Position transmitters SMAT-8M, for T-slot

Key features

Design

General

The SMAT-8M is a position transmitter for the contactless sensing of the piston position of drives that can be detected magnetically.

It supplies a displacement-proportional analogue output signal in the position measuring range.
It is connected directly to analogue PLC inputs without any accessories.

With its extremely compact design, the SMAT-8M is the ideal solution for grippers, short-stroke cylinders and all applications in which installation space is restricted.

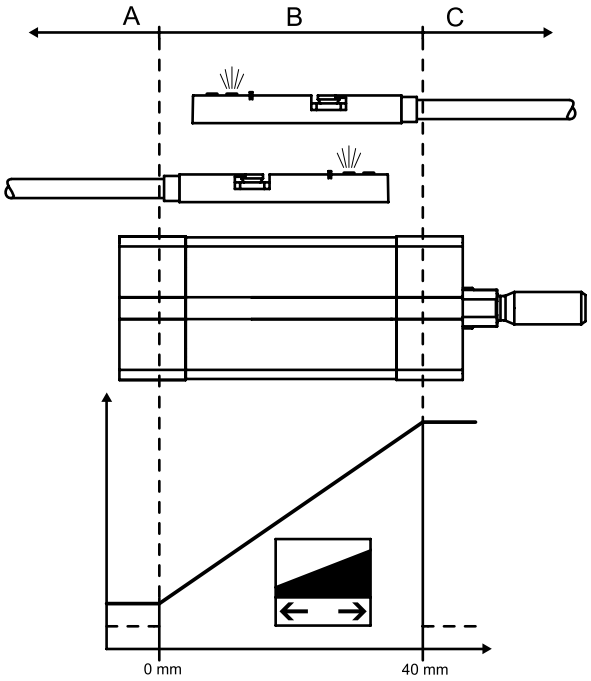
Note

It can be used with Festo drives with T-slot (profile slot 8) as well as round cylinders and tie-rod cylinders with mounting kits. A selection aid with suitable drives can be found below.

Position measuring range

The SMAT-8M supplies a displacement-proportional analogue output signal of 0 ... 10 V in a position measuring range of up to 40 mm (depending on the drive used). This means the voltage at the output increases when the piston moves in the direction of the piston rod. When the piston retracts, the output voltage drops.
The installation direction of the SMAT-8M is irrelevant in this case.
To achieve the best possible function on the drive in question, the position measuring range must be initialised on the drive during installation.

As a visual aid, the green LED lights up within the position measuring range (B) and the red LED lights up outside of the measuring range (A)/(C) in normal operation.

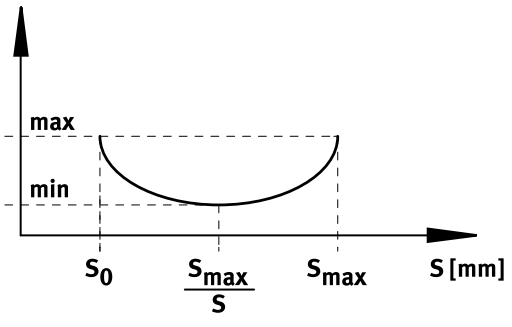


Repetition accuracy

The repetition accuracy is ±0.025 mm on grippers and ±0.1 mm on standard drives.

With standard drives, the repetition accuracy in the centre of the measuring range is lower than at the edge. For example, at a distance of ±5 mm from the centre point, it is ±0.06 mm. For critical applications, it is recommended that the SMAT-8M be mounted so that the relevant measuring points are close to 5.5 V.

