

150480.0), (1, 273600.0), (1, 5009.0), (1, 5011.0), (1, 5009.0), (1, 5017.0), (1, 2507.0), (1, 2507.0), (1, 2508.0), (1, 12540.0), (1, 22800.0), (1, 60108.0), (1, 60132.0), (1, 60108.0), (1, 60204.0), (1, 30084.0), (1, 30084.0), (1, 30096.0), (1, 150480.0), (1, 273600.0), (1, 275.0), (1, 275.0), (1, 275.0), (1, 275.0), (1, 275.0), (1, 275.0), (1, 3300.0), (1, 3300.0), (1, 3300.0), (1, 3300.0), (1, 3300.0), (1, 3300.0), (1, 3300.0), (1, 3300.0), (1, 3300.0), (1, 3300.0), (1, 3300.0), (1, 34.6377531), (1, 34.717611), (1, 34.7338194), (1, 137.0), (1, 137.0), (1, 135.0), (1, 132.0), (1, 138.0), (1, 138.0), (1, 132.0), (1, 133.0), (1, 134.0), (1, 132.0), (1, 138.0), (1, 138.0), (1, 129.0), (1, 129.0), (1, 129.0), (1, 129.0), (1, 129.0), (1, 129.0), (1, 129.0), (1, 129.0), (1, 1877.0), (1, 1874.0), (1, 1926.0), (1, 2695.0), (1, 2919.0), (1, 2924.0), (1, 126.0), (1, 125.0), (1, 124.0), (1, 125.0), (1, 123.0), (1, 125.0), (1, 125.0), (1, 125.0), (1, 125.0), (1, 125.0), (1, 125.0), (1, -0.00135150798), (1, -0.0119342913), (1, -0.120856669), (1, -1.18466885), (1, -11.8677048), (1, -116.844818), (1, -0.00109157196), (1, -0.0120942035), (1, -0.118625821), (1, -1.18414932), (1, -11.8611537), (1, -116.891303), (1, 1.02412506), (1, 1.02928725), (1, 1.02883533), (1, 1.01282699), (1, 0.999368229), (1, 0.998208716), (1, 97390.7253), (1, 10.3521726), (1, 1.00952837), (1, 1.01470078), (1, 1.01425526), (1, 0.998473783), (1, 0.985205754), (1, 0.984062673), (1, 3.45532772e-06), (1, 3.55891232e-05), (1, 0.000355891232), (1, 0.00355891232), (1, 0.0355891232), (1, 0.355891232), (1, 1.02499844), (1, 1.00022106), (1, 1.00011961), (1, 0.999986077), (1, 70.0), (1, 67.0), (1, 67.0), (1, 67.0), (1, 78.0), (1, 88.0), (1, 88.0), (1, 14.0)]

Destructive overloads?

