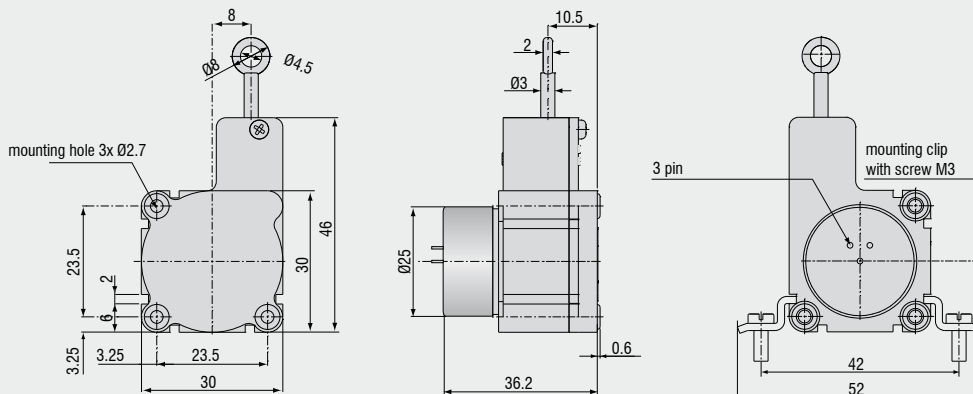**MICRO-EPSILON**

More Precision.

wireSENSOR
Draw-wire displacement sensors
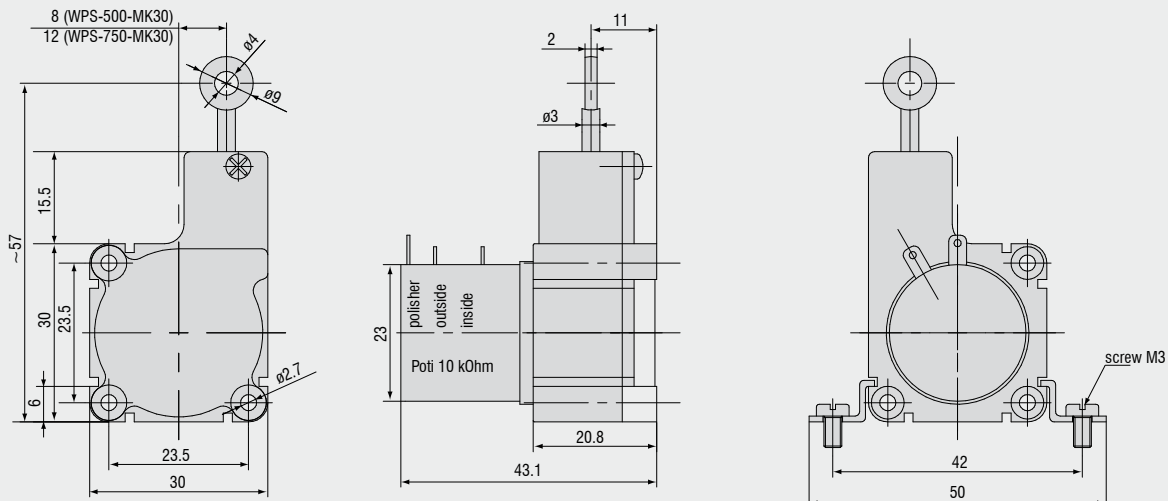
- **Robust plastic housing**

- **Customized versions for OEM**

- **Conductive plastic/wire/ hybrid potentiometer**

- **Smallest design in its class**

Model MK30-P (Measuring range 50mm)

Model MK30-P (Measuring range 150/250/500/750/1000/1250mm)

