Heavy Duty hollow shaft, optical | **Sendix Heavy Duty H120 (hollow shaft)** | **Push-pull / RS422**

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.

HD-Safety-Lock™ | 2.5 kV bearing isolation | Dual protection of the shaft | Temperature range | High protection level | Shock/vibration resistant | Terminal box rotatable - 180° | Plug-in cage-clamp connectors | Hollow shaft up to ø 28 mm | Optical sensor | Seawater durable

Robust

- Integrated bearing isolation up to 2.5 kV for reliable shaft connection. [1]
- Extremely high resilience as a result of dual protection of the shaft (shielding cover disk and radial shaft seal), protection level IP67 as well as a seawater durable housing.
- High shock (200 g) and vibration (15 g) resistance.

Flexible

- 3 fixing solutions: conical central fastening, cylindrical central fastening or through hollow shaft.
- Connection via cable, M12 or M23 connector or terminal box.
- Torque stop 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	.	X	X	X	X	.	XXXX
Type		a	b	c	d		e

a *Flange*
1 = without mounting aid
2 = with fastening arm 70 mm [2.76"] [2]
3 = with fastening arm 100 mm [3.93"] [2]
4 = with fastening arm 150 mm [5.91"] [2]
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 insertion depth max. 53 mm [2.09"]
A = ø 12 mm [0.47"]
B = ø 16 mm [0.63"]
Blind hollow shaft, cone with central fastening insertion depth max. 22.5 mm [0.89"]
K = ø 17 mm [0.67"], 1 : 10

c *Output circuit / supply voltage*
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

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°

*) 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 2/22 [3]

1) With a shaft diameter > 32 mm [1.26"] the insulation resistance of 2.5 kV cannot be guaranteed.
2) Enclosed, not mounted.
3) For the cable connection type, cable material PUR.

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Cables and connectors

		Order no.
Preassembled cables	M12 female connector with coupling nut, 8-pin, A coded, straight Single-ended 2 m [6.56'] PVC cable	**05.00.6041.8211.002M**
	M23 female connector with coupling nut, 12-pin, cw Single-ended 2 m [6.56'] PVC cable	**8.0000.6201.0002**
Connectors	M12 female connector with coupling nut, 8-pin, A coded, straight (metal)	**05.CMB 8181-0**
	M23 female connector with coupling nut, 12-pin, cw [1]	**8.0000.5012.0000**

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

Mechanical characteristics

Maximum speed		6000 min^{-1}
	at 60 °C [140 °F]	3500 min^{-1}
Starting torque – at 20 °C [68 °F]		0.05 Nm
Load capacity of shaft	radial	475 N
	axial	375 N
Weight		1.6 ... 2.0 kg [56.44 ... 70.55 oz] (depending on version)
Protection acc. to EN 60529		IP67
Working temperature range		-40 °C [2] ... +100 °C [3] [-40 °F [3] ... +212 °F [3]]
Materials	shaft	stainless steel, bore tolerance H7
	housing, flange	seawater durable
Shock resistance acc. to EN 60068-2-27		2000 m/s^2, 6 ms
Vibration resistance acc. to EN 60068-2-6		150 m/s^2, 10 ... 2000 Hz

Approvals

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)
UKCA compliant in accordance with	
EMC Regulations	S.I. 2016/1091
RoHS Regulations	S.I. 2012/3032
UKEX Regulations	S.I. 2016/1107 (for Ex 2/22 variants)

Electrical characteristics

Output circuit		**RS422** (TTL-compatible))	**Push-pull**	**Push-pull (power version)**
Supply voltage		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	DC	max. +/- 20 mA	max. +/- 30 mA	max. +/- 150 mA
per channel	peak	max. +/- 30 mA	max. +/- 70 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	min. +V - 3.0 V	min. +V - 4.0 V
	LOW	max. 0.5 V	max. 2.5 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 supply voltage		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 supply voltage correctly applied.

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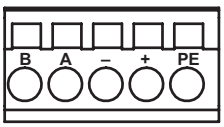
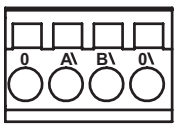
Terminal assignment

Output circuit	Type of connection	Cable (isolate unused cores individually before initial start-up)										
1, 4, 5, 6	1, A	Signal:	0 V	+V	0 Vsens	+Vsens	A	$\overline{A}$	B	$\overline{B}$	0	$\overline{0}$	⏚
		Core color:	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	$\overline{A}$	B	$\overline{B}$	0	$\overline{0}$	⏚
		Pin:	1	2	–	–	3	4	5	6	7	8	PH [1]

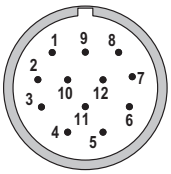
Output circuit	Type of connection	M23 connector, 12-pin										
1, 4, 5, 6	4, D	Signal:	0 V	+V	0 Vsens	+Vsens	A	$\overline{A}$	B	$\overline{B}$	0	$\overline{0}$	⏚
		Pin:	10	12	11	2	5	6	8	1	3	4	PH [1]