124, DESTRUCTIVE OVERLOADS valid 2941

Reference

Direct 5720B MFC test, verification 5720MMA

DUT Condition

Test on new spot

Test procedure : \$Id: hp3458a.py | Rev 1205 | 2019/03/13 22:05:56 MM \$

Source procedure : \$Id: f5720a.py | Rev 1577 | 2019/09/25 00:57:18 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	0.000000E+00	-1.29 µV	0.75 µV	-0.910 µV	0.910 µV	N/A	0.16 µV	FAIL
Short 0.0 VDC	0.000000E+00	-1.26 µV	0.75 µV	-0.900 µV	0.900 µV	N/A	0.15 µV	FAIL
Short 00.0 VDC	0.000000E+00	-1.10 µV	0.75 µV	-1.070 µV	1.070 µV	N/A	0.32 µV	FAIL
Short 000.0 VDC	0.000000E+00	32.54 µV	0.75 µV	-14.750 µV	14.750 µV	N/A	14.00 µV	FAIL
Short 0000.0 VDC	0.000000E+00	55.13 µV	0.75 µV	-41.750 µV	41.750 µV	N/A	41.00 µV	FAIL
DCV Test	0.1V-1000V	DUT	Source unc.	Low Limit	Hi limit	Measured	24h spec	Result
0.1 VDC (0.10 Range)	0.1000000	0.099999722	7.27 ppm	0.099998723	0.10000128	-2.780 ppm	5.50 ppm	PASS 15.25 %
-0.1 VDC (0.10 Range)	-0.1000000	-0.099999739	7.27 ppm	-0.10000128	-0.099998723	-2.612 ppm	5.50 ppm	PASS 14.33 %
0.1 VDC (1.00 Range)	0.1000000	0.099999578	7.27 ppm	0.099998823	0.10000118	-4.219 ppm	4.50 ppm	PASS 24.67 %
0.2 VDC (1.00 Range)	0.2000000	0.19999926	3.86 ppm	0.19999863	0.20000137	-3.679 ppm	3.00 ppm	PASS 37.63 %
1.0 VDC (1.00 Range)	1.0000000	1.0000004	3.86 ppm	0.99999434	1.0000057	0.403 ppm	1.80 ppm	PASS 4.73 %
-0.1 VDC (1.00 Range)	-0.1000000	-0.099999932	7.27 ppm	-0.10000118	-0.099998823	-0.683 ppm	4.50 ppm	PASS 4.00 %
-0.2 VDC (1.00 Range)	-0.2000000	-0.19999977	3.86 ppm	-0.20000137	-0.19999863	-1.147 ppm	3.00 ppm	PASS 11.73 %
-1.0 VDC (1.00 Range)	-1.0000000	-0.99999978	3.86 ppm	-1.0000057	-0.99999434	-0.222 ppm	1.80 ppm	PASS 2.60 %
1.0 VDC (10.00 Range)	1.0000000	1.0000009	3.86 ppm	0.99999514	1.0000049	0.944 ppm	1.00 ppm	PASS 11.84 %
2.0 VDC (10.00 Range)	2.0000000	2.0000017	2.77 ppm	1.999993	2.000007	0.871 ppm	0.75 ppm	PASS 15.18 %
10.0 VDC (10.00 Range)	10.0000000	10.000008	2.73 ppm	9.9999672	10.000033	0.800 ppm	0.55 ppm	PASS 14.36 %
-1.0 VDC (10.00 Range)	-1.0000000	-1.0000007	3.86 ppm	-1.0000049	-0.99999514	0.716 ppm	1.00 ppm	PASS 8.98 %
-2.0 VDC (10.00 Range)	-2.0000000	-2.0000012	2.77 ppm	-2.000007	-1.999993	0.575 ppm	0.75 ppm	PASS 10.02 %
-10.0 VDC (10.00 Range)	-10.0000000	-10.000007	2.73 ppm	-10.000033	-9.9999672	0.709 ppm	0.55 ppm	PASS 12.72 %
10 VDC (100.00 Range)	10.0000000	10.000079	2.77 ppm	9.9999173	10.000083	7.903 ppm	5.50 ppm	PASS 64.17 %
20 VDC (100.00 Range)	20.0000000	20.000074	3.73 ppm	19.999845	20.000155	3.716 ppm	4.00 ppm	PASS 33.97 %
100 VDC (100.00 Range)	100.0000000	100.00012	3.73 ppm	99.999347	100.00065	1.152 ppm	2.80 ppm	PASS 12.35 %
-10 VDC (100.00 Range)	-10.0000000	-9.9999503	2.77 ppm	-10.000083	-9.9999173	-4.970 ppm	5.50 ppm	PASS 40.36 %
-20 VDC (100.00 Range)	-20.0000000	-19.999951	3.73 ppm	-20.000155	-19.999845	-2.446 ppm	4.00 ppm	PASS 22.36 %
-100 VDC (100.00 Range)	-100.0000000	-99.999966	3.73 ppm	-100.00065	-99.999347	-0.338 ppm	2.80 ppm	PASS 3.63 %
100 VDC (1000.00 Range)	100.0000000	100.0002	3.73 ppm	99.999277	100.00072	1.969 ppm	3.50 ppm	PASS 19.25 %
200 VDC (1000.00 Range)	200.0000000	200.00021	3.73 ppm	199.99865	200.00135	1.026 ppm	3.00 ppm	PASS 10.72 %
1000 VDC (1000.00 Range)	1000.0000000	1000.0005	5.45 ppm	999.97995	1000.02	0.484 ppm	2.60 ppm	PASS 1.84 %
-100 VDC (1000.00 Range)	-100.0000000	-100.0001	3.73 ppm	-100.00072	-99.999277	0.964 ppm	3.50 ppm	PASS 9.42 %
-200 VDC (1000.00 Range)	-200.0000000	-200.00006	3.73 ppm	-200.00135	-199.99865	0.288 ppm	3.00 ppm	PASS 3.01 %
-1000 VDC (1000.00 Range)	-1000.0000000	-1000.0006	5.45 ppm	-1000.02	-999.97995	0.617 ppm	2.60 ppm	PASS 2.34 %

