

VALHALLA SCIENTIFIC – MODEL 4300C

Programmable Digital micro-Ohmmeter



PERFORMANCE THAT CONQUERS ANY RESISTANCE

The 4300C Digital μ -Ohmmeter quickly and accurately measures a wide variety of low resistance devices ranging in value from 100 Ω to 20k Ω . The flexible measurement format of the 4300C provides six ranges of user selectable test current (from .1mA to 10A) and three voltage sensitivity settings (20mV, 200mV and 2V). The unit's 4½ digit resistance readings are displayed on a high contrast LCD display and are optionally available via optional BCD, RS-232 or GPIB interface. Features of the 4300C include: four terminal compensation, a very low 2m Ω range, selectable test current levels (up to 10 amps), a fast settling charge inductor mode, safety disconnect status indicators, automatic temperature compensation, a basic accuracy of $\pm 0.03\%$ and a push button or GPIB controlled current on/off selector.

TRANSFORMERS, MOTORS, CABLES AND MORE:

The 4300C is the perfect instrument for tackling ultra-low resistance testing requirements associated with motors, transformers, fuses, connectors, breakers, bonding/weld resistance and many other applications. For rapid testing of inductive loads the 4300C's charge inductor mode provides in excess of 20V compliance. This model reduces settling time by a factor of 5:1 on inductive loads. The result is valid readings in minutes instead of hours when testing 400MW utility transformers. A solid-state "Crowbar" design provides front end protection for up to 500 amps of induced current.

CHARGING INDUCTOR MODE INDICATOR:

The Valhalla 4300C charging inductor mode LED, indicates when the unit's current source compliance voltage is exceeded. The 4300C "Boost Mode" then increases the compliance voltage to exceed 20V output to reduce the settling time (charges the inductance) when inductive loads (i.e. large transformers) are being measured.

DISCONNECT STATUS INDICATOR:

The Valhalla 4300C safe and unsafe LED's indicate when it is safe to disconnect the test leads from the load. When a highly inductive load is being measured, a potentially lethal back-EMF (collapsing field) is induced when the test current is removed. The Valhalla 4300C internally automatically provides a discharge path for this back-EMF and monitors voltage. The safe to disconnect LED is illuminated when the back-EMF is less than 5V.

The 4300C test current can be turned off and on via the test current switch or GPIB command. In addition, the LED above the test current switch indicates the current source status.

The 4300C's variable test current levels are selected via a six position rotary switch of GPIB command. The test current and full scale voltage sensitivity switch positions determine the resistance range as indicated by the front panel matrix. Large Inductor Resistance Measurement: The 4300C's 10A current source is ideal for low resistance inductors such as utility transformers. Combining the current output with boosted compliance voltage (>20 VDC)

FEATURES:

- User Selectable Test Current Up to 10 Amps.
- Boosted Compliance Voltage Mode for Rapid Charging of Motors and Transformers.
- Safety Disconnect Status L.E.D.s.
- Test Current On/Off Switch.
- Selectable Voltage Sensitivity: 1 μ V-10 μ V-100 μ V
- 18 Combinations of Voltage Sense/Current provide optimum measurement conditions
- Automatic Temperature Compensation
- Automatic Hi-Lo Limit Comparator
- Run/Hold and Peak Detector
- Print/Log Function

enables rapid stable resistance readings in seconds, not hours. Having unique features like Automatic Temperature Compensation, High Level Current Sourcing (10A) with High Compliance Drive circuitry and 18 combinations of Voltage / Current Range Selectivity, the 4300C Digital Micro-ohmmeter is second to none

AUTOMATIC TEMPERATURE COMPENSATION "WHY DO YOU NEED IT?":

Materials such as copper and aluminum will exhibit approximately a 0.4% change in resistance for a 1°C change in ambient temperature. When in Automatic Temperature Compensation mode (TCM), the Valhalla 4300C temperature sensor automatically senses the ambient temperature and references the resistance value of the test item equivalent to being in a 20° C controlled environment. A 10° C change in ambient (i.e. open air, shop floor) provides a 4% change in the resistance of a copper item. Without this "TCM" feature, a micro-ohmmeter which may be 0.02% accurate may be making a 5-10% resistance measurement error when measuring copper or aluminum (i.e., transformer wire) material. Virtually all competitive micro-ohmmeters lack copper or aluminum (TCM) ambient temperature coefficient of resistivity compensation. Ambient temperature can have drastic effect on the resistivity of a conductor. Without temperature compensation, materials can easily be erroneously classified during the resistance testing process. Correcting the resistance measurement on copper conductors, while ambient temperature varies makes "TCM" a very useful feature.

OTHER FEATURES:

The Model 4300C can also be programmed for Hi-Lo limit comparison. Three front panel LEDs allow a visual of the result and a rear panel relay closure screw terminal block can be used to implement an automated batch sorting system for components or products, operate counters, sound alarms or shut off a process. A Run/Hold function is also a standard feature of the 4300C. The user can program this function as a peak hi or peak low detector. Measurements may be printed or logged and viewed in a spread sheet by using the Print/Log feature also standard with the Model 4300C.

