

## *Calibration Certificate No. 14669/V*

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**Manufacturer:** Meatest**Model Type Number:** M-142**Serial Number:** 541121**Customer:** Meatest**Date of Calibration:** 14. 11. 2017**Place of Calibration:** Calibration laboratory Meatest, Zelezna 3, CZ-619 00 Brno**Number of Pages:** 5**Page:** 1

The instrument has been calibrated in accordance with the manufacturer's User's manual using standards that are traceable to National or International Standards or have been derived by approved ratio techniques.

The measurement uncertainties stated in this document have been determined according EA-4/02. They were estimated as expanded uncertainty obtained multiplying the standard uncertainty by the coverage factor  $k=2$  with confidence level of 95%.

The measurement results relate only to the calibrated items and do not carry any implication regarding long term stability of the instrument.

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<b>Seal</b>	<b>Date of Issue</b>	<b>Head of Calibration Laboratory</b>	<b>Person in Charge</b>
	14. 11. 2017	Ing. Karel Volný	Michal Sitta

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**Range of Calibration:** AC DC voltage, AC DC current  
DC resistance, capacitance  
AC power, frequency

**Calibration Conditions:** Temperature (22 ± 1) °C  
Humidity (50 ± 15) %

**Calibration Procedure:** Automatic calibration according to the test procedure 142SKT2B

**Applied Standards:** Direct measurement multimeter Fluke 8508A SN:860948037,  
Bu1240 0.01 SN:617184, Bu1240 0.1 SN:617888, Bu1281 0.001  
SN: 615827, AP RS2110S SN:1098100329, Agilent A53131A  
SN:MY47004119, M140 SN:14006, Agilent E4980 SN:MY46203974.

The following pages contain the calibration results with column indicating the instrument performance relative to the stated specification.

The column headed "%spe" is the measured error as percentage of the stated specification with no allowance being made for the calibration uncertainty.

Measurement Results:

