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# Li-Q25L

## Shock-resistant Linear Position Sensors



### Линейное положение

Задача измерения пути может быть решена с помощью нескольких видов датчиков.

Бесконтактные индуктивные датчики линейного перемещения работают на революционном принципе измерения. Позиция детектируется не с помощью магнита, а с помощью индуктивного колебательного контура. Ассортимент продуктов включает в себя магнитострикционные датчики линейного перемещения

для отслеживания положения поршня в гидравлических цилиндрах или датчиков для отслеживания позиции поплавков, а также тросовые энкодеры.

Информация о пути на длине до 40 м передается с высокой точностью и динамикой на контроллер верхнего уровня через цифровые и аналоговые интерфейсы.

# Shock-resistant Linear Position Sensors up to 200 g

- **Excellent linearity properties even under extreme shock and vibration loads**  
 Due to the contactless coupling between the positioning element and the built-in track board in the sensor, the sensor is extremely immune to shock and vibration. The sensor housing is extremely robust and can also be used in demanding applications with high shock loads, e.g. on presses. The sensor is not destroyed. In addition, the quality of the sensor signal is not affected, even under a shock load of up to 200 g. The sensor signal is not affected by the shock. The Li-Q25L series convinces with outstanding linearity characteristics that do not change even in a shock-loaded environment.
- **High sampling rate 5 kHz**  
 In contrast to conventional contactless systems, the inductive measuring principle is not based on a travel time measurement. Therefore, longer detection ranges can be sampled just as quickly as shorter ones. An increased sampling rate is particularly important where control quality is important. It is up to five times faster than with conventional systems.
- **High resolution 16 bit**  
 The new Li generation uses a 16-bit converter as standard, which guarantees a high-resolution output signal even with long sensor versions offering large measuring ranges.
- **Automatic error diagnostics**  
 The inductive linear position sensors indicate the current operating status via a diagnostic LED. If, for example, the distance between the sensor and the positioning element is likely to become too large, this is indicated by a yellow LED. The new generation also offers an error signal in the process output of 24 mA or 11 V as soon as the distance between the sensor and the positioning element is outside the permissible range. This information can be easily evaluated in the controller and facilitates the error diagnostics of a machine.

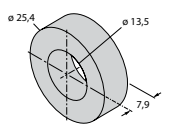
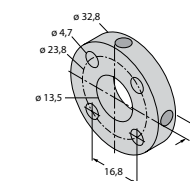
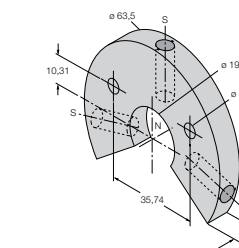
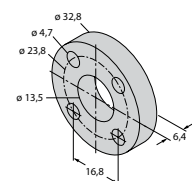
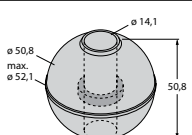
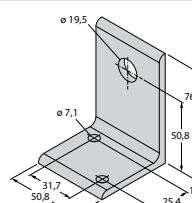
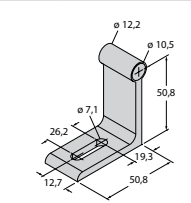
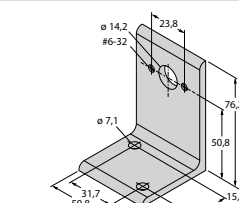


## Variants

Ident-No.	Type code	Measuring range [mm]
100001932	LI100P0-Q25LM0-ELIU5X3-H1151	100
100001933	LI200P0-Q25LM0-ELIU5X3-H1151	200
100001934	LI300P0-Q25LM0-ELIU5X3-H1151	300
100001935	LI400P0-Q25LM0-ELIU5X3-H1151	400
100001936	LI500P0-Q25LM0-ELIU5X3-H1151	500
100001937	LI600P0-Q25LM0-ELIU5X3-H1151	600
100001938	LI700P0-Q25LM0-ELIU5X3-H1151	700
100001939	LI800P0-Q25LM0-ELIU5X3-H1151	800
100001940	LI900P0-Q25LM0-ELIU5X3-H1151	900
100001941	LI1000P0-Q25LM0-ELIU5X3-H1151	1000
100001317	LI1250P0-Q25LM0-ELIU5X3-H1151	1250
100001318	LI1500P0-Q25LM0-ELIU5X3-H1151	1500
100001319	LI1750P0-Q25LM0-ELIU5X3-H1151	1750
100001320	LI2000P0-Q25LM0-ELIU5X3-H1151	2000

