

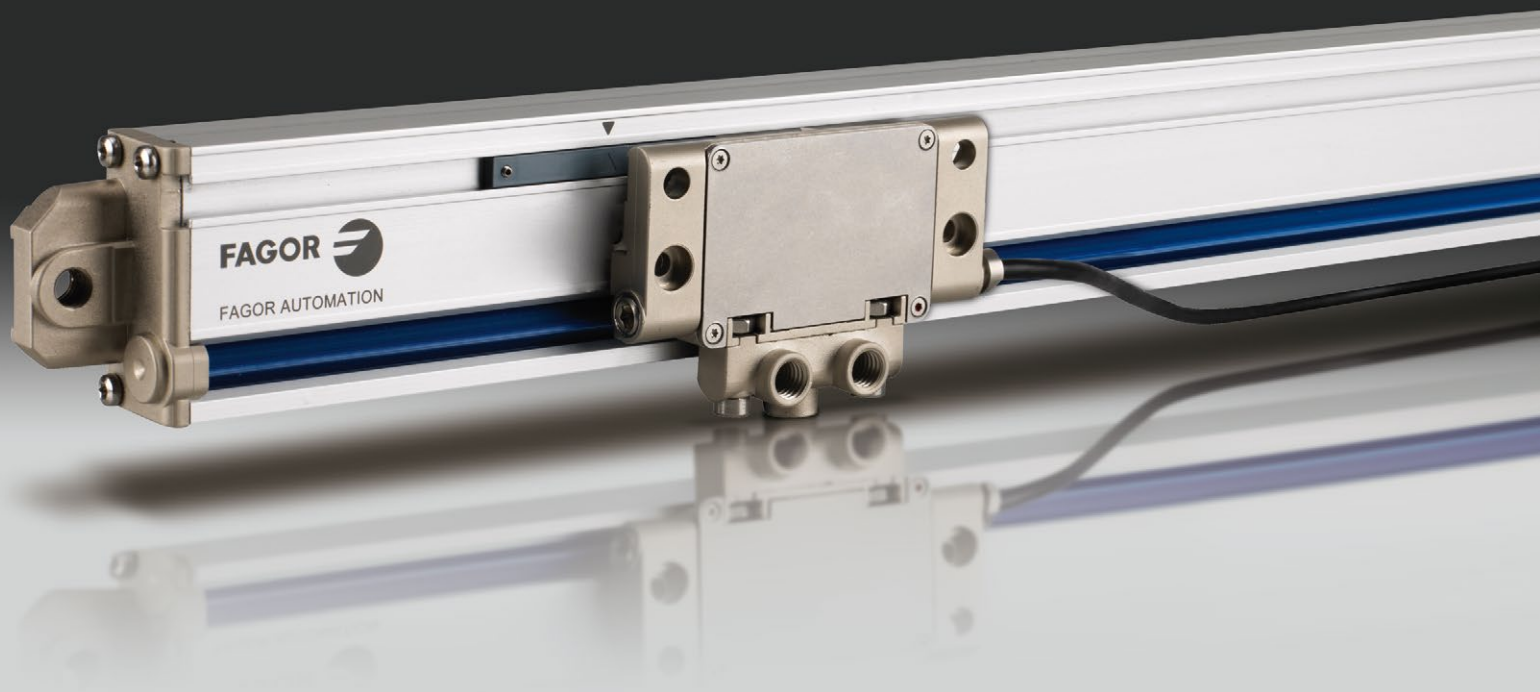
# Self-guided

LINEAR ENCODER

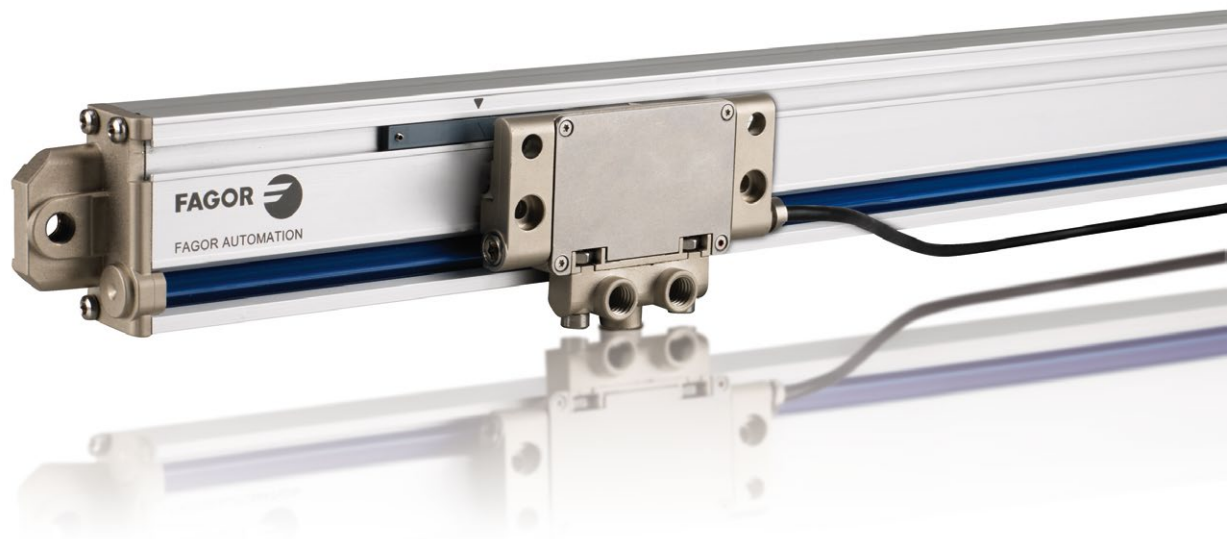
**FAGOR**  
AUTOMATION



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# PB series



New self-guided optical linear encoder with integrated bearings. Mainly intended, although not only, for press brakes and shears. The linear encoder especially designed with a resolution of up to 1  $\mu\text{m}$ , with a user-selectable reference position and with cable exit at either end of the reader head for a more versatile machine design.

