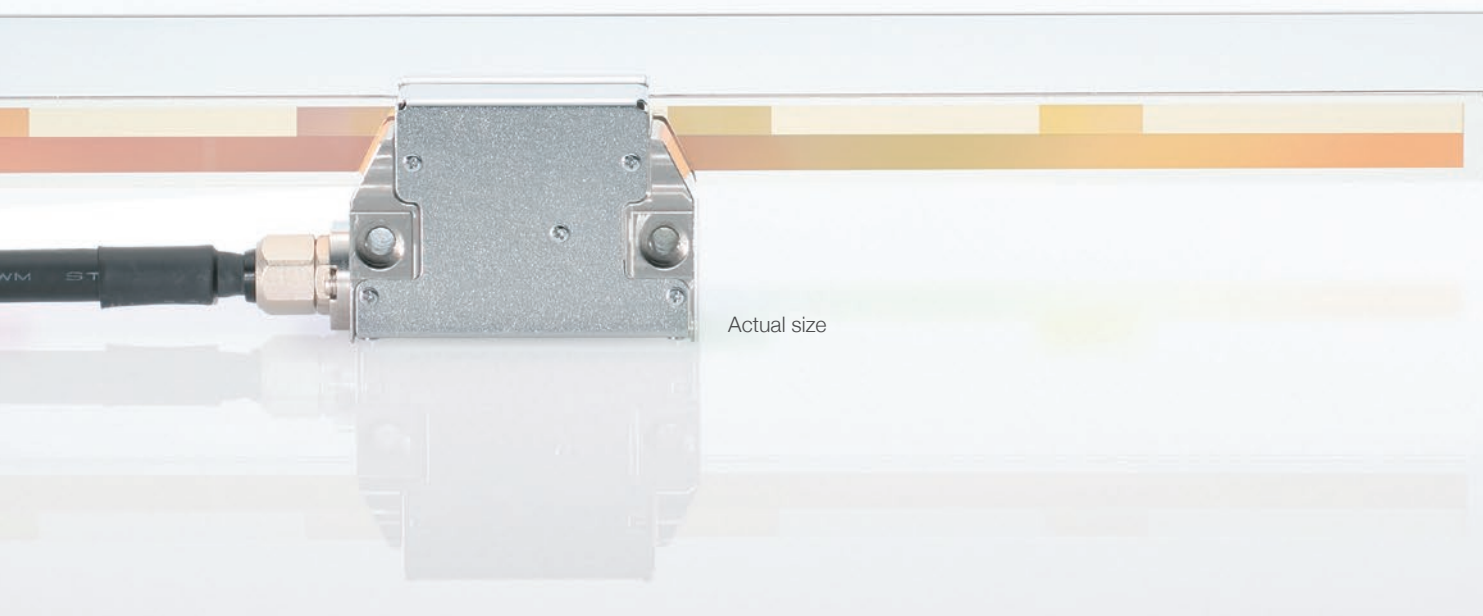


BS

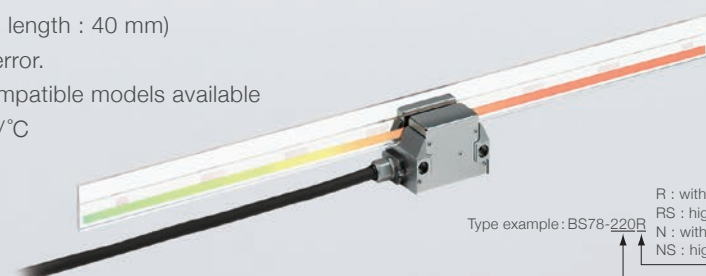
BS78 (with/without reference point)

High-speed and high-resolution, while maintaining stable, ultraprecision measuring.
Ideal for precision stages, semiconductor inspection/manufacturing systems,
and ultraprecision processing machines.



