



Brüel & Kjær Vibro



# Displacement sensors

# Quality products from a single source

For more than 50 years Brüel & Kjær Vibro has been a leading manufacturer of vibration measuring instruments and machine condition monitoring systems.

Brüel & Kjær Vibro offers its customers world-wide services and a rapid and budget-conscious supply of system solutions.

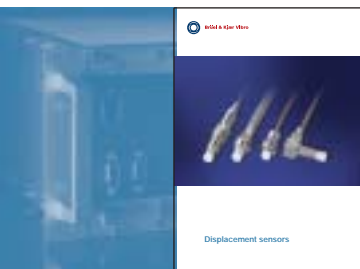
For measurement and monitoring of mechanical vibration in rotating machinery, the technically correct acquisition of measurements is of decisive importance.

## The right sensor for your measurement task!

The extensive programme of sensors from Brüel & Kjær Vibro offers the most suitable solution for every application.

### Displacement sensors and inductive displacement sensors for measurement of

- relative shaft vibration
- relative shaft position
- absolute and relative expansion
- speed and phase position
- eccentricity



### Velocity sensors for measurement of

- absolute case vibration
- absolute bearing vibration



All brochures are available in PDF-file format from: [www.bkvbros.com](http://www.bkvbros.com)

Brüel & Kjær Vibro reserves the right to change specifications and accessories without prior notification.

# Displacement sensors

Displacement sensors from Brüel & Kjær Vibro are used world wide in large numbers and their reliability has been proven through long-term use in industry.

**Displacement sensors** are used for non-contacting measurement of

- relative shaft vibration
- relative shaft position (axial/radial position)
- eccentricity (shaft excursion)
- relative shaft expansion
- rod-drop displacement
- reference signals for speed and phase angle
- rotational direction and zero speed.

**The non-contacting displacement sensors** are distinguished in terms of their basic construction.

- The DS series with sealed ceramic sensor tip and IP 68 protection class; conventional structure with sensor, calibrated cable and external oscillator
- SD series consisting of sensor, calibrated cable and external oscillator
- Series with an integrated oscillator (type IN-)

The **inductive displacement sensor** is used for measurement of

- absolute casing expansion

Through different **sensor constructions** and practical installation accessories, machine constructional characteristics and special environmental conditions can be taken into consideration.






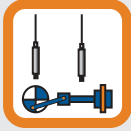


Therefore the optimally suitable displacement sensor from Brüel & Kjær Vibro can be selected with a view to

- the optimum displacement measuring range
- specific installation conditions
- operation in chemically aggressive conditions
- application at high temperatures
- installations in hazardous explosive areas and
- ruggedness and resistance to external influences



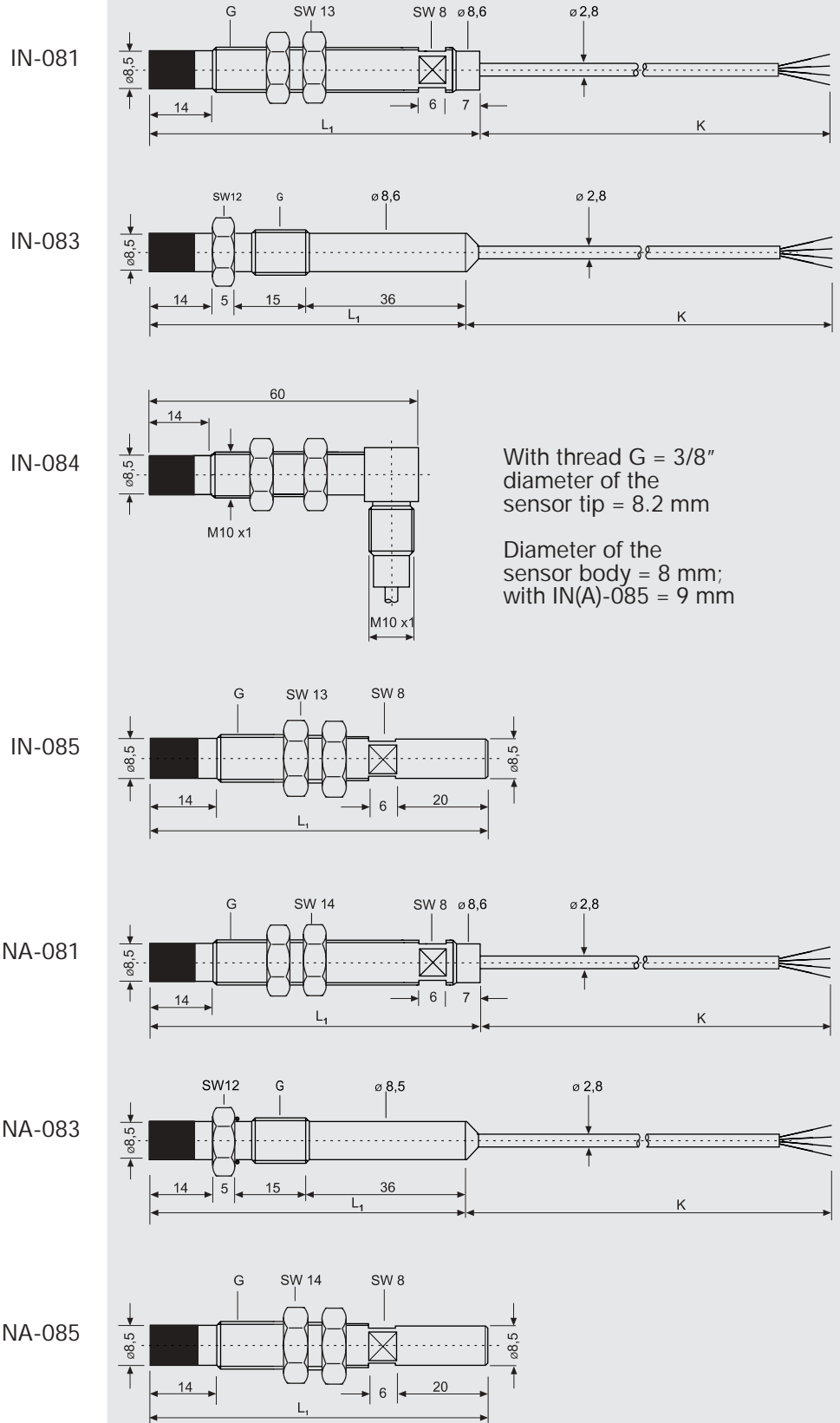
# Overview: Displacement sensors

Measuring range	Sensor type	Page	Non-contacting	Contacting	Integrated Oscillator	Sensor body version			Special environment		
						full length thread	reverse mount	right-angled head	For use in hazardous area	Mechanical execution in protection class IP 68	For use in aggressive chemical environment
1.5 mm	IN-081	6	•		•	•					
	IN-083		•		•		•				
	IN-084		•		•				•		
	IN-085		•		•	•					
	INA-081		•		•	•				•	
	INA-083		•		•			•		•	
	INA-085		•		•	•	•			•	
2 mm	DS-1051	8	•			•			•	•	
	DS-1052		•			•			•	•	
	DS-1053		•					•		•	
	DS-1054		•						•	•	
	SD-051	12	•			•					
	SD-052		•			•					
	SD-053		•					•			
	SD-054		•						•		
3.5 mm	SD-081	14	•			•					
	SD-083		•					•			
	SD-084		•						•		
	SD-087	16	•			•					•
	SD-088		•			•					•
	SD-089		•					•			•
4 mm	SDH-151	18	•			•					
	SDH-154		•						•		
8 mm	SD-161	20	•			•					
	SD-164		•						•		
20 mm	WT-010	26		•							
50 mm	WT-025	26		•							

		Standard application							
	For use at temperature > 180° C	Relative shaft vibration	Radial shaft position	Axial shaft position	Eccentricity	Relative expansion	Rod-drop reference	Speed & phase	Absolute expansion
									
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# Non-contacting displacement sensors with integrated oscillator

## Types and dimensions



## Displacement sensor with integrated oscillator

Order code

Sensor type					
General application	IN-081	IN-083	IN-084	IN-085	IN-08X
For use in hazardous area <sub>1)</sub>	INA-081	INA-083		INA-085	INA-08X
Measuring range	1.5 mm				
Operating temperature range	0 ... +110° C (in hazardous area depending on temperature class)				
Sensor body version	full length thread	reverse mount (e.g. in sensor holder AC-101)	right-angled head	full length thread and connector	

1)  II 2 G Ex Ib IIC T6  II 2 D Ex ib D 21 T135°C

Thread G					/X
M 10 x 1 - 6 g	•	•	•	•	3
3/8" - 24 UNF - 2A	o	o	-	o	4

Sensor body length L <sub>1</sub>					/XXX
Standard lengths	-	-	60 mm	-	060
	70 mm	70 mm	-	70 mm	070
	110 mm	-	-	-	110
Special length	on enquiry				
Minimum length	70 mm	70 mm	60 mm	70 mm	
Maximum length	250 mm	-	60 mm	150 mm	

