

Manufacturer	HEWLETT-PACKARD	Calibration date	January 23 2018
Model Number	3457A	Ambient Temperature	24.98 °C
Serial	0000	Relative Humidity	50.30 %
ID Number	X	Pressure	1017.28
Notes	Post-cal check GPIB3	Test type	PERFVAL FINAL

No service performed to unit, condition as received.

Reference standard	Mfg	Model	Options	Serial / Unc	CEID	Calibration date	Due date
CAL MFC	Fluke	5700A	/03 WB	XXX	CC1	2017/11/14	2018/11/14
DC STD	Fluke	732B-3	9.9999288 VDC	± 0.56ppm	SV03	2017/11/03	2018/11/03
STDR	IET	1 Ohm	0.99997483	± 0.17ppm	SM02	2017/11/3	2018/11/3
STDR	ESI	SR104	10000.0530 KΩ	± 0.15ppm	SM01	2017/10/30	2018/10/30

MFC last calibrated	70.0 days ago	MFC since DCV ZERO	0.0 days ago
MFC since WBFLAT	1973.0 days ago	MFC since WBGAIN	70.0 days ago
MFC Confidence level	24h 95%	MFC Calibrate date	2017-11-14 00:00:00
MFC Calibrate date Zero	2018-12-03 00:00:00	Calibrate date WB Flatness	2012-08-28 00:00:00
Calibrate date WB Gain	2017-11-14 00:00:00	CAL CONST 6.5V reference voltage	6.89136237019
CAL CONST 13V reference voltage	13.7948180303	CAL CONST 22V range positive zero	398.17887
CAL CONST 22V range negative zero	398.17862	CAL CONST DAC Linearity	0.0
CAL CONST 10KOHM true output resistance	10000.0741429	CAL CONST 10KOHM standard resistance	10000.4260101
CAL CONST, Zero calibration temperature	23.0	CAL CONST, All calibration temp	23.0

This note is test MFC text block for further use.
Calibrator was warmed up >24 hours. Source verified within 24 hour limits.

Meter Info	HP3457A	Last calibration date	1/21/2018
Next calibration date	1/21/2019	Test date	23 January 2018 14:21
DUT Internal TEMP?	NONE	DUT Calibrations number?	206
Self-test result?	16.0	ACAL ALL result?	ACAL ALL Completed
Firmware	6.0000000E+00, 0.0000000E+00	Options	0.0

Service information

Line freq
60.0
Reference
F5700A for final test 3457A
DUT Condition
Front panel posts used 4W+AUXCURR. Zero calibrated vs copper short.

