DAkkS
Deutsche
Akkreditierungsstelle

Accreditation

The Deutsche Akkreditierungsstelle attests with this **Accreditation Certificate** that

Framatome GmbH
Paul-Gossen-Straße 100, 91052 Erlangen

operates a calibration laboratory that fulfills the requirements according to DIN EN ISO/IEC 17025:2018 for those conformity assessment activities specified in detail in the annex listed below. This includes additional existing legal and normative requirements for the calibration laboratory including those in relevant sectoral schemes, provided that these are explicitly confirmed in the annex listed below.

D-K-21039-01-01 **Valid from: 23.06.2026**

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

This accreditation was issued in accordance with Art. 5 Para. 1 Sentence 2 of Regulation (EC) 765/2008, after an accreditation procedure was carried out in compliance with the minimum requirements of DIN EN ISO/IEC 17011 and on the basis of a review and decision of the appointed accreditation committees.

This accreditation certificate only applies in connection with the notice of 23.06.2026. It consists of this cover sheet, the reverse side of the cover sheet and the corresponding annex .

Registration number of the accreditation certificate: **D-K-21039-01-00**

Berlin, 23.06.2026 Dr. Florian Witt
Head of Technical Unit

Translation issued: 23.06.2026

This accreditation certificate was issued by the Deutsche Akkreditierungsstelle GmbH (DAkkS). It is digitally sealed and valid without signature. It reflects the status as indicated by the date of issue. The current status of any valid and surveyed accreditation can be found in the directory of accredited bodies maintained by Deutsche Akkreditierungsstelle GmbH (www.dakks.de).

This document is a translation. The definitive version is the original German accreditation certificate.

See notes overleaf

Deutsche Akkreditierungsstelle GmbH

Office Berlin
Spittelmarkt 10
10117 Berlin

The Deutsche Akkreditierungsstelle GmbH (DAkkS) is the entrusted national accreditation body of the Federal Republic of Germany according to § 8 section 1 AkkStelleG in conjunction with § 1 section 1 AkkStelleGBV. DAkkS is designated as the national accreditation authority by Germany according to Art. 4 Para. 4 of Regulation (EC) 765/2008 and clause 4.7 of DIN EN ISO/IEC 17000.

Pursuant to Art. 11 section 2 of Regulation (EC) 765/2008, the accreditation certificate shall be recognised as equivalent by the national authorities within the scope of this Regulation as well as by the WTO member states that have committed themselves in bilateral or multilateral mutual agreements to recognise the certificates of accreditation bodies that are members of ILAC or IAF as equivalent.

DAkkS is a signatory to the multilateral agreements for mutual recognition of the European co-operation for Accreditation (EA), International Accreditation Forum (IAF) and International Laboratory Accreditation Co-operation (ILAC).

The up-to-date state of membership can be retrieved from the following websites:
EA: www.european-accreditation.org
ILAC: www.ilac.org
IAF: www.iaf.nu

This accreditation certificate is the property of the German Accreditation Body

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Annex to the Accreditation Certificate D-K-21039-01-01 according to DIN EN ISO/IEC 17025:2018

Valid from: **23.06.2026**

Date of issue: 23.06.2026

This annex is part of the Accreditation Certificate D-K-21039-01-00.

Holder of the Accreditation Certificate:

Framatome GmbH
Paul-Gossen-Straße 100, 91052 Erlangen

with the locations

Framatome GmbH
Kalibrierlaboratorium
Paul-Gossen-Straße 100, 91052 Erlangen

Framatome GmbH
Kalibrierlaboratorium
Seligenstädter Straße 100, 63791 Karlstein am Main

The calibration laboratory meets the requirements of DIN EN ISO/IEC 17025:2018 to carry out the conformity assessment activities listed in this annex. The calibration laboratory meets additional legal and normative requirements, if applicable, including those in relevant sectoral schemes, provided that these are explicitly confirmed below.

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

This annex to the certificate was issued by the Deutsche Akkreditierungsstelle GmbH (DAkkS) and is digitally sealed.
This annex to the certificate is only valid together with the written accreditation certificate and reflects the status as indicated by the date of issue. The current status of any valid and surveyed accreditation can be found in the directory of accredited bodies maintained by Deutsche Akkreditierungsstelle GmbH (www.dakks.de).

Calibrations in the following areas:

Electrical quantities

DC and low frequency quantities

- **DC voltage** [a)]
- **DC current** [a)]
- **DC resistance** [a)]
- **AC voltage** [a)]
- **AC current** [a)]

Time and frequency

- **Frequency** [a)]
- **Time interval** [a)]

High frequency and radiation Measurements

High frequency quantities

- **Oscilloscope quantities** [a)]

[a)] also on-site calibrations

DAkkS Deutsche Akkreditierungsstelle

Permanent Laboratory - Location Erlangen

Calibration and Measurement Capabilities (CMC)

