## brown & sharpe®
précizika

BE163C *PHOTOELECTRIC LINEAR ENCODER*

Exposed Linear Encoder - High accuracy, High resolution, Electrically identical and Mechanically similar to LID300 encoders

The linear encoder **BE163C** is used to convert linear displacements of machine key components into electrical signals containing information about the value and direction of the displacement. Common applications include coordinate and precision machine tools, coordinate measuring machines, microscopes and other high precision equipment.
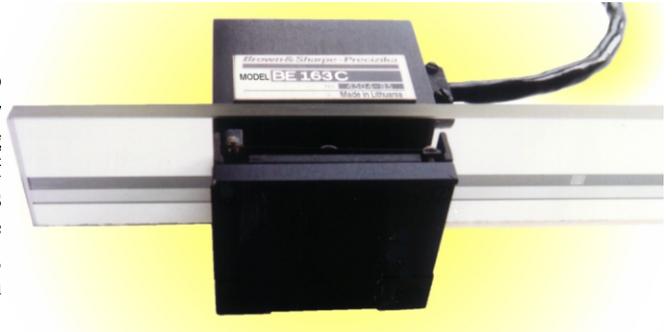
The system consists of an exposed scale and an encoder read head that works on the transmitted light principle. The scanning portion of the head self-aligns with the scale and thus maintains a constant gap between scanning unit and scale.
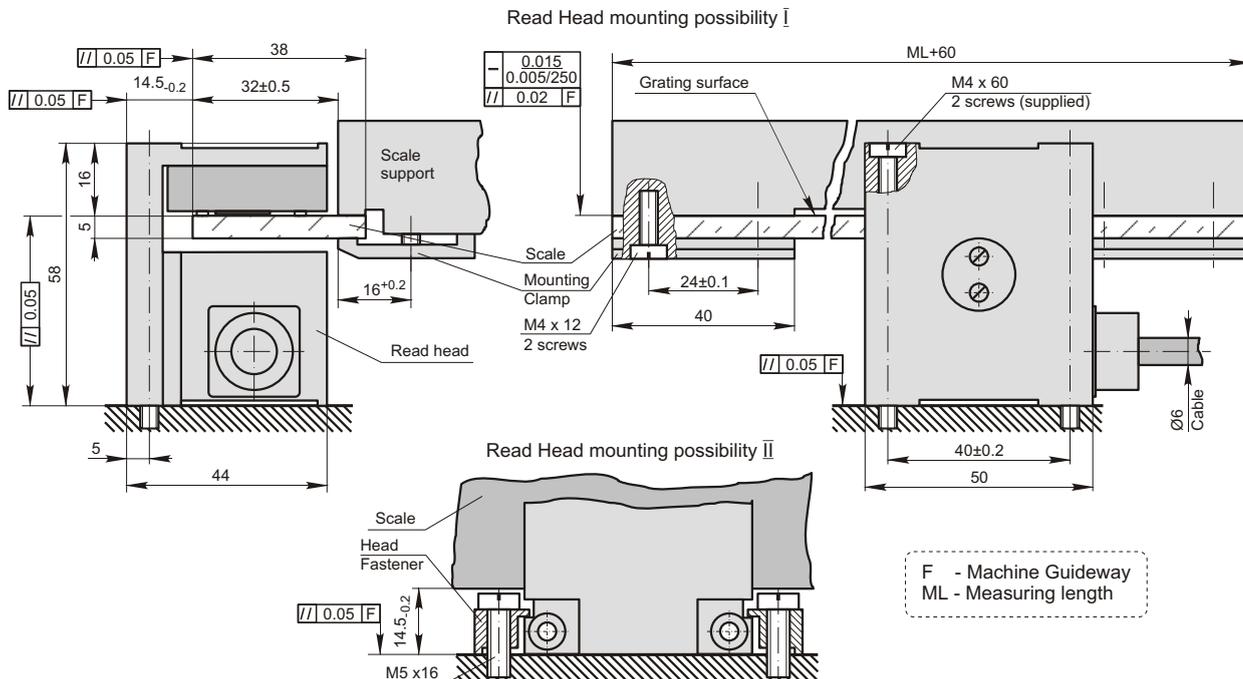
The glass scale has a grating with two line tracks. One track is the periodic graduation with a constant line pitch of 20 µm. The second contains a reference mark, which can be located 40 mm from either end, from both ends, or in the middle of the measurement range. Unique location of reference marks can also be supplied upon request.

The output signals are sinusoidal and phase shifted by 90°. With an external pulse shaping and interpolation unit (available separately) one can obtain square wave outputs with resolutions of 0.5 µm, 0.2 µm or 0.1 µm. The system is available in three accuracy grades. Connector, interpolation unit and scale mounting clamp are optional based on customer's request.

