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COMMUNICATION RESEARCH CORP.
manufacturer of precision test and measurement equipment

Multifunction Calibrator - Model 808(

- **Current Calibrator to 20 A**
- **Voltage Calibrator to 1000 V**
- **Power Calibrator to 2400 W**
- **Exceptional Uncertainties**
- **Extremely User Friendly**
- **NIST Traceable**

Description

The Multifunction Calibrator Model 8080 functions as a Voltage Calibrator, Current Calibrator, Pow Resistance Calibrator, Capacitance Calibrator and a Thermocouple Calibrator. Having very low ur ideal as a standard of these electric quantities in calibration laboratories. It also has the feature of several different waveshapes in additional to the traditional sinusoidal output. This feature makes testing meters which are true rms reading or crest factor sensitive. These signals are also suitable calibration of oscilloscopes. The calibrator has the capability of measuring temperature with TC an temperature sensors. A built-in multimeter can be used independently or in simultaneous operatior calibrator output.

Basic Functions

In the Voltage Calibrator mode, the Multifunction Calibrator generates DC/AC voltages up to 1000 Current Calibrator mode it generates DC/AC currents up to 20 A . Using a 50-turn transformer, the range can be extended to 500 A. The best accuracy of the calibrator on DC voltage ranges is 0.00 voltage ranges 0.03%, on DC current ranges 0.013% and on AC current ranges 0.055%. The frequ

from 20 Hz to 50 kHz. The calibrator can generate periodic non-harmonic signals with a defined cr signals can be used to test the sensitivity of multimeters to distorted signals. The Multifunction Cal simulates both resistance and capacitance. The resistance range extends to 50 MOhm and the ca range is from 1 nF to 50 µF. The precision of both quantities is sufficient for the calibration of com hand-held multimeters. The basic accuracy of the resistance ranges and capacitance ranges is 0.(respectively. The resistance calibration may be used with both DC and AC signals up to 1 kHz.

The frequency function of the calibrator makes it possible to generate a square wave signal with a calibrated duty cycle, frequency and amplitude in the range from 1 mV to 10 V in the frequency bar kHz. In the HF mode a square wave signal up to 20 MHz with a very low risetime can be generate frequency function is suitable for the calibrations of corresponding frequency ranges of multimeters calibration of the channel sensitivities and time bases of the oscilloscopes.

In the Power Calibration mode, the Model 8080 can be used as a source to calibrate DC and sing watt meters, power analyzers, and energy meters. In this mode, the output voltage can be set up t output current up to 10A, and the the power factor in range from -1 to +1 in the frequency band fro Hz. The current capability of the voltage output is 30 mA so that analog watt meters, which usually input impedances at their voltage input, may be calibrated.. For calibration of thermometers and te regulators, the temperature function is simulated by the Multifunction Calibrator. It is able to simula commonly used Pt and Ni resistance sensors as well as TC sensors of the R, S, B, J, T, E, K and Compensation of the TC cold junction is made either by entering a value from the keyboard, or aut measuring the ambient temperature with a Pt-100 sensor. The precision of the simulated resistanc sensors depends on set value and type of the sensor. For resistance sensors the uncertainty banc from 0.04 °C to 0.5 °C, for TC sensors from 0.4°C to 4.0 °C.

Built-in multimeter

An internal multimeter with basic ranges of 20 mA, 200 mV, 10 V and 2 kOhm is a standard featur Multifunction Calibrator. With an accuracy of 0.01%, it enables the user to measure the output sigr types of transducers. With external strain gauge sensors, pressure, torsion, strength, etc. can be displayed.

Calibrator - Tester

The Multifunction Calibrator can be used both as a precision signal source for a device under test to measure the resultant voltages generated by the device. Programmable capability of the calibrat user to set 10 steps of a testing procedure. The testing can run automatically, and after it is compl PASS/FAIL status is displayed. With the testing function, isolated relay contacts activated by the F make it possible to control other equipment.

User friendly

The Model 8080 Calibrator is equipped with a number of other functions which make it extremely e Among them, are the capability to set relative deviations from the actual value of the selected outp continuous displaying of the output signal uncertainty, and the internal calibration procedure. The l read, comprehensive luminescent display contains all of the necessary information to set up any o Multifunction Calibrator's functions. In addition, frequently used functions have specific keys assign The calibrator is equipped with the IEEE-488.2 interface and with the RS-232 serial interface.

Operation

The operation of the Model 8080 display, front panel keyboard and front panel terminals can be se by clicking on the links below.

