

## Position transmitters SMAT-8M, for T-slot

**FESTO**



## 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.

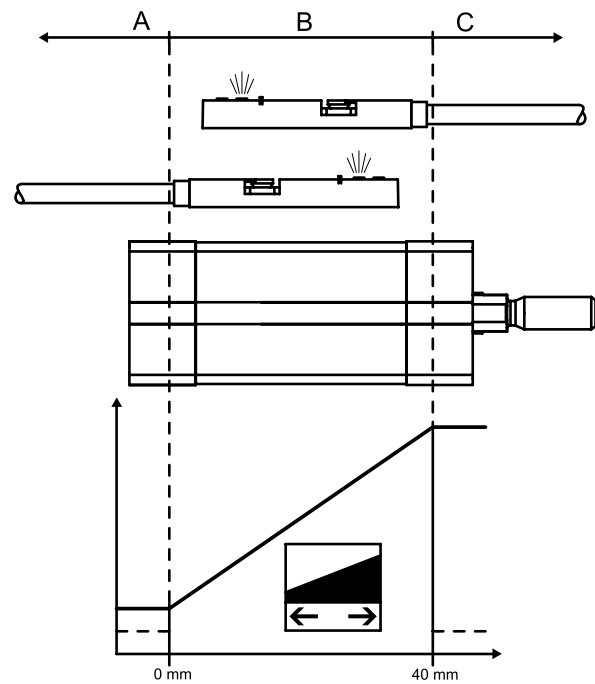
With its extremely compact design, the SMAT-8M is the ideal solution for grippers, short-stroke cylinders and all applications in which installation space is restricted.

