

Manufacturer	KEITHLEY INSTRUMENTS	Calibration date	October 01 2020
Model Number	Model 2002	Ambient Temperature	24.28 °C
Serial	4108747	Relative Humidity	40.05 %
ID Number	Calibration test, AS RECEIVED	Pressure	1006.79
Notes	1 day warmup, automated only test	Test type	Front PTFE cable terminals

This note is test dummy text block for further use. Cal.equipment Confidential, internal use only report.

Reference standard	Mfg	Model	Options	Serial / Unc	CEID	Calibration date	Due date
DC STD	xDevs.com	792X[2]	9.9999728 VDC	±0.5 ppm	XD01	03/03/2020	03/03/2021
STDR	ESI	SR104	10000.0026 KΩ	±0.15 ppm	G202088930104	03/17/2020	03/17/2021
STDR	xDevs.com/Fluke	SL935	1.00006085 Ω	±0.17 ppm	XR03	09/13/2019	09/13/2020
STDR	xDevs.com/Fluke	SL935	9999.9737 kΩ	±0.17 ppm	XR02	09/13/2019	09/13/2020
MFC	Fluke	5720A	03/HLK	9572003	XHC1	08/25/2020	02/25/2021
Amplifier	Fluke	5725A		5930005	XHB1	08/25/2020	02/25/2021
DMM	HP	3458A	001,X02	MY45040325	XD2	08/25/2020	02/25/2021
DMM	HP	3458A	001,X02	X	XD3	03/28/2020	03/28/2021

MFC last calibrated	38.0 days ago	MFC since DCV ZERO	1.0 days ago
MFC since WBFLAT	187.0 days ago	MFC since WBGAIN	38.0 days ago
MFC Confidence level	<b>24h 95% REL</b>	MFC Calibrate date	2020-08-25 00:00:00
MFC Calibrate date Zero	2020-10-01 00:00:00	Calibrate date WB Flatness	2020-03-29 00:00:00
Calibrate date WB Gain	2020-08-25 00:00:00	CAL CONST 6.5V reference voltage	6.95747245273
CAL CONST 13V reference voltage	13.8553014829	CAL CONST 22V range positive zero	398.17877
CAL CONST 22V range negative zero	398.17858	CAL CONST DAC Linearity	0.0
CAL CONST 10KOHM true output resistance	9999.80886709	CAL CONST 10KOHM standard resistance	9998.75455393
CAL CONST, Zero calibration temperature	23.3999996185	CAL CONST, All calibration temp	23.3999996185
Booster type	VB5725,IB5725	Current output posts	AUX
Calibrate date 5725A AMP	2020-04-13 00:00:00	Calibrated days ago	Debug
CAL CONST, Amp ACAL temperature	23.5	CAL CONST, Amp CalCheck temperature	23.3999996185

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 2002,4108747,B02 /A02	Test date start	01 October 2020 19:14
Test specification interval	<b>24 hour DUT spec</b>	Line frequency	110V 60 Hz
Next calibration date	2021,09,07	Last calibration date	2020,09,07
DUT Δ temperature to cal	0.60 °C	Last calibration temperature	24.45 °C

Service information

Last calibration temperature

24.45 °C

All CAL values

1.000174E+00,5.348989E-05,1.000079E+01,-3.801604E-05,9.999768E-01,4.637469E-07,9.998529E+00,1.064690E-05,9.998640E+01,4.970084E+02,3.958474E-03,6.349592E-03,2.227639E-03,4.251694E-03,6.328344E-03,1.225000E+02,1.410000E+02,6.822974E-06,5.103481E-06,4.903162E-06,5.502380E-06,5.268483E-06,-3.769262E-05,-7.005345E-07,-2.857226E-06,-3.635842E-07,-4.759003E-07,-1.883305E-06,-2.760714E-05,-5.928491E-07,-4.382684E-07,-2.284424E-06,-1.260324E-06,-2.298782E-06,1.423163E+00,1.423163E+00,5.082981E-06,1.423171E+00,1.423164E+00,-2.384472E-06,1.423163E+00,1.423163E+00,6.791667E-05,1.423234E+00,1.423164E+00,-2.873852E-05,1.778731E+00,1.778730E+00,8.467455E-04,1.779605E+00,1.778732E+00,-2.808739E-05,1.778731E+00,1.778728E+00,6.514632E-03,1.785273E+00,1.778733E+00,1.061170E+00,2.652851E-01,2.652860E+00,1.061083E-01,1.326329E+00,7.271999E-01,2.666245E-01,5.333059E-01,5.334005E-01,1.956566E+00,1.433828E+00,5.333558E-01,1.956522E+00,1.424230E+00,6.666507E-01,2.445410E+00,1.780052E+00,5.001075E-01,2.278866E+00,1.778852E+00,1.326254E+00,1.326224E+00,1.328148E+00,1.341228E+00,6.988241E-01,1.999991E+00,1.900000E+00,1.900000E+01,9.999563E+05,1.000003E+05,1.000037E+04,1.000022E+03,1.000026E+02,1.000188E+01,1.900000E-04,1.900000E-03,1.900000E-02,1.900000E-01,1.000000E+00,4.479539E+01,1.999501E+00,1.999933E+00,1.240000E+02,4.021730E-01,1.999940E+00,1.225000E+02,1.430000E+02,1.499114E+00,1.499675E+00,1.999636E+00,9.600000E+01,1.210000E+02,5.625812E-03,5.584923E-01,1.396194E-01,-1.396239E+00,-3.161081E-07,-2.654023E-06,-3.681685E-05,-2.327377E-07,-6.721604E-07,-8.795797E-07,-2.133872E-06,-8.953278E-07,4.250143E-06,-8.494729E-07,6.796384E-05,-1.076885E-05,8.481465E-04,-1.076113E-05,6.592059E-03,1.999674E-01,2.000464E-01,1.084503E+00,2.002293E+00

