

BS

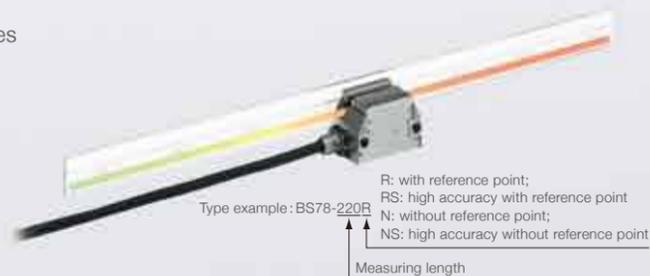
BS78 (with/without reference point)

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



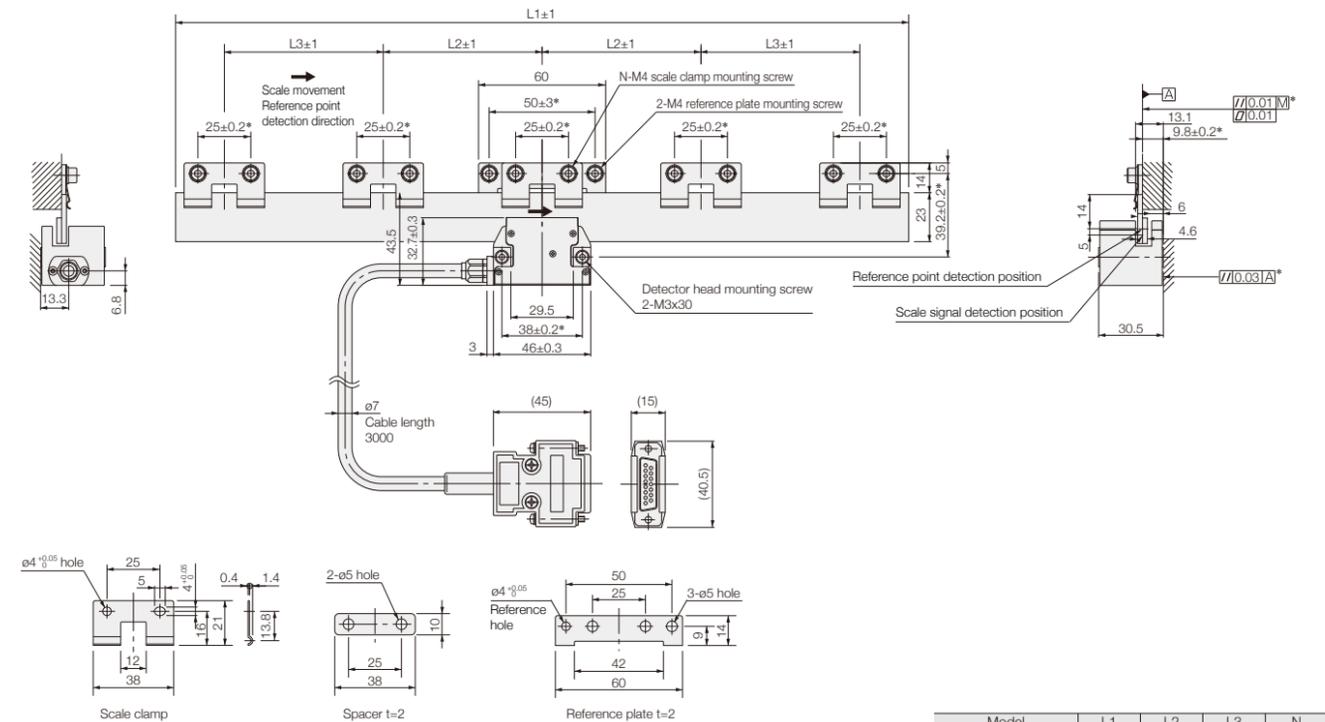
Actual size

- High-resolution scale with signal pitch of approx. 138nm, 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)