Cable length K					/XX
Standard length	-	-	-	0 m <sub>2)</sub>	00
	5 m	5 m	5 m	-	50
Special length	on enquiry				

2) available accessories (cable AC-426 for IN-085, cable AC-429 for INA-085)

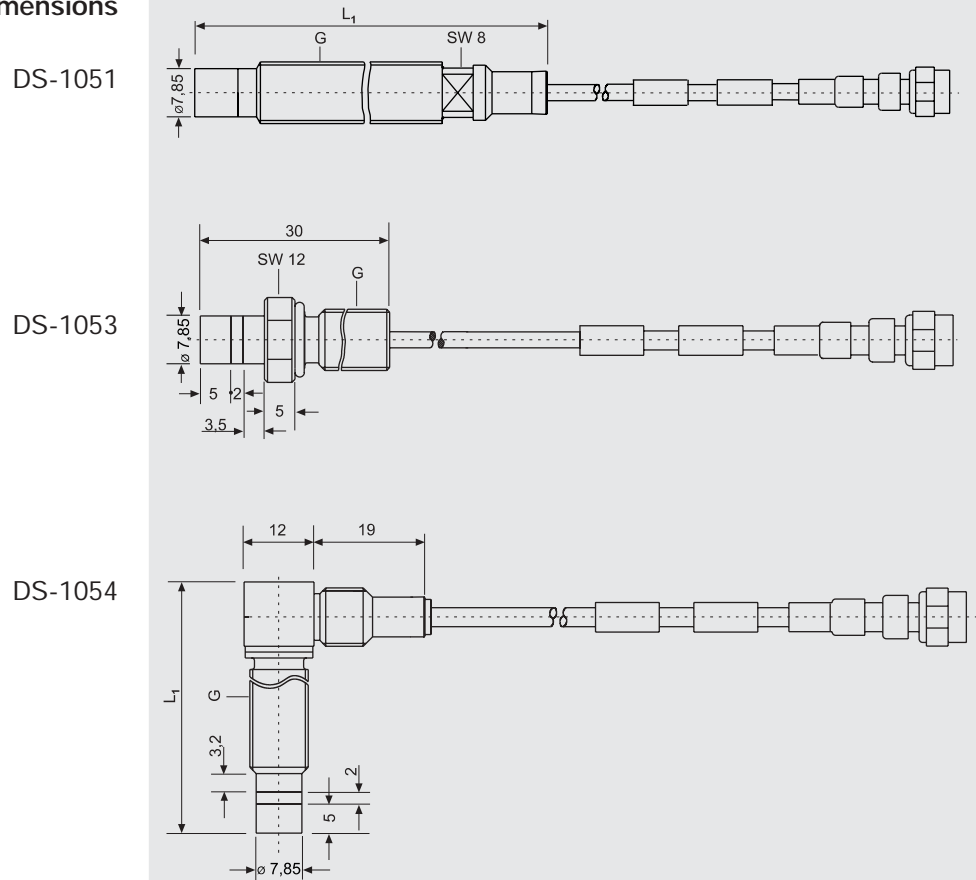
Special requirements (must be clarified in written form when ordering)					/X
no	•	•	•	•	0
yes	on enquiry				1

• preferred solution      o optional solution      - not available

Order example: IN-081/3/070/50/0

# Non-contacting displacement sensors DS with 2 mm measuring range

## Types and dimensions





<b>DS-1051 in standard form</b>		<b>Order code</b>				
Sensor with full length thread	DS-1051	/XX	/XXX	/XXX	/X	/9
Thread G: M 10 x 1 - 6 g		03				
Thread G: 3/8" - 24 UNF - 2A		04				
Sensor body length L <sub>1</sub> : 45 mm			045			
Sensor body length L <sub>1</sub> : 75 mm			075			
Sensor body length L <sub>1</sub> : 105 mm			105			
Sensor cable length K: 1 m				010		
Sensor cable length K: 5 m				050		
<b>preferred solution:</b> no cable protection					1	
optional solution with cable protection: steel protective conduit					2	
optional solution with cable protection: PTFE protective conduit					3	
No special requirements						9

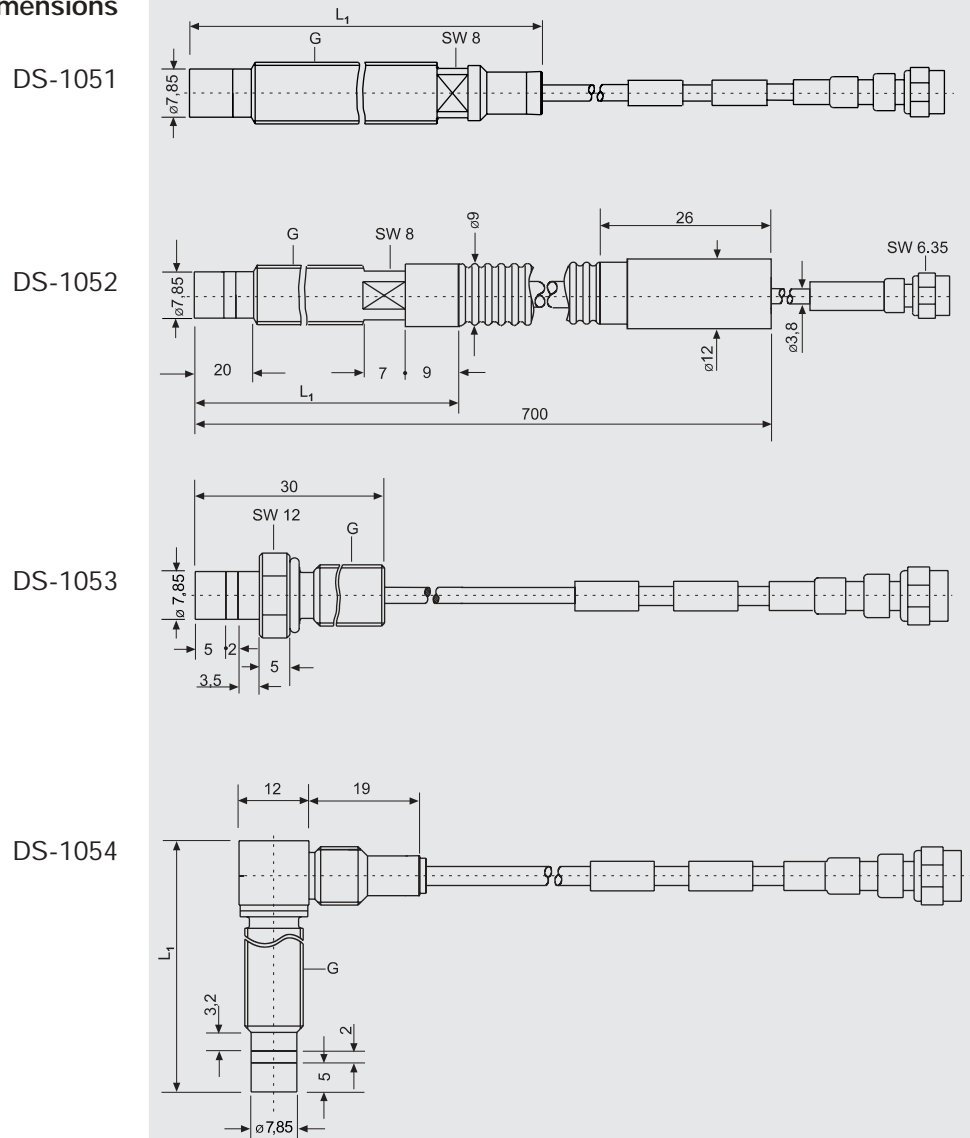
<b>DS-1053 in standard form</b>		<b>Order code</b>				
Reverse mount sensor	DS-1053	/03	/030	/XXX	/X	/9
Thread G: M 10 x 1 - 6 g		03				
Sensor body length L <sub>1</sub> : 30 mm			030			
Sensor cable length K: 1 m				010		
Sensor cable length K: 5 m				050		
<b>preferred solution:</b> no cable protection					1	
optional solution with cable protection: PTFE protective conduit					3	
No special requirements						9

<b>DS-1054 in standard form</b>		<b>Order code</b>				
Sensor with right-angled head	DS-1054	/03	/034	/XXX	/X	/9
Thread G: M 10 x 1 - 6 g		03				
Sensor body length L <sub>1</sub> : 34 mm			034			
Sensor cable length K: 1 m				010		
Sensor cable length K: 5 m				050		
<b>preferred solution:</b> no cable protection					1	
optional solution with cable protection: steel protective conduit					2	
optional solution with cable protection: PTFE protective conduit					3	
No special requirements						9

**Order examples:** DS-1051/03/045/010/1/9  
 DS-1053/03/030/010/1/9  
 DS-1054/03/034/010/1/9

# Non-contacting displacement sensors DS with 2 mm measuring range



## Types and dimensions



### Non-contacting displacement sensors Order code

	DS-1051	DS-1052 *	DS-1053	DS-1054	DS-105X
<b>Application</b>	general application and for use in hazardous area **				
<b>Measuring range</b>	2 mm				
<b>Operating temperature range</b>	-30 ... +180° C (in Ex area dependent on temperature class)				
<b>Sensor body version</b>	full length thread	full length thread with corrugated tube protection	reverse mount (e.g. in sensor holder AC-101)	right-angled head	

\* The sensor type DS-1052 is only available on enquiry and after technical clarification.

