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Screw-in transmitter LABO-D...I / U / F / C

- **Complete sensor with transmitter in the housing of a proximity switch**
- **Conversion of frequencies into current, voltage, frequency or pulse signals**
- **Various sensors available**
- **16-bit microcontroller**
- **Linearisable**
- **Numerous configurable parameters**
- **A parameter can be set locally**
- **Affordable**

Characteristics

The transmitters combine a primary sensor with evaluation electronics with a powerful 16-bit microcontroller in the housing of a proximity switch.
The transmitters enable, for example, the speed measurement of rotating machine parts, turbines, spinners, etc. by means of the detection of the approach of metals or magnets in various environments and the evaluation of the resulting frequency.

The primary sensors are available in various technologies depending on the application:

- Magnetic field sensors are capable of detecting the approach of magnets. This is also possible through metallic surfaces.
- Pre-tensioned hall sensors detect the approach of ferromagnetic metal parts, even through metallic but non-ferromagnetic surfaces.
- Inductive sensors detect the approach of all types of metal parts and can therefore not be used behind metal surfaces.

The LABO electronics make various output signals available:

- Analog signal 0/4 – 20 mA (LABO-D...I)
- Analog signal 0/2 – 10 V (LABO-D...U)
- Frequency signal (LABO-D...F) or
- Quantity signal Pulse / x Litres (LABO-D...C)

A model with switching output is also available.

If desired, the range end value can be set to the currently existing frequency using "teaching".

Technical data

Sensor	Magnetic field sensor (magneto-resistive) Pre-tensioned hall sensor Inductive sensor	
Detection distance	Magnetic field sensor	Depending on magnets used, signal threshold typ. 8 Gauss (= 0.8 milliTesla), switching distances over 25 mm possible
	Pre-tensioned hall sensor	Typ. 0.5..2.5 mm
	Inductive sensor	Typ. max. 4 mm based on 1 cm³ ST37
Metering range	0..10 kHz for hall sensor 0..1 kHz for inductive sensor	
Measurement uncertainty	±0.1 % measured value	
Pressure resistance	Pressureless application	
Operating temperature	0..+70 °C (other temperatures available on request)	
Storage temperature	-20..+80 °C	
Materials	Housing	CW614N nickelled
	Sensor flap	PA
	Plug insert	PC
	Contacts	CuZn, gold-plated
Supply voltage	10..30 V DC with voltage output 10 V: 15..30 V DC	
Power requirement	< 1 W (for no-load output)	
Output data:	all outputs are resistant to short circuits and reversal polarity protected	
Current output:	4..20 mA (0..20 mA available on request)	
Voltage output:	0..10 V (2..10 V available on request) Output current max. 20 mA	
Frequency output:	Transistor output "push-pull" I_{out} = 100 mA max.	
Pulse output:	Transistor output "push-pull" I_{out} = 100 mA max. Pulse width 50 ms Pulse/quantity is to be stated	
Display	Yellow LCD shows Operating voltage (LABO-D...I / U) or Output status (LABO-D...F / C) (rapid flashing = Programming)	
Electrical connection	for round plug connector M12x1, 4pole	
Ingress protection	IP 67	
Weight	approx. 0.02 kg	
Conformity	CE	

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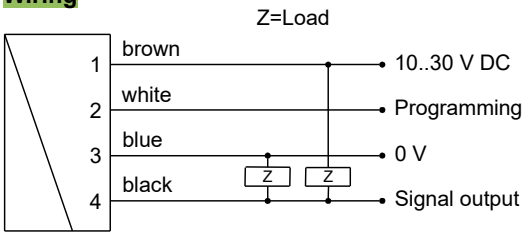
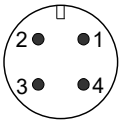
Product information

LABO-D...I / U / F / C

Wiring



Connection example: PNP NPN

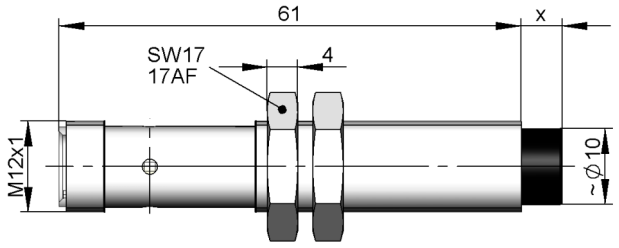


Before the electrical installation, it must be ensured that the supply voltage corresponds to the data sheet.

It is recommended to use shielded wiring.

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

Dimensions



Types	X mm
LABO-D-H	5.5
LABO-D-V	0.5
LABO-D-I	3.5

Handling and operation

Installation

The transmitters are screwed into a M12x1 threaded hole or fixed in a 12 mm hole by means of the supplied lock nuts.
The magnetic field sensor reacts to magnetic fields of both polarities perpendicular to the end face.

Note

The full scale value can be programmed by the user via "teaching". Requirement for programmability must be stated when ordering, otherwise the device cannot be programmed.
The ECI-1 device configurator with associated software is available as a convenient option for programming all parameters by PC, and for adjustment.
The teaching option is not available for the pulse output version.

Operation and programming

The teaching process can be carried out by the user as follows:
- The frequency 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 devices have a yellow LED which flashes during the programming pulse. During operation, the LED serves as an indicator of operating voltage (for analog output) or of switching status (for frequency or pulse 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 end of the metering range should be set to 80 %. However, only 60 % can be achieved without problem. 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 %.

There are many more parameters which can be programmed by the ECI-3 device configurator if necessary.

Ordering code

LABO - D - [1.] [2.] [3.] **[4. S]**

❍ = Option

1.	**Sensor**	
	H	Magnetic field sensor
	V	Pre-tensioned hall sensor
	I	Inductive sensor
2.	**Signal output**	
	I	Current output 4..20 mA
	U	Voltage output 0..10 V
	F	Frequency output
	C	Pulse output
3.	**Programming**	
	P ❍	Programmable (teaching possible)
	N	Cannot be programmed (no teaching)
4.	**Electrical connection**	
	S	For round plug connector M12x1, 4-pole

Required ordering information

For LABO-D...F:

Output frequency at full scale ☐☐☐☐ Hz

Maximum value: 2000 Hz

For LABO-D...C:

For the pulse output version, the quantity per pulse must be specified, in other words the number of input pulses which should correspond to an output pulse. In the process, uneven scaling factors are also possible on request.

Input pulse per output pulse ☐☐☐☐

Options

PowerOn delay period (0..99 s) ☐☐ s

(time after applying power during which the outputs are not activated or set to defined values)

Further options available on request.

Accessories

- Round plug connector/cable
- Evaluation electronics OMNI-TA
- Device configurator ECI-3