

Manufacturer	HEWLETT-PACKARD	Calibration date	March 06 2018
Model Number	3458A	Ambient Temperature	21.66 °C
Serial	0	Relative Humidity	65.27 %
ID Number	HP3458A	Pressure	1017.44
Notes	Pre-cal check GPIB3	Test type	PERFVAL

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
TEST MFC	Fluke	5700A	None	x26	ID02	10/03/2013	10/03/2014
DMM	HP	3458A	001,X02	MY45040325	XD2	01/05/2017	01/05/2018
DMM	Keithley	2002	MEM2	0603805	XD4	02/25/2018	02/25/2019
DMM	Keithley	2002	1801	XXX	XD6	01/05/2017	01/05/2018
STDR	xDevs.com	1GOhm	1.0 GΩ	XXX	MR00	08/23/2016	08/23/2017
DC STD	xDevs.com	792X[2]	10.000009 VDC	± 2.2ppm	XD01	02/16/2018	08/16/2018

MFC last calibrated	2254.0 days ago	MFC since DCV ZERO	6.0 days ago
MFC since WBFLAT	0.0 days ago	MFC since WBGAIN	0.0 days ago
MFC Confidence level	24h 95%	MFC Calibrate date	2013-10-03 00:00:00
MFC Calibrate date Zero	2019-03-01 00:00:00	Calibrate date WB Flatness	1988-10-01 00:00:00
Calibrate date WB Gain	1988-10-01 00:00:00	CAL CONST 6.5V reference voltage	6.53722425884
CAL CONST 13V reference voltage	13.0725878729	CAL CONST 22V range positive zero	398.18762
CAL CONST 22V range negative zero	398.18688	CAL CONST DAC Linearity	0.295316643473
CAL CONST 10KOHM true output resistance	9999.58094647	CAL CONST 10KOHM standard resistance	9999.79242649
CAL CONST, Zero calibration temperature	23.0	CAL CONST, All calibration temp	23.0

This note is test MFC dummy text block for further use.
Calibrator was warmed up >8 hours.

Meter Info	HP3458A	Last calibration date	1/8/2017
Next calibration date	1/8/2018	Test date	06 March 2018 10:08
DUT Internal TEMP?	35.2	DUT Calibrations number?	161
Self-test result?	Not tested	ACAL ALL result?	0,"NO ERROR"
Firmware	9,2	Options	1,0
CAL? 72	0.997707264	CAL? 1,1	39998.898
CAL? 2,1	7.18070682	CAL? Res 73	0.99750933
CAL 0 TEMP	31.56	CAL 10V TEMP	35.38
CAL 10KOhm TEMP	32.12	CAL? DCI	0.997873902

Service information

CAL DUMP
<pre> [(1, 39998.898), (1, 7.18070682), (1, 2.44677009e-06), (1, -8.42298113e-08), (1, 2.44963335e-06), (1, -1.33433376e-07), (1, 2.13002175e-06), (1, -3.3993293e-07), (1, -0.000155314065), (1, -0.000155314065), (1, -0.000178840293), (1, -0.000178840293), (1, 0.353255644), (1, 0.355589031), (1, 0.355425262), (1, 0.378265667), (1, 0.396379572), (1, 0.832763889), (1, 5.09567293), (1, 5.49040816), (1, 5.49040816), (1, 0.366662431), (1, 0.366685007), (1, 0.36655522), (1, 0.366663281), (1, 0.358726563), (1, -0.0143579981), (1, -0.0358850206), (1, -1.2200907), (1, -1.2200907), (1, 0.000614294277), (1, 0.00349392207), (1, 0.00342711921), (1, 0.0311528454), (1, 0.0602304556), (1, 0.563551425), (1, 5.92102841), (1, 5.92102841), (1, 5.92102841), (1, 0.000191102632), (1, 0.00137304477), (1, 0.00139329521), (1, 0.0136194036), (1, 0.0116656127), (1, 0.193832974), (1, 2.65549153), (1, 0.861240495), (1, 0.861240495), (1, 353.0), (1, 35.0), (1, 3.0), (1, 0.0), (1, 0.0), (1, 0.0), (1, 0.0), (1, 0.0), (1, 0.0), (1, 0.0), (1, 0.0), (1, 0.0), (1, 0.0), (1, 0.0), (1, 0.0), (1, 35.3799317), (1, 32.1163012), (1, 137.0), (1, -1.0079152e-11), (1, -1.40350482e-11), (1, -1.0046519e-10), (1, -6.6252896e-10), (1, -4.49170586e-09), (1, -4.68139963e-08), (1, -4.64665136e-07), (1, -4.35612254e-06), (1, 0.997045467), (1, 0.997529665), (1, 0.997707264), (1, 0.99750933), (1, 0.997686924), (1, 0.999965031), (1, 0.999506518), (1, 0.999991912), (1, 0.998343412), (1, 0.998903976), (1, 0.998926305), (1, 0.998648722), (1, 0.998648722), (1, 0.998648722), (1, 0.998648722), (1, 0.999965032), (1, 0.99950653), (1, 0.999991924), (1, 0.998343439), (1, 0.998904217), (1, 0.998926305), (1, 0.998648722), (1, 0.998648722), (1, 0.998648722), (1, 0.997873902), (1, 0.997122691), (1, 0.996974292), (1, 0.997328192), (1, 0.997010491), (1, 0.994500302), (1, 1.00559493), (1, 1.01484047), (1, 81.0), (1, 96.0), (1, 4.93830072), (1, 1.19609745e-11), (1, -9.18391477e-12), (1, 10002054.3), (1, -0.00909134406), (1, -0.0670691625), (1, 0.999998831), (1, 0.999999695), (1, 1666.99618), (1, 16666.9786), (1, 5063.0), (1, 5061.0), (1, 5060.0), (1, 5061.0), (1, 5060.0), (1, 60756.0), (1, 60732.0), (1, 60720.0), (1, 60732.0), (1, 60720.0), (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, 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, 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, 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, 35.1817044), (1, 35.2206773), (1, 35.2310579), (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, 137.0), (1, 138.0), (1, 129.0), (1, 129.0), (1, 129.0), (1, 129.0), (1, 129.0), (1, 1878.0), (1, 1874.0), (1, 1924.0), (1, 2694.0), (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, -0.0013453508), (1, -0.0119485271), (1, -0.120955186), (1, -1.18578814), (1, -11.8884918), (1, -117.107024), (1, -0.0010654605), (1, -0.0121172496), (1, -0.118791444), (1, -1.18719222), (1, -11.5295541), (1, -117.175241), (1, 1.0241283), (1, 1.02931185), (1, 1.0289502), (1, 1.01287075), (1, 0.999356187), (1, 0.998262798), (1, 100012.175), (1, 10.352241), (1, 1.00961022), (1, 1.01480409), (1, 1.01444753), (1, 0.998594724), (1, 0.985270641), (1, 0.984192663), (1, 3.54833421e-06), (1, 3.65470698e-05), (1, 0.000365470698), (1, 0.00365470698), (1, 0.0365470698), (1, 0.365470698), (1, 1.02508001), (1, 1.00022273), (1, 1.00013684), (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)]</pre>
Destructive overloads?
22, DESTRUCTIVE OVERLOADS valid 2941
Reference
F5700 pre-cal MAR test
DUT Condition
Front terminals used 4W, pre-cal DMM