The robust design, the mentioned characteristics together with both types of couplings (rod and flexible) offer the perfect solution to manufacturers of machines, forming equipment and cutting with the best quality-price ratio on the market.

## Measuring lengths in millimeters

70 • 120 • 170 • 220 • 270 • 320 • 370 • 420 • 470 • 520 •  
570 • 620 • 670 • 720 • 770 • 820 • 870 • 920 • 970 •  
1020 • 1140 • 1240 • 1340 • 1440 • 1540

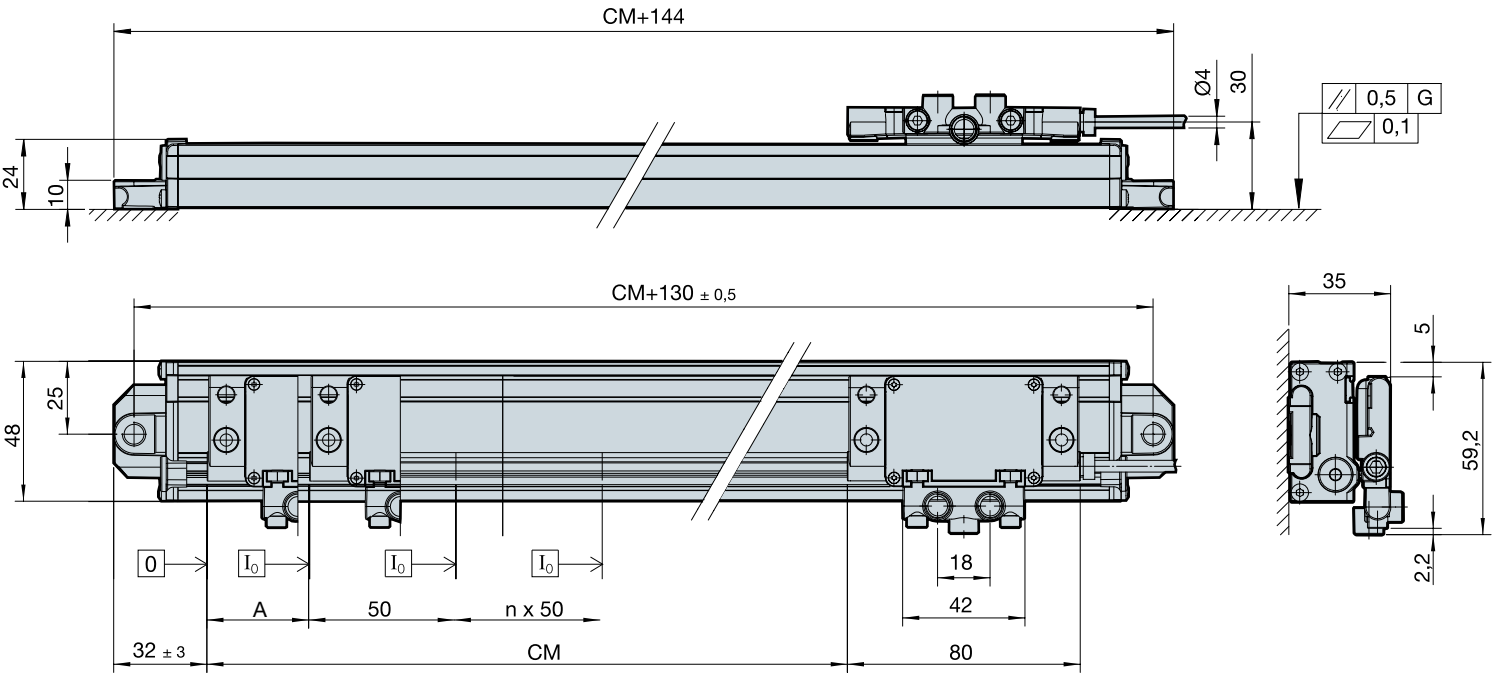
90 • 140 • 190 • 240 • 290 • 340 • 390 • 440 • 490 • 540 •  
590 • 640 • 690 • 740 • 790 • 840 • 890 • 940 • 990

