

SCOPE OF ACCREDITATION TO ISO/IEC 17025:2017 & KS Q ISO/IEC 17025:2017

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CALIBRATION

Valid To : Dec. 02, 2026.

Accreditation No : KC01-079

In recognition of the successful completion of the KOLAS evaluation process,
accreditation is granted to this laboratory to perform the following calibrations

Field Code	Item of Calibration	on-site	Field Code	Item of Calibration	on-site	Field Code	Item of Calibration	on-site
102. Linear dimension			10323	Alignment telescopes	N	10609	Micro indicators,	Y
10201	Balls	N	10326	Laser level	N		test indicators	
10206	Dial/cylinder gauge testers	N	10327	Optical wedges	N	10610	Micrometer heads	Y
10207	Doctor blades	N	104. Form			10611	3-points, micrometers	Y
10208	Laser distance meters	N	10401	Form testers	Y	10612	Inside micrometers	Y
10209	End bars	N	10404	Optical flats	N	10613	Outside micrometers	Y
10210	Extensometers	Y	10405	Optical parallels	N	10617	Standard sieves	N
10211	Feeler gauges	Y	10406	Parallel blocks	N	10620	Welding gauges	Y
10212	Film applicators	N	10407	Precision surface plates	Y	10621	Optical micrometers	N
10213	Gap gauges	N	10409	Roundness measurement instruments	Y	201. Mass		
10214	Gauge blocks, by comparison	N				20109	Electric balances	Y
10216	Height gauges/measuring machines	Y	10412	Straight edges	N	20112	Platform scale balances	Y
			10413	Straight rules	N	20113	Spring scale balances	Y
10220	Standard measuring machines	Y	10415	Test bars	N	20116	Weights	N
10223	Electronic micrometers	N	105. Complex geometry			202. Force		
10224	Height micrometers, riser blocks	N	10501	Base gauges for electric bulb	N	20203	Tension/compression testing machines	Y
			10502	Bench centers	N			
10225	Laser scan micrometers	Y	10503	Contact coordinate measuring machines	Y	20204	Push-pull gauges	N
10227	Standard tape rules	N				203. Torque		
10228	Cylindrical plug/pin gauges, thread measuring wire gauges	N	10504	Non-contact coordinate measuring machines	Y	20303	Torque wrenches/drivers	Y
10229	Radius gauges	N	10511	Measuring microscopes, profile projectors	Y	204. Pressure		
10230	Cylindrical ring gauges	N				20402	Manometers	N
10232	Step gauges	N	10512	Micro measuring microscopes	N	20404	Hydraulic pressure ballances	N
10233	Taper thickness gauges	N	10514	Taper plug gauges	N	20406	Absolute pressure gauges	Y
10234	Ultrasonic thickness gauges	Y	10515	Taper ring gauges	N	20407	Blood pressure gauges	Y
10235	Ultrasonic/coating thickness specimens	N	10517	Stylus type roughness testers	Y	20408	Compound pressure gauges	Y
10236	Coating thickness testers	Y				20409	Differential pressure gauges	Y
			10518	Socket gauges for electric blub	N	20411	Gauge pressure gauges	Y
						20412	Pressure transducers/transmitters	Y
103. Angle			10519	Roughness standard/comparison specimens	N	20413	Dial type vacuum gauges	Y
10303	Autocollimators	N				20414	Water depth meters	Y
10304	Bevel protractors	N	10525	Thread plug gauges	N	209. Fluid flow		
10306	Clinometers	N	10526	Taper thread plug gauges	N	20908	Gas flowmeters; differential pressure	N
10308	Fine angle generators, level comparators	N	10527	Thread ring gauges	N			
10310	Indexing tables	N	10528	Taper thread ring gauges	N	20909	Liquid flowmeters; differential pressure	N
10311	Plate/square/electric levels	N	10529	V-blocks, box blocks	N			
10312	Auto levels	N	106. Various dimensional			20910	Liquid flowmeters; electromagnetic	N
10316	Rotary tables	N	10601	Inside/outside/gear tooth calipers, caliper gauges	Y			
10317	Sine bars, plates, tables, centers	N	10603	Cylinder/bore gauges	Y	20911	Gas flowmeters; thermal mass, etc.	N
10318	Squareness testers, right angle testers	N	10604	Depth gauges, depth micrometers	Y			
10319	Cylindrical squares	N	10605	Dial/digital gauges	Y	20912	Liquid flowmeters; Coriolis, etc.	N
10320	Precision squares	N	10608	Grind gauges	N			
						20914	Gas flowmeters; positive displacement	N

209. Fluid flow			40302	Clamp ammeters/voltmeters	Y	901. Chemical analysis		
20915	Liquid flowmeters; positive displacement	N	40303	AC voltage/current calibrators	Y	90101	Breath alcohol analyzers	N
			40310	Power factor meters	Y	90103	Gas analyzers	Y
20916	Gas flowmeters; turbine	N	40311	AC power meters	Y			
			40312	AC power supplies	Y			
20917	Liquid flowmeters; turbine	N	40313	Puncture/safety testers	Y			
			40318	AC voltmeters	Y			
20918	Gas flowmeters; ultrasonic	N	404. Other DC & LF Measurements					
			40410	Line frequency meters	Y			
20919	Liquid flowmeters; ultrasonic	N	40411	Function generators	Y			
			40414	LF impulse generators	Y			
20920	Gas flowmeters; variable area	N	40416	Leakage current testers	Y			
			40417	Electronic AC/DC loads	Y			
20921	Liquid flowmeters; variable area	N	40419	Analogue/Digital multimeters	Y			
			40421	Oscilloscopes	Y			
20922	Gas flowmeters; vortex	N	40424	Volt/current recorders	Y			
			40425	Relay test sets	Y			
20923	Liquid flowmeters; vortex	N	501. Contact thermometry					
			50101	Temperature generators; ovens, furnaces, isothermal liquid baths, ice-point baths, dry-block calibrators	Y			
210. Hardness								
21001	Brinell hardness testers	Y						
21002	Rockwell hardness testers	Y						
21003	Shore hardness testers	Y	50102	Temperature indicators/ recorders/controllers, temperature calibrators	Y			
21004	Vickers hardness testers	Y						
21005	Durometer hardness testers	N						
21006	Leeb hardness testers	N	50103	Glass thermometers; liquid -in-glass, Beckmann	N			
301. Time/frequency								
30103	General frequency sources	N	50104	Resistance thermometers; SPRT, IPRT, thermistors, etc.	Y			
30104	Frequency meters/counters	N						
30106	Time interval meters/ stop watches/timers	Y	50105	Thermal expansion thermometers; bimetal, gas or liquid type	Y			
302. Velocity & revolution			50106	Thermocouples; noble metal, base metal	Y			
30201	Standard RPM generators	Y						
30202	Contact type tachometers	N	50107	Temperature transducers	Y			
30203	Photo tachometers /stroboscopes	N	502. Non contact thermometry					
			50204	Standard radiation thermometers	N			
401. DC voltage & current								
40101	DC ammeters	Y	503. Humidity					
40103	DC voltage/current calibrators	Y	50302	Relative humidity hygrometers; polimer thin film, hair, etc.	N			
40104	Electrical temperature calibrators	Y	50304	Temperature humidity recorders; hygrothermograph, etc.	N			
40108	DC power supplies	Y	50305	Transducers; relative humidity	N			
40112	DC voltmeters	Y						
402. Resistance, Capacitance and Inductance			50306	Humidity generators; two-pressure, two-temperature, flow mixing humidity generator, constant temperature and humidity chamber, etc.	Y			
40205	Earth testers	Y						
40210	Insulation testers	Y						
40213	Resistance bridges & Similar instruments	N						
40214	Resistance meters	Y						
40215	Resistors	N	701. Photometry					
403. AC voltage, current & power			70101	Illuminance meters	N			
40301	AC ammeters	Y						

Note

1. This laboratory provides calibration services in permanent standard laboratory and at on-site.
2. Laboratory conducts on-site calibration should meet requirements of KOLAS-SR-007.
3. On-site calibration is allowed to items with marking 'Y', not allowed to items with marking 'N'.
4. Measurement uncertainty normally is quoted as an expanded uncertainty at a coverage probability of 95 %, which usually requires the use of a coverage factor of $k=2$. It expresses the lowest uncertainty of measurement that can be provided by accredited calibration laboratories in normal conditions.
5. Due to the calibration environment such as reference standards or customers' facilities, it is note that uncertainty of measurement on a calibration certificate may be expressed larger than measurement uncertainty on scope of accreditation in general.

102. Linear dimension

Measured Quantity Instrument or Gauge	Field Code	Range	Measurement uncertainty (The Confidence Level is about 95 %)	Standard/Method of Measurement etc.
Balls Q & Q Co., Ltd. Roundness	10201	(ϕ 0 ~ ϕ 40) mm (ϕ 40 ~ ϕ 100) mm (ϕ 10 ~ ϕ 100) mm	$\sqrt{0.3^2 + 0.002\ 9^2 \times l^2}$ μ m $\sqrt{0.4^2 + 0.002\ 9^2 \times l^2}$ μ m (Unit of l : mm) 0.2 μ m	Standard measuring machine /QECI-LE201
Dial/cylinder gauge testers	10206	(0 ~ 5) mm (5 ~ 25) mm (25 ~ 100) mm	$\sqrt{0.11^2 + 0.002\ 7^2 \times l^2}$ μ m $\sqrt{0.11^2 + 0.002\ 9^2 \times l^2}$ μ m $\sqrt{0.21^2 + 0.002\ 9^2 \times l^2}$ μ m (Unit of l : mm)	Gauge block /QECI-LE206
Doctor blades	10207	(0 ~ 10) mm	1.0 μ m	Height micrometer /QECI-LE207
Laser distance meters	10208	(0 ~ 25) m	$\sqrt{0.8^2 + 0.001\ 5^2 \times l^2}$ mm (Unit of l : m)	Laser Calibration System /QECI-LE208
End bars	10209	(25 ~ 1 000) mm (1 000 ~ 2 000) mm	$\sqrt{0.3^2 + 0.002\ 9^2 \times l^2}$ μ m $\sqrt{1.2^2 + 0.003\ 0^2 \times l^2}$ μ m (Unit of l : mm)	Gauge block, Electronic micrometer /QECI-LE209
Extensometers	10210	(0 ~ 500) mm	$\sqrt{1.2^2 + 0.002\ 8^2 \times l^2}$ μ m (Unit of l : mm)	Gauge block /QECI-LE210
Feeler gauges	10211	(0 ~ 5) mm	0.3 μ m	Standard measuring machine /QECI-LE211
Film applicators	10212	(0 ~ 10) mm	1 μ m	Height micrometer /QECI-LE212
Gap gauges	10213	(1 ~ 200) mm (200 ~ 500) mm	$\sqrt{1.3^2 + 0.002\ 6^2 \times l^2}$ μ m $\sqrt{2.0^2 + 0.004\ 7^2 \times l^2}$ μ m (Unit of l : mm)	Height micrometer, Electronic micrometer /QECI-LE213
Gauge blocks, by comparison	10214	(0.5 ~ 100) mm (125 ~ 500) mm	$\sqrt{81^2 + 1.21^2 \times l^2}$ nm $\sqrt{95^2 + 1.30^2 \times l^2}$ nm (Unit of l : mm)	Gauge block /QECI-LE214
Height gauges/measuring machines Height gauges Height measuring machines	10216	(0 ~ 1 500) mm (0 ~ 1 000) mm	$\sqrt{7^2 + 0.002\ 9^2 \times l^2}$ μ m $\sqrt{0.6^2 + 0.002\ 9^2 \times l^2}$ μ m (Unit of l : mm)	Gauge block /QECI-LE216

102. Linear dimension

Measured Quantity Instrument or Gauge	Field Code	Range	Measurement uncertainty (The Confidence Level is about 95 %)	Standard/Method of Measurement etc.
Standard measuring machines	10220	(0 ~ 500) mm	$\sqrt{0.2^2 + 0.002 7^2 \times l^2}$ μm (Unit of l : mm)	Gauge block /QECI-LE220
Electronic micrometers	10223	±50 μm ±50 μm ~ ±2 mm	0.1 μm 1 μm	Gauge block /QECI-LE223
Height micrometers Block calibration Head calibration Riser blocks Parallelism	10224	(0 ~ 310) mm (310 ~ 1 010) mm (0 ~ 20) mm 150 mm 300 mm 600 mm	$\sqrt{0.6^2 + 0.002 8^2 \times l^2}$ μm $\sqrt{0.7^2 + 0.002 9^2 \times l^2}$ μm (Unit of l : mm) 0.6 μm 0.8 μm 1.0 μm 1.8 μm 0.6 μm	Gauge block, Electronic micrometer /QECI-LE224, /QECI-LE224-1
Laser scan micrometers	10225	(ø0 ~ ø60) mm	$\sqrt{0.31^2 + 0.003 8^2 \times l^2}$ μm (Unit of l : mm)	Cylindrical plug/pin gauge /QECI-LE225
Standard tape rules	10227	(0 ~ 25) m (25 ~ 50) m (50 ~ 75) m (75 ~ 100) m	$\sqrt{0.03^2 + 0.001 5^2 \times l^2}$ mm $\sqrt{0.05^2 + 0.001 5^2 \times l^2}$ mm $\sqrt{0.10^2 + 0.001 5^2 \times l^2}$ mm $\sqrt{0.12^2 + 0.001 5^2 \times l^2}$ mm (Unit of l : m)	Laser tape measurement system /QECI-LE227
Cylindrical plug/pin gauges, thread measuring wire gauges Cylindrical plug/pin gauges Thread measuring wire gauges Roundness	10228	(ø0.2 ~ ø200) mm (ø200 ~ ø500) mm (ø0.17 ~ ø4.39) mm (ø1 ~ ø200) mm	$\sqrt{0.27^2 + 0.003 7^2 \times l^2}$ μm $\sqrt{1.9^2 + 0.004 8^2 \times l^2}$ μm $\sqrt{0.39^2 + 0.003 6^2 \times l^2}$ μm (Unit of l : mm) 0.3 μm	Standard measuring machine, Roundness measurement instrument /QECI-LE228
Radius gauges	10229	(0 ~ 100) mm (100 ~ 500) mm	$\sqrt{0.6^2 + 0.002 8^2 \times l^2}$ μm $\sqrt{2.0^2 + 0.004 1^2 \times l^2}$ μm (Unit of l : mm)	Non-contact coordinate measuring machine /QECI-LE229
Cylindrical ring gauges Roundness	10230	(ø2 ~ ø200) mm (ø200 ~ ø500) mm (ø2 ~ ø500) mm (ø2 ~ ø200) mm (ø200 ~ ø500) mm	$\sqrt{0.1^2 + 0.002 8^2 \times l^2}$ μm $\sqrt{1.9^2 + 0.004 7^2 \times l^2}$ μm (Unit of l : mm) 0.2 μm $\sqrt{0.3^2 + 0.003 8^2 \times l^2}$ μm $\sqrt{2.7^2 + 0.005 8^2 \times l^2}$ μm (Unit of l : mm)	Gauge block, Standard measuring machine /QECI-LE230