Reference

Automated check;

DUT Condition

calkit-5720ah1

Test procedure : \$Id: k2002.py | Rev 1858 | 2020/10/01 14:28:06 tin\_fpga \$

Source procedure : \$Id: f5720b.py | Rev 1697 | 2020/04/04 04:09:52 tin\_fpga \$

**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	0.000000E+00	<b>-2.05 µV</b>	0.50 µV	-1.700 µV	1.700 µV	N/A	1.20 µV	FAIL
Short 0.0 VDC	0.000000E+00	<b>-2.80 µV</b>	0.50 µV	-4.500 µV	4.500 µV	N/A	4.00 µV	PASS
Short 00.0 VDC	0.000000E+00	<b>-2.00 µV</b>	0.50 µV	-80.500 µV	80.500 µV	N/A	80.00 µV	PASS
Short 000.0 VDC	0.000000E+00	<b>10.00 µV</b>	0.50 µV	-600.500 µV	600.500 µV	N/A	0.60 mV	PASS
Short 0000.0 VDC	0.000000E+00	<b>0.00 µV</b>	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	24h spec	Result
0.2 VDC (0.20 Range)	0.2000000	<b>0.19999828</b>	7.27 ppm	0.19999725	0.20000275	-8.613 ppm	6.50 ppm	PASS 44.16 %
-0.2 VDC (0.20 Range)	-0.2000000	<b>-0.20000309</b>	7.27 ppm	-0.20000275	-0.19999725	15.475 ppm	6.50 ppm	PASS 79.34 %
0.2 VDC (2.00 Range)	0.2000000	<b>0.1999975</b>	12.00 ppm	0.19999676	0.20000324	-12.500 ppm	4.20 ppm	PASS 49.16 %
1.0 VDC (2.00 Range)	1.0000000	<b>0.9999927</b>	3.86 ppm	0.99999434	1.0000057	-0.725 ppm	1.80 ppm	PASS 8.51 %
2.0 VDC (2.00 Range)	2.0000000	<b>2.0000013</b>	3.86 ppm	1.9999893	2.0000107	0.650 ppm	1.50 ppm	PASS 7.85 %
-0.2 VDC (2.00 Range)	-0.2000000	<b>-0.20000418</b>	12.00 ppm	-0.20000324	-0.19999676	20.875 ppm	4.20 ppm	PASS 82.10 %
-1.0 VDC (2.00 Range)	-1.0000000	<b>-1.000008</b>	3.86 ppm	-1.0000057	-0.99999434	8.000 ppm	1.80 ppm	PASS 93.92 %
-2.0 VDC (2.00 Range)	-2.0000000	<b>-2.0000136</b>	3.86 ppm	-2.0000107	-1.9999893	6.788 ppm	1.50 ppm	PASS 81.95 %
1.0 VDC (20.00 Range)	1.0000000	<b>1.0000003</b>	3.86 ppm	0.99999294	1.0000071	0.250 ppm	3.20 ppm	PASS 2.49 %
10.0 VDC (20.00 Range)	10.0000000	<b>10.000001</b>	2.77 ppm	9.9999583	10.000042	0.075 ppm	1.40 ppm	PASS 1.21 %
20.0 VDC (20.00 Range)	20.0000000	<b>20.000014</b>	2.73 ppm	19.999919	20.000081	0.688 ppm	1.30 ppm	PASS 11.37 %
-1.0 VDC (20.00 Range)	-1.0000000	<b>-1.0000047</b>	3.86 ppm	-1.0000071	-0.99999294	4.750 ppm	3.20 ppm	PASS 47.37 %
-10.0 VDC (20.00 Range)	-10.0000000	<b>-10.000021</b>	2.77 ppm	-10.000042	-9.9999583	2.150 ppm	1.40 ppm	PASS 34.64 %
-20.0 VDC (20.00 Range)	-20.0000000	<b>-20.000056</b>	2.73 ppm	-20.000081	-19.999919	2.800 ppm	1.30 ppm	PASS 46.30 %
10 VDC (200.00 Range)	10.0000000	<b>10.000005</b>	2.77 ppm	9.9998423	10.000158	0.500 ppm	13.00 ppm	PASS 1.88 %
100 VDC (200.00 Range)	100.0000000	<b>100.000007</b>	3.73 ppm	99.999047	100.00095	0.650 ppm	5.80 ppm	PASS 4.71 %
200 VDC (200.00 Range)	200.0000000	<b>200.000018</b>	3.73 ppm	199.99817	200.00183	0.925 ppm	5.40 ppm	PASS 7.05 %
-10 VDC (200.00 Range)	-10.0000000	<b>-10.000068</b>	2.77 ppm	-10.000158	-9.9998423	6.750 ppm	13.00 ppm	PASS 25.39 %
-100 VDC (200.00 Range)	-100.0000000	<b>-100.000042</b>	3.73 ppm	-100.00095	-99.999047	4.225 ppm	5.80 ppm	PASS 30.63 %
-200 VDC (200.00 Range)	-200.0000000	<b>-200.000088</b>	3.73 ppm	-200.00183	-199.99817	4.425 ppm	5.40 ppm	PASS 33.71 %
100 VDC (1000.00 Range)	100.0000000	<b>100.000012</b>	3.73 ppm	99.999047	100.00095	1.250 ppm	5.80 ppm	PASS 9.06 %
200 VDC (1000.00 Range)	200.0000000	<b>200.000025</b>	3.73 ppm	199.99817	200.00183	1.250 ppm	5.40 ppm	PASS 9.52 %
1000 VDC (1000.00 Range)	1000.0000000	<b>1000.0058</b>	5.45 ppm	999.98697	1000.013	5.793 ppm	5.08 ppm	PASS 48.31 %
-100 VDC (1000.00 Range)	-100.0000000	<b>-100.00002</b>	3.73 ppm	-100.00095	-99.999047	2.000 ppm	5.80 ppm	PASS 14.50 %
-200 VDC (1000.00 Range)	-200.0000000	<b>-200.00004</b>	3.73 ppm	-200.00183	-199.99817	2.000 ppm	5.40 ppm	PASS 15.24 %
-1000 VDC (1000.00 Range)	-1000.0000000	<b>-1000.0071</b>	5.45 ppm	-1000.013	-999.98697	7.113 ppm	5.08 ppm	PASS 59.32 %

