

Data Sheet

DC Resistance Meters 2840 Series



Touch screen to zoom, select, and enter values



The 2840 Series DC resistance meters feature high accuracy and resolution measurements in the milliohm range. Both meters are ideally suited for measuring contact resistance of relays, switches, and PCB traces, typically outside the resistance range of multimeters. The vivid 4.3-inch TFT LCD color touch screen and keypad provide intuitive operation.

The 2841 model adds extended range, accuracy, temperature measurement and functions. Measure low resistivity materials with offset voltage compensation to reduce the influence of thermal EMF. Cable error detection displays a message when one of the terminals is open, which helps identify defective test leads or poor contact that can cause unreliable measurements.

The 2841 includes two temperature compensation

functions: correction (TC) and conversion (Δt). The TC function corrects for ambient temperature changes that cause different resistance measurements of the same component. The temperature conversion (Δt) function can be used to evaluate a coil's resistance before and after operation to calculate a temperature change. These additional features make the 2841 ideal for evaluating coils, motor windings, transformers, actuators and conductive materials.

Both meters feature low power resistance testing (LPR) modes and variable measurement speeds that are suited for a wide range of applications. The handler interface with high-speed measurement capabilities enable the 2840 Series to evaluate a large quantity of components and be integrated into an automated test system.

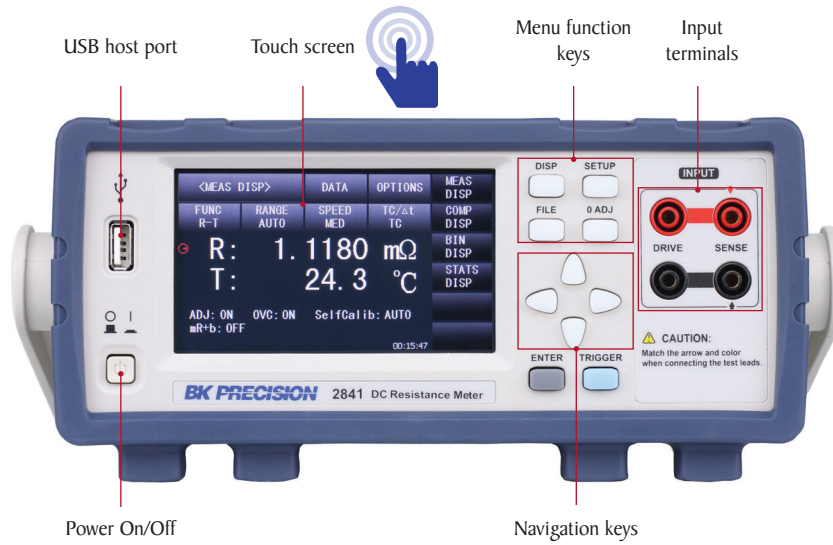
Features & Benefits

- 4.3-inch color touch screen
- 4-wire Kelvin test leads included
- Temperature measurement with correction*
- Low power resistance mode to protect DUT
- Manual or auto ranging
- Adjustable measurement speed for fast readout or better accuracy
- Fast measurement speed up to 20 ms/reading to increase manufacturing throughput
- Offset voltage compensation (OVC)*
- Cable compensation (0 ADJ)
- BIN comparator function to sort components in up to 10* bin locations
- Bin-sorting with statistical measurement
- Store/recall 30 instrument settings
- Screen capture to USB drive
- Selectable power line filter
- Trigger delay
- Handler interface for easy integration with a component handler
- Standard RS232, USB (USBTMC and virtual COM), and LAN* interfaces

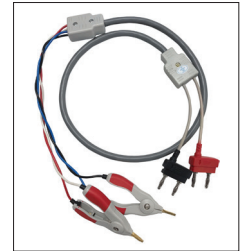
* model 2841 only

| Model | 2840 | 2841 |
|-------------------------------|--------------------------------|-----------------------------------|
| Display Range | 1 $\mu\Omega$ to 20 k Ω | 0.1 $\mu\Omega$ to 100 M Ω |
| Basic Accuracy | 0.1% | 0.01% |
| Measurement Resolution | 1 $\mu\Omega$ | 0.1 $\mu\Omega$ |
| Displayed Digits | 4 1/2 | 5 1/2 |
| Functions | R and LPR | R, R-T, T, LPR, LPR-T |
| Resistance Measurement Ranges | 7 + Auto | 11 + Auto |
| Temperature Compensation | - | √ |
| Number of Results Bins | 3 | 10 |

