

**The Appendix is an integral part of
Certificate of Accreditation No. 269/2023 of 31/05/2023**

Accredited entity according to ČSN EN ISO/IEC 17025:2018:

Vysoké učení technické v Brně
CAB number 2395, CVVOZE Calibration Laboratory
Technická 3082/12, 616 00 Brno

CMC for the field of measured quantity: Mechanical motion

Ord. number ¹	Calibrated quantity / Subject of calibration	Nominal range				Parameter(s) of the measurand	Lowest stated expanded measurement uncertainty ²	Calibration principle	Calibration procedure identification ³	Work-place
		min.	unit	max.	unit					
1*	Acceleration of linear harmonic mechanical vibrations / Vibrometers, seismometers, linear vibration generators, vibration testing systems ^{4,5}	0.01 m·s ⁻²		to	1,000 m·s ⁻²	0.2 Hz to 0.4 Hz 0.4 to 1 Hz 1 Hz to 1 kHz 1 to 5 kHz 5 to 10 kHz 10 to 15 kHz 15 to 20 kHz	1.5 % 1.0 % 0.5 % 0.7 % 1.5 % 2.0 % 3.0 %	Comparison with a reference sensor	KP-01 (ČSN ISO 16063-21), ČSN ISO 16063-44)	
2	Acceleration of linear harmonic mechanical vibrations / Vibrometers, seismometers, vibration transducer calibration systems, reference linear vibration generators ^{4,5}	0.01 m·s ⁻²		to	1,000 m·s ⁻²	0.2 Hz to 0.4 Hz 0.4 Hz to 1 Hz 1 Hz to 1 kHz 1 kHz to 5 kHz 5 kHz to 10 kHz 10 kHz to 15 kHz 15 kHz to 20 kHz	0.7 % 0.5 % 0.3 % 0.5 % 1.0 % 2.0 % 2.5 %	Direct measurement with a laser vibrometer	KP-01 (ČSN ISO 16063-11), ČSN ISO 16063-44)	

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		min.	unit	max.	unit					
3	Phase shift of acceleration of linear harmonic mechanical vibrations / Vibrometers, seismometers, linear vibration generators, vibration testing systems ⁴	0 °		to	360 °	0.2 Hz to 1 Hz 1 Hz to 5 kHz 5 kHz to 10 kHz 10 kHz to 15 kHz 15 kHz to 20 kHz	1.5 ° 0.7 ° 1.0 ° 2.0 ° 3.0 °	Comparison with a reference sensor	KP-01 (ČSN ISO 16063-21)	
4	Phase shift of acceleration of linear harmonic mechanical vibrations / Vibrometers, seismometers, vibration transducer calibration systems, reference linear vibration generators ⁴	0 °		to	360 °	0.2 Hz to 0.4 Hz 0.4 Hz to 5 kHz 5 kHz to 10 kHz 10 kHz to 15 kHz 15 kHz to 20 kHz	0.7 ° 0.5 ° 1.0 ° 2.0 ° 3.0 °	Direct measurement with a laser vibrometer	KP-01 (ČSN ISO 16063-11)	
5*	Sensitivity / Vibration transducers, geophones, vibrometers and vibration measurement chains with an electric output ^{4,5}	0.01 mV/m·s ⁻²		to	10,000 mV/m·s ⁻²			Comparison with a reference sensor	KP-01 (ČSN ISO 16063-21)	
		0.01 pC/m·s ⁻²		to	1,000 pC/m·s ⁻²					

