HEIDENHAIN

Product Information

LIC 3100

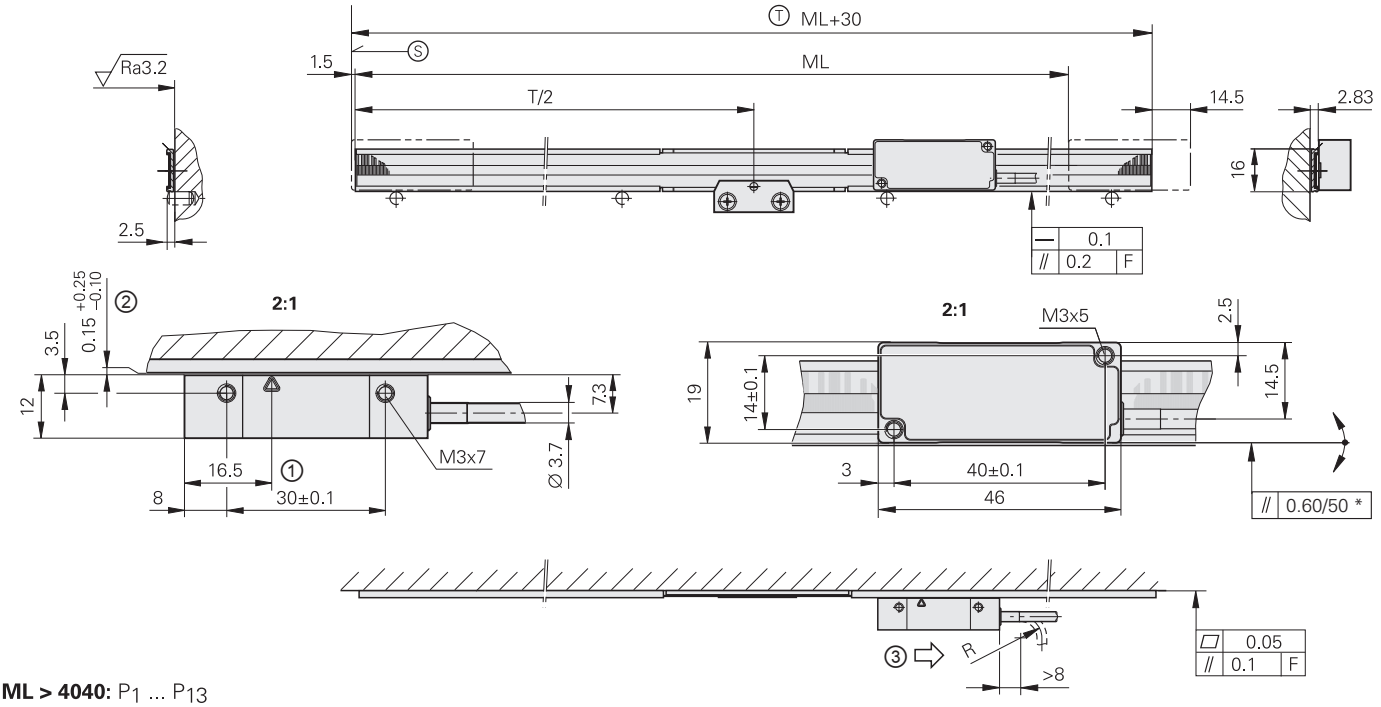
Absolute Exposed
Linear Encoders

11/2020

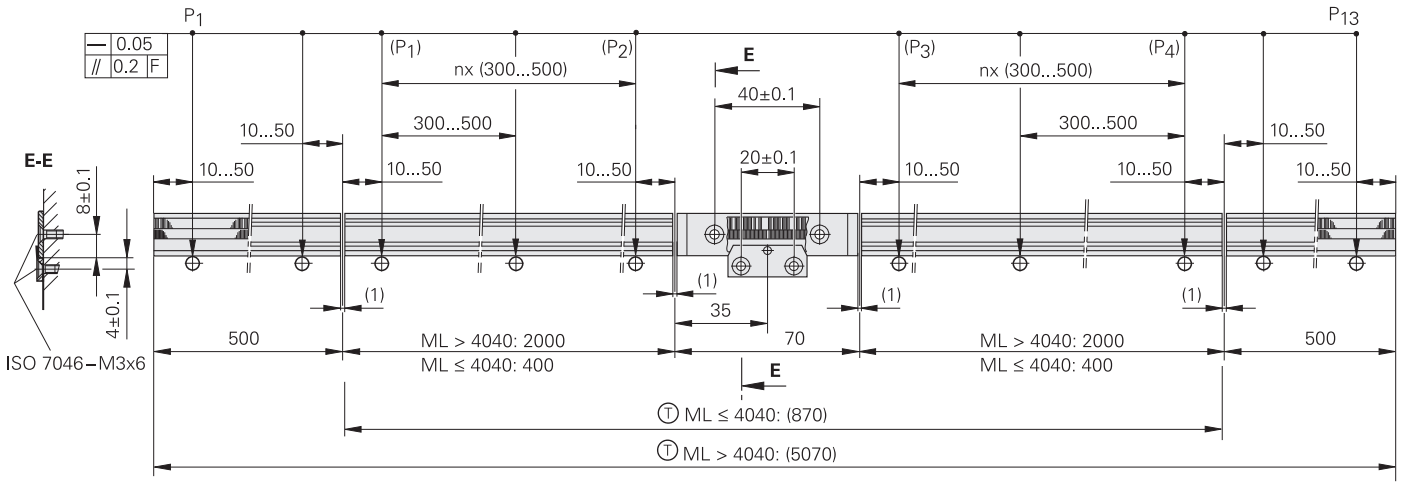
LIC 3117, LIC 3197

Absolute linear encoders for measuring lengths of up to 10 m

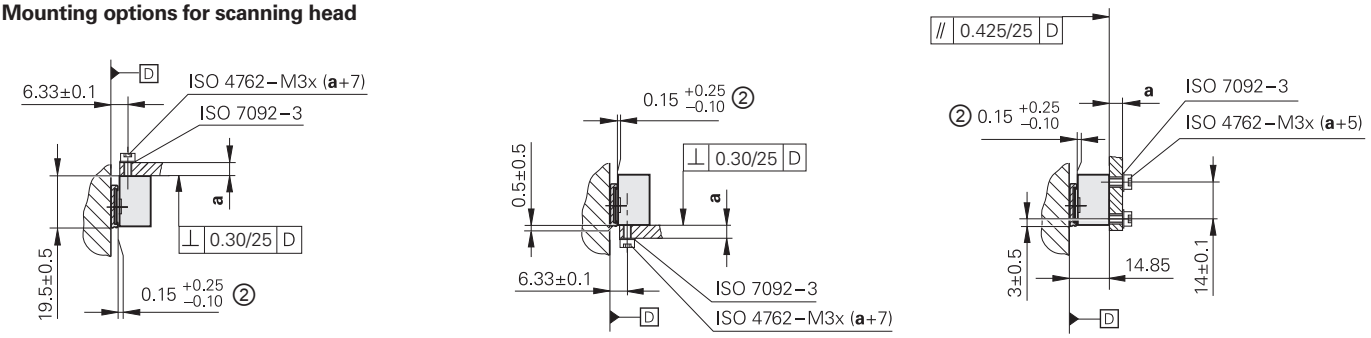
- **For measuring steps of down to 10 nm**
- **Steel scale tape pulled through aluminum extrusions and fastened at center**
- **Consisting of a linear scale and scanning head**



ML > 4040: P_1 ... P_{13}
ML ≤ 4040: (P_1 ... P_4)



Mounting options for scanning head



mm
Tolerancing ISO 8015
ISO 2768 - m H
< 6 mm: ±0.2 mm

F = Machine guideway
P = Measuring points for alignment
* = Mounting error plus dynamic guideway error
Ⓢ = Beginning of measuring length (ML)
Ⓣ = Carrier length
1 = Optical centerline
2 = Mounting clearance between scanning head and extrusion
3 = Direction of motion of the scanning unit for ascending position values

