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More Precision

wireSENSOR // Draw-wire mechanics for installation of rotary encoders





- Measuring ranges up to 50,000 mm
- Compact design with large measuring range
- Easy, quick and flexible installation
- High operational safety & long service life
- Ideal for custom design and large quantities



Measuring principle

Draw-wire displacement sensors measure linear movements using a highly flexible steel wire. High quality components ensure a long service life and high operational reliability.

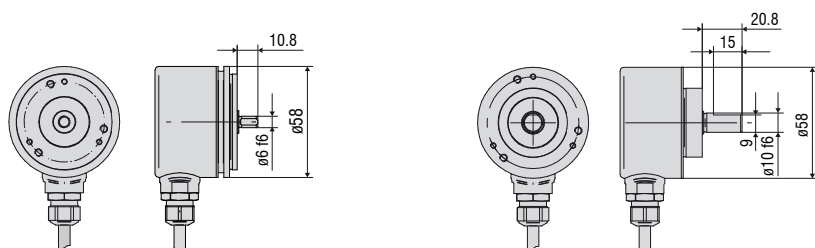
Micro-Epsilon offers numerous models based on different draw-wire mechanical principles to connect different rotary encoders. For special applications involving large quantities, we develop and manufacture customized OEM designs.

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

Robust draw-wire mechanics for encoder installation

The wireSENSOR mechanics are designed for mounting incremental or absolute encoders. This means that the interface, resolution and type of connection can be individually determined and adapted to the signal processing. High-quality precision components and a robust design ensure high operational safety and a long service life even under harsh industrial conditions. A complete measuring unit consists of the basic draw-wire mechanics and the adapter for the customer-specific encoder. The adapter contains all the necessary mounting accessories for mounting your encoder.

The following encoder types can be installed by default:



Synchro flange (standard) with WDS-EASxx adapter

- Housing size 58 mm
- Shaft diameter 6 mm
- Shaft length 10 mm

Clamping flange with WDS-EACxx adapter

- Housing size 58 mm
- Shaft diameter 10 mm
- Shaft length 20 mm

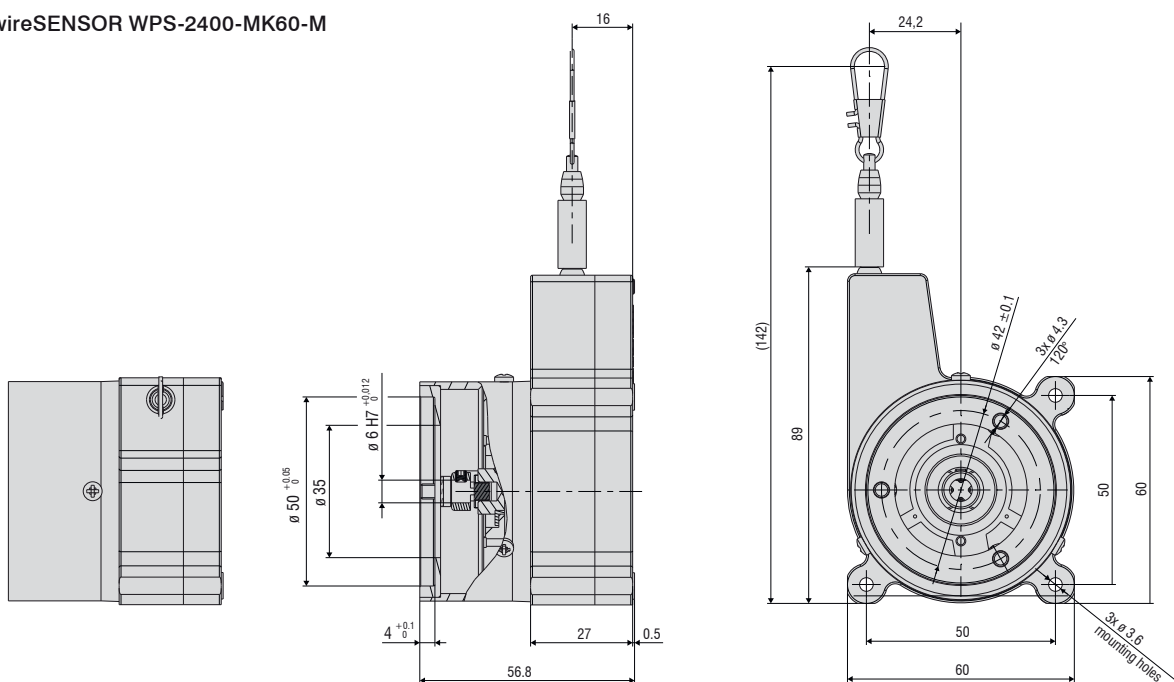
Contents

Model	Measuring range in mm	Page
MK60	2400	4
MK88	2300 5000	5
Z60	1500	6
P60	2000	7
P85	2500	8
P96	3000	9
P115	5000 7500 10,000 15,000	10
P200	30,000 40,000 50,000	11
Options		12
OEM examples		13
PCB model		14
Accessories		15

Model		WPS-2400-MK60-M
Measuring range	static (20 Hz)	2400 mm
Output type		dependent on encoder
Resolution	static (20 Hz)	dependent on encoder
Linearity	$\leq \pm 0.1\%$ FSO	$\leq \pm 2.4$ mm
Mean distance per rotation		150.75 mm
Suitable rotary encoder		Flange type $\varnothing 58$ mm: synchro flange $\varnothing 6$ mm shaft
Adapter flange for rotary encoder $\varnothing 58$	Synchro flange	included in delivery
Wire extension force (max)		8 N
Wire retraction force (min)		1 N
Wire acceleration (max.)		5 g
Material	Housing	Plastics
	Measuring wire	polyamide-coated stainless steel ($\varnothing 0.45$ mm)
Wire mounting		Wire clip
Installation		Mounting holes
Temperature range	Storage	$-40 \dots +85$ °C
	Operation	$-40 \dots +85$ °C
Shock (DIN-EN 60068-2-29)		50 g / 5 ms in 3 axes, 2 directions and 1000 shocks each
Vibration (DIN EN 60068-2-6)		20 g / 20 Hz ... 2 kHz in 3 axes and 10 cycles each
Protection class (DIN-EN 60529)		dependent on encoder
Weight		0.2 kg

