

Deutsche Akkreditierungsstelle GmbH

Annex to the Accreditation Certificate D-K-15115-01-00 according to DIN EN ISO/IEC 17025:2018

Valid from: 14.12.2020

Date of issue: 14.12.2020

Calibration laboratory:

1A CAL GmbH
Falderbaumstraße 23, 34123 Kassel

Calibration in the fields:

Electrical quantities

DC and low frequency quantities

- DC voltage *)

- DC current *)

- DC resistance

- AC voltage *)

- AC current *)

- AC/DC transfer

- Capacitance

Time and frequency

- Frequency

High frequency quantities

- HF voltage

- Oscilloscope quantities *)

- Rise time *)

- Band width *)

Optical quantities

- Radiometry

*) also on-site calibrations

Abbreviations used: see last page

The management system requirements in DIN EN ISO/IEC 17025 are written in language relevant to operations of calibration laboratories and operate generally in accordance with the principles of DIN EN ISO 9001.

*The certificate together with its annex reflects the status at the time of the date of issue. The current status of the scope of accreditation can be found in the database of accredited bodies of Deutsche Akkreditierungsstelle GmbH.
<https://www.dakks.de/en/content/accredited-bodies-dakks>*

Annex to the accreditation certificate D-K-15115-01-00

Permanent Laboratory

Calibration and Measurement Capabilities (CMC)

Measurement quantity / Calibration item	Range	Measurement conditions / procedure	Expanded uncertainty of measurement ¹⁾	Remarks
DC voltage Digital voltmeter	0.01 V to 10 V		13 nV	Comparison with Josephson voltage standard
Voltage standards	1 V; 1.018 V; 10 V		0.2 μV	
Linearity of digital voltmeters	0.01 V to 10 V		$\frac{23 \text{ nV}}{U_{\text{JPH}}}$	U_{JPH} = Josephson standard potential
divider ratio	0.01 V to 10 V		$2 \cdot 10^{-9} \cdot \sqrt{23 + 67 \cdot \left(\frac{1}{k_{\text{UF}}}\right)^2}$	k_{UF} = transmission factor of divider to be calibrated
measuring instruments	10 μV to 1 V		$0.2 \cdot 10^{-6} \cdot \sqrt{2.4 + \left(\frac{1.1V}{U}\right)^2}$	U = voltage to be calibrated
	> 1 V to 10 V		$0.2 \cdot 10^{-6} \cdot \sqrt{0.3 + \left(\frac{1.1V}{U}\right)^2}$	
	> 10 V to 100 V		$0.34 \cdot 10^{-6}$	
	> 100 V to 1000 V		$0.63 \cdot 10^{-6}$	
measuring instruments and sources	10 μV to 10 V		$0.2 \cdot 10^{-6} \cdot \sqrt{0.7 + \left(\frac{1.1V}{U}\right)^2}$	U = voltage to be calibrated
	> 10 V to 100 V		$0.3 \cdot 10^{-6}$	
	> 100 V to 1000 V		$0.6 \cdot 10^{-6}$	
High voltage sources and dividers	> 1000 V to 40 000 V		$0.15 \cdot 10^{-3}$	
DC current measuring instruments	0.1 μA		$35 \cdot 10^{-6}$	
	> 0.1 μA to < 1 μA		$15 \cdot 10^{-6}$	
	1 μA to < 10 μA		$8 \cdot 10^{-6}$	
	10 μA to 2 A		$7 \cdot 10^{-6}$	
	> 2 A to 10 A		$15 \cdot 10^{-6}$	
	> 10 A to 20 A		$20 \cdot 10^{-6}$	
Current clamps	0 A to 100 A		$0.5 \text{ mA} + 5 \cdot 10^{-3} \cdot I$	I = measured value
	> 100 A to 1000 A		$5 \cdot 10^{-3}$	
Sources	0.1 μA		$35 \cdot 10^{-6}$	
	> 0.1 μA to < 1 μA		$7 \cdot 10^{-6}$	
	1 μA to 0.2 A		$6 \cdot 10^{-6}$	
	> 0.2 A to 2 A		$7 \cdot 10^{-6}$	
	> 2 A to 10 A		$12 \cdot 10^{-6}$	
	> 10 A to 20 A		$14 \cdot 10^{-6}$	

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DC resistance resistors and measuring instruments	10 $\mu\Omega$ to < 100 $\mu\Omega$		$22 \cdot 10^{-6}$	
	100 $\mu\Omega$ to < 1 m Ω		$4.6 \cdot 10^{-6}$	
	1 m Ω to < 10 m Ω		$2.3 \cdot 10^{-6}$	
	10 m Ω to < 1 Ω		$1.2 \cdot 10^{-6}$	
	1 Ω to < 10 k Ω		$0.3 \cdot 10^{-6}$	
	10 k Ω to 1 M Ω		$0.5 \cdot 10^{-6}$	
	> 1 M Ω to 100 M Ω		$2 \cdot 10^{-6}$	
	> 100 M Ω to 1000 M Ω		$8 \cdot 10^{-6}$	
	> 1 G Ω to 10 G Ω		$1.1 \cdot 10^{-3}$	
DC power measuring instruments and calibrators	10 mW to 20 kW		$25 \cdot 10^{-6}$	
AC voltage measuring instruments	1 mV	10 Hz	$0.45 \cdot 10^{-3}$	Fluke 5790A measuring range: 2.2 mV
		20 Hz; 30 Hz	$0.42 \cdot 10^{-3}$	
		40 Hz; 55 Hz; 60 Hz	$0.42 \cdot 10^{-3}$	
		120 Hz; 300 Hz; 400 Hz	$0.42 \cdot 10^{-3}$	
		500 Hz; 1 kHz; 10 kHz	$0.42 \cdot 10^{-3}$	
		20 kHz; 30 kHz; 50 kHz	$0.42 \cdot 10^{-3}$	
		70 kHz; 100 kHz	$0.42 \cdot 10^{-3}$	
		200 kHz; 300 kHz	$0.45 \cdot 10^{-3}$	
		500 kHz	$0.45 \cdot 10^{-3}$	
700 kHz; 800 kHz	$0.50 \cdot 10^{-3}$			
1 MHz	$0.60 \cdot 10^{-3}$			
2 mV	10 Hz	20 Hz; 30 Hz	$0.22 \cdot 10^{-3}$	Fluke 5790A measuring range: 7 mV
		40 Hz; 55 Hz; 60 Hz	$0.20 \cdot 10^{-3}$	
		120 Hz; 300 Hz; 400 Hz	$0.20 \cdot 10^{-3}$	
		500 Hz; 1 kHz; 10 kHz	$0.20 \cdot 10^{-3}$	
		20 kHz; 30 kHz; 50 kHz	$0.20 \cdot 10^{-3}$	
		70 kHz; 100 kHz	$0.20 \cdot 10^{-3}$	
		200 kHz; 300 kHz	$0.22 \cdot 10^{-3}$	
		500 kHz	$0.22 \cdot 10^{-3}$	
		700 kHz; 800 kHz	$0.25 \cdot 10^{-3}$	
1 MHz	$0.30 \cdot 10^{-3}$			
2 mV	10 Hz	20 Hz	$0.20 \cdot 10^{-3}$	Fluke 5790A measuring range: 7 mV
		30 Hz; 40 Hz; 55 Hz; 60 Hz	$0.18 \cdot 10^{-3}$	
		120 Hz; 300 Hz; 400 Hz	$0.17 \cdot 10^{-3}$	
		500 Hz; 1 kHz; 10 kHz	$0.17 \cdot 10^{-3}$	
		20 kHz; 30 kHz; 50 kHz	$0.17 \cdot 10^{-3}$	
		70 kHz	$0.17 \cdot 10^{-3}$	
		100 kHz	$0.18 \cdot 10^{-3}$	
		200 kHz; 300 kHz; 500 kHz	$0.19 \cdot 10^{-3}$	
		700 kHz; 800 kHz	$0.22 \cdot 10^{-3}$	
1 MHz	$0.25 \cdot 10^{-3}$			

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Measurement quantity / Calibration item	Range	Measurement conditions / procedure	Expanded uncertainty of measurement ¹⁾	Remarks
AC voltage measuring instruments	6 mV	10 Hz 20 Hz; 30 Hz 40 Hz; 55 Hz; 60 Hz 120 Hz; 300 Hz; 400 Hz 500 Hz; 1 kHz; 10 kHz 20 kHz; 30 kHz; 50 kHz 70 kHz; 100 kHz 200 kHz; 300 kHz; 500 kHz 700 kHz; 800 kHz 1 MHz	0.12 · 10 ⁻³ 0.10 · 10 ⁻³ 0.10 · 10 ⁻³ 0.10 · 10 ⁻³ 0.10 · 10 ⁻³ 0.10 · 10 ⁻³ 0.12 · 10 ⁻³ 0.14 · 10 ⁻³ 0.17 · 10 ⁻³	Fluke 5790A measuring range: 7 mV
	2 mV	10 Hz 20 Hz; 30 Hz 40 Hz; 55 Hz; 60 Hz 120 Hz; 300 Hz; 400 Hz 500 Hz; 1 kHz; 10 kHz 20 kHz; 30 kHz 50 kHz; 70 kHz; 100 kHz 200 kHz; 300 kHz; 500 kHz 700 kHz 800 kHz 1 MHz	0.19 · 10 ⁻³ 0.16 · 10 ⁻³ 0.16 · 10 ⁻³ 0.16 · 10 ⁻³ 0.16 · 10 ⁻³ 0.16 · 10 ⁻³ 0.17 · 10 ⁻³ 0.18 · 10 ⁻³ 0.20 · 10 ⁻³ 0.21 · 10 ⁻³ 0.25 · 10 ⁻³	Fluke 5790A measuring range: 22 mV
	6 mV	10 Hz 20 Hz; 30 Hz; 40 Hz 55 Hz; 60 Hz 120 Hz; 300 Hz 400 Hz; 500 Hz 1 kHz; 10 kHz 20 kHz; 30 kHz; 50 kHz 70 kHz 100 kHz 200 kHz; 300 kHz 500 kHz 700 kHz; 800 kHz 1 MHz	0.10 · 10 ⁻³ 80 · 10 ⁻⁶ 80 · 10 ⁻⁶ 80 · 10 ⁻⁶ 80 · 10 ⁻⁶ 80 · 10 ⁻⁶ 75 · 10 ⁻⁶ 75 · 10 ⁻⁶ 80 · 10 ⁻⁶ 90 · 10 ⁻⁶ 0.10 · 10 ⁻³ 0.14 · 10 ⁻³ 0.16 · 10 ⁻³	
	10 mV	10 Hz 20 Hz; 30 Hz; 40 Hz 55 Hz; 60 Hz 120 Hz; 300 Hz 400 Hz; 500 Hz 1 kHz; 10 kHz 20 kHz; 30 kHz; 50 kHz 70 kHz 100 kHz 200 kHz; 300 kHz 500 kHz 700 kHz; 800 kHz 1 MHz	80 · 10 ⁻⁶ 60 · 10 ⁻⁶ 60 · 10 ⁻⁶ 60 · 10 ⁻⁶ 60 · 10 ⁻⁶ 60 · 10 ⁻⁶ 55 · 10 ⁻⁶ 55 · 10 ⁻⁶ 60 · 10 ⁻⁶ 70 · 10 ⁻⁶ 80 · 10 ⁻⁶ 0.10 · 10 ⁻³ 0.12 · 10 ⁻³	

