cal equipment

Keithley 2010

Manufacturer	KEITHLEY INSTRUMENTS	Calibration date	February 16 2022
Model Number	Model 2010	Ambient Temperature	24.21 °C
Serial	0769301	Relative Humidity	15.98 %
ID Number	Calibration test	Pressure	1023.04
Notes	Test as received, no adjustments	Test type	Front inputs, Fluke 5440-7002 cables

This note is test dummy text block for further use. It allow to include user information for further reference

Reference standard	Mfg	Model	Options	Serial / Unc	CEID	Calibration date	Due date
DCC	MIL	6010B		REDACTED	XRB1	01/23/2022	02/23/2022
MFC	Fluke	5720A	03/HLK	7530212	XHC1	02/07/2022	08/07/2022
Amplifier	Fluke	5725A		5930005	XHB1	02/07/2022	08/07/2022
DC STD	xDevs.com	792X[2]	9.9999798 VDC	±0.5 ppm	XD01	10/26/2021	04/26/2022
STDR	ESI	SR104	10000.0013 KΩ	±0.2 ppm	G202088930104	10/26/2021	10/26/2023
STDR	xDevs.com/Fluke	SL935	1.00006304 Ω	±0.31 ppm	XR03	10/28/2021	10/28/2022
STDR	xDevs.com/Fluke	SL935	9999.9757 kΩ	±0.36 ppm	XR02	10/28/2021	10/28/2022
DMM	HP	3458A	001,X02	MY45040325	XD2	10/26/2021	10/26/2022
DMM	HP	3458A	001,X02	Process DMM	XD3	10/26/2021	10/26/2022
Divider	Fluke	752A	4295200		XR01	02/10/2022	03/10/2022
STDR	IET	SRL-100M	100.0902 MΩ	±12 ppm	NHR01	05/27/2020	05/27/2022

MFC last calibrated	10.0 days ago	MFC since DCV ZERO	1.0 days ago
MFC since WBFLAT	404.0 days ago	MFC since WBGAIN	10.0 days ago
MFC Confidence level	**24h 95% REL**	MFC Calibrate date	2022-02-07 00:00:00
MFC Calibrate date Zero	2022-02-16 00:00:00	Calibrate date WB Flatness	2021-10-09 00:00:00
Calibrate date WB Gain	2022-02-07 00:00:00	CAL CONST 6.5V reference voltage	6.95748087
CAL CONST 13V reference voltage	13.8553055727	CAL CONST 22V range positive zero	398.1788
CAL CONST 22V range negative zero	398.17824	CAL CONST DAC Linearity	0.0
CAL CONST 10KOHM true output resistance	9999.78613209	CAL CONST 10KOHM standard resistance	9998.74147969
CAL CONST, Zero calibration temperature	23.0	CAL CONST, All calibration temp	23.0
Booster type	VB5725,IB5725	Current output posts	IB5725
Calibrate date 5725A AMP	2022-02-07 00:00:00	Calibrated days ago	Debug
CAL CONST, Amp ACAL temperature	24.1000003815	CAL CONST, Amp CalCheck temperature	23.0

Total uncertainty of each calibration point calculated with RSS

$$U_{95\%} = \sqrt{U_{SRC}{}^2 + U_{DUT}{}^2} * 2$$

Meter Info	KEITHLEY INSTRUMENTS INC.,MODEL 2010,0769301,A09 /A02	Test date start	16 February 2022 22:26
Test specification interval	1 year DUT spec	Line frequency	110V 60 Hz
Next calibration date	2022,06,17	Last calibration date	2021,06,17
DUT Δ temperature to cal	0.60 °C	Last calibration temperature	24.81 °C

Service information

Last calibration temperature
24.81 °C
All CAL values
000000000131072,000000000262144,000000000131072,000000000262144,+2.77716037E-02,+2.77152740E-01,+2.77861027E-02,+2.77335574E-01,+4.72696556E-04,+2.78221183E-02,+2.77648033E-01,+4.75423655E-04,+2.78351049E-02,+2.77800214E-01,+2.78122498E-02,+1.94298602E-01,+4.73215692E-04,+2.78258202E-02,+2.77696168E-01,+1.43040910E-02,+2.84792775E-01,+9.97966170E-01,+9.54717085E-01,+1.00000000E+03,+9.99983500E+02,+1.00000000E+01,-1.00000000E+01,+1.00000000E+02,+9.99999900E+00,+1.00000000E+03,+9.99999900E+03,+1.00000000E+05,+1.00000000E+06,+1.00000000E-02,+1.00000000E-01,+1.00000000E+00,+1.44497563E-01,+1.44497738E-01,+1.33197758E-07,+1.14544843E-08,-6.20284693E-07,+1.82445189E-06,+1.27337214E-06,+1.42526233E+00,-1.42526703E+00,+1.42586452E-01,-1.44000000E-01,+5.80595633E-04,+5.81304409E-05,+5.99613181E-04,+6.00105316E-05,+5.88681750E-06,+6.03759545E-06,+6.39398660E-07,+6.23569554E-07,+7.20536966E-08,+9.17253005E-02,+9.99730034E-01,+1.98683766E-06,+2.02120557E-06,+2.00794483E-06,+1.38347818E-06,+1.38833242E-06,+1.39460414E-06,+2.03002741E-06,+1.39163430E-06,+2.05345818E-06,+1.40963305E-06,+2.05011897E-06,+1.42595182E-06,-6.82856508E-07,+1.55597854E-02,+1.55809391E-03,+1.55322104E-01,+1.55283191E-02,+1.55281698E-01,+1.55323148E-01,+1.55327964E+00,+9.17000000E-02,+1.77342474E-05,+1.77441833E-05,+1.55529587E-03,+1.55516088E-03,+1.55340265E-02,+1.55281334E-01,+6.67543216E-07,+6.55506131E-07,+6.59886576E-07,+1.44028064E-02,+1.44471769E-02,+1.42646596E-02
Reference
Performance check, original firmware A09/A02
DUT Condition
calkit-pi3

