

Q-track™ linear position sensors

S-series with standard resolution, analog output (U/I)



Product features

- 12 bit resolution
- Current and voltage output in one device (5-wire, 15-30 VDC)
- M12 *euromast*® connector (5-pin)
- 29 mm blind zones
- Programmable measuring range
- Captive and floating (0-4 mm from sensing face) position elements available
- Robust extruded aluminum housing
- Watertight (IP67) polycarbonate insert
- Multifunction LED

Measuring range indicated via LED

- **Green:** The positioning element is in the measuring range.
- **Green/yellow alternate flashing:** The positioning element is in the measuring range with a lower signal quality (i.e. distance too long).
- **Yellow flashing:** The positioning element is outside of the measuring range (max. range).
- **Off:** The positioning element is outside the programmed range but inside the total, non-programmed measuring length.

Setting the measuring range

The initial and final value of the measuring range is set at the push of a button, either via a teach adapter or programming line (pin 5). Furthermore, the output curve can be inverted.

- Factory setting (0 V/4 mA at the connector end): Jumper pin 5 and pin 1 for 10 sec.
- Factory setting inverted: Jumper pin 5 and pin 3 for 10 sec.
- Setting the initial value: Move positioning element to desired position and jumper pin 5 and pin 3 for 2 sec.
- Setting the final value: Move positioning element to desired position and jumper pin 5 and pin 1 for 2 sec.

Part number key

Li 100 P1 - Q25L M1 - LiU5 X3 - H1151

Functional principle

Li = linear inductive position sensors

Measuring range (mm)

from 100 mm to 1,000 mm, in 100 mm increments (100 mm = 3.937 inches)

Positioning element (see page 12)

P0 = no positioning element
 P1 = P1-Li-Q25L (captive)
 P2 = P2-Li-Q25L (floating)
 P3 = P3-Li-Q25L (floating WFI)
 P4 = P4-Li-Q25L (floating right angle)

Housing style

Q25L = rectangular, profile 25 x 35 mm

Connection type

H1151 = M12 *euromast* 5-pin connector

X3 = Multifunction LEDs

Output configuration

LiU5 = analog output, 4-20 mA / 0-10 V

Mounting bracket (see page 13)

M0 = no mounting brackets
 M1 = M1-Q25L
 M2 = M2-Q25L
 M4 = M4-Q25L

Ordering information

The *Q-track* linear position sensors are available in different lengths from 100 to 1,000 mm, in increments of 100 mm. The sensors, mounting accessories and positioning elements are available individually or as a kit.



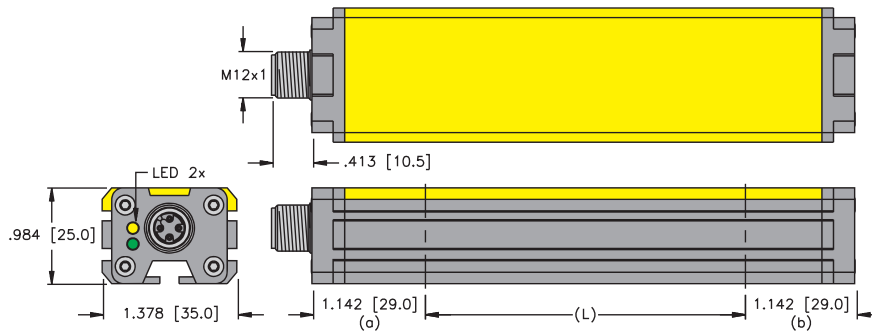
Assembly part number:
 Li200P1-Q25LM2-LiU5X3-H1151

S-series with standard resolution, analog output (U/I)

Technical data



Dimensions



Note: Right angle cable direction

Measuring range specifications

| | |
|----------------------|---|
| Measuring ranges (L) | 100, 200, 300, 400, 500, 600, 700, 800, 900, 1,000 mm |
| Blind zone (a) | 29 mm |
| Blind zone (b) | 29 mm |

System

| | |
|------------------------|---------------------------------------|
| Resolution | 12 bit (measuring range in mm / 4096) |
| Repeatability/accuracy | 0.025 % (0.025 mm per 100 mm) |
| Linearity deviation | ≤ 0.1 % of full scale |
| Temperature drift | ≤ ± 0.002 %/K |
| Ambient temperature | -25 to + 70 °C |
| Output update rate | 2 ms |
| Speed | 25 m/s |

