

GVS

200 - 202 S - 215

Installation Manual Self-aligned Scales



 **GIVI MISURE**

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GVS 2xx

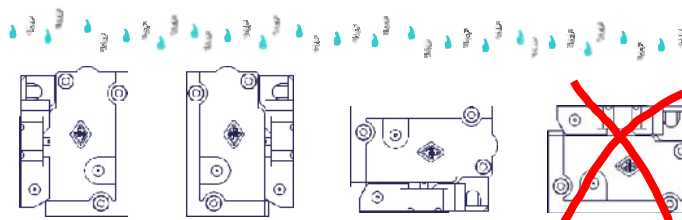
1 PRELIMINARY REMARKS AND WARNINGS

GVS 2xx scales are generally used on synchronized press brakes and mounted in vertical position. If the scales are used in other applications and mounted horizontally (longitudinal or transversal), please follow the indications provided in this manual.

The scale should be mounted to be as accessible and protected and as close to the machine's slide guides as practically possible.

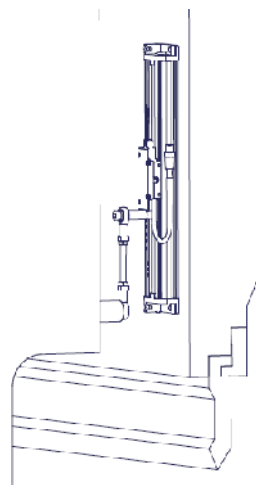
Mount the scale with the sealing lips facing down or away from the machining area (see recommended mounting positions).

The use of a sheet metal cover, especially for particularly exposed axes, is recommended to prevent any damage from falling tools or material and from infiltration of oils or fluids.



/ RECOMMENDED MOUNTING POSITIONS

Any kind of lever arm must be avoided. A proper joint orientation will prevent any scale damaging, even in case of anomalous descent of the punch-holder.



RECOMMENDED JOINT ORIENTATION

Avoid supporting surface painting and check their planarity.

To avoid and prevent contact of cable with any protrusion, the reader head should remain stationary and the scale body should be moved.

Spacer blocks or supporting arms should be adequately sized and made rigid to exclude any flexion or vibration that could compromise the scale's accuracy.

Make connections when power supply is switched off and batteries (when present) are excluded as well.

/ WARNING!

Do not touch the contacts of the cable's connector in order to avoid electrostatic discharges (ESD) on the device.



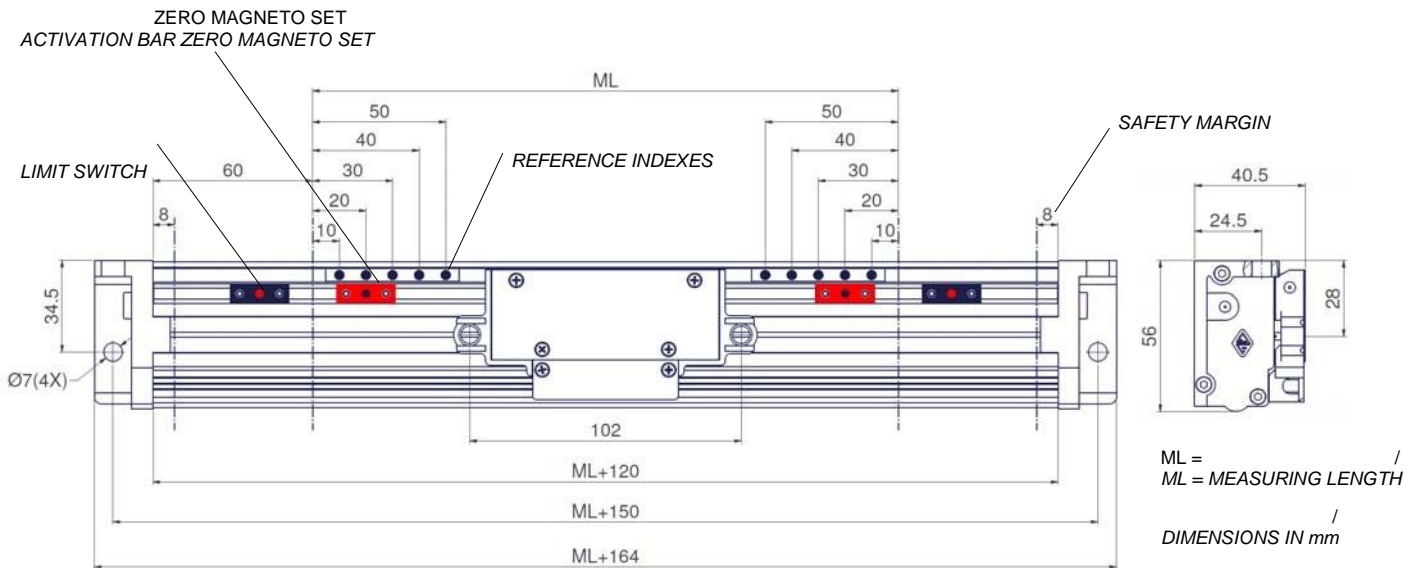
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2 INSTALLATION