Repetition accuracy as a function of position measuring range S



Selection aid

Drive/gripper	Usability on drive	Position measuring range approx.	
		With init. [mm]	Without init.[2] [mm]
Standards-based cylinders			
Standards-based cylinder DSBC-32	+	26	26
Standards-based cylinder DSBC-40	+	26	26
Standards-based cylinder DSBC-50	+	30	27
Standards-based cylinder DSBC-63	+	33	33
Standards-based cylinder DSBC-80	+	37	37
Standards-based cylinder DSBC-100	+	33	31
Standards-based cylinder DSBC-125	+	35	34
Standards-based cylinder DSBG-32	+	19	17
Standards-based cylinder DSBG-40	+	24	23
Standards-based cylinder DSBG-50	+	27	26
Standards-based cylinder DSBG-63	+	27	27
Standards-based cylinder DSBG-80	+	30	33
Standards-based cylinder DSBG-100	+	29	27
Standards-based cylinder DSBG-125	+	27	24
Standards-based cylinder DSBG-160	+	33	23
Standards-based cylinder DSBG-200	+	29	24
Standards-based cylinder DSBG-250	+	19	19
Standards-based cylinder DSBG-320	+	18	17
Standards-based cylinder DSNU/ESNU-8	+	19	17
Standards-based cylinder DSNU/ESNU-10	+	22	19
Standards-based cylinder DSNU/ESNU-12	+	21	19
Standards-based cylinder DSNU/ESNU-16	+	21	19
Standards-based cylinder DSNU/ESNU-20	+	20	18
Standards-based cylinder DSNU/ESNU-25	+	28	22
Round cylinder DSNU/ESNU-32	+	25	23
Round cylinder DSNU/ESNU-40	+	29	30
Round cylinder DSNU/ESNU-50	+	31	29
Round cylinder DSNU/ESNU-63	+	36	33
Standards-based cylinder DNCB-32	+	25	23
Standards-based cylinder DNCB-40	+	28	19
Standards-based cylinder DNCB-50	+	30	26
Standards-based cylinder DNCB-63	+	32	27
Standards-based cylinder DNCB-80	+	35	32
Standards-based cylinder DNCB-100	+	29	26
Standards-based cylinder DNC-32	+	29	32
Standards-based cylinder DNC-40	o[1]	–	–
Standards-based cylinder DNC-50	o[1]	–	–
Standards-based cylinder DNC-63	+	34	28
Standards-based cylinder DNC-80	+	35	29
Standards-based cylinder DNC-100	+	37	33
Standards-based cylinder DNC-125	+	38	32
Standards-based cylinder DNG-32	+	28	19
Standards-based cylinder DNG-40	+	34	30
Standards-based cylinder DNG-50	o[1]	–	–
Standards-based cylinder DNG-63	+	32	25
Standards-based cylinder DNG-80	+	32	25
Standards-based cylinder DNG-100	+	32	27

Drive/gripper	Usability on drive	Position measuring range approx.	
		With init. [mm]	Without init.[2] [mm]
Standards-based cylinders			
Compact cylinder ADN/AEN-12	+	22	22
Compact cylinder ADN/AEN-16	+	26	26
Compact cylinder ADN/AEN-20	+	30	28
Compact cylinder ADN/AEN-25	+	27	24
Compact cylinder ADN/AEN-32	+	31	31
Compact cylinder ADN/AEN-40	+	28	20
Compact cylinder ADN/AEN-50	+	25	21
Compact cylinder ADN/AEN-63	+	31	29
Compact cylinder ADN/AEN-80	o[1]	–	–
Compact cylinder ADN/AEN-100	+	28	24
Compact cylinder ADN/AEN-125	+	37	33
Piston rod cylinders			
Short-stroke cylinder ADVC/AEVC-32	+	Stroke < position measuring range SMAT-8M	Stroke < position measuring range SMAT-8M
Short-stroke cylinder ADVC/AEVC-40	+		24
Short-stroke cylinder ADVC/AEVC-50	+		Stroke < position measuring range SMAT-8M
Short-stroke cylinder ADVC/AEVC-63	+		
Short-stroke cylinder ADVC/AEVC-80	+		
Short-stroke cylinder ADVC/AEVC-100	+		24
Compact cylinder ADVU/AEVU-12	+	23	20
Compact cylinder ADVU/AEVU-16	+	20	17
Compact cylinder ADVU/AEVU-20	+	29	28
Compact cylinder ADVU/AEVU-25	+	25	21
Compact cylinder ADVU/AEVU-32	+	27	23
Compact cylinder ADVU/AEVU-40	+	24	21
Compact cylinder ADVU/AEVU-50	+	22	18
Compact cylinder ADVU/AEVU-63	+	32	27
Compact cylinder ADVU/AEVU-80	+	35	28
Compact cylinder ADVU/AEVU-100	+	33	26
Compact cylinder ADVU/AEVU-125	+	35	31
Compact cylinder DPDM-25	+	–	32
Compact cylinder DPDM-32	+	–	15
Flat cylinder DZF-12	+	29	26
Flat cylinder DZF-18	+	26	24
Flat cylinder DZF-25	+	28	23
Flat cylinder DZF-32	+	26	17
Flat cylinder DZF-40	o[1]	–	–
Flat cylinder DZF-50	o[1]	–	–
Flat cylinder DZF-63	o[1]	–	–