Electrical data

| | |
|---|-----------------------|
| Operating voltage | 15-30 VDC |
| Residual ripple | ≤ 10 % U_{pp} |
| No-load current | ≤ 8 mA |
| Rated insulation voltage | ≤ 0.5 kV |
| Short-circuit protection | yes |
| Wire breakage / reverse polarity protection | yes/yes |
| Output function | 5-wire, analog output |
| Voltage output | 0-10 V |
| Current output | 4-20 mA |
| Load resistance of voltage output | ≥ 4.7 kΩ |
| Load resistance of current output | ≤ 0.4 kΩ |

Housing style

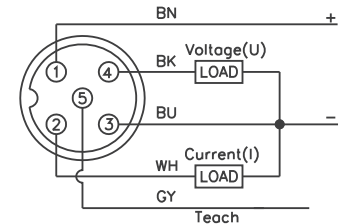
| | |
|---------------------------------------|--|
| Housing style | rectangular, Q25L |
| Dimensions | profile 35 x 25 mm, L = measuring range + 58mm |
| Housing material | aluminum |
| Material active face | plastic, PC-GF20 |
| Connection | connector, M12 x 1 |
| Vibration resistance | 55 Hz (1 mm)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

LEDs

| | |
|----------------------------|----------------------------------|
| Power indication | green LED |
| Measuring range indication | green/yellow multifunctional LED |

Wiring diagram

5-pin M12 *euromast*® connection



Mating cordset: RK 4.5T-*/S618

Connectivity



| Part number | Description |
|-------------|-------------|
|-------------|-------------|

| Connection cable for standard series and E-series with analog output | |
|--|--|
|--|--|

| | |
|---------------------------------|---|
| RK 4.5T-2/S618 | M12 <i>eurofast</i> ®, 5-pin female, shielded, 2 meter cable with flying leads. Other lengths available upon request. |
| RK 4.5T-2-RS 4.5T (as shown) | M12 <i>eurofast</i> , 5-pin 2 meter extension cable with male and female connectors. To connect <i>Q-track</i> ™ linear position sensors with analog output to TB4. Other lengths available upon request. |
| RKC 4.5T-2-RSS 4.5T | M12 <i>eurofast</i> , 5-pin 2 meter extension cable with male and female connectors. To connect <i>Q-track</i> ™ linear position sensors with analog output to TB4. Other lengths available upon request. Shield connected to male coupling nut for use in high noise environments. |



| Connection cable for E-series with SSI interface | |
|--|--|
|--|--|

| | |
|---|--|
| E-RKC-8T-264-2 | M12 <i>eurofast</i> , 8-pin female connector with 2 meter cable with flying leads. To connect <i>Q-track</i> linear position sensors with SSI output to <i>BL20</i> ® fieldbus stations. |
| E-RKC-8T-264-2-RSC-8T | M12 <i>eurofast</i> , 8-pin female connector with 2 meter cable to M12 <i>eurofast</i> , 8-pin male connector. To connect <i>Q-track</i> linear position sensors with SSI output to <i>BL67</i> ® and <i>BL compact</i> fieldbus stations. |
| E-RKS-8T-264-0.5-CSWM12/S3085 (as shown) | M12 <i>eurofast</i> , 8-pin female connector with 0.5 meter cable to right angle M23 <i>multifast</i> ®, 12-pin male connector. To connect <i>Q-track</i> linear position sensors with SSI output to <i>BL67</i> and fieldbus stations. |



| Teach adapter | |
|---------------|--|
|---------------|--|

| | |
|---------|---|
| VB2-SP5 | Teach adapter to program the measuring range of <i>Q-track</i> linear position sensors. |
|---------|---|



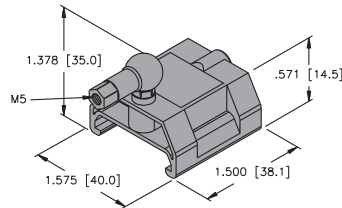
| Test box | |
|----------|--|
|----------|--|

| | |
|-----|--|
| TB4 | Test box for sensors with analog or switching output; batteries included. May also be used to program zero and span. |
|-----|--|