FSO = Full Scale Output

wireSENSOR WPS-2400-MK60-M

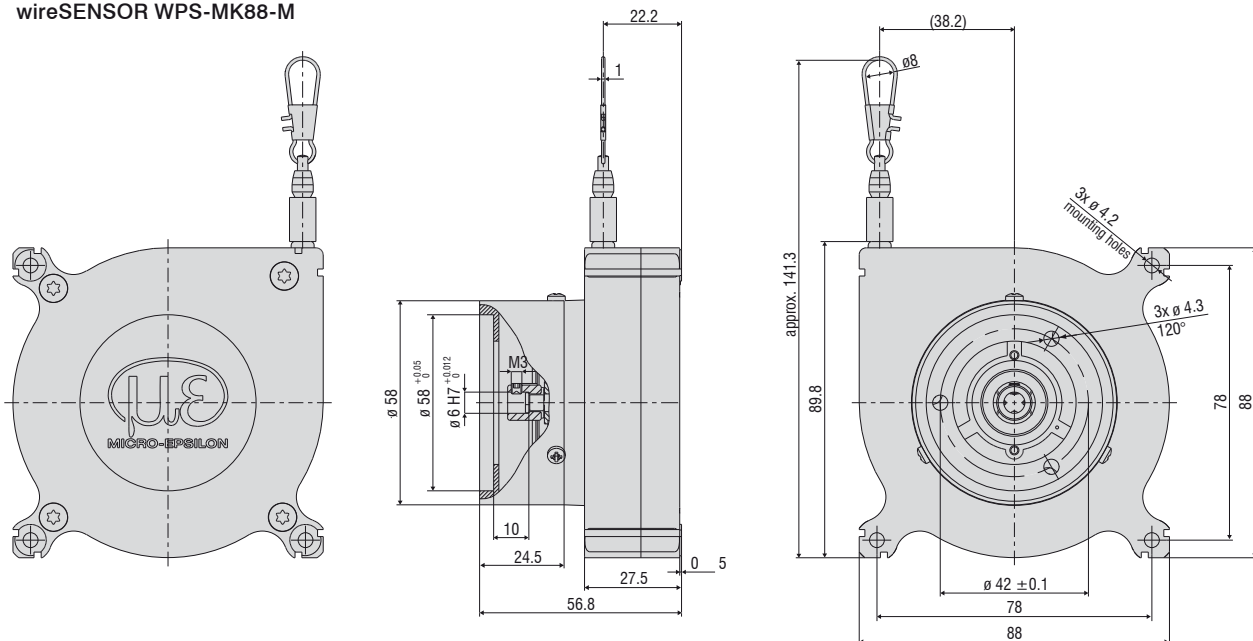


(dimensions in mm, not to scale)

Model		WPS-2300-MK88-M	WPS-3500-MK88-M	WPS-5000-MK88-M
Measuring range	static (20 Hz)	2300 mm	3500 mm	5000 mm
Output type		dependent on encoder		
Resolution	static (20 Hz)	dependent on encoder		
Linearity	$\leq \pm 0.1\%$ FSO	$\leq \pm 2.3$ mm	-	-
	$\leq \pm 0.3\%$ FSO	-	$\leq \pm 10.5$ mm	-
	$\leq \pm 0.4\%$ FSO	-	-	$\leq \pm 20$ mm
Mean distance per rotation		238.8 mm	239.7 mm	240.0 mm
Suitable rotary encoder		Flange type $\varnothing 58$ mm: synchro flange $\varnothing 6$ mm shaft		
Adapter flange for rotary encoder $\varnothing 58$	Synchro flange	included in delivery		
Wire extension force (max)		9 N		
Wire retraction force (min)		3 N		
Wire acceleration (max.)		5 g		
Material	Housing	Plastics		
	Measuring wire	polyamide-coated stainless steel ($\varnothing 0.45$ mm)		
Wire mounting		Wire clip		
Installation		Mounting holes or mounting grooves on the sensor housing		
Temperature range	Storage	$-40 \dots +85$ °C		
	Operation	$-40 \dots +85$ °C		
Shock (DIN-EN 60068-2-29)		50 g / 10 ms in 3 axes, 2 directions and 1000 shocks each		
Vibration (DIN EN 60068-2-6)		20 g / 20 Hz ... 2 kHz in 3 axes and 10 cycles each		
Protection class (DIN-EN 60529)		dependent on encoder		
Weight		0.5 kg		

