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Certificate of Calibration No

K026-17Pxxxx

MC6

S/N: 601255

Calibration

C e r t i f i c a t e

Certificate of Calibration No K026-17Pxxxx

Customer BEAMEX MARKETING
Ristisuonraitti 10
68600 PIETARSAARI
Finland

Customer No 1000

Item Advanced Field Calibrator and Communicator

Model MC6

Manufactured by Beamex Oy Ab

Serial Number 601255

Date Nov 21, 2017

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Signatures

Mika Laitinen
Service Technician

Jari Kivelä
Calibration Engineer

Documents Attached Service Report



MC6, S/N: 601255. Measurement Section (IN), S/N: 21119.

Voltage Measurement, As Found As Left results

Range: -1 ... 60 V, 1 Year Uncertainty: -1 ... 1 V $\pm(5 \mu\text{V} + 0.006\% \text{ RDG})$ and
1 ... 60 V $\pm(0.25 \text{ mV} + 0.006\% \text{ RDG})$

Calibrated By: Mika Laitinen
Calibration Date: Nov 18, 2017

Input	Indicated Value	Difference	Expanded Uncertainty (k=2)	Specification Low Limit	Specification High Limit	Status
[V]	[V]	[V]	[V]	[V]	[V]	
-0.999945	-0.999999	-0.000045	± 0.000011	-1.0000595	-0.9999295	PASS
-0.499985	-0.500001	-0.000025	± 0.000062	-0.5000335	-0.4999635	PASS
-0.250009	-0.250002	-0.000011	± 0.000039	-0.2500209	-0.2499809	PASS
-0.000009	-0.000001	-0.000001	± 0.000019	-0.0000059	0.0000041	PASS
0.250005	0.250001	0.000005	± 0.000039	0.2499805	0.2500205	PASS
0.499990	0.500001	0.000020	± 0.000062	0.4999640	0.5000340	PASS
0.999968	1.000001	0.000042	± 0.000011	0.9999318	1.0000618	PASS
4.99988	4.99992	-0.000068	± 0.000055	4.999438	5.000538	PASS
9.99964	9.99983	-0.000134	± 0.00011	9.999114	10.000814	PASS
20.00010	19.9999	-0.00020	± 0.00032	19.99865	20.00155	PASS
40.00008	39.9996	-0.00048	± 0.00054	39.99743	40.00273	PASS
59.99994	59.9992	-0.00074	± 0.00077	59.99609	60.00379	PASS

Current Measurement, As Found As Left results

Range: $\pm 100 \text{ mA}$, 1 Year Uncertainty: $\pm(1 \mu\text{A} + 0.01\% \text{ RDG})$

Calibrated By: Mika Laitinen
Calibration Date: Nov 18, 2017

Input	Indicated Value	Difference	Expanded Uncertainty (k=2)	Specification Low Limit	Specification High Limit	Status
[mA]	[mA]	[mA]	[mA]	[mA]	[mA]	
-100.0018	-100.001	0.0008	± 0.0057	-100.0128	-99.9908	PASS
-50.0007	-50.000	0.0007	± 0.0034	-50.0067	-49.9947	PASS
-20.00043	-20.0002	0.00023	± 0.0015	-20.00343	-19.99743	PASS
-0.00001	0.0000	0.00001	± 0.00017	-0.00101	0.00099	PASS
4.00008	4.0001	0.00002	± 0.00024	3.99868	4.00148	PASS
12.00019	12.0001	-0.00009	± 0.0011	11.99799	12.00239	PASS
20.00039	20.0002	-0.00019	± 0.0015	19.99739	20.00339	PASS
50.0006	50.000	-0.0006	± 0.0034	49.9946	50.0066	PASS
100.0017	100.001	-0.0007	± 0.0058	99.9907	100.0127	PASS

Frequency Measurement, As Found As Left results

Range: 0.0027... 50000 Hz, 1 Year Uncertainty: 0.0027 ... 0.5 Hz $\pm(0.000002 \text{ Hz} + 0.002\% \text{ RDG})$,
0.5 ... 5 Hz $\pm(0.00002 \text{ Hz} + 0.002\% \text{ RDG})$, 5 ... 50 Hz $\pm(0.0002 \text{ Hz} + 0.002\% \text{ RDG})$,
50 ... 500 Hz $\pm(0.002 \text{ Hz} + 0.002\% \text{ RDG})$, 500 ... 5000 Hz $\pm(0.02 \text{ Hz} + 0.002\% \text{ RDG})$ and
5000 ... 50000 Hz $\pm(0.2 \text{ Hz} + 0.002\% \text{ RDG})$

Calibrated By: Mika Laitinen
Calibration Date: Nov 18, 2017

Input	Indicated Value	Difference	Expanded Uncertainty (k=2)	Specification Low Limit	Specification High Limit	Status
[Hz]	[Hz]	[Hz]	[Hz]	[Hz]	[Hz]	
1.099985	1.09999	0.000005	± 0.000017	1.099943	1.100027	PASS
9.99986	9.9999	0.00004	± 0.00017	9.99946	10.00026	PASS
99.9986	99.999	0.0004	± 0.0017	99.9946	100.0026	PASS
999.986	999.99	0.004	± 0.017	999.946	1000.026	PASS
9999.86	9999.9	0.04	± 0.17	9999.46	10000.26	PASS
49999.29	49999.4	0.11	± 0.30	49998.09	50000.49	PASS

MC6, S/N: 601255. Temperature Section (TC-R-OUT), S/N: 61014.