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	0.9999291 Ω	0.99990576 Ω	32.0 ppm	9.9986210E-01	9.9999610E-01	-23.346 ppm	35.00 ppm	PASS, 24.61 % of 94.85 ppm
1.9 Ω	1.8998858 Ω	1.8998506 Ω	25.0 ppm	1.8997988E+00	1.8999728E+00	-18.551 ppm	20.79 ppm	PASS, 28.53 % of 65.03 ppm
10 Ω	9.999061 Ω	9.9990424 Ω	5.0 ppm	9.9989310E+00	9.9991910E+00	-1.860 ppm	8.00 ppm	PASS, 9.86 % of 18.87 ppm
19 Ω	18.999398 Ω	18.99945 Ω	4.0 ppm	1.8998965E+01	1.8999831E+01	2.724 ppm	18.79 ppm	PASS, 7.09 % of 38.42 ppm
100 Ω	99.99614 Ω	99.996212 Ω	1.7 ppm	9.9995370E+01	9.9996910E+01	0.716 ppm	6.00 ppm	PASS, 5.74 % of 12.47 ppm
190 Ω	189.99719 Ω	189.9976 Ω	1.7 ppm	1.8999629E+02	1.8999809E+02	2.139 ppm	3.05 ppm	PASS, 30.61 % of 6.99 ppm
1.0 kΩ	999.9957 kΩ	999.99502 kΩ	1.7 ppm	9.9999180E+02	9.9999960E+02	-0.684 ppm	2.20 ppm	PASS, 12.30 % of 5.56 ppm
1.9 kΩ	1899.9986 kΩ	1899.999 kΩ	1.7 ppm	1.8999896E+03	1.9000076E+03	0.208 ppm	3.05 ppm	PASS, 2.98 % of 6.99 ppm
10 kΩ	10000.393 kΩ	10000.386 kΩ	1.6 ppm	1.0000355E+04	1.0000431E+04	-0.702 ppm	2.20 ppm	PASS, 12.91 % of 5.44 ppm
19 kΩ	18999.384 kΩ	18999.383 kΩ	1.7 ppm	1.8999294E+04	1.8999474E+04	-0.036 ppm	3.05 ppm	PASS, 0.52 % of 6.99 ppm
100 kΩ	100002.34 kΩ	100001.97 kΩ	2.0 ppm	1.0000192E+05	1.0000276E+05	-3.743 ppm	2.20 ppm	PASS, 62.94 % of 5.95 ppm
190 kΩ	189996.84 kΩ	189997.09 kΩ	2.0 ppm	1.8999356E+05	1.9000012E+05	1.341 ppm	15.26 ppm	PASS, 4.35 % of 30.79 ppm
1.0 MΩ	1000004.4 MΩ	1000002.3 MΩ	2.5 ppm	9.9999090E+05	1.0000179E+06	-2.092 ppm	11.00 ppm	PASS, 9.27 % of 22.56 ppm
1.9 MΩ	1899941.5 MΩ	1899942.9 MΩ	3.0 ppm	1.8997908E+06	1.9000922E+06	0.716 ppm	76.32 ppm	PASS, 0.47 % of 152.75 ppm
10 MΩ	9999592 MΩ	9999444.4 MΩ	10.0 ppm	9.9989420E+06	1.0000242E+07	-14.762 ppm	55.00 ppm	PASS, 13.20 % of 111.80 ppm
19 MΩ	18998173 MΩ	18998662 MΩ	20.0 ppm	1.8987294E+07	1.9009052E+07	25.722 ppm	552.64 ppm	PASS, 2.33 % of 1106.00 ppm
100 MΩ	1.0000501E+08 MΩ	1.0000735E+08 MΩ	50.0 ppm	9.9949007E+07	1.0006101E+08	23.430 ppm	510.00 ppm	PASS, 2.29 % of 1024.89 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	24h spec	Result
10 Ω	Range 0.0000010 Ω	5.000e-05 Ω	-5e-05	5e-05	N/A	8.0000e-06 Ω	PASS
100 Ω	Range -0.0000023 Ω	5.500e-04 Ω	-0.00055	0.00055	N/A	2.2000e-06 Ω	PASS
1.0 kΩ	Range 0.0000018 Ω	5.500e-03 Ω	-0.0055	0.0055	N/A	2.2000e-06 Ω	PASS
10 kΩ	Range 0.0001076 Ω	5.500e-02 Ω	-0.055	0.055	N/A	2.2000e-06 Ω	PASS
100 kΩ	Range 0.0010768 Ω	5.500e-01 Ω	-0.55	0.55	N/A	2.2000e-06 Ω	PASS
1.0 MΩ	Range 0.1794735 Ω	5.500e+00 Ω	-5.5	5.5	N/A	2.2000e-06 Ω	PASS
10 MΩ	Range 0.3229646 Ω	5.500e+01 Ω	-55	55	N/A	2.2000e-06 Ω	PASS
100 MΩ	Range -0.5023894 Ω	5.500e+02 Ω	-550	550	N/A	2.2000e-06 Ω	PASS
1 GΩ	Range -0.5382744 Ω	5.500e+03 Ω	-5500	5500	N/A	2.2000e-06 Ω	PASS
OHM ZERO 2W	DUT	Source unc.	Low Limit	Hi limit	Measured	24h spec	Result
10 Ω	Range 0.2142464 Ω	3.000e-01 Ω	-0.3	0.3	N/A	8.0000e-06 Ω	PASS
100 Ω	Range 0.2134588 Ω	3.500e-01 Ω	-0.35	0.35	N/A	2.2000e-06 Ω	PASS
1.0 kΩ	Range 0.2126085 Ω	4.000e-01 Ω	-0.4	0.4	N/A	2.2000e-06 Ω	PASS
10 kΩ	Range 0.2099333 Ω	4.000e-01 Ω	-0.4	0.4	N/A	2.2000e-06 Ω	PASS
100 kΩ	Range 0.1916739 Ω	5.500e-01 Ω	-0.55	0.55	N/A	2.2000e-06 Ω	PASS
1.0 MΩ	Range -1.6798726 Ω	5.500e+00 Ω	-5.5	5.5	N/A	2.2000e-06 Ω	PASS
10 MΩ	Range -19.4855078 Ω	5.500e+01 Ω	-55	55	N/A	2.2000e-06 Ω	PASS
100 MΩ	Range -26.8418429 Ω	5.500e+02 Ω	-550	550	N/A	2.2000e-06 Ω	PASS
1 GΩ	Range -26.3753415 Ω	5.500e+03 Ω	-5500	5500	N/A	2.2000e-06 Ω	PASS

Procedure for all test points in the AC performance verification for ANAlog mode. 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 ANA Test	1V-10V	DUT	w/Guardband	Low Limit	Hi limit	Units	Measured	24h spec	Result
1.0 VAC @ 50.0 kHz	1.0	0.99977385	129.09	0.99955091	1.00044909	VAC	-226.154 ppm	320.0 ppm	PASS 50.36 %
1.0 VAC @ 1.0 MHz	1.0	1.0089639	0.2500 %	0.9874	1.0126	VAC	0.8964 %	1.0100 %	PASS 71.14 %
10 VAC @ 40 Hz	10	10.001292	0.0073 %	9.8982682	10.1017318	VAC	0.0129 %	1.0100 %	PASS 1.27 %
10 VAC @ 200 Hz	10	10.000242	73.18	9.9983682	10.0016318	VAC	24.218 ppm	90.0 ppm	PASS 14.84 %
10 VAC @ 500 Hz	10	10.000251	73.18	9.9983682	10.0016318	VAC	25.136 ppm	90.0 ppm	PASS 15.40 %
10 VAC @ 50.0 kHz	10	9.9969073	129.09	9.9955091	10.0044909	VAC	-309.269 ppm	320.0 ppm	PASS 68.87 %
10 VAC @ 1.0 MHz	10	10.08385	0.3000 %	9.869	10.131	VAC	0.8385 %	1.0100 %	PASS 64.01 %

