CERTIFICATE OF CALIBRATION

Issued By Transmille Ltd. **Certificate Number** 30109

Date of Issue 20 January 2016

0324

Approved Signatory

Transmille Ltd.
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☐ G.A. Shapland ☒ M.A. Bailey ☐ S.A. Hawkins ☐ J.A. Bailey

Customer : TRANSMILLE LTD.
UNIT 4 SELECT BUSINESS CENTRE, LODGE ROAD
STAPLEHURST KENT. TN12 0QW

Date Received : 14 January 2016

Instrument :

System ID :	T00006131	Job Number :	59790
Description :	Electrical Test Calibrator		
Manufacturer :	Transmille	Site :	
Model Number :	3200B	Location :	
Serial Number :	M1402A16		
Procedure Version :	1.7AT/N		

Environmental Conditions

Temperature :	20°C +/- 1°C	Mains Voltage :	230V +/- 12V
Relative Humidity :	50% +/- 20%	Mains Frequency :	50Hz +/- 1Hz

Comments

Instrument was allowed to stabilise for at least 12 hours before calibration.
Instrument calibrated with Bond lead supplied
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 : G.A. Shapland **Date of Calibration :** 20 January 2016

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Test Title	Applied Value	Reading	Uncertainties
Download Cal Factors	---	Pass	
3200A Version 10.3.2			
Insulation Resistance (0.01M Ohms to 2000M Ohms)			
10kΩ	10.000 0kΩ	9.994 6kΩ	430mΩ
20kΩ	20.000 0kΩ	20.007 3kΩ	610mΩ
30kΩ	30.000 0kΩ	29.994 6kΩ	610mΩ
40kΩ	40.000 0kΩ	40.009 0kΩ	610mΩ
60kΩ	60.000 0kΩ	60.009 3kΩ	610mΩ
100kΩ	100.000kΩ	100.033kΩ	2Ω
200kΩ	200.000kΩ	200.038kΩ	6Ω
400kΩ	400.000kΩ	400.051kΩ	10Ω
600kΩ	600.000kΩ	600.171kΩ	14Ω
1MΩ	1.000 00MΩ	1.000 35MΩ	22Ω
2MΩ	2.000 00MΩ	2.000 39MΩ	250Ω
3MΩ	3.000 00MΩ	3.000 74MΩ	310Ω
4MΩ	4.000 00MΩ	4.000 60MΩ	370Ω
5MΩ	5.000 00MΩ	5.012 23MΩ	430Ω
6MΩ	6.000 00MΩ	6.012 58MΩ	500Ω
7MΩ	7.000 00MΩ	7.012 53MΩ	580Ω
8MΩ	8.000 00MΩ	8.012 85MΩ	660Ω
9MΩ	9.000 00MΩ	9.012 63MΩ	740Ω
10MΩ	10.000 0MΩ	10.045 7MΩ	830Ω
20MΩ	20.000 0MΩ	20.051 2MΩ	14kΩ
30MΩ	30.000 0MΩ	30.095 9MΩ	20kΩ
40MΩ	40.000 0MΩ	40.090 4MΩ	25kΩ
50MΩ	50.000 0MΩ	49.872 6MΩ	32kΩ
60MΩ	60.000 0MΩ	59.929 0MΩ	38kΩ
70MΩ	70.000 0MΩ	69.941 1MΩ	44kΩ
80MΩ	80.000 0MΩ	79.991 7MΩ	51kΩ
90MΩ	90.000 0MΩ	89.990 8MΩ	57kΩ
100MΩ	100.000MΩ	99.661MΩ	64kΩ
200MΩ	200.000MΩ	199.236MΩ	1.6MΩ
400MΩ	400.000MΩ	398.832MΩ	3.2MΩ
600MΩ	600.000MΩ	600.357MΩ	4.9MΩ
800MΩ	800.000MΩ	799.742MΩ	6.5MΩ
1000MΩ	1 000.0MΩ	995.6MΩ	8.1MΩ
2000MΩ #	2 000.0MΩ	1 994.9MΩ	8.9MΩ
10G (10 000M) Ohm Option			
4GΩ #	4.000GΩ	3.998GΩ	18.1MΩ
6GΩ #	6.000GΩ	5.976GΩ	27MΩ
8GΩ#	8.000GΩ	7.981GΩ	36MΩ
10GΩ #	10.000GΩ	9.974GΩ	45MΩ

