

**LIK 21   LIK 22   LIK 23**

**Exposed Linear Encoders**  
compact model range

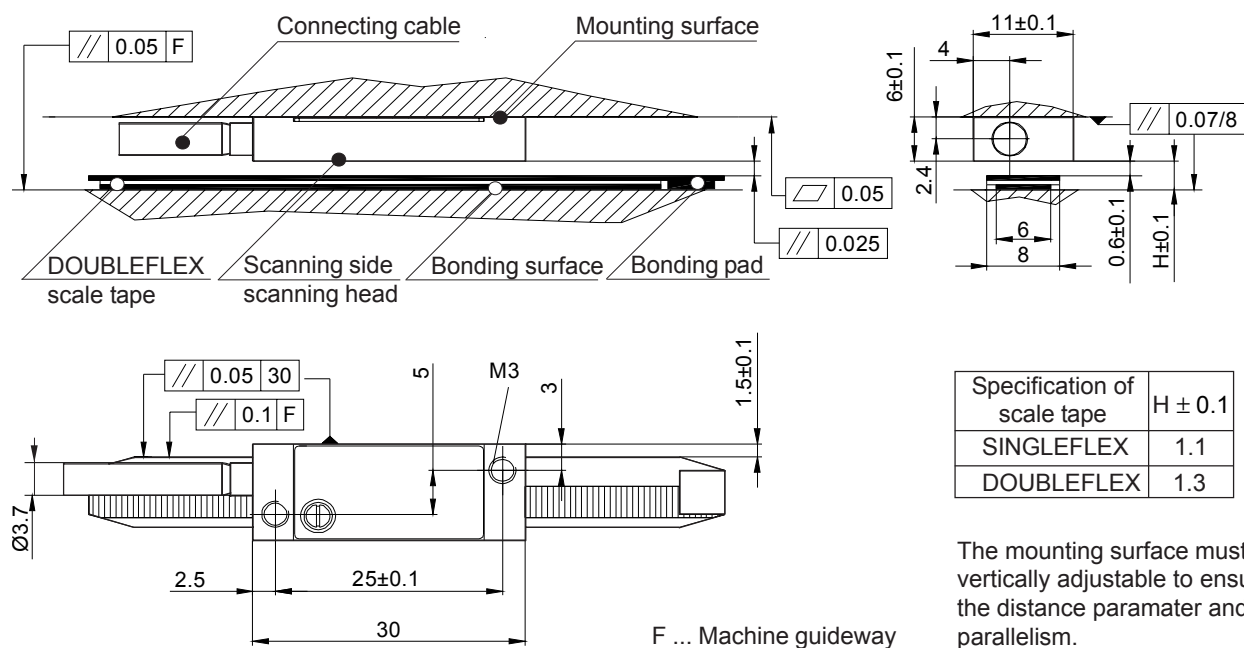
# Exposed Linear Encoders- compact model range LIK 21 LIK 22 LIK 23

- Extremely small dimensions of scanning head for crowded installation conditions
- High insensitivity to contamination of scale tapes due to two optical sensors in the scanning head
- High resolution and accuracy
- High interpolation accuracy due to electronic offset-compensation
- Signal processing in the D-Sub-connector
- Integrated signal interpolation up to 100x in the connector

- Optional with installation LED
- Wide mounting tolerances
- Defined thermal behavior of the DOUBLEFLEX scale tape
- Mechanical decoupled DOUBLEFLEX scale tape
- Simple mounting of the scale tapes because of double-side adhesive tapes

