Measuring wheel system | **MWE02** | **Compact**

The MWE02 measuring wheel system is the ideal solution for reliable speed, position and distance measurement in applications with linear movements. These are recorded rotationally via the measuring wheel with attached encoder and converted into measurement data.

An integrated spring ensures the contact pressure of the measuring wheel on the measuring surface required for reliable measured value acquisition. Due to its compact design, the system is also suitable for the tightest installation spaces and can be installed quickly and easily horizontally, vertically or overhead.

RoHS

Push-Pull HTL | RS422 TTL | Open Collector NPN

Features

- Compact measuring system with flexible mounting options: vertical, horizontal or overhead. Encoder can be mounted on both sides in 30° steps on the encoder spring arm.
- Integrated spring for optimum contact pressure of the measuring wheel on the measuring surface and as compensation for unevenness.
- Robust incremental Sendix encoder with max. resolution up to 2500 pulses/revolution and max. speed up to 4500 min^{-1}.
- Measuring wheels for different measuring surfaces: Available with O-ring NBR70, smooth plastic (polyurethane) or diamond knurled (aluminum) coating in 200 mm and 6“ circumferences.
- Integrated mechanical spring travel limitation.

Benefits

- Simple and fast mounting even for the tightest installation spaces.
- Direct and reliable measurement on the measuring surface for precise speed, position and distance measurement.
- Accurate measurement values for efficient production operation.
- Matching measuring wheels for any measuring surface.
- Spring overload protection ensures long service life.

Single components

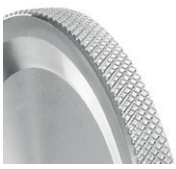
Encoder spring arm

Encoder Sendix Base KIS40

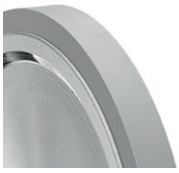
Measuring wheels with circumference 200 mm and 6“

The right measuring wheel coating for every surface of the material to be measured:

Diamond knurl



Plastic, smooth



O-ring

Measuring wheel system	MWE02	Compact

Order code

8.MWE02 . 121 . 3 X X 5 . 40 X X . XXXX

Type | a | b | c | d | e | f

a *Circumference measuring wheel*
2 = 200 mm
6 = 6“

b *Measuring wheel coating*
1 = diamond knurl (aluminum)
4 = plastic (polyurethane) smooth
7 = O-ring, NBR70

c *Mounted encoder*
40 = Sendix Base KIS40, incremental
(Other encoders on request. In addition to incremental encoders, absolute encoders, e.g. with IO-Link interface, can also be mounted.)

d *Output circuit / supply voltage*
3 = open collector NPN (with inverted signal) / 10 ... 30 V DC
4 = push-pull (with inverted signal) / 10 ... 30 V DC
6 = RS422 (with inverted signal) / 5 V DC
7 = open collector NPN (without inverted signal) / 10 ... 30 V DC
8 = push-pull (without inverted signal) / 10 ... 30 V DC
A = open collector NPN (with inverted signal) / 5 ... 30 V DC
B = push-pull (with inverted signal) / 5 ... 30 V DC
C = RS422 (with inverted signal) / 5 ... 30 V DC

e *Type of connection*
1 = axial cable, 2 m [6.56‘] PVC
2 = radial cable, 2 m [6.56‘] PVC
A = axial cable, special length PVC *)
B = radial cable, special length PVC *)

*) Available special lengths (connection types A, B):
3, 5, 8, 10, 15 m [9.84, 16.40, 26.25, 32.80, 49.21‘]
order code expansion .XXXX = length in dm
e.g.: 8.MWE02.121.3215.403A.1024.0050 (for cable length 5 m)

f *Pulse rate*
25, 50, 60, 100, 200, 360, 500, 512, 600, 1000, 1024, 2000, 2048, 2500
(e.g. 500 pulses => 0500)

Preferred numbers of pulses in relation to the measuring wheel circumference 200 mm

