More Precision

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.
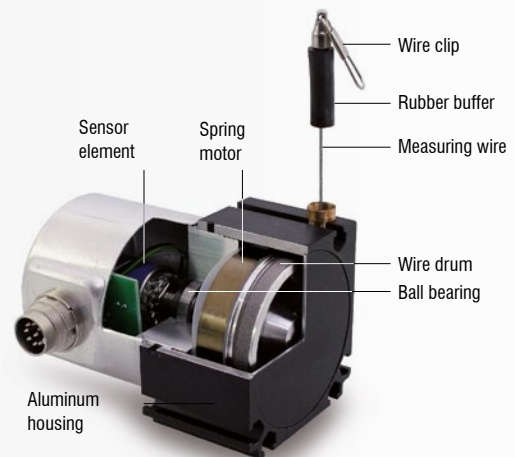
Sensor structure of a WDS-P60

Available sensor series

Draw-wire sensor		Output	Linearity max. [%]	Protection class *	Max. measuring range (mm)	Page
Draw-wire sensors for serial integration & OEM						
	MK30	Potentiometer	±0.1	IP20	750	6 - 7
		Incremental encoder	±0.05	IP54		8 - 9
	MK46	Potentiometer, voltage, current	±0.1	IP20	1,250	10 - 11
		Incremental encoder	±0.05	IP54		12 - 13
	MK77	Potentiometer, voltage, current	±0.25	IP20	2,100	14 - 15
		Incremental encoder	±0.05	IP54		16 - 17
	MK60	Potentiometer, voltage, current	±0.15	IP65	2,400	18 - 19
		Incremental encoder	±0.05	IP65		20 - 21
	MK88	Potentiometer, voltage, current	±0.15	IP65	5,000	22 - 23
		Absolute encoder				24 - 25
	MK120	Potentiometer, voltage, current	±0.15	IP65	7,500	26 - 27
	K100	Potentiometer, voltage, current	±0.25	IP67 / IP69K	8,000	28 - 29
		Absolute encoder				30 - 31
Industrial draw-wire sensors						
	P60	Potentiometer, voltage, current	±0.1	IP65	1,500	32 - 33
		Incremental/absolute encoder	±0.02	IP65		34 - 35
	P96	Potentiometer, voltage, current	±0.1	IP65	3,000	36 - 37
		Incremental/absolute encoder	±0.02	IP65		38 - 39
	P115	Potentiometer, voltage, current	±0.1	IP65	15,000	40 - 41
		Incremental/absolute encoder	±0.01	IP65		42 - 43
	P200	Incremental/absolute encoder	±0.01	IP65	50,000	44 - 45
Draw-wire sensors for fast measurement movements and high wire accelerations						
	MT	Potentiometer	±0.4	IP50	130	46 - 47
	MPM	Potentiometer	±0.2	IP65	250	48 - 49
	MP / MPW	Potentiometer	±0.1	IP67	1,000	50 - 51

* Higher protection class available on request

3

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
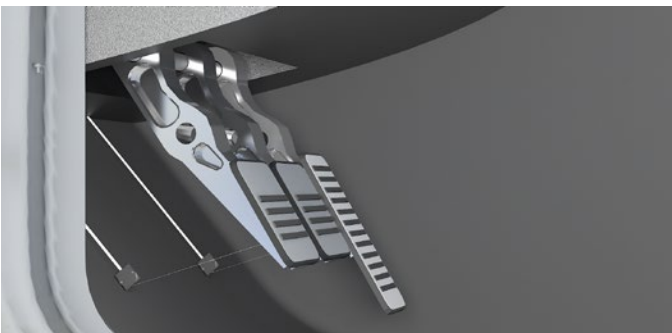
Measuring the pedal travel

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
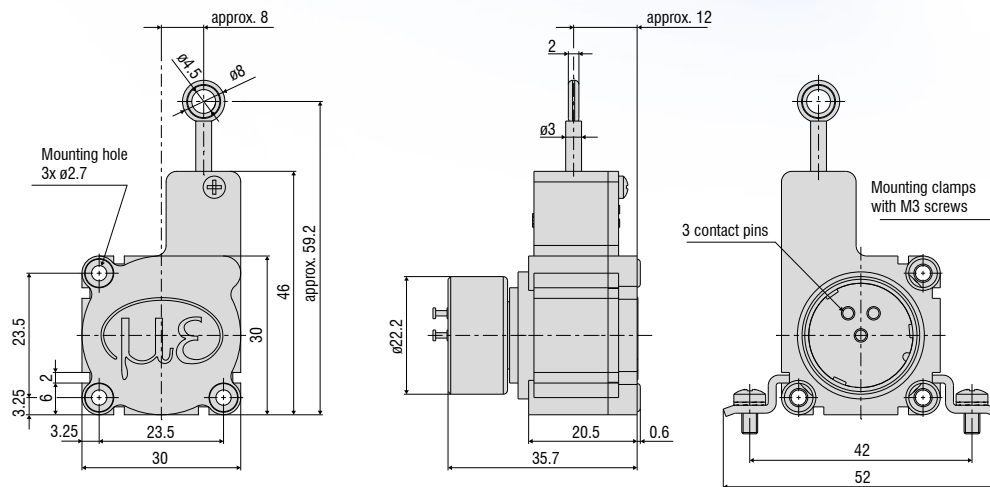
Measuring range 150/250/500/750 mm

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	-	-	-	-
Resolution — Wire potentiometer	-	-	-	0.15 mm	0.2 mm
Resolution — Hybrid potentiometer	-			towards infinity	
Linearity — Conductive plastic potentiometer P50 — ≤ ±0.5% FSO	≤ ±0.25 mm	-	-	-	-
Linearity — Wire potentiometer P25 — ≤ ±0.25% FSO	-	-	-	≤ ±1.25 mm	≤ ±1.87 mm
Linearity — Hybrid potentiometer P25 — ≤ ±0.25% FSO	-	≤ ±0.375 mm	≤ ±0.625 mm	-	-
Linearity — 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		
Material — Measuring wire			Polyamide-coated stainless steel (ø 0.36 mm)		
Wire mounting			Eyelet (ø 4.5 mm)		
Mounting			Mounting holes or mounting grooves on the sensor housing		
Temperature range — Storage			-20 … +80 °C		
Temperature range — Operation			-20 … +80 °C		
Connector			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

Output type:
Potentiometer P50 (linearity ±0.5 % FSO)
Potentiometer P25 (linearity ±0.25 % FSO)
Potentiometer P10 (linearity ±0.1 % FSO)

MK30 series

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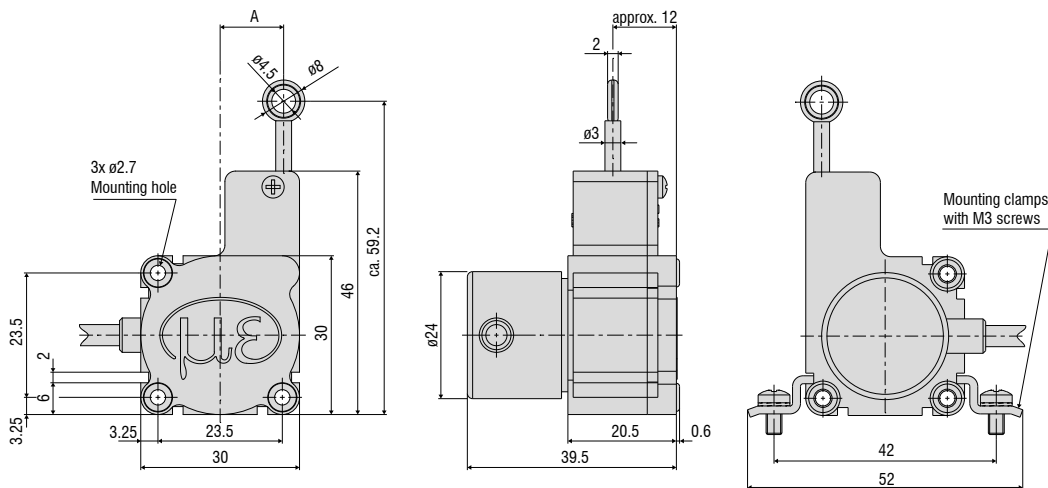
Measuring range (mm)	A (mm)
500	approx. 8
750	approx. 12

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)	
Mounting	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

Output type:
Encoder E (5 ... 24 VDC)
Encoder E830 (8 ... 30 VDC)

MK30 series

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
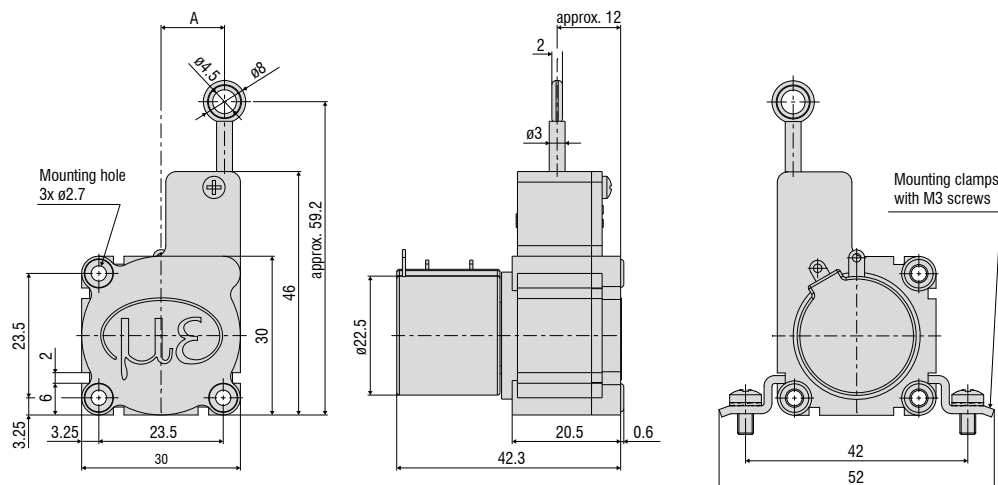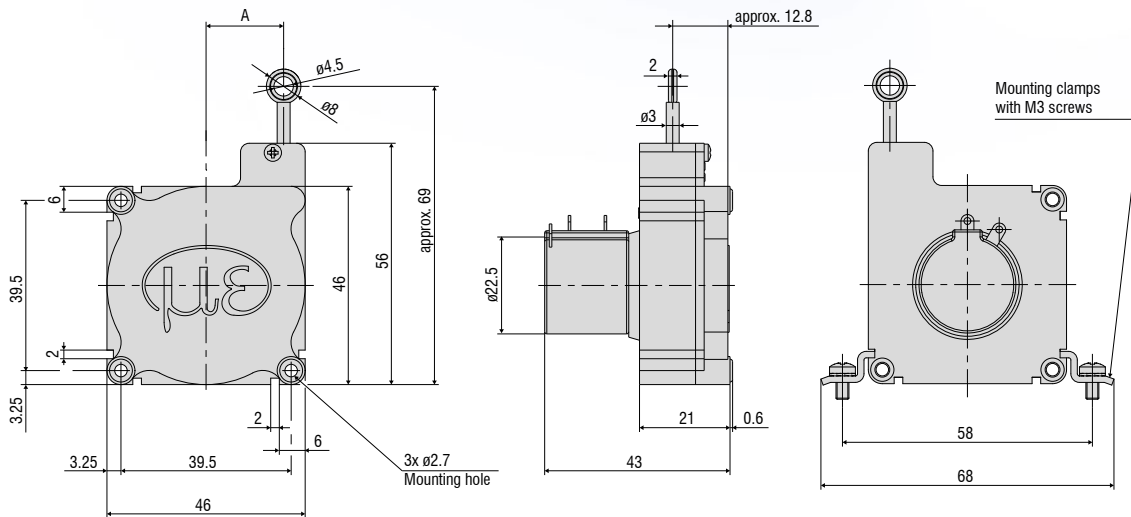

Measuring range (mm)	A (mm)
1000	approx. 18
1250	approx. 20

Output CR-P10/CR-P25/CR-U10/CR-I10
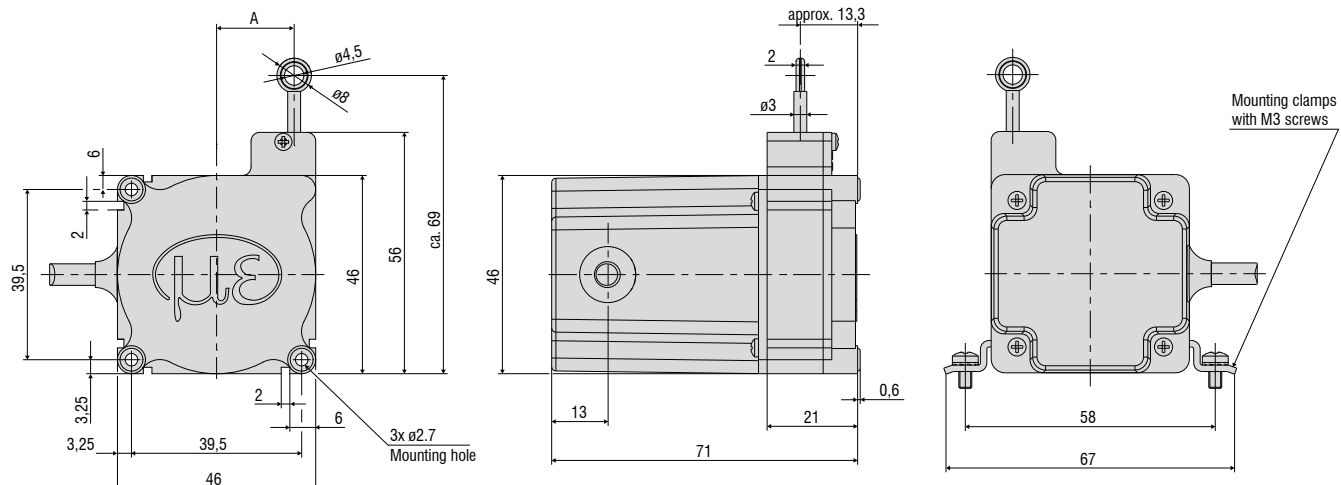
Model		WPS-1000-MK46	WPS-1250-MK46
Measuring range		1000 mm	1250 mm
Analog output		Potentiometer	Potentiometer, current, voltage
Resolution	Wire potentiometer P25	0.3 mm	0.4 mm
	Hybrid potentiometer P10/U10/I10	towards infinity	
Linearity	Wire potentiometer P25 ≤ ±0.25% FSO	≤ ±2.5 mm	≤ ±3.12 mm
	Hybrid 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)	
Mounting		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

Output type:
P10: Potentiometer
P25: Potentiometer
CR-P10/P25: potentiometer, integrated cable, radial, 1 m