102. Linear dimension

Measured Quantity Instrument or Gauge	Field Code	Range	Measurement uncertainty (The Confidence Level is about 95 %)	Standard/Method of Measurement etc.
Step gauges	10232	(0 ~ 300) mm (300 ~ 1 000) mm (1 000 ~ 1 500) mm	$\sqrt{1.2^2 + 0.002 7^2 \times l^2}$ μm $\sqrt{1.2^2 + 0.002 8^2 \times l^2}$ μm $\sqrt{1.6^2 + 0.002 8^2 \times l^2}$ μm (Unit of l : mm)	Gauge block /QECI-LE232
Taper thickness gauges	10233	(0 ~ 90) mm	$\sqrt{1.4^2 + 0.003 7^2 \times l^2}$ μm (Unit of l : mm)	Non-contact coordinate measuring machine /QECI-LE233
Ultrasonic thickness gauges	10234	(0 ~ 500) mm	$\sqrt{8^2 + 0.003 9^2 \times l^2}$ μm (Unit of l : mm)	Ultrasonic specimen /QECI-LE234
Ultrasonic/coating thickness specimens ; coating Ultrasonic Flatness	10235	(0 ~ 30) mm (2 ~ 800) mm	$\sqrt{0.3^2 + 0.002 7^2 \times l^2}$ μm $\sqrt{0.7^2 + 0.002 9^2 \times l^2}$ μm (Unit of l : mm) 0.5 μm	Standard measuring machine /QECI-LE235, /QECI-LE235-1
Coating thickness testers	10236	(0 ~ 20) mm	$\sqrt{1.2^2 + 0.002 7^2 \times l^2}$ μm (Unit of l : mm)	Thickness specimen /QECI-LE236

103. Angle

Measured Quantity Instrument or Gauge	Field Code	Range	Measurement uncertainty (The Confidence Level is about 95 %)	Standard/Method of Measurement etc.
Autocollimators	10303	± 15'	$\sqrt{0.4^2 + 0.000 3^2 \times R^2}$ '' (Unit of R : '')	Level comparator /QECI-AN303
Bevel protractors Angle accuracy Straightness	10304	(0 ~ 360)°	1' 1.2 μm	Rotary table, Electronic micrometer /QECI-AN304
Clinometers	10306	(0 ~ 360)°	4 ''	Rotary table /QECI-AN306
Fine angle generators, Level comparators Angle accuracy Flatness	10308	± 15' 530 mm × 60 mm	$\sqrt{0.6^2 + 0.000 3^2 \times R^2}$ '' (Unit of R : '') 1.3 μm	Autocollimator /QECI-AN308
Indexing tables	10310	(0 ~ 360)°	1.0 ''	Autocollimator, Polygon /QECI-AN310

103. Angle

Measured Quantity Instrument or Gauge	Field Code	Range	Measurement uncertainty (The Confidence Level is about 95 %)	Standard/Method of Measurement etc.
Plate/square/electric levels Angle(Bubble Tube Type) Angle(Electric Type) Flatness of Base Squareness	10311	± 0.1 mm/m ($\pm 10 \sim \pm 20$) mm/m ± 5 mm/m ($\pm 5 \sim \pm 10$) mm/m (0 ~ 300) mm (0 ~ 300) mm	$\sqrt{0.52^2 + 0.0003^2 \times R^2}$ " 0.6 mm/m $\sqrt{0.3^2 + 0.0003^2 \times R^2}$ " $\sqrt{1.5^2 + 0.0003^2 \times R^2}$ " (Unit of R : ") 0.9 μ m 6.3 μ m/m	Level comparator Rotary Table /QECI-AN311, /QECI-AN311-1
Auto levels Azimuth angle Line of sight straightness Optical Micrometer	10312	(0 ~ 360) $^\circ$ 0 m ~ ∞ ± 2.5 mm	3 " 0.15 mm 3 μ m	Collimating calibration system /QECI-AN312
Rotary tables	10316	(0 ~ 360) $^\circ$	1.0 "	Autocollimator, Polygon /QECI-AN316
Sine bars, plates, tables, Centers Distance between center of roller Flatness of measuring surface Parallelism between the measuring surface and the roller	10317	(50 ~ 200) mm	1.8 μ m 0.5 μ m 0.5 μ m	Angle gauge block, Electronic micrometer /QECI-AN317
Squareness testers	10318	(0 ~ 480) mm	$\sqrt{1.4^2 + 0.003^2 \times l^2}$ μ m (Unit of l : mm)	Standard cylindrical square /QECI-AN318
Cylindrical squares	10319	(0 ~ 500) mm	1.5 μ m	Standard cylindrical square /QECI-AN319
Precision squares Squareness Parallelism Straightness	10320	(0 ~ 500) mm (500 ~ 1 000) mm (0 ~ 1 000) mm (0 ~ 1 000) mm	$\sqrt{1.3^2 + 0.003^2 \times l^2}$ μ m (Unit of l : mm) 4.0 μ m 1.5 μ m 1.9 μ m	Cylindrical square, Contact coordinate measuring machine /QECI-AN320
Alignment telescopes Angle accuracy Line of sight Straightness Optical Micrometer	10323	$\pm 5'$ 0 m ~ ∞ ± 2.5 mm	1.3 " 0.15 mm 3 μ m	Collimator /QECI-AN323

103. Angle

Measured Quantity Instrument or Gauge	Field Code	Range	Measurement uncertainty (The Confidence Level is about 95 %)	Standard/Method of Measurement etc.
Laser levels Horizontality Squareness	10326	(0 ~ 2) m 90 °	0.11 mm 0.07 °	CCD CAMERA /QECI-AN326
Optical wedges	10327	± 15 "	0.9 "	Autocollimator /QECI-AN327

104. Form

Measured Quantity Instrument or Gauge	Field Code	Range	Measurement uncertainty (The Confidence Level is about 95 %)	Standard/Method of Measurement etc.
Form testers Height (Z axis) Traversing length (X axis) Angle	10401	(0 ~ 10) μ m (0.01 ~ 20) mm (0 ~ 50) mm 1" ~ 45°	0.04 μ m 0.07 μ m 1.00 μ m 3 "	Step block, Gauge block, Pitch master /QECI-LE401
Optical flats	10404	(ø 10 ~ ø 100) mm	$\sqrt{23^2 + 0.428^2 \times d^2}$ nm (Unit of <i>d</i> : mm)	Optical flat /QECI-LE404
Optical parallels Flatness Parallelism	10405	(ø 10 ~ ø 50) mm	0.04 μ m 0.08 μ m	Optical flat, Gauge block comparator /QECI-LE405
Parallel blocks Parallelism Flatness Difference of height between parallel block 1 and 2	10406	(0 ~ 500) mm	0.8 μ m 0.8 μ m 0.8 μ m	Electronic micrometer /QECI-LE406
Precision surface plates	10407	(0.09 ~ 1) m ² (1 ~ 1.44) m ² (1.44 ~ 2.7) m ² (2.7 ~ 4.84) m ² (4.84 ~ 9) m ² (9 ~ 17.5) m ²	0.7 μ m 0.9 μ m 1.1 μ m 1.4 μ m 1.8 μ m 2.2 μ m	Electronic Level /QECI-LE407

104. Form

Measured Quantity Instrument or Gauge	Field Code	Range	Measurement uncertainty (The Confidence Level is about 95 %)	Standard/Method of Measurement etc.
Roundness measurement instruments Detector accuracy Magnification accuracy Circumferential direction rotating error of spindle Axial direction rotating error of spindle Straightness of column	10409	(0 ~ 0.1) mm 360° 360° (0 ~ 450) mm	0.30 μm 2.6×10^{-3} 0.03 μm 0.03 μm 1.3 μm	Roundness Standard Specimen, Optical flat, Cylindrical square /QECI-LE409
Straight edges Straightness Parallelism	10412	(0 ~ 2 000) mm	0.6 μm 1.5 μm	Electronic micrometer, Precision surface plate /QECI-LE412
Straight rules	10413	(0 ~ 5) m	$\sqrt{0.3^2 + 0.0015^2 \times l^2}$ mm (l 의 단위 : m)	Laser tape measurement system /QECI-LE413
Test bars Outside diameter Straightness Run-out Flank angle	10415	(0 ~ 500) mm (ø 10 ~ ø 100) mm	$\sqrt{0.4^2 + 0.0036^2 \times l^2}$ μm (Unit of l : mm) 0.9 μm 0.9 μm 2 "	Gauge block, Electronic micrometer /QECI-LE415

105. Complex geometry

Measured Quantity Instrument or Gauge	Field Code	Range	Measurement uncertainty (The Confidence Level is about 95 %)	Standard/Method of Measurement etc.
Base gauges for electric bulb Inside diameter of GO/NO-GO side Screw	10501	($\phi 1 \sim \phi 50$) mm ($\phi 1 \sim \phi 50$) mm	$\sqrt{0.2^2 + 0.0037^2 \times l^2}$ μm (Unit of l : mm) $\sqrt{0.9^2 + 0.0040^2 \times l^2}$ μm (Unit of l : mm)	Height micrometer, Form tester /QECI-LE501
Bench centers Height difference of both the center Flatness of the bed side	10502	(0 ~ 500) mm	2.4 μm 1.1 μm	Test bar, Electronic micrometer /QECI-LE502
Contact coordinate measuring machines Indicating accuracy Squareness Straightness	10503	(0 ~ 1 000) mm (1 000 ~ 1 500) mm	$\sqrt{1.9^2 + 0.0040^2 \times l^2}$ μm $\sqrt{2.0^2 + 0.0040^2 \times l^2}$ μm (Unit of l : mm) 4.0 μm 0.9 μm	Gauge block, Precision square, Straight edge /QECI-LE503
Non-contact coordinate measuring machines Indicating accuracy Angle Squareness	10504	(0 ~ 600) mm (0 ~ 180) ° (0 ~ 450) mm	$\sqrt{0.4^2 + 0.0028^2 \times l^2}$ μm (Unit of l : mm) 5 '' 0.2 ''	Standard scale, Angle gauge block /QECI-LE504
Measuring microscopes, Profile projectors Feed accuracy of workstage Squareness Magnification Error Angle division accuracy	10511	(0 ~ 300) mm (0 ~ 360) °	$\sqrt{0.4^2 + 0.0028^2 \times l^2}$ μm (Unit of l : mm) 1.7 μm 2.4×10^{-4} 1.1 ′	Standard scale, Square /QECI-LE511, /QECI-LE511-1
Micro measuring microscopes	10512	(0 ~ 20) mm	0.7 μm	Standard scale /QECI-LE512
Taper plug gauges Taper half angle Small-end diameter Step diameter Big-end diameter Gauge length Step length	10514	(0 ~ 65) ° ($\phi 2 \sim \phi 200$) mm ($\phi 2 \sim \phi 200$) mm ($\phi 2 \sim \phi 200$) mm (0 ~ 250) mm (0 ~ 150) mm	1 '' $\sqrt{0.6^2 + 0.0027^2 \times l^2}$ μm $\sqrt{0.6^2 + 0.0027^2 \times l^2}$ μm $\sqrt{0.7^2 + 0.0030^2 \times l^2}$ μm $\sqrt{0.6^2 + 0.0030^2 \times l^2}$ μm $\sqrt{0.6^2 + 0.0030^2 \times l^2}$ μm (Unit of l : mm)	Standard measuring machine, Electronic micrometer /QECI-LE514

105. Complex geometry

Measured Quantity Instrument or Gauge	Field Code	Range	Measurement uncertainty (The Confidence Level is about 95 %)	Standard/Method of Measurement etc.
Taper ring gauges Taper half angle Small-end diameter Step diameter Big-end diameter Gauge length Notch & Step length	10515	(0 ~ 65)° (ø 2 ~ ø 80) mm (ø 80 ~ ø 200) mm (ø 2 ~ ø 80) mm (ø 80 ~ ø 200) mm (ø 2 ~ ø 80) mm (ø 80 ~ ø 200) mm (0 ~ 250) mm (0 ~ 150) mm	1 ~ $\sqrt{0.5^2 + 0.0006^2 \times l^2}$ μm $\sqrt{1.9^2 + 0.0041^2 \times l^2}$ μm $\sqrt{0.5^2 + 0.0006^2 \times l^2}$ μm $\sqrt{2.0^2 + 0.0041^2 \times l^2}$ μm $\sqrt{0.5^2 + 0.0006^2 \times l^2}$ μm $\sqrt{2.3^2 + 0.0041^2 \times l^2}$ μm $\sqrt{0.6^2 + 0.0030^2 \times l^2}$ μm $\sqrt{0.6^2 + 0.0030^2 \times l^2}$ μm (Unit of <i>l</i> : mm)	Standard measuring machine, Electronic micrometer, Contact coordinate measuring machine /QECI-LE515
Stylus type roughness testers Arithmetic mean(Ra) Max. height(Rz) Mean width(RSm) Depth(H)	10517	(0 ~ 3) μm (3 ~ 10) μm (0 ~ 10) μm (10 ~ 50) μm (0 ~ 140) μm (140 ~ 230) μm (0 ~ 1) μm (1 ~ 1 000) μm	$\sqrt{0.096^2 + 0.025^2 \times R^2}$ μm $\sqrt{0.18^2 + 0.025^2 \times R^2}$ μm $\sqrt{0.26^2 + 0.030^2 \times R^2}$ μm $\sqrt{0.27^2 + 0.003^2 \times R^2}$ μm (Unit of <i>R</i> : μm) $\sqrt{0.87^2 + 0.0036^2 \times L^2}$ μm $\sqrt{1.5^2 + 0.0036^2 \times L^2}$ μm (Unit of <i>L</i> : μm) $\sqrt{0.02^2 + 0.019^2 \times H^2}$ μm $\sqrt{0.08^2 + 0.019^2 \times H^2}$ μm (Unit of <i>H</i> : μm)	Roughness standard specimen, Step block /QECI-LE517
Socket gauges for electric bulb Outside diameter of GO/NOT GO /Thread GO side	10518	(ø 1 ~ ø 50) mm	$\sqrt{0.3^2 + 0.0037^2 \times l^2}$ μm (Unit of <i>l</i> : mm)	Form tester /QECI-LE518
Roughness standard/ comparison specimens Arithmetic mean(Ra) Max. height(Rz) Transversal Magnification (RSm) Depth(H)	10519	(0 ~ 3) μm (3 ~ 10) μm (0 ~ 10) μm (10 ~ 50) μm (0 ~ 140) μm (140 ~ 230) μm (0 ~ 1) μm (1 ~ 1 000) μm	$\sqrt{0.12^2 + 0.025^2 \times R^2}$ μm $\sqrt{0.19^2 + 0.025^2 \times R^2}$ μm $\sqrt{0.37^2 + 0.030^2 \times R^2}$ μm $\sqrt{0.29^2 + 0.003^2 \times R^2}$ μm (Unit of <i>R</i> : μm) $\sqrt{0.99^2 + 0.0036^2 \times L^2}$ μm $\sqrt{1.5^2 + 0.0036^2 \times L^2}$ μm (Unit of <i>L</i> : μm) $\sqrt{0.022^2 + 0.019^2 \times H^2}$ μm $\sqrt{0.089^2 + 0.019^2 \times H^2}$ μm (Unit of <i>H</i> : μm)	Stylus type roughness tester /QECI-SR519