Position elements



Dimensions

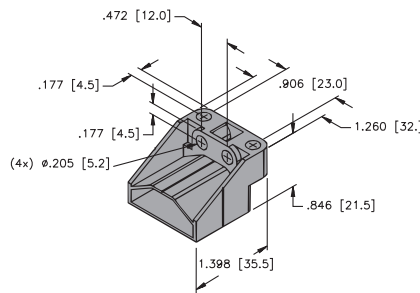


Part number

P1-Li-Q25L

Description

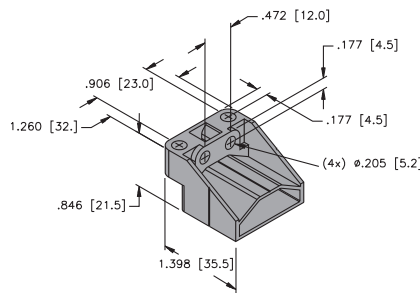
Captive positioning element; laterally inserted in sensor groove; incl. rod-end bearing to mount M5 threaded rods



Part number

P2-Li-Q25L

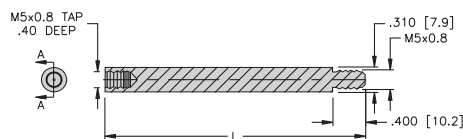
Floating positioning element, operates at a distance of 0-4 mm to the sensor surface



Part number

P3-Li-Q25L

Floating positioning element; right angle orientation; operates at a distance of 0-4 mm to the sensor surface

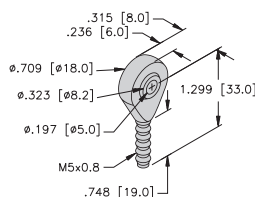


Part number

CA*E-Q21

Control arm; Can be used with P1-Li-Q25L and RE-Q21 to connect the positioning element to an actuator.

* Length specified in inches. 3, 6 and 9 inches are standard lengths. Other lengths available, consult factory for part numbers and availability.



Part number

RE-Q21

Rod End; Can be used with P1-Li-Q25L and CA*E-Q21 to connect the positioning element to an actuator.

Mounting accessories

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



| Dimensions | Part number | Description |
|------------|------------------|--|
| | M1-Q25L | Mounting foot for <i>Q-track</i> [™] linear position sensors; Two mounting feet should be used for devices with a measuring range of up to 1,000 mm; Material: stainless steel; 2 pcs. per bag. |
| | M2-Q25L | Mounting foot for <i>Q-track</i> linear position sensors; Two mounting feet should be used for devices with a measuring range of up to 1,000 mm; Material: stainless steel; 2 pcs. per bag. |
| | M4-Q25L | Mounting bracket for <i>Q-track</i> linear position sensors; Two mounting feet should be used for devices with a measuring range of up to 1,000 mm; Material: stainless steel; 2 pcs. per bag. |
| | MN-M4-Q25 | Sliding blocks with M4 thread for back side groove of <i>Q-track</i> linear position sensors; Material: Brass; 10 pcs. per bag. Only available separately, not as a kit with linear position sensors. |

Q-track™ linear position sensors

E-series with enhanced resolution and SSI interface



Product features

- Enhanced resolution, up to 20 bit, depending on sensor length
- Enhanced sample rate, 1 KHz
- Excellent temperature stability and linearity through direct digital signal transmission
- SSI interface
- M12 *eurofast*® connector (8-pin)
- 29 mm blind zones
- Robust extruded aluminum housing
- Watertight (IP67) polycarbonate insert
- Multifunction LED

Measuring range indicated via LED

- **Green:** The positioning element is in the measuring range.
- **Green/yellow alternate flashing:** The positioning element is in the measuring range with a lower signal quality (i.e. distance too long).
- **Yellow flashing:** The positioning element is outside of the measuring range (max. range).
- **Off:** The positioning element is outside the programmed range but inside the total, non-programmed measuring length.

