



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

The manufacturer and person authorized to compile the relevant technical documents

MICRO-EPSILON MESSTECHNIK
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hereby declare that the machine designated below complies with the relevant fundamental health and safety requirements of the EC Machinery Directive, including modifications to it applicable at the time of this declaration, based on its design and construction and in the version put on the market by us – to the extent that the scope of supply allows.

Machine design: Draw-wire sensor (mechanics and models with potentiometer output)

Type designation: WDS-xxx, WPS-xxx

The following fundamental health and safety requirements according to Annex I of the directive specified above have been applied and complied with:

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

Furthermore, we declare compliance with the following directives and standards including the modifications applicable at the time this declaration is made:

- Directive 2006/42/EC (machinery)
 - EN ISO 13857: 2008 Safety of machinery - Safety distances to prevent hazard zones being reached by upper and lower limbs
 - EN 60204-1: 2006 + EN 60204-1: 2006/A1: 2009 Safety of machinery - Electrical equipment of machines - Part 1: General requirements
- Directive 2011/65/EU (RoHS)
 - EN 50581: 2012 Technical documentation for the assessment of electrical and electronic devices with respect to the restriction of hazardous substances

We also declare that the special technical documentation for this partially completed machine has been created in accordance with Annex VII, Part B, and commit ourselves to disclose this to the market surveillance authorities upon request.

The commissioning of these partially completed machines is prohibited until the partially completed machine(s) has/have been installed in a machine that meets the requirements of the EC Machinery Directive and for which an EU Declaration of Conformity according to Annex II, Part A exists.



Ortenburg, May 22th 2019

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Appendix

1. Safety

System operation assumes knowledge of the operating instructions.

1.1 Symbols Used

The following symbols are used in these operating instructions:



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



Indicates a situation that may result in property damage if not avoided.



Indicates a user action.



Indicates a tip for users.

1.2 Warnings



Do not open the sensor housing.

- > Risk of injury from pre-tensioned spring motor

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

- > Risk 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.

- > Risk of injury

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

- > Risk 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 Marking

For WPS draw-wire displacement sensors with voltage, current, digital or encoder outputs, the EU Directives 2014/30/EU, 2011/65/EU shall apply. In addition, the Machinery Directive is taken into consideration (2006/42/EC).

These sensors carry the CE mark and satisfy the requirements of the EU Directives cited and the European harmonized standards (EN) listed therein.

The EU Declaration of Conformity is available to the responsible authorities at:

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Draw-wire displacement sensors with potentiometer output are devices (components) which cannot be operated autonomously and do not carry a CE mark. For WPS draw-wire displacement sensors with potentiometer output, the directives 2006/42/EC and 2011/65/EU shall apply. Therefore, an EU Declaration of Conformity is not issued according to EMC law and the Machinery Directive. The Declaration of Incorporation shall apply.

Sources: EMVG (Electromagnetic Compatibility of Equipment law), guidelines on the application of Directive 2014/35/EU, Directive 2006/42/EC.

1.4 Intended Use

- Draw wire sensors are used for
 - distance or displacement measuring
 - position determination of components or moving machine parts.
- The sensors must only be operated within the limits specified in the technical data, see Chap. 2..
- Draw wire sensors must be used in such a way that no persons are endangered or machines and other material goods are damaged in the event of malfunction or total failure of the sensor.
- Take additional precautions for safety and damage prevention in case of 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).

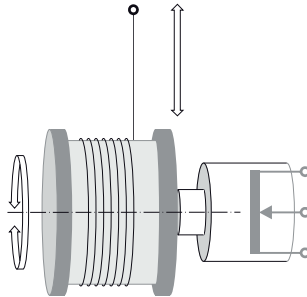


Fig. 1 Draw-wire sensor with potentiometer

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, Included in Delivery

-  Do not unpack the sensor by pulling the wire or wire bolt / clip.
-  Ensure that the goods are forwarded in such a way that no damage can occur.
-  Check the delivery for completeness and shipping damage immediately after unpacking.
-  If there is damage or parts are missing, immediately contact the manufacturer or supplier.
-  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 to +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.