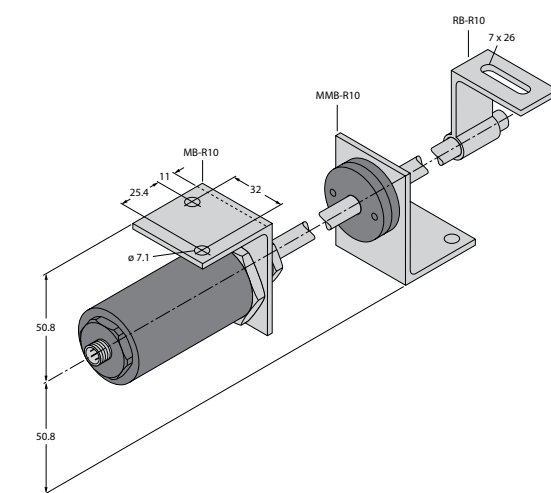
Accessories available separately

## Accessories

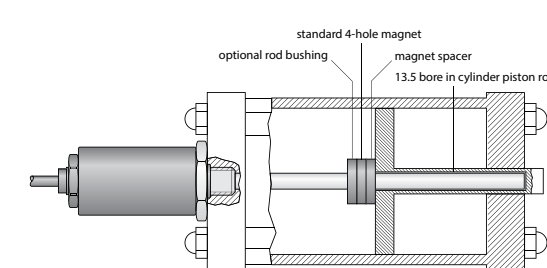
Type/dimension drawing	Description
  	<p>Standard positioning element Standard 4-hole positioning element Ring positioning element with slot</p>
	Standard spacer
	Float, stainless steel, specific gravity 0.62 kg/m <sup>3</sup>
  	Mounting bracket, sensor head and rod Mounting bracket, positioning element

### Mounting examples

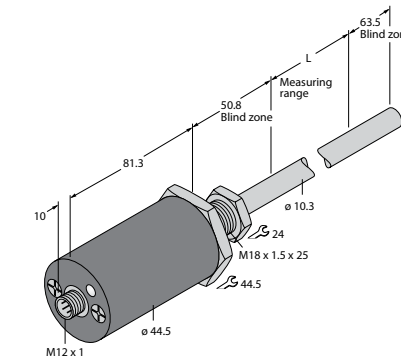
#### Mounting outside a cylinder



#### Application in a hydraulic cylinder



## LTX – Types and Features



	Analog output	SSI output
<b>Measuring range</b>		
Blind zone a	50.8 mm	50.8 mm
Blind zone b	63.5 mm	63.5 mm
Repetition accuracy	≤ 0.01 % full scale	Corresponds to the resolution
Resolution	16 bit	Selectable, see type code
Linearity	≤ 0.01 % full scale	≤ 0.01 % full scale
Operating temperature, rod	-40...+105 °C	-40...+105 °C
Electronics operating temperature	-40...+85 °C	-40...+85 °C
Temperature drift	<10 ppm/°C	<10 ppm/°C
<b>Electrical data</b>		
Operating voltage	7...30 VDC	7...30 VDC
Current consumption	< 100 mA/15 VDC	< 100 mA/15 VDC
Short-circuit protection	Yes/cyclic	Yes/cyclic
Output function	5-wire, analog	6-wire, SSI
<b>Design</b>		
Design	cylindrical/smooth	cylindrical/smooth
Housing material	Metal, AL, black (also available as stainless steel variant)	Metal, AL, black (also available as stainless steel variant)
Material of active face	Metal, stainless steel, 316	Metal, stainless steel, 316
Vibration resistance	30 Hz (1 mm)	30 Hz (1 mm)
Shock resistance	100 g (11 ms)	100 g (11 ms)
Pressure resistance (momentary)	680 bar	680 bar
Pressure resistance (permanent)	340 bar	340 bar
Ingress protection	IP68	IP68
<b>Miscellaneous</b>		
Status display	3-color LED, green/yellow/red	3-color LED, green/yellow/red
<b>Wiring diagram</b>		