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	0.010004353	0.0312 %	-0.290006	0.310006	0.0435 %	3000.0300 %	PASS 0.00 %
0.01 V AC+DC @ 20 Hz	0.010003652	0.0312 %	-0.290006	0.310006	0.0365 %	3000.0300 %	PASS 0.00 %
0.01 V AC+DC @ 40 Hz	0.010003527	0.0312 %	-0.290006	0.310006	0.0353 %	3000.0300 %	PASS 0.00 %
0.01 V AC+DC @ 100 Hz	0.010003445	0.0312 %	-0.100005	0.120005	0.0345 %	1100.0200 %	PASS 0.00 %
0.01 V AC+DC @ 1.0 kHz	0.010002481	0.0312 %	-0.100005	0.120005	0.0248 %	1100.0200 %	PASS 0.00 %
0.01 V AC+DC @ 10.0 kHz	0.010003659	0.0312 %	-0.100006	0.120006	0.0366 %	1100.0300 %	PASS 0.00 %
0.01 V AC+DC @ 20.0 kHz	0.010003781	0.0312 %	-0.100006	0.120006	0.0378 %	1100.0300 %	PASS 0.00 %
0.01 V AC+DC @ 50.0 kHz	0.010002298	0.0447 %	-0.100014	0.120014	0.0230 %	1100.1000 %	PASS 0.00 %
0.01 V AC+DC @ 100.0 kHz	0.0099887917	0.0773 %	-0.100058	0.120058	-0.1121 %	1100.5000 %	PASS 0.01 %
0.01 V AC+DC @ 300.0 kHz	0.0098612292	0.1500 %	-0.190415	0.210415	-1.3877 %	2004.0000 %	PASS 0.03 %
0.01 V AC+DC @ 500.0 kHz	0.009658157	0.2500 %	-0.493225	0.513225	-3.4184 %	5032.0000 %	PASS 0.03 %
0.01 V AC+DC @ 1.0 MHz	0.0086748942	0.4000 %	-0.493240	0.513240	-13.2511 %	5032.0000 %	PASS 0.13 %
0.03 V AC+DC @ 10 Hz	0.030015378	0.0121 %	0.029994	0.030006	0.0513 %	0.0083 %	FAIL 174.10 %
0.03 V AC+DC @ 20 Hz	0.030014426	0.0121 %	0.029994	0.030006	0.0481 %	0.0083 %	FAIL 163.32 %
0.03 V AC+DC @ 40 Hz	0.030013452	0.0121 %	0.029994	0.030006	0.0448 %	0.0083 %	FAIL 152.30 %
0.03 V AC+DC @ 100 Hz	0.030012699	0.0121 %	0.029994	0.030006	0.0423 %	0.0077 %	FAIL 147.44 %
0.03 V AC+DC @ 1.0 kHz	0.030013146	0.0121 %	0.029994	0.030006	0.0438 %	0.0077 %	FAIL 152.64 %
0.03 V AC+DC @ 10.0 kHz	0.030012675	0.0121 %	0.029992	0.030008	0.0423 %	0.0147 %	FAIL 110.97 %
0.03 V AC+DC @ 20.0 kHz	0.030012894	0.0121 %	0.029992	0.030008	0.0430 %	0.0147 %	FAIL 112.89 %
0.03 V AC+DC @ 50.0 kHz	0.030011653	0.0256 %	0.029983	0.030017	0.0388 %	0.0307 %	PASS 48.59 %
0.03 V AC+DC @ 100.0 kHz	0.03000603	0.0591 %	0.029958	0.030042	0.0201 %	0.0807 %	PASS 10.05 %
0.03 V AC+DC @ 300.0 kHz	0.029960249	0.0964 %	0.029880	0.030120	-0.1325 %	0.3033 %	PASS 20.82 %
0.03 V AC+DC @ 500.0 kHz	0.029920826	0.1500 %	0.029654	0.030346	-0.2639 %	1.0033 %	PASS 13.01 %
0.03 V AC+DC @ 1.0 MHz	0.029848358	0.3000 %	0.029609	0.030391	-0.5055 %	1.0033 %	PASS 24.13 %
0.1 V AC+DC @ 10 Hz	0.10000644	0.0121 %	0.099980	0.100020	0.0064 %	0.0074 %	PASS 22.65 %
0.1 V AC+DC @ 20 Hz	0.1000038	0.0121 %	0.099980	0.100020	0.0038 %	0.0074 %	PASS 13.35 %
0.1 V AC+DC @ 40 Hz	0.10000175	0.0121 %	0.099980	0.100020	0.0017 %	0.0074 %	PASS 6.14 %
0.1 V AC+DC @ 100 Hz	0.10000011	0.0121 %	0.099981	0.100019	0.0001 %	0.0072 %	PASS 0.40 %
0.1 V AC+DC @ 1.0 kHz	0.10000113	0.0121 %	0.099981	0.100019	0.0011 %	0.0072 %	PASS 4.02 %
0.1 V AC+DC @ 10.0 kHz	0.10000146	0.0121 %	0.099974	0.100026	0.0015 %	0.0142 %	PASS 3.92 %
0.1 V AC+DC @ 20.0 kHz	0.099997257	0.0121 %	0.099974	0.100026	-0.0027 %	0.0142 %	PASS 7.34 %
0.1 V AC+DC @ 50.0 kHz	0.099994156	0.0256 %	0.099944	0.100056	-0.0058 %	0.0302 %	PASS 7.38 %
0.1 V AC+DC @ 100.0 kHz	0.099965951	0.0591 %	0.099861	0.100139	-0.0340 %	0.0802 %	PASS 17.09 %
0.1 V AC+DC @ 300.0 kHz	0.099820906	0.0964 %	0.099603	0.100397	-0.1791 %	0.3010 %	PASS 28.33 %
0.1 V AC+DC @ 500.0 kHz	0.099685204	0.1500 %	0.098849	0.101151	-0.3148 %	1.0010 %	PASS 15.55 %
0.1 V AC+DC @ 1.0 MHz	0.099688932	0.3000 %	0.098699	0.101301	-0.3111 %	1.0010 %	PASS 14.88 %
0.3 V AC+DC @ 10 Hz	0.3000201	0.0050 %	0.299960	0.300040	0.0067 %	0.0083 %	PASS 34.56 %
0.3 V AC+DC @ 20 Hz	0.300009	0.0050 %	0.299960	0.300040	0.0030 %	0.0083 %	PASS 15.47 %
0.3 V AC+DC @ 40 Hz	0.3000052	0.0050 %	0.299960	0.300040	0.0017 %	0.0083 %	PASS 8.94 %
0.3 V AC+DC @ 100 Hz	0.30000297	0.0050 %	0.299962	0.300038	0.0010 %	0.0077 %	PASS 5.42 %
0.3 V AC+DC @ 1.0 kHz	0.3000139	0.0050 %	0.299962	0.300038	0.0046 %	0.0077 %	PASS 25.38 %
0.3 V AC+DC @ 10.0 kHz	0.30001555	0.0050 %	0.299941	0.300059	0.0052 %	0.0147 %	PASS 16.74 %
0.3 V AC+DC @ 20.0 kHz	0.29999216	0.0050 %	0.299941	0.300059	-0.0026 %	0.0147 %	PASS 8.44 %
0.3 V AC+DC @ 50.0 kHz	0.29999835	0.0085 %	0.299882	0.300118	-0.0005 %	0.0307 %	PASS 0.86 %
0.3 V AC+DC @ 100.0 kHz	0.30002013	0.0138 %	0.299717	0.300283	0.0067 %	0.0807 %	PASS 4.10 %
0.3 V AC+DC @ 300.0 kHz	0.30021206	0.0425 %	0.298962	0.301038	0.0707 %	0.3033 %	PASS 11.54 %
0.3 V AC+DC @ 500.0 kHz	0.3005403	0.1100 %	0.296660	0.303340	0.1801 %	1.0033 %	PASS 8.92 %
0.3 V AC+DC @ 1.0 MHz	0.30090643	0.1800 %	0.296450	0.303550	0.3021 %	1.0033 %	PASS 14.82 %
1.0 V AC+DC @ 10 Hz	1.0000938	0.0050 %	0.999876	1.000124	0.0094 %	0.0074 %	PASS 52.65 %
1.0 V AC+DC @ 20 Hz	1.0000432	0.0050 %	0.999876	1.000124	0.0043 %	0.0074 %	PASS 24.25 %
1.0 V AC+DC @ 40 Hz	1.0000322	0.0050 %	0.999876	1.000124	0.0032 %	0.0074 %	PASS 18.11 %
1.0 V AC+DC @ 100 Hz	1.0000312	0.0050 %	0.999878	1.000122	0.0031 %	0.0072 %	PASS 17.85 %

