

# Incremental Encoders

**Heavy Duty**  
**Hollow shaft, optical**

**Sendix Heavy Duty H120 (Hollow shaft)**

**Push-Pull / RS422 / Optical fibre**



The Sendix Heavy Duty H120 were especially developed for large motors and generators. They are highly accurate and extremely robust thanks to HD-Safety-Lock™ – the Heavy Duty hollow shaft design of the latest generation with sturdy bearing construction and integrated bearing isolation. The dual protection of the shaft, the wide temperature range and the high protection level allow for use even under the harshest conditions.

The very large hollow shaft up to 28 mm plus the wide variety of mounting solutions and connection options offer the very highest degree of flexibility during installation.



## Robust

- Integrated bearing isolation up to 2.5 kV for reliable shaft connection
- Extremely high resilience as a result of dual protection of the shaft (shielding cover disk and radial shaft seal), protection levels IP66 and IP67 as well as a seawater-resistant housing
- High shock (200 g) and vibration (15 g) resistance
- High level of resistance to interference as a result of optical fibre technology

## Seawaterresistant

- 3 fixing solutions: conical central fastening, cylindrical central fastening or through hollow shaft
- Connection via cable, M12 or M23 connector, terminal box or optical fibre
- Fastening arm on the flange or the cover – allows the device to be rotated as required during mounting
- Through hollow shaft up to ø 28 mm

## Order code Hollow shaft version

**8.H120** . **XXXX** . **XXXX**  
Type                      **a b c d e**

### **a** Flange

- 1 = without mounting aid
- 2 = with fastening arm 70 mm [2.76"]<sup>1)</sup>
- 3 = with fastening arm 100 mm [3.93"]<sup>1)</sup>
- 4 = with fastening arm 150 mm [5.91"]<sup>1)</sup>
- 5 = with stator coupling, ø 119 mm [4.69"]

### **b** Through hollow shaft

- 2 = ø 16 mm [0.63"]
- 3 = ø 20 mm [0.79"]
- 5 = ø 25 mm [0.98"]
- 7 = ø 28 mm [1.10"]
- 6 = ø 1"

*Blind hollow shaft, with central fastening*

- A = ø 12 mm [0.47"]
- B = ø 16 mm [0.63"]
- K = cone, ø 17 mm [0.67"], 1 : 10

### **c** Output circuit / Power supply

- 4 = RS422 (with inverted signal) / 5 V DC
- 1 = RS422 (with inverted signal) / 10 ... 30 V DC
- 5 = Gegentakt (with inverted signal) / 10 ... 30 V DC
- B = LWL + RS422 (with inverted signal) / 5 V DC<sup>2)</sup>
- A = LWL + RS422 with inverted signal) / 10 ... 30 V DC<sup>2)</sup>
- C = LWL + Push-Pull (with inverted signal) / 10 ... 30 V DC<sup>2)</sup>

### **d** Type of connection

- 1 = radial cable, 1 m [3.28'] PVC cable
- 2 = M12 connector, 8-pin, radial, ccw
- 4 = M23 connector, 12-pin, radial, ccw
- D = M23 connector, 12-pin, radial, cw
- K = Terminal box with plug-in spring terminal connectors, rotatable through 180°
- L = Optical fibre connector + M23 connector, 12-pin, radial, cw<sup>3)</sup>

### **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

*optional on request*

- Ex 2/22
- special cable length

1) Enclosed, not mounted

2) Can only be ordered with connection type L

3) Can only be ordered with output circuits A, B or C

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Connection technology		Order No.
Connector, self-assembly (straight)	M12 female connector with coupling nut	05.CMB 8181-0
	M23 female connector with coupling nut <sup>1)</sup>	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 <sup>1)</sup>	8.0000.6201.0002
Simplex patch cable, ST-ST-Multimode	Optical fibre, length 5 m [16.40']	05.B09-B09-821-0005
Cable gland for optical fibre version	For achieving protection IP66 and IP67 at the optical fibre connector	8.0000.5000.0007
Optical fibre receiver	HTL / 10 ... 30 V DC, plug-in connector HD-Sub D15	6.LWLE.51

Further accessories can be found in the Accessories section or in the Accessories area of our website at: [www.kuebler.com/accessories](http://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](http://www.kuebler.com/connection_technology).

