# **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.
- ±1µm 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 easyto-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



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**

0.3µm/.000012" Flatness: 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 \*
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.

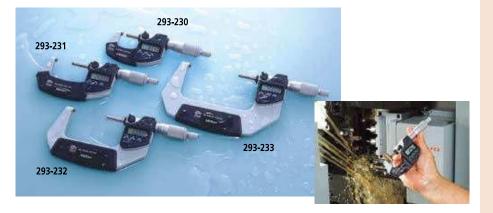




\*3 These are dedicated connecting cables for Coolant Proof micrometers







## **SPECIFICATIONS**

Metric
Order No
293-230
293-231
202 222

	Order No	Range	Resolution	Accuracy*	Parallelism Parallelism	Constant-force device	Mass
	293-230	0 - 25mm	0.001mm	±1µm	1μm	With ratchet stop	270g
	293-231	25 - 50mm					330g
	293-232	50 - 75mm			2μm		470g
	293-233	75 - 100mm		±2µm			625g
	293-250-10	100 - 125mm			3µm		600g
	293-251-10	125 - 150mm					740g
	293-252-10	150 - 175mm		±3µm			800g
	293-253-10	175 - 200mm			- 4μm		970g
with CDC	293-254-10	200 - 225mm					1100g
	293-255-10			±4µm			1270g
uata output	293-256-10	250 - 275mm					1340g
	293-257-10	275 - 300mm			5µm		1540g
	293-234	0 - 25mm		±1µm	1µm	With ratchet thimble	275g
	293-235	25 - 50mm					335g
	293-236				2um		475g
				±2µm	Ζμιτι		630g
293-230 293-231 293-232 293-253 293-255 293-255 293-255 293-255 293-255 293-255 293-255 293-255 293-255 293-236 293-236 293-236 293-240 293-241 293-242 293-243 293-244 293-244 293-244 293-245 293-246 293-246 293-246 293-246 293-246 293-246 293-246 293-246 293-246 293-246 293-246 293-246 293-246 293-246 293-246 293-246				±1µm	1µm	With friction thimble	275g
					_		
	293-963		293-231 & 293-23		_		
	293-240				1um		270g
	293-241	25 - 50mm		±1µm	ιμιιι	With ratchet stop	330g
293-231   25 - 50mm   293-232   50 - 75mm   293-233   75 - 100mm   293-250-10   100 - 125mm   293-251-10   125 - 150mm   293-251-10   175 - 200mm   293-251-10   200 - 225mm   293-251-10   200 - 275mm   293-234   0 - 25mm   293-235   25 - 50mm   293-236   50 - 75mm   293-238   0 - 25mm   293-238   0 - 25mm   293-238   0 - 25mm   293-230 & 293-231 & 293-232 & 293-233   293-240   0 - 25mm   293-244   25 - 50mm   293-244   0 - 25mm   293-245   25 - 50mm   293-246   50 - 75mm   293-247   75 - 100mm   293-247   25 - 50mm   293-247   75 - 100mm   293-247   25 - 50mm   293-247   25 - 50mm   293-247   25 - 50mm   293-248   25 - 50mm   293-249   25 - 50mm   25 - 25 - 25 - 25 - 25 - 25 - 25 - 25					2um		470g
				±2µm	- 2μπ		625g
	0.001mm		275g				
uata output	293-245	25 - 50mm		±1µm	ıµm '	With ratchet thimble	335g
		50 - 75mm	-				475g
		75 - 100mm		±2µm	- 2μπ		630g
	203-248	0 25mm		±1m	1 um	Mith friction thimble	275a

