

CERTIFICATE OF CALIBRATION

Issued By Transmille Ltd.
Date of Issue 25 June 2004

Certificate Number EXAMPLE2



Approved Signatory

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SIGNATORY
2

Signatory 3 Signatory 2 Signatory 1

Customer : DEMO COMPANY
ANY ROAD, ANY TOWN
ANY COUNTY

Date Received : 25 June 2004

Instrument :	System ID :	EXAMPLE2	Job Number :	EX2
	Description :	Electrical Test Calibrator		
	Manufacturer :	Transmille		
	Model Number :	2100HGAE		
	Serial Number :	EXAMPLE2100		
	Procedure Version :	1.5/A/N		

Environmental Conditions

Temperature : 20°C +/- 1°C	Mains Voltage : 240V +/- 10V
Relative Humidity : 50% +/- 20%	Mains Frequency : 50Hz +/- 1Hz

Comments

Instrument was allowed to stabilise for at least 12 hours before calibration.
Instrument calibrated with tests lead set supplied
Manual loop impedance set to zero.
4 Wire kelvin connections were used for ohms measurements below 10kOhms
Tests marked # are not UKAS accredited 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 : 25 June 2004

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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Test Title	Applied Value	Reading	Uncertainties
Insulation Resistance			
10 kOhms	10.000 0k Ω	9.999 5k Ω	470m Ω
20 kOhms	20.000 0k Ω	19.999 2k Ω	730m Ω
30 kOhms	30.000 0k Ω	29.992 3k Ω	950m Ω
40 kOhms	40.000 0k Ω	40.012 7k Ω	1.2 Ω
60 kOhms	60.000 0k Ω	59.998 5k Ω	1.6 Ω
100 kOhms	100.000k Ω	100.012k Ω	2.8 Ω
200 kOhms	200.000k Ω	200.023k Ω	5.7 Ω
400 kOhms	400.000k Ω	400.023k Ω	11 Ω
600 kOhms	600.000k Ω	599.931k Ω	16 Ω
1 MOhms	1.000 00M Ω	1.000 29M Ω	30 Ω
2 MOhms	2.000 00M Ω	2.000 33M Ω	130 Ω
3 MOhms	3.000 00M Ω	3.000 51M Ω	190 Ω
4 MOhms	4.000 00M Ω	4.000 26M Ω	250 Ω
5 MOhms	5.000 00M Ω	5.000 99M Ω	1k Ω
6 MOhms	6.000 00M Ω	5.976 17M Ω	1.3k Ω
7 MOhms	7.000 00M Ω	6.975 57M Ω	1.5k Ω
8 MOhms	8.000 00M Ω	7.976 36M Ω	1.7k Ω
9 MOhms	9.000 00M Ω	8.975 60M Ω	1.9k Ω
10 MOhms	10.000 0M Ω	9.955 7M Ω	2.1k Ω
20 MOhms	20.000 0M Ω	19.921 4M Ω	12k Ω
30 MOhms	30.000 0M Ω	29.869 4M Ω	18k Ω
40 MOhms	40.000 0M Ω	39.829 9M Ω	24k Ω
50 MOhms	50.000 0M Ω	50.007 4M Ω	31k Ω
60 MOhms	60.000 0M Ω	59.946 7M Ω	37k Ω
70 MOhms	70.000 0M Ω	69.909 9M Ω	43k Ω
80 MOhms	80.000 0M Ω	79.863 8M Ω	49k Ω
90 MOhms	90.000 0M Ω	89.815 5M Ω	55k Ω
100 MOhms	100.000M Ω	99.953M Ω	61k Ω
200 MOhms	200.000M Ω	200.244M Ω	1.2M Ω
400 MOhms	400.000M Ω	401.023M Ω	2.3M Ω
600 MOhms	600.00M Ω	600.50M Ω	3.5M Ω
800 MOhms	800.00M Ω	801.93M Ω	4.6M Ω
1 GOhms	1.000 0G Ω	0.998 5G Ω	5.8M Ω
2 GOhms #	2.000G Ω	2.002G Ω	8.9M Ω
4 GOhms #	4.00G Ω	3.92G Ω	18.1M Ω
6 GOhms #	6.00G Ω	6.11G Ω	27M Ω
8 GOhms #	8.00G Ω	8.08G Ω	36M Ω
10 GOhms #	10.00G Ω	10.07G Ω	45M Ω

