



More Precision.

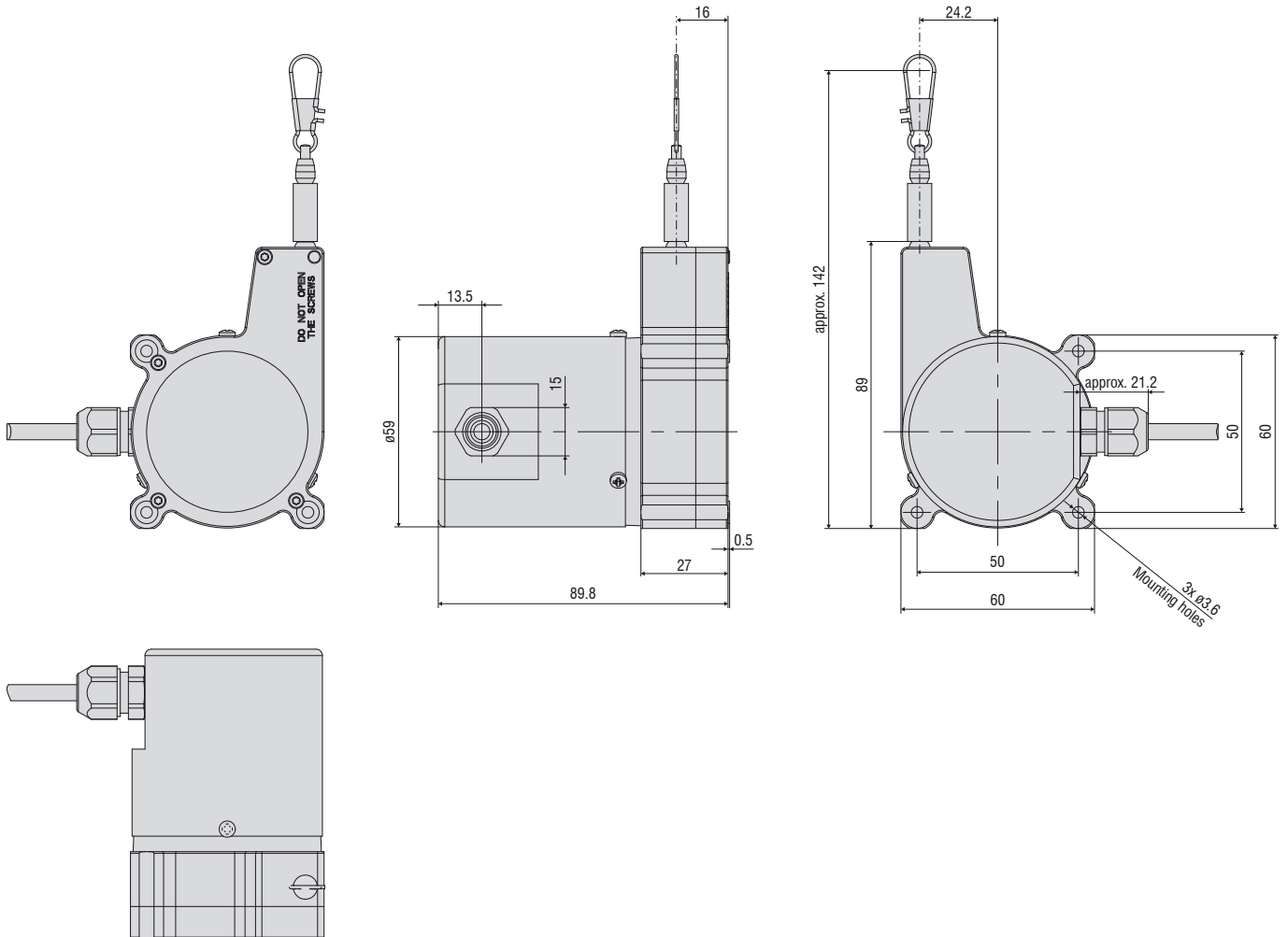
wireSENSOR // Draw-wire displacement sensors





- Robust plastic housing
- Customer-specific designs
- Potentiometer, current or voltage output

MK60 model



Dimensions in mm, not to scale.

