

# Electronic Equipment

## Electronic Digital Indicator (0.01 / 0.001mm), PC-Series

- Data output and statistics transaction can be easily made by using digital indicator.
- 0.01mm and 0.001mm resolution digital indicators are available.
- Standard models are equipped with preset function and conventional models deleting preset functions are available.

As compact as standard dial indicators and can be placed where dial indicator is used. Application can be enlarged like statistical calculation of measured value, comprising measuring system by output signal.

The photo shows connection sample that PC-440J is mounted to granite stand and SD-763P Digital Mini Printer.



## Measuring Range 12.7mm Type / Standard Model

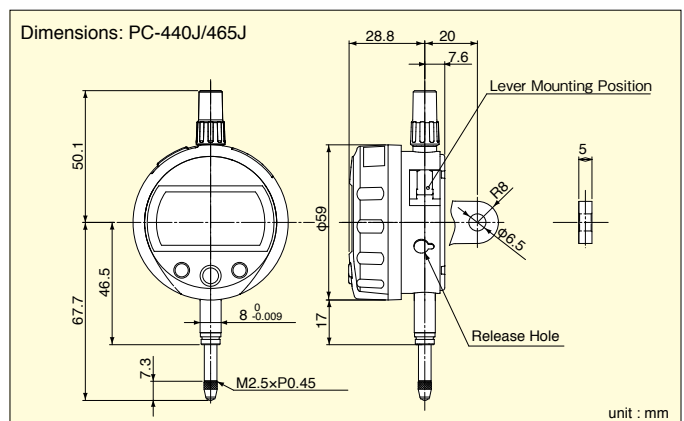


**PC-440J**

Resolution 0.01mm  
Measuring Range 12.7mm

**PC-465J**

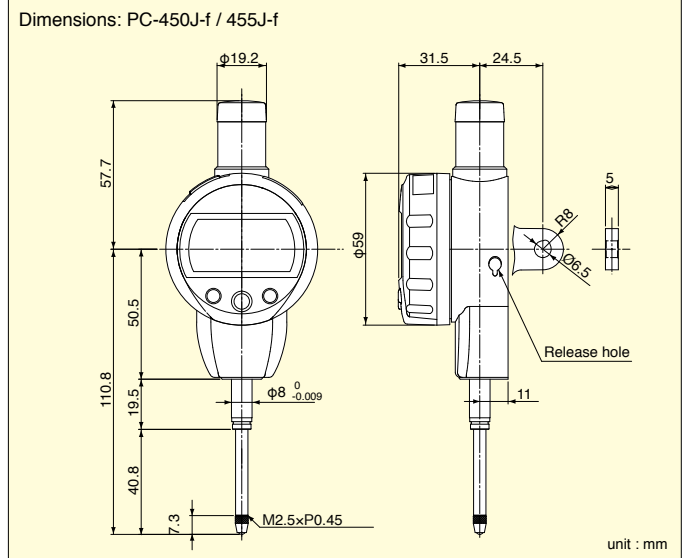
Resolution 0.001mm  
Measuring Range 12.7mm



Supplied with Lug back as standard models.  
Flat back and Lift lever are optional.

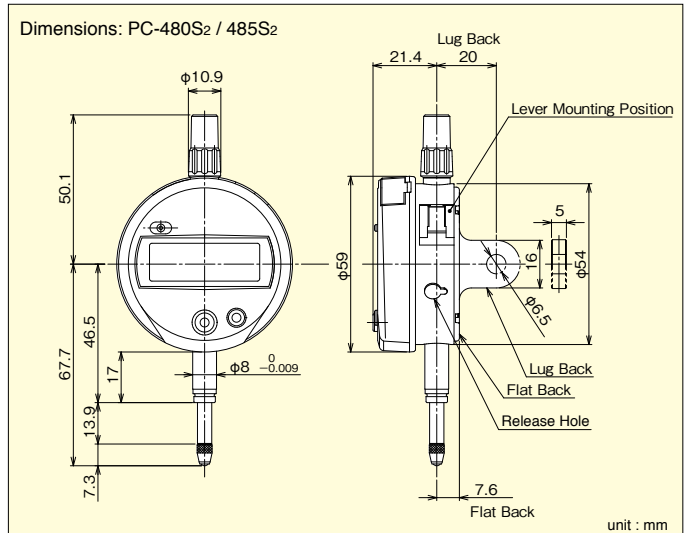


## Measuring Range 25.4mm Type / Standard Model



Supplied with Flat back as standard models.  
Lug back and Lift lever are optional.

## Measuring Range 12.7mm Type / Popular Model



Supplied with Lug back as standard models (ZL-026).  
Flat back (ZY-080) and Lift lever (ZY-918) are optional.

