BK PRECISION

Instruction Manual

Model 881
In-Circuit ESR & DCR Cap Tester

SAFETY GUIDELINES

WARNING

An electrical current of over 10 milliamps passing through the heart will stop most human hearts. Voltage of as low as 35Volts dc or ac rms should be considered hazardous since it can produce lethal current under certain conditions. Be sure to observe the following safety precautions:

1. There are no high voltages in the Cap Tester, but the equipment under test usually contains hazardous high voltage. Always follow the safety recommendations of the manufacturer of your equipment.

2. Some equipment may be wired as a “hot chassis” type; equipment using two-wire power plugs are always suspected and it may even include those with polarized plugs. Never touch chassis of “hot chassis” type equipment to avoid the possibility of a serious, possibly fatal electrical shock.

3. Don’t expose yourself needlessly to high voltage; only remove housings and covers when necessary.

4. Familiarize yourself with the equipment being tested and the location of its high voltage points. However be aware that high voltage may appear at unexpected points in defective equipment.

5. Never work alone. Someone should be nearby to render aid if needed. Training in CPR(Cardio-pulmonary resuscitation) is highly recommended.

In-Circuit ESR & DCR Cap Tester

Introduction:
The In-circuit ESR & DCR capacitor tester is specially designed to measure ESR (equivalent Series Resistance) on capacitors in the range of 0.47uf and up, in or out of circuit. The output test frequency of the meter is a 100 KHz SINE WAVE. The output voltage is 15mV pp and will not turn on any solid-state devices in the circuit under test.

It includes a one–handed tweezers test probe, microprocessor controlled, automatically discharges the capacitors under test, checks for low DCR, checks and displays ESR on a 25 segment LED bar scale, and beeps from one to five beeps depending on the ESR reading of the capacitor. It has a three-colored chart on the front panel that show typical ESR readings of good, fair, and bad capacitors depending on their capacitance.

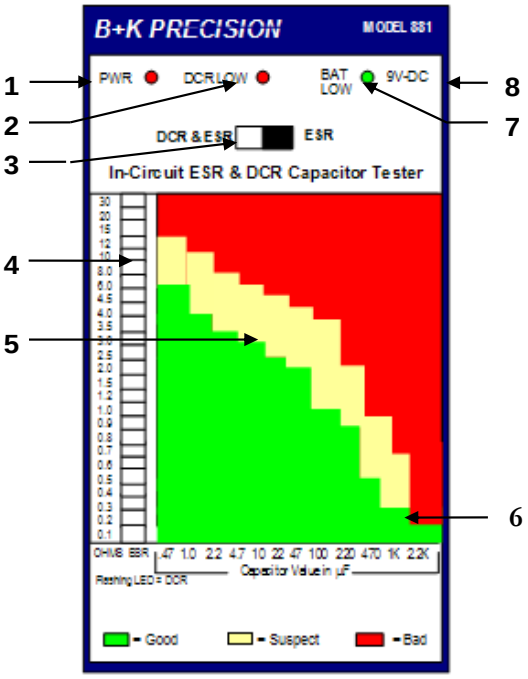
OPERATION:
1. Place the mode switch to the position for measurement.

2. Turn the unit on and wait; the unit will beep once when ready.

3. Hold the tweezer's test probe cross the capacitor leads to measure ESR of the capacitor.

Controls and Indicators

1. **Power Switch** – Power on or off
2. **DCR Low Indicator** – LED on when DCR low then 30 ohms
3. **Mode switch** – Selects test capacitor ESR or test capacitor DCR&ESR both.
4. **ESR or DCR Indicator** – Indicate the ESR or DCR
5. **Colored chart** – The three-colored chart that show typical ESR readings of good, fair, and bad capacitors depending on their capacitance.
6. **Square connector** – Capacitance
7. **Bat Low** – Indicates battery condition.
8. **AC Adapter Jack** – 9V DC, 100mA center pin + adapter input.



APPLICATIONS

Using the tester to measure electrolytic capacitors in or out of circuit.

When the meter is turned on, it will automatically calibrate the internal circuit, and then it will beep once to indicate it's ready. (Note: Before the unit beeps to signal it is ready, don't have the tweezer's test probes shorted together or connected to a capacitor, otherwise the meter will continue to sound an alarm until the test probe is opened or the capacitor is removed.)

The meter has two modes for performing in-circuit ESR measurements ("DCR & ESR" mode and "ESR" mode). Place the mode switch to the position for measurement.

To measure the ESR on a capacitor, hold the tweezer's test probe cross the capacitor leads. The meter's probes are nonpolar.

On the "ESR" mode, the meter performs a set cycle of tests each time it is connected to a capacitor. First it discharges the capacitor, then it measures the ESR and indicates the range of the value with the 25 LED bar, and also sounds one or more times depending on the ESR of the capacitor (see table 1). The three-color chart on the panel shows typical electrolytic capacitors ESR readings. If the capacitor's ESR range is in the green areas, it is good, and if the capacitor's ESR range is in the red areas, it must be replaced. If the capacitor's ESR range is in the yellow areas it's questionable and is up to the technician to decide on whether to replace this capacitor, or not. The capacitor with higher voltage ratings and used in circuits not requiring particularly low ESR may still work adequately in the yellow area. However, the modern solid circuits such as switch power supplies require low ESR capacitor. The ESR of a good capacitor depends upon the type of material, value and voltage rating.

