

# Bore Gauge

Bore Gauge is the comparative measuring instrument which measures internal diameter of a hole by comparing with master gauge (micrometer, ring gauge etc.). Center of probe and anvil are guided to diameter part of a hole by guide assembly and displacement of contact point is transferred to dial indicator (Automatic centripetal mechanism) by right angle change in the ratio of 1 : 1 with cam mechanism.

Measurement accuracy is changed according to graduation (resolution) of used dial indicator. Measuring range are available from minimum  $\phi 6\text{mm}$  to maximum  $\phi 450\text{mm}$  according to size of diameter.

## Bore Gauge (CD type)

- Compliance with JIS B 7515A.
- Anvil and Contact point are using the carbide ball.
- The measuring depth can be extend using the extension rod to measure a deep hole.



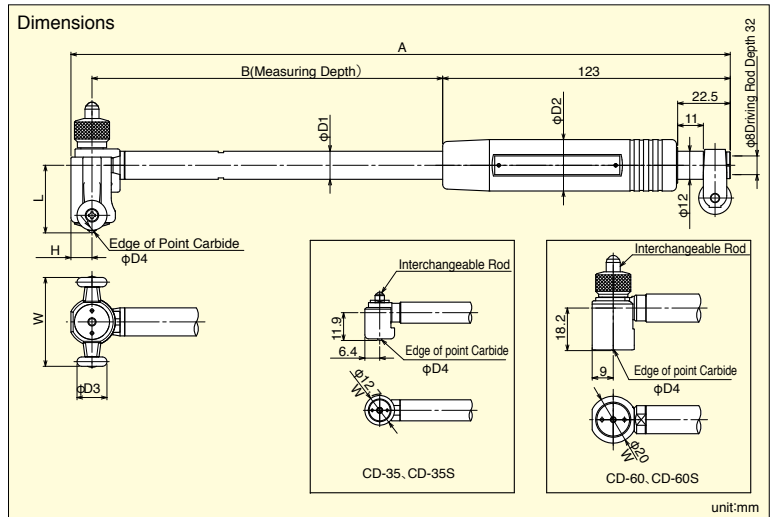
**CD-150**

Measuring Range 50~150mm

**CD-35S**  
Short size

Measuring Range 18~35mm

Dial gauge is an optional item.



Dimension Table : Standard

Model	A	B	L	H	W	$\phi D1$	$\phi D2$	$\phi D3$	$\phi D4$
CD-35	229.4	100	11.9	6.4	$\phi 12.7$	9	22	—	1.5
CD-60	282	150	18.2	9	$\phi 20$	12	22	—	1.5
CD-150	282	150	28.9	9	38	12	22	12.8	2
CD-160	282	150	28.9	9	50	12	22	12.8	2
CD-250	385	250	100.9	12	90	15	25	19.8	3
CD-400	385	250	100.9	12	90	15	25	19.8	3

unit: mm

Dimension Table : Short size

Model	A	B	L	H	W	$\phi D1$	$\phi D2$	$\phi D3$	$\phi D4$
CD-35S	179.4	50	11.9	3.4	$\phi 12.7$	9	22	—	1.5
CD-60S	182	50	18.2	9	$\phi 20$	12	22	—	1.5
CD-150S	182	50	28.9	9	38	12	22	12.8	2
CD-160S	182	50	28.9	9	50	12	22	12.8	2
CD-250S	285	150	100.9	12	90	15	25	19.8	3
CD-400S	285	150	100.9	12	90	15	25	19.8	3

unit: mm

### Specification

	Model	Measuring Range (mm)	Probe Depth (mm)	Effective Measuring Range (mm)	Total Range Error ( $\mu\text{m}$ )	Adjacent Error ( $\mu\text{m}$ )	Repeatability ( $\mu\text{m}$ )	Measuring Force	Guide Support Force	Number of Anvils	Number of Washers	Sub Anvil	Weight (g)
Standard type	CD-35	18-35	100	1.2	2	1	0.5	4N or less	6N or less	Increm 9pcs./2mm	2	—	160
	CD-60	35-60	150							Increm 6pcs./5mm	4	—	230
	CD-150	50-150	150	1.6				5N or less	10N or less	Increm 11pcs./5mm	4	50	250
	CD-160	100-160	150					Increm 13pcs./5mm	4	—	310		
	CD-250	160-250	250					6N or less	15N or less	Increm 6pcs./15mm	7	—	740
CD-400	250-400	250	Increm 5pcs./15mm	7	75	960							
Short type	CD-35S	18-35	50	1.2	2	1	0.5	4N or less	6N or less	Increm 9pcs./2mm	2	—	150
	CD-60S	35-60	50							Increm 6pcs./5mm	4	—	210
	CD-150S	50-150	50	1.6				5N or less	10N or less	Increm 11pcs./5mm	4	50	230
	CD-160S	100-160	50					Increm 13pcs./5mm	4	—	290		
	CD-250S	160-250	150					6N or less	15N or less	Increm 6pcs./15mm	7	—	630
CD-400S	250-400	150	Increm 5pcs./15mm	7	75	720							