## Characteristics

	PBSD	PBSX
Measurement	By means of a 100 $\mu\text{m}$ -pitch graduated glass	
Glass thermal expansion coefficient	$\alpha_{\text{therm}}$ : 8 ppm/K aprox.	
Measuring resolution	5 $\mu\text{m}$	1 $\mu\text{m}$
Output signals	□□ TTL differential	
Incremental signal period	20 $\mu\text{m}$	4 $\mu\text{m}$
Limit frequency	50 KHz	250 KHz
Minimum distance between flanks	1.2 $\mu\text{s}$	0.6 $\mu\text{s}$
Reference marks $I_0$	May be selected with a magnet every 50 mm	
Maximum cable length	50 m	
Supply voltage	5 V $\pm$ 5 %, < 175 mA	
Accuracy	$\pm$ 10 $\mu\text{m}/\text{m}$	
Maximum speed	60 m/min	
Maximum vibration	150 $\text{m}/\text{s}^2$	
Maximum shock	300 $\text{m}/\text{s}^2$	
Maximum acceleration	30 $\text{m}/\text{s}^2$	
Required moving force	< 5 N	
Operating temperature	0 °C ... 50 °C	
Storage temperature	-20 °C ... 70 °C	
Weight	0.5 kg + 1.3 kg/m Measuring length	
Relative humidity	20 ... 80 %	
Protection	IP 53	
Reader head	Leftward or rightward incorporated cable of 1 or 3 meters (1)	
Coupling	Coupling rod Spring rod	

(1) Contact Fagor Automation for other lengths.

Dimensions in mm



- CM** Measuring length
- G** Machine way
- O** Beginning of measuring length (**CM**)
- I<sub>0</sub>** Reference mark (1)