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Technical data		
Mechanical characteristics		
Speed	max. at 60°C [140°F]	6000 min <sup>-1</sup> max. 3500 min <sup>-1</sup>
Starting torque – at 20°C [68°F]		0.05 Nm
Load capacity of shaft	radial axial	400 N 300 N
Weight		approx. 1.8 kg [63.49 oz]
Protection acc. to EN 60529		IP66 + IP67
EX approval for hazardous areas		optional zone 2 and 22
Working temperature range		-40°C <sup>2)</sup> ... +100°C <sup>3)</sup> [-40°F <sup>3)</sup> ... +212°F <sup>3)</sup>
Materials	shaft  housing, flange	stainless steel, bore tolerance H7 seawater resistant
Shock resistance acc. to EN 60068-2-27		2000 m/s <sup>2</sup> , 6 ms
Vibration resistance acc. to EN 60068-2-6		150 m/s <sup>2</sup> , 10...2000 Hz

Electrical characteristics		
Output circuit	RS422 (TTL-compatible))	Push-Pull
Power supply	5 V DC (±5 %) or 10 ... 30 V DC	10 ... 30 V DC
Power consumption (no load)	typ. 40 mA / max. 90 mA	typ. 80 mA / max.150 mA
Permissible load / channel	max. ±20 mA	max. ±30 mA
Pulse frequency	max. 300 kHz	max. 300 kHz
Signal level	HIGH min. 2.5 V LOW max. 0.5 V	min. +V - 3 V max. 2,5 V
Rising edge time t <sub>r</sub>	max. 200 ns	max. 1 µs
Falling edge time t <sub>f</sub>	max. 200 ns	max. 1 µs
Short circuit proof outputs <sup>4)</sup>	yes	yes
Reverse polarity protection of the power supply	yes	yes
CE compliant acc. to	EMC guideline 2004/108/EC	
RoHS compliant acc. to	guideline 2011/65/EU	

Technical data for optical fibre connection	
Power consumption per module	< 2 W
Input level optical fibre transmitter	10...30 V DC or RS422
Optical wavelength	850 nm
Optical transmission rate	120 Mbit/s
Optical fibre synchronisation display	LED on the receiver
Optical fibre connection	ST connector, ø 9 mm [0.35"]
Glass fibre	multimode fibre, 50/125 µm, 62,5/125 µm
Optical fibre transmission distance	max. 1000 m [3280.84']

1) Suitable for connection type 4

2) With connector: -40°C [-40°F], with securely installed cable: -30°C [-22°F],  
with flexibly installed cable: -20°C [-4°F]

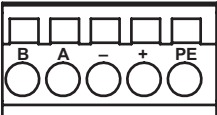
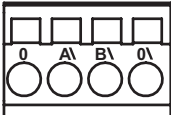
3) Measured at the flange

4) If supply voltage correctly applied

# Incremental Encoders

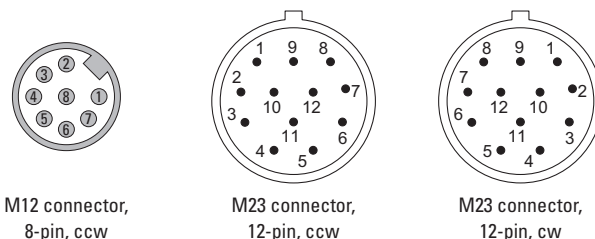
<b>Heavy Duty Hollow shaft, optical</b>	<b>Sendix Heavy Duty H120 (Hollow shaft)</b>	<b>Push-Pull / RS422 / Optical fibre</b>
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## Terminal assignment

Output circuit	Type of connection	Cable (isolate unused wires individually before initial start-up)											
1, 4, 5	1	Signal:	0 V	+V	0 Vsens	+Vsens	A	$\bar{A}$	B	$\bar{B}$	0	$\bar{0}$	$\perp$
		Cable colour:	WH	BN	GY PK	RD BU	GN	YE	GY	PK	BU	RD	Shield
Output circuit	Type of connection	M12 connector, 8-pin											
1, 4, 5	2	Signal:	0 V	+V	0 Vsens	+Vsens	A	$\bar{A}$	B	$\bar{B}$	0	$\bar{0}$	$\perp$
		Pin:	1	2	—	—	3	4	5	6	7	8	PH <sup>2)</sup>
Output circuit	Type of connection	M23 connector, 12-pin											
1, 4, 5, A, B, C	4, D, L	Signal:	0 V	+V	0 Vsens	+Vsens	A	$\bar{A}$	B	$\bar{B}$	0	$\bar{0}$	$\perp$
		Pin:	10	12	11	2	5	6	8	1	3	4	PH <sup>2)</sup>
Output circuit	Type of connection	Terminal connections											
1, 4, 5	K	Signal:	B	A	0 V	+V	$\perp$	0	$\bar{A}$	$\bar{B}$	$\bar{0}$		
		Pin:	B	A	—	+	PE	0	$\bar{A}$	$\bar{B}$	$\bar{0}$		
													

