





ACCREDITATION CERTIFICATE

LB-CAL-079

Emirates International Accreditation Centre

has accredited

Vital Equipments Calibration LLC

Building No: 74, Shop No. 7 & 8, Mussafah M-13

Abu Dhabi-United Arab Emirates

In accordance with the requirements of

ISO/IEC 17025:2017

General requirements for the competence of testing and calibration laboratories

to undertake the calibration in the attached accreditation scope

This Accreditation is invalid without the attached accreditation scope and shall remain in force within the validity period printed below, subject to continuing compliance with the requirements of the accreditation criteria.

Validity: 06-05-2021 to 07-01-2023

Initial Accreditation Date: 08-01-2020



CHIEF EXECUTIVE OFFICER APPROVAL



LB-CAL-079

Vital Equipments Calibration LLC

Building No: 74, Shop No. 7 & 8, Mussafah M-13

Abu Dhabi - United Arab Emirates

Date: 06-05-2021

Valid to: 07-01-2023

Accreditation History					
Scope	Issue No.	Details	Date		
Temperature & Humidity	02	Transition to ISO 17025:2017 and comply with the new	06-05-2021		
Mass					
Pressure					
Speed					
Volume					
Electrical					
Temperature & Humidity	01	Granted accreditation from Emirates International	08-01-2020		
Mass					
Pressure					
Speed					
Volume					
Electrical					



Temperature Humidity Calibration

Vital Equipments Calibration LLC

Building No: 74, Shop No. 7 & 8, Mussafah M-13

Abu Dhabi - United Arab Emirates

Issue no.: 02

Date: 06-05-2021

Valid to: 07-01-2023

			Calibration	
Calibration Field/	Calibration Mothod	Range and	Measurement	Location
Measuring Quality	Calibration Method	Specification	Capability	Location
			(CMC)*	
Calibration of RTD's,	Comparison method	-40 °C to 25 °C	0.3 °C	Laboratory
Thermocouple, Thermistor etc., with	using Standard SSPRT and 6 ½ DMM	25 °C to 100 °C	0.4 °C	
and without Indicator	(VEC/CAL/TH-01,	100 °C to 400 °C	0.6 °C	-
	VEC/CAL/TH-03)	400 °C to 650 °C	1.2 °C	
Calibration of Dry Block	Comparison method	-40 °C to 25 °C	0.2 °C	
Calibrator	and 6 1/2 DMM	25 °C to 200 °C	0.4 °C	
	(VEC/CAL/TH-05)	200 °C to 650 °C	0.8 °C	
Liquid Temperature	Comparison method	-40 °C to 25 °C	0.2 °C	
Calibrator / Dati	and 6 ½ DMM	25 °C to 250 °C	0.4 °C	
Calibration of Liquid in	Comparison method	-40 °C to 25 °C	0.2 °C	
Glass mermometers	and 6 ½ DMM	25 °C to 100 °C	0.3 °C	
	(VEC/CAL/TH-04)	100 °C to 250 °C	0.4 °C	



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Calibration Field/		Range and	Measurement	
Measuring Quality	Calibration Method	Specification	Capability	Location
			(CMC)*	
Calibration of Non-	Comparison method	-30 °C to 100 °C	2 °C	Laboratory
Contact Pyrometer / IR	using Standard PRT,			
Thermometer	Standard Thermocouple	100 °C to 250 °C	3 °C	
	and DBB -650			
	(VEC/CAL/TH-09)	250 °C to 650 °C	5 °C	
Calibration of	Comparison method	5 °C to 50 °C	0.4 °C	Laboratory
Temperature and	Standard Temperature			
Humidity Meters and	& Humidity Indicator			
Dataloggers	with Sensor	15 %RH to 90 %RH	3 %RH	
	(VEC/CAL/TH-12)			
Calibration of RTD's,	Comparison method	-40 °C to 25 °C	0.3 °C	Customer
Thermocouple,	using Standard PRT and			Premises
Thermistor etc., with	6 ½ DMM	25 °C to 200 °C	0.4 °C	
and without Indicator	(VEC/CAL/TH-01,			
	VEC/CAL/TH-02,	200 °C to 400 °C	1.0 °C	
	VEC/CAL/TH-03)			
Calibration of	Placing 9 points	-40 °C to 50 °C	0.5 °C	
Temperature Chambers,	calibration method using			
Freezers, Chillers,	a datalogger with RTD	50 °C to 250 °C	0.7 °C	
Refrigerators, Ovens	sensors			
	(VEC/CAL/TH-08)			



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Calibration Field/ Measuring Quality	Calibration Method	Range and Specification	Calibration Measurement Capability (CMC)*	Location
Calibration of	Placing 9 points	5 °C to 50 °C	0.5 °C	Customer
Environmental Chambers	Calibration method			Premises
	using datalogger with			
	RTD sensors and a			
	relative humidity sensor	15 %RH to 90 %RH	3 %KH	
	(VEC/CAL/TH-11)			
Calibration of Autoclave	Placing 9 points	115 °C to 134 °C	0.4 °C	
	calibration method using			
	Brainchild datalogger			
	with RTD sensors			
	(VEC/CAL/TH-10)			