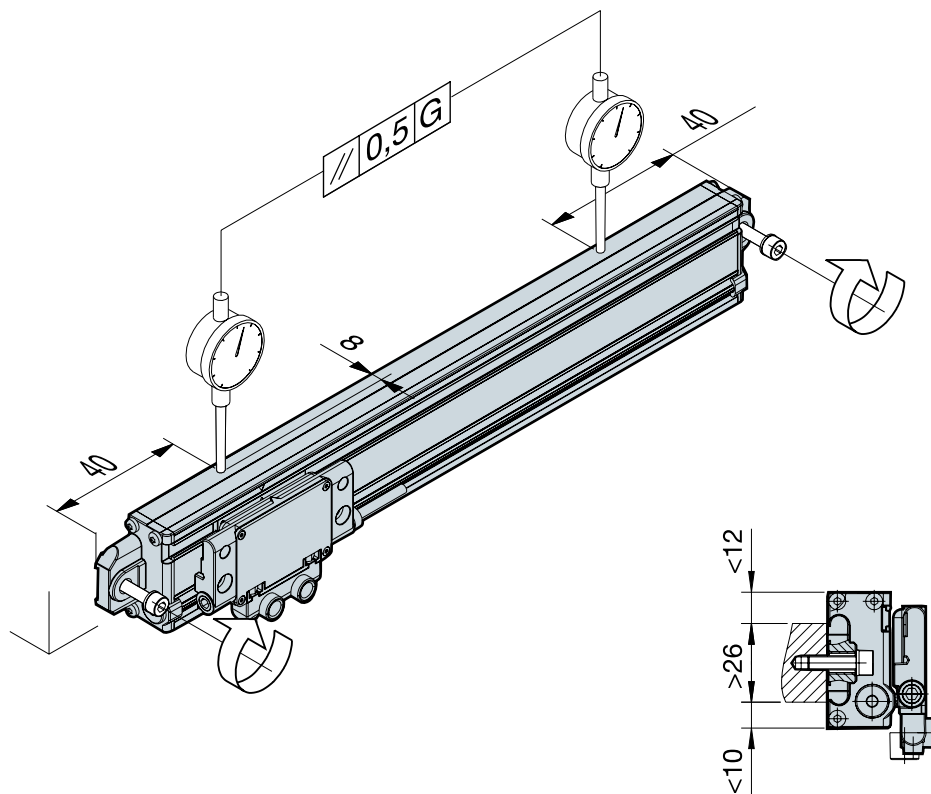
CM ends in:	A
20, 70	35
40, 90	45

Additional information can be found in the technical documentation and installation manual available on the website [www.fagorautomation.com](http://www.fagorautomation.com)

Order identification						
Example of Linear Encoder: PBSD-220-1D-L						
PB	S	D	220	1	D	L
Encoder self-guided linear	Reference mark: <ul style="list-style-type: none"><li>S: Selectable (1)</li></ul>	Type of signal: <ul style="list-style-type: none"><li>D: 5 µm resolution differential TTL</li><li>X: 1 µm resolution differential TTL</li></ul>	Measuring lengths in mm: In the example (220) = 220 mm	Cable length: <ul style="list-style-type: none"><li>1: 1 meter</li><li>3: 3 meters</li></ul>	Connector: <ul style="list-style-type: none"><li>D: subD HD 15 M</li><li>C1/C5: 12-pin M23 connector</li><li>C4E: 9-pin round connector</li><li>DL: subD 9 M DELEM®</li></ul>	Cable exit: <ul style="list-style-type: none"><li>Blank space: right</li><li>L: left</li></ul>

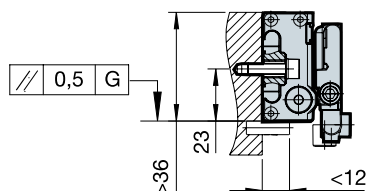
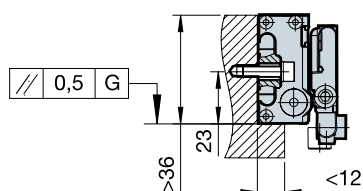
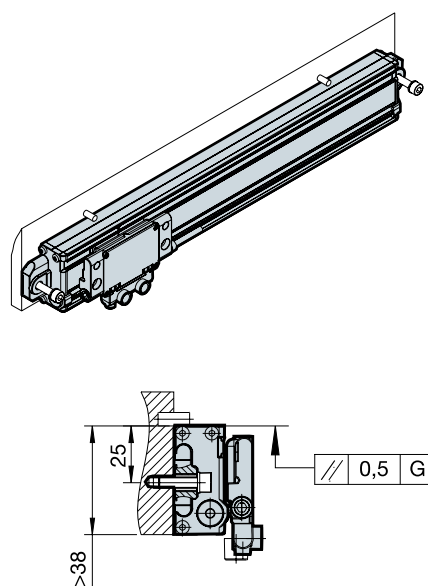
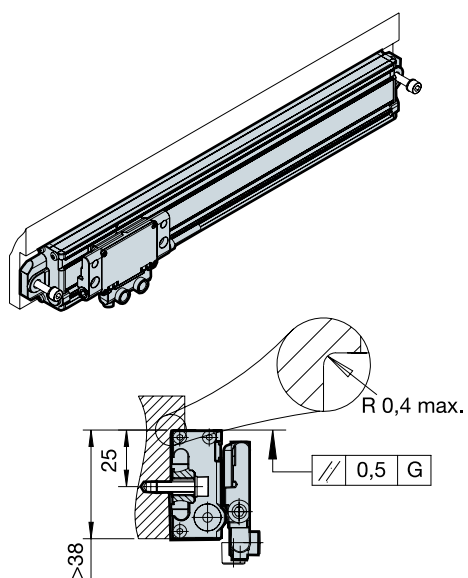
(1) One magnet for reference mark selection included. Part number 82620181 for ordering additional units of the magnet MPB-R.