Funct.	Range	Standard	UUT	Deviation	%spe	Allowed	Unct. k=2	
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Source								
DC Voltage								
VDC-2W	20 mV	0.99894 mV	1.00000 mV	1.06 uV	18	6.05 uV	0.24 uV	ok
VDC-2W	20 mV	-1.00048 mV	-1.00000 mV	0.48 uV	8	6.05 uV	0.32 uV	ok
VDC-2W	20 mV	18.99809 mV	19.00000 mV	1.91 uV	28	6.95 uV	0.39 uV	ok
VDC-2W	20 mV	-19.00058 mV	-19.00000 mV	0.58 uV	8	6.95 uV	0.50 uV	ok
VDC-2W	200 mV	189.9990 mV	190.0000 mV	1.1 uV	10	10.9 uV	1.2 uV	ok
VDC-2W	200 mV	-190.0018 mV	-190.0000 mV	1.8 uV	16	10.9 uV	1.2 uV	ok
VDC-2W	2 V	1.9000010 V	1.9000000 V	-0.0010 mV	-3	0.0328 mV	0.0082 mV	ok
VDC-2W	2 V	-1.9000028 V	-1.9000000 V	0.0028 mV	8	0.0328 mV	0.0082 mV	ok
VDC-2W	20 V	2.009993 V	2.010000 V	0.007 mV	10	0.070 mV	0.023 mV	ok
VDC-2W	20 V	3.999992 V	4.000000 V	0.008 mV	9	0.090 mV	0.030 mV	ok
VDC-2W	20 V	5.999992 V	6.000000 V	0.008 mV	7	0.110 mV	0.037 mV	ok
VDC-2W	20 V	7.999991 V	8.000000 V	0.009 mV	7	0.130 mV	0.044 mV	ok
VDC-2W	20 V	9.999990 V	10.000000 V	0.010 mV	7	0.150 mV	0.051 mV	ok
VDC-2W	20 V	11.999992 V	12.000000 V	0.008 mV	5	0.170 mV	0.058 mV	ok
VDC-2W	20 V	13.999989 V	14.000000 V	0.011 mV	6	0.190 mV	0.065 mV	ok
VDC-2W	20 V	15.999988 V	16.000000 V	0.012 mV	6	0.210 mV	0.072 mV	ok
VDC-2W	20 V	17.999988 V	18.000000 V	0.012 mV	5	0.230 mV	0.079 mV	ok
VDC-2W	20 V	18.999985 V	19.000000 V	0.015 mV	6	0.240 mV	0.082 mV	ok
VDC-2W	20 V	-19.000031 V	-19.000000 V	0.031 mV	13	0.240 mV	0.082 mV	ok
VDC-2W	240 V	229.9992 V	230.0000 V	0.8 mV	21	4.0 mV	3.0 mV	ok
VDC-2W	240 V	-229.9999 V	-230.0000 V	-0.1 mV	-2	4.0 mV	3.0 mV	ok
VDC-2W	1 kV	0.9500032 kV	0.9500000 kV	-0.0032 V	-5	0.0675 V	0.0067 V	ok
VDC-2W	1 kV	-0.9499970 kV	-0.9500000 kV	-0.0030 V	-4	0.0675 V	0.0067 V	ok
AC Voltage								
VAC-2W	20 mV	1.0006 mV; 120Hz	1.0000 mV	-0.6 uV	-2	32.0 uV	2.6 uV	ok
VAC-2W	20 mV	19.0092 mV; 1kHz	19.0000 mV	-9.2 uV	-13	68.0 uV	4.7 uV	ok
VAC-2W	200 mV	190.000 mV; 1kHz	190.000 mV	-0 uV	0	270 uV	25 uV	ok
VAC-2W	2 V	1.89999 V; 1kHz	1.90000 V	0.01 mV	1	0.44 mV	0.17 mV	ok
VAC-2W	20 V	2.01057 V; 1kHz	2.01000 V	-0.57 mV	-42	1.36 mV	0.38 mV	ok
