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DATA SHEET

Model 1700

Digital Ohmmeter

- **Low ohm resolution—to 0.1$\mu\Omega$**
- **Fast measurements—up to 13 per second**
- **0.02% Basic accuracy**
- **4-Terminal connection**
- **Switched DC and constant DC test signals**
- **Autoranging to 20 MΩ (1705B)**
- **Single cycle measurement (1705B)**
- **Remote operation**
- **Buffered BCD outputs**
- **Companion digital comparator for limit sorting**



No matter what your DC resistance measurement needs ... resistor sorting, coil resistance, connector quality, the Model 1700 Digital Ohmmeter has the range and flexibility to cover them.

Basic 0.02% accuracy and 4-terminal connection assure quality measurements. Three plug-ins provide wide-range capability—from 0.1$\mu\Omega$ to 20 MΩ.

A unique, switched DC measurement mode cancels errors inherent in low ohm measurement circuitry, and those caused by thermally generated voltages in the device under test.

High measurement speed, (up to 13 per second), buffered BCD output, and remote input/output capability make these instruments excellent for interfacing to a parts handler or for remote operation.

Extremely low resistance measurement needs are met by the SP3779B plug-in. It offers four ranges from 2mΩ to 2Ω, full scale, with 0.1$\mu\Omega$ resolution on the lowest range. A separate current source provides a stable 1A reference current. This unit also offers switched DC and constant DC modes.

The midrange 1701B plug-in provides four full-scale ranges from 20mΩ to 20Ω, with 1$\mu\Omega$ resolution on the lowest scale. Both switched DC and constant DC modes of measurement are provided.

The widest measurement range is available in the 1705B plug-in. It has nine ranges from 200mΩ to 20MΩ, full scale. The 1705B features autoranging as well as range hold for repetitive measurements on the same range. Constant DC, switched DC, and single cycle measurement modes are also provided. The single cycle mode minimizes internal heating of temperature-sensitive devices such as thermistors.

An optional Model 1715 Digital Comparator offers GO/NO-GO sorting capability. It can be used for hand testing with the front panel HI, LO and GO indicator lamps. It can also be used with a component handler.

The wide applicability offered by three plug-ins, push-button ease of operation and compact size make the Model 1700 Digital Ohmmeter appreciated on the bench and in automated test systems.

Specifications

	MODEL 1701B				MODEL 1705B									MODEL SP3779B			
RANGES	20mΩ	200mΩ	2Ω	20Ω	200mΩ	2Ω	20Ω	200Ω	2kΩ	20kΩ	200kΩ	2MΩ	20MΩ	2mΩ	20mΩ	200mΩ	2Ω
RESOLUTION	1μΩ	10μΩ	100μΩ	1mΩ	10μΩ	100μΩ	1mΩ	10mΩ	100mΩ	1Ω	10Ω	100Ω	1kΩ	0.1μΩ	1μΩ	10μΩ	100μΩ
ACCURACY SWITCHED DC	±(0.02% + 1 digit + 10μΩ) ±(0.01% + 1 digit + 5μΩ) typical				±(0.02% + 1 digit + 15μΩ) ±(0.01% + 1 digit + 5μΩ) typical							±(0.04% + 1 digit) ±(0.02% + 1 digit) typical		±(0.02% + 1 digit + 0.4μΩ) ±(0.02% + 1 digit + 0.2μΩ) typical			
ACCURACY SINGLE CYCLE① AND CONSTANT DC	±(0.02% + 1 digit + 10μΩ) ±(0.01% + 1 digit + 5μΩ) typical				±(0.04% + 1 digit + 100μΩ) ±(0.02% + 1 digit + 50μΩ) typical							②		±(0.02% + 1 digit + 0.4μΩ) ±(0.02% + 1 digit + 0.2μΩ) typical			
REFERENCE CURRENT	100mA				70mA	70mA	7mA	4.5mA	450μA	450μA	4.5μA	4.5μA	0.45μA	1A			100mA
OVERLOAD REFERENCE CURRENT③	150mA for 100μs				100mA (15V max thru 150Ω)									3A for 50μs			
MAXIMUM LEAD RESISTANCE (in each lead with no error)	5Ω	5Ω	5Ω	2.5Ω	10Ω	10Ω	10Ω	50Ω	50Ω	50Ω	40Ω	40Ω	40Ω	500mΩ			
TEMPERATURE COEFFICIENT	±20ppm/°C from 15-35°C				±5ppm/°C from 15-35°C							±8ppm/°C from 15-35°C		±20ppm/°C from 15-35°C			