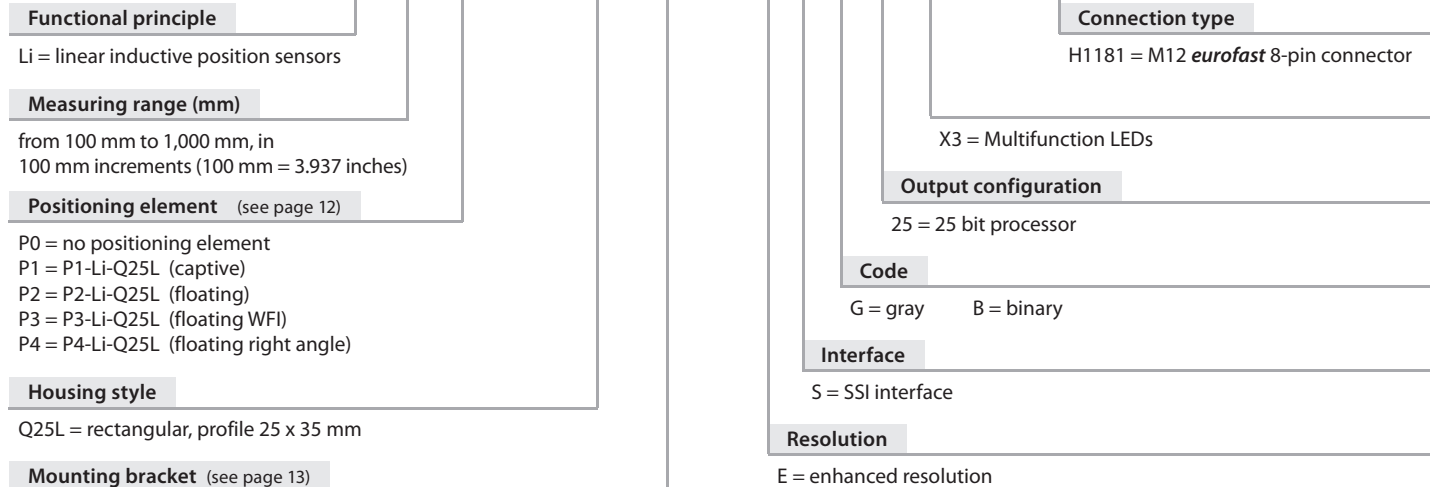
High-precision digital SSI output

SSI (synchronous serial interface) is a 4 wire data communication standard commonly used in industry to transmit position data digitally. The conductors in the cable are shielded twisted pairs that enhance EMI/RFI protection. In addition to the clock and data wires, it also has separate power wiring.

Available for order second quarter 2010.

Part number key

Li 100 P1 - Q25L M1 - E S G 25 X3 - H1181



Ordering information

The *Q-track* linear position sensors are available in different lengths from 100 to 1,000 mm, in increments of 100 mm. The sensors, mounting accessories and positioning elements are available individually or as a kit.



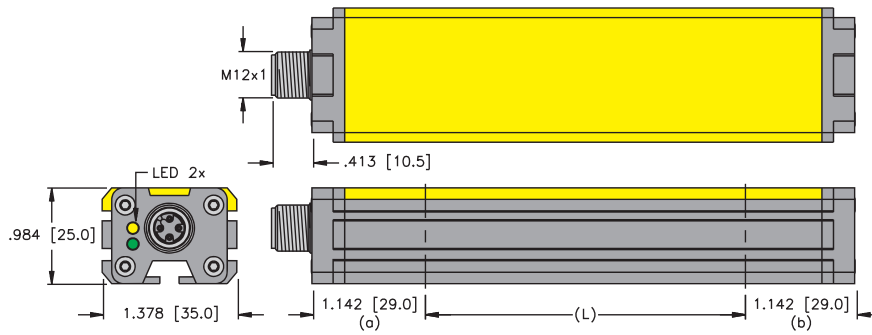
Assembly part number:
Li100P2-Q25LM1-ESG25X3-H1181

E-series with enhanced resolution and SSI interface

Technical data



Dimensions



Note: Right angle cable direction

Measuring range specifications

| | |
|----------------------|---|
| Measuring ranges (L) | 100, 200, 300, 400, 500, 600, 700, 800, 900, 1,000 mm |
| Blind zone (a) | 29 mm |
| Blind zone (b) | 29 mm |

System

| | |
|------------------------|----------------------------|
| Resolution | 0.001 mm |
| Repeatability/accuracy | 10 μ m (0.01 mm) |
| Linearity deviation | ≤ 0.1 % of full scale |
| Temperature drift | $\leq \pm 0.0001$ %/K |
| Ambient temperature | -25 to +70 °C |
| Output update rate | 1 ms |
| Speed | 50 m/s |

Electrical data

| | |
|---|-------------------------------|
| Operating voltage | 15-30 VDC |
| Residual ripple | ≤ 10 % U_{pp} |
| 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 code |
| Current consumption | < 100 mA |