1.0 V AC+DC @ 1.0 kHz	1.0000576	0.0050 %	0.999878	1.000122	0.0058 %	0.0072 %	PASS 32.95 %
1.0 V AC+DC @ 10.0 kHz	1.0000497	0.0050 %	0.999808	1.000192	0.0050 %	0.0142 %	PASS 16.51 %
1.0 V AC+DC @ 20.0 kHz	0.99999245	0.0050 %	0.999808	1.000192	-0.0008 %	0.0142 %	PASS 2.51 %
1.0 V AC+DC @ 50.0 kHz	1.0000147	0.0085 %	0.999613	1.000387	0.0015 %	0.0302 %	PASS 2.34 %
1.0 V AC+DC @ 100.0 kHz	1.0000052	0.0138 %	0.999060	1.000940	0.0005 %	0.0802 %	PASS 0.32 %
1.0 V AC+DC @ 300.0 kHz	1.0007288	0.0425 %	0.996565	1.003435	0.0729 %	0.3010 %	PASS 11.99 %
1.0 V AC+DC @ 500.0 kHz	1.0018553	0.1100 %	0.988890	1.011110	0.1855 %	1.0010 %	PASS 9.21 %
1.0 V AC+DC @ 1.0 MHz	1.0058399	0.1800 %	0.988190	1.011810	0.5840 %	1.0010 %	PASS 28.71 %
3.0 V AC+DC @ 10 Hz	3.0002382	0.0048 %	2.999605	3.000395	0.0079 %	0.0083 %	PASS 41.24 %
3.0 V AC+DC @ 20 Hz	3.0001105	0.0048 %	2.999605	3.000395	0.0037 %	0.0083 %	PASS 19.13 %
3.0 V AC+DC @ 40 Hz	3.0000797	0.0048 %	2.999605	3.000395	0.0027 %	0.0083 %	PASS 13.80 %
3.0 V AC+DC @ 100 Hz	3.0000575	0.0048 %	2.999625	3.000375	0.0019 %	0.0077 %	PASS 10.58 %
3.0 V AC+DC @ 1.0 kHz	3.0001044	0.0048 %	2.999625	3.000375	0.0035 %	0.0077 %	PASS 19.21 %
3.0 V AC+DC @ 10.0 kHz	2.9998825	0.0048 %	2.999415	3.000585	-0.0039 %	0.0147 %	PASS 12.68 %
3.0 V AC+DC @ 20.0 kHz	2.9997694	0.0048 %	2.999415	3.000585	-0.0077 %	0.0147 %	PASS 24.90 %
3.0 V AC+DC @ 50.0 kHz	2.999727	0.0085 %	2.998824	3.001176	-0.0091 %	0.0307 %	PASS 14.29 %
3.0 V AC+DC @ 100.0 kHz	2.9989276	0.0121 %	2.997216	3.002784	-0.0357 %	0.0807 %	PASS 21.91 %
3.0 V AC+DC @ 300.0 kHz	2.9942097	0.0336 %	2.989891	3.010109	-0.1930 %	0.3033 %	PASS 31.62 %
3.0 V AC+DC @ 500.0 kHz	2.9951299	0.1100 %	2.966600	3.033400	-0.1623 %	1.0033 %	PASS 8.04 %
3.0 V AC+DC @ 1.0 MHz	3.008146	0.1700 %	2.964800	3.035200	0.2715 %	1.0033 %	PASS 13.34 %
10.0 V AC+DC @ 10 Hz	10.001019	0.0048 %	9.998778	10.001222	0.0102 %	0.0074 %	PASS 57.72 %
10.0 V AC+DC @ 20 Hz	10.000509	0.0048 %	9.998778	10.001222	0.0051 %	0.0074 %	PASS 28.85 %
10.0 V AC+DC @ 40 Hz	10.000371	0.0048 %	9.998778	10.001222	0.0037 %	0.0074 %	PASS 21.01 %
10.0 V AC+DC @ 100 Hz	10.000319	0.0048 %	9.998798	10.001202	0.0032 %	0.0072 %	PASS 18.39 %
10.0 V AC+DC @ 1.0 kHz	10.00047	0.0048 %	9.998798	10.001202	0.0047 %	0.0072 %	PASS 27.12 %
10.0 V AC+DC @ 10.0 kHz	9.9997005	0.0048 %	9.998098	10.001902	-0.0030 %	0.0142 %	PASS 9.99 %
10.0 V AC+DC @ 20.0 kHz	9.999432	0.0048 %	9.998098	10.001902	-0.0057 %	0.0142 %	PASS 18.94 %
10.0 V AC+DC @ 50.0 kHz	9.9991088	0.0085 %	9.996125	10.003875	-0.0089 %	0.0302 %	PASS 14.20 %
10.0 V AC+DC @ 100.0 kHz	9.9957354	0.0121 %	9.990766	10.009234	-0.0426 %	0.0802 %	PASS 26.29 %
10.0 V AC+DC @ 300.0 kHz	9.9808852	0.0336 %	9.966536	10.033464	-0.1911 %	0.3010 %	PASS 31.56 %
