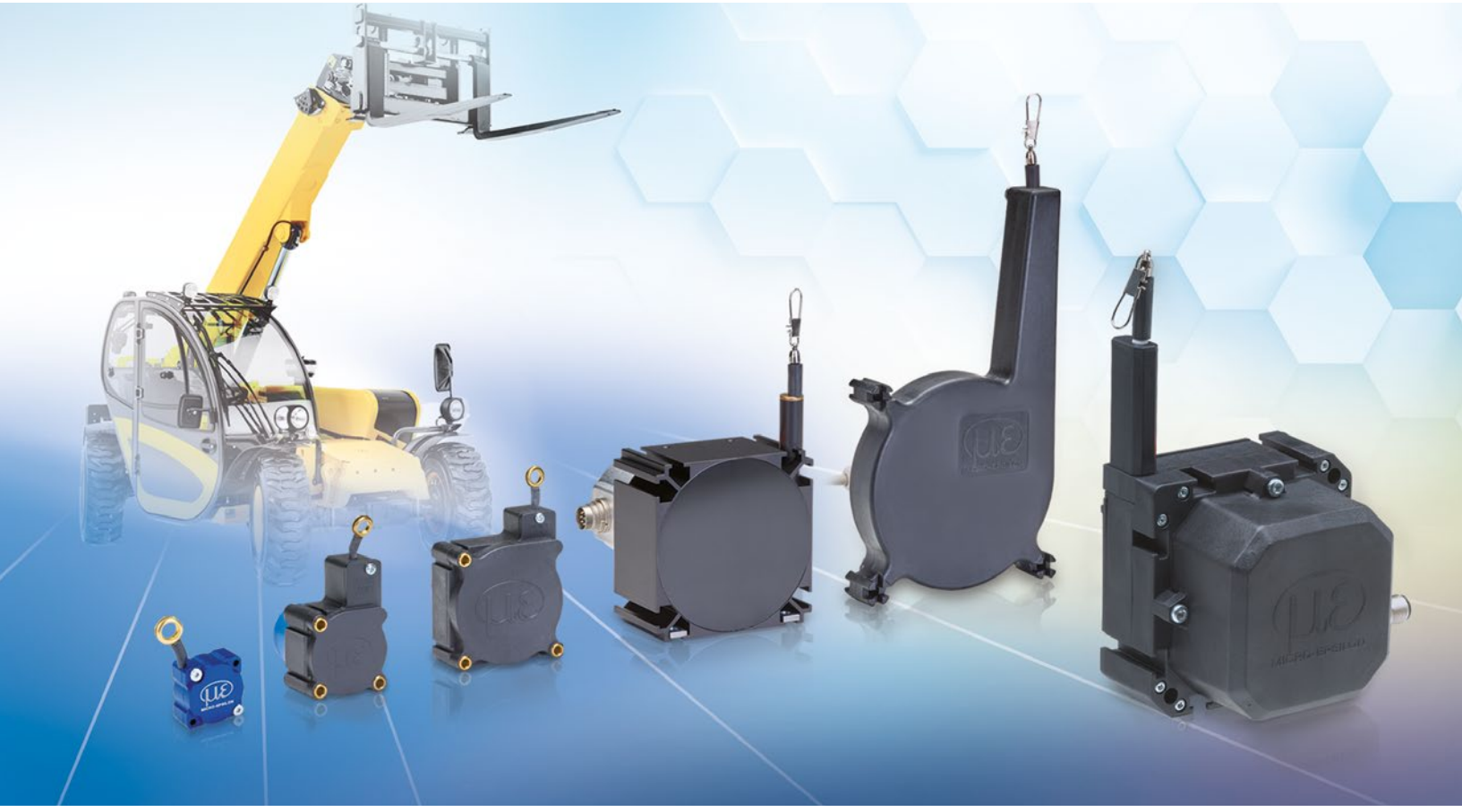
MICRO-EPSILON

More Precision

wireSENSOR // Draw-wire displacement sensors



Draw-wire sensors
wireSENSOR

- Measuring ranges up to 50,000 mm
- Resolution towards infinity
- Compact design with large measuring range
- Easy, fast and flexible mounting
- High operational safety & long service life
- Analog and digital outputs

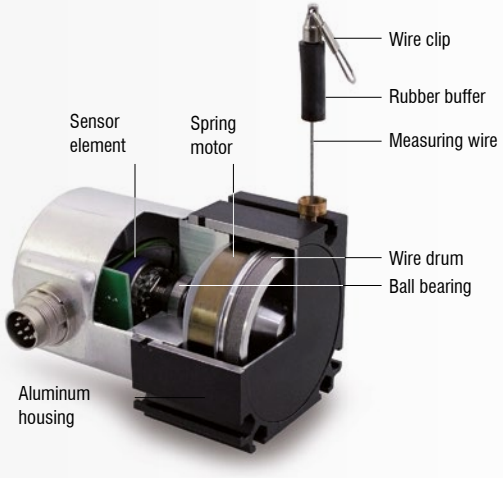


Measuring principle

Draw-wire displacement sensors measure linear movements using a highly flexible steel wire. The cable drum is attached to a sensor element which provides a displacement-proportional output signal. Measurements are performed with high accuracy and dynamics. High quality components ensure a long service life and high operational reliability.

Micro-Epsilon offers numerous models of different draw-wire displacement sensors with different output signal types. Therefore, you can choose the ideal sensor for your application. For special applications involving large numbers of pieces, we develop and manufacture individual OEM designs.

wireSENSOR models stand out due to their optimized ratio between measuring range and size, easy installation and handling. Their robust sensor design enables reliable measurements even in challenging ambient conditions.



Sensor structure of a WDS-P60

Available measuring ranges per sensor group

Measuring ranges in mm	40	50	80	100	130	150	250	300	500	750	1000	1250	1500	2000	2100	2300	2400	2500	3000	3500	4000	5000	7500	8000	10000	15000	30000	40000	50000
Draw-wire sensors for serial integration & OEM		■				■	■		■	■	■	■	■		■	■	■	■	■	■		■	■	■					
Industrial draw-wire sensors				■		■		■	■	■	■		■	■				■	■	■	■	■	■		■	■	■	■	■
Sensors for high wire accelerations	■	■	■	■	■	■	■	■	■		■																		

Available outputs per series and measuring range

Draw-wire sensors for serial integration & OEM

Measuring ranges in mm			50	150	250	500	750	1000	1250	1500	2100	2300	2400	2500	3000	3500	5000	7500	8000	Page
	MK30	analog	P	P	P	P	P													6 - 7
		digital				E	E													8 - 9
	MK46	analog						P	P U I											10 - 11
		digital							E											12 - 13
	MK77	analog									P									14 - 15
		digital									E									16 - 17
	MK60	analog								P U I										18 - 19
		digital											E							20 - 21
	MK88	analog										P U I				P U I	P U I			22 - 23
		digital										P				P	P			24 - 25
	MK120	analog													P U I		P U I	P U I		26 - 27
	K100	analog								P U I				P U I		P U I	P U I		P U I	28 - 29
		digital								P C				P C		P C	P C		P C	30 - 31

Industrial draw-wire sensors

Measuring ranges in mm			100	150	300	500	750	1000	1500	2000	2500	3000	4000	5000	7500	10000	15000	30000	40000	50000	Page
	P60	analog	P U I	P U I	P U I	P U I	P U I	P U I	P U I												32 - 33
		digital						E A	E A												34 - 35
	P96	analog								P U I	P U I										36 - 37
		digital										E A									38 - 39
	P115	analog										P U I	P U I	P U I	P U I	P U I	P U I				40 - 41
		digital												E A	E A	E A	E A				42 - 43
	P200	digital																E A	E A	E A	44 - 45

Sensors for high wire accelerations

Measuring ranges in mm			40	50	80	100	130	150	250	300	500	1000	Page
	MT	analog	P		P		P						46 - 47
	MPM	analog		P				P	P				48 - 49
	MP / MPW	analog				P				P	P	P	50 - 51

P Potentiometer U Voltage I Current E Incremental encoder (HTL, TTL) A Absolute-encoder (SSI, PROFINET, PROFIBUS, CANopen, EtherCAT, EtherNet/IP) C CANopen

Applications
wireSENSOR

Mobile machines: booms, supports & telescopic loaders



Measurement of the extension length of telescopic booms



Variable support for mobile cranes



Measuring the lift height in telescopic loaders

Lift tables: lifting platform, scissors lift tables



Measuring the lift height in synchronous lifting systems



Measuring the lift height in scissors lift tables

Industrial vehicles & driverless transport systems



Measuring the lift height in forklift trucks



Measuring the lift height in driverless transport systems

Medical technology: operating tables & mammography



Position measurement in Computer Tomography (CT)



Positioning of operating tables

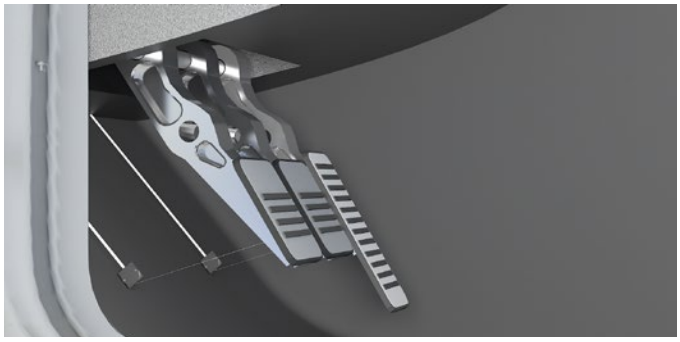


Position measurement in mammography

Test bench construction and road tests: chassis test benches & crash tests



Spring travel measurement in road tests



Measuring the pedal travel



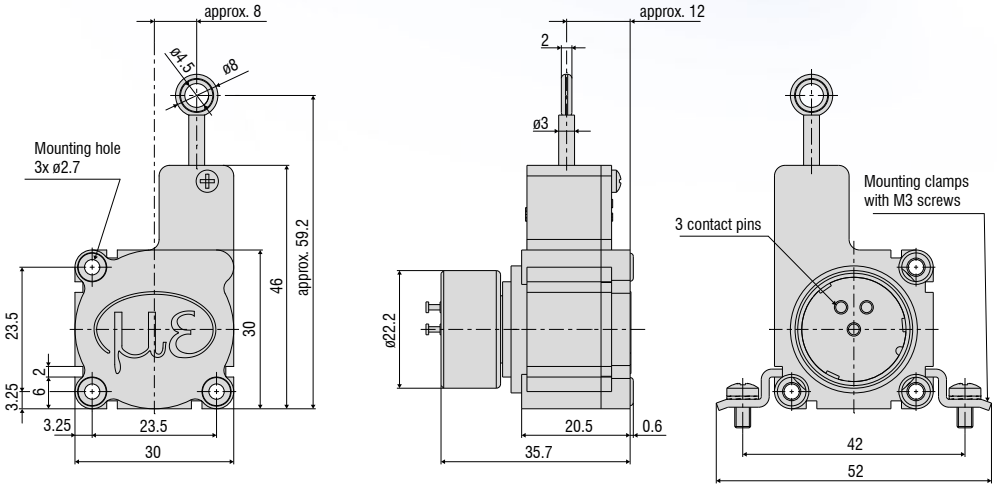
Displacement measurement in crash tests

Low-cost draw-wire sensors
wireSENSOR MK30 analog

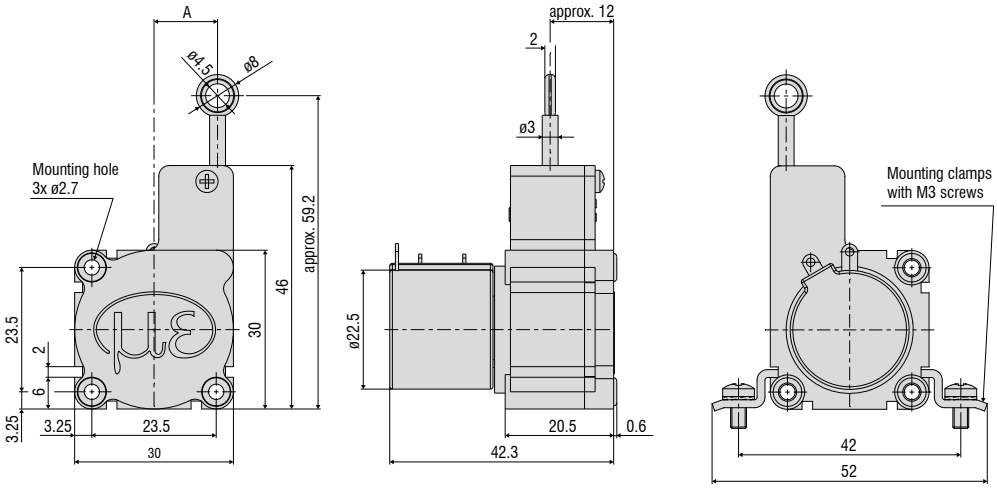
- Robust plastic housing
- Customer-specific designs
- Conductive plastic/wire/hybrid potentiometer
- Smallest design in its class



Measuring range 50 mm



Measuring range 150/250/500/750 mm



Measuring range (mm)	A (mm)
150 / 250 / 500	approx. 8
750	approx. 12

All dimensions in mm, not to scale

Model			WPS-50-MK30	WPS-150-MK30	WPS-250-MK30	WPS-500-MK30	WPS-750-MK30
Measuring range			50 mm	150 mm	250 mm	500 mm	750 mm
Analog output [1]			Potentiometer				
Resolution		Conductive plastic potentiometer	towards infinity	-	-	-	-
		Wire potentiometer	-	-	-	0.15 mm	0.2 mm
		Hybrid potentiometer	-	towards infinity			
Linearity	Conductive plastic potentiometer P50	≤ ±0.5% FSO	≤ ±0.25 mm	-	-	-	-
	Wire potentiometer P25	≤ ±0.25% FSO	-	-	-	≤ ±1.25 mm	≤ ±1.87 mm
	Hybrid potentiometer P25	≤ ±0.25% FSO	-	≤ ±0.375 mm	≤ ±0.625 mm	-	-
	Hybrid potentiometer P10	≤ ±0.1% FSO	-	-	≤ ±0.25 mm	≤ ±0.5 mm	≤ ±0.75 mm
Sensor element			Conductive plastic potentiometer	Hybrid potentiometer		Wire/hybrid potentiometer	
Wire extension force (max.)			approx. 2.5 N				
Wire retraction force (min.)			approx. 1 N				
Wire acceleration (max.)			approx. 5 g				
Material		Housing	Plastics				
		Measuring wire	Polyamide-coated stainless steel (ø 0.36 mm)				
Wire mounting			Eyelet (ø 4.5 mm)				
Installation			Mounting holes or mounting grooves on the sensor housing				
Temperature range		Storage	-20 … +80 °C				
		Operation	-20 … +80 °C				
Connection			Soldering tags				
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)			IP20				
Weight			approx. 45 g				

FSO = Full Scale Output

[1] Specifications for analog outputs from page 58 onwards.

Article designation

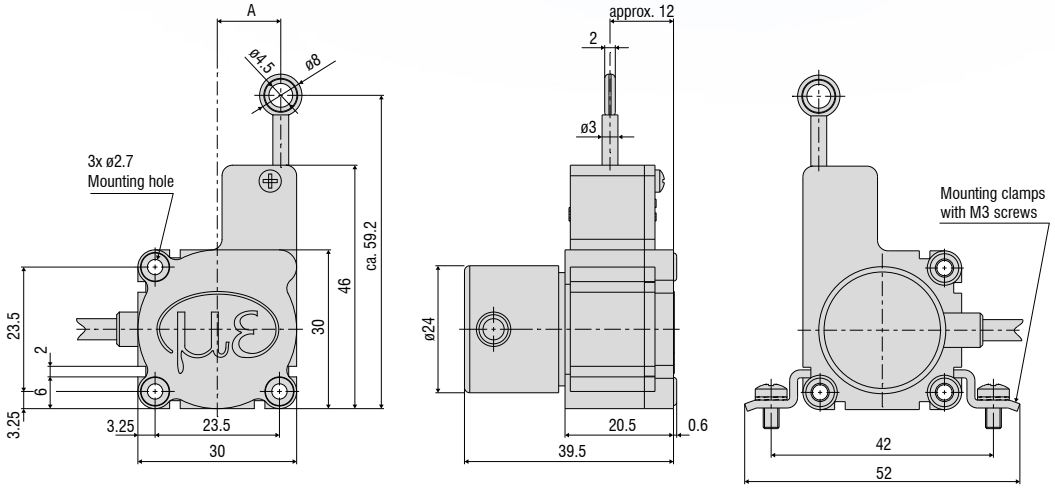
WPS - 50 - MK30 - P25

- **P25** – Output type:
  Potentiometer P50 (linearity ±0.5 % FSO)
  Potentiometer P25 (linearity ±0.25 % FSO)
  Potentiometer P10 (linearity ±0.1 % FSO)
- **MK30** – MK30 series
- **50** – Measuring range in mm

Low-cost draw-wire sensors
wireSENSOR MK30 digital

- Robust plastic housing
- Customer-specific designs
- Incremental encoder
- Smallest design in its class





Measuring range (mm)	A (mm)
500	approx. 8
750	approx. 12

All dimensions in mm, not to scale

Model		WPS-500-MK30	WPS-750-MK30
Measuring range		500 mm	750 mm
Digital output [1]		Encoder: E (5 … 24 VDC) / Encoder E830 (8 … 30 VDC)	
Resolution		10 pulses/mm	6.7 pulses/mm
		0.1 mm	0.15 mm
Linearity	≤ ±0.05% FSO	≤ ±0.25 mm	≤ ±0.375 mm
Sensor element		Incremental encoder	
Wire extension force (max.)		approx. 2.5 N	
Wire retraction force (min.)		approx. 1 N	
Wire acceleration (max.)		approx. 5 g	
Material	Housing	Plastics	
	Measuring wire	Polyamide-coated stainless steel (ø 0.36 mm)	
Wire mounting		Eyelet (ø 4.5 mm)	
Installation		Mounting holes or mounting grooves on the sensor housing	
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)		IP54	
Weight		approx. 80 g (incl. cable)	

FSO = Full Scale Output
[1] Specifications for digital outputs from page 59 onwards.