MK46 series

Measuring range in mm

WPS -	1250 -	MK46 -	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 series

Measuring range in mm

# Low-cost draw-wire sensors
wireSENSOR MK46 digital

Robust plastic housing

Customer-specific designs

Incremental encoder

approx. 20

ø4.5

ø8

approx. 69

56

46

6

39.5

2

3.25

3.25   39.5   2   6

46

3x ø2.7
Mounting hole

approx. 12.8

2

ø3

ø24

21   0.6

43.5

Mounting clamps
with M3 screws

58

68
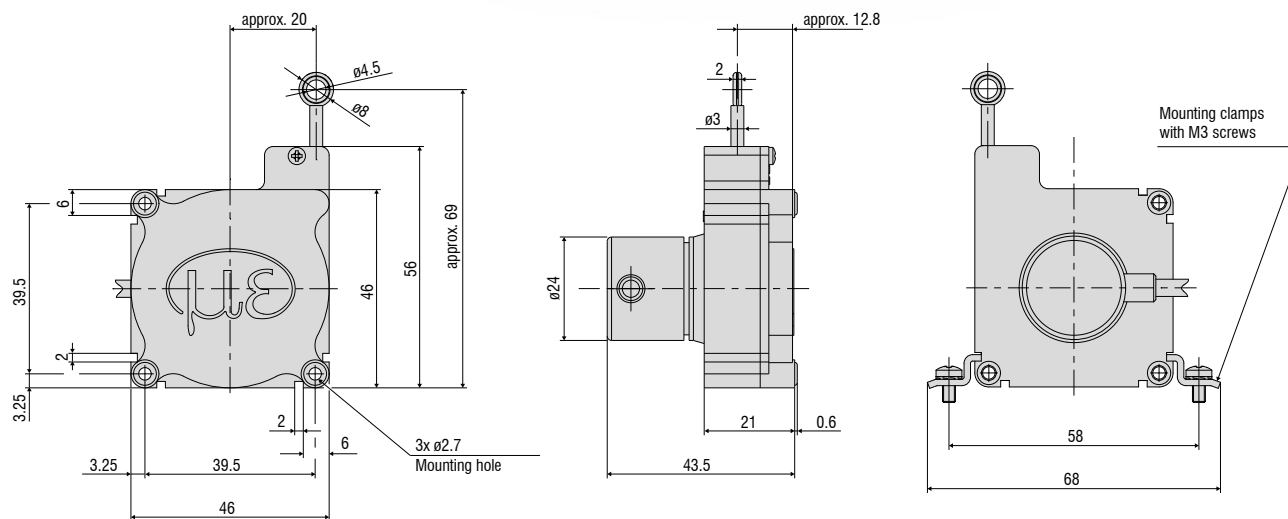
All dimensions in mm, not to scale

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
Material — Measuring wire	Polyamide-coated stainless steel (ø 0.36 mm)
Wire mounting	Eyelet (ø 4.5 mm)
Mounting	Mounting holes or mounting grooves on the sensor housing
Temperature range — Storage	-20 … +80 °C
Temperature range — 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

3x ø3.2 Mounting hole

approx. 34.3

ø8

ø4.5

approx. 105.2

92

77

67

5

5

67

77

approx. 22.5

2

ø3

ø22.4

28.5

50.5

0.4

Mounting clamps with M3 screws

38.5

2

6

89

99

Output CR-P25

3x ø3,2 Mounting hole

approx. 34.3

ø8

ø4.5

approx. 105.2

92

77

67

5

5

67

77

approx. 22.5

2

ø3

46

13

78.5

28.5

0.4

Mounting clamps with M3 screws

38.5

2

6

89

99

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)
Mounting	Mounting holes or mounting grooves on the sensor housing

Temperature range	Storage	-20 … +80 ℃
	Operation	-20 … +80 ℃
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
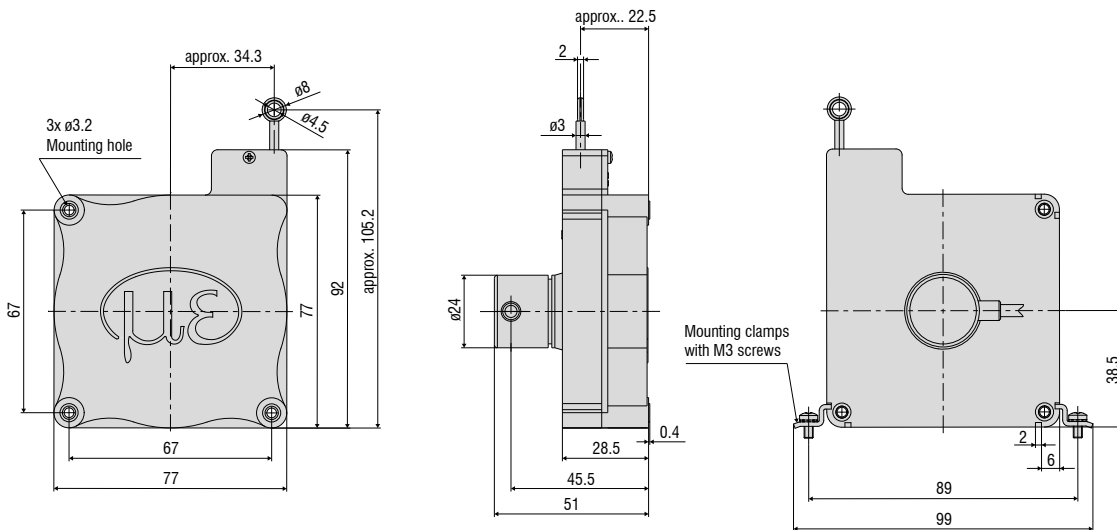
All dimensions in mm, not to scale

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)
Mounting	Mounting holes or mounting grooves on the sensor housing
Temperature range Storage	-20 … +80 ℃
Operation	-20 … +80 ℃
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
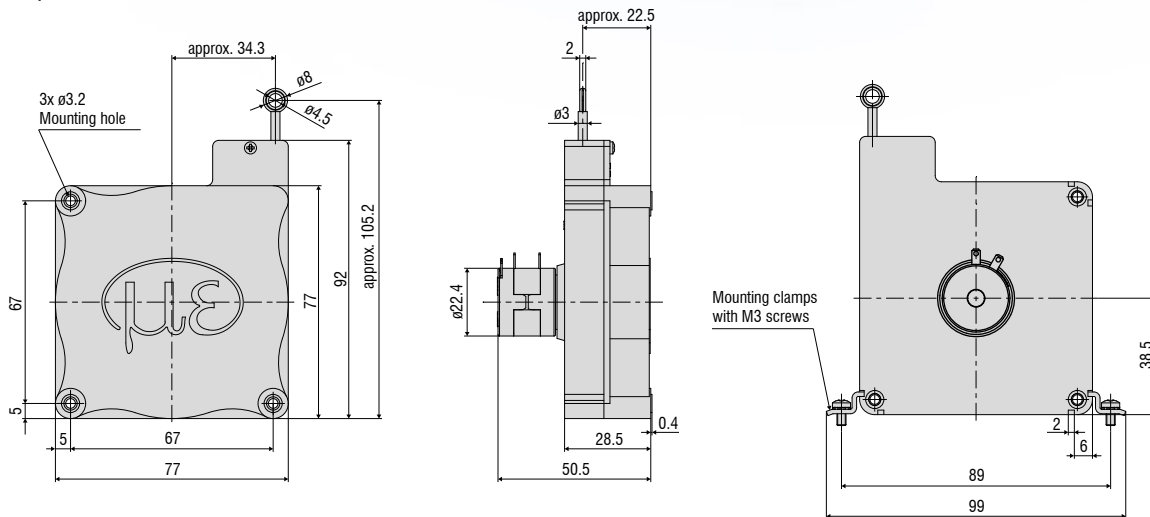## wireSENSOR MK60 analog
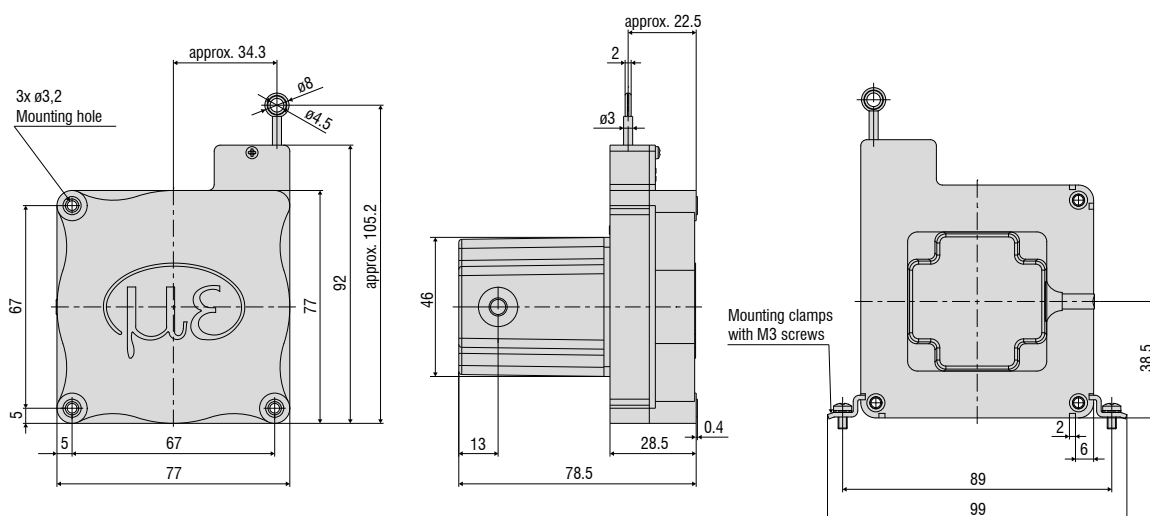
Robust plastic housing

Customer-specific designs

Potentiometer, current or voltage output
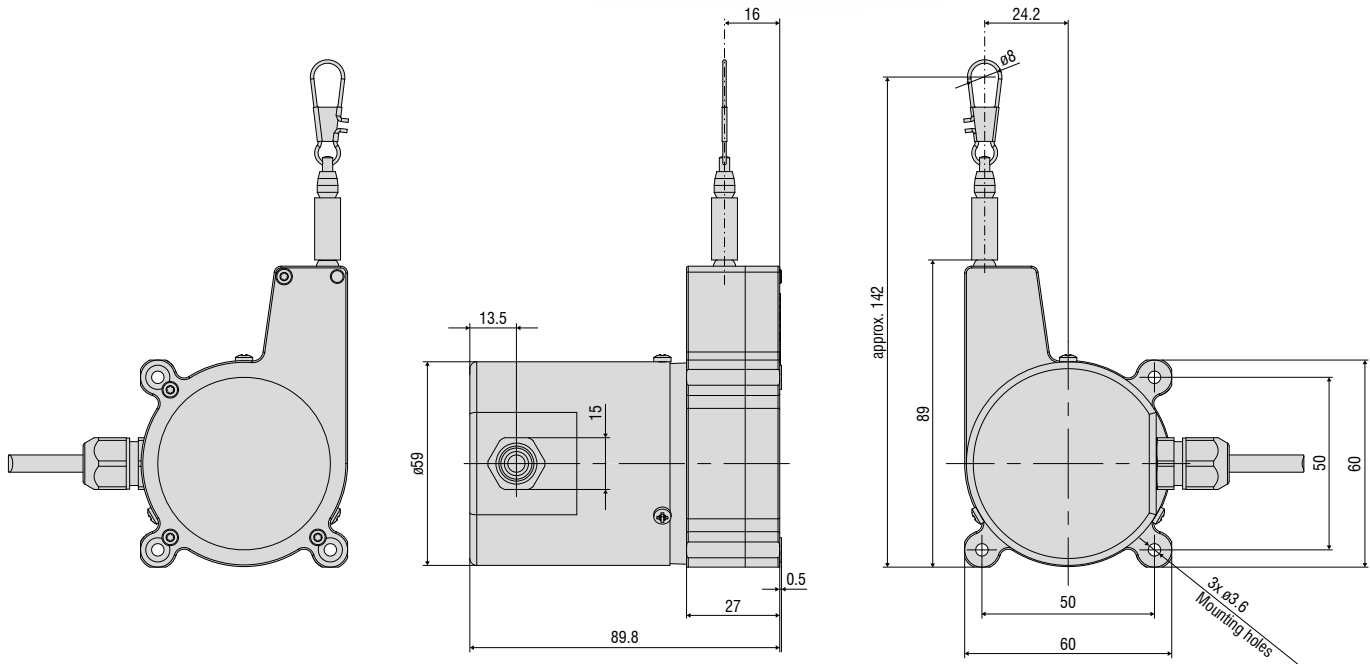
All dimensions in mm, not to scale

Model	WPS-1500-MK60
Measuring range	1500 mm
Analog output [1]	Potentiometer, current, voltage
Resolution Hybrid potentiometer P10	towards infinity
Linearity Hybrid potentiometer P10 $\leq \pm0.15\%$ FSO	$\leq \pm2.25$ 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
Mounting	Mounting holes
Temperature range Storage	-20 … +80 ℃
Operation	-20 … +80 ℃
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

Output:
P: potentiometer
U: voltage
I: current

Connection CR: integrated cable, radial, 1 m

MK60 series

Measuring range in mm

Low-cost draw-wire sensors
wireSENSOR MK60 digital

Robust plastic housing

Customer-specific designs

Incremental encoder
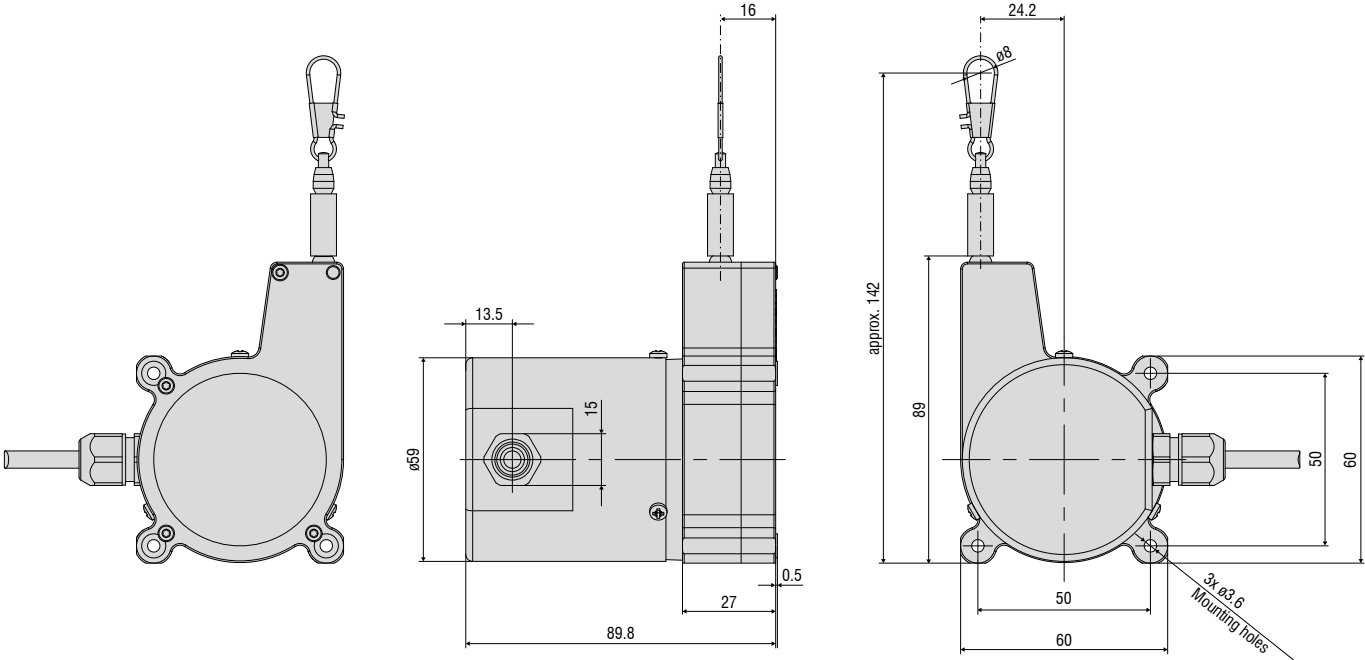
All dimensions in mm, not to scale

