



Instruction Manual
wireSENSOR, WPS

WPS - x - MK30
WPS - x - MK46
WPS - x - MK60
WPS - x - MK77
WPS - x - MK88
WPS - x - MK120

Declaration of incorporation

Declaration of incorporation according to the EC Machinery Directive 2006/42/EC, Annex II B

Manufacturer and authorized representative for the compilation of the relevant technical documents

MICRO-EPSILON MESSTECHNIK
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hereby declares that the machine designated below, as a result of its manner of design, construction as well as version that has been placed on the market - to the extent possible in the scope of delivery - corresponds to the relevant, fundamental health and safety requirements of the EC Machinery Directive, including the valid changes at the time of this declaration.

Model: wiresensor
Type designation: WDS-xxx, WPS-xxx

The following fundamental health and safety requirements in accordance with Annex I of the above-named directive are applied and maintained:

- No. 1.1.2. Principles of safety integration
- No. 1.7.3. Marking of machinery
- No. 1.7.4. Instructions

Furthermore, the compliance with the following EC Directives and standards is explained, including the valid changes at the time of this declaration:

- EN ISO 13857:2008 Safety of machinery - Safety distances to prevent hazard zones being reached by upper and lower limbs
- EN 60204-1:2006 Safety of machinery - Electrical equipment of machines - Part 1: General requirements
- DIN EN 61326-1: 2006-10
- DIN EN 61326-2-3: 2007-05

Moreover, we declare that the relevant technical documentation for this partly completed machinery has been created in accordance with part B of Annex VII, and that we shall be obligated to deliver these upon the request of the market surveillance authorities.

The described partly completed machinery is intended for installation in a production line.

The commissioning of this partly completed machinery shall be prohibited until the partly completed machinery has been installed in a machine that complies with the provision of the EC Machinery Directive and for which an EC Declaration of Conformity in accordance with Annex II A is available.



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Certified acc. to
DIN EN ISO 9001:2008

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Appendix

1. Safety

The handling of the sensor assumes knowledge of the instruction manual.

1.1 Symbols Used

The following symbols are used in this instruction manual:



Indicates a hazardous situation which, if not avoided, may result in minor or moderate injury.



Indicates a situation which, if not avoided, may lead to property damage.



Indicates an user action.



Indicates an user tip.

1.2 Warnings



Do not open the sensor housing.

- > Danger of injury from pre-tensioned spring motor

Do not let the measuring wire rewind without control (snap back).

- > Danger of injury from whiplash effect of the wire with assembly bolts/clips
- > Destruction of wire and/or of sensor

Do not pull or loop the measuring wire around unprotected parts of the body.

- > Danger of injury

Connect the power supply in accordance with the safety regulations for electrical equipment.

- > Danger of injury
- > Damage to or destruction of the sensor safety

NOTICE

Do not pull the measuring wire over measuring range.
> Destruction of the measuring wire and/or the sensor

Do not let the power supply exceed the specified limits.
> Damage to or destruction of the sensor

Avoid banging and knocking the sensor
> Damage to or destruction of the sensor

1.3 Notes on CE Identification

The following applies to series WPS draw wire sensors: Directive 2006/42/EC

The following applies to series WPS draw wire sensors with voltage, current or encoder output:

- EU directive 2014/30/EU
- EU directive 2011/65/EU, "RoHS" category 9

Products which carry the CE mark satisfy the requirements of the quoted EU directives and the European standards (EN) listed therein. The EC declaration of conformity is kept available according to EU regulation, article 10 by the authorities responsible at

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Draw wire sensors with potentiometer output are not automatically operable devices (components). An EC declaration of conformity or CE identification is therefore not issued by EMC law.

Draw wire sensors with encoder output carry the CE mark.

Sources: EMC law, Guidelines on the application of council directive 2004/108/EC, directive 2006/42/EC.

1.4 Proper Use

- Draw wire sensors are used for
 - distance or displacement measuring
 - position determination of components or moving machine parts.
- The sensors may only be operated within the limits specified in the technical data, see Chap. 2..
- Draw wire sensors should only be used in such a way that in case of malfunction or failure personnel or machinery are not endangered.
- Additional precautions for safety and damage prevention must be taken for safety-related applications.

1.5 Proper Environment

- Protection class for sensor IP 20¹
IP 65 (MK60, MK88, MK120)
- Operating temperature: -20 °C to +80 °C (-4 to +176 °F)
- Storage temperature: -40 °C to +80 °C (-40 to +176 °F)
- Humidity: 5 - 95 % (non-condensing)
- Ambient pressure: atmospheric pressure

i Note the slight power dissipation of the potentiometer above +40°C (+104 °F)! (-0.15 W/10 K)!

1.6 Foreseeable Misuse

Do not further extract the measuring wire but only to the specified measuring range. This may lead to damage of the measuring wire and also to uncontrollable snapping of the measuring wire. Danger of injury.

Make sure the sensor is not held by another person when the measuring wire is extracted. Danger of snapping and injury.

¹⁾For models with potentiometer. For models with encoder depends on encoder type.

2. Functional Principle, Technical Data

2.1 Functional Principle

With the wire principle, a linear motion is transformed into a change in resistance by a rotation.

A measuring wire made of highly flexible stainless steel wires is wound onto a drum with the aid of a long life spring motor.

The winding drum is coupled axially with a

- multi-turn potentiometer (Type WPS-...-MKxx-...-P/U/I) respectively with an
- encoder (Type WPS-...-MKxx-E).

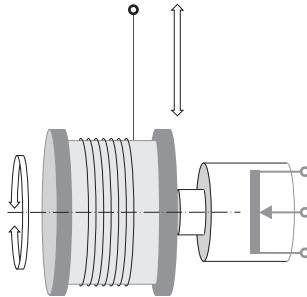


Fig. 1 Draw-wire sensor with potentiometer

2.2 Structure

The draw wire principle is used in the housing design MK30, MK46, MK77, MK60, MK88 and MK120 with different measuring lengths from 50 to 7500 mm (1.69 to 295.2 in).

