



An inspection certificate is supplied as standard. Refer to page X for details.

*Suffix Number (■) for Selecting Standard and Certificate Provided

ISO/DIN/JIS		
Suffix No.	Inspection Certificate	Calibration Certificate
1	○	—
6	○	○

Suffix No. 1: Not available for Grade K sets.

ASME		
Suffix No.	Inspection Certificate	Calibration Certificate
1	○	—
6	○	○

Suffix No. 1: Not available for Grade K sets.
Suffix No. 6: Only for Grade K sets.

BS		
Suffix No.	Inspection Certificate	Calibration Certificate
1	○	—

Inspection Certificate



SPECIFICATIONS

Metric Block Sets						
Blocks per set	Order No.		Standard / grade available and Suffix No.*			Blocks included in set
	Steel	CERA	ISO/DIN/JIS	ASME	BS	
16	516-111	516-161	0: -■0	—	—	1.00, 1.25, 1.5, 2, 3, 5, 10, 15, 20, 25, 25.25, 30, 35, 40, 45, 50mm, Cerastone, Optical parallels (t = 12mm, 25mm)
	516-112	516-162	1: -■0	—	—	
	516-113	516-163	2: -■0	—	—	
10	516-977	—	K: -■0	—	—	1.00, 1.25, 1.50, 2, 3, 5, 10, 15, 20, 25mm, Optical parallel (t = 12mm)
	516-978	516-378	0: -■0	—	—	
	516-979	516-379	1: -■0	—	—	
	516-980	516-380	2: -■0	—	—	
10	516-103	516-152	0: -■0	0: -■6	—	1.00, 1.25, 1.50, 2, 3, 5, 10, 15, 20, 25mm
	516-101	516-153	1: -■0	1: -■6	—	
	—	516-154	2: -■0	—	—	
10	516-580	516-390	0: -■0	—	—	2.2, 4.8, 7.8, 10.4, 12, 15.2, 17.4, 19.6, 22.6, 25mm
	516-581	516-391	1: -■0	—	—	
	516-582	516-392	2: -■0	—	—	
10	516-106	516-156	0: -■0	—	—	2.5, 5.1, 7.7, 10.3, 12.9, 15, 17.6, 20.2, 22.8, 25mm, Optical parallel (t = 12mm)
	516-107	516-157	1: -■0	—	—	
	516-108	516-158	2: -■0	—	—	
10	516-132	516-182	0: -■0	—	—	1.25, 1.50, 1, 2, 3, 5, 10, 15, 20, 25mm, Micro Checker, Optical parallel (t = 12mm)
	516-133	516-183	1: -■0	—	—	
	516-134	516-184	2: -■0	—	—	
10	516-135	516-185	0: -■0	—	—	2.5, 5.1, 7.7, 10.3, 12.9, 15, 17.6, 20.2, 22.8, 25mm, Micro Checker, Optical parallel (t = 12mm)
	516-136	516-186	1: -■0	—	—	
	516-137	516-187	2: -■0	—	—	
8	—	516-547	—	K: -■6	—	25, 50, 75, 100, 125, 150, 175, 200mm
	—	516-164	K: -■0	00: -■6	—	
	516-115	516-165	0: -■0	0: -■6	—	
	516-116	516-166	1: -■0	1: -■6	—	
	516-117	516-167	2: -■0	2: -■6	—	
	—	—	—	—	—	

Inch Block Sets						
Blocks per set	Order No.		Standard / grade available and Suffix No.*			Blocks included in set
	Steel	CERA	ISO/DIN/JIS	ASME	BS	
10	516-528	516-318	—	00: -■6	0: -■1	.087, .189, .307, .409, .472, .598, .669, .772, .890, 1"
	516-529	516-319	—	0: -■6	1: -■1	
	516-530	516-320	—	1: -■6	2: -■1	
10	516-552	516-559	—	K: -■6	—	.105, .210, .315, .420, .500, .605, .710, .815, .920, 1", Optical parallel (t = .5")
	516-921	516-321	—	00: -■6	0: -■1	
	516-922	516-322	—	0: -■6	1: -■1	
	516-923	516-323	—	1: -■6	2: -■1	
10	516-553	516-560	—	K: -■6	—	.105, .210, .315, .420, .500, .605, .710, .815, .920, 1", Micro checker, Optical parallel (t = .5")
	516-138	516-188	—	00: -■6	0: -■1	
	516-139	516-189	—	0: -■6	1: -■1	
	516-140	516-190	—	1: -■6	2: -■1	
9	516-554	516-561	—	K: -■6	—	.0625, .100, .125, .200, .250, .300, .500, 1, 2", Optical parallel (t = .5")
	516-929	516-333	—	00: -■6	—	
	516-930	516-334	—	0: -■6	—	
	516-931	516-335	—	1: -■6	—	
	516-932	516-336	—	2: -■6	—	
9	516-555	516-562	—	K: -■6	—	.0625, .100, .125, .200, .250, .300, .500, 1, 2", Micro Checker, Optical parallel (t = .5")
	516-141	516-191	—	00: -■6	—	
	516-142	516-192	—	0: -■6	—	
	516-143	516-193	—	1: -■6	—	
	516-144	516-194	—	2: -■6	—	
9	—	516-563	—	K: -■6	—	.0625, .100, .125, .200, .250, .300, .500, 1, 2"
	—	516-329	—	00: -■6	—	
	516-934	516-330	—	0: -■6	—	
	516-935	516-331	—	1: -■6	—	
8	516-126	516-176	—	0: -■6	—	1, 2, 3, 4, 5, 6, 7, 8"
	516-127	516-177	—	1: -■6	—	

SERIES 516 – Caliper Inspection Gauge Block Sets

SPECIFICATIONS

Metric Block Sets						
Blocks per set	Order No.		Standard / grade available and Suffix No.			Blocks included in set
	Steel	CERA	ISO/DIN/JIS	ASME	BS	
5	—	516-174	2: -10	—	—	5 pcs.: 10.3, 24.5, 50, 75, 100mm, Ceramic plain jaws, Holder (250mm), Glove
4	516-526	516-566	1: -10	—	—	4 pcs.: 10, 30, 50, 125mm, Setting ring (ø4mm, ø10mm), Pin gage (ø10mm), Glove
	516-527	516-567	2: -10	—	—	
3	516-124	516-150	1: -10	—	—	3 pcs.: 30, 41.3, 131.4mm, Setting ring (ø4mm, ø25mm), Glove
	516-125	516-151	2: -10	—	—	
2	516-122	516-172	1: -10	—	—	2 pcs.: 41.3, 131.4mm, Setting ring (ø20mm), Glove
	516-123	516-173	2: -10	—	—	

Gauge Blocks

Length Standards Brought to You by Mitutoyo

Individual Metric Rectangular Gauge Blocks

- If using only one length repeatedly, it is a good idea to purchase individual gauge blocks.
- Nominal sizes which are not included in the chart below can be supplied custom-made on request.
- Each Grade K gauge block to ISO/DIN/ JIS, BS or ASME standard is supplied with a Certificate of Calibration which certifies that the gauge block was calibrated by interferometry.



SPECIFICATIONS

Metric Blocks

* Details of the overall sizes for forms of block are given on page E-3 and the accuracy standards to which they are manufactured are given on page E-5.

Length (mm)	Order No.*		Length (mm)	Order No.*		Length (mm)	Order No.*	
	Steel	CERA		Steel	CERA		Steel	CERA
0.1	611821	—	0.53	611894	—	0.96	611937	—
0.11	611860	—	0.54	611895	—	0.97	611938	—
0.12	611861	—	0.55	611896	—	0.98	611939	—
0.13	611862	—	0.56	611897	—	0.99	611940	—
0.14	611863	—	0.57	611898	—	0.991	611551	613551
0.15	611822	—	0.58	611899	—	0.992	611552	613552
0.16	611864	—	0.59	611900	—	0.993	611553	613553
0.17	611865	—	0.6	611901	—	0.994	611554	613554
0.18	611866	—	0.61	611902	—	0.995	611555	613555
0.19	611867	—	0.62	611903	—	0.996	611556	613556
0.2	611823	—	0.63	611904	—	0.997	611557	613557
0.21	611868	—	0.64	611905	—	0.998	611558	613558
0.22	611869	—	0.65	611906	—	0.999	611559	613559
0.23	611870	—	0.66	611907	—	1	611611	613611
0.24	611871	—	0.67	611908	—	1.0005	611520	613520
0.25	611824	—	0.68	611909	—	1.001	611521	613521
0.26	611872	—	0.69	611910	—	1.002	611522	613522
0.27	611873	—	0.7	611911	—	1.003	611523	613523
0.28	611874	—	0.71	611912	—	1.004	611524	613524
0.29	611875	—	0.72	611913	—	1.005	611525	613525
0.3	611825	—	0.73	611914	—	1.006	611526	613526
0.31	611876	—	0.74	611915	—	1.007	611527	613527
0.32	611877	—	0.75	611916	—	1.008	611528	613528
0.33	611878	—	0.76	611917	—	1.009	611529	613529
0.34	611879	—	0.77	611918	—	1.01	611561	613561
0.35	611826	—	0.78	611919	—	1.02	611562	613562
0.36	611880	—	0.79	611920	—	1.03	611563	613563
0.37	611881	—	0.8	611921	—	1.04	611564	613564
0.38	611882	—	0.81	611922	—	1.05	611565	613565
0.39	611883	—	0.82	611923	—	1.06	611566	613566
0.4	611827	—	0.83	611924	—	1.07	611567	613567
0.41	611884	—	0.84	611925	—	1.08	611568	613568
0.42	611885	—	0.85	611926	—	1.09	611569	613569
0.43	611886	—	0.86	611927	—	1.1	611570	613570
0.44	611887	—	0.87	611928	—	1.11	611571	613571
0.45	611828	—	0.88	611929	—	1.12	611572	613572
0.46	611888	—	0.89	611930	—	1.13	611573	613573
0.47	611889	—	0.9	611931	—	1.14	611574	613574
0.48	611890	—	0.91	611932	—	1.15	611575	613575
0.49	611891	—	0.92	611933	—	1.16	611576	613576
0.5	611506	613506	0.93	611934	—	1.17	611577	613577
0.51	611892	—	0.94	611935	—	1.18	611578	613578
0.52	611893	—	0.95	611936	—	1.19	611579	613579



An inspection certificate is supplied as standard. Refer to page X for details.

*Suffix Number (-■■■) for Selecting Standard and Certificate Provided

ISO/DIN/JIS				
Suffix No.	Grade	Inspection Certificate	Calibration Certificate	
			JCSS	RvA
-016	K	○	○	—
-021	0	○	—	—
-026	0	○	○	—
-031	1	○	—	—
-036	1	○	○	—
-041	2	○	—	—
-046	2	○	○	—

ASME				
Suffix No.	Grade	Inspection Certificate	Calibration Certificate	
			JCSS	
-516	K	○	○	—
-521	00	○	—	—
-531	0	○	—	—
-541	1	○	—	—
-551	2	○	—	—

BS				
Suffix No.	Grade	Inspection Certificate	Calibration Certificate	
			JCSS	
-116	K	○	○	—
-121	0	○	—	—
-126	0	○	○	—
-131	1	○	—	—
-136	1	○	○	—
-141	2	○	—	—
-146	2	○	○	—



Inspection Certificate

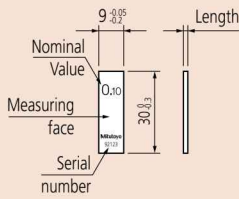


An inspection certificate is supplied as standard. Refer to page X for details.

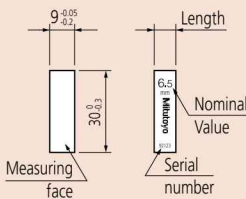
Dimensions

Unit: mm

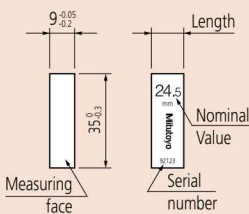
Nominal length:
0.1mm - 5.5mm
(.004" - .25")



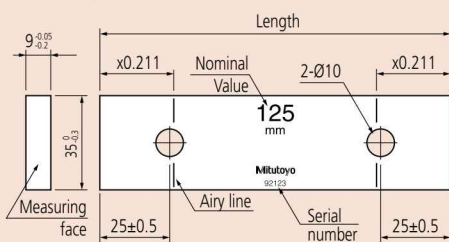
Nominal length:
6mm - 10mm
(.3" - .4")



Nominal length:
10.3mm - 100mm
(.45" - 4")



Nominal length 125mm - 1000mm (5" - 20")



* Details of the overall sizes for forms of block are given on page E-3 and the accuracy standards to which they are manufactured are given on page E-5.

Length (mm)	Order No.*	
	Steel	CERA
1.2	611580	613580
1.21	611581	613581
1.22	611582	613582
1.23	611583	613583
1.24	611584	613584
1.25	611585	613585
1.26	611586	613586
1.27	611587	613587
1.28	611588	613588
1.29	611589	613589
1.3	611590	613590
1.31	611591	613591
1.32	611592	613592
1.33	611593	613593
1.34	611594	613594
1.35	611595	613595
1.36	611596	613596
1.37	611597	613597
1.38	611598	613598
1.39	611599	613599
1.4	611600	613600
1.41	611601	613601
1.42	611602	613602
1.43	611603	613603
1.44	611604	613604
1.45	611605	613605
1.46	611606	613606
1.47	611607	613607
1.48	611608	613608
1.49	611609	613609
1.5	611641	613641
1.6	611516	613516
1.7	611517	613517
1.8	611518	613518
1.9	611519	613519
2	611612	613612
2.0005	611690	—
2.001	611691	—
2.002	611692	—
2.003	611693	—
2.004	611694	—
2.005	611695	—
2.006	611696	—
2.007	611697	—
2.008	611698	—
2.009	611699	—
2.01	611701	—
2.02	611702	—
2.03	611703	—
2.04	611704	—
2.05	611705	—
2.06	611706	—
2.07	611707	—
2.08	611708	—
2.09	611709	—
2.1	611710	—
2.11	611711	—
2.12	611712	—
2.13	611713	—
2.14	611714	—
2.15	611715	—
2.16	611716	—

Length (mm)	Order No.*	
	Steel	CERA
2.17	611717	—
2.18	611718	—
2.19	611719	—
2.2	611720	—
2.21	611721	—
2.22	611722	—
2.23	611723	—
2.24	611724	—
2.25	611725	—
2.26	611726	—
2.27	611727	—
2.28	611728	—
2.29	611729	—
2.3	611730	—
2.31	611731	—
2.32	611732	—
2.33	611733	—
2.34	611734	—
2.35	611735	—
2.36	611736	—
2.37	611737	—
2.38	611738	—
2.39	611739	—
2.4	611740	—
2.41	611741	—
2.42	611742	—
2.43	611743	—
2.44	611744	—
2.45	611745	—
2.46	611746	—
2.47	611747	—
2.48	611748	—
2.49	611749	—
2.5	611642	613642
2.6	611750	—
2.7	611751	—
2.8	611752	—
2.9	611753	—
3	611613	613613
3.5	611643	613643
4	611614	613614
4.5	611644	613644
5	611615	613615
5.1	611850	613850
5.5	611645	613645
6	611616	613616
6.5	611646	613646
7	611617	613617
7.5	611647	613647
7.7	611851	613851
8	611618	613618
8.5	611648	613648
9	611619	613619
9.5	611649	613649
10	611671	613671
10.3	611852	613852
10.5	611650	613650
11	611621	613621
11.5	611651	613651
12	611622	613622
12.5	611652	613652
12.9	611853	613853

Length (mm)	Order No.*	
	Steel	CERA
13	611623	613623
13.5	611653	613653
14	611624	613624
14.5	611654	613654
15	611625	613625
15.5	611655	613655
16	611626	613626
16.5	611656	613656
17	611627	613627
17.5	611657	613657
17.6	611854	613854
18	611628	613628
18.5	611658	613658
19	611629	613629
19.5	611659	613659
20	611672	613672
20.2	611855	613855
20.5	611660	613660
21	611631	613631
21.5	611661	613661
22	611632	613632
22.5	611662	613662
22.8	611856	613856
23	611633	613633
23.5	611663	613663
24	611634	613634
24.5	611664	613664
25	611635	613635
25.25	611754	613754
30	611673	613673
35	611755	613755
40	611674	613674
41.3	611857	613857
45	611756	613756
50	611675	613675
60	611676	613676
70	611677	613677
75	611801	613801
80	611678	613678
90	611679	613679
100	611681	613681
125	611802	613802
131.4	611858	613858
150	611803	613803
175	611804	613804
200	611682	613682
250	611805	613805
300	611683	613683
400	611684	613684
500	611685	613685
600	611840	—
700	611841	—
750	611842	—
800	611843	—
900	611844	—
1000	611845	—

Metric Wear Blocks	
Length (mm)	Order No.* Tungsten carbide
1	612611
2	612612

Gauge Blocks

Length Standards Brought to You by Mitutoyo

Individual Inch Rectangular Gauge Blocks

SPECIFICATIONS

Inch Block

* Details of the overall sizes for forms of block are given on page E-3 and the accuracy standards to which they are manufactured are given on page E-5.

Length (inch)	Order No.*		Length (inch)	Order No.*		Length (inch)	Order No.*	
	Steel	CERA		Steel	CERA		Steel	CERA
.004	611304	—	.024	611324	—	.0625	611303	613303
.005	611305	—	.025	611325	—	.07	611107	—
.006	611306	—	.026	611326	—	.078125 (5/64)	611103	613100
.007	611307	—	.027	611327	—	.08	611108	—
.008	611308	—	.028	611328	—	.09	611109	—
.009	611309	—	.029	611329	—	.09375 (3/32)	611104	613101
.01	611310	—	.03	611330	—	.1	611191	613191
.011	611311	—	.031	611331	—	.100025	611111	613110
.012	611312	—	.03125 (1/32)	611101	613103	.10005	611135	613135
.013	611313	—	.032	611332	—	.100075	611112	613111
.014	611314	—	.033	611333	—	.1001	611121	613121
.015	611315	—	.034	611334	—	.1002	611122	613122
.016	611316	—	.035	611335	—	.1003	611123	613123
.017	611317	—	.036	611336	—	.1004	611124	613124
.018	611318	—	.037	611337	—	.1005	611125	613125
.019	611319	—	.038	611338	—	.1006	611126	613126
.02	611320	—	.039	611339	—	.1007	611127	613127
.02005	611240	—	.04	611340	—	.1008	611128	613128
.0201	611231	—	.041	611341	—	.1009	611129	613129
.0202	611232	—	.042	611342	—	.101	611141	613141
.0203	611233	—	.043	611343	—	.102	611142	613142
.0204	611234	—	.044	611344	—	.103	611143	613143
.0205	611235	—	.045	611345	—	.104	611144	613144
.0206	611236	—	.046	611346	—	.105	611145	613145
.0207	611237	—	.046875 (3/64)	611102	613104	.106	611146	613146
.0208	611238	—	.047	611347	—	.107	611147	613147
.0209	611239	—	.048	611348	—	.108	611148	613148
.021	611321	—	.049	611349	—	.109	611149	613149
.022	611322	—	.05	611105	613105	.109375 (7/64)	611110	613102
.023	611323	—	.06	611106	—			



An inspection certificate is supplied as standard. Refer to page X for details.

*Suffix Number (-■■■) for Selecting Standard and Certificate Provided

ASME			
Suffix No.	Grade	Inspection Certificate	Calibration Certificate JCSS
-516	K	○	○
-521	00	○	—
-531	0	○	—
-541	1	○	—
-551	2	○	—

BS			
Suffix No.	Grade	Inspection Certificate	Calibration Certificate JCSS
-121	0	○	—
-131	1	○	—
-141	2	○	—



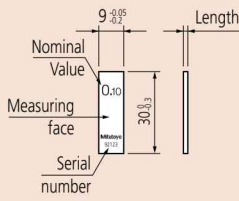


An inspection certificate is supplied as standard. Refer to page X for details.

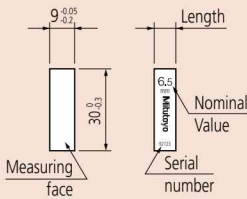
Dimensions

Unit: mm

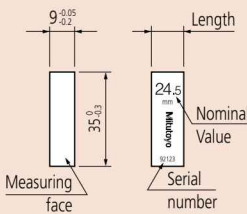
Nominal length:
0.1mm - 5.5mm
(.004" - .25")



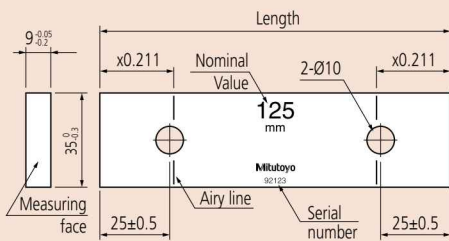
Nominal length:
6mm - 10mm
(.3" - .4")



Nominal length:
10.3mm - 100mm
(.45" - 4")



Nominal length 125mm - 1000mm (5" - 20")



SPECIFICATIONS

Inch Block

* Details of the overall sizes for forms of block are given on page E-3 and the accuracy standards to which they are manufactured are given on page E-5.

Length (inch)	Order No.*	
	Steel	CERA
.11	611150	613150
.111	611151	613151
.112	611152	613152
.113	611153	613153
.114	611154	613154
.115	611155	613155
.116	611156	613156
.117	611157	613157
.118	611158	613158
.119	611159	613159
.12	611160	613160
.121	611161	613161
.122	611162	613162
.123	611163	613163
.124	611164	613164
.125	611165	613165
.126	611166	613166
.127	611167	613167
.128	611168	613168
.129	611169	613169
.13	611170	613170
.131	611171	613171
.132	611172	613172
.133	611173	613173
.134	611174	613174
.135	611175	613175
.136	611176	613176
.137	611177	613177
.138	611178	613178

Length (inch)	Order No.*	
	Steel	CERA
.139	611179	613179
.14	611180	613180
.141	611181	613181
.142	611182	613182
.143	611183	613183
.144	611184	613184
.145	611185	613185
.146	611186	613186
.147	611187	613187
.148	611188	613188
.149	611189	613189
.15	611115	613115
.16	611116	613116
.17	611117	613117
.18	611118	613118
.19	611119	613119
.2	611192	613192
.21	611221	613221
.25	611212	613212
.3	611193	613193
.315	611209	613209
.35	611213	613213
.375 (3/8)	611113	613112
.4	611194	613194
.420	611210	613210
.45	611214	613214
.5	611195	613195
.55	611215	613215
.6	611196	613196

Length (inch)	Order No.*	
	Steel	CERA
.605	611211	613211
.65	611216	613216
.7	611197	613197
.710	611220	613220
.75	611217	613217
.8	611198	613198
.815	611226	613226
.85	611218	613218
.9	611199	613199
.920	611227	613227
.95	611219	613219
1	611201	613201
2	611202	613202
3	611203	613203
4	611204	613204
5	611205	613205
6	611206	613206
7	611207	613207
8	611208	613208
10	611222	613222
12	611223	613223
16	611224	613224
20	611225	613225

Inch Wear Blocks

Length (inch)	Order No.* Tungsten carbide
.05	612105
.1	612191

Gauge Blocks

Length Standards Brought to You by Mitutoyo

Rectangular Gauge Blocks Accessories SERIES 516

- To expand the range of rectangular gauge block (steel and CERA) applications, Mitutoyo offers the gauge block accessories set. By assembling the items in the set, together with gauge blocks, you can easily and quickly build up a precision gage.



516-601
(22 pcs)



516-602
(14 pcs)

SPECIFICATIONS

Item Description	Item Order No.	Set		Qty
		22 pcs 516-601	14 pcs 516-602	
Holder	619002	—	○	1 pc.
	619003	○	○	
	619004	○	○	
	619005	○	○	
Base	619009	○	○	One pair (2pcs)
	619010	○	○	
Half round jaw	619011	○	○	One pair (2pcs)
	619012	○	○	
	619013	○	—	
	619014	○	—	
Plain jaw	619018	○	—	1 pc.
Scriber point	619019	○	○	
Center point	619020	○	○	One pair (2pcs)
Tram point	619021	○	—	
Triangular straight edge	619022	○	○	1 pc.
	619023	○	—	

* Only 1 pc is supplied for each Order No. However, half round jaw, plain jaw, and tram point are supplied in a pair. (2 pcs).



Gaging a bore using a pair of half round jaws and a holder



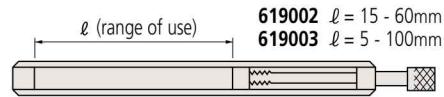
Marking a workpiece using the base, a holder and the scriber point



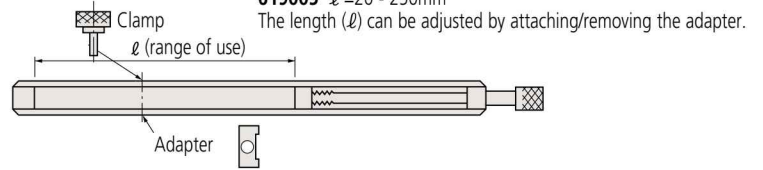
Setting a bore gage using a holder with the pair of Type I half-round jaws arranged as flat contact surfaces

Holder

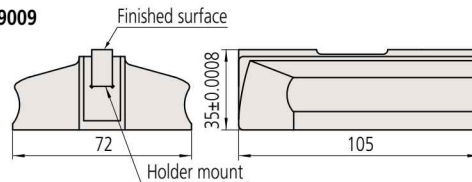
Thickness = 15mm
Width = 29.5mm



619002 $l = 15 - 60\text{mm}$
619003 $l = 5 - 100\text{mm}$



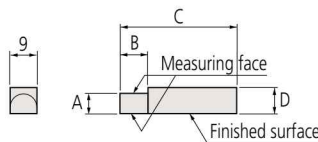
Base 619009



Flatness tolerance of the finished surface $0.5\mu\text{m}$
Flatness tolerance of the bottom surface $1\mu\text{m}$

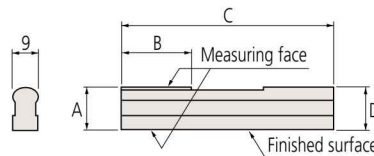
Half round jaw

Type I



Flatness tolerance of the finished surface $0.5\mu\text{m}$

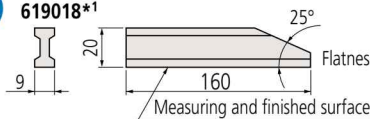
Type II



Unit: mm

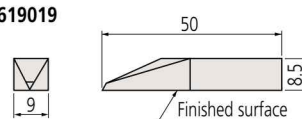
Order No.	Type	Size	A	B	C	D
619010*1	I	2	2 ± 0.0005	5.5	40	7.5
619011*1		5	5 ± 0.0005	15.5	45	7.5
619012*1		8	8 ± 0.0005	20	50	8.5
619013*1	II	12	12 ± 0.0005	25	75	13
619014*1		20	20 ± 0.0005	25	125	20.5

Plain jaw (B type) 619018*1



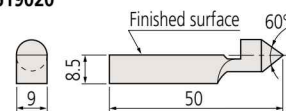
Flatness tolerance of the finished surface $1\mu\text{m}$

Scriber point 619019



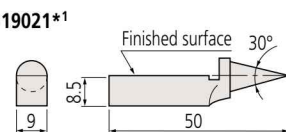
Flatness tolerance of the finished surface $0.5\mu\text{m}$

Center point 619020



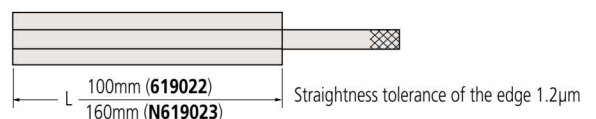
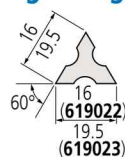
Eccentricity tolerance of the point $\pm 10\mu\text{m}$
Flatness tolerance of the finished surface $0.5\mu\text{m}$

Tram point 619021*1



Eccentricity tolerance of the point $\pm 10\mu\text{m}$
Flatness tolerance of the finished surface $0.5\mu\text{m}$

Triangular straight edge



*1 Qty: One pair (2 pcs)

Gauge Blocks

Length Standards Brought to You by Mitutoyo

Accessories for Rectangular Gauge Blocks over 100mm SERIES 516

- Specially designed for standard size gauge blocks over 125mm which have two coupling holes on the body: coupling of two long gauge blocks and attachment of jaws is possible.
- These accessories can also be used for CERA blocks.

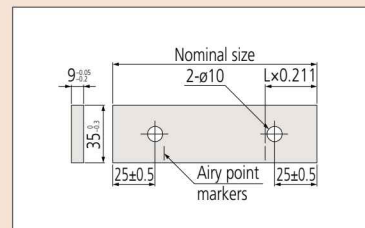


516-605
(14 pcs)

SPECIFICATIONS

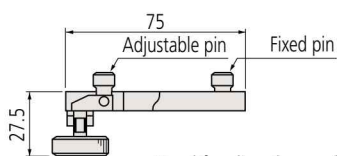
Set Order No.	Individual Item Order No.	Item Description	Quantity Supplied
516-605	619031	Connector A	1 pc.
	619032	Connector B	
	619033	Connector C	
	619034	Connector D	
	619035	Connector E	
	619036	Adapter	3 pcs.
	619009	Base	1 pc.
	619013	Half round jaw	One pair (2pcs)
	619018	Plain jaw	
	619019	Scriber point	1 pc.

* Only 1 pc is supplied for each Order No. However, half round jaw, plain jaw, and tram point are supplied in a pair. (2 pcs).



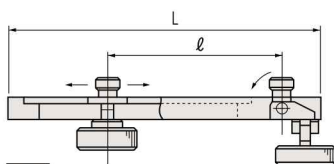
Coupling holes in long gauge blocks

Connector A 619031



Used for directly coupling two long gauge blocks.

Connectors B and C



Adapter 619036

	Order No.	ℓ (max.)	L	Adapter Qty
Connector B	619032	90mm	126mm	2
Connector C	619033	200mm	236mm	

Used for clamping jaws to the ends of one or more long gauge blocks in conjunction with adapters (619036). The length ℓ is highly adjustable to accommodate the variable length of a stack of regular gauge blocks that would be wrung to one of the long gauge blocks to achieve the required gaging size.

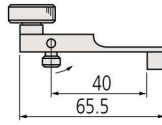


Use of B-type connectors in gage construction



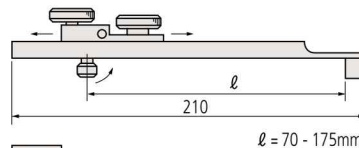
Setting a dial test indicator to a long-gauge-block stack attached to the base with a D-type connector

Connector D 619034



Used for attaching a long gauge block directly to the base.

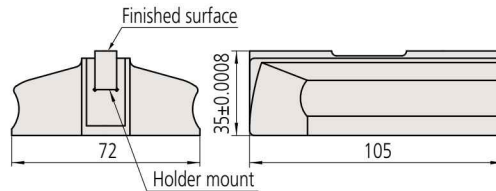
Connector E 619035



Adapter 619036 (1pc.)

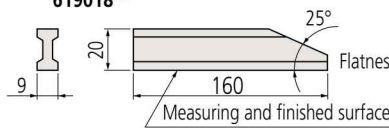
Used for attaching a long gauge block to the base over a stack of regular gauge blocks wrung between the base and long gauge block. The length ℓ is highly adjustable to accommodate the variable length of the stack.

Base 619009



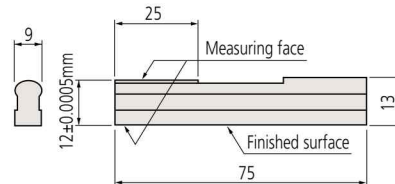
Flatness tolerance of the finished surface 0.5 μ m
Flatness tolerance of the bottom surface 1 μ m

Plain jaw 619018*2



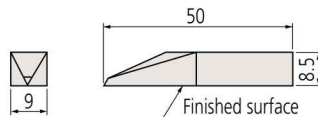
Flatness tolerance of the finished surface 1 μ m

Half round jaw 619013*2



Flatness tolerance of the finished surface 0.5 μ m

Scriber point 619019



Flatness tolerance of the finished surface 0.5 μ m

Assortment of accessories for gauge blocks

For inside and outside measurement inspection of 300 to 1000 mm (every 100mm) gauge blocks, select the appropriate combination of a rectangular gauge block and an accessory.

Items	Order No.	300mm		400mm		500mm		600mm		700mm		800mm		900mm		1000mm	
		Inner	Outer	Inner	Outer	Inner	Outer	Inner	Outer	Inner	Outer	Inner	Outer	Inner	Outer	Inner	Outer
Rectangular gauge block (nominal dimension)	200mm	611682						1	1								
	300mm	611683	1	1				1	1	1	1	1	1				
	400mm	611684			1	1		1	1	1	1			1	1		
	500mm	611685					1	1				1	1	1	1	2	2
Connector A	619031							1	1	1	1	1	1	1	1	1	1
Connector B*1	619032	2		2		2		2		2		2		2		2	
Half round jaws*2	619013	1		1		1		1		1		1		1		1	
Adapter	619036	(2)		(2)		(2)		(2)		(2)		(2)		(2)		(2)	

*1 Provided with adapters (2 pcs)

*2 2 pcs/set

Gauge Blocks

Length Standards Brought to You by Mitutoyo



An inspection certificate is supplied as standard. Refer to page X for details.

Metric/Inch Square Gauge Block Sets SERIES 516 — Metric Block Sets, Long Block Sets, Wear Block Sets

- Square gauge block sets have several unique characteristics (refer to page E-4 for details.). A wide choice is provided to best match the target applications: sets containing from 2 to 112 blocks are available.
- Mitutoyo accessory sets are available for expanding the range of square gauge block applications, especially for rapid assembly of precision gages.



Steel 112-block set



Steel 103-block set



Steel 76-block set



Steel 47-block set



Steel 32-block set

Wear block set



Tungsten Carbide 2-block set

Long block set



Steel 8-block set

The wear to a frequently used square gauge block set can be drastically reduced by using tungsten-carbide wear blocks on the ends of a stack. There are two available, of nominal dimension 1mm and 2mm. These blocks are much more wear-resistant than steel blocks, and they also absorb most of the wear that would otherwise occur to the blocks in the set due to contact, and therefore maximize the set's longevity. Wear blocks are relatively inexpensive and can be readily discarded when no longer serviceable. To achieve maximum protection, the same face of each wear block should always be wrung to a set block, so the opposite, wearing, face never touches a set block.



An inspection certificate is supplied as standard. Refer to page X for details.

***Suffix Number (■) for Selecting Standard and Certificate Provided**

ISO/DIN/JIS

Suffix No.	Inspection Certificate	Calibration Certificate
		JCSS
1	○	—
6	○	○

ASME

Suffix No.	Inspection Certificate	Calibration Certificate
		JCSS
1	○	—



Inspection Certificate

SPECIFICATIONS

Metric Block Sets

Blocks per set	Order No.		Standard / grade available		Blocks included in set		
	Steel	CERA	ISO/DIN/JIS	ASME	Size	Step	Qty.
112	516-437	—	—	00: -#6	1.005	—	1
	516-438	—	0: -#0	0: -#6	1.001 - 1.009	0.001	9
	516-439	—	1: -#0	1: -#6	1.01 - 1.49	0.01	49
	516-440	—	2: -#0	2: -#6	0.5 - 24.5	0.5	49
103	—	—	—	—	25 - 100	25	4
	516-441	—	—	00: -#6	1.005	—	1
	516-442	—	0: -#0	0: -#6	1.01 - 1.49	0.01	49
	516-443	—	1: -#0	1: -#6	0.5 - 24.5	0.5	49
76	516-444	—	2: -#0	2: -#6	25 - 100	25	4
	—	—	—	—	—	—	—
	516-449	—	—	00: -#6	1.005	—	1
	516-450	—	0: -#0	0: -#6	1.01 - 1.49	0.01	49
47	516-451	—	1: -#0	1: -#6	0.5 - 9.5	0.5	19
	516-452	—	2: -#0	2: -#6	10 - 40	10	4
	—	—	—	—	50 - 100	25	3
	—	—	—	—	—	—	—
32	516-457	—	—	00: -#6	1.005	—	1
	516-458	—	0: -#0	0: -#6	1.01 - 1.09	0.01	9
	516-459	—	1: -#0	1: -#6	1.1 - 1.9	0.1	9
	516-460	—	2: -#0	2: -#6	1 - 24	1	24
32	—	—	—	—	25 - 100	25	4
	516-465	—	—	00: -#6	1.005	—	1
	516-466	—	0: -#0	0: -#6	1.01 - 1.09	0.01	9
	516-467	—	1: -#0	1: -#6	1.1 - 1.9	0.1	9
32	516-468	—	2: -#0	2: -#6	1 - 9	1	9
	—	—	—	—	10 - 30	10	3
	—	—	—	—	60	—	1
	—	—	—	—	—	—	—

Metric Long Block Sets

Blocks per set	Order No.		Standard / grade available		Blocks included in set		
	Steel	CERA	ISO/DIN/JIS	ASME	Size	Step	Qty.
8	516-751	—	—	00: -#6	125, 150, 175	25	3
	516-752	—	0: -#0	0: -#6	200, 250	50	2
	516-753	—	1: -#0	1: -#6	300, 400, 500	100	3
	516-754	—	2: -#0	2: -#6	—	—	—

Metric Wear Block Sets

Blocks per set	Order No.		Standard / grade available		Blocks included in set		
	Steel	CERA	ISO/DIN/JIS	ASME	Size	Step	Qty.
2	516-820	—	0: -#0	—	1	—	2
2	516-821	—	1: -#0	—	—	—	—
	516-822	—	0: -#0	—	2	—	2
	516-823	—	1: -#0	—	—	—	—

Inch Block Sets

Blocks per set	Order No.		Standard / grade available		Blocks included in set		
	Steel	CERA	ISO/DIN/JIS	ASME	Size	Step	Qty.
81	516-401	516-201	—	00: -#6	.1001 - .1009	.0001	9
	516-402	516-202	—	0: -#6	.101 - .149	.001	49
	516-403	516-203	—	1: -#6	.05 - .95	.05	19
	516-404	516-204	—	2: -#6	1 - 4	1	4
36	—	—	—	—	—	—	—
	516-421	516-221	—	00: -#6	.05"	—	1
	516-422	516-222	—	0: -#6	.1001 - .1009	.0001	9
	516-423	516-223	—	1: -#6	.101 - .109	.001	9
28	516-424	516-224	—	2: -#6	.11 - .19	.01	9
	—	—	—	—	.1 - .5	.1	5
	—	—	—	—	1, 2, 4	1	3
	—	—	—	—	—	—	—
28	516-417	—	—	00: -#6	.02005	—	1
	516-418	—	—	0: -#6	.0201-.0209	.0001	9
	516-419	—	—	1: -#6	.021-.029	.001	9
	516-420	—	—	2: -#6	.010-.090	.01	9

Inch Long Block Sets

Blocks per set	Order No.		Standard / grade available		Blocks included in set		
	Steel	CERA	ISO/DIN/JIS	ASME	Size	Step	Qty.
8	516-762	—	—	0: -#0	5 - 7	1	3
	516-763	—	—	1: -#0	8, 10, 12	2	3
	—	—	—	—	16, 20	4	2

Inch Wear Block Sets

Blocks per set	Order No.		Standard / grade available		Blocks included in set		
	Carbide	CERA	ISO/DIN/JIS	ASME	Size	Step	Qty.
2	516-824	516-846	—	0: -#0	.05	—	2
	516-825	516-847	—	1: -#0	—	—	—
2	516-826	516-844	—	0: -#0	.1	—	2
	516-827	516-845	—	1: -#0	—	—	—

Gauge Blocks

Length Standards Brought to You by Mitutoyo

Individual Metric Square Gauge Blocks

- Purchasing individual metric square gauge blocks is a cost-effective way to replace heavily used sizes.
- Please add the suffix number representing the national standard and grade required at the end of the Order No. when ordering these items.
- Special sizes that are not included in the charts can be supplied custom-made on request.
- Mitutoyo accessory sets are available for expanding the range of square gauge block applications, especially for rapid assembly of precision gages.



SPECIFICATIONS

Metric Blocks

* Details of the overall sizes for forms of block are given on page E-3 and E24, and the accuracy standards to which they are manufactured are given on page E-5.

Length (mm)	Order No.*		Length (mm)	Order No.*		Length (mm)	Order No.*	
	Steel	CERA		Steel	CERA		Steel	CERA
0.5	614506	—	1.33	614593	—	13	614623	—
1	614611	—	1.34	614594	—	13.5	614653	—
1.0005	614520	—	1.35	614595	—	14	614624	—
1.001	614521	—	1.36	614596	—	14.5	614654	—
1.002	614522	—	1.37	614597	—	15	614625	—
1.003	614523	—	1.38	614598	—	15.5	614655	—
1.004	614524	—	1.39	614599	—	16	614626	—
1.005	614525	—	1.4	614600	—	16.5	614656	—
1.006	614526	—	1.41	614601	—	17	614627	—
1.007	614527	—	1.42	614602	—	17.5	614657	—
1.008	614528	—	1.43	614603	—	18	614628	—
1.009	614529	—	1.44	614604	—	18.5	614658	—
1.01	614561	—	1.45	614605	—	19	614629	—
1.02	614562	—	1.46	614606	—	19.5	614659	—
1.03	614563	—	1.47	614607	—	20	614672	—
1.04	614564	—	1.48	614608	—	20.5	614660	—
1.05	614565	—	1.49	614609	—	21	614631	—
1.06	614566	—	1.5	614641	—	21.5	614661	—
1.07	614567	—	1.6	614516	—	22	614632	—
1.08	614568	—	1.7	614517	—	22.5	614662	—
1.09	614569	—	1.8	614518	—	23	614633	—
1.1	614570	—	1.9	614519	—	23.5	614663	—
1.11	614571	—	2	614612	—	24	614634	—
1.12	614572	—	2.5	614642	—	24.5	614664	—
1.13	614573	—	3	614613	—	25	614635	—
1.14	614574	—	3.5	614643	—	30	614673	—
1.15	614575	—	4	614614	—	40	614674	—
1.16	614576	—	4.5	614644	—	50	614675	—
1.17	614577	—	5	614615	—	60	614676	—
1.18	614578	—	5.5	614645	—	75	614801	—
1.19	614579	—	6	614616	—	100	614681	—
1.2	614580	—	6.5	614646	—	125	614802	—
1.21	614581	—	7	614617	—	150	614803	—
1.22	614582	—	7.5	614647	—	175	614804	—
1.23	614583	—	8	614618	—	200	614682	—
1.24	614584	—	8.5	614648	—	250	614805	—
1.25	614585	—	9	614619	—	300	614683	—
1.26	614586	—	9.5	614649	—	400	614684	—
1.27	614587	—	10	614671	—	500	614685	—
1.28	614588	—	10.5	614650	—			
1.29	614589	—	11	614621	—			
1.3	614590	—	11.5	614651	—			
1.31	614591	—	12	614622	—			
1.32	614592	—	12.5	614652	—			

Metric Wear Blocks

Length (mm)	Order No. Tungsten carbide
1	615611
2	615612



An inspection certificate is supplied as standard. Refer to page X for details.