Test procedure : \$Id: hp3457a.py | Rev 480 | 2018/01/23 23:05:30 MM \$

Source procedure : \$Id: f5700a.py | Rev 458 | 2018/01/20 10:39:16 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 corrected 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	Units	Deviation	DUT Spec	Test Status
Short 00 mVDC	0.0000000E+00	-0.0000007	8.2 ppm	-0.000001	-0.000001	VDC	N/A	3.85 µV	PASS
Short 000 mVDC	0.0000000E+00	-0.0000006	4.0 ppm	-0.000001	-0.000001	VDC	N/A	4.00 µV	PASS
Short 0.0 VDC	0.0000000E+00	0.0000000	3.3 ppm	0.000000	0.000000	VDC	N/A	7.00 µV	PASS
Short 00.0 VDC	0.0000000E+00	0.0000000	4.4 ppm	0.000000	0.000000	VDC	N/A	20.00 µV	PASS
Short 000.0 VDC	0.0000000E+00	0.0000000	6.5 ppm	0.000000	0.000000	VDC	N/A	0.70 mV	PASS
DCV Test	0.1V-1000V	DUT	Source unc.	Low Limit	Hi limit	Units	Measured	24hr	Result
0.03 VDC (0.03 Range)	0.030000	0.03000054	3.81 ppm	0.0299973747	0.0300026253	VDC	17.844 ppm	83.70 ppm	PASS 20.39 %
-0.03 VDC (0.03 Range)	-0.030000	-0.03000126	3.81 ppm	-0.0300026253	-0.0299973747	VDC	41.922 ppm	83.70 ppm	PASS 47.91 %
0.3 VDC (0.30 Range)	0.300000	0.30000158	2.45 ppm	0.299995365	0.300004635	VDC	5.267 ppm	13.00 ppm	PASS 34.09 %
0.2 VDC (0.30 Range)	0.200000	0.20000137	2.45 ppm	0.19999691	0.20000309	VDC	6.850 ppm	13.00 ppm	PASS 44.34 %
0.1 VDC (0.30 Range)	0.100000	0.10000100	2.45 ppm	0.099998455	0.100001545	VDC	9.967 ppm	13.00 ppm	PASS 64.51 %
-0.1 VDC (0.30 Range)	-0.100000	-0.09999987	2.45 ppm	-0.100001545	-0.099998455	VDC	-1.303 ppm	13.00 ppm	PASS 8.44 %
-0.2 VDC (0.30 Range)	-0.200000	-0.20000036	2.45 ppm	-0.20000309	-0.19999691	VDC	1.783 ppm	13.00 ppm	PASS 11.54 %
-0.3 VDC (0.30 Range)	-0.300000	-0.30000143	2.45 ppm	-0.300004635	-0.299995365	VDC	4.767 ppm	13.00 ppm	PASS 30.85 %
1.0 VDC (3.00 Range)	1.000000	1.00000340	1.47 ppm	0.99999333	1.00000667	VDC	3.400 ppm	5.20 ppm	PASS 50.97 %
2.0 VDC (3.00 Range)	2.000000	2.00000457	1.47 ppm	1.99998666	2.00001334	VDC	2.283 ppm	5.20 ppm	PASS 34.23 %
3.0 VDC (3.00 Range)	3.000000	3.00000733	1.47 ppm	2.99997999	3.00002001	VDC	2.444 ppm	5.20 ppm	PASS 36.65 %
-1.0 VDC (3.00 Range)	-1.000000	-0.99999752	1.47 ppm	-1.00000667	-0.99999333	VDC	-2.480 ppm	5.20 ppm	PASS 37.18 %
-2.0 VDC (3.00 Range)	-2.000000	-1.99999857	1.47 ppm	-2.00001334	-1.99998666	VDC	-0.717 ppm	5.20 ppm	PASS 10.74 %
-3.0 VDC (3.00 Range)	-3.000000	-3.00000490	1.47 ppm	-3.00002001	-2.99997999	VDC	1.633 ppm	5.20 ppm	PASS 24.49 %
10 VDC (30.00 Range)	10.000000	10.00005367	2.36 ppm	9.9998814	10.0001186	VDC	5.367 ppm	9.50 ppm	PASS 45.25 %
20 VDC (30.00 Range)	20.000000	20.00006933	2.36 ppm	19.9997628	20.0002372	VDC	3.467 ppm	9.50 ppm	PASS 29.23 %
30 VDC (30.00 Range)	30.000000	30.00009367	2.36 ppm	29.9996442	30.0003558	VDC	3.122 ppm	9.50 ppm	PASS 26.33 %
-10 VDC (30.00 Range)	-10.000000	-10.00000537	2.36 ppm	-10.0001186	-9.9998814	VDC	0.537 ppm	9.50 ppm	PASS 4.53 %
-20 VDC (30.00 Range)	-20.000000	-20.00005333	2.36 ppm	-20.0002372	-19.9997628	VDC	2.667 ppm	9.50 ppm	PASS 22.48 %
-30 VDC (30.00 Range)	-30.000000	-30.00018200	2.36 ppm	-30.0003558	-29.9996442	VDC	6.067 ppm	9.50 ppm	PASS 51.15 %
100 VDC (300.00 Range)	100.000000	99.99910333	2.85 ppm	99.996385	100.003615	VDC	-8.967 ppm	33.30 ppm	PASS 24.80 %
200 VDC (300.00 Range)	200.000000	199.99890000	2.85 ppm	199.99277	200.00723	VDC	-5.500 ppm	33.30 ppm	PASS 15.21 %
300 VDC (300.00 Range)	300.000000	300.00069333	2.85 ppm	299.989155	300.010845	VDC	2.311 ppm	33.30 ppm	PASS 6.39 %
-100 VDC (300.00 Range)	-100.000000	-99.99869333	2.85 ppm	-100.003615	-99.996385	VDC	-13.067 ppm	33.30 ppm	PASS 36.15 %
-200 VDC (300.00 Range)	-200.000000	-199.99843000	2.85 ppm	-200.00723	-199.99277	VDC	-7.850 ppm	33.30 ppm	PASS 21.72 %
-300 VDC (300.00 Range)	-300.000000	-300.00057667	2.85 ppm	-300.007245	-299.992755	VDC	1.922 ppm	33.30 ppm	PASS 7.96 %

Additional test for **combined DUT+MFC** DC Voltage Integral Linearity (INL) using fixed 22V MFC range. Integral linearity is a measure of the device's deviation from ideal linear behaviour.

