

SONY

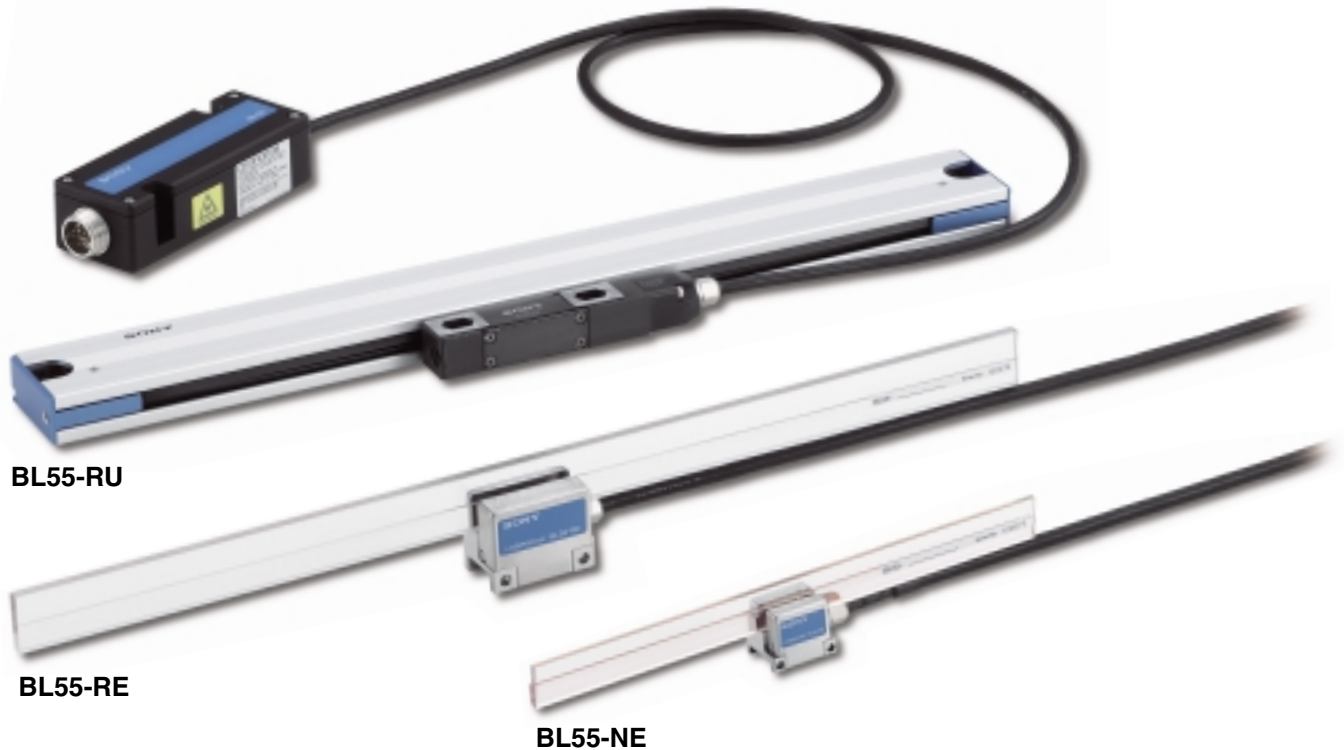
LASERSCALE™

Scale unit

BL55-RU.RE.NE

Introducing the BL55, a new Laserscale designed to meet next-generation needs by providing maximum performance in its class.

The BL55 features high-speed response, superior accuracy, and high environmental resistance.



BL55-RU (Shield Type with Zero Point), **BL55-RE** (Open Type with Zero Point), **BL55-NE** (Compact Open Type)

Resolutions of 0.1, 0.05, and 0.01 μm (including special model)

A wide range of new Laserscales are offered — shield type with zero point, open type with zero point, and low-expansion glass open type — and feature unrivaled ease of installation

Head signal pitch of 0.4 μm provides almost zero interpolation error

Optical IC driven by the latest semiconductor technology are used for a compact, energy efficient design

Typically not affected by changes in temperature, humidity, or air pressure, or by atmospheric fluctuations and uses low-expansion glass for enhanced measurement stability (Compact, open type)

Shield type design is non-contact, which eliminates mechanical errors

Maximum speed of 3,000 mm/s (analog output)



These products are manufactured at our Isehara Plant that is certified to ISO9001 Quality Management System and ISO14001 Environmental Management System.

