

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 durable housing.
- High shock (200 g) and vibration (15 g) resistance.
- High level of resistance to interference as a result of optical fibre technology.

Seawater durable

- 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"]¹⁾
- 3 = with fastening arm 100 mm [3.93"]¹⁾
- 4 = with fastening arm 150 mm [5.91"]¹⁾
- 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 = Push-Pull (with inverted signal) / 10 ... 30 V DC
- 6 = Push-Pull (with inverted signal) / 10 ... 30 V DC, power version up to 350 m
- B = LWL + RS422 (with inverted signal) / 5 V DC²⁾
- A = LWL + RS422 (with inverted signal) / 10 ... 30 V DC²⁾
- C = LWL + Push-Pull (with inverted signal) / 10 ... 30 V DC²⁾

d Type of connection

- 1 = radial cable, 1 m [3.28"] PVC
- A = radial cable, special length PVC *)
- 2 = radial M12 connector, 8-pin, ccw
- 4 = radial M23 connector, 12-pin, ccw
- D = radial M23 connector, 12-pin, cw
- K = terminal box with plug-in spring terminal connectors, rotatable through 180°
- L = optical fibre connector + radial M23 connector, 12-pin, cw³⁾

*) 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.H120.121A.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)

Optional on request

- other pulse rates
- Ex 2/22⁴⁾

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.

4) For the cable connection type, cable material PUR.

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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 ¹⁾	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 ¹⁾	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.
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		Technical data for optical fibre connection	
Maximum speed	at 60°C [140°F] 6000 min ⁻¹ 3500 min ⁻¹	Power consumption per module	< 2 W
Starting torque – at 20°C [68°F]	0.05 Nm	Input level optical fibre transmitter	10 ... 30 V DC or RS422
Load capacity of shaft	radial 475 N axial 375 N	Optical wavelength	850 nm
Weight	1.6 ... 2.0 kg [56.44 ... 70.55 oz] (depending on version)	Optical transmission rate	120 Mbit/s
Protection acc. to EN 60529	IP66 + IP67	Optical fibre synchronisation display	LED on the receiver
Working temperature range	-40°C ²⁾ ... +100°C ³⁾ [-40°F ³⁾ ... +212°F ³⁾	Optical fibre connection	ST connector, ø 9 mm [0.35"]
Materials	shaft stainless steel, bore tolerance H7 housing, flange seawater durable	Glass fibre	multimode fibre, 50/125 µm, 62.5/125 µm
Shock resistance acc. to EN 60068-2-27	2000 m/s ² , 6 ms	Optical fibre transmission distance	max. 2000 m [6561.68']
Vibration resistance acc. to EN 60068-2-6	150 m/s ² , 10 ... 2000 Hz		

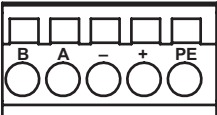
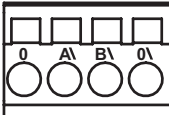
Electrical characteristics				
Output circuit	RS422 (TTL-compatible))		Push-Pull	Push-Pull (power version)
Power supply	5 V DC (±5 %) or 10 ... 30 V DC		10 ... 30 V DC	10 ... 30 V DC
Power consumption (no load)	max. 90 mA		max. 80 mA	max. 90 mA
Permissible load per channel	DC peak	max. +/- 20 mA max. +/- 30 mA	max. +/- 30 mA max. +/- 70 mA	max. +/- 150 mA max. +/- 200 mA
Pulse frequency	max. 300 kHz		max. 300 kHz	max. 300 kHz
Max. cable length	550 m at 100 kHz		150 m at 80 kHz	350 m at 100 kHz
Signal level	HIGH min. 2.5 V LOW max. 0.5 V		min. +V - 3.0 V max. 2.5 V	min. +V - 4.0 V max. 3.0 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		yes	yes
Reverse polarity protection of the power supply	yes		yes	yes
CE compliant acc. to	EMC guideline 2014/30/EU RoHS guideline 2011/65/EU			

- 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 power supply correctly applied.

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Terminal assignment

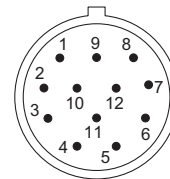
Output circuit	Type of connection	Cable (isolate unused wires individually before initial start-up)											
1, 4, 5, 6	1	Signal:	0 V	+V	0 Vsens	+Vsens	A	\bar{A}	B	\bar{B}	0	$\bar{0}$	\perp
		Cable colour:	WH	BN	GY PK	RD BU	GN	YE	GY	PK	BU	RD	Shield
Output circuit	Type of connection	M12 connector, 8-pin											
1, 4, 5, 6	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 ²⁾
Output circuit	Type of connection	M23 connector, 12-pin											
1, 4, 5, 6, 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 ²⁾
Output circuit	Type of connection	Terminal connections											
1, 4, 5, 6	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)