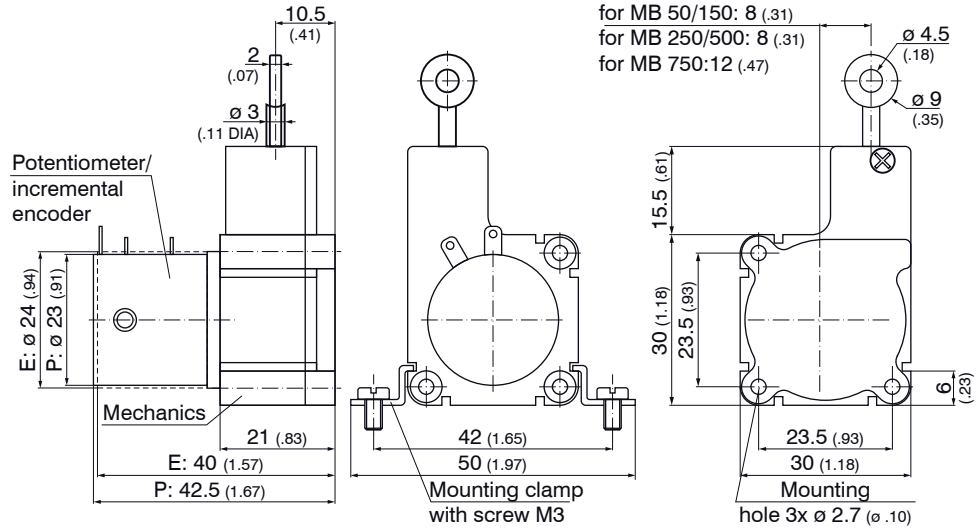


Fig. 2 Dimensional drawing WPS- ... -MK30 with potentiometer or encoder, dimensions in mm (inches), not to scale

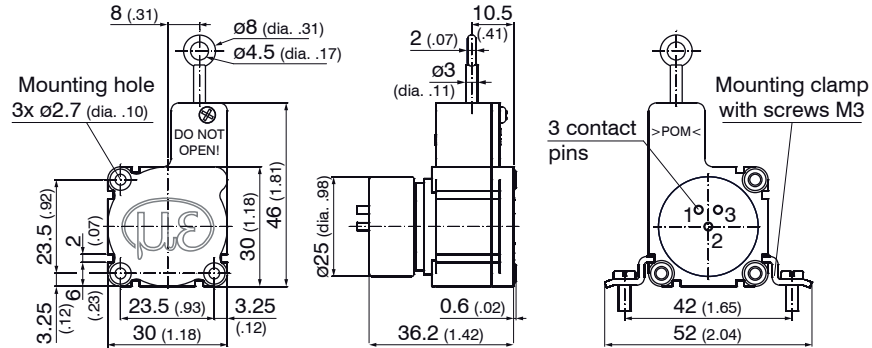


Fig. 3 Dimensional drawing WPS- ... -50MK30 with potentiometer or encoder, dimensions in mm (inches), not to scale

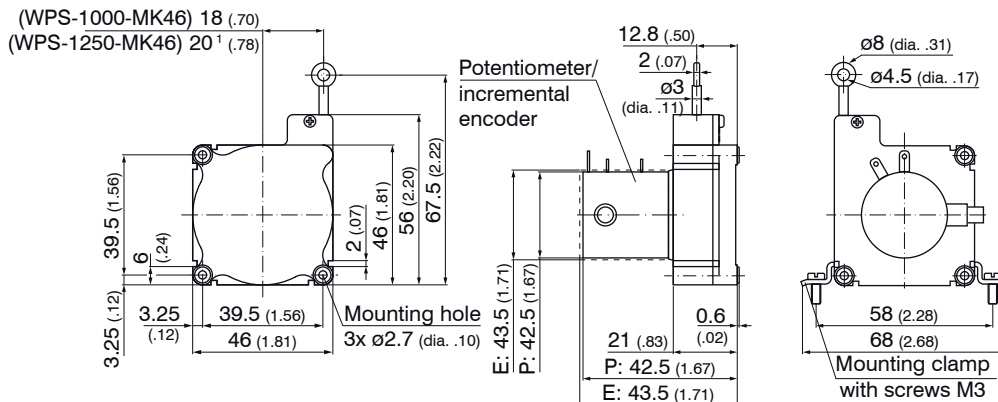


Fig. 4 Dimensional drawing WPS- ... -MK46, with potentiometer or encoder, dimensions in mm (inches), not to scale