Test procedure : \$Id: hp3458a.py | Rev 593 | 2018/03/06 10:07:27 tin_fpga \$

Source procedure : \$Id: f5700a.py | Rev 580 | 2018/03/04 11:10:30 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	Units	Deviation	DUT Spec	Test Status
Short 0 mVDC	0.000000E+00	0.0000003	0.5 ppm	0.000000	0.000001	VDC	N/A	0.16 µV	FAIL
Short 0.0 VDC	0.000000E+00	0.0000003	0.5 ppm	-0.000000	0.000001	VDC	N/A	0.15 µV	FAIL
Short 00.0 VDC	0.000000E+00	0.0000008	0.5 ppm	0.000000	0.000001	VDC	N/A	0.32 µV	FAIL
Short 000.0 VDC	0.000000E+00	0.0000053	0.5 ppm	-0.000025	0.000035	VDC	N/A	14.00 µV	PASS
Short 0000.0 VDC	0.000000E+00	0.0000124	0.5 ppm	-0.000088	0.000112	VDC	N/A	41.00 µV	PASS
DCV Test	0.1V-1000V	DUT	Source unc.	Low Limit	Hi limit	Units	Measured	24h spec	Result
0.1 VDC (0.10 Range)	0.1000000	0.099999585	7.27 ppm	0.099998723	0.100001277	VDC	-4.145 ppm	5.50 ppm	PASS 32.46 %
-0.1 VDC (0.10 Range)	-0.1000000	-0.09999944	7.27 ppm	-0.100001277	-0.099998723	VDC	-5.599 ppm	5.50 ppm	PASS 43.84 %
0.1 VDC (1.00 Range)	0.1000000	0.10000041	7.27 ppm	0.099999093	0.100000907	VDC	4.145 ppm	1.80 ppm	PASS 45.70 %
0.2 VDC (1.00 Range)	0.2000000	0.20000051	3.86 ppm	0.199998868	0.200001132	VDC	2.539 ppm	1.80 ppm	PASS 44.86 %
1.0 VDC (1.00 Range)	1.0000000	1.0000004	3.86 ppm	0.99999434	1.00000566	VDC	0.443 ppm	1.80 ppm	PASS 7.83 %
-0.1 VDC (1.00 Range)	-0.1000000	-0.099999888	7.27 ppm	-0.100000907	-0.099999093	VDC	-1.125 ppm	1.80 ppm	PASS 12.40 %
-0.2 VDC (1.00 Range)	-0.2000000	-0.19999993	3.86 ppm	-0.200001132	-0.199998868	VDC	-0.345 ppm	1.80 ppm	PASS 6.10 %
-1.0 VDC (1.00 Range)	-1.0000000	-1	3.86 ppm	-1.00000566	-0.99999434	VDC	0.033 ppm	1.80 ppm	PASS 0.58 %
1.0 VDC (10.00 Range)	1.0000000	1.0000014	3.86 ppm	0.99999559	1.00000441	VDC	1.364 ppm	0.55 ppm	PASS 30.93 %
2.0 VDC (10.00 Range)	2.0000000	2.0000011	2.77 ppm	1.99999336	2.00000664	VDC	0.550 ppm	0.55 ppm	PASS 16.57 %
10.0 VDC (10.00 Range)	10.0000000	9.9999906	2.73 ppm	9.9999672	10.0000328	VDC	-0.941 ppm	0.55 ppm	PASS 28.69 %
-1.0 VDC (10.00 Range)	-1.0000000	-1.0000005	3.86 ppm	-1.00000441	-0.99999559	VDC	0.526 ppm	0.55 ppm	PASS 11.93 %
-2.0 VDC (10.00 Range)	-2.0000000	-2.0000003	2.77 ppm	-2.00000664	-1.99999336	VDC	0.139 ppm	0.55 ppm	PASS 4.20 %
-10.0 VDC (10.00 Range)	-10.0000000	-9.9999892	2.73 ppm	-10.0000328	-9.9999672	VDC	-1.076 ppm	0.55 ppm	PASS 32.82 %
10 VDC (100.00 Range)	10.0000000	10.000017	2.77 ppm	9.9999443	10.0000557	VDC	1.748 ppm	2.80 ppm	PASS 31.38 %
20 VDC (100.00 Range)	20.0000000	19.999998	3.73 ppm	19.9998694	20.0001306	VDC	-0.096 ppm	2.80 ppm	PASS 1.46 %
100 VDC (100.00 Range)	100.0000000	99.999962	3.73 ppm	99.999347	100.000653	VDC	-0.385 ppm	2.80 ppm	PASS 5.89 %
-10 VDC (100.00 Range)	-10.0000000	-9.9999699	2.77 ppm	-10.0000557	-9.9999443	VDC	-3.012 ppm	2.80 ppm	PASS 54.08 %
-20 VDC (100.00 Range)	-20.0000000	-19.999965	3.73 ppm	-20.0001306	-19.9998694	VDC	-1.747 ppm	2.80 ppm	PASS 26.75 %
-100 VDC (100.00 Range)	-100.0000000	-99.999891	3.73 ppm	-100.000653	-99.999347	VDC	-1.093 ppm	2.80 ppm	PASS 16.74 %
100 VDC (1000.00 Range)	100.0000000	100.00006	3.73 ppm	99.999367	100.000633	VDC	0.585 ppm	2.60 ppm	PASS 9.24 %
200 VDC (1000.00 Range)	200.0000000	199.99992	3.73 ppm	199.998734	200.001266	VDC	-0.376 ppm	2.60 ppm	PASS 5.94 %
1000 VDC (1000.00 Range)	1000.0000000	1000.0004	5.45 ppm	999.97995	1000.02005	VDC	0.403 ppm	2.60 ppm	PASS 2.01 %
-100 VDC (1000.00 Range)	-100.0000000	-99.999977	3.73 ppm	-100.000633	-99.999367	VDC	-0.235 ppm	2.60 ppm	PASS 3.71 %
-200 VDC (1000.00 Range)	-200.0000000	-199.99985	3.73 ppm	-200.001266	-199.998734	VDC	-0.750 ppm	2.60 ppm	PASS 11.85 %
-1000 VDC (1000.00 Range)	-1000.0000000	-1000.0005	5.45 ppm	-999.99605	-1000.00395	VDC	0.509 ppm	2.60 ppm	PASS 12.89 %