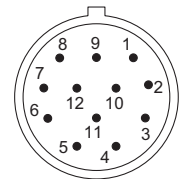
Top view of mating side, male contact base



M12 connector,
8-pin, ccw



M23 connector,
12-pin, ccw



M23 connector,
12-pin, cw

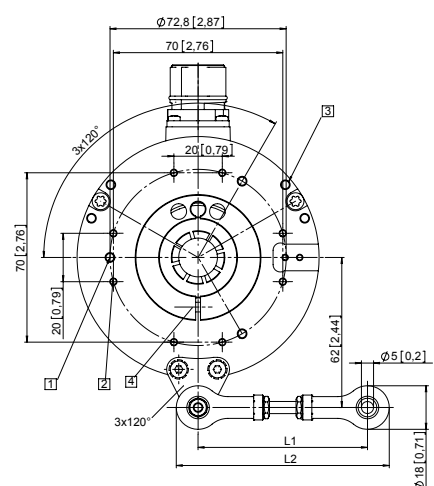
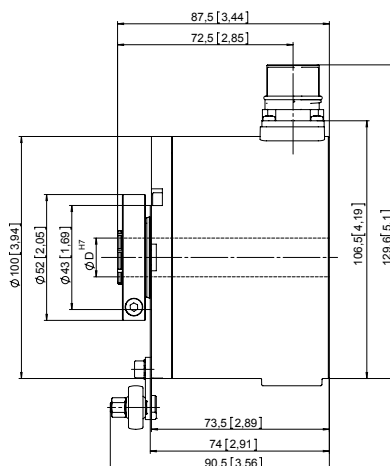
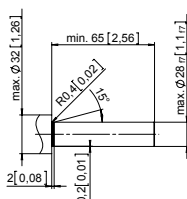
Dimensions

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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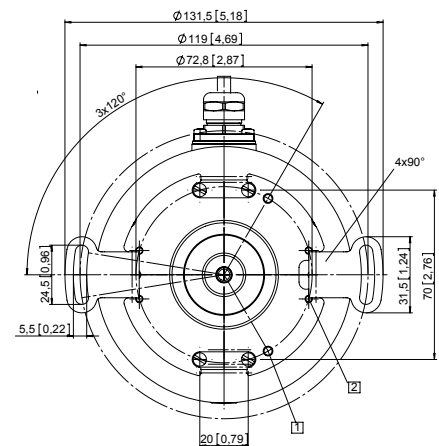
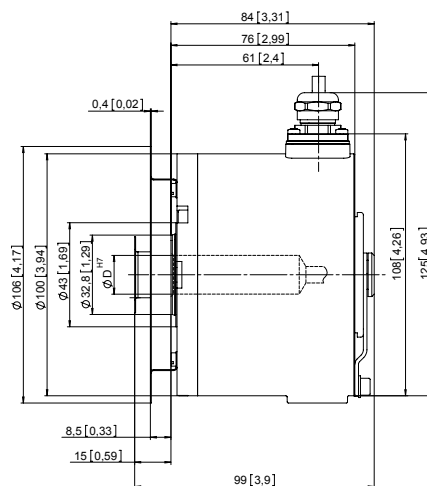
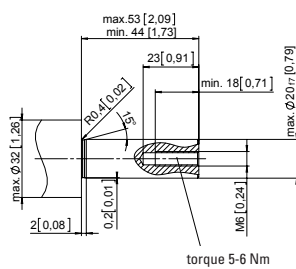
Dimensions

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

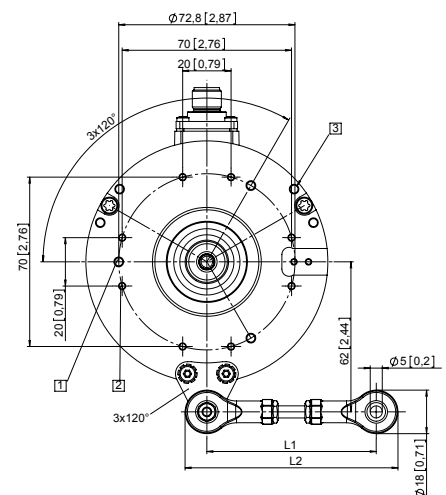
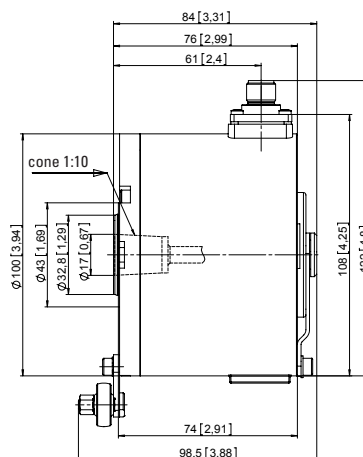
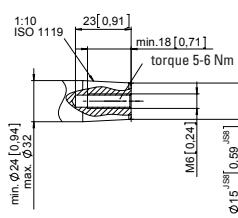
Shaft connection to the application