Mass Calibration

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Calibration Field/ Measuring Quality	Calibration Method	Range and Specification	Calibration Measurement Capability (CMC)*	Location
Mass / Electronics	In accordance to	0.001 g to 200 g	1.0 mg	Customer
Balances	EURAMET cg 18-v4: 2015	200g to 600g	2.9 mg	Premises
	Standard Weights	600 g to 1000 g	3.3 mg	
E2 class 1 mg to 1 kg F1 class 2 kg to 10 kg M1 class 20 kg to 300	E2 class 1 mg to 1 kg	1 kg to 2 kg	7.2 mg	
	M1 class 20 kg to 300kg	2 kg to 5 kg	16 mg	
	(VEC/CAL/WB-01)	5 kg to 10 kg	25 mg	
		10 kg to 20 kg	0.32 g	
		20 kg to 50 kg	1.2 g	
		50 kg to 300 kg	11 g	
Mass / Mass Standards	In acc. to OIML R111-1	1 mg to 5 g	0.17 mg	Laboratory
2004 (VEC/	2004 (VEC/CAL/WT-01)	10 g to 50 g	0.18 mg	
		100 g	0.20 mg	
		200 g	0.22 mg	
		500 g to 1 kg	2.2 mg	



Pressure Calibration

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Measuring Quality	Calibration Method	Specification	Capability	Location
			(CMC)*	
Gas Pressure-(Gauge)	Comparison method	-85 kPa < p ≤ 0 kPa	0.1 kPa	Laboratory
Calibration of Pressure	master pressure			
Indicating instruments	calibrator with a	0 kPa < p ≤1 MPa	0.7 kPa	
and gauges.	pneumatic hand pump			
Calibration of pressure	(VEC/CAL/PR-01)	1 MPa < p ≤ 3 MPa	0.8 kPa	
devices with an elctrical	DKD-R 6-1.			
output		3 MPa < p ≤ 4 MPa	1.3 kPa	
Hydraulic Pressure-	Comparison method	0 MPa < p ≤ 15 MPa	1.3 kPa	Laboratory
(Gauge)	master pressure			
Calibration of Pressure	calibrator with hydraulic			
Indicating instruments	comparator	15 MPa < p ≤ 50 MPa	15 kPa	
and gauges.	(VEC/CAL/PR-01)			
Calibration of pressure	DKD-R 6-1.			
devices with an elctrical		50 MPa < p ≤ 70 MPa	17 kPa	
output				



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Calibration Field/	Calibratian Mathed	Range and	Measurement	
Measuring Quality	Calibration Method	Specification	Capability	Location
			(CMC)*	
Gas Pressure-(Gauge)	Comparison method	± 3000 Pa	1.2 Pa	
Calibration of Pressure	master Digital	(±300 mmWc)	(0.12 mmWc)	
Indicating instruments	manometer with a			Laboratory /
and gauges; magnehelic	pneumatic screw pump			Customer
gauges; U-Tube	(VEC/CAL/PR-03)			Premises
Manometers	DKD-R 6-1, EURAMET-			
	cg-17.2.0			
Gas Pressure-(Gauge) &	Comparison method	-85 kPa < p ≤ 0 kPa	0.6 kPa	
Hydraulic Pressure	master pressure			
–(Gauge)	calibrator with	$0 k P_2$	0.7 kPa	
Calibration of Pressure	pneumatic hand pump /		0.7 Ki a	
Indicating instruments	Hydraulic comparator			Customer
and gauges.	(VEC/CAL/PR-01)	2 MPa < p ≤ 10 MPa	1.8 kPa	Premises
Calibration of pressure	DKD-R 6-1			
devices with an elctrical		10 MPa < p ≤ 70 MPa	13 kPa	
output				



Speed Calibration

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Calibration Field/ Measuring Quality	Calibration Method	Range and Specification	Calibration Measurement Capability (CMC)*	Location
Rotational Speed	VEC/CAL/ET/12	6 rpm to 599 rpm	1.3 rpm	Permanent
				laboratory/
		600 rpm to 3999 rpm	0.77 rpm	Customer
				Premises
		4000 rpm to 9999 rpm	1.8 rpm	
		10000 rpm to 19999	2.5 rpm	
		rpm		
		20000 rpm-25000 rpm	3.4 rpm	
Tachometer (Non	VEC/CAL/ET/11	6 rpm to 9999 rpm	0.09 rpm	
Contact)				
		10000 rpm to 26999	0.58 rpm	
		rpm		
		27000 rpm to 99999	0.75 rpm	
		rpm		



Volume Calibration

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Calibration Field/ Measuring Quality	Calibration Method	Range and Specification	Calibration Measurement Capability (CMC)*	Location
Liquid Volume / Piston	Gravimetric Method, ISO	10 µl to 100 µl	0.34 µl	Laboratory
Operated Pipettes	8655-6 (VEC/CAL/VOL-01)	>100 µl to 1000 µl	1.3 µl	
		>1000 µl to 10000 µl	12 µl	
Liquid Volume / Flask	Gravimetric Method, ISO	50 ml to 100 ml	0.10 ml	
	4787 (VEC/CAL/VOL-03)	>100 ml to 2000 ml	0.37 ml	
Liquid Volume /	Gravimetric Method, ISO	50 to 1000 ml	0.37 ml	
Measuring Cylinder	4787	>1000 ml to 2000 ml	0.86 ml	



