Deutsche Akkreditierungsstelle GmbH

Scope of Accreditation D-K-15070-01-01 to DIN EN ISO/IEC 17025:2005

Period of validity: 30.01.2018 to 27.10.2021 Date of issue: 30.01.2018

Certificate bearer:
Testo industrial services GmbH
Gewerbestraße 3. 79199 Kirchzarten

with the calibration laboratory:

Kalibrierlaboratorium Kirchzarten
Gewerbestraße 3. 79199 Kirchzarten

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Accredited calibration laboratory since: 08.04.1994

Areas of calibration:

Electrical measurands

DC and low frequency measurands

- DC voltage [a). b)]
- AC voltage [a). b)]
- Direct current [a). b)]
- Alternating current [a). b)]
- AC/DC-Transfer
- Power [a). b)]
- Phase angel
- DC resistance [a). b)]
- AC resistance
- Capacitance
- Inductance
- Voltage ratio

- High voltage measurands
- Time and frequency
  - Time interval [a). b)]
  - Frequency and rotational speed [a). b)]

  High frequency measurands
  - Impedance (Reflection coefficient) [a). b)]
  - Power [a). b)]
  - Attenuation [a). b)]
  - Modulation measurands
  - Oscilloscope measurands [a). b)]
  - Rise time [a). b)]
  - Bandwidth [a)]
  - Pulsed measurands [*)]

[a)] In-Situ Calibrations as well
[b)] Mobile Laboratory

Dimensional measurands

Length

- Gauge blocks
- Length-measuring instruments [a). *)]
- Diameter [*)]
- Thread

Mechanical measurands

- Force [*)]
- Weighing scales [a).*)]
- Pressure [a).*)]
- Torque [a). *)]
- Acceleration

Volumetric flow rate measurands

- Flow speed of gases

Thermodynamic measurands

Temperature measurands

- Resistance thermometer [a). *)]
- Thermocouple [a). *)]
- Radiation thermometer
- Temperature fixed-point cells
- Temperature dry-block calibrators [a). *)]
- Temperature indicators and -simulators [*)]
- Climate chambers (temperature) [a)]
- Temperature transwithter, data loggers [a). *)]

Humidity measurands

- Measuring instruments for relative humidity
- Measuring instruments for absolute humidity
- Climate chambers (humidity) [a)]
- Humidity generators and calibrators

The German original version “Anlage zur Akkreditierungsurkunde D-K-15070-01-01 nach DIN EN ISO/IEC 17025:2005“ is valid.

Permanent Laboratory

Measurand quantity / Calibration item	Range	Measurement Conditions/ Procedure	Smallest Measurement Uncertainty [1)]	Remarks
DC voltage	0 V		0.1 µV	
	10 mV		$12 \cdot 10^{-6}\,U$	U = Measured value
	100 mV		$1.3 \cdot 10^{-6}\,U$	
	1 V		$0.35 \cdot 10^{-6}\,U$	
	10 V		$0.25 \cdot 10^{-6}\,U$	
	100 V		$0.4 \cdot 10^{-6}\,U$	
	1000 V		$0.9 \cdot 10^{-6}\,U$	
	1 µV to 100 mV		$1.4 \cdot 10^{-6}\,U$ + 0.15 µV	
	> 100 mV to 100 V		$0.5 \cdot 10^{-6}\,U$	
	> 100 V to 1000 V		$1.4 \cdot 10^{-6}\,U$	
DC High Voltage	> 1 kV to 50 kV		$0.4 \cdot 10^{-3}\,U$	
DC Current	0 A to 10 pA		$1.6 \cdot 10^{-3}\,I$ + 2 fA	I = Measured value
	> 10 pA to 100 pA		$0.3 \cdot 10^{-3}\,I$	
	> 100 pA to 1 nA		$0.2 \cdot 10^{-3}\,I$	
	> 1 nA to 10 nA		$28 \cdot 10^{-6}\,I$	
	> 10 nA to 100 nA		$10 \cdot 10^{-6}\,I$	
	> 100 nA to 100 A		$6 \cdot 10^{-6}\,I$	
	> 100 A to 200 A		$1 \cdot 10^{-3}\,I$	
DC Current Current Clamps	1 mA to 2.2 A		$1 \cdot 10^{-3}\,I$	
	> 2.2 A to 20 A		$2 \cdot 10^{-3}\,I$	
	> 20 A to 1000 A		$3 \cdot 10^{-3}\,I$	
DC Resistance Resistors (discrete values)	100 mΩ		$0.5 \cdot 10^{-6}\,R$	R = Measured value
	1 Ω		$80 \cdot 10^{-9}\,R$	
	10 Ω		$0.12 \cdot 10^{-6}\,R$	
	100 Ω. 1 kΩ		$0.1 \cdot 10^{-6}\,R$	
	10 kΩ		$55 \cdot 10^{-9}\,R$	
	100 kΩ		$0.1 \cdot 10^{-6}\,R$	
	1 GΩ		$8 \cdot 10^{-6}\,R$	
	10 GΩ		$28 \cdot 10^{-6}\,R$	
	100 GΩ		$64 \cdot 10^{-6}\,R$	
	1 TΩ		$0.12 \cdot 10^{-3}\,R$	
	10 TΩ		$0.32 \cdot 10^{-3}\,R$	
	100 TΩ		$0.87 \cdot 10^{-3}\,R$	

[1)] The calibration and measurement capabilities are stated according to DAkkS-DKD-3 (EA-4/02). These are expanded uncertainties of measurement with a coverage probability of 95 % and have a coverage factor of k = 2 unless stated otherwise. Uncertainties without unit are relative uncertainties referring to the measurement value unless stated otherwise.

Measurand quantity / Calibration item	Range	Measurement Conditions/ Procedure	Smallest Measurement Uncertainty [1)]	Remarks
DC Resistance (Ranges)	0 µΩ to < 1 mΩ		$4 \cdot 10^{-6} R + 1\ n\Omega$	R = Measured value
	1 mΩ to < 10 mΩ		$3 \cdot 10^{-6} R + 1\ n\Omega$	
	10 mΩ to < 100 mΩ		$2 \cdot 10^{-6} R + 1\ n\Omega$	
	0.1 Ω to < 1 Ω		$0.5 \cdot 10^{-6} R$	
	1 Ω to 100 kΩ		$0.2 \cdot 10^{-6} R$	
	> 100 kΩ to 1 MΩ		$0.6 \cdot 10^{-6} R$	
	> 1 MΩ to 10 MΩ		$1.1 \cdot 10^{-6} R$	
	> 10 MΩ to 100 MΩ		$2.5 \cdot 10^{-6} R$	
	> 100 MΩ to 1 GΩ		$8 \cdot 10^{-6} R$	
	> 1 GΩ to 10 GΩ		$30 \cdot 10^{-6} R$	
	> 10 GΩ to 100 GΩ		$82 \cdot 10^{-6} R$	
	> 100 GΩ to 1 TΩ		$0.14 \cdot 10^{-3} R$	
	> 1 TΩ to 10 TΩ		$0.35 \cdot 10^{-3} R$	
	> 10 TΩ to 100 TΩ		$1.2 \cdot 10^{-3} R$	
DC Power	10 mW to 20 kW	Product of U *and* I;	$10 \cdot 10^{-6}$	
	> 20 kW to 100 kW	10 mV ≤ U ≤ 1000 V 100 µA ≤ I ≤ 100 A	$0.1 \cdot 10^{-3}$	
Alternating Resistance Resistance (discrete values)	0.1 Ω	10 Hz; 20 Hz; 30 Hz;	$25 \cdot 10^{-6} R$	R = Measured value
		40 Hz; 55 Hz;	$15 \cdot 10^{-6} R$	
		400 Hz; 500 Hz;	$11 \cdot 10^{-6} R$	
		1 kHz; 2 kHz; 5 kHz; 10 kHz;	$15 \cdot 10^{-6} R$	
	1 Ω	10 Hz; 20 Hz; 30 Hz;	$25 \cdot 10^{-6} R$	
		40 Hz; 55 Hz; 400 Hz; 500 Hz;	$11 \cdot 10^{-9} R$	
		1 kHz; 2 kHz; 5 kHz; 10 kHz;	$11 \cdot 10^{-6} R$	
	10 Ω	10 Hz; 20 Hz; 30 Hz;	$25 \cdot 10^{-6} R$	
		40 Hz; 55 Hz; 400 Hz; 500 Hz;	$10 \cdot 10^{-6} R$	
		1 kHz; 2 kHz; 5 kHz; 10 kHz;	$10 \cdot 10^{-6} R$	
	100 Ω	10 Hz; 20 Hz; 30 Hz;	$12 \cdot 10^{-6} R$	
		40 Hz; 55 Hz;	$8 \cdot 10^{-6} R$	
		400 Hz; 500 Hz; 1 kHz; 2 kHz	$6 \cdot 10^{-6} R$	
		5 kHz; 10 kHz;	$6 \cdot 10^{-6} R$	
	1 kΩ	10 Hz; 20 Hz; 30 Hz; 40 Hz;	$35 \cdot 10^{-6} R$	
		55 Hz; 400 Hz; 500 Hz; 1 kHz;	$35 \cdot 10^{-6} R$	
		2 kHz; 5 kHz; 10 kHz;	$35 \cdot 10^{-6} R$	
	10 kΩ	10 Hz;	$85 \cdot 10^{-6} R$	
		20 Hz; 30 Hz; 40 Hz;	$45 \cdot 10^{-6} R$	
		55 Hz;	$110 \cdot 10^{-6} R$	
		400 Hz; 500 Hz; 1 kHz;	$65 \cdot 10^{-6} R$	
		2 kHz; 5 kHz; 10 kHz;	$65 \cdot 10^{-6} R$	

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Measurand quantity / Calibration item	Range	Measurement Conditions/ Procedure	Smallest Measurement Uncertainty [1)]	Remarks
AC/DC-Transfer Sources	1 mV	10 Hz; 20 Hz; 30 Hz	$0.23 \cdot 10^{-3}\,U$	*U* = Measured value for discrete measurement points and frequencies Fluke 792A
		40 Hz; 55 Hz; 60 Hz; 120 Hz;	$0.11 \cdot 10^{-3}\,U$	
		300 Hz; 400 Hz; 500 Hz;	$0.11 \cdot 10^{-3}\,U$	
		1 kHz; 2 kHz; 5 kHz; 10 kHz;	$0.11 \cdot 10^{-3}\,U$	
		20 kHz; 30 kHz; 50 kHz	$0.11 \cdot 10^{-3}\,U$	
		70 kHz; 100 kHz	$0.16 \cdot 10^{-3}\,U$	
		200 kHz; 300 kHz	$0.17 \cdot 10^{-3}\,U$	
		500 kHz; 700 kHz; 800 kHz	$0.25 \cdot 10^{-3}\,U$	
		1 MHz	$0.27 \cdot 10^{-3}\,U$	
	2 mV	10 Hz; 20 Hz; 30 Hz	$0.13 \cdot 10^{-3}\,U$	
		40 Hz; 55 Hz; 60 Hz; 120 Hz;	$0.08 \cdot 10^{-3}\,U$	
		300 Hz; 400 Hz; 500 Hz;	$0.08 \cdot 10^{-3}\,U$	
		1 kHz; 2 kHz; 5 kHz; 10 kHz;	$0.08 \cdot 10^{-3}\,U$	
		20 kHz; 30 kHz; 50 kHz	$0.08 \cdot 10^{-3}\,U$	
		70 kHz; 100 kHz; 200 kHz; 300 kHz	$0.11 \cdot 10^{-3}\,U$	
		500 kHz; 700 kHz; 800 kHz	$0.16 \cdot 10^{-3}\,U$	
		1 MHz	$0.18 \cdot 10^{-3}\,U$	
	6 mV	10 Hz; 20 Hz; 30 Hz	$60 \cdot 10^{-6}\,U$	
		40 Hz; 55 Hz; 60 Hz; 120 Hz;	$45 \cdot 10^{-6}\,U$	
		300 Hz; 400 Hz; 500 Hz;	$45 \cdot 10^{-6}\,U$	
		1 kHz; 2 kHz; 5 kHz; 10 kHz;	$45 \cdot 10^{-6}\,U$	
		20 kHz; 30 kHz; 50 kHz	$45 \cdot 10^{-6}\,U$	
		70 kHz; 100 kHz	$55 \cdot 10^{-6}\,U$	
		200 kHz; 300 kHz	$73 \cdot 10^{-6}\,U$	
		500 kHz	$0.13 \cdot 10^{-3}\,U$	
		700 kHZ; 800 kHz; 1 MHz	$0.16 \cdot 10^{-3}\,U$	
	10 mV	10 Hz; 20 Hz; 30 Hz	$44 \cdot 10^{-6}\,U$	
		40 Hz; 55 Hz; 60 Hz; 120 Hz;	$37 \cdot 10^{-6}\,U$	
		300 Hz; 400 Hz; 500 Hz;	$37 \cdot 10^{-6}\,U$	
		1 kHz; 2 kHz; 5 kHz; 10 kHz;	$37 \cdot 10^{-6}\,U$	
		20 kHz; 30 kHz; 50 kHz	$37 \cdot 10^{-6}\,U$	
		70 kHz; 100 kHz	$50 \cdot 10^{-6}\,U$	
		200 kHz; 300 kHz	$60 \cdot 10^{-6}\,U$	
		500 kHz; 700 kHz; 800 kHz; 1 MHz	$0.14 \cdot 10^{-3}\,U$	
	20 mV	10 Hz; 20 Hz; 30 Hz	$30 \cdot 10^{-6}\,U$	
		40 Hz; 55 Hz; 60 Hz; 120 Hz;	$26 \cdot 10^{-6}\,U$	
		300 Hz; 400 Hz; 500 Hz;	$26 \cdot 10^{-6}\,U$	
		1 kHz; 2 kHz; 5 kHz; 10 kHz;	$26 \cdot 10^{-6}\,U$	

[1)] The calibration and measurement capabilities are stated according to DAkkS-DKD-3 (EA-4/02). These are expanded uncertainties of measurement with a coverage probability of 95 % and have a coverage factor of $k = 2$ unless stated otherwise. Uncertainties without unit are relative uncertainties referring to the measurement value unless stated otherwise.

Measurand quantity / Calibration item	Range	Measurement Conditions/ Procedure	Smallest Measurement Uncertainty [1)]	Remarks
AC/DC-Transfer Sources		20 kHz; 30 kHz; 50 kHz	$26 \cdot 10^{-6}\,U$	*U* = Measured value for discrete measurement points and frequencies Fluke 792A
		70 kHz; 100 kHz	$38 \cdot 10^{-6}\,U$	
		200 kHz; 300 kHz	$47 \cdot 10^{-6}\,U$	
		500 kHz; 700 kHz; 800 kHz; 1 MHz	$98 \cdot 10^{-6}\,U$	
	40 mV	10 Hz; 20 Hz; 30 Hz	$24 \cdot 10^{-6}\,U$	
		40 Hz; 55 Hz; 60 Hz; 120 Hz;	$21 \cdot 10^{-6}\,U$	
		300 Hz; 400 Hz; 500 Hz;	$21 \cdot 10^{-6}\,U$	
		1 kHz; 2 kHz; 5 kHz; 10 kHz;	$21 \cdot 10^{-6}\,U$	
		20 kHz; 30 kHz; 50 kHz	$21 \cdot 10^{-6}\,U$	
		70 kHz; 100 kHz	$31 \cdot 10^{-6}\,U$	
		200 kHz; 300 kHz	$47 \cdot 10^{-6}\,U$	
		500 kHz; 700 kHz; 800 kHz; 1 MHz	$90 \cdot 10^{-6}\,U$	
	60 mV	10 Hz; 20 Hz; 30 Hz	$29 \cdot 10^{-6}\,U$	
		40 Hz; 55 Hz; 60 Hz; 120 Hz;	$21 \cdot 10^{-6}\,U$	
		300 Hz; 400 Hz	$21 \cdot 10^{-6}\,U$	
		500 Hz; 1 kHz; 2 kHz; 5 kHz	$20 \cdot 10^{-6}\,U$	
		10 kHz; 20 kHz; 30 kHz; 50 kHz	$23 \cdot 10^{-6}\,U$	
		70 kHz; 100 kHz	$27 \cdot 10^{-6}\,U$	
		200 kHz; 300 kHz	$42 \cdot 10^{-6}\,U$	
		500 kHz; 700 kHz; 800 kHz; 1 MHz	$86 \cdot 10^{-6}\,U$	
	100 mV	10 Hz; 20 Hz	$24 \cdot 10^{-6}\,U$	
		30 Hz	$18 \cdot 10^{-6}\,U$	
		40 Hz; 55 Hz; 60 Hz; 120 Hz;	$8 \cdot 10^{-6}\,U$	
		300 Hz; 400 Hz; 500 Hz;	$8 \cdot 10^{-6}\,U$	
		1 kHz; 2 kHz; 5 kHz; 10 kHz;	$8 \cdot 10^{-6}\,U$	
		20 kHz; 30 kHz; 50 kHz;	$8 \cdot 10^{-6}\,U$	
		70 kHz; 100 kHz	$8 \cdot 10^{-6}\,U$	
		200 kHz; 300 kHz	$10 \cdot 10^{-6}\,U$	
		500 kHz; 700 kHz; 800 kHz; 1 MHz	$30 \cdot 10^{-6}\,U$	

[1)] The smallest measurement uncertainties are stated according to DAkkS-DKD-3 (EA-4/02). These are expanded uncertainties with a 95 % level of confidence and, unless otherwise stated, using a coverage factor of k = 2. Uncertainties that appear without units are relative to the measured value unless otherwise stated.

Measurand quantity / Calibration item	Range	Measurement Conditions/ Procedure	Smallest Measurement Uncertainty [1)]	Remarks
AC/DC-Transfer Sources	200 mV	10 Hz; 20 Hz	$18 \cdot 10^{-6}\,U$	*U* = Measured value for discrete measurement points and frequencies Fluke 792A
		30 Hz	$11 \cdot 10^{-6}\,U$	
		40 Hz; 55 Hz; 60 Hz; 120 Hz;	$6 \cdot 10^{-6}\,U$	
		300 Hz; 400 Hz; 500 Hz;	$6 \cdot 10^{-6}\,U$	
		1 kHz; 2 kHz; 5 kHz; 10 kHz;	$6 \cdot 10^{-6}\,U$	
		20 kHz; 30 kHz; 50 kHz	$6 \cdot 10^{-6}\,U$	
		70 kHz; 100 kHz;	$8 \cdot 10^{-6}\,U$	
		200 kHz; 300 kHz	$8 \cdot 10^{-6}\,U$	
		500 kHz	$17 \cdot 10^{-6}\,U$	
		700 kHz	$22 \cdot 10^{-6}\,U$	
		800 kHz	$27 \cdot 10^{-6}\,U$	
		1 MHz	$28 \cdot 10^{-6}\,U$	
	300 mV	10 Hz	$14 \cdot 10^{-6}\,U$	
		20 Hz	$11 \cdot 10^{-6}\,U$	
		30 Hz	$10 \cdot 10^{-6}\,U$	
		40 Hz; 55 Hz; 60 Hz; 120 Hz;	$5 \cdot 10^{-6}\,U$	
		300 Hz; 400 Hz; 500 Hz;	$5 \cdot 10^{-6}\,U$	
		1 kHz; 2 kHz	$5 \cdot 10^{-6}\,U$	
		5 kHz; 10 kHz; 20 kHz;	$7 \cdot 10^{-6}\,U$	
		30 kHz; 50 kHz; 70 kHz	$7 \cdot 10^{-6}\,U$	
		100 kHz; 200 kHz; 300 kHz	$8 \cdot 10^{-6}\,U$	
		500 kHz; 700 kHz; 800 kHz; 1 MHz	$18 \cdot 10^{-6}\,U$	
	400 mV	10 Hz; 20 Hz	$10 \cdot 10^{-6}\,U$	
		30 Hz	$7 \cdot 10^{-6}\,U$	
		40 Hz; 55 Hz; 60 Hz; 120 Hz;	$5 \cdot 10^{-6}\,U$	
		300 Hz; 400 Hz; 500 Hz;	$5 \cdot 10^{-6}\,U$	
		1 kHz; 2 kHz; 5 kHz; 10 kHz;	$5 \cdot 10^{-6}\,U$	
		20 kHz; 30 kHz; 50 kHz;	$5 \cdot 10^{-6}\,U$	
		70 kHz; 100 kHz	$5 \cdot 10^{-6}\,U$	
		200 kHz; 300 kHz	$6 \cdot 10^{-6}\,U$	
		500 kHz	$15 \cdot 10^{-6}\,U$	
		700 kHz; 800 kHz; 1MHz	$17 \cdot 10^{-6}\,U$	
	500 mV	10 Hz	$15 \cdot 10^{-6}\,U$	
		20 Hz	$9 \cdot 10^{-6}\,U$	
		30 Hz	$6 \cdot 10^{-6}\,U$	
		40 Hz; 55 Hz; 60 Hz; 120 Hz;	$4 \cdot 10^{-6}\,U$	
		300 Hz; 400 Hz;	$4 \cdot 10^{-6}\,U$	
		500 Hz; 1 kHz; 2 kHz; 5 kHz;	$6 \cdot 10^{-6}\,U$	

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Measurand quantity / Calibration item	Range	Measurement Conditions/ Procedure	Smallest Measurement Uncertainty [1)]	Remarks
AC/DC-Transfer Sources	500 mV	10 kHz; 20 kHz; 30 kHz.	$6 \cdot 10^{-6}\,U$	*U* = Measured value for discrete measurement points and frequencies Fluke 792A
		50 kHz; 70 kHz; 100 kHz;	$6 \cdot 10^{-6}\,U$	
		200 kHz; 300 kHz	$6 \cdot 10^{-6}\,U$	
		500 kHz; 700 kHz; 800 kHz; 1 MHz	$15 \cdot 10^{-6}\,U$	
	600 mV	10 Hz	$14 \cdot 10^{-6}\,U$	
		20 Hz	$9 \cdot 10^{-6}\,U$	
		30 Hz	$7 \cdot 10^{-6}\,U$	
		40 Hz; 55 Hz; 60 Hz; 120 Hz;	$4 \cdot 10^{-6}\,U$	
		300 Hz; 400 Hz; 500 Hz;	$4 \cdot 10^{-6}\,U$	
		1kHz; 2 kHz	$4 \cdot 10^{-6}\,U$	
		5 kHz	$6 \cdot 10^{-6}\,U$	
		10 kHz; 20 kHz;	$4 \cdot 10^{-6}\,U$	
		30 kHz; 50 kHz	$4 \cdot 10^{-6}\,U$	
		70 kHz; 100 kHz	$5 \cdot 10^{-6}\,U$	
		200 kHz; 300 kHz	$6 \cdot 10^{-6}\,U$	
		500 kHz; 700 kHz; 800 kHz; 1 MHz	$15 \cdot 10^{-6}\,U$	
	700 mV	10 Hz	$15 \cdot 10^{-6}\,U$	
		20 Hz	$9 \cdot 10^{-6}\,U$	
		30 Hz	$6 \cdot 10^{-6}\,U$	
		40 Hz; 55 Hz; 60 Hz; 120 Hz;	$4 \cdot 10^{-6}\,U$	
		300 Hz; 400 Hz;	$4 \cdot 10^{-6}\,U$	
		500 Hz; 1 kHz	$4 \cdot 10^{-6}\,U$	
		2 kHz; 5 kHz; 10 kHz;	$5 \cdot 10^{-6}\,U$	
		20 kHz; 30 kHz; 50 kHz;	$5 \cdot 10^{-6}\,U$	
		70 kHz; 100 kHz	$5 \cdot 10^{-6}\,U$	
		200 kHz; 300 kHz;	$6 \cdot 10^{-6}\,U$	
		500 kHz; 700 kHz; 800 kHz; 1 MHz	$15 \cdot 10^{-6}\,U$	
	1 V	10 Hz	$9 \cdot 10^{-6}\,U$	
		20 Hz	$8 \cdot 10^{-6}\,U$	
		30 Hz	$7 \cdot 10^{-6}\,U$	
		40 Hz; 55 Hz; 60 Hz;	$4 \cdot 10^{-6}\,U$	
		120 Hz; 300 Hz	$4 \cdot 10^{-6}\,U$	
		400 Hz; 500 Hz; 1 kHz	$2 \cdot 10^{-6}\,U$	
		2 kHz; 5 kHz	$3 \cdot 10^{-6}\,U$	
		10 kHz; 20 kHz;	$4 \cdot 10^{-6}\,U$	
		30 kHz; 50 kHz	$4 \cdot 10^{-6}\,U$	
		70 kHz; 100 kHz	$5 \cdot 10^{-6}\,U$	

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Measurand quantity / Calibration item	Range	Measurement Conditions/ Procedure	Smallest Measurement Uncertainty [1)]	Remarks
AC/DC-Transfer Sources	1 V	200 kHz; 300 kHz	$7 \cdot 10^{-6}\,U$	*U* = Measured value for discrete measurement points and frequencies Fluke 792A
		500 kHz	$11 \cdot 10^{-6}\,U$	
		700 kHz; 800 kHz; 1 MHz	$14 \cdot 10^{-6}\,U$	
	2 V	10 Hz; 20 Hz	$8 \cdot 10^{-6}\,U$	
		30 Hz	$5 \cdot 10^{-6}\,U$	
		40 Hz; 55 Hz; 60 Hz; 120 Hz;	$2 \cdot 10^{-6}\,U$	
		300 Hz; 400 Hz; 500 Hz;	$2 \cdot 10^{-6}\,U$	
		1 kHz; 2 kHz; 5 kHz; 10 kHz;	$2 \cdot 10^{-6}\,U$	
		20 kHz; 30 kHz; 50 kHz	$2 \cdot 10^{-6}\,U$	
		70 kHz; 100 kHz	$5 \cdot 10^{-6}\,U$	
		200 kHz; 300 kHz	$6 \cdot 10^{-6}\,U$	
		500 kHz	$11 \cdot 10^{-6}\,U$	
		700 kHz; 800 kHz	$14 \cdot 10^{-6}\,U$	
		1 MHz	$16 \cdot 10^{-6}\,U$	
	3 V; 4 V; 5 V; 6 V; 7 V; 8 V	10 Hz	$10 \cdot 10^{-6}\,U$	
		20 Hz	$8 \cdot 10^{-6}\,U$	
		30 Hz	$5 \cdot 10^{-6}\,U$	
		40 Hz; 55 Hz; 60 Hz; 120 Hz;	$3 \cdot 10^{-6}\,U$	
		300 Hz; 400 Hz; 500 Hz;	$3 \cdot 10^{-6}\,U$	
		1 kHz; 2 kHz; 5 kHz; 10 kHz;	$3 \cdot 10^{-6}\,U$	
		20 kHz; 30 kHz; 50 kHz	$3 \cdot 10^{-6}\,U$	
		70 kHz	$4 \cdot 10^{-6}\,U$	
		100 kHz	$5 \cdot 10^{-6}\,U$	
		200 kHz; 300 kHz	$8 \cdot 10^{-6}\,U$	
		500 kHz	$9 \cdot 10^{-6}\,U$	
		700 kHz; 800 kHz	$12 \cdot 10^{-6}\,U$	
		1 MHz	$15 \cdot 10^{-6}\,U$	
	10 V	10 Hz	$10 \cdot 10^{-6}\,U$	
		20 Hz	$8 \cdot 10^{-6}\,U$	
		30 Hz	$5 \cdot 10^{-6}\,U$	
		40 Hz; 55 Hz; 60 Hz; 120 Hz;	$4 \cdot 10^{-6}\,U$	
		300 Hz; 400 Hz; 500 Hz;	$4 \cdot 10^{-6}\,U$	
		1 kHz; 2 kHz; 5 kHz; 10 kHz;	$4 \cdot 10^{-6}\,U$	
		20 kHz; 30 kHz; 50 kHz	$4 \cdot 10^{-6}\,U$	
		70 kHz; 100 kHz	$5 \cdot 10^{-6}\,U$	
		200 kHz; 300 kHz	$6 \cdot 10^{-6}\,U$	
		500 kHz	$10 \cdot 10^{-6}\,U$	
		700 kHz; 800 kHz; 1 MHz	$13 \cdot 10^{-6}\,U$	

[1)] The calibration and measurement capabilities are stated according to DAkkS-DKD-3 (EA-4/02). These are expanded uncertainties of measurement with a coverage probability of 95 % and have a coverage factor of $k = 2$ unless stated otherwise. Uncertainties without unit are relative uncertainties referring to the measurement value unless stated otherwise.

Measurand quantity / Calibration item	Range	Measurement Conditions/ Procedure	Smallest Measurement Uncertainty [1)]	Remarks
AC/DC-Transfer Sources	20 V	10 Hz; 20 Hz	$8 \cdot 10^{-6}\,U$	*U* = Measured value for discrete measurement points and frequencies Fluke 792A
		30 Hz	$5 \cdot 10^{-6}\,U$	
		40 Hz; 55 Hz; 60 Hz; 120 Hz;	$3 \cdot 10^{-6}\,U$	
		300 Hz; 400 Hz; 500 Hz;	$3 \cdot 10^{-6}\,U$	
		1 kHz; 2 kHz; 5 kHz; 10 kHz;	$3 \cdot 10^{-6}\,U$	
		20 kHz; 30 kHz; 50 kHz	$3 \cdot 10^{-6}\,U$	
		70 kHz; 100 kHz	$5 \cdot 10^{-6}\,U$	
		200 kHz; 300 kHz	$6 \cdot 10^{-6}\,U$	
		500 kHz	$10 \cdot 10^{-6}\,U$	
		700 kHz; 800 kHz; 1 MHz	$12 \cdot 10^{-6}\,U$	
	30 V; 40 V; 50 V; 60 V; 70 V	10 Hz; 20 Hz	$9 \cdot 10^{-6}\,U$	
		30 Hz	$7 \cdot 10^{-6}\,U$	
		40 Hz; 55 Hz; 60 Hz; 120 Hz;	$6 \cdot 10^{-6}\,U$	
		300 Hz; 400 Hz; 500 Hz;	$6 \cdot 10^{-6}\,U$	
		1 kHz; 2 kHz; 5 kHz; 10 kHz;	$6 \cdot 10^{-6}\,U$	
		20 kHz; 30 kHz; 50 kHz	$6 \cdot 10^{-6}\,U$	
		70 kHz; 100 kHz	$9 \cdot 10^{-6}\,U$	
	100 V	10 Hz	$10 \cdot 10^{-6}\,U$	
		20 Hz	$9 \cdot 10^{-6}\,U$	
		30 Hz	$7 \cdot 10^{-6}\,U$	
		40 Hz; 55 Hz; 60 Hz; 120 Hz;	$6 \cdot 10^{-6}\,U$	
		300 Hz; 400 Hz; 500 Hz;	$6 \cdot 10^{-6}\,U$	
		1 kHz; 2 kHz; 5 kHz; 10 kHz;	$6 \cdot 10^{-6}\,U$	
		20 kHz; 30 kHz; 50 kHz	$6 \cdot 10^{-6}\,U$	
		70 kHz; 100 kHz	$9 \cdot 10^{-6}\,U$	
	200 V	10 Hz; 20 Hz	$10 \cdot 10^{-6}\,U$	
		30 Hz; 40 Hz; 55 Hz;	$7 \cdot 10^{-6}\,U$	
		60 Hz; 120 Hz; 300 Hz;	$7 \cdot 10^{-6}\,U$	
		400 Hz; 500 Hz; 1 kHz;	$7 \cdot 10^{-6}\,U$	
		2 kHz; 5 kHz; 10 kHz;	$7 \cdot 10^{-6}\,U$	
		20 kHz; 30 kHz; 50 kHz	$7 \cdot 10^{-6}\,U$	
		70 kHz; 100 kHz	$12 \cdot 10^{-6}\,U$	
	300 V; 400 V; 500 V; 600 V; 700 V; 800 V; 1000 V	10 Hz; 20 Hz; 30 Hz	$9 \cdot 10^{-6}\,U$	
		40 Hz; 55 Hz; 60 Hz;	$7 \cdot 10^{-6}\,U$	
		120 Hz; 300 Hz; 400 Hz;	$7 \cdot 10^{-6}\,U$	
		500 Hz; 1 kHz 2 kHz;	$7 \cdot 10^{-6}\,U$	
		5 kHz; 10 kHz; 20 kHz	$7 \cdot 10^{-6}\,U$	
		30 kHz; 50 kHz	$9 \cdot 10^{-6}\,U$	
		70 kHz; 100 kHz	$15 \cdot 10^{-6}\,U$	

[1)] The smallest measurement uncertainties are stated according to DAkkS-DKD-3 (EA-4/02). These are expanded uncertainties with a 95 % level of confidence and, unless otherwise stated, using a coverage factor of k = 2. Uncertainties that appear without units are relative to the measured value unless otherwise stated.

Measurand quantity / Calibration item	Range	Measurement Conditions/ Procedure	Smallest Measurement Uncertainty [1)]	Remarks
AC/DC-Transfer Measuring Instruments	1 mV	10 Hz; 20 Hz; 30 Hz	$0.30 \cdot 10^{-3}\,U$	*U* = Measured value for discrete measurement points and frequencies Fluke 792A
		40 Hz; 55 Hz; 60 Hz; 120 Hz;	$0.22 \cdot 10^{-3}\,U$	
		300 Hz; 400 Hz; 500 Hz;	$0.22 \cdot 10^{-3}\,U$	
		1 kHz; 2 kHz; 5 kHz; 10 kHz	$0.22 \cdot 10^{-3}\,U$	
		20 kHz; 30 kHz; 50 kHz;	$0.26 \cdot 10^{-3}\,U$	
		70 kHz; 100 kHz; 200 kHz;	$0.26 \cdot 10^{-3}\,U$	
		300 kHz	$0.26 \cdot 10^{-3}\,U$	
		500 kHz; 700 kHz; 800 kHz	$0.32 \cdot 10^{-3}\,U$	
		1 MHz	$0.33 \cdot 10^{-3}\,U$	
	2 mV	10 Hz; 20 Hz; 30 Hz	$0.16 \cdot 10^{-3}\,U$	
		40 Hz; 55 Hz; 60 Hz; 120 Hz;	$0.13 \cdot 10^{-3}\,U$	
		300 Hz; 400 Hz; 500 Hz;	$0.13 \cdot 10^{-3}\,U$	
		1 kHz; 2 kHz; 5 kHz; 10 kHz;	$0.13 \cdot 10^{-3}\,U$	
		20 kHz; 30 kHz; 50 kHz	$0.13 \cdot 10^{-3}\,U$	
		70 kHz; 100 kHz; 200 kHz;	$0.14 \cdot 10^{-3}\,U$	
		300 kHz	$0.14 \cdot 10^{-3}\,U$	
		500 kHz; 700 kHz; 800 kHz; 1 MHz	$0.20 \cdot 10^{-3}\,U$	
	6 mV	10 Hz; 20 Hz; 30 Hz	$67 \cdot 10^{-6}\,U$	
		40 Hz; 55 Hz; 60 Hz; 120 Hz;	$57 \cdot 10^{-6}\,U$	
		300 Hz; 400 Hz; 500 Hz	$57 \cdot 10^{-6}\,U$	
		1 kHz; 2 kHz; 5 kHz; 10 kHz;	$57 \cdot 10^{-6}\,U$	
		20 kHz; 30 kHz; 50 kHz	$57 \cdot 10^{-6}\,U$	
		70 kHz; 100 kHz	$65 \cdot 10^{-6}\,U$	
		200 kHz; 300 kHz	$80 \cdot 10^{-6}\,U$	
		500 kHz	$0.14 \cdot 10^{-3}\,U$	
		700 kHz; 800 kHz; 1 MHz	$0.16 \cdot 10^{-3}\,U$	
	10 mV	10 Hz; 20 Hz; 30 Hz	$50 \cdot 10^{-6}\,U$	
		40 Hz; 55 Hz; 60 Hz; 120 Hz;	$45 \cdot 10^{-6}\,U$	
		300 Hz; 400 Hz; 500 Hz;	$45 \cdot 10^{-6}\,U$	
		1 kHz; 2 kHz; 5 kHz; 10 kHz;	$45 \cdot 10^{-6}\,U$	
		20 kHz; 30 kHz; 50 kHz	$45 \cdot 10^{-6}\,U$	
		70 kHz; 100 kHz	$55 \cdot 10^{-6}\,U$	
		200 kHz; 300 kHz	$65 \cdot 10^{-6}\,U$	
		500 kHz; 700 kHz; 800 kHz; 1 MHz	$0.15 \cdot 10^{-3}\,U$	

[1)] The smallest measurement uncertainties are stated according to DAkkS-DKD-3 (EA-4/02). These are expanded uncertainties with a 95 % level of confidence and, unless otherwise stated, using a coverage factor of k = 2. Uncertainties that appear without units are relative to the measured value unless otherwise stated.