Sony Precision Technology Inc.

SONY

* These standards, specifications and exteriors are subject to change without prior notice for the purpose of incorporating technical improvements.

* This product uses a semiconductor laser (790 nm wavelength). Although the laser beam is not visible to the eye, it can cause an injury to the human body. Therefore, never look into the reader head.



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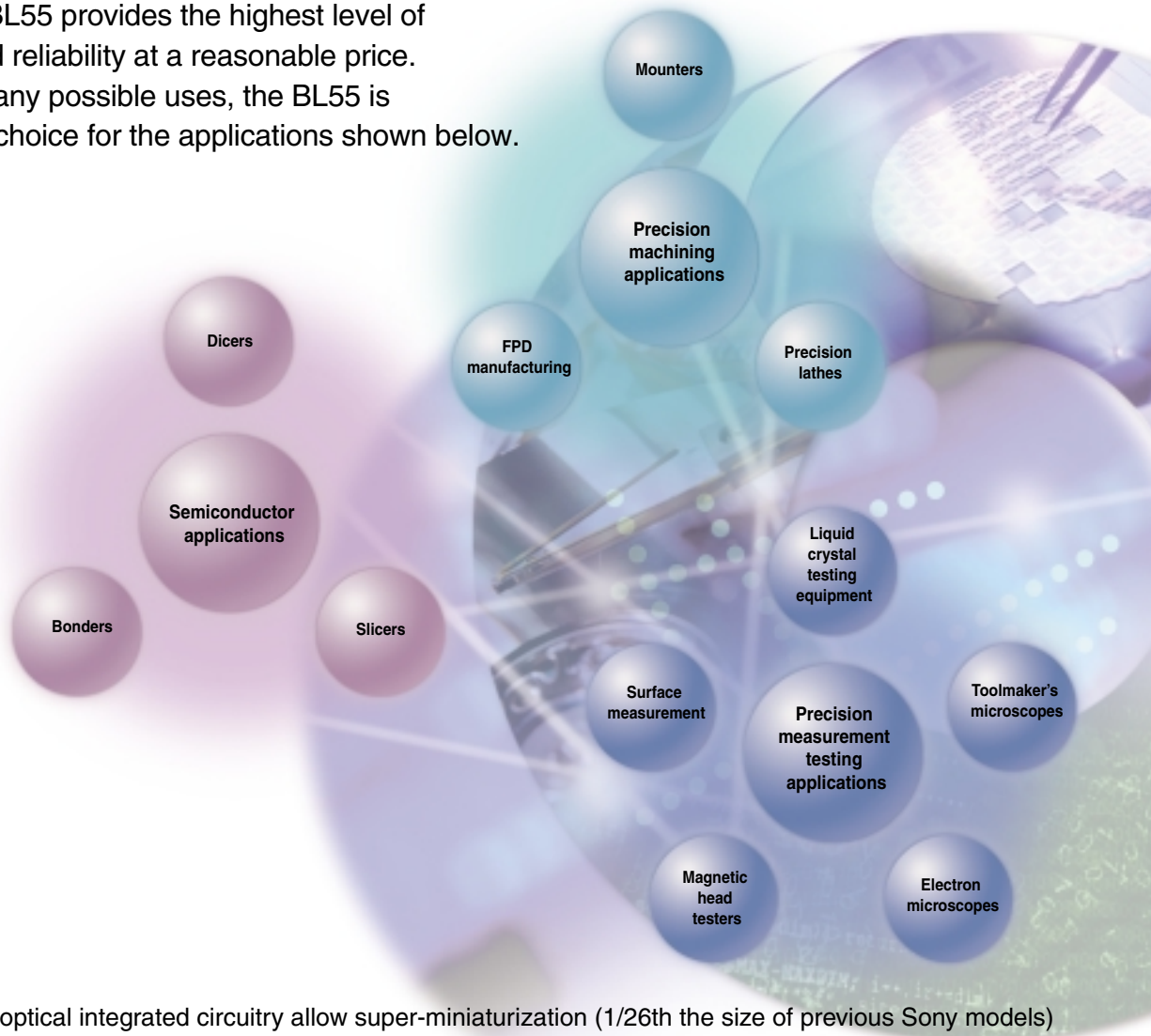
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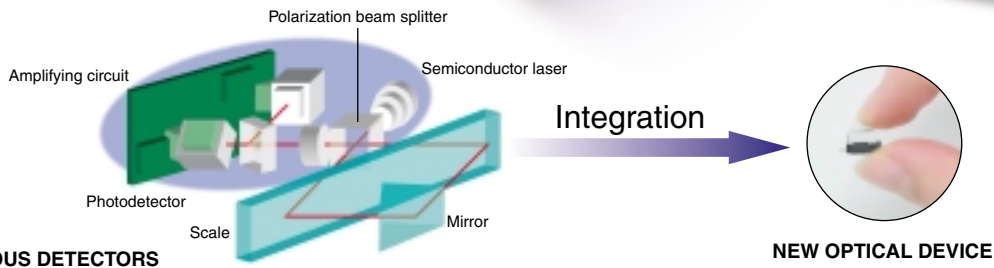
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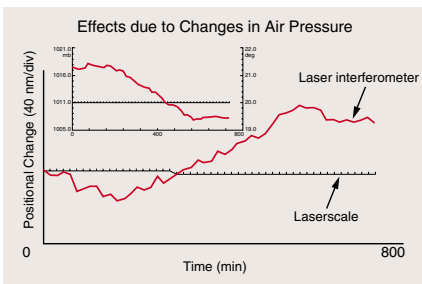
The BL55 range embodies a technological break-through in Sony's Laserscale design. Sony has dramatically reduced the overall size of its Laserscale by creating a new optical integrated circuit. All of the separate parts that make up the read head are now combined into one device. As a result, BL55 provides the highest level of precision and reliability at a reasonable price. Among its many possible uses, the BL55 is an excellent choice for the applications shown below.