DCV Linearity	10V Range	DUT	Source unc.	Low Limit	Hi limit	Units	Measured	24hr	Result
21.999998	21.99999800	22.00006967	1.47 ppm	21.999851260	22.000144740	VDC	3.258 ppm	5.20 ppm	PASS 48.84 %
20.999998	20.99999800	21.00006867	1.47 ppm	20.999857930	21.000138070	VDC	3.365 ppm	5.20 ppm	PASS 50.45 %
19.999998	19.99999800	20.00006633	1.47 ppm	19.999864600	20.000131400	VDC	3.417 ppm	5.20 ppm	PASS 51.22 %
18.999998	18.99999800	19.00006867	1.47 ppm	18.999871270	19.000124730	VDC	3.719 ppm	5.20 ppm	PASS 55.76 %
17.999998	17.99999800	18.00006600	1.47 ppm	17.999877940	18.000118060	VDC	3.778 ppm	5.20 ppm	PASS 56.64 %
16.999998	16.99999800	17.00006533	1.47 ppm	16.999884610	17.000111390	VDC	3.961 ppm	5.20 ppm	PASS 59.38 %
15.999998	15.99999800	16.00006567	1.47 ppm	15.999891280	16.000104720	VDC	4.229 ppm	5.20 ppm	PASS 63.41 %
14.999998	14.99999800	15.00006700	1.47 ppm	14.999897950	15.000098050	VDC	4.600 ppm	5.20 ppm	PASS 68.97 %
13.999998	13.99999800	14.00005700	1.47 ppm	13.999904620	14.000091380	VDC	4.214 ppm	5.20 ppm	PASS 63.18 %
12.999998	12.99999800	13.00005367	1.47 ppm	12.999911290	13.000084710	VDC	4.282 ppm	5.20 ppm	PASS 64.20 %
11.999998	11.99999800	12.00005067	1.47 ppm	11.999917960	12.000078040	VDC	4.389 ppm	5.20 ppm	PASS 65.80 %
10.999998	10.99999800	11.00005000	1.47 ppm	10.999924630	11.000071370	VDC	4.727 ppm	5.20 ppm	PASS 70.87 %
9.999999	9.99999900	10.00005000	1.47 ppm	9.999932300	10.000065700	VDC	5.100 ppm	5.20 ppm	PASS 76.46 %
8.888888	8.88888800	8.88893067	1.47 ppm	8.888828711	8.888947289	VDC	4.800 ppm	5.20 ppm	PASS 71.96 %
7.777777	7.77777700	7.77781337	1.47 ppm	7.777725122	7.777828878	VDC	4.676 ppm	5.20 ppm	PASS 70.10 %
6.666666	6.66666600	6.66670030	1.47 ppm	6.666621533	6.666710467	VDC	5.145 ppm	5.20 ppm	PASS 77.14 %
5.555555	5.55555500	5.55557677	1.47 ppm	5.555517944	5.555592056	VDC	3.918 ppm	5.20 ppm	PASS 58.74 %
4.444444	4.44444400	4.44446703	1.47 ppm	4.444414356	4.444473644	VDC	5.183 ppm	5.20 ppm	PASS 77.70 %
3.333333	3.33333300	3.33335373	1.47 ppm	3.333310767	3.333355233	VDC	6.220 ppm	5.20 ppm	PASS 93.25 %
2.222222	2.22222200	2.2222757	1.47 ppm	2.222207178	2.222236822	VDC	2.505 ppm	5.20 ppm	PASS 37.56 %
1.111111	1.11111100	1.11111460	2.45 ppm	1.111102500	1.111119500	VDC	3.240 ppm	5.20 ppm	PASS 42.35 %
0.123456789	0.12345679	0.12345850	9.91 ppm	0.123454924	0.123458654	VDC	13.832 ppm	5.20 ppm	PASS 91.54 %
-0.123456789	-0.12345679	-0.12345750	9.91 ppm	-0.123458654	-0.123454924	VDC	5.759 ppm	5.20 ppm	PASS 38.11 %
-1.111111	-1.11111100	-1.11110977	2.45 ppm	-1.111119500	-1.111102500	VDC	-1.110 ppm	5.20 ppm	PASS 14.51 %
-2.222222	-2.22222200	-2.22222293	1.47 ppm	-2.222236822	-2.222207178	VDC	0.420 ppm	5.20 ppm	PASS 6.30 %
-3.333333	-3.33333300	-3.33333283	1.47 ppm	-3.333355233	-3.333310767	VDC	-0.050 ppm	5.20 ppm	PASS 0.75 %
-4.444444	-4.44444400	-4.44443950	1.47 ppm	-4.444473644	-4.444414356	VDC	-1.013 ppm	5.20 ppm	PASS 15.18 %
-5.555555	-5.55555500	-5.55554287	1.47 ppm	-5.555592056	-5.555517944	VDC	-2.184 ppm	5.20 ppm	PASS 32.74 %
-6.666666	-6.66666600	-6.66666930	1.47 ppm	-6.666710467	-6.666621533	VDC	0.495 ppm	5.20 ppm	PASS 7.42 %
-7.777777	-7.77777700	-7.77777573	1.47 ppm	-7.777828878	-7.777725122	VDC	-0.163 ppm	5.20 ppm	PASS 2.44 %
-8.888888	-8.88888800	-8.88888517	1.47 ppm	-8.888947289	-8.888828711	VDC	-0.319 ppm	5.20 ppm	PASS 4.78 %
-9.999999	-9.99999900	-10.00000503	1.47 ppm	-10.000065700	-9.999932300	VDC	0.603 ppm	5.20 ppm	PASS 9.05 %
-10.999998	-10.99999800	-11.00001600	1.47 ppm	-11.000071370	-10.999924630	VDC	1.636 ppm	5.20 ppm	PASS 24.53 %
-11.999998	-11.99999800	-12.00001267	1.47 ppm	-12.000078040	-11.999917960	VDC	1.222 ppm	5.20 ppm	PASS 18.32 %
-12.999998	-12.99999800	-13.00001933	1.47 ppm	-13.000084710	-12.999911290	VDC	1.641 ppm	5.20 ppm	PASS 24.60 %
-13.999998	-13.99999800	-14.00002200	1.47 ppm	-14.000091380	-13.999904620	VDC	1.714 ppm	5.20 ppm	PASS 25.70 %
-14.999998	-14.99999800	-15.00002267	1.47 ppm	-15.000098050	-14.999897950	VDC	1.644 ppm	5.20 ppm	PASS 24.65 %
-15.999998	-15.99999800	-16.00002300	1.47 ppm	-16.000104720	-15.999891280	VDC	1.563 ppm	5.20 ppm	PASS 23.43 %
-16.999998	-16.99999800	-17.00003933	1.47 ppm	-17.000111390	-16.999884610	VDC	2.431 ppm	5.20 ppm	PASS 36.45 %
-17.999998	-17.99999800	-18.00003967	1.47 ppm	-18.000118060	-17.999877940	VDC	2.315 ppm	5.20 ppm	PASS 34.70 %
-18.999998	-18.99999800	-19.00003633	1.47 ppm	-19.000124730	-18.999871270	VDC	2.018 ppm	5.20 ppm	PASS 30.25 %
-19.999998	-19.99999800	-20.00005333	1.47 ppm	-20.000131400	-19.999864600	VDC	2.767 ppm	5.20 ppm	PASS 41.48 %
-20.999998	-20.99999800	-21.00005567	1.47 ppm	-21.000138070	-20.999857930	VDC	2.746 ppm	5.20 ppm	PASS 41.17 %
-21.999998	-21.99999800	-22.00006300	1.47 ppm	-22.000144740	-21.999851260	VDC	2.955 ppm	5.20 ppm	PASS 44.30 %