Additional test for **combined DUT+MFC** DC Voltage Integral Linearity (INL) using fixed 10V 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	Measured	24h spec	Result
10.999999	10.9999990	10.9999883	2.73 ppm	10.999962920	11.000035080	-0.97 ppm	0.55 ppm	PASS 29.68 %
10.10101	10.1010100	10.1010007	2.73 ppm	10.100976869	10.101043131	-0.92 ppm	0.55 ppm	PASS 28.07 %
10.0	10.0000000	9.9999906	2.73 ppm	9.999967200	10.000032800	-0.94 ppm	0.55 ppm	PASS 28.67 %
9.999999	9.9999990	9.9999896	2.73 ppm	9.999966200	10.000031800	-0.94 ppm	0.55 ppm	PASS 28.57 %
9.0	9.0000000	8.9999925	2.73 ppm	8.999970480	9.000029520	-0.83 ppm	0.55 ppm	PASS 25.30 %
8.888888	8.8888880	8.8888805	2.73 ppm	8.888858844	8.888917156	-0.84 ppm	0.55 ppm	PASS 25.56 %
8.0	8.0000000	7.9999931	2.73 ppm	7.999973760	8.000026240	-0.86 ppm	0.55 ppm	PASS 26.23 %
7.777777	7.7777770	7.7777703	2.73 ppm	7.777751489	7.777802511	-0.86 ppm	0.55 ppm	PASS 26.26 %
7.0	7.0000000	6.9999945	2.73 ppm	6.999977040	7.000022960	-0.79 ppm	0.55 ppm	PASS 24.00 %
6.666666	6.6666660	6.6666607	2.73 ppm	6.666644133	6.666687867	-0.79 ppm	0.55 ppm	PASS 24.21 %
6.0	6.0000000	5.9999958	2.73 ppm	5.999980320	6.000019680	-0.70 ppm	0.55 ppm	PASS 21.23 %
5.555555	5.5555550	5.5555511	2.73 ppm	5.555536778	5.555573222	-0.71 ppm	0.55 ppm	PASS 21.65 %
5.0	5.0000000	4.9999965	2.73 ppm	4.999983600	5.000016400	-0.69 ppm	0.55 ppm	PASS 21.12 %
4.444444	4.4444440	4.4444411	2.73 ppm	4.444429422	4.444458578	-0.66 ppm	0.55 ppm	PASS 20.03 %
4.0	4.0000000	3.9999970	2.73 ppm	3.999986880	4.000013120	-0.75 ppm	0.55 ppm	PASS 22.99 %
3.333333	3.3333330	3.3333312	2.73 ppm	3.333322067	3.333343933	-0.55 ppm	0.55 ppm	PASS 16.63 %
3.0	3.0000000	2.9999980	2.73 ppm	2.999990160	3.000009840	-0.66 ppm	0.55 ppm	PASS 20.07 %
2.222222	2.2222220	2.2222210	2.73 ppm	2.222214711	2.222229289	-0.46 ppm	0.55 ppm	PASS 14.14 %
2.0	2.0000000	1.9999991	2.73 ppm	1.999993440	2.000006560	-0.44 ppm	0.55 ppm	PASS 13.42 %
1.111111	1.1111110	1.1111108	2.73 ppm	1.111107356	1.111114644	-0.16 ppm	0.55 ppm	PASS 4.90 %
1.0	1.0000000	0.9999998	3.86 ppm	0.999995590	1.000004410	-0.16 ppm	0.55 ppm	PASS 3.62 %
0.1234567	0.12345670	0.12345766	7.27 ppm	0.123455735	0.123457665	7.74 ppm	0.55 ppm	PASS 98.97 %
-0.1234567	-0.1234567	-0.1234565	7.27 ppm	-0.123457665	-0.123455735	-1.45 ppm	0.55 ppm	PASS 18.57 %
-1.0	-1.0000000	-0.9999986	3.86 ppm	-1.000004410	-0.999995590	-1.44 ppm	0.55 ppm	PASS 32.57 %
-1.111111	-1.1111110	-1.1111095	2.73 ppm	-1.111114644	-1.111107356	-1.40 ppm	0.55 ppm	PASS 42.53 %
-2.0	-2.0000000	-1.9999976	2.73 ppm	-2.000006560	-1.999993440	-1.21 ppm	0.55 ppm	PASS 36.95 %
-2.222222	-2.2222220	-2.2222192	2.73 ppm	-2.222229289	-2.222214711	-1.27 ppm	0.55 ppm	PASS 38.83 %
-3.0	-3.0000000	-2.9999966	2.73 ppm	-3.000009840	-2.999990160	-1.13 ppm	0.55 ppm	PASS 34.50 %
-3.333333	-3.3333330	-3.3333294	2.73 ppm	-3.333343933	-3.333322067	-1.09 ppm	0.55 ppm	PASS 33.30 %
-4.0	-4.0000000	-3.9999951	2.73 ppm	-4.000013120	-3.999986880	-1.21 ppm	0.55 ppm	PASS 36.97 %
-4.444444	-4.4444440	-4.4444387	2.73 ppm	-4.444458578	-4.444429422	-1.20 ppm	0.55 ppm	PASS 36.68 %
-5.0	-5.0000000	-4.9999939	2.73 ppm	-5.000016400	-4.999983600	-1.22 ppm	0.55 ppm	PASS 37.08 %
-5.555555	-5.5555550	-5.5555486	2.73 ppm	-5.555573222	-5.555536778	-1.15 ppm	0.55 ppm	PASS 35.16 %
-6.0	-6.0000000	-5.9999933	2.73 ppm	-6.000019680	-5.999980320	-1.11 ppm	0.55 ppm	PASS 33.99 %
-6.666666	-6.6666660	-6.6666586	2.73 ppm	-6.666687867	-6.666644133	-1.11 ppm	0.55 ppm	PASS 33.77 %
-7.0	-7.0000000	-6.9999926	2.73 ppm	-7.000022960	-6.999977040	-1.05 ppm	0.55 ppm	PASS 32.12 %
-7.777777	-7.7777770	-7.7777683	2.73 ppm	-7.777802511	-7.777751489	-1.12 ppm	0.55 ppm	PASS 34.17 %
-8.0	-8.0000000	-7.9999913	2.73 ppm	-8.000026240	-7.999973760	-1.09 ppm	0.55 ppm	PASS 33.29 %
-8.888888	-8.8888880	-8.8888786	2.73 ppm	-8.888917156	-8.888858844	-1.06 ppm	0.55 ppm	PASS 32.21 %
-9.0	-9.0000000	-8.9999906	2.73 ppm	-9.000029520	-8.999970480	-1.04 ppm	0.55 ppm	PASS 31.71 %
-9.999999	-9.9999990	-9.9999882	2.73 ppm	-10.000031800	-9.999966200	-1.08 ppm	0.55 ppm	PASS 33.04 %
-10.0	-10.0000000	-9.9999888	2.73 ppm	-10.000032800	-9.999967200	-1.12 ppm	0.55 ppm	PASS 34.08 %
-10.10101	-10.1010100	-10.1009993	2.73 ppm	-10.101043131	-10.100976869	-1.06 ppm	0.55 ppm	PASS 32.43 %
-10.999999	-10.9999990	-10.9999877	2.73 ppm	-11.000035080	-10.999962920	-1.03 ppm	0.55 ppm	PASS 31.35 %