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Measurement quantity / Calibration item	Range	Measurement conditions / procedure	Expanded uncertainty of measurement ¹⁾	Remarks
AC voltage measuring instruments	20 mV	10 Hz 20 Hz; 30 Hz; 40 Hz 55 Hz; 60 Hz 120 Hz; 300 Hz 400 Hz; 500 Hz 1 kHz; 10 kHz 20 kHz; 30 kHz; 50 kHz 70 kHz 100 kHz 200 kHz; 300 kHz 500 kHz 700 kHz; 800 kHz 1 MHz	$60 \cdot 10^{-6}$ $40 \cdot 10^{-6}$ $40 \cdot 10^{-6}$ $40 \cdot 10^{-6}$ $35 \cdot 10^{-6}$ $35 \cdot 10^{-6}$ $35 \cdot 10^{-6}$ $35 \cdot 10^{-6}$ $45 \cdot 10^{-6}$ $50 \cdot 10^{-6}$ $70 \cdot 10^{-6}$ $80 \cdot 10^{-6}$	Fluke 5790A measuring range: 22 mV
	20 mV	10 Hz 20 Hz; 30 Hz; 40 Hz 55 Hz; 60 Hz 120 Hz; 300 Hz 400 Hz; 500 Hz 1 kHz; 10 kHz 20 kHz; 30 kHz; 50 kHz 70 kHz 100 kHz 200 kHz; 300 kHz 500 kHz 700 kHz; 800 kHz 1 MHz	$90 \cdot 10^{-6}$ $65 \cdot 10^{-6}$ $65 \cdot 10^{-6}$ $65 \cdot 10^{-6}$ $60 \cdot 10^{-6}$ $60 \cdot 10^{-6}$ $55 \cdot 10^{-6}$ $55 \cdot 10^{-6}$ $65 \cdot 10^{-6}$ $80 \cdot 10^{-6}$ $90 \cdot 10^{-6}$ $0.12 \cdot 10^{-3}$ $0.14 \cdot 10^{-3}$	Fluke 5790A measuring range: 70 mV
	40 mV	10 Hz 20 Hz; 30 Hz; 40 Hz 55 Hz; 60 Hz 120 Hz; 300 Hz 400 Hz; 500 Hz 1 kHz; 10 kHz 20 kHz; 30 kHz; 50 kHz 70 kHz 100 kHz 200 kHz; 300 kHz 500 kHz 700 kHz; 800 kHz 1 MHz	$75 \cdot 10^{-6}$ $55 \cdot 10^{-6}$ $55 \cdot 10^{-6}$ $55 \cdot 10^{-6}$ $50 \cdot 10^{-6}$ $50 \cdot 10^{-6}$ $45 \cdot 10^{-6}$ $45 \cdot 10^{-6}$ $55 \cdot 10^{-6}$ $65 \cdot 10^{-6}$ $75 \cdot 10^{-6}$ $0.10 \cdot 10^{-3}$ $0.12 \cdot 10^{-3}$	
	60 mV	10 Hz 20 Hz; 30 Hz; 40 Hz 55 Hz; 60 Hz 120 Hz; 300 Hz 400 Hz; 500 Hz 1 kHz; 10 kHz 20 kHz; 30 kHz 50 kHz; 70 kHz; 100 kHz 200 kHz; 300 kHz 500 kHz 700 kHz; 800 kHz 1 MHz	$60 \cdot 10^{-6}$ $40 \cdot 10^{-6}$ $40 \cdot 10^{-6}$ $40 \cdot 10^{-6}$ $35 \cdot 10^{-6}$ $35 \cdot 10^{-6}$ $35 \cdot 10^{-6}$ $30 \cdot 10^{-6}$ $40 \cdot 10^{-6}$ $50 \cdot 10^{-6}$ $70 \cdot 10^{-6}$ $80 \cdot 10^{-6}$	

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Measurement quantity / Calibration item	Range	Measurement conditions / procedure	Expanded uncertainty of measurement ¹⁾	Remarks	
AC voltage measuring instruments	60 mV	10 Hz 20 Hz; 30 Hz 40 Hz; 55 Hz; 60 Hz 120 Hz; 300 Hz; 400 Hz 500 Hz; 1 kHz; 10 kHz 20 kHz; 30 kHz; 50 kHz 70 kHz; 100 kHz 200 kHz; 300 kHz 500 kHz 700 kHz; 800 kHz 1 MHz	40 · 10 ⁻⁶ 30 · 10 ⁻⁶ 30 · 10 ⁻⁶ 30 · 10 ⁻⁶ 30 · 10 ⁻⁶ 30 · 10 ⁻⁶ 30 · 10 ⁻⁶ 40 · 10 ⁻⁶ 75 · 10 ⁻⁶ 0.10 · 10 ⁻³ 0.12 · 10 ⁻³	Fluke 5790A measuring range: 220 mV	
	100 mV; 200 mV	10 Hz 20 Hz 30 Hz; 40 Hz; 55 Hz 60 Hz; 120 Hz; 300 Hz 400 Hz; 500 Hz 1 kHz; 10 kHz; 20 kHz 30 kHz; 50 kHz; 70 kHz 100 kHz 200 kHz; 300 kHz	15 · 10 ⁻⁶ 12 · 10 ⁻⁶ 12 · 10 ⁻⁶ 12 · 10 ⁻⁶ 8 · 10 ⁻⁶ 8 · 10 ⁻⁶ 8 · 10 ⁻⁶ 9 · 10 ⁻⁶ 20 · 10 ⁻⁶		
	100 mV; 200 mV	500 kHz 700 kHz; 800 kHz 1 MHz	30 · 10 ⁻⁶ 40 · 10 ⁻⁶ 45 · 10 ⁻⁶		
	200 mV	10 Hz 20 Hz 30 Hz; 40 Hz; 55 Hz 60 Hz; 120 Hz; 300 Hz 400 Hz; 500 Hz 1 kHz; 10 kHz; 20 kHz 30 kHz; 50 kHz; 70 kHz 100 kHz 200 kHz; 300 kHz 500 kHz 700 kHz; 800 kHz 1 MHz	15 · 10 ⁻⁶ 12 · 10 ⁻⁶ 12 · 10 ⁻⁶ 12 · 10 ⁻⁶ 8 · 10 ⁻⁶ 8 · 10 ⁻⁶ 8 · 10 ⁻⁶ 9 · 10 ⁻⁶ 20 · 10 ⁻⁶ 30 · 10 ⁻⁶ 40 · 10 ⁻⁶ 45 · 10 ⁻⁶		Fluke 5790A measuring range:700 mV
	300 mV; 400 mV	10 Hz; 20 Hz 30 Hz; 40 Hz; 55 Hz 60 Hz; 120 Hz; 300 Hz 400 Hz; 500 Hz 1 kHz; 10 kHz 20 kHz; 30 kHz; 50 kHz 70 kHz 100 kHz 200 kHz; 300 kHz 500 kHz 700 kHz; 800 kHz 1 MHz	12 · 10 ⁻⁶ 12 · 10 ⁻⁶ 12 · 10 ⁻⁶ 8 · 10 ⁻⁶ 8 · 10 ⁻⁶ 6 · 10 ⁻⁶ 7 · 10 ⁻⁶ 9 · 10 ⁻⁶ 20 · 10 ⁻⁶ 30 · 10 ⁻⁶ 40 · 10 ⁻⁶ 45 · 10 ⁻⁶		

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Measurement quantity / Calibration item	Range	Measurement conditions / procedure	Expanded uncertainty of measurement ¹⁾	Remarks
AC voltage measuring instruments	500 mV; 600 mV; 700 mV	10 Hz; 20Hz 30 Hz; 40 Hz; 55 Hz 60 Hz; 120 Hz; 300 Hz 400 Hz; 500 Hz 1 kHz; 10 kHz; 20 kHz 30 kHz; 50 kHz 70 kHz 100 kHz 200 kHz; 300 kHz 500 kHz 700 Hz; 800 kHz 1 MHz	$12 \cdot 10^{-6}$ $12 \cdot 10^{-6}$ $12 \cdot 10^{-6}$ $5 \cdot 10^{-6}$ $5 \cdot 10^{-6}$ $5 \cdot 10^{-6}$ $6 \cdot 10^{-6}$ $9 \cdot 10^{-6}$ $20 \cdot 10^{-6}$ $30 \cdot 10^{-6}$ $40 \cdot 10^{-6}$ $45 \cdot 10^{-6}$	Fluke 5790A measuring range:700 mV
	600 mV	10 Hz; 20 Hz 30 Hz; 40 Hz; 55 Hz 60 Hz; 120 Hz; 300 Hz 400 Hz; 500 Hz 1 kHz; 10 kHz; 20 kHz 30 kHz; 50 kHz 70 kHz 100 kHz 200 kHz; 300 kHz 500 kHz 700 kHz; 800 kHz 1 MHz	$12 \cdot 10^{-6}$ $12 \cdot 10^{-6}$ $12 \cdot 10^{-6}$ $5 \cdot 10^{-6}$ $5 \cdot 10^{-6}$ $5 \cdot 10^{-6}$ $6 \cdot 10^{-6}$ $9 \cdot 10^{-6}$ $20 \cdot 10^{-6}$ $30 \cdot 10^{-6}$ $40 \cdot 10^{-6}$ $45 \cdot 10^{-6}$	Fluke 5790A measuring range: 2.2 V
	1 V; 2 V	10 Hz 20 Hz; 30 Hz; 40 Hz 55 Hz; 60 Hz; 120 Hz 300 Hz; 400 Hz; 500 Hz 1 kHz; 10 kHz; 20 kHz 30 kHz; 50 kHz; 70 kHz 100 kHz; 200 kHz 300 kHz; 500 kHz 700 kHz; 800 kHz 1 MHz	$5 \cdot 10^{-6}$ $4 \cdot 10^{-6}$ $4 \cdot 10^{-6}$ $4 \cdot 10^{-6}$ $4 \cdot 10^{-6}$ $4 \cdot 10^{-6}$ $6 \cdot 10^{-6}$ $8 \cdot 10^{-6}$ $10 \cdot 10^{-6}$ $20 \cdot 10^{-6}$	
	2 V; 3 V; 4 V; 5 V; 6 V; 7 V	10 Hz 20 Hz; 30 Hz; 40 Hz 55 Hz; 60 Hz; 120 Hz 300 Hz; 400 Hz; 500 Hz 1 kHz; 10 kHz; 20 kHz 30 kHz; 50 kHz; 70 kHz 100 kHz; 200 kHz 300 kHz; 500 kHz 700 kHz; 800 kHz 1 MHz	$5 \cdot 10^{-6}$ $4 \cdot 10^{-6}$ $4 \cdot 10^{-6}$ $4 \cdot 10^{-6}$ $4 \cdot 10^{-6}$ $4 \cdot 10^{-6}$ $6 \cdot 10^{-6}$ $8 \cdot 10^{-6}$ $10 \cdot 10^{-6}$ $20 \cdot 10^{-6}$	Fluke 5790A measuring range: 7 V

