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 N
293-230
293-231

	Order No	Range	Resolution	Accuracy*	Parallelism	Constant-force device	Mass
with SPC	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
	293-254-10	200 - 225mm					1100g
data output	293-255-10	225 - 250mm		±4µm			1270g
uala 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	50 - 75mm			2µm		475g
	293-237	75 - 100mm		±2µm	Ζμιτι		630g
	293-238	0 - 25mm		±1µm	1µm	With friction thimble	275g
	293-962		293-231& 293-23		_		
	293-963	1 pc of 293-230 &	293-231 & 293-23		_		
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		470g
	293-243	75 - 100mm		±2µm	Ζμιτι		625g
	293-244	0 - 25mm		±1µm	1µm	- With ratchet thimble	275g
	293-245	25 - 50mm					335g
	293-246	50 - 75mm			2µm		475g
	293-247	75 - 100mm		±2µm	Zpili		630g
	202 240	0 05		4	4	ARCH CARROLL ALCOHOL	0.75

293-230 293-231 293-232 293-233 293-250-10	0 - 25mm 25 - 50mm 50 - 75mm		±1µm	1µm		270g 330g
293-232 293-233	50 - 75mm		±1µm	ιμιιι		220~
293-233				ιμπι	With ratchet stop	330 <u>9</u>
	75 - 100mm		'	2μm		470g
293-250-10	7.5 10011111		±2µm			625g
233 230 10	100 - 125mm			3µm		600g
293-251-10	125 - 150mm					740g
293-252-10	150 - 175mm		±3µm			800g
293-253-10	175 - 200mm	0.001mm		- 4μm		970g
293-254-10	200 - 225mm					1100g
293-255-10	225 - 250mm		±4µm			1270g
293-256-10	250 - 275mm					1340g
293-257-10	275 - 300mm			5µm		1540g
293-234	0 - 25mm			1µm	- With ratchet thimble	275g
293-235	25 - 50mm		±1µm			335g
293-236	50 - 75mm			2,,,,,		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		_		
293-240	0 - 25mm			1.um		270g
### ##################################	±1µm	ιμιιι	Mith ratchet step	330g		
293-242	50 - 75mm			2	with ratchet stop	470g
293-243	75 - 100mm		±2µm	Ζμιτι		625g
293-244	0 - 25mm	275 - 300mm	0.001mm			
293-245	25 - 50mm		±1µm	ιμπι		335g
293-246	50 - 75mm			Zum		475g
293-247	75 - 100mm		±2µm	Ζμιιι		630g
293-248	0 - 25mm		±1µm	1µm	With friction thimble	275g
	293-253-10 293-254-10 293-255-10 293-255-10 293-234 293-234 293-237 293-238 293-238 293-962 293-963 293-963 293-941 293-241 293-242 293-243 293-244 293-244 293-244 293-245 293-246 293-247 293-246	293-252-10 150 - 175mm 293-253-10 175 - 200mm 293-254-10 200 - 225mm 293-255-10 225 - 250mm 293-256-10 250 - 275mm 293-257-10 275 - 300mm 293-234 0 - 25mm 293-235 25 - 50mm 293-237 75 - 100mm 293-238 0 - 25mm 293-239 1 pc of 293-230 & 293-963 1 pc of 293-230 & 293-963 1 pc of 293-230 & 293-240 0 - 25mm 293-241 25 - 50mm 293-242 50 - 75mm 293-243 75 - 100mm 293-244 0 - 25mm 293-245 25 - 50mm 293-246 50 - 75mm 293-247 75 - 100mm 293-246 50 - 75mm 293-247 75 - 100mm 293-248 0 - 25mm	293-252-10 150 - 175mm 293-253-10 175 - 200mm 293-254-10 200 - 225mm 0.001mm 293-255-10 225 - 250mm 0.001mm 293-256-10 250 - 275mm 0.001mm 293-257-10 275 - 300mm 0.001mm 293-234 0 - 25mm 0.001mm 293-235 25 - 50mm 0.001mm 293-237 75 - 100mm 0.001mm 293-238 0 - 25mm 0.001mm 293-963 1 pc of 293-230 & 293-231 & 2	293-252-10 150 - 175 mm 293-253-10 175 - 200 mm 293-254-10 200 - 225 mm 293-255-10 225 - 250 mm 293-256-10 225 - 250 mm 293-256-10 250 - 275 mm 293-234 0 - 25 mm 293-235 25 - 50 mm 293-236 50 - 75 mm 293-237 75 - 100 mm 293-238 0 - 25 mm 293-238 0 - 25 mm 293-230 & 293-231 & 293-232 & 293-233 293-240 0 - 25 mm 293-241 25 - 50 mm 293-241 25 - 50 mm 293-242 50 - 75 mm 293-243 75 - 100 mm 293-244 0 - 25 mm 293-244 0 - 25 mm 293-244 0 - 25 mm 293-245 25 - 50 mm 293-246 50 - 75 mm 293-246 50 - 75 mm 293-246 50 - 75 mm 293-247 75 - 100 mm 293-247 75 - 100 mm 293-248 0 - 25 mm 293-248 0 -	293-252-10 150 - 175mm 293-253-10 175 - 200mm ±3μm 0.001mm 4μm 293-255-10 225 - 250mm 293-255-10 225 - 250mm ±4μm 5μm 293-256-10 250 - 275mm 293-234 0 - 25mm 293-235 25 - 50mm 293-236 50 - 75mm 293-237 75 - 100mm ±2μm 1μm 1μm 2μm 293-238 0 - 25mm 293-230 & 293-231& 293-232 293-963 1 pc of 293-230 & 293-231& 293-232 293-963 1 pc of 293-230 & 293-231& 293-232 293-240 0 - 25mm 293-241 25 - 50mm 293-242 50 - 75mm 293-243 75 - 100mm 293-244 0 - 25mm 293-244 0 - 25mm 293-245 25 - 50mm 293-246 50 - 75mm 293-246 50 - 75mm 293-246 50 - 75mm 293-247 75 - 100mm 293-248 0 - 25mm 24μm 24	293-252-10 150 - 175 mm 293-253-10 175 - 200mm 293-253-10 275 - 200mm 293-255-10 225 - 250mm 293-256-10 225 - 250mm 293-256-10 250 - 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 293-238 0 - 25mm 293-230 & 293-231 & 293-232 293-233 293-231 & 293-232 293-240 0 - 25mm 293-241 25 - 50mm 293-241 25 - 50mm 293-242 50 - 75mm 293-243 75 - 100mm 293-244 0 - 25mm 293-244 0 - 25mm 293-245 25 - 50mm 293-246 50 - 75mm 293-246 50 - 75mm 293-246 50 - 75mm 293-246 50 - 75mm 293-247 75 - 100mm 293-248 0 - 25mm 293-246 50 - 75mm 293-247 75 - 100mm 293-248 0 - 25mm 293-248 293-238 293-238 293-238 293-238 293-238

