



HEIDENHAIN



Product Information

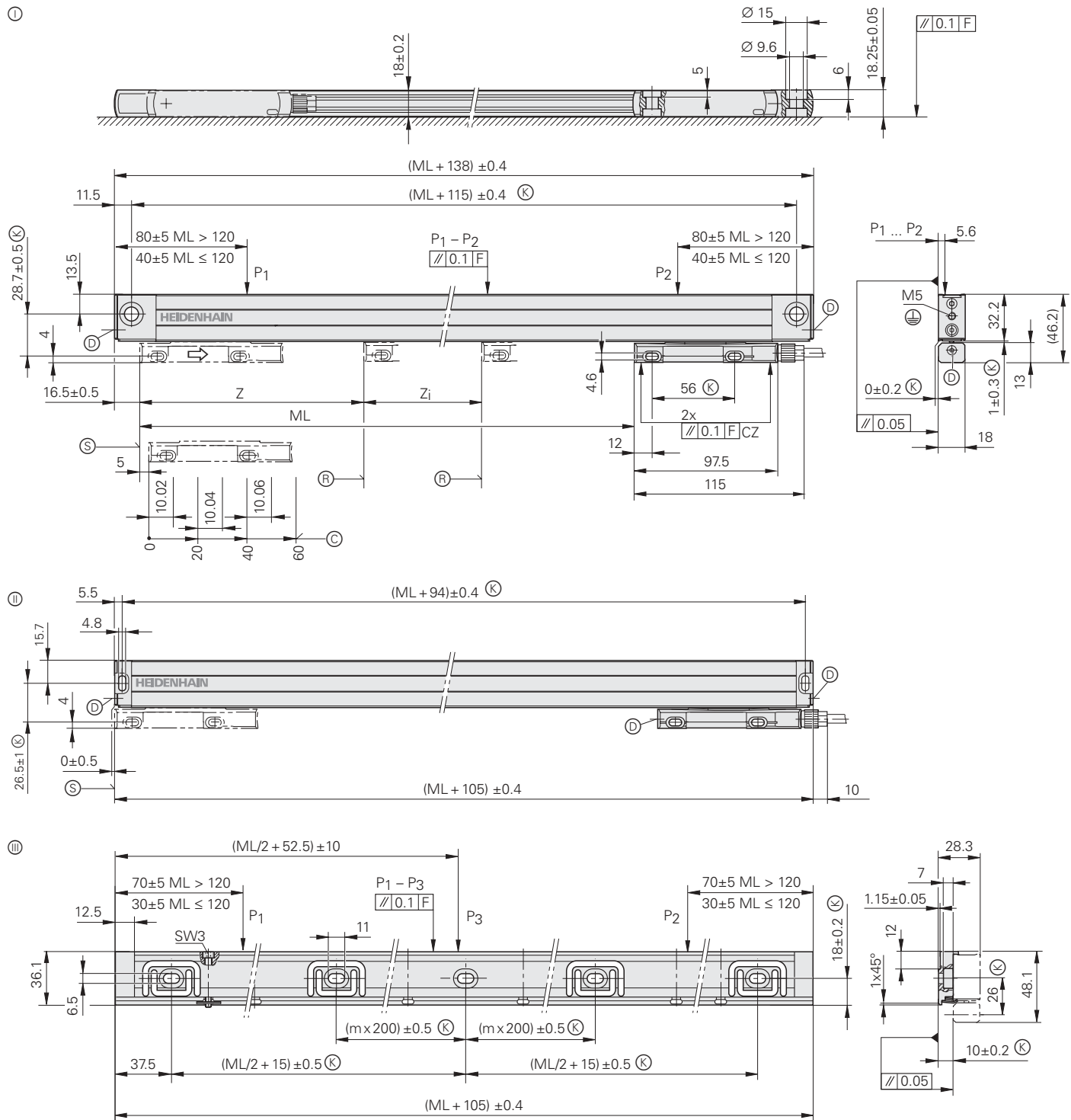
LS 477

Incremental Linear Encoder
with 50-fold Interpolation

November 2007

LS 477 Series

- Incremental linear encoder for measuring steps to 0.1 µm
- For limited installation space



Dimensions in mm



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

- ① = Without mounting spar (with M8 screws)
- ② = Short end piece, as replacement for predecessor with and without mounting spar.
If attached directly with M4 screws, than specifications are restricted.
- ③ = With mounting spar

- F = Machine guideway
- P = Gauging points for alignment
ML ≤ 820 P₁ - P₂
ML > 820 P₁ - P₃
- Ⓚ = Required mating dimensions
- Ⓜ = Compressed air inlet
- Ⓡ = Reference-mark position on LS 4x7
1 reference mark at midpoint of measuring length ML = 70
2 reference marks for measuring lengths
120 ... 1020 | 1140 ... 2040
Z = 35 | Z = 45
Z_i = ML - 70 | Z_i = ML - 90
- Ⓢ = Reference-mark position on LS 4x7C