Test procedure : $Id: k2010.py | Rev 2327 | 2022/02/17 02:47:28 tin_sl $

Source procedure : $Id: f5720b.py | Rev 2318 | 2022/02/14 06:25:01 clu $

Main DC Voltage ranges performance test.
Checks zero offset and +/-FS calibration on all ranges
The following test for the offset voltage specification using MFC 0V source in 4-wire ext sense mode as reference.
DCV gain range points verify gain of the DC voltage function, using uncorrected 24-hour MFC output. DC voltage offset of DUT is nulled before FS tests.

Test Description	Expected Value	Measured Value	Measurement Uncertainty	Lower Limit	Upper Limit	Deviation	DUT Spec	Test Status
Short 0 mVDC	0.0000000E+00	**-1.22 µV**	0.50 µV	-1.400 µV	1.400 µV	N/A	0.90 µV	PASS
Short 0.0 VDC	0.0000000E+00	**-1.49 µV**	0.50 µV	-2.500 µV	2.500 µV	N/A	2.00 µV	PASS
Short 00.0 VDC	0.0000000E+00	**-1.36 µV**	0.50 µV	-40.500 µV	40.500 µV	N/A	40.00 µV	PASS
Short 000.0 VDC	0.0000000E+00	**-20.74 µV**	0.50 µV	-400.500 µV	400.500 µV	N/A	0.40 mV	PASS
Short 0000.0 VDC	0.0000000E+00	**-179.05 µV**	0.50 µV	-6000.500 µV	6000.500 µV	N/A	6.00 mV	PASS
DCV Test	**0.1V-1000V**	**DUT**	**Source unc.**	**Low Limit**	**Hi limit**	**Measured**	**1y spec**	**Result**
0.02 VDC (0.10 Range)	0.0200000	**0.020000917**	24.00 ppm	0.01999788	0.02000212	45.875 ppm	82.00 ppm	PASS 53.69 %
0.1 VDC (0.10 Range)	0.1000000	**0.10000074**	8.00 ppm	0.0999946	0.1000054	7.395 ppm	46.00 ppm	PASS 15.84 %
0.119 VDC (0.10 Range)	0.1190000	**0.11900088**	7.40 ppm	0.11899382	0.11900618	7.353 ppm	44.56 ppm	PASS 16.28 %
-0.02 VDC (0.10 Range)	-0.0200000	**-0.019999225**	24.00 ppm	-0.02000212	-0.01999788	-38.743 ppm	82.00 ppm	PASS 45.34 %
-0.1 VDC (0.10 Range)	-0.1000000	**-0.099999293**	8.00 ppm	-0.1000054	-0.0999946	-7.066 ppm	46.00 ppm	PASS 15.13 %
-0.119 VDC (0.10 Range)	-0.1190000	**-0.11899936**	7.40 ppm	-0.11900618	-0.11899382	-5.378 ppm	44.56 ppm	PASS 11.91 %
0.2 VDC (1.00 Range)	0.2000000	**0.20000067**	13.00 ppm	0.1999904	0.2000096	3.345 ppm	35.00 ppm	PASS 8.96 %
0.6 VDC (1.00 Range)	0.6000000	**0.60000038**	4.20 ppm	0.59998048	0.60001952	0.627 ppm	28.33 ppm	PASS 2.19 %
1.0 VDC (1.00 Range)	1.0000000	**0.99999982**	3.70 ppm	0.9999693	1.0000307	-0.183 ppm	27.00 ppm	PASS 0.67 %
1.19 VDC (1.00 Range)	1.1900000	**1.1900001**	3.60 ppm	1.189964	1.190036	0.084 ppm	26.68 ppm	PASS 0.31 %
-0.2 VDC (1.00 Range)	-0.2000000	**-0.20000014**	13.00 ppm	-0.2000096	-0.1999904	0.705 ppm	35.00 ppm	PASS 1.89 %
-0.6 VDC (1.00 Range)	-0.6000000	**-0.60000111**	4.20 ppm	-0.60001952	-0.59998048	1.853 ppm	28.33 ppm	PASS 6.47 %
-1.0 VDC (1.00 Range)	-1.0000000	**-1.0000001**	3.70 ppm	-1.0000307	-0.9999693	0.150 ppm	27.00 ppm	PASS 0.55 %
-1.19 VDC (1.00 Range)	-1.1900000	**-1.1899998**	3.60 ppm	-1.190036	-1.189964	-0.160 ppm	26.68 ppm	PASS 0.59 %
1.0 VDC (10.00 Range)	1.0000000	**1.0000018**	5.00 ppm	0.999931	1.000069	1.810 ppm	64.00 ppm	PASS 2.82 %
10.0 VDC (10.00 Range)	10.0000000	**10.000026**	2.30 ppm	9.999697	10.000303	2.560 ppm	28.00 ppm	PASS 9.11 %
11.9 VDC (10.00 Range)	11.9000000	**11.900032**	2.30 ppm	11.899647	11.900353	2.706 ppm	27.36 ppm	PASS 9.85 %
-1.0 VDC (10.00 Range)	-1.0000000	**-0.99999934**	5.00 ppm	-1.000069	-0.999931	-0.665 ppm	64.00 ppm	PASS 1.04 %
-10.0 VDC (10.00 Range)	-10.0000000	**-10.000026**	2.30 ppm	-10.000303	-9.999697	2.640 ppm	28.00 ppm	PASS 9.40 %
-11.9 VDC (10.00 Range)	-11.9000000	**-11.900029**	2.30 ppm	-11.900353	-11.899647	2.437 ppm	27.36 ppm	PASS 8.88 %
10 VDC (100.00 Range)	10.0000000	**9.9995162**	7.00 ppm	9.99908	10.00092	-48.378 ppm	85.00 ppm	PASS 56.72 %
100 VDC (100.00 Range)	100.0000000	**99.996026**	3.40 ppm	99.99566	100.00434	-39.735 ppm	40.00 ppm	PASS 98.98 %
119 VDC (100.00 Range)	119.0000000	**118.9952**	3.30 ppm	118.99494	119.00506	-40.374 ppm	39.20 ppm	FAIL 102.63 %
-10 VDC (100.00 Range)	-10.0000000	**-9.9997019**	7.00 ppm	-10.00092	-9.99908	-29.813 ppm	85.00 ppm	PASS 34.99 %
-100 VDC (100.00 Range)	-100.0000000	**-99.996143**	3.40 ppm	-100.00434	-99.99566	-38.573 ppm	40.00 ppm	PASS 96.09 %