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 NOT tested, as it require manual external standard, MFC unable to provide this range value.

OHM Test	1 Ohm to 1 GOhm	DUT	Source unc.	Low Limit	Hi limit	Units	Measured	24h spec	Result
1 Ω	9.99797400E-01	0.99972667	40.20 ppm	0.999692221314	0.999902578686	Ω	-70.748 ppm	65.00 ppm	PASS 67.25 %
1.9 Ω	1.89952320E+00	1.89947	8.30 ppm	1.89938396495	1.89966243505	Ω	-28.007 ppm	65.00 ppm	PASS 38.21 %
10 Ω	9.99990400E+00	9.9999833	8.30 ppm	9.99917100704	10.000636993	Ω	7.933 ppm	65.00 ppm	PASS 10.82 %
19 Ω	1.89990950E+01	18.999227	4.30 ppm	18.9977783627	19.0004116373	Ω	6.930 ppm	65.00 ppm	PASS 10.00 %
100 Ω	1.00001630E+02	100.00203	4.30 ppm	99.9977999376	100.005460062	Ω	4.033 ppm	34.00 ppm	PASS 10.53 %
190 Ω	1.89995000E+02	189.99547	3.30 ppm	189.987913187	190.002086814	Ω	2.456 ppm	34.00 ppm	PASS 6.58 %
1.0 kΩ	9.99990500E+02	999.99433	3.30 ppm	999.952200364	1000.02879964	Ω	3.833 ppm	35.00 ppm	PASS 10.01 %
1.9 kΩ	1.89999610E+03	1900.001	3.30 ppm	1899.92333015	1900.06886985	Ω	2.579 ppm	35.00 ppm	PASS 6.73 %
10 kΩ	1.00000680E+04	10000.1	3.30 ppm	9999.6849974	10000.4510026	Ω	3.200 ppm	35.00 ppm	PASS 8.36 %
19 kΩ	1.89996850E+04	18999.74	3.30 ppm	18998.9573121	19000.4126879	Ω	2.895 ppm	35.00 ppm	PASS 7.56 %
100 kΩ	1.00001210E+05	100001.6	3.30 ppm	99996.8799476	100005.540052	Ω	3.900 ppm	40.00 ppm	PASS 9.01 %
190 kΩ	1.89992720E+05	189993.47	5.30 ppm	189984.11333	190001.32667	Ω	3.930 ppm	40.00 ppm	PASS 8.68 %
1.0 MΩ	9.99999900E+05	1000002.3	5.30 ppm	999949.600005	1000050.19999	Ω	2.433 ppm	45.00 ppm	PASS 4.84 %
1.9 MΩ	1.89995530E+06	1899962	14.30 ppm	1899842.63265	1900067.96735	Ω	3.526 ppm	45.00 ppm	PASS 5.95 %
10 MΩ	9.99936600E+06	9999443.3	14.30 ppm	9996723.16757	10002008.8324	Ω	7.734 ppm	250.00 ppm	PASS 2.93 %
19 MΩ	1.89990250E+07	18999373	60.30 ppm	18993129.6025	19004920.3975	Ω	18.334 ppm	250.00 ppm	PASS 5.91 %
100 MΩ	1.00008260E+08	1.0000663E+08	60.30 ppm	99842216.2859	100174303.714	Ω	-16.265 ppm	1600.00 ppm	PASS 0.98 %
OHM Test	10 Ω, 10 KΩ ZERO	DUT	Source unc.	Low Limit	Hi limit	Units	Measured	24h spec	Result
30R REAR Ω	1.00000000E-06	-7.8692 μΩ	50.000 μΩ	4.9999935e-05	5.0000065e-05	Ω	N/A	65.00 ppm	PASS 0.00 %
30K REAR Ω	1.00000000E-06	-17.9370 μΩ	50.000 μΩ	4.9999935e-05	5.0000065e-05	Ω	N/A	35.00 ppm	PASS 0.00 %

