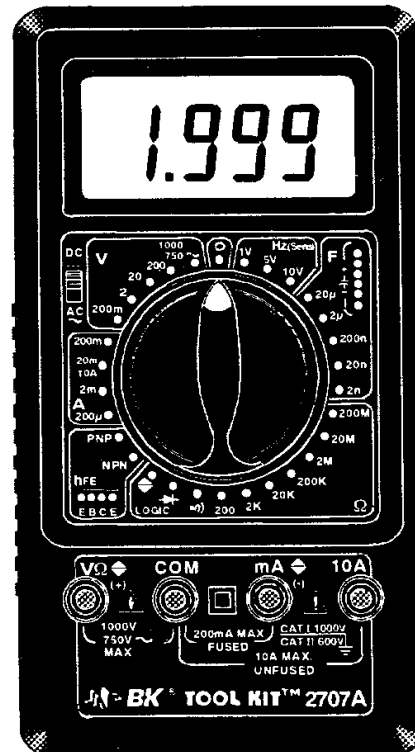


INSTRUCTION MANUAL

BK PRECISION®

TOOL KIT SERIES
DIGITAL MULTIMETER MODELS
2703B, 2704B, 2706A, 2707A & 2708



CE

SAFETY

WARNING

An electrical shock causing 10 milliamps of current to pass through the heart will stop most human heartbeats. Voltage as low as 35 volts dc or ac rms should be considered dangerous and hazardous since it can produce a lethal current under certain conditions. Higher currents are even more dangerous. Observe the following safety precautions:

1. Never exceed the input ratings of this meter. This meter is not recommended for high voltage industrial use; for example, not for measurements of 440 V ac or 600 V ac industrial power mains. The unit is intended for use with low energy circuits to 750 V ac or 1000 V dc, or high energy circuits to 250 V dc or ac. Accidental misuse by connection across a high voltage, high energy power source when meter is setup for mA measurement may be very hazardous.
2. When testing ac powered equipment, remember that ac line voltage may be present on some power input circuits (for example, at on-off switch, fuses, transformer, etc.), any time the equipment is connected to an ac outlet, even if it is turned off.
3. If possible, familiarize yourself with the equipment being tested and the location of its high voltage points. However, remember that high voltage may appear at unexpected points in defective equipment.
4. Before replacing batteries, make sure that the input leads are disconnected from any voltage points.
5. When taking measurements in high voltage equipment, never touch the equipment, meter, or test leads while the power is applied.

SAFETY (Cont.)

6. Never apply an external voltage to the Cx pr hFE sockets of your meter.
7. Use the time proven "one hand in the pocket" technique while handling an instrument probe. Be particularly careful to avoid contacting a nearby metal object that could provide a good ground return path.
8. When using a probe, touch only the insulated portion. Never touch the exposed tip.
9. Use an insulated floor material or a large insulated floor mat to stand on and an insulated work surface on which to place equipment. Make certain such surfaces are not damp or wet.
10. Some equipment with a two-wire ac power cord, including some with a polarized power plug, is the "hot chassis" type. This includes most recent television receivers and audio equipment. A plastic or wooden cabinet insulates the chassis to protect the customer. When the cabinet is removed for servicing, a serious shock hazard exists if the chassis is touched. To make measurements in "hot chassis" equipment, always connect an isolation transformer between the ac outlet and the equipment under test. The **BK PRECISION** Model TR-110 Isolation Transformer or Model 1653A or 1655A AC Power Supply is suitable for most applications. To be on the safe side, treat all two-wire ac powered equipment as "hot chassis" unless you are sure it has an isolated or earth ground chassis.
11. Never work alone. Someone should be nearby to render aid if necessary. Training in CP R (cardio-pulmonary resuscitation) first aid is highly recommended.

===== LIMITED ONE YEAR WARRANTY =====

BK PRECISION warrants to the original purchaser that its product, and the component parts thereof, will be free from defects in workmanship and materials for a period of one year from the date of purchase.

BK PRECISION will, without charge, repair or replace, at its option, defective product or component parts upon delivery to an authorized **BK PRECISION** service contractor or to the factory service department, accompanied by proof of the purchase date in the form of a sales receipt.

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. It is void if the serial number is altered, defaced or removed.

BK PRECISION shall not be liable for any consequential damages, including without limitation damages resulting from loss of use. Some states do not allow limitation 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.

