

Code <b>ST06</b>	Project <b>A50-A</b>	Release <b>E</b>	<b>TECHNICAL DATASHEET</b>
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## ABSOLUTE OPTICAL SCALE GVS 204

### GENERAL FEATURES

- Optical scale with glass measuring support and direct reading of the absolute position. Particularly suitable for synchronized press brakes.
- High-speed SSI - BiSS C (unidirectional) serial interface.
- Reader head guided by a self-aligned and self-cleaning sliding carriage with spring system.
- Resolutions up to 0.1  $\mu\text{m}$ . Accuracy grade up to  $\pm 1 \mu\text{m}$ .
- Adjustable cable output.
- **SYMMETRIC** mechanical mounting.
- Various possibilities of application, with double-effect joint or steel wire.
- Option: 1 Vpp analog signal or Line Driver digital signal.



### MECHANICAL AND ELECTRICAL CHARACTERISTICS

MECHANICAL	Cod. GVS	204
<ul style="list-style-type: none"> <li>• Rugged and heavy PROFILE, made of anodized aluminium. Dimensions 55x28 mm.</li> <li>• Elastic COUPLING for misalignment compensation and self-correction of mechanical hysteresis. Backlash error <math>&lt;0.2 \mu\text{m}</math>.</li> <li>• SEALING LIPS for the protection of the grating, made of special elastomer resistant to oil and wearing. Special self-blocking profile.</li> <li>• READER HEAD, consisting of tie rod and reading block, with fully protected place for electronic boards.</li> <li>• CARRIAGE guided by ball bearings with gothic arch profile sliding on tempered and grinded guides, to guarantee the system accuracy and the absence of wearing.</li> <li>• Die-cast TIE ROD, with nickel-plating surface treatment.</li> <li>• Absolute GLASS GRATING placed in the scale housing.</li> <li>• Elastomeric GASKETS which allow to reproduce the full protection in mechanical joints (in case of disassembling).</li> <li>• Adjustable CABLE output.</li> <li>• Various possibilities of application, with double-effect joint or steel wire. GV-PB adapter guarantees the compatibility with scale mod. PBS-HR.</li> <li>• Full possibility to disassemble and reassemble the scale.</li> <li>• Possibility of direct service.</li> </ul>	<b>Measuring support</b>  Grating pitch  Linear thermal expansion coefficient	glass scale  20 $\mu\text{m}$   $8 \times 10^{-6} \text{ } ^\circ\text{C}^{-1}$
	<b>Incremental signal (optional)</b>	sine wave 1 Vpp or TTL Line Driver
	<b>Resolution 1 Vpp</b>	up to 0.1 $\mu\text{m}$ *
	<b>Resolution Line Driver</b>	5 $\mu\text{m}$
	<b>Signal period</b>	20 $\mu\text{m}$
	<b>Serial interface</b>	SSI - BiSS C (unidirectional)
	<b>Resolution absolute measure</b>	1 $\mu\text{m}$ - 0.1 $\mu\text{m}$
	<b>Accuracy grade</b>	$\pm 2.5 \mu\text{m}$ ** standard version $\pm 1 \mu\text{m}$ ** high-accuracy version
	<b>Measuring length ML in mm</b>	170, 220, 270, 320, 370, 420, 470, 520, 570, 620, 720, ...
	<b>Max. traversing speed</b>	60 m/min
	<b>Max. acceleration</b>	20 $\text{m/s}^2$
	<b>Required moving force</b>	$\leq 1.5 \text{ N}$
	<b>Vibration resistance (EN 60068-2-6)</b>	80 $\text{m/s}^2$ [55 ÷ 2000 Hz]
	<b>Shock resistance (EN 60068-2-27)</b>	150 $\text{m/s}^2$ [11 ms]
	<b>Protection class (EN 60529)</b>	IP 54 standard      IP 64 pressurized
	<b>Operating temperature</b>	0 $^\circ\text{C}$ ÷ 50 $^\circ\text{C}$
	<b>Storage temperature</b>	-20 $^\circ\text{C}$ ÷ 70 $^\circ\text{C}$
	<b>Relative humidity</b>	20% ÷ 80% (not condensed)
	<b>Reading block sliding</b>	by ball bearings $\odot$
	<b>Power supply</b>	5 Vdc $\pm 5\%$ or      10 ÷ 28 Vdc
	<b>Current consumption (with R = 120 <math>\Omega</math>)</b>	350 $\text{mA}_{\text{MAX}}$ 180 $\text{mA}_{\text{TYP}}$ 5 Vdc 70 $\text{mA}_{\text{MAX}}$ 35 $\text{mA}_{\text{TYP}}$ 10 ÷ 28 Vdc
	<b>Max. cable length</b>	20 m ***
	<b>Electrical connections</b>	see related table
	<b>Electrical protections</b>	inversion of polarity and short circuits
	<b>Weight</b>	900 g + 1850 g/m

