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Flow Switch and Temperature Transmitter / Switch HFK30-FIN

- **Flow switch/transmitter for small flows in the foodstuffs industry**
- **Combination with temperature switch or transmitter possible**
- **No moving parts in the medium being measured**
- **Only one medium-contact material**
- **Simple to use**
- **Low pressure loss**
- **Various nominal widths**
- **Rapid response times for a calorimetric Sensor**
- **Linearised and temperature compensated**

Characteristics

The HFK30-FIN flow sensor monitors fluid media. Its compact form combines the measurement tube and converter / counter.
The integrated transducer has an analog output (4..20 mA or 0..10 V) and one switching output, which can be configured as a limit switch for monitoring minimal or maximal, or as a frequency output.
The switching output is designed as a push-pull driver, and can therefore be used both as a PNP or an NPN output. The state of the switching output is signalled with a yellow LED in the switching outlet; the LED has all-round visibility.
The sensor is configured in the factory, or alternatively this can be done with the aid of the optionally available ECI-3 device configurator (USB interface for PC). A selectable parameter can be modified on the device, with the aid of the magnet clip provided. In this case, the current measured value is saved as the parameter value. Examples of these parameters are the switching value or the metering range end value. The stainless steel electronics housing is rotatable, so it is possible to orient the cable outlet after installation.

The converter / counter record two process parameters: the flow speed of the medium and its temperature. Both parameters can be assigned to the analog output or to the switching output.

The following output combinations are available:

Flow		Temperature	
Analog	Switching output	Analog	Switching output
●			
	●		
●	●		
●			●
	●	●	

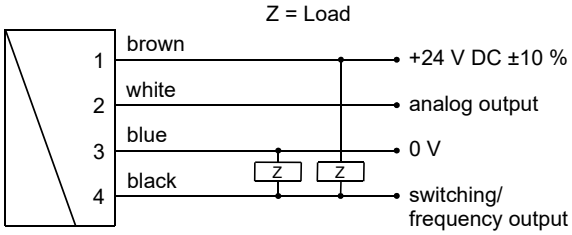
The switching output is a "push-pull" transistor output and provides PNP and NPN inputs equally. It can be offered as a minimum switch or a maximum switch, or as a frequency output.

Technical data

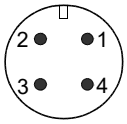
Sensor	calorimetric measurement principle
Process connection	smooth tube for crimp adapter or hose connection
Metering ranges (for water)	6 mm tube (0.001) 0.01..2 l/min 8 mm tube 0.025..5 l/min 10 mm tube 0.05..10 l/min () = special ranges available on request
Measurement accuracy	±3 % F.S. (H_2O dist.)
Repeatability	±1 % MW (H_2O dist.)
Temperature gradient	4 K/s
Start-up time	10 sec. after application of operating voltage
Response time	in water (25 °C) at an average flow speed of approx. 1-2 sec.
Process pressure	PN 10
Pressure loss	max. 0.3 bar at max. flow
Media temperature	0..+100 °C
Ambient temperature	-20..+70 °C
Storage temperature	-20..+80 °C
CIP- / SIP temperature	with spacer 140 °C, 30 minutes max.
Materials medium-contact	1.4404 (others available on request)
Materials, non-medium-contact	PPS, PA6.6, 1.4305
Power consumption	max. 2.5 W
Supply voltage	24 V DC ±10 %
Analog output	4..20 mA / Load 500 Ohm max. or 0..10 V / Load min. 1 kOhm
Electrical connection	for round plug connector M12x1, 4-pole
Current consumption	max. 100 mA
Switching output	transistor output "push-pull", compatible with PNP and NPN, (resistant to short circuits and polarity reversal) I_{out} = 100 mA max.
Switching hysteresis	flow 2 % of end value temperature: approx. 2 °C
Display (only with switching output)	yellow LED (On = OK / Off = Alarm)
Adjustment	by means of magnet

Ingress protection	IP 67
Weight	approx. 0.2 kg
Conformity	CE

Wiring

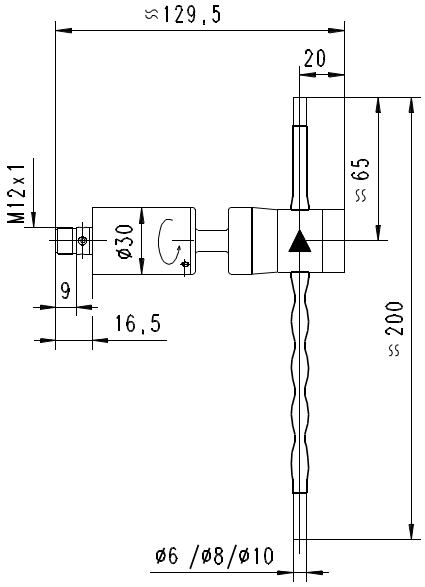


Connection example: PNP NPN



Dimensions

A spacer between the electronics head and the medium-contact measurement tube provides thermal decoupling between the two units. The media temperature may be raised for 45 min. to 130 °C.



Handling and operation

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, hoses with crush protection, or the crimp connectors provided by HONSBERG can be used for the connection.

The insulation hoses offer the best possible insulation against the surroundings, and must therefore not be removed.