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	1 Ohm to 1 GOhm	DUT	Source unc.	Low Limit	Hi limit	Measured	24h spec	Result
1 Ω	1.00001600E+00	9.99995888E-01	85.00 ppm	9.9992300E-01	1.0001090E+00	-20.112 ppm	8.00 ppm	PASS 21.63 %
1.9 Ω	1.89980340E+00	1.89973377E+00	85.00 ppm	1.8996267E+00	1.8999801E+00	-36.651 ppm	8.00 ppm	PASS 39.41 %
10 Ω	9.99970600E+00	9.99973376E+00	23.00 ppm	9.9993960E+00	1.0000016E+01	2.776 ppm	8.00 ppm	PASS 8.96 %
19 Ω	1.89982410E+01	1.89984194E+01	23.00 ppm	1.8997690E+01	1.8998792E+01	9.388 ppm	6.00 ppm	PASS 32.37 %
100 Ω	9.99981100E+01	9.99985109E+01	10.00 ppm	9.9996510E+01	9.9999710E+01	4.009 ppm	6.00 ppm	PASS 25.06 %
190 Ω	1.89988300E+02	1.89989018E+02	10.00 ppm	1.8998598E+02	1.8999062E+02	3.779 ppm	2.20 ppm	PASS 30.98 %
1.0 kΩ	9.99939700E+02	9.99942031E+02	8.00 ppm	9.9992950E+02	9.9994990E+02	2.331 ppm	2.20 ppm	PASS 22.85 %
1.9 kΩ	1.89989040E+03	1.89989647E+03	8.00 ppm	1.8998710E+03	1.8999098E+03	3.197 ppm	2.20 ppm	PASS 31.34 %
10 kΩ	9.99958100E+03	9.99960634E+03	8.00 ppm	9.9994790E+03	9.9996830E+03	2.534 ppm	2.20 ppm	PASS 24.85 %
19 kΩ	1.89991350E+04	1.89991925E+04	9.00 ppm	1.8998922E+04	1.8999348E+04	3.027 ppm	2.20 ppm	PASS 27.03 %
100 kΩ	9.99927700E+04	9.99925767E+04	9.00 ppm	9.9991650E+04	9.9993890E+04	-1.933 ppm	2.20 ppm	PASS 17.26 %
190 kΩ	1.89998150E+05	1.89999106E+05	9.00 ppm	1.8999435E+05	1.9000195E+05	5.029 ppm	11.00 ppm	PASS 25.14 %
1.0 MΩ	9.99878800E+05	9.99879314E+05	16.00 ppm	9.9985180E+05	9.9990580E+05	0.514 ppm	11.00 ppm	PASS 1.90 %
1.9 MΩ	1.89990310E+06	1.89991408E+06	17.00 ppm	1.8997663E+06	1.9000399E+06	5.782 ppm	55.00 ppm	PASS 8.03 %
10 MΩ	9.99810400E+06	9.99794671E+06	33.00 ppm	9.9972242E+06	9.9989838E+06	-15.732 ppm	55.00 ppm	PASS 17.88 %
19 MΩ	1.89983600E+07	1.89987431E+07	43.00 ppm	1.8987854E+07	1.9008866E+07	20.167 ppm	510.00 ppm	PASS 3.65 %
100 MΩ	1.00002310E+08	1.00006431E+08	100.00 ppm	9.9941309E+07	1.0006331E+08	41.208 ppm	510.00 ppm	PASS 6.76 %