Measurand quantity / Calibration item	Range	Measurement Conditions/ Procedure	Smallest Measurement Uncertainty [1)]	Remarks
AC/DC-Transfer Measuring Instruments	20 mV	10 Hz	$32 \cdot 10^{-6}\,U$	*U* = Measured value for discrete measurement points and frequencies Fluke 792A
		20 Hz; 30 Hz; 40 Hz; 55 Hz;	$30 \cdot 10^{-6}\,U$	
		60 Hz; 120 Hz; 300 Hz;	$30 \cdot 10^{-6}\,U$	
		400 Hz; 500 Hz; 1 kHz; 2 kHz;	$30 \cdot 10^{-6}\,U$	
		5 kHz; 10 kHz; 20 kHz	$30 \cdot 10^{-6}\,U$	
		30 kHz; 50 kHz	$30 \cdot 10^{-6}\,U$	
		70 kHz; 100 kHz	$40 \cdot 10^{-6}\,U$	
		200 kHz; 300 kHz	$50 \cdot 10^{-6}\,U$	
		500 kHz; 700 kHz; 800 kHz; 1 MHz	$0.1 \cdot 10^{-3}\,U$	
	40 mV	10 Hz; 20 Hz; 30 Hz	$30 \cdot 10^{-6}\,U$	
		40 Hz; 55 Hz; 60 Hz; 120 Hz;	$25 \cdot 10^{-6}\,U$	
		300 Hz; 400 Hz; 500 Hz;	$25 \cdot 10^{-6}\,U$	
		1 kHz; 2 kHz; 5 kHz; 10 kHz;	$25 \cdot 10^{-6}\,U$	
		20 kHz; 30 kHz; 50 kHz	$25 \cdot 10^{-6}\,U$	
		70 kHz; 100 kHz	$30 \cdot 10^{-6}\,U$	
		200 kHz; 300 kHz;	$43 \cdot 10^{-6}\,U$	
		500 kHz; 700 kHz; 800 kHz; 1 MHz	$86 \cdot 10^{-6}\,U$	
	60 mV	10 Hz; 20 Hz; 30 Hz	$30 \cdot 10^{-6}\,U$	
		40 Hz; 55 Hz; 60 Hz; 120 Hz;	$25 \cdot 10^{-6}\,U$	
		300 Hz; 400 Hz; 500 ,Hz;	$25 \cdot 10^{-6}\,U$	
		1 kHz; 2 kHz; 5 kHz; 10 kHz;	$25 \cdot 10^{-6}\,U$	
		20 kHz; 30 kHz; 50 kHz	$25 \cdot 10^{-6}\,U$	
		70 kHz; 100 kHz	$28 \cdot 10^{-6}\,U$	
		200 kHz; 300 kHz	$43 \cdot 10^{-6}\,U$	
		500 kHz; 700 kHz; 800 kHz; 1 MHz	$86 \cdot 10^{-6}\,U$	
	100 mV	10 Hz; 20 Hz	$24 \cdot 10^{-6}\,U$	
		30 Hz	$18 \cdot 10^{-6}\,U$	
		40 Hz; 55 Hz; 60 Hz; 120 Hz;	$8 \cdot 10^{-6}\,U$	
		300 Hz; 400 Hz; 500 Hz;	$8 \cdot 10^{-6}\,U$	
		1 kHz; 2 kHt; 5 kHz; 10 kHz;	$8 \cdot 10^{-6}\,U$	
		20 kHz; 300 kHz; 50 kHz	$8 \cdot 10^{-6}\,U$	
		70 kHz; 100 kHz	$9 \cdot 10^{-6}\,U$	
		200 kHz; 300 kHz	$10 \cdot 10^{-6}\,U$	
		500 kHz; 700 kHz; 800 kHz; 1 MHz	$30 \cdot 10^{-6}\,U$	

[1)] The smallest measurement uncertainties are stated according to DAkkS-DKD-3 (EA-4/02). These are expanded uncertainties with a 95 % level of confidence and, unless otherwise stated, using a coverage factor of k = 2. Uncertainties that appear without units are relative to the measured value unless otherwise stated.

Measurand quantity / Calibration item	Range	Measurement Conditions/ Procedure	Smallest Measurement Uncertainty [1)]	Remarks
AC/DC-Transfer Measuring Instruments	200 mV	10 Hz; 20 Hz	$18 \cdot 10^{-6}\,U$	*U* = Measured value for discrete measurement points and frequencies Fluke 792A
		30 Hz	$11 \cdot 10^{-6}\,U$	
		40 Hz; 55 Hz; 60 Hz; 120 Hz.	$6 \cdot 10^{-6}\,U$	
		300 Hz; 400 Hz; 500 Hz;	$6 \cdot 10^{-6}\,U$	
		1 kHz; 2 kHz; 5 kHz; 10 kHz;	$6 \cdot 10^{-6}\,U$	
		20 kHz; 30 kHz; 50 kHz	$6 \cdot 10^{-6}\,U$	
		70 kHz; 100 kHz; 200 kHz;	$8 \cdot 10^{-6}\,U$	
		300 kHz	$8 \cdot 10^{-6}\,U$	
		500 kHz;	$17 \cdot 10^{-6}\,U$	
		700 kHz	$22 \cdot 10^{-6}\,U$	
		800 kHz; 1 MHz	$28 \cdot 10^{-6}\,U$	
	300 mV	10 Hz; 20 Hz	$14 \cdot 10^{-6}\,U$	
		30 Hz	$10 \cdot 10^{-6}\,U$	
		40 Hz. 55 Hz; 60 Hz; 120 Hz;	$5 \cdot 10^{-6}\,U$	
		300 Hz; 400 Hz; 500 Hz;	$5 \cdot 10^{-6}\,U$	
		1 kHz. 2 kHz; 5 kHz; 10 kHz;	$5 \cdot 10^{-6}\,U$	
		20 kHz	$5 \cdot 10^{-6}\,U$	
		30 kHz; 50 kHz	$7 \cdot 10^{-6}\,U$	
		70 kHz; 100 kHz; 200 kHz;	$8 \cdot 10^{-6}\,U$	
		300 kHz	$8 \cdot 10^{-6}\,U$	
		500 kHz	$15 \cdot 10^{-6}\,U$	
		700 kHz; 800 kHz; 1 MHz	$18 \cdot 10^{-6}\,U$	
	400 mV	10 Hz; 20 Hz	$10 \cdot 10^{-6}\,U$	
		30 Hz	$7 \cdot 10^{-6}\,U$	
		40 Hz. 55 Hz; 60 Hz; 120 Hz;	$5 \cdot 10^{-6}\,U$	
		300 Hz; 400 Hz; 500 Hz	$5 \cdot 10^{-6}\,U$	
		1 kHz. 2 kHz; 5 kHz; 10 kHz;	$3 \cdot 10^{-6}\,U$	
		20 kHz; 30 kHz	$3 \cdot 10^{-6}\,U$	
		50 kHz; 70 kHz; 100 kHz;	$5 \cdot 10^{-6}\,U$	
		200 kHz	$5 \cdot 10^{-6}\,U$	
		300 kHz	$6 \cdot 10^{-6}\,U$	
		500 kHz	$12 \cdot 10^{-6}\,U$	
		700 kHz; 800 kHz; 1 MHz	$17 \cdot 10^{-6}\,U$	

[1)] The smallest measurement uncertainties are stated according to DAkkS-DKD-3 (EA-4/02). These are expanded uncertainties with a 95 % level of confidence and, unless otherwise stated, using a coverage factor of k = 2. Uncertainties that appear without units are relative to the measured value unless otherwise stated.

Measurand quantity / Calibration item	Range	Measurement Conditions/ Procedure	Smallest Measurement Uncertainty [1)]	Remarks
AC/DC-Transfer Measuring Instruments	500 mV	10 Hz	$15 \cdot 10^{-6}\,U$	*U* = Measured value for discrete measurement points and frequencies Fluke 792A
		20 Hz	$9 \cdot 10^{-6}\,U$	
		30 Hz	$6 \cdot 10^{-6}\,U$	
		40 Hz; 55 Hz; 60 Hz; 120 Hz;	$4 \cdot 10^{-6}\,U$	
		300 Hz; 400 Hz	$4 \cdot 10^{-6}\,U$	
		500 Hz; 1 kHz; 2 kHz; 5 kHz;	$6 \cdot 10^{-6}\,U$	
		10 kHz; 20 kHz; 30 kHz;	$6 \cdot 10^{-6}\,U$	
		50 kHz; 70 kHz; 100 kHz;	$6 \cdot 10^{-6}\,U$	
		200 kHz; 300 kHz	$6 \cdot 10^{-6}\,U$	
		500 kHz; 700 kHz; 800 kHz; 1 MHz	$15 \cdot 10^{-6}\,U$	
	600 mV	10 Hz	$14 \cdot 10^{-6}\,U$	
		20 Hz	$9 \cdot 10^{-6}\,U$	
		30 Hz	$7 \cdot 10^{-6}\,U$	
		40 Hz; 55 Hz; 60 Hz; 120 Hz;	$4 \cdot 10^{-6}\,U$	
		300 Hz; 400 Hz; 500 Hz;	$4 \cdot 10^{-6}\,U$	
		1 kHz; 2kHz	$4 \cdot 10^{-6}\,U$	
		5 kHz	$6 \cdot 10^{-6}\,U$	
		10 kHz; 20 kHz; 30 kHz;	$4 \cdot 10^{-6}\,U$	
		50 kHz	$4 \cdot 10^{-6}\,U$	
		70 kHz; 100 kHz	$5 \cdot 10^{-6}\,U$	
		200 kHz; 300 kHz	$6 \cdot 10^{-6}\,U$	
		500 kHz; 700 kHz; 800 kHz; 1 MHz	$15 \cdot 10^{-6}\,U$	
	700 mV	10 Hz	$15 \cdot 10^{-6}\,U$	
		20 Hz	$9 \cdot 10^{-6}\,U$	
		30 Hz	$6 \cdot 10^{-6}\,U$	
		40 Hz; 55 Hz; 60 Hz; 120 Hz;	$4 \cdot 10^{-6}\,U$	
		300 Hz; 400 Hz; 500 Hz;	$4 \cdot 10^{-6}\,U$	
		1 kHz	$4 \cdot 10^{-6}\,U$	
		2 kHz; 5 kHz; 10 kHz; 20 kHz;	$5 \cdot 10^{-6}\,U$	
		30 kHz; 50 kHz; 70 kHz;	$5 \cdot 10^{-6}\,U$	
		100 kHz	$5 \cdot 10^{-6}\,U$	
		200 kHz; 300 kHz	$6 \cdot 10^{-6}\,U$	
		500 kHz; 700 kHz; 800 kHz; 1 MHz	$15 \cdot 10^{-6}\,U$	

[1)] The smallest measurement uncertainties are stated according to DAkkS-DKD-3 (EA-4/02). These are expanded uncertainties with a 95 % level of confidence and, unless otherwise stated, using a coverage factor of k = 2. Uncertainties that appear without units are relative to the measured value unless otherwise stated.

Measurand quantity / Calibration item	Range	Measurement Conditions/ Procedure	Smallest Measurement Uncertainty [1)]	Remarks
AC/DC-Transfer Measuring Instruments	1 V	10 Hz	$9 \cdot 10^{-6}\,U$	*U* = Measured value for discrete measurement points and frequencies Fluke 792A
		20 Hz	$8 \cdot 10^{-6}\,U$	
		30 Hz	$7 \cdot 10^{-6}\,U$	
		40 Hz; 55 Hz; 60 Hz; 120 Hz;	$4 \cdot 10^{-6}\,U$	
		300 Hz	$4 \cdot 10^{-6}\,U$	
		400 Hz; 500 Hz; 1 kHz	$2 \cdot 10^{-6}\,U$	
		2 kHz; 5 kHz	$3 \cdot 10^{-6}\,U$	
		10 kHz; 20 kHz; 30 kHz;	$4 \cdot 10^{-6}\,U$	
		50 kHz	$4 \cdot 10^{-6}\,U$	
		70 kHz; 100 kHz	$5 \cdot 10^{-6}\,U$	
		200 kHz; 300 kHz	$7 \cdot 10^{-6}\,U$	
		500 kHz	$11 \cdot 10^{-6}\,U$	
		700 kHz; 800 kHz; 1 MHz	$14 \cdot 10^{-6}\,U$	
	2 V	10 Hz; 20 Hz	$8 \cdot 10^{-6}\,U$	
		30 Hz	$5 \cdot 10^{-6}\,U$	
		40 Hz; 55 Hz; 60 Hz; 120 Hz;	$2 \cdot 10^{-6}\,U$	
		300 Hz; 400 Hz; 500 Hz;	$2 \cdot 10^{-6}\,U$	
		1 kHz; 2 kHz; 5 kHz; 10 kHz;	$2 \cdot 10^{-6}\,U$	
		20 kHz; 30 kHz; 50 kHz	$2 \cdot 10^{-6}\,U$	
		70 kHz; 100 kHz	$5 \cdot 10^{-6}\,U$	
		200 kHz. 300 kHz	$6 \cdot 10^{-6}\,U$	
		500 kHz	$11 \cdot 10^{-6}\,U$	
		700 kHz; 800 kHz	$14 \cdot 10^{-6}\,U$	
		1 MHz	$16 \cdot 10^{-6}\,U$	
	3 V; 4 V; 5 V; 6 V; 7 V; 8 V	10 Hz	$10 \cdot 10^{-6}\,U$	
		20 Hz	$8 \cdot 10^{-6}\,U$	
		30 Hz	$5 \cdot 10^{-6}\,U$	
		40 Hz; 55 Hz; 60 Hz; 120 Hz;	$3 \cdot 10^{-6}\,U$	
		300 Hz. 400 Hz; 500 Hz;	$3 \cdot 10^{-6}\,U$	
		1 kHz; 2 kHz; 5 kHz; 10 kHz;	$3 \cdot 10^{-6}\,U$	
		20 kHz; 30 kHz; 50 kHz	$3 \cdot 10^{-6}\,U$	
		70 kHz	$4 \cdot 10^{-6}\,U$	
		100 kHz	$5 \cdot 10^{-6}\,U$	
		200 kHz; 300 kHz	$8 \cdot 10^{-6}\,U$	
		500 kHz	$9 \cdot 10^{-6}\,U$	
		700 kHz; 800 kHz	$12 \cdot 10^{-6}\,U$	
		1 MHz	$15 \cdot 10^{-6}\,U$	

[1)] The smallest measurement uncertainties are stated according to DAkkS-DKD-3 (EA-4/02). These are expanded uncertainties with a 95 % level of confidence and, unless otherwise stated, using a coverage factor of k = 2. Uncertainties that appear without units are relative to the measured value unless otherwise stated.

Measurand quantity / Calibration item	Range	Measurement Conditions/ Procedure	Smallest Measurement Uncertainty [1)]	Remarks
AC/DC-Transfer Measuring Instruments	10 V	10 Hz	$10 \cdot 10^{-6}\,U$	*U* = Measured value for discrete measurement points and frequencies Fluke 792A
		20 Hz	$8 \cdot 10^{-6}\,U$	
		30 Hz	$5 \cdot 10^{-6}\,U$	
		40 Hz; 55 Hz; 60 Hz; 120 Hz;	$4 \cdot 10^{-6}\,U$	
		300 Hz; 400 Hz. 500 Hz;	$4 \cdot 10^{-6}\,U$	
		1 kHz; 2 kHz; 5 kHz; 10 kHz;	$4 \cdot 10^{-6}\,U$	
		20 kHz; 30 kHz; 50 kHz	$4 \cdot 10^{-6}\,U$	
		70 kHz; 100 kHz	$5 \cdot 10^{-6}\,U$	
		200 kHz; 300 kHz	$6 \cdot 10^{-6}\,U$	
		500 kHz	$10 \cdot 10^{-6}\,U$	
		700 kHz; 800 kHz. 1 MHz	$13 \cdot 10^{-6}\,U$	
	20 V	10 Hz. 20 Hz	$8 \cdot 10^{-6}\,U$	
		30 Hz	$5 \cdot 10^{-6}\,U$	
		40 Hz. 55 Hz; 60 Hz; 120 Hz;	$3 \cdot 10^{-6}\,U$	
		300 Hz; 400 Hz; 500 Hz;	$3 \cdot 10^{-6}\,U$	
		1 kHz; 2 kHz; 5 kHz; 10 kHz;	$3 \cdot 10^{-6}\,U$	
		20 kHz; 30 kHz; 50 kHz	$3 \cdot 10^{-6}\,U$	
		70 kHz; 100 kHz	$5 \cdot 10^{-6}\,U$	
		200 kHz; 300 kHz	$6 \cdot 10^{-6}\,U$	
		500 kHz	$10 \cdot 10^{-6}\,U$	
		700 kHz; 800 kHz; 1 MHz	$12 \cdot 10^{-6}\,U$	
	30 V; 40 V; 50 V; 60 V; 70 V	10 Hz; 20 Hz	$9 \cdot 10^{-6}\,U$	
		30 Hz	$7 \cdot 10^{-6}\,U$	
		40 Hz; 55 Hz; 60 Hz; 120 Hz;	$6 \cdot 10^{-6}\,U$	
		300 Hz; 400 Hz; 500 Hz.	$6 \cdot 10^{-6}\,U$	
		1 kHz; 2 kHz; 5 kHz; 10 kHz;	$6 \cdot 10^{-6}\,U$	
		20 kHz; 30 kHz; 50 kHz	$6 \cdot 10^{-6}\,U$	
		70 kHz; 100 kHz	$9 \cdot 10^{-6}\,U$	
	100 V	10 Hz	$10 \cdot 10^{-6}\,U$	
		20 Hz	$9 \cdot 10^{-6}\,U$	
		30 Hz	$7 \cdot 10^{-6}\,U$	
		40 Hz; 55 Hz; 60 Hz; 120 Hz;	$6 \cdot 10^{-6}\,U$	
		300 Hz; 400 Hz; 500 Hz;	$6 \cdot 10^{-6}\,U$	
		1 kHz; 2 kHz; 5 kHz; 10 kHz;	$6 \cdot 10^{-6}\,U$	
		20 kHz; 30 kHz; 50 kHz	$6 \cdot 10^{-6}\,U$	
		70 kHz; 100 kHz	$9 \cdot 10^{-6}\,U$	

[1)] The smallest measurement uncertainties are stated according to DAkkS-DKD-3 (EA-4/02). These are expanded uncertainties with a 95 % level of confidence and, unless otherwise stated, using a coverage factor of k = 2. Uncertainties that appear without units are relative to the measured value unless otherwise stated.

Measurand quantity / Calibration item	Range	Measurement Conditions/ Procedure	Smallest Measurement Uncertainty [1)]	Remarks
AC/DC-Transfer Measuring Instruments	200 V	10 Hz; 20 Hz	$10 \cdot 10^{-6}\,U$	*U* = Measured value for discrete measurement points and frequencies Fluke 792A
		30 Hz; 40 Hz; 55 Hz; 60 Hz;	$7 \cdot 10^{-6}\,U$	
		120 Hz; 300 Hz; 400 Hz;	$7 \cdot 10^{-6}\,U$	
		500 Hz; 1 kHz; 2 kHz; 5 kHz;	$7 \cdot 10^{-6}\,U$	
		10 kHz; 20 kHz; 30 kHz;	$7 \cdot 10^{-6}\,U$	
		50 kHz	$7 \cdot 10^{-6}\,U$	
		70 kHz; 100 kHz	$12 \cdot 10^{-6}\,U$	
	300 V; 400 V; 500 V; 600 V; 700 V; 800 V; 1000 V	10 Hz; 20 Hz; 30 Hz	$9 \cdot 10^{-6}\,U$	
		40 Hz; 55 Hz; 60 Hz; 120 Hz;	$7 \cdot 10^{-6}\,U$	
		300 Hz; 400 Hz; 500 Hz;	$7 \cdot 10^{-6}\,U$	
		1 kHz; 2 kHz; 5 kHz; 10 kHz;	$7 \cdot 10^{-6}\,U$	
		20 kHz	$7 \cdot 10^{-6}\,U$	
		30 kHz; 50 kHz	$9 \cdot 10^{-6}\,U$	
		70 kHz; 100 kHz	$15 \cdot 10^{-6}\,U$	
AC Voltage Measuring Instruments and Sources	1 mV	10 Hz; 20 Hz; 30 Hz	$0.42 \cdot 10^{-3}\,U$	*U* = Measured value for discrete measurement points and frequencies Fluke 5790A
		40 Hz; 55 Hz; 60 Hz;	$0.36 \cdot 10^{-3}\,U$	
		120 Hz; 300 Hz; 400 Hz;	$0.36 \cdot 10^{-3}\,U$	
		500 Hz; 1kHz; 2 kHz; 5 kHz;	$0.36 \cdot 10^{-3}\,U$	
		10 kHz; 20 kHz; 30 kHz;	$0.36 \cdot 10^{-3}\,U$	
		50 kHz; 70 kHz; 100 kHz	$0.36 \cdot 10^{-3}\,U$	
		200 kHz; 300 kHz	$0.43 \cdot 10^{-3}\,U$	
		500 kHz; 700 kHz; 800 kHz	$0.48 \cdot 10^{-3}\,U$	
		1 MHz	$0.53 \cdot 10^{-3}\,U$	
	2 mV	10 Hz; 20 Hz; 30 Hz	$0.18 \cdot 10^{-3}\,U$	
		40 Hz; 55 Hz; 60 Hz; 120 Hz;	$0.14 \cdot 10^{-3}\,U$	
		300 Hz; 400 Hz; 500 Hz;	$0.14 \cdot 10^{-3}\,U$	
		1 kHz; 2 kHz; 5 kHz; 10 kHz;	$0.14 \cdot 10^{-3}\,U$	
		20 kHz; 30 kHz; 50 kHz	$0.14 \cdot 10^{-3}\,U$	
		70 kHz; 100 kHz;	$0.18 \cdot 10^{-3}\,U$	
		200 kHz; 300 kHz	$0.18 \cdot 10^{-3}\,U$	
		500 kHz; 700 kHz; 800 kHz	$0.21 \cdot 10^{-3}\,U$	
		1 MHz	$0.24 \cdot 10^{-3}\,U$	

[1)] The smallest measurement uncertainties are stated according to DAkkS-DKD-3 (EA-4/02). These are expanded uncertainties with a 95 % level of confidence and, unless otherwise stated, using a coverage factor of k = 2. Uncertainties that appear without units are relative to the measured value unless otherwise stated.

Measurand quantity / Calibration item	Range	Measurement Conditions/ Procedure	Smallest Measurement Uncertainty [1)]	Remarks
AC Voltage Measuring Instruments and Sources	6 mV	10 Hz; 20 Hz; 30 Hz	$70 \cdot 10^{-6}\,U$	*U* = Measured value for discrete measurement points and frequencies Fluke 5790A
		40 Hz; 55 Hz; 60 Hz; 120 Hz;	$60 \cdot 10^{-6}\,U$	
		300 Hz; 400 Hz; 500 Hz;	$60 \cdot 10^{-6}\,U$	
		1 kHz; 2 kHz; 5 kHz; 10 kHz;	$60 \cdot 10^{-6}\,U$	
		20 kHz; 30 kHz; 50 kHz	$60 \cdot 10^{-6}\,U$	
		70 kHz; 100 kHz	$70 \cdot 10^{-6}\,U$	
		200 kHz; 300 kHz	$85 \cdot 10^{-6}\,U$	
		500 kHz; 700 kHz; 800 kHz; 1 MHz	$0.17 \cdot 10^{-3}\,U$	
	10 mV	10 Hz; 20 Hz; 30 Hz	$53 \cdot 10^{-6}\,U$	
		40 Hz; 55 Hz; 60 Hz; 120 Hz;	$47 \cdot 10^{-6}\,U$	
		300 Hz; 400 Hz; 500 Hz;	$47 \cdot 10^{-6}\,U$	
		1 kHz; 2 kHz; 5 kHz; 10 kHz;	$47 \cdot 10^{-6}\,U$	
		20 kHz; 30 kHz; 50 kHz	$47 \cdot 10^{-6}\,U$	
		70 kHz; 100 kHz	$57 \cdot 10^{-6}\,U$	
		200 kHz; 300 kHz	$70 \cdot 10^{-6}\,U$	
		500 kHz; 700 kHz; 800 kHz; 1 MHz	$0.14 \cdot 10^{-3}\,U$	
	20 mV	10 Hz; 20 Hz; 30 Hz	$37 \cdot 10^{-6}\,U$	
		40 Hz; 55 Hz; 60 Hz; 120 Hz;	$35 \cdot 10^{-6}\,U$	
		300 Hz; 400 Hz; 500 Hz;	$35 \cdot 10^{-6}\,U$	
		1 kHz; 2 kHz; 5 kHz; 10 kHz;	$35 \cdot 10^{-6}\,U$	
		20 kHz; 30 kHz; 50 kHz	$35 \cdot 10^{-6}\,U$	
		70 kHz; 100 kHz	$45 \cdot 10^{-6}\,U$	
		200 kHz; 300 kHz	$56 \cdot 10^{-6}\,U$	
		500 kHz; 700 kHz; 800 kHz; 1 MHz	$0.11 \cdot 10^{-3}\,U$	
	40 mV	10 Hz; 20 Hz; 30 Hz	$33 \cdot 10^{-6}\,U$	
		40 Hz; 55 Hz; 60 Hz; 120 Hz;	$31 \cdot 10^{-6}\,U$	
		300 Hz; 400 Hz; 500 Hz;	$31 \cdot 10^{-6}\,U$	
		1 kHz; 2 kHz; 5 kHz; 10 kHz	$31 \cdot 10^{-6}\,U$	
		20 kHz; 30 kHz; 50 kHz	$31 \cdot 10^{-6}\,U$	
		70 kHz; 100 kHz	$40 \cdot 10^{-6}\,U$	
		200 kHz; 300 kHz	$56 \cdot 10^{-6}\,U$	
		500 kHz; 700 kHz; 800 kHz; 1 MHz	$95 \cdot 10^{-6}\,U$	

[1)] The smallest measurement uncertainties are stated according to DAkkS-DKD-3 (EA-4/02). These are expanded uncertainties with a 95 % level of confidence and, unless otherwise stated, using a coverage factor of k = 2. Uncertainties that appear without units are relative to the measured value unless otherwise stated.

Measurand quantity / Calibration item	Range	Measurement Conditions/ Procedure	Smallest Measurement Uncertainty [1)]	Remarks
AC Voltage Measuring Instruments and Sources	60 mV	10 Hz; 20 Hz; 30 Hz	$31 \cdot 10^{-6}\,U$	U = Measured value for discrete measurement points and frequencies Fluke 5790A
		40 Hz; 55 Hz; 60 Hz; 120 Hz;	$25 \cdot 10^{-6}\,U$	
		300 Hz; 400 Hz; 500 Hz;	$25 \cdot 10^{-6}\,U$	
		1 kHz; 2 kHz; 5 kHz; 10 kHz;	$25 \cdot 10^{-6}\,U$	
		20 kHz; 30 kHz; 50 kHz	$25 \cdot 10^{-6}\,U$	
		70 kHz; 100 kHz	$29 \cdot 10^{-6}\,U$	
		200 kHz; 300 kHz	$43 \cdot 10^{-6}\,U$	
		500 kHz; 700 kHz; 800 kHz	$87 \cdot 10^{-6}\,U$	
		1 MHz	$98 \cdot 10^{-6}\,U$	
	100 mV	10 Hz; 20 Hz	$26 \cdot 10^{-6}\,U$	
		30 Hz	$20 \cdot 10^{-6}\,U$	
		40 Hz; 55 Hz; 60 Hz; 120Hz;	$12 \cdot 10^{-6}\,U$	
		300 Hz; 400 Hz; 500 Hz;	$12 \cdot 10^{-6}\,U$	
		1 kHz; 2 kHz; 5kHz; 10 kHz;	$12 \cdot 10^{-6}\,U$	
		20 kHz; 30 kHz; 50 kHz	$12 \cdot 10^{-6}\,U$	
		70 kHz; 100 kHz	$13 \cdot 10^{-6}\,U$	
		200 kHz; 300 kHz	$14 \cdot 10^{-6}\,U$	
		500 kHz; 700 kHz; 800 kHz	$33 \cdot 10^{-6}\,U$	
		1 MHz	$53 \cdot 10^{-6}\,U$	
	200 mV	10 Hz; 20 Hz	$21 \cdot 10^{-6}\,U$	
		30 Hz	$15 \cdot 10^{-6}\,U$	
		40 Hz; 55 Hz; 60 Hz; 120 Hz;	$12 \cdot 10^{-6}\,U$	
		300 Hz; 400 Hz; 500 Hz;	$12 \cdot 10^{-6}\,U$	
		1 kHz; 2 kHz; 5 kHz; 10 kHz;	$12 \cdot 10^{-6}\,U$	
		20 kHz; 30 kHz; 50 kHz	$12 \cdot 10^{-6}\,U$	
		70 kHz; 100 kHz;	$13 \cdot 10^{-6}\,U$	
		200 kHz; 300 kHz	$13 \cdot 10^{-6}\,U$	
		500 kHz; 700 kHz	$25 \cdot 10^{-6}\,U$	
		800 kHz; 1 MHz	$35 \cdot 10^{-6}\,U$	
	300 mV	10 Hz; 20 Hz; 30 Hz	$17 \cdot 10^{-6}\,U$	
		40 Hz; 55 Hz; 60 Hz; 120 Hz;	$12 \cdot 10^{-6}\,U$	
		300 Hz; 400 Hz; 500 Hz;	$12 \cdot 10^{-6}\,U$	
		1 kHz; 2 kHz; 5 kHz;	$12 \cdot 10^{-6}\,U$	
		10 kHz; 20 kHz; 30 kHz;	$12 \cdot 10^{-6}\,U$	
		50 kHz; 70 kHz	$12 \cdot 10^{-6}\,U$	
		100 kHz; 200 kHz; 300 kHz	$13 \cdot 10^{-6}\,U$	
		500 kHz	$17 \cdot 10^{-6}\,U$	
		700 kHz; 800 kHz	$21 \cdot 10^{-6}\,U$	
		1 MHz	$28 \cdot 10^{-6}\,U$	

[1)] The smallest measurement uncertainties are stated according to DAkkS-DKD-3 (EA-4/02). These are expanded uncertainties with a 95 % level of confidence and, unless otherwise stated, using a coverage factor of k = 2. Uncertainties that appear without units are relative to the measured value unless otherwise stated.

Measurand quantity / Calibration item	Range	Measurement Conditions/ Procedure	Smallest Measurement Uncertainty [1)]	Remarks
AC Voltage Measuring Instruments and Sources	500 mV; 600 mV; 700 mV	10 Hz	$18 \cdot 10^{-6}\,U$	*U* = Measured value for discrete measurement points and frequencies Fluke 5790A
		20 Hz; 30 Hz	$13 \cdot 10^{-6}\,U$	
		40 Hz; 55 Hz; 60 Hz; 120 Hz;	$10 \cdot 10^{-6}\,U$	
		300 Hz; 400 Hz; 500 Hz;	$10 \cdot 10^{-6}\,U$	
		1 kHz; 2 kHz; 5 kHz; 10 kHz;	$10 \cdot 10^{-6}\,U$	
		20 kHz; 30 kHz; 50 kHz	$10 \cdot 10^{-6}\,U$	
		70 kHz; 100 kHz;	$11 \cdot 10^{-6}\,U$	
		200 kHz; 300 kHz	$11 \cdot 10^{-6}\,U$	
		500 kHz; 700 kHz; 800 kHz	$21 \cdot 10^{-6}\,U$	
		1 MHz	$40 \cdot 10^{-6}\,U$	
	1 V	10 Hz; 20 Hz	$13 \cdot 10^{-6}\,U$	
		30 Hz	$11 \cdot 10^{-6}\,U$	
		40 Hz; 55 Hz; 60 Hz; 120 Hz;	$10 \cdot 10^{-6}\,U$	
		300 Hz; 400 Hz; 500 Hz;	$10 \cdot 10^{-6}\,U$	
		1 kHz; 2 kHz; 5 kHz; 10 kHz;	$10 \cdot 10^{-6}\,U$	
		20 kHz; 30 kHz; 50 kHz	$10 \cdot 10^{-6}\,U$	
		70 kHz; 100 kHz	$10 \cdot 10^{-6}\,U$	
		200 kHz; 300 kHz	$11 \cdot 10^{-6}\,U$	
		500 kHz	$15 \cdot 10^{-6}\,U$	
		700 kHz; 800 kHz	$25 \cdot 10^{-6}\,U$	
		1 MHz	$60 \cdot 10^{-6}\,U$	
	2 V	10 Hz; 20 Hz	$12 \cdot 10^{-6}\,U$	
		30 Hz	$10 \cdot 10^{-6}\,U$	
		40 Hz; 55 Hz; 60 Hz; 120 Hz;	$9 \cdot 10^{-6}\,U$	
		300 Hz; 400 Hz; 500 Hz;	$9 \cdot 10^{-6}\,U$	
		1 kHz; 2 kHz; 5 kHz; 10 kHz;	$9 \cdot 10^{-6}\,U$	
		20 kHz; 30 kHz; 50 kHz	$9 \cdot 10^{-6}\,U$	
		70 kHz; 100 kHz;	$10 \cdot 10^{-6}\,U$	
		200 kHz; 300 kHz	$10 \cdot 10^{-6}\,U$	
		500 kHz	$15 \cdot 10^{-6}\,U$	
		700 kHz; 800 kHz	$25 \cdot 10^{-6}\,U$	
		1 MHz	$67 \cdot 10^{-6}\,U$	

[1)] The smallest measurement uncertainties are stated according to DAkkS-DKD-3 (EA-4/02). These are expanded uncertainties with a 95 % level of confidence and, unless otherwise stated, using a coverage factor of k = 2. Uncertainties that appear without units are relative to the measured value unless otherwise stated.

Measurand quantity / Calibration item	Range	Measurement Conditions/ Procedure	Smallest Measurement Uncertainty [1)]	Remarks
AC Voltage Measuring Instruments and Sources	3 V; 4 V; 5 V	10 Hz; 20 Hz	$15 \cdot 10^{-6}\,U$	*U* = Measured value for discrete measurement points and frequencies Fluke 5790A
		30 Hz; 40 Hz; 55 Hz; 60 Hz;	$11 \cdot 10^{-6}\,U$	
		120 Hz; 300 Hz; 400 Hz;	$11 \cdot 10^{-6}\,U$	
		500 Hz; 1 kHz; 2 kHz; 5 kHz	$11 \cdot 10^{-6}\,U$	
		10 kHz; 20 kHz; 30 kHz;	$11 \cdot 10^{-6}\,U$	
		50 kHz; 70 kHz	$11 \cdot 10^{-6}\,U$	
		100 kHz; 200 kHz; 300 kHz	$11 \cdot 10^{-6}\,U$	
		500 kHz	$15 \cdot 10^{-6}\,U$	
		700 kHz; 800 kHz	$25 \cdot 10^{-6}\,U$	
		1 MHz	$67 \cdot 10^{-6}\,U$	
	6 V; 7 V; 8 V	10 Hz; 20 Hz	$15 \cdot 10^{-6}\,U$	
		30 Hz; 40 Hz; 55 Hz; 60 Hz;	$11 \cdot 10^{-6}\,U$	
		120 Hz; 300 Hz; 400 Hz;	$11 \cdot 10^{-6}\,U$	
		500 Hz; 1 kHz; 2 kHz; 5 kHz;	$11 \cdot 10^{-6}\,U$	
		10 kHz; 20 kHz; 30 kHz;	$11 \cdot 10^{-6}\,U$	
		50 kHz; 70 kHz	$11 \cdot 10^{-6}\,U$	
		100 kHz; 200 kHz; 300 kHz	$13 \cdot 10^{-6}\,U$	
		500 kHz	$30 \cdot 10^{-6}\,U$	
		700 kHz; 800 kHz	$60 \cdot 10^{-6}\,U$	
		1 MHz	$95 \cdot 10^{-6}\,U$	
	10 V; 20 V	10 Hz; 20 Hz	$13 \cdot 10^{-6}\,U$	
		30 Hz; 40 Hz; 55 Hz; 60 Hz;	$11 \cdot 10^{-6}\,U$	
		120 Hz; 300 Hz; 400 Hz;	$11 \cdot 10^{-6}\,U$	
		500 Hz; 1 kHz; 2 kHz; 5 kHz;	$11 \cdot 10^{-6}\,U$	
		10 kHz; 20 kHz; 30 kHz;	$11 \cdot 10^{-6}\,U$	
		50 kHz; 70 kHz	$11 \cdot 10^{-6}\,U$	
		100 kHz; 200 kHz;	$25 \cdot 10^{-6}\,U$	
		300 kHz; 500 kHz	$25 \cdot 10^{-6}\,U$	
		700 kHz; 800 kHz; 1 MHz	$0.11 \cdot 10^{-3}\,U$	
	30 V; 40 V; 50 V; 60 V; 70 V	10 Hz; 20 Hz; 30 Hz; 40 Hz;	$15 \cdot 10^{-6}\,U$	
		55 Hz; 60 Hz; 120 Hz;	$15 \cdot 10^{-6}\,U$	
		300 Hz; 400 Hz; 500 Hz;	$15 \cdot 10^{-6}\,U$	
		1 kHz; 2 kHz; 5 kHz; 10 kHz;	$15 \cdot 10^{-6}\,U$	
		20 kHz; 30 kHz; 50 kHz	$15 \cdot 10^{-6}\,U$	
		70 kHz; 100 kHz	$20 \cdot 10^{-6}\,U$	

[1)] The smallest measurement uncertainties are stated according to DAkkS-DKD-3 (EA-4/02). These are expanded uncertainties with a 95 % level of confidence and, unless otherwise stated, using a coverage factor of k = 2. Uncertainties that appear without units are relative to the measured value unless otherwise stated.

