

Incremental Encoders

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.



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 10 mm up to 42 mm as standard
- With cable connection, M23 or M12 connectors

Order code Hollow shaft

8.A020 . **XXXX** . **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.



a Flange

- 1 = without mounting aid
- 2 = with short spring element
- 3 = with long spring element**
- 5 = with fastening arm long

b Hollow shaft

- 1 = ø 42 mm
- 2 = ø 38 mm
- 3 = ø 28 mm
- 4 = ø 25.4 mm (1")
- 5 = ø 25 mm**
- 6 = ø 24 mm
- A = ø 30 mm**
- B = ø 40 mm
- C = ø 20 mm

c Output circuit / Power supply

- 1 = RS422 (with inverted signal) / 5 V DC**
- 2 = Push-pull (without inverted signal) / 10 ... 30 V DC
- 3 = Push-pull (with inverted signal) / 10 ... 30 V DC**
- 4 = RS422 (with inverted signal) / 10 ... 30 V DC
- 5 = Push-pull (with inverted signal) / 5 ... 30 V DC
- 8 = SinCos, 1 Vss (with inverted signal) / 5 V DC
- 9 = SinCos, 1 Vss (with inverted signal) / 10 .. 30 V DC
- A = Push-pull 7272 / 5 ... 30 V DC

d Type of connection

- 1 = radial cable (1 m PVC cable)
- 2 = M23 connector, 12-pin, radial, without mating connector**
- E = M12 connector, 8-pin, radial

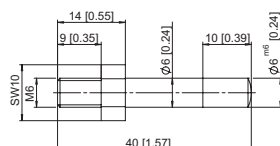
e Pulse rate

- 50, 360, 512, 600, 1000, **1024**, 1500, 2000, **2048**, 2500, 4096, **5000**
- (e.g. 360 pulses => 0360)
- Other pulse rates on request
- SinCos version not available with pulses <1024

Mounting accessory for hollow shaft encoders

Cylindrical pin, long

for torque stops



With fixing thread

8.0010.4700.0003

Connection Technology

Connector, self-assembly

M12
M23

05.CMB-8181-0
8.0000.5012.0000

Cordset, pre-assembled with 2 m PVC cable

M12
M23

05.WAKS8-2/P00
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.

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Mechanical characteristics	
Speed	max. 3000 min ⁻¹ 1)
Rotor moment of inertia 2)	< 150 x 10 ⁻⁶ kgm ²
Starting torque with sealing	< 0.2 Nm
Weight	approx. 0.7 kg
Protection acc. to EN 60 529	IP65
Working temperature range	-40°C 3) ... +70°C
Materials	shaft stainless steel H7
Shock resistance acc. EN 60068-2-27	1000 m/s ² , 6 ms
Vibration resistance acc. EN 60068-2-6	100 m/s ² , 10...2000 Hz

Electrical characteristics SinCos output		
Output circuit	SinCos U = 1 Vss	SinCos U = 1 Vss
Power supply	5 V ±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	1 Vss (±20%)	1 Vss (±20 %)
channel 0	0.1 ... 1.2 V	0.1 ... 1.2 V
Short circuit proof outputs 4)	yes	yes
Reverse connection of the supply voltage	no	yes
UL certified	File 224618	
CE compliant acc. to	EN 61 000-6-2, EN 61 000-6-4 and EN 61 000-6-3	
RoHS compliant acc. to	EU guideline 2002/95/EG	

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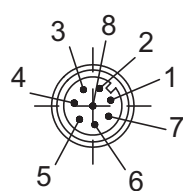
Electrical characteristics			
Output circuit	RS422 (TTL-compatible)	Push-Pull	Push-Pull (7272)
Power supply	5 V (±5 %) o. 10 ... 30 V DC	10 ... 30 V DC	5 ... 30 V DDC
Power consumption (no load)			
without inverted signal	–	typ. 55 mA/max. 125 mA	–
with inverted signal	typ. 40 mA/max. 90 mA	typ. 80 mA/max.150 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 kHz3)
Signal level	high min. 2.5 V low max. 0.5 V	min. U _B – 3 V max. 2.5 V	min. U _B – 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 connection of the supply voltage	no, 10 ... 30 V: yes	yes	no
UL certified	File 224618		
CE compliant acc. to	EN 61000-6-2, EN 61000-6-4 and EN 61000-6-3		
RoHS compliant acc. to	EU guideline 2002/95/EG		

Terminal assignment

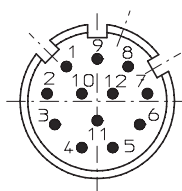
Signal:	0 V GND	+U _B	0 V Sensor	+U _B Sensor	A	\bar{A}	B	\bar{B}	Z	\bar{Z}	shield
M23 connector, multifast, 12-pin, Pin	10	12	11	2	5	6	8	1	3	4	PH 6)
M12 connector, eurofast, 8-pin connector, Pin	1	2			3	4	5	6	7	8	PH 6)
Cable colour	WH	BN	GY PK	RD BU	GN	YE	GY	PK	BU	RD	shield

Isolate unused outputs before initial start-up.

