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Calorimetric Flow Switch HFK12-S

- **Calorimetric flow switch for the foodstuffs industry in 12 mm housing**
- **User-configurable via plug pin (teaching)**
- **Same mechanical construction available as temperature transmitter/switch, as level switch, or as drip sensor**

Characteristics

The sensors of the HFK12 family can be used for measuring and monitoring flows in aqueous fluid media. They provide multiple configuration options combined with low space requirements. The mechanical construction makes them suitable for use in the foodstuffs industry.

The electronics of the HFK12 are a flexibly configurable limit switch.

The switching value can be set by the user via teaching (see Handling and Operation). All other values have been preset at the factory, but can be modified by the user with the aid of the optionally available ECI-1 device configurator and a PC.

The adjustable parameters are:

- Switching value
- Hysteresis
- Minimum/maximum monitoring
- Switching delay
- Switchback delay
- Power-On delay
- Teach-Offset

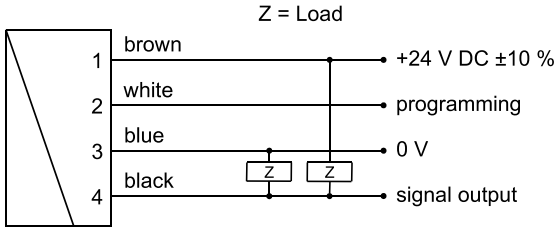
It is recommended also to order a T-piece, as the later installation position corresponds to the factory calibration situation.

Technical data

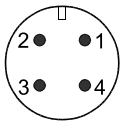
Sensor	calorimetric measurement principle
Process connection	GHM*adapt* G $^1/_2$
Metering range	water 2..150 cm/s range, 2..300 cm/s available on request, oil (available on request)
Measurement accuracy	±10 % end value, tested with 10 x D in inlet and output, with a rising pipe (medium: water)
Repeatability	±1 %
Temperature gradient	4 K/s
Start-up time	10 sec. after application of operating voltage
Response time	in water (25 °C) at average flow speed of approx. 1-2 sec.

Process pressure	PN 50	
Media temperature	0..+85 °C	
Ambient temperature	0..+60 °C	
Storage temperature	-20..+80 °C	
CIP/ SIP temperature	140 °C, 30 minutes max.	
Materials medium-contact	sensor tip	1.4435, FDA-compliant
Materials non-medium-contact	Housing:	1.4571
	Pressure screw:	1.4404
	Plug:	PA
	Contacts:	gold-plated
Supply voltage	24 V DC ±10 %	
Current consumption at rest	< 60 mA	
Switching output	transistor output "push-pull", compatible with PNP and NPN, (resistant to short circuits and polarity reversal) I_{out} = 100 mA max.	
Electrical connection	for round plug connector M12x1, 4-pole	
Ingress protection	IP 67	
Weight	approx. 0.1 kg incl. pressure screw	
Conformity	CE, EHEDG	

Wiring

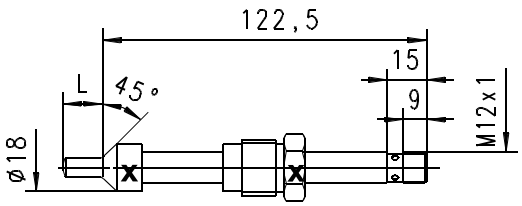


Connection example: PNP NPN



The use of shielded cabling is recommended!

Dimensions



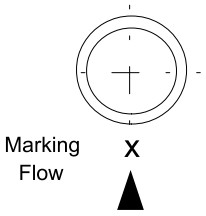
For T-pieces (recommended) and weld-on sockets in the GHM*adapt* series, see "Accessories".

Handling and operation

Installation

The sensor is inserted into the boring together with a sealing cone, oriented, and fastened in place with a pressure screw.

The flow should impinge on the side of the sensor marked with an X, in order to achieve as small a response time as possible.



The torque on the pressure screw should be between 5..10 Nm.

Avoid bubbles or deposits on the sensor. It is therefore best to install at the side.

Operation and programming

The switching value can be set by the user by means of teaching. For this, proceed as follows:

- The flow which is to be set is applied to the device.
- Apply an impulse of at least 0.5 seconds and max. 2 seconds duration to pin 2 (e.g. via a bridge to the auxiliary voltage or a pulse from the PLC), in order to accept the measured value.
- When the teaching is complete, pin 2 should be connected to 0 V, so as to prevent unintended programming.

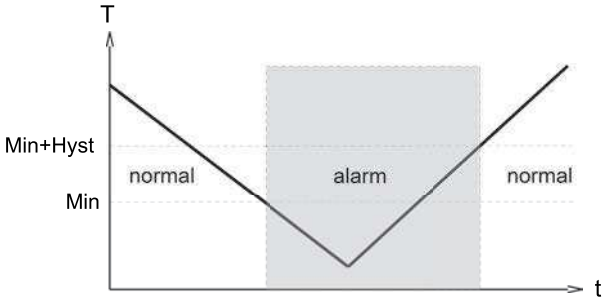
The device has a yellow LED which flashes during the programming pulse. During operation, the LED serves as a status display for the switching output.

