Table 7-1 HP 44702A/B Specifications

**DC VOLTAGE**

**Accuracy:** ±(% of reading + volts) rear terminal, one hour warmup, specified over time since last calibration, and operating temperature, with auto-zeroing performed within one minute of measurement.

90 Days, 18°C to 28°C

| | |
|---|---|
| 40 mV Range: | 0.05% + 68 µV |
| 320 mV Range: | 0.05% + 234 µV |
| 2.56 V Range: | 0.05% + 1.88 mV |
| 10.24 V Range: | 0.05% + 7.5 mV |

Average Readings, 90 Days 18° to 28°C

Accuracy if 100 readings are averaged:

For 40 mV Range: 0.05% + 39 µV

Accuracy if 10 readings are averaged (little advantage to averaging more readings):

For 320 mV Range: 0.05% + 156 µV
For 2.56 V Range: 0.05% + 1.25 mV
For 10.24 V Range: 0.05% + 5 mV

1 Year: Add 0.05% of reading to the 90 Days Specifications

Temperature Coefficient:

Add as an additional accuracy error using ±(% of reading + volts) per °C change outside 18° to 28°C, as long as the operating temperature is maintained between 0 to 18° or 28° to 55°C.

For 40 mV Range add 0.004% + 0.488 µV
For 320 mV Range add 0.002% + 3.91 µV
For 2.56 V Range add 0.002% + 31.3 µV
For 10.24 V Range add 0.002% + 125 µV

**Resolution:** 12 bits plus a sign bit

| Range | Resolution |
|---|---|
| 40 mV | 9.77 µV |
| 320 mV | 78.1 µV |
| 2.56 V | 625 µV |
| 10.24 V | 2.5 mV |

Table 7-1 HP 44702A/B Specifications (Cont.)

Over-ranging: None; maximum signal (high to low) + common mode voltage (low to chassis) to prevent out-of-range indication is ±10.24 V.

**Reading Rate:** 100,000 readings/second with auto-ranging. Proper auto-ranging is ensured as long as a single-channel signal changes no more than 600 volts/second during auto-ranging.

**RESISTANCE**

**Accuracy:** ±(% of reading + ohms), 4-wire or 2-wire ohms, maximum expected (resistance function) determines the current source used, rear terminal inputs, one-hour warmup, specified over time since last calibration, and operating temperature, with auto-zeroing performed within one minute of measurement. (Current source compliance voltage is at least 17 V. Only the HP 44711A FET multiplexer is recommended for measuring resistance properly.

90 Days, 18°C to 28°C

| Function | Range | Accuracy |
|---|---|---|
| 10 KΩ<br>(1 mA current source) | 40 Ω<br>320 Ω<br>2.56 KΩ<br>10.24 KΩ | 0.07% + 107 mΩ<br>0.07% + 234 mΩ<br>0.07% + 1.875 Ω<br>0.07% + 7.5 Ω |
| 100 KΩ<br>(100 µA current source) | 400 Ω<br>3.2 KΩ<br>25.6 KΩ<br>102.4 KΩ | 0.07% + 1.07 Ω<br>0.07% + 2.34 Ω<br>0.07% + 18.75 Ω<br>0.07% + 75 Ω |
| 1 MΩ<br>(10 µA current source) | 4 KΩ<br>32 KΩ<br>256 KΩ<br>10.24 MΩ | 0.07% + 12.7 Ω<br>0.07% + 39.1 Ω<br>0.07% + 312.5 Ω<br>0.07% + 1.25 KΩ |

Average Readings, 90 Days 18° to 28°C

Accuracy if 100 readings are averaged:

For 40 Ω Range: 0.07% + 78.1 mΩ
For 400 Ω Range: 0.07% + 781 mΩ
For 4 KΩ Range: 0.07% + 9.77 Ω

Table 7-1 HP 44702A/B Specifications (Cont.)