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Calibration Field/ Measuring Quality	Calibration Method	Range and Specification	Calibration Measurement Capability (CMC)*	Location
	Calibration	of Measuring Instrumen	ts	
DC Voltage	Direct Method Using Multi product calibrator (VEC/CAL/ET-02) & (VEC/CAL/ET-01) <i>U: Measured voltage Value</i>	0.1 mV to 1 mV >1 mV to 320 mV >320 mV to 1 V >1 V to 3.2 V >3.2 V to 10 V >10 V to 32 V >32 V to 100 V >100 V to 320 V >320 V to 1000 V	$1.3 \times 10^{-3} U + 2.6 \mu V$ $50 \times 10^{-6} U + 2.6 \mu V$ $40 \times 10^{-6} U + 4.0 \mu V$ $40 \times 10^{-6} U + 7.0 \mu V$ $40 \times 10^{-6} U + 39 \mu V$ $40 \times 10^{-6} U + 70 \mu V$ $40 \times 10^{-6} U + 0.40 m V$ $40 \times 10^{-3} U + 1.3 m V$	Laboratory / Customer Premises
DC Current	Direct Method Using Multi product calibrator (VEC/CAL/ET-02) <i>I: Measured current</i> <i>Value</i>	0 to 320 μA >320 μA to 3.2 mA >3.2 mA to 32 mA >32 mA to 320 mA >320 mA to 1 A	0.13×10 ⁻³ / + 0.016 μA 80×10 ⁻⁶ / + 0.040 μA 0.10×10 ⁻³ / + 0.20 μA 0.60×10 ⁻³ / + 1.9 μA 0.70×10 ⁻³ / + 34 μA	



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Calibration Field/		Range and	Measurement	
Measuring Quality	Calibration Method	Specification	Capability	Location
			(СМС)*	
	Calibra	tion of Measuring Devices		
DC Current	Direct Method Using Multi product	>1 A to 2.99 A	0.75×10 ⁻³ / + 0.40 mA	Laboratory/ Customer
	calibrator (VEC/CAL/ET-02)	>3 A to 10 A	0.70×10 ⁻³ / + 0.40 mA	Premises
	<i>l: Measured current Value</i>	>10 A to 20.5 A	1.0×10 ⁻³ / + 5.8 mA	
Resistance	Direct Method	0 to 1 Ω	0.10×10 ⁻³ <i>R</i> + 0.010 Ω	Laboratory/
	Using Multi product calibrator	>1 to 10 Ω	90×10 ⁻⁶ <i>R</i> + 0.010 Ω	Customer Premises
	(VEC/CAL/ET-02)	>10 Ω to 30 Ω	90×10 ⁻⁶ <i>R</i> + 0.012 Ω	
		>30 Ω to 100 Ω	70×10 ⁻⁶ <i>R</i> + 0.012 Ω	
	<i>R: Measured resistance Value</i>	>100 Ω to 3.2 kΩ	70×10 ⁻⁶ <i>R</i> + 0.16 Ω	
		>3.2 kΩ to 10 kΩ	70×10 ⁻⁶ <i>R</i> + 0.078 Ω	
		>10 kΩ to 32 kΩ	70×10 ⁻⁶ <i>R</i> + 0.78 Ω	
		>32 kΩ to 100 kΩ	90×10 ⁻⁶ <i>R</i> + 0.78 Ω	
		>100 kΩ to 320 kΩ	90×10 ⁻⁶ <i>R</i> + 7.8 Ω	
		>0.32 MΩ to 1 MΩ	0.12×10 ⁻³ <i>R</i> + 7.8 Ω	
		>1 MΩ to 3.2 MΩ	0.12×10 ⁻³ <i>R</i> + 0.12 kΩ	



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Calibration Field/ Measuring Quality	Calibration Method	Range and Specification	Calibration Measurement Capability (CMC)*	Location
Calibration of Measuring Devices				
Resistance	Direct Method	>3.2 MΩ to 10 MΩ	0.47×10 ⁻³ <i>R</i> + 0.19 kΩ	Laboratory /
	Csing Multi product calibrator	>10 MΩ to 32 MΩ	2.5×10 ⁻³ <i>R</i> + 1.9 kΩ	On Site
	(VEC/CAL/ET-02)	>32 MΩ to 100 MΩ	4.6×10 ⁻³ <i>R</i> + 2.3 kΩ	
	R: Measured resistance	>100 MΩ to 320 MΩ	4.9×10 ⁻³ <i>R</i> + 78 kΩ	
	Value	>320 MΩ to 1000 MΩ	12×10 ⁻³ <i>R</i> + 0.39 MΩ	
AC Voltage	Direct Method	1.0 to	32 mV	Laboratory/
	calibrator	10 Hz to 10 kHz	7.3×10-3 U + 16 μV	Premises
	(VEC/CAL/ET-02)	>32 mV t	o 100 mV	
	U: Measured voltage	10 Hz to 45 Hz	0.48×10 ⁻³ <i>U</i> + 16 μV	
	Value	>45 Hz to 10 kHz	0.37×10 ⁻³ <i>U</i> + 16 μV	
		>100 mV	to 320 mV	
		10 Hz to 45 Hz	0.43×10 ⁻³ <i>U</i> + 16 μV	
		>45 Hz to 10 kHz	0.29×10 ⁻³ <i>U</i> + 16 μV	
		>10 kHz to 20 kHz	0.67×10 ⁻³ <i>U</i> + 16 μV	