Actual size

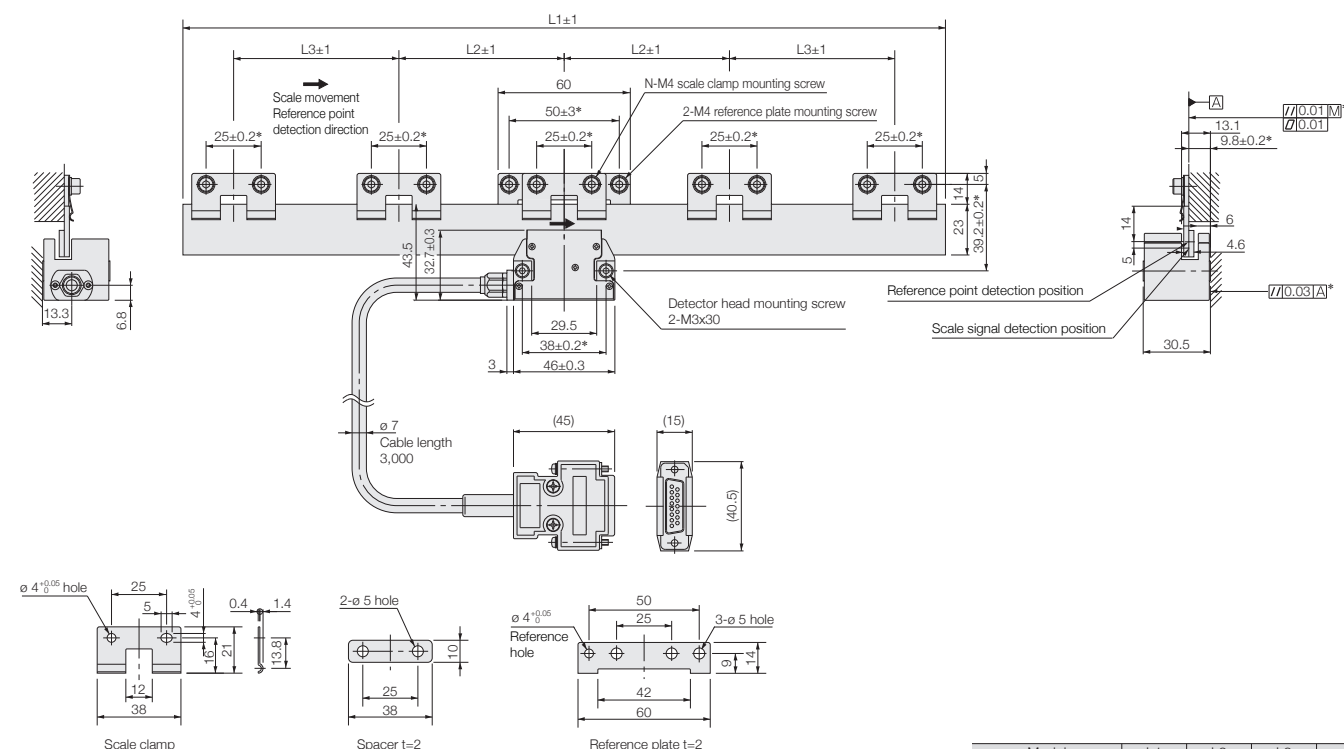
- High-resolution scale with signal pitch of approx. 138 nm, outperforming light wave interferometer systems
- High stability, unaffected by humidity, air pressure and air disturbances
- Reference point accuracy : $\pm 0.1 \mu\text{m}$
- Scale accuracy : $\pm 0.04 \mu\text{m}$ (measuring length : 40 mm)
- Non-contact design eliminates return error.
- Special non-magnetic and vacuum-compatible models available
- Using low expansion glass : $-0.7 \times 10^{-6}/^{\circ}\text{C}$ (measuring length : 10 to 420 mm)



Type example: BS78-220R
R : with reference point;
RS : high accuracy with reference point
N : without reference point;
NS : high accuracy without reference point
Measuring length

External Dimensions

● BS78-xxxR(RS) (Measuring length : 40/120/170/220/370/420 mm)