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	24h spec	Result
1 Ω	0.9997958 Ω	<b>0.9997177 Ω</b>	32.0 ppm	9.9966881E-01	9.9992279E-01	-78.116 ppm	95.02 ppm	PASS, 38.96 % of 200.52 ppm
1.9 Ω	1.8998512 Ω	<b>1.8997327 Ω</b>	25.0 ppm	1.8997042E+00	1.8999982E+00	-62.347 ppm	52.37 ppm	PASS, 53.72 % of 116.07 ppm
10 Ω	10.00062 Ω	<b>10.000447 Ω</b>	5.0 ppm	1.0000430E+01	1.0000810E+01	-17.344 ppm	14.00 ppm	PASS, 58.34 % of 29.73 ppm
19 Ω	19.000233 Ω	<b>18.999937 Ω</b>	4.0 ppm	1.8999972E+01	1.9000494E+01	-15.555 ppm	9.74 ppm	PASS, 73.89 % of 21.05 ppm
100 Ω	99.99665 Ω	<b>99.996516 Ω</b>	1.8 ppm	9.9995370E+01	9.9997930E+01	-1.340 ppm	11.00 ppm	PASS, 6.01 % of 22.29 ppm
190 Ω	189.9935 Ω	<b>189.99321 Ω</b>	1.8 ppm	1.8999161E+02	1.8999539E+02	-1.516 ppm	8.16 ppm	PASS, 9.07 % of 16.71 ppm
1.0 kΩ	1000.0265 kΩ	<b>1000.0294 kΩ</b>	1.8 ppm	1.0000216E+03	1.0000314E+03	2.900 ppm	3.10 ppm	PASS, 40.45 % of 7.17 ppm
1.9 kΩ	1899.897 kΩ	<b>1899.9034 kΩ</b>	1.8 ppm	1.8998882E+03	1.8999058E+03	3.349 ppm	2.82 ppm	PASS, 50.10 % of 6.68 ppm
10 kΩ	9999.81 kΩ	<b>9999.8008 kΩ</b>	1.7 ppm	9.9997620E+03	9.9998580E+03	-0.925 ppm	3.10 ppm	PASS, 13.08 % of 7.07 ppm
19 kΩ	18999.295 kΩ	<b>18999.283 kΩ</b>	1.8 ppm	1.8999207E+04	1.8999383E+04	-0.632 ppm	2.82 ppm	PASS, 9.45 % of 6.68 ppm
100 kΩ	99994.88 kΩ	<b>99995.349 kΩ</b>	2.0 ppm	9.9994030E+04	9.9995730E+04	4.688 ppm	6.50 ppm	PASS, 34.46 % of 13.60 ppm
190 kΩ	189989.26 kΩ	<b>189989.92 kΩ</b>	2.0 ppm	1.8998774E+05	1.8999078E+05	3.487 ppm	6.03 ppm	PASS, 27.46 % of 12.70 ppm
1.0 MΩ	999983.1 MΩ	<b>999988.46 MΩ</b>	2.5 ppm	9.9996800E+05	9.999820E+05	5.363 ppm	12.60 ppm	PASS, 20.87 % of 25.69 ppm
1.9 MΩ	1899979.9 MΩ	<b>1899984.8 MΩ</b>	3.0 ppm	1.8999508E+06	1.9000090E+06	2.566 ppm	12.32 ppm	PASS, 10.12 % of 25.35 ppm
10 MΩ	9999087 MΩ	<b>9998983.8 MΩ</b>	10.0 ppm	9.9984831E+06	9.9996909E+06	-10.326 ppm	50.40 ppm	PASS, 10.05 % of 102.77 ppm
19 MΩ	18998711 MΩ	<b>18998436 MΩ</b>	20.0 ppm	1.8997377E+07	1.9000045E+07	-14.490 ppm	50.21 ppm	PASS, 13.41 % of 108.09 ppm
100 MΩ	100.0038 MΩ	<b>100.0031 MΩ</b>	50.0 ppm	9.9983599E+07	1.0002400E+08	-6.980 ppm	152.00 ppm	PASS, 2.18 % of 320.02 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 Measured	Source unc.	Low Limit	Hi limit	24h spec	Result
20R Ω Range	<b>-0.0000451 Ω</b>	5.000e-05 Ω	-5e-05	5e-05	9.5000e-06 Ω	PASS
200R Ω Range	<b>-0.0000800 Ω</b>	5.500e-04 Ω	-0.00055	0.00055	2.8000e-06 Ω	PASS
2K Ω Range	<b>0.0000875 Ω</b>	5.500e-03 Ω	-0.0055	0.0055	2.8000e-06 Ω	PASS
