

Laboratory's Scopes of Calibration

Field of Calibration	Properties of Measured	Range	Calibration Methods
Electrical	Voltage / Current / Power Calibrations Group		
	DC Volt Meters / Panel Meters	DCV: 0-1100V	Direct measurement
	AC Volt Meters / Panel Meters	DCA: 0-100A	
	DC Current Meters / Panel Meters	ACV: Up-1100V (10Hz-1MHz)	
	AC Current Meters / Panel Meters	ACA: Up-50A (10Hz-30kHz)	
	DC Volt/Current Meters		
	AC Volt/Current Meters		
	Digital Panel Meters		
	Circuit Testers / Analog Testers	DCV: 0-1100V	Direct measurement / Direct comparison
	Electrometers / Pico Ammeters	DCA: 0-100A	
	Digital Multimeters (Not over 4 digit)	ACV: Up-1100V (10Hz-30MHz)	
	Digital Multimeters (Not over 5 digit)	ACA: Up-50A (10Hz-30kHz)	
	Digital Multimeters (Not over 6 digit)	DCR: 0-1TΩ	
	Digital Multimeters (Not over 7 digit)	Frequency: 1Hz-40GHz	
	Digital Multimeters (Not over 8 digit)	Capacitance: Up-100mF	
	Digital Multimeters (Over 8 digit) (Equivalent to 3458A or Fluke 8508A)	Inductance: 100μH-1H	
	AC Measurement Standard (Fluke 5790A)	ACV: Up-1100V (10Hz-30MHz)	AC-DC Difference Transfer
	AC Measurement Standard + Wideband (Fluke 5790A+WB Option)		
	DC Voltage Reference Standard Cell (Fluke 732A)	DCV: 1V, 1.018V, 10V	Comparison / Differential
	DC Voltage Reference Standard Cell (Fluke 732B)	DCV: 1.018V, 10V	
DC Volt/Current Generators (Low accuracy)	DCV: 0-1000V	Manufacturer's performance verification tests	
DC Volt/Current Generators (High accuracy)	DCA: 0-100A		
AC Volt/Current Generators (Low accuracy)	ACV: Up-3V (10Hz-30MHz)		
AC Volt/Current Generators (High accuracy)	>3-220V (10Hz-1MHz)		
Multi-Calibrators	>220-1100V (10Hz-100kHz)		

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Field of Calibration	Properties of Measured	Range	Calibration Methods		
Electrical	Multi-Product Calibrators (Fluke 5500A, Wavetek 9100)	ACA: Up-50A (10Hz-10kHz) DCR: 0-1GΩ Capacitance: 1pF-100mF (20Hz-13MHz) Temperature Indicator: All types Phase: 0-360 Deg. Freq: 1Hz-40GHz RF Power: +20dBm to -100dBm RF Impedance: 50Ω, 75Ω, 600Ω, 1MΩ	Manufacturer's performance verification tests		
	Multi-Product Calibrators + Scope Option (Fluke 5500A, Wavetek 9100)				
	Multi-Product Calibrators (Fluke 5520A)				
	Multi-Product Calibrators + Scope Option (Fluke 5520A)				
	Multi-Function Calibrators (Fluke 5700A, 5720A, Wavetek 4800A)				
	Multi-Function Calibrators + Wideband Option (Fluke 5700A, 5720A, Wavetek 4800A)				
	Amplifier (Fluke 5725A)				
	Oscilloscope Calibrators (Fluke 5800A, Wavetek 9500)				
	Oscilloscope Calibrators (Fluke 5820A)				
	Regulated DC Power Supply (Single O/P)			DCV: 0-1000V DCA: 0-100A ACV: Up-10kV (10Hz-100kHz) ACA: Up-50A (10Hz-1kHz)	Direct measurement / Ohm's Law
	Regulated DC Power Supply (Multi O/P)				
	AC Power Supply (Single O/P)				
	AC Power Supply (Multi O/P)				
	Electronic Load				
	Digital High Volt Meters			DCV: 0-10kV ACV: Up-10kV (50Hz-60Hz)	Direct measurement / Direct comparison to high voltage standard
	Analog High Volt Meters				
	Electrostatic Volt Meters (Digital / Analog)				
	High Voltage Dividers				
High Voltage Probe					
Withstanding Voltage Testers					
Withstanding Voltage / Insulation Testers					
Curr. Calibrator for W. Testers					

