Multifunction Calibrators
OCM143, OCM143-i

1000 V and 20 A

- ✓ Wide Voltage Range 0 to 1000V DC/AC, Accuracy 0.01%
- ✓ Current Range 0 to 20A DC/AC, Accuracy 0.02% (OCM143)
- ✓ Current Range 0 to 2A DC/AC (OCM143-i)
- ✓ Sinusoidal and Non-Sinusoidal waveforms
- ✓ Up to 1000A with Current Booster for calibration of Clamp meters
- ✓ Firm Standard Resistors 10 Ohm to 100 MOhm
- ✓ Simulation of DIN Thermocouples R, S, B, J, T, E, K, N
- ✓ Simulation of RTD Sensors
- ✓ Data Ports RS232, Option IEEE488

OCM143/143-i Multifunction Calibrators are cost saving solutions for calibration of instrumentation for electric quantities up to 1000 V and 20A (2A with OCM143-i). They offer basic accuracy 0.01% in DC voltage ranges which is required for calibration of 4½ digit multimeters.

Firm eight resistors from 10 Ω to 100 MΩ are available for calibration purposes.

Temperature Sensors are simulated for DIN Thermocouples with automatic cold junction compensation. RTD Simulation of Pt and Ni is optionally available.

The junction is automatically compensated by internal Pt-1000. The accuracy for Thermocouples is between 0.1 and 2.7 ºC, for RTD (Option) between 0.1 and 0.2 ºC.

The LCD display informs about the selected signal type and its magnitude, accuracy, menu parameters and the selection of the interface,

Interface RS232 or optional GPIB Interface Bus enable automated operation in remote mode. The Orbit Controls Software package CALIBER/ WinQbase can be used for automated calibration.

SPECIFICATIONS (Reference Temperature 20°C … 25°C)

DC/AC SINE Wave Voltage

Voltage Range:	0.0000 mV - 1000.00 V DC, 1.0000 mV - 1000.00 V AC
Internal ranges:	100 mV, 1 V, 10 V, 100 V, and 1000 V
Resolution:	5½ digits
Frequency range in AC mode:	1 mV - 10 V from 20 Hz to 2 kHz, 10 V - 1000 V from 40 Hz to 1 kHz
Accuracy of frequency:	0.01%
Resolution of frequency setting:	5½ digits

Voltage Accuracy

DC Voltage		AC Voltage		
Range	% of value + % of range	Range	% of value + % of range	% of value + % of range
			20.000 Hz-200.000 Hz	200.000 Hz-2000.00 Hz*1
0.0000 mV-10.0000 mV	0.050 + 0.070	1.0000 mV-10.0000 mV	0.20 + 0.25	0.20 + 0.30
10.000 mV-100.000 mV	0.010 + 0.0070	10.000 mV-100.000 mV	0.10 + 0.05	0.15 + 0.07
0.10000 V-1.00000 V	0.006 + 0.0010	0.10000 V-1.00000 V	0.05 + 0.005	0.07 + 0.03
1.0000 V-10.0000 V	0.006 + 0.0005	1.0000 V-10.0000 V	0.05 + 0.005	0.07 + 0.03
10.000 V-100.000 V	0.006 + 0.0010	10.000 V-100.000 V	0.05 + 0.010	0.07 + 0.03
100.00 V-1000.00 V	0.010 + 0.0020	100.00 V-1000.00 V	0.07 + 0.020	0.10 + 0.03

*1 voltage ranges 100V and 1000V from 40 Hz to 1kHz

Auxiliary Parameters

Range	10mV	100mV	1V	10V	100V	1000V
THD*2	0,05% + 200 μV	0,05% + 300 μV	0,05%	0,05%	0,10%	0,15%
Maximum Output Current	3 mADC *3 3 mAAC *3	5 mADC 5 mAAC	20 mADC 10 mAAC	50 mADC 50 mAAC	20 mADC 10 mAAC	2 mADC 1.5 mAAC
Output Impedance	< 10 mΩ	< 10 mΩ	< 10 mΩ	< 10 mΩ	< 100 mΩ	< 100 mΩ
Maximum Capacitance Load	500 pF	500 pF	500 pF	500 pF	300 pF	150 pF