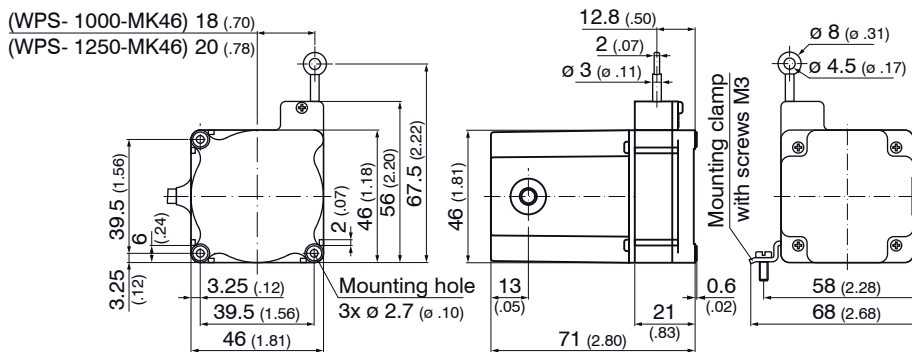


Fig. 5 Dimensional drawing WPS- ... -MK46-CR, with potentiometer and radial cable, dimensions in mm (inches), not to scale

1) 18 (.71) for WPS-1000-MK46-Pxx

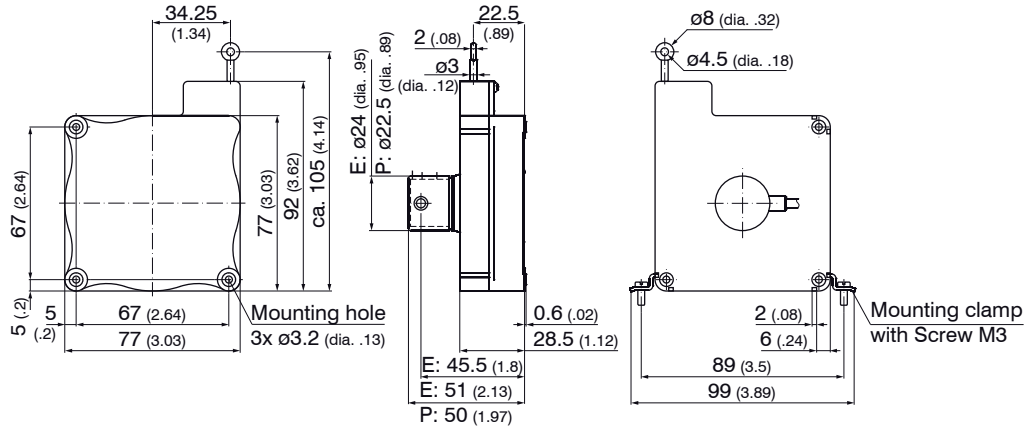


Fig. 6 Dimensional drawing WPS-...-MK77, with potentiometer or encoder, dimensions in mm (inches), not to scale

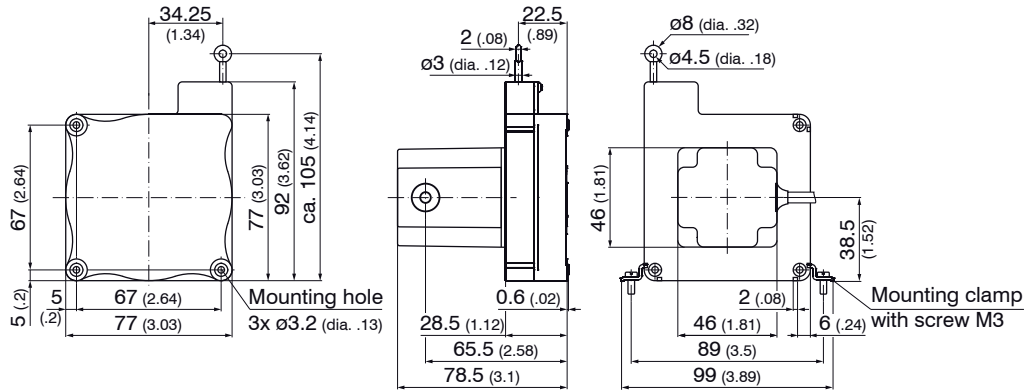


Fig. 7 Dimensional drawing WPS-...-MK77-CR, with potentiometer and radial cable, dimensions in mm (inches), not to scale