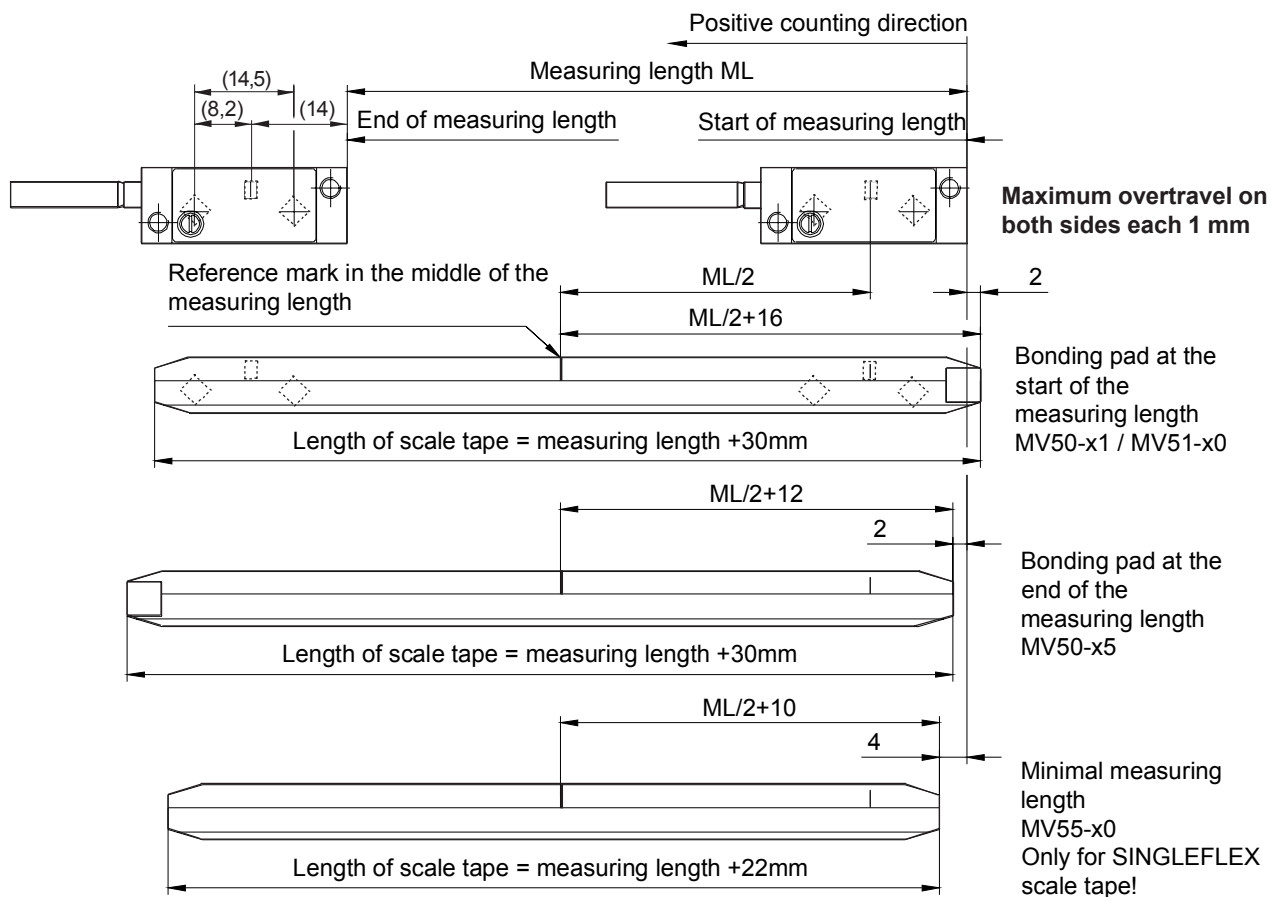
## Technical data

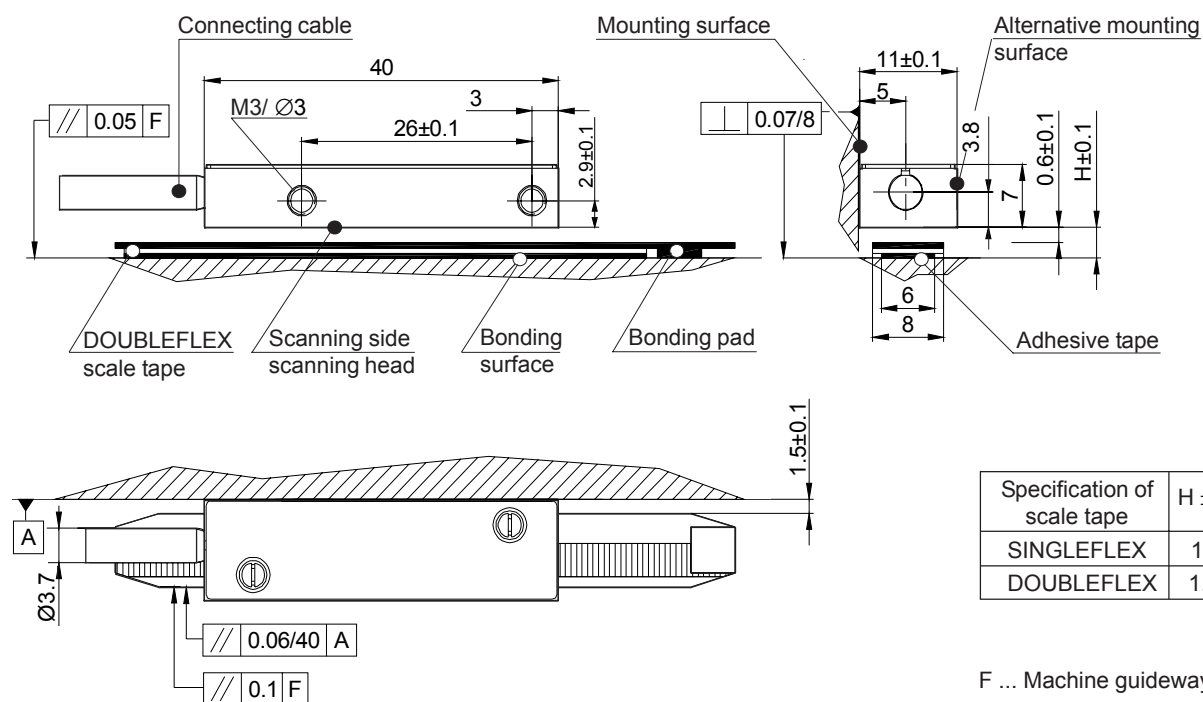
		LIK 21	LIK 22	LIK 23
<b>Mechanical data</b>	<b>Scanning head dimensions [mm]</b>	30 x 11 x 6	40 x 11 x 7	32 x 11 x 9,5
	<b>Weight of scanning head (without cable)</b>	3.2 g	5.5 g	5.0 g
	<b>Recommended resolution</b>	0.05 µm; 0.1 µm; 0.2 µm; 0.5 µm; 1.0 µm; 5.0 µm		
	<b>Travel speed</b>			
	- without interpolation (maximum)	600 m/min resp. 10 m/s		
	- with 50x interpolation (maximum)	96 m/min resp. 1.6 m/s		
	<b>Measuring length</b>	up to 30 m		
	<b>Scale tape</b>			
	- Material	steel		
	- Grating period (GP)	20 µm standard		
	- Reference marks	- periodically every 50 mm, starting from the middle of the measuring length - distance coded at 1000 x GP - at the center of the measuring length - others on request		
	<b>Linear expansion coefficient</b>			
	- DOUBLEFLEX- scale tape	10.5 x 10 <sup>-6</sup> deg <sup>-1</sup>		
	- SINGELFLEX- scale tape	as function of material of the mounting surface		
	<b>Accuracy classes</b>			
	- DOUBLEFLEX- scale tape	±1 µm; ±2 µm; ±3 µm; ±5 µm		
	- SINGELFLEX- scale tape	±5 µm; other on request		
