

SENSORS



Valve Position Sensors



Type	35 mm	26 mm	20 mm	16 mm
Sensing Range	4 mm	4 mm	4 mm	2.5 mm
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Type	Valve Sensor Pucks	EZ-track®
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Type	Accessories
Pages	L27

Valve Position Sensors

Position control in actuators and drives is essential in most chemical, petrochemical, and food industry applications. **TURCK** valve position sensors provide a quality solution to valve position feedback in a variety of applications. Each industry has different needs, and while the DS20 series works well in most general applications, **TURCK** has created a variety of styles that were designed with specific industries in mind.

Chemical and Petrochemical Industries

The DSU35 provides superior protection against environmental influences, and is highly resistant to harsh chemicals, making it the ideal choice for chemical and petrochemical applications. This sensor and target puck can be mounted to several different actuator sizes without the need for adapters or spacer plates. The DSU35 is available with numerous outputs circuits such as a 2-wire DC, 2-wire NAMUR, 2-wire AC/DC, as well as with DeviceNet™ and AS-I bus protocols. We also offer the DSU35 with a terminal chamber, which is often a requirement in chemical process applications where conduit must be used.



Rising stem valve shown with
TURCK Vprox® 773 sensors.

Food & Beverage Industries

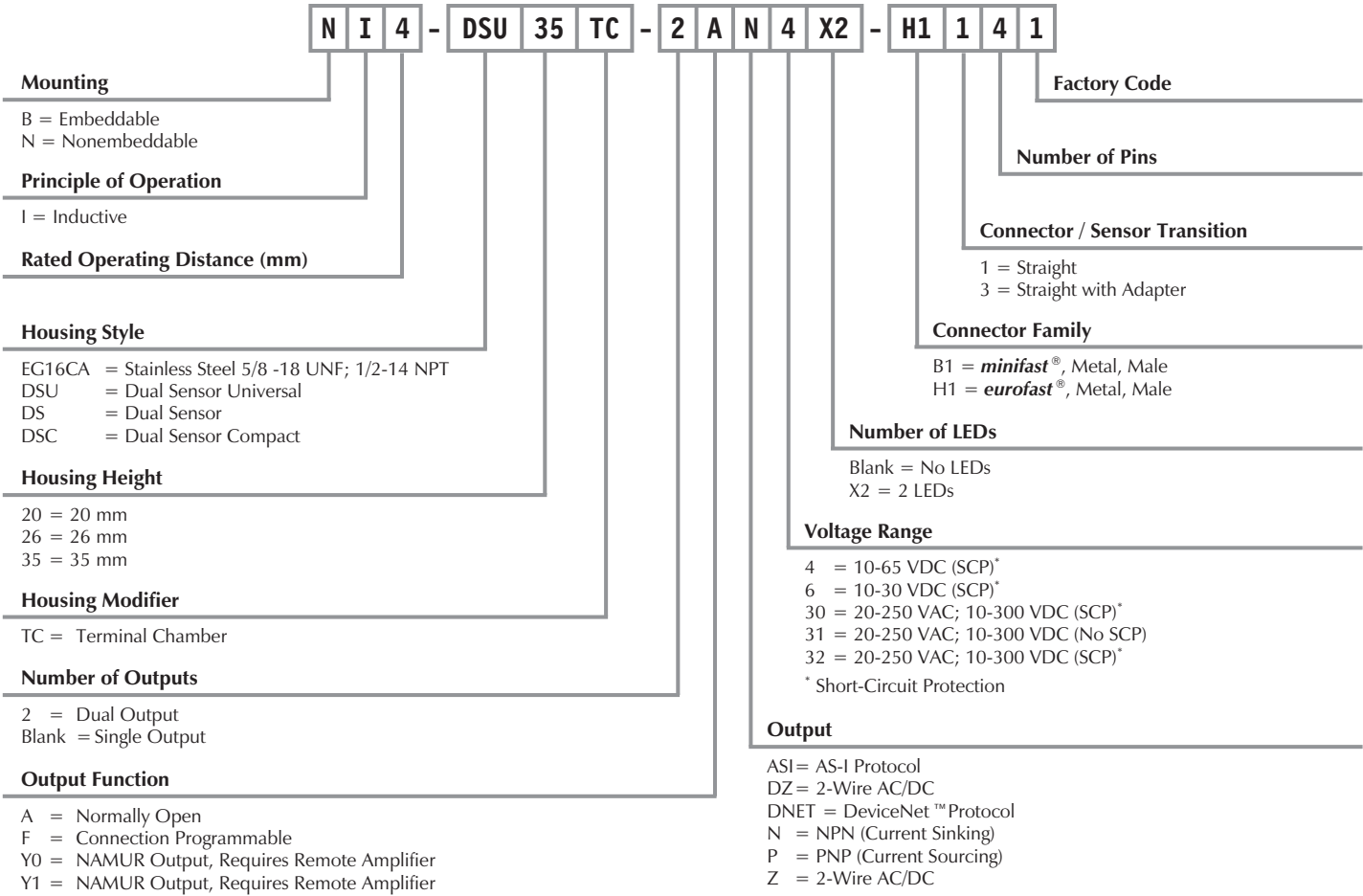
TURCK uses injection-molding technology to make the compact DSC26 sensor, ensuring that it is fully sealed and well suited in wet surroundings. These features make the DSC26 ideal for use in a number of food or beverage applications. The DSC26 has a smooth housing which makes it easy to clean, yet it also has a high degree of protection against high pressure cleaning, and is highly resistant to aggressive cleaning agents.

Overview

TURCK has met with market demand to create an extensive line of valve position sensors. With a variety of standard **eurofast®**, **microfast®**, and **minifast®** connections available, **TURCK's** dual sensors reduce installation costs and minimize the cost of maintenance. These robust and impact resistant sensors are ideal when valve position information must be provided.

Valve Position Sensor Part Number Key

Part Number Keys are to assist in IDENTIFICATION ONLY. Consult factory for catalog items not identified.



Dual DC NAMUR – Y0, Y1

Temperature Drift	≤±10%
Differential Travel (Hysteresis)	1-10% (5% typical)
Nominal Voltage	8.2 VDC (EN60947-5-6)
Resistance Change from Nonactivated to Activated Condition	Typical <1.0 to >8.0 kΩ
Rated Insulation Voltage	≤1.5 kV
Resulting Current Change	≥2.2 mA to ≤1.0 mA
Recommended Switching Point for Remote Amplifier	>1.2 to <2.1 mA, typ. 1.55 mA ON/1.75 mA OFF
Power-On Effect	Realized in Amplifier
Reverse Polarity Protection	Yes, up to 10 VDC
Wire-Break Protection	Realized in Amplifier
Transient Protection	Realized in Amplifier
Shock	30 g, 11 ms
Vibration	55 Hz, 1 mm Amplitude in all 3 Planes
Repeatability	≤2% of Rated Operating Distance
Short-Circuit Protection	Yes, when connected to NAMUR amplifier up to 15 VDC

Dual AC/DC without Short-Circuit Protection – ADZ31, ADZ35

Temperature Drift	≤±10%
Line Frequency	40-60 Hz
Differential Travel (Hysteresis)	3-15% (5% typical)
Voltage Drop Across Conducting Sensor	≤6.0 V at 400 mA
Off-State (Leakage) Current	≤1.7 mA
Minimum Load Current	≥5.0 mA
Inrush Current	≤8.0 A (≤10 ms, 5% Duty Cycle)
Power-On Effect	Per IEC 947-5-2
Transient Protection	Per EN 60947-5-2
Shock	30 g, 11 ms
Vibration	55 Hz, 1 mm Amplitude in all 3 Planes
Repeatability	≤2% of Rated Operating Distance
Short-Circuit Protection	No

Dual AC/DC with Short-Circuit Protection – ADZ30, ADZ32, FDZ32

Temperature Drift	≤±10%
Line Frequency	40-60 Hz
Differential Travel (Hysteresis)	3-15% (5% typical)
Voltage Drop Across Conducting Sensor	≤6.0 V at 400 mA; 8 & 12 mm ≤6.0 V at 100 mA
Trigger Current for Overload Protection	AC: ≥440 mA; DC: ≥330 mA
Rated Insulation Voltage	≤1.5 kV
Off-State (Leakage) Current	≤1.7 mA (AC) ≤1.5 mA (DC)
Minimum Load Current	≥3.0 mA
Inrush Current	4.0 A (≤20 ms, 10% Duty Cycle)
Power-On Effect	Per IEC 947-5-2
Transient Protection	Per EN 60947-5-2
Shock.	30 g, 11 ms
Vibration	55 Hz, 1 mm Amplitude in all 3 Planes
Repeatability	≤2% of Rated Operating Distance
Short-Circuit Protection	Yes

Dual DC or Discrete Output – 2AP4X2, 2AP6X2, 2AN4X2, 2AN6X2

Temperature Drift	≤±10%
Ripple	≤10%
Differential Travel (Hysteresis)	3-15% (5% typical)
Voltage Drop Across Conducting Sensor	≤1.8 V
Rated Insulation Voltage	≤0.5 kV
Trigger Current for Overload Protection	≥220 mA on 200 mA Load Current ≥170 mA on 150 mA Load Current ≥120 mA on 100 mA Load Current
Off-State (Leakage) Current	<100 µA
No-Load Current	<10 mA
Time Delay Before Availability.	≤8 ms
Power-On Effect	Per IEC 947-5-2
Reverse Polarity Protection	Incorporated
Wire-Break Protection	Incorporated
Transient Protection	Per EN 60947-5-2
Shock.	30 g, 11 ms
Vibration	55 Hz, 1 mm Amplitude in all 3 Planes
Repeatability	≤2% of Rated Operating Distance
Short-Circuit Protection	Yes

Dual DC – AS-interface®

Temperature Drift	≤±10%
Differential Travel (Hysteresis)	3-15% (5% typical)
No-Load Current	≤35 ma
Rated Insulation Voltage	≤0.5 kV
E/A Configuration (HEX) / ID-Code (HEX)	7 / F
I/O Matrix Input	0 = upper sensor S01 1 = lower sensor S02 2 = wire-break at output 3 = not used
I/O Matrix Output	0 = output "ON" 1-3 = not used
Short-Circuit Protection / Output Watchdog	Yes / Yes
Wire-Break Protection I _{out}	≤0.1 mA
Shock	30 g, 11 ms
Vibration	55 Hz, 1 mm Amplitude in all 3 Planes
Repeatability	≤2% of Rated Operating Distance
AS-I Version	AS-I V2.1

Dual DC – DeviceNet™

Temperature Drift	≤±10%
Differential Travel (Hysteresis)	3-15% (5% typical)
No-Load Current	≤60 ma
Rated Insulation Voltage	≤0.5 kV
Address (MacID)	0-63, via EDS file
Baud Rate	via EDS Date
Input Data DeviceNet	Bit 0 S01 input / Bit 1 S02 input / Bit 2 output error / Bit 7 input error / Bit 3-6, not used
Output Data DeviceNet	Bit 0 valve output / Bit 1-7, not used
Output Voltage	V+ - 3 V, PNP
Short-Circuit Protection / Output Watchdog	Yes / No
Wire-Break Protection I _{out}	≤0.1 mA
Shock	30 g, 11 ms
Vibration	55 Hz, 1 mm Amplitude in all 3 Planes
Repeatability	≤2% of Rated Operating Distance

LED	Color	State	Status
S01	YE	On	Target detected
S02	YE	On	Target detected
Out	YE	Off	Output Off
		On	Output On
ERR	RD	On	Output On/Off wirebreak detected
Status	RD/GN	Off	Sensor not powered
		GN On Steady	Sensor active and allocated by master
		GN Flashing	Sensor active and not allocated by master
		RD Flashing	Recoverable fault (open output, invalid input state, low bus voltage, I/O timeout)
		RD On Steady	Major fault (duplicate address, baud rate, bus off comm.)
		GN+RD On	Autobaud detect
		GN+RD Flashing	Power-up test

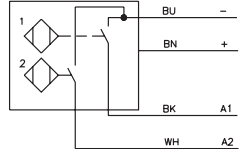
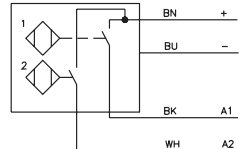
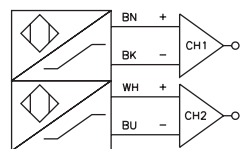
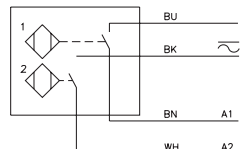


Housing Style	Part Number	ID Number	Features	Sensing Range (mm)	Output
35 mm - Nonembeddable, Dual Valve Sensor, Potted-In Cable 	Ni 4-DSU35-2AN4X2	M1569921	Short-Circuit Protection	4	Dual NPN
	Ni 4-DSU35-2AP4X2	M1569900	Short-Circuit Protection	4	Dual PNP
	Ni 4-DSU35-2Y1X2	M1051002	Short-Circuit Protection	4	Dual NAMUR
	Ni 4-DSU35-2ADZ30X2	M4290000	Short-Circuit Protection	4	Dual AC/DC

Additional specifications on pages L6 - L8.
 Target Pucks on pages L23 - L26.