\+ Unrestricted use

o On request

1) Different from technical data. Usability on request

2) Position measuring range without initialisation (delivery status)

Selection aid

Drive/gripper	Usability on drive	Position measuring range approx.	
		With init. [mm]	Without init.[2] [mm]
Rodless cylinders			
Linear drive DGC-18	+	30	26
Linear drive DGC-25	o[1]	–	–
Linear drive DGC-32	o[1]	–	–
Linear drive DGC-40	o[1]	–	–
Function-oriented drives			
Linear/swivel clamp CLR-12	+	22	22
Linear/swivel clamp CLR-16	+	26	26
Linear/swivel clamp CLR-20	+	30	28
Linear/swivel clamp CLR-25	+	27	24
Linear/swivel clamp CLR-32	+	31	31
Linear/swivel clamp CLR-40	+	28	20
Linear/swivel clamp CLR-50	+	25	21
Linear/swivel clamp CLR-63	+	31	29
Drives with linear guides			
Guided drive DFM-12	+	17	14
Guided drive DFM-16	+	21	21
Guided drive DFM-20	+	22	14
Guided drive DFM-25	+	19	15
Guided drive DFM-32	+	17	12
Guided drive DFM-40	+	21	16
Guided drive DFM-50	+	25	19
Guided drive DFM-63	+	31	27
Guided drive DFM-80	+	30	30
Guided drive DFM-100	+	25	24
Guided drive DFM-12-B	+	16	22
Guided drive DFM-16-B	+	20	21
Guided drive DFM-20-B	+	26	27
Guided drive DFM-25-B	+	24	22
Guided drive DFM-32-B	+	29	28
Guided drive DFM-40-B	+	30	29
Guided drive DFM-50-B	+	31	31
Guided drive DFM-63-B	+	33	32
Mini slide DGST-16	+	18	17
Mini slide DGST-20	+	20	18
Mini slide DGST-25	+	19	15
Linear drive unit SLE-10	+	22	22
Linear drive unit SLE-16	+	21	21
Linear drive unit SLE-20	+	20	20
Linear drive unit SLE-25	+	28	28
Linear drive unit SLE-32	+	25	25
Linear drive unit SLE-40	+	29	29
Linear drive unit SLE-50	+	31	31

Drive/gripper	Usability on drive	Position measuring range approx.	
		With init. [mm]	Without init.[2] [mm]
Handling modules			
Three-point gripper DHDS-32 (HGD)	+	Stroke < position measuring range SMAT-8M	Stroke < position measuring range SMAT-8M
Three-point gripper DHDS-50 (HGD)	+		
Parallel gripper DHPS-10 (HGP)	+		
Parallel gripper DHPS-16 (HGP)	+		
Parallel gripper DHPS-20 (HGP)	+		
Parallel gripper DHPS-25 (HGP)	+		
Parallel gripper DHPS-35 (HGP)	+		
Parallel gripper HGPL-63	o[1]		
Parallel gripper HGPL-14- ... -B	+	9	8
Parallel gripper HGPL-25- ... -B	+	18	14
Parallel gripper HGPL-40- ... -B	+	19	15
Parallel gripper HGPL-63- ... -B	+	23	19
Parallel gripper HGPT-40-B	+	Stroke < position measuring range SMAT-8M	Stroke < position measuring range SMAT-8M
Parallel gripper HGPT-50-B	+		
Parallel gripper HGPT-63-B	+	16	15
Parallel gripper HGPT-80-B	+	16	12
Angle gripper DHWS-16 (HGW)	+	Stroke < position measuring range SMAT-8M	Stroke < position measuring range SMAT-8M
Angle gripper DHWS-25 (HGW)	+		
Angle gripper DHWS-32 (HGW)	+		
Angle gripper DHWS-40 (HGW)	+		
Radial gripper DHRS-16 (HGR)	+		
Radial gripper DHRS-25 (HGR)	+		
Radial gripper DHRS-32 (HGR)	+		
Radial gripper DHRS-40 (HGR)	+		
Radial gripper HGRT-40-A-G2	+		
Radial gripper HGRT-50-A-G2	o[1]		
Semi-rotary drives with rack and pinion			
Semi-rotary drive DRRD-16	+[3]	17	19
Semi-rotary drive DRRD-20	+[3]	13	13
Semi-rotary drive DRRD-25	+[3]	28	28
Semi-rotary drive DRRD-32	+[3]	29	29
Semi-rotary drive DRRD-35	+[3]	34	33
Semi-rotary drive DRRD-40	+[3]	32	32
Semi-rotary drive DRRD-50	+[3]	32	32
Semi-rotary drive DRRD-63	o[1]	–	–

