

Manufacturer	KEITHLEY INSTRUMENTS	Calibration date	April 26 2023
Model Number	Model 2002	Ambient Temperature	24.16 °C
Serial	UNIT-LTC	Relative Humidity	24.20 %
ID Number	Calibration test	Pressure	1016.85
Notes	Test post-adjustment LTC connector mod, H1;	Test type	Front inputs, PTFE spade, AUX Current

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	01/04/2022	01/23/2023
BVD	MIL	6000A		REDACTED	XRB2	05/05/2022	05/05/2023
MFC	Fluke	5720A	H2	XRI	XHC1	12/16/2022	05/16/2023
MFC	Fluke	5720A	03/H1	7530212	XHC1	04/09/2023	10/09/2023
Amplifier	Fluke	5725A		5930005	XHB1	04/09/2023	10/09/2023
DC STD	xDevs.com	792X[2]	9.99997622 VDC	±0.3 ppm	XD01	10/21/2022	01/21/2023
STDR	ESI	SR104	10000.0019 KΩ	±0.2 ppm	G202088930104	04/18/2023	04/18/2024
STDR	xDevs.com/Fluke	SL935	1.0000638 Ω	±0.1 ppm	XR03	03/26/2023	03/26/2025
STDR	xDevs.com/Fluke	SL935	9999.9762 kΩ	±0.1 ppm	XR02	03/26/2023	03/26/2025
DMM	HP	3458A	001,X02	MY45040325	XD2	11/13/2022	11/13/2023

MFC last calibrated	17.0 days ago	MFC since DCV ZERO	1.0 days ago
MFC since WBFLAT	837.0 days ago	MFC since WBGAIN	443.0 days ago
MFC Confidence level	<b>24h 95% REL</b>	MFC Calibrate date	2023-04-09 00:00:00
MFC Calibrate date Zero	2023-04-25 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	6.95747533868
CAL CONST 13V reference voltage	13.8552874562	CAL CONST 22V range positive zero	398.17748
CAL CONST 22V range negative zero	398.17712	CAL CONST DAC Linearity	0.0
CAL CONST 10KOHM true output resistance	9999.79967663	CAL CONST 10KOHM standard resistance	9998.74840731
CAL CONST, Zero calibration temperature	23.2999992371	CAL CONST, All calibration temp	23.2999992371
Booster type	VB5725,IB5725	Current output posts	AUX
Calibrate date 5725A AMP	2023-04-09 00:00:00	Calibrated days ago	Debug
CAL CONST, Amp ACAL temperature	23.0	CAL CONST, Amp CalCheck temperature	23.0

Total uncertainty of each calibration point calculated with RSS



Meter Info	KEITHLEY INSTRUMENTS INC.,MODEL 2002,REDACTED,A08 /A02	Test date start	26 April 2023 02:29
Test specification interval	<b>24 hour DUT spec</b>	Line frequency	120V 60 Hz
Next calibration date	2024,04,26	Last calibration date	2023,04,26
DUT Δ temperature to cal	1.26 °C	Last calibration temperature	24.26 °C

Service information

Last calibration temperature	
24.26 °C	
All CAL values	
1.000148E+00,1.556910E-05,1.000695E+01,-2.487676E-05,1.000020E+00,1.664409E-05,1.000505E+01,1.064688E-04,1.000553E+02,4.967321E+02,4.461284E-03,6.781359E-03,2.472154E-03,1.400000E+02,1.360000E+02,-2.139523E-06,-1.236184E-06,-1.556522E-06,-1.077058E-06,-1.372380E-06,-2.734290E-05,-4.426359E-07,-2.013177E-06,-7.226709E-07,-8.616461E-08,-5.607396E-09,5.392441E-08,4.297276E-07,1.000659E-07,1.422946E+00,1.422946E+00,7.557201E-06,1.422945E+00,1.422937E+00,1.701121E-07,1.422946E+00,1.422946E+00,7.852674E-05,1.423010E-07,1.778205E+00,1.778206E+00,9.798538E-04,1.779076E+00,1.778090E+00,3.692108E-07,1.778206E+00,1.778204E+00,7.393434E-03,1.785488E+00,1.778090E+00,1.115178E+00,2.787844E-01,2.787777E-01,2.666412E-01,1.013137E+00,1.013385E+00,2.436331E+00,1.443212E+00,1.013354E+00,2.436300E+00,1.424973E+00,1.266814E+00,3.045014E+00,1.780733E+00,01,2.728316E+00,1.778453E+00,1.394130E+00,1.393919E+00,1.395695E+00,1.411676E+00,1.393229E+00,1.999929E+00,2.000000E+00,2.000000E+01,9.999824E+05,1.899892E+05,1.899926E+04,1.899804,2.000000E-03,2.000000E-02,2.000000E-01,2.000000E+00,4.378172E+01,1.999873E+00,2.000278E+00,1.405000E+02,4.025007E-01,1.999110E+00,1.395000E+02,1.360000E+02,1.499471E+00,1.500005E+00,2.001472E+00,9.600000E+01,1.210000E+02,1.744209E-02,5.575964E-01,1.393940E-01,-1.394150E+00,-7.059947E-07,-6.278108,-1.117404E-07,4.219451E-07,-1.300858E-07,7.527189E-06,-1.778952E-08,7.858797E-05,-2.270393E-06,9.805075E-04,-2.911996E-06,7.398128E-03,2.001149E+00,2.002028E+00,1.000000E+00	
Reference	
Performance check	
DUT Condition	
Ambient +23C	