<b>Electrical data</b>	<b>Scanning frequency</b>	max. 500 kHz		
	<b>Output interfaces and connectors</b>			
	Voltage output	1V <sub>pp</sub> / 15 pin D-Sub-connector		
	Square wave output (RS 422)	RS 422 with interpolation up to 50x / 15pin D-Sub-connector		
	<b>Supply voltage</b>	5V DC ±10%		
	<b>Power consumption</b>			
	Voltage output	80 mA <sup>1)</sup> ; 100mA <sup>2)</sup>		
	Square wave output	200 mA <sup>1)</sup> ; 220 mA <sup>2)</sup>		
		<sup>1)</sup> ...without installation-LED; <sup>2)</sup> ...with installation-LED		
	<b>Cable lengths</b>			
	Cable permanently connected to the scanning head	up to 3 m (standard lengths: 0.3 m; 0.5 m; 1 m; 1,5 m; 2 m; 3 m)		
	Permissible total cable length (with extension cable)	max. 100 m with extension cable		
	<b>Cables`permissible bending radius</b>			
		bent once: 8 mm		
		moving constantly: 40 mm		
<b>Ambient conditions</b>	<b>Operating temperature range</b>	0°C ... 55°C		
	<b>Storage temperature range</b>	-20°C ... +70°C		
	<b>Vibration (50Hz ... 2000Hz)</b>	≤ 200ms <sup>-2</sup>		
	<b>Shock (11ms)</b>	≤ 400ms <sup>-2</sup>		