20K Ω Range	<b>-0.0003750 Ω</b>	5.500e-02 Ω	-0.055	0.055	2.8000e-06 Ω	PASS
200K Ω Range	<b>-0.0001250 Ω</b>	5.500e-01 Ω	-0.55	0.55	2.8000e-06 Ω	PASS
OHM ZERO 2W	DUT	Source unc.	Low Limit	Hi limit	24h spec	Result
20R Ω Range	<b>0.2648265 Ω</b>	5.000e-01 Ω	-0.5	0.5	9.5000e-06 Ω	PASS
200R Ω Range	<b>0.2620365 Ω</b>	5.000e-01 Ω	-0.5	0.5	2.8000e-06 Ω	PASS
2K Ω Range	<b>0.2610250 Ω</b>	5.000e-01 Ω	-0.5	0.5	2.8000e-06 Ω	PASS
20K Ω Range	<b>0.2362500 Ω</b>	4.000e-01 Ω	-0.4	0.4	2.8000e-06 Ω	PASS
200K Ω Range	<b>0.0037500 Ω</b>	8.000e-01 Ω	-0.8	0.8	2.8000e-06 Ω	PASS
2M Ω Range	<b>-0.9850000 Ω</b>	9.000e+00 Ω	-9	9	2.8000e-06 Ω	PASS
20M Ω Range	<b>-1.0000000 Ω</b>	9.000e+01 Ω	-90	90	2.8000e-06 Ω	PASS
200M Ω Range	<b>0.0000000 Ω</b>	2.000e+04 Ω	-20000.0	20000.0	2.8000e-06 Ω	PASS
1G Ω Range	<b>0.0000000 Ω</b>	1.000e+05 Ω	-100000	100000	2.8000e-06 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
0.2 V AC+DC @ 10 Hz	<b>0.19998783</b>	0.0121 %	0.199654	0.200346	-0.0061 %	0.1607 %	PASS 1.89 %
0.2 V AC+DC @ 20 Hz	<b>0.19999046</b>	0.0121 %	0.199654	0.200346	-0.0048 %	0.1607 %	PASS 1.48 %
0.2 V AC+DC @ 50 Hz	<b>0.19999359</b>	0.0121 %	0.199914	0.200086	-0.0032 %	0.0307 %	PASS 4.85 %
0.2 V AC+DC @ 60 Hz	<b>0.20000145</b>	0.0121 %	0.199914	0.200086	0.0007 %	0.0307 %	PASS 1.10 %
0.2 V AC+DC @ 100 Hz	<b>0.19999795</b>	0.0121 %	0.199914	0.200086	-0.0010 %	0.0307 %	PASS 1.55 %
0.2 V AC+DC @ 1.0 kHz	<b>0.20000815</b>	0.0121 %	0.199914	0.200086	0.0041 %	0.0307 %	PASS 6.16 %
0.2 V AC+DC @ 6.25 kHz	<b>0.20001182</b>	0.0121 %	0.199904	0.200096	0.0059 %	0.0357 %	PASS 7.83 %
0.2 V AC+DC @ 10.0 kHz	<b>0.20001486</b>	0.0121 %	0.199904	0.200096	0.0074 %	0.0357 %	PASS 9.84 %
0.2 V AC+DC @ 20.0 kHz	<b>0.20001763</b>	0.0121 %	0.199904	0.200096	0.0088 %	0.0357 %	PASS 11.67 %
0.2 V AC+DC @ 50.0 kHz	<b>0.20000287</b>	0.0256 %	0.199847	0.200153	0.0014 %	0.0507 %	PASS 1.26 %
0.2 V AC+DC @ 100.0 kHz	<b>0.1998185</b>	0.0591 %	0.199280	0.200720	-0.0907 %	0.3007 %	PASS 14.80 %
0.2 V AC+DC @ 200.0 kHz	<b>0.19927279</b>	0.0964 %	0.198305	0.201695	-0.3636 %	0.7513 %	PASS 24.00 %
0.2 V AC+DC @ 300.0 kHz	<b>0.19891836</b>	0.0964 %	0.198305	0.201695	-0.5408 %	0.7513 %	PASS 35.70 %
0.2 V AC+DC @ 500.0 kHz	<b>0.198756</b>	0.1500 %	0.195690	0.204310	-0.6220 %	2.0050 %	PASS 15.47 %
0.2 V AC+DC @ 1.0 MHz	<b>0.20009991</b>	0.3000 %	0.195390	0.204610	0.0500 %	2.0050 %	PASS 1.23 %
2.0 V AC+DC @ 10 Hz	<b>2.0002575</b>	0.0050 %	1.996686	2.003314	0.0129 %	0.1607 %	PASS 4.00 %
