

Deutsche Akkreditierungsstelle GmbH

Entrusted according to Section 8 subsection 1 AkkStelleG in connection with Section 1 subsection 1 AkkStelleGBV

Signatory to the Multilateral Agreements of EA, ILAC and IAF for Mutual Recognition

Accreditation



The Deutsche Akkreditierungsstelle GmbH attests that the calibration laboratory

Hottinger Brüel & Kjaer GmbH
Im Tiefen See 45, 64293 Darmstadt

is competent under the terms of DIN EN ISO/IEC 17025:2018 to carry out calibrations in the following fields:

Mechanical quantities

- Torque
- Force
- Pressure

Thermodynamic quantities

- Temperature quantities
- Temperature indicators and simulators ^{a)}

Electrical quantities

- DC and low frequency quantities
- Voltage ratio ^{a)}
- DC voltage ^{a)}
- DC current ^{a)}
- DC resistance ^{a)}

Time and frequency

- Frequency ^{a)}

^{a)} also on-site calibration


The accreditation certificate shall only apply in connection with the notice of accreditation of 09.09.2020 with the accreditation number D-K-12029-01. It comprises the cover sheet, the reverse side of the cover sheet and the following annex with a total of 9 pages.

Registration number of the certificate: **D-K -12029-01-00**

Braunschweig,
09.09.2020

Dr. Heike Manke
Head of Division

Translation issued:
09.09.2020



Head of Division

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>

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

Deutsche Akkreditierungsstelle GmbH

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The publication of extracts of the accreditation certificate is subject to the prior written approval by Deutsche Akkreditierungsstelle GmbH (DAkKS). Exempted is the unchanged form of separate disseminations of the cover sheet by the conformity assessment body mentioned overleaf.

No impression shall be made that the accreditation also extends to fields beyond the scope of accreditation attested by DAkKS.

The accreditation was granted pursuant to the Act on the Accreditation Body (AkkStelleG) of 31 July 2009 (Federal Law Gazette I p. 2625) and the Regulation (EC) No 765/2008 of the European Parliament and of the Council of 9 July 2008 setting out the requirements for accreditation and market surveillance relating to the marketing of products (Official Journal of the European Union L 218 of 9 July 2008, p. 30). 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 Cooperation (ILAC). The signatories to these agreements recognise each other's accreditations.

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

Deutsche Akkreditierungsstelle GmbH

Annex to the Accreditation Certificate D-K-12029-01-00 according to DIN EN ISO/IEC 17025:2018

Valid from: 09.09.2020

Date of issue: 09.09.2020

Holder of certificate:

Hottinger Brüel & Kjaer GmbH
Im Tiefen See 45, 64293 Darmstadt

Calibration in the fields:

Mechanical quantities

- Torque ^{a)}
- Force ^{a)}
- Pressure ^{a)}

Thermodynamic quantities

- Temperature quantities**
- Temperature indicators
and simulators ^{a)}

Electrical quantities

- DC and low frequency quantities**
- Voltage ratio ^{a)}
 - DC voltage ^{a)}
 - DC current ^{a)}
 - DC resistance ^{a)}

Time and frequency

- Frequency ^{a)}

^{a)} also on-site calibration

Within the scope of accreditation marked with ^{a)} the calibration laboratory is permitted, without being required to inform and obtain prior approval from DAkkS, to use calibration standards or equivalent calibration procedures listed here with different issue dates.

The calibration laboratory maintains a current list of all calibration standards / equivalent calibration procedures within the flexible scope of accreditation.

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>*

Permanent Laboratory

Calibration and Measurement Capabilities (CMC)