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Test Title	Applied Value	Reading	Uncertainties
Continuity Resistance **Connection to the 3200 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 3200.**			
50mΩ	50.0mΩ	50.0mΩ	270uΩ
100mΩ	100.0mΩ	100.3mΩ	270uΩ
200mΩ	200.0mΩ	200.3mΩ	270uΩ
210mΩ	210.0mΩ	210.1mΩ	270uΩ
220mΩ	220.0mΩ	219.9mΩ	270uΩ
230mΩ	230.0mΩ	230.4mΩ	270uΩ
240mΩ	240.0mΩ	240.3mΩ	270uΩ
250mΩ	250.0mΩ	250.1mΩ	270uΩ
260mΩ	260.0mΩ	260.6mΩ	270uΩ
270mΩ	270.0mΩ	270.4mΩ	270uΩ
280mΩ	280.0mΩ	280.2mΩ	270uΩ
290mΩ	290.0mΩ	290.7mΩ	270uΩ
300mΩ	300.0mΩ	300.5mΩ	270uΩ
400mΩ	400.0mΩ	400.5mΩ	270uΩ
500mΩ	500.0mΩ	500.5mΩ	270uΩ
600mΩ	600.0mΩ	600.4mΩ	270uΩ
700mΩ	700.0mΩ	700.4mΩ	270uΩ
800mΩ	800.0mΩ	800.4mΩ	270uΩ
900mΩ	900.0mΩ	900.4mΩ	270uΩ
1Ω	1.000 0Ω	1.000 3Ω	270uΩ
2Ω	2.000 0Ω	2.000 9Ω	270uΩ
4Ω	4.000 0Ω	4.001 2Ω	290uΩ
6Ω	6.000 0Ω	6.001 0Ω	310uΩ
8Ω	8.000 0Ω	8.001 3Ω	330uΩ
10Ω	10.000 0Ω	10.000 9Ω	350uΩ
20Ω	20.000 0Ω	20.022 1Ω	890uΩ
50Ω	50.000 0Ω	50.031 9Ω	1.7mΩ
100Ω	100.000Ω	100.040Ω	2.3mΩ
500Ω	500.000Ω	500.074Ω	8mΩ
1kΩ	1.000 00kΩ	1.000 86kΩ	17mΩ
5kΩ	5.000 0kΩ	5.001 1kΩ	93mΩ
10kΩ	10.000 0kΩ	10.001 2kΩ	430mΩ
20kΩ	20.000 0kΩ	20.000 6kΩ	610mΩ
40kΩ	40.000 0kΩ	40.002 8kΩ	860mΩ
50kΩ	50.000 0kΩ	50.001 7kΩ	860mΩ
Continuity Current (Range 0 to 320mA D.C.)			
10mA	10.00mA	10.0mA	0.4mA
50mA	50.00mA	50.1mA	0.4mA
100mA	100.00mA	100.0mA	0.4mA
200mA	200.00mA	200.0mA	0.4mA
300mA	300.00mA	300.0mA	0.4mA

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Test Title	Applied Value	Reading	Uncertainties
AC Voltage Output (100V - 200V - Line - 300V - 400V)			
100 Volts Nom @ 50Hz	100.65V	100.8V	140mV
200 Volts Nom @ 50Hz	201.71V	201.8V	150mV
Line Volts @ 50Hz	242.77V	242.6V	160mV
300 Volts Nom @ 50Hz	302.60V	302.7V	190mV
400 Volts Nom @ 50Hz	403.82V	403.7V	230mV
Insulation Resistance Voltage Measurement			
Insulation Resistance Voltage Measurement -16th Edition (D.C. Voltage)			
50V	50.00V	50.0V	120mV
100V	100.00V	100.0V	120mV
250V	150.00V	150.1V	300mV
250V	200.00V	200.0V	300mV
250V	250.00V	250.0V	300mV
500V	500.00V	500.0V	520mV
1000V	1 000.00V	1 000.1V	1.2V
Insulation Resistance D.C. Current Measurement -16th Edition 500V / 1000V Ranges			
1.0mA @ 500V	1.000 0mA	1.000mA	4uA
1.0mA @ 1000V	1.000 0mA	1.000mA	4uA
Insulation Resistance Voltage Measurement -17th Edition (D.C. Voltage)			
50V	50.00V	50.0V	120mV
100V	100.00V	100.0V	120mV
250V	150.00V	150.1V	300mV
250V	200.00V	200.0V	300mV
250V	250.00V	250.0V	300mV
500V	500.00V	500.1V	520mV
1000V	1 000.00V	999.9V	1.2V
Insulation Resistance D.C. Current Measurement -17th Edition 500V / 1000V Range			
0.5mA @ 500V	0.500 0mA	0.500mA	4uA
1.0mA @ 1000V	1.000 0mA	1.000mA	4uA
Loop Resistance			
Loop impedance was measured using 4 wire ohms connections between the earth pin of the 3200 loop test socket and the earth pin of the 3200 mains supply lead. The supply loop impedance was manually entered as zero and the measurement system was nulled. The recorded readings are the differences recorded from the zero value.			
Loop Res.	0.053 6Ω	0.053 6Ω	1mΩ
Loop Res.	0.119 2Ω	0.119 2Ω	1.1mΩ
Loop Res.	0.217 3Ω	0.217 3Ω	1.1mΩ
Loop Res.	0.338 3Ω	0.338 5Ω	1.2mΩ
Loop Res.	0.479 3Ω	0.479 0Ω	1.3mΩ
Loop Res.	0.959 4Ω	0.959 6Ω	1.5mΩ
Loop Res.	5.010 1Ω	5.009 2Ω	1.5mΩ
Loop Res.	9.033 0Ω	9.033 1Ω	6mΩ
Loop Res.	90.299Ω	90.299Ω	18mΩ
Loop Res.	990.507Ω	990.512Ω	35mΩ
RCD Current			