-119 VDC (100.00 Range)	-119.0000000	**-118.9953**	3.30 ppm	-119.00506	-118.99494	-39.508 ppm	39.20 ppm	FAIL 100.43 %
100 VDC (1000.00 Range)	100.0000000	**99.995941**	8.00 ppm	99.9891	100.0109	-40.595 ppm	101.00 ppm	PASS 40.07 %
200 VDC (1000.00 Range)	200.0000000	**199.99185**	6.00 ppm	199.9846	200.0154	-40.767 ppm	71.00 ppm	PASS 57.22 %
1000 VDC (1000.00 Range)	1000.0000000	**1000.0362**	4.40 ppm	999.9286	1000.0714	36.220 ppm	47.00 ppm	FAIL 176.87 %
-100 VDC (1000.00 Range)	-100.0000000	**-99.996499**	8.00 ppm	-100.0109	-99.9891	-35.006 ppm	101.00 ppm	PASS 34.55 %
-200 VDC (1000.00 Range)	-200.0000000	**-199.99318**	6.00 ppm	-200.0154	-199.9846	-34.098 ppm	71.00 ppm	PASS 47.85 %
-1000 VDC (1000.00 Range)	-1000.0000000	**-999.97067**	4.40 ppm	-1000.0714	-999.9286	-29.325 ppm	47.00 ppm	FAIL 143.20 %

4W test procedure for all test points that verify Gain of the OHMF function. 4-wire kelvin connection is used between DMM and MFC. 1GΩ resistance range is tested using the external standard, as MFC unable to provide this range value.