On the "ESR" mode, the meter will indicate that a shorted capacitor is good because the meter does not perform the DCR measurement. Therefore, only in the "DCR & ESR mode" will the meter detect shorted capacitor in its DCR cycle.

Table 1
Beeps from 1 to 5 beeps depending on ESR

ESR range ohms:	0 – 0.5Ω	One sound
	0.5 – 1Ω	Two sounds
	1 – 3Ω	Three sounds
	3 – 8Ω	Four sounds
	8 – 30Ω	Five sounds

On the “DCR & ESR” mode, first it discharges the capacitor, then it checks the DC resistance and if the DC resistance is less than 30 ohm, it will stop on the DCR cycle, otherwise, it measures the ESR and indicates the range of the value with the 25 LED bar. On this mode, the meter detects shorted capacitor in its DCR cycle.
If the meter stops on the DCR cycle, it first sounds an alarm and turns on the DCR LOW led, then indicates DC resistance by flashing the LED on the LED bar and also sounds one or more times depending on the DC resistance (see table 2).

Table 2

Measures DCR by flashing the LED on the LED bar

DCR range ohms:		
	0 - 0.5Ω	flashing the 0.5Ω LED
	0.5 - 1.2Ω	flashing the 1.2Ω LED
	1.2 - 2.5Ω	flashing the 2.5Ω LED
	2.5 - 4.5Ω	flashing the 4.5Ω LED
	4.5 - 10Ω	flashing the 10Ω LED
	10 - 20Ω	flashing the 20Ω LED
	20 - 30Ω	flashing the 30Ω LED

Beeps from 1 to 3 beeps depending on DCR

DCR range ohms:		
	0 – 1.2Ω	One sound
	1.2 – 4.5Ω	Two sounds
	4.5 – 3 0Ω	Three sounds

The meter automatically discharges capacitors before testing. However, if capacitors are large enough, and there is enough voltage stored, it may damage the test probe. We recommend that for a large capacitor, you should discharge it before you test it.

You can use the “ESR” mode to test a capacitor with a parallel inductor if the inductor has a large inductance at 100 kHz test frequency and have no effect on the ESR reading.

On the “ESR” mode, the meter is an AC ohm meter, it can be used to measure low value non-inductive resistors. It also may be used to measure small inductors and compare meter reading to the known good inductors.

SPECIFICATIONS

Open circuit probe voltage	15mV pp
Output test frequency	100 KHz sine wave

Measures ESR

ESR range ohms 0.1 – 30 (25 segment LED bar scale)

Beeps from 1 to 5 beeps depending on ESR of capacitor

Measures DCR

DCR range ohms 0.5 – 30 flashing the LED

Power One 9V battery or an external AC adapter (9V DC 100mA 5.5mm x 2.1mm center pin+)

Power drain 10mA typical

Dimensions 1.5” x 3.8” x 5.7”

Note: Specifications and information in this manual are subject to change without notice. Please visit for the most current product information.

Service Information

Warranty Service: Please go to the support and service section on our website to obtain a RMA #. Return the product in the original packaging with proof of purchase to the address below. Clearly state on the RMA the performance problem and return any leads, probes, connectors and accessories that you are using with the device.
Non-Warranty Service: Please go to the support and service section on our website to obtain a RMA #. Return the product in the original packaging to the address below. Clearly state on the RMA the performance problem and return any leads, probes, connectors and accessories that you are using with the device. Customers not on an open account must include payment in the form of a money order or credit card. For the most current repair charges please refer to the service and support section on our website.

Return all merchandise to B&K Precision Corp. with prepaid shipping. The flat-rate repair charge for Non-Warranty Service does not include return shipping. Return shipping to locations in North America is included for Warranty Service. For overnight shipments and non-North American shipping fees please contact B&K Precision Corp.

Include with the returned instrument your complete return shipping address, contact name, phone number and description of problem.

Limited One-Year Warranty

B&K Precision Corp. warrants to the original purchaser that its products and the component parts thereof, will be free from defects in workmanship and materials for a period of one year from date of purchase.

B&K Precision Corp. will, without charge, repair or replace, at its option, defective product or component parts. Returned product must be accompanied by proof of the purchase date in the form of a sales receipt.

To help us better serve you, please complete the warranty registration for your new instrument via our website bkprecision.com

Exclusions: This warranty does not apply in the event of misuse or abuse of the product or as a result of unauthorized alterations or repairs. The warranty is void if the serial number is altered, defaced or removed.

B&K Precision Corp. shall not be liable for any consequential damages, including without limitation damages resulting from loss of use. Some states do not allow limitations of incidental or consequential damages. So the above limitation or exclusion may not apply to you.

This warranty gives you specific rights and you may have other rights, which vary from state-to-state.