



HEIDENHAIN



Product Information

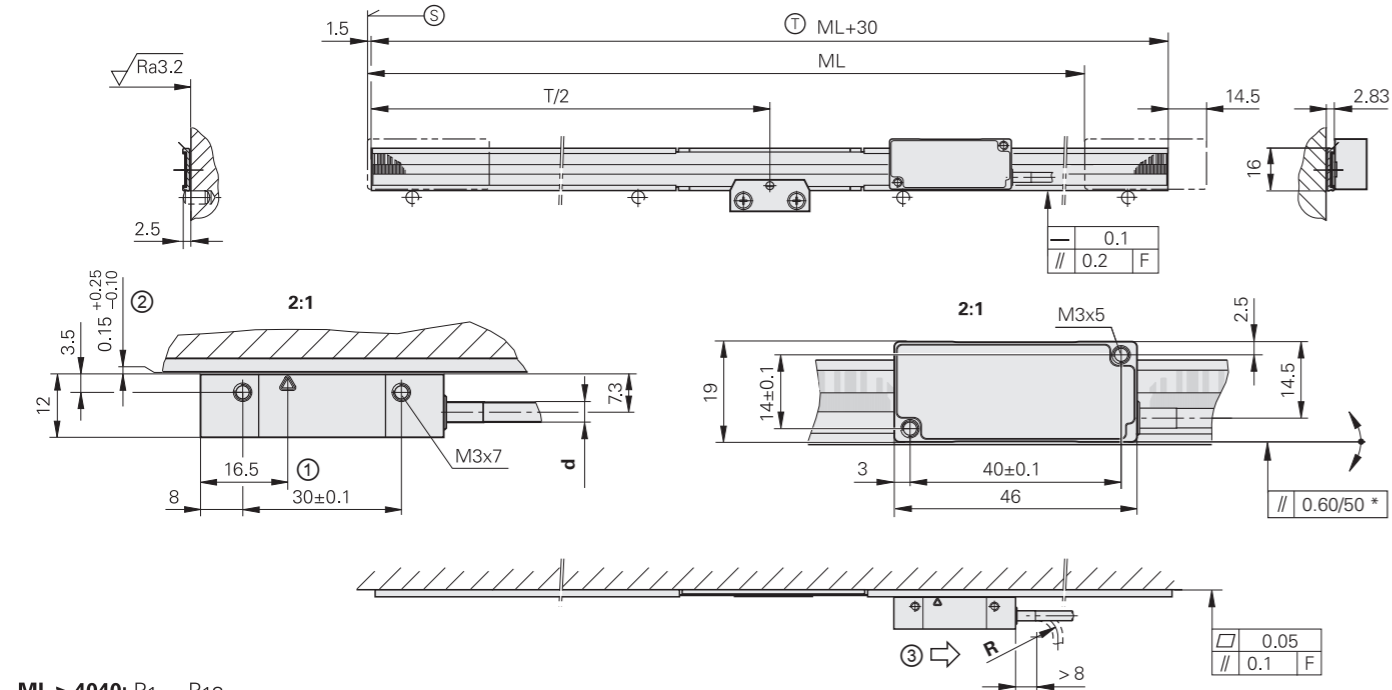
LIC 3100

Absolute Exposed
Linear Encoders

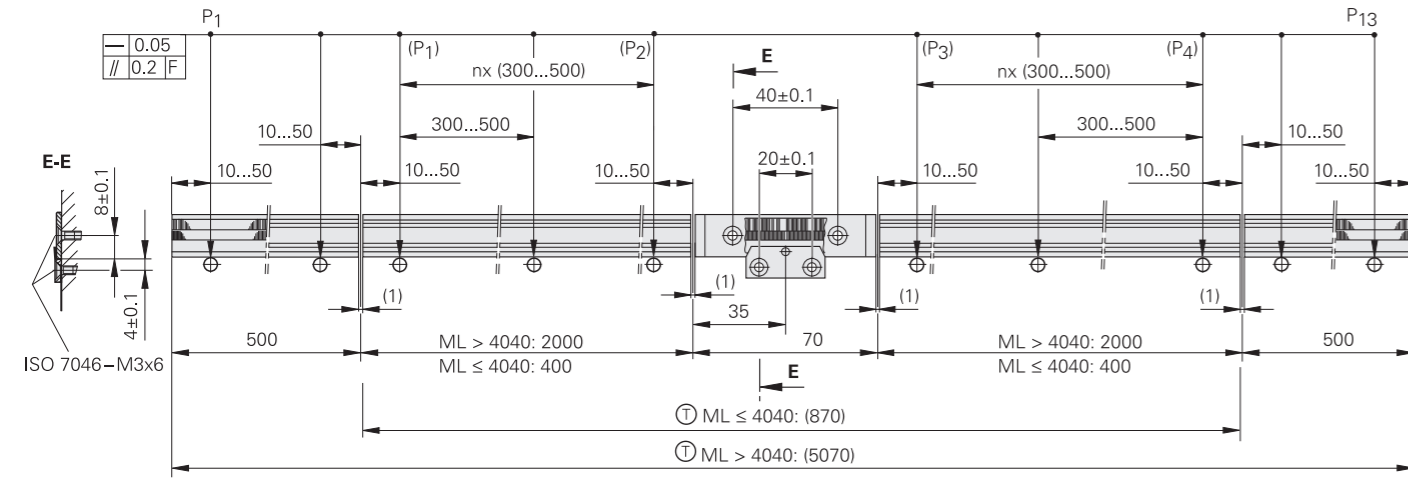
LIC 3117, LIC 3137, LIC 3197

Absolute linear encoders for measuring lengths of up to 10 m

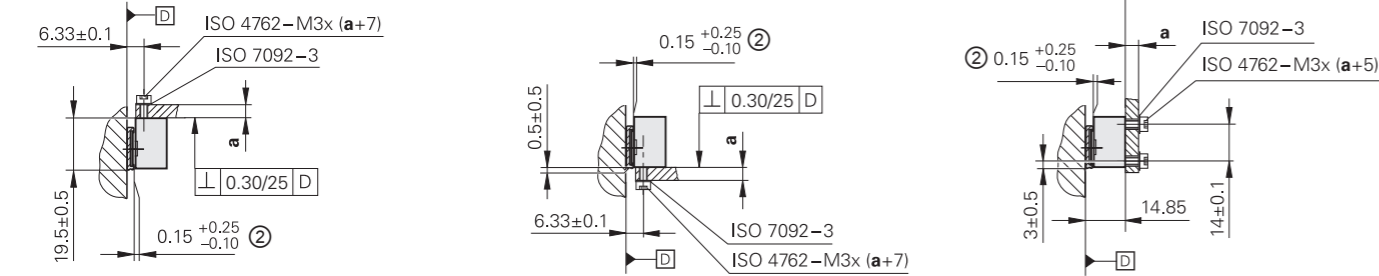
- For measuring steps of down to 8 nm
- Steel scale tape pulled through aluminum extrusions and fastened at center
- Consisting of a linear scale and scanning head



ML > 4040: P1 ... P13
ML ≤ 4040: (P1 ... P4)



Mounting options for scanning head



mm
Tolerancing ISO 8015
ISO 2768:1989-mH
≤ 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 increasing position values

d	R	
	Rigid configuration	Frequent flexing
∅ 3.7 mm	> 8 mm	≥ 40 mm
∅ 2.9 mm	> 6 mm	≥ 30 mm