OHM Test	Reference	DUT	Source unc.	Low Limit	Hi limit	Measured	1y spec	Result
1 Ω	0.9997689 Ω	**0.99811816 Ω**	32.0 ppm	9.9958692E-01	9.9995088E-01	-1651.122 ppm	150.02 ppm	FAIL, 1076.38 % of 153.40 ppm
1.9 Ω	1.8997939 Ω	**1.89665147 Ω**	25.0 ppm	1.8995424E+00	1.9000454E+00	-1654.090 ppm	107.37 ppm	FAIL, 1503.40 % of 110.02 ppm
10 Ω	10.000591 Ω	**9.98377035 Ω**	5.0 ppm	9.9998510E+00	1.0001331E+01	-1681.966 ppm	69.00 ppm	FAIL, 2433.56 % of 69.12 ppm
19 Ω	19.000192	**19.001862**	4.00 ppm	1.8998228E+01	1.9002156E+01	87.894 ppm	99.4 ppm	PASS, 88.38 % of 99.45 ppm
100 Ω	99.99593 Ω	**100.004159 Ω**	1.7 ppm	9.9989660E+01	1.0000220E+02	82.293 ppm	61.00 ppm	FAIL, 134.85 % of 61.02 ppm
190 Ω	189.99194 Ω	**190.007236 Ω**	1.7 ppm	1.8998012E+02	1.9000376E+02	80.509 ppm	60.53 ppm	FAIL, 132.96 % of 60.55 ppm
1.0 kΩ	1000.021 Ω	**1000.10312 Ω**	1.7 ppm	9.9996730E+02	1.0000747E+03	82.118 ppm	52.00 ppm	FAIL, 157.84 % of 52.03 ppm
1.9 kΩ	1899.88 Ω	**1900.04286 Ω**	1.7 ppm	1.8997618E+03	1.8999982E+03	85.721 ppm	60.53 ppm	FAIL, 141.57 % of 60.55 ppm
10 kΩ	9999.8 Ω	**10000.6698 Ω**	1.8 ppm	9.9992620E+03	1.0000338E+04	86.982 ppm	52.00 ppm	FAIL, 167.17 % of 52.03 ppm
19 kΩ	18999.277 Ω	**19000.329 Ω**	1.8 ppm	1.8997513E+04	1.9001041E+04	55.371 ppm	91.05 ppm	PASS, 60.80 % of 91.07 ppm
100 kΩ	99994.76	**100001.14**	7.50 ppm	9.9986610E+04	1.0000291E+05	63.793 ppm	74.0 ppm	PASS, 85.77 % of 74.38 ppm
190 kΩ	189989.18 Ω	**189992.686 Ω**	7.5 ppm	1.8997046E+05	1.9000790E+05	18.454 ppm	91.05 ppm	PASS, 20.20 % of 91.36 ppm
1.0 MΩ	999983.7 Ω	**999991.663 Ω**	13.0 ppm	9.9989670E+05	1.0000707E+06	7.963 ppm	74.00 ppm	PASS, 10.62 % of 74.97 ppm
1.9 MΩ	1899982.1 Ω	**1899825.69 Ω**	14.0 ppm	1.8991555E+06	1.9008087E+06	-82.322 ppm	421.05 ppm	PASS, 19.54 % of 421.29 ppm
10 MΩ	9999118 Ω	**9999761.05 Ω**	27.0 ppm	9.9948084E+06	1.0003428E+07	64.311 ppm	404.00 ppm	PASS, 15.89 % of 404.84 ppm
19 MΩ	18998781 Ω	**19002985.5 Ω**	35.0 ppm	1.8969218E+07	1.9028344E+07	221.304 ppm	1521.05 ppm	PASS, 14.55 % of 1521.43 ppm
100 MΩ	100004990 Ω	**100171812 Ω**	85.0 ppm	9.9846082E+07	1.0016390E+08	1668.142 ppm	1504.00 ppm	FAIL, 110.74 % of 1506.34 ppm

4W and 2W Zero test procedure for all test points that verify Zero offset of the OHMF function. 4-wire kelvin connection is used between DMM and MFC. 1GΩ resistance range is tested using the external standard, as MFC unable to provide this range value.

OHM ZERO 4W	DUT	Source unc.	Low Limit	Hi limit	Measured	1y spec	Result
10R ΩRange	**0.0000393 Ω**	5.000e-05 Ω	-5e-05	5e-05	N/A	6.9000e-05 Ω	PASS
100R ΩRange	**0.0001971 Ω**	5.500e-04 Ω	-0.00055	0.00055	N/A	5.2000e-05 Ω	PASS
1K ΩRange	**0.0001767 Ω**	5.500e-03 Ω	-0.0055	0.0055	N/A	5.2000e-05 Ω	PASS
10K ΩRange	**-0.0005507 Ω**	5.500e-02 Ω	-0.055	0.055	N/A	5.2000e-05 Ω	PASS
100K ΩRange	**-0.0227176 Ω**	5.500e-01 Ω	-0.55	0.55	N/A	5.2000e-05 Ω	PASS
1M ΩRange	**-0.1020709 Ω**	5.500e+00 Ω	-5.5	5.5	N/A	5.2000e-05 Ω	PASS
10M ΩRange	**-0.7716117 Ω**	5.500e+01 Ω	-55	55	N/A	5.2000e-05 Ω	PASS
100M ΩRange	**0.9546560 Ω**	5.500e+02 Ω	-550	550	N/A	5.2000e-05 Ω	PASS
OHM ZERO 2W	**DUT**	**Source unc.**	**Low Limit**	**Hi limit**	**Measured**	**1y spec**	**Result**
10R ΩRange	**-0.0004639 Ω**	5.000e-01 Ω	-0.5	0.5	N/A	6.9000e-05 Ω	PASS
100R ΩRange	**-0.0022802 Ω**	5.000e-01 Ω	-0.5	0.5	N/A	5.2000e-05 Ω	PASS
1K ΩRange	**-0.0043293 Ω**	5.000e-01 Ω	-0.5	0.5	N/A	5.2000e-05 Ω	PASS
10K ΩRange	**-0.0417563 Ω**	4.000e-01 Ω	-0.4	0.4	N/A	5.2000e-05 Ω	PASS
100K ΩRange	**-0.3920247 Ω**	8.000e-01 Ω	-0.8	0.8	N/A	5.2000e-05 Ω	PASS
1M ΩRange	**-0.7708103 Ω**	9.000e+00 Ω	-9	9	N/A	5.2000e-05 Ω	PASS
10M ΩRange	**-10.2942815 Ω**	9.000e+01 Ω	-90	90	N/A	5.2000e-05 Ω	PASS
100M ΩRange	**-11.0711017 Ω**	2.000e+04 Ω	-20000.0	20000.0	N/A	5.2000e-05 Ω	PASS