Pulse rate	Resolution	Measurement steps
200 ppr	1 pulse / mm	1 mm / pulse
500 ppr	2.5 pulses / mm	0.4 mm / pulse
1000 ppr	5 pulses / mm	0.2 mm / pulse
2000 ppr	10 pulses / mm	0.1 mm / pulse

Preferred numbers of pulses in relation to the measuring wheel circumference 6“

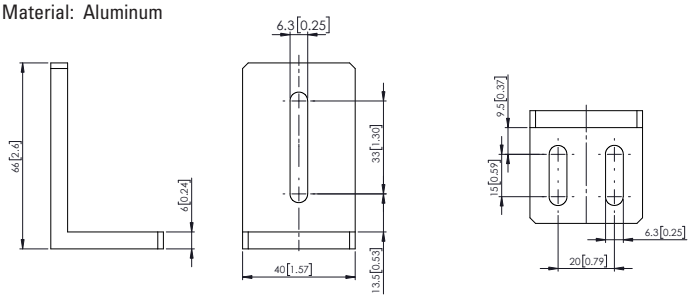
Pulse rate	Resolution	Measurement steps
600 ppr	100 pulses / inch	0.01 inch / pulse

Stock types
8.MWE02.121.3245.4042.2000 = measuring wheel circumf. 200 mm, PU
8.MWE02.121.3275.4042.2000 = measuring wheel circumf. 200 mm, O-ring
8.MWE02.121.3645.4042.0600 = measuring wheel circumf. 6“, PU
8.MWE02.121.3675.4042.0600 = measuring wheel circumf. 6“, O-ring

Measuring wheel system | MWE02 | Compact

Mounting accessories

		Order no.
Mounting bracket	Material: Aluminum	**8.0000.7000.0065**



Single components (included in scope of delivery)

			Order no.
Encoder spring arm		can be combined with encoder Sendix Base KIS40	**8.MWE02.121.0000.0000.0000**

Measuring wheels	circumference / coating:	200 mm / diamond knurl (aluminum)	**8.0000.3215.0006**
		200 mm / plastic, smooth (PU)	**8.0000.3245.0006**
		200 mm / O-ring (NBR70)	**8.0000.3275.0006**
		6“ / diamond knurl (aluminum)	**8.0000.3615.0006**
		6“ / plastic, smooth (PU)	**8.0000.3645.0006**
		6“ / O-ring (NBR70)	**8.0000.3675.0006**

O-rings		for measuring wheel circumf. 200 mm	**8.0000.7000.0067**
		for measuring wheel circumf. 6“	**8.0000.7000.0066**

Evaluation

		Order no.
Preset counter Codix 924	Multifunction device: - Tachometer with limit values - Position display with limit values - Time preset counter	**6.924.01XX.XXX**

Connection technology

		Order no.
Connector, self-assembly	M12 male connector with external thread, 8 pin, A coded, straight (metal)	**05.CMBS 8181-0**

Further accessories can be found in the accessories area of our website at: kuebler.com/accessories.
Additional connection technology can be found in the connection technology area of our website at: kuebler.com/connection_technology.

Measuring wheel system | **MWE02** | **Compact**

Technical data

Mechanical characteristics encoder spring arm

Materials	spring spring arm	spring steel aluminum
Weight		37 g
Total deflection		16 mm
Recommended preload		5 N (approx. 6,5 mm spring deflection)
Recommended operating travel (continuous)		±4 mm [1] (from the recommended preload)
Spring load max.		20 N
Spring operating life		2.0 Mio. cycles [2]

Mechanical characteristics measuring wheel

Materials	measuring wheel coating	aluminum diam. knurl: aluminum	plastic: PU	O-ring: NBR70
Bore diameter		6 mm	6 mm	6 mm
Wide		5,5 mm	6,5 mm	5,5 mm
Weight	circumference 200 mm circumference 6“	38,5 g 25,0 g	41,5 g 23,5 g	36,0 g 21,5 g