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

Article designation

WPS -	2400	MK60 -	CR -	TTL01

Output:
TTL01: A, $\underline{B}$, 0
TTL02: A, $\overline{A}$, B, $\overline{B}$, 0

Connection CR: integrated cable, radial, 1 m

MK60 series

Measuring range in mm

Low-cost draw-wire sensors
wireSENSOR MK88 analog

Robust plastic housing

Customer-specific designs

Potentiometer, current or voltage output

approx. 21.7

1

approx. 38.2

ø8

Mounting holes

3x ø4.2

ø59

approx. 141.3

89.8

78

88

13.5

27

0.5

90.7

78

88

99.8
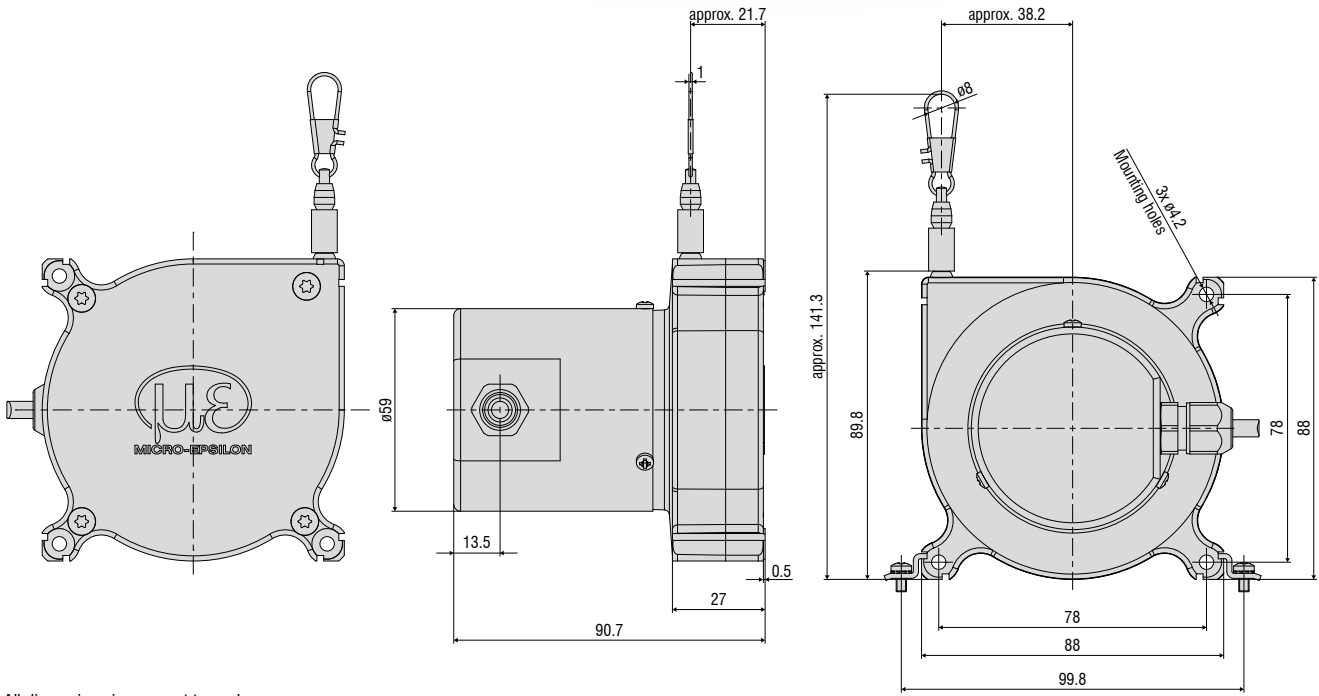
All dimensions in mm, not to scale

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	-	-
Linearity Hybrid potentiometer P10 ≤ ±0.3% FSO	-	≤ ±10.5 mm	-
Linearity 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)		
Material Protection cap	Glass-fiber reinforced plastic (PBT GF20)		
Material Measuring wire	Polyamide-coated stainless steel (ø 0.45 mm)		
Wire mounting	Wire clip		
Mounting	Mounting holes or mounting grooves on the sensor housing		
Temperature range Storage	-20 … +80 ℃		
Temperature range Operation	-20 … +80 ℃ (on request -40 … +85 ℃)		
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

Output:
P: potentiometer, U: voltage, I current

Connection CR: integrated cable, radial, 1 m

MK88 series

Measuring range in mm

Low-cost draw-wire sensors
wireSENSOR MK88 digital

Robust plastic housing

Customer-specific designs

CANopen Interface
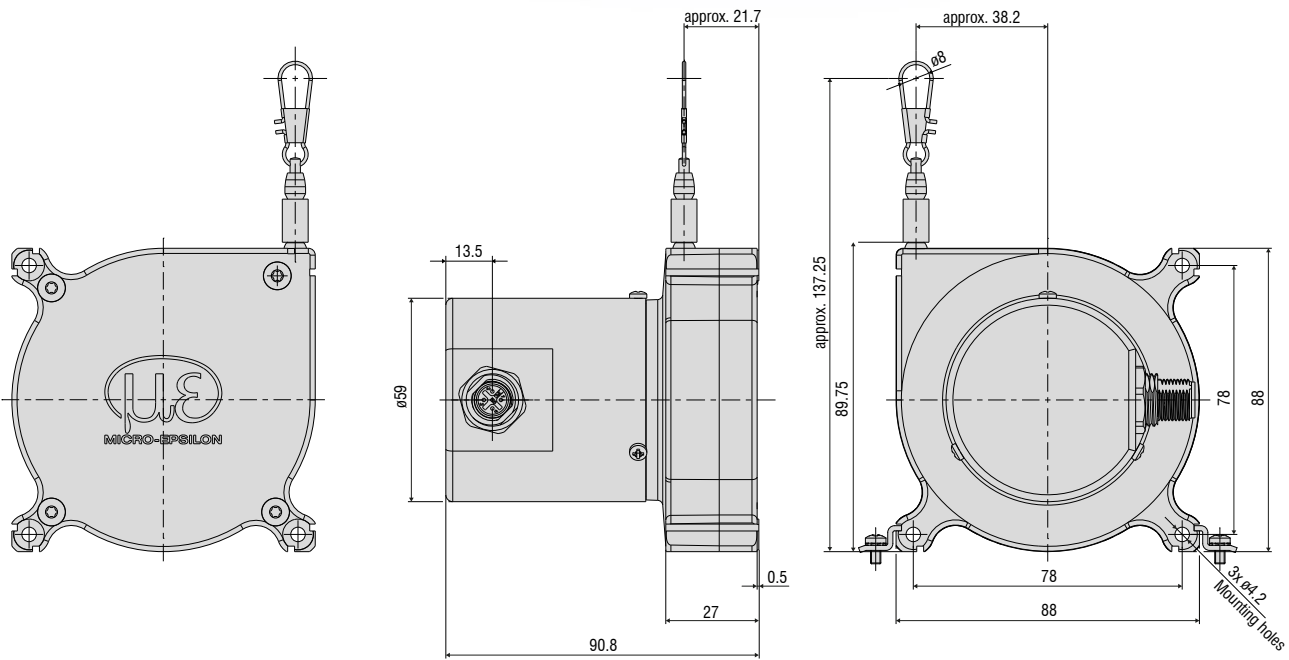
approx. 21.7

approx. 38.2

ø8

approx. 137.25

89.75

13.5

ø59

0.5

27

90.8

78

78

88

88

3x ø4.2
Mounting holes

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	-	-
Linearity — Hybrid potentiometer P10 ≤ ±0.3% FSO	-	≤ ±10.5 mm	-
Linearity — 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)		
Material — Protection cap	Glass-fiber reinforced plastic (PBT GF20)		
Material — Measuring wire	Polyamide-coated stainless steel (ø 0.45 mm)		
Wire mounting	Wire clip		
Mounting	Mounting holes or mounting grooves on the sensor housing		
Temperature range — Storage	-20 … +80 °C		
Temperature range — 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.
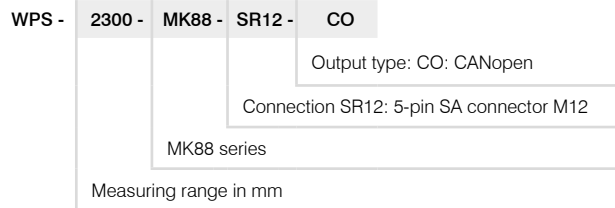[2] With plug version only when connected

Article designation

WPS -	2300 -	MK88 -	SR12 -	CO

Output type: CO: CANopen

Connection SR12: 5-pin SA connector M12

MK88 series

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

approx. 20.5   approx. 53

ø8

3x ø6
Mounting holes

approx. 177.4

130

107

120

ø58

27.7

55.7

73.7

107

120

Measuring range 7500 mm

approx. 20.5   ca. 53

ø8

3x ø6
Mounting hole

approx. 265.4

218

107

120

ø58

27.7

55.7

73.7

107

120
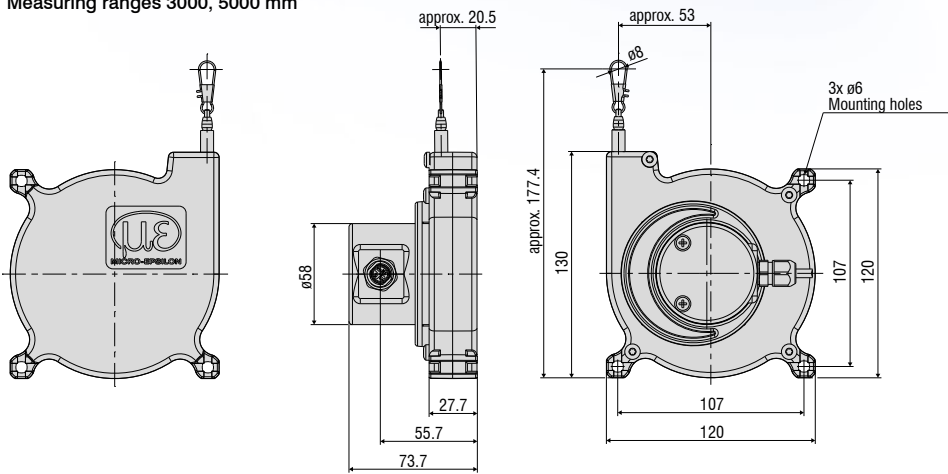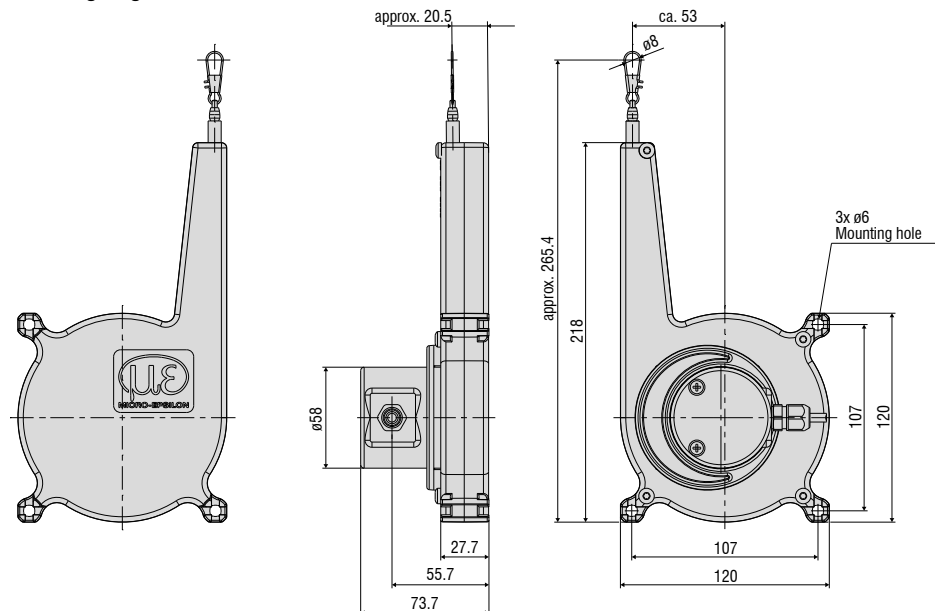
All dimensions in mm, not to scale

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		
Mounting	Mounting holes or mounting grooves on the sensor housing		
Temperature range	Storage	-20 … +80 ℃		
	Operation	-20 … +80 ℃		
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

Output:
P: potentiometer, U: voltage, I current

Connection CR: integrated cable, radial, 1 m

MK120 series

Measuring range in mm

Robust draw-wire sensors for OEM
wireSENSOR K100 analog

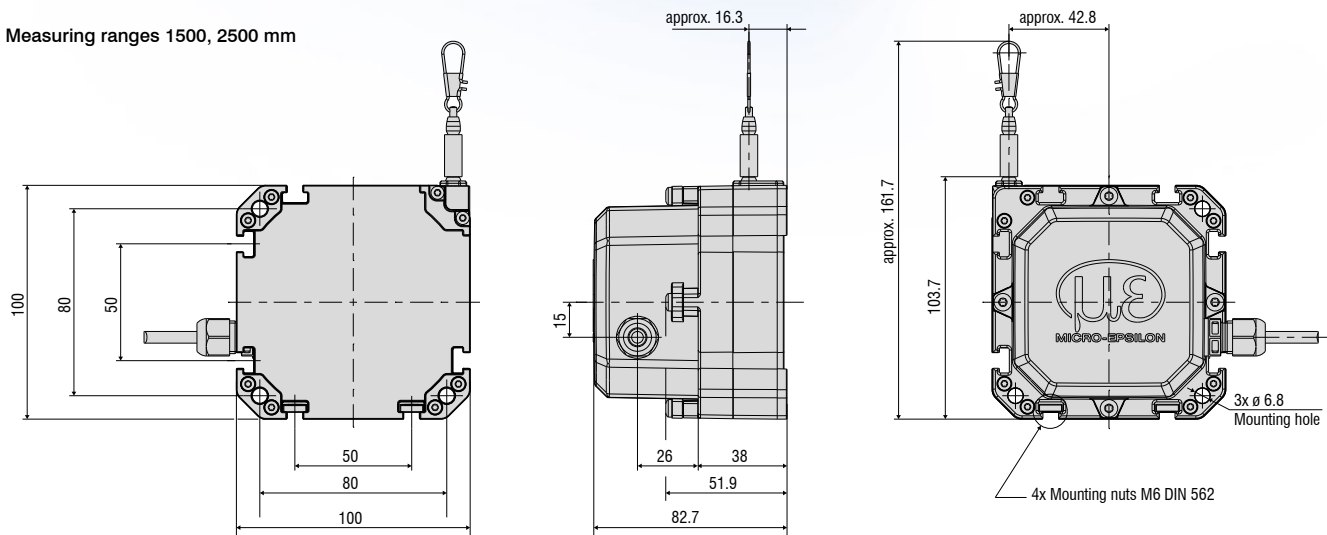Durable and robust sensor design (IP67/IP69K)

