



NÁRODNÍ AKREDITAČNÍ ORGÁN

EA MLA Signatory
Český institut pro akreditaci, o.p.s.
Olšanská 54/3, 130 00 Praha 3

issues

according to section 16 of Act No. 22/1997 Coll., on technical requirements for products, as amended

CERTIFICATE OF ACCREDITATION

No. 244 / 2015

FORTE a.s.

with registered office Mostkovice 529, 798 02 Mostkovice , Company Registration No. 25322303

to the Calibration Laboratory No. 2302
Metrological Laboratory

Scope of accreditation:

Calibration of measuring equipment in the field of direct current, alternate current and high-frequency electrical quantities and in the field of frequency and time to the extent as specified in the appendix to this Certificate.

This Certificate of Accreditation is a proof of Accreditation issued on the basis of assessment of fulfillment of the accreditation criteria in accordance with

ČSN EN ISO/IEC 17025:2005

In its activities performed within the scope and for the period of validity of this Certificate, the Body is entitled to refer to this Certificate, provided that the accreditation is not suspended and the Body meets the specified accreditation requirements in accordance with the relevant regulations applicable to the activity of an accredited Conformity Assessment Body.

This Certificate of Accreditation replaces, to the full extent, Certificate No.: 553/2014 of 29 August 2014, or any administrative acts building upon it.

The Certificate of Accreditation is valid until: **29 August 2019**

Prague: 7 April 2015



Jiří Růžička
Jiří Růžička
Director
Czech Accreditation Institute
Public Service Company

Accredited entity according to ČSN EN ISO/IEC 17025:2005:

FORTE a.s.

Meteorological Laboratory

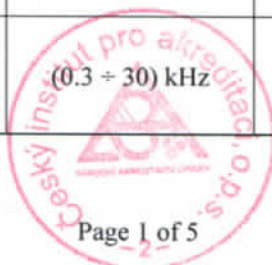
798 02 Mostkovice 529

Field of measured quantity: electrical quantities

Calibration:

Nominal calibration temperature: $(23 \pm 2) ^\circ\text{C}$

Ordinal number ¹⁾	Measured quantity	Measured quantity range	Calibration and Measurement Capability $[\pm]$ ²⁾	Calibration procedure identification
1.	Electrical resistance 0.0 Ω ÷ 0.5 Ω 0.5 Ω ÷ 1.0 Ω 1.0 Ω ÷ 4.0 Ω 4.0 Ω ÷ 1.0 M Ω 1.0 M Ω ÷ 3.0 M Ω 3.0 M Ω ÷ 10 M Ω 10 M Ω ÷ 40 M Ω 40 M Ω ÷ 100 M Ω		1.0 m Ω 0.25 % 0.070 % 0.035 % 0.060 % 0.035 % 0.30 % 0.15 %	KP 01/2001
	10 Ω 100 Ω 1k Ω 10 k Ω 100 k Ω 1M Ω 10 M Ω 100 M Ω		0.010 % 0.0050 % 0.0050 % 0.0050 % 0.0050 % 0.010 % 0.030 % 0.050 %	KP 02/2001
2.	DC voltage 0 mV ÷ 20 mV 20 mV ÷ 40 mV 40 mV ÷ 100 mV 100 mV ÷ 600 mV 600 mV ÷ 1,100 V		10 μ V 0.045 % 0.020 % 0.006 % 0.004 %	KP 02/2001
3.	DC current 0 mA ÷ 2 mA 2mA ÷ 1.99 A 2 A ÷ 20 A		1.0 μ A 0.05 % (0,026% + 1,1 mA)	KP 02/2001
4.	AC voltage 10 mV ÷ 60 mV 60 mV ÷ 199 mV 199 mV ÷ 1000 V	(32 ÷ 300) Hz	150 μ V 0.20 % 0.080 %	KP 02/2001 KP 14/2004
	10 mV ÷ 70 mV 70 mV ÷ 199 mV 199 mV ÷ 1000 V	(0.3 ÷ 30) kHz	150 μ V 0.20 % 0.070 %	



