

PBS-HR THE SELF-ALIGNED OPTICAL SCALE FOR SYNCHRONIZED PRESS BRAKES

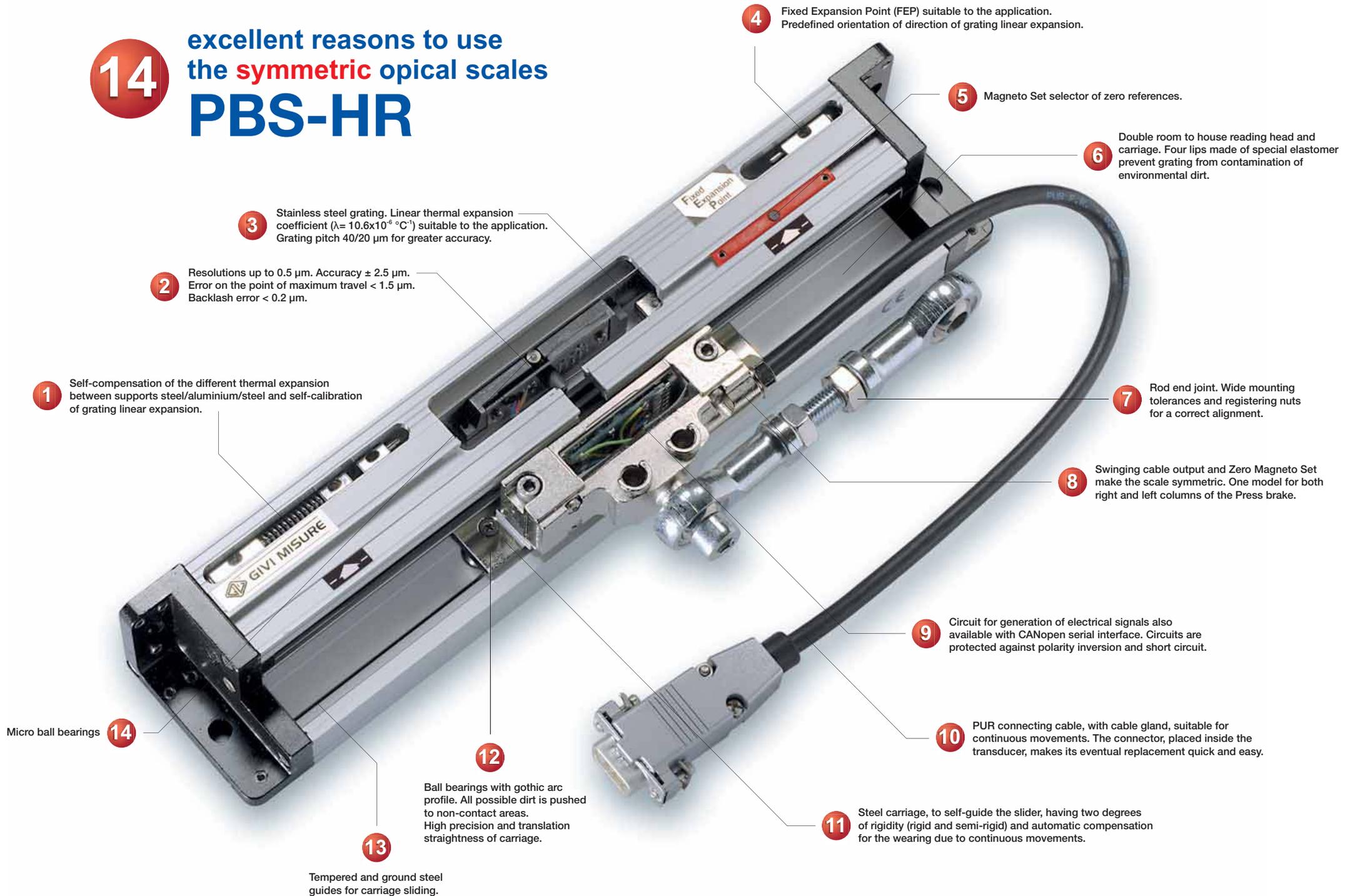
Zero Magneto Set and swinging cable output make the self-aligned optical scale PBS-HR

SYMMETRIC

One model for both columns, right and left, of the synchronized Press brake.



14 excellent reasons to use the **symmetric** optical scales **PBS-HR**



1 Self-compensation of the different thermal expansion between supports steel/aluminium/steel and self-calibration of grating linear expansion.

2 Resolutions up to 0.5 μm . Accuracy $\pm 2.5 \mu\text{m}$. Error on the point of maximum travel $< 1.5 \mu\text{m}$. Backlash error $< 0.2 \mu\text{m}$.

