



# HEIDENHAIN



Product Information

**LC 481**

**LC 491**

Absolute Linear Encoders

September 2005

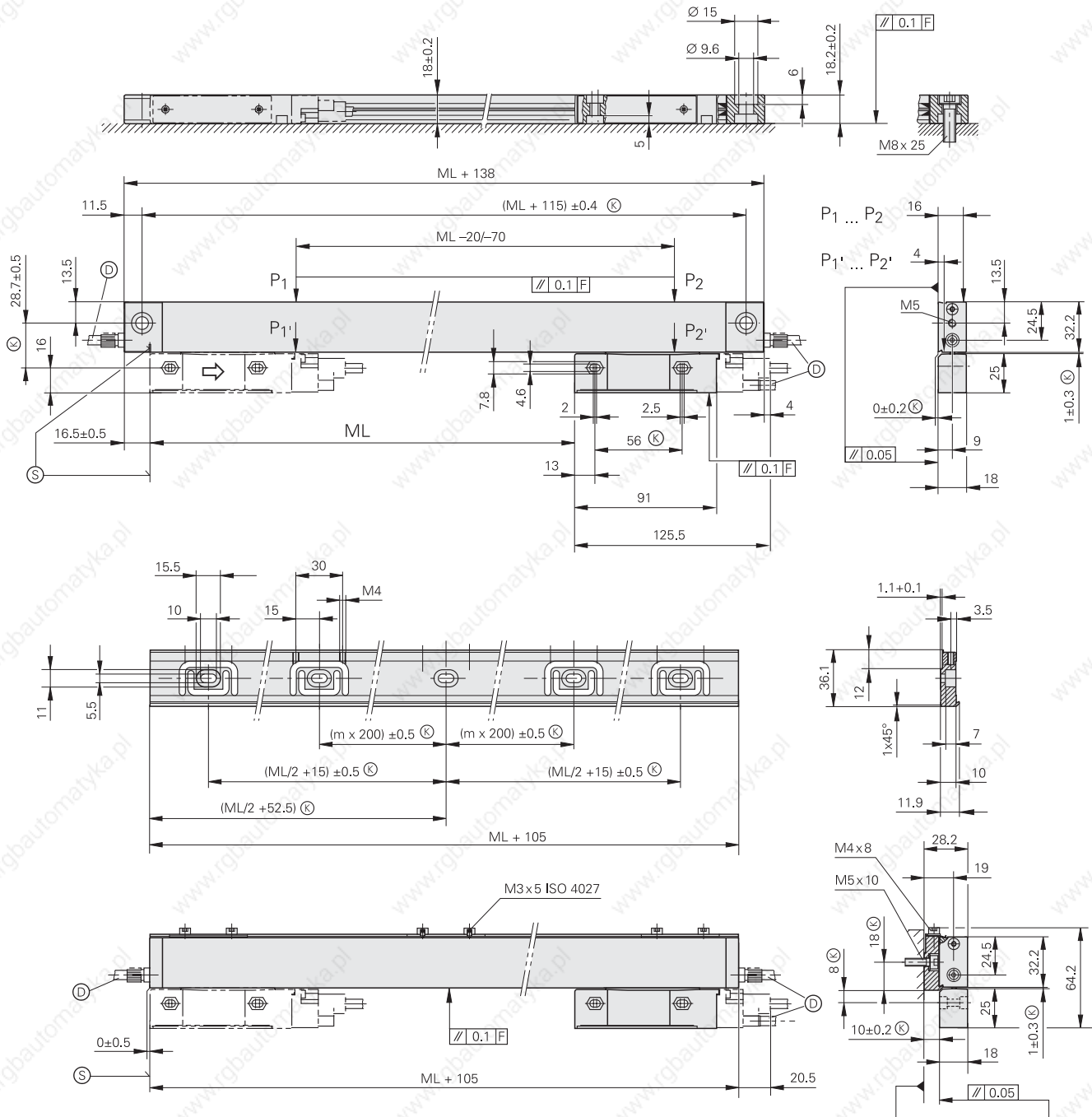
# LC 481/LC 491

- Absolute linear encoder
- High positioning accuracy and traversing speed through single-field scanning
- For limited installation space

