

# CERTIFICATE OF CALIBRATION

Issued By Alpha Electronics (Southern) Ltd

Date of Issue 25 November 2020

Certificate Number  
J365965

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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 : 23 November 2020

<b>Instrument -</b>	System ID :	R767667	Job Number :	R307215-1
	Description :	Multi-Function Tester	Site :	
	Manufacturer :	Megger	Location :	
	Model Number :	MFT1721	Last Certificate Number :	J354939
	Serial Number :	101508269	Last Calibration Date :	08/11/2019
	Procedure Version :	2.02/J [V]		

## Environmental Conditions

Temperature :	20.0°C +/- 3°C	Mains Voltage :	240.0V +/- 12V
Relative Humidity :	50% +/- 20%	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

Calibrated By : R.Bhandari

Date of Calibration : 25 November 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.

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This certificate complies with the requirements of BS EN ISO 10012:2003.

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Test Title	Tolerance	Applied Value	Reading	Pass/Fail
<b>General Tests</b>				
Lock Function	---	---	Pass	
Backlight Function	---	---	Pass	
Continuity Bleeper	---	---	Pass	
<b>Phase Rotation</b>				
L1-L2-L3 Correct	---	---	Pass	
L2-L1-L3 Reversed	---	---	Pass	
<b>AC Voltage Measurements @ 50Hz</b>				
600V Range	3V	100V	100V	Pass
600V Range	5.8V	240V	240V	Pass
600V Range	9V	400V	399V	Pass
<b>Frequency Measurements</b>				
400Hz Range	0.45Hz	50.0Hz	50.0Hz	Pass
400Hz Range	0.50Hz	60.0Hz	60.0Hz	Pass
400Hz Range	1.2Hz	200.0Hz	200.0Hz	Pass
<b>DC Insulation Test Voltage Measured with 1mA load</b>				
1kV Output	100V	1 100.0V	1 027.1V	Pass
Voltage Display	38.9V	1 027V	1 026V	Pass
500V Output	50V	550.0V	543.1V	Pass
Voltage Display	22V	543V	544V	Pass
250V Output	25V	275.0V	269.6V	Pass
Voltage Display	12.5V	270V	270V	Pass
100V Output	10V	110.0V	112.3V	Pass
Voltage Display	4.2V	112.3V	112.0V	Pass
<b>DC Insulation Resistance Measurements</b>				
1kV Range	11M $\Omega$	300M $\Omega$	301M $\Omega$	Pass
1kV Range	2.9M $\Omega$	90.0M $\Omega$	90.0M $\Omega$	Pass
1kV Range	1.7M $\Omega$	50.0M $\Omega$	49.7M $\Omega$	Pass
1kV Range	290k $\Omega$	9.00M $\Omega$	9.00M $\Omega$	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 $\pm 1$ 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) $\pm 2$ 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
500V Range	8M $\Omega$	200M $\Omega$	199M $\Omega$	Pass
500V Range	1.7M $\Omega$	50.0M $\Omega$	49.8M $\Omega$	Pass
500V Range	800k $\Omega$	20.0M $\Omega$	19.9M $\Omega$	Pass
500V Range	290k $\Omega$	9.00M $\Omega$	8.96M $\Omega$	Pass
250V Range	2.9M $\Omega$	90.0M $\Omega$	89.8M $\Omega$	Pass
250V Range	800k $\Omega$	20.0M $\Omega$	20.0M $\Omega$	Pass
250V Range	290k $\Omega$	9.00M $\Omega$	8.98M $\Omega$	Pass
250V Range	50k $\Omega$	1.00M $\Omega$	1.00M $\Omega$	Pass
100V Range	2.9M $\Omega$	90.0M $\Omega$	89.8M $\Omega$	Pass
100V Range	800k $\Omega$	20.0M $\Omega$	20.0M $\Omega$	Pass
100V Range	290k $\Omega$	9.00M $\Omega$	9.02M $\Omega$	Pass
100V Range	50k $\Omega$	1.00M $\Omega$	1.00M $\Omega$	Pass
<b>DC Continuity Measurements</b>				
99.9k $\Omega$ Range	4.7k $\Omega$	90.0k $\Omega$	90.0k $\Omega$	Pass
99.9k $\Omega$ Range	700 $\Omega$	10.0k $\Omega$	10.0k $\Omega$	Pass
99.9 $\Omega$ Range	400m $\Omega$	10.0 $\Omega$	10.1 $\Omega$	Pass
99.9 $\Omega$ Range	200m $\Omega$	9.00 $\Omega$	9.10 $\Omega$	Pass
99.9 $\Omega$ Range	40m $\Omega$	1.00 $\Omega$	1.03 $\Omega$	Pass
O/C Voltage	1V	5.000V	4.649V	Pass
S/C Current (>200mA)	20mA	220.0mA	211.8mA	Pass
S/C Current (>15mA)	5mA	20.0mA	15.8mA	Pass
<b>RCD Trip Current @ 250ms Trip Time</b>				
10mA X1 @ 0°	500uA	10.50mA	10.85mA	Pass
30mA X1 @ 0°	1.5mA	31.50mA	31.90mA	Pass
30mA X1 @ 180°	1.5mA	31.50mA	31.92mA	Pass
100mA X1 @ 0°	5mA	105.0mA	107.0mA	Pass
300mA X1 @ 0°	15mA	315.0mA	317.0mA	Pass
500mA X1 @ 0°	25mA	525.0mA	526.0mA	Pass
1000mA X1 @ 0°	50mA	1 050.0mA	1 049.9mA	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 $\pm 1$ 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) $\pm 2$ 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
<b>RCD Trip Current Multipliers @ 30ms Trip Time</b>				
30mA X 1/2 @ 0°	750uA	14.25mA	14.61mA	Pass
30mA X 5I @ 0°	7.5mA	157.50mA	159.37mA	Pass
<b>RCD Trip Time @ 30mA Trip Current</b>				
30ms @ 0°	1.3ms	30.0ms	30.7ms	Pass
200ms @ 0°	3ms	200ms	200ms	Pass
280ms @ 0°	3.8ms	280ms	281ms	Pass
<b>Auto RCD Test Sequence @ 20ms Trip Time</b>				
30mA X 1/2 @ 0°	750uA	14.25mA	14.91mA	Pass
30mA X1 @ 0°	1.5mA	31.50mA	31.90mA	Pass
30mA X1 @ 180°	1.5mA	31.50mA	31.89mA	Pass
30mA X 5I @ 0°	7.5mA	157.5mA	159.5mA	Pass
30mA X 5I @ 180°	7.5mA	157.5mA	159.4mA	Pass
<b>Loop Impedance Measurements - Z (High Current)</b>				
L-PE Loop	303mΩ	5.66Ω	5.79Ω	Pass
L-PE Loop	732.7mΩ	10.7Ω	10.8Ω	Pass
L-PE Loop	7Ω	101Ω	103Ω	Pass
<b>Loop Impedance Measurements - Z (Low Current)</b>				
L-PE Loop	84mΩ	0.68Ω	0.69Ω	Pass
L-PE Loop	98.1mΩ	0.96Ω	0.97Ω	Pass
L-PE Loop	333.1mΩ	5.66Ω	5.79Ω	Pass
L-PE Loop	1Ω	10.7Ω	10.8Ω	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.