FSO = Full Scale Output

wireSENSOR WPS-MK88-M

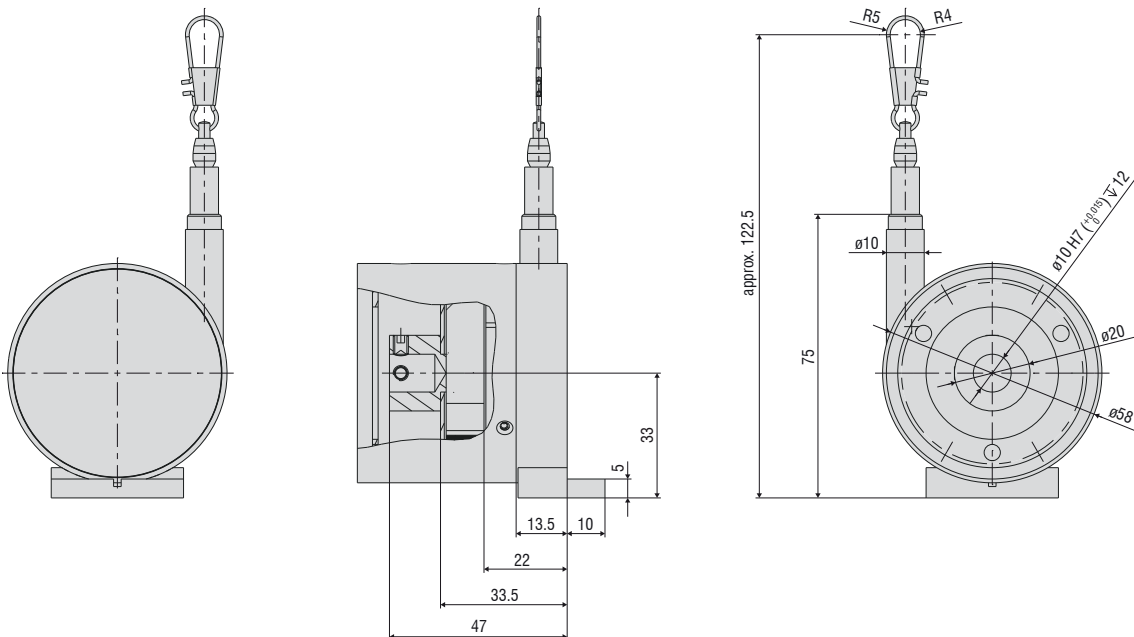


(dimensions in mm, not to scale)

Model		WDS-1500-Z60-M
Measuring range	static (20 Hz)	1500 mm
Output type		dependent on encoder
Resolution	static (20 Hz)	dependent on encoder
Linearity	$\leq \pm 0.02\%$ FSO	$\leq \pm 0.3$ mm
Mean distance per rotation		150 mm
Suitable rotary encoder		Flange type $\varnothing 58$ mm; synchro flange $\varnothing 6$ mm shaft, clamping flange $\varnothing 10$ mm shaft
Adapter flange for rotary encoder $\varnothing 58$ mm	Synchro flange	WDS-EAS 1
	Clamping flange	WDS-EAC 1
Wire extension force (max)		5.5 N
Wire retraction force (min)		3.5 N
Wire acceleration (max.)		10 g
Material	Housing	Aluminum
	Measuring wire	polyamide-coated stainless steel ($\varnothing 0.45$ mm)
Wire mounting		Wire clip
Installation		Mounting holes
Temperature range	Storage	$-40 \dots +80$ °C
	Operation	$-20 \dots +80$ °C
Shock (DIN-EN 60068-2-29)		50 g / 10 ms in 3 axes, 2 directions and 1000 shocks each
Vibration (DIN EN 60068-2-6)		20 g / 20 Hz ... 2 kHz in 3 axes and 10 cycles each
Protection class (DIN-EN 60529)		dependent on encoder
Weight		0.3 kg

FSO = Full Scale Output

wireSENSOR WDS-1500-Z60-M

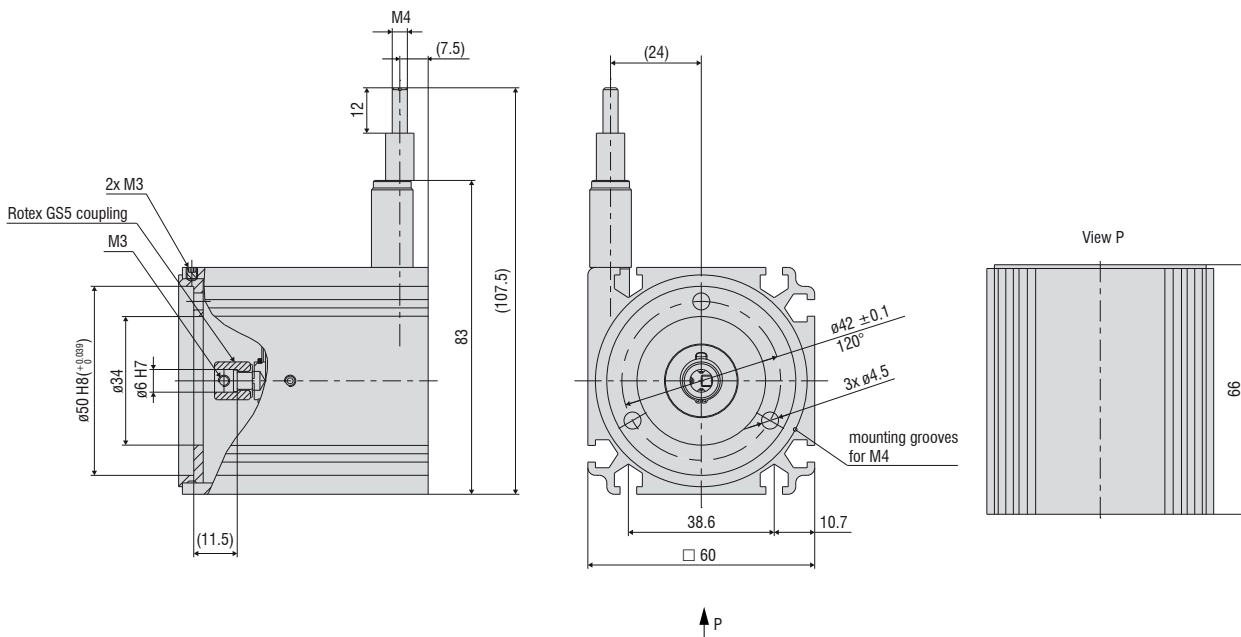


(dimensions in mm, not to scale)