Model	WPS-1500-MK60	
Measuring range	1500 mm	
Analog output	Potentiometer, current, voltage	
Resolution	Hybrid potentiometer P10	towards infinity
Linearity	Hybrid potentiometer P10	$\leq \pm 0.15 \% \text{ FSO}$
Sensor element	Hybrid potentiometer	
Wire extension force (max.)	approx. 8 N	
Wire retraction force (min.)	approx. 1 N	
Wire acceleration (max.)	approx. 5 g	
Material	Housing	Glass-fiber reinforced plastic (PBT GF20)
	Measuring wire	Polyamide-coated stainless steel ($\varnothing 0.45 \text{ mm}$)
Wire mounting	Wire clip	
Mounting	Mounting holes	
Temperature range	Storage	-20 ... +80 °C
	Operation	-20 ... +80 °C
Connection	integrated cable, radial, length 1 m	
Shock (DIN EN 60068-2-27)	50 g / 5 ms in 3 axes, 2 directions and 1000 shocks each	
Vibration (DIN EN 60068-2-6)	20 g / 20 ... 2000 Hz in 3 axes and 10 cycles each	
Protection class (DIN EN 60529)	IP65	
Weight	approx. 290 g (incl. cable)	

FSO = Full Scale Output

Specifications for analog outputs from page 54 onwards.

