What is Internal Resistance of Battery?

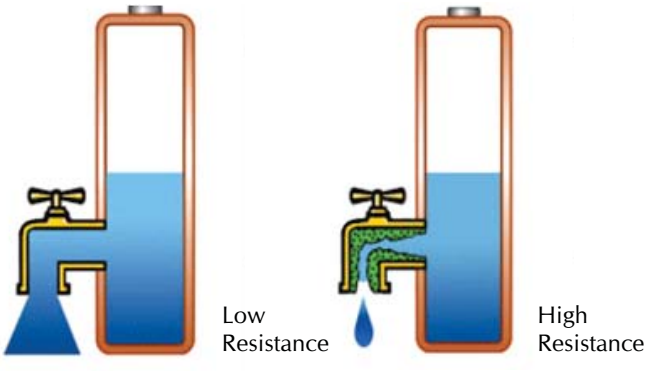
One of the basic requirements of a battery for digital applications is low internal resistance. Measured in milliohms, the internal resistance is the gatekeeper that, to a large extent, determines the runtime. The lower the resistance, the less restriction the battery encounters in delivering the needed power. The internal resistance (IR) of a battery is defined as the opposition to the flow of current within the battery. There are two basic components that impact the internal resistance of a battery; they are electronic resistance and ionic resistance. The electronic resistance plus the ionic resistance will be referred to as the total effective resistance.

How does Internal Resistance affect Performance?

Storage batteries are repeatedly charged and discharged over a long interval. This tends to gradually deteriorate the battery performance and the internal resistance increases until charging is no longer possible. Faults may also be caused by internal short-circuits, reducing the battery voltage, making the battery over-heat or in the case of a short-circuit caused by corrosion, possibly even leading to a fire.

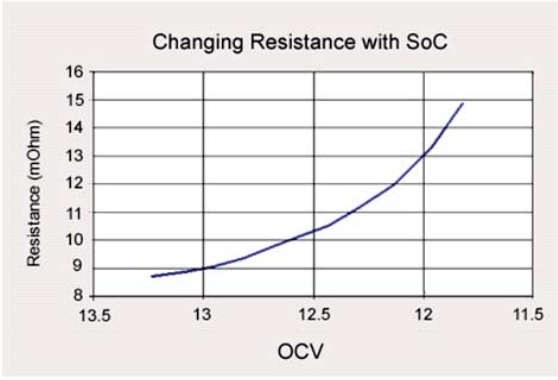
A high mW reading can trigger an early 'low battery' indication on a seemingly good battery because the available energy cannot be delivered in the required demand and remains inside the battery.

The internal resistance of a battery is dependent on the specific battery's size, chemical properties, age, temperature and the discharge current.



Effects of internal battery resistance

A battery with low internal resistance delivers current to the equipment (Load) as per requirement. High internal resistance causes battery voltage to drop. Because of drop in voltage, current flowing to the equipment (Load) gets cut-off leaving energy in the battery.



Typical internal resistance readings of a lead acid battery

The readings were taken at open circuit voltage (OCV).

MECO Battery Capacity Tester

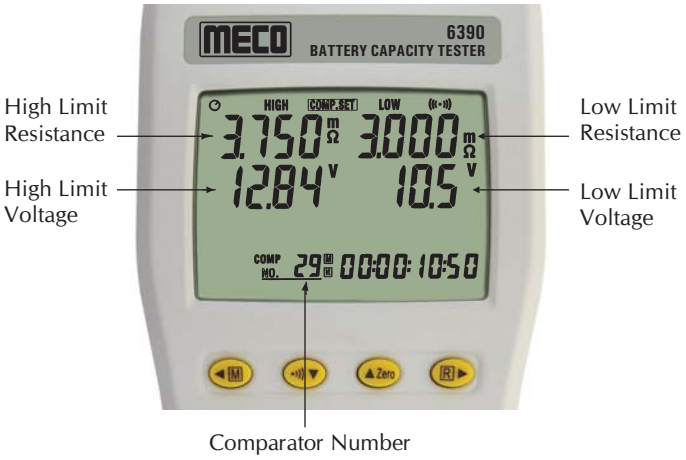
In the modern age with the increase in various portable devices, maintenance of batteries has become crucial as the performance of these devices depend on life of batteries. Because of continues charging and discharging of batteries their performance gradually deteriorates until charging is no longer possible which may result in sudden failure of the system.

MECO Batter Capacity Testers can give quick results on the state of a battery either as PASS, WARNING or FAIL which is based on comparator settings of internal resistance and the voltage for various batteries. MECO Battery Capacity Testers can check all types of batteries including Nickel-Metal Hydride batteries (NiMH), Nickel Cadmium batteries (NiCd), Lithium-Ion batteries (Li-ion), Alkaline batteries and Lead-Acid batteries. Users can choose from 2 models to suit their applications : Battery Capacity Tester Model 6363 for testing batteries upto 40V and 500Ah, and Battery Capacity Tester Model 6390 for testing batteries upto 60V and 1200Ah.

The analysis of batteries state is PASS / WARNING / FAIL based on a six-way combination of comparisons against upper and lower limits of Internal Resistance and Voltage threshold. This result is then indicated by LEDs and a beeper.

Comparator Table

Resistance / Voltage	Low Limit Resistance Lo ↓	Middle ↓	High Limit Resistance Hi
Voltage	WARNING Beeper	WARNING Beeper	FAIL Beeper
Comparison →	PASS	WARNING Beeper	FAIL Beeper
Value			



Applications (For 6363 & 6390)

For Manufacturers, R & D Units, Service Centers, Technicians, Dealers & Service Excutives in following industries

- Battery
- UPS
- Automobile
- Emergency Power Backup
- Solar Energy
- Wind Energy
- Lift
- Crane & forklift
- IT
- Telecom
- Aircraft
- Railways