#### MECHANICAL

- Rugged and heavy PROFILE, made of anodized aluminium. Dimensions 55x28 mm.
- Elastic COUPLING for misalignment compensation and self-correction of mechanical hysteresis. Backlash error  $<0.2 \mu\text{m}$ .
- SEALING LIPS for the protection of the grating, made of special elastomer resistant to oil and wearing. Special self-blocking profile.
- READER HEAD, consisting of tie rod and reading block, with fully protected place for electronic boards.
- CARRIAGE guided by ball bearings with gothic arch profile sliding on tempered and grinded guides, to guarantee the system accuracy and the absence of wearing.
- Die-cast TIE ROD, with nickel-plating 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).
- Adjustable CABLE output.
- Various possibilities of application, with double-effect joint or steel wire. GV-PB adapter guarantees the compatibility with scale mod. PBS-HR.
- Full possibility to disassemble and reassemble the scale.
- Possibility of direct service.

#### ELECTRICAL

- Reading device with an infra-red light emitter and receiving photodiodes.
- Option: A and B (analog 1 Vpp or digital Line Driver) output signals with phase displacement of 90° (electrical).
- Serial protocol SSI - BiSS C (unidirectional).
- CABLE:
  - Shielded twisted pair for digital signals (SSI - BiSS).
  - The cable is suitable for continuous movements.

#### SERIAL OUTPUT VERSION

- 6-wire shielded cable  $\varnothing = 7 \text{ mm}$ , PVC external sheath, with low friction coefficient, oil resistant.
- Conductors section: power supply 0.25  $\text{mm}^2$ ; signals 0.25  $\text{mm}^2$ .
- The cable's bending radius should not be lower than 70 mm.**

#### ANALOG or DIGITAL + SERIAL OUTPUT VERSION

- 10-wire shielded cable  $\varnothing = 7.1 \text{ mm}$ , PUR external sheath.
- Conductors section: power supply 0.35  $\text{mm}^2$ ; signals 0.10  $\text{mm}^2$ .
- The cable's bending radius should not be lower than 80 mm.**

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

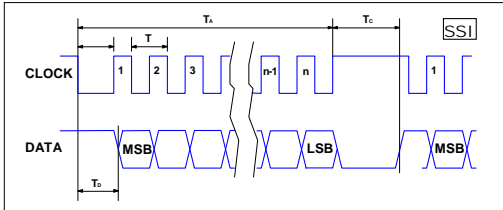
\* Depending on CNC division factor.

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

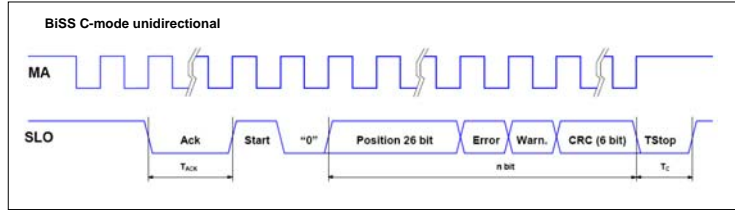
\*\*\* Ensuring the required power supply voltage to the transducer, the maximum cable length can be extended to 50 m.