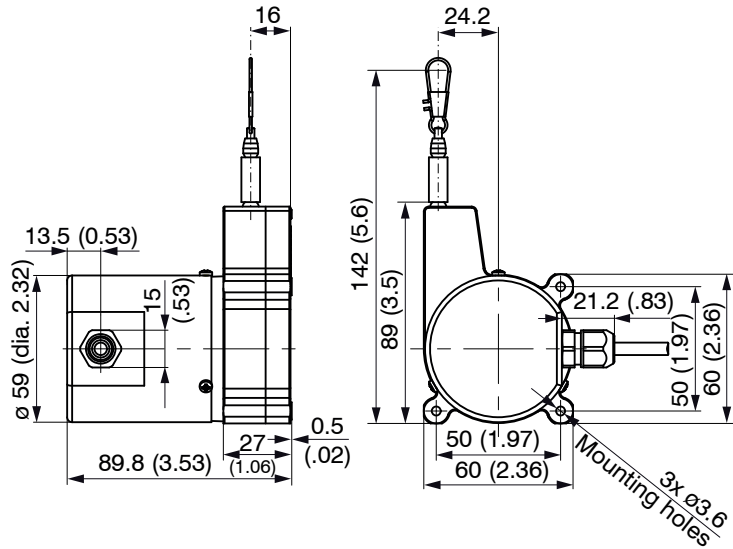


Fig. 8 Dimensional drawing WPS- ... -MK60-CR, with potentiometer, dimensions in mm, not to scale