Article designation

WPS - **500 -** **MK30 -** **E830**

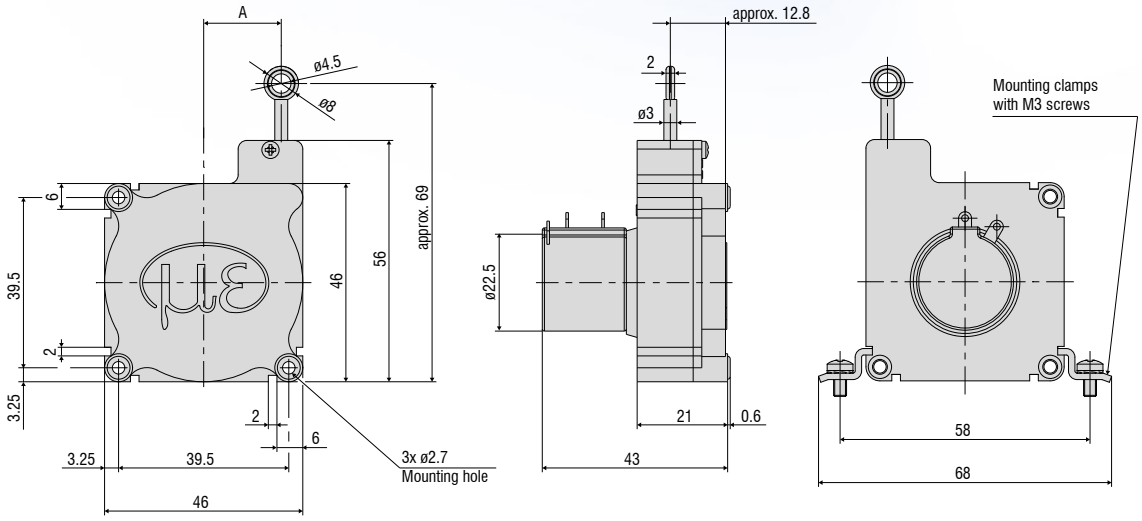
- **E830**: Output type: Encoder E (5 ... 24 VDC) / Encoder E830 (8 ... 30 VDC)
- **MK30 -**: MK30 series
- **500 -**: Measuring range in mm

Low-cost draw-wire sensors
wireSENSOR MK46 analog

- Robust plastic housing
- Customer-specific designs
- Wire or hybrid potentiometer

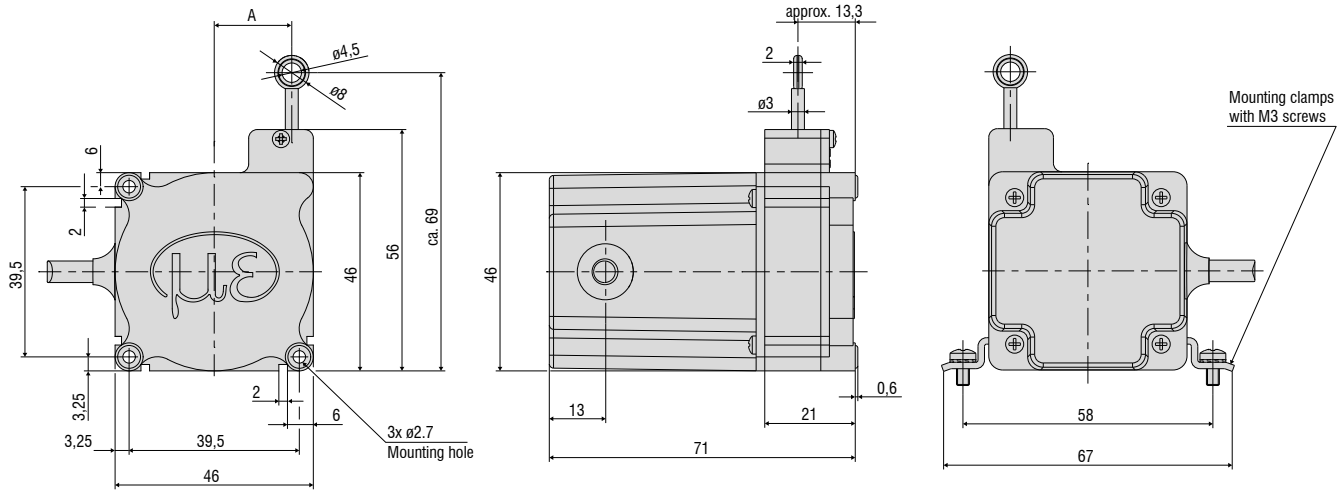


Output P10/P25



Measuring range (mm)	A (mm)
1000	approx. 18
1250	approx. 20

Output CR-P10/CR-P25/CR-U10/CR-I10



All dimensions in mm, not to scale

Model			WPS-1000-MK46	WPS-1250-MK46
Measuring range			1000 mm	1250 mm
Analog output			Potentiometer	Potentiometer, current, voltage
Resolution	Wire potentiometer P25		0.3 mm	0.4 mm
	Hybrid potentiometer P10/U10/I10		towards infinity	
Linearity	Wire potentiometer P25	≤ ±0.25% FSO	≤ ±2.5 mm	≤ ±3.12 mm
	Hybrid potentiometer P10/U10/I10	≤ ±0.1% FSO	≤ ±1 mm	≤ ±1.2 mm
Sensor element			Wire/hybrid potentiometer	
Wire extension force (max.)			approx. 1.6 N	approx. 1.5 N
Wire retraction force (min.)			approx. 1 N	
Wire acceleration (max.)			approx. 5 g	
Material	Housing		Plastics	
	Measuring wire		Polyamide-coated stainless steel (ø 0.36 mm)	
Wire mounting			Eyelet (ø 4.5 mm)	
Installation			Mounting holes or mounting grooves on the sensor housing	
Temperature range	Storage		-20 … +80 °C	
	Operation		-20 … +80 °C	
Connection	P10/P25		Soldering tags	
	CR-P10/CR-P25/CR-U10/CR-I10		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)			IP20	
Weight			approx. 80 g	

FSO = Full Scale Output

[1] Specifications for analog outputs from page 58 onwards.

Article designation

WPS - 1000 - MK46 - P25

- **P25** – Output type:
  P10: Potentiometer
  P25: Potentiometer
  CR-P10/P25: potentiometer, integrated cable, radial, 1 m
- **MK46** – MK46 series
- **1000** – Measuring range in mm

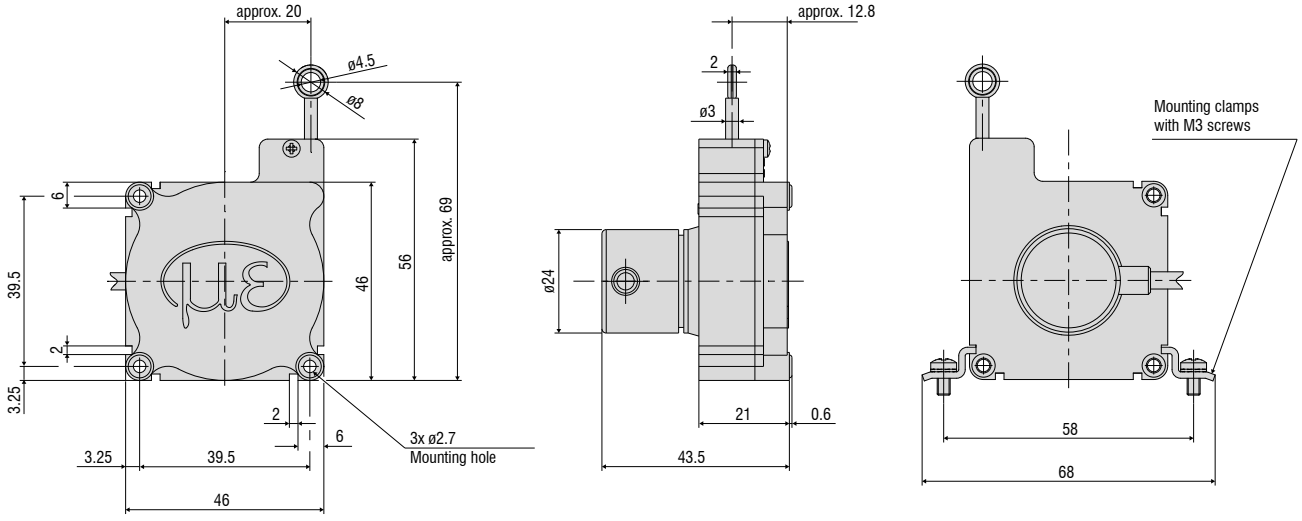
WPS - 1250 - MK46 - P25

- **P25** – Output type:
  P10: Potentiometer
  P25: Potentiometer
  CR-P10/P25: potentiometer, integrated cable, radial, 1 m
  CR-U10: Voltage, integrated cable, radial, 1 m
  CR-I10: Current, integrated cable, radial, 1 m
- **MK46** – MK46 series
- **1250** – Measuring range in mm

Low-cost draw-wire sensors
wireSENSOR MK46 digital

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





All dimensions in mm, not to scale

Model		WPS-1250-MK46
Measuring range		1250 mm
Digital output [1]		Encoder: E (5 … 24 VDC) / Encoder E830 (8 … 30 VDC)
Resolution		4 pulses/mm
		0.25 mm
Linearity	≤ ±0.05% FSO	≤ ±0.625 mm
Sensor element		Incremental encoder
Wire extension force (max.)		approx. 1.5 N
Wire retraction force (min.)		approx. 1 N
Wire acceleration (max.)		approx. 5 g
Material	Housing	Plastics
	Measuring wire	Polyamide-coated stainless steel (ø 0.36 mm)
Wire mounting		Eyelet (ø 4.5 mm)
Installation		Mounting holes or mounting grooves on the sensor housing
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)		IP54
Weight		approx. 120 g (incl. cable)

FSO = Full Scale Output

[1] Specifications for digital outputs from page 59 onwards.

Article designation

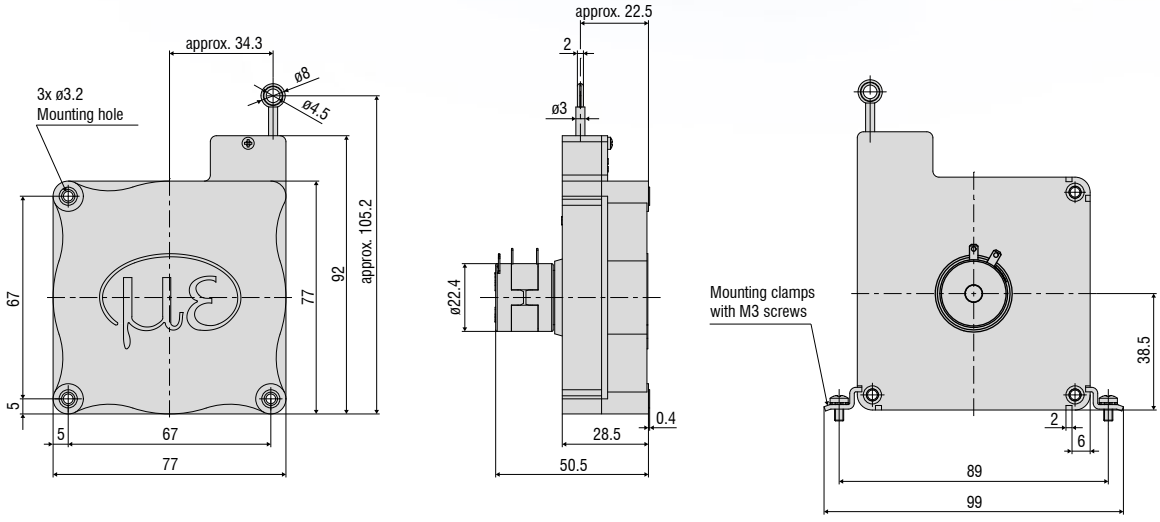
WPS -	1250 -	MK46 -	E
			Output type: Encoder E (5 ... 24 VDC) Encoder E830 (8 ... 30 VDC)
		MK46 series	
	Measuring range in mm		

Low-cost draw-wire sensors
wireSENSOR MK77 analog

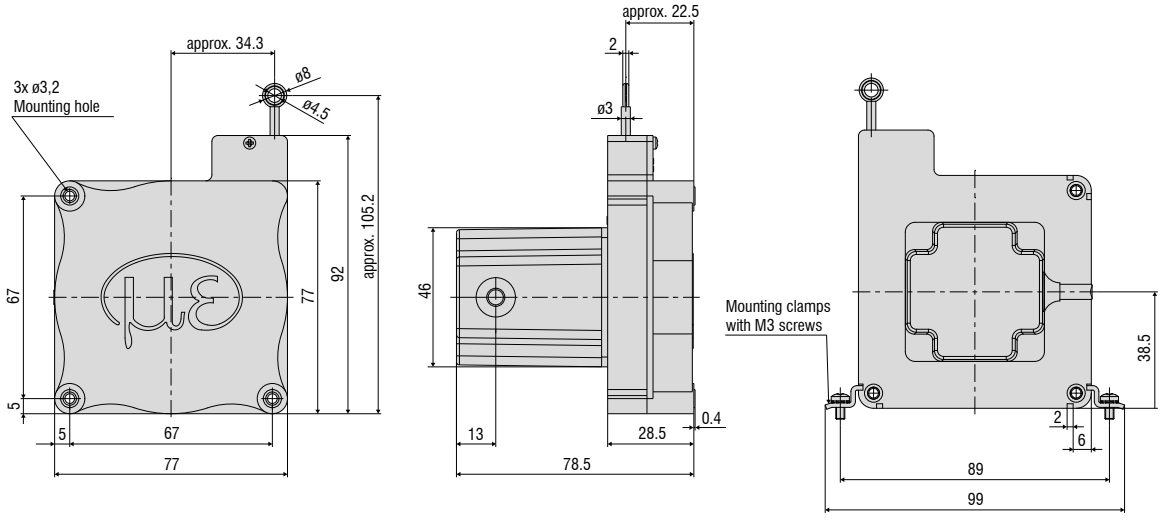
- Robust plastic housing
- Customer-specific designs
- Wire potentiometer



Output P25



Output CR-P25



All dimensions in mm, not to scale

Model			WPS-2100-MK77
Measuring range			2100 mm
Analog output			Potentiometer
Resolution		Wire potentiometer P25	0.55 mm
Linearity	Wire potentiometer P25	≤ ±0.25% FSO	≤ ±5.25 mm
Sensor element			Wire potentiometer
Wire extension force (max.)			approx. 5 N
Wire retraction force (min.)			approx. 3.5 N
Wire acceleration (max.)			approx. 5 g
Material		Housing	Plastics
		Measuring wire	Polyamide-coated stainless steel (ø 0.45 mm)
Wire mounting			Eyelet (ø 4.5 mm)
Installation			Mounting holes or mounting grooves on the sensor housing
Temperature range		Storage	-20 … +80 °C
		Operation	-20 … +80 °C
Connection		P25	Soldering tags
		CR-P25	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)			IP20
Weight		P25	approx. 220 g
		CR-P25	approx. 275 g (incl. cable)

FSO = Full Scale Output
Specifications for analog outputs from page 58 onwards.

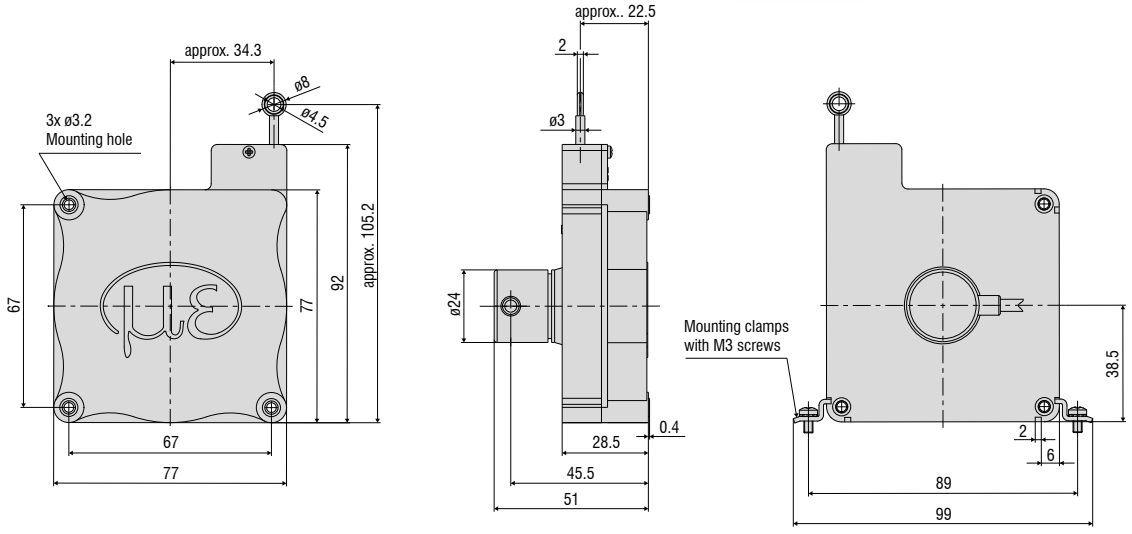
Article designation

WPS -	2100 -	MK77 -	P25
			Output type: Potentiometer P25 (linearity ±0.25 % FSO) CR-P25 potentiometer, integrated cable, radial, 1 m
		MK77 series	
	Measuring range in mm		

Low-cost draw-wire sensors
wireSENSOR MK77 digital

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





All dimensions in mm, not to scale

Model		WPS-2100-MK77
Measuring range		2100 mm
Digital output [1]		Encoder: E (5 … 24 VDC) / Encoder E830 (8 … 30 VDC)
Resolution		2.32 pulses/mm
		0.43 mm
Linearity	≤ ±0.05% FSO	≤ ±1.05 mm
Sensor element		Incremental encoder
Wire extension force (max.)		approx. 5 N
Wire retraction force (min.)		approx. 3.5 N
Wire acceleration (max.)		approx. 5 g
Material	Housing	Plastics
	Measuring wire	Polyamide-coated stainless steel (ø 0.45 mm)
Wire mounting		Eyelet (ø 4.5 mm)
Installation		Mounting holes or mounting grooves on the sensor housing
Temperature range	Storage	-20 … +80 °C
	Operation	-20 … +80 °C
Connection		integrated cable, radial, length 2 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)		IP54
Weight		approx. 275 g (incl. cable)

FSO = Full Scale Output

[1] Specifications for digital outputs from page 59 onwards.

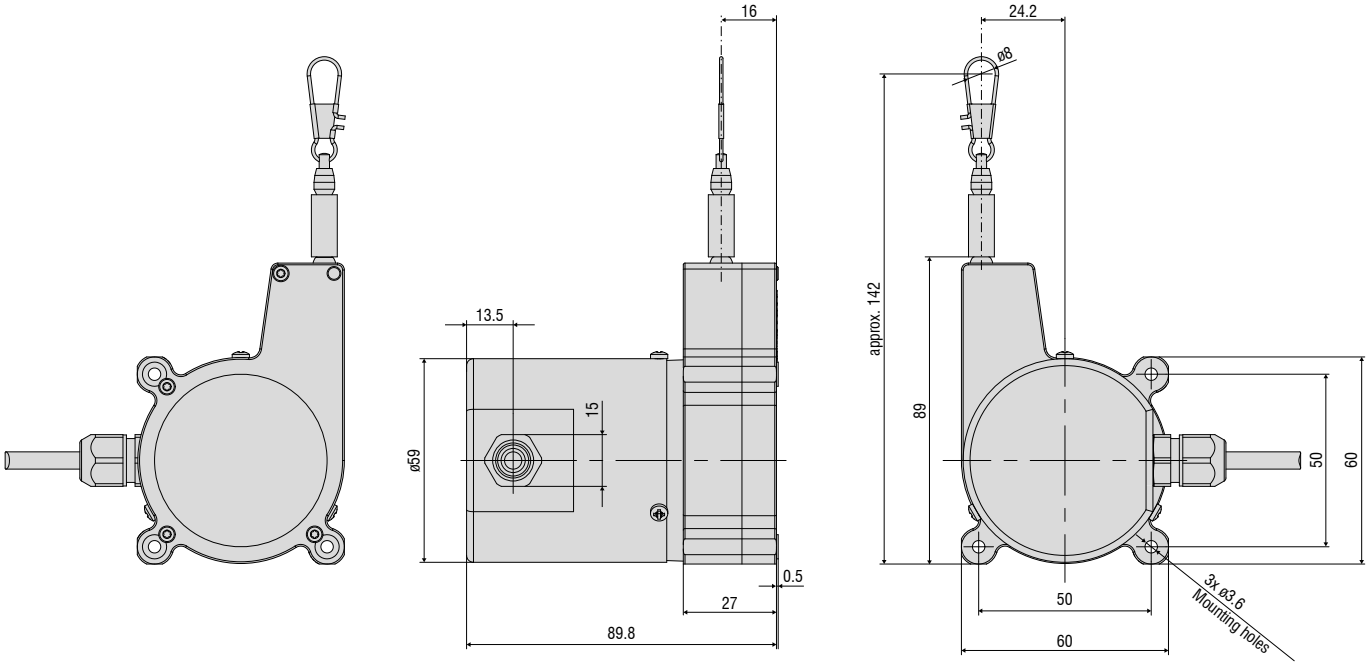
Article designation

WPS -	2100 -	MK77 -	E
			Output type: Encoder E (5 ... 24 VDC) Encoder E830 (8 ... 30 VDC)
		MK77 series	
	Measuring range in mm		

Low-cost draw-wire sensors
wireSENSOR MK60 analog

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





All dimensions in mm, not to scale

Model			WPS-1500-MK60
Measuring range			1500 mm
Analog output [1]			Potentiometer, current, voltage
Resolution		Hybrid potentiometer P10	towards infinity
Linearity	Hybrid potentiometer P10	≤ ±0.15% FSO	≤ ±2.25 mm
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 (ø 0.45 mm)
Wire mounting			Wire clip
Installation			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

[1] Specifications for analog outputs from page 58 onwards.