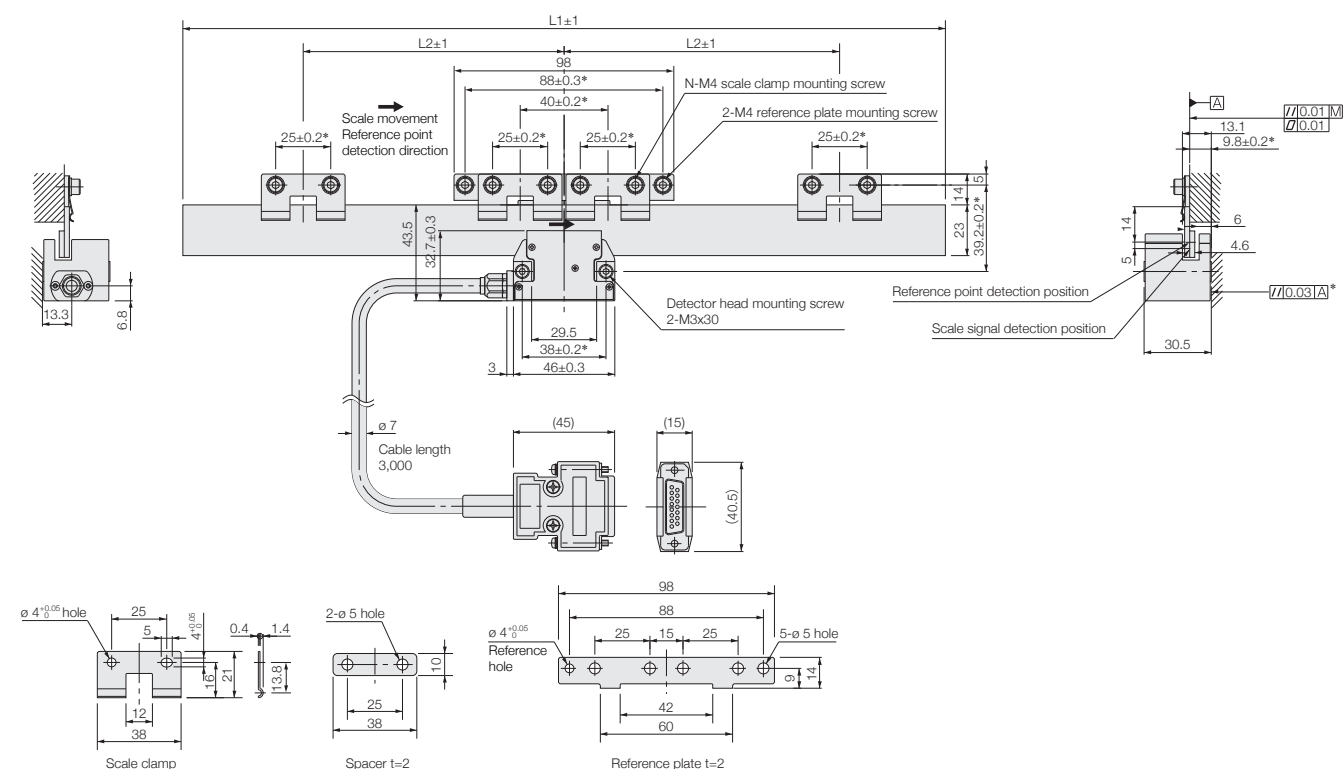


Note 1 : The items marked by an asterisk indicate the machining dimensions on the mounting surface.
Note 2 : The surface properties of the scale mounting surface is $R_{\text{max}} = 6.3S$.
Note 3 : The surface properties of the detector head mounting surface is $R_{\text{max}} = 12.5S$.
Note 4 : "M" refers to the machine guide.
Note 5 : Mount and adjust the paired reference plates so that their reference surfaces have a parallelism of 0.01 or less with respect to the machine guide.
Note 6 : Reference point detection direction : Standard (Scale movement direction → with the head stationary)