Test procedure : \$Id: k2002.py | Rev 2657 | 2023/04/12 18:21:22 tin\_sl \$

Source procedure : \$Id: f5720b.py | Rev 2670 | 2023/04/26 06:25:10 tin\_sl \$

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	Zero Value	DUT	Source U	Lower Limit	Upper Limit	Deviation	DUT Spec	Test Status
Short 0 mVDC	0.000	0.6 $\mu$ V	1.4 $\mu$ V	-2.6 $\mu$ V	2.6 $\mu$ V	24.23 %	1.2 $\mu$ V	PASS
Short 0.0 VDC	0.000	0.4 $\mu$ V	1.4 $\mu$ V	-5.4 $\mu$ V	5.4 $\mu$ V	6.67 %	4.0 $\mu$ V	PASS
Short 00.0 VDC	0.000	0.9 $\mu$ V	1.4 $\mu$ V	-81.4 $\mu$ V	81.4 $\mu$ V	1.11 %	80.0 $\mu$ V	PASS
Short 000.0 VDC	0.000	20.0 $\mu$ V	1.4 $\mu$ V	-601.4 $\mu$ V	601.4 $\mu$ V	3.33 %	0.600 mV	PASS
Short 0000.0 VDC	0.000	10.0 $\mu$ V	1.4 $\mu$ V	-6001.4 $\mu$ V	6001.4 $\mu$ V	0.17 %	6.000 mV	PASS
DCV Test	0.1V-1000V	DUT	Source U	Low Limit	Hi limit	Measured	24h spec	Result
0.02 VDC (0.20 Range)	0.0200	0.020000182	22.50 ppm	0.01999888	0.02000112	9.1 ppm	33.5 ppm	PASS 22.55 %
0.1 VDC (0.20 Range)	0.1000	0.10000053	9.50 ppm	0.0999981	0.1000019	5.3 ppm	9.5 ppm	PASS 39.60 %
0.2 VDC (0.20 Range)	0.2000	0.2000005	4.50 ppm	0.1999978	0.2000022	2.5 ppm	6.5 ppm	PASS 31.94 %
-0.02 VDC (0.20 Range)	-0.0200	-0.020000103	22.50 ppm	-0.02000112	-0.01999888	5.2 ppm	33.5 ppm	PASS 12.76 %
-0.1 VDC (0.20 Range)	-0.1000	-0.10000018	9.50 ppm	-0.1000019	-0.0999981	1.8 ppm	9.5 ppm	PASS 13.10 %
-0.2 VDC (0.20 Range)	-0.2000	-0.20000028	4.50 ppm	-0.2000022	-0.1999978	1.4 ppm	6.5 ppm	PASS 17.96 %
0.2 VDC (2.00 Range)	0.2000	0.20000049	6.00 ppm	0.19999796	0.20000204	2.4 ppm	4.2 ppm	PASS 33.45 %
1.0 VDC (2.00 Range)	1.0000	0.9999998	3.20 ppm	0.999995	1.000005	-0.2 ppm	1.8 ppm	PASS 5.45 %
1.9 VDC (2.00 Range)	1.9000	1.8999993	2.87 ppm	1.8999917	1.9000083	-0.4 ppm	1.5 ppm	PASS 11.35 %
2.0 VDC (2.00 Range)	2.0000	1.9999994	2.85 ppm	1.9999913	2.0000087	-0.3 ppm	1.5 ppm	PASS 9.31 %
-0.2 VDC (2.00 Range)	-0.2000	-0.20000131	6.00 ppm	-0.20000204	-0.19999796	6.5 ppm	4.2 ppm	PASS? 89.43 %
-1.0 VDC (2.00 Range)	-1.0000	-1.00000024	3.20 ppm	-1.000005	-0.999995	2.4 ppm	1.8 ppm	PASS 66.19 %
-1.9 VDC (2.00 Range)	-1.9000	-1.90000037	2.87 ppm	-1.9000083	-1.8999917	2.0 ppm	1.5 ppm	PASS 60.65 %
-2.0 VDC (2.00 Range)	-2.0000	-2.00000035	2.85 ppm	-2.0000087	-1.9999913	1.7 ppm	1.5 ppm	PASS 53.72 %
1.0 VDC (20.00 Range)	1.0000	1.00000022	7.00 ppm	0.9999898	1.0000102	2.2 ppm	3.2 ppm	PASS 28.58 %
10.0 VDC (20.00 Range)	10.0000	9.999996	1.90 ppm	9.999967	10.000033	-0.4 ppm	1.4 ppm	PASS 16.95 %
19.0 VDC (20.00 Range)	19.0000	18.999994	1.71 ppm	18.999943	19.000057	-0.3 ppm	1.3 ppm	PASS 13.70 %
20.0 VDC (20.00 Range)	20.0000	19.999996	1.70 ppm	19.99994	20.00006	-0.2 ppm	1.3 ppm	PASS 9.35 %
-1.0 VDC (20.00 Range)	-1.0000	-1.00000031	7.00 ppm	-1.0000102	-0.9999898	3.1 ppm	3.2 ppm	PASS 40.28 %
-10.0 VDC (20.00 Range)	-10.0000	-10	1.90 ppm	-10.000033	-9.999967	0.0 ppm	1.4 ppm	PASS 0.85 %
-19.0 VDC (20.00 Range)	-19.0000	-18.999998	1.71 ppm	-19.000057	-18.999943	-0.1 ppm	1.3 ppm	PASS 5.87 %
-20.0 VDC (20.00 Range)	-20.0000	-19.999998	1.70 ppm	-20.00006	-19.99994	-0.1 ppm	1.3 ppm	PASS 3.97 %
10 VDC (200.00 Range)	10.0000	10.000024	6.50 ppm	9.999805	10.000195	2.4 ppm	13.0 ppm	PASS 16.51 %
100 VDC (200.00 Range)	100.0000	100.00003	2.90 ppm	99.99913	100.00087	0.3 ppm	5.8 ppm	PASS 5.24 %
200 VDC (200.00 Range)	200.0000	199.99989	2.70 ppm	199.99838	200.00162	-0.5 ppm	5.4 ppm	PASS 8.94 %
-10 VDC (200.00 Range)	-10.0000	-10.000061	6.50 ppm	-10.000195	-9.999805	6.1 ppm	13.0 ppm	PASS 41.97 %
-100 VDC (200.00 Range)	-100.0000	-100.00013	2.90 ppm	-100.00087	-99.99913	1.3 ppm	5.8 ppm	PASS 20.36 %
-200 VDC (200.00 Range)	-200.0000	-200.00016	2.70 ppm	-200.00162	-199.99838	0.8 ppm	5.4 ppm	PASS 13.42 %
100 VDC (1000.00 Range)	100.0000	100.00009	7.00 ppm	99.99872	100.00128	0.9 ppm	5.8 ppm	PASS 9.90 %
200 VDC (1000.00 Range)	200.0000	200.00008	5.00 ppm	199.99792	200.00208	0.4 ppm	5.4 ppm	PASS 5.44 %
1000 VDC (1000.00 Range)	1000.0000	1000.00041	3.40 ppm	999.98152	1000.0185	4.1 ppm	15.1 ppm	PASS 20.31 %
-100 VDC (1000.00 Range)	-100.0000	-100.00045	7.00 ppm	-100.00128	-99.99872	4.5 ppm	5.8 ppm	PASS 49.50 %
-200 VDC (1000.00 Range)	-200.0000	-200.00021	5.00 ppm	-200.00208	-199.99792	1.1 ppm	5.4 ppm	PASS 14.27 %
-1000 VDC (1000.00 Range)	-1000.0000	-1000.005	3.40 ppm	-1000.0185	-999.98152	5.0 ppm	15.1 ppm	PASS 24.70 %