Measurand quantity / Calibration item	Range	Measurement Conditions/ Procedure	Smallest Measurement Uncertainty [1)]	Remarks
AC Voltage Measuring Instruments and Sources	100 V; 200 V	10 Hz; 20 Hz; 30 Hz	$17 \cdot 10^{-6}\,U$	*U* = Measured value for discrete measurement points and frequencies Fluke 5790A
		40 Hz; 55 Hz; 60 Hz;	$14 \cdot 10^{-6}\,U$	
		120 Hz; 300 Hz; 400 Hz;	$14 \cdot 10^{-6}\,U$	
		500 Hz; 1 kHz	$14 \cdot 10^{-6}\,U$	
		2 kHz; 5 kHz; 10 kHz;	$17 \cdot 10^{-6}\,U$	
		20 kHz; 30 kHz;	$17 \cdot 10^{-6}\,U$	
		50 kHz; 70 kHz	$17 \cdot 10^{-6}\,U$	
		100 kHz	$32 \cdot 10^{-6}\,U$	
	300 V	10 Hz; 20 Hz; 30Hz	$17 \cdot 10^{-6}\,U$	
		40 Hz; 55 Hz; 60 Hz;	$14 \cdot 10^{-6}\,U$	
		120 Hz; 300 Hz; 400 Hz;	$14 \cdot 10^{-6}\,U$	
		500 Hz; 1 kHz	$14 \cdot 10^{-6}\,U$	
		2 kHz; 5 kHz; 10 kHz; 20 kHz	$20 \cdot 10^{-6}\,U$	
		30 kHz; 50 kHz	$32 \cdot 10^{-6}\,U$	
		70 kHz	$44 \cdot 10^{-6}\,U$	
		100 kHz	$66 \cdot 10^{-6}\,U$	
	500 V; 1000 V	10 Hz; 20 Hz	$24 \cdot 10^{-6}\,U$	
		30 HZ; 40 Hz; 55 Hz;	$25 \cdot 10^{-6}\,U$	
		60 Hz; 120 Hz; 300 Hz;	$25 \cdot 10^{-6}\,U$	
		400 Hz; 500 Hz	$25 \cdot 10^{-6}\,U$	
		1 kHz; 2 kHz; 5 kHz; 10 kHz	$30 \cdot 10^{-6}\,U$	
		20 kHz; 30 kHz; 50 kHz	$47 \cdot 10^{-6}\,U$	
		70 kHz	$55 \cdot 10^{-6}\,U$	
		100 kHz	$66 \cdot 10^{-6}\,U$	
AC Voltage (Ranges) Measuring Instruments and Sources	1 mV to 2.2 mV	10 Hz to 40 Hz	$0.52 \cdot 10^{-3}\,U$	
		> 40 Hz to 50 kHz	$0.40 \cdot 10^{-3}\,U$	
		> 50 kHz to 100 kHz	$0.41 \cdot 10^{-3}\,U$	
		> 100 kHz to 300 kHz	$0.46 \cdot 10^{-3}\,U$	
		> 300 kHz to 500 kHz	$0.55 \cdot 10^{-3}\,U$	
		> 500 kHz to 1 MHz	$0.60 \cdot 10^{-3}\,U$	
	> 2.2 mV to 7 mV	10 Hz to 20 Hz	$0.22 \cdot 10^{-3}\,U$	
		> 20 Hz to 40 Hz	$0.22 \cdot 10^{-3}\,U$	
		> 40 Hz to 20 kHz	$0.16 \cdot 10^{-3}\,U$	
		> 20 kHz to 50 kHz	$0.16 \cdot 10^{-3}\,U$	
		> 50 kHz to 100 kHz	$0.20 \cdot 10^{-3}\,U$	
		> 100 kHz to 300 kHz	$0.22 \cdot 10^{-3}\,U$	
		> 300 kHz to 500 kHz	$0.33 \cdot 10^{-3}\,U$	
		> 500 kHz to 1 MHz	$0.45 \cdot 10^{-3}\,U$	

[1)] The smallest measurement uncertainties are stated according to DAkkS-DKD-3 (EA-4/02). These are expanded uncertainties with a 95 % level of confidence and, unless otherwise stated, using a coverage factor of k = 2. Uncertainties that appear without units are relative to the measured value unless otherwise stated.

Measurand quantity / Calibration item	Range	Measurement Conditions/ Procedure	Smallest Measurement Uncertainty [1)]	Remarks
AC Voltage (Ranges) Measuring Instruments and Sources	> 7 mV to 22 mV	10 Hz to 20 Hz	$80 \cdot 10^{-6}\,U$	*U* = Measured value for discrete measurement points and frequencies Fluke 5790A
		> 20 Hz to 40 Hz	$80 \cdot 10^{-6}\,U$	
		> 40 Hz to 20 kHz	$65 \cdot 10^{-6}\,U$	
		> 20 kHz to 50 kHz	$75 \cdot 10^{-6}\,U$	
		> 50 kHz to 100 kHz	$75 \cdot 10^{-6}\,U$	
		> 100 kHz to 300 kHz	$95 \cdot 10^{-6}\,U$	
		> 300 kHz to 500 kHz	$0.19 \cdot 10^{-3}\,U$	
		> 500 kHz to 1 MHz	$0.21 \cdot 10^{-3}\,U$	
	> 22 mV to 70 mV	10 Hz to 20 Hz	$70 \cdot 10^{-6}\,U$	
		> 20 Hz to 40 Hz	$58 \cdot 10^{-6}\,U$	
		> 40 Hz to 20 kHz	$35 \cdot 10^{-6}\,U$	
		> 20 kHz to 50 kHz	$35 \cdot 10^{-6}\,U$	
		> 50 kHz to 100 kHz	$45 \cdot 10^{-6}\,U$	
		> 100 kHz to 300 kHz	$55 \cdot 10^{-6}\,U$	
		> 300 kHz to 500 kHz	$0.11 \cdot 10^{-3}\,U$	
		> 500 kHz to 1 MHz	$0.13 \cdot 10^{-3}\,U$	
	> 70 mV to 220 mV	10 Hz to 20 Hz	$39 \cdot 10^{-6}\,U$	
		> 20 Hz to 40 Hz	$35 \cdot 10^{-6}\,U$	
		> 40 Hz to 20 kHz	$25 \cdot 10^{-6}\,U$	
		> 20 kHz to 50 kHz	$25 \cdot 10^{-6}\,U$	
		> 50 kHz to 100 kHz	$28 \cdot 10^{-6}\,U$	
		> 100 kHz to 300 kHz	$42 \cdot 10^{-6}\,U$	
		> 300 kHz to 500 kHz	$85 \cdot 10^{-6}\,U$	
		> 500 kHz to 1 MHz	$0.1 \cdot 10^{-3}\,U$	
	> 220 mV to 700 mV	10 Hz to 20 Hz	$25 \cdot 10^{-6}\,U$	
		> 20 Hz to 40 Hz	$22 \cdot 10^{-6}\,U$	
		> 40 Hz to 20 kHz	$12 \cdot 10^{-6}\,U$	
		> 20 kHz to 50 kHz	$12 \cdot 10^{-6}\,U$	
		> 50 kHz to 100 kHz	$13 \cdot 10^{-6}\,U$	
		> 100 kHz to 300 kHz	$14 \cdot 10^{-6}\,U$	
		> 300 kHz to 500 kHz	$27 \cdot 10^{-6}\,U$	
		> 500 kHz to 1 MHz	$40 \cdot 10^{-6}\,U$	
	> 700 mV to 2.2 V	10 Hz to 20 Hz	$20 \cdot 10^{-6}\,U$	
		> 20 Hz to 40 Hz	$14 \cdot 10^{-6}\,U$	
		> 40 Hz to 50 kHz	$10 \cdot 10^{-6}\,U$	
		> 50 kHz to 100 kHz	$11 \cdot 10^{-6}\,U$	
		> 100 kHz to 300 kHz	$11 \cdot 10^{-6}\,U$	
		> 300 kHz to 500 kHz	$22 \cdot 10^{-6}\,U$	
		> 500 kHz to 1 MHz	$68 \cdot 10^{-6}\,U$	

[1)] The smallest measurement uncertainties are stated according to DAkkS-DKD-3 (EA-4/02). These are expanded uncertainties with a 95 % level of confidence and, unless otherwise stated, using a coverage factor of k = 2. Uncertainties that appear without units are relative to the measured value unless otherwise stated.

Measurand quantity / Calibration item	Range	Measurement Conditions/ Procedure	Smallest Measurement Uncertainty [1)]	Remarks
AC Voltage (Ranges) Measuring Instruments and Sources	> 2.2 V to 7 V	10 Hz to 20 Hz	$18 \cdot 10^{-6}\,U$	*U* = Measured value for discrete measurement points and frequencies Fluke 5790A
		> 20 kHz to 50 kHz	$11 \cdot 10^{-6}\,U$	
		> 50 kHz to 100 kHz	$13 \cdot 10^{-6}\,U$	
		> 100 kHz to 300 kHz	$13 \cdot 10^{-6}\,U$	
		> 300 kHz to 500 kHz	$30 \cdot 10^{-6}\,U$	
		> 500 kHz to 1 MHz	$95 \cdot 10^{-6}\,U$	
	> 7 V to 22 V	10 Hz to 20 Hz	$17 \cdot 10^{-6}\,U$	
		> 20 Hz to 40 Hz	$16 \cdot 10^{-6}\,U$	
		> 40 Hz to 20 kHz	$11 \cdot 10^{-6}\,U$	
		> 20 kHz to 50 kHz	$11 \cdot 10^{-6}\,U$	
		> 50 kHz to 100 kHz	$11 \cdot 10^{-6}\,U$	
		> 100 kHz to 300 kHz	$25 \cdot 10^{-6}\,U$	
		> 300 kHz to 500 kHz	$30 \cdot 10^{-6}\,U$	
		> 500 kHz to 1MHz	$0.11 \cdot 10^{-3}\,U$	
	> 22 V to 70 V	10 Hz to 20 Hz	$18 \cdot 10^{-6}\,U$	
		> 20 Hz to 40 Hz	$16 \cdot 10^{-6}\,U$	
		> 40 Hz to 20 kHz	$15 \cdot 10^{-6}\,U$	
		> 20 kHz to 50 kHz	$15 \cdot 10^{-6}\,U$	
		> 50 kHz to 100 kHz	$25 \cdot 10^{-6}\,U$	
		> 100 kHz to 300 kHz	$25 \cdot 10^{-6}\,U$	
		> 300 kHz to 500 kHz	$40 \cdot 10^{-6}\,U$	
		> 500 kHz to 1 MHz	$0.13 \cdot 10^{-3}\,U$	
	> 70 V to 220 V	10 Hz to 20 Hz	$19 \cdot 10^{-6}\,U$	
		> 20 Hz to 40 Hz	$18 \cdot 10^{-6}\,U$	
		> 40 Hz to 20 kHz	$17 \cdot 10^{-6}\,U$	
		> 20 kHz to 50 kHz	$17 \cdot 10^{-6}\,U$	
		> 50 kHz to 100 kHz	$32 \cdot 10^{-6}\,U$	
	> 220 V to 1000 V	10 Hz to 20 Hz	$25 \cdot 10^{-6}\,U$	
		> 20 Hz to 40 Hz	$27 \cdot 10^{-6}\,U$	
		> 40 Hz to 20 kHz	$45 \cdot 10^{-6}\,U$	
		> 20 kHz to 50 kHz	$45 \cdot 10^{-6}\,U$	
		> 50 kHz to 100 kHz	$65 \cdot 10^{-6}\,U$	

[1)] The smallest measurement uncertainties are stated according to DAkkS-DKD-3 (EA-4/02). These are expanded uncertainties with a 95 % level of confidence and, unless otherwise stated, using a coverage factor of k = 2. Uncertainties that appear without units are relative to the measured value unless otherwise stated.

Measurand quantity / Calibration item	Range	Measurement Conditions/ Procedure	Smallest Measurement Uncertainty [1)]	Remarks
AC Voltage (Ranges) Measuring Instruments and Sources	0.01 V to 0.1 V	10 Hz to 40 Hz	$0.69 \cdot 10^{-3}\ U$	U = Measured value with Fluke 5720A
		> 40 Hz to 20 kHz	$0.53 \cdot 10^{-3}\ U$	
		> 20 kHz to 50 kHz	$0.64 \cdot 10^{-3}\ U$	
		> 50 kHz to 100 kHz	$1.1 \cdot 10^{-3}\ U$	
		> 100 kHz to 300 kHz	$2.1 \cdot 10^{-3}\ U$	
		> 300 kHz to 500 kHz	$3.6 \cdot 10^{-3}\ U$	
		> 500 kHz to 1 MHz	$5.0 \cdot 10^{-3}\ U$	
	> 0.1 V to 0.22 V	10 Hz to 40 Hz	$0.38 \cdot 10^{-3}\ U$	
		> 40 Hz to 20 kHz	$0.16 \cdot 10^{-3}\ U$	
		> 20 kHz to 50 kHz	$0.28 \cdot 10^{-3}\ U$	
		> 50 kHz to 100 kHz	$0.65 \cdot 10^{-3}\ U$	
		> 100 kHz to 300 kHz	$1.1 \cdot 10^{-3}\ U$	
		> 300 kHz to 500 kHz	$1.6 \cdot 10^{-3}\ U$	
		> 500 kHz to 1 MHz	$3.3 \cdot 10^{-3}\ U$	
	> 0.22 V to 2.2 V	10 Hz to 40 Hz	$0.49 \cdot 10^{-3}\ U$	
		> 40 Hz to 20 kHz	$0.09 \cdot 10^{-3}\ U$	
		> 20 kHz to 50 kHz	$0.14 \cdot 10^{-3}\ U$	
		> 50 kHz to 100 kHz	$0.29 \cdot 10^{-3}\ U$	
		> 100 kHz to 300 kHz	$0.85 \cdot 10^{-3}\ U$	
		> 300 kHz to 500 kHz	$2.1 \cdot 10^{-3}\ U$	
		> 500 kHz to 1 MHz	$3.3 \cdot 10^{-3}\ U$	
	> 2.2 V to 22 V	10 Hz to 40 Hz	$0.45 \cdot 10^{-3}\ U$	
		> 40 Hz to 20 kHz	$0.07 \cdot 10^{-3}\ U$	
		> 20 kHz to 50 kHz	$0.13 \cdot 10^{-3}\ U$	
		> 50 kHz to 100 kHz	$0.21 \cdot 10^{-3}\ U$	
		> 100 kHz to 300 kHz	$0.6 \cdot 10^{-3}\ U$	
		> 300 kHz to 500 kHz	$2.0 \cdot 10^{-3}\ U$	
		> 500 kHz to 1 MHz	$3.1 \cdot 10^{-3}\ U$	

[1)] The smallest measurement uncertainties are stated according to DAkkS-DKD-3 (EA-4/02). These are expanded uncertainties with a 95 % level of confidence and, unless otherwise stated, using a coverage factor of k = 2. Uncertainties that appear without units are relative to the measured value unless otherwise stated.

Measurand quantity / Calibration item	Range	Measurement Conditions/ Procedure	Smallest Measurement Uncertainty [1)]	Remarks
AC Voltage (Ranges) Measuring Instruments and Sources	>22 V to 220 V	10 Hz to 40 Hz	$0.47 \cdot 10^{-3}\,U$	*U* = Measured value with Fluke 5720A
		> 40 Hz to 20 kHz	$0.09 \cdot 10^{-3}\,U$	
		> 20 kHz to 50 kHz	$0.14 \cdot 10^{-3}\,U$	
		> 50 kHz to 100 kHz	$0.29 \cdot 10^{-3}\,U$	
	> 220 V to 1000 V	50 Hz to 1 kHz	$85 \cdot 10^{-6}\,U$	
AC Voltage with 50 Ω Input Impedance	3.2 V	10 Hz; 40 Hz; 100 Hz; 500 Hz 1 kHz; 10 kHz; 50 kHz 100 kHz; 200 kHz; 500 kHz 1 MHz; 2 MHz; 4 MHz	$0.5 \cdot 10^{-3}$	Discrete values
		5 MHz; 8 MHz	$1.1 \cdot 10^{-3}$	
		10 MHz; 15 MHz; 20 MHz	$2.0 \cdot 10^{-3}$	
		26 MHz; 30 MHz	$3.2 \cdot 10^{-3}$	
	1 V; 320 mV	10 Hz; 40 Hz; 100 Hz; 500 Hz 1 kHz; 10 kHz; 50 kHz 100 kHz; 200 kHz; 500 kHz 1 MHz; 2 MHz; 4 MHz	$0.7 \cdot 10^{-3}$	
		5 MHz; 8 MHz	$1.8 \cdot 10^{-3}$	
		10 MHz; 15 MHz; 20 MHz	$3.5 \cdot 10^{-3}$	
		26 MHz; 30 MHz	$5.4 \cdot 10^{-3}$	
	100 mV; 32 mV 10 mV; 3.2 mV 1 mV	10 Hz; 40 Hz; 100 Hz; 500 Hz 1 kHz; 10 kHz; 50 kHz 100 kHz; 200 kHz; 500 kHz 1 MHz; 2 MHz; 4 MHz	$1.3 \cdot 10^{-3}$	
		5 MHz;8 MHz	$2.7 \cdot 10^{-3}$	
		10 MHz; 15 MHz; 20 MHz	$5.2 \cdot 10^{-3}$	
		26 MHz; 30 MHz	$7.9 \cdot 10^{-3}$	

[1)] The smallest measurement uncertainties are stated according to DAkkS-DKD-3 (EA-4/02). These are expanded uncertainties with a 95 % level of confidence and, unless otherwise stated, using a coverage factor of k = 2. Uncertainties that appear without units are relative to the measured value unless otherwise stated.

Measurand quantity / Calibration item	Range	Measurement Conditions/ Procedure	Smallest Measurement Uncertainty [1)]	Remarks
Phase angel between Signals Measuring Instruments and Sources	0°; 90°; 180°; 270°	U_{SIG} / U_{REF} 50 mV / 50 mV 500 mV/ 500 mV Measuring Frequency: 15.625 Hz; 62.5 Hz; 312.5 Hz; 1 kHz; 2.5 kHz	0.008°	U_{SIG}: Signal amplitude in volts U_{REF}: Reference voltage For discrete measured value and frequency
	0°; 60°; 90°; 150°; 180°; 210°; 270°; 300°	U_{SIG} / U_{REF} 1 V/ 3 V 3 V / 1 V 5 V / 5 V Measuring Frequency: 15.625 Hz; 62.5 Hz; 312.5 Hz; 1 kHz; 2.5 kHz	0.005°	
		U_{SIG} / U_{REF} 6 V / 60 V 6 V / 120 V Measuring Frequency: 62.5 Hz	0.008°	
	-180° to +180°	U_{SIG} / U_{REF} 0.05 V to 0.5 V Measuring Frequency: 10 Hz to 2.5 kHz	0.008°	
		U_{SIG} / U_{REF} > 0.5 V to 5V Measuring Frequency: 10 Hz to 2.5 kHz	0.005°	
		U_{SIG} / U_{REF} > 5 V to 630 V 10 Hz to 2.5 kHz	0.008°	
High voltage	>1kV bis 30 kV	50 Hz	$0{,}5 \cdot 10^{-3}\,U$	
	>30 kV bis 50 kV	50 Hz	$0{,}6 \cdot 10^{-3}\,U$	

[1)] The smallest measurement uncertainties are stated according to DAkkS-DKD-3 (EA-4/02). These are expanded uncertainties with a 95 % level of confidence and, unless otherwise stated, using a coverage factor of k = 2. Uncertainties that appear without units are relative to the measured value unless otherwise stated.

Measurand quantity / Calibration item	Range	Measurement Conditions/ Procedure	Smallest Measurement Uncertainty [1)]	Remarks
AC Current- DC Current- Transfer	100 µA	10 Hz	$82 \cdot 10^{-6}\ I$	*I* = Measured value for discrete measured value and Frequency with Fluke 792A
		20 Hz	$39 \cdot 10^{-6}\ I$	
		30 Hz	$31 \cdot 10^{-6}\ I$	
		40 Hz	$34 \cdot 10^{-6}\ I$	
		55 Hz	$0.11 \cdot 10^{-3}\ I$	
		400 Hz	$63 \cdot 10^{-6}\ I$	
		500 Hz; 1 kHz	$41 \cdot 10^{-6}\ I$	
		2 kHz	$39 \cdot 10^{-6}\ I$	
		5 kHz; 10 kHz	$31 \cdot 10^{-6}\ I$	
	300 µA	10 Hz	$37 \cdot 10^{-6}\ I$	
		20 Hz	$34 \cdot 10^{-6}\ I$	
		30 Hz; 40 Hz	$31 \cdot 10^{-6}\ I$	
		55 Hz	$41 \cdot 10^{-6}\ I$	
		400 Hz	$35 \cdot 10^{-6}\ I$	
		500 Hz; 1 kHz	$31 \cdot 10^{-6}\ I$	
		2 kHz; 5 kHz; 10 kHz	$32 \cdot 10^{-6}\ I$	
	1 mA	10 Hz; 20 Hz; 30 Hz; 40 Hz; 55 Hz; 400 Hz; 500 Hz; 1 kHz; 2 kHz; 5 kHz; 10 kHz	$31 \cdot 10^{-6}\ I$	
	3 mA	10 Hz; 20 Hz; 30 Hz; 40 Hz;	$7 \cdot 10^{-6}\ I$	
		55 Hz; 400 Hz; 500 Hz;	$7 \cdot 10^{-6}\ I$	
		1 kHz; 2 kHz; 5 kHz	$7 \cdot 10^{-6}\ I$	
		10 kHz	$8 \cdot 10^{-6}\ I$	
	5 mA	10 Hz; 20 Hz	$7 \cdot 10^{-6}\ I$	
		30 Hz	$6 \cdot 10^{-6}\ I$	
		40 Hz; 55 Hz	$5 \cdot 10^{-6}\ I$	
		400 Hz; 500 Hz; 1 kHz; 2 kHz	$4 \cdot 10^{-6}\ I$	
		5 kHz	$6 \cdot 10^{-6}\ I$	
		10 kHz	$8 \cdot 10^{-6}\ I$	
	10 mA	10 Hz	$6 \cdot 10^{-6}\ I$	
		20 Hz; 30 Hz	$5 \cdot 10^{-6}\ I$	
		40 Hz; 55 Hz; 400 Hz;	$4 \cdot 10^{-6}\ I$	
		500 Hz; 1 kHz; 2 kHz; 5 kHz;	$4 \cdot 10^{-6}\ I$	
		10 kHz	$4 \cdot 10^{-6}\ I$	
	20 mA; 30 mA; 50 mA	10 Hz	$8 \cdot 10^{-6}\ I$	
		20 Hz; 30 Hz; 40 Hz; 55 Hz	$5 \cdot 10^{-6}\ I$	
		400 Hz; 500 Hz; 1 kHz; 2 kHz	$4 \cdot 10^{-6}\ I$	
		5 kHz; 10 kHz	$5 \cdot 10^{-6}\ I$	
	100 mA	10 Hz	$8 \cdot 10^{-6}\ I$	
		20 Hz; 30 Hz; 40 Hz; 55 Hz	$5 \cdot 10^{-6}\ I$	
		400 Hz	$8 \cdot 10^{-6}\ I$	
		500 Hz; 1 kHz	$5 \cdot 10^{-6}\ I$	

[1)] The smallest measurement uncertainties are stated according to DAkkS-DKD-3 (EA-4/02). These are expanded uncertainties with a 95 % level of confidence and, unless otherwise stated, using a coverage factor of k = 2. Uncertainties that appear without units are relative to the measured value unless otherwise stated.

Measurand quantity / Calibration item	Range	Measurement Conditions/ Procedure	Smallest Measurement Uncertainty [1)]	Remarks
AC Current- DC Current- Transfer		2 kHz	$8 \cdot 10^{-6}$ /	/ = Measured value for discrete measured value and Frequency with Fluke 792A
		5 kHz; 10 kHz	$5 \cdot 10^{-6}$ /	
	200 mA	10 Hz	$7 \cdot 10^{-6}$ /	
		20 Hz; 30 Hz; 40 Hz	$6 \cdot 10^{-6}$ /	
		55 Hz; 400 Hz; 500 Hz	$5 \cdot 10^{-6}$ /	
		1 kHz	$8 \cdot 10^{-6}$ /	
		2 kHz; 5 kHz; 10 kHz	$5 \cdot 10^{-6}$ /	
	300 mA; 500 mA	10 Hz; 20 Hz; 30 Hz	$6 \cdot 10^{-6}$ /	
		40 Hz; 55 Hz	$5 \cdot 10^{-6}$ /	
		400 Hz; 500 Hz; 1 kHz; 2 kHz	$4 \cdot 10^{-6}$ /	
		5 kHz; 10 kHz	$5 \cdot 10^{-6}$ /	
	1 A	10 Hz	$7 \cdot 10^{-6}$ /	
		20 Hz; 30 Hz	$6 \cdot 10^{-6}$ /	
		40 Hz; 55 Hz	$7 \cdot 10^{-6}$ /	
		400 Hz; 500 Hz;	$5 \cdot 10^{-6}$ /	
		1 kHz; 2 kHz; 5 kHz; 10 kHz	$9 \cdot 10^{-6}$ /	
	2 A	10 Hz	$7 \cdot 10^{-6}$ /	
		20 Hz; 30 Hz	$8 \cdot 10^{-6}$ /	
		40 Hz; 55 Hz; 400 Hz;	$7 \cdot 10^{-6}$ /	
		500 Hz; 1 kHz; 2 kHz;	$7 \cdot 10^{-6}$ /	
		5 kHz; 10 kHz	$7 \cdot 10^{-6}$ /	
	3 A; 5 A	10 Hz; 20 Hz; 30 Hz; 40 Hz;	$14 \cdot 10^{-6}$ /	
		55 Hz; 400 Hz; 500 Hz;	$14 \cdot 10^{-6}$ /	
		1 kHz; 2 kHz; 5 kHz; 10 kHz	$14 \cdot 10^{-6}$ /	
	10 A	10 Hz; 20 Hz; 30 Hz; 40 Hz;	$21 \cdot 10^{-6}$ /	
		55 Hz; 400 Hz; 500 Hz;	$21 \cdot 10^{-6}$ /	
		1 kHz; 2 kHz; 5 kHz; 10 kHz	$21 \cdot 10^{-6}$ /	
	20 A	10 Hz; 20 Hz; 30 Hz; 40 Hz;	$26 \cdot 10^{-6}$ /	
		55 Hz; 400 Hz; 500 Hz;	$26 \cdot 10^{-6}$ /	
		1 kHz; 2 kHz; 5 kHz;	$26 \cdot 10^{-6}$ /	
		10 kHz	$30 \cdot 10^{-6}$ /	
	50 A	10 Hz; 20 Hz; 30 Hz; 40 Hz;	$32 \cdot 10^{-6}$ /	
		55 Hz; 400 Hz; 500 Hz;	$32 \cdot 10^{-6}$ /	
		1 kHz; 2 kHz;	$32 \cdot 10^{-6}$ /	
		5 kHz; 10 kHz	$40 \cdot 10^{-6}$ /	
	100 A	10 Hz; 20 Hz; 30 Hz; 40 Hz;	$47 \cdot 10^{-6}$ /	
		55 Hz; 400 Hz; 500 Hz;	$47 \cdot 10^{-6}$ /	
		1 kHz; 2 kHz; 5 kHz;	$47 \cdot 10^{-6}$ /	
		10 kHz	$92 \cdot 10^{-6}$ /	

[1)] The smallest measurement uncertainties are stated according to DAkkS-DKD-3 (EA-4/02). These are expanded uncertainties with a 95 % level of confidence and, unless otherwise stated, using a coverage factor of k = 2. Uncertainties that appear without units are relative to the measured value unless otherwise stated.

Measurand quantity / Calibration item	Range	Measurement Conditions/ Procedure	Smallest Measurement Uncertainty [1)]	Remarks
Alternating current Sources	100 µA	10 Hz	$83 \cdot 10^{-6}$ /	
		20 Hz	$40 \cdot 10^{-6}$ /	
		30 Hz; 40 Hz	$34 \cdot 10^{-6}$ /	
		55 Hz	$0.11 \cdot 10^{-3}$ /	
		400 Hz	$64 \cdot 10^{-6}$ /	
		500 Hz; 1 kHz; 2 kHz	$42 \cdot 10^{-6}$ /	
		5 kHz; 10 kHz; 20 kHz; 30 kHz	$33 \cdot 10^{-6}$ /	
		50 kHz	$47 \cdot 10^{-6}$ /	
		70 kHz; 100 kHz	$77 \cdot 10^{-6}$ /	
	300 µA	10 Hz	$38 \cdot 10^{-6}$ /	
		20 Hz	$34 \cdot 10^{-6}$ /	
		30 Hz; 40 Hz	$32 \cdot 10^{-6}$ /	
		55 Hz	$42 \cdot 10^{-6}$ /	
		400 Hz	$36 \cdot 10^{-6}$ /	
		500 Hz; 1 kHz; 2 kHz;	$33 \cdot 10^{-6}$ /	
		5 kHz; 10 kHz; 20 kHz;	$33 \cdot 10^{-6}$ /	
		30 kHz; 50 kHz	$33 \cdot 10^{-6}$ /	
		70 kHz	$52 \cdot 10^{-6}$ /	
		100 kHz	$0.11 \cdot 10^{-3}$ /	

[1)] The smallest measurement uncertainties are stated according to DAkkS-DKD-3 (EA-4/02). These are expanded uncertainties with a 95 % level of confidence and, unless otherwise stated, using a coverage factor of k = 2. Uncertainties that appear without units are relative to the measured value unless otherwise stated.

Measurand quantity / Calibration item	Range	Measurement Conditions/ Procedure	Smallest Measurement Uncertainty [1)]	Remarks
Alternating current Sources	1 mA	10 Hz; 20 Hz; 30 Hz; 40 Hz;	$32 \cdot 10^{-6}\ I$	*I* = Measured value for discrete measured value and Frequency with Fluke 792A
		55 Hz; 400 Hz; 500 Hz;	$32 \cdot 10^{-6}\ I$	
		1 kHz; 2 kHz; 5 kHz; 10 kHz;	$32 \cdot 10^{-6}\ I$	
		20 kHz; 30 kHz; 50 kHz; 70 kHz	$32 \cdot 10^{-6}\ I$	
		100 kHz	$34 \cdot 10^{-6}\ I$	
	3 mA	10 Hz; 20 Hz; 30 Hz; 40 Hz;	$9 \cdot 10^{-6}\ I$	
		55 Hz; 400 Hz; 500 Hz; 1 kHz;	$9 \cdot 10^{-6}\ I$	
		2 kHz; 5 kHz	$9 \cdot 10^{-6}\ I$	
		10 kHz	$10 \cdot 10^{-6}\ I$	
		20 kHz; 30 kHz; 50 kHz; 70 kHz	$12 \cdot 10^{-6}\ I$	
		100 kHz	$15 \cdot 10^{-6}\ I$	
	5 mA	10 Hz; 20 Hz; 30 Hz	$9 \cdot 10^{-6}\ I$	
		40 Hz; 55 Hz; 400 Hz;	$8 \cdot 10^{-6}\ I$	
		500 Hz; 1 kHz; 2 kHz; 5 kHz	$8 \cdot 10^{-6}\ I$	
		10 kHz	$10 \cdot 10^{-6}\ I$	
		20 kHz; 30 kHz; 50 kHz; 70 kHz	$12 \cdot 10^{-6}\ I$	
		100 kHz	$15 \cdot 10^{-6}\ I$	
	10 mA	10 Hz	$9 \cdot 10^{-6}\ I$	
		20 Hz; 30 Hz; 40 Hz; 55 Hz	$8 \cdot 10^{-6}\ I$	
		400 Hz; 500 Hz; 1 kHz; 2 kHz	$7 \cdot 10^{-6}\ I$	
		5 kHz; 10 kHz; 20 kHz; 30 kHz	$8 \cdot 10^{-6}\ I$	
		50 kHz; 70 kHz	$10 \cdot 10^{-6}\ I$	
		100 kHz	$12 \cdot 10^{-6}\ I$	
	20 mA; 30 mA; 50 mA; 100 mA	10 Hz	$10 \cdot 10^{-6}\ I$	
		20 Hz; 30 Hz; 40 Hz; 55 Hz;	$8 \cdot 10^{-6}\ I$	
		400 Hz; 500 Hz	$8 \cdot 10^{-6}\ I$	
		1 kHz; 2 kHz; 5 kHz; 10 kHz;	$8 \cdot 10^{-6}\ I$	
		20 kHz; 30 kHz	$8 \cdot 10^{-6}\ I$	
		50 kHz; 70 kHz	$10 \cdot 10^{-6}\ I$	
		100 kHz	$13 \cdot 10^{-6}\ I$	
	200 mA	10 Hz	$9 \cdot 10^{-6}\ I$	
		20 Hz; 30 Hz; 40 Hz; 55 Hz;	$8 \cdot 10^{-6}\ I$	
		400 Hz; 500 Hz	$8 \cdot 10^{-6}\ I$	
		1 kHz	$10 \cdot 10^{-6}\ I$	
		2 kHz; 5 kHz; 10 kHz; 20 kHz	$9 \cdot 10^{-6}\ I$	
		30 kHz; 50 kHz;	$13 \cdot 10^{-6}\ I$	
		70 kHz; 100 kHz	$13 \cdot 10^{-6}\ I$	

[1)] The smallest measurement uncertainties are stated according to DAkkS-DKD-3 (EA-4/02). These are expanded uncertainties with a 95 % level of confidence and, unless otherwise stated, using a coverage factor of k = 2. Uncertainties that appear without units are relative to the measured value unless otherwise stated.