Procedure for all test points in the AC performance verification for SYNCronous mode. This is highest AC accuracy test. AC-measurements does not suffer from TEMF offsets, test connection can be made using shielded leads terminated with dual banana plugs. MFC main AC output is used as reference source

ACV SYNC Test	DUT	w/Guardband	Low Limit	Hi limit	Measured	24h spec	Result, % spec
0.01 V AC+DC @ 10 Hz	**0.010018218**	0.0600 %	0.009921	0.010078	0.1822 %	0.7250 %	PASS 25.04 %
0.01 V AC+DC @ 20 Hz	**0.010017988**	0.0480 %	0.009923	0.010077	0.1799 %	0.7250 %	PASS 24.76 %
0.01 V AC+DC @ 50 Hz	**0.010018098**	0.0470 %	0.009923	0.010077	0.1810 %	0.7250 %	PASS 24.91 %
0.01 V AC+DC @ 60 Hz	**0.010017539**	0.0470 %	0.009923	0.010077	0.1754 %	0.7250 %	PASS 24.14 %

0.01 V AC+DC @ 100 Hz	**0.010018509**	0.0470 %	0.009923	0.010077	0.1851 %	0.7250 %	PASS 25.48 %
0.01 V AC+DC @ 1.0 kHz	**0.010016243**	0.0470 %	0.009923	0.010077	0.1624 %	0.7250 %	PASS 22.36 %
0.01 V AC+DC @ 6.25 kHz	**0.010016618**	0.0470 %	0.009923	0.010077	0.1662 %	0.7250 %	PASS 22.87 %
0.01 V AC+DC @ 10.0 kHz	**0.010016558**	0.0470 %	0.009923	0.010077	0.1656 %	0.7250 %	PASS 22.79 %
0.01 V AC+DC @ 20.0 kHz	**0.010015096**	0.0470 %	0.009923	0.010077	0.1510 %	0.7250 %	PASS 20.78 %
0.01 V AC+DC @ 50.0 kHz	**0.010008789**	0.0570 %	0.009922	0.010078	0.0879 %	0.7250 %	PASS 12.08 %
0.01 V AC+DC @ 100.0 kHz	**0.0099911061**	0.0900 %	0.009928	0.010072	-0.0889 %	0.6250 %	PASS 14.08 %
0.01 V AC+DC @ 200.0 kHz	**0.0099541654**	0.1300 %	0.009879	0.010121	-0.4583 %	1.0750 %	PASS 42.33 %
0.01 V AC+DC @ 300.0 kHz	**0.0099073394**	0.1300 %	0.009879	0.010121	-0.9266 %	1.0750 %	PASS 85.57 %
0.01 V AC+DC @ 500.0 kHz	**0.0097289221**	0.3100 %	0.009669	0.010331	-2.7108 %	3.0000 %	PASS 89.88 %
0.01 V AC+DC @ 1.0 MHz	**0.0085139038**	0.4400 %	0.009656	0.010344	-14.8610 %	3.0000 %	FAIL 490.12 %
0.1 V AC+DC @ 10 Hz	**0.10011277**	0.0320 %	0.099536	0.100465	0.1128 %	0.4325 %	PASS 26.00 %
0.1 V AC+DC @ 20 Hz	**0.10011657**	0.0150 %	0.099553	0.100448	0.1166 %	0.4325 %	PASS 26.94 %
0.1 V AC+DC @ 50 Hz	**0.10012167**	0.0140 %	0.099554	0.100446	0.1217 %	0.4325 %	PASS 28.12 %
0.1 V AC+DC @ 60 Hz	**0.10012376**	0.0140 %	0.099554	0.100446	0.1238 %	0.4325 %	PASS 28.60 %
0.1 V AC+DC @ 100 Hz	**0.10012629**	0.0140 %	0.099554	0.100446	0.1263 %	0.4325 %	PASS 29.18 %
0.1 V AC+DC @ 1.0 kHz	**0.10012805**	0.0140 %	0.099554	0.100446	0.1280 %	0.4325 %	PASS 29.59 %
0.1 V AC+DC @ 6.25 kHz	**0.10012787**	0.0140 %	0.099554	0.100446	0.1279 %	0.4325 %	PASS 29.55 %
0.1 V AC+DC @ 10.0 kHz	**0.10012832**	0.0140 %	0.099554	0.100446	0.1283 %	0.4325 %	PASS 29.65 %
0.1 V AC+DC @ 20.0 kHz	**0.1001298**	0.0140 %	0.099554	0.100446	0.1298 %	0.4325 %	PASS 30.00 %
0.1 V AC+DC @ 50.0 kHz	**0.1001505**	0.0240 %	0.099544	0.100457	0.1505 %	0.4325 %	PASS 34.74 %
0.1 V AC+DC @ 100.0 kHz	**0.10022435**	0.0570 %	0.099611	0.100390	0.2244 %	0.3325 %	PASS 66.50 %
0.1 V AC+DC @ 200.0 kHz	**0.10052062**	0.0900 %	0.099128	0.100872	0.5206 %	0.7825 %	PASS 66.10 %
0.1 V AC+DC @ 300.0 kHz	**0.10085782**	0.0900 %	0.099128	0.100872	0.8578 %	0.7825 %	FAIL 108.91 %
0.1 V AC+DC @ 500.0 kHz	**0.10107759**	0.1400 %	0.097760	0.102240	1.0776 %	2.1000 %	PASS 51.20 %
