

TURCK

Industrielle Automation

INDUKTIVE LINEARWEGSENSOREN MIT SSI-SCHNITTSTELLE

INDUCTIVE LINEAR POSITION SENSORS WITH SSI INTERFACE



BENUTZER- INFORMATION

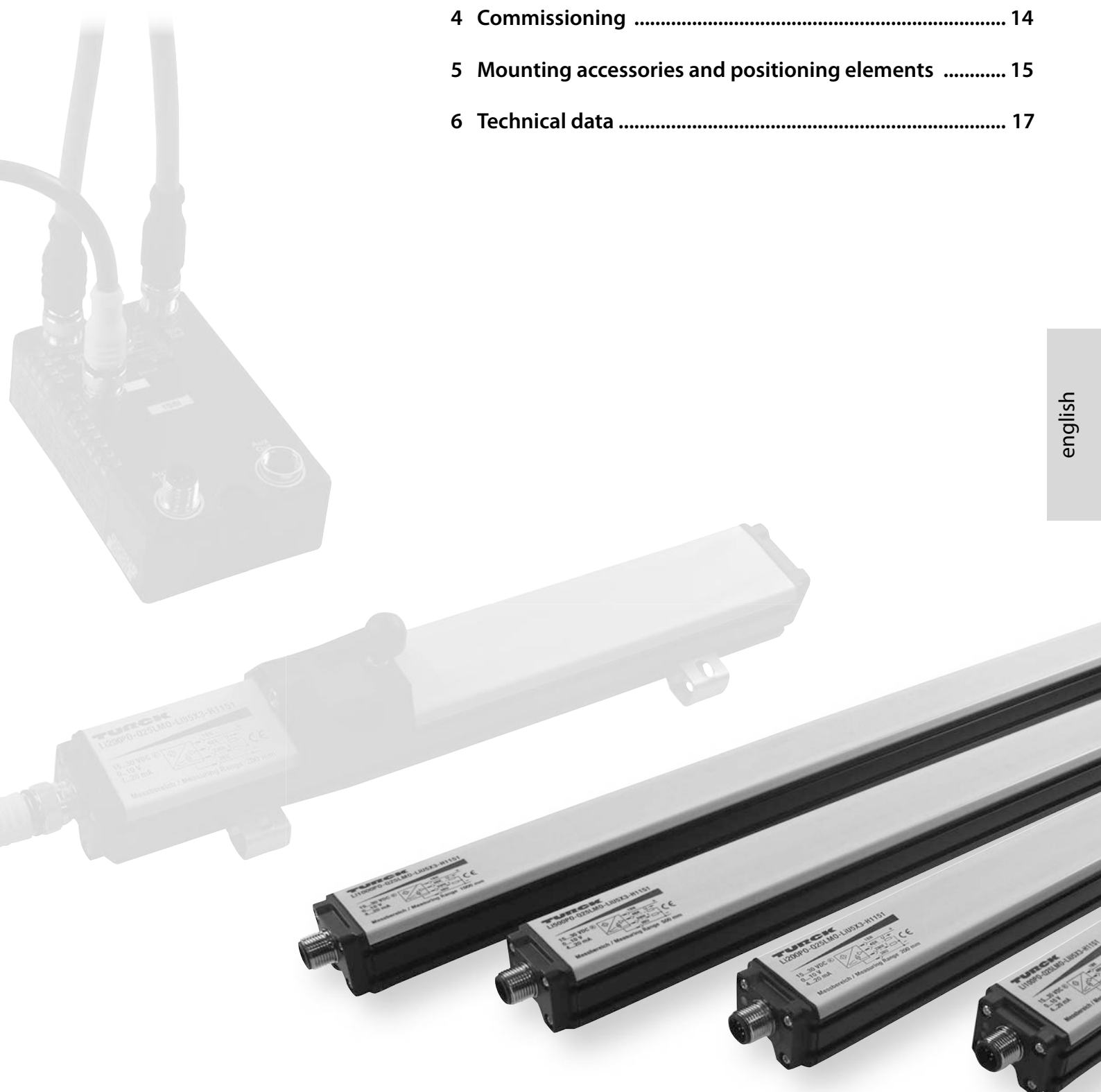
USER INFORMATION



Sense it! Connect it! Bus it! Solve it!