*Suffix Number (- ■■■) for Selecting Standard and Certificate Provided

ISO/DIN/JIS			
Suffix No.	Grade	Inspection Certificate	Calibration Certificate JCSS
-021	0	○	—
-026	0	○	○
-031	1	○	—
-036	1	○	○
-041	2	○	—
-046	2	○	○

ASME			
Suffix No.	Grade	Inspection Certificate	Calibration Certificate JCSS
-521	00	○	—
-531	0	○	—
-541	1	○	—
-551	2	○	—



Inspection Certificate



An inspection certificate is supplied as standard. Refer to page X for details.

*Suffix Number (-■■■) for Selecting Grade and Certificate Provided

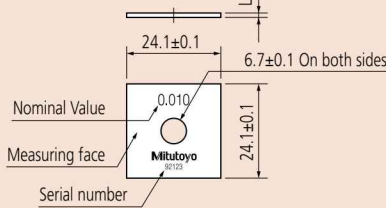
ASME			
Suffix No.	Grade	Inspection Certificate	Calibration Certificate JCSS
-521	00	○	—
-531	0	○	—
-541	1	○	—
-551	2	○	—



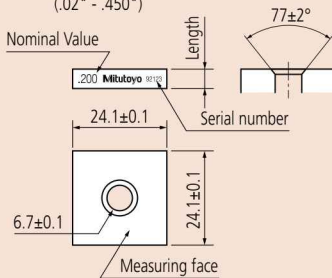
Inspection Certificate

Dimensions

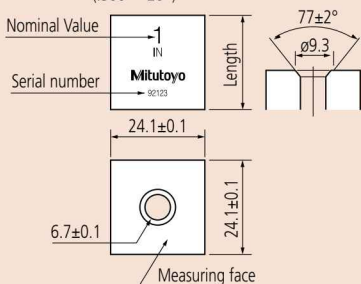
Nominal length: 0.5mm - 4.5mm
(.010" - .19") Unit: mm



Nominal length: 5mm - 14.5mm
(.02" - .450")



Nominal length: 15mm - 500mm
(.500" - 20")



Individual Inch Square Gauge Blocks

SPECIFICATIONS

Inch Blocks

* Details of the overall sizes for forms of block are given on page E-3 and the accuracy standards to which they are manufactured are given on page E-5.

Length (inch)	Order No.*		Length (inch)	Order No.*		Length (inch)	Order No.*	
	Steel	CERA		Steel	CERA		Steel	CERA
.01	614310	—	.106	614146	616146	.25	614212	616212
.02005	614240	—	.107	614147	616147	.3	614193	616193
.0201	614231	—	.108	614148	616148	.35	614213	616213
.0202	614232	—	.109	614149	616149	.375 (3/8)	614309	—
.0203	614233	—	.109375 (7/64)	614306	—	.4	614194	616194
.0204	614234	—	.11	614150	616150	.45	614214	616214
.0205	614235	—	.111	614151	616151	.5	614195	616195
.0206	614236	—	.112	614152	616152	.55	614215	616215
.0207	614237	—	.113	614153	616153	.6	614196	616196
.0208	614238	—	.114	614154	616154	.65	614216	616216
.0209	614239	—	.115	614155	616155	.7	614197	616197
.02	614320	—	.116	614156	616156	.75	614217	616217
.021	614321	—	.117	614157	616157	.8	614198	616198
.022	614322	—	.118	614158	616158	.85	614218	616218
.023	614323	—	.119	614159	616159	.9	614199	616199
.024	614324	—	.12	614160	616160	.95	614219	616219
.025	614325	—	.121	614161	616161	1	614201	616201
.026	614326	—	.122	614162	616162	2	614202	616202
.027	614327	—	.123	614163	616163	3	614203	616203
.028	614328	—	.124	614164	616164	4	614204	616204
.029	614329	—	.125	614165	616165	5	614205	—
.03	614330	—	.126	614166	616166	6	614206	—
.03125 (1/32)	614301	—	.127	614167	616167	7	614207	—
.04	614340	—	.128	614168	616168	8	614208	—
.046875 (3/64)	614302	—	.129	614169	616169	10	614222	—
.05	614105	616105	.13	614170	616170	12	614223	—
.06	614106	—	.131	614171	616171	16	614224	—
.0625	614303	616303	.132	614172	616172	20	614225	—
.07	614107	—	.133	614173	616173			
.078125 (5/64)	614304	—	.134	614174	616174			
.08	614108	—	.135	614175	616175			
.09	614109	—	.136	614176	616176			
.09375 (3/32)	614305	—	.137	614177	616177			
.1	614191	616191	.138	614178	616178			
.100025	614307	—	.139	614179	616179			
.10005	614135	616135	.14	614180	616180			
.100075	614308	—	.141	614181	616181			
.1001	614121	616121	.142	614182	616182			
.1002	614122	616122	.143	614183	616183			
.1003	614123	616123	.144	614184	616184			
.1004	614124	616124	.145	614185	616185			
.1005	614125	616125	.146	614186	616186			
.1006	614126	616126	.147	614187	616187			
.1007	614127	616127	.148	614188	616188			
.1008	614128	616128	.149	614189	616189			
.1009	614129	616129	.15	614115	616115			
.101	614141	616141	.16	614116	616116			
.102	614142	616142	.17	614117	616117			
.103	614143	616143	.18	614118	616118			
.104	614144	616144	.19	614119	616119			
.105	614145	616145	.2	614192	616192			

Inch Wear Blocks	
Length (inch)	Order No.* Tungsten carbide
.05	615105
.1	615191

Gauge Blocks

Length Standards Brought to You by Mitutoyo

Square Gauge Block Accessories Set

- To expand the application of square gauge blocks, Mitutoyo offers the Gauge Block Accessories Set. Square gauge blocks have a much broader range of application than rectangular gauge blocks due to the central clamping hole. Also, the accessories included in the set are sold individually depending on the application.
- Mitutoyo accessory sets are available for expanding the range of square gauge block applications, especially for rapid assembly of precision gages.



516-611

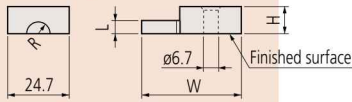


SPECIFICATIONS

Metric			Inch		
Order No.	Included in set	Quantity Supplied	Order No.	Included in set	Quantity Supplied
619070	Half round jaw	2 pcs.	619050	Half round jaw	2 pcs.
619071	Half round jaw		619051	Half round jaw	
619072	Plain jaw		619052	Plain jaw	
619073	Center point	1 pc.	619053	Center point	1 pc.
619054	Scriber point		619054	Scriber point	
619074	Base		619055	Base	
619057	Flat head screw	2 pcs.	619057	Flat head screw	2 pcs.
619058	Flat head screw		619058	Flat head screw	
619059	Slotted head nut		619059	Slotted head nut	
619060	Adjustable tie rod	1 pc.	619060	Adjustable tie rod	1 pc.
619061	Adjustable tie rod		619061	Adjustable tie rod	
619062	Tie rod		619062	Tie rod	
619063	Tie rod	2 pcs.	619063	Tie rod	2 pcs.
619064	Tie rod		619064	Tie rod	
619065	Tie rod		619065	Tie rod	
619056	Stud	1 pc.	619056	Stud	1 pc.
619066	Knurled head screw		619066	Knurled head screw	
619056	Stud	2 pcs.	619056	Stud	2 pcs.
619066	Knurled head screw		619066	Knurled head screw	

* 2 pcs of half round jaw, plain jaw, stud, flat head screw, slotted head nut, adjustable tie rod, and knurled head screw are included in each set. Please note that the abovementioned Order No. indicates only 1 set.

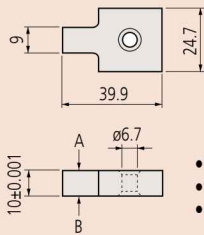
Half round jaw



Order No.	R	L	W	H
619070	1.95mm	2mm	33.6mm	5.3mm
619071	4.95mm	5mm	39.9mm	10.3mm

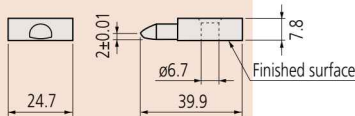
- Flatness tolerance 0.5µm
- Parallelism tolerance of L 0.5µm
- Tolerance of L ±0.5µm

Plain jaw 619072



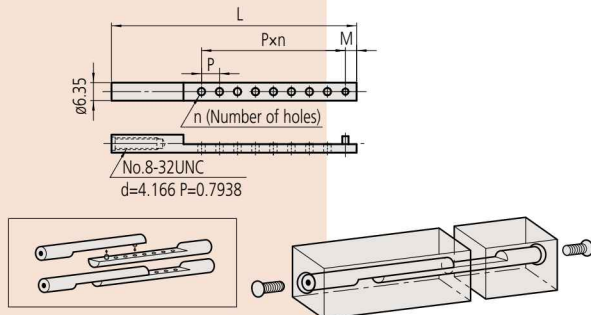
- Flatness tolerance 0.12µm
- Parallelism tolerance 0.12µm
- A and B are finished surfaces

Center point 619073



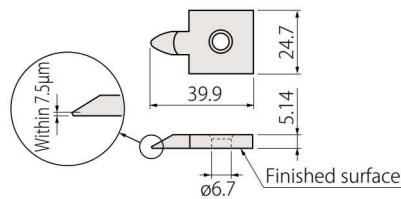
- Flatness tolerance 0.5µm

Adjustable tie rod

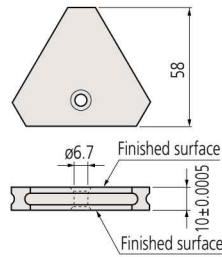


Order No.	L	M	P	n
619060	124.5mm	3.85mm	6.35mm	14
619061	86.5mm	3.95mm	6.35mm	8

Scriber point 619054

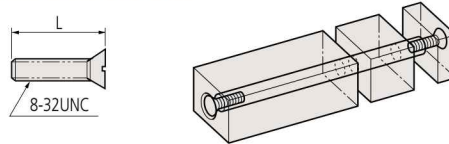


Base 619074



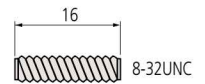
- Parallelism tolerance 1.5µm
- Flatness tolerance 1.5µm (The surface within 1.5mm of edge is excluded)

Flat head screw

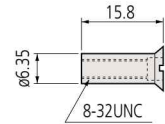


Order No.	L
619057	31.6mm
619058	15.8mm

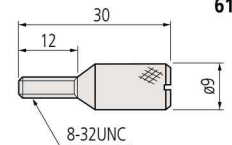
Stud 619056



Slotted head nut 619059



Knurled head screw 619066

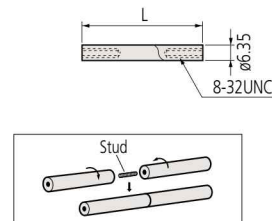


•Contraction caused by the clamping force

The minimum recommended torque to be applied to the clamping screws is approximately 600mN·m. The chart below shows the approximate length contraction of a 100mm gauge stack using typical torque values.

Driver	Contraction
Torque Driver 600mN·m	0.2µm/100mm
Ordinary Driver 700 - 800mN·m	0.3µm/100mm

Tie rod



Order No.	L
619065	19mm
619064	38mm
619063	57mm
619062	76mm

Accessories used for combining square gauge blocks

Overall length (mm)		Min.	21	36	34	41	45	58	64	72	77	82	91	95	109	117	130	148	121	167	143	160	205	180	223	240	258	295	375	
Order No.	Included in set	Max.	30	43	43	50	60	72	79	88	91	97	107	109	125	135	150	169	180	184	210	255	270	285	288	345	363	445	520	
619059	Slotted head nut		1	1		1																								
619058	Flat head screw		1		2	1	2	1	2		1	2							2			2								
619057	Flat head screw			1				1		2	1		2	1	2	1	2	2		2	2		2	2	2	2	2	2	2	2
619056	Stud					1																		1		1	1	1	1	2
619065	Tie rod				1	1																								
619064	Tie rod						1	1		1																				
619063	Tie rod								1		1																			
619062	Tie rod											1		1	1	1	1	1												
619061	Adjustable tie rod																		2			2			2				2	2
619060	Adjustable tie rod																					2		2		2	2	2	2	2

Gauge Blocks

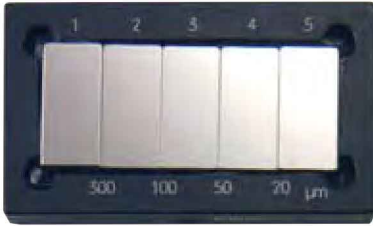
Length Standards Brought to You by Mitutoyo



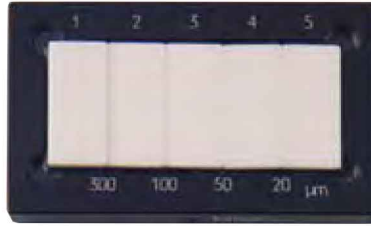
An inspection certificate is supplied as standard. Refer to page X for details.

Step Master SERIES 516

- Step Master is a gauge providing 4 small increments in height (steps) constructed from an assembly of 5 highly accurate steel or ceramic blocks.
- Each step is defined as the difference in height between the center of adjacent blocks, measured to a resolution of $0.01\mu\text{m}$ by using an interferometer with an accuracy tolerance of $\pm 0.20\mu\text{m}$.
- Steel and ceramic types are available to suit the application.
- Height differences are measured between the centers of adjacent steps.



Steel type
516-199



Ceramic type
516-499

SPECIFICATIONS

Steel type

Order No.	516-198					516-199				
Block No.	1	2	3	4	5	1	2	3	4	5
Cumulative step (μm)	0	10	15	17	18	0	300	400	450	470
Step value between adjacent blocks (μm)		10	5	2	1		300	100	50	20

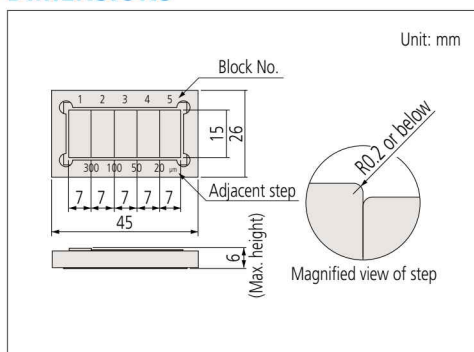
Ceramic type

Order No.	516-498					516-499				
Block No.	1	2	3	4	5	1	2	3	4	5
Cumulative step (μm)	0	10	15	17	18	0	300	400	450	470
Step value between adjacent blocks (μm)		10	5	2	1		300	100	50	20

○○○ - ○○○ -64: Provided with Calibration Certificate

○○○ - ○○○ -84: Provided with Calibration Certificate and Traceability System Chart

DIMENSIONS

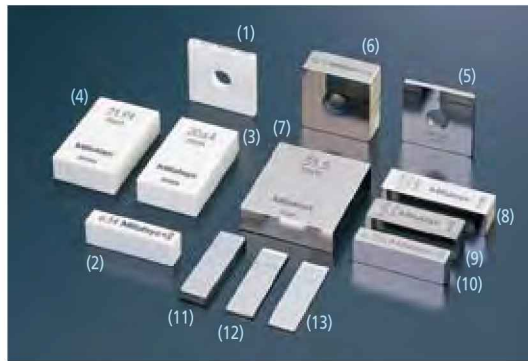


Custom-made Blocks & Gages

- Mitutoyo can manufacture Gauge Blocks and reference gages to your size and design.
- Nominal size range
 - 0.1mm to 1000mm (steel)
 - 0.5mm to 500mm (ceramic)
- Nominal size increment
 - 0.0005mm (up to 100mm)
 - 0.001mm (over 100mm)
- Cross section (same as the standard product)
 - Nominal length of 10mm or less: 30 x 9mm
 - Nominal length of more than 10mm: 35 x 9mm
 - Square types are also available.
- Special ultra-low expansion ceramic types are also available.
- Gauge Blocks and reference gages to your specifications (section dimensions) are available, including precision spacers which normally absorb much time and effort to manufacture in-house.
- Special processing including boring, step gaging and special marking are available. Consult us for details.

Note: Please specify that coupling holes are to be supplied if they are required in your long custom-made gauge blocks. These holes are always supplied with standard gauge blocks over 100mm but not for custom-made Gauge Blocks unless specified.

Typical examples of custom-made gauge blocks and reference gages.
Please enquire for price and delivery times for your particular requirements.

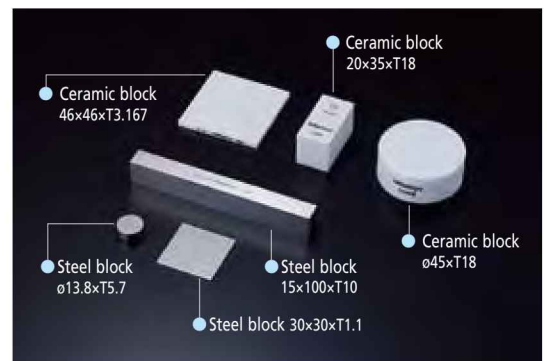


Ceramic

- (1) Square gauge block (2.1005mm)
- (2) Rectangular gauge block (6.34mm)
- (3) Rectangular gauge block (20.64mm)
- (4) Rectangular gauge block (21.94mm)

Steel

- (5) Square gauge block (2.2065mm)
- (6) Square gauge block (10.72mm)
- (7) Rectangular gauge block (31.5mm)
- (8) Rectangular gauge block (10.02mm)
- (9) Rectangular gauge block (9.694mm)
- (10) Rectangular gauge block (6.156mm)
- (11) Rectangular gauge block (3.603mm)
- (12) Rectangular gauge block (1.1505mm)
- (13) Rectangular gauge block (0.555mm)



Gauge Blocks

Length Standards Brought to You by Mitutoyo

Maintenance Kit for Gauge Blocks SERIES 516

- Maintenance kit for gauge blocks includes all the necessary maintenance tools for removing burrs and contamination, and applying anti-corrosion treatment after use, etc.



516-650

*Order No. 516-650E; 516-650

Tools and accessories included:

1. Anti-corrosion oil (**600001**)
(100ml, spray can)
Used for both steel and tungsten-carbide gauge blocks.
2. Ceraston (**601645**)
(both sides finished by lapping)
3. Optical flat (**158-117**)
($\phi 45$, 12mm thickness, JIS Grade 3)
Used to check the wringing of thin gauge blocks and for the presence of burrs.
4. Tweezers (**600004**)
Used for handling thin gauge blocks.
5. Blower brush (**600005**)
Used for blowing dust from measuring surfaces.
6. Cleaning paper (**600006**)
(lens paper, 82 x 304mm, 500 pcs)
Used for wiping off rust preventive oil and contamination. Lint free.
7. Artificial leather mat (B4 size) (**600007**)
Used as a gauge block mat in order to avoid scratches on the work table
8. Reagent bottle (**600008**)
(polyethylene container, 100ml)
Bottle of wiping solution.
(Mitutoyo employs n-Heptane for solvent.)
9. Gloves (**600009**)
Used for handling large gauge blocks. Effective for the prevention of corrosion and thermal expansion.

* **516-650E**: Excluding anti-corrosive oil (**600001**)
516-650: including anti-corrosive oil (**600001**) is for domestic sales only.
 In the case of an order from overseas, place an order for **516-650E**: excluding anti-corrosive oil, and order anti-corrosive oil (**600001**) separately.



Recommendation for regular calibration

Gauge blocks are often used to define a company's standard of length for manufacturing and as such must be reliable. This means that they need regular calibration to verify accuracy. (The problem of damage or corrosion should be addressed during use and blocks seriously affected must be discarded immediately.) The frequency of calibration depends on the tolerance requirements of the work, the amount of use and conditions under which the gauge blocks are used. The most economical cycle for any particular set of gauge blocks is best determined by studying the calibration history. The list below indicates timings for a typical initial calibration cycle for the various grades of block.

Application	Cycle	Grade (reference)
Reference	1 - 2	K
Standard	2	K or 0
Inspection	2	0 or 1
Shop floor	0.5 - 1	1 or 2

As an accredited calibration laboratory, Mitutoyo offers a traceable calibration service for customers' gauge blocks. Our regular calibration service features:

- Gauge blocks manufactured by any maker can be calibrated.
- Cleansing and removal of burrs.
- Central dimension and dimensional deviations of each block are measured.
- Calibration results are provided for immediate use and for building a calibration history of each block.

Ceraston SERIES 516 — Accessory for Gauge Block Maintenance



- Alumina-ceramic abrasive stone for removing burrs from hard materials such as ceramics that ordinary stones cannot handle.
- Can be used both for steel gauge blocks and CERA blocks.
- Excellent in the ease of removing burrs and durability compared with Arkansas stones.
- Both sides can be used.



601644
150 (W) x50 (D) x20 (H) mm



601645
100 (W) x25 (D) x12 (H) mm

Removing burrs

Figure 1

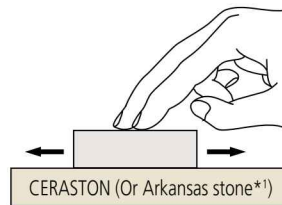
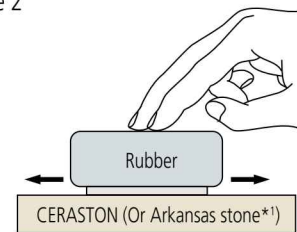


Figure 2



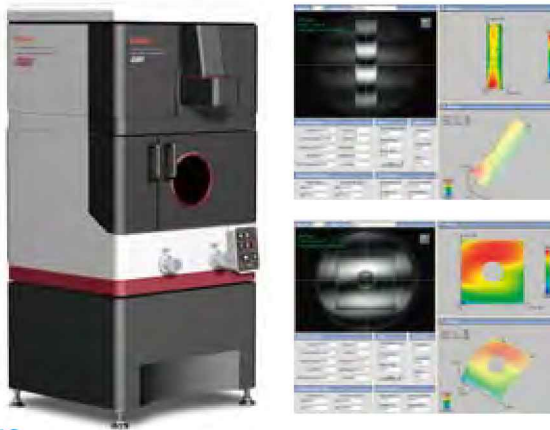
- (1) Wipe any dust and oil films from the gauge block and the Ceraston (or Arkansas stone) using a solvent.
- (2) Place the gauge block on the Ceraston so that the measuring face that has burrs is on the abrasive surface of the stone. While applying light pressure, move the gauge block to and fro about ten times (Fig. 1). Use a block rubber for thin gauge blocks to apply even pressure (Fig. 2).
- (3) Check the measuring face for burrs with an optical flat. If the burrs have not been removed, repeat step (2). If burrs are too large, they may not be removed with an abrasive stone. If so, discard the gauge block.

*1 Mitutoyo does not offer Arkansas stones.

Gauge Blocks

Length Standards Brought to You by Mitutoyo

Automatic Gauge Block Interferometer GBI (Interference fringe analyzing processing)



SPECIFICATIONS

Metric				
Range	Measuring Uncertainty (Coverage range factor k = 2)	Number of gauge blocks that can be mounted on the measuring table	Light sources	Operating conditions
0.1mm - 250mm	$0.025\mu\text{m} + 0.2 \times 10^{-6} L$ L = Gauge block length (mm)	12	632.8nm frequency-stabilized He-Ne laser 543.5nm frequency-stabilized He-Ne laser	20±0.5°C Under mild temperature change without direct exposure to cold or warm air



An inspection certificate is supplied as standard. Refer to page X for details.

- Automatic primary-level measuring instrument for gauge block lengths between 0.1mm and 250mm using optical interference. GBI is a Twyman-Green interferometer which employs the method of multiple wavelength coincidence to calibrate lengths more accurately.
- The GBI automatically detects the distribution of interference fringes with a CCD camera and processes the data. Measurement of parallelism and flatness is provided as well as lengths based on the phase shift method and the interference fringe analysis software.
- The intensity and wavelength of the He-Ne laser light sources are highly stable. This allows highly accurate and repeatable measurement.
- Both the refractive index of air and the thermal expansion of gauge blocks are automatically compensated for by computer which is linked to a thermometer, hygrometer and barometer.

Gauge Block Comparator GBCD-100A SERIES 565 - Automatic Comparator with Dual Gage Heads



SPECIFICATIONS

Metric					
Range	Resolution	Accuracy in narrow range (20°C)	Upper gage head		
			Type	Measuring force	Contact point
0.5mm - 100mm	0.00001mm (0.01μm)	$\pm(0.03 + 0.3L/1000)\mu\text{m}^*$ L = Gauge block length (mm)	Mu-Checker	1N (100gf)	Carbide contact point of radius of 20mm
Lower gaging head			Operating conditions		
Type	Measuring force	Contact point	Temperature: 20°C ±1°C Humidity: 58%RH ±15%RH		
Mu-Checker	0.6N (60gf)	Carbide contact point of radius 5mm			

* Uncertainty of measurement at the 95% confidence level (not including the calibration error of the reference gauge block).
Note: To denote your AC power cable add the following suffixes to the order No.: **A** for UL/CSA, **D** for CEE, **DC** for CCC, **E** for BS, **K** for KC, **No suffix** is required for JIS/100V



An inspection certificate is supplied as standard. Refer to page X for details.

- GBCD-100A measures the length of rectangular gauge blocks in the size range 0.5mm to 100mm. It automatically compares a test block with an appropriate reference gauge block.
- The compensation result is not affected by the warp of thinner gauge blocks due to the use of upper and lower gaging heads (dual-head system).
- Measurement configuration: 1 cycle of automatic comparison measurement with a standard gauge block.
- Compensation master for gauge block comparator



516-145-E2



An inspection certificate is supplied as standard. Refer to page X for details.

- Measuring capability: Rectangular Gauge Blocks; Square Gauge Blocks (requires dedicated holder - optional accessory)
- Measuring method: Differential measurement between upper and lower gaging heads (dual head system)

Gauge Block Comparator GBCD-250 SERIES 565 — Manual Comparator with Dual Gage Heads



SPECIFICATIONS

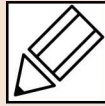
Metric			
Range	Resolution	Accuracy (Confidence level 95%) Comparison measurement of the same nominal length	Accuracy (Confidence level 95%) Dimensional deviations between standard gauge block and measurement gauge block: ±3mm
0.1mm - 250mm	0.00001mm (0.01µm)	$\pm(0.03+0.3L/1000)\mu\text{m}^*$ L = Gauge block length (mm)	$\pm(0.03+0.3L/1000)\mu\text{m}^*$ L = Gauge block length (mm)

Upper gage head			Lower gaging head			Operating conditions
Type	Measuring force	Contact point	Type	Measuring force	Contact point	
Laser Hologage	0.7N	Carbide contact point of radius 20mm	Laser Hologage	0.2N	Carbide contact point of radius 5mm	Temperature: 20°C ±1°C Humidity: 58%RH ±15%RH

* Uncertainty of measurement at the 95% confidence level (not including the calibration error of the reference gauge block).
Note: To denote your AC power cable add the following suffixes to the order No.: **A** for UL/CSA, **D** for CEE, **DC** for CCC, **E** for BS, **K** for KC, **No suffix** is required for JIS/100V

E

Quick Guide to Precision Measuring Instruments



Gauge Blocks

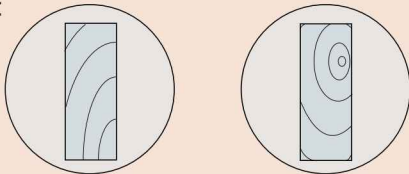
Definition of the Meter

The 17th General Conference of Weights and Measures in 1983 decided on a new definition of the meter unit as the length of the path traveled by light in a vacuum during a time interval of $1/299\,792\,458$ of a second. The gauge block is the practical realization of this unit and as such is used widely throughout industry.

Selection, Preparation and Assembly of a Gauge Block Stack

Select gauge blocks to be combined to make up the size required for the stack.

- (1) Take the following things into account when selecting gauge blocks.
 - a. Use the minimum number of blocks whenever possible.
 - b. Select thick gauge blocks whenever possible.
 - c. Select the size from the one that has the least significant digit required, and then work back through the more significant digits.
- (2) Clean the gauge blocks with an appropriate cleaning agent.
- (3) Check the measuring faces for burrs by using an optical flat as follows:



- a. Wipe each measuring face clean.
- b. Gently place the optical flat on the gauge block measuring face.
- c. Lightly slide the optical flat until interference fringes appear.

Judgment 1: If no interference fringes appear, it is assumed that there is a large burr or contaminant on the measuring face.

- d. Lightly press the optical flat to check that the interference fringes disappear.

Judgment 2: If the interference fringes disappear, no burr exists on the measuring face.

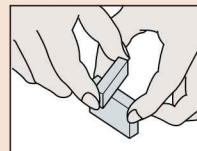
Judgment 3: If some interference fringes remain locally while the flat is gently moved to and fro, a burr exists on the measuring face. If the fringes move along with the optical flat, there is a burr on the optical flat.

- e. Remove burrs, if any, from the measuring face using a flat, fine-grained abrasive stone.

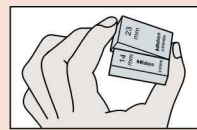
- (4) Apply a very small amount of oil to the measuring face and spread it evenly across the face. (Wipe the face until the oil film is almost removed.) Grease, spindle oil, vaseline, etc., are commonly used.

- (5) Gently overlay the faces of the gauge blocks to be wrung together. There are three methods to use (a, b and c as shown below) according to the size of blocks being wrung:

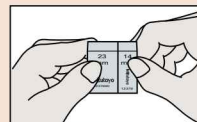
a. Wringing thick gauge blocks



Cross the gauge blocks at 90° in the middle of the measuring faces.

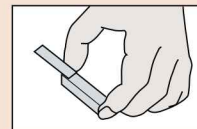


Rotate the gauge blocks while applying slight force to them. You will get a sense of wringing by sliding the blocks.

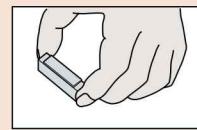


Align the measuring faces with each other.

b. Wringing a thick gauge block to a thin gauge block

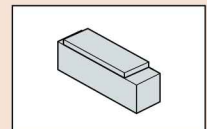


Overlap one side of a thin gauge block on one side of a thick gauge block.

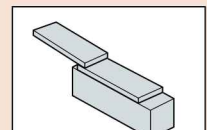


Slide the thin gauge block while pressing the entire overlapped area to align the measuring faces with each other.

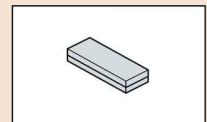
c. Wringing thin gauge blocks



To prevent thin gauge blocks from bending, first wring a thin gauge block onto a thick gauge block.

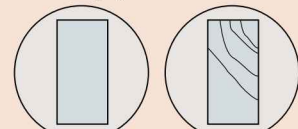


Then, wring the other thin gauge block onto the first thin gauge block.

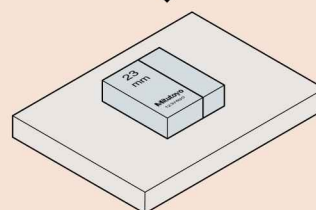


Finally, remove the thick gauge block from the stack.

Apply an optical flat to the surface of one thin gauge block to check the wringing state.



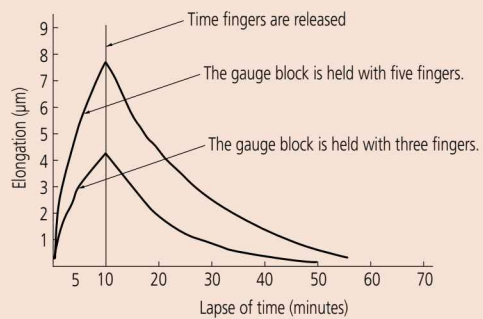
Irregular interference fringes



Wipe the exposed measuring face(s) and continue building up the stack, in the same manner as above, until complete.

■ Thermal Stabilization Time

The following figure shows the degree of dimensional change when handling a 100mm steel gauge block with bare hands.

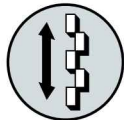


Reference Gages

Length Standards Brought to You by Mitutoyo

Height Master SERIES 515

- Height Master is a bestselling product with a name that has become the industry term for height reference instruments.



Staggered 20mm blocks (movable)



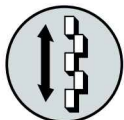
Vertical orientation



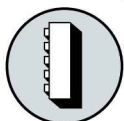
Riser block

515-322

Digital Height Master SERIES 515



Staggered 20mm blocks (movable)



Vertical orientation



Riser block

515-374

SPECIFICATIONS

Metric		
Order No.	515-322	
Range (H)	5 < H ≤ 310mm	
Graduation	0.001mm	
Block step	20mm (staggered)	
Micrometer adjustment	20mm	
Micrometer feed	0.5mm/rev	
Block pitch accuracy	±1.5μm	
Parallelism of blocks	1.0μm	
Feed error	±1.0μm	
Retrace error	1.0μm	
Mass	23kg	

Notes: 1) The block accuracy and the parallelism of blocks are relative to the main unit installation surface.
2) Supplied with a wooden storage case as standard.

Inch			
Order No.	515-310	515-311	
Range (H)	.2" < H ≤ 12.2"	.2" < H ≤ 12.2"	
Graduation	.00001"		
Block step	.5" (straight)	1" (staggered)	
Micrometer adjustment	1"		
Micrometer feed	.025"		
Block pitch accuracy	±50μin		
Parallelism of blocks	40μin		
Feed error	±40μin		
Retrace error	40μin		
Mass	23kg		

Notes: 1) The block accuracy and the parallelism of blocks are relative to the main unit installation surface.
2) Supplied with a wooden storage case as standard.

- Equipped with a data output port that enables incorporation into measurement networking and statistical process control systems. (Refer to Page A-3 for details.)



SPECIFICATIONS

Metric				
Order No.	515-374	515-376	515-378	
Range (H)	10 < H ≤ 310mm	10 < H ≤ 460mm	10 < H ≤ 610mm	
Graduation	0.001mm			
Block step	20mm (staggered)			
Micrometer adjustment	20mm			
Micrometer feed	0.5mm/rev			
Block pitch accuracy	0 < H ≤ 310mm	±1.5μm		
	310 < H ≤ 450mm	—		
	450 < H ≤ 610mm	±2.5μm		
Parallelism of blocks	0 < H ≤ 310mm	2.0μm		
	310 < H ≤ 610mm	—		
		2.5μm		
Feed error	±2.0μm		2.5μm	
Retrace error	2.0μm		2.5μm	
Mass	9.5kg	13.6kg	16kg	

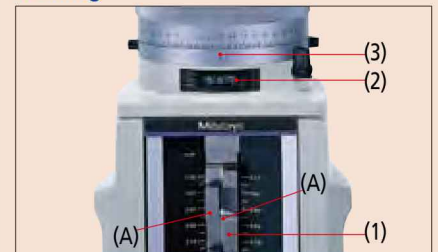
* The block accuracy and the parallelism of blocks are based on main unit installation surface, which does not include the retrace error.



An inspection certificate is supplied as standard. Refer to page X for details.



Reading



(A) Height A

(1) Scale	280. mm
(2) Counter	5.67 mm
(3) Thimble	0.000mm
	285.670mm



An inspection certificate is supplied as standard. Refer to page X for details.

Technical Data

Display:	LCD
Battery:	SR44 (2 pcs.), 938882
Battery life:	Approx. 1.8 years under normal use

Function

Zero setting, Presetting, ABS/INC switching, Data hold, Data output, Auto power off, inch/mm conversion (inch/mm models)
Alarm: Low voltage, Counting value composition error

Optional Accessories

515-111:	Auxiliary block kit for bore gage (mm)
515-120:	Auxiliary block kit for bore gage (inch)
—:	Riser block (see page E-36.)
959149:	SPC cable (1m)
959150:	SPC cable (2m)

Inch				
Order No.	515-375	515-377	515-379	
Range (H)	.5" < H ≤ 12"	.5" < H ≤ 18"	.5" < H ≤ 24"	
Graduation	.00001"			
Block step	1" (staggered)			
Micrometer adjustment	1"			
Micrometer feed	.025"/rev			
Block pitch accuracy	0 < H ≤ 12"	±100μin		
	12" < H ≤ 18"	—		
	18" < H ≤ 24"	±150μin		
Parallelism of blocks	0 < H ≤ 12"	50μin		
	12" < H ≤ 18"	—		
		100μin		
Feed error	±100μin		100μin	
Retrace error	100μin		100μin	
Mass	9.5kg	13.6kg	16kg	

* The block accuracy and the parallelism of blocks are based on main unit installation surface, which does not include the retrace error.



An inspection certificate is supplied as standard. Refer to page X for details.



Height Master SERIES 515 — Optional accessories

Riser Blocks SERIES 515

- These riser blocks are designed to increase the measurable height.
- They can also be used on Square Master models **311-215** and **311-225**.



515-113

515-114

515-115

Auxiliary Block Kit SERIES 515 – for Bore Gage

- Used for efficient reference-setting of dial bore gages and tubular inside micrometers (18-150mm) on a Height Master.



515-112

SPECIFICATIONS

Metric				
Order No.	Height	Accuracy	Variation in length	Mass
515-113	150mm	±0.6µm	0.6µm	5.7kg
515-114	300mm	±1.0µm	0.8µm	11.8kg
515-115	600mm	±2.0µm	1.0µm	26.8kg

Inch				
Order No.	Height	Accuracy	Variation in length	Mass
515-116	6"	±20µin	20µin	5.7kg
515-117	12"	±40µin	30µin	11.8kg
515-118	24"	±80µin	40µin	27.9kg

SPECIFICATIONS

Metric	
Order No.	Model
515-110	Universal Height Master
515-111	Digital Height Master (515-374/376/378)
515-112	Height Master (515-322)

Inch	
Order No.	Model
515-119	Universal Height Master, Height Master (515-310)
515-120	Digital Height Master (515-375/377/379)
515-121	Height Master (515-311)

Reference Gages

Length Standards Brought to You by Mitutoyo

Universal Height Master SERIES 515 — Usable in Vertical and Horizontal Orientations

- The Universal Height Master is designed for both vertical and horizontal orientation, providing a wide range of applications such as accuracy checking of machine tool table movements.



515-520

- Analog display by the built-in counter – the appearance and specifications are the same as model 515-322.

SPECIFICATIONS

Metric		
Order No.	515-520	515-523
Range (H)	$5 < H \leq 610\text{mm}$	$5 < H \leq 1010\text{mm}$
Graduation	0.001mm	
Block step	10mm (staggered)	
Micrometer adjustment	20mm	
Micrometer feed	0.5mm/rev	
Block pitch accuracy	$0 < H \leq 310\text{mm}$	$\pm 1.5\mu\text{m}$
	$310 < H \leq 610\text{mm}$	$\pm 2.5\mu\text{m}$
	$610 < H \leq 1010\text{mm}$	$\pm 3.5\mu\text{m}$
Parallelism of blocks	$0 < H \leq 610\text{mm}$	1.5 μm
	$610 < H \leq 1010\text{mm}$	—
Feed error	$\pm 1.2\mu\text{m}$	$\pm 1.5\mu\text{m}$
Retrace error	1.2 μm	1.5 μm
Mass	4.2kg	63.5kg

Notes: 1) The block accuracy and the parallelism of blocks are relative to the main unit installation surface.
2) Supplied with a wooden storage case as standard.

Inch			
Order No.	515-512	515-510	515-513
Range (H)	$2" < H \leq 18.2"$	$2" < H \leq 24.2"$	$2" < H \leq 40.2"$
Graduation	.00001"		
Block step	.5" (staggered)		
Micrometer adjustment	1"		
Micrometer feed	.025"/rev		
Block pitch accuracy	$0 < H \leq 12"$	$\pm 50\mu\text{in}$	
	$12" < H \leq 24"$	—	$\pm 100\mu\text{in}$
	$24" < H \leq 40"$	—	$\pm 150\mu\text{in}$
Parallelism of blocks	$H \leq 24"$	60 μin	
	$24" < H \leq 40"$	—	80 μin
Feed error	$\pm 40\mu\text{in}$	$\pm 60\mu\text{in}$	
Retrace error	40 μin	60 μin	
Mass	4.2kg	63.5kg	63.5kg

Notes: 1) The block accuracy and the parallelism of blocks are relative to the main unit installation surface.
2) Supplied with a wooden storage case as standard.



An inspection certificate is supplied as standard. Refer to page X for details.



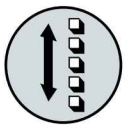
Using in horizontal orientation

Optional Accessories

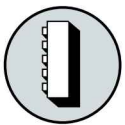
Supporting base
No.900574 (Dedicated for the Universal Height Master. Provided for 515-523 and 515-513 as standard.)
Stable vertical orientation is available.



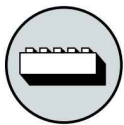
Supporting base



Single-row 10mm blocks (movable)



Vertical orientation



Horizontal orientation



Riser block



An inspection certificate is supplied as standard. Refer to page X for details.

Check Master SERIES 515



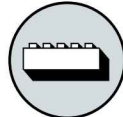
515-722



Single-row
10mm (5") blocks



Vertical
orientation



Horizontal
orientation

- Designed to check the accuracy of table movements of machine tools and calibrate CMMs.
- Can be used in either vertical or horizontal orientation



515-724

515-723

515-722

SPECIFICATIONS

Metric		515-720	515-721	515-722	515-723	515-724
Order No.		515-720	515-721	515-722	515-723	515-724
Range (H)		300 mm	450 mm	600 mm	1000 mm	1500 mm
Block step		10mm				
Block pitch accuracy	H ≤ 310 mm	±2.5 μm				
	310 < H ≤ 610 mm	—	—	—	±3.5 μm	
	610 < H ≤ 1010 mm	—	—	—	±5.0 μm	
	1010 < H ≤ 1510 mm	—	—	—	—	±8.0 μm
Parallelism of blocks	H ≤ 310 mm	1.2 μm				
	310 < H ≤ 610 mm	—	—	1.5 μm		
	610 < H ≤ 1010 mm	—	—	2.0 μm		
	1010 < H ≤ 1510 mm	—	—	—	2.5 μm	
Mass	7 kg	10 kg	13 kg	22 kg	30 kg	

Notes: 1) The block accuracy and the parallelism of blocks are relative to the main unit installation surface.
2) Supplied with a wooden storage case as standard.

Inch		515-710	515-711	515-712	515-713
Order No.		515-710	515-711	515-712	515-713
Range (H)		12"	18"	24"	40"
Block step		.5"			
Block pitch accuracy	H ≤ 12"	±100 μm			
	12" < H ≤ 24"	—	—	±150 μm	
	24" < H ≤ 40"	—	—	±200 μm	
Parallelism of blocks	H ≤ 12"	50 μm			
	12" < H ≤ 24"	—	—	60 μm	
	24" < H ≤ 40"	—	—	80 μm	
Mass	7 kg	10 kg	13 kg	22 kg	

Notes: 1) The block accuracy and the parallelism of blocks are relative to the main unit installation surface.
2) Supplied with a wooden storage case as standard.



An inspection certificate is supplied as standard. Refer to page X for details.

High Accuracy Check Master SERIES 515

- Designed to check the accuracy of table movements of machine tools and calibrate CMMs.
- Can be used either in vertical or horizontal orientation.