Model	L1	L2	L3	N
BS78-40R (RS)	66	—	—	2
BS78-120R (RS)	146	50	—	6
BS78-170R (RS)	196	75	—	6
BS78-220R (RS)	246	100	—	6
BS78-370R (RS)	396	75	75	10
BS78-420R (RS)	446	100	100	10

Unit : mm

● BS78-xxxR(RS) (Measuring length : 70/270/320 mm)

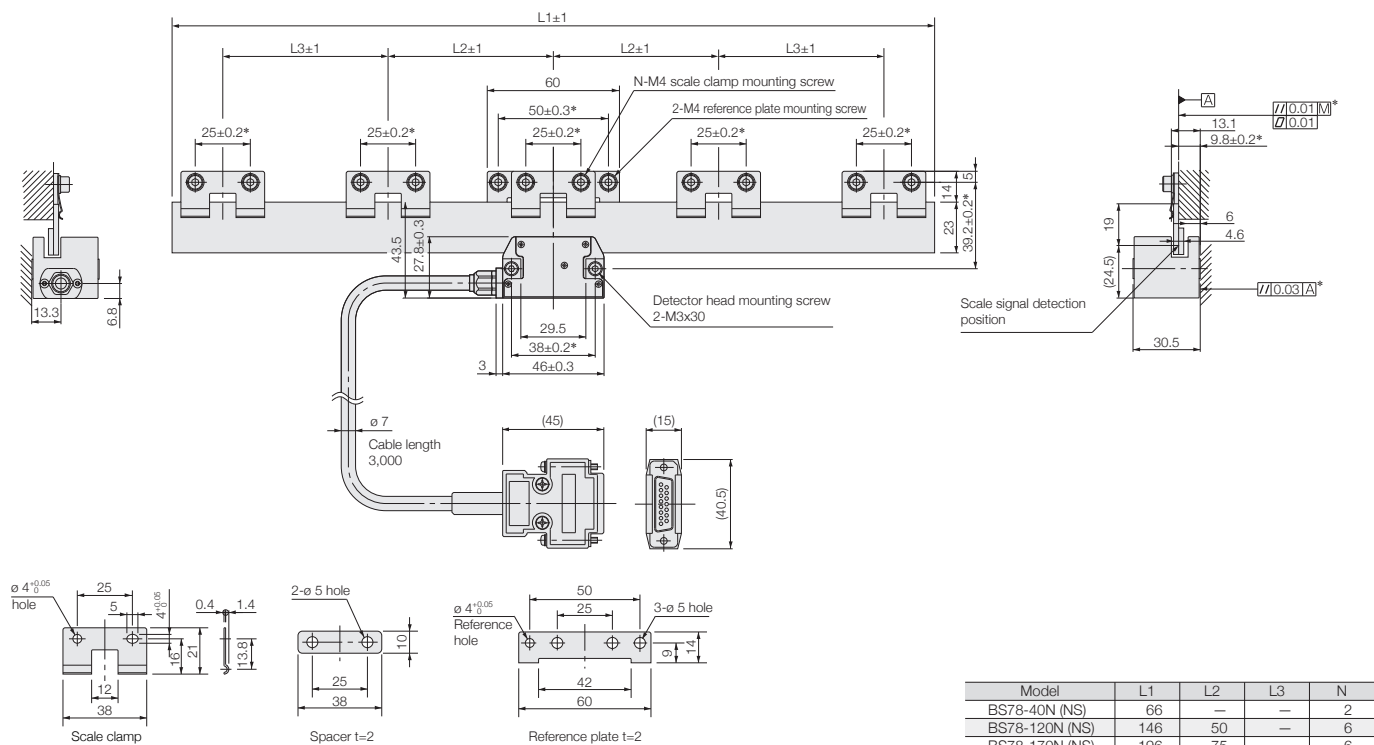


Note 1 : The items marked by an asterisk indicate the machining dimensions on the mounting surface.
Note 2 : The surface properties of the scale mounting surface is $R_{\text{max}} = 6.3S$.
Note 3 : The surface properties of the detector head mounting surface is $R_{\text{max}} = 12.5S$.
Note 4 : "M" refers to the machine guide.
Note 5 : Mount and adjust the paired reference plates so that their reference surfaces have a parallelism of 0.01 or less with respect to the machine guide.
Note 6 : Reference point detection direction : Standard (Scale movement direction → with the head stationary)