Laboratory's Scopes of Calibration

Field of Calibration	Properties of Measured	Range	Calibration Methods
Electrical	Portable Noise Checkers and Monitors	DCV: 0-10kV ACV: Up-10kV (50Hz-60Hz)	Direct measurement / Direct comparison to high voltage standard
	Impulse Noise Voltmeters		
	Damped-Oscillatory Wave Simulators		
	Fast Transient Noise Simulators		
	Electrostatic Discharge Simulators		
	Voltage Dip and Up Simulator		
	Lightning Surge Simulator		
	Electronic Volt-Meters (≤ 10 MHz) (Single O/P)	ACV: Up-3V (10Hz-30MHz) >3-220V (10Hz-1MHz) >220-1100V (10Hz-100kHz)	Direct measurement / Direct comparison
	Electronic Volt-Meters (≤ 10 MHz) (Multi O/P)		
	Wideband Electronic Volt-Meters (>10MHz)		
	AC/DC Clamp Meters (Clamp only)	DCA: 0-1000A ACA: Up-1000A (10Hz-1kHz)	Direct measurement
	AC/DC Clamp Meters (Include multi-meter)		
	Portable AC/DC Watt Meters (Analog Type)	DCW: 0-36kW (DCV: 0-1000V, DCA: 0-36A) ACW: Up-50kW (ACV: Up-1000V, ACA: Up-50A, 45Hz-65Hz, PF 0.3-1)	Direct measurement
	Digital DC Watt Meters		
	Digital AC Watt Meters		
	Digital AC/DC Watt Meters		
	DC Potentiometers	DCV: 0-1000V DCA: 0-36A	Direct measurement
	Electronic Galvanometers		
	Transducers & Volt / Current Transformers		
	Pen Recorders (Less than 4 pens)	DCV: 0-1000V DCA: 0-36A	Direct measurement
	Pen Recorders (More than 4 pens)		
	X-Y Recorders		
Data Loggers (only V/A/R and Temp)			
Oscillographic Recorders			
Beamorders / Photocorders			
Industrial Recorders			

Laboratory's Scopes of Calibration

Field of Calibration	Properties of Measured	Range	Calibration Methods
Electrical	Oscilloscope and Waveform Analysis Equipment Calibrations Group		
	Analog Oscilloscopes	Freq. Standard: 0.5MHz, 1MHz, 5MHz, 10MHz Freq. Bandwidth: DC-26.5GHz Period Range: 2ns-5s DCV: 0-10kV ACV: Up-7kV Impedance: 50Ω, 75Ω, 600Ω, 1MΩ	Direct measurement / Direct comparison
	Synchrosopes / Memoryscopes		
	Digitizing Oscilloscopes		
	Sampling Oscilloscopes		
	X-Y Scopes / X-Y Monitor Scopes		
	Oscilloscopes to (High) Voltage Probe		
	Oscilloscopes to Voltage Isolators		
	Oscilloscopes to Current Probes		
	Oscilloscopes to Differential Probes		
	Oscilloscopes to Active Probes		
	Spectrum Analyzers		
	Digital Spectrum Analyzers		
	Tracking Generators		
	Dynamic Signal Analyzers		
	FFT Analyzers		
	Servo Analyzers		
	RF Field Analyzers		
	Component Calibration Group (Resistance / Capacitance / Inductance)		
	Eart Testers (Analog Type)	DCR: 0-1TΩ	Direct measurement / Direct comparison
	Eart Testers (Digital Type)		
	Low Ohm Testers		
	Ohm Meters (Analog Type)		
	Ohm Meters (Digital Type)		
	Insulation Meters (Analog Type)		
	Insulation Meters (Digital Type)		
	Super Megaohm Meters		
Wrist Strap Footwere System Testers			
Wheatstone Bridge			
Double Bridge			