Low Voltage Measurement TC1, As Found As Left results
Range: -1000 ... 1000 mV, 1 Year Uncertainty: $\pm(4 \mu\text{V} + 0.007\% \text{ RDG})$

Calibrated By: Mika Laitinen
Calibration Date: Nov 18, 2017

Input [mV]	Indicated Value [mV]	Difference [mV]	Expanded Uncertainty (k=2) [mV]	Specification Low Limit [mV]	Specification High Limit [mV]	Status
-999.9966	-999.975	0.0216	± 0.011	-1000.0706	-999.9226	PASS
-499.9997	-499.988	0.0117	± 0.0062	-500.0387	-499.9607	PASS
-250.0017	-249.997	0.0047	± 0.0039	-250.0232	-249.9802	PASS
-0.0016	-0.002	-0.0004	± 0.0019	-0.0056	0.0024	PASS
100.0000	99.998	-0.0020	± 0.0026	99.9890	100.0110	PASS
250.0004	249.994	-0.0064	± 0.0039	249.9789	250.0219	PASS
499.9994	499.987	-0.0124	± 0.0062	499.9604	500.0384	PASS
749.9994	749.983	-0.0164	± 0.0087	749.9429	750.0559	PASS
999.9980	999.975	-0.0230	± 0.011	999.9240	1000.0720	PASS

Low Voltage Measurement TC2, As Found As Left results
Range: -1000 ... 1000 mV, 1 Year Uncertainty: $\pm(4 \mu\text{V} + 0.007\% \text{ RDG})$

Calibrated By: Mika Laitinen
Calibration Date: Nov 18, 2017

Input [mV]	Indicated Value [mV]	Difference [mV]	Expanded Uncertainty (k=2) [mV]	Specification Low Limit [mV]	Specification High Limit [mV]	Status
-999.9968	-999.974	0.0228	± 0.011	-1000.0708	-999.9228	PASS
-500.0000	-499.988	0.0120	± 0.0062	-500.0390	-499.9610	PASS
-250.0019	-249.996	0.0059	± 0.0039	-250.0234	-249.9804	PASS
-0.0017	-0.002	-0.0003	± 0.0019	-0.0057	0.0023	PASS
99.9998	99.997	-0.0028	± 0.0026	99.9888	100.0108	PASS
250.0002	249.994	-0.0062	± 0.0039	249.9787	250.0217	PASS
499.9992	499.987	-0.0122	± 0.0062	499.9602	500.0382	PASS
749.9993	749.983	-0.0163	± 0.0087	749.9428	750.0558	PASS
999.9976	999.974	-0.0236	± 0.011	999.9236	1000.0716	PASS

Low Voltage Generation TC1, As Found As Left results
Range: -1000 ... 1000 mV, 1 Year Uncertainty: $\pm(4 \mu\text{V} + 0.007\% \text{ RDG})$

Calibrated By: Mika Laitinen
Calibration Date: Nov 18, 2017

Generated Value [mV]	Measured Value [mV]	Difference [mV]	Expanded Uncertainty (k=2) [mV]	Specification Low Limit [mV]	Specification High Limit [mV]	Status
-1000.000	-1000.0233	-0.0233	± 0.011	-1000.0740	-999.9260	PASS
-500.000	-500.0117	-0.0117	± 0.0061	-500.0390	-499.9610	PASS
-250.000	-250.0051	-0.0051	± 0.0037	-250.0215	-249.9785	PASS
0.000	0.0004	0.0004	± 0.0016	-0.0040	0.0040	PASS
100.000	100.0025	0.0025	± 0.0023	99.9890	100.0110	PASS
250.000	250.0063	0.0063	± 0.0037	249.9785	250.0215	PASS
500.000	500.0123	0.0123	± 0.0061	499.9610	500.0390	PASS
750.000	750.0164	0.0164	± 0.0086	749.9435	750.0565	PASS
1000.000	1000.0234	0.0234	± 0.011	999.9260	1000.0740	PASS

MC6, S/N: 601255. Temperature Section (TC-R-OUT), S/N: 61014.

Voltage Generation, As Found As Left results

Range: -3 ... 24 V, 1 Year Uncertainty: $\pm(0.1 \text{ mV} + 0.007\% \text{ RDG})$

Calibrated By: Mika Laitinen

Calibration Date: Nov 18, 2017

Generated Value	Measured Value	Difference	Expanded Uncertainty (k=2)	Specification Low Limit	Specification High Limit	Status
[V]	[V]	[V]	[V]	[V]	[V]	
-3.00000	-3.000158	-0.000158	± 0.000034	-3.000310	-2.999690	PASS
-1.00000	-1.000076	-0.000076	± 0.000016	-1.000170	-0.999830	PASS
0.00000	-0.000031	-0.000031	± 0.000012	-0.000100	0.000100	PASS
1.00000	0.999980	-0.000020	± 0.000016	0.999830	1.000170	PASS
2.50000	2.500030	0.000030	± 0.000030	2.499725	2.500275	PASS
5.00000	5.000158	0.000158	± 0.000053	4.999550	5.000450	PASS
10.0000	10.00035	0.00035	± 0.00011	9.99920	10.00080	PASS
15.0000	15.00053	0.00053	± 0.00022	14.99885	15.00115	PASS
20.0000	20.00069	0.00069	± 0.00028	19.99850	20.00150	PASS
24.0000	24.00082	0.00082	± 0.00032	23.99822	24.00178	PASS

Current Generation, Internal Supply (Source), As Found As Left results

Range: 0 ... 55 mA, 1 Year Uncertainty: $0 \dots 25 \text{ mA} \pm(1 \mu\text{A} + 0.01\% \text{ RDG})$ and $25 \dots 55 \text{ mA} \pm(2 \mu\text{A} + 0.01\% \text{ RDG})$

