CERTIFICATE OF CALIBRATION

ISSUED BY **Calmet Laboratory Services**
A division of Lazgill Ltd
11b Upper Teddington Road, Hampton Wick, Kingston, Surrey KT1 4DL
Telephone: 020 8977 8455 Facsimile: 020 8614 8048

DATE OF ISSUE **14 April 2022** CERTIFICATE NUMBER **CN327385**

UKAS CALIBRATION
0143

Approved signatory

RPatel

Ramesh Patel
Technical Manager (Electrical)

LCM Systems LTD
Unit 15,
Newport Business Park,
Barry Way,
Newport
Isle of Wight
PO30 5GY

Your reference 34711

Our reference WI046546-002

Item	DIGITAL MULTIMETER 8845A
Manufacturer	FLUKE 8845A
Serial number	2596003
Date received	28 March 2022
Date calibrated	14 April 2022
Date of next calibration	14 April 2023
Laboratory environment	'Temperature' :20 °C ± 2 °C Mains Supply : 230V ± 3%, 50 Hz Relative Humidity : 46% ± 15%
Action taken	The instrument was connected to laboratory earth throughout.
Additional information	Adjustments were not required/performed on the instrument 'Final measurement' was performed after a minimum of 24 hours stabilisation in the laboratory. 'The decision rule used for this calibration is based on a simple acceptance/shared risk as defined in JCGM 106 section 8.2, where the uncertainty is less than or equal to the specified tolerance. 'The equipment was found to comply with the manufacturers specification at the points measured. 'The results/uncertainty' limits quoted refer to the measured values only, with no account being taken of the instrument's ability to maintain it's calibration. 'This certificate is issued in accordance with the recognised international standard ISO/IEC17025:2017 Fluke Specification Sheet, not dated.
Equipment used	IC001 Fluke 5500A IC474 Fluke 5730A
Comments	Previous UKAS Certificate number : CN315335, Issued by Laboratory : 0143, Dated : 16 March 2021.

Calibration results

Except where stated otherwise, the reported expanded uncertainty is based on a standard uncertainty multiplied by a coverage factor k=2, providing a level of confidence of approximately 95%. The uncertainty evaluation has been carried out in accordance with UKAS requirements.

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DATE OF ISSUE **14 April 2022** CERTIFICATE NUMBER **CN327385**

UKAS CALIBRATION
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1.0 DC VOLTAGE (6½ DIGITS)

	Range	Voltage	Indicated Value
a)	100 mV	.0000000 V	+0.001 7 mV
b)	1 V	.0000000 V	+0.000 001 V
c)	10 V	0.000000 V	0.000 00 V
d)	100 V	0.00000 V	0.000 0 V
e)	1000 V	0.0000 V	0.000 V

Uncertainty : DC Voltage 0.1V to 1V ± (7ppm + 1.0µV + 1LSD)

1.1 DC VOLTAGE LINEARITY (6½ DIGIT)

	Applied Value 1V . Range	Indicated Value +ve	Indicated Value -ve
a)	0.010000 V	0.010 000 V	0.009 999 V
b)	0.100000 V	0.100 000 V	0.099 999 V
c)	0.300000 V	0.300 001 V	0.299 999 V
d)	0.500000 V	0.500 001 V	0.500 001 V
e)	0.700000 V	0.700 002 V	0.700 002 V
f)	0.900000 V	0.900 003 V	0.900 002 V
g)	1.100000	1.100 004 V	1.100 003 V

Uncertainty : DC Voltage 0.1V to 1V ± (7ppm + 1.0µV + 1LSD)

1.2 DC VOLTAGE RANGE ACCURACY (6½ DIGIT)

	Range	Applied Value	Indicated Value +ve	Indicated Value -ve
a)	100 mV	0.100 0000 V	99.999 7 mV	100.000 7 mV
b)	1 V	1.0000000 V	1.000 003 V	1.000 003 V
c)	10 V	10.000000 V	10.000 02 V	10.000 02 V
d)	100 V	100.00000 V	100.000 0 V	100.000 1 V
e)	1000 V	1000.0000 V	1 000.003 V	1 000.001 V

Uncertainty : DC Voltage 0.1V to 1V ± (7ppm + 1.0µV + 1LSD)
Uncertainty : DC Voltage 1.1V to 11V ± (9ppm + 4 µV + 1 LSD)
Uncertainty : DC Voltage 100 V : 1000 V ± (17 ppm + 1 LSD)

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DATE OF ISSUE **14 April 2022** CERTIFICATE NUMBER **CN327385**

UKAS CALIBRATION
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2.0 A.C VOLTAGE ACCURACY (6½ DIGIT)

	Range	Applied Voltage	Frequency	Indicated Value
a1	100 mV	100.000 mV	60 Hz	100.009 8 mV
a2			1 kHz	100.009 4 mV
a3			10 kHz	100.003 0 mV
a4			20 kHz	100.000 0 mV
a5			100 kHz	100.297 3 mV
b1	1 V	1.00000 V	60 Hz	1.000 137 V
b2			1 kHz	1.000 119 V
b3			10 kHz	1.000 084 V
b4			50 kHz	1.000 039 V
b5			100 kHz	1.001 215 V
c1	10 V	10.0000 V	60 Hz	9.998 73 V
c2			1 kHz	9.998 79 V
c3			10 kHz	9.998 89 V
c4			50 kHz	9.997 75 V
c5			100 kHz	9.996 20 V
d1	100 V	100.000 V	60 Hz	99.994 3 V
d2			1 kHz	99.995 8 V
d3			10 kHz	99.999 6 V
d4			20 kHz	99.999 4 V
e1	750 V	700.00 V	60 Hz	699.956 V
e2			400 Hz	699.939 V
e3			1 kHz	699.961 V

Uncertainty : AC Voltage 1 V to 1000 V ± (0.01 % + 1 LSD)
Uncertainty : AC Voltage 100 mV ±(0.03% + 1LSD)

3.0 A.C CURRENT ACCURACY (6½ DIGIT)

	Range	Applied Current	Frequency	Indicated Value
a1	10 mA	10.000 00 mA	60 Hz	10.001 69 mA
a2			400 Hz	10.001 53 mA
a3			1 kHz	10.001 37 mA
b1	100 mA	100.000 0 mA	60 Hz	100.020 4 mA
b2			400 Hz	100.021 8 mA
b3			1 kHz	100.021 3 mA
c1	400 mA	400.000 0 mA	60 Hz	399.948 mA
c2			400 Hz	399.933 mA
c3			1 kHz	399..957 mA
d1	1 A	1.000 000 A	60 Hz	1.000 266 A
d2			400 Hz	1.000 220 A
d3			1 kHz	1.000 361 A
e1	3 A	3.000 00 A	60 Hz	3.000 48 A
e2			400 Hz	3.000 69 A
e3			1 kHz	3.001 15 A
f1	10 A	10.000 00 A	60 Hz	9.999 62 A
f2			400 Hz	10.000 22 A
f3			1 kHz	10.001 18 A

Uncertainty : AC Current ± (0.03% + 1 LSD)

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UKAS CALIBRATION
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4.0 RESISTANCE ACCURACY (6½ DIGIT)

	Range	Applied Value	Indicated Value
a) 4-Wire	100 Ohm	100.000 Ohm	100.000 3 Ohm
b)	1 k ohm	1.00000 k ohm	1.000 006 k ohm
c)	10 k ohm	10.0000 k ohm	10.000 07 k ohm
d)	100 k ohm	100.000 k ohm	99.998 7 k ohm
e)	1 M ohm	1.00000 M ohm	0.999 967 M ohm
f)	10 M ohm	10.0000 M ohm	9.998 91 M ohm
g) 2-Wire #	100 M ohm	100.000 M ohm	99.898 6 M ohm

Calibrations 'Not UKAS Accredited' included for completeness.
Uncertainty : Resistance 1 ohm to 10 Mohm ± (8ppm + 1LSD)

5.0 DC CURRENT ACCURACY (6½ DIGIT)

	Range	Applied Values	Indicated Value +ve	Indicated Value -ve
a	100 µA	100.000 0 µA	100.001 5 µA	100.00 53 µA
b	1 mA	1.000 000 mA	1.000 019 mA	1.000 034 mA
c	10 mA	10.000 00 mA	9.999 99 mA	10.002 20 mA
d	100 mA	100.000 0 mA	99.998 4 mA	100.004 4 mA
e	400 mA	400.000 0 mA	400.013 mA	400.014 mA
f	1 A	1.000 000 A	1.000 357 A	1.000 231 A
g	3 A	3.000 00 A	3.000 27 A	3.000 42 A
h	10 A	10.000 00 A	10.001 25 A	10.001 76 A

Uncertainty : DC Current ± (30 ppm + 1 LSD)

6.0 FREQUENCY ACCURACY

	Applied Value	Indicated Value
a)	10.000 000 Hz	10.000 05 Hz
b)	50.000 000 Hz	50.000 2 Hz
c)	100.000 00 Hz	100.000 5 Hz
d)	1.000 000 0 kHz	1.000 005 kHz
e)	10.000 000 kHz	10.000 05 kHz
f)	100.000 00 kHz	100.000 5 kHz

Uncertainty : Frequency ± 1 Part in 10 (EXP-7)

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DATE OF ISSUE **14 April 2022** CERTIFICATE NUMBER **CN327386**

UKAS CALIBRATION
0143

Approved signatory

RPatel

Ramesh Patel
Technical Manager (Electrical)

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Unit 15,
Newport Business Park,
Barry Way,
Newport
Isle of Wight
PO30 5GY

Your reference 34711

Our reference WI046546-003

Item	DIGITAL MULTIMETER 8845A
Manufacturer	FLUKE 8845A
Serial number	2596004
Date received	28 March 2022
Date calibrated	14 April 2022
Date of next calibration	14 April 2023
Laboratory environment	'Temperature' :20 °C ± 2 °C Mains Supply : 230V ± 3%, 50 Hz Relative Humidity : 46% ± 15%
Action taken	The instrument was connected to laboratory earth throughout.
Additional information	Adjustments were not required/performed on the instrument 'Final measurement' was performed after a minimum of 24 hours stabilisation in the laboratory. 'The decision rule used for this calibration is based on a simple acceptance/shared risk as defined in JCGM 106 section 8.2, where the uncertainty is less than or equal to the specified tolerance. 'The equipment was found to comply with the manufacturers specification at the points measured. 'The results/uncertainty' limits quoted refer to the measured values only, with no account being taken of the instrument's ability to maintain it's calibration. 'This certificate is issued in accordance with the recognised international standard ISO/IEC17025:2017 Fluke Specification Sheet, not dated.
Equipment used	IC001 Fluke 5500A IC474 Fluke 5730A
Comments	Previous UKAS Certificate number : CN315337, Issued by Laboratory : 0143, Dated : 16 March 2021.

