DAkkS
Deutsche
Akkreditierungsstelle

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

EMH Energie-Messtechnik GmbH
Vor dem Hassel 2, 21438 Brackel

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

Electrical Quantities

DC and Low Frequency Quantities

- **DC voltage**
- **DC current**
- **AC voltage**
- **AC current**
- **Electric energy**
- **Electric power**
- **Current ratio**

The accreditation certificate shall only apply in connection with the notice of accreditation of 02.08.2022 with the accreditation number D-K-12011-01. It comprises the cover sheet, the reverse side of the cover sheet and the following annex with a total of 3 pages.

Registration number of the certificate: **D-K -12011-01-00**

by proxy Dr Tallarek

Berlin, 02.08.2022	Dr. Florian Witt Head of Technical Unit	Translation issued: 02.08.2022	Technical Unit

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

Office Berlin
Spittelmarkt 10
10117 Berlin

Office Frankfurt am Main
Europa-Allee 52
60327 Frankfurt am Main

Office Braunschweig
Bundesallee 100
38116 Braunschweig

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

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Annex to the Accreditation Certificate D-K-12011-01-00 according to DIN EN ISO/IEC 17025:2018

Valid from: 02.08.2022

Date of issue: 02.08.2022

Holder of certificate:

EMH Energie-Messtechnik GmbH
Vor dem Hassel 2, 21438 Brackel

Calibration in the fields:

Electrical Quantities

DC and Low Frequency Quantities

- **DC voltage**
- **DC current**
- **AC voltage**
- **AC current**
- **Electric energy**
- **Electric power**
- **Current ratio**

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.

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Abbreviations used: see last page

Permanent Laboratory

Calibration and Measurement Capabilities (CMC)

Measurement quantity / Calibration item	Range	Measurement conditions / procedure	Expanded uncertainty of measurement	Remarks
AC voltage	60V, 120V, 240V, 480V	45 Hz ≤ f ≤ 65 Hz	$44 \cdot 10^{-6}$	Comparison with HEG K2005
	30 V to 480 V		$50 \cdot 10^{-6}$	
AC current	25 mA		$51 \cdot 10^{-6}$	
	50 mA, 100 mA, 250 mA, 500 mA, 1 A, 2,5 A, 5 A, 10 A		$38 \cdot 10^{-6}$	f: Frequency
	25 A, 50 A, 100 A		$44 \cdot 10^{-6}$	
	20 mA to < 50 mA		$57 \cdot 10^{-6}$	
	50 mA to < 10 A		$45 \cdot 10^{-6}$	
	10 A to 100 A		$50 \cdot 10^{-6}$	
AC voltage	30 V to 480 V	45 Hz ≤ f ≤ 65 Hz	$64 \cdot 10^{-6}$	Comparison with EMH K2006
AC current	5 mA to 10 mA		$0{,}24 \cdot 10^{-3}$	
	> 10 mA to 20 mA		$0{,}17 \cdot 10^{-3}$	f: Frequency
	> 20 mA to 50 mA		$0{,}1 \cdot 10^{-3}$	
	> 50 mA to 160 A		$70 \cdot 10^{-6}$	
DC voltage	100 mV to 1000 V		$17 \cdot 10^{-6}$	Comparison with digital multimeter FLUKE 8588A
DC current	10 mA to 1 A		$68 \cdot 10^{-6}$	Comparison with digital multimeter FLUKE 8588A and current transformer Danisense DS400ID with transducer Danisense DSSIU-4-1U
	> 1 A to 100 A		$72 \cdot 10^{-6}$	
	> 100 A to 600 A		$0{,}23 \cdot 10^{-3}$	
AC active power and energy	750 mW to 4800 W 750 mWh to 4800 Wh	45 Hz ≤ f ≤ 65 Hz 0,25 ≤ cosφ ≤ 1 60 V, 120 V, 240 V, 480 V 50 mA, 100 mA, 250 mA, 500 mA, 1 A, 2,5 A, 5 A, 10 A	$51 \cdot 10^{-6}$	Comparison with HEG K2005 Relative measurement uncertainty related to the apparent power or energy
	375 W to 48 kW 375 Wh to 48 kWh	45 Hz ≤ f ≤ 65 Hz 0,25 ≤ cosφ ≤ 1 60 V, 120 V, 240 V, 480 V 25 A, 50 A, 100 A	$60 \cdot 10^{-6}$	
	150 mW to < 26 W 150 mWh to < 26 Wh	45 Hz ≤ f ≤ 65 Hz 0,25 ≤ cosφ ≤ 1 30 V to 480 V 20 mA to < 50 mA	$0{,}15 \cdot 10^{-3}$	
	375 mW to < 4,8 kW 375 mWh to < 4,8 kWh	45 Hz ≤ f ≤ 65 Hz 0,25 ≤ cosφ ≤ 1 30 V to 480 V 50 mA to < 10 A	$57 \cdot 10^{-6}$	
	> 75 W to 4,8 kW > 75 Wh to 4,8 kWh	45 Hz ≤ f ≤ 65 Hz 0,25 ≤ cosφ ≤ 1 30 V to 480 V 10 A to 100 A	$64 \cdot 10^{-6}$	
AC active power and energy, effective, reactive and apparent power	37,5 mW to 2,4 W 37,5 mWh to 2,4 Wh 37,5 mVAr to 2,4 VAr 37,5 mVArh to 2,4 VArh 150 mVA to 2,4 VA 150 mVAh to 2,4 VAh	45 Hz ≤ f ≤ 65 Hz ± 0,25 ≤ cosφ ≤ ± 1 ± 0,25 ≤ sinφ ≤ ± 1 30 V to 240 V 5 mA to 10 mA	$0{,}24 \cdot 10^{-3}$	Comparison with EMH K2006 Relative measurement uncertainty related to the apparent power respectively energy

