

**SONY®**

# **GB/SR108 Series**

GB-5~220/SR108-005~220

# **SR107 Series**

SR107-005~125

**マグネスケール® / Magnescale®**

取扱説明書/ Instruction Manual/ Bedienungsanleitung



Before use, read this manual carefully for correct mounting and operation.

## ■ General Precautions

When using Sony Manufacturing Systems Corporation products, observe the following general precautions along with those given specifically in this manual to ensure proper use of the products.

- Before and during operations, be sure to check that our products function properly.
- Provide adequate safety measures to prevent damages in case our products should develop malfunction.
- Use outside indicated specifications or purposes and modification of our products will void any warranty of the functions and performance as specified of our products.
- When using our products in combination with other equipment, the functions and performance as noted in this manual may not be attained, depending upon operating environmental conditions. Make full study of the compatibility in advance.

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## Features

In the GB/SR108 and SR107 series of Magnescale, the scale and cable come as a single integrated unit.

These linear scales are semi-modular types that incorporate the detector inside the scale, and the relative positions of their scale and head are adjusted and secured using a slider holder.

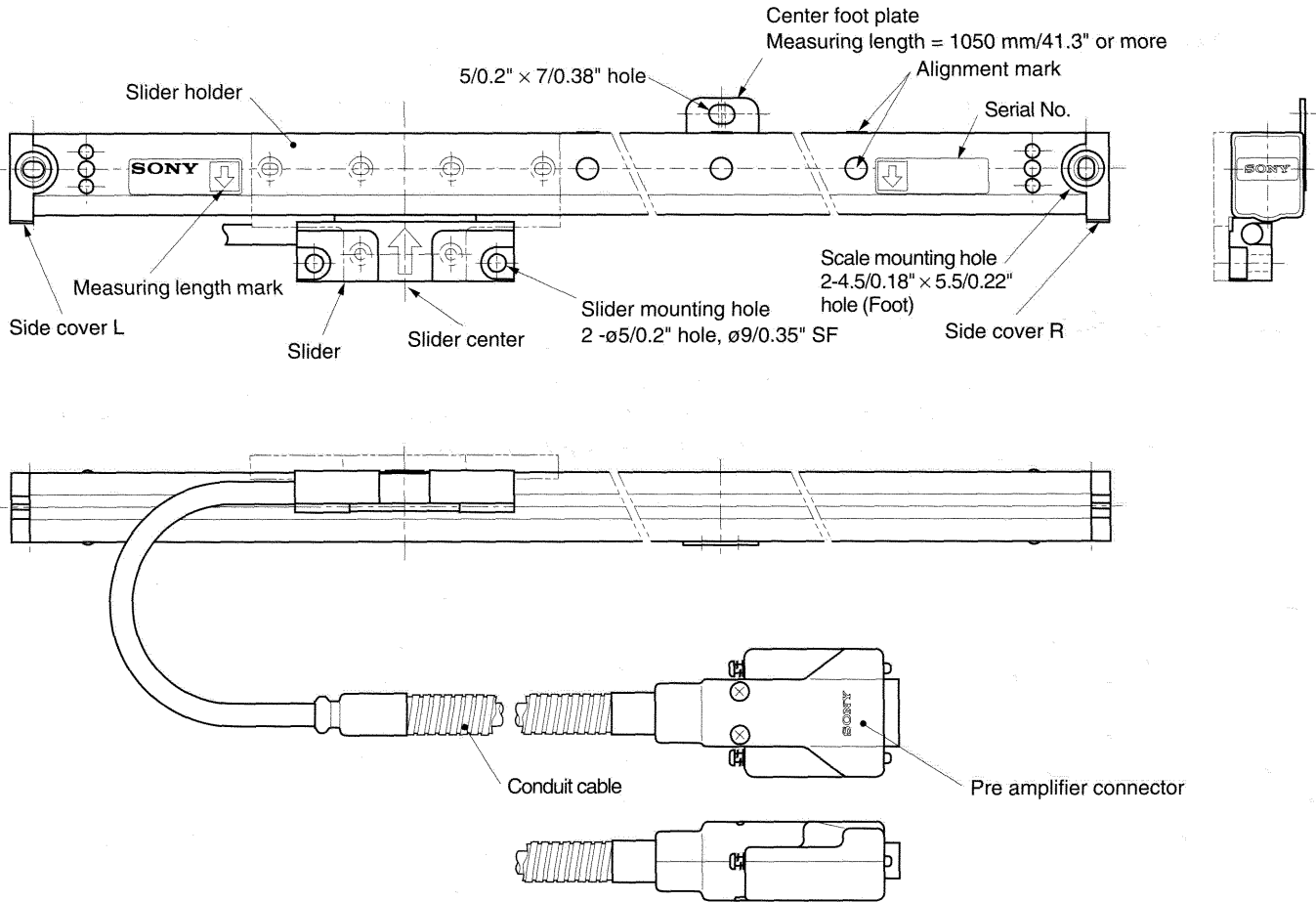
- Compact size and light weight
- Easy to install
- Highly accurate position detection
- Highly resistant to oils and dirt
- Same coefficient of expansion as that of machine tools

Use the LH31 series of display units which have been specially developed for these Magnescales. The display units with Sony Manufacturing Systems Corporation head amplifier can also be used by attaching the conversion adapter (SZ04).