3 Stainless steel grating. Linear thermal expansion coefficient ($\lambda = 10.6 \times 10^{-6} \text{ } ^\circ\text{C}^{-1}$) suitable to the application. Grating pitch 40/20 μm for greater accuracy.

4 Fixed Expansion Point (FEP) suitable to the application. Predefined orientation of direction of grating linear expansion.

5 Magneto Set selector of zero references.

6 Double room to house reading head and carriage. Four lips made of special elastomer prevent grating from contamination of environmental dirt.

7 Rod end joint. Wide mounting tolerances and registering nuts for a correct alignment.

8 Swinging cable output and Zero Magneto Set make the scale symmetric. One model for both right and left columns of the Press brake.

9 Circuit for generation of electrical signals also available with CANopen serial interface. Circuits are protected against polarity inversion and short circuit.

10 PUR connecting cable, with cable gland, suitable for continuous movements. The connector, placed inside the transducer, makes its eventual replacement quick and easy.

11 Steel carriage, to self-guide the slider, having two degrees of rigidity (rigid and semi-rigid) and automatic compensation for the wearing due to continuous movements.

12 Ball bearings with gothic arc profile. All possible dirt is pushed to non-contact areas. High precision and translation straightness of carriage.

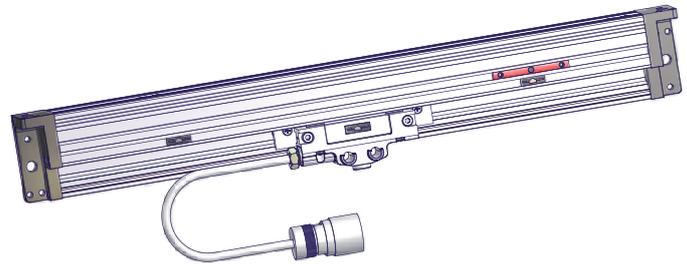
13 Tempered and ground steel guides for carriage sliding.

14 Micro ball bearings

TECHNICAL DATASHEET

GENERAL FEATURES

- Incremental optical scale with stainless steel grating (grating pitch 20 µm or 40 µm), for applications on synchronized Press brakes.
- Reader head guided by self-aligned translation carriage.
- Resolutions up to 0.5 µm, accuracy ± 2.5 µm.
- Linear thermal expansion coefficient $\lambda = 10.6 \times 10^{-6} \text{ }^\circ\text{C}^{-1}$ suitable to the application.
- Predefined orientation of direction of grating linear expansion.
- Reference indexes at coded distance or at constant step (10 mm*) or selectable by Magneto Set device. The swinging cable output and the selectable zero references make the scale symmetric and applicable, in the same version, both to the right column and to the left column of the Press brake.
- Protected against inversion of power supply polarity and short circuit on output ports.



MECHANICAL AND ELECTRICAL FEATURES

MECHANICAL

- Rugged and heavy PROFILE: anodized aluminium, dimensions 57x40 mm.
- Elastic COUPLING to compensate misalignments and self-correction of mechanical hysteresis. Backlash error <0.2 µm. Error on the point of maximum travel < 1.5 µm.
- Double level LIP SEALS (internal and external) along the sliding side of the reader head.
- READER HEAD, consisting of tie rod and reading block, with fully protected place for electronic boards.
- CARRIAGE guided by ball bearings with gothic arc profile sliding on tempered and straightened tracks, to guarantee accuracy and lack of wear.
- READING BLOCK sliding through ball bearings.
- Die-cast TIE ROD.
- Stainless steel GRATING placed in the aluminium profile.
- Elastomeric GASKETS which allow to reproduce the full protection in mechanical joints (in case of disassembly).
- Swinging CABLE output.
- Full possibility to disassemble and reassemble it.
- Possibility of direct service.

ELECTRICAL

- Reading device with an infra-red light emitter and receiving photodiodes.
- A and B output signals with phase displacement of 90° (electrical).
- CABLE:
 - 8-wire shielded cable $\varnothing = 6.1$ mm, PUR external sheath, with cable gland.
 - Conductor section: supply 0.35 mm², signals 0.14 mm².

Do not exceed the minimum cable bending radius of 40 mm.

The cable is suitable for continuous movements.

LINE DRIVER	PUSH-PULL	WIRE COLOUR
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
VS = 5V	VS = 5V	Red
VS0 = 0V	VS0 = 0V	Blue

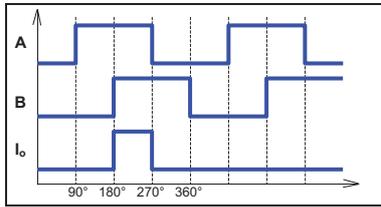
Valid for 5V version only.

