INSTRUCTION MANUAL

BK PRECISION®

TOOL KIT
3-1/2 DIGIT MULTIMETER
MODEL 2707

Full Multimeter Functions
- Capacitance Meter
- Frequency Meter
- Transistor Tester
- Logic Probe
- Diode Tester
- Continuity Tester

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Printed in U.S.A.
OPERATING INSTRUCTIONS

SAFETY RANGES
1. If you are not sure if a component is functional, disconnect all power sources before attempting to repair.

WARNING
An electrical shock causing 10 milliamps of current to pass through the eyes for more than 1 second may cause death. Voltage levels of 90 volts or above should be considered dangerous and hazardous since it can cause permanent damage to the internal circuits. Higher voltages are even more dangerous. Observe the following safety precautions:

1. Do not exceed the following input ratings. Personal injury or damage to the instrument may occur.
   - DC VOLTS: 1000 (± 3 ac peak) (for all mV range)
   - AC VOLTS: 500 (± 3 ac peak) (for 300 mV range)
   - OMHMS: 250 (± 3 ac peak) (for 100 mV range)
   - COM: Do not exceed 300 mV range

2. The meter is not recommended for high voltage industrial use (for example measurements of 600 VAC or 600 VDC industrial power lines). The unit is intended for use with low energy circuits or equipment under 1000 VAC or high energy equipment under 1000 VDC. Do not exceed the manufacturer's rating.

3. CAUTION: Never connect two circuits across a high voltage. High energy power sources can be lethal if no proper means to short-circuit the instrument are present.

4. Remove test leads before replacing batteries or fuses, and before performing a calibration check.

5. Turn off all equipment and disconnect all power sources before performing any test.

6. Do not apply an external voltage to the Co or HFE sockets. Damage to the meter may result and short-circuit protection is not provided before connecting.

DIODE TEST
1. Set function switch to Diode position.
2. Make the test leads to the diode under test. Make sure the leads are not touching each other or any other part of the circuit.

TRANSISTOR MEASUREMENTS
1. Set function switch to Continuity.
2. Connect the test leads to the collector and base.
3. Connect the test leads to the lower and upper test points.

BATTERY REPLACEMENT
The battery (symbol shown) indicates if the battery is not fully charged or needs to be replaced. To replace the battery, remove the rear cover and replace the battery with a new one. Make sure that the battery is fully charged before use.

FUSE REPLACEMENT
If no current measurements are possible, check for blown fuse protection or fuse failure. Replace the fuse with a one that is the same or higher rating.

TECHNICAL SPECIFICATIONS
1. Input Impedance: 1000 ohms
2. Input Sensitivity: 10 mV
3. Input Resistance: 1 Mohm

MAINTENANCE
Clean the surface of the unit with a dry cloth. Do not use any solvent to clean the unit. If the unit is not to be used for an extended period of time, turn off the power and remove the battery to prevent damage.
SPECIFICATIONS

Accuracy specifications apply from +18°C to +28°C at relative humidity up to 75% unless otherwise noted.

<table>
<thead>
<tr>
<th>DC VOLTS Manual ranging</th>
<th>Resolution</th>
<th>Accuracy</th>
<th>Overvoltage Protection</th>
</tr>
</thead>
<tbody>
<tr>
<td>200mV</td>
<td>10 µV</td>
<td>±0.1 %</td>
<td>±2.5 V (ac peak) AC 115 V (dc peak), 400 V (ac peak)</td>
</tr>
<tr>
<td>2 V</td>
<td>1 mV</td>
<td>±0.5 %</td>
<td>±10 V (ac peak) AC 400 V (dc peak)</td>
</tr>
<tr>
<td>20 V</td>
<td>10 mV</td>
<td>±1 %</td>
<td>±100 V (ac peak) AC 220 V (dc peak)</td>
</tr>
<tr>
<td>200 V</td>
<td>100 mV</td>
<td>±1.5 %</td>
<td>±1000 V (ac peak) AC 400 V (dc peak)</td>
</tr>
<tr>
<td>1 kV</td>
<td>1 V</td>
<td>±2 %</td>
<td>±1000 V (ac peak) AC 400 V (dc peak)</td>
</tr>
</tbody>
</table>

Input impedance.................................................. 10 MΩ

AC VOLTS Manual ranging, average responding, rms reading

<table>
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<td>2 V</td>
<td>1 mV</td>
<td>±0.5 %</td>
<td>±10 V (ac peak) AC 400 V (dc peak)</td>
</tr>
<tr>
<td>20 V</td>
<td>10 mV</td>
<td>±1 %</td>
<td>±100 V (ac peak) AC 220 V (dc peak)</td>
</tr>
<tr>
<td>200 V</td>
<td>100 mV</td>
<td>±1.5 %</td>
<td>±1000 V (ac peak) AC 400 V (dc peak)</td>
</tr>
<tr>
<td>750 V</td>
<td>1 V</td>
<td>±2 %</td>
<td>±1000 V (ac peak) AC 400 V (dc peak)</td>
</tr>
</tbody>
</table>