4W test procedure for all test points that verify Gain of the OHMF function. 4-wire kelvin connection is used between DMM and MFC. 1G $\Omega$  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 $\Omega$	0.9997714 $\Omega$	0.9997582 $\Omega$	32.0 ppm	9.9964441E-01	9.9989839E-01	-13.203 ppm	95.02 ppm	PASS, 13.17 % of 100.26 ppm
1.9 $\Omega$	1.8997947 $\Omega$	1.8998024 $\Omega$	25.0 ppm	1.8996477E+00	1.8999417E+00	4.053 ppm	52.37 ppm	PASS, 7.04 % of 57.61 ppm
10 $\Omega$	10.0006 $\Omega$	10.000614 $\Omega$	5.0 ppm	1.0000410E+01	1.0000790E+01	1.400 ppm	14.00 ppm	PASS, 9.62 % of 14.56 ppm
19 $\Omega$	19.0001771 $\Omega$	19.0001273 $\Omega$	4.0 ppm	1.8999916E+01	1.9000438E+01	-2.621 ppm	9.74 ppm	PASS, 24.90 % of 10.53 ppm
100 $\Omega$	99.995756 $\Omega$	99.995969 $\Omega$	1.7 ppm	9.9994486E+01	9.9997026E+01	2.130 ppm	11.00 ppm	PASS, 19.14 % of 11.13 ppm
190 $\Omega$	189.991291 $\Omega$	189.990848 $\Omega$	1.7 ppm	1.8998942E+02	1.8999316E+02	-2.332 ppm	8.16 ppm	PASS, 27.98 % of 8.33 ppm
1.0 k $\Omega$	1000.02101 $\Omega$	1000.01905 $\Omega$	1.7 ppm	1.0000162E+03	1.0000258E+03	-1.960 ppm	3.10 ppm	PASS, 55.44 % of 3.54 ppm
1.9 k $\Omega$	1899.8719 $\Omega$	1899.8666 $\Omega$	1.70 ppm	1.8998633E+03	1.8998805E+03	-2.790 ppm	2.8 ppm	?PASS, 84.81 % of 3.29 ppm
10 k $\Omega$	9999.8 $\Omega$	9999.7801 $\Omega$	1.6 ppm	9.9997530E+03	9.9998470E+03	-1.990 ppm	3.10 ppm	PASS, 57.04 % of 3.49 ppm
19 k $\Omega$	18999.2663 $\Omega$	18999.225 $\Omega$	1.7 ppm	1.8999181E+04	1.8999352E+04	-2.174 ppm	2.82 ppm	PASS, 66.09 % of 3.29 ppm
100 k $\Omega$	99994.75 $\Omega$	99994.846 $\Omega$	2.0 ppm	9.9993900E+04	9.9995600E+04	0.960 ppm	6.50 ppm	PASS, 14.12 % of 6.80 ppm
190 k $\Omega$	189989.15 $\Omega$	189989.103 $\Omega$	2.0 ppm	1.8998763E+05	1.8999067E+05	-0.247 ppm	6.03 ppm	PASS, 3.90 % of 6.35 ppm
1.0 M $\Omega$	999982.4 $\Omega$	999981.86 $\Omega$	2.5 ppm	9.9996730E+05	9.999750E+05	-0.540 ppm	12.60 ppm	PASS, 4.20 % of 12.85 ppm
1.9 M $\Omega$	1899978.3 $\Omega$	1899977.04 $\Omega$	3.0 ppm	1.8999492E+06	1.9000074E+06	-0.663 ppm	12.32 ppm	PASS, 5.32 % of 12.48 ppm
10 M $\Omega$	9999094 $\Omega$	9998995.8 $\Omega$	10.0 ppm	9.9984901E+06	9.9996979E+06	-9.821 ppm	50.40 ppm	PASS, 19.11 % of 51.38 ppm
19 M $\Omega$	18998711 $\Omega$	18998435.4 $\Omega$	20.0 ppm	1.8997377E+07	1.9000045E+07	-14.506 ppm	50.21 ppm	PASS, 26.84 % of 54.05 ppm
100 M $\Omega$	100005110 $\Omega$	100003717 $\Omega$	50.0 ppm	9.9984909E+07	1.0002531E+08	-13.929 ppm	152.00 ppm	PASS, 8.71 % of 160.01 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. 1G $\Omega$  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	24h spec	Result
20 $\Omega$ Range	-0.0000218 $\Omega$	0.0000500 $\Omega$	-0.0001435	0.0001435	15.19 %	0.0000935 $\Omega$	PASS
200 $\Omega$ Range	0.0001140 $\Omega$	0.0000500 $\Omega$	-0.00068	0.00068	16.76 %	0.0006300 $\Omega$	PASS
2 k $\Omega$ Range	0.0000200 $\Omega$	0.0000500 $\Omega$	-0.00068	0.00068	2.94 %	0.0006300 $\Omega$	PASS
20 k $\Omega$ Range	0.0015000 $\Omega$	0.0000500 $\Omega$	-0.00635	0.00635	23.62 %	0.0063000 $\Omega$	PASS
200 k $\Omega$ Range	0.0021000 $\Omega$	0.0000500 $\Omega$	-0.10505	0.10505	2.00 %	0.1050000 $\Omega$	PASS
OHM ZERO 2W	DUT	Source unc.	Low Limit	Hi limit	Measured	24h spec	Result
20 $\Omega$ Range	0.463089 $\Omega$	0.5 $\Omega$	-0.5000935	0.5000935	92.60 %	9.35E-05 $\Omega$	PASS
200 $\Omega$ Range	0.457758 $\Omega$	0.5 $\Omega$	-0.50063	0.50063	91.44 %	0.00063 $\Omega$	PASS
2 k $\Omega$ Range	0.44939 $\Omega$	0.5 $\Omega$	-0.50063	0.50063	89.76 %	0.00063 $\Omega$	PASS
20 k $\Omega$ Range	0.439 $\Omega$	0.5 $\Omega$	-0.5063	0.5063	86.71 %	0.0063 $\Omega$	PASS
200 k $\Omega$ Range	0.413 $\Omega$	0.5 $\Omega$	-0.605	0.605	68.26 %	0.105 $\Omega$	PASS
2 M $\Omega$ Range	0.45 $\Omega$	0.5 $\Omega$	-1.13	1.13	39.82 %	0.63 $\Omega$	PASS