VAC-2W	20 V	4.00037 V; 1kHz	4.00000 V	-0.37 mV	-22	1.72 mV	0.53 mV	ok
VAC-2W	20 V	6.00016 V; 1kHz	6.00000 V	-0.16 mV	-8	2.08 mV	0.68 mV	ok
VAC-2W	20 V	7.99994 V; 1kHz	8.00000 V	0.06 mV	2	2.44 mV	0.83 mV	ok
VAC-2W	20 V	9.99975 V; 1kHz	10.00000 V	0.25 mV	9	2.80 mV	0.98 mV	ok
VAC-2W	20 V	12.0001 V; 1kHz	12.0000 V	-0.1 mV	-4	3.2 mV	1.1 mV	ok
VAC-2W	20 V	14.0000 V; 1kHz	14.0000 V	-0.0 mV	-1	3.5 mV	1.3 mV	ok
VAC-2W	20 V	15.9999 V; 1kHz	16.0000 V	0.1 mV	2	3.9 mV	1.4 mV	ok
VAC-2W	20 V	17.9998 V; 1kHz	18.0000 V	0.2 mV	4	4.2 mV	1.6 mV	ok
VAC-2W	20 V	18.9999 V; 1kHz	19.0000 V	0.2 mV	3	4.4 mV	1.7 mV	ok
VAC-2W	20 V	18.9985 V; 50Hz	19.0000 V	1.5 mV	34	4.4 mV	2.1 mV	ok
VAC-2W	20 V	18.9992 V; 120Hz	19.0000 V	0.8 mV	18	4.4 mV	1.7 mV	ok
VAC-2W	20 V	19.0005 V; 5kHz	19.0000 V	-0.5 mV	-12	4.4 mV	2.1 mV	ok
VAC-2W	20 V	19.0026 V; 20kHz	19.0000 V	-2.6 mV	-17	15.5 mV	5.0 mV	ok
VAC-2W	240 V	189.995 V; 1kHz	190.000 V	5 mV	12	44 mV	17 mV	ok
VAC-2W	1 kV	0.95002 kV; 120Hz	0.95000 kV	-0.02 V	-4	0.49 V	0.37 V	ok
DC Resistance								
RDC-2W	100 Ohm	0.000308 Ohm	0.000000 Ohm	-0.308 mOhm	-2	15.000 mOhm	0.060 mOhm	ok
RDC-2W	100 Ohm	9.99841 Ohm	10.000000 Ohm	1.59 mOhm	10	16.000 mOhm	0.31 mOhm	ok
RDC-2W	100 Ohm	50.00033 Ohm	50.000000 Ohm	-0.33 mOhm	-2	20.000 mOhm	0.73 mOhm	ok
RDC-2W	100 Ohm	99.9996 Ohm	100.000000 Ohm	0.4 mOhm	2	25.000 mOhm	1.1 mOhm	ok
RDC-2W	2 kOhm	0.2000122 kOhm	0.20000000 kOhm	-0.0122 Ohm	-41	0.0300 Ohm	0.0035 Ohm	ok
RDC-2W	2 kOhm	1.000022 kOhm	1.00000000 kOhm	-0.022 Ohm	-20	0.110 Ohm	0.011 Ohm	ok
RDC-2W	2 kOhm	1.999997 kOhm	2.00000000 kOhm	0.003 Ohm	1	0.210 Ohm	0.035 Ohm	ok
RDC-2W	20 kOhm	4.999953 kOhm	5.00000000 kOhm	0.047 Ohm	9	0.510 Ohm	0.061 Ohm	ok
RDC-2W	20 kOhm	10.00004 kOhm	10.00000000 kOhm	-0.04 Ohm	-4	1.01 Ohm	0.10 Ohm	ok
RDC-2W	20 kOhm	20.00008 kOhm	20.00000000 kOhm	-0.08 Ohm	-4	2.01 Ohm	0.35 Ohm	ok
RDC-2W	200 kOhm	99.9996 kOhm	100.00000000 kOhm	0.4 Ohm	4	10.0 Ohm	1.0 Ohm	ok
RDC-2W	200 kOhm	200.0034 kOhm	200.00000000 kOhm	-3.4 Ohm	-17	20.0 Ohm	4.3 Ohm	ok
RDC-2W	1 MOhm	1.000016 MOhm	1.00000000 MOhm	-0.016 kOhm	-16	0.100 kOhm	0.012 kOhm	ok