Code PBS-HR	T10 100	T5 5	T1 W1	T05
Measuring support	stainless steel			
Grating pitch 	20 / 40 µm			
Linear thermal expansion	$10.6 \times 10^{-6} \text{ }^\circ\text{C}^{-1}$			
Reference index (I_0)	Z = in required position P = at constant step 10 / 20 mm E = selectable C = at coded distance			
Resolution	10 µm	5 µm	1 µm	0.5 µm
Accuracy	± 2.5 µm/m			
Measuring length ML in mm	170, 220, 270, 320, 370 420, 470, 520, 570, 620,.....			
Max. traversing speed in m/min	80	60	40 / 25	25
Max. acceleration	30 m/s ²			
Required moving force	≤ 4 N ≤ 2.5 N on request			
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)			
Block sliding	by ball bearings 			
Power supply	5 V ± 5% or 12 V ± 5%			
Current consumption	130 mA _{MAX} (with R = 120 Ω and 5 V)			
A and B output signals	LINE DRIVER  PUSH-PULL			
Maximum cable length	40 m			
Electrical connection	see the rel. table			
Electrical protections	inversion of power supply polarity and short circuit on output port			
Weight	720 g + 2300 g/m			

(*) Except for mod. T10, having indexes at constant step of 20 mm.

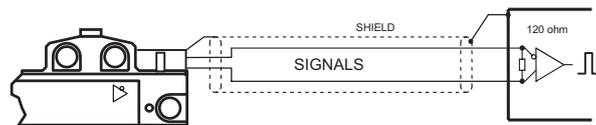
OPTICAL SCALE PBS-HR

OUTPUT SIGNALS



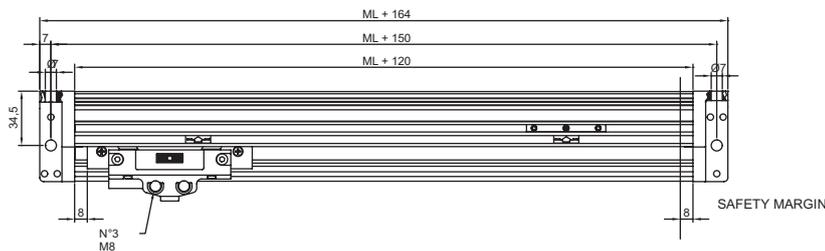
Signal amplitude	LINE DRIVER ($V_{OH} \geq 2.5\text{ V}$ $V_{OL} \leq 0.5\text{ V}$) TTL
Load per channel	$R = 120\ \Omega$ ($V_S = 5\text{ V}$) $I_L = \pm 20\text{ mA}_{MAX}$
A and B phase displacement	$90^\circ \pm 5^\circ$ electrical

CABLE



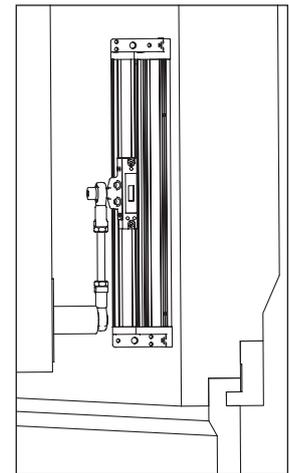
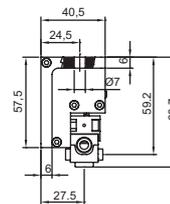
In case of cable extension, the electrical connection between the body of the connectors must be ensured.

DIMENSIONS



MOD. PBS-HR 5Z / 100Z

ML = MEASURING LENGTH
DIMENSIONS IN mm



RECOMMENDED JOINT ORIENTATION

ORDERING CODE

MODEL	SCALE TYPE, RESOLUTION, INDEX (OPTIONS)	MEASURING LENGTH	POWER SUPPLY, OUTPUT SIGNAL	CABLE LENGTH, CABLE TYPE	CONNECTOR WIRING	SPECIAL, PRESSURIZED
PBS-HR	5 Z	00270	05V L	M0.5 / S	CV	SP10

T10 / 100 = 10µm
T5 / 5 = 5µm
T1 / W1 = 1µm
T05 = 0.5µm

Z = indexes in required position
P = indexes at constant step
E = selectable indexes at constant step
C = indexes at coded distance

Length in mm
00270 = 270mm

05V = 5V
12V = 12V
L = LINE DRIVER
Q = PUSH-PULL

Mnn = length in m
M03 = 3m
M04 = 4m
M40 = 40m
S = standard cable
(for continuous movements)

Cnn = progressive

No code = standard
SPnn = special nn

Example **OPTICAL SCALE PBS-HR 5Z 00270 05VL M0.5/S CV**

Worldwide sales offices and service centers:



GREAT BRITAIN
6 Lumina, Martindale Road
Croft Business Park
CH 62 3PT BROMBOROUGH, Wirral
Tel.: +44 151 3344555
Fax: +44 151 3341616