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

Scanning head	LIC 311	LIC 313	LIC 319F	LIC 319M	LIC 319P	LIC 319Y
Interface	EnDat 2.2	EnDat 3	Fanuc Serial Interface α i	Mitsubishi high speed interface	Panasonic Serial Interface	Yaskawa serial interface
Ordering designation*	EnDat22	E30-RB E30-R4	Fanuc05	Mit03-4 Mit03-2	Pana02	YEC07
Measuring step	10 nm	8 nm	10 nm			
Calculation time t_{cal}	$\leq 5 \mu\text{s}$	-				
Clock frequency	$\leq 16 \text{ MHz}$					
Traversing speed²⁾	$\leq 600 \text{ m/min}$					
Interpolation error	$\pm 100 \text{ nm}$					
Electrical connection*	Cable (1 m or 3 m) with 8-pin M12 coupling (for all interfaces; EnDat 3: E30-RB), 15-pin D-sub connector (male) (for all interfaces; EnDat 3: E30-RB), or 4-pin MINI-SNAP connector (male) (EnDat 3: E30-R4)					
Cable length (with HEIDENHAIN cable)	$\leq 100 \text{ m}$		$\leq 50 \text{ m}$	$\leq 30 \text{ m}$		$\leq 50 \text{ m}$
Supply voltage	DC 3.6 V to 14 V					
Power consumption ²⁾ (max.)	At 3.6 V: $\leq 700 \text{ mW}$	At 3.6 V: $\leq 850 \text{ mW}$	At 14 V: $\leq 800 \text{ mW}$			
Current consumption (typical)	At 5 V: 75 mA (without load)	At 12 V: 35 mA (without load)	At 5 V: 95 mA (without load)			
Vibration 55 Hz to 2000 Hz	$\leq 500 \text{ m/s}^2$ (EN 60068-2-6)					
Shock 6 ms	$\leq 1000 \text{ m/s}^2$ (EN 60068-2-27)					
Operating temperature	$-10 \text{ }^\circ\text{C}$ to $70 \text{ }^\circ\text{C}$					
Mass	Scanning head: $\leq 18 \text{ g}$ (without cable) Cable: M12 coupling and D-sub connector: 20 g/m; MINI-SNAP connector: 15 g/m Connectors: M12 coupling: 15 g; D-sub connector: 32 g; MINI-SNAP: 8 g					