2.0 V AC+DC @ 20 Hz	<b>2.0002842</b>	0.0050 %	1.996686	2.003314	0.0142 %	0.1607 %	PASS 4.42 %
2.0 V AC+DC @ 50 Hz	<b>2.0002913</b>	0.0050 %	1.999286	2.000714	0.0146 %	0.0307 %	PASS 23.38 %
2.0 V AC+DC @ 60 Hz	<b>2.0002966</b>	0.0050 %	1.999286	2.000714	0.0148 %	0.0307 %	PASS 23.81 %
2.0 V AC+DC @ 100 Hz	<b>2.0002649</b>	0.0050 %	1.999286	2.000714	0.0132 %	0.0307 %	PASS 21.26 %
2.0 V AC+DC @ 1.0 kHz	<b>2.000254</b>	0.0050 %	1.999286	2.000714	0.0127 %	0.0307 %	PASS 20.39 %
2.0 V AC+DC @ 6.25 kHz	<b>2.0002755</b>	0.0050 %	1.999186	2.000814	0.0138 %	0.0358 %	PASS 19.08 %
2.0 V AC+DC @ 10.0 kHz	<b>2.0002861</b>	0.0050 %	1.999186	2.000814	0.0143 %	0.0358 %	PASS 19.82 %
2.0 V AC+DC @ 20.0 kHz	<b>2.000269</b>	0.0050 %	1.999186	2.000814	0.0134 %	0.0358 %	PASS 18.63 %
2.0 V AC+DC @ 50.0 kHz	<b>1.9998867</b>	0.0085 %	1.998814	2.001186	-0.0057 %	0.0507 %	PASS 5.50 %
2.0 V AC+DC @ 100.0 kHz	<b>1.9980313</b>	0.0138 %	1.993709	2.006291	-0.0984 %	0.3007 %	PASS 16.35 %
2.0 V AC+DC @ 200.0 kHz	<b>1.9927673</b>	0.0425 %	1.984124	2.015876	-0.3616 %	0.7513 %	PASS 24.03 %
2.0 V AC+DC @ 300.0 kHz	<b>1.9894368</b>	0.0425 %	1.984124	2.015876	-0.5282 %	0.7513 %	PASS 35.10 %
2.0 V AC+DC @ 500.0 kHz	<b>1.9873548</b>	0.1100 %	1.957700	2.042300	-0.6323 %	2.0050 %	PASS 15.74 %
2.0 V AC+DC @ 1.0 MHz	<b>1.99171</b>	0.1800 %	1.956300	2.043700	-0.4145 %	2.0050 %	PASS 10.30 %
20 V AC+DC @ 10 Hz	<b>20.000694</b>	0.0048 %	19.965536	20.034464	0.0035 %	0.1675 %	PASS 1.04 %
20 V AC+DC @ 20 Hz	<b>20.000746</b>	0.0048 %	19.965536	20.034464	0.0037 %	0.1675 %	PASS 1.11 %
20 V AC+DC @ 50 Hz	<b>20.001187</b>	0.0048 %	19.989536	20.010464	0.0059 %	0.0475 %	PASS 6.22 %
20 V AC+DC @ 60 Hz	<b>20.001116</b>	0.0048 %	19.989536	20.010464	0.0056 %	0.0475 %	PASS 5.84 %
20 V AC+DC @ 100 Hz	<b>20.001228</b>	0.0048 %	19.989536	20.010464	0.0061 %	0.0475 %	PASS 6.43 %
20 V AC+DC @ 1.0 kHz	<b>20.00033</b>	0.0048 %	19.989536	20.010464	0.0017 %	0.0475 %	PASS 1.73 %
20 V AC+DC @ 6.25 kHz	<b>19.996472</b>	0.0048 %	19.981536	20.018464	-0.0176 %	0.0875 %	PASS 10.06 %
20 V AC+DC @ 10.0 kHz	<b>19.996014</b>	0.0048 %	19.981536	20.018464	-0.0199 %	0.0875 %	PASS 11.37 %
20 V AC+DC @ 20.0 kHz	<b>19.996638</b>	0.0048 %	19.981536	20.018464	-0.0168 %	0.0875 %	PASS 9.59 %
20 V AC+DC @ 50.0 kHz	<b>20.000231</b>	0.0085 %	19.976791	20.023209	0.0012 %	0.1075 %	PASS 0.54 %
20 V AC+DC @ 100.0 kHz	<b>19.994846</b>	0.0121 %	19.936073	20.063927	-0.0258 %	0.3075 %	PASS 4.19 %