Two versions of the electrical connection are possible:

- Potentiometer output (resistance divider)
- Incremental encoder (with integral electronics, HTL or TTL output)

2.3 Technical Data MK30

Model		WPS-50 MK30	WPS-150 MK30	WPS-250 MK30	WPS-500 MK30	WPS-750 MK30
Output type ¹		P			P/E/E830	
Measuring range		mm	50	150	250	500 750
Linearity (FSO)	P50 (C)	±0.5 %	0.25 mm	-	-	- -
	P25 (W)	±0.25 %	-	-	-	1.25 mm 1.87 mm
	P25 (H)	±0.25 %	-	0.375 mm	0.625 mm	- -
	P10 (H)	±0.1 %	-	-	0.25 mm	0.5 mm 0.75 mm
	E/E830	±0.05 %	-	-	-	0.25 mm 0.375 mm
Resolution	W		-	0.1 mm	0.1 mm	0.15 mm 0.2 mm
	C/H		quasi infinite			
	E/E830		10 pulses per mm with measuring range 500 mm 6.7 pulses per mm with measuring range 750 mm			
Sensor element		Potentiometer or incremental encoder				
Operating temperature		°C/ °F	-20 ... +80 (-4 ... +176 °F)			
Material	Housing	Plastics				
	Wire	Stainless steel with polyamid sheath (wire)				
Wire diameter		mm	0.36			
Wire mounting	Wire clip					
Sensor mounting	Mounting holes and mounting grooves					
Wire retraction force (min)		N	Approximately 1			
Wire extension force (max)		N	Approximately 2.5			
Protection class	P	IP 20				
DIN EN60529	E/E830	Depends on sensor design				
Electrical connection	P	Soldering tags				
	E/E830	Depends on sensor design				
Weight	P	g	45			
	E/E830	g	80			

⚠ CAUTION

Uncontrolled retraction of the measuring wire is incorrect!

- > Danger of injury from whiplash effect of the wire with assembly bolts/clips
- > Destruction of wire and/or of sensor.

C = conductive plastic potentiometer
H = hybrid potentiometer

E/E830 = incremental encoder
P = potentiometer

W = wire potentiometer
FSO = Full Scale Output

2.4 Technical Data MK46

Model		WPS-1000 MK46	WPS-1250 MK46	WPS-1250 MK46
Output type ¹		P	P/U/I	E/E830
Measuring range	mm	1000	1250	1250
Linearity (FSO)	E/E830	±0.05 %	-	±0.625 mm
	W	±0.25 %	±2.5 mm	±3.12 mm
	H	±0.1 %	±1 mm	±1.2 mm
Resolution	W	0.3 mm	0,4 mm	-
	H	quasi infinite		
	E/E830	4 pulses per mm		
Sensor element		Potentiometer or incremental encoder		
Operating temperature	°C/ °F	-20 ... +80 (-4 ... +176 °F)		
Material	Housing	Plastics		
	Wire	Stainless steel with polyamid sheath (wire)		
Wire diameter	mm	0.36		
Wire mounting		wire clip		
Sensor mounting		Mounting holes and mounting grooves		
Wire retraction force (min)	N	1	0.9	1
Wire extension force (max)	N	1.6	1.5	1.4
Protection class		IP 20	IP 20	Depends on type
Electrical connection		Solder tags		Cable radial
Wire acceleration	m/s ²	75	70	75
Weight (with cable)	g	80	80	120

E/E830 = incremental encoder W = wire potentiometer H = hybrid potentiometer

P = Potentiometer FSO = Full Scale Output

1) Specifications for output P, U, I and E/E830, see Chap. 4.4, see Chap. 4.5

CAUTION

Uncontrolled retraction of the measuring wire is incorrect!

- > Danger of injury from whiplash effect of the wire with assembly bolts/clips
- > Destruction of wire and/or of sensor.

2.5 Technical Data MK77

Model		WPS-2100 MK77-P25	WPS-2100 MK77-CR-P25	WPS-2100 MK77-E/E830
Output type ¹		P		E/E830
Measuring range	mm	2100		
Linearity (FSO)		±0.25 %		±0.05 %
Resolution		0.55 mm		0.43 mm
Sensor element		Wire potentiometer or incremental encoder		
Operating temperature	°C/ °F	-20 ... +80 (-4 ... +176 °F)		
Material	Housing	Plastics		
	Wire	Stainless steel with polyamid sheath (wire)		
Wire diameter	mm	0.45		
Wire mounting		wire clip		
Sensor mounting		Mounting holes and mounting grooves		
Wire retraction force (min)	N	3.5		
Wire extension force (max)	N	5		
Protection class		IP 20		IP 54
Electrical connection		Solder tags	Cable radial, 1.5 m	Cable radial, 2 m
Wire acceleration	m/s ²	5		5
Weight (with cable)	g	200	225	270

E/E830 = Incremental encoder

P = Potentiometer

FSO = Full Scale Output

1) Specifications for output P, U, I and E/E830, see Chap. 4.4, see Chap. 4.5

CAUTION

Uncontrolled retraction of the measuring wire is incorrect!

- > Danger of injury from whiplash effect of the wire with assembly bolts/clips
- > Destruction of wire and/or of sensor.

2.6 Technical Data MK60

Model		WPS-1500-MK60	WPS-2400-MK60-CR
Output type ¹		P/U/I	TTL01 TTL02
Signals		-	A, B, O A, /A, B, /B, O
Measuring range	mm	1500	2400
Linearity (FSO)		±0.15 % FSO	±0.05 % FSO
Resolution/Sensibility		Quasi infinite	6.83 pulses/mm
Sensor element		Hybrid potentiometer	Incremental encoder
Operating temperature	°C	-20 ... +80	
Material	Housing	Plastic, PBT GF20	
	Wire	Coated polamide stainless steel (ø 0.45 mm)	
Wire diameter	mm	0.45	
Wire mounting		Wire clip	
Sensor mounting		Mounting holes on the sensor housing	
Wire retraction force (min)	N	1	
Wire extension force (max)	N	8	
Protection class		IP 65	
Electrical connection		Cable radial, 1 m	
Wire acceleration	m/s ²	5	
Weight (with cable)	g	290	