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	0.99979945	129.09	0.99955091	1.00044909	VAC	-200.553 ppm	320.0 ppm	PASS 44.66 %
1.0 VAC @ 1.0 MHz	1.0	1.0091044	0.2500 %	0.9874	1.0126	VAC	0.9104 %	1.0100 %	PASS 72.26 %
10 VAC @ 200 Hz	10	10.000981	73.18	9.9983682	10.0016318	VAC	98.085 ppm	90.0 ppm	PASS 60.11 %
10 VAC @ 500 Hz	10	10.000974	73.18	9.9983682	10.0016318	VAC	97.383 ppm	90.0 ppm	PASS 59.68 %
10 VAC @ 50.0 kHz	10	9.9981675	129.09	9.9955091	10.0044909	VAC	-183.247 ppm	320.0 ppm	PASS 40.80 %
10 VAC @ 1.0 MHz	10	10.064395	0.3000 %	9.869	10.131	VAC	0.6440 %	1.0100 %	PASS 49.16 %

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 VAC @ 10 Hz	0.010000414	312.27	0.009991	0.010009	41.449 ppm	600.0 ppm	PASS 4.54 %
0.01 VAC @ 20 Hz	0.010000153	312.27	0.009991	0.010009	15.270 ppm	600.0 ppm	PASS 1.67 %
0.01 VAC @ 40 Hz	0.010000274	312.27	0.009991	0.010009	27.449 ppm	600.0 ppm	PASS 3.01 %
0.01 V AC+DC @ 100 Hz	0.009999841	312.27	0.009994	0.010006	-15.901 ppm	310.0 ppm	PASS 2.56 %
0.01 V AC+DC @ 1.0 kHz	0.0099999041	312.27	0.009994	0.010006	-9.593 ppm	310.0 ppm	PASS 1.54 %
0.01 V AC+DC @ 10.0 kHz	0.0100009	312.27	0.009993	0.010007	89.950 ppm	410.0 ppm	PASS 12.45 %
0.01 V AC+DC @ 20.0 kHz	0.010000342	312.27	0.009993	0.010007	34.210 ppm	410.0 ppm	PASS 4.74 %
0.01 V AC+DC @ 50.0 kHz	0.0099995173	0.0312 %	0.009986	0.010014	-0.0048 %	0.1110 %	PASS 3.39 %
0.01 V AC+DC @ 100.0 kHz	0.0099877411	0.0312 %	0.009946	0.010054	-0.1226 %	0.5110 %	PASS 22.61 %
0.01 V AC+DC @ 300.0 kHz	0.0098485678	0.0447 %	0.009594	0.010406	-1.5143 %	4.0200 %	PASS 37.26 %
0.01 V AC+DC @ 500.0 kHz	0.0096315494	0.0773 %	0.006787	0.013213	-3.6845 %	32.0500 %	PASS 11.47 %
0.01 V AC+DC @ 1.0 MHz	0.0086471435	0.1500 %	0.006780	0.013220	-13.5286 %	32.0500 %	PASS 42.01 %
0.1 VAC @ 10 Hz	0.10000506	1500	0.99839	0.100161	50.588 ppm	110.0 ppm	PASS 3.14 %
0.1 VAC @ 20 Hz	0.099998632	2500	0.99739	0.100261	-13.684 ppm	110.0 ppm	PASS 0.52 %
0.1 VAC @ 40 Hz	0.0999978	4000	0.99589	0.100411	-21.996 ppm	110.0 ppm	PASS 0.54 %
0.1 V AC+DC @ 100 Hz	0.099997424	121.36	0.99979	0.100021	-25.764 ppm	90.0 ppm	PASS 12.19 %
0.1 V AC+DC @ 1.0 kHz	0.099998652	121.36	0.99979	0.100021	-13.477 ppm	90.0 ppm	PASS 6.38 %
0.1 V AC+DC @ 10.0 kHz	0.099997177	121.36	0.99972	0.100028	-28.231 ppm	160.0 ppm	PASS 10.03 %
0.1 V AC+DC @ 20.0 kHz	0.099992435	121.36	0.99972	0.100028	-75.650 ppm	160.0 ppm	PASS 26.89 %
0.1 V AC+DC @ 50.0 kHz	0.099988134	121.36	0.99956	0.100044	-118.662 ppm	320.0 ppm	PASS 26.89 %
0.1 V AC+DC @ 100.0 kHz	0.099953409	121.36	0.99906	0.100094	-465.915 ppm	820.0 ppm	PASS 49.49 %
0.1 V AC+DC @ 300.0 kHz	0.09891316	0.0121 %	0.099678	0.100322	-0.1087 %	0.3100 %	PASS 33.74 %
0.1 V AC+DC @ 500.0 kHz	0.099720228	0.0121 %	0.098978	0.101022	-0.2798 %	1.0100 %	PASS 27.37 %