# MOUNTING



mounting on machine hard stop

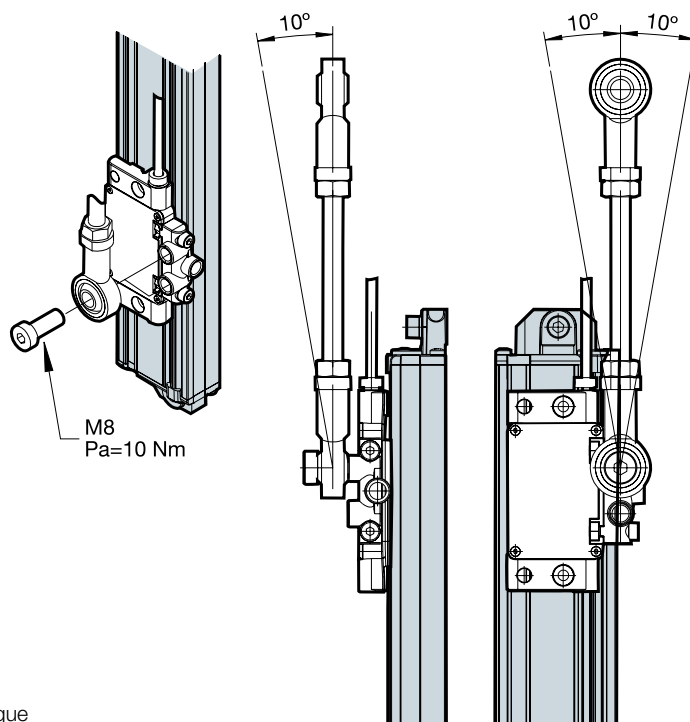
mounting on dowel pins



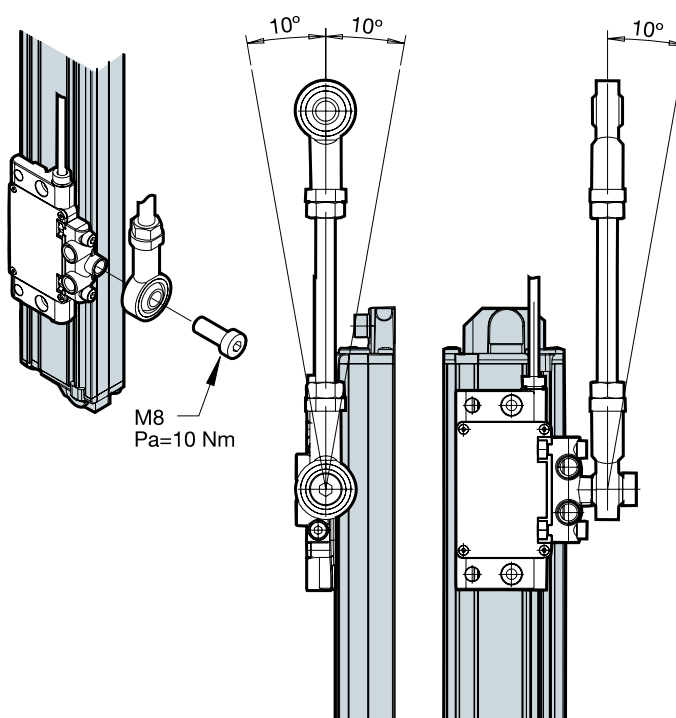
## mounting options with coupling rod



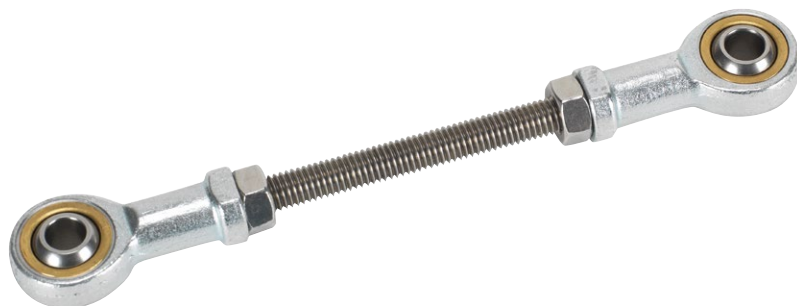
Maximum angular movements for the coupling rod