**Measurement Results:**

Funct.	Range	Standard	UUT	Deviation	%spe	Allowed	Unct. k=2	
RDC-2W	1 MOhm	0.5000061 MOhm	0.5000000 MOhm	-0.0061 kOhm	-12	0.0500 kOhm	0.0072 kOhm	ok
RDC-2W	20 MOhm	10.00143 MOhm	10.00000 MOhm	-1.43 kOhm	-14	10.00 kOhm	0.30 kOhm	ok
High resistance source								
RDC-2W	20 MOhm	2.00007 MOhm	2.00000 MOhm	-0.07 kOhm	-4	2.00 kOhm	0.16 kOhm	ok
RDC-2W	20 MOhm	20.006 MOhm	20.000 MOhm	-6 kOhm	-31	20 kOhm	13 kOhm	ok
RDC-2W	50 MOhm	50.027 MOhm	50.000 MOhm	-27 kOhm	-27	100 kOhm	15 kOhm	ok
RDC-2W	500 MOhm	100.035 MOhm	100.000 MOhm	-35 kOhm	-7	500 kOhm	19 kOhm	ok
RDC-2W	1 GOhm	0.8013 GOhm	0.8000 GOhm	-1.3 MOhm	-31	4.0 MOhm	1.6 MOhm	ok
Capacitance								
C-2W	1 nF	1.0040 nF	1.0000 nF	-4.0 pF	-20	20.0 pF	1.3 pF	ok
C-2W	10 nF	10.004 nF	10.000 nF	-4 pF	-8	50 pF	21 pF	ok
C-2W	100 nF	100.01 nF	100.00 nF	-8 pF	-1	1000 pF	543 pF	ok
C-2W	1 uF	0.9997 uF	1.0000 uF	0.3 nF	3	10.0 nF	2.1 nF	ok
C-2W	50 uF	10.000 uF	10.000 uF	0 nF	0	200 nF	21 nF	ok
C-2W	50 uF	50.00 uF	50.00 uF	1 nF	0	1000 nF	866 nF	ok
DC Current								
IDC	200 uA	190.0007 uA	190.0000 uA	-0.7 nA	-1	115.0 nA	3.1 nA	ok
IDC	200 uA	-189.9950 uA	-190.0000 uA	-5.0 nA	-4	115.0 nA	3.1 nA	ok
IDC	2 mA	1.899993 mA	1.900000 mA	0.007 uA	1	0.480 uA	0.031 uA	ok
IDC	2 mA	-1.899965 mA	-1.900000 mA	-0.035 uA	-7	0.480 uA	0.031 uA	ok
IDC	20 mA	19.000006 mA	19.000000 mA	-0.06 uA	-2	2.50 uA	0.33 uA	ok
IDC	20 mA	-18.99976 mA	-19.000000 mA	-0.24 uA	-10	2.50 uA	0.33 uA	ok
IDC	200 mA	20.0995 mA	20.1000 mA	0.5 uA	6	8.0 uA	1.8 uA	ok
IDC	200 mA	49.9999 mA	50.0000 mA	0.1 uA	1	11.0 uA	3.0 uA	ok
IDC	200 mA	99.9973 mA	100.0000 mA	2.7 uA	17	16.0 uA	2.6 uA	ok
IDC	200 mA	149.9975 mA	150.0000 mA	2.5 uA	12	21.0 uA	3.9 uA	ok
IDC	200 mA	189.9977 mA	190.0000 mA	2.3 uA	9	25.0 uA	5.0 uA	ok
IDC	200 mA	-190.0026 mA	-190.0000 mA	2.6 uA	10	25.0 uA	5.0 uA	ok
IDC	2 A	1.000022 A	1.000000 A	-0.022 mA	-9	0.250 mA	0.024 mA	ok
IDC	2 A	-1.000014 A	-1.000000 A	0.014 mA	5	0.250 mA	0.024 mA	ok
IDC	30 A	9.99670 A	10.00000 A	3.30 mA	49	6.80 mA	0.58 mA	ok
IDC	30 A	19.9964 A	20.0000 A	3.6 mA	32	11.5 mA	1.2 mA	ok
IDC	30 A	30.0067 A	30.0000 A	-6.7 mA	-42	16.2 mA	2.3 mA	ok
IDC	30 A	-19.9967 A	-20.0000 A	-3.3 mA	-29	11.5 mA	1.2 mA	ok
IDC	30 A	-30.0087 A	-30.0000 A	8.7 mA	54	16.2 mA	2.3 mA	ok
IDC	30 A	-9.99688 A	-10.00000 A	-3.12 mA	-46	6.80 mA	0.58 mA	ok
AC Current								
IAC	200 uA	189.993 uA; 120Hz	190.000 uA	7 nA	2	305 nA	85 nA	ok
IAC	2 mA	0.99996 mA; 120Hz	1.00000 mA	0.04 uA	5	0.90 uA	0.55 uA	ok
IAC	20 mA	9.9996 mA; 120Hz	10.0000 mA	0.4 uA	7	6.0 uA	5.5 uA	ok
IAC	200 mA	99.994 mA; 120Hz	100.000 mA	6 uA	10	60 uA	18 uA	ok
IAC	2 A	0.99997 A; 120Hz	1.00000 A	0.03 mA	5	0.60 mA	0.18 mA	ok
IAC	30 A	9.9974 A; 60Hz	10.0000 A	2.6 mA	14	19.0 mA	2.1 mA	ok
IAC	30 A	19.9979 A; 60Hz	20.0000 A	2.1 mA	7	32.0 mA	4.9 mA	ok
IAC	30 A	30.0101 A; 60Hz	30.0000 A	-10.1 mA	-23	45.0 mA	6.5 mA	ok
AC Power, Frequency = 60Hz								
P-PF1	480 W	100.006 W; 240V	100.000 W	-6 mW	-7	90 mW	58 mW	ok
P-PF1	480 W	480.03 W; 240V	480.00 W	-32 mW	-9	341 mW	277 mW	ok
P-PF1	2.4 kW	2.0000 kW; 240V	2.0000 kW	-0.0 W	-1	3.6 W	1.2 W	ok
P-PF0.5L	240 W	219.89 W; 240V	220.00 W	110 mW	11	1012 mW	127 mW	ok
P-PF0.5L	1.2 kW	1.09876 kW; 240V	1.10000 kW	1.24 W	23	5.31 W	0.63 W	ok
P-PF0.5L	240 W	220.17 W; 240V	220.00 W	-169 mW	-17	1012 mW	127 mW	ok
P-PF0.5L	1.2 kW	1.10094 kW; 240V	1.10000 kW	-0.94 W	-18	5.31 W	0.65 W	ok
Frequency								