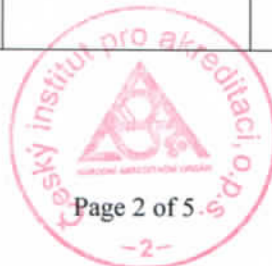
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Ordinal number ¹⁾	Measured quantity	Measured quantity range	Calibration and Measurement Capability [\pm] ²⁾	Calibration procedure identification
9	10 mV ÷ 70 mV 70 mV ÷ 300 mV 300 mV ÷ 19.99 V 19.99 V ÷ 199.99 V	(32 ÷ 100) kHz	180 μ V 0.25 % 0.060 % 0.12 %	
5.	AC current 1 mA ÷ 2 mA 2 mA ÷ 199 mA 199 mA ÷ 1.999 A 2 A ÷ 20 A	(0.01 ÷ 1) kHz	3 μ A 0.10 % 0.15 % (0,095% + 1,14 mA)	KP 02/2001
6.	Electric capacity (1; 2; 3) pF (4; 5; 6; 7) pF (8; 9; 10) pF (20; 30 ; 40; 70; 100; 200) pF (300; 400; 700) pF (1; 2; 3; 4; 7; 10; 20; 30; 40) nF (70; 100; 200; 300; 400; 700) nF 1 μ F	1 kHz	1.0 % 0.30 % 0.20 % 0.080 % 0.080 % 0.080 % 0.080 % 0.080 %	KP 04/2001
7.	Electrical inductance 10 μ H 100 μ H 1 mH 10 mH 100 mH 1 H	1 kHz	0.70 % 0.070 % 0.070 % 0.070 % 0.070 % 0.070 %	KP 07/2003
8.	High-frequency power 1 μ W ÷ 2 μ W 2 μ W ÷ 4 μ W 4 μ W ÷ 8 μ W 8 μ W ÷ 30 μ W 30 μ W ÷ 100 mW	10 MHz ÷ 1.99 GHz	8.1 % 5.0 % 3.4 % 3.0 % 2.8 %	KP 03/2003
	1 μ W ÷ 2 μ W 2 μ W ÷ 4 μ W 4 μ W ÷ 7 μ W 7 μ W ÷ 20 μ W 20 μ W ÷ 100 mW	(2 ÷ 12.39) GHz	9.2 % 6.5 % 5.5 % 5.2 % 5.1 %	



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Ordinal number ¹⁾	Measured quantity	Measured quantity range	Calibration and Measurement Capability [±] ²⁾	Calibration procedure identification
	1 μW ÷ 2 μW 2 μW ÷ 5 μW 5 μW ÷ 20 μW 20 μW ÷ 100 μW	(12.4 ÷ 18) GHz	9.9 % 7.5 % 6.5 % 6.4 %	
9.	Inspection equipment: loop impedance meters (0.5 ÷ 1.5) Ω (1.5 ÷ 10) Ω (10 ÷ 100) Ω (100 ÷ 1800) Ω		0.073 Ω 0.26 Ω 2.6 % 2.2 %	KP 18/2009
	meters of circuit breaker tripping current (3 ÷ 10) mA (10 ÷ 3000) mA	50 Hz	0.15 mA 2.0 %	
	meters of tripping contact voltage (1 ÷ 10) V (10 ÷ 100) V	50 Hz	4.9 V 11 V	
	meters of transition resistance (0.1 ÷ 1) Ω (1 ÷ 10) Ω (10 ÷ 10,000) Ω		0.019 Ω 0.042 Ω 0.42 %	
	meters of insulation resistance (0.01 ÷ 1) MΩ (1 ÷ 10) MΩ (10 ÷ 1,000) MΩ (1000 ÷ 10,000) MΩ		0.28 % 0.44 % 0.72 % 1.4 %	
	meters of leakage current (0.1 ÷ 1) mA (1 ÷ 10) mA (10 ÷ 28) mA	50 Hz	8.6 μA 0.86 % 0.62 %	

- 1) Expressed like uncertainty in accordance with the requirements of the document EA 4/02 at k = 2;
- 2) percentage is based on the value measured



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Measured instruments or devices:

(In accordance with the above list of measured quantities and the ranges of measurement the following types of instruments or devices can be measured.)

