Large hollow shaft optical | A020 (hollow shaft) | Push-Pull / RS422 / SinCos

The incremental encoder type A020 with optical sensor technology is available with a through hollow shaft up to max. 42 mm diameter.

With an installation depth of just 43 mm it is optimally suited for mounting on large shafts, even where space is tight.

High rotational speed | High protection level | Shock / vibration resistant | Magnetic field proof | Optical sensor

Compact

- Minimal installation depth but large hollow shaft.
- Available with compact M12 connector.
- Torque stop can be implemented even with small radius.

Flexible

- With Push-Pull, RS422 or SinCos interface.
- Hollow shaft from 20 mm up to 42 mm as standard.
- With cable connection, M12 or M23 connectors.

Order code Hollow shaft

8.A020	.	X	X	X	X	.	XXXX
Type		a	b	c	d		e

If for each parameter of an encoder the **underlined preferred option** is selected, then the delivery time will be 10 working days for a maximum of 10 pieces. Qts. up to 50 pcs. of these types generally have a delivery time of 15 working days.

10 by 10

a *Flange*
2 = with spring element, short
3 = with spring element, long
5 = with fastening arm, long

b *Hollow shaft*
C = ø 20 mm [0.79"]
6 = ø 24 mm [0.94"]
5 = ø 25 mm [0.98"]
3 = ø 28 mm [1.10"]
A = ø 30 mm [1.18"]
2 = ø 38 mm [1.50"]
B = ø 40 mm [1.57"]
1 = ø 42 mm [1.65"]
4 = ø 1"

c *Output circuit / power supply*
1 = RS422 (with inverted signal) / 5 V DC
4 = RS422 (with inverted signal) / 10 ... 30 V DC
2 = Push-pull (without inverted signal) / 10 ... 30 V DC
5 = Push-pull (with inverted signal) / 5 ... 30 V DC
3 = Push-pull (with inverted signal) / 10 ... 30 V DC
A = Push-pull (7272 compatible) / 5 ... 30 V DC
8 = SinCos, 1 Vpp (with inverted signal) / 5 V DC
9 = SinCos, 1 Vpp (with inverted signal) / 10 .. 30 V DC

d *Type of connection*
1 = radial cable, 1 m [3.28'] PVC
A = radial cable, special length PVC *)
2 = radial M23 connector, 12-pin, without mating connector
E = radial M12 connector, 8-pin

*) Available special lengths (connection type A):
2, 3, 5, 8, 10, 15 m [6.56, 9.84, 16.40, 26.25, 32.80, 49.21']
order code expansion .XXXX = length in dm
ex.: 8.A020.351A.2048.0030 (for cable length 3 m)

e *Pulse rate*
50, 360, 512, 600, 1000, **1024**, 1500, 2000, **2048**, 2500, 4096, **5000**
(e.g. 360 pulses => 0360)

SinCos version only available with pulses ≥ 1024

Optional on request
- other pulse rates

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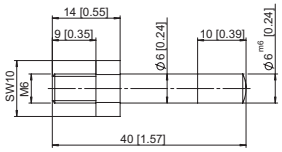
Mounting accessory for hollow shaft encoders

			Order no.
Cylindrical pin, long for torque stops		with fixing thread	**8.0010.4700.0003**

Connection technology

		Order no.
Connector, self-assembly (straight)	M12 female connector with coupling nut	**05.CMB 8181-0**
	M23 female connector with coupling nut	**8.0000.5012.0000**
Cordset, pre-assembled	M12 female connector with coupling nut, 2 m [6.56'] PVC cable	**05.00.6041.8211.002M**
	M23 female connector with coupling nut, 2 m [6.56'] PVC cable	**8.0000.6201.0002**

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

Technical data

Mechanical characteristics

Maximum speed	3000 min^{-1} 1)
Mass moment of inertia 2)	< 150 x 10^{-6} kgm^2
Starting torque with sealing at 20°C [68°F]	< 0.2 Nm
Weight	approx. 0.7 kg [24.69 oz]
Protection acc. to EN 60529	IP65
Working temperature range	-40°C 3) ... +70°C [-40°F 3) ... +158°F]
Material shaft	stainless steel H7
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, 10 ... 2000 Hz

Electrical characteristics SinCos output

Output circuit	**SinCos U = 1 Vpp**	**SinCos U = 1 Vpp**
Power supply	5 V DC (±5 %)	10 ... 30 V DC
Power consumption with inverted signal (no load)	typ. 65 mA max. 110 mA	typ. 65 mA max. 110 mA
-3 dB frequency	≤180 kHz	≤180 kHz
Signal level channels A/B channel 0	1 Vpp (±20 %) 0.1 ... 1.2 V	1 Vpp (±20 %) 0.1 ... 1.2 V
Short circuit proof outputs 4)	yes	yes
Reverse polarity protection of the power supply	no	yes
UL approval	file 224618	
CE compliant acc. to	EMC guideline 2014/30/EU RoHS guideline 2011/65/EU	