Front panel



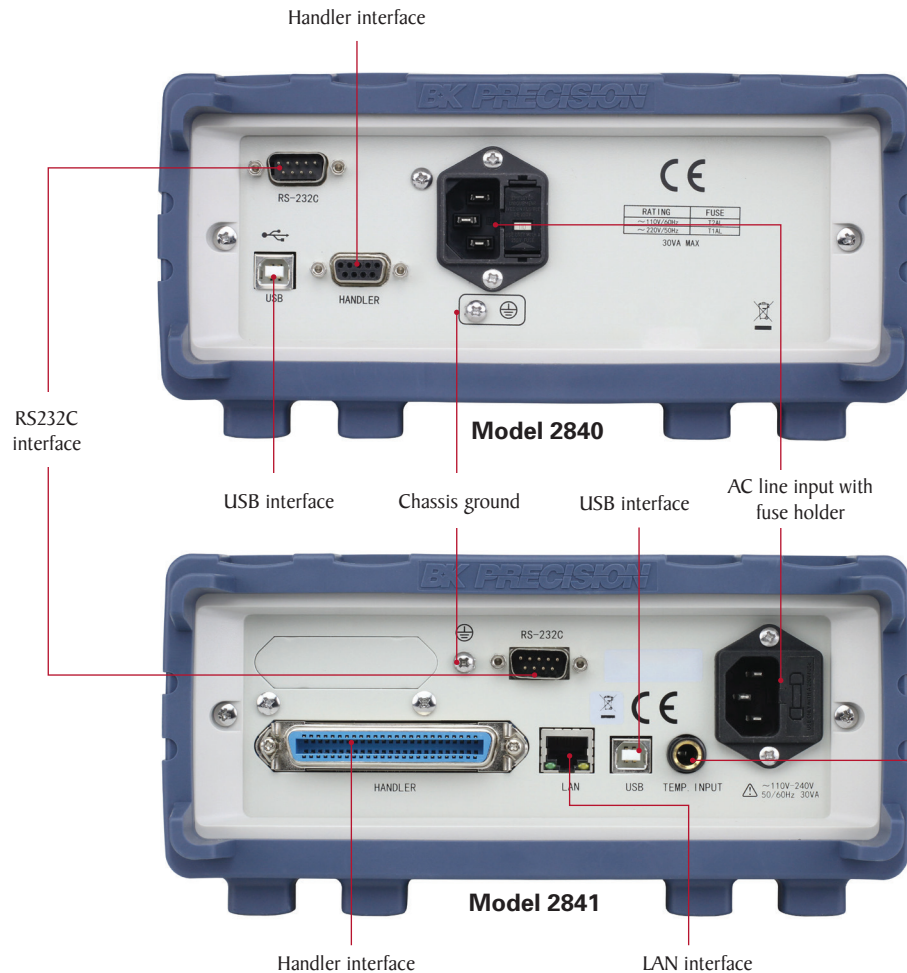
Kelvin test leads
(Included with both models)



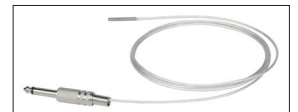
Intuitive user interface

The touch screen and keys both provide a convenient interface for setting parameters quickly and precisely. Both models also support one touch zoom to enhance the readability of displayed measurements.

Rear panel



Temperature probe
(Included with model 2841 only)



Temperature probe input

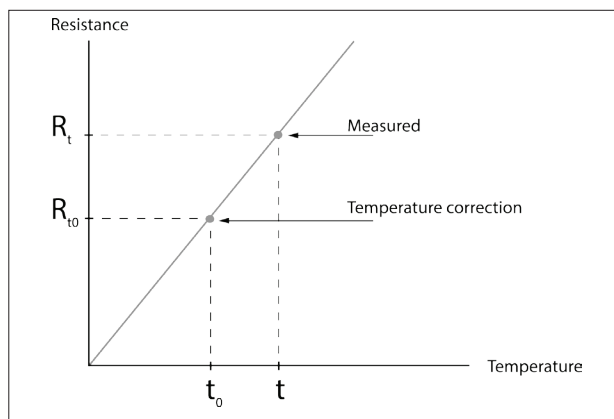
Powerful features

Bin sorting function



Quickly sort components using the 10 bins of the 2841 or 3 bins of the 2840. The results can be displayed on the screen or output via the handler interface. High and low limits for each bin can be set up in absolute or tolerance mode.

Temperature correction



The 2841 can compensate for temperature changes with a component's known temperature coefficient of resistivity. This allows for increased comparison accuracy between components that are measured at different temperatures.