P = Potentiometer

U = Voltage

I = Current

TTL01/ TTL02 = Incremental encoder

FSO = Full Scale Output

1) Specifications for output P, U, I and E/E830, see Chap. 4.4, see Chap. 4.5

2.7 Technical Data MK88

Model		WPS-2300 MK88	WPS-3500 MK88	WPS-5000 MK88
Output type ¹		P/U/I		
Measuring range	mm	2300	3500	5000
Linearity (FSO)		±0.15 %	±0.3 %	±0.4 %
Resolution/sensitivity		Quasi infinite		
Sensor element		Potentiometer		
Temperature range	°C	-20 ... +80		
Material	Housing	Plastic, PA 6 GF 30		
	Wire	Coated polyamid stainless steel		
	Protection cap	Aluminum		
Wire diameter	mm	ø 0.45 (0.45 dia.)		
Wire mounting		Wire clip		
Sensor mounting		Mounting holes / mounting grooves		
Wire retraction force (min)	N	4		
Wire extension force (max)	N	9		
Protection class		IP 65		
Electrical connection		Cable radial, 1 m		
Wire acceleration (max)		Approximately 7 g		
Weight (with cable)	g	400 - 430		

P = potentiometer U = voltage I = current

FSO = Full Scale Output

1) Specifications for output P, U, I and E/E830, see Chap. 4.4, see Chap. 4.5

⚠ CAUTION

Uncontrolled retraction of the measuring wire is incorrect!

- > Danger of injury from whiplash effect of the wire with assembly bolts/clips
- > Destruction of wire and/or of sensor.

2.8 Technical Data MK120

Model		WPS-3000 MK120	WPS-5000 MK120	WPS-7500 MK120
Output type ¹		P, U, I		
Measuring range	mm	3000	5000	7500
Linearity	FSO	0.15	0.15	0.15
Resolution		Quasi infinitely		
Sensor element		Hybrid potentiometer		
Operating temperature	°C/ °F	-20 ... +80 (-4 ... +176 °F)		
Material	Housing	Plastics PA6		
	Wire	0,45 mm encapsulated		
Wire diameter	mm	0.45		
Wire mounting		Wire clip		
Sensor mounting		Mounting holes		
Wire retraction force (min)	N	5.5	5	7
Wire extension force (max)	N	8	8	13
Protection class		IP 65		
Electrical connection		Built-in cable, radial, 1 m long		
Wire acceleration	m/s ²	25	25	15
Weight (with cable)	kg	0.75	0.75	0.9

P = potentiometer U = voltage I = current

FSO = Full scale Output

1) Specifications for output P, U, I and E/E830, see Chap. 4.4, see Chap. 4.5

3. Delivery

3.1 Unpacking

- Do not unpack the sensor by pulling the wire.
- Ship so, that no damage can appear.
- Check for completeness and shipping damages immediately after unpacking.
- In case of damage or missing parts, please contact the manufacturer or supplier.
- **i** Remove shipping protection of measuring wire by qualified personnel only and immediately before mounting.

3.2 Storage

Store only with the transport protection in place. This prevents the measuring wire being pulled out and accidental is snapping back.

- Storage temperature: -40 °C bis +80 °C (-40 to +176 °F)
- Humidity: 5 - 95 % (non-condensing)
- Atmospheric pressure

⚠ CAUTION

Uncontrolled retraction of the measuring wire is incorrect!

- > Danger of injury from whiplash effect of the wire with assembly bolts/clips
- > Destruction of wire and/or of sensor.

Save the wire during installation work.

4. Installation and Assembly

4.1 Precautionary Measures

Do not pull the measuring wire over range.

- > Damage to or destruction of the sensor is possible

Do not damage the measuring wire.

Do not oil or grease the measuring wire.

Do not bend the measuring wire.

Do not pull the measuring wire at an angle.

Do not allow to loop the measuring wire around objects.

Fix the sensor with drawn in measuring wire to the target.

Do not loop the measuring wire around parts of the body.

4.2 Sensor Mounting

Model	Screws	Mounting clamp
MK30	3 x M2.5	yes
MK46	3 x M2.5	yes
MK77	3 x M3	yes
MK60	3 x M3	no
MK88	3 x M4	yes
MK120	3 x M6	no

The sensor does not have to be oriented in a special way.

- ➡ Choose the installation position so that damage and soiling of the measuring wire is avoided.
- ➡ Prefer an installation position with measuring wire outlet facing downwards if possible.

This prevents liquids penetrating the measuring wire outlet.

- Do not let snap the measuring wire!
- ! No warranty by damage through snapping.

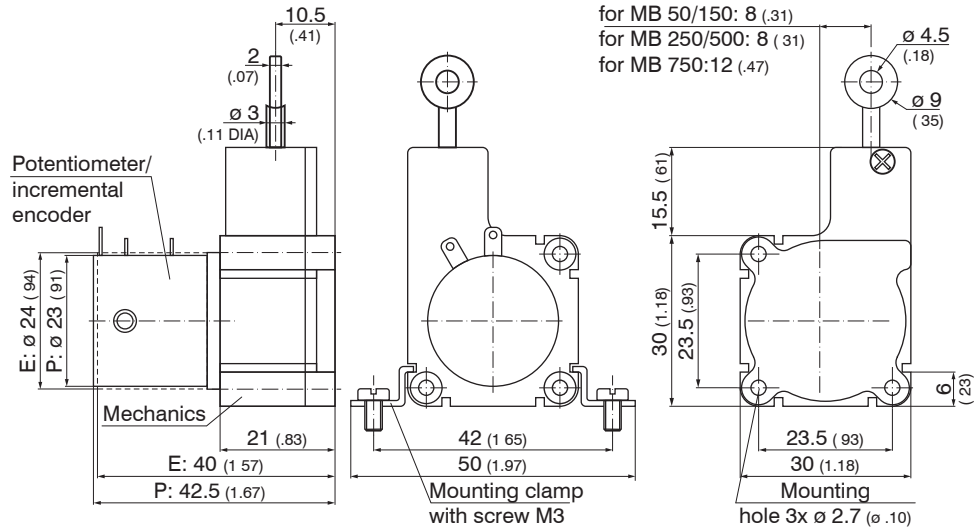


Fig. 2 Dimensional drawing WPS- ... -MK30 with potentiometer or encoder, dimensions in mm (inches), not to scale

