

CERTIFICATE OF CALIBRATION

Issued By Transmille Ltd.

Certificate Number EXAMPLE

Date of Issue 09/12/2008



Approved Signatory



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**EXAMPLE
CERTIFICATE**

EXAMPLE EXAMPLE

Customer :

Date Received :

Instrument : System ID : EXAMPLE
Description : Multi Product Calibrator
Manufacturer : Transmille
Model Number : 3050
Serial Number : EXAMPLE
Procedure Version : 2.2/V000/N

Environmental Conditions

Temperature : 20°C +/- 1°C
Relative Humidity : 50% +/- 20%

Mains Voltage : 240V +/- 12V
Mains Frequency : 50Hz +/- 1Hz

Comments

Instrument was allowed to stabilise for at least 12 hours before calibration.
4 Wire kelvin connections were used for ohms measurements below 10kOhms
The instrument RS232 interface was used during calibration
PT100 resistance converted to temperature using BS1904 tables.
Tests marked # are not UKAS accredited but have been included for completeness.

Calibration Information

The instrument was calibrated against laboratory standards whose values are traceable to recognised National Standards. The uncertainty limits quoted refer to the measured values only, with no account being taken of the instruments ability to maintain its calibration.

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.

Calibrated By : EXAMPLE

Date of Calibration : EXAMPLE

This certificate is issued in accordance with the laboratory accreditation requirements of the United Kingdom Accreditation Service. It 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. This certificate may not be reproduced other than in full, except with the prior written approval of the issuing laboratory.

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AFTER ADJUSTMENT RESULTS

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Test Title	Applied Value	Reading	Uncertainties
DC Voltage			
200mV Range	0.000 0mV	-0.0002mV	0.6uV
200mV Range	100.000 0mV	100.000 2mV	0.8uV
200mV Range	200.000 0mV	200.000 9mV	0.9uV
200mV Range	-100.0000mV	-100.0000mV	0.8uV
200mV Range	-200.0000mV	-200.0000mV	0.9uV
2V Range	0.220 000 0V	0.219 994 5V	0.9uV
2V Range	1.000 000 0V	0.999 999 6V	2.1uV
2V Range	2.000 000 0V	2.000 005 6V	7uV
2V Range	-0.2200000V	-0.2200018V	0.9uV
2V Range	-1.0000000V	-1.0000022V	2.1uV
2V Range	-2.0000000V	-2.0000024V	7uV
20V Range	2.200 000V	2.199 971V	7uV
20V Range	10.000 000V	9.999 992V	33uV
20V Range	20.000 000V	19.999 980V	66uV
20V Range	-2.200000V	-2.199985V	7uV
20V Range	-10.000000V	-9.999952V	33uV
20V Range	-20.000000V	-19.999867V	66uV
200V Range	100.000 00V	99.999 85V	330uV
200V Range	200.000 00V	200.000 05V	660uV
200V Range	-200.00000V	-199.99987V	660uV
200V Range	-100.00000V	-100.00007V	330uV
1kV Range	220.000 0V	219.998 2V	0.8mV
1kV Range	1 000.000 0V	999.998 6V	3.3mV
1kV Range	-1000.0000V	-999.9996V	3.3mV
1kV Range	-220.0000V	-220.0019V	0.8mV
AC Voltage Output Frequency Tests			
10kHz at 2V	10.000 00kHz	9.999 99kHz	0.01Hz
100kHz at 2V	100.000 0kHz	99.999 9kHz	0.1Hz
AC Voltage			
200mV A.C. : 40Hz	20.000mV	20.002mV	18uV
200mV A.C. : 206Hz	20.000mV	20.002mV	18uV
200mV A.C. : 20kHz	20.000mV	20.010mV	70uV
200mV A.C. : 10Hz #	200.000mV	200.004mV	60uV
200mV A.C. : 40Hz	200.000mV	199.974mV	34uV
200mV A.C. : 56Hz	200.000mV	200.009mV	34uV
200mV A.C. : 206Hz	200.000mV	200.000mV	34uV
200mV A.C. : 1kHz	200.000mV	200.010mV	46uV
200mV A.C. : 10kHz	200.000mV	200.037mV	46uV
200mV A.C. : 20kHz	200.000mV	200.066mV	70uV
2V Range : 40Hz	0.210 00V	0.210 00V	49uV
2V Range : 206Hz	0.210 00V	0.210 02V	49uV
2V Range : 100kHz #	0.210 00V	0.210 30V	580uV
2V Range. : 206Hz	1.000 00V	1.000 12V	120uV
2V Range : 206Hz	1.500 00V	1.500 10V	180uV
2V Range : 10Hz #	2.000 00V	2.000 11V	600uV
2V Range : 40Hz	2.000 00V	2.000 08V	240uV

