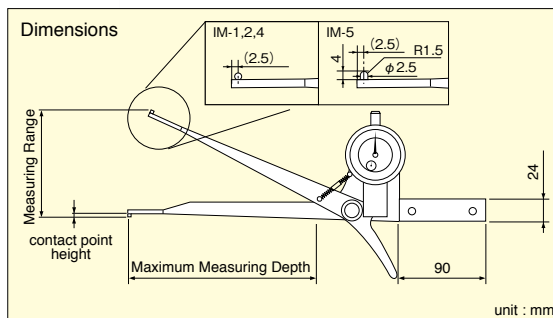
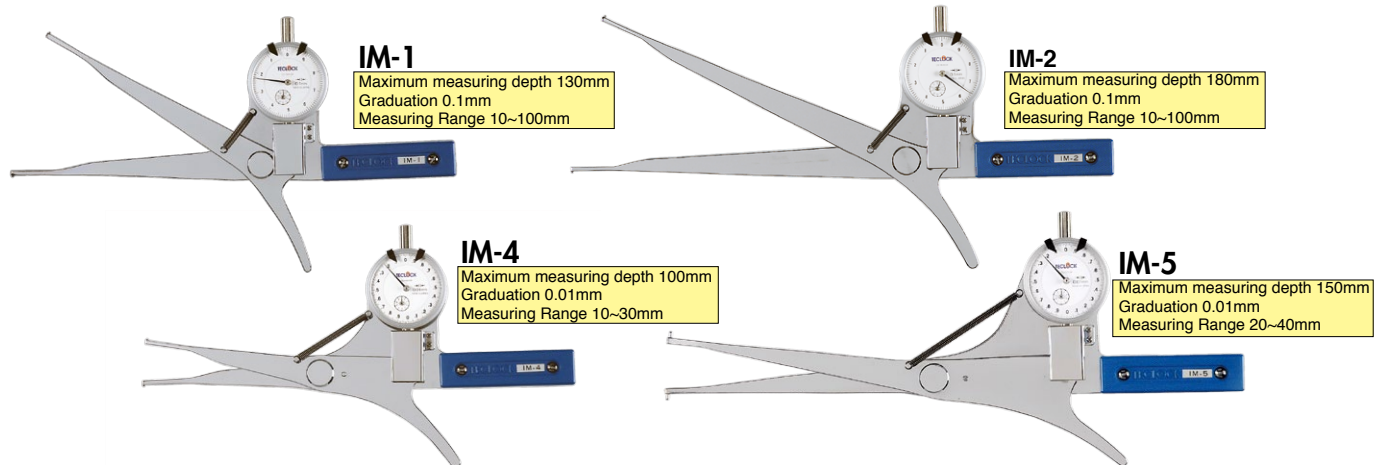


Caliper Gauge

As to internal caliper gauge IM-880 series, the distance between contact points facing outside is firstly set at standard dimension with ring gauge or micrometer. Then, it is measured by inserting contact point into internal dimension part to be measured after its outer dial of which moves together with rotated bezel is set at "0". The displacement of indicator from "0" point of outer dial is to be measured at that time. The value adding to the read displacement to standard dimension or deducting it from standard dimension is the dimension of internal diameter. This series attaches spare contact point which can set accurate dimension corresponding to size of internal dimension. External caliper gauge is opposite, namely reading the value by holding work piece with 2 contact points facing outside.

Internal Dial Caliper Gauge

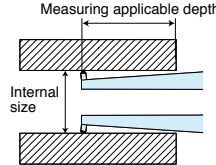
- These gauges are designed for use in measuring deep internal diameter of bores of castings etc, and for internal reading in fabrications. Clearance has been provided for use in recessed bores. The convenient retraction lever allows one-hand operation.



Specifications

| Model | Graduation (mm) | Measuring Range (mm) | Indication Error (mm) | Maximum Measuring Depth (mm) | Contact Point Height (mm) | Measuring Force (N) | Weight (g) |
|-------|-----------------|----------------------|-----------------------|------------------------------|---------------------------|---------------------|------------|
| IM-1 | 0.1 | 10~100 | ±0.1 | 130 | 2 | 5 or less | 500 |
| IM-2 | 0.1 | 10~100 | ±0.1 | 180 | 2 | 5 or less | 620 |
| IM-4 | 0.01 | 10~30 | ±0.02 | 100 | 2 | 5 or less | 500 |
| IM-5 | 0.01 | 20~40 | ±0.02 | 150 | 4 | 5 or less | 600 |

Internal size of workpiece is 10mm, 15mm, 20mm and 30mm or over against measuring applicable depth.



| Model | Internal Size | | | |
|-------|---------------|----|-----|-----|
| | 10 | 15 | 20 | 30~ |
| IM-1 | 35 | 50 | 80 | 130 |
| IM-2 | 35 | 50 | 80 | 180 |
| IM-4 | 35 | 50 | 80 | 100 |
| IM-5 | - | - | 140 | 150 |

Inside of workpiece should be straight or round shape without step etc.