\*\* with marking  II 1/2 G Ex ia IIC T5/T4  II 2 D Ex iaD 21 T100°C

<b>Thread G</b>					/XX
M 10 x 1 - 6 g	•	•	•	•	03
3/8" - 24 UNF - 2A	•	o	o	o	04

<b>Sensor body length L<sub>1</sub></b>					/XXX
Standard lengths	–	–	30 mm	–	030
	–	–	–	34 mm	034
	45 mm	–	–	–	045
	75 mm	75 mm	–	–	075
	105 mm	–	–	–	105
Special lengths	135 mm	–	–	–	135
	165 mm				165
	195 mm				195
	225 mm				225
	255 mm				255
Minimum length	45 mm	45 mm	30 mm	34 mm	
Maximum length	255 mm	255 mm	30 mm	150 mm	

<b>Sensor cable length K</b>					/XXX
Standard length	1 m	1 m	1 m	1 m	010
	5 m	5 m	5 m	5 m	050

<b>Cable protection</b>					/X
no	•	–	•	•	1
Steel protective conduit	o	–	–	o	2
PTFE protective conduit	o	–	o	o	3
Corrugated tube, version A	–	•	–	–	4
Corrugated tube, version B	–	o	–	–	5

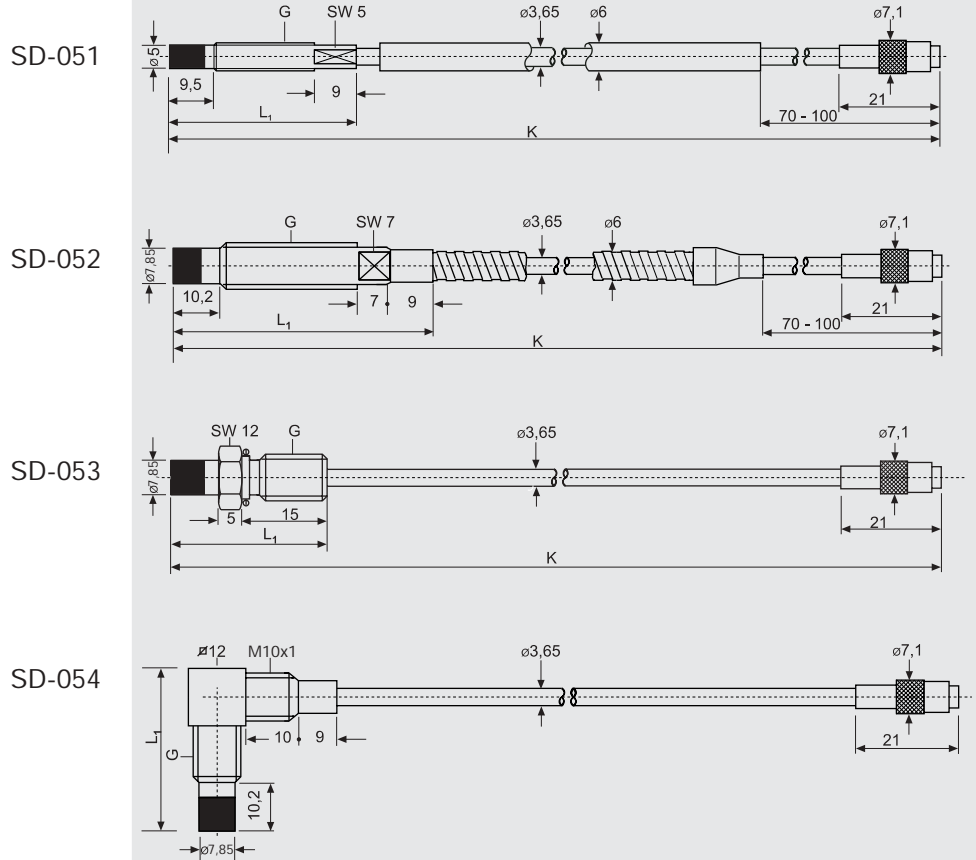
<b>Special requirements (must be clarified in written form when ordering)</b>					/X
no	•	–	•	•	9
yes	on enquiry				1

• preferred solution      o optional solution      – not available

**Order example:** DS-1051/03/075/010/1/9

# Non-contacting displacement sensors SD with 2 mm measuring range

## Types and dimensions



### Non-contacting displacement sensors Order code

Sensor type	SD-051	SD-052	SD-053	SD-054	SD-05X
Measuring range	2 mm				
Operating temperature range	-30 ... +180° C				
Sensor body version	full length thread	full length thread	reverse mount (e.g. in sensor holder AC-101)	right-angled head	

Thread G					/X
M 6 x 0.5 - 6 g	•	–	–	–	1
1/4" - 28 UNF -2A	•	–	–	–	2
M 10 X 1 - 6 g	–	•	•	•	3
3/8" -24 UNF - 2A	–	•	•		4
M 8 x 1	o	–	–	–	7

Sensor body length L <sub>1</sub>					/XXX
Standard lengths	–	–	30 mm	–	030
	–	–	–	34 mm	034
	45 mm	45 mm	–	–	045
	75 mm	75 mm	–	–	075
	105 mm	105 mm	–	–	105
Special length	on enquiry				
Minimum length	45 mm	45 mm	30 mm	34 mm	
Maximum length	150 mm	255 mm	30 mm	150 mm	

Cable length K					/XX
Standard length	1 m	1 m	1 m	1 m	10
	5 m	5 m	5 m	5 m	50
Optional length	0.5	0.5 m	0.5 m	0.5 m	05

Cable protection					/X
without	•	•	•	•	0
Steel protective conduit	o	o	–	o	1
PTFE protective conduit	o	o	o	o	2

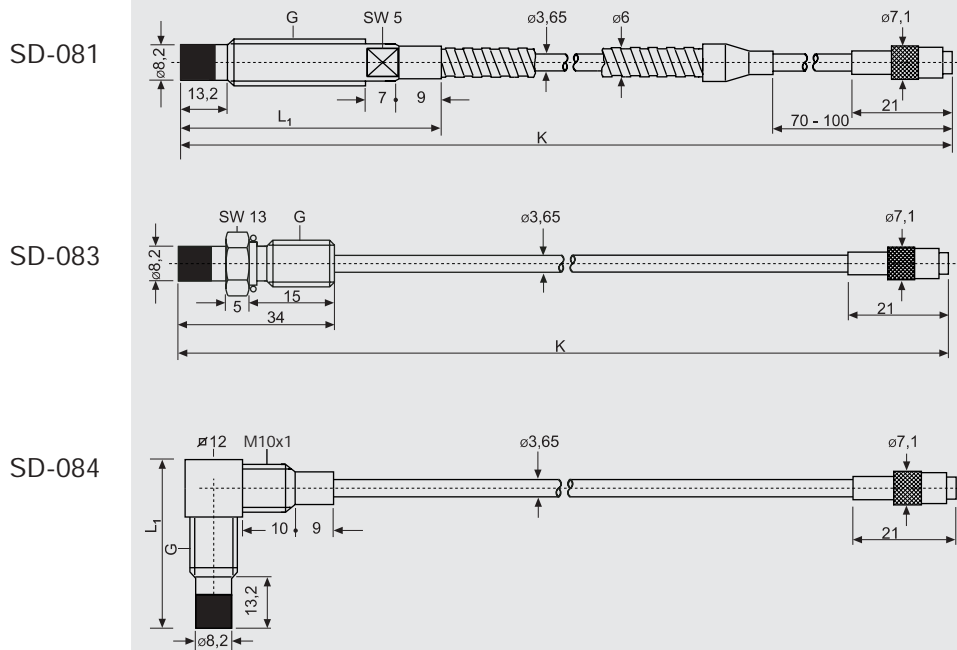
Special requirements (must be clarified in written form when ordering)					/X
no	•	•	•	•	0
yes	on enquiry				1