*2 the parameter includes non-linear distortion and non-harmonic noise in frequency range to 100 kHz

*3 Load Resistance > 50 Ohm in a frequency range 2kHz to 10kHz

NON-SINE Wave Voltage

Voltage range: 1.0000 mV_{p-p} - 10.0000 V_{p-p}
Waveform type: saw, triangle, square symmetrical, truncated sine
Frequency range: 20.000 to 80.000 Hz, Accuracy 0.01%
Accuracy of Frequency: 0.3 %

DC/AC SINE Wave Current

Current range summary: OCM143: 0.000 μA - 20.000 A DC, 1.000 μA - 20.000 A AC §
OCM143-i: 0.000 μA - 2.000 A DC, 1.000 μA - 2.000 A AC
Internal ranges: 200 μA, 2 mA, 20 mA, 200 mA, 2 A, 20 A
Frequency range in AC mode: 20 Hz to 1 kHz, accuracy of frequency 0.01%

Current Accuracy

DC Current		AC Current		
Range	**% of value + % of range**	**Range**	**% of value + % of range**	**% of value + % z range**
			20.000 Hz-200.000 Hz	**200.000 Hz-1000.00 Hz*3**
0.000 μA - 200.000 μA	0.050 + 0.010	1.000 μA-200.000 μA	0.25 + 0.010	0.20 + 0.10
0.20000 mA - 2.00000 mA	0.025 + 0.005	0.20000 mA-2.00000 mA	0.10 + 0.010	0.10 + 0.02
2.0000 mA - 22.0000 mA	0.015 + 0.003	2.0000 mA-20.0000 mA	0.07 + 0.005	0.10 + 0.02
22.000 mA - 200.000 mA	0.015 + 0.003	20.000 mA-200.000 mA	0.07 + 0.005	0.10 + 0.02
0.2000 A - 2.0000 A	0.015 + 0.005	0.2000 mA-2.0000 A	0.10 + 0.005	0.15 + 0.05
2.0000 A - 20.000 A	0.1 + 0.01	2.0000 mA-20.000 A	0.20 + 0.015	0.25 + 0.05

*3 current range 20 A from 20 Hz to 500 Hz. Maximum loading time is 5 minutes.
OCM143i has maximum output current 2A

Auxiliary Parameters

Range	200 μA	2 mA	20 mA	200 mA	2 A	20 A
Maximum inductive load	400 μH	400 μH	400 μH	400 μH	200 μH	200 μH
Maximum compliance voltage (p-p)	2 V	2 V	2 V_{AC}, 7 V_{DC}	2 V	2 V	1.5 V
THD[*3]	0,15%	0,10%	0,10%	0,10%	0,20%	0,40%

[*3] The parameter includes non-linear distortion and non-harmonic noise in frequency range to 100 kHz

NON-SINE Wave Current

Current range: 100.000 μAp-p – 2.000 00 Ap-p
Waveform type: saw, triangle, square sym. truncated sine
Frequency range: 20.000 to 80.000 Hz
Amplitude accuracy: 0.3 %
Frequency accuracy: 0.01 %

RESISTANCE

Number of resistances: 8
Range: 10 Ω to 100 MΩ
Calibration value resolution: 5 dig
Maximal test voltage: 50 V RMS or 0.1W, which is lower
Type of connection: two-wire

Accuracy

Nominal value (Ω)	10	100	1 k	10 k	100k	1M	10M	100M
Max. Calibration difference to nominal value (%)	5	1	0.5	0.5	0.5	0.5	1	5
Accuracy of calibration value (%)	0.03+25 mΩ	0.05	0.02	0.02	0.02	0.05	0.05	0.5

*TC and RTD[*4] Temperature Simulation*

TC Sensor Types: R, S, B, J, T, E, K, N
Temperature Range: -250.0 °C to +1820.0 °C depending on type
Cold Junction Compensation: -5.0 °C to 50.0 °C with external temperature sensor
Compensation Accuracy: 0.2 °C

RTD Sensor Types: Pt 1.385, Pt 1.392, Ni
Temperature Range: -200.0 °C to +850.0 °C depending on sensor type
Range of R0: 100 Ω to 1000 Ω
Type of Termination: Four Wire
Temperature Scale: IPTS68, ITS90
Temperature Units: °C, °F
Resolution of Temperature Setting: 0.1 °C/°F