(DIN 912).
TCEI M8x20
M8x10.

TCEI M6x20
TCEI

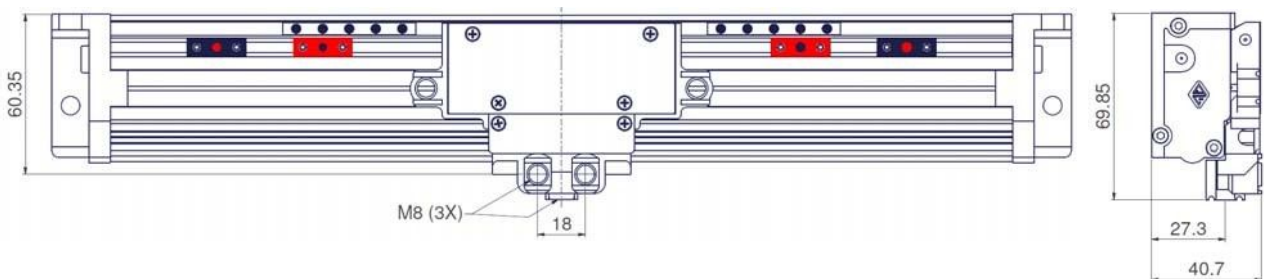
Fix the two scale ends with screws TCEI M6x20 (DIN 912).
Fix the transducer to the double-effect joint with screws M8x20, or to the steel wire with screws TCEI M8x10.
Make sure the carriage does not hit the end caps during the complete movement (safety margin).
Place the cable and manually cover the entire measuring length to make sure that both the scale and the cable are able to move without interferences.



GVS 2xx

GV-PB
PBS-HR.

GV-PB adapter is provided with each scale GVS 2xx, to guarantee the mechanical compatibility with PBS-HR scale.

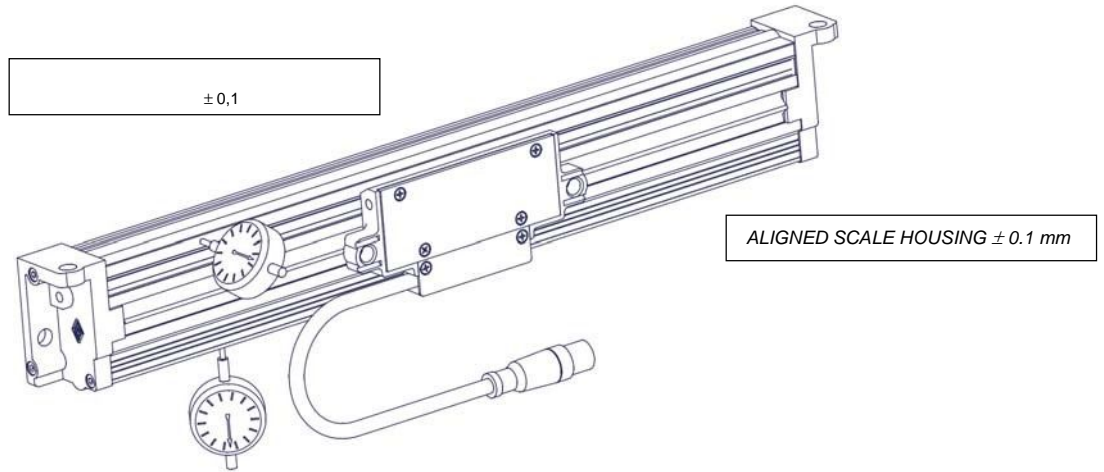


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3 FINAL OPERATIONS AND PRECAUTIONS