Most Ni 4-DSU35... dual valve sensors are FM approved for installation in Class I, Division 2 hazardous locations. See **TURCK** control drawing Ni-1.002 (www.turck.com/fmcd) for specific models and installation requirements. Ni 4-DSU35-2Y0X2-... dual valve sensors are FM approved as intrinsically safe for installation in Class I, II or III, Division 1 hazardous locations per **TURCK** control drawing IS-1.000 (www.turck.com/fmcd).

Voltage	Switching Freq. (Hz)	Switching Current (mA)	Operating Temp. (°C)	Protection	Housing	Face	End Cap	Power LED	Output LED	Mating Cord Cable Length/Jacket	Wiring Diagram #	Wiring Diagrams
10-65 VDC	50	≤200	-25 to +70	IP 67	PP	PP	N/A	N/A	YE/RD	2M/PVC	1	Diagram 1 
10-65 VDC	50	≤200	-25 to +70	IP 67	PP	PP	N/A	N/A	YE/RD	2M/PVC	2	Diagram 2 
5-30 VDC	50	Remote	-25 to +70	IP 67	PP	PP	N/A	N/A	YE/RD	2M/PVC	3	Diagram 3 
20-250 VAC 10-300 VDC	30	≤400/300	-25 to +70	IP 67	PP	PP	N/A	N/A	YE/RD	2M/PVC	4	Diagram 4 

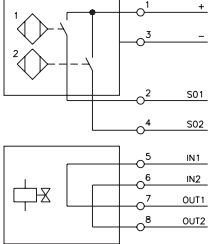
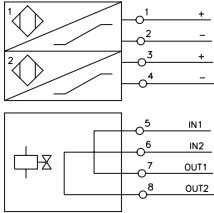
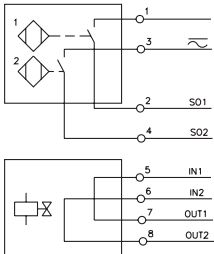
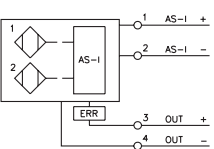


Housing Style	Part Number	ID Number	Features	Sensing Range (mm)	Output
35 mm - Nonembeddable, Dual Valve Sensor, Terminal Chamber 	Ni 4-DSU35TC-2AP4X2	M1569902	Short-Circuit Protection	4	Dual PNP
	Ni 4-DSU35TC-2Y1X2	M1051004	Short-Circuit Protection up to 15 VDC	4	Dual NAMUR
	Ni 4-DSU35TC-2ADZ30X2	M4290002	Short-Circuit Protection	4	Dual AC/DC
	Ni 4-DSU35TC-2ASIX4	M1902005	Short-Circuit Protection	4	Dual ASI-BUS

Additional specifications on pages L6 - L8.
 Target Pucks on pages L23 - L26.



Most Ni 4-DSU35... dual valve sensors are FM approved for installation in Class I, Division 2 hazardous locations. See **TURCK** control drawing Ni-1.002 (www.turck.com/fmcd) for specific models and installation requirements. Ni 4-DSU35TC-2Y0X2 dual valve sensors are FM approved as intrinsically safe for installation in Class I, II or III, Division 1 hazardous locations per **TURCK** control drawing IS-1.000 (www.turck.com/fmcd).

Voltage	Switching Freq. (Hz)	Switching Current (mA) VAC/VDC	Operating Temp. (°C)	Protection	Housing	Face	End Cap	Power LED	Output LED	Mating Cord Length/Jacket	Wiring Diagram #	Wiring Diagrams
10-65 VDC	50	≤200	-25 to +70	IP 67	PP	PP	N/A	N/A	YE/RD	N/A	1	Diagram 1 
5-30 VDC	50	Remote	-25 to +70	IP 67	PP	PP	N/A	N/A	YE/RD	N/A	2	Diagram 2 
20-250 VAC 10-300 VDC	30	≤400/300	-25 to +70	IP 67	PP	PP	N/A	N/A	YE/RD	N/A	3	Diagram 3 
18-33 VDC	30	≤80	-25 to +70	IP 67	PP	PP	N/A	N/A	YE/RD	N/A	4	Diagram 4 



Housing Style	Part Number	ID Number	Features	Sensing Range (mm)	Output
35 mm - Nonembeddable, Dual Valve Sensor, eurofast® Connector 	Ni 4-DSU35-2AN4X2-H1141	M1569920	Short-Circuit Protection	4	Dual NPN
	Ni 4-DSU35-2AP4X2-H1141	M1569901	Short-Circuit Protection	4	Dual PNP
	Ni 4-DSU35-2Y0X2-H1140	M1051003	Short-Circuit Protection up to 15 VDC	4	Dual NAMUR
35 mm - Nonembeddable, Dual Valve Sensor, minifast® Connector 	Ni 4-DSU35-2ADZ30X2-B1151	M4290001	Short-Circuit Protection	4	Dual AC/DC
	Ni 4-DSU35-2ADZ35X2-B1151	M4290009		4	
35 mm - Nonembeddable, Dual Valve Sensor, eurofast Connector 	Ni 4-DSU35-2ASIX4-H1140	M1902000	Short-Circuit Protection	4	Dual ASI-BUS
	Ni 4-DSU35-2DNETX5-H1150	M1569908	Short-Circuit Protection	4	Dual DeviceNet™
35 mm - Nonembeddable, Dual Valve Sensor, minifast Connector 	Ni 4-DSU35-2AP4X2-B1160-FKE4.5	M1569923	Short-Circuit Protection	4	Dual PNP

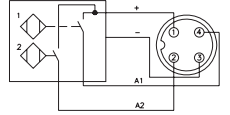
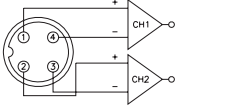
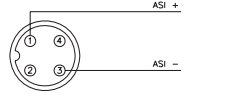
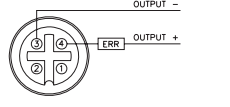
Additional specifications on pages L6 - L8.
Target Pucks on pages L23 - L26.



Most Ni 4-DSU35... dual valve sensors are FM approved for installation in Class I, Division 2 hazardous locations. See **TURCK** control drawing Ni-1.002 (www.turck.com/fmcd) for specific models and installation requirements. Ni 4-DSU35-2Y0X2-... dual valve sensors are FM approved as intrinsically safe for installation in Class I, II or III, Division 1 hazardous locations per **TURCK** control drawing IS-1.000 (www.turck.com/fmcd).

Voltage	Switching Freq. (Hz)	Switching Current (mA) VAC/VDC	Operating Temp. (°C)	Protection	Housing	Face	End Cap	Power LED	Output LED	Mating Cord Length/Jacket	Wiring Diagram #	Wiring Diagrams
10-65 VDC	50	≤200	-25 to +70	IP 67	PP	PP	N/A	N/A	YE/RD	RK 4.4T-*	1	Diagram 1
10-65 VDC	50	≤200	-25 to +70	IP 67	PP	PP	N/A	N/A	YE/RD	RK 4.4T-*	2	Diagram 2
5-30 VDC	50	Remote	-25 to +70	IP 67	PP	PP	N/A	N/A	YE/RD	RK 4.41T-*	6	Diagram 3
20-250 VAC 10-300 VDC	30	≤400/300	-25 to +70	IP 67	PP	PP	N/A	N/A	YE/RD	RKM 50-*M	4	Diagram 4
20-150 VAC 10-150 VDC	50	≤400/300	-25 to +70	IP 67	PP	PP	N/A	N/A	YE/RD	RKM 50-*M	4	Diagram 5
18-33 VDC	30	≤80	-25 to +70	IP 67	PP	PP	N/A	N/A	YE/RD	RKC 254-*M RS 4.4T-*	5	Diagram 6
11-25 VDC	50	≤80	-25 to +70	IP 67	PP	PP	N/A	N/A	YE/RD	RKC 572-*M RS 4.4T-*	6	Diagram 7
10-65 VDC	50	≤200	-25 to +70	IP 67	PP	PP	N/A	N/A	YE/RD	RKM 60-*M RK 4.5T-*	7	Diagram 8

* Length in meters.

Voltage	Switching Freq. (Hz)	Switching Current (mA) VAC/VDC	Operating Temp. (°C)	Protection	Housing	Face	End Cap	Power LED	Output LED	Mating Cord/ Cable Length/Jacket	Wiring Diagram #	Wiring Diagrams
10-30 VDC	50	≤200	-25 to +70	IP 67	PP	PP	N/A	N/A	YE/RD	RK 4.4T-*	1	Diagram 1 
10-65 VDC	50	≤200	-25 to +70	IP 67	PP	PP	N/A	N/A	YE/RD	RK 4.4T-*	1	Diagram 2 
5-30 VDC	50	Remote	-25 to +70	IP 67	PP	PP	N/A	N/A	YE/RD	RK 4.41T-*	2	Diagram 3 
18-33 VDC	30	≤80	-25 to +70	IP 67	PP	PP	N/A	N/A	YE/RD	RKC 254-* RS 4.4T-*	3	

* Length in meters.

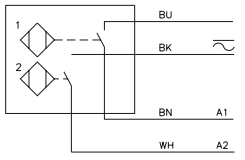
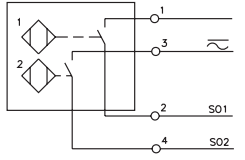
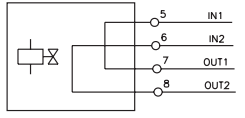


Housing Style	Part Number	ID Number	Features	Sensing Range (mm)	Output
26 mm - Nonembeddable, Dual Valve Sensor, Potted-In Cable 	Ni 4-DSU26-2ADZ30X2	M4290005	Short-Circuit Protection	4	Dual AC/DC
26 mm - Nonembeddable, Dual Valve Sensor, Terminal Chamber 	Ni 4-DSU26TC-2ADZ30X2	M4290004	Short-Circuit Protection	4	Dual AC/DC

Additional specifications on pages L6 - L8.
 Target Pucks on pages L23 - L26.



Most Ni 4-DS20-2Y1X2-... dual valve sensors are FM approved as intrinsically safe for installation in Class I, Division 1 hazardous locations per **TURCK** control drawing IS-1.000 (www.turck.com/fmcd).

Voltage	Switching Freq. (Hz)	Switching Current (mA) VAC/VDC	Operating Temp. (°C)	Protection	Housing	Face	End Cap	Power LED	Output LED	Mating Cord, Cable Length/Jacket	Wiring Diagram #	Wiring Diagrams
20-250 VAC 10-300 VDC	30	≤400/300	-25 to +70	IP 67	PP	PP	N/A	N/A	YE/RD	2M/PVC	1	Diagram 1  Diagram 2 
20-250 VAC 10-300 VDC	30	≤400/300	-25 to +70	IP 67	PP	PP	N/A	N/A	YE/RD	N/A	2	

Additional specifications on pages L6 - L8.
Target Pucks on pages L23 - L26.



Most Ni 4-DS20-2Y1X2-... dual valve sensors are FM approved as intrinsically safe for installation in Class I, Division 1 hazardous locations per **TURCK** control drawing IS-1.000 (www.turck.com/fmcd).

Voltage	Switching Freq. (Hz)	Switching Current (mA) VAC/VDC	Operating Temp. (°C)	Protection	Housing	Face	End Cap	Power LED	Output LED	Mating Cord Length/Jacket	Wiring Diagram #	Wiring Diagrams
10-30 VDC	50	≤200	-25 to +70	IP 67	PBT	PBT	N/A	N/A	YE/YE	RK 4.4T-*	1	Diagram 1
5-30 VDC	50	Remote	-25 to +70	IP 67	PBT	PBT	N/A	N/A	RD/RD	RK 4.41T-*	2	Diagram 2
20-250 VAC 10-300 VDC	20	≤100/300	-25 to +70	IP 67	PBT	PBT	N/A	N/A	RD/RD	KB 5T-*	3	Diagram 3
10-30 VDC	50	≤200	-25 to +70	IP 67	PBT	PBT	N/A	N/A	YE/YE	2M/PVC	4	Diagram 4
5-30 VDC	50	Remote	-25 to +70	IP 67	PBT	PBT	N/A	N/A	RD/RD	2M/PVC	5	Diagram 5

* Length in meters.

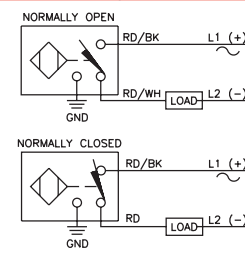
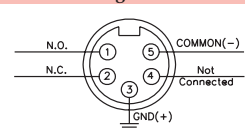


Housing Style	Part Number	ID Number	Features	Sensing Range (mm)	Output
16 mm - Embeddable, Vprox 773™, Potted-In Cable 	Bi 2.5-EG16CA-FDZ32X2	T4205100-1	<i>Prog. Outputs</i> <i>Low Temp. -40°C</i> <i>Short-Circuit Protection</i>	2.5	2-Wire AC/DC
16 mm - Embeddable, Vprox 773, minifast® Connector 	Bi 2.5-EG16CA-FDZ32X2-B1151	T4205190	<i>Prog. Outputs</i> <i>Low Temp. -40°C</i> <i>Short-Circuit Protection</i>	2.5	2-Wire AC/DC

Additional specifications on pages L6 - L8.