Measurement quantity / Calibration item	Range			Measurement conditions / procedure	Extended uncertainty of Measurement	Remarks
DC voltage	0 V	to	< 0,33 V		$25 \cdot 10^{-6} \cdot U + 2{,}0\ \mu V$	U: measured value
Measurement instruments	0,33 V	to	< 3,3 V		$15 \cdot 10^{-6} \cdot U + 3{,}0\ \mu V$	
	3,3 V	to	< 33 V		$15 \cdot 10^{-6} \cdot U + 30\ \mu V$	
	33 V	to	< 330 V		$25 \cdot 10^{-6} \cdot U + 0{,}20\ mV$	
	330 V	to	1000 V		$25 \cdot 10^{-6} \cdot U + 2{,}0\ mV$	
Sources	0 V	to	0,1 V		$15 \cdot 10^{-6} \cdot U + 1{,}0\ \mu V$	
	> 0,1 V	to	1 V		$15 \cdot 10^{-6} \cdot U + 1{,}0\ \mu V$	
	> 1 V	to	10 V		$15 \cdot 10^{-6} \cdot U + 1{,}0\ \mu V$	
	> 10 V	to	100 V		$15 \cdot 10^{-6} \cdot U + 50\ \mu V$	
	> 100 V	to	1000 V		$15 \cdot 10^{-6} \cdot U + 0{,}15\ mV$	
DC current	20 µA	to	< 330 µA		$0{,}20 \cdot 10^{-3} \cdot I + 0{,}10\ \mu A$	I: measured value
Measurement instruments	330 µA	to	< 3,3 mA		$0{,}15 \cdot 10^{-3} \cdot I + 0{,}10\ \mu A$	
	3,3 mA	to	< 33 mA		$0{,}13 \cdot 10^{-3} \cdot I + 1{,}0\ \mu A$	
	33 mA	to	< 330 mA		$0{,}13 \cdot 10^{-3} \cdot I + 5{,}0\ \mu A$	
	330 mA	to	< 1,1 A		$0{,}25 \cdot 10^{-3}\ I + 60\ \mu A$	
	1,1 A	to	< 3,0 A		$0{,}50 \cdot 10^{-3} \cdot I + 50\ \mu A$	
	3,0 A	to	< 11 A		$0{,}60 \cdot 10^{-3} \cdot I + 0{,}70\ mA$	
	11 A	to	20 A		$1{,}2 \cdot 10^{-3} \cdot I + 1{,}0\ mA$	
Sources	> 0,1 µA	to	1 µA		$30 \cdot 10^{-6} \cdot I + 0{,}00010\ \mu A$	
	> 1 µA	to	10 µA		$30 \cdot 10^{-6} \cdot I + 0{,}00015\ \mu A$	
	> 10 µA	to	100 µA		$30 \cdot 10^{-6} \cdot I + 0{,}0015\ \mu A$	
	> 100 µA	to	1 mA		$25 \cdot 10^{-6} \cdot I + 0{,}010\ \mu A$	
	> 1 mA	to	10 mA		$30 \cdot 10^{-6} \cdot I + 0{,}10\ \mu A$	
	> 10 mA	to	100 mA		$50 \cdot 10^{-6} \cdot I + 1{,}0\ \mu A$	
	> 100 mA	to	1 A		$150 \cdot 10^{-6} \cdot I + 10\ \mu A$	

Permanent Laboratory - Location Erlangen

Calibration and Measurement Capabilities (CMC)

Measurement quantity / Calibration item	Range	Measurement conditions / procedure	Extended uncertainty of Measurement	Remarks
DC resistance Measurement instruments	1 Ω to < 11 Ω		$25 \cdot 10^{-6} \cdot R + 0{,}70$ mΩ	R: measured value
	11 Ω to < 33 Ω		$30 \cdot 10^{-6} \cdot R + 0{,}50$ mΩ	
	33 Ω to < 330 Ω		$40 \cdot 10^{-6} \cdot R + 0{,}20$ mΩ	
	330 Ω to < 3,3 kΩ		$40 \cdot 10^{-6} \cdot R + 2{,}0$ mΩ	
	3,3 kΩ to < 33 kΩ		$40 \cdot 10^{-6} \cdot R + 20$ mΩ	
	33 kΩ to < 110 kΩ		$30 \cdot 10^{-6} \cdot R + 2{,}0$ Ω	
	110 kΩ to < 330 kΩ		$40 \cdot 10^{-6} \cdot R + 10$ Ω	
	330 kΩ to < 1,1 MΩ		$40 \cdot 10^{-6} \cdot R + 0{,}15$ kΩ	
	1,1 MΩ to < 3,3 MΩ		$40 \cdot 10^{-6} \cdot R + 1{,}5$ kΩ	
	3,3 MΩ to < 11 MΩ		$0{,}10 \cdot 10^{-3} \cdot R + 1{,}5$ kΩ	
	11 MΩ to < 33 MΩ		$0{,}30 \cdot 10^{-3} \cdot R + 1{,}5$ kΩ	
	33 MΩ to < 110 MΩ		$0{,}60 \cdot 10^{-3} \cdot R + 5{,}0$ kΩ	
	110 MΩ to < 330 MΩ		$3{,}5 \cdot 10^{-3} \cdot R + 5{,}0$ kΩ	
	330 MΩ to < 1,1 GΩ		$18 \cdot 10^{-3} \cdot R + 5{,}0$ kΩ	
DC resistance Resistance	1 Ω to 10 Ω		$20 \cdot 10^{-6} \cdot R + 0{,}10$ mΩ	
	> 10 Ω to 100 Ω		$15 \cdot 10^{-6} \cdot R + 1{,}0$ mΩ	
	> 100 Ω to 1 kΩ		$15 \cdot 10^{-6} \cdot R + 1{,}0$ mΩ	
	> 1 kΩ to 10 kΩ		$15 \cdot 10^{-6} \cdot R + 10$ mΩ	
	> 10 kΩ to 100 kΩ		$15 \cdot 10^{-6} \cdot R + 0{,}10$ Ω	
	> 100 kΩ to 1 MΩ		$20 \cdot 10^{-6} \cdot R + 4{,}0$ Ω	
	> 1 MΩ to 10 MΩ		$60 \cdot 10^{-6} \cdot R + 0{,}20$ kΩ	
	> 10 MΩ to 100 MΩ		$0{,}60 \cdot 10^{-3} \cdot R + 1{,}5$ kΩ	
	> 100 MΩ to 1 GΩ		$6{,}0 \cdot 10^{-3} \cdot R + 20$ kΩ	
AC voltage Measurement instruments	0,001 V to < 0,033 V	45 Hz to 10 kHz	$0{,}20 \cdot 10^{-3} \cdot U + 10$ µV	U: measured value
	0,033 V to < 0,33 V		$0{,}20 \cdot 10^{-3} \cdot U + 15$ µV	
	0,33 V to < 3,3 V		$0{,}20 \cdot 10^{-3} \cdot U + 0{,}10$ mV	
	3,3 V to < 33 V		$0{,}20 \cdot 10^{-3} \cdot U + 1{,}0$ mV	
	33 V to < 330 V		$0{,}25 \cdot 10^{-3} \cdot U + 10$ mV	
	330 V to 1000 V		$0{,}35 \cdot 10^{-3} \cdot U + 15$ mV	
Sources	0,001 V to 0,01 V	40 Hz to 20 kHz	$0{,}40 \cdot 10^{-3} \cdot U + 2{,}0$ µV	
	> 0,01 V to 0,1 V		$0{,}20 \cdot 10^{-3} \cdot U + 3{,}0$ µV	
	> 0,1 V to 1 V		$0{,}20 \cdot 10^{-3} \cdot U + 30$ µV	
	> 1 V to 10 V		$0{,}20 \cdot 10^{-3} \cdot U + 0{,}30$ mV	
	> 10 V to 100 V		$0{,}30 \cdot 10^{-3} \cdot U + 3{,}0$ mV	
	> 100 V to 700 V	40 Hz to 1 kHz	$0{,}60 \cdot 10^{-3} \cdot U + 30$ mV	