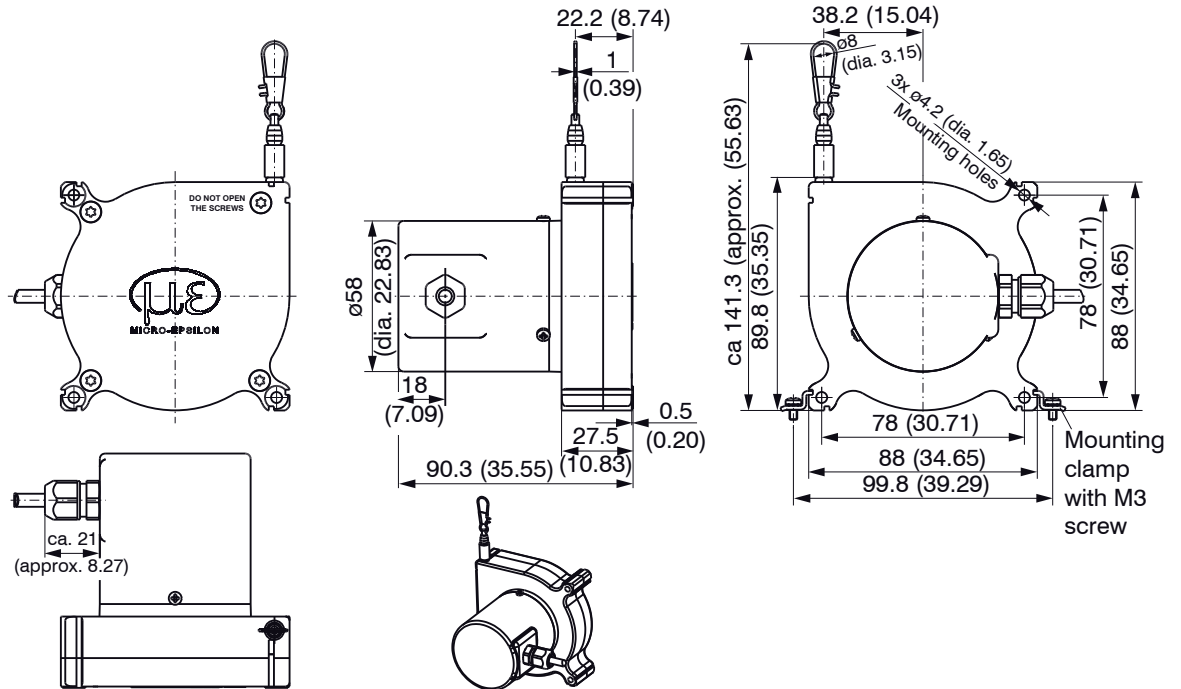


Fig. 9 Dimensional drawing WPS- ... -MK88-CR (01), with potentiometer, dimensions in mm, not to scale

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

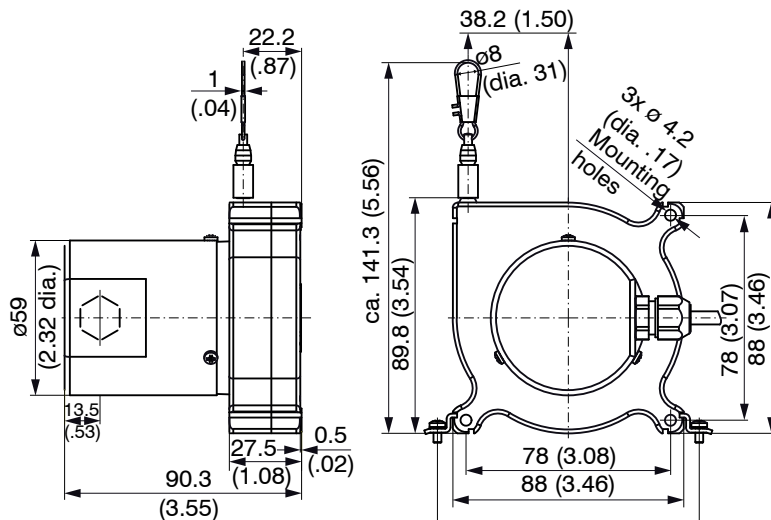


Fig. 10 Dimensional drawing WPS- ... -MK88-CR, with potentiometer, dimensions in mm, not to scale

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

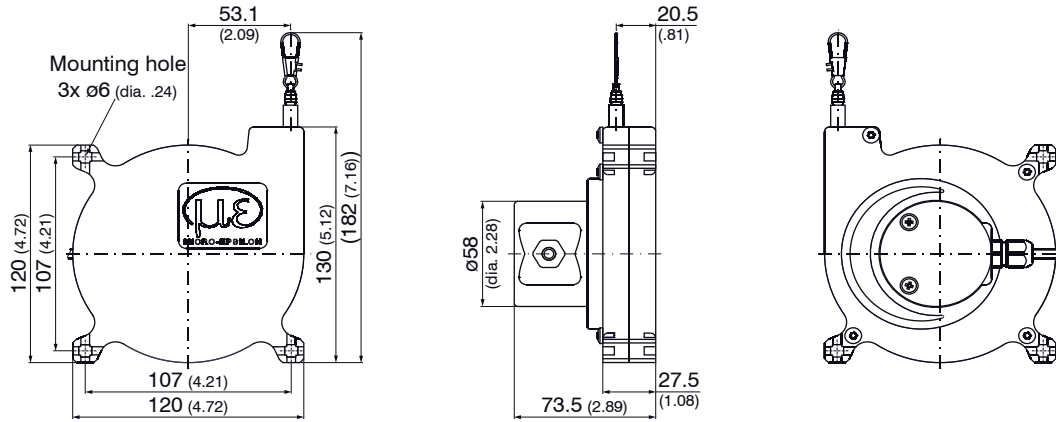


Fig. 11 Dimensional drawing WPS-...-MK120-CR, measuring ranges 3000 and 5000 mm, dimensions in mm (inches), not to scale