In order to avoid the need to transit to an undesired operating status during the teach-in, the device can be provided ex-works with a teach-offset. The teach-offset point is added to the currently measured value before saving.

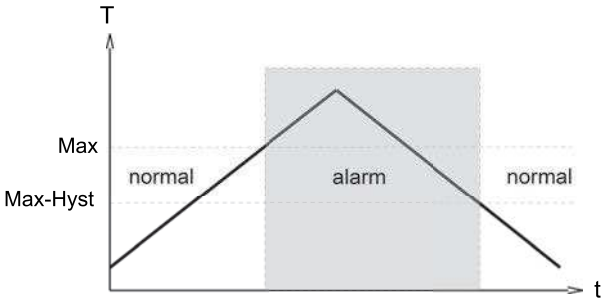
Example: The switching value is to be set to 80 cm/s, because at this flow rate a critical process status is to be notified. However, it is possible to reach only 60 cm/s without danger. In this case, the device would be ordered with a teach-offset of +20 cm/s. At 60 cm in the process, a switching value of 80 cm would then be stored during "teaching".

The HFK12-S limit switch can be used to monitor minimal or maximal.

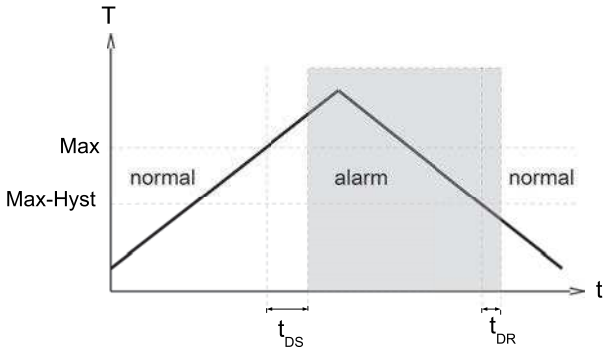
With a minimum-switch, falling below the limit value causes a switchover to the alarm state. Return to the normal state occurs when the limit value plus the set hysteresis is once more exceeded.



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.

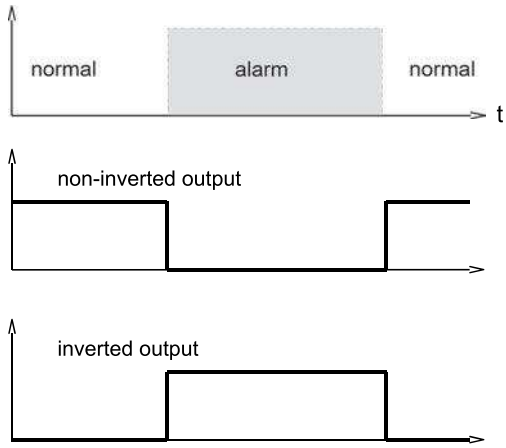


A switchover delay time (t_{DS}) can be applied to the switchover to the alarm state. Equally, one switch-back delay time (t_{DR}) of several can be applied to switching back to the normal state.



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 auxiliary voltage.

In the non-inverted (standard) version, while in the normal state the switching output is at the level of the auxiliary 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.



A Power-On-Delay function (ordered as a separate option) makes it possible to maintain the switching output in the normal state for a defined period after application of the supply voltage.

Ordering code

	1.	2.	3.	4.	5.	6.	7.
HFK12 -	S	015	K1				H

❍=Option

1.	**Limit switch**	
	S	transistor output "push-pull"
2.	**Sensor tip length**	
	015	L = 15 mm
3.	**Sensor material**	
	K1	stainless steel 1.4435
4.	**Programming**	
	N	cannot be programmed (no teaching)
	P ❍	programmable (teaching possible)
5.	**Function**	
	L	minimum-switch
	H	maximum-switch
6.	**Switching signal**	
	O	standard
	I ❍	inverted
7.	**Temperature**	
	H	CIP- / SIP version, 140 °C, 30 minutes max.

Options

Switching delay period (0.0..99.9 s) ___.___ s
(from Normal to Alarm)
Switch-back delay period (0.0..99.9 s) ___.___ s
(from Alarm to Normal)
Power-On-Delay period (0..99 s) ___ s
(After connecting the supply, time during which the switching output is not activated)
Switching output fixed at ___ cm/s

Switching hysteresis ___ %
Standard = 2 % of the metering range
Teach-offset ___ %
(in percent of the metering range)
Standard = 0 %

Accessories

- ECI-1 device configurator (USB programming adapter)
- Process adapter
- Cable/round plug connector (KH...)
  see additional information “Accessories”