Display	Front panel keyboard	Front panel te

Specifications

DC voltage

(1 digit in 2,000,000 resolution)

range	% of value + % of range
0 µV - 20 mV	0.05 + 0.0 + 10 µV
20 mV - 200 mV	0.01 + 0.0 + 10 µV
200 mV - 2 V	0.003 + 0.0008
2 V - 20 V	0.003 + 0.0005
20 V - 240 V	0.003 + 0.0005
240 V - 1000 V	0.005 + 0.005

AC voltage

(1 digit in 2,000,000 resolution)

range	% of value + % of range	% of value + % of range
	20 Hz - 10 kHz	*10 kHz - 50 kHz*
1 mV - 20 mV	0.20 + 0.05 + 20 µV	0.20 + 0.10 + 20 µV
20mV - 200mV	0.1 + 0.03 + 20 µV	0.15 + 0.05 + 20 µV
200 mV - 2 V	0.025 + 0.005	0.05 + 0.01
2 V - 20 V	0.025 + 0.005	0.05 + 0.03
20 V - 240 V	0.025 + 0.010	- -
240 V - 1000 V	0.03 + 0.02 *	- -

* valid for f < 1000 Hz

DC current

(1 digit in 2,000,000 resolution)

range	% of value + % of range
1 µA - 200 µA	0.05 + 0.0 + 20 nA
200 µA - 2 mA	0.02 + 0.005
2 mA - 20 mA	0.01 + 0.003
20 mA - 200 mA	0.01 + 0.003
200 mA - 2 A	0.015 + 0.005
2 A - 20 A	0.02 + 0.010

AC current

(1 digit in 2,000,000 resolution)

range	% of value + % of range	% of value + % of range
	20 Hz - 1 kHz	*1 kHz - 5 kHz*
1 µA - 200 µA	0.15 + 0.0 + 20 nA	0.30 + 0.10 + 20 nA
200 µA - 2 mA	0.07 + 0.01	0.20 + 0.05
2 mA - 20 mA	0.05 + 0.005	0.20 + 0.05
20 mA - 200 mA	0.05 + 0.005	0.20 + 0.05
200 mA - 2 A	0.05 + 0.005	- -
2 A - 20 A	0.10 + 0.03	- -

When option 130-50 Current coil is used, add uncertainty 0.3 % of the set current to the value specified in the above table. Output current is multiplied by factor 50.

Resistance (4-wire)

(1 digit in 20,000 resolution)

range	% of value
0 Ohm - 100 Ohm	0.03 + 10 mOhm
100 Ohm - 400 Ohm	0.015
400 Ohm - 2 kOhm	0.015
2 kOhm - 10 kOhm	0.015
10 kOhm - 40 kOhm	0.015
40 kOhm - 200 kOhm	0.015
200 kOhm - 1 MOhm	0.05
1 MOhm - 4 MOhm	0.1
4 MOhm - 20 MOhm	0.2
20 MOhm - 50 MOhm	0.5

Maximum allowed voltage on the load is 8 Vpk.

Capacitance (4-wire)

(1 digit in 20,000 resolution)

range	% of value
900 pF - 2.5 nF	0.5 + 15 pF
2.5 nF - 10 nF	0.5 + 5 pF
10 nF - 50 nF	0.5
50 nF - 250 nF	0.5
250 nF - 1 µF	0.5
1 µF - 3.5 µF	1.0
3.5 µF - 5 µF	1.0
5 µF - 10 µF	1.5
10 µF - 50 µF	2.0

Maximum allowed voltage on the load is 8 Vpk.

Frequency

(1 digit in 2,000,000 resolution)

type	PWM (pos, neg, sym)	HF *
range	0.1 Hz - 100 kHz	0.1 Hz - 20 MHz
frequency unc. (%)	0.005	0.005
amplitude	1 mV - 10 V	2 V
amplitude unc. (%)	0.1	10
ratio	0.00 - 1.00	- -
ratio unc.(%)	0.05	- -

* Rise time < 5 ns

DC power, energy

(1 digit in 2,000,000 resolution)

quantity	range	% of value + % of range
voltage	200 mV - 240 V	see voltage table
current	2 mA - 10 A	0.05 + 0.01

AC power, energy

(1 digit in 2,000,000 resolution)

quantity	range	uncertainty
voltage	200 mV - 240 V	see voltage table

current	2 mA - 10 A	0.05 % + 0.01 %
frequency	40 Hz - 400 Hz	0.005
power factor	-1 - +1	0.005 - 0.0005
phase	0 - 360 °	0.15 ° - 0.25 °

Setting time in energy mode 10 s - 1999 s.
Uncertainty of AC power depends on set value of voltage, current, phase. The best uncertainty is 0.08 %. Uncertainty in energy mode depends on set value of voltage, current, phase and time. The best uncertainty is 0.09 %.