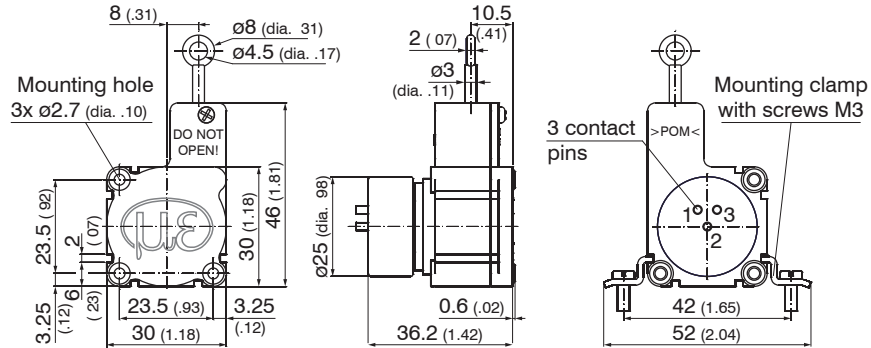


Fig. 3 Dimensional drawing WPS- ... -50MK30 with potentiometer or encoder, dimensions in mm (inches), not to scale

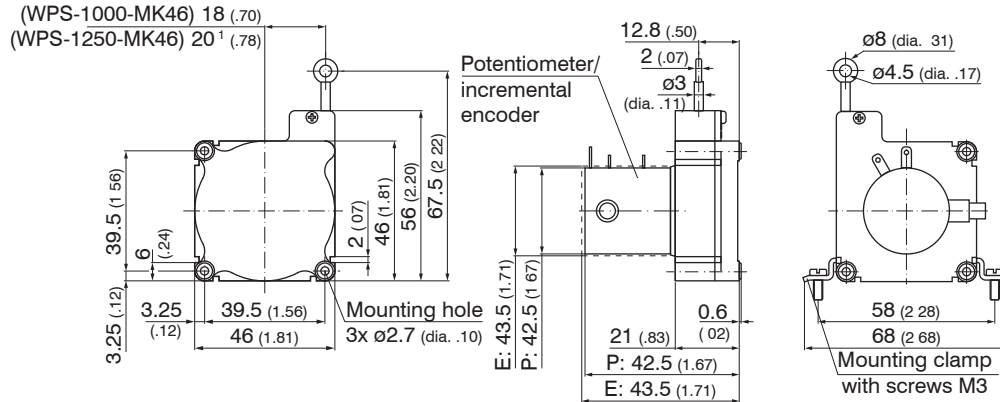


Fig. 4 Dimensional drawing WPS- ... -MK46, with potentiometer or encoder, dimensions in mm (inches), not to scale

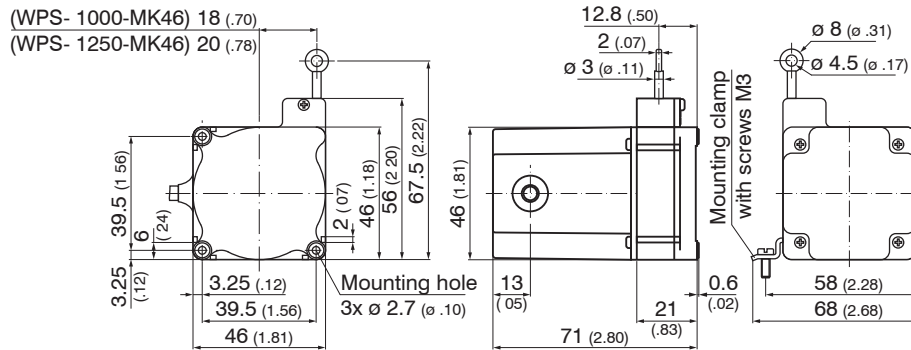


Fig. 5 Dimensional drawing WPS- ... -MK46-CR, with potentiometer and radial cable, dimensions in mm (inches), not to scale

¹) 18 (.71) for WPS-1000-MK46-Pxx

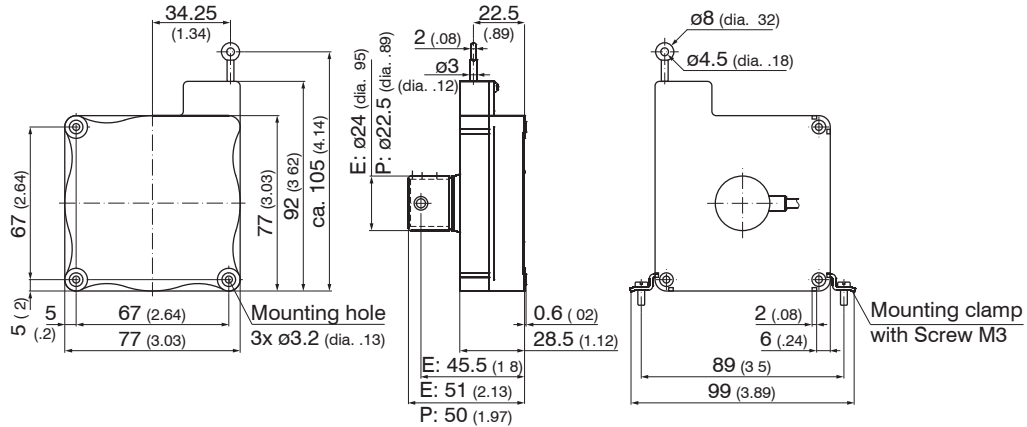


Fig. 6 Dimensional drawing WPS-...-MK77, with potentiometer or encoder, dimensions in mm (inches), not to scale