• preferred solution      o optional solution      – not available

Order example: SD-051/1/045/10/0/0

# Non-contacting displacement sensors SD with 3.5 mm measuring range

## Types and dimensions



## Non-contacting displacement sensors

## Order code

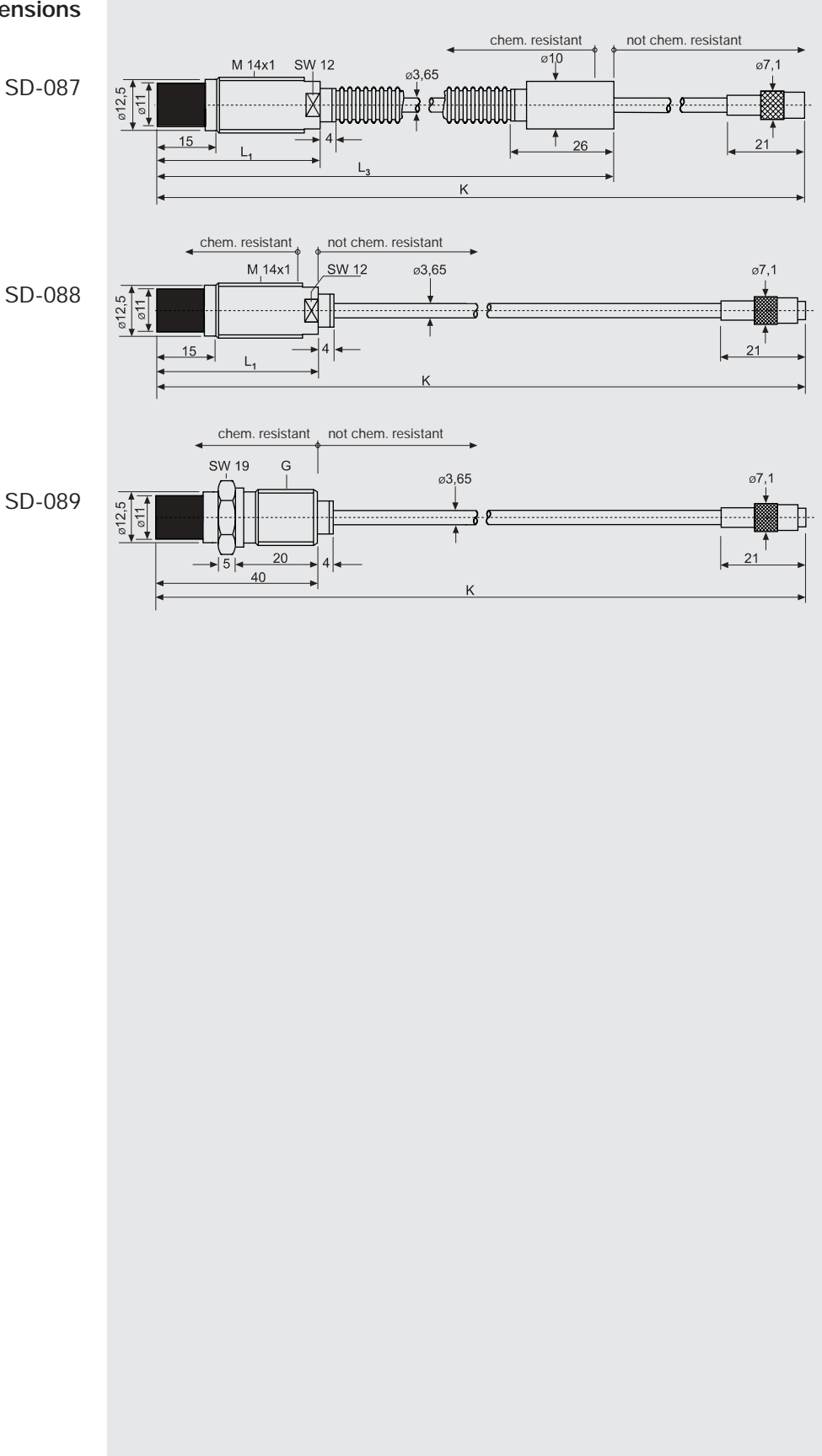
Sensor type	SD-081	SD-083	SD-084	SD-08X
Measuring range	3.5 mm			
Operating temperature range	-30 ... +180° C			
Sensor body version	full length thread	reverse mount (e.g. in sensor holder AC-101)	right-angled head	
<b>Thread G</b>				<b>/X</b>
M 10 x 1 - 6 g	•	•	•	<b>3</b>
3/8" - 24 UNF - 2A	•	•	-	<b>4</b>
1/2" - 20 UNF - 2A	o	-	-	<b>5</b>
<b>Sensor body length L<sub>1</sub></b>				<b>/XXX</b>
Standard lengths	-	34 mm	34 mm	<b>034</b>
	75 mm	-	-	<b>075</b>
Special length	on enquiry			
Minimum length	45 mm	34 mm	34 mm	
Maximum length	255 mm	34 mm	150 mm	
<b>Cable length K</b>				<b>/XX</b>
Standard length	1 m	1 m	1 m	<b>10</b>
	5 m	5 m	5 m	<b>50</b>
Optional length	0.5 m	0.5 m	0.5 m	<b>05</b>
<b>Cable protection</b>				<b>/X</b>
without	•	•	•	<b>0</b>
Steel protective conduit	o	-	o	<b>1</b>
PTFE protective conduit	o	o	o	<b>2</b>
<b>Special requirements (must be clarified in written form when ordering)</b>				<b>/X</b>
no	•	•	•	<b>0</b>
yes	on enquiry			<b>1</b>

• preferred solution      o optional solution      - not available

**Order example:** SD-081/3/075/10/0/0

# Chemically resistant displacement sensors SD with 3.5 mm measuring range

## Types and dimensions





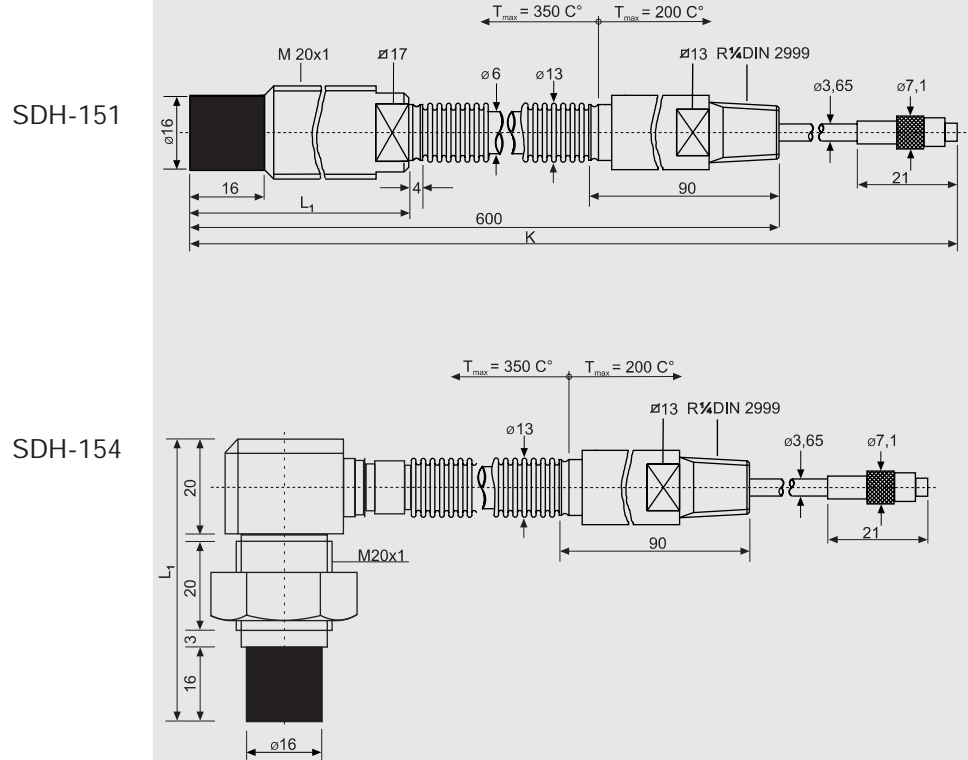
Chemically resistant non-contacting displacement sensors				Order code
Sensor type	SD-087	SD-088	SD-089	SD-08X
Measuring range		3.5 mm		
Operating temperature range		-30 ... +100° C		
Sensor body version	full length thread and corrugated tube protection	full length thread	reverse mount	
<b>Thread G</b>				<b>/X</b>
M 10 x 1 - 6 g	-	-	•	<b>3</b>
M 14 x 1	•	•	•	<b>8</b>
<b>Sensor body length L<sub>1</sub></b>				<b>/XXX</b>
Standard lengths	-	-	40 mm	<b>040</b>
	75 mm	75 mm	-	<b>075</b>
Special length	on enquiry		-	
Minimum length	40 mm	40 mm	40 mm	
Maximum length	250 mm	250 mm	40 mm	
<b>Cable length K</b>				<b>/XX</b>
Standard length	1 m	1 m	1 m	<b>10</b>
	5 m	5 m	5 m	<b>50</b>
<b>Cable protection</b>				<b>/XXX</b>
without	-	•	•	<b>000</b>
St. steel corrugated tube, L <sub>3</sub> = 700 mm	700	-	-	<b>700</b>
Special length of corrugated tube	on enquiry	-	-	
Minimum length	L <sub>1</sub> + 80 mm	-	-	
Maximum length	K - 250 mm	-	-	
<b>Special requirements (must be clarified in written form when ordering)</b>				<b>/X</b>
no	•	•	•	<b>0</b>
yes	on enquiry			<b>1</b>