Measurement Results:

Funct.	Range	Standard	UUT	Deviation	%spe	Allowed	Unct. k=2	ok
FREQ1	20 Hz	17.99999 Hz	18.00000 Hz	0.01 mHz	1	0.90 mHz	0.10 mHz	ok
FREQ1	200 Hz	99.99990 Hz	100.00000 Hz	0.10 mHz	2	5.00 mHz	0.58 mHz	ok
FREQ1	200 Hz	179.9999 Hz	180.0000 Hz	0.1 mHz	1	9.0 mHz	1.0 mHz	ok
FREQ1	2 kHz	0.9999990 kHz	1.0000000 kHz	0.0010 Hz	2	0.0500 Hz	0.0058 Hz	ok
FREQ1	2 kHz	1.799999 kHz	1.800000 kHz	0.001 Hz	1	0.090 Hz	0.010 Hz	ok
FREQ1	20 kHz	9.999990 kHz	10.000000 kHz	0.010 Hz	2	0.500 Hz	0.058 Hz	ok
FREQ1	20 kHz	17.99999 kHz	18.00000 kHz	0.01 Hz	1	0.90 Hz	0.10 Hz	ok
FREQ1	200 kHz	99.99990 kHz	100.00000 kHz	0.10 Hz	2	5.00 Hz	0.58 Hz	ok
FREQ1	200 kHz	179.9999 kHz	180.0000 kHz	0.1 Hz	1	9.0 Hz	1.0 Hz	ok
FREQ1	2 MHz	0.9999990 MHz	1.0000000 MHz	0.0010 kHz	2	0.0500 kHz	0.0058 kHz	ok
FREQ1	2 MHz	1.799999 MHz	1.800000 MHz	0.001 kHz	1	0.090 kHz	0.010 kHz	ok
FREQ1	20 MHz	9.999990 MHz	10.000000 MHz	0.010 kHz	2	0.500 kHz	0.058 kHz	ok
FREQ1	20 MHz	17.99999 MHz	18.00000 MHz	0.02 kHz	2	0.90 kHz	0.10 kHz	ok