Model			WPS-50-MK30	WPS-150-MK30	WPS-250-MK30	WPS-500-MK30	WPS-750-MK30
Output					P		
Measuring range			50mm	150mm	250mm	500mm	750mm
Linearität	conductive plastic pot. P50	±0.5% FSO	0.25mm	-	-	-	-
	wire pot. P25	±0.25% FSO	-	-	0.625mm	1.25mm	1.87mm
	hybrid pot. P25	±0.25% FSO	-	0.375mm	-	-	-
	hybrid pot. P10	±0.1% FSO	-	-	0.25mm	0.5mm	0.75mm
Resolution	conductive plastic pot.				quasi infinite		
	wire pot.		-	0.1mm	0.1mm	0.15mm	0.2mm
conductive plastic pot./hybrid pot.					quasi infinite		
Sensor element					conductive plastic/wire/hybrid potentiometer		
Temperature range					-20 ... +80°C		
Material	housing				plastic		
	draw wire				coated polyamid stainless steel (ø 0.36mm)		
Wire mounting					eyelet		
Sensor mounting					mounting holes / mounting grooves		
Wire acceleration					appr. 5g		
Wire retraction force (min)					appr.1N		
Wire extension force (max)					appr. 2.5N		
Protection class					IP 20		
Electrical connection					soldering tag		
Weight					appr. 45g		

FSO = Full Scale Output

Article description

WPS - 50 - MK30 - P25

Output option:
potentiometer P50 (linearity ±0.5 % FSO)
potentiometer P25 (linearity ±0.25 % FSO)
potentiometer P10 (linearity ±0.1 % FSO)

Model MK30

Measuring range in mm

- **Robust plastic housing**

- **Customized versions for OEM**

- **Smallest design in its class**

- **Incremental encoder**

Model MK30

8 (WPS-500-MK-E)
12 (WPS-750-MK30-E)

ø8
ø4.5

45.5
30
23.5
6
2
3.25
3.25
23.5
30
ø2.7
mounting hole

10.5
2
ø3
ø24
21
0.6
40

mounting clip
with screw M3
42
52

Model		WPS-500-MK30	WPS-750-MK30
Output		E/E830	E/E830
Measuring range		500mm	750mm
Linearity E	±0.05% FSO	0.25mm	0.375mm
Resolution		10 Pulses/mm	6.7 Pulses/mm
		0.1mm	0.15mm
Sensor element		Incremental encoder	
Temperature range		-20 ... +80°C	
Material	housing	plastic	
	draw wire	coated polyamid stainless steel (ø 0.36mm)	
Wire mounting		eyelet	
Sensor mounting		mounting holes / mounting grooves	
Wire acceleration		appr. 5g	
Wire retraction force (min)		appr. 1N	
Wire extension force (max)		appr. 2.5N	
Protection class		IP54	
Electrical connection		cable radial, 1m	
Weight		ca. 80g	

FSO = Full Scale Output
Specifications for digital outputs on page 47.

Article description
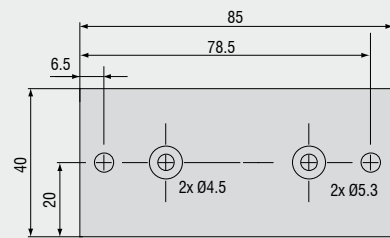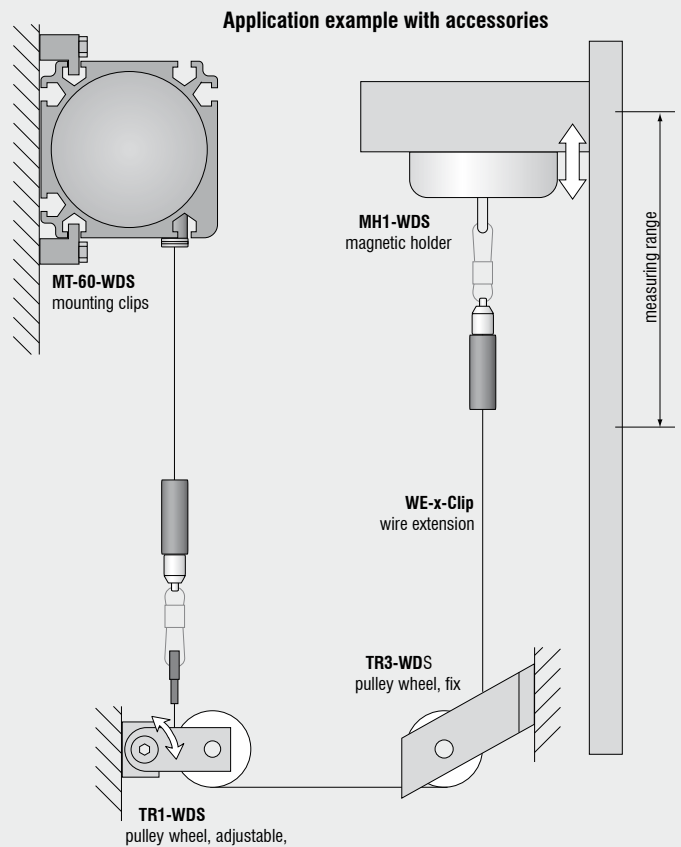
WPS - 500 - MK30 - E830