### Specifications

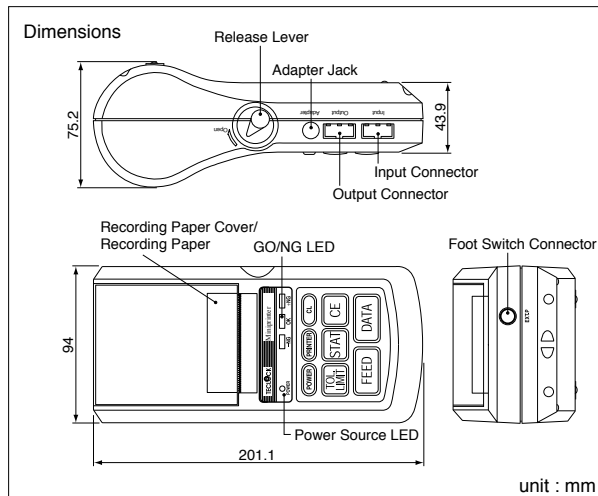
Model	PC-440J	PC-465J	PC-450J-f	PC-455J-f	PC-480S <sub>2</sub>	PC-485S <sub>2</sub>
Measuring Range		0-12.7mm		0-25.4mm		0-12.7mm
Resolution	0.01mm	0.001mm	0.01mm	0.001mm	0.01mm	0.001mm
Accuracy	0.02mm*	0.003mm*	0.02mm or less	0.003mm	0.02mm or less*	0.003mm or less*
Maximum response speed	1000mm/sec	480mm/sec	480mm/sec	480mm/sec	Unlimited	
Contact force	1.0N or less	1.5N or less*	1.8N or less*		2.0N or less*	
Display	LCD display (6-digital & minus)				LCD display (5-digital & minus)	LCD display (6-digital & minus)
Operating temp	0-40°C					
Functions	Preset, Zero-set, Power OM/OFF, Counting direction switching, Digimatic code output				Origin-set, Power ON/OFF, Counting direction Switching, Digimatic code output Display rotation(330°)	
Power supply	SR44 (Button, Silver oxide cell)					
Battery life	Approx. 5,000hours in continuous service				Approx. 20,000hours in continuous service	
Contact Point	R=1.5mm (carbide)					
Contact point thread (ISO/JIS type)	M2.5xP0.45mm					
Weight	170g		186g		120g	150g

\* The quantising error is not included.



# Digital Mini Printer

• Multi-function mini printer for Digital Indicator



### Mode 0

To print measured data, and judgement.

```
* MODE 0 *
DATE 2002/ 7/ 9
TIME 13:45

*LIMIT MODE*
*LIMIT DATA 1*
*NO LIMIT DATA*
LIMIT1 7.472 mm

LIMIT2 2.849 mm

*NEW LIMIT DATA*
*LIMIT DATA 1*
DATE 2002/ 7/ 9
TIME 13:47

LSL 2.849 mm
USL 7.472 mm
TOL 4.623 mm

1 5.395 mm
2 4.827 mm
3 4.826 mm
4 -1.089 mm
5 -2.727 mm
6 4.385 mm
7 10.392 mm
8 9.045 mm
9 2.098 mm
10 3.747 mm
11 -3.130 mm
```

Judgement

Perform statistical calculations

Histogram

### Mode 1

To print measured data, judgement, perform statistical calculations, and generate histogram.

```
* MODE 1 *
DATE 2002/ 7/ 9
TIME 13:45

*NEW LIMIT DATA*
*LIMIT DATA 1*
DATE 2002/ 7/ 9
TIME 13:51

LSL -0.016 mm
USL 4.543 mm
TOL 4.559 mm

* RESULT *
N 12
MAX 6.507 mm
MIN -1.414 mm
R 2.921 mm
σ 2.74216 mm
σn-1 2.43469 mm
σn-1 2.54295 mm

-NG 2
-NG 2
-NG 2
P 33.333 %
Cp 0.299
Cpk 0.236

* HISTOGRAM
DIV 10
-NG 2 00
LSL 1 1 0
A 1 1 0
B 1 1 0
C 0 0 0
D 1 0 0
E 1 0 0
F 1 0 0
G 1 0 0
H 1 0 0
I 3 0 0
J 1 0 0
USL 2 0 0
-NG
```

