

Datasheet

General Features


Absolute linear encoder for CNC machine tools.

- FANUC *ai* serial interface
- Resolutions up to 0.001 μm .
Accuracy grade up to $\pm 2 \mu\text{m}$
- Fixed expansion point (**FEP**) in the middle, positionable on the right (**RT**) or on the left (**LT**), for a linear expansion consistent with the type of application
- Direct reading of absolute measure
- Rugged and heavy profile of considerable section
- Adjustable cable output, through double connector
- Pressurization from both sides of the scale or from the transducer



FANUC

Technical Characteristics

Measuring support	Glass scale	
Grating pitch	20 μm	
Linear thermal expansion coefficient	$8 \times 10^{-6} \text{ } ^\circ\text{C}^{-1}$	
Serial interface	FANUC <i>ai</i>	
Resolution absolute measure	1 - 0.1 - 0.05 - 0.01 - 0.001 μm	
Accuracy grade	$\pm 5 \mu\text{m}$ * standard version $\pm 3 \mu\text{m}$ * high-accuracy version ($\pm 2 \mu\text{m}$ for measuring length up to 640 mm)	
Interpolation error (SDE)	$\pm 70 \text{ nm}$ **	
Hysteresis	90 nm **	
Measuring length ML in mm	140, 240, 340, 440, 540, 640, 740, 840, 940, 1.040, 1.140, 1.240, 1.340, 1.440, 1.540, 1.640, 1.740, 1.840, 2.040, 2.240, 2.440, 2.640, 2.840, 3.040, 3.240 max.	
Fixed expansion point (FEP)	central or positionable on the right (RT) or on the left (LT)	
Max. traversing speed	180 m/min	
Max. acceleration	50 m/s^2 in measuring direction	
Required moving force	$\leq 2.5 \text{ N}$	
Vibration resistance (EN60068-2-6)	100 m/s^2 [55 ÷ 2000 Hz]	
Shock resistance (EN60068-2-27)	150 m/s^2 [11 ms]	
Protection class (EN 60529)	IP 54 standard, IP 64 pressurized	
Operating temperature	0 $^\circ\text{C}$ ÷ 50 $^\circ\text{C}$	
Storage temperature	-20 $^\circ\text{C}$ ÷ 70 $^\circ\text{C}$	
Relative humidity	20 % ÷ 80 % (not condensed)	
Reading block sliding	by ball bearings \odot	
Power supply	5 VDC $\pm 10 \%$	
Current consumption	255 mA max. (with R = 120 Ω)	
Max. cable length	30 m	
Connector	on the transducer, with adjustable output	
Electrical protections	inversion of polarity and short circuits	
Weight	0.55 kg + 2.8 kg/m	

* The declared accuracy grade of $\pm X \mu\text{m}$ is referred to a measuring length of 1 m.

** The error declared is subject to the respect of the alignment tolerances.

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Electrical Characteristics

- Connector on the transducer, easily disconnectable in case of need.
- Reading device with an infrared light emitter and receiving photodiodes.
- Serial protocol FANUC *ai*.
- Electrical protection against polarity inversion and short circuits on output ports.
- CABLE:
 - PUR cable with low friction coefficient, resistant to oil and suitable for continuous movements
 - 7 wired, shielded cable, $\varnothing = 7,4$ mm
 - 4 m standard length
 - CU1 PCR 15-Pin connector

