

# Step Master

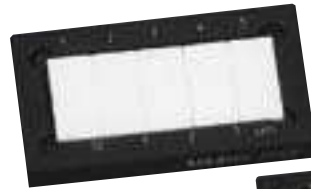
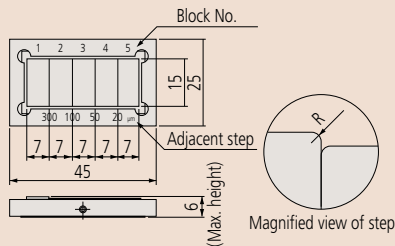
## SERIES 516

### FEATURES

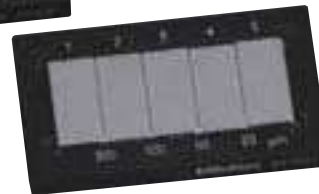
Step master is a master gage used for the z-axis (vertical direction) calibration of optical instruments.

- Each adjacent step is measured down to  $0.01\mu\text{m}$  by using an interferometer within  $\pm 0.20\mu\text{m}$  allowance.
- Steel and ceramic types are available.

### Dimension



**516-498**  
Ceramic type



**516-199**  
Steel type



### SPECIFICATIONS

#### Metric

Order No.	Step value between adjacent blocks				Remarks
	No. 1 - No. 2	No. 2 - No. 3	No. 3 - No. 4	No. 4 - No. 5	
<b>516-198</b>	10 $\mu\text{m}$	5 $\mu\text{m}$	2 $\mu\text{m}$	1 $\mu\text{m}$	Steel type
<b>516-199</b>	300 $\mu\text{m}$	100 $\mu\text{m}$	50 $\mu\text{m}$	20 $\mu\text{m}$	Steel type
<b>516-498</b>	10 $\mu\text{m}$	5 $\mu\text{m}$	2 $\mu\text{m}$	1 $\mu\text{m}$	Ceramic type
<b>516-499</b>	300 $\mu\text{m}$	100 $\mu\text{m}$	50 $\mu\text{m}$	20 $\mu\text{m}$	Ceramic type

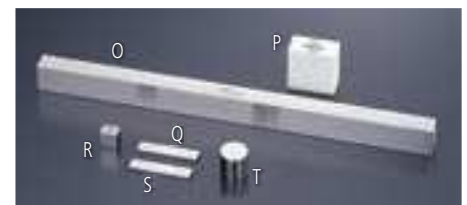
### Available Dimension

- Nominal size: 0.1mm to 1000mm (steel)  
0.5mm to 500mm (ceramic)
- Nominal pitch: 0.0005mm (up to 100mm)  
0.001mm (over 100mm)
- Minimum section dimension:  
Approx. 5 x 5mm
- Maximum section dimension:  
Approx. 140 x 140mm (steel)  
Approx.  $\phi 160$ mm (steel, cylindrical)  
Approx. 100 x 50mm (ceramic)  
Approx.  $\phi 60$ mm (ceramic, cylindrical)
- Accuracy: Gauge Block level
- Special materials of low expansion glass and low expansion ceramic are available.

## Made-to-order Block & Reference

### FEATURES

- Mitutoyo can provide Gauge Blocks and reference gages to you size and design.



- O: Steel Long rectangular block (15 x 10 x 200mm)  
P: Ceramic square block (24.1 x 24.1 x 12.3mm)  
Q: Steel thin rectangular block (30 x 6 x 1.9mm)  
R: Steel square block (9 x 9 x 6mm)  
S: Steel thin rectangular block (30 x 6 x 2.1mm)  
T: Steel cylindrical block ( $\phi 13.08$  x 12mm)



- A: Ceramic rectangular gauge block (21.94mm)  
B: Ceramic square gauge block (2.1005mm)  
C: Steel square gauge block (10.72mm)  
D: Steel square gauge block (2.2065mm)  
E: Ceramic rectangular gauge block (20.64mm)  
F: Steel rectangular gauge block (31.5mm)  
G: Ceramic rectangular gauge block (6.34mm)  
H: Steel rectangular gauge block (3.603mm)  
I: Steel rectangular gauge block (1.1505mm)  
J: Steel rectangular gauge block (0.555mm)  
K: Steel rectangular gauge block (6.156mm)  
L: Steel rectangular gauge block (9.694mm)  
M: Steel rectangular gauge block (10.02mm)



- U: Cylindrical reference block for depth micrometer ( $\phi 60$  x 150mm)  
V: Ceramic reference plate (50 x 50 x 50mm, flatness 0.3 $\mu\text{m}$ )  
W: Ceramic stepped block (30 x 18 x 5mm, step: 0.15mm)

# Gauge Block Interferometer GBI

## Automatic Gauge Block Calibration

### FEATURES

- Automatic measuring instrument for gauge block lengths between 0.1mm and 250mm using optical interference.
- The intensity and wavelength of the He-Ne laser light source is highly stable. This allows high-accuracy measurement.
- To reduce the effects of operator body heat, automatic remote measurement can be performed.
- The GBI automatically detects the light quantity distribution of interference fringes and processes data, thus eliminating human errors.
- Both the refractive index and the thermal expansion of gauge blocks are automatically compensated for by the computer which is linked to the thermometer, hygrometer, and digital barometer.