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Calibration and Measurement Capabilities (CMC)

Measurement quantity / Calibration item	Range	Measurement conditions / procedure	Expanded uncertainty of measurement ¹⁾	Remarks
AC voltage measuring instruments	6 V; 8 V; 10 V	10 Hz 20 Hz; 30 Hz; 40 Hz 55 Hz; 60 Hz; 120 Hz 300 Hz; 400 Hz 500 Hz; 1 kHz; 10 kHz 20 kHz; 30 kHz; 50 kHz 70 kHz 100 kHz; 200 kHz 300 kHz; 500 kHz 700 kHz; 800 kHz 1 MHz	$5 \cdot 10^{-6}$ $4 \cdot 10^{-6}$ $4 \cdot 10^{-6}$ $4 \cdot 10^{-6}$ $4 \cdot 10^{-6}$ $4 \cdot 10^{-6}$ $4 \cdot 10^{-6}$ $6 \cdot 10^{-6}$ $8 \cdot 10^{-6}$ $10 \cdot 10^{-6}$ $20 \cdot 10^{-6}$	Fluke 5790A measuring range: 22 V
	20 V	10 Hz; 20 Hz 30 Hz; 40 Hz; 55 Hz; 60 Hz 120 Hz; 300 Hz; 400 Hz 500 Hz; 1 kHz; 10 kHz 20 kHz; 30 kHz; 50 kHz 70 kHz 100 kHz 200 kHz 300 kHz 500 kHz 700 kHz; 800 kHz 1 MHz	$6 \cdot 10^{-6}$ $6 \cdot 10^{-6}$ $6 \cdot 10^{-6}$ $6 \cdot 10^{-6}$ $6 \cdot 10^{-6}$ $6 \cdot 10^{-6}$ $8 \cdot 10^{-6}$ $9 \cdot 10^{-6}$ $10 \cdot 10^{-6}$ $12 \cdot 10^{-6}$ $18 \cdot 10^{-6}$ $25 \cdot 10^{-6}$	
	20 V	10 Hz; 20 Hz 30 Hz; 40 Hz; 55 Hz; 60 Hz 120 Hz; 300 Hz; 400 Hz 500 Hz; 1 kHz; 10 kHz 20 kHz; 30 kHz; 50 kHz 70 kHz 100 kHz 200 kHz; 300 kHz 500 kHz 700 kHz; 800 kHz 1 MHz	$7 \cdot 10^{-6}$ $7 \cdot 10^{-6}$ $7 \cdot 10^{-6}$ $7 \cdot 10^{-6}$ $7 \cdot 10^{-6}$ $7 \cdot 10^{-6}$ $8 \cdot 10^{-6}$ $10 \cdot 10^{-6}$ $12 \cdot 10^{-6}$ $25 \cdot 10^{-6}$ $35 \cdot 10^{-6}$	Fluke 5790A measuring range: 70 V

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Measurement quantity / Calibration item	Range	Measurement conditions / procedure	Expanded uncertainty of measurement ¹⁾	Remarks
AC voltage measuring instruments	30 V	10 Hz 20 Hz; 30 Hz 40 Hz; 55 Hz; 60 Hz 120 Hz; 300 Hz; 400 Hz 500 Hz; 1 kHz; 10 kHz 20 kHz; 30 kHz; 50 kHz 70 kHz 100 kHz 200 kHz; 300 kHz 500 kHz 700 kHz	$8 \cdot 10^{-6}$ $7 \cdot 10^{-6}$ $7 \cdot 10^{-6}$ $7 \cdot 10^{-6}$ $7 \cdot 10^{-6}$ $7 \cdot 10^{-6}$ $9 \cdot 10^{-6}$ $12 \cdot 10^{-6}$ $15 \cdot 10^{-6}$ $25 \cdot 10^{-6}$	Fluke 5790A measuring range: 70 V
	40 V; 50 V; 60 V; 70 V	10 Hz 20 Hz; 30 Hz; 40 Hz; 55 Hz 60 Hz; 120 Hz; 300 Hz 400 Hz; 500 Hz 1 kHz; 10 kHz 20 kHz; 30 kHz; 50 kHz 70 kHz 100 kHz	$9 \cdot 10^{-6}$ $8 \cdot 10^{-6}$ $8 \cdot 10^{-6}$ $7 \cdot 10^{-6}$ $7 \cdot 10^{-6}$ $7 \cdot 10^{-6}$ $9 \cdot 10^{-6}$ $12 \cdot 10^{-6}$	
	60 V	10 Hz 20 Hz; 30 Hz; 40 Hz; 55 Hz 60 Hz; 120 Hz; 300 Hz 400 Hz; 500 Hz 1 kHz; 10 kHz 20 kHz; 30 kHz; 50 kHz 70 kHz 100 kHz	$9 \cdot 10^{-6}$ $8 \cdot 10^{-6}$ $8 \cdot 10^{-6}$ $7 \cdot 10^{-6}$ $7 \cdot 10^{-6}$ $7 \cdot 10^{-6}$ $9 \cdot 10^{-6}$ $12 \cdot 10^{-6}$	Fluke 5790A measuring range: 220 V
	100 V; 200 V	10 Hz 20 Hz; 30 Hz; 40 Hz; 55 Hz 60 Hz; 120 Hz; 300 Hz 400 Hz; 500 Hz 1 kHz; 10 kHz 20 kHz; 30 kHz; 50 kHz 70 kHz 100 kHz	$14 \cdot 10^{-6}$ $12 \cdot 10^{-6}$ $12 \cdot 10^{-6}$ $12 \cdot 10^{-6}$ $12 \cdot 10^{-6}$ $12 \cdot 10^{-6}$ $18 \cdot 10^{-6}$ $30 \cdot 10^{-6}$	
	200 V	10 Hz 20 Hz; 30 Hz; 40 Hz 55 Hz; 60 Hz 120 Hz; 300 Hz; 400 Hz 500 Hz; 1 kHz; 10 kHz 20 kHz; 30 kHz; 50 kHz 70 kHz 100 kHz	$14 \cdot 10^{-6}$ $12 \cdot 10^{-6}$ $12 \cdot 10^{-6}$ $12 \cdot 10^{-6}$ $12 \cdot 10^{-6}$ $12 \cdot 10^{-6}$ $18 \cdot 10^{-6}$ $30 \cdot 10^{-6}$	Fluke 5790A measuring range: 700 V
	300 V; 400 V	10 Hz 20 Hz; 30 Hz; 40 Hz 55 Hz; 60 Hz 120 Hz; 300 Hz; 400 Hz 500 Hz; 1 kHz; 10 kHz 20 kHz; 30 kHz; 50 kHz 70 kHz 100 kHz	$16 \cdot 10^{-6}$ $12 \cdot 10^{-6}$ $12 \cdot 10^{-6}$ $12 \cdot 10^{-6}$ $12 \cdot 10^{-6}$ $12 \cdot 10^{-6}$ $18 \cdot 10^{-6}$ $30 \cdot 10^{-6}$	

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Measurement quantity / Calibration item	Range	Measurement conditions / procedure	Expanded uncertainty of measurement ¹⁾	Remarks
AC voltage measuring instruments	500 V; 600 V; 700 V	10 Hz 20 Hz; 30 Hz; 40 Hz 55 Hz; 60 Hz 120 Hz; 300 Hz; 400 Hz 500 Hz; 1 kHz; 10 kHz 20 kHz; 30 kHz; 50 kHz 70 kHz 100 kHz	16 · 10 ⁻⁶ 12 · 10 ⁻⁶ 12 · 10 ⁻⁶ 12 · 10 ⁻⁶ 12 · 10 ⁻⁶ 12 · 10 ⁻⁶ 25 · 10 ⁻⁶ 35 · 10 ⁻⁶	Fluke 5790A measuring range: 700 V
	200 V	10 Hz; 20 Hz; 30 Hz 40 Hz; 55 Hz; 60 Hz 120 Hz; 300 Hz 400 Hz; 500 Hz; 1 kHz 10 kHz; 20 kHz; 30 kHz 50 kHz 70 kHz 100 kHz	14 · 10 ⁻⁶ 14 · 10 ⁻⁶ 14 · 10 ⁻⁶ 12 · 10 ⁻⁶ 12 · 10 ⁻⁶ 12 · 10 ⁻⁶ 18 · 10 ⁻⁶ 30 · 10 ⁻⁶	Fluke 5790A measuring range: 1000 V
	300 V; 500 V	10 Hz 20 Hz 30 Hz; 40 Hz; 55 Hz; 60 Hz 120 Hz; 300 Hz; 400 Hz 500 Hz; 1 kHz; 10 kHz 20 kHz; 30 kHz; 50 kHz 70 kHz 100 kHz	16 · 10 ⁻⁶ 14 · 10 ⁻⁶ 12 · 10 ⁻⁶ 12 · 10 ⁻⁶ 12 · 10 ⁻⁶ 12 · 10 ⁻⁶ 18 · 10 ⁻⁶ 30 · 10 ⁻⁶	
	600 V; 800 V; 1000 V	10 Hz 20 Hz; 30 Hz; 40 Hz 55 Hz; 60 Hz; 120 Hz 300 Hz; 400 Hz; 500 Hz 1 kHz; 10 kHz; 20 kHz 30 kHz; 50 kHz 70 kHz 100 kHz	18 · 10 ⁻⁶ 14 · 10 ⁻⁶ 12 · 10 ⁻⁶ 12 · 10 ⁻⁶ 12 · 10 ⁻⁶ 12 · 10 ⁻⁶ 25 · 10 ⁻⁶ 35 · 10 ⁻⁶	
measuring instruments and sources	0,01 V to 10 V	0,1 Hz to 10 Hz	35 · 10 ⁻⁶	