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Permanent Laboratory - Location Erlangen

Calibration and Measurement Capabilities (CMC)

Measurement quantity / Calibration item	Range	Measurement conditions / procedure	Extended uncertainty of Measurement	Remarks
AC current	29 µA to < 330 µA	45 Hz to 1 kHz	$1{,}5 \cdot 10^{-3} \cdot I + 1{,}0$ µA	I: measured value
Measurement instruments	330 µA to < 3,3 mA		$1{,}2 \cdot 10^{-3} \cdot I + 1{,}0$ µA	
	3,3 mA to < 33 mA		$0{,}50 \cdot 10^{-3} \cdot I + 5{,}0$ µA	
	33 mA to < 330 mA		$0{,}50 \cdot 10^{-3} \cdot I + 50$ µA	
	330 mA to < 1,1 A		$0{,}60 \cdot 10^{-3} \cdot I + 0{,}20$ mA	
	1,1 A to < 3 A		$0{,}70 \cdot 10^{-3} \cdot I + 0{,}20$ mA	
	3 A to < 11 A		$1{,}2 \cdot 10^{-3} \cdot I + 3{,}0$ mA	
	11 A to 20 A		$1{,}8 \cdot 10^{-3} \cdot I + 12$ mA	
Sources	10 µA to 100 µA	45 Hz to 5 kHz	$0{,}70 \cdot 10^{-3} \cdot I + 0{,}10$ µA	
	> 100 µA to 1 mA		$0{,}70 \cdot 10^{-3} \cdot I + 0{,}50$ µA	
	> 1 mA to 10 mA		$0{,}70 \cdot 10^{-3} \cdot I + 5{,}0$ µA	
	> 10 mA to 100 mA		$0{,}70 \cdot 10^{-3} \cdot I + 50$ µA	
	> 100 mA to 1 A	45 Hz to 1 kHz	$1{,}5 \cdot 10^{-3} \cdot I + 0{,}30$ mA	
Frequency				
Measurement instruments	0,1 Hz to 20 MHz		$25 \cdot 10^{-6} \cdot f$	f: measured value
Sources	0,1 Hz to 20 MHz		$6{,}0 \cdot 10^{-6} \cdot f$	
Time interval				
Sources	50 ns to 10 s		$25 \cdot 10^{-6} \cdot t$	t: measured value

On-Site Calibration - Location Erlangen

Calibration and Measurement Capabilities (CMC)

Measurement quantity / Calibration item	Range	Measurement conditions / procedure	Extended uncertainty of Measurement	Remarks
DC voltage	0 V to < 0,33 V		$25 \cdot 10^{-6} \cdot U + 2{,}0$ µV	U: measured value
Measurement instruments	0,33 V to < 3,3 V		$15 \cdot 10^{-6} \cdot U + 3{,}0$ µV	
	3,3 V to < 33 V		$15 \cdot 10^{-6} \cdot U + 30$ µV	
	33 V to < 330 V		$25 \cdot 10^{-6} \cdot U + 0{,}20$ mV	
	330 V to 1000 V		$25 \cdot 10^{-6} \cdot U + 2{,}0$ mV	
Sources	0 V to 0,1 V		$15 \cdot 10^{-6} \cdot U + 1{,}0$ µV	
	> 0,1 V to 1 V		$15 \cdot 10^{-6} \cdot U + 1{,}0$ µV	
	> 1 V to 10 V		$15 \cdot 10^{-6} \cdot U + 1{,}0$ µV	
	> 10 V to 100 V		$15 \cdot 10^{-6} \cdot U + 50$ µV	
	> 100 V to 1000 V		$15 \cdot 10^{-6} \cdot U + 0{,}15$ mV	

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On-Site Calibration - Location Erlangen

Calibration and Measurement Capabilities (CMC)

Measurement quantity / Calibration item	Range	Measurement conditions / procedure	Extended uncertainty of Measurement	Remarks
DC current Measurement instruments	20 µA to < 330 µA		$0{,}20 \cdot 10^{-3} \cdot I + 0{,}10$ µA	I: measured value
	330 µA to < 3,3 mA		$0{,}15 \cdot 10^{-3} \cdot I + 0{,}10$ µA	
	3,3 mA to < 33 mA		$0{,}13 \cdot 10^{-3} \cdot I + 1{,}0$ µA	
	33 mA to < 330 mA		$0{,}13 \cdot 10^{-3} \cdot I + 5{,}0$ µA	
	330 mA to < 1,1 A		$0{,}25 \cdot 10^{-3}\ I + 60$ µA	
	1,1 A to < 3,0 A		$0{,}50 \cdot 10^{-3} \cdot I + 50$ µA	
	3,0 A to < 11 A		$0{,}60 \cdot 10^{-3} \cdot I + 0{,}70$ mA	
	11 A to 20 A		$1{,}2 \cdot 10^{-3} \cdot I + 1{,}0$ mA	
Sources	> 0,1 µA to 1 µA		$30 \cdot 10^{-6} \cdot I + 0{,}00010$ µA	
	> 1 µA to 10 µA		$30 \cdot 10^{-6} \cdot I + 0{,}00015$ µA	
	> 10 µA to 100 µA		$30 \cdot 10^{-6} \cdot I + 0{,}0015$ µA	
	> 100 µA to 1 mA		$25 \cdot 10^{-6} \cdot I + 0{,}010$ µA	
	> 1 mA to 10 mA		$30 \cdot 10^{-6} \cdot I + 0{,}10$ µA	
	> 10 mA to 100 mA		$50 \cdot 10^{-6} \cdot I + 1{,}0$ µA	
	> 100 mA to 1 A		$150 \cdot 10^{-6} \cdot I + 10$ µA	
DC resistance Measurement instruments	1 Ω to < 11 Ω		$25 \cdot 10^{-6} \cdot R + 0{,}70$ mΩ	R: measured value
	11 Ω to < 33 Ω		$30 \cdot 10^{-6} \cdot R + 0{,}50$ mΩ	
	33 Ω to < 330 Ω		$40 \cdot 10^{-6} \cdot R + 0{,}20$ mΩ	
	330 Ω to < 3,3 kΩ		$40 \cdot 10^{-6} \cdot R + 2{,}0$ mΩ	
	3,3 kΩ to < 33 kΩ		$40 \cdot 10^{-6} \cdot R + 20$ mΩ	
	33 kΩ to < 110 kΩ		$30 \cdot 10^{-6} \cdot R + 2{,}0$ Ω	
	110 kΩ to < 330 kΩ		$40 \cdot 10^{-6} \cdot R + 10$ Ω	
	330 kΩ to < 1,1 MΩ		$40 \cdot 10^{-6} \cdot R + 0{,}15$ kΩ	
	1,1 MΩ to < 3,3 MΩ		$40 \cdot 10^{-6} \cdot R + 1{,}5$ kΩ	
	3,3 MΩ to < 11 MΩ		$0{,}10 \cdot 10^{-3} \cdot R + 1{,}5$ kΩ	
	11 MΩ to < 33 MΩ		$0{,}30 \cdot 10^{-3} \cdot R + 1{,}5$ kΩ	
	33 MΩ to < 110 MΩ		$0{,}60 \cdot 10^{-3} \cdot R + 5{,}0$ kΩ	
	110 MΩ to < 330 MΩ		$3{,}5 \cdot 10^{-3} \cdot R + 5{,}0$ kΩ	
	330 MΩ to < 1,1 GΩ		$18 \cdot 10^{-3} \cdot R + 5{,}0$ kΩ	