Sony's new optical integrated circuitry allow super-miniaturization (1/26th the size of previous Sony models)

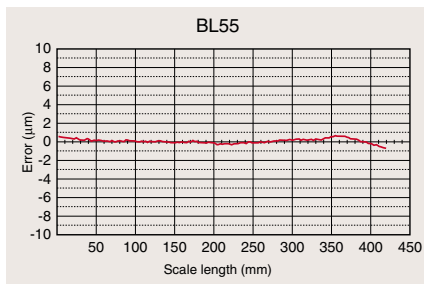


High stability under environmental fluctuations



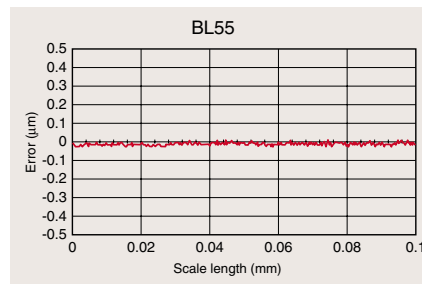
The Laserscale's unique principles prevent displacement from occurring due to the air pressure fluctuations that are characteristic of lasers.

High accuracy



The non-contact structure of the head scale allows high repeatability and a low returning error.

High accuracy (interpolation accuracy)



With the small signal wavelength of 0.4 µm, the interpolation error is practically non-existent.

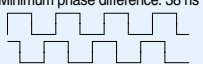

BL55-RU (Shield Type with Zero Point)

Even though the shield-type BL55 is enclosed, great care was taken to ensure a non-contact design, thus eliminating inherent mechanical errors. Also, the enclosure provides a higher resistance to harsh environments.

- All of the benefits Sony's Laserscale technology have been incorporated in an enclosed design
- High response speed and high accuracy at the top of its class
- Ideal for use on high precision machine tools
- Head signal pitch of 0.4 μm
- Offers user-definable zero point reference for maximum flexibility