Laboratory's Scopes of Calibration

Field of Calibration	Properties of Measured	Range	Calibration Methods
Electrical	Resistance Deviation Meters	DCR: 0-1TΩ	Direct measurement / Direct comparison
	Resistance Ratio Testers		
	Current Shunts	DCA: 0-100A	As choose of - Volt. inter-comparison - Volt ratio-comparison - Sub-stitution - Direct measurement - Ohm's law
	Standard Resistors (Single Value)	DCR: 0-1TΩ	
	Standard Resistors (Multi Values)	DCV: 0-1000V	
	Decade Resistance Box		
	Fixed Value Resistors (Low accuracy)		
	AC Current Shunt	ACA: Up-20A (10Hz-30kHz)	
	Fixed Value Capacitors (Low accuracy)	Capacitance: 1pF-100mF (20Hz-13MHz) AC Resistance: 1mΩ-100kΩ (DC-13MHz)	Direct measurement / Direct comparison.
	Standard Capacitor (Single Value)		
	Standard Capacitor (Multi Values)		
	Decade Capacitors		
	4-T Standard Air Capacitors Set (HP 16380A)		
	4-T Standard Air Capacitors Set (HP 16380C)		
	Calibration L-R Standard (HP 16074A)		
	4-T Pair Standard Resistors Set (HP 42030A)		
	Fixed Value Inductors (Low accuracy)	Inductance: 100μH-10H (100Hz-10kHz)	Direct measurement / Direct comparison
	Standard Inductors (Single Value)		
	Standard Inductors (Multi Values)		
Decade Inductors			
Capacitance Meters (Low accuracy)	Capacitance: 1pF-100mF (20Hz-13MHz)	Direct measurement / Direct comparison	
Capacitance Meters (High accuracy)			
Impedance Meters / Vector Impedance Meters	Inductance: 100μH-10H (100Hz-10kHz)		
Impedance Analyzers			

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Field of Calibration	Properties of Measured	Range	Calibration Methods
Electrical	Impedance Gain / Phase Analyzers	AC Resistance: 1mΩ-1MΩ (DC-13MHz)	Direct measurement / Direct comparison
	Impedance Deviation Meters / Comparators		
	Crystal Impedance Meters		
	Capacitance Bridge		
	Inductance Meters		
	Inductance Bridge		
	LCR Deviation Meters / Comparators	Capacitance:	Direct measurement / Direct comparison
	LCR Meters / LCZ Meters	1pF-100mF (20Hz-13MHz)	
	LCR Meters (Pocket Type)	Inductance:	
	Universal Bridge	100μH-10H (100Hz-10kHz)	
		AC Resistance: 1mΩ-1MΩ (DC-13MHz)	
	Diode Curve Tracers	DCV: 0-1000V	Direct measurement / Direct comparison
	Transistor Curve Tracers	DCA: 0-36A	
	Semiconductor Testers	Capacitance:	
	Semiconductor Parameter Analyzers	1pF-100mF (20Hz-13MHz)	
Modular DC Sources / Monitors	Inductance:		
Ratio Testers	100μH-10H (100Hz-10kHz)		
Fo & Ze Meters	AC Resistance:		
	1mΩ-1MΩ (DC-13MHz)		

Laboratory's Scopes of Calibration

Field of Calibration	Properties of Measured	Range	Calibration Methods
Frequency & RF Power	Frequency and Time Calibrations Group		
	Quartz Oscillators (TCXO Class, $\leq 5E-7$)	Freq. Standard:	Direct measurement and direct comparison to Frequency Standard from Rubidium Freq. Standard and GPS Freq. Ref. Receiver
	Quartz Oscillators (MCXO Class, $\leq 5E-8$)	0.5MHz, 1MHz, 5MHz, 10MHz	
	Quartz Oscillators (OCXO Class, $\leq 5E-9$)	Freq. Range:	
	Rubidium Frequency Standards ($\leq 2E-10$)	1Hz-40GHz	
	GPS Frequency Ref. Receivers		
	Freq./Universal Counters ($\leq 5E-6$)		
	Freq./Universal Counters ($\leq 5E-7$)		
	Freq./Universal Counters ($\leq 5E-8$)		
	Freq./Universal Counters ($\leq 5E-9$)		
	Freq./Universal Counters ($> 5E-9$)		
	Microwave Frequency Meters		
	Frequency Converters		
	Frequency Multipliers		
	Frequency Comparators		
	Modulation Domain/Time Interval Analyzer		
	Tachometers		
	Stroboscopes		
	Revolutionmeters		
	Digital Timers		
	Timers		
Stopwatches			
Watches & Clocks			
Phase Meters			
Vector Voltmeters / Gain-Phase Meters			
Delay Line / Phase Shifters			

