Data Sheet

40,000-Count Dual-Display Handheld LCR Meters

Models 878B, 879B, and 880

Features & Benefits

- 40,000 counts resolution on primary and 10,000 counts resolution on secondary display
- L, C, R and Z (879B & 880 only) primary measurements
- Automatic calculation of secondary parameters D, Q, θ, ESR (θ/ESR for 879B & 880 only), DCR (880 only)
- Accuracy up to 0.1% and selectable test frequencies up to 100 kHz (880 only)
- Fast auto range design for rapid, easy component measurements
- Auto detect mode for automatic component type identification and measurement type selection (880 only)
- Relative mode
- Visible and audible tolerance mode
- Data Hold and Min/Max/Average recording
- USB (Virtual COM) interface
- SCPI compliant commands for remote communication
- Software for datalogging and front panel emulation available as free download
- Configurable power-up-states
- 3 year warranty

Applications

- Passive component troubleshooting
- Electronic assembly
- Quality control (component sorting)

Full Featured Handheld LCR Meters

The 878B, 879B, and 880 40,000-count handheld LCR meters measure inductance, capacitance, and resistance quickly and precisely. The 879B and 880 also measure impedance, Theta, and ESR. Additionally, the 880 offers capabilities typically only found in bench LCR meters such as a 4-terminal configuration, basic measurement accuracy up to 0.1 %, test frequencies up to 100 kHz, selectable test signal levels and measurement rate.

Fast auto ranging and quick measurement configuration such as measurement parameter and test frequency selection make these meters very simple to operate. The meters also include handy functions such as data hold, Min/Max/Average recording, tolerance sorting, and relative mode.

Measurement data can continuously transfer to a PC via the meter's mini USB interface, using either the provided data logging software or SCPI commands sent from a custom program.

ESR Measurements

Models 879B and 880 have the ability to measure the ESR (Equivalent Series Resistance) of capacitors. ESR is the sum of in-phase AC resistance of a capacitor and used to rate a capacitor's quality. An ideal capacitor would be lossless and have an ESR of zero. A capacitor could measure the correct capacitance value, yet still be defective, due to the component's excessive in-phase AC resistance. The 879B and 880 would be able to detect this faulty component.

Specifications	878B	879B	880
Measurements	L, C, R, D, Q	L, C, R, Z, D, Q, θ, ESR	L, C, R, Z, D, Q, θ, ESR & DCR
Basic Accuracy	0.5%	0.5%	0.1%
Test Frequency	120 Hz, 1 kHz	100 Hz, 120 Hz, 1 kHz, 10 kHz	100 Hz, 120 Hz, 1 kHz, 10 kHz, 100 kHz
Test Signal	0.6 Vrms	0.6 Vrms	0.3 Vrms, 0.6 Vrms, 1 Vrms DCR: 1 Vdc
Backlit Display	-	√	√
Auto Detect Mode	-	-	√
Tolerance Mode	1%, 5%, 10%	1%, 5%, 10%, 20%	1%, 5%, 10%, 20%
Measurement Rate	1.5 readings/sec	1.5 readings/sec	4 readings/sec (fast), 1.5 readings/sec (slow)

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Easy Front Panel Operation

Powerful Features

Flexible Operation
A tilt stand provides position flexibility for viewing and operating the meter. The over-molding rubber case protects the meter for better durability. A single 9 V battery (16 hours with alkaline battery) or the included 12 V power adapter (with model 879B & 880) can be used to power the meter, giving the user options for portable or bench-top use.

Model 880 includes a rechargeable Ni-MH battery that can provide up to six hours of battery life.

