

CERTIFICATE OF CALIBRATION

Issued By Alpha Electronics (Southern) Ltd

Date of Issue 08 December 2020

Certificate Number
J366402

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Approved Signatory

D Johnston

M Vieira

J Puttock

Customer : Generator Installations
4 Old Mill Lane, Aylesford
Kent ME20 7DT

Date Received : 04 December 2020

| | | | | |
|---------------------|---------------------|-----------------------|---------------------------|------------|
| Instrument - | System ID : | R71577 | Job Number : | R308519-1 |
| | Description : | Multi Function Tester | Ref. Number : | AN:181012 |
| | Manufacturer : | Megger | Site : | |
| | Model Number : | MFT1720 | Location : | |
| | Serial Number : | 101163388 | Last Certificate Number : | J355147 |
| | Procedure Version : | 2.02/J [V] | Last Calibration Date : | 15/11/2019 |

Environmental Conditions

Temperature : 20.0°C +/- 3°C
Relative Humidity : 50% +/- 20%

Mains Voltage : 240.0V +/- 12V
Mains Frequency : 50.0Hz +/- 0.5Hz

Comments

UUT was allowed to stabilise for 6 hours in the laboratory before calibration
Specification Reference: Manufacturers Datasheet MFT1700_DS_en_V01

UUT was calibrated with mains lead supplied.
All tests passed calibration.

Traceability Information

| Instrument description | Serial number | Certificate number | Cal. Date | Cal. Period |
|--|---------------|--------------------|------------|-------------|
| 3050A Precision Multi-Product Calibrator | K1168E13 | U54936 (UKAS) | 05/11/2020 | 52 |
| 3200A Electrical Test Calibrator (STD) | M1345D14 | U54712 (UKAS) | 02/05/2020 | 52 |
| Fluke 87mk5 Multimeter | 94560226 | U54815 (UKAS) | 11/08/2020 | 52 |
| 3 Phase Line Installation | N/A | N/A | 10/09/2018 | 520 |
| Tinsley ZX99E Resistance Decade | R263418 | U54749 (UKAS) | 22/06/2020 | 52 |

Calibrated By : S Gurung

Date of Calibration : 08 December 2020

This certificate provides traceability of measurement to recognised National Standards, and to the units of measurement realised at the National Physical Laboratory or other recognised National Standards laboratories.
Copyright of this certificate is owned by the issuing laboratory and may not be reproduced except with the prior written approval of the issuing laboratory.
This certificate complies with the requirements of BS EN ISO 10012:2003.

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| Test Title | Tolerance | Applied Value | Reading | Pass/Fail |
|--|---------------|----------------|----------------|-----------|
| General Tests | | | | |
| Lock Function | --- | --- | Pass | |
| Backlight Function | --- | --- | Pass | |
| Continuity Bleeper | --- | --- | Pass | |
| Phase Rotation | | | | |
| L1-L2-L3 Correct | --- | --- | Pass | |
| L2-L1-L3 Reversed | --- | --- | Pass | |
| AC Voltage Measurements @ 50Hz | | | | |
| 600V Range | 3V | 100V | 100V | Pass |
| 600V Range | 5.8V | 240V | 240V | Pass |
| 600V Range | 9V | 400V | 401V | Pass |
| Frequency Measurements | | | | |
| 400Hz Range | 0.45Hz | 50.0Hz | 50.0Hz | Pass |
| 400Hz Range | 0.50Hz | 60.0Hz | 60.0Hz | Pass |
| 400Hz Range | 3Hz | 200Hz | 200Hz | Pass |
| DC Insulation Test Voltage Measured with 1mA load | | | | |
| 1kV Output | 100V | 1 100V | 1 082V | Pass |
| Voltage Display | 40.9V | 1 082V | 1 084V | Pass |
| 500V Output | 50V | 550V | 544V | Pass |
| Voltage Display | 22V | 544V | 544V | Pass |
| 250V Output | 25V | 275V | 271V | Pass |
| Voltage Display | 12.5V | 271V | 271V | Pass |
| DC Insulation Resistance Measurements | | | | |
| 1kV Range | 11M Ω | 300M Ω | 301M Ω | Pass |
| 1kV Range | 2.9M Ω | 90.0M Ω | 90.0M Ω | Pass |
| 1kV Range | 1.7M Ω | 50.0M Ω | 49.7M Ω | Pass |
| 1kV Range | 290k Ω | 9.00M Ω | 9.01M Ω | Pass |