105. Complex geometry

Measured Quantity Instrument or Gauge	Field Code	Range	Measurement uncertainty (The Confidence Level is about 95 %)	Standard/Method of Measurement etc.
Thread plug gauges Pitch diameter Major diameter Pitch Flank angle	10525	($\phi 1 \sim \phi 200$) mm ($\phi 1 \sim \phi 200$) mm (0.25 ~ 6.35) mm (0 ~ 45) °	$\sqrt{1.3^2 + 0.003 7^2 \times l^2}$ μm $\sqrt{0.4^2 + 0.003 7^2 \times l^2}$ μm (Unit of l : mm) 0.4 μm 4 "	Standard measuring machine, Form tester /QECI-LE525
Taper thread plug gauges Small-end pitch diameter Large-end pitch diameter Small-end major diameter Large-end major diameter Pitch Flank angles Taper half-angle Gauge length Notch & Step length	10526	($\phi 2 \sim \phi 200$) mm ($\phi 2 \sim \phi 200$) mm ($\phi 2 \sim \phi 200$) mm ($\phi 2 \sim \phi 200$) mm (0.25 ~ 6.35) mm (0 ~ 30) ° (0 ~ 2)° (0 ~ 250) mm (0 ~ 150) mm	$\sqrt{1.6^2 + 0.004 3^2 \times M_0^2}$ μm (Unit of M_0 : mm) $\sqrt{1.6^2 + 0.003 4^2 \times M_H^2}$ μm (Unit of M_H : mm) $\sqrt{0.7^2 + 0.004 3^2 \times L_0^2}$ μm (Unit of L_0 : mm) $\sqrt{0.7^2 + 0.003 4^2 \times L_H^2}$ μm (Unit of L_H : mm) 0.9 μm 5 " 7 " $\sqrt{0.6^2 + 0.003 0^2 \times l^2}$ μm $\sqrt{0.6^2 + 0.003 0^2 \times l^2}$ μm (Unit of l : mm)	Standard measuring machine, Gauge block /QECI-LE526
Thread ring gauges Pitch diameter Minor diameter Pitch Flank angle	10527	($\phi 2.5 \sim \phi 200$) mm ($\phi 2.5 \sim \phi 200$) mm (0.25 ~ 6.35) mm (0 ~ 45) °	$\sqrt{1.2^2 + 0.003 7^2 \times l^2}$ μm $\sqrt{1.7^2 + 0.005 6^2 \times l^2}$ μm (Unit of l : mm) 1.0 μm 5 "	Standard measuring machine, Form tester /QECI-LE527
Taper thread ring gauges Gauge length Notch & Step length Alternateness of minor diameter Alternateness of pitch diameter	10528	(1 ~ 150) mm (0 ~ 150) mm (0 ~ 2) mm (0 ~ 2) mm	$\sqrt{0.6^2 + 0.003 0^2 \times l^2}$ μm $\sqrt{0.6^2 + 0.003 0^2 \times l^2}$ μm (Unit of l : mm) 1.2 μm 2.1 μm	Height micrometer, Electronic micrometer, Taper thread plug gauge /QECI-LE528

105. Complex geometry

Measured Quantity Instrument or Gauge	Field Code	Range	Measurement uncertainty (The Confidence Level is about 95 %)	Standard/Method of Measurement etc.
V-blocks, Box blocks	10529	300 mm × 300 mm × 300 mm		Electronic micrometer ,
V-blocks				Test bar ,
Flatness of base side			0.5 μm	Squareness tester
Flatness of V surface			0.6 μm	/QECI-LE529,
The gradient on the base side of V-groove			0.4 μm	/QECI-LE529-1
The parallelism between the undersurface and the cylinder on the V surface.			2.4 μm	
The parallelism between the side and the cylinder on the V surface.			2.4 μm	
The mutual height difference of V surface for a pair of V blocks			2.3 μm	
Box blocks				
Squareness			1.6 μm	
The parallelism of upper surface for the undersurface			1.0 μm	
The parallelism between the undersurface and the cylinder on the V surface.			2.6 μm	

106. Various dimensional

Measured Quantity Instrument or Gauge	Field Code	Range	Measurement uncertainty (The Confidence Level is about 95 %)	Standard/Method of Measurement etc.
Inside/outside/gear tooth calipers, caliper gauges Inside/Outside calipers Gear tooth calipers Tooth height scale Tooth thickness scale Combine accuracy Caliper gauges	10601	(0 ~ 600) mm (600 ~ 1 000) mm (1 000 ~ 3 000) mm (0 ~ 50) mm (0 ~ 100) mm (0 ~ 100) mm (0 ~ 300) mm	$\sqrt{8^2 + 0.002 \ 9^2 \times l^2}$ μm $\sqrt{10^2 + 0.002 \ 9^2 \times l^2}$ μm $\sqrt{15^2 + 0.002 \ 9^2 \times l^2}$ μm (Unit of <i>l</i> : mm) $\sqrt{7^2 + 0.002 \ 7^2 \times l^2}$ μm $\sqrt{7^2 + 0.002 \ 9^2 \times l^2}$ μm $\sqrt{7^2 + 0.002 \ 6^2 \times l^2}$ μm $\sqrt{7^2 + 0.002 \ 9^2 \times l^2}$ μm (Unit of <i>l</i> : mm)	Gauge block, Surface plate /QECI-LE601, /QECI-LE601-1, /QECI-LE601-2
Cylinder/Bore gauges	10603	(0 ~ 5) mm	0.3 μm	Standard measuring machine, Dial gauge tester /QECI-LE603
Depth gauges, Depth micrometers Depth gauges Depth micrometers Dial depth gauges	10604	(0 ~ 1 000) mm (0 ~ 300) mm (0 ~ 100) mm	$\sqrt{7^2 + 0.002 \ 7^2 \times l^2}$ μm $\sqrt{1.0^2 + 0.002 \ 7^2 \times l^2}$ μm $\sqrt{1.0^2 + 0.002 \ 7^2 \times l^2}$ μm (Unit of <i>l</i> : mm)	Gauge block, Surface plate /QECI-LE604, /QECI-LE604-1, /QECI-LE604-2
Dial/digital gauges	10605	(0 ~ 5) mm (5 ~ 100) mm	$\sqrt{0.2^2 + 0.002 \ 7^2 \times l^2}$ μm $\sqrt{0.8^2 + 0.002 \ 7^2 \times l^2}$ μm (Unit of <i>l</i> : mm)	Standard measuring machine, Dial gauge tester /QECI-LE605
Grind gauges Depth of inclined plane Straightness of scraper	10608	(0 ~ 1) mm	0.9 μm 1.1 μm	Height micrometer, Electronic micrometer /QECI-LE608
Micro indicators, Test indicators Micro indicators Test indicators	10609	±1 mm (0 ~ 2) mm	0.3 μm 0.3 μm	Dial gauge tester /QECI-LE609
Micrometer heads	10610	(0 ~ 100) mm	$\sqrt{0.2^2 + 0.002 \ 9^2 \times l^2}$ μm (Unit of <i>l</i> : mm)	Gauge blocks /QECI-LE610
3-points, Micrometers	10611	(ø 2 ~ ø 6) mm (ø 6 ~ ø 200) mm (ø 200 ~ ø 300) mm	$\sqrt{1.4^2 + 0.004 \ 6^2 \times l^2}$ μm $\sqrt{1.9^2 + 0.004 \ 6^2 \times l^2}$ μm $\sqrt{2.5^2 + 0.005 \ 4^2 \times l^2}$ μm (Unit of <i>l</i> : mm)	Cylindrical ring gauge /QECI-LE611

106. Various dimensional

Measured Quantity Instrument or Gauge	Field Code	Range	Measurement uncertainty (The Confidence Level is about 95 %)	Standard/Method of Measurement etc.
Inside micrometers Inside micrometers Tubular inside micrometers	10612	(5 ~ 300) mm (50 ~ 1 000) mm (1 000 ~ 5 000) mm	$\sqrt{1.0^2 + 0.002 \ 9^2 \times l^2} \ \mu\text{m}$ $\sqrt{1.0^2 + 0.002 \ 9^2 \times l^2} \ \mu\text{m}$ $\sqrt{2.0^2 + 0.002 \ 9^2 \times l^2} \ \mu\text{m}$ (Unit of l : mm)	Gauge block, Gauge block accessory /QECI-LE612
Outside micrometers Outside micrometers V-Anvil micrometers	10613	(0 ~ 1 000) mm (1 000 ~ 2 000) mm (1 ~ 100) mm	$\sqrt{1.0^2 + 0.002 \ 9^2 \times l^2} \ \mu\text{m}$ $\sqrt{2.0^2 + 0.002 \ 9^2 \times l^2} \ \mu\text{m}$ $\sqrt{1.0^2 + 0.004 \ 9^2 \times l^2} \ \mu\text{m}$ (Unit of l : mm)	Gauge block, Optical flat, Cylindrical plug gauge /QECI-LE613, /QECI-LE613-1
Standard sieves Standard net sieve Wire diameter Sieve size Standard plate sieve Hole diameter Length of the hole center	10617	(0 ~ 10) mm (0 ~ 130) mm (0 ~ 130) mm (0 ~ 160) mm	3 μm 4 μm 3 μm 3 μm	Non-contact coordinate measuring machine /QECI-LE617
Welding gauges Height, Depth Scale Fillet Welding Height Taper thickness Angle	10620	(0 ~ 50) mm (0 ~ 90) mm (0 ~ 20) mm (1 ~ 10) mm (0 ~ 90) °	0.3 mm 0.3 mm 0.3 mm 0.2 mm 0.3 °	Non-contact coordinate measuring machine /QECI-LE620
Optical micrometers	10621	(0 ~ 10) mm	2 μm	Standard measuring machine /QECI-LE621

201. Mass

Measured Quantity Instrument or Gauge	Field Code	Range	Measurement uncertainty (The Confidence Level is about 95 %)	Standard/Method of Measurement etc.
Electric balances	20109	(0 ~ 20) g	64 μg	Weights /QECI-EB109
		(20 ~ 80) g	0.11 mg	
		(80 ~ 160) g	0.16 mg	
		(160 ~ 200) g	0.19 mg	
		(200 ~ 300) g	0.23 mg	
		(300 ~ 400) g	0.25 mg	
		(400 ~ 500) g	0.50 mg	
		(500 ~ 600) g	0.56 mg	
		(0.6 ~ 1) kg	0.9 mg	
		(1 ~ 2) kg	1.8 mg	
		(2 ~ 3) kg	1.9 mg	
		(3 ~ 4) kg	2.5 mg	
		(4 ~ 5) kg	4.7 mg	
		(5 ~ 8) kg	5.2 mg	
		(8 ~ 10) kg	9 mg	
		(10 ~ 16) kg	11 mg	
		(16 ~ 25) kg	18 mg	
		(25 ~ 30) kg	19 mg	
		(30 ~ 40) kg	0.02 g	
		(40 ~ 60) kg	0.7 g	
(60 ~ 150) kg	2 g			
(150 ~ 300) kg	3 g			
(300 ~ 1 000) kg	0.1 kg			
(1 000 ~ 2 000) kg	0.2 kg			
(2 000 ~ 5 000) kg	0.5 kg			
Platform scale balances	20112	(0 ~ 10) kg	0.002 kg	Weights /QECI-EB112
		(10 ~ 20) kg	0.005 kg	
		(20 ~ 100) kg	0.01 kg	
		(100 ~ 200) kg	0.02 kg	
		(200 ~ 300) kg	0.05 kg	
		(300 ~ 500) kg	0.1 kg	
		(500 ~ 1 000) kg	0.23 kg	
Spring scale balances	20113	(0 ~ 500) g	1 g	Weights /QECI-EB113
		(0.5 ~ 1) kg	2 g	
		(1 ~ 2) kg	5 g	
		(2 ~ 5) kg	0.01 kg	
		(5 ~ 10) kg	0.02 kg	
		(10 ~ 30) kg	0.05 kg	
		(30 ~ 50) kg	0.1 kg	
		(50 ~ 100) kg	0.2 kg	

201. Mass

Measured Quantity Instrument or Gauge	Field Code	Range	Measurement uncertainty (The Confidence Level is about 95 %)	Standard/Method of Measurement etc.
Weights, Class F1	20116	1 mg	2.2 μg	Weights /QECI-EB116
		2 mg	2.2 μg	
		5 mg	2.2 μg	
		10 mg	3.0 μg	
		20 mg	3.8 μg	
		50 mg	4.2 μg	
		100 mg	5.4 μg	
		200 mg	6.8 μg	
		500 mg	8.4 μg	
		1 g	11 μg	
		2 g	13 μg	
		5 g	17 μg	
		10 g	20 μg	
		20 g	27 μg	
		50 g	0.04 mg	
		100 g	0.06 mg	
		200 g	0.14 mg	
		500 g	0.31 mg	
		1 kg	0.55 mg	
		2 kg	1.9 mg	
5 kg	2.7 mg			
10 kg	5.7 mg			
20 kg	10 mg			

202. Force

Measured Quantity Instrument or Gauge	Field Code	Range	Measurement uncertainty (The Confidence Level is about 95 %)	Standard/Method of Measurement etc.
Tension/compression testing machines	20203	Tension		Load Cells /QECI-FC203
		(2 ~ 20) kN	7.0×10^{-4}	
		(20 ~ 50) kN	8.0×10^{-4}	
		Compression		
		(2 ~ 10) kN	5.0×10^{-4}	
		(10 ~ 20) kN	6.0×10^{-4}	
		(20 ~ 50) kN	1.3×10^{-3}	
		(50 ~ 100) kN	9.0×10^{-4}	
		(100 ~ 500) kN	1.4×10^{-3}	
		(0.5 ~ 1) MN	1.0×10^{-3}	
(1 ~ 2) MN	1.2×10^{-3}			

