



Multifunction Calibrator

- DCV, ACV, DCI, ACI and Ω Functions
- True 1kV AC Performance from a Single Unit
- Configurable to Meet Individual Requirements
- IEEE-488, Autocal, 4101B and 4600 Compatible
- Calibrates DMMs of up to 6½ Digit Scale Length

Some 90% or more of the typical calibration facility DMM workload consists of a range of instruments, varying in performance and capabilities, from simple handheld multimeters to the latest generation of mid-performance 5½ and 6½ digit systems DMMs. For these instruments, the model 4700 offers the most cost-effective calibration solution available, offering the necessary performance at an economic price.

DC and AC Voltage

The standard instrument will source DC voltages from 10nV to 200V with total 90 day, $\pm 1^\circ\text{C}$ uncertainties to 9 ppm, which provides a sufficient margin of accuracy over the latest generation of mid-performance half and full rack systems DMMs. With AC voltages from 90 μV to 200V to within 240 ppm, the 4700 is capable of calibrating all but the most accurate AC-measuring meters. The output capability of both functions may be extended to 1100V by the high voltage option. This is installed inside the unit and is capable of sourcing,

from one single, compact unit, the high voltage-high frequency test points required by today's systems DMMs.

Resistance and Current

Fully floating, high accuracy DC and AC currents are generated using a voltage to current converter which incorporates specially developed low loss shunts and is driven from either the DCV or ACV sections of the calibrator. For applications that require higher currents, such as the calibration of handheld multimeters, the model 4600 Transconductance Amplifier extends the current functions to 11A. Resistance outputs are derived from eight fixed value, hermetically sealed standard resistors, each being 4-wire or 2-wire connected to the output terminals, using ultra high isolation relay switches.

Flexibility and Ease of Use

A major design objective of the 4700 was to make it simple and straightforward to operate. Rapid rolling up/down keys are used for fast and easy setting of amplitude and frequency. The selected output is displayed at all times

on a high brightness display, while the patented spec. readout feature eliminates the need to make complex and tedious calculations of the accuracy of the applied signal. Deviation controls—Error and Offset—enable the output of the calibrator to differ from that indicated on the display, useful for checking the linearity and calibration of measuring instruments.

The 4700 is not limited to applications inside the calibration laboratory. Its rugged construction and insensitivity to temperature variations (specifications are available for $23^\circ\text{C} \pm 10^\circ\text{C}$ operation) mean that the instrument is equally suited to applications outside of the traditional calibration environment. As an accurate test source or stimulus, the 4700 provides a very cost effective solution to meet the growing requirements in A.T.E.s for improved test accuracy and confidence. For example, the basic 4700—without any options—can be installed as an integral source within an ATE rack to provide accurate, stable, programmable DC and AC voltages up to 200V.

In addition, the instrument is compatible with the Datron 4101B Multimeter Calibration software package. Together, the 4700 (optionally configured with the model 4600) and 4101B can form the basis of a compact, rugged and highly versatile automated calibration system capable of calibrating any multimeter from simple handhelds up to 5½ and 6½ digit systems DMMs.

VOLTAGE

DC Voltage

Ranges: 100µV to 1000V in decades.
Full scale: 2 x range except 1000V range, where max output=1100V.
Resolution: 1 digit in 19,999,999 or 10nV, whichever is greater.
Total Uncertainty: 90 day, 23° ±1°C (±ppm Output ±µV).
 100µV to 100 mV Ranges: 15±1.8.
 1V Range: 12±1.6.
 10V Range: 8.5±1.0.
 100V Range: 13±200.
 1000V Range (Option 10): 16±1 mV.
Sensing: Selectable remote/local sensing on 1V to 1000V ranges.
Guarding: Selectable remote/local guarding.
Settling Time: <1s to 10ppm of step size.
Output Impedance/Max output current: 100µV to 100 mV ranges: 100Ω.
 1V to 1000V range: 25 mA max.