Article designation

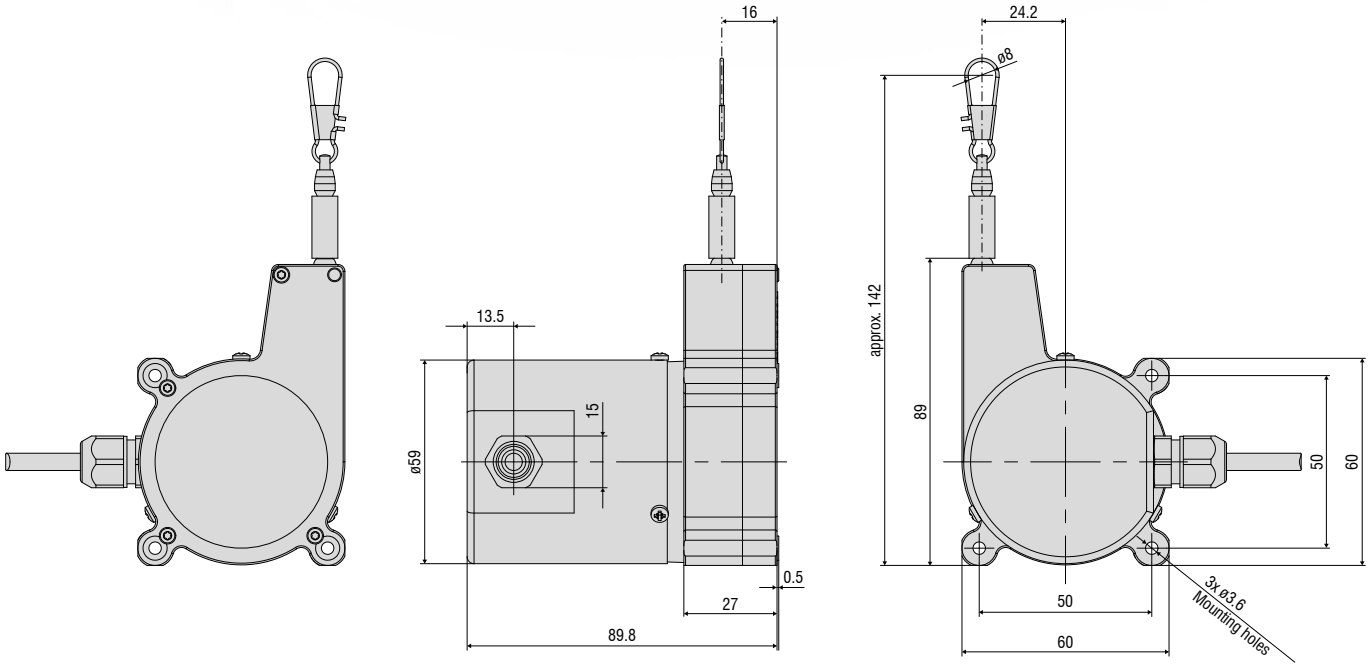
WPS - 1500 - MK60 - CR - P

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

Low-cost draw-wire sensors
wireSENSOR MK60 digital

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





All dimensions in mm, not to scale

Model		WPS-2400-MK60
Measuring range		2400 mm
Digital output [1]		TTL01 (A, B, 0) / TTL02 (A, $\overline{A}$, B, $\overline{B}$, 0)
Resolution		6.83 pulses/mm
		0.146 mm
Linearity	≤ ±0.05% FSO	≤ ±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 (ø 0.45 mm)
Wire mounting		Wire clip
Installation		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
[1] Specifications for digital outputs from page 59 onwards.

Article designation

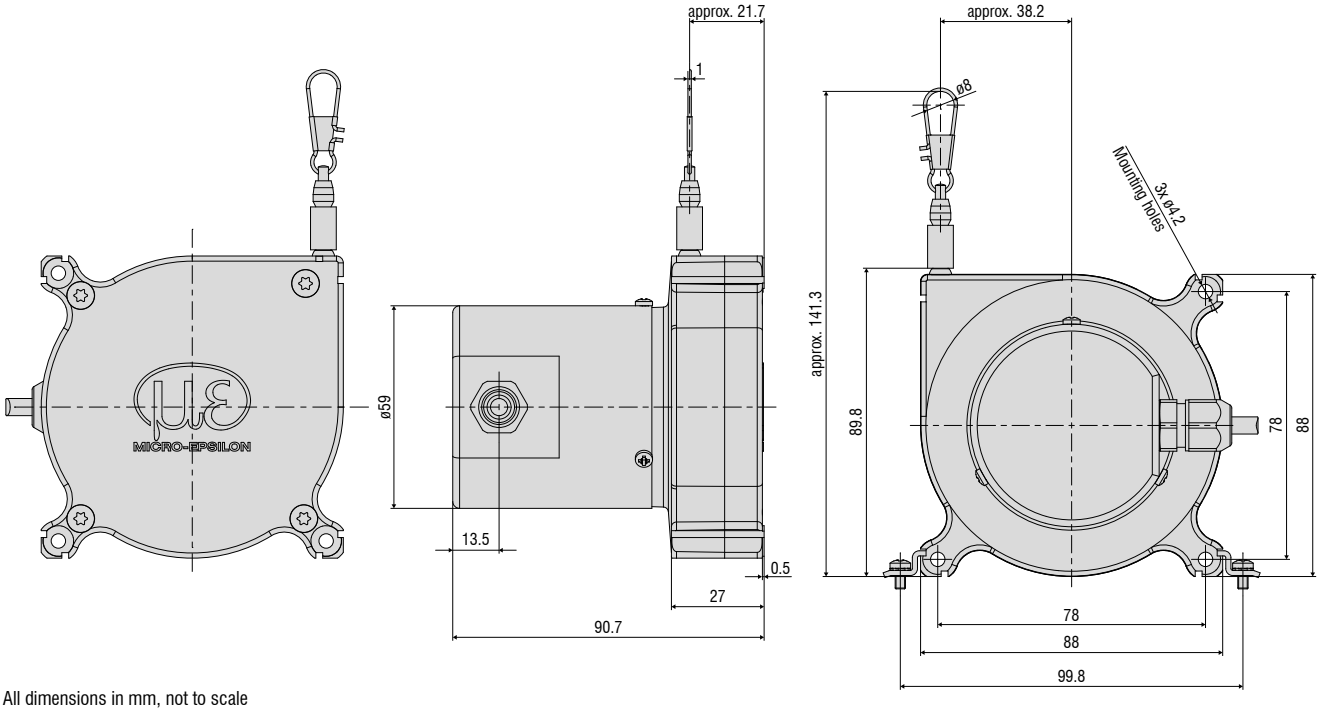
WPS -	2400	MK60 -	CR -	TTL01

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

Low-cost draw-wire sensors
wireSENSOR MK88 analog

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





All dimensions in mm, not to scale

Model			WPS-2300-MK88	WPS-3500-MK88	WPS-5000-MK88
Measuring range			2300 mm	3500 mm	5000 mm
Analog output [1]			Potentiometer, current, voltage		
Resolution		Hybrid potentiometer P10	towards infinity		
Linearity	Hybrid potentiometer P10	≤ ±0.15% FSO	≤ ±3.45 mm	-	-
	Hybrid potentiometer P10	≤ ±0.3% FSO	-	≤ ±10.5 mm	-
	Hybrid potentiometer P10	≤ ±0.4% FSO	-	-	≤ ±20 mm
Sensor element			Hybrid potentiometer		
Wire extension force (max.)			approx. 9 N		
Wire retraction force (min.)			approx. 4 N		
Wire acceleration (max.)			approx. 7 g		
Material		Housing	Glass-fiber reinforced plastic (PA 6 GF30)		
		Protection cap	Glass-fiber reinforced plastic (PBT GF20)		
		Measuring wire	Polyamide-coated stainless steel (ø 0.45 mm)		
Wire mounting			Wire clip		
Installation			Mounting holes or mounting grooves on the sensor housing		
Temperature range		Storage	-20 … +80 °C		
		Operation	-20 … +80 °C (on request -40 … +85 °C)		
Connection			integrated cable, radial, length 1 m		
Shock (DIN EN 60068-2-27)			50 g / 10 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 (on request IP67)		
Weight			approx. 400 - 430 g (incl. cable)		

FSO = Full Scale Output

[1] Specifications for analog outputs from page 58 onwards.

Article designation

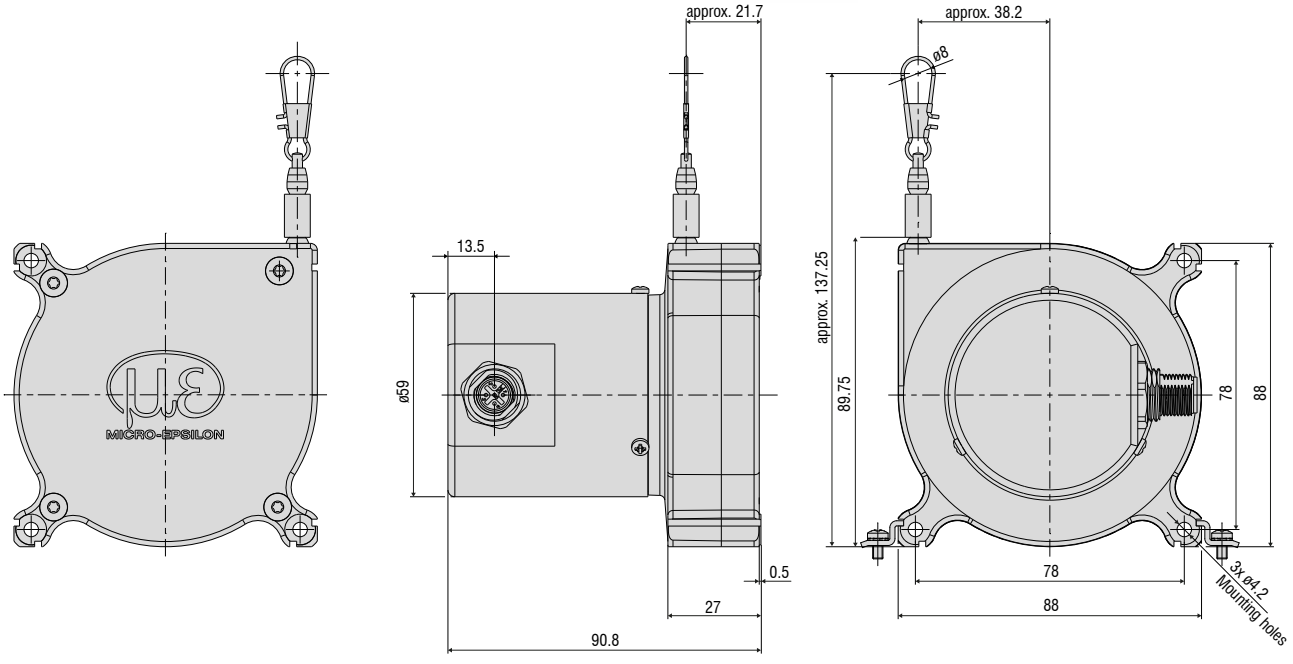
WPS -	2300 -	MK88 -	CR -	P

- P: Output: P: potentiometer, U: voltage, I current
- CR: Connection CR: integrated cable, radial, 1 m
- MK88: MK88 series
- 2300: Measuring range in mm

Low-cost draw-wire sensors
wireSENSOR MK88 digital

- Robust plastic housing
- Customer-specific designs
- CANopen Interface





All dimensions in mm, not to scale

Model			WPS-2300-MK88	WPS-3500-MK88	WPS-5000-MK88
Measuring range			2300 mm	3500 mm	5000 mm
Digital interface [1]			CANopen		
Resolution			0.56 mm	0.85 mm	1.22 mm
Linearity	Hybrid potentiometer P10	≤ ±0.15% FSO	≤ ±3.45 mm	-	-
	Hybrid potentiometer P10	≤ ±0.3% FSO	-	≤ ±10.5 mm	-
	Hybrid potentiometer P10	≤ ±0.4% FSO	-	-	≤ ±20 mm
Sensor element			Hybrid potentiometer		
Wire extension force (max.)			approx. 9 N		
Wire retraction force (min.)			approx. 4 N		
Wire acceleration (max.)			approx. 7 g		
Material		Housing	Glass-fiber reinforced plastic (PA 6 GF30)		
		Protection cap	Glass-fiber reinforced plastic (PBT GF20)		
		Measuring wire	Polyamide-coated stainless steel (ø 0.45 mm)		
Wire mounting			Wire clip		
Installation			Mounting holes or mounting grooves on the sensor housing		
Temperature range		Storage	-20 … +80 °C		
		Operation	-20 … +80 °C (on request -40 … +85 °C)		
Connection			5-pole M12x1 connector, radial		
Shock (DIN EN 60068-2-27)			50 g / 10 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 (on request IP67) [2]		
Weight			approx. 400 - 430 g (incl. cable)		

FSO = Full Scale Output
[1] Specifications for digital outputs from page 59 onwards.
[2] With plug version only when connected

Article designation

WPS -	2300 -	MK88 -	SR12 -	CO

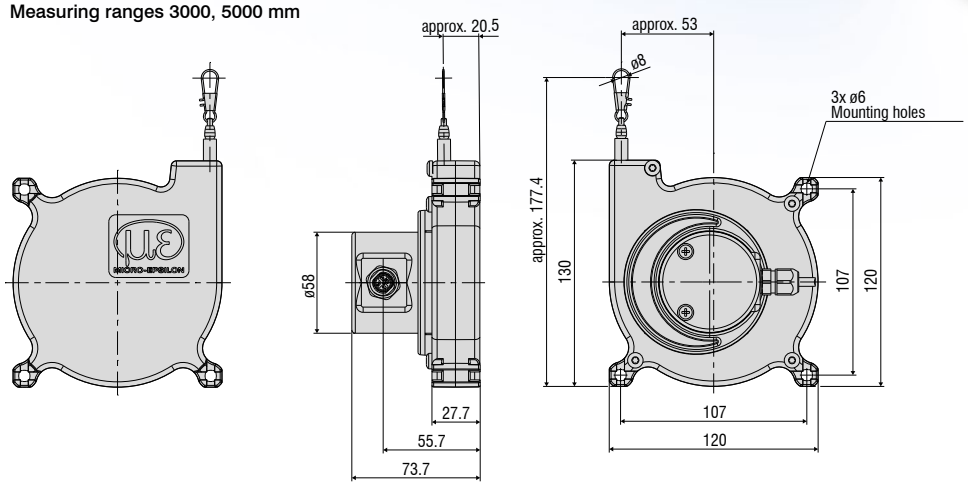
- CO: Output type: CANopen
- SR12: Connection SR12: 5-pin SA connector M12
- MK88: MK88 series
- 2300: Measuring range in mm

Low-cost draw-wire sensors
wireSENSOR MK120 analog

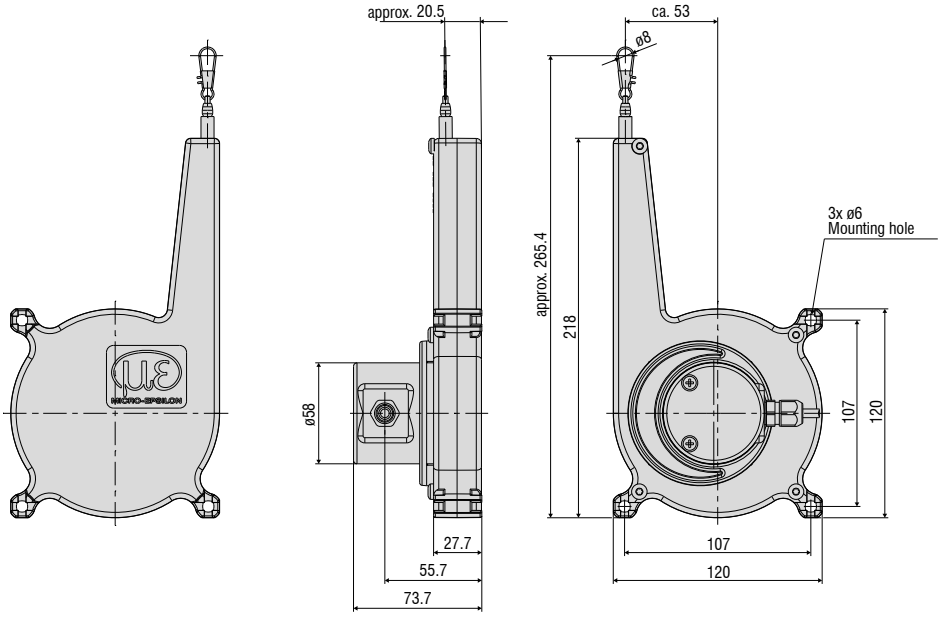
- Robust plastic housing
- Customer-specific designs
- Potentiometer, current or voltage output



Measuring ranges 3000, 5000 mm



Measuring range 7500 mm



All dimensions in mm, not to scale

Model			WPS-3000-MK120	WPS-5000-MK120	WPS-7500-MK120
Measuring range			3000 mm	5000 mm	7500 mm
Analog output [1]			Potentiometer, current, voltage		
Resolution		Hybrid potentiometer P10	towards infinity		
Linearity	Hybrid potentiometer P10	≤ ±0.15% FSO	≤ ±4.5 mm	≤ ±7.5 mm	≤ ±11.25 mm
Sensor element			Hybrid potentiometer		
Wire extension force (max.)			approx. 10 N		
Wire retraction force (min.)			approx. 4 N		
Wire acceleration (max.)			approx. 6 g		
Material		Housing	Plastics (PA 6)		
		Measuring wire	Polyamide-coated stainless steel (ø 0.45 mm)		
Wire mounting			Wire clip		
Installation			Mounting holes or mounting grooves on the sensor housing		
Temperature range		Storage	-20 … +80 °C		
		Operation	-20 … +80 °C		
Connection			integrated cable, radial, length 1 m		
Shock (DIN EN 60068-2-27)			40 g / 6 ms in 3 axes, 2 directions and 3000 shocks each		
Vibration (DIN EN 60068-2-6)			3 g / 10 … 5000 Hz in 3 axes and 10 cycles each		
Protection class (DIN EN 60529)			IP65		
Weight			approx. 850 g (incl. cable)		

FSO = Full Scale Output
[1] Specifications for analog outputs from page 58 onwards.

