

Flow, calorimetry - Hygienic Design



Characteristics

System	Calorimetric flow sensors
Evaluation	Displays Switching Measuring
Process connection	GHMadapt G 1/2
Process pressure	PN 50
Temperature	-20..+140°C
Materials	1.4404, 1.4435 only one material in contact with the medium

Applications

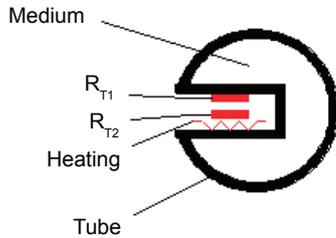
- Food and drink industries
- Pharmaceutical industry
- Flow switching
- Dry-run protection

Product information

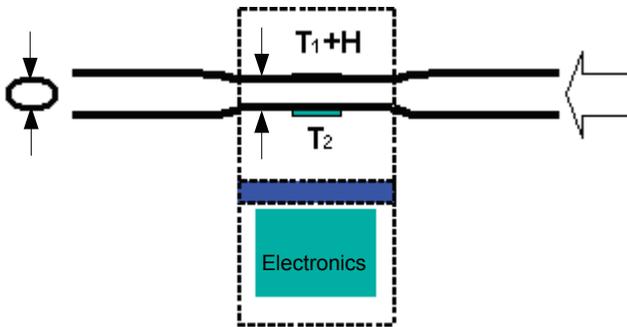
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Function and benefits

The calorimetric principle of the flow transmitter / switch from HONSBERG is based on two temperature sensors, both in good heat-conducting contact with the medium with simultaneously good heat insulation from one another.



Plug-in sensor construction principle



Inline sensor construction principle

One of the sensors is heated to a constant ΔT to the unheated sensor, so that a constant temperature difference between the two temperature sensors is set while the medium being measured is at a standstill. If the medium being measured moves, the thermal energy is extracted from heated temperature sensor and is immediately returned through a regulation until the same difference is provided. The energy required to do so is proportional to the current mass flow of the medium being measured.

In the process, the unheated temperature sensor detects the medium temperature and thereby enables a temperature compensation. In doing so, the flow is even correctly detected in the event of fluctuations of the medium temperature.

Different media influence the response time, because they have different heat conductivity. In general, the following rule applies: the lower the heat conductivity of the medium, the greater the medium flow must be in order to be detected.

With operation of the calorimetric measurement and monitoring principle, the state of the test medium as well as the medium temperature in relation to the desired measurement results play a crucial role. The present standard devices are designed and calibrated for the following parameters: Medium: water, temperature range 0 ..85 °C.

With a deviating medium consistence, e.g. viscosity or air and gases or enduring temperatures of more than 85 °C or less than 0 °C, we recommend leaving the device configuration according to the individual recommendation of the manufacturer.

Explanation of terms

Temperature gradient = temperature change per time unit of the medium (K/s). With volatile changes of the medium temperature, compensation can only be made within a specific range. The range in which fault-free operation is guaranteed is specified. If this temperature is exceeded by the medium, an error message may be issued by the system for a brief time. On such message can, of course be suppressed by switching delays, however, the switch-on and switch-off time of the system in general will be altered.

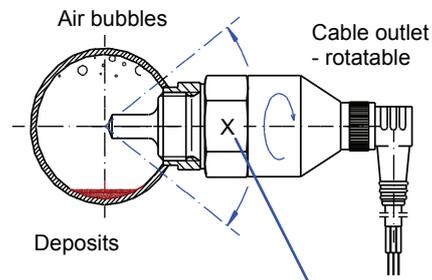
Start-up time is the time in which the device reaches its specified operating mode after operating voltage is applied. After they are switched on, the displays and outputs initially go to the maximum value of the metering range. After approximately three seconds, the current measurement is displayed and output.

Switch-on and switch-off time is the time in which the regular measurement parameter is detected after a volatile increase or drop of the flow speed. With a medium temperature of approximately 25 °C and a stainless steel sensor in water as a medium, there is an average switch-on and switch-off time of approximately two seconds. Please observe that this time depends on the operating conditions. With media with poor thermal conductivity or poor sensor materials, slower switching times arise.

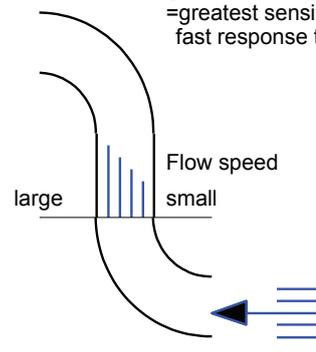
Temperature range of the medium is the range in which the calorimetric sensor functions faultlessly.

General installation instructions

As a basic principle, any installation location and position in which the "nose" of the sensor completely protrudes into the flowing media is suitable (see diagram). If the sensor is used for the detection of filled or non-filled pipes, of course this does not apply!



marking X in the flow direction
 =greatest sensitivity and fast response time



Product information

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Programmability of parameters

All calorimetric sensors from HONSBURG are a part of the family of intelligent sensors. They have a microcontroller which enables a multitude of parameter changes. By standard, all three main electronics have the capability of making local changes. In addition, an interface (device configurator ECI-1) can be used to change all saved parameters of a device at any time, if desired or necessary.

HFK12



Pulse programming on pin 2:
 Apply the supply voltage level for one second and save the current value as the full scale value (for analog outputs) or as a switching value (for limit switches).

HFK35



Programming with Magnet-Ring:
 With the aid of the display and of the movable ring, numerous parameters can be conveniently set on the spot.

HFK30



Programming with Magnet-Clip:
 Hold the magnet to the marking for 1 second and save the present value as the full scale value (for analog outputs) or as a switching value (for limit switches).

ECI-1



If required, all parameters can be set at any time on all intelligent sensors, using the ECI-1 device configurator.

Universal switching outputs

The push-pull transistor outputs enable the simplest installation. Therefore, they can be installed like an NPN or like a PNP switch and function accordingly without requiring additional configuration with the parameter settings and without wire breaks or the like.

You are assured a resistance to short circuits and pole reversal and an overload or short circuit is also shown in the display with HFK35 electronics.

Product family

Calorimetric sensors can also be used as:

- Limit status sensors
- Drip sensors
- Temperature sensors
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For this purpose, see the separate product information.

The same operation and the same or a similar installation type are the benefits of a product family.