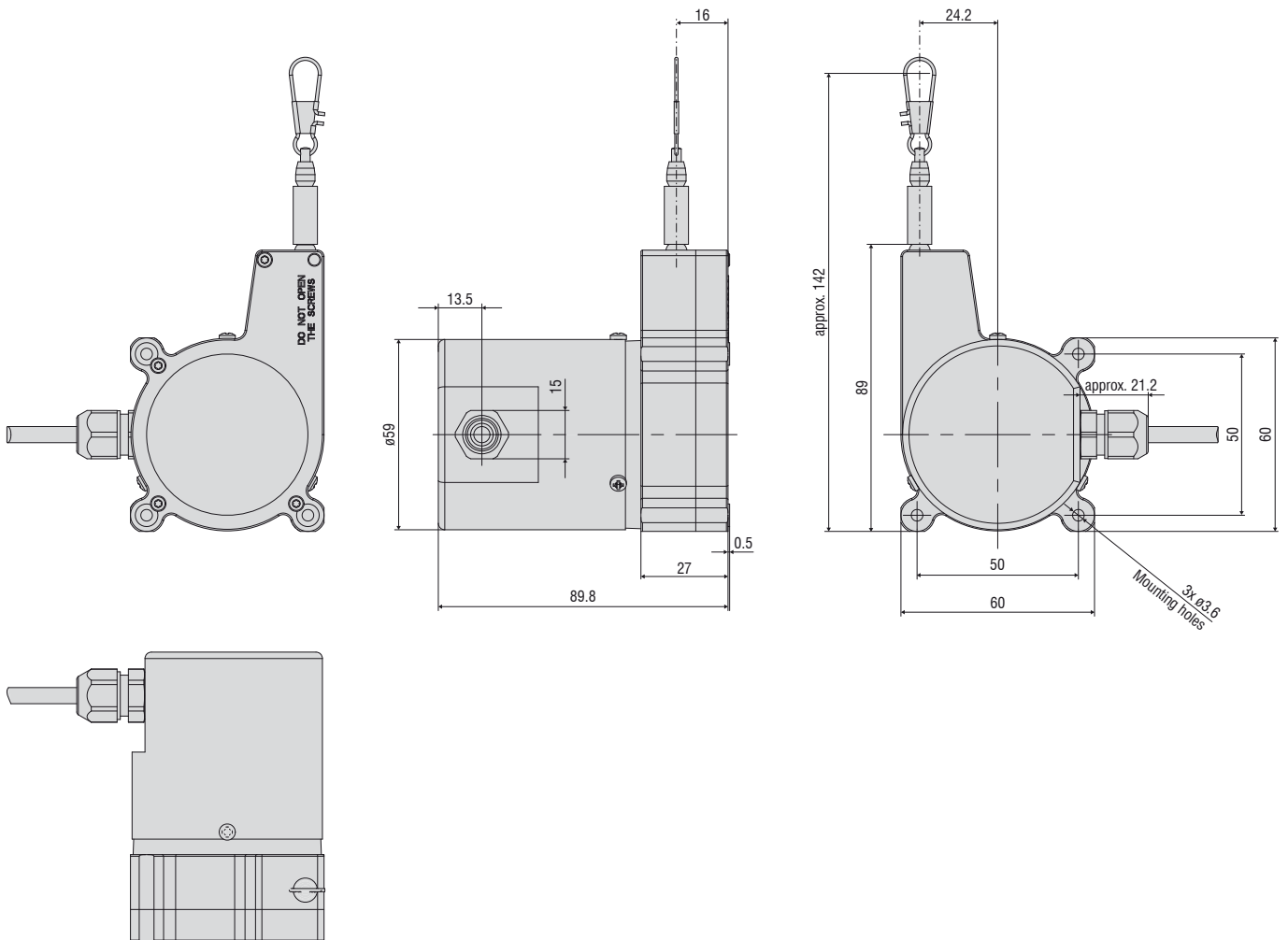
Article designation

WPS -	1500 -	MK60 -	CR -	P
				Output: P: potentiometer U: voltage I: current
			Connection CR: integrated cable, radial, 1 m	
		MK60 series		
	Measuring range in mm			



- Robust plastic housing
- Customer-specific designs
- Incremental encoder

MK60 model



Dimensions in mm, not to scale.

Model	WPS-2400-MK60-CR	
Measuring range	2400 mm	
Digital output	TTL01 (A, B, 0) / TTL02 (A, \bar{A} , B, \bar{B} , 0)	
Resolution	6.83 pulses/mm	
	0.146 mm	
Linearity	$\leq \pm 0.05\%$ FSO	$\leq \pm 1.2$ mm
Sensor element	Incremental encoder	
Wire extension force (max.)	approx. 8 N	
Wire retraction force (min.)	approx. 1 N	
Wire acceleration (max.)	approx. 5 g	
Material	Housing	Glass-fiber reinforced plastic (PBT GF20)
	Measuring wire	Polyamide-coated stainless steel (\varnothing 0.45 mm)
Wire mounting	Wire clip	
Mounting	Mounting holes	
Temperature range	Storage	-20 ... +80 °C
	Operation	-20 ... +80 °C
Connection	integrated cable, radial, length 1 m	
Shock (DIN EN 60068-2-27)	50 g / 5 ms in 3 axes, 2 directions and 1000 shocks each	
Vibration (DIN EN 60068-2-6)	20 g / 20 ... 2000 Hz in 3 axes and 10 cycles each	
Protection class (DIN EN 60529)	IP65	
Weight	approx. 290 g (incl. cable)	

FSO = Full Scale Output

Specifications for digital outputs from page 55 onwards.

Article designation

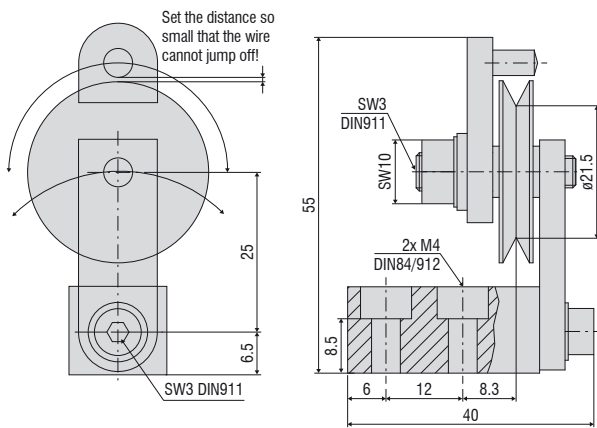
WPS -	2400	MK60 -	CR -	TTL01
				Output: TTL01: A, \bar{B} , 0 TTL02: A, \bar{A} , B, \bar{B} , 0
				Connection CR: integrated cable, radial, 1 m
				MK60 series
				Measuring range in mm