Model	L1	L2	N
BS78-70R (RS)	96	—	4
BS78-270R (RS)	296	120	8
BS78-320R (RS)	346	120	8

Unit : mm

● BS78-xxxN(NS) (Measuring length : 40/120/170/220/370/420 mm)



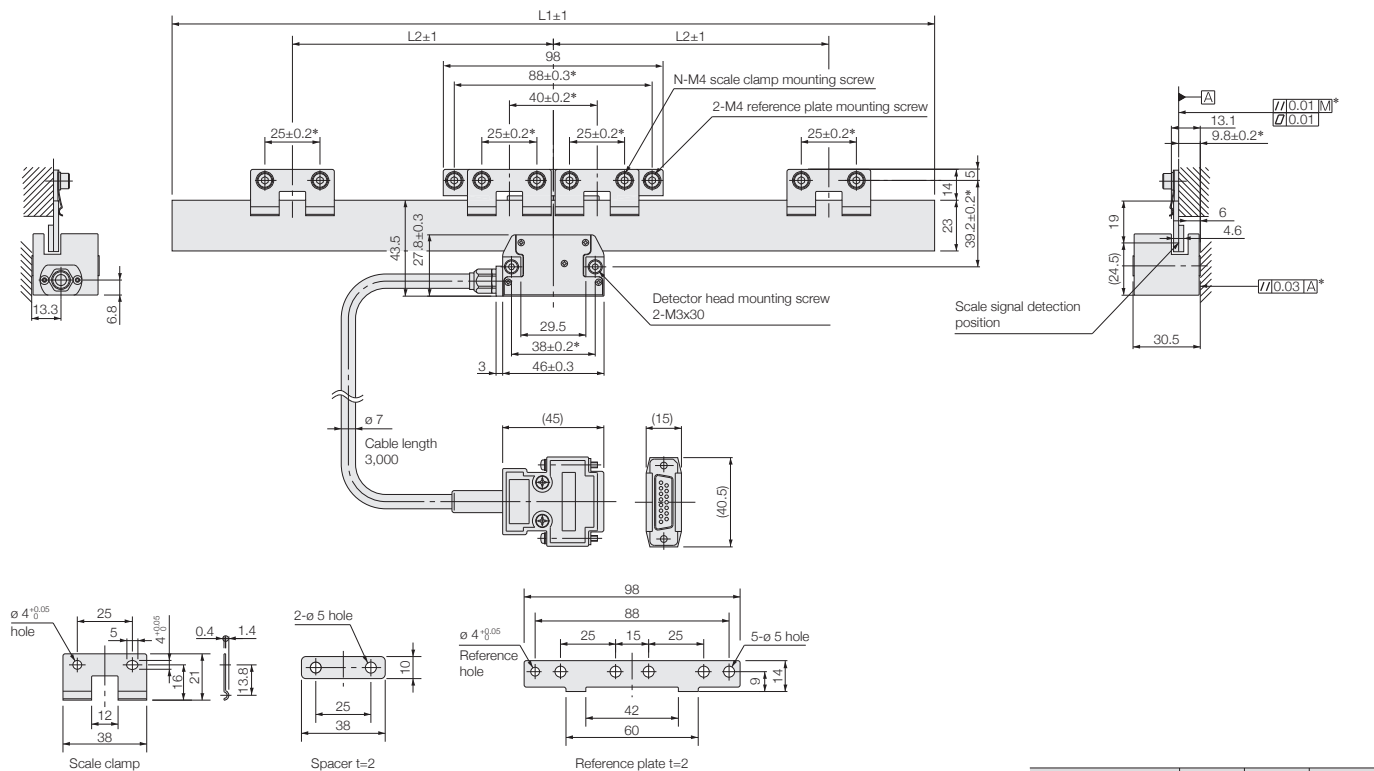
Note 1 : The items marked by an asterisk indicate the machining dimensions on the mounting surface.
 Note 2 : The surface properties of the scale mounting surface is Rmax = 6.3S.
 Note 3 : The surface properties of the detector head mounting surface is Rmax = 12.5S.
 Note 4 : "M" refers to the machine guide.
 Note 5 : Mount and adjust the paired reference plates so that their reference surfaces have a parallelism of 0.01 or less with respect to the machine guide.

