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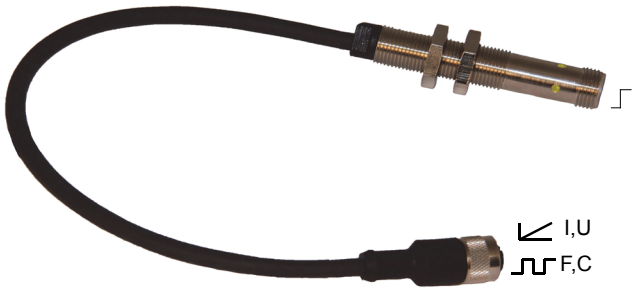
Limit switch LABO-W...S



- **Limit switch for looping into the sensor line**
- **Evaluation of voltages, currents or frequencies**
- **16-bit microcontroller**
- **Numerous configurable parameters**
- **A parameter can be set locally**
- **Affordable**

Characteristics

The LABO-W limit switches are designed for the measurement and evaluation of sensor signals. For this purpose, they have a powerful 16-bit microcontroller in their compact housing.
The standard versions are designed such that currents, voltages and frequencies which are common for industrial applications can be measured.
They have a 20 cm long breakout cable and thus can be easily looped into the sensor line.

Special designs for other signals and plug connections are available on request.

The LABO electronics 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.
If desired, the switching value can be set to the currently existing flow using "teaching". Switching and switch-back times can be adjusted dependent upon each other. The power-on-delay function makes it possible to keep the switching output in a defined state for a variable time after the supply voltage is switched on.

Models with analog or pulse output are also available.

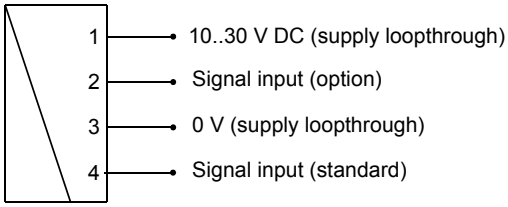
Technical data

Inputs and metering ranges	Strom 0..20 mA Voltage 0..10 V Frequencies 0..10 kHz others available on request
Measurement uncertainty	Typically ±0.1 % of full scale value
Operating temperature	0..+70 °C (higher values available on request)
Storage temperature	-20..+80 °C

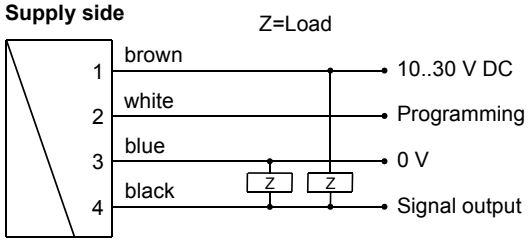
Materials	Housing	CW614N nickelled
	Cable exit	PA
	Cable	PUR
	Plug insert	PC
	Contacts	CuZn, gold-plated
Supply voltage	10..30 V DC	
Power requirement	< 1 W (for no-load output)	
Sensor supply	Corresponds to supply voltage (others available on request)	
Switching output	Transistor output "push-pull" (resistant to short circuits and reversed polarity protected) I_{out} = 100 mA max.	
Display	yellow LED (On = Normal / Off = Alarm / rapid flashing = Programming)	
Electrical connection	for round plug connector M12x1, 4pole Sensor-side: Cable bushing Supply side: Plug	
Ingress protection	IP 67	
Weight	approx. 0.02 kg	
Conformity	CE	

Wiring

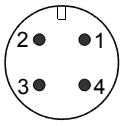
Sensor-side



Supply side



Connection example: PNP NPN

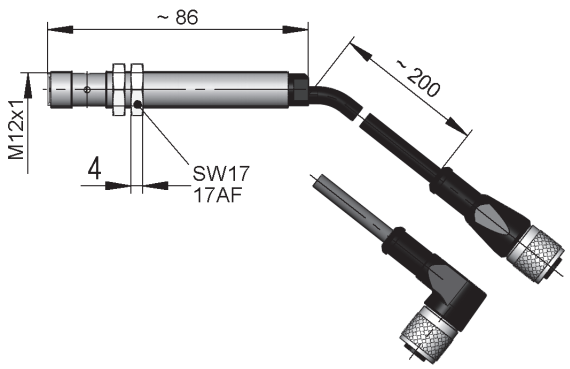


Before the electrical installation, it must be ensured that the supply voltage corresponds to the data sheet.

It is recommended to use shielded wiring.

The push-pull output of the frequency or pulse output version can as desired be switched as a PNP or an NPN output.

Dimensions



Handling and operation

Installation

The limit switches are looped into the existing sensor line using the M12x1 plug connector.
The converter housing can be fixed in a 12 mm hole as necessary using the supplied lock nuts.