①Single cycle applies only to Model 1705B.
②This range is not recommended, due to long internal time constants.
③Possible only during connection of measurement leads to unknown. Reference current is still specified for each range, if unknown causes overload.

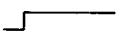
Model 1700

Display	4½ digits with decimal point; blanked for overload conditions.
Measurement Technique	Dual-slope integration, autozeroing, switched DC or constant DC test signal. (Single cycle available on 1705B only).
Measurement Mode	Continuous mode is standard on all three plug-ins; single cycle on 1705B only; cycle hold is standard on the 1701B and SP3779B.
Measurement Rate	2 to 13 measurements per second.
Connection to Unknown	Four-terminal Kelvin Klips® are supplied as standard equipment. Other fixtures are available as noted in the accessories section of this data sheet.
Outputs	Various plug-ins offer features available from the rear panel connector (J1), including buffered BCD output and remote start.
AC Noise Rejection	80dB at 60Hz and multiples (50Hz optional).
Power Requirements	105-125VAC or 210-250VAC, 60Hz, 36W. 50Hz optional.
Dimensions	Height, 13.5cm (5.3 in.); Width, 21.6cm (8.5 in.); Depth, 33cm (13 in.).
Weight	5.9kg (13 lbs) net.

Test signal

With the 1700 Digital Ohmmeter, the reference current can be applied to the unknown in three different modes:

Switched DC 

Constant DC 

Single Cycle  or 
(1705B only)

The switched DC mode is recommended for the majority of resistive components. In this mode, two measurements are made, one at each polarity of the switched DC. These measurements are added and then scaled by ½. This operation cancels errors caused by thermal voltages generated at junctions of dissimilar metals (test clip contacts, lead joints, etc.).

Constant DC is the traditional mode of resistance measurement. It should be used on inductive devices to avoid the oscillations that switched waveforms can cause with these components.

The single cycle mode is intended for use on temperature-sensitive devices. Measurement is made during application of a single cycle of the reference current (either switched DC or constant DC). This keeps power dissipation in the unknown to a minimum.

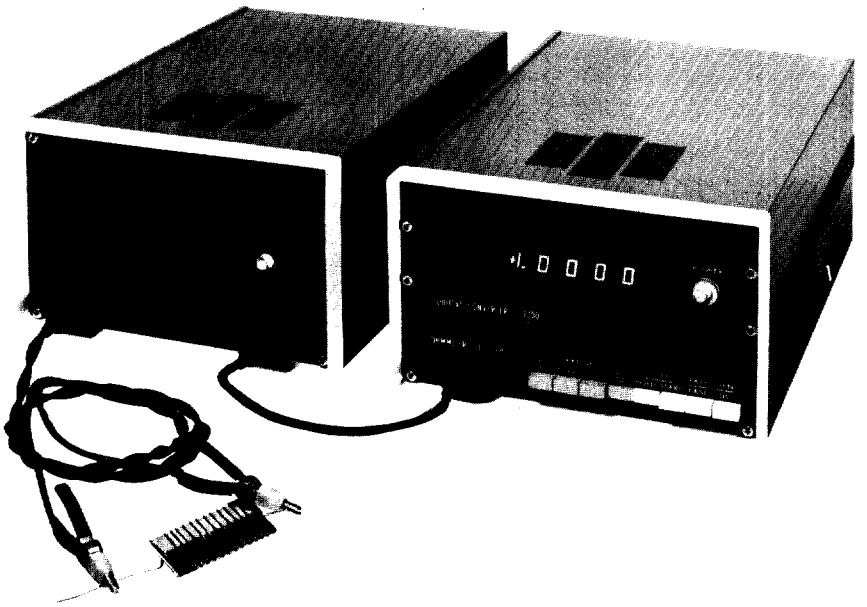
The following table shows the various modes available in each of the plug-ins for the 1700 Digital Ohmmeter.