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2V Range : 56Hz	2.000 00V	2.000 12V	240uV
2V Range : 200Hz	2.000 00V	1.999 94V	240uV
2V Range: 1kHz	2.000 00V	2.000 13V	240uV
2V Range : 5kHz	2.000 00V	2.000 07V	400uV
2V Range : 10kHz	2.000 00V	2.000 11V	400uV
2V Range : 20kHz	2.000 00V	2.000 14V	400uV
2V Range : 50kHz	2.000 00V	2.000 15V	400uV
2V Range : 100kHz #	2.000 00V	2.000 16V	610uV
20V Range : 40Hz	2.100 0V	2.100 1V	260uV
20V Range : 200Hz	2.100 0V	2.099 9V	260uV
20V Range : 100kHz #	2.100 0V	2.101 3V	640uV
20V Range : 200Hz	10.000 0V	10.000 0V	1.2mV
20V Range : 200Hz	15.000 0V	15.000 8V	1.8mV
20V Range : 10Hz #	20.000 0V	20.000 9V	4.2mV
20V Range : 40Hz	20.000 0V	20.001 1V	2.4mV
20V Range : 56Hz	20.000 0V	20.000 5V	2.4mV
20V Range : 200Hz	20.000 0V	19.999 3V	2.4mV
20V Range : 1kHz	20.000 0V	20.000 6V	2.4mV
20V Range : 5kHz	20.000 0V	20.001 2V	4mV
20V Range : 10kHz	20.000 0V	20.001 3V	4mV
20V Range : 20kHz	20.000 0V	20.002 4V	4mV
20V Range : 100kHz #	20.000 0V	20.016 3V	6mV
200V Range : 40Hz	21.000V	20.994V	2.6mV
200V Range : 200Hz	21.000V	20.993V	2.6mV
200V Range : 20kHz	21.000V	21.009V	4.2mV
200V Range : 200Hz	100.000V	100.007V	12mV
200V Range : 40Hz	200.000V	199.986V	24mV
200V Range : 56Hz	200.000V	199.993V	24mV
200V Range : 200Hz	200.000V	199.989V	24mV
200V Range : 1000Hz	200.000V	199.989V	24mV
200V Range : 10kHz	200.000V	200.023V	40mV
200V Range : 20kHz	200.000V	199.999V	40mV
1kV Range : 40Hz	210.000V	210.009V	45mV
1kV Range : 200Hz	210.000V	210.053V	45mV
1kV Range : 10kHz	210.000V	210.021V	45mV
1kV Range : 40Hz	700.000V	699.972V	91mV
1kV Range : 56Hz	700.000V	699.977V	91mV
1kV Range : 1kHz	700.000V	699.968V	91mV
1kV Range : 5kHz	700.000V	699.927V	148mV
1kV Range : 10kHz	700.000V	699.984V	148mV
1kV Range : 56Hz	1 000.000V	1 000.113V	130mV
Linearity - 20V DC Range			
Linearity	19.000 000V	19.000 012V	63uV
Linearity	18.000 000V	18.000 021V	60uV
Linearity	17.000 000V	17.000 025V	57uV
Linearity	16.000 000V	16.000 019V	53uV
Linearity	15.000 000V	15.000 020V	50uV
Linearity	14.000 000V	14.000 016V	47uV
Linearity	13.000 000V	13.000 024V	43uV