0.1 V AC+DC @ 1.0 MHz	0.099600489	0.0121 %	0.098978	0.101022	-0.3995 %	1.0100 %	PASS 39.09 %
1.0 VAC @ 10 Hz	1.0000838	256.36	0.999634	1.000366	83.787 ppm	110.0 ppm	PASS 22.87 %
1.0 VAC @ 20 Hz	1.0000366	590.91	0.999299	1.000701	36.611 ppm	110.0 ppm	PASS 5.22 %
1.0 VAC @ 40 Hz	1.0000229	963.64	0.998926	1.001074	22.920 ppm	110.0 ppm	PASS 2.13 %
1.0 V AC+DC @ 100 Hz	1.0000211	963.64	0.998946	1.001054	21.102 ppm	90.0 ppm	PASS 2.00 %
1.0 V AC+DC @ 1.0 kHz	1.0000458	1500	0.998410	1.001590	45.808 ppm	90.0 ppm	PASS 2.88 %
1.0 V AC+DC @ 10.0 kHz	1.0000159	3000	0.996840	1.003160	15.900 ppm	160.0 ppm	PASS 0.50 %
1.0 V AC+DC @ 20.0 kHz	0.99995775	49.55	0.999790	1.000210	-42.253 ppm	160.0 ppm	PASS 20.16 %
1.0 V AC+DC @ 50.0 kHz	0.99996808	49.55	0.999630	1.000370	-31.925 ppm	320.0 ppm	PASS 8.64 %
1.0 V AC+DC @ 100.0 kHz	0.99993054	49.55	0.999130	1.000870	-69.462 ppm	820.0 ppm	PASS 7.99 %
1.0 V AC+DC @ 300.0 kHz	1.0015241	0.0050 %	0.996850	1.003150	0.1524 %	0.3100 %	PASS 48.39 %
1.0 V AC+DC @ 500.0 kHz	1.002416	0.0050 %	0.989850	1.010150	0.2416 %	1.0100 %	PASS 23.80 %
1.0 V AC+DC @ 1.0 MHz	1.005769	0.0050 %	0.989850	1.010150	0.5769 %	1.0100 %	PASS 56.84 %
10.0 VAC @ 10 Hz	10.001107	49.55	9.997105	10.002895	110.732 ppm	240.0 ppm	PASS 38.24 %
10.0 VAC @ 20 Hz	10.000622	49.55	9.997105	10.002895	62.165 ppm	240.0 ppm	PASS 21.47 %
10.0 VAC @ 40 Hz	10.000481	49.55	9.997105	10.002895	48.087 ppm	240.0 ppm	PASS 16.61 %
10.0 V AC+DC @ 100 Hz	10.000423	85.45	9.996945	10.003054	42.347 ppm	220.0 ppm	PASS 13.86 %
10.0 V AC+DC @ 1.0 kHz	10.000594	138.18	9.996418	10.003582	59.372 ppm	220.0 ppm	PASS 16.58 %
10.0 V AC+DC @ 10.0 kHz	10.000255	425.45	9.993545	10.006455	25.461 ppm	220.0 ppm	PASS 3.94 %
10.0 V AC+DC @ 20.0 kHz	10.000163	425.45	9.993545	10.006455	16.303 ppm	220.0 ppm	PASS 2.53 %
10.0 V AC+DC @ 50.0 kHz	9.9999287	1100	9.985300	10.014700	-7.129 ppm	370.0 ppm	PASS 0.48 %
10.0 V AC+DC @ 100.0 kHz	9.9962337	0.1800 %	9.969800	10.030200	-0.0377 %	0.1220 %	PASS 12.47 %
10.0 V AC+DC @ 300.0 kHz	9.9882531	0.0048 %	9.958518	10.041482	-0.1175 %	0.4100 %	PASS 28.32 %
10.0 V AC+DC @ 500.0 kHz	9.9827156	0.0048 %	9.848518	10.151482	-0.1728 %	1.5100 %	PASS 11.41 %
10.0 V AC+DC @ 1.0 MHz	10.036206	0.0048 %	9.848518	10.151482	0.3621 %	1.5100 %	PASS 23.90 %
100.0 V AC+DC @ 1.0 kHz	100.00065	48.18	99.953182	100.046818	6.481 ppm	420.0 ppm	PASS 1.38 %
100.0 V AC+DC @ 10.0 kHz	99.998756	48.18	99.933182	100.066818	-12.443 ppm	620.0 ppm	PASS 1.86 %
100.0 V AC+DC @ 20.0 kHz	99.996005	48.18	99.933182	100.066818	-39.947 ppm	620.0 ppm	PASS 5.98 %
100.0 V AC+DC @ 50.0 kHz	100.0005	0.0048 %	99.873182	100.126818	0.0005 %	0.1220 %	PASS 0.39 %
100.0 V AC+DC @ 100.0 kHz	99.997049	0.0048 %	99.693182	100.306818	-0.0030 %	0.3020 %	PASS 0.96 %
700.0 V AC+DC @ 1.0 kHz	699.91789	48.18	699.672274	700.327726	-117.299 ppm	420.0 ppm	PASS 24.61 %