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### OUTPUT SIGNALS

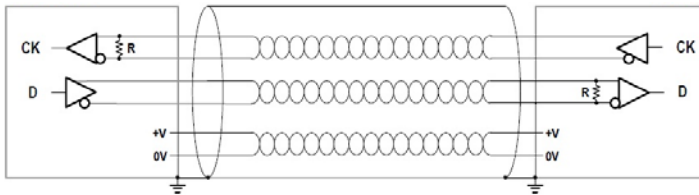
**SSI Version**


Interface	SSI Binary - Gray
Signals level	EIA RS 422
Clock frequency	0.1 ÷ 1.2 MHz
n	26 bit
T <sub>c</sub>	max. 25 µs
T <sub>D</sub>	max. 7 µs

**BiSS C (unidirectional) Version**


Interface	BiSS C unidirectional
Signals level	EIA RS 485 / RS 422
Clock frequency	0.1 ÷ 8 MHz
n	26 + 2 + 6 bit
T <sub>c</sub>	8 µs
T <sub>ACK</sub>	max. 22 µs

### CABLE

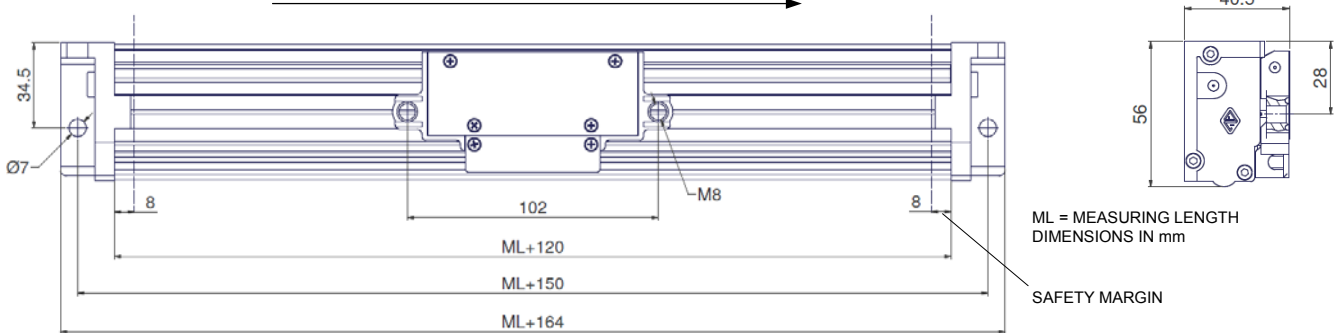
**Serial output**
**GVS 204**


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

- the electrical connection between the body of the connectors and the cables shield;
- the required power supply to the transducer.

### DIMENSIONS

POSITIVE COUNTING DIRECTION →



GV-PB adapter provided for the interchangeability with scale mod. PBS-HR.

### ORDERING CODE

MODEL	RESOLUT.	MEASURING LENGTH	POWER SUPPLY	OUTPUT SIGNALS	INCREMENTAL SIGNAL	CABLE LENGTH, CABLE TYPE	CONNECTOR	SPECIAL PRESSURIZATION
<b>GVS 204</b>	<b>T1</b>	<b>0270</b>	<b>05V</b>	<b>S0</b>	<b>V</b>	<b>M0.5 / S</b>	<b>SC</b>	<b>PR</b>

**T1** = 1 µm  
**T01** = 0.1 µm  
**Length in mm**  
**0270** = 270 mm  
**05V** = 5 Vdc  
**1028V** = 10 ÷ 28 Vdc  
**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  
**T** = Line Driver  
**No cod.** = no incremental signal  
**Mnn** = length in m  
**M0.5** = 0.5 m (standard)  
**50** = 50 m  
**R** = 6 wires (only serial)  
**S** = 10 wires (serial+analog or digital)  
**Cnn** = progressive  
**SC** = without connector  
**No cod.** = standard  
**SPnn** = special nn  
**PR** = pressurized

Example **ABSOLUTE OPTICAL SCALE GVS 204 T1 0270 05V S0 V M0.5/S SC PR**