Wire deflection pulleys for external installation

TR1-WDS	Wire deflection pulley, adjustable, for sensors with a wire diameter ≤ 0.45 mm
TR3-WDS	Wire deflection pulley, fixed, for sensors with a wire diameter ≤ 0.45 mm
TR4-WDS	Wire deflection pulley, fixed, for sensors with a wire diameter of 0.8 mm to 1 mm

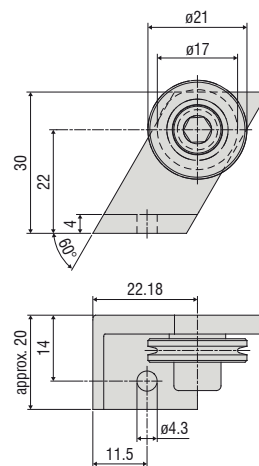
TR1-WDS

Wire deflection pulley, adjustable, for sensors with a wire diameter ≤ 0.45 mm



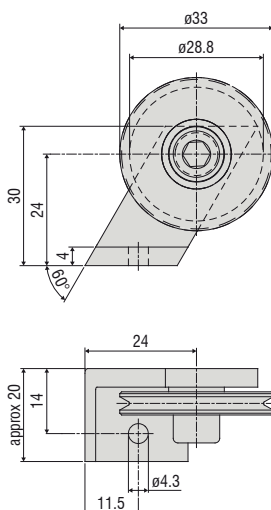
TR3-WDS

Wire deflection pulley, fixed, for sensors with a wire diameter ≤ 0.45 mm



TR4-WDS

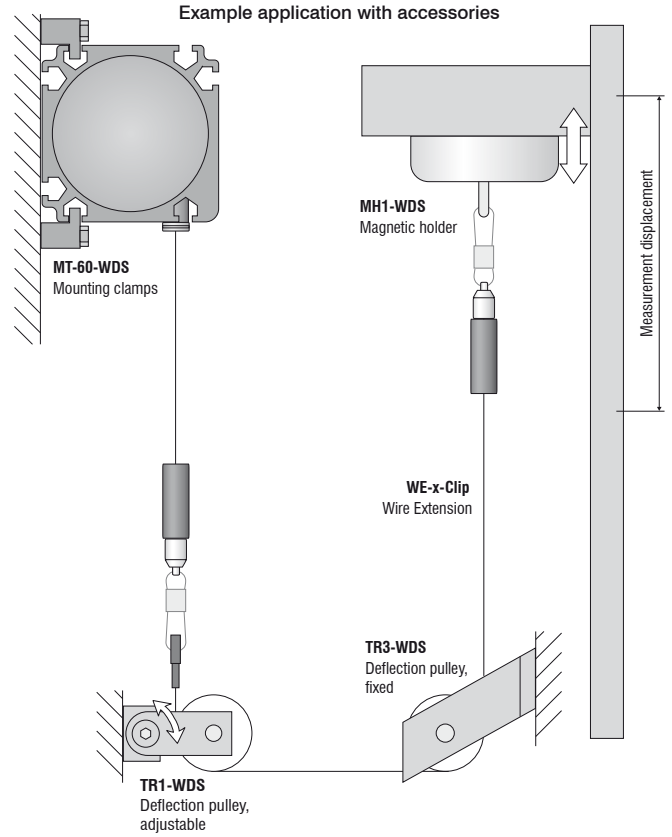
Wire deflection pulley, fixed, for sensors with a wire diameter of 0.8 mm to 1 mm



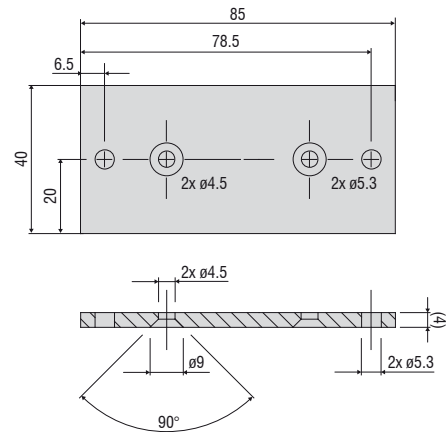
Dimensions in mm, not to scale.