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Linearity	12.000 000V	11.999 978V	40uV
Linearity	11.000 000V	11.000 025V	37uV
Linearity	9.000 000V	9.000 021V	30uV
Linearity	8.000 000V	8.000 025V	27uV
Linearity	7.000 000V	7.000 018V	24uV
Linearity	6.000 000V	6.000 014V	20uV
Linearity	5.000 000V	5.000 015V	17uV
Linearity	4.000 000V	4.000 008V	14uV
Linearity	3.000 000V	3.000 007V	10uV
Linearity	2.100 000V	2.100 011V	7uV
Linearity	-19.000000V	-18.999975V	63uV
Linearity	-18.000000V	-18.000015V	60uV
Linearity	-17.000000V	-17.000003V	57uV
Linearity	-16.000000V	-16.000032V	53uV
Linearity	-15.000000V	-15.000026V	50uV
Linearity	-14.000000V	-14.000030V	47uV
Linearity	-13.000000V	-13.000023V	43uV
Linearity	-12.000000V	-12.000038V	40uV
Linearity	-11.000000V	-11.000005V	37uV
Linearity	-9.000000V	-9.000029V	30uV
Linearity	-8.000000V	-8.000030V	27uV
Linearity	-7.000000V	-7.000028V	24uV
Linearity	-6.000000V	-6.000027V	20uV
Linearity	-5.000000V	-5.000029V	17uV
Linearity	-4.000000V	-4.000026V	14uV
Linearity	-3.000000V	-3.000022V	10uV
Linearity	-2.100000V	-2.100029V	7uV
DC Current			
200uA Range	0.000 0uA	-0.0013uA	0.2nA
200uA Range	100.000 0uA	99.999 5uA	0.2nA
200uA Range	200.000 0uA	199.999 0uA	2.7nA
200uA Range	-100.0000uA	-99.9985uA	0.2nA
200uA Range	-200.0000uA	-200.0005uA	2.7nA
2mA Range	0.210 000mA	0.209 976mA	2.7nA
2mA Range	1.000 000mA	0.999 990mA	2.7nA
2mA Range	2.000 000mA	2.000 017mA	34nA
2mA Range	-1.000000mA	-0.999972mA	2.7nA
2mA Range	-2.000000mA	-1.999990mA	34nA
20mA Range	5.000 00mA	4.999 96mA	34nA
20mA Range	10.000 00mA	9.999 98mA	34nA
20mA Range	15.000 00mA	15.000 14mA	380nA
20mA Range	20.000 00mA	20.000 01mA	380nA
20mA Range	-5.00000mA	-4.99998mA	34nA
20mA Range	-10.00000mA	-9.99997mA	34nA
20mA Range	-15.00000mA	-15.00008mA	380nA
20mA Range	-20.00000mA	-20.00012mA	380nA
200mA Range	100.000 0mA	99.999 4mA	380nA
200mA Range	200.000 0mA	199.999 9mA	8.7uA
200mA Range	-100.0000mA	-99.9997mA	380nA