### SPECIFICATIONS

Model No.	GBI
Light source	632.8 $\mu$ m wavelength system He-Ne laser 543.5 $\mu$ m wavelength system He-Ne laser
Measuring range	0.5mm - 250mm
Accuracy (Uncertainty 95%)	$\pm 0.02\mu$ m (when measuring a gauge block of 100mm length), $\pm 0.04\mu$ m (when measuring a gauge block of 200mm length)
Number of gauge blocks to be mounted on the measuring table	12

# Gauge Block Comparator GBCD-100A

## SERIES 516 — Automatic Type Comparator with Dual Gage Heads

### SPECIFICATIONS

Model No.	GBCD-100A
Order No.	100V AC <b>565-111K</b>
	110V AC <b>565-111C</b>
	120V AC <b>565-111A</b>
	240V AC <b>565-111E</b>
Resolution	0.00001mm (0.01 $\mu$ m)
Range	0.5mm - 100mm
Measuring unit	Differential (dual-head) type Mu-Checker
Accuracy in narrow range (20°C)	$\pm(0.03+0.3L/1000)\mu$ m* L = Gauge block length (mm) *Uncertainty of measurement is 95% (not including the calibration error of the standard gauge block).
Measuring force	Upper gage head: 1N (100gf) Lower gage head: 0.6N (60gf)
Air requirement	400kPa (4kgf/cm <sup>2</sup> )
Operating condition	Temperature: 20°C $\pm 1^\circ$ C Humidity: 58%RH $\pm 15\%$ RH
Power supply	100 - 120V/200 - 240V AC, 50/60Hz
Dimensions (W x D x H)	Main unit: 710 x 366 x 783mm Electronic unit: 160 x 410 x 382mm
Mass	Main unit: 120kg Electronic unit: 14kg



The GBCD-100A Automatic Gauge Block Comparator is an easy-to-operate dual-head type gauge block inspecting system. It automatically compares workpieces with the standard gauge block and determines accuracies of such as central length, maximum length, minimum length, and parallelism through the operation of the connected personal computer.

### Optional Accessory

- 962723:** Gauge block set for probe calibration
- 962764:** Gauge block holder for probe calibration
- 611615-02:** 5mm gauge block (glade 0) for origin setting
- 243989:** Auxiliary stage (size: 360 x 253mm)
- 218-007:** Work bench

# Gauge Block Comparator GBCD-250

**SERIES 516 — Manual Type Comparator with Dual Gage Heads**

## FEATURES

- Gauge blocks between 0.1mm and 250mm can be easily compared with the standard gauge block on the GBCD-250.
- The upper and lower gaging heads assure the operator of a high-accuracy measurement with ease of use.

### Optional Accessory

- 962723:** Gage head calibration kit  
**02ASD130:** Square gauge block measuring kit  
**02ASF040:** Heat insulation shield  
**02ASD100:** Gauge block set for accuracy inspection



## SPECIFICATIONS

Metric	
Model No.	GBCD-250
Order No.	100V AC <b>565-130</b>
	110V AC <b>565-130A</b>
	220V AC <b>565-130D</b>
	240V AC <b>565-130E</b>
Range	0.1mm - 250mm
Resolution	0.00001mm (0.01μm)
Accuracy in narrow range (20°C)	$\pm(0.03+0.3L/1000)\mu\text{m}^*$ L = Gauge block length (mm)
Measuring units	Laser Hologage (upper), Mucchecker (lower)
Operating condition	Temperature: 20°C $\pm$ 1°C Humidity: 58%RH $\pm$ 15%RH
Data output	Via SPC output port
Power supply	100 - 120V/200 - 240V AC, 50/60Hz
Dimensions (W x D x H)	Main unit: 455 x 318 x 691mm
	Display unit: 345 x 397 x 187mm
Mass	Main unit: Approx. 50kg
	Display unit: Approx. 9kg

\*Uncertainty of measurement is 95% (not including the calibration error of the standard gauge block).

# Gauge Block Comparator GBCS-250

**SERIES 516 — Manual Type Comparator with Single Gage Head**

## FEATURES

- By using the gauge block positioning unit, the operator can perform accuracy checking of many pieces of gauge blocks efficiently.
- A gauge block handling arm is provided for the GBCS which does not include a gauge block positioning unit.

### Optional Accessory

- 02ASB530:** Heat insulation shield  
**02ASD130:** Square gauge block measuring kit\*  
**02ASD150:** Square gauge block measuring kit\*\*  
 \* For the GBCS-250 with gauge block positioning unit only  
 \*\*For the GBCS-250 with gauge block handling arm only



**GBCS-250  
(with Gauge Block Positioning Unit)**

## SPECIFICATIONS

Model No.	GBCS-250	GBCS-250
Order No.	100V AC <b>565-120</b>	<b>565-122</b>
	110V AC <b>565-120A</b>	<b>565-122A</b>
	220V AC <b>565-120D</b>	<b>565-122D</b>
	240V AC <b>565-120E</b>	<b>565-122E</b>
Standard accessory	Gauge block positioning unit	Gauge block handling arm
Range	0.1mm - 250mm	
Resolution	0.00001mm (0.01μm)	
Accuracy in narrow range (20°C)	$\pm(0.03+0.3L/1000)\mu\text{m}^*$ L = Gauge block length (mm)	
Measuring unit	Laser Hologage	
Measuring force	Approx. 0.4N (40gf)	
Operating condition	Temperature: 20°C $\pm$ 1°C Humidity: 58%RH $\pm$ 15%RH	
Data output	Via RS-232C interface unit	
Power supply	100 - 120V/200 - 240V AC, 50/60Hz	
Dimensions (W x D x H)	Main unit: 300 x 300 x 687mm	
	Display unit: 235 x 115 x 118mm	
Mass	Main unit: Approx. 60kg	
	Display unit: Approx. 2kg	

\*Uncertainty of measurement is 95% (not including the calibration error of the standard gauge block).