Accessories

WE-xxx-M4	Wire extension with M4 wire connection, x=wire length
WE-xxx-Clip	Wire extension with eyelet, x = wire length
WE-xxx-Clip-WSS	Wire extension with clip and uncoated wire d=0.45 mm
WE-xxx-Ring-PW	Wire extension with plastic ring and para-aramid wire, 1 mm
GK1-WDS	Fork head for M4
MH1-WDS	Magnetic holder for wire attachment
MH2-WDS	Magnetic holder for sensor mounting
MT-60-WDS	Mounting clamps for WDS-P60
FC8	Mating plug for WDS straight, 8-pin
FC8/90	Mating plug, 90° angled for WDS
PC3/8-WDS	Sensor cable, 3 m long
PS2020	Power supply unit 24 V / 2.5 A; input 100-240 VAC, output 24 VDC / 2.5 A; mounting onto symmetrical standard rail 35 mm x 7.5 mm, DIN 50022)
WDS-MP60	Mounting plate for P60 models
PC2/10-WDS-A	Cable for SSI encoder, 2 m long
PC2/10-WDS-E	Cable for incremental encoder, 2 m long
PC10/10-WDS-A	Cable for SSI encoder, 10 m long
PC10/10-WDS-E	Cable for incremental encoder, 10 m long



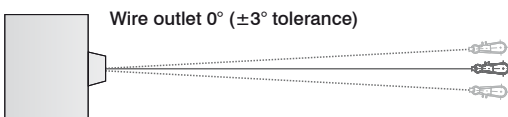
WDS-MP60
Mounting plate for P60 models



Installation instructions:

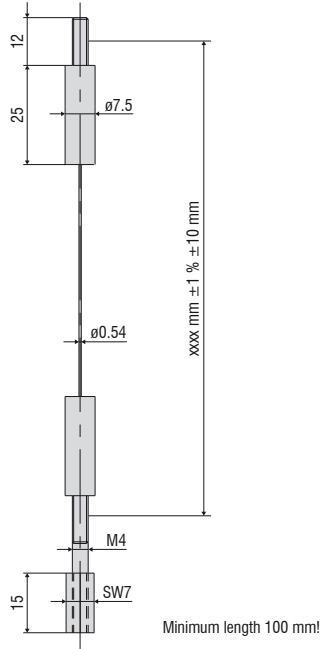
Wire attachment: during installation, do not allow at any time the measuring wire to freely return.

Angle of wire outlet: Make sure during installation that the wire outlet is straight (tolerance of $\pm 3^\circ$). Exceeding this tolerance leads to increased wear of the wire material and on the wire outlet.