515-743

515-742

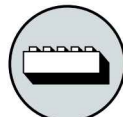
515-740



Single-row
10mm (5") blocks



Vertical
orientation



Horizontal
orientation

SPECIFICATIONS

Metric		515-740/515-760*	515-741/515-761*	515-742/515-762*	515-743/515-763*	515-744/515-764*
Order No.		515-740/515-760*	515-741/515-761*	515-742/515-762*	515-743/515-763*	515-744/515-764*
Range (R)		300 mm	450 mm	600 mm	1000 mm	1500 mm
Block step		10mm				
Block pitch accuracy	H ≤ 310 mm	±1.2 μm				
	310 < H ≤ 610 mm	—	—	±1.8 μm		
	610 < H ≤ 1010 mm	—	—	±2.5 μm		
	1010 < H ≤ 1510 mm	—	—	—	±4.0 μm	
Parallelism of blocks	H ≤ 450 mm	1.0 μm				
	450 < H ≤ 1010 mm	—	—	1.5 μm		
	1010 < H ≤ 1510 mm	—	—	2.0 μm		
	Mass	3.6 kg	5.4 kg	7.2 kg	12 kg	18 kg

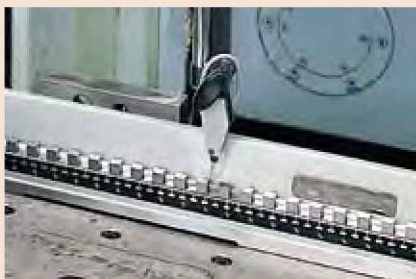
* Ceramic Check Master

Notes: 1) The block accuracy and the parallelism of blocks are relative to the main unit installation surface.
2) Supplied with a wooden storage case as standard.

Inch		515-730/515-750*	515-731/515-751*	515-732/515-752*	515-733/515-753*	515-734/515-754*
Order No.		515-730/515-750*	515-731/515-751*	515-732/515-752*	515-733/515-753*	515-734/515-754*
Range (R)		12"	18"	24"	40"	60"
Block step		.5"				
Block pitch accuracy	H ≤ 12"	±50 μm				
	12" < H ≤ 24"	±70 μm				
	24" < H ≤ 40"	±100 μm				
Parallelism of blocks	40" < H ≤ 60"	±158 μm				
	H ≤ 18"	40 μm				
	18" < H ≤ 40"	60 μm				
40" < H ≤ 60"	80 μm					
Mass	3.6 kg	5.4 kg	7.2 kg	12 kg	18 kg	

* Ceramic Check Master

Notes: 1) The block accuracy and the parallelism of blocks are relative to the main unit installation surface.
2) Supplied with a wooden storage case as standard.



Using in horizontal orientation

Optional Accessories

Supporting base
601167: Supporting base for vertical operation



Supporting base

Reference Gages

Length Standards Brought to You by Mitutoyo

Standard scales SERIES 182 — Made of Low Expansion Glass

- Standard scales can be used as a traceable standard of length for calibrating measuring instruments.
- These scales are manufactured using Mitutoyo's high-definition lithography technology in an underground scale manufacturing facility dedicated to the production of high-accuracy, high-quality line standards. They are considered top-grade length standards.



An inspection certificate is supplied as standard. Refer to page X for details.

Technical Data

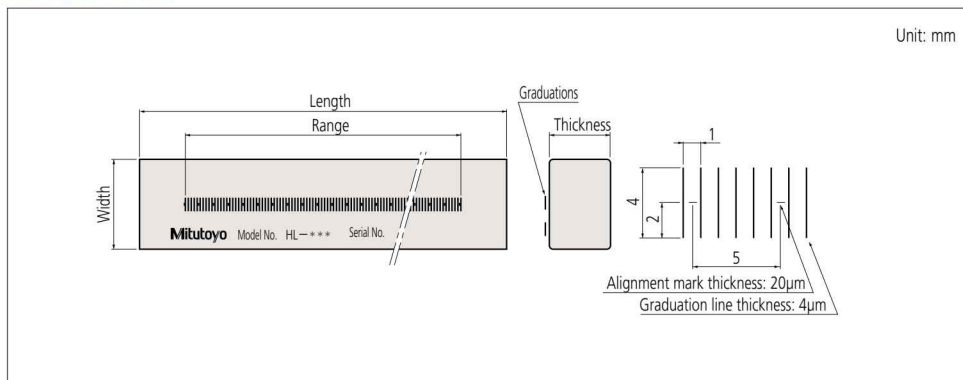
Accuracy (at 20°C): $(0.5+L/1000)\mu\text{m}$,
 L = Measured length (mm)
 Material: Low expansion glass
 Thermal expansion coefficient: $(0.00\pm 0.02)\times 10^{-6}/\text{K}$
 Graduation: 1mm
 Graduation line thickness: 4 μm
 Mass: 0.75kg (250mm), 1.8kg (500mm)

SPECIFICATIONS

Metric				
Order No.	Range	Length	Width	Thickness
182-501-50	250mm	280mm	20mm	10mm
182-501-60*				
182-502-50	500mm	530mm	30mm	20mm
182-502-60*				

* with English JCSS certificate.

DIMENSIONS





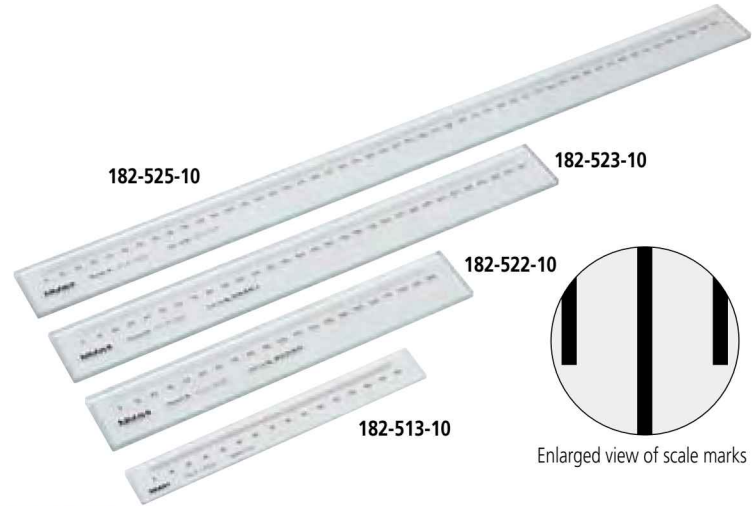
An inspection certificate is supplied as standard. Refer to page X for details.

Technical Data

Accuracy (at 20°C): $(1.5+2L/1000)\mu\text{m}$,
 L = Measured length (mm)
 Glass material: Sodium glass
 Thermal expansion coefficient: $(8\pm 1)\times 10^{-6}/\text{K}$
 Graduation:
 0.1mm (thickness: 20 μm)
 0.5mm (thickness: 50 μm)
 1mm (thickness: 100 μm)

Working Standard Scales SERIES 182

- Ideal for checking magnification accuracy of profile projectors and microscopes, and the table feeding accuracy of measuring equipment.
- These scales are manufactured using high-accuracy lithographic technologies. Mitutoyo has developed these technologies at the dedicated underground facility which was custom-built to produce highly accurate scales. Various sizes are available for each type to suit the application.

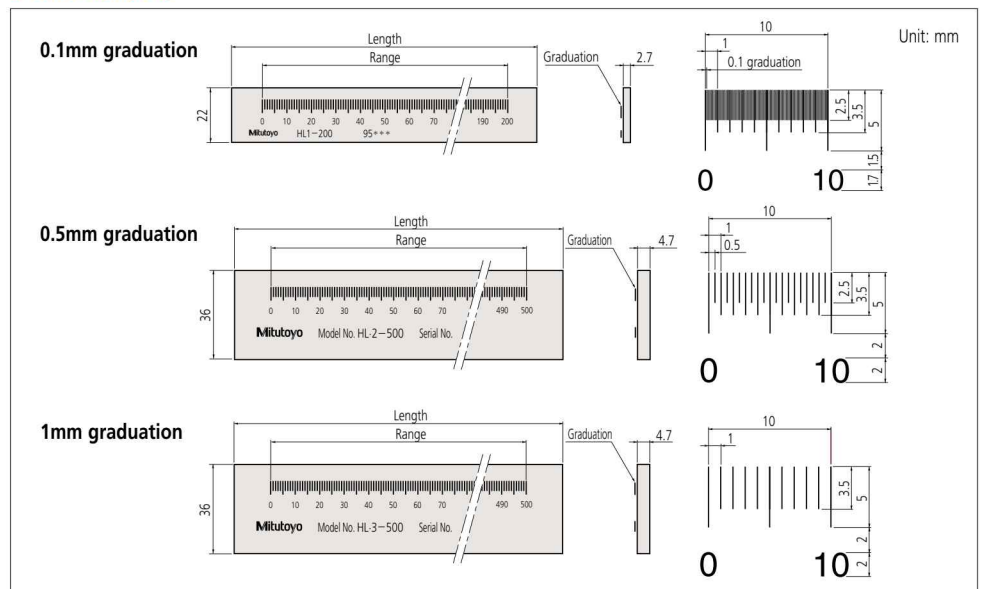


SPECIFICATIONS

Metric						
Order No.	Range	Graduation	Length	Inspection pitch	Graduation line thickness	Length
182-511-10	50mm	0.1mm	75mm	5mm	20 μm	0.23kg
182-512-10	100mm		125mm			0.24kg
182-513-10	150mm		175mm	10mm		0.25kg
182-514-10	200mm		225mm			0.26kg
182-521-10	100mm	0.5mm	130mm	20mm	50 μm	0.27kg
182-522-10	200mm		230mm			0.32kg
182-523-10	300mm		330mm			0.57kg
182-524-10	400mm		430mm			0.71kg
182-525-10	500mm	530mm	0.86kg			
182-531-10	250mm	1mm	280mm	25mm	100 μm	0.55kg
182-532-10	500mm		530mm			1.22kg
182-533-10	750mm		780mm			0.23kg
182-534-10	1000mm	1030mm	1.54kg			

Note: An inspection certificate produced by a standard scale automatic calibration system is supplied as standard.

DIMENSIONS



Reference Gages

Length Standards Brought to You by Mitutoyo

CERA Straight Master SERIES 311 — Straightness Measuring Gage

- The CERA Straight Master is a gage used for inspecting the straightness of travel of moving elements on equipment such as machine tools, CMMs, form measuring machines and semiconductor-related equipment.
- Precision lapped reference surfaces achieve higher accuracy than conventional models.
- Alumina ceramic construction achieves high resistance to abrasion and little secular

change.

- Three types (high accuracy, ultra-high accuracy and double faced models) are available to suit the majority of applications. The double faced model has two reference faces for checking straightness in two orthogonal directions.



Effective length: 700mm



Effective length: 1000mm

SPECIFICATIONS

Metric	High accuracy model			
Order No.*	Nominal length	Straightness*1	Size (L x W x H)	Mass
311-302	400mm	0.3µm	440 x 35 x 50mm	1.8kg
311-305	700mm	0.5µm	740 x 35 x 50mm	3kg
311-307	1000mm	1.0µm	1040 x 45 x 80mm	8kg
311-309	1300mm	1.5µm	1340 x 45 x 80mm	10kg

* Carrying handles (4pcs) are provided as standard for **311-307/9**.
Note: Straightness is measured within the specified range with the instrument supported at the Bessel points to minimize deflection (0.2232 x overall length from each end).

Metric	Ultra-high accuracy model			
Order No.*	Nominal length	Straightness*1	Size (L x W x H)	Mass
311-332	400mm	0.2µm	440 x 35 x 50mm	1.8kg
311-335	700mm	0.4µm	740 x 35 x 50mm	3kg
311-337	1000mm	0.5µm	1040 x 45 x 80mm	8kg
311-339	1300mm	0.7µm	1340 x 45 x 80mm	10kg

* Carrying handles (4pcs) are provided as standard for **311-337/9**.
Note: Straightness is measured within the specified range with the instrument supported at the Bessel points to minimize deflection (0.2232 x overall length from each end).

Inch	High accuracy model			
Order No.*	Nominal length	Straightness*1	Size (L x W x H)	Mass
311-322	16"	12µin	440 x 35 x 50mm	1.8kg
311-325	28"	20µin	740 x 35 x 50mm	3kg
311-327	40"	40µin	1040 x 45 x 80mm	8kg
311-329	50"	60µin	1340 x 45 x 80mm	10kg

* Carrying handles (4pcs) are provided as standard for **311-327/9**.
Note: Straightness is measured within the specified range with the instrument supported at the Bessel points to minimize deflection (0.2232 x overall length from each end).

Inch	Ultra-high accuracy model			
Order No.*	Nominal length	Straightness*1	Size (L x W x H)	Mass
311-342	16"	8µin	440 x 35 x 50mm	1.8kg
311-345	28"	16µin	740 x 35 x 50mm	3kg
311-347	40"	20µin	1040 x 45 x 80mm	8kg
311-349	50"	28µin	1340 x 45 x 80mm	10kg

* Carrying handles (4pcs) are provided as standard for **311-347/9**.
Note: Straightness is measured within the specified range with the instrument supported at the Bessel points to minimize deflection (0.2232 x overall length from each end).



Double faced model

SPECIFICATIONS

Metric	Double faced model			
Order No.*	Nominal length	Straightness*1	Size (L x W x H)	Mass
311-352	400mm	0.3µm	440 x 45 x 80mm	3.2kg
311-355	700mm	0.5µm	740 x 45 x 80mm	5.5kg
311-357	1000mm	1.0µm	1040 x 45 x 80mm	8kg
311-359	1300mm	1.5µm	1340 x 45 x 80mm	10kg

* Fixings for carrying handles are not provided.
Note: Straightness is measured within the specified range with the instrument supported at the Bessel points to minimize deflection (0.2232 x overall length from each end).

Inch	Double faced model			
Order No.*	Nominal length	Straightness*1	Size (L x W x H)	Mass
311-362	16"	12µin	440 x 45 x 80mm	3.2kg
311-365	28"	20µin	740 x 45 x 80mm	5.5kg
311-367	40"	40µin	1040 x 45 x 80mm	8kg
311-369	50"	60µin	1340 x 45 x 80mm	10kg



An inspection certificate is supplied as standard. Refer to page X for details.



Standard accessories

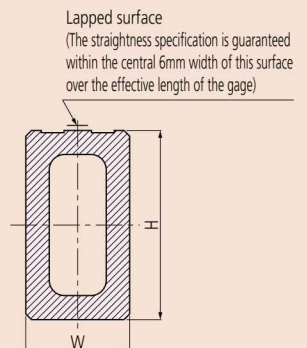
- User's manual
- Wooden case
- Support blocks (ceramic): 3pcs.
- Chamois leather
- Gloves

*Suffix Number for Inspection Certificate and Calibration Certificate

Suffix No.	Certificate provided
-20	Inspection Certificate
-22	Calibration Certificate

Cross section

(High accuracy model, ultra-high accuracy model)

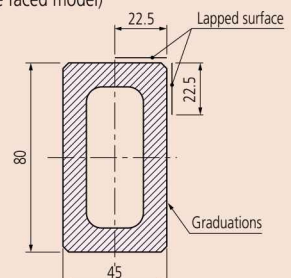


*Suffix Number for Inspection Certificate and Calibration Certificate

Suffix No.	Certificate provided
-20	Provided with Inspection Certificate
-22	Provided with Calibration Certificate

Cross section

(Double faced model)





An inspection certificate is supplied as standard. Refer to page X for details.

Technical Data

Reference surface

Perpendicularity tolerance: 1µm

Straightness tolerance: 1µm

Front/back faces

Perpendicularity tolerance: 5µm

Straightness tolerance: 5µm

Dedicated wooden case is provided.

High Precision Square SERIES 311

- The High Precision Square is a gage used for inspecting the travel straightness and axial perpendicularity of moving elements on equipment such as machine tools, CMMs, form measuring machines and semiconductor-related equipment.
- Four precision-lapped reference surfaces are provided.
- Better than 1µm/300mm straightness and perpendicularity of each (four) reference surface. In addition, front and back faces are accurate to better than 5µm/300mm.



311-111



311-112



311-113

SPECIFICATIONS

Metric		
Order No.	Dimension (W x L x T)	Mass
311-111	90 x 110 x 25mm	1.5kg
311-112	160 x 210 x 25mm	5.0kg
311-113	260 x 310 x 30mm	14.0kg

* 311-113 is supplied with a removable handle.

Reference Gages

Length Standards Brought to You by Mitutoyo

Square Master SERIES 311 — Squareness / Straightness Measuring

- Squareness (perpendicularity) and straightness measurements can be performed accurately and efficiently by just moving a lever.
- High accuracy perpendicularity and straightness measurement can be performed by prior setting to a master square using the built-in instrument squareness adjustment mechanism.
- Sliding force: Approx. 2 to 5N



SPECIFICATIONS

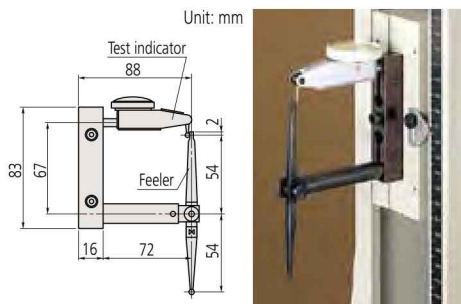
Metric					
Order No.	Vertical travel	Squareness	Straightness	Dimension (WxDxT)	Mass
311-215*	150mm	3 μ m	2 μ m	180x200x420mm	13.7Kg
311-225*	250mm	6 μ m	2.5 μ m	180x200x520mm	16.2Kg
311-245	450mm	9 μ m	3.5 μ m	220x220x720mm	24Kg

* Riser blocks to extend the height of Square Masters can be used.

Optional accessory

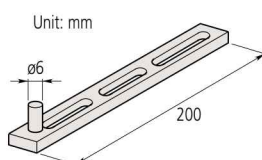
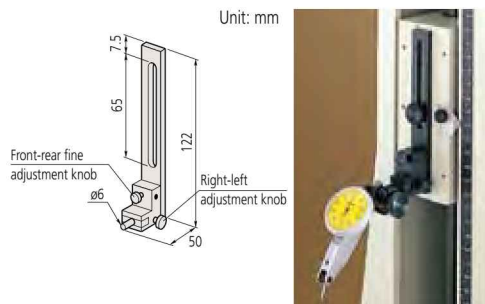
900565: Feeler

For probing surfaces that the contact point of a detector cannot reach.



No.900571: Adjustable holder

Enables easy adjustment of indicator position.



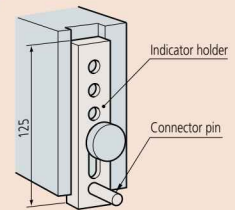
No.900551: Extension holder

Measurement position can be extended by using this 200mm length holder instead of the indicator holder.

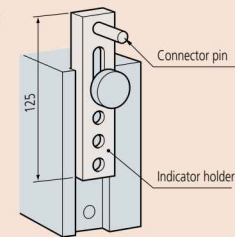


Mounting the indicator holder

Example 1



Example 2



Standard Accessories

513-405: Test indicator (Metric)

513-403: Test indicator (Inch)

902053: Clamp

601471: Indicator holder

538616: Allen wrench (3mm)

Note: Inspection certificate is not attached. Contact your local Mitutoyo sales office.

Optional accessory

900571: Adjustable holder

900551: Extension holder

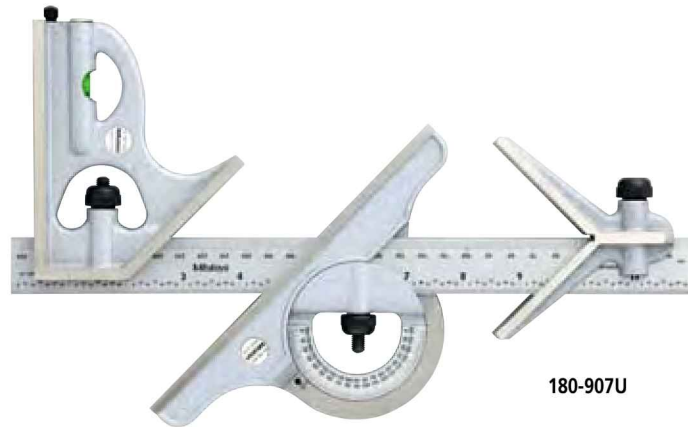
900565: Feeler

Technical Data

- Square head: Used to set the rule at 90 degrees or 45 degrees to an edge of a workpiece.
- Center head: Used to locate centers of round workpieces
- Protractor head: Used to set the rule at a desired angle to an edge of a workpiece. Also used for measuring angles.

Combination Square Set SERIES 180

- Three heads are attachable to the stainless steel rule (blade), allowing versatile measurements on various types of workpieces.



180-907U

SPECIFICATIONS

Metric Combination Square Sets		
Order No.	Size	Graduation
180-910U*	300mm	1mm, 0.5mm

* 180-910U consists of blade, square head (180-102U), center head (180-202U) and protractor head (180-301U).

Inch/Metric Combination Square Sets		
Order No.	Size	Graduation
180-907U*	12"/300mm	1/32", 1/64", 1mm, 0.5mm

* 180-907U consists of blade, square head (180-102U), center head (180-202U) and protractor head (180-301U).

Heads (Individual)

Order No.	Description	Remarks
180-102U	Square head	For 300mm (12"), 450mm (18"), 600mm (24") blades
180-202U	Center head	For 300mm (12"), 450mm (18"), 600mm (24") blades
180-301U	Protractor head	For 300mm (12"), 450mm (18"), 600mm (24") blades

Reference Gages

Length Standards Brought to You by Mitutoyo

Steel Rules SERIES 182

- Clear graduations on satin-chrome finish.
- Stainless tempered.



182-101



182-102



182-103



182-105



182-201



182-202



182-205



182-302

SPECIFICATIONS

Metric Wide Rigid Rules

Order No.	Graduations	Range	Width
182-111		150mm	19mm
182-131	1mm, 0.5mm (on both faces)	300mm	25mm
182-151		450mm	30mm
182-171		600mm	30mm

Inch/Metric Wide Rigid Rules

Order No.	Graduations	Range	Width
182-105		6"/150mm	.75"
182-125	1/32", 1/64"	12"/300mm	.98"
182-145	1mm, 0.5mm	18"/450mm	1.18"
182-165		24"/600mm	1.18"
182-106	1/50", 1/100"	6"/150mm	.75"
182-126	1mm, 0.5mm	12"/300mm	.98"
182-107	1/10", 1/100", 1mm, 0.5mm	6"/150mm	.75"
182-108	1/10", 1/50", 1mm, 0.5mm	6"/150mm	.75"

Inch Wide Rigid Rules

Order No.	Graduations	Range	Width
182-101		6"	.75"
182-121	1/8", 1/16", 1/32", 1/64"	12"	.98"
182-141		18"	0.71"
182-161		24"	1.18"
182-102		6"	.75"
182-122	1/50", 1/100", 1/32", 1/64"	12"	.98"
182-142		18"	1.18"
182-162		24"	1.18"
182-103		6"	.75"
182-123	1/10", 1/100", 1/32", 1/64"	12"	.98"
182-143		18"	1.18"
182-163		24"	1.18"
182-104	1/10", 1/50",	6"	.75"
182-124	1/32", 1/64"	12"	.98"

Metric Fully-Flexible Rules

Order No.	Graduations	Range	Width
182-211		150mm	12mm
182-231	1mm, 0.5mm (on both faces)	300mm	12mm
182-251		450mm	19mm
182-271		600mm	19mm

Inch/Metric Fully-Flexible Rules

Order No.	Graduations	Range	Width
182-205		6"/150mm	.47"
182-225	1/32", 1/64", 1mm, 0.5mm	12"/300mm	.47"
182-245		18"/450mm	.75"
182-265		24"/600mm	.75"
182-206	1/50", 1/100", 1mm, 0.5mm	6"/150mm	.47"
182-226	1mm, 0.5mm	12"/300mm	.47"
182-207	1/10", 1/100", 1mm, 0.5mm	6"/150mm	.47"
182-208	1/10", 1/50", 1mm, 0.5mm	6"/150mm	.47"

Inch Fully-Flexible Rules

Order No.	Graduations	Range	Width
182-201		6"	.47"
182-221	1/8", 1/16", 1/32", 1/64"	12"	.47"
182-241		18"	1.18"
182-261		24"	.75"
182-202		6"	.47"
182-222	1/50", 1/100", 1/32", 1/64"	12"	.47"
182-242		18"	.75"
182-262		24"	.75"
182-203		6"	.47"
182-223	1/10", 1/100", 1/32", 1/64"	12"	.47"
182-243		18"	.75"
182-263		24"	.75"
182-204	1/10", 1/50",	6"	.47"
182-224	1/32", 1/64"	12"	.47"

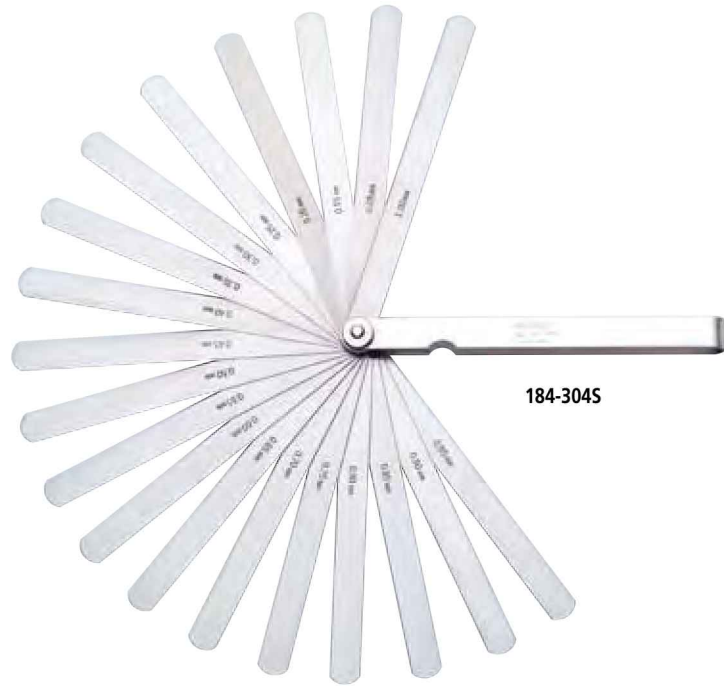
Inch/Metric Semi-Flexible Rules

Order No.	Graduations*	Range	Width
182-302		6"/150mm	.51"
182-303	1/16", 1/32", 1/64",	8"/200mm	.51"
182-305		12"/300mm	.59"
182-307	1mm, 0.5mm	20"/500mm	.59"
182-309		40"/1000mm	.59"

* Engraved on the front side only.

Thickness Gages SERIES 184

- Metric thickness gages are available with tapered leaves.
- Each leaf is marked with its thickness.
- Each leaf is detachable if necessary.



SPECIFICATIONS

Metric			
Order No.	Range	Composition of leaves	Remarks
184-313S	0.05 - 1mm	28 leaves: 0.05 - 0.15mm by 0.01mm, 0.2 - 1mm by 0.05mm	—
184-303S		28 leaves: 0.05 - 0.15mm by 0.01mm, 0.2 - 1mm by 0.05mm	Long leaf
184-304S	0.05 - 1mm	20 leaves: 0.05 - 1mm by 0.05mm	Long leaf
184-305S	0.05 - 1mm	13 leaves: 0.05 - 0.3mm by 0.05mm, 0.4 - 1mm by 0.1mm	—
184-301S		13 leaves: 0.05 - 0.3mm by 0.05mm, 0.4 - 1mm by 0.1mm	Long leaf
184-306S	0.05 - 0.8mm	10 leaves: 0.05 - 0.2mm by 0.05mm, 0.3 - 0.8mm by 0.1mm	—
184-308S		10 leaves: 0.05 - 0.2mm by 0.05mm, 0.3 - 0.8mm by 0.1mm	Long leaf
184-307S	0.03 - 0.5mm	13 leaves: 0.03 - 0.1mm by 0.01mm, 0.2 - 0.5mm by 0.1mm, 0.15mm	—
184-302S		13 leaves: 0.03 - 0.1mm by 0.01mm, 0.2 - 0.5mm by 0.1mm, 0.15mm	Long leaf

DIMENSIONS

Unit: mm

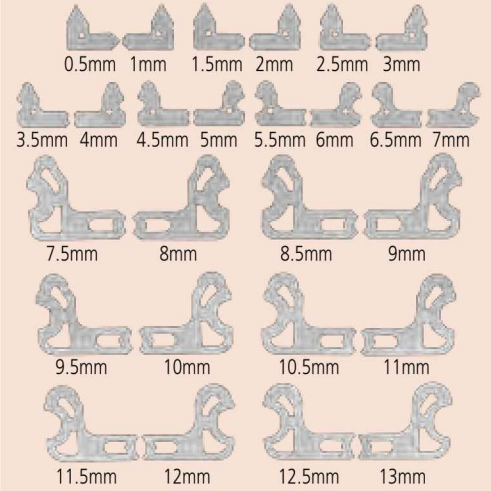
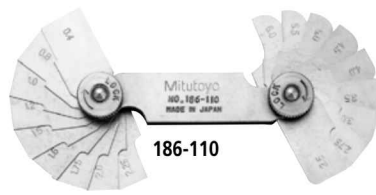
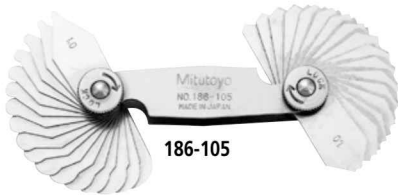
Order No.	L1	L2
184-313S	100	106
184-303S	150	156
184-304S	150	156
184-305S	100	106
184-301S	150	156
184-306S	100	106
184-308S	150	156
184-307S	100	106
184-302S	150	156

Reference Gages

Length Standards Brought to You by Mitutoyo

Radius Gages SERIES 186

- Radius size is stamped on each gage leaf.
- Each leaf comprises an internal and an external radius gage of the same size.
- With locking clamp.



Composition of leaves for 186-902

SPECIFICATIONS

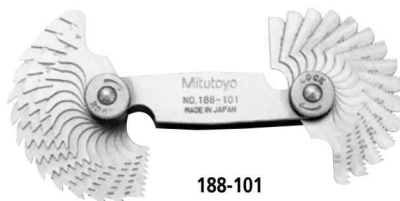
Metric			
Order No.	Range	Composition of leaves	Remarks
186-110	0.4 - 6mm	18 leaves: 0.4, 0.8, 1, 1.2, 1.5, 1.6mm, 1.75 - 3mm by 0.25mm, 3.5 - 6mm by 0.5mm	90° arc
186-902	0.5 - 13mm	26 leaves: 0.5 - 13mm by 0.5mm	90° arc, separate part type
186-105	1 - 7mm	34 leaves: 1 - 3mm by 0.25mm 3.5 - 7mm by 0.5mm	180° arc
186-106	7.5 - 15mm	32 leaves: 7.5 - 15mm by 0.5mm	180° arc
186-107	15.5 - 25mm	30 leaves: 15.5 - 20mm by 0.5mm, 21 - 25mm by 1mm	180° arc

Inch			
Order No.	Range	Composition of leaves	Remarks
186-103	1/32" - 17/64"	16 leaves: 1/32" - 17/64" by 64ths	90° arc
186-101	1/32" - 1/4"	15 leaves: 1/32" - 1/4" by 64ths	180° arc
186-102	17/64" - 1/2"	16 leaves: 17/64" - 1/2" by 64ths	180° arc
186-104	9/32" - 33/64"	16 leaves: 9/32" - 33/64" by 64ths	90° arc
186-901*	1/64" - 1/2"	25 leaves: 1/64" - 17/64" by 64ths, 9/32" - 1/2" by 32nds	—

* Each gage has five measuring locations.

Thread Pitch Gages SERIES 188

- Thread pitch is stamped on each gage.
- Metric, Unified, and Whitworth screw pitch gages.



SPECIFICATIONS

Metric Screw Pitch Gages

Order No.	Range	Composition of leaves
188-130	0.35 - 6mm	22 leaves: 0.35, 0.4, 0.45, 0.5, 0.6, 0.7, 0.75, 0.8, 1, 1.25, 1.5, 1.75, 2, 2.5, 3, 3.5, 4, 4.5, 5, 5.5, 6mm and 60° angle gage
188-122	0.4 - 7mm	21 leaves: 0.4, 0.5, 0.7, 0.75, 0.8, 0.9, 1, 1.25, 1.5, 1.75, 2, 2.5, 3, 3.5, 4, 4.5, 5, 5.5, 6, 6.5, 7mm
188-121	0.4 - 7mm	18 leaves: 0.4, 0.5, 0.75, 1, 1.25, 1.5, 1.75, 2, 2.5, 3, 3.5, 4, 4.5, 5, 5.5, 6, 6.5, 7mm

Unified Screw Pitch Gages

Order No.	Range	Composition of leaves
188-111	4 - 42 TPI	30 leaves: 4, 4 ^{1/2} , 5, 5 ^{1/2} , 6, 7, 8, 9, 10, 11, 11 ^{1/2} , 12, 13, 14, 15, 16, 18, 20, 22, 24, 26, 27, 28, 30, 32, 34, 36, 38, 40, 42 TPI

Note: Metric and Unified Pitch Gage Set (188-151) is available. It consists of 188-122 (Metric) and 188-111 (Unified).

Metric and Unified Screw Pitch Gage Set

Order No.	Range	Composition of leaves
188-151	0.4 - 7mm/4 - 42 TPI	51 leaves: Set of 188-122 and 188-111

Whitworth Screw Pitch Gages

Order No.	Range	Composition of leaves
188-101	4 - 42 TPI	30 leaves: 4, 4 ^{1/2} , 5, 5 ^{1/2} , 6, 7, 8, 9, 10, 11, 11 ^{1/2} , 12, 13, 14, 15, 16, 18, 20, 22, 24, 26, 27, 28, 30, 32, 34, 36, 38, 40, 42 TPI
188-102	4 - 60 TPI	28 leaves: 4, 4 ^{1/2} , 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 16, 18, 19, 20, 22, 24, 25, 26, 28, 30, 32, 34, 36, 40, 48, 60 TPI

Technical Data

Range: -360° to +360°
 Accuracy: ±2' (±0.03°)
 Repeatability: 1'
 Resolution: 1' (0.01°)
 Battery: Lithium Battery
 Battery life: 2,000 hours

Function

Presetting

Digital Universal Protractor SERIES 187

- Data output function makes it easy to gather statistical data.
- Can be attached to height gages using a gage holder (**950750**, metric)
- Setting preset value.
- Removable blade.

SPECIFICATIONS

Order No.	Blade length	Remarks (standard accessory)
187-501	150mm	Height gage holder (950750)
187-502	300mm	Height gage holder (950750)
187-551	6"	Height gage holder (950749)
187-552	12"	Height gage holder (950749)



187-501



Universal Bevel Protractor SERIES 187

- High-precision instrument for accurate angle measurement on machines, molds, and jigs.
- Can be attached to height gages.
- Graduation: 5'



187-901

SPECIFICATIONS

Metric		
Order No.	Blade length	Remarks
187-901	150, 300mm	w/60°, 45°, 30° edges
187-907	150mm	w/60°, 45° edges
187-908	300mm	w/60°, 45° edges

Inch		
Order No.	Blade length	Remarks
187-902	6", 12"	w/60°, 45°, 30° edges
187-904	6"	w/60°, 45° edges
187-906	12"	w/60°, 45° edges

Technical Data

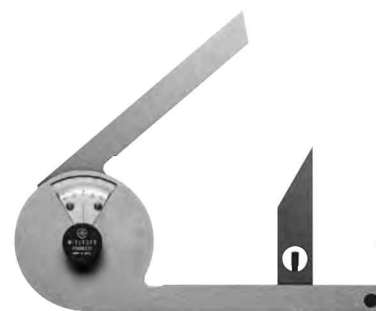
Range: 90° x 4 (360°)
 Graduation: 5 min. (0° - 90° - 0°)
 Blade edge angle: 30° and 60°
 Mass: 260g

Bevel Protractor SERIES 187

- Consists of three sheets of stainless steel, the middle one of which is made for angle measurements.

SPECIFICATIONS

Order No.	Blade length	Remarks
187-201	137mm	w/60°, 30° edges



187-201

Reference Gages

Length Standards Brought to You by Mitutoyo

Spring Dividers and Calipers SERIES 950

FEATURES

- Spring Divider — Fully hardened and tempered joints, spring, washers and divider points.
- Outside Spring Caliper — Contact ends fully rounded to give good contact with a workpiece.
- Inside Spring Caliper — Ends fully rounded to give good contact with a workpiece.



950-212
Spring divider



950-222
Outside spring calipers



950-232
Inside spring calipers

SPECIFICATIONS

Order No.			Range
Spring divider	Outside spring calipers	Inside spring calipers	
950-212	950-222	950-232	6" (150mm)
950-213	950-223	950-233	8" (200mm)

Precision Levels SERIES 960

- High-precision longitudinal and transverse vials make it possible to check or level surfaces.

SPECIFICATIONS

Order No.	Sensitivity	Dimensions (W x D x H)
960-603	0.02mm/m	200 x 44 x 38.2mm
960-703	0.02mm/m	200 x 44 x 200mm

Technical Data

Accuracy of graduations: ± 0.7 DIV (960-603),
 ± 0.3 DIV (960-703)

960-603



960-703



Technical Data

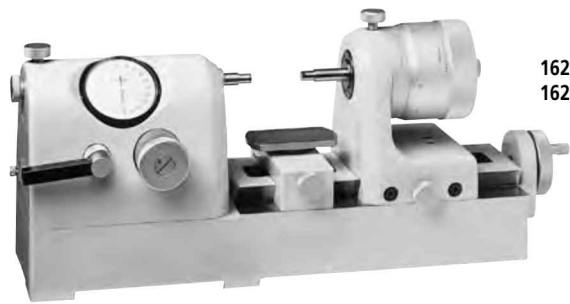
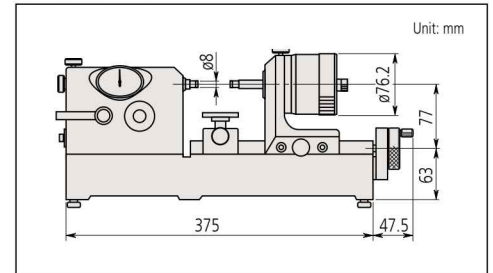
Micrometer head range: 25mm or 1"
Graduation: 0.001mm or .0001"
Dial indicator range: $\pm 0.1\text{mm}$ or $\pm .005''$
Maximum workpiece length: 100mm or 4"
Mass: 15kg

Bench Micrometer SERIES 162

FEATURES

- 25mm/1" stroke micrometer head (Graduation: 0.001mm/.0001") is provided.
- Retractable anvil with dial indicator for high accuracy inspection of mass-produced parts.
- Anvil measuring force is variable.
- Adjustable workpiece stage height.
- Dial Indicator is shockproof.
- $\varnothing 8\text{mm}$ (or 3/8") stem probe from the Mitutoyo Mu-Checker can be attached for higher precision measurement if required.

Dimensions



162-101 (metric)
162-102 (inch)

Technical Data

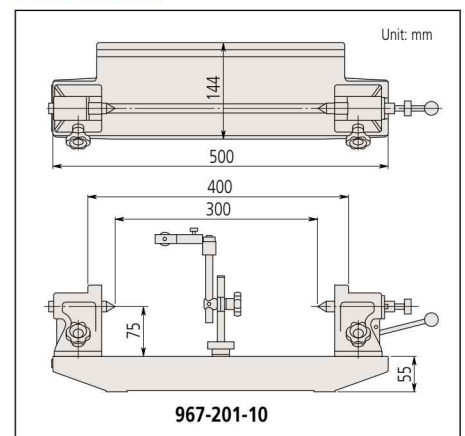
Maximum workpiece length: 300mm
Maximum workpiece dia.: 150mm
Mass: 13kg

Bench Centers SERIES 967

FEATURES

- Used with a dial test indicator (optional), these Bench Centers provide precision measurement of concentricity on cylindrical workpieces.
- With an indicator clamp. (Holding stem diameter: 8mm)

Dimensions



967-201-10

Reference Gages

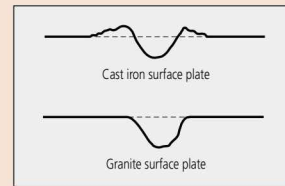
Length Standards Brought to You by Mitutoyo

Black Granite Surface Plates SERIES 517

- Natural granite is free from deterioration or dimensional change over time.
- Granite surface plates have significant advantages over cast iron surface plates: Twice as hard as cast iron. Non-magnetic. Low thermal expansion.
- Free from wringing, so there is no interruption of work.
- Free from burrs or protrusions because of the fine grain structure and insignificant stickiness; this ensures a high degree of flatness over a long service life and causes no damage to workpieces or instruments.
- Use these plates in a stable temperature environment. Since flatness error occurs when there is a temperature difference between the working surface and the underside, avoid working in direct sunlight. Also, do not place a plate in the vicinity of an air conditioner, etc. (Recommended environment: Temperature $20\pm 1^{\circ}\text{C}$, Humidity $58\pm 2\%$)



An inspection certificate is supplied as standard. Refer to page X for details.



1000 x 750mm



600 x 600mm

Custom-made Granite Products

Mitutoyo can manufacture granite products to your design (such as main structural components of semiconductor instruments and process machinery).



Grinding CMM granite tables on a large grinding machine

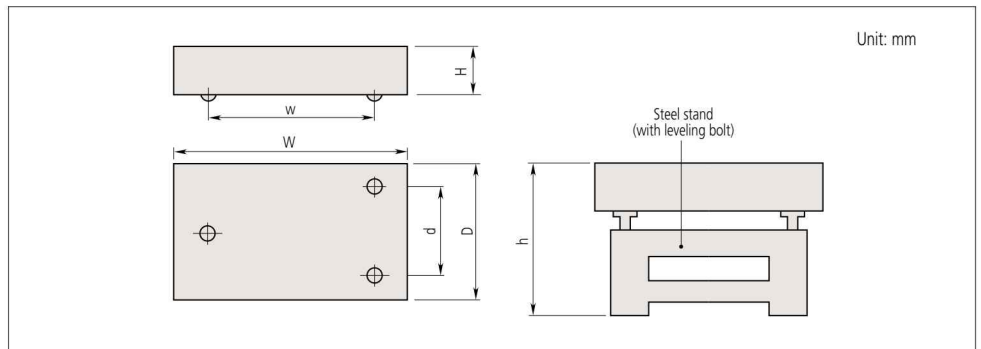
SPECIFICATIONS

Order No.	Size			Flatness	Mass	Stand (Option) Order No.			h
	WxDxh	d	w			Normal type	with safty frame	with caster	
517-401	300x300x100mm	240mm	240mm	2μm	27kg	—	—	—	—
517-301				3μm					
517-101				5μm					
517-411	450x300x100mm	240mm	390mm	2μm	40kg	—	—	—	—
517-311				3μm					
517-111				6μm					
517-414	600x450x100mm	370mm	500mm	2.5μm	80kg	517-203	517-203R	517-203CR	755 - 775mm*1
517-314				4μm					
517-114				8μm					
517-403	600x600x130mm	500mm	500mm	2.5μm	140kg	517-204	517-204R	517-204CR	755 - 775mm*1
517-303				5μm					
517-103				8μm					
517-405	750x500x130mm	420mm	630mm	3μm	146kg	517-205	517-205R	517-205CR	755 - 775mm*1
517-305				5μm					
517-105				9μm					
517-407	1000x750x150mm	630mm	700mm	3μm	337kg	517-206	517-206R	517-206CR	755 - 775mm*1
517-307				6μm					
517-107				12μm					
517-409	1000x1000x150mm	700mm	700mm	3.5μm	450kg	517-207	517-207R	517-207CR	735 - 775mm*1
517-309				7μm					
517-109				13μm					
517-413	1500x1000x200mm	700mm	1100mm	4μm	900kg	517-208	517-208R	517-208CR	735 - 775mm*1
517-313				8μm					
517-113				16μm					
517-410	2000x1000x250mm	700mm	1500mm	4.5μm	1500kg	517-209	517-209R	517-209CR	735 - 775mm*1
517-310				9.5μm					
517-110				19μm					
517-416	2000x1500x300mm	1100mm	1500mm	5μm	2700kg	517-210	517-210R	517-210CR	735 - 775mm*1
517-316				10μm					
517-116				20μm					
517-317	2000x2000x350mm	1500mm	1500mm	11μm	4200kg	—	—	—	700 - 706mm*1
517-117				22μm					
517-318	3000x1500x400mm	1100mm	2000mm	12.5μm	5400kg	—	—	—	700 - 706mm*1
517-118				25μm					
517-319	3000x2000x500mm	1500mm	2000mm	13.5μm	9000kg	—	—	—	700 - 706mm*1
517-119				27μm					

* With leveling bolt.