Calibrated By: Mika Laitinen

Calibration Date: Nov 18, 2017

Generated Value	Measured Value	Difference	Expanded Uncertainty (k=2)	Specification Low Limit	Specification High Limit	Status
[mA]	[mA]	[mA]	[mA]	[mA]	[mA]	
0.0000	0.00000	0.00000	± 0.000048	-0.00100	0.00100	PASS
4.0000	3.99978	-0.00022	± 0.00018	3.99860	4.00140	PASS
12.0000	11.99982	-0.00018	± 0.0011	11.99780	12.00220	PASS
20.0000	19.99985	-0.00015	± 0.0015	19.99700	20.00300	PASS
30.0000	29.9998	-0.0002	± 0.0020	29.9950	30.0050	PASS
40.0000	39.9999	-0.0001	± 0.0025	39.9940	40.0060	PASS
55.0000	54.9999	-0.0001	± 0.0033	54.9925	55.0075	PASS

Current Generation, External Supply (Sink), As Found As Left results

Range: 0 ... 55 mA, 1 Year Uncertainty: $0 \dots 25 \text{ mA} \pm(1 \mu\text{A} + 0.01\% \text{ RDG})$ and $25 \dots 55 \text{ mA} \pm(2 \mu\text{A} + 0.01\% \text{ RDG})$

Calibrated By: Mika Laitinen

Calibration Date: Nov 18, 2017

Generated Value	Measured Value	Difference	Expanded Uncertainty (k=2)	Specification Low Limit	Specification High Limit	Status
[mA]	[mA]	[mA]	[mA]	[mA]	[mA]	
0.0000	0.00000	0.00000	± 0.000048	-0.00100	0.00100	PASS
4.0000	4.00032	0.00032	± 0.00018	3.99860	4.00140	PASS
12.0000	12.00039	0.00039	± 0.0011	11.99780	12.00220	PASS
20.0000	20.00039	0.00039	± 0.0015	19.99700	20.00300	PASS
30.0000	30.0003	0.0003	± 0.0020	29.9950	30.0050	PASS
40.0000	40.0002	0.0002	± 0.0025	39.9940	40.0060	PASS
55.0000	55.0000	0.0000	± 0.0033	54.9925	55.0075	PASS

MC6, S/N: 601255. Temperature Section (TC-R-OUT), S/N: 61014.

Resistance Measurement R1, As Found results

Range: 0 ... 4000 Ω, 1 Year Uncertainty: 0 ... 100 Ω ±(6 mΩ), 100 ... 110 Ω ±(0.006% RDG), 110 ... 150 Ω ±(0.007% RDG), 150 ... 300 Ω ±(0.008% RDG), 300 ... 400 Ω ±(0.009% RDG) and 400 ... 4000 Ω ±(12 mΩ + 0.015% RDG)

Calibrated By: Mika Laitinen
Calibration Date: Nov 18, 2017

Input	Indicated Value	Difference	Expanded Uncertainty (k=2)	Specification Low Limit	Specification High Limit	Status
[Ω]	[Ω]	[Ω]	[Ω]	[Ω]	[Ω]	
5.0019	5.002	0.0001	±0.0017	4.9959	5.0079	PASS
100.0037	100.000	-0.0037	±0.0028	99.9977	100.0097	UD
200.0007	199.994	-0.0067	±0.0041	199.9847	200.0167	PASS
400.0064	399.993	-0.0134	±0.0071	399.9704	400.0424	PASS
600.001	599.98	-0.021	±0.019	599.899	600.103	PASS
1000.006	999.97	-0.036	±0.023	999.844	1000.168	PASS
1500.004	1499.96	-0.044	±0.033	1499.767	1500.241	PASS
2500.004	2499.91	-0.094	±0.048	2499.617	2500.391	PASS
4000.002	3999.85	-0.152	±0.071	3999.390	4000.614	PASS

Resistance Measurement R1, As Left results

Range: 0 ... 4000 Ω, 1 Year Uncertainty: 0 ... 100 Ω ±(6 mΩ), 100 ... 110 Ω ±(0.006% RDG), 110 ... 150 Ω ±(0.007% RDG), 150 ... 300 Ω ±(0.008% RDG), 300 ... 400 Ω ±(0.009% RDG) and 400 ... 4000 Ω ±(12 mΩ + 0.015% RDG)

Calibrated By: Mika Laitinen
Calibration Date: Nov 20, 2017

Input	Indicated Value	Difference	Expanded Uncertainty (k=2)	Specification Low Limit	Specification High Limit	Status
[Ω]	[Ω]	[Ω]	[Ω]	[Ω]	[Ω]	
4.9997	5.000	0.0003	±0.0017	4.9937	5.0057	PASS
100.0001	100.000	-0.0001	±0.0028	99.9941	100.0061	PASS
200.0007	200.000	-0.0007	±0.0041	199.9847	200.0167	PASS
400.0043	400.003	-0.0013	±0.0071	399.9683	400.0403	PASS
600.002	600.00	-0.002	±0.019	599.900	600.104	PASS
1000.006	1000.00	-0.006	±0.023	999.844	1000.168	PASS
1500.007	1500.00	-0.007	±0.033	1499.770	1500.244	PASS
2499.999	2499.99	-0.009	±0.048	2499.612	2500.386	PASS
4000.025	4000.01	-0.015	±0.071	3999.413	4000.637	PASS

Resistance Measurement R2, As Found As Left results

Range: 0 ... 4000 Ω, 1 Year Uncertainty: 0 ... 100 Ω ±(6 mΩ), 100 ... 110 Ω ±(0.006% RDG), 110 ... 150 Ω ±(0.007% RDG), 150 ... 300 Ω ±(0.008% RDG), 300 ... 400 Ω ±(0.009% RDG) and 400 ... 4000 Ω ±(12 mΩ + 0.015% RDG)

Calibrated By: Mika Laitinen
Calibration Date: Nov 20, 2017

Input	Indicated Value	Difference	Expanded Uncertainty (k=2)	Specification Low Limit	Specification High Limit	Status
[Ω]	[Ω]	[Ω]	[Ω]	[Ω]	[Ω]	
5.0053	5.005	-0.0003	±0.0017	4.9993	5.0113	PASS
99.9980	99.998	0.0000	±0.0028	99.9920	100.0040	PASS
199.9980	199.998	0.0000	±0.0041	199.9820	200.0140	PASS
400.0061	400.006	-0.0001	±0.0071	399.9701	400.0421	PASS
600.000	600.00	0.000	±0.019	599.898	600.102	PASS
1000.007	1000.00	-0.007	±0.023	999.845	1000.169	PASS
1500.003	1500.00	-0.003	±0.033	1499.766	1500.240	PASS
2500.001	2500.00	-0.001	±0.048	2499.614	2500.388	PASS
4000.000	4000.00	0.000	±0.071	3999.388	4000.612	PASS

MC6, S/N: 601255. Temperature Section (TC-R-OUT), S/N: 61014.