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

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.

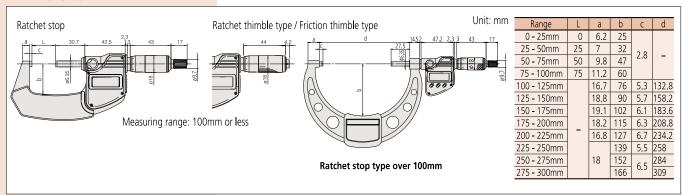
Function lock*5:

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

	Inch/Metric						
	Order No	Range	Resolution	Accuracy*	Para ll 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"		±.0001"			625g
	293-350-10	4" - 5"	.0001" /0.001mm		.00012"		600g
	293-351-10	5" - 6"					740g
	293-352-10	6" - 7"		±.00015"			800g
ith CDC	293-353-10	7" - 8"			.00016"		970g
with SPC	293-354-10	8" - 9"					1100g
data output	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	7 2/39
	293-336	1" - 2"				with inction thimble	335g
	293-960	1 pc of 293-330 & 293-331& 293-332				With ratchet stop	_
	293-961	1 pc of 293-330 & 293-331 & 293-232 & 293-333					_
without SPC data output	293-340	0 -1"	00005" - /0.001mm	±.00005"	.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"			.00008"		475g
	293-347	3" - 4"		±.0001"	.00000		630g
	293-348	0 -1"		±.00005"	.00004"	With friction thimble	275g

^{*} Excluding quantizing error

DIMENSIONS



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