0.1 V AC+DC @ 1.0 MHz	**0.09704596**	0.2900 %	0.097610	0.102390	-2.9540 %	2.1000 %	FAIL 139.35 %
1.0 V AC+DC @ 10 Hz	**1.0001972**	0.0240 %	0.998010	1.001990	0.0197 %	0.1750 %	PASS 11.17 %
1.0 V AC+DC @ 20 Hz	**1.0002356**	0.0090 %	0.998160	1.001840	0.0236 %	0.1750 %	PASS 13.44 %
1.0 V AC+DC @ 50 Hz	**1.0002847**	0.0045 %	0.999505	1.000495	0.0285 %	0.0450 %	PASS 62.96 %
1.0 V AC+DC @ 60 Hz	**1.0002867**	0.0045 %	0.999505	1.000495	0.0287 %	0.0450 %	PASS 63.41 %
1.0 V AC+DC @ 100 Hz	**1.0003312**	0.0045 %	0.999505	1.000495	0.0331 %	0.0450 %	PASS 73.24 %
1.0 V AC+DC @ 1.0 kHz	**1.0003467**	0.0045 %	0.999505	1.000495	0.0347 %	0.0450 %	PASS 76.67 %
1.0 V AC+DC @ 6.25 kHz	**1.0003368**	0.0045 %	0.999455	1.000545	0.0337 %	0.0500 %	PASS 67.10 %
1.0 V AC+DC @ 10.0 kHz	**1.0003338**	0.0045 %	0.999455	1.000545	0.0334 %	0.0500 %	PASS 66.49 %
1.0 V AC+DC @ 20.0 kHz	**1.0003353**	0.0045 %	0.999455	1.000545	0.0335 %	0.0500 %	PASS 66.81 %
1.0 V AC+DC @ 50.0 kHz	**1.0004123**	0.0075 %	0.999275	1.000725	0.0412 %	0.0650 %	PASS 63.02 %
1.0 V AC+DC @ 100.0 kHz	**1.0009564**	0.0130 %	0.996720	1.003280	0.0956 %	0.3150 %	PASS 30.34 %
1.0 V AC+DC @ 200.0 kHz	**1.0049557**	0.0380 %	0.991870	1.008130	0.4956 %	0.7750 %	PASS 63.87 %
1.0 V AC+DC @ 300.0 kHz	**1.0118437**	0.0380 %	0.991870	1.008130	1.1844 %	0.7750 %	FAIL 152.64 %
1.0 V AC+DC @ 500.0 kHz	**1.0275302**	0.1000 %	0.978000	1.022000	2.7530 %	2.1000 %	FAIL 130.95 %
1.0 V AC+DC @ 1.0 MHz	**1.0564341**	0.1600 %	0.977400	1.022600	5.6434 %	2.1000 %	FAIL 267.96 %
10.0 V AC+DC @ 10 Hz	**9.9987078**	0.0240 %	9.980100	10.019900	-0.0129 %	0.1750 %	PASS 7.32 %
10.0 V AC+DC @ 20 Hz	**9.9990702**	0.0090 %	9.981600	10.018400	-0.0093 %	0.1750 %	PASS 5.31 %
10.0 V AC+DC @ 50 Hz	**9.9994974**	0.0042 %	9.995080	10.004920	-0.0050 %	0.0450 %	PASS 11.12 %
10.0 V AC+DC @ 60 Hz	**9.9993949**	0.0042 %	9.995080	10.004920	-0.0061 %	0.0450 %	PASS 13.39 %
10.0 V AC+DC @ 100 Hz	**9.9999838**	0.0042 %	9.995080	10.004920	-0.0002 %	0.0450 %	PASS 0.36 %
10.0 V AC+DC @ 1.0 kHz	**10.000183**	0.0042 %	9.995080	10.004920	0.0018 %	0.0450 %	PASS 4.05 %
10.0 V AC+DC @ 6.25 kHz	**10.000333**	0.0042 %	9.994580	10.005420	0.0033 %	0.0500 %	PASS 6.64 %
10.0 V AC+DC @ 10.0 kHz	**10.000445**	0.0042 %	9.994580	10.005420	0.0044 %	0.0500 %	PASS 8.87 %
10.0 V AC+DC @ 20.0 kHz	**10.000782**	0.0042 %	9.994580	10.005420	0.0078 %	0.0500 %	PASS 15.59 %
10.0 V AC+DC @ 50.0 kHz	**10.000868**	0.0075 %	9.992750	10.007250	0.0087 %	0.0650 %	PASS 13.27 %
10.0 V AC+DC @ 100.0 kHz	**9.9970623**	0.0110 %	9.967400	10.032600	-0.0294 %	0.3150 %	PASS 9.32 %
10.0 V AC+DC @ 200.0 kHz	**9.9805574**	0.0310 %	9.919400	10.080600	-0.1944 %	0.7750 %	PASS 25.07 %
10.0 V AC+DC @ 300.0 kHz	**9.9503497**	0.0310 %	9.919400	10.080600	-0.4965 %	0.7750 %	PASS 64.01 %
10.0 V AC+DC @ 500.0 kHz	**9.8561894**	0.1000 %	9.780000	10.220000	-1.4381 %	2.1000 %	PASS 68.40 %
10.0 V AC+DC @ 1.0 MHz	**9.5935828**	0.1500 %	9.775000	10.225000	-4.0642 %	2.1000 %	FAIL 193.04 %
100.0 V AC+DC @ 10 Hz	**99.894413**	0.0240 %	99.801000	100.199000	-0.1056 %	0.1750 %	PASS 59.78 %
100.0 V AC+DC @ 20 Hz	**99.896679**	0.0090 %	99.816000	100.184000	-0.1033 %	0.1750 %	PASS 58.96 %
100.0 V AC+DC @ 50 Hz	**99.901188**	0.0051 %	99.939900	100.060100	-0.0988 %	0.0550 %	FAIL 178.92 %