Resistance Simulation R1, As Found As Left results

Range: 0 ... 4000 Ω, 1 Year Uncertainty: 0 ... 100 Ω ±(20 mΩ), 100 ... 400 Ω ±(10 mΩ + 0.01% RDG) and 400 ... 4000 Ω ±(20 mΩ + 0.015% RDG)

Calibrated By: Mika Laitinen
Calibration Date: Nov 20, 2017

Simulated Value [Ω]	Measured Value [Ω]	Difference [Ω]	Expanded Uncertainty (k=2) [Ω]	Specification Low Limit [Ω]	Specification High Limit [Ω]	Status
1.000	1.0006	0.0006	±0.0023	0.9800	1.0200	PASS
100.000	100.0080	0.0080	±0.0023	99.9800	100.0200	PASS
200.000	200.0056	0.0056	±0.0037	199.9700	200.0300	PASS
300.000	300.0054	0.0054	±0.0053	299.9600	300.0400	PASS
400.000	400.0040	0.0040	±0.0069	399.9500	400.0500	PASS
500.00	499.983	-0.017	±0.0087	499.905	500.095	PASS
1000.00	999.978	-0.022	±0.017	999.830	1000.170	PASS
2000.00	1999.991	-0.009	±0.037	1999.680	2000.320	PASS
2500.00	2500.008	0.008	±0.045	2499.605	2500.395	PASS
4000.00	4000.017	0.017	±0.069	3999.380	4000.620	PASS

Frequency Generation, As Found As Left results

Range: 0.0005... 50000 Hz, 1 Year Uncertainty: 0.0005 ... 0.5 Hz ±(0.000002 Hz + 0.002% RDG), 0.5 ... 5 Hz ±(0.00002 Hz + 0.002 % RDG), 5 ... 50 Hz ±(0.0002 Hz + 0.002 % RDG), 50 ... 500 Hz ±(0.002 Hz + 0.002 % RDG), 500 ... 5000 Hz ±(0.02 Hz + 0.002 % RDG) and 5000 ... 50000 Hz ±(0.2 Hz + 0.002 % RDG)

Calibrated By: Mika Laitinen
Calibration Date: Nov 18, 2017

Generated Value [Hz]	Measured Value [Hz]	Difference [Hz]	Expanded Uncertainty (k=2) [Hz]	Specification Low Limit [Hz]	Specification High Limit [Hz]	Status
1.10000	1.099997	-0.000003	±0.000017	1.099958	1.100042	PASS
10.0000	9.99997	-0.00003	±0.00017	9.99960	10.00040	PASS
100.000	99.9997	-0.0003	±0.0017	99.9960	100.0040	PASS
1000.00	999.997	-0.003	±0.017	999.960	1000.040	PASS
10000.0	9999.97	-0.03	±0.17	9999.60	10000.40	PASS
50000.0	49999.85	-0.15	±0.30	49998.80	50001.20	PASS

Pt100 Measurement R1, As Found results

Range: -200 ... 850°C ITS90, 1 Year Uncertainty: -200 ... 0°C ±0.015°C, 0°C ... 850°C ±(0.015°C + 0.012% RDG)

Calibrated By: Mika Laitinen
Calibration Date: Nov 18, 2017

Input [Ω]	Corresponding Temperature [°C]	Indicated Value [°C]	Difference [°C]	Expanded Uncertainty (k=2) [°C]	Specification Low Limit [°C]	Specification High Limit [°C]	Status
18.9578	-198.987	-198.989	-0.002	±0.0026	-199.002	-198.972	PASS
100.0001	0.000	-0.008	-0.008	±0.0062	-0.015	0.015	PASS
138.5146	100.024	100.012	-0.012	±0.0074	99.997	100.051	PASS
280.9779	500.001	499.975	-0.026	±0.015	499.926	500.076	PASS
390.1939	849.019	848.975	-0.044	±0.023	848.902	849.136	PASS

Temperature/resistance conversions are based on standard IEC 60751 ed2.0. The expanded uncertainties of the temperature measurements are based on electrical measurements. The expanded uncertainty of the electrical measurements is converted to the temperature in measurement points according to the standard IEC 60751 ed2.0.

MC6, S/N: 601255. Temperature Section (TC-R-OUT), S/N: 61014.

Pt100 Measurement R1, As Left results

Range: -200 ... 850°C ITS90, 1 Year Uncertainty: -200 ... 0°C ±0.015°C,
0°C ... 850°C ±(0.015°C + 0.012% RDG)

Calibrated By: Mika Laitinen
Calibration Date: Nov 20, 2017

Input [Ω]	Corresponding Temperature [°C]	Indicated Value [°C]	Difference [°C]	Expanded Uncertainty (k=2) [°C]	Specification Low Limit [°C]	Specification High Limit [°C]	Status
18.9565	-198.990	-198.990	0.000	±0.0026	-199.005	-198.975	PASS
99.9968	-0.008	-0.008	0.000	±0.0062	-0.023	0.007	PASS
138.5138	100.022	100.021	-0.001	±0.0074	99.995	100.049	PASS
280.9769	499.998	499.996	-0.002	±0.015	499.923	500.073	PASS
390.1919	849.012	849.009	-0.003	±0.023	848.895	849.129	PASS

Temperature/resistance conversions are based on standard IEC 60751 ed2.0. The expanded uncertainties of the temperature measurements are based on electrical measurements. The expanded uncertainty of the electrical measurements is converted to the temperature in measurement points according to the standard IEC 60751 ed2.0.