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Ord. number ¹	Calibrated quantity / Subject of calibration	Nominal range				Parameter(s) of the measurand	Lowest stated expanded measurement uncertainty ²	Calibration principle	Calibration procedure identification ³	Work-place
		min.	unit	max.	unit					
		0.1 V/m·s ⁻¹ 0.01 V/m		to 10,000 V/m·s ⁻¹ to 10,000 V/m		0.2 Hz to 0.4 Hz 0.4 Hz to 1 Hz 1 Hz to 1 kHz 1 kHz to 5 kHz 5 kHz to 10 kHz 10 kHz to 15 kHz 15 kHz to 20 kHz	1.5 % 1.0 % 0.5 % 0.7 % 1.5 % 2.0 % 3.0 %			
6	Sensitivity / Vibration transducers, standard vibration transducers, geophones, vibrometers and vibration measurement chains with an electric output ^{4,5}	0.01 mV/m·s ⁻² 0.01 pC/m·s ⁻² 0.1 V/m·s ⁻¹ 0.01 V/m		to 10,000 mV/m·s ⁻² to 1,000 pC/m·s ⁻² to 10,000 V/m·s ⁻¹ to 10,000 V/m		0.2 Hz to 0.4 Hz 0.4 Hz to 1 Hz 1 Hz to 1 kHz 1 kHz to 5 kHz 5 kHz to 10 kHz 10 kHz to 15 kHz 15 kHz to 20 kHz	0.7 % 0.5 % 0.3 % 0.5 % 1.0 % 2.0 % 2.5 %	Direct measurement with a laser vibrometer	KP-01 (ČSN ISO 16063-11)	
7	Sensitivity / Laser vibrometers with an electric output ^{4,5}	0.1 V/m·s ⁻¹ 0.01 V/m		to 10,000 V/m·s ⁻¹ to 10,000 V/m		0,2 Hz až 5 kHz	0,25 %	Direct measurement with a laser vibrometer	KP-01 (ČSN ISO 16063-41)	

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Ord. number ¹	Calibrated quantity / Subject of calibration	Nominal range				Parameter(s) of the measurand	Lowest stated expanded measurement uncertainty ²	Calibration principle	Calibration procedure identification ³	Work-place
		min.	unit	max.	unit					
						5 kHz až 10 kHz 10 kHz až 15 kHz 15 kHz až 20 kHz	0,3 % 0,5 % 0,7 %			
8	Sensitivity phase shift / Vibration transducers, geophones, vibrometers and vibration measurement chains with an electric output	0 °		to	360 °	0.2 Hz to 1 Hz 1 Hz to 5 kHz 5 kHz to 10 kHz 10 kHz to 15 kHz 15 kHz to 20 kHz	1.5 ° 0.7 ° 1.0 ° 2.0 ° 3.0 °	Comparison with a reference sensor	KP-01 (ČSN ISO 16063-21)	
9	Sensitivity phase shift / Vibration transducers, standard vibration transducers, geophones, vibrometers and vibration measurement chains with an electric output	0 °		to	360 °	0.2 Hz to 0.4 Hz 0.4 Hz to 5 kHz 5 kHz to 10 kHz 10 kHz to 15 kHz 15 kHz to 20 kHz	0.7 ° 0.5 ° 1.0 ° 2.0 ° 3.0 °	Direct measurement with a laser vibrometer	KP-01 (ČSN ISO 16063-11)	

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		min.	unit	max.	unit					
10	Sensitivity phase shift / Laser vibrometers with an electric output	0 °		to	360 °	0.2 Hz to 5 kHz 5 kHz to 10 kHz 10 kHz to 20 kHz	0,5 ° 0,7 ° 1,5 °	Direct measurement with a laser vibrometer	KP-01 (ČSN ISO 16063-41)	
11*	Frequency of linear harmonic mechanical vibrations / Vibrometers, seismometers, linear vibration generators, vibration testing systems	0.2 Hz		to	50 kHz		0.01 %	Measurement or comparison on a standard calibration device or with a reference frequency transducer	KP-01 (ČSN ISO 16063-21), ČSN ISO 16063-44)	
12	Frequency of linear harmonic mechanical vibrations / Vibrometers, seismometers, vibration transducer calibration systems, reference linear vibration generators	0.2 Hz		to	50 kHz		0.01 %	Measurement or comparison on a standard calibration device or with a standard frequency transducer	KP-01 (ČSN ISO 16063-11), ČSN ISO 16063-44)	
13*	Transfer / Charge amplifiers, voltage amplifiers, frequency filters, vibration test system controllers	0.001 mV/pC 0.001 V/V		to	1,000 mV/pC 1,000 V/V	0.1 Hz to 1 Hz 1 Hz to 20 kHz 20 kHz to 50 kHz	0.4 % 0.3 % 1.0 %	By simulated electrical signal	KP-02	