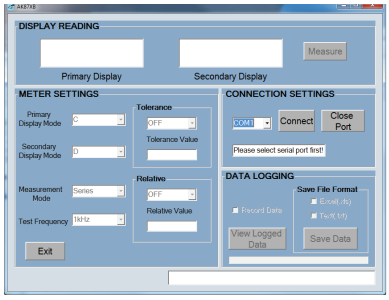
Four-terminal shielded configuration (880 only)
The 880 provides a 4-terminal socket with separate sensing and current leads plus guard terminal, a configuration typically only found in bench LCR meters. When using the included 4-terminal Kelvin test leads, this configuration can reduce the effect of lead impedances and contact resistance. This minimizes measurement errors and improves accuracy especially in the lower impedance range.

Faster Auto Range
The advanced auto range circuit design allows for faster measurements without the need to manually select ranges.

Dual Display
The dual display allows multiple measurements to be conveniently displayed at once.

Auto Detect Mode (880 only)
With the push of a single button, the Auto detect function will automatically identify primary parameters L, C or R and related secondary parameters, and set the suitable series/parallel equivalent mode and range.

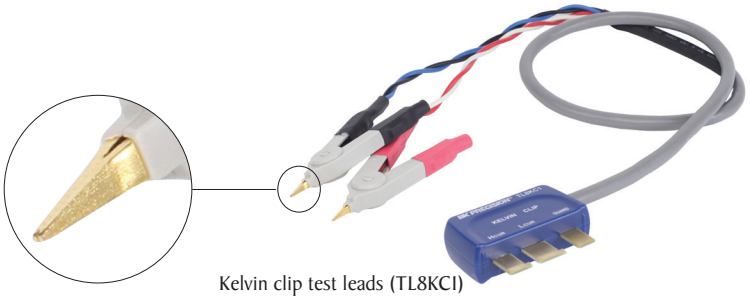
Increase Productivity with PC Connectivity
Free downloadable software is available for your handheld LCR meter. View and log measurements and setup and configure the instrument's measurement parameters.



Accessories


AC adapter


USB cable


Kelvin clip test leads (TL8KCI)


Shorting plate


Alligator test leads


SMD tweezer (TL8SM)

Model	Alligator test leads	USB cable	AC adapter	Shorting plate	Kelvin clip test leads	SMD tweezer
878B	●	●	-	-	-	-
879B	●	●	●	-	-	-
880	●	●	●	●	●	●

"●" Included

Specifications

General

Model	878B	879B	880
Measurement Parameters	L/C/R/D/Q	L/C/R/Z/D/Q/θ/ESR	L/C/R/Z/DCR/D/Q/θ/ESR
Test Frequency Setting	120 Hz, 1 kHz	100 Hz,120 Hz, 1 kHz, 10 kHz	100 Hz,120 Hz, 1 kHz, 10 kHz, 100 kHz
Actual Frequency (±0.02%)	120.048 Hz, 1 kHz	100 Hz, 120.048 Hz, 1 kHz, 10 kHz	100 Hz, 120.048 Hz, 1 kHz, 10 kHz, 100 kHz
