ELCAL
Messgeräte • Service • Kalibration

ELCAL AG
Heimstrasse 46
CH - 8953 Dietikon

Tel. +41 44 742 20 00
Fax +41 44 742 20 48

info@elcal.ch
www.elcal.ch

KALIBRIER – ZERTIFIKAT
CERTIFICATE D'ÉTALONNAGE
CERTIFICATE OF CALIBRATION

Instrument Instrument Instrument	Digital Multimeter	
Hersteller Fabricant Manufacturer	Keithley	
Typ Type Model	2000	
Serien- / Inventar-Nr. No. de série- / inventaire Serial- / Inv. No.	Sample	-
Kunde Client Customer	Sample AG, Volketswil	
Auftragsnummer No. de la commande Order No.	n/a	
Bemerkungen Remarques Remarks	n/a	
Datum der Kalibrierung Date de l'étalonnage Date of calibration	08.09.2010	

ELCAL AG bestätigt hiermit, dass genanntes Gerät im vom METAS (Metrologie und Akkreditierung Schweiz) akkreditierten, firmeneigenen Kalibrationslabor kalibriert wurde. Es erfüllte oder übertraf zu diesem Zeitpunkt alle im Manual aufgeführten Spezifikationen.

Die Kalibration wurde in Übereinstimmung mit unserem ISO 17025:2005 konformen Qualitätssicherungshandbuch mit Hilfe von Instrumenten ausgeführt, die um ein mehrfaches genauer sind als der Prüfling. Alle als Referenz verwendeten Normale werden periodisch von amtlichen Stellen überprüft.

Dietikon, 09. September 2010

Kalibriert durch:

Technischer Leiter:

ELCAL
Messgeräte • Service • Kalibration

ELCAL AG
Heimstrasse 46
CH - 8953 Dietikon
Tel. +41 44 742 20 00
Fax +41 44 742 20 48
info@elcal.ch
www.elcal.ch

Testreport
365845

Unit under Test : Keithley 2000 Digital Multimeter
Serial No : Sample
Customer : Sample AG, Volketswil
Inventory No : -
Date : 08.09.2010
Operator : J. Stampfli

TRACEABILITY INFORMATION

Instruments used:	Serial No:	Inventory No:	Cal Due Date:
Fluke 5020A	A52024	LAB-195	25.01.2011
Fluke 5720A	8930207	LAB-299	04.10.2010
Fluke 5725A	9860025	LAB-324	20.10.2010

All listed result are direct traceable to the Swiss Federal Office of Metrology, as far as listed in the uncertainty table of the SCS Certificate.

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 approx 95%.

SUMMARY OF LAST RECORDED CAL DATA

This certificate records the calibration status.
Points where %Tol exceeds the adjustment threshold are marked with a "M".
Points where %Tol exceeds the specification limit are marked with a "F".

Number of Test Marginal: 0
Number of Test Failed: 0

ELCAL
Messgeräte • Service • Kalibration

ELCAL AG
Heimstrasse 46 Tel. +41 44 742 20 00 info@elcal.ch
CH - 8953 Dietikon Fax +41 44 742 20 48 www.elcal.ch

Testreport
365845

Unit under Test : Keithley 2000 Digital Multimeter
Serial No : Sample
Customer : Sample AG, 8604 Volketswil
Inventory No : -
Date : 08.09.2010
Operator : J. Stampfli