Calibration results

Except where stated otherwise, the reported expanded uncertainty is based on a standard uncertainty multiplied by a coverage factor k=2, providing a level of confidence of approximately 95%. The uncertainty evaluation has been carried out in accordance with UKAS requirements.

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DATE OF ISSUE **14 April 2022** CERTIFICATE NUMBER **CN327386**

UKAS CALIBRATION
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1.0 DC VOLTAGE (6½ DIGITS)

	Range	Voltage	Indicated Value
a)	100 mV	.0000000 V	+0.001 4 mV
b)	1 V	.0000000 V	+0.000 001 V
c)	10 V	0.000000 V	0.000 00 V
d)	100 V	0.00000 V	0.000 0 V
e)	1000 V	0.0000 V	0.000 V

Uncertainty : DC Voltage 0.1V to 1V ± (7ppm + 1.0µV + 1LSD)

1.1 DC VOLTAGE LINEARITY (6½ DIGIT)

	Applied Value 1V . Range	Indicated Value +ve	Indicated Value -ve
a)	0.010000 V	0.010 000 V	0.010 000 V
b)	0.100000 V	0.100 000 V	0.099 998 V
c)	0.300000 V	0.300 001 V	0.299 999 V
d)	0.500000 V	0.5.00 001 V	0.499 999 V
e)	0.700000 V	0.700 001 V	0.699 999 V
f)	0.900000 V	0.900 002 V	0.900 000 V
g)	1.100000	1.100 003 V	1.100 001 V

Uncertainty : DC Voltage 0.1V to 1V ± (7ppm + 1.0µV + 1LSD)

1.2 DC VOLTAGE RANGE ACCURACY (6½ DIGIT)

	Range	Applied Value	Indicated Value +ve	Indicated Value -ve
a)	100 mV	0.100 0000 V	99.999 0 mV	100.000 9 mV
b)	1 V	1.0000000 V	1.000 003 V	1.000 001 V
c)	10 V	10.000000 V	10.000 02 V	10.000 01 V
d)	100 V	100.00000 V	100.000 0 V	100.000 2 V
e)	1000 V	1000.0000 V	999.999 V	999.999 V

Uncertainty : DC Voltage 0.1V to 1V ± (7ppm + 1.0µV + 1LSD)
Uncertainty : DC Voltage 1.1V to 11V ± (9ppm + 4 µV + 1 LSD)
Uncertainty : DC Voltage 100 V : 1000 V ± (17 ppm + 1 LSD)

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2.0 A.C VOLTAGE ACCURACY (6½ DIGIT)

	Range	Applied Voltage	Frequency	Indicated Value
a1	100 mV	100.000 mV	60 Hz	99.992 9 mV
a2			1 kHz	99.990 3 mV
a3			10 kHz	99.982 1 mV
a4			20 kHz	99.972 4 mV
a5			100 kHz	100.078 6 mV
b1	1 V	1.00000 V	60 Hz	1.000 018 V
b2			1 kHz	0.999 982 V
b3			10 kHz	0.999 936 V
b4			50 kHz	0.999 940 V
b5			100 kHz	1.001 207 V
c1	10 V	10.0000 V	60 Hz	9.996 47 V
c2			1 kHz	9.996 16 V
c3			10 kHz	9.996 34 V
c4			50 kHz	9.993 30 V
c5			100 kHz	9.983 98 V
d1	100 V	100.000 V	60 Hz	99.971 4 V
d2			1 kHz	99.970 1 V
d3			10 kHz	99.973 4 V
d4			20 kHz	99.971 2 V
e1	750 V	700.00 V	60 Hz	699.792 V
e2			400 Hz	699.761 V
e3			1 kHz	699.795 V

Uncertainty : AC Voltage 1 V to 1000 V ± (0.01 % + 1 LSD)
Uncertainty : AC Voltage 100 mV ±(0.03% + 1LSD)

3.0 A.C CURRENT ACCURACY (6½ DIGIT)

	Range	Applied Current	Frequency	Indicated Value
a1	10 mA	10.000 00 mA	60 Hz	10.000 91 mA
a2			400 Hz	10.000 62 mA
a3			1 kHz	10.000 53 mA
b1	100 mA	100.000 0 mA	60 Hz	100.013 2 mA
b2			400 Hz	100.009 6 mA
b3			1 kHz	100.008 5 mA
c1	400 mA	400.000 0 mA	60 Hz	399.842 mA
c2			400 Hz	399.862 mA
c3			1 kHz	399.878 mA
d1	1 A	1.000 000 A	60 Hz	1.000 295 A
d2			400 Hz	1.000 185 A
d3			1 kHz	1.000 301 A
e1	3 A	3.000 00 A	60 Hz	3.000 61 A
e2			400 Hz	3.000 80 A
e3			1 kHz	3.001 27 A
f1	10 A	10.000 00 A	60 Hz	10.000 94 A
f2			400 Hz	10.001 27 A
f3			1 kHz	10.001 04 A

Uncertainty : AC Current ± (0.03% + 1 LSD)

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4.0 RESISTANCE ACCURACY (6½ DIGIT)

	Range	Applied Value	Indicated Value
a) 4-Wire	100 Ohm	100.000 Ohm	100.001 7 Ohm
b)	1 k ohm	1.00000 k ohm	1.000 009 k ohm
c)	10 k ohm	10.0000 k ohm	10.000 09 k ohm
d)	100 k ohm	100.000 k ohm	100.000 5 k ohm
e)	1 M ohm	1.00000 M ohm	0.999 993 M ohm
f)	10 M ohm	10.0000 M ohm	9.999 17 M ohm
g) 2-Wire #	100 M ohm	100.000 M ohm	99.987 3 M ohm

Calibrations 'Not UKAS Accredited' included for completeness.
Uncertainty : Resistance 1 ohm to 10 Mohm ± (8ppm + 1LSD)

5.0 DC CURRENT ACCURACY (6½ DIGIT)

	Range	Applied Values	Indicated Value +ve	Indicated Value -ve
a	100 µA	100.000 0 µA	100.019 6 µA	100.032 3 µA
b	1 mA	1.000 000 mA	1.000 211 mA	1.000 227 mA
c	10 mA	10.000 00 mA	10.000 81 mA	10.001 63 mA
d	100 mA	100.000 0 mA	99.995 9 mA	100.002 8 mA
e	400 mA	400.000 0 mA	400.010 mA	400.012 mA
f	1 A	1.000 000 A	1.000 420 A	1.000 369 A
g	3 A	3.000 00 A	3.001 06 A	3.000 99 A
h	10 A	10.000 00 A	10.003 86 A	10.003 77 A

Uncertainty : DC Current ± (30 ppm + 1 LSD)

6.0 FREQUENCY ACCURACY

	Applied Value	Indicated Value
a)	10.000 000 Hz	10.000 01 Hz
b)	50.000 000 Hz	49.999 7 Hz
c)	100.000 00 Hz	100.000 1 Hz
d)	1.000 000 0 kHz	1.000 001 kHz
e)	10.000 000 kHz	10.000 01 kHz
f)	100.000 00 kHz	100.000 1 kHz

Uncertainty : Frequency ± 1 Part in 10 (EXP-7)

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UKAS CALIBRATION
0143

Approved signatory

RPatel

Ramesh Patel
Technical Manager (Electrical)

LCM Systems LTD
Unit 15,
Newport Business Park,
Barry Way,
Newport
Isle of Wight
PO30 5GY

Your reference 34711

Our reference WI046546-004

Item	DIGITAL MULTIMETER 8845A
Manufacturer	FLUKE 8845A
Serial number	2595008
Date received	28 March 2022
Date calibrated	14 April 2022
Date of next calibration	14 April 2023
Laboratory environment	'Temperature' :20 °C ± 2 °C Mains Supply : 230V ± 3%, 50 Hz Relative Humidity : 46% ± 15%
Action taken	The instrument was connected to laboratory earth throughout.
Additional information	Adjustments were not required/performed on the instrument 'Final measurement' was performed after a minimum of 24 hours stabilisation in the laboratory. 'The decision rule used for this calibration is based on a simple acceptance/shared risk as defined in JCGM 106 section 8.2, where the uncertainty is less than or equal to the specified tolerance. 'The equipment was found to comply with the manufacturers specification at the points measured. 'The results/uncertainty' limits quoted refer to the measured values only, with no account being taken of the instrument's ability to maintain it's calibration. 'This certificate is issued in accordance with the recognised international standard ISO/IEC17025:2017 Fluke Specification Sheet, not dated.
Equipment used	IC001 Fluke 5500A IC474 Fluke 5730A
Comments	Previous UKAS Certificate number : CN315336, Issued by Laboratory : 0143, Dated : 16 March 2021.

Calibration results

Except where stated otherwise, the reported expanded uncertainty is based on a standard uncertainty multiplied by a coverage factor k=2, providing a level of confidence of approximately 95%. The uncertainty evaluation has been carried out in accordance with UKAS requirements.

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UKAS CALIBRATION
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1.0 DC VOLTAGE (6½ DIGITS)

	Range	Voltage	Indicated Value
a)	100 mV	.0000000 V	+0.001 5 mV
b)	1 V	.0000000 V	+0.000 002 V
c)	10 V	0.000000 V	0.000 00 V
d)	100 V	0.00000 V	-0.000 1 V
e)	1000 V	0.0000 V	0.000 V

Uncertainty : DC Voltage 0.1V to 1V ± (7ppm + 1.0µV + 1LSD)

1.1 DC VOLTAGE LINEARITY (6½ DIGIT)

	Applied Value 1V . Range	Indicated Value +ve	Indicated Value -ve
a)	0.010000 V	0.009 999 V	0.010 000 V
b)	0.100000 V	0.099 998 V	0.099 999 V
c)	0.300000 V	0.299 997 V	0.299 999 V
d)	0.500000 V	0.499 996 V	0.499 999 V
e)	0.700000 V	0.699 995 V	0.700 000 V
f)	0.900000 V	0.899 994 V	0.900 000 V
g)	1.100000	1.099 995 V	1.100 001 V

Uncertainty : DC Voltage 0.1V to 1V ± (7ppm + 1.0µV + 1LSD)

1.2 DC VOLTAGE RANGE ACCURACY (6½ DIGIT)

	Range	Applied Value	Indicated Value +ve	Indicated Value -ve
a)	100 mV	0.100 0000 V	99.998 9 mV	100.001 3 mV
b)	1 V	1.0000000 V	0.999 994 V	1.000 001 V
c)	10 V	10.000000 V	9.999 99 V	10.000 01 V
d)	100 V	100.00000 V	99.999 7 V	100.000 3 V
e)	1000 V	1000.0000 V	999.999 V	999.999 V