Model		WDS-2000-P60-M
Measuring range	static (20 Hz)	2000 mm
Output type		dependent on encoder
Resolution	static (20 Hz)	dependent on encoder
Linearity	$\leq \pm 0.02\%$ FSO	$\leq \pm 0.4$ mm
Mean distance per rotation		150 mm
Suitable rotary encoder		Flange type $\varnothing 58$ mm: synchro flange $\varnothing 6$ mm shaft
Wire extension force (max)		7 N
Wire retraction force (min)		3.5 N
Wire acceleration (max.)		10 g
Material	Housing	Aluminum
	Measuring wire	polyamide-coated stainless steel ($\varnothing 0.45$ mm)
Wire mounting		M4 threaded bolts
Installation		Mounting grooves on the sensor housing
Temperature range	Storage	-40 ... +80 °C
	Operation	-20 ... +80 °C
Shock (DIN-EN 60068-2-29)		50 g / 10 ms in 3 axes, 2 directions and 1000 shocks each
Vibration (DIN EN 60068-2-6)		20 g / 20 Hz ... 2 kHz in 3 axes and 10 cycles each
Protection class (DIN-EN 60529)		dependent on encoder
Weight		1 kg

FSO = Full Scale Output

wireSENSOR WDS-2000-P60-M

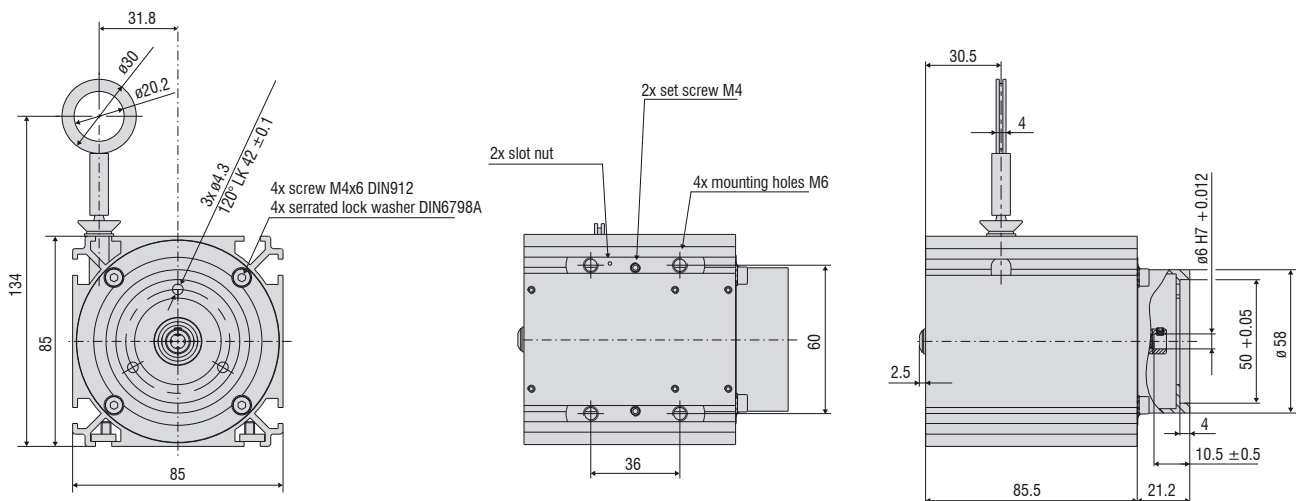


(dimensions in mm, not to scale)

Model		WDS-2500-P85-M
Measuring range	static (20 Hz)	2500 mm
Output type		dependent on encoder
Resolution	static (20 Hz)	dependent on encoder
Linearity	$\leq \pm 0.02\%$ FSO	$\leq \pm 0.5$ mm
Mean distance per rotation		199.8 mm
Suitable rotary encoder		Flange type $\varnothing 58$ mm; synchro flange $\varnothing 6$ mm shaft, clamping flange $\varnothing 10$ mm shaft
Adapter flange for rotary encoder $\varnothing 58$ mm	Synchro flange	included in delivery
	Clamping flange	WDS-EAC115
Wire extension force (max)		16 N
Wire retraction force (min)		6 N
Wire acceleration (max.)		5 g
Material	Housing	Aluminum
	Measuring wire	polyamide-coated stainless steel ($\varnothing 1.2$ mm)
Wire mounting		Eyelet ($\varnothing 30$ mm)
Installation		Mounting grooves on the sensor housing
Temperature range	Storage	$-40 \dots +80$ °C
	Operation	$-20 \dots +80$ °C
Shock (DIN-EN 60068-2-29)		50 g / 10 ms in 3 axes, 2 directions and 1000 shocks each
Vibration (DIN EN 60068-2-6)		20 g / 20 Hz ... 2 kHz in 3 axes and 10 cycles each
Protection class (DIN-EN 60529)		dependent on encoder
Weight		1 kg

FSO = Full Scale Output

wireSENSOR WDS-2500-P85-M

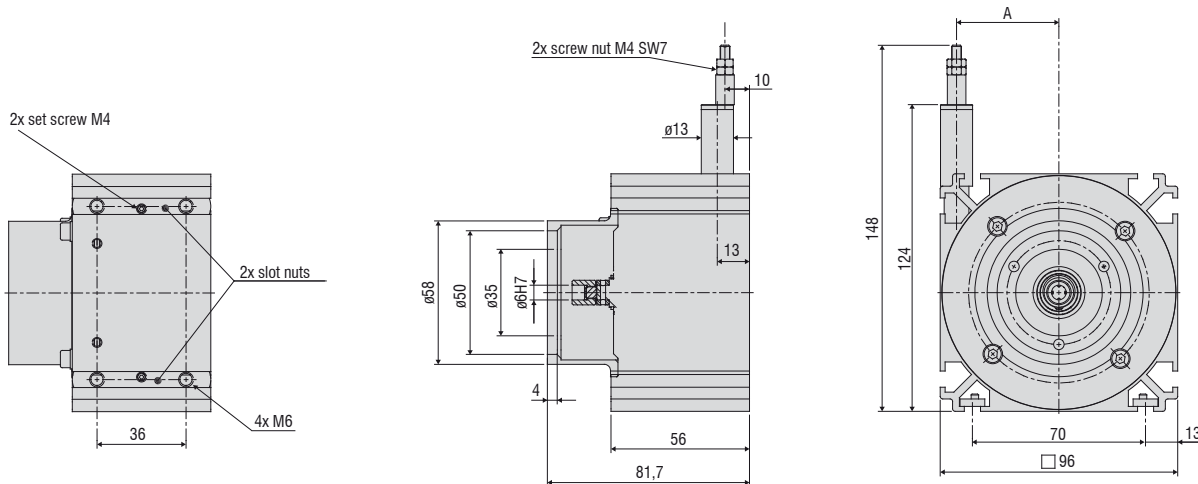


(dimensions in mm, not to scale)