	1701B	1705B	SP3779B
Switched DC	X	X	X
Constant DC	X	X	X
Single Cycle		X	

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Model SP3779B

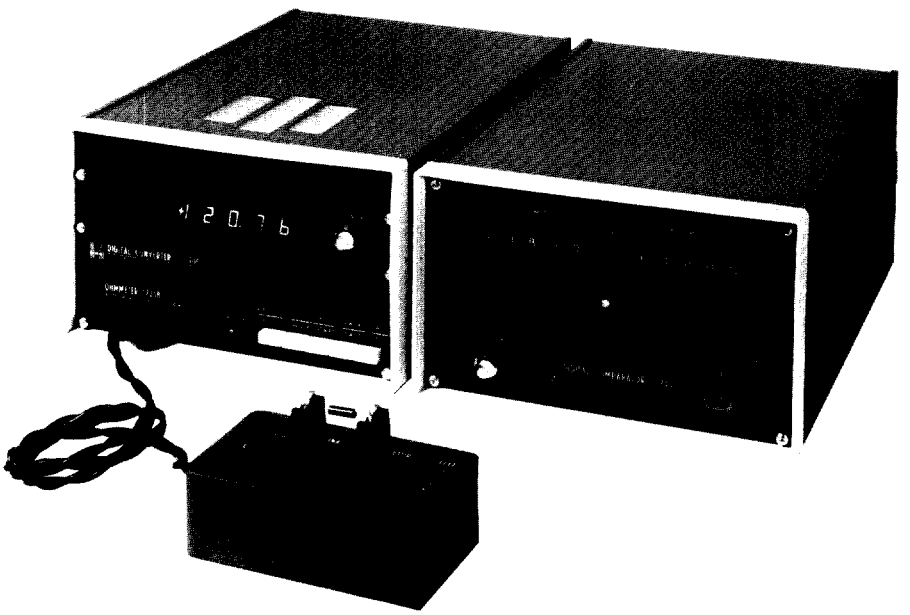
Measurement Rate	2 to 13 measurements per second.
Current Source Power Requirements	Same as 1700 unit except 25 W.
Current Source Dimensions and Weight	Same as 1700 except weight is 10 lbs net.



Model 1715

Digital Comparator

- **Fast GO/NO-GO testing**
- **4½ Digit limits**
- **LED indicators for LO, GO, HI**
- **Relay outputs for handler operation**



The Model 1715 Digital Comparator is a companion unit for the Model 1700 Digital Ohmmeter. It provides rapid GO/NO-GO decisions for sorting resistors.

Measurements from the 1700 Digital Ohmmeter are compared with manually selected limits. Results are displayed on LED indicators as LO, GO, or HI. The results also appear on a rear panel connector as open-collector TTL logic states (+5V, true; 0V, false) and as relay closures for each limit.

Limit range is 00000 to 19999. Selection is quick and easy via 5-digit push-button assemblies. Limit comparisons contribute no error to the basic accuracy of the 1700 unit. Results are GO for anything equal to or between the LO and HI limits. Anything less than LO is LO; anything greater than HI is HI.

A 50-pin rear panel connector can be used for BCD inputs, logic outputs, and relay closures.