Uncertainty : DC Voltage 0.1V to 1V ± (7ppm + 1.0µV + 1LSD)
Uncertainty : DC Voltage 1.1V to 11V ± (9ppm + 4 µV + 1 LSD)
Uncertainty : DC Voltage 100 V : 1000 V ± (17 ppm + 1 LSD)

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UKAS CALIBRATION
0143

2.0 A.C VOLTAGE ACCURACY (6½ DIGIT)

	Range	Applied Voltage	Frequency	Indicated Value
a1	100 mV	100.000 mV	60 Hz	99.992 3 mV
a2			1 kHz	99.995 1 mV
a3			10 kHz	99.987 3 mV
a4			20 kHz	99.978 9 mV
a5			100 kHz	100.141 7 mV
b1	1 V	1.00000 V	60 Hz	0.999 998 V
b2			1 kHz	0.999 982 V
b3			10 kHz	0.999 934 V
b4			50 kHz	1.000 063 V
b5			100 kHz	1.001 798 V
c1	10 V	10.0000 V	60 Hz	9.993 83 V
c2			1 kHz	9.994 21 V
c3			10 kHz	9.994 46 V
c4			50 kHz	9.995 14 V
c5			100 kHz	10.000 44 V
d1	100 V	100.000 V	60 Hz	99.944 3 V
d2			1 kHz	99.946 8 V
d3			10 kHz	99.952 1 V
d4			20 kHz	99.953 9 V
e1	750 V	700.00 V	60 Hz	699.600 V
e2			400 Hz	699.598 V
e3			1 kHz	699.619 V

Uncertainty : AC Voltage 1 V to 1000 V ± (0.01 % + 1 LSD)
Uncertainty : AC Voltage 100 mV ±(0.03% + 1LSD)

3.0 A.C CURRENT ACCURACY (6½ DIGIT)

	Range	Applied Current	Frequency	Indicated Value
a1	10 mA	10.000 00 mA	60 Hz	9.994 35 mA
a2			400 Hz	9.999 99 mA
a3			1 kHz	10.000 07 mA
b1	100 mA	100.000 0 mA	60 Hz	99.943 8 mA
b2			400 Hz	100.001 1 mA
b3			1 kHz	100.001 6 mA
c1	400 mA	400.000 0 mA	60 Hz	399.509 mA
c2			400 Hz	399.730 mA
c3			1 kHz	399.764 mA
d1	1 A	1.000 000 A	60 Hz	1.000 435 A
d2			400 Hz	1.000 378 A
d3			1 kHz	1.000 517 A
e1	3 A	3.000 00 A	60 Hz	3.000 88 A
e2			400 Hz	3.001 26 A
e3			1 kHz	3.001 78 A
f1	10 A	10.000 00 A	60 Hz	10.002 29 A
f2			400 Hz	10.003 66 A
f3			1 kHz	10.004 24 A

Uncertainty : AC Current ± (0.03% + 1 LSD)

CERTIFICATE OF CALIBRATION

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DATE OF ISSUE **14 April 2022** CERTIFICATE NUMBER **CN327387**

UKAS CALIBRATION
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4.0 RESISTANCE ACCURACY (6½ DIGIT)

	Range	Applied Value	Indicated Value
a) 4-Wire	100 Ohm	100.000 Ohm	99.996 7 Ohm
b)	1 k ohm	1.00000 k ohm	0.999 958 k ohm
c)	10 k ohm	10.0000 k ohm	9.999 63 k ohm
d)	100 k ohm	100.000 k ohm	99.998 0 k ohm
e)	1 M ohm	1.00000 M ohm	0.999 975 M ohm
f)	10 M ohm	10.0000 M ohm	9.998 38 M ohm
g) 2-Wire #	100 M ohm	100.000 M ohm	99.905 9 M ohm

Calibrations 'Not UKAS Accredited' included for completeness.
Uncertainty : Resistance 1 ohm to 10 Mohm ± (8ppm + 1LSD)

5.0 DC CURRENT ACCURACY (6½ DIGIT)

	Range	Applied Values	Indicated Value +ve	Indicated Value -ve
a	100 µA	100.000 0 µA	100.006 6 µA	100.005 5 µA
b	1 mA	1.000 000 mA	1.000 030 mA	1.000 034 mA
c	10 mA	10.000 00 mA	10.000 74 mA	10.000 99 mA
d	100 mA	100.000 0 mA	100.003 5 mA	100.003 7 mA
e	400 mA	400.000 0 mA	400.021 mA	400.008 mA
f	1 A	1.000 000 A	1.000 545 A	1.000 567 A
g	3 A	3.000 00 A	3.001 48 A	3.001 44 A
h	10 A	10.000 00 A	10.006 39 A	10.005 71 A

Uncertainty : DC Current ± (30 ppm + 1 LSD)

6.0 FREQUENCY ACCURACY

	Applied Value	Indicated Value
a)	10.000 000 Hz	10.000 06 Hz
b)	50.000 000 Hz	50.000 2 Hz
c)	100.000 00 Hz	100.000 6 Hz
d)	1.000 000 0 kHz	1.000 006 kHz
e)	10.000 000 kHz	10.000 06 kHz
f)	100.000 00 kHz	100.000 6 kHz

Uncertainty : Frequency ± 1 Part in 10 (EXP-7)

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DATE OF ISSUE **16 June 2022** CERTIFICATE NUMBER **CN329105**

UKAS CALIBRATION
0143

Approved signatory

RPatel

Ramesh Patel
Technical Manager (Electrical)

LCM Systems LTD
Unit 15,
Newport Business Park,
Barry Way,
Newport
Isle of Wight
PO30 5GY

Your reference 34817

Our reference WI046775-005

Item	PRECISION DIGITAL MULTIMETER 8845A
Manufacturer	FLUKE 8845A
Serial number	2596006
Date received	10 May 2022
Date calibrated	16 June 2022
Date of next calibration	16 June 2023
Laboratory environment	'Temperature' :20 °C ± 2 °C Mains Supply : 230V ± 3%, 50 Hz Relative Humidity : 49% ± 15%
Action taken	The instrument was connected to laboratory earth throughout.
Additional information	Adjustments were not required/performed on the instrument 'Final measurement' was performed after a minimum of 24 hours stabilisation in the laboratory. 'The decision rule used for this calibration is based on a simple acceptance/shared risk as defined in JCGM 106 section 8.2, where the uncertainty is less than or equal to the specified tolerance. 'The equipment was found to comply with the manufacturers specification at the points measured. 'The results/uncertainty' limits quoted refer to the measured values only, with no account being taken of the instrument's ability to maintain it's calibration. 'This certificate is issued in accordance with the recognised international standard ISO/IEC17025:2017 Fluke literature, not dated.
Equipment used	IC001 Fluke 5500A IC474 Fluke 5730A
Comments	Previous UKAS Certificate number : CN315920, Issued by Laboratory : 0143, Dated : 07 April 2021.

Calibration results

Except where stated otherwise, the reported expanded uncertainty is based on a standard uncertainty multiplied by a coverage factor k=2, providing a level of confidence of approximately 95%. The uncertainty evaluation has been carried out in accordance with UKAS requirements.

CERTIFICATE OF CALIBRATION

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DATE OF ISSUE **16 June 2022** CERTIFICATE NUMBER **CN329105**

UKAS CALIBRATION
0143

1.0 DC VOLTAGE (6½ DIGITS)

	Range	Voltage	Indicated Value
a)	100 mV	.0000000 V	+0.000 9 mV
b)	1 V	.0000000 V	+0.000 003 V
c)	10 V	0.000000 V	0.000 00 V
d)	100 V	0.00000 V	+0.000 1 V
e)	1000 V	0.0000 V	0.000 V

Uncertainty : DC Voltage 0.1V to 1V ± (7ppm + 1.0µV + 1LSD)

1.1 DC VOLTAGE LINEARITY (6½ DIGIT)

	Applied Value 1V . Range	Indicated Value +ve	Indicated Value -ve
a)	0.010000 V	0.010 000 V	0.009 999 V
b)	0.100000 V	0.099 999 V	0.099 999 V
c)	0.300000 V	0.299 999 V	0.299 999 V
d)	0.500000 V	0.499 998 V	0.499 999 V
e)	0.700000 V	0.699 997 V	0.699 999 V
f)	0.900000 V	0.899 997 V	0.900 000 V
g)	1.100000	1.099 997 V	1.100 000 V

Uncertainty : DC Voltage 0.1V to 1V ± (7ppm + 1.0µV + 1LSD)

1.2 DC VOLTAGE RANGE ACCURACY (6½ DIGIT)

	Range	Applied Value	Indicated Value +ve	Indicated Value -ve
a)	100 mV	0.100 0000 V	99.999 6 mV	100.000 8 mV
b)	1 V	1.0000000 V	0.999 997 V	1.000 000 V
c)	10 V	10.000000 V	9.999 99 V	10.000 02 V
d)	100 V	100.00000 V	100.000 3 V	100.000 0 V
e)	1000 V	1000.0000 V	999.998 V	999.998 V

Uncertainty : DC Voltage 0.1V to 1V ± (7ppm + 1.0µV + 1LSD)
Uncertainty : DC Voltage 1.1V to 11V ± (9ppm + 4 µV + 1 LSD)
Uncertainty : DC Voltage 100 V : 1000 V ± (17 ppm + 1 LSD)

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DATE OF ISSUE **16 June 2022** CERTIFICATE NUMBER **CN329105**

UKAS CALIBRATION
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2.0 A.C VOLTAGE ACCURACY (6½ DIGIT)

	Range	Applied Voltage	Frequency	Indicated Value
a1	100 mV	100.000 mV	60 Hz	99.992 1 mV
a2			1 kHz	99.993 5 mV
a3			10 kHz	99.986 6 mV
a4			20 kHz	99.982 0 mV
a5			100 kHz	100.254 8 mV
b1	1 V	1.00000 V	60 Hz	0.999 924 V
b2			1 kHz	0.999 341 V
b3			10 kHz	0.999 889 V
b4			50 kHz	0.999 759 V
b5			100 kHz	1.000 704 V
c1	10 V	10.0000 V	60 Hz	9.993 05 V
c2			1 kHz	9.993 16 V
c3			10 kHz	9.93 24 V
c4			50 kHz	9.992 02 V
c5			100 kHz	9.99602 V
d1	100 V	100.000 V	60 Hz	99.93 13 V
d2			1 kHz	99.9334 V
d3			10 kHz	99.937 5 V
d4			20 kHz	99.938 1 V
e1	750 V	700.00 V	60 Hz	699.484 V
e2			400 Hz	699.515 V
e3			1 kHz	699.530 V