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■ Mechanical Data

Measuring lengths (ML), mm	120, 170, 220, 270, 320, 340, 420, 470, 520, 620, 650, 720, 820, 920, 940, 1020 (others ML on request)	Max. acceleration	40 m/s^2
		Required moving force	< 0.05 N
		Protection (IEC 529)	IP00
Standard grating pitch	20 µm	Weight	(0.34+0.53×ML) kg (ML in metres)
Accuracy grades to any metre within the ML (at 20°C)	±3; ±2 µm ±1 for ML ≤ 320 mm	Coefficient of temperature expansion of glass scale	8.5 µm/m ^{o}C
Reference marks (RI):	- middle of ML - 40 mm from either end - 40 mm from both ends - others locations on request	Operating temperature	0...+50°C
		Storage & transportation temperature	-20...+70°C
		Permissible vibration (40 to 2000 Hz)	≤ 10 m/s^2
		Permissible shock (11 ms)	≤ 50 m/s^2
Max. traversing speed	45 m/min	Relative humidity (without condensation of moisture)	≤ 80%

Read Head mounting possibility Ī

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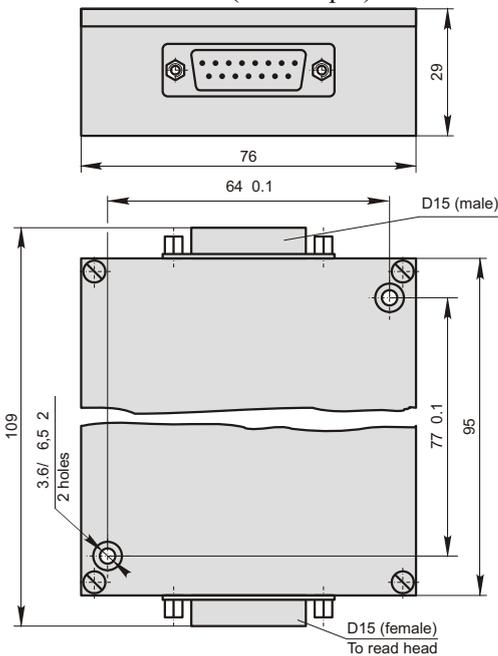
F - Machine Guideway
ML - Measuring length

■ Electrical Data

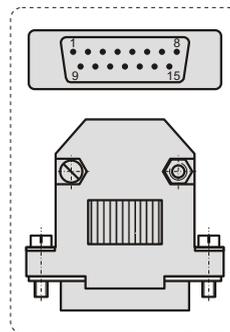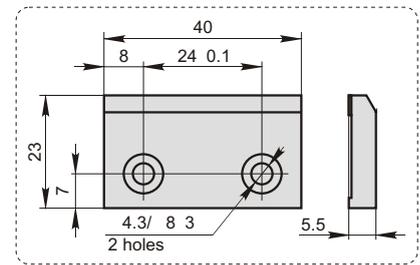|	
Power supply	+5 V ±5% / < 90 mA
Light source	LED
Resolution at x5 x10, x25 and x50 interpolation	1.0, 0.5, 0.2 µm (after 4-fold dividing in subsequent electronics)
Incremental signals	Two sinusoidal I_1 and I_2. Amplitude at 1 k load: - I_1 = 11-16 µA - I_2 = 11-16 µA
Reference signal	Quasi-triangle I_0. Signal magnitude at 1 k load: - I_0 = 4-8 µA
Maximum operating frequency	50 kHz
Direction of signals	I_2 lags I_1 at reading head displacement from left to right
Standard cable length	1 m, without connector
Max. cable length	3 m
Cable diameter	6 mm

Shape of output signals
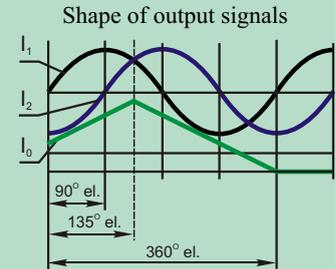
■ Accessories

NK5, NK10, NK25
Interpolation unit x5, x10, x25
(TTL output)

29
76
64 0.1
D15 (male)
109
3,6/ 6,5 2
2 holes
77 0.1
95
D15 (female)
To read head

D15
15-pin flat connector

BE163C.05.008
Scale mounting clamp

40
8
24 0.1
23
7
4.3/ 8 3
2 holes
5.5

C9
9-pin round connector. Not available with NK50

55
Ø25
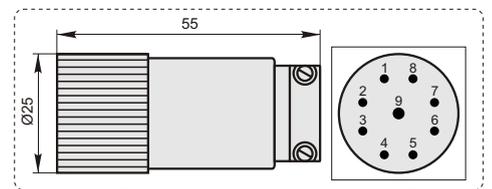
■ Order form

BE163C – X X X – X X – X X – X X / X – X

Measuring length:	Reference marks:	Accuracy:	Cable length:	Type of connector:	Mounting clamp:
012 - 120 mm	**N** - none RI	**01** - ±1 µm	**01** - 1m	**W** - without connector	**0** - without clamp
052 - 520 mm	**S1** - middle of ML	**02** - ±2 µm	**02** - 2m	**C9** - round, 9 pins	**1** - with clamp
....	**S2** - 40 mm from left end	**03** - ±3 µm	**03** - 3m	**D15** - flat, 15 pins	
102 - 1020 mm	**S3** - 40 mm from right end				
	S4 - 40 mm from both ends				

CE

January 2003