Pt100 Measurement R2, As Found As Left results

Range: -200 ... 850°C ITS90, 1 Year Uncertainty: -200 ... 0°C ±0.015°C,
0°C ... 850°C ±(0.015°C + 0.012% RDG)

Calibrated By: Mika Laitinen
Calibration Date: Nov 20, 2017

Input [Ω]	Corresponding Temperature [°C]	Indicated Value [°C]	Difference [°C]	Expanded Uncertainty (k=2) [°C]	Specification Low Limit [°C]	Specification High Limit [°C]	Status
18.9583	-198.986	-198.986	0.000	±0.0026	-199.001	-198.971	PASS
99.9987	-0.003	-0.003	0.000	±0.0062	-0.018	0.012	PASS
138.5121	100.017	100.017	0.000	±0.0074	99.990	100.044	PASS
280.9791	500.005	500.006	0.001	±0.015	499.930	500.080	PASS
390.1883	849.000	849.000	0.000	±0.023	848.883	849.117	PASS

Temperature/resistance conversions are based on standard IEC 60751 ed2.0. The expanded uncertainties of the temperature measurements are based on electrical measurements. The expanded uncertainty of the electrical measurements is converted to the temperature in measurement points according to the standard IEC 60751 ed2.0.

Pt100 Simulation R1, As Found As Left results

Range: -200 ... 850°C ITS90, 1 Year Uncertainty: -200 ... 0°C ±0.05°C,
0°C ... 850°C ±(0.05°C + 0.014% RDG)

Calibrated By: Mika Laitinen
Calibration Date: Nov 20, 2017

Simulated Value [°C]	Corresp. Resistance [Ω]	Measured Value [Ω]	Corresp. Temperature [°C]	Difference [°C]	Expanded Uncertainty (k=2) [°C]	Specification Low Limit [°C]	Specification High Limit [°C]	Status
-199.000	18.9522	18.9608	-198.980	0.020	±0.0025	-199.050	-198.950	PASS
0.000	100.0000	100.0068	0.017	0.017	±0.0068	-0.050	0.050	PASS
100.000	138.5055	138.5139	100.022	0.022	±0.0078	99.936	100.064	PASS
500.000	280.9775	280.9801	500.008	0.008	±0.018	499.880	500.120	PASS
849.000	390.1884	390.1941	849.019	0.019	±0.024	848.831	849.169	PASS

Temperature/resistance conversions are based on standard IEC 60751 ed2.0. The expanded uncertainties of the temperature simulations are based on electrical measurements. The expanded uncertainty of the electrical measurements is converted to the temperature in measurement points according to the standard IEC 60751 ed2.0.

MC6, S/N: 601255. Temperature Section (TC-R-OUT), S/N: 61014.

Thermocouple Measurement TC1, Type K (without cold junction comp. RJ=0°C), As Found As Left results
Range: -270°C ... 1372°C ITS90, 1 Year Uncertainty: -270°C ... -200°C ±(0.007% of thermovoltage + 4 µV),
-200°C ... 0°C ±(0.1°C + 0.1% RDG), 0°C ... 1000°C ±(0.1°C + 0.007% RDG), 1000 ... 1372°C ±0.017% RDG

Calibrated By: Mika Laitinen
Calibration Date: Nov 18, 2017

Input [mV]	Corresponding Temperature [°C]	Indicated Value [°C]	Difference [°C]	Expanded Uncertainty (k=2) [°C]	Specification Low Limit [°C]	Specification High Limit [°C]	Status
-5.893	-200.09	-200.11	-0.02	±0.071	-200.39	-199.79	PASS
-0.002	-0.04	-0.05	-0.01	±0.030	-0.14	0.06	PASS
20.643	499.98	499.96	-0.02	±0.033	499.84	500.12	PASS
41.275	999.99	999.95	-0.04	±0.040	999.82	1000.16	PASS
54.852	1370.98	1370.93	-0.05	±0.049	1370.75	1371.21	PASS

Temperature/voltage conversions are based on the IEC 60584-1 ed2.0 standard. The expanded uncertainties of the temperature measurements are based on electrical measurements. The expanded uncertainty of the electrical measurements is converted to the temperature in measurement points according to the standard IEC 60584-1 ed2.0.

Thermocouple Measurement TC2, Type K (without cold junction comp. RJ=0°C), As Found As Left results
Range: -270°C ... 1372°C ITS90, 1 Year Uncertainty: -270°C ... -200°C ±(0.007% of thermovoltage + 4 µV),
-200°C ... 0°C ±(0.1°C + 0.1% RDG), 0°C ... 1000°C ±(0.1°C + 0.007% RDG), 1000 ... 1372°C ±0.017% RDG

Calibrated By: Mika Laitinen
Calibration Date: Nov 18, 2017

Input [mV]	Corresponding Temperature [°C]	Indicated Value [°C]	Difference [°C]	Expanded Uncertainty (k=2) [°C]	Specification Low Limit [°C]	Specification High Limit [°C]	Status
-5.893	-200.10	-200.10	0.00	±0.071	-200.40	-199.80	PASS
-0.002	-0.04	-0.04	0.00	±0.030	-0.14	0.06	PASS
20.643	499.97	499.96	-0.01	±0.033	499.84	500.10	PASS
41.275	999.98	999.95	-0.03	±0.040	999.81	1000.15	PASS
54.852	1370.98	1370.94	-0.04	±0.049	1370.75	1371.21	PASS

Temperature/voltage conversions are based on the IEC 60584-1 ed2.0 standard. The expanded uncertainties of the temperature measurements are based on electrical measurements. The expanded uncertainty of the electrical measurements is converted to the temperature in measurement points according to the standard IEC 60584-1 ed2.0.