Pa: tightening torque



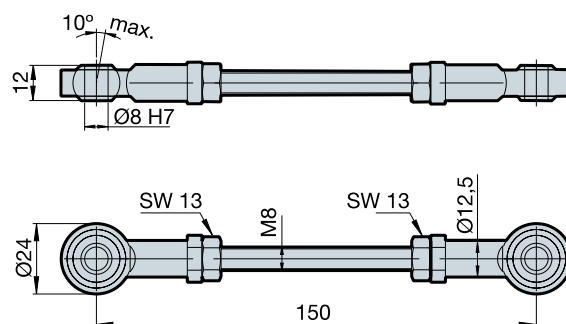
# COUPLING ROD



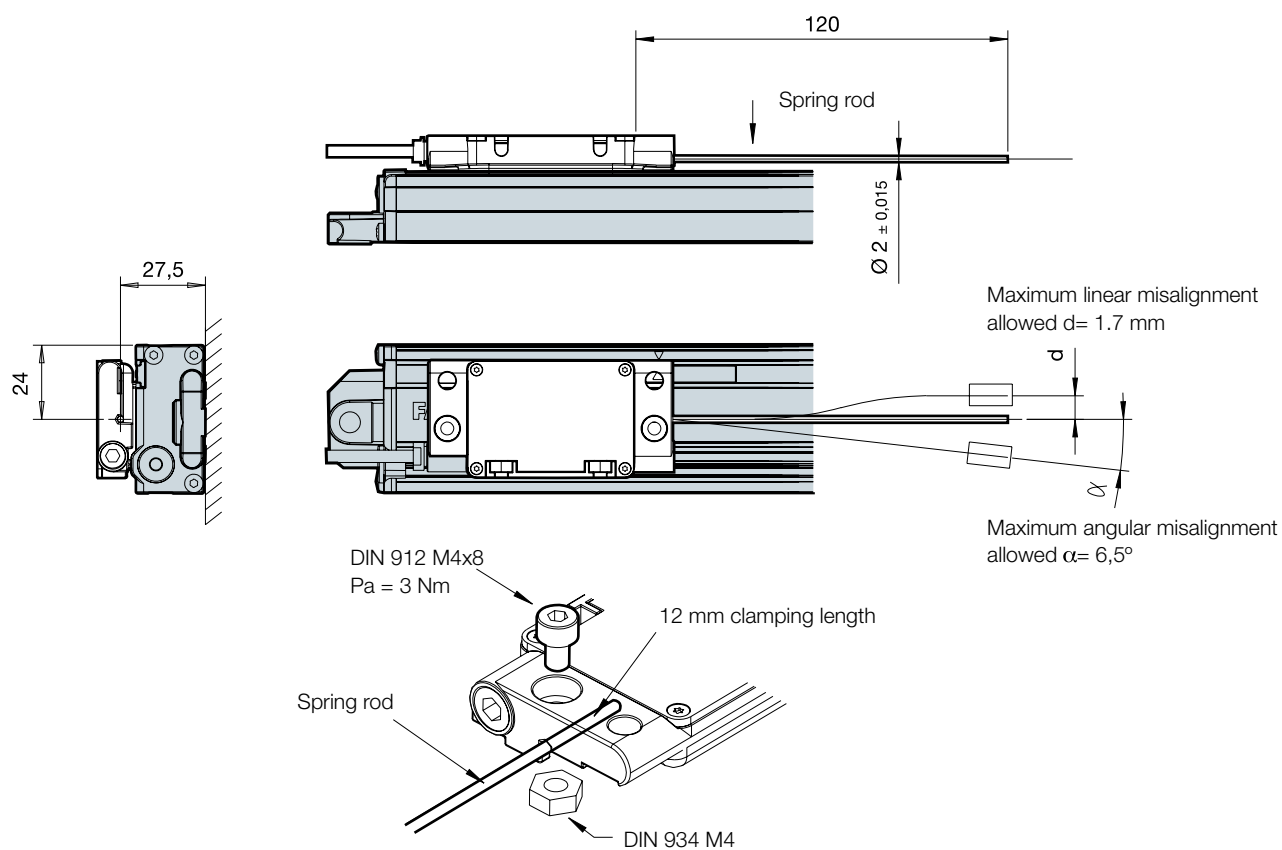
Coupling bar

Code: 82620180

One M8 screw included



## mounting with spring rod



# DIRECT CONNECTION CABLES

## Connection to FAGOR CNC

### UP TO 3 METERS

For direct connection to FAGOR

#### PB...-D

Lengths: 1 and 3 meters

Cable included

SUB D 15 HD connector (Male Pin )

Pin	Signal	Color
1	A	Green
2	/A	Yellow
3	B	Blue
4	/B	Red
5	I <sub>0</sub>	Grey
6	/I <sub>0</sub>	Pink
8	/AL	Purple
9	+5 V	Brown
10	+5 V sensor	Blue-Red (Orange)
11	0 V	White
12	0 V sensor	Grey-Pink (colorless)
Housing	Ground	Shield



For direct connection to DELEM®

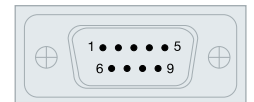
#### PB...-DL

Lengths: 1 and 3 meters

Cable included

SUB D 9 connector (Male Pin )

Pin	Signal	Color
3	A	Green
8	/A	Yellow
2	B	Blue
7	/B	Red
1	I <sub>0</sub>	Grey
6	/I <sub>0</sub>	Pink
9	+5 V	Brown+ Blue-Red (Orange)
5	0 V	White + Grey-Pink
Housing	Ground	Shield



### FROM 3 METERS ON

For connection to FAGOR: PB...-...C1 + XC-C2...-D extension cable

For connection to FANUC® (for Separate Detector Unit SDU): PB...-...C1 + XC-C2...-FN1 extension cable