DAkkS Deutsche Akkreditierungsstelle

On-Site Calibration - Location Erlangen

Calibration and Measurement Capabilities (CMC)

Measurement quantity / Calibration item	Range	Measurement conditions / procedure	Extended uncertainty of Measurement	Remarks
DC resistance				R: measured value
Resistance	1 Ω to 10 Ω		$20 \cdot 10^{-6} \cdot R + 0{,}10$ mΩ	
	> 10 Ω to 100 Ω		$15 \cdot 10^{-6} \cdot R + 1{,}0$ mΩ	
	> 100 Ω to 1 kΩ		$15 \cdot 10^{-6} \cdot R + 1{,}0$ mΩ	
	> 1 kΩ to 10 kΩ		$15 \cdot 10^{-6} \cdot R + 10$ mΩ	
	> 10 kΩ to 100 kΩ		$15 \cdot 10^{-6} \cdot R + 0{,}10$ Ω	
	> 100 kΩ to 1 MΩ		$20 \cdot 10^{-6} \cdot R + 4{,}0$ Ω	
	> 1 MΩ to 10 MΩ		$60 \cdot 10^{-6} \cdot R + 0{,}20$ kΩ	
	> 10 MΩ to 100 MΩ		$0{,}60 \cdot 10^{-3} \cdot R + 1{,}5$ kΩ	
	> 100 MΩ to 1 GΩ		$6{,}0 \cdot 10^{-3} \cdot R + 20$ kΩ	
AC voltage				U: measured value
Measurement instruments	0,001 V to < 0,033 V	45 Hz to 10 kHz	$0{,}20 \cdot 10\text{-}3 \cdot U + 10$ µV	
	0,033 V to < 0,33 V		$0{,}20 \cdot 10^{-3} \cdot U + 15$ µV	
	0,33 V to < 3,3 V		$0{,}20 \cdot 10^{-3} \cdot U + 0{,}10$ mV	
	3,3 V to < 33 V		$0{,}20 \cdot 10^{-3} \cdot U + 1{,}0$ mV	
	33 V to < 330 V		$0{,}25 \cdot 10^{-3} \cdot U + 10$ mV	
	330 V to 1000 V		$0{,}35 \cdot 10^{-3} \cdot U + 15$ mV	
Sources	0,001 V to 0,01 V	40 Hz to 20 kHz	$0{,}40 \cdot 10^{-3} \cdot U + 2{,}0$ µV	
	> 0,01 V to 0,1 V		$0{,}20 \cdot 10^{-3} \cdot U + 3{,}0$ µV	
	> 0,1 V to 1 V		$0{,}20 \cdot 10^{-3} \cdot U + 30$ µV	
	> 1 V to 10 V		$0{,}20 \cdot 10^{-3} \cdot U + 0{,}30$ mV	
	> 10 V to 100 V		$0{,}30 \cdot 10^{-3} \cdot U + 3{,}0$ mV	
	> 100 V to 700 V	40 Hz to 1 kHz	$0{,}60 \cdot 10^{-3} \cdot U + 30$ mV	
AC current				I: measured value
Measurement instruments	29 µA to < 330 µA	45 Hz to 1 kHz	$1{,}5 \cdot 10^{-3} \cdot I + 1{,}0$ µA	
	330 µA to < 3,3 mA		$1{,}2 \cdot 10^{-3} \cdot I + 1{,}0$ µA	
	3,3 mA to < 33 mA		$0{,}50 \cdot 10^{-3} \cdot I + 5{,}0$ µA	
	33 mA to < 330 mA		$0{,}50 \cdot 10^{-3} \cdot I + 50$ µA	
	330 mA to < 1,1 A		$0{,}60 \cdot 10^{-3} \cdot I + 0{,}20$ mA	
	1,1 A to < 3 A		$0{,}70 \cdot 10^{-3} \cdot I + 0{,}20$ mA	
	3 A to < 11 A		$1{,}2 \cdot 10^{-3} \cdot I + 3{,}0$ mA	
	11 A to 20 A		$1{,}8 \cdot 10^{-3} \cdot I + 12$ mA	
Sources	10 µA to 100 µA	45 Hz to 5 kHz	$0{,}70 \cdot 10^{-3} \cdot I + 0{,}10$ µA	
	> 100 µA to 1 mA		$0{,}70 \cdot 10^{-3} \cdot I + 0{,}50$ µA	
	> 1 mA to 10 mA		$0{,}70 \cdot 10^{-3} \cdot I + 5{,}0$ µA	
	> 10 mA to 100 mA		$0{,}70 \cdot 10^{-3} \cdot I + 50$ µA	
	> 100 mA to 1 A	45 Hz to 1 kHz	$1{,}5 \cdot 10^{-3} \cdot I + 0{,}30$ mA	
Frequency				
Measurement instruments	0,1 Hz to 20 MHz		$25 \cdot 10^{-6} \cdot f$	f: measured value
Sources	0,1 Hz to 20 MHz		$6{,}0 \cdot 10^{-6} \cdot f$	
Time interval				
Sources	50 ns to 10 s		$25 \cdot 10^{-6} \cdot t$	t: measured value