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Measuring Quality	Calibration Method	Specification	Capability	Location
			(CMC)*	
	Calibra	tion of Measuring Devices		
AC Voltage	Direct Method	>100 mV	to 320 mV	Laboratory/
	Using Multi product calibrator	>20 kHz to 50 kHz	0.87×10 ⁻³ <i>U</i> + 31 μV	Customer Premises
	(VEC/CAL/ET-02)	>50 kHz to 100 kHz	$2.3 \times 10^{-3} U + 0.14 \text{ mV}$	
	U: Measured voltage	>320 m\	/to 1V	
	Value	45 Hz to 10 kHz	0.26×10 ⁻³ <i>U</i> + 47 μV	
		>10 kHz to 20 kHz	0.67×10 ⁻³ <i>U</i> + 47 μV	
		>20 kHz to 50 kHz	0.87×10 ⁻³ <i>U</i> + 47 μV	
		>50 kHz to 100 kHz	1.6×10 ⁻³ <i>U</i> + 47 μV	
		>1 V t	o 3.2 V	
		45 Hz to 10 kHz	0.29×10 ⁻³ <i>U</i> + 47 μV	
		>10 kHz to 20 kHz	0.45×10 ⁻³ <i>U</i> + 47 μV	
		>20 kHz to 50 kHz	0.87×10 ⁻³ <i>U</i> + 47 μV	
		>50 kHz to 100 kHz	$2.3 \times 10^{-3} U + 0.14 \text{ mV}$	
		>3.2 V	to 32 V	
		45 Hz to 10 kHz	0.29×10 ⁻³ U + 0.47 mV	



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Measuring Quality	Calibration Method	Specification	Capability	Location
			(CMC)*	
	Calibrati	on of Measuring Devices		
AC Voltage	Direct Method	>10 V	to 32 V	Laboratory/
	Using Multi product calibrator	45 Hz to 10 kHz	0.29×10 ⁻³ U + 0.47 mV	Customer Premises
	(VEC/CAL/ET-02)	>32 V 1	to 100 V	
		45 Hz to 1 kHz	1.3×10 ⁻³ U + 2.3 mV	
	U: Measured voltage Value	>1 kHz to 10 kHz	$0.63 \times 10^{-3} U + 7.0 \text{ mV}$	
		>100 V	to 320 V	
		45 Hz to 1 kHz	0.43×10 ⁻³ U + 2.4 mV	
		>1 kHz to 10 kHz	$0.65 \times 10^{-3} U + 7.0 \text{ mV}$	
		>320 V	to 750 V	
		45 Hz to 1 kHz	0.41×10 ⁻³ U + 16 mV	
		>1 kHz to 5 kHz	$0.46 \times 10^{-3} U + 16 \text{ mV}$	
		>5 kHz to 10 kHz	$0.71 \times 10^{-3} U + 16 \text{ mV}$	
		>750 V 1	to 1020 V	
		45 Hz to 1 kHz	$1.5 \times 10^{-3} U + 16 \text{ mV}$	
		>1 kHz to 5 kHz	$2.2 \times 10^{-3} U + 16 \text{ mV}$	
		>5 kHz to 10 kHz	$1.6 \times 10^{-3} U + 16 \text{ mV}$	



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Measuring Quality	Calibration Method	Specification	Capability	Location
			(CMC)*	
Calibration of Measuring Devices				
AC Current	Direct Method	29 µA t	:ο 100 μA	Laboratory/
	Using Multi product	45 Hz to 1 kHz	$1.5 \times 10^{-3} / + 0.08 \mu \Delta$	Customer
	calibrator		1.5×10 7 + 0.00 μΑ	Premises
	(VEC/CAL/ET-02)	>100 µA	to 320 μA	
	I: Measured current	45 Hz to 1 kHz	1.5×10 ⁻³ / + 0.08 μA	
	Value	>1 kHz to 5 kHz	2.6×10 ⁻³ / + 0.12 μA	•
		>320 µ/	A to 1 mA	
		45 Hz to 1 kHz	0.93×10 ⁻³ / + 0.12 μA	
		>1 kHz to 5 kHz	1.6×10 ⁻³ / + 0.16 μA	
		>1 mA f	L to 3.2 mA	
		45 Hz to 1 kHz	1.3×10 ⁻³ / + 0.12 μA	
		>1 kHz to 5 kHz	1.6×10 ⁻³ / + 0.16 μA	
		>3.2 mA	L to 10 mA	•
		45 Hz to 1 kHz	1.1×10 ⁻³ / + 1.6 μA	•
		>1 kHz to 5 kHz	0.66×10 ⁻³ / +1.6 μA	

more or less routine calibrations of nearly ideal measurement standards or nearly ideal measuring equipment. Calibration and Measurement Capabilities represent expanded uncertainties expressed at approximately the 95 % level of confidence, usually using a coverage factor of k = 2. The actual measurement uncertainty of a specific calibration performed by the laboratory may be greater than the CMC due to the behavior of the customer's device and to influences from the circumstances of the specific calibration.