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

## Top view of mating side, male contact base



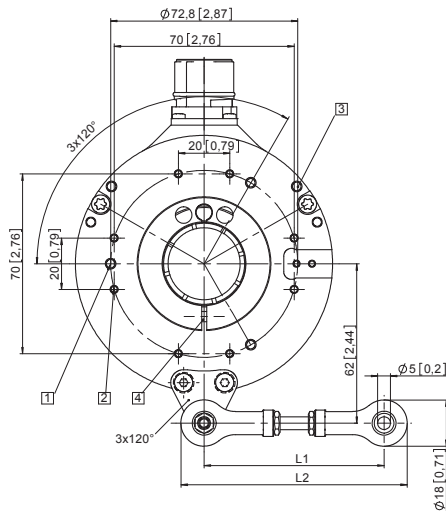
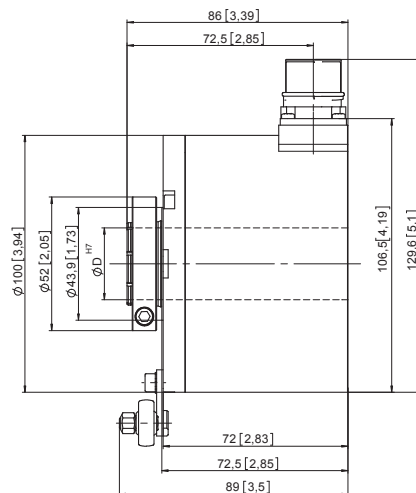
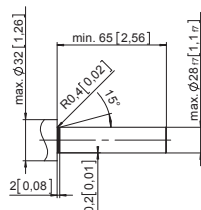
## Dimensions

Dimensions in mm [inch]

### Flange with fastening arm Through hollow shaft

- 3 x M4, 7 [0.28] deep
- 8 x M3, 8 [0.31] deep
- 6 x M4
- Recommended torque for the clamping ring 2 Nm

### Shaft connection to the application



Fastening arm	L1	L2
70 mm [2.76]	64 ... 74 [2.51 ... 2.91]	82 ... 92 [3.23 ... 3.62]
100 mm [3.93]	94 ... 104 [3.70 ... 4.09]	112 ... 122 [4.41 ... 4.80]
150 mm [5.91]	144 ... 154 [5.67 ... 6.06]	162 ... 172 [6.38 ... 6.77]

1) With a shaft diameter > 32 mm [1.26"] the insulation resistance of 2.5 kV cannot be guaranteed.  
 2) PH = Shield is attached to connector housing

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## Heavy Duty Hollow shaft, optical

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## Push-Pull / RS422 / Optical fibre

### Dimensions

Dimensions in mm [inch]