20 V AC+DC @ 200.0 kHz	<b>19.977728</b>	0.0336 %	19.840773	20.159227	-0.1114 %	0.7625 %	PASS 7.30 %
20 V AC+DC @ 300.0 kHz	<b>19.990274</b>	0.0336 %	19.840773	20.159227	-0.0486 %	0.7625 %	PASS 3.19 %
20 V AC+DC @ 500.0 kHz	<b>20.070353</b>	0.1100 %	19.158000	20.842000	0.3518 %	4.1000 %	PASS 4.29 %
20 V AC+DC @ 1.0 MHz	<b>20.482313</b>	0.1700 %	19.146000	20.854000	2.4116 %	4.1000 %	PASS 29.38 %
200.0 V AC+DC @ 100 Hz	<b>200.03159</b>	0.0060 %	199.906460	200.093540	0.0158 %	0.0408 %	PASS 19.17 %
200.0 V AC+DC @ 1.0 kHz	<b>200.01312</b>	0.0060 %	199.906464	200.093536	0.0066 %	0.0408 %	PASS 7.96 %
200.0 V AC+DC @ 6.25 kHz	<b>199.99055</b>	0.0060 %	199.826464	200.173536	-0.0047 %	0.0807 %	PASS 2.92 %
200.0 V AC+DC @ 10.0 kHz	<b>199.9989</b>	0.0060 %	199.826464	200.173536	-0.0005 %	0.0807 %	PASS 0.34 %
200.0 V AC+DC @ 20.0 kHz	<b>200.01381</b>	0.0060 %	199.826464	200.173536	0.0069 %	0.0807 %	PASS 4.26 %
700.0 V AC+DC @ 100 Hz	<b>700</b>	0.0060 %	699.382874	700.617126	0.0000 %	0.0821 %	PASS 0.00 %
700.0 V AC+DC @ 1.0 kHz	<b>699.9764</b>	0.0074 %	699.373452	700.626548	-0.0034 %	0.0821 %	PASS 2.04 %