Output circuit	Type of connection	Terminal connections								
1, 4, 5, 6	K	Signal:	B	A	0 V	+V	⏚	0	$\overline{A}$	$\overline{B}$	$\overline{0}$
		Pin:	B	A	–	+	PE	0	$\overline{A}$	$\overline{B}$	$\overline{0}$
											

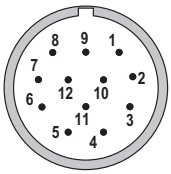
+V: Supply voltage encoder +V DC
0 V: Supply voltage encoder ground GND (0 V)
0 V_{sens} / +V_{sens}: Using the sensor outputs of the encoder, the voltage present can be measured and if necessary increased accordingly.
A, $\overline{A}$: Incremental output channel A
B, $\overline{B}$: Incremental output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

Top view of mating side, male contact base

M12 connector, 8-pin, ccw



M23 connector, 12-pin, ccw



M23 connector, 12-pin, cw

1) PH = shield is attached to connector housing.

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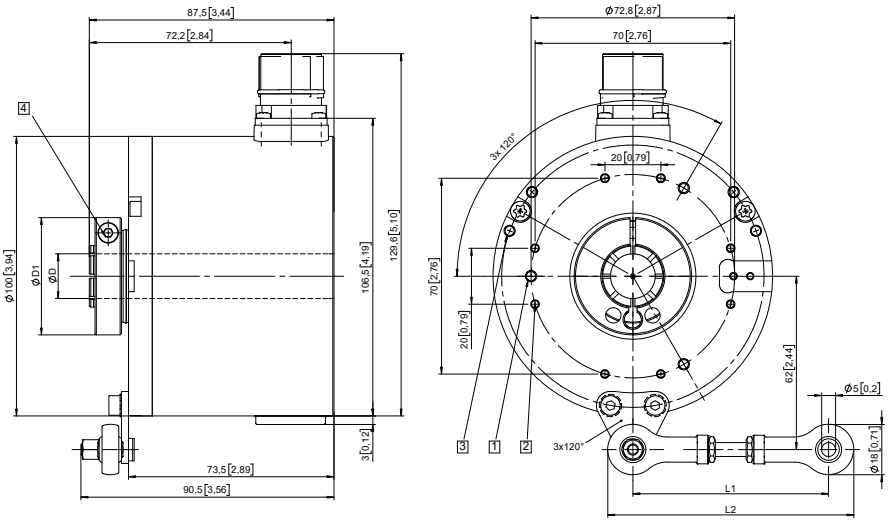
Dimensions

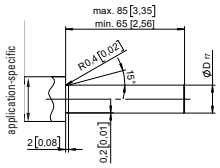
Dimensions in mm [inch]

Flange with fastening arm
Through hollow shaft

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 (SW3)



Shaft connection to the application

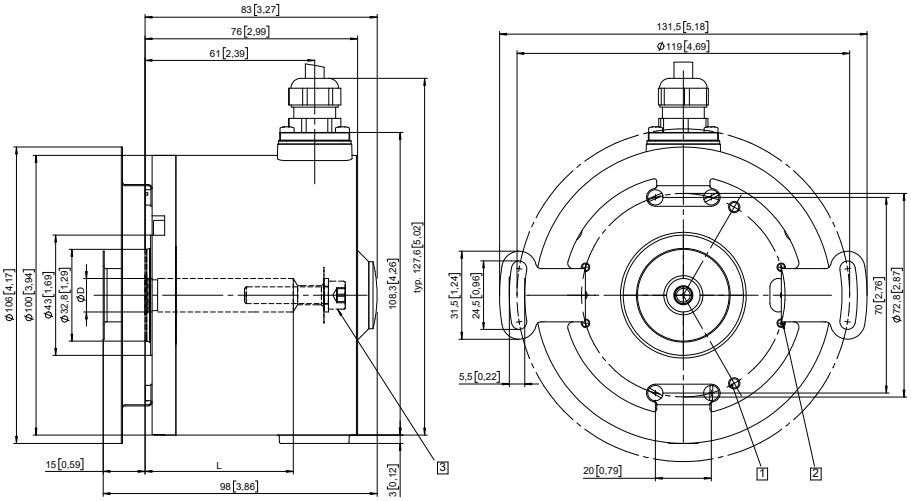


D	Fit	D1
16 [0.63]	H7	42.0 [1.65]
20 [0.79]	H7	42.0 [1.65]
25 [0.98]	H7	47.5 [1.87]
28 [1.10]	H7	52.0 [2.05]
1''	H7	47.5 [1.87]

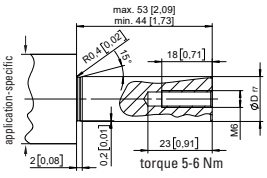
Fastening arm	L1		L2	
70 mm [2.76]	64 ... 74	[2.51 ... 2.91]	82 ... 92	[3.23 ... 3.62]
100 mm [3.93]	94 ... 104	[3.70 ... 4.09]	112 ... 122	[4.41 ... 4.80]
150 mm [5.91]	144 ... 154	[5.67 ... 6.06]	162 ... 172	[6.38 ... 6.77]