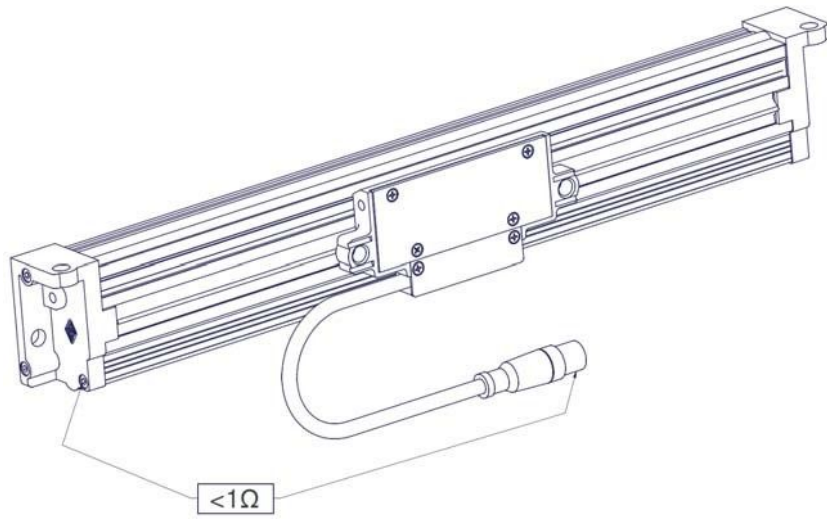
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Use a dial gauge to check the correct alignment of the scale housing and correct any misalignment.



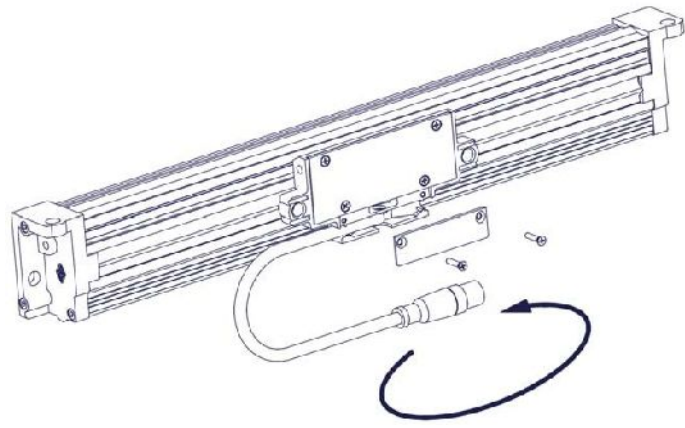
(< 1 Ω).

Check the correct connection and the continuity of the shield which has to be connected to a grounding node with very low impedance (< 1 Ω).



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The output of the cable from the transducer can be easily modified. To this purpose, loosen the screws that block the cover (see the picture below), modify the cable orientation and tighten again the screws.



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GVS 200, GVS 202 S GVS 215

GVS 2xx.

4 PRESSURIZATION

GVS 200, GVS 202 S and GVS 215 scales offer a very good protection class, generally sufficient for press brakes applications.

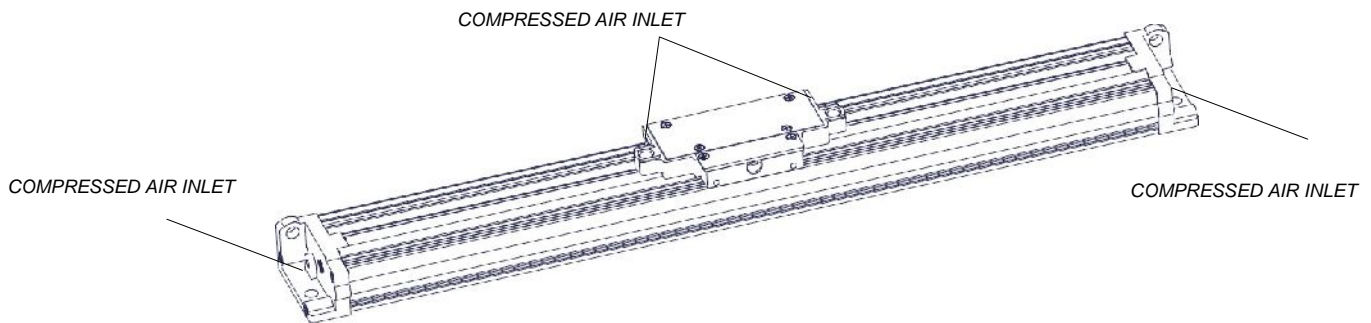
If the scales are used in particularly aggressive environments, characterized by dusts, fluids, etc., it is possible to further improve their protection class, through their pressurization.

