



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 GmbH & Co. KG Königbacher Straße 15 94496 Ortenburg / Germany

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 ac-

cording to Annex II. Part A exists.

Ortenburg, May 22th 2019

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## 1. Safety

System operation assumes knowledge of the operating instructions.

#### 1.1 Symbols Used

The following symbols are used in these operating instructions:

**▲** CAUTION

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

NOTICE

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

 $\rightarrow$ 

Indicates a user action.

i

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:
Storage temperature:
Humidity:
-20 °C to +80 °C (-4 to +176 °F)
-40 °C to +80 °C (-40 to +176 °F)
5 - 95 % (non-condensing)

- Ambient pressure: Atmospheric pressure

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).

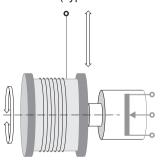


Fig. 1 Draw-wire sensor with potentiometer

#### 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 <sup>1</sup>			Р			P/E/E830		
Measuring range mm		mm	50	150	250	500	750	
	P50 (C)	±0.5 %	0.25 mm	-	-	-	-	
Linearity (FSO)	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	
	W		-	0.1 mm	0.1 mm	0.15 mm	0.2 mm	
Resolution	C/H		quasi infinite					
E/E			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)					
Matarial	Housing		Plastics					
Material	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 (mir	1)	N	Approximately 1					
Wire extension force (ma	x)	N	Approximately 2.5					
Protection class	Р		IP 20					
DIN EN60529	E/E830		Depends on sensor design					
Electrical connection	Р			S	oldering tags	3		
Electrical connection	E/E830		Depends on sensor design					
Woight	Р	g			45			
Weight	E/E830	g			80			



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

wireSENSOR, WPS

#### 2.4 Technical Data MK46

Model			WPS-1000 MK46	WPS-1250 MK46	WPS-1250 MK46	
Output type 1			Р	P/U/I	E/E830	
Measuring range		mm	1000	1250	1250	
	E/E830	±0.05 %	-	-	±0.625 mm	
Linearity (FSO)	W	±0.25 %	±2.5 mm	±3.12 mm	-	
	Н	±0.1 %	±1 mm	±1.2 mm	-	
	W		0.3 mm	0,4 mm	-	
Resolution	Н			quasi infinite		
	E/E830			4 pulses per mm		
Sensor element	Potentiometer or incremental encoder			ıl encoder		
Operating temperature		°C/ °F	-20 +80 (-4 +176 °F)			
Material	Housing		Plastics			
iviaterial	Wire		Stainless steel with polyamid sheath (wire)			
Wire diameter		mm	0.36			
Wire mounting			wire clip			
Sensor mounting			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			Solde	Solder tags (		
Wire acceleration		m/s²	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	5 mm	0.43 mm		
Sensor element		Wire pote	ntiometer or increme	ental encoder		
Operating temperature	°C/ °F	-20 +80 (-4 +176 °F)				
Material Housing	ı	Plastics				
Material Wire	)	Stainless steel with polyamid sheath (wire)				
Wire diameter	mm		0.45			
Wire mounting			wire clip			
Sensor mounting		Mountin	ng holes and mountii	ng 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 <sup>2</sup>	5 5 5		5		
Weight (with cable)	g	200 225 270				

E/E830 = Incremental encoder

P = Potentiometer

FSO = Full Scale Output

## **A** 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.

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

#### 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	24	-00	
Linearity (FSO)		±0.15 % FSO	±0.05	% FSO	
Resolution/Sensibility		Quasi infinite	6.83 pu	lses/mm	
Sensor element		Hybrid potentiometer	Increment	al encoder	
Operating temperature	°C	-2	-20 +80		
Material Housing		Plastic, PBT GF20			
Wire		Coated polamide stainless steel (ø 0.45 mm)			
Wire diameter	mm		0.45		
Wire mounting		\	Vire clip		
Sensor mounting		Mounting holes	on the sensor ho	using	
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/s²	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 rai	nge	mm	2300	3500	5000		
Linearity (FSC	0)		±0.15 %	±0.3 %	±0.4 %		
Resolution/se	nsitivity			Quasi infinite			
Sensor eleme	ent			Potentiometer			
Temperature i	range	°C		-20 +80			
	Housing			Plastic, PA 6 GF 30			
Material	Wire		Coated polyamid stainless steel				
ivialerial	Protection		Aluminum				
	сар		Aluminum				
Wire diameter	r	mm		ø 0.45 (0.45 dia.)			
Wire mounting	g			Wire clip			
Sensor moun			Moun	ting holes / mounting gro	ooves		
Wire retraction	n 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 o	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	1	
Measuring range		mm	3000	5000	7500	
Linearity		FSO	0.15	0.15	0.15	
Resolution				Quasi infinitely		
Sensor element				Hybrid potentiomet	er	
Operating temperature		°C/ °F	-20 +80 (-4 +176 °F)			
Material	Housing		Plastics PA6			
Material	Wire		0,45 mm encapsulated			
Wire diameter		mm	0.45			
Wire mounting				Wire clip		
Sensor mounting				Mounting holes		
Wire retraction force (mi	in)	N	5.5	5	7	
Wire extension force (ma	ax)	N	8	8	13	
Protection class			IP 65			
Electrical connection			Built-in cable, radial, 1 m long			
Wire acceleration		m/s²	25	25	15	
Weight (with cable)		kg	0.75	0.75	0.9	