**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.

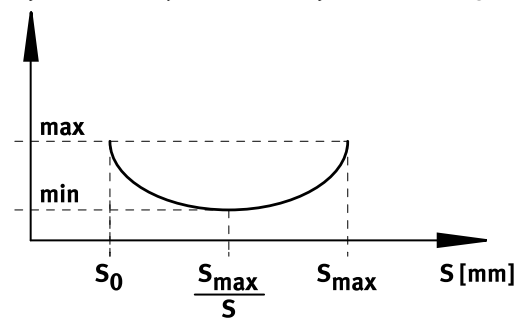


#### Repetition accuracy

The repetition accuracy is  $\pm 0.025$  mm on grippers and  $\pm 0.1$  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  $\pm 5$  mm from the centre point, it is  $\pm 0.06$  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.		Drive/gripper	Usability on drive	Position measuring range approx.		
		With init. [mm]	Without init. <sup>2)</sup> [mm]			With init. [mm]	Without init. <sup>2)</sup> [mm]	
<b>Standards-based cylinders</b>				<b>Standards-based cylinders</b>				
Standards-based cylinder DSBC-32	+	26	26	Compact cylinder ADN/AEN-12	+	22	22	
Standards-based cylinder DSBC-40	+	26	26	Compact cylinder ADN/AEN-16	+	26	26	
Standards-based cylinder DSBC-50	+	30	27	Compact cylinder ADN/AEN-20	+	30	28	
Standards-based cylinder DSBC-63	+	33	33	Compact cylinder ADN/AEN-25	+	27	24	
Standards-based cylinder DSBC-80	+	37	37	Compact cylinder ADN/AEN-32	+	31	31	
Standards-based cylinder DSBC-100	+	33	31	Compact cylinder ADN/AEN-40	+	28	20	
Standards-based cylinder DSBC-125	+	35	34	Compact cylinder ADN/AEN-50	+	25	21	
Standards-based cylinder DSBG-32	+	19	17	Compact cylinder ADN/AEN-63	+	31	29	
Standards-based cylinder DSBG-40	+	24	23	Compact cylinder ADN/AEN-80	o <sup>1)</sup>	–	–	
Standards-based cylinder DSBG-50	+	27	26	Compact cylinder ADN/AEN-100	+	28	24	
Standards-based cylinder DSBG-63	+	27	27	Compact cylinder ADN/AEN-125	+	37	33	
Standards-based cylinder DSBG-80	+	30	33	<b>Piston rod cylinders</b>				
Standards-based cylinder DSBG-100	+	29	27	Short-stroke cylinder ADVC/AEVC-32	+	Stroke < position measuring range SMAT-8M	Stroke < position measuring range SMAT-8M	
Standards-based cylinder DSBG-125	+	27	24	Short-stroke cylinder ADVC/AEVC-40	+			24
Standards-based cylinder DSBG-160	+	33	23	Short-stroke cylinder ADVC/AEVC-50	+			Stroke < position measuring range SMAT-8M
Standards-based cylinder DSBG-200	+	29	24	Short-stroke cylinder ADVC/AEVC-63	+			
Standards-based cylinder DSBG-250	+	19	19	Short-stroke cylinder ADVC/AEVC-80	+			
Standards-based cylinder DSBG-320	+	18	17	Short-stroke cylinder ADVC/AEVC-100	+	24		
Standards-based cylinder DSNU/ESNU-8	+	19	17	Compact cylinder ADVU/AEUV-12	+	23	20	
Standards-based cylinder DSNU/ESNU-10	+	22	19	Compact cylinder ADVU/AEUV-16	+	20	17	
Standards-based cylinder DSNU/ESNU-12	+	21	19	Compact cylinder ADVU/AEUV-20	+	29	28	
Standards-based cylinder DSNU/ESNU-16	+	21	19	Compact cylinder ADVU/AEUV-25	+	25	21	
Standards-based cylinder DSNU/ESNU-20	+	20	18	Compact cylinder ADVU/AEUV-32	+	27	23	
Standards-based cylinder DSNU/ESNU-25	+	28	22	Compact cylinder ADVU/AEUV-40	+	24	21	
Round cylinder DSNU/ESNU-32	+	25	23	Compact cylinder ADVU/AEUV-50	+	22	18	
Round cylinder DSNU/ESNU-40	+	29	30	Compact cylinder ADVU/AEUV-63	+	32	27	
Round cylinder DSNU/ESNU-50	+	31	29	Compact cylinder ADVU/AEUV-80	+	35	28	
Round cylinder DSNU/ESNU-63	+	36	33	Compact cylinder ADVU/AEUV-100	+	33	26	
Standards-based cylinder DNCB-32	+	25	23	Compact cylinder ADVU/AEUV-125	+	35	31	
Standards-based cylinder DNCB-40	+	28	19	Compact cylinder DPDM-25	+	–	32	
Standards-based cylinder DNCB-50	+	30	26	Compact cylinder DPDM-32	+	–	15	
Standards-based cylinder DNCB-63	+	32	27	Flat cylinder DZF-12	+	29	26	
Standards-based cylinder DNCB-80	+	35	32	Flat cylinder DZF-18	+	26	24	
Standards-based cylinder DNCB-100	+	29	26	Flat cylinder DZF-25	+	28	23	
Standards-based cylinder DNC-32	+	29	32	Flat cylinder DZF-32	+	26	17	
Standards-based cylinder DNC-40	o <sup>1)</sup>	–	–	Flat cylinder DZF-40	o <sup>1)</sup>	–	–	
Standards-based cylinder DNC-50	o <sup>1)</sup>	–	–	Flat cylinder DZF-50	o <sup>1)</sup>	–	–	
Standards-based cylinder DNC-63	+	34	28	Flat cylinder DZF-63	o <sup>1)</sup>	–	–	
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 <sup>1)</sup>	–	–					
Standards-based cylinder DNG-63	+	32	25					
Standards-based cylinder DNG-80	+	32	25					
Standards-based cylinder DNG-100	+	32	27					

+ 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. <sup>2)</sup> [mm]