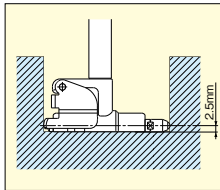
## Bore Gauge (CD type) for shallow hole



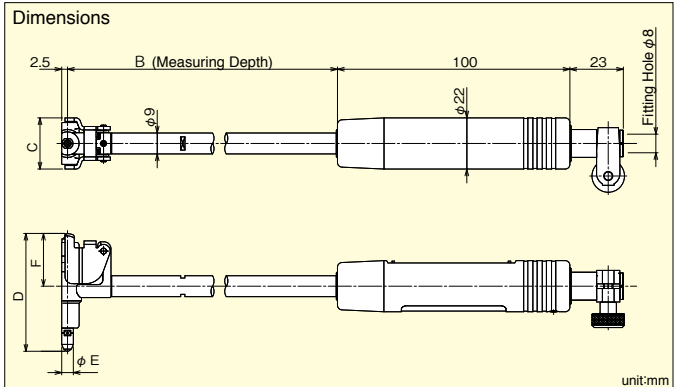
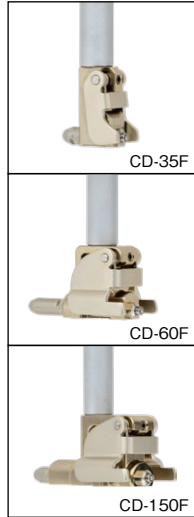
### CD-35F

Measuring Range 15~35mm

Dial gauge is optional item.



Internal measurement is possible at the position from shallow hole bottom by 2.5mm.



Dimension Table

Model	A	B	C	D	E	F
CD-35F	275.5	150	10.6	15.7	5	10
CD-60F	275.5	150	18	35.7	5	14.3
CD-150F	275.5	150	22	50.7	5	22.7
CD-35FS	175.5	50	10.6	15.7	5	10
CD-60FS	175.5	50	18	35.7	5	14.3
CD-150FS	175.5	50	22	50.7	5	22.7

unit:mm

### Specification

Model	Measuring Range (mm)	Effective Measuring Range (mm)	Total Range Error (μm)	Adjacent Error (μm)	Repeatability (μm)	Anvil (pcs.)	Weight (g)
CD-35F	15~35	1.2	4	1	1	11	180
CD-60F	35~60	1.2	4	1	1	6	200
CD-150F	50~150	1.2	4	1	1	11	210
CD-35FS	15~35	1.2	4	1	1	11	140
CD-60FS	35~60	1.2	4	1	1	6	160
CD-150FS	50~150	1.2	4	1	1	11	170

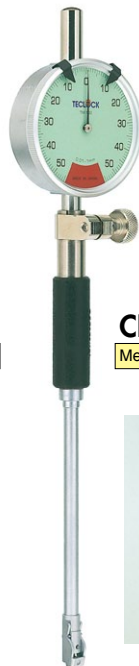
## Bore Gauge (CN type) for small hole

- These are bore gauges for small holes of which internal diameter is 18.5mm or less and high accuracy measuring is possible as well as standard type bore gauges.



