

EQ-MSK-BK300
SINGLE CHANNEL INTERNAL RESISTANCE TESTER
For Use With All Batteries

OPERATION MANUAL



AA PC

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AA Portable Power Corp

IMPORTANT NOTES

Thank you for purchasing from AA Portable Power Corp (AAPPC). This manual contains important operation and safety information prepared for those intending on using the equipment. The prospective user is responsible for carefully reading and understanding the contents of this manual prior to operating the equipment.

AAPPC reserves the right to update or upgrade the product without informing customers of the data change(s) in this manual. Please frequently visit www.Batteryspace.com for the latest information and manual.

WARNINGS

AAPPC will not be responsible for equipment damage, accidents leading to minor or fatal injuries, and etc. caused by the user's negligence or lack of knowledge. Always read the manual fully beforehand and exercise the best judgment when handling the equipment.

To avoid electrical shock:

- Use a properly grounded electrical outlet of correct voltage and current handling capacity.
- Be disconnected from the power supply before servicing.
- Always double check the wiring and consult a licensed electrician for installation.
- Do not let the equipment be exposed to water or moisture.

To avoid Physical Injuries:

- Do not put this equipment in flammable or explosive environments.
- This equipment uses a 220V, 0.5A fuse to protect against current overflow. Please cut off the power before changing the fuse.
- Do not leave the internal circuit exposed after disassembling the case for calibration.
- Power should be cut off when performing external maintenance like cleaning.

INTRODUCTION

The EQ-BK-300 is a precision internal resistance meter that uses alternating current to test both the resistance value and voltage of batteries. With its four cable clamps, errors caused by resistance in the battery – probe connection are effectively eliminated.

This meter allows the user to freely set limits on the internal resistance value to activate a warning signal for quick identification of non-qualifying samples. It is able to measure batteries in the voltage range of 0 – 19.99V with +/-1mOhm accuracy and is ideal for obtaining UN38.3 Initial Characteristics.

SPECIFICATIONS

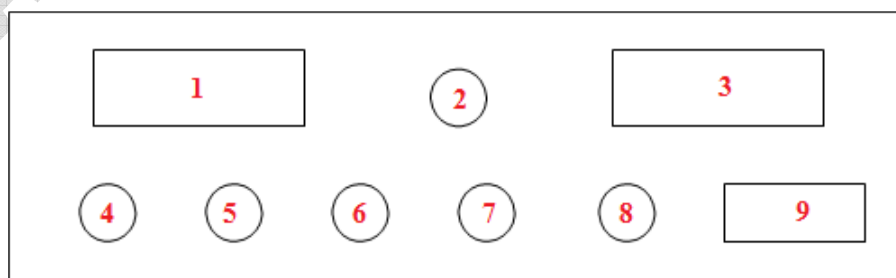
1. Technical Index

- Voltage Measuring Range: Direct Current 0~1.999v $\pm (0.5\%fs+2 \text{ digits})$ Display Resolution 1mv
 Direct Current 2~19.99v $\pm (0.5\%fs+2 \text{ digits})$ Display Resolution 10mv
- Resistance Measuring Range: 0~199.9 m $\Omega \pm (0.5\%fs+5 \text{ digits})$ Display Resolution 0.1m Ω
 200~1999 m $\Omega \pm (0.5\%fs+5 \text{ digits})$ Display Resolution 0.1m Ω
- Alternating Current Frequency: 1KHz ± 0.1 KHz
- Reading Speed: 2~3 per second

2. Circumstance Requirements

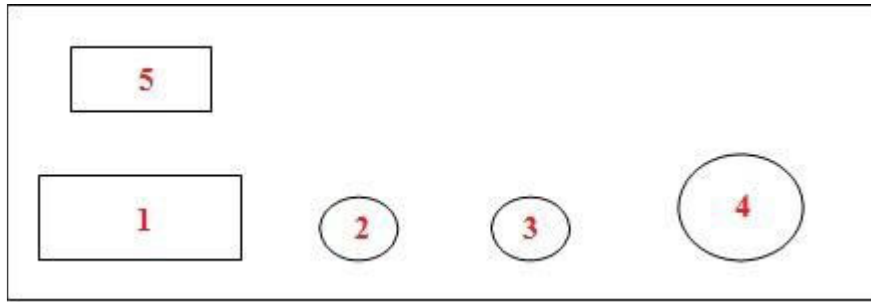
- Temperature Range for Accurate Testing: 20 °C ± 5 °C
- Working Temperature: 0 °C~40 °C
- Input power source: AC220V $\pm 10\%$, 50Hz/ 60Hz
- Power: ≤ 10 W (5)
- Fuse: 0.5A
- Size: 36cm*32cm*14cm

PANEL ILLUSTRATIONS



1. Illustration of Front Panel

- (1) Resistance Indicator
- (2) Non-qualifying Indicator
- (3) Voltage Indicator
- (4) Resistance Threshold Adjustment Knob
- (5) Resistance Testing ON/ OFF Button
- (6) Resistance Measuring Range Switch
- (7) Voltage Measuring Range Switch
- (8) Start ON/ OFF Button
- (9) Power ON/ OFF switch



2. Illustration of Back Panel

- (1) 220V Power Socket
- (2) Fuse Socket
- (3) Ground
- (4) Probe Input Socket
- (5) Alarm Sound Switch

OPERATION PROCEDURES

1. Connect the ground cable to the “**Ground**” terminal on the back panel.
2. Switch the power switch to the “ON” position and then press down the “**Start ON/OFF Button**” to turn it on.
3. Plug the cable into the “**Probe Input Socket**” and connect the battery to the alligator clips. Afterwards, warm up the tester’s internal circuit by leaving the battery stay connected for 10~15 minutes.
4. After 10~15 minutes of warming up, remove the battery from the probes.
5. Press down the “**Resistance Testing ON/ OFF Button**” to enable setting the limit of the internal resistance. Rotate the “**Resistance Threshold Adjustment Knob**” to display the resistance threshold value on the “**Resistance Indicator**” to set a cutoff limit for the internal resistance. Press the “**Resistance Testing ON/ OFF Button**” again to release it and return “**Resistance Indicator**” display to the resistance readout mode. When testing, if the readout resistance value \geq threshold limit value, the alarm will sound off and turn on the “**Non-qualifying Indicator**”.