Accuracy if 10 readings are averaged (little advantage to averaging more readings):

For 320 Ω Range: 0.07% + 156 mΩ
For 3.2 KΩ Range: 0.07% + 1.56 Ω
For 32 KΩ Range: 0.07% + 31.25 Ω
For 2.56 KΩ Range: 0.07% + 1.25 Ω
For 25.6 KΩ Range: 0.07% + 12.5 Ω
For 256 KΩ Range: 0.07% + 250 Ω
For 10.24 KΩ Range: 0.07% + 5 Ω
For 102.4 KΩ Range: 0.07% + 50 Ω
For 1.024 MΩ Range: 0.07% + 1 KΩ

1 Year: Add 0.03% of reading to the 90 Days Specifications

Temperature Coefficient:

Add as an additional accuracy error using ±(% of reading + ohms) per °C change outside 18° to 28°C, as long as the operating temperature is maintained between 0 to 18° or 28° to 55°C.

For 40 Ω Range add 0.005% + 0.488 mΩ
For 400 Ω Range add 0.005% + 4.88 mΩ
For 4 KΩ Range add 0.005% + 48.8 mΩ
For 320 Ω Range add 0.003% + 3.91 mΩ
For 3.2 KΩ Range add 0.003% + 39.1 mΩ
For 32 KΩ Range add 0.003% + 391 mΩ
For 2.56 KΩ Range add 0.003% + 31.3 m Ω
For 25.6 KΩ Range add 0.003% + 313 mΩ
For 256 KΩ Range add 0.003% + 3.13 Ω
For 10.24 KΩ Range add 0.7% + 5 Ω
For 102.4 KΩ Range add 0.07% + 50 Ω
For 1.024 MΩ Range add 0.07% + 1 KΩ

**Reading Rate:** 100,000 readings/second with auto-ranging. Proper auto-ranging is ensured as long as a single-channel signal changes no more than 600 volts/second during auto-ranging.

**PACER**

**Programmable Intervals:** 10 µsec to 17 minutes with .25 µsec resolution.

**Accuracy:** Programmed pulse interval ±0.01% of pulse interval

**Pulse Widths:** 0.5 µsec nominally (low true)

Table 7-1 HP 44702A/B Specifications (Cont.)

## INPUT CHRACTERISTICS

**Noise Rejection:** Min effective common mode rejection specified in dB for DC to 60 Hz with 1 KΩ in low lead; maximum signal (high to low) + coomon mode voltage (low to chassis) for proper operation is ±10.24 volts.

| Range | ECMR |
|---|---|
| 40 mV | 90 |
| 320 mV | 80 |
| 2.56 V | 70 |
| 10.24 V | 70 |

**Maximum Input Voltage:** All inputs (ribbon, rear, and back-plane) are protected to 16 V peak. Input impedance, however, decreases abpve 12 V due to internal protection circuitry. The analog back-plane can be disconnected from the high-speed voltmeter, allowing the maximum back-plane voltage to be 42 V peak.

**Bandwidth:** 50 Ω source, 1 MΩ termination

| Range | 0.1% Flatness | 1.0% Flatness | -3 dB Bandwidth |
|---|---|---|---|
| 40 mV | 10 kHz | 45 kHz | 250 kHz |
| 320 mV to 10.24 V | 15 kHz | 55 kHz | 400 kHz |

**Input Impedance:** All Ranges.

| Impedance | Terminals | |
|---|---|---|
| | High to Low | High or Low to Chassis |
| Power On Resistance (Ω) | $>10^8$ | $>10^8$ |
| Power Off Resistance (Ω) Vin 10 V | >1000 | >1000 |
| Power Off Resistance (Ω) Vin >10 V | >470 | >470 |
| Max. Capacitance (pf) at 1MHz | 100 | 200 |

Table 7-1 HP 44702A/B Specifications (Cont.)

**Maximum Bias Current:** Currents sourced by high or low into rear terminals, ribbon cable, or back-plane. These currents may affect accuracy for source impedances >1 KΩ.

±1.4 nA DC (0 to 28°C)
±18 nA DC (28° to 55°C)

**Settling Time:** To within 0.1% of step change.

Fixed Rate: Any full scale step change (worst case) <10 µsec

Range Changes from Lower to Higher Range: <10 µsec

Rnage Changes from Higher to Lower Range (resulting in a step voltage change at the inputs):

2.56 V Destination Range: <30 µsec (10.24 v step change)
320 mV Destination Range: <20 µsec (2.56 V step change)
<100 µsec (10.24 V step change)
40 mV Destination Range: <20 µsec (320 mV step change)
<120 µsec (2.56 V step change)
<1 msec (10.24 V step change