*1 Distance from the bottom of the large granite plate block mount to the granite plate top surface.

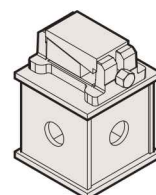
DIMENSIONS



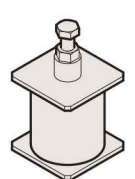
SPECIFICATIONS: Stand

Block mount	Applicable surface plate	
Order No.	Order No.	Size (W × D × H)
06AAY174	517-317	2000 × 2000 × 350mm
	517-117	
06AAY175	517-318	3000 × 1500 × 400mm
	517-118	
06AAY176	517-319	3000 × 2000 × 500mm
	517-119	

Block platform for supporting legs



Block platform for auxiliary legs



New Products



ABSOLUTE Digimatic Indicator ID-C (Peak-Value Hold Type)

Refer to page F-9 for details.



ABSOLUTE Digimatic Indicator ID-C (Bore Gage Type)

Refer to page F-10 for details.



ABSOLUTE Digimatic Indicator ID-C (Calculation Type)

Refer to pages F-11 to F-12 for details.



ABSOLUTE Digimatic Indicator ID-C (Signal Output Function Type)

Refer to pages F-13 for details.



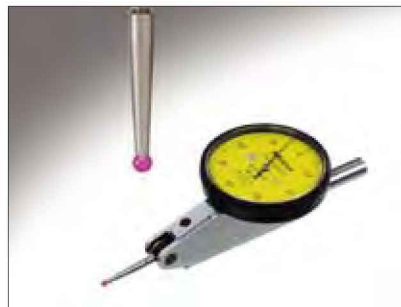
Digimatic Indicators



Dial Indicators



Dial Test Indicators



Dial Indicator Applications and Stands



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An inspection certificate is supplied as standard. Refer to page X for details.

Digimatic Indicators

Comparison measuring instruments which ensure high quality, high accuracy and reliability.

ABSOLUTE Solar-Powered Digimatic Indicator ID-SS SERIES 543

- Solar powered
An environmentally friendly measuring instrument that does not require batteries, eliminating the hassle and cost of battery replacement. Can operate under minimum light conditions of 40 lux—lower than the level in a warehouse.
- Built-in recharger
The large-capacity built-in reservoir capacitor allows you to use the indicator for long periods of time under light conditions below the minimum level.*
- User-friendly buttons
All functions can be accessed by using the two or three large buttons on the front of the indicator.
- Origin recorded even if display disappears.
The indicator includes an ABS (absolute) sensor that allows the previously set origin to

be restored even if the display disappears due to insufficient light, making it easy to resume measurement. This feature makes ID-SS ideal for long-time or multi-point measurement.



543-500

SPECIFICATIONS

Metric ISO/JIS type ASME/ANSI/AGD type

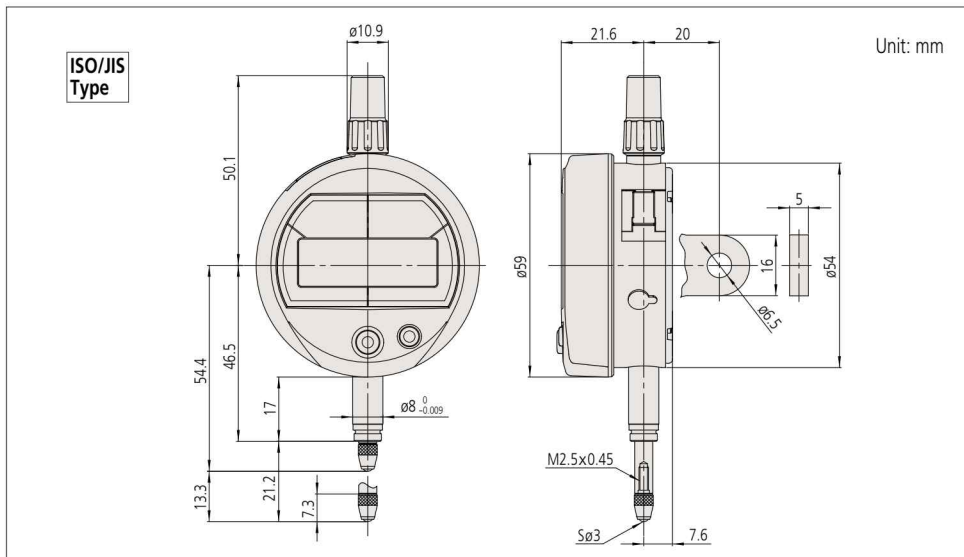
Order No.	Range	Resolution	Accuracy			Remarks	
			Overall*	Hysteresis*	Repeatability*		
543-500	12.7mm	0.001mm	0.003mm	0.002mm	0.002mm	With lug	
543-500B						Flat	
543-505		0.01mm	0.02mm	0.02mm	0.02mm	0.01mm	With lug
543-505B							Flat

Inch/Metric

Order No.	Range	Resolution	Accuracy			Remarks
			Overall*	Hysteresis*	Repeatability*	
543-501	.5"	.00005"/0.001mm	±.0001"/0.003mm	.0001"/0.002mm	.0001"/0.002mm	With lug
543-501B						Flat
543-502						With lug
543-502B		Flat				
543-506		.0005/0.01mm	±.0010"/0.02mm	.0010"/0.02mm	.005"/0.01mm	With lug
543-506B						Flat
543-507	With lug					
543-507B	Flat					

* Quantizing error of ±1 count is excluded.

Dimensions



Note 1: Dimensions of the inch (ANSI/AGD Type) dial indicator partly differ from those of the metric (ISO/JIS Type) indicator.
Note 2: Inch (ANSI/AGD Type) dial indicators are provided with a stem of 3/8" dia. and #4-48UNF thread mount for the contact point.

Technical Data

Display: 6-digit LCD and sign
Scale type: ABSOLUTE electrostatic linear encoder
Measuring force: 1.5 N or less
Usable positions: All
Power supply: Solar battery (for indoor use)
Minimum Operating light: 40 lux
Note: A built-in reservoir capacitor allows a fully charged ID-SS to be used for about 3.5 hours under light conditions below the minimum level.
The charging time differs depending on the environment, but it usually takes about 1.5 hours for a fully discharged ID-SS to fully recharge under light conditions of 500 lux.
Maximum response speed: No limit (scan-type measurement is not supported)
Stem dia: 8mm (ISO/JIS type) or 3/8" (ANSI/AGD type)

Functions

Origin set (zero-set)
Count direction switching
inch/mm conversion (inch/mm models)
Data output
Alarm: Counting value composition error
Insufficient illumination intensity or change

Optional accessories



Optional Accessories

- **Lifting**
Lifting lever **No.21EZA198** (ISO/JIS/DIN Type),
Lifting knob **No.21EZA199** (ASME/ANSI/ AGD Type),
No.21EZA105 (ISO/JIS/DIN Type),
No.21EZA150 (ASME/ANSI/ AGD Type)
Lifting cable (**No. 540774**)
 - SPC Cable:
No.905338 (1m)
No.905409 (2m)
 - USB Input Tool Direct (2m) : **06ADV380F**
 - Connecting Cables for **U-WAVE-T** (160mm):
No.02AZD790F
For footswitch **02AZE140F**
Refer to page F-60 for details.
 - Digimatic Mini-Processor DP-1VR: **264-504**
 - Contact points for Mitutoyo's dial indicators (Refer to pages F-51 to F-54 for details.)
Interchangeable backs for 2 series (Refer to page F-55 for details.)
 - Measuring stands (Refer to page F-79 to F-85 for details.)
 - ID-SS can be used in standard work environments.
- The following is excerpted from JIS Z9110:2010 General rules of recommended lighting levels; 5.4 Factories:

Luminance (lux)	Location (permissible work)
1500	Very detailed visual work
750	Detailed visual work; design and drawing work
500	Regular visual work such as work carried out in a factory; monitoring work such as using instrument panels and control panels
300	Administrative work carried out in a warehouse
200	Control rooms, bathrooms, and places where manual light work is carried out
150	Work such as loading, unloading, and shifting loads
100	Hallways, corridors, entrances and exits, and warehouses
50	Indoor emergency staircases



An inspection certificate is supplied as standard. Refer to page X for details.

Technical Data

Display: 6-digit LCD and sign
 Scale type: ABSOLUTE electrostatic linear encoder
 Usable orientation: All
 Power supply: SR44, part No. **938882** for initial operational checks (standard accessory)
 Maximum response speed: No limit (scan-type measurement is not supported)
 Operating temperature range: 0 to 40°C
 Storage temperature range: -10 to 60°C

Functions

Origin set (zero-set) : The display can be zeroed at any chosen position.
 Direction switching : The measuring direction can be switched.
 in/mm reading (inch/mm models only)
 Measurement data output: These indicators have a measurement data output socket, which makes it possible to output measurement to the DP-1VR mini processor or to a PC through an input tool. Furthermore, the U-WAVE measurement data wireless communication system can be used to wirelessly input measurement data to a PC.
 Error warning

Optional accessories

- Lifting**
 - Lifting lever **No.21EZA198** (ISO/JIS/DIN Type), **No.21EZA199** (ASME/ANSI/AGD Type)
 - Lifting knob **No.21EZA105** (ISO/JIS/DIN Type), **No.21EZA150** (ASME/ANSI/AGD Type)
 - Lifting cable **No. 540774**
- SPC Cable:
 - No.905338** (1m)
 - No.905409** (2m)
- USB Input Tool Direct (2m) : **06ADV380F**
- Connecting Cables for **U-WAVE-T** (160mm):
 - No.02AZD790F**
 For footswitch: **02AZE140F**
 Refer to page F-60 for details.
- Digimatic Mini-Processor DP-1VR: **264-504**
- Contact points for Mitutoyo's dial indicators (Refer to pages F-51 to F-54 for details.)
 Interchangeable backs for 2 series (Refer to page F-55 for details.)
- Measuring stands (Refer to page F-79 to F-85 for details.)

IP53 dust/water protection level

Level 5: Dust protection

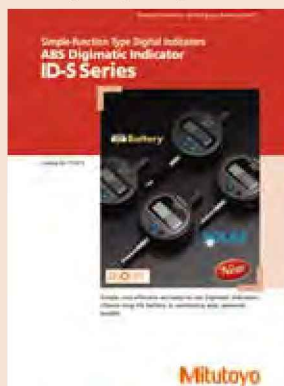
While complete protection against invasion of dust is not provided, protection is adequate to prevent dust amounts that would inhibit the prescribed operations and safety of the electronic equipment.

Level 3: Protection against spraying water

The product suffers no harmful effects when subjected to water sprayed at an angle of up to 60 degrees on both sides.

For details on the dust/water protection level test conditions, please refer to IEC 60529:2001 and JIS C 0920:2003.

IP code is the degree of protection against solid foreign objects and water.
 Mitutoyo offers a lineup of coolant proof, ID-N/B indicators that have excellent resistance to oil, water and dust and so are suitable for use in environments that include splashing cutting fluid.



Refer to the ABS Digimatic Indicator ID-S Series brochure (E12013) for details.

ABSOLUTE Digimatic Indicator ID-SX SERIES 543

- Cost-effective oriented design
 ID-SX indicators use a button-type battery (SR44) and come with the minimum of functionality for ease of use. There is a choice of models in the lineup allowing selection of 0.01 mm, 0.001 mm or inch-based measurement resolutions.
- IP53 dust/water protection level
 The models listed below also provide IP53 dust/water protection level specifications: **543-794/94B/95/95B/96/96B**

- ABS (absolute) sensor
 These Digimatic indicators employ Mitutoyo's proprietary ABS (absolute) sensor, which makes it possible to restore the origin point even if the power is turned off. This eliminates the need to perform origin restoration each time the power is turned on. Furthermore, this sensor ensures that overspeed errors do not occur, which improves reliability.
- Long battery life
 One button battery (SR44) provides approximately 20,000 hours of continuous use for .0005"/0.01mm resolution models.



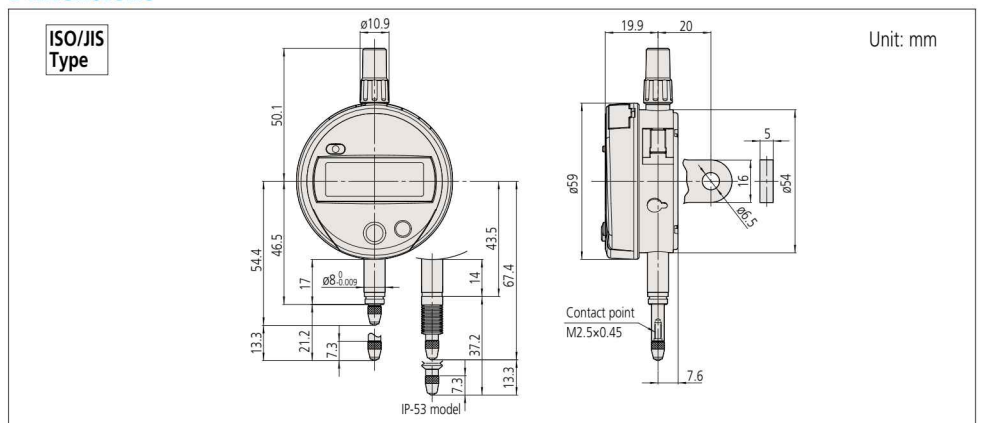
SPECIFICATIONS

Order No.	Range	Resolution	Accuracy*1			Back type	Measuring force	Battery life*3	Dust/Water protection level*4	
			Overall*2	Hysteresis	Repeatability					
543-790	12.7 mm	0.001 mm	0.003 mm	0.002 mm	0.002 mm	With lug	1.5N or less	18,000 hours	IP42	
543-790B						Flat				
543-794						With lug				2.5N or less
543-794B						Flat				
543-781						0.01 mm				0.02 mm
543-781B	Flat									

Order No.	Range	Resolution	Accuracy*1			Back type	Measuring force	Battery life*3	Dust/Water protection level*4
			Overall*2	Hysteresis	Repeatability				
543-791	5"/12.7 mm	.00005"/0.001mm	±.0001"/0.003mm	.0001"/0.002mm	.0001"/0.002mm	With lug	1.5N or less	18,000 hours	IP42
543-791B						Flat			
543-792						With lug			
543-792B						Flat			
543-793						With lug			
543-793B	Flat								
543-795	.00005"/0.001mm	.00005"/0.001mm	±.0010"/0.02mm	.0010"/0.02mm	.0005"/0.01mm	With lug	1.5N or less	20,000 hours	IP42
543-795B						Flat			
543-796						With lug			
543-796B						Flat			
543-782						.0005"/0.01mm			
543-782B	With lug								
543-783	With lug								
543-783B									

*1 These values apply at 20°C, and do not include ±1 count allowance for quantization error.
 *2 Overall magnification and linearity.
 *3 The battery life varies, depending on the number of times the Digimatic indicators are used as well as the way it is used. The values listed above are approximations.
 *4 This is only valid when the data socket cover is in place. Does not apply if the cover is removed, a lifting accessory is attached, or a connecting cable is attached.

Dimensions



Note 1: Dimensions of the inch (ANSI/AGD Type) dial indicator partly differ from those of the metric (ISO/JIS Type) indicator.
 Note 2: Inch (ANSI/AGD Type) dial indicators are provided with a stem of 3/8" dia. and #4-48UNF thread mount for the contact point.

Digimatic Indicators

Comparison measuring instruments which ensure high quality, high accuracy and reliability.

ABSOLUTE Digimatic Indicator ID-CX SERIES 543 — Standard Type

- The ABS (absolute) sensor restores the last origin position automatically when the indicator is turned on.
- Thanks to Mitutoyo's ABSOLUTE Linear Encoder, reliability has been increased due to elimination of over-speed errors.
- Tolerance-judging measurement is available by setting upper and lower limit values.
- Battery life of approx. 7,000 hours in continuous use has been achieved with only one battery.
- Equipped with a data output port that enables incorporation into measurement networking and statistical process control systems.

Note: Regarding origin setting, refer to "Origin Setting of Digimatic Indicators" on page F-18.



• Large LCD

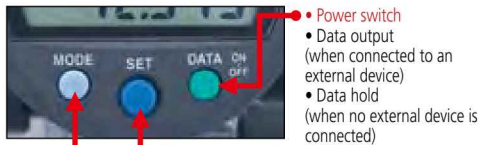
The large LCD incorporates 11mm characters giving 1.5 times the character area of conventional products (which display 8.5mm characters) making measurement values much easier to read.



Actual size

• Three large buttons

The popular three-large button design, which is used in products such as the ABS coolant proof Digimatic indicators ID-NVB, makes buttons easier to press and operations easier to perform.



- Parameter setting mode
- Count direction switching, tolerance judgment setting, resolution switching, scale factor setting, and function lock setting
- inch/mm conversion (inch/mm models)

• 330° rotary display

The display can be rotated 330°, allowing use at a position where you can easily read the measurement value.



• Calculation: $f(x) = Ax$

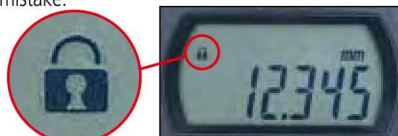
Mounting the ID-CX on a measuring jig and setting the multiplying factor (to any practical value) allows direct indication of size (see example below) without using a conversion table and so improves measurement efficiency.



Usage example
Note: The measuring jig is not supplied with the ID-CX.

• Function locking

Ensures reliability of measurement by locking the settings to prevent preset function settings from being changed by mistake.



ABSOLUTE™ (Refer to page X for details.)



An inspection certificate is supplied as standard. Refer to page X for details.

Technical Data

Accuracy: Refer to the list of specifications (excluding quantizing error)

Resolution:

0.01mm type	0.01mm
0.001mm type	0.01mm/0.001mm
.0005"/0.01mm type	.0005"/0.01mm
.00005"/0.001mm type	.0005"/.0001"/.00005"/0.01mm/0.001mm

Display: 6-digit LCD and sign
Scale type: ABSOLUTE electrostatic linear encoder
Max. response speed: Unlimited (Measurement by scanning cannot be performed)

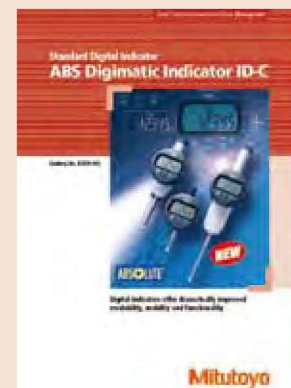
Measuring force: Refer to the list of specifications
Stem dia.: 8mm (ISO/JIS type) or 3/8" (ANSI/AGD type)
Battery: SR44 (1 pc.), **938882** for initial operational checks (standard accessory)
Battery life: Approx. 7,000 hours of continuous use
Dust/Water protection level: IP42

Functions

Preset, Zero set, GO/±NG judgment, Counting direction switching, Power ON/OFF, Simplified calculation, Function lock, Data hold, Data output, inch/mm conversion (inch/mm models)
Alarm: Low voltage, Counting value composition error, Overflow error, Tolerance limit setting error

Optional Accessories

- Lifting
 - Lifting lever:
 - No.21EZA198 (12.7mm/.5" ISO/JIS type)
 - No.21EZA199 (12.7mm/.5" ASME/ANSI/AGD type)
 - Lifting knob:
 - No.21EZA105 (12.7mm/.5" ISO/JIS type)*
 - No.21EZA150 (12.7mm/.5" ASME/ANSI/AGD type)*
 - Lifting cable: No.540774
 - Lifting lever: No.137693 (for measuring range: 25.4 and 50.8mm) (supplied with 25.4mm and 50.8mm models as standard.)
- Auxiliary spindle spring:
 - No.02ACA571 (25.4mm/1" models)**
 - No.02ACA773 (50.8mm/2" models)**
- Lug-on-senter back:
 - No.101040 (25.4mm/1" and 50.8mm/2", ISO/JIS type)
 - No.101306 (25.4mm/1" and 50.8mm/2", ASME/ANSI/AGD type)
- * Not available for low measuring force models.
- ** Required when orienting the indicator upside down.
- SPC Cable:
 - No.905338 (1m)
 - No.905409 (2m)
- USB Input Tool Direct (2m): **06ADV380F**
- Connecting Cables for **U-WAVE-T** (160mm):
No.02AZD790F
For footswitch (**02AZE140F**)
Refer to page F-60 for details.
- Digimatic Mini-Processor **DP-1VR: 264-504**
- Contact points for Mitutoyo's dial indicators (Refer to pages F-46 to F-49 for details.)
Interchangeable backs for 2 series (Refer to page F-50 for details.)
- Measuring stands (Refer to page F-80 for details.)



Refer to the ABS Digimatic Indicator ID-CX brochure (**E4330-543**) for details.

Setting measuring force on low measuring force models

• 543-404/404B/405/405B/406/406B

Spindle orientation	Spring	Weight (approximately 0.1N)	Maximum measuring force
Pointing vertically downward	Yes	Yes	0.5N or less
	Yes	No	0.4N or less
	No	Yes	0.3N or less
	No	No	0.2N or less
Horizontal	Yes	No	0.3N or less

Note) Operation using configurations other than shown above is not guaranteed.

• 543-394/394B/395/395B/396/396B

Spindle orientation	Spring	Weight (approximately 0.1N)	Maximum measuring force
Pointing vertically downward	Yes	Yes	0.7N or less
	Yes	No	0.6N or less
	No	Yes	0.4N or less
	No	No	Not guaranteed
Horizontal	Not guaranteed		

Note) Operation using configurations other than shown above is not guaranteed.

SPECIFICATIONS

Metric		Range	Resolution	Overall accuracy*	Measuring force	Remarks
Order No. (w/ lug, flat-back)						
543-390	543-390B	12.7mm	0.001mm	0.003mm	1.5N or less	—
543-394	543-394B				0.4N - 0.7N	Low measuring force
—	543-470B				25.4mm	1.8N or less
—	543-490B	50.8mm		0.005mm	2.3N or less	—
543-400	543-400B	12.7mm	0.01mm	0.02mm	0.9N or less	—
543-404	543-404B				0.2N - 0.5N	Low measuring force
—	543-474B				25.4mm	1.8N or less
—	543-494B	50.8mm		0.04mm	2.3N or less	—

* Hysteresis: 0.001mm/0.01mm Resolution Type: 0.002mm
0.01mm Resolution Type: 0.02mm

* Repeatability: 0.001mm/0.01mm Resolution Type: 0.002mm
0.01mm Resolution Type: 0.02mm

Inch/Metric

Order No. (w/ lug, flat-back)	Range	Resolution	Overall accuracy*	Measuring force	Remarks	
543-391	.5"	.0005"/.0001"/.0005"/.001mm / 0.01mm	.0001"	1.5N or less	—	
543-392				543-392B	1.5N or less	—
543-395				543-395B	0.4N - 0.7N	Low measuring force
543-396				543-396B	0.4N - 0.7N	Low measuring force
—	543-471B	1"	.0002"	1.8N or less**	—	
—	543-472B			1.8N or less**	—	
—	543-491B	2"	.0002"	2.3N or less**	—	
—	543-492B			2.3N or less**	—	
543-401	.5"	.0005"/0.01mm	.001"	0.9N or less	—	
543-402				543-402B	0.9N or less	—
543-405				543-405B	0.2N - 0.5N	Low measuring force
543-406				543-406B	0.2N - 0.5N	Low measuring force
—	543-475B	1"	.0015"	1.8N or less**	—	
—	543-476B			1.8N or less**	—	
—	543-495B	2"	.0015"	2.3N or less**	—	
—	543-496B			2.3N or less**	—	

* Hysteresis: .0005"/.0001"/.0005"/0.001mm/0.01mm
Resolution Type: .00010"/0.002mm
.0005"/0.01mm Resolution Type: .0010"/0.02mm

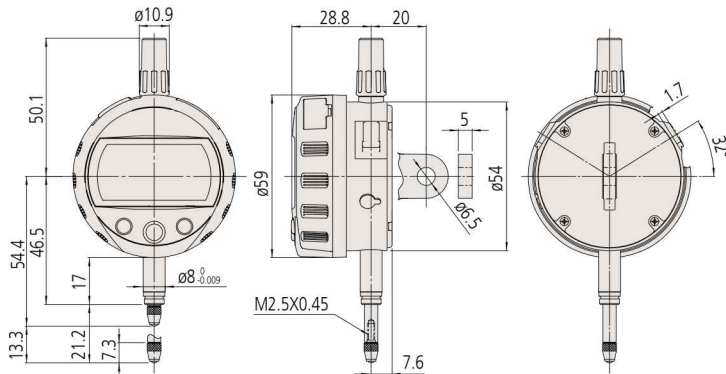
* Repeatability: .0005"/.0001"/.0005"/0.001mm/0.01mm
Resolution Type: .00010"/0.002mm
.0005"/0.01mm Resolution Type: .0005"/0.02mm

* Quantizing error of ±1 count is excluded

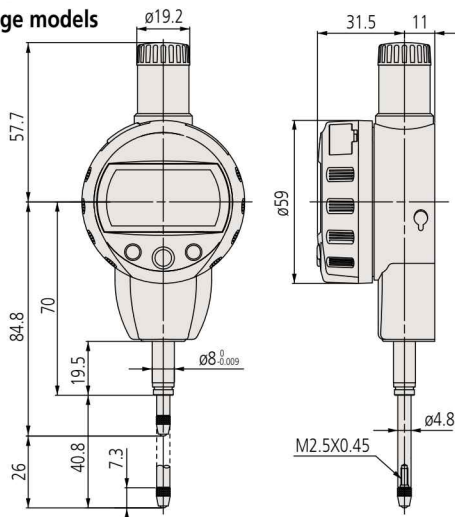
** Applies for a spindle orientation between the spindles

DIMENSIONS

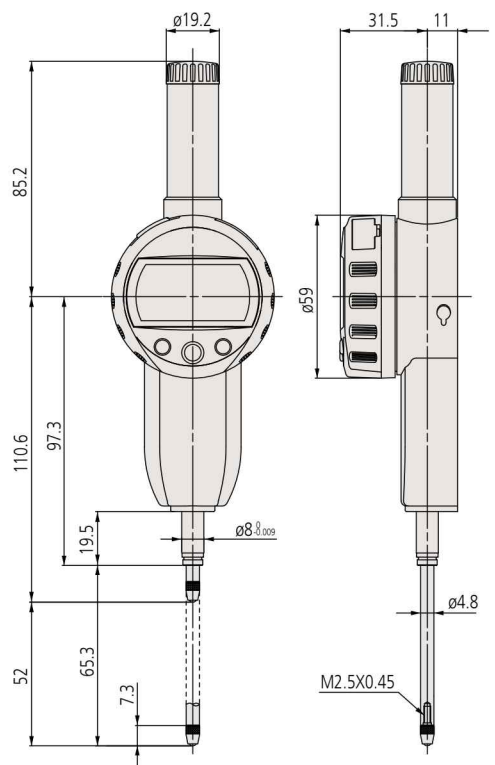
ISO/JIS Type 12.7mm range models



25.4mm range models



50.8mm range models



Unit: mm

Note 1: Dimensions of the inch (ANSI/AGD Type) dial indicator partly differ from those of the metric (ISO/JIS Type) indicator.

Note 2: Inch (ANSI/AGD Type) dial indicators are provided with a stem of 3/8" dia. and #4-48UNF thread mount for the contact point.

Note 3: Products with an Order No. suffixed "B" have a plain back, and other models have a center lug back.

Refer to page F-55 for details of the backs.

Digimatic Indicators

Comparison measuring instruments which ensure high quality, high accuracy and reliability.

ABSOLUTE Digimatic Indicator ID-N/B SERIES 543 — with Dust/ Water Protection Conforming to IP66

- Our unique ABS sensor restores the last origin position automatically when the indicator is turned on.
- The chance of overspeed errors has been eliminated thanks to the ABS sensor.
- Rated to IP66: can be used satisfactorily even in adverse environments where the indicator is subject to splashing by cutting fluid or coolant.
- Slim body design (body width: only 35mm) is advantageous in multipoint measurement situations where space is restricted. The LCD readout can also be rotated 180° to allow reading from the most convenient direction.
- Succeeded in digitalization of the Back Plunger type widely used for dial indicators for ID-B. A 5mm-stroke plunger with a higher degree of accuracy has been implemented by adopting a direct reading scale for plunger displacement.
- Built-in tolerance judgment function provides OK, +NG, or -NG judgment of measurement with respect to the preset upper and lower limit values, indicating the status of a measurement with the appropriate symbol. The symbols can be displayed much larger.
- Equipped with a data output port that enables incorporation into measurement networking and statistical process control systems.
- There is a choice of convenient Interface Input Tools which enable the conversion of measurement data to keyboard signals and directly input them to cells in off-the-shelf spreadsheet software such as Excel.

543-575



IP66



www.tuv.com
ID 0000007161

543-585



IP66



www.tuv.com
ID 0000007162



Rated to IP66 water- and dust-proofing standard and oil resistance improved.



Body width 35mm



LCD readout reversal function

ABSOLUTE™ (Refer to page X for details.)

Technical Data

Display: 6-digit LCD and sign
Scale type: ABSOLUTE electrostatic linear encoder
Max. response speed: Unlimited (Measurement by scanning cannot be performed)
Measuring force: 2.5N or less (ID-N)
2.0N or less (ID-B)
Stem dia: 8mm (ISO/JIS type) or 3/8" (ANSI/AGD type)
Standard contact point: **901312** (ISO/JIS type)
21BZB005 (ANSI/AGD type)
Battery SR44 (1pc.) : **938882** for initial operational checks (standard accessory)
Battery life: Approx. 7,000 hours of continuous use

Functions

Zero-setting, Presetting, Direction switching, Tolerance judgment, Display hold, Data output, inch/mm conversion (inch/mm models), LCD readout reversal
Alarm: Low voltage, Counting value composition error, Overflow error, Tolerance limit setting error

Optional accessories

- Lifting knob (only for ID-N)
No.21EZA105 (ISO/JIS type)*
No.21EZA150 (ASME/ANSI/AGD type)*
Spindle can be manually lifted. Remove the spindle cap for ID-N and attach the lifting knob to the spindle. Note that water resistance is not maintained in this configuration.

Using the lifting knob



- Lug
No.21EZA145 (ISO/JIS type)
No.21EZA146 (ASME/ANSI/AGD type)
- Arm for ID-B (mode-to-order)
- Rubber boot
For oil resistance (NBR) **No.02ACA376** (for ID-N)
No.125317 (for ID-B)
For durability (silicon) **No.238774** (for ID-N)
No.21EAA212 (for ID-B)

- SPC cable:
No.21EAA194 (1m)
No.21EAA190 (2m)
- USB Input Tool Direct (2m): **No.06ADV380G**
- Connecting Cables for U-WAVE-T (160mm)
: **No.02AZD790G**
For footswitch: **No.02AZE140G**
Refer to page F-60 for details.
- Bifurcated connecting cable with zero-setting terminal:
No.21EAA210 (1m)
No.21EAA211 (2m)
Two of the wires inside the cable are separated for zero setting without touching the SET switch on the main body. Use these cables in combination with commercially available switches. Zero setting is performed by briefly connecting these two wires together (less than a second), and ABS preset & recall by connecting for a second or more.
- Contact points for Mitutoyo's dial indicators (Refer to pages F-51 to F-54 for details.)

SPECIFICATIONS

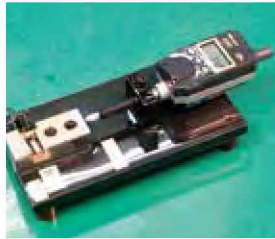
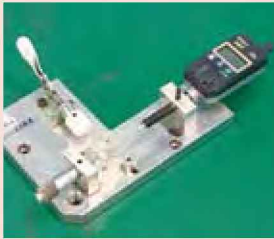
Metric		ISO/JIS type		ASME/ANSI/AGD type	
Order No.	Range	Resolution	Accuracy*	Remarks	
543-570	12.7mm	0.01mm	0.02mm	Slim type ID-N	
543-580	5.0mm			Back plunger type ID-B	
543-575	12.7mm	0.01mm / 0.001mm	0.01mm / 0.003mm	Slim type ID-N	
543-585	5.0mm			Back plunger type ID-B	

Inch/Metric		ISO/JIS type		ASME/ANSI/AGD type	
Order No.	Range	Resolution	Accuracy*	Remarks	
543-571	.5"	.0005", 0.01mm	.001"	Slim type ID-N	
543-581	.2"			Back plunger type ID-B	
543-576	.5"	0.01mm / 0.001mm .0005" / .00005"	.00012"	Slim type ID-N	
543-586	.2"			Back plunger type ID-B	

*Quantizing error of ±1 count is excluded

Mitutoyo

Usage examples



DIMENSIONS



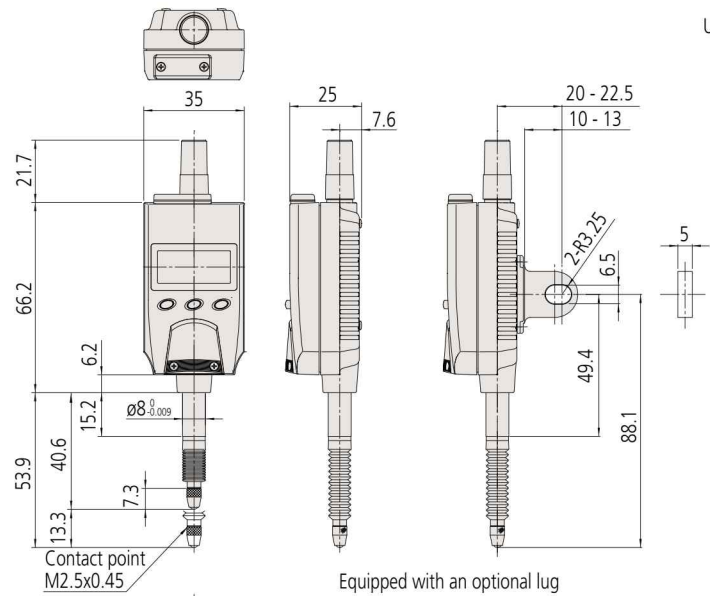
SPC cable



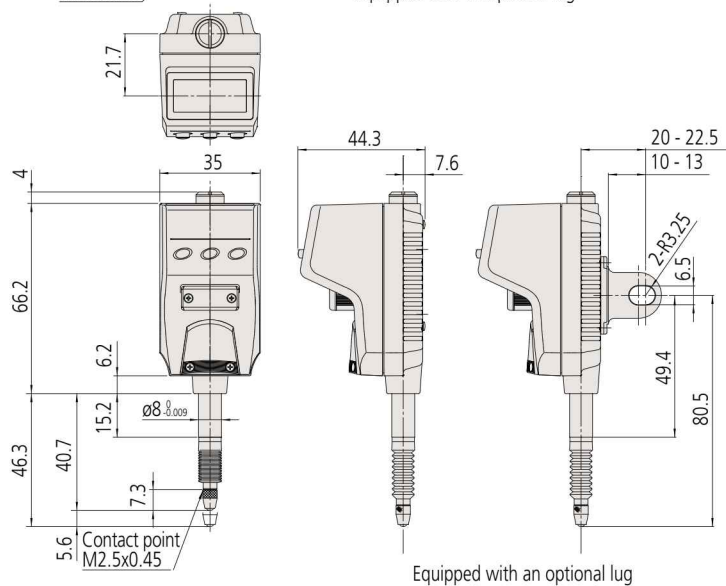
Bifurcated connecting cable with zero-setting terminal

ID-N

Unit: mm



ID-B



Refer to the ABS Coolantproof Digimatic Indicator ID-N/ID-B brochure (E4302-543) for details.

Note 1: Dimensions of the inch (ANSI/AGD Type) dial indicator partly differ from those of the metric (ISO/JIS Type) indicator.

Note 2: Inch (ANSI/AGD Type) dial indicators are provided with a stem of 3/8" dia. and #4-48UNF thread mount for the contact point.

Digimatic Indicators

Comparison measuring instruments which ensure high quality, high accuracy and reliability.

ABSOLUTE Digimatic Indicator ID-C SERIES 543 — Peak-Value Hold Type

- Run-out/MAX/MIN Hold function enables GO/±NG judgement for peak or difference values.
- Simple operation of many functions with five buttons and status icons.
- Wide LCD and new analog bar graph are now standard on all models.
- Sampling is performed fifty times per second for accurate detection of maximum and minimum values.



543-302/543-302B

SPECIFICATIONS

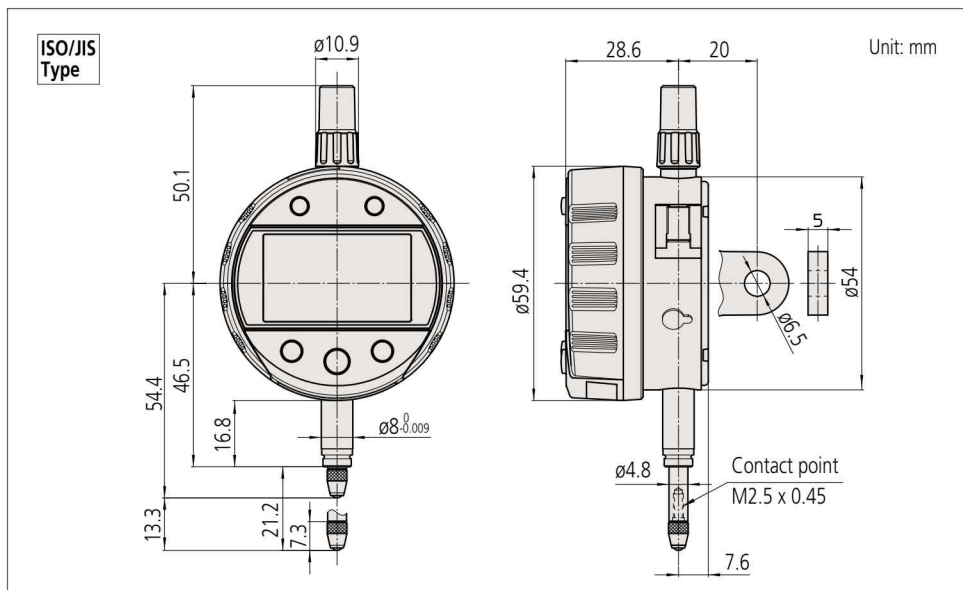
Metric								
Order No. (w/lug, flat-back)	Range	Resolution	Accuracy*1	Hysteresis*1	Repeatability*1	Power supply	Battery life (normal use)*2	Net weight
543-300	12.7mm	0.001/0.01mm	0.003mm	0.002mm	0.002mm	CR2032 x 1 pc.	Approx. 1 year	180 g
543-300B								170 g

Inch/Metric								
Order No. (w/lug, flat-back)	Range	Resolution	Accuracy*1	Hysteresis*1	Repeatability*1	Power supply	Battery life (normal use)*2	Net weight
543-301	.5"/12.7mm	.00005/.0001/.0005"/ 0.001/0.01mm	±.00010" / 0.003mm	.00010" / 0.002mm	.00010" / 0.002mm	CR2032 x 1 pc.	Approx. 1 year	180 g
543-301B								170 g
543-302								195 g
543-302B								170 g

Notes:
 1) GO/±NG judgment result is visual and cannot be output.
 2) Max./Min. hold: Sample rate is 50 readings per sec.
 Maximum trackable rate of change is 50µm per sec.

3) Order numbers suffixed "B" have a plain back.
 *1 Does not include quantizing error (±1 count). Valid for resolution set to 0.001mm/.00005" and coefficient A=1.
 *2 Applies only if not connected to a data processor. Battery life depends on use of the indicator. Use the above value as a guide only. (TIP) Battery life with Peak detection mode and FAST mode ON is about 4.5 months.

DIMENSIONS



Note 1: Dimensions of the inch (ANSI/AGD Type) dial indicator partly differ from those of the metric (ISO/JIS Type) indicator.
 Note 2: Inch (ANSI/AGD Type) dial indicators are provided with a stem of 3/8" dia. and #4-48UNF thread mount for the contact point.

ABSOLUTE™ (Refer to page X for details.)



An inspection certificate is supplied as standard. Refer to page X for details.

Functions

- Peak value hold function (maximum and minimum value)
- Runout value Hold function (difference between maximum/minimum values)
- Zeroset function (INC system)
- Preset function (ABS system)
- Counting direction switching function
- Tolerance judgement function (P1, P2, P3, and INC can be stored)
- Resolution selection function
- Simple calculation function $f(x)=Ax$
- Analog bar resolution selection function
- Key lock function
- in/mm conversion (inch/mm models)
- Display hold function (when external device is connected)
- Data output function
- External PC setting input function
- Display rotation function (330°)
- Low battery/voltage alarm display
- Error alarm display

Optional Accessories

- Lifting lever
- Lifting knob
- SPC Cable:
- No.905338 (1m)
- No.905409 (2m)
- USB Input Tool Direct (2m) : No.06ADV380F
- Connecting Cables for U-WAVE-T (160mm): No.02AZD790F
- For footswitch: No.02AZE140F
- Refer to page F-60 for details.
- Digimatic Mini-Processor DP-1VR: 264-504
- Parameter setup kit: 21EZA313
- Note: Parameter setting software (can be downloaded freely from Mitutoyo website) is also required.



Parameter setting software



- Contact points for Mitutoyo's dial indicators (Refer to pages F-51 to F-54 for details.)
- Interchangeable backs for 2 series (Refer to page F-55 for details.)
- Measuring stands. (Refer to page F-79 to F-85 for details.)



An inspection certificate is supplied as standard. Refer to page X for details.

Functions

- Minimum value detection function
- Preset function (3 Preset values can be stored)
- Tolerance judgement function (3 sets of upper and lower limits can be stored)
- Resolution selection function
- Analog bar resolution selection function
- Key lock function
- in/mm conversion (when external device is connected)
- Display hold function (when external device is connected)
- Data saving/calling function (when external device is connected)
- Data output function
- External PC setting input function
- Display rotation function
- Low battery/voltage alarm display
- Error alarm display

Optional Accessories

- SPC Cable:
 - No.905338** (1m)
 - No.905409** (2m)
- USB Input Tool Direct (2m) : **No.06ADV380F**
- Connecting Cables for U-WAVE-T (160mm) : **No.02AZD790F**
 - For footswitch : **No.02AZE140F**
- Digimatic Mini-Processor DP-1VR: **264-504**
- Parameter setup kit : **No.21EZA313**

Note: Parameter setting software (can be downloaded freely from Mitutoyo website) is also required.