All GVS 2xx scales, in fact, are predisposed to pressurization, through the air inlet holes positioned on both end caps, and on both sides of the transducer.

The protection classes that can be obtained are the following ones:

GVS 200 / 202 S -	IP 54	IP 64
GVS 215 -	IP 64	IP 67

	STANDARD	PRESSURIZED
GVS 200 / 202 S - OPTICAL	IP 54	IP 64
GVS 215 - MAGNETIC	IP 64	IP 67



Pressurization needs to be always active. If this is not possible, wait at least 30 minutes from the last machining, before interrupting the air flow.

The necessary compressed air flow varies between **6** and **9 normal l/min** per each scale.

Depending on the length of the measuring system, the recommended pressures are described in the table below.

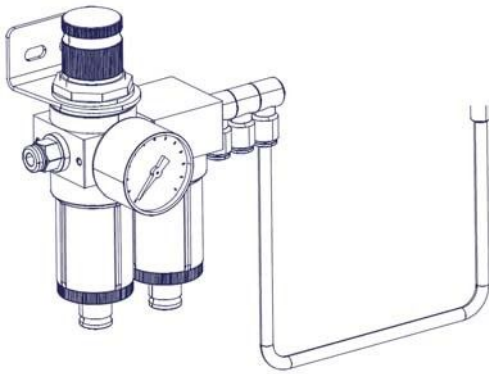
RECOMMENDED PRESSURES ACCORDING TO SCALE LENGTH		
0 ÷ 1000	1000 ÷ 2000	> 2000
0.5 ÷ 0.6	0.6 ÷ 0.7	0.8 ÷ 0.9

The compressed air introduced in the measuring system must be cleaned and comply with the following quality classes as per ISO 8573-1.

- Solid contaminants: Class 1 solid particles size $\leq 0.1 \mu\text{m}$
- Pressure dew point: Class 4 $\leq +3 \text{ }^\circ\text{C}$
- Oil content: Class 1 $\leq 0.01 \text{ mg/m}^3$

Moreover, the pneumatic circuit has to be endowed with a drying system and controlling devices (sense pneumatic pressure, etc.). The use of a sensor for the air flow control at the scale inlet is recommended.

Replace the filter cartridges when necessary; interrupt pressurization before proceeding with the replacement.



GVI MISURE

GVI MISURE can supply compressed air units that respect the required air quality classes, allowing the connection of up to three optical scales.

How to prevent condensate, when pressurization is not active:

- Clean frequently the machine guides close to the scale, avoiding the use of compressed air.
- Protect the scale against coolants as much as possible, avoiding the stagnation of liquids in the machine's collecting tank.
- Protect, if possible, the scale from the direct contact with vapours developed during the working cycle (with upper covers closed on the side or lower screens to prevent the vapour from laying on the sealing lips).

Possible causes of an ineffective pressurization and remedies:

- Inadequate filtering and air quality. Respect the instructions provided.
- Insufficient air pressure. Respect the pressure values suggested by the Manufacturer.
- Filters blocked by liquids or dust. Use self-draining filters or regularly empty the glasses and replace the filter cartridges.
- Broken, obstructed or blocked air pipes. Verify their integrity.
- Damaged sealing lips. Replace them and verify the respect of the scale's alignment tolerances.
- Deactivation of pressurization during machining. Wait at least 30 minutes from the last machining, before disconnecting pressurization. Make sure that, without pressurization, the scale is not immersed in stagnating liquids.
- Presence of liquid jets that hit the scale directly or indirectly, with a higher pressure if compared to the pressurization one. Use covers to adequately protect the scale from such jets.

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GVS 200, GVS 202 S GVS 215
 $\varnothing = 6,1$

- : 0,35²
- : 0,14²

0,35² 0,14²

5 ELECTRICAL CONNECTIONS

8- GVS 200, GVS 202 S and GVS 215 scales are supplied with a 8-wire shielded cable, $\varnothing = 6.1$ mm, PUR external sheath.

- Conductors section:
- supply: 0.35 mm²
 - signals: 0.14 mm²

If **cable extensions** are needed, it is necessary to use shielded cables with a section of at least 0.35 mm² for power supply and mm² for signals.

