

Micrometer

The origin of Mitutoyo's trustworthy brand of small tool instruments

Coolant Proof Micrometers SERIES 293 — with Dust/Water Protection Conforming to IP65 Level

- Based on new water-proof structural technology, these micrometers provide IP65 protection levels, enabling use in environments that include cutting oil, etc*.
- * Anti-corrosion treatment is required after use.
- $\pm 1\mu\text{m}$ instrumental error (75mm/3" or less measuring range models).
- Measuring data output function is available with a water-resistant connecting cable to realize IP65.
- Oil-resistant materials are used in all plastic components.
- Further-Increased operability thanks to easy-to-read LCD with 30% more character area.
- Auto power ON/OFF function.
- Models equipped with a Digimatic output port can form part of a statistical process control or networked measurement system. (Refer to page A-3 for details.)
- Interface Input Tools are available that enable the conversion of measurement data to keyboard signals that are then directly input to cells in off-the-shelf spreadsheet software such as Excel. (Refer to page A-5 for details.)
- Two types of constant-force devices are available: Ratchet Stop and Ratchet Thimble.
- Measuring faces: Carbide



293-230



293-252-10



These marks indicate that a product has successfully passed IP65-level testing, which is carried out by the independent German certification organization TÜV Rheinland.



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

IP Codes

- Level 6: Dust-proof.
No ingress of dust allowed.
- Level 5: Protected against water jets.
Water projected in jets against the enclosure from any direction shall have no harmful effects.

Technical Data

- Flatness: 0.3 μm /0.00012"
- Dust/water protection level: IP65 (IEC60529) *2
- Measuring force: 5 to 10N
- Battery: **SR44** (1 pc), **938882**, for initial operational checks (standard accessory)
- Battery life: Approx. 1.2 years under normal use
- Standard accessories: Reference bar, 1 pc (except for 0-25mm (0-1") models)
Spanner (**301336**), 1 pc

*2 Rustproofing shall be applied after use.

Optional accessories

(Only for models with data output function)

Connecting cables with output switch *3

1m: **05CZA662**

2m: **05CZA663**

USB Input Tool Direct

USB-ITN-B (2m): **06ADV380B**

Connecting cables for **U-WAVE-T** (160mm)

02AZD790B

For foot switch: **02AZE140B**

Refer to page A-21 for details.



*3 These are dedicated connecting cables for Coolant Proof micrometers.

SPECIFICATIONS

Metric

	Order No	Range	Resolution	Accuracy*	Parallelism	Constant-force device	Mass					
with SPC data output	293-230	0 - 25mm	0.001mm	±1µm	1µm	With ratchet stop	270g					
	293-231	25 - 50mm					330g					
	293-232	50 - 75mm			470g							
	293-233	75 - 100mm			625g							
	293-250-10	100 - 125mm		±2µm	3µm		600g					
	293-251-10	125 - 150mm					740g					
	293-252-10	150 - 175mm		±3µm	4µm		800g					
	293-253-10	175 - 200mm					970g					
	293-254-10	200 - 225mm		±4µm	5µm		1100g					
	293-255-10	225 - 250mm					1270g					
	293-256-10	250 - 275mm		±1µm	1µm		1340g					
	293-257-10	275 - 300mm					1540g					
	without SPC data output	293-234		0 - 25mm	0.001mm		±1µm	1µm	With ratchet thimble	275g		
		293-235		25 - 50mm						335g		
293-236		50 - 75mm	475g									
293-237		75 - 100mm	630g									
293-238		0 - 25mm	±2µm	2µm		With friction thimble	275g					
293-962		1 pc of 293-230 & 293-231 & 293-232					—					
293-963		1 pc of 293-230 & 293-231 & 293-232 & 293-233	—									
without SPC data output		293-240	0 - 25mm	0.001mm			±1µm	1µm		With ratchet stop	270g	
		293-241	25 - 50mm								330g	
		293-242	50 - 75mm				±2µm	2µm			470g	
		293-243	75 - 100mm								625g	
		293-244	0 - 25mm				±1µm	1µm			With ratchet thimble	275g
		293-245	25 - 50mm									335g
		293-246	50 - 75mm				±2µm	2µm				475g
	293-247	75 - 100mm	630g									
	293-248	0 - 25mm	±1µm		1µm		With friction thimble	275g				

Functions

Origin point setting (ABS measurement system): Resets the ABS origin at the current spindle position to the minimum value of the measuring range and switches to ABS mode.