Measurand quantity / Calibration item	Range	Measurement Conditions/ Procedure	Smallest Measurement Uncertainty [1)]	Remarks
Alternating current Sources	300 mA	10 Hz; 20 Hz	$9 \cdot 10^{-6}\ I$	I = Measured value for discrete measured value and Frequency with Fluke 792A
		30 Hz; 40 Hz; 55 Hz; 400 Hz;	$8 \cdot 10^{-6}\ I$	
		500 Hz; 1 kHz; 2 kHz; 5 kHz;	$8 \cdot 10^{-6}\ I$	
		10 kHz; 20 kHz	$8 \cdot 10^{-6}\ I$	
		30 kHz; 50 kHz	$9 \cdot 10^{-6}\ I$	
		70 kHz; 100 kHz	$14 \cdot 10^{-6}\ I$	
	500 mA	10 Hz; 20 Hz; 30 Hz	$9 \cdot 10^{-6}\ I$	
		40 Hz; 55 Hz; 400 Hz; 500 Hz;	$8 \cdot 10^{-6}\ I$	
		1 kHz: 2 kHz; 5 kHz; 10 kHz; 20 kHz	$8 \cdot 10^{-6}\ I$	
		30 kHz; 50 kHz	$9 \cdot 10^{-6}\ I$	
		70 kHz	$11 \cdot 10^{-6}\ I$	
		100 kHz	$14 \cdot 10^{-6}\ I$	
	1 A	10 Hz; 20 Hz; 30 Hz;	$9 \cdot 10^{-6}\ I$	
		40 Hz; 55 Hz	$9 \cdot 10^{-6}\ I$	
		400 Hz; 500 Hz	$8 \cdot 10^{-6}\ I$	
		1 kHz; 2 kHz; 5 kHz; 10 kHz	$11 \cdot 10^{-6}\ I$	
		20 kHz; 30 kHz; 50 kHz	$11 \cdot 10^{-6}\ I$	
		70 kHz	$13 \cdot 10^{-6}\ I$	
		100 kHz	$15 \cdot 10^{-6}\ I$	
	2 A	10 Hz; 20 Hz; 30 Hz	$10 \cdot 10^{-6}\ I$	
		40 Hz; 55 Hz; 400 Hz; 500 Hz	$8 \cdot 10^{-6}\ I$	
		1 kHz; 2 kHz; 5 kHz; 10 kHz	$9 \cdot 10^{-6}\ I$	
		20 kHz; 30 kHz; 50 kHz	$13 \cdot 10^{-6}\ I$	
		70 kHz	$18 \cdot 10^{-6}\ I$	
		100 kHz	$23 \cdot 10^{-6}\ I$	
	3 A	10 Hz; 20 Hz; 30 Hz	$18 \cdot 10^{-6}\ I$	
		40 Hz; 55 Hz; 400 Hz;	$17 \cdot 10^{-6}\ I$	
		500 Hz; 1k Hz; 2 kHz; 5 kHz;	$17 \cdot 10^{-6}\ I$	
		10 kHz; 20 kHz; 30 kHz	$17 \cdot 10^{-6}\ I$	
		50 kHz	$18 \cdot 10^{-6}\ I$	
		70 kHz	$27 \cdot 10^{-6}\ I$	
		100 kHz	$29 \cdot 10^{-6}\ I$	
	5 A	10 Hz; 20 Hz; 30 Hz; 40 Hz;	$16 \cdot 10^{-6}\ I$	
		55 Hz; 400 Hz; 500 Hz;	$16 \cdot 10^{-6}\ I$	
		1 kHz; 2 kHz; 5 kHz; 10 kHz; 20 kHz; 30 kHz	$16 \cdot 10^{-6}\ I$	
		50 kHz	$18 \cdot 10^{-6}\ I$	
		70 kHz	$27 \cdot 10^{-6}\ I$	
		100 kHz	$29 \cdot 10^{-6}\ I$	

[1)] The smallest measurement uncertainties are stated according to DAkkS-DKD-3 (EA-4/02). These are expanded uncertainties with a 95 % level of confidence and, unless otherwise stated, using a coverage factor of k = 2. Uncertainties that appear without units are relative to the measured value unless otherwise stated.

Measurand quantity / Calibration item	Range	Measurement Conditions/ Procedure	Smallest Measurement Uncertainty [1)]	Remarks
Alternating current Sources	10 A	10 Hz; 20 Hz; 30 Hz; 40 Hz;	$22 \cdot 10^{-6}\ I$	*I* = Measured value for discrete measured value and Frequency with Fluke 792A
		55 Hz; 400 Hz; 500 Hz;	$22 \cdot 10^{-6}\ I$	
		1 kHz; 2 kHz; 5 kHz;	$22 \cdot 10^{-6}\ I$	
		10 kHz; 20 kHz	$22 \cdot 10^{-6}\ I$	
		30 kHz	$31 \cdot 10^{-6}\ I$	
		50 kHz	$41 \cdot 10^{-6}\ I$	
		70 kHz	$51 \cdot 10^{-6}\ I$	
		100 kHz	$76 \cdot 10^{-6}\ I$	
	20 A	10 Hz; 20 Hz; 30 Hz; 40 Hz;	$27 \cdot 10^{-6}\ I$	
		55 Hz; 400 Hz; 500 Hz;	$27 \cdot 10^{-6}\ I$	
		1 kHz; 2 kHz; 5 kHz; 10 kHz	$27 \cdot 10^{-6}\ I$	
		20 kHz; 30 kHz	$31 \cdot 10^{-6}\ I$	
		50 kHz	$46 \cdot 10^{-6}\ I$	
		70 kHz	$0.13 \cdot 10^{-3}\ I$	
		100 kHz	$0.17 \cdot 10^{-3}\ I$	
	50 A	10 Hz; 20 Hz; 30 Hz; 40 Hz;	$33 \cdot 10^{-6}\ I$	
		55 Hz; 400 Hz; 500 Hz;	$33 \cdot 10^{-6}\ I$	
		1 kHz; 2 kHz;	$33 \cdot 10^{-6}\ I$	
		5 kHz; 10 kHz	$40 \cdot 10^{-6}\ I$	
	100 A	10 Hz; 20 Hz; 30 Hz; 40 Hz;	$48 \cdot 10^{-6}\ I$	
		55 Hz; 400 Hz; 500 Hz;	$48 \cdot 10^{-6}\ I$	
		1 kHz; 2 kHz; 5 kHz;	$48 \cdot 10^{-6}\ I$	
		10 kHz	$93 \cdot 10^{-6}\ I$	
Alternating current Measuring Instruments	100 µA	10 Hz	$83 \cdot 10^{-6}\ I$	
		20 Hz	$40 \cdot 10^{-6}\ I$	
		30 Hz; 40 Hz	$34 \cdot 10^{-6}\ I$	
		55 Hz	$0.11 \cdot 10^{-3}\ I$	
		400 Hz	$64 \cdot 10^{-6}\ I$	
		500 Hz; 1 kHz; 2 kHz;	$42 \cdot 10^{-6}\ I$	
		5 kHz; 10 kHz	$42 \cdot 10^{-6}\ I$	
	300 µA	10 Hz	$38 \cdot 10^{-6}\ I$	
		20 Hz	$34 \cdot 10^{-6}\ I$	
		30 Hz; 40 Hz	$32 \cdot 10^{-6}\ I$	
		55 Hz	$42 \cdot 10^{-6}\ I$	
		400 Hz	$36 \cdot 10^{-6}\ I$	
		500 Hz; 1 kHz	$32 \cdot 10^{-6}\ I$	
		2 kHz; 5 kHz; 10 kHz	$33 \cdot 10^{-6}\ I$	

[1)] The smallest measurement uncertainties are stated according to DAkkS-DKD-3 (EA-4/02). These are expanded uncertainties with a 95 % level of confidence and, unless otherwise stated, using a coverage factor of k = 2. Uncertainties that appear without units are relative to the measured value unless otherwise stated.

Measurand quantity / Calibration item	Range	Measurement Conditions/ Procedure	Smallest Measurement Uncertainty [1)]	Remarks
Alternating current Measuring Instruments	1 mA	10 Hz; 20 Hz; 30 Hz; 40 Hz;	$32 \cdot 10^{-6}\ I$	*I* = Measured value for discrete measured value and Frequency with Fluke 792A
		55 Hz; 400 Hz; 500 Hz; 1 kHz;	$32 \cdot 10^{-6}\ I$	
		2 kHz; 5 kHz; 10 kHz	$32 \cdot 10^{-6}\ I$	
	3 mA; 5 mA	10 Hz; 20 Hz; 30 Hz; 40 Hz;	$10 \cdot 10^{-6}\ I$	
		55 Hz; 400 Hz; 500 Hz;	$10 \cdot 10^{-6}\ I$	
		1 kHz; 2 kHz; 5 kHz	$10 \cdot 10^{-6}\ I$	
		10 kHz	$11 \cdot 10^{-6}\ I$	
	10 mA	10 Hz	$9 \cdot 10^{-6}\ I$	
		20 Hz; 30 Hz; 40 Hz; 55 Hz;	$8 \cdot 10^{-6}\ I$	
		400 Hz; 500 Hz; 1 kHz; 2 kHz; 5 kHz; 10 kHz	$8 \cdot 10^{-6}\ I$	
	20 mA; 30 mA; 50 mA; 100 mA	10 Hz	$10 \cdot 10^{-6}\ I$	
		20 Hz; 30 Hz; 400 Hz; 55 Hz;	$8 \cdot 10^{-6}\ I$	
		400 Hz; 500 Hz; 1 kHz; 2 kHz	$8 \cdot 10^{-6}\ I$	
		5 kHz; 10 kHz	$9 \cdot 10^{-6}\ I$	
	200 mA; 300 mA; 500 mA	10 Hz	$10 \cdot 10^{-6}\ I$	
		20 Hz; 30 Hz; 40 Hz. 55 Hz;	$9 \cdot 10^{-6}\ I$	
		400 Hz; 500 Hz; 1 kHz; 2 kHz;	$9 \cdot 10^{-6}\ I$	
		5 kHz; 10 kHz	$9 \cdot 10^{-6}\ I$	
	1 A; 2 A	10 Hz; 20 Hz; 30 Hz; 40 Hz; 55 Hz. 400 Hz; 500 Hz;	$11 \cdot 10^{-6}\ I$	
		1 kHz; 2 kHz; 5kHz; 10 kHz	$11 \cdot 10^{-6}\ I$	
	3 A; 5 A	10 Hz; 20 Hz; 30 Hz; 40 Hz;	$18 \cdot 10^{-6}\ I$	
		55 Hz; 400 Hz; 500 Hz;	$18 \cdot 10^{-6}\ I$	
		1 kHz; 2 kHz; 5kHz; 10 kHz	$18 \cdot 10^{-6}\ I$	
	10 A	10 Hz; 20 Hz; 30 Hz; 40 Hz;	$22 \cdot 10^{-6}\ I$	
		55 Hz; 400 Hz; 500 Hz;	$22 \cdot 10^{-6}\ I$	
		1 kHz; 2 kHz; 5kHz; 10 kHz	$22 \cdot 10^{-6}\ I$	
	20 A	10 Hz; 20 Hz; 30 Hz; 40 Hz;	$27 \cdot 10^{-6}\ I$	
		55 Hz; 400 Hz; 500 Hz;	$27 \cdot 10^{-6}\ I$	
		1 kHz; 2 kHz; 5kHz;	$27 \cdot 10^{-6}\ I$	
		10 kHz	$31 \cdot 10^{-6}\ I$	
	50 A	10 Hz; 20 Hz; 30 Hz; 40 Hz;	$33 \cdot 10^{-6}\ I$	
		55 Hz; 400 Hz; 500 Hz;	$33 \cdot 10^{-6}\ I$	
		1 kHz; 2 kHz;	$33 \cdot 10^{-6}\ I$	
		5 kHz; 10 kHz	$40 \cdot 10^{-6}\ I$	
	100 A	10 Hz; 20 Hz; 30 Hz; 40 Hz;	$48 \cdot 10^{-6}\ I$	
		55 Hz; 400 Hz; 500 Hz;	$48 \cdot 10^{-6}\ I$	
		1 kHz; 2 kHz; 5 kHz;	$48 \cdot 10^{-6}\ I$	
		10 kHz	$93 \cdot 10^{-6}\ I$	

[1)] The smallest measurement uncertainties are stated according to DAkkS-DKD-3 (EA-4/02). These are expanded uncertainties with a 95 % level of confidence and, unless otherwise stated, using a coverage factor of k = 2. Uncertainties that appear without units are relative to the measured value unless otherwise stated.

Measurand quantity / Calibration item	Range	Measurement Conditions/ Procedure	Smallest Measurement Uncertainty [1)]	Remarks
Alternating current (Ranges) Sources and Measuring Instruments	100 µA to 1 mA	10 Hz to 40 Hz	$0.12 \cdot 10^{-3} I$	*I*= Measured value with Fluke 5790A
		> 40 Hz to 1 kHz;	$0.16 \cdot 10^{-3} I$	
		> 1 kHz to 10 kHz;	$60 \cdot 10^{-6} I$	
	> 1 mA to 10 mA	10 Hz to 40 Hz > 40 Hz to 1 kHz; > 1 kHz to 10 kHz;	$46 \cdot 10^{-6} I$	
	> 10 mA to 1 A	10 Hz to 40 Hz > 40 Hz to 1 kHz; > 1 kHz to 10 kHz;	$17 \cdot 10^{-6} I$	
	> 1 A to 10 A	10 Hz to 40 Hz > 40 Hz to 1 kHz; > 1 kHz to 10 kHz;	$32 \cdot 10^{-6} I$	
	> 10 A to 20 A	10 Hz to 40 Hz > 40 Hz to 1 kHz; > 1 kHz to 10 kHz;	$39 \cdot 10^{-6} I$	
	>20 A to 100 A	10 Hz to 40 Hz	$69 \cdot 10^{-6} I$	
		> 40 Hz to 1 kHz;	$69 \cdot 10^{-6} I$	
		> 1 kHz to 10 kHz;	$0.17 \cdot 10^{-3} I$	
Alternating current (Ranges) Measuring Instruments	0.1 mA to 0.2 mA	10 Hz to 40 Hz	$0.40 \cdot 10^{-3} I$	*I* = Measured value with Fluke 5720A
		> 40 Hz to 1 kHz	$0.21 \cdot 10^{-3} I$	
		> 1 kHz to 5 kHz	$0.40 \cdot 10^{-3} I$	
		> 5 kHz to 10 kHz	$1.7 \cdot 10^{-3} I$	
	> 0.2 mA to 2.2 mA	10 Hz to 40 Hz	$0.44 \cdot 10^{-3} I$	
		> 40 Hz to 1 kHz	$0.30 \cdot 10^{-3} I$	
		> 1 kHz to 5 kHz	$0.72 \cdot 10^{-3} I$	
		> 5 kHz to 10 kHz	$4.2 \cdot 10^{-3} I$	
	> 2.2 mA to 22 mA	10 Hz to 40 Hz	$0.44 \cdot 10^{-3} I$	
		> 40 Hz to 1 kHz	$0.30 \cdot 10^{-3} I$	
		> 1 kHz to 5 kHz	$0.46 \cdot 10^{-3} I$	
		> 5 kHz to 10 kHz	$3.5 \cdot 10^{-3} I$	
	> 22 mA to 220 mA	10 Hz to 40 Hz	$0.44 \cdot 10^{-3} I$	
		> 40 Hz to 1 kHz	$0.25 \cdot 10^{-3} I$	
		> 1 kHz to 5 kHz	$0.37 \cdot 10^{-3} I$	
		> 5 kHz to 10 kHz	$1.6 \cdot 10^{-3} I$	
	> 220 mA to 2.2 A	20 Hz to 1 kHz	$0.43 \cdot 10^{-3} I$	
		> 1 kHz to 5 kHz	$0.84 \cdot 10^{-3} I$	
		> 5 kHz to 10 kHz	$7.6 \cdot 10^{-3} I$	
	> 2.2 A to 20 A	40 Hz to 5 kHz	$0.81 \cdot 10^{-3} I + 1.2$ mA	*I* = Measured value with Fluke 5220 A

[1)] The smallest measurement uncertainties are stated according to DAkkS-DKD-3 (EA-4/02). These are expanded uncertainties with a 95 % level of confidence and, unless otherwise stated, using a coverage factor of k = 2. Uncertainties that appear without units are relative to the measured value unless otherwise stated.

Measurand quantity / Calibration item	Range	Measurement Conditions/ Procedure	Smallest Measurement Uncertainty [1)]	Remarks
Alternating current Sources	0.1 mA to 1 A	40 Hz to 5 kHz	$2 \cdot 10^{-3}\, I$	I = Measured value with HP3458A
Alternating current Current Clamps	1 mA to 2.2 A	40 Hz to 5 kHz	$2 \cdot 10^{-3}\, I$	I = Measured value
	> 2.2 A to 20 A	40 Hz to 5 kHz	$3 \cdot 10^{-3}\, I$	
	> 20 A to 800 A	40 Hz to 65 Hz	$4 \cdot 10^{-3}\, I$	
Resistance Ratio AC/DC-Bridges	0.16 to 6.3	DC and AC Current to 400 Hz	$0.2 \cdot 10^{-6}$	Measurement uncertainty refers to absolute value.
Alternating Current Active Power discrete values Sources and Measuring Instruments		50 mV / 1 mA / 10 Hz to 1 kHz		P = AC Active Power
	50 µW	Phase angle: 0 °	$0.17 \cdot 10^{-3}\, P$	
	43 µW	Phase angle: ±30 °	$0.2 \cdot 10^{-3}\, P$	
	25 µW	Phase angle: ±60 °	$0.3 \cdot 10^{-3}\, P$	
	13 µW	Phase angle: ±75 °	$0.6 \cdot 10^{-3}\, P$	
		500 mV / 1 mA / 10 Hz to 1 kHz		
	500 µW	Phase angle: 0 °	$0.16 \cdot 10^{-3}\, P$	
	433 µW	Phase angle: ±30 °	$0.2 \cdot 10^{-3}\, P$	
	250 µW	Phase angle: ±60 °	$0.3 \cdot 10^{-3}\, P$	
	129 µW	Phase angle: ±75 °	$0.6 \cdot 10^{-3}\, P$	
		500 mV / 10 mA / 10 Hz to 1 kHz		
	5 mW	Phase angle: 0 °	$55 \cdot 10^{-6}\, P$	
	4.3 mW	Phase angle: ±30 °	$0.1 \cdot 10^{-3}\, P$	
	2.5 mW	Phase angle: ±60 °	$0.25 \cdot 10^{-3}\, P$	
	1.3 mW	Phase angle: ±75 °	$0.55 \cdot 10^{-3}\, P$	
		500 mV / 100 mA / 10 Hz to 1 kHz		
	50 mW	Phase angle: 0 °	$35 \cdot 10^{-6}\, P$	
	43 mW	Phase angle: ±30 °	$90 \cdot 10^{-6}\, P$	
	25 mW	Phase angle: ±60 °	$0.25 \cdot 10^{-3}\, P$	
	13 mW	Phase angle: ±75 °	$0.55 \cdot 10^{-3}\, P$	
		5 V / 100 mA / 10 Hz to 1 kHz		
	500 mW	Phase angle: 0 °	$25 \cdot 10^{-6}\, P$	
	433 mW	Phase angle: ±30 °	$90 \cdot 10^{-6}\, P$	
	250 mW	Phase angle: ±60 °	$0.25 \cdot 10^{-3}\, P$	
	129 mW	Phase angle: ±75 °	$0.55 \cdot 10^{-3}\, P$	
		50 V / 100 mA / 16 Hz to 1 kHz		
	5 W	Phase angle: 0 °	$25 \cdot 10^{-6}\, P$	
	4.3 W	Phase angle: ±30 °	$90 \cdot 10^{-6}\, P$	
	2.5 W	Phase angle: ±60 °	$0.25 \cdot 10^{-3}\, P$	
	1.3 W	Phase angle: ±75 °	$0.55 \cdot 10^{-6}\, P$	
		500 V / 1 A / 16 Hz to 1 kHz		
	500 W	Phase angle: 0 °	$50 \cdot 10^{-6}\, P$	
	433 W	Phase angle: ±30 °	$0.1 \cdot 10^{-3}\, P$	
	250 W	Phase angle: ±60 °	$0.3 \cdot 10^{-3}\, P$	
	129 W	Phase angle: ±75 °	$0.6 \cdot 10^{-3}\, P$	

[1)] The smallest measurement uncertainties are stated according to DAkkS-DKD-3 (EA-4/02). These are expanded uncertainties with a 95 % level of confidence and, unless otherwise stated, using a coverage factor of k = 2. Uncertainties that appear without units are relative to the measured value unless otherwise stated.

Measurand quantity / Calibration item	Range	Measurement Conditions/ Procedure	Smallest Measurement Uncertainty [1)]	Remarks
Alternating current Active Power discrete values Sources and Measuring Instruments		500 V / 10 A / 16 Hz to 1 kHz		*P* = AC Active Power
	5 kW	Phase angle: 0 °	$65 \cdot 10^{-6} P$	
	4.3 kW	Phase angle: ±30 °	$0.15 \cdot 10^{-3} P$	
	2.5 kW	Phase angle: ±60 °	$0.35 \cdot 10^{-3} P$	
	1.3 kW	Phase angle: ±75 °	$0.75 \cdot 10^{-3} P$	
		500 V / 20 A / 16 Hz to 1 kHz		
	10 kW	Phase angle: 0 °	$65 \cdot 10^{-6} P$	
	8.7 kW	Phase angle: ±30 °	$0.15 \cdot 10^{-3} P$	
	5 kW	Phase angle: ±60 °	$0.35 \cdot 10^{-3} P$	
	2.6 kW	Phase angle: ±75 °	$0.75 \cdot 10^{-3} P$	
		500 V / 50 A / 40 Hz to 850 Hz		
	25 kW	Phase angle: 0 °	$85 \cdot 10^{-6} P$	
	21.7 kW	Phase angle: ±30 °	$0.2 \cdot 10^{-3} P$	
	12.5 kW	Phase angle: ±60 °	$0.5 \cdot 10^{-3} P$	
	6.5 kW	Phase angle: ±75 °	$1.0 \cdot 10^{-3} P$	
		500 V / 80 A / 40 Hz to 850 Hz		
	40 kW	Phase angle: 0 °	$85 \cdot 10^{-6} P$	
	34.6 kW	Phase angle: ±30 °	$0.2 \cdot 10^{-3} P$	
	20 kW	Phase angle: ±60 °	$0.5 \cdot 10^{-3} P$	
	10.4 kW	Phase angle: ±75 °	$1.0 \cdot 10^{-3} P$	
Alternating current Reactive Power discrete values Sources and Measuring Instruments		50 mV / 1 mA / 10 Hz to 1 kHz		*Q* = AC Reactive Power
	50 µvar	Phase angle: ±90 °	$0.17 \cdot 10^{-3} Q$	
	43 µvar	Phase angle: ±60°	$0.2 \cdot 10^{-3} Q$	
	25 µvar	Phase angle: ±30°	$0.3 \cdot 10^{-3} Q$	
	13 µvar	Phase angle: ±15°	$0.6 \cdot 10^{-3} Q$	
		500 mV / 1 mA / 10 Hz to 1 kHz		
	500 µvar	Phase angle: ±90 °	$0.16 \cdot 10^{-3} Q$	
	433 µvar	Phase angle: ±60°	$0.2 \cdot 10^{-3} Q$	
	250 µvar	Phase angle: ±30°	$0.3 \cdot 10^{-3} Q$	
	129 µvar	Phase angle: ±15°	$0.6 \cdot 10^{-3} Q$	
		500 mV / 10 mA / 10 Hz to 1 kHz		
	5 mvar	Phase angle: ±90 °	$55 \cdot 10^{-6} Q$	
	4.3 mvar	Phase angle: ±60°	$0.1 \cdot 10^{-3} Q$	
	2.5 mvar	Phase angle: ±30°	$0.25 \cdot 10^{-3} Q$	
	1.3 mvar	Phase angle: ±15°	$0.55 \cdot 10^{-3} Q$	

[1)] The smallest measurement uncertainties are stated according to DAkkS-DKD-3 (EA-4/02). These are expanded uncertainties with a 95 % level of confidence and, unless otherwise stated, using a coverage factor of k = 2. Uncertainties that appear without units are relative to the measured value unless otherwise stated.

Measurand quantity / Calibration item	Range	Measurement Conditions/ Procedure	Smallest Measurement Uncertainty [1)]	Remarks
Alternating current Reactive Power discrete values Sources and Measuring Instruments		500 mV / 100 mA / 10 Hz to 1 kHz		*Q* = AC Reactive Power
	50 mvar	Phase angle: ±90 °	$35 \cdot 10^{-6}\,Q$	
	43 mvar	Phase angle: ±60°	$90 \cdot 10^{-6}\,Q$	
	25 mvar	Phase angle: ±30°	$0.25 \cdot 10^{-3}\,Q$	
	13 mvar	Phase angle: ±15°	$0.55 \cdot 10^{-3}\,Q$	
		5 V / 100 mA / 10 Hz to 1 kHz		
	500 mvar	Phase angle: ±90 °	$25 \cdot 10^{-6}\,Q$	
	433 mvar	Phase angle: ±60°	$90 \cdot 10^{-6}\,Q$	
	250 mvar	Phase angle: ±30°	$0.25 \cdot 10^{-3}\,Q$	
	129 mvar	Phase angle: ±15°	$0.55 \cdot 10^{-3}\,Q$	
		50 V / 100 mA / 16 Hz to 1 kHz		
	5 var	Phase angle: ±90 °	$25 \cdot 10^{-6}\,Q$	
	4.3 var	Phase angle: ±60°	$90 \cdot 10^{-6}\,Q$	
	2.5 var	Phase angle: ±30°	$0.25 \cdot 10^{-3}\,Q$	
	1.3 var	Phase angle: ±15°	$0.55 \cdot 10^{-3}\,Q$	
		500 V / 1 A / 16 Hz to 1 kHz		
	500 var	Phase angle: ±90 °	$50 \cdot 10^{-6}\,Q$	
	433 var	Phase angle: ±60°	$0.1 \cdot 10^{-3}\,Q$	
	250 var	Phase angle: ±30°	$0.3 \cdot 10^{-3}\,Q$	
	129 var	Phase angle: ±15°	$0.6 \cdot 10^{-3}\,Q$	
		500 V / 10 A / 16 Hz to 1 kHz		
	5 kvar	Phase angle: ±90 °	$65 \cdot 10^{-6}\,Q$	
	4.3 kvar	Phase angle: ±60°	$0.15 \cdot 10^{-3}\,Q$	
	2.5 kvar	Phase angle: ±30°	$0.35 \cdot 10^{-3}\,Q$	
	1.3 kvar	Phase angle: ±15°	$0.75 \cdot 10^{-3}\,Q$	
		500 V / 20 A / 16 Hz to 1 kHz		
	10 kvar	Phase angle: ±90 °	$65 \cdot 10^{-6}\,Q$	
	8.7 kvar	Phase angle: ±60°	$0.15 \cdot 10^{-3}\,Q$	
	5 kvar	Phase angle: ±30°	$0.35 \cdot 10^{-3}\,Q$	
	2.6 kvar	Phase angle: ±15°	$0.75 \cdot 10^{-3}\,Q$	
		500 V / 50 A / 40 Hz to 850 Hz		
	25 kvar	Phase angle: ±90 °	$85 \cdot 10^{-6}\,Q$	
	21.7 kvar	Phase angle: ±60°	$0.2 \cdot 10^{-3}\,Q$	
	12.5 kvar	Phase angle: ±30°	$0.5 \cdot 10^{-3}\,Q$	
	6.5 kvar	Phase angle: ±15°	$1.0 \cdot 10^{-3}\,Q$	
		500 V / 80 A / 40 Hz to 850 Hz		
	40 kvar	Phase angle: ±90 °	$85 \cdot 10^{-6}\,Q$	
	34.6 kvar	Phase angle: ±60°	$0.2 \cdot 10^{-3}\,Q$	
	20 kvar	Phase angle: ±30°	$0.5 \cdot 10^{-3}\,Q$	
	10.4 kvar	Phase angle: ±15°	$1.0 \cdot 10^{-3}\,Q$	

[1)] The smallest measurement uncertainties are stated according to DAkkS-DKD-3 (EA-4/02). These are expanded uncertainties with a 95 % level of confidence and, unless otherwise stated, using a coverage factor of k = 2. Uncertainties that appear without units are relative to the measured value unless otherwise stated.

Measurand quantity / Calibration item	Range	Measurement Conditions/ Procedure	Smallest Measurement Uncertainty [1)]	Remarks
Alternating current Apparent Power discrete values Sources and Measuring Instruments	50 µVA	50 mV / 1 mA / 10 Hz to 1 kHz	$0.17 \cdot 10^{-3}\,S$	S = AC Apparent Power
	50 µVA; 500 µVA	50 mV / 1 mA / > 1 kHz to 10 kHz	$70 \cdot 10^{-6}\,S$	
		500 mV / 1 mA / 10 Hz to 1 kHz	$0.16 \cdot 10^{-3}\,S$	
	500 µVA; 5 mVA	50 mV / 1 mA / > 1 kHz to 10 kHz	$70 \cdot 10^{-6}\,S$	
		500 mV / 10 mA / 10 Hz to 10 kHz	$55 \cdot 10^{-6}\,S$	
	50 mVA	500 mV / 100 mA / 10 Hz to 10 kHz	$30 \cdot 10^{-6}\,S$	
	500 mVA	5 V / 100 mA / 10 Hz to 10 kHz	$25 \cdot 10^{-6}\,S$	
	5 VA	50 V / 100 mA / 16 Hz to 1 kHz	$25 \cdot 10^{-6}\,S$	
	500 VA	500 V / 1 A / 16 Hz to 1 kHz	$50 \cdot 10^{-6}\,S$	
	5 kVA	500 V / 10 A / 16 Hz to 1 kHz	$65 \cdot 10^{-6}\,S$	
	10 kVA	500 V / 20 A / 16 Hz to 1 kHz	$65 \cdot 10^{-6}\,S$	
	25 kVA	500 V / 50 A / 40 Hz to 850 Hz	$85 \cdot 10^{-6}\,S$	
	40 kVA	500 V / 80 A / 40 Hz to 850 Hz	$85 \cdot 10^{-6}\,S$	
	80 kVA	1000 V / 80 A / 40 Hz to 850 Hz	$85 \cdot 10^{-6}\,S$	
Alternating current Active Power (Ranges) Sources and Measuring Instruments	50 µW to 500 mW	50 mV ≤ U ≤ 5 V 1 mA ≤ I ≤ 100 mA 10 Hz to 10 kHz Phase angle: 0 °	$0.17 \cdot 10^{-3}\,P$	P = AC Active Power
		50 mV ≤ U ≤ 5 V 1 mA ≤ I ≤ 100 mA 10 Hz to 1 kHz Phase angle: 0° to ±30 °	$0.2 \cdot 10^{-3}\,P$	
		50 mV ≤ U ≤ 5 V 1 mA ≤ I ≤ 100 mA 10 Hz to 1 kHz Phase angle: 30 ° to 60 ° Phase angle: -30 ° to -60 °	$0.3 \cdot 10^{-3}\,P$	
		50 mV ≤ U ≤ 5 V 1 mA ≤ I ≤ 100 mA 10 Hz to 1 kHz Phase angle: 60 ° to 75 ° Phase angle: -60 ° to -75 °	$0.6 \cdot 10^{-3}\,P$	
	500 mW to 500 W	5 V ≤ U ≤ 500 V 100 mA ≤ I ≤ 1 A 16 Hz to 1 kHz Phase angle: 0 °	$0.1 \cdot 10^{-3}\,P$	
		5 V ≤ U ≤ 500 V 100 mA ≤ I ≤ 1 A 16 Hz to 1 kHz Phase angle: 0° to ±30 °	$0.1 \cdot 10^{-3}\,P$	
		5 V ≤ U ≤ 500 V 100 mA ≤ I ≤ 1 A 16 Hz to 1 kHz Phase angle: 30 ° to 60 ° Phase angle: -30 ° to -60 °	$0.3 \cdot 10^{-3}\,P$	

[1)] The smallest measurement uncertainties are stated according to DAkkS-DKD-3 (EA-4/02). These are expanded uncertainties with a 95 % level of confidence and, unless otherwise stated, using a coverage factor of k = 2. Uncertainties that appear without units are relative to the measured value unless otherwise stated.

Measurand quantity / Calibration item	Range	Measurement Conditions/ Procedure	Smallest Measurement Uncertainty [1)]	Remarks
Alternating current Active Power (Ranges) Sources and Measuring Instruments	500 mW to 500 W	5 V ≤ *U* ≤ 500 V 100 mA ≤ *I* ≤ 1 A 16 Hz to 1 kHz Phase angle: 60 ° to 75 ° Phase angle: -60 ° to -75 °	$0.6 \cdot 10^{-3}\,P$	P = AC Active Power
	500 W to 10 kW	25 V ≤ *U* ≤ 500 V 1 A ≤ *I* ≤ 20 A 16 Hz to 1 kHz Phase angle: 0 °	$0.1 \cdot 10^{-3}\,P$	
		25 V ≤ *U* ≤ 500 V 1 A ≤ *I* ≤ 20 A 16 Hz to 1 kHz Phase angle: 0° to ±30 °	$0.15 \cdot 10^{-3}\,P$	
		25 V ≤ *U* ≤ 500 V 1 A ≤ *I* ≤ 20 A 16 Hz to 1 kHz Phase angle: 30 ° to 60 ° Phase angle: -30 ° to -60 °	$0.35 \cdot 10^{-3}\,P$	
	500 W to 10 kW	25 V ≤ *U* ≤ 500 V 1 A ≤ *I* ≤ 20 A 16 Hz to 1 kHz Phase angle: 60 ° to 75 ° Phase angle: -60 ° to -75 °	$0.75 \cdot 10^{-3}\,P$	
	10 kW to 80 kW	500 V ≤ *U* ≤ 1000 V 20 A ≤ *I* ≤ 80 A 40 Hz to 850 Hz Phase angle: 0 °	$85 \cdot 10^{-6}\,P$	
		500 V ≤ *U* ≤ 1000 V 20 A ≤ *I* ≤ 80 A 40 Hz to 850 Hz Phase angle: 0° to ±30 °	$0.25 \cdot 10^{-3}\,P$	
		500 V ≤ *U* ≤ 1000 V 20 A ≤ *I* ≤ 80 A 40 Hz to 850 Hz Phase angle: 30 ° to 60 ° Phase angle: -30 ° to -60 °	$0.65 \cdot 10^{-3}\,P$	
		500 V ≤ *U* ≤ 1000 V 20 A ≤ *I* ≤ 80 A 40 Hz to 850 Hz Phase angle: 60 ° to 75 ° Phase angle: -60 ° to -75 °	$1.5 \cdot 10^{-3}\,P$	

[1)] The smallest measurement uncertainties are stated according to DAkkS-DKD-3 (EA-4/02). These are expanded uncertainties with a 95 % level of confidence and, unless otherwise stated, using a coverage factor of k = 2. Uncertainties that appear without units are relative to the measured value unless otherwise stated.

Measurand quantity / Calibration item	Range	Measurement Conditions/ Procedure	Smallest Measurement Uncertainty [1)]	Remarks
Alternating current Reactive Power (Ranges) Sources and Measuring Instruments	50 µvar to 500 mvar	50 mV ≤ *U* ≤ 5 V 1 mA ≤ *I* ≤ 100 mA 10 Hz to 1 kHz Phase angle: ±90 °	$0.17 \cdot 10^{-3}\,Q$	*Q* = AC Reactive Power
		50 mV ≤ *U* ≤ 5 V 1 mA ≤ *I* ≤ 100 mA 10 Hz to 1 kHz Phase angle: 90 ° to 60 ° Phase angle: -90 ° to -60 °	$0.2 \cdot 10^{-3}\,Q$	
		50 mV ≤ *U* ≤ 5 V 1 mA ≤ *I* ≤ 100 mA 10 Hz to 1 kHz Phase angle: 60 ° to 30 ° Phase angle: -60 ° to -30 °	$0.3 \cdot 10^{-3}\,Q$	
		50 mV ≤ *U* ≤ 5 V 1 mA ≤ *I* ≤ 100 mA 10 Hz to 1 kHz Phase angle: 30 ° to 15 ° Phase angle: -30 ° to -15 °	$0.6 \cdot 10^{-3}\,Q$	
		5 V ≤ *U* ≤ 500 V 100 mA ≤ *I* ≤ 1 A 16 Hz to 1 kHz Phase angle: 90 °	$0.1 \cdot 10^{-3}\,Q$	
	500 mvar to 500 var	5 V ≤ *U* ≤ 500 V 100 mA ≤ *I* ≤ 1 A 16 Hz to 1 kHz Phase angle: 90 ° to 60 ° Phase angle: -90 ° to -60 °	$0.1 \cdot 10^{-3}\,Q$	
		5 V ≤ *U* ≤ 500 V 100 mA ≤ *I* ≤ 1 A 16 Hz to 1 kHz Phase angle: 60 ° to 30 ° Phase angle: -60 ° to -30 °	$0.3 \cdot 10^{-3}\,Q$	
		5 V ≤ *U* ≤ 500 V 100 mA ≤ *I* ≤ 1 A 16 Hz to 1 kHz Phase angle: 30 ° to 15 ° Phase angle: -30 ° to -15 °	$0.6 \cdot 10^{-3}\,Q$	
	500 var to 10 kvar	25 V ≤ *U* ≤ 500 V 1 A ≤ *I* ≤ 20 A 16 Hz to 1 kHz Phase angle:± 90 °	$0.1 \cdot 10^{-3}\,Q$	
		25 V ≤ *U* ≤ 500 V 1 A ≤ *I* ≤ 20 A 16 Hz to 1 kHz Phase angle: 90 ° to 60 ° Phase angle: -90 ° to -60 °	$0.15 \cdot 10^{-3}\,Q$	

[1)] The smallest measurement uncertainties are stated according to DAkkS-DKD-3 (EA-4/02). These are expanded uncertainties with a 95 % level of confidence and, unless otherwise stated, using a coverage factor of k = 2. Uncertainties that appear without units are relative to the measured value unless otherwise stated.