Model		WDS-3000-P96-M
Measuring range	static (20 Hz)	3000 mm
Output type		dependent on encoder
Resolution	static (20 Hz)	dependent on encoder
Linearity	$\leq \pm 0.02\%$ FSO	$\leq \pm 0.6$ mm
Mean distance per rotation		260.09 mm
Suitable rotary encoder		Flange type $\varnothing 58$ mm: synchro flange $\varnothing 6$ mm shaft, clamping flange $\varnothing 10$ mm shaft
Adapter flange for rotary encoder $\varnothing 58$ mm	Synchro flange	included in delivery
	Clamping flange	WDS-EAC 96/200
Wire extension force (max)		10 N
Wire retraction force (min)		5 N
Wire acceleration (max.)		7 g
Material	Housing	Aluminum
	Measuring wire	polyamide-coated stainless steel ($\varnothing 0.8$ mm)
Wire mounting		M4 threaded bolts
Installation		Slot nuts
Temperature range	Storage	$-40 \dots +80$ °C
	Operation	$-20 \dots +80$ °C
Shock (DIN-EN 60068-2-29)		50 g / 10 ms in 3 axes, 2 directions and 1000 shocks each
Vibration (DIN EN 60068-2-6)		20 g / 20 Hz ... 2 kHz in 3 axes and 10 cycles each
Protection class (DIN-EN 60529)		dependent on encoder
Weight		1.1 kg

FSO = Full Scale Output

wireSENSOR WDS-3000-P96-M



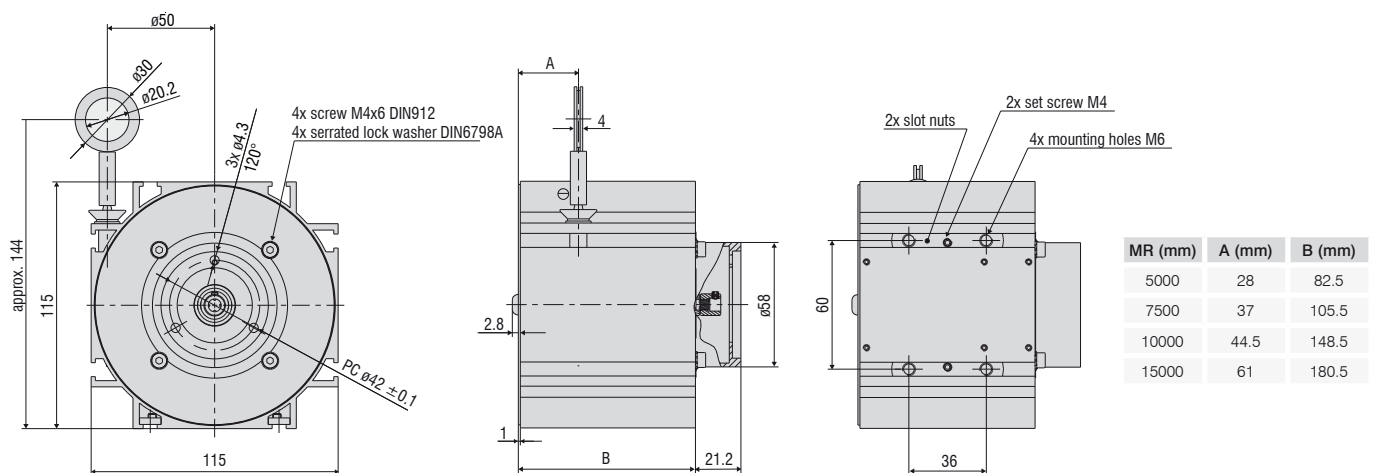
MR (mm)	A (mm)
2000	26
3000	41.5

(dimensions in mm, not to scale)

Model		WDS-5000-P115-M	WDS-7500-P115-M	WDS-10000-P115-M	WDS-15000-P115-M
Measuring range	static (20 Hz)	5000 mm	7500 mm	10000 mm	15000 mm
Output type		dependent on encoder			
Resolution	static (20 Hz)	dependent on encoder			
Linearity	$\leq \pm 0.01\%$ FSO	-	-	$\leq \pm 1$ mm	$\leq \pm 1.5$ mm
	$\leq \pm 0.02\%$ FSO	$\leq \pm 1$ mm	$\leq \pm 1.5$ mm	-	-
Mean distance per rotation		315.07 mm			
Suitable rotary encoder		Flange type $\varnothing 58$ mm: synchro flange $\varnothing 6$ mm shaft, clamping flange $\varnothing 10$ mm shaft			
Adapter flange for rotary encoder $\varnothing 58$ mm	Synchro flange	included in delivery			
	Clamping flange	WDS-EAC 115			
Wire extension force (max)		16 N	24 N	21 N	25 N
Wire retraction force (min)		4 N	8 N	8 N	8 N
Wire acceleration (max.)		5 g	6 g	3 g	3 g
Material	Housing	Aluminum			
	Measuring wire	polyamide-coated stainless steel ($\varnothing 1.0$ mm)			
Wire mounting		Eyelet ($\varnothing 30$ mm)			
Installation		Slot nuts			
Temperature range	Storage	$-40 \dots +80$ °C			
	Operation	$-20 \dots +80$ °C			
Shock (DIN-EN 60068-2-29)		50 g / 10 ms in 3 axes, 2 directions and 1000 shocks each			
Vibration (DIN EN 60068-2-6)		20 g / 20 Hz ... 2 kHz in 3 axes and 10 cycles each			
Protection class (DIN-EN 60529)		dependent on encoder			
Weight		1.4 kg	1.9 kg	2.8 kg	3.2 kg