202. Force

Measured Quantity Instrument or Gauge	Field Code	Range	Measurement uncertainty (The Confidence Level is about 95 %)	Standard/Method of Measurement etc.
Push-pull gauges Tension, Compression	20204	(0.2 ~ 2) N	1.5×10^{-3}	Weights /QECI-FC204
		(2 ~ 5) N	8.0×10^{-4}	
		(5 ~ 10) N	6.0×10^{-4}	
		(10 ~ 50) N	5.0×10^{-4}	
		(50 ~ 100) N	6.0×10^{-4}	
		(100 ~ 300) N	5.0×10^{-4}	
		(300 ~ 1 000) N	6.0×10^{-4}	

203. Torque

Measured Quantity Instrument or Gauge	Field Code	Range	Measurement uncertainty (The Confidence Level is about 95 %)	Standard/Method of Measurement etc.
Torque wrenches/drivers	20303	(0.1 ~ 1) N·m	6.9×10^{-3}	Torque wrench tester /QECI-FC303
		(1 ~ 2.5) N·m	9.8×10^{-3}	
		(2.5 ~ 5) N·m	5.9×10^{-3}	
		(5 ~ 10) N·m	7.3×10^{-3}	
		(10 ~ 25) N·m	7.2×10^{-3}	
		(25 ~ 50) N·m	3.6×10^{-3}	
		(50 ~ 100) N·m	8.3×10^{-3}	
		(100 ~ 250) N·m	1.8×10^{-3}	
		(250 ~ 500) N·m	7.2×10^{-3}	
		(500 ~ 1 000) N·m	6.2×10^{-3}	
(1 000 ~ 2 000) N·m	4.4×10^{-3}			

204. Pressure

Measured Quantity Instrument or Gauge	Field Code	Range	Measurement uncertainty (The Confidence Level is about 95 %)	Standard/Method of Measurement etc.
Manometers	20402	(0 ~ 1.25) kPa	$\sqrt{2.8^2 + 0.68^2 \times p_s^2}$ Pa (Unit of p_s : kPa)	Pressure Controller/Calibrator /QECI-PS402
		(1.25 ~ 15) kPa	$\sqrt{2.8^2 + 0.63^2 \times p_s^2}$ Pa (Unit of p_s : kPa)	
		(15 ~ 130) kPa	$\sqrt{77^2 + 0.11^2 \times p_s^2}$ Pa (Unit of p_s : kPa)	
Hydraulic pressure ballances	20404	(0.1 ~ 10) MPa	6.4×10^{-5}	Hydraulic pressure balance /QECI-PS404, /QECI-PS404-1
		(10 ~ 100) MPa	6.6×10^{-5}	
		(100 ~ 200) MPa	6.8×10^{-5}	
		(200 ~ 500) MPa	1.7×10^{-4}	

204. Pressure

Measured Quantity Instrument or Gauge	Field Code	Range	Measurement uncertainty (The Confidence Level is about 95 %)	Standard/Method of Measurement etc.
Absolute pressure gauges Absolute pressure Barometers	20406	(0 ~ 350) kPa (0.35 ~ 5) MPa (90 ~ 110) kPa	$\sqrt{0.58^2 + 0.047^2 \times p_s^2}$ Pa (p_s : Max Pressure, Unit of p_s : kPa) $\sqrt{0.058^2 + 0.047^2 \times p_s^2}$ kPa (p_s : Max Pressure, Unit of p_s : MPa) $\sqrt{9.0^2 + 0.15^2 \times p_s^2}$ Pa (p_s : Max Pressure, Unit of p_s : kPa)	Pressure Controller/Calibrator /QECI-PS406
Blood pressure gauges	20407	(0 ~ 40) kPa	$\sqrt{7.7^2 + 0.28^2 \times p_s^2}$ Pa (p_s : Max Pressure, Unit of p_s : kPa)	Pressure Controller/Calibrator /QECI-PS407
Compound pressure gauges	20408	-100 kPa ~ 5 MPa	$\sqrt{0.058^2 + 0.066^2 \times p_s^2}$ kPa (p_s : the negative or positive max pressure, unit of p_s : MPa)	Pressure Controller/Calibrator /QECI-PS408
Differential pressure gauges	20409	(0 ~ 1.25) kPa (1.25 ~ 15) kPa (0.015 ~ 7) MPa	$\sqrt{0.58^2 + 0.12^2 \times p_s^2}$ Pa (p_s : Max Pressure, Unit of p_s : kPa) $\sqrt{0.58^2 + 0.047^2 \times p_s^2}$ Pa (p_s : Max Pressure, Unit of p_s : kPa) $\sqrt{0.058^2 + 0.049^2 \times p_s^2}$ kPa (Unit of p_s : MPa)	Pressure Controller/Calibrator, Pneumatic pressure balance /QECI-PS409
Gauge pressure gauges Pneumatic Hydraulic	20411	(0 ~ 15) kPa (0.015 ~ 0.7) MPa (0.7 ~ 7) MPa (0 ~ 10) MPa (10 ~ 100) MPa (100 ~ 200) MPa (200 ~ 500) MPa	$\sqrt{0.10^2 + 0.047^2 \times p_s^2}$ Pa (Unit of p_s : kPa) $\sqrt{0.005^2 + 0.053^2 \times p_s^2}$ kPa (Unit of p_s : MPa) $\sqrt{0.058^2 + 0.049^2 \times p_s^2}$ kPa (Unit of p_s : MPa) $\sqrt{0.080^2 + 0.060^2 \times p_s^2}$ kPa (Unit of p_s : MPa) $\sqrt{0.080^2 + 0.062^2 \times p_s^2}$ kPa (Unit of p_s : MPa) $\sqrt{0.080^2 + 0.063^2 \times p_s^2}$ kPa (Unit of p_s : MPa) $\sqrt{8.4^2 + 0.17^2 \times p_s^2}$ kPa (Unit of p_s : MPa)	Pressure Controller/Calibrator, Hydraulic pressure balance /QECI-PS411

204. Pressure

Measured Quantity Instrument or Gauge	Field Code	Range	Measurement uncertainty (The Confidence Level is about 95 %)	Standard/Method of Measurement etc.
Pressure transducers/transmitters Pressure transducers Pneumatic Hydraulic Pressure transmitters Pneumatic Hydraulic	20412	(-100 ~ 0) kPa	$\sqrt{1.3^2 + 0.056^2 \times p_s^2}$ Pa (p_s : the negative maximum pressure, unit of p_s : kPa)	Pressure Controller/Calibrator, Pneumatic pressure balance, Hydraulic pressure balance /QECI-PS412
		(0 ~ 15) kPa	$\sqrt{0.20^2 + 0.047^2 \times p_s^2}$ Pa (Unit of p_s : kPa)	
		(0.015 ~ 0.7) MPa	$\sqrt{0.008^2 + 0.053^2 \times p_s^2}$ kPa (Unit of p_s : MPa)	
		(0.7 ~ 7) MPa	$\sqrt{0.090^2 + 0.049^2 \times p_s^2}$ kPa (Unit of p_s : MPa)	
		(0 ~ 10) MPa	$\sqrt{0.13^2 + 0.060^2 \times p_s^2}$ kPa (Unit of p_s : MPa)	
		(10 ~ 100) MPa	$\sqrt{1.3^2 + 0.062^2 \times p_s^2}$ kPa (Unit of p_s : MPa)	
		(100 ~ 200) MPa	$\sqrt{2.3^2 + 0.063^2 \times p_s^2}$ kPa (Unit of p_s : MPa)	
		(200 ~ 500) MPa	$\sqrt{6.5^2 + 0.17^2 \times p_s^2}$ kPa (Unit of p_s : MPa)	
		(-100 ~ 0) kPa	$\sqrt{3.8^2 + 0.056^2 \times p_s^2}$ Pa (p_s : the negative maximum pressure, unit of p_s : kPa)	
		(0 ~ 15) kPa	$\sqrt{0.20^2 + 0.047^2 \times p_s^2}$ Pa (Unit of p_s : kPa)	
		(0.015 ~ 0.7) MPa	$\sqrt{0.008^2 + 0.053^2 \times p_s^2}$ kPa (Unit of p_s : MPa)	
		(0 ~ 7) MPa	$\sqrt{0.10^2 + 0.049^2 \times p_s^2}$ kPa (Unit of p_s : MPa)	
		(0 ~ 10) MPa	$\sqrt{0.15^2 + 0.060^2 \times p_s^2}$ kPa (Unit of p_s : MPa)	
		(10 ~ 100) MPa	$\sqrt{1.5^2 + 0.062^2 \times p_s^2}$ kPa (Unit of p_s : MPa)	
(100 ~ 200) MPa	$\sqrt{3.0^2 + 0.063^2 \times p_s^2}$ kPa (Unit of p_s : MPa)			
(200 ~ 500) MPa	$\sqrt{7.4^2 + 0.17^2 \times p_s^2}$ kPa (Unit of p_s : MPa)			
Dial type vacuum gauges	20413	(-100 ~ 0) kPa	$\sqrt{0.10^2 + 0.000050^2 \times p_s^2}$ kPa (p_s : the negative maximum pressure, unit of p_s : kPa)	Pressure Controller/Calibrator /QECI-PS413

204. Pressure

Measured Quantity Instrument or Gauge	Field Code	Range	Measurement uncertainty (The Confidence Level is about 95 %)	Standard/Method of Measurement etc.
Water Depth Meters	20414	(0 ~ 350) m	$\sqrt{0.088^2 + 0.25^2 \times p_s^2}$ m (Unit of p_s : MPa)	Pressure Controller/Calibrator /QECI-PS414
		(350 ~ 690) m	$\sqrt{0.41^2 + 0.25^2 \times p_s^2}$ m (Unit of p_s : MPa)	

209. Fluid flow

Measured Quantity Instrument or Gauge	Field Code	Range	Measurement uncertainty (The Confidence Level is about 95 %)	Standard/Method of Measurement etc.
Gas flowmeters; differential pressure	20908	(0.002 ~ 250) m ³ /h	3.2×10^{-3}	Sonic nozzles /QECI-FL901
Liquid flowmeters; differential pressure	20909	(0.2 ~ 1 500) m ³ /h	3.2×10^{-3}	Master Flow Meters /QECI-FL902
Liquid flowmeters; electromagnetic	20910	(0.2 ~ 1 500) m ³ /h	3.2×10^{-3}	Master Flow Meters /QECI-FL902
Gas flowmeters; thermal mass, etc.	20911	(0.002 ~ 250) m ³ /h	3.2×10^{-3}	Sonic nozzles /QECI-FL901
Liquid flowmeters; Coriolis, etc.	20912	(0.2 ~ 1 500) m ³ /h	3.2×10^{-3}	Master Flow Meters /QECI-FL902
Gas flowmeters; positive displacement	20914	(0.002 ~ 250) m ³ /h	3.2×10^{-3}	Sonic nozzles /QECI-FL901
Liquid flowmeters; positive displacement	20915	(0.2 ~ 1 500) m ³ /h	3.2×10^{-3}	Master Flow Meters /QECI-FL902
Gas flowmeters; turbine	20916	(0.002 ~ 250) m ³ /h	3.2×10^{-3}	Sonic nozzles /QECI-FL901
Liquid flowmeters; turbine	20917	(0.2 ~ 1 500) m ³ /h	3.2×10^{-3}	Master Flow Meters /QECI-FL902
Gas flowmeters; ultrasonic	20918	(0.002 ~ 250) m ³ /h	3.2×10^{-3}	Sonic nozzles /QECI-FL901
Liquid flowmeters; ultrasonic	20919	(0.2 ~ 1 500) m ³ /h	3.2×10^{-3}	Master Flow Meters /QECI-FL902
Gas flowmeters; variable area	20920	(0.002 ~ 250) m ³ /h	3.2×10^{-3}	Sonic nozzles /QECI-FL901
Liquid flowmeters; variable area	20921	(0.2 ~ 1 500) m ³ /h	3.2×10^{-3}	Master Flow Meters /QECI-FL902
Gas flowmeters; vortex	20922	(0.002 ~ 250) m ³ /h	3.2×10^{-3}	Sonic nozzles /QECI-FL901
Liquid flowmeters; vortex	20923	(0.2 ~ 1 500) m ³ /h	3.2×10^{-3}	Master Flow Meters /QECI-FL902

210. Hardness

Measured Quantity Instrument or Gauge	Field Code	Range	Measurement uncertainty (The Confidence Level is about 95 %)	Standard/Method of Measurement etc.
Brinell hardness testers	21001	\leq 250 HBW 10/3 000 (250 ~ 450) HBW 10/3 000 > 450 HBW 10/3 000	2.6 HBW 10/3 000 4.1 HBW 10/3 000 6.0 HBW 10/3 000	Brinell Hardness test block /QECI-HN101
Rockwell hardness testers	21002	(20 ~ 70) HRC (10 ~ 100) HRBW	0.4 HRC 0.7 HRBW	Rockwell Hardness test block /QECI-HN102
Shore hardness testers	21003	(20 ~ 35) HS (45 ~ 55) HS (55 ~ 65) HS (75 ~ 85) HS (85 ~ 100) HS	1.0 HS 1.0 HS 1.0 HS 1.1 HS 1.1 HS	Shore hardness test block /QECI-HN103
Vickers hardness testers	21004	\leq 225 HV 0.2 (400 ~ 600) HV 0.2 > 700 HV 0.2 \leq 225 HV 0.5 (400 ~ 600) HV 0.5 > 700 HV 0.5 \leq 225 HV 10 (400 ~ 600) HV 10 > 700 HV 10 \leq 225 HV 30 (400 ~ 600) HV 30 > 700 HV 30	5.7 HV 0.2 14 HV 0.2 20 HV 0.2 5.2 HV 0.5 15 HV 0.5 18 HV 0.5 3.0 HV 10 6.9 HV 10 8.9 HV 10 3.5 HV 30 5.7 HV 30 11 HV 30	Vickers hardness test block /QECI-HN104
Durometer hardness testers	21005	(0 ~ 100) HDA (0 ~ 100) HDD	0.4 HDA 0.4 HDD	Durometer calibrator /QECI-HN105
Leeb hardness testers	21006	\leq 500 HLD (500 ~ 700) HLD > 700 HLD	5 HLD 5 HLD 5 HLD	Leeb hardness test block /QECI-HN106