\+ Unrestricted use

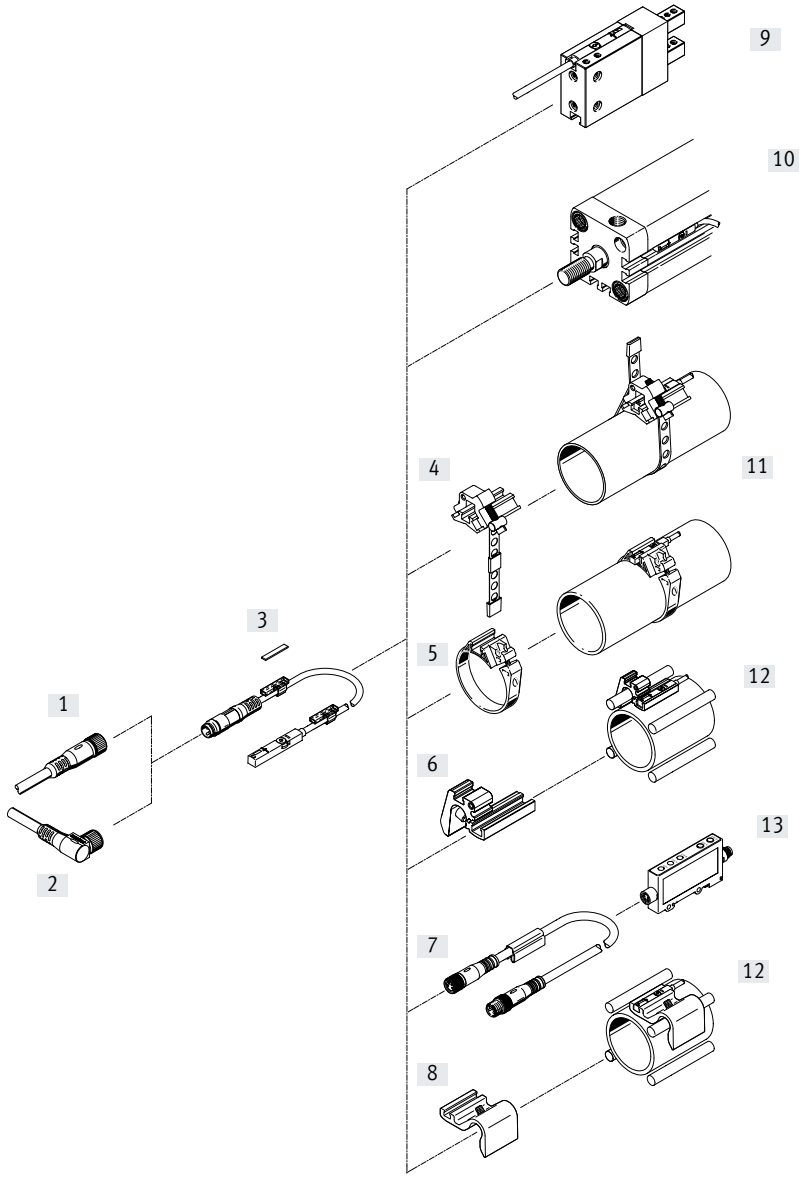
o On request

1) Different from technical data. Usability on request

2) Position measuring range without initialisation (delivery status)

3) Repetition accuracy corresponds to 1°

Peripherals overview



Accessories		→ Page/ Internet	Accessories		→ Page/ Internet
[1]	Connecting cable NEBU-M8G4	10	[10]	Standards-based cylinder DSBC	dsbc
[2]	Connecting cable NEBU-M8W4	10		Standards-based cylinder DNC	dnc
[3]	Inscription label ASLR	10		Compact cylinder ADN	adn
[4]	Mounting kit SMBR-8-8/100-S6, heat resistant	10		Short-stroke cylinder ADVC/AEVC	advc
[5]	Mounting kit SMBR	10		Compact cylinder ADVU/AEVU	advu
[6]	Mounting SMBZ-8	10		Flat cylinder DZF	dzf
[7]	Connecting cable NEBU-M8G4	10		Linear drive DGC	dgc
[8]	Sensor bracket DASP-M4-...	10		Linear/swivel clamp CLR	clr
[9]	Three-point gripper DHDS	dhds		Guided drive DFM	dfm
	Three-point gripper HGDD	hgdd	[11]	Standards-based/round cylinder DSNU	dsnu
	Parallel gripper DHPS	dhps		Linear drive unit SLE	sle
	Parallel gripper HGPD	hgpd	[12]	Standards-based cylinder DSBG	dsbg
	Parallel gripper HGPT	hgpt	[13]	Signal converter SVE4	sve4
	Angle gripper DHWS	dhws			
	Radial gripper DHRS	dhrs			
	Radial gripper HGRT	hgrt			