## Composition

Model			Measuring length	Cable length
GB-5/	SR108-005	SR107-005	50 mm/1.9"	3 m 9.8'
GB-10/	SR108-010	SR107-010	100 mm/3.9"	
GB-15/	SR108-015	SR107-015	150 mm/5.9"	
GB-20/	SR108-020	SR107-020	200 mm/7.8"	
GB-25/	SR108-025	SR107-025	250 mm/9.8"	
GB-30/	SR108-030	SR107-030	300 mm/11.8"	
GB-35/	SR108-035	SR107-035	350 mm/13.7"	
GB-40/	SR108-040	SR107-040	400 mm/15.7"	
GB-45/	SR108-045	SR107-045	450 mm/17.7"	
GB-50/	SR108-050	SR107-050	500 mm/19.6"	
GB-55/	SR108-055	SR107-055	550 mm/21.6"	5 m 16.4'
GB-60/	SR108-060	SR107-060	600 mm/23.6"	
GB-65/	SR108-065	SR107-065	650 mm/25.5"	
GB-75/	SR108-075	SR107-075	750 mm/29.5"	
GB-85/	SR108-085	SR107-085	850 mm/33.4"	
GB-95/	SR108-095	SR107-095	950 mm/37.4"	
GB-105/	SR108-105	SR107-105	1050 mm/41.3"	
GB-125/	SR108-125	SR107-125	1250 mm/49.2"	
GB-140/	SR108-140		1400 mm/55.1"	
GB-160/	SR108-160		1600 mm/62.9"	
GB-185/	SR108-185		1850 mm/72.8"	10 m 32.8'
GB-205/	SR108-205		2050 mm/80.7"	
GB-220/	SR108-220		2200 mm/86.6"	

# Names of Parts



# Notes for Mounting

## Mounting locations

- Mount the scale for more precise positioning as closely as possible to the workpiece or to the object being measured.  
(The farther the scale is mounted from workpiece, the greater the mechanical errors grow.)
- Avoid locations where the scale is exposed to direct sunlight and heat sources such as motors.
- Do not place anything on the mounted scale, or step on it: excessive force to the scale causes trouble.

## Mounting positions

Mount the scale in the positions shown in the figure below.

- Do not mount the scale in any other direction since difficulties with servicing and maintenance may arise. (The mounting position [A] in particular is recommended: cutting oil and chips may be effectively kept out.)

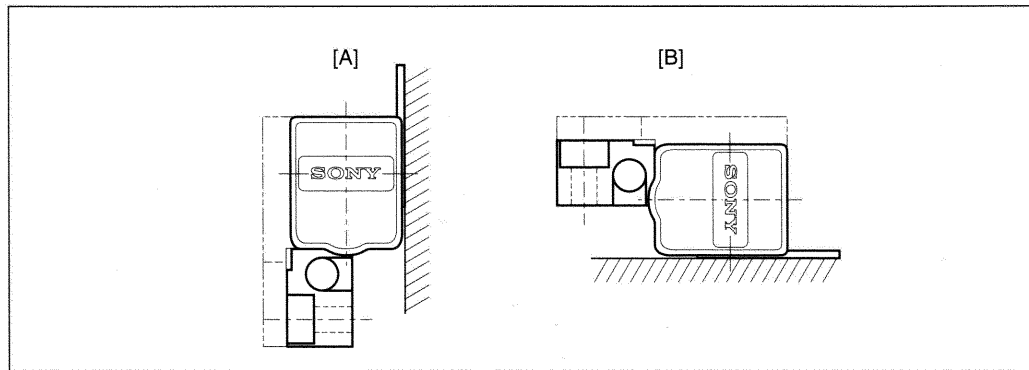
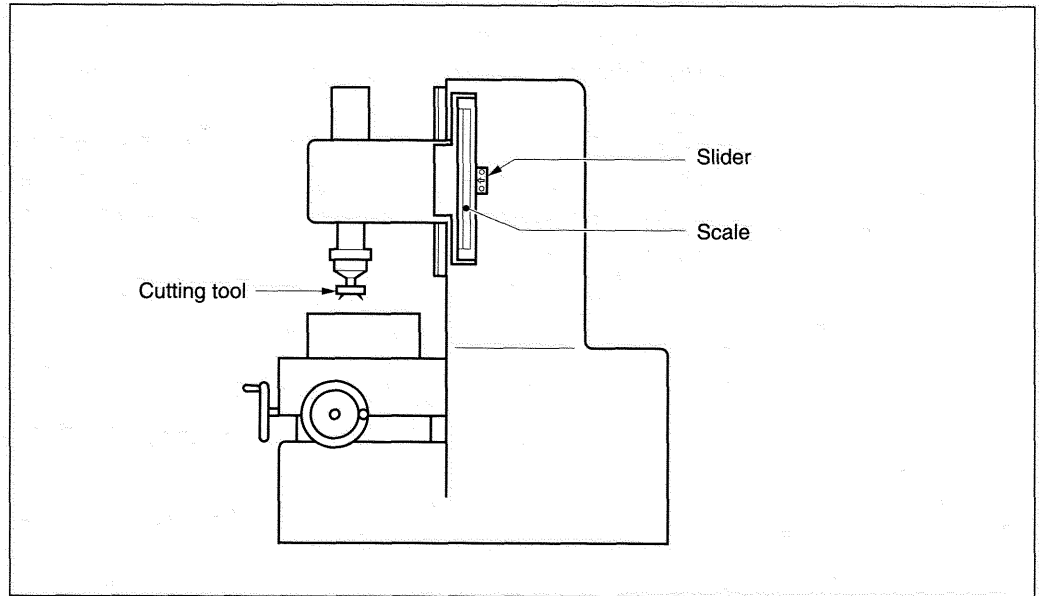


Fig. 1 Scale mounting direction

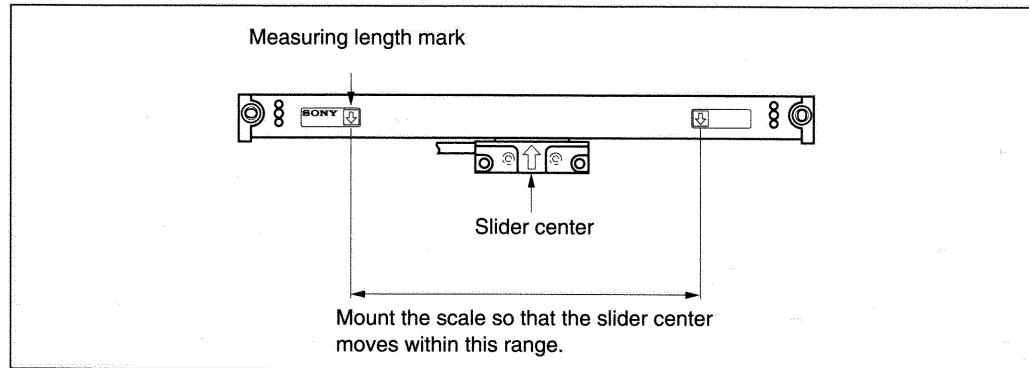
When mounting the scale vertically, be sure to mount the scale slider on the opposite side of a workpiece or cutting tool.