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Measuring Quality	Specificat	Specification	Capability	Location
			(CMC)*	
	Calibrati	on of Measuring Devices		
AC Current	Direct Method	>10 mA	to 32 mA	Laboratory/
	Using Multi product calibrator	45 Hz to 1 kHz	1.1×10 ⁻³ / + 1.6 μA	Customer Premises
	(VEC/CAL/ET-02)	>1 kHz to 5 kHz	0.66 ×10 ⁻³ / + 1.6 μA	i remises
		>32 mA t	o 320 mA	
	l: Measured current Value	45 Hz to 1 kHz	1.5×10 ⁻³ / + 16 μΑ	
Value	>1 kHz to 5 kHz	0.81×10 ⁻³ / + 39 μA		
		>320 mA		
		45 Hz to 1 kHz	1.8×10 ⁻³ / + 78 μA	
		>1 kHz to 5 kHz	4.7×10 ⁻³ / + 0.78 mA	
		>2.99 A	to 10 A	
		45 Hz to 100 Hz	1.3×10 ⁻³ / + 1.6 mA	
		>100 Hz to 1 kHz	0.10×10 ⁻³ / + 1.6mA	
		>1 kHz to 5 kHz	24×10 ⁻³ / + 1.6 mA	
		>10 A t	o 20.5 A	
		45 Hz to 100 Hz	1.4×10 ⁻³ / + 7.0 mA	
		>100 Hz to 1 kHz	1.3×10 ⁻³ / + 7.0 mA	



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Measuring Quality	Calibration Method	Specification	Capability	Location
			(CMC)*	
	Calibrati	on of Measuring Devices		
Frequency	Direct Method	0.1 Hz to 10 Hz	$30 \times 10^{-6} F + 0.78 \text{ mHz}$	Laboratory/
	Using Multi product calibrator	>10 Hz to 50 Hz	20×10 ⁻⁶ <i>F</i> + 0.78 mHz	Customer Premises
	(VEC/CAL/ET-02)	>50 Hz to 120 Hz	$20 \times 10^{-6} F + 0.97 \text{ mHz}$	
	F: Measured frequency	>120 Hz to 11 kHz	20×10 ⁻⁶ <i>F</i> + 58mHz	
	Value	>11 kHz to 1 MHz	20×10 ⁻⁶ <i>F</i> + 0.58 Hz	
		>1 MHz to 2 MHz	20×10 ⁻⁶ <i>F</i> + 0.58 kHz	
Capacitance	Direct Method	220.0 to 399.9 pF	8×10 ⁻³ <i>C</i> + 7.9 pF	
	Using Multi product calibrator	0.4 to 3 nF	8×10 ⁻³ C + 0.01 nF	
	(VEC/CAL/ET-02)	>3 nF to 10 nF	2.6×10 ⁻³ C + 0.01 nF	
	C: Measured	>10 nF to 100 nF	2.6×10 ⁻³ <i>C</i> + 0.09 nF	
	capacitance Value	>100 nF to 300 nF	2.6×10 ⁻³ <i>C</i> + 0.23 nF	
		>0.3 nF to 1 µF	2.3×10 ⁻³ <i>C</i> + 0.96 nF	
		>1 µF to 3.2 µF	2.3×10 ⁻³ C + 6.3 nF	
		>3.2 µF to 10 µF	2.4×10 ⁻³ C + 9.6 nF	
		>10 µF to 30 µF	3.4×10 ⁻³ C + 63 nF	



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Calibration Field/		Range and	Measurement				
Measuring Quality	Calibration Method	Specification	Capability	Location			
			(СМС)*				
	Calibration of Measuring Devices						
Capacitance	Direct Method	>30 µF to 100 µF	4.7×10 ⁻³ C + 97 nF	Laboratory/			
	Using Multi product calibrator	>100 µF to 300 µF	4.7×10 ⁻³ <i>C</i> + 0.24 μF	Customer Premises			
	(VEC/CAL/ET-02) <i>C: Measured capacitance</i>	>0.3 mF to 1 mF	4.7×10 ⁻³ <i>C</i> + 0.63 μF				
Thermocouple	Direct Method	600°C to 800°C	0.40°C				
В-Туре Т/С	Using Multi product calibrator	>800°C to 1000°C	0.32°C				
	(VEC/CAL/ET-04 &	>1000°C to 1550°C	0.28°C				
	VEC/CAL/ET-09)	>1550°C to 1820°C	0.30°C				
Thermocouple	-	0°C to 150°C	0.25°C				
С-Туре Т/С		>150°C to 650°C	0.24°C				
		>650°C to 1000°C	0.26°C				
		>1000°C to 1800°C	0.41°C				
		>1800°C to 2316°C	0.67°C				
Thermocouple	-	-250°C to -100°C	0.41°C				
Е-Туре Т/С		>-100°C to -25°C	0.39°C				
		>-25°C to 350°C	0.14°C				