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Measurement quantity / Calibration item	Range	Measurement conditions / procedure	Expanded uncertainty of measurement ¹⁾	Remarks
AC/DC transfer	2 mV	10 Hz 20 Hz 30 Hz; 40 Hz; 55 Hz 60 Hz; 120 Hz; 300 Hz 400 Hz; 500 Hz; 1 kHz 10 kHz; 20 kHz 30 kHz; 50 kHz; 70 kHz 100 kHz 200 kHz; 300 kHz 500 kHz 700 kHz; 800 kHz 1 MHz	0.11 · 10 ⁻³ 90 · 10 ⁻⁶ 85 · 10 ⁻⁶ 85 · 10 ⁻⁶ 85 · 10 ⁻⁶ 85 · 10 ⁻⁶ 85 · 10 ⁻⁶ 90 · 10 ⁻⁶ 0.11 · 10 ⁻³ 0.12 · 10 ⁻³ 0.15 · 10 ⁻³ 0.19 · 10 ⁻³	Fluke 792A measuring range: 22 mV
	6 mV	10 Hz 20 Hz; 30 Hz; 40 Hz; 55 Hz 60 Hz; 120 Hz; 300 Hz 400 Hz; 500 Hz 1 kHz; 10 kHz 20 kHz; 30 kHz 50 kHz; 70 kHz 100 kHz 200 kHz; 300 kHz 500 kHz 700 kHz; 800 kHz 1 MHz	90 · 10 ⁻⁶ 65 · 10 ⁻⁶ 65 · 10 ⁻⁶ 60 · 10 ⁻⁶ 60 · 10 ⁻⁶ 55 · 10 ⁻⁶ 55 · 10 ⁻⁶ 60 · 10 ⁻⁶ 75 · 10 ⁻⁶ 90 · 10 ⁻⁶ 0.12 · 10 ⁻³ 0.14 · 10 ⁻³	
	10 mV	10 Hz 20 Hz; 30 Hz; 40 Hz; 55 Hz 60 Hz; 120 Hz; 300 Hz 400 Hz; 500 Hz 1 kHz; 10 kHz 20 kHz; 30 kHz 50 kHz; 70 kHz 100 kHz 200 kHz; 300 kHz 500 kHz 700 kHz; 800 kHz 1 MHz	75 · 10 ⁻⁶ 55 · 10 ⁻⁶ 55 · 10 ⁻⁶ 50 · 10 ⁻⁶ 50 · 10 ⁻⁶ 45 · 10 ⁻⁶ 45 · 10 ⁻⁶ 55 · 10 ⁻⁶ 65 · 10 ⁻⁶ 75 · 10 ⁻⁶ 95 · 10 ⁻⁶ 0.12 · 10 ⁻³	
	20 mV	10 Hz 20 Hz; 30 Hz; 40 Hz; 55 Hz 60 Hz; 120 Hz; 300 Hz 400 Hz; 500 Hz 1 kHz; 10 kHz; 20 kHz 30 kHz; 50 kHz 70 kHz; 100 kHz 200 kHz; 300 kHz 500 kHz 700 kHz; 800 kHz 1 MHz	60 · 10 ⁻⁶ 40 · 10 ⁻⁶ 40 · 10 ⁻⁶ 35 · 10 ⁻⁶ 35 · 10 ⁻⁶ 30 · 10 ⁻⁶ 30 · 10 ⁻⁶ 40 · 10 ⁻⁶ 50 · 10 ⁻⁶ 70 · 10 ⁻⁶ 80 · 10 ⁻⁶	

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Measurement quantity / Calibration item	Range	Measurement conditions / procedure	Expanded uncertainty of measurement ¹⁾	Remarks
AC/DC transfer	60 mV	10 Hz 20 Hz; 30 Hz; 40 Hz; 55 Hz 60 Hz; 120 Hz; 300 Hz 400 Hz; 500 Hz; 1 kHz 10 kHz; 20 kHz; 30 kHz 50 kHz; 70 kHz; 100 kHz 200 kHz; 300 kHz 500 kHz 700 kHz; 800 kHz 1 MHz	$35 \cdot 10^{-6}$ $25 \cdot 10^{-6}$ $25 \cdot 10^{-6}$ $25 \cdot 10^{-6}$ $25 \cdot 10^{-6}$ $25 \cdot 10^{-6}$ $40 \cdot 10^{-6}$ $50 \cdot 10^{-6}$ $70 \cdot 10^{-6}$ $80 \cdot 10^{-6}$	Fluke792A measuring range: 220 mV
	100 mV	10 Hz 20 Hz; 30 Hz; 40 Hz; 55 Hz 60 Hz; 120 Hz; 300 Hz 400 Hz; 500 Hz; 1 kHz 10 kHz; 20 kHz; 30 kHz 50 kHz; 70 kHz; 100 kHz 200 kHz; 300 kHz 500 kHz 700 kHz; 800 kHz 1 MHz	$15 \cdot 10^{-6}$ $12 \cdot 10^{-6}$ $12 \cdot 10^{-6}$ $8 \cdot 10^{-6}$ $8 \cdot 10^{-6}$ $8 \cdot 10^{-6}$ $20 \cdot 10^{-6}$ $30 \cdot 10^{-6}$ $40 \cdot 10^{-6}$ $45 \cdot 10^{-6}$	
	200 mV	10 Hz 20 Hz 30 Hz; 40 Hz; 55 Hz 60 Hz; 120 Hz; 300 Hz 400 Hz; 500 Hz 1 kHz; 10 kHz; 20 kHz 30 kHz; 50 kHz; 70 kHz 100 kHz 200 kHz; 300 kHz 500 kHz 700 kHz; 800 kHz 1 MHz	$15 \cdot 10^{-6}$ $12 \cdot 10^{-6}$ $11 \cdot 10^{-6}$ $11 \cdot 10^{-6}$ $7 \cdot 10^{-6}$ $7 \cdot 10^{-6}$ $7 \cdot 10^{-6}$ $8 \cdot 10^{-6}$ $20 \cdot 10^{-6}$ $30 \cdot 10^{-6}$ $40 \cdot 10^{-6}$ $45 \cdot 10^{-6}$	
	200 mV	10 Hz 20 Hz; 30 Hz; 40 Hz; 55 Hz 60 Hz; 120 Hz; 300 Hz 400 Hz; 500 Hz; 1 kHz 10 kHz; 20 kHz; 30 kHz 50 kHz; 70 kHz 100 kHz 200 kHz; 300 kHz 500 kHz 700 kHz; 800 kHz 1 MHz	$12 \cdot 10^{-6}$ $11 \cdot 10^{-6}$ $11 \cdot 10^{-6}$ $7 \cdot 10^{-6}$ $7 \cdot 10^{-6}$ $7 \cdot 10^{-6}$ $8 \cdot 10^{-6}$ $18 \cdot 10^{-6}$ $30 \cdot 10^{-6}$ $40 \cdot 10^{-6}$ $45 \cdot 10^{-6}$	

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Measurement quantity / Calibration item	Range	Measurement conditions / procedure	Expanded uncertainty of measurement ¹⁾	Remarks
AC/DC transfer	300 mV; 400 mV; 500 mV; 600 mV; 700 mV	10 Hz; 20 Hz; 30 Hz	$11 \cdot 10^{-6}$	Fluke 792A measuring range: 700 mV
		40 Hz; 55 Hz; 60 Hz	$11 \cdot 10^{-6}$	
		120 Hz; 300 Hz	$11 \cdot 10^{-6}$	
		400 Hz; 500 Hz; 1 kHz	$7 \cdot 10^{-6}$	
	600 mV	10 kHz; 20 kHz; 30 kHz	$7 \cdot 10^{-6}$	Fluke 792A measuring range: 2.2 V
		50 kHz; 70 kHz	$7 \cdot 10^{-6}$	
		100 kHz	$8 \cdot 10^{-6}$	
		200 kHz; 300 kHz	$18 \cdot 10^{-6}$	
		500 kHz	$30 \cdot 10^{-6}$	
		700 kHz; 800 kHz	$40 \cdot 10^{-6}$	
		1 MHz	$45 \cdot 10^{-6}$	
		10 Hz; 20 Hz	$11 \cdot 10^{-6}$	
		30 Hz; 40 Hz; 55 Hz	$11 \cdot 10^{-6}$	
		60 Hz; 120 Hz; 300 Hz	$11 \cdot 10^{-6}$	
		400 Hz; 500 Hz	$4 \cdot 10^{-6}$	
		1 kHz; 10 kHz	$4 \cdot 10^{-6}$	
20 kHz; 30 kHz; 50 kHz	$5 \cdot 10^{-6}$			
70 kHz;	$6 \cdot 10^{-6}$			
100 kHz	$8 \cdot 10^{-6}$			
200 kHz; 300 kHz	$18 \cdot 10^{-6}$			
500 kHz	$30 \cdot 10^{-6}$			
700 kHz; 800 kHz	$40 \cdot 10^{-6}$			
1 MHz	$45 \cdot 10^{-6}$			
	1 V; 2 V	10 Hz	$4 \cdot 10^{-6}$	
		20 Hz	$3 \cdot 10^{-6}$	
		30 Hz; 40 Hz; 55 Hz	$2 \cdot 10^{-6}$	
		60 Hz; 120 Hz	$2 \cdot 10^{-6}$	
		300 Hz ; 400 Hz; 500 Hz	$2 \cdot 10^{-6}$	
		1 kHz; 10 kHz	$2 \cdot 10^{-6}$	
		20 kHz; 30 kHz; 50 kHz	$2 \cdot 10^{-6}$	
		70 kHz	$3 \cdot 10^{-6}$	
		100 kHz	$4 \cdot 10^{-6}$	
		200 kHz; 300 kHz	$5 \cdot 10^{-6}$	
		500 kHz	$7 \cdot 10^{-6}$	
		700 kHz; 800 kHz	$9 \cdot 10^{-6}$	
		1 MHz	$15 \cdot 10^{-6}$	
			2 V; 3 V; 4 V 5 V; 6 V; 7 V	
20 Hz	$3 \cdot 10^{-6}$			
30 Hz; 40 Hz; 55 Hz	$2 \cdot 10^{-6}$			
60 Hz; 120 Hz	$2 \cdot 10^{-6}$			
300 Hz ; 400 Hz; 500 Hz	$2 \cdot 10^{-6}$			
1 kHz; 10 kHz; 20 kHz	$2 \cdot 10^{-6}$			
30 kHz; 50 kHz 70 kHz	$2 \cdot 10^{-6}$			
100 kHz	$4 \cdot 10^{-6}$			
200 kHz; 300 kHz	$5 \cdot 10^{-6}$			
500 kHz	$6 \cdot 10^{-6}$			
700 kHz	$8 \cdot 10^{-6}$			
800 kHz	$9 \cdot 10^{-6}$			
1 MHz	$15 \cdot 10^{-6}$			