Measurand quantity / Calibration item	Range	Measurement Conditions/ Procedure	Smallest Measurement Uncertainty [1)]	Remarks
Alternating current Reactive Power (Ranges) Sources and Measuring Instruments	500 var to 10 kvar	25 V ≤ *U* ≤ 500 V 1 A ≤ *I* ≤ 20 A 16 Hz to 1 kHz Phase angle: 60 ° to 30 ° Phase angle: -60 ° to -30 °	$0.35 \cdot 10^{-3}\,Q$	*Q* = AC Reactive Power
		25 V ≤ *U* ≤ 500 V 1 A ≤ *I* ≤ 20 A 16 Hz to 1 kHz Phase angle: 30 ° to 15 ° Phase angle: -30 ° to -15 °	$0.75 \cdot 10^{-3}\,Q$	
	10 kvar to 80 kvar	500 V ≤ *U* ≤ 1000 V 20 A ≤ *I* ≤ 80 A 40 Hz to 850 Hz Phase angle:± 90 °	$85 \cdot 10^{-6}\,Q$	
		500 V ≤ *U* ≤ 1000 V 20 A ≤ *I* ≤ 80 A 40 Hz to 850 Hz Phase angle: 90 ° to 60 ° Phase angle: -90 ° to -60 °	$0.25 \cdot 10^{-3}\,Q$	
		500 V ≤ *U* ≤ 1000 V 20 A ≤ *I* ≤ 80 A 40 Hz to 850 Hz Phase angle: 60 ° to 30 ° Phase angle: -60 ° to -30 °	$0.65 \cdot 10^{-3}\,Q$	
		500 V ≤ *U* ≤ 1000 V 20 A ≤ *I* ≤ 80 A 40 Hz to 850 Hz Phase angle: 30 ° to 15 ° Phase angle: -30 ° to -15 °	$1.5 \cdot 10^{-3}\,Q$	
Alternating current Apparent Power(Ranges) Sources and Measuring Instruments	50 µVA to 500 µVA	50 mV ≤ *U* ≤ 500 mV *I* = 1 mA 10 Hz to 10 kHz	$0.17 \cdot 10^{-3}\,S$	*S* = AC-Apparent Power
	500 µVA to 5 mVA	*U* = 500 mV 1 mA ≤ *I* ≤ 10 mA 10 Hz to 10 kHz	$0.16 \cdot 10^{-3}\,S$	
	5 mVA to 50 mVA	*U* = 500 mV 10 mA ≤ *I* ≤ 100 mA 10 Hz to 10 kHz	$55 \cdot 10^{-6}\,S$	
	50 mVA to 500 mVA	500 mV ≤ *U* ≤ 5 V *I* = 100 mA 10 Hz to 10 kHz	$30 \cdot 10^{-6}\,S$	

[1)] The smallest measurement uncertainties are stated according to DAkkS-DKD-3 (EA-4/02). These are expanded uncertainties with a 95 % level of confidence and, unless otherwise stated, using a coverage factor of k = 2. Uncertainties that appear without units are relative to the measured value unless otherwise stated.

Measurand quantity / Calibration item	Range	Measurement Conditions/ Procedure	Smallest Measurement Uncertainty [1)]	Remarks
Alternating Current Apparent power (Ranges) Sources and Measuring Instruments	500 mVA to 5 VA	5 V ≤ *U* ≤ 50 V *I* = 100 mA 16 Hz to 10 kHz	$25 \cdot 10^{-6}\, S$	*S* = AC-Apparent Power
	5 VA to 500 VA	50 V ≤ *U* ≤ 500 V 100 mA ≤ *I* ≤ 1 A 16 Hz to 10 kHz	$50 \cdot 10^{-6}\, S$	
	500 VA to 5 kVA	*U* = 500 V 1 A ≤ *I* ≤ 10 A 16 Hz to 5 kHz	$60 \cdot 10^{-6}\, S$	
	5 kVA to 10 kVA	*U* = 500 V 1 A ≤ *I* ≤ 20 A 16 Hz to 5 kHz	$60 \cdot 10^{-6}\, S$	
	10 kVA to 80 kVA	500 V ≤ *U* ≤ 1000 V 20 A ≤ *I* ≤ 80 A 40 Hz to 850 Hz	$85 \cdot 10^{-6}\, S$	
Inductance Measuring Instruments Source Decade Standards	100 µH	1 kHz; 10kHz	$0.3 \cdot 10^{-3}$	
	1 mH	1 kHz; 10kHz	$65 \cdot 10^{-6}$	
	10 mH	1 kHz; 10kHz	$55 \cdot 10^{-6}$ $0.16 \cdot 10^{-3}$	
	100 mH	1 kHz; 10kHz	$65 \cdot 10^{-6}$ $0.21 \cdot 10^{-3}$	
	1 H	100 Hz; 1 kHz	$0.1 \cdot 10^{-3}$ $70 \cdot 10^{-6}$	
	10 H	100 Hz; 1 kHz	$0.5 \cdot 10^{-3}$ $0.2 \cdot 10^{-3}$	
Inductance Measuring Instruments Source	0.1 mH bis 1 mH >1 mH bis 10 mH >10 mH bis 100 mH >0.1 H bis 1 H > 1 H bis 10 H	1 kHz bis 10 kHz 1 kHz bis 10 kHz 1 kHz bis 10 kHz 1 kHz 100 Hz bis 10 kHz	$5.5 \cdot 10^{-3}$ $1.5 \cdot 10^{-3}$ $0.4 \cdot 10^{-3}$ $0.4 \cdot 10^{-3}$ $1.5 \cdot 10^{-3}$	

[1)] The smallest measurement uncertainties are stated according to DAkkS-DKD-3 (EA-4/02). These are expanded uncertainties with a 95 % level of confidence and, unless otherwise stated, using a coverage factor of k = 2. Uncertainties that appear without units are relative to the measured value unless otherwise stated.

Measurand quantity / Calibration item	Range	Measurement Conditions/ Procedure	Smallest Measurement Uncertainty [1)]	Remarks
Capacitance Measuring Instruments Decade Standards	1 pF	50 Hz	$6 \cdot 10^{-3}$	
		100 Hz	$2.5 \cdot 10^{-3}$	
		1 kHz	$0.3 \cdot 10^{-3}$	
		10 kHz	$0.2 \cdot 10^{-3}$	
		100 kHz; 400 kHz; 1 MHz	$3.5 \cdot 10^{-3}$	
	10 pF	50 Hz	$0.6 \cdot 10^{-3}$	
		100 Hz	$0.4 \cdot 10^{-3}$	
		1 kHz	$35 \cdot 10^{-6}$	
		10 kHz	$40 \cdot 10^{-6}$	
		100 kHz; 400 kHz	$50 \cdot 10^{-6}$	
		1 MHz	$85 \cdot 10^{-6}$	
	100 pF	50 Hz	$80 \cdot 10^{-6}$	
		100 Hz	$40 \cdot 10^{-6}$	
		1 kHz; 10 kHz	$20 \cdot 10^{-6}$	
		100 kHz	$35 \cdot 10^{-6}$	
		400 kHz	$65 \cdot 10^{-6}$	
		1 MHz	$0.35 \cdot 10^{-3}$	
	1 nF	50 Hz	$25 \cdot 10^{-6}$	
		100 Hz	$15 \cdot 10^{-6}$	
		1 kHz	$10 \cdot 10^{-6}$	
		10 kHz	$20 \cdot 10^{-6}$	
		100 kHz	$55 \cdot 10^{-6}$	

[1)] The smallest measurement uncertainties are stated according to DAkkS-DKD-3 (EA-4/02). These are expanded uncertainties with a 95 % level of confidence and, unless otherwise stated, using a coverage factor of k = 2. Uncertainties that appear without units are relative to the measured value unless otherwise stated.

Measurand quantity / Calibration item	Range	Measurement Conditions/ Procedure	Smallest Measurement Uncertainty [1)]	Remarks
Capacitance Measuring Instruments Decade Standards	1 nF	400 kHz	$0.45 \cdot 10^{-3}$	
		1 MHz	$3 \cdot 10^{-3}$	
	10 nF	50 Hz; 1 kHz	$25 \cdot 10^{-6}$	
		100 Hz; 10 kHz	$35 \cdot 10^{-6}$	
	100 nF	50 Hz; 10 kHz	$35 \cdot 10^{-6}$	
		100 Hz	$55 \cdot 10^{-6}$	
		1 kHz	$25 \cdot 10^{-6}$	
	1 µF	50 Hz	$40 \cdot 10^{-6}$	
		100 Hz	$70 \cdot 10^{-6}$	
		1 kHz	$35 \cdot 10^{-6}$	
		10 kHz	$55 \cdot 10^{-6}$	
	10 µF	50 Hz; 100 Hz; 1 kHz	$0.2 \cdot 10^{-3}$	
		10 kHz	$0.4 \cdot 10^{-3}$	
Capacitance Sources, Measuring Instruments, Standards	10 pF to 100 pF	50 Hz to 1 kHz	$2.3 \cdot 10^{-6} C + 0.016$ pF	C- measured value
		> 1 kHz to 10 kHz	$2.7 \cdot 10^{-6} C + 0.009$ pF	
		> 10 kHz to 100 kHz	$10 \cdot 10^{-6} C + 0.010$ pF	
		> 100 kHz to 400 kHz	$18 \cdot 10^{-6} C + 0.010$ pF	
		> 400 kHz to 1 MHz	$0.29 \cdot 10^{-3} C + 0.019$ pF	
	> 100 pF to 1 nF	50 Hz to 1 kHz	$2.2 \cdot 10^{-6} C + 0.11$ pF	
		> 1 kHz to 100 kHz	$3.1 \cdot 10^{-6} C + 0.12$ pF	
		> 100 kHz to 400 kHz	$0.42 \cdot 10^{-3} C + 0.11$ pF	
		> 400 kHz to 1 MHz	$3.1 \cdot 10^{-3} C + 0.46$ pF	
	> 1 nF to 10 nF	50 Hz to 1 kHz	$2.5 \cdot 10^{-6} C + 2.0$ pF	
		> 1 kHz to 10 kHz	$2.3 \cdot 10^{-6} C + 2.2$ pF	
	> 10 nF to 100 nF	50 Hz to 1 kHz	$4.7 \cdot 10^{-6} C + 24$ pF	
		> 1 kHz to 10 kHz	$3.2 \cdot 10^{-6} C + 16$ pF	
	> 100 nF to 1 µF	50 Hz to 100 Hz	$2.9 \cdot 10^{-6} C + 0.31$ nF	
		> 100 Hz to 1 kHz	$9.5 \cdot 10^{-6} C + 0.17$ nF	
		> 1 kHz to 10 kHz	$9.7 \cdot 10^{-6} C + 0.09$ nF	
	>1 µF bis 10 µF	50 Hz bis 100 Hz	$1.9 \cdot 10^{-4} C + 0.0001$ µF	
		>100 Hz bis 1 kHz	$1.1 \cdot 10^{-4} C + 0.0013$ µF	
		>1kHz bis 10 kHz	$2.1 \cdot 10^{-4} C + 0.0032$ µF	

[1)] The smallest measurement uncertainties are stated according to DAkkS-DKD-3 (EA-4/02). These are expanded uncertainties with a 95 % level of confidence and, unless otherwise stated, using a coverage factor of k = 2. Uncertainties that appear without units are relative to the measured value unless otherwise stated.

Measurand quantity / Calibration item	Range	Measurement Conditions/ Procedure	Smallest Measurement Uncertainty [1)]	Remarks
Capacitance Measuring Instruments	190 pF bis < 400pF	10 Hz bis 10 kHz	$4 \cdot 10^{-3}\, C + 8$ pF	With 5520 A / 5522 A
	400 pF bis < 1.1 nF	10 Hz bis 10 kHz	$4.5 \cdot 10^{-3}\, C + 8$ pF	
	1.1 nF bis < 3.3 nF	10 Hz bis 3 kHz	$4 \cdot 10^{-3}\, C + 8$ pF	
	3.3 nF bis < 11 nF	10 Hz bis 1 kHz	$2.5 \cdot 10^{-3}\, C + 8$ pF	
	11 nF bis < 33 nF	10 Hz bis 1 kHz	$2.5 \cdot 10^{-3}\, C + 8$ pF	
	33 nF bis < 110 nF	10 Hz bis 1 kHz	$2.5 \cdot 10^{-3}\, C + 8$ pF	
	110 nF bis < 330 nF	10 Hz bis 1 kHz	$4.5 \cdot 10^{-3}\, C$	
	330 nF bis < 1.1 µF	10 Hz bis 600 Hz	$4.5 \cdot 10^{-3}\, C$	
	1.1 µF bis < 3.3 µF	10 Hz bis 300 Hz	$4.5 \cdot 10^{-3}\, C$	
	3.3 µF bis < 11 µF	10 Hz bis 150 Hz	$4.5 \cdot 10^{-3}\, C$	
	11 µF bis < 33 µF	10 Hz bis 120 Hz	$6 \cdot 10^{-3}\, C$	
	33 µF bis < 110 µF	10 Hz bis 80 Hz	$6.5 \cdot 10^{-3}\, C$	
	110 µF bis < 330 µF	DC bis 50 Hz	$6 \cdot 10^{-3}\, C$	
	330 µF bis < 1.1 mF	DC bis 20 Hz	$6 \cdot 10^{-3}\, C$	
	1.1 mF bis < 3.3 mF	DC bis 6 Hz	$6 \cdot 10^{-3}\, C$	
	3.3 mF bis < 11 mF	DC bis 2Hz	$6 \cdot 10^{-3}\, C$	
	11 mF bis < 33mF	DC bis 0.6 Hz	$8.5 \cdot 10^{-3}\, C$	
	33 mF bis < 110 mF	DC bis 0.2 Hz	$11 \cdot 10^{-3}\, C$	
DC-Capacitance Sources. Measuring Instruments, Standards	1 µF to 70 µF	DC method	$2.6 \cdot 10^{-3}$	
	> 70 µF to 200 µF		$5.5 \cdot 10^{-4}$	
	> 200 µF to 110 mF		$3.0 \cdot 10^{-4}$	

[1)] The smallest measurement uncertainties are stated according to DAkkS-DKD-3 (EA-4/02). These are expanded uncertainties with a 95 % level of confidence and, unless otherwise stated, using a coverage factor of k = 2. Uncertainties that appear without units are relative to the measured value unless otherwise stated.

Measurand quantity / Calibration item	Range	Measurement Conditions/ Procedure	Smallest Measurement Uncertainty [1)]	Remarks
Voltage Ratio	± 2 mV/V	Bridge Voltage: 5 V Measuring Frequency 225 Hz Measuring Frequency 600 Hz Measuring Frequency 4.8 kHz	 0.04 µV/V 0.05 µV/V 1.0 µV/V	Calibration of 350 Ω Bridge Standards and associated indicators at discrete points in steps of 10 %.
	± 2 mV/V	Bridge Voltage: 2.5 V Measuring Frequency 225 Hz Measuring Frequency 600 Hz Measuring Frequency 4.8 kHz	 0.5 µV/V 0.5 µV/V 1.0 µV/V	
	± 5 mV/V	Bridge Voltage: 5 V Measuring Frequency 225 Hz Measuring Frequency 4.8 kHz	 0.15 µV/V 1.0 µV/V	
	± 10 mV/V	Bridge Voltage: 5 V Measuring Frequency 225 Hz Measuring Frequency 4.8 kHz	 0.10 µV/V 0.3 µV/V	
	± 5 mV/V	Bridge Voltage: 2.5 V Measuring Frequency 225 Hz Measuring Frequency 600 Hz Measuring Frequency 4.8 kHz	 0.1 µV/V 0.1 µV/V 0.1 µV/V	
	± 10 mV/V	Bridge Voltage: 2.5 V Measuring Frequency 225 Hz Measuring Frequency 600 Hz Measuring Frequency 4.8kHz	 0.4 µV/V 0.4 µV/V 0.4 µV/V	
	± 10 mV/V	Bridge Voltage: 1 V Measuring Frequency 600 Hz	 0.4 µV/V	
	± 20 mV/V	Bridge Voltage: 1 V Measuring Frequency: 4.8 kHz	 0.6 µV/V	
	± 100 mV/V	Bridge Voltage: 1 V Measuring Frequency: 4.8 kHz	 5 µV/V	
	± 100 mV/V	Bridge Voltage: 2.5 V Measuring Frequency: 4.8 kHz	 5 µV/V	

[1)] The smallest measurement uncertainties are stated according to DAkkS-DKD-3 (EA-4/02). These are expanded uncertainties with a 95 % level of confidence and, unless otherwise stated, using a coverage factor of k = 2. Uncertainties that appear without units are relative to the measured value unless otherwise stated.

Measurand quantity / Calibration item	Range	Measurement Conditions/ Procedure	Smallest Measurement Uncertainty [1)]	Remarks
Voltage Ratio DC voltage Bridge standard	0 mV/V -2 mV/V bis +2 mV/V -5 mV/V bis +5 mV/V -10 mV/V bis +10 mV/V -20 mV/V bis +20 mV/V -100 mV/V bis +100 mV/V	DC voltage Bridge Voltage: 0.5 V	0.40 µV/V 0.35 µV/V 0.35 µV/V 0.35 µV/V 0.35 µV/V 0.35 µV/V	Calibration of 350 Ω Bridge Standards and associated indicators at discrete points in steps of 10 %.
	0 mV/V -2 mV/V bis +2 mV/V -5 mV/V bis +5 mV/V -10 mV/V bis +10 mV/V -20 mV/V bis +20 mV/V -100 mV/V bis +100 mV/V	DC voltage Bridge Voltage: 1.0 V	0.20 µV/V 0.15 µV/V 0.15 µV/V 0.15 µV/V 0.15 µV/V 0.25 µV/V	
	0 mV/V -2 mV/V bis +2 mV/V -5 mV/V bis +5 mV/V -10 mV/V bis +10 mV/V -20 mV/V bis +20 mV/V -100 mV/V bis +100 mV/V	DC voltage Bridge Voltage: 2.5 V	0.10 µV/V 0.07 µV/V 0.07 µV/V 0.07 µV/V 0.07 µV/V 0.20 µV/V	
	0 mV/V -2 mV/V bis +2 mV/V -5 mV/V bis +5 mV/V -10 mV/V bis +10 mV/V -20 mV/V bis +20 mV/V -100 mV/V bis +100 mV/V	DC voltage Bridge Voltage: 5.0 V	0.04 µV/V 0.035 µV/V 0.035 µV/V 0.035 µV/V 0.045 µV/V 0.15 µV/V	
	0 mV/V -2 mV/V bis +2 mV/V -5 mV/V bis +5 mV/V -10 mV/V bis +10 mV/V -20 mV/V bis +20 mV/V -100 mV/V bis +100 mV/V	DC voltage Bridge Voltage: 7.5 V	0.025 µV/V 0.025 µV/V 0.025 µV/V 0.025 µV/V 0.04 µV/V 0.15 µV/V	
	0 mV/V -2 mV/V bis +2 mV/V -5 mV/V bis +5 mV/V -10 mV/V bis +10 mV/V -20 mV/V bis +20 mV/V -100 mV/V bis +100 mV/V	DC voltage Bridge Voltage: 10 V	0.02 µV/V 0.015 µV/V 0.020 µV/V 0.025 µV/V 0.035 µV/V 0.075 µV/V	

[1)] The smallest measurement uncertainties are stated according to DAkkS-DKD-3 (EA-4/02). These are expanded uncertainties with a 95 % level of confidence and, unless otherwise stated, using a coverage factor of k = 2. Uncertainties that appear without units are relative to the measured value unless otherwise stated.

Measurand quantity / Calibration item	Range	Measurement Conditions/ Procedure	Smallest Measurement Uncertainty [1)]	Remarks
Voltage Ratio DC voltage Bridge, measuring instruments, measuring amplifier	-2 mV/V bis +2 mV/V -5 mV/V bis +5 mV/V -10 mV/V bis +10 mV/V -20 mV/V bis +20 mV/V -100 mV/V bis +100 mV/V	DC voltage Bridge Voltage: 0.5 V	0.35 µV/V 0.35 µV/V 0.40 µV/V 0.55 µV/V 2.5 µV/V	With K 148
	-2 mV/V bis +2 mV/V -5 mV/V bis +5 mV/V -10 mV/V bis +10 mV/V -20 mV/V bis +20 mV/V -100 mV/V bis +100 mV/V	DC voltage Bridge Voltage: 1 V	0.20 µV/V 0.20 µV/V 0.30 µV/V 0.50 µV/V 2.5 µV/V	
	-2 mV/V bis +2 mV/V -5 mV/V bis +5 mV/V -10 mV/V bis +10 mV/V -20 mV/V bis +20 mV/V -100 mV/V bis +100 mV/V	DC voltage Bridge Voltage: 2.5 V; 5 V; 7.5 V; 10 V	0.10 µV/V 0.15 µV/V 0.25 µV/V 0.45 µV/V 2.5 µV/V	
Frequency	10 MHz	Measurement Time > 30 min	$1 \cdot 10^{-11} f$	f = measured frequency
Frequency Measurement	1 mHz to 46 GHz	Measurement Time > 5 min	$\sqrt{(1 \cdot 10^{-10} \cdot f)^2 + U_{Tf}^2}$	At lower frequencies trigger uncertainty U_{Tf} and U_{Tt}, must be considered
Frequency Synthesis	1 mHz to 50 GHz		$1 \cdot 10^{-10} f$	
Time Intervall	1 ns to 1000 s		$\sqrt{(1 \cdot 10^{-10} \cdot t)^2 + U_{Tt}^2 + 1\text{ns}^2}$	
Rotational Speed optical	1 min^{-1} to $2 \cdot 10^5$ min^{-1}	with Strobe Light	$6 \cdot 10^{-6}$ but not smaller than 0.001 min^{-1}	
mechanical	1 min^{-1} to 10000 min^{-1}		$4 \cdot 10^{-4}$ but not smaller than 0.01 min^{-1}	

[1)] The smallest measurement uncertainties are stated according to DAkkS-DKD-3 (EA-4/02). These are expanded uncertainties with a 95 % level of confidence and, unless otherwise stated, using a coverage factor of k = 2. Uncertainties that appear without units are relative to the measured value unless otherwise stated.

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Measurand quantity / Calibration item	Range	Measurement Conditions/Procedure	Smallest Measurement Uncertainty [1]	Remarks
HF-Impedance (Reflection Coefficient) Magnitude $\|\Gamma\|$ One and Two-Port Measurements	≤ 0.1	45 MHz to 2 GHz	0.006	PC-7 Connector; 50 Ω [2]
	> 0.1 to 0.2		0.007	
	>0.2 to 0.4		0.01	
	>0.4 to 0.6		0.013	
	>0.6 to 0.8		0.018	
	>0.8 to 1.0		0.023	
	≤ 0.1	> 2 GHz to 18 GHz	0.006	
	>0.1 to 0.2		0.008	
	>0.2 to 0.4		0.012	
	>0.4 to 0.6		0.017	
	>0.6 to 0.8		0.023	
	>0.8 to 1.0		0.031	
	≤ 0.1	9 kHz to 45 MHz	0.007	N Connector; 50 Ω [2]
	>0.1 to 0.2		0.007	
	>0.2 to 0.4		0.01	
	>0.4 to 0.6		0.013	
	>0.6 to 0.8		0.018	
	>0.8 to 1.0		0.023	
	≤ 0.1	> 45 MHz to 2 GHz	0.006	
	>0.1 to 0.2		0.007	
	>0.2 to 0.4		0.01	
	>0.4 to 0.6		0.013	
	>0.6 to 0.8		0.018	
	>0.8 to 1.0		0.023	
	≤ 0.1	> 2 GHz to 18 GHz	0.006	
	>0.1 to 0.2		0.008	
	>0.2 to 0.4		0.012	
	>0.4 to 0.6		0.017	
	>0.6 to 0.8		0.023	
	>0.8 to 1.0		0.031	

[2] The measurement uncertainties increase with other connectors. The measurement uncertainty is given in units of magnitude of the reflection coefficient.

[1] The smallest measurement uncertainties are stated according to DAkkS-DKD-3 (EA-4/02). These are expanded uncertainties with a 95 % level of confidence and, unless otherwise stated, using a coverage factor of k = 2. Uncertainties that appear without units are relative to the measured value unless otherwise stated.

Measurand quantity / Calibration item	Range	Measurement Conditions/Procedure	Smallest Measurement Uncertainty [1]	Remarks
HF-Impedance (Reflection Coefficient) Magnitude $\|\Gamma\|$ One and Two-Port Measurements	≤ 0.1	45 MHz to 2 GHz	0.006	PC-3.5 Connector; 50 Ω The measurement uncertainties increases with other connectors. The measurement uncertainty is given in units of magnitude of the reflection coefficient.
	>0.1 to 0.2		0.007	
	>0.2 to 0.4		0.01	
	>0.4 to 0.6		0.013	
	>0.6 to 0.8		0.018	
	>0.8 to 1.0		0.023	
	≤ 0.1	> 2 GHz to 18 GHz	0.006	
	>0.1 to 0.2		0.008	
	>0.2 to 0.4		0.012	
	>0.4 to 0.6		0.017	
	>0.6 to 0.8		0.023	
	>0.8 to 1.0		0.031	
	≤ 0.1	> 18 GHz to 26.5 GHz	0.008	
	>0.1 to 0.2		0.011	
	>0.2 to 0.4		0.015	
	>0.4 to 0.6		0.022	
	>0.6 to 0.8		0.029	
	>0.8 to 1.0		0.039	
HF-Impedance (Reflection Coefficient) One and two-Port Devices $\|S_{21}\|.\|S_{12}\| \leq$ -10 dB Magnitude $\|\Gamma\|$	≤ 0.1	45 MHz to 2 GHz	0.008	Type N Connector; PC-3.5 Connector; PC-7 Connector; 50 Ω The measurement uncertainties increases with other connectors. The measurement uncertainty is given in units of magnitude of the reflection coefficient.
	>0.1 to 0.2		0.008	
	>0.2 to 0.4		0.011	
	>0.4 to 0.6		0.015	
	>0.6 to 0.8		0.019	
	>0.8 to 1.0		0.025	
	≤ 0.1	> 2 GHz to 18 GHz	0.008	
	>0.1 to 0.2		0.009	
	>0.2 to 0.4		0.013	
	>0.4 to 0.6		0.018	
	>0.6 to 0.8		0.025	
	>0.8 to 1.0		0.032	
	≤ 0.1	9 kHz to 45 MHz	0.007	Type N Connector; 50 Ω The measurement uncertainties increases with other connectors. The measurement uncertainty is given in units of magnitude of the reflection coefficient.
	>0.1 to 0.2		0.007	
	>0.2 to 0.4		0.01	
	>0.4 to 0.6		0.014	
	>0.6 to 0.8		0.019	
	>0.8 to 1.0		0.024	
HF-Impedance (Reflection Coefficient)				PC-3.5 Connector; 50 Ω [2]

[1] The smallest measurement uncertainties are stated according to DAkkS-DKD-3 (EA-4/02). These are expanded uncertainties with a 95 % level of confidence and, unless otherwise stated, using a coverage factor of k = 2. Uncertainties that appear without units are relative to the measured value unless otherwise stated.

Measurand quantity / Calibration item	Range	Measurement Conditions/Procedure	Smallest Measurement Uncertainty [1)]	Remarks
One and two-Port Devices $\|S_{21}\|.\|S_{12}\| \leq$ -10 dB Magnitude $\|\Gamma\|$	≤ 0.1	> 18 GHz to 26.5 GHz	0.011	
	>0.1 to 0.2		0.013	
	>0.2 to 0.4		0.018	
	>0.4 to 0.6		0.024	
	>0.6 to 0.8		0.031	
	>0.8 to 1.0		0.04	
HF-Impedance (Reflection Coefficient) One and two-Port Devices -3 dB ≥ $\|S_{21}\|.\|S_{12}\|$ > -10 dB Magnitude $\|\Gamma\|$	≤ 0.1	> 45 MHz to 2 GHz	0.01	PC-3.5, PC-7, Type N Connectors; 50 Ω [2)]
	>0.1 to 0.2		0.012	
	>0.2 to 0.4		0.015	
	>0.4 to 0.6		0.019	
	>0.6 to 0.8		0.023	
	>0.8 to 1.0		0.029	
	≤ 0.1	> 2 GHz to 18 GHz	0.014	
	>0.1 to 0.2		0.016	
	>0.2 to 0.4		0.019	
	>0.4 to 0.6		0.025	
	>0.6 to 0.8		0.031	
	>0.8 to 1.0		0.038	
	≤ 0.1	9 kHz to 45 MHz	0.01	Type N Connector; 50 Ω [2)]
	>0.1 to 0.2		0.011	
	>0.2 to 0.4		0.014	
	>0.4 to 0.6		0.018	
	>0.6 to 0.8		0.022	
	>0.8 to 1.0		0.028	
	≤ 0.1	> 18 GHz to 26.5 GHz	0.022	PC-3.5 Connector; 50Ω [2)]
	>0.1 to 0.2		0.023	
	>0.2 to 0.4		0.028	
	>0.4 to 0.6		0.034	
	>0.6 to 0.8		0.041	
	>0.8 to 1.0		0.05	

[2)] The measurement uncertainties increase with other connectors. The measurement uncertainty is given in units of magnitude of the reflection coefficient.

[1)] The smallest measurement uncertainties are stated according to DAkkS-DKD-3 (EA-4/02). These are expanded uncertainties with a 95 % level of confidence and, unless otherwise stated, using a coverage factor of k = 2. Uncertainties that appear without units are relative to the measured value unless otherwise stated.

Measurand quantity / Calibration item	Range	Measurement Conditions/Procedure	Smallest Measurement Uncertainty [1)]	Remarks
HF-Impedance (Reflection Coefficient) One and two-Port Devices 0 dB ≥ |S_{21}|.| S_{12}| > -3 dB Magnitude |Γ|	≤ 0.1	45 MHz to 2 GHz	0.015	PC-3.5, PC-7, Type N Connectors; 50 Ω [2)]
	>0.1 to 0.2		0.016	
	>0.2 to 0.4		0.019	
	>0.4 to 0.6		0.023	
	>0.6 to 0.8		0.028	
	>0.8 to 1.0		0.033	
	≤ 0.1	> 2 GHz to 18 GHz	0.022	
	>0.1 to 0.2		0.023	
	>0.2 to 0.4		0.027	
	>0.4 to 0.6		0.032	
	>0.6 to 0.8		0.04	
	>0.8 to 1.0		0.047	
	≤ 0.1	9 kHz to 45 MHz	0.014	Type N Connector; 50 Ω [2)].
	>0.1 to 0.2		0.015	
	>0.2 to 0.4		0.019	
	>0.4 to 0.6		0.023	
	>0.6 to 0.8		0.027	
	>0.8 to 1.0		0.033	
	≤ 0.1	> 18 GHz to 26.5 GHz	0.035	PC-3.5 Connector; 50 Ω [2)]
	>0.1 to 0.2		0.037	
	>0.2 to 0.4		0.041	
	>0.4 to 0.6		0.046	
	>0.6 to 0.8		0.055	
	>0.8 to 1.0		0.064	

[2)] The measurement uncertainties increase with other connectors. The measurement uncertainty is given in units of magnitude of the reflection coefficient.

[1)] The smallest measurement uncertainties are stated according to DAkkS-DKD-3 (EA-4/02). These are expanded uncertainties with a 95 % level of confidence and, unless otherwise stated, using a coverage factor of k = 2. Uncertainties that appear without units are relative to the measured value unless otherwise stated.

Measurand quantity / Calibration item	Range	Measurement Conditions/Procedure	Smallest Measurement Uncertainty [1)]	Remarks
HF-Impedance (Reflection Coefficient) One and two-Port Devices Phase φ	-180° to +180°	9 kHz to 18 GHz >0.2 to 1	$\arcsin\frac{U(\lvert\Gamma\rvert)}{\lvert\Gamma\rvert}\cdot\frac{180°}{\pi}+K\cdot f$	*Type N Connector* $K\cdot f$ = MU-Contribution of cabling error f = frequency, K = 0.05°/GHz,
		45 MHz to 18 GHz >0.2 to 1		PC-7 Connector. $K\cdot f$ = MU-Contribution of cabling error f = frequency, K = 0.05°/GHz,
		45 MHz to 26.5 GHz >0.2 to 1		PC-3.5 Connector $K\cdot f$ = MU-Contribution of cabling error f = frequency, K = 0.05°/GHz,
HF-Impedance (Reflection Coefficient) One and two-Port Devices $\lvert S_{21}\rvert . \lvert S_{12}\rvert \le$ -3 dB Magnitude $\lvert\Gamma\rvert$	0 to 1	50 MHz to 2 GHz > 2 GHz to 40 GHz > 40 GHz to 50 GHz	0.015 + 0.005 $\lvert\Gamma\rvert^2$ 0.020 + 0.005 $\lvert\Gamma\rvert^2$ 0.025 + 0.005 $\lvert\Gamma\rvert^2$	PC-2.4 Connector; 50 Ω Measurement uncertainty in units of magnitude of the reflection coefficient
Phase φ	-180° to +180°	50 MHz to 50 GHz >0.2 to 1	$\arcsin\frac{U(\lvert\Gamma\rvert)}{\lvert\Gamma\rvert}\cdot\frac{180°}{\pi}+K\cdot f$	PC-2.4 Connector; 50 Ω $K\cdot f$ = MU-Contribution of cabling error f = frequency, K = 0.05°/GHz, Direct connection to the measuring por

[1)] The smallest measurement uncertainties are stated according to DAkkS-DKD-3 (EA-4/02). These are expanded uncertainties with a 95 % level of confidence and, unless otherwise stated, using a coverage factor of k = 2. Uncertainties that appear without units are relative to the measured value unless otherwise stated.

