

Manufacturer	ADVANTEST	Calibration date	June 19 2020
Model Number	R6581T	Ambient Temperature	23.05 °C
Serial	Trent meter	Relative Humidity	46.81 %
ID Number	Calibration test unit	Pressure	1013.45
Notes	Test front spade cables	Test type	Front spade lug terminals

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
DC STD	xDevs.com	792X[2]	9.9999751 VDC	±0.5 ppm	XD01	03/03/2020	03/03/2021
DC STD	Fluke	732Bx	10.0000328	±0.7 ppm	6480002	03/26/2020	06/26/2020
STDR	ESI	SR104	10000.0026 KΩ	±0.15 ppm	G202088930104	03/17/2020	03/17/2021
STDR	xDevs.com/Fluke	SL935	1.00006085 Ω	±0.17 ppm	XR03	09/13/2019	09/13/2020
STDR	xDevs.com/Fluke	SL935	9999.9737 kΩ	±0.17 ppm	XR02	09/13/2019	09/13/2020
MFC	Fluke	5720A	03/HLK	E2E6	XC01	03/28/2020	03/28/2021
Amplifier	Fluke	5725A		5930005	XB01	03/28/2020	03/28/2021
DMM	HP	3458A	001,X02	MY45040325	XD2	06/16/2019	12/16/2019
DMM	HP	3458A	001,X02	X	XD3	03/28/2020	03/28/2021
AVMS	Wavetek	4920M	80	29336	XA02	07/11/2017	07/11/2018
DC STD	Wavetek	7000	54222	±2.2 ppm	XD01	02/16/2018	02/16/2019
Divider	Fluke	752A	4295200		XR01	02/16/2018	02/16/2019

MFC last calibrated	68.0 days ago	MFC since DCV ZERO	2.0 days ago
MFC since WBFLAT	83.0 days ago	MFC since WBGAIN	59.0 days ago
MFC Confidence level	24h 95% REL	MFC Calibrate date	2020-04-13 00:00:00
MFC Calibrate date Zero	2020-06-18 00:00:00	Calibrate date WB Flatness	2020-03-29 00:00:00
Calibrate date WB Gain	2020-04-22 00:00:00	CAL CONST 6.5V reference voltage	6.95748103013
CAL CONST 13V reference voltage	13.855305491	CAL CONST 22V range positive zero	398.17917
CAL CONST 22V range negative zero	398.17866	CAL CONST DAC Linearity	0.0
CAL CONST 10KOHM true output resistance	9999.80823198	CAL CONST 10KOHM standard resistance	9998.75116377
CAL CONST, Zero calibration temperature	24.0	CAL CONST, All calibration temp	24.0
Booster type	VB5725,IB5725	Current output posts	AUX
Calibrate date 5725A AMP	2020-04-13 00:00:00	Calibrated days ago	Debug
CAL CONST, Amp ACAL temperature	23.5	CAL CONST, Amp CalCheck temperature	24.0

Total uncertainty of each calibration point calculated with RSS

$$U_{95\%} = \sqrt{U_{SRC}^2 * U_{DUT}^2 * 2}$$

Meter Info	ADVANTEST,R6581D,0,A03	Test date start	19 June 2020 17:42
Test specification interval	24 hour DUT spec	Line frequency	60Hz
Next calibration date	0	Last calibration date	0
Last DCV INT CAL temperature	38.9515259	Last OHM INT CAL temperature	38.9609483
DUT temperature	38.61	Last calibration temperature	+26.2

Service information

All CAL values

0

ACAL ALL result?

0,"No error"