Zero-setting (INC measurement system): A brief press on the ZERO/ABS button sets display to zero at the current spindle position and switches to the incremental (INC) measuring mode. A longer press resets to the ABS measuring mode.

Hold:

Pressing the HOLD button freezes the current value in the display. This function is useful for preserving a measurement in situations of poor visibility where the instrument must be moved away from the workpiece before the reading can be recorded.

Data output*4 :

Models equipped with this function have an output port for transferring measurement data to a Statistical Process Control (SPC) system.

*4: Only models with the data output function

Auto power ON/OFF:

The reading on the LCD disappears after this instrument is idle for about 20 minutes, but the reading and measurement mode are retained. Turning the spindle causes the reading to reappear.

Error alarm:

In case of an overflow on the LCD or a computing error, an error message appears on the LCD, and the measuring function stops. This prevents an instrument from giving an erroneous reading. Also, when the battery voltage drops to a certain level, the low-battery-voltage alarm annunciator appears well before the micrometer becomes unusable.

Function lock*5 :

This function allows the ORIGIN (origin point setting) function and the ZERO (zero-setting) function to be locked to prevent these points being reset accidentally.

*5: All-digit preset type only

* Excluding quantizing error

• All-Digit preset type: models over 125mm (5") measuring range

Inch/Metric

	Order No	Range	Resolution	Accuracy*	Parallelism	Constant-force device	Mass			
with SPC data output	293-330	0 - 1"	/0.001mm	±0.0005"	.0004"	With ratchet stop	270g			
	293-331	1" - 2"					330g			
	293-332	2" - 3"			470g					
	293-333	3" - 4"			625g					
	293-350-10	4" - 5"		±0.001"	.00012"		With ratchet stop	600g		
	293-351-10	5" - 6"						740g		
	293-352-10	6" - 7"		±0.0015"	.00016"			800g		
	293-353-10	7" - 8"						970g		
	293-354-10	8" - 9"		±0.002"	.0002"			1100g		
	293-355-10	9" - 10"						1270g		
	293-356-10	10" - 11"		.00005"	±0.0005"			.0004"	1340g	
	293-357-10	11" - 12"							1540g	
	293-334	0 - 1"		.00005"	±0.0005"			.0004"	With ratchet thimble	275g
	293-335	1" - 2"							With friction thimble	335g
293-960	1 pc of 293-330 & 293-331 & 293-332	—								
293-961	1 pc of 293-330 & 293-331 & 293-232 & 293-333	—								
without SPC data output	293-340	0 - 1"	/0.001mm	±0.0005"	.0004"	With ratchet stop		270g		
	293-341	1" - 2"						330g		
	293-342	2" - 3"		±0.001"	.00008"		470g			
	293-343	3" - 4"					625g			
	293-344	0 - 1"		±0.0005"	.00004"		With ratchet thimble	275g		
	293-345	1" - 2"						335g		
	293-346	2" - 3"		±0.001"	.00008"			475g		
	293-347	3" - 4"						630g		
	293-348	0 - 1"		±0.0005"	.0004"			With friction thimble	275g	

* Excluding quantizing error

• All-Digit preset type: models over 125mm (5") measuring range

DIMENSIONS

Measuring range: 100mm or less

Ratchet stop type over 100mm

Unit: mm

Range	L	a	b	c	d
0 - 25mm	0	6.2	25	2.8	-
25 - 50mm	25	7	32		
50 - 75mm	50	9.8	47		
75 - 100mm	75	11.2	60		
100 - 125mm	-	16.7	76	5.3	132.8
125 - 150mm		18.8	90	5.7	158.2
150 - 175mm		19.1	102	6.1	183.6
175 - 200mm		18.2	115	6.3	208.8
200 - 225mm		16.8	127	6.7	234.2
225 - 250mm		139	5.5	258	
250 - 275mm		18	152	6.5	284
275 - 300mm	166	6.5	309		