Flow Switch LABO-RT-S

- **Very short response time**
- **High precision**
- **No magnetic components in the flow space**
- **High pressure resistance**

Characteristics

A turbine acts as the primary sensor; its rotational speed is proportional to the flow rate. The rotational speed is detected by means of pre-tensioned Hall sensors, i.e. there are no magnets in the flow space.

The integrated converter / counter make available an electronic switching output (push-pull) with adjustable characteristics (minimum/maximum) and hysteresis, which responds when an adjustable limit is fallen short of or exceeded.
The switching value can be set to the currently existing flow using "teaching".

Models with analog or pulse output are also available.

Technical data

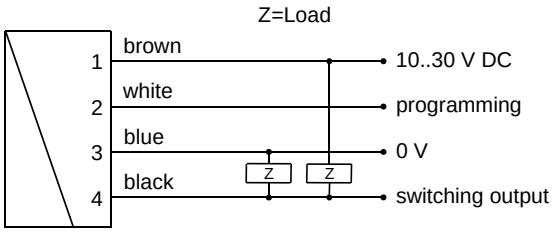
Sensor	turbine with biased Hall sensor	
Nominal width	DN 15..50	
Process connection	G $^1/_2$ A...G 2 A (others on request)	
Switching ranges	see table "Ranges"	
Measurement accuracy	±1 % of full scale value in the specified metering range including linearity and repeatability	
Pressure loss	0.3 bar at $Q_{max.}$	
Pressure resistance	PN 250 bar	
Medium temperature	-20..+85 °C optionally -20..+150 °C (for 8 bar min.)	
Ambient temperature	-20..+70 °C	
Storage temp.	-20..+80 °C	
Materials medium-contact	Housing Turbine Bearing	stainless steel 315 stainless steel 430 tungsten carbide
Material electronics housing	CW614N plated	
Max. particle size	0.5 mm	

Supply voltage	10..30 V DC
Power consumption	< 1 W (without load)
Switching output	transistor output "push-pull" (resistant to short circuits and polarity reversal) I_{out} = 100 mA max.
Display	yellow LED (On = Normal / Off = Alarm / rapid flashing = Programming)
Electrical connection	for round plug connector M12x1, 4-pole
Ingress protection	IP 67
Weight	see table "Dimensions"
Conformity	CE

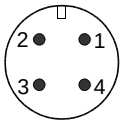
Ranges

Types	**Switching range (1..5 mm²/s)**	
	l/min	m³/h
RT-015AK001.	1.8.. 18	0.11.. 1.1
RT-020AK002.	3.7.. 37	0.22.. 2.2
RT-020AK004.	6.7.. 67	0.40.. 4.0
RT-020AK008.	13.3.. 133	0.80.. 8.0
RT-025AK016.	26.7.. 267	1.60.. 16.0
RT-040AK034.	56.7.. 567	3.40.. 34.0
RT-050AK068.	113.3..1133	6.80.. 68.0

Wiring



Connection example: PNP NPN

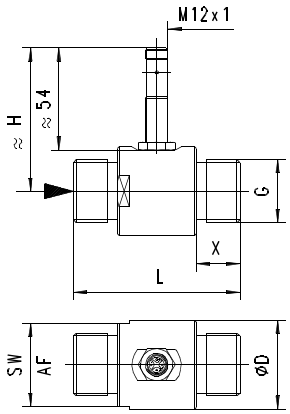


Before the electrical installation, it must be ensured that the supply voltage corresponds to the data sheet.

It is recommended to use shielded wiring.

The push-pull output) can as desired be switched as a PNP or an NPN output.

Dimensions



DN	G	ØD	SW / AF	H	L	X	Range m³/h at 1-5 mm² /s	Weight kg
15	1/2	38	35	69	64	19	0.11 – 1.1	0.32
20	3/4	38	35	70	64	19	0.22 – 2.2	0.42
20	3/4	38	35	70	64	19	0.40 – 4.0	0.42
20	3/4	40	38	73	83	22	0.80 – 8.0	0.42
25	1	47	44	76	88	23	1.60 – 16.0	0.63
40	1 1/2	60	52	82	114	28	3.40 – 34.0	1.42
50	2	70	64	87	132	29	6.80 – 68.0	1.92

Handling and operation

Installation

As with all flow meters, if possible the turbine should be installed ahead of a valve (on the pressure side). Good degassing should be ensured. 10 x D calming sections are recommended before and after the turbine in order to maintain the specified accuracies. The turbine should be filled with fluid at all times.
The electronics housing does not project into the flow space.

Note

The switching value can be programmed by the user via "teaching". If desired, programmability can be blocked by the manufacturer.

The ECI-1 device configurator with associated software is available as a convenient option for programming all parameters by PC, and for adjustment.

Operation and programming

The switching value is set as follows:

- Apply the flow rate to be set 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 supply 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.