TURCK Vprox sensors are FM approved for installation in Class I, Division 2 hazardous locations when installed per **TURCK** control drawing Ni-1.002 (www.turck.com/fmcd).

Voltage	Switching Freq. (Hz)	Switching Current (mA) VAC/VDC	Operating Temp. (°C)	Protection	Housing	Face	End Cap	Power LED	Output LED	Mating Cord/ Cable Length/Jacket	Wiring Diagram #	Wiring Diagrams
20-250 VAC 10-300 VDC	50	≤100	-40 to +70	IP 67	SS	PA 12	N/A	GN	RD	2M/PVC	1	Diagram 1 
20-250 VAC 10-300 VDC	50	≤100	-40 to +70	IP 67	SS	PA 12	N/A	GN	RD	RK 50-*M	2	Diagram 2 

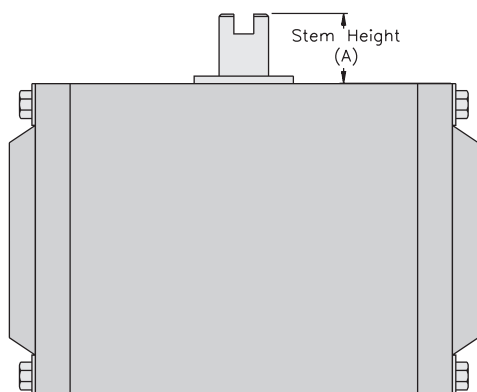
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Valve Sensor Puck Selection Guide

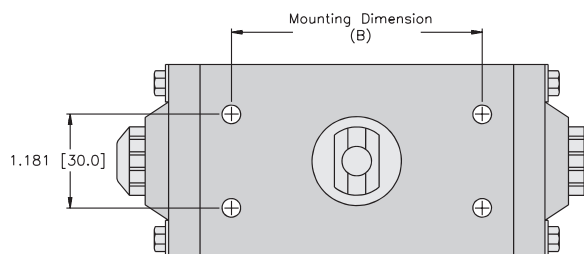
Stem Height (A)		20 mm		30 mm		50 mm	
Mounting Dimension (B)		80 mm	130 mm	80 mm	130 mm	80 mm	130 mm
Part Number	Output Function						
DS20	End Position Indication- On	BTS-DS20-TP1 (M6900155)	Consult Factory	BTS-DS20-TK1 (M6900156)	BTS-DS20-TP1 (M6900155)	N/A	N/A
	Adjustable/End Position- On	BTS-DS20-KEY (M6900136)	BTS-DS20-KEY (M6900136)	Consult Factory	Consult Factory	N/A	N/A
DSC26	End Position Indication- On	BTS-DSC26-EB1 (M6900222)	Consult Factory	BTS-DSC26-EB2 (M6900223)	BTS-DSC26-EB3 (M6900224)	Consult Factory	Consult Factory
DSU35	End Position Indication- On	BTS-DSU35-EB1 (M6900225)	BTS-DSU35-EB1 (M6900225)	BTS-DSU35-EB1 (M6900225)	BTS-DSU35-EB1 (M6900225)	BTS-DSU35-EB1 (M6900225) and BTS-DSU35-Z07 (M6900403)	BTS-DSU35-EB1 (M6900225) and BTS-DSU35-Z07 (M6900403)
	Adjustable/End Position- On	BTS-DSU35-EBE1 (M6900226)	BTS-DSU35-EBE1 (M6900226)	BTS-DSU35-EBE2 (M6900228)	BTS-DSU35-EBE2 (M6900228)	BTS-DSU35-EBE1 (M6900226) and BTS-DSU35-Z07 (M6900403)	BTS-DSU35-EBE1 (M6900226) and BTS-DSU35-Z07 (M6900403)
	End Position Indication- Off	BTS-DSU35-EU1 (M6900227)	BTS-DSU35-EU1 (M6900227)	BTS-DSU35-EU1 (M6900227)	BTS-DSU35-EU1 (M6900227)	BTS-DSU35-EU1 (M6900227) and BTS-DSU35-Z07 (M6900403)	BTS-DSU35-EU1 (M6900227) and BTS-DSU35-Z07 (M6900403)

For stems that exceed 40 mm in diameter, consult drawings for appropriate shim package.

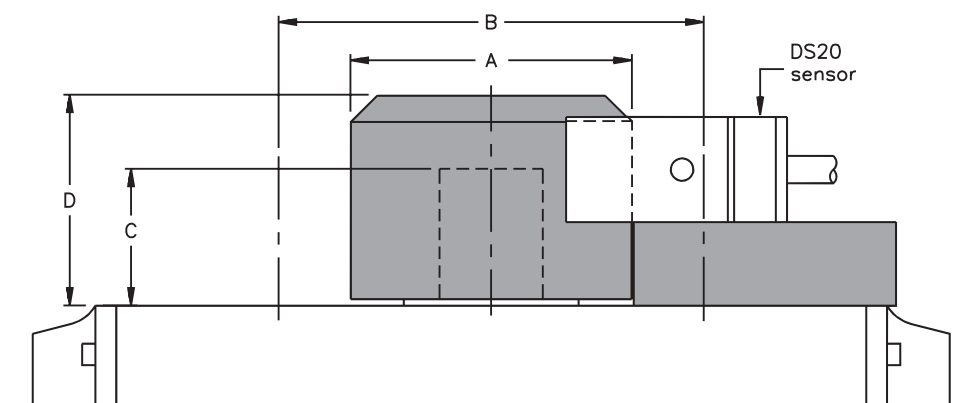
Actuator Side View



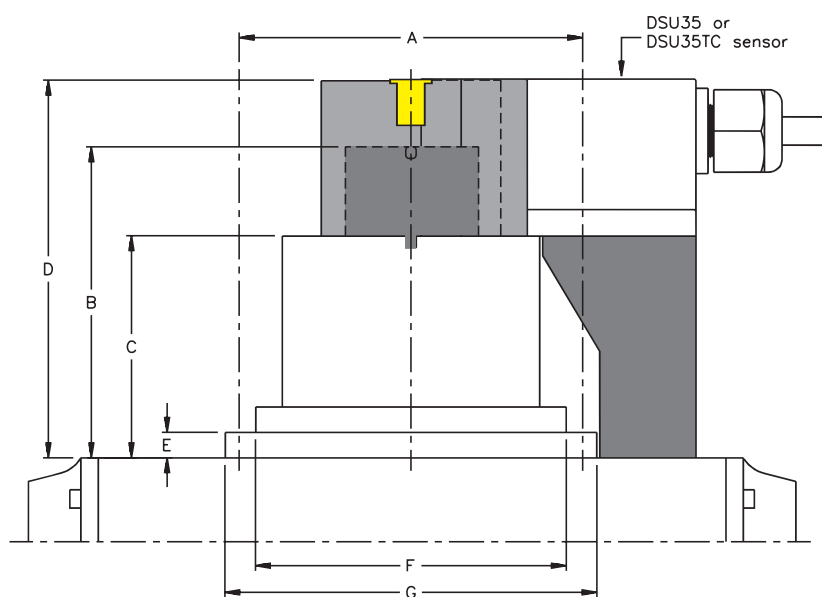
Actuator Top View



Valve Sensor Puck Information

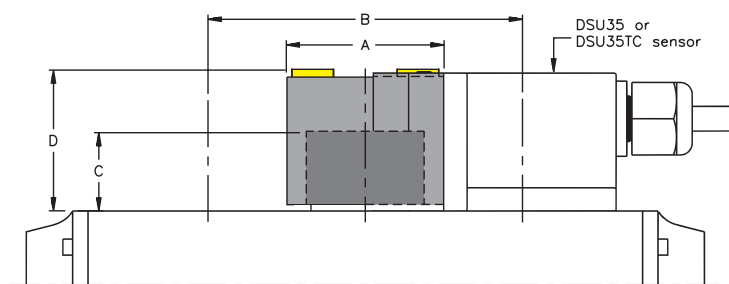


Part Number	Dimensions (mm)			
	A	B	C	D
BTS-DS20-KEY	40	80x130	20	37

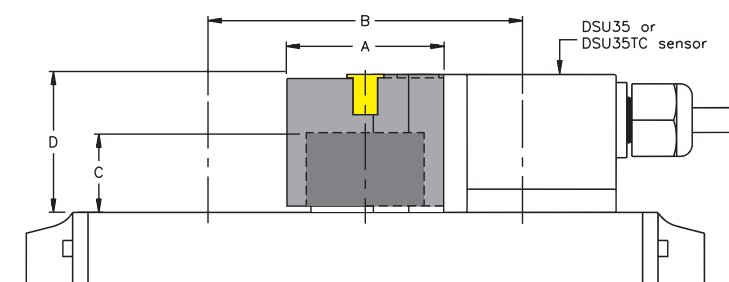


Part Number	Dimensions (mm)						
	A	B	C	D	E	F	G
BTS-DSU35-Z03	130	50	30	65	19 (max)	70	110
BTS-DSU35-Z07	130	70	50	85	19 (max)	10	110

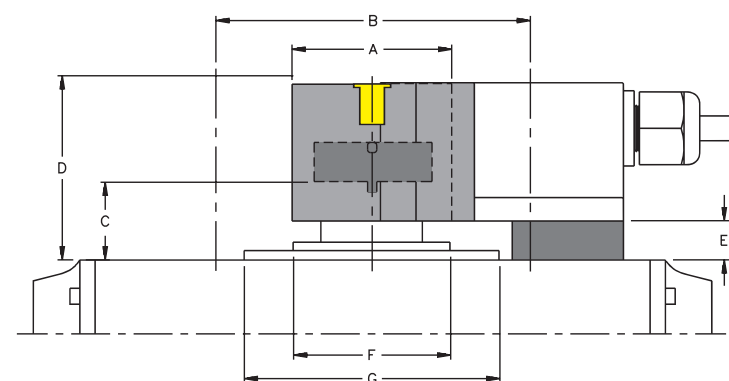
Valve Sensor Puck Information



Part Number	Dimensions (mm)			
	A	B	C	D
BTS-DSU35-EU1	40	80x130	20x30	36



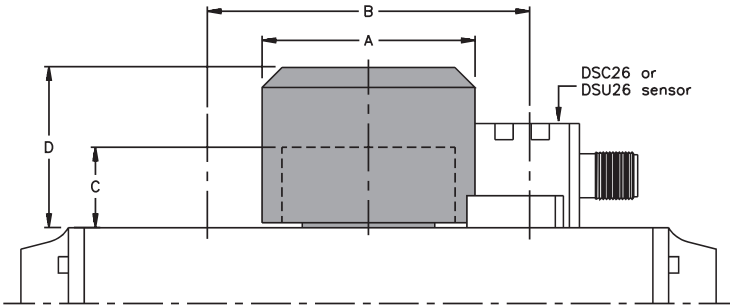
Part Number	Dimensions (mm)			
	A	B	C	D
BTS-DSU35-EB1	40	80x130	20x30	36
BTS-DSU35-EBE1	40	80x130	20	36
BTS-DS20-TP1	40	80	20	36



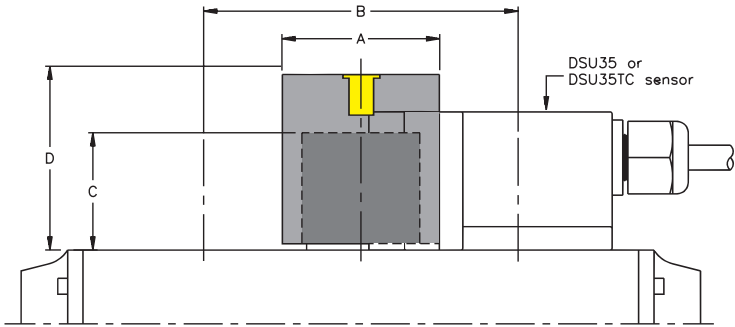
Part Number	Dimensions (mm)						
	A	B	C	D	E	F	G
BTS-DSU35-Z01	40	80x130	20	45	10	40	65
BTS-DSU35-Z02	40	80x130	20	55	20	40	65
BTS-DSU35-Z04	40	80x130	30	45	10	40	65
BTS-DSU35-Z05	40	80x130	30	55	20	30	65
BTS-DSU35-Z06	40	80x130	30	65	30	40	65
BTS-DS20-TK1	40	80x130	30	46	10	50	50

"Z" mounting packages include shims to increase height of sensor and may include similar shim for target puck (depending on package).