20 M $\Omega$ Range	0.6 $\Omega$	0.5 $\Omega$	-4.7	4.7	12.77 %	4.2 $\Omega$	PASS
200 M $\Omega$ Range	0 $\Omega$	0.5 $\Omega$	-210.5	210.5	0.00 %	210 $\Omega$	PASS
1 G $\Omega$ Range	0 $\Omega$	0.5 $\Omega$	-5000.5	5000.5	0.00 %	5000 $\Omega$	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	Source U	Low Limit	Hi limit	Measured	24h spec	Result, % spec
0.02 V AC+DC @ 10 Hz	0.02002268	0.0400 %	0.019819	0.020181	0.1134 %	0.8650 %	PASS 13.10 %
0.02 V AC+DC @ 20 Hz	0.02002109	0.0280 %	0.019821	0.020179	0.1054 %	0.8650 %	PASS 12.18 %
0.02 V AC+DC @ 50 Hz	0.02002016	0.0270 %	0.019822	0.020178	0.1008 %	0.8650 %	PASS 11.65 %
0.02 V AC+DC @ 60 Hz	0.0200266	0.0270 %	0.019822	0.020178	0.1330 %	0.8650 %	PASS 15.37 %
0.02 V AC+DC @ 100 Hz	0.0200198	0.0270 %	0.019822	0.020178	0.0990 %	0.8650 %	PASS 11.44 %
0.02 V AC+DC @ 1.0 kHz	0.02002286	0.0270 %	0.019822	0.020178	0.1143 %	0.8650 %	PASS 13.21 %
0.02 V AC+DC @ 6.25 kHz	0.01995001	0.0270 %	0.019822	0.020178	-0.2499 %	0.8650 %	PASS 28.88 %
0.02 V AC+DC @ 10.0 kHz	0.01995034	0.0270 %	0.019822	0.020178	-0.2483 %	0.8650 %	PASS 28.69 %
0.02 V AC+DC @ 20.0 kHz	0.01995543	0.0270 %	0.019822	0.020178	-0.2229 %	0.8650 %	PASS 25.75 %
0.02 V AC+DC @ 50.0 kHz	0.01995479	0.0370 %	0.019820	0.020180	-0.2260 %	0.8650 %	PASS 26.11 %
0.02 V AC+DC @ 100.0 kHz	0.01993874	0.0650 %	0.019854	0.020146	-0.3063 %	0.6650 %	PASS 45.84 %
0.02 V AC+DC @ 200.0 kHz	0.01991386	0.0800 %	0.019671	0.020329	-0.4307 %	1.5650 %	PASS 27.48 %
0.02 V AC+DC @ 300.0 kHz	0.01990909	0.0800 %	0.019671	0.020329	-0.4545 %	1.5650 %	PASS 29.01 %
0.02 V AC+DC @ 500.0 kHz	0.01998866	0.2100 %	0.019078	0.020922	-0.0567 %	4.4000 %	PASS 1.29 %
0.02 V AC+DC @ 1.0 MHz	0.02040739	0.6500 %	0.018990	0.021010	2.0369 %	4.4000 %	PASS 45.80 %
0.2 V AC+DC @ 10 Hz	0.19997961	0.0260 %	0.199418	0.200582	-0.0102 %	0.2650 %	PASS 3.83 %
0.2 V AC+DC @ 20 Hz	0.19997923	0.0115 %	0.199447	0.200553	-0.0104 %	0.2650 %	PASS 3.92 %
0.2 V AC+DC @ 50 Hz	0.19998195	0.0105 %	0.199899	0.200101	-0.0090 %	0.0400 %	PASS 21.84 %
0.2 V AC+DC @ 60 Hz	0.19998327	0.0105 %	0.199899	0.200101	-0.0084 %	0.0400 %	PASS 20.84 %
0.2 V AC+DC @ 100 Hz	0.19998472	0.0105 %	0.199899	0.200101	-0.0076 %	0.0400 %	PASS 18.49 %
0.2 V AC+DC @ 1.0 kHz	0.19998495	0.0105 %	0.199899	0.200101	-0.0075 %	0.0400 %	PASS 18.21 %
0.2 V AC+DC @ 6.25 kHz	0.1999883	0.0105 %	0.199889	0.200111	-0.0058 %	0.0450 %	PASS 12.67 %
0.2 V AC+DC @ 10.0 kHz	0.19999058	0.0105 %	0.199889	0.200111	-0.0047 %	0.0450 %	PASS 10.20 %
0.2 V AC+DC @ 20.0 kHz	0.19998866	0.0105 %	0.199889	0.200111	-0.0057 %	0.0450 %	PASS 12.28 %
0.2 V AC+DC @ 50.0 kHz	0.19995512	0.0205 %	0.199819	0.200181	-0.0224 %	0.0700 %	PASS 30.78 %
0.2 V AC+DC @ 100.0 kHz	0.19972493	0.0485 %	0.199273	0.200727	-0.1375 %	0.3150 %	PASS 43.16 %
0.2 V AC+DC @ 200.0 kHz	0.19911672	0.0800 %	0.195790	0.204210	-0.4416 %	2.0250 %	PASS 21.79 %
0.2 V AC+DC @ 300.0 kHz	0.19873311	0.0800 %	0.195790	0.204210	-0.6334 %	2.0250 %	PASS 31.26 %
0.2 V AC+DC @ 500.0 kHz	0.19849623	0.1200 %	0.195360	0.204640	-0.7519 %	2.2000 %	PASS 34.13 %
0.2 V AC+DC @ 1.0 MHz	0.19865888	0.2600 %	0.195080	0.204920	-0.6706 %	2.2000 %	PASS 30.27 %
2.0 V AC+DC @ 10 Hz	2.0003665	0.0220 %	1.994260	2.005740	0.0183 %	0.2650 %	PASS 6.89 %
2.0 V AC+DC @ 20 Hz	2.0003394	0.0083 %	1.994535	2.005465	0.0170 %	0.2650 %	PASS 6.40 %
2.0 V AC+DC @ 50 Hz	2.0003514	0.0041 %	1.999118	2.000882	0.0176 %	0.0400 %	PASS 43.71 %
2.0 V AC+DC @ 60 Hz	2.0003419	0.0041 %	1.999118	2.000882	0.0171 %	0.0400 %	PASS 42.53 %
2.0 V AC+DC @ 100 Hz	2.0003278	0.0041 %	1.999118	2.000882	0.0164 %	0.0400 %	PASS 40.77 %
2.0 V AC+DC @ 1.0 kHz	2.0003685	0.0041 %	1.999118	2.000882	0.0184 %	0.0400 %	PASS 45.83 %
2.0 V AC+DC @ 6.25 kHz	2.0002953	0.0041 %	1.999018	2.000982	0.0148 %	0.0450 %	PASS 32.68 %
