



Instruction Manual

DTH05

***Calorimetric Flow Sensor
for Low Flow Values***



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Table of Contents

Safety Information.....	2
Functional Description.....	3
Characteristic Curves.....	4
Installation.....	5
Electrical Connection.....	5
Programming.....	6
MIN / MAX Switches.....	7

Safety Information

General Instructions

To ensure safe operation, the device should only be operated according to the specifications in the instruction manual. The requisite Health & Safety regulations for a given application must also be observed. This statement also applies to the use of accessories. Every person who is commissioned with the initiation or operation of this device must have read and understood the operating instructions and in particular the safety instructions!

The liability of the manufacturer expires in the event of damage due to improper use, non-observance of this operating manual, use of insufficiently qualified personnel and unauthorized modification of the device.

Proper Usage

The flow meters of the DTH08 series are used for the reliable measurement of low flow rates of aqueous media which do not attack the materials used. All other usage is regarded as being improper and outside the scope of the device.

In particular, applications in which shock loads occur (for example, pulsed operation) should be discussed and checked in advance with our technical staff.

The series DS10 flow meter devices should not be deployed as the sole agents to prevent dangerous conditions occurring in plant or machinery. Machinery and plant need to be designed in such a manner that faulty conditions and malfunctions do not arise that could pose a safety risk for operators.

Dangerous substances

For dangerous media such as e.g. Oxygen, Acetylene, flammable or toxic substances as well as refrigeration systems, compressors, etc. must comply with the relevant regulations beyond the general rules.

Qualified Personnel

The DTH08 devices may only be installed by trained, qualified personnel who are able to mount the devices correctly. Qualified personnel are persons, who are familiar with assembling, installation, placing in service and operating these devices and who are suitably trained and qualified.

Inward Monitoring

Please check directly after delivery the device for any transport damages and deficiencies. Additional with reference to the accompanying delivery note the number of parts must be checked.

Claims for replacement or goods which relate to transport damage can only be considered valid if the delivery company is notified without delay.


Functional Description

The DTH08 flow sensor monitors fluid media. Its compact form combines the measurement tube and converter / counter which, depending on the model, trigger an adjustable limit value with transistor output or an analogue output (4..20 mA or 0..10 V) or both.

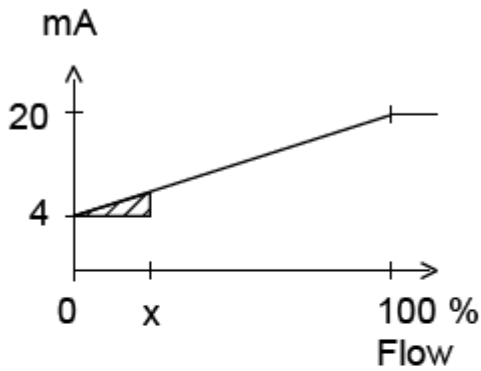
In addition, the limit switch can alternatively be replaced by a frequency output. The converter / counter record two process parameters: the flow speed of the medium and its temperature. Both parameters can be assigned to the analogue output or to the switching output.

Characteristic Curves

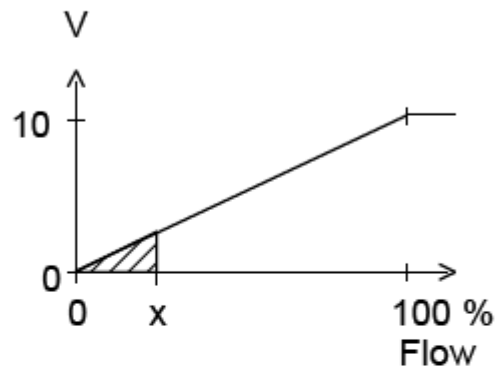
Value x = Begin of the specified range

 = not specified range

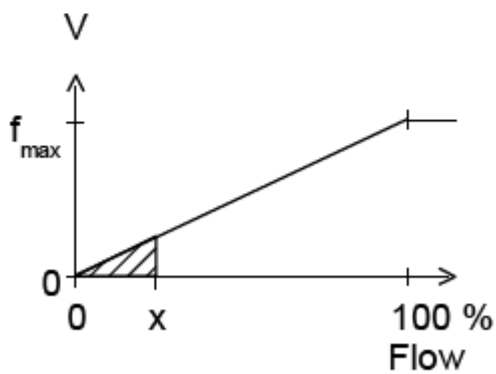
Current output



Voltage output



Frequency output



f_{\max} selectable in the range of up to 2000 Hz

Installation

- In order to ensure the sensor's maximum insensitivity to interference, the flow should run from bottom to top (best degassing even at the slowest flow speed).
- Standard crimp connectors can be used for the connection.
- The insulation hoses offer the best possible insulation against the surroundings, and must therefore not be removed.
- There is a marking on the rear of the housing. The sensor should be fixed there using a sheet metal screw. The penetration depth of the screw must not exceed 5 mm.
- The piping must not be bent or deformed. When testing, use only hoses, because the transmitter can no longer be returned if the connection pieces have been crimped.