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Test Title	Applied Value	Reading	Uncertainties
200mA Range	-200.0000mA	-200.0002mA	8.7uA
2A Range	1.000 000A	0.999 976A	8.7uA
2A Range	2.000 000A	1.999 982A	96uA
2A Range	-1.000000A	-0.999977A	8.7uA
2A Range	-2.000000A	-1.999990A	96uA
20A Range	10.000 00A	10.001 25A	0.48mA
20A Range	20.000 00A	20.000 34A	0.68mA
20A Range	-20.00000A	-20.00008A	0.68mA
20A Range	-10.00000A	-10.00111A	0.48mA
AC Current			
200uA Rng: 40Hz	25.000uA	24.989uA	15nA
200uA Rng: 200Hz	25.000uA	24.987uA	15nA
200uA Rng: 10kHz #	25.000uA	24.980uA	49nA
200uA Rng: 10Hz #	200.000uA	200.018uA	260nA
200uA Rng: 40Hz	200.000uA	200.020uA	49nA
200uA Rng: 56Hz	200.000uA	200.016uA	49nA
200uA Rng: 1kHz	200.000uA	200.012uA	49nA
200uA Rng: 10kHz #	200.000uA	200.053uA	247nA
2mA Rng: 40Hz	0.210 00mA	0.210 01mA	55nA
2mA Rng: 200Hz	0.210 00mA	0.210 00mA	55nA
2mA Rng: 10kHz #	0.210 00mA	0.210 01mA	0.19uA
2mA Rng: 10Hz #	2.000 00mA	2.000 05mA	1uA
2mA Rng: 40Hz	2.000 00mA	2.000 20mA	400nA
2mA Rng: 56Hz	2.000 00mA	2.000 15mA	400nA
2mA Rng: 1kHz	2.000 00mA	2.000 07mA	400nA
2mA Rng: 10kHz #	2.000 00mA	2.000 10mA	1.8uA
20mA Rng: 40Hz	2.100 0mA	2.099 9mA	430nA
20mA Rng: 200Hz	2.100 0mA	2.100 0mA	430nA
20mA Rng: 10kHz #	2.100 0mA	2.099 0mA	1.9uA
20mA Rng: 56Hz	10.000 0mA	10.004 2mA	2uA
20mA Rng: 10Hz #	20.000 0mA	20.000 7mA	26uA
20mA Rng: 40Hz	20.000 0mA	20.000 2mA	4uA
20mA Rng: 1kHz	20.000 0mA	20.001 0mA	4uA
20mA Rng: 10kHz #	20.000 0mA	20.001 0mA	18uA
200mA Rng: 40Hz	21.000mA	21.003mA	4.2uA
200mA Rng: 200Hz	21.000mA	21.001mA	4.2uA
200mA Rng: 10kHz #	21.000mA	20.981mA	19uA
200mA Rng: 10Hz #	200.000mA	200.004mA	75uA
200mA Rng: 40Hz	200.000mA	200.026mA	40uA
200mA Rng: 56Hz	200.000mA	200.016mA	40uA
200mA Rng: 1kHz	200.000mA	199.990mA	40uA
200mA Rng: 10kHz #	200.000mA	200.008mA	180uA
2A Rng: 40Hz	0.210 00A	0.209 95A	42uA
2A Rng: 200Hz	0.210 00A	0.209 95A	42uA
2A Rng: 2kHz #	0.210 00A	0.209 97A	0.19mA
2A Rng: 10Hz #	2.000 00A	1.999 91A	0.9mA
2A Rng: 40Hz	2.000 00A	1.999 93A	0.5mA

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2A Rng: 56Hz	2.000 00A	1.999 97A	0.5mA
2A Rng: 1kHz	2.000 00A	1.999 94A	0.5mA
2A Rng: 2kHz #	2.000 00A	1.999 99A	1.8mA
20A Rng: 40Hz	2.100 00A	2.098 91A	530uA
20A Rng: 200Hz	2.100 00A	2.098 98A	530uA
20A Rng: 10Hz #	20.000 00A	19.998 29A	26mA
20A Rng: 40Hz	20.000 00A	20.008 51A	5mA
20A Rng: 56Hz	20.000 00A	19.996 24A	5mA
20A Rng: 100Hz	20.000 00A	20.002 42A	5mA
20A Rng: 1kHz #	20.000 00A	19.997 40A	5mA
20A Rng: 2kHz #	20.000 00A	19.998 05A	5mA