Measurement quantity / Calibration item	Range	Measurement conditions / procedure	Expanded uncertainty of measurement ¹⁾	Remarks
Torque¹⁾ Torque transducer, Torque measuring chains	2 N·m to 200 N·m	DIN 51309:2005 DKD-R 10-5:2020 VDI/VDE 2646:2019	$4 \cdot 10^{-4}$	200-N·m Torque-RCM, correction 1.00025 counterclockwise and clockwise torque
	5 N·m to 1000 N·m		$1 \cdot 10^{-4}$	1-kN·m-Torque-RCM
	20 N·m to 1000 N·m		$2 \cdot 10^{-4}$	1-kN·m-Torque-RCM
	150 N·m to 10 kN·m		$2 \cdot 10^{-4}$	10-kN·m Torque-RCM
	50 N·m to 200 N·m		$4 \cdot 10^{-4}$	20-kN·m
	250 N·m to 20 kN·m		$2 \cdot 10^{-4}$	Torque-RCM
	100 N·m to 20 kN·m		$0.8 \cdot 10^{-4}$	25-kN·m
	> 20 kN·m to 25 kN·m		$1 \cdot 10^{-4}$	Torque-RCM
	3 kN·m to 400 kN·m	DIN 51309:2005 VDI/VDE 2646:2019	$1 \cdot 10^{-3}$	400-kN·m Torque-RCM
Force¹⁾	2.5 N to 200 N	DIN EN ISO 376:2011 DKD-R 3-3:2010	$5 \cdot 10^{-5}$	200-N-Force-RCM compression force
			$8 \cdot 10^{-5}$	200-N-Force-RCM tension force
	50 N to 2.5 kN		$5 \cdot 10^{-5}$	2.5-kN-Force-RCM compression force
			$8 \cdot 10^{-5}$	2.5-kN-Force-RCM tension force
	1 kN to 20 kN		$2 \cdot 10^{-4}$	20-kN-Force-RCM tension and compression force
	500 N to 25 kN		$5 \cdot 10^{-5}$	25-kN-Force-RCM compression force
			$8 \cdot 10^{-5}$	25-kN-Force-RCM tension force
	5 kN to 100 kN		$2 \cdot 10^{-4}$	100-kN-Force-RCM tension and compression force
	5 kN to 240 kN		$1 \cdot 10^{-4}$	240-kN-Force-RCM tension and compression force
	50 kN to 1 MN		$1 \cdot 10^{-4}$	1-MN-Force-RCM compression force
	50 kN to 600 kN		$2 \cdot 10^{-4}$	1-MN-Force-RCM tension force
	100 kN to 5 MN		$2 \cdot 10^{-4}$	5-MN-Force-RCM tension and compression force
Pressure¹⁾ positive gauge pressure p_e	0 bar; 50 bar to 3600 bar	DKD-R 6-1:2014	$2 \cdot 10^{-4} p_e$; but not < 72 mbar	Pressure medium: Oil

¹⁾ The expanded uncertainties according to EA-4/02 M:2013 are part of CMC and are the best measurement uncertainties within accreditation. They have a coverage probability of approximately 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.

Permanent Laboratory

Calibration and Measurement Capabilities (CMC)

Measurement quantity / Calibration item	Range	Measurement conditions / procedure	Expanded uncertainty of measurement ¹⁾	Remarks
Frequency measuring instruments	2 kHz		$12 \cdot 10^{-6} \cdot f$	<i>f</i> : measured value
	20 kHz			
	100 kHz			
	200 kHz			
	500 kHz			
	1 000 kHz			
	2 000 kHz			
Temperature¹⁾ indicators for resistance thermometers PT 100	-100 °C to 200 °C	DKD-R 5-5:2018 electrical simulation	0.02 K	electrical simulation of the sensor signal; temperature equivalent in Ω according to DIN EN 60751:2009
	> 200 °C to 500 °C		0.03 K	
	> 500 °C to 800 °C		0.04 K	
indicators for resistance thermometers PT 1000	-100 °C to 200 °C		0.02 K	
	> 200 °C to 500 °C		0.09 K	
	> 500 °C to 800 °C		0.12 K	
indicators for thermocouples Type K	-100 °C to 800 °C		0.12 K	electrical simulation of the sensor signal; temperature equivalent in V (with regard to reference junction temperature 0 °C) according to DIN EN 60584:2014
	> 800 °C to 1 300 °C		0.3 K	
indicators for thermocouples Type T	-200 °C to 400 °C		0.12 K	
DC voltage measuring instruments	0 V		1 μ V	<i>U</i> : measured value
	0.001 V to 0.22 V		$7 \cdot 10^{-6} \cdot U + 2 \mu$ V	
	> 0.22 V to 2.2 V		$8 \cdot 10^{-6} \cdot U + 2 \mu$ V	
	> 2.2 V to 11 V		$8 \cdot 10^{-6} \cdot U + 4 \mu$ V	
	> 11 V to 22 V		$9 \cdot 10^{-6} \cdot U + 10 \mu$ V	
	> 22 V to 220 V		$30 \cdot 10^{-6} \cdot U + 40 \mu$ V	
sources	0.0 V to 0.1 V		$6 \cdot 10^{-6} \cdot U + 0.4 \mu$ V	<i>U</i> : measured value
	> 0.1 V to 1 V		$5 \cdot 10^{-6} \cdot U + 0.4 \mu$ V	
	> 1 V to 10 V		$5 \cdot 10^{-6} \cdot U + 0.4 \mu$ V	
	> 10 V to 100 V		$50 \cdot 10^{-6} \cdot U + 1\,000 \mu$ V	
DC current measuring instruments	0.001 A to 0.022 A		$50 \cdot 10^{-6} \cdot I + 0.3 \mu$ A	<i>I</i> : measured value
	> 0.022 A to 0.22 A		$60 \cdot 10^{-6} \cdot I + 2 \mu$ A	