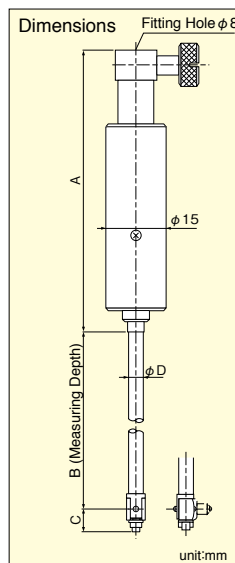
### CN-10

Measuring Range 6~10mm



### CN-18

Measuring Range 10~18.5mm



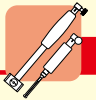
Dimension Table

Model	A	B	C	D
CN-10	80	49	5.4	4
CN-18	80	100	8.5	6

unit:mm

### Specification

Model	Measuring Range (mm)	Effective Measuring Range (mm)	Total Range Error (μm)	Adjacent Error (μm)	Repeatability (μm)	Weight (g)
CN-10	6~10	0.5	5	2	2	70
CN-18	10~18.5	0.6	5	2	2	85



# Parts

## Interchangeable Rods (Anvils), Washers and Extension Rods (For CD & CN type)

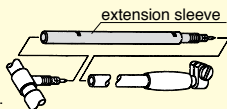
Model	Extension rods	Interchangeable rods (anvils)													Washers						
		No.1	No.2	No.3	No.4	No.5	No.6	No.7	No.8	No.9	No.10	No.11	No.12	No.13	0.5mm	1mm	2mm	3mm	4mm	5mm	6mm
CN-10	NML	6	6.5	7	7.5	8	8.5	9	9.5	10											
	Code No.	ZJ-300	ZJ-301	ZJ-302	ZJ-303	ZJ-304	ZJ-305	ZJ-306	ZJ-307	ZJ-308											
CN-18	NML	10	11	12	13	14	15	16	17	18											
	Code No.	ZJ-310	ZJ-311	ZJ-312	ZJ-313	ZJ-314	ZJ-315	ZJ-316	ZJ-317	ZJ-318											
CD-35	NML	18	20	22	24	26	28	30	32	34											
	Code No.	ZJ-350	ZJ-351	ZJ-352	ZJ-353	ZJ-354	ZJ-355	ZJ-356	ZJ-357	ZJ-358											
CD-60	NML	35	40	45	50	55	60														
	Code No.	ZJ-360	ZJ-361	ZJ-362	ZJ-363	ZJ-364	ZJ-365														
CD-150	NML	50	55	60	65	70	75	80	85	90	95	100									
	Code No.	ZJ-360	ZJ-361	ZJ-362	ZJ-363	ZJ-364	ZJ-365	ZJ-366	ZJ-367	ZJ-368	ZJ-369	ZJ-370									
CD-150S	NML	50	100	105	110	115	120	125	130	135	140	145	150								
	Code No.	ZJ-379	ZJ-360	ZJ-361	ZJ-362	ZJ-363	ZJ-364	ZJ-365	ZJ-366	ZJ-367	ZJ-368	ZJ-369	ZJ-370								
CD-160	NML	100	105	110	115	120	125	130	135	140	145	150	155	160							
	Code No.	ZJ-360	ZJ-361	ZJ-362	ZJ-363	ZJ-364	ZJ-365	ZJ-366	ZJ-367	ZJ-368	ZJ-369	ZJ-370	ZJ-371	ZJ-372							
CD-250	NML	160	175	190	205	220	235														
	Code No.	ZJ-373	ZJ-374	ZJ-375	ZJ-376	ZJ-377	ZJ-378														
CD-400	NML	250	265	280	295	310															
	Code No.	ZJ-373	ZJ-374	ZJ-375	ZJ-376	ZJ-377															
CD-400S	NML	75	325	340	355	370	385														
	Code No.	ZJ-380	ZJ-373	ZJ-374	ZJ-375	ZJ-376	ZJ-377														
CD-35F	NML	15	16	17	18	19	20	21	22	23	24	25									
	Code No.	ZJ-319	ZJ-320	ZJ-321	ZJ-322	ZJ-323	ZJ-324	ZJ-325	ZJ-326	ZJ-327	ZJ-328	ZJ-329									
CD-35FS	NML	10mm	(25)	26	27	28	29	30	31	32	33	34	35								
	Code No.	ZJ-341	(ZJ-319)	ZJ-320	ZJ-321	ZJ-322	ZJ-323	ZJ-324	ZJ-325	ZJ-326	ZJ-327	ZJ-328	ZJ-329								
CD-60F	NML	35	40	45	50	55	60														
	Code No.	ZJ-330	ZJ-331	ZJ-332	ZJ-333	ZJ-334	ZJ-335														
CD-150F	NML	50	55	60	65	70	75	80	85	90	95	100									
	Code No.	ZJ-330	ZJ-331	ZJ-332	ZJ-333	ZJ-334	ZJ-335	ZJ-336	ZJ-337	ZJ-338	ZJ-339	ZJ-340									
CD-150FS	NML	50	(100)	105	110	115	120	125	130	135	140	145	150								
	Code No.	ZJ-342	(ZJ-330)	ZJ-331	ZJ-332	ZJ-333	ZJ-334	ZJ-335	ZJ-336	ZJ-337	ZJ-338	ZJ-339	ZJ-340								