Valve Sensor Puck Information



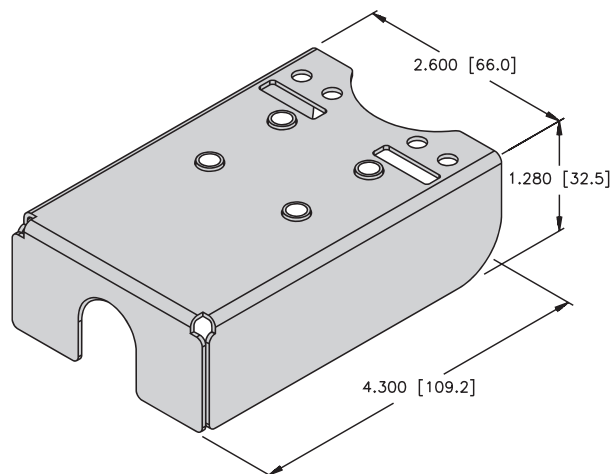
Part Number	Dimensions (mm)			
	A	B	C	D
BTS-DSC26-EB1	53	80	20	40
BTS-DSC26-EB2	65	80	30	50
BTS-DSC26-EB3	102	130	30	50



Part Number	Dimensions (mm)			
	A	B	C	D
BTS-DSU35-EBE2	40	80x130	30	47

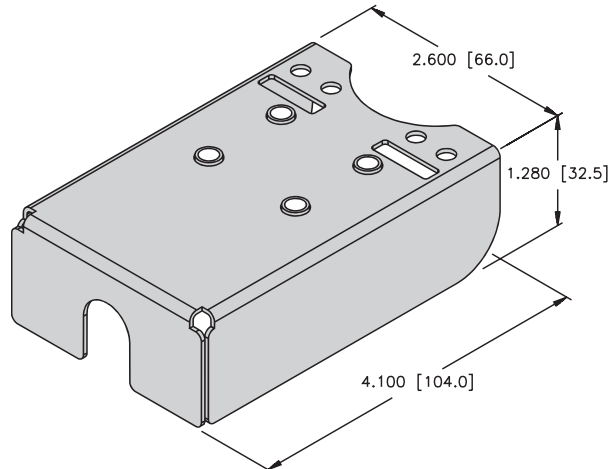
Valve Sensor Accessories for Class I, Division 2 Applications

GUARD-DSU35-AD
(A9235)



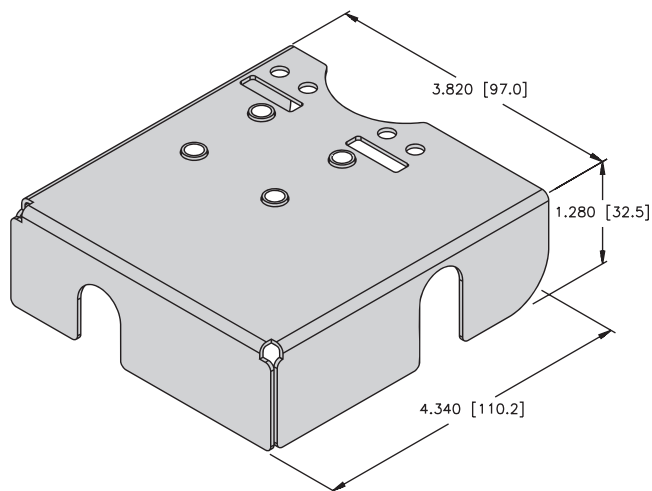
For use with: Ni 4-DSU35-ADZ35X2-B1151

GUARD-DSU35-DC
(A9234)



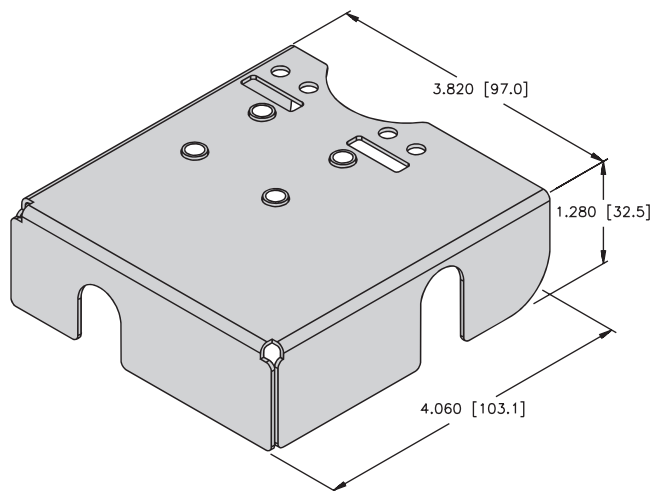
For use with: Ni 4-DSU35-2AP4X2-H1140
 Ni 4-DSU35-2AN4X2
 Ni 4-DSU35-2ADZ35X2
 Ni 4-DSU35-2AP4X2

GUARD-DSU35-DCS
(A9287)



For use with: Ni 4-DSU35-2AP4X2-B1160-FKE4.5

GUARD-DSU35-DCS
(A9150)



For use with: Ni 4-DSU35-2ASIX4
 Ni 4-DSU35-2DNETX5

EZ-track®

TURCK's EZ-track line of linear displacement transducers (LDTs) is the latest offering in **TURCK's** continuous effort to change the shape of sensing. Based on magnetostrictive technology, the **EZ-track** line will reliably operate in the harsh conditions for which **TURCK** products are known to withstand. With its unique features, IP 67 or optional IP 68 environmental rating, easy mounting and absolute positioning, the **EZ-track** line will be sure to fit into your tough linear sensing applications.

EZ-track



Features and Benefits

Non-Contact Sensing Reduces Wear, Breakage, Downtime, and Ultimately Cost

TURCK's EZ-track line is a family of magnetostrictive LDTs. These non-contact devices detect the position of an external magnet along the active stroke of the sensor without causing any wear on the sensor parts. Because there are no parts to wear or break, the sensors can offer better performance over a longer life than competing technologies. **EZ-track** LDTs also offer an alternative when a continuous, absolute reading is necessary in the application.

The absolute reading allows the sensor to accurately determine the position at power ON without the need to set up a home position. With this technology, repeatability of up to $\pm 0.001\%$ of full stroke can be achieved. See specifications for detailed information on each product family.

Fast Connections

As a leading supplier of connectivity products, **TURCK** delivers the complete package. Standard, shielded 4 and 5-pin M12 **eurofast**® cables are always available from **TURCK** for quick connection to **EZ-track**.

IP 67 / IP 68 (optional)

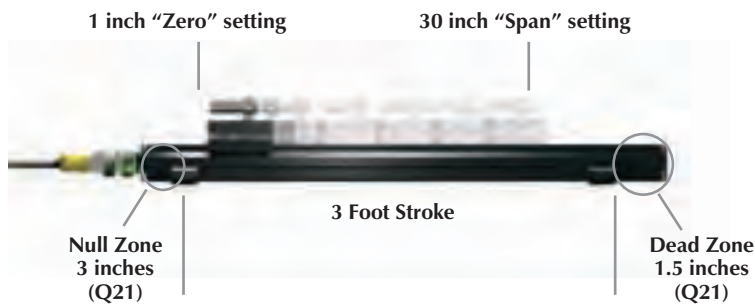
The **EZ-track** line will stand up in harsh environments, thus downtime situations due to environmental conditions can be reduced. Standard units have an environmental rating of IP 67, however IP 68 versions are also available. Consult factory for details.

***EZ-track*® General Overview**

Programmable Stroke

Programmable Zero and Span Allow Standard Sensors to Have Customized Stroke Lengths, Eliminating the Need to Stock Numerous Models

EZ-track's analog outputs are not limited to the entire length of the sensor. The zero and span settings can be programmed anywhere along the active stroke. By utilizing this feature, the user can reduce stock levels for various length LDTs used in the plant by replacing them with standard sizes and programming to the specific applications. The **Q21** profile style transducers are available in stroke lengths up to 180 inches.



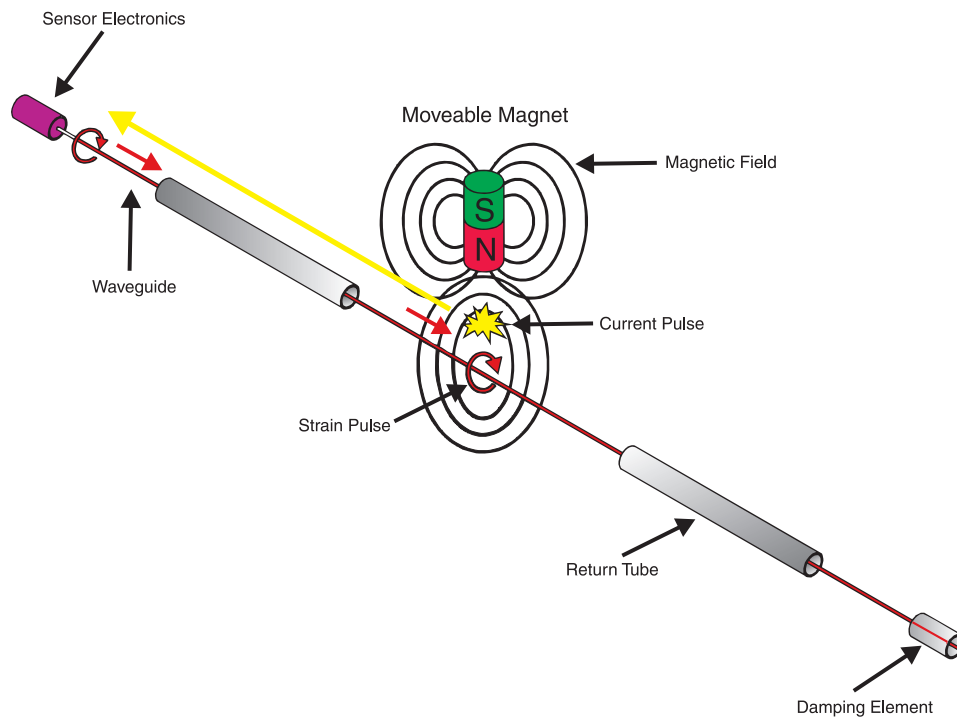
To Program the *EZ-track* Sensor:

Short pin 2 to pin 3 to obtain "Zero" setting,
short pin 2 to pin 1 to obtain "Span" setting, or
use **TURCK's** RP-Q21 Programmer.

Reliable Accurate Technology

EZ-track® LDTs profile style probes use magnetostrictive technology by applying a mechanical strain pulse to a magnetostrictive waveguide that runs the length of the sensor. When the strain pulse encounters a magnetic field produced by the slide or floating magnet assembly, a current pulse is produced that is picked up by the electronic circuitry. A high speed timer measures the time difference between the applied strain pulse and the return of the induced current pulse. This time, proportional to position, is compared to the "zero" and "span" positions established during the calibration process to scale the output. Once the position has been scaled accordingly, it is converted to a signal in the form of an analog (voltage or current) output, quadrature pulse output, or digital (PWM or start/stop) outputs.

In the **Q21R** the magnetostrictive effect is used in the opposite manner, in that a current pulse is induced and a strain pulse returns to the sensor electronics. Utilizing the magnetostrictive effect gives you highly accurate, non-contact absolute position sensing with no wear on the sensing element.



Applications

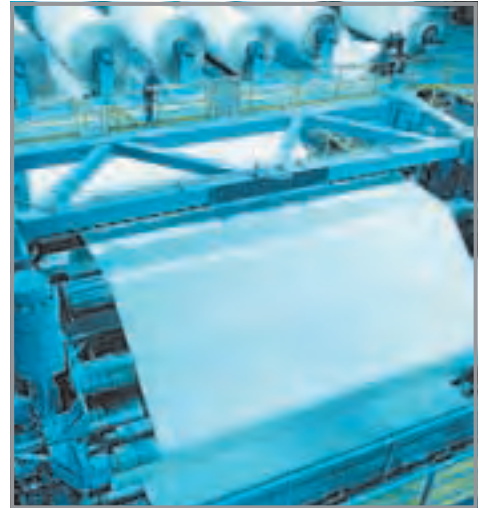
- Hydraulic Cylinders
- Injection / Blow Molding
- Palletizers
- Foundries
- Packaging Machines
- Die Casting
- Medical Systems
- X-Y Axis Positioning
- Elevators
- Extruding Equipment
- Valve / Actuator Position
- Material Handling
- Laminating / Gluing Machines
- Saw Mills / Lumber Equipment
- Cutting / Slitting Machines
- Amusement Park Rides
- Flight Simulators
- Side Guides

Analog Profile Series

Low Profile Extrusion Housing

Low Profile Housings Reduce Mounting Restrictions and Eliminate Special Mounting Fixtures

The **Q21** series is housed in low profile, environmentally sealed, anodized aluminum housings. The electronics and the sensing element are incorporated into a housing that is less than 1 inch tall without the need for a can or head on the sensor to house the electronics (typical competitive devices are 2.5 times larger). By reducing the profile of the sensor lessens mounting issues, and allows the **Q21** series to fit into applications where others are too bulky.



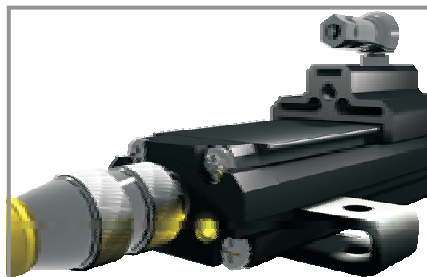
Diagnostic LED

An LED Indicating the Status of the Sensor Simplifies Troubleshooting and Reduces Maintenance

The **EZ-track®** Series utilizes a diagnostic LED that enables the operator to understand the state of the sensor dependent upon the position of the target magnet.