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 μ ADC	0	-1.960405E-10	71.82 ppm	0	0	Z-check	410 ppm	INFO
50 nADC	5E-08	4.9791694E-08	71.82 ppm	4.997591E-08	5.002409E-08	-4166.127 ppm	410 ppm	INFO
100 nADC	1E-07	9.9894747E-08	71.82 ppm	9.995182E-08	1.000482E-07	-1052.534 ppm	410 ppm	FAIL 218.45 %
-50 nADC	-5E-08	-5.0177761E-08	71.82 ppm	-5.002409E-08	-4.997591E-08	3555.228 ppm	410 ppm	INFO
-100 nADC	-1E-07	-1.0010308E-07	71.82 ppm	-1.000482E-07	-9.995182E-08	1030.783 ppm	410 ppm	FAIL 213.94 %
Zero μ ADC	0	-1.3469611E-10	71.82 ppm	0	0	Z-check	410 ppm	INFO
1 μ ADC	1E-06	9.9987324E-07	71.82 ppm	9.998782E-07	1.000122E-06	-126.764 ppm	50 ppm	FAIL 104.06 %
1.1 μ ADC	1.1E-06	1.0997343E-06	71.82 ppm	1.099866E-06	1.100134E-06	-241.511 ppm	50 ppm	FAIL 198.25 %
-1 μ ADC	-1E-06	-1.0000996E-06	71.82 ppm	-1.000122E-06	-9.998782E-07	99.588 ppm	50 ppm	PASS 81.75 %
-1.1 μ ADC	-1.1E-06	-1.1000933E-06	71.82 ppm	-1.100134E-06	-1.099866E-06	84.816 ppm	50 ppm	PASS 69.62 %
Zero 00 μ ADC	0	-6.3255386E-11	71.82 ppm	0	0	Z-check	410 ppm	INFO
10 μ ADC	1E-05	9.9996778E-06	71.82 ppm	9.999112E-06	1.000089E-05	-32.224 ppm	17 ppm	PASS 36.28 %
11 μ ADC	1.1E-05	1.0999688E-05	71.82 ppm	1.099902E-05	1.100098E-05	-28.393 ppm	17 ppm	PASS 31.97 %
-10 μ ADC	-1E-05	-9.9998358E-06	71.82 ppm	-1.000089E-05	-9.999112E-06	-16.418 ppm	17 ppm	PASS 18.49 %
-11 μ ADC	-1.1E-05	-1.0999766E-05	71.82 ppm	-1.100098E-05	-1.099902E-05	-21.250 ppm	17 ppm	PASS 23.92 %
Zero 000 μ ADC	0	-5.0191455E-11	71.82 ppm	0	0	Z-check	410 ppm	INFO
100 μ ADC	0.0001	9.9997568E-05	71.82 ppm	9.999122E-05	0.0001000088	-24.319 ppm	16 ppm	PASS 27.69 %
110 μ ADC	0.00011	0.00010999736	71.82 ppm	0.0001099903	0.0001100097	-24.025 ppm	16 ppm	PASS 27.36 %
-100 μ ADC	-0.0001	-9.9997616E-05	71.82 ppm	-0.0001000088	-9.999122E-05	-23.839 ppm	16 ppm	PASS 27.14 %
-110 μ ADC	-0.00011	-0.0001099973	71.82 ppm	-0.0001100097	-0.0001099903	-24.524 ppm	16 ppm	PASS 27.92 %
Zero mADC	0	-2.8436715E-12	33.64 ppm	0	0	Z-check	410 ppm	INFO
-1.0 mADC	0.001	0.00099997767	33.64 ppm	0.0009999524	0.001000048	-22.334 ppm	14 ppm	PASS 46.88 %
1.1 mADC	0.0011	0.0010999752	33.64 ppm	0.001099948	0.001100052	-22.535 ppm	14 ppm	PASS 47.30 %
-1.0 mADC	-0.001	-0.00099997902	33.64 ppm	-0.001000048	-0.0009999524	-20.984 ppm	14 ppm	PASS 44.05 %
-1.1 mADC	-0.0011	-0.0010999768	33.64 ppm	-0.001100052	-0.001099948	-21.089 ppm	14 ppm	PASS 44.27 %
Zero 00 mADC	0	-4.2456146E-11	32.27 ppm	0	0	Z-check	410 ppm	INFO
10 mADC	0.01	0.0099998006	32.27 ppm	0.009999537	0.01000046	-19.940 ppm	14 ppm	PASS 43.10 %
11 mADC	0.011	0.010999775	32.27 ppm	0.01099949	0.01100051	-20.493 ppm	14 ppm	PASS 44.29 %
-10 mADC	-0.01	-0.0099998056	32.27 ppm	-0.01000046	-0.009999537	-19.444 ppm	14 ppm	PASS 42.02 %
-11 mADC	-0.011	-0.010999782	32.27 ppm	-0.01100051	-0.01099949	-19.778 ppm	14 ppm	PASS 42.75 %
Zero 000 mADC	0	-3.0823834E-11	53.32 ppm	0	0	Z-check	410 ppm	INFO
100 mADC	0.1	0.099997097	53.32 ppm	0.09999177	0.1000082	-29.032 ppm	29 ppm	PASS 35.27 %
110 mADC	0.11	0.10999682	53.32 ppm	0.1099909	0.1100091	-28.933 ppm	29 ppm	PASS 35.15 %
-100 mADC	-0.1	-0.099998505	53.32 ppm	-0.1000082	-0.09999177	-14.950 ppm	29 ppm	PASS 18.16 %
-110 mADC	-0.11	-0.10999831	53.32 ppm	-0.1100091	-0.1099909	-15.375 ppm	29 ppm	PASS 18.68 %
Zero ADC	0	1.9260005E-11	115.22 ppm	0	0	Z-check	410 ppm	INFO
1.0 ADC	1	0.99996412	115.22 ppm	0.9997748	1.000225	-35.875 ppm	110 ppm	PASS 15.93 %
1.1 ADC	1.1	1.0999504	115.22 ppm	1.099752	1.100248	-45.106 ppm	110 ppm	PASS 20.03 %
-1.0 ADC	-1	-0.99993985	115.22 ppm	-1.000225	-0.9997748	-60.152 ppm	110 ppm	PASS 26.71 %
-1.1 ADC	-1.1	-1.0999179	115.22 ppm	-1.100248	-1.099752	-74.594 ppm	110 ppm	PASS 33.12 %