Article designation

WPS - **3000 -** **MK120 -** **CR -** **P**

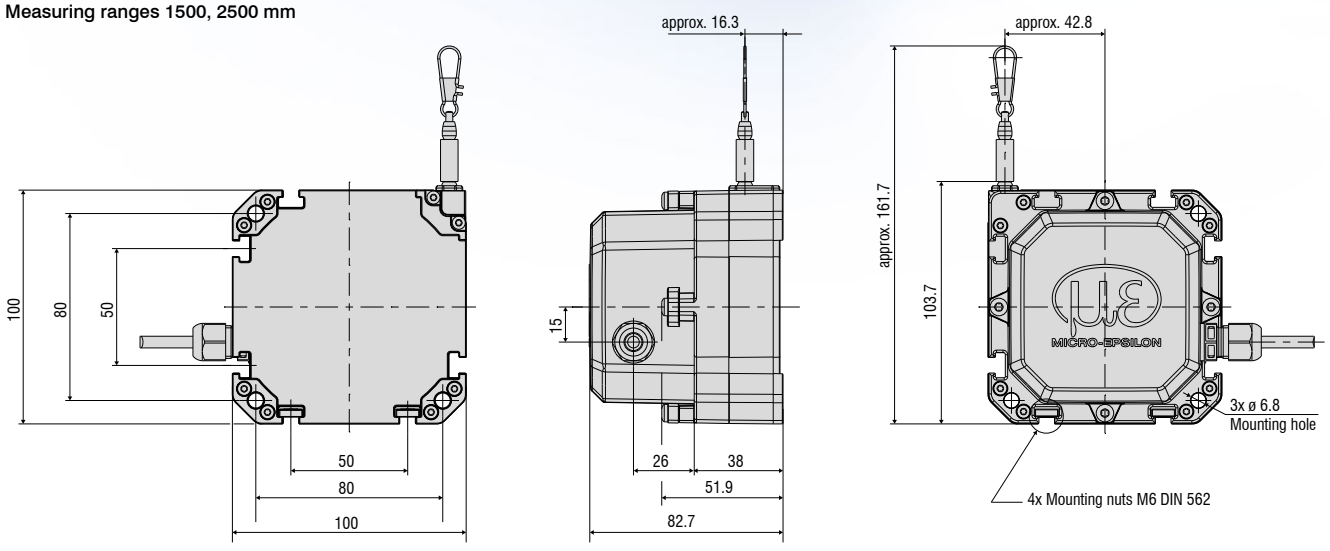
- P: Output: P: potentiometer, U: voltage, I current
- CR: Connection CR: integrated cable, radial, 1 m
- MK120: MK120 series
- 3000: Measuring range in mm

Robust draw-wire sensors for OEM
wireSENSOR K100 analog

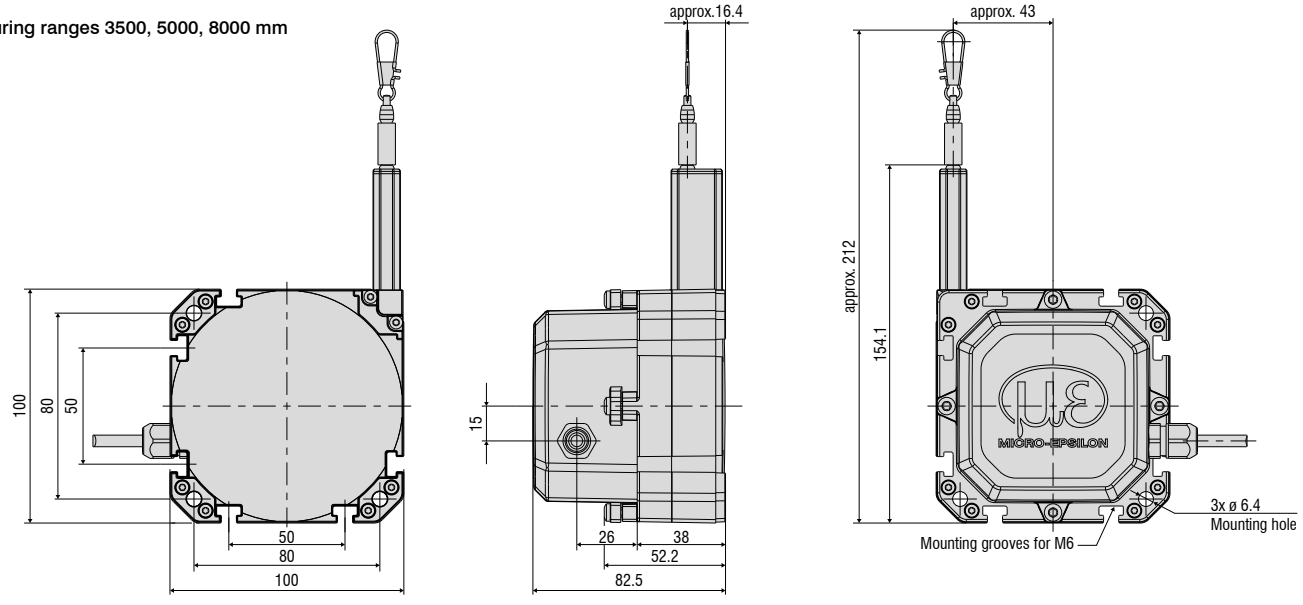
- Durable and robust sensor design (IP67/IP69K)
- Compact sensor with large measuring range
- Large temperature range from -40 to +85 °C
- Potentiometer, current or voltage output



Measuring ranges 1500, 2500 mm



Measuring ranges 3500, 5000, 8000 mm



All dimensions in mm, not to scale

Model		WPS-1500-K100	WPS-2500-K100	WPS-3500-K100	WPS-5000-K100	WPS-8000-K100
Measuring range		1500 mm	2500 mm	3500 mm	5000 mm	8000 mm
Analog output [1]		Potentiometer, current, voltage				
Resolution		towards infinity				
Linearity	≤ ±0.15% FSO	≤ ±2.25 mm	-	-	-	-
	≤ ±0.20% FSO	-	≤ ±5 mm	-	-	-
	≤ ±0.25% FSO	-	-	≤ ±8.75 mm	≤ ±12.5 mm	-
	≤ ±0.35% FSO	-	-	-	-	≤ ±28 mm
Sensor element		Hybrid potentiometer				
Wire extension force (max.)		approx. 10 N				
Wire retraction force (min.)		approx. 2 N				approx. 1.5 N
Wire acceleration (max.)		approx. 5 g				
Material	Housing	Glass-fiber reinforced plastic				
	Measuring wire	Polyamide-coated stainless steel (ø 0.61 mm)			Polyamide-coated stainless steel (ø 0.45 mm)	
Wire mounting		Wire clip				
Installation		Through-bores Ø 6.4 mm and mounting nuts (for M6) on the sensor housing				
Temperature range	Storage	-40 … +85 °C				
	Operation	-40 … +85 °C				
Connection		integrated cable, radial, length 1 m				
Shock (DIN EN 60068-2-27)		50 g / 8 ms in 3 axes, 2 directions and 1000 shocks each				
Vibration (DIN EN 60068-2-6)		5 g / 10 … 150 Hz in 3 axes and 20 cycles each				
Protection class (DIN EN 60529)		IP67 / IP69K				
Weight		approx. 500 g				

FSO = Full Scale Output

[1] Specifications for analog outputs from page 58 onwards.

Article designation

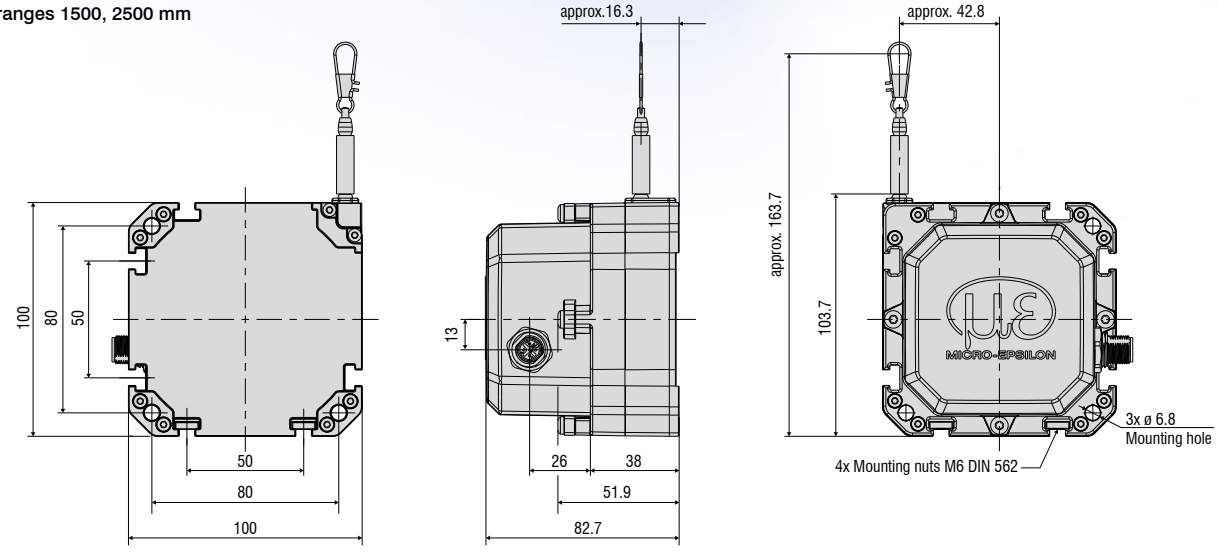
WPS -	1500 -	K100 -	CR -	P
				Output: P: potentiometer, U: voltage, I current
			Connection CR: integrated cable, radial, 1 m	
		K100 series		
	Measuring range in mm			

Robust draw-wire sensors for OEM
wireSENSOR K100 digital

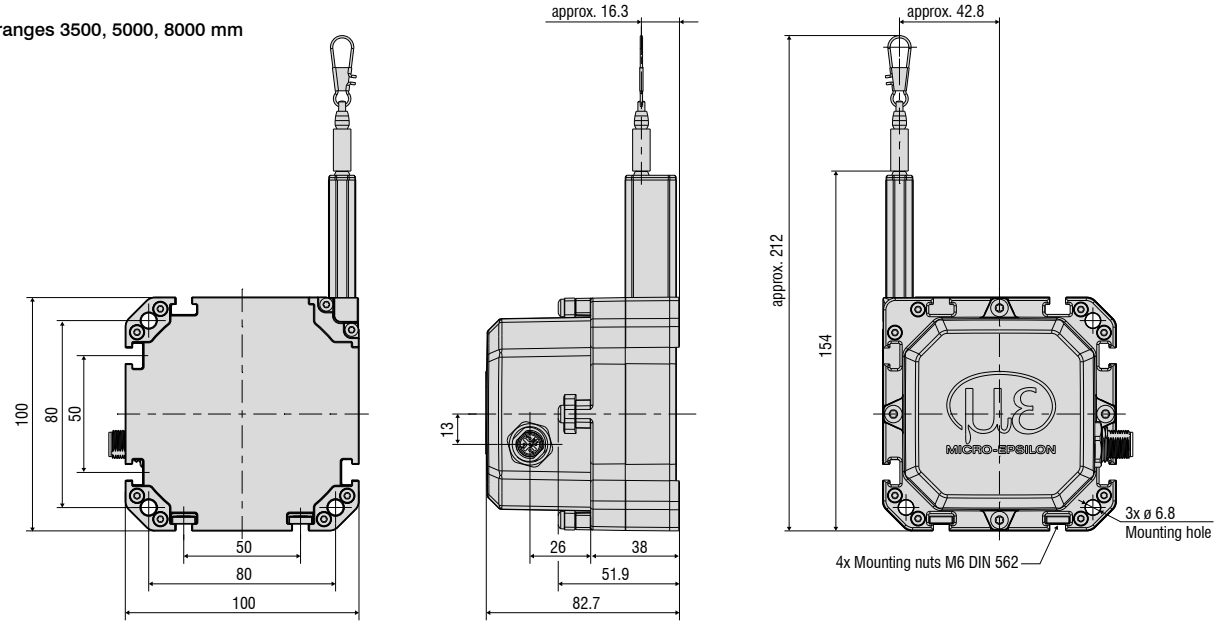


- Durable and robust sensor design (IP67/IP69K)
- Compact sensor with large measuring range
- Large temperature range from -40 to +85 °C
- CANopen Interface

Measuring ranges 1500, 2500 mm



Measuring ranges 3500, 5000, 8000 mm



All dimensions in mm, not to scale

Model		WPS-1500-K100	WPS-2500-K100	WPS-3500-K100	WPS-5000-K100	WPS-8000-K100
Measuring range		1500 mm	2500 mm	3500 mm	5000 mm	8000 mm
Digital interface [1]		CANopen				
Resolution		0.37 mm	0.61 mm	0.85 mm	1.22 mm	1.95 mm
Linearity	≤ ±0.15% FSO	≤ ±2.25 mm	-	-	-	-
	≤ ±0.20% FSO	-	≤ ±5 mm	-	-	-
	≤ ±0.25% FSO	-	-	≤ ±8.75 mm	≤ ±12.5 mm	-
	≤ ±0.35% FSO	-	-	-	-	≤ ±28 mm
Sensor element		Hybrid potentiometer				
Wire extension force (max.)		approx. 10 N				
Wire retraction force (min.)		approx. 2 N				approx. 1.5 N
Wire acceleration (max.)		approx. 5 g				
Material	Housing	Glass-fiber reinforced plastic				
	Measuring wire	Polyamide-coated stainless steel (ø 0.61 mm)			Polyamide-coated stainless steel (ø 0.45 mm)	
Wire mounting		Wire clip				
Installation		Through-bores Ø 6.4 mm and mounting nuts (for M6) on the sensor housing (optional: for series applications with additional M12 socket)				
Temperature range	Storage	-40 … +85 °C				
	Operation	-40 … +85 °C				
Connection		5-pole M12x1 connector				
Shock (DIN EN 60068-2-27)		50 g / 8 ms in 3 axes, 2 directions and 1000 shocks each				
Vibration (DIN EN 60068-2-6)		5 g / 10 … 150 Hz in 3 axes and 20 cycles each				
Protection class (DIN EN 60529)		IP67 / IP69K [2]				
Weight		approx. 500 g				

FSO = Full Scale Output

[1] Specifications for digital outputs from page 59 onwards. Available with SAE J1939 on request.

[2] With plug version only when connected. Available on request with two 5-pin M12x2 connectors (male-female, looped through).

Article designation

WPS -	1500 -	K100 -	SR12 -	CO

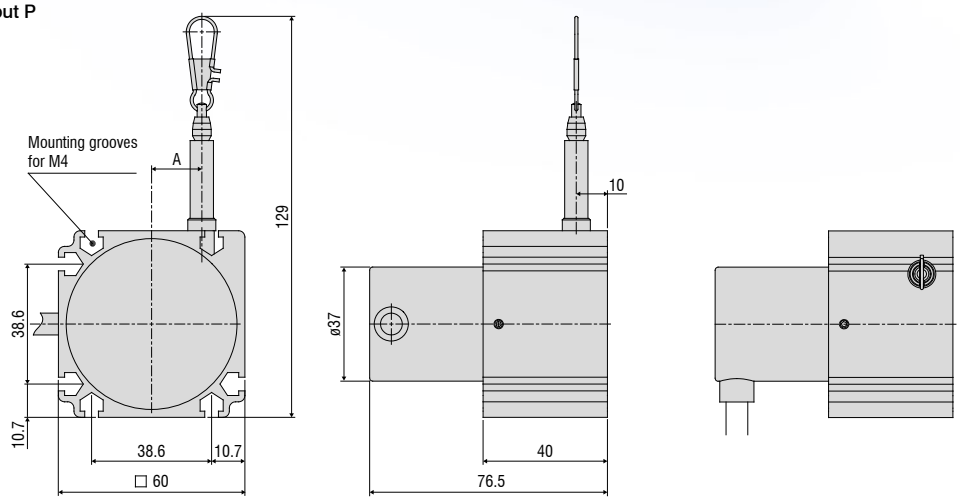
- CO: Output type: CANopen
- SR12: Connection SR12: 5-pin SA connector M12
- K100: K100 series
- 1500: Measuring range in mm

Industrial draw-wire sensors
wireSENSOR P60 analog

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

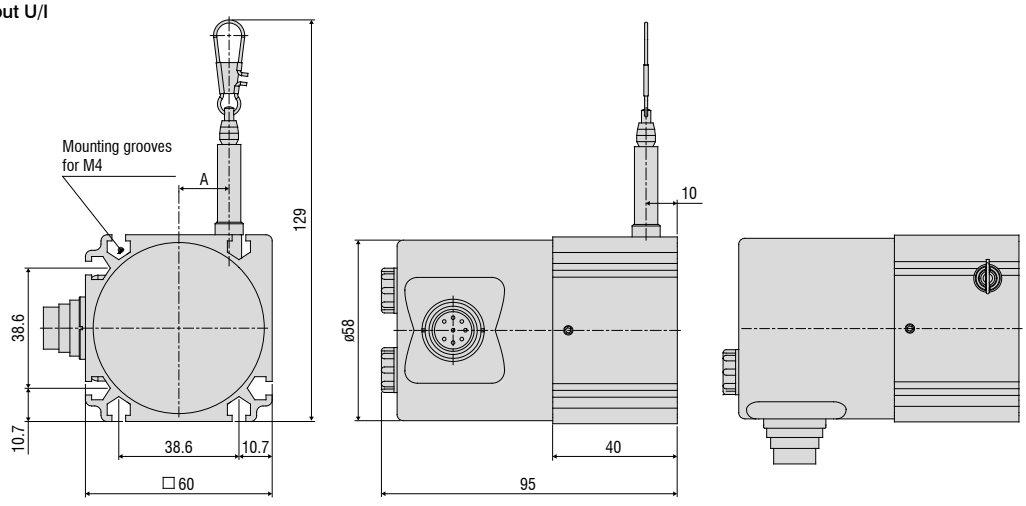


Output P



Measuring range (mm)	A (mm)
100 / 300 / 500 / 1000	approx. 16.15
150 / 750 / 1500	approx. 24.2

Output U/I



All dimensions in mm, not to scale

Model			WDS-100-P60	WDS-150-P60	WDS-300-P60	WDS-500-P60	WDS-750-P60	WDS-1000-P60	WDS-1500-P60
Measuring range			100 mm	150 mm	300 mm	500 mm	750 mm	1000 mm	1500 mm
Analog output [1]			Potentiometer, current, voltage						
Resolution			towards infinity						
Linearity	Hybrid potentiometer P10	≤ ±0.1% FSO	-	-	-	≤ ±0.5 mm	≤ ±0.75 mm	≤ ±1 mm	≤ ±1.5 mm
	Hybrid potentiometer P25	≤ ±0.25% FSO	-	-	≤ ±0.75 mm	-	-	-	-
	Conductive plastic/wire potentiometer P25	≤ ±0.5% FSO	≤ ±0.5 mm	≤ ±0.75 mm	-	-	-	-	-
Sensor element			Conductive plastic/wire potentiometer		Hybrid potentiometer				
Wire extension force (max.)			approx. 7.5 N	approx. 5.5 N	approx. 7.5 N	approx. 7.5 N	approx. 5.5 N	approx. 7.5 N	approx. 5.5 N
Wire retraction force (min.)			approx. 6.5 N	approx. 4.5 N	approx. 6 N	approx. 6 N	approx. 4 N	approx. 5 N	approx. 3.5 N
Wire acceleration (max.)			approx. 10 ... 15 g (depending on measuring range)						
Material		Housing	Aluminum						
		Measuring wire	Polyamide-coated stainless steel (ø 0.45 mm)						
Wire mounting			Wire clip						
Installation			Mounting grooves on the sensor housing						
Temperature range		Storage	-20 … +80 °C						
		Operation	-20 … +80 °C						
Connection		Potentiometer	integrated cable, radial, length 1 m						
		Current, voltage	pluggable cable via 8-pin flange connector (DIN45326), radial						
Shock (DIN EN 60068-2-27)			50 g / 10 ms in 3 axes, 1000 shocks each						
Vibration (DIN EN 60068-2-6)			20 g / 10 … 2000 Hz in 3 axes, 10 cycles each						
Protection class (DIN EN 60529)			IP65 [2]						
Weight			approx. 370 g						

FSO = Full Scale Output

[1] Specifications for analog outputs from page 58 onwards.

[2] With plug version only when connected.