¹⁾ The expanded uncertainties according to EA-4/02 M:2013 are part of CMC and are the best measurement uncertainties within accreditation. They have a coverage probability of approximately 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.

Permanent Laboratory

Calibration and Measurement Capabilities (CMC)

Measurement quantity / Calibration item	Range	Measurement conditions / procedure	Expanded uncertainty of measurement ¹⁾	Remarks
DC resistance measuring instruments	16 Ω to 400 Ω		$25 \cdot 10^{-6} \cdot R + 1.8 \text{ m}\Omega$	R: measured value
	> 400 Ω to 2 000 Ω		$40 \cdot 10^{-6} \cdot R + 0.1 \text{ m}\Omega$	
	> 2 000 Ω to 10 000 Ω		$95 \cdot 10^{-6} \cdot R + 0.45 \text{ m}\Omega$	
Voltage ratio bridge standards	0 mV/V	DC voltage bridge voltage: 1.0 V	0.2 $\mu\text{V/V}$	
	$\pm 2 \text{ mV/V}$		0.25 $\mu\text{V/V}$	
	$\pm 5 \text{ mV/V}$		0.3 $\mu\text{V/V}$	
	$\pm 10 \text{ mV/V}$		0.3 $\mu\text{V/V}$	
	$\pm 20 \text{ mV/V}$		0.4 $\mu\text{V/V}$	
	$\pm 100 \text{ mV/V}$		1 $\mu\text{V/V}$	
	$\pm 1 000 \text{ mV/V}$		10 $\mu\text{V/V}$	
	0 mV/V	DC voltage bridge voltage: > 1 V to 2.5 V	0.1 $\mu\text{V/V}$	
	$\pm 2 \text{ mV/V}$		0.1 $\mu\text{V/V}$	
	$\pm 5 \text{ mV/V}$		0.2 $\mu\text{V/V}$	
	$\pm 10 \text{ mV/V}$		0.2 $\mu\text{V/V}$	
	$\pm 20 \text{ mV/V}$		0.2 $\mu\text{V/V}$	
	$\pm 100 \text{ mV/V}$		1 $\mu\text{V/V}$	
	$\pm 1 000 \text{ mV/V}$		10 $\mu\text{V/V}$	
	0 mV/V	DC voltage bridge voltage: > 2.5 V to 7.5 V	0.1 $\mu\text{V/V}$	
	$\pm 2 \text{ mV/V}$		0.1 $\mu\text{V/V}$	
	$\pm 5 \text{ mV/V}$		0.1 $\mu\text{V/V}$	
	$\pm 10 \text{ mV/V}$		0.1 $\mu\text{V/V}$	
	$\pm 20 \text{ mV/V}$		0.2 $\mu\text{V/V}$	
	$\pm 100 \text{ mV/V}$		1 $\mu\text{V/V}$	
	$\pm 1 000 \text{ mV/V}$		10 $\mu\text{V/V}$	
Voltage ratio bridge standards	0 mV/V	DC voltage bridge voltage: > 7.5 V to 10 V	0.1 $\mu\text{V/V}$	
	$\pm 2 \text{ mV/V}$		0.1 $\mu\text{V/V}$	
	$\pm 5 \text{ mV/V}$		0.1 $\mu\text{V/V}$	
	$\pm 10 \text{ mV/V}$		0.1 $\mu\text{V/V}$	
	$\pm 20 \text{ mV/V}$		0.2 $\mu\text{V/V}$	
	$\pm 100 \text{ mV/V}$		1 $\mu\text{V/V}$	
	$\pm 200 \text{ mV/V}$		2 $\mu\text{V/V}$	
Voltage ratio bridge standards and measuring instruments	2.5 mV/V	frequency: 225 Hz bridge voltage: 2.5 V	0.03 $\mu\text{V/V}$	calibration of 350 Ω - bridge standards and associated indicators with inductive reference bridge standard