Housing style

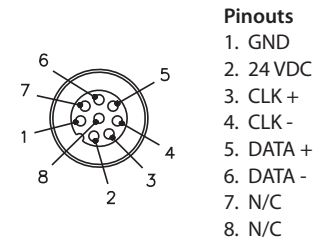
| | |
|---------------------------------------|---|
| Housing style | rectangular, Q25L |
| Dimensions | profile 35 x 25mm, L = measuring range + 58mm |
| Housing material | aluminum |
| Material active face | plastic, PC-GF20 |
| Connection | connector, M12 x 1 |
| Vibration resistance | 55 Hz (1 mm)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

LEDs

| | |
|----------------------------|----------------------------------|
| Power indication | green LED |
| Measuring range indication | green/yellow multifunctional LED |

Wiring diagram

8-pin M12 eurofast® connection



Mating cordset: E-RKC 8T-264-*

Accessories – Fieldbus connection

The *Q-track*™ linear position sensor with SSI interface is compatible with all fieldbus devices



| Part number | Description |
|-------------|-------------|
|-------------|-------------|

| <i>BL20</i> ® – Distributed I/O, IP20 rated device | | |
|--|-------------------|---|
| Select one | BL20-GW-EN-IP | Gateway Ethernet/IP™ |
| | BL20-GW-DPV1 | Gateway PROFIBUS®-DP |
| | BL20-GWBR-DNET | Gateway DeviceNet™ |
| | BL20-GWBR-CANOPEN | Gateway CANopen |
| | BL20-GW-EN | Gateway Ethernet Modbus TCP |
| | BL20-PG-EN | Gateway Ethernet Modbus TCP, programmable |
| | BL20-GW-PG-EN | Gateway Ethernet PROFINET® IO |
| | BL20-1SSI | Communication module |
| | BL20-S4T-SBBS | Connection module, tension-spring connection |
| | E-RKC-8T-264-2 | Connection cable M12, 8-pin, 2 m cable (end open) to connect <i>Q-track</i> ™ linear position sensors with SSI output to <i>BL20</i> fieldbus stations. |



| <i>BL67</i> ® – Distributed I/O, IP67 rated device | |
|--|--|
|--|--|

| | | |
|-----------------------------|---|--|
| Select one | BL67-GW-EN-IP | Gateway Ethernet IP |
| | BL67-GW-DPV1 | Gateway PROFIBUS-DP |
| | BL67-PG-DP | Gateway PROFIBUS-DP, programmable |
| | BL67-GW-DN | Gateway DeviceNet |
| | BL67-GW-CO | Gateway CANopen |
| | BL67-GW-EN | Gateway Ethernet Modbus TCP |
| | BL67-PG-EN | Gateway Ethernet Modbus TCP, programmable |
| | BL67-GW-EN-PN | Gateway Ethernet PROFINET IO |
| | BL67-1SSI | Communication module |
| | BL67-B-1M12-8 | Connection module M12 <i>eurofast</i> ®, 8-pin |
| BL67-B-1M23 | Connection module M23 <i>multifast</i> ®, 12-pin | |
| E-RKC-8T-264-2-RSC-8T | Connection cable M12 <i>eurofast</i> , 8-pin, 2 m to connect <i>Q-track</i> linear position sensors with SSI output to BL67 and <i>BL compact</i> fieldbus stations. | |
| E-RKS-8T-264-1-CSWM12/S3085 | Connection cable M12 <i>eurofast</i> , 8-pin, on M23 <i>multifast</i> 12-pin, 1m to connect <i>Q-track</i> linear position sensors with SSI output to <i>BL67</i> and <i>piconet</i> fieldbus stations. | |



| <i>BL compact</i> – Robust, IP67 rated device | |
|---|--|
|---|--|

| | |
|-----------------------|---|
| BLCEP-1M12MT-1SSI | Ethernet IP, M12 <i>eurofast</i> , 8-pin |
| E-RKC-8T-264-2-RSC-8T | Connection cable M12 <i>eurofast</i> , 8-pin, 2 m to connect <i>Q-track</i> linear position sensors with SSI output to <i>BL67</i> and <i>BL compact</i> fieldbus stations. |

Sample configuration - BL67

The following components are required to connect a *Q-track* linear position sensor to a Ethernet IP system via a *BL67* station:

- 1 x Ethernet IP gateway: BL67-PG-EN-IP
- 1 x communication module: BL67-1SSI
- 1 x connection module: BL67-B-1M12-8
- 1 x connection cable: E-RKC-8T-264-2-RSC 8T