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Calibration Field/ Measuring Quality	Calibration Method	Range and Specification	Calibration Measurement Capability (CMC)*	Location
	Calibrati	on of Measuring Devices		
Thermocouple	Direct Method	>350°C to 650°C	0.14°C	Laboratory/
Е-Туре Т/С	Using Multi product calibrator	>650°C to 1000°C	0.18°C	Customer Premises
Thermocouple	(VEC/CAL/ET-04 &	-210°C to -100°C	0.23°C	
J-Type T/C	VEC/CAL/ET-09)	>-100°C to -30°C	0.14°C	
		>-30°C to 150°C	0.13°C	
		>150°C to 760°C	0.15°C	
		>760°C to 1200°C	0.19°C	
Thermocouple		-250°C to -100°C	0.28°C	
К-Туре Т/С		>-100°C to -25°C	0.17°C	
		>-25°C to 120°C	0.16°C	
		>120°C to 1000°C	0.22°C	
		>1000°C to 1372°C	0.32°C	
Thermocouple		-200°C to -100°C	0.30°C	
L-Type T/C		>-100°C to 800°C	0.21°C	
		>800°C to 900°C	0.15°C	



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Calibration Field/	Calibratian Mathed	Range and	Measurement	Lootion
Measuring Quality	Calibration Method	Specification	Capability	Location
			(CMC)*	
	Calibrati	on of Measuring Devices		
Thermocouple	Direct Method	-200°C to -100°C	0.34°C	Laboratory/
N-Туре Т/С	Using Multi product	>-100°C to -25°C	0.19°C	Customer
	calibrator			Premises
	(VEC/CAL/ET-04 &	>-25°C to 120°C	0.17°C	
	VEC/CAL/ET-09	>120°C to 410°C	0.16°C	
		>410°C to 1300°C	0.22°C	
Thermocouple	-	0°C to 250°C	0.52°C	
R-Type T/C		>250°C to 400°C	0.31°C	
		>400°C to 1000°C	0.29°C	
		>1000°C to 1767°C	0.34°C	
Thermocouple	-	0°C to 250°C	0.46°C	-
S-Type T/C		>250°C to 1000°C	0.32°C	
		>1000°C to 1400°C	0.32°C	
		>1400°C to 1767°C	0.39°C	
Thermocouple	-	-250°C to -150°C	0.53°C	
Т-Туре Т/С		>-150°C to 0°C	0.20°C	•



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	Calibration of Measuring Devices					
Thermocouple T-Type T/C	Direct Method Using Multi product	>0°C to 120°C	0.15°C	Laboratory/ Customer		
Thermocouple	calibrator (VEC/CAL/ET-04 &	-200°C to 0°C	0.45°C	Premises		
U-Туре Т/С	VEC/CAL/ET-09	>0°C to 600°C	0.22°C			
Temperature	Direct Method	-200°C to -100°C	0.028°C			
Measurement (RTD/ PT- 100 (385)	Using DMM 8846A	>-100°C to 0°C	0.042°C			
	(VEC/CAL/ET-09)	>0°C to 100°C	0.046°C			
		>100°C to 300°C	0.072°C			
		>300°C to 600°C	0.12°C			
		>600°C to 800°C	0.15°C			
DC Current Calibration of Current Clamps	Direct Method Using Multi product calibrator & clamp coil	>20 A to 400 A	3.0×10 ⁻³ / + 58 mA			
	(VEC/CAL/ET-01) <i>I: Measured current Value</i>	>400 A to 1000 A	3.1×10 ⁻³ / + 0.58 A			



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Calibration of Measuring Devices					
Current	Direct Method	>20 A t	o 150 A	Laboratory/	
Clamps	calibrator & clamp coil	45 Hz to 100 Hz	3.5×10 ⁻³ / + 58 mA	Premises	
	(VEC/CAL/EI-01)	>100 Hz to 440 Hz	3.7×10 ⁻³ / + 58 mA		
<i>I: Measured current Value</i>	l: Measured current Value	>150 A ·	to 400 A		
		45 Hz to 100 Hz	3.3×10 ⁻³ / + 58 mA		
		>100 Hz to 440 Hz	8.3×10 ⁻³ / + 58 mA		
		>400 A t	o 1000 A		
		45 Hz to 100 Hz	3.2×10 ⁻³ / + 0.58 A		
		>100 Hz to 440 Hz	8.3×10 ⁻³ / + 0.58 A		



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Measuring Quality	Calibration Method	Specification	Capability	Location
			(СМС)*	
	Cal	libration of Sources		
DC Voltage	Direct Method	0 mV to 10 mV	0.49×10 ⁻³ <i>U</i> + 4.2 μV	Laboratory/
	Using DMM 8846A	>10 to 100 mV	40×10 ⁻⁶ <i>U</i> + 4.2 μV	Customer
	(VEC/CAL/ET-03)	>100 mV to 1 V	30×10 ⁻⁶ <i>U</i> + 8.2 μV	Premises
	11. Measured voltage	>1 V to 10 V	30×10 ⁻⁶ <i>U</i> + 58 μV	
	Value	>10 V to 100 V	40×10 ⁻⁶ U + 0.70 mV	
		>100 V to 1000 V	50×10 ⁻⁶ <i>U</i> + 12 mV	
AC Voltage	Direct Method	1 mV to 32 mV		
	Using DMM 8846A	45 Hz – 1 kHz	5.8×10 ⁻³ <i>U</i> + 47 μV	
	(VEC/CAL/ET-03)	>32 mV to 100 mV		
		45 Hz – 1 kHz	0.72×10 ⁻³ <i>U</i> + 47 μV	
	U: Measured voltage	>100 m	IV to 1 V	
	Value	45 Hz – 1 kHz	0.70×10 ⁻³ U + 0.35 mV	
		>1 V to	o 10 V	
		45 Hz – 1 kHz	0.70×10 ⁻³ U + 3.5 mV	
		>10 V to	o 100 V	
		45 Hz – 1 kHz	0.70×10 ⁻³ U + 35 mV	
		>100 V te	o 1000 V	
		45 Hz – 1 kHz	0.70×10 ⁻³ U + 0.35 V	



