

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

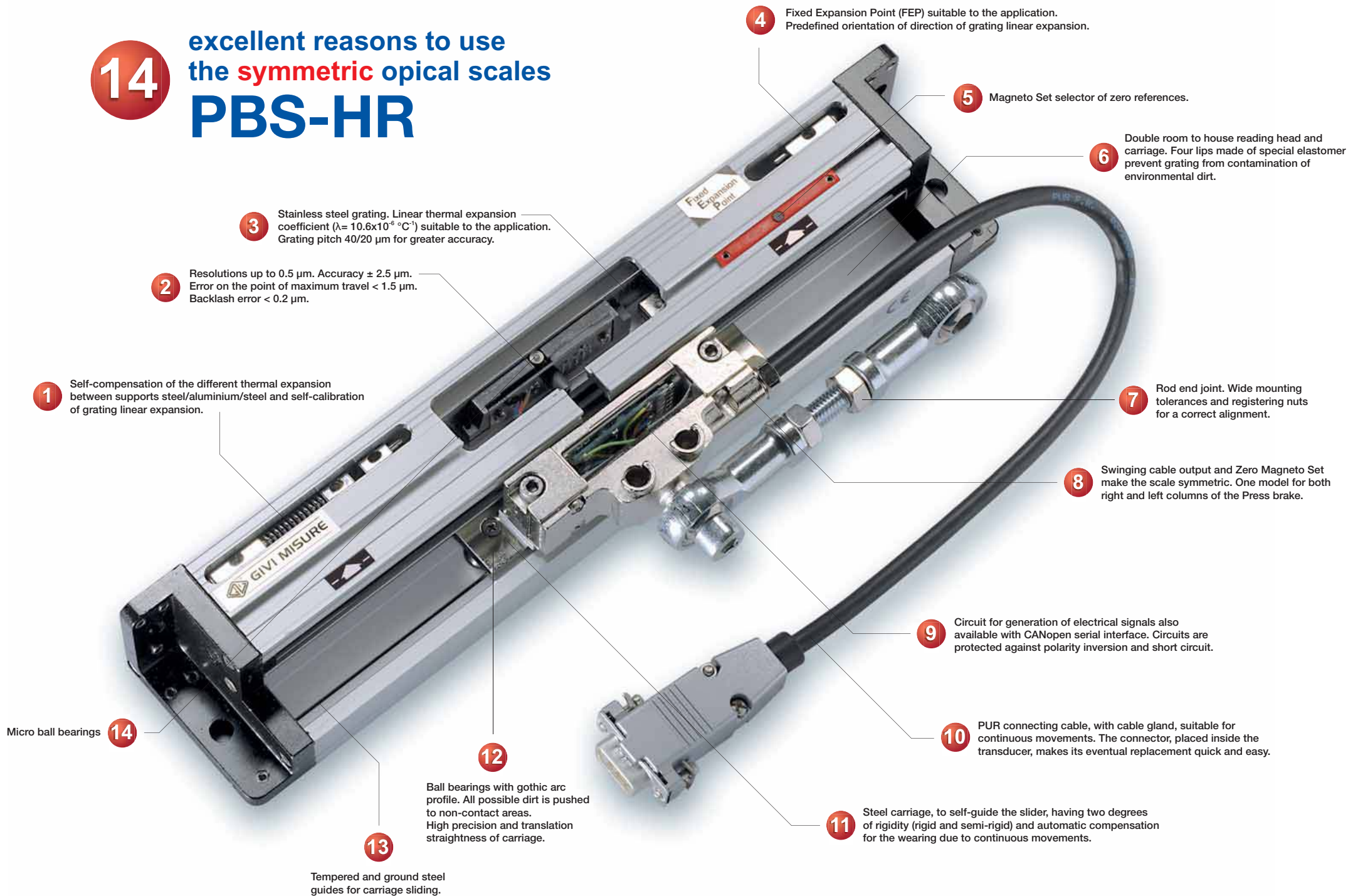
Zero Magneto Set and swinging cable output make the self-aligned optical scale PBS-HR

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.

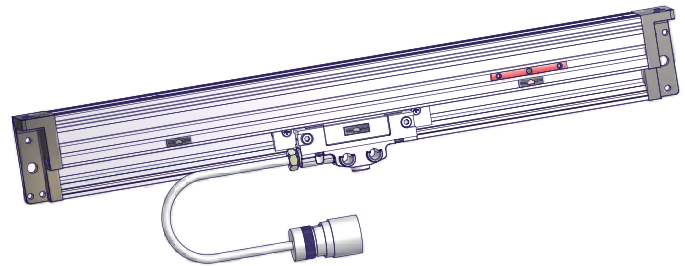
13 Tempered and ground steel guides for carriage sliding.

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 $\varnothing = 6.1 \text{ mm}$, PUR external sheath, with cable gland.
 - Conductor section: supply 0.35 mm^2 , signals 0.14 mm^2 .

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

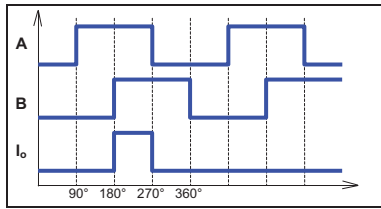
Valid for 5V version only.

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



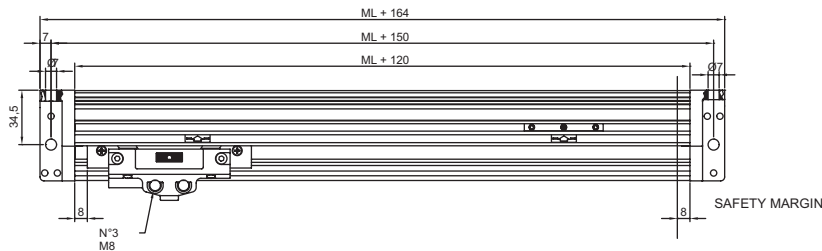
Signal amplitude	LINE DRIVER ($V_{OH} \geq 2.5\text{ V}$ $V_{OL} \leq 0.5\text{ V}$) TTL
Load per channel	$R = 120\ \Omega$ ($V_S = 5\text{ V}$) $I_L = \pm 20\text{ mA}_{MAX}$
A and B phase displacement	$90^\circ \pm 5^\circ$ electrical

CABLE



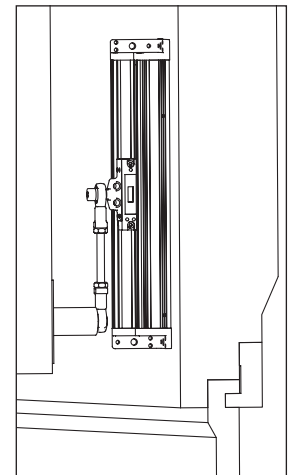
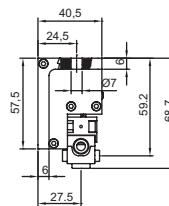
In case of cable extension, the electrical connection between the body of the connectors must be ensured.

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 = 10 μ m
T5 / 5 = 5 μ m
T1 / W1 = 1 μ m
T05 = 0.5 μ m

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 \Rightarrow OPTICAL SCALE PBS-HR 5Z 00270 05VL M0.5/S CV

