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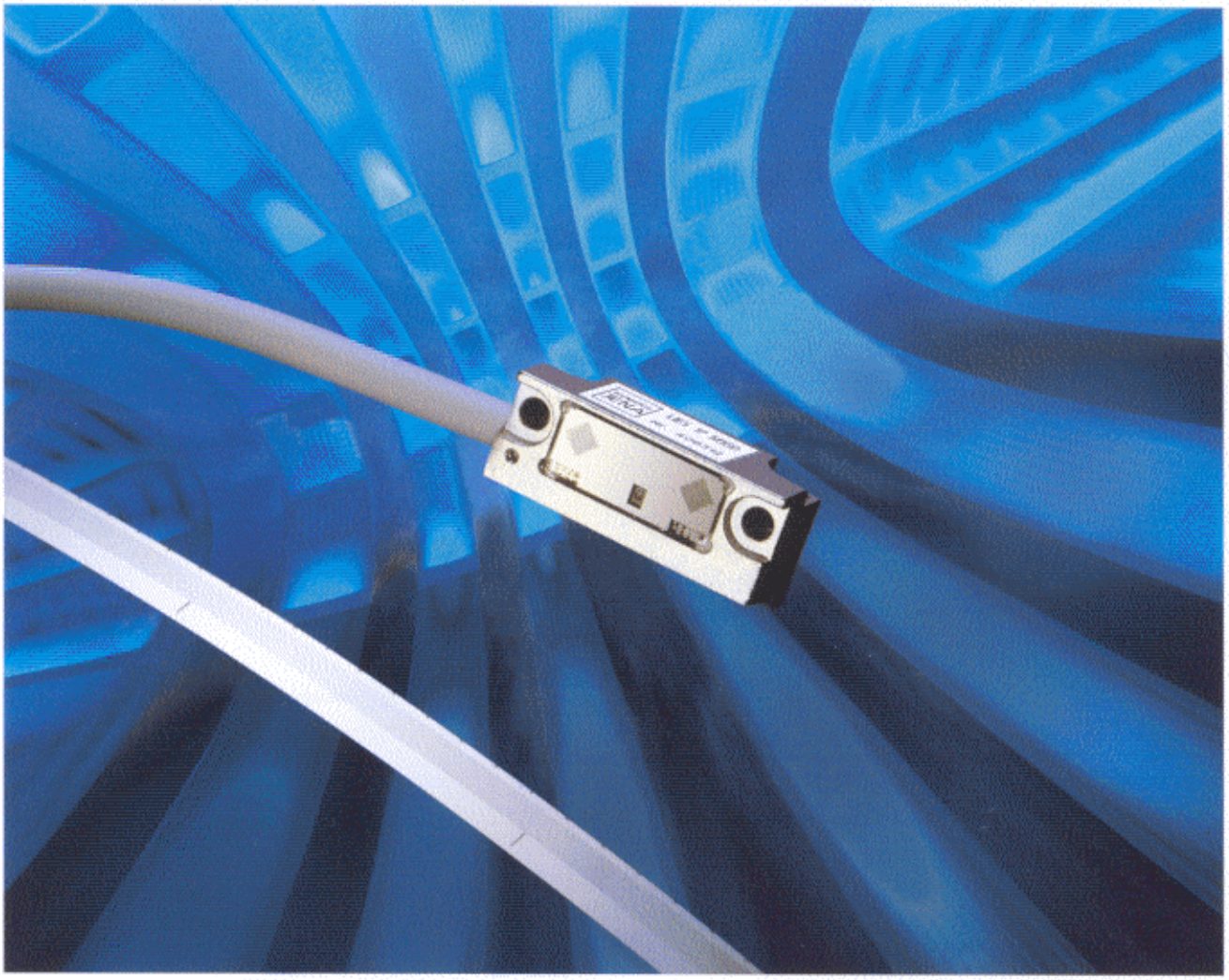


LIE 5
Exposed Linear Encoder

Technical Data

Mechanical data

Recommended measuring increments	0.1 µm; 0.2 µm; 0.5 µm; 1 µm; 5 µm
Dimensions of scanning head	34 x 13.2 x 12.4 mm³
Weight of scanning head without cable	≤ 20 g
Max. travel speed, depending on auxiliary electronic units for GP = 20 µm	480 m/min without interpolation 70 m/min with interpolation 50x
Measuring lengths	up to 30 m (on request)
Scale tape • Material • Grating period (GP) • Reference marks	 steel 20 µm (standard) or 100 µm periodically every 50 mm; distance coded at 1000 × GP; at the center of the measuring length; others on request
Linear expansion coefficient	DOUBLEFLEX scale tape: 10,5 × 10^{-6} grd^{-1} SINGLEFLEX scale tape: as function of material of the mounting surface
Accuracy classes	DOUBLEFLEX scale tape: ± 1 µm, ± 2 µm, ± 3 µm, ± 5 µm SINGLEFLEX scale tape: ± 5 µm, others on request