External Dimensions

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

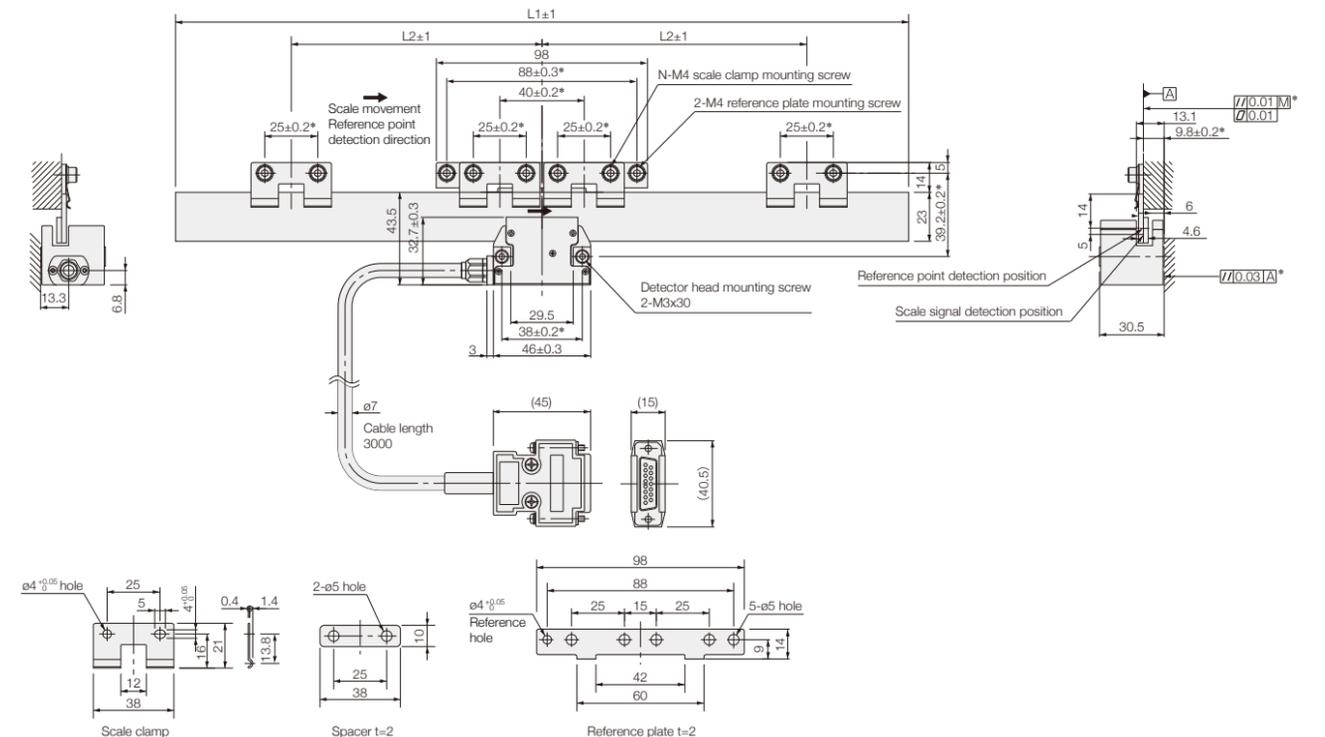


- Note 1: The items marked by an asterisk indicate the machining dimensions on the mounting surface.
 Note 2: The surface roughness of the scale mounting surface is $R_{\text{max}} = 6.3\text{S}$.
 Note 3: The surface roughness of the detector head mounting surface is $R_{\text{max}} = 12.5\text{S}$.
 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 \rightarrow 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)