301. Time/frequency

Measured Quantity Instrument or Gauge	Field Code	Range	Measurement uncertainty (The Confidence Level is about 95 %)	Standard/Method of Measurement etc.
General frequency sources Reference oscillator	30103	10 MHz	7.0×10^{-12}	GPS receiver, Frequency counter /QECI-TF103
Frequency meters/counters Input Frequency Reference oscillator	30104	10 MHz 10 MHz	7.0×10^{-12} 7.0×10^{-12}	GPS receiver, Frequency counters /QECI-TF104
Time interval meters/ stop watches/timers Stop watches Timers	30106	(0.1 ~ 86 400) s (0.1 ~ 3.0) s (3.0 ~ 10 000) s	1.5×10^{-7} 6.4×10^{-4} 7.0×10^{-4}	Stopwatch calibrator GPS receiver, Frequency counter /QECI-TF106

302. Velocity & revolution

Measured Quantity Instrument or Gauge	Field Code	Range	Measurement uncertainty (The Confidence Level is about 95 %)	Standard/Method of Measurement etc.
Standard RPM generators RPM RPM(Centrifuge)	30201	(30 ~ 4 000) min ⁻¹ (60 ~ 5 000) min ⁻¹ (5 000 ~ 30 000) min ⁻¹	0.05 min ⁻¹ 0.1 min ⁻¹ 1 min ⁻¹	GPS receiver, Frequency counter stroboscope / QECI-VR201
Contact type tachometers RPM	30202	(6 ~ 60) min ⁻¹ (60 ~ 4 000) min ⁻¹	0.01 min ⁻¹ 0.1 min ⁻¹	GPS receiver, RPM calibration system / QECI-VR202
Photo tachometers/stroboscopes RPM (Tachometer) RPM (Stroboscopes)	30203	(30 ~ 1 000) min ⁻¹ (1 000 ~ 10 000) min ⁻¹ (10 000 ~ 99 000) min ⁻¹ (30 ~ 1 000) min ⁻¹ (1 000 ~ 10 000) min ⁻¹ (10 000 ~ 99 000) min ⁻¹	0.001 min ⁻¹ 0.01 min ⁻¹ 0.1 min ⁻¹ 0.001 min ⁻¹ 0.01 min ⁻¹ 0.1 min ⁻¹	GPS receiver Frequency counter, Optical generator/detector / QECI-VR203

401. DC volatage & current

Measured Quantity Instrument or Gauge	Field Code	Range	Measurement uncertainty (The Confidence Level is about 95 %)	Standard/Method of Measurement etc.
DC ammeters DC ammeters	40101	(±) 0 μA (0 ~ 10) μA (10 ~ 100) μA (0.1 ~ 1) mA (1 ~ 10) mA (10 ~ 100) mA (0.1 ~ 1) A (1 ~ 10) A (10 ~ 100) A	9.3 nA 4.8×10^{-3} 5.5×10^{-4} 1.5×10^{-4} 1.0×10^{-4} 1.3×10^{-4} 2.0×10^{-4} 9.0×10^{-4} 4.7×10^{-4}	Meter calibrator, Current calibrator /QECI-EL101
DC voltage/current calibrators DC voltage DC current	40103	(±) 0 mV (0 ~ 10) mV (10 ~ 100) mV (0.1 ~ 1) V (1 ~ 10) V (10 ~ 100) V (100 ~ 1 000) V 0 μA (0 ~ 100) μA (0.1 ~ 1) mA (1 ~ 10) mA (10 ~ 100) mA (0.1 ~ 1) A (1 ~ 20) A	0.12 μV 1.3×10^{-4} 4.2×10^{-5} 8.7×10^{-6} 8.7×10^{-6} 9.3×10^{-6} 9.7×10^{-6} 0.74 nA 1.1×10^{-4} 1.1×10^{-4} 3.1×10^{-5} 1.0×10^{-4} 2.7×10^{-4} 6.3×10^{-4}	Multimeter /QECI-EL103
Electrical temperature calibrators Source S Type R Type	40104	(±) 0 mV (0.000 ~ 5.239) mV (0 ~ 600) °C (5.239 ~ 18.503) mV (600 ~ 1 750) °C 0 mV (0.000 ~ 5.584) mV (0 ~ 600) °C (5.584 ~ 20.877) mV (600 ~ 1 750) °C	1 μV 3.8×10^{-4} 1.1×10^{-4} 1 μV 3.6×10^{-4} 9.6×10^{-5}	Multimeter Meter calibrator /QECI-EL104

401. DC volatage & current

Measured Quantity Instrument or Gauge	Field Code	Range	Measurement uncertainty (The Confidence Level is about 95 %)	Standard/Method of Measurement etc.
B Type	40104	(1.792 ~ 6.786) mV	1.1×10^{-3}	Multimeter Meter calibrator /QECI-EL104
		(600 ~ 1 200) °C		
	(6.786 ~ 13.820) mV	1.4×10^{-4}		
	(1 200 ~ 1 820) °C			
K Type	(-5.891 ~ 12.209) mV	3.4×10^{-4}		
	(-200 ~ 300) °C			
	0 mV	1 μV		
	(12.209 ~ 54.886) mV	3.6×10^{-5}		
	(300 ~ 1 372) °C			
J Type	(-7.891 ~ 10.779) mV	2.5×10^{-4}		
	(-200 ~ 200) °C			
	0 mV	1 μV		
	(10.779 ~ 57.953) mV	3.5×10^{-5}		
	(200 ~ 1 000) °C			
T Type	(-5.603 ~ 4.279) mV	3.6×10^{-4}		
	(-200 ~ 100) °C			
	0 mV	1 μV		
	(4.279 ~ 20.872) mV	9.6×10^{-5}		
	(100 ~ 400) °C			
N Type	(-3.990 ~ 9.341) mV	2.5×10^{-4}		
	(-200 ~ 300) °C			
	0 mV	1 μV		
	(9.341 ~ 47.513) mV	4.2×10^{-5}		
	(300 ~ 1 300) °C			
E Type	(-8.825 ~ 37.005) mV	2.3×10^{-4}		
	(-200 ~ 500) °C			
	0 mV	1 μV		
	(37.005 ~ 76.362) mV	2.6×10^{-5}		
	(500 ~ 1 000) °C			
pt100(385) Type	(18.52 ~ 332.79) Ω	3.0×10^{-5}		
	(-200 ~ 660) °C			
pt100(3916) Type	(17.08 ~ 337.03) Ω	3.0×10^{-5}		
	(-200 ~ 660) °C			
Measurement	(±)			
S Type	0 mV	2 μV		
	(0.000 ~ 5.239) mV	3.8×10^{-4}		
	(5.239 ~ 18.174) mV	1.1×10^{-4}		

401. DC volatage & current

Measured Quantity Instrument or Gauge	Field Code	Range	Measurement uncertainty (The Confidence Level is about 95 %)	Standard/Method of Measurement etc.
R Type	40104	0 mV	2 μ V	Multimeter Meter calibrator /QECI-EL104
		(0.000 ~ 5.584) mV	3.6×10^{-4}	
		(5.584 ~ 20.489) mV	9.8×10^{-5}	
B Type		(1.792 ~ 6.786) mV	1.1×10^{-3}	
		(6.786 ~ 13.820) mV	1.4×10^{-4}	
K Type		(-5.891 ~ 12.209) mV	3.4×10^{-4}	
		0 mV	2 μ V	
		(12.209 ~ 54.886) mV	5.5×10^{-5}	
J Type		(-7.891 ~ 10.779) mV	2.5×10^{-4}	
		0 mV	2 μ V	
		(10.779 ~ 57.953) mV	5.2×10^{-5}	
T Type		(-5.603 ~ 4.279) mV	3.6×10^{-4}	
		0 mV	2 μ V	
		(4.279 ~ 20.872) mV	9.6×10^{-5}	
N Type		(-3.990 ~ 9.341) mV	5.0×10^{-4}	
		0 mV	2 μ V	
	(9.341 ~ 47.513) mV	6.3×10^{-5}		
E Type	(-8.825 ~ 37.005) mV	2.3×10^{-4}		
	0 mV	2 μ V		
	(37.005 ~ 76.373) mV	4.1×10^{-5}		
pt100(385) Type		(18.52 ~ 332.79) Ω	6.0×10^{-5}	
pt100(3916) Type		(17.08 ~ 337.03) Ω	5.9×10^{-5}	
DC power supplies	40108	(\pm)		Multimeter, Shunt /QECI-EL108
DC voltage		0 mV	0.60 μ V	
		(0 ~ 100) mV	3.2×10^{-5}	
		(0.1 ~ 1) V	2.0×10^{-5}	
		(1 ~ 10) V	2.0×10^{-5}	
		(10 ~ 100) V	2.1×10^{-5}	
		(100 ~ 1 000) V	2.1×10^{-5}	
DC current		0 mA	5.9 nA	
		(0 ~ 1) mA	3.7×10^{-5}	
		(1 ~ 10) mA	3.6×10^{-5}	
		(10 ~ 100) mA	7.7×10^{-5}	
		(0.1 ~ 1) A	2.6×10^{-4}	
		(1 ~ 10) A	6.0×10^{-4}	
		(10 ~ 100) A	2.5×10^{-4}	

401. DC volatage & current

Measured Quantity Instrument or Gauge	Field Code	Range	Measurement uncertainty (The Confidence Level is about 95 %)	Standard/Method of Measurement etc.
DC voltmeters DC voltmeter	40112	(±) 0 mV (0 ~ 10) mV (10 ~ 100) mV (0.1 ~ 1) V (1 ~ 10) V (10 ~ 100) V (100 ~ 1 000) V	0.61 μV 6.5×10^{-4} 4.0×10^{-5} 1.3×10^{-5} 1.0×10^{-5} 1.3×10^{-5} 1.3×10^{-5}	Meter calibrator /QECI-EL112

402. Resistance, Capacitance and Inductance

Measured Quantity Instrument or Gauge	Field Code	Range	Measurement uncertainty (The Confidence Level is about 95 %)	Standard/Method of Measurement etc.
Earth testers AC voltage Resistors meters	40205	60 Hz (0.2 ~ 1) V (1 ~ 10) V (10 ~ 100) V (0.2 ~ 1) Ω (1 ~ 10) Ω (10 ~ 100) Ω (0.1 ~ 1) kΩ (1 ~ 10) kΩ	6.5×10^{-4} 3.9×10^{-4} 4.0×10^{-4} 1.0×10^{-3} 5.8×10^{-4} 5.8×10^{-4} 5.8×10^{-4} 5.8×10^{-4}	Meter calibrator, Decade resistance box /QECI-EL205
Insulation testers DC voltage AC voltage Resistance	40210	(0.01 ~ 0.1) kV (0.1 ~ 1) kV (1 ~ 5) kV (5 ~ 10) kV 60 Hz (4 ~ 10) V (10 ~ 100) V (100 ~ 1 000) V 1 kΩ (1 ~ 10) kΩ (10 ~ 100) kΩ (0.1 ~ 1) MΩ (1 ~ 10) MΩ (10 ~ 100) MΩ (0.1 ~ 1) GΩ (1 ~ 10) GΩ (10 ~ 100) GΩ (100 ~ 1 000) GΩ	5.8×10^{-2} 7.3×10^{-4} 6.3×10^{-3} 6.2×10^{-3} 3.8×10^{-4} 3.0×10^{-4} 4.0×10^{-4} 0.35 Ω 3.5×10^{-4} 3.5×10^{-4} 3.5×10^{-4} 3.6×10^{-4} 1.2×10^{-3} 2.3×10^{-3} 6.0×10^{-3} 1.2×10^{-2} 1.2×10^{-2}	Multimeter, Meter calibrator, High Resistor /QECI-EL210

402. Resistance, Capacitance and Inductance

Measured Quantity Instrument or Gauge	Field Code	Range	Measurement uncertainty (The Confidence Level is about 95 %)	Standard/Method of Measurement etc.
Resistance bridges & Similar instruments Measuring Arm	40213	(20 ~ 100) mΩ (0.1 ~ 1) Ω (1 ~ 10) Ω (10 ~ 100) Ω (0.1 ~ 1) kΩ (1 ~ 10) kΩ (10 ~ 100) kΩ (0.1 ~ 1) MΩ (1 ~ 10) MΩ	2.5×10^{-4} 6.1×10^{-5} 3.5×10^{-5} 2.4×10^{-5} 1.9×10^{-5} 1.9×10^{-5} 1.9×10^{-5} 2.9×10^{-5} 8.0×10^{-5}	Multimeter /QECI-EL213
Resistance meters Resistor	40214	1 mΩ (1 ~ 10) mΩ (10 ~ 100) mΩ (0.1 ~ 1) Ω (1 ~ 10) Ω (10 ~ 100) Ω (0.1 ~ 1) kΩ (1 ~ 10) kΩ (10 ~ 100) kΩ (0.1 ~ 1) MΩ (1 ~ 10) MΩ (10 ~ 100) MΩ (0.1 ~ 1) GΩ (1 ~ 10) GΩ (10 ~ 100) GΩ (100 ~ 1 000) GΩ	0.06 μΩ 6.0×10^{-5} 6.0×10^{-5} 3.0×10^{-5} 2.0×10^{-5} 2.0×10^{-5} 2.0×10^{-5} 2.0×10^{-5} 2.0×10^{-5} 2.0×10^{-5} 4.0×10^{-5} 3.0×10^{-5} 3.0×10^{-3} 6.0×10^{-3} 1.2×10^{-2} 1.2×10^{-2}	Resistor, Decade resistance box, Resistance meter /QECI-EL214
Decade resistance box, Resistor	40215	1 mΩ (1 ~ 10) mΩ (10 ~ 100) mΩ (0.1 ~ 1) Ω (1 ~ 10) Ω (10 ~ 100) Ω (0.1 ~ 1) kΩ (1 ~ 10) kΩ (10 ~ 100) kΩ (0.1 ~ 1) MΩ (1 ~ 10) MΩ (10 ~ 100) MΩ (0.1 ~ 1) GΩ	0.66 μΩ 6.5×10^{-4} 2.9×10^{-4} 1.5×10^{-4} 1.7×10^{-5} 2.4×10^{-5} 1.9×10^{-5} 1.9×10^{-5} 1.9×10^{-5} 2.9×10^{-5} 8.0×10^{-5} 6.5×10^{-4} 6.5×10^{-3}	Meter calibrator, Multimeter /QECI-EL215