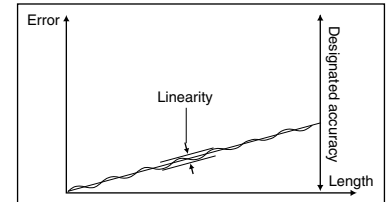


Main standards and specifications

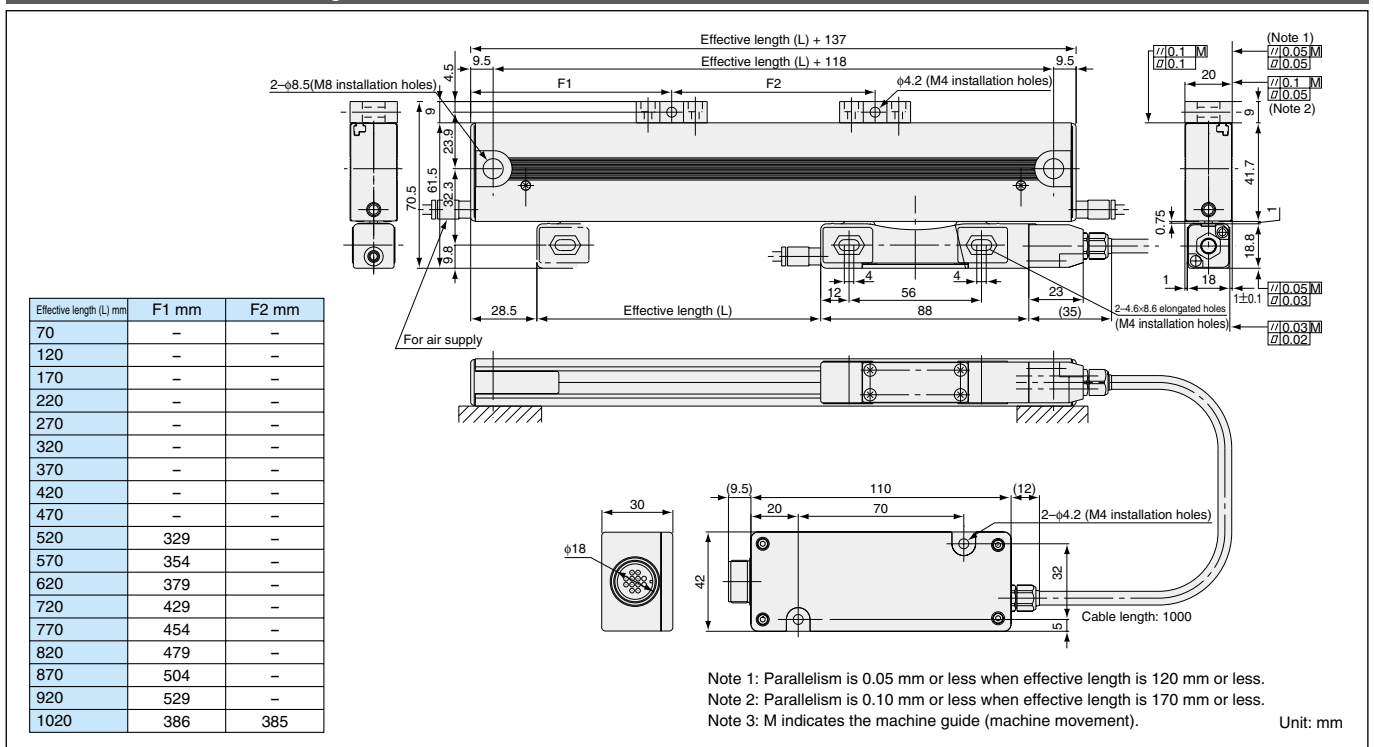
Model name	BL55-RUF	BL55-RUH
Output signal form	A/B quadrature output	Analog output
Detection system	Diffraction grating scanning system	
Scale length	Effective measurement length (mm)	70-120-170-220-270-320-370-420-470-520-570-620-720-770-820-870-920-1020
	Mounting hole pitch	Effective length + 118mm
	Entire scale length	Effective length + 137mm
Grating pitch	1.6 μm max.	
Signal pitch	0.4 μm max.	
Output signal	Differential (compliant with EIA-422)	Differential (zero point signal only is compliant with EIA-422)
Resolution	0.1/0.05 μm (can be changed by switch)*1	0.4 μm (1 Vp-p)
Accuracy	$\pm 2.5 \mu\text{m}$ (70 to 320 mm) · $\pm 4.5 \mu\text{m}$ (370 mm or more) (Accuracy per meter for more than 1 m of length)	
Linearity*2	$\pm 2.5 \mu\text{m}$	
Returning error	0.1 μm max.	
Repeatability	0.1 μm max.	
Thermal expansion coefficient	$8 \times 10^{-6}/^{\circ}\text{C}$	
Maximum response speed	2000 mm/s (0.1 μm) 1000 mm/s (0.05 μm) Minimum phase difference: 38 ns	3000 mm/s*3 Max.: 7.5 MHz
		