Top view of mating side, male contact base



M12 connector, 8-pin



M23 connector, 12-pin

1) Short term (app. 15 min. range) up to 3500 min⁻¹
 2) Depending on shaft diameter
 3) With connector: -40°C, securely installed: -30°C, flexibly installed: -20°C
 4) If supply voltage correctly applied.

5) Only one channel allowed to be shorted-out:
 If U_B = 5 V, short-circuit to channel, 0 V, or +U_B is permitted.
 If U_B = 5 - 30 V, short-circuit to channel or 0 V is permitted.
 6) PH = Shield is attached to connector housing

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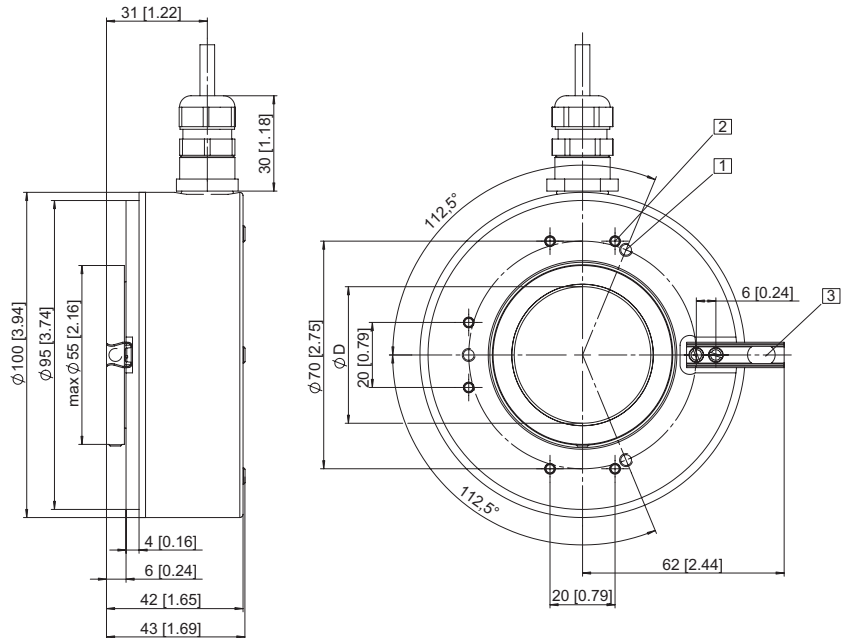
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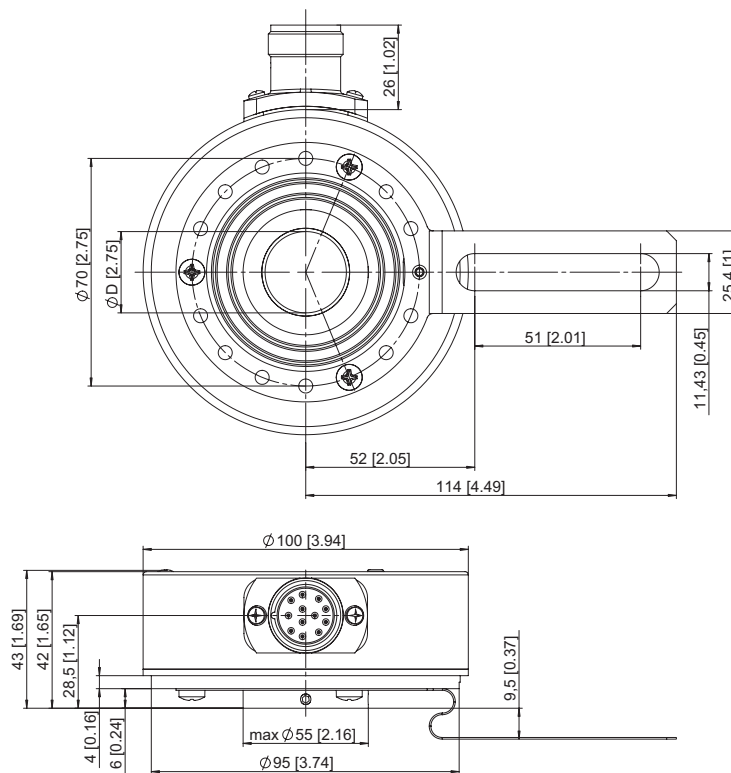
Dimensions hollow shaft version

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 DIN6325, \varnothing 6 mm



With fastening arm, long
Flange type 5



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