

Manufacturer	AGILENT	Calibration date	February 10 2019
Model Number	34401A	Ambient Temperature	24.8 °C
Serial	3146A02516	Relative Humidity	51.00 %
ID Number	34401A SY	Pressure	1001.2
Notes	Test front ports	Test type	As received

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
MFC	Fluke	5720A	03/HLK	E2E6	XC01	02/09/2019	08/09/2019
Amplifier	Fluke	5725A		5930005	XA01	02/09/2019	08/09/2019
DC STD	xDevs.com	792X[2]	9.9999854 VDC	±2.2 ppm	XD01	02/16/2018	02/16/2019
STDR	ESI	SR104	10000.0012 KΩ	±1.00 ppm	XR04	06/30/2018	06/30/2019
STDR	xDevs.com/Fluke	SL935	1.00005942 Ω	±0.17 ppm	XR03	05/31/2018	05/31/2019
STDR	xDevs.com/Fluke	SL935	9999.9755 kΩ	±0.33 ppm	XR02	05/31/2018	05/31/2019

MFC last calibrated	1 days ago	MFC since DCV ZERO	0 days ago
MFC since WBFLAT	1 days ago	MFC since WBGAIN	1 days ago
MFC Confidence level	24h 95% REL	MFC Calibrate date	02/09/2019
MFC Calibrate date Zero	02/10/2019	Calibrate date WB Flatness	02/09/2019
Calibrate date WB Gain	02/09/2019	CAL CONST 6.5V reference voltage	+6.957480629534423E+00
CAL CONST 13V reference voltage	+1.385529947933807E+01	CAL CONST 22V range positive zero	+3.981796600000000E+02
CAL CONST 22V range negative zero	+3.981792800000000E+02	CAL CONST DAC Linearity	-2.073712828121188E-01
CAL CONST 10KOHM true output resistance	+9.999785888249386E+03	CAL CONST 10KOHM standard resistance	+9.998741377818425E+03
CAL CONST, Zero calibration temperature	+24.6	CAL CONST, All calibration temp	+24.6
Booster type	VB5725,IB5725	Current output posts	IB5725
Calibrate date 5725A AMP	02/09/2019	Calibrated days ago	1 days
CAL CONST, Amp ACAL temperature	+24.6	CAL CONST, Amp CalCheck temperature	+24.6

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

Meter Info	HP34401A	Test date start	10 February 2019 11:17
Test specification interval	24 hour DUT spec	Self-test result?	+0,"No error"
Line frequency	110V 60 Hz	Next calibration date	17/01/2017
Last calibration date	17/01/2016	SCPI Version	1
Last calibration temperature	26.6	Calibration count	64

Service information

Calibration count	64
Calibration string	N/A
Reference	Direct MFC test, PTFE cables, verification
DUT Condition	Boosted Hulk

Test procedure : \$Id: hp34401a.py | Rev 1151 | 2019/02/10 08:31:08 clu \$

Source procedure : \$Id: f5720b.py | Rev 1111 | 2019/01/03 11:24:54 tin_fpga \$

Main DC Voltage ranges performance test.

Checks zero offset and +/-FS calibration on all ranges

The following test for the offset voltage specification using MFC 0V source in 4-wire ext sense mode as reference.

DCV gain range points verify gain of the DC voltage function, using uncorrected 24-hour MFC output. DC voltage offset of DUT is nulled before FS tests.