Reference

Verification

DUT Condition

xfer-calkit

Test procedure : \$Id: r6581t.py | Rev 1741 | 2020/06/18 01:20:33 tin_fpga \$

Source procedure : \$Id: f5720b.py | Rev 1697 | 2020/04/04 04:09:52 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	0.59 µV	0.50 µV	-1.700 µV	1.700 µV	N/A	1.20 µV	PASS
Short 0.0 VDC	0.000000E+00	0.45 µV	0.50 µV	-4.500 µV	4.500 µV	N/A	4.00 µV	PASS
Short 00.0 VDC	0.000000E+00	0.20 µV	0.50 µV	-80.500 µV	80.500 µV	N/A	80.00 µV	PASS
Short 000.0 VDC	0.000000E+00	-3.00 µV	0.50 µV	-600.500 µV	600.500 µV	N/A	0.60 mV	PASS
Short 0000.0 VDC	0.000000E+00	-10.00 µV	0.50 µV	-6000.500 µV	6000.500 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	0.10000006	7.27 ppm	0.099998023	0.10000198	0.600 ppm	12.50 ppm	PASS 2.07 %
-0.1 VDC (0.10 Range)	-0.1000000	-0.10000035	7.27 ppm	-0.10000198	-0.099998023	3.550 ppm	12.50 ppm	PASS 12.27 %
0.1 VDC (1.00 Range)	0.1000000	0.10000038	7.27 ppm	0.099998123	0.10000188	3.800 ppm	11.50 ppm	PASS 13.97 %
1.0 VDC (1.00 Range)	1.0000000	1.0000025	3.86 ppm	0.99999364	1.0000064	2.500 ppm	2.50 ppm	PASS 27.18 %
1.1 VDC (1.00 Range)	1.1000000	1.1000029	3.86 ppm	1.0999931	1.1000069	2.627 ppm	2.41 ppm	PASS 28.87 %
-0.1 VDC (1.00 Range)	-0.1000000	-0.10000026	7.27 ppm	-0.10000188	-0.099998123	2.600 ppm	11.50 ppm	PASS 9.56 %
-1.0 VDC (1.00 Range)	-1.0000000	-1.0000029	3.86 ppm	-1.0000064	-0.99999364	2.870 ppm	2.50 ppm	PASS 31.20 %
-1.1 VDC (1.00 Range)	-1.1000000	-1.1000032	3.86 ppm	-1.1000069	-1.0999931	2.877 ppm	2.41 ppm	PASS 31.62 %
1.0 VDC (10.00 Range)	1.0000000	1.0000016	3.86 ppm	0.99999464	1.0000054	1.600 ppm	1.50 ppm	PASS 19.32 %
10.0 VDC (10.00 Range)	10.0000000	9.999952	2.77 ppm	9.9999663	10.000034	-0.480 ppm	0.60 ppm	PASS 8.47 %
11.0 VDC (10.00 Range)	11.0000000	10.999994	2.73 ppm	10.999963	11.000037	-0.586 ppm	0.59 ppm	PASS 10.50 %
-1.0 VDC (10.00 Range)	-1.0000000	-1.0000042	3.86 ppm	-1.0000054	-0.99999464	4.200 ppm	1.50 ppm	PASS 50.71 %
-10.0 VDC (10.00 Range)	-10.0000000	-10.000001	2.77 ppm	-10.000034	-9.9999663	0.105 ppm	0.60 ppm	PASS 1.85 %
-11.0 VDC (10.00 Range)	-11.0000000	-11.000001	2.73 ppm	-11.000037	-10.999963	0.082 ppm	0.59 ppm	PASS 1.46 %
10 VDC (100.00 Range)	10.0000000	9.999655	2.77 ppm	9.9998473	10.000153	-3.450 ppm	12.50 ppm	PASS 13.47 %
100 VDC (100.00 Range)	100.0000000	99.999736	3.73 ppm	99.999277	100.00072	-2.640 ppm	3.50 ppm	PASS 25.81 %
110 VDC (100.00 Range)	110.0000000	109.99971	3.73 ppm	109.99921	110.00079	-2.600 ppm	3.41 ppm	PASS 25.73 %
-10 VDC (100.00 Range)	-10.0000000	-9.999985	2.77 ppm	-10.000153	-9.9998473	-1.500 ppm	12.50 ppm	PASS 5.86 %
-100 VDC (100.00 Range)	-100.0000000	-99.99978	3.73 ppm	-100.00072	-99.999277	-2.205 ppm	3.50 ppm	PASS 21.55 %
-110 VDC (100.00 Range)	-110.0000000	-109.99975	3.73 ppm	-110.00079	-109.99921	-2.273 ppm	3.41 ppm	PASS 22.49 %
100 VDC (1000.00 Range)	100.0000000	99.99931	3.73 ppm	99.999277	100.00072	-6.900 ppm	3.50 ppm	PASS 67.45 %
200 VDC (1000.00 Range)	200.0000000	199.99858	3.73 ppm	199.99865	200.00135	-7.100 ppm	3.00 ppm	PASS 74.16 %
1000 VDC (1000.00 Range)	1000.0000000	999.99864	5.45 ppm	999.98495	1000.015	-1.360 ppm	2.60 ppm	PASS 7.67 %
-100 VDC (1000.00 Range)	-100.0000000	-99.99957	3.73 ppm	-100.00072	-99.999277	-4.300 ppm	3.50 ppm	PASS 42.03 %
-200 VDC (1000.00 Range)	-200.0000000	-199.99888	3.73 ppm	-200.00135	-199.99865	-5.600 ppm	3.00 ppm	PASS 58.49 %
-1000 VDC (1000.00 Range)	-1000.0000000	-999.99869	5.45 ppm	-1000.015	-999.98495	-1.310 ppm	2.60 ppm	PASS 7.38 %