- Ⓢ = Beginning of measuring length (ML)
- ⇒ = Direction of scanning unit motion for output signals in accordance with interface description

Mounting spar

ML	m
70 ... 520	0
570 ... 920	1
1020 ... 1340	2
1440 ... 1740	3
1840 ... 2040	4



LS 477 without mounting spar

LS 477 with mounting spar

Specifications	LS 477
Measuring standard Expansion coefficient	Glass scale with DIADUR graduation $\alpha_{\text{therm}} \approx 8 \times 10^{-6} \text{ K}^{-1}$ (mounting type ①/②); <i>with mounting spar</i> : $\alpha_{\text{therm}} \approx 9 \times 10^{-6} \text{ K}^{-1}$ (mounting type ③)
Accuracy grade*	$\pm 3 \mu\text{m}$; $\pm 5 \mu\text{m}$
Measuring length ML* in mm	Mounting spar* optional 70 120 170 220 270 320 370 420 470 520 570 620 670 720 770 820 870 920 1020 1140 1240 Mounting spar* necessary 1340 1440 1540 1640 1740 1840 2040
Reference marks* LS 477 LS 477C	Selectable with magnets every 50 mm Standard: ML 70 mm: 1 in the center, up to ML 1020 mm: 2, each 35 mm from beginning/end of ML, from ML 1140 mm: 2, each 45 mm from beginning/end of ML Distance-coded
Incremental signals	$\square$ TTL x 50
Grating period Integrated interpolation* Signal period	20 μm 50fach 0,4 μm
Cutoff frequency -3dB	–
Scanning frequency* Edge separation a	40 kHz $\geq 0.125 \mu\text{s}$
Measuring step	0.10 $\mu\text{m}^{1)}$
Traversing speed	$\leq 48 \text{ m/min}$
Power supply without load	5 V $\pm 5 \%$ / < 140 mA
Electrical connection	Separate adapter cable (1 m/3 m/6 m/9 m) connectable to mounting block
Cable length²⁾	$\leq 100 \text{ m}$
Required moving force	$\leq 5 \text{ N}$
Vibration 55 to 2000 Hz Shock 11 ms Acceleration	<i>Without mounting spar</i> : $\leq 100 \text{ m/s}^2$ (IEC 60068-2-6) <i>With mounting spar and cable outlet right/left</i> : $\leq 200 \text{ m/s}^2/100 \text{ m/s}^2$ (IEC 60068-2-6) $\leq 300 \text{ m/s}^2$ (IEC 60068-2-27) $\leq 100 \text{ m/s}^2$ in measuring direction
Operating temperature	0 °C to 50 °C
Protection IEC 60529	IP 53 when mounted according to the mounting instructions; IP 64 if compressed air is connected via DA 300
Weight	0.4 kg + 0.5 kg/m measuring length

* Please indicate when ordering

¹⁾ After 4-fold evaluation in the evaluation electronics

²⁾ With HEIDENHAIN cable

Electrical Connection

Adapter cables		Cable Ø	ID
With M23 coupling (male)		6 mm	360645-xx
Without connector		6 mm	354319-xx
With 15-pin D-sub connector		6 mm	360974-xx

Available cable lengths: 1 m/3 m/6 m/9 m

PUR connecting cables 12-pin: $[4(2 \times 0.14 \text{ mm}^2) + (4 \times 0.5 \text{ mm}^2)] \text{ } \varnothing 8 \text{ mm}$		
Complete with M23 coupling (female) and M23 connector (male)		298401-xx
Complete with M23 connector (female) and D-sub connector (female) for IK 220		310 199-xx
One connector (female)		309777-xx
Cable without connectors, Ø 8 mm		244957-01

Pin layout

12-pin M23 coupling				12-pin M23 connector				15-pin D-sub connector, female for HEIDENHAIN controls and IK 220					
Power supply				Incremental signals						Other signals			
	12	2	10	11	5	6	8	1	3	4	7/9	/	/
	1	9	2	11	3	4	6	7	10	12	5/8/13/14/15	/	/
	U _P	Sensor U _P	0V	Sensor 0V	A+	A-	B+	B-	R+	R-	Vacant	Vacant	Vacant
	Brown/ Green	Blue	White/ Green	White	Brown	Green	Gray	Pink	Red	Black	/	Violet	Yellow

Cable shield connected to housing; **U_P** = power supply voltage

Sensor: The sensor line is connected internally with the corresponding power line

Vacant pins or wires must not be used!

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For more information

- Linear Encoders for Numerically Controlled Machine Tools catalog