* Please select when ordering

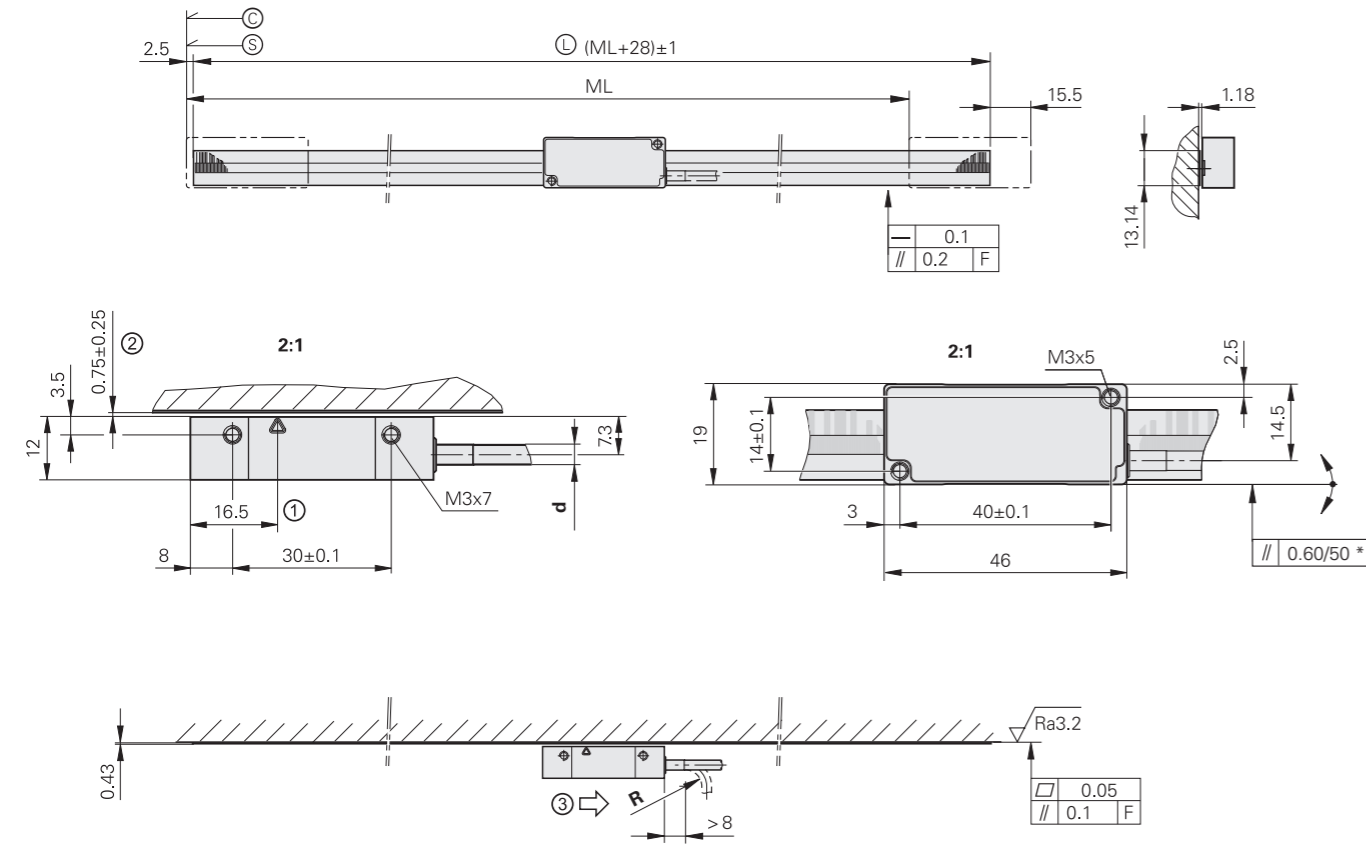
¹⁾ $\pm 5 \mu\text{m}$ after linear-error compensation in the downstream electronics

²⁾ See *General electrical information* in the *Interfaces of HEIDENHAIN Encoders* brochure

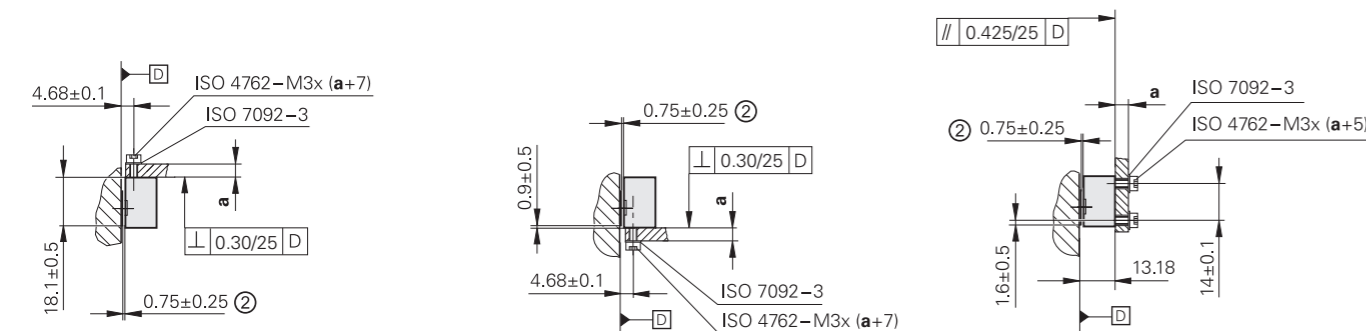
LIC 3119, LIC 3139, LIC 3199

Absolute linear encoders for measuring lengths of up to 10 m

- For measuring steps of down to 8 nm
- Steel scale tape adhesively bonded to mounting surface
- Consisting of a linear scale and scanning head