Moreover, it is necessary to guarantee:

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

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NOTE

The cable's bending radius should not be lower than 80 mm. The following output signals are available:

LINE DRIVER	PUSH-PULL	
+ V	+ V	
0 V	0 V	
A	B	
\bar{A}	NC	
B	A	
\bar{B}	NC	
I_0	I_0	
\bar{I}_0	NC	
SCH	SCH	

LINE DRIVER	PUSH-PULL	CONDUCTOR COLOR
+ V	+ V	Red
0 V	0 V	Blue
A	B	Green
\bar{A}	NC	Orange
B	A	White
\bar{B}	NC	Light-blue
I_0	I_0	Brown
\bar{I}_0	NC	Yellow
SCH	SCH	Shield

LINE DRIVER.

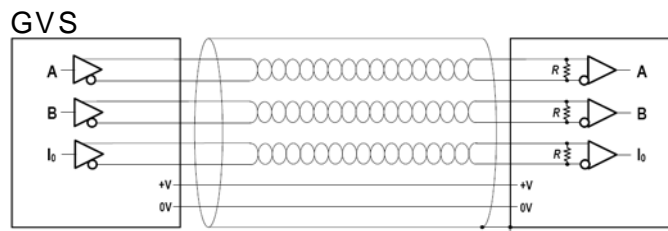
LINE

DRIVER,

200

The scales are set up with a LINE DRIVER output. If the device in use cannot read LINE DRIVER signals, it is necessary to isolate the unused wires one by one in order to avoid short circuits.

Make sure a minimum spacing of 200 mm exists between the cable and any device that may cause electromagnetic interferences (e.g. motors, solenoid valves, inverters). If interferences are detected, act directly on the source of disturb using EMC filters.



0,5-

The scale is supplied with a standard 0,5 m-long cable, suitable to continuous movements; longer or different cables are available on request.

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6 REFERENCE INDEX SELECTION

GVS 2xx (10

E) GVS 2xx scales, in E version, have reference indexes placed at a constant step of 10 mm, along the entire measuring length.

Two labels placed on the scale housing shows the positions of the most used reference indexes, in the press brakes application.

The activation bar (red plastic bar) identifies the position of the activated index. The bar is kept in its position by two fixing dowels that prevent it from sliding along the scale housing.

To change the position of the activated indexes, proceed as follows:

- loosen both fixing dowels;
- move the activation bar and position it in correspondence to the desired index position;
- tighten both fixing dowels.

/ WARNING!

Do not place any external magnet close to the scale, to avoid the accidental activation of reference indexes in undesired positions.

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GVS 2xx

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GVS 2xx

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7 OPTION: LIMIT SWITCH

If GVS 2xx scales are ordered with the Limit Switch option, we recommend to read the dedicated manual.

8 USE AND MAINTENANCE

GVS 2xx scales do not require any particular maintenance and the correct use guarantees quality and good operation.

During machining, remove any accumulation of swarfs that does not allow the free sliding of the movable parts.


Any discrepancy should be reported to the Manufacturer for repairing or replacement of defective parts.

After maintenance, verify the mounting tolerances and adjust any eventual misalignment.

9 TECHNICAL FEATURES

GLASS GRATING


GVS 200 – OPTICAL SCALE GVS 200

Cod. GVS	200
	20  $8 \times 10^{-6} \text{ }^\circ\text{C}^{-1}$
(I ₀)	E = (10) C =
	10 - 5 - 1 - 0,5 - 0,1
	$\pm 2,5$ ± 1
ML	170, 220, 270, 320, 370, 420, 470, 520, 570, 620, 720, ..., 3240 _{MAX}
	120 / *
	30 / ²
	$\leq 1,5 \text{ N}$
(EN 60068-2-6)	100 / ² [55 ÷ 2000]
(EN 60068-2-27)	150 / ² [11 ms]
(EN 60529)	IP 54 IP 64 **
	0 °C ÷ 50 °C (-10 °C ÷ 60 °C)
	-20 °C ÷ 80 °C
	20% ÷ 80% ()
	⊙
	5 Vdc ± 5% 10 ÷ 28 Vdc ± 5%
	140 mA _{MAX} (R= 120 Ω) 5 Vdc 100 mA _{MAX} (R= 1200 Ω) 10 ÷ 28 Vdc
A, B I ₀	LINE DRIVER PUSH-PULL
	25 ***
	900 + 1850 /

* With a 0,5 μm resolution, the maximum traversing speed becomes 60 m/min.
0,1 μm resolution, the maximum traversing speed becomes 40 m/min.