Laboratory's Scopes of Calibration

Field of Calibration	Properties of Measured	Range	Calibration Methods
Frequency & RF Power	Communications Equipment Calibration Group		
	Signal Generators Digital Modulation Signal Generators Microwave Signal Generators Function Generators Frequency Synthesizers (Low accuracy) Frequency Synthesizers (High accuracy) Sweep Oscillators Synthesized Sweep Oscillator Pulse Generators Universal Sources Clock Generators Pulse Pattern Generators Data Generators / Word Generators Speaker Test Oscillators Time Synthesizers Phase Generators Noise Generators (White/Pink) IF/RF Noise Generators FM Linear Detectors FM/AM Modulation Meters Modulation Analyzers Modulation Analyzer With Power Sensors Measuring Receivers Measuring Receiver With Power Sensors Receiver / Test Receivers Interference / Field Strength Meters TV Field Intensity Meters / CN Checkers Radio Communication Analyzers Radio Test Set	Freq. Standard: 0.5MHz, 1MHz, 5MHz, 10MHz Freq. Range: 1Hz-40GHz AC Level: Up-10V (1Hz-10MHz) RF Level: Up-10V (10MHz-18.6GHz) RF Attenuator: Up-100dB (DC-40GHz) RF Impedance: 50Ω, 75Ω, 600Ω (DC-40GHz)	As choose of - In-house methods of laboratory or - Maker's performance verification tests

Laboratory's Scopes of Calibration

Field of Calibration	Properties of Measured	Range	Calibration Methods
Frequency & RF Power	Cellular Testers / MCA Testers	Freq. Standard:	As choose of - In-house methods of laboratory or - Maker's performance verification tests
	Personal Checkers / Output Testers	0.5MHz, 1MHz, 5MHz, 10MHz	
	Digital Modulation Radio Communication Analyzers	Freq. Range:	
	Digital Mobile Radio Transmitter Testers	1Hz-40GHz	
	Modulation Spectrum Analyzers	AC Level: Up-10V (1Hz-10MHz)	
	Signalling Testers	RF Level:	
	PDC/PHS Testers	Up-10V (10MHz-18.6GHz)	
	Digital Modulators	RF Attenuator:	
	Standard Level Meters	Up-100dB (DC-40GHz)	
	Level Meters	RF Impedance:	
	Selective Level Meters	50Ω, 75Ω, 600Ω (DC-40GHz)	
	Psophometers / Noise Meters		
	Noise Loading Test Set		
	Attenuators (600Ω, 75Ω Balance, f ≤ 1.3GHz)		
	Attenuators (75Ω, 50Ω Un-balance, f ≤ 1.3GHz)		
	Filters (LP / HP / BP)		
	Universal Filters		
	Key Box / Level Comparators		
	Switching Unit / Key Box With Attenuator		
	Distortion Meters		
	Distortion Calibrators		
	Distortion Meters With Oscillators		
	Audio Analyzers		
Error Rate Testers			
Error Detectors			
Error Analyzers			
Repeater Testers			
Jitter Generator Receivers			
PCM Line Test Set			
PCM Multiplex Testers			