10.0 V AC+DC @ 500.0 kHz	9.9841263	0.1100 %	9.888900	10.111100	-0.1587 %	1.0010 %	PASS 7.88 %
10.0 V AC+DC @ 1.0 MHz	10.056956	0.1700 %	9.882900	10.117100	0.5696 %	1.0010 %	PASS 28.05 %
30 V AC+DC @ 10 Hz	30.002023	0.0060 %	29.991795	30.008205	0.0067 %	0.0213 %	PASS 15.21 %
30 V AC+DC @ 20 Hz	30.000612	0.0060 %	29.991795	30.008205	0.0020 %	0.0213 %	PASS 4.60 %
30 V AC+DC @ 40 Hz	30.000339	0.0060 %	29.991795	30.008205	0.0011 %	0.0213 %	PASS 2.55 %
30 V AC+DC @ 100 Hz	30.000238	0.0060 %	29.991995	30.008005	0.0008 %	0.0207 %	PASS 1.85 %
30 V AC+DC @ 1.0 kHz	30.000633	0.0060 %	29.991995	30.008005	0.0021 %	0.0207 %	PASS 4.90 %
30 V AC+DC @ 10.0 kHz	29.999119	0.0060 %	29.991995	30.008005	-0.0029 %	0.0207 %	PASS 6.82 %
30 V AC+DC @ 20.0 kHz	29.998025	0.0060 %	29.991995	30.008005	-0.0066 %	0.0207 %	PASS 15.29 %
30 V AC+DC @ 50.0 kHz	30.000162	0.0060 %	29.987495	30.012505	0.0005 %	0.0357 %	PASS 0.75 %
30 V AC+DC @ 100.0 kHz	30.00152	0.0174 %	29.958591	30.041409	0.0051 %	0.1207 %	PASS 2.08 %
30 V AC+DC @ 300.0 kHz	30.038894	0.0991 %	29.849273	30.150727	0.1296 %	0.4033 %	PASS 15.61 %
30 V AC+DC @ 500.0 kHz	30.107852	0.5200 %	29.393000	30.607000	0.3595 %	1.5033 %	PASS 11.30 %
100.0 V AC+DC @ 10 Hz	100.00896	0.0060 %	99.973582	100.026418	0.0090 %	0.0204 %	PASS 21.06 %
100.0 V AC+DC @ 20 Hz	100.00411	0.0060 %	99.973582	100.026418	0.0041 %	0.0204 %	PASS 9.67 %
100.0 V AC+DC @ 40 Hz	100.00292	0.0060 %	99.973582	100.026418	0.0029 %	0.0204 %	PASS 6.87 %
100.0 V AC+DC @ 100 Hz	100.00252	0.0060 %	99.973782	100.026218	0.0025 %	0.0202 %	PASS 5.98 %
100.0 V AC+DC @ 1.0 kHz	100.00381	0.0060 %	99.973782	100.026218	0.0038 %	0.0202 %	PASS 9.05 %
100.0 V AC+DC @ 10.0 kHz	100.00021	0.0060 %	99.973782	100.026218	0.0002 %	0.0202 %	PASS 0.49 %
100.0 V AC+DC @ 20.0 kHz	99.997534	0.0060 %	99.973782	100.026218	-0.0025 %	0.0202 %	PASS 5.85 %
100.0 V AC+DC @ 50.0 kHz	100.00318	0.0095 %	99.955255	100.044745	0.0032 %	0.0352 %	PASS 4.35 %
100.0 V AC+DC @ 100.0 kHz	100.00076	0.0174 %	99.862436	100.137564	0.0008 %	0.1202 %	PASS 0.31 %
300.0 V AC+DC @ 100 Hz	299.90929	0.0079 %	299.854408	300.145592	-0.0302 %	0.0407 %	PASS 36.50 %
300.0 V AC+DC @ 1.0 kHz	299.91728	0.0079 %	299.854408	300.145592	-0.0276 %	0.0407 %	PASS 33.29 %
300.0 V AC+DC @ 10.0 kHz	149.95323	0.0079 %	299.794408	300.205592	-50.0156 %	0.0607 %	FAIL 40879.62 %
300.0 V AC+DC @ 20.0 kHz	149.95079	0.0110 %	299.784865	300.215135	-50.0164 %	0.0607 %	FAIL 40555.66 %
300.0 V AC+DC @ 50.0 kHz	150.01383	0.0110 %	299.604865	300.395135	-49.9954 %	0.1207 %	FAIL 20630.08 %
750.0 V AC+DC @ 100 Hz	749.8401	0.0245 %	749.514498	750.485502	-0.0213 %	0.0403 %	PASS 22.62 %
750.0 V AC+DC @ 1.0 kHz	749.87213	0.0660 %	749.203000	750.797000	-0.0170 %	0.0403 %	PASS 11.03 %