FSO = Full Scale Output

wireSENSOR WDS-P115-M

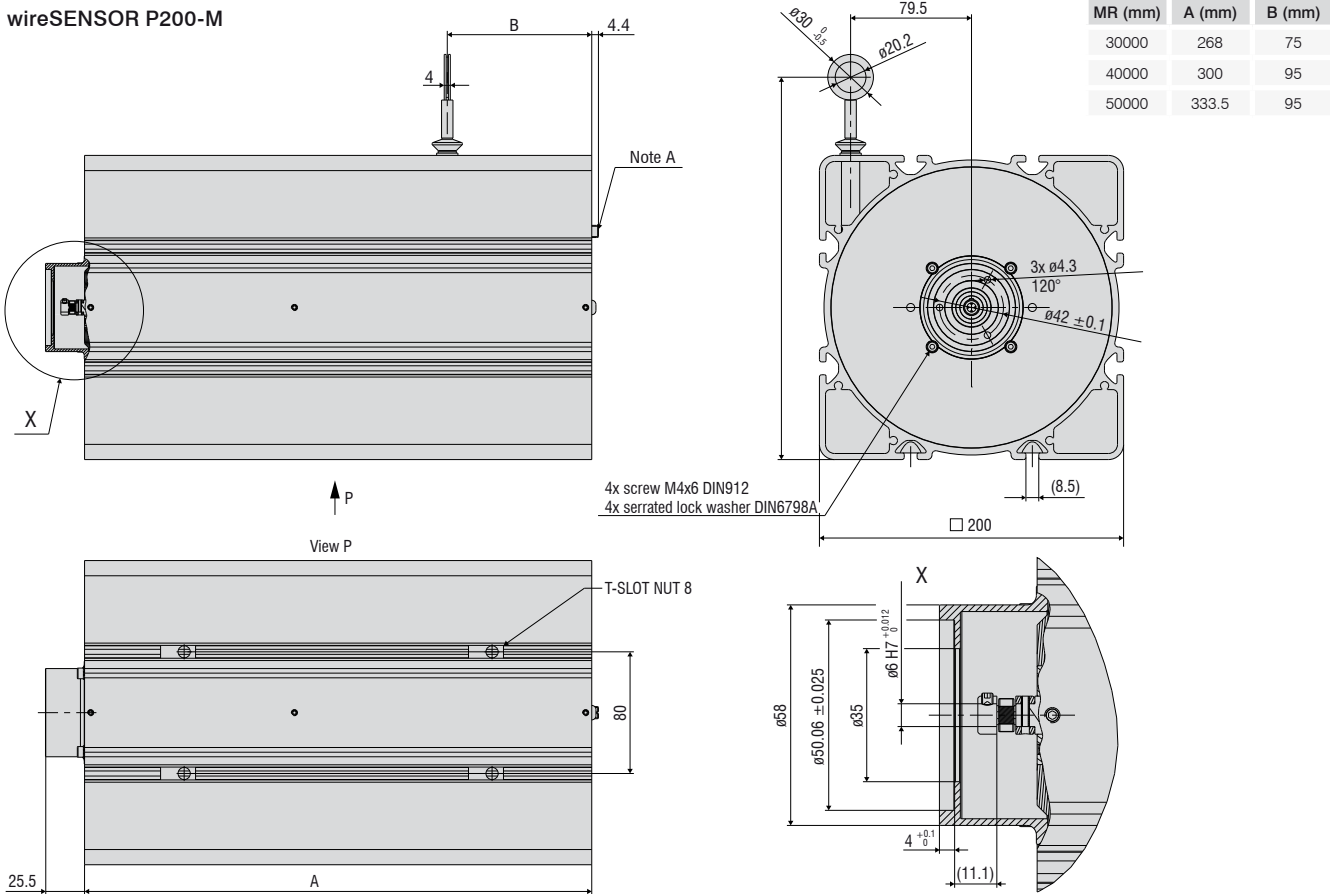


(dimensions in mm, not to scale)

Model		WDS-30000-P200-M	WDS-40000-P200-M	WDS-50000-P200-M
Measuring range	static (20 Hz)	30000 mm	40000 mm	50000 mm
Output type		dependent on encoder		
Resolution	static (20 Hz)	dependent on encoder		
Linearity	$\leq \pm 0.01\%$ FSO	$\leq \pm 3$ mm	$\leq \pm 4$ mm	$\leq \pm 5$ mm
Mean distance per rotation		500 mm		
Suitable rotary encoder		Flange type $\varnothing 58$ mm: synchro flange $\varnothing 6$ mm shaft, clamping flange $\varnothing 10$ mm shaft		
Adapter flange for rotary encoder $\varnothing 58$ mm	Synchro flange	included in delivery		
	Clamping flange	WDS-EAC 96/200		
Wire extension force (max)		22 N	22 N	24 N
Wire retraction force (min)		12 N	11 N	11 N
Wire acceleration (max.)		2 g		
Material	Housing	Aluminum		
	Measuring wire	polyamide-coated stainless steel ($\varnothing 0.8$ mm)		
Wire mounting		Eyelet ($\varnothing 30$ mm)		
Installation		Slot nuts		
Temperature range	Storage	$-40 \dots +80$ °C		
	Operation	$-20 \dots +80$ °C		
Vibration (DIN EN 60068-2-6)		20 g / 20 Hz ... 2 kHz in 3 axes and 10 cycles each		
Protection class (DIN-EN 60529)		dependent on encoder		
Weight		9.5 kg	10 kg	11 kg

