



**ACCREDITATION
DOCUMENT**

**F-06/02
Issue Date: 18/08/2020
Rev. No: 09
LAB 103**

Accreditation No: LAB 103

Awarded to

**ADVANCE ENGINEERING & RESEARCH ORGANIZATION (AERO)
CALIBRATION LAB,
LUB THATTO, HASSAN ABDAL, PAKISTAN.**

The scope of accreditation is in accordance with the standard specifications outlined in the following page(s) of this document. The accredited scope shall be visible and legible in areas such as customer service, sample-receiving section etc and shall not mislead its users.

The accreditation was first time granted on **15-03-2016** by Pakistan National Accreditation Council.

The laboratory complies with the requirements of **ISO/IEC 17025:2017**.

The accreditation requires regular surveillance, and is valid until **14-03-2022**.

The decision of accreditation made by Pakistan National Accreditation Council implies that the organization has been found to fulfill the requirements for accreditation within the scope.

The organization however, itself is responsible for the results of performed measurements/tests.

PAKISTAN NATIONAL ACCREDITATION COUNCIL

19-05-2021
Date

SD.
Director General

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Calibration Laboratory.

**ADVANCE ENGINEERING & RESEARCH ORGANIZATION (AERO)
CALIBRATION LAB,
LUB THATTO, HASSAN ABDAL, PAKISTAN.**

Permanent laboratory premises

Field of measurement: Electrical Measurements				
Measured quantity	Range	*Expanded Uncertainty (±)	Technique, Reference Standard, Equipment	
DC VOLTAGE	0 mV to 329.9999 mV	0.0021 mV	FLUKE 5522A MULTIPRODUCT CALIBRATOR, FLUKE WARRANTED METCAL PROCEDURES	
	0.33 V to 3.299999 V	0.0000074 V		
	3.3 V to 32.99999 V	0.000083 V		
	33 V to 329.9999 V	0.00065 V		
	330 V to 1020 V	0.0018 V		
DC CURRENT	0 µA to 329.999 µA	0.0010 µA		
	330 µA to 3.29999 mA	0.0000072 mA		
	3.3 mA to 32.9999 mA	0.00013 mA		
	33 mA to 329.999 mA	0.00062 mA		
	330 mA to 1.09999 A	0.000044 A		
	1.1 A to 2.99999 A	0.000044 A		
	3 A to 10.9999 A	0.000087 A		
	11 A to 20.5 A	0.000087 A		
AC CURRENT	29.00 µA to 329.99 µA	10 Hz to 20 Hz		0.012 uA.
		20 Hz to 45 Hz		0.011 uA
		45 Hz to 1 KHz	0.0061 uA	
		1 KHz to 5 KHz	0.0061 uA	
		5 KHz to 10 KHz	0.0061 uA	
		10 KHz to 30 KHz	0.0061 uA	
	0.33 mA to 3.29999 mA	10 Hz to 20 Hz	0.011 mA	
		20 Hz to 45 Hz	0.011 mA	
		45 Hz to 1 KHz	0.0059 mA	
		1 KHz to 5 KHz	0.0059 mA	
		5 KHz to 10 KHz	0.0059 mA	
		10 KHz to 30 KHz	0.0059 mA	
		10 Hz to 20 Hz	0.011 mA	

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	3.3 mA to 32.9999 mA	20 Hz to 45 Hz	0.011 mA	FLUKE 5522A MULTIPRODUCT CALBRATOR, FLUKE WARRANTED METCAL PROCEDURES
		45 Hz to 1 KHz	0.0059 mA	
		1 KHz to 5 KHz	0.0059 mA	
		5 KHz to 10 KHz	0.0059 mA	
		10 KHz to 30 KHz	0.0059 mA	
	33 mA to 329.999 mA	10 Hz to 20 Hz	0.013 mA	
		20 Hz to 45 Hz	0.011 mA	
		45 Hz to 1 KHz	0.053 mA	
		1 KHz to 5 KHz	0.0060 mA	
		5 KHz to 10 KHz	0.0060 mA	
		10 KHz to 30 KHz	0.0060 mA	
	0.33 A to 1.09999 A	10 Hz to 20 Hz	0.00019A	
		20 Hz to 45 Hz	0.00013 A	
		45 Hz to 1 KHz	0.00013A	
		1 KHz to 5 KHz	0.00013A	
		5 KHz to 10 KHz	0.00013 A	
		10 KHz to 30 KHz	0.00013A	
	1.1 A to 2.99999 A	10 Hz to 20 Hz	0.00019A	
		20 Hz to 45 Hz	0.00013A	
		45 Hz to 1 KHz	0.00013A	
		1 KHz to 5 KHz	0.00013 A	
		5 KHz to 10 KHz	0.00013 A	
	3 A to 10.9999 A	45 Hz to 100 Hz	0.00013 A	
		100 Hz to 1 KHz	0.00013 A	
1 KHz to 5 KHz		0.00013 A		
11 A to 20.5 A	45 Hz to 100 Hz	0.0012 A		
	100 Hz to 1 KHz	0.0011 A		
	1 KHz to 5 KHz	0.0012 A		
AC VOLTAGE	1.0 mV to 32.999 mV	10 Hz to 45 Hz	0.0056 mV	
		45 Hz to 10 KHz	0.0097 mV	
		10 KHz to 20 KHz	0.0015 mV	
		20 KHz to 50 KHz	0.0035 mV	
		50 KHz to 100 KHz	0.0039 mV	
		100 KHz to 500 KHz	0.0033 mV	
	33 mV to 329.999 mV	10 Hz to 45 Hz	0.0056 mV	
		45 Hz to 10 KHz	0.0097 mV	
		10 KHz to 20 KHz	0.0015 mV	
		20 KHz to 50 KHz	0.0035 mV	