For your convenience, we suggest you contact your **BK PRECISION** distributor, who may be authorized to make repairs or can refer you to the nearest service contractor.

If warranty cannot be obtained locally, please send the unit to **BK PRECISION** Service Department, 22820 Savi Ranch Parkway Yorba Linda, CA 92887, properly packaged to avoid damage in shipment.

BK PRECISION Test Instruments only warrants products sold in the U.S.A and its overseas territories. In other countries, each distributor warrants the **BK PRECISION** products which it sells.

GENERAL INFORMATION

INTRODUCTION

These instructions describe the operation and maintenance of five **BK PRECISION** digital multimeters, Models 2703B, 2704B, 2706A, 2707A and 2708. Follow the instructions that apply to your meter. If an instruction applies only to a specific meter or meters, the model of the meter or meters is enclosed in brackets in the title or heading of the instruction. As an example: A (amperes) [2706A, 2707A], this instruction only applies to the amperes measurements for models 2706A and 2707A. If the instruction applies to all four meters reference to a model number is omitted.

REPLACEMENT TEST LEADS & ACCESSORIES

Periodically examine your test leads to ensure they are in good condition. Replace damaged or defective leads for safe operation and to avoid false readings; request Replacement Test Leads, **BK PRECISION** Model TL-1.

OPTIONAL ACCESSORIES

- Replacement Test Leads: TL-1.
- Deluxe Test Leads: TL-2A.
- Accessory Tip Kit for TL-2: TL-3.
- Carrying case LC-29A: This is a padded vinyl case with a nylon lining. It has an internal pouch for test leads and a convenient zipper flap for easy access.
- Clamp-on AC/DC Current Probe: CP-3.
- High voltage probe, 40 kV DC: PR-28.
- Temperature Probes: TP-29 standard replacement; TP-1 immersion; TP-2 air; TP-3 bead type with 900 °F insulation; TP-4 surface.

SPECIFICATIONS

General Characteristics

Display: 3-1/2 digit liquid crystal display (LCD) with a maximum reading of 1999.
Nominal Measurement Rate: 3 times/second.
Low Battery Indicator: "BAT" [2703B] or " E " [2704B, 2706A, 2707, 2708].
Overrange Indicator: "1" or "-1" displayed [2703B] "OL" or "-OL" displayed [2704B, 2706A, 2707A, 2708].
Accuracy Readings: Stated at +18 to 28°C < 75% relative humidity.
Polarity: Automatic, positive (+) implied, negative (-) shown.
Range Selection [2707A, 2706A, 2704B]: Manual with autorange Frequency.
Range Selection [2703B]: Manual with auto zero.
Range Selection [2708]: Autorange.
Power: Single 9V battery, NEDA # 1604, or equivalent.
Battery Life: 200 hours typical w/carbon zinc battery.
Operating Temp: 0 to 40°C at < 70% relative humidity.
Storage Temp: -20 to 60°C at < 80% relative humidity (battery removed).
Size (H x W x D): 5.9" x 3.1" x 1.3" (150 x 80 x 35 mm)
Weight: 9oz (250g) including battery.
Accessories Supplied: ● Pair test leads. ● Battery.
● Instruction manual. ● Holster.

DC Voltage

Ranges [2708]: 430mV, 4.3V, 43V, 1000V.
Ranges [2707A, 2706A, 2704B, 2703B]: 200mV, 2V, 20V, 200V, 1000V.
Resolution: 100uV, 1mV, 10mV, 100mV, 1.0V.
Accuracy [2708]: $\pm(0.25\% + 1 \text{ digit})$.
Accuracy [2707A, 2706A, 2704B, 2703B]: $\pm(0.5\% \text{ reading} + 1 \text{ digit})$
Overload Protection, 2V - 1000V Ranges: 1200V (dc + ac peak) AC 800V (rms sine)
Overload Protection, 200mV Range: 500V (dc + ac peak) AC 350V (rms sine)
Input Impedance: 10 M Ω