Electrical characteristics

Output circuit	**RS422** (TTL compatible)	**Push-Pull**	**Push-Pull** (7272 compatible)
Power supply	5 V DC (±5 %) or 10 ... 30 V DC	10 ... 30 V DC	5 ... 30 V DC
Power consumption (no load) without inverted signal with inverted signal	 – typ. 40 mA/max. 90 mA	 typ. 55 mA/max. 125 mA typ. 80 mA/max.150 mA	 – typ. 50 mA/max.100 mA
Permissible load / channel	max. +/- 20 mA	max. +/- 30 mA	max. +/- 20 mA
Pulse frequency	max. 300 kHz	max. 300 kHz	max. 300 kHz
Signal level HIGH LOW	min. 2.5 V max. 0.5 V	min. +V - 3.0 V max. 2.5 V	min. +V - 2.0 V max. 0.5 V
Rising edge time t_r	max. 200 ns	max. 1 µs	max. 1 µs
Falling edge time t_f	max. 200 ns	max. 1 µs	max. 1 µs
Short circuit proof outputs 4)	yes 5)	yes	yes
Reverse polarity protection of the power supply	no, 10 ... 30 V DC: yes	yes	no
UL approval	file 224618		
CE compliant acc. to	EMC guideline 2014/30/EU RoHS guideline 2011/65/EU		

1) Short term (app. 15 min. range) up to 3500 min^{-1}.
2) Depending on shaft diameter.
3) With connector: -40°C [-40°F], securely installed: -30°C [-22°F], flexibly installed: -20°C [-4°F].
4) If power supply 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 = 10 ... 30 V DC short circuit to channel or 0 V is permitted.

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Terminal assignment

Output circuit	Type of connection	Cable (isolate unused wires individually before initial start-up)											
1 ... A	1, A	Signal:	0 V	+V	0 Vsens	+Vsens	A	$\overline{A}$	B	$\overline{B}$	0	$\overline{0}$	⏚
		Cable colour:	WH	BN	GY PK	RD BU	GN	YE	GY	PK	BU	RD	shield

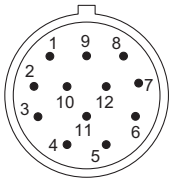
Output circuit	Type of connection	M23 connector, 12 pin											
1 ... A	2	Signal:	0 V	+V	0 Vsens	+Vsens	A	$\overline{A}$	B	$\overline{B}$	0	$\overline{0}$	⏚
		Pin:	10	12	11	2	5	6	8	1	3	4	PH [1]

Output circuit	Type of connection	M12 connector, 8 pin											
1 ... A	E	Signal:	0 V	+V	0 Vsens	+Vsens	A	$\overline{A}$	B	$\overline{B}$	0	$\overline{0}$	⏚
		Pin:	1	2	–	–	3	4	5	6	7	8	PH [1]

+V: Encoder power supply +V DC
0 V: Encoder power supply ground GND (0 V)
0 V_{sens} / +V_{sens}: Using the sensor outputs of the encoder, the voltage present can be measured and if necessary increased accordingly.
A, $\overline{A}$: Incremental output channel A
B, $\overline{B}$: Incremental output channel B
0, $\overline{0}$: Reference signal
PH ⏚: Plug connector housing (shield)

Top view of mating side, male contact base

M12 connector, 8-pin



M23 connector, 12-pin

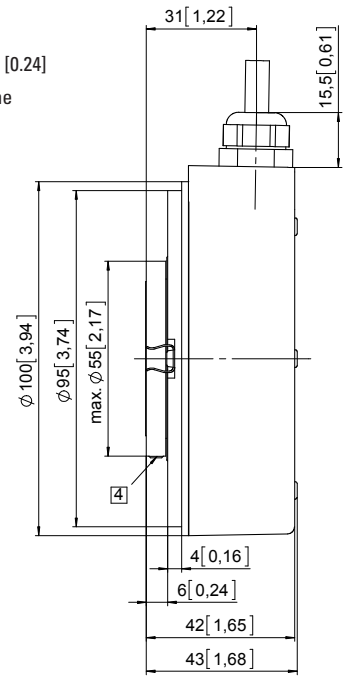
Dimensions hollow shaft version

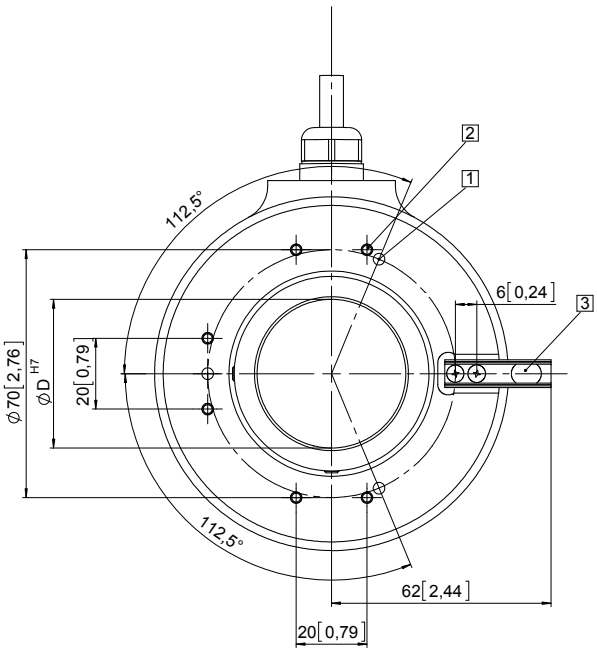
Dimensions in mm [inch]

Flange with spring element, long
Flange type 3

1 3 x M4, 7 [0.28] deep
2 6 x M3, 8 [0.31] deep
3 Cylindrical pin DIN 6325, ø 6 [0.24]
4 Recommended torque for the clamping ring 1.0 Nm

Note:
Minimum insertion depth
1.5 x $D_{hollow\ shaft}$





1) PH = shield is attached to connector housing.

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Dimensions hollow shaft version

Dimensions in mm [inch]

Flange with fastening arm, long
Flange type 5

1 Recommended torque for the clamping ring 1.0 Nm

Note:
Minimum insertion depth
1.5 x $D_{hollow\ shaft}$