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Ord. number ¹	Calibrated quantity / Subject of calibration	Nominal range				Parameter(s) of the measurand	Lowest stated expanded measurement uncertainty ²	Calibration principle	Calibration procedure identification ³	Workplace
		min.	unit	max.	unit					
14*	Transfer phase shift / Charge amplifiers, voltage amplifiers, frequency filters, vibration test system controllers	0 °		to	360 °	0.1 Hz to 1 Hz 1 Hz to 20 kHz	0.75 % 0.5 %	By simulated electrical signal	KP-02	
15*	Acceleration of harmonic vibrations / Vibrometers without a transducer, measuring chains without a transducer with an output to a display or a scale, vibration test system controllers ^{4,5}	0.01 m·s ⁻²		to	10,000 m·s ⁻²	0.1 Hz to 1 Hz 1 Hz to 20 kHz	0.4 % 0.3 %	By simulated electrical signal	KP-02	
16	Maximum value of half-sine wave mechanical shock acceleration / shock meters	50 m·s ⁻² 200 m·s ⁻² 2 km·s ⁻² 40 km·s ⁻²		to	200 m·s ⁻² 2 km·s ⁻² 40 km·s ⁻² 100 km·s ⁻²		2.0 % 1.5 % 1.8 % 3.0 %	Direct measurement or comparison with a reference sensor	KP-01 (ČSN ISO 16063-22)	
17	Sensitivity of half-sine wave mechanical shock acceleration sensors / shock sensors, vibration sensors	0.000 1 mV/m·s ⁻² 0.000 1 pC/m·s ⁻²		to	100 mV/m·s ⁻² 100 pC/m·s ⁻²	50 m·s ⁻² to 200 m·s ⁻²	2.0 %	Comparison with a standard sensor	KP-01 (ČSN ISO 16063-22)	

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Ord. number ¹	Calibrated quantity / Subject of calibration	Nominal range				Parameter(s) of the measurand	Lowest stated expanded measurement uncertainty ²	Calibration principle	Calibration procedure identification ³	Work-place
		min.	unit	max.	unit					
						200 m·s ⁻² to 2 km·s ⁻² 2 to 40 km·s ⁻² 40 to 100 km·s ⁻²	1.5 % 1.8 % 3.0 %			
18	Sensitivity of half-sine wave mechanical shock sensors / shock hammers	0.1 mV/N 0.1 pC/N	to	100 mV/N 100 pC/N			3.0 %	Comparison with a reference sensor using a known reaction mass	KP-01 (ČSN ISO 16063-22)	

¹ Asterisk at the ordinal number identifies the calibrations, which the Laboratory is qualified to carry out outside the permanent laboratory premises.

² The expanded measurement uncertainty is in accordance with ILAC-P14 and EA-4/02 M a part of CMC and it is the lowest value of the respective uncertainty. If not stated otherwise, its coverage probability is approx. 95 %. If not stated otherwise, the uncertainty values stated without a unit are relative to the measured value. The uncertainty value stated herein is based on the best conditions achievable by the laboratory; the uncertainty value of a specific calibration may be higher depending on the conditions of such a calibration. For identical extreme values of adjacent ranges, the lower uncertainty value always applies.

³ If the document identifying the calibration procedure is dated, only these specific procedures are used. If the document identifying the calibration procedure is not dated, the latest edition of the specified procedure is used (including any changes).

⁴ The calibrated quantities may include also the velocity and deviation, if the calibration is carried out using a harmonic vibration signal of a known frequency.