Measurand quantity / Calibration item	Range	Measurement Conditions/Procedure	Smallest Measurement Uncertainty [1)]	Remarks
HF Attenuation Step Attenuator	0 dB to 60 dB	9 kHz to 18 GHz	0.11 dB	Type N Connectors; 50 Ω $\lvert\Gamma\rvert \leq 0{,}1$ [3)]
	> 60 dB to 90 dB		0.12 dB	
Absolute Attenuation values	0 dB to 60 dB	45 MHz to 20 GHz	0.11 dB	PC-3.5 Connector; 50 Ω 45 MHz to 20 GHz: $\lvert\Gamma\rvert \leq 0.1$ > 20 GHz to 26.5 GHz: $\lvert\Gamma\rvert \leq 0.15$
	0 dB to 60 dB	> 20 GHz to 26.5 GHz	0.19 dB	
	> 60 dB to 90 dB	45 MHz to 20 GHz	0.13 dB	
	> 60 dB to 90 dB	> 20 GHz to 26.5 GHz	0.21 dB	
	0 dB. 10 dB. 20 dB. 30 dB 40 dB. 50 dB. 60 dB	50 MHz to 20 GHz	0.12 dB	PC-2.4 Connector; 50 Ω 50 MHz to 20 GHz: $\lvert\Gamma\rvert \leq 0.1$ > 20 GHz to 40 GHz: $\lvert\Gamma\rvert \leq 0.15$ > 40 GHz to 50 GHz: $\lvert\Gamma\rvert \leq 0.2$
		> 20 GHz to 40 GHz	0.2 dB	
		> 40 GHz to 50 GHz	0.32 dB	
Inkremental Attenuation values	0 dB to 60 dB	9 kHz to 18 GHz	0.16 dB	Type N Connector; 50 Ω. $\lvert\Gamma\rvert \leq 0.1$ [3)]
	> 60 dB to 90 dB		0.17 dB	
	0 dB to 60 dB	45 MHz to 20 GHz	0.16 dB	PC-3.5 Connector; 50 Ω 45 MHz to 20 GHz: $\lvert\Gamma\rvert \leq 0.1$ > 20 GHz to 26.5 GHz: $\lvert\Gamma\rvert \leq 0.15$ [3)]
	0 dB to 60 dB	> 20 GHz to 26.5 GHz	0.27 dB	
	> 60 dB to 90 dB	45 MHz to 20 GHz	0.19 dB	
	> 60 dB to 90 dB	> 20 GHz to 26.5 GHz	0.3 dB	
	0 dB. 10 dB. 20 dB. 30 dB 40 dB. 50 dB. 60 dB	50 MHz to 20 GHz	0.17 dB	PC-2.4 Connector; 50 Ω 50 MHz to 20 GHz: $\lvert\Gamma\rvert \leq 0.1$ > 20 GHz to 40 GHz: $\lvert\Gamma\rvert \leq 0.15$ > 40 GHz to 50 GHz: $\lvert\Gamma\rvert \leq 0.2$ Attenuation in 10 dB steps
		> 20 GHz to 40 GHz	0.29 dB	
		> 40 GHz to 50 GHz	0.45 dB	

[3)] Attenuation in 1 dB and 10 dB steps

[1)] The smallest measurement uncertainties are stated according to DAkkS-DKD-3 (EA-4/02). These are expanded uncertainties with a 95 % level of confidence and, unless otherwise stated, using a coverage factor of k = 2. Uncertainties that appear without units are relative to the measured value unless otherwise stated.

Measurand quantity / Calibration item	Range	Measurement Conditions/Procedure	Smallest Measurement Uncertainty [1)]	Remarks
Power Measuring Instruments	> 1 pW to 0.1 mW	2.5 MHz to 2 GHz	$(0.025 + 0.14 \cdot \lvert r \rvert) \cdot P$	Type N, PC-3.5 Connectors; 50 Ω. $\lvert \Gamma \rvert \leq 0.2$
		> 2 GHz to 18 GHz	$(0.049 + 0.21 \cdot \lvert r \rvert) \cdot P$	N. PC-3.5; 50 Ω. $\lvert \Gamma \rvert \leq 0.2$
		> 18 GHz to 26.5GHz	$(0.071 + 0.32 \cdot \lvert r \rvert) \cdot P$	PC-3.5; 50 Ω. $\lvert \Gamma \rvert \leq 0.2$
Sources	> 1 pW to 0.1 mW	2.5 MHz to 2 GHz	$(0.035 + 0.13 \cdot \lvert r \rvert) \cdot P$	N. PC-3.5; 50 Ω. $\lvert \Gamma \rvert \leq 0.2$
		> 2 GHz to 18 GHz	$(0.053 + 0.2 \cdot \lvert r \rvert) \cdot P$	N. PC-3.5; 50 Ω. $\lvert \Gamma \rvert \leq 0.2$
		> 18 GHz to 26.5 GHz	$(0.074 + 0.31 \cdot \lvert r \rvert) \cdot P$	PC-3.5; 50 Ω. $\lvert \Gamma \rvert \leq 0.2$
Power Sensors	1 mW	0.1 MHz to 50 MHz	$10 \cdot 10^{-3} \cdot P$	Type N Connector. 50 Ω $\lvert \Gamma \rvert \leq 0.3$
		> 50 MHz to 6 GHz	$15 \cdot 10^{-3} \cdot P$	
		> 6 GHz to 18 GHz	$20 \cdot 10^{-3} \cdot P$	
		10 MHz to 1 GHz	$15 \cdot 10^{-3} \cdot$	PC-3.5 Connector; 50 Ω $\lvert \Gamma \rvert \leq 0.3$
		> 1 GHz to 10 GHz	$20 \cdot 10^{-3} \cdot P$	
		> 10 GHz to 18 GHz	$25 \cdot 10^{-3} \cdot P$	
		> 18 GHz to 26.5 GHz	$30 \cdot 10^{-3} \cdot P$	
Sources	0.1 mW to 10 mW	0.1 MHz to 50 MHz	$10 \cdot 10^{-3} \cdot P$	Type N Connector. 50 Ω $\lvert \Gamma \rvert \leq 0.3$
		> 50 MHz to 6 GHz	$15 \cdot 10^{-3} \cdot P$	
		> 6 GHz to 18 GHz	$20 \cdot 10^{-3} \cdot P$	
		10 MHz to 1 GHz	$20 \cdot 10^{-3} \cdot P$	PC-3.5 Connector; 50 Ω $\lvert \Gamma \rvert \leq 0.3$
		> 1 GHz to 10 GHz	$30 \cdot 10^{-3} \cdot P$	
		> 10 GHz to 18 GHz	$40 \cdot 10^{-3} \cdot P$	
		> 18 GHz to 26.5 GHz	$45 \cdot 10^{-3} \cdot P$	
Measuring Instruments	0.1 mW to 10 mW	0.1 MHz to 50 MHz	$6.0 \cdot 10^{-3} \cdot P$	Type N Connector. 50 Ω $\lvert \Gamma \rvert \leq 0.3$
		> 50 MHz to 6 GHz	$12 \cdot 10^{-3} \cdot P$	
		> 6 GHz to 18 GHz	$20 \cdot 10^{-3} \cdot P$	
		10 MHz to 1 GHz	$10 \cdot 10^{-3} \cdot P$	PC-3.5 Connector; 50 Ω $\lvert \Gamma \rvert \leq 0.3$
		> 1 GHz to 10 GHz	$15 \cdot 10^{-3} \cdot P$	
		> 10 GHz to 18 GHz	$20 \cdot 10^{-3} \cdot P$	
		> 18 GHz to 26.5 GHz	$25 \cdot 10^{-3} \cdot P$	

[1)] The smallest measurement uncertainties are stated according to DAkkS-DKD-3 (EA-4/02). These are expanded uncertainties with a 95 % level of confidence and, unless otherwise stated, using a coverage factor of k = 2. Uncertainties that appear without units are relative to the measured value unless otherwise stated.

Measurand quantity / Calibration item	Range	Measurement Conditions/Procedure	Smallest Measurement Uncertainty [1)]	Remarks
Amplitude Modulation Modulation Index *m*	0.1 to ≤ 1	Sine signal f_{HF}: 150 kHz to 2 GHz f_{MOD}: 0.02 kHz to 50 kHz P_{HF} = 0 dBm k < 0.0025 0.0025 ≤ k ≤ 0.01 0.01 < k ≤ 0.02	 -3 · *k* · *m* + 0.1 *k* · *m* + 0.08 2.5 · *k* · *m* + 0.06	f_{HF} *: Carrier frequency* f_{MOD}*:* Modulation frequency P_{HF}*:* Carrier level *k:* Distortion factor Absolute measuring uncertainty
Frequency Modulation Frequency Deviation *Δf*	0.5 kHz to 400 kHz 0.5 kHz to 250 kHz 0.5 kHz to 400 kHz with Phase deviation *ΔΦ:* 2.4048 5.5201	Sine signal f_{HF}*:* 150 kHz to 76 MHz f_{HF}*:* 152 MHz to 302 MHz f_{HF}*:* 303 MHz to 2 GHz f_{MOD}: 0.02 kHz to 200 kHz *k* ≤ 0.02 P_{HF} = 0 dBm *Δf* ≤ 1 kHz 1kHz < *Δf* ≤ 400 kHz	 0.075 kHz (0.87 · *k* + 0.005) · *Δf* + 0.06 kHz	f_{HF} *:* Carrier frequency f_{MOD}*:* Modulation frequency P_{HF}*:* Carrier level *Δf :* Frequency deviation *k:* Distortion factor Absolute measuring uncertainty
Phase Modulation Peak-Phase deviation *ΔΦ* at discrete Measured values	2.4048 to 8.6531 2.4048 2.4048 to 18.0711 2.4048 to 24.3525 Phase deviation *ΔΦ:* 2.4048 5.5201 8.6531 11.7915 14.9309 18.0711 21.2116 24.3525	Sine Signal f_{HF}*:* 150 kHz to 76 MHz f_{HF}*:* 152 MHz to 605 MHz f_{HF}*:* 606 MHz to 1.21 GHz f_{HF}*:* 1.22 GHz to 2 GHz f_{MOD}: 0.02 kHz to 200 kHz *k* ≤ 0.02 P_{HF} = 0 dBm *Δf* ≤ 1 kHz 1 kHz < *Δf* ≤ 400 kHz	 0.05 rad $0.96\frac{\text{rad}}{\text{kHz}} \cdot \Delta f \cdot k + 0.06\,\text{rad}$	Δf*:* Frequency Deviation f_{MOD}*:* Modulation frequency f_{HF} *:* Carrier frequency *k:* Distortion factor Δ<P*:* Phase deviation Δ<P*: Δf* / f_{MOD} Absolute measuring uncertainty
Distortion Factor	> 0.0001 to 0.01 > 0.01 to 0.1 > 0.1 to 0.2	AM-Demodulation method f_{HF}: 150 kHz to 2 GHz f_{MOD} = 1 kHz P_{HF} = 0 dBm	0.09	f_{HF} *:* Carrier frequency f_{MOD}*:* Modulation frequency P_{HF}*:* Carrier level Absolute measuring uncertainty
	> 0.0001 to 0.01 > 0.01 to 0.1 > 0.1 to 0.2	FM- & PM- Demodulations method f_{HF}:150 kHz to 2 GHz f_{MOD} = 1 kHz P_{HF} = 0 dBm *Δf* ≤ 50 kHz		

[1)] The smallest measurement uncertainties are stated according to DAkkS-DKD-3 (EA-4/02). These are expanded uncertainties with a 95 % level of confidence and, unless otherwise stated, using a coverage factor of k = 2. Uncertainties that appear without units are relative to the measured value unless otherwise stated.

Measurand quantity / Calibration item	Range	Measurement Conditions/Procedure	Smallest Measurement Uncertainty [1)]	Remarks
Oscilloscope measurands Calibrator Vertical Deflection	1 mV to 5 V	Square wave voltage: 10 Hz to 10 kHz R_i = 50 Ω	$20 \cdot 10^{-6} + 1\ \mu V$	
	1 mV to 200 V	R_i = 1 MΩ	$20 \cdot 10^{-6} + 1\ \mu V$	
Horizontal Deflection	1 ns to 1 s >1 s to 5 s	Measuring time > 5 min R_i = 1 MΩ. 50 Ω	$\sqrt{(1 \cdot 10^{-10} \cdot t)^2 + U_{Tt}^2}$ $\sqrt{(5 \cdot 10^{-10} \cdot t)^2 + U_{Tt}^2}$	t: Actual Measured value Trigger uncertainty U_{Tt} must be considered
Rise time t_r	18 ps to 100 ps	20 mV to 1 V	8 ps	External trigger source required
	> 100 ps to 10 ms		$4.5 \cdot 10^{-2} \cdot t_r + 3$ ps	
Range *B*	f_c : 50 MHz to 26.5 GHz	0.2 V to 2 V R_i = 50 Ω $\lvert \Gamma_{KALI} \rvert \le 0.02$	10 MHz	f_c : Frequency at -3dB $\lvert \Gamma_{KALI} \rvert$:Range equipment
		$\lvert \Gamma_{KALI} \rvert \le 0.05$	11 MHz	
		$\lvert \Gamma_{KALI} \rvert \le 0.1$	13 MHz	
		$\lvert \Gamma_{KALI} \rvert \le 0.15$	16 MHz	
		$\lvert \Gamma_{KALI} \rvert \le 0.2$	20 MHz	
Oscilloscope Vertical Deflection	1 mV to 5 V	Square wave voltage: 10 Hz to 10 kHz R_i = 50 Ω	0.35 %	R_i : Internal resistance
	1 mV to 120 V	R_i = 1 MΩ	0.35 %	
Horizontal Deflection	50 ps to < 1 µs	< 1 V	6 ps	
	1 µs to 5 s		$1.5 \cdot 10^{-3} \cdot t$	
Rise time t_r	180 ps to 450 ps	250 mV	40 ps	t_r : Actual rising time
	> 450 ps to 10 ms	250 mV to 1 V	$4.5 \cdot 10^{-2} \cdot t_r$	
Range *B*	f_c : 50 MHz to 26.5GHz	0.2 V to 2 V R_i = 50 Ω $\lvert \Gamma_{OSZI} \rvert \le 0.05$	12 MHz	f_c : Frequency at -3dB f_{Ref} = 5% · f_c $\lvert \Gamma_{OSZI} \rvert$: Range Oscilloscope
		$\lvert \Gamma_{OSZI} \rvert \le 0.1$	13 MHz	
		$\lvert \Gamma_{OSZI} \rvert \le 0.15$	14 MHz	
		$\lvert \Gamma_{OSZI} \rvert \le 0.2$	15 MHz	

[1)] The smallest measurement uncertainties are stated according to DAkkS-DKD-3 (EA-4/02). These are expanded uncertainties with a 95 % level of confidence and, unless otherwise stated, using a coverage factor of k = 2. Uncertainties that appear without units are relative to the measured value unless otherwise stated.

Measurand quantity / Calibration item	Range	Measurement Conditions/Procedure	Smallest Measurement Uncertainty [1)]	Remarks
Pulsed measurands Spektral Voltage Amplitude density [*)]	S_0 = 13.5 µVs	CISPR Band A 9 kHz to 0.15 MHz DIN EN 55016-1-1:2015 CISPR 16-1-1:2010	0.30 dB	Pulse rate: 1 Hz to 100 Hz Γ_G and $\Gamma_L \leq 0.05$ G: object L: load
	S_0 =0.316 µVs	CISPR Band B > 0.15 MHz to 30 MHz DIN EN 55016-1-1:2015 CISPR 16-1-1:2010	0.30 dB	Pulse rate: 1 Hz to 1000 Hz Γ_G and $\Gamma_L \leq 0.07$
	S_0 = 0.044 µVs	CISPR Band C > 30 MHz to 300 MHz DIN EN 55016-1-1:2015 CISPR 16-1-1:2010	0.36 dB	Pulse rate: 1 Hz to 1000 Hz Γ_G and $\Gamma_L \leq 0.12$
	S_0 = 0.044 µVs	CISPR Band D > 300 MHz to 1 GHz DIN EN 55016-1-1:2015 CISPR 16-1-1:2010	0.40 dB	Pulse rate: 1 Hz to 1000 Hz Γ_G and $\Gamma_L \leq 0.12$
HF-Current Transformer Tong Transfer Impedance dB(Ω) [*)]	9 kHz to 100 MHz	DIN EN 55016-1-2:2015 4.4 mA	0.3 dB	
	>100 MHz to 400 MHz		0.5 dB	
	>400 MHz to 1 GHz		0.8 dB	
HF Bulk Current Injection Converter pliers Insertion loss dB [*)]	9 kHz to 100 MHz	DIN EN 61000-4-6:2014 4.4 mA	0.3 dB	
	>100 MHz to 400 MHz		0.5 dB	
	> 400 MHz to 1 GHz		0.8 dB	
Burst-Generators Voltage pulse [*)]	100 V to 4400 V	DIN EN 61000-4-4:2012 under load (RL) an R_L = 50 Ω an R_L = 1 kΩ	2.2 %	R_L : Load resistance
Rise time and Pulse width	3 ns to 1 µs		2.5 %	
Burstduration and Burstperiod[)]	100 ns to 1 s		0.25 %	
Surge-Generators Voltage amplitude [*)]	250 V to 7000 V	DIN EN 61000-4-5:2015 with or without coupling- and decoupling network	3.5 %	
Current amplitude	5 A to 5 kA		3.5 %	
Rise time and Pulse width [*)]	400 ns to 1 ms		3.5 %	

[1)] The smallest measurement uncertainties are stated according to DAkkS-DKD-3 (EA-4/02). These are expanded uncertainties with a 95 % level of confidence and, unless otherwise stated, using a coverage factor of k = 2. Uncertainties that appear without units are relative to the measured value unless otherwise stated.

Measurand quantity / Calibration item	Range	Measurement Conditions/Procedure	Smallest Measurement Uncertainty [1)]	Remarks
Electrostatic discharge (ESD) [*)] Currentpulse I_P	1 A to 35 A	DIN EN 61000-4-2:2009	3.0 %	I_P : First discharge Current peak
Stützwerte [*)] Currentpulse I_{30}	1 A to 35 A		3.5 %	I_{30} :Current at 30 ns
Currentpulse I_{60}	1 A to 35 A		3.5 %	I_{60} :Current at 60 ns
Rise time t_r [*)]	0.6 ns to 1 µs		5.0 %	
DC Voltage U_L [*)]	1 kV to 25 kV		0.5 %	

[1)] The smallest measurement uncertainties are stated according to DAkkS-DKD-3 (EA-4/02). These are expanded uncertainties with a 95 % level of confidence and, unless otherwise stated, using a coverage factor of k = 2. Uncertainties that appear without units are relative to the measured value unless otherwise stated.

Permanent Laboratory – Dimensional measurands

Measurand quantity / Calibration item	Range	Measurement Conditions/Procedure	Smallest Measurement Uncertainty [1)]	Remarks
Length [*)] Cylindrical Setting Gauge Ring Gauge Diameter Plug Gauge Diameter	1 mm to 150 mm	DAkkS-R 4-3 Page 4.1:2010. Point 5.3.3., 5.3.4	0.8 µm + 2 · 10^{-6} · *l*	*l = measured length*
Pin Gauge Diameter	1 mm to 150 mm	DAkkS-R 4-3 Page 4.1:2010. Point 5.3.3., 5.3.4	0.8 µm + 2 · 10^{-6} · *l*	
	0.1 mm to 30 mm	DAkkS-DKD-R 4-3 Page 4.2:2010. Point 5.3.3	0.8 µm + 2 · 10^{-6} · *l*	
Length Thread Gauge (Single and Multi-Start Cylindrical Outer and Inner Threads with Straight-Sided Symmetrical Profile) Thread Pin: Simple Pitch Diameter Thread Ring: Simple Pitch Diameter	1.4 mm to 200 mm Nominal Pitch: 0.3 mm to 6 mm	DAkkS-DKD-R 4-3 Page 4.8:2010, Option 1	3 µm + 10 · 10^{-6} · *l*	
	3 mm to 200 mm Nominal Pitch: 0.5 mm to 6 mm	DAkkS-DKD-R 4-3 Page 4.9:2010, Option 1	3 µm + 10 · 10^{-6} · *l*	
Caliper for Outer and Inner Depth Measurements, Depth Gauge Digit and scale display	0 mm to 300 mm	DAkkS-DKD-R 4-3 Page 9.1:2010	9 µm + 11 · 10^{-6} · *l* 10 µm + 10 · 10^{-6} · *l*	Calibration with an automated measuring device *l* = measured length
Micrometer	0 mm to 50 mm	DAkkS-DKD-R 4-3 Page 10.1:2010	1.1 µm + 12 · 10^{-6} · *l*	
Caliper for Outer and Inner Depth Measurements, Depth Gauge	0 mm to 500 mm	DAkkS-DKD-R 4-3 Page 9.1:2010	30 µm + 30 · 10^{-6} · *l*	*l* = measured length
Depth Gauge		DAkkS-DKD-R 4-3 Page 9.2:2010		
Height Gauge		DAkkS-DKD-R 4-3 Page 9.3:2010		
Micrometer	0 mm to 150 mm	DAkkS-DKD-R 4-3 Page 10.1:2010	3 µm + 10 · 10^{-6} · *l*	*l* = measured length
Length 2-Point Internal Micrometers	13 mm to 300 mm	DAkkS-DKD-R 4-3 Page 10.7:2010	3 µm + 10 · 10^{-6} · *l*	
	> 300 mm to 500 mm	DAkkS-DKD-R 4-3 Page 10.7:2010	5 µm + 10 · 10^{-6} · *l*	

[1)] The smallest measurement uncertainties are stated according to DAkkS-DKD-3 (EA-4/02). These are expanded uncertainties with a 95 % level of confidence and, unless otherwise stated, using a coverage factor of k = 2. Uncertainties that appear without units are relative to the measured value unless otherwise stated.

Measurand quantity / Calibration item	Range	Measurement Conditions/Procedure	Smallest Measurement Uncertainty [1)]	Remarks
Length 3-Point Internal Micrometers	3 mm to 150 mm	DAkkS-DKD-R 4-3 Page 10.8:2010	3 µm + 10 · 10^{-6} · d	l= measured length
Dial Gauge	to 100 mm	DAkkS-DKD-R 4-3 Page 11.1:2010	3 µm + 10 · 10^{-6} · l	l = measured length
Precision Pointer	to 3 mm	DAkkS-DKD-R 4-3 Page 11.2:2010	0.6 µm	
Lever Gauges	to 1.6 mm	DAkkS-DKD-R 4-3. Page 11.3:2010	1.0 µm	
Steel Gauge Blocks according to DIN EN ISO 3650	0.5 mm to 150 mm In nominal dimensions of steel standards	DAkkS-DKD-R 4-3: 2010. Page 3.1 Deviation measurement of the middle dimension l_c from the nominal dimension l_n divided by the difference measurement Deviation Measurement of f_o and f_u from the middle dimension by 5-point difference measurement	Middle dimension: 0.08 µm + 0.7 · 10^{-6} · l Deviations f_o and f_u from the middle dimension: 0.07 µm	l = measured length

[1)] The smallest measurement uncertainties are stated according to DAkkS-DKD-3 (EA-4/02). These are expanded uncertainties with a 95 % level of confidence and, unless otherwise stated, using a coverage factor of k = 2. Uncertainties that appear without units are relative to the measured value unless otherwise stated.

Permanente Laboratory – Mechanical measurands

Measurand quantity / Calibration item	Range	Measurement Conditions/Procedure	Smallest Measurement Uncertainty [1)]	Remarks
Acceleration Vibration Sensors Vibration Indicators Vibration Calibrators	0.1 m/s² to 20 m/s²	Sine Excitation Frequencies: 0.2 Hz to < 0.4 Hz	2.5 % / 1.6 °	Complex coefficient of transmission (Magnitude / Phase). Sensor mass to 0.9 kg. displacement to 100 mm
		0.4 Hz to < 1 Hz	1.5 % / 1.6 °	
		1 Hz to < 16 Hz	0.8 % / 0.8 °	
		16 Hz	0.55 % / 0.6 °	
		> 16 Hz to 63 Hz	0.8 % / 0.8 °	
		> 63 Hz to 160 Hz	1.0 % / 1.1 °	
	1 m/s² to 200 m/s²	Sine Excitation Frequencies: 10 Hz to < 20 Hz	1.0 % / 1.5 °	Complex coefficient of transmission (Magnitude / Phase). Sensor mass to 0.9 kg. displacement to 8 mm
		20 Hz to < 80 Hz	0.8 % / 0.8 °	
		80 Hz	0.55 % / 0.6 °	
		> 80 Hz to 1 kHz	0.8 % / 0.8 °	
		> 1 kHz to 5 kHz	1.0 % / 1.1 °	
		> 5 kHz to 9 kHz	2.0 % / 2.1 °	
		> 9 kHz to 10 kHz	3.0 % / 2.1 °	
Negative and positive pressure p_e ***)**	-1 bar to 0.0 bar	DKD-R 6-1:2014	$1 \cdot 10^{-4}\ p_e$ but not smaller than 20 µbar	P_e = Measured value pressure medium: gas
	> 0 mbar to 0.2 bar		0.5 µbar + $0.01 \cdot p_e$	
	> 0.2 mbar to 160 mbar		$2 \cdot 10^{-4}\ p_e$ but not smaller than 1.0 µbar	
	> 0.16 bar to 2 bar		20 µbar + $3 \cdot 10^{-5}\ p_e$	
	> 2 bar to 20 bar		$6 \cdot 10^{-5}\ p_e$	
	> 20 bar to 70 bar		$7 \cdot 10^{-5}\ p_e$	
	0.5 bar to 55 bar		$7 \cdot 10^{-5}\ p_e$ but not smaller than 0.34 mbar	pressure medium: oil
	> 55 bar to 1100 bar		$7 \cdot 10^{-5}\ p_e$ but not smaller than 7.5 mbar	

[1)] The smallest measurement uncertainties are stated according to DAkkS-DKD-3 (EA-4/02). These are expanded uncertainties with a 95 % level of confidence and, unless otherwise stated, using a coverage factor of k = 2. Uncertainties that appear without units are relative to the measured value unless otherwise stated.

Measurand quantity / Calibration item	Range	Measurement Conditions/Procedure	Smallest Measurement Uncertainty [1)]	Remarks
Absolute pressure p_{abs} *)	0.03 bar to 20 bar	DKD-R 6-1:2014	$6 \cdot 10^{-5}\ p_{abs}$ but not smaller than 0.012 mbar	p_{abs} = Measured value pressure medium: gas Consider the measurement uncertainty of the vacuum meter
	> 20 bar to 70 bar		$7 \cdot 10^{-5}\ p_{abs}$	
	1 bar to 56 bar		$7 \cdot 10^{-5}\ p_{abs}$ but not smaller than 0.34 mbar	p_{abs} = Measured value pressure medium: oil Consider the measurement uncertainty of the barometer
	> 56 bar to 1101 bar		$7 \cdot 10^{-5}\ p_{abs}$ but not smaller than 7.5 mbar	
Force (Tension, Compression) Indicators and Transducers	10 N to 250 kN	DAkkS-DKD-R 3-3: 2010	$1 \cdot 10^{-3}$	
Torque Calibration Units	1 N·m to 1000 N·m	DAkkS-DKD-R 3-8:2010	$5 \cdot 10^{-3}$	
Torque Manually Operated Torque Drivers Actuating / Indicating	1 N·m to 1000 N·m	DIN EN ISO 6789:2003	$5 \cdot 10^{-3}$	
Flow speed of gases	0.1 m/s to 68 m/s	Measurement with low-turbulence open free jet	0.5 %. but not smaller than 0.01 m/s	

[1)] The smallest measurement uncertainties are stated according to DAkkS-DKD-3 (EA-4/02). These are expanded uncertainties with a 95 % level of confidence and, unless otherwise stated, using a coverage factor of k = 2. Uncertainties that appear without units are relative to the measured value unless otherwise stated.

Permanent Laboratory – Thermodynamical measurands

Measurand quantity / Calibration item	Range	Measurement Conditions/Procedure	Smallest Measurement [1)]	Remarks
Temperature fixed point cells	-189.3442 °C	Argon-Triple Point	4.0 mK	Comparison with standard fixed-point cells supported by standard resistance thermometers
	-38.8344 °C	Mercury Triple Point	1.0 mK	
	0.01 °C	Triple Point of Water	0.5 mK	
	29.7646 °C	Gallium Melting Point	0.8 mK	
	156.5985 °C	Indium Freezing Point	2.5 mK	
	231.928 °C	Tin Freezing Point	1.5 mK	
	419.527 °C	Zinc Freezing Point	2.0 mK	
	660.323 °C	Aluminium Freezing Point	7.0 mK	
Resistance Thermometer (only SPRT) and direct reading resistance thermometer with SPRT	-189.3442 °C	Argon-Triple Point	4.0 mK	Calibration at temperature fixed-points of the ITS-90
	-38.8344 °C	Mercury Triple Point	1.5 mK	
	0.01 °C	Triple Point of Water	0.5 mK	
	29.7646 °C	Gallium Melting Point	1.0 mK	
	156.5985 °C	Indium Freezing Point	2.5 mK	
	231.928 °C	Tin Freezing Point	2.5 mK	
	419.527 °C	Zinc Freezing Point	2.5 mK	
	660.323 °C	Aluminium Freezing Point	7.0 mK	
	-196 °C to -189 °C	Extrapolation according to EURAMET tg-1:03/2010	8.0 mK	Calibration at temperature fixed-points with deviation function according to ITS-90
	-189 °C to 0 °C	Ar-. Hg-. TPW-Fixed points	6.0 mK	
	-40 °C to 30 °C	Hg-. TPW-. Ga-Fixed points	2.0 mK	
	0 °C to 156 °C	TPW-. In-Fixed points	3.5 mK	
	0 °C to 232 °C	TPW-. In-. Sn-Fixed points	3.5 mK	
	> 232 °C to 420 °C	TPW-. Sn-. Zn-Fixed points	4.0 mK	
	> 232 °C to 660 °C	TPW-. Sn-. Zn-. Al-Fixed points	8.0 mK	
Resistance Thermometer (SPRT and IPRT) and direct reading resistance thermometer *)	0.00 °C	DAkkS-DKD-R 5-1:2010. Ice point	5 mK	Compared to standard - resistance thermometers in thermostatic baths
	-196 °C	DAkkS-DKD-R 5-1:2010 Liquid Nitrogen	15 mK	
	-120 °C to < -80 °C	DAkkS-DKD-R 5-1:2010 Argon-Thermostat	10 mK	
	-80 °C to < 0 °C	DAkkS-DKD-R 5-1:2010. Ethanol	10 mK	
	0 °C to 200 °C	DAkkS-DKD-R 5-1:2010 Silicone Oil Bath		
	> 200 °C to 300 °C	DAkkS-DKD-R 5-1:2010 Salt Bath	15 mK	
	> 300 °C to 420 °C		20 mK	
	> 420 °C to 500 °C		50 mK	
	> 500 °C to 660 °C	DAkkS-DKD-R 5-1:2010 Tube Furnace with Na-Heating Tube	0.2 K	

[1)] The smallest measurement uncertainties are stated according to DAkkS-DKD-3 (EA-4/02). These are expanded uncertainties with a 95 % level of confidence and, unless otherwise stated, using a coverage factor of k = 2. Uncertainties that appear without units are relative to the measured value unless otherwise stated.

Measurand quantity / Calibration item	Range	Measurement Conditions/Procedure	Smallest Measurement [1)]	Remarks
Temperature Thermocouple Typ Au / Pt Typ Pt / Pd	0.01 °C	Triple Point of Water	0.4 K	Compare to temperature fixed-points of the ITS-90
	231.928 °C	Tin Freezing Point	0.4 K	
	419.527 °C	Zinc Freezing Point	0.4 K	
	660.323 °C	Aluminium Freezing Point	0.4 K	
	961.78 °C	Silver Freezing Point	0.5 K	
	0 °C to 1000 °C	Calibration at temperature fixed-points	0.6 K	Compared to standard Resistance thermometers
Precious-Metal-Thermocouples	0.01 °C	Triple Point of Water	0.4 K	Compare to temperature fixed-points of the ITS-90
	231.928 °C	Tin Freezing Point	0.4 K	
	419.527 °C	Zinc Freezing Point	0.4 K	
	660.323 °C	Aluminium Freezing Point	0.4 K	
	961.78 °C	Silver Freezing point	0.5 K	
	0 °C to 1000 °C	Calibration at temperature fixed-points	0.6 K	Compared to standard Resistance thermometers
Precious-Metal-Thermocouples	-40 °C to 500 °C	DAkkS-DKD-R 5-3:2010 thermostatic bath	0.5 K	
	> 500 °C to 1000 °C	DAkkS-DKD-R 5-3:2010 Tube Furnace with Na-Heating	0.8 K	Compared to standard thermocouple
Non-Precious-Metal Thermocouples	-196 °C	DAkkS-DKD-R 5-3:2010 Liquid Nitrogen	0.5 K	Compared to standard resistance thermometers
	-80 °C to 200 °C	DAkkS-DKD-R 5-3:2010 thermostatic bath	0.2 K	
	> 200 °C to 400 °C		0.4 K	
	> 400 °C to 500 °C		0.5 K	
	> 500 °C to 1000 °C	DAkkS-DKD-R 5-3:2010 Tube Furnace with Na-Heating	1.0 K	Compared to standard thermocouple
Temperature Transmitters with connected Resistance thermometer	-80 °C to 200 °C	DAkkS-DKD-R 5-1:2010 Calibration Bath	15 mK	Compared to standard resistance thermometers
	> 200 °C to 500 °C	DAkkS-DKD-R 5-1:2010 Salt Bath	25 mK	
Temperature Transmitters with connected thermocouple	-80 °C to 200 °C	DAkkS-DKD-R 5-3:2010 Calibration bath	0.3 K	Compared to standard resistance thermometers
	> 200 °C to 500 °C	DAkkS-DKD-R 5-3:2010 Salt bath	1.0 K	
	> 500 °C to 1000 °C	DAkkS-DKD-R 5-3:2010 Tube Furnace with Na-Heating	2.0 K	Compared to standard thermocouple

[1)] The smallest measurement uncertainties are stated according to DAkkS-DKD-3 (EA-4/02). These are expanded uncertainties with a 95 % level of confidence and, unless otherwise stated, using a coverage factor of k = 2. Uncertainties that appear without units are relative to the measured value unless otherwise stated.

Measurand quantity / Calibration item	Range	Measurement Conditions/Procedure	Smallest Measurement Uncertainty [1)]	Remarks
Temperature Dry-Block Calibrators	-40 °C to 150 °C	DAkkS-DKD-R 5-4:2010	50 mK	Compared to resistance thermometers
	> 150 °C to 300 °C		0.25 K	
	> 300 °C to 650 °C		0.50 K	
	> 650 °C to 800 °C		2.5 K	Compared to standard thermocouple
	> 800 °C to 1000 °C		4 K	
Temperature Surface Probes	50 °C to 100 °C		0.8 K	t = Measured value in °C
	> 100 °C to 500 °C		0.008 K · t / °C	
Temperature Radiation Thermometers	-18 °C to 60 °C	Spectral Range 8 µm to 14 µm	0.6 K	Compared to bathed liquid cavity radiator
	> 60 °C to 100 °C		0.9 K	
	> 100 °C to 350 °C		1.2 K	
Temperature Temperature Indicators	-40 °C to 0 °C	Temperature chamber	0.32 K	Compared to resistance thermometers
	> 0 °C to 50 °C		0.34 K	
	> 50 °C to 80 °C		0.52 K	
	> 80 °C to 120 °C		0.84 K	
	> 120 °C to 180 °C		0.90 K	
	-18 °C to 0 °C	Climate chamber	0.65 K	
	> 0 °C to 25 °C		0.36 K	
	> 25 °C to 50 °C		0.25 K	
	> 50 °C to 80 °C		0.55 K	
	0 °C to 90 °C	Humidity Generator or 2-Pressure/2-Temperature-Generator	0.2 K	
Temperature Indicators, Data Loggers, Transducers	-10 °C to < 0 °C	2-Pressure/1-Temperature-Generator with Flow-Box	0.35 K	
	0 °C to 70 °C		0.20 K	
	-10 °C to 70 °C	2-Pressure/1-Temperature-Generator in Volume	0.35 K	

[1)] The smallest measurement uncertainties are stated according to DAkkS-DKD-3 (EA-4/02). These are expanded uncertainties with a 95 % level of confidence and, unless otherwise stated, using a coverage factor of k = 2. Uncertainties that appear without units are relative to the measured value unless otherwise stated.

Measurand quantity / Calibration item	Range	Measurement Conditions/Procedure	Smallest Measurement Uncertainty [1]	Remarks
Dewpoint-Temperature Hygrometers with direct dew point detection	-20 °C to 85 °C	2-Pressure/2-Temperature-Generator	50 mK	
	-32 °C to -25 °C	Humidity-Generator 2-Pressure/1-Temperature with Flow-Box	90 mK	
	> -25 °C to -10 °C		60 mK	
	> -10 °C to 40 °C		90 mK	
	> 40 °C to 70 °C		0.12 K	
	-20 °C to 50 °C	Climate Chamber	0.2 K	
	> 50 °C to 70 °C		0.25 K	
Relative Humidity Hygrometer, Data Loggers, Transducers	-32 °C to < 0°C	2-Pressure/1-Temperature-Generator in Volume	0.25 K	at 10 % to 85 % relative humidity
	0 °C to 40 °C		0.15 K	at 10 % to 95 % relative humidity
	> 40 °C to 70 °C		0.25 K	
Relative Humidity Hygrometer, Data Loggers, Transducers	10 % to 20 %		0.7 %	temperature range: -10 °C to < 0°C; Range and measurement uncertainty stated in relative humidity
	> 20 % to 40 %		1.3 %	
	> 40 % to 85 %		2.1 %	
	10 % to 20 %		0.4 %	temperature range: 0 °C to < 70°C; Range and measurement uncertainty stated in relative humidity
	> 20 % to 40 %		0.7 %	
	> 40 % to 85 %		1.1 %	
	> 85 % to 95 %		1.3 %	
Relative Humidity Hygrometer, Humidity sensor with transmitter, without psychomotor	5 % to 40 %	2-Pressure/2-Temperature-Generator Temperature Range: 5 °C to 90 °C	0.2 %	Range and measurement uncertainty stated in relative humidity
	> 40 % to 80 %		0.3 %	
	> 80 % to 95 %		0.4 %	
	10 % to 40 %	2-Pressure/1-Temperature-Generator with Flow-Box Temperature Range: 0 °C to 20 °C	0.3 %	
	> 40 % to 80 %		0.6 %	
	> 80 % to 95 %		0.7 %	
Relative Humidity Hygrometer, Data Loggers, Transducers	10 % to 40 %	2-Pressure/1-Temperature-Generator with Flow-Box Temperature Range: 20 °C to 70 °C	0.3 %	
	> 40 % to 80 %		0.5 %	
	> 80 % to 95 %		0.6 %	

[1] The smallest measurement uncertainties are stated according to DAkkS-DKD-3 (EA-4/02). These are expanded uncertainties with a 95 % level of confidence and, unless otherwise stated, using a coverage factor of k = 2. Uncertainties that appear without units are relative to the measured value unless otherwise stated.