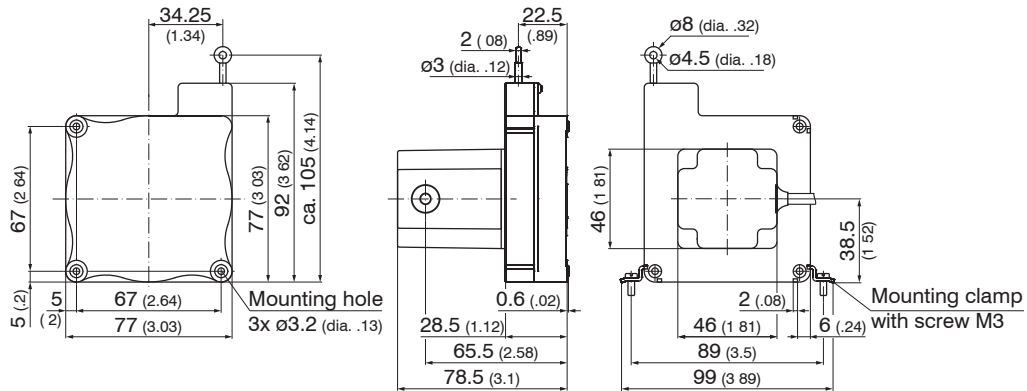


Fig. 7 Dimensional drawing WPS-...-MK77-CR, with potentiometer and radial cable, dimensions in mm (inches), not to scale

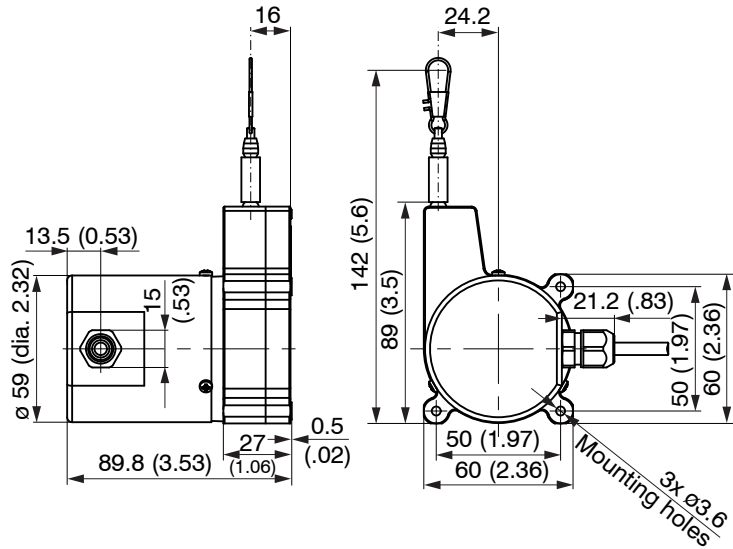


Fig. 8 Dimensional drawing WPS- ... -MK60-CR, with potentiometer, dimensions in mm, not to scale

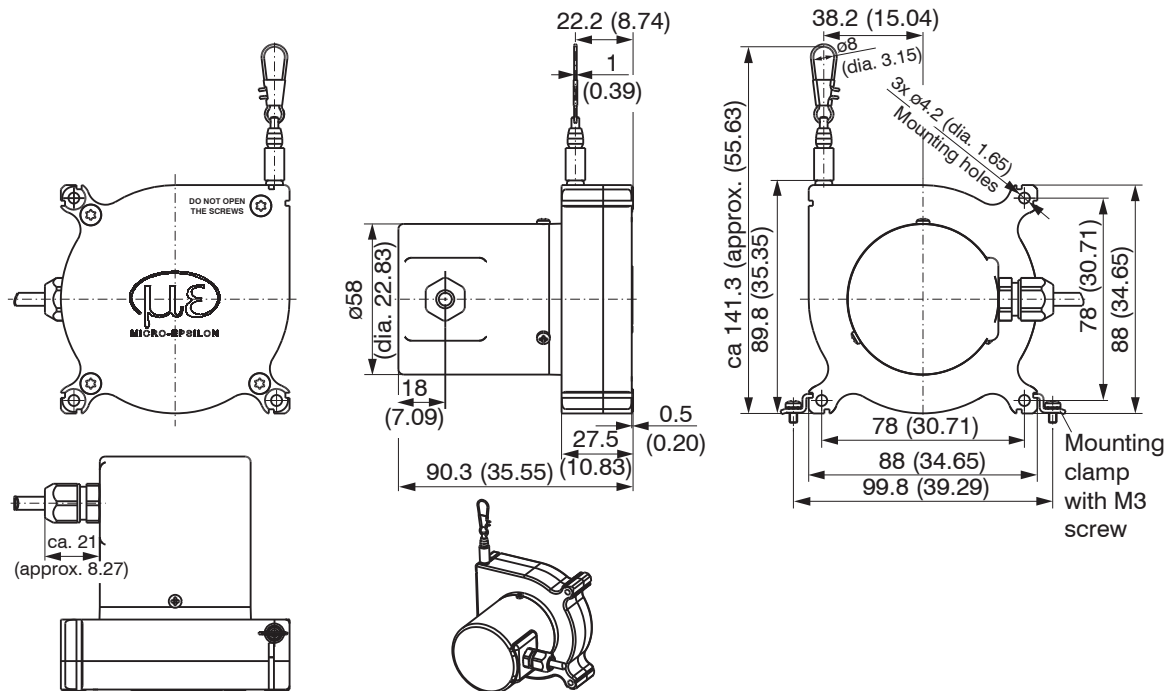


Fig. 9 Dimensional drawing WPS- ... -MK88-CR (01), with potentiometer, dimensions in mm, not to scale

1) Old version with aluminum cap WPS-... -MK88-CR (01)

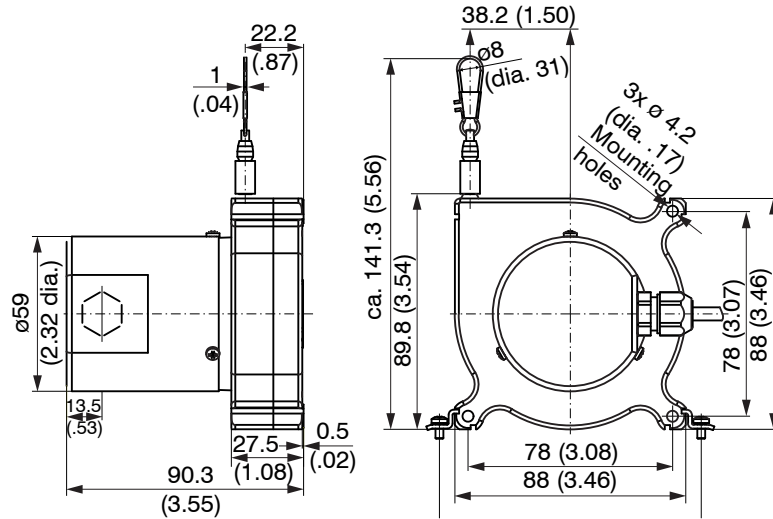


Fig. 10 Dimensional drawing WPS- ... -MK88-CR, with potentiometer, dimensions in mm, not to scale