Laboratory's Scopes of Calibration

Field of Calibration	Properties of Measured	Range	Calibration Methods
Frequency & RF Power	DSU Testers	Freq. Standard: 0.5MHz, 1MHz, 5MHz, 10MHz Freq. Range: 1Hz-40GHz AC Level: Up-10V (1Hz-10MHz) RF Level: Up-10V (10MHz-18.6GHz) RF Attenuator: Up-100dB (DC-40GHz) RF Impedance: 50Ω, 75Ω, 600Ω (DC-40GHz)	As choose of - In-house methods of laboratory or - Maker's performance verification tests
	Digital Transmission Analyzers		
	Superdigital Line Analyzers		
	PCM Terminal Test Set / PCM Channel Test Set		
	Multimedia MUX Analyzers		
	PCM Codec Analyzers		
	NNI Analyzers		
	ATM Analyzers		
	SMD Analyzers		
	PCM/FDM/TDM Analyzers		
	Encoders		
	Interface Testers		
	Code Generators / Code Distortion Generators		
	Telecom / Datacom Analyzers		
	Television Test Generators		
	Modular TV Test Generators		
	NTSC / PAL Generators		
	Television Test Digital Generators		
	Television Color Bar / Pattern Generators		
	Video Sweep Generators		
	Related Television Test Generators		
	Television Monochrome / Color Monitors		
	Television Waveform Monitors		
Television Vector Waveforms Monitors			
Video Analyzers			
Multiplex Video Analyzers			
Video Noise Meters			
Stereo Modulators			
Telephone Unit Testers			
Telephone Dial Testers			

Laboratory's Scopes of Calibration

Field of Calibration	Properties of Measured	Range	Calibration Methods
Frequency & RF Power	MF-DP Dial Memory Testers	Freq. Standard: 0.5MHz, 1MHz, 5MHz, 10MHz Freq. Range: 1Hz-40GHz AC Level: Up-10V (1Hz-10MHz) RF Level: Up-10V (10MHz-18.6GHz) RF Attenuator: Up-100dB (DC-40GHz) RF Impedance: 50Ω, 75Ω, 600Ω (DC-40GHz)	As choose of - In-house methods of laboratory or - Maker's performance verification tests
	Telephone Impedance Testers		
	PBX Testers		
	Transmitter Sensitivity Testers		
	Bell Ringer Generators		
	Impulse Senders		
	Bon.DSU/OCU Testers		
	Wow Flutter Meters		
	CD Jitter Meters		
	Logic Analyzers		
	Logic Analyzer Systems		
Microwave Equipment and RF Component Calibrations Group			
	Termination Power Meters (50Ω, 1Hz-1GHz, Max. 50W)	Freq. Standard: 0.5MHz, 1MHz, 5MHz, 10MHz Freq. Range: 1Hz-40GHz AC Level: Up-10V (1Hz-10MHz) RF Level: Up-10V (10MHz-18.6GHz) RF Attenuator: Up-100dB (DC-40GHz) RF Impedance: 50Ω, 75Ω, 600Ω (DC-40GHz)	As choose of - In-house methods of laboratory or - Maker's performance verification tests
	Through Line Power Meters (50Ω, 1Hz-1GHz, Max. 50W)		
	Microwave Power Meters + Power Sensors		
	Power Meters (Indicator only)		
	Power Sensors (Thermocouple and Diod Type)		
	Thermistor Mounts		
	Peak Power Meters		
	Modulation Power Meters		
	Power Meter Calibrators (Range Calibrator)		
	Network Analyzers		
	Network Analyzers + S-Parameter Test Sets		
	Network / Spectrum Analyzers		
	RF Analyzers		
	Scalar Network Analyzers		
	Transmission / Reflection Test Sets		
VSWR Bridge / Reflection Bridge			

Laboratory's Scopes of Calibration

Field of Calibration	Properties of Measured	Range	Calibration Methods
<p>Frequency & RF Power</p>	Return Loss Testers	Freq. Standard:	<p>As choose of</p> <ul style="list-style-type: none"> - In-house methods of laboratory or - Maker's performance verification tests
	SWR Meters	0.5MHz, 1MHz, 5MHz, 10MHz	
	Fixed Attenuators	Freq. Range:	
	Three / Four Port Junction Pad	1Hz-40GHz	
	Step Attenuator (50Ω, DC-1.3GHz)	AC Level: Up-10V (1Hz-10MHz)	
	Terminations / Calibration Kit	RF Level:	
	Directional Couplers	Up-10V (10MHz-18.6GHz)	
	Directional Detectors	RF Attenuator:	
	RF Detectors, RF Filters	Up-100dB (DC-40GHz)	
	Power Splitters	RF Impedance:	
	Power Dividers	50Ω, 75Ω, 600Ω (DC-40GHz)	
	Hybrids		
	Matching Pad and Impedance Adapters		
	RF Amplifiers		