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	24h spec	Result
Zero $\mu$ ADC	0	-1E-10						INFO
1 $\mu$ ADC	1E-06	1.00003E-06	71.82 ppm	9.986792E-07	1.001321E-06	0.0030 %	1249 ppm	PASS 1.20 %
2 $\mu$ ADC	2E-06	2.00006E-06	71.82 ppm	1.998557E-06	2.001443E-06	30.000 ppm	649 ppm	PASS 2.30 %
-1 $\mu$ ADC	-1E-06	-1.00004E-06	71.82 ppm	-1.001323E-06	-9.986772E-07	0.0040 %	1251 ppm	PASS 1.60 %
-2 $\mu$ ADC	-2E-06	-2.00004E-06	71.82 ppm	-2.001445E-06	-1.998555E-06	20.000 ppm	651 ppm	PASS 1.53 %
Zero 00 $\mu$ ADC	0	-2.5E-10						INFO
10 $\mu$ ADC	1E-05	9.99979E-06	71.82 ppm	9.997583E-06	1.000242E-05	-21.000 ppm	170 ppm	PASS 5.69 %
20 $\mu$ ADC	2E-05	1.99996E-05	71.82 ppm	1.999636E-05	2.000364E-05	-20.000 ppm	110 ppm	PASS 7.61 %
-10 $\mu$ ADC	-1E-05	-1.000013E-05	71.82 ppm	-1.000242E-05	-9.997581E-06	13.000 ppm	170 ppm	PASS 3.52 %
20 $\mu$ ADC	-2E-05	-2.00001E-05	71.82 ppm	-2.000364E-05	-1.999636E-05	5.000 ppm	110 ppm	PASS 1.90 %
Zero 000 $\mu$ ADC	0	-3.6E-10						INFO
100 $\mu$ ADC	0.0001	9.999809E-05	71.82 ppm	9.998662E-05	0.0001000134	-19.100 ppm	62 ppm	PASS 10.07 %
200 $\mu$ ADC	0.0002	0.00019999595	71.82 ppm	0.0001999744	0.0002000256	-20.250 ppm	56 ppm	PASS 11.12 %
-100 $\mu$ ADC	-0.0001	-9.99991E-05	71.82 ppm	-0.0001000134	-9.998662E-05	-0.900 ppm	62 ppm	PASS 0.47 %
-200 $\mu$ ADC	-0.0002	-0.0001999987	71.82 ppm	-0.0002000256	-0.0001999744	-0.650 ppm	56 ppm	PASS 0.36 %
Zero mADC	0	-1.9E-10						INFO
-1.0 mADC	0.001	0.0009999894	33.64 ppm	0.0009999064	0.001000094	-10.600 ppm	60 ppm	PASS 7.71 %
2.0 mADC	0.002	0.0019999772	33.64 ppm	0.001999823	0.002000177	-11.400 ppm	55 ppm	PASS 8.84 %
-1.0 mADC	-0.001	-0.001000081	33.64 ppm	-0.001000094	-0.0009999064	8.100 ppm	60 ppm	PASS 5.89 %
-2.0 mADC	-0.002	-0.002000017	33.64 ppm	-0.002000177	-0.001999823	8.500 ppm	55 ppm	PASS 6.59 %
Zero 00 mADC	0	-1.9E-10						INFO
10 mADC	0.01	0.010000048	32.27 ppm	0.009999077	0.01000092	4.800 ppm	60 ppm	PASS 3.52 %
20 mADC	0.02	0.020000089	32.27 ppm	0.01999825	0.02000175	4.450 ppm	55 ppm	PASS 3.49 %
-10 mADC	-0.01	-0.010000243	32.27 ppm	-0.01000092	-0.009999077	24.300 ppm	60 ppm	PASS 17.83 %
-20 mADC	-0.02	-0.020000473	32.27 ppm	-0.02000175	-0.01999825	23.650 ppm	55 ppm	PASS 18.54 %
Zero 000 mADC	0	-2.4E-10						INFO
100 mADC	0.1	0.10000287	53.32 ppm	0.09998617	0.1000138	28.700 ppm	85 ppm	PASS 14.30 %
200 mADC	0.2	0.20000959	53.32 ppm	0.1999733	0.2000267	47.950 ppm	80 ppm	PASS 24.94 %
-100 mADC	-0.1	-0.10000544	53.32 ppm	-0.1000138	-0.09998617	54.400 ppm	85 ppm	PASS 27.11 %
-200 mADC	-0.2	-0.20001438	53.32 ppm	-0.2000267	-0.1999733	71.900 ppm	80 ppm	PASS 37.39 %
Zero ADC	0	-4E-11						INFO
1.0 ADC	1	1.0000162	115.22 ppm	0.9995248	1.000475	16.200 ppm	360 ppm	PASS 2.14 %
2.0 ADC	2	2.0000161	115.22 ppm	1.99906	2.00094	8.050 ppm	355 ppm	PASS 1.08 %
-1.0 ADC	-1	-1.0001034	115.22 ppm	-1.000475	-0.9995248	103.400 ppm	360 ppm	PASS 13.68 %
-2.0 ADC	-2	-2.0000352	115.22 ppm	-2.00094	-1.99906	17.600 ppm	355 ppm	PASS 2.36 %