¹⁾ The expanded uncertainties according to EA-4/02 M:2013 are part of CMC and are the best measurement uncertainties within accreditation. They have a coverage probability of approximately 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.

Permanent Laboratory

Calibration and Measurement Capabilities (CMC)

Measurement quantity / Calibration item	Range	Measurement conditions / procedure	Expanded uncertainty of measurement ¹⁾	Remarks
Voltage ratio measuring instruments	$\pm 2 \text{ mV/V}$	DC voltage bridge voltage: 1.0 V	0.5 $\mu\text{V/V}$	
	$\pm 5 \text{ mV/V}$		0.5 $\mu\text{V/V}$	
	$\pm 10 \text{ mV/V}$		1.0 $\mu\text{V/V}$	
	$\pm 20 \text{ mV/V}$		1.5 $\mu\text{V/V}$	
	$\pm 100 \text{ mV/V}$		15 $\mu\text{V/V}$	
	$\pm 1\,000 \text{ mV/V}$		150 $\mu\text{V/V}$	
	$\pm 2 \text{ mV/V}$	DC voltage bridge voltage: > 1 V to 10 V	0.3 $\mu\text{V/V}$	
	$\pm 5 \text{ mV/V}$		0.6 $\mu\text{V/V}$	
	$\pm 10 \text{ mV/V}$		1.2 $\mu\text{V/V}$	
	$\pm 20 \text{ mV/V}$		2.4 $\mu\text{V/V}$	
	$\pm 100 \text{ mV/V}$		12 $\mu\text{V/V}$	
	$\pm 1\,000 \text{ mV/V}$		120 $\mu\text{V/V}$	
	$\pm 5 \text{ mV/V}$	frequency: 600 Hz to 1 250 Hz square wave bridge voltage: 1 V	0.5 $\mu\text{V/V}$	
	$\pm 10 \text{ mV/V}$		1 $\mu\text{V/V}$	
	$\pm 20 \text{ mV/V}$		1.5 $\mu\text{V/V}$	
	$\pm 100 \text{ mV/V}$		15 $\mu\text{V/V}$	
	$\pm 2 \text{ mV/V}$	frequency: 600 Hz to 1 250 Hz square wave bridge voltage: > 1 V to 5 V	0.3 $\mu\text{V/V}$	
	$\pm 5 \text{ mV/V}$		0.6 $\mu\text{V/V}$	
	$\pm 10 \text{ mV/V}$		1.2 $\mu\text{V/V}$	
	$\pm 20 \text{ mV/V}$		2.4 $\mu\text{V/V}$	
Voltage ratio quarter- and half-bridge measuring instruments	$\pm 10 \text{ mV/V}$	DC voltage bridge voltage: 1.0 V	5 $\mu\text{V/V}$	
	$\pm 20 \text{ mV/V}$		5 $\mu\text{V/V}$	
	$\pm 100 \text{ mV/V}$		20 $\mu\text{V/V}$	
	$\pm 2 \text{ mV/V}$	DC voltage bridge voltage: > 1 V to 2.5 V	2 $\mu\text{V/V}$	
	$\pm 5 \text{ mV/V}$		2 $\mu\text{V/V}$	
	$\pm 10 \text{ mV/V}$		2 $\mu\text{V/V}$	
	$\pm 20 \text{ mV/V}$		5 $\mu\text{V/V}$	
	$\pm 100 \text{ mV/V}$		20 $\mu\text{V/V}$	
	$\pm 2 \text{ mV/V}$	DC voltage bridge voltage: > 2.5 V to 5.0 V	2 $\mu\text{V/V}$	
	$\pm 5 \text{ mV/V}$		3 $\mu\text{V/V}$	
	$\pm 10 \text{ mV/V}$		5 $\mu\text{V/V}$	

