ABSOLUTE OPTICAL SCALE GVS 508 D

DRIVE-CLiQ INTERFACE

TECHNICAL DATASHEET 1/4

code **ST02** | project **A82** | release **A**

DRIVE-CLiQ

GENERAL FEATURES

- Absolute optical scale with glass measuring support.
- DRIVE-CLiQ serial interface, for a direct connection to Siemens CNCs.
- Resolutions up to 10 nm. Accuracy grade up to ± 2 µm.
- Central fixed expansion point (**FEP**). On request positioned on the right (**RT**) or on the left (**LT**), for a linear expansion consistent with the type of application.
- Direct reading of the absolute measure.
- Small size, to allow installation in narrow spaces.
- Connector on the transducer.
- Pressurization from both sides of the scale or from the transducer.

Cod. GVS 508	D
Measuring support - Grating pitch - Linear thermal expansion coefficient	glass scale 20 µm P 8 x 10^{-6} °C^{-1}
Serial interface	Siemens DRIVE-CLiQ
Resolution absolute measure	0.1 - 0.01 µm
Accuracy grade	± 5 µm * standard version ± 3 µm * high-accuracy version (± 2 µm for ML up to 670 mm)
Interpolation error (SDE)	± 50 nm **
Hysteresis	90 nm **
Measuring length ML in mm	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_{MAX} ***
Max. traversing speed	180 m/min
Max. acceleration	50 m/s² in measuring direction
Required moving force	⍰ 2.5 N
Vibration resistance (EN 60068-2-6)	100 m/s² [55 ÷ 2000 Hz]
Shock resistance (EN 60068-2-27)	150 m/s² [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 ◎
Connector	on the transducer
Electrical protections	inversion of polarity and short circuits
Weight	225 g + 610 g/m

* 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.
*** For measuring lengths higher than 1340 mm it is necessary to use the supporting bar or the intermediate fixing blocks (optional for lower measuring lengths).

MECHANICAL CHARACTERISTICS

- **PROFILE** made of anodized aluminum. Dimensions 32.2x18 mm.
- **SPRING SYSTEM** for misalignment compensation and self-correction of mechanical hysteresis.
- Non-extendible **SEALING LIPS**, along the sliding side of the reader head.
- 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).
- **SUPPORTING BAR** or **INTERMEDIATE FIXING BLOCKS** for measuring lengths higher than 1340 mm (optional for lower measuring lengths).
- **FULL POSSIBILITY** to disassemble and reassemble it.
- Possibility of direct **SERVICE**.

ELECTRICAL CHARACTERISTICS

- Connector on the transducer, easily disconnectable in case of need.
- Reading device with an infra-red light emitter and receiving photodiodes.
- Serial protocol Siemens DRIVE-CLiQ.
- 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, 0.5 m standard length.
  - M12 8 Pin connector.