750.0 V AC+DC @ 10.0 kHz	749.87227	0.0079 %	749.489020	750.510980	-0.0170 %	0.0603 %	PASS 14.01 %
750.0 V AC+DC @ 20.0 kHz	749.87203	0.0079 %	749.489020	750.510980	-0.0171 %	0.0603 %	PASS 14.04 %

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 µADC	0	1.2853504E-11						INFO
50 nADC	5E-08	5.0038445E-08						INFO
100 nADC	1E-07	1.0001679E-07	71.82 ppm	9.995282E-08	1.000472E-07	167.918 ppm	400 ppm	PASS 20.66 %
-100 nADC	-1E-07	-9.9970886E-08	71.82 ppm	-9.996918E-08	-1.000308E-07	-291.141 ppm	-380 ppm	PASS 37.64 %
-50 nADC	-5E-08	-4.9980558E-08						INFO
Zero µADC	0	2.6910343E-11						INFO
0.5 µADC	5E-07	5.000191E-07	71.82 ppm	4.999201E-07	5.000799E-07	38.191 ppm	88 ppm	PASS 16.81 %
1.0 µADC	1E-06	1.0000175E-06	71.82 ppm	9.998792E-07	1.000121E-06	17.492 ppm	49 ppm	PASS 10.06 %
-1.0 µADC	-1E-06	-9.9994624E-07	71.82 ppm	-1.000043E-06	-9.999572E-07	-53.763 ppm	-29 ppm	PASS 34.71 %
-0.5 µADC	-5E-07	-4.9994685E-07	71.82 ppm	-5.000019E-07	-4.999981E-07	-106.293 ppm	-68 ppm	PASS 53.74 %
Zero 00 µADC	0	2.4916199E-11						INFO
5 µADC	5E-06	5.0000715E-06	71.82 ppm	4.999522E-06	5.000478E-06	14.307 ppm	24 ppm	PASS 9.45 %
10 µADC	1E-05	1.0000041E-05	71.82 ppm	9.999113E-06	1.000089E-05	4.053 ppm	17 ppm	PASS 2.75 %
-10 µADC	-1E-05	-9.9999125E-06	71.82 ppm	-1.000075E-05	-9.999251E-06	-8.748 ppm	3 ppm	PASS 6.08 %
-5 µADC	-5E-06	-4.9998975E-06	71.82 ppm	-5.00034E-06	-4.99966E-06	-20.500 ppm	-4 ppm	PASS 14.25 %
Zero 000 µADC	0	4.1241111E-11						INFO
50 µADC	5E-05	5.0000165E-05	71.82 ppm	4.999531E-05	5.000469E-05	3.290 ppm	22 ppm	PASS 2.19 %
100 µADC	0.0001	0.0001000009	71.82 ppm	9.999122E-05	0.0001000088	0.923 ppm	16 ppm	PASS 0.63 %
-100 µADC	-0.0001	-9.999958E-05	71.82 ppm	-0.0001000076	-9.999242E-05	-4.202 ppm	4 ppm	PASS 2.92 %
-50 µADC	-5E-05	-4.9999642E-05	71.82 ppm	-5.000349E-05	-4.999651E-05	-7.157 ppm	-2 ppm	PASS 4.98 %
Zero mADC	0	9.0807732E-11						INFO
0.5 mADC	0.0005	0.00049999985	33.64 ppm	0.0004999742	0.0005000258	-0.306 ppm	18 ppm	PASS 0.40 %
1.0 mADC	0.001	0.00099999958	33.64 ppm	0.0009999524	0.001000048	-0.424 ppm	14 ppm	PASS 0.58 %
-1.0 mADC	-0.001	-0.0010000012	33.64 ppm	-0.00100004	-0.0009999604	1.204 ppm	6 ppm	PASS 1.76 %
-0.5 mADC	-0.0005	-0.00050000167	33.64 ppm	-0.0005000178	-0.0004999822	3.341 ppm	2 ppm	PASS 4.96 %
Zero 00 mADC	0	2.5491778E-11						INFO
5 mADC	0.005	0.0049999438	32.27 ppm	0.004999749	0.005000251	-11.247 ppm	18 ppm	PASS 15.22 %
10 mADC	0.01	0.0099999392	32.27 ppm	0.009999537	0.01000046	-6.080 ppm	14 ppm	PASS 8.64 %
-10 mADC	-0.01	-0.010000028	32.27 ppm	-0.01000038	-0.009999617	2.814 ppm	6 ppm	PASS 4.29 %
-5 mADC	-0.005	-0.0050000403	32.27 ppm	-0.005000171	-0.004999829	8.070 ppm	2 ppm	PASS 12.48 %
Zero 000 mADC	0	3.1883473E-11						INFO
50 mADC	0.05	0.049999789	53.32 ppm	0.04999568	0.05000432	-4.228 ppm	33 ppm	PASS 3.37 %
100 mADC	0.1	0.099999863	53.32 ppm	0.09999177	0.1000082	-1.374 ppm	29 ppm	PASS 1.13 %
-100 mADC	-0.1	-0.10000191	53.32 ppm	-0.1000074	-0.09999257	19.148 ppm	21 ppm	PASS 16.71 %
-50 mADC	-0.05	-0.050001301	53.32 ppm	-0.05000352	-0.04999648	26.026 ppm	17 ppm	PASS 23.25 %
Zero ADC	0	8.8495634E-11						INFO
0.5 ADC	0.5	0.49998954	115.22 ppm	0.4998824	0.5001176	-20.913 ppm	120 ppm	PASS 6.29 %
1.0 ADC	1	0.99995633	115.22 ppm	0.9997748	1.000225	-43.671 ppm	110 ppm	PASS 13.71 %
-1.0 ADC	-1	-0.99993189	115.22 ppm	-1.000205	-0.9997948	-68.112 ppm	90 ppm	PASS 23.29 %
-0.5 ADC	-0.5	-0.49997771	115.22 ppm	-0.5000976	-0.4999024	-44.575 ppm	80 ppm	PASS 15.89 %