Tolerance Mode	1%, 5%, 10%	1%, 5%, 10%, 20%	
Backlit Display	None	Yes	
Test Signal Level (Typical)	0.6 Vrms		0.3 Vrms, 0.6 Vrms, 1 Vrms. DCR signal: 1 Vdc
Measuring Circuit Mode	Series mode / Parallel mode		
Basic Accuracy	0.5%		0.1%
Ranging Mode	Auto		
Measuring Terminals	3 terminals with sockets		3-terminal, 5-terminal with sockets
Measurement Rate	1.5 readings/sec (auto range search not included)		LCRZ: 4 readings/sec (Fast), 1.5 readings/sec (Slow) DCR: 3 readings/sec (Fast), 2.5 readings/sec (Slow)
Response Time (Typical)	680 ms		
Auto Power-Off	5, 15, 30, 60 minutes, none		
Operating Temperature	32° F to 104° F (0° to 40° C); 0-70% R.H.		32° F to 104° F (0° to 40° C); ≤90% R.H.
Storage Temperature	-4° F to 122 °F (-20° to +50° C); 0-80% R.H.		-4° F to 104° F (-20° to 50° C); 0-90% R.H.
Low Battery Indication (Typical)	6.8 V		
Battery Life (Typical)	16 hours using alkaline battery (at 1 kHz with 100 Ω DUT, backlight off), 6 hours using Ni-MH (880 only)		
Power Consumption (Typical)	28 mA (under full power battery) for operation/ 2 µA (11 µA 880 only) after power-off.		
Power Requirements	9V battery or Ext. AC adapter*: DC 12 Vmin –15 Vmax. (load 50 mA Min.)		
Dimensions (L x W x H)	7.5" x 3.5" x 1.6" (190 × 90 × 41) mm		
Weight	0.767 lbs (348 g) without battery		
Safety	EN61010-1:2001, EU Low Voltage Directive 2006/95/EC		
Electromagnetic Compatibility	Meets EMC Directive 2004/108/EC, EN61326-1:2006		
			Three-Year Warranty
Standard Accessories	Banana-to-alligator test leads, 9 V battery, mini USB interface cable, manual, AC adapter* (879B only)		Banana-to-alligator test leads, Ni-MH 9 V battery, mini USB interface cable, Quick Start insert, AC adapter* shorting plate, four-terminal shielded Kelvin clip test leads (TL8KC1), SMD tweezer (TL8SM)