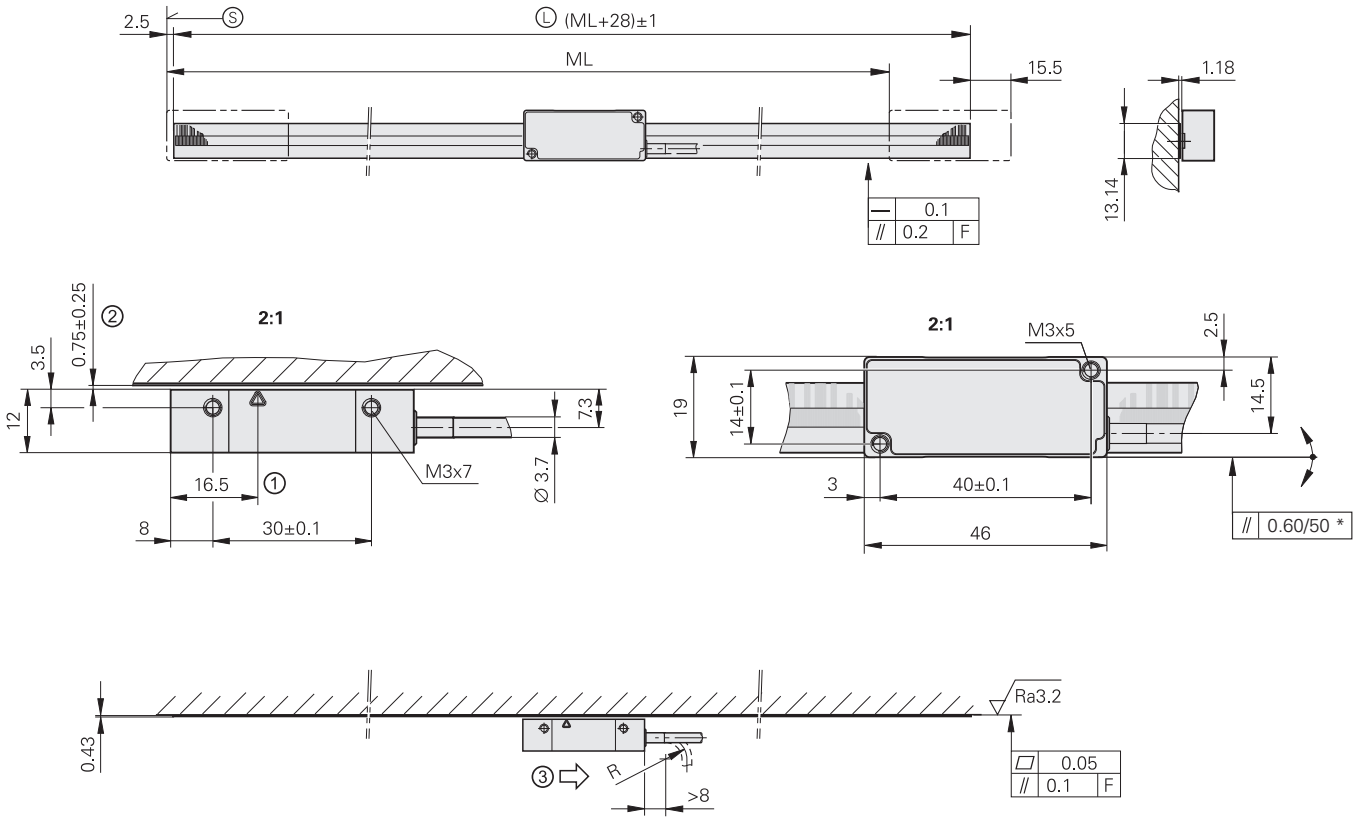
Scale	LIC 3107
Measuring standard Coefficient of linear expansion	Steel scale tape with absolute track and incremental track $\alpha_{therm} \approx 10 \cdot 10^{-6}\ K^{-1}$
Accuracy grade	±15 µm[1)]
Baseline error	≤ ±0.750 µm/50 mm (typical)
Scale tape from roll*	3 m, 5 m, 10 m
Mass Scale tape Parts kit Scale tape carrier	31 g/m 20 g 68 g/m