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Measurement quantity / Calibration item	Range	Measurement conditions / procedure	Expanded uncertainty of measurement ¹⁾	Remarks
AC/DC transfer	6 V; 8 V	10 Hz	$4 \cdot 10^{-6}$	Fluke 792A measuring range: 22 V
		20 Hz	$3 \cdot 10^{-6}$	
		30 Hz; 40 Hz; 55 Hz	$2 \cdot 10^{-6}$	
		60 Hz; 120 Hz	$2 \cdot 10^{-6}$	
		300 Hz ; 400 Hz; 500 Hz	$2 \cdot 10^{-6}$	
		1 kHz; 10 kHz; 20 kHz	$2 \cdot 10^{-6}$	
30 kHz; 50 kHz; 70 kHz	$2 \cdot 10^{-6}$			
100 kHz	$4 \cdot 10^{-6}$			
200 kHz; 300 kHz	$5 \cdot 10^{-6}$			
500 kHz	$7 \cdot 10^{-6}$			
700 kHz; 800 kHz	$9 \cdot 10^{-6}$			
1 MHz	$15 \cdot 10^{-6}$			
10 V	10 V	10 Hz	$4 \cdot 10^{-6}$	
		20 Hz; 30 Hz; 40 Hz; 55 Hz	$3 \cdot 10^{-6}$	
		60 Hz; 120 Hz	$3 \cdot 10^{-6}$	
		300 Hz ; 400 Hz; 500 Hz	$3 \cdot 10^{-6}$	
		1 kHz; 10 kHz; 20 kHz	$3 \cdot 10^{-6}$	
		30 kHz; 50 kHz; 70 kHz	$3 \cdot 10^{-6}$	
		100 kHz	$4 \cdot 10^{-6}$	
		200 kHz; 300 kHz	$5 \cdot 10^{-6}$	
		500 kHz	$7 \cdot 10^{-6}$	
		700 kHz; 800 kHz	$9 \cdot 10^{-6}$	
		1 MHz	$15 \cdot 10^{-6}$	
20 V	20 V	10 Hz; 20 Hz; 30 Hz; 40 Hz	$6 \cdot 10^{-6}$	
		55 Hz; 60 Hz; 120 Hz	$6 \cdot 10^{-6}$	
		300 Hz ; 400 Hz; 500 Hz	$6 \cdot 10^{-6}$	
		1 kHz; 10 kHz; 20 kHz	$6 \cdot 10^{-6}$	
		30 kHz; 50 kHz; 70 kHz	$3 \cdot 10^{-6}$	
		100 kHz	$7 \cdot 10^{-6}$	
		200 kHz; 300 kHz	$9 \cdot 10^{-6}$	
		500 kHz	$12 \cdot 10^{-6}$	
		700 kHz; 800 kHz	$18 \cdot 10^{-6}$	
		1 MHz	$25 \cdot 10^{-6}$	
		20 V	20 V	10 Hz; 20 Hz; 30 Hz; 40 Hz
55 Hz; 60 Hz; 120 Hz	$6 \cdot 10^{-6}$			
300 Hz ; 400 Hz; 500 Hz	$6 \cdot 10^{-6}$			
1 kHz; 10 kHz; 20 kHz	$6 \cdot 10^{-6}$			
30 kHz; 50 kHz; 70 kHz	$3 \cdot 10^{-6}$			
100 kHz	$7 \cdot 10^{-6}$			
200 kHz; 300 kHz	$9 \cdot 10^{-6}$			
500 kHz	$12 \cdot 10^{-6}$			
700 kHz; 800 kHz	$18 \cdot 10^{-6}$			
1 MHz	$25 \cdot 10^{-6}$			
30 V	30 V			10 Hz
		20 Hz; 30 Hz; 40 Hz; 55 Hz	$6 \cdot 10^{-6}$	
		60 Hz; 120 Hz; 300 Hz	$6 \cdot 10^{-6}$	
		400 Hz 500 Hz; 1 kHz	$6 \cdot 10^{-6}$	
		10 kHz; 20 kHz; 30 kHz	$6 \cdot 10^{-6}$	
		50 kHz; 70 kHz	$6 \cdot 10^{-6}$	
		100 kHz	$8 \cdot 10^{-6}$	
		200 kHz; 300 kHz	$12 \cdot 10^{-6}$	
		500 kHz	$15 \cdot 10^{-6}$	
		700 kHz	$25 \cdot 10^{-6}$	
		Fluke 792A measuring range: 70 V	30 V	10 Hz; 20 Hz; 30 Hz; 40 Hz
55 Hz; 60 Hz; 120 Hz	$6 \cdot 10^{-6}$			
300 Hz ; 400 Hz; 500 Hz	$6 \cdot 10^{-6}$			
1 kHz; 10 kHz; 20 kHz	$6 \cdot 10^{-6}$			
30 kHz; 50 kHz; 70 kHz	$3 \cdot 10^{-6}$			
100 kHz	$7 \cdot 10^{-6}$			
200 kHz; 300 kHz	$9 \cdot 10^{-6}$			
500 kHz	$12 \cdot 10^{-6}$			
700 kHz; 800 kHz	$18 \cdot 10^{-6}$			
1 MHz	$25 \cdot 10^{-6}$			

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Calibration and Measurement Capabilities (CMC)

Measurement quantity / Calibration item	Range	Measurement conditions / procedure	Expanded uncertainty of measurement ¹⁾	Remarks
AC/DC transfer	40 V; 50 V; 60 V; 70 V	10 Hz 20 Hz; 30 Hz; 40 Hz; 55 Hz 60 Hz; 120 Hz; 300 Hz 400 Hz; 500 Hz; 1 kHz 10 kHz; 20 kHz 30 kHz; 50 kHz 70 kHz 100 kHz	8 · 10 ⁻⁶ 7 · 10 ⁻⁶ 7 · 10 ⁻⁶ 6 · 10 ⁻⁶ 6 · 10 ⁻⁶ 6 · 10 ⁻⁶ 8 · 10 ⁻⁶ 12 · 10 ⁻⁶	Fluke 792A measuring range: 70 V
	60 V	10 Hz 20 Hz; 30 Hz; 40 Hz; 55 Hz 60 Hz; 120 Hz; 300 Hz 400 Hz; 500 Hz; 1 kHz 10 kHz; 20 kHz 30 kHz; 50 kHz 70 kHz 100 kHz	8 · 10 ⁻⁶ 7 · 10 ⁻⁶ 7 · 10 ⁻⁶ 6 · 10 ⁻⁶ 6 · 10 ⁻⁶ 6 · 10 ⁻⁶ 8 · 10 ⁻⁶ 12 · 10 ⁻⁶	Fluke 792A measuring range: 220 V
	100 V	10 Hz 20 Hz; 30 Hz; 40 Hz; 55 Hz 60 Hz; 120 Hz; 300 Hz 400 Hz; 500 Hz; 1 kHz 10 kHz; 20 kHz 30 kHz; 50 kHz 70 kHz 100 kHz	12 · 10 ⁻⁶ 11 · 10 ⁻⁶ 11 · 10 ⁻⁶ 11 · 10 ⁻⁶ 11 · 10 ⁻⁶ 11 · 10 ⁻⁶ 18 · 10 ⁻⁶ 30 · 10 ⁻⁶	
	200 V	10 Hz; 20 Hz 30 Hz; 40 Hz; 55 Hz 60 Hz; 120 Hz; 300 Hz 400 Hz; 500 Hz; 1 kHz 10 kHz; 20 kHz 30 kHz; 50 kHz 70 kHz 100 kHz	12 · 10 ⁻⁶ 12 · 10 ⁻⁶ 12 · 10 ⁻⁶ 11 · 10 ⁻⁶ 11 · 10 ⁻⁶ 11 · 10 ⁻⁶ 18 · 10 ⁻⁶ 30 · 10 ⁻⁶	
	200 V	10 Hz 20 Hz 30 Hz; 40 Hz; 55 Hz 60 Hz; 120 Hz; 300 Hz 400 Hz; 500 Hz 1 kHz; 10 kHz 20 kHz; 30 kHz; 50 kHz 70 kHz 100 kHz	15 · 10 ⁻⁶ 13 · 10 ⁻⁶ 12 · 10 ⁻⁶ 12 · 10 ⁻⁶ 11 · 10 ⁻⁶ 11 · 10 ⁻⁶ 11 · 10 ⁻⁶ 18 · 10 ⁻⁶ 30 · 10 ⁻⁶	Fluke 792A measuring range: 1000 V
	300 V	10 Hz 20 Hz; 30 Hz; 40 Hz; 55 Hz; 60 Hz 120 Hz; 300 Hz; 400 Hz 500 Hz; 1 kHz; 10 kHz 20 kHz; 30 kHz; 50 kHz 70 kHz 100 kHz	15 · 10 ⁻⁶ 12 · 10 ⁻⁶ 11 · 10 ⁻⁶ 11 · 10 ⁻⁶ 11 · 10 ⁻⁶ 11 · 10 ⁻⁶ 18 · 10 ⁻⁶ 30 · 10 ⁻⁶	

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Calibration and Measurement Capabilities (CMC)