Uncertainties

| | |
|----------------------|--|
| Loop Resistance | $\pm 0.5\%$ $\pm 0.004R$ ± 1 digit |
| Continuity Ohms | $\pm 0.25\%$ $\pm 10mR$ ± 1 digit |
| Insulation Ohms | 10kR - 5MR $\pm 0.1\%$: 5MR - 200GR $\pm 1\%$ (all ± 1 digit) |
| Ins Voltage <1.2kV | $\pm 1\%$ ± 1 digit |
| RCD Current | $\pm 1.2\%$ ± 1 digit |
| RCD Time | $\pm 0.7ms$ ± 1 digit |
| AC Voltage 0 - 1.2kV | $\pm 0.04\%$ (45Hz - 10kHz) ± 2 digit |
| Continuity Current | $\pm 0.05\%$ ± 1 digit |
| Frequency | $\pm 1ppm$ ± 1 digit. |

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| Test Title | Tolerance | Applied Value | Reading | Pass/Fail |
|---|---------------|----------------|----------------|-----------|
| 500V Range | 8M Ω | 200M Ω | 200M Ω | Pass |
| 500V Range | 1.7M Ω | 50.0M Ω | 49.8M Ω | Pass |
| 500V Range | 800k Ω | 20.0M Ω | 19.9M Ω | Pass |
| 500V Range | 290k Ω | 9.00M Ω | 8.97M Ω | Pass |
| 250V Range | 2.9M Ω | 90.0M Ω | 90.0M Ω | Pass |
| 250V Range | 800k Ω | 20.0M Ω | 20.2M Ω | Pass |
| 250V Range | 290k Ω | 9.00M Ω | 8.98M Ω | Pass |
| 250V Range | 50k Ω | 1.00M Ω | 1.00M Ω | Pass |
| DC Continuity Measurements | | | | |
| 99.9k Ω Range | 4.7k Ω | 90.0k Ω | 89.8k Ω | Pass |
| 99.9k Ω Range | 700 Ω | 10.0k Ω | 10.0k Ω | Pass |
| 99.9 Ω Range | 2 Ω | 90.0 Ω | 90.5 Ω | Pass |
| 99.9 Ω Range | 200m Ω | 9.00 Ω | 9.04 Ω | Pass |
| 99.9 Ω Range | 40m Ω | 1.00 Ω | 1.01 Ω | Pass |
| O/C Voltage | 1V | 5.000V | 4.620V | Pass |
| S/C Current (>200mA) | 20mA | 220.0mA | 211.8mA | Pass |
| S/C Current (>15mA) | 5mA | 20.0mA | 15.8mA | Pass |
| RCD Trip Current @ 250ms Trip Time | | | | |
| 10mA X1 @ 0° | 500uA | 10.500mA | 10.790mA | Pass |
| 30mA X1 @ 0° | 1.5mA | 31.500mA | 31.890mA | Pass |
| 30mA X1 @ 180° | 1.5mA | 31.500mA | 31.880mA | Pass |
| 100mA X1 @ 0° | 5mA | 105.00mA | 107.23mA | Pass |
| 300mA X1 @ 0° | 15mA | 315.0mA | 317.0mA | Pass |
| 500mA X1 @ 0° | 25mA | 525.0mA | 526.8mA | Pass |
| 1000mA X1 @ 0° | 50mA | 1 050.0mA | 1 050.1mA | Pass |