* The 879B and 880 include a 120 V AC adapter. For a 230 V AC adapter, order model 879B-220 V or 880-220 V. The AC adapters are optional accessories for the 878B.

Specifications (cont.)

Accuracy Specifications

Accuracy is expressed as ±(% of reading + number of last significant digits) for readings falling within 10% to 100% of full scale of range.
Valid after 30 minutes of warm up time, operation at 23 °C + 5 °C, <75% R.H. and slowest measurement speed.
880 only: When selecting a test signal level of 0.3V, the measurement accuracy is twice the accuracy listed in the table.

		Range	Max Display	Lx Accuracy (878B & 879B)	Lx Accuracy (880 only)	DF (Dx <0.5) (878B & 879B)	DF (Dx <0.5) (880 only)	Measurement Mode
Inductance	100 Hz*/120 Hz	1000 H	1000.0 H	1.5% + 3 digits	1% + 3 digits	1.5% + 50 digits	1% + 3 digits	Parallel
		400 H	399.99 H	0.7% + 2 digits	0.35% +2 digits	0.7% + 50 digits	0.35% +2 digits	Parallel
		40 H	39.999 H	0.7% + 2 digits	0.1% + 2 digits	0.7% + 50 digits	0.1% + 2 digits	Series/ Parallel (Parallel)**
		4000 mH 4 H**	3999.9 mH 3.9999 H**	0.5% + 1 digits	0.1% + 2 digits	0.5% + 50 digits	0.1% + 2 digits	Series Series/Parallel**
		400 mH	399.99 mH	0.6% + 2 digits	0.1% + 2 digits	0.6% + 50 digits	0.1% + 2 digits	Series
		40 mH	39.999 mH	0.9% + 2 digits	0.45% + 2 digits	0.9% + 50 digits	0.45% + 2 digits	Series
		4 mH	3.9999 mH	2.8% + 3 digits	1.40% + 5 digits	2.8% + 50 digits	Not Specified	Series
	1 kHz	100 H	100.00 H	1.5% + 3 digits	1% + 3 digits	1.5% + 50 digits	1% + 3 digits	Parallel
		40 H	39.999 H	0.7% + 2 digits	0.35% + 2 digits	0.7% + 50 digits	0.35% + 3 digits	Parallel
		4000 mH 4 H**	3999.9 mH 3.9999 H**	0.7% + 2 digits	0.1% + 2 digits	0.7% + 50 digits	0.1% + 2 digits	Series/ Parallel (Parallel)**
		400 mH	399.99 mH	0.5% + 1 digits	0.1% + 2 digits	0.5% + 50 digits	0.1% + 2 digits	Series Series/ Parallel
		40 mH	39.999 mH	0.6% + 2 digits	0.1% + 2 digits	0.6% + 50 digits	0.1% + 2 digits	Series
		4000 µH 4 mH**	3999.9 µH 3.9999 mH**	0.9% + 2 digits	0.45% + 2 digits	0.9% + 50 digits	0.45% + 2 digits	Series
		400 µH	399.99 µH	2.8% + 3 digits	1.4% + 5 digits	2.8% + 50 digits	Not Specified	Series
	10 kHz*	1000 mH	1000.0 mH	1.5% + 3 digits	0.8% + 3 digits	1.5% + 50 digits	0.8% + 3 digits	Parallel
		400 mH	399.99 mH	0.7% + 2 digits	0.35% + 2 digits	0.7% + 50 digits	0.35% + 2 digits	Series/ Parallel (Parallel)**
		40 mH	39.999 mH	0.5% + 1 digits	0.1% + 2 digits	0.5% + 50 digits	0.1% + 2 digits	Series Series/ Parallel**
		4000 µH 4 mH**	3999.9 µH 3.9999 mH**	0.6% + 2 digits	0.3% + 2 digits	0.6% + 50 digits	0.3% + 2 digits	Series
		400 µH	399.99 µH	0.9% + 2 digits	0.45% + 2 digits	0.9% +50 digits	0.45% + 2 digits	Series
		40 µH	39.99 µH	2.8% + 3 digits	1.4% + 5 digits	2.8% + 50 digits	Not Specified	Series
	100 kHz**	100 mH	399.99 mH	N/A	1.5% + 5 digits	N/A	1.5% + 5 digits	Parallel
		40 mH	39.999 mH	N/A	1.5% + 2 digits	N/A	1.5% + 2 digits	Parallel
		4 mH	3.9999 mH	N/A	0.5% + 2 digits	N/A	0.5% + 2 digits	Series/ Parallel
		400 µH	399.99 µH	N/A	0.5% + 2 digits	N/A	0.5% + 2 digits	Series
		40 µH	39.999 µH	N/A	0.8% + 5 digits	N/A	0.8% + 5 digits	Series
		4 µH	3.999 µH	N/A	2.5% + 10 digits	N/A	Not Specified	Series

* = Models 879B & 880 only, ** = Model 880 only

Specifications (cont.)