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	Units	Measured	24h spec	Result, % spec
10 µA AC @ 0.05 kHz	1e-05	1.002147E-05	0.0165 %	9.9893455e-06	1.00106545e-05	AAC	2147.047 ppm	0.0900 %	INFO
100 µA AC @ 0.05 kHz	0.0001	9.9999269E-05	0.0165 %	9.9893455e-05	0.000100106545	AAC	-7.315 ppm	0.0900 %	PASS 0.69 %
1.0 mA AC @ 0.05 kHz	0.001	0.001000684	0.0165 %	0.00099893455	0.00100106545	AAC	684.007 ppm	0.0900 %	PASS 64.20 %
10 mA AC @ 0.05 kHz	0.01	0.010000426	0.0165 %	0.0099893455	0.0100106545	AAC	42.577 ppm	0.0900 %	PASS 4.00 %
100 mA AC @ 0.05 kHz	0.1	0.10000802	0.0138 %	0.099896182	0.100103818	AAC	80.211 ppm	0.0900 %	PASS 7.73 %
1.0 A AC @ 0.05 kHz	1.0	0.99988665	0.0138 %	0.99896182	1.00103818	AAC	-113.345 ppm	0.0900 %	PASS 10.92 %
10 µA AC @ 0.06 kHz	1e-05	1.0024785E-05	0.0138 %	9.9896182e-06	1.00103818e-05	AAC	2478.464 ppm	0.0900 %	INFO
100 µA AC @ 0.06 kHz	0.0001	9.9987556E-05	0.0138 %	9.9896182e-05	0.000100103818	AAC	-124.438 ppm	0.0900 %	PASS 11.99 %
1.0 mA AC @ 0.06 kHz	0.001	0.0010001084	0.0134 %	0.00099896636	0.00100103364	AAC	108.398 ppm	0.0900 %	PASS 10.49 %
10 mA AC @ 0.06 kHz	0.01	0.010000708	0.0134 %	0.0099896636	0.0100103364	AAC	70.753 ppm	0.0900 %	PASS 6.85 %
100 mA AC @ 0.06 kHz	0.1	0.10001057	0.0308 %	0.099879182	0.100120818	AAC	105.697 ppm	0.0900 %	PASS 8.75 %
1.0 A AC @ 0.06 kHz	1.0	0.99992056	0.0308 %	0.99879182	1.00120818	AAC	-79.437 ppm	0.0900 %	PASS 6.57 %
10 µA AC @ 1000.0 Hz	1e-05	1.0021899E-05	0.0165 %	9.9893455e-06	1.00106545e-05	AAC	2189.890 ppm	0.0900 %	INFO
100 µA AC @ 1000.0 Hz	0.0001	9.9989989E-05	0.0165 %	9.9893455e-05	0.000100106545	AAC	-100.113 ppm	0.0900 %	PASS 9.40 %
1.0 mA AC @ 1000.0 Hz	0.001	0.0010007671	0.0165 %	0.00099893455	0.00100106545	AAC	767.112 ppm	0.0900 %	PASS 72.00 %
10 mA AC @ 1000.0 Hz	0.01	0.010001249	0.0165 %	0.0099893455	0.0100106545	AAC	124.851 ppm	0.0900 %	PASS 11.72 %
100 mA AC @ 1000.0 Hz	0.1	0.1000164	0.0138 %	0.099896182	0.100103818	AAC	164.038 ppm	0.0900 %	PASS 15.80 %
1.0 A AC @ 1000.0 Hz	1.0	1.0000223	0.0138 %	0.99896182	1.00103818	AAC	22.344 ppm	0.0900 %	PASS 2.15 %

Test date	06 March 2018 15:56
UUT Internal TEMP?	35.2
Destructive overloads?	24, DESTRUCTIVE OVERLOADS valid 2941

Lab temperature maintained +24°C ±2°C

Internal use only

Not validated