Uncertainties

| | |
|----------------------|--|
| Loop Resistance | $\pm 0.5\% \pm 0.004R \pm 1$ digit |
| Continuity Ohms | $\pm 0.25\% \pm 10mR \pm 1$ digit |
| Insulation Ohms | 10kR - 5MR $\pm 0.1\%$: 5MR - 200GR $\pm 1\%$ (all ± 1 digit) |
| Ins Voltage <1.2kV | $\pm 1\% \pm 1$ digit |
| RCD Current | $\pm 1.2\% \pm 1$ digit |
| RCD Time | $\pm 0.7ms \pm 1$ digit |
| AC Voltage 0 - 1.2kV | $\pm 0.04\%$ (45Hz - 10kHz) ± 2 digit |
| Continuity Current | $\pm 0.05\% \pm 1$ digit |
| Frequency | $\pm 1ppm \pm 1$ digit. |

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| Test Title | Tolerance | Applied Value | Reading | Pass/Fail |
|---|-----------|---------------|----------|---------------|
| RCD Trip Current Multipliers @ 30ms Trip Time | | | | |
| 30mA X ½I @ 0° | 750uA | 14.250mA | 14.924mA | Pass |
| 30mA X 5I @ 0° | 7.5mA | 157.50mA | 159.49mA | Pass |
| RCD Trip Time @ 30mA Trip Current | | | | |
| 30ms @ 0° | 1.3ms | 30.0ms | 30.6ms | Pass |
| 200ms @ 0° | 3ms | 200ms | 200ms | Pass |
| 280ms @ 0° | 3.8ms | 280ms | 280ms | Pass |
| Auto RCD Test Sequence @ 30ms Trip Time | | | | |
| 30mA X ½I @ 0° | 750uA | 14.250mA | 14.950mA | Marginal Pass |
| 30mA X1 @ 0° | 1.5mA | 31.500mA | 32.020mA | Pass |
| 30mA X1 @ 180° | 1.5mA | 31.500mA | 31.880mA | Pass |
| 30mA X 5I @ 0° | 7.5mA | 157.50mA | 158.84mA | Pass |
| 30mA X 5I @ 180° | 7.5mA | 157.50mA | 158.75mA | Pass |
| Loop Impedance Measurements - Z (High Current) | | | | |
| L-PE Loop | 332.8mΩ | 5.66Ω | 5.82Ω | Pass |
| L-PE Loop | 1Ω | 10.6Ω | 10.9Ω | Pass |
| L-PE Loop | 10Ω | 101Ω | 103Ω | Pass |
| Loop Impedance Measurements - Z (Low Current) | | | | |
| L-PE Loop | 83.8mΩ | 0.68Ω | 0.75Ω | Pass |
| L-PE Loop | 131mΩ | 1.62Ω | 1.62Ω | Pass |
| L-PE Loop | 332.8mΩ | 5.66Ω | 5.83Ω | Pass |
| L-PE Loop | 1Ω | 10.6Ω | 10.9Ω | Pass |
| L-PE Loop | 5.5Ω | 100.9Ω | 102.0Ω | Pass |

End of results

Uncertainties

| | |
|----------------------|---|
| Loop Resistance | ±0.5% ±0.004R ±1 digit |
| Continuity Ohms | ±0.25% ±10mR ±1 digit |
| Insulation Ohms | 10kR - 5MR ±0.1% : 5MR - 200GR ±1% (all ±1 digit) |
| Ins Voltage <1.2kV | ±1% ±1 digit |
| RCD Current | ±1.2% ±1 digit |
| RCD Time | ±0.7ms ±1 digit |
| AC Voltage 0 - 1.2kV | ±0.04% (45Hz - 10kHz) ±2 digit |
| Continuity Current | ±0.05% ±1 digit |
| Frequency | ±1ppm ±1 digit. |