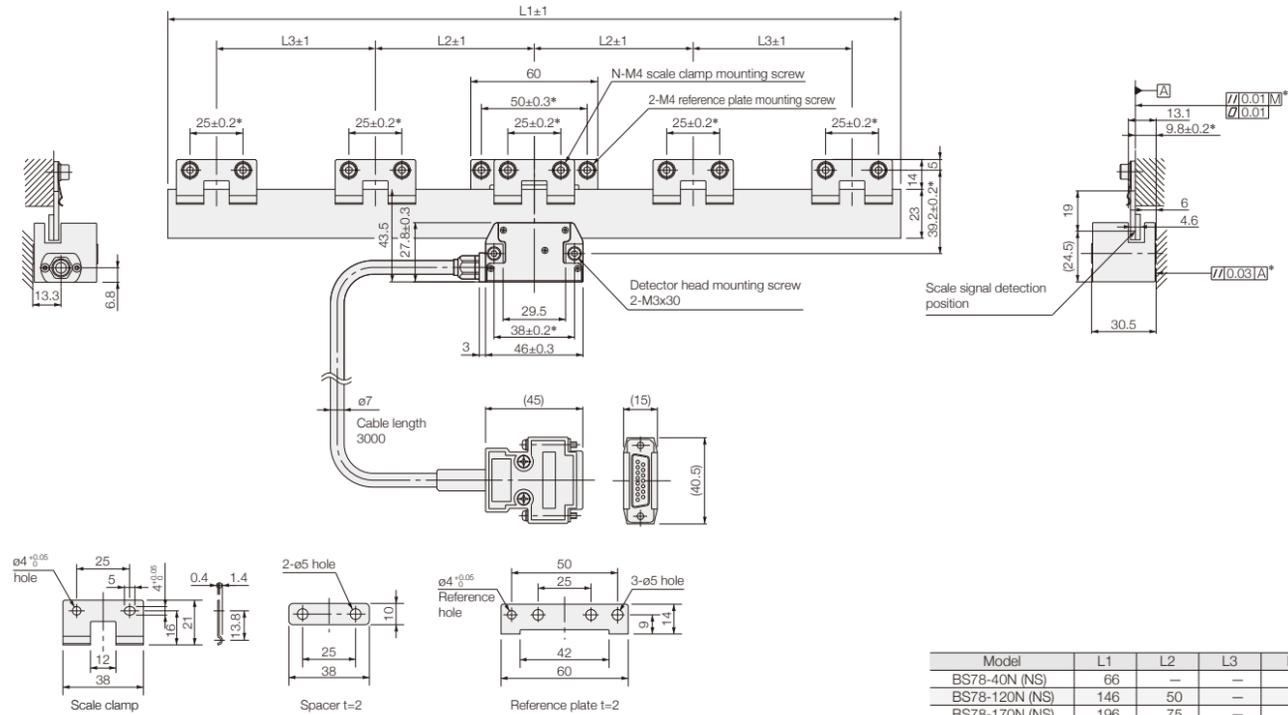
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 Note 5: Mount and adjust the paired reference plates so that their reference surfaces have a parallelism of 0.01 or less with respect to the machine guide.
 Note 6: Reference point detection direction : Standard (Scale movement direction \rightarrow 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