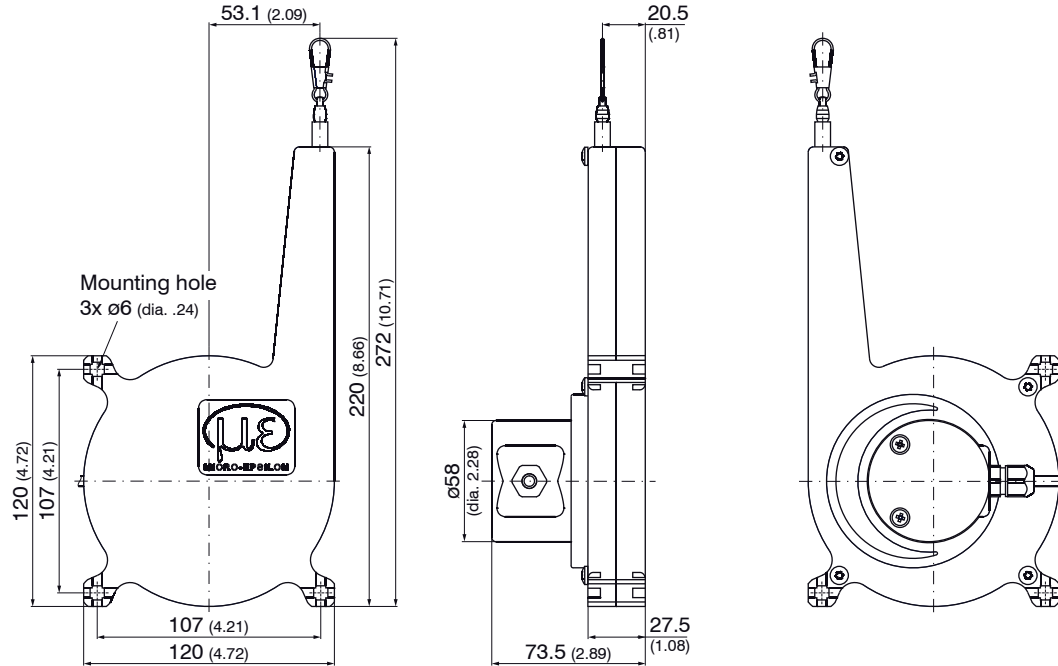


Fig. 12 Dimensional drawing WPS-...-MK120-CR, measuring ranges 7500 mm, dimensions in mm (inches), not to scale

4.3 Wire Guide and Fastening

CAUTION

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

NOTICE

Do not twist the measuring wire!

If the measuring wire has to be extracted from the sensor to guide the wire respectively to fix it to the target

- 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

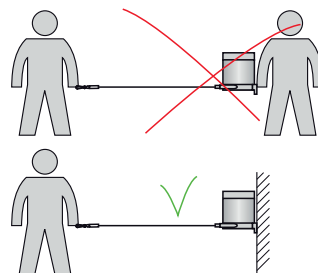
- ➔ Fix the measuring wire to the target using a wire clip.
- ➔ Guide the measuring wire vertically out of the sensor housing.

Misalignment only permissible up to 3 degrees.

Dragging of the measuring wire on the inlet hole or other objects leads to damage and/or breakage of the measuring wire.

i If the measuring wire cannot be fed vertically out of the housing, it is essential to use a guide pulley (accessory TR1-WDS or TR3-WDS, see Chapter Accessories).

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



Wrong

Correct

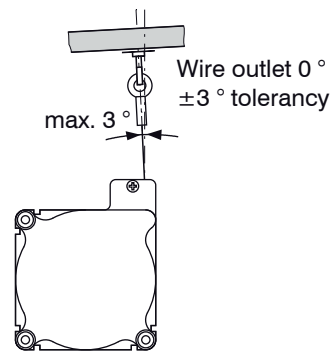


Fig. 13 Wire fastening and misalignment

4.4 Output Specifications Analog

4.4.1 Potentiometer Output

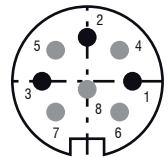
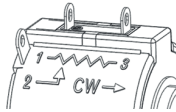
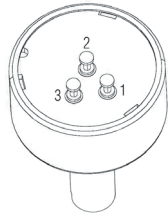
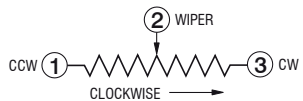
Output		Plug M16 -SA / -SR	Integrated cable- CA / -CR	Open contacts	
Potentiometer output (P)		 <p>View 1</p>			
Supply voltage	max. 32 VDC at 1 kOhm / max. 1 W				
Resistance	1 kOhm ±10 % (potentiometer)				
Temperature coefficient	±0.0025 % d.M./°C				
Viper current	≤ 10 μA				
Sensitivity	Depends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

Fig. 14 Table potentiometer output

Draw wire sensors with potentiometer output are connected according table, see [Fig. 14](#).