100.0 V AC+DC @ 60 Hz	**99.901859**	0.0051 %	99.939900	100.060100	-0.0981 %	0.0550 %	FAIL 177.70 %
100.0 V AC+DC @ 100 Hz	**99.905109**	0.0051 %	99.939900	100.060100	-0.0949 %	0.0550 %	FAIL 171.82 %
100.0 V AC+DC @ 1.0 kHz	**99.907898**	0.0051 %	99.939900	100.060100	-0.0921 %	0.0550 %	FAIL 166.77 %
100.0 V AC+DC @ 6.25 kHz	**99.908638**	0.0051 %	99.899900	100.100100	-0.0914 %	0.0950 %	PASS 96.04 %
100.0 V AC+DC @ 10.0 kHz	**99.909733**	0.0051 %	99.899900	100.100100	-0.0903 %	0.0950 %	PASS 94.89 %
100.0 V AC+DC @ 20.0 kHz	**99.910859**	0.0051 %	99.899900	100.100100	-0.0891 %	0.0950 %	PASS 93.70 %
100.0 V AC+DC @ 50.0 kHz	**99.901065**	0.0080 %	99.877000	100.123000	-0.0989 %	0.1150 %	PASS 85.82 %
100.0 V AC+DC @ 100.0 kHz	**99.849068**	0.0145 %	99.670500	100.329500	-0.1509 %	0.3150 %	PASS 47.87 %
100.0 V AC+DC @ 200.0 kHz	**99.807172**	0.0860 %	99.139000	100.861000	-0.1928 %	0.7750 %	PASS 24.73 %
700.0 V AC+DC @ 50 Hz	**698.87854**	0.0081 %	699.550800	700.449200	-0.1602 %	0.0561 %	FAIL 282.86 %
700.0 V AC+DC @ 60 Hz	**698.88971**	0.0081 %	699.550800	700.449200	-0.1586 %	0.0561 %	FAIL 280.04 %
700.0 V AC+DC @ 100 Hz	**698.90631**	0.0081 %	699.550800	700.449200	-0.1562 %	0.0561 %	FAIL 275.85 %
700.0 V AC+DC @ 1.0 kHz	**698.9204**	0.0081 %	699.550800	700.449200	-0.1542 %	0.0561 %	FAIL 272.30 %
700.0 V AC+DC @ 6.25 kHz	**698.93772**	0.0114 %	699.247700	700.752300	-0.1518 %	0.0961 %	FAIL 156.86 %
700.0 V AC+DC @ 10.0 kHz	**698.93754**	0.0114 %	699.247700	700.752300	-0.1518 %	0.0961 %	FAIL 156.89 %
700.0 V AC+DC @ 20.0 kHz	**698.93866**	0.0114 %	699.247700	700.752300	-0.1516 %	0.0961 %	FAIL 156.72 %