External Dimensions

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

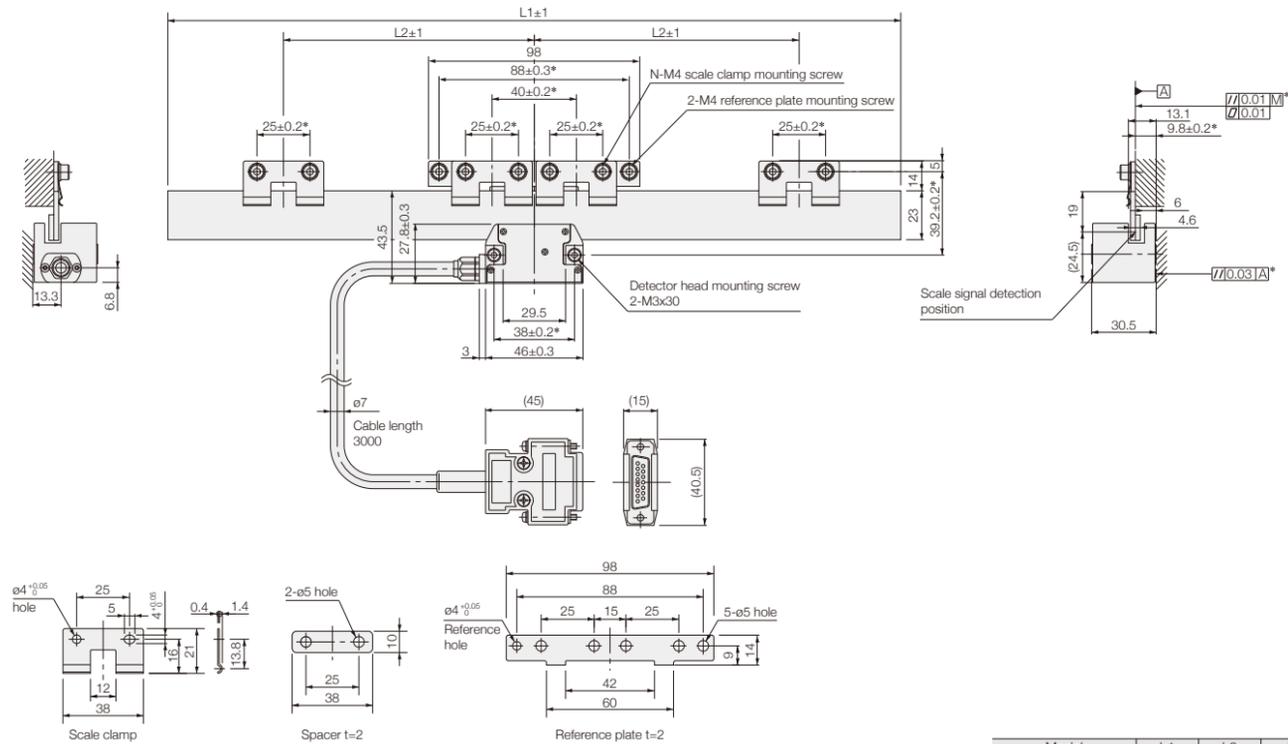


- Note 1: The items marked by an asterisk indicate the machining dimensions on the mounting surface.
 Note 2: The surface roughness of the scale mounting surface is $R_{max} = 6.3S$.
 Note 3: The surface roughness of the detector head mounting surface is $R_{max} = 12.5S$.
 Note 4: "M" refers to the 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.

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

Unit: mm

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



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

Unit: mm

Main Specifications

Model	BS78	
Measuring length	10(only N/NS)/40/70/120/170/220/270/320/370/420 mm	
Overall length	58mm (L=10mm:open type scale), L + 26mm (L= 40mm to 420mm) L: Measuring length	
Max. travel	L + 2mm (L=10mm:open type scale), L + 10mm (L= 40mm to 420mm) L: Measuring length	
Scale accuracy(at 20°C)	NS type, RS type : ±0.03μm (L=10mm : NS type) ±0.04μm (L=40mm) ±0.10μm (L=70/120mm) ±0.18μm (L=170/220mm) L: Measuring length	N type, R type : ±0.25μm (L=270mm) ±0.34μm (L=320mm) ±0.39μm (L=370mm) ±0.44μm (L=420mm)
Grating pitch	Approx. 0.55μm	
Signal pitch	Approx. 0.138μm (Approx. 138nm)	
Reference point accuracy	0.1μm (Only R/RS type)	
Reference point position	At the center, and every 50mm from the center to the left and to the right (BS78 models with measuring lengths of 320, 370, 420mm: 20mm offset from the center at 50mm intervals)	
Reference point detection direction	Single direction	
Return error	This is virtually eliminated. It should be considered to be less than two resolution limits of the detector that is used.	
Repeatability	This is virtually eliminated. It should be considered to be less than one resolution limit of the detector that is used.	
Thermal expansion coefficient	-0.7 x 10 ⁻⁶ /°C	
Light source	Semiconductor laser : Wavelength 790nm, Output 6mW	
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	400mm/s (When connected with BD96)	