• preferred solution      - not available

**Order example:** SD-087/8/075/10/700/0

# High-temperature displacement sensors SDH with 4 mm measuring range

## Types and dimensions



## High temperature non-contacting displacement sensors Typ SDH-15X

Order code

Sensor type	SDH-151	SDH-154	SDH-15X
Measuring range	4 mm		
Operating temperature range	-30 ...+ 350 °C		
Sensor body version	full length thread and corrugated tube protection	right-angled head and corrugated tube protection	
<b>Thread G</b>			<b>/6</b>
M 20 x 1	•	•	6
<b>Sensor body length L<sub>1</sub></b>			<b>/XXX</b>
Standard lengths	–	50 mm	050
	105 mm	–	105
Special length	on enquiry		
Minimum length	65 mm	50 mm	
Maximum length	255 mm	150 mm	
<b>Cable length K</b>			<b>/50</b>
Standard length	5 m	5 m	
<b>Cable protection (for the cable behind the corrugated tube)</b>			<b>/0</b>
without	•	•	0
<b>Special requirements (must be clarified in written form when ordering)</b>			<b>/X</b>
no	•	•	0
yes	on enquiry		1

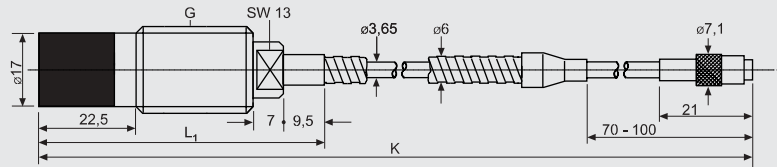
• preferred solution                      – not available

**Order example:** SDH-151/6/105/50/0/0

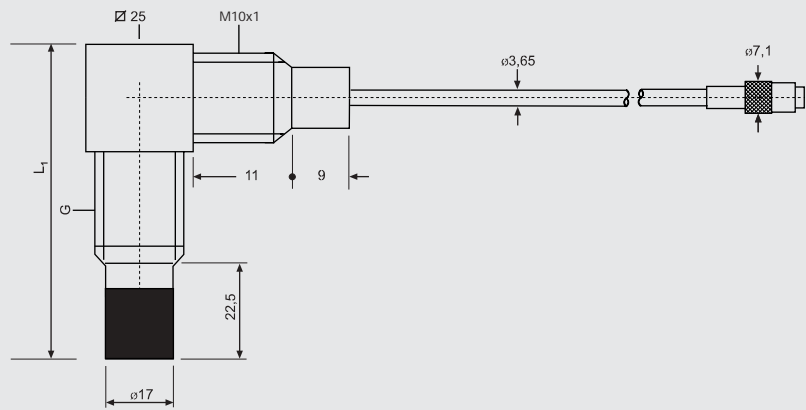
# Non-contacting displacement sensors SD with 8 mm measuring range

## Types and dimensions

SD-161



SD-164



## Non-contacting displacement sensors

## Order code

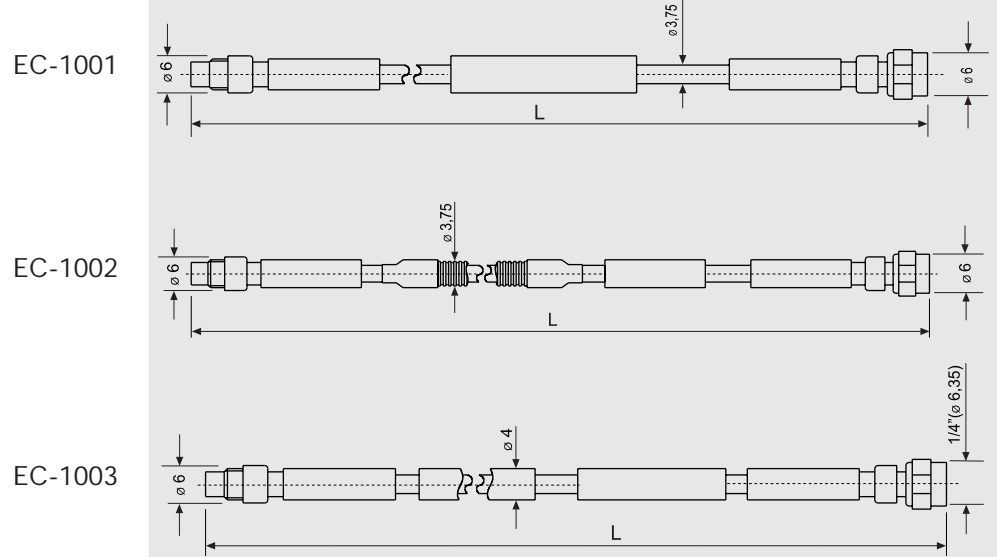
Sensor type	SD-161	SD-164	SD-16X
Measuring range	8 mm		
Operating temperature range	-30 ... +180° C		
Sensor body version	full length thread	right-angled head	
<b>Thread G</b>			<b>/6</b>
M 20 x 1	•	•	6
<b>Sensor body length L<sub>1</sub></b>			<b>/XXX</b>
Standard lengths	–	50 mm	<b>050</b>
	105 mm	–	<b>105</b>
Special length	on enquiry		
Minimum length	75 mm	50 mm	
Maximum length	255 mm	150 mm	
<b>Cable length K</b>			<b>/XX</b>
Standard lengths	1 m	1 m	<b>10</b>
	5 m	5 m	<b>50</b>
Optional length	0.5 m	0.5 m	<b>05</b>
<b>Cable protection</b>			<b>/X</b>
without	•	•	<b>0</b>
Steel protective conduit	o	o	<b>1</b>
PTFE protective conduit	o	o	<b>2</b>
<b>Special requirement (must be clarified in written form when ordering)</b>			<b>/X</b>
no	•	•	<b>0</b>
yes	on enquiry		<b>1</b>

• preferred solution      o optional solution      – not available

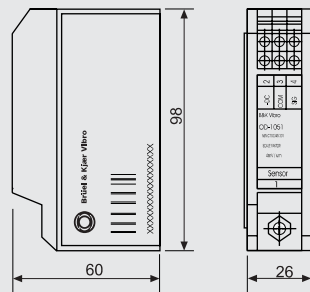
**Order example:** SD-161/6/105/10/0/0

# Extension cables and oscillators for displacement sensors DS

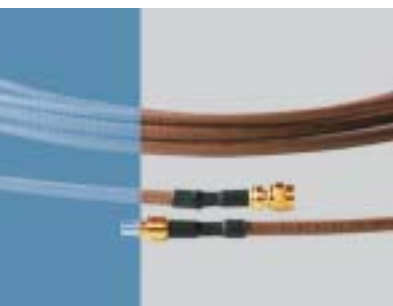
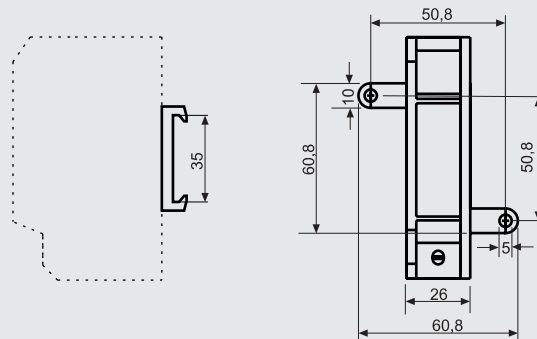
## Types and dimensions



OD-105X



OD-105X



## Extension cables for DS-1051/DS-1052/DS-1053/DS-1054

## Order code

	EC-100X			/XXX
<b>preferred solution:</b> no protection	EC-1001			
optional solution with steel protective conduit		EC-1002		
optional solution with PTFE protective conduit			EC-1003	
<b>preferred solution in conjunction with OD-1051:</b> cable length L = 4 m (-0.4 m/+0.6 m)				040
<b>preferred solution in conjunction with OD-1053:</b> cable length L = 9 m (-0.4 m/+0.6 m)				090
optional solution in conjunction with OD-1053: cable length L = 5 m (-0.4 m/+0.6 m)				050