SPECIFICATIONS

AC Voltage

Ranges [2708]: 430mV, 4.3V, 43V, 430V, 750V.
Ranges [2707A, 2706A, 2704B]: 200mV, 2V, 20V, 200V, 750V.
Ranges [2703B]: 200V, 750V.
Resolution [2708, 2707A, 2706A, 2704B]: 100 μ V, 1mV, 10mV, 100mV, 1.0V.
Accuracy [2708], 50-100Hz, 430mV: \pm (1.5% reading + 3 digits). 50-500z, 4.3-750V: \pm (0.75% reading + 2 digits). 500-2KHz, 43-750V: \pm (1.5% reading + 3 digits).
Accuracy [2707A, 2706A, 2704B], 50-500Hz: 200mV-200V, \pm (1.0% reading + 4 digits); 750V, \pm (1.5% reading + 4 digits).
Accuracy [2703B]: 50-500Hz, 200V, \pm (1.2% reading + 4 digits); 750V, \pm (1.5% reading + 4 digits)
Overload Protection, 2V-750V Ranges: 1200V (dc + ac peak) AC 800V (rms sine).
Overload Protection, 200mV Ranges: 500 V (dc + ac peak) AC 350V (rms sine).
Input Impedance [2708, 2707A, 2706A, 2704B]: 10M Ω
Input Impedance [2703B]: 4.5M Ω

DC Current

Ranges [2708]: 430 μ A, 43mA, 430mA, 10A.
Ranges [2707A]: 200 μ A, 2mA, 20mA, 200mA, 10A
Ranges [2706A]: 200 μ A, 2mA, 20mA, 200mA, 2A, 10A.
Ranges [2704B, 2703B]: 200 μ A, 20mA, 200mA, 10A.
Resolution [2708]: 0.1 μ A, 10 μ A, 100 μ A, 10mA.
Resolution [2707A]: 0.1 μ A, 1.0 μ A, 10 μ A, 100 μ A, 10mA.
Resolution [2706A]: 0.1 μ A, 1.0 μ A, 10 μ A, 100 μ A, 1mA, 10mA.
Resolution [2704B, 2703B]: 0.1 μ A, 1 μ A, 100 μ A, 10mA.
Accuracy, μ A & mA Ranges: [2708]: \pm (0.5 % reading + 1 digit), other models: \pm (1.0% reading + 1 digit).
Accuracy, 10A ranges: \pm (2.0% reading + 3 digits)
Burden Voltage, 200 μ A 200mA: 325 mV maximum.
Burden Voltage, 200mA 10A: 750 mV maximum.
Overload Protection: μ A & mA ranges, 0.63A/250V; 10A range unfused.

SPECIFICATIONS

AC Current [2708, 2707A, 2706A, 2704B]

Range [2708]: 430 μ A, 43mA, 430mA, 10A.
Range [2707A]: 200 μ A, 2mA, 20mA, 200mA, 10A.
Range [2706A]: 200 μ A, 2mA, 20mA, 200mA, 2A, 10A.
Range [2704B]: 200 μ A, 20mA, 200mA, 10A
Resolution [2708]: 0.1 μ A, 10 μ A, 100 μ A, 10mA.
Resolution [2707A]: 0.1 μ A, 1.0 μ A, 10 μ A, 100 μ A, 10mA.
Resolution [2706A]: 0.1 μ A, 1.0 μ A, 10 μ A, 100 μ A, 1mA, 10mA.
Resolution [2704B]: 0.1 μ A, 10 μ A, 100 μ A, 10mA.
Accuracy, 200 μ A - 200mA, 50 - 500 Hz: \pm (1.2% reading + 4 digits).
Accuracy, 10A, 50 - 500Hz: \pm (2% reading + 4 digits).
Burden Voltage, 200 μ A - 200mA: 325mV maximum.
Burden Voltage, 200mA - 10A: 750 mV maximum.
Overload Protection: See DC CURRENT.