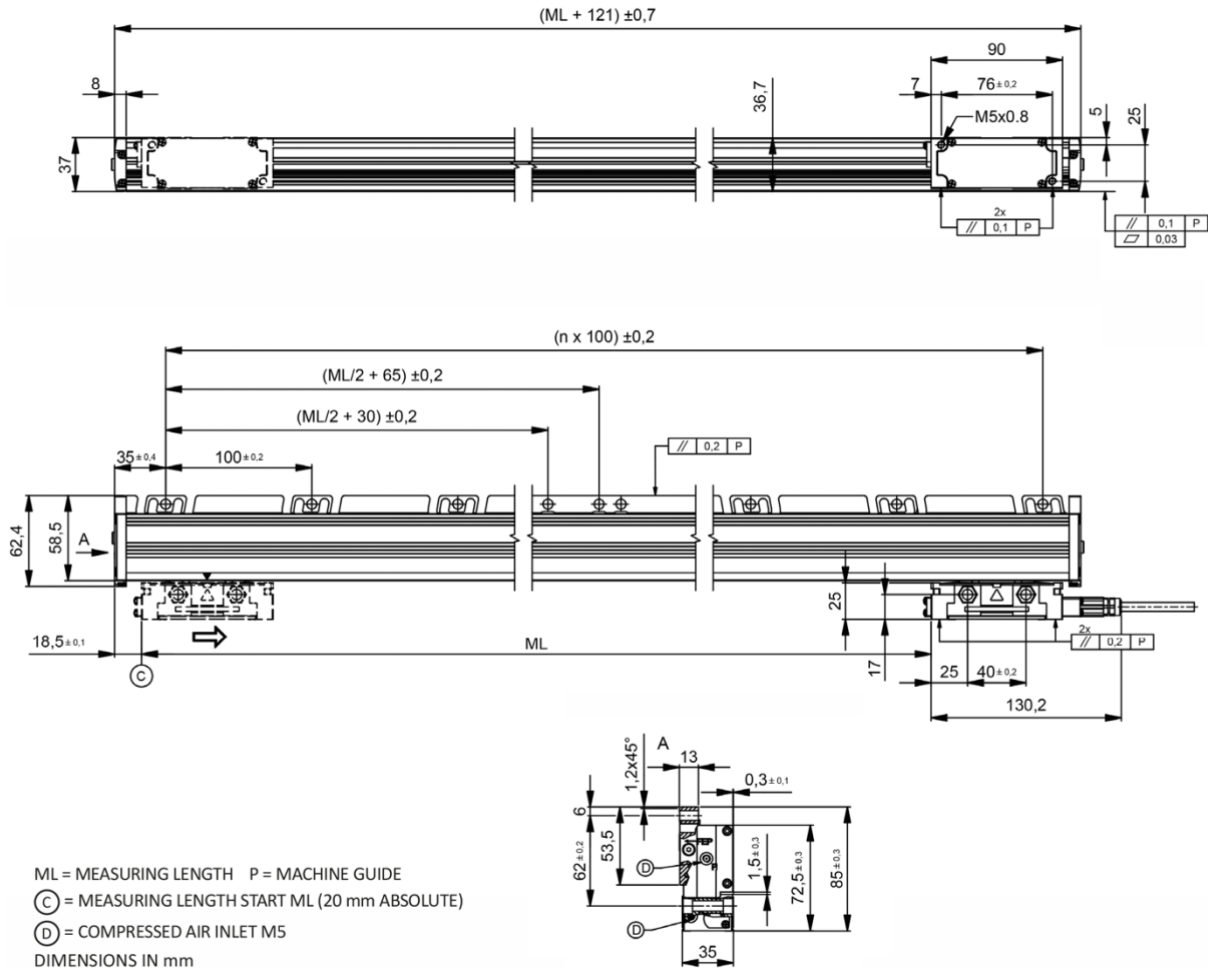
The cable's bending radius should not be lower than 80 mm.

Mechanical Characteristics

- Rugged and heavy **PROFILE** of considerable section, made of anodized aluminum.
Dimensions 36.7 x 58.5 mm
- **SPRING SYSTEM** for misalignment compensation and self-correction of mechanical hysteresis
- Double pair of linear **SEALING LIPS** for a very high protection of the grating
- Pressurizable **READER HEAD**, consisting of tie rod and reading block, with fully-protected place for electronic boards
- **READING BLOCK** sliding through ball bearings
- Die-cast **TIE ROD**, with nickel surface treatment
- Absolute glass **GRATING**, placed in the scale housing
- Elastomeric **GASKETS** which allow to reproduce the full protection in mechanical joints (in case of disassembling)
- **FULL POSSIBILITY** to disassemble and reassemble it

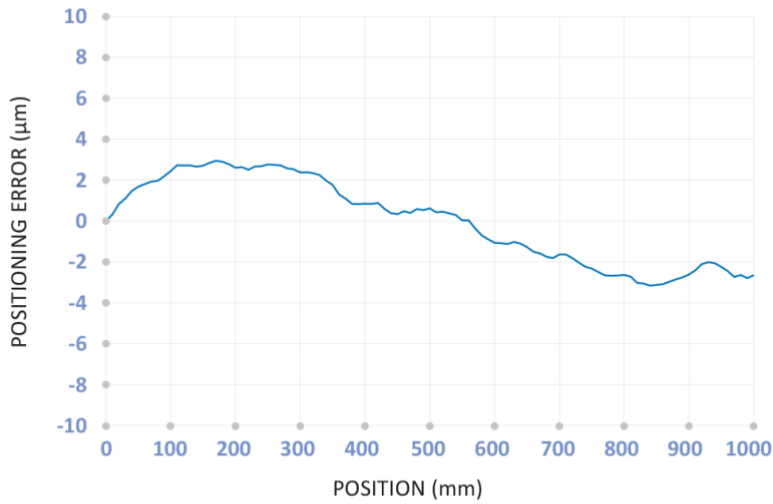
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Dimensions



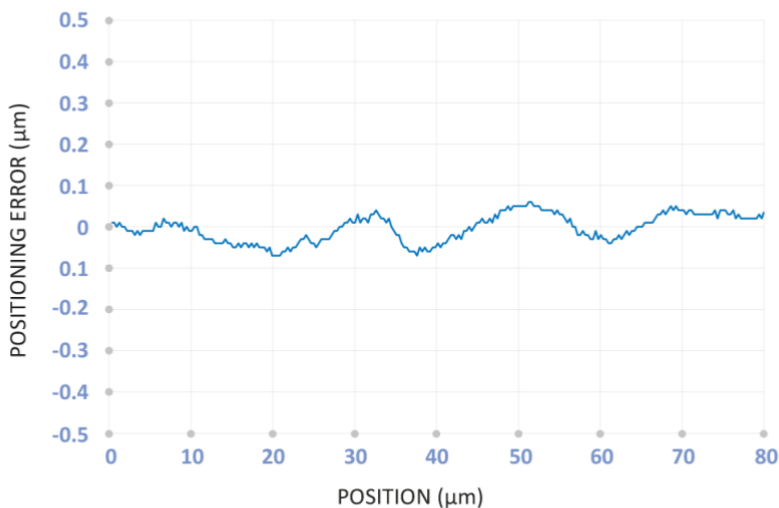
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Accuracy



Accuracy graph: deviation between the value measured by the encoder and the value measured by the reference system.