Your Global Automation Partner

# LTX Pressure Resistant Rod-Type Position Sensors





# Pressure Resistant Rod-Type Position Sensors

## LTX for position sensing in hydraulic cylinders

The LTX is a pressure resistant sensor for precise position sensing in hydraulic cylinders. Contactless, wear-free, shock and vibration proof – these are only some of the features that make Turck LTX linear position sensors a standard when it comes to cylinder installation. With the optimum configuration factory shipped, the magnetostrictive linear position sensor is available with an analog or SSI interface.



### General features:

- High accuracy
- Wide input voltage range from 7 to 30 VDC, with low power consumption of typically 1 Watt
- High degree of protection to IP68
- Infinitely variable sensor lengths up to 7600 mm
- Also fully available as stainless steel variant
- Extensive range of accessories for external mounting or level monitoring
- Also available as complete set with corresponding connectors and block I/O

### Your benefits

#### Faster commissioning...

- ...with Autotuning  
The Autotuning function enables the sensor to adapt automatically to the positioning element and allows straightforward, fast and safe commissioning.
- ...with adjustable blind zones  
The blind zones can be optimally adjusted onsite to customer requirements using an optionally available teach adapter or the sensor can be ordered as a variant.

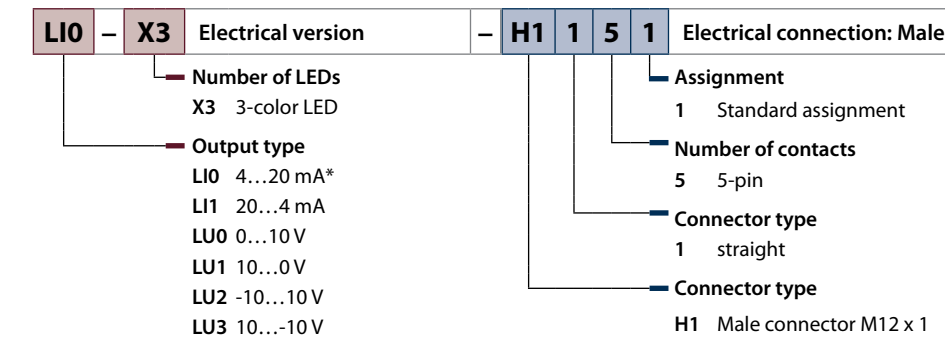
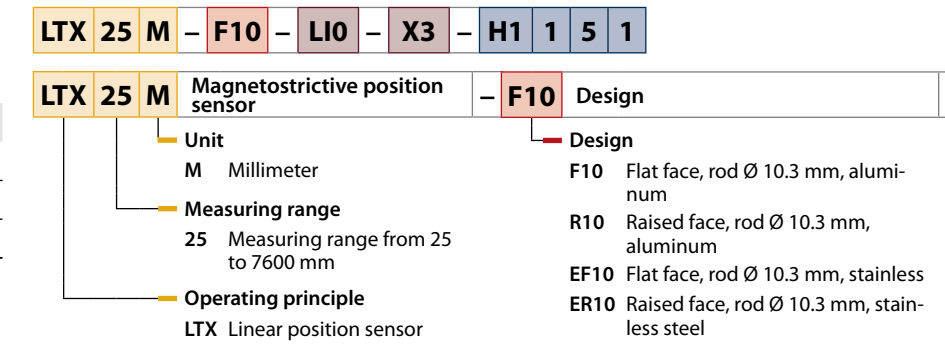
#### Optimum configuration factory shipped...

- ...with connectors compatible with market competitors  
This enables simple one-to-one replacement without any effort. The LTX sensors are shipped as standard with a 5-pin M12 connector.
- ...with a wide range of output types  
Besides 4...20 mA and SSI outputs, 0...10 V, -10...10 V, 0...5 V, -5...5 V outputs are now also optionally available as standard.
- ...with an infinitely variable measuring length  
Instead of using the conventional 25 mm increments, the sensor can be ordered with a measuring range of 25 mm to 7600 mm in 1 mm increments.