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]
100 mm [3.93]	94 ... 104 [3.70 ... 4.09]	112 ... 122 [4.41 ... 4.80]
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Push-Pull / RS422 / optical fibre

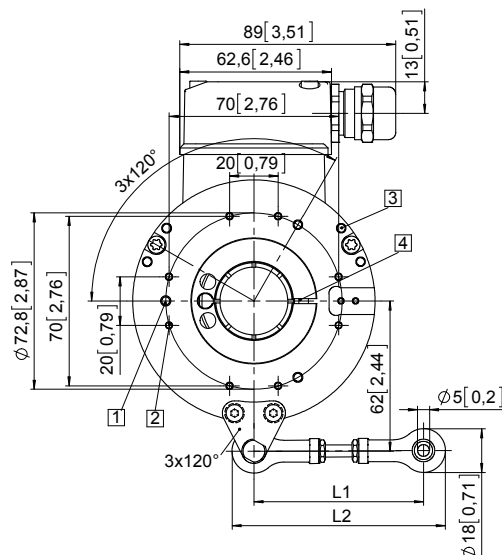
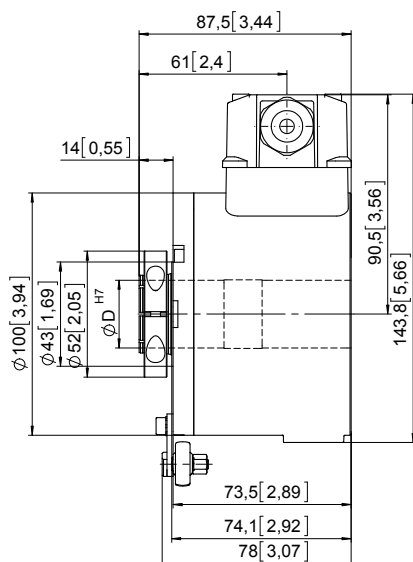
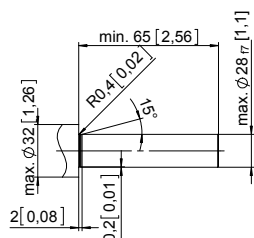
Dimensions

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

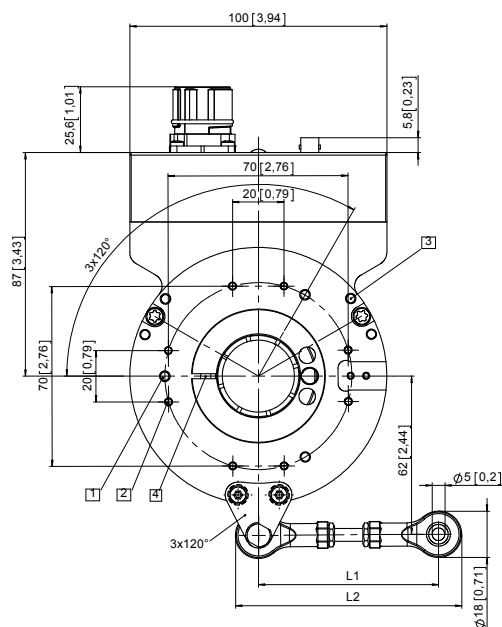
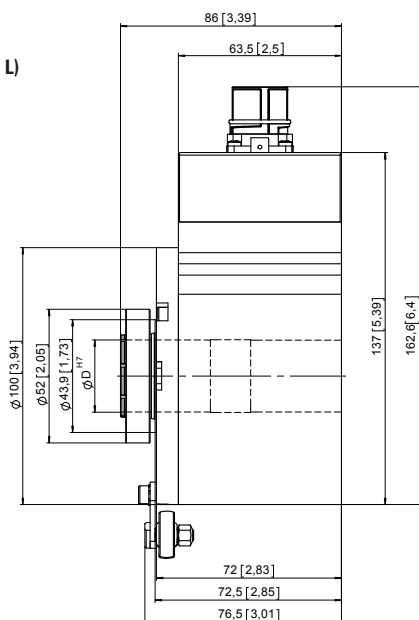
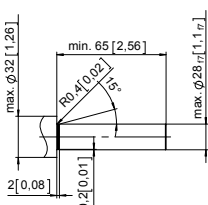


Fastening arm	L1	L2
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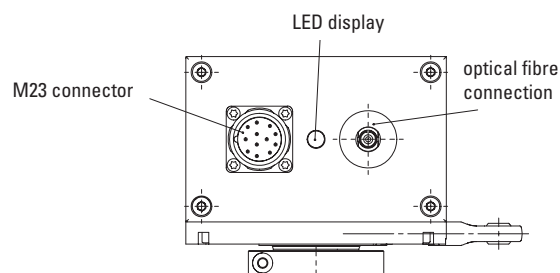
Flange with fastening arm Through hollow shaft and optical fibre connection (type of connection L)

- 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
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]
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