Alarms	The output signal is high impedance when a response speed is exceeded or signal level error occurs.	None

Model name	BL55-RUF	BL55-RUH
Zero point position	User definable	
Zero point accuracy	$\pm 0.4 \mu\text{m}$ (at 20°C) (depending on machine movement accuracy)	
Zero point output signal	Unidirectional synchronous zero point (specify the position and detection direction when ordering)	
Head cable	Cable length	1,000 mm**
	Bending radius	When stationary: 30 mm When in motion: 100 mm
Output cable length (to the electronic control section)	15 m max.	15 m max.*3
Power supply	+5V $\pm 5\%$	
Power consumption	450 mA (no load) 600 mA (maximum when cable is connected)	
Protective design	IP53 or equivalent (when air is supplied: IP64 or equivalent)	
Vibration resistance	100 m/s ² (50 to 2000 Hz)	
Impact resistance	200 m/s ²	
Operating temperature range	0 to +40°C (no condensation)	
Storage temperature range	-10 to +50°C	
Light source	Two semiconductor lasers with power of 6 mW and wavelength of 790 nm	
Radiation power	JIS Class 1 equivalent, DHHS Class 1 equivalent	

- *1: 0.01 μm resolution of AB quadrature output is special model.
 *2: The linearity is the range of scattering when scale accuracy slope is set to zero.
 *3: Please inquire about this matter separately since there is a correlation between the maximum response speed and output cable length.
 *4: Up to 3,000 mm can be supported for special model.



BL55-RU External Dimensional Diagram



BL55-RE (Open Type with Zero Point)

BL55 makes highly accurate positioning affordable for anyone. With the linearity of $\pm 1.5 \mu\text{m}$ or better, and a design that makes installation simple, the BL55-RE is an excellent choice for thousands of demanding applications.

- High response speed of up to 3,000 mm/s
- Can be supplied with either A/B quadrature or analog (1V p-p) output
- Offers user-definable zero point reference for maximum flexibility
- Measuring length available to 1,060 mm



Main standards and specifications

Model name	BL55-REF	BL55-REH
Output signal form	A/B quadrature output	Analog output
Detection system	Diffraction grating scanning system	
Effective measurement length (mm)	60-160-260-360-460-560-660-760-860-960-1060	
Maximum movable length	Effective length + 10 mm	
Entire scale length	Effective length + 36 mm	
Grating pitch	1.6 μm	
Signal pitch	0.4 μm	
Output signal	Differential (compliant with EIA-422)	Differential (zero point signal only is compliant with EIA-422)
Resolution	0.1/0.05 μm (can be changed by switch)*1	0.4 μm (1 Vp-p)
Accuracy	$\pm 2.5 \mu\text{m}$ (60 to 360 mm) · $\pm 4.5 \mu\text{m}$ (460 mm or more) (Accuracy per meter for more than 1 m of length)	
Linearity ²	$\pm 0.5 \mu\text{m}$ (60 to 160 mm) · $\pm 1 \mu\text{m}$ (260 to 360 mm) · $\pm 1.5 \mu\text{m}$ (460 mm or more)	
Returning error	0.05 μm max.	
Repeatability	0.05 μm max.	
Thermal expansion coefficient	$8 \times 10^{-6}/^\circ\text{C}$	
Maximum response speed	2000 mm/s (0.1 μm) 1000 mm/s (0.05 μm) Minimum phase difference: 38 ns	3000 mm/s*3 Max.: 7.5 MHz

Model name	BL55-REF	BL55-REH
Alarms	The output signal is high impedance when a response speed is exceeded or signal level error occurs.	None
Zero point position	Any selected point	
Zero point accuracy	$\pm 0.4 \mu\text{m}$ (at 20°C) (depending on machine movement accuracy)	
Zero point output signal	Unidirectional synchronous zero point (specify the position and detection direction when ordering)	
Head cable	Cable length: 1,000 mm*4 Bending radius: When stationary: 30 mm When in motion: 100 mm	
Output cable length (to the electronic control section)	15 m max.	15 m max.*3
Power supply	+5V $\pm 5\%$	
Power consumption	450 mA (no load) 600 mA (maximum when cable is connected)	
Vibration resistance	100 m/s ² (50 to 2000 Hz)	
Impact resistance	200 m/s ²	
Operating temperature range	0 to +40°C (no condensation)	
Storage temperature range	-10 to +50°C	
Light source	Two semiconductor lasers with power of 6 mW and wavelength of 790 nm	
Radiation power	JIS Class 1 equivalent, DHHS Class 1 equivalent	

*1: 0.01 μm resolution of AB quadrature output is available as special model.