¹⁾ The expanded uncertainties according to EA-4/02 M:2013 are part of CMC and are the best measurement uncertainties within accreditation. They have a coverage probability of approximately 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.

Permanent Laboratory

Calibration and Measurement Capabilities (CMC)

Measurement quantity / Calibration item	Range	Measurement conditions / procedure	Expanded uncertainty of measurement ¹⁾	Remarks
Voltage ratio	± 0.5 mV/V ± 1 mV/V ± 2 mV/V ± 5 mV/V ± 10 mV/V	DC voltage bridge voltage: 5 V or 10 V	$1 \cdot 10^{-4}$ from measured value; but not < 0.2 μ V/V	calibration of 350 Ω - bridge standards and associated indicators
	± 2 mV/V	frequency: 600 Hz bridge voltage: 1 V bridge voltage: 2.5 V bridge voltage: 5 V	0.2 μ V/V 0.15 μ V/V 0.1 μ V/V	calibration of 350 Ω - bridge standards and associated indicators with reference bridge standard HBM-K3608
	± 2 mV/V	frequency: 4,8 kHz bridge voltage: 1 V bridge voltage: 2.5 V bridge voltage: 5 V	0.4 μ V/V 0.3 μ V/V 0.25 μ V/V	
	± 2.5 mV/V	frequency: 600 Hz bridge voltage: 2.5 V bridge voltage: 5 V	0.06 μ V/V 0.03 μ V/V	
	± 5 mV/V	frequency: 600 Hz bridge voltage: 2.5 V bridge voltage: 5 V	0.08 μ V/V 0.06 μ V/V	calibration of 350 Ω - bridge standards and associated indicators with inductive reference bridge standard
	± 5 mV/V	frequency: 225 Hz bridge voltage: 2.5 V bridge voltage: 5 V	0.04 μ V/V 0.03 μ V/V	
	± 10 mV/V	frequency: 600 Hz bridge voltage: 1 V; 2.5 V or 5 V	0.5 μ V/V	
	± 10 mV/V	frequency: 4.8 kHz bridge voltage: 1 V; 2.5 V or 5 V	1.5 μ V/V	calibration of 350 Ω - bridge standards and associated indicators with reference bridge standard HBM-K3608
	± 100 mV/V	frequency: 4.8 kHz bridge voltage: 1 V or 2.5 V	10 μ V/V	
	± 1 000 mV/V	frequency: 4.8 kHz bridge voltage: 1 V or 2.5 V	50 μ V/V	
	± 2.5 mV/V	frequency: 225 Hz bridge voltage: 5 V or 10 V	0.02 μ V/V	calibration of 350 Ω - bridge standards and associated indicators with an inductive reference bridge standard

¹⁾ The expanded uncertainties according to EA-4/02 M:2013 are part of CMC and are the best measurement uncertainties within accreditation. They have a coverage probability of approximately 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.

On-site Calibration

Calibration and Measurement Capabilities (CMC)