BS78-370N (NS)	396	75	75	10
BS78-420N (NS)	446	100	100	10

Unit : mm

Unit : mm

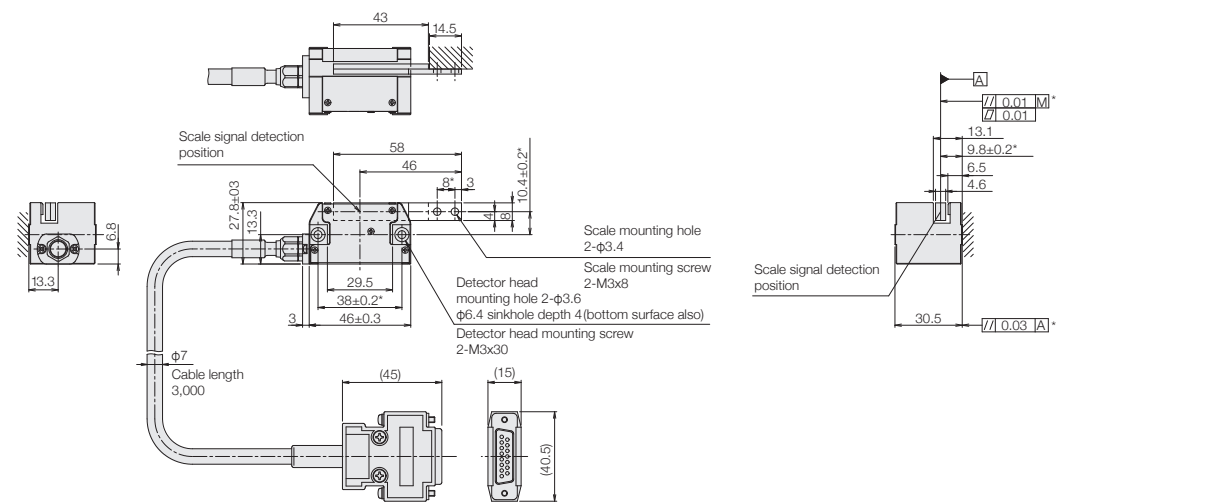
● BS78-xxxN(NS) (Measuring length : 70/270/320 mm)



Note 1 : The items marked by an asterisk indicate the machining dimensions on the mounting surface.	BS78-70N (NS)	96	120	8
Note 2 : The surface properties of the scale mounting surface is Rmax = 6.3S.	BS78-270N (NS)	296	120	8
Note 3 : The surface properties of the detector head mounting surface is Rmax = 12.5S.	BS78-320N (NS)	346	120	8
Note 4 : "M" refers to the machine guide.				
Note 5 : Mount and adjust the paired reference plates so that their reference surfaces have a parallelism of 0.01 or less with respect to the machine guide.				

Unit : mm

● BS78-10N/NS (Measuring length : 10 mm)



Note 1 : The items marked by an asterisk indicate the machining dimensions on the mounting surface.
 Note 2 : The surface properties of the scale mounting surface is Rmax = 6.3S.
 Note 3 : The surface properties of the detector head mounting surface is Rmax = 12.5S.
 Note 4 : "M" refers to the machine guide.