The ABSOLUTE Digimatic Bore Gage



ABSOLUTE Digimatic Bore Gages, which integrate the display with a bore gage measuring unit, are also available. Refer to pages C-41 and C-42 for details.



ABSOLUTE Digimatic Indicator ID-C SERIES 543 — Bore Gage Type

- Dedicated to inside measurement with minimum-value Hold and tolerance judgement functions.
- Measurement data memory function (9 measurement results can be stored)
- Simple operation of many functions with five buttons and status icons.
- Wide LCD and new analog bar graph are now standard on all models.
- Sampling is performed fifty times per second for accurate detection of maximum and minimum values.



543-312B

SPECIFICATIONS

Metric		ISO/JIS type		ASME/ANSI/AGD type				
Order No.*	Range	Resolution	Accuracy*1	Hysteresis*1	Repeatability*1	Power supply	Battery life (normal use)*2	Net weight
543-310B	12.7mm	0.001/0.01mm	0.003mm	0.002 mm	0.002 mm	CR2032 x 1 pc.	Approx. 1 year	170 g

*Flat back only

Inch/Metric		ISO/JIS type		ASME/ANSI/AGD type				
Order No.*	Range	Resolution	Accuracy*1	Hysteresis*1	Repeatability*1	Power supply	Battery life (normal use)*2	Net weight
543-311B	.5"/12.7mm	.00005/.0001/.0005"/	±.0001" / 0.003 mm	.00010" / 0.002 mm	.00010" / 0.002 mm	CR2032 x 1 pc.	Approx. 1 year	170 g
543-312B		0.001/0.01 mm						

*Flat back only

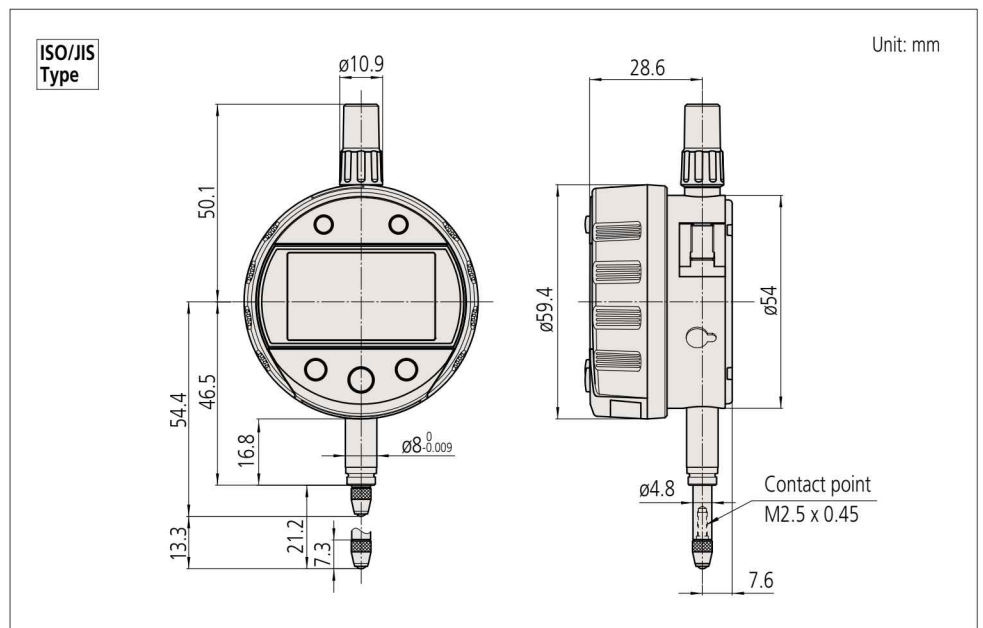
*1 Does not include quantizing error (±1 count). Valid for resolution set to 0.001mm/0.0005"

*2 Applies only if not connected to a data processor. Battery life depends on use of the indicator. Use the above value as a guide only. (TIP) Battery life with Peak detection mode and FAST mode ON is about 4.5 months.

Notes:

- 1) Min. hold: sample rate is 50 readings/sec; maximum trackable rate of change is 50µm/sec.
- 2) All instruments in this series are of the flat back type.
- 3) All instruments in this series can be only used for inside diameter measurement.

DIMENSIONS



Note 1: Dimensions of the inch (ANSI/AGD Type) dial indicator partly differ from those of the metric (ISO/JIS Type) indicator.
 Note 2: Inch (ANSI/AGD Type) dial indicators are provided with a stem of 3/8" dia. and #4-48UNF thread mount for the contact point.



An inspection certificate is supplied as standard. Refer to page X for details.

Digimatic Indicators

Comparison measuring instruments which ensure high quality, high accuracy and reliability.

ABSOLUTE Digimatic Indicator ID-C SERIES 543 — Calculation Type

- Calculation function operates on spindle displacement.
- Entering the appropriate formula factors for a fixture dedicated to the application enables direct measurement readout, thereby eliminating any need for the conversion tables previously needed for those applications where fixtures are typically used.
- Peak-Value Run-out/MAX/MIN Hold enables GO/±NG judgement for peak value.
- Simple operation of many functions with five buttons and status icons.
- Wide LCD and new analog bar graph are now standard on all models.
- Sampling can be performed fifty times per second for accurate detection of maximum, minimum and run-out values.



543-342B

ISO/JIS type ASME/ANSI/AGD type

SPECIFICATIONS

Order No.*	Range	Resolution (selectable)	Accuracy*1	Hysteresis*1	Repeatability*1	Measuring force	Power supply	Battery life (normal use)*2	Net weight
543-340B	12.7mm	12 steps*5	±0.003mm	0.002 mm	0.002 mm	1.5N or less	CR2032 x 1 pc.	Approx. 1 year	170 g
543-590B	25.4mm					1.8N or less*3			190 g
543-595B	50.8mm					2.3N or less*3			260 g

* Flat back only

Order No.*	Resolution (selectable)	Range	Accuracy*1	Hysteresis*1	Repeatability*1	Measuring force	Power supply	Battery life (normal use)*2	Net weight
543-341B	12 steps*5	.5"/12.7mm	±0.0010" / 0.003 mm	.00010" / 0.002 mm	0.0010" / 0.002 mm	1.5N or less	CR2032 x 1 pc.	Approx. 1 year	170 g
543-342B						1.8N or less*3			190 g
543-591B		1"/25.4mm				2.3N or less*3			260 g
543-592B						2"/50.8mm			±0.0025" / 0.006 mm
543-596B									
543-597B									

* Flat back only

Note: All instruments in this series are of the flat back type.

The back is interchangeable with the standard backs for Series 2.

Refer to page F-55 for details of the optional backs.

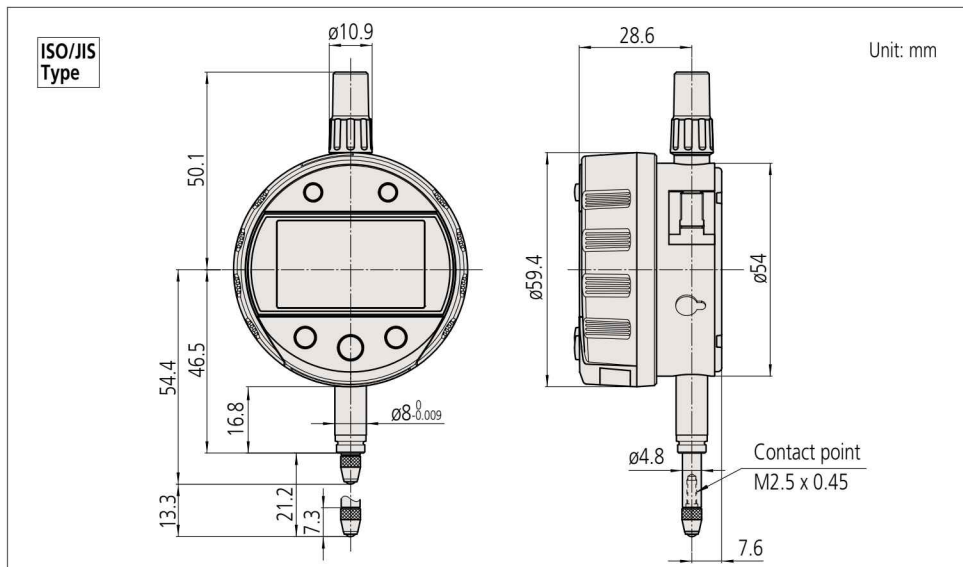
*1 Does not include quantizing error (±1 count). Valid for resolution set to 0.001mm/.00005" and coefficients A=1, B=0 and C=0.

*2 Applies only if not connected to a data processor. Battery life depends on use of the indicator. Use the above value as a guide only. (TIP) Battery life with Peak detection mode and FAST mode ON is about 10 months.

*3 Applies for a spindle orientation between the spindle pointing vertically downward to the spindle horizontal.

*4 The resolution can be selected from one of 12 steps (Refer to table right).

DIMENSIONS



Note 1: Dimensions of the inch (ANSI/AGD Type) dial indicator partly differ from those of the metric (ISO/JIS Type) indicator.

Note 2: Inch (ANSI/AGD Type) dial indicators are provided with a stem of 3/8" dia. and #4-48UNF thread mount for the contact point.

Functions

Calculation function $f(x) = Ax^2 + B + Cx^{-1}$
($x' = x + \text{offset}$)

Peak detection function (Max/Min)

Runout value Hold function (difference between max. and min. value motion)

Peak detection sampling rate (Switchable)

10 times/sec. (FAST Mode OFF)

50 times/sec. (FAST Mode ON)

Zeroret function (INC system)

Preset function (ABS system)

Tolerance judgement function (P1, P2, P3, and INC can be stored)

Analog bar resolution selectable function

Key lock function

Display hold function (when external device is connected)

Data output function

External PC setting input function (330°)

Low battery/voltage alarm display

Error alarm display

Resolution switching function*5

Resolution (mm)			Resolution (inch)		
0.0002	0.005	0.1	0.00001	0.0002	0.005
0.0005	0.01	0.2	0.00002	0.0005	0.01
0.001	0.02	0.5	0.00005	0.001	0.02
0.002	0.05	1	0.0001	0.002	0.05

*5: Since the calculation resolution is one micrometer (0.001mm), using sub-micrometer resolution settings may result in the 4th-place digit being unreliable, particularly when B is set to a very low value and C = 0. It does not change at all with certain combinations of calculation coefficient (for example, A = 1, B = C = 0). The 3rd-place digit representing micrometers (if displayed) is always reliable.

Optional Accessories

- Lifting
 - Lifting lever:
 - No.21EZA198 (ISO/JIS/DIN Type),
 - No.21EZA199 (ASME/ANSI/AGD Type)
 - Lifting knob:
 - No.21EZA105 (ISO/JIS/DIN Type),
 - No.21EZA150 (ASME/ANSI/AGD Type)
 - Lifting cable : No. 540774
 - SPC Cable:
 - No.905338 (1m)
 - No.905409 (2m)
 - USB Input Tool Direct (2m) : No.06ADV380F
 - Connecting Cables for U-WAVE-T (160mm) : No.02AZD790F
 - For footswitch : No.02AZE140F
 - Refer to page F-60 for details.
 - Digimatic Mini-Processor DP-1VR : 264-504
 - Parameter setup kit : No.21EZA313
- Note: Parameter setting software (can be downloaded freely from Mitutoyo website) is also required.
- Contact points for Mitutoyo's dial indicators (Refer to pages F-51 to F-54 for details.)
 - Measuring stands (Refer to page F-79 to F-85 for details.)

Fixture examples



Examples of measuring various features

Item	D = Countersink diameter / Groove width; H = Countersink depth / Groove depth			R = Outside radius of round object		R = Inside radius of round object	R = Outside radius of round object		
Fixture type*									
Contact point	Cone	Ball	Cone	Flat or radius to suit feature					
x = Spindle displacement from ORIGIN set position (retraction is the positive-going direction)									
Calculation (x' = x + d)	D = Ax	D = Ax' + B	H = Ax' + B	D = Ax'	R = Ax'	R = Ax' + B + C/x'	R = A(x') + B + C/(x')		
Coefficient values	A	$-2 \tan \frac{\theta}{2}$	$-2 \tan \frac{\theta}{2}$	-1	$-2 \tan \frac{\theta}{2}$	$-\frac{\sin \frac{\theta}{2}}{1 - \sin \frac{\theta}{2}}$	$\frac{1}{2}$	$-\frac{1}{2}$	$\frac{1}{2}$
	B	0	$2r \left(\frac{1}{\cos \frac{\theta}{2}} - \tan \frac{\theta}{2} \right)$	$r \left(\frac{1}{\cos \frac{\theta}{2}} - 1 \right) - \frac{d}{2 \tan \frac{\theta}{2}}$	0	0	-r	r	-r
	C	0	0	0	0	0	$\frac{L^2}{2}$	$-\frac{L^2}{2}$	$\frac{L^2}{2}$
Origin offset value	d	0	0	0	0	0	0	0	
ORIGIN-set position of spindle *									
Displayed measurement value at ORIGIN-set position of spindle	0	Value of coefficient B	0	0	0	Err 30 ** (Overflow error of Display value)	Depends on value of d ***		

* The spindle position at which the ORIGIN is set. This is when the contact point is touching either the reference plane or the calibrated artefact, as shown.

** The 'Err30' message shown in the display is extinguished when the spindle is moved into the measurement plane.

*** The value of d is chosen to suit the radius range to be measured, the stroke of the indicator and the best spindle position for the ORIGIN. Note that the value of x' should not be allowed to approach zero as this is a highly non-linear region of the equation and measurement accuracy will deteriorate rapidly. A spreadsheet simulation will aid selection of the best value of d for particular r, L and R values.

Notes

1. Fixtures suited to individual workpieces can be made to order.
2. Measuring accuracy is subject to fixture accuracy and workpiece form accuracy.



An inspection certificate is supplied as standard. Refer to page X for details.

Digimatic Indicators

Comparison measuring instruments which ensure high quality, high accuracy and reliability.

ABSOLUTE Digimatic Indicator ID-C SERIES 543 — Signal Output Function Type

- Enables a tolerance judgment to be output to external equipment for a measurement result against user-defined limits. Solid-state switching provides high reliability by avoiding metallic switch contacts.
- Output is enabled by directly connecting to external devices (sequencers, etc., for which a logical invert is available if required). The measurement and judgment results are displayed on the LCD. The judgment result is also indicated by 2 LEDs.
- A peak-detection function is equipped for measuring and judging peak values, such as runout.
- Measurements are absolute (ABS system) relative to an origin point*1 as set by the user, which holds indefinitely so does not require resetting at every power-on.
- Provided with a 4m cable.
- External power required is 5 - 24VDC.
- Dust-water protection level: Conforms to IP54.

*1 Regarding origin setting, refer to "Origin Setting of Digimatic Indicators" on page F-18.



543-350



SPECIFICATIONS

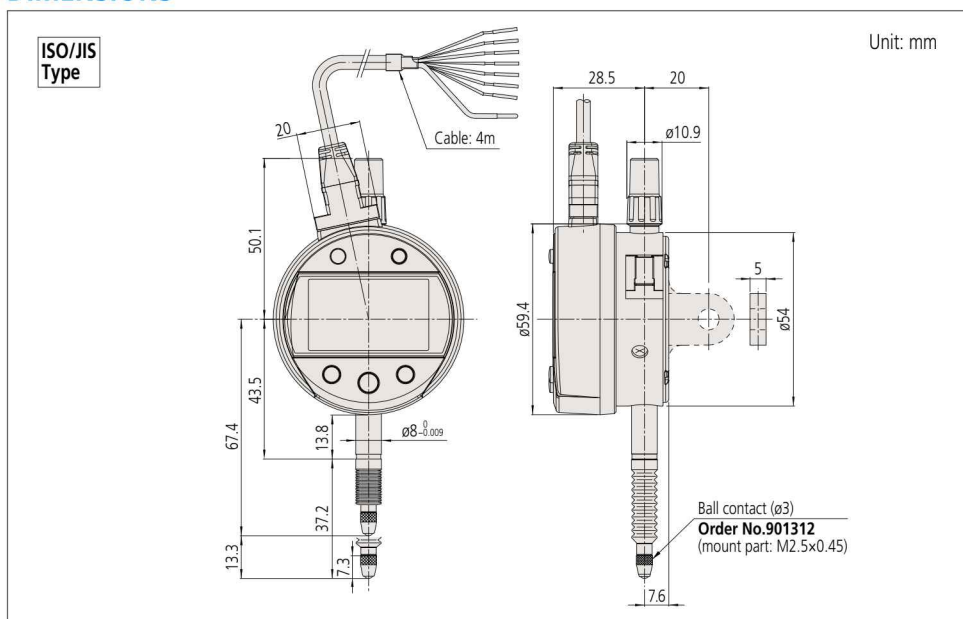
Metric		ISO/JIS type	ASME/ANSI/AGD type
Order No. (w/ lug, flat-back)	Range	Resolution	Accuracy*2
543-350	543-350B	12.7mm	0.001/0.01mm
			0.003mm or less
			2.5N or less

Inch/Metric		ISO/JIS type	ASME/ANSI/AGD type
Order No. (w/ lug, flat-back)	Range	Resolution	Accuracy*2
543-351	543-351B	.5" / 12.7mm	.00005"/.0001"/.0005" //
543-352	543-352B		0.001/0.01mm
			±.00010" / 0.003mm or less
			2.5N or less

Notes:

- 1) LCD readout does not rotate.
 - 2) Max./min. holding: sample rate is 100 readings/sec; max. rate of change of reading is 100µm/sec.
 - 3) Products with an Order No. suffixed "B" have a flat back
 - 4) Standard contact point: **901312** (ISO/JIS type), **21BZB005** (ANSI/AGD type)
- *2 Quantizing error of ±1 count is excluded.

DIMENSIONS



Note 1: Dimensions of the inch (ANSI/AGD Type) dial indicator partly differ from those of the metric (ISO/JIS Type) indicator.
 Note 2: Inch (ANSI/AGD Type) dial indicators are provided with a stem of 3/8" dia. and #4-48UNF thread mount for the contact point.

Functions

Signal output (-NG/OK+NG, N-ch open drain, logical invert is available), Remote control (peak start preset/zero-set), Preset, Zeraset, GO±NG judgment (3 pairs of ABS, INC memory function) Max/Min/Runout value holding, Measurement direction switching, Power ON/OFF, inch/mm conversion (inch/mm models), Resolution switching, Scaling function f(x)=Ax, Key lock, Calibration mode (Signal output in Digimatic code format).
 Alarm: Counting value composition error, Overflow error, Tolerance limit setting error

Optional accessories

- Lifting*3
 - Lifting lever **No.21EZA198** (ISO/JIS/DIN Type), **No.21EZA199** (ASME/ANSI/AGD Type)
 - Lifting knob **No.21EZA105** (ISO/JIS/DIN Type), **No.21EZA150** (ASME/ANSI/AGD Type)
 - Lifting cable **No.540774**
- Digimatic power unit: **21EZA345**
 Note: To denote your AC power cable add the following suffixes to the order No.: A for UL/CSA, D for CEE, DC for CCC, E for KC. No suffix is required for JIS/100VAC.
- Used in the calibration mode when executing automatic inspection using i-Checker. In such a case, please purchase connecting cable **21EAA194** (1m), or **21EAA190** (2m).
- Contact points for Mitutoyo's dial indicators.*4
- Interchangeable backs for Series 2 models. Dust-water protection is not guaranteed. Use the waterproof types of Series 2 for plain backs if required.*5
- Measuring stands (Refer to page F-75 to F-80 for details.)
- *3 Dust-water protection is not guaranteed.
- *4 Refer to pages F-46 to F-49 for details.
- *5 Refer to page F-50 for details.

Output signals and LCD display

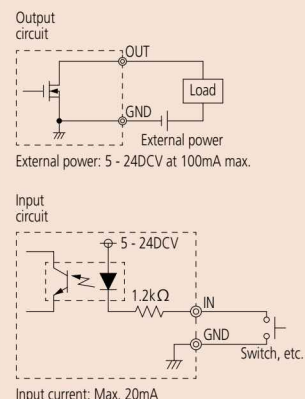
Wire	- NG	OK	+ NG	Composition error
Orange (- NG)	Low	High	High	High
Green (OK)	High	Low	High	High
Brown (+ NG)	High	High	Low	High
LCD	◀	○	▶	"x.xxE" indication

* Logical invert is available.

I/O Specifications

Wire	Signal	I/O	Description
Black	- V (GND)	—	Connected to minus (-) terminal
Red	+ V	—	Power supply (5 - 24VDC)
Orange	- NG	O	Tolerance judgment
Green	OK	O	result output: Only the terminal corresponding to a judgment result is set to the low level.
Brown	+ NG	O	to a judgment result is set to the low level.
Yellow	PRESET_REC ALL ZERO	I	External input terminal: If the relevant terminal is set to the low level, its signal becomes true.
Blue	PEAK_START	I	External input terminal: If the relevant terminal is set to the low level, its signal becomes true.
Shield	FG	—	Connected to GND (Earth)

Note: Measurement data cannot be output.



Technical Data

Accuracy: Refer to the list of specifications (Excluding quantizing error of ±1 count)
 Resolution: 0.01mm, .0005"/0.01mm
 Display: 5-digit and sign
 Scale type: ABSOLUTE electrostatic linear encoder
 Max. response speed: Unlimited (Measurement by scanning cannot be performed)
 Measuring force: Refer to the list of specifications
 Stem dia.: 8mm (ISO/JIS type) or 3/8" (ANSI/AGD type)
 Standard contact point: **901312** (ISO/JIS type)
21BZB005 (ANSI/AGD type)
 Battery: SR44 (1 pc.), **938882** for initial operational checks (standard accessory)
 Battery life: Approx. 20,000 hours of continuous use
 Dust/Water protection level: IP42
 Lifting lever: **137693**

Function

Origin-set (Zerose), Counting direction switching, Power ON/OFF, Data output, inch/mm conversion (inch/mm models)
 Alarm: Low voltage, Counting value composition error

Optional Accessories

- Spindle lifting cable (stroke: 10mm) : **No.540774**
- SPC Cable:
No.905338 (1m)
No.905409 (2m)
- USB Input Tool Direct (2m) : **No.06ADV380F**
- Connecting Cables for U-WAVE-T (160mm):
No.02AZD790F
 For footswitch : **No.02AZE140F**
 Refer to page F-60 for details.
- Digimatic Mini-Processor DP-1VR: **264-504**
- Contact points for Mitutoyo's dial indicators (Refer to pages F-46 to F-49 for details.)
- Measuring stands (Refer to page F-79 to F-85 for details.)

ABSOLUTE Digimatic Indicator ID-U SERIES 575 — Slim and Economical Design

- General purpose indicator with the measuring range of 25.4mm/ 1"
- Cost-effective and user-friendly type which is equipped with the basic functions necessary.
- The ABS (absolute) sensor restores the last origin position automatically when the indicator is turned on, and realizes high reliability by eliminating over-speed errors. Regarding origin setting, refer to "Origin Setting of Digimatic Indicators" on page F-18.
- Battery life of 20,000 hours in continuous use has been achieved.
- Easy-to-read large LCD readout with the character height of 8mm.
- Equipped with a data output port that enables incorporation into measurement networking and statistical process control systems.



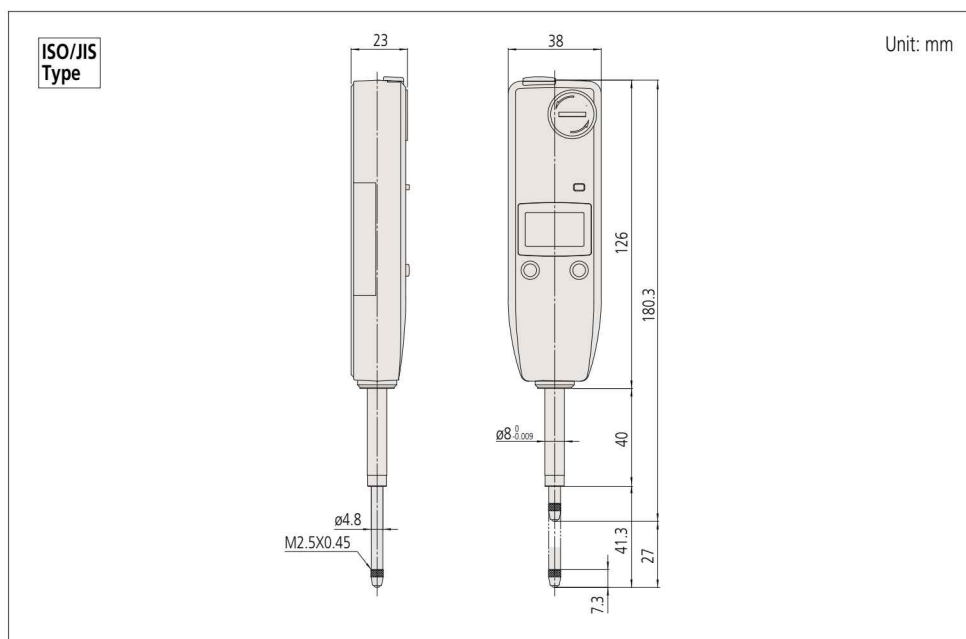
SPECIFICATIONS

Metric		ISO/JIS type	ASME/ANSI/AGD type		
Order No. (w/ lug, flat-back)	Range	Resolution	Accuracy*	Measuring force	
—	575-121	25.4mm	0.01mm	0.02mm	1.8N or less

Inch/Metric		ISO/JIS type	ASME/ANSI/AGD type		
Order No. (w/ lug, flat-back)	Range	Resolution	Accuracy*	Measuring force	
—	575-122	1" / 25.4mm	.0005" / 0.01mm	.001" / 0.02mm	1.8N or less
—	575-123				

*Quantizing error of ±1 count is excluded
 *Flat back only

DIMENSIONS



Note 1: Dimensions of the inch (ANSI/AGD Type) dial indicator partly differ from those of the metric (ISO/JIS Type) indicator.
 Note 2: Inch (ANSI/AGD Type) dial indicators are provided with a stem of 3/8" dia. and #4-48UNF thread mount for the contact point.

Digimatic Indicators

Comparison measuring instruments which ensure high quality, high accuracy and reliability.

Digimatic Indicator ID-H SERIES 543 — High Accuracy and High Functionality Type

- This new-generation digital indicator offers the excellent accuracy and functionality expected from the top class of indicator.
- Take advantage of its high accuracy backed up by 0.5µm/0.00002" resolution, remote control functionality via a handheld controller (or an RS-232C interface) and easy runout measurements with the well-established analog bar display.
- Functionality meets the needs of diverse measurement applications.

Tolerance judgment



- Measuring maximum value, minimum value and runout (difference between a maximum and a minimum value)

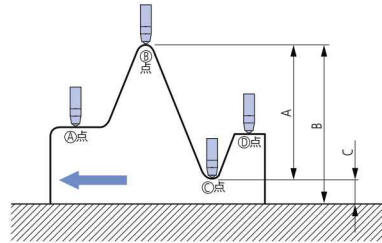
Maximum value / minimum value measurement



Difference/runout measurement



Example: Indicator traces between points <A> to <D>
Difference (or Total Runout) is displayed as <A>. Dimensions (maximum value) and <C> (minimum value) can be recalled from memory with a simple key sequence.



- With the optional remote controller, operations such as zero-setting and presetting can be made without touching the indicator body, thereby avoiding disturbance to the set-up.
- An advanced, remote control system can be implemented with the built-in RS-232 interface and a PC.
- Equipped with a data output port that enables incorporation into measurement networking and statistical process control systems.



Remote controller (optional)



An inspection certificate is supplied as standard. Refer to page X for details.

Technical Data

Display: 7-digit LCD, sign, and analog bar with 2-color backlight
Power supply: 6V DC (via AC adaptor) **06AEG180**
* To denote your AC power cable add the following suffixes to the order No.: **A** for UL/CSA, **D** for CEE, **DC** for CCC, **E** for BS, **K** for KC, **No suffix** is required for JIS/100V
Positional detection method: Photoelectric-type reflection linear encoder
Maximum response speed: 1000mm/sec
Measuring force: 2.0N or less (30.4mm/1.2" type)
2.5N or less (60.9mm/2.4" type)
Spindle orientation: Between the spindle pointing vertically downward to the spindle horizontal
Standard contact point: **901312** (ISO/JIS type)
21BZB005 (ANSI/AGD type)
Lifting lever: **No.137693**

Functions

Zero set, Preset, GO/±NG judgement
Max/Min value hold, Runout measurement
Resolution switching
Counting direction switching
Data output, Data hold, Function lock
inch/mm conversion (inch/mm models)
Alarm: Over speed error, Setting error, Overflow error

Optional accessories

- Lifting
Lifting knob : **No.21EZA101**
Lifting cable : **No.540774** (stroke 30 mm)
- Lug-on-center back:
No.101040 (ISO/JIS type)
No.101306 (ASME/ANSI/AGD type)
- Remote controller : **No.21EZA099**
- RS-232 Connecting cable (2m) : **No.21EAA131**
- SPC Cable:
No.936937 (1m)
No.965014 (2m)
- USB Input Tool Direct (2m) : **No.06ADV380D**
- Connecting Cables for U-WAVE-T (160mm) :
No.02AZD790D
For footswitch : **No.02AZE140D**
Refer to page F-60 for details.
- Digimatic Mini-Processor DP-1VR: **264-504**
- Contact points for Mitutoyo's dial indicators (Refer to pages F-46 to F-49 for details.)
- Granite comparator stand: **215-156-10**
- Comparator stand: **215-505-10**

Comparator stand
215-505-10



Remote controller

Spindle lifting cable

Digimatic Mini-Processor
DP-1VR



Spindle lifting knob

SPECIFICATIONS

Metric			
Order No.*	Range	Resolution	Accuracy**
543-561	30.4mm	0.0005mm,	0.0015mm
543-563	60.9mm	0.001mm	0.0025mm

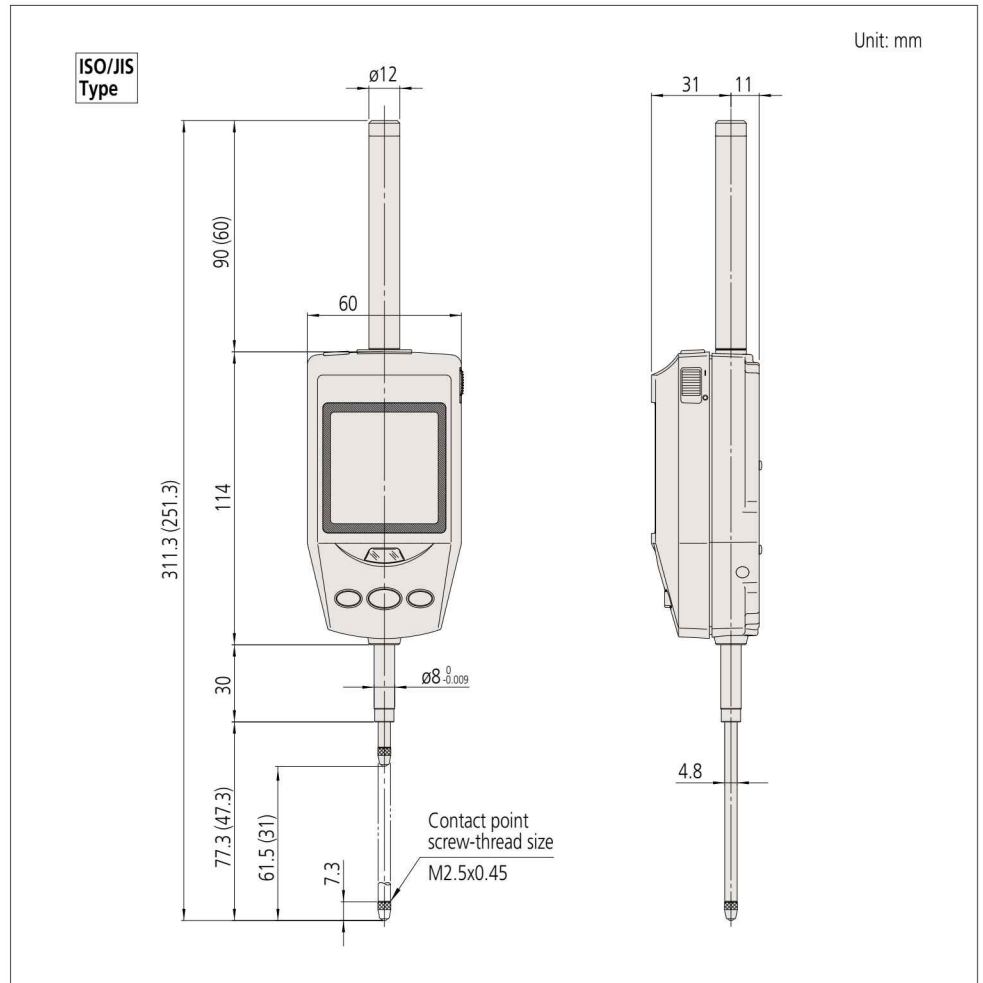
* To denote your AC power cable add the following suffixes to the order No.: **A** for UL/CSA, **D** for CEE, **DC** for CCC, **E** for BS, **K** for KC, **No suffix** is required for JIS/100V

** Quantizing error of ± 1 count is excluded.

Inch/Metric			
Order No.*	Range	Resolution	Accuracy**
543-562	1.2" / 30.4mm	.00002", .00005", .0001",	.00006" / 0.0015mm
543-564	2.4" / 60.9mm	0.0005mm, 0.001mm	.0001" / 0.0025mm

* To denote your AC power cable add the following suffixes to the order No.: **A** for UL/CSA, **D** for CEE, **DC** for CCC, **E** for BS, **K** for KC, **No suffix** is required for JIS/100V

DIMENSIONS



Note 1: Dimensions of the inch (ANSI/AGD Type) dial indicator partly differ from those of the metric (ISO/JIS Type) indicator.

Note 2: Inch (ANSI/AGD Type) dial indicators are provided with a stem of 3/8" dia. and #4-48UNF thread mount for the contact point.

() : for 30.4mm model

Digimatic Indicators

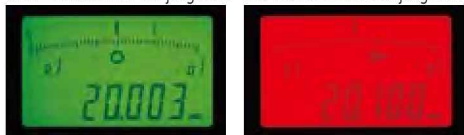
Comparison measuring instruments which ensure high quality, high accuracy and reliability.

ABSOLUTE™ (Refer to page X for details.)

ABSOLUTE Digimatic Indicator ID-F SERIES 543 — with Back-light LCD Screen

- GO/±NG judgment function: If a judgment result shows an out of tolerance condition, the display backlighting changes from green to red.
- An analog bar indicator has been integrated to make upper/lower limit and turnover point reading more comfortable.

Green indication for GO judgment Red indication for ±NG judgment



- With Mitutoyo's ABSOLUTE Linear Encoder technology, once the measurement reference point has been set it will not be lost when the power is turned off. Also, reliability has been increased due to the elimination of over-speed errors.

Note: Regarding origin setting, refer to "Origin Setting of Digimatic Indicators" on page F-18.

- Easy-to-read large LCD readout with the character height of 8.5mm.
- External power supply type: battery change is not necessary. Power can also be supplied via the AC adaptor supplied as a standard accessory.

- The resolution can be switched between 0.001mm / 0.01mm (or .001" / .0005" / .0001" / .00005").
- Equipped with a data output port that enables incorporation into measurement networking and statistical process control systems.

Multi-functional model



SPECIFICATIONS

Metric			
Order No.*	Range	Resolution	Accuracy**
543-551	25mm		0.003mm
543-557	50mm	0.001mm, 0.01mm	0.003mm
543-553	50mm		0.006mm

* To denote your AC power cable add the following suffixes to the order No.: **A** for UL/CSA, **D** for CEE, **DC** for CCC, **E** for BS, **K** for KC, **No suffix** is required for JIS/100V

**Quantizing error of ±1 count is excluded.

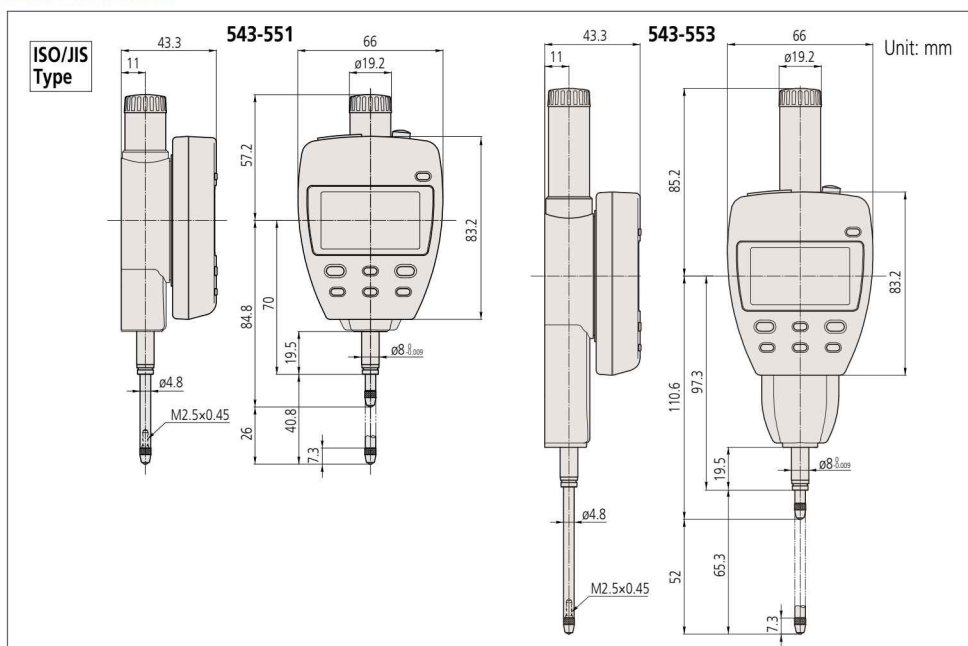
Inch/Metric			
Order No.*	Range	Resolution	Accuracy**
543-552	1" / 25.4mm	.0005", .0001"	.00012" / 0.003mm
543-558	2" / 50.8mm	.0005", .001"	.00012" / 0.003mm
543-554	2" / 50.8mm	0.001mm, 0.01mm	.00024" / 0.006mm

* To denote your AC power cable add the following suffixes to the order No.: **A** for UL/CSA, **D** for CEE, **DC** for CCC, **E** for BS, **K** for KC, **No suffix** is required for JIS/100V

**Quantizing error of ±1 count is excluded.

ISO/JIS type ASME/ANSI/AGD type

DIMENSIONS



Note 1: Dimensions of the inch (ANSI/AGD Type) dial indicator partly differ from those of the metric (ISO/JIS Type) indicator.

Note 2: Inch (ANSI/AGD Type) dial indicators are provided with a stem of 3/8" dia. and #4-48UNF thread mount for the contact point.

Technical Data

Resolution: 0.01mm/0.001mm or .0005"/.0001"/.0005"/.001"/0.001mm/0.01mm

Display: 6-digit LCD, sign, and analog bar with 2-color backlight

Scale type: ABSOLUTE electrostatic linear encoder

Max. response speed: Unlimited

Measuring force: 1.8N or less (25.4mm models)
2.3N or less (50.8mm models)

Spindle orientation: Between the spindle pointing vertically downward to the spindle horizontal

Stem dia.: 8mm (ISO/JIS type) or 3/8" (ANSI/AGD type)

Power supply: 9V DC (via AC adaptor) **06AEG302**

Lifting lever: **137693**

* To denote your AC power cable add the following suffixes to the order No.: **A** for UL/CSA, **D** for CEE, **DC** for CCC, **E** for BS, **K** for KC, **No suffix** is required for JIS/100V

Functions

Preset, Zeroreset, GO/±NG judgment, Max/Min value hold, Runout measurement, Resolution switching, Counting direction switching, Power ON/OFF, Data output, inch/mm conversion (inch/mm models)

Alarm: Counting value composition error, Overflow error, Tolerance limit setting error

Optional Accessories

• Lifting cable: **No.540774** (stroke 25.4mm)

• Auxiliary spindle spring:
No.02ACA571 (25.4mm/1" models)*
No.02ACA773 (50.8mm/2" models)*

• Lug-on-center back:
No.101040 (ISO/JIS type)
No.101306 (ASME/ANSI/AGD type)

* Required when orienting the indicator upside down.

• SPC cable:
No.936937 (1m)

No.965014 (2m)

• USB Input Tool Direct (2m) : **No.06ADV380F**

• Connecting Cables for U-WAVE-T (160mm) :

No.02AZD790D

For footswitch: **No.02AZE140D**

Refer to page F-60 for details.

• Digimatic Mini-Processor DP-1VR: **264-504**

• Contact points for Mitutoyo's dial indicators *4

• Interchangeable backs for Series 2 models*5

• Measuring stands

* 4 Refer to pages F-46 to F-49 for details.

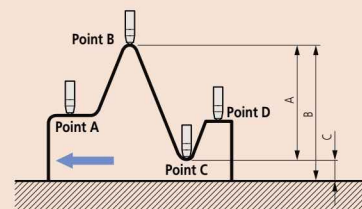
* 5 Refer to page F-50 for details.

Application

Difference/Runout measurement

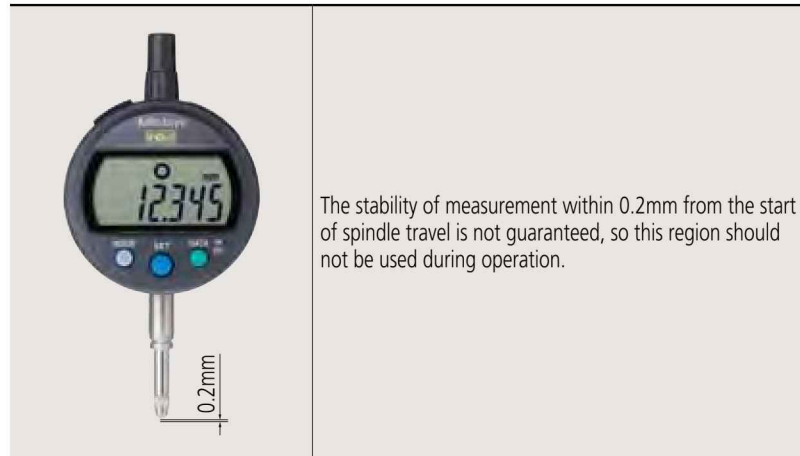
Example: Indicator travel from points A to D

Difference (or Total Runout) is displayed as A. Dimensions B (maximum value) and C (minimum value) can be recalled from memory with a simple key sequence.