403. AC voltage, current & power

Measured Quantity Instrument or Gauge	Field Code	Range	Measurement uncertainty (The Confidence Level is about 95 %)	Standard/Method of Measurement etc.
AC ammeters AC current	40301	50 Hz ~ 1 kHz (2 ~ 10) μ A (10 ~ 100) μ A (0.1 ~ 1) mA (1 ~ 10) mA (10 ~ 100) mA (0.1 ~ 1) A (1 ~ 10) A 60 Hz (10 ~ 100) A	3.1×10^{-2} 3.1×10^{-3} 4.4×10^{-4} 3.8×10^{-4} 4.2×10^{-4} 1.0×10^{-3} 3.8×10^{-3} 2.9×10^{-3}	Meter calibrator, Current calibrator /QECI-EL301
Clamp ammeters/voltmeters DC voltage DC current AC voltage AC current Resistance	40302	(20 ~ 100) mV (0.1 ~ 1) V (1 ~ 10) V (10 ~ 100) V (100 ~ 1 000) V (0.3 ~ 1) A (1 ~ 10) A (10 ~ 100) A (100 ~ 1 000) A 60 Hz (30 ~ 100) mV (0.1 ~ 1) V (1 ~ 10) V (10 ~ 100) V (100 ~ 1 000) V 60 Hz (0.3 ~ 1) A (1 ~ 10) A (10 ~ 100) A (100 ~ 1 000) A (2 ~ 10) Ω (10 ~ 100) Ω (0.1 ~ 1) k Ω (1 ~ 10) k Ω (10 ~ 100) k Ω (0.1 ~ 1) M Ω (1 ~ 10) M Ω	8.5×10^{-5} 3.1×10^{-5} 2.0×10^{-5} 2.8×10^{-5} 2.8×10^{-5} 2.4×10^{-3} 2.4×10^{-3} 2.4×10^{-3} 2.7×10^{-3} 5.0×10^{-4} 3.8×10^{-4} 3.8×10^{-4} 3.0×10^{-4} 4.0×10^{-4} 2.9×10^{-3} 2.9×10^{-3} 2.9×10^{-3} 2.9×10^{-3} 8.0×10^{-5} 6.6×10^{-5} 6.6×10^{-5} 6.6×10^{-5} 6.6×10^{-5} 1.5×10^{-4} 2.7×10^{-4}	Meter calibrator, Coil, Decade resistance box /QECI-EL302

403. AC voltage, current & power

Measured Quantity Instrument or Gauge	Field Code	Range	Measurement uncertainty (The Confidence Level is about 95 %)	Standard/Method of Measurement etc.
AC voltage/current calibrators AC voltage	40303	40 Hz ~ 1 kHz (2 ~ 10) mV (10 ~ 100) mV (0.1 ~ 1) V (1 ~ 10) V (10 ~ 100) V (100 ~ 1 000) V	8.2×10^{-3} 8.4×10^{-4} 2.8×10^{-4} 2.8×10^{-4} 2.8×10^{-4} 3.2×10^{-4}	Multimeter Shunt /QECI-EL303
AC current		40 Hz~ 1 kHz (2 ~ 10) mA (10 ~ 100) mA (0.1 ~ 1) A (1 ~ 10) A (50 ~ 400) Hz (10 ~ 100) A	1.7×10^{-3} 1.6×10^{-3} 2.5×10^{-3} 2.6×10^{-3} 1.3×10^{-3}	
Power factor meters Lead, Lag	40310	60 Hz 1 0.9 0.8 0.7 0.6 0.5 0.4 0.3 0.2 0.1	1.4×10^{-3} 1.6×10^{-3} 2.3×10^{-3} 3.1×10^{-3} 4.7×10^{-3} 7.6×10^{-3} 9.5×10^{-3} 1.9×10^{-2} 2.9×10^{-2} 1.2×10^{-1}	Power calibrator /QECI-EL310

403. AC voltage, current & power

Measured Quantity Instrument or Gauge	Field Code	Range	Measurement uncertainty (The Confidence Level is about 95 %)	Standard/Method of Measurement etc.
AC power meters	40311	(50 ~ 60) Hz		Power calibrator, Coil /QECI-EL311
AC voltage		(0.4 ~ 1) V	3.8×10^{-4}	
		(1 ~ 10) V	3.8×10^{-4}	
		(10 ~ 100) V	3.3×10^{-4}	
		(100 ~ 1 000) V	4.0×10^{-4}	
AC current		(50 ~ 60) Hz		
		(2 ~ 10) mA	3.0×10^{-3}	
		(10 ~ 100) mA	1.1×10^{-3}	
		(0.1 ~ 1) A	2.0×10^{-3}	
		(1 ~ 10) A	2.2×10^{-3}	
		(10 ~ 20) A	1.9×10^{-3}	
Electric power		(50 ~ 60) Hz		
		(2 ~ 10) W	1.2×10^{-3}	
		(10 ~ 50) W	1.2×10^{-3}	
		(50 ~ 100) W	1.2×10^{-3}	
		(100 ~ 500) W	1.2×10^{-3}	
		(0.5 ~ 1) kW	1.2×10^{-3}	
		(1 ~ 5) kW	1.2×10^{-3}	
	(5 ~ 10) kW	5.2×10^{-4}		
	(10 ~ 20) kW	4.0×10^{-4}		
AC power supplies	40312	40 Hz ~ 1 kHz		Multimeter, Shunt /QECI-EL312
AC voltage		(20 ~ 100) mV	8.4×10^{-4}	
		(0.1 ~ 1) V	2.8×10^{-4}	
		(1 ~ 10) V	2.8×10^{-4}	
		(10 ~ 100) V	2.8×10^{-4}	
		(100 ~ 1 000) V	3.2×10^{-4}	
AC current		40 Hz ~ 1 kHz		
		(2 ~ 10) mA	1.7×10^{-3}	
		(10 ~ 100) mA	1.7×10^{-3}	
		(0.1 ~ 1) A	1.9×10^{-3}	
		(1 ~ 10) A	3.3×10^{-3}	
		(50 ~ 400) Hz		
		(10 ~ 100) A	1.3×10^{-3}	

403. AC voltage, current & power

Measured Quantity Instrument or Gauge	Field Code	Range	Measurement uncertainty (The Confidence Level is about 95 %)	Standard/Method of Measurement etc.
Puncture/safety testers DC voltage AC voltage Breaking DC current Breaking AC current Operating time	40313	(0.2 ~ 1) kV	1.0×10^{-2}	High voltage voltmeter, Current calibrator , Multimeter, Oscilloscope /QECI-EL313
		(1 ~ 5) kV	7.0×10^{-3}	
		(5 ~ 10) kV	1.7×10^{-2}	
		(10 ~ 50) kV	1.3×10^{-2}	
		(50 ~ 100) kV	1.3×10^{-2}	
		60 Hz		
		(0.2 ~ 1) kV	2.0×10^{-2}	
		(1 ~ 5) kV	1.4×10^{-2}	
		(5 ~ 10) kV	2.5×10^{-2}	
		(10 ~ 50) kV	1.6×10^{-2}	
		(50 ~ 100) kV	1.3×10^{-2}	
		(0.2 ~ 1) mA	5.0×10^{-3}	
		(1 ~ 10) mA	5.0×10^{-3}	
		(10 ~ 100) mA	5.0×10^{-3}	
		60 Hz		
		(0.2 ~ 1) mA	1.0×10^{-2}	
(1 ~ 10) mA	5.5×10^{-3}			
(10 ~ 100) mA	1.0×10^{-2}			
(0 ~ 30) s	1.0×10^{-2}			
AC voltmeters AC voltmeter	40318	50 Hz ~ 1 kHz		Meter calibrator /QECI-EL318
		(1 ~ 10) mV	1.0×10^{-2}	
		(10 ~ 100) mV	6.5×10^{-4}	
		(0.1 ~ 1) V	2.7×10^{-4}	
		(1 ~ 10) V	1.8×10^{-4}	
		(10 ~ 100) V	1.8×10^{-4}	
		(100 ~ 1 000) V	1.7×10^{-4}	
		(1 ~ 10) kHz		
		(1 ~ 10) mV	1.0×10^{-2}	
		(10 ~ 100) mV	6.5×10^{-4}	
		(0.1 ~ 1) V	2.7×10^{-4}	
		(1 ~ 10) V	1.8×10^{-4}	
		(10 ~ 100) V	1.8×10^{-4}	
		(10 ~ 100) kHz		
		(1 ~ 10) mV	3.1×10^{-2}	
		(10 ~ 100) mV	2.5×10^{-3}	
		(0.1 ~ 1) V	1.2×10^{-3}	
		(1 ~ 10) V	4.7×10^{-4}	
(10 ~ 100) V	9.0×10^{-4}			

404. Other DC & LF Measurements

Measured Quantity Instrument or Gauge	Field Code	Range	Measurement uncertainty (The Confidence Level is about 95 %)	Standard/Method of Measurement etc.
Line frequency meters	40410	(45 ~ 100) Hz (100 ~ 1 000) Hz (1 000 ~ 10 000) Hz	0.02 Hz 0.2 Hz 2 Hz	Meter calibrator QECI-EL410
Function generators Frequency Amplitude	40411	0.1 Hz ~ 100 MHz 10 Hz ~ 1 kHz 1 mV (1 ~ 10) mV (10 ~ 100) mV (0.1 ~ 1) V (1 ~ 10) V (10 ~ 100) V (1 ~ 10) kHz 1 mV (1 ~ 10) mV (10 ~ 100) mV (0.1 ~ 1) V (1 ~ 10) V (10 ~ 100) V (10 ~ 100) kHz 1 mV (1 ~ 10) mV (10 ~ 100) mV (0.1 ~ 1) V (1 ~ 10) V (10 ~ 100) V (10 ~ 100) kHz 1 mV (1 ~ 10) mV (10 ~ 100) mV (0.1 ~ 1) V (1 ~ 10) V (10 ~ 100) V 100 kHz ~ 1 MHz 1 mV (1 ~ 10) mV (10 ~ 100) mV (0.1 ~ 1) V (1 ~ 10) V 1 V 40 Hz 100 Hz 1 kHz 10 kHz 100 kHz 1 MHz 10 MHz 10 mV (10 ~ 100) mV (0.1 ~ 1) V (1 ~ 10) V (10 ~ 20) V 1 ns ~ 10 ms	5.8 × 10 ⁻⁷ 0.21 μV 2.1 × 10 ⁻⁴ 2.1 × 10 ⁻⁴ 1.1 × 10 ⁻⁴ 1.1 × 10 ⁻⁴ 1.1 × 10 ⁻⁴ 0.43 μV 4.3 × 10 ⁻⁴ 4.3 × 10 ⁻⁴ 2.7 × 10 ⁻⁴ 2.7 × 10 ⁻⁴ 2.7 × 10 ⁻⁴ 0.94 μV 9.4 × 10 ⁻⁴ 9.4 × 10 ⁻⁴ 7.0 × 10 ⁻⁴ 7.0 × 10 ⁻⁴ 7.0 × 10 ⁻⁴ 25 μV 2.5 × 10 ⁻² 2.4 × 10 ⁻² 2.4 × 10 ⁻² 2.4 × 10 ⁻² 1.4 × 10 ⁻⁴ 1.3 × 10 ⁻⁴ 1.3 × 10 ⁻⁴ 2.7 × 10 ⁻⁴ 7.0 × 10 ⁻⁴ 2.1 × 10 ⁻³ 2.1 × 10 ⁻³ 0.58 μV 5.8 × 10 ⁻⁵ 5.9 × 10 ⁻⁵ 5.8 × 10 ⁻⁵ 3.0 × 10 ⁻⁵ 6.2 × 10 ⁻³	GPS Receiver, Universal Counter, Multimeter, Oscilloscope QECI-EL411
Amplitude Flatness				
DC Offset				
Rise/Fall Time				

404. Other DC & LF Measurements

Measured Quantity Instrument or Gauge	Field Code	Range	Measurement uncertainty (The Confidence Level is about 95 %)	Standard/Method of Measurement etc.
LF impulse generators Impulse voltage Pulse Width Pulse Rising Time	40414	0.1 kV (0.1 ~ 1) kV (1 ~ 5) kV (5 ~ 10) kV (10 ~ 20) kV (20 ns ~ 100 ms) (20 ns ~ 100 ms)	4.3 V 4.3×10^{-2} 4.3×10^{-2} 4.3×10^{-2} 4.3×10^{-2} 2.2×10^{-3} 2.2×10^{-3}	Oscilloscope, High voltage tester /QECI-EL414
Leakage current testers AC voltage AC current DC current	40416	60 Hz (20 ~ 100) mV (0.1 ~ 1) V (1 ~ 10) V (10 ~ 100) V (100 ~ 600) V 60 Hz (2 ~ 10) μ A (10 ~ 100) μ A (0.1 ~ 1) mA (1 ~ 10) mA (10 ~ 100) mA (2 ~ 10) μ A (10 ~ 100) μ A (0.1 ~ 1) mA (1 ~ 10) mA (10 ~ 100) mA	7.5×10^{-4} 4.4×10^{-4} 2.9×10^{-4} 3.0×10^{-4} 4.2×10^{-4} 9.5×10^{-3} 1.2×10^{-3} 5.6×10^{-3} 3.0×10^{-3} 2.9×10^{-3} 4.7×10^{-3} 6.5×10^{-4} 3.7×10^{-4} 4.7×10^{-4} 4.8×10^{-4}	Meter calibrator, Current calibrator /QECI-EL416
Electronic AC/DC loads DC voltage DC current	40417	(20 ~ 100) mV (0.1 ~ 1) V (1 ~ 10) V (10 ~ 100) V (100 ~ 1 000) V (20 ~ 100) mA (0.1 ~ 1) A (1 ~ 10) A (10 ~ 100) A	9.0×10^{-5} 4.7×10^{-5} 2.7×10^{-5} 3.3×10^{-5} 3.3×10^{-5} 1.2×10^{-4} 1.2×10^{-4} 1.4×10^{-4} 2.5×10^{-4}	Meter calibrator, Current calibrator /QECI-EL417

