ABSOLUTE OPTICAL SCALE GVS 808 T

SSI - BiSS C INTERFACE

TECHNICAL DATASHEET

code **ST02** | project **A70** | release **B**

SSI BiSS INTERFACE

GENERAL FEATURES

- Absolute optical scale with glass measuring support, SSI - BiSS C (unidirectional) interface.
- Resolutions up to 10 nm. Accuracy grade up to ± 2 µm.
- 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.
- Option: 1 Vpp analog signal.

Cod. GVS 808	T
Measuring support - Grating pitch - Linear thermal expansion coefficient	glass scale 20 µm P 8 x 10^{-6} °C^{-1}
Incremental signal	sine wave 1 Vpp (optional)
Resolution 1 Vpp	up to 0.01 µm *
Serial interface	SSI - BiSS C (unidirectional)
Resolution absolute measure	1 - 0.1 - 0.05 - 0.01 µm
Accuracy grade	± 5 µm ** standard version ± 3 µm ** high-accuracy version (± 2 µm for ML up to 640 mm)
Interpolation error (SDE)	± 70 nm ***
Hysteresis	90 nm ***
Measuring length ML in mm	140, 240, 340, 440, 540, 640, 740, 840, 940, 1040, 1140, 1240, 1340, 1440, 1540, 1640, 1740, 1840, 2040, 2240, 2440, 2640, 2840, 3040, 3240$_{MAX}$
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	≤ 2.5 N
Vibration resistance (EN 60068-2-6)	100 m/s^2 [55 ÷ 2000 Hz]
Shock resistance (EN 60068-2-27)	150 m/s^2 [11 ms]
Protection class (EN 60529)	IP 54 standard IP 64 pressurized
Operating temperature	0 °C ÷ 50 °C
Storage temperature	-20 °C ÷ 70 °C
Relative humidity	20% ÷ 80% (not condensed)
Reading block sliding	by ball bearings
Power supply	5 Vdc ± 10%
Current consumption	255 mA$_{MAX}$ (with R = 120 Ω)
Max. cable length	50 m (serial + analog output) 70 m (serial output) ****
Electrical connections	see related table
Connector	on the transducer, with adjustable output
Electrical protections	inversion of polarity and short circuits
Weight	0.55 kg + 2.8 kg/m

* Depending on CNC division factor.
** The declared accuracy grade of ± X µm is referred to a measuring length of 1 m.
*** The error declared is subject to the respect of the alignment tolerances.
**** Ensuring a minimum power supply voltage of 5 V to the transducer.

MECHANICAL CHARACTERISTICS

- Rugged and heavy **PROFILE** of considerable section, made of anodized aluminum. Dimensions 36.7x58.5 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.

ELECTRICAL CHARACTERISTICS

- Connector on the transducer, easily disconnectable in case of need.
- Reading device with an infra-red light emitter and receiving photodiodes.
- Option: A and B 1 Vpp output signals with phase displacement of 90° (electrical).
- Serial protocol SSI - BiSS C (unidirectional).
- CABLE:
  - Shielded twisted pair for analog signals (1 Vpp).
  - PUR cable with low friction coefficient, resistant to oil and suitable for continuous movements.

SERIAL + ANALOG OUTPUT VERSION
- 10-wire shielded cable ø = 6.2 mm, PUR external sheath.
- Conductors section: power supply 0.30 mm^2; signals 0.10 mm^2.

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

SERIAL OUTPUT VERSION
- 6-wire shielded cable ø = 6.2 mm, PUR external sheath.
- Conductors section: power supply 0.35 mm^2; signals 0.25 mm^2.

The cable's bending radius should not be lower than 70 mm.