**Fig. 2 Mounting the scale vertically**

## Setting of operating range

- The measuring length of the scale is the distance between the measuring length marks (↕) at both ends of the scale.
- Mount the scale in such a position that the slider center moves within these measuring length marks.
- A leeway (equivalent to 7 mm/0.28" at the left and right ends of the scale for a measuring length of up to 200 mm/7.8" and 15 mm/0.59" for a measuring length of up to 250 mm/9.8") is provided for the slider movement. Take special care not to move the slider beyond this limit or the scale may be damaged.



**Fig. 3 Operating range**

## Protection of cable and connectors

The head cable and scale come as a single integrated unit. Take care not to pull the head cable forcefully or bend it repeatedly or the cable may break.



## Mounting a protective cover

Where the scale is exposed to chips and cutting oil, it is recommended a protective cover be provided to maintain the scale's high performance.

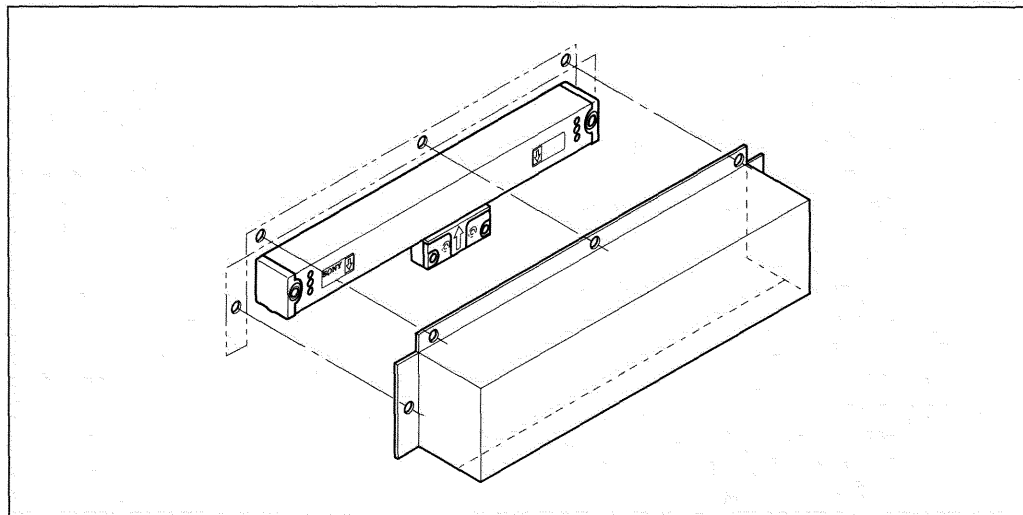


Fig. 4 Example of protective cover

# Mounting Instructions

## Required items for mounting

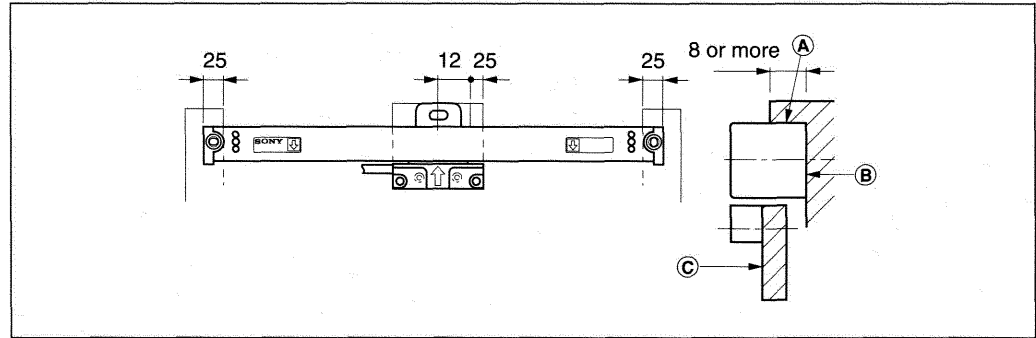
### Accessories (supplied)

Hex socket head cap screw .....	3
M4 × 10 for mounting scale	
(2 pcs. for scale of L < 1000 mm/39")	
Hex socket head cap screw .....	2
M4 × 12 for mounting slider	
Pan head screw .....	5
M4 × 10 for cable clamp (1 pc. for spare)	
Plain washer (large) .....	3
with 4 mm dia. hole	
(2 pcs. for scale of L < 1000 mm/39")	
Plain washer (small) .....	2
with 4 mm dia. hole for mounting slider	
Cable clamp for mounting conduit cable .....	4
Screening label .....	1
for concealing the screw holes after the slider	
holder has been removed	
Hex socket head cap screw .....	2
M5 × 25 for mounting slider	
Hex nut .....	2
M5 for mounting slider	
Spacer .....	5
t = 0.1 for mounting slider	

Tools you need other than the supplied accessories.

Bracket for mounting scale (for <b>(A)</b> <b>(B)</b> surfaces) .....	1 to 2
Bracket for mounting slider (for <b>(C)</b> surface) .....	1
Dial indicator with magnetic base capable of reading	
0.01 mm/0.0005" .....	1 to 2
Allen wrench for M2.6 (2 mm) type .....	1
Allen wrench for M4 (3 mm) type .....	1
Allen wrench for M5 (4 mm) type .....	1
Phillips head screwdriver for M2.6 .....	1
Tap M4 .....	1
Drill ø3.2/0.126" dia .....	1
Electrical drill .....	1
Liner, spacer t = 0.05 to 0.2 mm/0.002 to 0.08" .....	Some

**Note:** L = measuring length  
t = thickness



**Fig. 5 Mounting dimensions**

**<1> When the mounting surface already meets parallelism and flatness requirements**

When the scale mounting surface is finished and meets parallelism and flatness specifications below, just mount the scale using two M4×10 hex socket head cap screws and two plain washers (large).