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	1.0093792E-05	0.0160 %	9.9623955e-06	1.00376045e-05	0.9379 %	0.3600 %	INFO
100 µA AC @ 50 Hz	0.0001	0.00010001729	0.0160 %	9.9893955e-05	0.000100106045	172.874 ppm	0.0900 %	PASS 9.46 %
1.0 mA AC @ 50 Hz	0.001	0.001000038	0.0160 %	0.00099903955	0.00100096045	38.033 ppm	0.0800 %	PASS 2.33 %
10 mA AC @ 50 Hz	0.01	0.010000219	0.0160 %	0.0099903955	0.0100096045	21.948 ppm	0.0800 %	PASS 1.34 %
100 mA AC @ 50 Hz	0.1	0.10001162	0.0133 %	0.099906682	0.100093318	116.196 ppm	0.0800 %	PASS 7.16 %
1.0 A AC @ 50 Hz	1.0	1.0007476	0.0133 %	0.99886682	1.00113318	747.629 ppm	0.1000 %	PASS 37.05 %
10 µA AC @ 60 Hz	1e-05	1.0101308E-05	0.0133 %	9.9626682e-06	1.00373318e-05	1.0131 %	0.3600 %	INFO
100 µA AC @ 60 Hz	0.0001	0.00010002053	0.0133 %	9.9896682e-05	0.000100103318	205.309 ppm	0.0900 %	PASS 11.28 %
1.0 mA AC @ 60 Hz	0.001	0.0010000743	0.0129 %	0.00099907136	0.00100092864	74.255 ppm	0.0800 %	PASS 4.58 %
10 mA AC @ 60 Hz	0.01	0.010000416	0.0129 %	0.0099907136	0.0100092864	41.555 ppm	0.0800 %	PASS 2.56 %
100 mA AC @ 60 Hz	0.1	0.10001253	0.0288 %	0.099891182	0.100108818	125.345 ppm	0.0800 %	PASS 7.37 %
1.0 A AC @ 60 Hz	1.0	1.0004846	0.0288 %	0.99871182	1.00128818	484.577 ppm	0.1000 %	PASS 23.28 %
10 µA AC @ 1.0 kHz	1e-05	1.0091451E-05	0.0160 %	9.9623955e-06	1.00376045e-05	0.9145 %	0.3600 %	INFO
100 µA AC @ 1.0 kHz	0.0001	9.9987691E-05	0.0160 %	9.9893955e-05	0.000100106045	-123.094 ppm	0.0900 %	PASS 6.73 %
1.0 mA AC @ 1.0 kHz	0.001	0.001000104	0.0160 %	0.00099933955	0.00100066045	104.006 ppm	0.0500 %	PASS 9.90 %
10 mA AC @ 1.0 kHz	0.01	0.01000082	0.0160 %	0.0099933955	0.0100066045	81.957 ppm	0.0500 %	PASS 7.80 %
100 mA AC @ 1.0 kHz	0.1	0.10001562	0.0133 %	0.099936682	0.100063318	156.241 ppm	0.0500 %	PASS 15.10 %
1.0 A AC @ 1.0 kHz	1.0	1.0003884	0.0133 %	0.99866682	1.00133318	0.0388 %	0.1200 %	PASS 16.08 %

Test completed

Test date	05 October 2019 23:13
UUT Internal TEMP?	33.5
Destructive overloads?	125, DESTRUCTIVE OVERLOADS valid 2941

Lab temperature maintained +24°C ±2°C

Internal use only

Not validated

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