Measuring example of inner diameter of a small metal work piece.



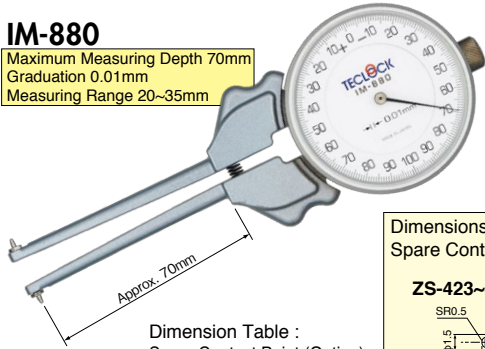
Dial Depth Gauge

- Internal caliper gauge to measure internal diameter of cylindrical workpiece and recessed groove diameter. It can measure groove diameter of "O" ring by modifying spare contact point.
- Set dimension within $\pm 1\text{mm}$ (indication range 2mm) can be comparatively measured (880 series) by alternatively using auxiliary spare contact point in accordance with measured dimension.

- Please set standard dimension within measuring range with micrometer or ring gauge.

IM-880

Maximum Measuring Depth 70mm
Graduation 0.01mm
Measuring Range 20~35mm



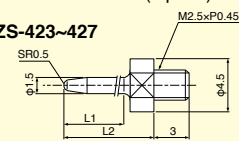
Dimension Table : Spare Contact Point (Option)

| Code No. | L1 | L2 | Measuring Range |
|----------|-----|----|-----------------|
| ZS-423 | 2.5 | 4 | 20-23 |
| ZS-424 | 3.5 | 5 | 22-25 |
| ZS-425 | 4.5 | 6 | 24-27 |
| ZS-426 | 5.5 | 7 | 26-29 |
| ZS-427 | 5.5 | 8 | 28-31 |
| ZS-428 | 5.5 | 9 | 30-33 |
| ZS-429 | 5.5 | 10 | 32-35 |

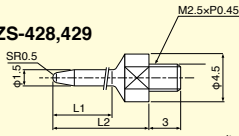
unit : mm

Dimensions : Spare Contact Point (Option)

ZS-423~427



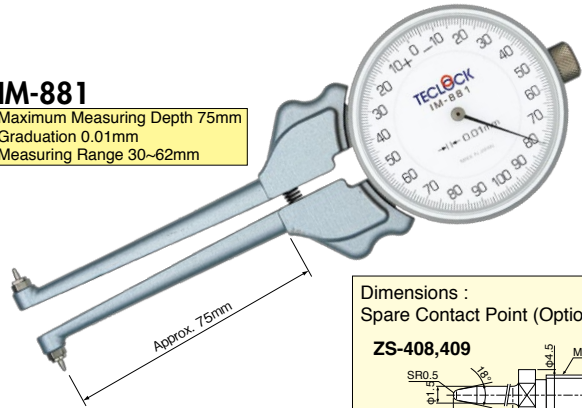
ZS-428,429



unit : mm

IM-881

Maximum Measuring Depth 75mm
Graduation 0.01mm
Measuring Range 30~62mm



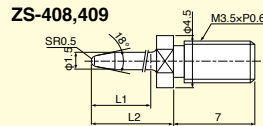
Dimension Table : Spare Contact Point (Option)

| Code No. | L1 | L2 | Measuring Range |
|----------|-----|------|-----------------|
| ZS-408 | 3 | 4.5 | 30-38 |
| ZS-409 | 5.5 | 7.5 | 36-44 |
| ZS-410 | 6 | 10.5 | 42-50 |
| ZS-411 | 6 | 13.5 | 48-56 |
| ZS-412 | 6 | 16.5 | 54-62 |

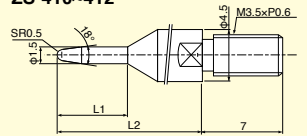
unit : mm

Dimensions : Spare Contact Point (Option)

ZS-408,409



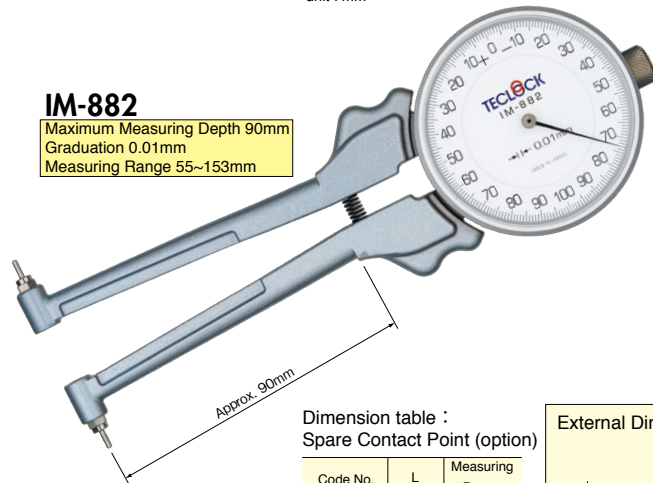
ZS-410~412



unit : mm

IM-882

Maximum Measuring Depth 90mm
Graduation 0.01mm
Measuring Range 55~153mm



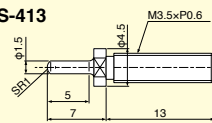
Dimension table : Spare Contact Point (option)