⁵ Acceleration can be specified also in g, sensor sensitivity in pC/g, resp. mV/g units, where 1 g = 9.807 m.s⁻²

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CMC for the field of measured quantity: Electrical quantities

Ord. number ¹	Calibrated quantity / Subject of calibration	Nominal range				Parameter(s) of the measurand	Lowest stated expanded measurement uncertainty ²	Calibration principle	Calibration procedure identification ³	Work-place
		min	unit	max	unit					
1*	DC Voltage / DC voltage sources and meters, voltmeters, multimeters, signal analyzers, vibration meters, vibration test system controllers	0 mV	to	100 mV			0.010 % + 0.010 mV	Direct measurement or comparison with a reference multimeter	KP-03	
		100 mV	to	1 V			0.010 % + 0.020 mV			
		1 V	to	10 V			0.010 % + 0.10 mV			
		10 V	to	100 V			0.010 % + 1.0 mV			
2*	DC current / DC current sources and meters, ammeters, multimeters	0 mA	to	1 mA			0.10 % + 0.10 uA	Direct measurement or comparison with a reference multimeter	KP-03	
		1 mA	to	10 mA			0.10 % + 5.0 uA			
		10 mA	to	100 mA			0.10 % + 10 uA			
		100 mA	to	1 A			0.20 % + 0.20 mA			
3*	DC Resistance / Resistors, resistance boxes, shunts, dividers	0 Ω	to	100 Ω			0.020 % + 0.010 Ω	Direct measurement by a standard multimeter	KP-03	
		100 Ω	to	1 kΩ			0.020 % + 0.020 Ω			
		1 kΩ	to	10 kΩ			0.020 % + 0.20 Ω			
		10 kΩ	to	100 kΩ			0.020 % + 2.0 Ω			
		100 kΩ	to	1 MΩ			0.025 % + 20 Ω			
		1 MΩ	to	10 MΩ			0.10 % + 200 Ω			

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		min	unit	max	unit					
4*	AC Voltage / AC voltage sources and meters, AC voltmeters, multimeters, signal analyzers, vibration meters, vibration sensor calibration systems, signal generators, controllers for vibration test systems	1 mV	to	100 mV		10 Hz to 20 kHz 20 kHz to 50 kHz 50 kHz to 100 kHz	0.10 % + 0.050 mV 0.20 % + 0.10 mV 0.80 % + 0.15 mV	Direct measurement or comparison with a reference multimeter	KP-03	
		100 mV	to	1 V		10 Hz to 20 kHz 20 kHz to 50 kHz 50 kHz to 100 kHz	0.10 % + 0.50 mV 0.20 % + 1.0 mV 0.80 % + 1.5 mV			
		1 V	to	10 V		10 Hz to 20 kHz 20 kHz to 50 kHz 50 kHz to 100 kHz	0.10 % + 5.0 mV 0.20 % + 10 mV 0.80 % + 15 mV			
		10 V	to	100 V		10 Hz to 20 kHz 20 kHz to 50 kHz 50 kHz to 100 kHz	0.10 % + 50 mV 0.20 % + 100 mV 0.80 % + 150 mV			

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CMC for the field of measured quantity: Time and frequency quantities

Ord. number ¹	Calibrated quantity / Subject of calibration	Nominal range				Parameter(s) of the measurand	Lowest stated expanded measurement uncertainty ²	Calibration principle	Calibration procedure identification ³	Work-place
		min	unit	max	unit					
1*	Frequency / Signal generators, counters, multimeters, signal analyzers, vibration meters, calibration systems, vibration test system controllers	0.1 Hz	to	1 Hz		250 mV to 50 V 30 mV to 50 V	5.0·10 ⁻³ 2.0·10 ⁻⁵	Direct measurement or comparison with a reference counter	KP-03	
2*	Period / Signal generators, counters, multimeters, signal analyzers, vibration meters, calibration systems, vibration test system controllers	100 ns	to	1 s		30 mV to 50 V 250 mV to 50 V	2.0·10 ⁻⁵ 5.0·10 ⁻³	Direct measurement or comparison with a reference counter	KP-03	
3*	Time interval / Signal generators, counters, multimeters, signal analyzers	0.1 ms	to	0.1 s		250 mV to 50 V	1.0·10 ⁻³	Direct measurement or comparison with a reference counter	KP-03	

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