Mounting options for scanning head



d	R	
	Rigid configuration	Frequent flexing
∅ 3.7 mm	> 8 mm	≥ 40 mm
∅ 2.9 mm	> 6 mm	≥ 30 mm

mm
Tolerancing ISO 8015
ISO 2768:1989-mH
≤ 6 mm: ±0.2 mm

- F = Machine guideway
 * = Mounting error plus dynamic guideway error
 © = Code start value: ≥ 100 mm
 Ⓢ = 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 increasing position values

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

Scanning head	LIC 311	LIC 313	LIC 319F	LIC 319M	LIC 319P	LIC 319Y
Interface	EnDat 2.2	EnDat 3	Fanuc Serial Interface α i	Mitsubishi high speed interface	Panasonic Serial Interface	Yaskawa serial interface
Ordering designation*	EnDat22	E30-RB E30-R4	Fanuc05	Mit03-4 Mit03-2	Pana02	YEC07
Measuring step	10 nm	8 nm	10 nm			
Calculation time t_{cal} Clock frequency	≤ 5 μs ≤ 16 MHz	–				
Traversing speed²⁾	≤ 600 m/min					
Interpolation error	±100 nm					
Electrical connection*	Cable (1 m or 3 m) with 8-pin M12 coupling (for all interfaces; EnDat 3: E30-RB), 15-pin D-sub connector (male) (for all interfaces; EnDat 3: E30-RB), or 4-pin MINI-SNAP connector (male) (EnDat 3: E30-R4)					
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 12 V: 35 mA (without load)	At 5 V: 95 mA (without load)			
Vibration 55 Hz to 2000 Hz Shock 6 ms	≤ 500 m/s^2 (EN 60068-2-6) ≤ 1000 m/s^2 (EN 60068-2-27)					
Operating temperature	–10 °C to 70 °C					
Mass	Scanning head: ≤ 18 g (without cable) Cable: M12 coupling and D-sub connector: 20 g/m; MINI-SNAP connector: 15 g/m Connectors: M12 coupling: 15 g; D-sub connector: 32 g; MINI-SNAP: 8 g					



* Please select when ordering

¹⁾ ±5 μm after linear-error compensation in the downstream electronics


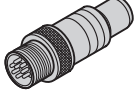

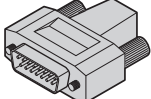
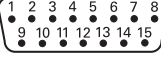


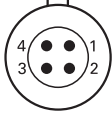




²⁾ See *General electrical information* in the *Interfaces of HEIDENHAIN Encoders* brochure

Electrical connection

EnDat 3 adapter cable and connecting cable (MINI-SNAP, E30-R4)

PUR (2 × 0.25 mm ²) + (2 × 0.09 mm ²) Ø 5.2 mm; A _P = 0.25 mm ²		
Adapter cable with 4-pin MINI-SNAP connector (female) and 15-pin D-sub connector (male)		1362192-xx
Connecting cable with 4-pin MINI-SNAP connector (female) and 4-pin MINI-SNAP connector (male)		1363049-xx

EnDat 3 pin layout

8-pin M12 coupling (E30-RB)		15-pin D-sub connector (E30-RB)				4-pin MINI-SNAP connector (E30-R4)			
									
	Power supply				Serial data transmission				
 M12	8	2	5	1	3	4	7	6	
	4	12	2	10	5	13	8	15	
 MINI-SNAP	1	–	3	–	–	–	2	4	
	U_P	Sensor U _P	0V	Sensor 0V	SD+_NEXT	SD-_NEXT	SD+	SD-	
	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!

For information about connecting cables and pin layouts, please refer to the *Cables and Connectors* 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 and intended operation:

- 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