Supplemental information on Digimatic Indicators

Origin setting of Digimatic Indicators



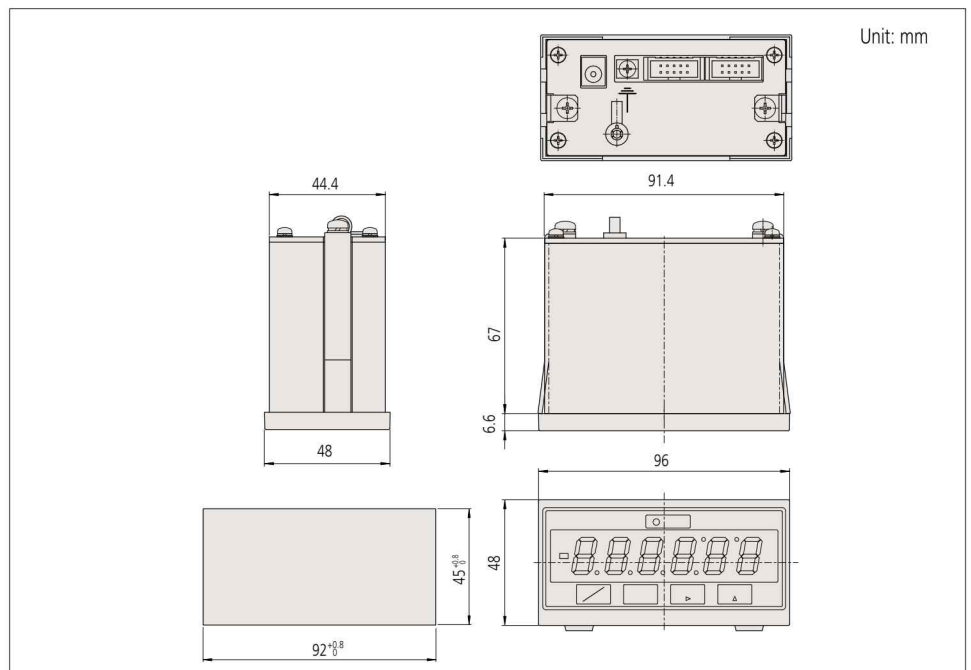
EC Counter SERIES 542 — Low-cost, Modular Type Display Unit



542-007

- 3 steps of limit setting value can be displayed.
- Can be set to produce either tolerance judgment output or Digimatic output.
- Small size (96 x 48mm) which conforms to DIN standards.
- Refer to page G-21 for details.

DIMENSIONS



Dial Indicators

Comparison measuring instruments which ensure high quality, high accuracy and reliability.

Dial Indicators

Mitutoyo's dial indicators have long been used by many of our customers. In full recognition of their needs, we have devoted ourselves to the research and development necessary to produce high-quality and high-accuracy dial indicators. Due to the recent re-acknowledgement of the importance of measurement technologies, the demands on dial indicators are many and varied: installation in measuring jigs, mounting in countless types of precision equipment, etc. We offer numerous models with various types of dial faces, measuring ranges, graduation styles and environmental resistance ratings. The stems, which ensure the fixture reliability, and the spindles, which are the basis of accuracy, have excellent resistance against hard use thanks to the hardened stainless steel construction. 0.01mm resolution dial indicators have a grand gear made of stainless steel with high resistance to wear and deformation. 0.001mm graduation dial indicators employ a sector gear made of a special alloy in order to further increase the resistance to wear. S-type dial indicators employ an O-ring to ensure the air tightness between the outer frame and the crystal case in order to prevent water or oil penetration. Important factors in choosing a dial indicator: the size (bezel diameter), resolution (graduation) and measuring range. Use the table on the right to help choose a suitable model for your application.



Parts of a dial indicator

Feature icons

Icon	Feature description
	Continuous scale
	Balanced scale
	Reverse reading type, Suitable for depth and step measurement.
	One revolution type for easy and error-free reading
	Double scale spacing type, easy-on-the-eyes
	Shockproof
	Waterproof (IP63)
	Waterproof (IP64)
	With damper at lowest rest point
	Jeweled bearing
	Peak retaining
	Dustproof
	With coaxial revolution counter
	Back plunger
	Adjustable hand

*Mitutoyo produces ASME-compatible products. Contact us for details.

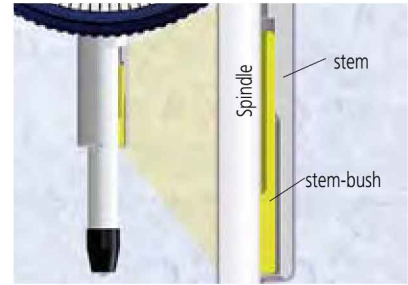
FEATURES: S Series (Series 2, 3, 4)



- No through screw-holes on the frame for high oil- and dust-resistance. The bezel clamp can be attached either to the right or left side.
- Improved Impact- and oil-resistant materials are employed in the outer frame. Easier reading is due to the improved shape of the crystal face.



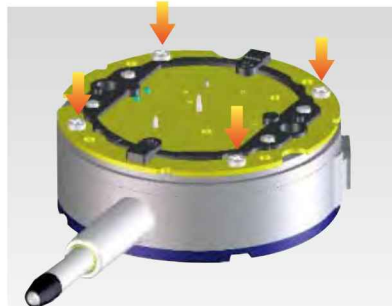
- The spindle lifting lever (optional: 21AZB149) can be attached to either the right or left side providing high operability and smooth movement. This lever can be easily installed and removed without tools.



- Revolutionary stem-bush design for trouble-free stem clamping (longer clamping range; maximum tightening torque at the clamping point with M5 screw: 150N-cm).



- Limit markers (1) can be moved without interfering with the clamp (2).



- Greater rigidity in the bearing plate for reduced retrace error (20%) and 4-screw mounting for increased impact resistance.

Dial Indicators

Comparison measuring instruments which ensure high quality, high accuracy and reliability.



An inspection certificate is supplied as standard. Refer to page X for details.

SERIES 2 — Standard Type, 0.01mm Graduation

- Standard 0.01mm graduation dial gages having a bezel with an outside diameter of 57mm. All types come with limit markers and a bezel clamp as standard.
- The bezel clamp and lifting lever (optional) can be attached to either the right or left side. These parts can be easily installed and removed without tools.
- Secure adhesion between the bezel and crystal as well as the use of an O-ring prevents water or oil penetration.
- The spindle is made of high-strength quench-hardened stainless steel suitable for heavy-duty use.
- A carbide contact point is used.
- The grand gear is made of stainless steel with high resistance to wear and deformation.
- Application of a hard coating on the surface of the crystal makes the gage highly scratch- and chemical-resistant.



20465



Continuous scale



Graduation: 0.01mm,
Measuring range: 10mm

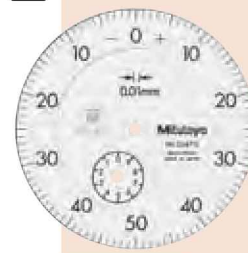
20465

20465-09

Shockproof type



Balanced scale



Graduation: 0.01mm,
Measuring range: 10mm

20475



Reverse reading type. Suitable for depth and step measurement.



Graduation: 0.01mm,
Measuring range: 10mm

29025



Continuous scale



Graduation: 0.01mm,
Measuring range: 10mm

2310S-10

With coaxial revolution counter

Jeweled bearing type



Continuous scale



Graduation: 0.01mm,
Measuring range: 5mm

20445

20445-09

Shockproof



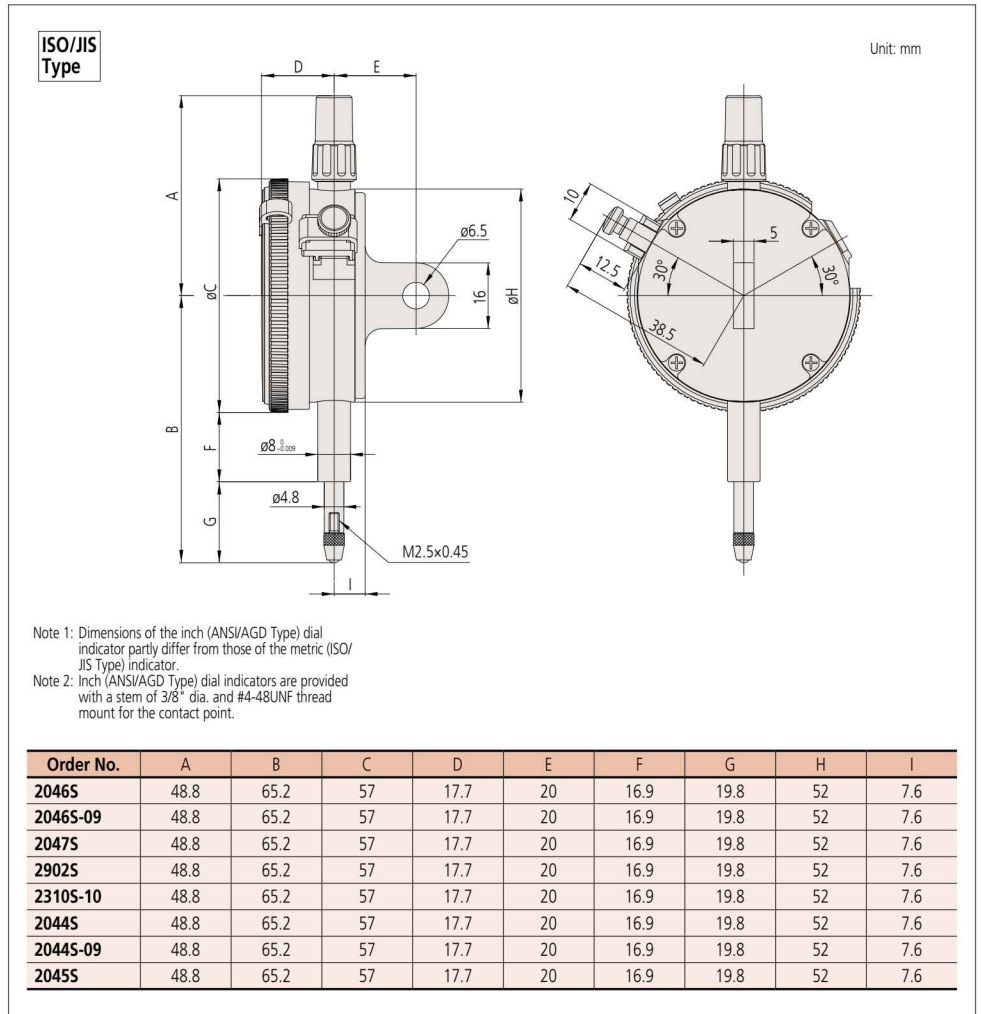
Balanced scale



Graduation: 0.01mm,
Measuring range: 5mm

20455

DIMENSIONS



FEATURES

Metric									
Order No.	w/ lug	Flat-back	30° Rev	10° Rev	30° Rev	30° Rev	CS	Diamond	30° Rev
2046S	2046SB	✓	—	—	—	—	—	—	—
2046S-09	2046SB-09	✓	—	—	✓	—	—	—	—
2047S	2047SB	—	✓	—	—	—	—	—	—
2902S	2902SB	—	—	✓	—	—	—	—	✓
2310S-10	2310SB-10	✓	—	—	—	—	—	✓	✓
2044S	2044SB	✓	—	—	—	—	—	—	—
2044S-09	2044SB-09	✓	—	—	✓	—	—	—	—
2045S	2045SB	—	✓	—	—	—	—	—	—

SPECIFICATIONS

Metric										ISO/JIS type		
Order No.	w/ lug	Flat-back	Graduation	Range (range/rev)	Accuracy				Repeat-ability	Dial reading	Measuring force	
				Overall	Retrace	1/10 Rev	1 Rev					
2046S	2046SB	0.01mm	10mm (1mm)	13μm	3μm	5μm	10μm	3μm	±0-100	1.4N or less		
2046S-09	2046SB-09	0.01mm	10mm (1mm)	15μm	3μm	5μm	10μm	3μm	±0-100	1.4N or less		
2047S	2047SB	0.01mm	10mm (1mm)	13μm	3μm	5μm	10μm	3μm	0-50-0	1.4N or less		
2902S	2902SB	0.01mm	10mm (1mm)	13μm	3μm	5μm	10μm	3μm	100-0	1.4N or less		
2310S-10	2310SB-10	0.01mm	10mm (1mm)	15μm	3μm	5μm	10μm	3μm	±0-100	1.4N or less		
2044S	2044SB	0.01mm	5mm (1mm)	12μm	3μm	5μm	10μm	3μm	±0-100	1.4N or less		
2044S-09	2044SB-09	0.01mm	5mm (1mm)	12μm	3μm	5μm	10μm	3μm	±0-100	1.4N or less		
2045S	2045SB	0.01mm	5mm (1mm)	12μm	3μm	5μm	10μm	3μm	0-50-0	1.4N or less		

* Completed products inspection is performed in the vertical position (contact point downward) and the stated accuracy is guaranteed.

Dial Indicators

Comparison measuring instruments which ensure high quality, high accuracy and reliability.



An inspection certificate is supplied as standard. Refer to page X for details.

SERIES 2 — Standard Type, 0.001mm & 0.005mm Graduation

- Standard 0.001mm and 0.005mm graduation dial indicators having a bezel with an outside diameter of $\varnothing 57\text{mm}$. All types come with limit markers and a bezel clamp.
- The outer clamp and lifting lever (optional) can be attached to either the right or left side. These parts can be easily installed and removed without tools.
- Secure adhesion between the bezel and crystal as well as the use of an O-ring prevents water or oil penetration.
- The spindle is made of high-strength quench-hardened stainless steel which resists arduous use.
- A carbide contact point is used.
- A special alloy is used for the sector gears to provide improved wear resistance.
- The indicator uses jeweled bearings, providing excellent indication sensitivity and durability.
- Application of a hard coating on the surface of the crystal makes the gauge highly scratch- and chemical-resistant.



2109S-10



Balanced scale



Graduation: 0.001mm,
Measuring range: 1mm

2109S-10

Shockproof type
 Jeweled bearing type



Continuous scale



Graduation: 0.001mm,
Measuring range: 1mm

2110S-10

Double scale spacing type
 Shockproof type
 Jeweled bearing type



Balanced scale



Graduation: 0.001mm,
Measuring range: 2mm

2113S-10

Shockproof type
 Jeweled bearing type



Continuous scale



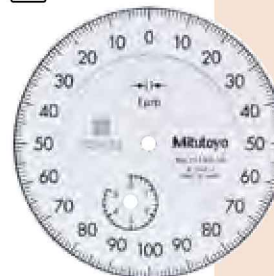
Graduation: 0.001mm,
Measuring range: 5mm

2118S-10

Jeweled bearing type



Balanced scale



Graduation: 0.001mm,
Measuring range: 5mm

2119S-10

Jeweled bearing type



Continuous scale

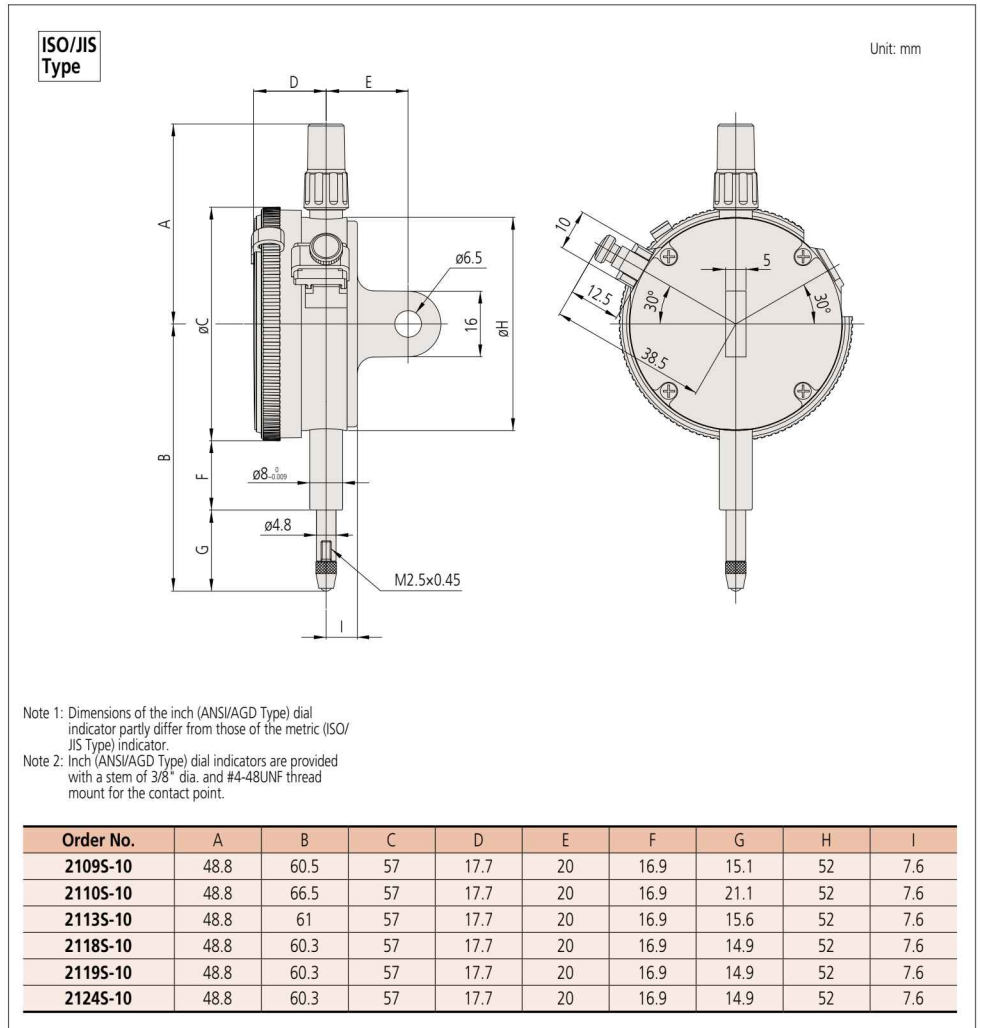


Graduation: 0.005mm,
Measuring range: 5mm

2124S-10

Jeweled bearing type

DIMENSIONS



FEATURES

Metric		30°	45°	60°	75°	90°	120°
Order No.	w/ lug	Flat-back	30°	45°	60°	75°	90°
2109S-10	2109SB-10	—	✓	✓	—	✓	—
2110S-10	2110SB-10	✓	—	✓	—	✓	✓
2113S-10	2113SB-10	—	✓	✓	—	✓	—
2118S-10	2118SB-10	✓	—	—	—	✓	—
2119S-10	2119SB-10	—	✓	—	—	✓	—
2124S-10	2124SB-10	✓	—	—	—	✓	—

SPECIFICATIONS

Metric		ISO/JIS type									
Order No.	w/ lug	Flat-back	Graduation	Range (range/rev)	Accuracy				Repeatability	Dial reading	Measuring force
					Overall	Retrace	1/10 Rev	1 Rev			
2109S-10	2109SB-10	0.001mm	1mm (0.2mm)	5μm	2μm	2μm	4μm	0.5μm	0-100-0	1.5N or less	
2110S-10	2110SB-10	0.001mm	1mm (0.1mm)	5μm	2μm	2μm	4μm	0.5μm	±0-100	1.8N or less	
2113S-10	2113SB-10	0.001mm	2mm (0.2mm)	7μm	2μm	2μm	5μm	0.5μm	0-100-0	1.5N or less	
2118S-10	2118SB-10	0.001mm	5mm (0.2mm)	10μm	3μm	3.5μm	6μm	1μm	0-100-100	1.5N or less	
2119S-10	2119SB-10	0.001mm	5mm (0.2mm)	10μm	3μm	3.5μm	6μm	1μm	0-100-0	1.5N or less	
2124S-10	2124SB-10	0.005mm	5mm (0.5mm)	12μm	3μm	5μm	9μm	3μm	±0-50	1.5N or less	

* Completed products inspection is performed in the vertical position (contact point downward) and the stated accuracy is guaranteed.

Dial Indicators

Comparison measuring instruments which ensure high quality, high accuracy and reliability.



An inspection certificate is supplied as standard. Refer to page X for details.

SERIES 2 — Waterproof Type, 0.01mm & 0.001mm Graduation

- Waterproof type dial gages having a bezel with an outside diameter of 57mm. All types come with limit markers and a bezel clamp as standard.
- The bezel clamp can be attached to either the right or left side. These parts can be easily installed and removed without tools.
- The stem and spindle are made of high-strength quench-hardened stainless steel suitable for heavy-duty use.
- A carbide contact point is used.
- Application of a hard coating on the surface of the crystal makes the gage highly scratch- and chemical-resistant.



20465-60

Continuous scale



Graduation: 0.01mm, Measuring range: 10mm **Waterproof**

Continuous scale

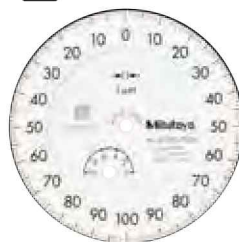


Graduation: 0.01mm, Measuring range: 5mm **Waterproof**



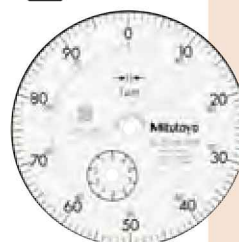
21095-70

Balanced scale



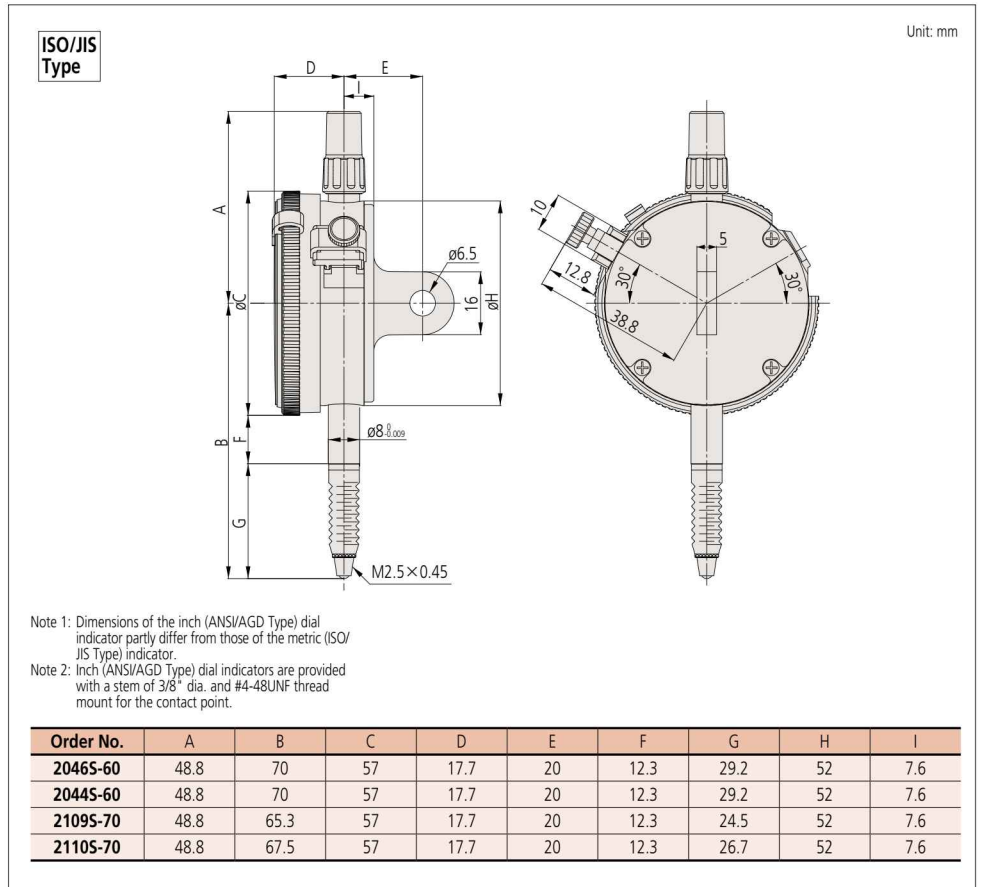
Graduation: 0.001mm, Measuring range: 1mm **Waterproof**
 Shockproof
 Jeweled bearing

Continuous scale



Graduation: 0.001mm, Measuring range: 1mm **Waterproof**
 Double scale spacing
 Shockproof
 Jeweled bearing

DIMENSIONS



FEATURES

Metric							
Order No.							
w/ lug	Flat-back						
2046S-60	2046SB-60	✓	—	—	✓	—	—
2044S-60	2044SB-60	✓	—	—	✓	—	—
2109S-70	2109SB-70	—	✓	✓	✓	✓	—
2110S-70	2110SB-70	✓	—	✓	✓	✓	✓

SPECIFICATIONS

Metric		ISO/JIS type								
Order No.		Graduation	Range (range/rev)	Accuracy			Repeat-ability	Dial reading	Measuring force	
w/ lug	Flat-back			Overall	Retrace	1/10 Rev				1 Rev
2046S-60	2046SB-60	0.01mm	10mm (1mm)	13µm	3µm	5µm	10µm	3µm	±0-100	2.5N or less
2044S-60	2044SB-60	0.01mm	5mm (1mm)	12µm	3µm	5µm	10µm	3µm	±0-100	2.5N or less
2109S-70	2109SB-70	0.001mm	1mm (0.2mm)	5µm	2µm	2µm	4µm	0.5µm	0-100-0	2.0N or less
2110S-70	2110SB-70	0.001mm	1mm (0.1mm)	5µm	2µm	2µm	4µm	0.5µm	±0-100	2.0N or less

* Completed products inspection is performed in the vertical position (contact point downward) and the stated accuracy is guaranteed.

Dial Indicators

Comparison measuring instruments which ensure high quality, high accuracy and reliability.




SERIES 2 — Standard Type, Inch Reading

SPECIFICATIONS

Inch		ANSI/AGD type						
Order No.		Graduation	Range (range/rev)	Accuracy		Repeat-ability	Dial reading	Measuring force
w/ lug	Flat-back			First 1 Rev / 2.5 Rev / 10 Rev	Retrace			
2414S	2414SB	.001"	.5" (.1")	±.001" / ±.001" / ±.001"	.0002"	±.0002"	±0-100	1.8N or less
2415S	2415SB	.001"	.5" (.1")	±.001" / ±.001" / ±.001"	.0002"	±.0002"	0-50-0	1.8N or less
2914S	2914SB	.001"	.5" (.1")	±.001" / ±.001" / ±.001"	.0002"	±.0002"	100-0	1.8N or less
2506S	2506SB	.0005"	.125" (.05")	±.0005" / ±.0005" / —	.00016"	±.0001"	±0-50	1.8N or less
2507S	2507SB	.0005"	.125" (.05")	±.0005" / ±.0005" / —	.00016"	±.0001"	0-25-0	1.8N or less
2514S	2514SB	.0005"	.5" (.05")	±.0005" / ±.0005" / ±.0015"	.00016"	±.0001"	±0-50	1.8N or less
2922S	2922SB	.0005"	.125" (.05")	±.0005" / ±.0005" / —	.00016"	±.0001"	0-25-0	1.8N or less
2356S-10	2356SB-10	.0001"	.25" (.01")	±.0002" / ±.0002" / ±.0003" ±.0004" (First 20rev) / ±.0005" (Over 20rev)	.0001"	±.00003"	0-10	2.0N or less
2358S-10	2358SB-10	.0001"	.5" (.01")	±.0002" / ±.0002" / ±.0003" ±.0004" (First 20rev) / ±.0008" (Over 20rev)	.00015"	±.00003"	0-10	2.0N or less
2802S-10	2802SB-10	.0001"	.025" (.01")	±.0001" / ±.0001" / —	.0001"	±.00003"	0-10	2.0N or less
2803S-10	2803SB-10	.0001"	.025" (.01")	±.0001" / ±.0001" / —	.0001"	±.00003"	0-5-0	2.0N or less
2804S-10	2804SB-10	.0001"	.05" (.01")	±.0001" / ±.0001" / ±.0002"	.0001"	±.00003"	0-10	2.0N or less
2805S-10	2805SB-10	.0001"	.05" (.01")	±.0001" / ±.0001" / ±.0002"	.0001"	±.00003"	0-5-0	2.0N or less
2905S-10	2905SB-10	.0001"	.05" (.01")	±.0001" / ±.0001" / ±.0002"	.0001"	±.00003"	10-0	2.0N or less
2923S-10	2923SB-10	.0001"	.05" (.01")	±.0001" / ±.0001" / ±.0002"	.0001"	±.00003"	0-5-0	2.0N or less

* Completed products inspection is performed in the vertical position (contact point downward) and the stated accuracy is guaranteed.

FEATURES

Inch				
Order No.				
w/ lug	Flat-back			
2414S	2414SB	—	—	—
2415S	2415SB	—	—	—
2914S	2914SB	—	✓	—
2506S	2506SB	—	—	—
2507S	2507SB	—	—	—
2514S	2514SB	—	—	—
2922S	2922SB	—	—	—
2356S-10	2356SB-10	—	—	✓
2358S-10	2358SB-10	—	—	✓
2802S-10	2802SB-10	✓	—	✓
2803S-10	2803SB-10	✓	—	✓
2804S-10	2804SB-10	✓	—	✓
2805S-10	2805SB-10	✓	—	✓
2905S-10	2905SB-10	✓	✓	✓
2923S-10	2923SB-10	✓	—	✓



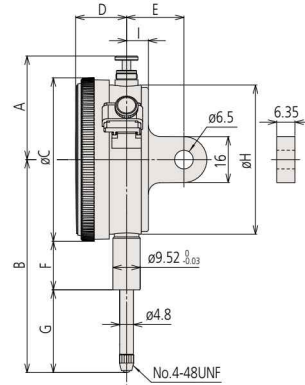
An inspection certificate is supplied as standard. Refer to page X for details.

Optional Accessories

- : Backs (See page F-55.)
- : Contact points (See page F-51 to F-54.)

DIMENSIONS

ANSI/AGD
Type



Unit: mm

Order No.	A	B	C	D	E	F	G	H	I
2414S	38.9	64.1	57	17.7	19	13.6	22	52	7.6
2415S	38.9	64.1	57	17.7	19	13.6	22	52	7.6
2914S	38.9	64.1	57	17.7	19	13.6	22	52	7.6
2506S	48.8	54.3	57	17.7	19	13.6	12.2	52	7.6
2507S	48.8	54.3	57	17.7	19	13.6	12.2	52	7.6
2514S	38.9	64.1	57	17.7	19	13.6	22	52	7.6
2922S	48.8	54.3	57	17.7	19	13.6	12.2	52	7.6
2356S-10	48.8	57.2	57	17.7	19	13.6	15.1	52	7.6
2358S-10	38.9	63.6	57	17.7	19	13.6	21.5	52	7.6
2802S-10	48.8	51.4	57	17.7	19	13.6	9.3	52	7.6
2803S-10	48.8	51.4	57	17.7	19	13.6	9.3	52	7.6
2804S-10	48.8	51.7	57	17.7	19	13.6	9.6	52	7.6
2805S-10	48.8	51.7	57	17.7	19	13.6	9.6	52	7.6
2905S-10	48.8	51.7	57	17.7	19	13.6	9.6	52	7.6
2923S-10	48.8	51.7	57	17.7	19	13.6	9.6	52	7.6

Dial Indicators

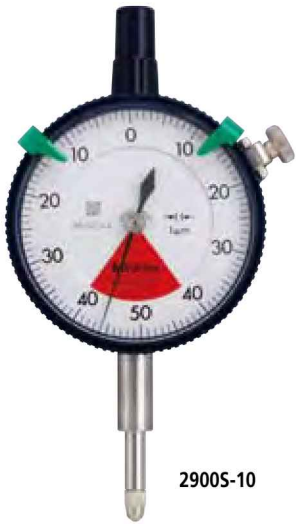
Comparison measuring instruments which ensure high quality, high accuracy and reliability.



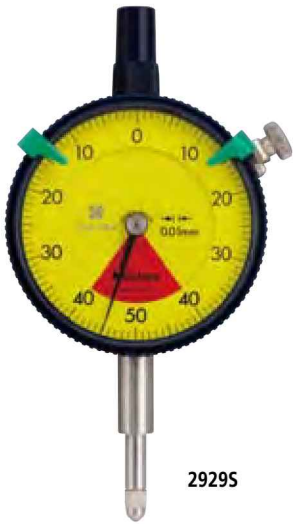
An inspection certificate is supplied as standard. Refer to page X for details.

SERIES 2 — Standard One Revolution Type for Error-free Reading

- Mitutoyo's unique shock-proof mechanism is incorporated, providing improved resistance to shock due to sudden spindle retraction caused by impact.
- This series has been developed to eliminate the possibility of reading errors due to miscounting multiple revolutions.
- The dead zone in red indicates "accuracy not guaranteed".



2900S-10



2929S

One revolution type Back plunger dial gages are also available. (Refer to pages F-49 to F-50 for details.)



2990T-10

Balanced scale



Graduation: 0.001mm,
Measuring range: 0.08mm

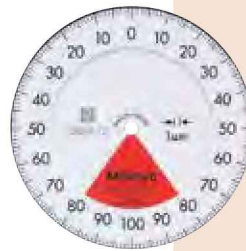
2900S-10

- One revolution
- Shockproof
- Jeweled bearing

2900S-72

- One revolution
- Shockproof
- Dustproof
- Jeweled bearing

Balanced scale



Graduation: 0.001mm,
Measuring range: 0.16mm

2901S-10

- One revolution
- Shockproof
- Jeweled bearing

Balanced scale

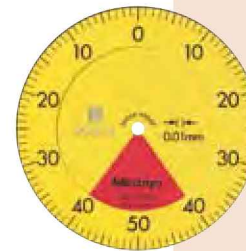


Graduation: 0.1mm,
Measuring range: 4mm

2928S

- One revolution
- Shockproof

Balanced scale

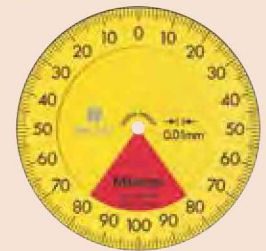


Graduation: 0.01mm,
Measuring range: 0.8mm

2929S

- One revolution
- Shockproof
- 2929S-62**
- One revolution
- Shockproof
- Dustproof

Balanced scale



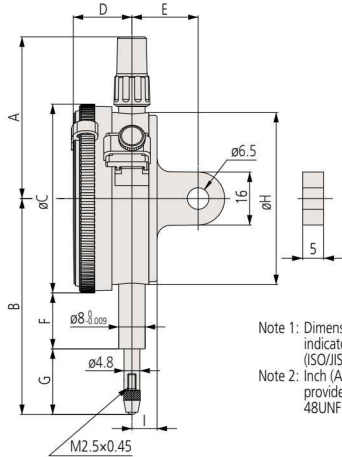
Graduation: 0.01mm,
Measuring range: 1.6mm

2959S

- One revolution
- Shockproof

DIMENSIONS

ISO/JIS Type

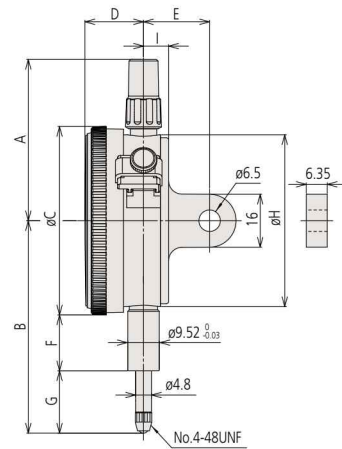


Note 1: Dimensions of the inch (ANSI/AGD Type) dial indicator partly differ from those of the metric (ISO/JIS Type) indicator.
 Note 2: Inch (ANSI/AGD Type) dial indicators are provided with a stem of 3/8" dia. and #4-48UNF thread mount for the contact point.

Order No.	A	B	C	D	E	F	G	H	I
2928S	48.8	65.2	57	17.7	20	16.9	19.8	52	7.6
2929S	48.8	65.2	57	17.7	20	16.9	19.8	52	7.6
2929S-62	48.8	65.2	57	17.7	20	16.9	19.8	52	7.6
2959S	48.8	65.2	57	17.7	20	16.9	19.8	52	7.6
2900S-10	48.8	66	57	17.7	20	16.9	20.6	52	7.6
2900S-72	48.8	66	57	17.7	20	16.9	20.6	52	7.6
2901S-10	48.8	66.1	57	17.7	20	16.9	20.7	52	7.6

ANSI/AGD Type

Unit: mm



Order No.	A	B	C	D	E	F	G	H	I
2909S-62	48.8	51.9	57	17.7	19	13.6	9.8	52	7.6
2910S-10	48.8	51.2	57	17.7	19	13.6	9.1	52	7.6

FEATURES

Metric

Order No.		ISO/JIS	6E	Waterproof	Diamond	—	—
w/ lug	Flat-back						
2928S	2928SB	✓	—	—	—	—	—
2929S	2929SB	✓	—	—	—	—	—
2929S-62	2929SB-62	✓	—	✓	—	—	—
2959S	2959SB	✓	—	—	—	—	—
2900S-10	2900SB-10	✓	—	—	✓	—	—
2900S-72	2900SB-72	✓	—	✓	✓	—	—
2901S-10	2901SB-10	✓	—	—	✓	—	—

Inch

Order No.		ISO/JIS	6E	Waterproof	Diamond	—	—
w/ lug	Flat-back						
2909S-62	2909SB-62	✓	—	✓	—	—	—
2910S-10	2910SB-10	✓	—	—	✓	—	—

SPECIFICATIONS

Metric

ISO/JIS type

Order No.		Graduation	Range (range/rev)	Accuracy				Repeatability	Dial reading	Measuring force
w/ lug	Flat-back			Overall	Retrace	1/10 Rev	1 Rev			
2928S	2928SB	0.1mm	4mm (5mm)	40µm	20µm	20µm	—	20µm	2-0-2	1.4N or less
2929S	2929SB	0.01mm	0.8mm (1mm)	8µm	3µm	5µm	—	3µm	40-0-40	1.4N or less
2929S-62	2929SB-62	0.01mm	0.8mm (1mm)	8µm	3µm	5µm	—	3µm	40-0-40	2.0N or less
2959S	2959SB	0.01mm	1.6mm (2mm)	10µm	3µm	5µm	—	3µm	80-0-80	1.4N or less
2900S-10	2900SB-10	0.001mm	0.08mm (0.1mm)	3µm	2µm	2µm	—	0.5µm	40-0-40	1.5N or less
2900S-72	2900SB-72	0.001mm	0.08mm (0.1mm)	3µm	2µm	2µm	—	0.5µm	40-0-40	2.0N or less
2901S-10	2901SB-10	0.001mm	0.16mm (0.2mm)	4µm	2µm	2µm	—	0.5µm	80-0-80	1.5N or less

* Completed products inspection is performed in the vertical position (contact point downward) and the stated accuracy is guaranteed.

Inch

ANSI/AGD type

Order No.		Graduation	Range (range/rev)	Accuracy		Repeatability	Dial reading	Measuring force
w/ lug	Flat-back			First 1 Rev / 2.5 Rev / 10 Rev	Retrace			
2909S-62	2909SB-62	.0005"	.04" / .05"	±.0005" / — / —	.00016"	±.0001"	20-0-20	2.5N or less
2910S-10	2910SB-10	.0001"	.008" / .01"	±.0001" / — / —	.0001"	±.00003"	4-0-4	1.8N or less

* Completed products inspection is performed in the vertical position (contact point downward) and the stated accuracy is guaranteed.

Dial Indicators

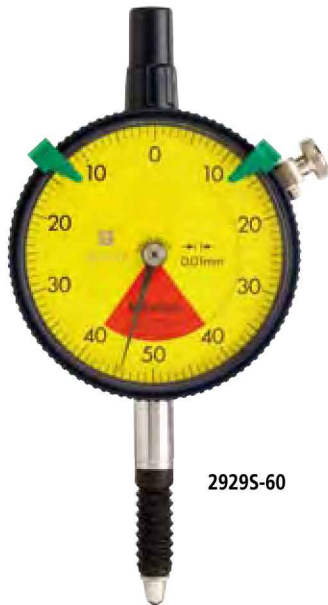
Comparison measuring instruments which ensure high quality, high accuracy and reliability.

SERIES 2 — Standard One Revolution Type for Error-free Reading, Waterproof Type

- Mitutoyo's unique shock-proof mechanism is incorporated, providing improved resistance to shock due to sudden spindle retraction caused by impact.
- This series has been developed to eliminate the possibility of reading errors due to miscounting multiple revolutions.
- The dead zone in red indicates "accuracy not guaranteed".
- One revolution type Back plunger dial gages are also available. (Refer to pages F-44 to F-45 for details.)



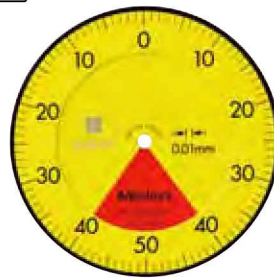
An inspection certificate is supplied as standard. Refer to page X for details.



2929S-60



Balanced scale



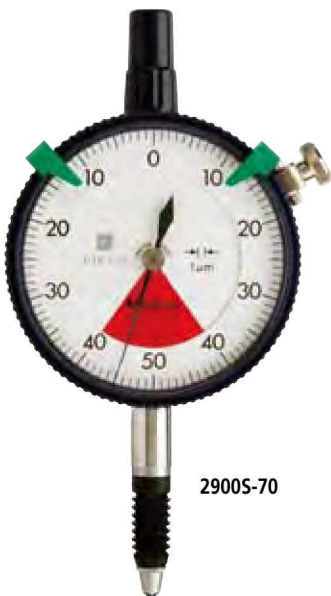
Graduation: 0.01mm,
Measuring range: 0.8mm

2929S-60

One revolution

Shockproof

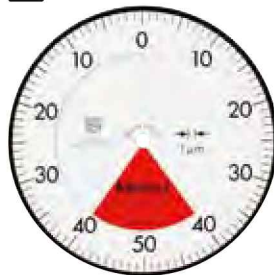
Waterproof



2900S-70



Balanced scale



Graduation: 0.001mm,
Measuring range: 0.08mm

2900S-70

One revolution

Shockproof

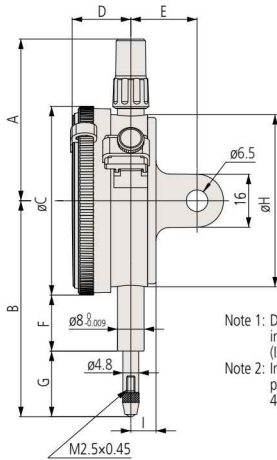
Waterproof

Jeweled bearing

F

DIMENSIONS

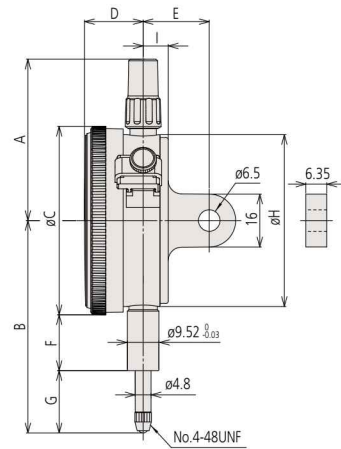
ISO/JIS Type



Note 1: Dimensions of the inch (ANSI/AGD Type) dial indicator partly differ from those of the metric (ISO/JIS Type) indicator.
 Note 2: Inch (ANSI/AGD Type) dial indicators are provided with a stem of 3/8" dia. and #4-48UNF thread mount for the contact point.