Thermocouple Simulation TC1, Type K (without cold junction comp. RJ=0°C), As Found As Left results
Range: -270°C ... 1372°C ITS90, 1 Year Uncertainty: -270°C ... -200°C ±(0.007% of thermovoltage + 4 µV),
-200°C ... 0°C ±(0.1°C + 0.1% RDG), 0°C ... 1000°C ±(0.1°C + 0.007% RDG), 1000 ... 1372°C ±0.017% RDG

Calibrated By: Mika Laitinen
Calibration Date: Nov 18, 2017

Simulated Value [°C]	Corresp. Voltage [mV]	Measured Value [mV]	Corresp. Temperature [°C]	Difference [°C]	Expanded Uncertainty (k=2) [°C]	Specification Low Limit [°C]	Specification High Limit [°C]	Status
-200.00	-5.891	-5.892	-200.01	-0.01	±0.11	-200.30	-199.70	PASS
0.00	0.000	0.000	0.01	0.01	±0.039	-0.10	0.10	PASS
500.00	20.644	20.645	500.02	0.02	±0.040	499.86	500.14	PASS
1000.00	41.276	41.277	1000.04	0.04	±0.047	999.83	1000.17	PASS
1371.00	54.852	54.854	1371.05	0.05	±0.057	1370.77	1371.23	PASS

Temperature/voltage conversions are based on the IEC 60584-1 ed2.0 standard. The expanded uncertainties of the temperature simulations are based on electrical measurements. The expanded uncertainty of the electrical measurements is converted to the temperature in measurement points according to the standard IEC 60584-1 ed2.0.

Internal Reference Junction TC1, As Found As Left results
Thermocouple, Type K

Calibrated By: Mika Laitinen
Calibration Date: Nov 20, 2017

Compensated Type K in ice bath [°C]	Ambient Temperature [°C]	Indicated Value [°C]	Difference [°C]	Expanded Uncertainty (k=2) [°C]	Specification Low Limit [°C]	Specification High Limit [°C]	Status
0.00	23	0.04	0.04	±0.075	-0.18	0.18	PASS

Temperature / voltage conversion is based on the IEC 60584-1 ed2.0 standard. Calibration of the internal reference junction compensation has been made by measuring an ice bath (0°C) with the K type thermocouple specified in the calibration procedures.

MC6, S/N: 601255. Temperature Section (TC-R-OUT), S/N: 61014.

Internal Reference Junction TC2, As Found As Left results
Thermocouple, Type K

Calibrated By: Mika Laitinen
Calibration Date: Nov 20, 2017

Compensated Type K in ice bath [°C]	Ambient Temperature [°C]	Indicated Value [°C]	Difference [°C]	Expanded Uncertainty (k=2) [°C]	Specification Low Limit [°C]	Specification High Limit [°C]	Status
0.00	23	0.02	0.02	±0.075	-0.18	0.18	PASS

Temperature / voltage conversion is based on the IEC 60584-1 ed2.0 standard. Calibration of the internal reference junction compensation has been made by measuring an ice bath (0°C) with the K type thermocouple specified in the calibration procedures.

MC6, S/N: 601255. Pressure Module, S/N: 42453.

P400mC Pressure Measurement, As Found As Left results

Range: -40 ... 40 kPa gauge, 1 Year Uncertainty: $\pm(0.02\% \text{ FS} + 0.025\% \text{ RDG})$

Calibrated By: Mika Laitinen

Calibration Date: Nov 20, 2017

Input [kPa]	Indicated Value [kPa]	Difference [kPa]	Expanded Uncertainty (k=2) [kPa]	Specification Low Limit [kPa]	Specification High Limit [kPa]	Status
0.0000	0.000	0.0000	± 0.0012	-0.0080	0.0080	PASS
8.0000	7.999	-0.0010	± 0.0018	7.9900	8.0100	PASS
15.9999	15.998	-0.0019	± 0.0025	15.9879	16.0119	PASS
23.9998	23.997	-0.0028	± 0.0033	23.9858	24.0138	PASS
32.0000	32.004	0.0040	± 0.0041	31.9840	32.0160	PASS
39.9999	40.001	0.0011	± 0.0052	39.9819	40.0179	PASS
32.0001	32.004	0.0039	± 0.0041	31.9841	32.0161	PASS
24.0000	23.998	-0.0020	± 0.0033	23.9860	24.0140	PASS
16.0000	16.000	0.0000	± 0.0025	15.9880	16.0120	PASS
8.0001	8.002	0.0019	± 0.0018	7.9901	8.0101	PASS
0.0000	0.001	0.0010	± 0.0012	-0.0080	0.0080	PASS
-8.0001	-7.999	0.0011	± 0.0018	-8.0101	-7.9901	PASS
-16.0000	-16.000	0.0000	± 0.0026	-16.0120	-15.9880	PASS
-24.0000	-24.000	0.0000	± 0.0033	-24.0140	-23.9860	PASS
-32.0000	-32.001	-0.0010	± 0.0041	-32.0160	-31.9840	PASS
-40.0002	-40.002	-0.0018	± 0.0050	-40.0182	-39.9822	PASS

The pressure sensor has been zeroed before calibration of negative gauge.

MC6, S/N: 601255. Pressure Module, S/N: 43211.