Programming

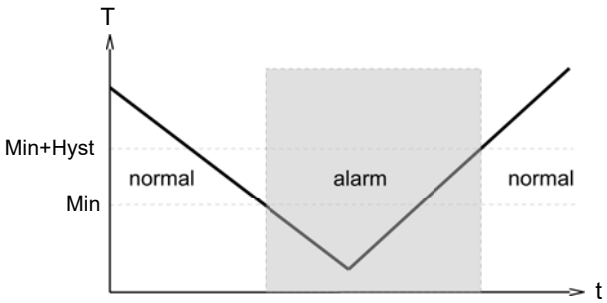
The electronics contain a magnetic contact, with the aid of which different parameters can be programmed. Programming takes place when a magnet clip is applied for a period between 0.5 and 2 seconds to the marking located on the label. If the contact time is longer or shorter than this, no programming 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. In order to avoid the need to transit to an undesired operating status during "teaching", the device can be provided ex-works with a "teach-offset". The "teach-offset" value is added to the currently measured value before saving (or is subtracted if a negative value is entered).

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".

Normally, programming is used to set the limit switch. However, if desired, other parameters such as the end value of the analog or frequency output may also be set.

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 once more exceeded.



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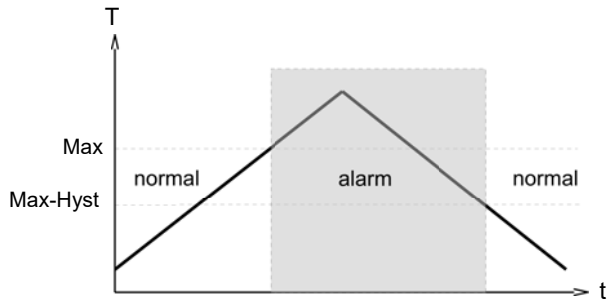
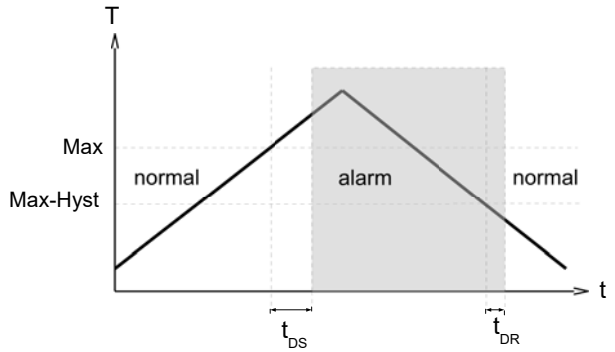
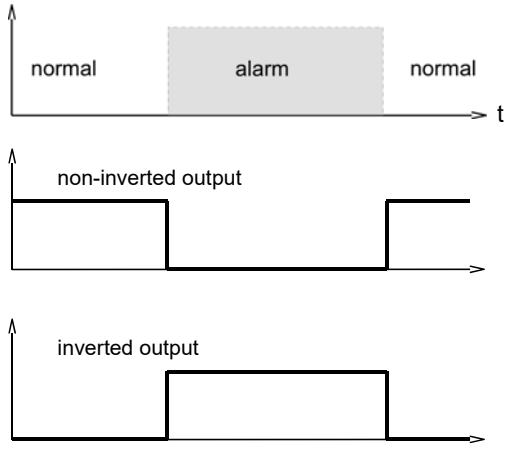
With a maximum-switch, exceeding the limit value causes a switchover to the alarm state. Return to the normal state occurs when the measured value once more falls below the limit value minus the set hysteresis.



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) version, 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.



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.	8.
HFK30-FIN	-		-		**K1**					

9.	10.	11.	12.
	H		

For combination option, see table "Technical data".
❍=Option

1.	**Tubing diameter**	
	006	6 mm
	008	8 mm
	010	10 mm
2.	**Metering range**	
	02000	(0.001) 0.01..2 l/min
	05000	0.025..5 l/min
	10000	0.05..10 l/min
3.	**Pipework material**	
	K1	stainless steel 1.4404
4.	**Analog output**	
	I	current output 4..20 mA
	U	voltage output 0..10 V
5.	**Measurement parameter to analog output**	
	F	flow rate to analog output
	T	temperature to analog output
6.	**Switching output**	
	T	transistor output "push-pull"
	M ❍	NPN (open collector)
7.	**Measurement parameter to switching output**	
	F	flow to switching output
	T	temperature to switching output
8.	**Functioning of the switching output**	
	L	minimum-switch
	H	maximum-switch
	R	frequency output
9.	**Switching signal**	
	O	standard
	I	inverted
10.	**Spacer**	
	H	CIP- / SIP version, 140 °C, 30 minutes max.
11.	**Options**	
	00	without option
12.	**Certificate DIN EN 10204 (indicate only when required, multiple responses possible)**	
	APZMAT	acceptance test certificate 3.1 for material (in contact with products)
	WZ2.2	factory certification 2.2

Options

Special measuring range for flow:
Metering range start value ☐☐☐☐☐ ml/min

Metering range end value ☐☐☐☐☐ ml/min

Special measuring range for tempe-rature:
Maximum 100 °C (standard = 70 °C) ☐☐☐ °C

Minimum -20 °C (standard = 0 °C) ☐☐☐ °C

Special range for analog output:
<= Metering range ☐☐☐ ml/min
(Standard = Metering range) °C

Special range for frequency output:
<= Metering range ☐☐☐ ml/min
(Standard = Metering range) °C

End frequency (max. 2000 Hz) ☐☐☐ Hz

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 ☐☐ s
(After connecting the supply, time during which the switching output is not activated)

Switching output fixed ☐☐☐ ml/min
°C
Special hysteresis ☐☐ %
(standard = 2 % EW)

Teach-offset ☐☐☐☐ %
(in percent of the metering range)
Standard = 0 %

If the field is not completed, the standard setting is selected automatically.

Accessories

- ECI-3 device configurator (USB programming adapter)
- Process adapter
- Cable/round plug connector (KH...)
  see additional information “Accessories”
- External display OMNI-TA or OMNI Remote