HONG KONG
Flat 811, 8/F., Hing Wah Centre,
82-84 TokWaiWan Road, Kowloon,
HONG KONG
Tel.: +852 2333 7679
Fax: +852 2333 7176

INDIA
VITC Export Bhavan, 1st Block
Plot No. 488, KIADB Complex 14th
Cross,
IV Phase, Peenya Indl. Area
560 058 BANGALORE
Tel.: +91 80 41272559
Fax: +91 80 41171374

IRAN
Second floor, no. 29
3rd Golbon Alley, 11th Fath St.
Fath Blvd., TEHRAN
Tel.: +98 21 66791775
Fax: +98 21 66791776

ISRAEL
31 Habarzel St.
69710 TEL AVIV
Tel.: +972 3 6470471
Fax: +972 3 6470472

ITALY
Via Assunta, 57
20054 Nova Milanese (MI) - Italy
Tel.: +39 0362.36.61.26 - Fax: +39 0362.36.68.76
E-mail: info@givimisure.it

JAPAN
1-1-1, Higashi-Shinjuku
Shinjuku-Ku, TOKYO
Tel.: +81 3 3344 5555
Fax: +81 3 3344 6666

SOUTH KOREA
5731-1, Daejeo 2-Dong
Gangseo-Gu,
618-810 BUSAN
Tel.: +82 51 517 5514
Fax: +82 51 517 5515

SPAIN
C/. La Garsa, 33
08450 Lleinars del Valles
(BARCELONA)
Tel.: +34 93 8713057
Fax: +34 93 8713182

SWEDEN
Metallgatan 1 B
262 72 ANGELHOLM
Tel.: +46 431 448454
Fax: +46 431 14190

SYRIA
P.O. BOX 12850
DAMASCUS
Tel.: +963 11 3325519
Fax: +963 11 3342639

TAIWAN
7F-3, No. 13, Wu-Chun, 1 Rd., 248
HSIN-CHUANG, TAIPEI HSIEN
Tel.: +886 2 22995422
Fax: +886 2 22995423

THAILAND
145/35 Soi Sukhumwit 105 (La Salle 1)
Sukhumwit Rd., Kwang Bangna, KE
10260 BANGKOK
Tel.: +66 2 749 1048
Fax: +66 2 749 1049

TURKEY
Tophane, Bogazkesen Cad. No.149/4
34433 ISTANBUL
Tel.: +90 212 252 90 66
Fax: +90 212 292 00 20

AUSTRALIA
6/9 Mavis Street
Revesby, NSW 2212
Tel.: +61 2 97722289
Fax: +61 2 97722289

DENMARK
Blokken 42
DK-3460 BIRKERØD
Tel.: +45 4582 4440
Fax: +45 4582 5550

FINLAND
Pyynikintie, 25
33230 TAMPERE
Tel.: +358 3 3432450
Fax: +358 3 3433878

POLAND
ul. Przemyslowa 47
43100 TYCHY
Tel.: +48 32 7801322
Fax: +48 32 7801322

THAILAND
145/35 Soi Sukhumwit 105 (La Salle 1)
Sukhumwit Rd., Kwang Bangna, KE
10260 BANGKOK
Tel.: +66 2 749 1048
Fax: +66 2 749 1049

CHINA
Rm 406, No. 681,
Huai An Rd.
200041 SHANGHAI
Tel.: +86 21 32271250
Fax: +86 21 62770735

FRANCE
53 Avenue Carnot
94100 SAINT MAUR
Tel.: +33 1 48867794
Fax: +33 1 42831195

RUSSIA
Paveletskay Nab. 2, Str.7
115114 MOSCOW
Tel.: +7 495 9814844
Fax: +7 495 9814843

CZECH REPUBLIC
Delnickà 3272
40747 VARNSDORF
Tel.: +420 412 374 320
Fax: +420 412 374 327

GERMANY
Kaplaneigasse 80
64319 PFUNGSTADT
Tel.: +49 6157 9862212
Fax: +49 6157 9866130

SOUTH AFRICA
P.O. BOX 3221
7602 MATIELAND
Tel.: +27 21 946 1925
Fax: +27 21 946 1926

**Optical Scales
for Press Brakes:**
Perpa Tic. Mer. B Blok Kat 11 Nr. 1740
Okmeydani-Perpa
34385 ISTANBUL
Tel.: +90 212 320 13 83
Fax: +90 212 320 13 86



OPTICAL SCALES

MAGNETIC SCALES

ROTARY ENCODERS

DIGITAL READOUTS

POSITION CONTROLLERS

GIVI MISURE s.r.l. Via Assunta, 57
20054 Nova Milanese (MI) - Italy
Tel. +39 0362.36.61.26 - Fax: +39 0362.36.68.76
E-mail: info@givimisure.it
www.givimisure.it

 **GIVI MISURE**
Measuring and control systems