TEST	RANGE	UUT INDICATED	SYSTEM ACTUAL	MODIFIER	ERROR	ERROR (%TOL)	M F
		Actual Ambient Temp. 23.6 ±0.5°C / Humidity 41.5%					
		Marginal limit 70% of UUT Tol.					
		UUT ID$: KEITHLEY INSTRUMENTS INC.,MODEL 2000,0822609,A13 /A02					
		Prior Verification UUT stored SW Cal Date: 2009,07,08					
		KEITHLEY 2000 Performance Verification:					
		Tests Refer to 1 Year Specs as per Manual 2000-905-01					
		DC Voltage Accuracy Test:					
		100mV Range: (Rel. Zero)					
4	100	19.9998mV	20.00000mV		-7.51 ppm	3	
5	100	-20.0005mV	-20.00000mV		24.2 ppm	11	
6	100	49.9996mV	50.00000mV		-7.73 ppm	6	
7	100	-50.0008mV	-50.00000mV		16.1 ppm	13	
8	100	100.0000mV	100.00000mV		0.34 ppm	0	
9	100	-100.0016mV	-100.00000mV		15.8 ppm	19	
		1V Range:					
10	1	0.199999V	0.2000000V		-7.02 ppm	11	
11	1	-0.200002V	-0.2000000V		11.0 ppm	17	
12	1	0.500000V	0.5000000V		-0.97 ppm	2	
13	1	-0.500002V	-0.5000000V		4.67 ppm	11	
14	1	1.000002V	1.0000000V		1.99 ppm	5	
15	1	-1.000006V	-1.0000000V		5.56 ppm	15	
		10V Range:					
16	10	2.00000V	2.000000V		0.71 ppm	1	
17	10	-2.00000V	-2.000000V		2.14 ppm	4	
18	10	5.00000V	5.000000V		-0.10 ppm	0	
19	10	-5.00000V	-5.000000V		0.30 ppm	1	
20	10	10.00000V	10.000000V		0.25 ppm	1	
21	10	-10.00001V	-10.000000V		0.80 ppm	2	
		100V Range:					
22	100	19.9999V	20.00000V		-4.82 ppm	6	
23	100	-19.9999V	-20.00000V		-3.58 ppm	5	
24	100	49.9998V	50.00000V		-3.99 ppm	7	
25	100	-49.9998V	-50.00000V		-3.86 ppm	7	
26	100	99.9997V	100.00000V		-2.66 ppm	5	
27	100	-99.9997V	-100.00000V		-2.98 ppm	6	
		1000V Range:					
28	1000	199.999V	200.0000V		-6.56 ppm	9	
29	1000	-199.998V	-200.0000V		-7.51 ppm	10	
30	1000	499.998V	500.0000V		-3.82 ppm	7	
31	1000	-499.998V	-500.0000V		-3.80 ppm	7	
32	1000	999.998V	1000.0000V		-1.86 ppm	4	
33	1000	-999.998V	-1000.0000V		-1.59 ppm	3	

ELCAL
Messgeräte • Service • Kalibration

ELCAL AG
Heimstrasse 46
CH - 8953 Dietikon
Tel. +41 44 742 20 00
Fax +41 44 742 20 48
info@elcal.ch
www.elcal.ch

Testreport
365845

Unit under Test : Keithley 2000 Digital Multimeter
Serial No : Sample
Customer : Sample AG, 8604 Volketswil
Inventory No : -
Date : 08.09.2010
Operator : J. Stampfli

TEST	RANGE	UUT INDICATED	SYSTEM ACTUAL	MODIFIER	ERROR	ERROR (%TOL)	M F
		DC Voltage Linearity Test:					
		10V Range:					
34	10	1.11112V	1.111110V		9.42 ppm	13	
35	10	2.22223V	2.222220V		3.73 ppm	7	
36	10	3.33334V	3.333330V		1.76 ppm	4	
37	10	4.44444V	4.444440V		1.12 ppm	3	
38	10	5.55555V	5.555550V		0.77 ppm	2	
39	10	6.66666V	6.666660V		0.38 ppm	1	
40	10	7.77777V	7.777770V		0.30 ppm	1	
41	10	8.88888V	8.888880V		0.33 ppm	1	
42	10	9.99999V	9.999990V		0.04 ppm	0	
43	10	11.11112V	11.111110V		0.97 ppm	3	
		4-WIRE Resistance Test:					
		100 Ohms Range:					
44	100	19.0000Ω	18.999651Ω		18.0 ppm	6	
45	100	99.9975Ω	99.99963Ω		-21.6 ppm	15	
		1 kOhm Range:					
46	1	0.189994kΩ	0.19000002kΩ		-30.3 ppm	20	
47	1	0.999976kΩ	1.0000078kΩ		-32.0 ppm	29	
		10 kOhm Range:					
48	10	1.90000kΩ	1.9000265kΩ		-16.5 ppm	11	
49	10	9.99997kΩ	10.000061kΩ		-8.61 ppm	8	
		100 kOhm Range:					
50	100	18.9995kΩ	18.999614kΩ		-8.43 ppm	6	
51	100	99.9994kΩ	99.99996kΩ		-5.48 ppm	5	
		1 MOhm Range:					
52	1	0.190000MΩ	0.19000003MΩ		1.97 ppm	1	
53	1	0.999958MΩ	0.9999655MΩ		-7.87 ppm	7	
		2-WIRE Resistance Test:					
		10 MOhms Range:					
54	10	1.89999MΩ	1.8999526MΩ		17.8 ppm	4	
55	10	9.99992MΩ	9.999893MΩ		2.64 ppm	1	
		100 MOhm Range:					
56	100	18.9989MΩ	18.999059MΩ		-5.90 ppm	0	
57	100	99.9972MΩ	100.00503MΩ		-78.1 ppm	5	