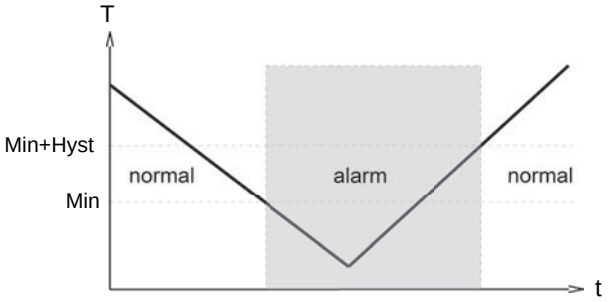
The device has a yellow LED which flashes during the programming pulse. During operation, the LED serves as a status display for the switching output.

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. The offset point can be positive or negative.

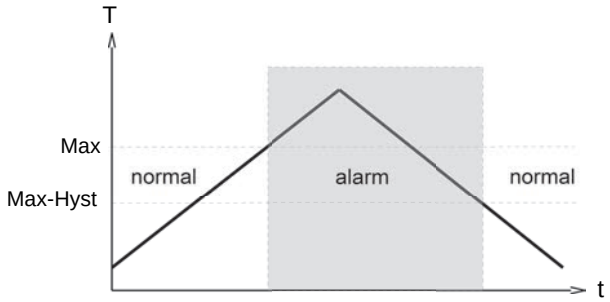
Example: The switching value should be set to 80 l/min. However, it is possible only to reach 60 l/min without problems. In this case, the device would be set using a teach-offset of +20 l/min. At a flow rate of 60 l/min in the process, teaching would then store a value of 80 l/min.

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

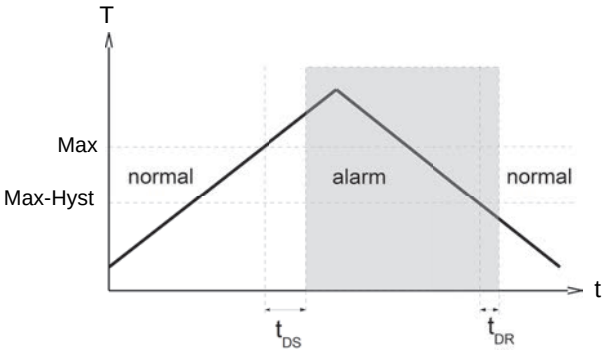
With a minimum-switch, falling below the limit value causes a switchover to the alarm state. Return to the normal state occurs when the limit value plus the set hysteresis is once more exceeded.



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.

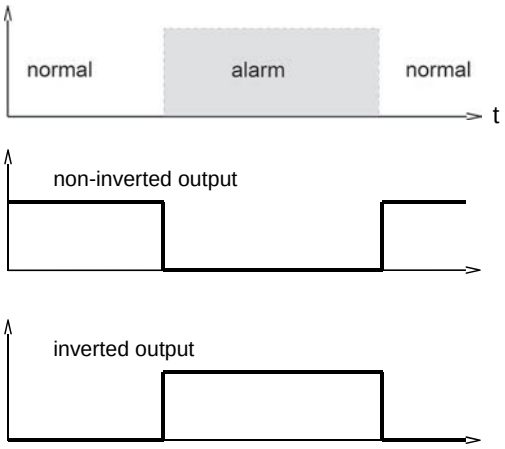


A changeover delay time (t_{DS}) can be applied to switching to the alarm state. Equally, one switch-back delay time (t_{DR}) of several can be applied to switching back to the normal state.



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.



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

The basic device is ordered e.g. RT-xxx with electronics
e.g. LABO-RT-xxx

	1.	2.	3.	4.	5.
RT -		**A**	**K**		**E**

	6.	7.	8.	9.	10.	11.
LABO - RT-	**S**				**S**	

❍ = Option

1.	**Nominal width**		
	015		DN 15 - G $^1/_2$ A
	020		DN 20 - G $^3/_4$ A
	025		DN 25 - G 1 A
	040		DN 40 - G $1^1/_2$ A
	050		DN 50 - G 2 A
2.	**Mechanical connection**		
	A		male thread
3.	**Housing material**		
	K		stainless steel
4.	**Metering range**		
	001		0.11.. 1.1 m³/h ●
	002		0.22.. 2.2 m³/h ●
	004		0.40.. 4.0 m³/h ●
	008		0.80.. 8.0 m³/h ●
	016		1.60..16.0 m³/h ●
	034		3.40..34.0 m³/h ●
	068		6.80..68.0 m³/h ●
5.	**Connection for**		
	E		electronics

6.	**Switching output (Limit switch)**		
	S		push-pull (compatible with PNP and NPN)
7.	**Programming**		
	P		programmable (teaching possible)
	N	❍	cannot be programmed (no teaching)
8.	**Switching function**		
	L		minimum-switch
	H		maximum-switch
9.	**Switching signal**		
	O		standard
	I	❍	inverted
10.	**Electrical connection**		
	S		for round plug connector M12x1, 4-pole
11.	**Optional**		
	H	❍	100 °C version (with 300 mm cable)

Options for LABO

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 actuated)

Switching output fixed at l/min

Switching hysteresis %
standard = 2 % of the metering range

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

Further options available on request.

Options

- Flanged model,
- max. temperature 150 °C
- DN 80-300 PN 16
- model for air / gas
- range from 0.05 m³/h

Accessories

- Cable/round plug connector (KB...)
  see additional information “Accessories”
- Device configurator ECI-1
- OMNI-TA