Permanent Laboratory - Location Karlstein am Main

Calibration and Measurement Capabilities (CMC)

Measurement quantity / Calibration item	Range	Measurement conditions / procedure	Extended uncertainty of Measurement	Remarks
DC voltage Measurement instruments	0 V to < 0,33 V		$25 \cdot 10^{-6} \cdot U + 2{,}0\ \mu V$	*U*: measured value
	0,33 V to < 3,3 V		$15 \cdot 10^{-6} \cdot U + 3{,}0\ \mu V$	
	3,3 V to < 33 V		$15 \cdot 10^{-6} \cdot U + 30\ \mu V$	
	33 V to < 330 V		$25 \cdot 10^{-6} \cdot U + 0{,}20\ mV$	
	330 V to 1000 V		$25 \cdot 10^{-6} \cdot U + 2{,}0\ mV$	
Sources	0 V to 0,1 V		$15 \cdot 10^{-6} \cdot U + 1{,}0\ \mu V$	
	> 0,1 V to 1 V		$15 \cdot 10^{-6} \cdot U + 1{,}0\ \mu V$	
	> 1 V to 10 V		$15 \cdot 10^{-6} \cdot U + 1{,}0\ \mu V$	
	> 10 V to 100 V		$15 \cdot 10^{-6} \cdot U + 50\ \mu V$	
	> 100 V to 1000 V		$15 \cdot 10^{-6} \cdot U + 0{,}15\ mV$	
DC current Measurement instruments	20 µA to < 330 µA		$0{,}20 \cdot 10^{-3} \cdot I + 0{,}10\ \mu A$	*I*: measured value
	330 µA to < 3,3 mA		$0{,}15 \cdot 10^{-3} \cdot I + 0{,}10\ \mu A$	
	3,3 mA to < 33 mA		$0{,}13 \cdot 10^{-3} \cdot I + 1{,}0\ \mu A$	
	33 mA to < 330 mA		$0{,}13 \cdot 10^{-3} \cdot I + 5{,}0\ \mu A$	
	330 mA to < 1,1 A		$0{,}25 \cdot 10^{-3} \cdot I + 60\ \mu A$	
	1,1 A to < 3,0 A		$0{,}50 \cdot 10^{-3} \cdot I + 50\ \mu A$	
	3,0 A to < 11 A		$0{,}60 \cdot 10^{-3} \cdot I + 0{,}70\ mA$	
	11 A to 20 A		$1{,}2 \cdot 10^{-3} \cdot I + 1{,}0\ mA$	
Sources	> 0,1 µA to 1 µA		$30 \cdot 10^{-6} \cdot I + 0{,}00010\ \mu A$	
	> 1 µA to 10 µA		$30 \cdot 10^{-6} \cdot I + 0{,}00015\ \mu A$	
	> 10 µA to 100 µA		$30 \cdot 10^{-6} \cdot I + 0{,}0015\ \mu A$	
	> 100 µA to 1 mA		$25 \cdot 10^{-6} \cdot I + 0{,}010\ \mu A$	
	> 1 mA to 10 mA		$30 \cdot 10^{-6} \cdot I + 0{,}10\ \mu A$	
	> 10 mA to 100 mA		$50 \cdot 10^{-6} \cdot I + 1{,}0\ \mu A$	
	> 100 mA to 1 A		$150 \cdot 10^{-6} \cdot I + 10\ \mu A$	

Permanent Laboratory - Location Karlstein am Main

Calibration and Measurement Capabilities (CMC)