Article designation

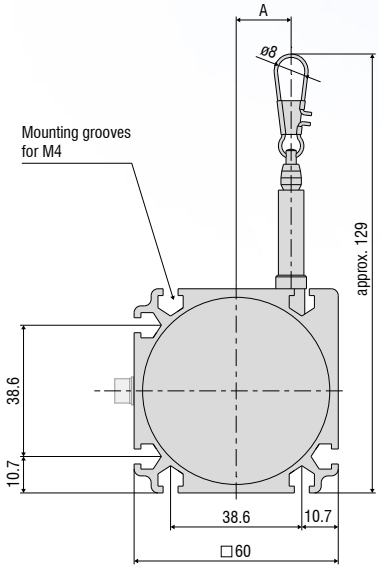
WDS -	100 -	P60 -	CR -	P

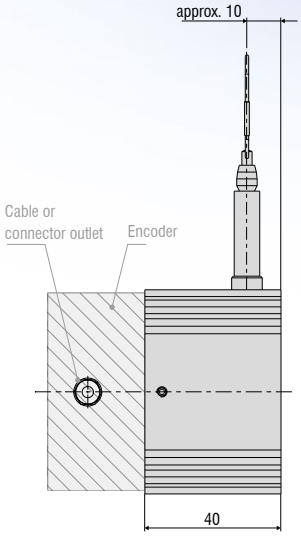
- P: Output type: P: potentiometer (with connection CR); U: voltage (with connection SR); I: current (with connection SR)
- CR: Connection: SR: radial plug; CR: integrated cable, radial, 1 m
- P60: P60 series
- 100: Measuring range in mm

Industrial draw-wire sensors
wireSENSOR P60 digital

- Robust aluminum profile housing
- Customer-specific designs
- Absolute or incremental encoder

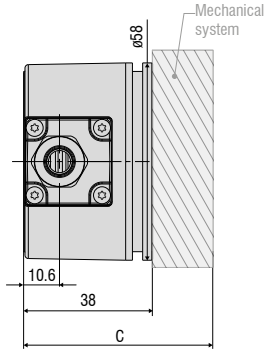




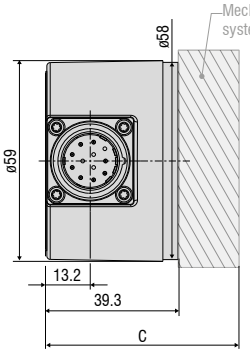


MR (mm)	A (mm)
1000	approx. 16.15
1500	approx. 24.2

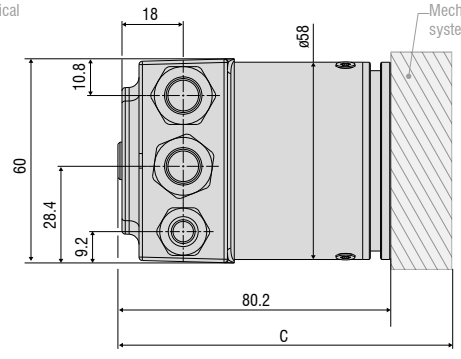
HTL/TTL output



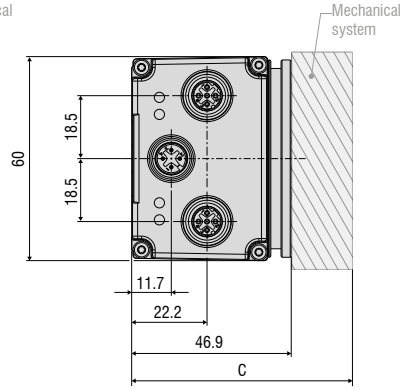
SSI output



Output CO/PB



Output PN/ENIP/CAT



All dimensions in mm, not to scale

Total length mechanics + Encoder (C)				
Output	HTL/TTL	SSI	CO/PB	PN/ENIP/CAT
C (mm)	78	79.3	120.3	86.9

Model		WDS-1000-P60	WDS-1500-P60
Measuring range		1000 mm	1500 mm
Digital interface [1]		PROFINET, Profibus DP, CANopen, EtherNet/IP, EtherCAT	
Digital output [1]		HTL, TTL, SSI	
Resolution	HTL, TTL	0.067 mm (15 pulses/mm)	0.1 mm (10 pulses/mm)
	SSI, PROFINET, Profibus DP, CANopen, EtherNet/IP, EtherCAT	0.012 mm	0.018 mm
Linearity	≤ ±0.02% FSO	≤ ±0.2 mm	≤ ±0.3 mm
Sensor element		Incremental/absolute encoder	
Wire extension force (max.)		approx. 7.5 N	approx. 5.5 N
Wire retraction force (min.)		approx. 5 N	approx. 3.5 N
Wire acceleration (max.)		approx. 10 g	approx. 15 g
Material	Housing	Aluminum	
	Measuring wire	Polyamide-coated stainless steel (ø 0.45 mm)	
Wire mounting		Wire clip	
Installation		Mounting grooves on the sensor housing	
Temperature range	Storage	-20 … +80 °C	
	Operation	-20 … +80 °C	
Connection	HTL, TTL	integrated cable, radial, length 1 m	
	SSI	12-pin flange connector, radial	
	PROFINET, Profibus DP, CANopen, EtherNet/IP, EtherCAT	Bus cover	
Shock (DIN EN 60068-2-27)		50 g / 10 ms in 3 axes, 1000 shocks each	
Vibration (DIN EN 60068-2-6)		20 g / 10 … 2000 Hz in 3 axes, 10 cycles each	
Protection class (DIN EN 60529)		IP65 [2]	
Weight		approx. 1 kg	

FSO = Full Scale Output
[1] Specifications for digital outputs from page 59 onwards.
[2] With plug version only when connected

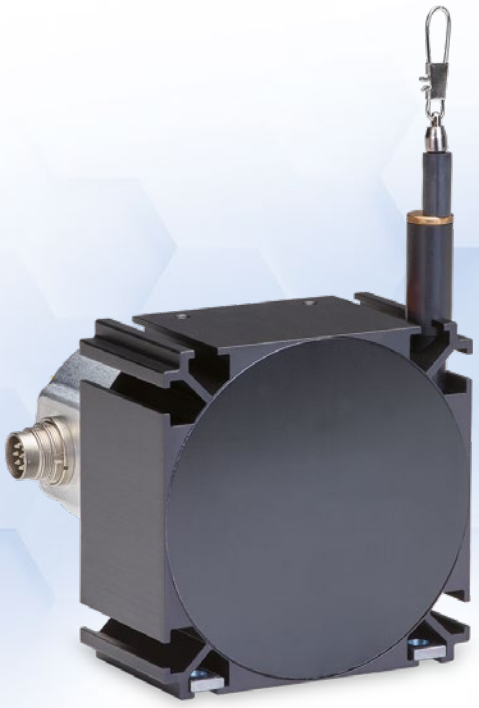
Article designation

WDS - 1000 - P60 - CR - TTL

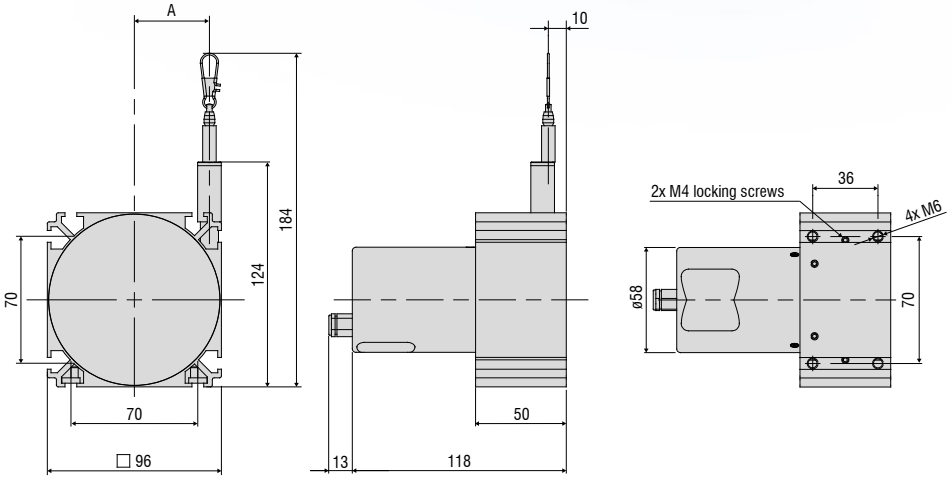
- **TTL** – Output:
  HTL
  TTL
  CO: CANopen
  PB: Profibus DP
  SSI: Gray Code
  PN: PROFINET
  ENIP: EtherNet/IP
  CAT: EtherCAT
- **CR** – Connection:
  SR (with SSI output): plug, radial
  CR (with HTL, TTL output): integrated cable, radial, 1 m
  BH (with CO, PB, PN, ENIP, CAT output): bus cover
- **P60** – P60 series
- **1000** – Measuring range in mm

Industrial draw-wire sensors
wireSENSOR P96 analog

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

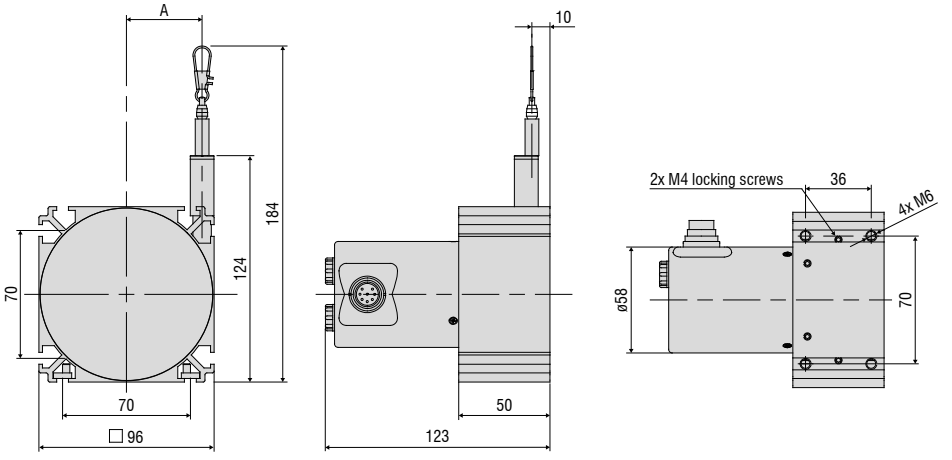


Output P



Measuring range (mm)	A (mm)
2000	approx. 32
2500	approx. 41.4

Output U/I



All dimensions in mm, not to scale

Model		WDS-2000-P96	WDS-2500-P96
Measuring range		2000 mm	2500 mm
Analog output [1]		Potentiometer, current, voltage	
Resolution		towards infinity	
Linearity	≤ ±0.1% FSO	≤ ±2 mm	≤ ±2.5 mm
Sensor element		Hybrid potentiometer	
Wire extension force (max.)		approx. 11 N	approx. 9 N
Wire retraction force (min.)		approx. 7.5 N	approx. 5.5 N
Wire acceleration (max.)		approx. 8 g	
Material	Housing	Aluminum	
	Measuring wire	Polyamide-coated stainless steel (ø 0.8 mm)	
Wire mounting		Wire clip	
Installation		Mounting grooves on the sensor housing	
Temperature range	Storage	-20 … +80 °C	
	Operation	-20 … +80 °C	
Connection	Potentiometer	integrated cable, axial, length 1 m	
	Current, voltage	pluggable cable via 8-pin flange connector (DIN45326), radial	
Shock (DIN EN 60068-2-27)		50 g / 10 ms in 3 axes, 1000 shocks each	
Vibration (DIN EN 60068-2-6)		20 g / 20 … 2000 Hz in 3 axes, 10 cycles each	
Protection class (DIN EN 60529)		IP65 [2]	
Weight		approx. 1.1 kg	

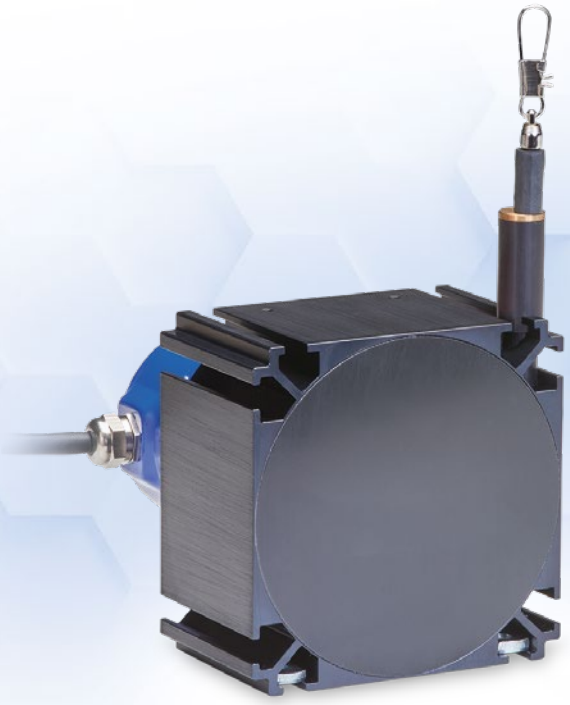
FSO = Full Scale Output
[1] Specifications for analog outputs from page 58 onwards.
[2] With plug version only when connected.

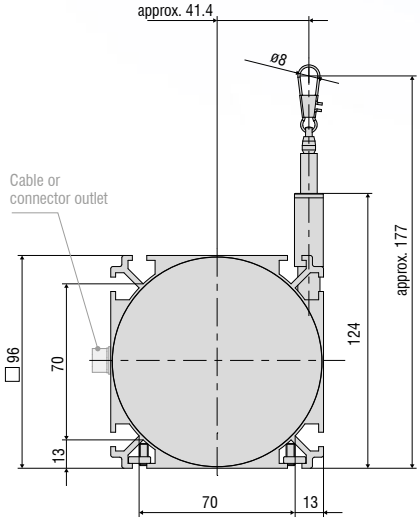
Article designation

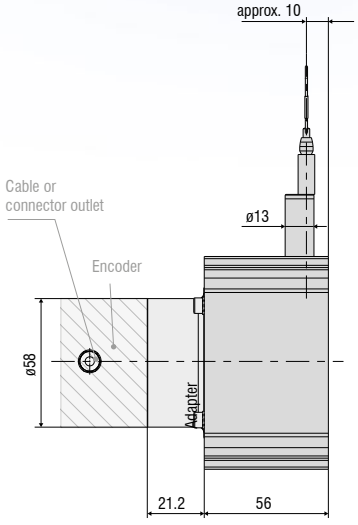
WDS -	2000 -	P96 -	CA -	P
				Output type: P: potentiometer (with CA connection) U: voltage (with connection SR) I: current (with connection SR)
			Connection: SR: radial plug CA: integrated cable, axial, 1 m	
		P96 series		
	Measuring range in mm			

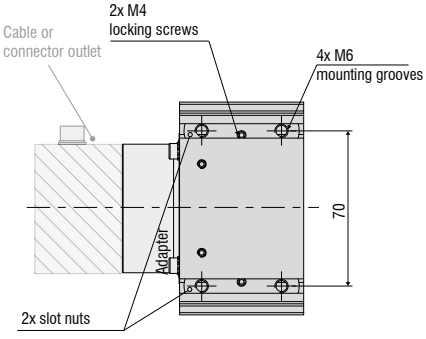
Industrial draw-wire sensors
wireSENSOR P96 digital

- Robust aluminum profile housing
- Absolute or incremental encoder

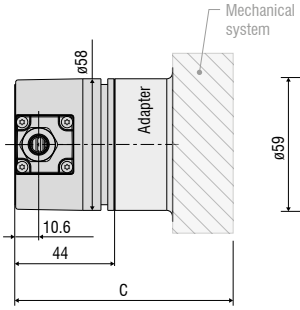




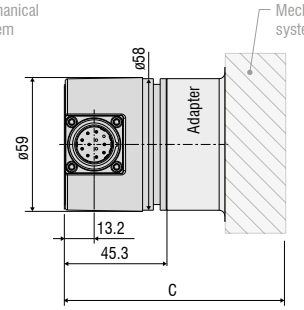




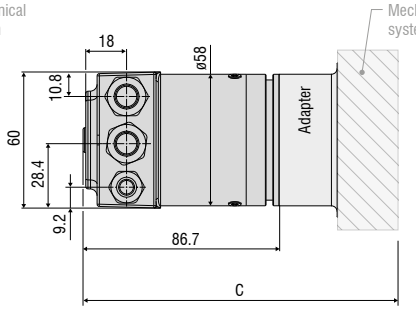
HTL/TTL output



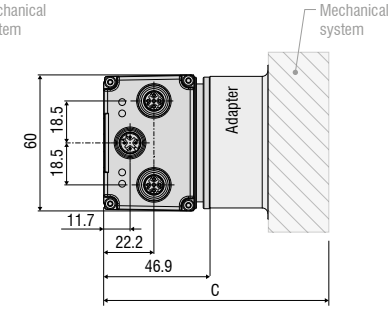
SSI output



Output CO / PB



Output PN / ENIP / CAT



All dimensions in mm, not to scale

Total length mechanics + Encoder (C)				
Output	HTL/TTL	SSI	CO/PB	PN /ENIP/CAT
C (mm)	121.2	122.5	163.9	124.1

Model		WDS-3000-P96
Measuring range		3000 mm
Digital interface [1]		PROFINET, Profibus DP, CANopen, EtherNet/IP, EtherCAT
Digital output [1]		HTL, TTL, SSI
Resolution	HTL, TTL	0.087 mm (11.53 pulses/mm)
	SSI, PROFINET Profibus DP, CANopen, EtherNet/IP, EtherCAT	0.032 mm
Linearity	≤ ±0.02% FSO	≤ ±0.6 mm
Sensor element		Incremental/absolute encoder
Wire extension force (max.)		approx. 9 N
Wire retraction force (min.)		approx. 5.5 N
Wire acceleration (max.)		approx. 7 g
Material	Housing	Aluminum
	Measuring wire	Polyamide-coated stainless steel (ø 0.8 mm)
Wire mounting		Wire clip
Installation		Mounting grooves on the sensor housing
Temperature range	Storage	-20 … +80 °C
	Operation	-20 … +80 °C
Connection	HTL, TTL	integrated cable, radial, length 1 m
	SSI	12-pin flange connector, radial
	PROFINET Profibus DP, CANopen, EtherNet/IP, EtherCAT	Bus cover
Shock (DIN EN 60068-2-27)		50 g / 10 ms in 3 axes, 1000 shocks each
Vibration (DIN EN 60068-2-6)		20 g / 20 … 2000 Hz in 3 axes, 10 cycles each
Protection class (DIN EN 60529)		IP65 [2]
Weight		approx. 1.7 kg

FSO = Full Scale Output
[1] Specifications for digital outputs from page 59 onwards.
[2] With plug version only when connected

Article designation

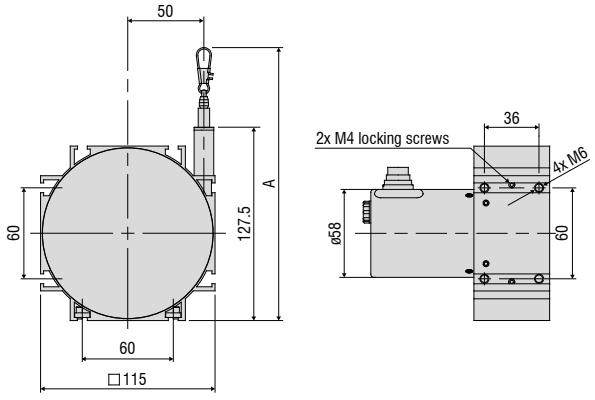
WDS -	3000 -	P96 -	CR -	TTL
				Output: HTL TTL CO: CANopen PB: Profibus DP SSI: Gray Code PN: PROFINET ENIP: EtherNet/IP CAT: EtherCAT
			Connection: SR (with SSI output): plug, radial CR (with HTL, TTL output): integrated cable, radial, 1 m BH (with CO, PB, PN, ENIP, CAT output): bus cover	
		P96 series		
	Measuring range in mm			

Industrial draw-wire sensors
wireSENSOR P115 analog

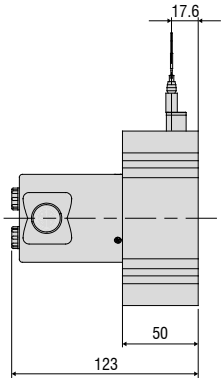
- Robust aluminum profile housing
- Customer-specific designs
- Potentiometer, current or voltage output



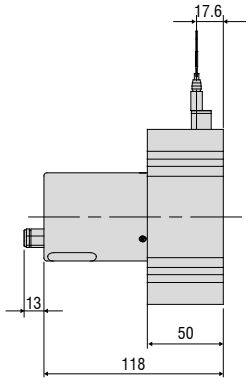
Measuring range 3000/4000/5000 mm



Output U/I

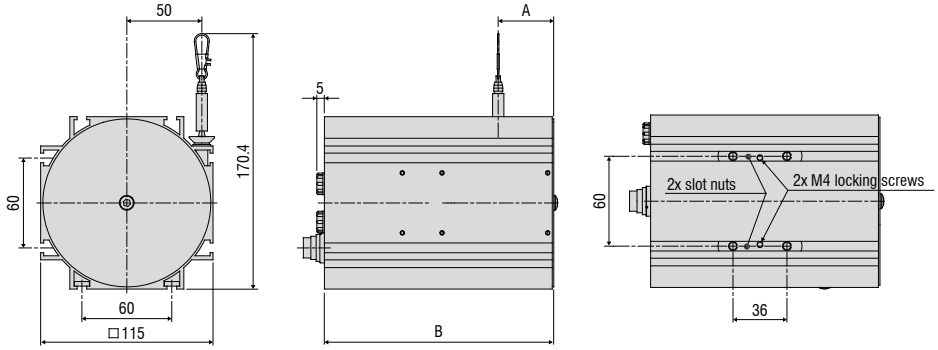


Output P



Measuring range (mm)	A (mm)
3000	approx. 186
4000 / 5000	approx. 180

Measuring range 7500/10000/15000 mm



Measuring range (mm)	A (mm)	B (mm)
7500	37	153
10000	44.5	198
15000	60.5	228

All dimensions in mm, not to scale

Model		WDS-3000-P115	WDS-4000-P115	WDS-5000-P115	WDS-7500-P115	WDS-10000-P115	WDS-15000-P115
Measuring range		3000 mm	4000 mm	5000 mm	7500 mm	10000 mm	15000 mm
Analog output [1]		Potentiometer, current, voltage					
Resolution		towards infinity					
Linearity	≤ ±0.1% FSO	≤ ±3 mm	-	-	-	-	-
	≤ ±0.15% FSO	-	≤ ±6 mm	≤ ±7.5 mm	≤ ±11.3 mm	≤ ±15 mm	≤ ±22.5 mm
Sensor element		Hybrid potentiometer					
Wire extension force (max.)		approx. 8 N	approx. 8.5 N	approx. 9 N	approx. 24 N	approx. 21 N	approx. 25 N
Wire retraction force (min.)		approx. 4 N	approx. 4 N	approx. 4 N	approx. 8 N	approx. 8 N	approx. 8 N
Wire acceleration (max.)		approx. 6 g					
Material	Housing	Aluminum					
	Measuring wire	Polyamide-coated stainless steel (ø 0.45 mm)			Polyamide-coated stainless steel (ø 1 mm)		
Wire mounting		Wire clip					
Installation		Mounting grooves on the sensor housing					
Temperature range	Storage	-20 … +80 °C					
	Operation	-20 … +80 °C					
Connection	Potentiometer	integrated cable, axial, length 1 m					
	Current, voltage	pluggable cable via 8-pin flange connector (DIN45326), radial					
Shock (DIN EN 60068-2-27)		50 g / 10 ms in 3 axes, 1000 shocks each					
Vibration (DIN EN 60068-2-6)		20 g / 20 … 2000 Hz in 3 axes, 10 cycles each					
Protection class (DIN EN 60529)		IP65 [2]					
Weight		approx. 1.1 kg			approx. 2.2 kg	approx. 3.2 kg	approx. 3.5 kg

FSO = Full Scale Output

[1] Specifications for analog outputs from page 58 onwards.