Resistance

Ranges [2708]: 430 Ω , .4.3K Ω , 43K Ω , 430K Ω , 4300K Ω , 43M Ω .
Ranges [2707A]: 200 Ω , 2K Ω , 20K Ω , 200K Ω , 2M Ω , 20M Ω , 200M Ω .
Ranges [2706A, 2704B, 2703B]: Same as 2707A less 200M Ω .
Resolution [2707A]: 0.1 Ω , 1 Ω , 10 Ω , 100 Ω , 1K Ω , 10K Ω , 100K Ω .
Resolution [2708, 2706A, 2704B, 2703B]: Same as 2707A less 100K Ω .
Accuracy [2708]: 430 Ω , \pm (0.3% reading + 3 digits). 4.3K - 4300K Ω , \pm (0.3% reading + 2 digits). 43M Ω , \pm (1.5% reading + 4 digits).
Accuracy 200M Ω [2707A]: \pm (5.0% reading 10 digits) + 10 digits.
Accuracy, 200 Ω : \pm (1.0% reading + 3 digits)
Accuracy, 2K Ω - 2M Ω : \pm (0.8% reading + 1 digit).
Accuracy, 20M Ω : \pm (3.0% reading + 3 digits)
Open Circuit Volts, 200 Ω & 200 M Ω : 3 V dc.
Open Circuit Volts, 2K Ω - 20M Ω : 0.3 V dc.
Overload Protection: 500 V (dc + ac peak).

SPECIFICATIONS

Continuity

Audible Indication: Less than 100Ω
 Response Time: Less than 100 ms.
 Overload Protection: 500 V (dc + ac peak).

Diode Test

Accuracy: ±(3.0% reading + 3 digits).
 Resolution: 1mV.
 Maximum Test Current: 1,0 mA + 0.6 mA.
 Open Circuit Voltage: 3.2 V, typical.

Capacitance [2707A, 2706A, 2704B]

Ranges: 2 nF, 20 nF, 200 nF, 2 μF, 20 μF.
 Resolution: 1 μF.
 Accuracy: ±(3.0% reading + 10 digits) all ranges.
 Test Frequency: 2.5 Hz, 3V.

Frequency [2707A, 2706A, 2704B]

Autoranges: 2 kHz, 20 kHz, 200 kHz, 2000 kHz, 15MHz.
 Accuracy: ±(0.1% reading + 2 digits) all ranges.
 Sensitivity [2707A]:
 Selectable 1 V: TTL signal 1Vrms min
 5 V: TTL signal 5Vp-p max
 10 V: TTL signal 10Vp-p max.
 Sensitivity [2706A, 2704B]: 1 V rms.
 Overload Protection: 500 V (dc + ac peak).

hFE Test [2707A, 2706A, 2704B]

Range, PNP & NPN: 0 to 1000 hFE values.
 Base Current (I_b): 10 μA approximately
 Voltage, Collector Emitter (V_{ce}): 2.8 V dc.

Temperature [2706A]

Ranges: -4°F to about 1400°F (-20 to 750°C).
 Resolution: 0.1°F, 0.1°C
 Accuracy: -20 to 500°C (± 2.0% reading + 3°C)
 Accuracy: 500 to 750°C (± 3.0% reading + 2°C)
 Accuracy: -4 to 900°F (± 2.0% reading + 6°F)
 Accuracy: 900 to 1400°F (± 3.0% reading + 4°F)

SPECIFICATIONS

Logic Test 2707A, 2708]

Threshold Logic: High (2.8 V ± 0.8 V), Low (0.8 V ± 0.5 V).
 Frequency Response: 20 MHz.
 Minimum Pulse Width: 25 ns.
 Input Impedance: 120 kΩ nominal.
 Pulse Limits: > 30% & < 70% duty.
 Overload Protection: 500 V (dc + ac peak).



COM



BAT or



1000 V

750 V MAX.

200 mA MAX.
 500 mA MAX.

10 A

SYMBOLS

See instruction manual for further precautionary information.

Common (COM) input terminal.

Danger, high voltage terminal.

Continuity buzzer.

Diode Test.

Earth ground.

Equipment double insulated.

Low battery.

Logic.

AC Symbol.

DC Symbol.

Maximum input rating of V Hz terminal with respect to COM input terminal. (For voltage measurements only.)

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

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

MAINTENANCE

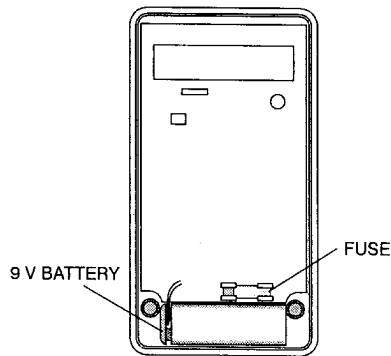
WARNING

Disconnect test leads from voltage source before changing batteries or performing any maintenance.

BATTERY REPLACEMENT

Replace battery when the low battery symbol is displayed. A fresh 9 V, NEDA 1604, battery is needed.