Elektrical data

Scanning frequency	max. 400 kHz
Output interfaces • Voltage output • Current output • Square-wave output	 ~ 1 V_{PP} with integrated line driver ~ 11 $µA_{PP}$ ⊓⊔ RS 422 A, optionally with internal signal interpolation 5x, 10x, 25x, 50x
Supply voltage	5 V dc ± 10%
Power consumption • Voltage output • Current output • Square-wave output (RS 422 A)	 < 50 mA < 30 mA < 150 mA
Cable lengths • Cable permanently connected to the scanning head • Permissible total cable lengths (with extension cable)	 1 m with connector; other cable lengths on request; for greater lengths use extension cable max. 18 m for current output 11 $µA_{PP}$ max. 100 m for voltage output 1 V_{PP} max. 100 m for square-wave output RS 422 A

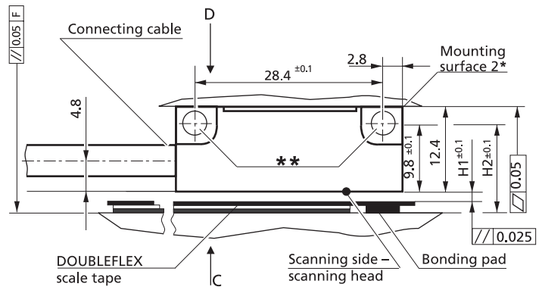
Ambient conditions

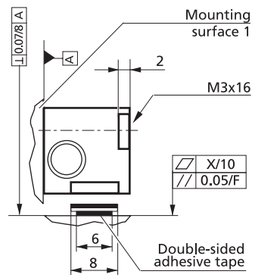
Operating temperature range	0 °C ... +55 °C
Storage temperature range	–20 °C ... +70 °C
Vibration (50 Hz ... 2000 Hz)	≤ 200 ms^{-2}
Shock (11 ms)	≤ 400 ms^{-2}

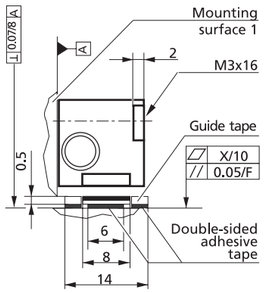
Incremental Exposed Linear Encoder LIE 5

- Minimum space requirements
- Wide mounting tolerances
- Defined thermal behavior of the DOUBLEFLEX scale tape
- Mechanical decoupled DOUBLEFLEX scale tape
- Integrated signal interpolation up to 50x in the scanning head or in the connector
- Insensitive to contamination of scale tapes because of two optical sensors in the scanning head
- High resolution and accuracy
- Simple mounting of the scale tapes because of double-side adhesive tapes

Installation Outline



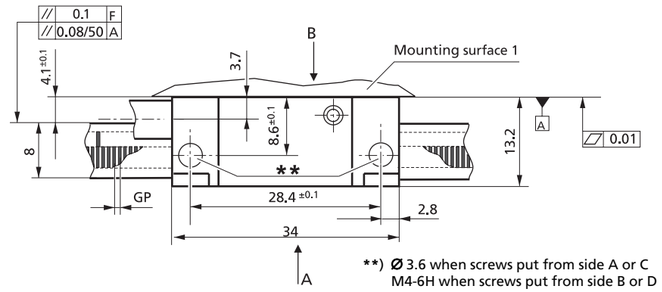




Grating periods	DOUBLEFLEX scale tape		SINGLEFLEX scale tape	
	H1	H2	H1	H2
20 µm	0.6 mm	11.1 mm	0.6 mm	10.9 mm
100 µm	0.8 mm	11.3 mm	0.8 mm	11.1 mm

Accuracy classes	X
± 1 µm	0.003
± 2 µm	0.006
± 3 µm	0.009
± 5 µm	0.009

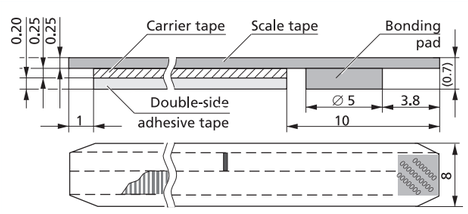
F = machine guideway



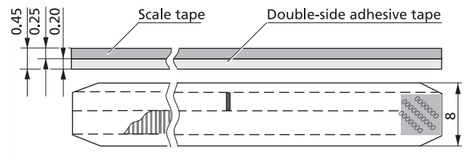
**) Ø 3.6 when screws put from side A or C
M4-6H when screws put from side B or D

*) The mounting surface 2 must be vertically adjustable to ensure that the distance parameter H1±0.1 and the parallelism 0.025 can be achieved.