Type codes

001	Series	
SMAT	Position transmitter, magnetic	

002	Design type	
8	For T-slot	

003	Sensor version	
M	Inserted in the slot from above	

004	Analogue output	
U	0 ... 10 V	

005	Cable characteristic	
E	Suitable for energy chains/robot applications	

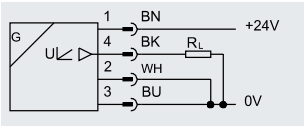
006	Cable length [m]	
0,3	0.3 m	

007	Electrical connection	
M8D	Plug M8, 4-pin, rotatable thread	

Data sheet

Function

Normal operation



General technical data		
Design		For T-slot
Certification		c UL us listed (OL)
		RCM
CE marking (see declaration of conformity)		To EU EMC Directive[1)]
Note on materials		RoHS-compliant
		Halogen-free

1) For information about the area of use, see the EC declaration of conformity at: www.festo.com/catalogue/SMAT-8M → Support/Downloads.
If the devices are subject to usage restrictions in residential, commercial or light-industrial environments, further measures for the reduction of the emitted interference may be necessary.

Input signal/measuring element		
Measuring principle		Magnetic
Position measuring range	[mm]	≤ 40[2)]

2) Dependent on drive/gripper used.

Signal processing		
Max. speed of travel	[m/s]	3

Output, general		
Path resolution	[mm]	≤ 0.05[2)]
Repetition accuracy	[mm]	0.2
	[°]	1 on semi-rotary drive DRRD

Analogue output		
Typical linearity error	[mm]	±1 on cylinders[2)]
		±0.2 on grippers[2)]

2) Dependent on drive/gripper used.

Electrical outputs		
Analogue output	[V]	0 ... 10
Short circuit current rating		Yes
Overload protection		Available
Output signal		Analogue

Data sheet

Electronics		
Operating voltage range	[V DC]	15 ... 30
Typical sampling interval	[ms]	2.8
Reverse polarity protection		For all electrical connections

Electromechanics		
Electrical connection		SMAT-8M-U-E-0.3-M8D
Connection type		Cable with plug
Connection technology		M8x1, A-coded to EN 61076-2-104
Number of pins/wires		4
Type of mounting		Screw-type lock
Ambient temperature with flexible cable installation	[°C]	–25 ... +75
Cable length	[m]	0.3
Cable characteristic		Suitable for energy chains + robot applications
Cable test conditions		Energy chain: 50,000 cycles, bending radius 30 mm
		Torsional resistance: › 300,000 cycles, 270°/0.1 m
		Resistance to bending: to Festo standard; test conditions on request
Information on materials: Cable sheath		TPE-U (PUR)

Mechanics		
Type of mounting		Screw-clamped, inserted in the slot from above
Product weight	[g]	10
Information on materials: Housing		Reinforced PA6

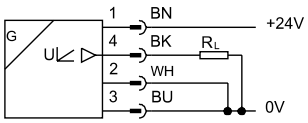
Display/operation	
Status indication	Red, green LED

Immission/emission		
Ambient temperature	[°C]	–25 ... +75
Degree of protection		IP65, IP68
Corrosion resistance class CRC[1)]		2

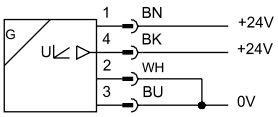
1) Corrosion resistance class CRC 2 to Festo standard FN 940070
Moderate corrosion stress. Indoor applications in which condensation can occur. External visible parts with primarily decorative surface requirements which are in direct contact with a normal industrial environment.