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 wiper 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

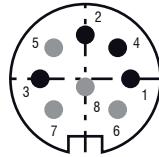
Voltage output (U)		 <p>View ²</p>	
Supply voltage	14 ... 27 VDC (non stabilized ¹)		
Current consumption	max. 30 mA		
Output voltage	0 ... 10 VDC Options 0 ... 5 / ± 5 V		
Output current	2 mA max.		
Load impedance	> 5 kOhm		
Signal noise	0.5 mV _{eff}		
Temperature coefficient	± 0.005 % FSO/ $^{\circ}$ 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. 15 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. 16 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

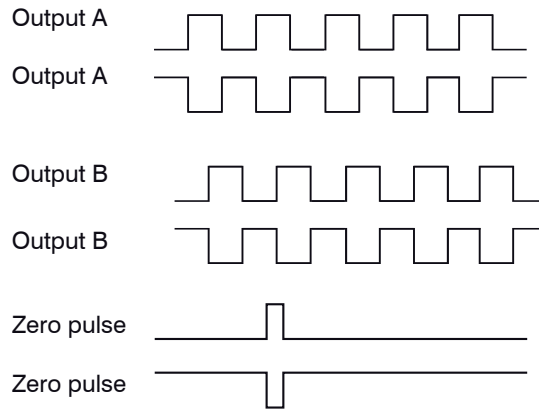


Fig. 17 Signal output

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. 18 Pin assignment E, E830

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

Fig. 19 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. 20 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, see Chap. 8.

7. Liability for Material Defects

All components of the device have been checked and tested for functionality at the factory. However, if defects occur despite our careful quality control, MICRO-EPSILON or your dealer must be notified immediately.

The liability for material defects is 12 months from delivery.

Within this period, defective parts, except for wearing parts, will be repaired or replaced free of charge, if the device is returned to MICRO-EPSILON with shipping costs prepaid. Any damage that is caused by improper handling, the use of force or by repairs or modifications by third parties is not covered by the liability for material defects. Repairs are carried out exclusively by MICRO-EPSILON.

Further claims can not be made. Claims arising from the purchase contract remain unaffected. In particular, MICRO-EPSILON shall not be liable for any consequential, special, indirect or incidental damage. In the interest of further development, MICRO-EPSILON reserves the right to make design changes without notification.

For translations into other languages, the German version shall prevail.

8. Service, Repair

If the sensor is defective, please send us the effected parts for repair or exchange.

If the cause of a fault cannot be clearly identified, please send the entire measuring system to:

MICRO-EPSILON MESSTECHNIK
GmbH & Co. KG

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info@micro-epsilon.de

www.micro-epsilon.com

9. Decommissioning, Disposal

➡ Remove 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.

Appendix

Accessories and Spare Parts

TR1-WDS Guide pulley adjustable with mounting socket, see [Fig. 21](#)

TR3-WDS Guide pulley fix with mounting socket, see [Fig. 22](#)

WE-xxxx-CLIP Wire extension with wire clip, see [Fig. 23](#), wire length in millimeters for xxxx, max. 10.000 mm (33 ft)

Adjust the distance,
that the wire
can't snap off!