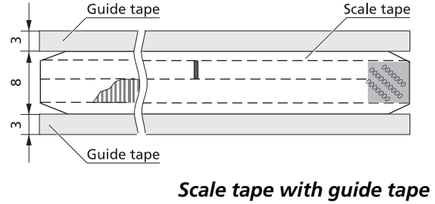
Installation outline
shown with DOUBLEFLEX scale tape



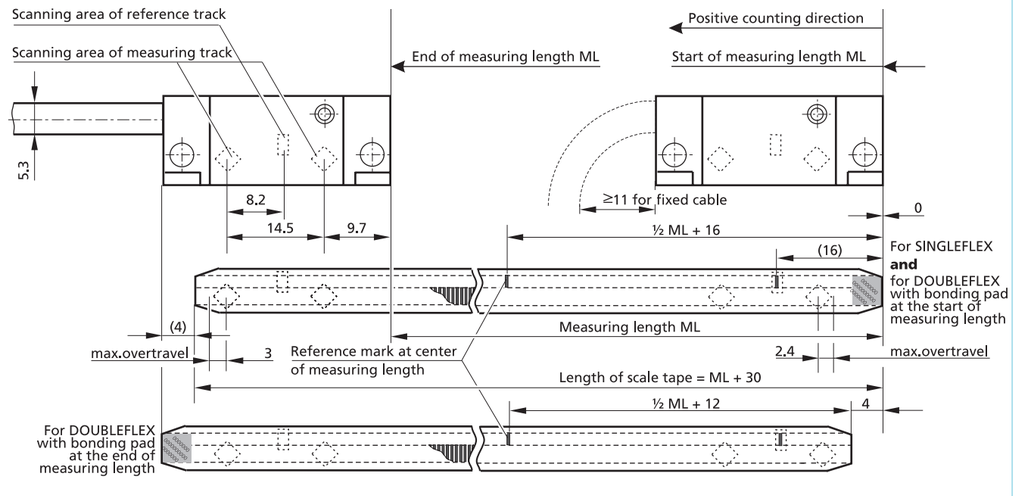
DOUBLEFLEX scale tape
always with bonding pad



SINGLEFLEX scale tape
always without bonding pad



Scale tape with guide tape



Scanning head is drawn with lateral offset to the scale tape, from top through the scanning head on the scale tape.

Definition of measuring length

Ordering Key

Scanning head

Designation example: LIE 5 1 P C X F H 0

Model type

L	linear encoder
I	incremental
E	exposed

Installation conditions

1	bore Ø 3.6 in the scanning head
2	thread M4 in the scanning head

Grating period GP

P	20 µm
R	100 µm

Output signals

B	sinusoidal signal 11 μA_{pp}
C	sinusoidal signal 1 V_{pp}
K	square-wave signal RS 422 A without interpolation
L	square-wave signal RS 422 A with interpolation 5x
M	square-wave signal RS 422 A with interpolation 10x
I	square-wave signal RS 422 A with interpolation 25x
N	square-wave signal RS 422 A with interpolation 50x

X	distinguishing mark for clock frequency of counter on request (only valid for versions with interpolation)

Pin assignment

0	standard
X	customized version*

*) No standard, supplied with surcharge.

Connectors on cable

A	no connector
D	9pin; D-Sub; male; straight
H	12pin; plug; round; male; plastic-armored
I	9pin; plug; round; male; plastic-armored
K	12pin; coupling; male; plastic-armored
O	15pin; D-Sub; male; straight
S	customized plug on request *
Z	15pin; D-Sub; electronic in the connector

Cable fixed to scanning head

A	0.3 m
F	1 m
G**	2 m
K**	3 m
O	other length (up to 3m)

**) not for output signals N (with 50x interpolation)

For greater lengths use extension cable.

Scale tape

Designation example: MV 5 0 – 1 1 B P 00770

Material

5	steel tape/ two-field sensor

Design type

0	DOUBLEFLEX, standard
1	SINGLEFLEX, standard
2	DOUBLEFLEX, with guide tape
3	SINGLEFLEX, with guide tape

Accuracy class

1	± 1 µm
2	± 2 µm
3	± 3 µm
4	± 5 µm

Bonding pad position

0	none [1]
1	at the start of measuring length [2]
5*	at the end of measuring length [2]

measuring length (ML) [mm]

Grating periods (GP)

P	20 µm
R	100 µm

Position of reference mark (RM)

O	none
B	RM at the center of measuring length
E	customized version *
F	RM distance coded at 1000×GP
N	RM at 50 mm spacings, starting at center of measuring length

1) only for SINGLEFLEX scale tape
2) only for DOUBLEFLEX scale tape
*) no standard, supplied with surcharge
E: specified in XXXXX mm from start of measuring length

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