Laboratory's Scopes of Calibration

Field of Calibration	Properties of Measured	Range	Calibration Methods
Optical	Optical Calibrations Group		
	Optical Attenuator	Wavelength:	Direct measurement
	Wavelength Meter (per Module)	1310, 1550nm	to Optical Power Sensor
	Lightwave Meter (per module)	Level:	and Optical Wavelength
	Optical Head	0 to -60dBm	
	Optical Power Meter (Measuring only)		
	Optical Power Meter (Measuring & Source)		
	Infinium Digital Communication Analyzer (per module)		
	Optical Spectrum Analyzer		
	SONET Transmission Test Set		
	Communications Performance Analyzer		
	Communication Signal Analyzer (CSA Series)		
	OTDR		
	Nettek OTDR		
	Bit Error Rate Tester		

Laboratory's Scopes of Calibration

Field of Calibration	Properties of Measured	Range	Calibration Methods
Gauge Block	Gauge Blocks [Steel, Ceramic, Carbide] Grade: 0, 1, 2	0.1 mm-100 mm	- JIS B 7506-1997 Cal. central deviation only and variation in length
	Gauge Blocks [Steel, Ceramic, Carbide] Grade: 0, 1, 2	0.1 mm-100 mm	- JIS B 7506-1997 Cal. central deviation and variation in length
	Long Gauge Blocks [Steel, Ceramic, Carbide] Grade: 0, 1, 2	> 100 mm-300 mm	Comparison method Cal. central deviation only.
	Long Gauge Blocks [Steel, Ceramic, Carbide] Grade: 0, 1, 2	> 100 mm-300 mm	Comparison method Cal. central deviation only.
Dimensional	Dial Gauges / Digital Indicators	Up - 25 mm Up - 50 mm Up - 75 mm Up - 100 mm	JIS B 7503-1997
	Dial Test Indicators	Up - 1 mm	JIS B 7533-1990
	Microindicators	Up - 0.5 mm	JIS B 7519-1976
	Cylinder Gauges / Bore Gauges	6 mm - 300 mm	JIS B 7515-1982
	Outside / Inside Micrometers	Up - 25 mm 25 mm - 200 mm 200 mm -1000 mm	JIS B 7502-1994
	Indicating Micrometer	Up - 25 mm 25 mm - 100 mm 100 mm -1000 mm	JIS B 7520-1981
	Depth Micrometer	Up - 300 mm	JIS B 7544-1994

Laboratory's Scopes of Calibration

Field of Calibration	Properties of Measured	Range	Calibration Methods
Dimensional	Vernier Caliper (Vernier, Dial, Digital Types)	Up - 300 mm Up - 600 mm Up - 1000 mm Up - 1500 mm	JIS B 7507-1993
	Gear Tooth Vernier Calipers	Up - 100 mm	JIS B 7531-1982
	Height Gauges (Vernier, Dial, Digital Types)	Up - 300 mm Up - 600 mm Up - 1000 mm Up - 1500 mm	JIS B 7517-1993
	Depth Gauges (Vernier, Dial, Digital Types)	Up - 500 mm	JIS B 7518-1993
	Feeler Gauges	0.01 mm - 20 mm	JIS B 7524-1992
	Thickness Gauges (Dial, Digital Types)	Up - 100 mm	Direct measurement to gauge block
	Coating Thickness Plates (Film/Copper)	Up - 10 mm	Direct measurement to Laser Hologauge
	Coating Thickness Gauges (without customer thickness plate)	17 μm - 251 μm	Direct comparison to Laser Hologauge
	Holtests	2 mm - 100 mm	Direct measurement to Standard Ring Gauge
	Electrical Comparators / Mu-Checkers (include: Probe and Display Unit)	Up - 500 mm	JIS B 7536-1982
	Universal Length Machines (ULM)	Up - 500 mm	Comparison to Gauge Blocks
	Electric Levels	Full range	JIS B 7510-1993
	Spirit Levels	Full range	JIS B 7510-1993
	Precision Squares (up to 100mm)	Grade 1, 2	JIS B 7526-1977
	Precision Squares (up to 1,000mm)	Grade 1, 2	JIS B 7526-1977
	Bevel Protactors (Analog / Digital)	0-360°	Direct measurement by angle gauge standard
Combination Sets (Analog / Digital)	Full range	Direct measurement by angle gauge standard	
Setting Rod for Micrometers	Up - 1000 mm	Comparison to Gauge Blocks	