P = potentiometer

FSO = Full scale Output

U = voltage I = current

<sup>1)</sup> 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.

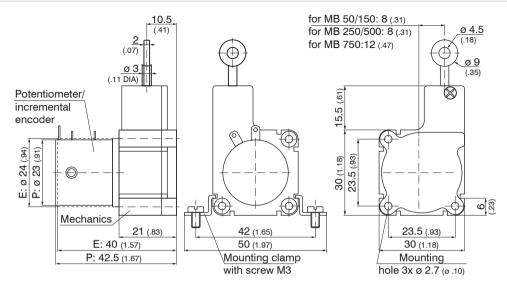


Fig. 2 Dimensional drawing WPS- ... -MK30 with potentiometer or encoder, dimensions in mm (inches), not to scale

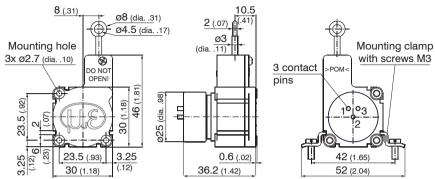


Fig. 3 Dimensional drawing WPS- ... -50MK30 with potentiometer or encoder, dimensions in mm (inches), not to scale

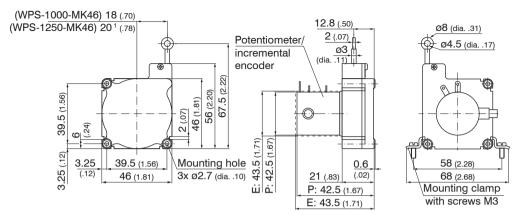


Fig. 4 Dimensional drawing WPS- ... -MK46, with potentiometer or encoder, dimensions in mm (inches), not to scale

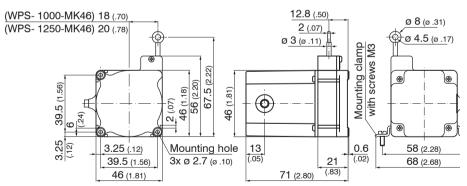


Fig. 5 Dimensional drawing WPS- ... -MK46-CR, with potentiometer and radial cable, dimensions in mm (inches), not to scale

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

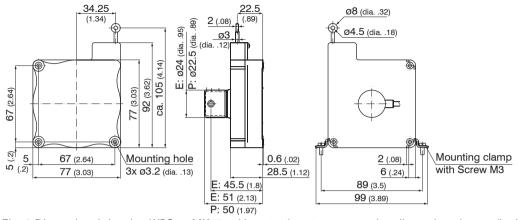


Fig. 6 Dimensional drawing WPS-...-MK77, with potentiometer or encoder, dimensions in mm (inches), not to scale

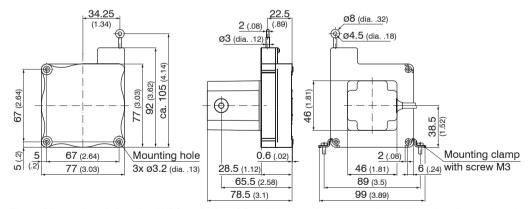


Fig. 7 Dimensional drawing WPS-...-MK77-CR, with potentiometer and radial cable, dimensions in mm (inches), not to scale

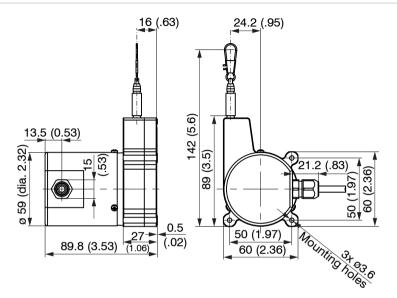


Fig. 8 Dimensional drawing WPS- ... -MK60-CR, with potentiometer, dimensions in mm, not to scale