| Code No. | L | Measuring Range |
|----------|----|-----------------|
| ZS-413 | 7 | 55~73 |
| ZS-414 | 15 | 71~89 |
| ZS-415 | 23 | 87~105 |
| ZS-416 | 31 | 103~121 |
| ZS-417 | 39 | 119~137 |
| ZS-418 | 47 | 135~153 |

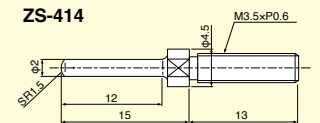
unit : mm

Dimensions : Spare Contact Point (Option)

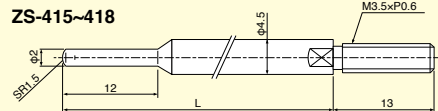
ZS-413



ZS-414

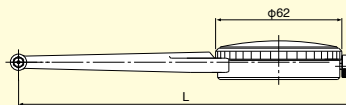


ZS-415~418



unit : mm

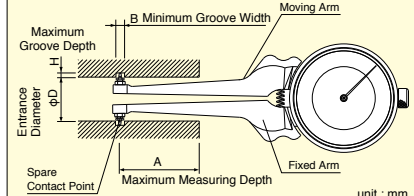
External Dimensions



| Model | L |
|--------|-----|
| IM-880 | 165 |
| IM-881 | 170 |
| IM-882 | 183 |

unit : mm

Dimensions



unit : mm

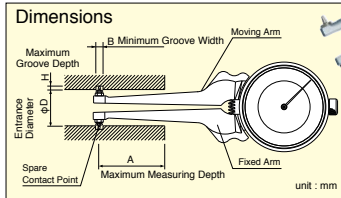
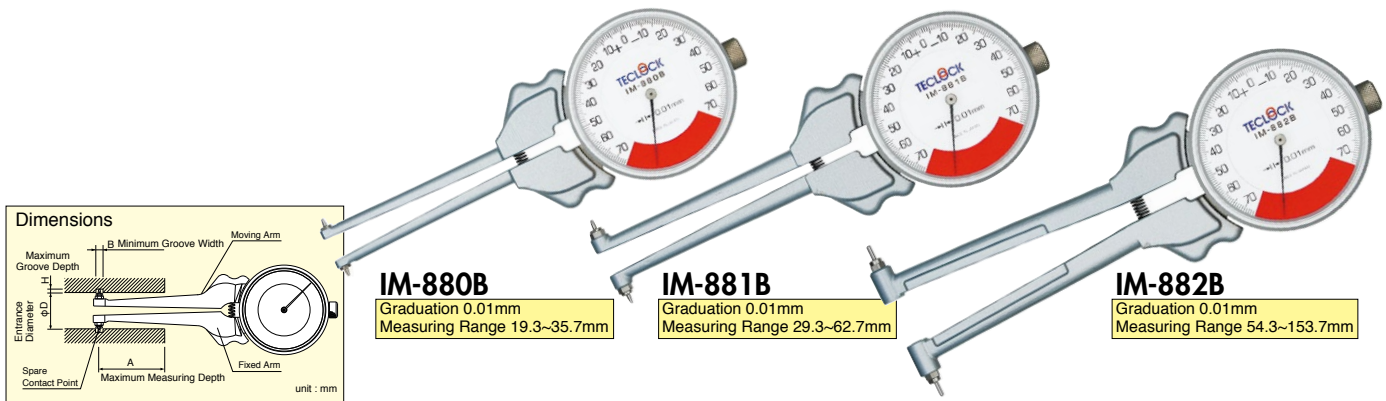
Specifications