Rodless cylinders			
Linear drive DGC-18	+	30	26
Linear drive DGC-25	o <sup>1)</sup>	-	-
Linear drive DGC-32	o <sup>1)</sup>	-	-
Linear drive DGC-40	o <sup>1)</sup>	-	-
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

+ Unrestricted use

o On request

1) Different from technical data. Usability on request

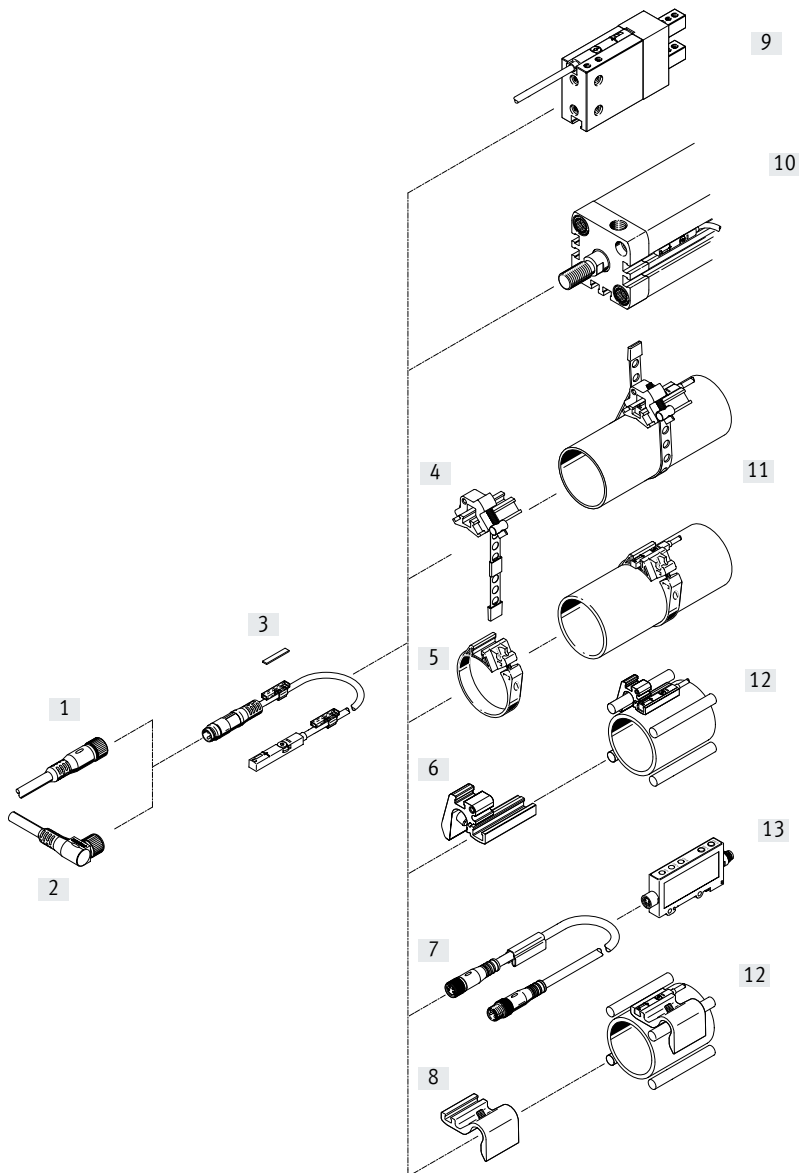
2) Position measuring range without initialisation (delivery status)