2.0 V AC+DC @ 10.0 kHz	2.0003076	0.0041 %	1.999018	2.000982	0.0154 %	0.0450 %	PASS 34.04 %
2.0 V AC+DC @ 20.0 kHz	2.0002809	0.0041 %	1.999018	2.000982	0.0140 %	0.0450 %	PASS 31.09 %
2.0 V AC+DC @ 50.0 kHz	1.9997167	0.0070 %	1.998460	2.001540	-0.0142 %	0.0700 %	PASS 20.14 %
2.0 V AC+DC @ 100.0 kHz	1.9963289	0.0115 %	1.993470	2.006530	-0.1836 %	0.3150 %	PASS 58.23 %
2.0 V AC+DC @ 200.0 kHz	1.9918217	0.0340 %	1.958820	2.041180	-0.4089 %	2.0250 %	PASS 20.19 %
2.0 V AC+DC @ 300.0 kHz	1.9886832	0.0340 %	1.958820	2.041180	-0.5658 %	2.0250 %	PASS 27.94 %
2.0 V AC+DC @ 500.0 kHz	1.9876772	0.0900 %	1.954200	2.045800	-0.6161 %	2.2000 %	PASS 27.98 %
2.0 V AC+DC @ 1.0 MHz	1.9934674	0.1500 %	1.953000	2.047000	-0.3266 %	2.2000 %	PASS 14.81 %
20 V AC+DC @ 10 Hz	19.99949	0.0220 %	19.915600	20.084400	-0.0025 %	0.4000 %	PASS 0.64 %
20 V AC+DC @ 20 Hz	19.999444	0.0083 %	19.918350	20.081650	-0.0028 %	0.4000 %	PASS 0.69 %
20 V AC+DC @ 50 Hz	19.999681	0.0040 %	19.963210	20.036790	-0.0016 %	0.1800 %	PASS 0.89 %
20 V AC+DC @ 60 Hz	19.99985	0.0040 %	19.963210	20.036790	-0.0008 %	0.1800 %	PASS 0.42 %
20 V AC+DC @ 100 Hz	19.999936	0.0040 %	19.963210	20.036790	-0.0003 %	0.1800 %	PASS 0.18 %
20 V AC+DC @ 1.0 kHz	19.998934	0.0040 %	19.963210	20.036790	-0.0053 %	0.1800 %	PASS 2.96 %
20 V AC+DC @ 6.25 kHz	19.993317	0.0040 %	19.959210	20.040790	-0.0334 %	0.2000 %	PASS 16.70 %
20 V AC+DC @ 10.0 kHz	19.993497	0.0040 %	19.959210	20.040790	-0.0325 %	0.2000 %	PASS 16.25 %
20 V AC+DC @ 20.0 kHz	19.996511	0.0040 %	19.959210	20.040790	-0.0174 %	0.2000 %	PASS 8.72 %
20 V AC+DC @ 50.0 kHz	20.001192	0.0070 %	19.954600	20.045400	0.0060 %	0.2200 %	PASS 2.71 %
20 V AC+DC @ 100.0 kHz	19.993638	0.0100 %	19.908000	20.092000	-0.0318 %	0.4500 %	PASS 3.07 %
20 V AC+DC @ 200.0 kHz	19.973316	0.0280 %	19.144400	20.855600	-0.1334 %	4.2500 %	PASS 3.14 %
20 V AC+DC @ 300.0 kHz	19.980543	0.0280 %	19.144400	20.855600	-0.0973 %	4.2500 %	PASS 2.29 %
20 V AC+DC @ 500.0 kHz	20.060162	0.0900 %	18.782000	21.218000	0.3008 %	6.0000 %	PASS 5.01 %
20 V AC+DC @ 1.0 MHz	20.379699	0.1400 %	18.772000	21.228000	1.8985 %	6.0000 %	PASS 31.63 %
200.0 V AC+DC @ 10 Hz	200.03542	0.0220 %	199.426000	200.574000	0.0177 %	0.2650 %	PASS 6.66 %
200.0 V AC+DC @ 20 Hz	200.03573	0.0083 %	199.453500	200.546500	0.0179 %	0.2650 %	PASS 6.74 %
200.0 V AC+DC @ 50 Hz	200.03713	0.0048 %	199.900400	200.099600	0.0186 %	0.0450 %	PASS 41.02 %
200.0 V AC+DC @ 60 Hz	200.03687	0.0048 %	199.900400	200.099600	0.0184 %	0.0450 %	PASS 40.74 %
200.0 V AC+DC @ 100 Hz	200.0355	0.0048 %	199.900400	200.099600	0.0178 %	0.0450 %	PASS 39.22 %
200.0 V AC+DC @ 1.0 kHz	200.00855	0.0048 %	199.900400	200.099600	0.0043 %	0.0450 %	PASS 9.45 %
200.0 V AC+DC @ 6.25 kHz	199.97291	0.0048 %	199.860400	200.139600	-0.0135 %	0.0650 %	PASS 20.78 %
200.0 V AC+DC @ 10.0 kHz	199.97419	0.0048 %	199.860400	200.139600	-0.0129 %	0.0650 %	PASS 19.80 %
200.0 V AC+DC @ 20.0 kHz	199.99954	0.0048 %	199.860400	200.139600	-0.0002 %	0.0650 %	PASS 0.35 %
200.0 V AC+DC @ 50.0 kHz	200.01239	0.0075 %	199.815000	200.185000	0.0062 %	0.0850 %	PASS 7.26 %
200.0 V AC+DC @ 100.0 kHz	199.89724	0.0133 %	199.343500	200.656500	-0.0514 %	0.3150 %	PASS 16.30 %
700.0 V AC+DC @ 50 Hz	700.1094	0.0079 %	699.101952	700.898048	0.0156 %	0.1204 %	PASS 12.95 %
700.0 V AC+DC @ 60 Hz	700.1347	0.0079 %	699.101952	700.898048	0.0192 %	0.1204 %	PASS 15.94 %
700.0 V AC+DC @ 100 Hz	700.1477	0.0079 %	699.101952	700.898048	0.0211 %	0.1204 %	PASS 17.48 %
700.0 V AC+DC @ 1.0 kHz	700.1047	0.0079 %	699.101952	700.898048	0.0150 %	0.1204 %	PASS 12.39 %
700.0 V AC+DC @ 6.25 kHz	700.1608	0.0111 %	698.869650	701.130350	0.0230 %	0.1504 %	PASS 15.23 %
700.0 V AC+DC @ 10.0 kHz	700.1853	0.0111 %	698.869650	701.130350	0.0265 %	0.1504 %	PASS 17.55 %
700.0 V AC+DC @ 20.0 kHz	700.2881	0.0111 %	698.869650	701.130350	0.0412 %	0.1504 %	PASS 27.29 %