| Model | Graduation (mm) | Measuring Range (mm) | Indicating Range (mm) | Indication Error (μm) | Measuring Force (N) | Weight (g) | Spare Contact Point | | Maximum Measuring Depth A (mm) | Entrance Diameter φD (mm)* | Groove Depth H (mm) | Minimum Groove Width B (mm) |
|--------|-----------------|----------------------|-----------------------|-----------------------|---------------------|------------|---------------------|----------------------|--------------------------------|----------------------------|---------------------|-----------------------------|
| | | | | | | | Code No. | Measuring Range (mm) | | | | |
| IM-880 | 0.01 | 20-35 | 2 | ± 20 | 3 or less | 196 | ZS-423 | 20-23 | 70 | 15-18 | 2.5 | 2.5 |
| | | | | | | | ZS-424 | 22-25 | | | | |
| | | | | | | | ZS-425 | 24-27 | | | | |
| | | | | | | | ZS-426 | 26-29 | | | | |
| | | | | | | | ZS-427 | 28-31 | | | | |
| | | | | | | | ZS-428 | 30-33 | | | | |
| | | | | | | | ZS-429 | 32-35 | | | | |
| | | | | | | | ZS-408 | 30-38 | | | | |
| IM-881 | 0.01 | 30-62 | 2 | ± 20 | 3 or less | 218 | ZS-409 | 36-44 | 75 | 27.4-35.4 | 4.3 | 2.5 |
| | | | | | | | ZS-410 | 42-50 | | | | |
| | | | | | | | ZS-411 | 48-56 | | | | |
| | | | | | | | ZS-412 | 54-62 | | | | |
| | | | | | | | ZS-413 | 55-73 | | | | |
| | | | | | | | ZS-414 | 71-89 | | | | |
| | | | | | | | ZS-415 | 87-105 | | | | |
| | | | | | | | ZS-416 | 103-121 | | | | |
| IM-882 | 0.01 | 55~153 | 2 | ± 20 | 3 or less | 240 | ZS-417 | 119-137 | 90 | 45-63 | 5 | 3.5 |
| | | | | | | | ZS-418 | 135-153 | | | | |
| | | | | | | | ZS-413 | 55-73 | | | | |
| | | | | | | | ZS-414 | 71-89 | | | | |
| | | | | | | | ZS-415 | 87-105 | | | | |
| | | | | | | | ZS-416 | 103-121 | | | | |
| ZS-417 | 119-137 | | | | | | | | | | | |
| ZS-418 | 135-153 | | | | | | | | | | | |

*φD=Measuring Rang - 2H



One Revolution Internal Dial Caliper Gauge



Specifications

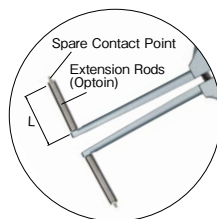
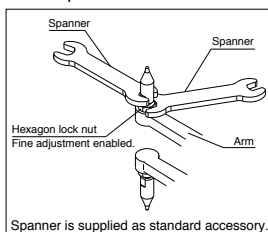
| Model | Graduation (mm) | Measuring Range (mm) | Indicating range (mm) | Indication Error (μm) | Measuring Force (N) | Spare Contact Point | | | Maximum Measuring Depth A (mm) | Entrance Diameter ϕD (mm)* | Groove Depth H (mm) | Groove Width B (mm) | Weight (g) | |
|---------|-----------------|----------------------|-----------------------|-----------------------|---------------------|---------------------|----------------|----------------------|--------------------------------|----------------------------|---------------------|---------------------|------------|-----|
| | | | | | | Code No. | Extension Rods | Measuring Range (mm) | | | | | | |
| IM-880B | 0.01 | 20~35 | 1.4 | ±20 | 3 or less | ZS-423 | ZS-423 | - | 19.3~20.7 | 70 | 14.3 | 2.5 | 2.5 | 196 |
| | | | | | | ZS-423 | ZS-424 | - | 20.3~21.7 | | 15.3 | 2.5 | | |
| | | | | | | ZS-424 | ZS-424 | - | 21.3~22.7 | | 14.3 | 3.5 | | |
| | | | | | | ZS-424 | ZS-425 | - | 22.3~23.7 | | 15.3 | 3.5 | | |
| | | | | | | ZS-425 | ZS-425 | - | 23.3~24.7 | | 15.3 | 4 | | |
| | | | | | | ZS-425 | ZS-426 | - | 24.3~25.7 | | 16.3 | 4 | | |
| | | | | | | ZS-426 | ZS-426 | - | 25.3~26.7 | | 17.3 | 4 | | |
| | | | | | | ZS-426 | ZS-427 | - | 26.3~27.7 | | 18.3 | 4 | | |
| | | | | | | ZS-427 | ZS-427 | - | 27.3~28.7 | | 19.3 | 4 | | |
| | | | | | | ZS-427 | ZS-428 | - | 28.3~29.7 | | 20.3 | 4 | | |
| | | | | | | ZS-428 | ZS-428 | - | 29.3~30.7 | | 21.3 | 4 | | |
| | | | | | | ZS-428 | ZS-429 | - | 30.3~31.7 | | 22.3 | 4 | | |
| | | | | | | ZS-429 | ZS-429 | - | 31.3~32.7 | | 23.3 | 4 | | |
| | | | | | | ZS-426 | ZS-426 | ZS-646 | 32.3~33.7 | | 24.3 | 4 | | |
| | | | | | | ZS-426 | ZS-427 | ZS-646 | 33.3~34.7 | | 25.3 | 4 | | |
| ZS-427 | ZS-427 | ZS-646 | 34.3~35.7 | 26.3 | 4 | | | | | | | | | |
| IM-881B | 0.01 | 30~62 | 1.4 | ±20 | 3 or less | ZS-408 | ZS-408 | - | 29.3~38.7 | 75 | 24 | 3 | 2.5 | 218 |
| | | | | | | ZS-409 | ZS-409 | - | 35.3~44.7 | | 27.4 | 4.3 | | |
| | | | | | | ZS-410 | ZS-410 | - | 41.3~50.7 | | 33.4 | 4.3 | | |
| | | | | | | ZS-411 | ZS-411 | - | 47.3~56.7 | | 39.4 | 4.3 | | |
| | | | | | | ZS-412 | ZS-412 | - | 53.3~62.7 | | 45.4 | 4.3 | | |
| | | | | | | ZS-413 | ZS-413 | - | 54.3~73.7 | | 45 | 5 | | |
| IM-882B | 0.01 | 55~153 | 1.4 | ±20 | 3 or less | ZS-414 | ZS-414 | - | 70.3~89.7 | 90 | 54 | 8.5 | 3.5 | 240 |
| | | | | | | ZS-415 | ZS-415 | - | 86.3~105.7 | | 70 | 8.5 | | |
| | | | | | | ZS-416 | ZS-416 | - | 102.3~121.7 | | 86 | 8.5 | | |
| | | | | | | ZS-417 | ZS-417 | - | 118.3~137.7 | | 102 | 8.5 | | |
| | | | | | | ZS-418 | ZS-418 | - | 134.3~153.7 | | 118 | 8.5 | | |