		Range	Max Display	Cx Accuracy (878B & 879B)	Cx Accuracy (880 only)	DF (Dx <0.5) (878B & 879B)	DF (Dx <0.5) (880 only)	Measurement Mode
Capacitance	100 Hz*/120 Hz	20 mF	20.000 mF	8% + 3 digits	5% + 5 digits	8% + 50 digits	5% + 5 digits	Series
		4000 µF (4 mF)**	3999.9 µF (3.9999 mF)**	2% + 2 digits	1% + 3 digits	2% + 50 digits	1% + 3 digits	Series
		400 µF	399.99 µF	0.7% + 2 digits	0.35% + 2 digits	0.7% + 50 digits	0.35% + 2 digits	Series
		40 µF	39.999 nF	0.5% + 1 digits	0.1% + 2 digits	0.5% + 50 digits	0.1% + 2 digits	Series
		4000 nF 4 µF**	3999.9 nF 3.9999 µF**	0.5% + 1 digits	0.1% + 2 digits	0.5% + 50 digits	0.1% + 2 digits	Series/ Parallel
		400 nF	399.99 nF	0.5% + 2 digits	0.1% + 2 digits	0.5% + 50 digits	0.1% + 2 digits	Series/ Parallel (Parallel)**
		40 nF	39.999 nF	0.7% + 1 digits	0.35% + 3 digits	0.7% + 50 digits	0.35% + 3 digits	Parallel
		4 nF	3.9999 nF	2.5% + 2 digits	1.25% + 5 digits	2.5% + 50 digits	Not Specified	Parallel
	1 kHz	1000 µF	1000.0 µF	3.7% + 3 digits	2% + 5 digits	3.7% + 50 digits	2% + 5 digits	Series
		400 µF	399.99 µF	2% + 2 digits	1% + 3 digits	2% + 50 digits	1% + 3 digits	Series
		40 µF	39.999 µF	0.7% + 2 digits	0.35% + 2 digits	0.7% + 50 digits	0.35% + 2 digits	Series
		4000 nF 4 µF**	3999.9 nF 3.9999 µF**	0.5% + 1 digit	0.1% + 2 digits	0.5% + 50 digit	0.1% + 2 digits	Series
		400 nF	399.99 nF	0.5% + 2 digits	0.1% + 2 digits	0.5% + 50 digits	0.1% + 2 digits	Series/ Parallel
		40 nF	39.999 nF	0.5% + 2 digits	0.1% + 2 digits	0.5% + 50 digits	0.1% + 2 digits	Series/ Parallel (Parallel)**
		4000 pF 4 nF**	3999.9 pF 3.9999 nF**	0.7% + 2 digits	0.35% + 3 digits	0.7% + 50 digits	0.35% + 3 digits	Parallel
		400 pF	399.9 pF	2.5% + 2 digits	1.25% + 5 digits	2.5% + 50 digits	Not Specified	Parallel
	10 kHz*	100 µF	100.00 µF	3.9% + 5 digits	3% + 5 digits	3.9% + 50 digits	3% + 5 digits	Series
		40 µF	39.999 µF	3.7% + 3 digits	1.5% + 3 digits	3.7% + 50 digits	1.5% + 3 digits	Series
		4000 nF 4 nF**	3999.9 nF 3.9999 nF**	0.7% + 2 digits	0.35% + 2 digits	0.7% + 50 digits	0.35% + 2 digits	Series
		400 nF	399.99 nF	0.5% + 2 digits	0.1% + 2 digits	0.5% + 50 digits	0.1% + 2 digits	Series
		40 nF	39.999 nF	0.5% + 1 digit	0.1% + 2 digits	0.5% + 50 digit	0.1% + 2 digits	Series/ Parallel
		4000 pF	3999.9 nF	0.5% + 2 digits	0.1% + 2 digits	0.5% + 50 digits	0.1% + 2 digits	Series/ Parallel (Parallel)**
		400 pF	399.99 pF	0.7% + 2 digits	0.35% + 3 digits	0.7% + 50 digits	0.35% + 3 digits	Parallel
		40 pF	39.99 pF	2.5% + 2 digits	1.5% + 5 digits	2.5% + 50 digits	Not Specified	Parallel
	100 kHz**	10 µF	10.000 µF	N/A	6% + 20 digits	N/A	6% + 20 digits	Series
		4 µF	3.9999 µF	N/A	2.5% + 10 digits	N/A	2.5% + 10 digits	Series
		400 nF	399.99 nF	N/A	0.8% + 5 digits	N/A	0.8% + 5 digits	Series
		40 nF	39.999 nF	N/A	0.5% + 2 digits	N/A	0.5% + 2 digits	Series/ Parallel
		4 nF	3.9999 nF	N/A	0.5% + 2 digit	N/A	0.5% + 2 digit	Parallel
		400 pF	399.99 pF	N/A	0.8% + 2 digits	N/A	0.8% + 2 digits	Parallel
		40 pF	39.999 pF	N/A	1.2% + 5 digits	N/A	1.2% + 5 digits	Parallel
		4 pF	4.999 pF	N/A	Not Specified	N/A	Not Specified	Parallel

* = Models 879B & 880 only, ** = Model 880 only

Specifications (cont.)