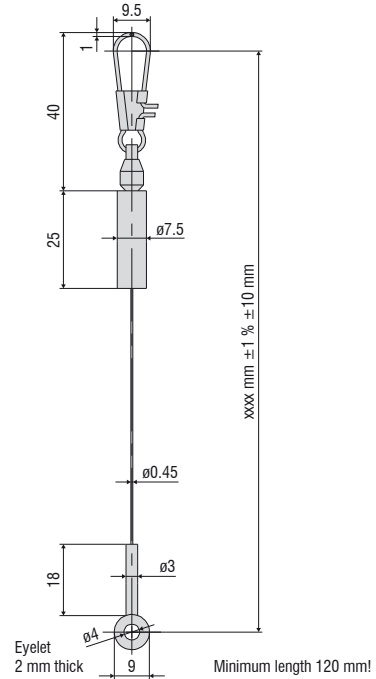
WE-xxxx-M4

Wire extension with M4 wire connection, x=wire length



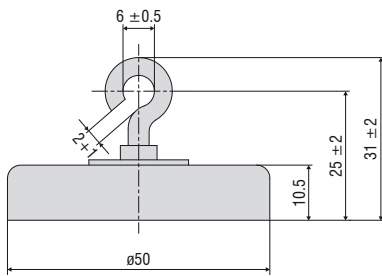
WE-xxxx-Clip

Wire extension with eyelet, x = wire length



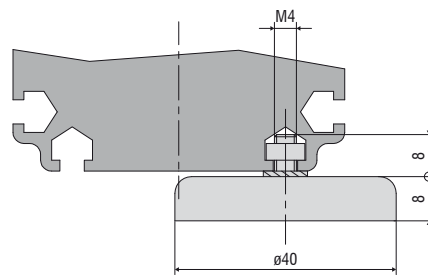
MH1-WDS

Magnetic holder for wire attachment



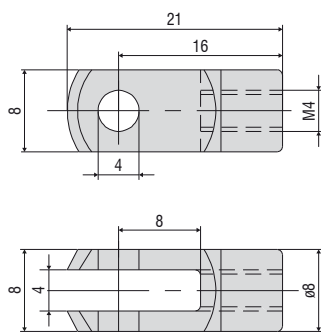
MH2-WDS

Magnetic holder for sensor mounting



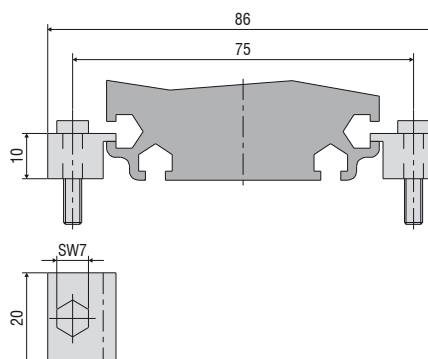
GK1-WDS

Fork head for M4



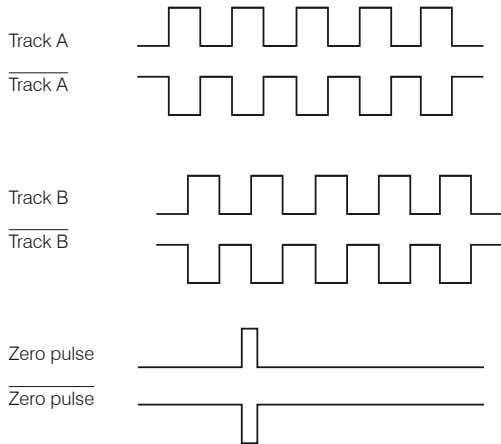
MT-60-WDS

Mounting clamps for WDS-P60



Output		Connector M16 -SA / -SR	Integrated cable -CA / -CR	Open contacts
Potentiometer output (P)		 <p>Sensor side</p> <p>1 = Input + 2 = Ground 3 = Signal</p>		 <p>1 = Input + 2 = Signal 3 = Ground</p>  <p>② WIPER CLOCKWISE →</p>
Input voltage	max. 32 VDC with 1 kOhm / max. 1 W			
Resistance	1 kOhm $\pm 10\%$ (resistance divider)			
Temperature coefficient	$\pm 0.0025\%$ FSO/ $^{\circ}$ C			
Voltage output (U)		 <p>Sensor side</p> <p>1 = Power supply 2 = Ground 3 = Signal 4 = Ground</p>		
Supply voltage	14 ... 27 VDC (non-stabilized)			
Current consumption	max. 30 mA			
Output voltage	0 ... 10 VDC Option 0 ... 5 / ± 5 V			
Load resistance	> 5 kOhm			
Output noise	0.5 mV _{eff}			
Temperature coefficient	$\pm 0.005\%$ FSO/ $^{\circ}$ C			
Electromagnetic compatibility (EMC)	EN 61000-6-4 EN 61000-6-2			
Adjustment range (if supported by the model)				
Zero	$\pm 20\%$ FSO			
Sensitivity	$\pm 20\%$			
Current output (I)		 <p>Sensor side</p> <p>1 = Power supply 2 = Ground</p>		
Supply voltage	14 ... 27 VDC (non-stabilized)			
Current consumption	max. 35 mA			
Output current	4 ... 20 mA			
Load	< 600 Ohm			
Output noise	$< 1.6 \mu\text{A}_{\text{eff}}$			
Temperature coefficient	$\pm 0.01\%$ FSO/ $^{\circ}$ C			
Electromagnetic compatibility (EMC)	EN 61000-6-4 EN 61000-6-2			
Adjustment range (if supported by the model)				
Zero	$\pm 18\%$ FSO			
Sensitivity	$\pm 15\%$			