*Please combine with ZS-646 extension rod when measuring ϕ33 to ϕ35 by IM-880B.

Optional Extension Rods

- IM-880 series dialcaliper gauges can measure internal dimension up to measuring range in the right list by installing extension rods. Standard products of spare extension rods can be used as it is.

Mounting Method of Spare Contact Point



IM-880:

Measuring range with extension rods (mm)

| Spare Contact Point | Extension Rods | Measuring Range | |
|---------------------|----------------|-----------------|--------|
| ZS-646 L=7 | ZS-423 | 34-37 | |
| | ZS-424 | 36-39 | |
| | ZS-425 | 38-41 | |
| | ZS-426 | 40-43 | |
| | ZS-427 | 42-45 | |
| | ZS-428 | 44-47 | |
| | ZS-429 | 46-49 | |
| | ZS-647 L=14 | ZS-423 | 48-51 |
| | | ZS-424 | 50-53 |
| | | ZS-425 | 52-55 |
| | | ZS-426 | 54-57 |
| | | ZS-427 | 56-59 |
| | | ZS-428 | 58-61 |
| | | ZS-429 | 60-63 |
| | | ZS-648 L=21 | ZS-423 |
| ZS-424 | 64-67 | | |
| ZS-425 | 66-69 | | |
| ZS-426 | 68-71 | | |
| ZS-427 | 70-73 | | |
| ZS-428 | 72-75 | | |
| ZS-429 | 74-77 | | |
| ZS-649 L=28 | ZS-423 | 76-79 | |
| | ZS-424 | 78-81 | |
| | ZS-425 | 80-83 | |
| | ZS-426 | 82-85 | |
| | ZS-427 | 84-87 | |
| | ZS-428 | 86-89 | |
| | ZS-429 | 88-91 | |

IM-881:

Measuring range with extension rods (mm)

| Spare Contact Point | Extension Rods | Measuring Range | |
|---------------------|----------------|-----------------|---------|
| ZS-693 L=15 | ZS-408 | 60-68 | |
| | ZS-409 | 66-74 | |
| | ZS-410 | 72-80 | |
| | ZS-411 | 78-86 | |
| | ZS-412 | 84-92 | |
| | ZS-408 | 90-98 | |
| | ZS-409 | 96-104 | |
| | ZS-410 | 102-110 | |
| | ZS-411 | 108-116 | |
| | ZS-412 | 114-122 | |
| | ZS-694 L=30 | ZS-408 | 120-128 |
| | | ZS-409 | 126-134 |
| ZS-410 | | 132-140 | |
| ZS-411 | | 138-146 | |
| ZS-412 | | 144-152 | |

IM-882:

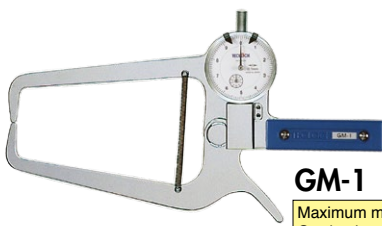
Measuring range with extension rods (mm)

| Spare Contact Point | Extension Rods | Measuring Range | |
|---------------------|----------------|-----------------|---------|
| ZS-696 L=48 | ZS-413 | 151-169 | |
| | ZS-414 | 167-185 | |
| | ZS-415 | 183-201 | |
| | ZS-416 | 199-217 | |
| | ZS-417 | 215-233 | |
| | ZS-418 | 231-249 | |
| | ZS-413 | 247-265 | |
| | ZS-414 | 263-281 | |
| | ZS-415 | 279-297 | |
| | ZS-416 | 295-313 | |
| | ZS-417 | 311-329 | |
| | ZS-418 | 327-345 | |
| | ZS-697 L=96 | ZS-413 | 327-345 |