Electrical Connection

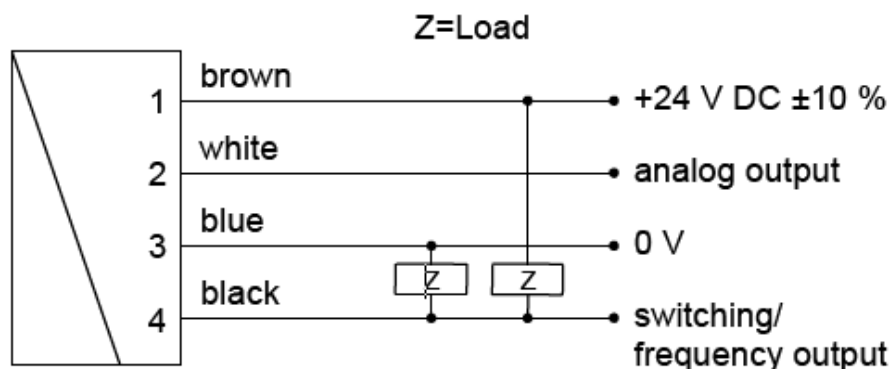
Attention:

Before the electrical connection of the device, it must be ensured that the supply voltage corresponds to the required one and that the supply voltage is switched off.

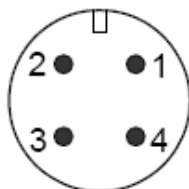
It is recommended to use shielded cables.

Cable length < 30 m

Supply lines < 10 m



Connection example: PNP NPN



Programming

Depending on the version, the switching point, the analog output or the frequency output can be determined as described below.

The electronics contain a magnetic contact, with the aid of which different parameters can be programmed. Programming takes place when a magnet clip is applied for a period between 0.5 and 2 seconds to the marking located on the label. If the contact time is longer or shorter than this, no programming takes place (protection against external magnetic fields).



- After the programming ("teaching"), the clip can either be left on the device, or removed to protect data.
- The device has a yellow LED which flashes during the programming pulse. During operation, the LED serves as a status display for the switching output.

Example:

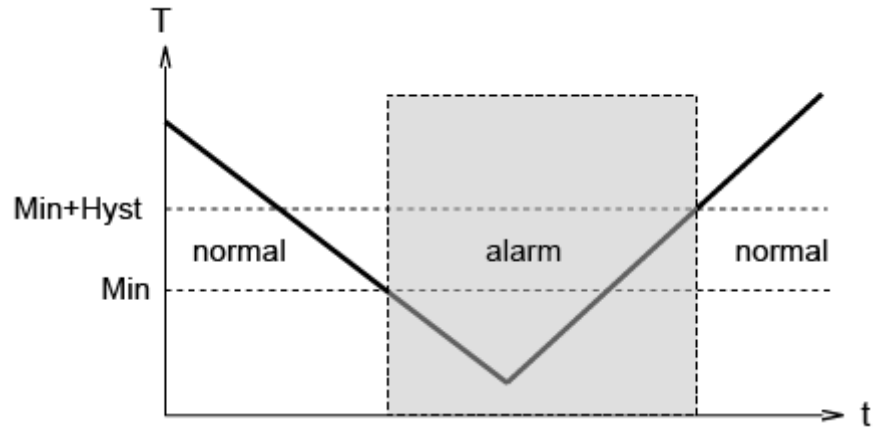
The switching value is to be set to 70 % of the metering range, because at this flow rate a critical process status is to be notified. However, only 50% can be achieved without danger.

In this case, the device would be ordered with a "teach-offset" of +20 %. At 50 % in the process, a switching value of 70 % would then be stored during "teaching".