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AC VOLTAGE		50 KHz to 100 KHz	0.0039 mV	FLUKE 5522A MULTIPRODUCT CALIBRATOR, FLUKE WARRANTED METCAL PROCEDURES
		100 KHz to 500 KHz	0.0033 mV	
	0.33 V to 3.29999 V	10 Hz to 45 Hz	0.00011 V	
		45 Hz to 10 KHz	0.00020 V	
		10 KHz to 20 KHz	0.00020 V	
		20 KHz to 50 KHz	0.00021 V	
		50 KHz to 100 KHz	0.00020 V	
		100 KHz to 500 KHz	0.00020 V	
	3.3 V to 329.999 V	10 Hz to 45 Hz	0.05 V	
		45 Hz to 10 KHz	0.056 V	
		10 KHz to 20 KHz	0.052 V	
		20 KHz to 50 KHz	0.052 V	
	320 V to 1020 V	45 Hz to 1 KHz	0.0089 V	
		1 KHz to 5 KHz	0.050 V	
		5 KHz to 10 KHz	0.051 V	
RESISTANCE	0 Ω to 10.9999 Ω		0.000063 Ω	FLUKE 5522A MULTIPRODUCT CALIBRATOR, FLUKE WARRANTED METCAL PROCEDURES
	11 Ω to 32.9999 Ω		0.000093 Ω	
	33 Ω to 109.9999 Ω		0.00015 Ω	
	110 Ω to 329.9999 Ω		0.00015 Ω	
	0.33 K Ω to 1.099999 K Ω		0.0052 K Ω	
	1.1 K Ω to 3.299999 K Ω		0.0052 K Ω	
	3.3 K Ω to 10.99999 K Ω		0.0050 K Ω	
	11 K Ω to 32.99999 K Ω		0.0050 K Ω	
	33 K Ω to 109.9999 K Ω		0.0058 K Ω	
	110 K Ω to 329.99999 K Ω		0.0058 K Ω	
	0.33 M Ω to 1.099999 M Ω		0.00018 M Ω	
	3.3 M Ω to 10.99999 M Ω		0.012 M Ω	
	11 M Ω to 32.99999 M Ω		0.17 M Ω	
	33 M Ω to 109.9999 M Ω		0.17 M Ω	
	110 M Ω to 329.9999 M Ω		2.20 M Ω	
330 M Ω to 1100 M Ω		2.20 M Ω		
CAPACITANCE	11 nF to 32.9999 nF		0.10 nF	FLUKE 5522A MULTIPRODUCT CALIBRATOR, FLUKE WARRANTED METCAL PROCEDURES
	33 nF to 109.999 nF		0.070 nF	
	110 nF to 329.999 nF		0.070 nF	
	0.33 μ F to 1.0999 μ F		0.00070 μ F	
	1.1 μ F to 3.29999 μ F		0.00070 μ F	
	3.3 μ F to 10.9999 μ F		0.025 μ F	
	11 μ F to 32.9999 μ F		0.00077 μ F	

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CAPACITANCE		33 μ F to 109.999 μ F	0.087 μ F	FLUKE 5522A MULTIPRODUCT CALIBRATOR, FLUKE WARRANTED METCAL PROCEDURES
		110 μ F to 329.999 μ F	0.97 μ F	
		0.33 mF to 1.09999 mF	0.000075 mF	
		1.1 mF to 3.29999 mF	0.010 mF	
		3.3 mF to 10.9999 mF	0.010 mF	
		11 mF to 32.9999 mF	0.040 mF	
TEMPERATURE	K Type	-200°C to -100°C	0.34°C	
		-100°C to -25°C	0.16°C	
		-25°C to 120°C	0.26°C	
		120°C to 1000°C	0.24°C	
		1000°C to 1372°C	0.21°C	
	J Type	-210°C to -100°C	0.26°C	
		-100°C to -30 °C	0.26°C	
		-30°C to 150°C	0.16°C	
		150°C to 760°C	0.18°C	
		760°C to 1200°C	0.24°C	
	E Type	-250°C to -100°C	0.50°C	
		-100°C to -25°C	0.50°C	
		-25°C to 350 °C	0.16°C	
		350°C to 650 °C	0.16°C	
		650°C to 1000°C	0.22°C	
	R Type	0°C to 250°C	0.58°C	
		250°C to 400°C	0.36°C	
		400°C to 1000°C	0.34°C	
		1000°C to 1767°C	0.10°C	
	S Type	0°C to 250°C	0.56°C	
250°C to 1000°C		0.36°C		
1000°C to 1400°C		0.38°C		
1400°C to 1757°C		0.16°C		
T Type	-250°C to -150°C	0.64°C		
	-150°C to 0°C	0.24°C		
	0°C to 120°C	0.16°C		
	120°C to 400°C	0.14°C		
FREQUENCY		0.01 Hz to 119.99 Hz	0.0032 Hz	
		120.0 Hz to 1199.9 Hz	0.0032 Hz	
		1.200 KHz to 11.999 KHz	0.000012 KHz	
		12.00 KHz to 119.99 KHz	0.0000050 KHz	
		120.0 KHz to 1199.9 KHz	0.000000065 KHz	

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	1.200 MHz to 2.000 MHz	0.00000056 MHz	
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*** Expanded Uncertainty:**

- Expanded Uncertainty is the measurement uncertainty at a coverage probability of 95 %, which usually requires the use of a coverage factor of $k = 2$. This measurement uncertainty is a value for which the laboratory has been accredited using the procedure that was the subject of assessment. In certificates issued under its accreditation scope an accredited laboratory is not permitted to quote an uncertainty that is smaller than the published uncertainty for respective ranges as given above.

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