

Incremental encoders

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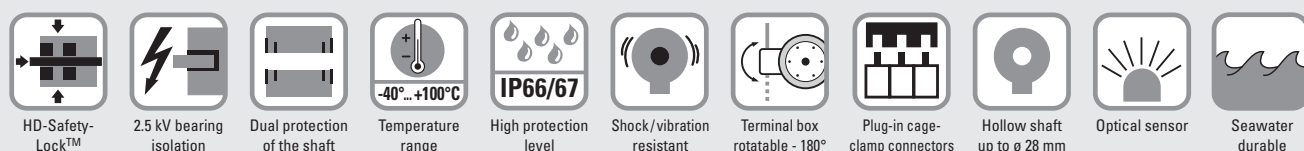


The Sendix Heavy Duty H120 were especially developed for large motors and generators. They are highly accurate and extremely robust thanks to HD-Safety-Lock™ – the Heavy Duty hollow shaft design of the latest generation with sturdy bearing construction and integrated bearing isolation. The dual protection 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.



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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 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 fiber technology.

Flexible

- 3 fixing solutions: conical central fastening, cylindrical central fastening or through hollow shaft.
- Connection via cable, M12 or M23 connector, terminal box or optical fiber.
- 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	.XXXXX.	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 / 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 = optical fiber + RS422 (with inverted signal) / 5 V DC ³⁾
- A = optical fiber + RS422 (with inverted signal) / 10 ... 30 V DC ³⁾
- C = optical fiber + push-pull (with inverted signal) / 10 ... 30 V DC ³⁾

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 fiber connector + radial M23 connector, 12-pin, cw ⁴⁾

- *) 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 ⁵⁾

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

3) Can only be ordered with connection type L.
4) Can only be ordered with output circuits A, B or C.
5) For the cable connection type, cable material PUR.

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Connection technology		Order no.
Cordset, pre-assembled	M12 female connector with coupling nut, 8-pin 2 m [6.56'] PVC cable	05.00.6041.8211.002M
	M23 female connector with coupling nut, 12-pin 2 m [6.56'] PVC cable ¹⁾	8.0000.6201.0002
Connector, self-assembly (straight)	M12 female connector with coupling nut, 8-pin	05.CMB 8181-0
	M23 female connector with coupling nut, 12-pin ¹⁾	8.0000.5012.0000
Simplex patch cable, ST-ST-multimode	optical fiber, length 5 m [16.40']	05.B09-B09-821-0005
Cable gland for optical fiber version	for achieving protection IP66 and IP67 at the optical fiber connector	8.0000.5000.0007
Optical fiber 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	
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	IP66 + 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
Technical data for optical fiber connection	
Power consumption per module	< 2 W
Input level optical fiber transmitter	10 ... 30 V DC or RS422
Optical wavelength	850 nm
Optical transmission rate	120 Mbit/s
Optical fiber synchronization display	LED on the receiver
Optical fiber connection	ST connector, ø 9 mm [0.35"]
Glass fiber	multimode fiber, 50/125 µm, 62.5/125 µm
Optical fiber transmission distance	max. 2000 m [6561.68']

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	max. +/- 20 mA	max. +/- 30 mA	max. +/- 150 mA
	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 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].

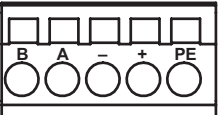
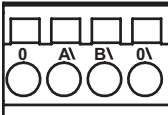
3) Measured at the flange.

4) If power supply correctly applied.