Scanning head	LIC 311	LIC 319F	LIC 319M		LIC 319P	LIC 319Y
Interface	EnDat 2.2	Fanuc Serial Interface αi	Mitsubishi high speed interface		Panasonic Serial Interface	Yaskawa Serial Interface
Ordering designation*	EnDat22	Fanuc05	Mit03-4	Mit03-2	Pana02	YEC07
Measuring step	0.01 µm (10 nm)					
Calculation time t_{cal} Clock frequency	≤ 5 µs ≤ 16 MHz	–				
Traversing speed[2)]	≤ 600 m/min					
Interpolation error	±100 nm					
Electrical connection*	Cable (1 m or 3 m) with 8-pin M12 coupling (male) or 15-pin D-sub connector (male)					
Cable length (with HEIDENHAIN cable)	≤ 100 m	≤ 50 m	≤ 30 m		≤ 50 m	
Supply voltage	DC 3.6 V to 14 V					
Power consumption[2)] (max.)	*At 3.6 V:* ≤ 700 mW *At 14 V:* ≤ 800 mW	*At 3.6 V:* ≤ 850 mW *At 14 V:* ≤ 950 mW				
Current consumption (typical)	*At 5 V:* 75 mA (without load)	*At 5 V:* 95 mA (without load)				
Vibration 55 Hz to 2000 Hz **Shock** 6 ms	≤ 500 m/s² (EN 60068-2-6) ≤ 1000 m/s² (EN 60068-2-27)					
Operating temperature	–10 °C to 70 °C					
Mass Scanning head Cable Connecting element	≤ 18 g (without cable) 20 g/m *M12 coupling:* 15 g; *D-sub connector:* 32 g					

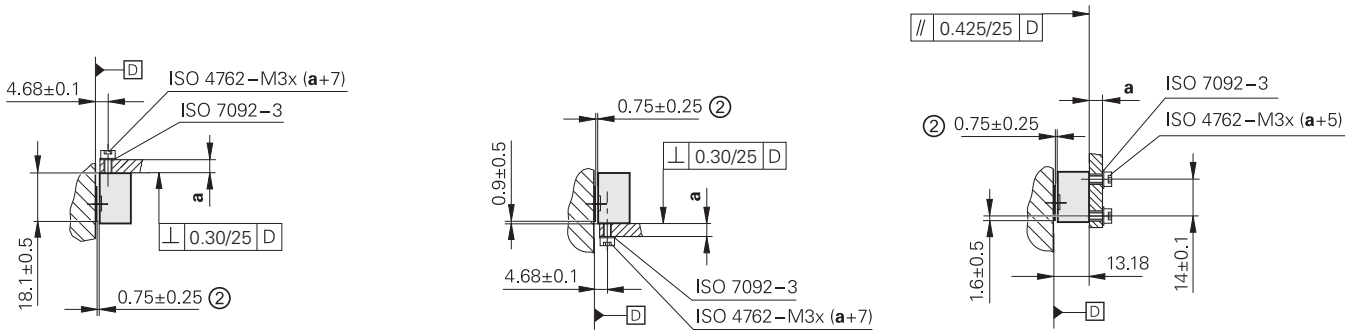
* Please select when ordering
1) ±5 µm after linear length-error compensation in the subsequent electronics
2) See *General electrical information* in the *Interfaces of HEIDENHAIN Encoders* brochure

LIC 3119, LIC 3199

Absolute linear encoders for measuring lengths of up to 10 m
- **For measuring steps of down to 10 nm**
- **Steel scale tape adhesively bonded to mounting surface**
- **Consisting of a linear scale and scanning head**



Mounting options for scanning head



mm

Tolerancing ISO 8015
ISO 2768 - m H
< 6 mm: ±0.2 mm

F = Machine guideway
* = Mounting error plus dynamic guideway error
Ⓢ = Beginning of measuring length (ML)
Ⓛ = Scale tape length
1 = Optical centerline
2 = Mounting clearance between scanning head and linear scale
3 = Direction of motion of the scanning unit for ascending position values

Scale	LIC 3109
Measuring standard Coefficient of linear expansion	Steel scale tape with absolute track and incremental track $\alpha_{therm} \approx 10 \cdot 10^{-6}\ K^{-1}$
Accuracy grade	±15 µm[1)]
Baseline error	≤ ±0.750 µm/50 mm (typical)
Scale tape from roll*	3 m, 5 m, 10 m
Mass	31 g/m