1) New version with plastic cap WPS-... -MK88-CR

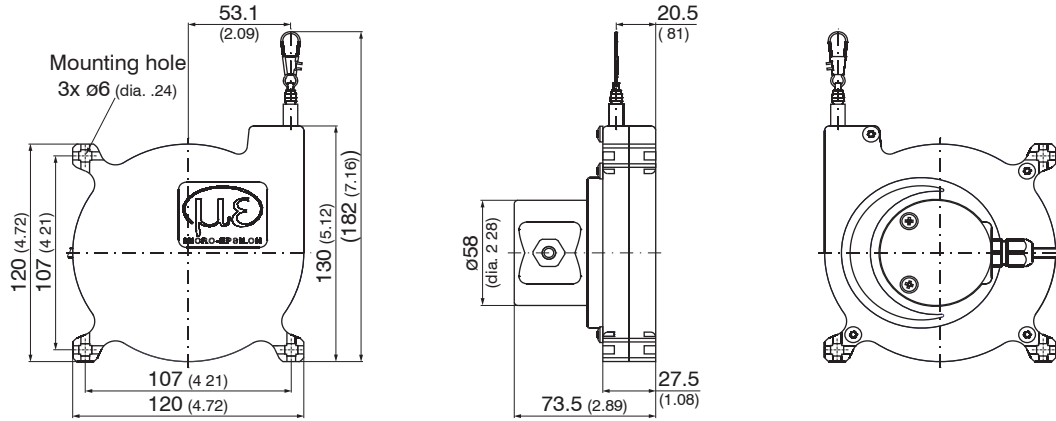


Fig. 11 Dimensional drawing WPS-...-MK120-CR, measuring ranges 3000 and 5000 mm, dimensions in mm (inches), not to scale

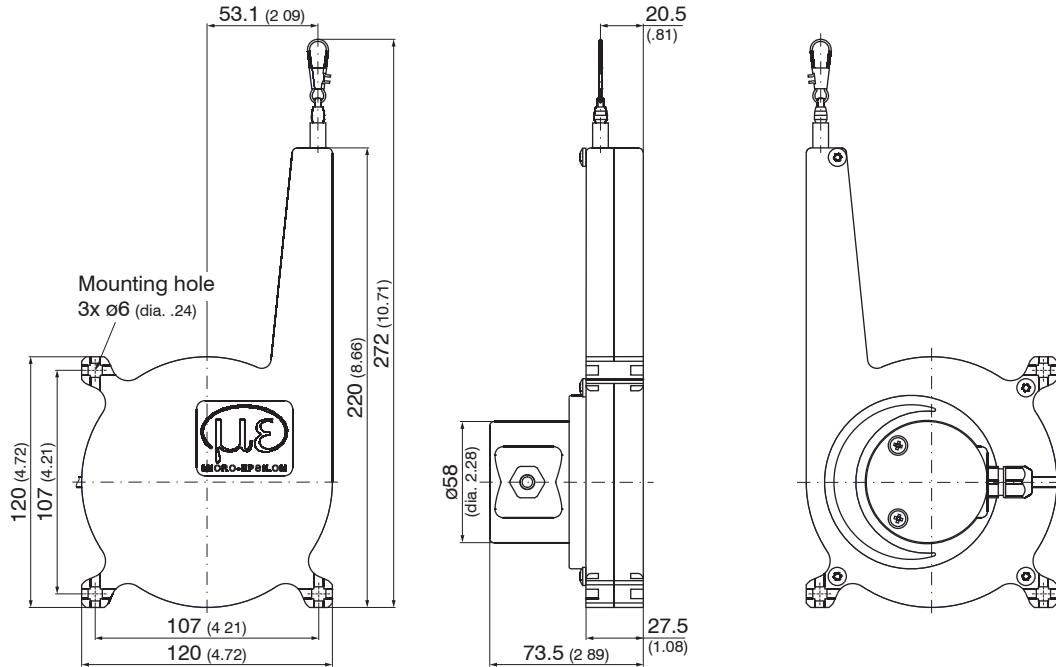


Fig. 12 Dimensional drawing WPS-...-MK120-CR, measuring ranges 7500 mm, dimensions in mm (inches), not to scale

CAUTION

A measuring wire under tension where operators are standing can lead to injuries.

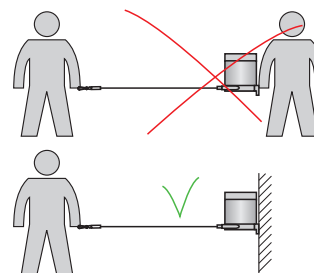
NOTICE

Do not twist the measuring wire!

4.3 Wire Guide and Fastening

If the measuring wire has to be extracted from the sensor

- the sensor may not be held by another person
- the measuring wire may not be further extracted but only to the specified measuring range
- the surroundings of the sensor have to be protected against snapping of the measuring wire



Wrong

Correct

- ➡ Fix the measuring wire to the target using a wire clip
- ➡ Fed the measuring wire perpendicularly from the sensor housing.

Misalignment only permissible up to 3 degrees.

If you drag of the measuring wire on the inlet hole or other objects, this leads for damaging and/or snapping of the measuring wire.

- ➡ Keep measuring wire in an area where it cannot be snagged or otherwise be violated.