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Field of Calibration	Properties of Measured	Range	Calibration Methods
Dimensional	Micrometer Heads	Up - 50 mm	JIS B 7502-1994
	Calibration Testers (Analog / Digital)	Up - 50 mm	Direct measurement by Laser Hologauge
	Measuring Microscopes	Up - 300 mm	JIS B 7153-1995 by standard scale
	Micrometer Microscopes	Up - 10 mm	JIS B 7150-1977 by Objective Micrometer
	Profile Projectors	Up - 300 mm	JIS B 7153-1995 and JIS B 7184-1972
	Scale Lubes	Up - 100 mm	Comparison to Standard Scale
	Digimatic Scale Units	Up - 1000 mm	Comparison to Standard Gauge Block
	Metal Rules	Up - 1000 mm Up - 2000 mm Up - 5000 mm (above)	JIS B 7516-1987
	Steel Tape Measures	Up - 1000 mm Up - 2000 mm Up - 5000 mm (above)	JIS B 7512-1993
	Textile Tape Measures	Up - 1000 mm Up - 2000 mm Up - 5000 mm (above)	JIS B 7522-1993
	Height Masters (Analog / Digital)	Up - 300 mm Up - 600 mm	ISO 7863-1984 comparison gauge block
	Riser Blocks	Up - 150 mm Up - 300 mm Up - 600 mm	ISO 7863-1984 comparison gauge block
	Caliper Checkers	Up - 300 mm Up - 600 mm	ISO 7863-1984 comparison gauge block
	Depth Micro Checkers	Up - 300 mm	ISO 7863-1984 comparison gauge block

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Field of Calibration	Properties of Measured	Range	Calibration Methods
Dimensional	Surface Plates [Site calibration available] [Excluded on-site expenses]	≤ 300 mm x 300 mm ≤ 500 mm x 500 mm > 500 mm x 500 mm (above)	JIS B 7513-1992 by Electric Level
	Steel Straightedges	as JIS B 7514-1977	JIS B 7514-1977
	Go-No Go Plain Plug Gauges	Up - 100 mm	JIS B 7420-1997
	Go-No Go Thread Plug Gauges	as JIS B 0261-1978	JIS B 0261-1978 by 3-wire
	3-Wires	as JIS B 0271-1992	JIS B 0271-1992
	Pin Gauges	Up - 100 mm	JIS B 0261-1978
	Laser Scan Micrometers	0.1 mm - 25 mm	Comparison to Standard pin gauge
	Flatness Testers	Up - 600 mm	Comparison to Surface Straightedge
	CMMs [Site calibration only]	10 mm - 610 mm	ISO 10360-2

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Field of Calibration	Properties of Measured	Range	Calibration Methods
Torque	Mechanical Calibrations Group		
	Torque Drivers	Up-200 kgf.cm	ISO 6789-1992
	Torque Wrenches	Up-2000kgf.cm	
	Torque Gauges	Up-400kgf.cm	Direct measurement to weight + arm
Torque Testers / Torque Meters	Up - 1000kgf.cm		
Force	Push-Pull Scales / Force Gauges	Up-200kgf (or equivalent unit)	Direct measurement by standard weight
	Handy Force Gauges (With load cell sensor)		
	Tension Gauges		
	Dial Tension Gauges		
	Tensile Machines [Compress and tension modes]	Up-100kN (or equivalent unit)	Direct comparison with standard force transducer
	(Site Calibration)		

Laboratory's Scopes of Calibration

Field of Calibration	Properties of Measured	Range	Calibration Methods
Mass	Mechanical Calibrations Group		
	Weight Class OIML F1 [Range: 1g-20kg]	1mg-200kg	OIML R-111-2
	Weight Class OIML F1 [Range: <1g, >20kg]		
	Weight Class OIML F2 [Range: 1mg-20kg]		
	Weight Class OIML F2 [Range: >20kg]		
	Weight Class OIML M1-2-3 [Range: 1mg-20kg]		
	Weight Class OIML M1-2-3 [Range: > 20kg]		
	Electronic Balances [Resolution: < 0.1mg]	Up-100g	UKAS LAB 14-2001
	Electronic Balances [Resolution: ≥ 0.1mg]	Up-200kg	
	Spring Balances		
	Trip Balances (2 Pan Balances)	Up-200kg	Direct measurement by standard weight
	Suspension Spring Balances		
	Beam Balances		