Compact sensor with large measuring range

Large temperature range from -40 to +85 °C

Potentiometer, current or voltage output

Measuring ranges 1500, 2500 mm

approx. 16.3

approx. 42.8

approx. 161.7

103.7

100
80
50

15

50
80
100

26   38
51.9
82.7

3x ø 6.8
Mounting hole

4x Mounting nuts M6 DIN 562

Measuring ranges 3500, 5000, 8000 mm

approx.16.4

approx. 43

approx. 212

154.1

100
80
50

15

50
80
100

26   38
52.2
82.5

3x ø 6.4
Mounting hole

Mounting grooves for M6

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	-	-	-	-
Linearity ≤ ±0.20% FSO	-	≤ ±5 mm	-	-	-
Linearity ≤ ±0.25% FSO	-	-	≤ ±8.75 mm	≤ ±12.5 mm	-
Linearity ≤ ±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				
Material Measuring wire	Polyamide-coated stainless steel (ø 0.61 mm)			Polyamide-coated stainless steel (ø 0.45 mm)	
Wire mounting	Wire clip				
Mounting	Through-bores Ø 6.4 mm and mounting nuts (for M6) on the sensor housing				
Temperature range Storage	-40 … +85 ℃				
Temperature range Operation	-40 … +85 ℃				
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
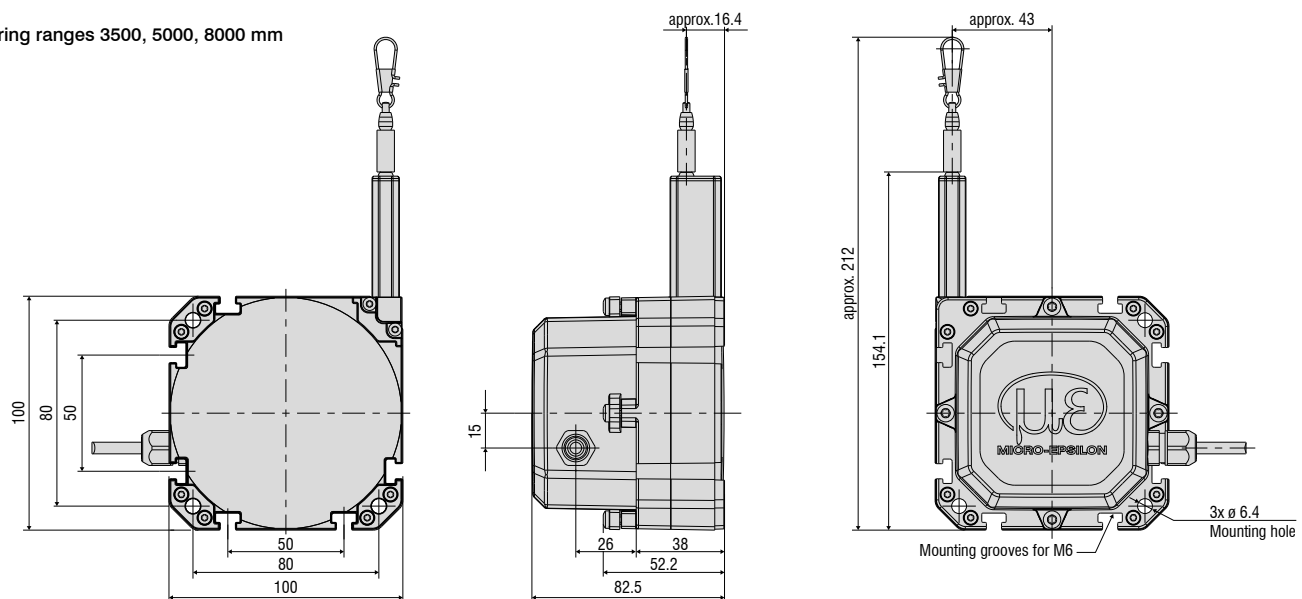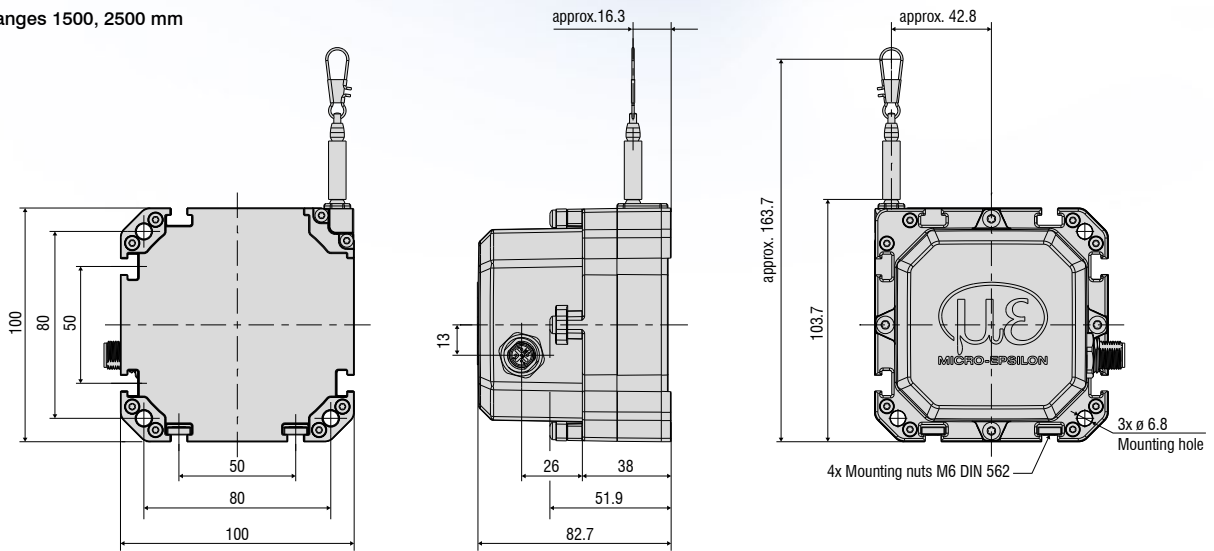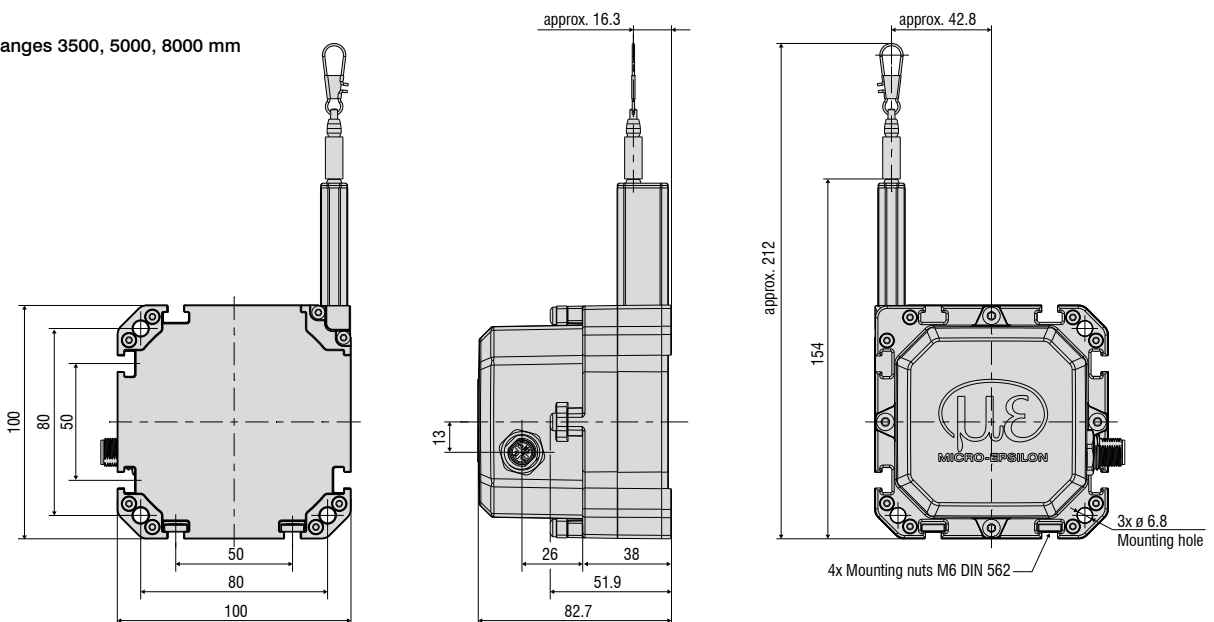
Large temperature range from -40 to +85 °C

CANopen Interface

Measuring ranges 1500, 2500 mm

approx.16.3

approx. 42.8

approx. 163.7

103.7

100
80
50

50
80
100

13

26   38

51.9

82.7

3x ø 6.8
Mounting hole

4x Mounting nuts M6 DIN 562

Measuring ranges 3500, 5000, 8000 mm

approx. 16.3

approx. 42.8

approx. 212

154

100
80
50

50
80
100

13

26   38

51.9

82.7

3x ø 6.8
Mounting hole

4x Mounting nuts M6 DIN 562

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	-	-	-	-
Linearity ≤ ±0.20% FSO	-	≤ ±5 mm	-	-	-
Linearity ≤ ±0.25% FSO	-	-	≤ ±8.75 mm	≤ ±12.5 mm	-
Linearity ≤ ±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				
Material Measuring wire	Polyamide-coated stainless steel (ø 0.61 mm)			Polyamide-coated stainless steel (ø 0.45 mm)	
Wire mounting	Wire clip				
Mounting	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 ℃				
Temperature range Operation	-40 … +85 ℃				
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

Output type: CO: CANopen

Connection SR12: 5-pin SA connector M12
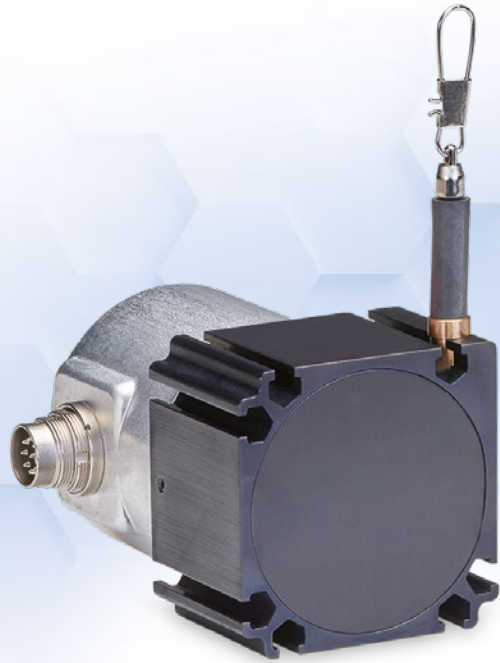
K100 series
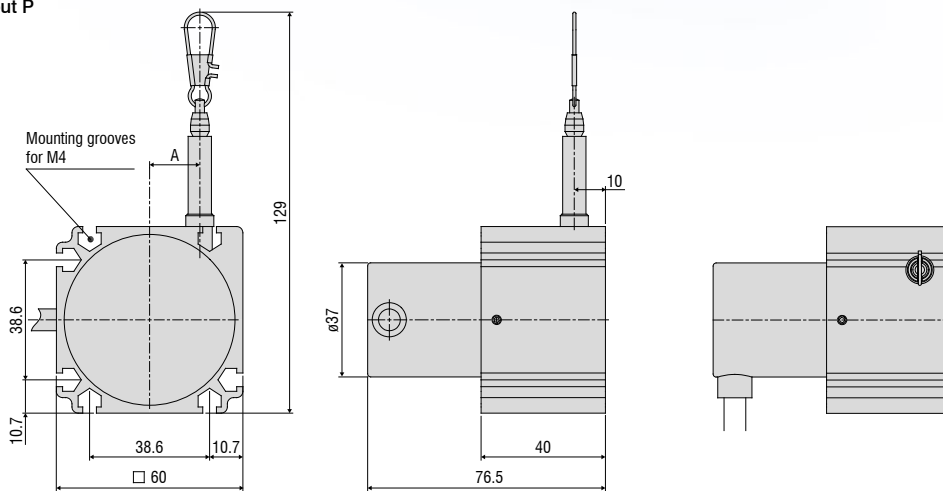
Measuring range in mm
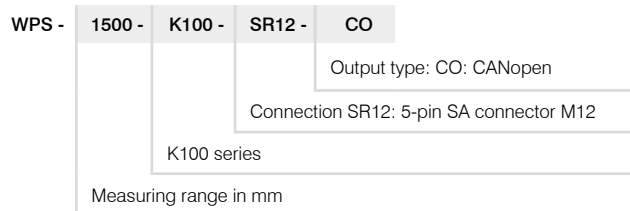
Industrial draw-wire sensors
wireSENSOR P60 analog

Robust aluminum profile housing

Customer-specific designs

Potentiometer, current or voltage output

Output P

Mounting grooves for M4

A

129

ø37

38.6

10.7

38.6 | 10.7

□ 60

40

76.5

10
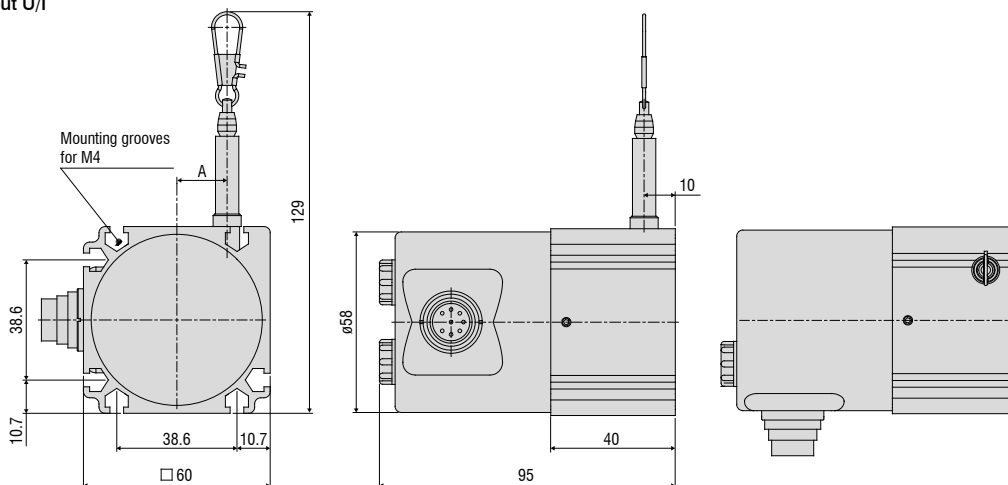
Measuring range (mm)	A (mm)
100 / 300 / 500 / 1000	approx. 16.5
150 / 750 / 1500	approx 24.2

Output U/I

Mounting grooves for M4

A

129

ø58

38.6

10.7

38.6 | 10.7

□ 60

40

95

10

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						
Mounting			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