STANDARD MEASUREMENT MODE SPECIFICATIONS

#	Range	Test Voltage	Full Scale	Resolution	Current Source ¹	Accuracy ² (±% of Reading ±Ω)	Temperature Coefficient ³
1)	2mΩ	20mV	2.0000mΩ	100nΩ	10A	±.06 ± .0006m	±50ppm/°C
2)	20mΩ	20mV	20.000mΩ	1μΩ	1A	±.04 ± .006m	±50ppm/°C
3)	200mΩ	20mV	200.00mΩ	10μΩ	.1A	±.04 ± .06m	±50ppm/°C
4)	2Ω	20mV	2.0000Ω	100μΩ	10mA	±.04 ± .0006	±50ppm/°C
5)	20Ω	20mV	20.000Ω	1mΩ	1mA	±.04 ± .006	±50ppm/°C
6)	200Ω	20mV	200.00Ω	10mΩ	.1mA	±.04 ± .06	±50ppm/°C
7)	20mΩ	200mV	20.000mΩ	1μΩ	10A	±.06 ± .003m	±50ppm/°C
8)	200mΩ	200mV	200.00mΩ	10μΩ	1A	±.04 ± .03m	±50ppm/°C
9)	2Ω	200mV	2.0000Ω	100μΩ	.1A	±.04 ± .0003	±50ppm/°C
10)	20Ω	200mV	20.000Ω	1mΩ	10mA	±.04 ± .003	±50ppm/°C
11)	200Ω	200mV	200.00Ω	10mΩ	1mA	±.04 ± .03	±50ppm/°C
12)	2kΩ	200mV	2.0000kΩ	100mΩ	.1mA	±.04 ± .0003k	±50ppm/°C
13)	200mΩ	2V	200.00mΩ	10μΩ	10A	±.06 ± .03m	±50ppm/°C
14)	2Ω	2V	2.0000Ω	100μΩ	1A	±.04 ± .0003	±50ppm/°C
15)	20Ω	2V	20.000Ω	1mΩ	.1A	±.04 ± .003	±50ppm/°C
16)	200Ω	2V	200.00Ω	10mΩ	10mA	±.04 ± .03	±50ppm/°C
17)	2kΩ	2V	2.0000kΩ	100mΩ	1mA	±.04 ± .0003k	±50ppm/°C
18)	20kΩ	2V	20.000kΩ	1Ω	.1mA	±.04 ± .003k	±50ppm/°C

¹ Current source is ±1% absolute accuracy

² Accuracy specifications are valid following a 30 minute warm-up at an ambient temperature between 22°C and 28°C, and include the effects of line voltage variations within the allowed range.

³ Temperature coefficient
Specified for temperature ranges from 5°C to 21°C and 29°C to 50°C.

TEMPERATURE COMPENSATOR MODE SPECIFICATIONS

#	Range	Range Settings	Accuracy ⁴ (±% of Reading ±Ω)	#	Range	Range Settings	Accuracy ⁴ (±% of Reading ±Ω)
1)	2m	10A/20mV	±.11 ± .0006m	10)	20	10mA/200mV	±.09 ± .003
2)	20m	1A/20mV	±.09 ± .006m	11)	200	1mA/200mV	±.09 ± .03
3)	200m	.1A/20mV	±.09 ± .06m	12)	2k	.1mA/200mV	±.09 ± .0003k
4)	2	10mA/20mV	±.09 ± .0006	13)	200m	10A/2V	±.11 ± .03m
5)	20	1mA/20mV	±.09 ± .006	14)	2	1A/2V	±.09 ± .0003
6)	200	.1mA/20mV	±.09 ± .06	15)	20	.1A/2V	±.09 ± .003
7)	20m	10A/200mV	±.11 ± .003m	16)	200	10mA/2V	±.09 ± .03
8)	200m	1A/200mV	±.09 ± .03m	17)	2k	1mA/2V	±.09 ± .0003k
9)	2	.1A/200mV	±.09 ± .0003	18)	20k	.1mA/2V	±.09 ± .003k

⁴Accuracy specifications valid following a 30 minute warm-up at an ambient temperature between 21°C and 29°C.

GENERAL SPECIFICATIONS

Display:Multi Section VFD 140px x 32px

Overload Indication:Display flashes "OVERLOAD"

Terminal Configuration: Four-wire Kelvin

ADC Conversion Rate:45 conversions / second

Display Update:5 user selections (100msec, 200msec, 300msec, 400msec, 500msec)

Maximum Kick-Back Protection: 500A Peak Induced Current

Compliance Voltage (Normal Mode): 7.5 VDC nominal at 10A resistive

Compliance Voltage (Charging Inductor Mode): > 20 VDC when indicator is lit

Open Circuit Voltage (Test Current Off) : < 20mV between IHI and ILO terminals



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