Order example: EC-1001/040

## Oscillator for DS-1051/DS-1052/DS-1053/DS-1054

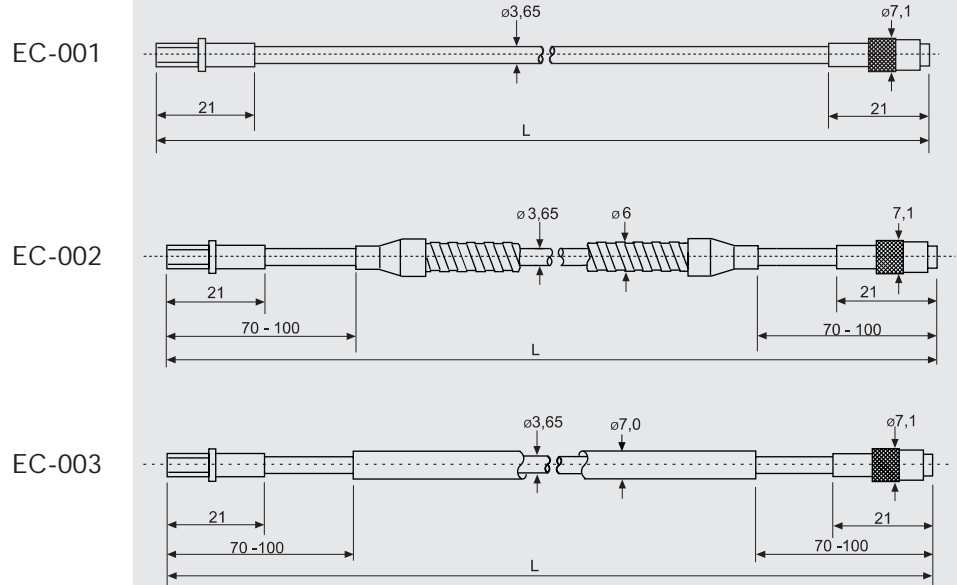
## Order code

2 mm measuring range, standard version, for total cable length $M = K + L = 5$ m		OD-1051
2 mm measuring range, standard version, for total cable length $M = K + L = 10$ m		OD-1053

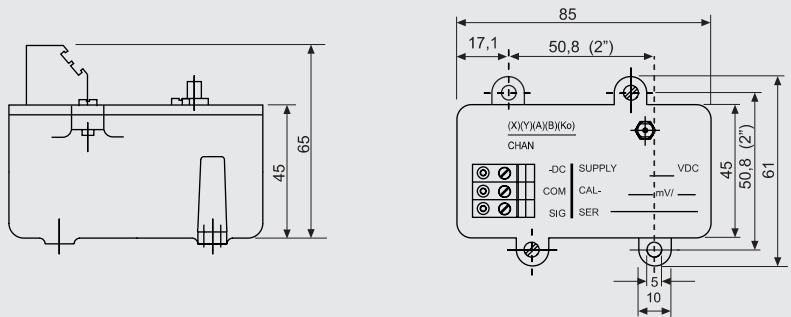


# Extension cables and oscillators for displacement sensors SD

## Types and dimensions



OD-05X  
OD-08X  
OD-151  
OD-162





## Extension cables for SD-05X/SD-08X/SD-16X/SDH-15X

## Order code

	EC-00X	/XX	/X
<b>preferred solution:</b> no protection	EC-001		
optional solution with steel protective conduit	EC-002		
optional solution with PTFE protective conduit	EC-003		
in conjunction with OD-051/OD-054/OD-081/OD-151/OD-162: cable length L = 4 m (-0.4 m / +0.6 m)		40	
in conjunction with OD-051/OD-054/OD-081/OD-151/OD-162: cable length L = 4.5 m (-0.4 m / +0.6 m)		45	
in conjunction with OD-053/OD-083: cable length L = 9 m (-0.4 m / +0.6 m)		90	
in conjunction with OD-053/OD-083: cable length L = 9.5 m (-0.4 / +0.6 m)		95	
<b>preferred solution:</b> no special requirements			0
Special requirements must be clarified in written form when ordering			1

Order example: EC-001/40/0

## Oscillator

## Order code

Associated sensor type	Measuring range	Operating temperature	Total cable length	Order code
for displacement sensor type SD-05X	2 mm	-30 ... +65° C	M = K + L = 5 m	OD-051
			M = K + L = 10 m	OD-053
		+100° C	M = K + L = 5 m	OD-054
			M = 1,5 m	OD-055
for displacement sensor type SD-08X	3.5 mm	-30 ... +65° C	M = K + L = 5 m	OD-081
			M = K + L = 10 m	OD-083
for displacement sensor type SDH-15X	4 mm		M = 5 m	OD-151
for displacement sensor type SD-16X	8 mm		M = K + L = 5 m	OD-162
for displacement sensor type SD-16X	8 mm		M = K + L = 5 m	OD-165

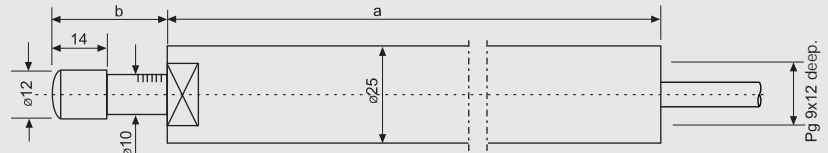
For measuring relative expansion with one pair of SD-16X sensors it is recommended to use 1 x OD-162 and 1 x OD-165



# Displacement sensor

## Types and dimensions

WT-010/WT-025



Dimensions

WT-010

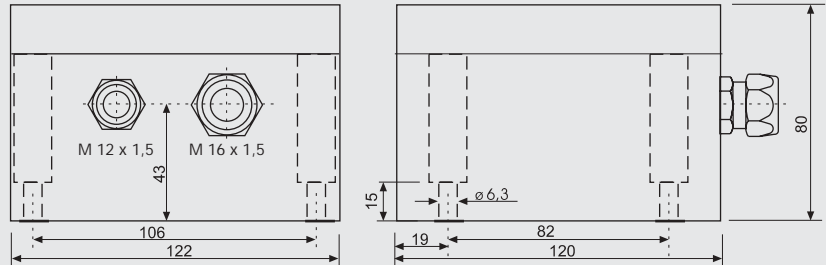
WT-025

a  
b

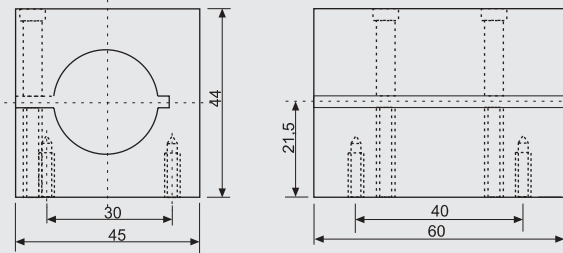
195 mm  
30 mm

265 mm  
45 mm

SP-502



AC-175



**Displacement sensor for absolute expansion****Order code**

	WT-0XX	
Linear measuring range +/- 10 mm	WT-010	
Linear measuring range +/- 25 mm		WT-025

**Accessories for Displacement sensor****Order code**

Signal processor	SP-502
Mounting block for Displacement sensor	AC-175
Power supply for SP-502 (230 V AC/ +24 V DC, 1 A)	AC-4601

**Components of the measuring chain**

Displacement sensor	WT-010	WT-025
Signal processor	SP-502	
Mounting block for sensor	AC-175	

**Measuring and electrical properties**

Operating principle	Inductive differential choke with carrier frequency amplifier	
Total measurement range	20 mm	50 mm
Nominal range	+/- 10 mm	+/- 25 mm
Sensitivity	500 mV/mm	200 mV/mm
Operating frequency range	DC ... 200 Hz (-3 dB)	
Supply voltage	$U_B = +24 \text{ V DC (+20 ... +30 V DC)}$	
Max. power consumption	2 W	
Output signal	0 ... 10 V (at load $R_L (1 \text{ k}\Omega)$ optionally: 4 ... 20 mA (at load $R_L \leq 500 \Omega$ )	
Zero point adjustment	+/- 10% of nominal range	
Sensitivity deviation	< 0.1 % of nominal range	
Linearity error	< 0.1 %	

**Other technical data for WT-010 / WT-025**

Operating temperature range	-50 ... +120° C	
Storage temperature range	-50 ... +120° C	
Protection class	IP 54	
Total weight	approx. 500 g	approx. 650 g
Connection cable to SP-502	integral cable, 5 m long, with protective conduit	

**Other technical data for SP-502**

Operating temperature range	0 ... + 60° C
Storage temperature range	-25 ... +85° C
Protection class	IP 65
Housing size	122 x 120 x 80 mm (Length x Width x Height)
Total weight	approx. 2 kg
Electrical connection for power supply and output signal	terminal connector inside the housing

# Non-contacting displacement sensors with external oscillator: Technical data


## Measuring chain components

Displacement sensor	DS-105X		
Extension cable	EC-100X/XXX		
Oscillator	OD-1051	OD-1053	OD

## Measuring and electrical properties

Operating principle			
Linear measuring range	2 mm		
Operating frequency range			
Sensitivity	8 mV/μm		
Recommended operating point			
Supply voltage	U <sub>B</sub> = -24 V DC (-18 ... -30 V DC)		
Maximum current consumption	16 mA		
Output signal			
Cable length for output signal	max. 1000 m		
Output impedance			
Sensitivity deviation			
Deviation from reference line	< 25 μm in testing range 0 ... 45° C; < 76 μm in operating temperature range		

## Ex-protection according to directive 94/9/EG ATEX

Designation	 II 1/2 2 G Ex ia IIC T5/T4 II 2 D Ex iaD 21 T100°C
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## Displacement sensor

Sensor type	DS-1051 DS-1052 DS-1053 DS-1054
Sensor tip material	Ceramic
Sensor tip diameter	7.85 mm
Sensor body material	
Thread	
Protection class	IP 68 (5 bar, EN 60529)*
Operating temperature range	-30 ... +180° C (in Ex area dependent on temperature class)
Storage temperature range	
Sensor cable	75 Ohm tri-axial cable
Cable jacket	
Cable length K	1 m (-0.2/+0.3 m) or 5 m (-0.5/+0.6 m)
Minimum cable bending radius	
Cable end	

\* The sensor type DS-105x can be delivered, on enquiry, with increased demand on pressure resistance.