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

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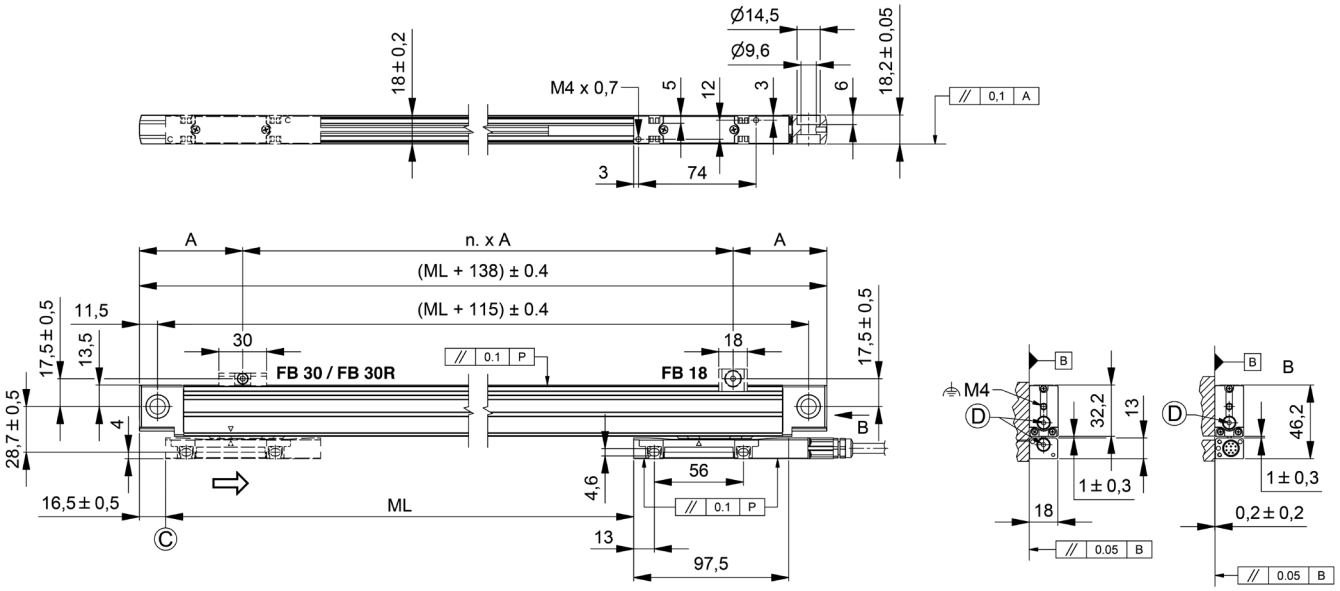
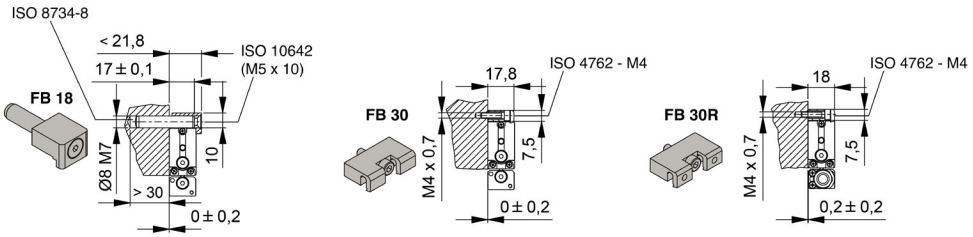
DIMENSIONS

STANDARD mounting

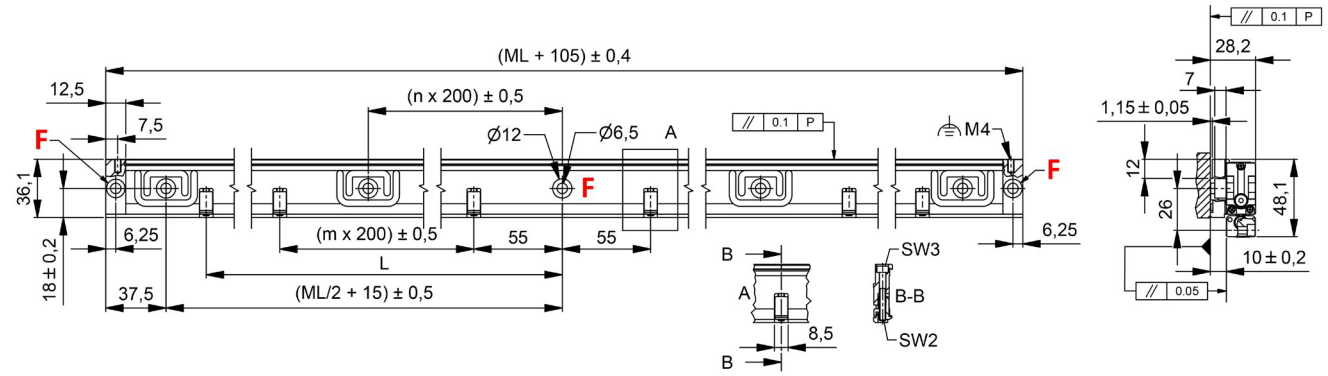


The intermediate fixing blocks FB 18 or FB 30 secure the scale to the machine and allow for its correct alignment.
If the scale is mounted with the cable exit on the left (visible rear side), it is necessary to use the FB 30R blocks.

