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TURCK

CMTH...
Condition Monitoring Sensor

Instructions for Use

Contents

Contents

Hans Turck GmbH & Co. KG | T +49 208 4952-0 | F +49 208 4952-264 | more@turck.com | www.turck.com

1 About These Instructions

These operating instructions describe the structure, functions and the use of the product and will help you to operate the product as intended. Read these instructions carefully before using the product. This is to avoid possible damage to persons, property or the device. Retain the instructions for future use during the service life of the product. If the product is passed on, pass on these instructions as well.

1.1 Target groups

These instructions are aimed at qualified personal and must be carefully read by anyone mounting, commissioning, operating, maintaining, dismantling or disposing of the device.

1.2 Explanation of symbols used

The following symbols are used in these instructions:

	**DANGER** DANGER indicates a dangerous situation with high risk of death or severe injury if not avoided.
	**WARNING** WARNING indicates a dangerous situation with medium risk of death or severe injury if not avoided.
	**CAUTION** CAUTION indicates a dangerous situation of medium risk which may result in minor or moderate injury if not avoided.
	**NOTICE** NOTICE indicates a situation which may lead to property damage if not avoided.
	**NOTE** NOTE indicates tips, recommendations and useful information on specific actions and facts. The notes simplify your work and help you to avoid additional work.
▶	**CALL TO ACTION** This symbol denotes actions that the user must carry out.
⇨	**RESULTS OF ACTION** This symbol denotes relevant results of actions.

1.3 Other documents

Besides this document the following material can be found on the Internet at **www.turck.com**:

- Data sheet
- Commissioning manual IO-Link devices
- IO-Link parameters manual
- EU Declaration of Conformity

1.4 Feedback about these instructions

We make every effort to ensure that these instructions are as informative and as clear as possible. If you have any suggestions for improving the design or if some information is missing in the document, please send your suggestions to **techdoc@turck.com**.

2 Notes on the Product

2.1 Product identification

These instructions apply to the following condition monitoring sensors:

- CMTH1-M12-IOL6X2-H1141

2.2 Scope of delivery

- Condition monitoring sensor
- 2 fixing nuts

2.3 Legal requirements

The device is subject to the following EC directives:

- 2014/30/EU (electromagnetic compatibility)
- 2011/65/EU (RoHS Directive)

2.4 Turck Service

Turck supports you with your projects, from initial analysis to the commissioning of your application. The Turck product database under www.turck.com contains software tools for programming, configuration or commissioning, data sheets and CAD files in numerous export formats.

The contact details of Turck subsidiaries worldwide can be found on p. [▷ 20].

3 For Your Safety

The product is designed according to state-of-the-art technology. However, residual risks still exist. Observe the following warnings and safety notices to prevent damage to persons and property. Turck accepts no liability for damage caused by failure to observe these warning and safety notices.

3.1 Intended use

The condition monitoring sensors of the CMTH series monitor temperature and air humidity.

The process values are output by the device via IO-Link.

The devices are designed for condition monitoring or for predictive maintenance tasks.

The devices may only be used as described in these instructions. Any other use is not in accordance with the intended use. Turck accepts no liability for any resulting damage.

3.2 Obvious misuse

- The devices are not safety components and must not be used for personal or property protection.
- The devices are not suitable for continuous operation under water.

3.3 General safety instructions

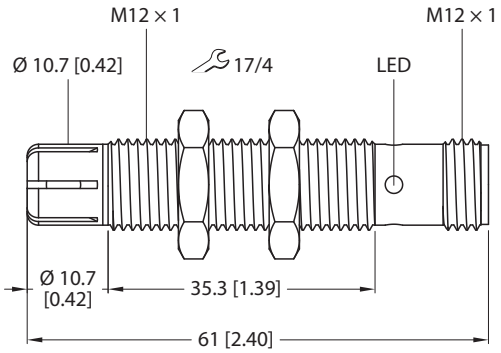
- The device may only be assembled, installed, operated, parameterized and maintained by professionally-trained personnel.
- The device may only be used in accordance with applicable national and international regulations, standards and laws.
- Only operate the device within the limits stated in the technical specifications.

4 Product Description

The condition monitoring sensors of the CMTH… series are provided with a metal housing with an M12 male thread and an aluminium front cap. The active face can be installed in any position in the surrounding area.

The device has two outputs which can be set independently of each other. The temperature value is provided at output 1 and the humidity value at output 2. Temperature and air humidity are measured and output simultaneously.

