

	<b>ACCREDITATION DOCUMENT</b>	<b>F-06/02 Issue Date: 18/08/2020 Rev. No: 09 LAB 103</b>
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**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 **14-03-2025**.

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**

08-12-2022  
Date

SD  
Director General

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### Calibration Laboratory.

Advance Engineering & Research Organization (AERO) Calibration Lab.

Permanent laboratory premises

Field of measurement:				
Measured quantity	Range	*Expanded Uncertainty ( ± )	Technique, Reference Standard, Equipment	
DC Voltage (Source Mode)	0 to 329.9999 mV	0.0020 mV	Fluke Warranted METCAL Procedures,  Fluke 5522A Multi Product Calibrator	
	330 mV to 3.299999 V	0.000011 V		
	3.3 V to 32.99999 V	0.000042 V		
	33 V to 329.9999 V	0.0034 V		
	330 V to 1020 V	0.0035 V		
DC Current (Source Mode)	0 to 329.999 µA	0.020 µA		
	330 µA to 3.29999 mA	0.00010 mA		
	3.3 mA to 32.9999 mA	0.0020 mA		
	33 mA to 329.999 mA	0.0011 mA		
	330 mA to 1.09999 A	0.0010 A		
	1.1 A to 2.99999 A	0.0010 A		
	3 A to 10.9999 A	0.0010 A		
	11 A to 20.5 A	0.0010 A		
AC Current (Source Mode)	29.00 µA to 329.99 µA	10 Hz to 20 Hz		0.20 µA
		20 Hz to 45 Hz		0.20 µA
		45 Hz to 1 KHz	0.20 µA	
		1 KHz to 5 KHz	0.010 µA	
		5 KHz to 10 KHz	0.010 µA	
	0.33 mA to 3.29999 mA	10 KHz to 30 KHz	0.010 µA	
		10 Hz to 20 Hz	0.0020 mA	
		20 Hz to 45 Hz	0.0020 mA	
		45 Hz to 1 KHz	0.0020 mA	
		1 KHz to 5 KHz	0.020 mA	
	3.3 mA to 32.9999 mA	5 KHz to 10 KHz	0.020 mA	
		10 KHz to 30 KHz	0.010 mA	
		10 Hz to 20 Hz	0.021 mA	
		20 Hz to 45 Hz	0.020 mA	
		45 Hz to 1 KHz	0.020 mA	
		1 KHz to 5 KHz	0.020 mA	
		5 KHz to 10 KHz	0.10 mA	

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AC Current (Source Mode)	33 mA to 329.9999 mA	10 KHz to 30 KHz	0.10 mA	Fluke Warranted METCAL Procedures,  Fluke 5522A Multi Product Calibrator
		10 Hz to 20 Hz	0.30 mA	
		20 Hz to 45 Hz	0.30 mA	
		45 Hz to 1 KHz	0.30 mA	
		1 KHz to 5 KHz	0.0083 mA	
		5 KHz to 10 KHz	0.0079 mA	
		10 KHz to 30 KHz	0.0079 mA	
	0.33 A to 1.09999 A	10 Hz to 20 Hz	0.00034 A	
		20 Hz to 45 Hz	0.00032 A	
		45 Hz to 1 KHz	0.00030 A	
		1 KHz to 5 KHz	0.00070 A	
		5 KHz to 10 KHz	0.0070 A	
		10 KHz to 30 KHz	0.0070 A	
	1.1 A to 2.99999 A	10 Hz to 20 Hz	0.00034 A	
		20 Hz to 45 Hz	0.00032 A	
		45 Hz to 1 KHz	0.00030 A	
		1 KHz to 5 KHz	0.0030 A	
		5 KHz to 10 KHz	0.0030 A	
	3 A to 10.9999 A	45 Hz to 100 Hz	0.0030 A	
		100 Hz to 1 KHz	0.0030 A	
1 KHz to 5 KHz		0.0030 A		
11 A to 20.5 A	45 Hz to 100 Hz	0.0030 A		
	100 Hz to 1 KHz	0.0030 A		
	1 KHz to 5 KHz	0.0030 A		
AC Voltage (Source Mode)	1.0 mV to 32.999 mV	10 Hz to 45 Hz	0.020 mV	
		45 Hz to 10 KHz	0.020 mV	
		10 KHz to 20 KHz	0.020 mV	
		20 KHz to 50 KHz	0.020 mV	
		50 KHz to 100 KHz	0.020 mV	
		100 KHz to 500 KHz	0.020 mV	
	33 mV to 329.999 mV	10 Hz to 45 Hz	0.10 mV	
		45 Hz to 10 KHz	0.020 mV	
		10 KHz to 20 KHz	0.020 mV	
		20 KHz to 50 KHz	0.020 mV	
		50 KHz to 100 KHz	0.020 mV	
		100 KHz to 500 KHz	0.020 mV	
	0.33 V to 3.29999 V	10 Hz to 45 Hz	0.00030 V	
		45 Hz to 10 KHz	0.00010 V	
		10 KHz to 20 KHz	0.00010 V	
		20 KHz to 50 KHz	0.00010 V	
		50 KHz to 100 KHz	0.00010 V	
		100 KHz to 500 KHz	0.00010 V	
	3.3 V to 329.999 V	10 Hz to 45 Hz	0.010 V	
		45 Hz to 10 KHz	0.010 V	
		10 KHz to 20 KHz	0.010 V	