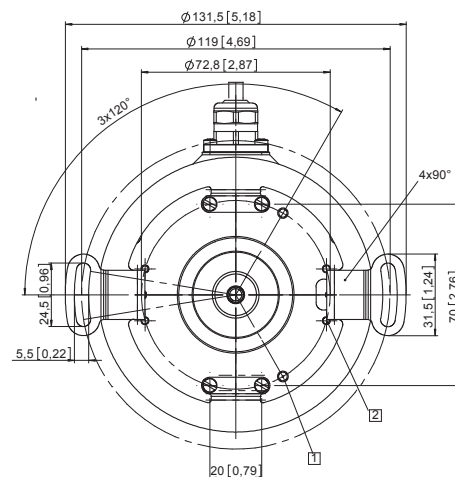
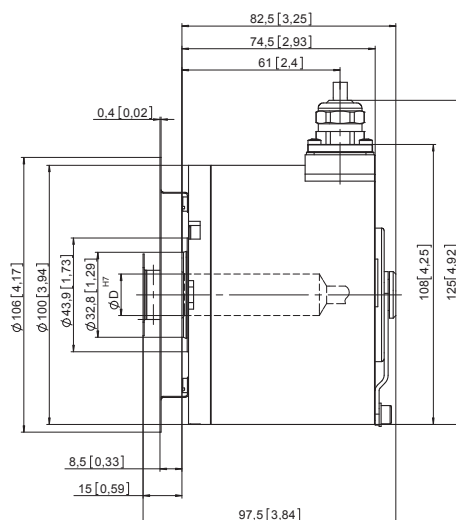
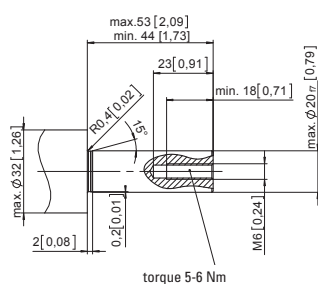
**Flange with stator coupling,  $\varnothing$  119 [4.69]**

**Blind hollow shaft with central fastening**

1) 3 x M4, 7 [0.28] deep

2) 8 x M3, 8 [0.31] deep

Shaft connection to the application



**Flange with fastening arm**

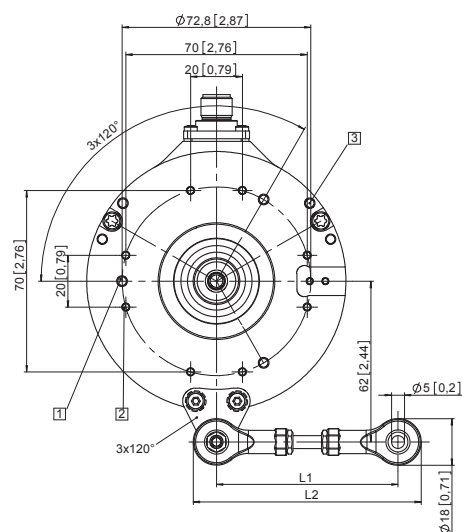
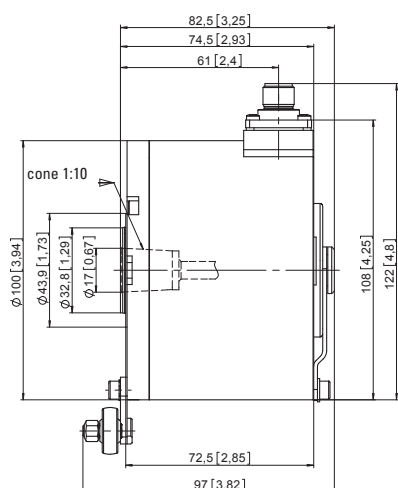
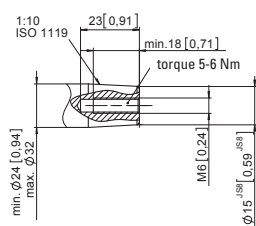
**Blind hollow shaft with central fastening, cone,  $\varnothing$  17 [0.67], 1 : 10**

1) 3 x M4, 7 [0.28] deep

2) 8 x M3, 8 [0.31] deep

3) 6 x M4

Shaft connection to the application



Fastening arm	L1	L2
70 mm [2.76]	64 ... 74 [2.51 ... 2.91]	82 ... 92 [3.23 ... 3.62]
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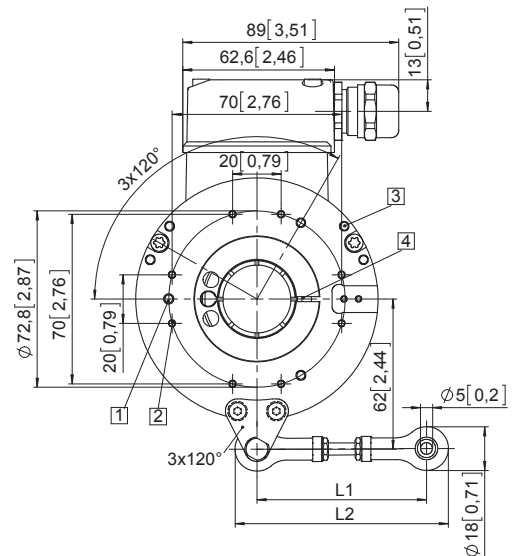
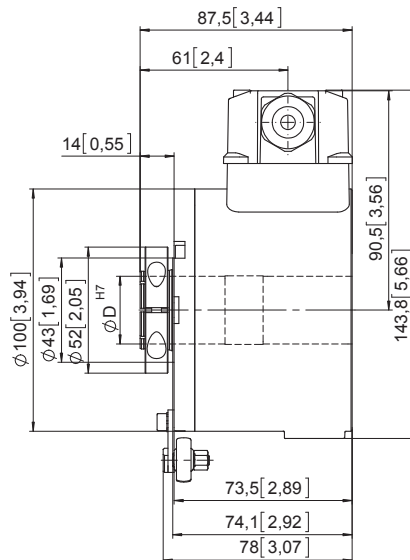
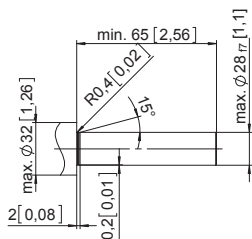
### Dimensions