Procedure for all test points that verify Gain of the AC Current ACI function. Three frequency band points are tested, 50 Hz, 60 Hz and 1 kHz. 2-wire connection at LO and DCI is used between DMM and MFC.

ACI Test	200µA-2A	DUT	Source unc.	Low Limit	Hi limit	Measured	24h spec	Result, % spec
1.0 mA AC @ 50 Hz	0.001	<b>0.0009995914</b>	0.0138 %	0.00099924182	0.00100075818	-408.600 ppm	0.0620 %	PASS 32.16 %
2.0 mA AC @ 50 Hz	0.002	<b>0.0019996509</b>	0.0138 %	0.00199850364	0.00200149636	-174.550 ppm	0.0610 %	PASS 13.95 %
10 mA AC @ 50 Hz	0.01	<b>0.009996853</b>	0.0138 %	0.0099924182	0.0100075818	-314.700 ppm	0.0620 %	PASS 24.77 %
20 mA AC @ 50 Hz	0.02	<b>0.01999824</b>	0.0138 %	0.0199850364	0.0200149636	-88.000 ppm	0.0610 %	PASS 7.03 %
100 mA AC @ 50 Hz	0.1	<b>0.10001758</b>	0.0134 %	0.099924636	0.100075364	175.800 ppm	0.0620 %	PASS 13.86 %
200 mA AC @ 50 Hz	0.2	<b>0.20008251</b>	0.0134 %	0.199851272	0.200148728	412.550 ppm	0.0610 %	PASS 33.03 %
1.0 A AC @ 50 Hz	1.0	<b>0.9998214</b>	0.0308 %	0.99887182	1.00112818	-178.600 ppm	0.0820 %	PASS 10.19 %
2.0 A AC @ 50 Hz	2.0	<b>2.000028</b>	0.0308 %	1.99776364	2.00223636	14.000 ppm	0.0810 %	PASS 0.81 %
1.0 mA AC @ 60 Hz	0.001	<b>0.0009996864</b>	0.0138 %	0.00099924182	0.00100075818	-313.600 ppm	0.0620 %	PASS 24.68 %
2.0 mA AC @ 60 Hz	0.002	<b>0.0019998256</b>	0.0138 %	0.00199850364	0.00200149636	-87.200 ppm	0.0610 %	PASS 6.97 %
10 mA AC @ 60 Hz	0.01	<b>0.009997129</b>	0.0138 %	0.0099924182	0.0100075818	-287.100 ppm	0.0620 %	PASS 22.60 %
20 mA AC @ 60 Hz	0.02	<b>0.019999715</b>	0.0138 %	0.0199850364	0.0200149636	-14.250 ppm	0.0610 %	PASS 1.14 %
100 mA AC @ 60 Hz	0.1	<b>0.10002391</b>	0.0134 %	0.099924636	0.100075364	239.100 ppm	0.0620 %	PASS 18.85 %
200 mA AC @ 60 Hz	0.2	<b>0.20009166</b>	0.0134 %	0.199851272	0.200148728	458.300 ppm	0.0610 %	PASS 36.70 %
1.0 A AC @ 60 Hz	1.0	<b>0.999846</b>	0.0308 %	0.99887182	1.00112818	-154.000 ppm	0.0820 %	PASS 8.79 %
2.0 A AC @ 60 Hz	2.0	<b>2.0001518</b>	0.0308 %	1.99776364	2.00223636	75.900 ppm	0.0810 %	PASS 4.38 %
1.0 mA AC @ 1.0 kHz	0.001	<b>0.0009997669</b>	0.0138 %	0.00099954182	0.00100045818	-233.100 ppm	0.0320 %	PASS 33.44 %
2.0 mA AC @ 1.0 kHz	0.002	<b>0.0019999933</b>	0.0138 %	0.00199910364	0.00200089636	-3.350 ppm	0.0310 %	PASS 0.49 %
10 mA AC @ 1.0 kHz	0.01	<b>0.009999002</b>	0.0138 %	0.0099954182	0.0100045818	-99.800 ppm	0.0320 %	PASS 14.32 %
20 mA AC @ 1.0 kHz	0.02	<b>0.020002638</b>	0.0138 %	0.0199910364	0.0200089636	131.900 ppm	0.0310 %	PASS 19.43 %
100 mA AC @ 1.0 kHz	0.1	<b>0.10003945</b>	0.0134 %	0.099954636	0.100045364	394.500 ppm	0.0320 %	PASS 56.88 %
200 mA AC @ 1.0 kHz	0.2	<b>0.20012692</b>	0.0133 %	0.199911272	0.200088728	0.0635 %	0.0310 %	PASS 93.99 %
1.0 A AC @ 1.0 kHz	1.0	<b>1.0000001</b>	0.0308 %	0.99867182	1.00132818	0.0000 %	0.1020 %	PASS 0.00 %
2.0 A AC @ 1.0 kHz	2.0	<b>2.0003573</b>	0.0308 %	1.99736364	2.00263636	0.0179 %	0.1010 %	PASS 8.46 %
1.0 mA AC @ 10.0 kHz	0.001	<b>0.0010000767</b>	0.1400 %	0.00099798	0.00100202	76.700 ppm	0.0620 %	PASS 2.50 %
2.0 mA AC @ 10.0 kHz	0.002	<b>0.0020003754</b>	0.1400 %	0.00199598	0.00200402	187.700 ppm	0.0610 %	PASS 6.15 %
10 mA AC @ 10.0 kHz	0.01	<b>0.010000421</b>	0.1300 %	0.0099808	0.0100192	42.100 ppm	0.0620 %	PASS 1.46 %
20 mA AC @ 10.0 kHz	0.02	<b>0.020002965</b>	0.1300 %	0.0199618	0.0200382	148.250 ppm	0.0610 %	PASS 5.16 %
100 mA AC @ 10.0 kHz	0.1	<b>0.10008623</b>	0.1100 %	0.099828	0.100172	862.300 ppm	0.0620 %	PASS 34.15 %
200 mA AC @ 10.0 kHz	0.2	<b>0.20019351</b>	0.1100 %	0.199658	0.200342	967.550 ppm	0.0610 %	PASS 38.46 %
1.0 A AC @ 10.0 kHz	1.0	<b>0.9970546</b>	0.6100 %	0.99088	1.00912	-0.2945 %	0.3020 %	PASS 21.64 %
2.0 A AC @ 10.0 kHz	2.0	<b>1.9910519</b>	0.6100 %	1.98178	2.01822	-0.4474 %	0.3010 %	PASS 32.89 %

Test date finish

02 October 2020 05:31

Lab temperature maintained +24°C ±2°C

Internal use only

Not validated