Ordinal number	Measured instrument/device type
1	Resistance boxes with maximum resistance 100 M Ω Digital multimeter with resolution up to 6.5 places Ohmmeter with measuring range 10 Ω ÷ 100 M Ω
2	Digital multimeter with resolution up to 6.5 places Digital DC voltmeter with resolution up to 6.5 places and measurement range 10 mV ÷ 1 100V
3	Digital multimeter with resolution up to 6.5 places Digital DC ammeter with resolution up to 6.5 places and measurement range 1 mA ÷ 1,99 A
4	Digital multimeter with resolution up to 6.5 places Digital AC voltmeter with resolution up to 6.5 places and measurement range 10 mV ÷ 1 000 V in frequency range 32 Hz ÷ 30 kHz; 10 mV ÷ 199.99 V in frequency range 30 kHz ÷ 100 kHz Oscilloscope vertical channel with sensitivity 1 mV/division ÷ 20 V/division
5	Digital multimeter with resolution up to 6.5 places Digital AC ammeter with resolution up to 6.5 places and measurement range 1 mA ÷ 1.999 A in frequency range 10 Hz ÷ 1 kHz
6	Capacity meter with measurement range 1 pF ÷ 1 μ F at 1 kHz
7	Inductance meters with range of 10 μ H; 100 μ H; 1 mH; 10 mH; 100 mH; 1 H at 1 kHz
8	Measurement of high-frequency power in coaxial system at 50 Ω at "N" connector (female) with power range of 1 μ W ÷ 100 mW in frequency range from 10 MHz to 18 GHz
9	Inspection equipment



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Field of measured quantity: time and frequency quantities

Calibration:

Nominal calibration temperature: $(23 \pm 2) ^\circ\text{C}$

Ordinal number	Measured quantity	Measured quantity range	Best measuring ability $[\pm]$ ¹⁾	Method identification
1	Relative frequency deviation from f_0 (1 MHz, 5 MHz, 10 MHz)	$\leq (\pm 1.10^{-7})$	$2.5 \cdot 10^{-10}$	KP 05/2003
	Relative frequency deviation from f_0 (1 MHz, 5 MHz, 10 MHz)	$\leq (\pm 1.10^{-6})$	$1.2 \cdot 10^{-9}$	
	Frequency f	1.5 GHz ÷ 12 GHz	$25 \cdot 10^{-6}$	KP 16/2004
2	Frequency f	0.1 Hz ÷ 100 Hz	$3 \cdot 10^{-4}/f$	KP 14/2004
		100 Hz ÷ 100 kHz	$6 \cdot 10^{-4}/f$	
		100 kHz ÷ 1.5GHz	$6 \cdot 10^{-7}$	KP 15/2004
		1 GHz ÷ 12 GHz	$25 \cdot 10^{-6}$	
3	Pulse rise time	≥ 3.5 ns	0.80 ns	KP 14/2004
4	Inspection equipment meters of circuit breaker tripping times	(10 ÷ 100) ms	0.69 ms	KP 18 /2009
		(100 ÷ 1000) ms	0.85 ms	

1) Expressed like uncertainty in accordance with the requirements of the document EA 4/02 at $k = 2$;

Measured instruments or devices:

(In accordance with the above list of measured quantities and the ranges of measurement the following types of instruments or devices can be measured.)

Ordinal number	Measured instrument/device type
1	Calibration of electronic frequency meters (electronic counters) with internal oscillator of nominal value 1; 5 and 10 MHz for the measurement range of 0.1 Hz to 12 GHz
2	Measurement of sine wave signal frequency in the range of 0.1 Hz ÷ 12 GHz Oscilloscope horizontal channel with deflection coefficient of 1 ns/division and higher
3	Oscilloscopes
4	Inspection equipment