Output type:
P: potentiometer (with connection CR)
U: voltage (with connection SR)
I: current (with connection SR)

Connection:
SR: radial plug
CR: integrated cable, radial, 1 m
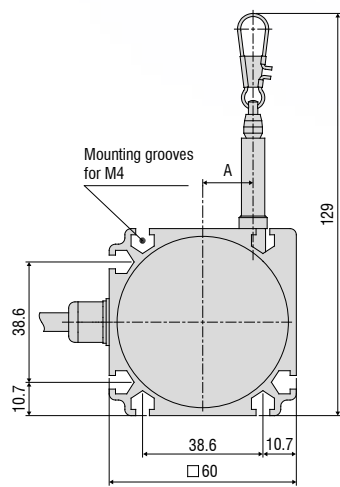
P60 series

Measuring range in mm

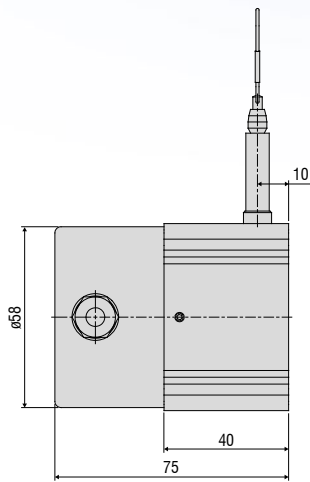# Industrial draw-wire sensors
wireSENSOR P60 digital

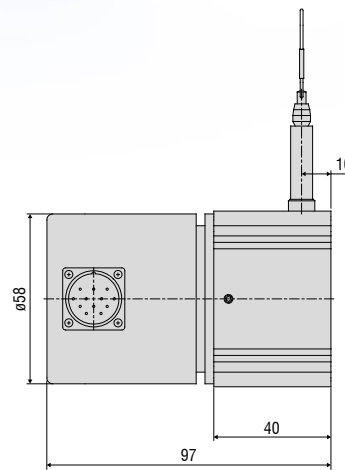Robust aluminum profile housing
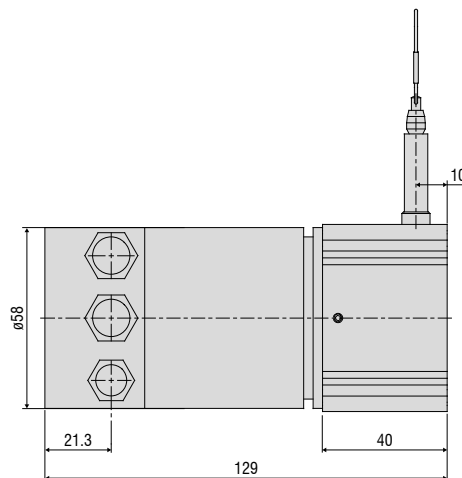
Customer-specific designs

Absolute or incremental encoder

HTL/TTL output

SSI output

Mounting grooves for M4

A

129

38.6

10.7

38.6   10.7

□60

ø58

10

40

75

ø58

10

40

97

CO / PB / PN / ENIP / CAT output

Mounting grooves for M4

A

129

38.6

10.7

38.6   10.7

□60

81

ø58

10

21.3

40

129
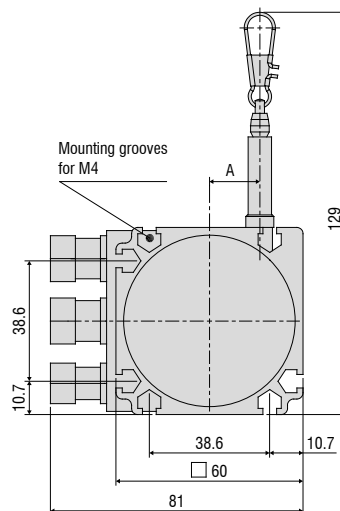
Measuring range (mm)	A (mm)
1000	approx. 16.15
1500	approx 24.2

All dimensions in mm, not to scale

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)
Resolution — 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 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	
Material — Measuring wire	Polyamide-coated stainless steel (ø 0.45 mm)	
Wire mounting	Wire clip	
Mounting	Mounting grooves on the sensor housing	
Temperature range — Storage	-20 … +80 °C	
Temperature range — Operation	-20 … +80 °C	
Connection — HTL, TTL	integrated cable, radial, length 1 m	
Connection — SSI	12-pin flange connector, radial	
Connection — 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

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

P60 series

Measuring range in mm

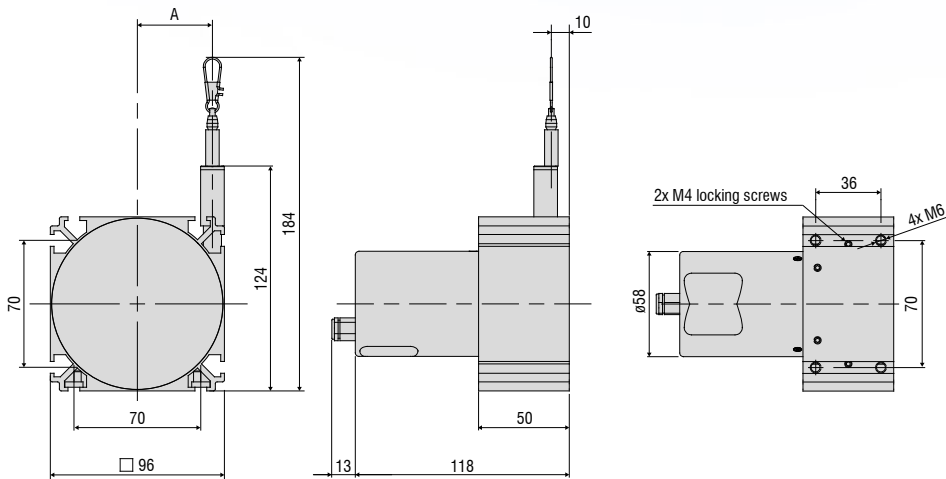# Industrial draw-wire sensors
wireSENSOR P96 analog

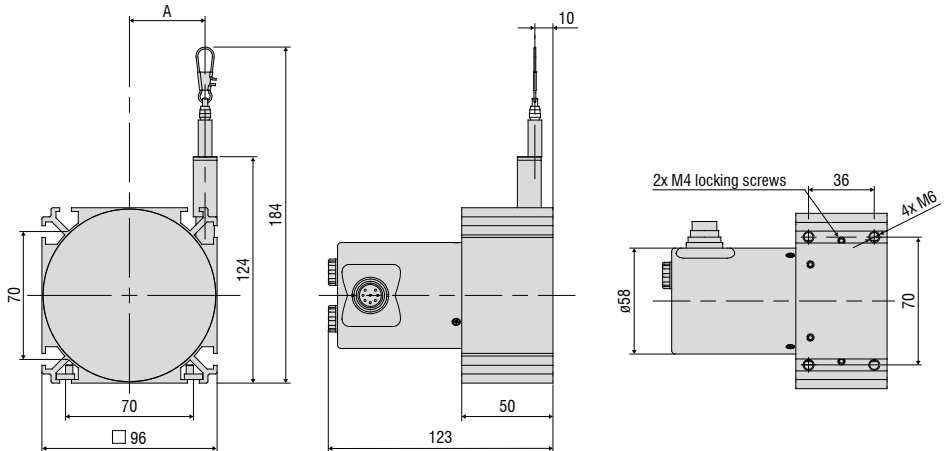Robust aluminum profile housing

Customer-specific designs

Potentiometer, current or voltage output
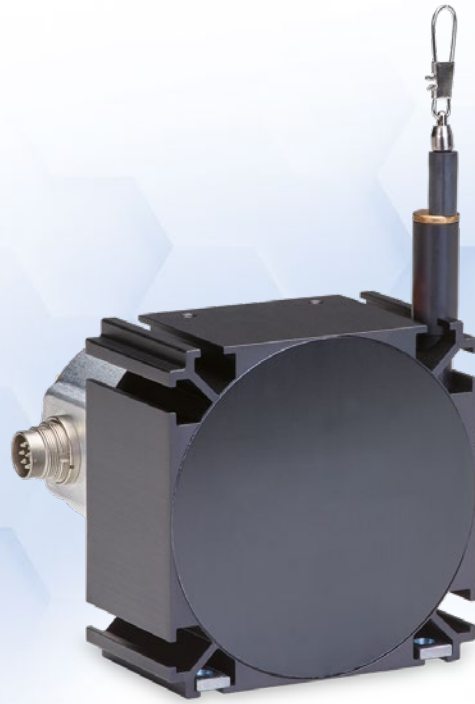
Output P

Output U/I

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

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	
Mounting		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
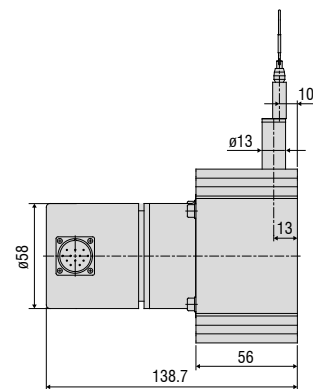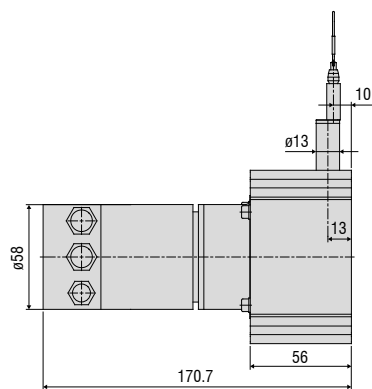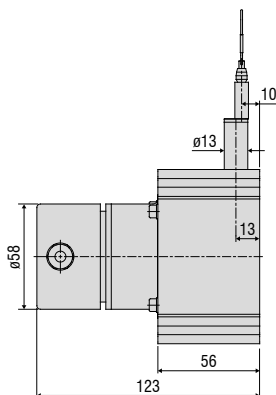## wireSENSOR P96 digital

Robust aluminum profile housing

Absolute or incremental encoder

41.4

184

124

70

70

70

13

70

36

□96

2x slot nuts

4x M6

2x M4 locking screws
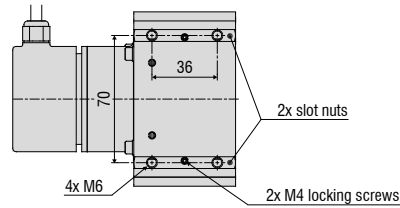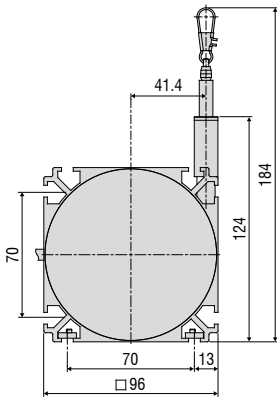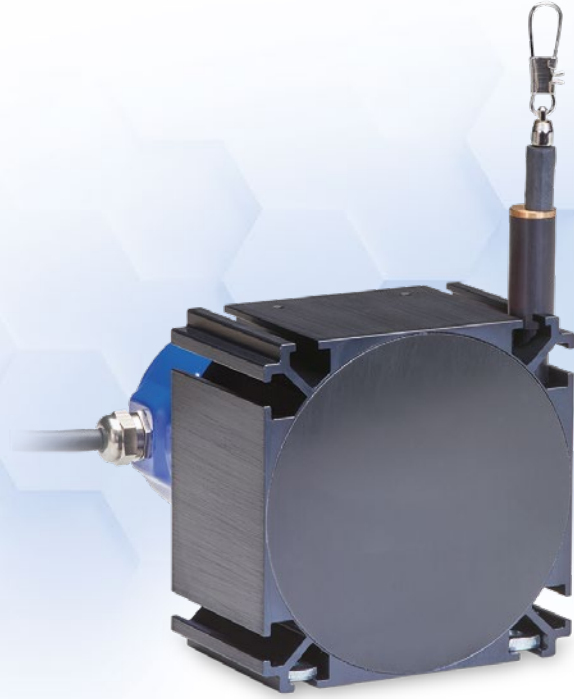
HTL/TTL output

CO/PB/PN/ENIP/CAT output

SSI output

10

ø13

13

ø58

56

123

10

ø13

13

ø58

56

170.7

10

ø13

13

ø58

56

138.7

All dimensions in mm, not to scale

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
Mounting		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
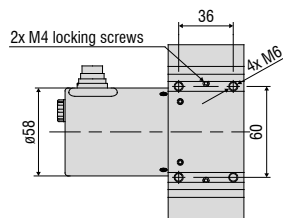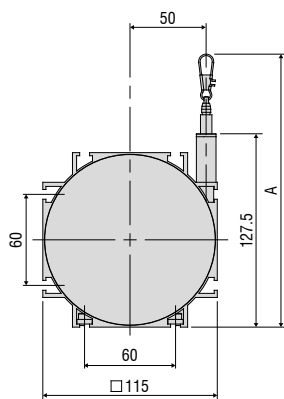## wireSENSOR P115 analog

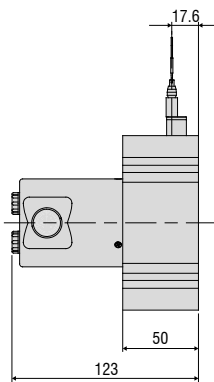Robust aluminum profile housing

Customer-specific designs

Potentiometer, current or voltage output

Measuring range 3000/4000/5000 mm
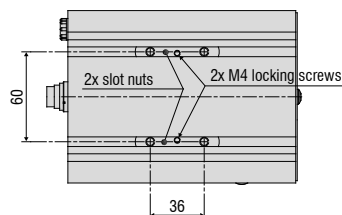

50

A

127.5

60

60

□115

2x M4 locking screws

36

ø58

4x M6

60

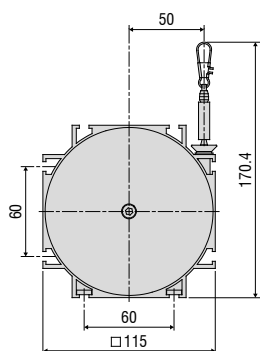**Output U/I**

17.6

50

123

Output P

17.6

13

50

118
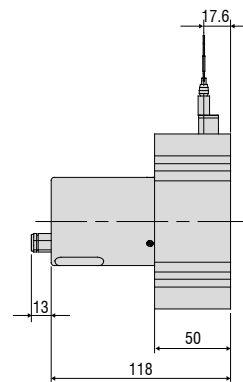
Measuring range (mm)	A (mm)
3000	approx. 186
4000 / 5000	approx. 180

Measuring range 7500/10000/15000 mm

50

170.4

60

60

□115

A

5

B

2x slot nuts

2x M4 locking screws

60

36
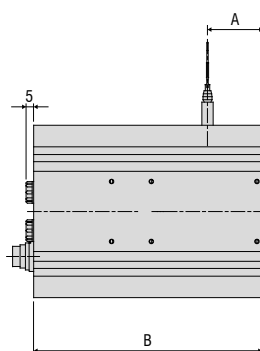
Measuring range (mm)	A (mm)	B (mm)
7500	37	153
10000	44.5	198
15000	60.5	228