Scanning head	LIC 311	LIC 319F	LIC 319M		LIC 319P	LIC 319Y
Interface	EnDat 2.2	Fanuc Serial Interface αi	Mitsubishi high speed interface		Panasonic Serial Interface	Yaskawa Serial Interface
Ordering designation*	EnDat22	Fanuc05	Mit03-4	Mit03-2	Pana02	YEC07
Measuring step	0.01 µm (10 nm)					
Calculation time t_{cal} Clock frequency	≤ 5 µs ≤ 16 MHz	–				
Traversing speed[2)]	≤ 600 m/min					
Interpolation error	±100 nm					
Electrical connection*	Cable (1 m or 3 m) with 8-pin M12 coupling (male) or 15-pin D-sub connector (male)					
Cable length (with HEIDENHAIN cable)	≤ 100 m	≤ 50 m	≤ 30 m		≤ 50 m	
Supply voltage	DC 3.6 V to 14 V					
Power consumption[2)] (max.)	*At 3.6 V:* ≤ 700 mW *At 14 V:* ≤ 800 mW	*At 3.6 V:* ≤ 850 mW *At 14 V:* ≤ 950 mW				
Current consumption (typical)	*At 5 V:* 75 mA (without load)	*At 5 V:* 95 mA (without load)				
Vibration 55 Hz to 2000 Hz **Shock** 6 ms	≤ 500 m/s² (EN 60068-2-6) ≤ 1000 m/s² (EN 60068-2-27)					
Operating temperature	–10 °C to 70 °C					
Mass Scanning head Cable Connecting element	≤ 18 g (without cable) 20 g/m *M12 coupling:* 15 g; *D-sub connector:* 32 g					

* Please select when ordering
1) ±5 µm after linear length-error compensation in the subsequent electronics
2) See *General electrical information* in the *Interfaces of HEIDENHAIN Encoders* brochure

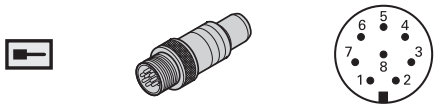
Electrical connection

EnDat connecting cables

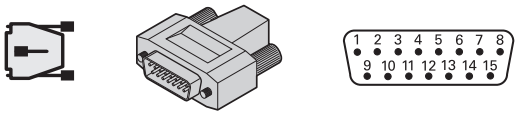
PUR $(4 \times 0.14\ mm^2) + (4 \times 0.34\ mm^2)$ Ø 6 mm; A_P= 0.34 mm^2		**EnDat**
With 8-pin M12 connector (female) and 8-pin M12 coupling (male)		368330-xx
With 8-pin M12 connector (female) and 15-pin D-sub connector (female) for an IK 220		533627-xx
With 8-pin M12 connector (female) and 15-pin D-sub connector (male) for an IK 215		524599-xx
With 8-pin M12 connector (female) and stripped cable end		634265-xx

EnDat pin layout

8-pin M12 coupling



15-pin D-sub connector



	Power supply				Serial data transmission			
	8	**2**	**5**	**1**	**3**	**4**	**7**	**6**
	4	**12**	**2**	**10**	**5**	**13**	**8**	**15**
	U_P	**Sensor** U_P	**0 V**	**Sensor** 0 V	**DATA**	**$\overline{DATA}$**	**CLOCK**	**$\overline{CLOCK}$**
	Brown/Green	Blue	White/Green	White	Gray	Pink	Violet	Yellow

Cable shield connected to housing; **U_P** = Power supply voltage
Sensor: The sense line is connected in the encoder with the corresponding power line.
Vacant pins or wires must not be used!

Connecting cables and pin layouts for Fanuc, Mitsubishi, Panasonic, and Yaskawa can be found in the *Exposed Linear Encoders* brochure.

HEIDENHAIN

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This Product Information document supersedes all previous editions, which thereby become invalid. The basis for ordering from HEIDENHAIN is always the Product Information document edition valid when the order is placed.

Further information:

Comply with the requirements described in the following documents to ensure correct operation of the encoder:

- Brochure: *Exposed Linear Encoders* 208960-xx
- Brochure: *Cables and Connectors* 1206103-xx
- Brochure: *Interfaces of HEIDENHAIN Encoders* 1078628-xx
- Technical Information document: *EnDat* 383942-18

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