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	3V-30V	DUT	w/Guardband	Low Limit	Hi limit	Units	Measured	24h spec	Result
3.0 VAC @ 50.0 kHz	3.0	2.996044	0.0129 %	2.98155273	3.01844727	VAC	-0.1319 %	0.6020 %	PASS 21.44 %
3.0 VAC @ 1.0 MHz	3.0	3.000638	0.2500 %	2.6892	3.3108	VAC	0.0213 %	10.1100 %	PASS 0.21 %
30 VAC @ 40 Hz	30	29.97837	0.2085 %	26.90445	33.09555	VAC	-0.0721 %	10.1100 %	PASS 0.70 %
30 VAC @ 200 Hz	30	29.99853	73.18	29.9732046	30.0267954	VAC	-49.000 ppm	820.0 ppm	PASS 5.49 %
30 VAC @ 500 Hz	30	29.99974	73.18	29.9732046	30.0267954	VAC	-8.667 ppm	820.0 ppm	PASS 0.97 %
30 VAC @ 50.0 kHz	30	29.96993	0.0129 %	29.8155273	30.1844727	VAC	-0.1002 %	0.6020 %	PASS 16.30 %
30 VAC @ 1.0 MHz	30	29.96985	0.3000 %	26.877	33.123	VAC	-0.1005 %	10.1100 %	PASS 0.97 %