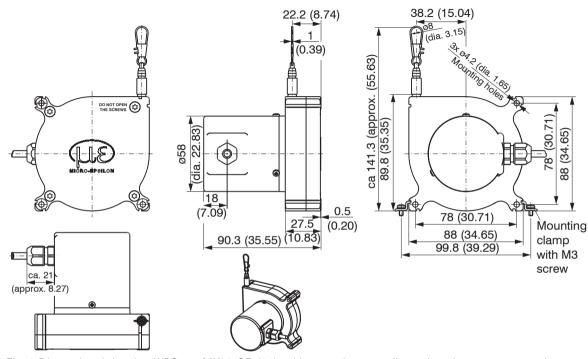


Fig. 9 Dimensional drawing WPS- ... -MK88-CR (01), with potentiometer, dimensions in mm, not to scale

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

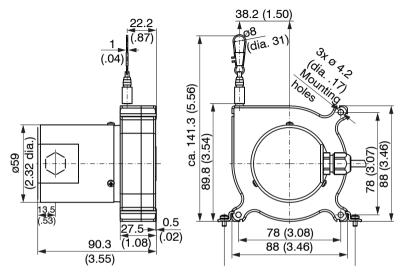


Fig. 10 Dimensional drawing WPS- ... -MK88-CR, with potentiometer, dimensions in mm, not to scale

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

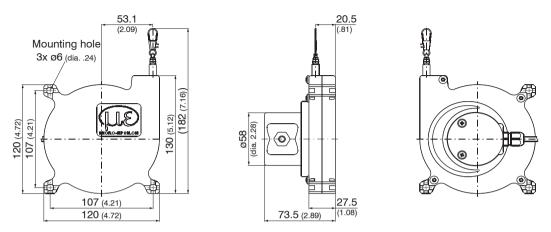


Fig. 11 Dimensional drawing WPS-...-MK120-CR, measuring ranges 3000 and 5000 mm, dimensions in mm (inches), not to scale

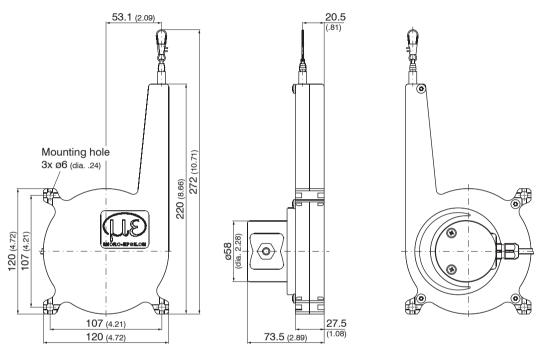


Fig. 12 Dimensional drawing WPS-...-MK120-CR, measuring ranges 7500 mm, dimensions in mm (inches), not to scale

## **▲** CAUTION

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

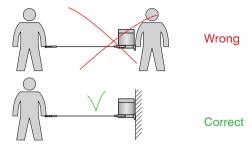
## NOTICE

Do not twist the measuring wire!

## 4.3 Wire Guide and Fastening

If the measuring wire has to be extracted from the sensor 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.

- 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.

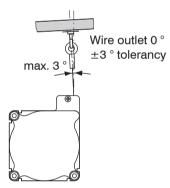


Fig. 13 Wire fastening and misalignment

### 4.4 Output Specifications Analog

#### 4.4.1 Potentiometer Output

Output		Plug M16 -SA / -SR	Integrated cable- CA / -CR	Open contacts	
Potentiometer out	put (P)				
Supply voltage	max. 32 VDC at 1 kOhm / max. 1 W	5 • • 4			
Resistance	1 kOhm ±10 % (potentiometer)	3 1		71-W-3	38 81
Temperature coefficient	±0.0025 % d.M./°C	View <sup>1</sup>			
Viper current	≤ 10 <i>µ</i> A	1 = input +	white = input +	1 = input +	② WIPER
Sensitivity	Depends on measuring range	2 = ground 3 = signal	brown = ground green = signal	2 = signal 3 = ground	ccw 1 — CLOCKWISE — 3 CW

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 viper is limited.