Uncertainty : AC Voltage 1 V to 1000 V ± (0.01 % + 1 LSD)
Uncertainty : AC Voltage 100 mV ±(0.03% + 1LSD)

3.0 A.C CURRENT ACCURACY (6½ DIGIT)

	Range	Applied Current	Frequency	Indicated Value
a1	10 mA	10.000 00 mA	60 Hz	9.999 48 mA
a2			400 Hz	9.999 59 mA
a3			1 kHz	9.999 43 mA
b1	100 mA	100.000 0 mA	60 Hz	99.992 1 mA
b2			400 Hz	99.994 0 mA
b3			1 kHz	99.993 0 mA
c1	400 mA	400.000 0 mA	60 Hz	399.658 mA
c2			400 Hz	399.654 mA
c3			1 kHz	399.675 mA
d1	1 A	1.000 000 A	60 Hz	1.000 508 A
d2			400 Hz	1.000 498 A
d3			1 kHz	1.000 524 A
e1	3 A	3.000 00 A	60 Hz	3.001 96 A
e2			400 Hz	3.002 19 A
e3			1 kHz	3.002 38 A
f1	10 A	10.000 00 A	60 Hz	10.004 14 A
f2			400 Hz	10.005 13 A
f3			1 kHz	10.005 46 A

Uncertainty : AC Current ± (0.03% + 1 LSD)

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DATE OF ISSUE **16 June 2022** CERTIFICATE NUMBER **CN329105**

UKAS CALIBRATION
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4.0 RESISTANCE ACCURACY (6½ DIGIT)

	Range	Applied Value	Indicated Value
a) 4-Wire	100 Ohm	100.000 Ohm	99.997 6 Ohm
b)	1 k ohm	1.00000 k ohm	0.999 993 k ohm
c)	10 k ohm	10.0000 k ohm	9.999 84 k ohm
d)	100 k ohm	100.000 k ohm	99.999 0 k ohm
e)	1 M ohm	1.00000 M ohm	0.999 981 M ohm
f)	10 M ohm	10.0000 M ohm	9.999 16 M ohm
g) 2-Wire #	100 M ohm	100.000 M ohm	99.947 6 M ohm

Calibrations 'Not UKAS Accredited' included for completeness.
Uncertainty : Resistance 1 ohm to 10 Mohm ± (8ppm + 1LSD)

5.0 DC CURRENT ACCURACY (6½ DIGIT)

	Range	Applied Values	Indicated Value +ve	Indicated Value -ve
a	100 µA	100.000 0 µA	100.004 2 µA	100.002 9 µA
b	1 mA	1.000 000 mA	1.000 037 mA	1.000 051 mA
c	10 mA	10.000 00 mA	9.9992 5 mA	10.000 30 mA
d	100 mA	100.000 0 mA	99.993 8 mA	99.994 8 mA
e	400 mA	400.000 0 mA	399.977 mA	399.975 mA
f	1 A	1.000 000 A	1.000 508 A	1.000 394 A
g	3 A	3.000 00 A	3.001 71 A	3.002 03 A
h	10 A	10.000 00 A	10.005 36 A	10.005 93 A

Uncertainty : DC Current ± (30 ppm + 1 LSD)

6.0 FREQUENCY ACCURACY

	Applied Value	Indicated Value
a)	10.000 000 Hz	10.000 07 Hz
b)	50.000 000 Hz	50.000 3 Hz
c)	100.000 00 Hz	100.000 7 Hz
d)	1.000 000 0 kHz	1.000 007 kHz
e)	10.000 000 kHz	10.000 07 kHz
f)	100.000 00 kHz	100.000 7 kHz

Uncertainty : Frequency ± 1 Part in 10 (EXP-7)

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DATE OF ISSUE **16 June 2022** CERTIFICATE NUMBER **CN329106**

UKAS CALIBRATION
0143

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PO30 5GY

Your reference 34817

Approved signatory

RPatel

Ramesh Patel
Technical Manager (Electrical)

Our reference WI046775-006

Item	PRECISION DIGITAL MULTIMETER 8845A
Manufacturer	FLUKE 8845A
Serial number	2596009
Date received	10 May 2022
Date calibrated	16 June 2022
Date of next calibration	16 June 2023
Laboratory environment	'Temperature' :20 °C ± 2 °C Mains Supply : 230V ± 3%, 50 Hz Relative Humidity : 49% ± 15%
Action taken	The instrument was connected to laboratory earth throughout.
Additional information	Adjustments were not required/performed on the instrument 'Final measurement' was performed after a minimum of 24 hours stabilisation in the laboratory. 'The decision rule used for this calibration is based on a simple acceptance/shared risk as defined in JCGM 106 section 8.2, where the uncertainty is less than or equal to the specified tolerance. 'The equipment was found to comply with the manufacturers specification at the points measured. 'The results/uncertainty' limits quoted refer to the measured values only, with no account being taken of the instrument's ability to maintain it's calibration. 'This certificate is issued in accordance with the recognised international standard ISO/IEC17025:2017 Fluke literature, not dated.
Equipment used	IC001 Fluke 5500A IC474 Fluke 5730A
Comments	Previous UKAS Certificate number : CN315921, Issued by Laboratory : 0143, Dated : 07 April 2021.

Calibration results

Except where stated otherwise, the reported expanded uncertainty is based on a standard uncertainty multiplied by a coverage factor k=2, providing a level of confidence of approximately 95%. The uncertainty evaluation has been carried out in accordance with UKAS requirements.

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DATE OF ISSUE **16 June 2022** CERTIFICATE NUMBER **CN329106**

UKAS CALIBRATION
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1.0 DC VOLTAGE (6½ DIGITS)

	Range	Voltage	Indicated Value
a)	100 mV	.0000000 V	+0.002 0 mV
b)	1 V	.0000000 V	+0.000 002 V
c)	10 V	0.000000 V	0.000 00 V
d)	100 V	0.00000 V	+0.000 1 V
e)	1000 V	0.0000 V	0.000 V

Uncertainty : DC Voltage 0.1V to 1V ± (7ppm + 1.0µV + 1LSD)

1.1 DC VOLTAGE LINEARITY (6½ DIGIT)

	Applied Value 1V . Range	Indicated Value +ve	Indicated Value -ve
a)	0.010000 V	0.010 000 V	0.010 000 V
b)	0.100000 V	0.100 001 V	0.100 000 V
c)	0.300000 V	0.300 003 V	0.300 002 V
d)	0.500000 V	0.500 005 V	0.500 003 V
e)	0.700000 V	0.700 007 V	0.700 004 V
f)	0.900000 V	0.900 009 V	0.900 006 V
g)	1.100000	1.100 011 V	1.100 008 V

Uncertainty : DC Voltage 0.1V to 1V ± (7ppm + 1.0µV + 1LSD)

1.2 DC VOLTAGE RANGE ACCURACY (6½ DIGIT)

	Range	Applied Value	Indicated Value +ve	Indicated Value -ve
a)	100 mV	0.100 0000 V	99.999 6 mV	100.001 0 mV
b)	1 V	1.0000000 V	1.000 010 V	1.000 007 V
c)	10 V	10.000000 V	10.000 06 V	10.000 03 V
d)	100 V	100.00000 V	100.000 6 V	100.000 1 V
e)	1000 V	1000.0000 V	1 000.001 V	1 000.001 V

Uncertainty : DC Voltage 0.1V to 1V ± (7ppm + 1.0µV + 1LSD)
Uncertainty : DC Voltage 1.1V to 11V ± (9ppm + 4 µV + 1 LSD)
Uncertainty : DC Voltage 100 V : 1000 V ± (17 ppm + 1 LSD)

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2.0 A.C VOLTAGE ACCURACY (6½ DIGIT)

	Range	Applied Voltage	Frequency	Indicated Value
a1	100 mV	100.000 mV	60 Hz	99.976 2 mV
a2			1 kHz	99.977 5 mV
a3			10 kHz	99.969 9 mV
a4			20 kHz	99.960 4 mV
a5			100 kHz	100.085 5 mV
b1	1 V	1.00000 V	60 Hz	0.999 869 V
b2			1 kHz	0.999 895 V
b3			10 kHz	0.999 848 V
b4			50 kHz	0.999 891 V
b5			100 kHz	1.001 274 V
c1	10 V	10.0000 V	60 Hz	9.993 68 V
c2			1 kHz	9.993 93 V
c3			10 kHz	9.994 08 V
c4			50 kHz	9.995 27 V
c5			100 kHz	9.990 23 V
d1	100 V	100.000 V	60 Hz	99.934 9 V
d2			1 kHz	99.935 8 V
d3			10 kHz	99.936 4 V
d4			20 kHz	99.930 1 V
e1	750 V	700.00 V	60 Hz	699.626 V
e2			400 Hz	699.673 V
e3			1 kHz	699.980 V

Uncertainty : AC Voltage 1 V to 1000 V ± (0.01 % + 1 LSD)
Uncertainty : AC Voltage 100 mV ±(0.03% + 1LSD)

3.0 A.C CURRENT ACCURACY (6½ DIGIT)

	Range	Applied Current	Frequency	Indicated Value
a1	10 mA	10.000 00 mA	60 Hz	9.999 84 mA
a2			400 Hz	10.000 17 mA
a3			1 kHz	10.000 39 mA
b1	100 mA	100.000 0 mA	60 Hz	100.000 5 mA
b2			400 Hz	100.007 1 mA
b3			1 kHz	100.009 1 mA
c1	400 mA	400.000 0 mA	60 Hz	399.795 mA
c2			400 Hz	399.819 mA
c3			1 kHz	399.846 mA
d1	1 A	1.000 000 A	60 Hz	1.000 137 A
d2			400 Hz	1.000 105 A
d3			1 kHz	1.000 193 A
e1	3 A	3.000 00 A	60 Hz	3.001 07 A
e2			400 Hz	3.001 22 A
e3			1 kHz	3.001 61 A
f1	10 A	10.000 00 A	60 Hz	10.002 86 A
f2			400 Hz	10.002 67 A
f3			1 kHz	10.002 29 A

Uncertainty : AC Current ± (0.03% + 1 LSD)

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UKAS CALIBRATION
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4.0 RESISTANCE ACCURACY (6½ DIGIT)

	Range	Applied Value	Indicated Value
a) 4-Wire	100 Ohm	100.000 Ohm	99.992 7 Ohm
b)	1 k ohm	1.00000 k ohm	0.999 906 k ohm
c)	10 k ohm	10.0000 k ohm	9.999 05 k ohm
d)	100 k ohm	100.000 k ohm	99.993 5 k ohm
e)	1 M ohm	1.00000 M ohm	0.999 937 M ohm
f)	10 M ohm	10.0000 M ohm	9.998 65 M ohm
g) 2-Wire #	100 M ohm	100.000 M ohm	99.728 3 M ohm