The LED is green when the power is on and the magnet is in an active programmed area.



The LED turns yellow when the magnet moves out of the programmed area, but is still within the active stroke.



The LED turns red when there is no magnet present or it is in the null or dead zones.

The LED flashes to indicate it is in AGC mode (**Q21**).

This feature simplifies programming and troubleshooting, effectively reducing setup and maintenance time.

Various Analog Outputs Available Profile Style

The **Q21** series can be ordered in a variety of outputs.

<u>Voltage:</u>	<u>Current:</u>	<u>Quadrature:</u>
0-10 VDC	4-20 mA	10 kHz to 1 MHz
10-0 VDC	20-4 mA	
-10 to 10 VDC		
10 to -10 VDC		
0-5 VDC		
5-0 VDC		
-5 to 5 VDC		
5 to -5 VDC		



Although sensors can be ordered with any of the above outputs, the units can easily be changed in the field to reverse the analog signal. Thus, one model can be used for two applications by programming the "zero" and "span" appropriately.

Automatic Gain Control

The Automatic Gain Control (AGC) feature allows the **EZ-track**® to sense a magnet other than the standard slide magnet and adjust to the magnetic field strength accordingly. With the ability to sense a standard floating magnet up to 3/8 inch away, the user has greater mounting flexibility for various applications.

FM Approved Installation (Class I, Division 2)

The **EZ-track Q21** unit can be ordered for use in a Class I, Division 2 environment. The unit will utilize a Euro-G Fast-Lock, as shown below. See page L37 for part number key and ordering information (S1690 unit rating option).

Quadrature Profile Series

Direct Quadrature Output

Reduce installation time, vendors and cost by directly interfacing to the PLC input card

The **Q21-DQ** provides a quadrature output directly from the transducer to the controller. The **Q21-DQ** provides A and B channel quadrature output signals that are proportional to the position of the magnet assembly along the length of the probe. The quadrature output makes it possible to have a direct interface to virtually any incremental encoder input or counter card, eliminating costly absolute encoder converters and special PLC interface modules. An index channel (Z) is also provided and its position can be set by the user at any position along the active system. The A, B and Z channels are differential outputs. That is, the connection for each output consists of two signal wires. These are typically described as the “+” and “-” signals. Differential signals are much less prone to interference caused by electrical noise or ground loops more often found in single ended connections.

Replace Incremental Output Devices

The **Q21-DQ** can be used in certain applications to replace incremental rotary and linear encoders. The quadrature output can be used in applications requiring 0.001 inch resolution and repeatability.

Velocity Feedback

The **EZ-track** quadrature produces pulses that are sent to the controller in packets at a fixed frequency. The period of the pulses do not change with magnet velocity. Therefore, velocity can not be determined from the pulse packets unless the controller can interpolate velocity from position over time. If your application requires a velocity feedback, please consider the Linear Encoder on pages M4-M5 or consult factory.

Incremental Output, Absolute Functionality

No need to home the machine at start up or after power failure

The **Q21-DQ** allows you to use an incremental style of output while taking advantage of an absolute sensing technology. The Burst Input on the transducer triggers a data transfer of all incremental position data relative to the transducer's zero position. This can be used to achieve absolute position updates when power is restored to the system or anytime an update is needed to re-zero or home the machine.

Programmable Zero Point

The Zero Input allows you to set the probes reference position at any point along the active stroke. The probe will output an increasing or decreasing signal based on the direction the magnet is moving in relation to the established zero point. See Quadrature Part Number Key to select storage mode.

Volatile Storage - the zero point will be kept until a new zero pulse is sent or until the probe loses power. The zero point can be programmed an infinite number of times.

Non-Volatile Storage - the probe will store the zero position even in the event of a power failure. The zero point can be set 100,000 times.

Quadrature Profile Series

Transducer Inputs

The *Burst* and *Zero* Inputs are single ended connections. That is, the connection for each input consists of only one wire. The **Q21-DQ** is available with either +24 VDC level signal or TTL level thresholds. Additionally, the 24 VDC can be specified as either sinking or sourcing relative to the probe's input.

Quadrature Output Resolution and Speed

The internal resolution of the **Q21-DQ** transducer is 0.001 inches. This would be represented to the encoder input device by specifying an output resolution of 1,000 cycles per inch (CPI).

Frequency or Pulse Rate

For a typical incremental encoder output, the resolution of the encoder and the speed of travel govern the frequency and pulse width of the output pulses. The output pulse rate from the **EZ-track®** transducer is fixed and controlled internally. This output frequency is user specified (10 kHz to 1MHz) so that it does not exceed the maximum input rate of the counter card. If the controller's maximum input frequency falls between two available frequencies, choose the lower frequency.

Output Drivers

The **Q21-DQ** uses an OL7272 line driver and can be configured for either a TTL level output or a 10-30 VDC level output. Option R has a 5 VDC TTL level output regardless of input power. Option L has an output of 1 volt less than the probe's input voltage and should be used when driving input cards that are not TTL compatible.

Digital Profile Series

The **Q21D** is a non-contact LDT with a digital output. This transducer utilizes magnetostrictive technology to give absolute position that is repeatable to .006% of the active sensing distance. It also has the same auto-tuning capability that the other profile series transducers offer so that it can adjust its signal strength to various magnets. There is a diagnostic LED that is located at the connector end of the probe and provides visual status information regarding the operation of the **Q21D**. The indications are as follows:

Green: Magnet is present and within the active range, the LED will remain illuminated continuously during normal operation.

Red: Fault, the LDT has lost its signal from the magnet or the magnet has moved into the Null or Dead Zone.

Yellow: No external interrogation pulse is detected.

The **Q21D** digital transducer provides either a Start/Stop or a Variable Pulse signal interface that is proportional to the position of the slide magnet assembly along the length of the probe.

Start/Stop (RS)

The Start/Stop signal interface of the **Q21D** digital output series is a differential RS-422 output. To initiate a start pulse, an external device must be used, and should be a minimum of 1ms in duration. A stop pulse of 1 ms in duration will follow. The time delay from the leading edge of the start pulse to the leading edge of the stop pulse is proportional to the distance from the Null Zone to the Magnet.

Digital Profile Series**Variable Pulse (VP)**

The Variable Pulse interface digital output is a pulse width modulated signal (RS-422). The **Q21D** LDT can be ordered with either external (**VPE**) or internal (**VPI**) interrogation.

External interrogation occurs when an external device connected to the **Q21D-VPE** generates a start pulse. This start pulse should be a minimum of 1 ms in duration. Within 50 nanoseconds after the leading edge of the start pulse has been received, the LDT will generate an output pulse. The duration of the output pulse is proportional to the distance from the Null Zone to the Magnet.

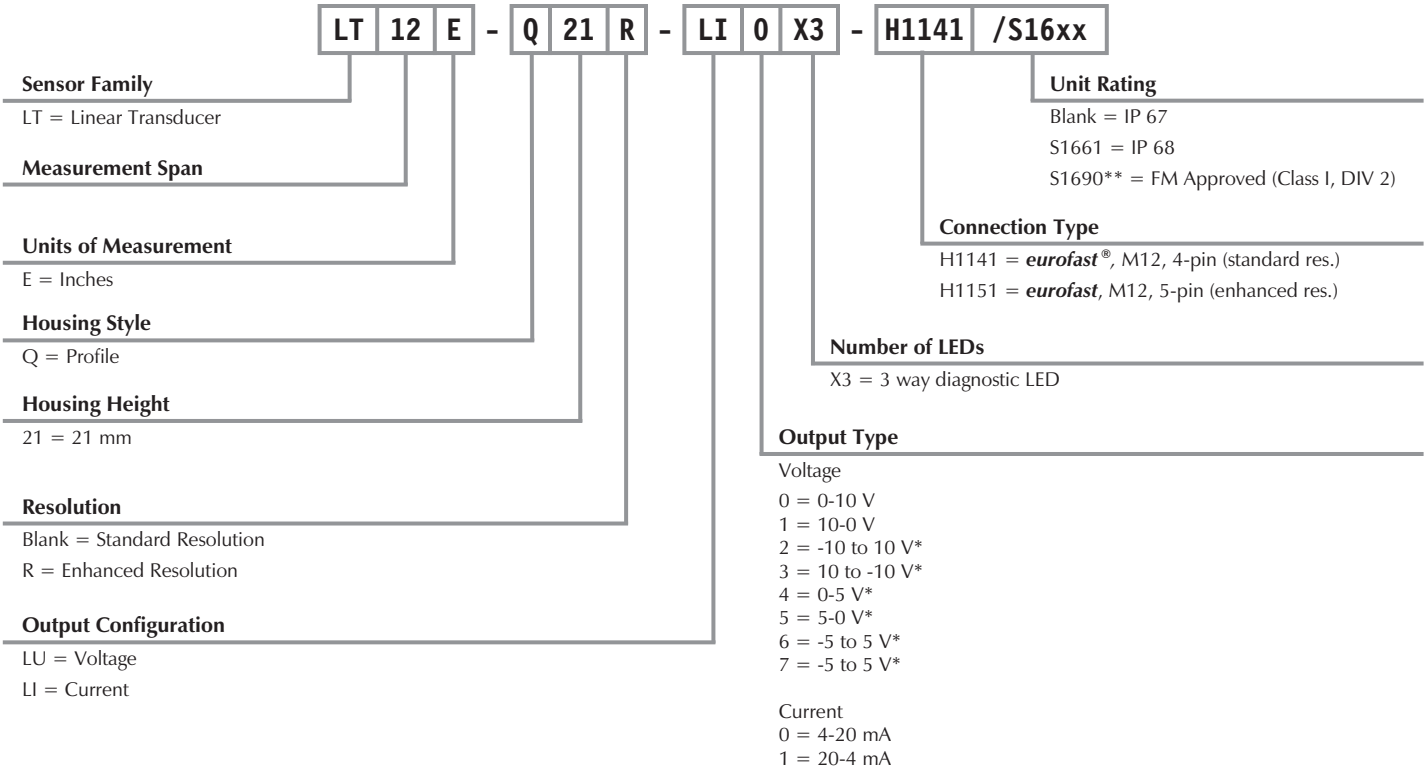
The **Q21D-VPI** generates an internal interrogation, and will continually output pulse width modulated signals. The duration of this output pulse is also proportional to the distance from the Null Zone to The Magnet.



Notes:

Analog Profile Series Part Number Key

Part Number Keys are to assist in IDENTIFICATION ONLY. Consult factory for catalog items not identified.

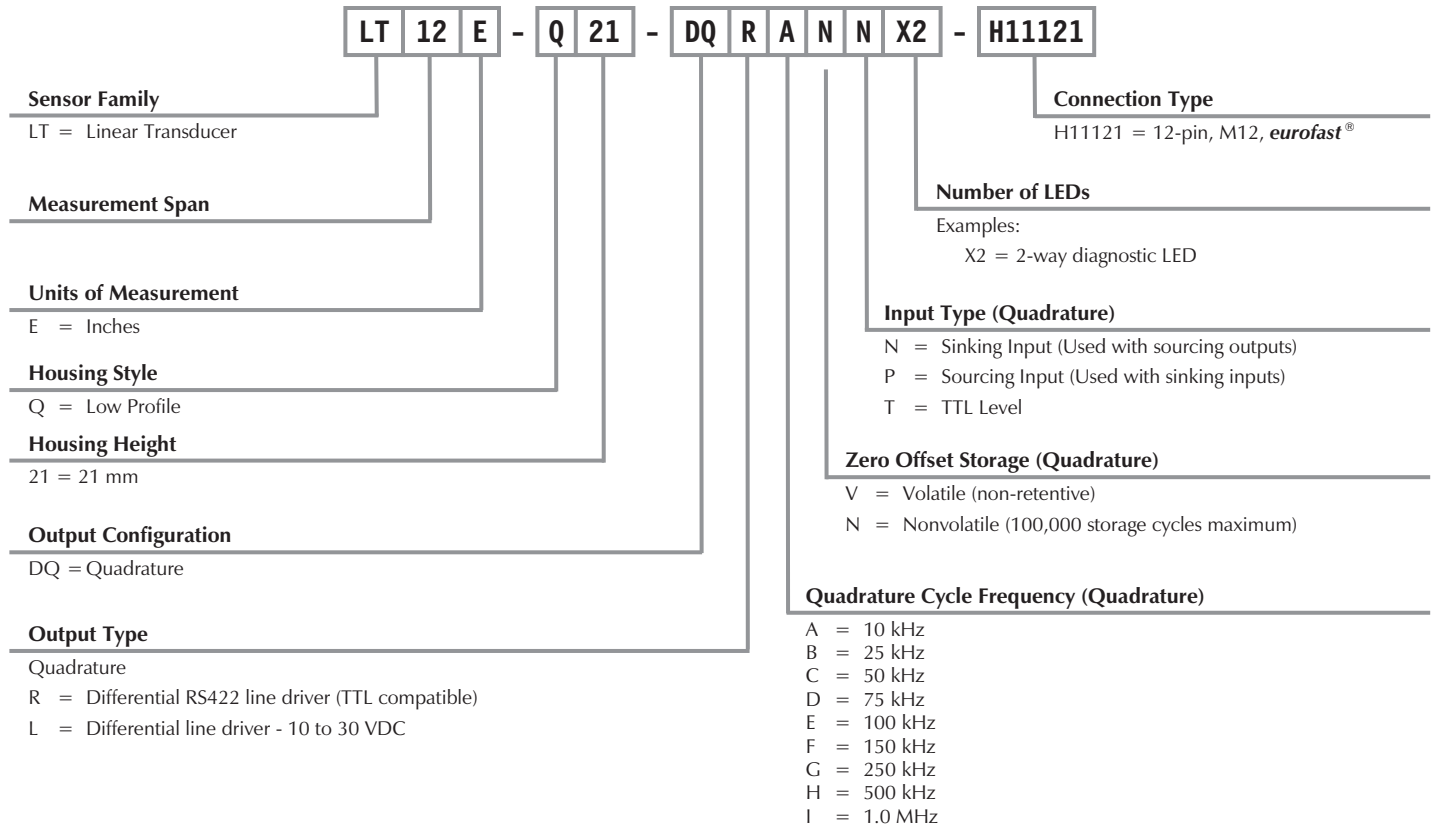


* Q21 / Q35 versions only
** FM approved units ship with Euro-G Fast Lock, which must be installed to maintain FM approval.