Mechanical characteristics encoder Sendix Base KIS40

Flange		clamping-synchro flange, ø 40 mm
Shaft		ø 6 x 12.5 mm, with flat
Maximum speed		4500 min^{-1}
Starting torque – at 20 °C [68 °F]		< 0.05 Nm
Mass moment of inertia		approx. 0.2 x 10^{-6} kgm^2
Shaft load capacity	radial axial	40 N 20 N
Weight		approx. 0.17 kg [6.00 oz]
Protection acc. to EN 60529		IP64
Working temperature range		-20 °C ... +70 °C [-4 °F ... +158 °F]
Materials	shaft flange housing cable	stainless steel aluminum aluminum PVC
Shock resistance acc. to EN 60068-2-27		1000 m/s^2, 6 ms
Vibration resistance acc. to EN 60068-2-6		100 m/s^2, 55 ... 2000 Hz

Electrical characteristics encoder Sendix Base KIS40

Output circuit		**RS422** (TTL comp.)	**Push-pull** [3] (7272 comp.)	**Open collector NPN** (7273)
Supply voltage		5 V DC (±5 %) / 5 ... 30 V DC	10 ... 30 V DC / 5 ... 30 V DC	10 ... 30 V DC / 5 ... 30 V DC
Power consumption with inverted signal (no load)		typ. 40 mA max. 90 mA / max. 165 mA	typ. 50 mA max. 100 mA	100 mA
Permissible load / channel		max. +/- 20 mA	max. +/- 20 mA	20 mA sink at 30 V DC
Pulse frequency		max. 250 kHz	max. 250 kHz	max. 250 kHz
Signal level	HIGH LOW	min. 2.5 V max. 0.5 V	min. +V - 2.0 V max. 0.5 V	
Rising edge time t_r		max. 200 ns	max. 1 µs	
Falling edge time t_f		max. 200 ns	max. 1 µs	
Short circuit proof outputs [4]		yes [5]	yes	yes
Reverse polarity protection of the supply voltage		no/yes	yes	yes
UL approval		file no. E224618		
CE compliant acc. to		EMC guideline 2014/30/EU – RoHS guideline 2011/65/EU		

1) Operating deflection is measured after preload applied and with/for continuous operations.
2) Life of spring is measured with operating deflection at 1 Hz.
3) Max. recommended cable length 30 m [98.43’].
4) If supply voltage correctly applied.
5) Only one channel allowed to be shorted-out:
at +V= 5 V DC, short-circuit to channel, 0 V, or +V is permitted.
at +V= 5 ... 30 V DC, short-circuit to channel or 0 V is permitted.

Terminal assignment

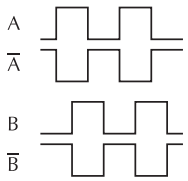
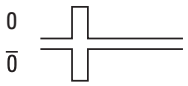
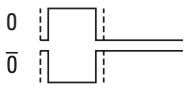
Output circuit	Type of connection	Cable (isolate unused cores individually before initial start-up)								
3, 4, 6, A, B, C with inv. signal	1, 2, A, B	Signal:	0 V	+V	A	$\overline{A}$	B	$\overline{B}$	0	$\overline{0}$
		Core color:	WH	BN	GN	YE	GY	PK	BU	RD

Output circuit	Type of connection	Cable (isolate unused cores individually before initial start-up)								
7, 8 without inv. signal	1, 2, A, B	Signal:	0 V	+V	A	–	B	–	0	–
		Core color:	WH	BN	GN	–	GY	–	BU	–