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	-	-	-	-	-
Linearity ≤ ±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					
Material Measuring wire	Polyamide-coated stainless steel (ø 0.45 mm)			Polyamide-coated stainless steel (ø 1 mm)		
Wire mounting	Wire clip					
Mounting	Mounting grooves on the sensor housing					
Temperature range Storage	-20 … +80 °C					
Temperature range Operation	-20 … +80 °C					
Connection Potentiometer	integrated cable, axial, length 1 m					
Connection 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
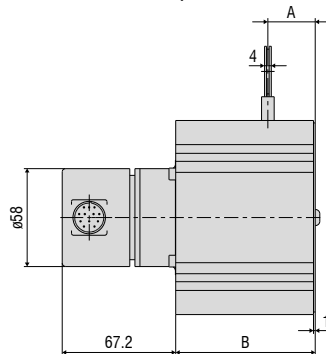
Absolute or incremental encoder

50 ø30
ø20.2

115
approx.144

115

2x slot nuts
2x M4 locking screws
4x M6 mounting holes

60

36
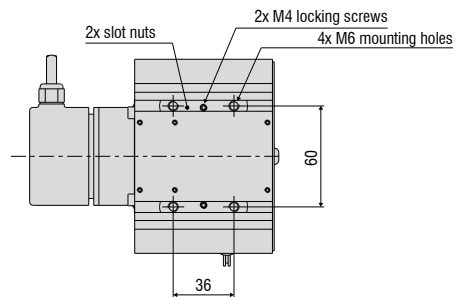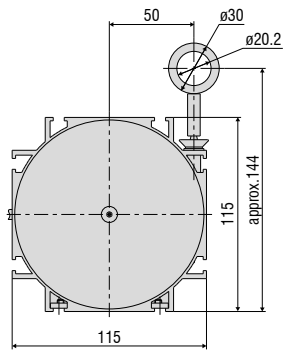
Measuring range (mm)	A (mm)	B (mm)
5000	approx. 28	82.5
7500	approx. 37	105.5
10000	approx. 44.5	148.5
15000	approx. 61	180.5

HTL/TTL output

4

ø58

62.2   B

1

SSI output

4

ø58

67.2   B

1

CO / PB / PN / ENIP / CAT output

4

ø58

103.2   B

1
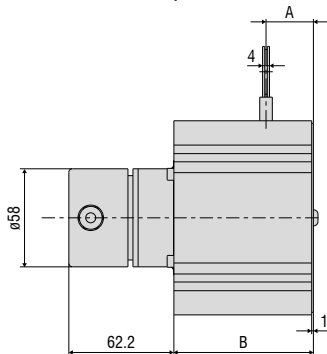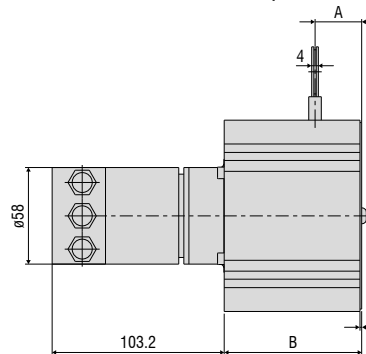
All dimensions in mm, not to scale

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)			
Resolution — SSI, PROFINET, Profibus DP, CANopen, EtherNet/IP, EtherCAT	0.038 mm			
Linearity — ≤ ±0.01% FSO	-	-	≤ ±1 mm	≤ ±1.5 mm
Linearity — ≤ ±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			
Material — Measuring wire	Polyamide-coated stainless steel (ø 1 mm)			
Wire mounting	Eyelet (ø 20.2 mm)			
Mounting	Mounting grooves on the sensor housing			
Temperature range — Storage	-20 … +80 °C			
Temperature range — Operation	-20 … +80 °C			
Connection — HTL, TTL	integrated cable, radial, length 1 m			
Connection — SSI	12-pin flange connector, radial			
Connection — 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

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

P115 series

Measuring range in mm

Draw-wire long-range sensors
wireSENSOR P200 digital
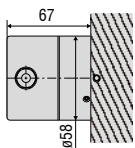
Robust aluminum profile housing
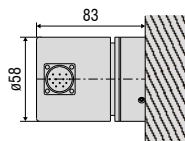
Customer-specific designs

Absolute or incremental encoder
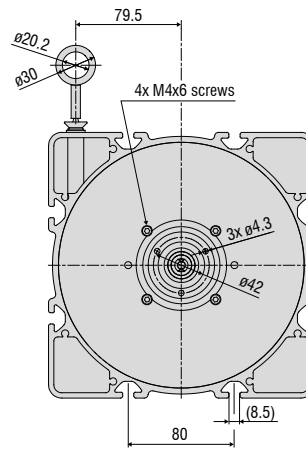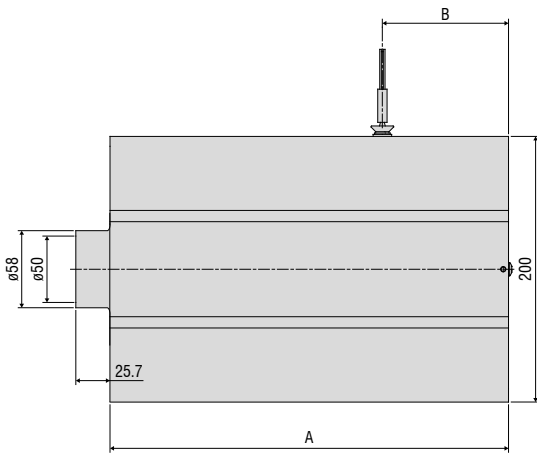
Measuring range (mm)	A (mm)	B (mm)
30000	268	75
40000	300	95
50000	333.5	95

HTL/TTL output

SSI output

CO / PB / PN / ENIP / CAT output
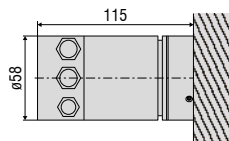
All dimensions in mm, not to scale

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)		
Mounting		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

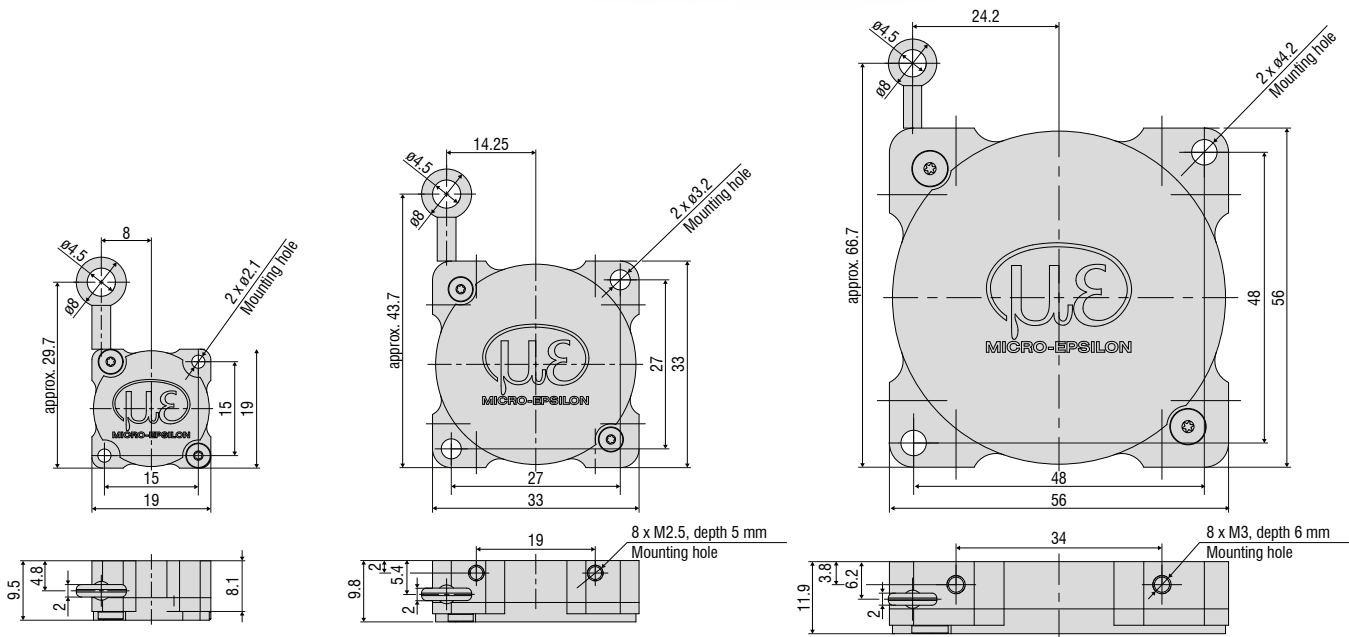# Miniature draw-wire sensors for test applications
wireSENSOR MT

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 [1]	Potentiometer		
Resolution	towards infinity		
Linearity ≤ ±0.4 % FSO	-	≤ ±0.32 mm	≤ ±0.52 mm
Linearity ≤ ±1 % FSO	≤ ±0.4 mm	-	-
Sensor element	Conductive plastic potentiometer		
Wire extension force (max.)	approx. 2 N	approx. 1.5 N	approx. 1 N
Wire retraction force (min.)	approx. 0.7 N	approx. 0.5 N	approx. 0.3 N
Wire acceleration (max.)	approx. 60 g	approx. 60 g	approx. 15 g
Material Housing	Aluminum		
Material 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-holes ø 2.1 mm	Through-holes ø 3.2 mm	Through-holes ø 4.2 mm
Temperature range Storage	-40 … +85 ℃		
Temperature range Operation	-40 … +85 ℃		
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

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

Article designation

WDS -	40 -	MT -	P

Output type:
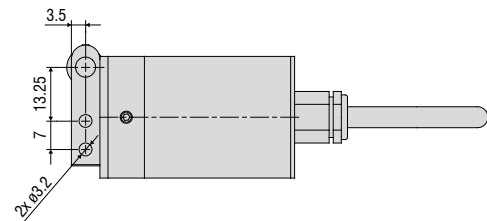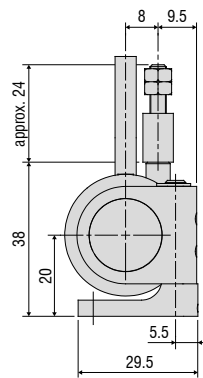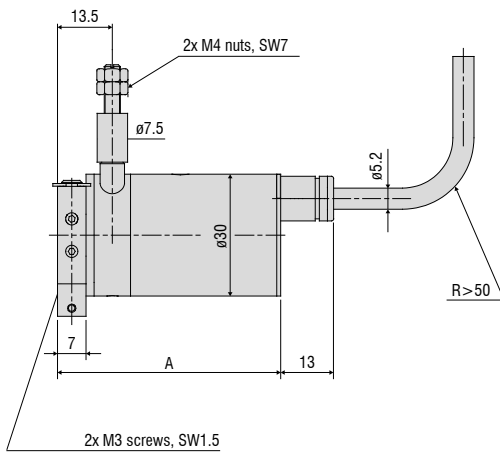P: potentiometer

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

13.5

2x M4 nuts, SW7

ø7.5

ø5.2

ø30

R>50

7

A

13

2x M3 screws, SW1.5

8   9.5

approx. 24

38

20

5.5

29.5

3.5

13.25

7

2x ø3.2

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		
Mounting		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

WDS -	50 -	MPM -	C -	P -	HG

HG option:
wire acceleration up to 100 g

Output type:
P: potentiometer

Connection:
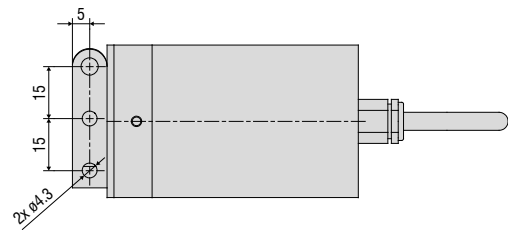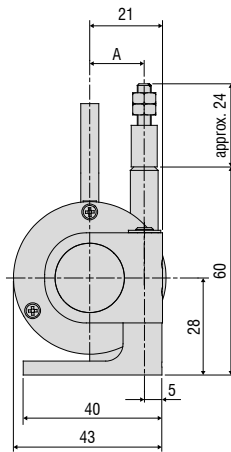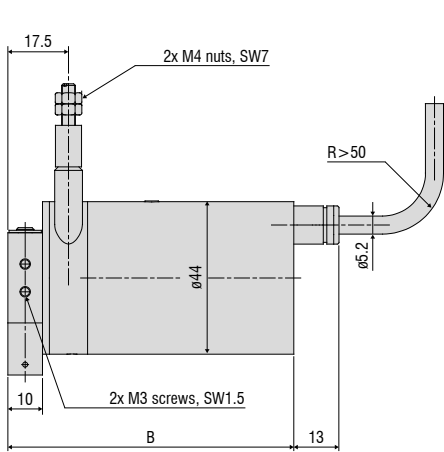C: integrated cable, axial, 1 m

MPM series

Measuring range in mm

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
Linearity — Wire potentiometer P25 ≤ ±0.25% FSO	-	≤ ±0.75 mm	-	
Linearity — 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			
Material — Measuring wire	Stainless steel (ø 0.45 mm)			
Wire mounting	M4 threaded bolts			
Mounting	Mounting flange rotatable in two axes 180° / 360°			
Temperature range — Storage	-20 … +80 °C			
Temperature range — 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			
Protection class (DIN EN 60529) — MPW series	IP67			
Weight	approx. 270 g (incl. cable)			

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

Article designation

WDS -	100 -	MP -	C -	P

Output type:
P: potentiometer

Connection C:
integrated cable, axial, 1 m

MP / MPW series (IP67)

Measuring range in mm

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°
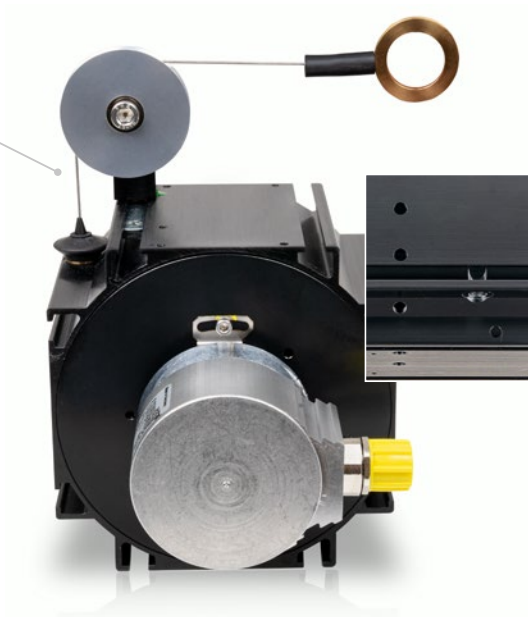
Housing and environment
- Wire outlet right (standard) / left
- Protection class up to IP69K
- Drainage holes
- Stainless steel spring
- Housing material
- Wire acceleration
- Snap protection
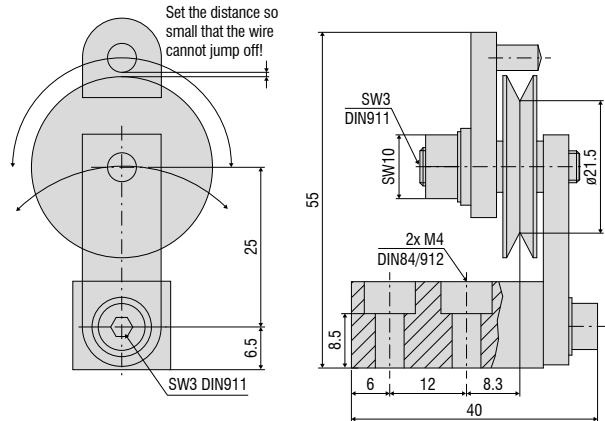
* Some options cannot be combined with each other;
  availability of options on request

Accessories
wireSENSOR

Wire deflection pulleys for external installation

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

Set the distance so small that the wire cannot jump off!