Dimensions in mm [inch]

#### Flange with fastening arm Through hollow shaft and terminal box (type of connection K)

- 1 3 x M4, 7 [0.28] deep
- 2 8 x M3, 8 [0.31] deep
- 3 6 x M4
- 4 Recommended torque for the clamping ring 2 Nm

#### Shaft connection to the application

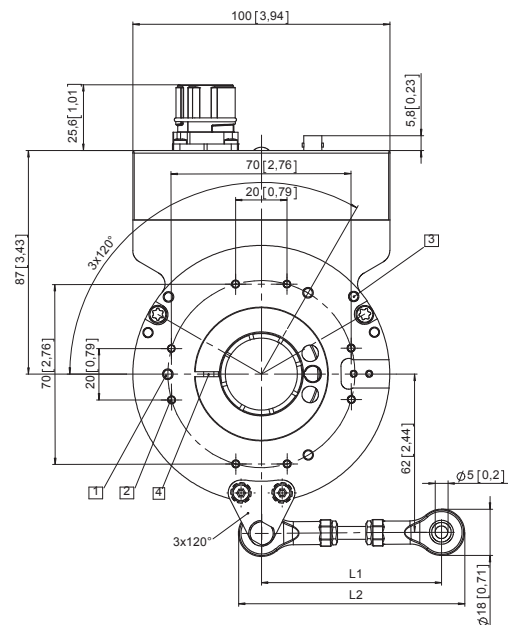
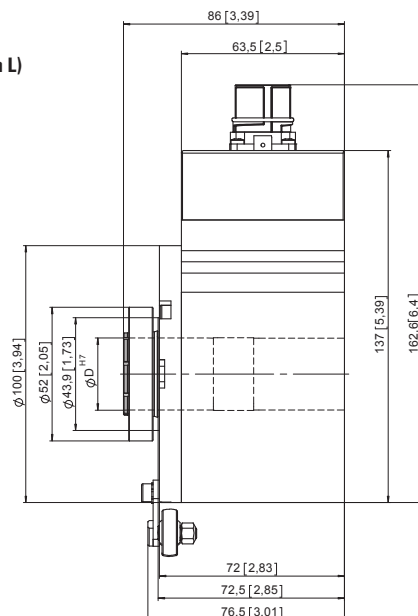
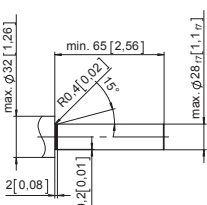


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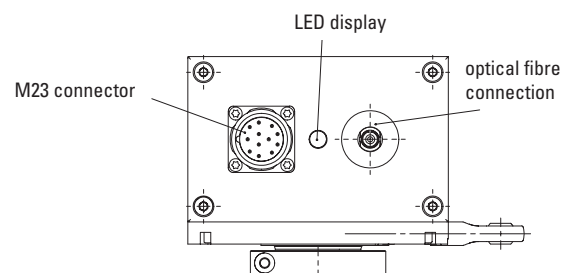
#### Flange with fastening arm Through hollow shaft and optical fibre connection (type of connection L)

- 1 3 x M4, 7 [0.28] deep
- 2 8 x M3, 8 [0.31] deep
- 3 6 x M4
- 4 Recommended torque for the clamping ring 2 Nm

#### Shaft connection to the application



Fastening arm	L1	L2
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