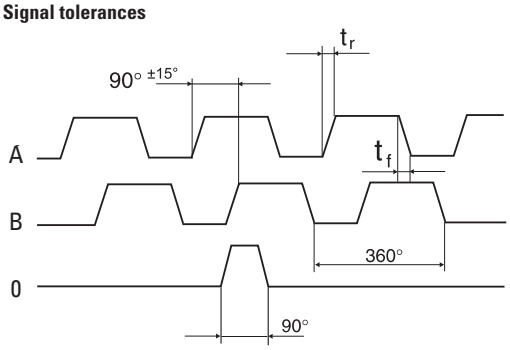
+V: Supply voltage encoder +V DC
0 V: Supply voltage encoder ground GND (0 V)
A, $\overline{A}$: Incremental output channel A
B, $\overline{B}$: Incremental output channel B
0, $\overline{0}$: Reference signal

Output signal formats

All Kübler encoders come standard with six channels where A leads B in the clockwise direction and the standard index is gated with A & B. The tolerance of the wave form affects the control and, in some cases, may affect the smoothness of system operation.

A leads B when the shaft is rotated in the clockwise direction viewing the shaft or collet end. This is the Kübler standard. This format applies to the pin key codes listed below.		
standard	0 gated with A & B. This is the Kübler standard. 0 is 90° wide.	
on request	0 ungated. 0 is 330° to 360° wide.	

Signal tolerances



t_r = rising edge time
t_f = falling edge time

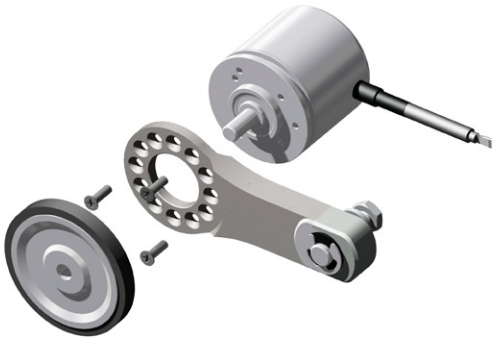
Measuring wheel system | **MWE02** | **Compact**

Technology in detail

Mounting options encoder on encoder spring arm

The encoder is attached to the encoder spring arm with 3 screws.

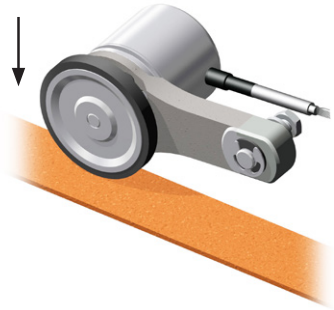
The fastening points are designed in such a way that mounting on both sides of the encoder spring arm is possible.



For a flexible cable outlet direction, the encoder can additionally be mounted in 30° steps.

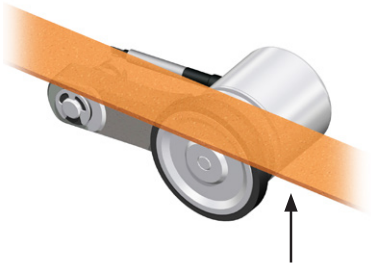
Various mounting options

downwards

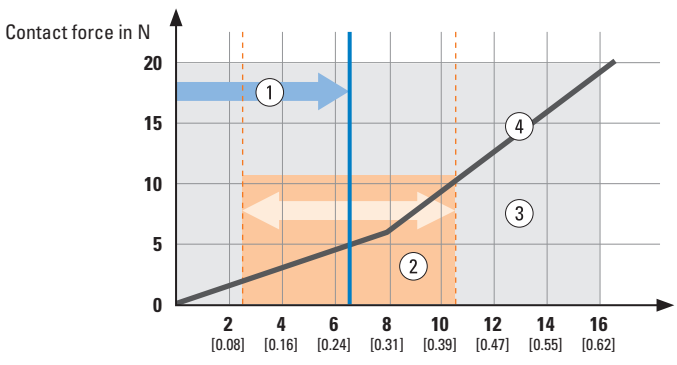


sidewards

upwards (overhead)