TR3-WDS
Wire deflection pulley, fixed, for sensors with a wire diameter ≤ 0.45 mm
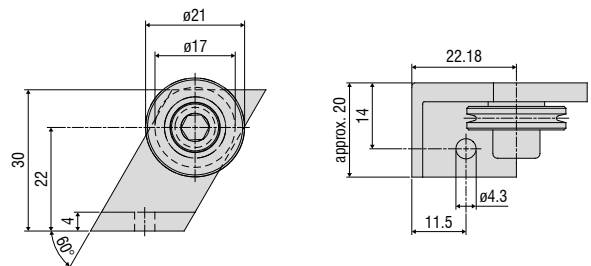
TR4-WDS
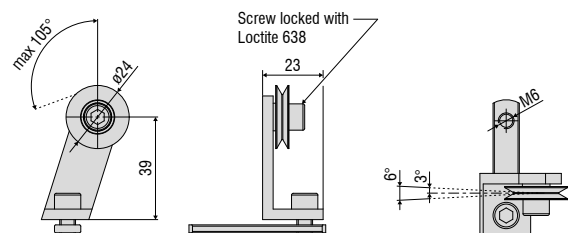Wire deflection pulley, fixed, for sensors with a wire diameter of 0.8 mm to 1 mm
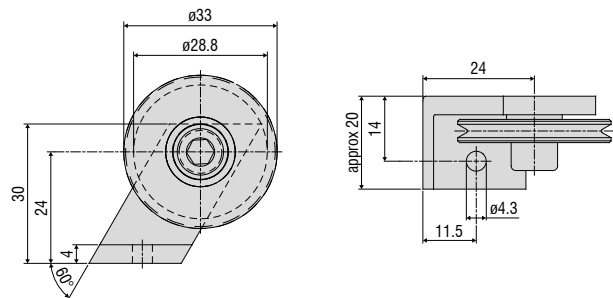
Wire deflection pulley for direct installation on the sensor housing

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

Screw locked with Loctite 638

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

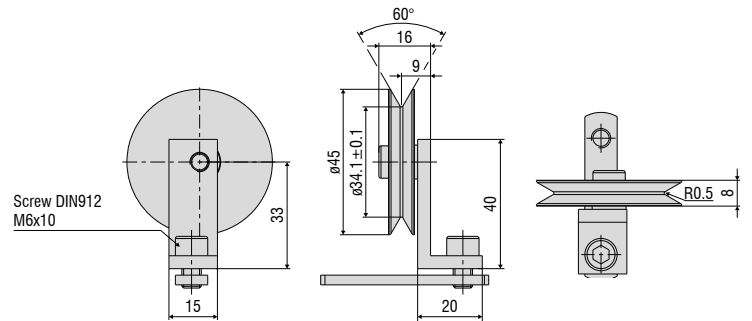Screw locked with
Loctite 638

2x ø21
77.5±0.5
67
39
23
approx. 16
40.1±0.5
52
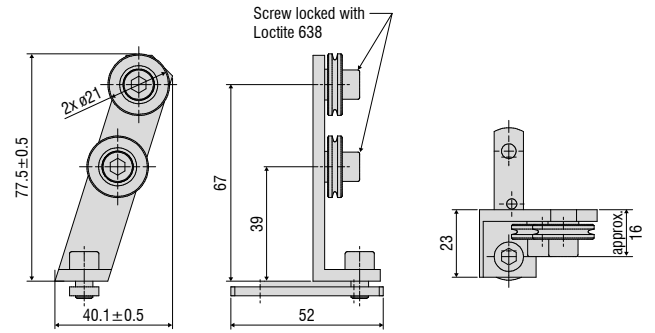
TR5-WDS(04)
Integrated double deflection pulley, 90° angled, for P115 sensors with a wire diameter of 0.45 mm

Screw locked
with Loctite 638

34.4
75.8±0.5
65.3
39.3
approx. 37
approx. 16
31
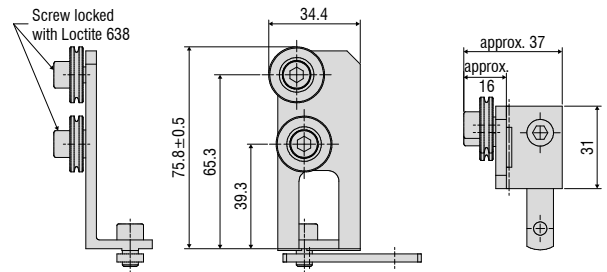
TR6-WDS(01)
Integrated wire deflection pulley for the P115 sensors with a wire diameter of 1 mm

Screw DIN912
M6x10

60°
16
9
ø45
ø34.1±0.1
40
33
15
20
R0.5
8

Mounting bracket set

46
39.5
57.5
39.5
4x ø2.9
1.5

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

(15)
10
35.6
2x ø5.3

77
67
50
86.5
67
50
4x ø3.2
4x ø3.2
2

101
12.5
(20)
15
85.7
2x ø5.6

WPS-MB77
for the MK77 series

90
78
97
78
4x ø4.2
2

135
(20)
12
120.1
2x ø6.5

WPS-MB88
for the MK88 series
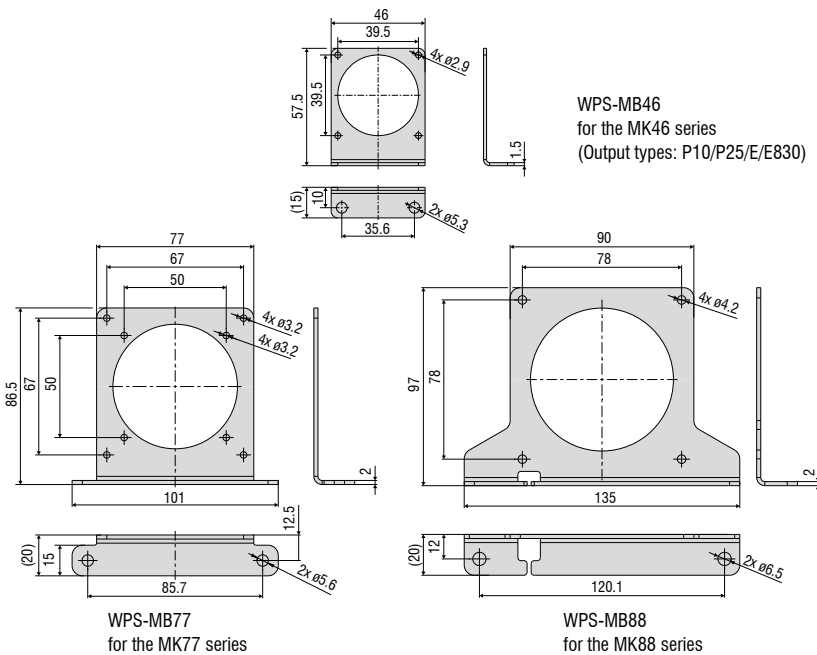
Accessories & Notes for installation
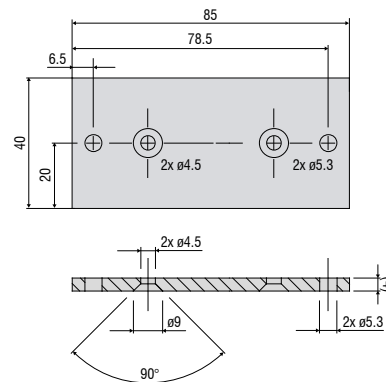## wireSENSOR

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

MT-60-WDS
Mounting clamps

MH1-WDS
Magnetic holder

WE-x-Clip
Wire Extension

TR3-WDS
Deflection pulley, fixed

TR1-WDS
Deflection pulley, adjustable

Measurement displacement
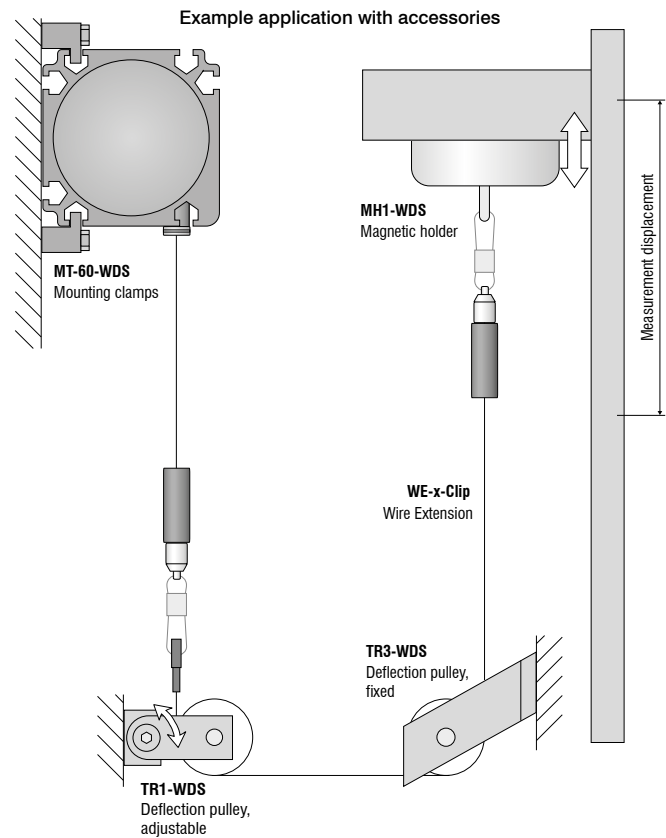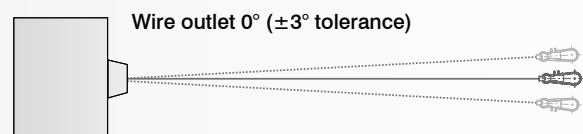
WDS-MP60
Mounting plate for P60 models

All dimensions in mm, not to scale

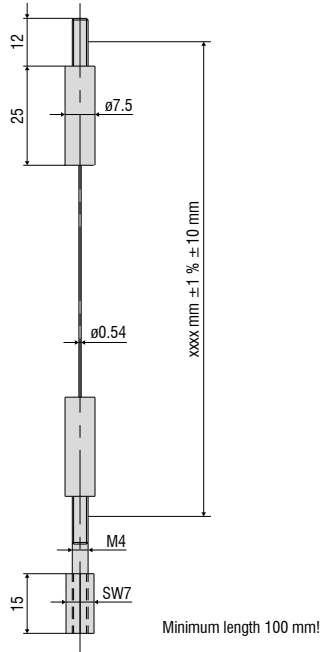## Installation instructions:

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.
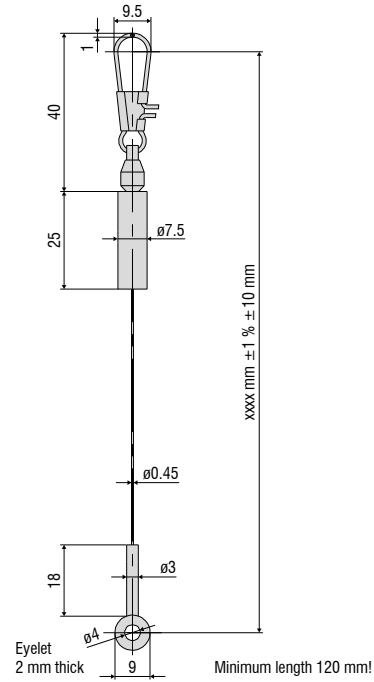
Wire outlet 0° (±3° tolerance)

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

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

12
25
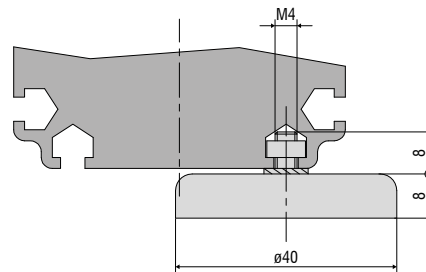ø7.5
ø0.54
xxxx mm ±1 % ±10 mm
M4
15
SW7
Minimum length 100 mm!

9.5
1
40
25
ø7.5
xxxx mm ±1 % ±10 mm
ø0.45
18
ø3
ø4
Eyelet
2 mm thick
9
Minimum length 120 mm!

MH1-WDS
Magnetic holder for wire attachment

6 ±0.5
2 +1
25 ±2
31 ±2
10.5
ø50

MH2-WDS
Magnetic holder for sensor mounting

M4
8
8
ø40

GK1-WDS
Fork head for M4

21
16
8
M4
4
8
8
4
ø8

MT-60-WDS
Mounting clamps for WDS-P60

86
75
10
SW7
20
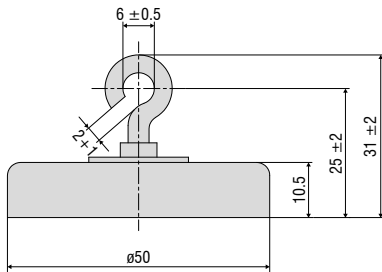
Analog

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
Adjustment range (if supported by the model)	
Zero	±20 % FSO
Sensitivity	±20 %

Sensor side

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
Adjustment range (if supported by the model)	
Zero	±18 % FSO
Sensitivity	±15 %

Sensor side

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
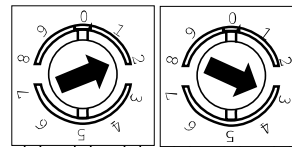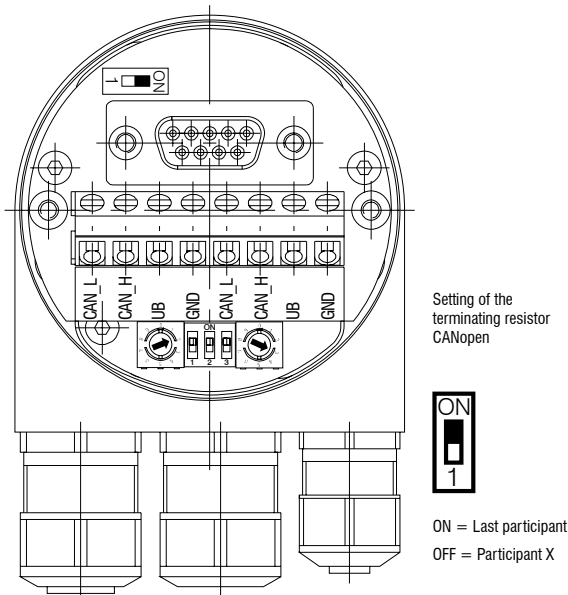(for P60, P96, P115 and P200 series)

