Multifunction Standard

- **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 8½ Digit Scale Length**

The model 4707 Autocal Multifunction Standard offers the very best in programmable multifunction performance. Capable of calibrating—BY ITSELF—the latest generation of high performance systems and standards DMMs, it represents the most practical and cost-effective solution to today's high accuracy calibration requirements.

DC Voltage

With outputs available from 10 nV to 1100V, and total 90 day, ±1°C uncertainties to 4 ppm, the DC Voltage function offers performance unrivalled by any other instrument. This performance extends to high linearity and low noise, essential when calibrating 7½ and 8½ digit DMMs, while the fast settling times inherent in the signal generation techniques employed make the instrument ideal for automated applications.

AC Voltage

The AC Voltage function also offers unmatched performance and functional capability, offering total 90 day, ±1°C uncertainties to 100 ppm and 65 mA of current drive on the optional 1000V range. In practice this means that the high voltage-high frequency test requirements of today's DMMs may be met by one single, compact unit.

The internal AC-DC transfer is accomplished by a fully electronic technique, which offers faster settling times than traditional thermal techniques. These settling times are also independent of signal level, a most desirable feature in automated applications.

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 function 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

The IEEE-488 interface is fitted as standard, enabling the 4707 to form the heart of a compact and highly accurate calibration or test system, while its rugged construction and insensitivity to temperature variations make it ideal for applications outside of the traditional calibration environment. It is compatible with the Datron 4101B Multimeter Calibration software package, a combination which forms an automated calibration system capable of calibrating anything from simple handheld multimeters up to the most sophisticated Standards DMMs.

Calibration

The Model 4707 employs Autocal, the electronic adjustment technique whereby all calibration adjustments are made through the

use of digital corrections stored in non-volatile memory. The instrument is calibrated by applying the standard and following a simple sequence of front panel keystrokes or IEEE-488 bus commands. Moreover, the signal generation circuit configuration employed during calibration is the same as that used during normal operation, ensuring fast, traceable, repeatable calibration.

SPECIFICATIONS

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 10 nV, whichever is greater.
Total Uncertainty: 90 day, 23° ±1°C (±ppm Output ±μV).
100μV to 100 mV Ranges: 8±1.4.
1V Range: 5±0.8.
10V Range: 3.5±5.
100V Range: 5±100.
1000V Range (Option 17): 6±500.
Sensing: Selectable remote/local sensing on 1V to 1000V ranges.
Guarding: Selectable remote/local guarding.
Settling Time: <1 s to 10 ppm of step size.
Output Impedance/Max Output Current:
100μV to 100 mV Ranges: 100Ω.
1V to 1000V Ranges: 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 100 nV, 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: 1000 pF on 1V to 100V ranges, 300 pF on 1000V range.
Total Uncertainty: 90 day, 23°±1°C (±ppm Output±μV).

1 mV Range
170±6: (10-31 Hz).
140±6: (32-330 Hz).
130±6: (300 Hz-10 kHz).
280±6: (10-33 kHz).
800±6: (30-100 kHz).
0.14%±11: (100-330 kHz).
0.24%±23: (330k-1 MHz).

10 mV Range
170±7: (10-31 Hz).
140±6: (32-330 Hz).
130±6: (300 Hz-10 kHz).
280±6: (10-33 kHz).
800±6: (30-100 kHz).
0.14%±13: (100-330 kHz).
0.24%±41: (330k-1 MHz).

100 mV Range
170±12: (10-31 Hz).
140±10: (32-330 Hz).
130±10: (300 Hz-10 kHz).
280±10: (10-33 kHz).
800±10: (30-100 kHz).
0.14%±31: (100-330 kHz).
0.24%±221: (330k-1 MHz).

1V Range
140±40: (10-31 Hz).
100±20: (32-330 Hz).
90±20: (300 Hz-33 kHz).
170±40: (30-100 kHz).
500±200: (100-330 kHz).
0.23%±800: (330k-1 MHz).

10V Range
140±400: (10-31 Hz).
100±200: (32-330 Hz).
90±200: (300 Hz-33 kHz).
170±400: (30-100 kHz).
500±2 mV: (100-330 kHz).
0.23%±8 mV: (330k-1 MHz).

100V Range
140±4 mV: (10-31 Hz).
100±2 mV: (32-330 Hz).
90±2 mV: (300 Hz-10 kHz).
100±2 mV: (10-33 kHz).
200±4 mV: (30-100 kHz).

1000V Range (Option 17)
150±50 mV: (45-330 Hz).
130±50 mV: (300 Hz-10 kHz).
200±50 mV: (10-33 kHz).
Settling Times: To 100 ppm of step size: <10 s (10-32 Hz), <3 s (33-330 Hz), <1 s (>330 Hz).

DC Current (Op 27)

Ranges: 100μA to 1A in decades.
Full scale: 2 x range.
Resolution: 1 digit in 1,999,999 or 100 pA, whichever is greater.
Total Uncertainty: 90 day, 23°±1°C (±ppm Output ± nA).
100μA Range: 59±2.
1 mA Range: 29±10.
10 mA Range: 29±100.
100 mA Range: 29±1μA.
1A Range: 71±20μA.
10A Range (Requires Model 4600): 85 ±500μA.
Guarding: Selectable remote/local guarding.

AC Current

Ranges: 100μA to 1A in decades.
Full Scale: 2 x range.
Resolution: 1 digit in 1,999,999 or 100 pA, whichever is greater.
Total Uncertainty: 90 day, 23°±1°C (±ppm Output±nA).

100μA Range
600±10: (10-1 kHz).
1050±16: (1k-5 kHz).

1mA Range
320±100: (10-1 kHz).
450±100: (1k-5 kHz).

10 mA Range
320±1μA: (10-1 kHz).
450±1μA: (1k-5 kHz).

100 mA Range
320±10μA: (10-1 kHz).
450±10μA: (1k-5 kHz).

1A Range
500±100μA: (10-1 kHz).
750±160μA: (1k-5 kHz).

10A Range (Requires Model 4600):
450±1.5 mA (10-1 kHz).
1060±1.6 mA (1k-5 kHz).
Guarding: Selectable remote/local guarding.

Resistance (Op 27)

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: ±20.
100Ω & 1kΩ: ±8.
10kΩ: ±7.
100kΩ: ±13.
1MΩ: ±27.
10MΩ: ±42.
100MΩ: ±230.

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.) net.
Power: 100/120/220/240 Vac ±10%, 50 Hz or 60 Hz. Consumption 370 VA standby, 660 VA full power.

OPTIONS

17: 1000V Ranges, DCV and ACV.
27: 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