SIGNALS	CONDUCTOR COLOR
+ V	Brown
0 V	White
CK	Green
$\overline{CK}$	Yellow
D	Pink
$\overline{D}$	Grey
SCH	Shield

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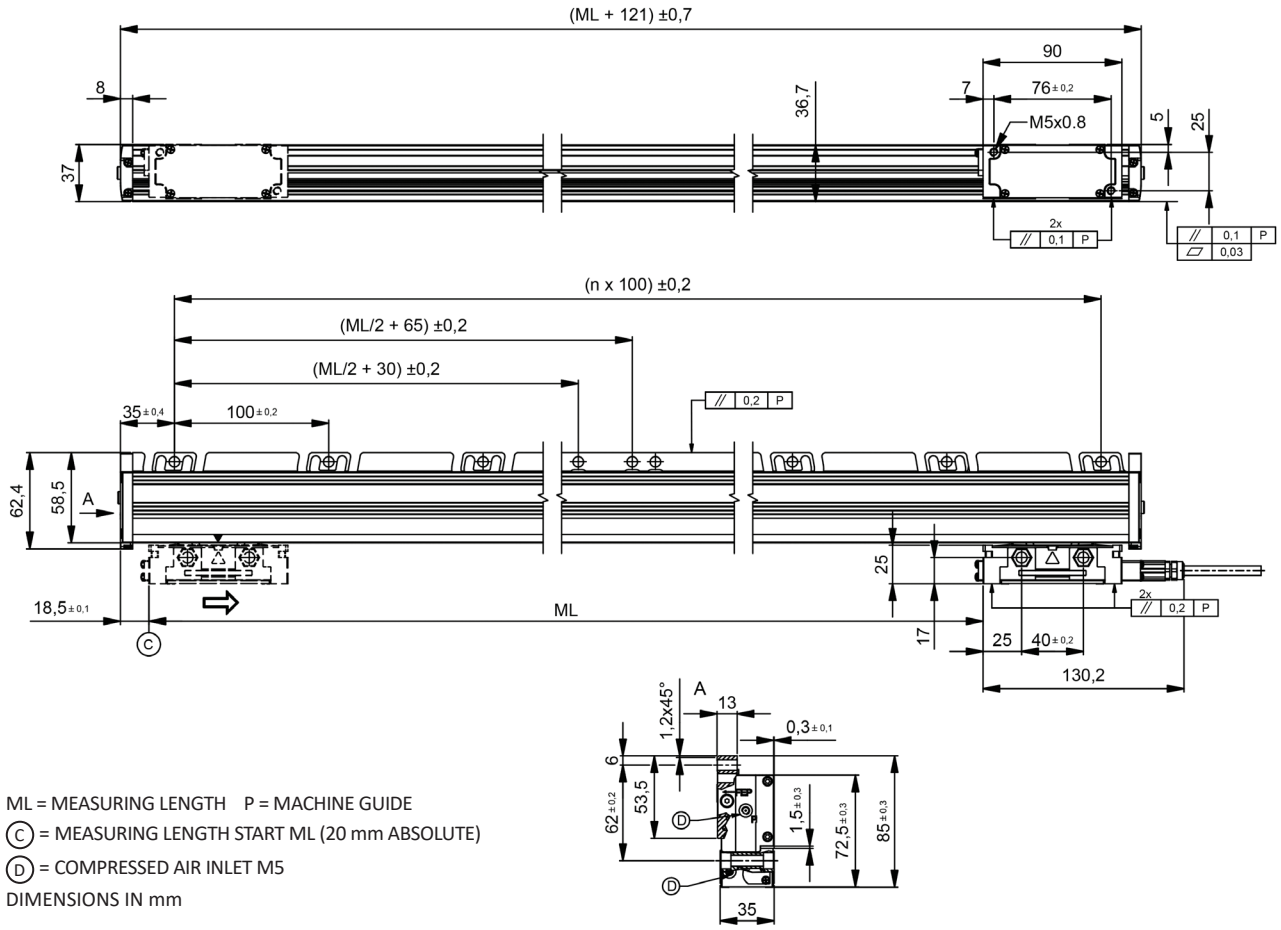
DIMENSIONS



ML = MEASURING LENGTH P = MACHINE GUIDE

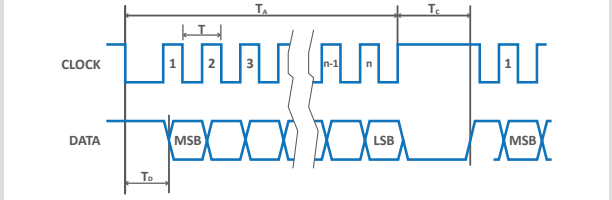
(C) = MEASURING LENGTH START ML (20 mm ABSOLUTE)