Calibrations 'Not UKAS Accredited' included for completeness.
Uncertainty : Resistance 1 ohm to 10 Mohm ± (8ppm + 1LSD)

5.0 DC CURRENT ACCURACY (6½ DIGIT)

	Range	Applied Values	Indicated Value +ve	Indicated Value -ve
a	100 µA	100.000 0 µA	100.000 3 µA	100.000 8 µA
b	1 mA	1.000 000 mA	1.000 021 mA	1.000 049 mA
c	10 mA	10.000 00 mA	9.999 79 mA	10.000 13 mA
d	100 mA	100.000 0 mA	99.996 4 mA	99.999 2 mA
e	400 mA	400.000 0 mA	399.992 mA	400.019 mA
f	1 A	1.000 000 A	1.000 088 A	1.000 127 A
g	3 A	3.000 00 A	3.000 63 A	3.000 71 A
h	10 A	10.000 00 A	10.002 17 A	10.002 59 A

Uncertainty : DC Current ± (30 ppm + 1 LSD)

6.0 FREQUENCY ACCURACY

	Applied Value	Indicated Value
a)	10.000 000 Hz	10.000 07 Hz
b)	50.000 000 Hz	50.000 4 Hz
c)	100.000 00 Hz	100.000 7 Hz
d)	1.000 000 0 kHz	1.000 007 kHz
e)	10.000 000 kHz	10.000 07 kHz
f)	100.000 00 kHz	100.000 7 kHz

Uncertainty : Frequency ± 1 Part in 10 (EXP-7)

CERTIFICATE OF CALIBRATION

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DATE OF ISSUE **16 June 2022** CERTIFICATE NUMBER **CN329107**

UKAS CALIBRATION
0143

Approved signatory

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Technical Manager (Electrical)

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Barry Way,
Newport
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PO30 5GY

Your reference 34817

Our reference WI046775-007

Item	PRECISION DIGITAL MULTIMETER 8845A
Manufacturer	FLUKE 8845A
Serial number	2594012
Date received	10 May 2022
Date calibrated	16 June 2022
Date of next calibration	16 June 2023
Laboratory environment	'Temperature' :20 °C ± 2 °C Mains Supply : 230V ± 3%, 50 Hz Relative Humidity : 49% ± 15%
Action taken	The instrument was connected to laboratory earth throughout.
Additional information	Adjustments were not required/performed on the instrument 'Final measurement' was performed after a minimum of 24 hours stabilisation in the laboratory. 'The decision rule used for this calibration is based on a simple acceptance/shared risk as defined in JCGM 106 section 8.2, where the uncertainty is less than or equal to the specified tolerance. 'The equipment was found to comply with the manufacturers specification at the points measured. 'The results/uncertainty' limits quoted refer to the measured values only, with no account being taken of the instrument's ability to maintain it's calibration. 'This certificate is issued in accordance with the recognised international standard ISO/IEC17025:2017 Fluke literature, not dated.
Equipment used	IC001 Fluke 5500A IC474 Fluke 5730A
Comments	Previous UKAS Certificate number : CN315922, Issued by Laboratory : 0143, Dated : 07 April 2021.

Calibration results

Except where stated otherwise, the reported expanded uncertainty is based on a standard uncertainty multiplied by a coverage factor k=2, providing a level of confidence of approximately 95%. The uncertainty evaluation has been carried out in accordance with UKAS requirements.

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DATE OF ISSUE **16 June 2022** CERTIFICATE NUMBER **CN329107**

UKAS CALIBRATION
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1.0 DC VOLTAGE (6½ DIGITS)

	Range	Voltage	Indicated Value
a)	100 mV	.0000000 V	+0.000 3 mV
b)	1 V	.0000000 V	+0.000 001 V
c)	10 V	0.000000 V	0.000 00 V
d)	100 V	0.00000 V	-0.000 1 V
e)	1000 V	0.0000 V	0.000 V

Uncertainty : DC Voltage 0.1V to 1V ± (7ppm + 1.0µV + 1LSD)

1.1 DC VOLTAGE LINEARITY (6½ DIGIT)

	Applied Value 1V . Range	Indicated Value +ve	Indicated Value -ve
a)	0.010000 V	0.010 000 V	0.010 000 V
b)	0.100000 V	0.099 999 V	0.099 999 V
c)	0.300000 V	0.299 998 V	0.299 997 V
d)	0.500000 V	0.499 997 V	0.499 997 V
e)	0.700000 V	0.699 996 V	0.699 996 V
f)	0.900000 V	0.899 996 V	0.899 996 V
g)	1.100000	1.099 995 V	1.099 996 V

Uncertainty : DC Voltage 0.1V to 1V ± (7ppm + 1.0µV + 1LSD)

1.2 DC VOLTAGE RANGE ACCURACY (6½ DIGIT)

	Range	Applied Value	Indicated Value +ve	Indicated Value -ve
a)	100 mV	0.100 0000 V	100.000 5 mV	99.999 7 mV
b)	1 V	1.0000000 V	0.999 995 V	0.999 996 V
c)	10 V	10.000000 V	10.000 09 V	10.000 07 V
d)	100 V	100.00000 V	100.000 4 V	100.000 8 V
e)	1000 V	1000.0000 V	1 000.004 V	1 000.005 V

Uncertainty : DC Voltage 0.1V to 1V ± (7ppm + 1.0µV + 1LSD)
Uncertainty : DC Voltage 1.1V to 11V ± (9ppm + 4 µV + 1 LSD)
Uncertainty : DC Voltage 100 V : 1000 V ± (17 ppm + 1 LSD)

CERTIFICATE OF CALIBRATION

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DATE OF ISSUE **16 June 2022** CERTIFICATE NUMBER **CN329107**

UKAS CALIBRATION
0143

2.0 A.C VOLTAGE ACCURACY (6½ DIGIT)

	Range	Applied Voltage	Frequency	Indicated Value
a1	100 mV	100.000 mV	60 Hz	99.998 7 mV
a2			1 kHz	99.995 9 mV
a3			10 kHz	99.988 1 mV
a4			20 kHz	99.980 0 mV
a5			100 kHz	100.112 7 mV
b1	1 V	1.00000 V	60 Hz	1.000 010 V
b2			1 kHz	0.999 978 V
b3			10 kHz	0.999 3 7 V
b4			50 kHz	1.000 012 V
b5			100 kHz	1.001 433 V
c1	10 V	10.0000 V	60 Hz	9.996 13 V
c2			1 kHz	9.996 03 V
c3			10 kHz	9.995 97 V
c4			50 kHz	9.991 95 V
c5			100 kHz	9.980 88 V
d1	100 V	100.000 V	60 Hz	99.964 1 V
d2			1 kHz	99.963 3 V
d3			10 kHz	99.96 59 V
d4			20 kHz	99.963 5 V
e1	750 V	700.00 V	60 Hz	699.727 V
e2			400 Hz	699.718 V
e3			1 kHz	699.741 V

Uncertainty : AC Voltage 1 V to 1000 V ± (0.01 % + 1 LSD)
Uncertainty : AC Voltage 100 mV ±(0.03% + 1LSD)

3.0 A.C CURRENT ACCURACY (6½ DIGIT)

	Range	Applied Current	Frequency	Indicated Value
a1	10 mA	10.000 00 mA	60 Hz	10.000 51 mA
a2			400 Hz	10.000 16 mA
a3			1 kHz	9.999 95 mA
b1	100 mA	100.000 0 mA	60 Hz	100.003 7 mA
b2			400 Hz	100.000 9 mA
b3			1 kHz	100.000 5 mA
c1	400 mA	400.000 0 mA	60 Hz	399.797 mA
c2			400 Hz	399.786 mA
c3			1 kHz	399.859 mA
d1	1 A	1.000 000 A	60 Hz	1.000 192 A
d2			400 Hz	1.000 179 A
d3			1 kHz	1.000 199 A
e1	3 A	3.000 00 A	60 Hz	3.000 52 A
e2			400 Hz	3.000 74 A
e3			1 kHz	3.000 95 A
f1	10 A	10.000 00 A	60 Hz	10.002 76 A
f2			400 Hz	10.002 37 A
f3			1 kHz	10.002 20 A

Uncertainty : AC Current ± (0.03% + 1 LSD)

CERTIFICATE OF CALIBRATION

ISSUED BY **Calmet Laboratory Services**
A division of Lazgill Ltd
11b Upper Teddington Road, Hampton Wick, Kingston, Surrey KT1 4DL
Telephone: 020 8977 8455 Facsimile: 020 8614 8048

DATE OF ISSUE **16 June 2022** CERTIFICATE NUMBER **CN329107**

UKAS CALIBRATION
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4.0 RESISTANCE ACCURACY (6½ DIGIT)

	Range	Applied Value	Indicated Value
a) 4-Wire	100 Ohm	100.000 Ohm	99.995 9 Ohm
b)	1 k ohm	1.00000 k ohm	0.999 981 k ohm
c)	10 k ohm	10.0000 k ohm	9.999 69 k ohm
d)	100 k ohm	100.000 k ohm	99.998 3 k ohm
e)	1 M ohm	1.00000 M ohm	0.999 979 M ohm
f)	10 M ohm	10.0000 M ohm	9.999 20 M ohm
g) 2-Wire #	100 M ohm	100.000 M ohm	99.935 7 M ohm

Calibrations 'Not UKAS Accredited' included for completeness.
Uncertainty : Resistance 1 ohm to 10 Mohm ± (8ppm + 1LSD)

5.0 DC CURRENT ACCURACY (6½ DIGIT)

	Range	Applied Values	Indicated Value +ve	Indicated Value -ve
a	100 µA	100.000 0 µA	100.008 2 µA	100.009 5 µA
b	1 mA	1.000 000 mA	1.000 071 mA	1.000 086 mA
c	10 mA	10.000 00 mA	10.000 18 mA	10.000 33 mA
d	100 mA	100.000 0 mA	99.999 1 mA	99.999 6 mA
e	400 mA	400.000 0 mA	399.992 mA	399.999 mA
f	1 A	1.000 000 A	1.000 218 A	1.000 241 A
g	3 A	3.000 00 A	3.000 46 A	3.000 53 A
h	10 A	10.000 00 A	10.003 26 A	10.003 49 A

Uncertainty : DC Current ± (30 ppm + 1 LSD)

6.0 FREQUENCY ACCURACY

	Applied Value	Indicated Value
a)	10.000 000 Hz	10.000 06 Hz
b)	50.000 000 Hz	50.000 3 Hz
c)	100.000 00 Hz	100.000 6 Hz
d)	1.000 000 0 kHz	1.000 006 kHz
e)	10.000 000 kHz	10.000 06 kHz
f)	100.000 00 kHz	100.000 6 kHz

