

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

24-10-2023  
Date

SD  
Director General

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**Calibration Laboratory.**

Advance Engineering & Research Organization (AERO) Calibration Lab.

Permanent laboratory premises

<b>Field of Measurement:</b>				
<b>Measured Quantity</b>	<b>Range</b>		<b>*Expanded Uncertainty (±)</b>	<b>Technique, Reference Standard, Equipment</b>
DC Voltage (Source Mode)	0 to 329.9999 mV		4.30E-04 mV to 2.43E-03 mV	Fluke Warranted METCAL Procedures, Fluke 5522A Multi Product Calibrator
	330 mV to 3.299999 V		1.39E-03 mV to 1.42E-05 V	
	3.3 V to 32.99999 V		6.06E-04 V to 6.13E-04 V	
	33 V to 329.9999 V		4.54E-04 V to 4.10E-03 V	
	330 V to 1020 V		1.84E-03 V to 4.23E-03 V	
DC Current (Source Mode)	0 to 329.999 µA		8.30E-04 µA to 2.34E-02 µA	
	330 µA to 3.29999 mA		1.44E-02 µA to 1.21E-04 mA	
	3.3 mA to 32.9999 mA		1.08E-04 mA to 6.39E-04 mA	
	33 mA to 329.999 mA		2.52E-03 mA to 2.51E-02 mA	
	330 mA to 1.09999 A		5.51E-02 mA to 2.33E-04 A	
	1.1 A to 2.99999 A		2.33E-04 A to 5.98E-04 A	
	3 A to 10.9999 A		3.48E-04 A to 6.16E-04 A	
AC Current (Source Mode)	29.00 µA to 329.99 µA	10 Hz to 30 kHz	8.15E-04 µA to 1.71E-01 µA	
	0.33 mA to 3.29999 mA		2.19E-04 mA to 2.01E-02 mA	

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AC Current (Source Mode)	3.3 mA to 32.9999 mA	10 Hz to 30 kHz	2.01E-03 mA to 1.00E-01 mA	Fluke Warranted METCAL Procedures,  Fluke 5522A Multi Product Calibrator
	33 mA to 329.9999 mA		1.34E-03 mA to 3.12E-01 mA	
	0.33 A to 1.09999 A		1.03E-04 A to 6.56E-03 A	
	1.1 A to 2.99999 A		1.67E-03 A to 5.01E-03 A	
	3 A to 10.9999 A		1.38E-03 A to 5.61E-03 A	
	11 A to 20.5 A		3.10E-03 A to 5.61E-03 A	
AC Voltage (Source Mode)	1.0 mV to 32.999 mV	10 Hz to 500 kHz	3.36E-03 mV to 1.77E-02 mV	
	33 mV to 329.999 mV		7.87E-03 mV to 7.90E-02 mV	
	0.33 V to 3.29999 V		7.70E-05 V to 7.87E-04 V	
	3.3 V to 32.9999 V		8.81E-03 V to 8.81E-02 V	
	33 V to 329.999 V		8.92E-03 V to 8.84E-02 V	
	330 V to 1020 V		3.00E-02 V to 1.43E-01 V	
Resistance (Source Mode)	0 $\Omega$ to 10.9999 $\Omega$		1.37E-03 $\Omega$ to 1.52E-04 $\Omega$	
	11 $\Omega$ to 32.9999 $\Omega$		1.82E-04 $\Omega$ to 6.46E-04 $\Omega$	
	33 $\Omega$ to 109.9999 $\Omega$		2.19E-04 $\Omega$ to 8.15E-04 $\Omega$	
	110 $\Omega$ to 329.9999 $\Omega$		6.42E-04 $\Omega$ to 1.18E-02 $\Omega$	
	330 $\Omega$ to 1.09999 k $\Omega$		1.32E-03 k $\Omega$ to 1.27E-04 k $\Omega$	
	1.1 k $\Omega$ to 3.29999 k $\Omega$		7.06E-03 k $\Omega$ to 1.39E-03 k $\Omega$	
	3.3 k $\Omega$ to 10.9999 k $\Omega$		2.45E-05 k $\Omega$ to 1.13E-04 k $\Omega$	
	11 k $\Omega$ to 32.9999 k $\Omega$		2.49E-03 k $\Omega$ to 2.51E-03 k $\Omega$	
	33 k $\Omega$ to 109.9999 k $\Omega$		2.49E-03 k $\Omega$ to 2.64E-03 k $\Omega$	