Measurement quantity / Calibration item	Range	Measurement conditions / procedure	Expanded uncertainty of measurement ¹⁾	Remarks
AC/DC transfer	500 V	10 Hz 20 Hz; 30 Hz; 40 Hz; 55 Hz; 60 Hz 120 Hz; 300 Hz; 400 Hz 500 Hz; 1 kHz; 10 kHz 20 kHz; 30 kHz; 50 kHz 70 kHz 100 kHz	17 · 10 ⁻⁶ 12 · 10 ⁻⁶ 11 · 10 ⁻⁶ 11 · 10 ⁻⁶ 11 · 10 ⁻⁶ 11 · 10 ⁻⁶ 18 · 10 ⁻⁶ 35 · 10 ⁻⁶	Fluke 792A measuring range: 1000 V
	600 V; 800 V; 1000 V	10 Hz 20 Hz; 30 Hz; 40 Hz 55 Hz; 60 Hz 120 Hz; 300 Hz; 400 Hz 500 Hz; 1 kHz; 10 kHz 20 kHz; 30 kHz; 50 kHz 70 kHz 100 kHz	17 · 10 ⁻⁶ 12 · 10 ⁻⁶ 11 · 10 ⁻⁶ 11 · 10 ⁻⁶ 11 · 10 ⁻⁶ 11 · 10 ⁻⁶ 18 · 10 ⁻⁶ 35 · 10 ⁻⁶	Fluke 792A measuring range: 1000 V
AC voltage High voltage sources and dividers	1000 V to 20 000 V	50 Hz; 60 Hz	0.15 %	
AC voltage square wave and triangular voltage	1 mV	10 Hz to 40 Hz 55 Hz to 10 kHz 10 kHz to 100 kHz 200 kHz to 700 kHz 700 kHz to 1 MHz	0.50 · 10 ⁻³ 0.50 · 10 ⁻³ 0.50 · 10 ⁻³ 0.70 · 10 ⁻³ 0.90 · 10 ⁻³	square wave and triangular voltage on 50 Ω and 1 MΩ input resistance
	2 mV	10 Hz to 40 Hz 55 Hz to 10 kHz 10 kHz to 100 kHz 200 kHz to 700 kHz 700 kHz to 1 MHz	0.30 · 10 ⁻³ 0.30 · 10 ⁻³ 0.30 · 10 ⁻³ 0.50 · 10 ⁻³ 0.80 · 10 ⁻³	
	6 mV; 10 mV; 20 mV	10 Hz to 40 Hz 55 Hz to 10 kHz 10 kHz to 100 kHz 200 kHz to 700 kHz 700 kHz to 1 MHz	0.20 · 10 ⁻³ 0.20 · 10 ⁻³ 0.20 · 10 ⁻³ 0.50 · 10 ⁻³ 0.80 · 10 ⁻³	
	40 mV	10 Hz to 40 Hz 55 Hz to 10 kHz 10 kHz to 100 kHz 200 kHz to 700 kHz 700 kHz to 1 MHz	0.20 · 10 ⁻³ 0.20 · 10 ⁻³ 0.20 · 10 ⁻³ 0.50 · 10 ⁻³ 0.80 · 10 ⁻³	
	60 mV	10 Hz to 40 Hz 55 Hz to 10 kHz 10 kHz to 100 kHz 200 kHz to 700 kHz 700 kHz to 1 MHz	0.15 · 10 ⁻³ 0.15 · 10 ⁻³ 0.15 · 10 ⁻³ 0.50 · 10 ⁻³ 0.80 · 10 ⁻³	
	100 mV to 20 V	10 Hz to 40 Hz 55 Hz to 10 kHz 10 kHz to 100 kHz 200 kHz to 700 kHz 700 kHz to 1 MHz	0.10 · 10 ⁻³ 0.10 · 10 ⁻³	
			0.10 · 10 ⁻³ 0.45 · 10 ⁻³ 0.80 · 10 ⁻³	

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Calibration and Measurement Capabilities (CMC)

Measurement quantity / Calibration item	Range	Measurement conditions / procedure	Expanded uncertainty of measurement ¹⁾	Remarks
AC voltage square wave and triangular voltage	30 V to 100 V	10 Hz to 40 Hz 55 Hz to 10 kHz 10 kHz to 100 kHz	$0.10 \cdot 10^{-3}$ $0.10 \cdot 10^{-3}$ $0.10 \cdot 10^{-3}$	square wave and triangular voltage on 50 Ω and 1 MΩ input resistance
HF voltage frequency response of the output voltage of generators based on 1 kHz at the nominal impedance of 50 Ω	7 V	10 Hz to 30 Hz	$0.40 \cdot 10^{-3}$	$ I \leq 0.01$
		> 30 Hz to 2 MHz	$0.32 \cdot 10^{-3}$	
		> 2 MHz to 10 MHz	$0.44 \cdot 10^{-3}$	$ I \leq 0.02$
		> 10 MHz to 20 MHz > 20 MHz to 30 MHz	$0.94 \cdot 10^{-3}$ $1.1 \cdot 10^{-3}$	
	2.2 V and 0.7 V	10 Hz to 30 Hz	$0.83 \cdot 10^{-3}$	$ I \leq 0.01$
		> 30 Hz to 2 MHz	$0.44 \cdot 10^{-3}$	
		> 2 MHz to 10 MHz	$0.68 \cdot 10^{-3}$	$ I \leq 0.02$
		> 10 MHz to 20 MHz > 20 MHz to 30 MHz	$1.2 \cdot 10^{-3}$ $1.4 \cdot 10^{-3}$	
	70 mV and 220 mV	10 Hz to 30 Hz	$0.94 \cdot 10^{-3}$	$ I \leq 0.01$
		> 30 Hz to 2 MHz	$0.49 \cdot 10^{-3}$	
		> 2 MHz to 10 MHz	$0.81 \cdot 10^{-3}$	$ I \leq 0.02$
		> 10 MHz to 20 MHz > 20 MHz to 30 MHz	$1.4 \cdot 10^{-3}$ $1.6 \cdot 10^{-3}$	
7 mV and 22 mV	10 Hz to 30 Hz	$1.1 \cdot 10^{-3}$	$ I \leq 0.01$	
	> 30 Hz to 2 MHz	$0.58 \cdot 10^{-3}$		
	> 2 MHz to 10 MHz	$1.1 \cdot 10^{-3}$	$ I \leq 0.02$	
	> 10 MHz to 20 MHz > 20 MHz to 30 MHz	$2.1 \cdot 10^{-3}$ $2.8 \cdot 10^{-3}$		
2.2 mV	10 Hz to 30 Hz	$1.2 \cdot 10^{-3}$	$ I \leq 0.01$	
	> 30 Hz to 2 MHz	$0.62 \cdot 10^{-3}$		
	> 2 MHz to 10 MHz	$1.2 \cdot 10^{-3}$	$ I \leq 0.02$	
	> 10 MHz to 20 MHz > 20 MHz to 30 MHz	$2.2 \cdot 10^{-3}$ $2.8 \cdot 10^{-3}$		

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Calibration and Measurement Capabilities (CMC)

Measurement quantity / Calibration item	Range	Measurement conditions / procedure	Expanded uncertainty of measurement ¹⁾	Remarks
HF voltage input voltage of HF mV meters with 50 Ω input impedance of the incident voltage based on 1 kHz	7 V	10 Hz to 30 Hz	$0.57 \cdot 10^{-3}$	$ r \leq 0.005$
		> 30 Hz to 2 MHz	$0.34 \cdot 10^{-3}$	
	2.2 V and 0.7 V	> 2 MHz to 10 MHz	$0.60 \cdot 10^{-3}$	$ r \leq 0.01$
		> 10 MHz to 20 MHz	$1.0 \cdot 10^{-3}$	
		> 20 MHz to 30 MHz	$1.2 \cdot 10^{-3}$	
		10 Hz to 30 Hz	$0.75 \cdot 10^{-3}$	
	70 mV and 220 mV	> 30 Hz to 2 MHz	$0.48 \cdot 10^{-3}$	$ r \leq 0.005$
		> 2 MHz to 10 MHz	$0.78 \cdot 10^{-3}$	
		> 10 MHz to 20 MHz	$1.3 \cdot 10^{-3}$	
		> 20 MHz to 30 MHz	$1.6 \cdot 10^{-3}$	
	7 mV and 22 mV	10 Hz to 30 Hz	$1.0 \cdot 10^{-3}$	$ r \leq 0.005$
		> 30 Hz to 2 MHz	$0.56 \cdot 10^{-3}$	
		> 2 MHz to 10 MHz	$0.89 \cdot 10^{-3}$	
		> 10 MHz to 20 MHz	$1.6 \cdot 10^{-3}$	
	2 mV	> 20 MHz to 30 MHz	$1.9 \cdot 10^{-3}$	$ r \leq 0.07$
		10 Hz to 30 Hz	$1.1 \cdot 10^{-3}$	
> 30 Hz to 2 MHz		$0.60 \cdot 10^{-3}$		
> 2 MHz to 10 MHz		$1.0 \cdot 10^{-3}$		
AC current transfer	300 μA; 1 mA; 3 mA; 5 mA	10 Hz to 40 Hz	$15 \cdot 10^{-6}$	$ r $: magnitude of complex reflection coefficient
		> 40 Hz to 1 kHz	$11 \cdot 10^{-6}$	
		> 1 kHz to 10 kHz	$15 \cdot 10^{-6}$	
	10 mA; 20 mA; 30 mA; 50 mA; 100 mA; 200 mA	10 Hz to 40 Hz	$15 \cdot 10^{-6}$	
		> 40 Hz to 1 kHz	$11 \cdot 10^{-6}$	
		> 1 kHz to 10 kHz	$15 \cdot 10^{-6}$	
	300 mA; 500 mA	10 Hz to 40 Hz	$18 \cdot 10^{-6}$	
		> 40 Hz to 1 kHz	$14 \cdot 10^{-6}$	
> 1 kHz to 10 kHz		$18 \cdot 10^{-6}$		
1 A; 2 A	10 Hz to 40 Hz	$18 \cdot 10^{-6}$		
	> 40 Hz to 1 kHz	$14 \cdot 10^{-6}$		
	> 1 kHz to 10 kHz	$18 \cdot 10^{-6}$		
3 A; 5 A	10 Hz to 40 Hz	$26 \cdot 10^{-6}$		
	> 40 Hz to 1 kHz	$24 \cdot 10^{-6}$		
	> 1 kHz to 10 kHz	$26 \cdot 10^{-6}$		
10 A	10 Hz to 40 Hz	$30 \cdot 10^{-6}$		
	> 40 Hz to 1 kHz	$28 \cdot 10^{-6}$		
	> 1 kHz to 10 kHz	$30 \cdot 10^{-6}$		
20 A	10 Hz to 40 Hz	$35 \cdot 10^{-6}$		
	> 40 Hz to 1 kHz	$33 \cdot 10^{-6}$		
	> 1 kHz to 10 kHz	$35 \cdot 10^{-6}$		

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Calibration and Measurement Capabilities (CMC)

Measurement quantity / Calibration item	Range	Measurement conditions / procedure	Expanded uncertainty of measurement ¹⁾	Remarks
AC current calibrators	100 µA	10 Hz to 40 Hz > 40 Hz to 1 kHz > 1 kHz to 10 kHz	65 · 10 ⁻⁶ 60 · 10 ⁻⁶ 65 · 10 ⁻⁶	
	300 µA; 1 mA	10 Hz to 40 Hz > 40 Hz to 1 kHz > 1 kHz to 10 kHz	25 · 10 ⁻⁶ 15 · 10 ⁻⁶ 25 · 10 ⁻⁶	
	3 mA	10 Hz to 40 Hz > 40 Hz to 1 kHz > 1 kHz to 10 kHz	20 · 10 ⁻⁶ 15 · 10 ⁻⁶ 25 · 10 ⁻⁶	
	5 mA; 10 mA; 20 mA 30 mA; 50 mA; 100 mA; 200 mA	10 Hz to 40 Hz > 40 Hz to 1 kHz > 1 kHz to 10 kHz	20 · 10 ⁻⁶ 15 · 10 ⁻⁶ 25 · 10 ⁻⁶	
	300 mA; 500 mA; 1 A	10 Hz to 40 Hz > 40 Hz to 1 kHz > 1 kHz to 10 kHz	25 · 10 ⁻⁶ 18 · 10 ⁻⁶ 30 · 10 ⁻⁶	
	2 A	10 Hz to 40 Hz > 40 Hz to 1 kHz > 1 kHz to 10 kHz	25 · 10 ⁻⁶ 18 · 10 ⁻⁶ 30 · 10 ⁻⁶	
	3 A; 5 A	10 Hz to 40 Hz > 40 Hz to 1 kHz > 1 kHz to 10 kHz	35 · 10 ⁻⁶ 30 · 10 ⁻⁶ 35 · 10 ⁻⁶	
	10 A	10 Hz to 40 Hz > 40 Hz to 1 kHz > 1 kHz to 10 kHz	40 · 10 ⁻⁶ 35 · 10 ⁻⁶ 40 · 10 ⁻⁶	
	20 A	10 Hz to 40 Hz > 40 Hz to 1 kHz > 1 kHz to 10 kHz	40 · 10 ⁻⁶ 40 · 10 ⁻⁶ 45 · 10 ⁻⁶	