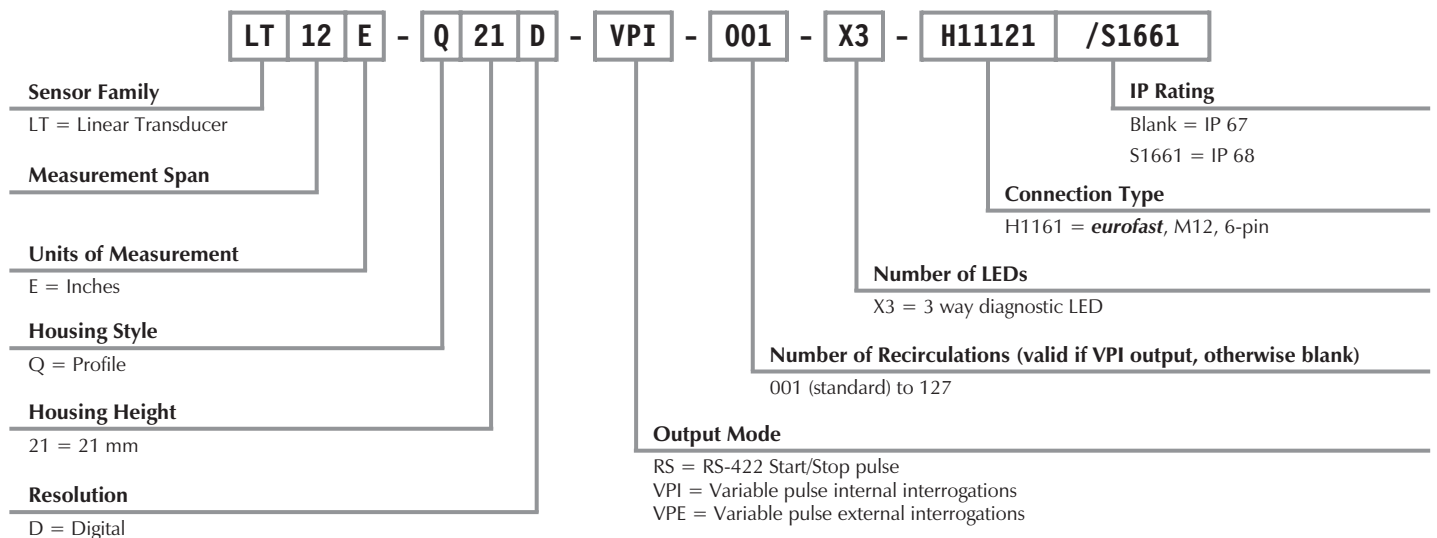
Note: In addition to the LDT, a typical system includes a magnet, mounting feet and cable (all sold separately).

Quadrature Profile Series Part Number Key

Part Number Keys are to assist in IDENTIFICATION ONLY. Consult factory for catalog items not identified.



Digital Profile Series Part Number Key



Note: In addition to the LDT, a typical system includes a magnet, mounting feet and cable (sold separately).

Enhanced Resolution Analog Profile Style (Q21R) Specifications

Output	Current:	Voltage:
	4-20 mA	0-10 VDC
	20-4 mA	10-0 VDC
Load Impedance	$\leq(\text{voltage in} - 4) \div 0.02 \Omega$ $\geq 1000 \Omega$ (example: 10 VDC $\leq 300 \Omega$)	
Span	5 to 180 in. (Q35 style maximum length 36 in.)	
Repeatability	+/-0.006% of full stroke or +/-0.002 in., whichever is greater	
Resolution	0.001 in. internal (For stroke lengths <65"); 16 bit (For lengths >65)	
Operating Temperature	-40° to +70°C (-40° to +158°F)	
Null Zone	3.00 in.	
Dead Zone	2.00 in.	
Operating Voltage	13.5-30 VDC	
Current Consumption	120 mA at 15 VDC, 2.5 watts maximum	
Response Time:		
≤50 in	1 ms	
50 to 100 in	2 ms	
101 to 150 in	3 ms	
151 to 180 in	4 ms	
LED	Green = Power is applied and magnet is present in the programmed range Red = Fault, magnet is in the Null Zone, Dead Zone or lost	

Standard Resolution Analog Profile Style (Q21) Specifications

Output	Current:	Voltage:	
	4-20 mA	+5 to -5 VDC	0-10 VDC
	20-4 mA	-5 to +5 VDC	10-0 VDC
		0 to +5 VDC	-10 to +10 VDC
		+5 to 0 VDC	+10 to -10 VDC
Load Impedance	$\leq(\text{voltage in} - 4) \div 0.02 \Omega$ $\geq 1000 \Omega$ (example: 10 VDC $\leq 300 \Omega$)		
Span	4 to 180 in. (Q35 style maximum length 36 in.)		
Repeatability	+/-0.01% of full stroke or +/-0.014 in., whichever is greater		
Resolution	0.014 in. for stroke lengths less than 60 in.; For lengths over 60 in.: 12 bits		
Operating Temperature	-40° to +70°C (-40° to +158°F)		
Null Zone	3.00 in.		
Dead Zone	1.50 in.		
Operating Voltage	10-30 VDC		
Current Consumption (max.)	100 mA		
Response Time:			
50 in. or Less:	1 ms updates with 5 ms settling time		
50 in. or Greater:	2 ms updates with 4 ms settling time		
LED	Green = Power is applied and magnet is present in the programmed range Red = Fault, magnet is in the Null Zone, Dead Zone or lost Yellow = Magnet is out of the active programmed range, but still within the active		

Quadrature Profile Style (Q21-DQ) Specifications

Output	Quadrature, A, $\bar{A}$, B, $\bar{B}$, Z, $\bar{Z}$
Span	5 to 180 inches (Q35 maximum length 36 inches)
Repeatability	+/-0.001% of full stroke or +/- 0.001 inches, whichever is greater
Resolution	0.001 inches internal (1000 pulses per inch)
Operating Temperature	-20° to +70°C (-4° to +158°F)
Null Zone	3.00 in.
Dead Zone	2.00 in.
Operating Voltage	13.5-30 VDC
Current Consumption	3 watts maximum (1 watt typical)
Response Time:	
≤50 in	1 ms
50 to 100 in	2 ms
101 to 150 in	3 ms
151 to 180 in	4 ms
Inputs:	
Option N	NPN (used with sourcing outputs)
Option P	PNP (used with sinking outputs)
Option T	TTL
Option R	5 V differential
Option L	10 to 30 VDC, $V_{out} = V_{in} - 1$ Volt
Output Frequency	10 kHz - 1 MHz
Nonlinearity	+/- 0.05% of full stroke
LED	Green = Power is applied and magnet is present in the programmed range Red = Fault, magnet is in the Null Zone, Dead Zone or lost

Digital Profile Style (Q21D) Specifications

Output	Start/Stop Pulse: External interrogation; Variable Pulse: Internal or External interrogation
Number of Recirculations	Variable Pulse: 001 (standard) to 127
Span	5 to 180 in.
Repeatability	+/-0.006% of full stroke
Hysteresis	+/-0.02% of full stroke
Operating Temperature	-20° to +70°C (-4° to +158°F)
Null Zone	3.00 in.
Dead Zone	2.00 in.
Operating Voltage	13.5-30 VDC
Current Consumption	120 mA at 15 VDC, 2.5 watts maximum
Shock	Tested to 40G
Vibration	MIL-STD810E, 10G rms random, 20 Hz - 2 kHz
LED	Green = Power is applied and magnet is present Red = Fault, magnet is in the Dead Zone or lost Yellow = No interrogation signal detected



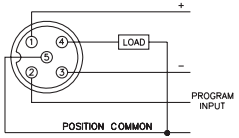
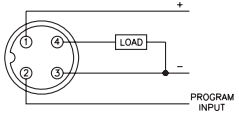
Housing Style	Part Number	Output
21 mm Anodized Aluminum, 5-pin eurofast® Connection 	LT***E-Q21R-LI0X3-H1151	Analog Current 4-20 mA
	LT***E-Q21R-LI1X3-H1151	Analog Current 20-4 mA
	LT***E-Q21R-LU0X3-H1151	Analog Voltage 0-10 V
	LT***E-Q21R-LU1X3-H1151	Analog Voltage 10-0 V
21 mm Anodized Aluminum, 4-pin eurofast Connection 	LT***E-Q21-LI0X3-H1141	Analog Current 4-20 mA
	LT***E-Q21-LI1X3-H1141	Analog Current 20-4 mA
	LT***E-Q21-LU0X3-H1141	Analog Voltage 0-10 V
	LT***E-Q21-LU1X3-H1141	Analog Voltage 10 -0 V
	LT***E-Q21-LU2X3-H1141	Analog Voltage -10 to 10 V
	LT***E-Q21-LU3X3-H1141	Analog Voltage 10 to -10 V
	LT***E-Q21-LU4X3-H1141	Analog Voltage 0-5 V
	LT***E-Q21-LU5X3-H1141	Analog Voltage 5-0 V
	LT***E-Q21-LU6X3-H1141	Analog Voltage -5 to 5 V
	LT***E-Q21-LU7X3-H1141	Analog Voltage 5 to -5 V

*** Span = measuring length in inches.

See page L45 for magnets and mounting accessories (not included).



TURCK LT...-Q21-...-H1141 and LT...-Q21-...-H1151 **EZ-track** sensors are FM approved for installation in Class I, Division 2 hazardous locations when installed per **TURCK** control drawing Ni-1.003 (www.turck.com/fmcd).

Voltage	Features	euromast Connection	Enclosure Rating	Agency Approval	Mating Cordset	Wiring Diagram #	Wiring Diagrams
13.5-30 VDC	Analog Output Enhanced Resolution	5-pin	IP 67	CE	RKS 4.5T-*	1	Diagram 1 
		5-pin	IP 67	CE	RKS 4.5T-*	1	
		5-pin	IP 67	CE	RKS 4.5T-*	1	
		5-pin	IP 67	CE	RKS 4.5T-*	1	
10-30 VDC	Analog Output Standard Resolution	4-pin	IP 67	CE	RK 4.4T-*/S618	2	Diagram 2 
		4-pin	IP 67	CE	RK 4.4T-*/S618	2	
		4-pin	IP 67	CE	RK 4.4T-*/S618	2	
		4-pin	IP 67	CE	RK 4.4T-*/S618	2	
		4-pin	IP 67	CE	RK 4.4T-*/S618	2	
		4-pin	IP 67	CE	RK 4.4T-*/S618	2	
		4-pin	IP 67	CE	RK 4.4T-*/S618	2	
		4-pin	IP 67	CE	RK 4.4T-*/S618	2	
		4-pin	IP 67	CE	RK 4.4T-*/S618	2	
		4-pin	IP 67	CE	RK 4.4T-*/S618	2	

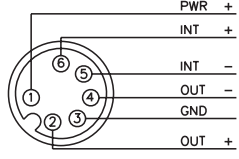
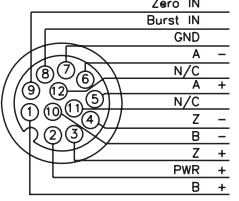
* Length in meters.