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Terminal assignment

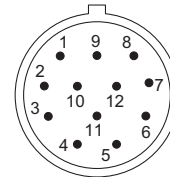
Output circuit	Type of connection	Cable (isolate unused wires individually before initial start-up)											
1, 4, 5, 6	1, A	Signal:	0 V	+V	0 V _{sens}	+V _{sens}	A	\bar{A}	B	\bar{B}	0	$\bar{0}$	\perp
		Cable color:	WH	BN	GY PK	RD BU	GN	YE	GY	PK	BU	RD	Shield
Output circuit	Type of connection	M12 connector, 8-pin											
1, 4, 5, 6	2	Signal:	0 V	+V	0 V _{sens}	+V _{sens}	A	\bar{A}	B	\bar{B}	0	$\bar{0}$	\perp
		Pin:	1	2	–	–	3	4	5	6	7	8	PH ¹⁾
Output circuit	Type of connection	M23 connector, 12-pin											
1, 4, 5, 6, A, B, C	4, D, L	Signal:	0 V	+V	0 V _{sens}	+V _{sens}	A	\bar{A}	B	\bar{B}	0	$\bar{0}$	\perp
		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	\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)

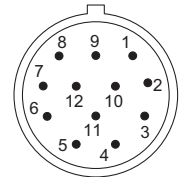
Top view of mating side, male contact base



M12 connector,
8-pin, ccw



M23 connector,
12-pin, ccw



M23 connector,
12-pin, cw

1) PH = shield is attached to connector housing.

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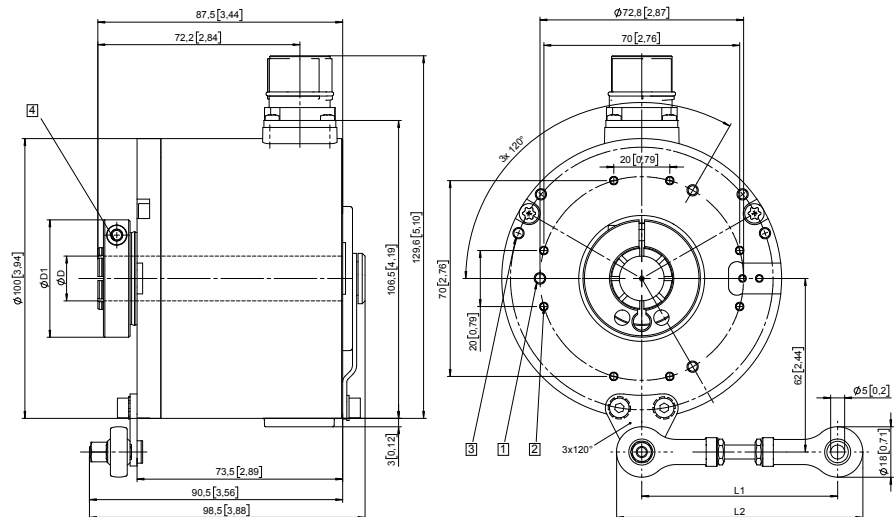
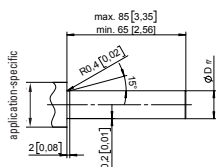
Dimensions

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



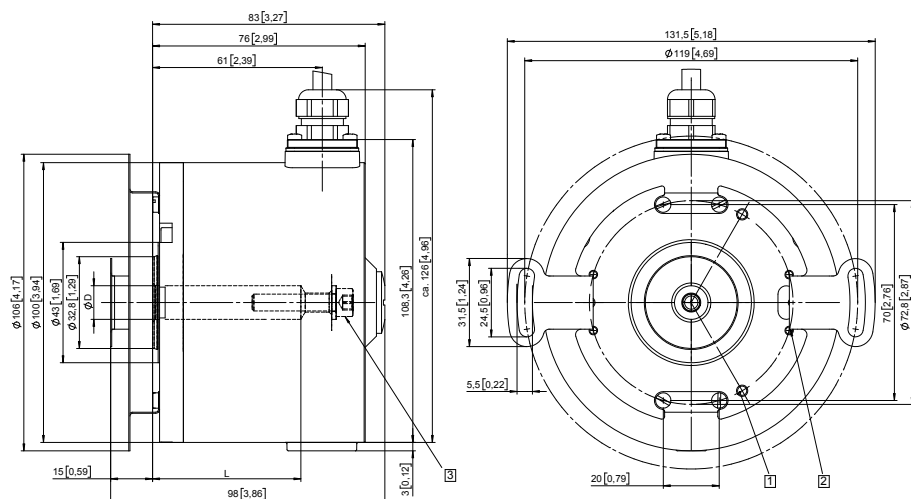
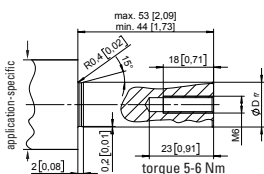
D	Fit	D1
16 [0.63]	H7	42.0 [1.65]
20 [0.79]	H7	42.0 [1.65]
25 [0.98]	H7	47.5 [1.87]
28 [1.10]	H7	52.0 [2.05]
1"	H7	47.5 [1.87]