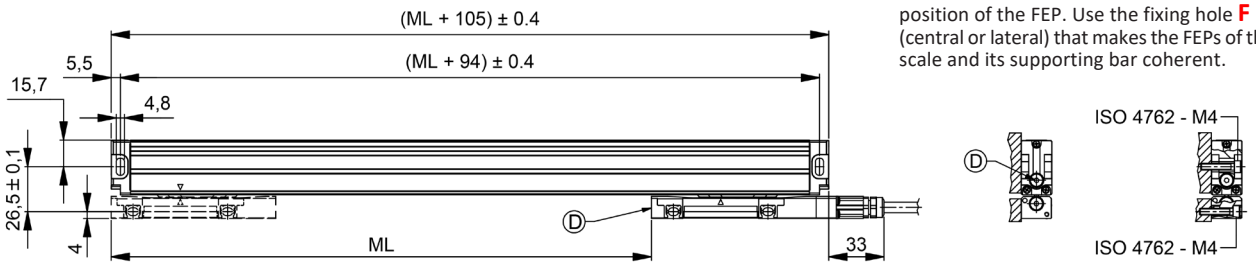


ML (mm)	N.	A
Up to 570	0	---
From 620 to 1240	2	(ML+138)/3
From 1340 to 1740	3	(ML+138)/4
From 1840 to 2040	4	(ML+138)/5

Mounting with SUPPORTING BAR



The supporting bar fixing determines the position of the FEP. Use the fixing hole **F** (central or lateral) that makes the FEPs of the scale and its supporting bar coherent.



ML = MEASURING LENGTH P = MACHINE GUIDE MEASURING LENGTH START ML (20 mm ABSOLUTE) COMPRESSED AIR INLET M5 DIMENSIONS IN mm

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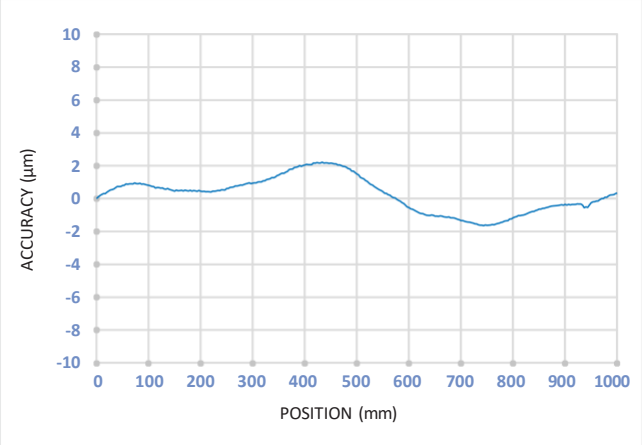
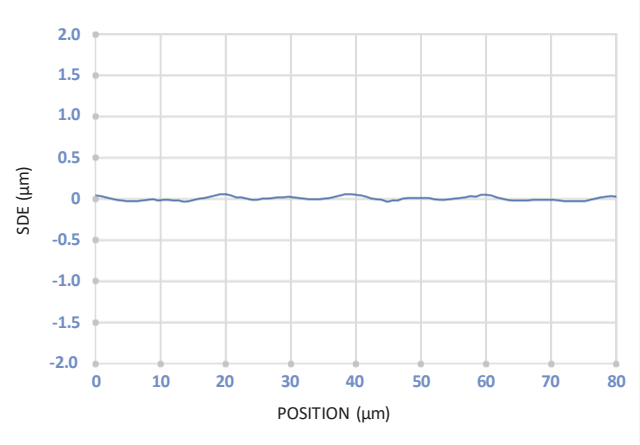
ACCURACY



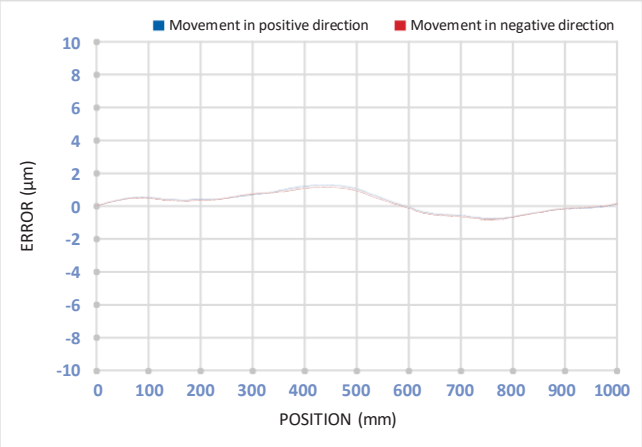
Accuracy graph: deviation between the value measured by the encoder and the value measured by the reference system.

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.

INNOVATIV
SYSTE
FE
FixedExpansionPoint

GVS 508 is supplied with a Fixed Expansion Point (FEP) positioned in the middle (standard), 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. In case of a lateral FEP, the scale is provided with a special elastic end cap on the opposite side, that leaves the scale free to expand in the predetermined correct direction. Also in case of mounting with supporting bar, it is possible to determine the central or lateral position of the FEP through its specifically-designed elastic fixing.