** Pressurization set up on request.

*** Ensuring the required power supply voltage to the transducer, the maximum cable length can be extended to 100 m.

Cod. GVS	200
Measuring support	glass grating 
Grating pitch	20 μm
Linear thermal expansion coefficient	$8 \times 10^{-6} \text{ }^\circ\text{C}^{-1}$
Reference indexes (I ₀)	E = selectable (every 10 mm) C = coded distance
Resolution	10 - 5 - 1 - 0,5 - 0,1 μm
Accuracy grade	$\pm 2,5 \text{ } \mu\text{m}$ standard version $\pm 1 \text{ } \mu\text{m}$ high-accuracy version
Measuring length ML in mm	170, 220, 270, 320, 370, 420, 470, 520, 570, 620, 720, ..., 3240 _{MAX}
Max. traversing speed	120 m/min *
Max. acceleration	30 m/s ²
Required moving force	$\leq 1,5 \text{ N}$
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 (-10 °C ÷ 60 °C on request)
Storage temperature	-20 °C ÷ 80 °C
Relative humidity	20% ÷ 80% (not condensed)
Reading block sliding	by ball bearings ⊙
Power supply	5 Vdc ± 5% or 10 ÷ 28 Vdc ± 5%
Current consumption	140 mA _{MAX} (with R= 120 Ω) 5 Vdc 100 mA _{MAX} (with R= 1200 Ω) 10 ÷ 28 Vdc
A, B and I ₀ output signals	LINE DRIVER PUSH-PULL
Max. cable length	25 m ***
Electrical connections	see related table
Electrical protections	inversion of polarity and short circuits
Weight	900 g + 1850 g/m


* With a 0.5 μm resolution, the maximum traversing speed becomes 60 m/min.
With a 0.1 μm resolution, the maximum traversing speed becomes 40 m/min.


** Pressurization set up on request.

*** Ensuring the required power supply voltage to the transducer, the maximum cable length can be extended to 100 m.

GVS 202 S – OPTICAL SCALE GVS 202 S

STEEL GRATING


Cod. GVS	202 S
	250  $10,6 \times 10^{-6} \text{ } ^\circ\text{C}^{-1}$
(b)	E = (10)
	10 - 5 - 1 - 0,5 - 0,1
	$\pm 2,5$ ± 1
ML	70, 120, 170, 220, 270, 320, 370, 420, 30000
	120 / *
	30 / ²
	$\leq 1,5 \text{ N}$
(EN 60068-2-6)	100 / ² [55 \div 2000]
(EN 60068-2-27)	150 / ² [11 ms]
(EN 60529)	IP 54 IP 64 **
	0 $^\circ\text{C} \div 50 \text{ } ^\circ\text{C}$ (-10 $^\circ\text{C} \div 60 \text{ } ^\circ\text{C}$)
	-20 $^\circ\text{C} \div 80 \text{ } ^\circ\text{C}$
	20% $\div 80\%$ ()
	5 Vdc $\pm 5\%$ 10 $\div 28 \text{ Vdc} \pm 5\%$
	140 mA _{MAX} (R= 120 Ω) 5 Vdc 100 mA _{MAX} (R= 1200 Ω) 10 $\div 28 \text{ Vdc}$
A, B I ₀	LINE DRIVER PUSH-PULL
	25 ***
	.
	850 g + 1800 /