Remote PC control



Integrate your DC resistance meter into an automated test system and control it from a PC using commands via the RS232 or USB interface. The 2841 is LAN enabled with a web browser interface that allows users to conveniently configure, control, or monitor basic settings.

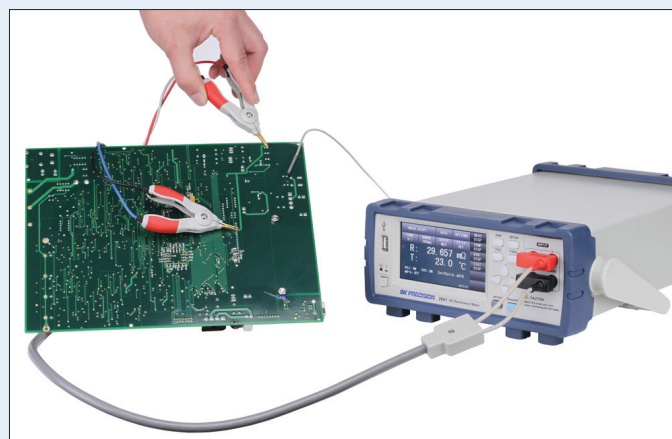
Applications

Component testing



Measure the resistance of motor and transformer windings, relay and switch contacts, and other conductive materials and components. 4-wire Kelvin test leads included with both models.

Circuit board testing



The resistance meters' high accuracy make them suitable for measuring trace resistances and finding shorts on PCBs.

LPR (Lower Power Resistance) measurement

In standard resistance measurement mode (LPR OFF), the large drive current (1 A max.) may damage sensitive components or circuits. LPR mode protects the DUT by limiting the maximum power being applied.

Offset voltage compensation (OVC)

OVC switches the polarity and averages the forward and reverse polarity readings. This enables accurate measurements by minimizing the adverse effects of thermal EMFs or small biases in a circuit (e.g., from a capacitor's dielectric absorption when measuring a PCB trace).

Specifications

Specifications are valid after temperature stabilization period of 15 minutes over an ambient temperature range of 23 °C ± 5 °C.

Resistance Measurements

| Model 2840 | | | | |
|------------------|---------|------------|---------------------------------------|-------------------------------|
| LPR OFF | | | | |
| Resistance Range | Current | Resolution | Accuracy (rdg% + digits) ¹ | Maximum Open Terminal Voltage |
| 20 mΩ | 1 A | 1 μΩ | 0.1 + 3 | 0.7 V |
| 200 mΩ | 100 mA | 10 μΩ | 0.1 + 2 | |
| 2 Ω | | 100 μΩ | | |
| 20 Ω | 10 mA | 1 mΩ | | 3 V |
| 200 Ω | 1 mA | 10 mΩ | | |
| 2 kΩ | 100 μA | 100 mΩ | | |
| 20 kΩ | | 1 Ω | | |
| LPR ON | | | | |
| 2 Ω | 10 mA | 100 μΩ | 0.2 + 5 | 40 mV |
| 20 Ω | 1 mA | 1 mΩ | | |
| 200 Ω | 100 μA | 10 mΩ | | |
| 2 kΩ | 10 μA | 100 mΩ | | |

Accuracy = (measurement value x rdg) + (least significant digit)

¹ - Test speed set to Slow2

| Model 2841 | | | | | |
|-------------------------------|------------------------|------------|-----------------------|-------------------------------|--|
| LPR OFF | | | | | |
| Resistance range ³ | Current | Resolution | Accuracy (rdg% + FS%) | Maximum Open Terminal Voltage | |
| 20 mΩ | 1 A | 0.1 μΩ | 0.25+0.001 | 5 V | |
| 200 mΩ ² | | 1 μΩ | 0.25+0.001 | | |
| 200 mΩ ² | (selectable) 100 mA | 1 μΩ | 0.35+0.001 | 2.6 V | |
| 2 Ω | 100 mA | 10 μΩ | 0.035+0.001 | | |
| 20 Ω | 10 mA | 100 μΩ | 0.025+0.001 | | |
| 200 Ω | | 1 mΩ | 0.01+0.001 | | |
| 2 kΩ | 1 mA | 10 mΩ | 0.01+0.001 | 13 V | |
| 20 kΩ | 100 μA | 100 mΩ | 0.01+0.005 | | |
| 100 kΩ | | 1 Ω | 0.01+0.003 | | |
| 1 MΩ | 10 μA | 10 Ω | 0.02+0.001 | | |
| 10 MΩ | 1 μA | 100 Ω | 0.1+0.006 | | |
| 100 MΩ | 100 nA | 1 kΩ | 0.8+0.060 | 60 mV | |
| LPR ON | | | | | |
| 2 Ω | 10 mA | 100 μΩ | 0.05+0.001 | | |
| 20 Ω | 1 mA | 1 mΩ | | | |
| 200 Ω | 100 μA | 10 mΩ | | | |
| 2 kΩ | 10 μA | 100 mΩ | | | |

Accuracy = (measurement value x rdg%) + (resistance range x FS%)

² - Current for the 200 mΩ range can be selected in the measurement setup menu.