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Test Title	Applied Value	Reading	Uncertainties
2 Wire Resistance measured as value at terminals.			
0 Ω 2 Wire	0.173 0 Ω	0.173 6 Ω	0.8m Ω
10 Ω 2 Wire	10.185 Ω	10.185 Ω	1m Ω
100 Ω 2 Wire	100.177 Ω	100.177 Ω	1.3m Ω
1k Ω 2 Wire	1.000 170k Ω	1.000 170k Ω	3.8m Ω
10k Ω 2 Wire	9.999 85k Ω	9.999 81k Ω	21m Ω
100k Ω 2 Wire	100.040 9k Ω	100.040 9k Ω	620m Ω
1M Ω 2 Wire	0.999 988M Ω	0.999 988M Ω	14 Ω
10M Ω 2 Wire	10.003 93M Ω	10.003 95M Ω	150 Ω
100M Ω 2 Wire	100.193 0M Ω	100.192 5M Ω	4.5k Ω
4 Wire Ohms Measured relative to Zero			
10 Ω 4 Wire	10.000 000 Ω	10.000 128 Ω	150u Ω
100 Ω 4 Wire	100.000 00 Ω	99.998 28 Ω	0.4m Ω
1k Ω 4 Wire	0.999 986 1k Ω	0.999 985 9k Ω	3m Ω
10k Ω 4 Wire	9.999 623k Ω	9.999 624k Ω	12m Ω
100k Ω 4 Wire	100.040 90k Ω	100.040 38k Ω	800m Ω
Capacitance @ 1kHz Measured Cp up to 1uF, Cs above			
10nF	9.962nF	9.962nF	12pF
20nF	19.848nF	19.848nF	28pF
50nF	50.160nF	50.160nF	35pF
100nF	100.58nF	100.58nF	60pF
1uF	0.988 3uF	0.988 3uF	0.52nF
Reference Frequency Output			
Frequency	10.000 000MHz	9.999 984MHz	2Hz
Frequency	1.000 000 0MHz	0.999 998 8MHz	0.2Hz
Frequency	100.000 00kHz	99.999 88kHz	0.02Hz
Frequency	50.000 000kHz	49.999 937kHz	0.01Hz
Frequency	20.000 000kHz	19.999 975kHz	0.004Hz
Frequency	10.000 000kHz	9.999 988kHz	2mHz
Frequency	1.000 000 0kHz	0.999 998 9kHz	0.2mHz
Frequency	100.000 00Hz	99.999 83Hz	0.02mHz
Power Option: AC Voltage Measurements (Current out = 3A)			
20V Range : 56Hz	20.000V	20.001V	2.4mV
200V Range : 60Hz	50.000V	50.012V	6mV
200V Range : 60Hz	100.000V	100.016V	12mV
200V Range : 45Hz	200.000V	199.998V	24mV
200V Range : 60Hz	200.000V	200.010V	24mV
200V Range : 400Hz	200.000V	199.985V	24mV
1000V Range : 60Hz	500.000V	500.072V	105mV
Power Option: AC Current (Voltage out = 20V)			
20A Rng: 56Hz	3.000 00A	3.000 53A	0.8mA
20A Rng: 56Hz	5.000 00A	5.000 86A	1.3mA
20A Rng: 45Hz	10.000 00A	10.001 98A	2.5mA
20A Rng: 56Hz	10.000 00A	10.001 92A	2.5mA
20A Rng: 400Hz	10.000 00A	9.994 25A	4.1mA
20A Rng: 56Hz	15.000 00A	14.999 40A	3.8mA
2A Rng: 56Hz	2.000 00A	1.999 80A	0.5mA
2A Rng: 56Hz	0.500 00A	0.500 29A	125uA
DC Current output on Power (DC Voltage out = 20V)			
20A DC Rng	20.000 00A	20.001 76A	1mA

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20A DC Rng	3.000 00A	3.001 63A	144uA
2A DC Rng	2.000 00A	1.999 88A	96uA
2A DC Rng	0.300 00A	0.300 05A	8.7uA
DC Voltage output on Power (DC Current = 3Amp)			
20V Range DC	20.000 0V	20.000 1V	66uV
200V Range DC	200.000V	200.000V	660uV
1000V Range DC	500.000V	499.998V	1.7mV
Phase Angle, Measured at 150V/5A 50Hz AC			
0° Phase Angle#	0.00°	0.00°	0.05°
60° Phase Angle#	60.00°	60.00°	0.05°
90° Phase Angle#	90.00°	90.00°	0.05°

End Of Results