Order No.	A	B	C	D	E	F	G	H	I
2929S-60	48.8	70	57	17.7	20	12.3	29.2	52	7.6
2900S-70	48.8	67	57	17.7	20	12.3	26.2	52	7.6

ANSI/AGD Type



Unit: mm

Order No.	A	B	C	D	E	F	G	H	I
2910S-72	48.8	51.2	57	17.7	19	13.6	9.1	52	7.6

FEATURES

Metric

Order No.		Flat-back	3	60	Light	Diamond	—	—
2929S-60	2929SB-60	✓	✓	—	—	—	—	—
2900S-70	2900SB-70	✓	✓	—	✓	—	—	—

Inch

Order No.		Flat-back	3	60	Light	Diamond	—	—
2910S-72	2910SB-72	✓	✓	✓	✓	—	—	—

SPECIFICATIONS

Metric

Order No.		Graduation	Range (range/rev)	Accuracy				Repeatability	Dial reading	Measuring force
w/ lug	Flat-back			Overall	Retrace	1/10 Rev	1 Rev			
2929S-60	2929SB-60	0.01mm	0.8mm (1mm)	8µm	3µm	5µm	—	3µm	40-0-40	2.0N or less
2900S-70	2900SB-70	0.001mm	0.08mm (0.1mm)	3µm	2µm	2µm	—	0.5µm	40-0-40	2.0N or less

* Completed products inspection is performed in the vertical position (contact point downward) and the stated accuracy is guaranteed.

Inch

Order No.		Graduation	Range (range/rev)	Accuracy		Repeatability	Dial reading	Measuring force
w/ lug	Flat-back			First 1 Rev / 2.5 Rev / 10 Rev	Retrace			
2910S-72	2910SB-72	.0001"	.008" / .01"	±.0001" / — / —	.0001"	±.00003"	4-0-4	2.5N or less

* Completed products inspection is performed in the vertical position (contact point downward) and the stated accuracy is guaranteed.

Dial Indicators

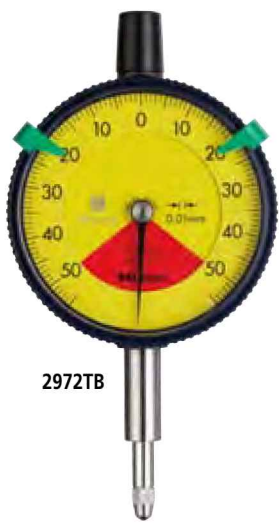
Comparison measuring instruments which ensure high quality, high accuracy and reliability.

SERIES 2 — Standard One Revolution Type for Error-free Reading, Lightweight Type

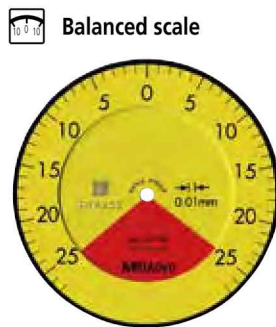
- Excellent water- and drip-proof characteristics (IP43).
- Smooth movement thanks to the improved design of bush and stem.
- Application of a hard coating on the surface of the crystal makes the gage scratch- and oil-resistant.
- Lightweight type (70g).



An inspection certificate is supplied as standard. Refer to page X for details.



2972TB

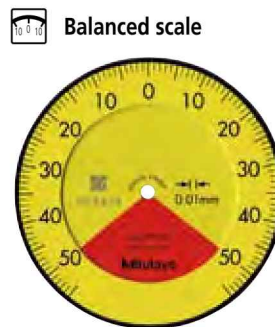


Balanced scale

Graduation: 0.01mm,
Measuring range: 0.5mm

2971TB

- One revolution**
- Shockproof**
- Dustproof**

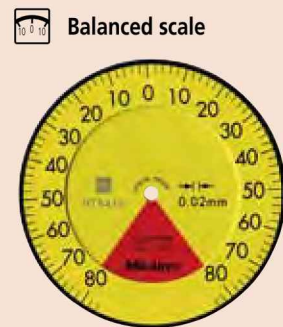


Balanced scale

Graduation: 0.01mm,
Measuring range: 1mm

2972TB

- One revolution**
- Shockproof**
- Dustproof**



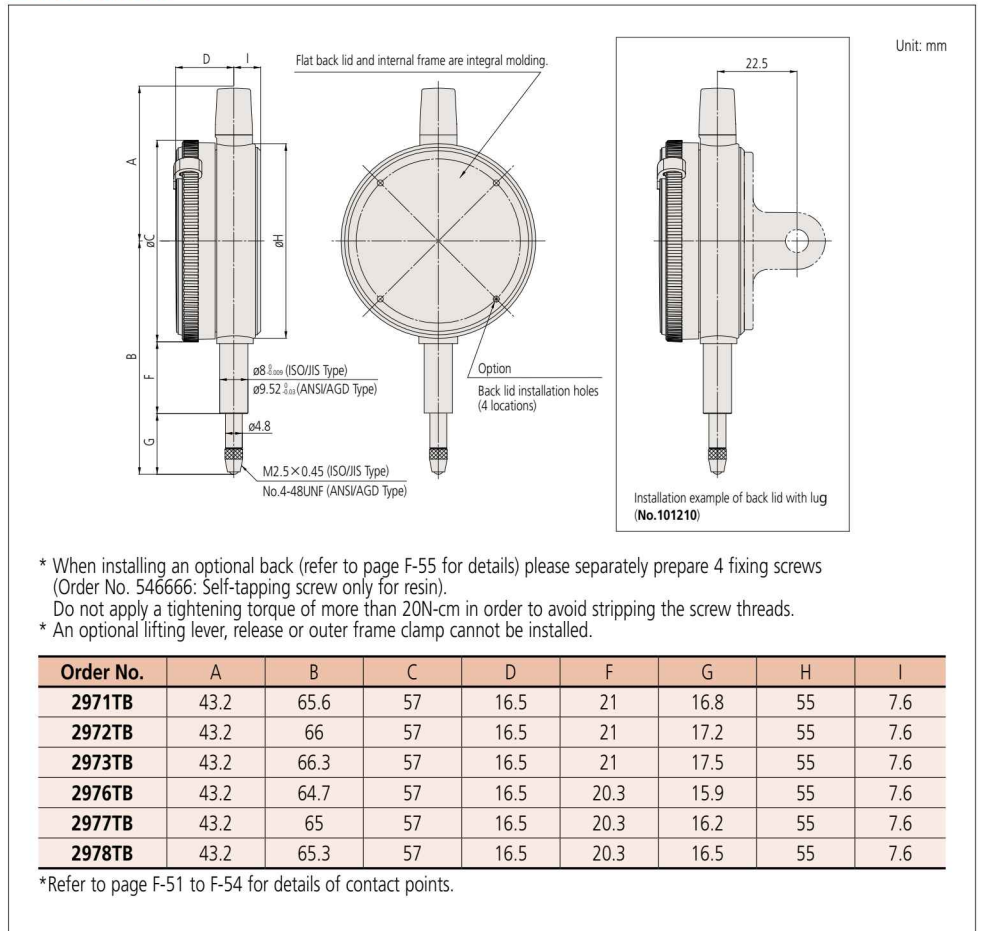
Balanced scale

Graduation: 0.02mm,
Measuring range: 1.6mm

2973TB

- One revolution**
- Shockproof**
- Dustproof**

DIMENSIONS



FEATURES

Metric					
Order No.	Flat-back				
w/ lug					
— 2971TB	✓	✓	✓	✓	✓
— 2972TB	✓	✓	✓	✓	✓
— 2973TB	✓	✓	✓	✓	✓

Inch					
Order No.	Flat-back				
w/ lug					
— 2976TB	✓	✓	✓	✓	✓
— 2977TB	✓	✓	✓	✓	✓
— 2978TB	✓	✓	✓	✓	✓

SPECIFICATIONS

Metric				Accuracy				Repeat-ability	Dial reading	Measuring force
Order No.	Flat-back	Graduation	Range (range/rev)	Overall	Retrace	1/10 Rev	1 Rev			
— 2971TB	0.01mm	0.5mm (0.7mm)	8µm	3µm	5µm	—	3µm	25-0-25	1.4N or less	
— 2972TB	0.01mm	1mm (1.4mm)	8µm	3µm	5µm	—	3µm	50-0-50	1.4N or less	
— 2973TB	0.02mm	1.6mm (2mm)	16µm	6µm	8µm	—	5µm	80-0-80	1.4N or less	

* Completed products inspection is performed in the vertical position (contact point downward) and the stated accuracy is guaranteed.

Inch				Accuracy		Repeat-ability	Dial reading	Measuring force
Order No.	Flat-back	Graduation	Range (range/rev)	First 1 Rev / 2.5 Rev / 10 Rev	Retrace			
— 2976TB	.0005"	.02" (.028")	±.0005" / -/-	.00016"	±.0001"	10-0-10	1.4N or less	
— 2977TB	.0005"	.04" (.055")	±.0005" / -/-	.00016"	±.0001"	20-0-20	1.4N or less	
— 2978TB	.001"	.06" (.079")	±.001" / -/-	.0002"	±.0002"	30-0-30	1.4N or less	

* Completed products inspection is performed in the vertical position (contact point downward) and the stated accuracy is guaranteed.

Dial Indicators

Comparison measuring instruments which ensure high quality, high accuracy and reliability.

SERIES 2 — Long Stroke Type

- Long stroke dial indicators with a $\varnothing 57\text{mm}$ outer frame. All the models are equipped with limit markers and a bezel clamp as standard.
- An O-ring is employed to ensure air-tightness between the outer frame and the crystal case to prevent water or oil penetration.
- Both the stem and the spindle are made of high-strength quench-hardened stainless steel suitable for heavy-duty use.
- A carbide contact point is employed.
- The grand gear is made of stainless steel with high resistance to wear and deformation.
- Application of a hard coating on the surface of the crystal makes the gauge highly scratch- and chemical-resistant.
- The bezel clamp and lifting lever* (optional) can be attached to either the right or left side. These parts can be easily installed and removed without any tools.

* Not available for waterproof type.



An inspection certificate is supplied as standard. Refer to page X for details.



2050S



2050S-60

Continuous scale



Graduation: 0.01mm,
Measuring range: 20mm

2050S

With damper at lowest rest point

2050S-19

Shockproof

Jeweled bearing

With damper at lowest rest point

2050S-60

Waterproof

Continuous scale



Graduation: 0.01mm,
Measuring range: 30mm

2052S

With damper at lowest rest point

2052S-19

Shockproof

Jeweled bearing

With damper at lowest rest point

Continuous scale



Graduation: 0.01mm,
Measuring range: 30mm

2330S-10

With coaxial revolution counter

With damper at lowest rest point

Jeweled bearing

Continuous scale



Graduation: 0.01mm,
Measuring range: 20mm

2320S-10

With coaxial revolution counter

With damper at lowest rest point

Jeweled bearing

Reverse reading



Graduation: 0.01mm,
Measuring range: 30mm

2952S

With damper at lowest rest point

FEATURES

Metric

Order No.									
w/ lug	Flat-back								
2050S	2050SB	✓	—	—	—	—	—	—	—
2050S-60	2050SB-60	✓	—	—	—	—	—	—	—
2050S-19	2050SB-19	✓	—	—	—	—	—	—	—
2320S-10	2320SB-10	✓	—	—	—	—	—	—	—
2052S	2052SB	✓	—	—	—	—	—	—	—
2052S-19	2052SB-19	✓	—	—	—	—	—	—	—
2330S-10	2330SB-10	✓	—	—	—	—	—	—	—
2952S	2952SB	—	—	✓	—	—	—	—	—

SPECIFICATIONS

Metric

ISO/JIS type

Order No.		Graduation	Range (range/rev)	Accuracy				Repeat-ability	Dial reading	Measuring force
w/ lug	Flat-back			Overall	Retrace	1/10 Rev	1 Rev			
2050S	2050SB	0.01mm	20mm (1mm)	20µm	5µm	8µm	15µm	4µm	±0-100	2.0N or less
2050S-60	2050SB-60	0.01mm	20mm (1mm)	20µm	5µm	8µm	15µm	4µm	±0-100	2.5N or less
2050S-19	2050SB-19	0.01mm	20mm (1mm)	20µm	5µm	8µm	15µm	4µm	±0-100	2.0N or less
2320S-10	2320SB-10	0.01mm	20mm (1mm)	20µm	5µm	8µm	15µm	4µm	±0-100	2.0N or less
2052S	2052SB	0.01mm	30mm (1mm)	25µm	7µm	10µm	15µm	5µm	±0-100	2.5N or less
2052S-19	2052SB-19	0.01mm	30mm (1mm)	25µm	7µm	10µm	15µm	5µm	±0-100	2.5N or less
2330S-10	2330SB-10	0.01mm	30mm (1mm)	25µm	7µm	10µm	15µm	5µm	±0-100	2.5N or less
2952S	2952SB	0.01mm	30mm (1mm)	25µm	7µm	10µm	15µm	5µm	100-0	2.5N or less

*1 2050S-60 and 2050SB-60 are waterproof types that use a rubber bellows to cover the spindle. Please note that the outer diameter of the bellows (ø9.5) is larger than that of the stem (ø8).

*2 Completed products inspection is performed in the vertical position (contact point downward) and the stated accuracy is guaranteed.

Inch

Order No.									
w/ lug	Flat-back								
2416S	2416SB	✓	—	—	—	—	—	—	—
2416S-06	2416SB-06	✓	—	—	—	—	—	—	—
2416S-10	2416SB-10	✓	—	—	—	—	—	—	—
2417S	2417SB	—	✓	—	—	—	—	—	—
2424S-19	2424SB-19	✓	—	✓	—	—	—	—	—
2776S	2776SB	✓	—	—	—	—	—	—	—
2904S	2904SB	—	—	—	✓	—	—	—	—

Inch

ANSI/AGD type

Order No.		Graduation	Range (range/rev)	Accuracy			Repeat-ability	Dial reading	Measuring force
w/ lug	Flat-back			First 1 Rev / 2.5 Rev / 10 Rev	Retrace				
2416S	2416SB	.001"	1" (.1")	±.001" / ±.001" / ±.002"	.0002"	±.0002"	±0-100	1.8N or less	
2416S-06	2416SB-06	.001"	1" (.1")	±.001" / ±.001" / ±.002"	.0002"	±.0002"	±0-100	1.8N or less	
2416S-10	2416SB-10	.001"	1" (.1")	±.001" / ±.001" / ±.002"	.0002"	±.0002"	±0-100	1.8N or less	
2417S	2417SB	.001"	1" (.1")	±.001" / ±.001" / ±.002"	.0002"	±.0002"	0-50-0	1.8N or less	
2424S-19	2424SB-19	.001"	2" (.1")	±.001" / ±.001" / ±.002" / ±.003" (First 20Rev)	.00033"	±.0002"	±0-100	2.5N or less	
2776S	2776SB	.0005"	1" (.05")	±.0005" / ±.0005" / ±.0015" / ±.002" (First 20Rev)	.0002"	±.0001"	±0-50	2.5N or less	
2904S	2904SB	.001"	1" (.1")	±.001" / ±.001" / ±.002"	.0002"	±.0002"	100-0	1.8N or less	

* Completed products inspection is performed in the vertical position (contact point downward) and the stated accuracy is guaranteed.

DIMENSIONS

ISO/JIS Type

2050S-60

ANSI/AGD Type

Unit: mm

Order No.	A	B	C	D	E	F	G	H	I
2050S	38.8	75.2	57	17.7	20	16.9	29.8	52	7.6
2050S-60	59.8	87.2	57	17.7	20	12.3	46.4	52	7.6
2050S-19	38.8	75.2	57	17.7	20	16.9	29.8	52	7.6
2320S-10	38.8	75.2	57	17.7	20	16.9	29.8	52	7.6
2052S	38.8	88.7	57	17.7	20	16.9	43.3	52	7.6
2052S-19	38.8	88.7	57	17.7	20	16.9	43.3	52	7.6
2330S-10	38.8	88.7	57	17.7	20	16.9	43.3	52	7.6
2952S	38.8	88.7	57	17.7	20	16.9	43.3	52	7.6

Order No.	A	B	C	D	E	F	G	H	I
2416S	38.9	76.8	57	17.7	19	13.6	34.7	52	7.6
2416S-06	38.9	76.8	57	17.7	19	13.6	34.7	52	7.6
2416S-10	38.9	76.8	57	17.7	19	13.6	34.7	52	7.6
2417S	38.9	76.8	57	17.7	19	13.6	34.7	52	7.6
2424S-19	118	142.5	57	17.7	20.9	54.3	59.7	52	9.5
2776S	38.9	76.8	57	17.7	19	13.6	34.7	52	7.6
2904S	38.9	76.8	57	17.7	19	13.6	34.7	52	7.6

Dial Indicators

Comparison measuring instruments which ensure high quality, high accuracy and reliability.



An inspection certificate is supplied as standard. Refer to page X for details.

SERIES 1 — Compact Type, Small Diameter

- Compact dial indicators with bezel diameters of $\varnothing 31$ or $\varnothing 36$ mm for restricted-space applications in gaging jigs.



1911T-10



Balanced scale



Graduation: 0.01mm,
Measuring range: 2.5mm

1911T-10

Jeweled bearing



Balanced scale



Graduation: 0.02mm,
Measuring range: 0.5mm

1913T-10

Jeweled bearing



1003T



Balanced scale



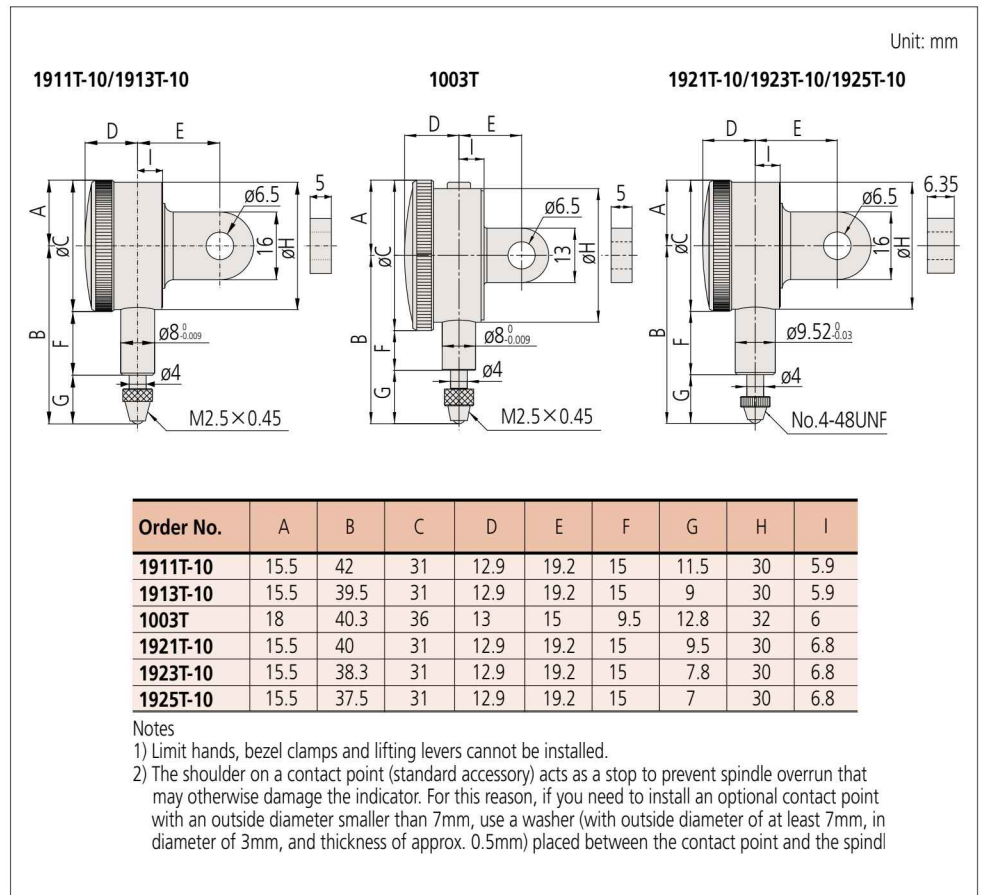
Graduation: 0.01mm,
Measuring range: 4mm

1003T



An inspection certificate is supplied as standard.
Refer to page X for details.

DIMENSIONS



SPECIFICATIONS

ISO/JIS type

Order No.		Graduation	Range (range/rev)	Accuracy				Repeat-ability	Dial reading	Measuring force
w/ lug	Flat-back			Overall	Retrace	1/10 Rev	1 Rev			
1911T-10	1911TB-10	0.01mm	2.5mm (1mm)	12µm	4µm	8µm	10µm	3µm	0-50-0	1.8N or less
1913T-10	1913TB-10	0.002mm	0.5mm (0.2mm)	6µm	2.5µm	2.5µm	5µm	1µm	0-100-0	1.8N or less
1003T	1003TB	0.01mm	4mm (1mm)	13µm	4µm	8µm	11µm	3µm	0-50-0	1.4N or less

* Completed products inspection is performed in the vertical position (contact point downward) and the stated accuracy is guaranteed.

ANSI/AGD type

Order No.		Graduation	Range (range/rev)	Accuracy			Repeat-ability	Dial reading	Measuring force
w/ lug	Flat-back			First 1 Rev / 2.5 Rev / 10 Rev	Retrace				
1921T-10	1921TB-10	.001"	.1" (.04")	±.001" / ±.001" / —	.0002"	±.0002"	0-20-0	1.8N or less	
1923T-10	1923TB-10	.0005"	.05" (.02")	±.0005" / ±.005" / —	.00016"	±.0001"	0-10-0	1.8N or less	
1925T-10	1925TB-10	.0001"	.025" (.01")	±.0002" / ±.0002" / —	.0001"	±.00003"	0-5-0	1.8N or less	

* Completed products inspection is performed in the vertical position (contact point downward) and the stated accuracy is guaranteed.

Dial Indicators

Comparison measuring instruments which ensure high quality, high accuracy and reliability.



An inspection certificate is supplied as standard. Refer to page X for details.

SERIES 1 — Compact Type, Small Diameter

- Compact dial indicators with bezel diameters of $\varnothing 40\text{mm}$ for restricted-space applications in gaging jigs.



1044S

Continuous scale



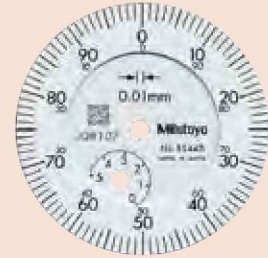
Graduation: 0.01mm, Measuring range: 3.5mm
 Double scale spacing

Balanced scale



Graduation: 0.01mm, Measuring range: 3.5mm
 Double scale spacing

Continuous scale



Graduation: 0.01mm, Measuring range: 5mm
1044S
1044S-15
 Jeweled bearing

Balanced scale



Graduation: 0.01mm, Measuring range: 5mm
1045S



1109S-10

Balanced scale



Graduation: 0.001mm, Measuring range: 1mm
1109S-10
 Shockproof
 Jeweled bearing

Balanced scale



Graduation: 0.002mm, Measuring range: 1mm
1013S-10
 Shockproof
 Jeweled bearing

Continuous scale



Graduation: 0.005mm, Measuring range: 3.5mm
1124S



1044S-60

Continuous scale



Graduation: 0.01mm,
Measuring range: 5mm Waterproof

ISO/JIS type

SPECIFICATIONS

Order No.		Graduation	Range (range/rev)	Accuracy				Repeat-ability	Dial reading	Measuring force
w/ lug	Flat-back			Overall	Retrace	1/10 Rev	1 Rev			
1013S-10	1013SB-10	0.002mm	1mm (0.2mm)	6µm	2.5µm	2.5µm	5µm	1µm	0-100-0	1.5N or less
1040S	1040SB	0.01mm	3.5mm (0.5mm)	13µm	4µm	8µm	11µm	3µm	±0-50	1.4N or less
1041S	1041SB	0.01mm	3.5mm (0.5mm)	13µm	4µm	8µm	11µm	3µm	0-25-0	1.4N or less
1044S	1044SB	0.01mm	5mm (1mm)	13µm	4µm	8µm	11µm	3µm	±0-100	1.4N or less
1044S-15	1044SB-15	0.01mm	5mm (1mm)	13µm	4µm	8µm	11µm	3µm	±0-100	0.4N or less*
1044S-60	1044SB-60	0.01mm	5mm (1mm)	13µm	4µm	8µm	11µm	3µm	±0-100	2.0N or less
1045S	1045SB	0.01mm	5mm (1mm)	13µm	4µm	8µm	11µm	3µm	0-50-0	1.4N or less
1109S-10	1109SB-10	0.001mm	1mm (0.2mm)	5µm	2µm	2.5µm	4.5µm	1µm	0-100-0	1.5N or less
1124S	1124SB	0.005mm	3.5mm (0.5mm)	12µm	3.5µm	6µm	10µm	3µm	±0-50	1.4N or less

* Completed products inspection is performed in the vertical position (contact point downward) and the stated accuracy is guaranteed.

Order No.		Graduation	Range (range/rev)	Accuracy		Repeat-ability	Dial reading	Measuring force
w/ lug	Flat-back			First 1 Rev / 2.5 Rev / 10 Rev	Retrace			
1410S	1410SB	.001"	.25" (.1")	±.001" / ±.001" / —	.0002"	±.0002"	0-100	1.4N or less
1411S	1411SB	.001"	.25" (.1")	±.001" / ±.001" / —	.0002"	±.0002"	0-50-0	1.4N or less
1410S-10	1410SB-10	.001"	.25" (.1")	±.001" / ±.001" / —	.0002"	±.0002"	0-100	1.4N or less
1780S	1780SB	.001"	.125" (.05")	±.001" / ±.001" / —	.0002"	±.0002"	0-50	1.4N or less
1781S	1781SB	.001"	.125" (.05")	±.001" / ±.001" / —	.0002"	±.0002"	0-25-0	1.4N or less
1506S	1506SB	.0005"	.125" (.05")	±.0005" / ±.0005" / —	.00016"	±.0001"	0-50	1.4N or less
1507S	1507SB	.0005"	.125" (.05")	±.0005" / ±.0005" / —	.00016"	±.0001"	0-25-0	1.4N or less
1670S	1670SB	.0005"	.1" (.04")	±.0005" / ±.0005" / —	.00016"	±.0001"	0-40	1.4N or less
1671S	1671SB	.0005"	.1" (.04")	±.0005" / ±.0005" / —	.00016"	±.0001"	0-20-0	1.4N or less
1802S-10	1802SB-10	.0001"	.025" (.01")	±.0001" / ±.0001" / —	.0001"	±.00003"	0-10	1.5N or less
1803S-10	1803SB-10	.0001"	.025" (.01")	±.0001" / ±.0001" / —	.0001"	±.00003"	0-5-0	1.5N or less

* Completed products inspection is performed in the vertical position (contact point downward) and the stated accuracy is guaranteed.

DIMENSIONS

ANSI/AGD Type

Unit: mm

Order No.	A	B	C	D	E	F	G	H	I
1410S	32.5	47.6	40	14.5	19	12.8	14.8	38	6.6
1411S	32.5	47.6	40	14.5	19	12.8	14.8	38	6.6
1410S-10	32.5	47.6	40	14.5	19	12.8	14.8	38	6.6
1780S	32.5	44.1	40	14.5	19	12.8	11.3	38	6.6
1781S	32.5	44.1	40	14.5	19	12.8	11.3	38	6.6
1506S	32.5	44.1	40	14.5	19	12.8	11.3	38	6.6
1507S	32.5	44.1	40	14.5	19	12.8	11.3	38	6.6
1670S	32.5	43.4	40	14.5	19	12.8	10.6	38	6.6
1671S	32.5	43.4	40	14.5	19	12.8	10.6	38	6.6
1802S-10	32.5	41.3	40	14.5	19	12.5	8.5	38	6.6
1803S-10	32.5	41.3	40	14.5	19	12.5	8.5	38	6.6

ISO/JIS Type

Unit: mm

Order No.	A	B	C	D	E	F	G	H	I
1013S-10	32.5	49	40	14.5	20	13.8	15.2	38	6.6
1040S	32.5	46	40	14.5	20	13.8	12.2	38	6.6
1041S	32.5	46	40	14.5	20	13.8	12.2	38	6.6
1044S	32.5	47.5	40	14.5	20	13.8	13.7	38	6.6
1044S-15*2	32.5	47.5	40	14.5	20	13.8	13.7	38	6.6
1044S-60	32.5	57	40	14.5	20	12.2	24.8	38	6.6
1045S	32.5	47.5	40	14.5	20	13.8	13.7	38	6.6
1109S-10	32.5	49	40	14.5	20	13.8	15.2	38	6.6
1124S	32.5	46	40	14.5	20	13.8	12.2	38	6.6

Note 1: Dimensions of the inch (ANSI/AGD Type) dial indicator partly differ from those of the metric (ISO/JIS Type) indicator.

Note 2: Inch (ANSI/AGD Type) dial indicators are provided with a stem of 3/8" dia. and #4-48UNF thread mount for the contact point.

*2 Use in a vertical position (contact point downward) for the low measuring force model.

Dial Indicators

Comparison measuring instruments which ensure high quality, high accuracy and reliability.



An inspection certificate is supplied as standard. Refer to page X for details.

SERIES 1 — Compact One Revolution Type for Error-free Reading

- Mitutoyo's unique shock-proof mechanism is incorporated, providing improved resistance to shock due to sudden spindle retraction caused by impact.
- This series has been developed to eliminate the possibility of reading errors due to miscounting multiple revolutions.
- The dead zone in red indicates "accuracy not guaranteed" .
- One revolution type Back plunger dial gages are also available. (Refer to pages F-49 to F-50 for details.)



1929S



Balanced scale



Graduation: 0.01mm,
Measuring range: 1mm

1929S

One revolution

Shockproof

1929S-62

One revolution

Shockproof

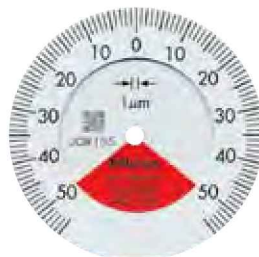
Dustproof



1900S-10



Balanced scale



Graduation: 0.001mm,
Measuring range: 0.1mm

1900S-10

One revolution

Shockproof

Jeweled bearing

1900S-72

One revolution

Shockproof

Dustproof

Jeweled bearing

One revolution type Back plunger dial gages are also available. (Refer to pages F-49 to F-50 for details.)



2990T-10

FEATURES

Metric

Order No.				
w/ lug	Flat-back			
1929S	1929SB	—	—	✓
1929S-62	1929SB-62	—	✓	✓
1900S-10	1900SB-10	✓	—	✓
1900S-72	1900SB-72	✓	✓	✓

Inch

Order No.				
w/ lug	Flat-back			
1909S-62	1909SB-62	—	✓	✓
1910S-72	1910SB-72	✓	✓	✓

SPECIFICATIONS

Metric

Order No.		Graduation	Range (range/rev)	Accuracy				Repeatability	Dial reading	Measuring force
w/ lug	Flat-back			Overall	Retrace	1/10 Rev	1 Rev			
1929S	1929SB	0.01mm	1mm (1.4mm)	11µm	4µm	7µm	—	3µm	50-0-50	1.4N or less
1929S-62	1929SB-62	0.01mm	1mm (1.4mm)	11µm	4µm	7µm	—	3µm	50-0-50	1.4N or less
1900S-10	1900SB-10	0.001mm	0.1mm (0.14mm)	5µm	2µm	2.5µm	—	1µm	50-0-50	1.5N or less
1900S-72	1900SB-72	0.001mm	0.1mm (0.14mm)	5µm	2µm	2.5µm	—	1µm	50-0-50	1.5N or less

* Completed products inspection is performed in the vertical position (contact point downward) and the stated accuracy is guaranteed.

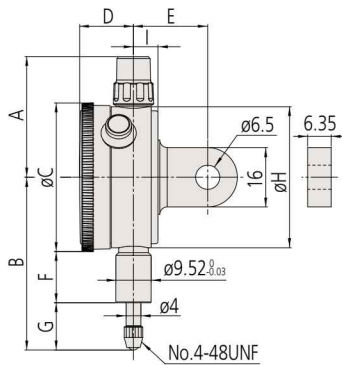
Inch

Order No.		Graduation	Range (range/rev)	Accuracy		Repeatability	Dial reading	Measuring force
w/ lug	Flat-back			First 1 Rev / 2.5 Rev / 10 Rev	Retrace			
1909S-62	1909SB-62	.0005"	.04" (.056")	±.0005" / — / —	.00016"	±.0001"	20-0-20	1.4N or less
1910S-72	1910SB-72	.0001"	.006" (.008")	±.0001" / — / —	.0001"	±.00003"	3-0-3	1.5N or less

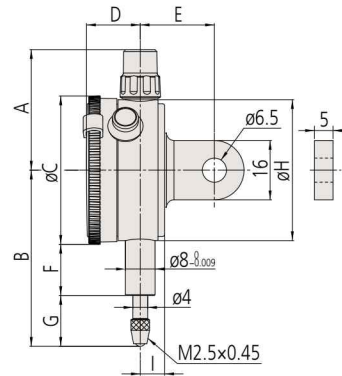
* Completed products inspection is performed in the vertical position (contact point downward) and the stated accuracy is guaranteed.

DIMENSIONS

ANSI/AGD Type



ISO/JIS Type



Unit: mm

Note 1: Dimensions of the inch (ANSI/AGD Type) dial indicator partly differ from those of the metric (ISO/JIS Type) indicator.
Note 2: Inch (ANSI/AGD Type) dial indicators are provided with a stem of 3/8" dia. and #4-48UNF thread mount for the contact point.

Order No.	A	B	C	D	E	F	G	H	I
1909S-62	32.5	41.7	40	14.5	19	12.8	8.9	38	6.6
1910S-72	32.5	40.8	40	14.5	19	12.8	8	38	6.6

Order No.	A	B	C	D	E	F	G	H	I
1929S	32.5	47.5	40	14.5	20	13.8	13.7	38	6.6
1929S-62	32.5	47.5	40	14.5	20	13.8	13.7	38	6.6
1900S-10	32.5	53.5	40	14.5	20	16.8	16.7	38	6.6
1900S-72	32.5	53.5	40	14.5	20	16.8	16.7	38	6.6

Dial Indicators

Comparison measuring instruments which ensure high quality, high accuracy and reliability.

SERIES 3, 4 — Long Stroke Type, Large Diameter

- Dial indicators with a large-diameter dial face for easy reading.
- Models with longer measuring ranges are also available.
- All types are supplied with limit markers and a bezel clamp as standard.
- Both the stem and the spindle are made of high-strength quench-hardened stainless steel suitable for heavy-duty use.
- The bezel clamp and lifting lever (optional)*1 can be attached to either the right or left side. These parts can be easily installed and removed without tools.

*1: Can be attached only to Code No.

3046S, 3047S, 3050S, 3109S-10 and 4046S.



An inspection certificate is supplied as standard. Refer to page X for details.

3109S-10

Continuous scale

Graduation: 0.01mm, Measuring range: 100mm

3058S-19

Balanced scale

Graduation: 0.01mm, Measuring range: 50mm

4046S

Continuous scale

Graduation: 0.01mm, Measuring range: 10mm

3052S-19

Continuous scale

Graduation: 0.01mm, Measuring range: 30mm

3047S

Continuous scale

Graduation: 0.01mm, Measuring range: 10mm

3050S

Continuous scale

Graduation: 0.01mm, Measuring range: 20mm

3062S-19

Continuous scale

Graduation: 0.01mm, Measuring range: 100mm

3109S-10

Balanced scale

Graduation: 0.001mm, Measuring range: 1mm

3060S-19

Continuous scale

Graduation: 0.01mm, Measuring range: 80mm

4046S

Continuous scale

Graduation: 0.01mm, Measuring range: 10mm

Dial Indicators

Comparison measuring instruments which ensure high quality, high accuracy and reliability.

ANSI/AGD Type Metric Dial Indicator with $\varnothing 3/8$ " Stem and #4-48UNF-Thread Contact Point Compatible Type

SPECIFICATIONS

Metric		Series 1		ANSI/AGD type					
Order No.		Graduation	Range (range/rev)	Accuracy		Repeat-ability	Dial reading	Measuring force	
w/ lug	Flat-back			First 1 Rev / 2.5 Rev / 10 Rev	Retrace				
1230S-01	1230SB-01	0.01mm	2.5mm (1mm)	$\pm 10\mu\text{m} / \pm 10\mu\text{m} / \text{—}$	3 μm	$\pm 2\mu\text{m}$	0-100	1.4N or less	
1231S-01	1231SB-01	0.01mm	2.5mm (1mm)	$\pm 10\mu\text{m} / \pm 10\mu\text{m} / \text{—}$	3 μm	$\pm 2\mu\text{m}$	0-50-0	1.4N or less	
1044S-01	1044SB-01	0.01mm	5mm (1mm)	$\pm 10\mu\text{m} / \pm 10\mu\text{m} / \pm 13\mu\text{m}$	3 μm	$\pm 3\mu\text{m}$	$\pm 0-100$	1.4N or less	
1045S-01	1045SB-01	0.01mm	5mm (1mm)	$\pm 10\mu\text{m} / \pm 10\mu\text{m} / \pm 13\mu\text{m}$	3 μm	$\pm 3\mu\text{m}$	0-50-0	1.4N or less	
1010S-11	1010SB-11	0.002mm	0.5mm (0.2mm)	$\pm 2\mu\text{m} / \pm 2\mu\text{m} / \text{—}$	2 μm	$\pm 1\mu\text{m}$	0-20	1.5N or less	
1011S-11	1011SB-11	0.002mm	0.5mm (0.2mm)	$\pm 2\mu\text{m} / \pm 2\mu\text{m} / \text{—}$	2 μm	$\pm 1\mu\text{m}$	0-10-0	1.5N or less	

* Completed products inspection is performed in the vertical position (contact point downward) and the stated accuracy is guaranteed.

Metric		Series 2		ANSI/AGD type					
Order No.		Graduation	Range (range/rev)	Accuracy		Repeat-ability	Dial reading	Measuring force	
w/ lug	Flat-back			First 1 Rev / 2.5 Rev / 10 Rev	Retrace				
2230S-01	2230SB-01	0.01mm	2.5mm (1mm)	$\pm 10\mu\text{m} / \pm 10\mu\text{m} / \text{—}$	3 μm	$\pm 3\mu\text{m}$	$\pm 0-100$	1.4N or less	
2231S-01	2231SB-01	0.01mm	2.5mm (1mm)	$\pm 10\mu\text{m} / \pm 10\mu\text{m} / \text{—}$	3 μm	$\pm 3\mu\text{m}$	0-50-0	1.4N or less	
2046S-01	2046SB-01	0.01mm	10mm (1mm)	$\pm 10\mu\text{m} / \pm 10\mu\text{m} / \pm 13\mu\text{m}$	3 μm	$\pm 3\mu\text{m}$	$\pm 0-100$	1.4N or less	
2046S-11	2046SB-11	0.01mm	10mm (1mm)	$\pm 10\mu\text{m} / \pm 10\mu\text{m} / \pm 13\mu\text{m}$	3 μm	$\pm 3\mu\text{m}$	$\pm 0-100$	1.4N or less	
2048S-11	2048SB-11	0.01mm	10mm (1mm)	$\pm 10\mu\text{m} / \pm 10\mu\text{m} / \pm 13\mu\text{m}$	3 μm	$\pm 3\mu\text{m}$	$\pm 0-100$	1.4N or less	
2047S-01	2047SB-01	0.01mm	10mm (1mm)	$\pm 10\mu\text{m} / \pm 10\mu\text{m} / \pm 13\mu\text{m}$	3 μm	$\pm 3\mu\text{m}$	0-50-0	1.4N or less	
2047S-11	2047SB-11	0.01mm	10mm (1mm)	$\pm 10\mu\text{m} / \pm 10\mu\text{m} / \pm 13\mu\text{m}$	3 μm	$\pm 3\mu\text{m}$	0-50-0	1.4N or less	
2902S-01	2902SB-01	0.01mm	10mm (1mm)	$\pm 10\mu\text{m} / \pm 10\mu\text{m} / \pm 13\mu\text{m}$	3 μm	$\pm 3\mu\text{m}$	100-0	1.4N or less	
2050S-01	2050SB-01	0.01mm	20mm (1mm)	$\pm 10\mu\text{m} / \pm 10\mu\text{m} / \pm 15\mu\text{m} / \pm 20\mu\text{m} (20\text{Rev})$	4 μm	$\pm 3\mu\text{m}$	$\pm 0-100$	2.0N or less	
2050S-11	2050SB-11	0.01mm	20mm (1mm)	$\pm 10\mu\text{m} / \pm 10\mu\text{m} / \pm 15\mu\text{m} / \pm 20\mu\text{m} (20\text{Rev})$	4 μm	$\pm 3\mu\text{m}$	$\pm 0-100$	2.0N or less	
2056S-01	2056SB-01	0.01mm	25mm (1mm)	$\pm 10\mu\text{m} / \pm 10\mu\text{m} / \pm 15\mu\text{m} / \pm 20\mu\text{m} (20\text{Rev}) / \pm 25\mu\text{m} (\text{Over } 20\text{Rev})$	4 μm	$\pm 3\mu\text{m}$	$\pm 0-100$	2.5N or less	
2900S-73*	2900SB-73*	0.001mm	0.08mm (0.1mm)	$\pm 2\mu\text{m} / \text{—} / \text{—}$	2 μm	$\pm 0.3\mu\text{m}$	40-0-40	2.0N or less	
2109S-11	2109SB-11	0.001mm	1mm (0.2mm)	$\pm 3\mu\text{m} / \pm 3\mu\text{m} / \pm 4\mu\text{m}$	2 μm	$\pm 0.3\mu\text{m}$	0-10-0	1.5N or less	
2119S-11	2119SB-11	0.001mm	5mm (0.2mm)	$\pm 7\mu\text{m} / \pm 7\mu\text{m} / \pm 8\mu\text{m} / \pm 10\mu\text{m} (20\text{Rev}) / \pm 10\mu\text{m} (\text{Over } 20\text{Rev})$	2.5 μm	$\pm 0.3\mu\text{m}$	0-10-0	1.5N or less	

*1 One revolution type

*2 Completed products inspection is performed in the vertical position (contact point downward) and the stated accuracy is guaranteed.

FEATURES

Metric		ANSI/AGD type							
Order No.		w/ lug	Flat-back						—
1230S-01	1230SB-01								
1231S-01	1231SB-01	—	—	—	—	—	—	—	
1044S-01	1044SB-01	—	—	—	—	—	—	—	
1045S-01	1045SB-01	—	—	—	—	—	—	—	
1010S-11	1010SB-11	—	✓	—	—	—	—	✓	
1011S-11	1011SB-11	—	✓	—	—	—	—	✓	

Metric		ANSI/AGD type							
Order No.		w/ lug	Flat-back						
2230S-01	2230SB-01								
2231S-01	2231SB-01	—	—	—	—	—	—	—	
2046S-01	2046SB-01	—	—	—	—	—	—	—	
2046S-11	2046SB-11	—	✓	—	—	—	—	—	
2048S-11	2048SB-11	—	✓	✓	✓	—	—	—	
2047S-01	2047SB-01	—	—	—	—	—	—	—	
2047S-11	2047SB-11	—	✓	—	—	—	—	—	
2902S-01	2902SB-01	—	—	—	—	—	—	✓	
2050S-01	2050SB-01	—	—	—	—	—	—	—	
2050S-11	2050SB-11	—	✓	—	—	—	—	—	
2056S-01	2056SB-01	—	—	—	—	—	—	—	
2900S-73*	2900SB-73*	—	✓	—	—	—	✓	✓	
2109S-11	2109SB-11	—	✓	—	—	—	—	—	
2119S-11	2119SB-11	—	✓	—	—	—	—	—	






An inspection certificate is supplied as standard. Refer to page X for details.

Optional Accessories

- : Backs (See page F-50.)
- : Contact points (See pages F-46 to F-49.)