Output signals



TTL Output	Line driver (5 VDC)	
High level	$\geq 2.5\text{ V}$	(with $I = -20\text{ mA}$)
Low level	$\leq 0.5\text{ V}$	(with $I = 20\text{ mA}$)
Load High	$\leq 20\text{ mA}$	
Tracks	A, \bar{A} , B, \bar{B} , 0	

Output TTL01/ TTL02	NPN (5 VDC $\pm 5\%$)	
High level	$> 4.5\text{ V}$	
Low level	$< 1.0\text{ V}$	
Load High	$\leq 3\text{ mA}$	
Tracks (TTL01)	A, B, 0	
Tracks (TTL02)	A, \bar{A} , B, \bar{B} , 0	

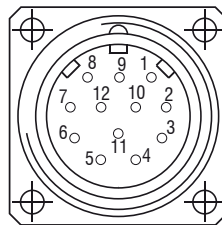
Output HTL	Push-pull (10 ... 30 VDC)	
High level	$\geq V+ - 3\text{ V}$	(with $I = -20\text{ mA}$)
Low level	$\leq 1.5\text{ V}$	(with $I = 20\text{ mA}$)
Load High	$\leq 40\text{ mA}$	
Tracks	A, \bar{A} , B, \bar{B} , 0	

Output E	Push-pull (5 VDC)	
High level	$\geq V+ - 2.5\text{ V}$	
Low level	$\leq 0.5\text{ V}$	
Load High	$\leq 50\text{ mA}$	
Tracks	A, B, 0	

Output E830	Push-pull (8 ... 30 VDC)	
High level	$\geq V+ - 3\text{ V}$	
Low level	$\leq 2.5\text{ V}$	
Load High	$\leq 50\text{ mA}$	
Tracks	A, B, 0	

Pin assignment TTL, HTL

Connector	Cable color	Assignment
Pin 1	Pink	Track B inv.
Pin 2	Blue	V+ Sense
Pin 3	Red	Track N (zero pulse)
Pin 4	Black	Track N inv. (zero pulse inv.)
Pin 5	Brown	Track A
Pin 6	Green	Track inv.
Pin 7	-	-
Pin 8	Gray	Track B
Pin 9	-	-
Pin 10	White-green	GND
Pin 11	White	GND Sense
Pin 12	Brown-green	V+



V+ Sense and GND Sense are directly connected to V+ or GND. Recommendation: Use twisted-pair cables (e.g. A/A inv.) from a cable length of 10 m.

Pin assignment E, E830

Cable color	Assignment
White	0V
Brown	V+
Green	A
-	\bar{A}
Yellow	B
-	\bar{B}
Gray	0

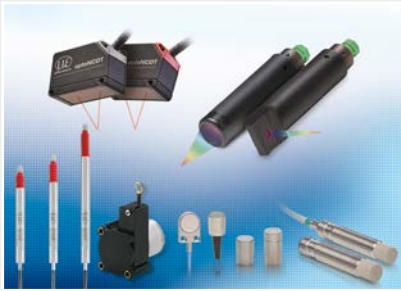
Pin assignment TTL01

Cable color	Assignment
Brown	0V
Gray	V+
White	A
Green	B
Yellow	0

Pin assignment TTL02

Cable color	Assignment
Red	V+
Black	0V
Brown	A
Black	\bar{A}
Orange	B
Black	\bar{B}
Yellow	0
Black	n. c.

Sensors and Systems from Micro-Epsilon



Sensors and systems for displacement, distance and position



Sensors and measurement devices for non-contact temperature measurement



Measuring and inspection systems for metal strips, plastics and rubber



Optical micrometers and fiber optics, measuring and test amplifiers



Color recognition sensors, LED analyzers and inline color spectrometers



3D measurement technology for dimensional testing and surface inspection