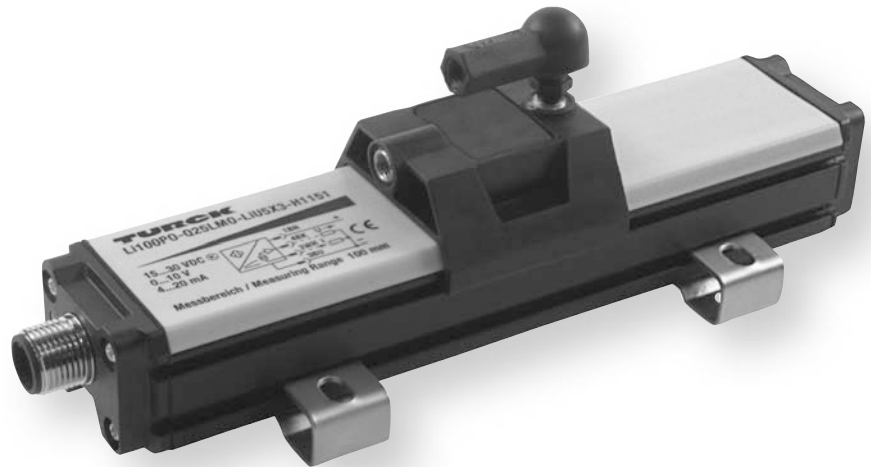
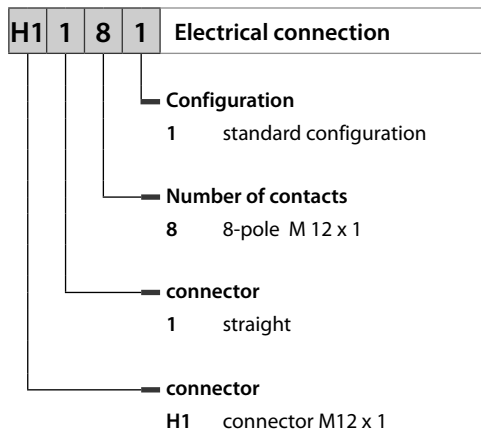
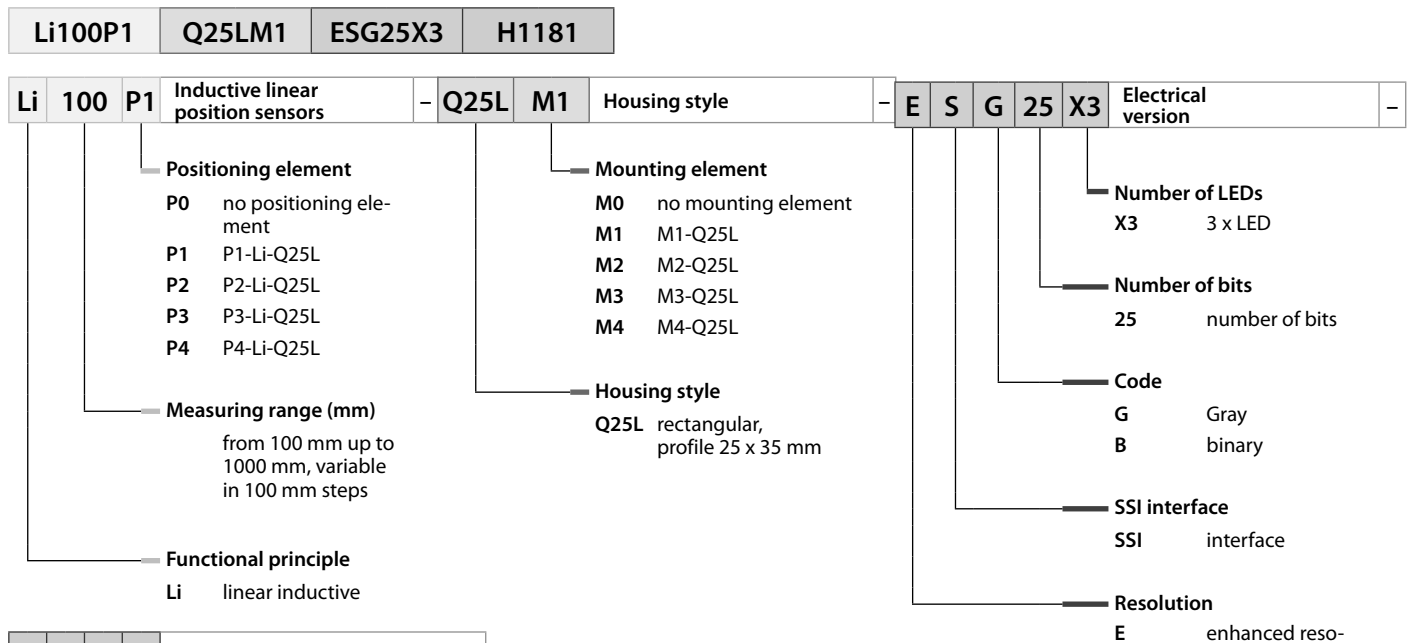
Inductive linear position sensors Li-Q25L – with SSI Interface