Output option:
encoder E (5 ... 24VDC)
encoder E830 (8 ... 30VDC)

Model MK30

Measuring range in mm

wireSENSOR Accessories and mounting

WE-x-M4, WE-x-Clip	Wire extension x=length
TR1-WDS	Pulley wheel, adjustable
TR3-WDS	Pulley wheel, fixed
GK1-WDS	Attachment head for M4
MH1-WDS	Magnetic holder for wire mounting
MH2-WDS	Magnetic holder for sensor mounting
MT-60-WDS	Mounting clamp for WDS-P60
FC8	Female connector for WDS, 8-pin
FC8/90	Female connector 90° for WDS
PC 3/8	Sensor cable, lenght 3 m
PS 2010	Power supply (chassis mounting 35 x 7.5 mm); input 120/230 VAC; output 24 VDC/2.5 A; L/B/H 120 x 20 x 40 mm
WDS-MP60	Mounting plate for P60 sensors

Application example with accessories

MH1-WDS
magnetic holder

MT-60-WDS
mounting clips

measuring range

WE-x-Clip
wire extension

TR3-WDS
pulley wheel, fix

TR1-WDS
pulley wheel, adjustable,

85
78.5
6.5
40
20
2x Ø4.5
2x Ø5.3

Mounting plate WDS-MP60

Installation information:
Wire attachment: The free return of the measurement wire is not permissible and it is essential that this is avoided during installation.

Wire exit angle:
When mounting a draw-wire displacement sensor, a straight wire exit (±3° tolerance) must be taken into account. If this tolerance is exceeded, increased material wear on the wire and at the wire aperture must be expected.

wire aperture 0° (±3° tolerance)

input +
ground
signal

1
2   100 %
3

R1K

1 = white
2 = brown   0 %
3 = green
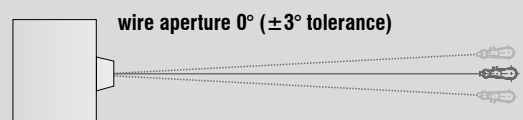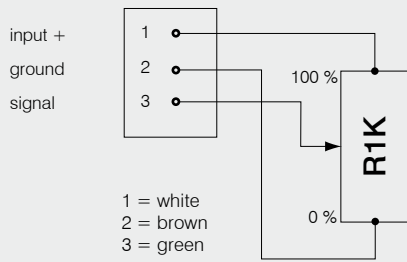
Potentiometric output (P)	
Supply voltage	max. 32VDC at 1kOhm / 1 Wmax
Resistance	1kOhm ±10% (potentiometer)
Temperature coefficient	±0.0025% FSO/°C
Sensitivity	depends on measuring range individually shown on test report

supply   1
ground   2   zero   gain
signal   3
ground   4   U
           5
           6
           7   0-10 Vdc
           8
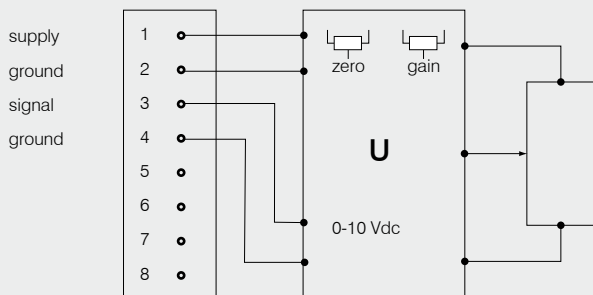
Voltage output (U)	
Supply voltage	14 ... 27VDC (non stabilized)
Current consumption	30mA max
Output voltage	0 ... 10VDC
	Option 0 ... 5 / ±5V
Load impendance	>5kOhm
Signal noise	$0.5mV_{eff}$
Temperature coefficient	±0.005% FSO/°C
Electromagnetic compatibiity (EMC)	EN 50081-2
	EN 50082-2
Adjustment ranges	
Zero	±20 %FSO
Sensitivity	±20 %