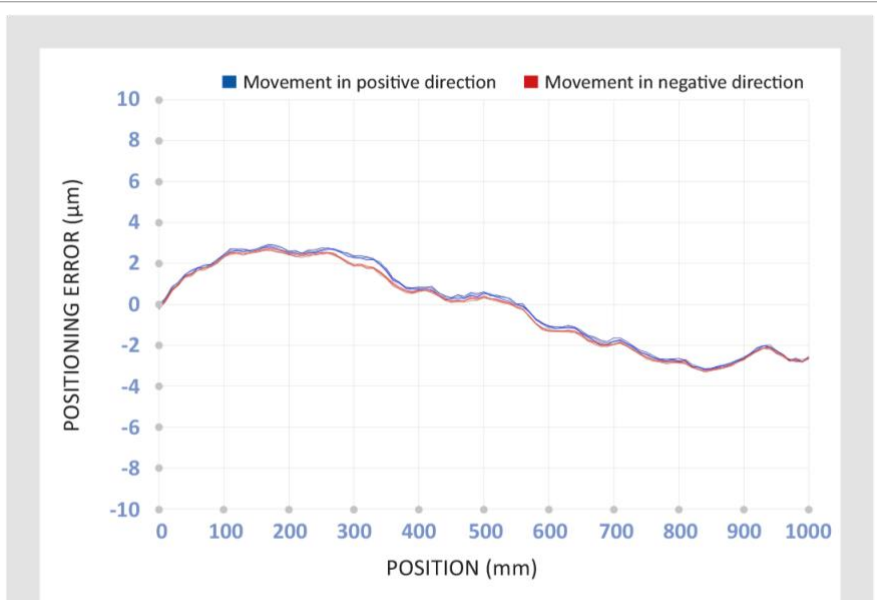
Interpolation - SDE



SDE (sub-division error) graph: accuracy of the interpolation device within the single grating pitch.

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Repeatability



Repeatability graph obtained by carrying out the measurements several times in both directions of advancement.

- Unidirectional repeatability: measurement error detected without inverting the movement direction of the encoder.
- Hysteresis: difference in the measure due to the inversion of the encoder movement direction.

The graphs show tests carried out in a metrological room under controlled climatic conditions: T= 20 °C ± 0.1 °C and R.H.= 45 ÷ 55%. The reference system for the comparison of position measurements is interferometric with 1 nm resolution and equipped with an environmental compensation device.



GVS 808 is supplied with a Fixed Expansion Point (FEP) positioned in the middle (standard). On request it is possible to supply scales with FEP positionable on the left (LT) or on the right (RT). Based on the application, the customer can determine the linear thermal expansion direction, so as to maximize the machining accuracy and repeatability even in the presence of significant temperature changes.

Alarm conditions

Alarm line	Alarm	Alarm Type	FANUC / GIVI Alarm description
b7	OHAL	Over head alarm	Temperature in the encoder is too high
b6	LDAL	LED alarm	LED is not working
b5	BLAL	Battery low alarm	Battery voltage is low
b4	PHAL	Phase alarm	Miss detection occurs by noise or other causes
b3	CMAL	Count miss alarm	Absolute position is abnormal by position miscounting
b2	BZAL	Battery zero alarm	Battery voltage is lower than the minimum operating voltage
b1	PMAL	Puls miss alarm	Trouble is detected in the interpolation circuit by noise or other causes
b0	PCAL	-	Logical sum (OR) of b7-b

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Ordering Code

Model **GVS 808** - **F1A** - **3240** - **V** - **F1** - **M04/S** - **CU1** - - -

Scale type, resolution

F1 = 1 μm
F01 = 0.1 μm
F005 = 0.05 μm
F001 = 0.01 μm
A = absolute

Measuring length [mm]

3.240 = max. measuring length

Power supply

V = 5 Vdc

Output signals

F1 = FANUC *ai*

Cable length, cable type

Mnn = length in m
M04 = 4 m (standard)
M30 = 30 m
S = PUR cable

Connector, wiring

CU1 = Fanuc *ai*

FEP (fixed expansion point)

No cod. = central FEP (standard)
SLT = selectable FEP

Special, pressurization

No cod. = standard
SPnn = special nn
PR = pressurized

Without prior notice, the products may be subject to modifications that the Manufacturer reserves to introduce as deemed necessary for their improvement.