4.4 Output Specifications Analog

4.4.1 Potentiometer Output

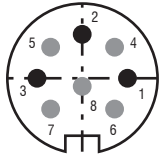
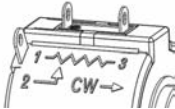
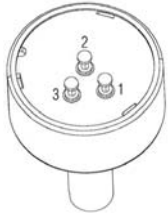
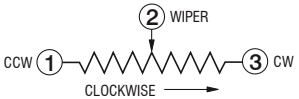
Output		Plug M16 -SA / -SR	Integrated cable- CA / -CR	Open contacts	
Potentiometer output (P)		 <p>View 1</p>			
Supply voltage	max. 32 VDC at 1 kOhm / max. 1 W				
Resistance	1 kOhm ±10 % (potentiometer)				
Temperature coefficient	±0.0025 % d.M./°C				
Viper current	≤ 10 μA				
Sensitivity	Depends on measuring range	1 = input + 2 = ground 3 = signal	white = input + brown = ground green = signal	1 = input + 2 = signal 3 = ground	

Fig. 13 Table potentiometer output

Draw wire sensors with potentiometer output are connected according table, see [Fig. 13](#).

All potentiometers must only be used in a voltage divider circuit. Using them as a variable resistor, destroys the element. Ensure that the maximum current through the viper is limited.

i Use potentiometer only as voltage divider, not as variable series resistor!

1) Pin side sensor plug or solder side cable socket

4.4.2 Voltage Output

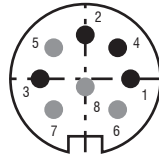
Voltage output (U)		 <p>View ²</p>	
Supply voltage	14 ... 27 VDC (non stabilized ¹)		
Current consumption	max. 30 mA		
Output voltage	0 ... 10 VDC Options 0 ... 5 / ±5 V		
Output current	2 mA max.		
Load impedance	> 5 kOhm		
Signal noise	0.5 mV _{eff}		
Temperature coefficient	±0.005 % FSO/°C		
Einstellbereiche (if supported by the model)		1 = supply	white = supply
Zero	±20 % d.M.	2 = ground	brown = ground
Sensitivity	±20 %	3 = signal	green = signal
		4 = ground	yellow = ground

Fig. 14 Table voltage output

- 1) Non stabilized, measured on the input terminal of the sensor
- 2) Pin side sensor plug or solder side cable socket

4.4.3 Current Output

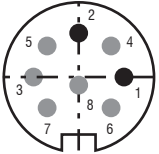
Current output (I)			
Supply voltage	14 ... 27 VDC (non stabilized ¹⁾)	 <p>View ²</p>	
Current consumption	max. 35 mA		
Output current	4 ... 20 mA		
Load	< 600 Ohm		
Signal noise	< 1.6 μA_{eff}		
Temperature coefficient	± 0.01 % FSO/K		
Adjustment range (if supported by the model)			
Zero	± 18 % d.M.	1 = Supply	White = Supply
Sensitivity	± 15 %	2 = Ground	Brown = Ground

Fig. 15 Table current output

- 1) Non stabilized, measured on the input terminal of the sensor
- 2) Pin side sensor plug or solder side cable socket

4.5 Output Specifications Incremental Encoder

4.5.1 Signal Output

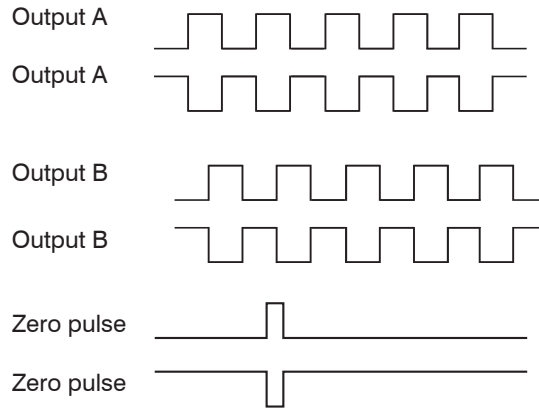


Fig. 16 Signal output

Output TTL01	NPN (5 VDC \pm5 %)	
Level High	$\geq U_B - 0.2 \text{ V}$	
Level Low	0.55 - 0.75 V	
Load High	$\leq 1.85 \text{ mA}$	
Output	A, B, 0	
Output TTL02	Linedriver (5 VDC \pm5 %)	
Level High	$\geq 2.0 \text{ V}$	(with $I = -40 \text{ mA}$)
Level Low	$\leq 0.5 \text{ V}$	(with $I = 40 \text{ mA}$)
Load High	$\leq 40 \text{ mA}$	
Output	A, \bar{A} , B, \bar{B} , 0	

Output E	Push-pull (5 VDC)
Level High	$\geq UB - 2.5 V$
Level Low	$\leq 0.5 V$
Load High	$\leq 50 mA$
Output	A, B, 0
Output E830	Push-pull (8 ... 30 VDC)
Level High	$\geq UB - 3 V$
Level Low	$\leq 2.5 V$
Load High	$\leq 50 mA$
Output	A, B, 0

4.5.2 Pin Assignment

Pin assignment E, E830	
Cable color	Assignment
White	0 V
Brown	+UB
Green	A
-	\bar{A}
Yellow	B
-	\bar{B}
Gray	0

Fig. 17 Pin assignment E, E830

Pin assignment TTL01	
Cable color	Assignment
Brown	0 V
Gray	+UB
White	A
Green	B
Yellow	0

Fig. 18 Pin assignment TTL01

Pin assignment TTL02	
Cable color	Assignment
Red	+UB
Black	0 V
Brown	A
Black	\bar{A}
Orange	B
Black	\bar{B}
Yellow	0
Black	n.c.

Fig. 19 Pin assignment TTL02

Note the pin assignment for draw-wire displacement sensors with encoder output. The sensor contains an additional supplement for detailed information.

5. Operation

For draw wire sensors with potentiometer output (P) or encoder output (E) there are no adjustment and setting elements.

6. Operation and Maintenance

The measuring wire, the wire drum, the spring motor and the potentiometer may not be greased or oiled.

The notes on wire guiding, see Chap. 4.3, must be observed during operation.

Imperfect wire guiding can lead to increased wear and premature defects.

The warranty and all liability claims are null and void if the device is manipulated by unauthorized persons.