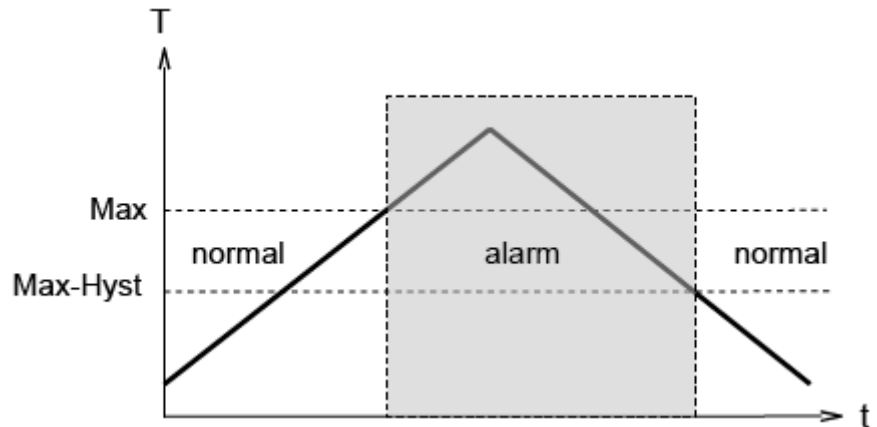
The limit switch can be used to monitor minimal or maximal. With a minimum-switch, falling below the limit value causes a switchover to the alarm state. Return to the normal state occurs when the limit value plus the set hysteresis is again exceeded.

MIN / MAX Switches

With a **minimum-switch**, falling below the limit value causes a switchover to the alarm state. Return to the normal state occurs when the limit value plus the set hysteresis is again exceeded.

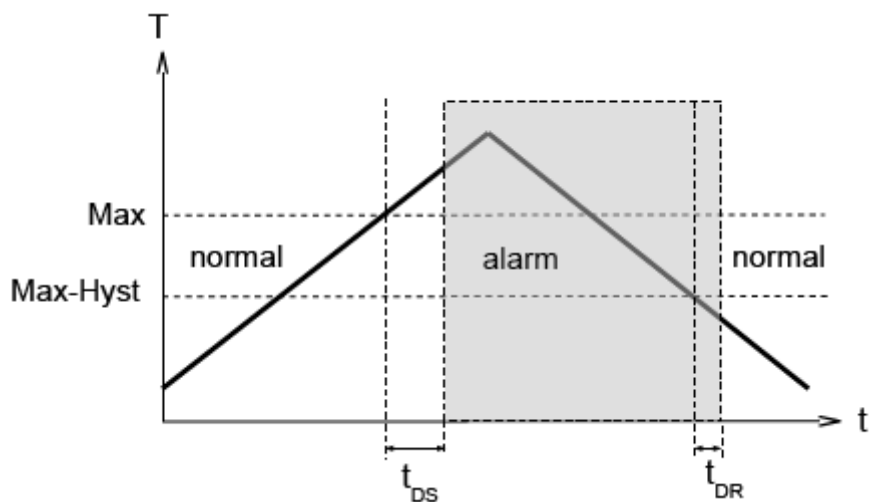


With a **maximum-switch**, exceeding the limit value causes a switchover to the alarm state. Return to the normal state occurs when the measured value once more falls below the limit value minus the set hysteresis.

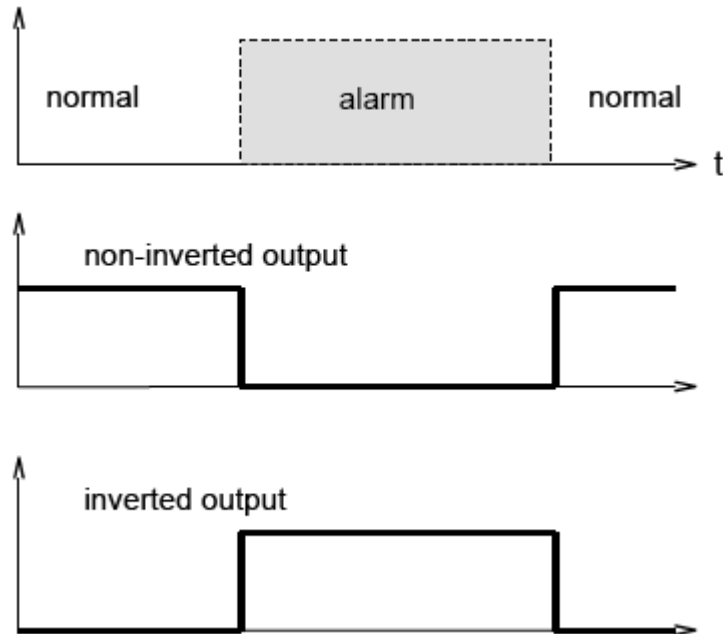


A switchover **delay time** (t_{DS}) can be applied to the switchover to the alarm state. Equally, one switch-back delay time (t_{DR}) of several can be applied to switching back to the normal state.

In the normal state the integrated LED is on, in the alarm state it is off, and this corresponds to its status when there is no supply voltage.