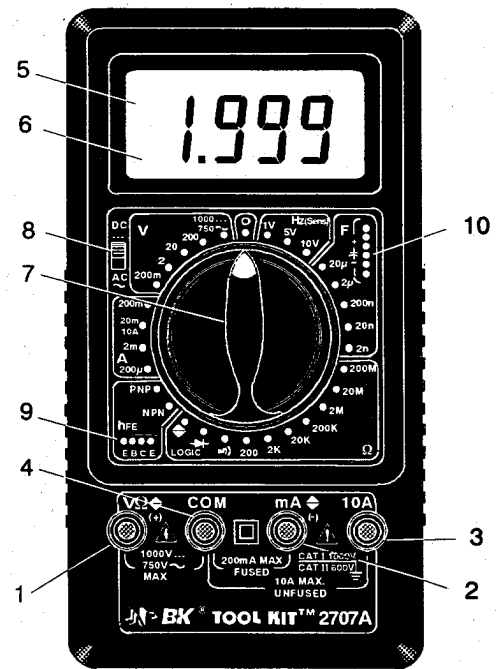
1. Disconnect test leads from circuit.
2. Switch function selector to OFF.
3. At rear of case, remove the two Phillips screws at lower end of case. Next, push up at lower end of case then remove cover.
4. Remove old battery and install fresh battery.
5. When reinstalling, place rear cover squarely over front cover then snap into place. Secure cover with the two screws removed in step (3).



REAR COVER REMOVED FROM CASE

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CONTROLS & INDICATORS

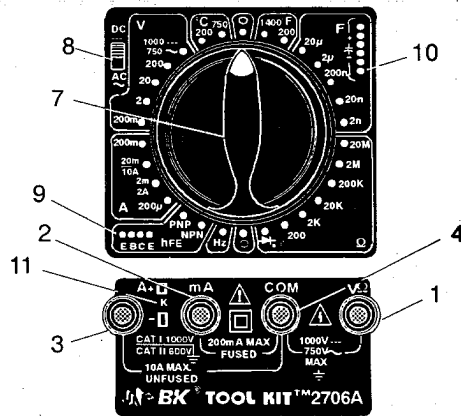


Model 2707A

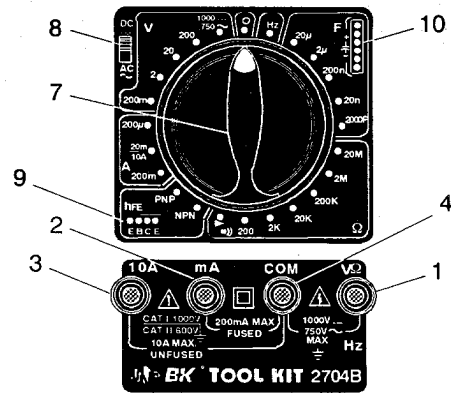
NOTE:
Display of all five
models are similar.