Measurement quantity / Calibration item	Range	Measurement conditions / procedure	Extended uncertainty of Measurement	Remarks
DC resistance Measurement instruments	1 Ω to < 11 Ω		$25 \cdot 10^{-6} \cdot R + 0{,}70$ mΩ	R: measured value
	11 Ω to < 33 Ω		$30 \cdot 10^{-6} \cdot R + 0{,}50$ mΩ	
	33 Ω to < 330 Ω		$40 \cdot 10^{-6} \cdot R + 0{,}20$ mΩ	
	330 Ω to < 3,3 kΩ		$40 \cdot 10^{-6} \cdot R + 2{,}0$ mΩ	
	3,3 kΩ to < 33 kΩ		$40 \cdot 10^{-6} \cdot R + 20$ mΩ	
	33 kΩ to < 110 kΩ		$30 \cdot 10^{-6} \cdot R + 2{,}0$ Ω	
	110 kΩ to < 330 kΩ		$40 \cdot 10^{-6} \cdot R + 10$ Ω	
	330 kΩ to < 1,1 MΩ		$40 \cdot 10^{-6} \cdot R + 0{,}15$ kΩ	
	1,1 MΩ to < 3,3 MΩ		$40 \cdot 10^{-6} \cdot R + 1{,}5$ kΩ	
	3,3 MΩ to < 11 MΩ		$0{,}10 \cdot 10^{-3} \cdot R + 1{,}5$ kΩ	
	11 MΩ to < 33 MΩ		$0{,}30 \cdot 10^{-3} \cdot R + 1{,}5$ kΩ	
	33 MΩ to < 110 MΩ		$0{,}60 \cdot 10^{-3} \cdot R + 5{,}0$ kΩ	
	110 MΩ to < 330 MΩ		$3{,}5 \cdot 10^{-3} \cdot R + 5{,}0$ kΩ	
	330 MΩ to < 1,1 GΩ		$18 \cdot 10^{-3} \cdot R + 5{,}0$ kΩ	
DC resistance Resistance	1 Ω to 10 Ω		$20 \cdot 10^{-6} \cdot R + 0{,}10$ mΩ	
	> 10 Ω to 100 Ω		$15 \cdot 10^{-6} \cdot R + 1{,}0$ mΩ	
	> 100 Ω to 1 kΩ		$15 \cdot 10^{-6} \cdot R + 1{,}0$ mΩ	
	> 1 kΩ to 10 kΩ		$15 \cdot 10^{-6} \cdot R + 10$ mΩ	
	> 10 kΩ to 100 kΩ		$15 \cdot 10^{-6} \cdot R + 0{,}10$ Ω	
	> 100 kΩ to 1 MΩ		$20 \cdot 10^{-6} \cdot R + 4{,}0$ Ω	
	> 1 MΩ to 10 MΩ		$60 \cdot 10^{-6} \cdot R + 0{,}20$ kΩ	
	> 10 MΩ to 100 MΩ		$0{,}60 \cdot 10^{-3} \cdot R + 1{,}5$ kΩ	
	> 100 MΩ to 1 GΩ		$6{,}0 \cdot 10^{-3} \cdot R + 20$ kΩ	
AC voltage Measurement instruments	0,001 V to < 0,033 V	45 Hz to 10 kHz	$0{,}20 \cdot 10^{-3} \cdot U + 10$ µV	U: measured value
	0,033 V to < 0,33 V		$0{,}20 \cdot 10^{-3} \cdot U + 15$ µV	
	0,33 V to < 3,3 V		$0{,}20 \cdot 10^{-3} \cdot U + 0{,}10$ mV	
	3,3 V to < 33 V		$0{,}20 \cdot 10^{-3} \cdot U + 1{,}0$ mV	
	33 V to < 330 V		$0{,}25 \cdot 10^{-3} \cdot U + 10$ mV	
	330 V to 1000 V		$0{,}35 \cdot 10^{-3} \cdot U + 15$ mV	
Sources	0,001 V to 0,01 V	40 Hz to 20 kHz	$0{,}40 \cdot 10^{-3} \cdot U + 2{,}0$ µV	
	> 0,01 V to 0,1 V		$0{,}20 \cdot 10^{-3} \cdot U + 3{,}0$ µV	
	> 0,1 V to 1 V		$0{,}20 \cdot 10^{-3} \cdot U + 30$ µV	
	> 1 V to 10 V		$0{,}20 \cdot 10^{-3} \cdot U + 0{,}30$ mV	
	> 10 V to 100 V		$0{,}30 \cdot 10^{-3} \cdot U + 3{,}0$ mV	
	> 100 V to 700 V	40 Hz to 1 kHz	$0{,}60 \cdot 10^{-3} \cdot U + 30$ mV	

Permanent Laboratory - Location Karlstein am Main

Calibration and Measurement Capabilities (CMC)

Measurement quantity / Calibration item	Range	Measurement conditions / procedure	Extended uncertainty of Measurement	Remarks
AC current	29 µA to < 330 µA	45 Hz to 1 kHz	$1{,}5 \cdot 10^{-3} \cdot I + 1{,}0$ µA	I:measured value
Measurement instruments	330 µA to < 3,3 mA		$1{,}2 \cdot 10^{-3} \cdot I + 1{,}0$ µA	
	3,3 mA to < 33 mA		$0{,}50 \cdot 10^{-3} \cdot I + 5{,}0$ µA	
	33 mA to < 330 mA		$0{,}50 \cdot 10^{-3} \cdot I + 50$ µA	
	330 mA to < 1,1 A		$0{,}60 \cdot 10^{-3} \cdot I + 0{,}20$ mA	
	1,1 A to < 3 A		$0{,}70 \cdot 10^{-3} \cdot I + 0{,}20$ mA	
	3 A to < 11 A		$1{,}2 \cdot 10^{-3} \cdot I + 3{,}0$ mA	
	11 A to 20 A		$1{,}8 \cdot 10^{-3} \cdot I + 12$ mA	
Sources	10 µA to 100 µA	45 Hz to 5 kHz	$0{,}70 \cdot 10^{-3} \cdot I + 0{,}10$ µA	
	> 100 µA to 1 mA		$0{,}70 \cdot 10^{-3} \cdot I + 0{,}50$ µA	
	> 1 mA to 10 mA		$0{,}70 \cdot 10^{-3} \cdot I + 5{,}0$ µA	
	> 10 mA to 100 mA		$0{,}70 \cdot 10^{-3} \cdot I + 50$ µA	
	> 100 mA to 1 A	45 Hz to 1 kHz	$1{,}5 \cdot 10^{-3} \cdot I + 0{,}30$ mA	
Frequency				
Measurement instruments	0,1 Hz to 20 MHz		$25 \cdot 10^{-6} \cdot f$	f: measured value
Sources	0,1 Hz to 35 MHz		$6{,}0 \cdot 10^{-6} \cdot f$	
Oscilloscope quantities Vertical deflection	5 mV to 10 mV	DC to 10 MHz	$40 \cdot 10^{-3} \cdot U$	Application: Voltage Measurement
	> 10 mV to 5 V		$35 \cdot 10^{-3} \cdot U$	
Horizontal deflection	0,5 MHz to 1 MHz		$2 \cdot 10^{-3} \cdot f$	Application: Frequency Measurement
	> 1 MHz to 2 MHz		$2 \cdot 10^{-3} \cdot f$	
	> 2 MHz to 5 MHz		$4 \cdot 10^{-3} \cdot f$	
	> 5 MHz to 10 MHz		$7 \cdot 10^{-3} \cdot f$	
	> 10 MHz to 20 MHz		$8 \cdot 10^{-3} \cdot f$	
	> 20 MHz to 25 MHz		$8 \cdot 10^{-3} \cdot f$	
	> 25 MHz to 30 MHz		$10 \cdot 10^{-3} \cdot f$	
	> 30 MHz to 35 MHz		$12 \cdot 10^{-3} \cdot f$	
Horizontal deflection	2,0 ns to 10 ns		0,050 ns	Appliaction: Time-duration Measurement
	> 10 ns to 0,10 µs		0,20 ns	
	> 0,1 µs to 1,0 µs		0,30 ns	
	> 1,0 µs to 10 µs		3,0 ns	
	> 10 µs to 50 µs		10 ns	
	> 50 µs to 0,10 ms		30 ns	
	> 0,10 ms to 0,50 ms		100 ns	
	> 0,50 ms to 1,0 ms		300 ns	