Housing Style	Part Number	Output
21 mm Anodized Aluminum, 6-pin eurofast® Connection 	LT***E-Q21D-RS-X3-H1161 LT***E-Q21D-VPI***-X3-H1161 LT***E-Q21D-VPE-X3-H1161	RS 422 Start/Stop pulse Variable pulse internal interrogations Variable pulse external interrogations
21 mm Anodized Aluminum, 12-pin eurofast Connection 	LT***E-Q21-DQR*N*X2-H11121 LT***E-Q21-DQR*N*X2-H11121 LT***E-Q21-DQL*N*X2-H11121 LT***E-Q21-DQL*N*X2-H11121 LT***E-Q21-DQR*V*X2-H11121 LT***E-Q21-DQR*V*X2-H11121 LT***E-Q21-DQR*V*X2-H11121 LT***E-Q21-DQR*V*X2-H11121	Quadrature RS 422 Line Driver (TTL) Quadrature RS 422 Line Driver (TTL) Quadrature 10-30 VDC Line Driver Quadrature 10-30 VDC Line Driver Quadrature RS 422 Line Driver (TTL) Quadrature RS 422 Line Driver (TTL) Quadrature 10-30 VDC Line Driver Quadrature 10-30 VDC Line Driver

*** Span = measuring length in inches.

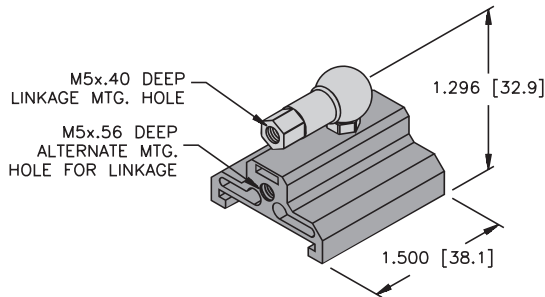
See page L45 for magnets and mounting accessories (not included).

Voltage	Features	Eurofast Connection	Enclosure Rating	Agency Approval	Mating Cordset	Wiring Diagram #	Wiring Diagrams
13.5-30 VDC	Digital Output	6-pin	IP 67	CE	RKS 6T-*	1	Diagram 1  Diagram 2 
	Digital Output	6-pin	IP 67	CE	RKS 6T-*	1	
	Digital Output	6-pin	IP 67	CE	RKS 6T-*	1	
13.5-30 VDC	Nonvolatile Zero Offset Storage	12-pin	IP 67	CE	RKS 10T-*	2	
	Nonvolatile Zero Offset Storage	12-pin	IP 67	CE	RKS 10T-*	2	
	Nonvolatile Zero Offset Storage	12-pin	IP 67	CE	RKS 10T-*	2	
	Nonvolatile Zero Offset Storage	12-pin	IP 67	CE	RKS 10T-*	2	
	Volatile Zero Offset Storage	12-pin	IP 67	CE	RKS 10T-*	2	
	Volatile Zero Offset Storage	12-pin	IP 67	CE	RKS 10T-*	2	
	Volatile Zero Offset Storage	12-pin	IP 67	CE	RKS 10T-*	2	
	Volatile Zero Offset Storage	12-pin	IP 67	CE	RKS 10T-*	2	

* Length in meters.

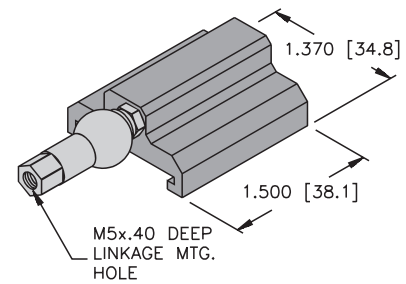
Profile Style Accessories

Slide Magnet



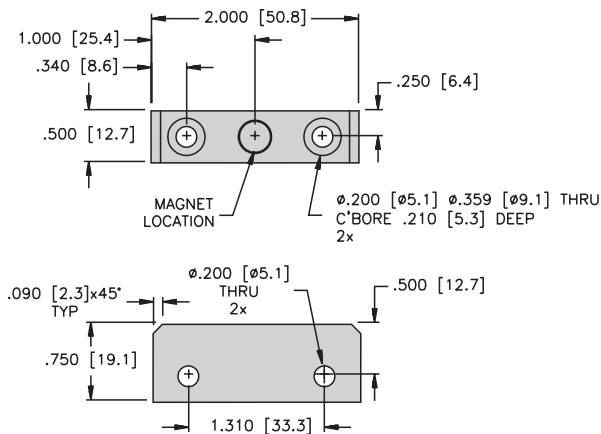
SM-Q21 (A5600)

Slide Magnet with Slide Adapter



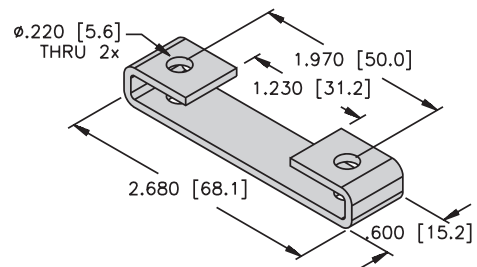
SA-Q21 (A0864)

Floating Magnet



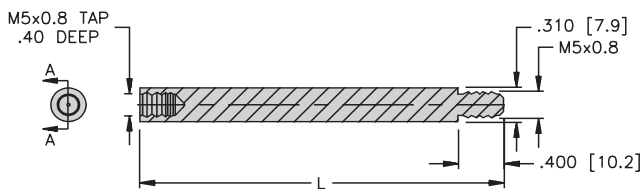
FM-Q21 (A5500)

Q21 Mounting Brackets



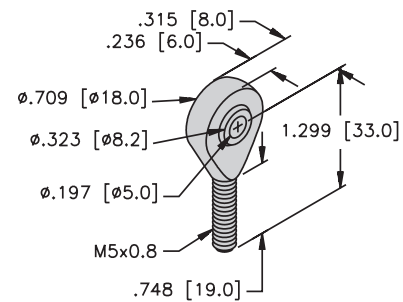
MB-Q21
 (* mount every 3 feet) (A5700)

Control Arms



CAE-Q21**

Rod Ends

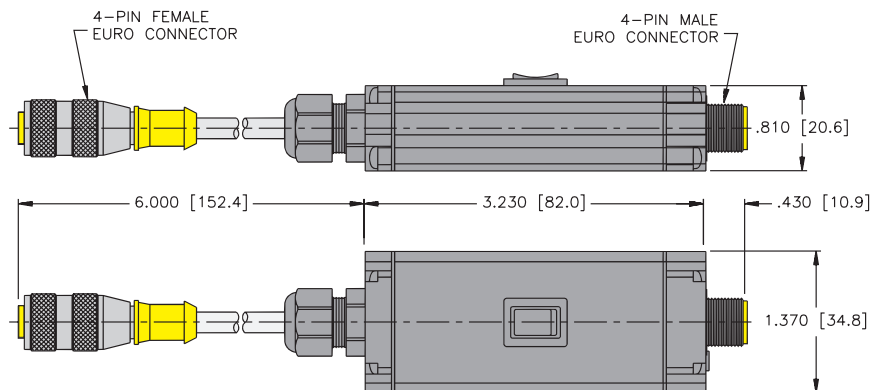


RE-Q21 (A0865)

** Length in inches.
 Stocked in 3", 6" and 9" lengths.

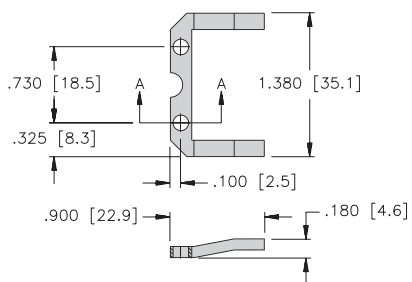
All dimensions shown as: Inches [mm]

Rocker Programmer



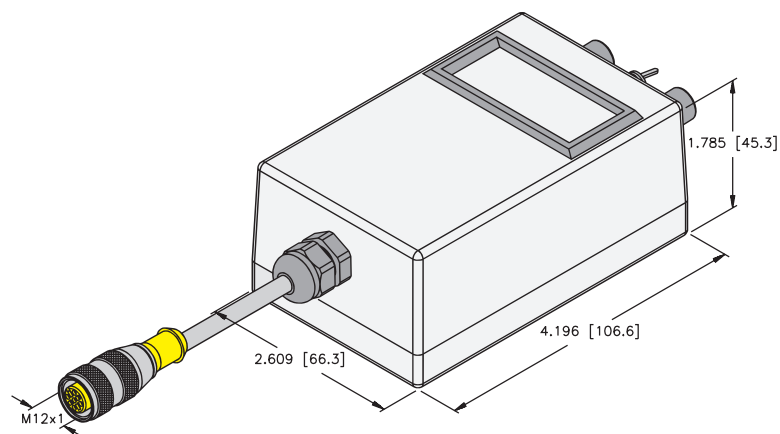
RP-Q21 (A0875)

Q21 Upside Down Brackets



**UB-Q21 (2/bag)
(A0876)**

Test and Programming Device



**TB2-LDT (voltage) (A58001)
TB2-LDT-LI (current) (A58002)**

All dimensions shown as: Inches [mm]

Hazardous Area Proximity Sensors



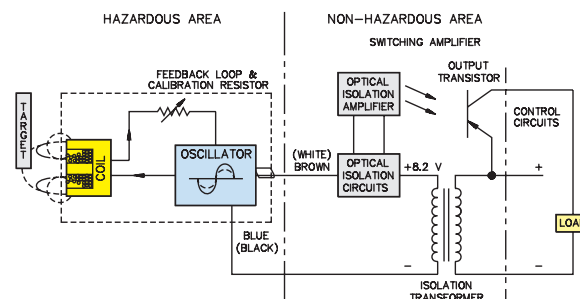
Type	NAMUR Barrel Style	NAMUR Rectangular Style	Hazardous Area Metal Barrel	Hazardous Area Plastic Barrel
Sensing Range	1.5 - 15 mm	3 - 10 mm	12 - 30 mm	12 - 30 mm
Pages	L49	L50	L53	L53

Hazardous Area Proximity Sensors

TURCK NAMUR proximity sensors are 2-wire sensing devices meeting the interoperability requirements of EN 60947-5-6. Because NAMUR sensors operate on very low power, they can be designed to be intrinsically safe for use in hazardous locations. Turck NAMUR compliant sensors have intrinsic safety approval from FM, CSA, ATEX and others.

The operation of NAMUR sensors is similar to that of a variable resistor, with a change of impedance as a target approaches the sensor. When no metal is being sensed, an inductive sensor is in a low impedance state and draws a current of more than 2.2 mA. When a metal target enters the high-frequency field radiated from the sensor face, the impedance increases as the target approaches. When fully damped, the sensor draws less than 1.0 mA. This current change is used to trigger an external amplifier at a defined switch point, usually about 1.5 mA.

Figure 1



NAMUR sensors contain a relatively small number of components, which allows the construction of small devices and helps to ensure a high degree of reliability. As the sensors are 2-wire current loops with fairly low impedance, they are unaffected by most transients.

General NAMUR Specifications

Differential Travel (Hysteresis)	1-10% (5% typical)
Nominal Voltage	8.2 VDC (EN60947-5-6)
Resistance Change from	
Nonactivated to Activated Condition	typical <1.0 to >8.0 k Ω
Resulting Current Change	≥ 2.2 mA to ≤ 1.0 mA
Recommended Switching Point for	
Remote Amplifier	>1.2 to <2.1 mA, typ. 1.55 mA ON/1.75 mA OFF
Power-On Effect	Realized in Amplifier
Reverse Polarity Protection	Incorporated
Wire-Break Protection	Realized in Amplifier
Transient Protection	Realized in Amplifier
Shock	30 g, 11 ms
Vibration	55 Hz, 1 mm Amplitude in all 3 Planes
Repeatability	$\leq 2\%$ of Rated Operating Distance

See **TURCK** Sensors Catalog for detailed individual specifications for all NAMUR sensors.



TURCK NAMUR proximity sensors are functionally compatible with all switch amplifiers with input characteristics that meet the NAMUR requirements. Their approved intrinsic safety entity parameters are compatible with all **TURCK** safety switch amplifiers and remote I/O systems. See Section B, IS Interface Technology, and Section C, IP 20 Slice I/O, for more information.