### Extension Sleeves

Length (mm)	CD-35 CD-35F~CD-150F	CD-60~ CD-160	CD-250~ CD-400
125	ZJ-400	ZJ-403	ZJ-408
250	ZJ-401	ZJ-404	ZJ-409
500	ZJ-402	ZJ-405	ZJ-410
750	-	ZJ-406	ZJ-411
1000	-	ZJ-407	ZJ-412
Extension sleeve dia. (mm)	φ8.7	φ12	φ15
Spanner	ZZ-018	ZZ-019	

Can not be used for CN-10, 18, 35F, 60F, 150F.

In case that deep holes are measured which can not be measured with standard bore gauges, measuring depth is to be extended by extension rod outer cylinder.

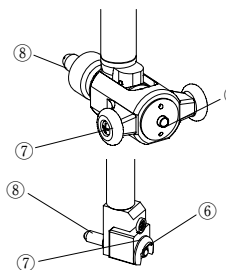
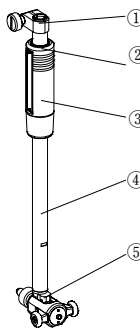


### Dial Gauge Protection Cover (ZY-094)



Dial indicator protection cover (ZY-094). Protection cover for bore gauge. It can not be used for CC type.

### Parts Names



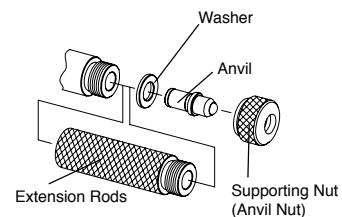
- ① Dial Clamp
- ② Dial Holder
- ③ Grip
- ④ Sleeve
- ⑤ Head
- ⑥ Contact Point (Movable Side)
- ⑦ Guide
- ⑧ Anvil

As error may occur due to deflection, only 1 extension rod should be adopted.

### Extension Rods and Washer Set

Code No.	Model
ZJ-918	CN-10
ZJ-919	CN-18
ZJ-920	CN-35F
ZJ-921	CN-60F
ZJ-922	CN-150F
ZJ-923	CD-35
ZJ-924	CD-60
ZJ-925	CD-150
ZJ-926	CD-160
ZJ-927	CD-250
ZJ-928	CD-400

Can also be used to CN type of old products.

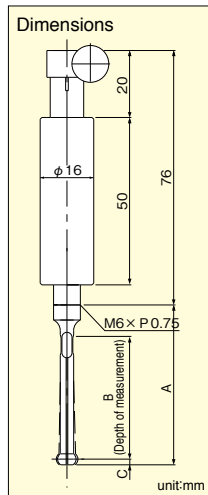
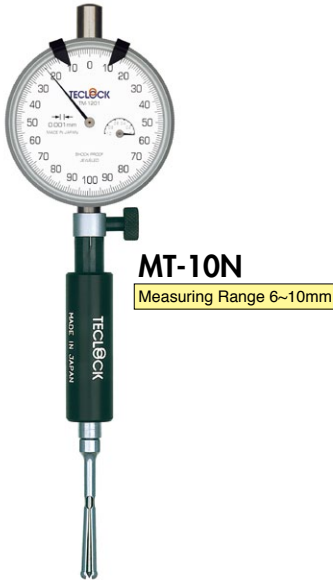


# Micro-Hole test

This is designed for measuring diameter of small holes exclusively and can measure diameters from minimum  $\phi 1.7\text{mm}$  to maximum  $\phi 10\text{mm}$ . When the edge of probe is inserted to a small hole, the edge is closed to inside and presses inner driving rod upward. The principle is that movement is transferred to the extension rod and instructs to dial indicator. Swing width of dial graduation is read as well as bore gauge. It is marked characteristic that stability accuracy indicating performance is high as  $2\mu\text{m}$ .