Procedure for all test points that verify Gain of the DC current DCI function. Both +/-FS points are tested.
2-wire connection at LO and DCI is used between DMM and MFC.
DCI gain range points verify gain of the DC current function, using corrected 24-hour MFC output.

DCI Test	100nA-1A	DUT	Source unc.	Low Limit	Hi limit	Measured	1y spec	Result
Zero mADC	0	**3.0426893E-07**						INFO
-1.0 mADC	0.001	**0.0010001537**	32.00 ppm	0.000998668	0.001001332	0.0154 %	1300 ppm	PASS 11.82 %
2.0 mADC	0.002	**0.0019999944**	28.50 ppm	0.001998143	0.002001857	-2.825 ppm	900 ppm	PASS 0.31 %
-1.0 mADC	-0.001	**-0.00099959539**	32.00 ppm	-0.001001332	-0.000998668	-0.0405 %	1300 ppm	PASS 31.11 %
-2.0 mADC	-0.002	**-0.0019994917**	28.50 ppm	-0.002001857	-0.001998143	-254.152 ppm	900 ppm	PASS 28.23 %
Zero 00 mADC	0	**2.3294148E-07**						INFO
10 mADC	0.01	**0.0099987691**	29.00 ppm	0.00999391	0.01000609	-123.095 ppm	580 ppm	PASS 21.20 %
20 mADC	0.0119	**0.011898494**	27.00 ppm	0.01189293	0.01190707	-126.571 ppm	567 ppm	PASS 22.29 %
-10 mADC	-0.01	**-0.0099984973**	29.00 ppm	-0.01000609	-0.00999391	-150.271 ppm	580 ppm	PASS 25.88 %
-20 mADC	-0.0119	**-0.01189828**	27.00 ppm	-0.01190707	-0.01189293	-144.580 ppm	567 ppm	PASS 25.46 %
Zero 000 mADC	0	**8.7992625E-08**						INFO
100 mADC	0.1	**0.099986946**	42.00 ppm	0.0998658	0.1001342	-0.0131 %	1300 ppm	PASS 10.04 %
119 mADC	0.119	**0.11898494**	47.00 ppm	0.1188549	0.1191451	-0.0127 %	1172 ppm	PASS 10.79 %
-100 mADC	-0.1	**-0.099988064**	42.00 ppm	-0.1001342	-0.0998658	-0.0119 %	1300 ppm	PASS 9.18 %
-119 mADC	-0.119	**-0.11898608**	47.00 ppm	-0.1191451	-0.1188549	-0.0117 %	1172 ppm	PASS 9.97 %
Zero ADC	0	**-1.1096512E-07**						INFO
1.0 ADC	1	**0.99995223**	62.00 ppm	0.999058	1.000942	-47.773 ppm	880 ppm	PASS 5.42 %
2 ADC	2	**2.0000709**	96.00 ppm	1.997288	2.002712	0.0035 %	1260 ppm	PASS 2.81 %
-1.0 ADC	-1	**-1.0000711**	62.00 ppm	-1.000942	-0.999058	71.095 ppm	880 ppm	PASS 8.06 %
-2 ADC	-2	**-2.0001055**	96.00 ppm	-2.002712	-1.997288	0.0053 %	1260 ppm	PASS 4.17 %
Zero ADC	0	**-0.000156**						INFO
1 ADC	1	**0.999962**	62.00 ppm	0.999058	1.000942	-38.000 ppm	880 ppm	PASS 4.31 %
2 ADC	2	**2.000142**	96.00 ppm	1.997288	2.002712	0.0071 %	1260 ppm	PASS 5.62 %
3 ADC	3	**3.000842**	487.00 ppm	2.994819	3.005181	0.0281 %	1240 ppm	PASS 21.07 %
-1 ADC	-1	**-0.999961**	62.00 ppm	-1.000942	-0.999058	-39.000 ppm	880 ppm	PASS 4.42 %
-2 ADC	-2	**-2.000152**	96.00 ppm	-2.002712	-1.997288	0.0076 %	1260 ppm	PASS 6.01 %
-3 ADC	-3	**-3.00107**	487.00 ppm	-3.005181	-2.994819	0.0357 %	1240 ppm	PASS 26.78 %

Test date	16 February 2022 03:26

Lab temperature maintained +24°C ±2°C