[2] With plug version only when connected.

Article designation

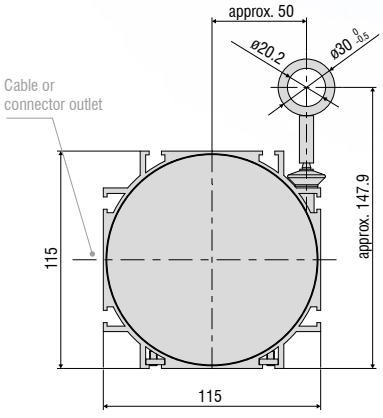
WDS - 3000 - P115 - CA - P

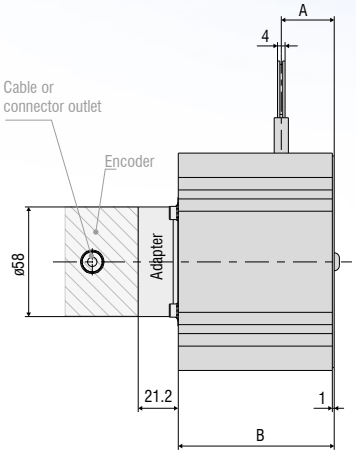
- P: potentiometer:
  CA connection with P115-3000/4000/5000
  SA connection with P115-7500/10000/15000
  U/I: voltage/current
  SR connection with P115-3000/4000/5000
  SA connection with P115-7500/10000/15000
- Connection:
  SR: radial plug
  SA: axial plug
  CA: integrated cable, axial, 1 m
- P115 series
- Measuring range in mm

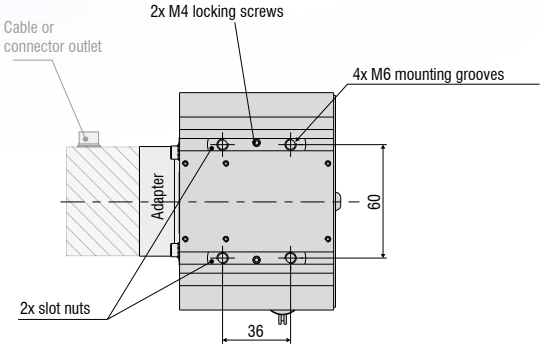
Industrial draw-wire sensors
wireSENSOR P115 digital

- Robust aluminum profile housing
- Customer-specific designs
- Absolute or incremental encoder

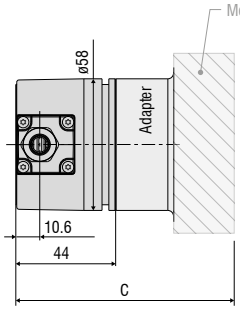




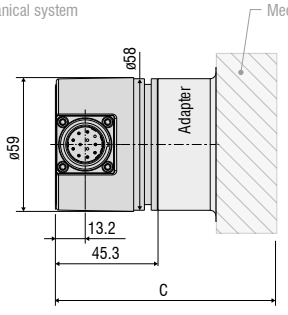




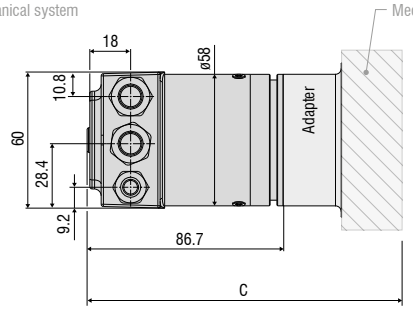
HTL/TTL output



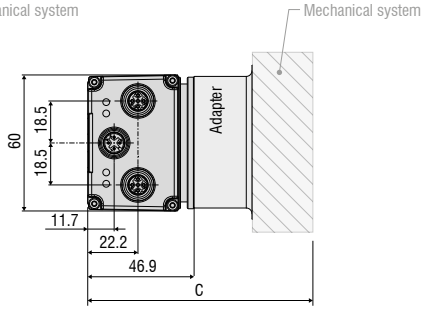
SSI output



Output CO/PB



Output PN / ENIP / CAT



All dimensions in mm, not to scale

MR (mm)	A (mm)	B (mm)
5000	approx. 28	82.5
7500	approx. 37	105.5
10000	approx. 44.5	148.5
15000	approx. 61	180.5

Total length mechanics + Encoder (C)					
Output		HTL/TTL	SSI	CO/PB	PN /ENIP/CAT
C (mm)	MR 5000	147.7	149.0	190.4	150.6
	MR 7500	170.7	172.0	213.4	173.6
	MR 10000	213.7	215.0	256.4	216.6
	MR 15000	245.7	247.0	288.4	248.6

Model		WDS-5000-P115	WDS-7500-P115	WDS-10000-P115	WDS-15000-P115
Measuring range		5000 mm	7500 mm	10000 mm	15000 mm
Digital interface [1]		PROFINET, Profibus DP, CANopen, EtherNet/IP, EtherCAT			
Digital output [1]		HTL, TTL, SSI			
Resolution	HTL, TTL	0.105 mm (9.52 pulses/mm)			
	SSI, PROFINET, Profibus DP, CANopen, EtherNet/IP, EtherCAT	0.038 mm			
Linearity	≤ ±0.01% FSO	-	-	≤ ±1 mm	≤ ±1.5 mm
	≤ ±0.02% FSO	≤ ±1 mm	≤ ±1.5 mm	-	-
Sensor element		Incremental/absolute encoder			
Wire extension force (max.)		approx. 16 N	approx. 24 N	approx. 21 N	approx. 25 N
Wire retraction force (min.)		approx. 4 N	approx. 8 N	approx. 8 N	approx. 8 N
Wire acceleration (max.)		approx. 5 g	approx. 6 g	approx. 3 g	approx. 3 g
Material	Housing	Aluminum			
	Measuring wire	Polyamide-coated stainless steel (ø 1 mm)			
Wire mounting		Eyelet (ø 20.2 mm)			
Installation		Mounting grooves on the sensor housing			
Temperature range	Storage	-20 … +80 °C			
	Operation	-20 … +80 °C			
Connection	HTL, TTL	integrated cable, radial, length 1 m			
	SSI	12-pin flange connector, radial			
	PROFINET, Profibus DP, CANopen, EtherNet/IP, EtherCAT	Bus cover			
Shock (DIN EN 60068-2-27)		50 g / 10 ms in 3 axes, 1000 shocks each			
Vibration (DIN EN 60068-2-6)		20 g / 20 … 2000 Hz in 3 axes, 10 cycles each			
Protection class (DIN EN 60529)		IP65 [2]			
Weight		approx. 2 kg	approx. 2.5 kg	approx. 3.5 kg	approx. 4.5 kg

FSO = Full Scale Output
[1] Specifications for digital outputs from page 59 onwards.
[2] With plug version only when connected

Article designation

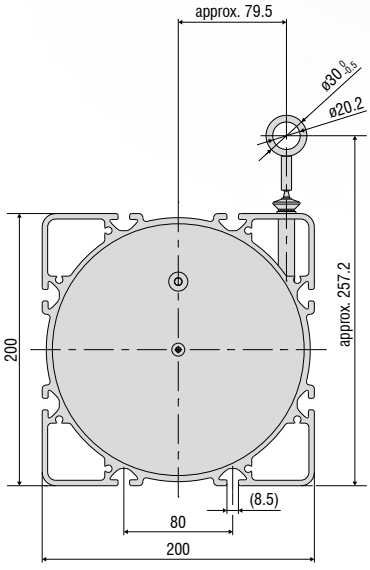
WDS - **5000 -** **P115 -** **CR -** **TTL**

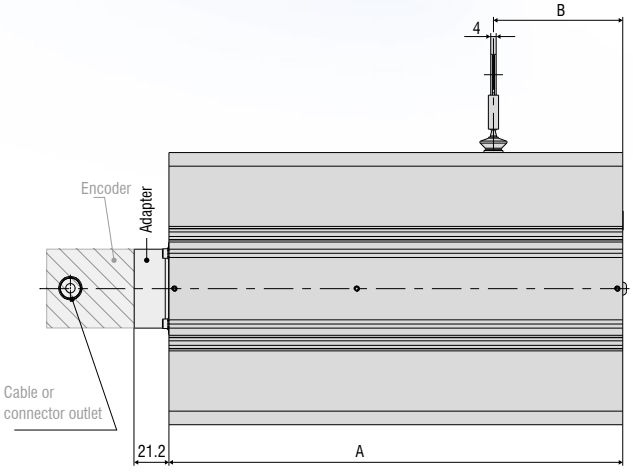
- **TTL** – Output:
  HTL
  TTL
  CO: CANopen
  PB: Profibus DP
  SSI: Gray Code
  PN: PROFINET
  ENIP: EtherNET/IP
  CAT: EtherCAT
- **CR -** – Connection:
  SR (with SSI output): plug, radial
  CR (with HTL, TTL output): integrated cable, radial, 1 m
  BH (with CO, PB, PN, ENIP, CAT output): bus cover
- **P115 -** – P115 series
- **5000 -** – Measuring range in mm

Draw-wire long-range sensors
wireSENSOR P200 digital

- Robust aluminum profile housing
- Customer-specific designs
- Absolute or incremental encoder

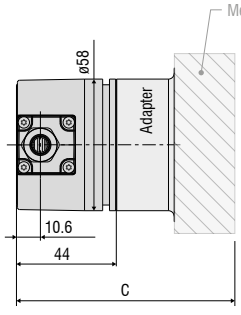




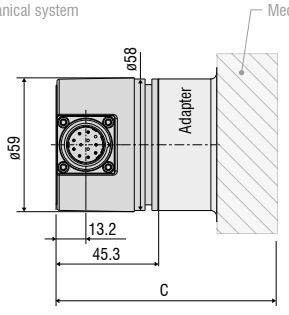


MR (mm)	A (mm)	B (mm)
30000	268	75
40000	300	95
50000	333.5	95

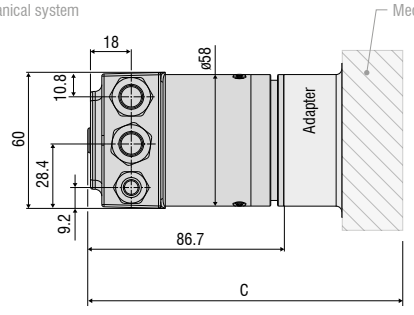
HTL/TTL output



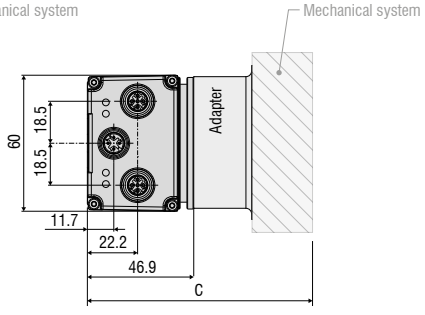
SSI output



Output CO / PB



Output PN / ENIP / CAT



All dimensions in mm, not to scale

Total length mechanics + Encoder (C)					
Output		HTL/TTL	SSI	CO/PB	PN /ENIP/CAT
C (mm)	MR 30,000	333.2	334.5	375.9	336.1
	MR 40,000	365.2	366.5	407.9	368.1
	MR 50,000	399,2	400	441,4	401,6

Model		WDS-30000-P200	WDS-40000-P200	WDS-50000-P200
Measuring range		30000 mm	40000 mm	50000 mm
Digital interface [1]		PROFINET, Profibus DP, CANopen, EtherNet/IP, EtherCAT		
Digital output [1]		HTL, TTL, SSI		
Resolution	HTL, TTL	0.167 mm (6 pulses/mm)		
	SSI, PROFINET, Profibus DP, CANopen, EtherNet/IP, EtherCAT	0.061 mm		
Linearity	≤ ±0.01% FSO	≤ ±3 mm	≤ ±4 mm	≤ ±5 mm
Sensor element		Incremental/absolute encoder		
Wire extension force (max.)		approx. 22 N	approx. 22 N	approx. 24 N
Wire retraction force (min.)		approx. 12 N	approx. 11 N	approx. 11 N
Wire acceleration (max.)		approx. 2 g		
Material	Housing	Aluminum		
	Measuring wire	Polyamide-coated stainless steel (ø 0.8 mm)		
Wire mounting		Eyelet (ø 20.2 mm)		
Installation		Mounting grooves on the sensor housing		
Temperature range	Storage	-20 … +80 °C		
	Operation	-20 … +80 °C		
Connection	HTL, TTL	integrated cable, radial, length 1 m		
	SSI	12-pin flange connector, radial		
	PROFINET, Profibus DP, CANopen, EtherNet/IP, EtherCAT	Bus cover		
Shock (DIN EN 60068-2-27)		50 g / 10 ms in 3 axes, 1000 shocks each		
Vibration (DIN EN 60068-2-6)		20 g / 20 … 2000 Hz in 3 axes, 10 cycles each		
Protection class (DIN EN 60529)		IP65 [2]		
Weight		approx. 10 kg	approx. 11 kg	approx. 12 kg

FSO = Full Scale Output
[1] Specifications for digital outputs from page 59 onwards.
[2] With plug version only when connected

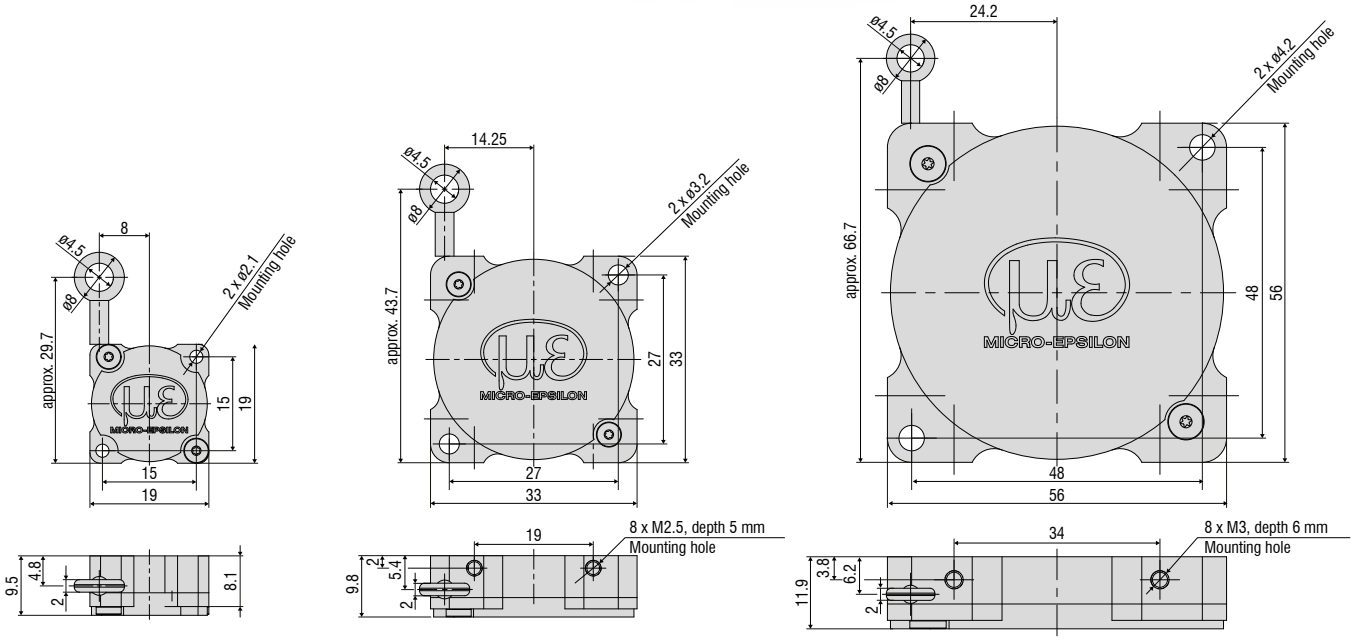
Article designation

WDS -	30000 -	P200 -	CR -	TTL
				Output: HTL TTL CO: CANopen PB: Profibus DP SSI: Gray Code PN: PROFINET ENIP: EtherNet/IP CAT: EtherCAT
			Connection: SR (with SSI output): radial plug CR (with HTL, TTL output): integrated cable, radial, 1 m BH (with CO, PB, PN, ENIP, CAT output): bus cover	
		P200 series		
	Measuring range in mm			

Miniature draw-wire sensors for test applications
wireSENSOR MT

- Miniature sensor size
- Ideal for extremely high accelerations
- Easy, fast and flexible mounting
- Potentiometer Output





All dimensions in mm, not to scale

Model		WDS-40-MT19-P	WDS-80-MT33-P	WDS-130-MT56-P
Measuring range		40 mm	80 mm	130 mm
Analog output		Potentiometer		
Resolution		virtually infinite		
Linearity[1]	≤ ±0.4 % FSO	-	≤ ±0.32 mm	≤ ±0.52 mm
	≤ ±1 % FSO [2]	≤ ±0.4 mm	-	-
Sensor element		Conductive plastic potentiometer		
Wire extension force (max.)		ca. 2 N	ca. 1,5 N	ca. 1 N
Wire retraction force (min.)		ca. 0,7 N	ca. 0,5 N	ca. 0,3 N
Wire acceleration (max.)		ca. 60 g	ca. 60 g	ca. 15 g
Material	Housing	Aluminum		
	Measuring wire	Polyamide-coated stainless steel (Ø 0.36)	Polyamide-coated stainless steel (Ø 0.45)	
Wire mounting		Eyelet (ø 4,5 mm)		
Mounting		Through-bores ø 2.1 mm	Through-bores ø 3.2 mm	Through-bores ø 4.2 mm
Temperature range	Storage	-40 … +85 °C		
	Operation	-40 … +85 °C		
Connection		Stranded wires, approx. 6 cm		
Shock (DIN EN 60068-2-27)		50 g / 10 ms in 1 direction, 1000 shocks		
Vibration (DIN EN 60068-2-6)		20 g / 20 … 2000 Hz in 3 axes, 10 cycles each		
Protection class (DIN EN 60529)		IP50		
Weight		approx. 8 g	approx. 22 g	approx. 82 g