On-Site Calibration - Location Karlstein am Main

Calibration and Measurement Capabilities (CMC)

Measurement quantity / Calibration item	Range	Measurement conditions / procedure	Extended uncertainty of Measurement	Remarks
DC voltage Measurement instruments	0 V to < 0,33 V		$25 \cdot 10^{-6} \cdot U + 2{,}0\ \mu V$	U: measured value
	0,33 V to < 3,3 V		$15 \cdot 10^{-6} \cdot U + 3{,}0\ \mu V$	
	3,3 V to < 33 V		$15 \cdot 10^{-6} \cdot U + 30\ \mu V$	
	33 V to < 330 V		$25 \cdot 10^{-6} \cdot U + 0{,}20\ mV$	
	330 V to 1000 V		$25 \cdot 10^{-6} \cdot U + 2{,}0\ mV$	
Sources	0 V to 0,1 V		$15 \cdot 10^{-6} \cdot U + 1{,}0\ \mu V$	
	> 0,1 V to 1 V		$15 \cdot 10^{-6} \cdot U + 1{,}0\ \mu V$	
	> 1 V to 10 V		$15 \cdot 10^{-6} \cdot U + 1{,}0\ \mu V$	
	> 10 V to 100 V		$15 \cdot 10^{-6} \cdot U + 50\ \mu V$	
	> 100 V to 1000 V		$15 \cdot 10^{-6} \cdot U + 0{,}15\ mV$	
DC current Measurement instruments	20 µA to < 330 µA		$0{,}20 \cdot 10^{-3} \cdot I + 0{,}10\ \mu A$	I: measured value
	330 µA to < 3,3 mA		$0{,}15 \cdot 10^{-3} \cdot I + 0{,}10\ \mu A$	
	3,3 mA to < 33 mA		$0{,}13 \cdot 10^{-3} \cdot I + 1{,}0\ \mu A$	
	33 mA to < 330 mA		$0{,}13 \cdot 10^{-3} \cdot I + 5{,}0\ \mu A$	
	330 mA to < 1,1 A		$0{,}25 \cdot 10^{-3} \cdot I + 60\ \mu A$	
	1,1 A to < 3,0 A		$0{,}50 \cdot 10^{-3} \cdot I + 50\ \mu A$	
	3,0 A to < 11 A		$0{,}60 \cdot 10^{-3} \cdot I + 0{,}70\ mA$	
	11 A to 20 A		$1{,}2 \cdot 10^{-3} \cdot I + 1{,}0\ mA$	
Sources	> 0,1 µA to 1 µA		$30 \cdot 10^{-6} \cdot I + 0{,}00010\ \mu A$	
	> 1 µA to 10 µA		$30 \cdot 10^{-6} \cdot I + 0{,}00015\ \mu A$	
	> 10 µA to 100 µA		$30 \cdot 10^{-6} \cdot I + 0{,}0015\ \mu A$	
	> 100 µA to 1 mA		$25 \cdot 10^{-6} \cdot I + 0{,}010\ \mu A$	
	> 1 mA to 10 mA		$30 \cdot 10^{-6} \cdot I + 0{,}10\ \mu A$	
	> 10 mA to 100 mA		$50 \cdot 10^{-6} \cdot I + 1{,}0\ \mu A$	
	> 100 mA to 1 A		$150 \cdot 10^{-6} \cdot I + 10\ \mu A$	
DC resistance Measurement instruments	1 Ω to < 11 Ω		$25 \cdot 10^{-6} \cdot R + 0{,}70\ m\Omega$	R: measured value
	11 Ω to < 33 Ω		$30 \cdot 10^{-6} \cdot R + 0{,}50\ m\Omega$	
	33 Ω to < 330 Ω		$40 \cdot 10^{-6} \cdot R + 0{,}20\ m\Omega$	
	330 Ω to < 3,3 kΩ		$40 \cdot 10^{-6} \cdot R + 2{,}0\ m\Omega$	
	3,3 kΩ to < 33 kΩ		$40 \cdot 10^{-6} \cdot R + 20\ m\Omega$	
	33 kΩ to < 110 kΩ		$30 \cdot 10^{-6} \cdot R + 2{,}0\ \Omega$	
	110 kΩ to < 330 kΩ		$40 \cdot 10^{-6} \cdot R + 10\ \Omega$	
	330 kΩ to < 1,1 MΩ		$40 \cdot 10^{-6} \cdot R + 0{,}15\ k\Omega$	
	1,1 MΩ to < 3,3 MΩ		$40 \cdot 10^{-6} \cdot R + 1{,}5\ k\Omega$	
	3,3 MΩ to < 11 MΩ		$0{,}10 \cdot 10^{-3} \cdot R + 1{,}5\ k\Omega$	
	11 MΩ to < 33 MΩ		$0{,}30 \cdot 10^{-3} \cdot R + 1{,}5\ k\Omega$	
	33 MΩ to < 110 MΩ		$0{,}60 \cdot 10^{-3} \cdot R + 5{,}0\ k\Omega$	
	110 MΩ to < 330 MΩ		$3{,}5 \cdot 10^{-3} \cdot R + 5{,}0\ k\Omega$	
	330 MΩ to < 1,1 GΩ		$18 \cdot 10^{-3} \cdot R + 5{,}0\ k\Omega$	

On-Site Calibration - Location Karlstein am Main

Calibration and Measurement Capabilities (CMC)