404. Other DC & LF Measurements

Measured Quantity Instrument or Gauge	Field Code	Range	Measurement uncertainty (The Confidence Level is about 95 %)	Standard/Method of Measurement etc.	
Analogue/Digital multimeters	40419	(±)		Meter calibrator, Resistors, Decade resistance box /QECI-EL419	
		DC voltage	0 mV		0.70 μV
		(0 ~ 100) mV	4.6×10^{-5}		
		(0.1 ~ 1) V	1.5×10^{-5}		
		(1 ~ 10) V	1.2×10^{-5}		
		(10 ~ 100) V	1.4×10^{-5}		
		(100 ~ 1 000) V	1.4×10^{-5}		
		DC current	0 μA		9.3 nA
		(0 ~ 100) μA	5.3×10^{-4}		
		(0.1 ~ 1) mA	1.1×10^{-4}		
		(1 ~ 10) mA	9.3×10^{-5}		
		(10 ~ 100) mA	1.0×10^{-4}		
		(0.1 ~ 1) A	1.9×10^{-4}		
		(1 ~ 20) A	9.5×10^{-4}		
		AC voltage	50 Hz ~ 10 kHz		
		(20 ~ 100) mV	6.5×10^{-4}		
		(0.1 ~ 1) V	2.7×10^{-4}		
		(1 ~ 10) V	1.8×10^{-4}		
		(10 ~ 100) V	1.8×10^{-4}		
		(100 ~ 1 000) V	1.7×10^{-4}		
		AC voltage	(10 ~ 100) kHz		
		(20 ~ 100) mV	2.5×10^{-3}		
		(0.1 ~ 1) V	1.2×10^{-3}		
		(1 ~ 10) V	4.7×10^{-4}		
		(10 ~ 100) V	9.3×10^{-4}		
		AC current	50 Hz ~ 1 kHz		
		(20 ~ 100) μA	2.9×10^{-4}		
		(0.1 ~ 1) mA	4.4×10^{-4}		
		(1 ~ 10) mA	2.7×10^{-4}		
		(10 ~ 100) mA	2.8×10^{-4}		
		(0.1 ~ 1) A	1.0×10^{-3}		
		(1 ~ 20) A	2.3×10^{-3}		
		Resistance	1 Ω		24 μΩ
(1 ~ 10) Ω	1.2×10^{-5}				
(10 ~ 100) Ω	1.2×10^{-5}				
(0.1 ~ 1) kΩ	1.2×10^{-5}				
(1 ~ 10) kΩ	1.2×10^{-5}				
(10 ~ 100) kΩ	1.2×10^{-5}				
(0.1 ~ 1) MΩ	1.8×10^{-5}				
(1 ~ 10) MΩ	3.0×10^{-5}				
(10 ~ 100) MΩ	2.5×10^{-5}				

404. Other DC & LF Measurements

Measured Quantity Instrument or Gauge	Field Code	Range	Measurement uncertainty (The Confidence Level is about 95 %)	Standard/Method of Measurement etc.
Oscilloscopes	40421			Scopes calibrator /QECI-EL421
Vertical		(2 ~ 5) mV	2.5×10^{-2}	
		(5 ~ 10) mV	8.0×10^{-3}	
		(10 ~ 50) mV	4.0×10^{-3}	
		(50 ~ 100) mV	2.0×10^{-3}	
		(100 ~ 500) mV	1.5×10^{-3}	
		(0.5 ~ 1) V	2.0×10^{-3}	
		(1 ~ 5) V	1.5×10^{-3}	
		(5 ~ 10) V	2.0×10^{-3}	
		(10 ~ 50) V	1.5×10^{-3}	
		(50 ~ 100) V	2.0×10^{-3}	
Horizontal		(2 ~ 5) ns	5.0×10^{-4}	
		(5 ~ 50) ns	1.0×10^{-3}	
		(50 ~ 500) ns	1.0×10^{-3}	
		(0.5 ~ 5) μ s	1.0×10^{-3}	
		(5 ~ 50) μ s	1.0×10^{-3}	
		(50 ~ 500) μ s	1.0×10^{-3}	
		(0.5 ~ 5) ms	1.0×10^{-3}	
		(5 ~ 50) ms	1.0×10^{-3}	
		(50 ~ 500) ms	1.0×10^{-3}	
		(0.5 ~ 5) s	1.0×10^{-3}	
Bandwidth		600 mV		
		(0.05 ~ 100) MHz	7.5×10^{-2}	
		(100 ~ 300) MHz	1.2×10^{-2}	
		(300 ~ 600) MHz	1.2×10^{-2}	
Volt/Current recorders	40424	(\pm)		Meter calibrator /QECI-EL424
DC voltage		0 mV	1.2 μ V	
		(0 ~ 10) mV	6.5×10^{-4}	
		(10 ~ 100) mV	8.5×10^{-5}	
		(0.1 ~ 1) V	3.1×10^{-5}	
		(1 ~ 10) V	2.0×10^{-5}	
		(10 ~ 100) V	2.8×10^{-5}	
		(100 ~ 1 000) V	2.8×10^{-5}	
DC current		0 μ A	24 nA	
		(0 ~ 10) μ A	1.2×10^{-2}	
		(10 ~ 100) μ A	1.4×10^{-3}	
		(0.1 ~ 1) mA	4.7×10^{-4}	
		(1 ~ 10) mA	4.0×10^{-4}	
		(10 ~ 100) mA	3.9×10^{-4}	
		(0.1 ~ 1) A	4.3×10^{-4}	
		(1 ~ 20) A	1.3×10^{-3}	

404. Other DC & LF Measurements

Measured Quantity Instrument or Gauge	Field Code	Range	Measurement uncertainty (The Confidence Level is about 95 %)	Standard/Method of Measurement etc.
Relay test sets	40425	60 Hz		Multimeter, Shunt /QECI-EL425
AC voltage		(20 ~ 100) mV	8.4×10^{-4}	
		(0.1 ~ 1) V	2.8×10^{-4}	
		(1 ~ 10) V	2.8×10^{-4}	
		(10 ~ 100) V	2.8×10^{-4}	
		(100 ~ 1 000) V	3.2×10^{-4}	
AC current		60 Hz		
		(2 ~ 10) mA	1.7×10^{-3}	
		(10 ~ 100) mA	1.7×10^{-3}	
		(0.1 ~ 1) A	2.5×10^{-3}	
		(1 ~ 10) A	3.3×10^{-3}	
		(10 ~ 100) A	1.3×10^{-3}	

501. Contact thermometry

Measured Quantity Instrument or Gauge	Field Code	Range	Measurement uncertainty (The Confidence Level is about 95 %)	Standard/Method of Measurement etc.
Temperature generators	50101			Data logger, Noble metal thermocouple SPRT /QECI-TE101 /QECI-TE101-1 /QECI-TE101-2 /QECI-TE101-3 /QECI-TE101-4
Ovens		(-100 ~ 200) °C	0.9 °C	
		(200 ~ 250) °C	1.5 °C	
Furnaces		(200 ~ 1 100) °C	1.3 °C	
Isothermal liquid baths		(-196 ~ 200) °C	0.05 °C	
		(200 ~ 400) °C	0.1 °C	
Ice-point baths		0 °C	0.01 °C	
Dry-block calibrators		(-40 ~ 100) °C	0.06 °C	
		(100 ~ 400) °C	0.09 °C	
		(400 ~ 1 100) °C	0.8 °C	
Temperature indicators /recorders/controllers, temperature calibrators (Include sensors)	50102	(-196 ~ 400) °C	0.04 °C	SPRT, Noble metal thermocouple Calibrator /QECI-TE102 /QECI-TE102-1 /QECI-TE102-1 /QECI-TE102-2
		(400 ~ 800) °C	1.3 °C	
		(800 ~ 1 100) °C	1.6 °C	
		(1 100 ~ 1 300) °C	2.6 °C	
Thermoelectric type (Exclude sensors)		(-196 ~ 1 300) °C	0.47 °C	
Resistance type (Exclude sensors)		(-196 ~ 650) °C	0.15 °C	

501. Contact thermometry

Measured Quantity Instrument or Gauge	Field Code	Range	Measurement uncertainty (The Confidence Level is about 95 %)	Standard/Method of Measurement etc.
Glass thermometers; liquid-in-glass, Beckmann Glass thermometers	50103	(-40 ~ 360) °C	0.05 °C	SPRT /QECI-TE103
Resistance thermometers; IPRT, etc.	50104	(-196 ~ 400) °C	0.06 °C	SPRT /QECI-TE104
Thermal expansion thremometers; bimetal, gas or liquid types	50105	(-40 ~ 150) °C (150 ~ 400) °C	0.4 °C 0.7 °C	SPRT /QECI-TE105
Thermomecoules; Base metal thermomecoules Noble metal thermomecoules	50106	(-196 ~ -40) °C (-40 ~ 200) °C (200 ~ 1 100) °C (1 100 ~ 1 300) °C (0 ~ 1 100) °C (1 100 ~ 1 300) °C	0.5 °C 0.3 °C 1.6 °C 2.7 °C 1.3 °C 2.4 °C	SPRT, Noble metal thermocouple /QECI-TE106-1 /QECI-TE106-2
Temperature transducers	50107	(-196 ~ 400) °C (400 ~ 1 100) °C (1 100 ~ 1 300) °C	0.3 °C 1.6 °C 2.8 °C	SPRT, Noble metal thermocouple /QECI-TE107

502. Non contact thermometry

Measured Quantity Instrument or Gauge	Field Code	Range	Measurement uncertainty (The Confidence Level is about 95 %)	Standard/Method of Measurement etc.
Standard radiation thermometers	50204	(0 ~ 200) °C (200 ~ 700) °C (700 ~ 1 000) °C	1.2 °C 1.6 °C 2.3 °C	Standard radiation thermometer /QECI-TE204

503. Humidity

Measured Quantity Instrument or Gauge	Field Code	Range	Measurement uncertainty (The Confidence Level is about 95 %)	Standard/Method of Measurement etc.
Relative humidity hygrometers Polimer thin film hygrometers Hair hygrometers	50302	(10 ~ 95) % R.H. (-20 ~ 80) °C (20 ~ 90) % R.H. (10 ~ 50) °C	2.9 % R.H. 0.6 °C 4.4 % R.H. 0.7 °C	Dew point thermometer /QECI-HU302 /QECI-HU302-1
Temperature humidity recorders; hygrothermograph, etc.	50304	(20 ~ 90) % R.H. (10 ~ 80) °C	3.2 % R.H. 1.1 °C	Dew point thermometer /QECI-HU304
Transducers; dew-point/ relative humidity Ralative humidity transducers	50305	(10 ~ 50) % R.H. (50 ~ 95) % R.H.	2.6 % R.H. 2.9 % R.H.	Dew point thermometer /QECI-HU305
Humidity generators; two-pressure, two-temperature, flow mixing humidity gererator, constant temperature and humidity chamber, etc.	50306	(10 ~ 30) % R.H. (30 ~ 60) % R.H. (60 ~ 80) % R.H. (80 ~ 98) % R.H. (-70 ~ 180) °C	2.2 % R.H. 2.8 % R.H. 4.0 % R.H. 4.8 % R.H. 0.9 °C	Dew point thermometer /QECI-HU306

701. Photometry

Measured Quantity Instrument or Gauge	Field Code	Range	Measurement uncertainty (The Confidence Level is about 95 %)	Standard/Method of Measurement etc.
Illuminance meters	70101	0.5 lx (0.5 ~ 1) lx (1 ~ 20 000)lx	2.4×10^{-2} 2.0×10^{-2} 1.9×10^{-2}	Illuminance meters /QECI-PH701

901. Chemical analysis

Measured Quantity Instrument or Gauge	Field Code	Range	Measurement uncertainty (The Confidence Level is about 95 %)	Standard/Method of Measurement etc.
Breath alcohol analyzers	90101	0.030 % BAC (0.080 ~ 0.100) % BAC	3.3×10^{-2} 2.1×10^{-2}	Alcohol gas /QECI-CA101
Gas analyzers Oxygen (O ₂) Carbon monoxide (CO) Hydrongen sulfide (H ₂ S) Methane (CH ₄) Carbon Dioxide (CO ₂) Isobutylene (i-C ₄ H ₈) Isobutane (i-C ₄ H ₁₀) Hydrogen (H ₂) Propane (C ₃ H ₈) Nitric oxide (NO) Ammonia (NH ₃)	90103	(0 ~ 21.0) cmol/mol (0 ~ 150.2) μmol/mol (0 ~ 13) μmol/mol (13 ~ 30) μmol/mol (0 ~ 1.26) cmol/mol (1.26 ~ 2.51) cmol/mol (0 ~ 2.54) cmol/mol 100 μmol/mol (0 ~ 1) cmol/mol (0 ~ 2) cmol/mol 1.06 cmol/mol (0 ~ 10.2) μmol/mol (10.2 ~ 51.0) μmol/mol 50 μmol/mol	2.0×10^{-2} 2.0×10^{-2} 3.8×10^{-2} 3.2×10^{-2} 2.4×10^{-2} 2.0×10^{-2} 2.0×10^{-2} 1.0 μmol/mol 1.3×10^{-2} 1.1×10^{-2} 0.030 cmol/mol 4.9×10^{-2} 2.9×10^{-2} 2.4 μmol/mol	Standard gas /QECI-CA103

SCOPE OF ACCREDITATION TO ISO/IEC 17025:2017 & KS Q ISO/IEC 17025:2017

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CALIBRATION

Valid To : Dec. 02, 2026.

Accreditation No : KC01-079

In recognition of the successful completion of the KOLAS evaluation process,
accreditation is granted to this laboratory to perform the following calibrations

Field Code	Item of Calibration	on-site	Field Code	Item of Calibration	on-site	Field Code	Item of Calibration	on-site
102.	Linear dimension		10511	Measuring microscopes, profile projectors	Y			
10206	Dial/cylinder gauge testers	N						
10207	Doctor blades	N	10514	Taper plug gauges	N			
10209	End bars	N	106.	Various dimensional				
10212	Film applicators	N	10601	Inside/outside/gear tooth calipers, caliper gauges	Y			
10213	Gap gauges	N						
10214	Gauge blocks, by comparison	N	10603	Cylinder/bore gauges	Y			
10216	Height gauges/measuring machines	Y	10604	Depth gauges, depth micrometers	Y			
10220	Standard measuring machines	Y	10605	Dial/digital gauges	Y			
10223	Electronic micrometers	N	10609	Micro indicators, test indicators	Y			
10224	Height micrometers, riser blocks	N	10611	3-points, micrometers	Y			
10229	Radius gauges	N	10612	Inside micrometers	Y			
10233	Taper thickness gauges	N	10613	Outside micrometers	Y			
10234	Ultrasonic thickness gauges	Y	10617	Standard sieves	N			
10236	Coating thickness testers	Y	10620	Welding gauges	Y			
103.	Angle							
10304	Bevel protractors	N						
10311	Plate/square/electric levels	N						
10318	Squareness testers, right angle testers	N						
10320	Precision squares	N						
104.	Form							
10404	Optical flats	N						
10405	Optical parallels	N						
10406	Parallel blocks	N						
10407	Precision surface plates	Y						
10415	Test bars	N						
105.	Complex geometry							
10502	Bench centers	N						
10503	Contact coordinate measuring machines	Y						
10504	Non-contact coordinate measuring machines	Y						

Note

- This laboratory provides calibration services in permanent standard laboratory and at on-site.
- Laboratory conducts on-site calibration should meet requirements of KOLAS-SR-007.
- On-site calibration is allowed to items with marking 'Y', not allowed to items with marking 'N'.
- Measurement uncertainty normally is quoted as an expanded uncertainty at a coverage probability of 95 %, which usually requires the use of a coverage factor of $k=2$. It expresses the lowest uncertainty of measurement that can be provided by accredited calibration laboratories in normal conditions.
- Due to the calibration environment such as reference standards or customers' facilities, it is note that uncertainty of measurement on a calibration certificate may be expressed larger than measurement uncertainty on scope of accreditation in general.