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Test Title	Applied Value	Reading	Uncertainties
Continuity Resistance			
<i>Connection to the 2100 insulation test terminals was made using 4 wire ohms with the system nulled when shorted at the terminals. The readings recorded are the resistance measured at the terminals and include any residual resistance of the 2100.</i>			
100 mOhms	100.0mΩ	101.1mΩ	570uΩ
110 mOhms	110.0mΩ	111.8mΩ	570uΩ
120 mOhms	120.0mΩ	122.4mΩ	570uΩ
130 mOhms	130.0mΩ	130.5mΩ	570uΩ
140 mOhms	140.0mΩ	143.2mΩ	570uΩ
150 mOhms	150.0mΩ	153.0mΩ	570uΩ
160 mOhms	160.0mΩ	160.1mΩ	570uΩ
170 mOhms	170.0mΩ	168.6mΩ	570uΩ
180 mOhms	180.0mΩ	182.8mΩ	570uΩ
190 mOhms	190.0mΩ	193.3mΩ	570uΩ
200 mOhms	200.0mΩ	203.8mΩ	570uΩ
300 mOhms	300.0mΩ	302.2mΩ	580uΩ
400 mOhms	400.0mΩ	388.2mΩ	580uΩ
500 mOhms	500.0mΩ	504.4mΩ	590uΩ
600 mOhms	600.0mΩ	598.7mΩ	590uΩ
700 mOhms	700.0mΩ	687.9mΩ	600uΩ
800 mOhms	800.0mΩ	800.3mΩ	600uΩ
900 mOhms	900.0mΩ	901.0mΩ	610uΩ
1 Ohms	1.000 0Ω	0.997 9Ω	610uΩ
2 Ohms	2.000 0Ω	1.981 8Ω	660uΩ
4 Ohms	4.000 0Ω	3.991 3Ω	760uΩ
6 Ohms	6.000 0Ω	5.991 8Ω	860uΩ
8 Ohms	8.000 0Ω	7.992 7Ω	960uΩ
10 Ohms	10.000 0Ω	9.969 7Ω	1.1mΩ
20 Ohms	20.000 0Ω	19.989 1Ω	1.7mΩ
100 Ohms	100.000Ω	100.007Ω	6.4mΩ
1 kOhms	1.000 00kΩ	1.000 10kΩ	53mΩ
Continuity Current			
100mA	100.0mA	100.0mA	120uA
200mA	200.0mA	199.7mA	130uA
300mA	300.0mA	299.4mA	240uA

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Test Title	Applied Value	Reading	Uncertainties
AC Voltage Output			
100 Volts Nom @ 50Hz	102.1V	102.2V	140mV
200 Volts Nom @ 50Hz	204.9V	204.8V	150mV
Line Volts @ 50Hz	242.3V	242.2V	160mV
300 Volts Nom @ 50Hz	307.4V	307.3V	190mV
400 Volts Nom @ 50Hz	409.7V	409.7V	230mV
Insulation Resistance Voltage Measurement			
50V	50.0V	50.0V	120mV
100V	100.0V	100.0V	120mV
250V	150.0V	149.9V	120mV
250V	200.0V	200.0V	130mV
250V	250.0V	250.0V	130mV
500V	500.0V	500.0V	160mV
1000V	1 000.0V	1 000.0V	250mV
Loop Resistance			
<i>Loop impedance was measured using 4 wire ohms connections between the earth pin of the 2100 supply lead and the UUT 13 AMP socket at the end of the supplied test adaptor lead. The supplied loop impedance was manually entered as zero and the system was nulled with the 2100 set to zero loop impedance. The recorded readings are the differences recorded from zero.</i>			
Loop Lead No	1 000a	1 062a	
Loop Adaptor	25.0m Ω	12.2m Ω	840u Ω
Loop Res.	0.063 8 Ω	0.063 0 Ω	1m Ω
Loop Res.	0.115 7 Ω	0.116 3 Ω	1.1m Ω
Loop Res.	0.236 6 Ω	0.235 9 Ω	1.1m Ω
Loop Res.	0.344 6 Ω	0.344 8 Ω	1.2m Ω
Loop Res.	0.512 1 Ω	0.511 5 Ω	1.3m Ω
Loop Res.	1.009 4 Ω	1.012 5 Ω	1.5m Ω
Loop Res.	5.062 3 Ω	5.063 0 Ω	3.5m Ω
Loop Res.	10.065 4 Ω	10.065 4 Ω	6m Ω
Loop Res.	99.273 Ω	99.272 Ω	18m Ω
Loop Res.	994.550 Ω	994.911 Ω	35m Ω
RCD Current			
10mA @ 50Hz	10.00mA	10.00mA	15uA
30mA @ 50Hz	30.00mA	30.00mA	40uA
100mA @ 50Hz	90.00mA	90.00mA	75uA
100mA @ 50Hz	100.00mA	100.04mA	81uA
100mA @ 50Hz	110.00mA	109.94mA	87uA
300mA @ 50Hz	300.0mA	300.1mA	410uA
1A @ 50Hz	1.000 0A	1.000 2A	870uA
2A @ 50Hz	2.000A	2.000A	2mA