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Inductive linear position sensors Li-Q25L with SSI interface – Type code

2 Type code



Note

The linear position sensors are available in different lengths of 100, 200, ... up to 1000 mm.

The sensors, mounting accessories and positioning elements are individually available or as a kit.

Sensor versions transmitting different data lengths and using different coding (Gray or binary) are also available.

3 SSI interface

The linear position sensors provide an absolute signal of a guided or free positioning element. For non-contact detection of the resonator, the sensor is coupled with the positioning element via a stable inductive RLC circuit.

In addition to process values indicated via current and voltage outputs, the SSI interface (Synchronous Serial Interface) has become an established alternative in the field of industrial automation. Process values are transmitted via SSI interface directly to the higher level control unit (with SSI card) or to the bus subscriber connecting to all standard fieldbuses, such as *piconet*[®], BL67, BL20 or BL compact from TURCK.

Signals are directly and digitally transmitted via the SSI telegram and are therefore more precise and immune to interferences. Not only process data are transmitted via SSI telegram but also diagnostic information.

The fieldbus device performs as a master providing a clock signal to which the sensor responds synchronously via SSI telegram. The clock speed and the data length are determined by the master. A clock speed matching the length of the connection cable is recommended (see Commissioning).

In order to adapt to the cable length, the clock speed is adjustable in the master. The data length and the process value displayed as Gray or binary code have to be identical on the master and sensor side, too.

To provide resistance against mechanical impact, the sensor electronics is incorporated in a plastic inlay and additionally protected by an aluminium cast housing. Metal parts between the positioning element and the active sensor surface should be avoided to ensure proper RLC coupling.

Inductive linear position sensors Li-Q25L with SSI interface – Commissioning

4 Commissioning

The sensor is connected to the SSI input card respectively field device with a matching cable. For proper data transfer only use shielded connection cables with twisted core pairs.

Please ensure that the settings of the SSI master and the sensor are identical. The sensor type code indicates the required data length of the SSI telegram (24, 25 or 26 bit) and the coding (Gray or binary). These features should be identical to those of the master.

The sensor adjusts automatically to the clock speed provided by the master (62.5 kHz up to 1 MHz).

Recommended cable lengths for the different transmission frequencies:

Cable length	Clock speed
< 25 m	< 1000 kHz
< 50 m	< 500 kHz
< 100 m	< 400 kHz
< 200 m	< 200 kHz
< 400 m	< 100 kHz

The nominal distance between positioning element and sensor is 2 mm.

To ensure stable RLC coupling between sensor and resonator, the distance should not be greater than 4 mm. The maximum lateral offset should not be greater than 4mm either.