P2C Pressure Measurement, As Found results

Range: -100 ... 200 kPa gauge, 1 Year Uncertainty: $\pm(0.01\% \text{ FS} + 0.025\% \text{ RDG})$

Calibrated By: Mika Laitinen

Calibration Date: Nov 17, 2017

Input [kPa]	Indicated Value [kPa]	Difference [kPa]	Expanded Uncertainty (k=2) [kPa]	Specification Low Limit [kPa]	Specification High Limit [kPa]	Status
-0.0008	-0.002	-0.0012	± 0.0015	-0.0208	0.0192	PASS
39.9999	39.990	-0.0099	± 0.0053	39.9699	40.0299	PASS
80.0001	79.974	-0.0261	± 0.0095	79.9601	80.0401	PASS
119.9990	119.960	-0.0390	± 0.014	119.9490	120.0490	UD
160.0006	159.953	-0.0476	± 0.018	159.9406	160.0606	UD
199.9853	199.941	-0.0443	± 0.029	199.9153	200.0553	UD
160.0035	159.958	-0.0455	± 0.018	159.9435	160.0635	UD
119.9981	119.963	-0.0351	± 0.014	119.9481	120.0481	PASS
79.9997	79.977	-0.0227	± 0.0095	79.9597	80.0397	PASS
39.9998	39.991	-0.0088	± 0.0053	39.9698	40.0298	PASS
0.0008	0.003	0.0022	± 0.0015	-0.0192	0.0208	PASS
-19.9974	-19.990	0.0074	± 0.0030	-20.0224	-19.9724	PASS
-40.0017	-39.992	0.0097	± 0.0050	-40.0317	-39.9717	PASS
-60.0015	-59.985	0.0165	± 0.0072	-60.0365	-59.9665	PASS
-80.0002	-79.981	0.0192	± 0.0093	-80.0402	-79.9602	PASS
-93.0001	-92.978	0.0221	± 0.011	-93.0434	-92.9568	PASS

The pressure sensor has been zeroed before calibration of negative gauge.

P2C Pressure Measurement, As Left results

Range: -100 ... 200 kPa gauge, 1 Year Uncertainty: $\pm(0.01\% \text{ FS} + 0.025\% \text{ RDG})$

Calibrated By: Mika Laitinen

Calibration Date: Nov 17, 2017

Input [kPa]	Indicated Value [kPa]	Difference [kPa]	Expanded Uncertainty (k=2) [kPa]	Specification Low Limit [kPa]	Specification High Limit [kPa]	Status
-0.0008	-0.002	-0.0012	± 0.0015	-0.0208	0.0192	PASS
40.0003	39.999	-0.0013	± 0.0053	39.9703	40.0303	PASS
80.0000	79.993	-0.0070	± 0.0095	79.9600	80.0400	PASS
120.0001	119.989	-0.0111	± 0.014	119.9501	120.0501	PASS
160.0000	159.989	-0.0110	± 0.018	159.9400	160.0600	PASS
200.0008	200.005	0.0042	± 0.029	199.9308	200.0708	PASS
160.0032	159.997	-0.0062	± 0.018	159.9432	160.0632	PASS
120.0008	119.994	-0.0068	± 0.014	119.9508	120.0508	PASS
79.9998	79.996	-0.0038	± 0.0095	79.9598	80.0398	PASS
40.0002	40.002	0.0018	± 0.0053	39.9702	40.0302	PASS
-0.0003	0.002	0.0023	± 0.0015	-0.0203	0.0197	PASS
-20.0005	-20.000	0.0005	± 0.0030	-20.0255	-19.9755	PASS
-40.0016	-40.001	0.0006	± 0.0050	-40.0316	-39.9716	PASS
-60.0003	-59.998	0.0023	± 0.0072	-60.0353	-59.9653	PASS
-80.0000	-79.998	0.0020	± 0.0093	-80.0400	-79.9600	PASS
-92.9996	-92.996	0.0036	± 0.011	-93.0428	-92.9564	PASS

The pressure sensor has been zeroed before calibration of negative gauge.

MC6, S/N: 601255. Pressure Module, S/N: 68102.

P20C Pressure Measurement, As Found As Left results

Range: -100 ... 2000 kPa gauge, 1 Year Uncertainty: $\pm(0.01\% \text{ FS} + 0.025\% \text{ RDG})$

Calibrated By: Mika Laitinen

Calibration Date: Nov 21, 2017

Input [kPa]	Indicated Value [kPa]	Difference [kPa]	Expanded Uncertainty (k=2) [kPa]	Specification Low Limit [kPa]	Specification High Limit [kPa]	Status
0.000	0.00	0.000	± 0.013	-0.200	0.200	PASS
399.980	399.98	0.000	± 0.057	399.680	400.280	PASS
799.997	800.01	0.013	± 0.099	799.597	800.397	PASS
1199.991	1199.99	-0.001	± 0.14	1199.491	1200.491	PASS
1599.997	1600.04	0.043	± 0.19	1599.397	1600.597	PASS
2000.000	2000.06	0.060	± 0.23	1999.300	2000.700	PASS
1600.005	1600.07	0.065	± 0.19	1599.405	1600.605	PASS
1199.986	1200.01	0.024	± 0.14	1199.486	1200.486	PASS
799.989	800.01	0.021	± 0.099	799.589	800.389	PASS
399.996	400.00	0.004	± 0.057	399.696	400.296	PASS
0.000	0.02	0.020	± 0.013	-0.200	0.200	PASS
-20.000	-20.00	0.000	± 0.013	-20.205	-19.795	PASS
-40.000	-40.01	-0.010	± 0.014	-40.210	-39.790	PASS
-60.000	-60.02	-0.020	± 0.015	-60.215	-59.785	PASS
-80.000	-80.02	-0.020	± 0.016	-80.220	-79.780	PASS
-93.000	-93.02	-0.020	± 0.019	-93.223	-92.777	PASS

The pressure sensor has been zeroed before calibration of negative gauge.

MC6, S/N: 601255. Barometric Module, S/N: 43077.