Dimensions in mm



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



- ⊙ = Without mounting spar
- ⊙ = With mounting spar
- F = Machine guideway
- P = Gauging points for alignment
- ⊙ = Required mating dimensions
- ⊙ = Compressed air inlet
- ⊙ = 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

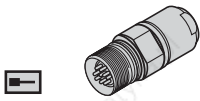
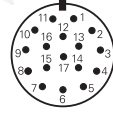
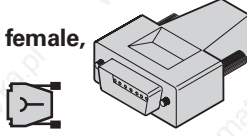
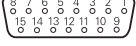



Specifications	LC 481	LC 491F	LC 491M
<b>Measuring standard</b> Thermal expansion coefficient	DIADUR glass scale with absolute track and incremental track <i>Without mounting spar:</i> approx. $8 \cdot 10^{-6} \text{ K}^{-1}$ , <i>with mounting spar:</i> approx. $9 \cdot 10^{-6} \text{ K}^{-1}$		
<b>Accuracy grade*</b>	$\pm 3 \mu\text{m}$ , $\pm 5 \mu\text{m}$		
<b>Measuring length ML*</b> in mm Mounting spar recommended	70 120 170 220 270 320 370 420 470 520 570 620		
Only with mounting spar	1340 1440 1540 1640 1740 1840 2040		
<b>Absolute position values</b>	EnDat 2.1	Fanuc 01 serial interface	Mitsubishi High Speed Serial Interface
<b>Measuring step</b>	Approx. $0.02 \mu\text{m}^{1)}$	<i>Accuracy <math>\pm 3 \mu\text{m}</math>:</i> $0.01 \mu\text{m}$ , <i>accuracy <math>\pm 5 \mu\text{m}</math>:</i> $0.05 \mu\text{m}$	
<b>Calculation time <math>t_{\text{cal}}</math></b>	< 1 ms	-	
<b>Incremental signals</b> Grating period/signal period Cutoff frequency -3dB	$\sim 1 \text{ V}_{\text{PP}}$ $20 \mu\text{m}$ $\geq 150 \text{ kHz}$	-	
<b>Power supply</b>	$5 \text{ V} \pm 5\%$ / < 300 mA without load. Remote sensing is possible		
<b>Electrical connection</b> Max. cable length	Separate adapter cable (1 m/3 m/6 m/9 m) connectable to mounting block Upon request		
<b>Traversing speed</b>	$\leq 180 \text{ m/min}$		
<b>Required moving force</b>	$\leq 5 \text{ N}$		
<b>Vibration</b> 55 to 2000 Hz	<i>Without mounting spar:</i> $\leq 100 \text{ m/s}^2$ (IEC 60 068-2-6) <i>With mounting spar:</i> $\leq 200 \text{ m/s}^2$ (IEC 60 068-2-6)		
<b>Shock</b> 11 ms <b>Acceleration in measuring direction</b>	$\leq 300 \text{ m/s}^2$ (IEC 60 068-2-27) $\leq 100 \text{ m/s}^2$		
<b>Operating temperature</b>	0 to $50 \text{ }^\circ\text{C}$		
<b>Protection</b> IEC 60 529	IP 53 when installed acc. to mounting instructions, IP 64 with compressed air from DA 300		
<b>Weight</b>	<i>Encoder:</i> 0.2 kg + 0.5 kg/m measuring length, <i>mounting spar:</i> 0.9 kg/m		

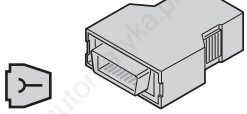
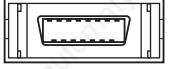
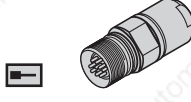
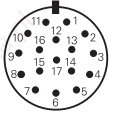