Test Description	Expected Value	Measured Value	Measurement Uncertainty	Lower Limit	Upper Limit	Deviation	DUT Spec	Test Status
Short 0 mVDC	0.000000E+00	-9.91 μV	8.23 μV	-11.230 μV	11.230 μV	N/A	3.00 μV	PASS
Short 0.0 VDC	0.000000E+00	-8.69 μV	3.95 μV	-9.950 μV	9.950 μV	N/A	6.00 μV	PASS
Short 00.0 VDC	0.000000E+00	-6.50 μV	3.32 μV	-43.320 μV	43.320 μV	N/A	40.00 μV	PASS
Short 000.0 VDC	0.000000E+00	-182.00 μV	4.36 μV	-604.360 μV	604.360 μV	N/A	0.60 mV	PASS
Short 0000.0 VDC	0.000000E+00	-390.00 μV	6.45 μV	-6006.450 μV	6006.450 μV	N/A	6.00 mV	PASS
DCV Test	0.1V-1000V	DUT	Source unc.	Low Limit	Hi limit	Measured	24h spec	Result
0.1 VDC (0.10 Range)	0.1000000	0.09999448	9.91 ppm	0.099993009	0.10000699	-55.195 ppm	60.00 ppm	PASS 78.95 %
-0.1 VDC (0.10 Range)	-0.1000000	-0.10001437	9.91 ppm	-0.10000699	-0.099993009	143.700 ppm	60.00 ppm	FAIL 205.55 %
0.1 VDC (1.00 Range)	0.1000000	0.09999259	9.91 ppm	0.099996409	0.10000359	-74.100 ppm	26.00 ppm	FAIL 206.35 %
0.5 VDC (1.00 Range)	0.5000000	0.50000054	4.05 ppm	0.49998497	0.50001502	1.080 ppm	26.00 ppm	PASS 3.59 %
1.0 VDC (1.00 Range)	1.0000000	1.0000109	4.05 ppm	0.99996995	1.00003	10.900 ppm	26.00 ppm	PASS 36.27 %
-0.1 VDC (1.00 Range)	-0.1000000	-0.10001195	9.91 ppm	-0.10000359	-0.099996409	119.500 ppm	26.00 ppm	FAIL 332.78 %
-0.5 VDC (1.00 Range)	-0.5000000	-0.50001925	4.05 ppm	-0.50001502	-0.49998497	38.500 ppm	26.00 ppm	FAIL 128.12 %
-1.0 VDC (1.00 Range)	-1.0000000	-1.0000273	4.05 ppm	-1.00003	-0.99996995	27.350 ppm	26.00 ppm	PASS 91.01 %
1.0 VDC (10.00 Range)	1.0000000	1.0000016	4.05 ppm	0.99997695	1.0000231	1.650 ppm	19.00 ppm	PASS 7.16 %
5.0 VDC (10.00 Range)	5.0000000	5.0000279	1.47 ppm	4.9998977	5.0001023	5.580 ppm	19.00 ppm	PASS 27.26 %
10.0 VDC (10.00 Range)	10.0000000	10.000076	2.36 ppm	9.9997864	10.000214	7.600 ppm	19.00 ppm	PASS 35.58 %
-1.0 VDC (10.00 Range)	-1.0000000	-1.0000142	4.05 ppm	-1.0000231	-0.99997695	14.200 ppm	19.00 ppm	PASS 61.61 %
-5.0 VDC (10.00 Range)	-5.0000000	-5.000032	1.47 ppm	-5.0001023	-4.9998977	6.410 ppm	19.00 ppm	PASS 31.31 %
-10.0 VDC (10.00 Range)	-10.0000000	-10.000047	2.36 ppm	-10.000214	-9.9997864	4.700 ppm	19.00 ppm	PASS 22.00 %
10 VDC (100.00 Range)	10.0000000	10.000091	2.36 ppm	9.9997164	10.000284	9.100 ppm	26.00 ppm	PASS 32.09 %
50 VDC (100.00 Range)	50.0000000	50.001249	5.45 ppm	49.998427	50.001573	24.980 ppm	26.00 ppm	PASS 79.43 %
100 VDC (100.00 Range)	100.0000000	100.00268	5.45 ppm	99.996855	100.00315	26.800 ppm	26.00 ppm	PASS 85.21 %
-10 VDC (100.00 Range)	-10.0000000	-10.000489	2.36 ppm	-10.000284	-9.9997164	48.900 ppm	26.00 ppm	FAIL 172.43 %
-50 VDC (100.00 Range)	-50.0000000	-50.001567	5.45 ppm	-50.001573	-49.998427	31.340 ppm	26.00 ppm	PASS 99.65 %
-100 VDC (100.00 Range)	-100.0000000	-100.00275	5.45 ppm	-100.00315	-99.996855	27.450 ppm	26.00 ppm	PASS 87.28 %
100 VDC (1000.00 Range)	100.0000000	100.00065	5.45 ppm	99.996855	100.00315	6.500 ppm	26.00 ppm	PASS 20.67 %
200 VDC (1000.00 Range)	200.0000000	200.00195	5.45 ppm	199.99371	200.00629	9.750 ppm	26.00 ppm	PASS 31.00 %
1000 VDC (1000.00 Range)	1000.0000000	1000.015	7.55 ppm	999.95645	1000.0435	15.000 ppm	26.00 ppm	PASS 34.44 %
-100 VDC (1000.00 Range)	-100.0000000	-100.00147	5.45 ppm	-100.00315	-99.996855	14.700 ppm	26.00 ppm	PASS 46.74 %
-200 VDC (1000.00 Range)	-200.0000000	-200.00254	5.45 ppm	-200.00629	-199.99371	12.675 ppm	26.00 ppm	PASS 40.30 %
-1000 VDC (1000.00 Range)	-1000.0000000	-1000.0121	7.55 ppm	-1000.0435	-999.95645	12.100 ppm	26.00 ppm	PASS 51.38 %