NAMUR Barrel Style Sensors

Metal Barrel



Quick Disconnect



Integral Cable

8 mm Diameter, Sensing Range 1.5-3 mm

Bi 1.5-EG08K-Y1-H1341	Bi 1.5-GS880-Y0
Bi 1.5-EG08K-Y1X-H1341	Bi 1.5-EG08K-Y1
Bi 1.5-EG08-Y1-H1341	Bi 1.5-EG08-Y1
Ni 1.5-EG08K-Y1-H1341	Bi 1.5-G08-Y1
Ni 1.5-EG08K-Y1X-H1341	Ni 2-G08-Y1
Ni 1.5-EG08-Y1-H1341	Ni 3-EG08K-Y1

12 mm Diameter, Sensing Range 2-5 mm

Bi 2-EM12-Y0X-H1141	Bi 2-EG12-Y0X
Bi 2-M12-Y1X-H1141	Bi 2-G12-Y0
Bi 2-MT12-Y0X-H1141	Bi 2-G12-Y0X
Bi 2-M12E-Y0X-H1141	Ni 5-G12-Y0
Ni 5-M12-Y1X-H1141	Ni 5-G12-Y0X
Ni 5-G12-Y0-H1141	

18 mm Diameter, Sensing Range 5-10 mm

Bi 5-M18-Y1X-H1141	Bi 5-EG18-Y0
Ni10-M18-Y1X-H1141	Bi 5-G18-Y0
BiD2-G18-Y0-H1141/S212	Bi 5-EG18-Y0X
	BiD2-G180-Y1/S212
	Ni10-G18-Y0
	Ni10-G18-Y0X

30 mm Diameter, Sensing Range 10-15 mm

Bi10-M30-Y1X-H1141	Bi10-G30-Y0
	Bi10-G30-Y0X
	Bi10-G30-Y0/S90
	Ni15-G30-Y0
	Ni15-G30-Y0X

Plastic Barrel



Quick Disconnect



Integral Cable



Terminal Chamber

11 mm Diameter, Sensing Range 2-5 mm

Bi 2-K11-Y1
Ni 5-K11-Y0

12 mm Diameter, Sensing Range 2-5 mm

Bi 2-S12-Y0X-H1141	Bi 2-P12-Y0	Bi 2-P12SK-Y1X
Ni 5-S12-Y0X-H1141	Bi 2-P12-Y0/S100	Ni 5-P12SK-Y0X
	Bi 2-P12-Y0X	
	Bi 2-P12-Y1X/S97	
	Ni 5-P12-Y0/S100	
	Ni 5-P12-Y0X	
	Ni 5-P12-Y1	

18 mm Diameter, Sensing Range 5-10 mm

Ni10-K18-Y1	Bi 5-P18-Y0	Bi 5-P18SK-Y1X
	Bi 5-P18-Y0X	Ni10-P18SK-Y1X
	Bi 5-P18-Y0/S100	
	Ni10-P18-Y0X	
	Ni10-P18-Y1	
	Ni10-P18-Y0/S100	

20 mm Diameter, Sensing Range 10 mm

Ni10-K20-Y1

20 mm Diameter, Sensing Range 10 mm

Bi10-P30-Y0X
Bi10-P30-Y1
Ni15-P30-Y0X
Ni15-P30-Y1

20 mm Diameter, Sensing Range 10 mm

Ni20-K40-Y1

See **TURCK** Sensor Catalog for detailed individual specifications for all NAMUR sensors.

NAMUR Rectangular Style Sensors



6-20 mm with
Integral Cable



20-26 mm with
Quick Disconnect

6 mm , Sensing Range 3 mm

Bi 2-Q5.5-Y1X

8 mm , Sensing Range 5 mm

Bi 2-Q08-Y1X

10 mm , Sensing Range 2 mm

Bi 2-Q10S-Y1X

11 mm , Sensing Range 2 mm

Bi 2-Q11S-Y1X

14 mm , Sensing Range 10 mm

Bi10-Q14-Y0X

20 mm , Sensing Range 15 mm

Bi15-Q20-Y0X

Bi15-Q20-Y0X-H1141

26 mm , Sensing Range 10 mm

Bi15-Q20-Y0X-H1141



40 mm CP40



80 mm CP80



80 mm Q40



90 mm K90

6 mm , Sensing Range 3 mm

Bi 5-CP40-Y1X

8 mm , Sensing Range 5 mm

Ni20-CP40-Y1X

10 mm , Sensing Range 2 mm

Ni40-CP40-Y1

11 mm , Sensing Range 2 mm

Ni50-CP40-Y1

Ni50-K90SR-Y1/M20

14 mm , Sensing Range 10 mm

Ni60-Q80-Y0X

Class I, Division 2 Hazardous Area Sensors

TURCK 3-wire DC proximity sensors without code AN6., AP6., RN6., or RP6. with threaded barrels are approved by FM Approvals for installation in Class I, Division 2 hazardous locations. The sensors must be installed using a Division 2 wiring method, which, for all practical purposes, means that the sensor must be either installed in an enclosure that requires the use of a tool to open, or they must be adapted to a raceway or conduit product. **TURCK** TMF conduit adapters or other suitable thread adapters may be used for this purpose.



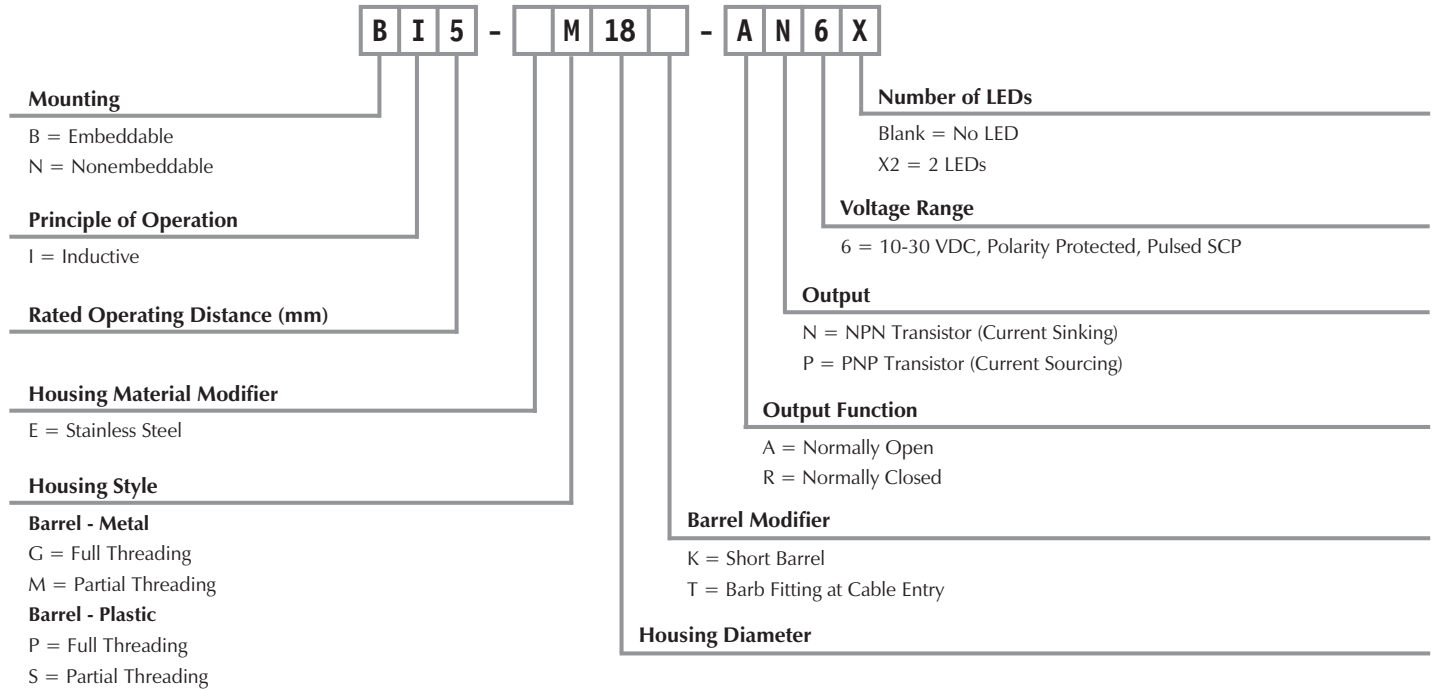
Conduit Adapters

When installed in this fashion and powered from a supply not exceeding 30 VDC, there are no further energy limiting or protective enclosure requirements for installation in Class I, Division 2. The sensors have no arcing or sparking components and will not dissipate heat under normal operating conditions.

Part Number	ID Number	Barrel Diameter	Dimensions					
			A	B	C	D	E	F
TMF 12-G	A3310	12 mm	1.15 [29.2]	1.00 [25.4]	1.00 [25.4]	0.50 [12.7]	0.50 [12.7]	M12x1
TMF 18-G	A3320	18 mm	1.15 [29.2]	1.00 [25.4]	1.00 [25.4]	0.50 [12.7]	0.50 [12.7]	M18x1
TMF 30-G	A3345	30 mm	1.73 [44.0]	1.50 [38.1]	1.00 [25.4]	0.60 [15.2]	0.40 [10.2]	M30x1.5
Use above Conduit Adapters with G and P Barrel sensors.								
TMF 18-MS	A3330	18 mm	1.15 [29.2]	1.00 [25.4]	2.00 [50.8]	1.50 [38.1]	0.50 [12.7]	M18x1
TMF 30-MS	A3355	30 mm	1.73 [44.0]	1.50 [38.1]	2.00 [50.8]	0.60 [15.2]	1.40 [35.6]	M30x1.5
Use above Conduit Adapters with M and S Barrel sensors.								
Material: Aluminum Inches [mm]								

Class I, Division 2 Hazardous Area Metal Barrel Sensors Part Number Key

Part Number Keys are to assist in IDENTIFICATION ONLY. Consult factory for catalog items not identified.



TURCK

Process Automation – Sensors

Class I, Division 2 Hazardous Area Sensors

Metal Barrel



12 - 18 mm



30 mm

Embeddable

Bi 2-EG12-AN6X	Bi 4-EM12-AN6X	Bi 5-G18K-AN6X	Bi10-G30-AN6
Bi 2-EG12-AP6X	Bi 4-G12-AN6	Bi 5-G18K-AP6	Bi10-G30-AN6X
Bi 2-EG12-RP6X	Bi 4-G12-AN6X	Bi 5-G18K-AP6X	Bi10-G30-AP6
Bi 2-G08-AN6	Bi 4-G12-AP6X	Bi 5-G18K-RN6X	Bi10-G30-AP6X
Bi 2-G12-AN6	Bi 4-G12K-AN6X	Bi 5-G18-RP6X	Bi10-G30K-AN6
Bi 2-G12-AN6X	Bi 4-G12K-AN6X	Bi 5-M18-AN6X	Bi10-G30K-AN6X
Bi 2-G12-AP6	Bi 4-G12K-AP6X	Bi 5-M18-AP6X	Bi10-G30K-AP6X
Bi 2-G12-AP6X	Bi 4-G12K-RP6X	Bi 5-M18T-AN6X	Bi10-G30K-RP6X
Bi 2-G12K-AN6X	Bi 4-M12-AN6X	Bi 5-M18T-AP6X	Bi10-G30-RN6X
Bi 2-G12K-AP6	Bi 4-M12-AP6X	Bi 5-M18T-RP6X	Bi10-G30-RP6X
Bi 2-G12K-AP6X	Bi 4-M12-RN6X	Bi 8-G18-AN6X	Bi10-M30-RP6
Bi 2-G12K-RN6X	Bi 4-M12-RP6X	Bi 8-G18-AP6X	Bi10-M30T-AN6X
Bi 2-G12K-RP6X	Bi 4-M12T-AN6X	Bi 8-G18-RN6X	Bi10-M30T-AP6X
Bi 2-G12-RN6X	Bi 4-M12T-AP6X	Bi 8-M18-AN6X	Bi15-G30K-AP6X
Bi 2-G12-RP6X	Bi 5-EG18-AN6X	Bi 8-M18-AP6X	Bi15-M30-AN6X
Bi 2-M12-AN6X	Bi 5-EG18-AP6X	Bi 8-M18-RN6X	Bi15-M30-AP6X
Bi 2-M12-AP6X	Bi 5-G18-AN6	Bi 8-M18-RP6X	Bi15-M30-RP6X
Bi 2-M12-RP6X	Bi 5-G18-AN6X	Bi 8-M18T-AN6X	Bi15-M30T-AN6X
Bi 2-M12T-AN6X	Bi 5-G18-AP6	Bi 8-M18T-AP6X	Bi15-M30T-AP6X
Bi 2-M12T-AP6X	Bi 5-G18-AP6X		
Bi 4-EG12-AN6X	Bi 5-G18K-AN6		

Nonembeddable

Ni 4-M12-AP6X	Ni 5-G12K-AP6X	Ni10-G18-AN6X	Ni15-M30T-AN6X
Ni 4-M12T-AN6X	Ni 5-G12K-RN6X	Ni10-G18-AP6	Ni15-M30T-AP6X
Ni 4-M12T-AP6X	Ni 5-G12K-RP6X	Ni10-G18-AP6X	
Ni 5-G12-AN6	Ni 5-G12-RN6X	Ni10-G18K-AN6X	
Ni 5-G12-AN6X	Ni 5-G12-RP6X	Ni10-G18K-AP6X	
Ni 5-G12-AP6	Ni 8-M18-AP6X	Ni10-G18K-RP6X	
Ni 5-G12-AP6X	Ni 8-M18T-AN6X	Ni10-G18-RN6X	
Ni 5-G12K-AN6X	Ni 8-M18T-AP6X	Ni10-G18-RP6X	
Ni 5-G12K-AP6	Ni10-G18-AN6		

Plastic Barrel



12 - 18 mm



30 mm

Embeddable

Bi 2-S12-AN6X	Bi10-S30-AN6X
Bi 2-S12-AP6X	Bi10-S30-AP6X
Bi 2-S12-RN6X	
Bi 5-S18-AN6X	
Bi 5-S18-AP6X	
Bi 5-S18-RN6X	
Bi 5-S18-RP6X	

Nonembeddable

Ni 4-S12-AN6X	Ni15-S30-AN6X
Ni 4-S12-AP6	
Ni 4-S12-AP6X	
Ni 8-S18-AN6X	
Ni 8-S18-AP6	
Ni 8-S18-AP6X	
Ni 8-S18-RN6X	

See **TURCK** Sensor Catalog for detailed individual specifications for all NAMUR sensors.