Measurement quantity / Calibration item	Range	Measurement conditions / procedure	Expanded uncertainty of measurement ¹⁾	Remarks
Frequency measuring instruments	2 kHz		$12 \cdot 10^{-6} \cdot f$	f: measured value
	20 kHz			
	100 kHz			
	200 kHz			
	500 kHz			
	1 000 kHz			
	2 000 kHz			
Temperature ¹⁾ indicators for resistance thermometers PT 100	-100 °C to 200 °C	DKD-R 5-5:2018 electrical simulation	0.02 K	electrical simulation of the sensor signal; temperature equivalent in Ω according to DIN EN 60751:2009
	> 200 °C to 500 °C		0.03 K	
	> 500 °C to 800 °C		0.04 K	
indicators for resistance thermometers PT 1000	-100 °C to 200 °C		0.02 K	
	> 200 °C to 500 °C		0.09 K	
	> 500 °C to 800 °C		0.12 K	
indicators for thermocouples Type K	-100 °C to 800 °C	DKD-R 5-5:2018 electrical simulation	0.12 K	electrical simulation of the sensor signal; temperature equivalent in V (with regard to reference function temperature 0 °C) according to DIN EN 60584:2014
	> 800 °C to 1 300 °C		0.3 K	
indicators for thermocouples Type T	-200 °C to 400 °C		0.12 K	
DC voltage measuring instruments	0 V to 0.045 V		$30 \cdot 10^{-6} \cdot U + 4 \mu\text{V}$	U: measured value
	> 0.045 V to 0.3 V		$35 \cdot 10^{-6} \cdot U + 13 \mu\text{V}$	
	> 0.3 V to 0.45 V		$35 \cdot 10^{-6} \cdot U + 22 \mu\text{V}$	
	> 0.45 V to 3 V		$35 \cdot 10^{-6} \cdot U + 125 \mu\text{V}$	
	> 3 V to 4.5 V		$35 \cdot 10^{-6} \cdot U + 215 \mu\text{V}$	
	> 4.5 V to 30 V		$35 \cdot 10^{-6} \cdot U + 1\,300 \mu\text{V}$	
	> 30 V to 60 V		$35 \cdot 10^{-6} \cdot U + 2\,500 \mu\text{V}$	
	> 60 V to 100 V		$50 \cdot 10^{-6} \cdot U + 1\,000 \mu\text{V}$	
sources	0.001 V to 0.1 V		$35 \cdot 10^{-6} \cdot U + 8 \mu\text{V}$	U: measured value
	> 0.1 V to 1 V		$35 \cdot 10^{-6} \cdot U + 11 \mu\text{V}$	
	> 1 V to 10 V		$35 \cdot 10^{-6} \cdot U + 60 \mu\text{V}$	
	> 10 V to 100 V		$50 \cdot 10^{-6} \cdot U + 1\,000 \mu\text{V}$	