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	Units	Measured	24h spec	Result, % spec
0.03 VAC @ 20 Hz	0.02990869	0.0140 %	0.029567	0.030433	VAC	-0.3044 %	1.4300 %	PASS 21.08 %
0.03 VAC @ 40 Hz	0.02996907	0.0140 %	0.029567	0.030433	VAC	-0.1031 %	1.4300 %	PASS 7.14 %
0.03 VAC @ 100 Hz	0.02999208	140.45	0.029968	0.030032	VAC	-264.000 ppm	910.0 ppm	PASS 25.13 %
0.03 VAC @ 400 Hz	0.02999694	140.45	0.029968	0.030032	VAC	-102.000 ppm	910.0 ppm	PASS 9.71 %
0.03 VAC @ 1.0 kHz	0.02999568	140.45	0.029968	0.030032	VAC	-144.000 ppm	910.0 ppm	PASS 13.71 %
0.03 VAC @ 6.5 kHz	0.02999525	140.45	0.029971	0.030029	VAC	-158.333 ppm	810.0 ppm	PASS 16.66 %
0.03 VAC @ 10.0 kHz	0.02999713	140.45	0.029971	0.030029	VAC	-95.667 ppm	810.0 ppm	PASS 10.07 %
0.03 VAC @ 20.0 kHz	0.0299998	140.45	0.029971	0.030029	VAC	-6.667 ppm	810.0 ppm	PASS 0.70 %
0.03 VAC @ 50.0 kHz	0.02994827	0.0345 %	0.029806	0.030194	VAC	-0.1724 %	0.6110 %	PASS 26.71 %
0.03 VAC @ 100.0 kHz	0.02989801	0.0886 %	0.029790	0.030210	VAC	-0.3400 %	0.6110 %	PASS 48.59 %
0.03 VAC @ 300.0 kHz	0.02966459	0.1100 %	0.029031	0.030969	VAC	-1.1180 %	3.1200 %	PASS 34.61 %
0.03 VAC @ 500.0 kHz	0.0296987	0.1700 %	0.026904	0.033096	VAC	-1.0043 %	10.1500 %	PASS 9.73 %
0.03 VAC @ 1.0 MHz	0.03028037	0.3500 %	0.026850	0.033150	VAC	0.9346 %	10.1500 %	PASS 8.90 %
0.3 VAC @ 20 Hz	0.2991941	0.0073 %	0.295688	0.304312	VAC	-0.2686 %	1.4300 %	PASS 18.69 %
0.3 VAC @ 40 Hz	0.299799	0.0073 %	0.295688	0.304312	VAC	-0.0670 %	1.4300 %	PASS 4.66 %
0.3 VAC @ 100 Hz	0.299971	73.18	0.299705	0.300295	VAC	-96.667 ppm	910.0 ppm	PASS 9.83 %
0.3 VAC @ 400 Hz	0.300001	73.18	0.299705	0.300295	VAC	3.333 ppm	910.0 ppm	PASS 0.34 %
0.3 VAC @ 1.0 kHz	0.2999991	73.18	0.299705	0.300295	VAC	-3.000 ppm	910.0 ppm	PASS 0.31 %
0.3 VAC @ 6.5 kHz	0.2999911	73.18	0.299735	0.300265	VAC	-29.667 ppm	810.0 ppm	PASS 3.36 %
0.3 VAC @ 10.0 kHz	0.300011	73.18	0.299735	0.300265	VAC	36.667 ppm	810.0 ppm	PASS 4.15 %
0.3 VAC @ 20.0 kHz	0.3000354	73.18	0.299735	0.300265	VAC	118.000 ppm	810.0 ppm	PASS 13.36 %
0.3 VAC @ 50.0 kHz	0.2998352	0.0129 %	0.298128	0.301872	VAC	-0.0549 %	0.6110 %	PASS 8.80 %
0.3 VAC @ 100.0 kHz	0.2992768	0.0266 %	0.298087	0.301913	VAC	-0.2411 %	0.6110 %	PASS 37.81 %
0.3 VAC @ 300.0 kHz	0.2974809	0.0468 %	0.290500	0.309500	VAC	-0.8397 %	3.1200 %	PASS 26.52 %
0.3 VAC @ 500.0 kHz	0.2988769	0.1200 %	0.269190	0.330810	VAC	-0.3744 %	10.1500 %	PASS 3.65 %
0.3 VAC @ 1.0 MHz	0.3111045	0.2500 %	0.268800	0.331200	VAC	3.7015 %	10.1500 %	PASS 35.59 %
1.0 VAC @ 20 Hz	0.997125	0.0073 %	0.985887	1.014113	VAC	-0.2875 %	1.4040 %	PASS 20.37 %
1.0 VAC @ 40 Hz	0.999106	0.0073 %	0.985887	1.014113	VAC	-0.0894 %	1.4040 %	PASS 6.33 %
1.0 VAC @ 100 Hz	0.999688	73.18	0.999107	1.000893	VAC	-312.000 ppm	820.0 ppm	PASS 34.93 %
1.0 VAC @ 400 Hz	0.999812	73.18	0.999107	1.000893	VAC	-188.000 ppm	820.0 ppm	PASS 21.05 %
1.0 VAC @ 1.0 kHz	0.999836	73.18	0.999107	1.000893	VAC	-164.000 ppm	820.0 ppm	PASS 18.36 %
1.0 VAC @ 6.5 kHz	0.999797	73.18	0.999207	1.000793	VAC	-203.000 ppm	720.0 ppm	PASS 25.59 %
1.0 VAC @ 10.0 kHz	0.999785	73.18	0.999207	1.000793	VAC	-215.000 ppm	720.0 ppm	PASS 27.11 %
1.0 VAC @ 20.0 kHz	0.999674	73.18	0.999207	1.000793	VAC	-326.000 ppm	720.0 ppm	PASS 41.10 %
1.0 VAC @ 50.0 kHz	0.998452	0.0129 %	0.993851	1.006149	VAC	-0.1548 %	0.6020 %	PASS 25.17 %
1.0 VAC @ 100.0 kHz	0.995566	0.0266 %	0.993714	1.006286	VAC	-0.4434 %	0.6020 %	PASS 70.53 %
1.0 VAC @ 300.0 kHz	0.985282	0.0468 %	0.968432	1.031568	VAC	-1.4718 %	3.1100 %	PASS 46.62 %
1.0 VAC @ 500.0 kHz	0.983403	0.1200 %	0.897700	1.102300	VAC	-1.6597 %	10.1100 %	PASS 16.22 %
1.0 VAC @ 1.0 MHz	0.989839	0.2500 %	0.896400	1.103600	VAC	-1.0161 %	10.1100 %	PASS 9.81 %
3.0 VAC @ 20 Hz	2.991628	0.0073 %	2.957660	3.042340	VAC	-0.2791 %	1.4040 %	PASS 19.77 %
3.0 VAC @ 40 Hz	2.997651	0.0073 %	2.957660	3.042340	VAC	-0.0783 %	1.4040 %	PASS 5.55 %
3.0 VAC @ 100 Hz	2.999421	73.18	2.997320	3.002680	VAC	-193.000 ppm	820.0 ppm	PASS 21.61 %
3.0 VAC @ 400 Hz	2.99976	73.18	2.997320	3.002680	VAC	-80.000 ppm	820.0 ppm	PASS 8.96 %
3.0 VAC @ 1.0 kHz	2.999826	73.18	2.997320	3.002680	VAC	-58.000 ppm	820.0 ppm	PASS 6.49 %
3.0 VAC @ 6.5 kHz	2.999703	73.18	2.997620	3.002380	VAC	-99.000 ppm	720.0 ppm	PASS 12.48 %
3.0 VAC @ 10.0 kHz	2.999672	73.18	2.997620	3.002380	VAC	-109.333 ppm	720.0 ppm	PASS 13.78 %
3.0 VAC @ 20.0 kHz	2.9994	73.18	2.997620	3.002380	VAC	-200.000 ppm	720.0 ppm	PASS 25.21 %
3.0 VAC @ 50.0 kHz	2.996015	0.0129 %	2.981553	3.018447	VAC	-0.1328 %	0.6020 %	PASS 21.60 %
3.0 VAC @ 100.0 kHz	2.98756	0.0248 %	2.981195	3.018805	VAC	-0.4147 %	0.6020 %	PASS 66.15 %
3.0 VAC @ 300.0 kHz	2.958228	0.0577 %	2.904968	3.095032	VAC	-1.3924 %	3.1100 %	PASS 43.96 %
3.0 VAC @ 500.0 kHz	2.955641	0.1400 %	2.692500	3.307500	VAC	-1.4786 %	10.1100 %	PASS 14.43 %
3.0 VAC @ 1.0 MHz	3.000736	0.3000 %	2.687700	3.312300	VAC	0.0245 %	10.1100 %	PASS 0.24 %
10.0 VAC @ 20 Hz	9.9717	0.0073 %	9.878868	10.121132	VAC	-0.2830 %	1.2040 %	PASS 23.36 %
10.0 VAC @ 40 Hz	9.99151	0.0073 %	9.878868	10.121132	VAC	-0.0849 %	1.2040 %	PASS 7.01 %
10.0 VAC @ 100 Hz	9.99727	73.18	9.991068	10.008932	VAC	-273.000 ppm	820.0 ppm	PASS 30.56 %
10.0 VAC @ 400 Hz	9.99848	73.18	9.991068	10.008932	VAC	-152.000 ppm	820.0 ppm	PASS 17.02 %
10.0 VAC @ 1.0 kHz	9.99874	73.18	9.991068	10.008932	VAC	-126.000 ppm	820.0 ppm	PASS 14.11 %
10.0 VAC @ 6.5 kHz	9.99836	73.18	9.992068	10.007932	VAC	-164.000 ppm	720.0 ppm	PASS 20.68 %
10.0 VAC @ 10.0 kHz	9.99818	73.18	9.992068	10.007932	VAC	-182.000 ppm	720.0 ppm	PASS 22.95 %

