

F-06/02

Issue Date: 18/08/2020

Rev. No: 09 LAB 036

Accreditation No: LAB 036

Awarded to

Applied Physics Computers & Instrumentation Centre (APCIC), Pakistan Council of Scientific & Industrial Research (PCSIR) Labs. Complex. Lahore 54600, 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 **24-08-2006** 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 16-12-2025.

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

| <u>18-09-2025</u> | SD |
|-------------------|------------------|
| Date | Director General |



F-06/02

Issue Date: 18/08/2020

Rev. No: 09 LAB 036

Calibration Laboratory.

Accreditation scope of Applied Physics Computers & Instrumentation Centre (APCIC), Pakistan Council of Scientific & Industrial Research (PCSIR) Laboratories Complex, Lahore 54600, Pakistan.

Permanent laboratory premises X

| Field of Measurement: Volume Measurement | | | |
|--|---|---|--|
| Measured Quantity | Range | *Expanded Uncertainty (±) | Technique, Reference Standard, Equipment |
| Glassware Micropipette | 1 mL 2 mL 5 mL 10 ml 25 mL 25.1 mL to 100.0 mL 100.1 mL to 500.0 mL 500.0 to 1000.0 mL 1.0 L to 5.0 L 20 μL to 1000 μL | 1.0 μL 1.6 μL 5.0 μL 8.0 μL 2.0 μL 7.8 μL 1.1 mL 6.0 mL 5.0 mL 0.25 μL | Reference Used: F2 Class Mass Weighing Scale UUC: Pipettes, Burettes, Dispensers, Cylinders, Flasks, Beakers, Jugs etc. Method Used: ASTM E-542 LLC/APCIC/VCP/01 |
| | ent: Masses and Weighing I 1.0 mg to 220.0000 g 0.1 g to 20.0000 kg 0.10 kg to 260.0 kg | · | Reference Used: E2 Class Mass F2 Class Mass UUC: Class I & Below F1 Class & Below |
| Masses | 1.0 mg to 500.0 mg 1.0000 g to 200.0000 g 0.5000 kg to 20.0000 kg 30.000 kg to 50.000 kg | 0.050 mg 0.060 mg 0.080 g 4.6 g | Method Used: OIML, R111-1 R111-2, NIMT CP-301 LLC/APCIC/MCP/01 LLC/APCIC/MCP/02 |
| Field of Measurem | ent: Temperature Measurer | | |
| Temperature | - 50.00 °C to 50.00 °C | 0.050 °C | Reference Used: Reference Thermometer |

| <u>18-09-2025</u> | SD |
|-------------------|----------|
| Date | Director |

0.20 °C

with RTD Probe,

50.10 °C to 400.0 °C



F-06/02

Issue Date: 18/08/2020

Rev. No: 09 LAB 036

| | | | Precision k-type |
|---------------------|--|----------------|--------------------------------------|
| | 400.1 °C to 800.0 °C | 0.30 °C | Thermocouple, |
| | 400.1 C 10 600.0 C | 0.50 C | Temperature Controller, |
| Temperature | -50.0 °C to 100.0 °C | 0.20 °C | Dry Well Calibrator |
| Temperature | -50.0 C to 100.0 C | 0.20 C | <u>UUC:</u> |
| | 100.1 °C to 350 °C | 0.28 °C | Digital Thermometer |
| | | | Liquid in glass Thermometer |
| | | | Method Used: |
| | | | LLC/APCIC/TCP/01 |
| | | | LLC/APCIC/TCP/02 |
| Field of Maggaran | anti Tampawatuwa Sauraa | | |
| rieid of Mieasurein | ent: Temperature Source - 50.0 °C to 100.0 °C | 0.18 °C | Reference Used: |
| Temperature | - 30.0 € 10 100.0 € | 0.18 C | Reference Thermometer |
| Temperature | 100.1 °C to 350.0 °C | 0.20 °C | with RTD Probe |
| | | | Precision Thermometer |
| | 350.1 °C to 600 °C | 0.24 °C | with k-type |
| | | | <u>UUC:</u> |
| | - 40.0 °C to 100.0 °C | 0.18 °C | Thermocouple, |
| Temperature | 100 1 00 4- 200 0 00 | 0.22 °C | Temperature Controllers Dry Block |
| | 100.1 °C to 300.0 °C | 0.22 °C | Calibrator / Temperature |
| | | | Calibrator |
| Temperature | | | Environmental |
| Tomp or an area | 200 °C to 1000 °C | 0.65 °C | Chambers / Oven |
| | | | Muffle Furnace |
| | | | Method Used: |
| Town sustants Mass | | | LLC/APCIC/TCP/01 |
| | urement by Simulation M - 100 °C to 800 °C | 0.20 °C | Defenence Heads |
| Temperature | - 100 °C 10 800 °C | 0.20 °C | Reference Used: Portable Calibrator, |
| | | | Fluke 8508A Reference |
| Temperature | - 200 °C to 1200 °C | 0.24 °C | Multimeter |
| | | | <u>UUC:</u> |
| | | | RTD Pt 100, |
| | | | Thermocouple Type k |
| Temperature | - 200 °C to 1200 °C | 0.24 °C | and J |
| Tomporature | 200 0 10 1200 0 | 0.24 | Method Used: LLC/APCIC/TCP/01 |
| Field of Measureme | ent: Temperature & Hum | idity Measuren | |
| Source | 10.0 °C to 40.0 °C | 0.45 °C | Reference Used: |
| | 30 %RH to 80 %RH | 2.9 %RH | Thermo-hygrometer |
| | | | <u>UUC:</u> |
| Measurement | 10 °C to 40 °C | 0.45 °C | Humidity Chamber, |
| | 30 %RH to 80 %RH | 2.9 %RH | Method used: LLC/APCIC/TCP/03 |
| | 0.2025 | | CD. |