Ethernet Modbus TCP



| Part number | Description |
|-------------|-------------|
|-------------|-------------|

| Connection cable for standard series and E-series with analog output | |
|--|--|
|--|--|

| | |
|---------------------------------|---|
| RK 4.5T-2/S618 | M12 <i>eurofast</i> ®, 5-pin female, shielded, 2 meter cable with flying leads. Other lengths available upon request. |
| RK 4.5T-2-RS 4.5T (as shown) | M12 <i>eurofast</i> , 5-pin 2 meter extension cable with male and female connectors. To connect <i>Q-track</i> ™ linear position sensors with analog output to TB4. Other lengths available upon request. |
| RKC 4.5T-2-RSS 4.5T | M12 <i>eurofast</i> , 5-pin 2 meter extension cable with male and female connectors. To connect <i>Q-track</i> ™ linear position sensors with analog output to TB4. Other lengths available upon request. Shield connected to male coupling nut for use in high noise environments. |



| Connection cable for E-series with SSI interface | |
|--|--|
|--|--|

| | |
|---|--|
| E-RKC-8T-264-2 | M12 <i>eurofast</i> , 8-pin female connector with 2 meter cable with flying leads. To connect <i>Q-track</i> linear position sensors with SSI output to <i>BL20</i> ® fieldbus stations. |
| E-RKC-8T-264-2-RSC-8T | M12 <i>eurofast</i> , 8-pin female connector with 2 meter cable to M12 <i>eurofast</i> , 8-pin male connector. To connect <i>Q-track</i> linear position sensors with SSI output to <i>BL67</i> ® and <i>BL compact</i> fieldbus stations. |
| E-RKS-8T-264-0.5-CSWM12/S3085 (as shown) | M12 <i>eurofast</i> , 8-pin female connector with 0.5 meter cable to right angle M23 <i>multifast</i> ®, 12-pin male connector. To connect <i>Q-track</i> linear position sensors with SSI output to <i>BL67</i> and fieldbus stations. |



| Teach adapter | |
|---------------|--|
|---------------|--|

| | |
|---------|---|
| VB2-SP5 | Teach adapter to program the measuring range of <i>Q-track</i> linear position sensors. |
|---------|---|



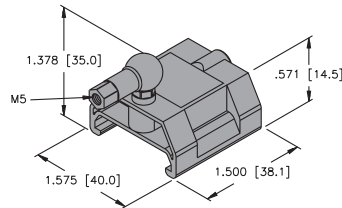
| Test box | |
|----------|--|
|----------|--|

| | |
|-----|--|
| TB4 | Test box for sensors with analog or switching output; batteries included. May also be used to program zero and span. |
|-----|--|

Position elements



Dimensions

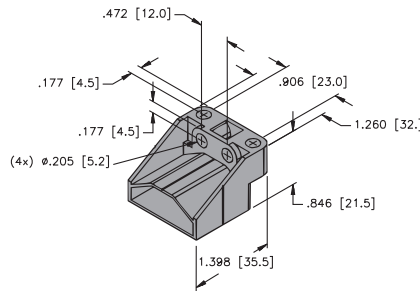


Part number

P1-Li-Q25L

Description

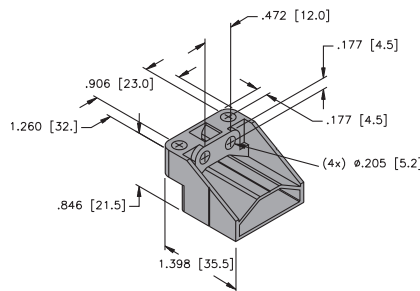
Captive positioning element; laterally inserted in sensor groove; incl. rod-end bearing to mount M5 threaded rods



Part number

P2-Li-Q25L

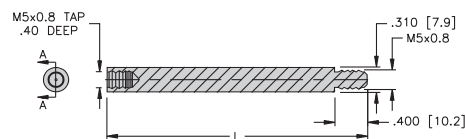
Floating positioning element, operates at a distance of 0-4 mm to the sensor surface



Part number

P3-Li-Q25L

Floating positioning element; right angle orientation; operates at a distance of 0-4 mm to the sensor surface

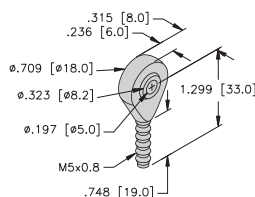


Part number

CA*E-Q21

Control arm; Can be used with P1-Li-Q25L and RE-Q21 to connect the positioning element to an actuator.