Meter

DC Voltage

VDC-2W	20 mV	0.9999 mV	1.0029 mV	2.94 uV	41	7.20 uV	0.32 uV	ok
VDC-2W	20 mV	18.9989 mV	19.0007 mV	1.87 uV	17	10.80 uV	0.36 uV	ok
VDC-2W	20 mV	-19.0006 mV	-18.9982 mV	2.39 uV	22	10.80 uV	0.35 uV	ok
VDC-2W	200 mV	100.000 mV	100.001 mV	1.57 uV	6	27.00 uV	0.96 uV	ok
VDC-2W	200 mV	189.996 mV	190.002 mV	6.2 uV	14	45.0 uV	1.3 uV	ok
VDC-2W	200 mV	-190.005 mV	-190.007 mV	-2.0 uV	-4	45.0 uV	1.5 uV	ok
VDC-2W	2 V	1.00000 V	1.00001 V	0.0144 mV	7	0.2070 mV	0.0087 mV	ok
VDC-2W	2 V	1.90000 V	1.90002 V	0.024 mV	6	0.387 mV	0.010 mV	ok
VDC-2W	2 V	-1.90000 V	-1.89996 V	0.041 mV	11	0.387 mV	0.010 mV	ok
VDC-2W	12 V	2.1000 V	2.1000 V	-0.010 mV	-2	0.510 mV	0.063 mV	ok
VDC-2W	12 V	4.0000 V	3.9999 V	-0.136 mV	-20	0.700 mV	0.066 mV	ok
VDC-2W	12 V	6.0000 V	6.0003 V	0.345 mV	38	0.900 mV	0.069 mV	ok
VDC-2W	12 V	8.0000 V	8.0001 V	0.126 mV	11	1.100 mV	0.073 mV	ok
VDC-2W	12 V	10.0000 V	10.0001 V	0.122 mV	9	1.300 mV	0.078 mV	ok
VDC-2W	12 V	-10.0000 V	-9.9996 V	0.439 mV	34	1.300 mV	0.078 mV	ok

DC Current

IDC	20 mA	5.00019 mA	4.99972 mA	-0.48 uA	-46	1.05 uA	0.13 uA	ok
IDC	20 mA	19.00050 mA	19.00024 mA	-0.25 uA	-8	3.15 uA	0.34 uA	ok
IDC	20 mA	-18.99979 mA	-19.00008 mA	-0.28 uA	-9	3.15 uA	0.34 uA	ok

Frequency

FREQ1	15 kHz	0.04999991 kHz	0.05000000 kHz	0.00009 Hz	4	0.00250 Hz	0.00031 Hz	ok
FREQ1	15 kHz	0.09999990 kHz	0.10000020 kHz	0.00030 Hz	6	0.00500 Hz	0.00058 Hz	ok
FREQ1	15 kHz	0.9999990 kHz	0.9999998 kHz	0.0008 Hz	2	0.0500 Hz	0.0058 Hz	ok
FREQ1	15 kHz	4.999996 kHz	4.999999 kHz	0.003 Hz	1	0.250 Hz	0.029 Hz	ok
FREQ1	15 kHz	9.999990 kHz	9.999999 kHz	0.009 Hz	2	0.500 Hz	0.058 Hz	ok
FREQ1	15 kHz	13.999990 kHz	13.999990 kHz	0.000 Hz	0	0.700 Hz	0.081 Hz	ok

DC 4W Resistance

RDC-4W	2 kOhm	0.0100000 kOhm	0.0100055 kOhm	0.0055 Ohm	46	0.0120 Ohm	0.0038 Ohm	ok
RDC-4W	2 kOhm	0.0500000 kOhm	0.0500094 kOhm	0.0094 Ohm	47	0.0200 Ohm	0.0052 Ohm	ok
RDC-4W	2 kOhm	0.1000000 kOhm	0.1000105 kOhm	0.0105 Ohm	35	0.0300 Ohm	0.0069 Ohm	ok
RDC-4W	2 kOhm	1.000000 kOhm	1.000061 kOhm	0.061 Ohm	29	0.210 Ohm	0.058 Ohm	ok
RDC-4W	2 kOhm	0.500000 kOhm	0.500047 kOhm	0.047 Ohm	43	0.110 Ohm	0.029 Ohm	ok
RDC-4W	2 kOhm	2.00000 kOhm	2.00017 kOhm	0.17 Ohm	41	0.41 Ohm	0.12 Ohm	ok

ok ... passed

Statement of Compliance:

Passed