10.0 VAC @ 20.0 kHz	9.99704	73.18	9.992068	10.007932	VAC	-296.000 ppm	720.0 ppm	PASS 37.32 %
10.0 VAC @ 50.0 kHz	9.98703	0.0129 %	9.938509	10.061491	VAC	-0.1297 %	0.6020 %	PASS 21.09 %
10.0 VAC @ 100.0 kHz	9.95944	0.0248 %	9.937318	10.062682	VAC	-0.4056 %	0.6020 %	PASS 64.71 %
10.0 VAC @ 300.0 kHz	9.8705	0.0577 %	9.683227	10.316773	VAC	-1.2950 %	3.1100 %	PASS 40.88 %
10.0 VAC @ 500.0 kHz	9.8784	0.1400 %	8.975000	11.025000	VAC	-1.2160 %	10.1100 %	PASS 11.86 %
10.0 VAC @ 1.0 MHz	10.09537	0.3000 %	8.959000	11.041000	VAC	0.9537 %	10.1100 %	PASS 9.16 %
30 VAC @ 400 Hz	29.99955	79.55	29.973014	30.026986	VAC	-15.000 ppm	820.0 ppm	PASS 1.67 %
30 VAC @ 1.0 kHz	30.00036	79.55	29.973014	30.026986	VAC	12.000 ppm	820.0 ppm	PASS 1.33 %
30 VAC @ 6.5 kHz	29.9991	79.55	29.976014	30.023986	VAC	-30.000 ppm	720.0 ppm	PASS 3.75 %
30 VAC @ 10.0 kHz	29.99877	79.55	29.976014	30.023986	VAC	-41.000 ppm	720.0 ppm	PASS 5.13 %
30 VAC @ 20.0 kHz	29.99595	79.55	29.976014	30.023986	VAC	-135.000 ppm	720.0 ppm	PASS 16.88 %
30 VAC @ 50.0 kHz	29.96942	0.0218 %	29.812855	30.187145	VAC	-0.1019 %	0.6020 %	PASS 16.34 %
30 VAC @ 100.0 kHz	29.88931	0.0545 %	29.803037	30.196964	VAC	-0.3690 %	0.6020 %	PASS 56.20 %
100.0 VAC @ 100 Hz	99.9734	79.55	99.892045	100.107955	VAC	-0.0266 %	1000.0 ppm	PASS 24.64 %
100.0 VAC @ 400 Hz	99.985	79.55	99.892045	100.107955	VAC	-0.0150 %	1000.0 ppm	PASS 13.89 %
100.0 VAC @ 1.0 kHz	99.9869	79.55	99.892045	100.107955	VAC	-0.0131 %	1000.0 ppm	PASS 12.13 %
100.0 VAC @ 6.5 kHz	99.9778	79.55	99.902045	100.097955	VAC	-222.000 ppm	900.0 ppm	PASS 22.66 %
100.0 VAC @ 10.0 kHz	99.9705	79.55	99.902045	100.097955	VAC	-295.000 ppm	900.0 ppm	PASS 30.12 %
300.0 VAC @ 100 Hz	299.9576	0.0079 %	299.340408	300.659592	VAC	-0.0141 %	0.2120 %	PASS 6.42 %
300.0 VAC @ 400 Hz	299.9985	0.0079 %	299.340408	300.659592	VAC	-0.0005 %	0.2120 %	PASS 0.23 %
300.0 VAC @ 1.0 kHz	300.005	0.0079 %	299.340408	300.659592	VAC	0.0017 %	0.2120 %	PASS 0.76 %
300.0 VAC @ 6.5 kHz	300.0062	0.0079 %	299.550408	300.449592	VAC	0.0021 %	0.1420 %	PASS 1.38 %
300.0 VAC @ 10.0 kHz	300.0058	0.0079 %	299.550408	300.449592	VAC	0.0019 %	0.1420 %	PASS 1.29 %

