CERTIFICATE OF CALIBRATION

Issued By Transmille Ltd.

Certificate Number 34360

Date of Issue 20 September 2017

0324

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Approved Signatory

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Customer : PT SENTRAL TEHNOLOGI MANAGEMEN
CIKARANG SQUARE, BLOK B NO 11
KABUPATEN BEKASI - JAWA BARAT INDONESIA

Date Received : 20 September 2017

Instrument :

System ID :	T00010024	Job Number :	66986
Description :	Source/Measure T/C Adapter	Ref. Number :	
Manufacturer :	Transmille	Site :	
Model Number :	EA001A	Location :	
Serial Number :	112164I17		
Procedure Version :	12/N		

Environmental Conditions

Temperature : 20°C +/- 1°C
Relative Humidity : 40% +/- 20%

Mains Voltage : 230V +/- 12V
Mains Frequency : 50Hz +/- 1Hz

Comments

Instrument was allowed to stabilise for at least 12 hours before calibration.
Reference temperature of 0'C used for the thermocouple CJC.
Temperature Scale ITS90
Temperature measurement uncertianties apply to the applied mV input
(the calculated equivalent temperature at the points on the scale)

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 : E. Bailey

Date of Calibration : 20 September 2017

CERTIFICATE OF CALIBRATION

UKAS Accredited Calibration Laboratory No. 0324
AFTER ADJUSTMENT RESULTS

Certificate Number
34360

Test Title	Applied Value	Reading	Uncertainties
Cold Junction Compensation - Simulation (Source)			
CJC Temp Measurement	20.00°C	20.00°C	0.12°C
Cold Junction Compensation - Measure (Readback)			
CJC Temp Measurement	20.0°C	20.0°C	0.22°C
Figures in brackets ( ) are the equivalent voltage for the temperature input			
Temperature Measure - Type K - CJC at 0°C - ITS90			
-190°C (-5.730mV)	-190.00°C	-189.97°C	0.20°C
-140°C (-4.669mV)	-140.00°C	-140.00°C	0.15°C
-100°C (-3.554mV)	-100.00°C	-99.98°C	0.10°C
-50°C (-1.889mV)	-50.00°C	-49.97°C	0.10°C
-25°C (-0.968mV)	-25.00°C	-25.00°C	0.10°C
0°C (0.000mV)	0.00°C	0.03°C	0.10°C
100°C (4.096mV)	100.00°C	99.99°C	0.10°C
122°F (2.023mV)	122.00°F	122.00°F	0.18°F
212°F (4.096mV)	212.00°F	212.01°F	0.18°F
120°C (4.920mV)	120.00°C	120.00°C	0.10°C
200°C (8.138mV)	200.00°C	199.99°C	0.10°C
500°C (20.644mV)	500.00°C	499.97°C	0.10°C
700°C (29.129mV)	700.00°C	700.00°C	0.10°C
1000°C (41.276mV)	1 000.00°C	999.99°C	0.10°C
1370°C (54.819mV)	1 370.00°C	1 370.00°C	0.10°C
Temperature Measure - Type J - CJC at 0°C - ITS90			
-200°C (-7.890mV)	-200.00°C	-199.99°C	0.20°C
0°C (0.000mV)	0.00°C	0.02°C	0.10°C
400°C (21.848mV)	400.00°C	399.99°C	0.10°C
1200°C (69.553mV)	1 200.00°C	1 200.01°C	0.10°C
Temperature Measure - Type T - CJC at 0°C - ITS90			
-240°C (-6.105mV)	-240.00°C	-240.07°C	0.40°C
0°C (0.000mV)	0.00°C	0.00°C	0.10°C
400°C (20.872mV)	400.00°C	399.98°C	0.10°C
Temperature Measure - Type R - CJC at 0°C - ITS90			
0°C (0.000mV)	0.00°C	0.09°C	0.55°C
400°C (3.408mV)	400.00°C	399.95°C	0.30°C
1760°C (21.003mV)	1 760.00°C	1 759.91°C	0.25°C
Temperature Measure - Type S - CJC at 0°C - ITS90			
0°C (0.000mV)	0.00°C	0.01°C	0.55°C
400°C (3.259mV)	400.00°C	399.96°C	0.30°C
1760°C (18.609mV)	1 760.00°C	1 759.92°C	0.25°C
Temperature Measure - Type N - CJC at 0°C - ITS90			
-190°C (-3.884mV)	-190.00°C	-189.97°C	0.30°C
-25°C (-0.646mV)	-25.00°C	-25.04°C	0.15°C
120°C (3.374mV)	120.00°C	119.99°C	0.10°C
1300°C (47.513mV)	1 300.00°C	1 299.99°C	0.10°C
Temperature Measure - Type B - CJC at 0°C - ITS90			
600°C (1.792mV)	600.00°C	600.01°C	0.45°C