Contact force of the measuring wheel on the material to be measured



1 Recommended preload: 5 N (approx. 6,5 mm defection)

2 Rec. operating travel: ± 4 mm (from the rec. preload)

3 Maximum spring deflection: 0 ... 16 mm

4 Contact force in relation to spring deflection (Functional principle based on 2 integrated springs)

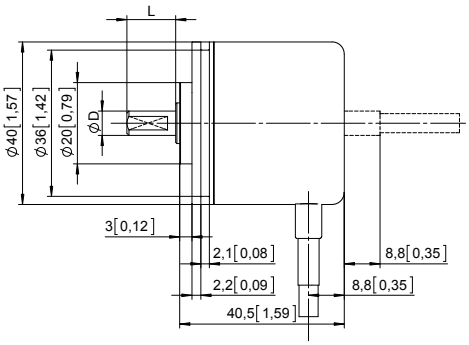
Measuring wheel system | MWE02 | Compact

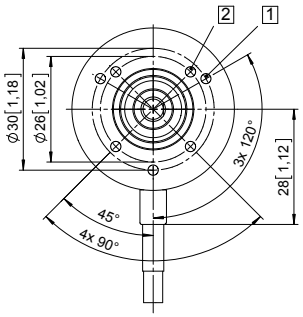
Dimensions

Dimensions in mm [inch]

Encoder
Clamping-synchro flange, ø 40 [1.57]

1 3 x M3, 4 [0.16] deep
2 4 x M3, 4 [0.16] deep

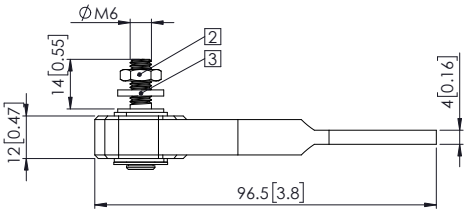


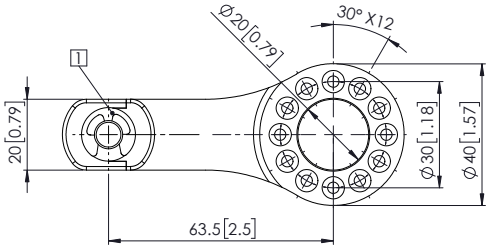


D	Fit	L
6 [0.24]	h7	12,5 [0.49]

Encoder spring arm

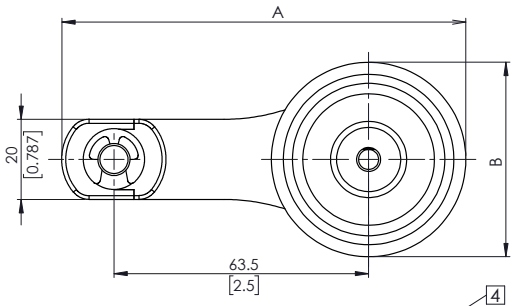
1 External retaning ring E type
2 Fixing nut M6
3 Toothed wahsher

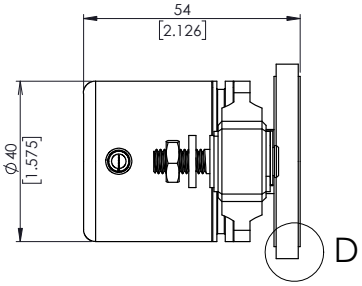


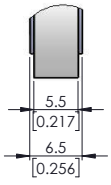


MWE02 combination
- encoder spring arm
- measuring wheel
- encoder Sendix Base KIS40

1 Fixing screw M4 x 6 for meas. wheel
2 Hexagon nut M6
3 Toothed washer
4 Encoder





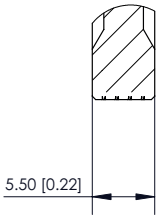


D
(2 : 1)

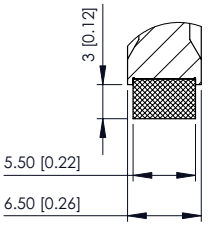
measuring wheel circumference	A	B
200 mm	108.4 [4.27]	63.7 [2.51]
6“	100.8 [3.97]	48.5 [1.91]

D for measuring wheel with coating:

Diamond knurl



Plastic PU



O-ring