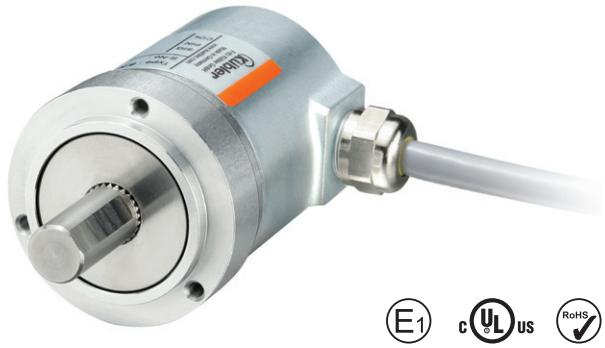
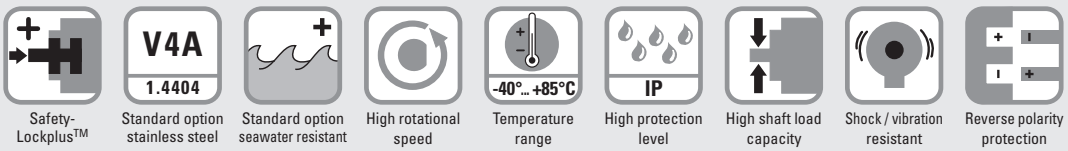
Compact, robust magnetic | **Sendix M3651AR (shaft)** | **Analog**



The Sendix M3651AR singleturn encoders with analog interface and magnetic sensor technology are particularly flexible in use due to their diverse interfaces and measuring ranges.

The "R"obust version is particularly suitable for use in harsh environments. Protected up to IP69k, resistance against shock and extreme temperature fluctuations, the Sendix M36 encoders are suitable even for demanding outdoor applications.



Safety-Lockplus™ | Standard option stainless steel | Standard option seawater resistant | High rotational speed | Temperature range | High protection level | High shaft load capacity | Shock / vibration resistant | Reverse polarity protection

Highest robustness

- Sturdy bearing construction in Safety-Lockplus™ design for particularly high resistance.
- Extra large bearings.
- Mechanically protected shaft seal.
- Protection level IP66, IP67 and IP69k in one device.
- Wide temperature range -40°C ... +85°C.

Application oriented

- Current output 4 ... 20 mA.
- Voltage output 0 ... 10 V or 0 ... 5 V.
- Different measuring ranges.
- Set input for easy start-up.

Order code Shaft version

8.M3651AR . X X X X . X X X 2
Type — a b c d — e f g

a *Version*
1 = standard [1]
clamping flange ø 42 mm [1.65"]
7 = stainless steel V4A [2]
clamping flange ø 42 mm [1.65"]
all metal parts accessible from outside are out of stainless steel V4A

b *Shaft (ø x L), with flat*
1 = ø 6 x 12.5 mm [0.24 x 0.49"]
3 = ø 8 x 15 mm [0.32 x 0.59"]
5 = ø 10 x 20 mm [0.39 x 0.79"]
2 = ø 1/4" x 12.5 mm [0.49"]
E = ø 10 x 20 mm [0.39 x 0.79"], stainless steel V4A

c *Output circuit* [3]
3 = current output
4 = voltage output

d *Type of connection*
2 = radial cable, 1 m [3.28'] PVC
B = radial cable, special length PVC *)
4 = radial M12 connector, 5-pin
*) Available special lengths (connection types B):
2, 3, 5, 8, 10, 15 m [5.56, 9.84, 16.40, 26.25, 32.80, 49.21']
order code expansion .XXXX = length in dm
ex.: 8.M3651AR.133B.3112.0030 (for cable length 3 m)

e *Interface / resolution / supply voltage*
3 = 4 ... 20 mA / 12 bit / 10 ... 30 V DC
4 = 0 ... 10 V / 12 bit / 15 ... 30 V DC
5 = 0 ... 5 V / 11 bit / 10 ... 30 V DC

f *Measuring range*
1 = 1 x 360°
2 = 1 x 180°
3 = 1 x 90°
4 = 1 x 45°

g *Counting direction*
1 = cw
2 = ccw

Optional on request
- Ex 2/22 (only for connection type 4)
- other shaft diameters out of V4A stainless steel

1) Not in conjunction with shaft type "E".
2) Only in conjunction with shaft type "E" + type of connection "4" .
3) Output circuit "3" only in conjunction with interface "3", output circuit "4" only in conjunction with interface "4" or "5".