CERTIFICATE OF CALIBRATION

UKAS Accredited Calibration Laboratory No. 0324
AFTER ADJUSTMENT RESULTS

Certificate Number
34360

Test Title	Applied Value	Reading	Uncertainties
1000°C (4.834mV)	1 000.00°C	999.93°C	0.30°C
1820°C (13.820mV)	1 820.00°C	1 819.97°C	0.25°C
Temperature Measure - Type E - CJC at 0°C - ITS90			
-240°C (-9.604mV)	-240.00°C	-239.98°C	0.30°C
-25°C (-1.432mV)	-25.00°C	-25.04°C	0.10°C
350°C (24.964mV)	350.00°C	349.99°C	0.03°C
1000°C (76.373mV)	1 000.00°C	1 000.02°C	0.10°C
Temperature Measure - Type L - CJC at 0°C - ITS90			
-200°C (8.158mV)	-200.00°C	-200.02°C	0.10°C
0°C (0.000mV)	0.00°C	0.00°C	0.10°C
900°C (53.154mV)	900.00°C	900.00°C	0.10°C
Temperature Measure - Type U - CJC at 0°C - ITS90			
-200°C (-5.696mV)	-200.00°C	-199.96°C	0.15°C
0°C (0.000mV)	0.00°C	0.00°C	0.10°C
600°C (34.309mV)	600.00°C	599.97°C	0.10°C
Temperature Measure - Type C - CJC at 0°C - ITS90			
10°C (0.135mV)	10.00°C	10.01°C	0.25°C
650°C (11.583mV)	650.00°C	649.98°C	0.15°C
1000°C (18.257mV)	1 000.00°C	999.98°C	0.15°C
2316°C (37.070mV)	2 316.00°C	2 315.90°C	0.35°C

CERTIFICATE OF CALIBRATION

UKAS Accredited Calibration Laboratory No. 0324
AFTER ADJUSTMENT RESULTS

Certificate Number
34360

Test Title	Applied Value	Reading	Uncertainties

Figures in brackets ( ) are the equivalent temperature for the mV output

Temperature Simulation - Type K - CJC at 0°C - ITS90

-5.891mV (-200°C)	-5.891mV	-5.8898mV	1.4uV
-4.669mV (-140°C)	-4.669mV	-4.6680mV	1.4uV
-3.554mV (-100°C)	-3.554mV	-3.5531mV	1.4uV
-1.889mV (-50°C)	-1.889mV	-1.8882mV	1.4uV
-0.968mV (-25°C)	-0.968mV	-0.9661mV	1.4uV
0.000mV (0°C)	0.000mV	0.000 7mV	1.4uV
4.096mV (100°C)	4.096mV	4.096 2mV	1.4uV
2.023mV (122°F)	2.023mV	2.023 3mV	1.4uV
4.096mV (212°F)	4.096mV	4.096 1mV	1.4uV
4.920mV (120°C)	4.920mV	4.920 2mV	1.4uV
8.138mV (200°C)	8.138mV	8.138 0mV	1.4uV
20.644mV (500°C)	20.644mV	20.643 7mV	1.5uV
29.129mV (700°C)	29.129mV	29.128 6mV	1.5uV
41.276mV (1000°C)	41.276mV	41.275 5mV	1.6uV
54.819mV (1370°C)	54.819mV	54.818 4mV	1.7uV