Uncertainty : Frequency ± 1 Part in 10 (EXP-7)

CERTIFICATE OF CALIBRATION

ISSUED BY: DM Systems and Test limited

DATE OF ISSUE 30 June 2022 Certificate Number: 99065

UKAS CALIBRATION

8211

d+m systems and test

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STEVEN PEARCE

APPROVED SIGNATORY

ELECTRONICALLY AUTHORISED DOCUMENT

Customer	**LCM SYSTEMS LTD** **UNIT 15, NEWPORT BUSINESS PARK** **BARRY WAY** **NEWPORT** **ISLE OF WIGHT** **PO30 5GY**
On Behalf Of	
Customer Order No.	**35259**
Customer Ident/Asset No.	
Manufacturer	**FLUKE**
Type	**8845A**
Equipment Description	**PRECISION DIGITAL MULTIMETER**
Serial Number	**2596001**
Date of Receipt	**28 June 2022**
Date of Calibration	**30 June 2022**
Date of Next Calibration	**30 June 2023**

DM Systems and Test Limited is accredited in accordance with the recognised International Standard ISO/IEC 17025. This accreditation demonstrates technical competence for a defined scope and the operation of a laboratory management system (refer joint ISO-ILAC-IAF communiqué dated April 2017). The calibration of all test equipment and standards referenced comply with ISO 17025 and are traceable to National or International Standards. The instrument reported on this certificate has been calibrated in accordance with the specification stipulated in the contract, order or with the following calibration values. The results were recorded on the stated date and do not reflect the stability or the long term performance of the instrument.

Instrument Status:

1. The instrument was calibrated.
2. No adjustments were made.
3. The instrument was compliant with the reported specification at the measured points.
4. The calibration values are shown on the following page(s).

The instrument was safety tested in accordance with HSG 107.

The ambient conditions at the time of calibration:

Temperature 23 °C ± 3 °C
Relative Humidity 20 %rh to 60 %rh

DM 039/5

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The measured results are only applicable to the unit under test and were obtained using methods detailed in the following procedures: CP010, CP016.

The unit under test was switched on and allowed to stabilise in the Laboratory environment, prior to calibration, for a minimum of 4 hours.

Specification source: Manufacturer's Calibration Manual 8845A/8846A, January 2007, Rev.1, 11/07
The decision rule used for this calibration is based on a simple acceptance/shared risk as defined in JCGM 106 section 8.2, where the uncertainty is less than or equal to the specified tolerance.

The uncertainty quoted refers only to the measured value and does not carry any implication regarding the stability of the unit under test. Values do not include unit under test resolution for which an allowance of ½ least significant digit displayed should be made.

CERTIFICATE OF CALIBRATION

UKAS ACCREDITED CALIBRATION LABORATORY N0. 8211

1. DC VOLTAGE

APPLIED DC VOLTAGE	INSTRUMENT INDICATION Positive	Negative	SPECIFICATION	UNCERTAINTY OF MEASUREMENT
	100 millivolt range			
(± millivolt)	(millivolt)	(millivolt)	(± %)	(± %)
100.00000	100.0060	99.9946	0.0085	0.0021
	1 volt range			
(± volt)	(volt)	(volt)	(± %)	(± %)
1.0000000	1.000008	0.999991	0.0047	0.0015
	10 volt range			
(± volt)	(volt)	(volt)	(± %)	(± %)
2.000000	2.00000	1.99999	0.0060	0.0006
3.000000	3.00001	2.99999	0.0052	0.0006
4.000000	4.00001	3.99999	0.0048	0.0006
5.000000	5.00001	4.99998	0.0045	0.0006
6.000000	6.00002	5.99998	0.0043	0.0006
7.000000	7.00002	6.99997	0.0042	0.0006
8.000000	8.00003	7.99997	0.0041	0.0006
9.000000	9.00003	8.99996	0.0041	0.0006
10.000000	10.00003	9.99996	0.0040	0.0006
	100 volt range			
(± volt)	(volt)	(volt)	(± %)	(± %)
100.00000	99.9993	99.9993	0.0051	0.0011
	1000 volt range			
(± volt)	(volt)	(volt)	(± %)	(± %)
1000.0000	999.989	999.987	0.0055	0.0021

CERTIFICATE OF CALIBRATION

UKAS ACCREDITED CALIBRATION LABORATORY N0. 8211

2. DC CURRENT

APPLIED DC CURRENT	INSTRUMENT INDICATION Positive	Negative	SPECIFICATION	UNCERTAINTY OF MEASUREMENT
100 microampere range				
(± microampere)	(microampere)	(microampere)	(± %)	(± %)
100.00000	100.0076	99.9948	0.075	0.012
1 milliampere range				
(± milliampere)	(milliampere)	(milliampere)	(±%)	(±%)
1.0000000	1.000001	0.999982	0.055	0.0085
10 milliampere range				
(± milliampere)	(milliampere)	(milliampere)	(±%)	(±%)
10.000000	9.99994	9.99988	0.070	0.0085
100 milliampere range				
(± milliampere)	(milliampere)	(milliampere)	(±%)	(±%)
100.00000	99.9997	99.9977	0.055	0.010
400 milliampere range				
(± milliampere)	(milliampere)	(milliampere)	(±%)	(±%)
400.0000	400.055	400.031	0.055	0.025
1 ampere range				
(± ampere)	(ampere)	(ampere)	(±%)	(±%)
1.0000000	1.000420	0.999827	0.070	0.025
3 ampere range				
(± ampere)	(ampere)	(ampere)	(±%)	(±%)
3.000000	3.00006	2.99994	0.120	0.065
10 ampere range				
(± ampere)	(ampere)	(ampere)	(±%)	(±%)
10.000000	10.00068	10.00012	0.158	0.065

CERTIFICATE OF CALIBRATION

UKAS ACCREDITED CALIBRATION LABORATORY N0. 8211

3. RESISTANCE

APPLIED RESISTANCE STANDARD	INSTRUMENT INDICATION	SPECIFICATION	UNCERTAINTY OF MEASUREMENT
4 Wire	**100 ohm range**		
(ohm)	(ohm)	(± %)	(± %)
100.00000	100.0017	0.014	0.0020
	1 kilohm range		
(kilohm)	(kilohm)	(± %)	(± %)
1.0000000	0.999996	0.011	0.0020
	10 kilohm range		
(kilohm)	(kilohm)	(± %)	(± %)
10.000000	9.99989	0.011	0.0020
	100 kilohm range		
(kilohm)	(kilohm)	(± %)	(± %)
100.00000	99.9997	0.011	0.0020
2 Wire	**1 Megohm range**		
(Megohm)	(Megohm)	(± %)	(± %)
1.0000000	1.000011	0.011	0.0045
	10 Megohm range		
(Megohm)	(Megohm)	(± %)	(± %)
10.000000	10.00173	0.041	0.018
	100 Megohm range		
(Megohm)	(Megohm)	(± %)	(± %)
100.00000	100.1281	0.81	0.070

CERTIFICATE OF CALIBRATION

UKAS ACCREDITED CALIBRATION LABORATORY N0. 8211

4. AC VOLTAGE

APPLIED AC VOLTAGE AT 1 kHz	INSTRUMENT INDICATION	SPECIFICATION	UNCERTAINTY OF MEASUREMENT
	100 millivolt range		
(millivolt)	(millivolt)	(± %)	(± %)
100.00000	100.0041	0.100	0.032
	1 volt range		
(volt)	(volt)	(± %)	(± %)
1.0000000	1.000033	0.090	0.032
	10 volt range		
(volt)	(volt)	(± %)	(± %)
2.000000	1.99955	0.210	0.032
3.000000	2.99930	0.160	0.032
4.000000	3.99907	0.135	0.032
5.000000	4.99883	0.120	0.032
6.000000	5.99856	0.110	0.032
7.000000	6.99835	0.103	0.032
8.000000	7.99811	0.098	0.032
9.000000	8.99788	0.093	0.032
10.000000	9.99769	0.090	0.032
	100 volt range		
(volt)	(volt)	(± %)	(± %)
100.00000	99.9799	0.090	0.047
	750 volt range		
(volt)	(volt)	(± %)	(± %)
700.0000	699.890	0.090	0.070

CERTIFICATE OF CALIBRATION

UKAS ACCREDITED CALIBRATION LABORATORY N0. 8211

4. AC VOLTAGE

FREQUENCY OF APPLIED AC VOLTAGE	INSTRUMENT INDICATION FOR 1.000000 volt APPLIED	SPECIFICATION	UNCERTAINTY OF MEASUREMENT
(Hz)	(volt)	(± %)	(± %)
10	0.999862	0.380	0.055
60	0.999846	0.090	0.032
(kHz)	(volt)	(± %)	(± %)
1	1.000033	0.090	0.032
5	0.999911	0.090	0.040
20	0.999768	0.090	0.040
50	0.999712	0.170	0.12
100	1.000831	0.680	0.12
300	1.006615	4.500	0.47

5. AC CURRENT

APPLIED AC CURRENT AT 1 kHz	INSTRUMENT INDICATION	SPECIFICATION	UNCERTAINTY OF MEASUREMENT
	10 milliampere range		
(milliampere)	(milliampere)	(± %)	(± %)
10.000000	10.00021	0.21	0.082
	100 milliampere range		
(milliampere)	(milliampere)	(± %)	(± %)
100.00000	100.0071	0.14	0.082
	400 milliampere range		
(milliampere)	(milliampere)	(± %)	(± %)
400.0000	399.815	0.20	0.065

CERTIFICATE OF CALIBRATION

UKAS ACCREDITED CALIBRATION LABORATORY N0. 8211

5. AC CURRENT

APPLIED AC CURRENT AT 1 kHz	INSTRUMENT INDICATION	SPECIFICATION	UNCERTAINTY OF MEASUREMENT
	1 ampere range		
(ampere)	(ampere)	(± %)	(± %)
1.0000000	1.000292	0.14	0.065
	3 ampere range		
(ampere)	(ampere)	(± %)	(± %)
3.000000	2.99901	0.21	0.075
	10 ampere range		
(ampere)	(ampere)	(± %)	(± %)
10.000000	9.99784	0.21	0.075

FREQUENCY OF APPLIED AC CURRENT	INSTRUMENT INDICATION FOR 10.000 milliampere APPLIED	SPECIFICATION	UNCERTAINTY OF MEASUREMENT
(Hz)	(milliampere)	(± %)	(± %)
45	9.99741	0.21	0.12
60	9.99753	0.21	0.12
100	9.99825	0.21	0.12
(kHz)	(milliampere)	(± %)	(± %)
1	10.00021	0.21	0.082

---------- end ----------

The reported expanded uncertainty is based on a standard uncertainty multiplied by a coverage factor k=2, providing a coverage probability of approximately 95%. The uncertainty evaluation has been carried out in accordance with UKAS requirements.