AC Voltage

Ranges: 1 mV to 1000V in decades.
Full scale: 2 x range except 1000V range, where max output=1100V.
Resolution: 1 digit in 1,999,999 or 100nV, whichever is greater.
Frequency: Ranges: 100Hz to 1MHz in decade steps. Resolution: 1% of range. Accuracy <±100ppm.
Sensing: Selectable remote/local sensing on 1V to 1000V ranges.
Guarding: Selectable remote/local guarding.
Maximum Capacitive Load: 1000pF on 1V to 100V ranges, 300pF on 1000V range.
Total Uncertainty: 90 day, 23° ±1°C (±ppm Output ±µV).
1mV Range
 10 to 31 Hz: 330±22.
 32 Hz to 33 kHz: 430±20.
 30 to 100 kHz: 0.11%±21.
 100 to 330 kHz: 0.27%±32.
 300k to 1 MHz: 0.7%±46.
10mV Range
 10 to 31 Hz: 330±23.
 32 Hz to 33 kHz: 430±21.
 30 to 100 kHz: 0.11%±22.
 100 to 330 kHz: 0.27%±36.
 300k to 1 MHz: 0.7%±82.
100mV Range
 10 to 31 Hz: 330±34.
 32 Hz to 33 kHz: 430±28.
 30 to 100 kHz: 0.11%±33.
 100 to 330 kHz: 0.27%±72.
 300k to 1 MHz: 0.7%±442.
1V Range
 10 to 31 Hz: 330±80.
 32 Hz to 33 kHz: 220±40.
 30 to 100 kHz: 340±60.
 100 to 330 kHz: 850±400.
 300k to 1 MHz: 0.48%±2mV.
10V Range
 10 to 31 Hz: 330±800.
 32 Hz to 33 kHz: 220±400.
 30 to 100 kHz: 340±600.
 100 to 330 kHz: 850±4 mV.
 300k to 1 MHz: 0.48%±20mV.

100V Range

10 to 31 Hz: 330±8 mV.
 32 Hz to 33 kHz: 230±4 mV.
 30 to 100 kHz: 420±8 mV.
1000V Range (Option 10)
 45 to 330 Hz: 370±100 mV.
 300 Hz to 10 kHz: 290±100 mV.
 10 to 33 kHz: 430±100 mV.
Settling times: To 100ppm of step size.
 10 to 32 Hz: <10s.
 33 to 330 Hz: <3s.
 >330 Hz: <1s.

DC Current (Option 20)

Ranges: 100µA to 1A in decades.
Full scale: 2 x range.
Resolution: 1 digit in 1,999,999 or 100pA, whichever is greater.
Total Uncertainty: 90 day, 23° ±1°C (±ppm Output±nA).
100µA Range: 84±2.
1 mA Range: 72±14.
10 mA Range: 72±140.
100 mA Range: 72±1.4µA.
1A Range: 176±30µA.
10A Range: (Requires Model 4600). 85±500µA.
Guarding: Selectable remote/local guarding.

AC Current (Option 20)

Ranges: 100µA to 1A in decades.
Full scale: 2 x range.
Resolution: 1 digit in 1,999,999 or 100pA, whichever is greater.
Total Uncertainty: 90 day, 23° ±1°C (±ppm Output±nA).
100µA Range
 10 to 1 kHz: 800±16.
 1k to 5 kHz: 1450±20.
1 mA Range
 10 to 1 kHz: 475±160.
 1k to 5 kHz: 605±160.
10 mA Range
 10 to 1 kHz: 475±1.6µA.
 1k to 5 kHz: 605±1.6µA.
100 mA Range
 10 to 1 kHz: 475±16µA.
 1k to 5 kHz: 605±16µA.
1A Range
 10 to 1 kHz: 690±160µA.
 1k to 5 kHz: 990±200µA.
10A Range: (Requires Model 4600).
 10 to 1 kHz: 530 ± 2 mA.
 1k to 5 kHz: 1100 ± 2 mA.
Guarding: Selectable remote/local guarding.

Resistance (Option 20)

Ranges: 10Ω to 100MΩ in decades (Ranges are nominal, actual calibrated values are displayed).
Connections: Selectable 2 or 4-wire, remote/local guard.
Display resolution: 1 digit in 19,999,999.
Total Uncertainty: 90 day, 23° ±1°C (±ppm Output).
 10Ω: ±45.
 100Ω and 1kΩ: ±16.
 10kΩ: ±15.
 100kΩ: ±24.
 1MΩ: ±57.
 10MΩ: ±112.
 100MΩ: ±300.

GENERAL

Calibration: Autocal from front panel or via the IEEE-488 interface.
Environmental
Operating Temp: 0° to +50°C.
Storage Temp: -40° to +70°C.
Dimensions: 178 mm (7 in.) high, 455 mm (17.9 in.) wide, 563 mm (22.2 in.) deep.

Weight: 36 kg (80 lb).
Power: 100/120/220/240 Vac ±10%, 50 Hz or 60 Hz. Consumption 370 VA standby, 660 VA full power.

OPTIONS

10: 1000V Ranges for DCV and ACV
20: DCI, ACI and Ω
42: Alternative Rear Output
80: 115V 60 Hz Line Operation
81: 115V 50 Hz Line Operation
90: Rack Mounting Kit

FACTORY/FOB
Indianapolis, IN
Norwich, England