Unit : mm

Unit : mm

Main Specifications																											
Model	BS78																										
Measuring length	10 (only N/NS)/40/70/120/170/220/270/320/370/420 mm																										
Overall length	58 mm (L=10mm : open type scale), L + 26 mm (L= 40 mm to 420 mm) L : Measuring length																										
Max. travel	L + 2 mm (L=10 mm : open type scale), L +10 mm (L= 40 mm to 420 mm) L : Measuring length																										
Scale accuracy (at20 °C)	<table><tr><td colspan="2">NS type, RS type :</td><td colspan="2">N type, R type :</td></tr><tr><td>±0.03 μm (L=10 mm : NS type)</td><td>±0.25 μm (L=270 mm)</td><td>±0.06 μm (L=10 mm : N type)</td><td>±0.35 μm (L=170/220 mm)</td></tr><tr><td>±0.04 μm (L=40 mm)</td><td>±0.34 μm (L=320 mm)</td><td>±0.08 μm (L=40 mm)</td><td>±0.50 μm (L=270 to 370 mm)</td></tr><tr><td>±0.10 μm (L=70/120 mm)</td><td>±0.39 μm (L=370 mm)</td><td>±0.20 μm (L=70/120 mm)</td><td>±0.65 μm (L=420 mm)</td></tr><tr><td>±0.18 μm (L=170/220 mm)</td><td>±0.44 μm (L=420 mm)</td><td colspan="2">L : Measuring length</td></tr><tr><td colspan="2">L : Measuring length</td><td colspan="2"></td></tr></table>			NS type, RS type :		N type, R type :		±0.03 μm (L=10 mm : NS type)	±0.25 μm (L=270 mm)	±0.06 μm (L=10 mm : N type)	±0.35 μm (L=170/220 mm)	±0.04 μm (L=40 mm)	±0.34 μm (L=320 mm)	±0.08 μm (L=40 mm)	±0.50 μm (L=270 to 370 mm)	±0.10 μm (L=70/120 mm)	±0.39 μm (L=370 mm)	±0.20 μm (L=70/120 mm)	±0.65 μm (L=420 mm)	±0.18 μm (L=170/220 mm)	±0.44 μm (L=420 mm)	L : Measuring length		L : Measuring length			
NS type, RS type :		N type, R type :																									
±0.03 μm (L=10 mm : NS type)	±0.25 μm (L=270 mm)	±0.06 μm (L=10 mm : N type)	±0.35 μm (L=170/220 mm)																								
±0.04 μm (L=40 mm)	±0.34 μm (L=320 mm)	±0.08 μm (L=40 mm)	±0.50 μm (L=270 to 370 mm)																								
±0.10 μm (L=70/120 mm)	±0.39 μm (L=370 mm)	±0.20 μm (L=70/120 mm)	±0.65 μm (L=420 mm)																								
±0.18 μm (L=170/220 mm)	±0.44 μm (L=420 mm)	L : Measuring length																									
L : Measuring length																											
Grating pitch	Approx. 0.55 μm																										
Signal pitch	Approx. 0.138 μm (Approx. 138 nm)																										
Reference point accuracy	0.1 μm (Only R/RS type)																										
Reference point position	At the center, and every 50 mm from the center to the left and to the right (BS78 models with measuring lengths of 320, 370, 420 mm : 20 mm offset from the center at 50 mm intervals)																										
Reference point detection direction	Single direction																										
Return error	This is virtually eliminated.																										
Repeatability	This is virtually eliminated.																										
Thermal expansion coefficient	-0.7 x 10 ⁻⁶ / °C																										
Light source	Semiconductor laser : Wavelength 790 nm, Output 6 mW																										
Radiation power	DHHS class 1																										
Detection principle	Diffraction grating scanning system																										
Operating temperature	+10 to +30 °C (No condensation)																										
Storage temperature	-10 to +50 °C (Humidity 60 % or less)																										
Max. response speed	400 mm/s (When connected with BD700)																										

Magnescale reserves the right to change product specifications without prior notice.