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Measuring Quality	Calibration Method	Specification	Capability	Location
			(CMC)*	
	Ca	libration of Sources		
Resistance	Direct Method	0 to 10 Ω	$0.17 \times 10^{-3} R + 3.5 m\Omega$	Laboratory/
	Using DMM 8846A (VEC/CAL/ET-03)	>10 to 100 Ω	0.12×10 ⁻³ <i>R</i> + 4.7 mΩ	Customer Premises
		>100 Ω to 1 kΩ	0.12×10 ⁻³ <i>R</i> + 13 mΩ	
	<i>R: Measured resistance Value</i>	>1 kΩ to 3.2 kΩ	$0.12 \times 10^{-3} R + 0.12 \Omega$	
		>3.2 kΩ to 10 kΩ	0.12×10 ⁻³ <i>R</i> + 0.13 Ω	
		>10 kΩ to 32 kΩ	0.12×10 ⁻³ <i>R</i> + 1.2 Ω	
		>32 kΩ to 100 kΩ	0.12×10 ⁻³ <i>R</i> + 1.3 Ω	
		>100 kΩ to 0.32 MΩ	0.12×10 ⁻³ <i>R</i> + 12 Ω	
		>0.32 MΩ to 1 MΩ	0.12×10 ⁻³ <i>R</i> + 13 Ω	
		>1 MΩ to 3.2 MΩ	0.46×10 ⁻³ <i>R</i> + 0.12 kΩ	
		>3 MΩ to 10 MΩ	0.46×10 ⁻³ <i>R</i> + 0.13 kΩ	
		>10 MΩ to 100 MΩ	9.3×10 ⁻³ <i>R</i> + 12 kΩ	
DC Current	Direct Method	0 μA to 50 μA	1.1×10 ⁻³ / + 0.03 μA	
	Using DMM 8846A (VEC/CAL/ET-03)	>50 to 100 µA	0.59×10 ⁻³ / + 0.03 μA	
	I: Measured current Value	>100 µA to 1 mA	0.58×10 ⁻³ / + 0.06 μA	



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		Specification	Capability	Location
			(CMC)*	
Calibration of Sources				
DC Current	Direct Method	>1 mA to 10 mA	0.58×10 ⁻³ / + 2.3 μA	Laboratory/
	Using DMM 8846A	>10 mA to 100 mA	0.58×10 ⁻³ / + 5.8 μA	Customer
	(VEC/CAL/ET-03) <i>I: Measured current</i>	>100 mA to 1 A	0.59×10 ⁻³ / + 0.23 mA	Premises
	Value	>1 A to 1.5 A	1.2×10 ⁻³ / + 0.69 mA	
		>1.5 A to 2.9 A	1.3×10 ⁻³ / + 0.69 mA	
		>2.9 A to 10 A	1.9×10 ⁻³ / + 0.93 mA	
AC Current	Direct Method	10 μA to 50 μA		
	Using DMM 8846A	45 Hz – 1 kHz	1.6×10 ⁻³ / + 0.05 μA	
	(VEC/CAL/ET-03)	>50 µA to	100 μΑ	
	l: Measured current	45 Hz – 1 kHz	1.3×10 ⁻³ / + 0.05 μA	
	Value	>100 µA to 1 mA		
		45 Hz – 1 kHz	1.3×10 ⁻³ / + 0.47 μA	
		>1 mA to	10 mA	
		45 Hz – 1 kHz	1.3×10 ⁻³ / + 4.7 μA	
		>10 mA to		
		45 Hz – 1 kHz	1.3×10 ⁻³ / + 47 μA	



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Measuring Quality	Calibration Method	Specification	Capability	Location
			(CMC)*	
	Cal	ibration of Sources		
AC Current	Direct Method	>100 mA	to 400 mA	Laboratory/
	Using DMM 8846A	45 Hz – 1 kHz	1.3×10 ⁻³ / + 0.19 mA	Customer
	(VEC/CAL/ET-03)	>400 mA to 1 A		Premises
	I: Measured current	45 Hz – 1 kHz	1.3×10 ⁻³ / + 0.47 mA	
	Value	>1 A to 3 A		
		45 Hz – 1 kHz	2.0×10 ⁻³ / + 0.70 mA	
		>3 A to 10 A		
		45 Hz – 1 kHz	2.0×10 ⁻³ / + 0.70 mA	
Frequency	Direct Method	10 Hz – 40 Hz	0.69×10 ⁻³ F + 0.01 Hz	
(100 mV to 1000V)	Using DMM 8846A	>40 Hz – 300 kHz	0.13×10 ⁻³ <i>F</i> + 58 Hz	
	F: Measured frequency	>300 kHz – 1 MHz	0.13×10 ⁻³ <i>F</i> + 0.58 kHz	
Capacitance	Direct Method	0.1 nF to 0.5 nF	74×10 ⁻³ <i>C</i> + 29 pF	
	Using DMM 8846A	>0.5 nF to 1 nF	30×10 ⁻³ <i>C</i> + 29 pF	
	(VEC/CAL/E1-03)	>1 nF to 10 nF	17×10 ⁻³ <i>C</i> + 58 pF	
	C: Measured	>10 nF to 100 nF	23×10 ⁻³ <i>C</i> + 0.58 nF	
	capacitance Value	>100 nF to 1 µF	24×10 ⁻³ C + 5.8 nF	