If RLC coupling takes place in the limit range (inadmissible distance) enhancing the likelihood of reduced signal quality, this status is indicated via LED (yellow) and via bit 22 in the SSI telegram.

If the positioning element moves out of the measuring range, the LED starts flashing yellow and the status is additionally indicated via bit 23 in the SSI telegram. Bit 1 to 20 are used for the process data.

Measuring range indicated via LED

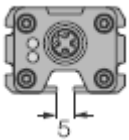
- **green:**
The positioning element is in the measuring range.
- **yellow:**
The positioning element is in the measuring range with a lower signal quality (e.g. distance too long)
- **yellow flashing:**
The positioning element is outside the measuring range (max. range)

5 Accessories

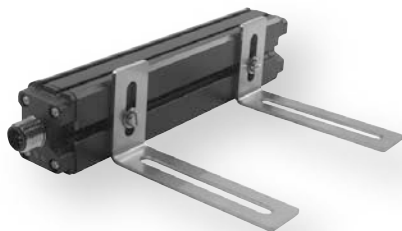
5.1 Mounting accessories

A comprehensive range of accessories is available for mounting. Sliding blocks for the sensor groove and different brackets provide many mounting possibilities. Flexibility is guaranteed as accessories are available for all borehole intervals.

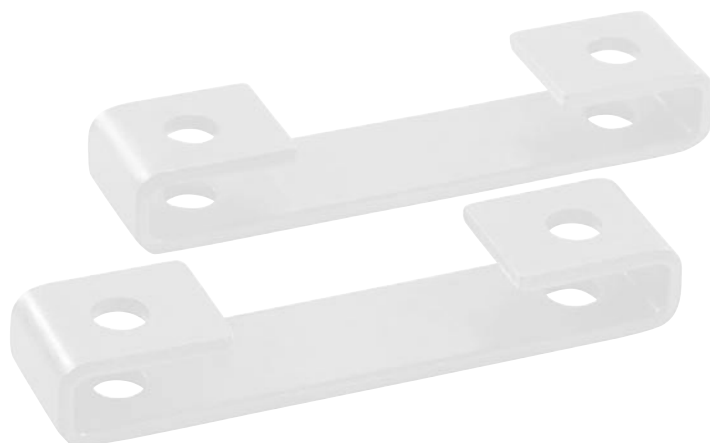
Parallel alignment of the sensor with the mounting bracket.



A guide slot at the sensor backside takes the sliding blocks.



Dimension drawing	Type	Description
	M1-Q25L	Mounting foot for inductive linear position sensors Q25L; two mounting feet should be used for devices with a measuring range of up to 1000 mm; material: Stainless steel; 2 pcs. per bag
	M2-Q25L	Mounting foot for inductive linear position sensors Q25L; two mounting feet should be used for devices with a measuring range of up to 1000 mm; material: Stainless steel; 2 pcs. per bag
	M4-Q25L	Mounting bracket for inductive linear position sensors Q25L; two mounting feet should be used for devices with a measuring range of up to 1000 mm; material: Stainless steel; 2 pcs. per bag
	MN-M4-Q25	Sliding blocks with M4 thread fit in the guide slot at the backside of the inductive linear position sensors Q25L; material: Brass; 10 pcs. per bag Only available separately, not as a kit with linear displacement sensors!



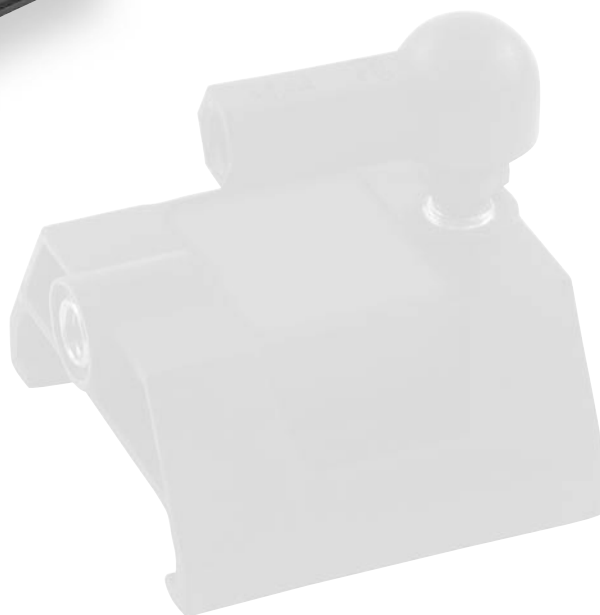
Inductive linear position sensors Li-Q25L with SSI interface – Accessories Positioning elements

5.2 Positioning element

Different positioning elements are available.