ORDERING CODE

Example OPTICAL SCALE **GVS 508 D01A 02040 V D1 M0.5/S LT PR**

Model	Scale type, resolution	Measuring length	End cap *	Power supply	Output signals	Cable length, cable type	FEP (fixed expansion point)	Special, pressurization
GVS 508	D01 = 0.1 µm D001 = 0.01 µm A = absolute	Measuring length in mm 02040 = ML_{MAX}	No cod. = LP end cap (28 mm) SP = SP end cap (11.5 mm)	V	D1 = DRIVE-CLiQ	Mnn = length in m M0.5 = 0.5 m S = PUR cable	No cod. = central FEP (standard) RT = right FEP LT = left FEP	No cod. = standard SPnn = special nn PR = pressurized

* GVS 508 scales are supplied as standard with LP (large profile) end caps, but they can be requested with SP (small profile) end caps based on the customer's needs. In case of installation with supporting bar, it is necessary to use SP end caps.

ORDERING CODE

Example SUPPORTING BAR **SB 50 02040**

Model	GVS 508 measuring length
SB 50	Measuring length in mm 02040 = ML_{MAX}

Example INTERMEDIATE FIXING BLOCKS **FB 30**

Model
FB 18
FB 30
FB 30R

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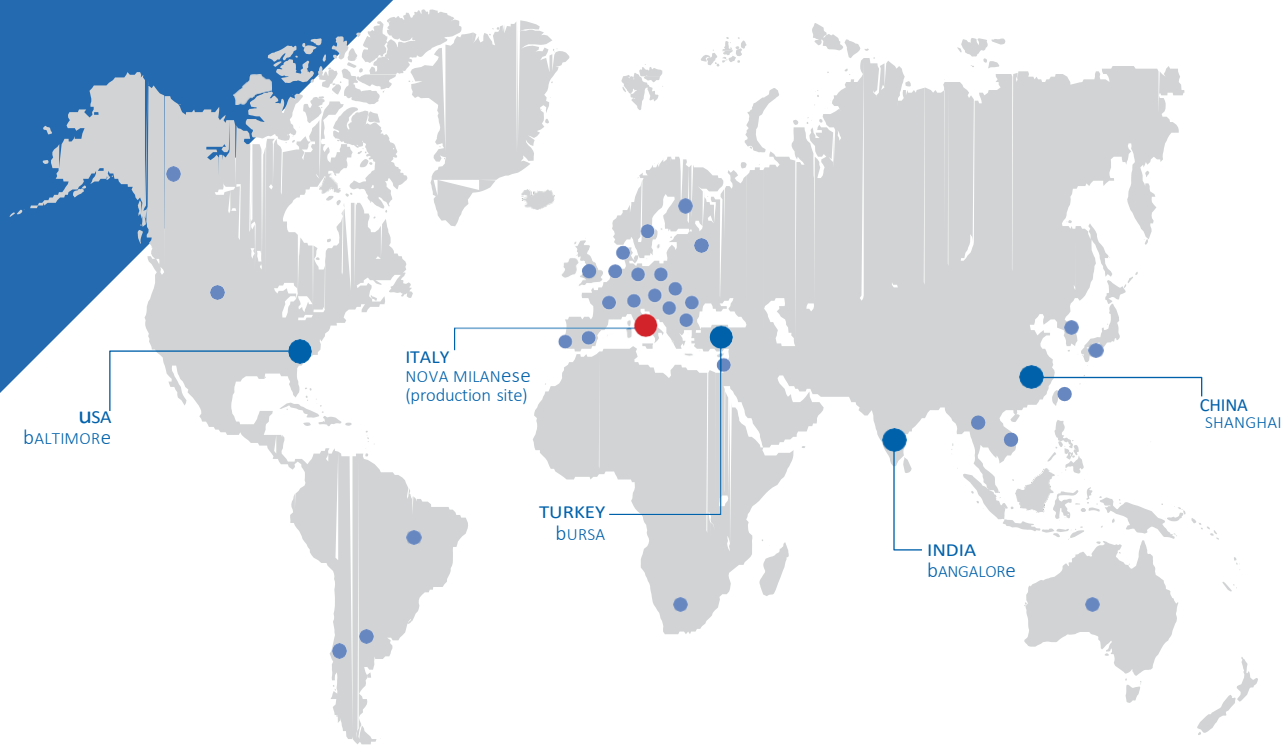

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QUALITY SYSTEM CERTIFICATION DNV ISO 9001

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