Flatness of (A) (B) surfaces:	within 0.1 mm/0.004"
Parallelism of (A) (B) surfaces to machine table movement:	within 0.1 mm/0.004"

Provide the range shown in Fig. 5 for surface (A).

The above tolerances suppose no quick change in the surfaces and no obstacle in the way between the right and left mounting surfaces.

〈2〉 When the scale mounting surface is a casting surface

■ Mount the scale using mounting brackets.

① When the scale mounting surface is a casting surface and parallelism is not satisfied

Use mounting brackets and adjust so that the parallelism specified in (1) may be satisfied. The mounting brackets need only cover the length of at least the scale feet. However, the brackets must be long enough for the parallelism of the right and left feet of the scale to be measurable.

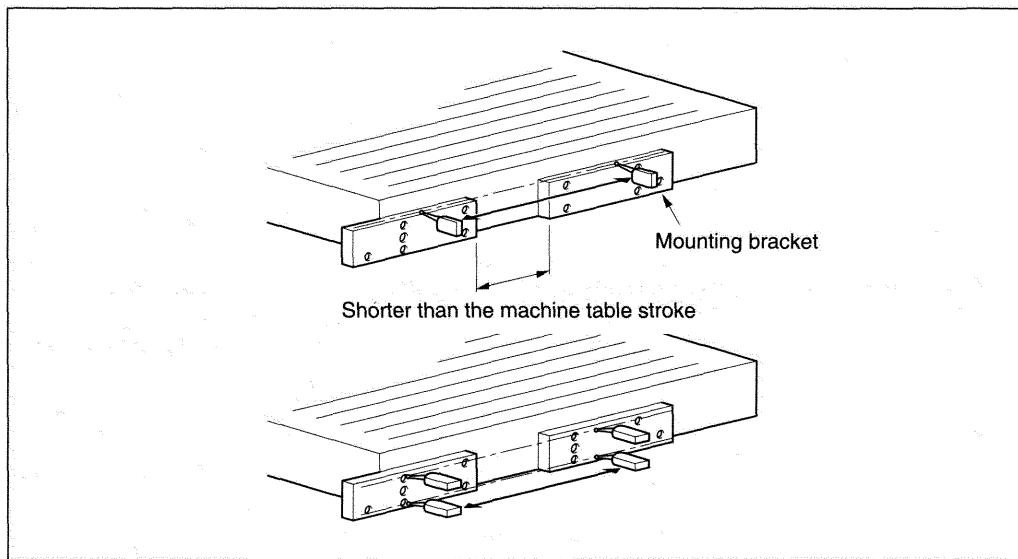


Fig. 6 Length of mounting brackets and measurement of their parallelism

**② Checking of mounting position and tapping**

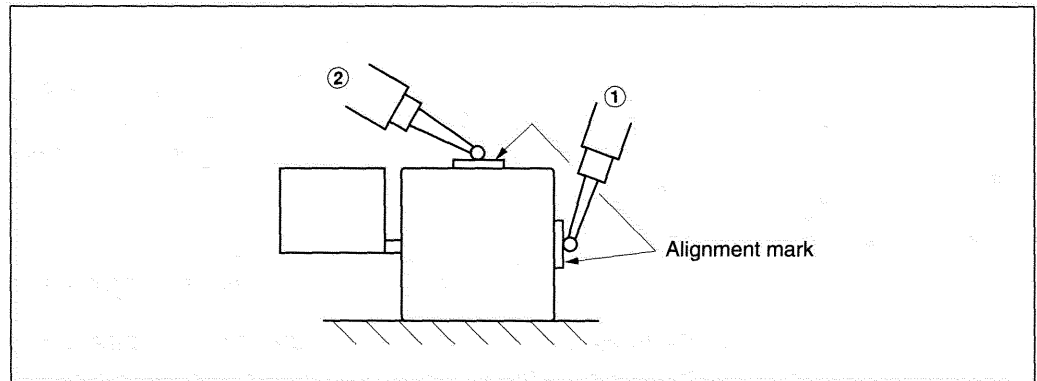
Check that the parallelism for mounting scale meets the specifications, and then tap for M4 screws of 10 mm/0.39" depth referring to the dimensions on page 43.

**③ Mounting of scale**

Mount the scale loosely with M4 × 10 hex socket head cap screws, and leave it for 30 minutes for the scale to have ambient temperature. Then firmly mount the scale.

**④ Measuring parallelism of scale with machine table movement**

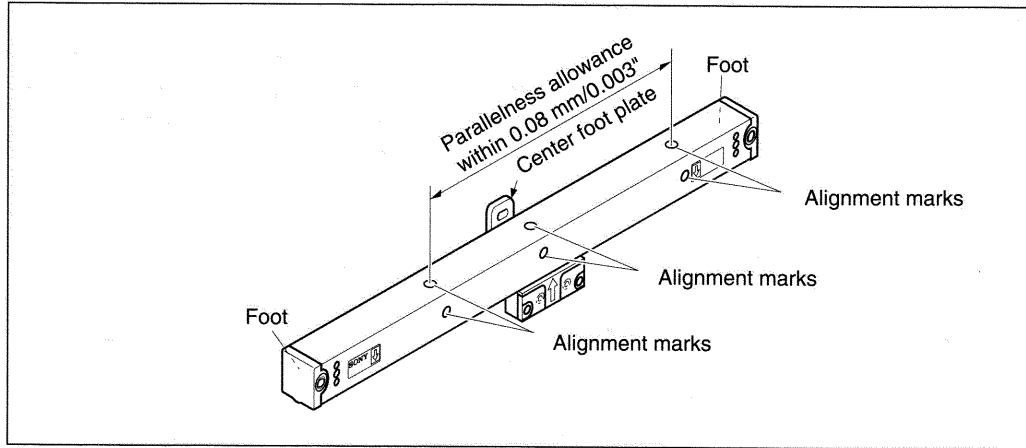
Place a dial gauge directly where the alignment mark (<1> in the figure below) is positioned on the side of the scale, and check that the scale is surely mounted parallel to the machine table movement:



**Fig. 7 Parallelness check of scale and machine table movement**

Adjust the parallelism of the length between the two alignment marks to within 0.08 mm/0.003" and tighten the setscrews. For the scale with a measuring length of 1050 mm/41.3" or more, adjust the parallelisms of the lengths between the central alignment mark and those on both sides of it to within 0.08 mm/0.003".