CANopen features

Bus protocol	CANopen
Device profile	CANopen - CiA DSP 406, V 3.0
CANopen features	Device class 2, CAN 2.0B
Operating modes (with SDO progr.)	Polling mode (asynch, via SDO) Cyclic mode (asynch-cyclic). The encoder cyclically transmits the current actual process value without a request by a master. The cycle time can be parameterized for values between 1 and 65,535 ms. Synch mode (synch-cyclic). The encoder transmits the current actual process value after receiving a synch telegram sent by a master. The synch counter in the encoder can be parameterized such that the position value is transmitted only after a defined number of synch telegrams. Acyclic mode (synch-acyclic)
Preset value	With the "Preset" parameter the encoder can be set to a desired actual process value that corresponds to the defined axis position of the system. The offset value between the encoder zero point and the mechanical zero point of the system is saved in the encoder.
Rotary direction	With the operating parameter the rotary direction in which the output code is to increase or decrease can be parameterized.
Scaling	The steps per rotation and the total revolution can be parameterized.
Diagnosis	The encoder supports the following error messages: - Position and parameter errors - Lithium cell voltage at lower limit value (multi-turn)
Default setting	50 kbit/s, node number 1

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
500 kBit/s	ON	OFF	ON
800 kBit/s	ON	ON	OFF
1 MBit/s	ON	ON	ON

Description of the CANopen connections

CAN_L	CAN bus signal (dominant Low)
CAN_H	CAN bus signal (dominant High)
V+	Supply voltage 10 ... 30 VDC
GND	Ground connection for V+

(Terminals with the same designation are internally interconnected)

Settings of the CANopen participant address

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

Setting of the terminating resistor CANopen

ON = Last participant
OFF = Participant X

SSI (Gray Code)

Connections

1 V+	Supply connection of rotary encoder
2 GND	Ground connection of rotary encoder The voltage drawn to GND is V+
3 Pulses +	Positive SSI clock input. Pulse + forms a current loop with Pulse -. A current of approx. 7 mA in direction of Pulse + input generates a logical 1 in positive logic.
4 data +	Positive, serial data output of the differential line driver. A high level at the output corresponds to logical 1 in positive logic.
5 ZERO	Zero-setting input for setting a zero point at any point within the total resolution. The zeroing process is triggered by a High pulse (pulse duration $\geq$100 ms) and must take place after the rotating direction selection (F/R). For maximum interference immunity, the input must be connected to GND after zeroing.
6 Data -	Negative, serial data output of the differential line driver. A high level at the output corresponds to logical 0 in positive logic.
7 Pulses -	Negative SSI clock input. Pulse - forms a current loop with Pulse +. A current of approx. 7 mA in direction of the clock input generates a logical 0 in positive logic.
8 / 10 $\overline{\text{DATAVALID}}$ $\overline{\text{DATAVALID}}$ $\overline{\text{MT}}$	Diagnosis outputs DV and DV MT Jumps in data word, e.g., due to defective LED or photo receiver, are displayed via the DV output. In addition, the power supply of the multi-turn sensor unit is monitored and the DV MT output is set when the voltage falls below a specified level. Both outputs are low-active, i.e. are switched through to GND in the event of an error.
9 F/R	Forward/reverse counting direction input. When not connected, this input is on High. F/R High means increasing output data with a clockwise rotating shaft when looking at the flange. F/R Low means increasing values with a counterclockwise rotating shaft when looking at the flange.
11 / 12	Not assigned

Pin assignment

Connector	Cable color	Assignment
1	brown	V+
2	black	GND
3	blue	Pulse +
4	beige	Data +
5	green	ZERO
6	yellow	Data -
7	purple	Pulse -
8	brown-yellow	$\overline{\text{DATAVALID}}$
9	pink	F/R
10	black-yellow	$\overline{\text{DATAVALID}}$ $\overline{\text{MT}}$
11	-	-
12	-	-
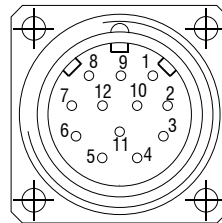
Use twisted-pair cables as extension cables.

Inputs

Control signals $\overline{\text{F/R}}$ and zero	
High level	> 0.7 V+
Low level	< 0.3 V+
Circuitry	$\overline{\text{F/R}}$ input with 10 kOhm against V+, Zero-setting input with 10 kOhm against GND.
SSI clock	
Optocoupler inputs for galvanic isolation	

Outputs

SSI data	RS485 driver	
Diagnosis outputs		
Push-pull outputs, short circuit proof		
High level	> V+ -3.5 V	(with I = -20 mA)
Low level	$\leq$ 0.5 V	(with I = 20 mA)

PROFIBUS

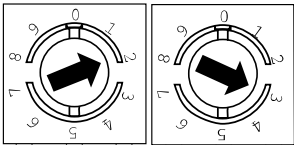| Profibus DP features	
Bus protocol	Profibus DP
Profibus features	Device class 1 and 2
Data Exch. Functions	Input: Position value Additional configurable speed signal (output of the current rotary speed) Output: Preset value
Preset value	With the "Preset" parameter the encoder can be set to a desired actual value that corresponds to the defined axis position of the system.
Parameter functions	Rotary direction: With the operating parameter the rotary direction for which the output code is to increase or decrease can be parameterized. Scaling: The steps per rotation and the total revolution can be parameterized.
Diagnosis	The encoder supports the following error messages: - Position error - Lithium cell voltage at lower limit value (multi-turn)
Default setting	Participant address 00
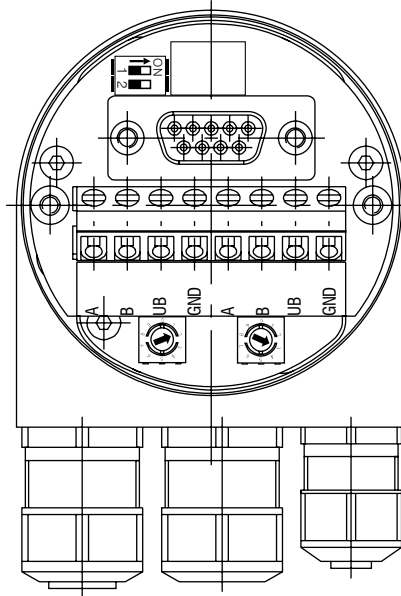
Setting of the terminating resistor Profibus DP

ON = Last participant
OFF = Participant X

Settings of the Profibus participant address
Address can be set with rotary switch. Example: Participant address 23

| Profibus DP connections |
|---|
| A Negative serial data line |
| B Positive serial data line |
| V+ supply voltage 10 ... 30 VDC |
| GND ground connection for V+ |
| (Terminals with the same designation are internally interconnected) |

PROFINET

| PROFINET features	
Bus protocol	PROFINET
Device profile	Encoder profile PNO 3.162 Version 4.1
Features	- 100 MBaud Fast Ethernet - Automatic address assignment - Real-time (RT) Class 1, IRT Class 2, IRT Class 3
Process data	- Position value 32-Bit input data with/without rotational speed 16/32 Bit - Telegram 81-83 of the Profidrive profile
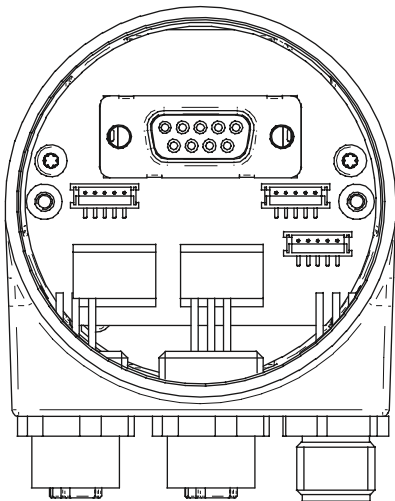
Pin assignment		
Supply voltage		
Connector	Connection	Description
Pin 1	V+	Supply voltage
Pin 2	N.C.	Not assigned
Pin 3	GND	Ground connection
Pin 4	N.C.	Not assigned
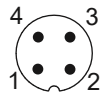
1x M12 connector (pin), A-coded

PROFINET (data line)		
Connector	Connection	Description
Pin 1	TxD+	Transmitted data+
Pin 2	RxD+	Received data+
Pin 3	TxD-	Transmitted data-
Pin 4	RxD-	Received data-
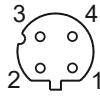
1x M12 connector (pin), A-coded

Output specifications
wireSENSOR

EtherNet/IP

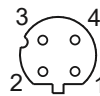| Characteristics - EtherNet/IP	
Bus protocol	EtherNet/IP
Device profile	Encoder Device, Type22hex, according to CIP specification
Features	- 100 MBaud Fast Ethernet - Programmable IP address - Automatic IP address assignment (DHCP) - Direction of rotation, resolution, total resolution and preset programmable according to CIP specification
Process data	Position value, warning flag, alert flag Assembly Instances 1 and 2 according to CIP specification
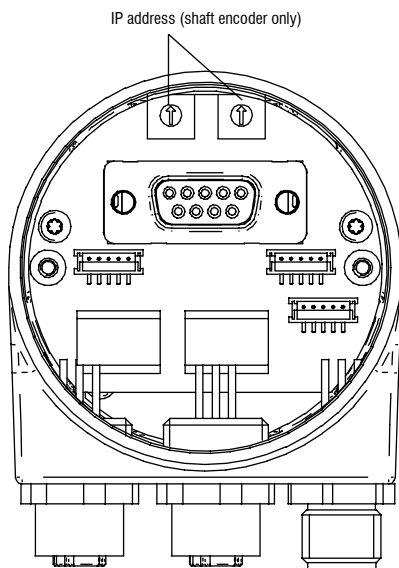
IP address (shaft encoder only)

Pin assignment

Supply voltage

Connector	Connection	Description
Pin 1	UB	Supply voltage
Pin 2	N.C.	Not assigned
Pin 3	GND	Ground connection
Pin 4	N.C.	Not assigned
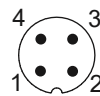
1x M12 connector (pin), A-coded

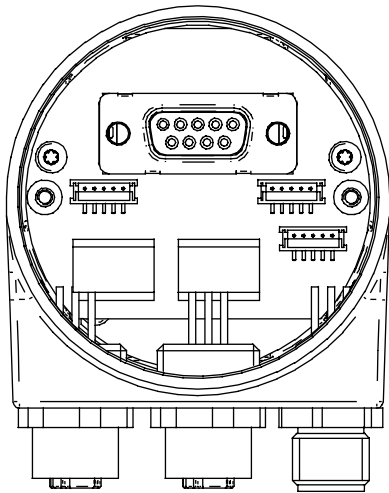| EtherNet/IP (data line)		
Connector	Connection	Description
Pin 1	TxD+	Transmitted data+
Pin 2	RxD+	Received data+
Pin 3	TxD-	Transmitted data-
Pin 4	RxD-	Received data-

2x M12 connectors (socket), D-coded

IP address

Adjustable via HEX rotary switch. Example: IP address B5$_{hex}$
Configuration via DHCP: 00hex
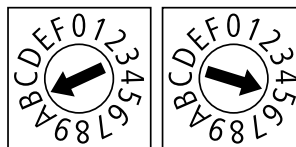
EtherCAT

| Characteristics - EtherCAT	
Bus protocol	EtherCAT
Device profile	CoE (CANopen over EtherCAT) DSP406

Features	- 100 MBaud Ethernet
	- Automatic address assignment
	- Distributed-Clock for precise synchronization.
	  Device can be configured as „Reference Clock"
	- Default 10 byte PDO, configurable
	  4 byte PDO / 2 byte PDO for shorter cycle times

Process data	Position value Warnings System time
Cycle times	Depending on sensor type, activated scaling function and PDO length. Min. cycle time: 62.5 μs
Synchronization	0x00 Free Run, not synchronized 0x03 Distributed clocks DC, synchronized with SYNCO/SYNC1 event

Pin assignment

Supply voltage

Connector	Connection	Description
Pin 1	UB	Supply voltage
Pin 2	N.C.	Not assigned
Pin 3	GND	Ground connection
Pin 4	N.C.	Not assigned
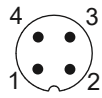
1x M12 connector (pin), A-coded

EtherCAT (data line)

Connector	Connection	Description
Pin 1	TxD+	Transmitted data+
Pin 2	RxD+	Received data+
Pin 3	TxD-	Transmitted data-
Pin 4	RxD-	Received data-
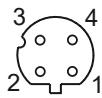
2x M12 connectors (socket), D-coded

Output specifications
wireSENSOR

Incremental encoder

Output signals

Track A

$\overline{\text{Track A}}$

Track B

$\overline{\text{Track B}}$

Zero pulse

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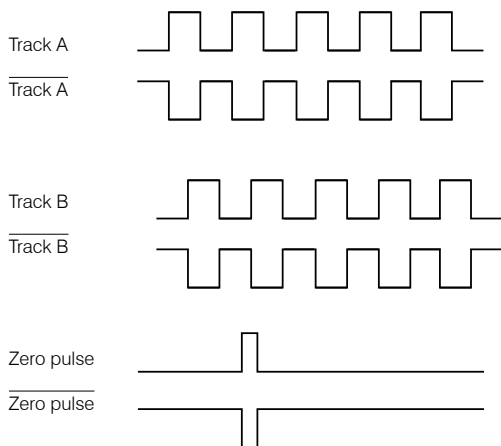
TTL Output	Line driver (5 VDC)	
High level	≥ 2.5 V	(with I = -20 mA)
Low level	≤ 0.5 V	(with I = 20 mA)
High load	≤ 20 mA	
Tracks	A, $\overline{\text{A}}$, B, $\overline{\text{B}}$, 0	

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, $\overline{\text{A}}$, B, $\overline{\text{B}}$, 0

Output HTL	Push-pull (10 ... 30 VDC)	
High level	≥ V+ -3 V	(with I = -20 mA)
Low level	≤ 1.5 V	(with I = 20 mA)
High load	≤ 40 mA	
Tracks	A, $\overline{\text{A}}$, B, $\overline{\text{B}}$, 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	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+
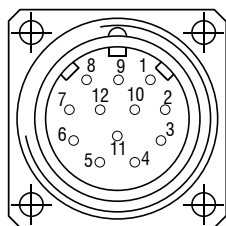
V+ Sense and GND Sense are directly connected to V+ or GND. Recommendation: Use twisted-pair cables (e.g. A/A inv.) from a cable length of 10 m.

Pin assignment E, E830

Cable color	Assignment
white	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

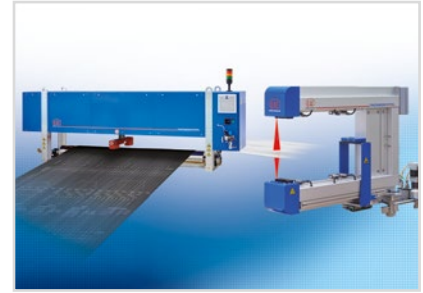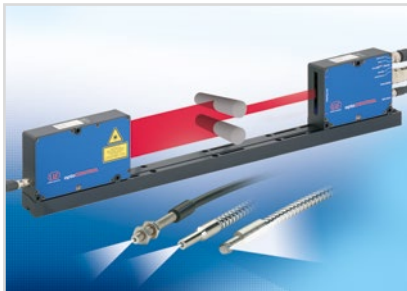| Cable color	Assignment
red	V+
black	0 V
brown	A
black	$\overline{A}$
orange	B
black	$\overline{B}$
yellow	0
black	n. c.

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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