Temperature Simulation - Type J - CJC at 0°C - ITS90

-8.095mV (-210°C)	-8.095mV	-8.0937mV	1.4uV
0.000mV (0°C)	0.000mV	0.001 0mV	1.4uV
21.848mV (400°C)	21.848mV	21.847 9mV	1.5uV
69.553mV (1200°C)	69.553mV	69.552 5mV	1.8uV

Temperature Simulation - Type T - CJC at 0°C - ITS90

-6.180mV (-250°C)	-6.180mV	-6.1786mV	1.4uV
0.000mV (0°C)	0.000mV	0.001 1mV	1.4uV
20.872mV (400°C)	20.872mV	20.872 0mV	1.5uV

Temperature Simulation - Type R - CJC at 0°C - ITS90

0.000mV (0°C)	0.000mV	0.001 0mV	1.4uV
3.408mV (400°C)	3.408mV	3.408 4mV	1.4uV
21.003mV (1760°C)	21.003mV	21.003 0mV	1.5uV

Temperature Simulation - Type S - CJC at 0°C - ITS90

0.000mV (0°C)	0.000mV	0.001 0mV	1.4uV
3.259mV (400°C)	3.259mV	3.259 4mV	1.4uV
18.609mV (1760°C)	18.609mV	18.609 0mV	1.5uV

Temperature Simulation - Type N - CJC at 0°C - ITS90

-3.990mV (-200°C)	-3.990mV	-3.9888mV	1.4uV
-0.646mV (-25°C)	-0.646mV	-0.6440mV	1.4uV
3.374mV (120°C)	3.374mV	3.374 4mV	1.4uV
47.513mV (1300°C)	47.513mV	47.512 5mV	1.7uV

Temperature Simulation - Type B - CJC at 0°C - ITS90

1.792mV (600°C)	1.792mV	1.792 6mV	1.4uV
4.834mV (1000°C)	4.834mV	4.834 5mV	1.4uV
13.820mV (1820°C)	13.820mV	13.820 1mV	1.4uV

Temperature Simulation - Type E - CJC at 0°C - ITS90

CERTIFICATE OF CALIBRATION

UKAS Accredited Calibration Laboratory No. 0324
AFTER ADJUSTMENT RESULTS

Test Title	Applied Value	Reading	Uncertainties
-9.718mV (-250°C)	-9.718mV	-9.7168mV	1.4uV
-1.432mV (-25°C)	-1.432mV	-1.4293mV	1.4uV
24.964mV (350°C)	24.964mV	24.963 9mV	1.5uV
76.373mV (1000°C)	76.373mV	76.373 1mV	2.2uV
Temperature Simulation - Type L - CJC at 0°C - ITS90			
-8.158mV (-200°C)	-8.158mV	-8.1654mV	1.4uV
0.000mV (0°C)	0.000mV	0.001 1mV	1.4uV
53.140mV (900°C)	53.140mV	53.134 1mV	1.7uV
Temperature Simulation - Type U - CJC at 0°C - ITS90			
-5.696mV (-200°C)	-5.696mV	-5.6907mV	1.4uV
0.000mV (0°C)	0.000mV	0.001 1mV	1.4uV
34.309mV (600°C)	34.309mV	34.306 7mV	1.6uV
Temperature Simulation - Type C - CJC at 0°C - ITS90			
0.000mV (0°C)	0.000mV	0.001 2mV	1.4uV
11.583mV (650°C)	11.583mV	11.583 1mV	1.4uV
18.257mV (1000°C)	18.257mV	18.257 1mV	1.5uV
37.070mV (2316°C)	37.070mV	37.070 0mV	1.6uV

Thermocouple Reference Tables

EN60584-1 : 2013
Replaces EN60584-1 : 1996, IEC 60584-1 : 1995

End of results