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CONTROLS & INDICATORS



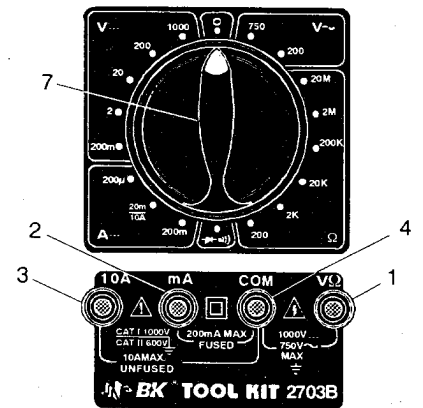
Model 2706A



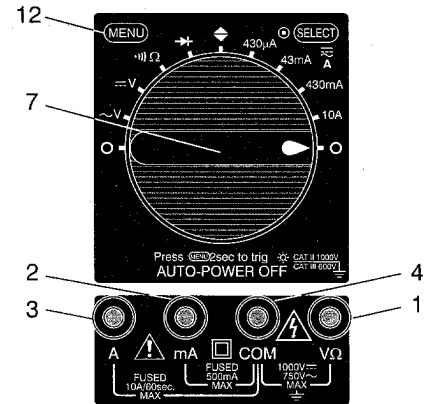
Model 2704B

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CONTROLS & INDICATORS




Model 2703B




Model 2708

13

OPERATING INSTRUCTIONS

- V Ω Jack**
[2707A] Input for voltage, resistance, continuity, diode, logic and Hz frequency tests.
[2706A, 2704B] Input similar to model 2707A without logic function.
[2703B, 2707] Input similar to 2707A without logic and Hz frequency functions.
- mA Jack**
[2707A] Input for current measurements up to 200 mA and negative (-) input for Logic tests.
[2706A, 2704B, 2703B] Input for current measurements up to 200mA.
[2708] Input for current measurement up to 320mA.
- 10A Jack**
Input for current measurements up to 10 amperes.
- COM Jack**
Input for common or reference (black) test lead; not Used with hFE, Cx and TEMP measurements.
Voltage From earth ground or reference to measuring point Must not exceed 750 V ac or 1000V dc.
- Display**
Indicates measured value and low battery status.
3-1/2 digit display (1999 maximum) with automatic decimal point and negative (-) sign. Overrange shown by displaying a "1" [2703B] or "OL" [2704B, 2706A, 2707A, 2708] in most significant digit location and all other digits blank.
- Annunciators**
Left side shows minus (-) sign, positive implied, logic And low battery status:  symbol [2704B, 2706A 2707A, 2708] or "BAT" [2703B].
- Function/Range Selector**
Rotary switch to turn meter OFF (O) or to select measurement range and function.
[2707A, 2706A, 2704B] Select dc or ac current and voltage with AC/DC selector.
[2703B] Select ac or dc voltage and dc current with Function/Range selector.
[2708] Select ac or dc current with mode switch.
- DC/AC Selector [2707A, 2706A 2704B]**

OPERATING INSTRUCTIONS

- Selector for dc or ac voltage and current.
- hFE Socket [2707A, 2706A, 2704B]**
Input socket for transistor test. Push transistor leads into appropriate jack, E (emitter), B (base) and C (collector).
 - Cx (Capacitor) Socket [2707A, 2706A, 2704B]**
Input socket for farad measurements of small axial-lead or PC-lead capacitors.
 - TEMP Socket**
Socket for standard type-K temperature probe, plug-in To measure degrees Fahrenheit (F) or Celsius (C).
 - MENU/SELECT OPERATION [2708]**
 - 12.1 Manual Range Mode**
Press (SELECT) button to select the Manual Range mode and turn on the "O" annunciator. In the Manual Range mode, each time you press (SELECT) button, the range (and the annunciator) increments, and a new value is displayed. To exit the Manual Range mode and return to autoranging, press and hold down (SELECT) button for 2 seconds, the "O" annunciator turns off.
 - 12.2 MAX/MIN/AVG record Mode**
Set the Function/range switch to the desired function and range.
Select MAX/MIN/AVG recording mode by press (MENU) (Manual range mode feature is enabled) until the cursor  is pointing to the REC MX MN AG prompt. Press (SELECT), the (REC) prompt remains lit and all nonselected prompts are turned off. If after six seconds, a selection is not made, the blinking prompts turn off. The cursor remains lit if pointing to a previous selected feature. The automatic power-off feature is disable. Push (SELECT) to cycle through the maximum (MX), minimum (MN), average (AG) and present reading. (AG) is average last ten times reading can be displayed. Press (MENU) to exit and erase recorded reading.

OPERATING INSTRUCTIONS

12.3 Auto Hold Mode

Set the Function/Range switch to the desired function and range.

Select Auto Hold mode by press (MENU) (Manual range mode feature is enabled) until the cursor **▶** is pointing to the (A-H) Prompt. Press (SELECT), the (A-H) prompt remains lit and all nonselected prompts are turned off. Press (MENU) to exit Auto Hold Mode: In Auto hold mode, the meter will capture and hold the first stable non-zero (> 100 digits) reading after a zero reading (< 100 digits). Several consecutive measurements can be held and displayed without pressing the button. Simply by shorting the test leads together between measurements.

12.4 Relative Mode

Set the Function/Range switch to the desired function and range.

Select Relative mode by press (MENU) (Manual range mode feature is enabled) until the cursor **▶** is pointing to the (REL) prompt. Press (SELECT), the (REL) prompt remains lit and all nonselected prompts are turned off. Press (MENU) to exit Relative mode, enter the relative mode, zero the display and store the display reading as a reference value. In the Relative Mode, the value show on the display is always the difference between the stored reference value and present reading.