* Length specified in inches. 3, 6 and 9 inches are standard lengths. Other lengths available, consult factory for part numbers and availability.



Part number

RE-Q21

Rod End; Can be used with P1-Li-Q25L and CA*E-Q21 to connect the positioning element to an actuator.


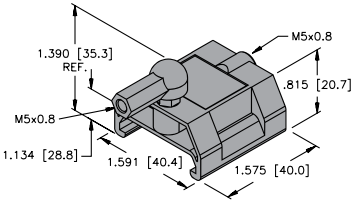

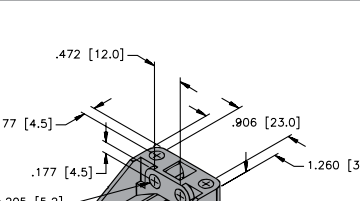

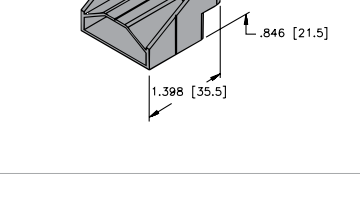

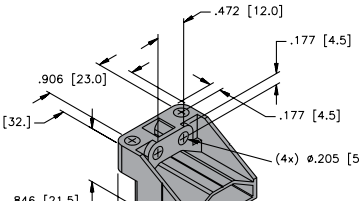
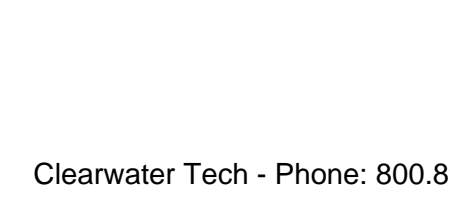
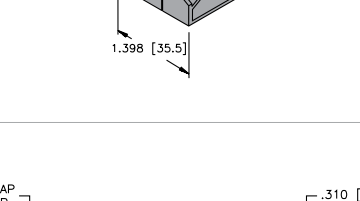

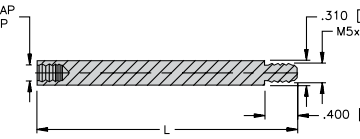

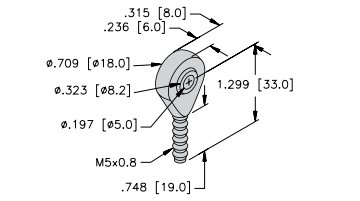
Mounting accessories

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



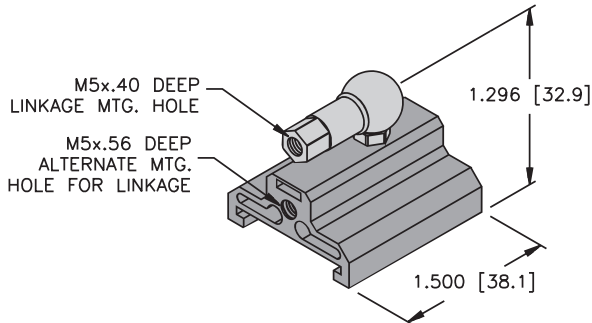
| Dimensions | Part number | Description |
|------------|------------------|--|
| | M1-Q25L | Mounting foot for <i>Q-track</i> ™ linear position sensors; Two mounting feet should be used for devices with a measuring range of up to 1,000 mm; Material: stainless steel; 2 pcs. per bag. |
| | M2-Q25L | Mounting foot for <i>Q-track</i> linear position sensors; Two mounting feet should be used for devices with a measuring range of up to 1,000 mm; Material: stainless steel; 2 pcs. per bag. |
| | M4-Q25L | Mounting bracket for <i>Q-track</i> linear position sensors; Two mounting feet should be used for devices with a measuring range of up to 1,000 mm; Material: stainless steel; 2 pcs. per bag. |
| | MN-M4-Q25 | Sliding blocks with M4 thread for back side groove of <i>Q-track</i> linear position sensors; Material: Brass; 10 pcs. per bag. Only available separately, not as a kit with linear position sensors. |