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

Heavy Duty hollow shaft, optical

Sendix Heavy Duty H120 (hollow shaft)

Push-pull / RS422 / optical fiber

Dimensions

Dimensions in mm [inch]

Flange with fastening arm

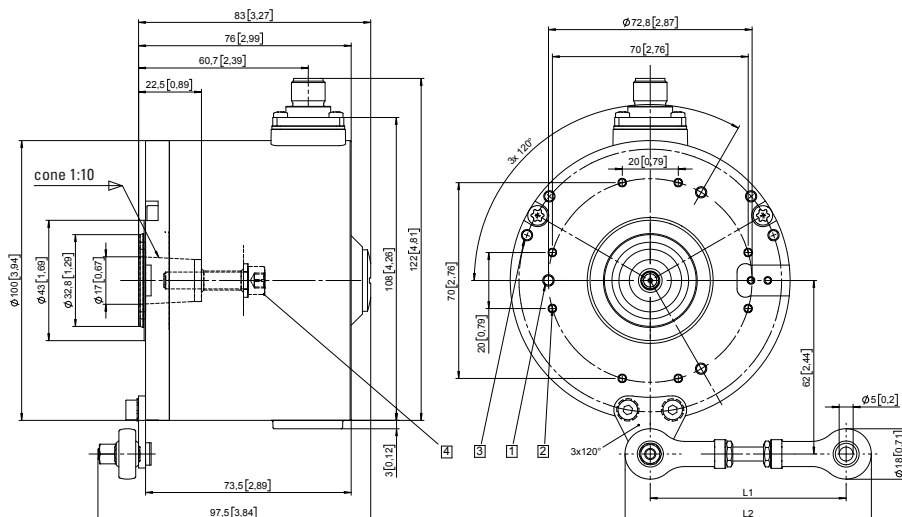
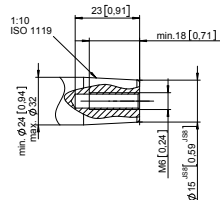
Blind hollow shaft with central fastening,

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



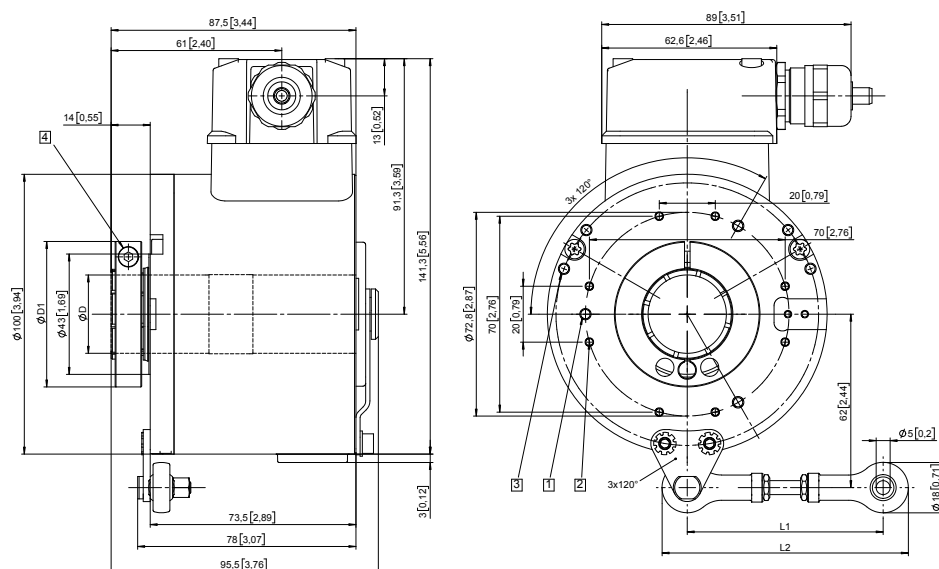
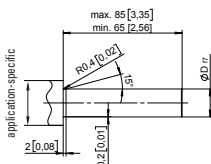
Fastening arm	L1	L2
70 mm [2.76]	64 ... 74 [2.51 ... 2.91]	82 ... 92 [3.23 ... 3.62]
100 mm [3.93]	94 ... 104 [3.70 ... 4.09]	112 ... 122 [4.41 ... 4.80]
150 mm [5.91]	144 ... 154 [5.67 ... 6.06]	162 ... 172 [6.38 ... 6.77]