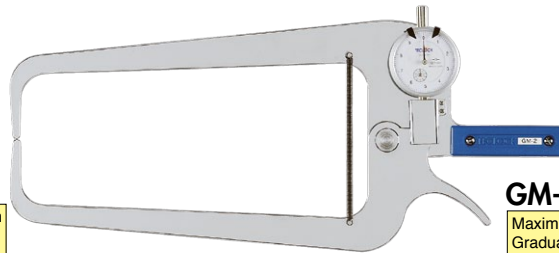


External Dial Caliper Gauge

- These gauges are designed for use in measuring external dimension of thick and large measuring work piece or special shape products which seem to be difficult to measure.
- Special order can be produced.



GM-1
Maximum measuring depth 125mm
Graduation 0.1mm
Measuring Range 0~90mm



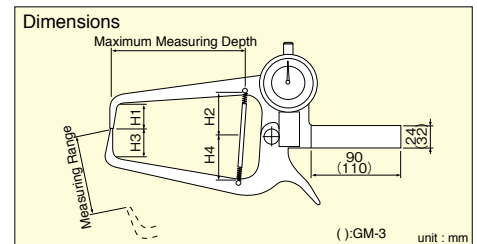
GM-2
Maximum measuring depth 250mm
Graduation 0.1mm
Measuring Range 0~90mm



GM-3
Maximum measuring depth 400mm
Graduation 0.1mm
Measuring Range 0~90mm

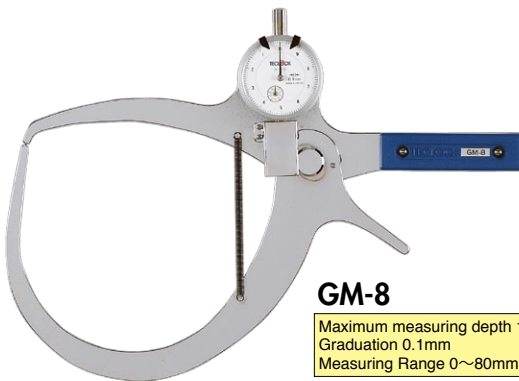


Overall length of GM-3 is large as 635mm.

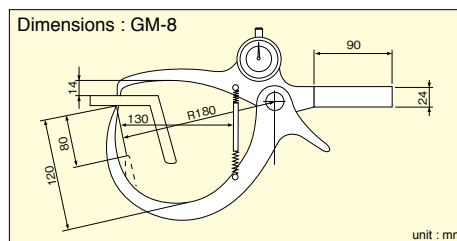


| Model | H ₁ | H ₂ | H ₃ | H ₄ |
|-------|----------------|----------------|----------------|----------------|
| GM-1 | 25 | 40 | 25 | 40 |
| GM-2 | 50 | 60 | 50 | 60 |
| GM-3 | 60 | 70 | 60 | 80 |

unit : mm



GM-8
Maximum measuring depth 130mm
Graduation 0.1mm
Measuring Range 0~80mm



Specifications

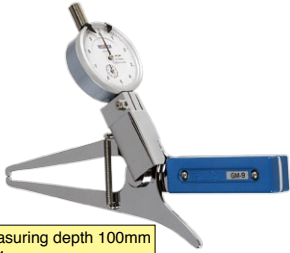
| Model | Graduation (mm) | Measuring Range (mm) | Indication Error (mm) | Maximum measuring depth (mm) | Measuring Force (N) | Weight (g) |
|-------|-----------------|----------------------|-----------------------|------------------------------|---------------------|------------|
| GM-1 | 0.1 | 0~90 | ±0.1 | 125 | 5 or less | 500 |
| GM-2 | 0.1 | 0~90 | ±0.1 | 250 | 5 or less | 800 |
| GM-3 | 0.1 | 0~90 | ±0.2 | 400 | 10 or less | 1,400 |
| GM-8 | 0.1 | 0~80 | ±0.1 | 130 | 5 or less | 630 |