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Calibration and Measurement Capabilities (CMC)

Measurement quantity / Calibration item	Range	Measurement conditions / procedure	Expanded uncertainty of measurement ¹⁾	Remarks
AC current measuring instruments	100 µA	10 Hz to 40 Hz > 40 Hz to 1 kHz > 1 kHz to 10 kHz	0.10 · 10 ⁻³ 95 · 10 ⁻⁶ 0.15 · 10 ⁻³	
	300 µA; 1 mA; 3 mA; 5 mA; 10 mA; 20 mA; 30 mA; 50 mA; 100 mA	10 Hz to 40 Hz > 40 Hz to 1 kHz > 1 kHz to 10 kHz	75 · 10 ⁻⁶ 65 · 10 ⁻⁶ 0.14 · 10 ⁻³	
	200 mA; 300 mA; 500 mA	10 Hz to 40 Hz > 40 Hz to 1 kHz > 1 kHz to 10 kHz	75 · 10 ⁻⁶ 65 · 10 ⁻⁶ 0.14 · 10 ⁻³	
	1 A; 2 A	10 Hz to 40 Hz > 40 Hz to 1 kHz > 1 kHz to 10 kHz	75 · 10 ⁻⁶ 70 · 10 ⁻⁶ 0.14 · 10 ⁻³	
	3 A; 5 A	10 Hz to 40 Hz > 40 Hz to 1 kHz > 1 kHz to 10 kHz	80 · 10 ⁻⁶ 75 · 10 ⁻⁶ 0.14 · 10 ⁻³	
	10 A	10 Hz to 40 Hz > 40 Hz to 1 kHz > 1 kHz to 10 kHz	80 · 10 ⁻⁶ 75 · 10 ⁻⁶ 0.14 · 10 ⁻³	
	20 A	10 Hz to 40 Hz > 40 Hz to 1 kHz > 1 kHz to 10 kHz	90 · 10 ⁻⁶ 80 · 10 ⁻⁶ 0.14 · 10 ⁻³	
AC current current clamps	0 A to 100 A	10 Hz to 100 Hz	7 · 10 ⁻³ / + 0.5 mA	/ = measuring value
		> 100 Hz to 1 kHz	18 · 10 ⁻³ / + 0.5 mA	
	> 100 A to 1000 A	10 Hz to 100 Hz > 100 Hz to 1 kHz	7 · 10 ⁻³ 18 · 10 ⁻³	
Capacitance measuring instruments	1 pF	100 Hz; 120 Hz	1.6 · 10 ⁻³	
		1 kHz	0.41 · 10 ⁻³	
		10 kHz	0.47 · 10 ⁻³	
	10 pF	100 Hz; 120 Hz	0.47 · 10 ⁻³	
		1 kHz; 10 kHz	0.37 · 10 ⁻³	
	100 pF	100 Hz; 120 Hz; 1 kHz; 10 kHz	0.37 · 10 ⁻³	
1 nF; 10 nF	100 Hz; 120 Hz	0.16 · 10 ⁻³		
	1 kHz	0.13 · 10 ⁻³		
	10 kHz	0.16 · 10 ⁻³		
100 nF	100 Hz; 120 Hz	0.20 · 10 ⁻³		
	1 kHz	0.13 · 10 ⁻³		
	10 kHz	0.42 · 10 ⁻³		
1 µF	100 Hz; 120 Hz; 1 kHz 10 kHz	0.20 · 10 ⁻³ 2.0 · 10 ⁻³		

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Permanent Laboratory

Calibration and Measurement Capabilities (CMC)

Measurement quantity / Calibration item	Range	Measurement conditions / procedure	Expanded uncertainty of measurement ¹⁾	Remarks	
Capacitance standards	100 pF	1 kHz; 10 kHz	$0.38 \cdot 10^{-3}$		
	1 nF	100 Hz; 120 Hz	$0.20 \cdot 10^{-3}$		
		1 kHz	$0.15 \cdot 10^{-3}$		
		10 kHz	$0.18 \cdot 10^{-3}$		
	10 nF	100 Hz; 120 Hz	$0.20 \cdot 10^{-3}$	$0.14 \cdot 10^{-3}$ $0.20 \cdot 10^{-3}$	
		1 kHz			
	100 nF	100 Hz; 120 Hz	$0.20 \cdot 10^{-3}$	$0.15 \cdot 10^{-3}$ $0.43 \cdot 10^{-3}$	
1 kHz					
100 nF	100 Hz; 120 Hz	1 kHz			
1 μF	100 Hz; 120 Hz; 1 kHz	10 kHz	$0.21 \cdot 10^{-3}$ $2.0 \cdot 10^{-3}$		
10 μF	100 Hz; 120 Hz; 1 kHz;	10 kHz	$0.39 \cdot 10^{-3}$		
100 μF	100 Hz; 120 Hz; 1 kHz		$0.25 \cdot 10^{-3}$		
calibrators	500 pF to < 30 nF	DC method	$0.70 \cdot 10^{-3}$		
	30 nF to < 600 nF		$0.40 \cdot 10^{-3}$		
	600 nF to 110 mF		$0.31 \cdot 10^{-3}$		
Frequency	1 MHz, 5 MHz, 10 MHz	Sine wave, $U_{\text{eff}} > 0.5 \text{ V}$ measuring time > 24 h	$9 \cdot 10^{-12}$	Analogue measurement of phase time difference	
	0.01 Hz to 300 MHz	Sine wave, $U_{\text{eff}} > 0.5 \text{ V}$ measuring time > 1000 s	$1 \cdot 10^{-11} + U_{\text{tr}}$		U_{tr} = trigger uncertainty, digital frequency measurement based on counting
	300 MHz to 20 GHz		$1 \cdot 10^{-11}$		
Revolution	0.016 s ⁻¹ to 1700 s ⁻¹		$1 \cdot 10^{-6}$		
Oscilloscopes					
vertical deflection	5 mV to 30 mV	Square wave 10 kHz to 10 kHz	0.03 %		
	> 30 mV to 200 V		0.02 %		
horizontal deflection	> 500 ps to 5 s	Amplitude time mark < 1 V	$2 \text{ ps} + 1,5 \cdot 10^{-4} \cdot t$	t = measured value	
rise time	> 50 ps to 100 ps	Amplitude < 1 V	5 ps	t = actual rise time	
	> 100 ps to 10 ms		$5 \text{ ps} + 2 \cdot 10^{-2} \cdot t$		
frequency response	10 Hz to 6 GHz	5 mV to 3 V	3.5 % (0.3 dB)	For $ r > 0.02$ the uncertainty increases. $ r $: magnitude of complex reflection coefficient	
Oscilloscope calibrators					
vertical deflection	5 mV to 30 mV	Square wave 10 Hz to 10 kHz	$0.23 \cdot 10^{-3}$		
	> 30 mV to 300 mV		$0.12 \cdot 10^{-3}$		
	> 300 mV to 200 V		$40 \cdot 10^{-6}$		
horizontal deflection	> 500 ps to 10 ns	Amplitude time mark > 0.5 V	$2 \cdot 10^{-11} + W_{\text{tr}}$	W_{tr} = relative trigger uncertainty; measuring time > 1000 s	
	> 10 ns to 1 s		$2 \cdot 10^{-11} + W_{\text{tr}}$		
	> 1 s to 5 s		$3 \cdot 10^{-11} + W_{\text{tr}}$		

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Calibration and Measurement Capabilities (CMC)

Measurement quantity / Calibration item	Range	Measurement conditions / procedure	Expanded uncertainty of measurement ¹⁾	Remarks
rise time	> 15 ps to 100 ps	Amplitude < 1V	3 ps	
	> 100 ps to 10 ms		$3 \text{ ps} + 2 \cdot 10^{-2} \cdot t$	$t = \text{actual rise time}$
frequency response	10 Hz to 6 GHz	5 mV to 3 V	2.3 % (0.2 dB)	output voltage at 50 Ω
optical radiated power	100 pW to 10 nW	Wavelength 830 nm to 870 nm	5.0 %	
	> 10 nW to 1 mW		1.5 %	
	> 1 mW to 3 mW		3.5 %	
	100 pW to 10 nW	Wavelength 1280 nm to 1320 nm	5.0 %	
	> 10 nW to 1 mW		1.0 %	
	> 1 mW to 3 mW		3.5 %	
	100 pW to 10 nW	Wavelength 1530 nm to 1570 nm	6.0 %	
	> 10 nW to 1 mW		1.2 %	
	> 1 mW to 3 mW		4.5 %	
	10 nW to 1 mW	Wavelength 488 nm, 633 nm, 656 nm, 775 nm, 850 nm	2.0 %	
Nonlinearity of susceptibility and of signal,	100 pW to < 10 nW	Wavelength	1.5 %	Si-normal
	$\geq 10 \text{ nW}$ to 3 mW	450 nm to 1020 nm	1.2 %	Si-normal
Amplification and attenuation of faseroptical components, Optical density in transmission	100 pW to 3 mW	Wavelength 830 nm to 1570 nm	0.2 % at 1300 nm	Ge-normal Discrete wavelength For other wavelengths, the smallest measurable uncertainty is greater.
Wavelength measuring devices	400 nm to 1700 nm	Wavelength in vacuum	0.06 nm at 633 nm	Discrete wavelength For other wavelengths, the smallest measurable uncertainty is greater.
		Wavelength in air	0.11 nm at 1523 nm	
Radiation sources		Wavelength in vacuum	0.5 nm	
Single line laser	600 nm to 1600 nm	Wavelength in vacuum	0.004 nm at 633 nm	Discrete wavelength For other wavelengths, the smallest measurable uncertainty is greater.