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Mounting accessory for shaft encoders		Order no.
Coupling	Bellows coupling ø 19 mm [0.75“] for shaft 8 mm [0.32“]	**8.0000.1102.0808** [1]

Cables and connectors		Order no.
Preassembled cables	M12 female connector with coupling nut, 5-pin, A coded, straight single ended 2 m [6.56‘] PVC cable	**05.00.6081.2211.002M** [1]
Connectors	M12 female connector with coupling nut, 5-pin, A coded, straight (metal)	**8.0000.5116.0000** [1]
	M12 female connector with coupling nut, 5-pin, A coded, straight (stainless steel V4A)	**8.0000.5116.0000.V4A**

Further Kübler accessories can be found at: kuebler.com/accessories
Further Kübler cables and connectors can be found at: kuebler.com/connection-technology

Technical data

Electrical characteristics current interface 4 ... 20 mA

Supply voltage		10 ... 30 V DC
Current consumption (no load)		max. 30 mA
Reverse polarity protection of the supply voltage		yes
Short-circuit proof outputs		yes [2]
Measuring range		45°, 90°, 180° or 360°
DA converter resolution		12 bit
Angular measurement deviation [3]		±0,5°
Temperature coefficient		< 100 ppm/K
Repeat accuracy, at 25°C [77°F]		±0.2°
Output load	at 10 V DC at 24 V DC at 30 V DC	max. 200 Ohm max. 900 Ohm max. 1200 Ohm
Setting time		< 1 ms, R_{Burden} = 900 Ohm, 25°C [77°F]
LEDs (green/red)		- system status - current loop interruption – input load too high - reference point display (only with factory settings) at cw: betw. 0° and 1° at ccw: betw. 0° and -1°
SET input		level = +V for 1 s minimum
PowerON Time		< 1 s
Update rate		1 ms

Electrical characteristics voltage interface 0 ... 10 V / 0 ... 5 V

Supply voltage	output 0 ... 5 V output 0 ... 10 V	10 ... 30 V DC 15 ... 30 V DC
Current consumption (no load)		max. 30 mA
Reverse polarity protection of the supply voltage		yes
Short-circuit proof outputs		yes [2]
Measuring range		45°, 90°, 180° or 360°
DA converter resolution	0 ... 10 V 0 ... 5 V	12 bit 11 bit
Angular measurement deviation [3]		±0,5°
Temperature coefficient		< 100 ppm/K
Repeat accuracy, at 25°C [77°F]		±0.2°
Current output		max. 10 mA
Setting time		< 1 ms, R_{Load} = 1000 Ohm, 25°C [77°F]
LEDs (green/red)		- system status - reference point display (only with factory settings) at cw: betw. 0° and 1° at ccw: betw. 0° and -1°
SET input		level = +V for 1 s minimum
PowerON Time		< 1 s
Update rate		1 ms

1) Not for version “7” (V4A stainless steel)
2) When the supply voltage is correctly applied.
But not output to +V. Supply voltage and sensor output signal are not galvanically isolated.
3) Over the whole temperature range.

Compact, robust magnetic | **Sendix M3651AR (shaft)** | **Analog**

Mechanical characteristics

Maximum speed		4000 min^{-1} 2000 min^{-1} (continuous)	
Starting torque at 20 °C [68 °F]		< 0.01 Nm	
Shaft load capacity	radial	80 N	
	axial	40 N	
Weight		approx. 250 g [8.82 oz]	
Protection acc. to EN 60529		IP66, IP67, IP69k	
Working temperature range		-40 °C ... +85 °C [-40 °F ... +185 °F]	
Materials		**version "1"** (standard)	**version "7"** (stainless steel)
	shaft	V2A	V4A
	flange	aluminum	V4A
	housing	zinc die-cast	V4A
	cable	PVC	–
Shock resistance acc. to EN 60068-2-27		5000 m/s^2, 4 ms	
Vibration resistance acc. to EN 60068-2-6		300 m/s^2, 10 ... 2000 Hz	

SET input

Input		active HIGH
Input type		comparator
Signal level (+V = supply voltage)	HIGH	min. 60 % of +V, max: +V
	LOW	max. 30 % of +V
Input current		< 0.5 mA
Min. pulse duration (SET)		10 ms
Input delay		1 ms
New position data readable after		1 ms
Internal processing time		200 ms

The encoder can be set to zero at any position by means of a HIGH signal on the SET input. Other preset values can be factory-programmed. The SET input has a signal processing time of approx. 1 ms, after which the new position data can be read. Once the SET function has been triggered, the encoder requires an internal processing time of typ. 200 ms; during this time the supply voltage must not be switched off.
The SET function should be carried out whilst the encoder is at rest.

The number of preset value writing cycles is limited to 10,000.

If this input is not used, it should be connected to 0 V (Encoder ground GND) in order to avoid interferences.