supply   1
ground   2   zero   gain
           3
           4   I
           5
           6
           7   4-20 mA
           8
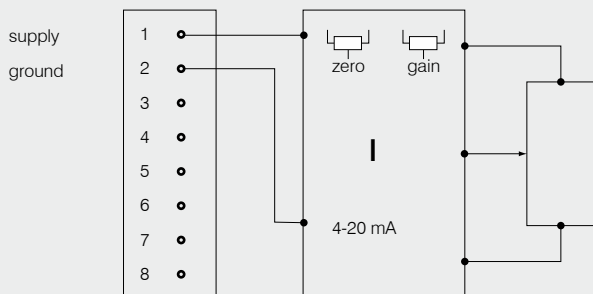
| Current Output (I)	
Supply voltage	14 ... 27VDC (non stabilized)
Current consumption	35mA max
Output current	4 ... 20mA
Load	<600Ohm
Signal noise	$<1.6\mu A_{eff}$
Temperature coefficient	±0.01% FSO/°C
Electromagnetic compatibility (EMC)	EN 50081-2
	EN 50082-2
Adjustment ranges	
Zero	±18% FSO
Sensitivity	±15%

Contact description

1 UB Encoder power supply connection.

2 GND Encoder ground connection. The voltage drawn to GND is UB.

3 Pulses + Positive SSI pulse input. Pulse + forms a current loop with pulse -. A current of approx. 7 mA in direction of pulse + input generates a logical 1 in positive logic.

4 Data + Positive, serial data output of the differential line driver. A High level at the output corresponds to logical 1 in positive logic.

5 ZERO Zero setting input for setting a zero point at any desired point within the entire resolution. The zeroing process is triggered by a High pulse (pulse duration ≥100 ms) and must take place after the rotating direction selection (UP/DOWN). For maximum interference immunity, the input must be connected to GND after zeroing.

6 Data - Negative, serial data output of the differential line driver. A High level at the output corresponds to logical 0 in positive logic.

7 Pulses - Negative SSI pulse input. Pulse - forms a current loop with pulse +. A current of approx. 7 mA in direction of pulse - input generates a logical 0 in positive logic.

8 / 10
$\overline{\text{DATAVALID}}$
$\overline{\text{DATAVALID}}$ $\overline{\text{MT}}$ Diagnosis outputs $\overline{\text{DV}}$ and $\overline{\text{DV}}$ $\overline{\text{MT}}$ Jumps in data word, e.g. due to defective LED or photoreceiver, are displayed via the $\overline{\text{DV}}$ output. In addition, the power supply of the multiturn sensor unit is monitored and the $\overline{\text{DV}}$ $\overline{\text{MT}}$ output is set when a specified voltage level is dropped below. Both outputs are Low-active, i.e. are switched through to GND in the case of an error.

9 UP/DOWN UP/DOWN counting direction input. When not connected, this input is on High. UP/ $\overline{\text{DOWN}}$-High means increasing output data with a clockwise shaft rotating direction when looking at the flange. UP/ $\overline{\text{DOWN}}$-Low means increasing values with a counter-clockwise shaft rotating direction when looking at the flange.

11 / 12 Not in use

Anschlussbelegung

Pin	Cable color	Assignment
1	brown	UB
2	black	GND
3	blue	Pulses +
4	beige	Data +
5	green	ZERO
6	yellow	Data -
7	violet	Pulses -
8	brown/yellow	$\overline{\text{DATAVALID}}$
9	pink	UP/ DOWN
10	black/yellow	$\overline{\text{DATAVALID}}$ $\overline{\text{MT}}$
11	-	-
12	-	-
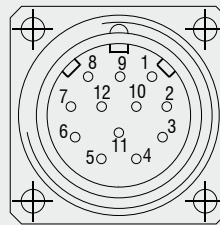
Please use leads twisted in pairs for extension cables.

Inputs

Control signals UP/DOWN and Zero

Level High	> 0.7UB
Level Low	< 0.3UB

Connection: UP/DOWN input with 10kohms to UB, zeroing input with 10kohms to GND.