Flange with stator coupling, ø 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
3 Recommended torque for M6 (SW5) 5 - 6 Nm



Shaft connection to the application



D	Fit	L
12 [0.47]	H7	53 [2.09]
16 [0.63]	H7	53 [2.09]
L = insertion depth blind hollow shaft		

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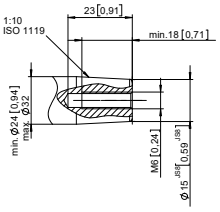
Dimensions

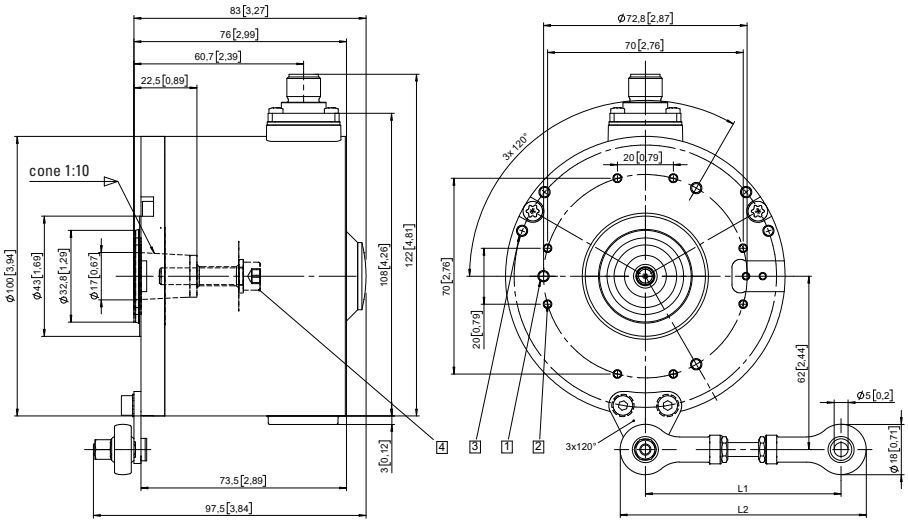
Dimensions in mm [inch]

Flange with fastening arm
Blind hollow shaft with central fastening, cone, ø 17 [0.67], 1 : 10
(blind hollow shaft, cone type 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 M6 (SW5) 5 - 6 Nm

Shaft connection to the application



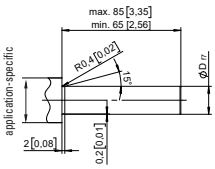


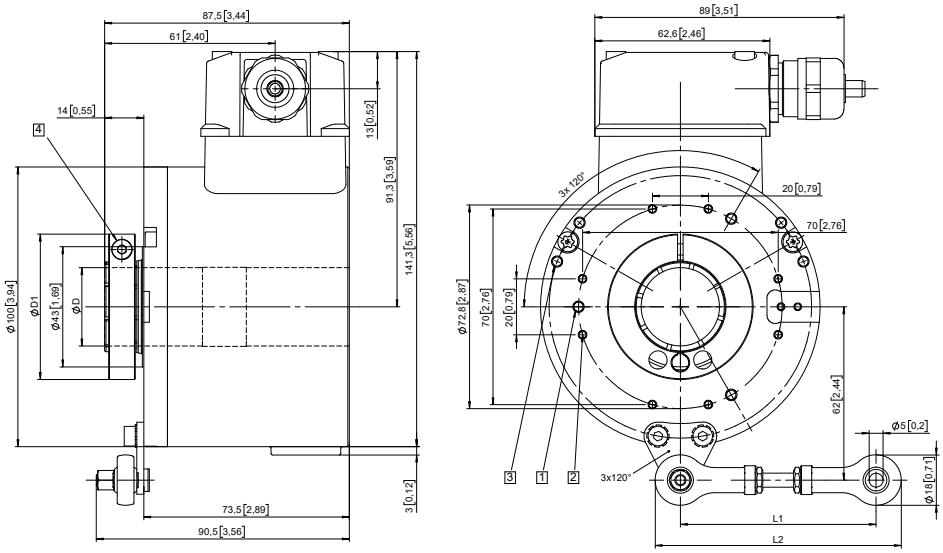
Fastening arm	L1		L2	
70 mm [2.76]	64 ... 74	[2.51 ... 2.91]	82 ... 92	[3.23 ... 3.62]
100 mm [3.93]	94 ... 104	[3.70 ... 4.09]	112 ... 122	[4.41 ... 4.80]
150 mm [5.91]	144 ... 154	[5.67 ... 6.06]	162 ... 172	[6.38 ... 6.77]

Flange with fastening arm
Through hollow shaft and terminal box

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 (SW3)

Shaft connection to the application





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16 [0.63]	H7	42.0 [1.65]
20 [0.79]	H7	42.0 [1.65]
25 [0.98]	H7	47.5 [1.87]
28 [1.10]	H7	52.0 [2.05]
1''	H7	47.5 [1.87]

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]