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 µADC	0	2.1E-10						INFO
1 µADC	1E-06	1.00031E-06	1619.37 ppm	9.971316E-07	1.002868E-06	0.031 %	1249 ppm	PASS 15.16 %
2 µADC	2E-06	2.00026E-06	821.32 ppm	1.997058E-06	2.002942E-06	130 ppm	649 ppm	PASS 12.42 %
-1 µADC	-1E-06	-9.9963E-07	1619.37 ppm	-1.00287E-06	-9.971296E-07	-0.037 %	1251 ppm	PASS 18.08 %
-2 µADC	-2E-06	-1.99959E-06	821.32 ppm	-2.002944E-06	-1.997056E-06	-205 ppm	651 ppm	PASS 19.57 %
Zero 00 µADC	0	3.3E-10						INFO
10 µADC	1E-05	1.000014E-05	181.97 ppm	9.996481E-06	1.000352E-05	14 ppm	170 ppm	PASS 5.62 %
20 µADC	2E-05	2.000006E-05	101.99 ppm	1.999576E-05	2.000424E-05	3 ppm	110 ppm	PASS 2.00 %
-10 µADC	-1E-05	-9.9995E-06	181.97 ppm	-1.000352E-05	-9.996479E-06	-50 ppm	170 ppm	PASS 20.07 %
20 µADC	-2E-05	-1.999926E-05	101.99 ppm	-2.000424E-05	-1.999576E-05	-37 ppm	110 ppm	PASS 24.66 %
Zero 000 µADC	0	5E-10						INFO
100 µADC	0.0001	9.999838E-05	38.00 ppm	9.999E-05	0.00010001	-16 ppm	62 ppm	PASS 22.28 %
200 µADC	0.0002	0.0001999954	30.00 ppm	0.0001999828	0.0002000172	-23 ppm	56 ppm	PASS 36.36 %
-100 µADC	-0.0001	-9.999848E-05	38.00 ppm	-0.00010001	-9.999E-05	-15 ppm	62 ppm	PASS 20.90 %
-200 µADC	-0.0002	-0.0001999977	30.00 ppm	-0.0002000172	-0.0001999828	-12 ppm	56 ppm	PASS 18.26 %
Zero mADC	0	1.9E-09						INFO
1.0 mADC	0.001	0.001000028	26.00 ppm	0.000999914	0.001000086	28 ppm	60 ppm	PASS 43.58 %
2.0 mADC	0.002	0.002000048	24.00 ppm	0.001999842	0.002000158	24 ppm	55 ppm	PASS 39.66 %
-1.0 mADC	-0.001	-0.001000035	26.00 ppm	-0.001000086	-0.000999914	35 ppm	60 ppm	PASS 53.06 %
-2.0 mADC	-0.002	-0.002000073	24.00 ppm	-0.002000158	-0.001999842	36 ppm	55 ppm	PASS 60.57 %
Zero 00 mADC	0	1.9E-08						INFO
10 mADC	0.01	0.01000137	26.00 ppm	0.00999914	0.01000086	137 ppm	60 ppm	FAIL 209.05 %
20 mADC	0.02	0.02000262	24.00 ppm	0.01999842	0.02000158	131 ppm	55 ppm	FAIL 218.14 %
-10 mADC	-0.01	-0.01000139	26.00 ppm	-0.01000086	-0.00999914	139 ppm	60 ppm	FAIL 213.18 %
-20 mADC	-0.02	-0.02000281	24.00 ppm	-0.02000158	-0.01999842	141 ppm	55 ppm	FAIL 234.30 %
Zero 000 mADC	0	2.5E-07						INFO
100 mADC	0.1	0.1000021	27.50 ppm	0.09998875	0.1000112	21 ppm	85 ppm	PASS 23.73 %
200 mADC	0.2	0.2000028	26.25 ppm	0.1999788	0.2000212	14 ppm	80 ppm	PASS 16.87 %
-100 mADC	-0.1	-0.1000021	27.50 ppm	-0.1000113	-0.09998875	21 ppm	85 ppm	PASS 23.51 %
-200 mADC	-0.2	-0.2000055	26.25 ppm	-0.2000213	-0.1999787	27 ppm	80 ppm	PASS 32.36 %
Zero ADC	0	1.8E-06						INFO
2 ADC	2	1.999998	43.00 ppm	1.999204	2.000796	-1 ppm	355 ppm	PASS 0.24 %
-2 ADC	-2	-2.000052	43.00 ppm	-2.000796	-1.999204	26 ppm	355 ppm	PASS 7.23 %
-1 ADC	-1	-0.999887	46.00 ppm	-1.000406	-0.999594	-113 ppm	360 ppm	PASS 31.14 %
1 ADC	1	0.9998713	46.00 ppm	0.999594	1.000406	-129 ppm	360 ppm	PASS 35.46 %