**Note** Since alignment marks are not provided on scales with a measuring length of 150 mm/5.9" or less, place the dial gauge on the scale unit and ensure that the allowance at the two ends of the machine travel is within 0.08 mm/0.003".



**Fig. 8 Parallelism check by alignment marks**

**⑤ When the specified parallelism for the scale mounting bracket is not obtained**

Insert spacers below the feet and make adjustment by placing a dial gauge at ② in Fig. 7 (Page 35) to adjust the parallelism to within 0.08 mm/0.03" throughout the length between may be obtained at the center of the alignment marks.

For the scale with a measuring length of more than 1050 mm/41.3", make sure, that the parallelism near the center foot plate is also within 0.08 mm/0.003".

### ③ Mounting of slider

#### ① When parallelism and flatness of the mounting surface are already satisfied

When the mounting surface is finished and its parallelism and flatness satisfy the specifications below, just mount the slider using two M4 × 12 hex socket head cap screws and two plain washers (small).

Flatness of ③ surface:	within 0.05 mm/0.02"
Parallelism of ③ surface to machine table movement:	0.05 mm/60 mm (0.002"/2.36")
Parallelism between ② and ③ surfaces:	0.05 mm/60mm (0.002"/2.36")
Clearance between ② and ③ surface:	8.7 to 8.8 mm/0.343" to 0.346"

Move the machine table till the mounting surface comes just at the slider. First use the spacers provided to fill the gap between the mounting surface and slider, and then secure the slider. Then remove the screws which fix slider holder. In this process, be careful not to make the slider and the mounting bracket contact with each other.

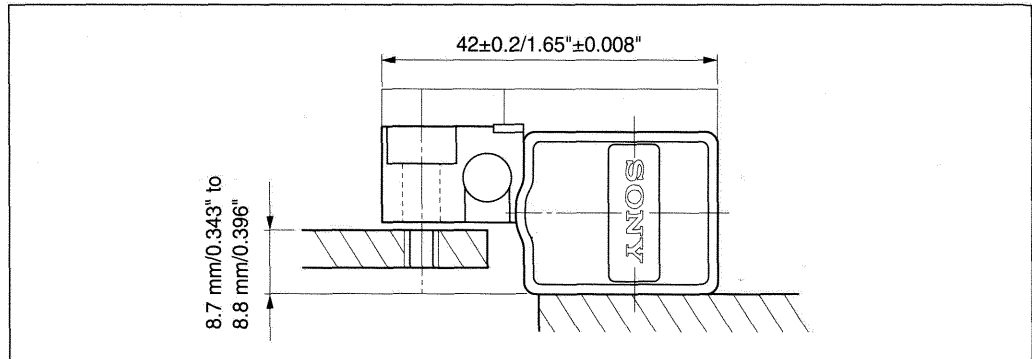


Fig. 9

② **When the slider mounting surface has yet to meet the specifications**

When the mounting surface of the machine is a casting surface, use a bracket. Place the bracket on the underside of the slider without loosening the screws that hold the slider holder. Adjust the position of the bracket and mount it with the supplied M4 × 12 bolts.

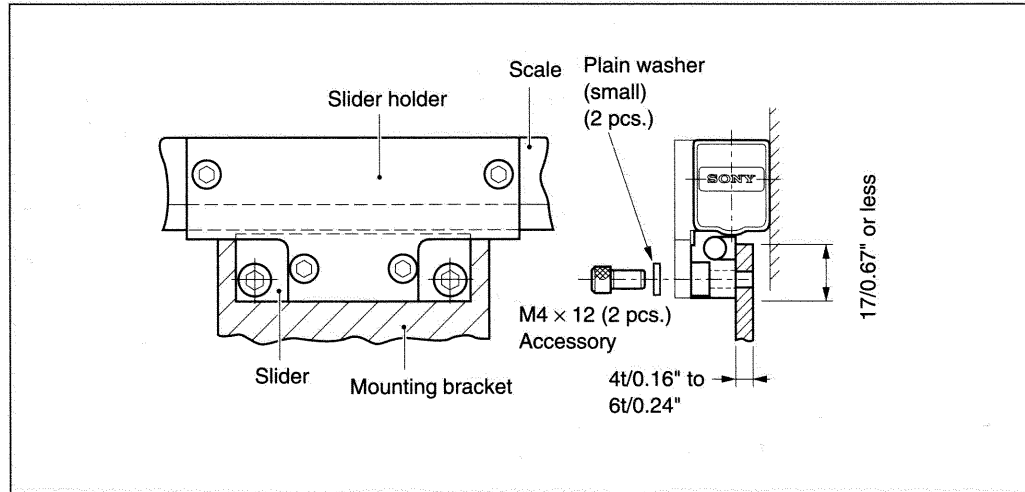
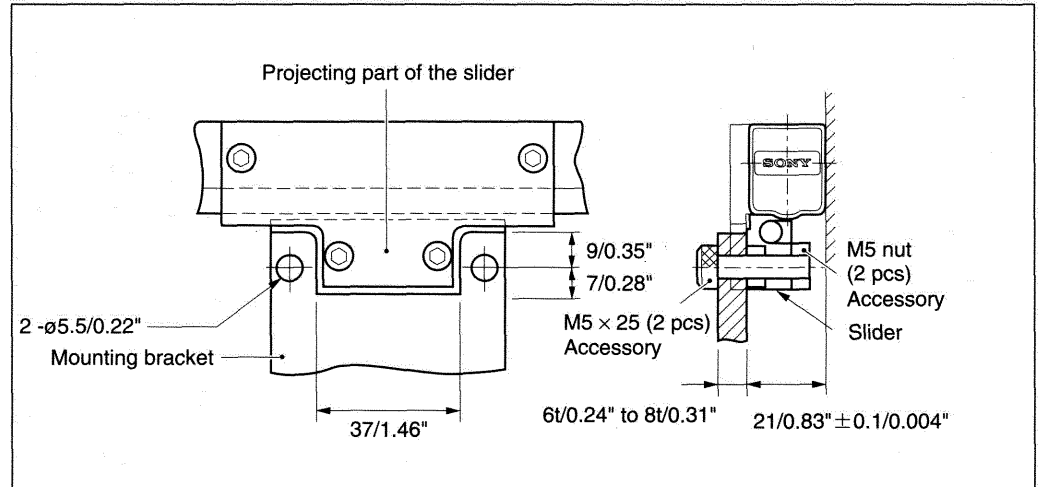