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	Reference	DUT	Source unc.	Low Limit	Hi limit	Measured	24h spec	Result
1 Ω	0.999791 Ω	0.999834 Ω	85.0 ppm	9.9950102E-01	1.0000810E+00	43.009 ppm	205.04 ppm	PASS, 9.69 % of 443.92 ppm
1.9 Ω	1.8998378 Ω	1.89992 Ω	85.0 ppm	1.8994668E+00	1.9002088E+00	43.267 ppm	110.27 ppm	PASS, 15.54 % of 278.46 ppm
10 Ω	10.000581	10.001133	23.00 ppm	1.0000101E+01	1.0001061E+01	55.197 ppm	25.0 ppm	PASS, 81.24 % of 67.94 ppm
19 Ω	19.00024 Ω	19.00125 Ω	23.0 ppm	1.8999208E+01	1.9001272E+01	53.157 ppm	31.32 ppm	PASS, 68.41 % of 77.71 ppm
100 Ω	99.9966 Ω	100.00188 Ω	10.0 ppm	9.9994600E+01	9.9998600E+01	52.797 ppm	10.00 ppm	FAIL, 186.66 % of 28.28 ppm
190 Ω	189.99379 Ω	190.00317 Ω	10.0 ppm	1.8998632E+02	1.9000126E+02	49.370 ppm	29.32 ppm	PASS, 79.69 % of 61.95 ppm
1.0 kΩ	1000.0256 kΩ	1000.0736 kΩ	8.0 ppm	1.0000096E+03	1.0000416E+03	48.004 ppm	8.00 ppm	FAIL, 212.15 % of 22.63 ppm
1.9 kΩ	1899.9011 kΩ	1899.9855 kΩ	8.0 ppm	1.8998771E+03	1.8999251E+03	44.423 ppm	4.63 ppm	FAIL, 240.28 % of 18.49 ppm
10 kΩ	9999.8 kΩ	10000.242 kΩ	8.0 ppm	9.9996950E+03	9.9999050E+03	44.196 ppm	2.50 ppm	FAIL, 263.65 % of 16.76 ppm
19 kΩ	18999.283 kΩ	18995.21 kΩ	9.0 ppm	1.8999024E+04	1.8999542E+04	-214.377 ppm	4.63 ppm	FAIL, 1058.98 % of 20.24 ppm
100 kΩ	99994.81 kΩ	99973.008 kΩ	9.0 ppm	9.9993660E+04	9.9995960E+04	-218.031 ppm	2.50 ppm	FAIL, 1167.09 % of 18.68 ppm
190 kΩ	189989.23 kΩ	189946.76 kΩ	9.0 ppm	1.8998462E+05	1.8999384E+05	-223.539 ppm	15.26 ppm	FAIL, 630.78 % of 35.44 ppm
1.0 MΩ	999983.3 MΩ	999748.45 MΩ	16.0 ppm	9.9995630E+05	1.0000103E+06	-234.849 ppm	11.00 ppm	FAIL, 604.77 % of 38.83 ppm
1.9 MΩ	1899980.9 MΩ	1899559.5 MΩ	17.0 ppm	1.8998036E+06	1.9001582E+06	-221.792 ppm	76.32 ppm	FAIL, 141.83 % of 156.37 ppm
10 MΩ	9999100 MΩ	9996786 MΩ	33.0 ppm	9.9982201E+06	9.999799E+06	-231.421 ppm	55.00 ppm	FAIL, 180.40 % of 128.28 ppm
19 MΩ	18998751 MΩ	18995860 MΩ	43.0 ppm	1.8987435E+07	1.9010067E+07	-152.168 ppm	552.64 ppm	PASS, 13.73 % of 1108.61 ppm
100 MΩ	1.0000484E+08 MΩ	99979320 MΩ	100.0 ppm	9.9943837E+07	1.0006584E+08	-255.188 ppm	510.00 ppm	PASS, 24.55 % of 1039.42 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 Ω resistance range is tested using the external standard, as MFC unable to provide this range value.