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
10 µA AC @ 50 Hz	1e-05	1.33142e-05	0.0165 %	9.95335E-06	1.00467E-05	33.1420 %	0.4500 %	INFO
50 µA AC @ 50 Hz	5e-05	4.72093e-05	0.0165 %	4.98267E-05	5.01733E-05	-5.5814 %	0.3300 %	FAIL 1689.22 %
100 µA AC @ 50 Hz	0.0001	9.86226e-05	0.0165 %	9.96685E-05	0.000100332	-1.3774 %	0.3150 %	FAIL 436.67 %
200 µA AC @ 50 Hz	0.0002	0.0001992295	0.0165 %	0.000199352	0.000200648	-0.3853 %	0.3075 %	FAIL 125.10 %
1.0 mA AC @ 50 Hz	0.001	0.0009993682	0.0138 %	0.000996847	0.00100315	-0.0632 %	0.3015 %	PASS 20.93 %
2.0 mA AC @ 50 Hz	0.002	0.001999418	0.0138 %	0.00199371	0.00200629	-0.0291 %	0.3007 %	PASS 9.67 %
10 mA AC @ 50 Hz	0.01	0.009995129	0.0138 %	0.00996847	0.0100315	-0.0487 %	0.3015 %	PASS 16.14 %
20 mA AC @ 50 Hz	0.02	0.01999717	0.0138 %	0.0199371	0.0200629	-0.0141 %	0.3007 %	PASS 4.69 %
100 mA AC @ 50 Hz	0.1	0.09998028	0.0134 %	0.0996851	0.100315	-0.0197 %	0.3015 %	PASS 6.53 %
200 mA AC @ 50 Hz	0.2	0.2000295	0.0134 %	0.199372	0.200628	0.0147 %	0.3007 %	PASS 4.89 %
1.0 A AC @ 50 Hz	1.0	0.9988266	0.0308 %	0.996177	1.00382	-0.1173 %	0.3515 %	PASS 33.26 %
2.0 A AC @ 50 Hz	2.0	1.999008	0.0308 %	1.99237	2.00763	-0.0496 %	0.3507 %	PASS 14.08 %
10 µA AC @ 60 Hz	1e-05	1.33163e-05	0.0165 %	9.96835E-06	1.00317E-05	33.1630 %	0.3000 %	INFO
50 µA AC @ 60 Hz	5e-05	4.71991e-05	0.0165 %	4.99017E-05	5.00983E-05	-5.6018 %	0.1800 %	FAIL 3099.08 %
100 µA AC @ 60 Hz	0.0001	9.86131e-05	0.0165 %	9.98185E-05	0.000100182	-1.3869 %	0.1650 %	FAIL 836.36 %
200 µA AC @ 60 Hz	0.0002	0.0001992708	0.0165 %	0.000199652	0.000200348	-0.3646 %	0.1575 %	FAIL 230.23 %
1.0 mA AC @ 60 Hz	0.001	0.0009994388	0.0138 %	0.000998347	0.00100165	-0.0561 %	0.1515 %	PASS 36.89 %
2.0 mA AC @ 60 Hz	0.002	0.001999578	0.0138 %	0.00199671	0.00200329	-0.0211 %	0.1507 %	PASS 13.92 %
10 mA AC @ 60 Hz	0.01	0.009995978	0.0138 %	0.00998347	0.0100165	-0.0402 %	0.1515 %	PASS 26.44 %
20 mA AC @ 60 Hz	0.02	0.01999882	0.0138 %	0.0199671	0.0200329	-0.0059 %	0.1507 %	PASS 3.89 %
100 mA AC @ 60 Hz	0.1	0.09998707	0.0134 %	0.0998351	0.100165	-0.0129 %	0.1515 %	PASS 8.50 %
200 mA AC @ 60 Hz	0.2	0.2000486	0.0134 %	0.199672	0.200328	0.0243 %	0.1507 %	PASS 16.06 %
1.0 A AC @ 60 Hz	1.0	0.9989123	0.0308 %	0.997677	1.00232	-0.1088 %	0.2015 %	PASS 53.36 %
2.0 A AC @ 60 Hz	2.0	1.999204	0.0308 %	1.99537	2.00463	-0.0398 %	0.2007 %	PASS 19.60 %
10 µA AC @ 1.0 kHz	1e-05	1.33157e-05	0.0165 %	9.97135E-06	1.00287E-05	33.1570 %	0.2700 %	INFO
50 µA AC @ 1.0 kHz	5e-05	4.72115e-05	0.0165 %	4.99167E-05	5.00833E-05	-5.5770 %	0.1500 %	FAIL 3695.64 %
100 µA AC @ 1.0 kHz	0.0001	9.86358e-05	0.0165 %	9.98485E-05	0.000100152	-1.3642 %	0.1350 %	FAIL 1003.02 %
200 µA AC @ 1.0 kHz	0.0002	0.0001992671	0.0165 %	0.000199712	0.000200288	-0.3665 %	0.1275 %	FAIL 285.02 %
1.0 mA AC @ 1.0 kHz	0.001	0.0009995802	0.0138 %	0.000998647	0.00100135	-0.0420 %	0.1215 %	PASS 34.33 %
2.0 mA AC @ 1.0 kHz	0.002	0.001999844	0.0138 %	0.00199731	0.00200269	-0.0078 %	0.1207 %	PASS 6.43 %
10 mA AC @ 1.0 kHz	0.01	0.00999772	0.0138 %	0.00998647	0.0100135	-0.0228 %	0.1215 %	PASS 18.65 %
20 mA AC @ 1.0 kHz	0.02	0.02000235	0.0138 %	0.0199731	0.0200269	0.0118 %	0.1207 %	PASS 9.69 %
100 mA AC @ 1.0 kHz	0.1	0.1000064	0.0134 %	0.0998351	0.100165	0.0064 %	0.1515 %	PASS 4.19 %
200 mA AC @ 1.0 kHz	0.2	0.2000816	0.0134 %	0.199672	0.200328	0.0408 %	0.1507 %	PASS 26.95 %
1.0 A AC @ 1.0 kHz	1.0	0.9991001	0.0308 %	0.995177	1.00482	-0.0900 %	0.4515 %	PASS 19.89 %
2.0 A AC @ 1.0 kHz	2.0	1.999564	0.0308 %	1.99037	2.00963	-0.0218 %	0.4507 %	PASS 4.83 %
10 µA AC @ 10.0 kHz	1e-05	1.3324e-05	0.1400 %	9.946E-06	1.0054E-05	33.2400 %	0.4000 %	INFO
50 µA AC @ 10.0 kHz	5e-05	4.72475e-05	0.1400 %	4.979E-05	5.021E-05	-5.5050 %	0.2800 %	FAIL 1758.52 %