Laboratory's Scopes of Calibration

Field of Calibration	Properties of Measured	Range	Calibration Methods
Pressure	Pneumatic Pressure Gauges	Up-50kgf.cm ⁻²	BSEN 837-1 : 1998
	Hydraulic Pressure Gauges	(or equivalent unit)	
	Pressure Calibrators	Up-500PSI	Comparison method
	Dead Weight Testers		
Hardness	Rubber Hardness Testers [JIS, ASTM]	0-100°	In-house: MC-0084-01-05
	Duro Meter Testers		
	Vicker Hardness Machines (Site calibration)	HMV 700	JIS B 7725-1997
	Rockwell Hardness Machines (Site calibration)	HRC 30, 45, 60 HRB 30, 90	JIS B 7726-1997
pH	pH Meter (Indicator type)	All pH	ASTM E70-97 and BS 1647-1984 by DCV standard and pH solution
	pH Meters + Sensors	pH 4, 7, 10	
Others	Conductivity Meters + Probes	0.1nS - 1S	Standard solution and S = 1/Resistance
	Viscosity Meters (Max. 3 Spindle)	610.8-147877mPa.s	Standard viscosity solution
	Roughness Testing Machines	4.5μRa	JIS B 0651-1996 by standard specimen
	Roundness Testing Machines		JIS B 7451-1997 by master ball

Laboratory's Scopes of Calibration

Field of Calibration	Properties of Measured	Range	Calibration Methods	
Temperature	Temperature Indicator / Simulator Calibrations Group			
	Soldering Iron Testers	TC: All types RTD: All types	EA-10/11	
	Dip Testers			
	Reflow Checkers (Without sensor)			
	Temperature Recorders			
	Hybrid Recorders			
	Temperature Controllers			
	RTD Indicators			
	RTD Simulators			
	Thermocouple Simulators (No cold junction)			
	Thermocouple Simulators (With cold junction)			
	Thermometers Calibrations Group			
	Digital/Analog Thermometers + Sensors	Temp: -20°C-1200°C	Comparison with SPRT	
	Surface Thermometers + Sensors			
	RTD Sensors (High accuracy type) (Best uncertainty: 0.05°C)			ASTM E644-98 by comparison with SPRT
	RTD Sensors (Low accuracy type) (Uncertainty: >0.15°C)			
	Thermocouple Sensors [Range: -20°C-660°C] (Uncertainty: < 0.3-0.4°C)			ASTM E220-86 by comparison with SPRT
	Thermocouple Sensors [Range: -20°C-660°C] (Uncertainty: > 0.4°C)			
	Thermocouple Sensors [Range: > 660°C]			by sub-contract
	Liquid-in-glass Thermometers (Total immersion type: -20°C - 150°C)			ASTM E77-92 by comparison with SPRT
Liquid-in-glass Thermometers (Total immersion type: > 150°C)				
Liquid-in-glass Thermometers (Partial immersion type)	by sub-contract			
Thermo-Hygrographes [0-98°C - 30-90%RH]	Comparison method			
Thermo-Hygrometers [0-98°C - 30-90%RH]				

Laboratory's Scopes of Calibration

Field of Calibration	Properties of Measured	Range	Calibration Methods
Temperature	Temperature Source Calibrations Group		
	Dry Block / Dry-Well Calibrators [Range: -20°C-660°C]	Temp: -20°C-1200°C	EA-10/13
	Dry Block / Dry-Well Calibrators [Range: > 660°C]		by sub-contract
	Liquid Calibration Bath [Range: -20°C-140°C]		ASTM E715-80
	Liquid Calibration Bath [Range: > 140°C]		by sub-contract
	Chambers / Ovens (Site calibration) [Range: -20°C-200°C]		ASTM E145-94 and AS2853-1986
	Chambers / Ovens (Site calibration) [Range: > 200-400oC]		by sub-contract