ELCAL
Messgeräte • Service • Kalibration

ELCAL AG
Heimstrasse 46
CH - 8953 Dietikon
Tel. +41 44 742 20 00
Fax +41 44 742 20 48
info@elcal.ch
www.elcal.ch

Testreport
365845

Unit under Test : Keithley 2000 Digital Multimeter
Serial No : Sample
Customer : Sample AG, 8604 Volketswil
Inventory No : -
Date : 08.09.2010
Operator : J. Stampfli

TEST	RANGE	UUT INDICATED	SYSTEM ACTUAL	MODIFIER	ERROR	ERROR (%TOL)	M F
		AC Voltage Test:					
		100mV Range:					
58	100	99.9977mV	100.00000mV	10Hz	-23.0 ppm	3	
59	100	9.9980mV	10.00000mV	1kHz	-0.020 %	6	
60	100	100.0036mV	100.00000mV	50kHz	35.8 ppm	2	
		1V Range:					
61	1	0.999972V	1.0000000V	1kHz	-28.4 ppm	3	
62	1	1.000069V	1.0000000V	50kHz	68.5 ppm	4	
63	1	1.000560V	1.0000000V	100kHz	0.056 %	8	
64	1	1.006142V	1.0000000V	300kHz	0.610 %	14	
		10V Range:					
65	10	9.99807V	10.000000V	1kHz	-0.019 %	22	
66	10	3.19781V	3.200000V	50kHz	-0.069 %	25	
67	10	3.18217V	3.200000V	300kHz	-0.560 %	10	
68	10	9.99877V	10.000000V	50kHz	-0.012 %	7	
		100V Range:					
69	100	99.9797V	100.00000V	200Hz	-0.020 %	23	
70	100	99.9829V	100.00000V	1kHz	-0.017 %	19	
71	100	99.9606V	100.00000V	50kHz	-0.039 %	6	
		750V Range:					
72	750	699.888V	700.0000V	1kHz	-0.016 %	17	
74	750	699.634V	700.0000V	50kHz	-0.052 %	57	
		DC Current Test:					
		10mA Range:					
75	10	0.00005mA	0.000000mA		0.000052mA	13	
76	10	2.00010mA	2.000000mA		51.3 ppm	7	
77	10	-2.00004mA	-2.000000mA		21.9 ppm	3	
78	10	10.00041mA	10.000000mA		40.6 ppm	8	
79	10	-10.00040mA	-10.000000mA		39.5 ppm	7	
		100mA Range:					
80	100	-0.0003mA	0.00000mA		-0.00033mA	1	
81	100	100.0028mA	100.00000mA		27.6 ppm	3	
82	100	-100.0045mA	-100.00000mA		45.4 ppm	5	
		1A Range:					
83	1	0.000001A	0.0000000A		0.0000010A	3	
84	1	1.000041A	1.0000000A		41.3 ppm	5	
85	1	-1.000035A	-1.0000000A		34.8 ppm	4	
		3A Range:					
86	3	-0.00000A	0.000000A		-0.000004A	1	
87	3	2.09954A	2.100000A		-0.022 %	15	
88	3	-2.09947A	-2.100000A		-0.025 %	18	

ELCAL
Messgeräte • Service • Kalibration

ELCAL AG
Heimstrasse 46
CH - 8953 Dietikon
Tel. +41 44 742 20 00
Fax +41 44 742 20 48
info@elcal.ch
www.elcal.ch

Testreport
365845

Unit under Test : Keithley 2000 Digital Multimeter
Serial No : Sample
Customer : Sample AG, 8604 Volketswil
Inventory No : -
Date : 08.09.2010
Operator : J. Stampfli