The preferred types are available with the following default settings:

Measuring range	Defaults
100...500 mm	25-mm increments
500...2000 mm	50-mm increments
2000...7600 mm	500-mm increments

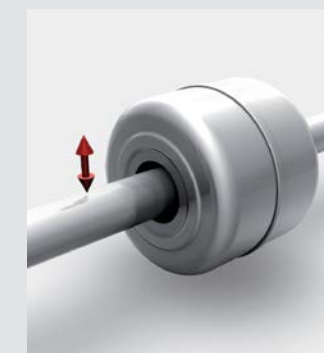
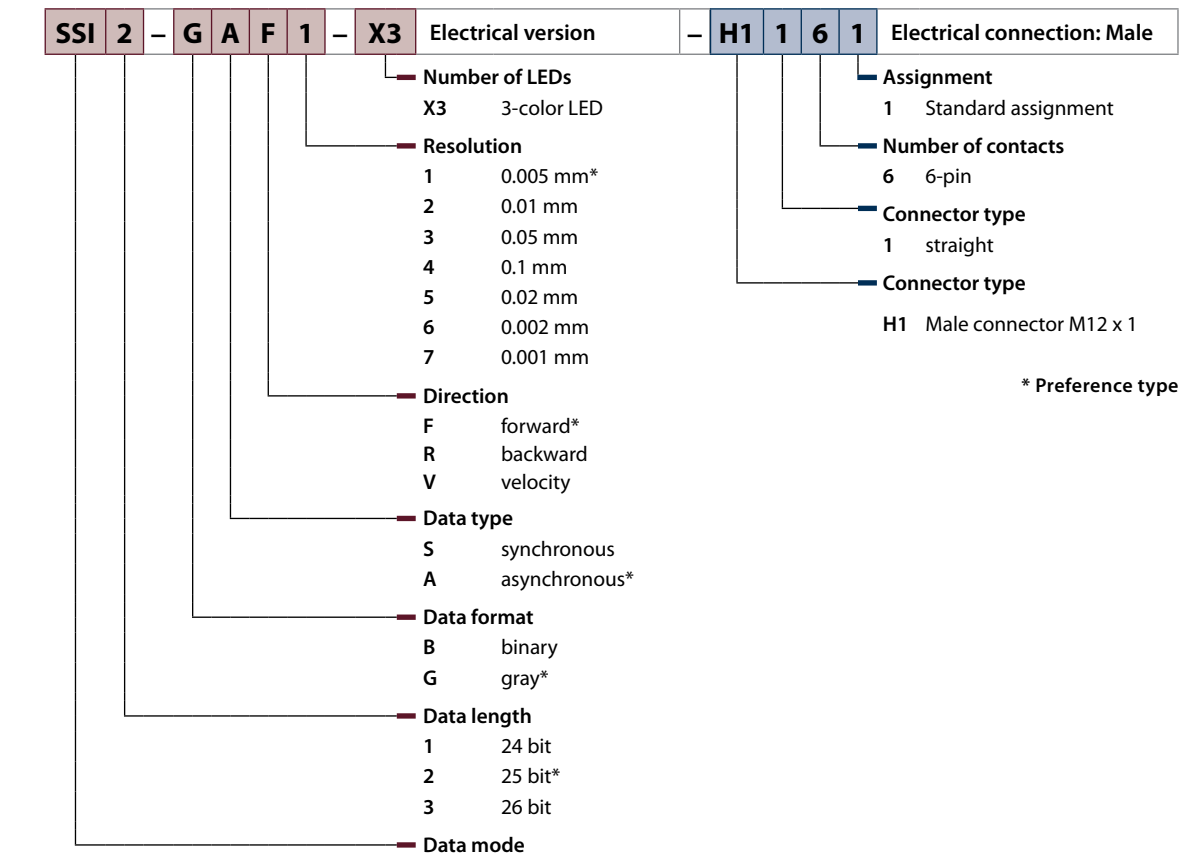
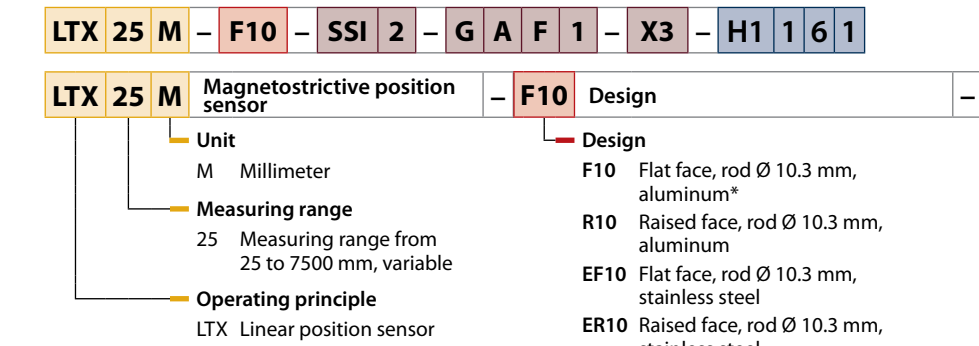
### Analog output