\* Please indicate when ordering

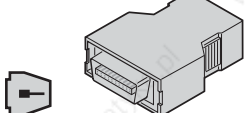


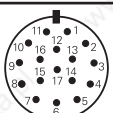



<sup>1)</sup> After 1024-fold interpolation of the incremental signals

Connecting Elements and Cables	LC 481	LC 491F	LC 491M
<b>Adapter cable complete</b> With M23 coupling (male), 17-pin Cable length 1 m/3 m/6 m/9 m Cable diameter 6 mm	Id. Nr. 369 129-xx 	Id. Nr. 337 439-xx 	
<b>Connecting cable complete</b> With M23 connector (female), 17-pin Cable diameter 8 mm	With D-sub connector (female) Id. Nr. 332 115-xx 	With Fanuc connector Id. Nr. 534 855-xx 	With Mitsubishi connector Id. Nr. 344 625-xx 
<b>Connecting cable with one connector</b> With M23 connector (female) Cable diameter 8 mm	Id. Nr. 309 778-xx 	-	
<b>Adapter cable complete</b> Cable diameter 6 mm	With D-sub connector (female) Id. Nr. 370 474-xx 	With Fanuc connector Id. Nr. 532 759-xx 	With Mitsubishi connector Id. Nr. 367 425-xx 

# Electrical Connection

<b>LC 481</b> <b>17-pin coupling M23</b>  					<b>15-pin D-sub connector, female,</b> for HEIDENHAIN controls and IK 220  								
	Power supply					Incremental signals				Absolute position values			
	7	1	10	4	11	15	16	12	13	14	17	8	9
	1	9	2	11	13	3	4	6	7	5	8	14	15
	<b>U<sub>P</sub></b>	<b>Sensor U<sub>P</sub></b>	<b>0V</b>	<b>Sensor 0V</b>	<b>Inside shield</b>	<b>A+</b>	<b>A-</b>	<b>B+</b>	<b>B-</b>	<b>DATA</b>	<b>DATA</b>	<b>CLOCK</b>	<b>CLOCK</b>
	Brown/Green	Blue	White/Green	White	/	Green/Black	Yellow/Black	Blue/Black	Red/Black	Gray	Pink	Violet	Yellow

<b>LC 491F</b> <b>20-pin Fanuc connector</b>  					<b>17-pin coupling M23</b>  				
	Power supply					Absolute position values			
	9	18/20	12	14	16	1	2	5	6
	7	1	10	4	-	14	17	8	9
	<b>U<sub>P</sub></b>	<b>Sensor U<sub>P</sub></b>	<b>0V</b>	<b>Sensor 0V</b>	<b>Shield</b>	<b>Serial Data</b>	<b>Serial Data</b>	<b>Request</b>	<b>Request</b>
	Brown/Green	Blue	White/Green	White	-	Gray	Pink	Violet	Yellow

<b>LC 491M</b> <b>20-pin Mitsubishi connector</b>  					<b>17-pin coupling M23</b>  				
	Power supply					Absolute position values			
	20	19	1	11	6	16	7	17	
	7	1	10	4	14	17	8	9	
	<b>U<sub>P</sub></b>	<b>Sensor U<sub>P</sub></b>	<b>0V</b>	<b>Sensor 0V</b>	<b>Serial Data</b>	<b>Serial Data</b>	<b>Request Frame</b>	<b>Request Frame</b>	
	Brown/Green	Blue	White/Green	White	Gray	Pink	Violet	Yellow	

**Shield** on housing; **U<sub>P</sub>** = power supply voltage

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

Vacant pins or wires must not be used!

## HEIDENHAIN

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### For more information

- Sealed Linear Encoders brochure
- Technical Information: *Single-Field Scanning*