(D) = COMPRESSED AIR INLET M5

DIMENSIONS IN mm

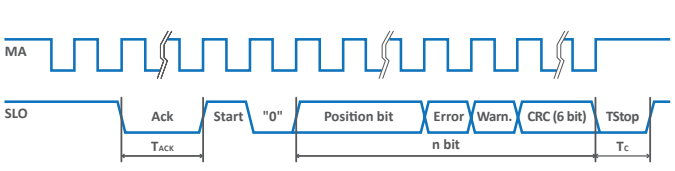
OUTPUT SIGNALS

SSI Version



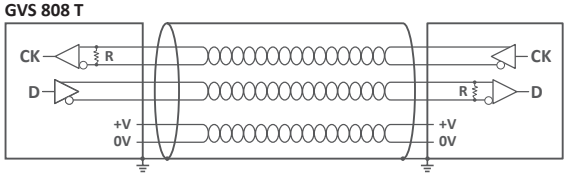
Interface	SSI Binary – Gray
Signals level	EIA RS 422
Clock frequency	0.1 ÷ 1.2 MHz Duty cycle 50% ± 10%
n	26 bit (res. 1 - 0.1 µm) 30 bit (res. 0.05 - 0.01 µm)
T_C	max. 15 µs at 100 KHz
T_D	max. 7 µs

BiSS C (unidirectional) Version



Interface	BiSS C unidirectional
Signals level	EIA RS 485 / RS 422
Clock frequency	0.5 ÷ 5 MHz Duty cycle 50% ± 10%
n	26 + 2 + 6 bit (res. 1 - 0.1 µm) 32 + 2 + 6 bit (res. 0.05 - 0.01 µm)
T_C	max. 20 µs
T_{Ack}	2 Clock

CABLE



In case of cable extension, it is necessary to guarantee:

- the electrical connection between the body of the connectors and the cables shield;
- a minimum power supply voltage of 5 V to the transducer.

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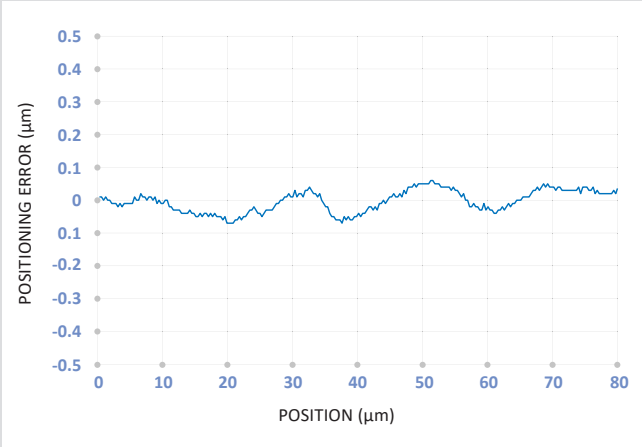
ACCURACY

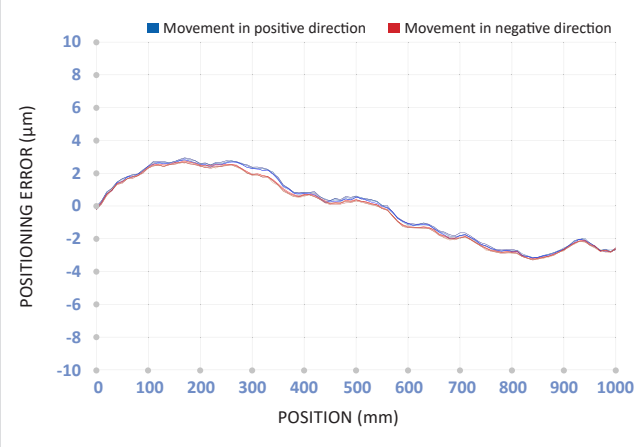
Accuracy graph: deviation between the value measured by the encoder and the value measured by the reference system.

INTERPOLATION - SDE



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

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.

INNOVATIVE SYSTEM FEP

FixedExpansionPoint

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.