Resistance temperature sensor simulation

types	Pt 1.385, Pt 1.392, Ni
range of R0	20 Ohm - 2 kOhm
range of temperature	-200 °C - 850 °C
temperature uncertainty	0.04 °C - 0.5 °C
temperature scale	ITS 90, PTS 68

Thermocouple simulation

types	R, S, B, J, T, E, K, N
range of temperature	-250 °C - 1820 °C
temperature uncertainty	0.4 °C - 4.0 °C
temperature scale	ITS 90, PTS 68

Multimeter

quantity	range	uncertainty
VDC (DC voltage)	0 - ± 12 V	0.01 % + 100 µV
mVDC (DC voltage)	0 - ± 2000 mV	0.01 % + 10 µV
mADC (DC current)	0 - ± 25 mA	0.02 % + 1 µA
FREQ (Frequency)	1 Hz - 15 kHz	0.005 %
R4W (Resistance)	0 - 2 kOhm	0.02 % + 100 mOhm
TRTD (RTD sensors)	-150 - +600 °C	0.1 °C
TTC (TC sensors)	-250 - +1820 °C	0.4 - 4 °C
SGS (strain gauge sensor) *	depends on sensor	0.01 % + 10 µV + sensor unc.

* Supplying voltage 2 to 10 V DC, max. current 40 mA, input resistance > 100 MOhm
sensitivity 0.5 - 100 mV/V, displayed unit settable

Accessories included

Power line cable	1 pc
Operation manual	1 pc
Option 10/11 Test cable	2 pcs
Option 40	1 pc

Test cable for built-in multimeter, 2 banana terminals for DC voltage and current measurement.

Option 60 1 pc

Test cable for built-in multimeter, 4 banana terminals for

resistance measurement as well as Pt/Ni sensor temperature measurement.

Option 70 1 pc

4-wire resistance adapter. The adapter provides a four wire return to the calibrator for making resistance measurements.

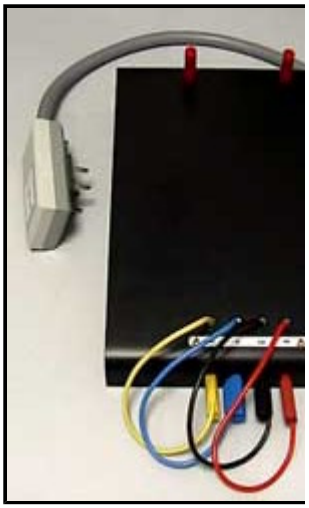
Optional Accessories

Option 130-50 Current coil 50 turns. Suitable for clamp-on Current transformer testing.

Option 140-01 Cable adapter for multimeters.

The adapter provides support for the meter under test as well as a simple cable connection to the calibrator front panel terminals.

The Adapter is equipped with a built-in Pt-100 temperature sensor. The internal meter can measure ambient temperature and display it on the screen and automatically make cold junction compensation when the TC temperature sensor simulation is selected.



Option 140-41 Cable adapter for simultaneous applications.

Cable adapter is designed for low-voltage/current aplications to 20 VDC and 200 mADC. There are two fields on the adapter. The first contains terminals with the calibrator output signals, the second contains internal multimeter input terminals.

	Various calibration tasks can be fulfilled with the adapter, especially measurements where simultaneous generation of the calibrated signal and response of unit under test are required. With the adapter, temperatures of external TC temperature sensors can be measured and displayed.
Option 140-02	Set of cables and adapters. It includes Option 140-01, Option 140-41, Option 10 2pcs, Option 11 2pcs, Option 20, Option 30, Option 40, Option 60, Option 70
Option 10	Test cable 20A/1000V (black)
Option 11	Test cable 20A/1000V (red)
Option 20	Test cable BNC/BNC 1m
Option 30	Test cable BNC/banana 1m
Cable GPIB	IEEE-488, 2m
Cable RS-232	RS-232, 2m

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clarke-hess
43-24 21 Street, Long Island City, NY 11101
Phone: (718) 784-0445 Fax: (718) 784-2438