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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 current measuring instruments	0.002 A to 0.0075 A		$90 \cdot 10^{-6} \cdot I + 0.9 \mu\text{A}$	I: measured value
	> 0.0075 A to 0.052 A		$90 \cdot 10^{-6} \cdot I + 4 \mu\text{A}$	
DC resistance measuring instruments	16 Ω to 400 Ω		$25 \cdot 10^{-6} \cdot R + 1.8 \text{ m}\Omega$	R: measured value
	> 400 Ω to 2 000 Ω		$40 \cdot 10^{-6} \cdot R + 0.1 \text{ m}\Omega$	
	> 2 000 Ω to 10 000 Ω		$95 \cdot 10^{-6} \cdot R + 0.45 \text{ m}\Omega$	
Voltage ratio measuring instruments	$\pm 2 \text{ mV/V}$	DC voltage bridge voltage: 1.0 V	0.5 $\mu\text{V/V}$	
	$\pm 5 \text{ mV/V}$		0.5 $\mu\text{V/V}$	
	$\pm 10 \text{ mV/V}$		1.0 $\mu\text{V/V}$	
	$\pm 20 \text{ mV/V}$		1.5 $\mu\text{V/V}$	
	$\pm 100 \text{ mV/V}$		15 $\mu\text{V/V}$	
	$\pm 1 000 \text{ mV/V}$		150 $\mu\text{V/V}$	
	$\pm 2 \text{ mV/V}$	DC voltage bridge voltage: > 1 V to 10 V	0.3 $\mu\text{V/V}$	
	$\pm 5 \text{ mV/V}$		0.6 $\mu\text{V/V}$	
	$\pm 10 \text{ mV/V}$		1.2 $\mu\text{V/V}$	
	$\pm 20 \text{ mV/V}$		2.4 $\mu\text{V/V}$	
	$\pm 100 \text{ mV/V}$		12 $\mu\text{V/V}$	
	$\pm 1 000 \text{ mV/V}$		120 $\mu\text{V/V}$	
	$\pm 5 \text{ mV/V}$	frequency: 600 Hz to 1 250 Hz square wave bridge voltage: 1 V	0.5 $\mu\text{V/V}$	
	$\pm 10 \text{ mV/V}$		1 $\mu\text{V/V}$	
	$\pm 20 \text{ mV/V}$		1.5 $\mu\text{V/V}$	
	$\pm 100 \text{ mV/V}$		15 $\mu\text{V/V}$	
	$\pm 2 \text{ mV/V}$	frequency: 600 Hz to 1 250 Hz square wave bridge voltage: > 1 V to 5 V	0.3 $\mu\text{V/V}$	
	$\pm 5 \text{ mV/V}$		0.6 $\mu\text{V/V}$	
	$\pm 10 \text{ mV/V}$		1.2 $\mu\text{V/V}$	
	$\pm 20 \text{ mV/V}$		2.4 $\mu\text{V/V}$	
	$\pm 2 \text{ mV/V}$	frequency: 4.8 kHz bridge voltage: 1 V	0.5 $\mu\text{V/V}$	
	$\pm 10 \text{ mV/V}$		2 $\mu\text{V/V}$	
	$\pm 100 \text{ mV/V}$		15 $\mu\text{V/V}$	
	$\pm 1 000 \text{ mV/V}$		120 $\mu\text{V/V}$	
	$\pm 2 \text{ mV/V}$	frequency: 4.8 kHz bridge voltage: 2.5 V	0.4 $\mu\text{V/V}$	
	$\pm 5 \text{ mV/V}$		2 $\mu\text{V/V}$	
	$\pm 10 \text{ mV/V}$		2 $\mu\text{V/V}$	
	$\pm 100 \text{ mV/V}$		15 $\mu\text{V/V}$	
	$\pm 2 \text{ mV/V}$	frequency: 4.8 kHz bridge voltage: 5 V	0.4 $\mu\text{V/V}$	

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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
Voltage ratio measuring instruments	± 2 mV/V	frequency: 600 Hz bridge voltage: 2.5 V	0.1 μ V/V	calibration of indicators with inductive reference bridge standard
	± 5 mV/V		0.2 μ V/V	
	± 10 mV/V		1 μ V/V	
	± 2 mV/V	frequency: 600 Hz bridge voltage: 5 V	0.1 μ V/V	
	± 5 mV/V		0.2 μ V/V	
	± 2.5 mV/V	frequency: 225 Hz bridge voltage: 2.5 V	0.06 μ V/V	
	± 5 mV/V		0.08 μ V/V	
	± 10 mV/V		0.2 μ V/V	
	± 2.5 mV/V	frequency: 225 Hz bridge voltage: 5 V	0.04 μ V/V	
	± 5 mV/V		0.06 μ V/V	
Voltage ratio quarter- and half-bridge measuring instruments	± 10 mV/V	DC voltage bridge voltage: 1.0 V	5 μ V/V	
	± 20 mV/V		5 μ V/V	
	± 100 mV/V		20 μ V/V	
	± 2 mV/V	DC voltage bridge voltage: > 1 V to 2.5 V	2 μ V/V	
	± 5 mV/V		2 μ V/V	
	± 10 mV/V		2 μ V/V	
	± 20 mV/V		5 μ V/V	
	± 100 mV/V		10 μ V/V	
	± 2 mV/V	DC voltage bridge voltage: > 2.5 V to 5.0 V	2 μ V/V	
	± 5 mV/V		3 μ V/V	
	± 10 mV/V		5 μ V/V	

Abbreviations used:

CMC	Calibration and measurement capabilities
DKD-R	Guideline of Deutscher Kalibrierdienst (DKD), published by Physikalisch-Technische Bundesanstalt
EURAMET	European Association of National Metrology Institutes

¹⁾ The expanded uncertainties according to EA-4/02 M:2013 are part of CMC and are the best measurement uncertainties within accreditation. They have a coverage probability of approximately 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.