Accuracy

TC sensor simulation			RTD sensor simulation [*5]		
Thermocouple Type	**Temperature Range [°C]**	**Uncertainty [°C]**	**Temperature Sensor**	**Temperature Range [°C]**	**Uncertainty [°C]**
R	-50.0 to +1767.0	1.2 to 2.5	*Pt100 - Pt200*	*-200.0 … 0.0*	*0.2*
S	-50.0 to +1767.0	1.5 to 2.2	*Pt100 - Pt200*	*0.0 … 850.0*	*0.1*
B	400.0 to +1820.0	1.3 to 2.7	*Pt200 - Pt1000*	*-200.0 … 0.0*	*0.1*
J	-210.0 to +1200.0	0.3 to 0.9	*Pt200 - Pt1000*	*0.0 … 850.0*	*0.1*
T	-200.0 to +400.0	0.3 to 0.9	*Ni100 - Ni200*	*-60.0 … 0.0*	*0.2*
E	-250.0 to +1000.0	0.2 to 1.7	*Ni100 - Ni200*	*0.0 … 300.0*	*0.1*
K	-200.0 to +1372.0	0.4 to 0.8	*Ni200 - Ni1000*	*-60.0 … 0.0*	*0.1*
N	-200.0 to +1300.0	0.5 to 1.3	*Ni200 - Ni1000*	*0.0 … 300.0*	*0.1*

[*4] RTD sensor simulation is optionally available

[*5] Specifications valid for four-wire termination

Frequency Output

Waveform type:	positive $5V_{pk}$ /50 Ohm (TTL)
Amplitude accuracy:	10 %
Frequency range:	0.100 0 Hz to 2.000 00 MHz
Frequency accuracy:	0.01 %

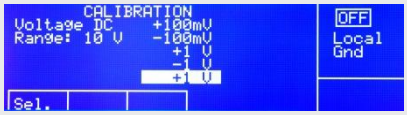
General Specifications

Reference temperature range:	23 °C ± 2 °C (for above shown uncertainties)
Relative humidity:	<80 % to 30 °C, <70 % to 40 °C, <40 % to 50 °C
Temperature coefficient:	In extended temperature range +5 °C to +40 °C multiply uncertainty parameters 0.15x / °C
Absolute Accuracy Definition:	The specifications include stability, temperature coefficient, linearity, line and load regulation and traceability with factory standards used for calibration.
Specification confidence interval:	99 %
Safety standards:	Complies with EN/IEC 61010-1:2001
Temperature Ranges:	working: +10 °C … +40 °C, storing: - 20 °C … +50 °C
Power supply:	115/230V - 50/60 Hz, 250 VA max.
Dimensions (W x H x D):	325 x 111 x 316 mm, weight 9kg

Presence of dangerous voltage over 100 V at the output terminals is indicated with „⚡" at the display and with beeping.

AC/DC maximal output current is 20 A. Continuous Output Current in ranges 10 to 20 A is timely limited.

Two temperature scales PTS68 and ITS90 and two Pt-Sensors PT 1.385 and PT 1.392 can be selected.



Re-Calibration of OCM143 is simple and user-friendly. Access to calibration values is protected with a password.

Option 140-50 Current coil with multiplying coefficient x25 and x50 is used for calibration of clamp amperemeters up to 1000 A at 50/60 Hz.

Option 143-60 Cable adapter is designed for simulation of RTD temperature sensors. Option 143-60 is included in the delivery when the RTD Simulator is ordered.

External temperature sensor Pt1000 can be used for automatic compensation of cold junction of simulated thermocouple sensors. It is included in the standard delivery.

TO ORDER

OCM143	Multifunction Calibrator 1000V/20A with RS232 interface
OCM143 RTD	Multifunction Calibrator 1000V/20A with RS232 interface and RTD option 143-60
OCM143 GPIB	Multifunction Calibrator 1000V/20A with RS232/GPIB interface
OCM143 GPIB/RTD	Multifunction Calibrator 1000V/20A with RS232/GPIB interface and RTD option143-60

OPTIONS upon extra order

Option 140-50	Current Coil

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