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:

- The measured value 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 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.

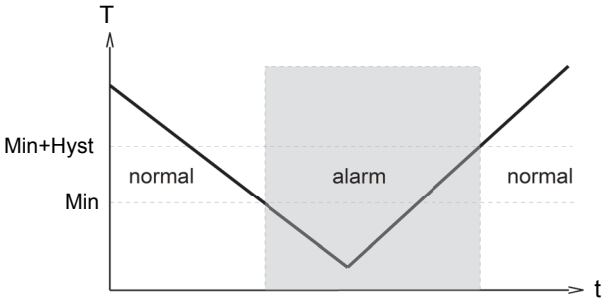
The device has a yellow LED which flashes during the programming pulse. During operation, the LED serves as a status display for the switching output.

To avoid the need to transit to an undesired operating status for the purpose of teaching, 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.

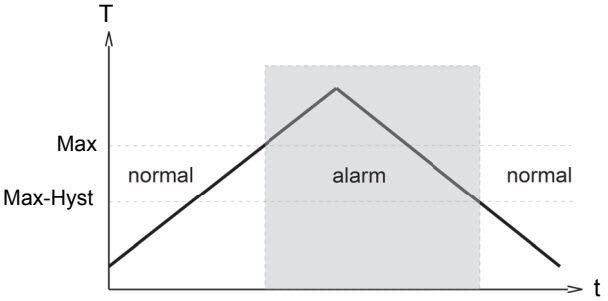
Example: The switching value should be set to 80 %. However, it is possible only to reach 60 % without problems. In this case, the device would be ordered with a "teach offset" of +20 %. At a flow rate of 60 % in the process, teaching would then store a value of 80 %.

The limit switch can be used to monitor minima or maxima.

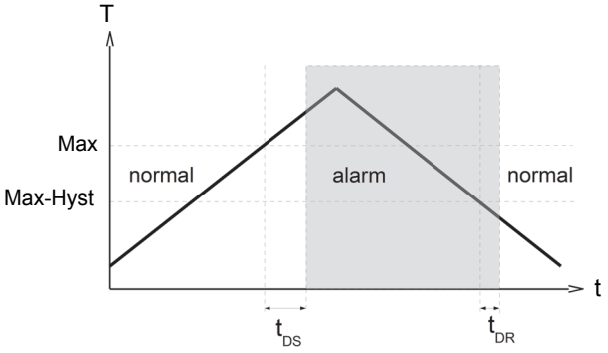
With a minimum-switch, falling below the limit value causes a switchover to the alarm state. Return to the normal state occurs when the limit value plus the set hysteresis is once more exceeded.



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.

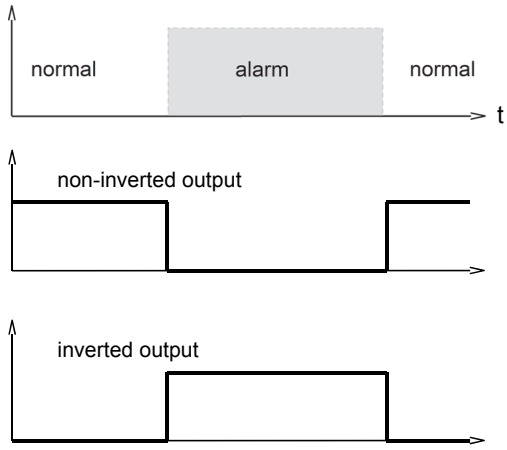


A changeover delay time (t_{DS}) can be applied to switching to the alarm state. One switch-back delay time (t_{DR}) of several can likewise be applied to switching back to the normal state.



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 PowerOn 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.
LABO - W -			**S**				**S**

❍ = Option

1.	**Signal input**		
	I		Current input 0..20 mA
	U		Voltage input 0..10 V
	F		Frequency input 0..10 kHz
2.	**Sensor connection**		
	G		Cable socket, straight 200 mm
	W		Cable socket, elbow 200 mm
3.	**Signal output**		
	S		Push-pull (compatible with PNP and NPN)
4.	**Programming**		
	P		Programmable (teaching possible)
	N	❍	Cannot be programmed (no teaching)
5.	**Switching function**		
	L		Minimum switch
	H		Maximum switch
6.	**Switching signal**		
	O		Standard
	I	❍	Inverted
7.	**Electrical connection**		
	S		For round plug connector M12x1, 4-pole

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)

PowerOn delay period (0..99 s) ___ s
(After connecting the supply, time during which the switching output is not activated)

Switching output fixed at ___ Hz

Switching hysteresis ___ %
Standard = 2 % of the metering range

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

Further options available on request.

Accessories

- Round plug connector/cable
- Evaluation electronics OMNI-TA
- Device configurator ECI-1