		Range	Max Display	R/Zx Accuracy (878B - 879B)	R/Zx Accuracy (880 only)	θ Accuracy (878B - 879B)	θ Accuracy (880 only)	Measurement Mode
Resistance/Impedance*	100 Hz*/120 Hz/ 1 kHz/10 kHz*	10 MΩ	10.000 MΩ	5.5% + 3 digits	3% + 3 digits	±3.2°	±1.75°	Parallel
		4000 kΩ	3999.9 kΩ	2.5% + 2 digits	1% + 3 digits	±1.5°	±0.75°	Parallel
		400 kΩ	399.99 kΩ	0.7% + 2 digits	0.35% + 2 digits	±0.4°	±0.25°	Parallel
		40 kΩ	39.999 kΩ	0.5% + 2 digits	0.1% + 2 digits	±0.3°	±0.1°	Series/ Parallel (Parallel)**
		4000 Ω 4 kΩ**	3999.9 Ω 3.9999 kΩ**	0.5% + 2 digits	0.1% + 2 digits	±0.3°	±0.1°	Series/ Parallel
		400 Ω	399.99 Ω	0.5% + 2 digits	0.1% + 2 digits	±0.3°	±0.1°	Series
		40 Ω	39.999 Ω	0.7% + 2 digits	0.35% + 2 digits	±0.4°	±0.25°	Series
		4 Ω	3.9999 Ω	2% + 2 digits	1% + 3 digits	±1.2°	±0.6°	Series
		0.4 Ω**	0.3999 Ω**	Not Specified	3% + 5 digits	Not Specified	Not Specified	Series
Impedance**	100 kHz**	10 MΩ	10.000 MΩ	N/A	8.0% + 20 digits	N/A	±4.6°	Parallel
		4 MΩ	3.9999 MΩ	N/A	3% + 10 digits	N/A	±1.75°	Parallel
		400 kΩ	399.99 kΩ	N/A	1.2% + 5 digits	N/A	±0.69°	Parallel
		40 kΩ	39.999 kΩ	N/A	0.8% + 2 digits	N/A	±0.46°	Parallel
		4 kΩ	3.9999 kΩ	N/A	0.5% + 2 digits	N/A	±0.3°	Series/ Parallel
		400 Ω	399.99 Ω	N/A	0.5% + 2 digits	N/A	±0.3°	Series
		40 Ω	39.999 Ω	N/A	0.8% + 5 digits	N/A	±0.46°	Series
		4 Ω	3.9999 Ω	N/A	2.5% + 10 digits	N/A	±1.43°	Series
		0.4 Ω	3.9999 Ω	N/A	6% + 20 digits	N/A	Not Specified	Series

	Range	Max Display	ESR Accuracy	Measurement Mode
ESR (879B) 100 Hz/120 Hz/ 1 kHz/ 10 kHz	1000 Ω	999.9 Ω	0.5% + 2 digits	Series
	100 Ω	99.99 Ω	0.5% + 2 digits	Series
	10 Ω	9.999 Ω	0.7% + 2 digits	Series
	1 Ω	.9999 Ω	2% + 2 digits	Series

* = Models 879B & 880 only, ** = Model 880 only

Specifications (cont.)

	Range	Max Display	Accuracy
DCR (880)	20 MΩ	20.000 MΩ	2 %+20 digits
	4 MΩ	3.9999 MΩ	1%+10 digits
	400 kΩ	399.99 kΩ	0.5%+5 digits
	40 kΩ	39.999 kΩ	0.1%+2 digits
	4 kΩ	3.9999 kΩ	0.1%+2 digits
	400 Ω	399.99 Ω	0.1%+2 digits
	40 Ω	39.999 Ω	0.1%+2 digits
	4 Ω	3.9999 Ω	0.5%+10 digits
	0.4 Ω	0.3999 Ω	2%+20 digits

Notes: Equivalent series resistance (ESR) accuracy for the 880 is calculated according to the following formula:

$R_{se} = \pm X_x \times \varnothing_e$

where X_x is the measured impedance, $2\pi f L_x$ or $\frac{1}{2\pi f C_x}$, and $\varnothing_e$ is the phase angle accuracy, $\theta_e \times \frac{\pi}{180}$.

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