3) Repetition accuracy corresponds to 1°

Drive/gripper	Usability on drive	Position measuring range approx.	
		With init. [mm]	Without init. <sup>2)</sup> [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)	+	9	8
Parallel gripper DHPS-35 (HGP)	+		
Parallel gripper HGPL-63	o <sup>1)</sup>		
Parallel gripper HGPL-14- ... -B	+		
Parallel gripper HGPL-25- ... -B	+		
Parallel gripper HGPL-40- ... -B	+	18	14
Parallel gripper HGPL-63- ... -B	+	19	15
Parallel gripper HGPT-40-B	+	23	19
Parallel gripper HGPT-50-B	+	Stroke < position measuring range SMAT-8M	Stroke < position measuring range SMAT-8M
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 <sup>1)</sup>		
Semi-rotary drives with rack and pinion			
Semi-rotary drive DRRD-16	+ <sup>3)</sup>	17	19
Semi-rotary drive DRRD-20	+ <sup>3)</sup>	13	13
Semi-rotary drive DRRD-25	+ <sup>3)</sup>	28	28
Semi-rotary drive DRRD-32	+ <sup>3)</sup>	29	29
Semi-rotary drive DRRD-35	+ <sup>3)</sup>	34	33
Semi-rotary drive DRRD-40	+ <sup>3)</sup>	32	32
Semi-rotary drive DRRD-50	+ <sup>3)</sup>	32	32
Semi-rotary drive DRRD-63	o <sup>1)</sup>	-	-

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/AEUV	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	hgtr		

## Type codes

001	Series
<b>SMAT</b>	Position transmitter, magnetic

002	Design type
<b>8</b>	For T-slot

003	Sensor version
<b>M</b>	Inserted in the slot from above

004	Analogue output
<b>U</b>	0 ... 10 V

005	Cable characteristic
<b>E</b>	Suitable for energy chains/robot applications

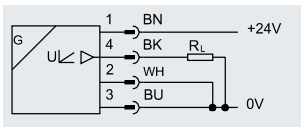
006	Cable length [m]
<b>0,3</b>	0,3 m

007	Electrical connection
<b>M8D</b>	Plug M8, 4-pin, rotatable thread

## Data sheet

### Function

#### Normal operation



General technical data	
Design	For T-slot
Mounting position	Any
Certification	c UL us listed (OL) RCM
CE marking (see declaration of conformity)	To EU EMC Directive <sup>1)</sup> To EU RoHS Directive
UKCA marking (see declaration of conformity)	To UK instructions for EMC To UK RoHS instructions
KC mark	KC EMC
Certificate issuing authority	UL E232949
Application information	Support / Overview of actuator sensors „The right sensor for the actuator“
Note on materials	RoHS-compliant Halogen-free
PWIS conformity	VDMA24364-B2-L

- 1) For information about the area of use, see the EC declaration of conformity at: [www.festo.com/catalogue/SMAT-8M](http://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	
Measured variable	Position
Measuring principle	Magnetic
Position measuring range [mm]	≤ 40 <sup>2)</sup>

- 2) Dependent on drive/gripper used.

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

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

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

- 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
No-load supply current	[mA]	< 12
Sensing range	[mm]	≤ 52
Resolution of travel	[mm]	≤ 0.02
Typical linearity error	[mm]	± 1
Typical sampling interval	[ms]	2
Residual ripple	[%]	10
Reverse polarity protection		For all electrical connections

Electromechanics		
Electrical connection	SMAT-8M-U-E-0,3-M8D	
Connection direction	In-line	
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	
Cable length	[m]	0.3
Cable characteristic	Suitable for energy chains + robot applications	
Cable test conditions	Energy chain: 5 million cycles, bending radius 28 mm	
	Torsional resistance: > 300,000 cycles, ±270°/0.1 m	
	Resistance to bending: to Festo standard; test conditions on request	
Housing material	High-alloy stainless steel, PA reinforced	
Union nut material	Nickel-plated brass	
Cable sheath material	TPE-U (PUR)	
Material of pin contacts	Gold-plated copper alloy	
Cable sheath colour	Grey	

Mechanics		
Type of mounting	Screw-clamped, inserted in the slot from above	
Product weight	[g]	9.5