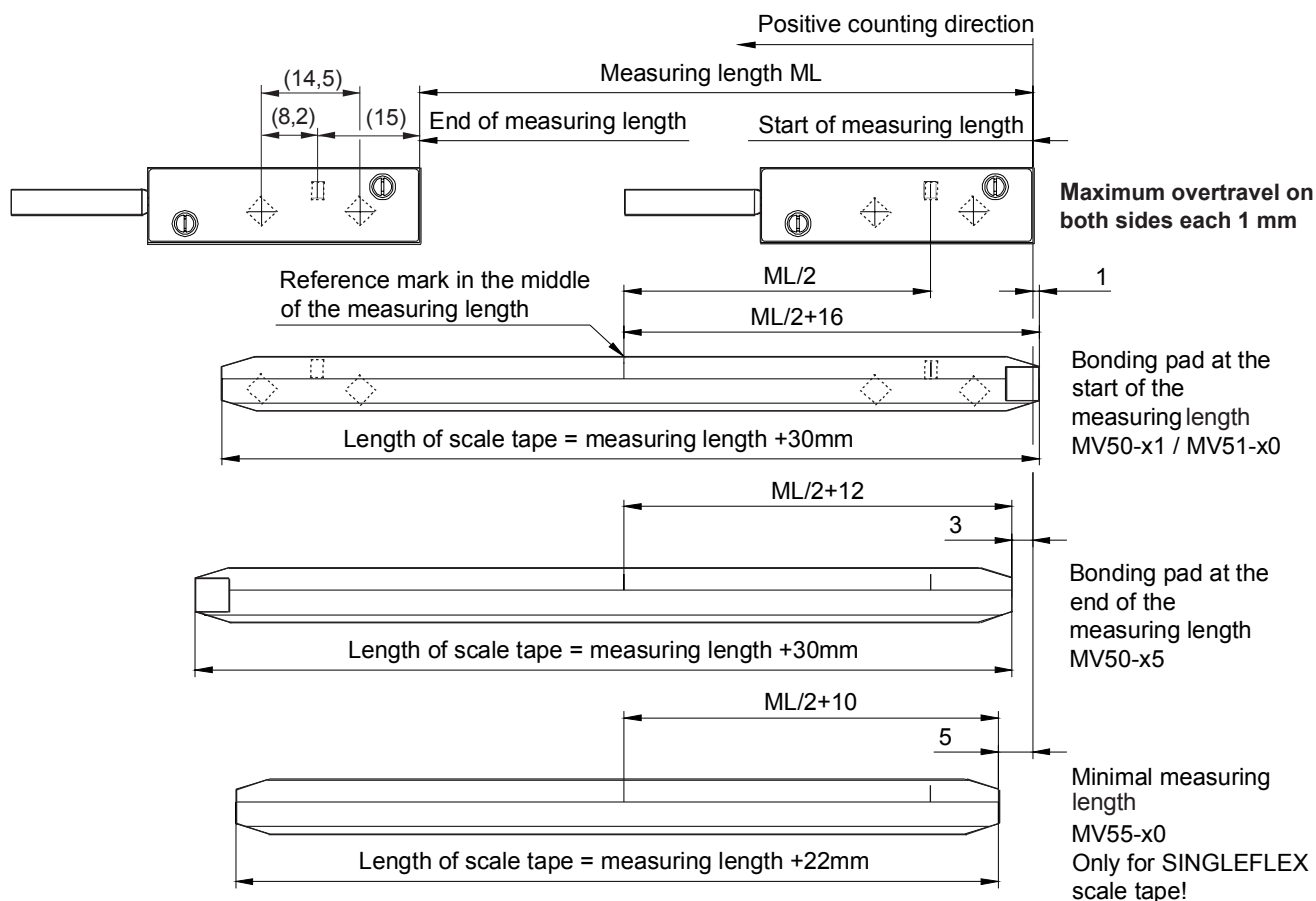
## Allocation of scanning head, scale tape and measuring length