#### Straightforward handling...

- ... by replacing via removable sleeve  
The electronics housing together with the measuring system can be removed simply by separating the actual sensor from the pressure tube via two screws. The cylinder remains hydraulically sealed.
- ... with multi-color diagnostics LED  
The LED indicates fault states in addition to the position signal. This saves time and costs for any fault finding.

### SSI interface



**Contactless and wear-free**  
The magnetostrictive measurement principle works contactless and wear-free. Important characteristics such as accuracy, linearity, resistance to shock and vibration are maintained ingress protection.



**Rugged housing easy installation**  
The compact LTX sensor meets the IP68 ingress protection category and is resistant to many chemicals and oils. The rod is made of high-quality stainless steel and offers optimal protection – even against aggressive media.

**4...20 mA**  
**SSI**  
**0...5 V**  
**0...10 V**

**Flexible process connection**  
The LTX adapts perfectly to any application environment. The sensor is available in different versions, either with 0...10 VDC or 4...20 mA analog output, or with an SSI interface. The connection is established via standard M12 connectors – special connectors are not required.



**Highest accuracy**  
High-quality components and an innovative QM system ensure accurately measured signals and form the basis for high linearity and repeatability. With Turck linear position sensors, even the most demanding applications can be solved in an economically and technically efficient way.



**Shock and vibration resistance**  
The rugged construction ensures high stability in the event of vibration and mechanical load. A vibration resistance of 30 g RMS and a shock resistance of 100 g RMS prevent interference and machine downtimes, even under intense load in mechanically demanding applications.



**Programmable measuring range**  
The LTX sensor can be easily programmed. The required measuring range can be adjusted in an instant. This helps you to reduce the inventory of different device types sustainably.

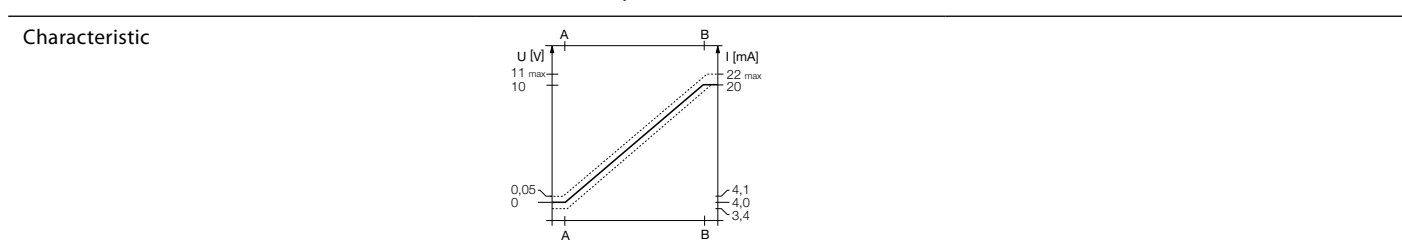
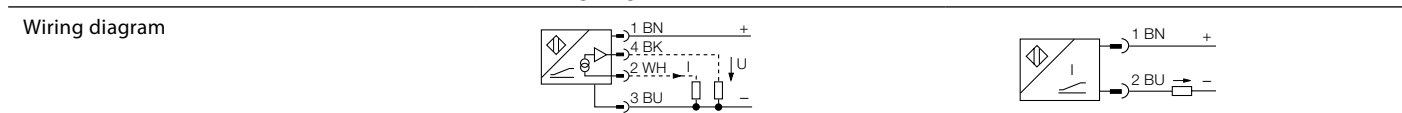
## Types and Features