4.1 Device overview



mm [Inch]

Fig. 1: Dimensions

4.1.1 Indication elements

The devices are provided with a green and a yellow status LED.

4.2 Properties and features

- Sensor for condition monitoring
- Accurate temperature and air humidity measurement
- Sensor-2-cloud compatible
- DC 4-wire, 18…30 VDC
- Male connector, M12 × 1
- Configuration and communication via IO-Link V1.1
- Continuous process values for temperature and air humidity
- Limit value monitoring of preset values in the SIO mode
- Temperature monitoring with settable limits
- Air humidity monitoring with settable limits
- Operating hours counter for other analysis options

4.3 Operating principle

Condition monitoring sensors are designed for use in plant sections where the ambient conditions significantly affect machine availability or process quality. The monitoring of temperature or air humidity makes it possible to detect deviations early on and introduce counter measures. The process value is transferred to the controller via IO-Link for monitoring. It is also possible to use switching bits to signal limit value violations for specific applications.

4.4 Functions and operating modes

The sensors monitor temperature and air humidity in condition monitoring applications. The device outputs a continuous process value for both variables via IO-Link. Two limit value pairs can also be defined (window function) for each detected variable. The overshooting or undershooting of the defined limit value is indicated via a bit in the IO-Link process data.

In operation without IO-Link communication output 1 supplies the temperature value and output 2 the humidity value. A switch window can be set for each of these two outputs. The switching output is set if one of the limit values was reached.

4.4.1 IO-Link mode

The devices must be connected to an IO-Link master for operation in IO-Link mode. If the port is configured in IOL mode, bidirectional IO-Link communication is provided between the IO-Link master and the device. For this the device is integrated in the controller level via an IO-Link master. The communication parameters are exchanged first of all; the cyclic data exchange of the process data (process data objects) then starts.

4.4.2 SIO mode (standard I/O mode)

In standard I/O mode no IO-Link communication takes place between the device and the master. The device only transfers the switching state of its binary outputs and can also be run via a fieldbus device or controller with digital PNP or NPN inputs. An IO-Link master is not required for operation.

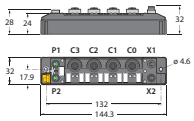
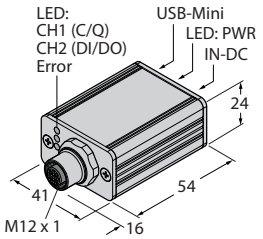
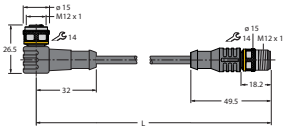
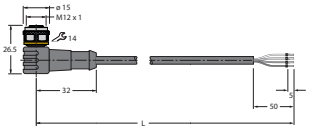
The device parameters can be set via IO-Link and then operated at the digital inputs with the appropriate settings in SIO mode. Not all functions and properties of the device can be used in SIO mode.

4.4.3 Window function

The window function is used to teach a switching range in which the switching output takes on a defined switching state. The switching range is defined by an upper and lower limit value.

The limit values for output 1 (temperature) and output 2 (air humidity) can be set independently of each other.

4.5 Technical accessories

Figure	Type	Description
	TBEN-S2-4IOL	Compact multiprotocol I/O module for Ethernet, 4 IO-Link master channels, 4 universal digital PNP channels, 0.5 A, channel diagnostics
	USB-2-IOL-0002	IO-Link adapter V1.1 with integrated USB interface
	WKC4.4T-2-RSC4.4T/TXL	Connection cable, M12 female connector, angled to M12 connector, straight, 4-pin, cable length: 2 m, sheathing material: PUR, black; cULus approval
	WKC4.4T-2/TXL	Connection cable, M12 female connector, angled, 4-pin, cable length: 2 m, sheathing material: PUR, black; cULus approval

In addition to the above connection cables,Turck also offers other cable types for specific applications with the correct terminals for the device. More information on this is available from the Turck product database at **https://www.turck.de/products** in the Connectivity area.

5 Installing

The sensors can be installed in any position. The maximum tightening torque of the housing nuts is 7 Nm.

- Clean the mounting surface and the surrounding area.
- Install the sensor in a fixture (mounting bracket or fixing clamp) if necessary.
- Install the sensor or the mounting fixture at the intended location. Observe the minimum mounting distances.
- To ensure proper air convection, do not cover the front cap.

6 Connection

- Connect the female connector of the connection cable to the male connector of the sensor.
- Connect the open end of the connection cable to the power supply and/or processing units.