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	-6.375E-11						INFO
50 nADC	5E-08	4.99134E-08						INFO
100 nADC	1E-07	9.986755E-08	71.82 ppm	9.995282E-08	1.000472E-07	-1324.501 ppm	400 ppm	FAIL 162.96 %
-50 nADC	-1E-07	-1.000591E-07	71.82 ppm	-1.000492E-07	-9.995082E-08	591.001 ppm	420 ppm	PASS 69.35 %
-100 nADC	-5E-08	-5.005875E-08						INFO
Zero µADC	0	-9.235E-11						INFO
1 µADC	5E-07	5.000215E-07	71.82 ppm	4.999201E-07	5.000799E-07	43.000 ppm	88 ppm	PASS 18.93 %
1.1 µADC	1E-06	1.0001208E-06	71.82 ppm	9.998792E-07	1.000121E-06	120.750 ppm	49 ppm	PASS 69.44 %
-1 µADC	-1E-06	-1.0002703E-06	71.82 ppm	-1.000123E-06	-9.998772E-07	270.250 ppm	51 ppm	FAIL 153.40 %
-1.1 µADC	-5E-07	-5.0019655E-07	71.82 ppm	-5.000819E-07	-4.999181E-07	393.100 ppm	92 ppm	FAIL 168.40 %
Zero 00 µADC	0	-1.345E-10						INFO
10 µADC	5E-06	5.0011895E-06	71.82 ppm	4.999417E-06	5.000583E-06	237.900 ppm	45 ppm	FAIL 140.52 %
11 µADC	1E-05	1.0001445E-05	71.82 ppm	9.999033E-06	1.000097E-05	144.500 ppm	25 ppm	PASS 95.05 %
-10 µADC	-1E-05	-1.0002042E-05	71.82 ppm	-1.000097E-05	-9.999031E-06	204.150 ppm	25 ppm	FAIL 134.17 %
-11 µADC	-5E-06	-5.0014285E-06	71.82 ppm	-5.000585E-06	-4.999415E-06	285.700 ppm	45 ppm	FAIL 168.34 %
Zero 000 µADC	0	5.05E-10						INFO
100 µADC	5E-05	4.999811E-05	71.82 ppm	4.999416E-05	5.000584E-05	-37.800 ppm	45 ppm	PASS 22.30 %
110 µADC	0.0001	9.999588E-05	71.82 ppm	9.999032E-05	0.0001000097	-41.200 ppm	25 ppm	PASS 27.09 %
-100 µADC	-0.0001	-9.999482E-05	71.82 ppm	-0.0001000097	-9.999032E-05	-51.800 ppm	25 ppm	PASS 34.06 %
-110 µADC	-5E-05	-4.999719E-05	71.82 ppm	-5.000584E-05	-4.999416E-05	-56.200 ppm	45 ppm	PASS 33.15 %
Zero mADC	0	5.25E-09						INFO
-1.0 mADC	0.0005	0.00049997985	33.64 ppm	0.0004999607	0.0005000393	-40.300 ppm	45 ppm	PASS 35.87 %
1.1 mADC	0.001	0.00099995715	33.64 ppm	0.0009999414	0.001000059	-42.850 ppm	25 ppm	PASS 51.12 %
-1.0 mADC	-0.001	-0.00099994745	33.64 ppm	-0.001000059	-0.0009999414	-52.550 ppm	25 ppm	PASS 62.69 %
-1.1 mADC	-0.0005	-0.0004999711	33.64 ppm	-0.0005000393	-0.0004999607	-57.800 ppm	45 ppm	PASS 51.44 %
Zero 00 mADC	0	6.65E-08						INFO
10 mADC	0.005	0.0049997055	32.27 ppm	0.004999589	0.005000411	-58.900 ppm	50 ppm	PASS 49.49 %
11 mADC	0.01	0.009999438	32.27 ppm	0.009999377	0.01000062	-56.200 ppm	30 ppm	PASS 63.78 %
-10 mADC	-0.01	-0.009999526	32.27 ppm	-0.01000062	-0.009999377	-47.400 ppm	30 ppm	PASS 53.79 %
-11 mADC	-0.005	-0.0049997975	32.27 ppm	-0.005000411	-0.004999589	-40.500 ppm	50 ppm	PASS 34.03 %
Zero 000 mADC	0	5E-07						INFO
100 mADC	0.05	0.04999776	53.32 ppm	0.04999433	0.05000567	-44.800 ppm	60 ppm	PASS 27.91 %
110 mADC	0.1	0.09999504	53.32 ppm	0.09999067	0.1000093	-49.600 ppm	40 ppm	PASS 37.21 %
-100 mADC	-0.1	-0.09999468	53.32 ppm	-0.1000093	-0.09999067	-53.200 ppm	40 ppm	PASS 39.91 %
-110 mADC	-0.05	-0.049997545	53.32 ppm	-0.05000567	-0.04999433	-49.100 ppm	60 ppm	PASS 30.58 %
Zero ADC	0	2.15E-06						INFO
1.0 ADC	0.5	0.4999662	115.22 ppm	0.4998724	0.5001276	-67.600 ppm	140 ppm	PASS 18.64 %
1.1 ADC	1	0.999938	115.22 ppm	0.9997648	1.000235	-62.000 ppm	120 ppm	PASS 18.63 %
-1.0 ADC	-1	-0.9999281	115.22 ppm	-1.000235	-0.9997648	-71.900 ppm	120 ppm	PASS 21.61 %
-1.1 ADC	-0.5	-0.4999595	115.22 ppm	-0.5001276	-0.4998724	-81.000 ppm	140 ppm	PASS 22.34 %

Test completed

Test date

20 June 2020 01:50

Lab temperature maintained $+24^{\circ}\text{C} \pm 2^{\circ}\text{C}$

Internal use only

Not validated

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