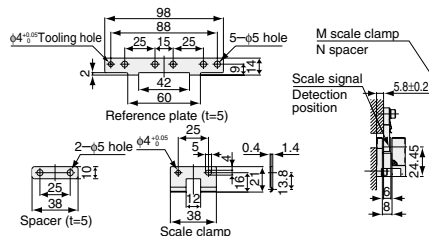
*2: The linearity is the range of scattering when scale accuracy slope is set to zero.

*3: Please inquire about this matter separately since there is a correlation between the maximum response speed and output cable length.

*4: Up to 3,000 mm can be supported for special model.

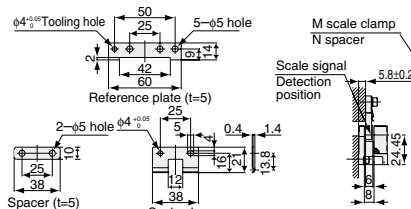
External Dimensional Diagram

Open type with zero point
BL55-006RE
BL55-026RE
BL55-046RE
BL55-066RE
BL55-086RE
BL55-106RE

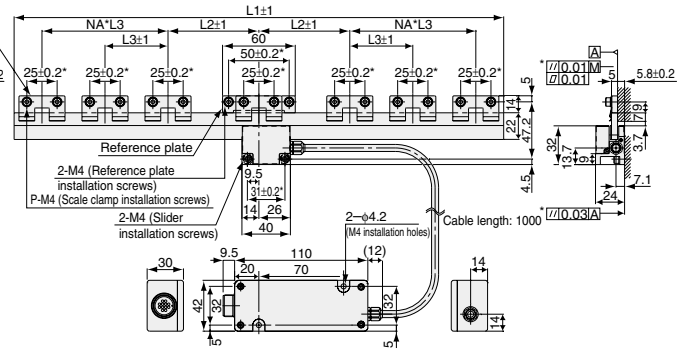
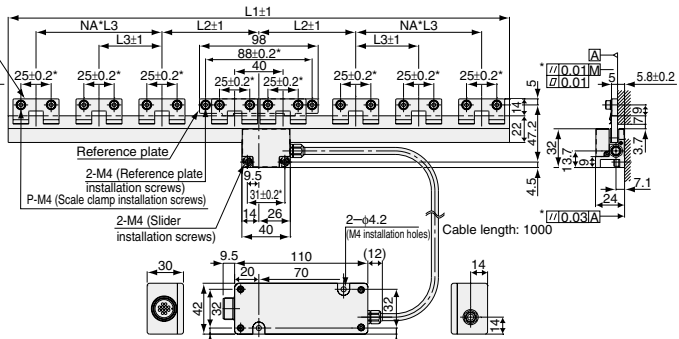


Model name	L1	L2	L3	NA	M	N	P
BL55-006RE	96	-	-	NA	M	-	4
BL55-026RE	296	120	-	-	4	2	8
BL55-046RE	496	120	75	1	6	4	12
BL55-066RE	696	120	75	2	8	6	16
BL55-086RE	896	120	75	3	10	8	20
BL55-106RE	1096	120	100	4	12	10	24

Open type with zero point
BL55-016RE
BL55-036RE
BL55-056RE
BL55-076RE
BL55-096RE



Model name	L1	L2	L3	NA	M	N	P
BL55-016RE	196	75	-	-	3	2	6
BL55-036RE	396	75	75	1	5	4	10
BL55-056RE	596	75	75	2	7	6	14
BL55-076RE	796	75	75	3	9	8	18
BL55-096RE	996	75	75	4	11	10	22



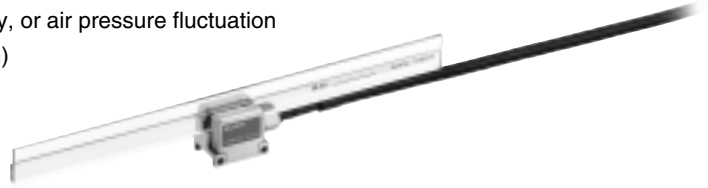
Note 1: The machining dimensions of the installation surface are indicated by *. Note 2: The surface roughness of the scale installation surface shall be $R_{\text{max}}=6.3\text{S}$. Note 3: The surface roughness of the slider installation surface shall be $R_{\text{max}}=12.5\text{S}$. Note 4: M indicates the machine guide (machine movement).