Measurand quantity / Calibration item	Range	Measurement Conditions/Procedure	Smallest Measurement Uncertainty [1)]	Remarks
Relative Humidity Hygrometer, Data Loggers, Transducers	5 % to 30 %	Climate Chamber Temperature Range: -18 °C to 0 °C	2.0 %	Range and measurement uncertainty stated in relative humidity
	> 30 % to 60 %		3.9 %	
	> 60 % to 95 %		6.2 %	
	5 % to 30 %	Climate Chamber Temperature Range: > 0 °C to 25 °C	1.0 %	
	> 30 % to 60 %		1.8 %	
	> 60 % to 95 %		3.3 %	
	5 % to 30 %	Climate Chamber Temperature Range: > 25 °C to 50 °C	0.6 %	
	> 30 % to 60 %		1.1 %	
	> 60 % to 95 %		1.8 %	
	5 % to 30 %	Climate Chamber Temperature Range: > 50 °C to 80 °C	0.8 %	
	> 30 % to 60 %		1.5 %	
	> 60 % to 95 %		2.4 %	
Temperature Indicators and Simulators for Resistance Thermometers	-200 °C to 850 °C	DAkkS-DKD-R 5-5:2010	30 mK	Characteristic according to DIN EN 60751:2009
for Precious-Metal	-200 °C to 1750 °C		0.1 K	Characteristic according to DIN EN 60584-1:2014
for Non-Precious-Metal Thermocouples	-200 °C to 1300 °C		50 mK	

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Onsite Calibration

Measurand quantity / Calibration item	Range	Measurement Conditions/Procedure	Smallest Measurement Uncertainty [1)]	Remarks
Temperature Directdisplay, Electrical Resistance Thermometer *), Electrical Thermometer *)	0.00 °C	Ice point	10 mK	Calibration at temperature fixed-points
	-80°C to < 0 °C	DAkkS-DKD-R 5-1:2010 Ethanol Bath	10 mK	Compared to standard resistance thermometers in thermostatic bath
	0 °C to 200 °C	DAkkS-DKD-R 5-1:2010 Glykol Bath / Silicone Oil Bath		
	> 200 °C to 300 °C	DAkkS-DKD-R 5-1:2010 Temperature-Dry-block Calibrator	0.5 K	Compared to standard resistance thermometers
Non-Precious-Metal Thermocouples *)	> 300 °C to 1000 °C	DAkkS-DKD-R 5-3:2010 High temperature furnace	3.0 K	Compared to standard thermocouple
Circulating Thermostates Präzisionsbäder	-80 °C to 200 °C	Testo Quality guidline 4_VB_00152_DE	10 mK	Compared to standard resistance thermometers
	> 200 °C to 300 °C		15 mK	
Temperature-Blockcalibrator *)	-40 °C to 150 °C	DAkkS-DKD-R 5-4:2010	50 mK	Compared to resistance thermometers
	> 150 °C to 300 °C		0.25 K	Compared to standard thermocouple
	> 300 °C to 650 °C		0.5 K	
	> 650 °C to 800 °C		2.5 K	
	> 800 °C Bto 1000 °C		4.0 K	
Temperature-transmitter with connected Resistances-Thermometer *)	-80 °C to 200 °C	DAkkS-DKD-R 5-1:2010 Calibration bath	20 mK	Compared to resistance thermometers
	> 200 °C to 500 °C		25 mK	
Temperatur-transmitter with connected Thermoelement *)	-80 °C to 200 °C	DAkkS-DKD-R 5-3:2010 Temperature-Blockkalibrator / High temperature furnace	0.3 K	
	> 200 °C to 1000 °C		3.5 K	Compared to thermocouple
Temperatur gauge, data logger	-40 °C to <0 °C	Temperature chamber	0.30 mK	Compared with resistance thermometers
	0 °C to 50 °C		0.15 K	
	>50 °C to 80 °C		0.25 K	
	>80 °C to 120 °C		0.40 K	
	>120 °C to 180 °C		0.90 K	

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Measurand quantity / Calibration item	Range			Measurement Conditions/Procedure	Smallest Measurement Uncertainty [1)]	Remarks
Climate Chambers with circulating air in an empty or defined loaded chamber interior	-90 °C	to	0 °C	Measuring medium: Air Calibration Methods A and B according to DAkkS-DKD-R 5-7:2010	0.5 K	Compared to resistance thermometers
	> 0 °C	to	100 °C		0.3 K	
	> 100 °C	to	200 °C		0.5 K	At load specify exactly type and arrangement of the load in the climate chamber
	> 200 °C	to	350 °C		0.8 K	
Climate Chambers without circulating air in an empty or defined loaded chamber interior	- 90 °C	to	0 °C		0.8 K	
	> 0 °C	to	100 °C		0.5 K	
	> 100 °C	to	200 °C		0.8 K	
	> 200 °C	to	350 °C		1.2 K	
Climate Chambers without circulating air in an empty or defined loaded chamber interior	- 90 °C	to	0 °C	Measuring medium: Air Calibration Methods C according to DAkkS-DKD-R 5-7:2010	0.3 K	
	> 0 °C	to	100 °C		0.2 K	
	> 100 °C	to	200 °C		0.3 K	
	> 200 °C	to	350 °C		0.5 K	
Climate Chambers without circulating air in an empty or defined loaded chamber interior	- 90 °C	to	0 °C		0.5 K	
	> 0 °C	to	100 °C		0.3 K	
	> 100 °C	to	200 °C		0.5 K	
	> 200 °C	to	350 °C		0.8 K	

[1)] The smallest measurement uncertainties are stated according to DAkkS-DKD-3 (EA-4/02). These are expanded uncertainties with a 95 % level of confidence and, unless otherwise stated, using a coverage factor of k = 2. Uncertainties that appear without units are relative to the measured value unless otherwise stated.

Measurand quantity / Calibration item	Range	Measurement Conditions/Procedure	Smallest Measurement Uncertainty [1)]	Remarks
Relative Humidity Climate Chambers without circulating air in an empty or defined loaded chamber interior	5 % to 30 %	Measuring medium: Air Calibration Methods C according to DAkkS-DKD-R 5-7:2010	0.3 %	Measuring range and – uncertainty expressed in relative humidity; Temperature range: -10 °C to 95 °C; Humidity reference is calculated from dew point and air temperature
	> 30 % to 60 %		0.4 %	
	> 60 % to 98 %		0.6 %	
Relative Humidity Climate Chambers without circulating air in an empty or defined loaded chamber interior	5 % to 30 %	Measuring medium: Air Calibration Methods A and B according to DAkkS-DKD-R 5-7:2010	0.4 %	
	> 30 % to 60 %		0.6 %	
	> 60 % to 98 %		0.8 %	At load specify exactly type and arrangement of the load in the climate chamber
Relative Humidity, Hygrometer, Data logger, Transmitter	(10 bis 95) % rF 0 °C to 70 °C	Humidity generator flow box	0.6 %	
Dew point temperature, Dew point measuring instrument; Hygrometer	-25 °C to 70 °C;		0.09 K	
Temperature; Temperature measuring instrument; Data logger; Transmitter	(10 bis 95) % rF 0°C to 40 °C >40 °C to 70 °C		0.05 K	
Relative Humidity, Hygrometer, Data logger, Transmitter	(10 bis 95) % rF 0°C to 40 °C >40 °C to 70 °C	Humidity generator restricted usable volume	0.09 % 2.0 %	
Dew point temperature, Dew point measuring instrument; Hygrometer	-25 to 70 °C 0°C to 40 °C >40 °C to 70 °C		0.09 K 0.15 K	
Temperature; Temperature measuring instrument; Data logger; Transmitter	0°C to 40 °C >40 °C to 70 °C		0.20 K 0.30 K	
Temperature indicator and -simulator Resistance thermometers	-200 °C to 850 °C	DAkkS-DKD-R 5-5:2010	0.03 K	
precious metal thermometer	-200 °C to 1750 °C		0.10 K	Characteristic curve according to DIN EN 60751:2009
Non-precious metal thermometer	-200 °C to 1300 °C		0.05 K	Characteristic curve according to DIN EN 60584-1:1998

[1)] The smallest measurement uncertainties are stated according to DAkkS-DKD-3 (EA-4/02). These are expanded uncertainties with a 95 % level of confidence and, unless otherwise stated, using a coverage factor of k = 2. Uncertainties that appear without units are relative to the measured value unless otherwise stated.

Measurand quantity / Calibration item	Range	Measurement Conditions/Procedure	Smallest Measurement Uncertainty [1)]	Remarks
Length *)				
cylindrical Setting standards Ring gauge Diameter without shape measurement	1 mm to 150 mm	DAkkS-DKD-R 4-3 Page 4.1:2010. Pkt. 5.3.3. Pkt. 5.3.4	0.8 µm + 2 · 10^{-}	*L* =measured length
Plug gauge Diameter without shape measurement	1 mm to 150 mm		0.8 µm + 2 · 10^{-6} · *l*	
Test pins Diameter without shape measurement	0.1 mm to 30 mm	DAkkS-DKD-R 4-3 Page 4.2:2010. Option 5.3.3	0.8 µm + 2 · 10^{-6} · *l*	
Thread gauge (Single and Multi-Start cylindrical Outer- and Inner Threads with Straight-Sided Symmetrical Profile)				
Thread Pin Simple pitch diameter	1.4 mm to 200 mm Nominal Pitch: 0.3 mm to 6 mm	DAkkS-DKD-R 4-3 Page 4.8:2010. Option 1	3 µm + 10 · 10^{-}	
Thread Ring Simple pitch diameter	3 mm to 200 mm Nominal Pitch: 0.5 mm to 6 mm	DAkkS-DKD-R 4-3 Page 4.9:2010. Option 1	3 µm + 10 · 10^{-6} · *l*	
Caliper for outer and inner depth measurements; Depth gauge	0 mm to 500 mm	DAkkS-DKD-R 4-3 Page 9.1:2010	30 µm + 30 · 10^{-6} · *l*	
Depth gauge		DAkkS-DKD-R 4-3 Page 9.2:2010		
Height calipers		DAkkS-DKD-R 4-3 Page 9.3:2010		
Gauge	to 100 mm	DAkkS-DKD-R 4-3 Page 11.1:2010	3 µm + 10 · 10^{-6} · *l*	
Dial Indicator	to 3 mm	DAkkS-DKD-R 4-3 Page 11.2:2010	0.6 µm	
Level Indicator	to 1.6 mm	DAkkS-DKD-R 4-3 Page 11.3:2010	1.0 µm	
Micrometer	0 mm to 150 mm	DAkkS-DKD-R 4-3 Page 10.1:2010	3 µm + 10 · 10^{-6} · *l*	
Length 2-Point Internal Micrometers	13 mm to 300 mm	DAkkS-DKD-R 4-3 Page 10.7:2010	3 µm + 10 · 10^{-6} · *l*	*l* = measured length
	> 300 mm to 500 mm		5 µm + 10 · 10^{-6} · *l*	
Length 3-Point Internal Micrometers	3 mm to 150 mm	DAkkS-DKD-R 4-3 Page 10.8:2010	3 µm + 10 · 10^{-6} · *d*	*d* = measured diameter

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Measurand quantity / Calibration item	Range	Measurement Conditions/Procedure	Smallest Measurement Uncertainty [1)]	Remarks
Weighing Scales *)	to 10 kg	EURAMET Calibration Guide No. 18 Version 4.0	$1 \cdot 10^{-6}$	with weights of the category E_2 according to OIML R 111-1:2004
	to 80 kg		$5 \cdot 10^{-6}$	
Negative and positive pressure p_e *)	-1.0 bar to 0.0 bar	DAkkS-DKD-R 6-1	$5 \cdot 10^{-4}\ p_{end}$	pressure medium: gas p_e = final value of the standard's measuring range
	> 0.0 bar to 0.02 bar		$2 \cdot 10^{-3}\ p_{end}$	
	> 0.02 bar to 70 bar		$5 \cdot 10^{-4}\ p_{end}$	
Absolute pressure p_{abs} *)	0.1 bar to 71 bar		$5 \cdot 10^{-4}\ p_{end}$	
Torque *) Manually Operated Torque Drivers Actuating/ Indicating	1 N·m to 1000 N·m	DIN EN ISO 6789:2003	1 %	

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Measurand quantity / Calibration item	Range	Measurement Conditions/Procedure	Smallest Measurement Uncertainty [1)]	Remarks
DC Voltage	0 V		0.1 µV	U = adjusted value
Measuring Instruments	0.01 V to 2.2 V		$7 \cdot 10^{-6}\,U + 1$ µV	Fluke 5700A
	> 2.2 V to 11 V		$9 \cdot 10^{-6}\,U$	
	> 11 V to 22 V		$8 \cdot 10^{-6}\,U$	
	> 22 V to 1000 V		$12 \cdot 10^{-6}\,U$	
Sources	0 V		0.1 µV	U = measured value
	1 mV to 100 mV		$8 \cdot 10^{-6}\,U + 1$ µV	HP 3458A
	> 100 mV to 1 V		$11 \cdot 10^{-6}\,U$	
	> 1 V to 10 V		$9 \cdot 10^{-6}\,U$	
	> 10 V to 100 V		$13 \cdot 10^{-6}\,U$	
	> 100 V to 1000 V		$16 \cdot 10^{-6}\,U$	
DC Current	0 A		0.2 nA	I = adjusted value
Measuring Instruments	10 µA to 220 µA		$50 \cdot 10^{-6}\,I + 8$ nA	Fluke 5700A
	> 220 µA to 22 mA		$87 \cdot 10^{-6}\,I$	
	> 22 mA to 220 mA		$89 \cdot 10^{-6}\,I$	
	> 220 mA to 2.2 A		$0.2 \cdot 10^{-3}\,I$	
	> 2.2 A to 20 A		$1.2 \cdot 10^{-3}\,I$	with 5520A/5522A
	> 20 A to 200 A	Voltage drop with Standard Resistor	$1.0 \cdot 10^{-3}\,I$	
DC Current	0 A		0.2 nA	I = measured value
Sources	0.1 µA to 1 µA		$0.4 \cdot 10^{-3}\,I$	HP 3458A
	> 1 µA to 10 µA		$0.12 \cdot 10^{-3}\,I$	
	> 10 µA to 100 µA		$0.1 \cdot 10^{-3}\,I$	
	> 100 µA to 10 mA		$70 \cdot 10^{-6}\,I$	
	> 10 mA to 100 mA		$85 \cdot 10^{-6}\,I$	
	> 100 mA to 1 A		$0.2 \cdot 10^{-3}\,I$	
	> 1 A to 10 A	Voltage drop with Standard Resistor	$0.5 \cdot 10^{-3}\,I$	
	> 10 A to 200 A		$1.0 \cdot 10^{-3}\,I$	
Current Clamps	1 mA to 2.2 A		$1 \cdot 10^{-3}\,I$	
	> 2.2 A to 20 A		$2 \cdot 10^{-3}\,I$	
	> 20 A to 1000 A		$3 \cdot 10^{-3}\,I$	

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Measurand quantity / Calibration item	Range	Measurement Conditions/Procedure	Smallest Measurement Uncertainty [1)]	Remarks
DC Resistance Measuring Instruments	0 Ω		50 µ Ω	*R* = adjusted value Fluke 5700A
	1 Ω; 1.9 Ω		$95 \cdot 10^{-6} R$	
	10 Ω		$28 \cdot 10^{-6} R$	
	19 Ω		$27 \cdot 10^{-6} R$	
	100 Ω; 190 Ω		$17 \cdot 10^{-6} R$	
	1 kΩ; 1.9 kΩ		$13 \cdot 10^{-6} R$	
	10 kΩ; 19 kΩ		$12 \cdot 10^{-6} R$	
	100 kΩ; 190 kΩ		$14 \cdot 10^{-6} R$	
	1 MΩ		$20 \cdot 10^{-6} R$	
	1.9 MΩ		$21 \cdot 10^{-6} R$	
	10 MΩ		$40 \cdot 10^{-6} R$	
	19 MΩ		$48 \cdot 10^{-6} R$	
	100 MΩ		$0.11 \cdot 10^{-3} R$	
Resistance	0 Ω		0.1 mΩ	*R* = measured value HP 3458A
	1 Ω to 10 Ω		$16 \cdot 10^{-6} R$ + 50 µΩ	
	> 10 Ω to 100 Ω		$12 \cdot 10^{-6} R$ + 0.5 mΩ	
	> 100 Ω to 100 kΩ		$15 \cdot 10^{-6} R$	
	> 100 kΩ to 1 MΩ		$35 \cdot 10^{-6} R$	
	> 1 MΩ to 10 MΩ		$0.15 \cdot 10^{-3} R$	
	> 10 MΩ to 100 MΩ		$0.6 \cdot 10^{-3} R$	
	> 100 MΩ to 1 GΩ		$5 \cdot 10^{-3} R$	
DC Resistance (Ranges) Measuring Instruments	1 Ω to < 11 Ω		$0.12 \cdot 10^{-3} R$	*R* = adjusted value Fluke 5520A /5522A
	11 Ω to < 33 Ω		$33 \cdot 10^{-6} R$	
	33 Ω to < 110 Ω		$29 \cdot 10^{-6} R$	
	110 Ω to < 110 kΩ		$28 \cdot 10^{-6} R$	
	110 kΩ to < 330 kΩ		$32 \cdot 10^{-6} R$	
	330 kΩ to < 1.1 MΩ		$33 \cdot 10^{-6} R$	
	1.1 MΩ to < 3.3 MΩ		$62 \cdot 10^{-6} R$	
	3.3 MΩ to < 11 MΩ		$0.13 \cdot 10^{-3} R$	
	11 MΩ to < 33 MΩ		$0.25 \cdot 10^{-3} R$	
	33 MΩ to < 110 MΩ		$0.5 \cdot 10^{-3} R$	
	110 MΩ to < 330 MΩ		$3 \cdot 10^{-3} R$	
	330 MΩ to < 1.1 GΩ		$15 \cdot 10^{-3} R$	

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Measurand quantity / Calibration item	Range	Measurement Conditions/Procedure	Smallest Measurement Uncertainty [1)]	Remarks
AC Voltage	0.01 V to 0.022 V	10 Hz to 40 Hz	$1.2 \cdot 10^{-3}\ U$	U = adjusted value
Measuring Instruments		> 40 Hz to 20 kHz	$0.7 \cdot 10^{-3}\ U$	Fluke 5700A
		> 20 kHz to 50 kHz	$1.0 \cdot 10^{-3}\ U$	
		> 50 kHz to 100 kHz	$1.8 \cdot 10^{-3}\ U$	
		> 100 kHz to 300 kHz	$2.6 \cdot 10^{-3}\ U$	
		> 300 kHz to 500 kHz	$4.7 \cdot 10^{-3}\ U$	
		> 500 kHz to 1 MHz	$6.7 \cdot 10^{-3}\ U$	
	> 0.022 V to 0.22 V	10 Hz to 40 Hz	$0.75 \cdot 10^{-3}\ U$	
		> 40 Hz to 20 kHz	$0.21 \cdot 10^{-3}\ U$	
		> 20 kHz to 50 kHz	$0.45 \cdot 10^{-3}\ U$	
		> 50 kHz to 100 kHz	$1.3 \cdot 10^{-3}\ U$	
		> 100 kHz to 300 kHz	$1.5 \cdot 10^{-3}\ U$	
		> 300 kHz to 500 kHz	$2.3 \cdot 10^{-3}\ U$	
		> 500 kHz to 1 MHz	$4.7 \cdot 10^{-3}\ U$	
	> 0.22 V to 2.2 V	10 Hz to 40 Hz	$1.0 \cdot 10^{-3}\ U$	
		> 40 Hz to 20 kHz	$0.12 \cdot 10^{-3}\ U$	
		> 20 kHz to 50 kHz	$0.22 \cdot 10^{-3}\ U$	
		> 50 kHz to 100 kHz	$0.7 \cdot 10^{-3}\ U$	
		> 100 kHz to 300 kHz	$1.2 \cdot 10^{-3}\ U$	
		> 300 kHz to 500 kHz	$3.1 \cdot 10^{-3}\ U$	
		> 500 kHz to 1 MHz	$7.4 \cdot 10^{-3}\ U$	
	> 2.2 V to 22 V	10 Hz to 40 Hz	$1.0 \cdot 10^{-3}\ U$	
		> 40 Hz to 20 kHz	$0.12 \cdot 10^{-3}\ U$	
		> 20 kHz to 50 kHz	$0.22 \cdot 10^{-3}\ U$	
		> 50 kHz to 100 kHz	$0.45 \cdot 10^{-3}\ U$	
		> 100 kHz to 300 kHz	$1.3 \cdot 10^{-3}\ U$	
		> 300 kHz to 500 kHz	$3.6 \cdot 10^{-3}\ U$	
		> 500 kHz to 1 MHz	$7.4 \cdot 10^{-3}\ U$	
	> 22 V to 220 V	10 Hz to 40 Hz	$1.0 \cdot 10^{-3}\ U$	
		> 40 Hz to 20 kHz	$0.13 \cdot 10^{-3}\ U$	
		> 20 kHz to 50 kHz	$0.42 \cdot 10^{-3}\ U$	
		> 50 kHz to 100 kHz	$1.0 \cdot 10^{-3}\ U$	
	> 220 V to 1000 V	> 50 Hz to 1 kHz	$0.12 \cdot 10^{-3}\ U$	

[1)] The smallest measurement uncertainties are stated according to DAkkS-DKD-3 (EA-4/02). These are expanded uncertainties with a 95 % level of confidence and, unless otherwise stated, using a coverage factor of k = 2. Uncertainties that appear without units are relative to the measured value unless otherwise stated.

Measurand quantity / Calibration item	Range	Measurement Conditions/Procedure	Smallest Measurement Uncertainty [1)]	Remarks
AC Voltage	0.01 V to 0.1 V	40 Hz to 1 kHz	$0.27 \cdot 10^{-3}\ U$	U = measured value
Sources		> 1 kHz to 20 kHz	$0.34 \cdot 10^{-3}\ U$	HP 3458A
		> 20 kHz to 50 kHz	$0.55 \cdot 10^{-3}\ U$	
	> 0.1 V to 10 V	40 Hz to 1 kHz	$0.27 \cdot 10^{-3}\ U$	
		> 1 kHz to 20 kHz	$0.34 \cdot 10^{-3}\ U$	
		> 20 kHz to 50 kHz	$0.5 \cdot 10^{-3}\ U$	
	> 10 V to 100 V	40 Hz to 1 kHz	$0.4 \cdot 10^{-3}\ U$	
		> 1 kHz to 20 kHz	$0.4 \cdot 10^{-3}\ U$	
		> 20 kHz to 50 kHz	$0.55 \cdot 10^{-3}\ U$	
	> 100 V to 700 V	40 Hz to 1 kHz	$0.55 \cdot 10^{-3}\ U$	
Alternating current	0.1 mA to 0.22 mA	10 Hz to 40 Hz	$1.1 \cdot 10^{-3}\ I$	I = adjusted value
Measuring Instruments		> 40 Hz to 1 kHz	$0.3 \cdot 10^{-3}\ I$	Fluke 5700A
		> 1 kHz to 5 kHz	$1.2 \cdot 10^{-3}\ I$	
		> 5 kHz to 10 kHz	$2.7 \cdot 10^{-3}\ I$	
	> 0.22mA to 220 mA	10 Hz to 40 Hz	$1.0 \cdot 10^{-3}\ I$	
		> 40 Hz to 1 kHz	$0.4 \cdot 10^{-3}\ I$	
		> 1 kHz to 5 kHz	$3.0 \cdot 10^{-3}\ I$	
		> 5 kHz to 10 kHz	$6.4 \cdot 10^{-3}\ I$	
	> 220 mA to 2.2 A	20 Hz to 1 kHz	$1.1 \cdot 10^{-3}\ I$	
		> 1 kHz to 5 kHz	$1.3 \cdot 10^{-3}\ I$	
		> 5 kHz to 10 kHz	$10 \cdot 10^{-3}\ I$	
	> 2.2 A to 3 A	10 Hz to 45 Hz	$1.9 \cdot 10^{-3}\ I$	I = adjusted value
		> 45 Hz to 1 kHz	$0.7 \cdot 10^{-3}\ I$	Fluke 5520A/5522A
		> 1 kHz to 5 kHz	$6.9 \cdot 10^{-3}\ I$	
		> 5 kHz to 10 kHz	$29 \cdot 10^{-3}\ I$	
	> 3 A to 11 A	45 Hz to 100 Hz	$1.3 \cdot 10^{-3}\ I$	I = adjusted value
		> 100 Hz to 1 kHz	$1.6 \cdot 10^{-3}\ I$	Fluke 5520A/5522A
		> 1 kHz to 5 kHz	$30 \cdot 10^{-3}\ I$	
	> 11 A to 20.5 A	45 Hz to 100 Hz	$1.6 \cdot 10^{-3}\ I$	
		> 100 Hz to 1 kHz	$1.9 \cdot 10^{-3}\ I$	
		> 1 kHz to 5 kHz	$30 \cdot 10^{-3}\ I$	
Alternating current	0.1 mA to 100 mA	20 Hz to 45 Hz	$3.5 \cdot 10^{-3}\ I$	I = measured value
Sources		> 45 Hz to 100 Hz	$2.6 \cdot 10^{-3}\ I$	HP 3458A
		> 100 Hz to 5 kHz	$2.3 \cdot 10^{-3}\ I$	
	> 100 mA to 1 A	20 Hz to 45 Hz	$3.6 \cdot 10^{-3}\ I$	
		> 45 Hz to 100 Hz	$2.8 \cdot 10^{-3}\ I$	
		> 100 Hz to 5 kHz	$3.0 \cdot 10^{-3}\ I$	

[1)] The smallest measurement uncertainties are stated according to DAkkS-DKD-3 (EA-4/02). These are expanded uncertainties with a 95 % level of confidence and, unless otherwise stated, using a coverage factor of k = 2. Uncertainties that appear without units are relative to the measured value unless otherwise stated.

Measurand quantity / Calibration item	Range	Measurement Conditions/Procedure	Smallest Measurement Uncertainty [1)]	Remarks
Capacitance Measuring instruments	190 pF to < 400 pF 400 pF to < 1.1 nF 1.1 nF to < 3.3 nF 3.3 nF to < 11 nF 11 nF to < 33 nF 33 nF to < 110 nF 110 nF to < 330 nF 330nF to < 1.1 µF 1.1 µF to < 3.3 µF 3.3 µF to < 11 µF 11 µF to < 33 µF 33 µF to < 110 µF 110 µF to < 330 µF 330 µF to < 1.1 mF 1.1 mF to < 3.3 mF 3.3 mF to < 11 mF 11 mF to < 33 mF 33 mF to 110 mF	10 Hz to 10 kHz 10 Hz to 10 kHz 10 Hz to 3 kHz 10 Hz to 1 kHz 10 Hz to 1 kHz 10 Hz to 1 kHz 10 Hz to 1 kHz 10 Hz to 600 Hz 10 Hz to 300 Hz 10 Hz to 150 Hz 10 Hz to 120 Hz 10 Hz to 80 Hz DC to 50 Hz DC to 20 Hz DC to 6 Hz DC to 2 Hz DC to 0.6 Hz DC to 0.2 Hz	$4 \cdot 10^{-3}\,C + 8\text{pF}$ $4.5 \cdot 10^{-3}\,C + 8\text{pF}$ $4 \cdot 10^{-3}\,C + 8\text{pF}$ $2.5 \cdot 10^{-3}\,C + 8\text{pF}$ $2.5 \cdot 10^{-3}\,C + 80\text{pF}$ $2.5 \cdot 10^{-3}\,C + 80\text{pF}$ $4.5 \cdot 10^{-3}\,C$ $4.5 \cdot 10^{-3}\,C$ $4.5 \cdot 10^{-3}\,C$ $4.5 \cdot 10^{-3}\,C$ $6.0 \cdot 10^{-3}\,C$ $6.5 \cdot 10^{-3}\,C$ $6.0 \cdot 10^{-3}\,C$ $6.0 \cdot 10^{-3}\,C$ $6.0 \cdot 10^{-3}\,C$ $6.0 \cdot 10^{-3}\,C$ $8.0 \cdot 10^{-3}\,C$ $11.0 \cdot 10^{-3}\,C$	*C* = measured value 5520A / 5522A

[1)] The smallest measurement uncertainties are stated according to DAkkS-DKD-3 (EA-4/02). These are expanded uncertainties with a 95 % level of confidence and, unless otherwise stated, using a coverage factor of k = 2. Uncertainties that appear without units are relative to the measured value unless otherwise stated.

Measurand quantity / Calibration item	Range	Measurement Conditions/Procedure	Smallest Measurement Uncertainty [1)]	Remarks
Alternating current	1 mA to 2.2 A	40 Hz to 5 kHz	$2 \cdot 10^{-3} I$	I = Measured value
Current Clamps	> 2.2 A to 20 A	40 Hz to 5 kHz	$3 \cdot 10^{-3} I$	
	> 20 A to 800 A	40 Hz to 65 Hz	$4 \cdot 10^{-3} I$	
Alternating current		33 mV to 1000 V		P = adjusted value with Fluke 5520A/5522A PF: power factor ($\cos \varphi$), φ ;Phase angle
Active Power Measuring		45 Hz to 65 Hz; PF=1		
Instruments	109 µW to < 11 kW	33 mA to < 11 A	$1.4 \cdot 10^{-3} P$	
	363 mW to 20 kW	11 A to 20 A	$2.0 \cdot 10^{-3} P$	
Oscilloscope measurands	5 mV to 5 V	R_i = 50 Ω	$3.5 \cdot 10^{-3} U$ + 35 µV	Squarewave voltage
Vertical Deflection	5 mV to 120 V	R_i = 1 MΩ	$2.4 \cdot 10^{-3} U$ + 40 µV	10 Hz to 10 kHz
Horizontal Deflection	5 ns to 520 ms		$3 \cdot 10^{-6} t$ + 1 ns	t: actual rising time
	> 20 ms to 5 s		$30 \cdot 10^{-6} t + 1.2 \cdot 10^{-4} t^2$	
Rising time	600 ps to 10 ms	25 mV to 1V R_i = 50 Ω	$40 \cdot 10^{-3} t_r$ + 7 ps	
Frequency	1 mHz to 46 GHz		$2 \cdot 10^{-9} f + U$	f : Measured value
Time Intervall	1 µs to 1000 s		$2 \cdot 10^{-9}$ t + 2 ns	f : Measured value trigger uncertainty U f: current measuring value

[1)] The smallest measurement uncertainties are stated according to DAkkS-DKD-3 (EA-4/02). These are expanded uncertainties with a 95 % level of confidence and, unless otherwise stated, using a coverage factor of k = 2. Uncertainties that appear without units are relative to the measured value unless otherwise stated.

Measurand quantity / Calibration item	Range	Measurement Conditions/ Procedure	Smallest Measurement Uncertainty [1)]	Remarks
Voltage Ratio	± 2 mV/V	Bridge Voltage: 5 V Measuring Frequency 225 Hz Measuring Frequency 600 Hz Measuring Frequency 4.8 kHz	 0.04 µV/V 0.05 µV/V 1.0 µV/V	Calibration of 350 Ω Bridge Standards and associated indicators at discrete points in steps of 10 %.
	± 2 mV/V	Bridge Voltage: 2.5 V Measuring Frequency 225 Hz Measuring Frequency 600 Hz Measuring Frequency 4.8 kHz	 0.05 µV/V 0.05 µV/V 1.0 µV/V	
	± 5 mV/V	Bridge Voltage: 5 V Measuring Frequency 225 Hz Measuring Frequency 4.8 kHz	 0.15 µV/V 1.0 µV/V	
	± 10 mV/V	Bridge Voltage: 5 V Measuring Frequency 225 Hz Measuring Frequency 4.8 kHz	 0.10 µV/V 0.3 µV/V	
	± 5 mV/V	Bridge Voltage: 2.5 V Measuring Frequency 225 Hz Measuring Frequency 600 Hz Measuring Frequency 4.8 kHz	 0.1 µV/V 0.1 µV/V 0.1 µV/V	
	± 10 mV/V	Bridge Voltage: 2.5 V Measuring Frequency 225 Hz Measuring Frequency 600 Hz Measuring Frequency 4.8kHz	 0.4 µV/V 0.4 µV/V 0.4 µV/V	
	± 10 mV/V	Bridge Voltage: 1 V Measuring Frequency 600 Hz	0.4 µV/V	
	± 20 mV/V	Bridge Voltage: 1 V Measuring Frequency: 4.8 kHz	0.6 µV/V	
	± 100 mV/V	Bridge Voltage: 1 V Measuring Frequency: 4.8 kHz	5 µV/V	
	± 100 mV/V	Bridge Voltage: 2.5 V Measuring Frequency: 4.8 kHz	5 µV/V	
Voltage Ratio DC Voltage Bridge standard	0 mV/V -2 mV/V bis +2 mV/V -5 mV/V bis +5 mV/V -10 mV/V bis +10 mV/V -20 mV/V bis +20 mV/V -100 mV/V bis +100 mV/V	Bridge Voltage: 0.5 V	2.0 µV/V 2.5 µV/V 2.5 µV/V 2.5 µV/V 2.5 µV/V 2.5 µV/V	

[1)] The smallest measurement uncertainties are stated according to DAkkS-DKD-3 (EA-4/02). These are expanded uncertainties with a 95 % level of confidence and, unless otherwise stated, using a coverage factor of k = 2. Uncertainties that appear without units are relative to the measured value unless otherwise stated.

Measurand quantity / Calibration item	Range	Measurement Conditions/ Procedure	Smallest Measurement Uncertainty [1)]	Remarks
Voltage Ratio DC Voltage Bridge standard	0 mV/V -2 mV/V bis +2 mV/V -5 mV/V bis +5 mV/V -10 mV/V bis +10 mV/V -20 mV/V bis +20 mV/V -100 mV/V bis +100 mV/V	Bridge Voltage: 1.0 V	1.0 µV/V 2.0 µV/V 2.0 µV/V 2.0 µV/V 2.0 µV/V 2.0 µV/V	
	0 mV/V -2 mV/V bis +2 mV/V -5 mV/V bis +5 mV/V -10 mV/V bis +10 mV/V -20 mV/V bis +20 mV/V -100 mV/V bis +100 mV/V	Bridge Voltage: 2.5 V	0.5 µV/V 0.5 µV/V 0.5 µV/V 0.5 µV/V 0.5 µV/V 1.5 µV/V	
	0 mV/V -2 mV/V bis +2 mV/V -5 mV/V bis +5 mV/V -10 mV/V bis +10 mV/V -20 mV/V bis +20 mV/V -100 mV/V bis +100 mV/V	Bridge Voltage: 5.0 V	0.3 µV/V 0.25 µV/V 0.25 µV/V 0.25 µV/V 0.35 µV/V 1.5 µV/V	
	0 mV/V -2 mV/V bis +2 mV/V -5 mV/V bis +5 mV/V -10 mV/V bis +10 mV/V -20 mV/V bis +20 mV/V -100 mV/V bis +100 mV/V	Bridge Voltage: 7.5 V	0.2 µV/V 0.2 µV/V 0.2 µV/V 0.2 µV/V 0.3 µV/V 1.5 µV/V	
	0 mV/V -2 mV/V bis +2 mV/V -5 mV/V bis +5 mV/V -10 mV/V bis +10 mV/V -20 mV/V bis +20 mV/V -100 mV/V bis +100 mV/V	Bridge Voltage: 10.0 V	0.1 µV/V 0.15 µV/V 0.15 µV/V 0.2 µV/V 0.3 µV/V 1.5 µV/V	

[1)] The smallest measurement uncertainties are stated according to DAkkS-DKD-3 (EA-4/02). These are expanded uncertainties with a 95 % level of confidence and, unless otherwise stated, using a coverage factor of k = 2. Uncertainties that appear without units are relative to the measured value unless otherwise stated.