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)						
Supply voltage	14 27 VDC (non stabilized ¹)					
Current consumption	max. 30 mA	12				
Output voltage	0 10 VDC Options 0 5 / ±5 V	5 9 4				
Output current	2 mA max.	$\begin{bmatrix} 3 & 7 & 8 & 1 \\ & 1 & 8 & 1 \end{bmatrix}$				
Load impedance	> 5 kOhm	7/11/6/				
Signal noise	0.5 mV <sub>eff</sub>	View <sup>2</sup>				
Temperature coefficient	±0.005 % FSO/°C					
Einstellbereiche (if supp	ported by the model)	1 = supply	white = supply			
Zero	±20 % d.M.	2 = ground	brown = ground			
Sensitivity	±20 %	3 = signal 4 = ground	green = signal 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)				
Current consumption	max. 35 mA				
Output current	4 20 mA				
Load	< 600 Ohm	3 8 1			
Signal noise	< 1.6 µA <sub>eff</sub>	7,116			
Temperature coefficient	±0.01 % FSO/K	View <sup>2</sup>			
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

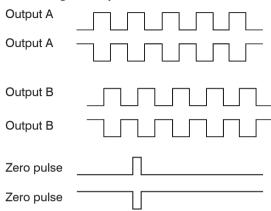


Fig. 17 Signal output

Output TTL01	NPN (5 VDC ±	NPN (5 VDC ±5 %)			
Level High	≥ UB - 0.2 V	≥ UB - 0.2 V			
Level Low	0.55 - 0.75 V	0.55 - 0.75 V			
Load High	≤ 1.85 mA	≤ 1.85 mA			
Output	A, B, 0	A, B, 0			
Output TTL02	Linedriver (5 VI	Linedriver (5 VDC ±5 %)			
Level High	≥ 2.0 V	(with I= -40 mA)			
Level Low	≤ 0.5 V	(with I= 40 mA)			
Load High	≤ 40 mA				
Output	A, $\overline{A}$ , B, $\overline{B}$ , 0				

Output E	Push-pull (5 VDC)
Level High	≥ UB -2.5 V
Level Low	≤ 0.5 V
Load High	≤ 50 mA
Output	A, B, 0
Output E830	Push-pull (8 30 VDC)
Level High	≥ UB -3 V
Level Low	≤ 2.5 V
Load High	≤ 50 mA
Output	A, B, 0

## 4.5.2 Pin Assignment

Pin assignment E, E830				
Cable color	Assignment			
White	0 V			
Brown	+UB			
Green	А			
-	Ā			
Yellow	В			
-	B			
Gray	0			

Fig. 18 Pin assignment E, E830

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

Fig. 19 Pin assignment TTL01

Pin assignment TTL02		
Cable color	Assignment	
Red	+UB	
Black	0 V	
Brown	A	
Black	Ā	
Orange	В	
Black	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 Königbacher Str. 15 94496 Ortenburg / Germany

Tel. +49 (0) 8542/168-0 Fax +49 (0) 8542/168-90 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)

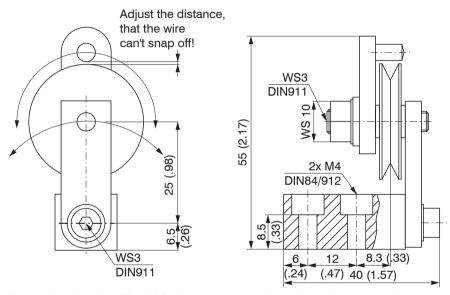


Fig. 21 Guide pulley TR1-WDS with mounting socket, dimensions in mm (inches), not to scale

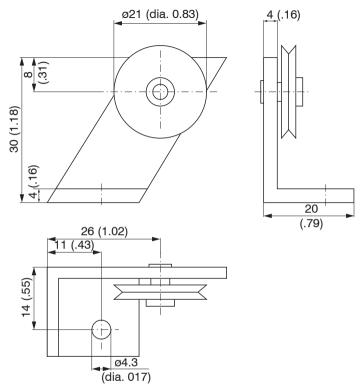


Fig. 22 Guide pulley TR3-WDS fix with mounting socket, dimensions in mm (inches), not to scale

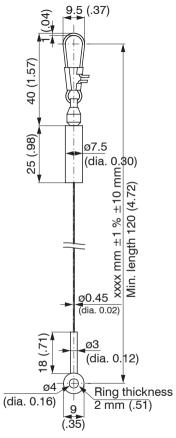


Fig. 23 Wire extension WE-xxxx-CLIP, dimensions in mm (inches), not to scale



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