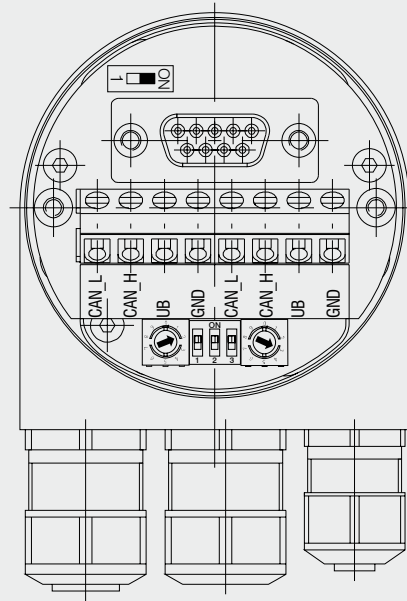SSI pulse

Optocoupler inputs for electrical isolation

Outputs

SSI data RS485 driver

Diagnostic outputs

Push-pull outputs are short-circuit-proof

Level High	> UB -3.5V	(with I = -20mA)
Level Low	≤ 0.5V	(with I = 20mA)

CANopen features

Bus protocol	CANopen
Device profile	CANopen - CiA DSP 406, V 3.0
CANopen Features	Device Class 2, CAN 2.0B
Operating modes (with SDO progr.)	Polling Mode (asynch, via SDO) Cyclic Mode (asynch-cyclic) The encoder cyclically sends the current process actual value without a request by a master. The cycle time can be parameterized for values between 1 and 65535 ms. Synch Mode (synch-cyclic) The encoder sends the current actual process value after receiving a synch telegram sent by a master. The synch counter in the encoder can be parameterized so that the position value is not sent until after a defined number of synch telegrams. Acyclic Mode (synch-acyclic)
Preset value	With the "Preset" parameter the encoder can be set to a desired actual process value that corresponds to the defined axis position of the system. The offset value between the encoder zero point and the mechanical zero point of the system is saved in the encoder.
Rotating direction	With the operating parameter the rotating direction in which the output code is to increase or decrease can be parameterized. Scaling The steps per revolution and the total revolution can be parameterized.
Scaling:	The steps per revolution and the total revolution can be parameterized.
Diagnose	The encoder supports the following error messages: - Position and parameter error - Lithium cell voltage at lower limit (Multiturn)
Default setting	50kbit/s, node number 1

Setting of terminating Resistor for CANopen

ON = Last user
OFF = User X

Setting CANopen baud rate

Baud rate	Setting Dip Switch		
	1	2	3
10kBit/s	OFF	OFF	OFF
20kBit/s	OFF	OFF	ON
50kBit/s	OFF	ON	OFF
125kBit/s	OFF	ON	ON
250kBit/s	ON	OFF	OFF
500kBit/s	ON	OFF	ON
800kBit/s	ON	ON	OFF
1MBit/s	ON	ON	ON

Contact description CANopen

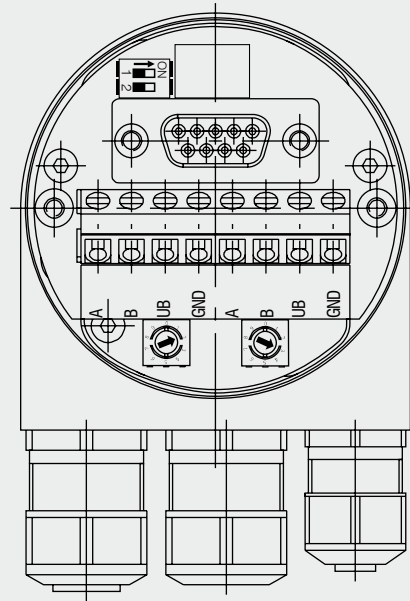|	
CAN_L	CAN Bus Signal (dominant Low)
CAN_H	CAN Bus Signal (dominant High)
UB	Versorgungsspannung 10...30VDC
GND	Ground contact for UB
	(Terminals with the same designation are internally interconnected)