Guided positioning elements are inserted in the lateral sensor groove and are thus connected to the sensor.

The free and guided positioning elements are connected to the movable parts of the machine. They "float" freely above the active face of the sensor.

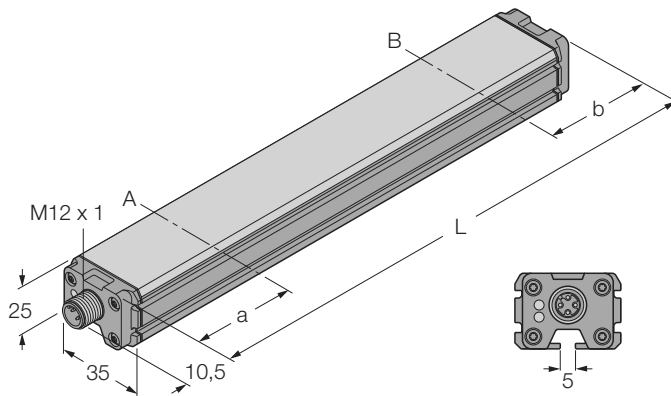


Dimensions	Type	Description
	P1-Li-Q25L	Guided positioning element; laterally inserted in sensor groove; incl. rod-end bearing to mount M5 threaded rods
	P2-Li-Q25L	Free positioning element, operates at a distance of 0...4 mm to the sensor surface
	P4-Li-Q25L	Free positioning element, applied in extremely strong magnetic fields, such as welding areas; operates at a distance of 0...4 mm to the sensor surface
	P3-Li-Q25L	Free positioning element; right-angle mounting; operates at a distance of 0...4 mm to the sensor surface

Inductive linear position sensors Li-Q25L with SSI interface – Technical data

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Measuring range specifications

Sensor lengths	100, 200, ... 1000 mm
Blind zone a	29 mm
Blind zone b	29 mm

System

Resolution	0.001 mm
Repeatability/accuracy	10 μ m
Linearity deviation	$\leq 0.1\%$ of full scale
Temperature drift	$\leq \pm 0.0001\%$ /K
Ambient temperature	-25...+70 °C

Electrical data

Operating voltage	15...30 VDC
Residual ripple	$\leq 10\%$ U_{PP}
No-load current	≤ 50 mA
Rated insulation voltage	≤ 0.5 kV
Short-circuit protection	yes
Wire breakage / reverse polarity protection	yes/yes (voltage supply)
Output function	8-wire, SSI, 25 bit Gray coding
Sampling rate	500 Hz
Current consumption	< 100 mA

Housing style

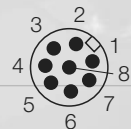
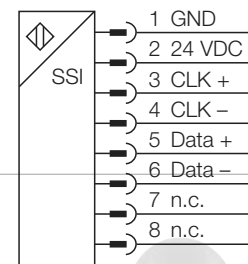
Housing style	rectangular, Q25L
Dimensions	profile 35 x 25mm, length = meas. length + 58 mm
Housing material	aluminium
Material active face	plastic, PC-GF20
Connection	connector, M12 x 1
Vibration resistance	55 Hz (1 mm)
Shock resistance	30 g (11 ms)
Protection class (IEC 60529/EN 60529)	IP67

LEDs

Power-on indication	LED green
Measuring range indication	green, yellow, yellow flashing, multifunctional LED

Wiring diagrams

The sensor is connected to an SSI input device via standard M12 x 1 connectors as shown in the diagram below.



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