Power requirements and dimensions of the 1715 Digital Comparator are the same as for the 1700. Weight is 5kg (11 lbs) net.

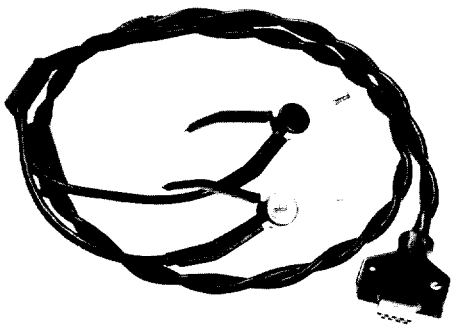
DATA SHEET

Accessories to Complete Your Installation

Standard Equipment

Included with each instrument is a 27838 Kelvin Klip® Set and an instruction manual.

27838 Kelvin Klips®

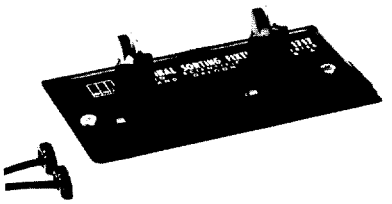


Kelvin Klips allow you to make solid four-terminal connection to leaded components. This set is provided as standard equipment. They are particularly useful for hand testing resistors, but can be used to connect to various devices under test. Four-terminal measurement technique allows precision measurements by cancelling the effects of lead resistance. Gold plated, hardened beryllium-copper jaws ensure low contact resistance, low thermal emf to copper, high corrosion resistance and long life. Assembly includes cable and plug for connection to instrument.

SP2501 Heavy Duty Kelvin Klips®

For connecting to objects up to two inches in diameter, such as buss bars and large fuses, order this heavy duty cable set. Cable length is 10 feet.

1717 Four-Terminal Sorting Fixture

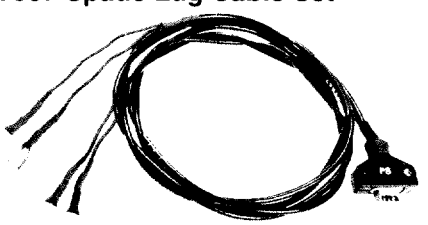


This fixture holds components for test while providing four-terminal connection. Its holding clips can rotate 90 degrees to accommodate axial and radial-leaded components. They can also be set from 116cm (5/8 in.) to 8cm (3½ in.) apart. This allows use of this fixture with many component sizes and configurations.

Terminal contact pressure is also adjustable. Pressure can be reduced for easy insertion of components with small gauge leads. Contacts are gold-plated beryllium copper.

Model 1717 comes with cables for connection to the meter.

27867 Spade Lug Cable Set



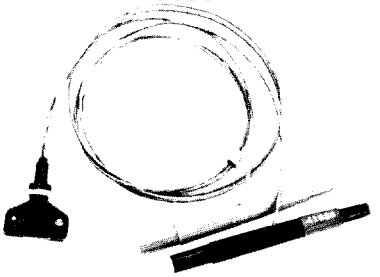
This is an optional cable set for the 1700. Instead of clips, it has spade lugs for connection to binding posts on peripheral equipment.

SP5180 Tweezer Set



This four-terminal tweezer set makes solid connections to chip components in hand sorting applications. Jaw opening is 12.7mm (0.5 in.). Contact tips are replaceable. Cables are 1m (39 in.) long, and include the plug for connection to the instrument.

41938 OHM Probes



The small, spring-loaded tips of the OHM probes are designed for getting into small, hard-to-reach spots. They are especially useful for probing circuit card components, reaching connector contacts, etc.

Probe bodies are molded DuPont Delrin. They are color-coded red and black for polarity identification. The replaceable spring-loaded points are gold-plated beryllium copper. The tip sleeve is gold-lined brass.

Test leads use shielded 29 AWG coaxial cable and provide four-terminal connection to the probe tips.

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