ORDERING CODE

Example OPTICAL SCALE **GVS 808 T1A 03240 05V S0 V M04/S CG8 SLT PR**

Model	Scale type, resolution	Measuring length	Power supply	Output signals	Incremental signal	Cable length, cable type	Connector, wiring	FEP (Fixed Expansion Point)	Special, pressurization
GVS 808	T1 = 1 µm T01 = 0.1 µm T005 = 0.05 µm T001 = 0.01 µm A = absolute	Measuring length in mm 03240 = ML_{MAX}	05V = 5 V	S0 = SSI programmable S1 = SSI binary S2 = SSI binary+even parity S3 = SSI binary+odd parity S4 = SSI binary+error S5 = SSI binary+even parity+error S6 = SSI binary+odd parity+error S7 = SSI Gray B1 = BiSS binary	V = + 1 Vpp No cod. = no increm. signal	Mnn = length in m M04 = 4 m (standard) M50 = 50 m S = PUR cable	Cnn = progressive SC = without connector	No cod. = central FEP (standard) SLT = selectable FEP	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.

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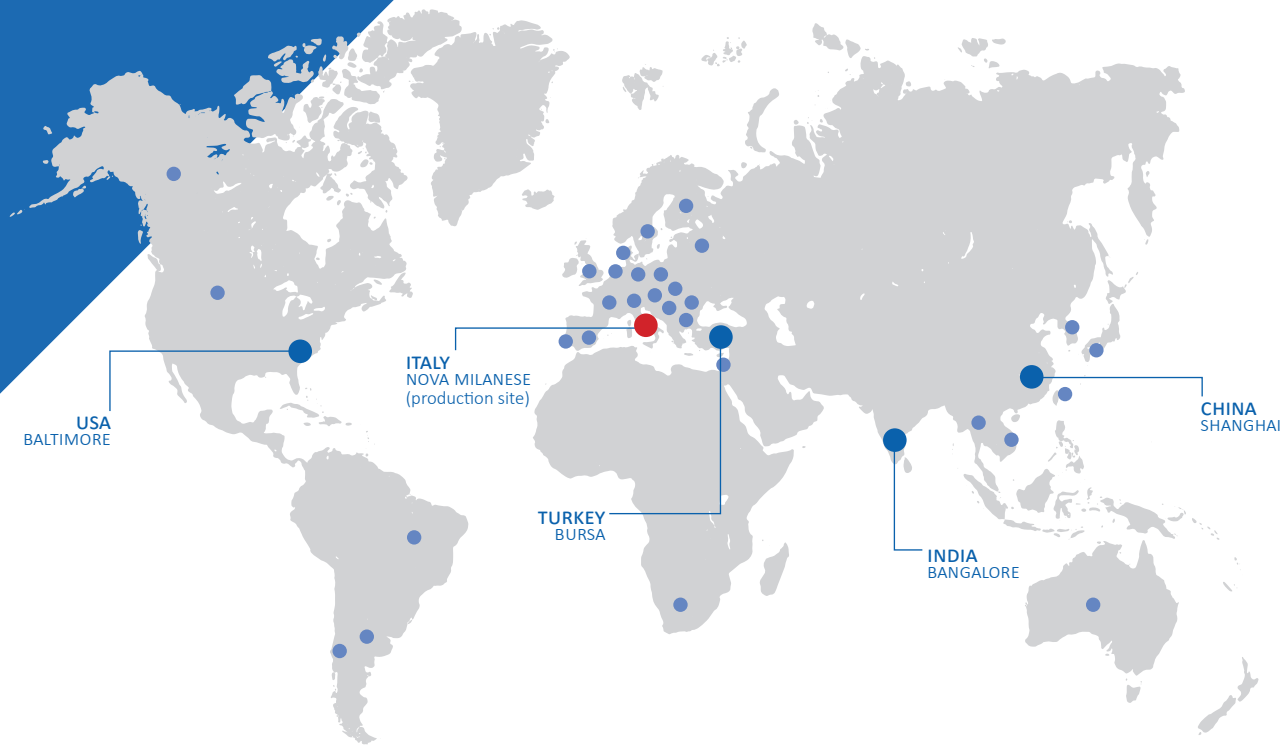

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QUALITY SYSTEM CERTIFICATION DNV ISO 9001

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