6.1 Wiring diagrams

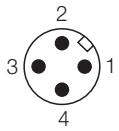


Fig. 2: Pin assignment

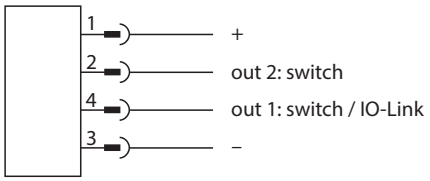


Fig. 3: Wiring diagram

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7 Commissioning

After connecting and switching on the power supply, the device is automatically ready for operation.

8 Operation

8.1 LEDs

LED indication	Meaning
Flashing green (1 s on, 0.1 s off)	IO-Link communication
Green	Device is operational SIO mode: No switching output active
Yellow	SIO mode: Switching output active
Flashing green/yellow	SIO mode, short circuit at one output

8.2 Operation when the sensor tip is wet with water

If the sensor tip is surrounded by water, the device indicates an air humidity of 100 %. The water on the measuring element evaporates as soon as the sensor tip is no longer fully surrounded by water. During evaporation, the remaining water on the sensor element has an effect on the measured values for air humidity and temperature.

Once dried, the device outputs process values that are not affected by the water. The time required for evaporation depends on the ambient conditions. Evaporation can take up to 40 minutes at room temperature.

9 Setting and Parameterization

9.1 Setting via IO-Link

The device can be parameterized within the technical specifications (see data sheet) via the IO-Link communication interface – both offline, e.g. with the configuration tool as well as also online via the controller. An overview of the different functions and properties that can be set and used for IO-Link mode can be found in the chapter “Setting” and in the IO-Link parameter manual of the device. Detailed instructions on the parameterization of devices via the IO-Link interface are provided in the IO-Link commissioning manual.

All the parameters can changed in IO-Link mode via the controller during commissioning as well as during operation.

9.2 Settable functions and properties

The following functions and properties can be set and used via the IO-Link interface:

- Switching limits for the window function
- Output configuration
- On/off switching of outputs

10 Troubleshooting

If the device does not function as expected, first check whether ambient interference is present. If there is no ambient interference present, check the connections of the device for faults.

If there are no faults, there is a device malfunction. In this case, decommission the device and replace it with a new device of the same type.

11 Maintenance

The device is maintenance-free. Clean with a damp cloth if required.

12 Repair

The device must not be repaired by the user. The device must be decommissioned if it is faulty. Observe our return acceptance conditions when returning the device to Turck.

12.1 Returning devices

Returns to Turck can only be accepted if the device has been equipped with a Decontamination declaration enclosed. The decontamination declaration can be downloaded from
https://www.turck.de/en/retoure-service-6079.php
and must be completely filled in, and affixed securely and weather-proof to the outside of the packaging.

13 Disposal

The devices must be disposed of correctly and must not be included in general household garbage.

14 Technical Data

Technical data	
Type	CMTH1-M12-IOL6X2-H1141
Ident-No.	100027532
General data	
Function	Temperature/air humidity sensor
Temperature measuring range	-25…+85 °C
Accuracy	±0.8°C
Resolution	0.1 K
Air humidity measuring range	0…100 % rH
Accuracy	±4.5 % rH (10…90 % rH) ±7 % rH (0…10 % rF/90…100 % rH)
Resolution	1 % rH
Electrical data	
Operating voltage	18…30 VDC
Ripple	< 10 % U_{ss}
DC rated operational current	≤ 150 mA
No-load current	≤ 24 mA
Short-circuit protection	Yes/cyclic
Reverse polarity protection	Yes
Output function	Programmable, IO-Link, SIO mode
Output 2	Switching output
Max. load current I_o	0.05 A
Response time	Min. 8 s
Setting option	IO-Link
IO-Link	
IO-Link specification	V1.1
IO-Link port type	Class A
Communication mode	COM 2 (38.4 Kbaud)
Process data width	32 bit
Measured value information	24 bit
Switching point information	8 bit
Frame type	2.2
Minimum cycle time	35.2ms
Function Pin 4	IO-Link
Function Pin 2	DI
Maximum cable length	20 m
Mechanical data	
Design	Cylindrical/threaded, M12
Dimensions	Ø 12 × 61 mm
Housing material	Metal, AL, CuZN, chrome-plated
Electrical connection	Male connector, M12 × 1
Ambient temperature	-25…+85 °C