12.5 Back-Light

Press (MENU) button for two seconds to turn on the back-light, to turn off the back-light, press (MENU) button again for two seconds. The back-light will switch off automatically after 30 seconds.

13. Tilt Stand

Not shown, at rear of case, swing out to use.

OPERATING INSTRUCTIONS

OPERATING TIPS

Before using your meter review these tips carefully. They will help you to use this meter safely, get reliable measurements and avoid false readings.

1. Follow the instructions that apply to your specific model number. If an instruction applies only to a specific model or models, the model number is enclosed in brackets in the title or heading of the instruction.
2. Read, thoroughly understand and follow the SAFETY instructions given in this manual.
3. Examine your test leads. Make sure they are in good condition, free from cracks, etc., and that they make good contact with the jacks of your meter. Do this for safe operation and to avoid false readings.
4. Before taking a measurement, review the related instructions in this manual.
5. Before taking a measurement, estimate its expected value. If you are considerably out of an expected range, carefully review your circuit under test; it could be defective.
6. Stay within the operating range of your meter. Never exceed the 750 V ac or 1000 V dc maximum from your measuring point to earth ground or reference.
7. If value of measurement is unknown, start with the highest range.
8. If an overrange is shown, immediately switch to a higher range.

CAUTION

Never switch between ranges while connected to high voltage to avoid damage to the instrument and possible personal harm.

9. Set function selector to OFF (○) when not in use to conserve battery power.

OPERATING INSTRUCTIONS

VOLTAGE MEASUREMENTS

CAUTION

Never try to measure voltage greater than 750V ac or 1000V dc.

1. Plug black test lead into **COM** jack and red test lead into **V Ω** jack.
2. [2707A, 2706A, 2704B]: Select AC or DC voltage with AC/DC selector switch.
[2703B, 2708]: Set function selector to **V $\overline{=}$** for dc measurements or **V \sim** for ac measurements.
3. Set Function/Range switch to desired range. Always select a higher range than voltage expected. If range is unknown, select highest range.
4. Connect black lead to point of reference (common), red test lead to measuring point.
Value shown in display window is the actual level with the decimal point correctly Located.
Negative polarity (-) is shown, positive is assumed.
Never exceed 1000V dc or 750V ac, or 500V dc + 500V ac peak-to-peak with respect to earth ground.

RESISTANCE MEASUREMENT

CAUTION

Verify that power is off in circuit under test and that any electrolytic capacitors are discharged.

1. Plug black test lead into **COM** jack and red test lead into **V Ω** jack.
2. Set function selector to desired range in Ω range group.
3. Short leads together. Make sure battery is good. If low battery symbol is shown replace battery as indicated in MAINTENANCE before going further.
4. Connect test leads across component or circuit being measured. Read value at display.

OPERATING INSTRUCTIONS

DIODE TEST

1. Plug black test lead into **COM** jack and red test lead into **V Ω** jack.
2. [2708, 2707A] Set function selector to **$\rightarrow|$** position.
[2706A, 2704B, 2703B] Set function selector to **$\rightarrow| \cdot ||$** position.
3. To check forward voltage (V_f), connect red test lead to anode and black test lead to cathode of diode. This check is valid for diodes and semiconductors with a rated V_f of less than about 3V. Typical forward voltage drops for good diodes are as follows:
 - Silicon diode, 0.5V to 0.65V.
 - Germanium diode, 0.2V to 0.4V
 - LED (T1 type), 1.4 to 1.6V.A reading of near 0 V indicates a shorted diode. Overrange may indicate an open diode.
4. Reverse test leads to diode; overrange should be displayed. A reading lower than overrange indicates a leaky diode.

CONTINUITY TEST

1. Plug black test lead into **COM** jack and red test lead into **V Ω** jack.
2. [2708] Set function selector to **$\cdot ||$** Ω position.
[2707A] Set function selector to **$\cdot ||$** position.
[2706A, 2704B, 2703B] Set function selector to **$\rightarrow| \cdot ||$** position.
3. Touch probes to test points. Audible buzzer sounds when resistance is below about 100 ohms.