Dimensions	Type	Ident-No.	(A – B) = measuring range	Approval
	WIM100-Q25L-LiU5X2-H1141	1536630	100 mm	ATEX category II 2 G, Ex Zone 1 ATEX category II 2 D, Ex Zone 21
	WIM125-Q25L-LiU5X2-H1141	1536631	125 mm	
	WIM160-Q25L-LiU5X2-H1141	1536632	160 mm	
	WIM200-Q25L-LiU5X2-H1141	1536633	200 mm	
	WIM100-Q25L-Li-EXI-H1141	1536642	100 mm	
	WIM125-Q25L-Li-EXI-H1141	1536643	125 mm	
	WIM160-Q25L-Li-EXI-H1141	1536644	160 mm	
	WIM200-Q25L-Li-EXI-H1141	1536645	200 mm	

Technical data	LIU5X2	Li-EXI
Repeat accuracy	≤ 0.1 % of measuring range	≤ 0.1 % of measuring range
Linearity deviation	≤ 1 % of full scale	≤ 1 % of full scale
Temperature drift	± 0.006 % / K	± 0.03 % / K
Ambient temperature	-25...+ 65 °C	-25...+ 70 °C
Operating voltage	15...30 VDC	14...30 VDC
Restwelligkeit	≤ 10 % Uss	≤ 10 % Uss
Bemessungsisolationsspannung	≤ 0,5 kV	≤ 0,5 kV
Short-circuit protection	yes	jayes
Wire breakage/Reverse polarity protection	yes/complete	yes/complete
Output function	4-wire, analog output	2-wire, analog output
Voltage output	0...10 V	
Current output	4...20 mA	4...20 mA
Load resistance voltage output	≥ 4,7 kΩ	
Load resistance current output	≤ 0,4 kΩ	≤ [(UB-14 V)/20 mA] kΩ
Sample rate	200 Hz	200 Hz

Housing	LIU5X2	Li-EXI
Housing material	rectangular, Q25L metal, aluminium	rectangular, Q25L metal, aluminium
Material active face	plastic, PA6-GF30	plastic, PA6-GF30
Connectivity	connector, M12 x 1	connector, M12 x 1
Vibration resistance	55 Hz (1 mm)	55 Hz (1 mm)
Shock resistance	30 g (11 ms)	30 g (11 ms)
Degree of protection	IP67	IP67

LED indications	LIU5X2	Li-EXI
- green	2 x LED voltage supply	no positioning magnet within the measuring range after power reset
- yellow flashing	no positioning magnet within the measuring range after power reset	positioning magnet within the measuring range
- yellow	positioning magnet within the measuring range	



## Mounting Accessories

Dimensions	Type	Description	Dimensions	Type	Description
	M1-Q25L Ident no. 6901045	Mounting accessories compatible with magnetostrictive sensors or linear potentiometers Material: aluminum		M4-Q25L Ident no. 6901048	Universal bracket and shielding blocks for lateral mounting, packing unit: 2 pcs
	M2-Q25L Ident no. 6901046	Accessories for standard lateral mounting, compatible with magnetostrictive sensors or linear potentiometers Material: aluminum		MN-M4-Q25 Ident no. 6901025	Sliding blocks for back-side sensor profile, for M4 screws Material stainless steel, packing unit: 10 pcs.
	MB1-Q25 Ident no. 6901026	Mounting clip, for end cap mounting, also for mounting on pneumatic cylinders, packing unit: 2 pcs.		MN-M5-Q25 Ident no. 6901039	Sliding blocks for back-side sensor profile, for M5 screws Material stainless steel, packing unit: 10 pcs.
	MB2.1-Q25 Ident no. 6901027 MB2.2-Q25 Ident no. 6901028	Mounting bracket for pneumatic cylinders, admissible cylinder sizes 40...60 mm (MB2.1), 70...120 mm (MB2.2), packing unit: 4 pcs.			