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On-site Calibration

Calibration and Measurement Capabilities (CMC)

Measurement quantity / Calibration item	Range	Measurement conditions / procedure	Expanded uncertainty of measurement ¹⁾	Remarks
DC voltage	0.01 V to 0.22 V		$2 \mu\text{V} + 8 \cdot 10^{-6} \cdot U$	$U =$ measured value
	> 0.22 V to 2.2 V		$2 \mu\text{V} + 5 \cdot 10^{-6} \cdot U$	
	> 2.2 V to 11 V		$8 \mu\text{V} + 4 \cdot 10^{-6} \cdot U$	
	> 11 V to 22 V		$5 \mu\text{V} + 4 \cdot 10^{-6} \cdot U$	
	> 22 V to 220 V		$60 \mu\text{V} + 7 \cdot 10^{-6} \cdot U$	
	> 220 V to 1000 V		$0.7 \text{ mV} + 8 \cdot 10^{-6} \cdot U$	
DC current	10 μA to 220 μA		$60 \cdot 10^{-6}$	$I =$ measured value
	> 220 μA to 2.2 mA		$60 \cdot 10^{-6}$	
	> 2.2 mA to 22 mA		$60 \cdot 10^{-6}$	
	> 22 mA to 220 mA		$1 \mu\text{A} + 70 \cdot 10^{-6} \cdot I$	
	> 0.22 A to 2.2 A		$25 \mu\text{A} + 70 \cdot 10^{-6} \cdot I$	
	> 2.2 A to 10 A		$0.48 \text{ mA} + 0.4 \cdot 10^{-3} \cdot I$	
DC current current clamps	0 A to 100 A		$0.5 \text{ mA} + 5 \cdot 10^{-3} \cdot I$	
	> 100 A to 1000 A		$5 \cdot 10^{-3}$	
DC resistance	0.1 Ω to 1.9 Ω		$85 \cdot 10^{-6}$	
	> 1.9 Ω to 10 Ω		$30 \cdot 10^{-6}$	
	> 10 Ω to 19 Ω		$25 \cdot 10^{-6}$	
	> 19 Ω to 190 Ω		$20 \cdot 10^{-6}$	
	> 190 Ω to 1.9 k Ω		$15 \cdot 10^{-6}$	
	> 1.9 k Ω to 19 k Ω		$12 \cdot 10^{-6}$	
	> 19 k Ω to 190 k Ω		$15 \cdot 10^{-6}$	
	> 190 k Ω to 1.9 M Ω		$20 \cdot 10^{-6}$	
	> 1.9 M Ω to 10 M Ω		$35 \cdot 10^{-6}$	
	> 10 M Ω to 19 M Ω		$70 \cdot 10^{-6}$	
	> 19 M Ω to 100 M Ω		$0.12 \cdot 10^{-3}$	
AC voltage	60 mV to 220 mV	10 Hz to 20 Hz	$0.84 \cdot 10^{-3}$	
		20 Hz to 40 Hz	$0.38 \cdot 10^{-3}$	
		40 Hz to 20 kHz	$0.27 \cdot 10^{-3}$	
		20 kHz to 50 kHz	$0.48 \cdot 10^{-3}$	
		50 kHz to 100 kHz	$1.3 \cdot 10^{-3}$	
		100 kHz to 300 kHz	$1.7 \cdot 10^{-3}$	
		300 kHz to 500 kHz	$2.5 \cdot 10^{-3}$	
	500 kHz to 1 MHz	$5.2 \cdot 10^{-3}$		
	> 220 mV to 2.2 V	10 Hz to 20 Hz	$0.95 \cdot 10^{-3}$	
		20 Hz to 40 Hz	$0.3 \cdot 10^{-3}$	
		40 Hz to 20 kHz	$0.11 \cdot 10^{-3}$	
		20 kHz to 50 kHz	$0.22 \cdot 10^{-3}$	
		50 kHz to 100 kHz	$0.62 \cdot 10^{-3}$	
		100 kHz to 300 kHz	$1.2 \cdot 10^{-3}$	
300 kHz to 500 kHz		$3.0 \cdot 10^{-3}$		
500 kHz to 1 MHz	$6.7 \cdot 10^{-3}$			

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On-site Calibration

Calibration and Measurement Capabilities (CMC)

Measurement quantity / Calibration item	Range	Measurement conditions / procedure	Expanded uncertainty of measurement ¹⁾	Remarks	
AC voltage	> 2.2 V to 22 V	10 Hz to 20 Hz	$0.95 \cdot 10^{-3}$		
		20 Hz to 40 Hz	$0.30 \cdot 10^{-3}$		
		40 Hz to 20 kHz	$0.11 \cdot 10^{-3}$		
		20 kHz to 50 kHz	$0.22 \cdot 10^{-3}$		
		50 kHz to 100 kHz	$0.43 \cdot 10^{-3}$		
		100 kHz to 300 kHz	$1.4 \cdot 10^{-3}$		
		300 kHz to 500 kHz	$3.6 \cdot 10^{-3}$		
		500 kHz to 1 MHz	$7.4 \cdot 10^{-3}$		
	> 22 V to 220 V	10 Hz to 20 Hz	$0.95 \cdot 10^{-3}$		
		20 Hz to 40 Hz	$0.30 \cdot 10^{-3}$		
		40 Hz to 20 kHz	$0.13 \cdot 10^{-3}$		
		20 kHz to 50 kHz	$0.41 \cdot 10^{-3}$		
		50 kHz to 100 kHz	$0.95 \cdot 10^{-3}$		
		15 Hz to 50 Hz	$0.50 \cdot 10^{-3}$		
		50 Hz to 1 kHz	$0.15 \cdot 10^{-3}$		
		1 kHz to 20 kHz	$0.20 \cdot 10^{-3}$		
	> 220 V to 1100 V	20 kHz to 30 kHz	$0.50 \cdot 10^{-3}$		
		30 kHz to 50 kHz	$0.50 \cdot 10^{-3}$		
		50 kHz to 100 kHz	$1.80 \cdot 10^{-3}$		
AC current	10 μ A to 220 μ A	10 Hz to 20 Hz	$0.70 \cdot 10^{-3}$		
		20 Hz to 40 Hz	$0.36 \cdot 10^{-3}$		
		40 Hz to 1 kHz	$0.14 \cdot 10^{-3}$		
		1 kHz to 5 kHz	$0.59 \cdot 10^{-3}$		
		5 kHz to 10 kHz	$1.70 \cdot 10^{-3}$		
		10 Hz to 20 Hz	$0.70 \cdot 10^{-3}$		/ = measured value
		20 Hz to 40 Hz	$0.36 \cdot 10^{-3}$		
		40 Hz to 1 kHz	$0.14 \cdot 10^{-3}$		
	> 220 μ A to 2.2 mA	1 kHz to 5 kHz	$1 \mu\text{A} + 0.59 \cdot 10^{-3} \cdot /$		
		5 kHz to 10 kHz	$10 \mu\text{A} + 1.70 \cdot 10^{-3} \cdot /$		
		10 Hz to 20 Hz	$1 \mu\text{A} + 0.70 \cdot 10^{-3} \cdot /$		
		20 Hz to 40 Hz	$1 \mu\text{A} + 0.36 \cdot 10^{-3} \cdot /$		
40 Hz to 1 kHz	$1 \mu\text{A} + 0.14 \cdot 10^{-3} \cdot /$				
1 kHz to 5 kHz	$5 \mu\text{A} + 0.59 \cdot 10^{-3} \cdot /$				
	> 2.2 mA to 22 mA	5 kHz to 10 kHz	$10 \mu\text{A} + 1.70 \cdot 10^{-3} \cdot /$		
		10 Hz to 20 Hz	$5 \mu\text{A} + 0.70 \cdot 10^{-3} \cdot /$		
		20 Hz to 40 Hz	$5 \mu\text{A} + 0.36 \cdot 10^{-3} \cdot /$		
		40 Hz to 1 kHz	$5 \mu\text{A} + 0.14 \cdot 10^{-3} \cdot /$		
	> 22 mA to 220 mA	1 kHz to 5 kHz	$50 \mu\text{A} + 0.59 \cdot 10^{-3} \cdot /$		
		5 kHz to 10 kHz	$0.1 \text{ mA} + 1.7 \cdot 10^{-3} \cdot /$		
		10 Hz to 20 Hz			
		20 Hz to 40 Hz			
40 Hz to 1 kHz					
1 kHz to 5 kHz					

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On-site Calibration

Calibration and Measurement Capabilities (CMC)

Measurement quantity / Calibration item	Range	Measurement conditions / procedure	Expanded uncertainty of measurement ¹⁾	Remarks
AC current	> 220 mA to 2.2 A	20 Hz to 1 kHz 1 kHz to 5 kHz 5 kHz to 10 kHz	$50 \mu\text{A} + 0.64 \cdot 10^{-3} \cdot I$ $0.1 \text{ mA} + 0.76 \cdot 10^{-3} \cdot I$ $0.2 \text{ mA} + 8.7 \cdot 10^{-3} \cdot I$	
	> 2.2 A to 11 A	40 Hz to 1 kHz 1 kHz to 5 kHz 5 kHz to 10 kHz	$0.2 \text{ mA} + 0.47 \cdot 10^{-3} \cdot I$ $0.5 \text{ mA} + 1 \cdot 10^{-3} \cdot I$ $0.9 \text{ mA} + 3.8 \cdot 10^{-3} \cdot I$	
AC current current clamps	0 A to 100 A	10 Hz to 100 Hz > 100 Hz to 1 kHz	$0.5 \text{ mA} + 7 \cdot 10^{-3} \cdot I$ $0.5 \text{ mA} + 18 \cdot 10^{-3} \cdot I$	
	> 100 A to 1000 A	10 Hz to 100 Hz > 100 Hz to 1 kHz	$7 \cdot 10^{-3}$ $18 \cdot 10^{-3}$	
Oscilloscope quantities vertical deflection	5 mV to 30 mV	Square wave 10 kHz to 10 kHz	0.03 %	
	> 30 mV to 200 V		0.02 %	
horizontal deflection	> 500 ps to 5 s	Amplitude time mark < 1 V	$2 \text{ ps} + 1.5 \cdot 10^{-4} \cdot t$	$t = \text{measured value}$
rise time	> 50 ps to 100 ps	Amplitude < 1 V	5 ps	$t = \text{actual rise time}$
	> 100 ps to 10 ms		$5 \text{ ps} + 2 \cdot 10^{-2} \cdot t$	
frequency response	10 Hz to 6 GHz	5 mV to 3 V	3.5 % (0.3 dB)	For $ \Gamma > 0.02$ the uncertainty increases. $ \Gamma $: magnitude of complex reflection coefficient
measuring instruments and sources	0,01 V to 10 V	0,1 Hz to 10 Hz	$35 \cdot 10^{-6}$	

Abbreviations used:

CMC Calibration and measurement capabilities

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