[1] FSO = Full Scale Output
[2] typ. 1 % up to max. 2 % FSO

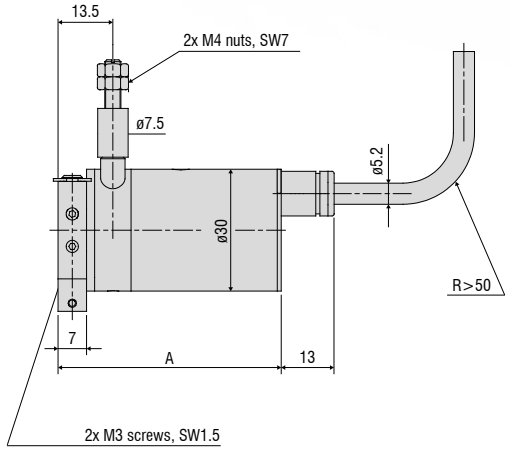
Article designation

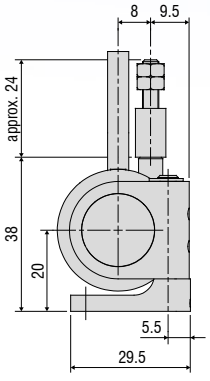
WDS -	40 -	MT -	P
			Output type: P: potentiometer
		MT series	
	Measuring range in mm		

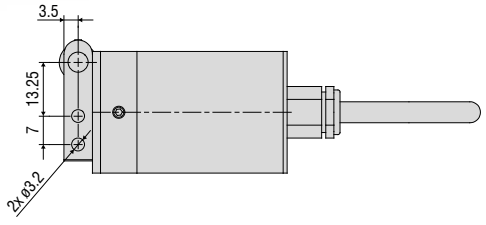
Robust miniature draw-wire sensors
wireSENSOR MPM analog

- Compact miniature design
- Flexible mounting options due to swiveling mounting flange
- For very fast measurement movements, wire accelerations up to 100 g









Measuring range (mm)	A (mm)
50	55
150 / 250	64
50-HG	61
150 / 250-HG	70

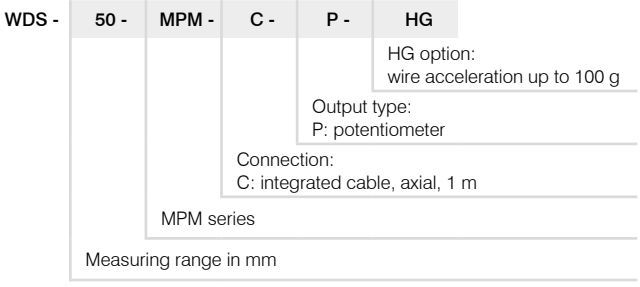
All dimensions in mm, not to scale

Model			WDS-50-MPM	WDS-150-MPM	WDS-250-MPM
Measuring range			50 mm	150 mm	250 mm
Analog output [1]			Potentiometer		
Resolution			towards infinity		
Linearity	Conductive plastic potentiometer P20	≤ ±0.2% FSO	≤ ±0.125 mm	-	-
	Hybrid potentiometer P25	≤ ±0.25% FSO	-	≤ ±0.3 mm	≤ ±0.5 mm
Sensor element			Conductive plastic potentiometer	Hybrid potentiometer	
Wire extension force (max.)			approx. 3.5 N (HG option: 17 N)		
Wire retraction force (min.)			approx. 1.5 N (HG option: 10 N)		
Wire acceleration (max.)			approx. 25 g (HG option: 100 g)		
Material		Housing	Aluminum		
		Measuring wire	Stainless steel (ø 0.45 mm)		
Wire mounting			M4 threaded bolts		
Installation			Mounting flange rotatable in two axes 180° / 360°		
Temperature range		Storage	-20 … +80 °C		
		Operation	-20 … +80 °C		
Connection			integrated cable, axial, length 1 m		
Shock (DIN EN 60068-2-27)			50 g / 20 ms in 3 axes, 1000 shocks each		
Vibration (DIN EN 60068-2-6)			20 g / 20 … 2000 Hz in 3 axes, 10 cycles each		
Protection class (DIN EN 60529)			IP65		
Weight			approx. 150 g (incl. cable)		

FSO = Full Scale Output

[1] Specifications for analog outputs from page 58 onwards.

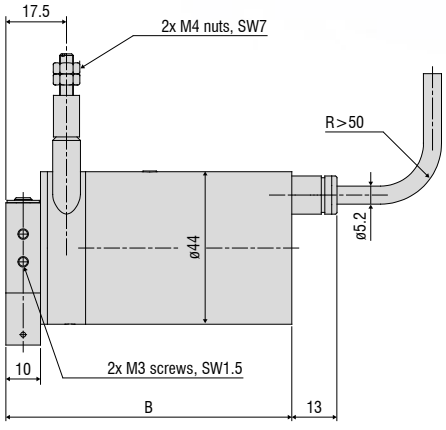
Article designation

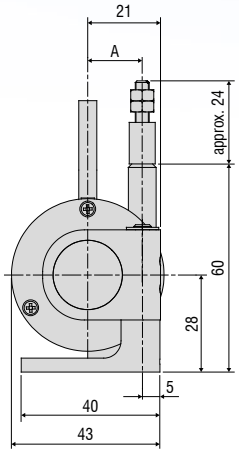


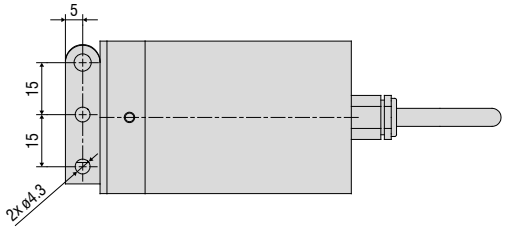
Robust miniature draw-wire sensors
wireSENSOR MP / MPW analog

- Miniature design
- High protection class IP67 (MPW)
- For fast movements and harsh application environments









All dimensions in mm, not to scale

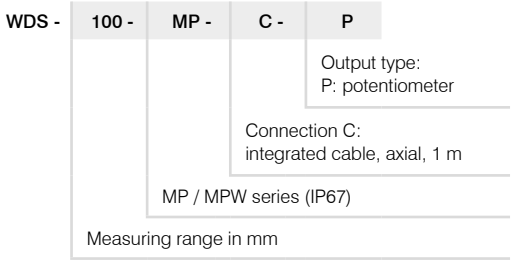
Measuring range (mm)	A (mm)	B (mm)
100 / 300 / 500 / 1000-MP	15.7	82.5
100 / 300 / 500 / 1000-MPW	15.7	86.5

Model			WDS-100-MP(W)	WDS-300-MP(W)	WDS-500-MP(W)	WDS-1000-MP(W)
Measuring range			100 mm	300 mm	500 mm	1000 mm
Analog output [1]			Potentiometer			
Resolution			0.15 mm	0.2 mm	towards infinity	
Linearity	Hybrid potentiometer P10	≤ ±0.1% FSO	-	-	≤ ±0.5 mm	≤ ±1 mm
	Wire potentiometer P25	≤ ±0.25% FSO	-	≤ ±0.75 mm	-	
	Wire potentiometer P50	≤ ±0.5% FSO	≤ ±0.5 mm	-	-	-
Sensor element			Wire potentiometer		Hybrid potentiometer	
Wire extension force (max.)			approx. 8.5 N	approx. 8.5 N	approx. 8.5 N	approx. 8 N
Wire retraction force (min.)			approx. 7 N	approx. 7 N	approx. 6.5 N	approx. 5 N
Wire acceleration (max.)			approx. 30 g			
Material		Housing	Aluminum			
		Measuring wire	Stainless steel (ø 0.45 mm)			
Wire mounting			M4 threaded bolts			
Installation			Mounting flange rotatable in two axes 180° / 360°			
Temperature range		Storage	-20 … +80 °C			
		Operation	-20 … +80 °C			
Connection			integrated cable, axial, length 1 m			
Shock (DIN EN 60068-2-27)			50 g / 20 ms in 3 axes, 1000 shocks each			
Vibration (DIN EN 60068-2-6)			20 g / 20 … 2000 Hz in 3 axes, 10 cycles each			
Protection class (DIN EN 60529)		MP series	IP65			
		MPW series	IP67			
Weight			approx. 270 g (incl. cable)			

FSO = Full Scale Output

[1] Specifications for analog outputs from page 58 onwards.

Article designation



Options
wireSENSOR

Customer-specific modifications for your series application

If the standard models do not meet certain specific requirements, draw-wire sensors from the standard range can be adapted accordingly by Micro-Epsilon. Cost-effective implementation can already be achieved with medium-sized quantities (depending on the type and number of changes).

Wire attachment
- Wire clip
- Eyelet
- Thread
- Wire extension

Measuring wire
- Plastics
- Stainless steel (coated/uncoated)
- Different diameters
- Thicker wire for improved snap protection





Connection/Output signal
- Different cable lengths
- Different plug variants
- Redundant sensor element
- Adaption of supply voltage
- Inverted signal
- Redundant signal outputs
- Alignment cable/connector outlet



Sensor mounting
- Mounting bracket
- Mounting plate
- Magnetic holder

Wire guide
- Wire wiper
- Different designs of integrated deflection pulleys
- Wire outlet socket from ceramics for increased diagonal pull up to 15°



Housing and environment
- Wire outlet right (standard) / left
- Protection class up to IP69K
- Drainage holes
- Stainless steel spring
- Housing material
- Wire acceleration
- Snap protection

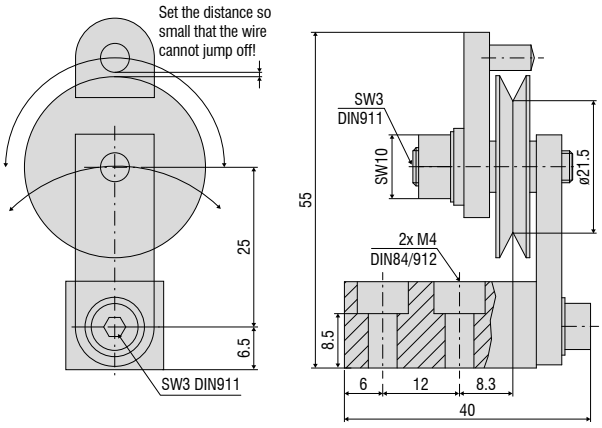
* Some options cannot be combined with each other; availability of options on request

Accessories
wireSENSOR

Wire deflection pulleys for external installation

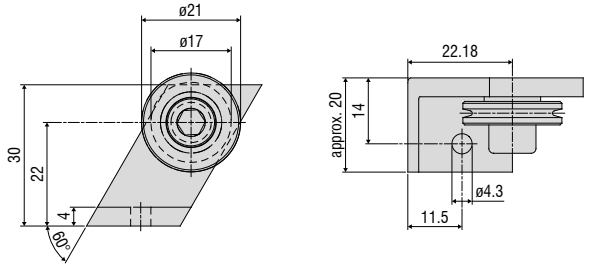
TR1-WDS
Wire deflection pulley, adjustable, for sensors with a wire diameter ≤ 0.45 mm





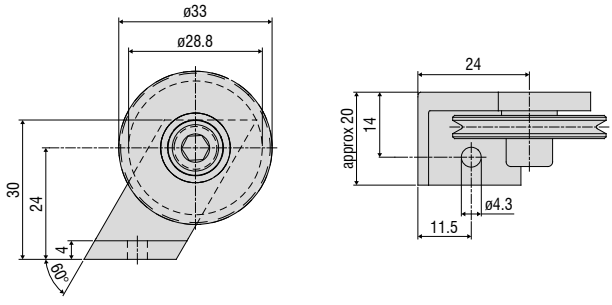
TR3-WDS
Wire deflection pulley, fixed, for sensors with a wire diameter ≤ 0.45 mm





TR4-WDS
Wire deflection pulley, fixed, for sensors with a wire diameter of 0.8 mm to 1 mm

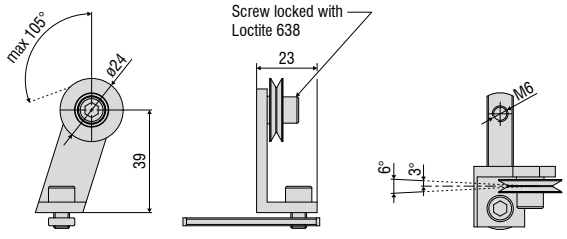




Wire deflection pulley for direct installation on the sensor housing

TR5-WDS
Integrated wire deflection pulley for P115 sensors
with a wire diameter of 0.45 mm

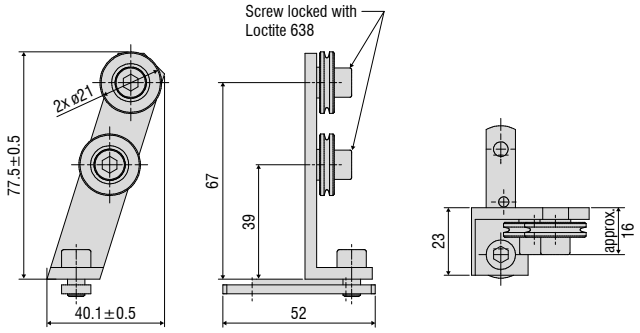




All dimensions in mm, not to scale

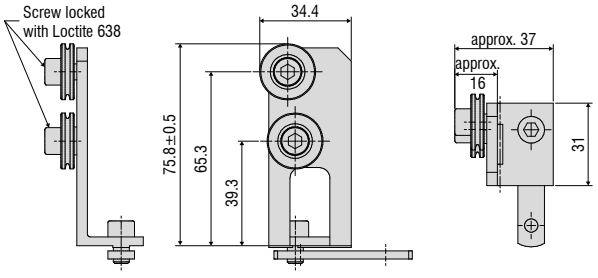
TR5-WDS(03)
Integrated double deflection pulley for P115 sensors with a wire diameter of 0.45 mm





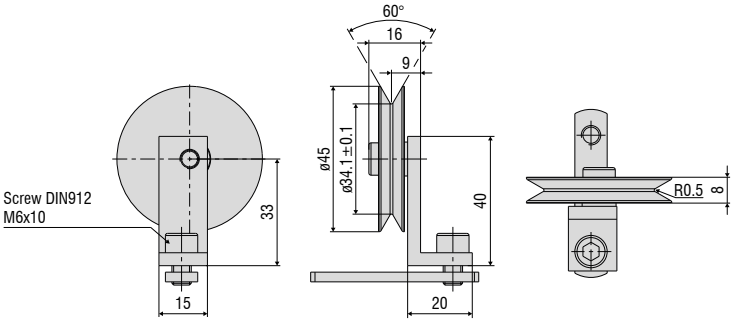
TR5-WDS(04)
Integrated double deflection pulley, 90° angled, for P115 sensors with a wire diameter of 0.45 mm





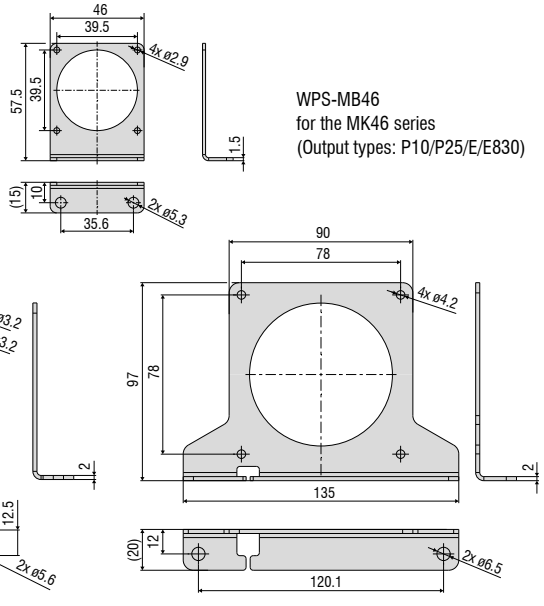
TR6-WDS(01)
Integrated wire deflection pulley for the P115 sensors with a wire diameter of 1 mm





Mounting bracket set





WPS-MB46
for the MK46 series
(Output types: P10/P25/E/E830)

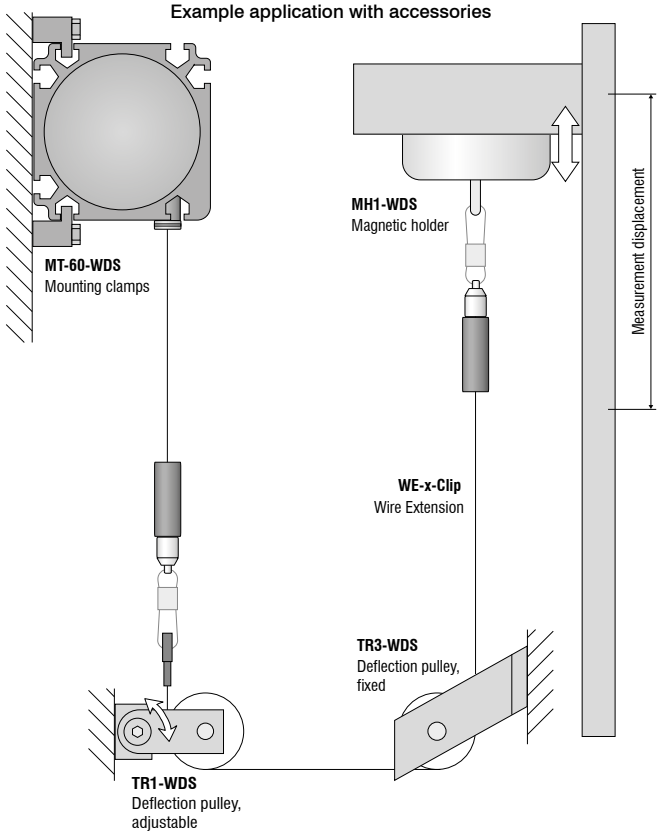
WPS-MB77
for the MK77 series

WPS-MB88
for the MK88 series

Accessories & Notes for installation
wireSENSOR

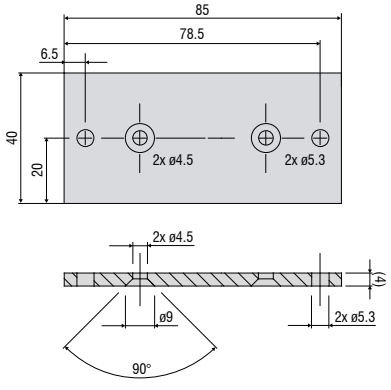
Accessories	
WE-xxxx-M4	Wire extension with M4 wire connection, x=wire length
WE-xxxx-Clip	Wire extension with eyelet, x = wire length
WE-xxx-Clip-WSS	Wire extension with clip and uncoated wire d=0.45 mm
WE-xxxx-Ring-PW	Wire extension with plastic ring and para-aramid wire, 1 mm
GK1-WDS	Fork head for 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, for WDS with 8-pin cable connector
WDS-MP60	Mounting plate for P60 models
WPS-MB46	Mounting bracket set for the MK46 series (output type: P10/P25/E/E830)
WPS-MB77	Mounting bracket set for the MK77 series
WPS-MB88	Mounting bracket set for the MK88 series
PC2/10-WDS-A	Cable for SSI encoder, 2 m long
PC10/10-WDS-A	Cable for SSI encoder, 10 m long
PC5/5-IWT	Sensor cable, 5 m long, M12x1 connector, 5-pin, A-coding

Example application with accessories



WDS-MP60
Mounting plate for P60 models



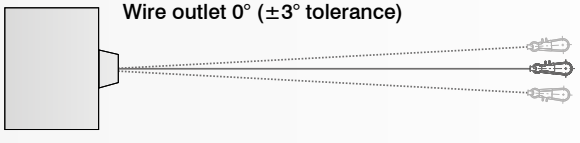


All dimensions in mm, not to scale

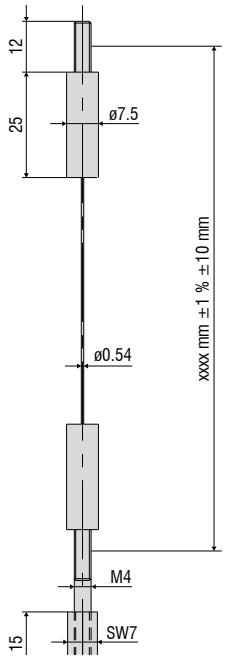
Installation instructions:

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

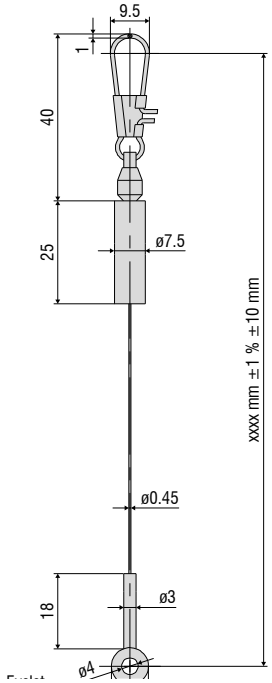
Angle of wire outlet: Make sure during installation that the wire outlet is straight (tolerance of ±3°). Exceeding this tolerance leads to increased wear of the wire material and on the wire outlet.