for more details see data sheets

## Positioning magnet

Dimensions	Type	Description	Dimensions	Type	Description
	DM-Q12 Ident no. 6900367	Floating positioning magnet, Permanent magnet, Housing material: plastic, Admissible distance between sensor and magnet: 2...5 mm		P1-WIM-Q25L Ident no. 6901088	Guided positioning element, Housing material: plastic
	DMR15-6-3 Ident no. 6900216 DMR20-10-4 Ident no. 6900214 DMR31-15-5 Ident no. 6900215	Material: Hard ferrite, Admissible distance between sensor and magnet: 2...5 mm (2...7 mm for DMR31-15-5)			

Your Global Automation Partner

# Q25L Magnetic Linear Position Sensors





# Q25L – Magnetic Linear Position Sensors

Exact position detection up to 200 mm

Position measurement systems are used in different applications. The requirements on these devices are equally high for all applications: High accuracy and linearity, easy installation and a robust design, multiple functions and – last but not least – a large measuring range.

Turck offers magnetically actuated linear position sensors with measuring ranges of up to 200 mm. The sensors are based on the Hall principle which is also applied in compact magnetic field sensors WIM45 with analog output. Typical features are high accuracy and linearity and also extreme short blind zones. The Q25L sensor family is thus perfectly suited for applications which require precise signal transmission over long measuring distances. Typical applications are for example pneumatic pump units, slides, blanking or moulding systems.

With a broad range of accessories, straight forward mounting and installation without compromise is guaranteed by Turck. Mounting is not only easier but also more reliable with the tailor-made accessories.



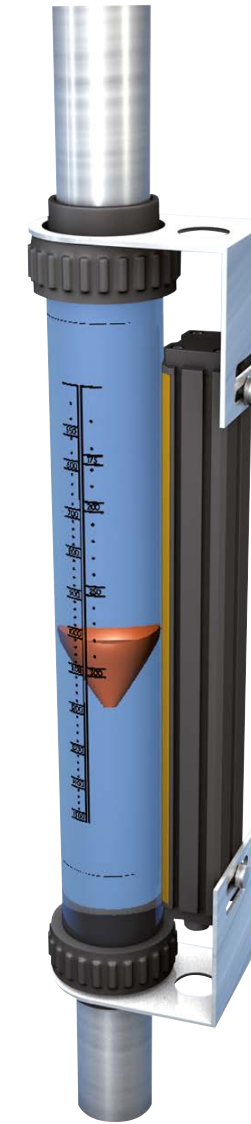
## Clear advantages for all applications

The sensor family Q25L is a cost-saving alternative to other linear position sensors which may be oversized for certain applications. Systems that still work with binary sensors, can now be equipped with cost-saving analog alternatives. Thus switch points can be set flexibly via PLC for the entire measuring range. The advantages for productivity are obvious: Control tasks are implemented quicker and the flexibility of systems is improved. Not forgetting the reduced changeover times, if for example different parts are produced or processed with one machine.

The linear position measuring principle of the Q25L series is also available as intrinsically-safe 2-wire version with analog current output (4...20 mA). Analog detection of tracks in explosion-protected areas

(zones 1/21) is thus possible. The system offers the same performance data as the well-known version with current/voltage output.

With the linear position sensors control tasks are easily and effectively implemented, such as monitoring floats at flow meters and level control via PLC. The sensor is also applied for position detection on pneumatic cylinders. Moreover, with an external magnet used as a position indicator, even more applications can be realized.



## Design and function

The sensor is composed of a chain of 50 Hall elements, the signals of which are continuously processed by a microprocessor. Interfering external magnetic fields are filtered out by permanent comparison of all 50 sensor signals and thus do not impair the operability of the sensor.

The output signal (0...10 V, 4...20 mA) is linearized and independent of the magnet orientation (N/S). The characteristic can thus be reversed from 0...10 V to 10...0 V, simply by turning the sensor.

The "in-range" function detects if the magnet is located within the measuring range and indicates in which direction it left the span. If the magnet exits the measuring range in direction of the connector, the sensor gives out a signal of 0 V/4 mA. If the magnet exits the measuring range in opposite direction, the highest output signal is indicated, 10 V/20 mA.



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