ANSI/AGD Type Metric Dial Indicator with $\phi 3/8$ " Stem and #4-48UNF-Thread Contact Point Compatible Type

FEATURES

Metric		Order No.					
w/ lug	Flat-back				—	—	—
3052S-11	3052SB-11	✓	✓	✓	—	—	—
3058S-11	3058SB-11	✓	✓	✓	—	—	—

SPECIFICATIONS

Metric		Series 3			ANSI/AGD type				
Order No.		Graduation	Range (range/rev)	Accuracy		Retrace	Repeat-ability	Dial reading	Measuring force
w/ lug	Flat-back			First 1 Rev / 2.5 Rev / 10 Rev / 20 Rev / Over 20 Rev					
3052S-11	3052SB-11	0.01mm	30mm (1mm)	$\pm 10\mu\text{m} / \pm 10\mu\text{m} / \pm 15\mu\text{m} / \pm 20\mu\text{m} / \pm 30\mu\text{m}$	5 μm	$\pm 3\mu\text{m}$	$\pm 0-100$	2.5N or less	
3058S-11	3058SB-11	0.01mm	50mm (1mm)	$\pm 15\mu\text{m} / \pm 15\mu\text{m} / \pm 20\mu\text{m} / \pm 25\mu\text{m} / \pm 40\mu\text{m}$	6 μm	$\pm 3\mu\text{m}$	$\pm 0-100$	3.0N or less	

* Completed products inspection is performed in the vertical position (contact point downward) and the stated accuracy is guaranteed.



An inspection certificate is supplied as standard. Refer to page X for details.

Optional Accessories

- : Backs (See page F-50.)
- : Contact points (See pages F-46 to F-49.)

Dial Indicators

Comparison measuring instruments which ensure high quality, high accuracy and reliability.

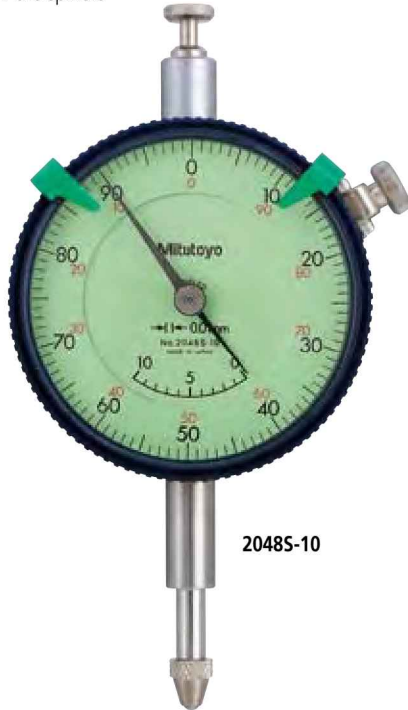


An inspection certificate is supplied as standard. Refer to page X for details.

SERIES 2 — Special Dial Indicators

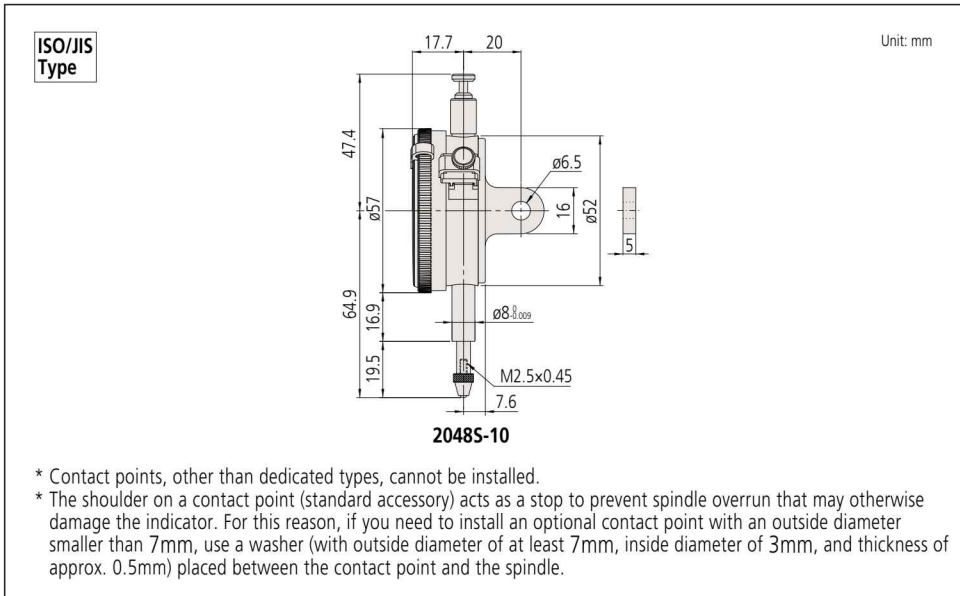
Adjustable hand dial gauge

- The hand position can be adjusted independently of the position of the spindle by rotating the top knob.



2048S-10

DIMENSIONS



SPECIFICATIONS

Metric		ISO/JIS type								
Order No.		Graduation	Range (range/rev)	Accuracy				Repeat-ability	Dial reading	Measuring force
w/ lug	Flat-back			Overall	Retrace	1/10 Rev	1 Rev			
2048S-10	2048SB-10	0.01mm	10mm (1mm)	15µm	3µm	5µm	10µm	3µm	±0-100	1.4N or less

* Completed products inspection is performed in the vertical position (contact point downward) and the stated accuracy is guaranteed.

Inch		ANSI/VGD type								
Order No.		Graduation	Range (range/rev)	Accuracy		Repeat-ability	Dial reading	Measuring force		
w/ lug	Flat-back			First 1 Rev / 2.5 Rev / 10 Rev	Retrace				—	—
2915S-10	2915SB-10	.001"	.5" (.1")	±.001" / ±.001" / ±.001	.0002	±.0002	±0-100	1.8N or less	—	—
2918S-10	2918SB-10	.001"	.5" (.1")	±.001" / ±.001" / ±.001	.0002	±.0002	0-50-0	1.8N or less	—	—

* Completed products inspection is performed in the vertical position (contact point downward) and the stated accuracy is guaranteed.

FEATURES

Metric							
Order No.		STOP	STOP	STOP	—	—	
w/ lug	Flat-back	STOP	STOP	STOP	—	—	
2048S-10	2048SB-10	✓	—	✓	—	—	

Inch							
Order No.		STOP	STOP	STOP	—	—	
w/ lug	Flat-back	STOP	STOP	STOP	—	—	
2915S-10	2915SB-10	✓	—	✓	—	—	
2918S-10	2918SB-10	✓	—	✓	—	—	



An inspection certificate is supplied as standard.
Refer to page X for details.

SERIES 2 — Special Dial Indicators

Peak hold type dial gauge

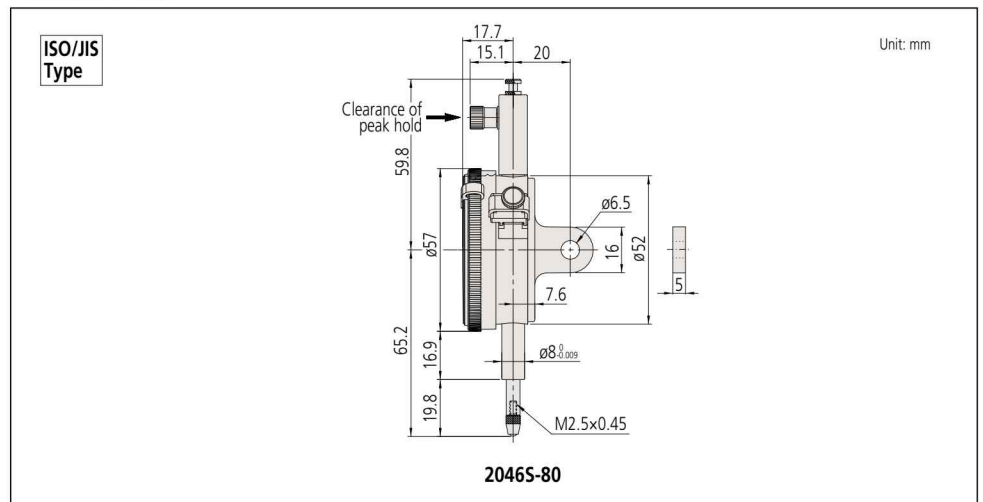
- A mechanism holds the pointer and the spindle at the position of maximum depression and hence displays the maximum value.

* Clearance of peak hold: push the nut in the direction of the arrow indicated in the dimensional drawing below.



2046S-80

DIMENSIONS



2046S-80

FEATURES

Metric						
Order No.						
w/ lug	Flat-back				—	—
2046S-80	2046SB-80	—	✓	—	—	—

SPECIFICATIONS

Metric				Accuracy						
Order No.		Graduation	Range (range/rev)	Overall	Retrace	1/10 Rev	1 Rev	Repeat-ability	Dial reading	Measuring force
2046S-80	2046SB-80	0.01mm	10mm (1mm)	15μm	—	5μm	10μm	—	±0-100	5.0N or less

* Completed products inspection is performed in the vertical position (contact point downward) and the stated accuracy is guaranteed.

Dial Indicators

Comparison measuring instruments which ensure high quality, high accuracy and reliability.

Back Plunger Type Dial Indicator SERIES 2

- Back plunger type dial gauges are suitable for mounting onto leveling machine tool tables or inspection jigs, and for use in small spaces where the graduations of standard dial gauges are difficult to see.
- Models 2960T, 2961T, 2990T-10 and 2991T-10, which use Mitutoyo's proprietary shock-proofing mechanism, have excellent durability and shock resistance.
- Model 2990T-10 provides 0.001mm graduation.



An inspection certificate is supplied as standard. Refer to page X for details.



Holding bar (optional)

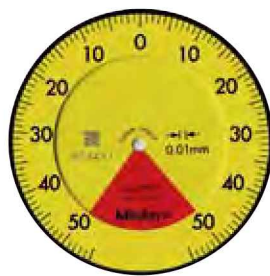
Order No.	øD	L
21AAA166	ø6mm	42mm
136567	ø6mm	81mm
124625	ø6.35mm	81mm
21AAA167	ø6.35mm	42mm
21AAA168	ø8mm	42mm
136568	ø8mm	81mm

* øD and L: detail shown in drawing below.



2960T

Balanced scale



Graduation: 0.01mm,
Measuring range: 1mm

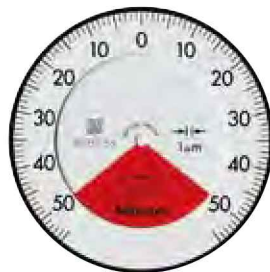
2960T

- One revolution
- Shockproof
- Back plunger



2990T-10

Balanced scale

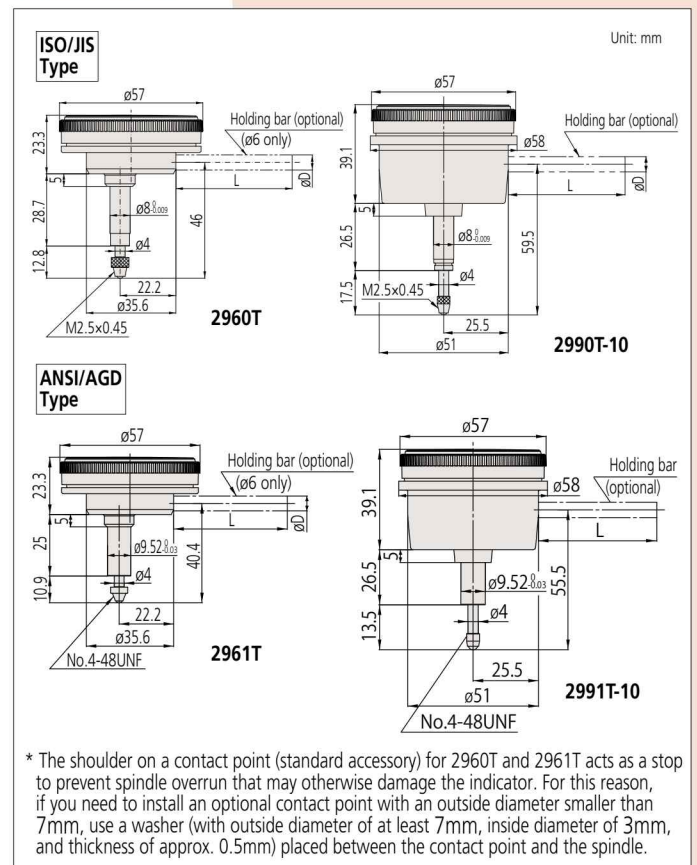


Graduation: 0.01mm,
Measuring range: 1mm

2990T-10

- One revolution
- Shockproof
- Back plunger
- Jeweled bearing

DIMENSIONS



Order No.	Graduation	Range (range/rev)	Accuracy				Repeatability	Dial reading	Measuring force
			Overall	Retrace	1/10 Rev	1 Rev			
2960T	0.01mm	1mm (1.27mm)	14µm	4µm	8µm	—	3µm	50-0-50	1.4N or less
2990T-10	0.001mm	0.1mm (0.14mm)	5µm	2µm	2.5µm	—	1µm	50-0-50	1.5N or less

* Completed products inspection is performed in the vertical position (contact point downward) and the stated accuracy is guaranteed.

Order No.	Graduation	Range (range/rev)	Accuracy			Repeatability	Dial reading	Measuring force
			First 1 Rev / 2.5 Rev / 10 Rev	Retrace	1 Rev			
2961T	.0005"	.04" / .05"	±.0005" / — / —	.00016"	±.0001"	±.0001"	20-0-20	1.4N or less
2991T-10	.0001"	.008" / .01"	±.0002" / — / —	.0001"	±.00005"	±.00005"	4-0-4	1.5N or less

* Completed products inspection is performed in the vertical position (contact point downward) and the stated accuracy is guaranteed.



An inspection certificate is supplied as standard. Refer to page X for details.



Holding bar

Holding bar (optional)

Order No.	øD	L
21AAA166	ø6mm	42mm
136567	ø6mm	81mm
124625	ø6.35mm	81mm
21AAA167	ø6.35mm	42mm
21AAA168	ø8mm	42mm
136568	ø8mm	81mm

* øD and L: detail shown in drawing below.

DIMENSIONS

ANSI/AGD Type

Unit: mm

Order No.	A	B	C	E	F	G	H
1166T	40	22.1	35.6	22.2	25	10.9	42
1167T	40	22.1	35.6	22.2	25	10.9	42
1168T	40	22.1	35.6	22.2	25	10.9	42
1961T	40	22.1	35.6	22.2	25	10.9	40

ISO/JIS Type

Unit: mm

Order No.	A	B	C	E	F	G	H
1160T	40	22.1	35.6	22.2	25	13.8	43.3
1162T	40	22.1	35.6	22.2	25	13.8	43.3
1960T	40	22.1	35.6	22.2	28.7	12.8	46

Note 1: Contact point (standard accessory) for all products in this page has a role as a top dead point stopper. For this reason, if you need to install an optional contact point with an outside diameter smaller than 7mm, use a washer (with outside diameter of at least 7mm, inside diameter of 3mm, and thickness of approx. 0.5mm) placed between the contact point and the spindle.

Note 2: Dimensions of the inch (ANSI/AGD Type) dial indicator partly differ from those of the metric (ISO/JIS Type) indicator.

Note 3: Inch (ANSI/AGD Type) dial indicators are provided with a stem of 3/8" dia. and #4-48UNF thread mount for the contact point.

Back Plunger Type Dial Indicator SERIES 1

- Back plunger type dial gauges are suitable for mounting onto leveling machine tool tables or inspection jigs, and for use in situations where standard dial gauges are difficult to read.
- Model 1960T and 1961T, which uses Mitutoyo's proprietary shock-proofing mechanism, has excellent durability and shock resistance.



1160T



Continuous scale



Graduation: 0.01mm,
Measuring range: 5mm

1160T

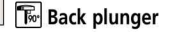


Reverse reading

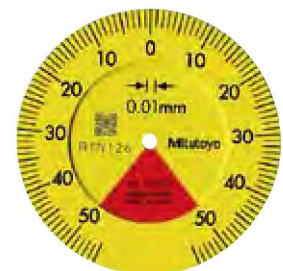


Graduation: 0.01mm,
Measuring range: 5mm

1162T



Balanced scale

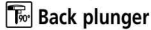


Graduation: 0.01mm,
Measuring range: 1mm

1960T



One revolution



Shockproof



Back plunger

FEATURES

Order No.	Continuous scale	Reverse reading	Balanced scale	One revolution	Shockproof	Back plunger
1960T	✓	✓	—	—	—	—
1160T	—	—	—	—	—	—
1162T	—	—	✓	—	—	—

Inch

Order No.	Continuous scale	Reverse reading	Balanced scale	One revolution	Shockproof	Back plunger
1961T	✓	✓	—	—	—	—
1166T	—	—	—	—	—	—
1167T	—	—	—	—	—	—
1168T	—	—	✓	—	—	—

SPECIFICATIONS

Order No.	Graduation	Range (range/rev)	Accuracy				Repeatability	Dial reading	Measuring force
			Overall	Retrace	1/10 Rev	1 Rev			
1960T	0.01mm	1mm (1.27mm)	14µm	4µm	8µm	—	3µm	50-0-50	1.4N or less
1160T	0.01mm	5mm (1mm)	16µm	4µm	8µm	14µm	3µm	±0-100	1.4N or less
1162T	0.01mm	5mm (1mm)	16µm	4µm	8µm	14µm	3µm	100-0	1.4N or less

* Completed products inspection is performed in the vertical position (contact point downward) and the stated accuracy is guaranteed.

Order No.	Graduation	Range (range/rev)	Accuracy			Repeatability	Dial reading	Measuring force
			First 1 Rev / 2.5 Rev / 10 Rev	Retrace	1 Rev			
1961T	.001"	.04" (.05")	±.001" / — / —	.0002"	±.0002"	20-0-20	1.4N or less	
1166T	.001"	.2" (.05")	±.001" / ±.001" / ±.001"	.00033"	±.0002"	±0-50	1.4N or less	
1167T	.001"	.2" (.05")	±.001" / ±.001" / ±.001"	.00033"	±.0002"	0-25-0	1.4N or less	
1168T	.001"	.2" (.05")	±.001" / ±.001" / ±.001"	.00033"	±.0002"	50-0	1.4N or less	

* Completed products inspection is performed in the vertical position (contact point downward) and the stated accuracy is guaranteed.

Dial Indicators

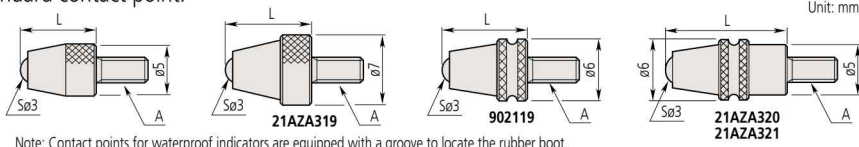
Comparison measuring instruments which ensure high quality, high accuracy and reliability.

Contact Points

Optional Accessory for Digimatic and Dial Indicators and Linear Gages

Ball point

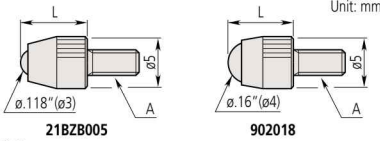
Standard contact point.



Note: Contact points for waterproof indicators are equipped with a groove to locate the rubber boot.

A: M2.5x0.45

L	Material	Carbide		Ruby	Plastic
		Without groove	With groove (waterproof type)	Without groove	Without groove
7.3		901312	—	120047	901994
8.3		21AZA319	902119	—	—
12.1		—	21AZA320	—	—
14		21JAA225	—	—	—
15		120049	—	120051	—
17		21JAA224	—	—	—
19.3		—	21AZA321	—	—
20		137391	—	137392	—
22		21JAA226	—	—	—
25		120053	—	120055	—
30		21AAA252	—	21AAA253	—

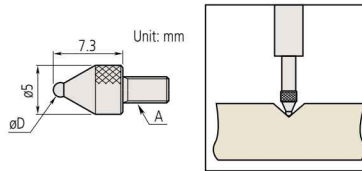


A: 4-48UNF

L	Material	Carbide	Plastic
1/4"		21BZB005	902018

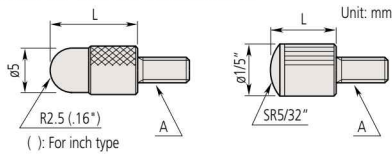
Ball point

Optimal for workpieces with deep indentations.



Shell Type Point

Contact point with a large radius.
Optimal for use on flat surfaces.



A: M2.5x0.45

Order No.	L
101386	5
101118	10
137393	15
101387	20
101388	25
21AAA254	30

A: 4-48UNF

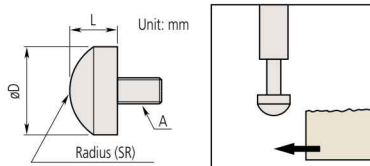
Order No.	L
193697	3/32"
101184	5/32"
21AAA031	1/4"
21AAA032	3/8"
101185	1/2"
21AAA033	5/8"
101186	3/4"
21AAA034	7/8"
101187	1"
21AAA035	1 1/4"
21AAA036	1 1/2"
21AAA037	1 3/4"
21AAA038	2"
21AAA039	2 1/4"
21AAA040	2 1/2"
21AAA041	2 3/4"
21AAA042	3"

A: M2.5x0.45

Order No.	SøD	ød
21AAA349	1mm, carbide	5mm
21AAA350	1.5mm, carbide	5mm
101122	1.8mm, steel	5mm
21AAA351	2.5mm, carbide	5mm
21AAA352	4mm, carbide	5mm

Spherical Point

A large radius makes this contact point optimal for use where the workpiece needs to slide from the side.



A: M2.5x0.45

Order No.	D	L	SR
111460	5.5	3	5
125258	7.9	5	5
101119	10	5	7

A: 4-48UNF

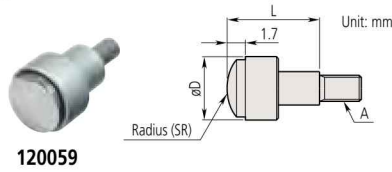
Order No.	D	L	SR
101205	1/2"	1/8"	.35"
101204	3/8"	3/32"	.28"

Contact Points

Optional Accessory for Digimatic and Dial Indicators and Linear Gages

Spherical Point (Carbide)

A large radius makes this contact point optimal for use where the workpiece needs to slide from the side.



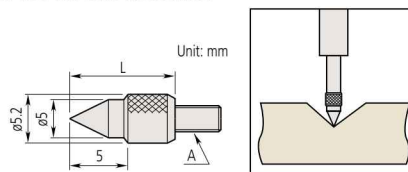
120059

A: M2.5x0.45

Order No.	D	L	SR
120058	5.2	5	5
120059	7.5	10	7
120060	10.5	10	10

Conical Point

Used for positioning the measurement point. Since it can damage a workpiece easily, it is not suitable for use on soft materials.



A: M2.5x0.45

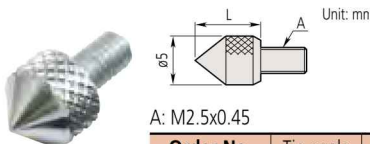
Order No.	Tip angle	L
101120	60°	10



101120

A: 4-48UNF

Order No.	L	A
101190	1/2"	.2"



101385

A: M2.5x0.45

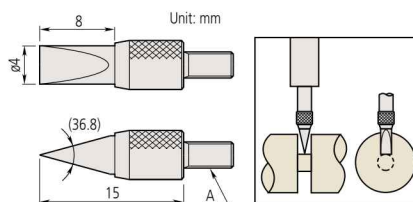
Order No.	Tip angle	L
101385	90°	5

A: 4-48UNF

Order No.	D	L
101191	.2"	1/4"

Knife Edge Point (Carbide)

Suitable for measuring narrow groove diameter, etc.



A: M2.5x0.45

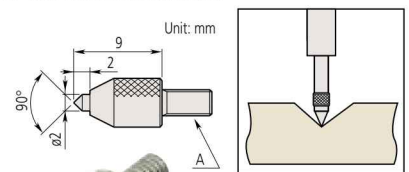
Order No.
120067



120067

Conical Point (Carbide)

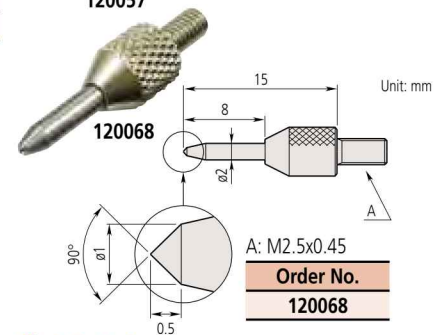
Used for positioning the measurement point. Since it can damage a workpiece easily, it is not suitable for use on soft materials.



120057

A: M2.5x0.45

Order No.
120057



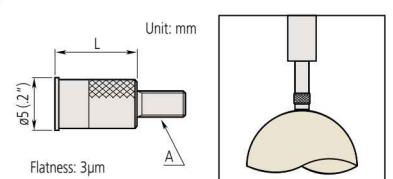
120068

A: M2.5x0.45

Order No.
120068

Flat Point

Optimal for use on convex surfaces.



A: M2.5x0.45

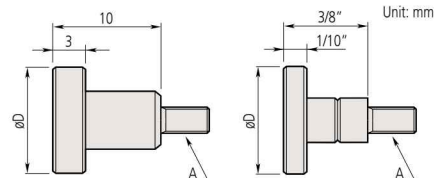
Order No.	L
131365	8
21AAA340	10



131365

A: 4-48UNF

Order No.	L
133017	5/16"
21AAA043	1/2"
21AAA044	3/4"
21AAA045	1"



A: M2.5x0.45

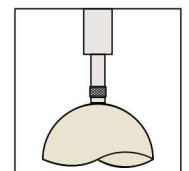
Order No.	D
101117	10
21AAA341	15
21AAA342	20
21AAA343	25
21AAA344	30



101117

A: 4-48UNF

Order No.	D
101188	1/2"
101189	3/8"



Dial Indicators

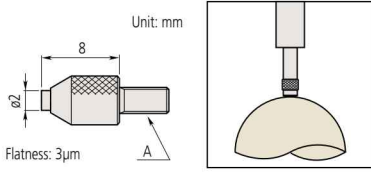
Comparison measuring instruments which ensure high quality, high accuracy and reliability.

Contact Points

Optional Accessory for Digimatic and Dial Indicators and Linear Gages

Flat Point (Carbide)

Optimal for use on convex surfaces.

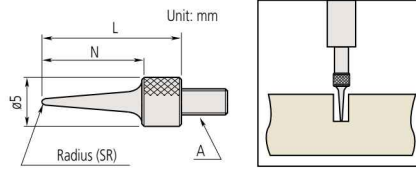


A: M2.5x0.45

Order No.
120056

Needle Point

Suitable for probing the bottom of a groove or hole.

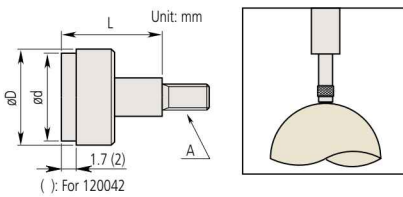


A: M2.5x0.45

Order No.	N	L	SR
101121	11	15	0.4
137413	13	17	0.2
21AAA255	21	25	0.4
21AAA256	31	35	0.4

A: 4-48UNF

Order No.	L	SR
21AAA030	.6"	.016"
21AAA046	1"	.016"
21AAA047	1 1/2"	.016"
21AAA048	2"	.016"

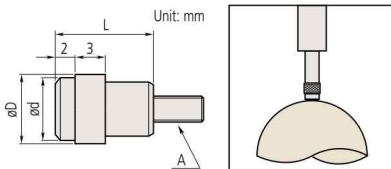


120043

A: M2.5x0.45

Order No.	D	d	L
120041	5.2	4.3*	5
120042	7	6.5*	10
120043	10.5	9.5*	10
21AAA345	17	15**	10
21AAA346	22	20**	10
21AAA347	27	25**	10
21AAA348	32	30**	10

Flatness: *3µm, **5µm



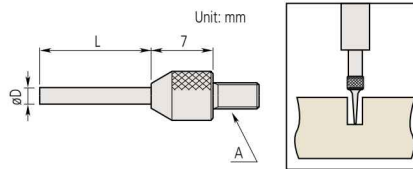
137255

A: M2.5x0.45

Order No.	D	d	L
137255	7	6.4	10
137399	9	8	10

Needle Point (Carbide)

Suitable for probing the bottom of a groove or hole.

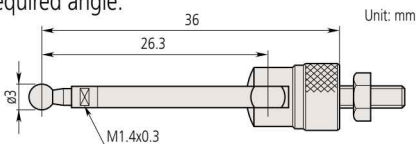


A: M2.5x0.45

Order No.	D	L
120066	0.45	3
21AAA329	0.45	5
120065	1	3
21AAA330	1	5
21AAA331	1	8
21AAA332	1	10
21AAA333	1	20
21AAA334	1	40
21AAA335	1.5	5
21AAA336	1.5	10
120064	1.5	13
21AAA337	1.5	20
21AAA338	1.5	40
137257	2	8
21AAA257	2	18
21AAA258	2	28
21AAA339	2	40

Lever Point

Suitable for use on perpendicular faces, such as those within mold cavities. Lever can be adjusted to the required angle.



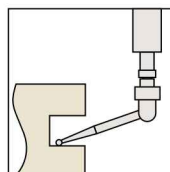
900391

A: M2.5x0.45

Order No.
900391

A: 4-48UNF

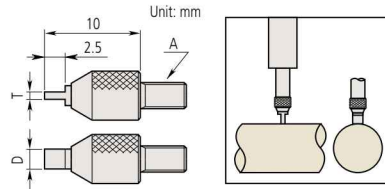
Order No.
900393



Contact Points Optional Accessory for Digimatic and Dial Indicators and Linear Gages

Blade Point (Carbide)

Suitable for use on convex surfaces, especially those with shallow grooves.



A: M2.5x0.45

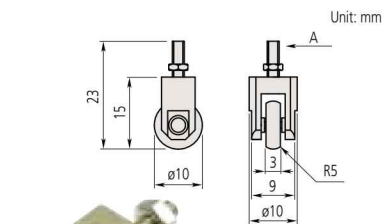
Order No.	T	D
120061	0.4	2
120062	0.6	2
120063	1	4



120062

Roller Point

Suitable for use on a moving workpiece surface, or where the workpiece needs to slide from the side.



901954

A: M2.5x0.45

Order No.
901954

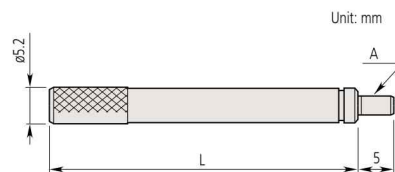
A: 4-48UNF

Order No.
901991

Extension Rod



303613

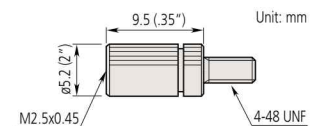


A: M2.5x0.45

Order No.	L
303611	10
21AAA259A	15
303612	20
21AAA259B	25
303613	30
21AAA259C	35
21AAA259D	40
21AAA259E	45
21AAA259F	50
21AAA259G	55
304146	60
21AAA259H	65
21AAA259J	70
21AAA259L	75
21AAA259M	80
304147	90
303614	100

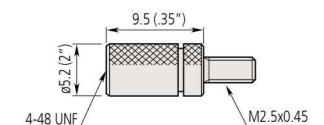
A: 4-48UNF

Order No.	L
139167	1/2"
301655	1"
301657	2"
301659	4"



Order No.

21AAA011



Order No.

21AAA012

Interchangeable Contact Point Set

This set consists of six types of popular contact point for extending the use of an indicator to many applications.



A: M2.5x0.45




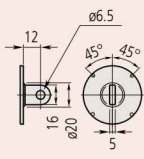

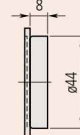

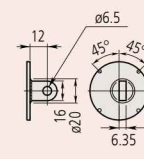

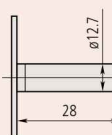

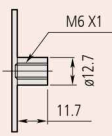

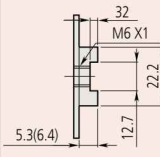

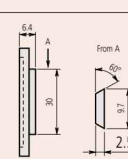

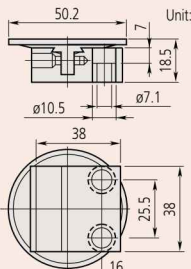
Order No.	Contact points included
7822	Flat Point (131365, 0.5mm) Flat Point (101117, 1.0mm) Needle Point (101121) Spherical Point (101119) Shell Type Point (101118) Shell Type Point (101387)

Dial Indicators

Comparison measuring instruments which ensure high quality, high accuracy and reliability.

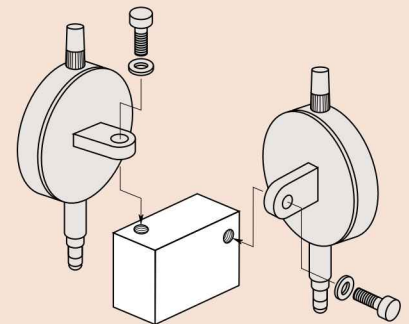
Interchangeable Backs Optional Accessory for Digimatic and Dial Indicators

SPECIFICATIONS

Description	Order No.	Series		
		Series 1 (ø31, ø36, ø40mm)	Series 2(ø57mm)	Series 3, 4 (ø78, 91mm)
Flat Back 		Unit: mm 101211 : a=2.2 136872 : for water-proof type 191559 : for 1911TB-10, 1913TB-10, 1921TB-10, 1923TB-10, 1925TB-10 137906 : for 1003TB	101039 : a=2.5 21AZB231 : for water-proof of S type 192910 : (F type waterproof model)	100836 : a=3.0
Lug-on-Center Back 		Unit: mm 101210 : metric type 101307 : inch type 190561 : for 1911T-10, 1913-10 190139 : 1921T-10, 1923T-10, 1925T-10 137905 : for 1003T	101040 : metric type 101306 : inch type 21AZB230 : for water-proof of S type (mm) 21BZB104 : for water-proof of S type (inch)	100691 : metric type 100797 : inch type
Magnetic Back 		Unit: mm Special order	900928	900929
Back with Offset Lug 		Unit: mm Special order	101167	100837
Back with Post 		Unit: mm 193172 Custom made	101169	100839
Back with Screw Mount 		Unit: mm 193173 : M6x1, Custom made 193174 : #1/4-28UNF, Custom made	136023 : M6x1 101170 : #1/4-28UNF	136024 : M6x1 100840 : #1/4-28UNF
Adjustable Back 		Unit: mm 136025 : M6x1 129721 : #1/4-20UNC	136026 : M6x1 101168 : #1/4-20UNC	136027 : M6x1 100838 : #1/4-20UNC
Back with Dovetail 		Unit: mm —	900008	Special order
Back with Adjustable Bracket 		Unit: mm —	901963	—

A dial or Digimatic indicator may be held in position by clamping on either the stem or the lug on the back of the indicator. The back of the indicator may need to be interchanged with another type for special applications. A wide variety of backs are available for Mitutoyo Digimatic and dial indicators.

Application



When installing to 297*TB series, please separately prepare 4 fixing screws (Order No.546666 Self-tapping screw only for resin). Do not apply a tightening torque of more than 20N-cm in order to avoid stripping the screw threads.

Spindle Lifting Lever and Cable Optional Accessories for Digimatic and Dial Indicators

Spindle Lifting Lever

- The Spindle Lifting Lever is attached to the top end of the spindle for improved inspection efficiency when using a dial indicator mounted on a stand.

902100

Use for S type Series 1 and F type Series 2 (up to 10mm/.4" range) dial indicators.



21AZB149

Use for S type Series 2, 3, and 4 dial indicators (up to 10mm/.4").

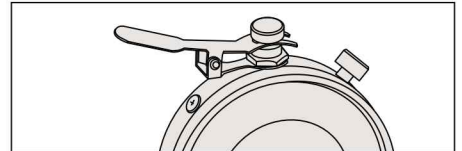
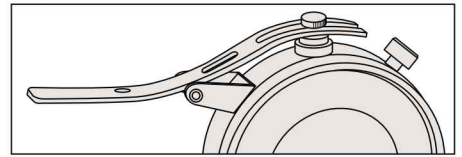


21AZB150

Use for S type Series 2 and 3 dial indicators (from 10mm/.4" up to 20mm/.8").



Application



21BZA205

Use for F type Series 1 dial indicators.



900527: Lever
101171: Screw

902011

Use for F type Series 2 dial indicators (up to 10mm/.4" range).



903424

Use for F type Series 2 dial indicators (up to 20mm/.8" range) and Series 3 and 4 dial indicators (up to 10mm/.4" range).



903307: Lever
192686: Screw

21EZA198

Use for ID-SS, ID-SX, ID-CX



21AZB149: Lever
101171: Screw

* If the spindle lifting lever is installed on a water/dustproof type, waterproof performance is not guaranteed.

Dial Indicators

Comparison measuring instruments which ensure high quality, high accuracy and reliability.

Spindle Lifting Cable

901975: with auto-stop function



Note: This accessory is not applicable to range of 20mm or more, 2048S(B)-10, 2046S(B)-80, 1911T-10, 1913T-10, 1921T-10, 1923T-10, 1925T-10, and 2971TB to 2978TB.

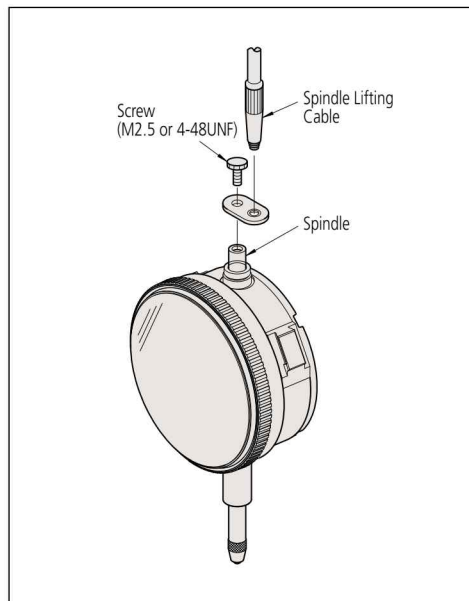
Spindle Lifting Lever

137693

Suitable for 4.8mm spindle diameter.



Application



Limit Stickers

- These are stuck onto the dial face or crystal of a Series 2 dial indicator (55.6mm or 57mm bezel diameter) to indicate tolerance limits.



Red



No.136420
(10 sheets/set)

Green



No.136421
(10 sheets/set)

Yellow



No.136422
(10 sheets/set)

Color-coded Spindle Caps

- 9 color-coded spindle caps are available for dial indicators with a range of 10mm or less.



Color	Order No.	
	Standard	Waterproof
Black	193051	193595
White	193051W	193595W
Red	193051R	193595R
Green	193051G	193595G
Blue	193051B	193595B
Yellow	193051Y	193595Y
Orange	193051D	193595D
Pink	193051P	193595P
Navy	193051S	193595S

Note: This accessory is not applicable to 1003T, 1911T-10, 1913T-10, 1921T-10, 1923T-10, 1925T-10 and 2971TB to 2978TB.

Note: When attaching to small dial indicators, the overall height will be 8mm taller.

Dial Indicators

Comparison measuring instruments which ensure high quality, high accuracy and reliability.

Dial Indicator Repair Tool Kit

Set 7823

Set Configuration



- (1) Spindle rest (**129730**)
- (2) Pin remover (**129732**)
- (3) Punch (**129733**)
- (4) Bearing adjuster (**129734**)
- (5) Pinion set (**129735**)
- (6) Reamer $\varnothing 1$ (**129736**)
- (7) Reamer $\varnothing 0.6$ (**193702**)
- (8) Reamer for pointer ($\varnothing 0.5$: 1/20 taper) (**21JAA273**)
- (9) Pointer removing tool (**126628**)
- (10) Pliers (**901180**)
- (11) Nippers (**901179**)
- (12) Pin rest (**129731**)
- (13) Grease (**901171**)
- (14) Hammer (**901178**)
- (15) Stick (**21JAA314**)
- (16) Brush (**901177**)
- (17) Brush (**901176**)
- (18) Pin-vise (**901175**)
- (19) Screwdriver (Phillips/flat blade) (**901174**)
- (20) Tweezers (**129729**)
- (21) Screwdriver (Phillips) (**901173**)
- (22) Lubricating oil (**21JAA313**)
- (23) Pointer removing tip ($\varnothing 0.8$) (**126630**)
- (24) Pointer removing tip ($\varnothing 0.5$) (**126630B**)
- (25) Pointer removing tip ($\varnothing 1.6$) (**126630C**)
- (26) Adjustable nut (**100699**)
- (27) Case (**901182**)

Application examples

Lubricate bezel to restore smooth operation

Apply the grease (No. 13) to the entire groove of the bezel with the brush (No. 16).

Renew lubricant in bearing

Apply the lubrication oil (No. 22) to the pinion bearing with the stick (No. 15).

Remove the long hand

Position the pointer removing tool (No. 9) on the hole diameter of the minute hand. Push the pivot with the pointer removing tool to remove the long hand.

Remove the little hand

Remove the little hand with the nippers (No. 11).

Adjust a bearing

Press the steel or jeweled bearing into its housing using the bearing adjuster (No. 4).

Remove or replace a pin

Place the spindle on the groove of the spindle rest (No. 1). Remove the pin with the pin remover (No. 2) and the hammer (No. 14). Tap the pin directly with the hammer (No. 14) to replace the pin.

Replace the long or little hand

Screw the pinion rest (No. 5) into the pin rest (No. 12). Support the pinion with the fixed pinion rest, and replace the hand with the punch (No. 3) and hammer (No. 14). Reaming is necessary in order to use a new hand. Use the reamer $\varnothing 1$ (No. 6) or reamer $\varnothing 0.6$ (No. 7) for F-type dial indicators and dial test indicators. Use the reamer for hands ($\varnothing 0.5$ 1/20 taper) (No.8) on S type and T type dial indicators.

Dial Indicator Crystal Setter



7000

- Used for fitting a crystal on dial indicators (Series 1 and 2), dial test indicators, and dial calipers. (Integrated molded crystals are excluded.)
- 8 sizes of crystal setting pads are supplied as standard.
- Application examples
 - Nos. 2 and 3: Pocket-type dial test indicators
 - Nos. 3 and 4: Dial test indicators, universal-type test indicators, full-range of Series 1 dial indicators, full range of dial calipers
 - Nos. 7 and 8: full-range of Series 2 dial indicators, dial height gage with counter
- Size of crystal setting pads (mm)
 - (1) $\varnothing 19.5$ (2) $\varnothing 22.5$ (3) $\varnothing 25.5$ (4) $\varnothing 28.5$
 - (5) $\varnothing 32.5$ (6) $\varnothing 35$ (7) $\varnothing 38$ (8) $\varnothing 50$
- Crystal setting pads set (including No. 1 to No. 8): 21JAA032

Note: Crystal setting pads for large dial indicators (Series 3 and 4) are available by special order.

Replacing bezels and graduation plates

A bezel and graduation plate must be swaged together so that the graduation plate always rotates with the bezel. Assemblies comprised of a swaged bezel and graduation plate are available for some models.

Code No. of dial indicators	Code No. of swaged assemblies
2046S	21AZB132
2109S-10	21AZB138
2046F	903457
2109F	903464