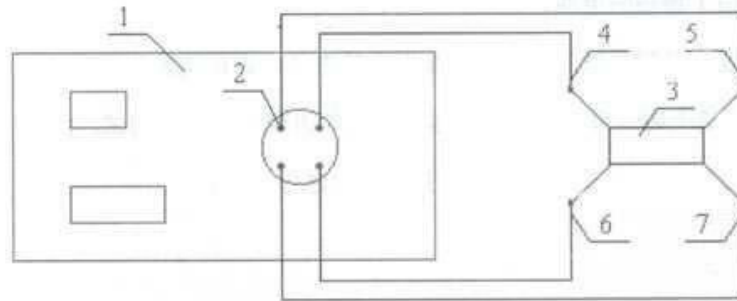


Attention: The “**Alarm Sound Switch**” can be used to enable or disable the alarm sound.

6. During the testing process, press down on the “**Start ON/OFF Button**” and use the alligator clips to connect the battery to be tested. Record the data when the reading is stable and then take off the battery after releasing the “**Start ON/OFF Button**” by pressing it again.
7. Repeat step 6 until all the batteries are tested (refer to step 5 if changing resistance threshold limit is necessary).
8. Turn off the power; place the tester in a dry environment.

CALIBRATION

The tester should be calibrated annually to ensure that its readings are accurate. This section will cover the calibration procedures:



1. Back Panel
2. Four Sockets Aero Plug
3. Standard Resistor (50 mΩ/0.5W)
4. Voltage Sampling Positive Probe (Small Red Clamp)
5. Voltage Sampling Negative Probe (Small Black Clamp)
6. Current Positive Probe (Big Red Clamp)
7. Current Negative Probe (Big Black Clamp)

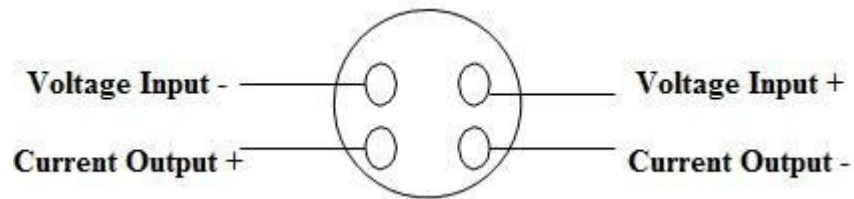
- (1) Connect the Voltage Probes (4 & 5) and Current Probes (6 & 7) to the terminals of the standard 50mOhm resistor as shown above. Open box to reveal the circuit board and locate the following variable resistors for calibrating each corresponding parameter accordingly.
- (2) VR1: No Effect on any parameters; leave it alone
VR2: Voltage in the 20V range
VR3: Resistance in the 200mOhm range
VR4: Resistance in the 2000mOhm range
- (3) The resistance calibration is confirmed by obtaining a resistance value on the readout display to around 50mOhm. Rotate the variable resistors (VR3 & VR4) until the resistance value on both resistance range (200mOhm & 2000mOhm) matches the standard resistor's 50mOhm resistance.
- (4) To calibrate the voltage, use a digital multimeter to obtain the voltage readout of a battery. Then rotate the VR2 variable resistor until a value close to that obtained on the multimeter is obtained.

Attention:

The calibration process requires opening up internal resistance tester and dealing with delicate circuitry. Consulting an experienced technician for performing the calibration is highly recommended.

PRECAUTIONARY MEASURES

- (1) Always use a Four Socket Aero Plug cable to test the internal resistance and voltage
- (2) Always follow step 3 in OPERATION PROCEDURES to warm up the tester prior to use.
- (3) If the voltage of the battery is lower than 2V, the “**Voltage Measuring Range Switch**” should be adjusted to 2V.
- (4) If the resistance value of the battery is lower than 200mΩ, the “**Resistance Measuring Range Switch**” should be adjusted to 200 mΩ.
- (5) Working temperature should be as stable as possible.
- (6) The tester operates on low power; therefore the power should be left on to reduce the warm up time.
- (7) Always have some spare batteries handy for warming up the tester before testing samples.



Four aero sockets plug of the cable of clamp

MAINTENANCE & TYPICAL PROBLEMS

1. The clamps could deteriorate with use over time and affect internal resistance readings. When this happens, please use sand paper to gently clean the clamps.
2. Prolonged testing in one battery may produce different results; however, this is a normal phenomenon because the battery has a discharging process.

SYMBOL INDICATIONS

Personnel(s) operating this equipment should get familiar with symbols below. Misuse and negligence could result in damage, personal injury and other undesirable outcomes.

 Grounding

 Button on



Button off

Resistance Testing ON/ OFF Button: **ON** ----- Enables alarm when threshold value of resistance is reached or exceeded

Resistance Testing ON/ OFF Button: **OFF** ----- Disables the alarm entirely regardless of the resistance threshold value

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