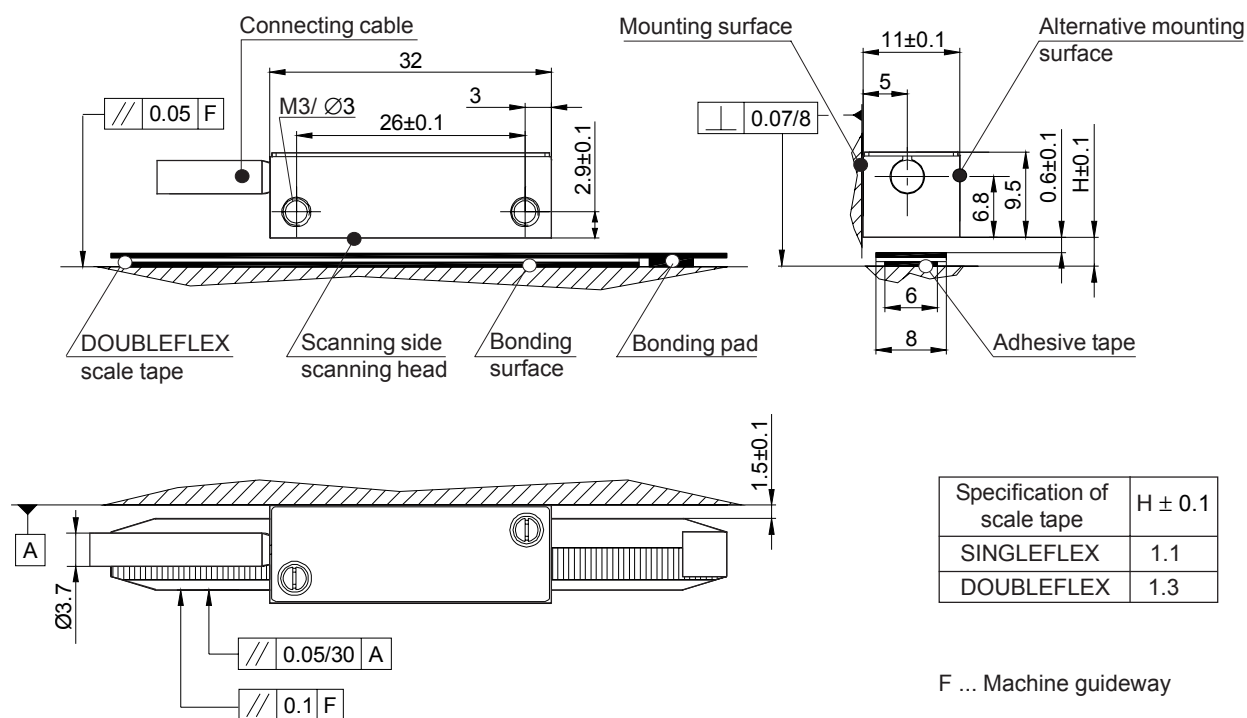
## LIK 21



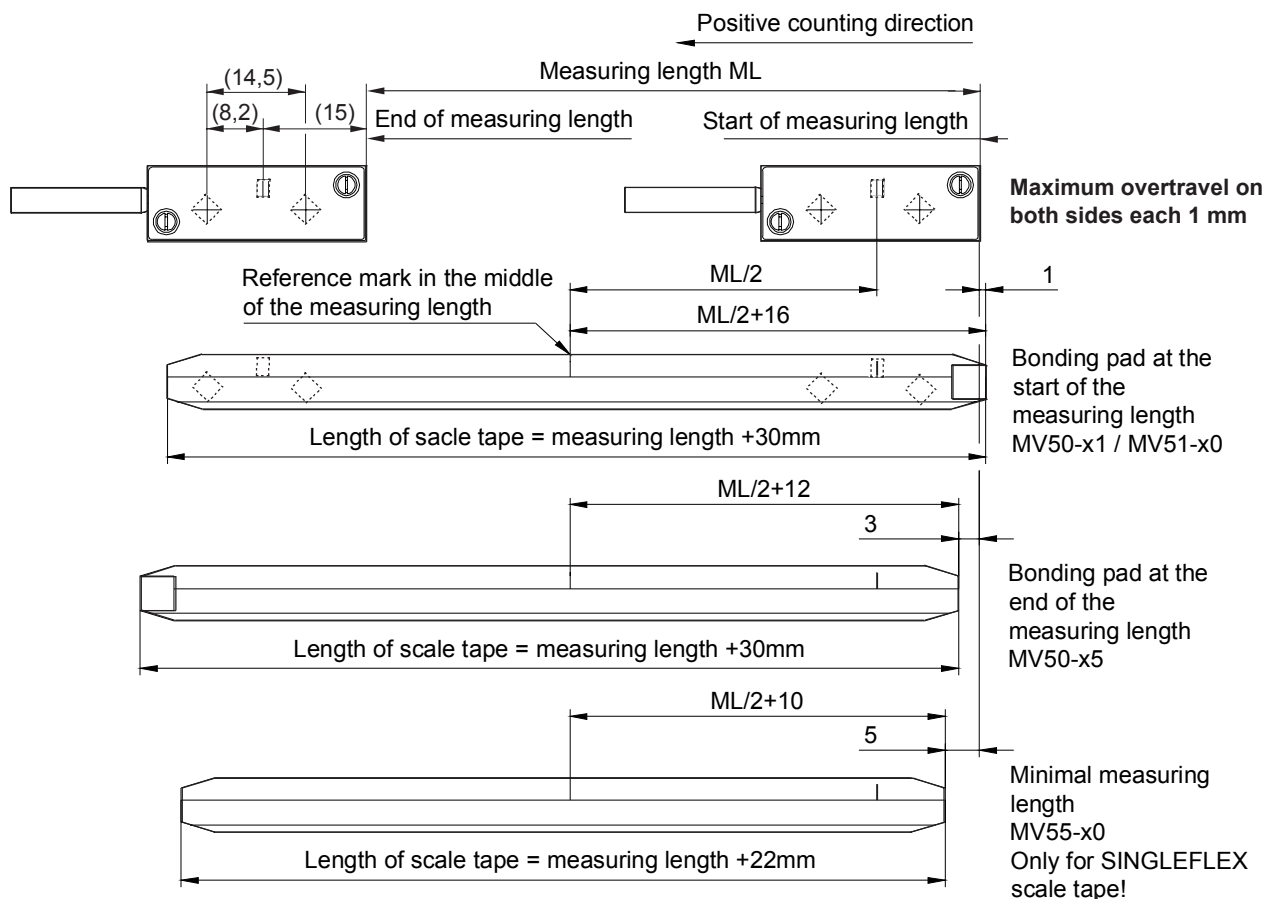


## Allocation of scanning head, scale tape and measuring length



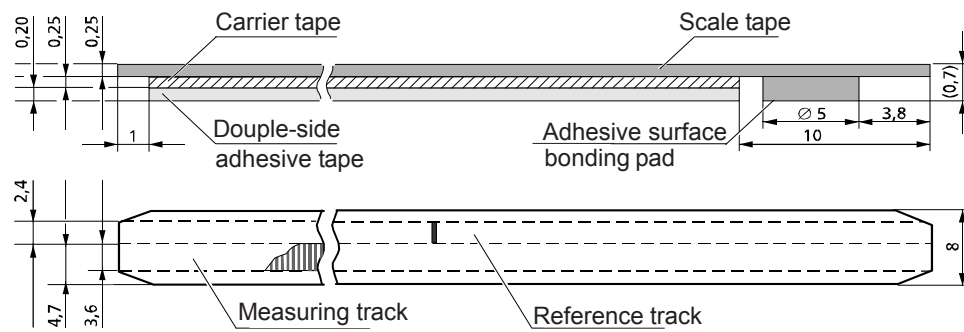


## Allocation of scanning head, scale tape and measuring length

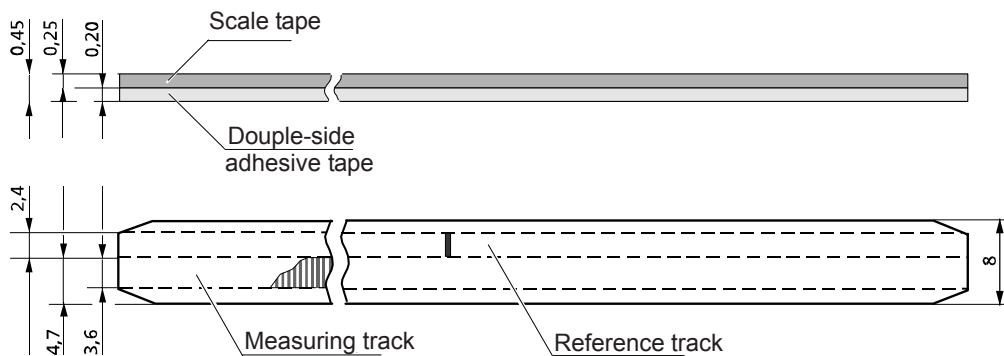


# Design of scale tape

## DOUBLEFLEX scale tape - invariably **with** bonding pad

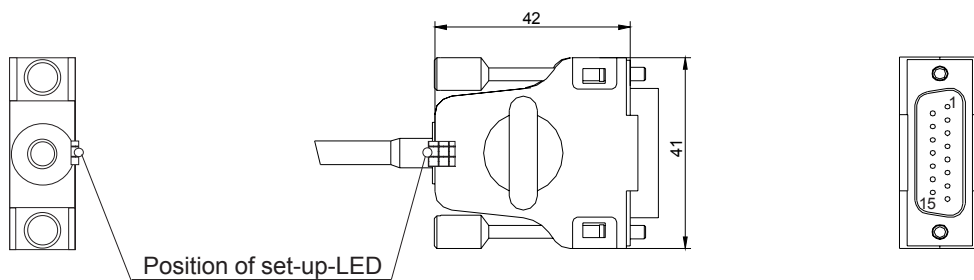




## SINGLEFLEX scale tape - invariably **without** bonding pad



## Connector, pin assignment

### 15pin D-Sub-connector



Pin	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	Housing
<b>1V<sub>pp</sub></b> 	-	-	-	U <sub>0-</sub>	U <sub>2-</sub>	U <sub>1-</sub>	5V	5V	0V	-	-	U <sub>0+</sub>	U <sub>2+</sub>	U <sub>1+</sub>	-	shield
<b>RS 422</b> 	-	-	NAS	Z <sub>0-</sub>	Z <sub>2-</sub>	Z <sub>1-</sub>	5V*	5V*	0V	-	AS	Z <sub>0+</sub>	Z <sub>2+</sub>	Z <sub>1+</sub>	-	shield
Colour	-	-	vt	pk	rd	bn	bu	bu	wh	-	-	gy	bk	gn	-	