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	Units	Measured	24h spec	Result
300 nADC	3E-07	3.1630002E-07	71.36 ppm	2.98838592e-07	3.01161408e-07	ADC	5.4333 %	3800.00 ppm	INFO 1403.47 %
-300 nADC	-3E-07	-2.8350001E-07	71.36 ppm	-3.01161408e-07	-2.98838592e-07	ADC	-5.5000 %	3800.00 ppm	INFO 1420.69 %
3 µADC	3E-06	3.0151E-06	71.36 ppm	2.98838592e-06	3.01161408e-06	ADC	0.5033 %	3800.00 ppm	INFO 130.01 %
-3 µADC	-3E-06	-2.9826002E-06	71.36 ppm	-3.01161408e-06	-2.98838592e-06	ADC	-0.5800 %	3800.00 ppm	INFO 149.82 %
30 µADC	3E-05	3.0004401E-05	71.36 ppm	2.98838592e-05	3.01161408e-05	ADC	0.0147 %	3800.00 ppm	PASS 3.79 %
-30 µADC	-3E-05	-2.9971501E-05	71.36 ppm	-3.01161408e-05	-2.98838592e-05	ADC	-0.0950 %	3800.00 ppm	PASS 24.54 %
300 µADC	0.0003	0.00030000248	71.36 ppm	0.000298838592	0.000301161408	ADC	0.0008 %	3800.00 ppm	PASS 0.21 %
-300 µADC	-0.0003	-0.00029975622	71.36 ppm	-0.000301161408	-0.000298838592	ADC	-0.0813 %	3800.00 ppm	PASS 20.99 %
3.0 mADC	0.003	0.0030000167	38.63 ppm	0.00299977011	0.00300022989	ADC	5.567 ppm	38.00 ppm	PASS 7.26 %
-3.0 mADC	-0.003	-0.0029996721	38.63 ppm	-0.00300022989	-0.00299977011	ADC	-109.300 ppm	38.00 ppm	FAIL 142.63 %
30 mADC	0.03	0.030000138	38.63 ppm	0.0299977011	0.0300022989	ADC	4.600 ppm	38.00 ppm	PASS 6.00 %
-30 mADC	-0.03	-0.02999978	38.63 ppm	-0.0300022989	-0.0299977011	ADC	-7.333 ppm	38.00 ppm	PASS 9.57 %
300 mADC	0.3	0.30000622	48.63 ppm	0.299949111	0.300050889	ADC	20.733 ppm	121.00 ppm	PASS 12.22 %
-300 mADC	-0.3	-0.30000541	48.63 ppm	-0.300050889	-0.299949111	ADC	18.033 ppm	121.00 ppm	PASS 10.63 %
1.0 ADC	1	1.0000109	71.36 ppm	0.99969064	1.00030936	ADC	10.900 ppm	238.00 ppm	PASS 3.52 %
-1.0 ADC	-1	-1.000005	71.36 ppm	-1.00030936	-0.99969064	ADC	5.000 ppm	238.00 ppm	PASS 1.62 %

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	1µA-1A	DUT	Source unc.	Low Limit	Hi limit	Units	Measured	24h spec	Result, % spec
3.0 mA AC @ 50 Hz	0.003	0.0030025	0.0139 %	0.002991183	0.003008817	AAC	0.0833 %	0.2800 %	PASS 28.35 %
30 mA AC @ 50 Hz	0.03	0.02998905	0.0139 %	0.02991183	0.03008817	AAC	-0.0365 %	0.2800 %	PASS 12.42 %
300 mA AC @ 50 Hz	0.3	0.299969	0.0619 %	0.2995743	0.3004257	AAC	-103.333 ppm	0.0800 %	PASS 7.28 %
1 A AC @ 50 Hz	1	0.999639	0.0619 %	0.998381	1.001619	AAC	-0.0361 %	0.1000 %	PASS 22.30 %
3.0 mA AC @ 60 Hz	0.003	0.00300277	0.0139 %	0.002991183	0.003008817	AAC	0.0923 %	0.2800 %	PASS 31.42 %
30 mA AC @ 60 Hz	0.03	0.02999326	0.0139 %	0.02991183	0.03008817	AAC	-0.0225 %	0.2800 %	PASS 7.64 %
300 mA AC @ 60 Hz	0.3	0.300021	0.0619 %	0.2995743	0.3004257	AAC	70.000 ppm	0.0800 %	PASS 4.93 %
1 A AC @ 60 Hz	1	0.999805	0.0619 %	0.998381	1.001619	AAC	-0.0195 %	0.1000 %	PASS 12.04 %
3.0 mA AC @ 1000.0 Hz	0.003	0.00300378	0.0139 %	0.002992083	0.003007917	AAC	0.1260 %	0.2500 %	PASS 47.75 %
30 mA AC @ 1000.0 Hz	0.03	0.03000079	0.0139 %	0.02992083	0.03007917	AAC	0.0026 %	0.2500 %	PASS 1.00 %
300 mA AC @ 1000.0 Hz	0.3	0.300127	0.0619 %	0.2996643	0.3003357	AAC	423.333 ppm	0.0500 %	PASS 37.83 %
1 A AC @ 1000.0 Hz	1	1.000138	0.0619 %	0.998181	1.001819	AAC	0.0138 %	0.1200 %	PASS 7.59 %

Test completed

Test date	23 January 2018 18:05
UUT Internal TEMP?	NONE

Lab temperature maintained +24°C ±2°C

Internal use only

Not validated

2018 © cal.equipment