Approvals

E1 compliant in accordance with	ECE guideline
UL compliant in accordance with	File no. E224618
CE compliant in accordance with	
EMC Directive	2014/30/EU
RoHS Directive	2011/65/EU
ATEX Directive	2014/34/EU (for Ex 2/22 variants)

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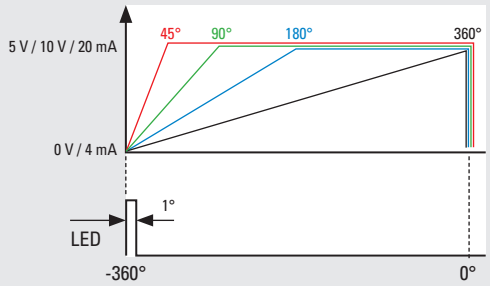
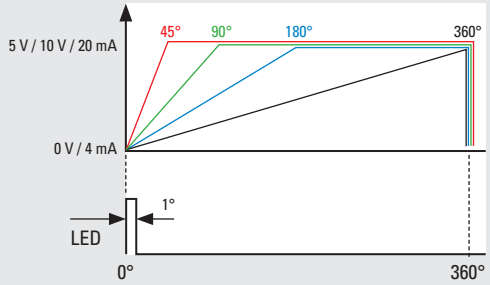
Example (output signal evolution)
Variante counting direction cw

Direction of rotation left

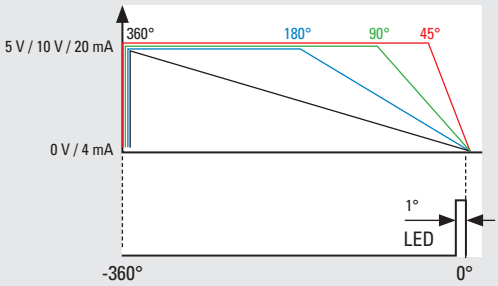


Direction of rotation right

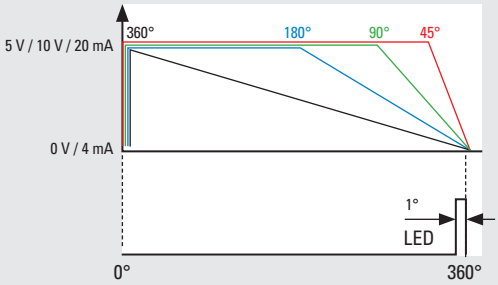


Example (output signal evolution)
Variante counting direction ccw

Direction of rotation left



Direction of rotation right



Terminal assignment

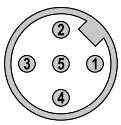
Interface	Type of connection	Cable (isolate unused cores individually before initial start-up)					
3 (current)	2, B	Signal:	0 V	+V	+I	SET	
		Core color:	WH	BN	GN	GY	

Interface	Type of connection	M12 connector, 5 pin					
3 (current)	4	Signal:	0 V	+V	+I	SET	–
		Pin:	3	2	1	5	4

Interface	Type of connection	Cable (isolate unused cores individually before initial start-up)					
4, 5 (voltage)	2, B	Signal:	0 V	+V	+U	SET	
		Core color:	WH	BN	GN	GY	

Interface	Type of connection	M12 connector, 5 pin					
4, 5 (voltage)	4	Signal:	0 V	+V	+U	SET	–
		Pin:	3	2	1	5	4

Top view of mating side, male contact base



M12 connector, 5-pin

+V : Supply voltage encoder +V DC
0 V : Supply voltage encoder ground GND (0 V)
+U : Voltage
+I : Current
SET : Set input

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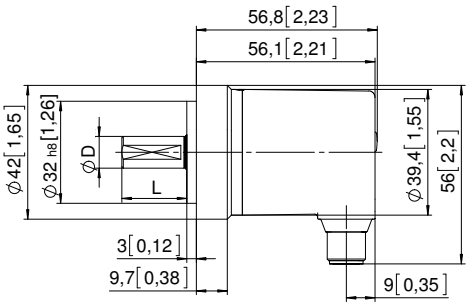
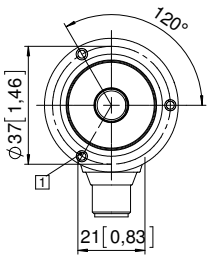
Dimensions

Dimensions in mm [inch]

Aluminum
clamping flange, ø 42 [1.65]
version 1

1 3 x M3, 6 [0.24] deep

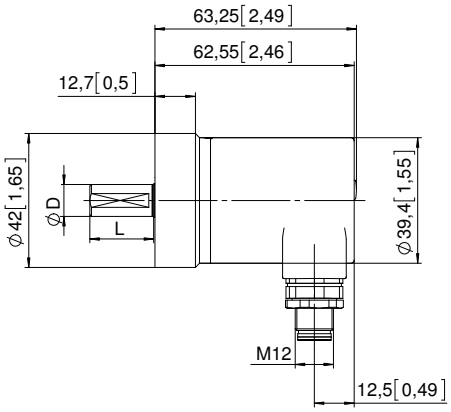


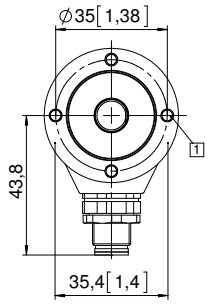


D	Fit	L
6 [0.24]	h7	12,5 [0.49]
8 [0.32]	h7	15 [0.59]
10 [0.39]	f7	20 [0.79]
1/4"	h7	12,5 [0.49]

Stainless steel V4A
clamping flange, ø 42 [1.65]
version 7

1 4 x M4, 8 [0.31] deep





D	Fit	L
10 [0.39]	f7	20 [0.79]