In the non-inverted (standard) model, while in the normal state the switching output is at the level of the supply voltage; in the alarm state it is at 0 V, so that a wire break would also display as an alarm state at the signal receiver. Optionally, an inverted switching output can also be provided, i.e. in the normal state the output is at 0 V, and in the alarm state it is at the level of the supply voltage.



DTH08

Calorimetric Flowmeter for Low Flows

- **measuring range from 0,001...2 l/min, 0,025...5 l/min, 0,05...10 l/min**
- **wetted parts made of stainless steel 1.4571**
- **no moving parts**
- **low pressure loss**
- **easy handling**
- **max. pressure: 10 bar**
- **max. temperature: 70 °C**



Description:

The calorimetric flow meter DTH08 is used for measurement and monitoring of liquid media. Due to its compact design it can be used for many applications. Depending on the version, the instrument can be equipped with an analogue output (4...20 mA or 0...10 V) and a switching output or a frequency output. The evaluation electronics records the flow velocity and temperature of the medium. Both parameters can be assigned to the analogue output or the switching output (see table 1).

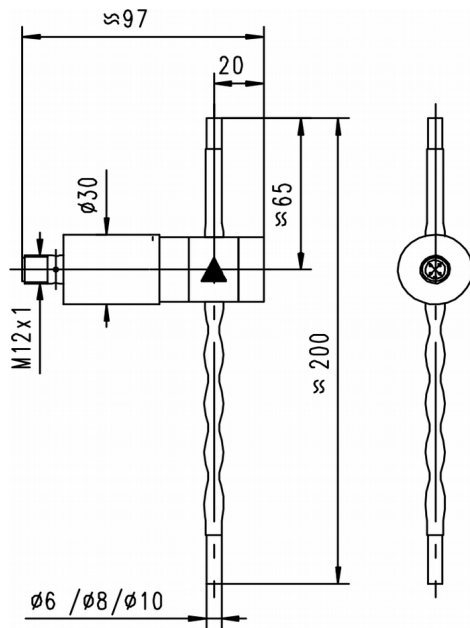
Typical applications:

The devices of the series DTH08 are used for cost-effective measurement and monitoring of flows of aqueous media. Due to their low flow resistance and their insensitivity to contamination by solids, they offer a very good alternative to conventional flow meters.

Output Combinations (table 1):

code	flow rate		temperature	
	analogue	switch output/ frequency output	analogue	switch output// frequency output
1	x			
2		x		
3	x	x		
4	x			x
5		x	x	

Dimensions:



Electrical Data:

Power supply:	24 VDC \pm 10 %
Power consumption:	max. 100 mA (150 mA peak)
Switched output:	transistor output „push pull“ (short-circuit and reverse polarity proof) $I_{out} = 100$ mA max.
Switching hysteresis:	flow rate 1 % FS temperature ca. 1 °C
Analogue output:	4...20 mA load 500 Ohm max. or 0...10 V / load, min. 1 KOhm

Technical Data:

Process connection:	pipe connection with \varnothing 6/8/10 mm for compression fitting
Max. pressure:	10 bar (other on request)
Max. medium temp.:	0...70 °C
Temperature gradient:	4 °C/s
Accuracy:	\pm 5 % of m.V.
Pressure loss:	max. 0,3 bar with maximum flow
Connection:	plug, 4-pole acc. to DIN
Protection class:	IP40

Order Code:

Order number: DTH08. 1. 1. 1. 0. 1. 0

Calorimetric flowmeter for low flows

Measuring range:

1 = 0,001–2 l/min, diameter = 6 mm
2 = 0,025–5 l/min, diameter = 8 mm
3 = 0,05–10 l/min, diameter = 10 mm
S = special measuring range

Analogue- or switch output combinations (see table 1):

1 = analogue output for flows
2 = switch output or frequency output for flows
3 = analogue and switch output or frequency output for flows
4 = analogue output for flows and switch output or frequency output for temperature
5 = switch output or frequency output for flows and analogue output for temperature

Analogue output:

0 = no analogue output
1 = 4...20 mA standard
2 = 4...20 mA inverted
3 = 0...10 V standard
4 = 0...10 V inverted

Switching signal

0 = no switch output
1 = minimum switch point
2 = maximum switch point
3 = frequency output, max. 2000 Hz

Electrical connection:

1 = plug connection M12 x 1, 4-pin

Options:

0 = without
9 = please specify in plain text

Accessory:



Order code: SM12. 4. 2. G. 0

M12-plug with PVC cable

Number of poles:

4 = 4-pole

Cable length:

0 = without cable for self assembly
2 = 2 m PVC cable (standard)
5 = 5 m PVC cable
10 = 10 m PVC cable

Construction:

G = straight
W = angled

Option:

0 = without
9 = please specify in writing