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 100 MOhm	DUT	Source unc.	Low Limit	Hi limit	Measured	24h spec	Result
1 Ω	0.9998127	0.999234	70.2 ppm	9.9968252E-01	9.9994288E-01	-578.808 ppm	60.0 ppm	INFO
1.9 Ω	1.8998846	1.898897	8.3 ppm	1.8997548E+00	1.9000144E+00	-519.821 ppm	60.0 ppm	INFO
10 Ω	10.000321	9.999539	8.3 ppm	9.9996380E+00	1.0001004E+01	-78.197 ppm	60.0 ppm	FAIL 114.49 %
19 Ω	19.000007	18.999477	4.3 ppm	1.8998785E+01	1.9001229E+01	-27.895 ppm	60.0 ppm	PASS 43.38 %
100 Ω	100.00322	100.00476	4.3 ppm	9.9996790E+01	1.0000965E+02	15.400 ppm	60.0 ppm	PASS 23.95 %
190 Ω	189.9982	189.99713	3.3 ppm	1.8999282E+02	1.9000358E+02	-5.632 ppm	25.0 ppm	PASS 19.90 %
1.0 kΩ	1000.01	1000.009	3.3 ppm	9.9998170E+02	1.0000383E+03	-1.000 ppm	25.0 ppm	PASS 3.53 %
1.9 kΩ	1900.0237	1899.9802	3.3 ppm	1.8999699E+03	1.9000775E+03	-22.894 ppm	25.0 ppm	PASS 80.90 %
10 kΩ	9999.791	9999.6187	3.3 ppm	9.9995080E+03	1.0000074E+04	-17.235 ppm	25.0 ppm	PASS 60.90 %
19 kΩ	18999.393	18997.635	3.3 ppm	1.8998855E+04	1.8999931E+04	-92.503 ppm	25.0 ppm	FAIL 326.87 %
100 kΩ	99994.7	99985.822	3.3 ppm	9.9991870E+04	9.9997530E+04	-88.785 ppm	25.0 ppm	FAIL 313.73 %
190 kΩ	189988.6	190005.4	5.3 ppm	1.8994770E+05	1.9002950E+05	88.400 ppm	210.0 ppm	PASS 41.06 %
1.0 MΩ	999979.2	1000058.8	5.3 ppm	9.9976390E+05	1.0001945E+06	79.552 ppm	210.0 ppm	PASS 36.95 %
1.9 MΩ	1899962	1899469.4	14.3 ppm	1.8970659E+06	1.9028581E+06	-259.268 ppm	1510.0 ppm	PASS 17.01 %
10 MΩ	9998943	9995936.1	14.3 ppm	9.9837016E+06	1.0014184E+07	-300.727 ppm	1510.0 ppm	PASS 19.73 %
19 MΩ	18998193	19001996	60.3 ppm	1.8938153E+07	1.9058233E+07	200.203 ppm	3100.0 ppm	PASS 6.33 %
100 MΩ	1.0000636E+08	1.0021925E+08	60.3 ppm	9.9690310E+07	1.0032241E+08	2128.765 ppm	3100.0 ppm	PASS 67.36 %

Test completed

Test date	10 February 2019 13:04
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Lab temperature maintained +24°C ±2°C

Internal use only

Not validated

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