Fig. 10



③ **When the bracket is mounted on slider's outer side (Fig. 11)**

Align the mounting bracket with the slider's top surface, and adjust the bracket so that the height from the scale mounting surface is brought to  $21 \pm 0.1 \text{ mm}$  ( $0.83 \text{''} \pm 0.004 \text{''}$ ). Ensure that the mounting bracket used comes in a shape that accommodates the projecting part of the slider holder. As shown in the figure, secure the slider using two cap screws (M5  $\times$  25 hexagon socket head cap screws) and two nuts (for the M5 cap screws).



**Fig. 11**

#### 〈4〉 Removal of the Slider holder

Remove the four M2.6 mounting screws for the slider holder and then remove the slider holder itself.

- Be sure to adhere the screening label (accessory) to cover the screw holes after removing the slider holder. If these holes are not plugged, chips, cutting oil or dust may enter and the accuracy of the scale may be deteriorated.  
Use a ball-point pen to enter the mounting date and name of the person responsible on the label.

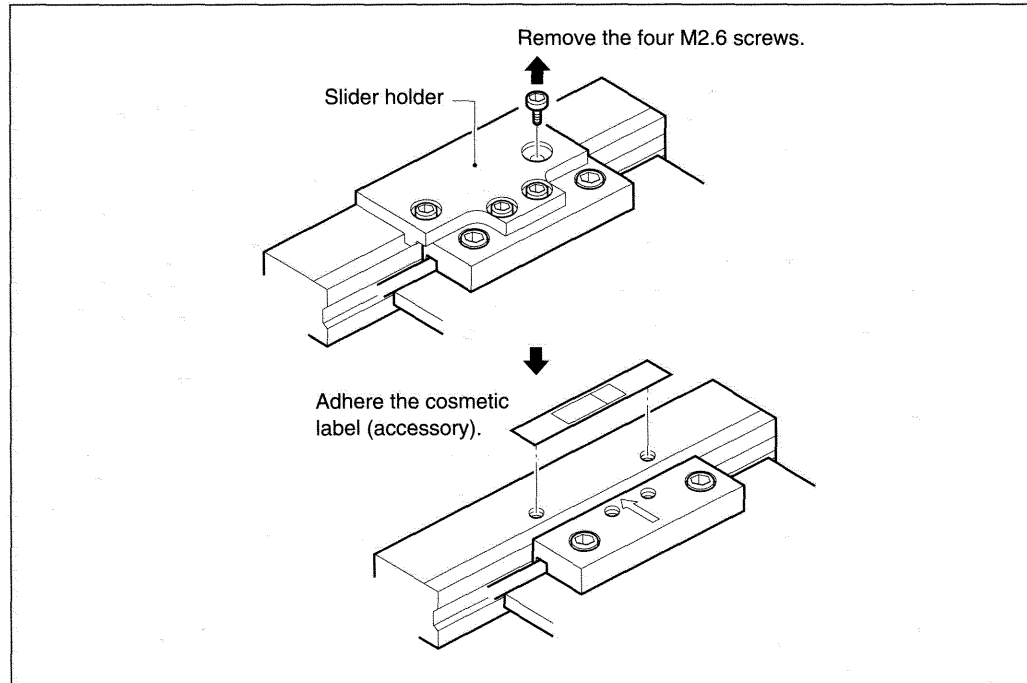


Fig. 12 Removal of slider holder

**Note** Keep slider holder and four M2.6 screws after the installation.

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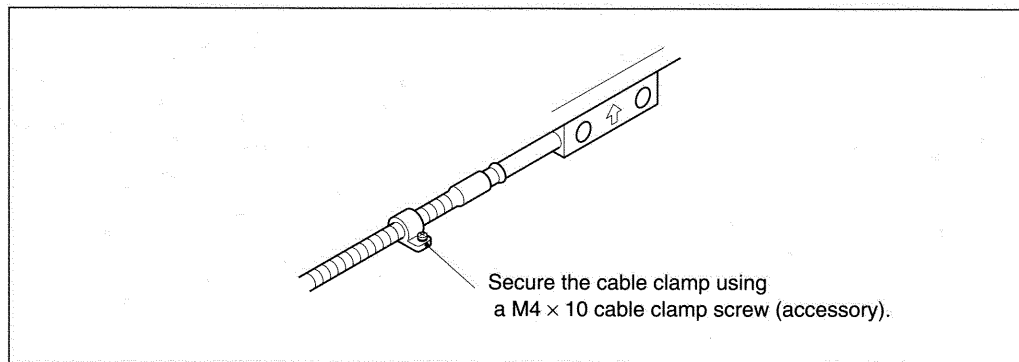
### 〈5〉 Checking of the operating range

After mounting the scale and slider, be sure to move the machine over the overall length of the scale to check that the machine moves within the measuring length. Remember that the scale may be damaged if the machine moves beyond the movable range of the slider (measuring length + leeway).