CERTIFICATE OF CALIBRATION

ISSUED BY: DM Systems and Test limited

DATE OF ISSUE 30 June 2022 Certificate Number: 99067

UKAS CALIBRATION

8211

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STEVEN PEARCE

APPROVED SIGNATORY

ELECTRONICALLY AUTHORISED DOCUMENT

Customer	**LCM SYSTEMS LTD** **UNIT 15, NEWPORT BUSINESS PARK** **BARRY WAY** **NEWPORT** **ISLE OF WIGHT** **PO30 5GY**
On Behalf Of	
Customer Order No.	**35259**
Customer Ident/Asset No.	
Manufacturer	**FLUKE**
Type	**8845A**
Equipment Description	**PRECISION DIGITAL MULTIMETER**
Serial Number	**2595009**
Date of Receipt	**28 June 2022**
Date of Calibration	**30 June 2022**
Date of Next Calibration	**30 June 2023**

DM Systems and Test Limited is accredited in accordance with the recognised International Standard ISO/IEC 17025. This accreditation demonstrates technical competence for a defined scope and the operation of a laboratory management system (refer joint ISO-ILAC-IAF communiqué dated April 2017). The calibration of all test equipment and standards referenced comply with ISO 17025 and are traceable to National or International Standards. The instrument reported on this certificate has been calibrated in accordance with the specification stipulated in the contract, order or with the following calibration values. The results were recorded on the stated date and do not reflect the stability or the long term performance of the instrument.

Instrument Status:

1. The instrument was calibrated.
2. No adjustments were made.
3. The instrument was compliant with the reported specification at the measured points.
4. The calibration values are shown on the following page(s).

The instrument was safety tested in accordance with HSG 107.

The ambient conditions at the time of calibration:

Temperature 23 °C ± 3 °C
Relative Humidity 20 %rh to 60 %rh

DM 039/5

CERTIFICATE OF CALIBRATION

UKAS ACCREDITED CALIBRATION LABORATORY N0. 8211

The measured results are only applicable to the unit under test and were obtained using methods detailed in the following procedures: CP010, CP016.

The unit under test was switched on and allowed to stabilise in the Laboratory environment, prior to calibration, for a minimum of 4 hours.

Specification source: Manufacturer's Calibration Manual 8845A/8846A, January 2007, Rev.1, 11/07
The decision rule used for this calibration is based on a simple acceptance/shared risk as defined in JCGM 106 section 8.2, where the uncertainty is less than or equal to the specified tolerance.

The uncertainty quoted refers only to the measured value and does not carry any implication regarding the stability of the unit under test. Values do not include unit under test resolution for which an allowance of ½ least significant digit displayed should be made.

CERTIFICATE OF CALIBRATION

UKAS ACCREDITED CALIBRATION LABORATORY N0. 8211

1. DC VOLTAGE

APPLIED DC VOLTAGE	INSTRUMENT INDICATION Positive	Negative	SPECIFICATION	UNCERTAINTY OF MEASUREMENT
	100 millivolt range			
(± millivolt)	(millivolt)	(millivolt)	(± %)	(± %)
100.00000	99.9997	100.0001	0.0085	0.0021
	1 volt range			
(± volt)	(volt)	(volt)	(± %)	(± %)
1.0000000	0.999990	0.999989	0.0047	0.0015
	10 volt range			
(± volt)	(volt)	(volt)	(± %)	(± %)
2.000000	2.00000	2.00000	0.0060	0.0006
3.000000	3.00001	3.00000	0.0052	0.0006
4.000000	4.00001	4.00000	0.0048	0.0006
5.000000	5.00001	5.00000	0.0045	0.0006
6.000000	6.00001	6.00000	0.0043	0.0006
7.000000	7.00002	7.00000	0.0042	0.0006
8.000000	8.00002	8.00000	0.0041	0.0006
9.000000	9.00002	9.00000	0.0041	0.0006
10.000000	10.00002	10.00000	0.0040	0.0006
	100 volt range			
(± volt)	(volt)	(volt)	(± %)	(± %)
100.00000	99.9997	99.9998	0.0051	0.0011
	1000 volt range			
(± volt)	(volt)	(volt)	(± %)	(± %)
1000.0000	999.987	999.988	0.0055	0.0021

CERTIFICATE OF CALIBRATION

UKAS ACCREDITED CALIBRATION LABORATORY N0. 8211

2. DC CURRENT

APPLIED DC CURRENT	INSTRUMENT INDICATION Positive	Negative	SPECIFICATION	UNCERTAINTY OF MEASUREMENT
100 microampere range				
(± microampere)	(microampere)	(microampere)	(± %)	(± %)
100.00000	100.0011	100.0067	0.075	0.012
1 milliampere range				
(± milliampere)	(milliampere)	(milliampere)	(±%)	(±%)
1.0000000	1.000046	1.000050	0.055	0.0085
10 milliampere range				
(± milliampere)	(milliampere)	(milliampere)	(±%)	(±%)
10.000000	9.99864	9.99993	0.070	0.0085
100 milliampere range				
(± milliampere)	(milliampere)	(milliampere)	(±%)	(±%)
100.00000	99.9934	99.9937	0.055	0.010
400 milliampere range				
(± milliampere)	(milliampere)	(milliampere)	(±%)	(±%)
400.0000	400.021	400.002	0.055	0.025
1 ampere range				
(± ampere)	(ampere)	(ampere)	(±%)	(±%)
1.0000000	1.000136	1.000255	0.070	0.025
3 ampere range				
(± ampere)	(ampere)	(ampere)	(±%)	(±%)
3.000000	2.99998	3.00016	0.120	0.065
10 ampere range				
(± ampere)	(ampere)	(ampere)	(±%)	(±%)
10.000000	10.00034	10.00042	0.158	0.065

CERTIFICATE OF CALIBRATION

UKAS ACCREDITED CALIBRATION LABORATORY N0. 8211

3. RESISTANCE

APPLIED RESISTANCE STANDARD	INSTRUMENT INDICATION	SPECIFICATION	UNCERTAINTY OF MEASUREMENT
4 Wire	**100 ohm range**		
(ohm)	(ohm)	(± %)	(± %)
100.00000	99.9972	0.014	0.0020
	1 kilohm range		
(kilohm)	(kilohm)	(± %)	(± %)
1.0000000	0.999955	0.011	0.0020
	10 kilohm range		
(kilohm)	(kilohm)	(± %)	(± %)
10.000000	9.99957	0.011	0.0020
	100 kilohm range		
(kilohm)	(kilohm)	(± %)	(± %)
100.00000	99.9955	0.011	0.0020
2 Wire	**1 Megohm range**		
(Megohm)	(Megohm)	(± %)	(± %)
1.0000000	0.999957	0.011	0.0045
	10 Megohm range		
(Megohm)	(Megohm)	(± %)	(± %)
10.000000	9.99961	0.041	0.018
	100 Megohm range		
(Megohm)	(Megohm)	(± %)	(± %)
100.00000	99.9323	0.81	0.070

CERTIFICATE OF CALIBRATION

UKAS ACCREDITED CALIBRATION LABORATORY N0. 8211

4. AC VOLTAGE

APPLIED AC VOLTAGE AT 1 kHz	INSTRUMENT INDICATION	SPECIFICATION	UNCERTAINTY OF MEASUREMENT
	100 millivolt range		
(millivolt)	(millivolt)	(± %)	(± %)
100.00000	99.9937	0.100	0.032
	1 volt range		
(volt)	(volt)	(± %)	(± %)
1.0000000	0.999895	0.090	0.032
	10 volt range		
(volt)	(volt)	(± %)	(± %)
2.000000	1.99896	0.210	0.032
3.000000	2.99826	0.160	0.032
4.000000	3.99757	0.135	0.032
5.000000	4.99693	0.120	0.032
6.000000	5.99615	0.110	0.032
7.000000	6.99566	0.103	0.032
8.000000	7.99496	0.098	0.032
9.000000	8.99430	0.093	0.032
10.000000	9.99369	0.090	0.032
	100 volt range		
(volt)	(volt)	(± %)	(± %)
100.00000	99.9388	0.090	0.047
	750 volt range		
(volt)	(volt)	(± %)	(± %)
700.0000	699.550	0.090	0.070

CERTIFICATE OF CALIBRATION

UKAS ACCREDITED CALIBRATION LABORATORY N0. 8211

4. AC VOLTAGE

FREQUENCY OF APPLIED AC VOLTAGE	INSTRUMENT INDICATION FOR 1.000000 volt APPLIED	SPECIFICATION	UNCERTAINTY OF MEASUREMENT
(Hz)	(volt)	(± %)	(± %)
10	0.999647	0.380	0.055
60	0.999695	0.090	0.032
(kHz)	(volt)	(± %)	(± %)
1	0.999895	0.090	0.032
5	0.999738	0.090	0.040
20	0.999630	0.090	0.040
50	0.999658	0.170	0.12
100	1.000892	0.680	0.12
300	1.005587	4.500	0.47

5. AC CURRENT

APPLIED AC CURRENT AT 1 kHz	INSTRUMENT INDICATION	SPECIFICATION	UNCERTAINTY OF MEASUREMENT
	10 milliampere range		
(milliampere)	(milliampere)	(± %)	(± %)
10.000000	9.99859	0.21	0.082
	100 milliampere range		
(milliampere)	(milliampere)	(± %)	(± %)
100.00000	99.9888	0.14	0.082
	400 milliampere range		
(milliampere)	(milliampere)	(± %)	(± %)
400.0000	399.646	0.20	0.065

CERTIFICATE OF CALIBRATION

UKAS ACCREDITED CALIBRATION LABORATORY N0. 8211

5. AC CURRENT

APPLIED AC CURRENT AT 1 kHz	INSTRUMENT INDICATION	SPECIFICATION	UNCERTAINTY OF MEASUREMENT
	1 ampere range		
(ampere)	(ampere)	(± %)	(± %)
1.0000000	1.000141	0.14	0.065
	3 ampere range		
(ampere)	(ampere)	(± %)	(± %)
3.000000	2.99924	0.21	0.075
	10 ampere range		
(ampere)	(ampere)	(± %)	(± %)
10.000000	9.99818	0.21	0.075

FREQUENCY OF APPLIED AC CURRENT	INSTRUMENT INDICATION FOR 10.000 milliampere APPLIED	SPECIFICATION	UNCERTAINTY OF MEASUREMENT
(Hz)	(milliampere)	(± %)	(± %)
45	9.99618	0.21	0.12
60	9.99628	0.21	0.12
100	9.99626	0.21	0.12
(kHz)	(milliampere)	(± %)	(± %)
1	9.99859	0.21	0.082

---------- end ----------

The reported expanded uncertainty is based on a standard uncertainty multiplied by a coverage factor k=2, providing a coverage probability of approximately 95%. The uncertainty evaluation has been carried out in accordance with UKAS requirements.