FSO = Full Scale Output

wireSENSOR P200-M



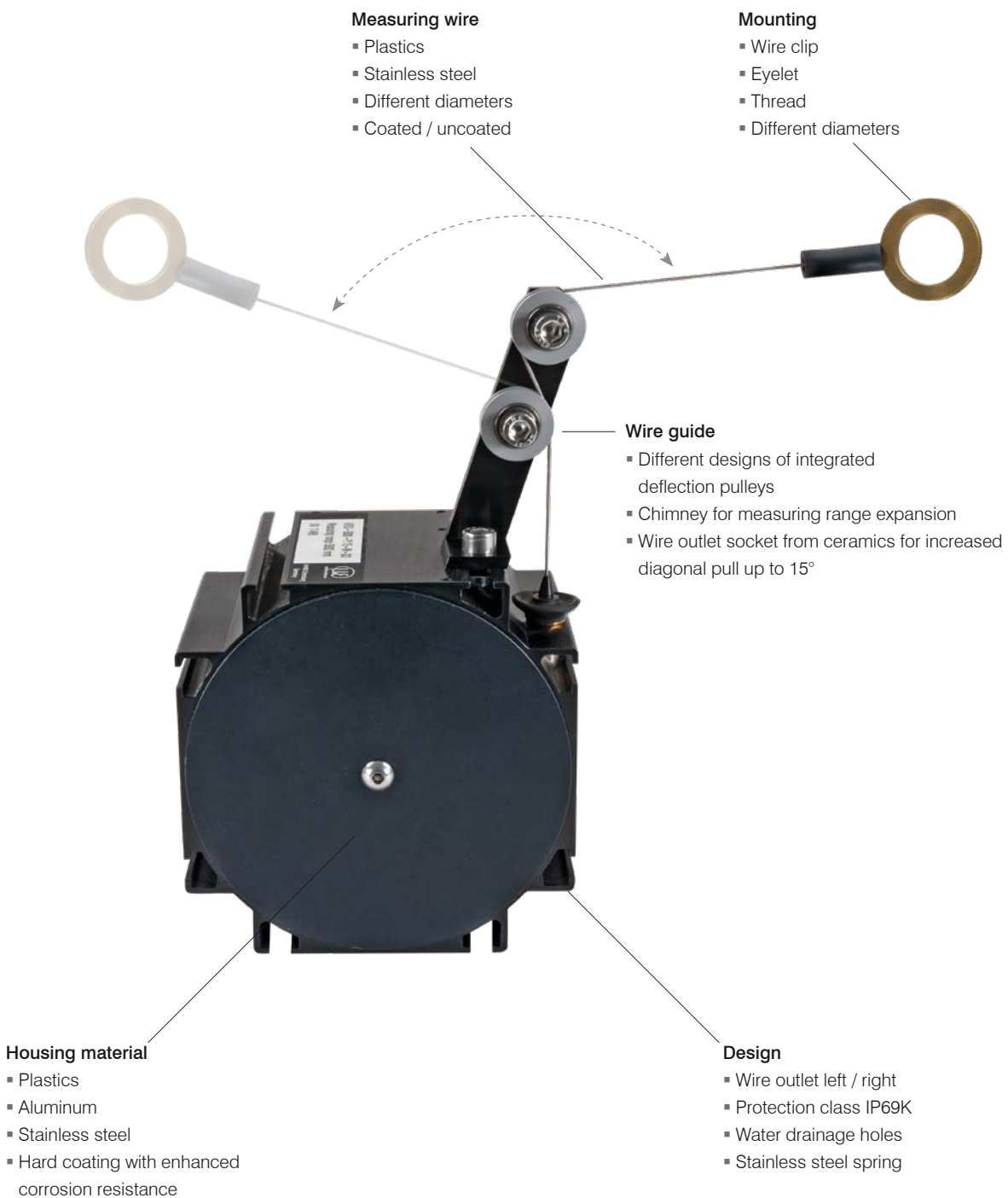
MR (mm)	A (mm)	B (mm)
30000	268	75
40000	300	95
50000	333.5	95

(dimensions in mm, not to scale)

Customized draw-wire mechanics

Micro-Epsilon also develops sensors for special requirements that are not met by standard models. Draw-wire mechanics from the standard range can be modified accordingly.

Low-cost implementation can already be achieved with medium-sized quantities (depending on the type and number of changes).





Z60 Sensor mechanics / stainless steel housings
 Sensor mechanics entirely made from stainless steel for difficult ambient conditions (salt water)



MK88 Sensor mechanics to monitor telescopic booms

- Integrated deflection pulley made from plastic with secured "wire guidance"
- High spring force
- IP67 / -40 °C ... 80 °C
- Robust plastic housing



MK88-M Snap-protected sensors with plastic housing
 Measuring wire can snap back from a distance up to 60 cm without damaging the measuring wire or the sensor.



P115 Sensor mechanics with aluminum housing and drainage holes

- Drainage holes to drain condensed water
- Suitable for outdoor applications
- Measuring ranges up to 15,000 mm

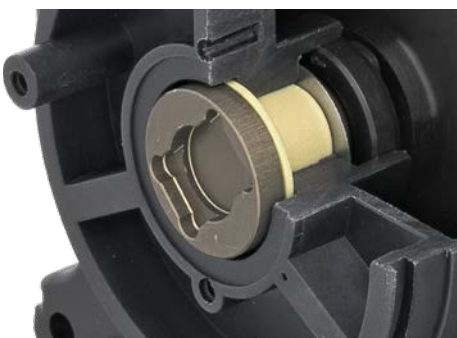


Integration of PCBs

These draw-wire mechanics can be configured to directly connect with a PCB. With this variant, the PCB is directly connected to the sensor mechanics. Depending on the needs, the installation can be performed at the factory or by the customer.

MK60 and M88 mechanics for PCB integration are available from stock. With a certain number of pieces, other series may also be used for PCB integration.