Caliper Gauge

GM-9

Maximum measuring depth 100mm
Graduation 0.1mm
Measuring Range 0~30mm



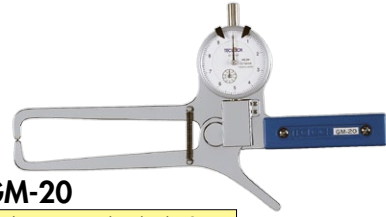
GM-11

Maximum measuring depth 125mm
Graduation 0.1mm
Measuring Range 0~50mm



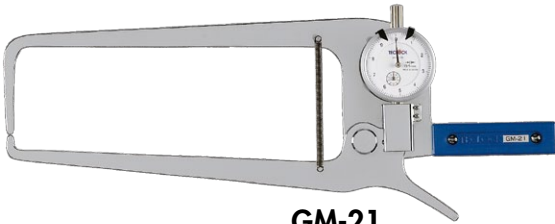
GM-20

Maximum measuring depth 125mm
Graduation 0.1mm
Measuring Range 0~80mm



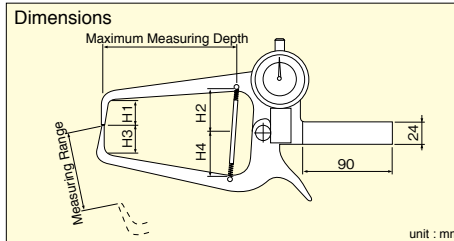
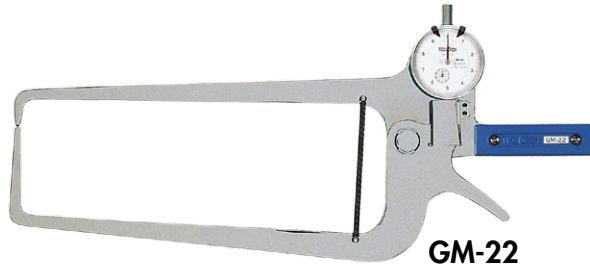
GM-21

Maximum measuring depth 220mm
Graduation 0.1mm
Measuring Range 0~90mm



GM-22

Maximum measuring depth 250mm
Graduation 0.1mm
Measuring Range 0~90mm



Dimension Table

| Model | H ₁ | H ₂ | H ₃ | H ₄ |
|-------|----------------|----------------|----------------|----------------|
| GM-9 | 2 | 12 | 2 | 12 |
| GM-11 | 2 | 6 | 2 | 6 |
| GM-20 | 17 | 11 | 17 | 11 |
| GM-21 | 65 | 70 | 10 | 15 |
| GM-22 | 20 | 25 | 65 | 70 |

unit : mm

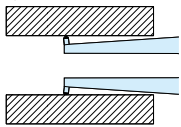
Specifications

| Model | Graduation (mm) | Measuring Range (mm) | Indication Error (mm) | Maximum Measuring Depth (mm) | Measuring Force (N) | Weight (g) |
|-------|-----------------|----------------------|-----------------------|------------------------------|---------------------|------------|
| GM-9 | 0.1 | 0~30 | ±0.1 | 100 | 5 or less | 460 |
| GM-11 | 0.1 | 0~50 | ±0.1 | 125 | 5 or less | 430 |
| GM-20 | 0.1 | 0~80 | ±0.1 | 125 | 5 or less | 405 |
| GM-21 | 0.1 | 0~90 | ±0.1 | 220 | 5 or less | 660 |
| GM-22 | 0.1 | 0~90 | ±0.1 | 250 | 5 or less | 720 |

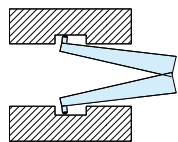
Usage Example

Internal Caliper Gauge

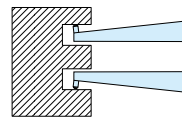
Internal dimension of deep position can be easily measured. (maximum measuring depth 180mm=IM-2)



Groove diameter of groove for "O" ring can be easily measured. (IM-808,IM-880 etc)

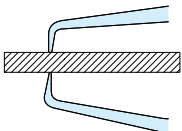


Measurement evading from screw, nuts etc. can be made.

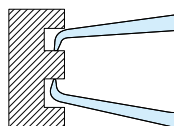


External Caliper Gauge

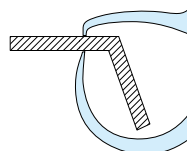
Thickness of long distance position of board shape workpiece can be measured. (maximum measuring depth 400mm=GM-3)



Thickness measurement in narrow area. (GM-9,GM-11)



It can measure evading obstacles in front of measuring point. (GM-8,GMD-8J)





External Digital Caliper Gauge

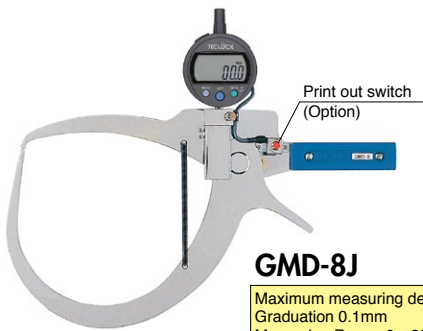
- External dimension measuring instrument of which digital gauge is built into frame. This can treat statistics data and print out it by connecting it to the optional exclusive printer SD-765P (Please refer to page 52).
- It is possible to equip print out switch (Option).