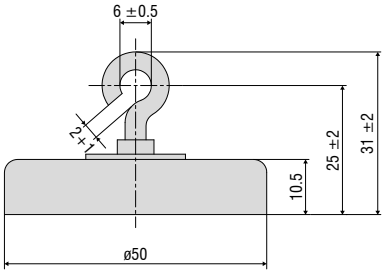
WE-xxxx-M4
Wire extension with M4 wire connection, x=wire length



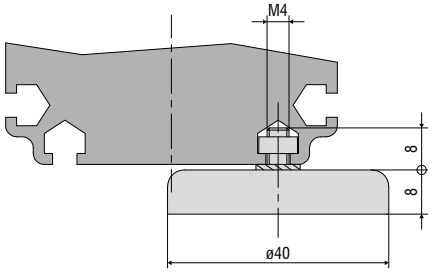
WE-xxxx-Clip
Wire extension with eyelet, x = wire length



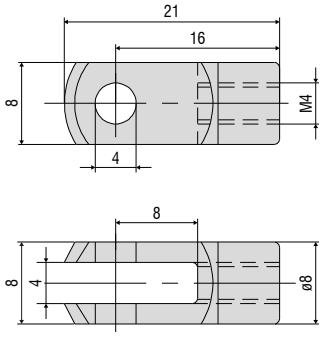
MH1-WDS
Magnetic holder for wire attachment



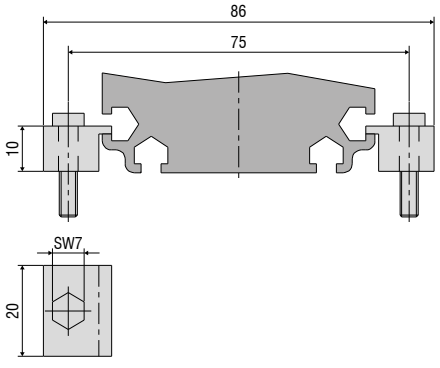
MH2-WDS
Magnetic holder for sensor mounting



GK1-WDS
Fork head for M4

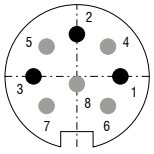
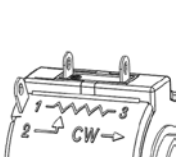
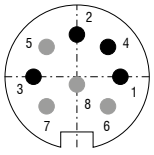
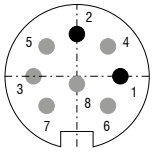


MT-60-WDS
Mounting clamps for WDS-P60



Output specifications
wireSENSOR

Analog

Output	Connector M16 -SA / -SR	Integrated cable -CA / -CR	Open contacts
Potentiometer output (P)			
Input voltage: max. 32 VDC with 1 kOhm / max. 1 W Resistance: 1 kOhm ±10 % (resistance divider) Temperature coefficient: ±0.0025 % FSO/°C	 Sensor side 1 = Input + 2 = Ground 3 = Signal	White = Input + Brown = Ground Green = Signal	 1 = Input + 2 = Signal 3 = Ground 
Voltage output (U)			
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: ±0.005 % FSO/°C Electromagnetic compatibility (EMC): EN 61000-6-4 EN 61000-6-2	 Sensor side		
Adjustment range (if supported by the model) Zero: ±20 % FSO Sensitivity: ±20 %	1 = Power supply 2 = Ground 3 = Signal 4 = Ground	White = Supply Brown = Ground Green = Signal Yellow = Ground	
Current output (I)			
Supply voltage: 14 ... 27 VDC (non-stabilized) Current consumption: max. 35 mA Output current: 4 ... 20 mA Load: <600 Ohm Output noise: <1.6 μA_{eff} Temperature coefficient: ±0.01 % FSO/°C Electromagnetic compatibility (EMC): EN 61000-6-4 EN 61000-6-2	 Sensor side		
Adjustment range (if supported by the model) Zero: < ±18 % FSO Sensitivity: ±15 %	1 = Power supply 2 = Ground	White = Supply Brown = Ground	

CANopen

(for the MK88 and K100 series)

CANopen features	
Profiles	Communication profile CiA 301. Device profile CiA 406 (absolute linear encoder)
SDO	1x SDO server
PDO	2x TxPDO
PDO modes	Event/time-triggered, synchronous (cyclic/acyclic)
Preset value	The "Preset" parameter can be used to set the current measured value to any value. The difference from the original value is stored in the object.
Direction	Via the operating parameter, the counting direction of the measured values can be reversed
Diagnosis	Heartbeat, Emergency Message
Default setting	AutoBaud(9), Node-ID 1

Setting the baud rate	
Baud rate adjustable via LSS or object 0x3001	
0	1000 kBaud
2	500 kBaud
3	250 kBaud
4	125 kBaud
6	50 kBaud
9	AutoBaud (default)

Description of the connections	
Pin	Assignment
1	n. c.
2	V+ (7…32VDC)
3	GND
4	CAN-High
5	CAN-Low



5-pin
housing connector
View on pin side
A-coded

Setting the subscriber address (node ID)
Address adjustable via LSS or object 0x3000 (1....127, 1=default)

Output specifications
wireSENSOR

CANopen

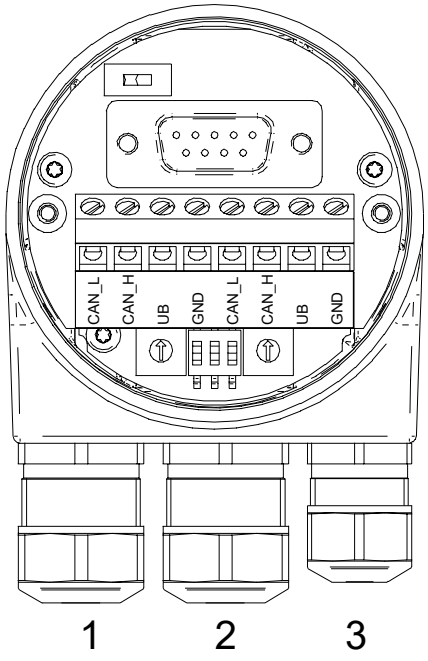
(for P60, P96, P115 and P200 series)



Setting the CANopen baud rate

Baud rate	DIP switch setting		
	1	2	3
10 kBit/s	OFF	OFF	OFF
20 kBit/s	OFF	OFF	ON
50 kBit/s	OFF	ON	OFF
125 kBit/s	OFF	ON	ON
250 kBit/s	ON	OFF	OFF (factory settings)
500 kBit/s	ON	OFF	ON
800 kBit/s	ON	ON	OFF
1 MBit/s	ON	ON	ON

If Node-ID 00 is set, the baud rate can be programmed via the CAN bus.



Description of the CANopen connections

GND	Ground connection for UB
UB	Operating voltage
CAN_H	CAN bus signal (dominant High)
CAN_L	CAN bus signal (dominant Low)

Max. core cross-section

Single-wire (rigid)	1.5 mm 2
Fine-wired (flexible)	1.0 mm2
Fine-wired (flexible)	With ferrule 0.75 mm2

Cable diameter

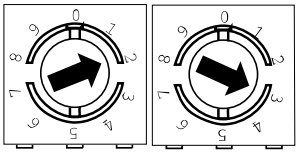
Cable gland 1,2	ø8...10 mm (-40...+85 °C) ø5...9 mm (-25...+85 °C)
Cable gland 3	ø4.5...6 mm (-40...+85 °C) ø3...6 mm (-25...+85 °C)

Tightening torque

Terminal block/screw terminal max. 0.4 Nm
(recommended tightening torque 0.3 Nm)

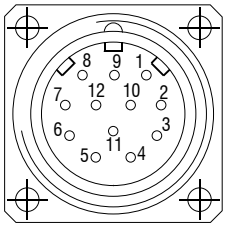
Settings of the CANopen participant address

Address can be set with rotary switch. Example: Participant address 23



SSI (Gray Code)

Pin assignment	
Flange socket M23, 12-pin, pin contacts, CW (assignment according to option 3252)	
PIN	Assignment
1	+Vs
2	0 V
3	Clock+
4	Data+
5	SET
6	Data-
7	Clock-
8	-
9	DIR
10	-
11	-
12	-



Connections	
SET	**Zero setting input** For setting a zero point at any point. The zeroing process is triggered by a High pulse and must take place after the rotating direction selection (DIR). Pulse duration > 100 ms. For maximum interference immunity, connect to 0 V after zeroing.
DIR	**Counting direction input** When not connected, this input is on High. DIR High means increasing output data with a clockwise rotating shaft when looking at the flange. DIR Low means increasing values with a counterclockwise rotating shaft when looking at the flange. For maximum interference immunity, connect to +Vs or 0 V depending on the direction of rotation.

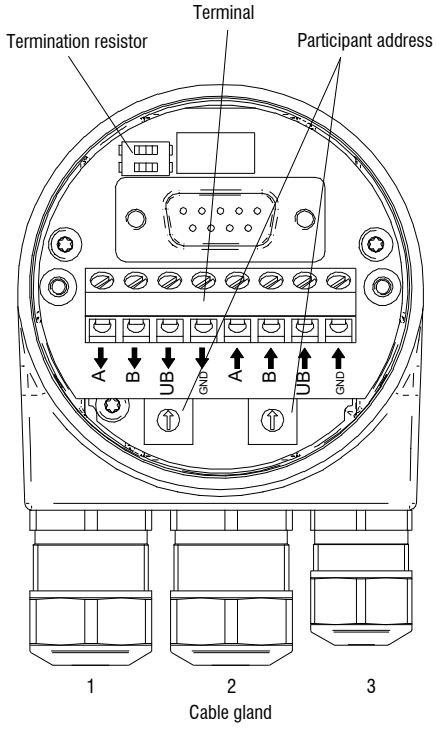
Switching level	
SSI switch	
SSI clock	RS422 with terminating resistance 120 Ω
SSI data	RS422

Control inputs of input circuit	
Input level High	>0.7 UB
Input level Low	<0.3 UB
Input resistance	10 kΩ

Output specifications
wireSENSOR

PROFIBUS

Profibus DP features	
Bus protocol	Profibus-DPV0
Device profile	Device class 1 and 2
Cyclical data exchange	Communication in accordance with DPV0
Input data	Position value Additional configurable speed signal
Output data	Preset value
Preset value	This parameter can be used to set the rotary encoder to a desired position value that corresponds to a defined axis position of the system. The storage is non-volatile.
Rotary direction	This parameter can be used to parameterize the direction of rotation in which the position value should rise or fall.
Scaling	Parameterization of the steps per rotation and the total resolution.
Gear factor	Adjustable via counter / denominator
Diagnosis	Position and parameter errors Monitoring multi-turn scanning Readable hour meter



Cable: 1, 2 = ø8 - 10 mm (-40 - 85 °C) / ø5 - 9 mm (-25 - 85 °C)
Cable: 3 = ø4.5 - 6 mm (-40 - 85 °C) / ø3 - 6 mm (-25 - 85 °C)

Pin assignment	
+Vs	Operating voltage 8...30 VDC
0 V	Ground connection related to +Vs
A	Negative data line
B	Positive data line

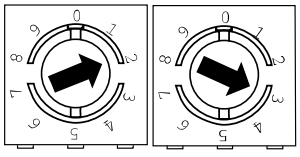
Terminals with the same designation are internally connected and functionally identical These internal terminal connections Vs-Vs / 0V-0V may be loaded with max. 1 A each

Terminator



Both ON = last participant
Both OFF = participant X
Default setting OFF

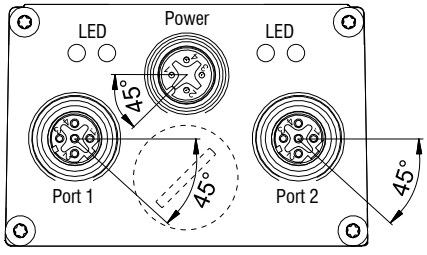
Participant address



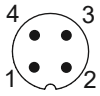
Adjustable via rotary switch
Example: Participant address 23
Default setting. 00

PROFINET

PROFINET features	
Bus protocol	PROFINET IO
Device profile	Encoder Profile PNO 3.162 V4.1 and V3.1 PROFIdrive Profil PNO 3.172 V4.1
Real-time classes	Realtime (RT) Class 1, IRT Class 3
Transmission frequency	RT: 1 ms, 2 ms, 4 ms IRT: 250 μs, 500 μs, 1 ms, 2 ms, 4 ms
Update time	Min. 500 μs
Product features	- 100 MBaud Fast Ethernet - Device replacement without removable media - Media redundancy protocol MRP - Gear factor / round axis
Process data	- Position value 32-Bit input data with/without rotational speed 16 or 32 Bit - Telegram 81-83 of the PROFIdrive profile
LED status display	Link/Activity, Status, Error

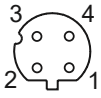


Pin Assignment		
Operating voltage		
Pin	Connection	Description
1	UB	Operating voltage
2	n.c.	Do not connect
3	GND	Ground connection
4	n.c.	Do not connect



1x flange connector M12 (pin), A-coded

PROFINET (data line)		
Pin	Connection	Description
1	TxD+	Transmitted data+
2	RxD+	Received data+
3	TxD-	Transmitted data-
4	RxD-	Received data-

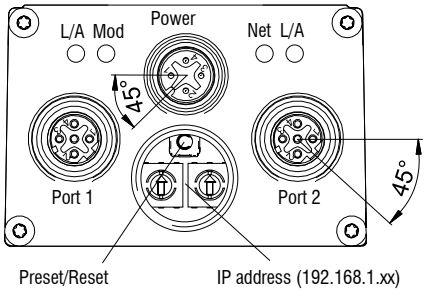


2x flange connector M12 (socket), D-coded

Output specifications
wireSENSOR

EtherNet/IP

EtherNet/IP characteristics	
Bus protocol	EtherNet/IP
Device profile	CIP Nov 2016, 22_{hex} Encoder
Cycle time	1 ms
Product features	- Gear factor (round axis) and continuous operation - Plausibility test of adjustable parameters - Comprehensive diagnosis function - Adress Conflict Detection - Device Level Ring - Several simultaneous IO connections
LED status display	2x Link/Activity, module status, network status



Pin Assignment

Operating voltage

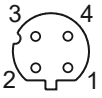
Pin	Connection	Description
1	UB	Operating voltage
2	d.c.	Do not connect
3	GND	Ground connection
4	d.c.	Do not connect



1x flange connector M12 (pin), A-coded

EtherNet/IP (data line)

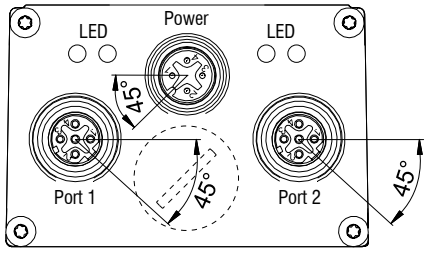
Pin	Connection	Description
1	TxD+	Transmitted data+
2	RxD+	Received data+
3	TxD-	Transmitted data-
4	RxD-	Received data-



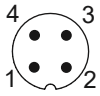
2x flange connector M12 (socket), D-coded

EtherCAT

EtherCAT characteristics	
Bus protocol	EtherCAT
Device profile	Encoder profile CANopen® CiA 406 Vers. 4.0.2 dated August 18, 2016
Operating modes	Free Run, synchronous with SM3 Event, DC Mode (Distributed Clocks)
Cycle time	Min. 62.5 μs
Product features	- Gear factor (round axis) and continuous operation - Time stamp (time of position data acquisition) - Plausibility check of adjustable parameters - Comprehensive diagnosis function - Preset gauge for position - File Access over EtherCAT (FoE)
Process data	- Position value 32-Bit input data with/without rotational speed 32 Bit - Comprehensive process data mapping
LED status display	2x Link/Activity, RUN, ERR

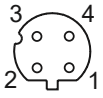


Pin Assignment		
Operating voltage		
Pin	Connection	Description
1	UB	Operating voltage
2	n.c.	Do not connect
3	GND	Ground connection
4	n.c.	Do not connect



1x flange connector M12 (pin), A-coded

EtherCAT (data line)		
Pin	Connection	Description
1	TxD+	Transmitted data+
2	RxD+	Received data+
3	TxD-	Transmitted data-
4	RxD-	Received data-

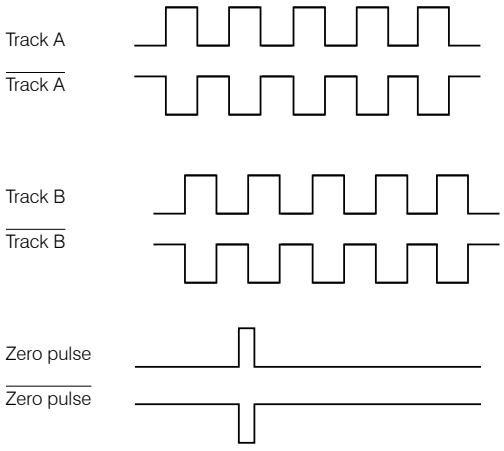


2x flange connector M12 (socket), D-coded

Output specifications
wireSENSOR

Incremental encoder

Output signals



TTL Output	Line driver (5 VDC)
High level	≥ 2.5 V
Low level	≤ 0.5 V
High load	≤ 20 mA
Tracks	A, $\overline{A}$, B, $\overline{B}$, 0

Output TTL01/ TTL02	NPN (5 VDC ±5 %)
High level	> 4.5 V
Low level	< 1.0 V
High load	≤ 3 mA
Tracks (TTL01)	A, B, 0
Tracks (TTL02)	A, $\overline{A}$, B, $\overline{B}$, 0

Output HTL	Push-pull (10 ... 30 VDC)
High level	≥ V+ -3 V
Low level	≤ 1.5 V
High load	≤ 40 mA
Tracks	A, $\overline{A}$, B, $\overline{B}$, 0

Output E	Push-pull (5 VDC)
High level	≥ V+ -2.5 V
Low level	≤ 0.5 V
High load	≤ 50 mA
Tracks	A, B, 0

Output E830	Push-pull (8 ... 30 VDC)
High level	≥ V+ -3 V
Low level	≤ 2.5 V
High load	≤ 50 mA
Tracks	A, B, 0

Pin assignment TTL, HTL		
Connector	Cable color	Assignment
Pin 1	pink	B-
Pin 2	-	-
Pin 3	blue	R+
Pin 4	red	R-
Pin 5	green	A+
Pin 6	yellow	A-
Pin 7	-	-
Pin 8	gray	B+
Pin 9	-	-
Pin 10	white	GND
Pin 11	-	-
Pin 12	brown	UB

Pin assignment E, E830	
Cable color	Assignment
white	0 V
brown	V+
green	A
-	$\overline{A}$
yellow	B
-	$\overline{B}$
gray	0

Pin assignment TTL01	
Cable color	Assignment
brown	0 V
gray	V+
white	A
green	B
yellow	0

Pin assignment TTL02	
Cable color	Assignment
red	V+
black	0 V
brown	A
black	$\overline{A}$
orange	B
black	$\overline{B}$
yellow	0
black	n. c.

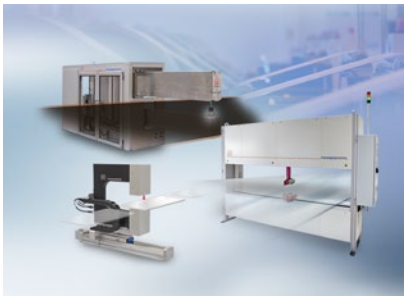
Sensors and Systems from Micro-Epsilon



Sensors and systems for displacement, distance and position



Sensors and measurement devices for non-contact temperature measurement



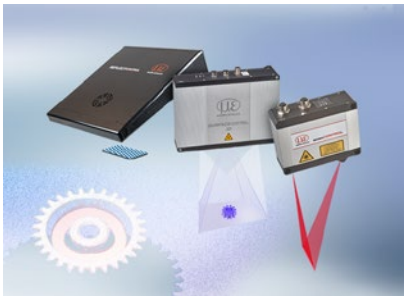
Measuring and inspection systems for metal strips, plastics and rubber



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

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