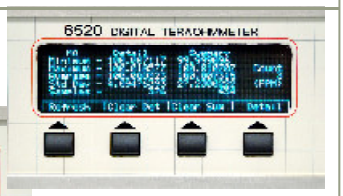
Progammable Digital Teraohmmeter

6520

Ultra-High Resistance High Accuracy Measurement



Guildline 6520 Digital Teraohmmeter is the latest instrument of its type from Guildline Instruments. It expands the range and performance to a level never available before in a resistance measuring instrument. The 6520 teraohmmeter offers true state-of-the-art, ultra-high resistance measurement superior to bridge methods. Through its inherently linear design of the measurement section, the 6520 achieves the highest accuracy and range conmercially available today. Accuracies better than 0.0025% can be achieved when used as a transfer standard.

The 6520 teraohmmeter is fully automatic, functioning under microprocessor control and Guildline's unique Sofcal^{tm} on-board calibration firmware. The instrument measures extremely high resistances, up to 10^{17} Ω , or very small currents down to 10^{-14} A. Measurement time for the instrument is 5 ms to 1000 s and sensing of instrument resistance range, integration time and threshold voltage are fully automatic or manually selectable.

The 6520 utilizes Sofcal^{tm} to configure the IEEE-488.2 and the RS232C interfaces. In addition, Sofcal^{tm} provides supply and reference voltage diagnostics, protection resistor compensation, integrator linearity check and standard calibration from the front panel. Calibration is achieved by simply connecting a known reference resistor to the input connectors (accessory 9336-100M) and starting the self calibration procedure. On-board firmware also provides self test and diagnostic help features.

6520 Features

- Resistance range: 100 kΩ -100 PΩ
- Current range: 10^{-2} Amp -10^{-14} Amp
- Automatic sensing of resistance range, integration time and threshold voltage
- Surface and volume resistivity measurements with 65221 option
- Test voltages 1 to 1000 volts
- Environmental monitoring with 65220 sensors
- Logging, graphical display and analysis of measurements
- Programmable test parameters
- Programmable test profiles
- Sofcal^{tm} for on-board intelligence and front panel calibration
- TeraCal^{tm} Data Acquisition Software with easy to use metrology utilities
- SCPI compliant IEEE-488.2 and RS 232C interfaces as standard
- Rear input option

The 6520 achieves the highest accuracy and range commercially available

Besides being a laboratory standard the 6520 is ideal for automatic production line testing in a variety of applications such as calibration of electrometers, semi-conductor testing, capacitance leakage measurement, film surface and volume resistivity measurement, and many others. In current mode, the instrument can be used to measure chemical reaction rates, photoelectric effects and ionization effects.

The SCPI compliant IEEE-488.2 and RS 232C interfaces are built in as standard, as is an external trigger input to command a measurement from an external device, process or timing mechanism.

The 6520 is supplied with Guildline's TeraCal^{tm} software program. TeraCal^{tm} is a convenient Windows® based software program, developed on the National Instruments LabView^{tm} platform, designed specifically for metrologists. It provides easy to use controls, data storage, report generation and utilities for the performance of a variety of resistance measurements. When used with the 65221 test fixture, this includes surface and volume resistivity. When the optional 65220 environmental sensors are installed, the ambient temperature, humidity and pressure can be recorded and time stamped.

A range of calibrating resistors are available (9336 & 9337) as well as other accessories for use with the 6520.

► ***For Ultra Precise Standard Resistors in a Temperature Stabilized Enclosure, see the Guildline 6634A and 6634TS Primary Resistance Standards.***

Specifications

Range (Ohms)	Uncertainty* (± % of reading over 1 year, 23°C ±2°C)	Transfer Uncertainty** (± % of reading over 4 hours, 23°C ±2°C)	Temperature Coefficient (± % of reading/°C 15°C to 21°C 25°C to 30°C)
10^5 to 10^6	0.025	0.005	0.01
10^6 to 10^7	0.025	0.0025	0.0035
10^7 to 10^8	0.015	0.0025	0.0035
10^8 to 10^9	0.02	0.0025	0.005
10^9 to 10^{10}	0.06	0.0025	0.007
10^{10} to 10^{11}	0.08	0.0025	0.01
10^{11} to 10^{12}	0.1	0.005	0.02
10^{12} to 10^{13}	0.2	0.0075	0.03
10^{13} to 10^{14}	0.3	0.0125	0.05
10^{14} to 10^{15}	1.0	0.05	0.1
10^{15} to 10^{16}	5.0	0.1	1.0
10^{16} to 10^{17}	50.0	0.2	5.0