Technical data	
Storage temperature	-40…+85 °C
Protection type	IP67
Operating voltage indication	LED, green
Tests and approvals	
Vibration resistance	IEC 60060-2-6: (10-150 Hz) 20 g
Shock testing	IEC 60068-2-27: 30 g (11 ms)
Approvals	CE

15 Turck Subsidiaries - Contact Information

Germany	Hans Turck GmbH & Co. KG Witzlebenstraße 7, 45472 Mülheim an der Ruhr **www.turck.de**
Australia	Turck Australia Pty Ltd Building 4, 19-25 Duerdin Street, Notting Hill, 3168 Victoria **www.turck.com.au**
Belgium	TURCK MULTIPROX Lion d'Orweg 12, B-9300 Aalst **www.multiprox.be**
Brazil	Turck do Brasil Automação Ltda. Rua Anjo Custódio Nr. 42, Jardim Anália Franco, CEP 03358-040 São Paulo **www.turck.com.br**
China	Turck (Tianjin) Sensor Co. Ltd. 18,4th Xinghuazhi Road, Xiqing Economic Development Area, 300381 Tianjin **www.turck.com.cn**
France	TURCK BANNER S.A.S. 11 rue de Courtalin Bat C, Magny Le Hongre, F-77703 MARNE LA VALLEE Cedex 4 **www.turckbanner.fr**
Great Britain	TURCK BANNER LIMITED Blenheim House, Hurricane Way, GB-SS11 8YT Wickford, Essex **www.turckbanner.co.uk**
India	TURCK India Automation Pvt. Ltd. 401-403 Aurum Avenue, Survey. No 109 /4, Near Cummins Complex, Baner-Balewadi Link Rd., 411045 Pune - Maharashtra **www.turck.co.in**
Italy	TURCK BANNER S.R.L. Via San Domenico 5, IT-20008 Bareggio (MI) **www.turckbanner.it**
Japan	TURCK Japan Corporation Syuuhou Bldg. 6F, 2-13-12, Kanda-Sudacho, Chiyoda-ku, 101-0041 Tokyo **www.turck.jp**
Canada	Turck Canada Inc. 140 Duffield Drive, CDN-Markham, Ontario L6G 1B5 **www.turck.ca**
Korea	Turck Korea Co, Ltd. B-509 Gwangmyeong Technopark, 60 Haan-ro, Gwangmyeong-si, 14322 Gyeonggi-Do **www.turck.kr**
Malaysia	Turck Banner Malaysia Sdn Bhd Unit A-23A-08, Tower A, Pinnacle Petaling Jaya, Jalan Utara C, 46200 Petaling Jaya Selangor **www.turckbanner.my**

Mexico	Turck Comercial, S. de RL de CV Blvd. Campestre No. 100, Parque Industrial SERVER, C.P. 25350 Arteaga, Coahuila **www.turck.com.mx**
Netherlands	Turck B. V. Postbus 297, NL-8000 AG Zwolle **www.turck.nl**
Austria	Turck GmbH Graumanngasse 7/A5-1, A-1150 Wien **www.turck.at**
Poland	TURCK sp.z.o.o. Wroclawska 115, PL-45-836 Opole **www.turck.pl**
Romania	Turck Automation Romania SRL Str. Siriului nr. 6-8, Sector 1, RO-014354 Bucuresti **www.turck.ro**
Russian Federation	TURCK RUS OOO 2-nd Pryadilnaya Street, 1, 105037 Moscow **www.turck.ru**
Sweden	Turck Sweden Office Fabriksstråket 9, 433 76 Jonsered **www.turck.se**
Singapore	TURCK BANNER Singapore Pte. Ltd. 25 International Business Park, #04-75/77 (West Wing) German Centre, 609916 Singapore **www.turckbanner.sg**
South Africa	Turck Banner (Pty) Ltd Boeing Road East, Bedfordview, ZA-2007 Johannesburg **www.turckbanner.co.za**
Czech Republic	TURCK s.r.o. Na Brne 2065, CZ-500 06 Hradec Králové **www.turck.cz**
Turkey	Turck Otomasyon Ticaret Limited Sirketi Inönü mah. Kayisdagi c., Yesil Konak Evleri No: 178, A Blok D:4, 34755 Kadiköy/ Istanbul **www.turck.com.tr**
Hungary	TURCK Hungary kft. Árpád fejedelem útja 26-28., Óbuda Gate, 2. em., H-1023 Budapest **www.turck.hu**
USA	Turck Inc. 3000 Campus Drive, USA-MN 55441 Minneapolis **www.turck.us**

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