102. Linear dimension

Measured Quantity Instrument or Gauge	Field Code	Range	Measurement uncertainty (The Confidence Level is about 95 %)	Standard/Method of Measurement etc.
Dial/cylinder gauge testers Q & Q Co., Ltd.	10206	(0 ~ 25) mm	$\sqrt{(0.20 \mu\text{m})^2 + (2.9 \times 10^{-6} \times l_0)^2}$	Gauge block, Electronic micrometer /QYCI-LE206
Doctor blades	10207	(0 ~ 10) mm	1.1 μm	Height micrometer, Electronic micrometer /QYCI-LE207
End bars	10209	(25 ~ 500) mm (500 ~ 1 000) mm	$\sqrt{(0.33 \mu\text{m})^2 + (3.0 \times 10^{-6} \times l_0)^2}$ $\sqrt{(1.3 \mu\text{m})^2 + (2.9 \times 10^{-6} \times l_0)^2}$	Gauge block, Electronic micrometer /QYCI-LE209
Film applicators	10212	(0 ~ 10) mm	1.1 μm	Height micrometer, Electronic micrometer /QYCI-LE212
Gap gauges	10213	(2 ~ 200) mm	$\sqrt{(1.4 \mu\text{m})^2 + (2.7 \times 10^{-6} \times l_0)^2}$	Height micrometer, Electronic micrometer /QYCI-LE213
Gauge blocks, by comparison	10214	(0.5 ~ 100) mm	$\sqrt{(80 \text{ nm})^2 + (1.2 \times 10^{-6} \times l_0)^2}$	Gauge block, Gauge block comparator /QYCI-LE214
Height gauges/measuring machines Height gauges Height measuring machines	10216	(0 ~ 1 500) mm (0 ~ 600) mm	$\sqrt{(10 \mu\text{m})^2 + (3.0 \times 10^{-6} \times l_0)^2}$ $\sqrt{(0.5 \mu\text{m})^2 + (0.3 \times 10^{-5} \times l_0)^2}$	Gauge block /QYCI-LE216
Standard measuring machines	10220	(0 ~ 500) mm	$\sqrt{(0.20 \mu\text{m})^2 + (2.8 \times 10^{-6} \times l_0)^2}$	Gauge block /QYCI-LE220
Electronic micrometers	10223	$\pm 50 \mu\text{m}$ $\pm 50 \mu\text{m} \sim \pm 2 \text{ mm}$	0.1 μm 1 μm	Gauge block /QYCI-LE223
Height micrometers Block calibration Head calibration Riser blocks Parallelism	10224	(0 ~ 310) mm (0 ~ 20) mm 150 mm 300 mm 600 mm	$\sqrt{(0.74 \mu\text{m})^2 + (3.0 \times 10^{-6} \times l_0)^2}$ 0.8 μm 0.9 μm 1.1 μm 2.2 μm 0.8 μm	Gauge block, Electronic micrometer /QYCI-LE224 /QYCI-LE224-1
Radius gauges	10229	(0.03 ~ 100) mm	2 μm	Non-contact coordinate measuring machine /QYCI-LE229

102. Linear dimension

Measured Quantity Instrument or Gauge	Field Code	Range	Measurement uncertainty (The Confidence Level is about 95 %)	Standard/Method of Measurement etc.
Taper thickness gauges	10233	(0 ~ 90) mm	2 μm	Non-contact coordinate measuring machine /QYCI-LE233
Ultrasonic thickness gauges	10234	(0 ~ 200) mm	$\sqrt{(10 \mu\text{m})^2 + (3.9 \times 10^{-6} \times l_0)^2}$	Ultrasonic specimen /QYCI-LE234
Coating thickness testers	10236	(0 ~ 3.9) mm	$\sqrt{(1.8 \mu\text{m})^2 + (2.7 \times 10^{-6} \times l_0)^2}$	Thickness specimen /QYCI-LE236

103. Angle

Measured Quantity Instrument or Gauge	Field Code	Range	Measurement uncertainty (The Confidence Level is about 95 %)	Standard/Method of Measurement etc.
Bevel protractors Angle accuracy Straightness	10304	(0 ~ 180)° (0 ~ 300) mm	1' 1.3 μm	Non-contact coordinate measuring machine /QYCI-AN304
Plate/square/electric levels Angle(Bubble Tube Type) Flatness of Base Squareness	10311	±20.6" (0 ~ 300) mm (0 ~ 300) mm	$\sqrt{(0.8'')^2 + (0.3 \times 10^{-3} \times r_0)^2}$ 1.0 μm 8.3 μm/m	Level comparator, Electronic micrometer /QYCI-AN311
Squareness testers	10318	(0 ~ 490) mm	$\sqrt{(1.4 \mu\text{m})^2 + (3.0 \times 10^{-6} \times l_0)^2}$	Standard cylindrical square, Electronic micrometer /QYCI-AN318
Precision squares Squareness Parallelism Straightness	10320	(0 ~ 490) mm (0 ~ 500) mm (0 ~ 500) mm	$\sqrt{(1.3 \mu\text{m})^2 + (3.0 \times 10^{-6} \times l_0)^2}$ 1.7 μm 1.9 μm	Standard cylindrical square, Electronic micrometer /QYCI-AN320

104. Form

Measured Quantity Instrument or Gauge	Field Code	Range	Measurement uncertainty (The Confidence Level is about 95 %)	Standard/Method of Measurement etc.
Optical flats	10404	(Ø10 ~ Ø100) mm	$\sqrt{(23 \text{ nm})^2 + (4.3 \times 10^{-7} \times d_0)^2}$	Optical flat /QYCI-LE404
Optical parallels Flatness Parallelism	10405	(Ø10 ~ Ø50) mm	0.04 µm 0.08 µm	Optical flat, Gauge block comparator /QYCI-LE405
Parallel blocks Parallelism Flatness Difference of height between parallel block 1 and 2	10406	(0 ~ 500) mm	1.9 µm 1.9 µm 1.9 µm	Electronic micrometer /QYCI-LE406
Precision surface plates	10407	(0.09 ~ 1.44) m ² (1.44 ~ 4.84) m ² (4.84 ~ 9) m ² (9 ~ 17.5) m ²	1.3 µm 1.9 µm 2.6 µm 3.1 µm	Electronic Level /QYCI-LE407
Test bars Outside diameter Straightness Run-out Flank angle	10415	(0 ~ 500) mm (Ø10 ~ Ø100) mm	$\sqrt{(1.3 \text{ µm})^2 + (4.1 \times 10^{-6} \times l_0)^2}$ 1.0 µm 1.0 µm 3"	Gauge block, Electronic micrometer, Outside micrometers /QYCI-LE415

105. Complex geometry

Measured Quantity Instrument or Gauge	Field Code	Range	Measurement uncertainty (The Confidence Level is about 95 %)	Standard/Method of Measurement etc.
Bench centers Height difference of both the center Flatness of the bed side	10502	(0 ~ 500) mm	2.6 μm 2.3 μm	Test bar, Electronic micrometer /QYCI-LE502
Contact coordinate measuring machines Indicating accuracy Squareness Straightness	10503	(0 ~ 1 500) mm (0 ~ 1 000) mm (0 ~ 500) mm	$\sqrt{(2.7 \mu\text{m})^2 + (5.5 \times 10^{-6} \times l_0)^2}$ 4.0 μm 1.7 μm	Gauge block, Precision square, Straight edge, Step Gauge /QYCI-LE503
Non-contact coordinate measuring machines Indicating accuracy Squareness	10504	(0 ~ 600) mm (0 ~ 450) mm	$\sqrt{(0.40 \mu\text{m})^2 + (2.8 \times 10^{-6} \times l_0)^2}$ 2"	Standard scale, Angle gauge block /QYCI-LE504
Measuring microscopes, Profile projectors Feed accuracy of workstage Squareness Magnification Error Angle division accuracy	10511	(0 ~ 300) mm (0 ~ 360)°	$\sqrt{(0.51 \mu\text{m})^2 + (2.3 \times 10^{-6} \times l_0)^2}$ 2.6 μm 2.4 × 10 ⁻⁴ 1.1'	Standard scale, Square /QYCI-LE511 /QYCI-LE511-1
Taper plug gauges Taper half angle Small-end diameter Step diameter Big-end diameter Gauge length Step length	10514	(0 ~ 65)° (Ø2 ~ Ø100) mm (Ø2 ~ Ø100) mm (Ø2 ~ Ø100) mm (0 ~ 250) mm (0 ~ 150) mm	2" $\sqrt{(1.2 \mu\text{m})^2 + (3.0 \times 10^{-6} \times m_0)^2}$ $\sqrt{(1.5 \mu\text{m})^2 + (3.0 \times 10^{-6} \times d_1)^2}$ $\sqrt{(2.1 \mu\text{m})^2 + (3.0 \times 10^{-6} \times d_2)^2}$ $\sqrt{(0.80 \mu\text{m})^2 + (2.9 \times 10^{-6} \times l_0)^2}$ $\sqrt{(0.80 \mu\text{m})^2 + (2.9 \times 10^{-6} \times l_0)^2}$	Gauge block, Electronic micrometer, Outside micrometers, Height micrometer /QYCI-LE514

106. Various dimensional

Measured Quantity Instrument or Gauge	Field Code	Range	Measurement uncertainty (The Confidence Level is about 95 %)	Standard/Method of Measurement etc.
Inside/outside/gear tooth calipers, caliper gauges Inside/Outside calipers Gear tooth calipers Tooth height scale Tooth thickness scale Combine accuracy Caliper gauges	10601	(0 ~ 1 500) mm	$\sqrt{(10 \mu\text{m})^2 + (3.0 \times 10^{-6} \times l_0)^2}$	Gauge block, Step gauge, Surface plate /QYCI-LE601 /QYCI-LE601-1 /QYCI-LE601-2
		(0 ~ 50) mm	$\sqrt{(10 \mu\text{m})^2 + (2.9 \times 10^{-6} \times l_0)^2}$	
		(0 ~ 100) mm	$\sqrt{(10 \mu\text{m})^2 + (3.0 \times 10^{-6} \times l_0)^2}$	
		(0 ~ 100) mm	$\sqrt{(10 \mu\text{m})^2 + (2.8 \times 10^{-6} \times l_0)^2}$	
		(0 ~ 300) mm	$\sqrt{(10 \mu\text{m})^2 + (3.0 \times 10^{-6} \times l_0)^2}$	
Cylinder/Bore gauges	10603	(0 ~ 5) mm	0.3 μm	Dial gauge tester /QYCI-LE603
Depth gauges, Depth micrometers Depth gauges Depth micrometers Dial depth gauges	10604	(0 ~ 500) mm	$\sqrt{(10 \mu\text{m})^2 + (2.8 \times 10^{-6} \times l_0)^2}$	Gauge block, Surface plate /QYCI-LE604 /QYCI-LE604-1 /QYCI-LE604-2
		(0 ~ 300) mm	$\sqrt{(1.0 \mu\text{m})^2 + (2.7 \times 10^{-6} \times l_0)^2}$	
		(0 ~ 100) mm	$\sqrt{(1.0 \mu\text{m})^2 + (2.8 \times 10^{-6} \times l_0)^2}$	
Dial/digital gauges	10605	(0 ~ 1) mm	$\sqrt{(0.30 \mu\text{m})^2 + (3.9 \times 10^{-6} \times l_0)^2}$	Dial gauge tester, Gauge block /QYCI-LE605
		(1 ~ 25) mm	$\sqrt{(1.0 \mu\text{m})^2 + (3.9 \times 10^{-6} \times l_0)^2}$	
Micro indicators, Test indicators Micro indicators Test indicators	10609	±1 mm	0.3 μm	Dial gauge tester /QYCI-LE609 /QYCI-LE609-1
		(0 ~ 2) mm	0.3 μm	
3-points, Micrometers	10611	(Ø3 ~ Ø6) mm	1.1 μm	Cylindrical ring gauge /QYCI-LE611
		(Ø6 ~ Ø100) mm	2 μm	
Inside micrometers Inside micrometers Tubular inside micrometers	10612	(5 ~ 300) mm	$\sqrt{(1.0 \mu\text{m})^2 + (3.0 \times 10^{-6} \times l_0)^2}$	Gauge block, Gauge block accessory /QYCI-LE612 /QYCI-LE612-1
		(50 ~ 600) mm	$\sqrt{(1.0 \mu\text{m})^2 + (3.0 \times 10^{-6} \times l_0)^2}$	
		(600 ~ 1 500) mm	$\sqrt{(2.0 \mu\text{m})^2 + (3.0 \times 10^{-6} \times l_0)^2}$	

106. Various dimensional

Measured Quantity Instrument or Gauge	Field Code	Range	Measurement uncertainty (The Confidence Level is about 95 %)	Standard/Method of Measurement etc.
Outside micrometers Outside micrometers	10613	(0 ~ 100) mm	$\sqrt{(1.0 \mu\text{m})^2 + (2.9 \times 10^{-6} \times l_0)^2}$	Gauge block, Optical flat, Cylindrical plug gauge /QYCI-LE613 /QYCI-LE613-1
		(100 ~ 500) mm	$\sqrt{(1.0 \mu\text{m})^2 + (3.0 \times 10^{-6} \times l_0)^2}$	
		(500 ~ 1 000) mm	$\sqrt{(2.0 \mu\text{m})^2 + (3.0 \times 10^{-6} \times l_0)^2}$	
V-Anvil micrometers		(1 ~ 85) mm	$\sqrt{(1.0 \mu\text{m})^2 + (4.6 \times 10^{-6} \times l_0)^2}$	
Standard sieves Standard net sieve Wire diameter Sieve size Standard plate sieve Hole diameter Length of the hole center	10617	(0 ~ 10) mm	3 μm	Non-contact coordinate measuring machine /QYCI-LE617
		(0 ~ 130) mm	4 μm	
		(0 ~ 130) mm	3 μm	
		(0 ~ 160) mm	3 μm	
Welding gauges Height, Depth Scale Fillet Welding Height Taper thickness Angle	10620	(0 ~ 50) mm	0.3 mm	Non-contact coordinate measuring machine, Gauge block /QYCI-LE620
		(0 ~ 90) mm	0.3 mm	
		(0 ~ 20) mm	0.3 mm	
		(1 ~ 10) mm	0.2 mm	
		(0 ~ 90)°	0.3°	