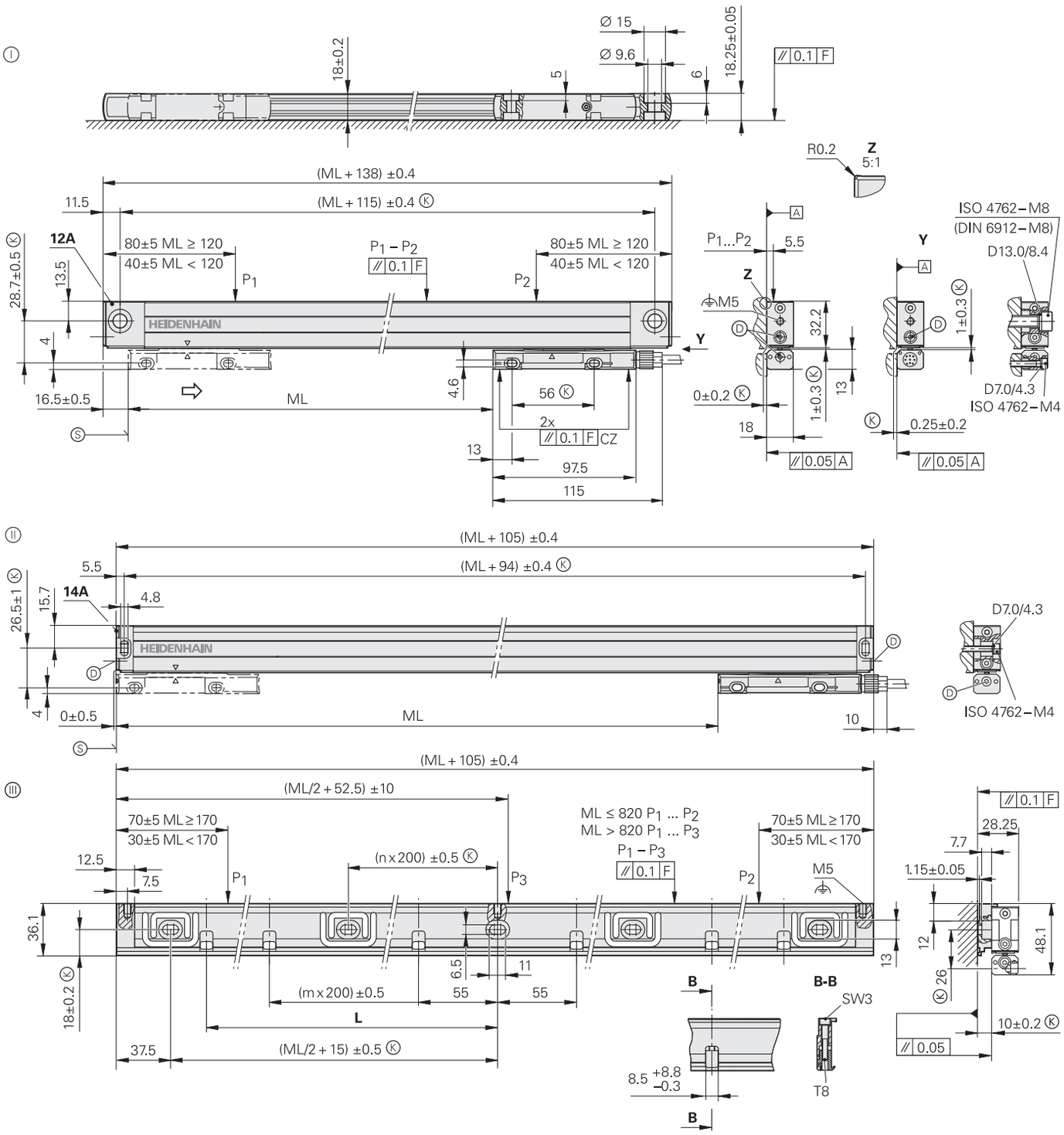
LC 400 series

Absolute linear encoders with slimline scale housing

- **Low installation space requirements**



ML	70	120	170	220	270	320	370	420	470	520	570	620	670	720	770	820	920	1020	1140	1240	1340	1440	1540	1640	1740	1840	2040
L	37.5	55	75	100	115	140	175	200	225	250	275	300	325	350	375	400	450	500	555	610	655	710	760	810	855	910	1010