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	330 V to 1020 V	20 KHz to 50 KHz	0.010 V	Fluke Warranted METCAL Procedures,  Fluke 5522A Multi Product Calibrator
		45 Hz to 1 KHz	0.010 V	
		1 KHz to 5 KHz	0.010 V	
		5 KHz to 10 KHz	0.010 V	
Resistance (Source Mode)	0 Ω to 10.9999 Ω		0.00010 Ω	
	11 Ω to 32.9999 Ω		0.00014 Ω	
	33 Ω to 109.9999 Ω		0.00040 Ω	
	110 Ω to 329.9999 Ω		0.00011 Ω	
	330 Ω to 1.09999 kΩ		0.0000030 kΩ	
	1.1 kΩ to 3.29999 kΩ		0.00010 kΩ	
	3.3 kΩ to 10.9999 kΩ		0.00011 kΩ	
	11 kΩ to 32.9999 kΩ		0.00027 kΩ	
	33 kΩ to 109.9999 kΩ		0.00030 kΩ	
	110 kΩ to 329.9999 kΩ		0.00030 kΩ	
	330 kΩ to 1.09999 MΩ		0.000010 MΩ	
	1.1 MΩ to 3.29999 MΩ		0.00024 MΩ	
	3.3 MΩ to 10.9999 MΩ		0.00024 MΩ	
	11 MΩ to 32.9999 MΩ		0.0030 MΩ	
33 MΩ to 109.9999 MΩ		0.00024 MΩ		
110 MΩ to 329.9999 MΩ		0.00024 MΩ		
330 MΩ to 400 MΩ		0.00024 MΩ		
Capacitance (Source Mode)	11 nF to 32.9999 nF		0.099 nF	
	33 nF to 109.999 nF		0.065 nF	
	110 nF to 329.999 nF		0.065 nF	
	0.33 nF to 1.0999 μF		0.00065 μF	
	1.1 μF to 3.29999 μF		0.00065 μF	
	3.3 μF to 10.9999 μF		0.025 μF	
	11 μF to 32.9999 μF		0.00077 μF	
	33 μF to 109.999 μF		0.087 μF	
	110 μF to 329.999 μF		0.97 μF	
	0.330 mF to 1.09999 mF		0.00075 mF	
1.1 mF to 32.999 mF		0.040 mF		
Temperature (Source Mode)	K Type	-200 °C to -100 °C	0.22 °C	
		-100 °C to -25 °C	0.22 °C	
		-25 °C to 120 °C	0.16 °C	
		120 °C to 1000 °C	0.26 °C	
		1000 °C to 1372 °C	0.40 °C	
	J Type	-210 °C to -100 °C	0.20 °C	
		-100 °C to -30 °C	0.20 °C	
		-30 °C to 150 °C	0.19 °C	
		150 °C to 760 °C	0.18 °C	
		760 °C to 1200 °C	0.24 °C	
E Type	-250 °C to -100 °C	0.18 °C		

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<b>Temperature (Source Mode)</b>		-100 °C to -25 °C	0.18 °C	<b>Fluke Warranted METCAL Procedures,  Fluke 5522A Multi Product Calibrator</b>
		-25 °C to 350 °C	0.16 °C	
		350 °C to 650 °C	0.22 °C	
		650 °C to 1000 °C	0.22 °C	
	<b>R Type</b>	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	0.40 °C	
	<b>S Type</b>	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	0.46 °C	
	<b>T Type</b>	-250 °C to -150 °C	0.24 °C	
-150 °C to 0 °C		0.16 °C		
0 °C to 120 °C		0.16 °C		
120 °C to 400 °C		0.16 °C		
<b>Frequency (Source Mode)</b>	0.01 Hz to 119.99 Hz		0.014 Hz	
	120 Hz to 1199.9 Hz		0.0000061 Hz	
	1.200 KHz to 11.999 KHz		0.0000061 KHz	
	12.00 KHz to 119.99 KHz		0.0000062 KHz	
	120.0 KHz to 1199.9 KHz		0.0000058 KHz	
	1.20 MHz to 11.999 MHz		0.0000058 MHz	
	12.00 MHz to 119.99 MHz		0.0000058 MHz	
	120.0 MHz to 800 MHz		0.0000058 MHz	

**\* 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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