 18-09-2025
 SD______

 Date
 Director



F-06/02

Issue Date: 18/08/2020

Rev. No: 09 LAB 036

| Field of Measurement | nt: Pressure Measurement | | |
|-----------------------------------|---|--|---|
| Pressure | 0.01 to 10.00 psi 10.01 to 50.00 psi 50.01 to 100.00 psi 100.01 to 250.00 psi | 0.31 psi 0.36 psi 0.37 psi 0.38 psi | Reference Used: Pressure Calibrator Dead Weight Tester & Pressure Guages |
| Pressure | 50 psi to 500 psi 550 psi to 1000 psi 2000 psi to 5000 psi 5000 psi to 8000 psi | 1.4 psi 1.9 psi 5.7 psi 8.8 psi | UUC: Pressure Gauge (Pneumatic , Vacuum & Hydraulic) Pressure calibrator , Dead weight |
| | 100 mm of Hg to 200 mm of Hg 220 mm of Hg to 500 mm of Hg 520 mm of Hg to 600 mm of Hg | 12.31 mm of Hg 12.31 mm of Hg 12.31 mm of Hg | Method Used: DKD-R 6-1 LLC/APCIC/PCP/01 LLC/APCIC/PCP/02 |
| Field of Measuremen | nt: Dimensional Measure | | |
| General Dimension measurements | 0.001 mm to 25.000 mm | 0.40 μm | Reference Used: Gauge Block Set, |
| Length, Diameter, | 25.10 mm to 100.00 mm | 1.0 μm | Micrometer, Vernier Caliper, Line Length |
| Thickness and Depth of Industrial | 100.01 mm to 300.00 mm | 1.0 μm | Standard, Measuring Tape |
| Artifacts | 1.0 cm to 100.0 cm | 0.10 cm | Method Used: EAL-G 21 |
| | 100.1 cm to 500.0 cm | 0.10 cm | SOP # 10 & 12 (NIST) LLC/APCIC/DCP/01 LLC/APCIC/DCP/02 LLC/APCIC/DCP/03 LLC/APCIC/DCP/04 LLC/APCIC/DCP/05 |
| Field of Measuremen | nt: Frequency | | |
| Frequency Generation | 10.0 Hz to 100.0 Hz | 0.010 Hz | Reference Used : Universal Frequency |
| | 1.000 kHz to 100.00 kHz | 0.039 Hz | Counter |
| | 1.00 MHz to 100.0 MHz | 0.060 kHz | <u>UUC:</u> |
| Frequency | 10.0 Hz to 100.0 Hz | 0.010 Hz | Function Generator |
| Measurement | 1.000 KHz to 100.00 KHz 1.00 MHz to 100.00 MHz | 0.080 Hz 0.060 kHz | Frequency Counter, Digital Oscilloscope Method Used: LLC/APCIC/FCP/01 |
| Field of Measureme | nt: RPM Measurement | | |

| <u> 18-09-2025</u> | SD |
|--------------------|----------|
| Date | Director |



F-06/02

Issue Date: 18/08/2020

Rev. No: 09 LAB 036

| Tachometers / RPM Measurement 30.0 RPM to 300 300.1 RPM to 60 6000.1 RPM to 1 RPM 15000.1 RPM to RPM | 00.0 RPM | Reference Used: Universal Frequency Counter UUC: Function Generator, Digital Tachometers Method Used: LLC/APCIC/RCP/01 |
|---|----------|--|
|---|----------|--|