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Resistance (Source Mode)	110 kΩ to 329.9999 kΩ		1.00E-03 kΩ to 9.44E-03 kΩ	Fluke Warranted METCAL Procedures,  Fluke 5522A Multi Product Calibrator
	330 kΩ to 1.09999 MΩ		9.04E-03 kΩ to 1.07E-04 MΩ	
	1.1 MΩ to 3.29999 MΩ		1.32E-04 MΩ to 4.25E-04 MΩ	
	3.3 MΩ to 10.9999 MΩ		1.47E-03 MΩ to 1.53E-03 MΩ	
	11 MΩ to 32.9999 MΩ		1.94E-03 MΩ to 6.08E-03 MΩ	
	33 MΩ to 109.9999 MΩ		1.39E-01 MΩ to 1.40E-01 MΩ	
	110 MΩ to 329.9999 MΩ		1.40E-01 MΩ to 1.66E-01 MΩ	
	330 MΩ to 1100 MΩ		2.55E-01 MΩ to 8.65E-01 MΩ	
Temperature (Source Mode)	K Type	-200 °C to -100 °C	3.56E-01 °C to 3.70E-01 °C	
		-100 °C to -25 °C	1.91E-01 °C to 3.70E-01 °C	
		-25 °C to 120 °C	1.83E-01 °C to 1.91E-01 °C	
		120 °C to 1000 °C	1.83E-01 °C to 2.76E-01 °C	
		1000 °C to 1372 °C	2.76E-01 °C to 4.13E-01 °C	
	J Type	-210 °C to -100 °C	2.99E-01 °C to 3.16E-01 °C	
		-100 °C to -30 °C	1.91E-01 °C to 3.16E-01 °C	
		-30 °C to 150 °C	1.91E-01 °C to 2.00E-01 °C	
		150 °C to 760 °C	2.00E-01 °C to 2.03E-01 °C	
		760 °C to 1200 °C	2.03E-01 °C to 2.61E-01 °C	
	E Type	-250 °C to -100 °C	3.56E-01 °C to 3.70E-01 °C	
		-100 °C to -25 °C	1.91E-01 °C to 3.70E-01 °C	
		-25 °C to 350 °C	1.83E-01 °C to 1.91E-01 °C	

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Temperature (Source Mode)		350 °C to 650 °C	1.83E-01 °C to 2.76E-01 °C	Fluke Warranted METCAL Procedures,  Fluke 5522A Multi Product Calibrator
		650 °C to 1000 °C	2.76E-01 °C to 4.13E-01 °C	
	N Type	-200 °C to -100 °C	4.14E-01 °C to 4.26E-01 °C	
		-100 °C to -25 °C	2.25E-01 °C to 4.26E-01 °C	
		-25 °C to 120 °C	2.19E-01 °C to 2.25E-01 °C	
		120 °C to 410 °C	2.19E-01 °C to 2.95E-01 °C	
		410 °C to 1300 °C	2.95E-01 °C to 2.98E-01 °C	
	R Type	0 °C to 250 °C	5.91E-01 °C to 5.90E-01 °C	
		250 °C to 400 °C	3.88E-01 °C to 5.90E-01 °C	
		400 °C to 1000 °C	3.55E-01 °C to 3.88E-01 °C	
		1000 °C to 1767 °C	3.55E-01 °C to 4.13E-01 °C	
	S Type	0 °C to 250 °C	5.75E-01 °C to 5.78E-01 °C	
		250 °C to 1000 °C	5.75E-01 °C to 3.70E-01 °C	
		1000 °C to 1400 °C	1.91E-01 °C to 3.70E-01 °C	
		1400 °C to 1757 °C	1.83E-01 °C to 1.91E-01 °C	
	T Type	-250 °C to -150 °C	2.84E-01 °C to 6.49E-01 °C	
-150 °C to 0 °C		1.94E-01 °C to 2.84E-01 °C		
0 °C to 120 °C		1.83E-01 °C to 1.94E-01 °C		
120 °C to 400 °C		1.83E-01 °C to 1.85E-01 °C		
Frequency (Source Mode)	0.01 Hz to 119.99 Hz		4.76E-04 Hz to 2.20E-03 Hz	
	120 Hz to 1199.9 Hz		2.57E-03 Hz to 3.24E-03 Hz	

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Frequency (Source Mode)	1.200 kHz to 11.999 kHz	1.38E-05 kHz to 5.77E-04 kHz	Fluke Warranted METCAL Procedures,  Fluke 5522A Multi Product Calibrator
	12.00 kHz to 119.99 kHz	1.45E-05 kHz to 6.73E-05 kHz	
	120.0 kHz to 1199.9 kHz	5.96E-05 kHz to 1.93E-03 kHz	
	1.20 MHz	5.77E-07 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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