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### 〈6〉 Mounting of the conduit cable

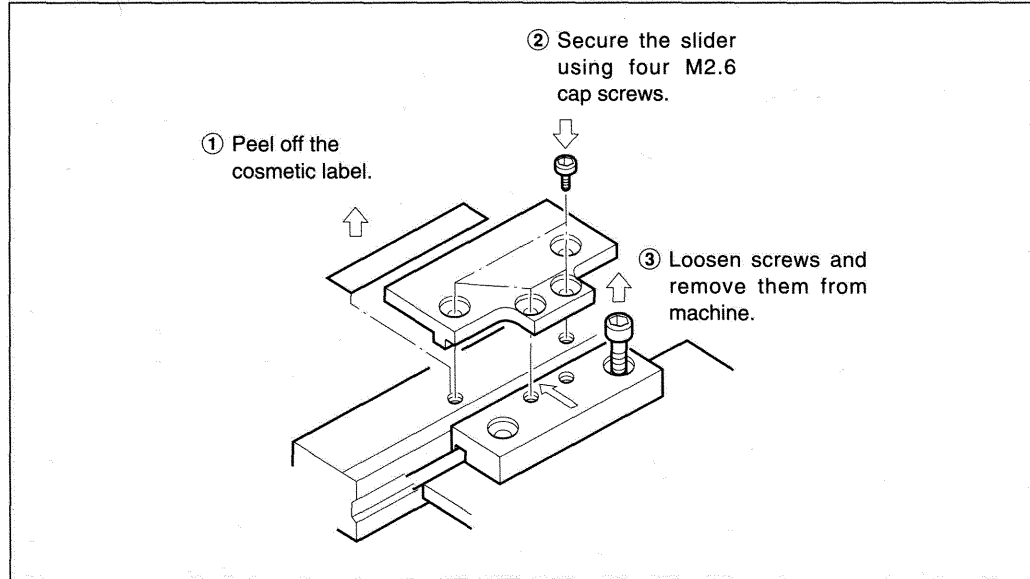
Fix the conduit cable with cable clamps so that they will not interfere with moving parts of the machine.



**Fig. 13**

## <7> Removal of the scale

When removing a mounted scale from the machine, be sure to secure the slider to the scale with the slider holder. Follow the numerical sequence.

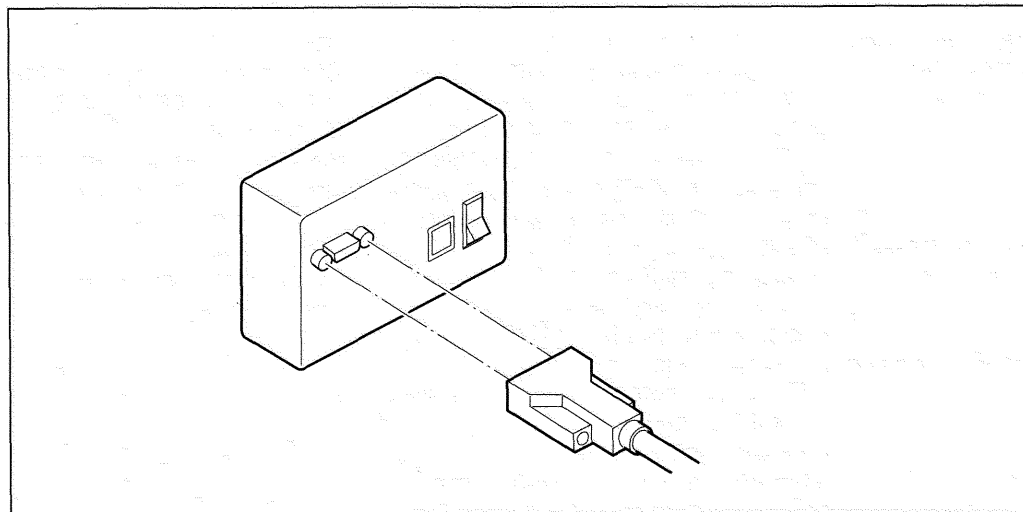


**Fig. 14 Removal of scale**

Securing the slider to the scale keeps the alignment of the scale and head after removal from the machine and makes reinstallation easy.

**〈8〉 Connection of the head cable and a display unit**

Be sure to firmly tighten the screws.