For connection to SIEMENS® SME20: PB...-...C5 + XC-C4...-C5 extension cable

For connection to SIEMENS® SMC30: PB...-...C5 + XC-C4...-S2 extension cable

For connection to DELEM®: PB...-...C1 + XC-C2...-DL extension cable

Without connector for other applications: PB...-...C1 + XC-C2...-O extension cable

#### PB...-...C1

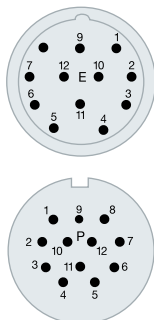
#### PB...-...C5

Lengths: 1 and 3 meters

Cable included

M23 12 connector (Male Pin )

Pin	Signal	Color
5	A	Green
6	/A	Yellow
8	B	Blue
1	/B	Red
3	I <sub>0</sub>	Grey
4	/I <sub>0</sub>	Pink
7	/AL	Purple
12	+5 V	Brown
2	+5 V sensor	Blue-Red (Orange)
10	0 V	White
11	0 V sensor	Grey-Pink
Housing	Ground	Shield



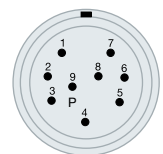
#### PB...-...C4E

Lengths: 1 and 3 meters

Cable included

9 Circular connector (Male Pin )

Pin	Signal	Color
8	A	Green
1	/A	Yellow
5	B	Blue
6	/B	Red
4	I <sub>0</sub>	Grey
3	/I <sub>0</sub>	Pink
9	+5 V	Brown
9	+5 V sensor	Blue-Red (Orange)
7	0 V	White
7	0 V sensor	Grey-Pink
2	Ground	Shield
Housing	Ground	Shield



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