

Model 918B Phase Angle Multimeter



Model 918B shown with included accessories.

The Arbiter Systems[®], Inc. Model 918B Phase Angle Multimeter is a compact, rugged, microprocessor-controlled instrument that provides ten measurement functions optimized for use in power transmission and distribution systems.

The following parameters are measured simultaneously:

DC Volts	0.2 V to 1 kV
AC Volts RMS	0.2 V to 1 kV
AC Amperes RMS	0.02 A to 20 A
Frequency	45 to 500 Hz
Phase Angle	0° to 360° or ±180°, lead or lag

The following parameters are calculated, based on the measured ac values:

Active Power	0.004 W to 20 kW
Apparent Power	0.004 VA to 20 kVA
Reactive Power	0.004 VAR to 20 kVAR
Power Factor	-1.0 to +1.0, lead or lag
Total Energy	0 to 9999 kWh

The Model 918B accepts input signals via safety-shrouded front-panel banana connectors: one pair for voltage and one pair for current. The voltage connections are made directly to the circuit under test, using leads supplied with the instrument. The current input is isolated from the circuit under test by a clamp-on current transformer (included).

With this CT, you can make measurements without breaking the current-carrying circuit. Direct-input CTs are available, and two available adapters allow voltage-to-voltage phase-angle measurements.

A 16-character supertwist liquid-crystal display provides a clear indication of the parameter being measured and the results. Eight push buttons allow easy selection of functions to be measured. Autoranging simplifies operation by minimizing keystrokes, although the ranges may be set manually. The "Hold" function freezes the instantaneous values for all parameters with a single keystroke. The "Minimum/Maximum" function continually records the minimum and maximum values for each parameter, within a user-specified time frame.

A unique feature of the Model 918B is the "Delta Phase" mode, which allows measurement of the phase angle between two voltages or two currents, using a synchronous current (or voltage) as a reference. This mode also includes fixed 30°, 60°, and 90° offsets, simplifying measurements in three-phase systems. The phase offset is also incorporated into calculations for active power, reactive power, and power factor.

The Model 918B operates from either the internal rechargeable battery or the plug-in power supply module for the ac line, making the Model 918B well suited for both hand-held and bench top applications.

Model 918B Specifications

Inputs

Voltage (RMS and DC)

Input Ranges	0.2 to 2 V
	2 to 20 V
	20 to 200 V
	200 to 1000 V

Input	Safety-shrouded banana connectors
Impedance	1 megohm

Current (RMS)

Input Ranges	0.02 to 0.2 A
	0.2 to 2 A
	2 to 20 A

Input	1000:1 clamp on current transformer
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Measurements

Voltage and Current

Accuracy	±(1% reading + 1 count), maximum ±(0.2% reading + 0.05% full scale), typical
	Current, specified with supplied 1000:1 current transformer

Phase Angle¹

Range	0° to 360° or ±180°, lead or lag
Accuracy	±1° maximum, I ≥ 0.1 A and E ≥ 1 V ±0.5° typical
Resolution	0.1°
Offsets	0°, 30°, 60°, or 90°, or measured value

Measurements (Continued)

Frequency¹

Range	45 to 500 Hz
Accuracy	±(0.01% reading + 1 count), maximum
Resolution	4 digits

Power / Energy Quantities

VA ¹	Product of the rms voltage and the rms current
VAR ¹	Product of the rms voltage, the rms current, and the negative sine of the phase angle
W ¹	Product of the rms voltage, the rms current, and the cosine of the phase angle
Wh ¹	Active power, sampled once per second
PF ¹	Cosine of the phase angle
Range	±0.1 to 20 kVA, kW, or kVAR 0 to ±9999 kWh -1.0000 to +1.0000, lead or lag
Accuracy	±1.5% of VA, for VA, W, and VAR ±0.6% reading typical, 120 Vrms, 1 Arms, and 0° for kWh ±0.01 max., I ≥ 0.1 A and E ≥ 1 V for PF

Interface

Operator Interface

Display	16 character supertwist liquid-crystal
Keyboard	8 function keys

¹The Model 918B measures phase angle and frequency using zero crossings. The calculated parameters are based on linear models, assuming low distortion. Because of this, measurement errors for harmonic-rich signals may exceed these specifications. The Models 931A, 930A, and 929A are recommended for accurate measurements of harmonic-rich signals.

Model 918B Specifications

Power Requirements

Internal Battery

Type	Nickel-cadmium
Operation	25 hours minimum, fully charged
Charge	8 hours

External Power

AC Line	Plug-in transformer, 15 Vdc / 150 mA 120 Vrms, 60 Hz, 5 VA; contact factory for other voltages
Safety	Meets UL, CSA requirements

General

Physical

Size	182 x 122 x 43 mm (7.2 x 4.8 x 1.7 in.)
Soft Case	24 x 22 x 16 cm (9.5 x 8.7 x 6.3 in.)
Weight	1 kg (2.2 lbs); 2 kg (4.4 lbs), with case and included accessories

Environmental

Temperature	Operating: 0° to +50° C Nonoperating: -40° to +75° C
Humidity	Non-condensing

Accessories

Included

<u>Description</u>	<u>Order No.</u>
Voltage test probe kit, with adapters	AP0002000
Battery Charger, 120 Vac / 60 Hz	AP0001100
1000:1 Clamp-on Current Transformer	09111A
Current Transformer Cable	CA0014300
Tilt Bail	HD0033800
Soft Carrying Case	HD0033600
Operation Manual	PD0010600

Available

<u>Description</u>	<u>Order No.</u>
Auxiliary Voltage Adapter, 10 to 750 V	09184A
Isolated Voltage Adapter, 50 to 750 V	09185A
Plug-in direct-input CT, 100:1, 0.002 to 2.0 A	09182A
Plug-in direct-input CT, 1000:1, 0.02 to 20.0 A	09182B
1000 A Clamp-on Current Transformer (must be used in conjunction with Model 09182A 100:1 direct input CT); overall range 2 to 1000 A.	09113A
Maintenance Manual	PD0011100