**Fig. 15**

# Specifications

## Specifications

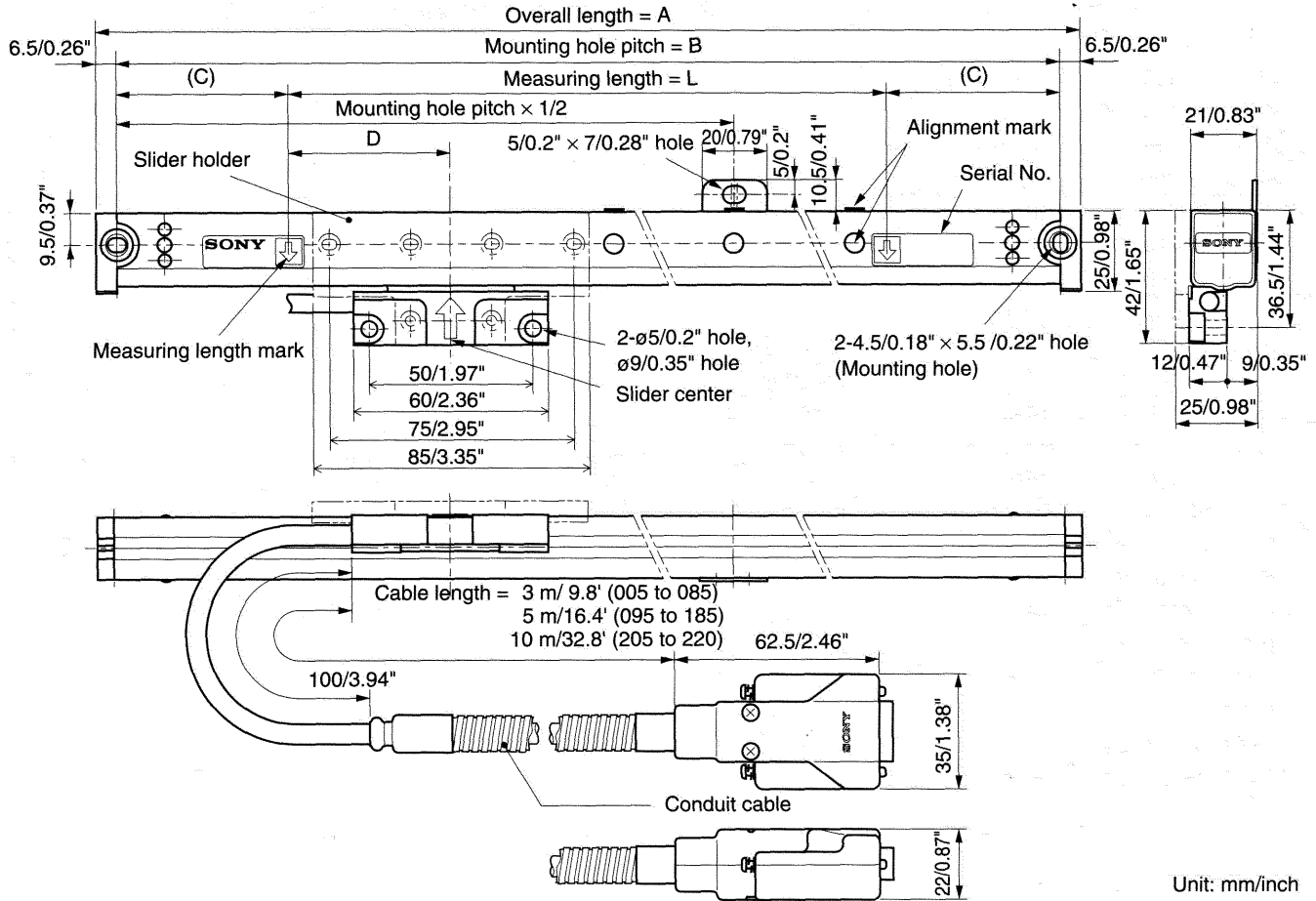
<b>Measuring length (mm/inch)</b>	50/1.9", 100/3.9", 150/5.9", 200/7.8", 250/9.8", 300/11.8", 350/13.7", 400/15.7", 450/17.7", 500/19.6", 550/21.6", 600/23.6", 650/25.5", 750/29.5", 850/33.4", 950/37.4", 1050/41.3", 1250/49.2", 1400/55.1", 1600/62.9", 1850/72.8", 2050/80.7", 2200/86.6". <b>(SR107 series: up to 1250/49.2")</b>
<b>Overall length</b>	Measuring length+104 mm/4.1" (Measuring length 200 mm/7.8" or less) Measuring length+120 mm/4.72" (Measuring length 250 mm/9.8" or more)
<b>Maximum travel</b>	Measuring length+14 mm/0.55" (Measuring length 200 mm/7.8" or less, 7 mm/0.275" each at right and left) Measuring length+30 mm/1.2" (Measuring length 250 mm/9.8" or more, 15 mm/0.6" each at right and left)
<b>Scale accuracy (at 20 °C/68°F)</b>	Metric: $\pm(0.0025+0.0025 \times \text{measuring length in meters})$ mm Inch: $\pm(0.0001+0.0000025 \times \text{measuring length in inches})$ inch
<b>(SR107 series)</b>	Metric: $\pm(0.0015+0.0015 \times \text{measuring length in meters})$ mm Inch: $\pm(0.00006+0.0000015 \times \text{measuring length in inches})$ inch
<b>Cable length</b>	Max. 30 m/98.4'
<b>Parallelism</b>	0.1 mm/0.004"
<b>Thermal expansion coefficient</b>	$(11 \pm 1) \times 10^{-6}/^{\circ}\text{C}$
<b>Operating temperature</b>	0 °C to +40 °C/+32 °F to +104 °F
<b>Storage temperature</b>	-10 °C to +50 °C/+14 °F to +122 °F

## Accessories

Hex socket head cap screw M4 × 10 .....	3
Hex socket head cap screw M4 × 12 .....	2
Pan head screw M4 × 10 .....	5
Plain washer (large) with 4 mm dia .....	3
Plain washer (small) with 4 mm dia .....	2
Spacer (for slider) 0.1 mm/0.004" thick .....	5
Cable clamp .....	4
Cosmetic label .....	1
Hex socket head cap screw M5 × 25 .....	2
Hex nut M5 .....	2

- Design and specifications are subject to change without notice.

# Dimensions



Model		Measuring length (L)	Overall length (A)	Mounting hole pitch (B)	C	D
GB-5/ SR108-005	SR107-005	50/1.9"	Measuring length + 104/4.1"	Measuring length + 91/3.6"	45.5/1.8"	Measuring length × 1/2
GB-10/ SR108-010	SR107-010	100/3.9"				
GB-15/ SR108-015	SR107-015	150/5.9"				
GB-20/ SR108-020	SR107-020	200/7.8"				
GB-25/ SR108-025	SR107-025	250/9.8"	Measuring length + 120/4.7"	Measuring length + 107/4.2"	53.5/2.1"	50/2"
GB-30/ SR108-030	SR107-030	300/11.8"				
GB-35/ SR108-035	SR107-035	350/13.7"				
GB-40/ SR108-040	SR107-040	400/15.7"				
GB-45/ SR108-045	SR107-045	450/17.7"				
GB-50/ SR108-050	SR107-050	500/19.6"				
GB-55/ SR108-055	SR107-055	550/21.6"				
GB-60/ SR108-060	SR107-060	600/23.6"				
GB-65/ SR108-065	SR107-065	650/25.5"				
GB-75/ SR108-075	SR107-075	750/29.5"				
GB-85/ SR108-085	SR107-085	850/33.4"				
GB-95/ SR108-095	SR107-095	950/37.4"				
GB-105/ SR108-105	SR107-105	1050/41.3"				
GB-125/ SR108-125	SR107-125	1250/49.2"				
GB-140/ SR108-140		1400/55.1"				
GB-160/ SR108-160		1600/62.9"				
GB-185/ SR108-185		1850/72.8"				
GB-205/ SR108-205		2050/80.7"				
GB-220/ SR108-220		2200/86.6"				



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2-995-653-04

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2004.4

Printed in Japan

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