Cod. GVS	202 S
Measuring support	stainless steel grating
Grating pitch	250 μm 
Linear thermal expansion coefficient	$10,6 \times 10^{-6} \text{ } ^\circ\text{C}^{-1}$
Reference indexes (I ₀)	E = selectable (every 10 mm)
Resolution	10 - 5 - 1 - 0.5 - 0.1 μm
Accuracy grade	$\pm 2,5 \mu\text{m}$ standard version $\pm 1 \mu\text{m}$ high-accuracy version
Measuring length ML in mm	70, 120, 170, 220, 270, 320, 370, 420, ... max. 30000 mm in modular version
Max. traversing speed	120 m/min *
Max. acceleration	30 m/s ²
Required moving force	$\leq 1,5 \text{ N}$
Vibration resistance (EN 60068-2-6)	100 m/s ² [55 \div 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 $^\circ\text{C} \div 50 \text{ } ^\circ\text{C}$ (-10 $^\circ\text{C} \div 60 \text{ } ^\circ\text{C}$ on request)
Storage temperature	-20 $^\circ\text{C} \div 80 \text{ } ^\circ\text{C}$
Relative humidity	20% $\div 80\%$ (not condensed)
Reading block sliding	without contact
Power supply	5 Vdc $\pm 5\%$ or 10 $\div 28 \text{ Vdc} \pm 5\%$
Current consumption	140 mA _{MAX} (with R= 120 Ω) 5 Vdc 100 mA _{MAX} (with R= 1200 Ω) 10 $\div 28 \text{ Vdc}$
A, B and I ₀ output signals	LINE DRIVER PUSH-PULL
Max. cable length	25 m ***
Electrical connections	see related table
Electrical protections	inversion of polarity and short circuits
Weight	850 g + 1800 g/m

* 0,5
0,1
- 60 /
- 40 /
100

* With a 0.5 μm resolution, the maximum traversing speed becomes 60 m/min.
With a 0.1 μm resolution, the maximum traversing speed becomes 40 m/min.
** Pressurization set up on request.
*** Ensuring the required power supply voltage to the transducer, the maximum cable length can be extended to 100 m.

GVS 215 – MAGNETIC SCALE GVS 215

Cod. GVS	215
	2+2  $10,6 \times 10^{-6} \text{ } ^\circ\text{C}^{-1}$
(I ₀)	E = (10)
	50 - 25 - 10 - 5 - 1
	± 1
	± 15 ± 10
ML	70, 120, 170, 220, 270, 320, 370, 420, 30000
	120 / * 30 / ²
	≤ 1,5 N
	(EN 60068-2-6) 100 / ² [55 ÷ 2000]
	(EN 60068-2-27) 150 / ² [11 ms]
	(EN 60529) IP 64 IP 67
	-10 °C ÷ 80 °C (-20 °C ÷ 80 °C)
	-30 °C ÷ 90 °C
	20% ÷ 80% ()
	5 Vdc ± 5% 10 ÷ 28 Vdc ± 5%
	140 mA _{MAX} (R= 120 Ω) 5 Vdc 100 mA _{MAX} (R= 1200 Ω) 10 ÷ 28 Vdc
A, B I ₀	LINE DRIVER PUSH-PULL
	25 **
	900 + 1850 /

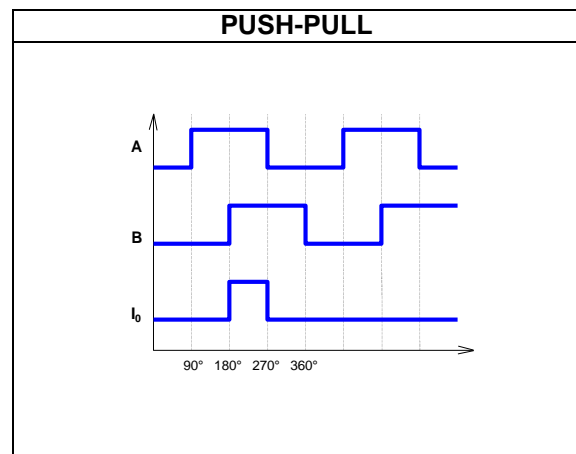
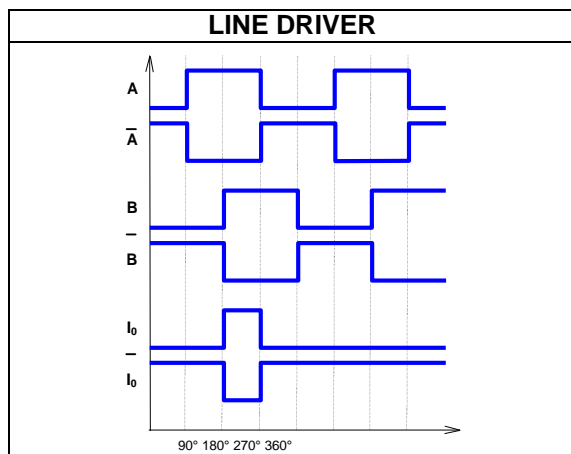
Cod. GVS	215
Measuring support	plastoferrite on stainless steel tape
Pole pitch	2+2 mm 
Linear thermal expansion coefficient	$10,6 \times 10^{-6} \text{ } ^\circ\text{C}^{-1}$
Reference indexes (I ₀)	E = selectable (every 10 mm)
Resolution	50 - 25 - 10 - 5 - 1 μm
Repeatability	± 1 increment
Accuracy grade	± 15 μm standard version ± 10 μm high-accuracy version
Measuring length ML in mm	70, 120, 170, 220, 270, 320, 370, 420, ... max. 30000 mm in modular version
Max. traversing speed	120 m/min *
Max. acceleration	30 m/s ²
Required moving force	≤ 1.5 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 64 standard IP 67 on request
Operating temperature	-10 °C ÷ 80 °C (-20 °C ÷ 80 °C on request)
Storage temperature	-30 °C ÷ 90 °C
Relative humidity	20% ÷ 80% (not condensed)
Reading block sliding	without contact
Power supply	5 Vdc ± 5% or 10 ÷ 28 Vdc ± 5%
Current consumption	140 mA _{MAX} (with R= 120 Ω) 5 Vdc 100 mA _{MAX} (with R= 1200 Ω) 10 ÷ 28 Vdc
A, B and I ₀ output signals	LINE DRIVER PUSH-PULL
Max. cable length	25 m **
Electrical connections	see related table
Electrical protections	inversion of polarity and short circuits
Weight	900 g + 1850 g/m