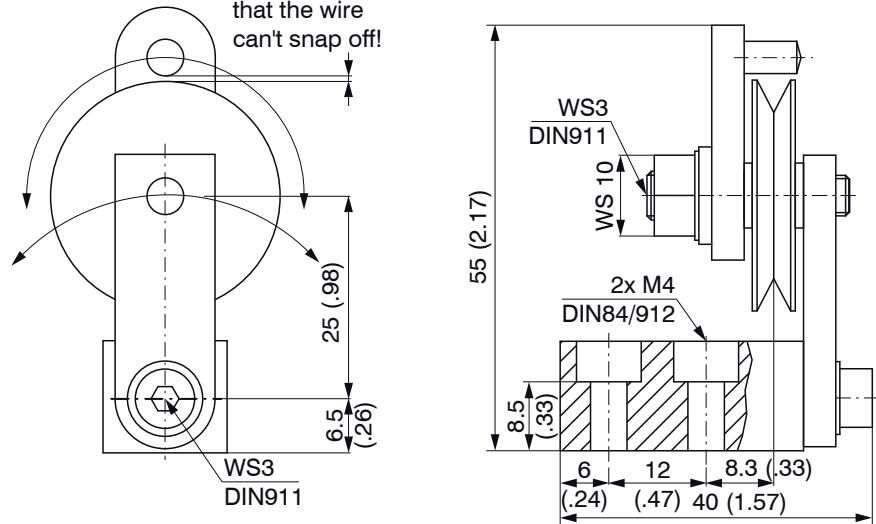


Fig. 21 Guide pulley TR1-WDS with mounting socket, dimensions in mm (inches), not to scale

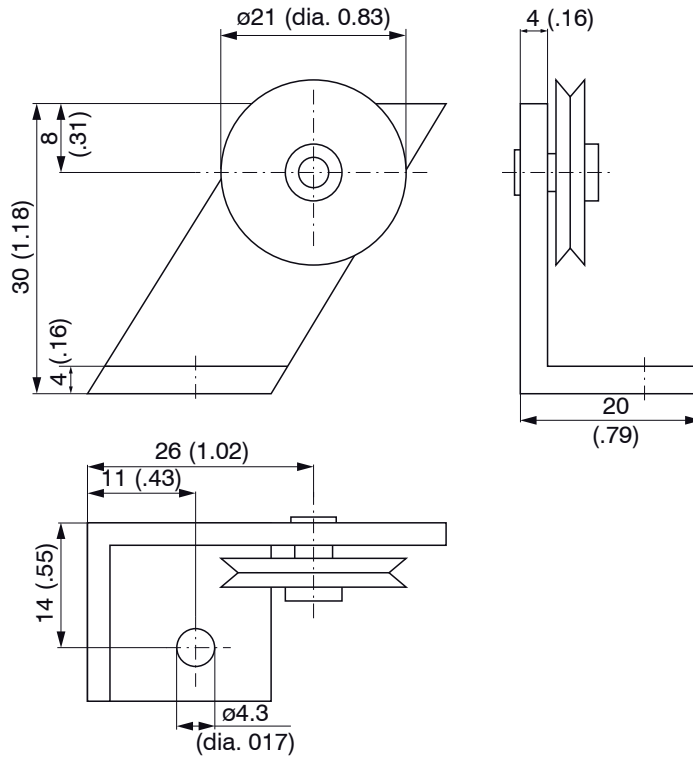


Fig. 22 Guide pulley TR3-WDS fix with mounting socket, dimensions in mm (inches), not to scale

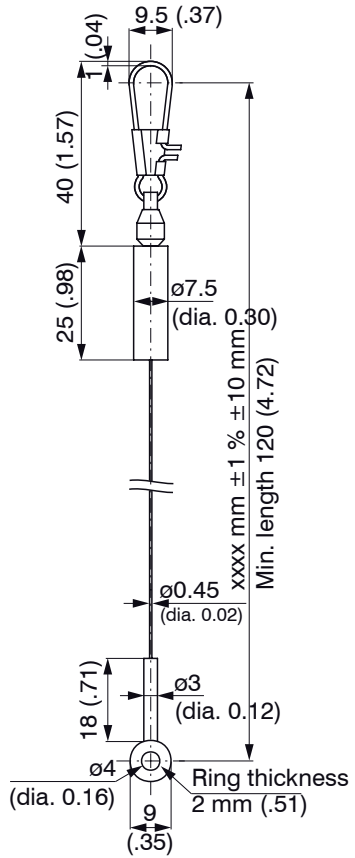


Fig. 23 Wire extension WE-xxxx-CLIP, dimensions in mm (inches), not to scale



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