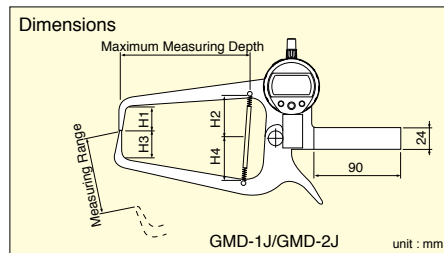
GMD-1J
 Maximum measuring depth 125mm
 Graduation 0.1mm
 Measuring Range 0~90mm



GMD-2J
 Maximum measuring depth 250mm
 Graduation 0.1mm
 Measuring Range 0~90mm



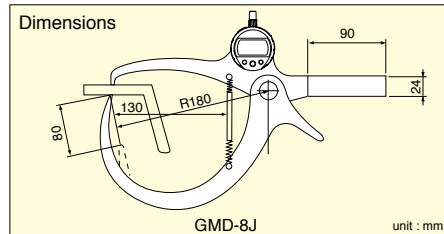
GMD-8J
 Maximum measuring depth 130mm
 Graduation 0.1mm
 Measuring Range 0~80mm



Dimension Table

| Model | H ₁ | H ₂ | H ₃ | H ₄ |
|--------|----------------|----------------|----------------|----------------|
| GMD-1J | 25 | 40 | 25 | 40 |
| GMD-2J | 50 | 60 | 50 | 60 |

unit: mm



Printer (Option)
 Mini Printer for
 Digital Caliper Gauges SD-763P
 Connect cable ZE-018



Specifications

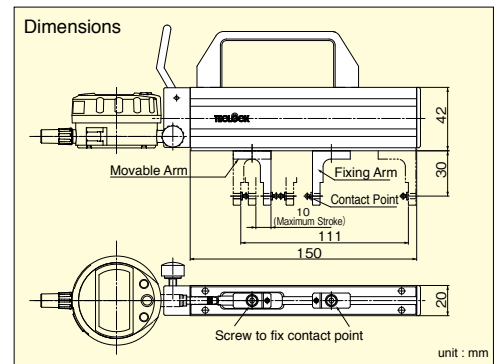
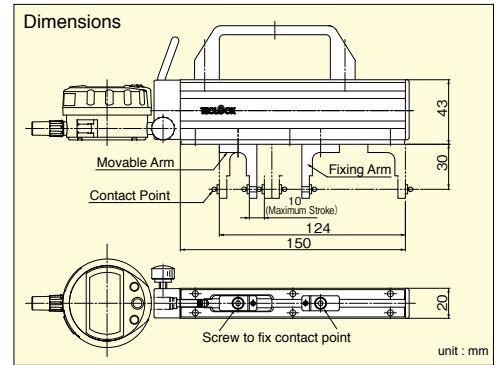
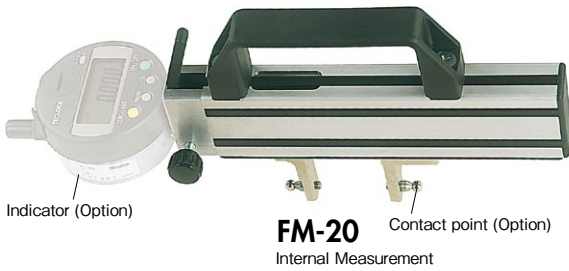
| Model | Graduation (mm) | Measuring Range (mm) | Indication Error* (mm) | Maximum Measuring Depth (mm) | Measuring Force (N) | Weight (g) |
|--------|-----------------|----------------------|------------------------|------------------------------|---------------------|------------|
| GMD-1J | 0.1 | 0~90 | ±0.1 | 125 | 5 or less | 560 |
| GMD-2J | 0.1 | 0~90 | ±0.1 | 250 | 5 or less | 830 |
| GMD-8J | 0.1 | 0~80 | ±0.1 | 130 | 5 or less | 580 |

*The quantizing error function is not included.



Arm Slide Type Caliper Gauge

- Stable and accurate measuring dimension (comparative measurement) is possible for internal and external dimension, as this can well stick to workpiece with measurement method by sliding movable arm.
- Boxy type, easily to hold, lightweight and solid, this is suitable to inspect large volume at work site.
- This can be used for various objectives to measure internal gears, internal diameter female screw, plain gear, spline shaft of special key, over pin diameter of separation shaft and pitch gear thickness.
- Contact point is separately produced on demand such as ball type, flat type, knife edge type. Please advise dimension and shape.
- As Digital indicator is an option, please select it according to an objective. Because dial indicator can be installed.
- This can print out data by connected to Digital mini printer SD-763P (option).



Groove internal diameter is comparatively measured by using Digital indicator with 0.001mm resolution

Specifications

| Model | Application | Measuring Range (mm) | Arm Length (mm) | Measuring Force (N) | Fitting Holes (mm) | Weight (g) |
|-------|-------------|----------------------|-----------------|---------------------|----------------------------|------------|
| FM-20 | Internal | 20~130 | 30 | 7~9 | Screw to fix contact point | 380 |
| FM-25 | External | 0~100 | 30 | 7~9 | φ3.5 | 380 |

Contact point and digital indicator are not included.