* With a 1 μm resolution, the maximum traversing speed becomes 60 m/min.
 ** Ensuring the required power supply voltage to the transducer, the maximum cable length can be extended to 100 m.

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 ** Ensuring the required power supply voltage to the transducer, the maximum cable length can be extended to 100 m.

10

10 OUTPUT SIGNALS



5 Vdc

	LINE DRIVER
	$R = 120 \Omega I_L = \pm 20 \text{ mA}_{MAX}$
A B	$90^\circ \pm 5^\circ$

POWER SUPPLY 5 Vdc

Output signals	LINE DRIVER
Load per channel	$R = 120 \Omega I_L = \pm 20 \text{ mA}_{MAX}$
A and B phase displacement	$90^\circ \pm 5^\circ \text{ electrical}$

10 ÷ 28 Vdc

	LINE DRIVER
	$R = 1200 \Omega I_L = \pm 20 \text{ mA}_{MAX}$
A B	$90^\circ \pm 5^\circ$

POWER SUPPLY 10 ÷ 28 Vdc

Output signals	LINE DRIVER
Load per channel	$R = 1200 \Omega I_L = \pm 20 \text{ mA}_{MAX}$
A and B phase displacement	$90^\circ \pm 5^\circ \text{ electrical}$



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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GVS 200, GVS 202 S GVS 215

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11 WARRANTY TERMS

GVS 200, GVS 202 S and GVS 215 scales are guaranteed against manufacturing faults for a period of 12 months from the date of purchase. Any repair must take place at the Manufacturer's premises.

The Manufacturer is released from any claim against damages due to the non-observance of these instructions or mounting tolerances which causes the annulment of the warranty terms.

The warranty does not provide for repairing and/or replacement of those parts that have been damaged by negligence or misuse, improper installation or maintenance, maintenance performed by unauthorized personnel, transport or any other circumstance that excludes a manufacturing fault of the product.

Similarly, the warranty does not apply if serial numbers or any data identifying the product are cancelled or altered in any way, and if product modifications are introduced without the written authorization of the Manufacturer.

The Manufacturer declines any responsibility for damages to people or properties deriving from the use of the product, including any loss of profit or any other direct, indirect or accidental loss.

12

12 DISPOSAL

2012/19/UE

(RAEE)

Disposal of waste electrical and electronic equipment (WEEE)
European Council Directive (2012/19/EU)

WEEE

The use of the WEEE Symbol indicates that this product may not be treated as household waste.

If this product is disposed correctly, you will help to protect the environment.

For more detailed information about the recycling of this product, please contact your local authority, your household waste disposal service provider or the retailer where you purchased the product.

This information regards only European customers, according to 2012/19/EU European Parliament Directive.

For other countries, please refer to local law requirements.



(2012/19/EU).

All Around the World



OUR PRODUCTS ARE SOLD AND HAVE AFTER-SALE SERVICE IN ANY INDUSTRIALIZED COUNTRY



OPTICAL SCALES



MAGNETIC SYSTEMS



ROTARY ENCODERS



DIGITAL READOUTS



POSITION CONTROLLERS



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