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

		nange		/ tecaracy			
	293-230	0 - 25mm	0.001mm	±1µm	1µm	With ratchet stop	270g
	293-231	25 - 50mm					330g
	293-232	50 - 75mm			2µm		470g
	293-233	75 <b>-</b> 100mm					625g
	293-250-10	100 - 125mm		±2µm	3µm		600g
	293-251-10	125 - 150mm					740g
	293-252-10	150 - 175mm		±3µm			800g
	293-253-10	175 <b>-</b> 200mm			- 4μm		970g
with SPC	293-254-10	200 <b>-</b> 225mm					1100g
data output	293-255-10	225 <b>-</b> 250mm		±4µm			1270g
uata output	293-256-10	250 - 275mm					1340g
	293-257-10	275 <b>-</b> 300mm	]		5µm		1540g
	293-234	0 - 25mm		±1µm	1µm	- With ratchet thimble	275g
	293-235	25 - 50mm					335g
	293-236	50 - 75mm			2µm		475g
	293-237	75 - 100mm		±2µm	Ζμιτι		630g
	293-238	0 - 25mm		±1µm	1µm	With friction thimble	275g
	293-962	1 pc of 293-230 &	293-231& 293-23				
	293-963	1 pc of 293-230 &	293-231 & 293-23	32 & 293-233		_	
	293-240	0 - 25mm	0.001mm	±1µm	1µm	- With ratchet stop	270g
	293-241	25 - 50mm					330g
	293-242	50 - 75mm			2µm		470g
without SPC data output	293-243	75 - 100mm		±2µm	Ζμιτι		625g
	293-244	0 - 25mm		±1µm	1µm	With ratchet thimble	275g
adia output	293-245	25 - 50mm					335g
	293-246	50 - 75mm			2µm		475g
	293-247	75 - 100mm		±2µm	· ·		630g
	293-248	0 - 25mm		±1µm	1µm	With friction thimble	275g

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

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

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

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

Zero-setting (INC measurement system):

to the ABS measuring mode.

before the reading can be recorded. **Data output**\*4:

\*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:

**Functions** 

to ABS mode

Hold:

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.

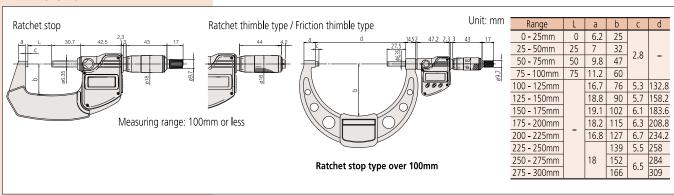
### Function lock\*5:

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

	Inch/Metric						
	Order No	Range	Resolution	Accuracy*	Para <b>ll</b> elism	Constant-force device	Mass
	293-330	0 -1"	.00005" /0.001mm	±.00005"	.00004"	With ratchet stop	270g
	293-331	1" - 2"					330g
	293-332	2" - 3"			.00008"		470g
	293-333	3" - 4"					625g
	293-350-10	4" - 5"	.0001" /0.001mm	±.0001"	.00012"		600g
	293-351-10	5" - 6"					740g
	293-352-10	6" - 7"		±.00015"			800g
with SPC data output	293-353-10	7" - 8"			.00016"		970g
	293-354-10	8" - 9"					1100g
	293-355-10	9" -10"		±.0002"			1270g
	293-356-10	10" - 11"					1340g
	293-357-10	11" - 12"			.0002 "		1540g
	293-334	0 -1"	.00005" - /0.001mm	±.00005"	.00004"	With ratchet thimble	275g
	293-335					With friction thimble	2/39
	293-336	1" - 2"				with inction thimble	335g
	293-960	1 pc of 293-330 &	293-331& 293-33	With ratchet stop	_		
	293-961	1 pc of 293-330 &	293-331 & 293-23		_		
without SPC data output	293-340	0 -1"	00005" - /0.001mm	±.00005" ±.0001"	.00004"	- With ratchet stop	270g
	293-341	1" - 2"					330g
	293-342	2" - 3"			.00008"		470g
	293-343	3" - 4"					625g
	293-344	0 -1"		±.00005"	.00004"	- With ratchet thimble	275g
	293-345	1" - 2"					335g
	293-346	2" - 3"					475g
	293-347	3" - 4"		±.0001"			630g
	293-348	0 -1"		±.00005"	.00004"	With friction thimble	275g

<sup>\*</sup> Excluding quantizing error

#### **DIMENSIONS**



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