| Field of Measurement: Time Interval Measurement | | | | |
|---|---------------------------------|----------|--|--|
| Ct Wt1. | 10 s to 3600 s | 0.49 s | Reference Used: | |
| Stop Watch | 3601 s to 7200 s | 0.75 s | Universal Frequency | |
| | | | Counter <u>UUC:</u> Function Generator, | |
| Timer | 10 s to 7200 s | 0.75 s | Frequency Counter, Stop Watches, Method Used: LLC/APCIC/WCP/01 | |
| Field of Measureme | ent: Electrical Parameters | I | ELECTRI CICI W CITOI | |
| | 1.00 mV to 100.00 mV | 0.61 μV | | |
| DC Voltage | 1.000 V to 10.000 V | 0.011 mV | Reference Used: | |
| 8 | 10.001 V to 100.00 V | 0.11 mV | Reference Multimeter | |
| | 100.01 V to 1000.0 V | 56 mV | Fluke 8508A | |
| ACTI | 100.0 mV to 1.000 V | 0.46 mV | <u>UUC:</u> | |
| AC Voltage | 1.001 V to 10.000 V | 0.11 mV | Inmel Calibrator | |
| @ 50 Hz | 10.001 V to 100.00 V | 2.6 mV | Clamp Meter | |
| | 100.01 V to 500.0 V | 11 mV | Standard Resistors | |
| | 500.1 V to 1000 V | 51 mV | | |
| AC Current | 1.00 mA to 10.00 mA | 0.76 μΑ | Method Used: | |
| @ 50 Hz | 10.01 mA to 100.0 mA | 3.6 µA | LLC/APCIC/ECP/01 | |
| | 1.000 A to 10.000 A | 4.8 mA | LLC/APCIC/ECP/01 | |
| AC Current (Clamp | 5.0 A to 10.0 A | 0.20 A | | |
| on) | 10.1 A to 100.0 A | 0.52 A | | |
| @ 50 Hz | 100.1 A to 500.0 A | 1.1 A | | |
| | 500.1 A to 800 A | 2.0% A | | |
| DC Current | 1.00 mA to 10.00 mA | 2.2 μΑ | | |
| | 10.01 mA to 100.0 mA | 5.6 μΑ | | |
| | 1.000 A to 10.000 A | 4.4 mA | | |
| DC Current | 5.0 A to 10.0 A | 0.30 A | | |
| (Clamp on) | 10.1 A to 100.0 A | 0.33 A | | |
| | 100.1 A to 500.0 A | 1.3 A | | |
| | 500.1 A to 800 A | 2.0% A | | |
| Resistance | $1.00~\Omega$ to $10.00~\Omega$ | 0.013 Ω | | |

| <u>18-09-2025</u> | SD |
|-------------------|----------|
| Date | Director |



F-06/02

Issue Date: 18/08/2020

Rev. No: 09 LAB 036

Director

| | $10.01~\Omega$ to $100.00~\Omega$ | 0.015 Ω | |
|---|---|-------------------------------------|--|
| | 100.00Ω to $1.000 k\Omega$ | 0.015 Ω | |
| | $1.001 \text{ k}\Omega$ to $10.00 \text{ k}\Omega$ | 0.10 Ω | |
| | 10.01 kΩ to 100.00 KΩ | 4.7 Ω | |
| | $100.01 \text{ k}\Omega$ to $1.000 \text{ M}\Omega$ | 0.54 ΚΩ | |
| | $1.001~\mathrm{M}\Omega$ to $10.00~\mathrm{M}\Omega$ | 8.7 kΩ | |
| | $10.01~\mathrm{M}\Omega$ to $100.0~\mathrm{M}\Omega$ | 15 kΩ | |
| Insulation Resistance @ 250 V to 1000 V | $100.1~\text{M}\Omega$ to $1.000~\text{G}\Omega$ | 5.0 ΜΩ | |
| Low Resistance Measurement | $10.0~\mathrm{m}\Omega$ to $100.0~\mathrm{m}\Omega$ | 0.14 mΩ | |
| Field of Measuremen | nt: AC Power (Single Phas | e) | |
| AC Power @ 50 Hz | 10.00 W to 100.0 W 100.1 W to 500.0 W 500.1 W to 1000.0 W 1000.1 W to 5000.0 W | 0.12 W 0.24 W 0.42 W 1.0 W | Reference Used: Multimeter Fluke 8508A UUC: Power Meter Clamp Meter Inmel 33 Calibrator Method Used: LLC/APCIC/ECP/01 LLC/APCIC/ECP/02 |
| Field of Measuremen | nt: Spectrophotometer | | |
| Wavelength Accuracy | 525.5 nm | 0.78 nm | Reference Used: SS-1 Spectronics Standard Filters |
| Transmittance @ 590nm & 412 nm | 6.13%T to 10.4 %T | 0.011 %T | Thermo Spectronics USA UUC: Spectrophotomotors |
| Absorbance @ 590nm & 412 nm | 0.990 A to 1.209 A | 0.043 A | Spectrophotometers Method Used: Thermo Scientific, USA LLC/APCIC/SCP/01 |
| | | | |
| Field of Measuremen | nt: pH Measurement | 1 | |
| pH Meter | 4.00 pH to 10.00 pH @ 25 °C | 0.010 pH | Reference Used: HANNA pH Buffers, pH Meter UUC: pH Meters |
| <u>18-09-</u> | <u>-2025</u> | | SD |
| D (| | | D' . |

Page 6 of 7

Date



| r-00/02 |
|------------------------|
| Issue Date: 18/08/2020 |
| Day Mar 00 |

Rev. No: 09 LAB 036

E 06/02

| | Method Used: |
|--|---------------------|
| | ASTM D 1293-12 |
| | LLC/APCIC/SCP/02 |

* 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.

| <u>18-09-2025</u> | SD |
|-------------------|----------|
| Date | Director |