PB Pressure Measurement, As Found results

Range: 70 ... 120 kPa abs, 1 Year Uncertainty: ±0.05 kPa

Calibrated By: Mika Laitinen

Calibration Date: Nov 20, 2017

Input [kPa]	Indicated Value [kPa]	Difference [kPa]	Expanded Uncertainty (k=2) [kPa]	Specification Low Limit [kPa]	Specification High Limit [kPa]	Status
70.000	70.01	0.010	±0.016	69.950	70.050	PASS
80.000	80.01	0.010	±0.017	79.950	80.050	PASS
90.000	90.02	0.020	±0.018	89.950	90.050	PASS
100.000	100.02	0.020	±0.019	99.950	100.050	PASS
110.000	110.02	0.020	±0.021	109.950	110.050	PASS
120.000	120.03	0.030	±0.022	119.950	120.050	UD

PB Pressure Measurement, As Left results

Range: 70 ... 120 kPa abs, 1 Year Uncertainty: ±0.05 kPa

Calibrated By: Mika Laitinen

Calibration Date: Nov 20, 2017

Input [kPa]	Indicated Value [kPa]	Difference [kPa]	Expanded Uncertainty (k=2) [kPa]	Specification Low Limit [kPa]	Specification High Limit [kPa]	Status
70.000	70.00	0.000	±0.016	69.950	70.050	PASS
80.000	80.00	0.000	±0.017	79.950	80.050	PASS
90.000	90.00	0.000	±0.018	89.950	90.050	PASS
100.000	100.00	0.000	±0.019	99.950	100.050	PASS
110.000	110.00	0.000	±0.021	109.950	110.050	PASS
120.000	120.00	0.000	±0.022	119.950	120.050	PASS

Advanced Field Calibrator and Communicator MC6

Serial No: 601255

Calibration Procedure

Calibration was carried out according to the internal instruction no. 7.1.4.1.49

Before starting the calibration of the unit, the unit was allowed to stabilise to the constant laboratory conditions for 2 hours.

Condition of the calibrated device

The device came for recalibration/repair (see attached Service Report).

Calibration Equipment Used

Equipment	Model	Serial No.	Cert. No.	Calibrated
Pressure Controller	Mensor CPC 8000	4100050K	K026-17P4902	Oct 13, 2017
Pressure Controller	Ruska 7250xi	65095	K026-17P4654	Oct 02, 2017
Pressure Controller	Ruska 7250xi	65147	K026-17P4667	Oct 03, 2017
Digital Multimeter	Agilent 3458A	MY45047555	K026-17E3033	Jun 08, 2017
Frequency Counter	Agilent 53131A	MY47004895	K026-17F2173	Apr 24, 2017
Thermocouple	Beamex Type K	51	K026-16T5813	Dec 16, 2016
Thermocouple	Beamex Type K	38	K026-16T5839	Dec 19, 2016

Calibrations are traceable to national or international measurement standards.

Calibration Uncertainty

The reported expanded uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor $k = 2$, which for a normal distribution corresponds to a coverage probability of approximately 95%. The standard uncertainty of measurement has been determined in accordance with EA Publication EA-4/02.

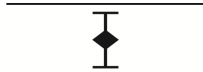
Calibration Conditions

The calibrations were made in controlled conditions where the temperature was $23^{\circ}\text{C} \pm 1^{\circ}\text{C} / 73^{\circ}\text{F} \pm 2^{\circ}\text{F}$ and the relative humidity was $50\% \text{RH} \pm 10\% \text{RH}$.


ASSESSMENT OF COMPLIANCE WITH MANUFACTURER'S SPECIFICATION

PASS = The measurement result is within the specification limit (the specification limits are not breached by the measurement result, extended by half of the expanded uncertainty interval at a level confidence of 95%).

Specified upper limit

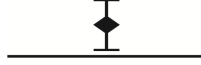


Specified lower limit




FAIL = The measurement result is outside the specification limit even though it is extended downwards/upwards by half of the expanded uncertainty interval at a level confidence of 95%.

Specified upper limit




Specified lower limit

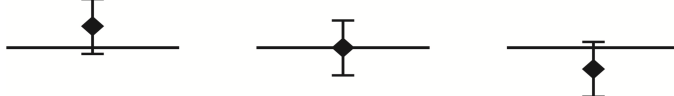


UD = The measurement result is above/below/equal to the specification limit by a margin less than the half of the expanded uncertainty interval; it is therefore not possible to state PASS/FAIL based on 95% level of confidence (UD = UNDEFINED).

Specified upper limit



Specified lower limit



(Based on ILAC-G8:03/2009)

Beamex Ref : **0011763284**
Beamex viite

SERVICE REPORT
Huoltoselostus

Page: **1 / 1**
Sivu

Customer: **BEAMEX MARKETING**
Asiakas

Customer Number: **1000**
Asiakasnumero

EQUIPMENT: **MC6 MULTIFUNCT CALIBRATOR**
Laitte

S / N : **601255**

REASON FOR RETURN:
Huoltokäynnin aihe

Calibration

OBSERVATIONS; STEPS TAKEN:
Suoritetut toimenpiteet

Unit tested and calibrated.

·
Following range(s) adjusted:
Resistance Measurement R1.
Pt100 Measurement R1.
P2C Pressure Measurement.
PB Pressure Measurement.

·
Firmware upgrade 1.70 -> 1.80.

CERTIFICATE:
Todistus

Accredited calibration certificate no: K026-17Pxxxx

In order to improve our services, we kindly ask you to take 2 minutes of your time to fill in our customer satisfaction survey!
www.beamex.com/servicefeedback

Jotta voisimme parantaa palveluamme, pyydämme sinua täyttämään asiakastytyväisyystutkimuksemme. Se vie vain 2min aikaa.
www.beamex.com/servicefeedback



Print Date: **22.11.2017**
Tulostus Päivämäärä

Technician: **Huolto**
Teknikko

E-mail: **service@beamex.com**
Sähköposti