### Mode 2

To print D-chart, perform statistical calculations, and generate histogram.

```
* MODE 2 *
DATE 2002/ 7/ 9
TIME 13:55

1 -3.132 mm
2 1.782 mm
3 2.608 mm
4 6.590 mm
5 -0.737 mm
6 -0.737 mm
7 1.705 mm
8 1.705 mm

* CANCEL *
8 1.925 mm
9 1.762 mm
10 4.316 mm

*NEW LIMIT DATA*
*LIMIT DATA 1*
DATE 2002/ 7/ 9
TIME 13:58

LSL 0.452 mm
USL 3.591 mm
TOL 3.139 mm

L C U
5.023mm | |
6.959mm | |
3.354mm | |
2.964mm | |
2.758mm | |
1.373mm | |
-0.397mm | |
1.457mm | |
4.316mm | |
0.819mm | |
10 | |
-0.547mm | |
1.490mm | |
```

D-Chart

### Mode 3

By entering data, it will calculate and draw a R-control chart.

```
*CLEAR SUB DATA*
* EXIT SUB GR. *
*CLEAR ALL DATA*

SUB GR. NO. 1
1 4.121 mm
2 0.326 mm
3 0.326 mm
4 4.643 mm
5 2.733 mm

*CONTROL LIMIT*
DATE 2002/ 7/ 9
TIME 14: 7
NO. OF SUB GR. 1
SAMPLE SIZE 5
X-UCL 1.14478 mm
X-LCL 1.52963 mm
R-UCL 0.75992 mm
R-LCL 1.14200 mm
TR-UCL 2.07387 mm
TR-LCL 0.21013 mm
```

Operation result

### Specifications

Item	Description	Remarks
Printing Method	Line thermal 384 dot	
Character format	36 × 24 (Large) 24 × 16 (Normal)	
Printing Speed	0.5 sec. per line	When using AC adapter
Printing line numbers per printing roll	6500 lines / 1 roll (normal)/ 12000 lines / 1 roll (large)	
Power supply	AC adapter (6V, 500 mA) or 4 size AA Ni-MH batteries	Dual power supply *AC adapter input voltage within a range of 100VAC 5%
Operating Temperature	0 ~ 45°C (AC Adapter) 10 ~ 45°C (batteries)	
Storage Temperature	-10 ~ 50°C	In a package as specified by TECLOCK
Accuracy	2 min. max / month	
Clock battery life expectancy	Approx. 10 years	Average life expectancy
Battery life	10000 lines 1600 mAh Ni-MH Printing every 5 sec.	Average life expectancy but varies with usage
Dimensions	201.1 × 94 × 75.2 (D × W × H)	
Weight	390 g	Without accessories
Printouts	Measurements, GO/NG judgment results	Mode 0
	Measurements, GO/NG judgment results, Number of measurements, MAX., MIN., Range, Standard deviation (σ-n, σn-1), Number of defects, Percentage of defects, Process capability index (Cp, Cpk), Histogram	Mode 1
	Same as above plus D-Chart	Mode 2
	Function of calculating the center value between the control limits required for generating various control charts	Mode 3
Processing capability	100000 9999 10 × 9999 = 99990 (Sample size × Number of sub-groups = total number of measurements) 5 sets of limit data	Mode 0 Both Mode 1 and 2 Mode 3
Output function	Measured data (RS-232C, TTL level) GO/NG Judgment results (+NG, GO, -NG)	
Timer-controlled data input	0.25 sec, 1 sec, 5 sec, 30 sec, 1 min, 30 min, 60 min.	
Standard accessories	AC Adapter	100V-240V ZE-217 (JAPAN, USA, KOREA) 100V-240V ZE-218 (GERMANY) 100V-240V ZE-219 (U.K. and Other)
	Recording paper: 1 pc. (58 mm (W) 48 m (L))	When ordering Part No. ZE-304 (10 packs.)
	Strap	ZY-111
	Quick Reference	Q-036
	Operation manual	Q-035

### Options

Model	Accessories
ZE-304	Recording Paper (10 packs)
ZE-110	RS-232C conversion cable 9 pins for AT connector
ZE-018	Extension cable 1m
ZE-019	Extension cable 2m
ZE-020	Extension cable 5m
ZE-109	Judgment result output cable
ZE-013	Foot switch



# Digital Comparators

- These are exclusive equipments which comparatively measure dimension of internal diameter and outer diameter.
- After placing master gauge on measuring table and setting up standard value (zero point set up), tolerance judging measurement against standard value is possible by measuring work piece.

- Cemented carbide is provided to stylus and anvil (anvil pin).
- Special made products are complied for the measuring range except for below.