Display/operation	
Status indication	Red, green LED

Immission/emission		
Ambient temperature	[°C]	-40 ... +80
Ambient temperature with flexible cable installation	[°C]	-20 ... +70
Degree of protection		IP65, IP68
Corrosion resistance class CRC <sup>1)</sup>		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

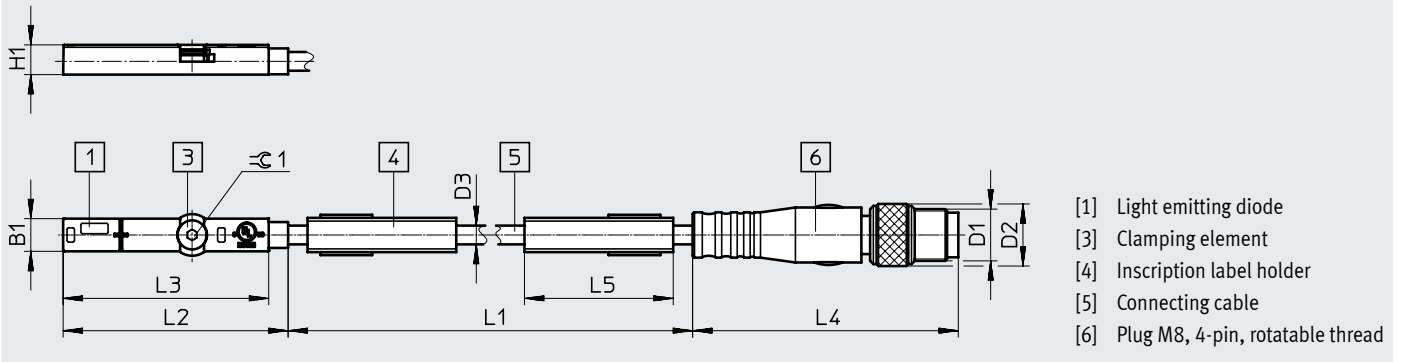
Normal operation	Initialisation	Plug	
			<ul style="list-style-type: none"> <li>1 Operating voltage</li> <li>2 Analogue output 0 V</li> <li>3 0 V</li> <li>4 Analogue output 0 ... 10 V</li> </ul>
<b>Wire colours</b> BN = Brown                      BU = Blue BK = Black                        WH = White			



Data sheet

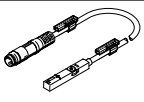
Dimensions

Download CAD data → [www.festo.com](http://www.festo.com)

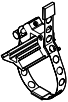



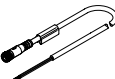
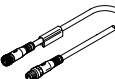
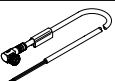



B1	D1	D2 ∅	D3 ∅	H1	L1	L2	L3	L4	L5	⊕
5	M8x1	9.6	2.9	4.6	300	34.8	31.8	41.1	23	1.5

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 $\varnothing$	Part no.	Type			
<b>Mounting kit SMBR-8-8/100-S6, heat-resistant</b>						
	8 ... 100	538937	SMBR-8-8/100-S6			
<b>Mounting kit SMBR</b>						
	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				
<b>Mounting SMBZ</b>						
	32 ... 100	537806	SMBZ-8-32/100			
	125 ... 320	537808	SMBZ-8-125/320			
<b>Sensor bracket DASP-M4-...</b>						
	For DSBG-125	1451483	DASP-M4-125-A			
	For DSBG-250	1456781	DASP-M4-250-A			
	For DSBG-320	3015256	DASP-M4-320-A			
<b>Ordering data – Connecting cable NEBU-M8</b>						
	Electrical connection, left	Electrical connection, right	Cable length [m]	Part no.	Type	Data sheets → Internet: nebu
	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	
<b>Ordering data – Inscription label ASLR</b>						
	Size	Part no.	Type	PU <sup>1)</sup>		
	23x4 mm	541598	ASLR-L-423	34		

1) Packaging unit per frame