TEST	RANGE	UUT INDICATED	SYSTEM ACTUAL	MODIFIER	ERROR	ERROR (%TOL)	M F
		AC Current Test:					
		1A Range:					
89	1	0.100022A	0.1000000A	50Hz	0.022 %	4	
90	1	0.499914A	0.5000000A	50Hz	-0.017 %	10	
91	1	0.999784A	1.0000000A	50Hz	-0.022 %	15	
92	1	0.999928A	1.0000000A	1kHz	-72.1 ppm	5	
93	1	0.999797A	1.0000000A	5kHz	-0.020 %	15	
		3A Range:					
94	3	1.99961A	2.000000A	50Hz	-0.020 %	8	
95	3	1.99969A	2.000000A	1kHz	-0.016 %	7	
96	3	1.99937A	2.000000A	5kHz	-0.031 %	13	
		DCV Zero Test: (Rear Inputs)					
		100mV DC Range:					
97	100	0.0015mV	0.00000mV		0.00153mV	44	
		1V DC Range:					
98	1	0.000002V	0.0000000V		0.0000023V	33	
		10V DC Range:					
99	10	0.00001V	0.000000V		0.000007V	14	
		100V DC Range:					
100	100	0.0000V	0.00000V		0.00002V	4	
		1000V DC Range:					
101	1000	-0.000V	0.0000V		-0.0005V	8	
		Resistance Zero Test: (Rear Inputs)					
		100 Ohm Range:					
102	100	-0.0004Ω	0.00000Ω		-0.00044Ω	11	
		1 kOhm Range:					
103	1	-0.000000kΩ	0.0000000kΩ		-0.0000004kΩ	4	
		10 kOhm Range:					
104	10	-0.00000kΩ	0.000000kΩ		-0.000002kΩ	2	
		100 kOhm Range:					
105	100	-0.0000kΩ	0.00000kΩ		-0.00002kΩ	2	
		1 MOhm Range:					
106	1	-0.000000MΩ	0.0000000MΩ		-0.0000001MΩ	1	
		Noise Test: 1V DC Range (Rear Inputs)					
107	1	0V	0.0V		0.0V	0	

ELCAL
Messgeräte • Service • Kalibration

ELCAL AG
Heimstrasse 46
CH - 8953 Dietikon
Tel. +41 44 742 20 00
Fax +41 44 742 20 48
info@elcal.ch
www.elcal.ch

Testreport
365845

Unit under Test : Keithley 2000 Digital Multimeter
Serial No : Sample
Customer : Sample AG, 8604 Volketswil
Inventory No : -
Date : 08.09.2010
Operator : J. Stampfli

TEST	RANGE	UUT INDICATED	SYSTEM ACTUAL	MODIFIER	ERROR	ERROR (%TOL)	M F
	K - Type TC Temperature Test:						
109		-0.084°C	0.0000°C	@0°C_Comp	-0.0839°C	17	
110		9.890°C	10.0000°C	@0°C_Comp	-1.117 %	22	
111		49.948°C	50.0000°C	@0°C_Comp	-0.105 %	11	
112		99.943°C	100.0000°C	@0°C_Comp	-0.058 %	12	
113		199.964°C	200.0000°C	@0°C_Comp	-0.018 %	7	
114		500.010°C	500.0000°C	@0°C_Comp	20.2 ppm	2	
115		1000.096°C	1000.0000°C	@0°C_Comp	96.4 ppm	19	
	J - Type TC Temperature Test:						
116		-0.061°C	0.0000°C	@0°C_Comp	-0.0614°C	12	
117		9.926°C	10.0000°C	@0°C_Comp	-0.745 %	15	
118		49.960°C	50.0000°C	@0°C_Comp	-0.080 %	8	
119		99.962°C	100.0000°C	@0°C_Comp	-0.038 %	8	
120		199.980°C	200.0000°C	@0°C_Comp	-0.010 %	4	
121		500.010°C	500.0000°C	@0°C_Comp	20.9 ppm	2	
122		749.887°C	750.0000°C	@0°C_Comp	-0.015 %	23	
	T - Type TC Temperature Test:						
123		-0.078°C	0.0000°C	@0°C_Comp	-0.0779°C	16	
124		9.870°C	10.0000°C	@0°C_Comp	-1.317 %	26	
125		49.978°C	50.0000°C	@0°C_Comp	-0.043 %	4	
126		99.967°C	100.0000°C	@0°C_Comp	-0.033 %	7	
127		199.970°C	200.0000°C	@0°C_Comp	-0.015 %	6	
128		349.995°C	350.0000°C	@0°C_Comp	-12.9 ppm	1	

No optional Scanner Module installed!

Past Verification UUT stored SW Cal Date: 2010,09,08

End of KEITHLEY 2000: C/L Verification & Adj. Procedure