SD-05X				SD-08X		SD-16X	SDH-15X
EC-001/XXX or EC-002/XX/X or EC-003/XX/X							-
OD-051	OD-053	OD-054	OD-055	OD-081	OD-083	OD-162	OD-151
Eddy-current principle							
				3.5 mm	8 mm	4 mm	
DC ... 10 kHz (- 3 dB)							
				4 mV/μm	2 mV/μm	4 mV/μm	
-9 ... -11 V DC GAP-voltage							
U <sub>B</sub> = -24 V DC (-18 ... -26 V DC)							
30 mA							
nominally -2 ... -18 V (-2 ... (U <sub>B</sub> + 2 V))							
(only for OD-105X: requirements for use in hazardous area must be considered)							
approx. 5 Ohm							
< 5 % in testing range 0 ... 45° C;							
< 10 % in operating temperature range							
< 7% in operating temperature range							
not approved for use in hazardous areas							
SD-051 SD-052 SD-053 SD-054	SD-081 SD-083 SD-084	SD-087 SD-088 SD-089	SD-161 SD-164	SDH-151 SDH-154			
Epoxy	Epoxy	Ceramic	Epoxy	Ceramic			
7.5 mm (for SD-051:5 mm)	8.2 mm	11 mm	17 mm	16 mm			
stainless-steel							
see ordering information							
-30 ... +180° C				-30 ... +100° C	-30 ... +180° C	-30 ... +350° C	
-55 ... +180° C				-30 ... +100° C	-55 ... +180° C	-50 ... +425° C	
95 Ohm co-axial cable							
FEP							
1 m (-0.2/+0.3 m) or 5 m (-0.5/+0.6 m)						5 m (-0.5/+0.6 m)	
25 mm (100 mm for configuration with corrugated tube protection)							
Co-axial plug connector							

# Non-contacting displacement sensors with external oscillator: Technical data

## Extension cable

Extension cable type	<b>EC-100X/XXX</b>		
Cable type	75 Ohm tri-axial cable		
Cable jacket			
Cable length L	4 m (-0.4/+0.6 m)	5 m (-0.4/+0.6 m) or 9 m (-0.4/+0.6 m)	
Minimum cable bending radius			
Operating temperature range			

## Oscillator

Oscillator type	<b>OD-1051</b>	<b>OD-1053</b>	<b>C</b>
Associated sensor type	DS-105X		
Total length M (= K + L) of sensor integral cable and extension cable	5 m	10 m	
Operating temperature range	-30 ... +65° C		
Storage temperature range			
Protection class			
Housing material			
Housing size (Length x Width x Height)	98 mm x 26 mm x 60 mm		
Housing weight			
Connection for sensor cable			
Connection for signal output & supply			
Other			

<b>EC-001/XXX or EC-002/XX/X or EC-003/XX/X</b>
95 Ohm co-axial cable
FEP
depending on sensor cable length and selected oscillator: 4 m (-0.4/+0.6 m) or 4.5 m (-0.4/+0.6 m) or 9 m (-0.4/+0.6 m) or 9.5 m (-0.4/+0.6 m)
25 mm
-50 ... +200° C

<b>OD-051</b>	<b>OD-053</b>	<b>OD-054</b>	<b>OD-055</b>	<b>OD-081</b>	<b>OD-083</b>	<b>OD-162</b>	<b>OD-151</b>
SD-05X				SD-08X		SD-16X	SDH-15X
5 m	10 m	5 m	1.5 m	5 m	10 m	5 m	5 m
-30 ... + 65° C		-20 ... +100° C		-30 ... +65° C			
-55 ... +100° C							
IP 20							
Aluminium							
85 mm x 61 mm x 65 mm							
approx. 300 g							
Co-axial housing plug							
3-pole terminal block							
Isolated mounting in protective housing is recommended.							

# Non-contacting displacement sensors with integrated oscillator: Technical data


## Measuring chain

Sensor type	IN-081, IN-083, IN-084	IN-085	INA-081, INA-083	INA-085
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## Measuring and electrical properties

Operating principle	Eddy-current principle			
Linear measuring range	1.5 mm			
Operating frequency range	DC ... 10 kHz (-3 dB)			
Sensitivity	8 mV/ $\mu$ m			
Recommended operating point	-9 ... -11 V DC GAP-voltage			
Supply voltage	$U_B = -24$ V DC (-18 ... -30 V DC)			
Maximum current consumption	5 mA			
Output signal	nominally -2 ... -18 V (-2 ... ( $U_B + 2$ V))			
Cable length for output signal	max. 1000 m	requirements for use in hazardous area must be considered		
Output impedance	approx. 5 Ohm, max. 15 mA			
Sensitivity deviation	< 5 % in testing range 0 ... 45° C; < 10 % in operating temperature range			
Deviation from reference line	< 25 mm in testing range 0 ... 45° C; < 76 mm in operating temperature range			

## EX-protection according to directive 94/9/EG ATEX

Designation	not approved for hazardous area	 II 2 G Ex ib IIC T6 II 2 D Ex ib D 21 T135°C
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## Mechanical data

Sensor tip material	Epoxy
Sensor tip diameter	8.5 mm
Sensor body material	stainless-steel
Thread	see order information

## Ambient conditions

Operating temperature range	0 ... +110° C (in Ex area dependent on temperature class)
Storage temperature range	-50 ... +150° C

## Electrical connection

Integral cable, open ended	yes	-	yes	-
Connector plug	-	yes	-	yes
Cable type	3-wire, screened	-	3-wire, screened	-
Standard cable length K	5 m	-	5 m	-
Cable jacket	PVDF	-	PVDF	-
Minimum cable bending radius	20 mm	-	20 mm	-
Operating temperature range	-20 ... +125° C	-	-20 ... +125° C	-