## Micro-Hole test

- It can comply with measuring internal diameter from minimum  $\phi 1.7\text{mm}$  to maximum  $\phi 10\text{mm}$ .
- It has realized stability accuracy  $2\mu\text{m}$ , even though it is applied for small internal diameter which is difficult to measure.
- It realizes smooth operation with hard chrome plating. It can be naturally inserted to small internal diameter and obtain stable indication value.



### [Full Choice] Micro-Hole Test

Series to select only the measuring range is needed.

Model	Order number	Measuring Range (mm)	Probe	Driving Rod
MT-3N	MT-3N 1.7	1.7~2.1	012	1
	MT-3N 2.1	2.1~2.4	013	1
	MT-3N 2.3	2.3~2.7	014	2
	MT-3N 2.7	2.7~3.2	015	2
MT-4N	MT-4N 2.7	2.7~3.2	015	2
	MT-4N 3.1	3.1~3.5	016	2
	MT-4N 3.4	3.4~3.8	017	2
MT-6N	MT-4N 3.8	3.8~4.3	018	2
	MT-6N 3.8	3.8~4.3	018	2
	MT-6N 4.2	4.2~5.0	021	3
MT-10N	MT-6N 4.7	4.7~5.5	022	3
	MT-6N 5.3	5.3~6.2	023	3
	MT-10N 6.0	6.0~6.8	024	3
MT-10N	MT-10N 6.6	6.6~7.5	025	3
	MT-10N 7.3	7.3~8.1	026	3
	MT-10N 8.0	8.0~8.8	027	3
	MT-10N 8.5	8.5~9.4	028	3
	MT-10N 9.2	9.2~10.0	029	3

Product configuration=Probe+Driving rod + Holder + Extension rods + Spanner (Dialgauge options)

### Specification

Model	Measuring Range (mm)	Number of Probe	No.	Measuring Range (mm)	Probe Dimensions (mm)			Accessories			Indication Error ( $\mu\text{m}$ )	Repeatability ( $\mu\text{m}$ )	Weight (g)
					A	B	C	Driving Rod	Extension Rods	Spanner			
MT-3N	1.7~3.2	4	012	1.70~2.10	25.3	17	0.9	Driving Rod1	1	1	8	2	100
			013	2.10~2.40									
			014	2.30~2.70									
			015	2.70~3.20									
MT-4N	2.7~4.3	4	016	3.10~3.50	30.6	22	1.2	Driving Rod2	1	1	8	2	100
			017	3.40~3.80									
			018	3.80~4.30									
			018	3.80~4.30									
MT-6N	3.8~6.2	4	021	4.20~5.00	30.6	22	2.0	Driving Rod3	1	1	8	2	100
			022	4.70~5.50									
			023	5.30~6.20									
			024	6.00~6.80									
MT-10N	6.0~10.0	6	025	6.60~7.50	47.3	40	2.0	Driving Rod3	1	1	8	2	100
			026	7.30~8.10									
			027	8.00~8.80									
			028	8.50~9.40									
			029	9.20~10.00									
							50						

## Technical Data

- Dial indicator can be installed to bore gauges and Micro-hole Test. It is selectable for easier reading in compliance with objective and dimension range.



Measuring purpose  
Graduation 0.001mm  
Applicable Models  
**TM-1201f**  
(Measuring Range 1mm)  
**TM-1202f**  
(Measuring Range 2mm)



Measuring purpose  
Graduation 0.001mm  
Continuous Dial  
Applicable Models  
**TM-1251f**  
(Measuring Range 1mm)



Measuring purpose  
Graduation 0.001mm  
One Revolution Dial Indicator  
Applicable Models  
**TM-1200f**  
(Measuring Range 0.16mm)



Measuring purpose  
Graduation 0.01mm  
Applicable Models  
**TM-105**  
(Measuring Range 5mm)



Measuring purpose  
Graduation 0.01mm  
One Revolution Dial Indicator  
Applicable Models  
**TM-102f**  
(Measuring Range 1mm)



Measuring purpose  
Small Dial Indicators  
Applicable Models  
**TM-36f**  
(Graduation 0.005mm  
Measuring Range 3.5mm)  
**TM-37C**  
(Graduation 0.01mm  
Measuring Range 3.5mm)



As to dial indicator installed to bore gauge, dial indicator with flat back is recommended. Lug back is standard for ordinary dial indicators but it will be with flat back by adding suffix "f" to the end of model name. TM-105 and TM-37C dial indicator is supplied with Flat back as standard.