Repairs are to be made exclusively by Micro-Epsilon.

7. Decommissioning, Disposal

- ➡ Disconnect the power supply and output cable on the sensor.
- ➡ Release the measuring wire from the measuring object. Do not let the measuring wire rewind without control (snap back).

Incorrect disposal may cause harm to the environment.

- ➡ Dispose of the device, its components and accessories, as well as the packaging materials in compliance with the applicable country-specific waste treatment and disposal regulations of the region of use.

8. Warranty

All components of the device have been checked and tested for perfect function in the factory.

In the unlikely event that errors should occur despite our thorough quality control, this should be reported immediately to MICRO-EPSILON.

The warranty period lasts 12 months following the day of shipment. Defective parts, except wear parts, will be repaired or replaced within this period if you return the device to MICRO-EPSILON free of charge.

This warranty does not apply towards damages resulting from abuse of the equipment and devices, from forceful handling or installation of the devices or from repair or modifications performed by third parties.

No other claims, except as warranted, are accepted.

The terms of the purchasing contract apply in full.

MICRO-EPSILON will specifically not be responsible for eventual consequential damages.

MICRO-EPSILON always strives to supply customers with the finest and most advanced equipment. Development and refinement is therefore performed continuously and the right for design changes without prior notice is accordingly reserved.

For translation in other languages the data and statements of the German language operation manual are to be taken as authoritative.

Appendix

Accessories and Spare Parts

- TR1-WPS Guide pulley adjustable with mounting socket, see [Fig. 20](#)
- TR3-WPS Guide pulley fix with mounting socket, see [Fig. 21](#)
- WE-xxxx-CLIP Wire extension with wire clip, see [Fig. 22](#), wire length in millimeters for xxxx, max. 10.000 mm (33 ft)

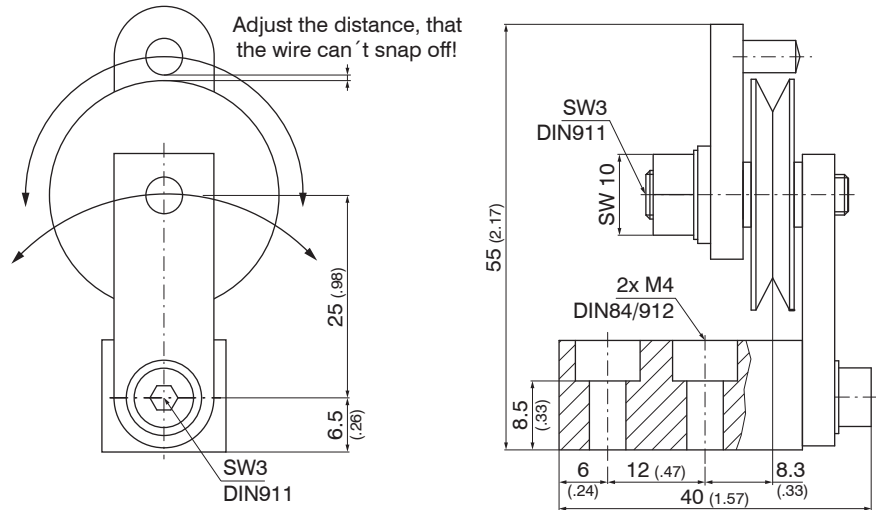


Fig. 20 Guide pulley TR1-WPS with mounting socket, dimensions in mm (inches), not to scale

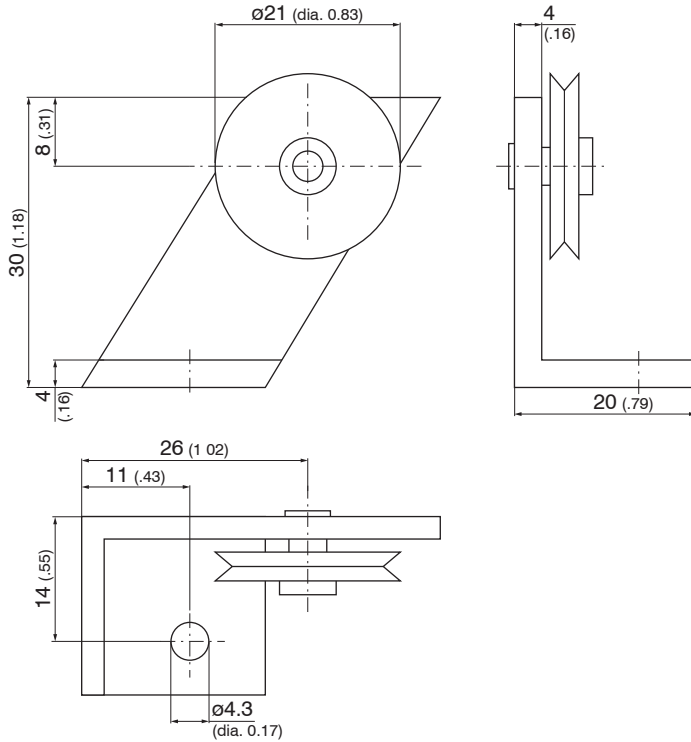


Fig. 21 Guide pulley TR3-WPS fix with mounting socket, dimensions in mm (inches), not to scale

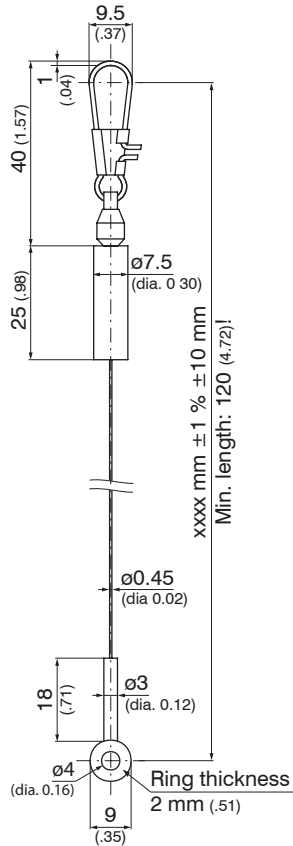


Fig. 22 Wire extension WE-xxxx-CLIP, dimensions in mm (inches), not to scale



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