# Our centres in Darmstadt and Nærum



office in Darmstadt



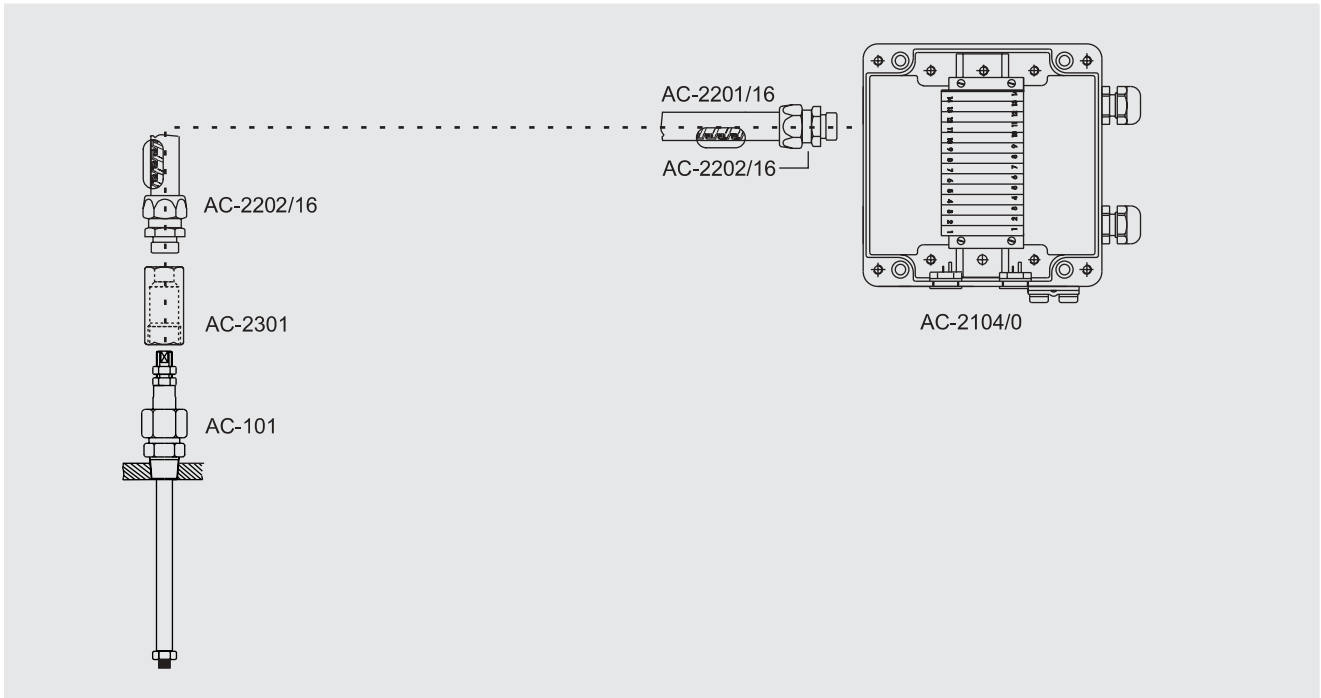
office in Nærum



# Installation examples for displacement measuring chains

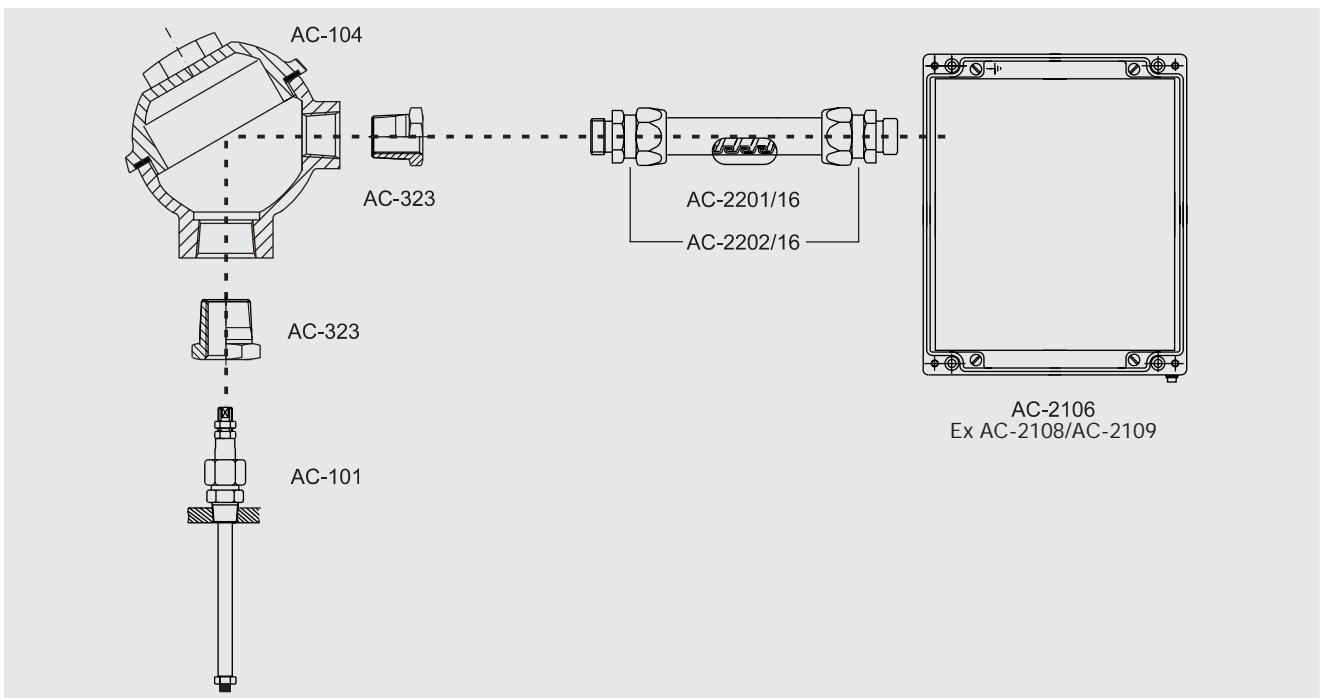
## Reverse-mounted displacement sensors with integrated oscillator

Sensor holder AC-101; Adapter AC-2301  
 Protective conduit M16 2201/16; Protective conduit fittings M16 AC-2202/16  
 Junction box AC-2104/0



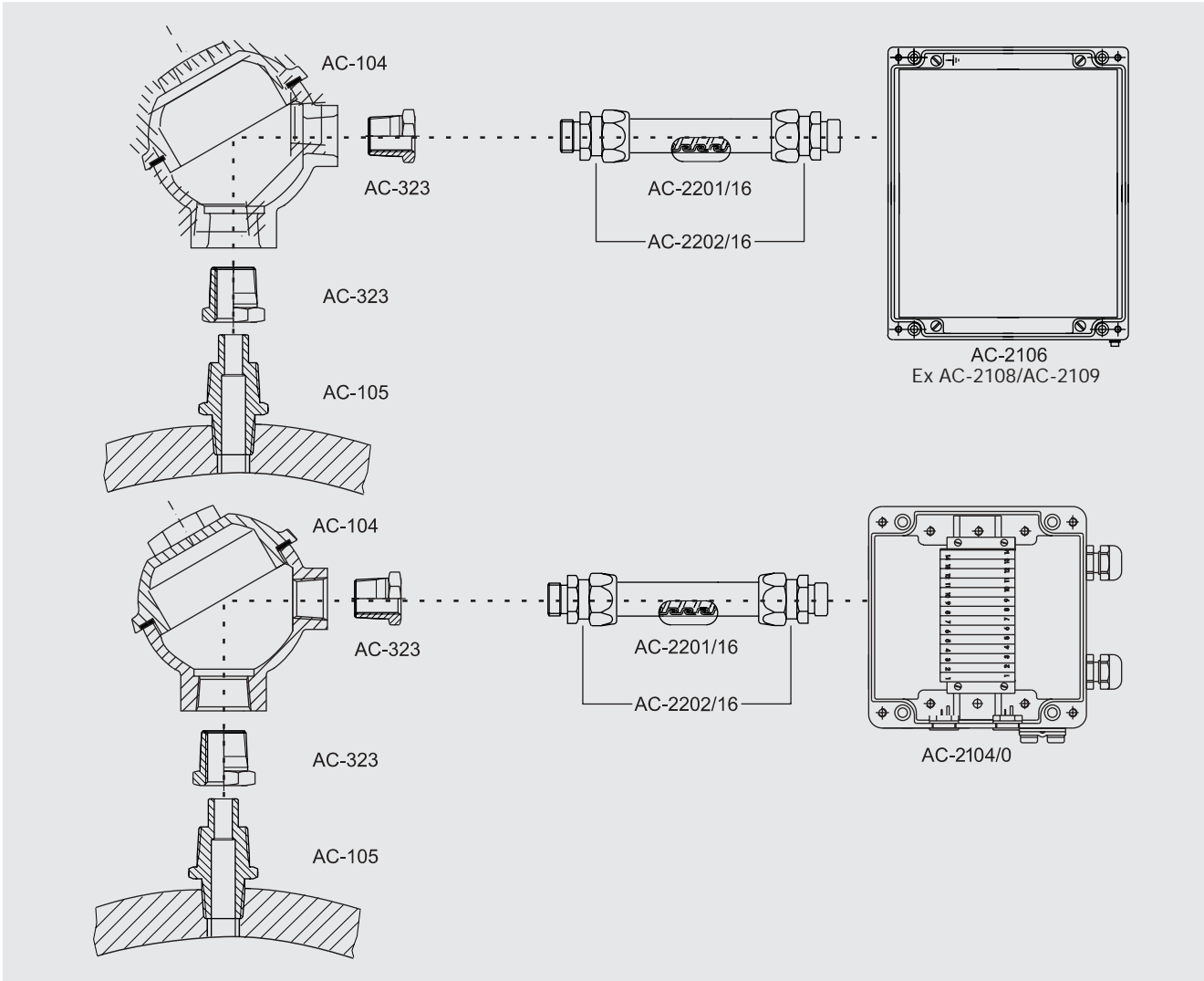
## Reverse-mounted displacement sensors with external oscillator

Sensor holder AC-101; Adapter AC-323; Terminal head AC-104; Adapter AC-323; Protective conduit AC-2201/16; Protective conduit fittings M16 AC-2202/16; Oscillator protective housing AC-2106



**Space-saving installation of displacement sensors with continuous thread on small machines**

Sensor holder AC-105; Terminal head AC-104; Adapter AC-323 and protective conduit AC-2201/16;  
 Protective conduit fittings M16 AC-2202/16;  
 Oscillator protective housing AC-2106 or junction box AC-2104/0



**Machine foundation mounting of displacement sensor for measurement of absolute case expansion**

Mounting block AC-175; Displacement sensor WT-010/025; Signal processor SP-502 in protective housing;  
 plus sep. power supply AC-4601