CERTIFICATE OF CALIBRATION

ISSUED BY: DM Systems and Test limited

DATE OF ISSUE 30 June 2022 Certificate Number: 99066

UKAS CALIBRATION

8211

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STEVEN PEARCE

APPROVED SIGNATORY

ELECTRONICALLY AUTHORISED DOCUMENT

Customer	**LCM SYSTEMS LTD** **UNIT 15, NEWPORT BUSINESS PARK** **BARRY WAY** **NEWPORT** **ISLE OF WIGHT** **PO30 5GY**
On Behalf Of	
Customer Order No.	**35259**
Customer Ident/Asset No.	
Manufacturer	**FLUKE**
Type	**8845A**
Equipment Description	**PRECISION DIGITAL MULTIMETER**
Serial Number	**2596002**
Date of Receipt	**28 June 2022**
Date of Calibration	**30 June 2022**
Date of Next Calibration	**30 June 2023**

DM Systems and Test Limited is accredited in accordance with the recognised International Standard ISO/IEC 17025. This accreditation demonstrates technical competence for a defined scope and the operation of a laboratory management system (refer joint ISO-ILAC-IAF communiqué dated April 2017). The calibration of all test equipment and standards referenced comply with ISO 17025 and are traceable to National or International Standards. The instrument reported on this certificate has been calibrated in accordance with the specification stipulated in the contract, order or with the following calibration values. The results were recorded on the stated date and do not reflect the stability or the long term performance of the instrument.

Instrument Status:

1. The instrument was calibrated.
2. No adjustments were made.
3. The instrument was compliant with the reported specification at the measured points.
4. The calibration values are shown on the following page(s).

The instrument was safety tested in accordance with HSG 107.

The ambient conditions at the time of calibration:

Temperature 23 °C ± 3 °C
Relative Humidity 20 %rh to 60 %rh

DM 039/5

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The measured results are only applicable to the unit under test and were obtained using methods detailed in the following procedures: CP010, CP016.

The unit under test was switched on and allowed to stabilise in the Laboratory environment, prior to calibration, for a minimum of 4 hours.

Specification source: Manufacturer's Calibration Manual 8845A/8846A, January 2007, Rev.1, 11/07
The decision rule used for this calibration is based on a simple acceptance/shared risk as defined in JCGM 106 section 8.2, where the uncertainty is less than or equal to the specified tolerance.

The uncertainty quoted refers only to the measured value and does not carry any implication regarding the stability of the unit under test. Values do not include unit under test resolution for which an allowance of ½ least significant digit displayed should be made.

CERTIFICATE OF CALIBRATION

UKAS ACCREDITED CALIBRATION LABORATORY N0. 8211

1. DC VOLTAGE

APPLIED DC VOLTAGE	INSTRUMENT INDICATION Positive	Negative	SPECIFICATION	UNCERTAINTY OF MEASUREMENT
	100 millivolt range			
(± millivolt)	(millivolt)	(millivolt)	(± %)	(± %)
100.00000	100.0011	100.0022	0.0085	0.0021
	1 volt range			
(± volt)	(volt)	(volt)	(± %)	(± %)
1.0000000	1.000004	0.999999	0.0047	0.0015
	10 volt range			
(± volt)	(volt)	(volt)	(± %)	(± %)
2.000000	2.00000	1.99999	0.0060	0.0006
3.000000	2.99999	2.99998	0.0052	0.0006
4.000000	3.99999	3.99997	0.0048	0.0006
5.000000	4.99999	4.99997	0.0045	0.0006
6.000000	5.99999	5.99997	0.0043	0.0006
7.000000	6.99999	6.99996	0.0042	0.0006
8.000000	7.99998	7.99996	0.0041	0.0006
9.000000	8.99998	8.99995	0.0041	0.0006
10.000000	9.99998	9.99995	0.0040	0.0006
	100 volt range			
(± volt)	(volt)	(volt)	(± %)	(± %)
100.00000	99.9997	99.9995	0.0051	0.0011
	1000 volt range			
(± volt)	(volt)	(volt)	(± %)	(± %)
1000.0000	999.989	999.986	0.0055	0.0021

CERTIFICATE OF CALIBRATION

UKAS ACCREDITED CALIBRATION LABORATORY N0. 8211

2. DC CURRENT

APPLIED DC CURRENT	INSTRUMENT INDICATION Positive	Negative	SPECIFICATION	UNCERTAINTY OF MEASUREMENT
100 microampere range				
(± microampere)	(microampere)	(microampere)	(± %)	(± %)
100.00000	100.0003	100.0014	0.075	0.012
1 milliampere range				
(± milliampere)	(milliampere)	(milliampere)	(±%)	(±%)
1.0000000	1.000005	1.000015	0.055	0.0085
10 milliampere range				
(± milliampere)	(milliampere)	(milliampere)	(±%)	(±%)
10.000000	9.99871	10.00192	0.070	0.0085
100 milliampere range				
(± milliampere)	(milliampere)	(milliampere)	(±%)	(±%)
100.00000	100.0027	100.0051	0.055	0.010
400 milliampere range				
(± milliampere)	(milliampere)	(milliampere)	(±%)	(±%)
400.0000	400.058	400.071	0.055	0.025
1 ampere range				
(± ampere)	(ampere)	(ampere)	(±%)	(±%)
1.0000000	1.000228	1.000294	0.070	0.025
3 ampere range				
(± ampere)	(ampere)	(ampere)	(±%)	(±%)
3.000000	3.00051	3.00050	0.120	0.065
10 ampere range				
(± ampere)	(ampere)	(ampere)	(±%)	(±%)
10.000000	10.00229	10.00192	0.158	0.065

CERTIFICATE OF CALIBRATION

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3. RESISTANCE

APPLIED RESISTANCE STANDARD 4 Wire	INSTRUMENT INDICATION	SPECIFICATION	UNCERTAINTY OF MEASUREMENT
	100 ohm range		
(ohm)	(ohm)	(± %)	(± %)
100.00000	100.0019	0.014	0.0020
	1 kilohm range		
(kilohm)	(kilohm)	(± %)	(± %)
1.0000000	0.999980	0.011	0.0020
	10 kilohm range		
(kilohm)	(kilohm)	(± %)	(± %)
10.000000	9.99972	0.011	0.0020
	100 kilohm range		
(kilohm)	(kilohm)	(± %)	(± %)
100.00000	99.9951	0.011	0.0020
2 Wire	**1 Megohm range**		
(Megohm)	(Megohm)	(± %)	(± %)
1.0000000	0.999935	0.011	0.0045
	10 Megohm range		
(Megohm)	(Megohm)	(± %)	(± %)
10.000000	10.00066	0.041	0.018
	100 Megohm range		
(Megohm)	(Megohm)	(± %)	(± %)
100.00000	99.9779	0.81	0.070

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4. AC VOLTAGE

APPLIED AC VOLTAGE AT 1 kHz	INSTRUMENT INDICATION	SPECIFICATION	UNCERTAINTY OF MEASUREMENT
	100 millivolt range		
(millivolt)	(millivolt)	(± %)	(± %)
100.00000	100.0254	0.100	0.032
	1 volt range		
(volt)	(volt)	(± %)	(± %)
1.0000000	1.000023	0.090	0.032
	10 volt range		
(volt)	(volt)	(± %)	(± %)
2.000000	1.99931	0.210	0.032
3.000000	2.99884	0.160	0.032
4.000000	3.99846	0.135	0.032
5.000000	4.99810	0.120	0.032
6.000000	5.99768	0.110	0.032
7.000000	6.99733	0.103	0.032
8.000000	7.99711	0.098	0.032
9.000000	8.99694	0.093	0.032
10.000000	9.99653	0.090	0.032
	100 volt range		
(volt)	(volt)	(± %)	(± %)
100.00000	99.9697	0.090	0.047
	750 volt range		
(volt)	(volt)	(± %)	(± %)
700.0000	699.884	0.090	0.070

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4. AC VOLTAGE

FREQUENCY OF APPLIED AC VOLTAGE	INSTRUMENT INDICATION FOR 1.000000 volt APPLIED	SPECIFICATION	UNCERTAINTY OF MEASUREMENT
(Hz)	(volt)	(± %)	(± %)
10	0.999944	0.380	0.055
60	0.999806	0.090	0.032
(kHz)	(volt)	(± %)	(± %)
1	1.000023	0.090	0.032
5	0.999876	0.090	0.040
20	0.999745	0.090	0.040
50	0.999767	0.170	0.12
100	1.000994	0.680	0.12
300	1.006093	4.500	0.47

5. AC CURRENT

APPLIED AC CURRENT AT 1 kHz	INSTRUMENT INDICATION	SPECIFICATION	UNCERTAINTY OF MEASUREMENT
	10 milliampere range		
(milliampere)	(milliampere)	(± %)	(± %)
10.000000	10.00119	0.21	0.082
	100 milliampere range		
(milliampere)	(milliampere)	(± %)	(± %)
100.00000	100.0235	0.14	0.082
	400 milliampere range		
(milliampere)	(milliampere)	(± %)	(± %)
400.0000	399.846	0.20	0.065

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5. AC CURRENT

APPLIED AC CURRENT AT 1 kHz	INSTRUMENT INDICATION	SPECIFICATION	UNCERTAINTY OF MEASUREMENT
	1 ampere range		
(ampere)	(ampere)	(± %)	(± %)
1.0000000	1.000308	0.14	0.065
	3 ampere range		
(ampere)	(ampere)	(± %)	(± %)
3.000000	2.99951	0.21	0.075
	10 ampere range		
(ampere)	(ampere)	(± %)	(± %)
10.000000	10.00114	0.21	0.075

FREQUENCY OF APPLIED AC CURRENT	INSTRUMENT INDICATION FOR 10.000 milliampere APPLIED	SPECIFICATION	UNCERTAINTY OF MEASUREMENT
(Hz)	(milliampere)	(± %)	(± %)
45	9.99879	0.21	0.12
60	9.99907	0.21	0.12
100	9.99923	0.21	0.12
(kHz)	(milliampere)	(± %)	(± %)
1	10.00119	0.21	0.082

---------- end ----------

The reported expanded uncertainty is based on a standard uncertainty multiplied by a coverage factor k=2, providing a coverage probability of approximately 95%. The uncertainty evaluation has been carried out in accordance with UKAS requirements.