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Test Title	Applied Value	Reading	Uncertainties
10mA @ 50Hz	2.000mA	2.00mA	20uA
10mA @ 50Hz	10.000mA	10.00mA	20uA
30mA @ 50Hz	6.000mA	6.00mA	80uA
30mA @ 50Hz	30.000mA	29.99mA	80uA
100mA @ 50Hz	20.000mA	19.99mA	150uA
100mA @ 50Hz	90.000mA	89.98mA	160uA
100mA @ 50Hz	100.000mA	99.98mA	160uA
100mA @ 50Hz	110.000mA	109.97mA	170uA
300mA @ 50Hz	60.000mA	60.01mA	240uA
300mA @ 50Hz	150.000mA	149.89mA	240uA
300mA @ 50Hz	300.000mA	299.98mA	840uA
1000mA @ 50Hz	200.00mA	200.1mA	1.7mA
1000mA @ 50Hz	1 000.00mA	999.5mA	1.7mA
3000mA @ 50Hz	400.00mA	400.3mA	3mA
3000mA @ 50Hz	2 000.00mA	1 999.7mA	3mA

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RCD Trip time - 0°			
20ms	20.0ms	20.3ms	0.5ms
30ms	30.0ms	29.7ms	0.5ms
40ms	40.0ms	40.3ms	0.5ms
100ms	100.0ms	100.3ms	0.5ms
200ms	200.0ms	200.2ms	0.5ms
390ms	390.0ms	389.8ms	0.5ms
900ms	900.0ms	899.7ms	8.1ms
RCD Trip time - 180°			
30ms	30.0ms	30.4ms	0.5ms
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.			
1MΩ	1.000 35MΩ	1.000 30MΩ	22Ω
2MΩ	2.000 39MΩ	2.000 31MΩ	170Ω
4MΩ	4.000 60MΩ	4.000 38MΩ	330Ω
6MΩ	6.012 58MΩ	6.010 75MΩ	500Ω
8MΩ	8.012 85MΩ	8.010 66MΩ	660Ω
10MΩ	10.045 7MΩ	10.042 6MΩ	830Ω
PAT : Earth Bond Resistance			
The resistances recorded include the resistance of the PAT test mains lead (approx 25milliohms)			
PAT Lead No	1 000a	3 639a	
PAT Lead Resistance	25.0mΩ	19.7mΩ	260uΩ
Bond Res.	0.045 6Ω	0.045 6Ω	1mΩ
Bond Res.	0.102 2Ω	0.102 1Ω	1mΩ
Bond Res.	0.169 0Ω	0.169 0Ω	1.1mΩ
Bond Res.	0.277 9Ω	0.277 9Ω	1.1mΩ
Bond Res.	0.399 7Ω	0.399 8Ω	1.2mΩ
Bond Res.	0.539 8Ω	0.539 8Ω	1.3mΩ
Bond Res.	1.018 7Ω	1.018 2Ω	1.5mΩ
Bond Res.	5.055 3Ω	5.053 0Ω	3.5mΩ
Bond Res.	9.077 5Ω	9.077 8Ω	6mΩ
Bond Res.	90.368Ω	90.367 6Ω	18mΩ
Bond Res.	990.839Ω	990.844 0Ω	35mΩ

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Test Title	Applied Value	Reading	Uncertainties
PAT : Earth Bond Current Measurement at 0.1 Ohm load			
500mA Rng @ 50Hz	100.0mA	101mA	1.2mA
500mA Rng @ 50Hz	200.0mA	200mA	1.2mA
500mA Rng @ 50Hz	400.0mA	401mA	1.2mA
10A Rng @ 50Hz	4.000A	4.00A	15mA
10A Rng @ 50Hz	8.000A	8.00A	15mA
10A Rng @ 50Hz	10.000A	10.01A	16mA
30A Rng @ 50Hz	12.000A	12.01A	22mA
30A Rng @ 50Hz	20.000A	20.01A	22mA
30A Rng @ 50Hz	25.000A	25.00A	22mA
PAT : Earth Bond Current Measurement at 0.02 Ohm load			
10A Rng @ 50Hz	4.000A	4.00A	15mA
30A Rng @ 50Hz	25.000A	25.00A	22mA
PAT: Load Testing			
S/C Test	0.00Ω	0.23Ω	10mΩ
O/C test	---	Pass	
0.13kVA Test	440Ω	435.1Ω	0.1Ω
PAT: Leakage Current			
Leakage @ 240V	2.000mA	2.000mA	9.3uA
Leakage @ 240V	4.700mA	4.703mA	9.3uA
Leakage @ 240V	7.700mA	7.699mA	9.3uA
Final Checks	---	Pass	

End of results