³ - Measurement display is 5 1/2 digits for ranges 20 mΩ to 20 kΩ, 5 digits for ranges 100 kΩ to 100 MΩ

Temperature Measurements (Model 2841 only)

| Pt500 | | | |
|---------------------|------------|------------------------|----------------------|
| Temperature range | Resolution | Accuracy in six months | Accuracy in one year |
| -10.0 °C to 39.9 °C | 0.1 °C | ±0.30%rdg ± 0.5 °C | ±0.45%rdg ± 0.8 °C |
| 40.0 °C to 99.9 °C | 0.1 °C | ±0.30%rdg ± 1.0 °C | ±0.45%rdg ± 1.5 °C |

Accuracy = 0.3% x measured value ± 0.5 °C

| Analog Input | | | |
|---------------------|---------------------------|------------|---------------------------|
| Input voltage range | Temperature range display | Resolution | Accuracy |
| 0 to 2 V | -99.9 °C to 999.9 °C | 1 mV | ±1% T _R ± 3 mV |

Accuracy = 1% x (T_R - T_{0V}) + 0.3% x (T_{IV} - T_{0V})

T_{IV}: The temperature measured under input voltage of 1 V.

T_{0V}: The temperature measured under input voltage of 0 V.

T_R: The current measured temperature.

Specifications

| Model | | 2840 | 2841 |
|----------------------------------------------------|------------------|----------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------|
| Measurement Function | | | |
| Resistance Measurement Time (typical) ¹ | FAST | 10 ms | 7 ms |
| | MED | 25 ms | 22 ms |
| | SLOW1 | 115 ms | 102 ms |
| | SLOW2 | 455 ms | 402 ms |
| Temperature Measurement Time | | - | 100 ± 10 ms |
| Measuring Terminals | | 4 terminals | |
| Averaging | | 1 - 255 | |
| Range Mode | | Auto and Manual | |
| Trigger Mode | | Internal, Manual, External, Bus | |
| mr + b Mode | | Apply a multiplier (m) and offset (b) to the measurement (r). (2841 model only) | |
| LPR Mode | | Ranges 20 Ω, 200 Ω, 2 kΩ, maximum open terminal voltage: 60 mV | |
| Statistical Measurement Function | | AVG, MAX, MIN, OSD (Overall standard deviation), SSD (Sample standard deviation), Process capacity index (Cp, Cpk) | |
| Comparator (bin sorting) Function | | | |
| Comparator | Signal output | IN, HI, LO | |
| | Beep mode | OFF, IN, HI, LO | |
| | Limit setup mode | Absolute value high/low limit, Percentage high/low limit + nominal value | |
| Bin Sorting | | 3 bins, absolute value/percentage | 10 bins, absolute value/percentage |
| General | | | |
| AC input | Voltage | 110 - 240 VAC ± 10 % | |
| | Frequency | 50 - 60 Hz | |
| Display | | 4.3", 480 x 272 TFT Color (24-bit) LCD touch screen | |
| Power Consumption | | < 30 VA | |
| Remote Interface | | USB (USBTMC or virtual COM), RS232 | USB (USBTMC or virtual COM), RS232, LAN |
| Handler Interface | | 9-pin connector | 50-pin connector |
| Storage Memory | | Save/recall 30 instrument settings | |
| Operating Temperature | | 0 °C to 40 °C, ≤ 90% RH | |
| Storage Temperature | | -10 °C to 50 °C, ≤ 90% RH | |
| Dimensions (W x H x D) | | 8.46" x 3.5" x 14.17" (215 mm x 89 mm x 360 mm) | |
| Weight | | 8.59 lbs (3.9 kg) | 6.39 lbs (2.9 kg) |
| Three-Year Warranty | | | |
| Included Accessories | | AC power cord, user manual, Kelvin test leads (TLDKI), temperature probe TPTC2 (model 2841 only), test report and certificate of calibration | |

¹ - When DISPLAY is OFF; when DISPLAY is ON, 20 ms should be added.