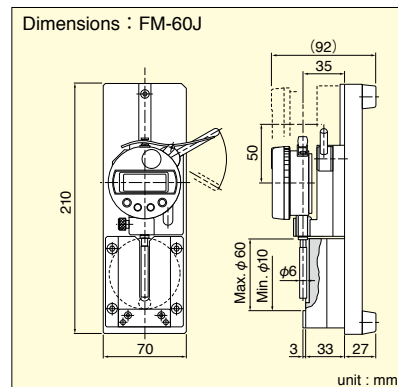
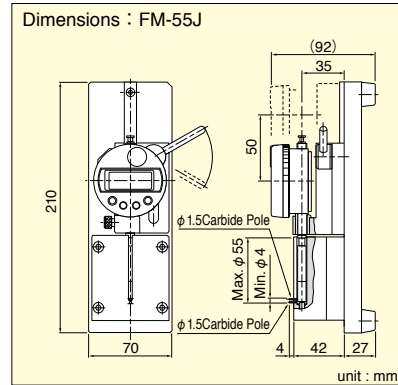
**Digital Inside Comparator FM-55J**

Resolution 0.001mm  
Measuring Range 4~55mm



**Digital Outside Comparator FM-60J**

Resolution 0.001mm  
Measuring Range 10~60mm



Example

Effective for measuring internal diameter of thin ring (FM-55)

### Specifications

Model	Resolution (mm)	Gauge Accuracy* (mm)	Measuring Range (mm)	Indicating Range (mm)	Measuring Force (N)
FM-55	0.001	0.003	4~55	12	1.5 or less
FM-60	0.001	0.003	10~60	12	1.5 or less

\*The quantizing error is not included.

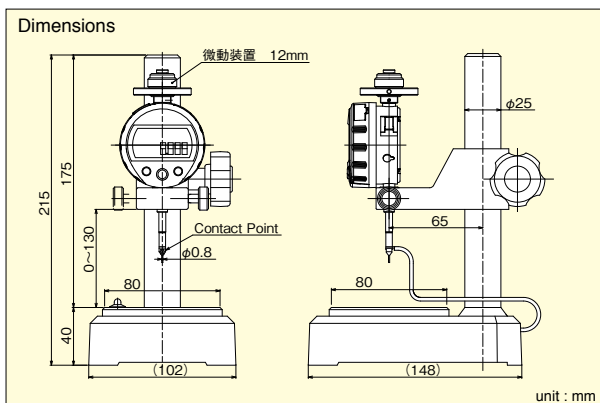
Both models can print out data with SD-763P digital mini printer and ZE-018 connection cable.





## Sensor Gauge Digital Type

- Springs and pressed parts which are used for precision equipments, computer terminal and home electric goods can be measured just before their shapes are changed due to measuring force.
- If detecting contact between sensor (contact point) and work piece by energizing, it simultaneously sounds (buzzer) when LED lamp is lighting.. Then read the value which is detected.
- Micro-motion is adjusted by 12mm with upper knob.
- Work piece of maximum 150mm can be measured by using block gauge.
- As detection is implemented by energizing, work piece which is not energized can not be measured.



Example



Measuring height of coil spring

### SD-465A

Resolution 0.001mm  
Measuring Range 12mm



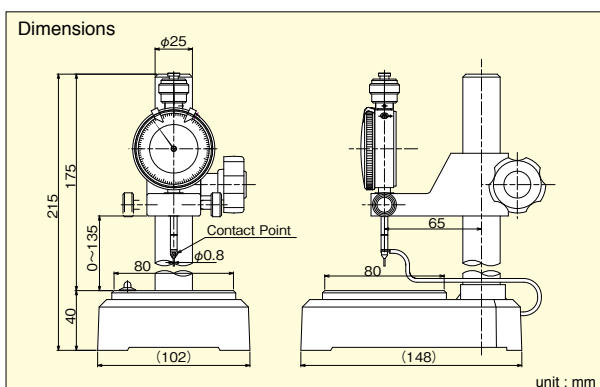
### Specifications

Model	Display	Resolution (mm)	Indicating Range (mm)	Measuring Range (mm)	Gauge Error (μm)	Specimen Table Size (mm)	Power Supply	Weight (kg)
SD-465A	Digital	0.001	12	Max. 150	±3 <sup>*1</sup>	W80×D80	DC3V (AA size battery×2) <sup>*2</sup>	3.4

<sup>\*1</sup> The quantizing error is not included. <sup>\*2</sup> SR-44 battery for digital indicator

## Sensor Gauge Dial Type

- Micro-motion is adjusted by 10mm with upper knob.



### SD-101A

Graduation 0.001mm  
Measuring Range 10mm



### Specifications

Model	Display	Resolution (mm)	Indicating Range (mm)	Measuring Range (mm)	Gauge Error (μm)	Specimen Table Size (mm)	Power Supply	Weight (kg)
SD-101A	Dial (Analog)	0.01	10	Max. 150	±15	W80×D80	DC3V (AA size battery×2)	3.4

- Specification of minimum display 0.01mm digital type, that of dial type of its graduation 0.001mm and type without stand can be produced with treatment of special order. Please contact our branch nearby for detail.