100 µAAC @ 10.0 kHz	0.0001	<b>9.87025e-05</b>	0.1400 %	9.9595E-05	0.000100405	-1.2975 %	0.2650 %	FAIL 432.92 %
200 µAAC @ 10.0 kHz	0.0002	<b>0.0001993841</b>	0.1400 %	0.000199205	0.000200795	-0.3080 %	0.2575 %	FAIL 105.07 %
1.0 mAAC @ 10.0 kHz	0.001	<b>0.0009998102</b>	0.1400 %	0.000996085	0.00100391	-0.0190 %	0.2515 %	PASS 6.59 %
2.0 mAAC @ 10.0 kHz	0.002	<b>0.002000077</b>	0.1400 %	0.00199219	0.00200781	0.0038 %	0.2507 %	PASS 1.33 %
10 mAAC @ 10.0 kHz	0.01	<b>0.009998606</b>	0.1300 %	0.00996185	0.0100381	-0.0139 %	0.2515 %	PASS 4.92 %
20 mAAC @ 10.0 kHz	0.02	<b>0.02000177</b>	0.1300 %	0.0199239	0.0200761	0.0089 %	0.2507 %	PASS 3.14 %
100 mAAC @ 10.0 kHz	0.1	<b>0.1000601</b>	0.1100 %	0.0993885	0.100611	0.0601 %	0.5015 %	PASS 11.71 %
200 mAAC @ 10.0 kHz	0.2	<b>0.2001649</b>	0.1100 %	0.198779	0.201221	0.0825 %	0.5007 %	PASS 16.08 %
1.0 AAC @ 10.0 kHz	1.0	<b>0.9994816</b>	0.6100 %	0.978885	1.02111	-0.0518 %	1.5015 %	PASS 3.20 %
2.0 AAC @ 10.0 kHz	2.0	<b>1.997541</b>	0.6100 %	1.95779	2.04221	-0.1229 %	1.5007 %	PASS 7.59 %

Test date	26 April 2023 07:39
-----------	---------------------

Lab temperature maintained +23°C ±2°C

Internal use only

Not validated