Input impedance.................................................. 10 MΩ

DC CURRENT Manual ranging

<table>
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<tr>
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<tbody>
<tr>
<td>200 mV</td>
<td>10 µA</td>
<td>±0.1 %</td>
<td>±2.5 V (ac peak) AC 115 V (dc peak), 400 V (ac peak)</td>
</tr>
<tr>
<td>2 mA</td>
<td>100 nA</td>
<td>±1 %</td>
<td>±10 V (ac peak) AC 400 V (dc peak)</td>
</tr>
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<td>20 mA</td>
<td>1 µA</td>
<td>±1.5 %</td>
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</tr>
<tr>
<td>200 mA</td>
<td>10 µA</td>
<td>±2 %</td>
<td>±1000 V (ac peak) AC 400 V (dc peak)</td>
</tr>
<tr>
<td>10 A</td>
<td>100 µA</td>
<td>±5 %</td>
<td>±1000 V (ac peak) AC 400 V (dc peak)</td>
</tr>
</tbody>
</table>

Overload protection 0.8A, 250V fuse. 10A Not fused.

RESISTANCE Manual ranging

<table>
<thead>
<tr>
<th>Range</th>
<th>Resolution</th>
<th>Accuracy</th>
<th>Upper Voltage</th>
</tr>
</thead>
<tbody>
<tr>
<td>200Ω</td>
<td>0.1 Ω</td>
<td>±1 %</td>
<td>±0.5 V (ac peak) AC 115 V (dc peak), 400 V (ac peak)</td>
</tr>
<tr>
<td>2kΩ</td>
<td>10 Ω</td>
<td>±2 %</td>
<td>±10 V (ac peak) AC 400 V (dc peak)</td>
</tr>
<tr>
<td>20kΩ</td>
<td>100 Ω</td>
<td>±5 %</td>
<td>±100 V (ac peak) AC 220 V (dc peak)</td>
</tr>
<tr>
<td>200kΩ</td>
<td>1 kΩ</td>
<td>±10 %</td>
<td>±1000 V (ac peak) AC 400 V (dc peak)</td>
</tr>
<tr>
<td>2MΩ</td>
<td>10 kΩ</td>
<td>±20 %</td>
<td>±1000 V (ac peak) AC 400 V (dc peak)</td>
</tr>
</tbody>
</table>

Overload protection same as dc current.

CAPACITANCE Manual ranging

<table>
<thead>
<tr>
<th>Range</th>
<th>Resolution</th>
<th>Accuracy</th>
<th>Test Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>2pF</td>
<td>1 pF</td>
<td>±1 %</td>
<td>±0.5 V (ac peak) AC 115 V (dc peak), 400 V (ac peak)</td>
</tr>
<tr>
<td>20pF</td>
<td>10 pF</td>
<td>±2 %</td>
<td>±10 V (ac peak) AC 400 V (dc peak)</td>
</tr>
<tr>
<td>200pF</td>
<td>100 pF</td>
<td>±5 %</td>
<td>±100 V (ac peak) AC 220 V (dc peak)</td>
</tr>
<tr>
<td>2NF</td>
<td>1 nF</td>
<td>±10 %</td>
<td>±1000 V (ac peak) AC 400 V (dc peak)</td>
</tr>
</tbody>
</table>

Overload protection 500 V (dc + ac peak)

FREQUENCY COUNTER Manual ranging.

<table>
<thead>
<tr>
<th>Range</th>
<th>Resolution</th>
<th>Accuracy</th>
<th>Sensitivity</th>
<th>Min. Input</th>
</tr>
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<tbody>
<tr>
<td>2 kHz</td>
<td>1 kHz</td>
<td>±1 %</td>
<td>±0.5 V (ac peak) AC 115 V (dc peak), 400 V (ac peak)</td>
<td></td>
</tr>
<tr>
<td>20 kHz</td>
<td>10 kHz</td>
<td>±2 %</td>
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<td></td>
</tr>
<tr>
<td>200 kHz</td>
<td>100 kHz</td>
<td>±5 %</td>
<td>±100 V (ac peak) AC 220 V (dc peak)</td>
<td></td>
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</tbody>
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Overload protection 500 V (dc + ac peak)

Reading.......................................... 10 to 1999

LOGIC

Test Voltage............................................ TTL
Logic Threshold....................................... 2.8 V ± 0.8 V
Logic 1 (high)......................................... 2.8 V ± 0.8 V
Logic 0 (low).......................................... 2.8 V ± 0.8 V
Input Impedance....................................... 120 kΩ Nominal
Minimum Pulse Width.................................. 25 ns
Overload Protection.................................. 500 V (dc + ac peak)