Settings of user address for CANopen

Address can be set with rotary switch. Example: User address 23
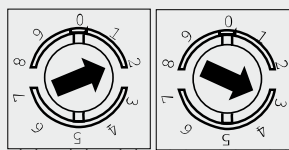
Profibus-DP features

|	
Bus protocol	Profibus-DP
Profibus features	Device Class 1 and 2
Data exch. functions	Input: Position value Additional parameterized speed signal (readout of the current rotary speed) Output: Preset value
Preset value	With the "Preset" parameter the encoder can be set to a desired actual value that corresponds to the defined axis position of the system.
Parameter functions	Rotating direction: With the operating parameter the rotating direction for which the output code is to increase or decrease can be parameterized.
Diagnose	The encoder supports the following error messages: - Position error - Lithium cell voltage at lower limit (Multiturn)
Default setting	User address 00

Settings of terminating resistors for Profibus-DP

ON = last user
OFF = user X

Settings of user address for Profibus-DP

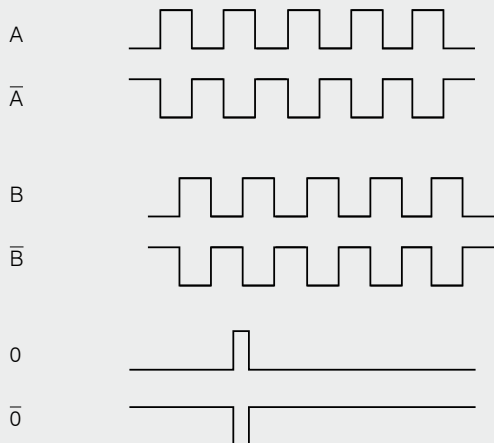Address can be set with rotary switch. Example: User address 23
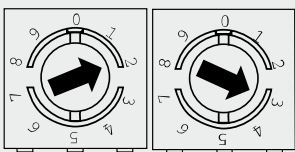
Contact description Profibus-DP

A A negative serial data line

B Positive serial data line

UB Supply voltage 10...30VDC

GND Ground contact for UB

(Terminals with the same designation are internally interconnected)

Output specifications Incremental encoder

Signal output

A

$\overline{A}$

B

$\overline{B}$

0

$\overline{0}$

Output TTL	Linedriver (5VDC)	
Level High	$\geq 2.5V$	(with I = -20mA)
Level Low	$\leq 0.5V$	(with I = 20mA)
Load High	$\leq 20mA$	
Output	A, $\overline{A}$, B, $\overline{B}$, O	

Output HTL	Push-pull (10 ... 30VDC)	
Level High	$\geq UB -3V$	(with I = -20mA)
Level Low	$\leq 1.5V$	(with I = 20mA)
Load High	$\leq 40mA$	
Output	A, $\overline{A}$, B, $\overline{B}$, O	

Output E	Push-pull (5VDC)
Level High	UB -2.5V
Level Low	$\leq 0.5V$
Load High	$\leq 50mA$
Output	A, B, O

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

Pin assignment TTL, HTL

Pin	Cable color	Assignment
1	pink	B inv.
2	blue	UB Sense
3	red	N (Nullimpulses)
4	black	N inv. (Nullimpulses inv.)
5	brown	A
6	green	A inv.
7	-	-
8	grey	B
9	-	-
10	white/green	GND
11	white	GND Sense
12	brown/green	UB
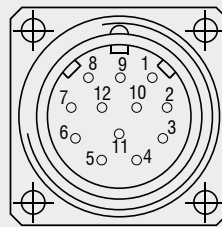
Pin 2 and Pin 12 are internally connected as well as Pin 11 and 10.
For cable length >10m twisted pair wires are required.

Connection assignment E, E830

Pin	Cable color	Assignment
-	white	0V
-	brown	+UB
-	green	A
-	-	$\overline{A}$
-	yellow	B
-	-	$\overline{B}$
-	grey	0

High performance sensors made by Micro-Epsilon

Sensors and systems for displacement, position and dimension
Eddy current displacement sensors
Optical and laser sensors
Capacitve sensors
Linear inductive sensors
Draw wire displacement sensors
Laser micrometer
2D/3D profile sensors (laser scanner)
Image processing

Sensors and systems for non-contact temperature measurement
IR handheld
Stationary IR sensors
Thermal imager

Turn key systems for quality inspection
of plastics and film
of tires and rubber
of endless band material
of automotive components
of glass

MICRO-EPSILON