Compared with conventional encoders, PCB solutions offer a great cost advantage. As the functionality of PCBs usually is sufficient, this price advantage can be optimally used with draw-wire sensors from Micro-Epsilon.



Magnets are available in different designs.

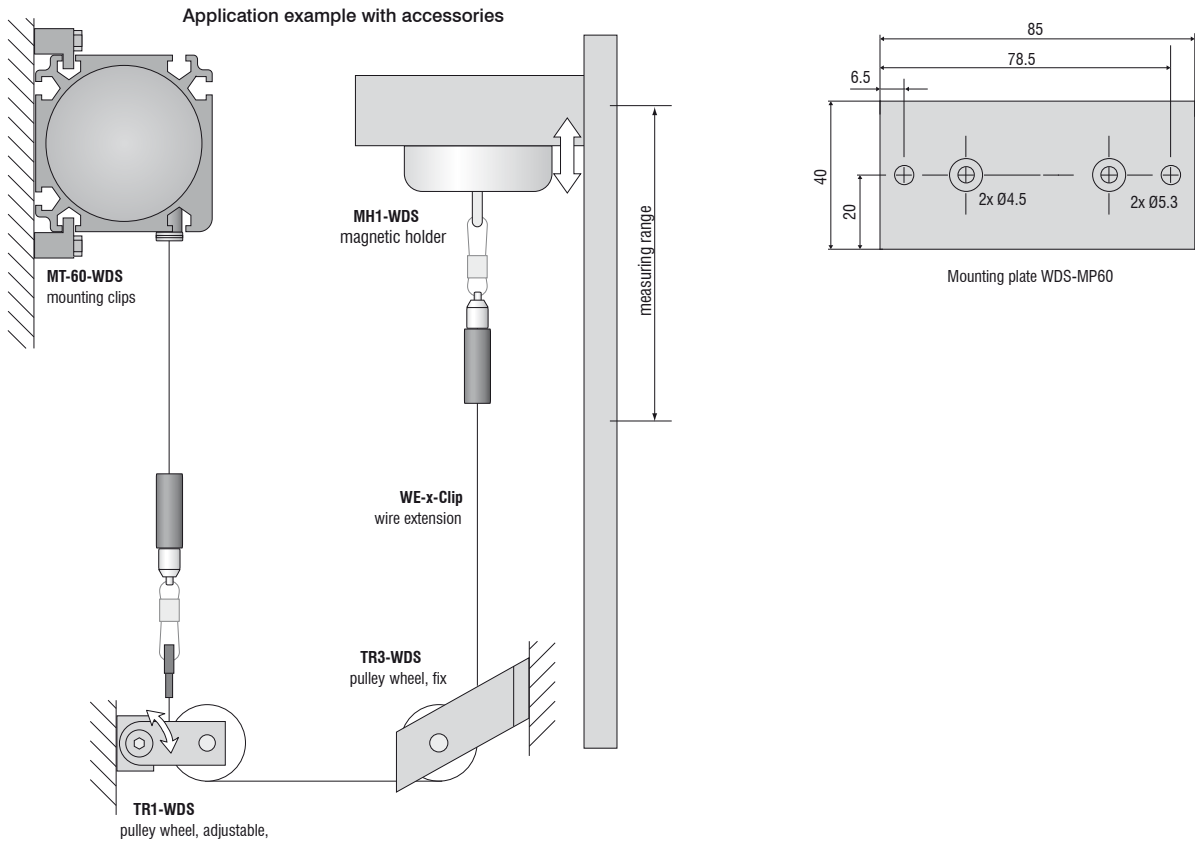
Accessories:

WE-xxx-M4	Wire extension with M4 wire connection, x=wire length
WE-xxx-Clip	Wire extension with eyelet, x = wire length
TR1-WDS	Wire deflection pulley, adjustable
TR3-WDS	Wire deflection pulley, fixed
GK1-WDS	Fork head for M4
MH1-WDS	Magnetic holder for wire attachment
MH2-WDS	Magnet holder for sensor mounting
MT-60-WDS	Mounting clamps for WDS-P60
WDS-MP60	Mounting plate for P60 models



Synchro flange	Clamping flange	Synchro flange for MK series	Different adaptations for OEM application, e.g., small clamping flange
Standard	Option	Standard	Optional for OEM
WDS-EAS115	WDS-EAC115		

Other flange types on request

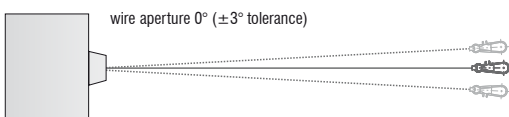


Installation instructions:

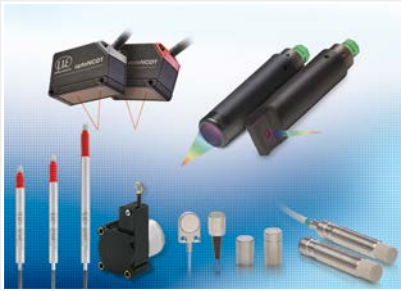
Wire attachment: during installation, do not allow at any time the measuring wire to freely return.

Angle of wire outlet: Make sure during installation that the wire outlet is straight (tolerance of $\pm 3^\circ$).

Exceeding this tolerance leads to increased wear of the wire material and on the wire outlet.



Sensors and Systems from Micro-Epsilon



Sensors and systems for displacement, distance and position



Sensors and measurement devices for non-contact temperature measurement



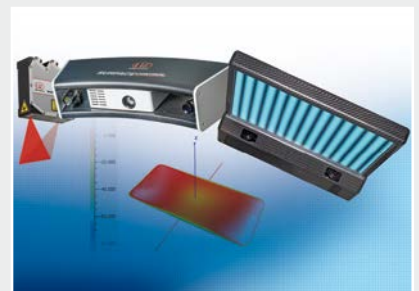
Measuring and inspection systems for metal strips, plastics and rubber



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