TRANISTOR HFE (DC GAIN) MEASUREMENT

0-1000 HFE values on either PNP or NPN transistors
Test condition........................................ Base DC current = 10 µA; Vcc = 2.6 V
CONTINUITY CHECK

Buzzer Threshold....................................... Approx. 100 Ω
Response Time......................................... <100 ms

DIODE CHECK

<table>
<thead>
<tr>
<th>Range</th>
<th>Resolution</th>
<th>Max Current</th>
<th>Min. Open Voltage</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 V</td>
<td>1 mV</td>
<td>100 mA</td>
<td>1.0 V</td>
</tr>
<tr>
<td>1.5 V</td>
<td>5 mV</td>
<td>200 mA</td>
<td>1.1 V</td>
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Measures forward voltage drop of diode or semiconductor

GENERAL SPECIFICATIONS

Display.............................................. 3-1/2 digit liquid crystal display (LCD) with a maximum reading of 9999.
Polarity........................................... Automatic; + or - polarity indication.
Overrange Indication................................ "19" or "1999" (Battery Symbol) displayed.
Sampling Rate..................................... 3 measurements per second, nominal.
Temperature....................................... Test operation: 0 to 50°C; <70% R.H.
Storage: -20 to +60°C; <90% R.H.; <80% R.H.; battery removed.
Power................................................................ Single standard 9V battery, NEDA 1604 or equivalent.
Battery Life......................................... 200 hours typical (alkaline).
Dimensions......................................... (H x W x D) 5.95 x 5.11 x 1.98 (150 x 80 x 3.50mm)
Weight.................................................. 9 oz. (250 g) including battery.
Supplied Accessories................................ 1. Peak Test Leads Battery Instruction Manual

AC CURRENT Manual ranging, average responding, rms reading

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Overload protection same as dc current.

500 V (dc + ac peak)

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Overload protection 500 V (dc + ac peak)

Reading.......................................... 10 to 1999

OPTIONAL ACCESSORIES

Clamp-on AC current probe................................ Model CP-1
High voltage probe (40 kVDC).......................... Model PR-28
High voltage probe (6 kVDC)............................ Model HV-6
High current test leads................................ Model FP-10
Replacement test leads................................ Model FP-30
Semiconductor Temperature Adapter.................. Model TP-28
Thermocouple Temperature Adapter................... Model TP-30

SYMBOLS

Do not exceed maximum ratings listed with this symbol.

High voltage terminal: up to 1000 volts may be present if connected to high voltage.

Common input terminal.

Continuity buzzer.

500V MAX

Connect to earth ground or point not more than 500 volts from earth ground.

1000V DC MAX

Maximum input rating of 1000 V DC with respect to COM input terminal. [For voltage measurement functions only.]

250 mA MAX

Maximum input rating of mA terminal with respect to COM input terminal.

10A MAX

Maximum input rating of 10A terminal with respect to COM input terminal.

ANNULATORS

Negative Polarity.

Low Battery indicator.

Input Range Indicator.

2, 20, 200
WARRANTY INFORMATION

LIMITED ONE YEAR WARRANTY

B + K Precision, a division of TEST INSTRUMENTS CORPORATION, warrants to the original purchaser that this B + K Precision product and all parts thereof will be free from defects in workmanship and material for a period of one year from the date of purchase. At its option, it will either repair or replace, without charge, any part deemed defective. This warranty does not apply to normal wear or to damage resulting from failure to perform routine maintenance, which is the responsibility of the owner. Nor does this warranty apply to any damage from accident, abuse, unauthorized service or the use of non-B + K Precision products.

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

In the event of a warranty claim, return the product to the nearest B + K Precision service dealer. If warranty service cannot be obtained locally, please send the unit to B + K Precision, 6470 West Cortland Street, Chicago, Illinois 60635, properly packaged to avoid damage in transit.

FEATURES

- Basic accuracy: DCV ± 0.5%.
- Resolution of 100 µV, 0.1Ω, 0.1 µA, 1 pF, 1 Hz.
- Single function and range control.
- Five ac voltage ranges: 200 mV to 1000 V.
- Five ac voltage ranges: 200 mV to 750 V.
- Five capacitance ranges: 2 nF to 20 µF.
- Five dc current ranges: 200 µA to 200 mA and 10 A.
- Five ac current ranges: 200 µA to 200 mA and 10 A.
- Seven resistance ranges: 200Ω to 200 MΩ.
- Three frequency ranges: 2 kHz to 200 kHz.
- Logic probe function: indicates logic high or logic low for TTL circuits.
- hFE transistor test function: Measures dc gain (dc β or hFE) of PNP and NPN transistors.
- Diode test function: measures forward voltage drop.
- Audible continuity buzzer.
- 3-1/2 digit LCD display.
- Easy to read high contrast display with large 0.7" digits.
- Auto polarity, auto zero.
- Overrange indication on all ranges.
- Overload protection.
- Tilt stand.
- Non-skid feet.
- Rugged case withstands 4-foot drop.