\* ... bridged in the connector

# Ordering key for scanning head

## Designation example

LIK 2 1 - L 4 1 - T Z

### Sensor

2	Two field sensor
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### Dimension (mm)

1	30 x 11 x 6 mm <sup>3</sup>
2	40 x 11 x 7 mm <sup>3</sup>
3	32 x 11 x 9.5 mm <sup>3</sup>

### Grating period

-	20 µm
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### Output signals

C	sinusoidal signal 1 V <sub>pp</sub>
L	square wave signal RS 422 with 5x interpolator
M	square wave signal RS 422 with 10x interpolator
I	square wave signal RS 422 with 25x interpolator
N	square wave signal RS 422 with 50x interpolator
P	square wave signal RS 422 with 100x interpolator

1 ... supplied with surcharge  
2 ... only for LIK 22 and LIK 23

### Connectors on cable

Z	15pin D Sub; electronics in the connector
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### Cable fixed to the scanning head (Ø 3.7 mm)

R	0.3 m
S	0.5 m
T	1 m
P	1,5 m
V	2 m
W	3 m
U <sup>1</sup>	other length on request (length max. 3 m)

### Version

-	standard
3 <sup>1</sup>	non- magnetic scanning head
K	set-up- LED in the connector
N <sup>1</sup>	non- magnetic scanning head; set- up- LED in the connector

### Installation conditions

2	thread M3 in the scanning head
1 <sup>2</sup>	bore Ø 3 in the scanning head

### Frequency/ Edge separation

X	distinguishing mark for clock frequency of counter on request (only valid for versions with interpolation)
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# Ordering key for scale tapes

## Designation example

MV 5 0 - 1 1 B P 00770

### Material

5	steel tape/ double array sensor
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### Design type

0	DOUBLEFLEX, standard <sup>3</sup>
1	SINGLEFLEX, standard
5	minimal measuring length with reference mark <sup>1,4</sup>

### Accuracy class

1	± 1 µm
2	± 2 µm
3	± 3 µm
4	± 5 µm

### Position of bonding pad/ construction

0	none <sup>1</sup>
1	bonding pad at the start of measuring length <sup>2</sup>
3	without adhesive tape
5**	bonding pad at the end of measuring length <sup>2</sup>

measuring length (ML) [mm]

### Grating period

P	20 µm
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### Position of reference mark (RM)

O	none
B	RM in the center of the measuring length
F	RM distance coded at 1000 * GP <sup>5</sup>
N	RM at 50 mm spacings, starting at the center of measuring length
E**	customized version <sup>6</sup>

1 ... only for SINGLEFLEX scale tape  
2 ... only for DOUBLEFLEX scale tape  
3 ... minimal measuring length of DOUBLEFLEX scale tape= 100 mm  
maximal measuring length of DOUBLEFLEX scale tape= 7300 mm  
4 ... measuring length + 22 mm  
5 ... maximal measuring length= 8000mm  
6 ... specified in XXX mm from start of measuring length  
\*\*... no standard, supplied with surcharge





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