Measurand quantity / Calibration item	Range	Measurement Conditions/ Procedure	Smallest Measurement Uncertainty [1)]	Remarks
Voltage Ratio DC Voltage Bridge standard; Measuring instrument; Measurement amplifier	-2 mV/V bis +2 mV/V -5 mV/V bis +5 mV/V -10 mV/V bis +10 mV/V -20 mV/V bis +20 mV/V -100 mV/V bis +100 mV/V	Bridge Voltage: 0.5 V	0.35 µV/V 0.35 µV/V 0.40 µV/V 0.55 µV/V 2.5 µV/V	K 148
	-2 mV/V bis +2 mV/V -5 mV/V bis +5 mV/V -10 mV/V bis +10 mV/V -20 mV/V bis +20 mV/V -100 mV/V bis +100 mV/V	Bridge Voltage: 1 V	0.2 µV/V 0.2 µV/V 0.3 µV/V 0.5 µV/V 2.5 µV/V	
	-2 mV/V bis +2 mV/V -5 mV/V bis +5 mV/V -10 mV/V bis +10 mV/V -20 mV/V bis +20 mV/V -100 mV/V bis +100 mV/V	Bridge Voltage: 2.5 V; 5 V; 7.5 V; 10 V	0.1 µV/V 0.15 µV/V 0.25 µV/V 0.45 µV/V 2.5 µV/V	

[1)] The smallest measurement uncertainties are stated according to DAkkS-DKD-3 (EA-4/02). These are expanded uncertainties with a 95 % level of confidence and, unless otherwise stated, using a coverage factor of k = 2. Uncertainties that appear without units are relative to the measured value unless otherwise stated.

Measurand quantity / Calibration item	Range	Measurement Conditions/Procedure	Smallest Measurement Uncertainty [1]	Remarks
HF Impedance (Reflection Coefficient) One-Port Measurements $\|S_{11}\|$ Magnitude $\|\Gamma\|$:	0.0 to 1.0	300 kHz to 2 GHz	$0.02 + 0.02 \|\Gamma\|^2$	PC-7 Connector; 50 Ω [2]
		> 2 GHz to 8 GHz	$0.02 + 0.02 \|\Gamma\|^2$	
		> 8 GHz to 18 GHz	$0.02 + 0.02 \|\Gamma\|^2$	
		300 kHz to 2 GHz	$0.05 + 0.02 \|\Gamma\|^2$	Type N Connector; 50 Ω [2]
		> 2 GHz to 18 GHz	$0.05 + 0.02 \|\Gamma\|^2$	
		45 MHz to 2 GHz	$0.02 + 0.02 \|\Gamma\|^2$	PC-3.5Connector; 50 Ω [2]
		> 2 GHz to 20 GHz	$0.02 + 0.02 \|\Gamma\|^2$	
		> 20 GHz to 26.5 GHz	$0.02 + 0.02 \|\Gamma\|^2$	
Phase φ	-180° to +180°	300 kHz to 26.5 GHz $0.2 \leq \|\Gamma\| < 1$	$\arcsin\frac{U(\|\Gamma\|)}{\|\Gamma\|}\cdot\frac{180°}{\pi} + K \cdot f$	PC-7, Type N, PC-3.5 Connector $K \cdot f$ = U-Contribution of cabling error with f = frequency K = 0.05°/GHz, direct connection to the measuring port
Two-Port Measurements $\|S_{11}\|$ & $\|S_{22}\|$	0.0 to 1.0	300 kHz to 2 GHz	$0.03 + 0.02 \|\Gamma\|^2$	PC-7 Connector; 50 Ω [2] for 3dB and $\|S_{11}\| < 0.05$
		> 2 GHz to 8 GHz	$0.03 + 0.02 \|\Gamma\|^2$	
		> 8 GHz to 18 GHz	$0.03 + 0.02 \|\Gamma\|^2$	
		300 kHz to 2 GHz	$0.05 + 0.02 \|\Gamma\|^2$	Type N Connector; 50 Ω [2] for 3dB and $\|S_{11}\| < 0.05$
		> 2 GHz to 18 GHz	$0.06 + 0.02 \|\Gamma\|^2$	
		> 8 GHz to 18 GHz	$0.06 + 0.02 \|\Gamma\|^2$	
		45 MHz to 2 GHz	$0.02 + 0.02 \|\Gamma\|^2$	PC-3.5Connector; 50 Ω [2] for 3dB and $\|S_{11}\| < 0.05$
		> 2 GHz to 20 GHz	$0.02 + 0.02 \|\Gamma\|^2$	
		> 20 GHz to 26.5 GHz	$0.03 + 0.02 \|\Gamma\|^2$	
Phase φ	-180° to +180°	300 kHz to 26.5 GHz $0.2 \leq \|\Gamma\| < 1$	$\arcsin\frac{U(\|\Gamma\|)}{\|\Gamma\|}\cdot\frac{180°}{\pi} + K \cdot f$	PC-7, Type N, PC-3.5 Connector $K \cdot f$ = U-Contribution of cabling error with f = frequency K = 0.05°/GHz, direct connection to the measuring port

[2] The measurement uncertainties increase with other connectors. Measurement uncertainty in units of the magnitude of the reflection coefficient.

[1] The smallest measurement uncertainties are stated according to DAkkS-DKD-3 (EA-4/02). These are expanded uncertainties with a 95 % level of confidence and, unless otherwise stated, using a coverage factor of k = 2. Uncertainties that appear without units are relative to the measured value unless otherwise stated.

Measurand quantity / Calibration item	Range	Measurement Conditions/Procedure	Smallest Measurement Uncertainty [1]	Remarks
Power Sensors	1 mW	0.1 MHz to 50 MHz	$15 \cdot 10^{-3}$	Type N Connector 50 Ω [2] $\lvert\Gamma\rvert \le 0.3$
		> 50 MHz to 6 GHz	$20 \cdot 10^{-3}$	
		> 6 GHz to 18 GHz	$25 \cdot 10^{-3}$	
		10 MHz to 1 GHz	$20 \cdot 10^{-3}$	PC-3.5 Connector; 50 Ω [2] $\lvert\Gamma\rvert \le 0.3$
		> 1 GHz to 10 GHz	$25 \cdot 10^{-3}$	
		> 10 GHz to 18 GHz	$30 \cdot 10^{-3}$	
		> 18 GHz to 26.5 GHz	$35 \cdot 10^{-3}$	
HF Attenuation Step Attenuators Absolute Attenuation value	0 dB to 60 dB	9 kHz to 18 GHz	0.3 dB	Type N Connector 50 Ω [2] $\lvert\Gamma\rvert \le 0.1$ [3]
	> 60 dB to 90 dB		0.3 dB	
	0 dB to 60 dB	45 MHz to 20 GHz	0.3 dB	PC-3.5 Connector; 50 Ω [2] 45 MHz to 20 GHz: $\lvert\Gamma\rvert \le 0.1$ >20 GHz to 26.5 GHz: $\lvert\Gamma\rvert \le 0.15$ [3]
	0 dB to 60 dB	> 20 GHz to 26.5 GHz	0.5 dB	
	> 60 dB to 90 dB	45 MHz to 20 GHz	0.3 dB	
	>60 dB to 90 dB	> 20 GHz to 26.5 GHz	0.5 dB	
Incremental Attenuation Value	0 dB to 60 dB	9 kHz to 18 GHz	0.42 dB	Type N Connector 50 Ω [2] $\lvert\Gamma\rvert \le 0.1$ [3]
	> 60 dB to 90 dB		0.42 dB	
	0 dB to 60 dB	45 MHz to 20 GHz	0.42 dB	PC-3.5 Connector; 50 Ω [2] 45 MHz to 20 GHz: $\lvert\Gamma\rvert \le 0.1$ >20 GHz to 26.5 GHz: $\lvert\Gamma\rvert \le 0.15$ [3]
	0 dB to 60 dB	> 20 GHz to 26.5 GHz	0.70 dB	
	> 60 dB to 90 dB	45 MHz to 20 GHz	0.42 dB	
	> 60 dB to 90 dB	> 20 GHz to 26.5 GHz	0.70 dB	

[2] The measurement uncertainties increase with other connectors. Measurement uncertainty in units of the magnitude of the reflection coefficient.

[3] Attenuation in 1 dB and 10 dB steps

[1] The smallest measurement uncertainties are stated according to DAkkS-DKD-3 (EA-4/02). These are expanded uncertainties with a 95 % level of confidence and, unless otherwise stated, using a coverage factor of k = 2. Uncertainties that appear without units are relative to the measured value unless otherwise stated.

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Measurand quantity / Calibration item	Range	Measurement Conditions/Procedure	Smallest Measurement Uncertainty [1)]	Remarks
DC Voltage	0 V		0.1 µV	U = adjusted value
Measuring Instruments	0.01 V to 2.2 V		$7 \cdot 10^{-6}\,U + 1$ µV	Fluke 5700A
	> 2.2 V to 11 V		$9 \cdot 10^{-6}\,U$	
	> 11 V to 22 V		$8 \cdot 10^{-6}\,U$	
	> 22 V to 1000 V		$12 \cdot 10^{-6}\,U$	
Sources	0 V		0.1 µV	U = measured value
	1 mV to 100 mV		$8 \cdot 10^{-6}\,U + 1$ µV	HP 3458A
	> 100 mV to 1 V		$11 \cdot 10^{-6}\,U$	
	> 1 V to 10 V		$9 \cdot 10^{-6}\,U$	
	> 10 V to 100 V		$13 \cdot 10^{-6}\,U$	
	> 100 V to 1000 V		$16 \cdot 10^{-6}\,U$	
DC Current	0 A		0.2 nA	I = adjusted value
Measuring Instruments	10 µA to 220 µA		$50 \cdot 10^{-6}\,I + 8$ nA	Fluke 5700A
	> 220 µA to 22 mA		$87 \cdot 10^{-6}\,I$	
	> 22 mA to 220 mA		$89 \cdot 10^{-6}\,I$	
	> 220 mA to 2.2 A		$0.2 \cdot 10^{-3}\,I$	
	> 2.2 A to 11 A		$0.55 \cdot 10^{-3}\,I$	with 5520A/5522A
	> 11 A to 20 A		$1.2 \cdot 10^{-3}\,I$	
	> 20 A to 200 A	Voltage drop with Standard Resistor	$1.0 \cdot 10^{-3}\,I$	
DC Current	0 A		0.2 nA	I = measured value
Sources	0.1 µA to 1 µA		$0.4 \cdot 10^{-3}\,I$	HP 3458A
	> 1 µA to 10 µA		$0.12 \cdot 10^{-3}\,I$	
	> 10 µA to 100 µA		$0.1 \cdot 10^{-3}\,I$	
	> 100 µA to 10 mA		$70 \cdot 10^{-6}\,I$	
	> 10 mA to 100 mA		$85 \cdot 10^{-6}\,I$	
	> 100 mA to 1 A		$0.2 \cdot 10^{-3}\,I$	
	> 1 A to 1 A	Voltage drop with Standard Resistor	$0.5 \cdot 10^{-3}\,I$	
	> 10 A to 200 A		$1.0 \cdot 10^{-3}\,I$	
Current Clamps	1 mA to 2.2 A		$1 \cdot 10^{-3}\,I$	
	> 2.2 A to 20 A		$2 \cdot 10^{-3}\,I$	
	> 20 A to 1000 A		$3 \cdot 10^{-3}\,I$	

[1)] The smallest measurement uncertainties are stated according to DAkkS-DKD-3 (EA-4/02). These are expanded uncertainties with a 95 % level of confidence and, unless otherwise stated, using a coverage factor of k = 2. Uncertainties that appear without units are relative to the measured value unless otherwise stated.

Measurand quantity / Calibration item	Range	Measurement Conditions/Procedure	Smallest Measurement Uncertainty [1)]	Remarks
DC Resistance	0 Ω		50 µ Ω	R = adjusted value
Measuring Instruments	1 Ω; 1.9 Ω		$95 \cdot 10^{-6} R$	Fluke 5700A
	10 Ω		$28 \cdot 10^{-6} R$	
	19 Ω		$27 \cdot 10^{-6} R$	
	100 Ω; 190 Ω		$17 \cdot 10^{-6} R$	
	1 kΩ; 1.9 kΩ		$13 \cdot 10^{-6} R$	
	10 kΩ; 19 kΩ		$12 \cdot 10^{-6} R$	
	100 kΩ; 190 kΩ		$14 \cdot 10^{-6} R$	
	1 MΩ		$20 \cdot 10^{-6} R$	
	1.9 MΩ		$21 \cdot 10^{-6} R$	
	10 MΩ		$40 \cdot 10^{-6} R$	
	19 MΩ		$48 \cdot 10^{-6} R$	
	100 MΩ		$0.11 \cdot 10^{-3} R$	
Resistance	0 Ω		0.1 mΩ	R = measured value
	1 Ω to 10 Ω		$16 \cdot 10^{-6} R$ + 50 µΩ	HP 3458A
	> 10 Ω to 100 Ω		$12 \cdot 10^{-6} R$ + 0.5 mΩ	
	> 100 Ω to 100 kΩ		$15 \cdot 10^{-6} R$	
	> 100 kΩ to 1 MΩ		$35 \cdot 10^{-6} R$	
	> 1 MΩ to 10 MΩ		$0.15 \cdot 10^{-3} R$	
	> 10 MΩ to 100 MΩ		$0.6 \cdot 10^{-3} R$	
	> 100 MΩ to 1 GΩ		$5 \cdot 10^{-3} R$	
DC Resistance (Ranges) Measuring Instruments	1 Ω to < 11 Ω		$0.12 \cdot 10^{-3} R$	R = adjusted value
	11 Ω to < 33 Ω		$33 \cdot 10^{-6} R$	Fluke 5520A /5522A
	33 Ω to < 110 Ω		$29 \cdot 10^{-6} R$	
	110 Ω to < 110 kΩ		$28 \cdot 10^{-6} R$	
	110 kΩ to < 330 kΩ		$32 \cdot 10^{-6} R$	
	330 kΩ to < 1.1 MΩ		$33 \cdot 10^{-6} R$	
	1.1 MΩ to < 3.3 MΩ		$62 \cdot 10^{-6} R$	
	3.3 MΩ to < 11 MΩ		$0.13 \cdot 10^{-3} R$	
	11 MΩ to < 33 MΩ		$0.25 \cdot 10^{-3} R$	
	33 MΩ to < 110 MΩ		$0.5 \cdot 10^{-3} R$	
	110 MΩ to < 330 MΩ		$3 \cdot 10^{-3} R$	
	330 MΩ to < 1.1 GΩ		$15 \cdot 10^{-3} R$	

[1)] The smallest measurement uncertainties are stated according to DAkkS-DKD-3 (EA-4/02). These are expanded uncertainties with a 95 % level of confidence and, unless otherwise stated, using a coverage factor of k = 2. Uncertainties that appear without units are relative to the measured value unless otherwise stated.

Measurand quantity / Calibration item	Range	Measurement Conditions/Procedure	Smallest Measurement Uncertainty [1)]	Remarks
AC Voltage	0.01 V to 0.022 V	10 Hz to 40 Hz	$1.2 \cdot 10^{-3}\ U$	U = adjusted value
Measuring Instruments		> 40 Hz to 20 kHz	$0.7 \cdot 10^{-3}\ U$	Fluke 5700A
		> 20 kHz to 50 kHz	$1.0 \cdot 10^{-3}\ U$	
		> 50 kHz to 100 kHz	$1.8 \cdot 10^{-3}\ U$	
		> 100 kHz to 300 kHz	$2.6 \cdot 10^{-3}\ U$	
		> 300 kHz to 500 kHz	$4.7 \cdot 10^{-3}\ U$	
		> 500 kHz to 1 MHz	$6.7 \cdot 10^{-3}\ U$	
	> 0.022 V to 0.22 V	10 Hz to 40 Hz	$0.75 \cdot 10^{-3}\ U$	
		> 40 Hz to 20 kHz	$0.21 \cdot 10^{-3}\ U$	
		> 20 kHz to 50 kHz	$0.45 \cdot 10^{-3}\ U$	
		> 50 kHz to 100 kHz	$1.3 \cdot 10^{-3}\ U$	
		> 100 kHz to 300 kHz	$1.5 \cdot 10^{-3}\ U$	
		> 300 kHz to 500 kHz	$2.3 \cdot 10^{-3}\ U$	
		> 500 kHz to 1 MHz	$4.7 \cdot 10^{-3}\ U$	
	> 0.22 V to 2.2 V	10 Hz to 40 Hz	$1.0 \cdot 10^{-3}\ U$	
		> 40 Hz to 20 kHz	$0.12 \cdot 10^{-3}\ U$	
		> 20 kHz to 50 kHz	$0.22 \cdot 10^{-3}\ U$	
		> 50 kHz to 100 kHz	$0.7 \cdot 10^{-3}\ U$	
		> 100 kHz to 300 kHz	$1.2 \cdot 10^{-3}\ U$	
		> 300 kHz to 500 kHz	$3.1 \cdot 10^{-3}\ U$	
		> 500 kHz to 1 MHz	$7.4 \cdot 10^{-3}\ U$	
	> 2.2 V to 22 V	10 Hz to 40 Hz	$1.0 \cdot 10^{-3}\ U$	
		> 40 Hz to 20 kHz	$0.12 \cdot 10^{-3}\ U$	
		> 20 kHz to 50 kHz	$0.22 \cdot 10^{-3}\ U$	
		> 50 kHz to 100 kHz	$0.45 \cdot 10^{-3}\ U$	
		> 100 kHz to 300 kHz	$1.3 \cdot 10^{-3}\ U$	
		> 300 kHz to 500 kHz	$3.6 \cdot 10^{-3}\ U$	
		> 500 kHz to 1 MHz	$7.4 \cdot 10^{-3}\ U$	
	> 22 V to 220 V	10 Hz to 40 Hz	$1.0 \cdot 10^{-3}\ U$	
		> 40 Hz to 20 kHz	$0.13 \cdot 10^{-3}\ U$	
		> 20 kHz to 50 kHz	$0.42 \cdot 10^{-3}\ U$	
		> 50 kHz to 100 kHz	$1.0 \cdot 10^{-3}\ U$	
	> 220 V to 1000 V	> 50 Hz to 1 kHz	$0.12 \cdot 10^{-3}\ U$	

[1)] The smallest measurement uncertainties are stated according to DAkkS-DKD-3 (EA-4/02). These are expanded uncertainties with a 95 % level of confidence and, unless otherwise stated, using a coverage factor of k = 2. Uncertainties that appear without units are relative to the measured value unless otherwise stated.

Measurand quantity / Calibration item	Range	Measurement Conditions/Procedure	Smallest Measurement Uncertainty [1)]	Remarks
AC Voltage Sources	0.01 V to 0.1 V	40 Hz to 1 kHz	$0.27 \cdot 10^{-3}\ U$	*U* = measured value HP 3458A
		> 1 kHz to 20 kHz	$0.34 \cdot 10^{-3}\ U$	
		> 20 kHz to 50 kHz	$0.55 \cdot 10^{-3}\ U$	
	> 0.1 V to 10 V	40 Hz to 1 kHz	$0.27 \cdot 10^{-3}\ U$	
		> 1 kHz to 20 kHz	$0.34 \cdot 10^{-3}\ U$	
		> 20 kHz to 50 kHz	$0.5 \cdot 10^{-3}\ U$	
	> 10 V to 100 V	40 Hz to 1 kHz	$0.4 \cdot 10^{-3}\ U$	
		> 1 kHz to 20 kHz	$0.4 \cdot 10^{-3}\ U$	
		> 20 kHz to 50 kHz	$0.55 \cdot 10^{-3}\ U$	
	> 100 V to 700 V	40 Hz to 1 kHz	$0.55 \cdot 10^{-3}\ U$	
Alternating current Measuring Instruments	0.1 mA to 0.22 mA	10 Hz to 40 Hz	$1.1 \cdot 10^{-3}\ I$	*I* = adjusted value Fluke 5700A
		> 40 Hz to 1 kHz	$0.3 \cdot 10^{-3}\ I$	
		> 1 kHz to 5 kHz	$1.2 \cdot 10^{-3}\ I$	
		> 5 kHz to 10 kHz	$2.7 \cdot 10^{-3}\ I$	
	> 0.22mA to 220 mA	10 Hz to 40 Hz	$1.0 \cdot 10^{-3}\ I$	
		> 40 Hz to 1 kHz	$0.4 \cdot 10^{-3}\ I$	
		> 1 kHz to 5 kHz	$3.0 \cdot 10^{-3}\ I$	
		> 5 kHz to 10 kHz	$6.4 \cdot 10^{-3}\ I$	
	> 220 mA to 2.2 A	20 Hz to 1 kHz	$1.1 \cdot 10^{-3}\ I$	
		> 1 kHz to 5 kHz	$1.3 \cdot 10^{-3}\ I$	
		> 5 kHz to 10 kHz	$10 \cdot 10^{-3}\ I$	
	> 2.2 A to 3 A	10 Hz to 45 Hz	$1.9 \cdot 10^{-3}\ I$	*I* = adjusted value Fluke 5520A/5522A
		> 45 Hz to 1 kHz	$0.7 \cdot 10^{-3}\ I$	
		> 1 kHz to 5 kHz	$6.9 \cdot 10^{-3}\ I$	
		> 5 kHz to 10 kHz	$29 \cdot 10^{-3}\ I$	
	> 3 A to 11 A	45 Hz to 100 Hz	$1.3 \cdot 10^{-3}\ I$	*I* = adjusted value Fluke 5520A/5522A
		> 100 Hz to 1 kHz	$1.6 \cdot 10^{-3}\ I$	
		> 1 kHz to 5 kHz	$30 \cdot 10^{-3}\ I$	
	> 11 A to 20.5 A	45 Hz to 100 Hz	$1.6 \cdot 10^{-3}\ I$	
		> 100 Hz to 1 kHz	$1.9 \cdot 10^{-3}\ I$	
		> 1 kHz to 5 kHz	$30 \cdot 10^{-3}\ I$	
Alternating current Sources	0.1 mA to 100 mA	20 Hz to 45 Hz	$3.5 \cdot 10^{-3}\ I$	*I* = measured value HP 3458A
		> 45 Hz to 100 Hz	$2.6 \cdot 10^{-3}\ I$	
		> 100 Hz to 5 kHz	$2.3 \cdot 10^{-3}\ I$	
	> 100 mA to 1 A	20 Hz to 45 Hz	$3.6 \cdot 10^{-3}\ I$	
		> 45 Hz to 100 Hz	$2.8 \cdot 10^{-3}\ I$	
		> 100 Hz to 5 kHz	$3.0 \cdot 10^{-3}\ I$	

[1)] The smallest measurement uncertainties are stated according to DAkkS-DKD-3 (EA-4/02). These are expanded uncertainties with a 95 % level of confidence and, unless otherwise stated, using a coverage factor of k = 2. Uncertainties that appear without units are relative to the measured value unless otherwise stated.

Measurand quantity / Calibration item	Range	Measurement Conditions/Procedure	Smallest Measurement Uncertainty [1)]	Remarks
Alternating current	1 mA to 2.2 A	40 Hz to 5 kHz	$2 \cdot 10^{-3}\, I$	I = Measured value
Current Clamps	> 2.2 A to 20 A	40 Hz to 5 kHz	$3 \cdot 10^{-3}\, I$	
	> 20 A to 800 A	40 Hz to 65 Hz	$4 \cdot 10^{-3}\, I$	
Alternating current Active Power Measuring Instruments	109 µW to < 11 kW	33 mV to 1000 V 45 Hz to 65 Hz; PF=1 33 mA to < 11 A	$1.4 \cdot 10^{-3}\, P$	P = adjusted value with Fluke 5520A/5522A PF: Leistungsfaktor (cos φ), φ: Phase angle
	363 mW to 20 kW	11 A to 20 A	$2.0 \cdot 10^{-3}\, P$	
Oscilloscope measurands	5 mV to 5 V	R_i = 50 Ω	$3.5 \cdot 10^{-3}\, U$ + 35 µV	Square wave voltage
Vertical Deflection	5 mV to 120 V	R_i = 1 MΩ	$2.4 \cdot 10^{-3}\, U$ + 40 µV	10 Hz to 10 kHz
Horizontal Deflection	5 ns to 520 ms		$3 \cdot 10^{-6}\, t$ + 1 ns	t: Rising time
	> 20 ms to 5 s		$30 \cdot 10^{-6}\, t + 1.2 \cdot 10^{-4}\, t^2$	
Rising time	600 ps to 10 ms	25 mV to 1V R_i = 50 Ω	$40 \cdot 10^{-3}\, t_r$ + 7 ps	
Frequency	1 mHz to 46 GHz		$2 \cdot 10^{-9}\, f + U$	f = current measuring value trigger uncertainity U
Time intervall	1 µs to 1000s		$2 \cdot 10^{-9} t + 2$ ns	
Capacitance Measuring Instruments	190 pF bis < 400pF	10 Hz bis 10 kHz	$4 \cdot 10^{-3}\, C$ + 8 pF	With 5520 A / 5522 A
	400 pF bis < 1.1 nF	10 Hz bis 10 kHz	$4.5 \cdot 10^{-3}\, C$ + 8 pF	
	1.1 nF bis < 3.3 nF	10 Hz bis 3 kHz	$4 \cdot 10^{-3}\, C$ + 8 pF	
	3.3 nF bis < 11 nF	10 Hz bis 1 kHz	$2.5 \cdot 10^{-3}\, C$ + 8 pF	
	11 nF bis < 33 nF	10 Hz bis 1 kHz	$2.5 \cdot 10^{-3}\, C$ + 80 pF	
	33 nF bis < 110 nF	10 Hz bis 1 kHz	$2.5 \cdot 10^{-3}\, C$ + 80 pF	
	110 nF bis < 330 nF	10 Hz bis 1 kHz	$4.5 \cdot 10^{-3}\, C$	
	330 nF bis < 1.1 µF	10 Hz bis 600 Hz	$4.5 \cdot 10^{-3}\, C$	
	1.1 µF bis < 3.3 µF	10 Hz bis 300 Hz	$4.5 \cdot 10^{-3}\, C$	
	3.3 µF bis < 11 µF	10 Hz bis 150 Hz	$4.5 \cdot 10^{-3}\, C$	
	11 µF bis < 33 µF	10 Hz bis 120 Hz	$6 \cdot 10^{-3}\, C$	
	33 µF bis < 110 µF	10 Hz bis 80 Hz	$6.5 \cdot 10^{-3}\, C$	
	110 µF bis < 330 µF	DC bis 50 Hz	$6 \cdot 10^{-3}\, C$	
	330 µF bis < 1.1 mF	DC bis 20 Hz	$6 \cdot 10^{-3}\, C$	
	1.1 mF bis < 3.3 mF	DC bis 6 Hz	$6 \cdot 10^{-3}\, C$	
	3.3 mF bis < 11 mF	DC bis 2Hz	$6 \cdot 10^{-3}\, C$	
	11 mF bis < 33mF	DC bis 0.6 Hz	$8.0 \cdot 10^{-3}\, C$	
	33 mF bis < 110 mF	DC bis 0.2 Hz	$11 \cdot 10^{-3}\, C$	

[1)] The smallest measurement uncertainties are stated according to DAkkS-DKD-3 (EA-4/02). These are expanded uncertainties with a 95 % level of confidence and, unless otherwise stated, using a coverage factor of k = 2. Uncertainties that appear without units are relative to the measured value unless otherwise stated.

Measurand quantity / Calibration item	Range	Measurement Conditions/Procedure	Smallest Measurement Uncertainty [1)]	Remarks
HF-Impedance (Reflection Coefficient) One-Port Measurements |S11| Magnitude $\|\Gamma\|$	0.0 to 1.0	300 kHz to 2 GHz	$0.02 + 0.02 \cdot \|\Gamma\|^2$	PC-7 Connector; 50 Ω [2)]
		> 2 GHz to 8 GHz	$0.02 + 0.02 \cdot \|\Gamma\|^2$	
		> 8 GHz to 18 GHz	$0.02 + 0.02 \cdot \|\Gamma\|^2$	
		300 kHz to 2 GHz	$0.05 + 0.02 \cdot \|\Gamma\|^2$	Type N Connector; 50 Ω [2)]
		> 2 GHz to 8 GHz	$0.05 + 0.02 \cdot \|\Gamma\|^2$	
		45 MHz to 2 GHz	$0.02 + 0.02 \cdot \|\Gamma\|^2$	PC-3.5Connector; 50 Ω [2)]
		> 2 GHz to 20 GHz	$0.02 + 0.02 \cdot \|\Gamma\|^2$	
		> 20 GHz to 26.5 GHz	$0.02 + 0.02 \cdot \|\Gamma\|^2$	
Phase φ	-180° to +180°	300 kHz to 26.5 GHz $0.2 \leq \|\Gamma\| < 1$	$\arcsin\frac{U(\|\Gamma\|)}{\|\Gamma\|} \cdot \frac{180°}{\pi} + K \cdot f$	PC-7; Type N; PC-3.5 Connector $K \cdot f$ = MU-Contribution of cabling error f = frequency, K = 0.05°/GHz, Direct connection to the measuring port
Two-Port Measurements $\|S_{11}\|$ & $\|S_{22}\|$	0.0 to 1.0	300 kHz to 2 GHz	$0.03 + 0.02 \cdot \|\Gamma\|^2$	PC-7 Connector; 50 Ω [2)] for 3dB and $\|S_{11}\| < 0.05$
		> 2 GHz to 8 GHz	$0.03 + 0.02 \cdot \|\Gamma\|^2$	
		> 8 GHz to 18 GHz	$0.03 + 0.02 \cdot \|\Gamma\|^2$	
		300 kHz to 2 GHz	$0.05 + 0.02 \cdot \|\Gamma\|^2$	Type N Connector; 50 Ω [2)] for 3dB and $\|S_{11}\| < 0.05$
		> 2 GHz to 18 GHz	$0.06 + 0.02 \cdot \|\Gamma\|^2$	
		> 8 GHz to 18 GHz	$0.06 + 0.02 \cdot \|\Gamma\|^2$	
		45 MHz to 2 GHz	$0.02 + 0.02 \cdot \|\Gamma\|^2$	PC-3.5Connector; 50 Ω [2)] for 3dB and $\|S_{11}\| < 0.05$
		> 2 GHz to 20 GHz	$0.02 + 0.02 \cdot \|\Gamma\|^2$	
		> 20 GHz to 26.5 GHz	$0.03 + 0.02 \cdot \|\Gamma\|^2$	
Phase φ	-180° to +180°	300 kHz to 26.5 GHz $0.2 \leq \|\Gamma\| < 1$	$\arcsin\frac{U(\|\Gamma\|)}{\|\Gamma\|} \cdot \frac{180°}{\pi} + K \cdot f$	PC-7; Type N; PC-3.5 Connector $K \cdot f$ = MU-Contribution of cabling error f = frequency, K = 0.05°/GHz, Direct connection to the measuring port

[2)] The measurement uncertainties increase with other connectors. Measurement uncertainty in units of the magnitude of the reflection coefficient.

[1)] The smallest measurement uncertainties are stated according to DAkkS-DKD-3 (EA-4/02). These are expanded uncertainties with a 95 % level of confidence and, unless otherwise stated, using a coverage factor of k = 2. Uncertainties that appear without units are relative to the measured value unless otherwise stated.

Measurand quantity / Calibration item	Range	Measurement Conditions/Procedure	Smallest Measurement Uncertainty [1]	Remarks
HF-Power Sensors	1 mW	0.1 MHz to 50 MHz	$15 \cdot 10^{-3}$	Type N Connector; 50 Ω [2] $\lvert\Gamma\rvert \leq 0.3$
		> 50 MHz to 6 GHz	$20 \cdot 10^{-3}$	
		> 6 GHz to 18 GHz	$25 \cdot 10^{-3}$	
		10 MHz to 1 GHz	$20 \cdot 10^{-3}$	PC-3.5Connector; 50 Ω [2] $\lvert\Gamma\rvert \leq 0.3$
		> 1 GHz to 10 GHz	$25 \cdot 10^{-3}$	
		> 10 GHz to 18 GHz	$30 \cdot 10^{-3}$	
		> 18 GHz to 26.5 GHz	$35 \cdot 10^{-3}$	
HF-Attenuation Step Attenuator Absolute Attenuation value	0 dB to 60 dB	9 kHz to 18 GHz	0.3 dB	Type N Conncetor; 50 Ω [2] $\lvert\Gamma\rvert \leq 0.1$ [3]
	> 60 dB to 90 dB		0.3 dB	
	0 dB to 60 dB	45 MHz to 20 GHz	0.3 dB	PC-3.5Connector; 50 Ω [2] 45 MHz to 20 GHz: $\lvert\Gamma\rvert \leq 0.1$ >20 GHz to 26.5 GHz: $\lvert\Gamma\rvert \leq 0.15$ [3]
	0 dB to 60 dB	> 20 GHz to 26.5 GHz	0.5 dB	
	> 60 dB to 90 dB	45 MHz to 20 GHz	0.3 dB	
	>60 dB to 90 dB	> 20 GHz to 26.5 GHz	0.5 dB	
Incremental Attenuation value	0 dB to 60 dB	9 kHz to 18 GHz	0.42 dB	Type N Connector; 50 Ω [2] $\lvert\Gamma\rvert \leq 0.1$ [3]
	> 60 dB to 90 dB		0.42 dB	
	0 dB to 60 dB	45 MHz to 20 GHz	0.42 dB	PC-3.5Connector; 50 Ω [2] 45 MHz to 20 GHz: $\lvert\Gamma\rvert \leq 0.1$ >20 GHz to 26.5 GHz: $\lvert\Gamma\rvert \leq 0.15$ [3]
	0 dB to 60 dB	> 20 GHz to 26.5 GHz	0.70 dB	
	> 60 dB to 90 dB	45 MHz to 20 GHz	0.42 dB	
	> 60 dB to 90 dB	> 20 GHz to 26.5 GHz	0.70 dB	

[2] The measurement uncertainties increase with other connectors. Measurement uncertainty in units of the magnitude of the reflection coefficient.
[3] Attenuation in 1 dB and 10 dB steps

[1] The smallest measurement uncertainties are stated according to DAkkS-DKD-3 (EA-4/02). These are expanded uncertainties with a 95 % level of confidence and, unless otherwise stated, using a coverage factor of k = 2. Uncertainties that appear without units are relative to the measured value unless otherwise stated.

Measurand quantity / Calibration item	Range	Measurement Conditions/Procedure	Smallest Measurement Uncertainty [1)]	Remarks
Temperature indicator and -simulator Resistance thermometers	-200 °C to 850 °C	DAkkS-DKD-R 5-5:2010	0.03 K	
precious metal thermometer	-200 °C to 1750 °C		0.10 K	Characteristic curve according to DIN EN 60751:2009
Non-precious metal thermometer	-200 °C to 1300 °C		0.05 K	Characteristic curve according to DIN EN 60584-1:1998

[1)] The smallest measurement uncertainties are stated according to DAkkS-DKD-3 (EA-4/02). These are expanded uncertainties with a 95 % level of confidence and, unless otherwise stated, using a coverage factor of k = 2. Uncertainties that appear without units are relative to the measured value unless otherwise stated.

Abbreviations used:

SPRT	Standard Platinum Resistance Thermometer
ISPRT	Industrial Standard Platinum Resistance Thermometer
DAkkS-DKD-R	A calibration directive from the „Deutsche Akkreditierungsstelle“ formerly „Deutscher Kalibrierdienst“

[1] The smallest measurement uncertainties are stated according to DAkkS-DKD-3 (EA-4/02). These are expanded uncertainties with a 95 % level of confidence and, unless otherwise stated, using a coverage factor of k = 2. Uncertainties that appear without units are relative to the measured value unless otherwise stated.