Unit: mm

BL55-NE (Compact Open Type)

The BL55-NE takes full advantage of the newly developed optical integrated circuitry and offers the smallest footprint of any SONY Laserscale. Plus, the BL55-NE is comprised of low-expansion glass, which ensures consistent accuracy.

- Compact size makes machine integration much easier (Head thickness: 18.6 mm)
- Typically not affected by changes in temperature, humidity, or air pressure fluctuation
- Designed with low expansion coefficient glass (Neoceram) for enhanced measuring stability
- Incredible linearity of $\pm 1 \mu\text{m}$ or less



Main standards and specifications

Model name	BL-55-NEA
Detection system	Diffraction grating scanning system
Scale length	30 70 120 170 220 270 320 370 420
Effective measurement length (mm)	30 70 120 170 220 270 320 370 420
Maximum movable length	Effective length + 10 mm
Entire scale length	Effective length + 26 mm
Grating pitch	1.6 μm max.
Signal pitch	0.4 μm max.
Output signal	A/B quadrature differential (compliant with EIA-422)
Resolution	0.1 μm
Accuracy	$\pm 2.5 \mu\text{m}$ (30 to 220 mm) · $\pm 4.5 \mu\text{m}$ (270 mm or more)
Linearity ¹	$\pm 0.5 \mu\text{m}$ (30 to 220 mm) · $\pm 1 \mu\text{m}$ (270 mm or more)
Returning error	0.05 μm max.
Repeatability	0.05 μm max.
Thermal expansion coefficient	$-0.7 \times 10^{-6}/^\circ\text{C}$
Maximum response speed	1000 mm/s Minimum phase difference: 80 ns

Model name	BL-55-NEA
Alarms	The A/B quadrature is high impedance when signal level error occurs.
Head cable	Cable length: 1,000 mm
Bending radius	When stationary: 30 mm When in motion: 100 mm
Output cable length	15 m max. (to the electronic control section)
Power supply	+5V +10%, -5% ^{*2}
Power consumption ^{*2}	200 mA (no load) 250 mA (maximum when cable is connected)
Vibration resistance	100 m/s ² (50 to 2000 Hz)
Impact resistance	200 m/s ²
Operating temperature range	0 to +40°C (no condensation)
Storage temperature range	-10 to +50°C
Light source	Semiconductor laser with power of 6 mW and wavelength of 790 nm
Radiation power	JIS Class 1 equivalent, DHHS Class 1 equivalent

- *1: The linearity is the range of scattering when scale accuracy slope is set to zero.
 *2: The specifications are satisfied by the connector input section.
 *3: 1Vp-p Analog output : Please consult our sales.

External Dimensional Diagram

Compact open type
BL55-012NE, BL55-017NE, BL55-022NE
BL55-037NE, BL55-042NE

Compact open type
BL55-003NE, BL55-007NE,
BL55-027NE, BL55-032NE

Model name	+L1	+L2	+L3	N
BL55-003NE	55	-	-	-
BL55-012NE	146	+50	-	6
BL55-017NE	196	+75	-	6
BL55-022NE	246	100	-	6
BL55-037NE	396	75	75	10
BL55-042NE	446	100	100	10

Model name	L1	L2	N
BL55-007NE	96	-	4
BL55-027NE	296	120	8
BL55-032NE	346	120	8

Note 1: The machining dimensions of the installation surface are indicated by *.
 Note 2: The surface roughness of the scale installation surface shall be $R_{\text{max}}=6.3\text{S}$.
 Note 3: The surface roughness of the slider installation surface shall be $R_{\text{max}}=12.5\text{S}$.
 Note 4: M indicates the machine guide (machine movement).

Unit: mm