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		Specification	Capability	Location
			(СМС)*	
	Cal	libration of Sources		
Capacitance	Direct Method Using DMM 8846A (VEC/CAL/ET-03)	>1 µF to 10 µF	17×10 ⁻³ C + 58 nF	Laboratory/
		>10 µF to 100 µF	17×10 ⁻³ <i>C</i> + 0.58 μF	Customer
		>100 µF to 1 mF	16×10 ⁻³ <i>C</i> + 5.8 μF	Premises
	C: Measured	>1 mF to 10 mF	16×10 ⁻³ <i>C</i> + 58 μF	
	capacitance Value	600°C to 800°C	0.50°C	
		>800°C to 1000°C	0.43°C	
		>1000°C to 1550°C	0.40 °C	
		>1550°C to 1820°C	0.41°C	
Thermocouple	Direct Method	600°C to 800°C	0.50°C	
В-Туре Т/С	Using Multi product calibrator (VEC/CAL/ET-09)	>800°C to 1000°C	0.43°C	-
		>1000°C to 1550°C	0.40 °C	
		>1550°C to 1820°C	0.41°C	
Thermocouple		0 °C to 150°C	0.26°C	
С-Туре Т/С		>150°C to 650°C	0.23°C	
		>650°C to 1000°C	0.26°C	
		>1000°C to 1800°C	0.41°C	
		>1800°C to 2316°C	0.67°C	



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		Specification	Capability	Location
			(CMC)*	
	Cal	ibration of Sources		
Thermocouple	Direct Method	-250°C to -100°C	0.58°C	Laboratory/
Е-Туре Т/С	Using Multi product	>-100°C to -25°C	0.42°C	Customer
	calibrator			Premises
	(VEC/CAL/ET-09)	>-25°C to 350°C	0.42°C	
		>350°C to 650°C	0.42°C	
		>650°C to 1000°C	0.44°C	
Thermocouple	-	-210°C to -100°C	0.22°C	
Ј-Туре Т/С		>-100°C to -30°C	0.15°C	
		>-30°C to 150°C	0.13°C	
		>150°C to 760°C	0.15°C	
		>760°C to 1200°C	0.20°C	
Thermocouple	-	-250°C to -100°C	0.28°C	
К-Туре Т/С		>-100°C to -25°C	0.17°C	
		>-25°C to 120°C	0.16°C	
		>120°C to 1000°C	0.22°C	
		>1000°C to 1372°C	0.32°C	



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Calibration Field/	Caliburation Mathead	Range and	Measurement	
Measuring Quality	Calibration Method	Specification	Capability	Location
			(CMC)*	
	Cal	ibration of Sources		
Thermocouple	Direct Method	-200°C to -100°C	0.30°C	Laboratory/
L-Type T/C	Using Multi product	>-100°C to 800°C	0.21°C	Customer Premises
	(VEC/CAL/ET-09)	>800°C to 900°C	0.15°C	Tremises
Thermocouple		-200°C to -100°C	0.35°C	
N-Type T/C		>-100°C to -25°C	0.33°C	
		>-25°C to 120°C	0.20°C	
		>120°C to 410°C	0.18°C	
		>410°C to 1300°C	0.23°C	
Thermocouple		0°C to 250°C	0.56°C	
R-Type T/C		>250°C to 400°C	0.36°C	
		>400°C to 1000°C	0.34°C	
		>1000°C to 1767°C	0.39°C	
Thermocouple		0°C to 250°C	0.50°C	
S-Type T/C		>250°C to 1000°C	0.36°C	
		>1000°C to 1400°C	0.37°C	
		>1400°C to 1767°C	0.43°C	



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	Cal	ibration of Sources		
Thermocouple T-Type T/C	Direct Method	-250°C to -150°C	0.53°C	Laboratory/
	Using Multi product calibrator	>-150°C to 0°C	0.20°C	Customer Premises
	(VEC/CAL/ET-09)	>0°C to 120°C	0.15°C	
		>120°C to 400°C	0.13°C	
Thermocouple		-200°C to 0°C	0.45°C	
U-Туре Т/С		>0°C to 600°C	0.22°C	
Temperature	Direct Method	-200°C to -100°C	0.028°C	
Measurement (RTD/ PT- 100 (385)	Using DMM 8846A	>-100°C to 0°C	0.042°C	
	(VEC/CAL/ET-09)	>0°C to 100°C	0.046°C	
		>100°C to 300°C	0.072°C	
		>300°C to 600°C	0.12°C	
		>600°C to 800°C	0.15°C	