Terminal allocation

Normal operation



Initialisation



Plug

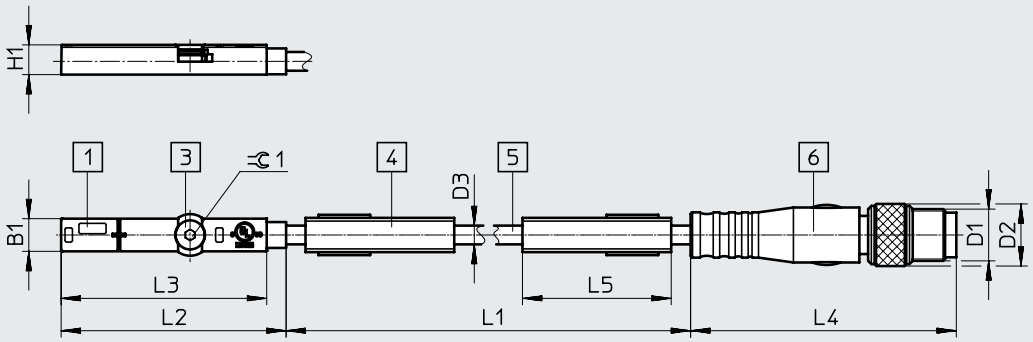
1 Operating voltage
2 Analogue output 0 V
3 0 V
4 Analogue output 0 ... 10 V

Wire colours

BN = Brown
BK = Black
BU = Blue
WH = White

Data sheet

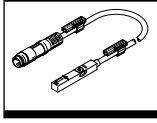
Dimensions Download CAD data ➔ www.festo.com



[1] Light emitting diode
[3] Clamping element
[4] Inscription label holder
[5] Connecting cable
[6] Plug M8, 4-pin, rotatable thread

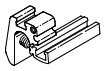
B1	D1	D2 ø	D3 ø	H1	L1	L2	L3	L4	L5	⫧
5	M8x1	9.6	2.9	4.6	300	34.8	31.8	41.1	23	1.5

Ordering data

Size	Analogue output [V]	Electrical connection	Cable length [m]	Part no.	Type
	0 ... 10	Plug M8, 4-pin, rotatable thread	0.3	**553744**	**SMAT-8M-U-E-0.3-M8D**

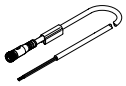
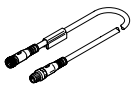
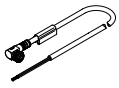
Accessories

Ordering data – Mounting components

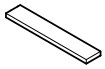
	For piston ⌀	Part no.	Type
Mounting kit SMBR-8-8/100-S6, heat-resistant			
	8 ... 100	**538937**	**SMBR-8-8/100-S6**
Mounting kit SMBR			
	8	**175091**	**SMBR-8-8**
	10	**175092**	**SMBR-8-10**
	12	**175093**	**SMBR-8-12**
	16	**175094**	**SMBR-8-16**
	20	**175095**	**SMBR-8-20**
	25	**175096**	**SMBR-8-25**
	32	**175097**	**SMBR-8-32**
	40	**175098**	**SMBR-8-40**
	50	**175099**	**SMBR-8-50**
	63	**175100**	**SMBR-8-63**
Mounting SMBZ			
	32 ... 100	**537806**	**SMBZ-8-32/100**
	125 ... 320	**537808**	**SMBZ-8-125/320**
Sensor bracket DASP-M4-...			
	For DSBG-125	**1451483**	**DASP-M4-125-A**
	For DSBG-250	**1456781**	**DASP-M4-250-A**
	For DSBG-320	**3015256**	**DASP-M4-320-A**

Ordering data – Connecting cable NEBU-M8

Data sheets → Internet: nebu

	Electrical connection, left	Electrical connection, right	Cable length [m]	Part no.	Type
	Straight socket, M8x1, 4-pin	Cable, open end, 4-wire	2.5	**541342**	**NEBU-M8G4-K-2.5-LE4**
			5	**541343**	**NEBU-M8G4-K-5-LE4**
	Straight socket, M8x1, 4-pin	Straight socket, M8x1, 4-pin	2.5	**554035**	**NEBU-M8G4-K-2.5-M8G4**
	Angled socket, M8x1, 4-pin	Cable, open end, 4-wire	2.5	**541344**	**NEBU-M8W4-K-2.5-LE4**
			5	**541345**	**NEBU-M8W4-K-5-LE4**

Ordering data – Inscription label ASLR

	Size	Part no.	Type	PU[1]
	23x4 mm	**541598**	**ASLR-L-423**	34

1) Packaging unit per frame