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RCD Trip current			
150mA @ 30ms	150.0mA	153.6mA	0.1mA
RCD Trip time			
40ms	40.0ms	39.4ms	0.4ms
400ms	400.0ms	399.4ms	0.4ms

PAT : Insulation Resistance

The PAT Insulation Resistance is produced from the same decade resistance arm as used for the Insulation Resistance output. The following Tests are only to confirm the operation of the output switching. For the Full range of values, use the Insulation measurements on this certificate.

1 MOhms	1.000 00M Ω	1.000 28M Ω	30 Ω
2 MOhms	2.000 00M Ω	2.000 31M Ω	130 Ω
4 MOhms	4.000 00M Ω	4.000 18M Ω	250 Ω
6 MOhms	6.000 00M Ω	5.974 74M Ω	1.3k Ω
8 MOhms	8.000 00M Ω	7.973 66M Ω	1.7k Ω
10 MOhms	10.000 0M Ω	9.930 8M Ω	2.1k Ω

PAT : Earth Bond Resistance

The resistances recorded include the resistance of the PAT test mains lead (approx 25milliohms)

PAT Adaptor Lead No	1 000a	1 003a	
PAT lead	25.0m Ω	27.5m Ω	2m Ω
Bond Res. (Cal)	0.107 5 Ω	0.107 0 Ω	1m Ω
Bond Res.	0.045 5 Ω	0.044 5 Ω	1m Ω
Bond Res.	0.107 5 Ω	0.107 3 Ω	1m Ω
Bond Res.	0.160 0 Ω	0.160 3 Ω	1.1m Ω
Bond Res.	0.279 0 Ω	0.279 6 Ω	1.1m Ω
Bond Res.	0.388 8 Ω	0.389 1 Ω	1.2m Ω
Bond Res.	0.556 3 Ω	0.556 6 Ω	1.3m Ω
Bond Res.	1.054 6 Ω	1.054 7 Ω	1.5m Ω
Bond Res.	5.108 0 Ω	5.106 0 Ω	3.5m Ω
Bond Res.	10.109 8 Ω	10.109 8 Ω	6m Ω
Bond Res.	99.339 Ω	99.339 Ω	18m Ω
Bond Res.	998.880 Ω	998.871 Ω	35m Ω

PAT : Earth Bond Current

100mA @ 50Hz	0.100A	0.100A	1.2mA
10A @ 50Hz	8.00A	8.00A	16mA
10A @ 50Hz	10.00A	9.99A	18mA
20A @ 50Hz	20.00A	20.03A	28mA

PAT: LOAD TESTS

S/C TEST	0.00 Ω	0.25 Ω	10m Ω
O/C TEST	---	Pass	
0.13KVA TEST	440.0 Ω	442.6 Ω	0.1 Ω

PAT: LEAKAGE CURRENT TEST

Leakage @ 240V	2.000mA	1.990mA	9.3uA
Leakage @ 240V	4.700mA	4.680mA	9.3uA
Leakage @ 240V	7.700mA	7.660mA	9.3uA

----- END OF TEST DATA -----