mm

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

Ⓘ = 12A end block; for mounting with and without mounting spar
Ⓘⓘ = 14A end block; for mounting with mounting spar
(if directly fastened with M4 screws, then specifications are subject to constraints)
Ⓘⓘⓘ = MSL 41 mounting spar
F = Machine guideway
P = Measuring points for alignment
Ⓚ = Required mating dimensions
Ⓓ = Compressed air inlet
Ⓢ = Beginning of measuring length (ML) (= 20 mm absolute)
⇨ = Direction of motion of the scanning unit for ascending position values

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Specifications	LC 415 (Functional Safety)	LC 415	LC 485
Measuring standard Coefficient of linear expansion	DIADUR glass scale with absolute track and incremental track; grating period: 20 µm $\alpha_{therm} \approx 8 \cdot 10^{-6}\ K^{-1}$ (mounting type ①/ⓓ); with mounting spar: $\alpha_{therm} \approx 9 \cdot 10^{-6}\ K^{-1}$ (mounting type ⓘⓘ)		
Accuracy grade*	±3 µm, ±5 µm (typical interpolation error: ±20 nm)		
Measuring length (ML)* in mm	Mounting spar* or clamping elements* optional up to ML 1240; necessary for ML 1340 or greater 70 120 170 220 270 320 370 420 470 520 570 620 670 720 770 820 920 1020 1140 1240 1340 1440 1540 1640 1740 1840 2040		
Functional safety for applications with up to	• SIL 2 as per EN 61508 (further basis for testing: IEC 61800-5-3) • Category 3, PL d as per EN ISO 13849-1	–	
PFH (per axis)	$\leq 15 \cdot 10^{-9}$ (up to 2000 m above sea level)	–	
Safe position[1]	Encoder: ±550 µm (safe measuring step (SM) = 220 µm)	–	
	Mechanical connection: fault exclusions for loosening of the housing and scanning unit (page 21)		
Interface	EnDat 2.2		
Ordering designation	EnDat22		EnDat02
Measuring step At ±3 µm At ±5 µm	0.001 µm 0.010 µm		0.005 µm 0.010 µm
Clock frequency (calc. time t_{cal})	≤ 16 MHz (≤ 5 µs)		≤ 2 MHz (≤ 5 µs)
Measurement of direct-drive motor temperature[2]	With EIB 5211 or EIB 5181		With EIB 5281 or EIB 5181
Incremental signals	–		∿ 1 V_{PP} (20 µm)
Cutoff frequency –3 dB	–		≥ 150 kHz
Electrical connection	Separate adapter cable (1 m / 3 m / 6 m / 9 m) connectable on mounting block		
Cable length	≤ 100 m[3]		≤ 150 m[3]
Supply voltage	DC 3.6 V to 14 V		
Power consumption (maximum)	3.6 V: ≤ 1.1 W; 14 V: ≤ 1.3 W		
Traversing speed	≤ 180 m/min (max. acceleration in the direction of measurement ≤ 100 m/s^2)		
Required moving force	≤ 5 N		
Vibration 55 Hz to 2000 Hz acting on **Shock** 11 ms	Scanning unit: ≤ 200 m/s^2 (EN 60068-2-6) Housing without mounting spar: ≤ 100 m/s^2 (EN 60068-2-6) Housing with mounting spar; cable outlet on the right: ≤ 150 m/s^2, or left: ≤ 100 m/s^2 (EN 60068-2-6) ≤ 300 m/s^2 (EN 60068-2-27)		
Operating temperature	0 °C to 50 °C		
Protection EN 60529[4]	IP53 when installed in conformity with instructions in the brochure; IP64 with sealing air via DA 400		
Mass	Encoder: 0.2 kg + 0.55 kg/m of measuring length; mounting spar: 0.9 kg/m		

* Please select when ordering; [1] Further tolerances may arise in the downstream electronics after position value comparison (contact mfr. of downstream electronics); [2] Depending on the serial number index of the encoder; please consult HEIDENHAIN; [3] With HEIDENHAIN cable (see the *Interfaces of HEIDENHAIN Encoders* brochure); [4] In the application, protect the LC from the ingress of particles and liquids

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