CURRENT MEASUREMENTS

CAUTION

- *Always connect meter in series with load when measuring current. If you incorrectly connect it in parallel with the load, it provides a low impedance path, almost a short, shunting the load. this high current path could damage the meter and/or equipment under test. The 10A jack is unfused requiring more care.*

OPERATING INSTRUCTIONS

- Never exceed the maximum current rating of the related jack, such as 10A, to avoid the possibility of personal harm and/or damage to the meter.
- Always select a range high enough to pass the current you plan to measure. If current value is unknown, or in doubt, start with the highest range. Never exceed the current range selected or range of the related jack.
- Never switch range when connected to load while the power to the circuit is ON; turn it OFF before switching.
- [Model 2703]: Only use this meter to measure dc currents; ever try to use it to measure ac current. Only model 2708, 2707A, 2706A and 2704B can be used for ac current measurements.

CURRENT MEASUREMENTS (cont).

1. Plug black test lead into **COM** jack and red test lead into **mA** or **A** jack (above mA range). Use mA jack for current measurements up to 200mA; use **10 A** jack for currents above mA range.
2. [2708] Select AC or DC current with the "SELECT" toggle button.
[2707A, 2706A, 2704B] Select AC or DC current with the AC/DC selector switch.
[2703B] Set function selector to A $\overline{\text{---}}$ for dc current measurements. This meter can not be used for ac current measurements.
3. Set Function/Range switch to desired range. Always select a higher range than current expected. If range is unknown, select highest range.
4. Remove power from circuit under test, it must be "electrically cold".
5. Open circuit at a point that does not exceed 1000 V dc, or 750 V ac, or 500 V dc + 500 V ac peak from earth ground, or chassis of equipment under test.

OPERATING INSTRUCTIONS

6. DC current measurements: Connect meter in series with line opened: red test lead to positive (+) side, black test lead to negative (-) side of line. [2708, 2707A, 2706A, 2704B] Ignore polarity for ac current measurements.
7. Apply power to circuit then read value of current at display.
8. Turn power to circuit under test OFF.
9. Restore circuit to its original condition.

CAPACITANCE MEASUREMENTS [2707A, 2706A, 2704B]

CAUTION

Never apply an external voltage to the Cx or hFE sockets to avoid damage to the meter. Always short capacitor leads together before connecting to meter.

1. Set function selector to desired F (Farad) range.
2. Plug capacitor leads directly into the Cx capacitor test socket.
3. Read capacity at display in selected range as pico, nano or microfarads.

FREQUENCY MEASUREMENTS [2707A, 2706A, 2704B]

1. Connect black test lead to **COM** jack, red into **V Ω** jack.
2. [2707A] Set function selector to Hz (Sens) and select sensitivity voltage: 1 V, 5V or 10V. A lower voltage increases sensitivity and possibility of false triggering by noise. A higher voltage reduces sensitivity to noise and signal trigger, however it may improve accuracy. Select the voltage that provides the best sensitivity without false triggering.
[2706A, 2704B] Set function selector to Hz, fixed sensitivity.
3. Connect test leads to point of measurement and read frequency in Hz at display.

OPERATING INSTRUCTIONS

TRANSISTOR MEASUREMENTS [2707A, 2706A, 2704B]

CAUTION

Never apply an external voltage to hFE or Cx sockets to avoid damage to the meter.

1. Plug leads of transistor into matching jacks of hFE socket, emitter (E), base (B) and collector (C).
2. Select type of transistor under test with function selector, NPN or PNP.
3. Read transistor hFE (gain) at display.

TEMPERATURE MEASUREMENTS [2706A]

1. Set function selector to °F or °C position and select range.
2. Plug temperature probe into polarized "TEMP" socket of meter.
3. Place bead at end of probe into desired measuring area.
4. Wait about 30 seconds before reading temperature to allow probe to stabilize.

LOGIC TEST [2708, 2707A]

1. Plug black test lead into COM jack [2708]; mA jack [2707A] and red test lead into VΩ jack.
2. Set function selector to \diamond position.
3. Connect black lead to circuit ground, common; connect red test lead to test point.
4. Note symbol at display, \blacktriangle shows logic high, \blacktriangledown shows logic low. If both indicators are on, test point is toggling between high and low.
5. [2708]: The Back-Light function is disabled in logic test.

MEMORY MODE [2708]

Press **SELECT** button to enter memory mode and turn on the "MEN" annunciator, the Pulse indicator "⚡" will turn on with the first transition (either rising or falling), thereafter as long as the meter is powered, the "⚡" sign will remain on until press "SELECT" button to exit memory mode.

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