Permanent Laboratory

Calibration and Measurement Capabilities (CMC)

Measurement quantity / Calibration item	Range			Measurement conditions / procedure	Expanded uncertainty of measurement	Remarks
	> 75 mW > 75 mWh > 75 mVAr > 75 mVArh > 300 mVA > 300 mVAh	to to to to to to	4,8 W 4,8 Wh 4,8 VAr 4,8 VArh 4,8 VA 4,8 VAh	45 Hz ≤ f ≤ 65 Hz ± 0,25 ≤ cosφ ≤ ± 1 ± 0,25 ≤ sinφ ≤ ± 1 30 V to 240 V > 10 mA to 20 mA	$0{,}2 \cdot 10^{-3}$	
	> 150 mW > 150 mWh > 150 mVAr > 150 mVArh > 600 mVA > 600 mVAh	to to to to to to	12 W 12 Wh 12 VAr 12 VArh 12 VA 12 VAh	45 Hz ≤ f ≤ 65 Hz ± 0,25 ≤ cosφ ≤ ± 1 ± 0,25 ≤ sinφ ≤ ± 1 30 V to 240 V > 20 mA to 50 mA	$0{,}12 \cdot 10^{-3}$	
	> 375 mW > 375 mWh > 375 mVAr > 375 mVArh > 1,5 VA > 1,5 VAh	to to to to to to	9,6 kW 9,6 kWh 9,6 kVAr 9,6 kVArh 9,6 kVA 9,6 kVAh	45 Hz ≤ f ≤ 65 Hz ± 0,25 ≤ cosφ ≤ ± 1 ± 0,25 ≤ sinφ ≤ ± 1 30 V to 480 V > 50 mA to 20 A	$92 \cdot 10^{-6}$	
	> 150 W > 150 Wh > 150 VAr > 150 VArh > 600 VA > 600 VAh	to to to to to to	76,8 kW 76,8 kWh 76,8 kVAr 76,8 kVArh 76,8 kVA 76,8 kVAh	45 Hz ≤ f ≤ 65 Hz ± 0,25 ≤ cosφ ≤ ± 1 ± 0,25 ≤ sinφ ≤ ± 1 30 V to 480 V > 20 A to 160 A	$92 \cdot 10^{-6}$	
DC electric power and electric energy	1 mW 1 mWh	to to	1 kW 1 kWh	100 mV to 1000 V 10 mA to 1 A	$70 \cdot 10^{-6}$	Comparison with digital multimeter FLUKE 8588A and current transformer Danisense DS400ID with transducer Danisense DSSIU-4-1U
	100 mW 100 mWh	to to	100 kW 100 kWh	100 mV to 1000 V > 1 A to 100 A	$74 \cdot 10^{-6}$	
	10 W 10 Wh	to to	600 kW 600 kWh	100 mV to 1000 V > 100 A to 600 A	$0{,}23 \cdot 10^{-3}$	
Current transformers with transformation ratio 1:1	20 mA	to	< 50 mA	45 Hz ≤ f ≤ 65 Hz	$0{,}12 \cdot 10^{-3}$ 0,47´ ≙ 0,014 crad	Substitution method with two reference standards
	50 mA	to	160 A		$0{,}11 \cdot 10^{-3}$ 0,41´ ≙ 0,012 crad	

Abbreviations used:

CMC	Calibration and measurement capabilities (Kalibrier- und Messmöglichkeiten)
EMH	EMH Energie-Messtechnik GmbH
HEG	Hamburger Elektronik Gesellschaft