Range (Amps)	Uncertainty (± % of reading over 1 year, 23°C ±2°C)	Temperature Coefficient (± % of reading/°C 15°C to 21°C 25°C to 30°C)
10^{-3} to 10^{-2}	0.1	0.008
10^{-4} to 10^{-3}	0.1	0.008
10^{-5} to 10^{-4}	0.1	0.005
10^{-6} to 10^{-5}	0.1	0.005
10^{-7} to 10^{-6}	0.1	0.005
10^{-8} to 10^{-7}	0.2	0.03
10^{-9} to 10^{-8}	0.2	0.03
10^{-10} to 10^{-9}	0.2	0.1
10^{-11} to 10^{-10}	1.0	0.1
10^{-12} to 10^{-11}	1.0	0.1
10^{-13} to 10^{-12}	10.0	1.0
10^{-14} to 10^{-13}	50.0	5.0

* *6520 operating in Auto mode to 1TΩ and with a soak time of 5 seconds or more above 1TΩ. Does not include instabilities of test resistance (e.g. dielectric effects, volts coeff.)*
** *This is the stability of the mearsurement of the 6520 over the specified time period.*

Range: 10^5 to 10^{17} Ω or 10^{-2} to 10^{-14} A
Display Resolution: Selectable up to 8 digits
Input Impedance 100 kΩ, 100 Ω (current mode)
Measurement Time: 5ms to > 1000 seconds
Test Voltage (Programmable): 1, 2, 5, 10, 20, 50, 100, 200, 500 & 1000V
Environmental Monitors:
Temperature: Range: -50°C to 100°C
Uncertainty: ±0.3% (+ sensor error over 1yr)
Atmospheric Pressure: Range 15 to 115 kPa
Uncertainty: ±0.3% (+ sensor error over 1yr)
Humidity: Range: 0% to 100% RH
Uncertainty: ±0.3% (+ sensor error over 1yr)

Interfaces: IEEE-488.2 and RS232C
Power Supply: 100, 120, 220, 240 VAC, 50/60 Hz ±5%, 50 VA
Environment: Operating: 15°C to 30°C
20% to 50% RH
Storage: -30°C to 70°C
15% to 80% RH non-condensing
Source Connector High Voltage BNC
Input Connector: 3 Lug Triax

Dimensions: H 89mm (3.5in); W 444mm (17.5in); D 500mm (19.7in)
Weight: 11.4 kg (25 lbs)

Ordering Information

6520 Programmable Digital Teraohmmeter
TeraCal™ Data Acquisition Software (included)
TM6520 Technical Manual & Certificate of Calibration (included)
Report of Calibration (extra charge)

Accessories

65220 Environmental Monitor
65221 Surface/Volume Resistivity Test Fixture
65222 Large Shielded Enclosure
65223 Shielded Sample Enclosure
65224 Zero link
65225 Lead Set
65226 Calibration Kit

Accessories continued

9336-100M 100 MΩ High Value Resistance Standard
9336-X High Value Resistance Standard (range 10MΩ to 100GΩ)
9337-X Ultra High Value Resistance Standard (range 1TΩ to 10 PΩ)
6675A-01A National Instruments IEEE-488.2 Interface Card for PC PCI slot
6675A-01B National Instruments IEEE-488.2 Interface Card for PC ISA slot
6675A-02A 2 Meters Double Shielded IEEE-488.2 Interface Cable
6675A-02B 1 Meter Double Shielded IEEE-488.2 Interface Cable

Calibration Standards & Measurement Solutions

Guildline
GUILDLINE INSTRUMENTS INC.
103 Commerce St., Suite 160, Lake Mary, FL 32746
(407) 333-3327 · 1-800-232-4536 · Fax: (407) 333-3309
e-mail: sales@guildline.com
Online:
www.guildline.com