Position elements

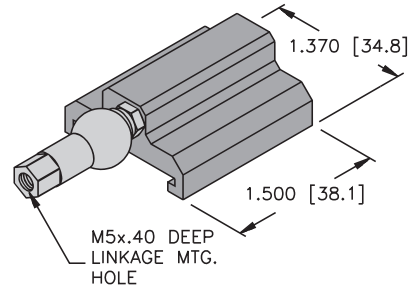
| | Dimensions | Part number | Description |
|--|---|--|-------------|
|  |  | P1-Li-Q25L Captive positioning element; laterally inserted in sensor groove; incl. rod-end bearing to mount M5 threaded rods | |
|  |  | P5-Li-Q25L Captive positioning element applied in extremely strong magnetic fields, such as welding areas; laterally inserted in sensor groove; incl. rod-end bearing to mount M5 threaded rods | |
|  |  | P2-Li-Q25L Floating positioning element, operates at a distance of 0-4 mm to the sensor surface | |
|  |  | P4-Li-Q25L Floating 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 Floating positioning element; right angle orientation; operates at a distance of 0-4 mm to the sensor surface | |
|  |  | CA*E-Q21 Control arm; Can be used with P1-Li-Q25L and RE-Q21 to connect the positioning element to an actuator. * Length specified in inches. 3, 6 and 9 inches are standard lengths. Other lengths available, consult factory for part numbers and availability. | |
|  |  | RE-Q21 Rod End; Can be used with P1-Li-Q25L and CA*E-Q21 to connect the positioning element to an actuator. | |

Profile series accessories

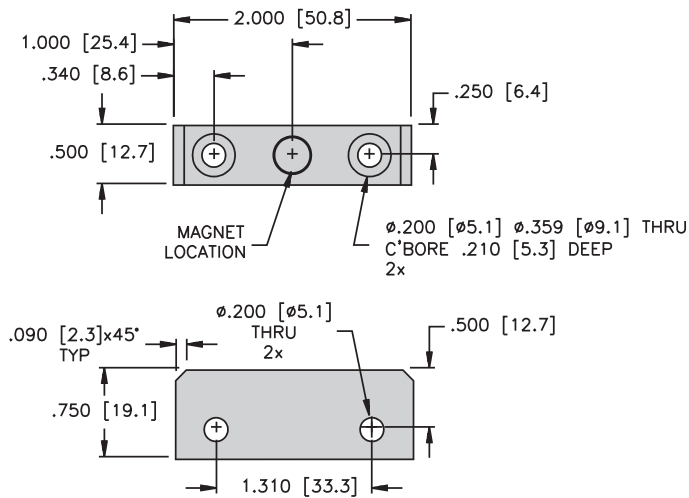
Slide magnet
SM-Q21 [A5600]



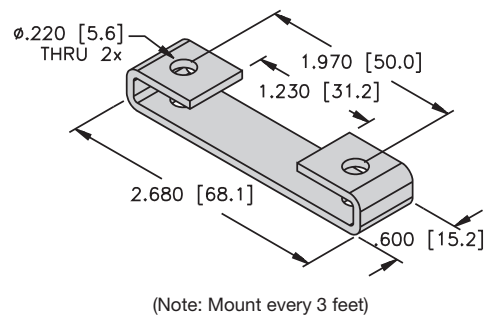
Slide magnet with slide adapter
SA-Q21 [A0864]



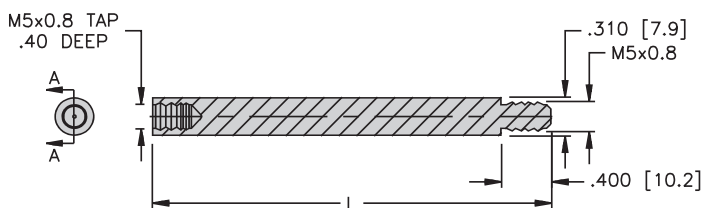
Floating magnet
FM-Q21 [A5500]



Q21 mounting brackets
MB-Q21 [A5700]

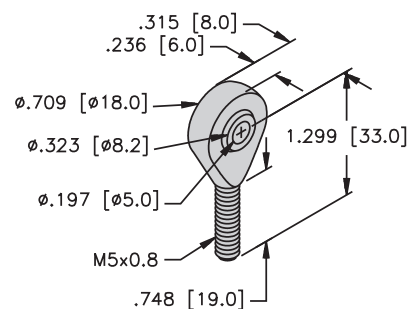


Control arms
CA*E-Q21



Rod ends

RE-Q21 [A0865]



* Length in inches.