Measurement quantity / Calibration item	Range	Measurement conditions / procedure	Extended uncertainty of Measurement	Remarks
DC resistance Resistance	1 Ω to 10 Ω		$20 \cdot 10^{-6} \cdot R + 0{,}10$ mΩ	R: measured value
	> 10 Ω to 100 Ω		$15 \cdot 10^{-6} \cdot R + 1{,}0$ mΩ	
	> 100 Ω to 1 kΩ		$15 \cdot 10^{-6} \cdot R + 1{,}0$ mΩ	
	> 1 kΩ to 10 kΩ		$15 \cdot 10^{-6} \cdot R + 10$ mΩ	
	> 10 kΩ to 100 kΩ		$15 \cdot 10^{-6} \cdot R + 0{,}10$ Ω	
	> 100 kΩ to 1 MΩ		$20 \cdot 10^{-6} \cdot R + 4{,}0$ Ω	
	> 1 MΩ to 10 MΩ		$60 \cdot 10^{-6} \cdot R + 0{,}20$ kΩ	
	> 10 MΩ to 100 MΩ		$0{,}60 \cdot 10^{-3} \cdot R + 1{,}5$ kΩ	
	> 100 MΩ to 1 GΩ		$6{,}0 \cdot 10^{-3} \cdot R + 20$ kΩ	
AC voltage Measurement instruments	0,001 V to < 0,033 V	45 Hz to 10 kHz	$0{,}20 \cdot 10^{-3} \cdot U + 10$ µV	U: measured value
	0,033 V to < 0,33 V		$0{,}20 \cdot 10^{-3} \cdot U + 15$ µV	
	0,33 V to < 3,3 V		$0{,}20 \cdot 10^{-3} \cdot U + 0{,}10$ mV	
	3,3 V to < 33 V		$0{,}20 \cdot 10^{-3} \cdot U + 1{,}0$ mV	
	33 V to < 330 V		$0{,}25 \cdot 10^{-3} \cdot U + 10$ mV	
	330 V to 1000 V		$0{,}35 \cdot 10^{-3} \cdot U + 15$ mV	
Sources	0,001 V to 0,01 V	40 Hz to 20 kHz	$0{,}40 \cdot 10^{-3} \cdot U + 2{,}0$ µV	
	> 0,01 V to 0,1 V		$0{,}20 \cdot 10^{-3} \cdot U + 3{,}0$ µV	
	> 0,1 V to 1 V		$0{,}20 \cdot 10^{-3} \cdot U + 30$ µV	
	> 1 V to 10 V		$0{,}20 \cdot 10^{-3} \cdot U + 0{,}30$ mV	
	> 10 V to 100 V		$0{,}30 \cdot 10^{-3} \cdot U + 3{,}0$ mV	
	> 100 V to 700 V	40 Hz to 1 kHz	$0{,}60 \cdot 10^{-3} \cdot U + 30$ mV	
AC current Measurement instruments	29 µA to < 330 µA	45 Hz to 1 kHz	$1{,}5 \cdot 10^{-3} \cdot I + 1{,}0$ µA	I: measured value
	330 µA to < 3,3 mA		$1{,}2 \cdot 10^{-3} \cdot I + 1{,}0$ µA	
	3,3 mA to < 33 mA		$0{,}50 \cdot 10^{-3} \cdot I + 5{,}0$ µA	
	33 mA to < 330 mA		$0{,}50 \cdot 10^{-3} \cdot I + 50$ µA	
	330 mA to < 1,1 A		$0{,}60 \cdot 10^{-3} \cdot I + 0{,}20$ mA	
	1,1 A to < 3 A		$0{,}70 \cdot 10^{-3} \cdot I + 0{,}20$ mA	
	3 A to < 11 A		$1{,}2 \cdot 10^{-3} \cdot I + 3{,}0$ mA	
	11 A to 20 A		$1{,}8 \cdot 10^{-3} \cdot I + 12$ mA	
Sources	10 µA to 100 µA	45 Hz to 5 kHz	$0{,}70 \cdot 10^{-3} \cdot I + 0{,}10$ µA	
	> 100 µA to 1 mA		$0{,}70 \cdot 10^{-3} \cdot I + 0{,}50$ µA	
	> 1 mA to 10 mA		$0{,}70 \cdot 10^{-3} \cdot I + 5{,}0$ µA	
	> 10 mA to 100 mA		$0{,}70 \cdot 10^{-3} \cdot I + 50$ µA	
	> 100 mA to 1 A	45 Hz to 1 kHz	$1{,}5 \cdot 10^{-3} \cdot I + 0{,}30$ mA	

DAkkS Deutsche Akkreditierungsstelle

On-Site Calibration - Location Karlstein am Main

Calibration and Measurement Capabilities (CMC)

Measurement quantity / Calibration item	Range	Measurement conditions / procedure	Extended uncertainty of Measurement	Remarks
Frequency				
Measurement instruments	0,1 Hz to 20 MHz		$25 \cdot 10^{-6} \cdot f$	f: measured value
Sources	0,1 Hz to 35 MHz		$6{,}0 \cdot 10^{-6} \cdot f$	
Oscilloscope quantities Vertical deflection	5 mV to 10 mV	DC to 10 MHz	$40 \cdot 10^{-3} \cdot U$	Application: Voltage Measurement
	> 10 mV to 5 V		$35 \cdot 10^{-3} \cdot U$	
Horizontal deflection	0,5 MHz to 1 MHz		$2 \cdot 10^{-3} \cdot f$	Application: Frequency Measurement
	> 1 MHz to 2 MHz		$2 \cdot 10^{-3} \cdot f$	
	> 2 MHz to 5 MHz		$4 \cdot 10^{-3} \cdot f$	
	> 5 MHz to 10 MHz		$7 \cdot 10^{-3} \cdot f$	
	> 10 MHz to 20 MHz		$8 \cdot 10^{-3} \cdot f$	
	> 20 MHz to 25 MHz		$8 \cdot 10^{-3} \cdot f$	
	> 25 MHz to 30 MHz		$10 \cdot 10^{-3} \cdot f$	
	> 30 MHz to 35 MHz		$12 \cdot 10^{-3} \cdot f$	
Horizontal deflection	2,0 ns to 10 ns		0,050 ns	Application: Time-duration Measurement
	> 10 ns to 0,10 µs		0,20 ns	
	> 0,1 µs to 1,0 µs		0,30 ns	
	> 1,0 µs to 10 µs		3,0 ns	
	> 10 µs to 50 µs		10 ns	
	> 50 µs to 0,10 ms		30 ns	
	> 0,10 ms to 0,50 ms		100 ns	
	> 0,50 ms to 1,0 ms		300 ns	

Abbreviations used:

DIN Deutsches Institut für Normung e.V.
EN Europäische Norm
IEC International Electrotechnical Commission – Internationale Elektrotechnische Kommission
ISO International Organization for Standardization – Internationale Organisation für Normung