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



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]
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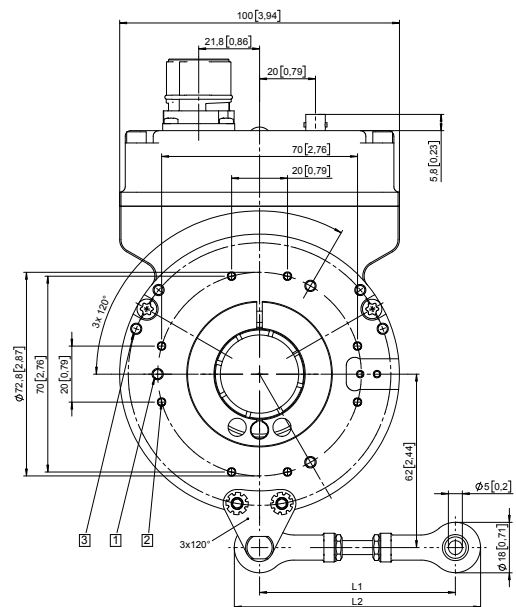
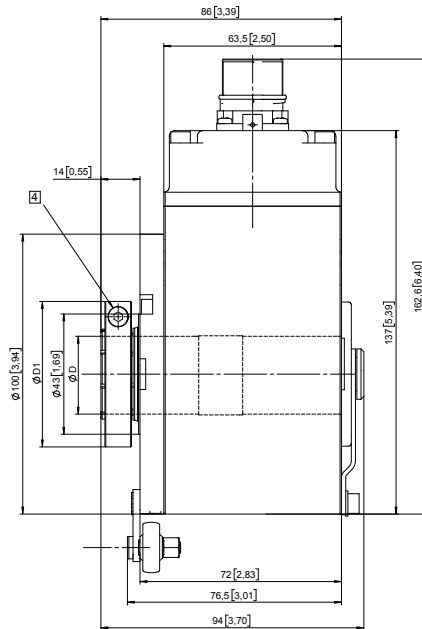
Push-pull / RS422 / optical fiber

Dimensions

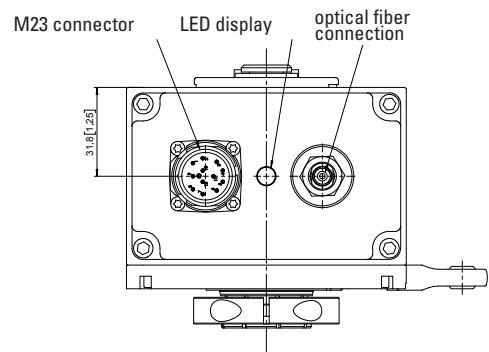
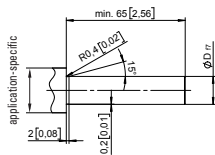
Dimensions in mm [inch]

**Flange with fastening arm
through hollow shaft and
optical fiber 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 (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]
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