Series 4000
Automated Test System

The Maccor Series 4000 multifunction test system is a fully automated programmable multiple channel test system. The Series 4000 is a "Turn-Key" system with all software and hardware included.

Features of the Series 4000 include:

Test System is based upon embedded microprocessors, memory, and firmware whereby the test procedure is completely downloaded to the test system.

Test system's software has the capability to terminate a particular channel's test and force an open circuit condition to isolate the device under test based on user defined safety (upper and lower) tolerances of voltage and current.

Each test channel is controlled independently of the other channels in the system.

Step types include: Charge (Source Current), Discharge (Sink Current), Rest (Wait), Voltage Scan, Pulse – 10 mS standard (GSM, CDMA, and 1 mS channels with 100 μS pulse widths are available as an option).

Steps can be user programmed to operate in modes of constant (fixed) current, power, voltage, or resistance.

Each test step can have up to 16 different end conditions.

Tests can branch to any step in the test based on the step end criteria met.

Step end conditions include but are not limited to: measured values (voltage, current, time, etc.), integrated values (energy, capacity, half cycle data), and calculated values ($\Delta V/\delta t$, $\Delta T/\delta t$, first and second derivatives).

Four levels of loop nesting are available in each test.

Test procedures can be called as a subroutine in another test yielding virtually limitless step lengths.

Data from active (real-time) or completed tests can be viewed, plotted, or printed.

The MIMS Client, Maccor's data analysis software package, provides plotting of test data.

Automatic transfer of test data from multiple test systems via a company's LAN to a central location with the MIMS Server.

Charts (plots) can be customized with titles, axis formatting, line colors, and much more.

Customized charts can be saved as templates to use again and again.

Data from multiple test channels may be plotted on a single chart, or multiple charts can be created as a single view.

The system's power monitoring electronics provide complete data retention and automatic restart from external power failures when used with an uninterruptible power supply.

A proprietary software algorithm is available on most channel types to extract 1 kHz AC impedance during testing.

Similarly rated test channels can be combined in parallel in groups of 2, 4, or 8 to yield higher current rated channels when needed. Some features are not available when channels are combined in parallel. Contact the sales department for details.

Multiple current range test channels can automatically switch ranges within a step providing very accurate control.

Test cabinets are designed with front and rear doors providing easy access to the electronics.

Several types of environmental chambers may be used as an integral part of the system. Tests started with single or groups of cells, can output a temperature set point to the environmental chamber(s) configured in the system software throughout the test. With the appropriate interface hardware the system can communicate with one or several chambers.

Test systems are delivered calibrated to NIST traceable standards, and require calibration only once per year.

Specifications

Number of Channels		96
Current Range		
	1	-150µA to +150µA Full Scale ±0.01% FS
	2	-5mA to +5mA Full Scale ±0.01% FS
	3	-150mA to +150mA Full Scale ±0.01% FS
	4	-5A to +5A Full Scale ±0.01% FS
	Current Control Range (Charge)	+300 ηA to +5 A
	Current Control Range (Discharge)	-300 ηA to -5 A
	Voltage Range	-5 to +5 Volts Full Scale ±2 mV
	Voltage Accuracy	±0.02% FS
	Resolution (Voltage & Current)	16-bit (1 part in 65,536)

Modes of Operation

- Constant Current
- Constant Power
- Constant Voltage
- Constant Resistance
- Voltage Scan (Cyclic Voltammetry)
- Fixed 1 kHz AC Impedance Measurement
- Waveform – allows the streaming of an external text test file (i.e. FUDS drive cycle test) to the test system
- Functions – refer to Appendix C for additional information concerning this feature

Time

Minimum Step Time	10 mS
Control, Measure, and Adjust	10 mS

System Size and Configuration

Approximate Test Cabinet Dimensions	1 bay - Floor Standing cabinet	32" deep x 87" high x 25" wide
Battery Interface		4 position plug in connectors
AC Power supply connections		bottom rear of cabinet

Additional Items Supplied

Tester PC	Dell OptiPlex 7040 Minitower, 3.2 GHz Core i5-3470 Processor 240 GB Hard Drive, 2.0 GB RAM Memory, Flat Panel Monitor (19” viewable image size), 48X CD ROM, with Windows 10 Professional
Software / License	Maccor’s 32-bit Windows based battery test software MIMS Client graphical and statistical software MIMS Server Software for automatically transferring data
Software license includes lifetime updates at no additional cost. This license is not transferrable in the event the system is given away, donated, or sold.	
2200VA UPS	Maccor systems are designed to detect power outages and avoid losing any data when a UPS is used on the logic power supplies and PC. The system can also be user configured to automatically restart when power is restored.
Cell Holders, 18650, PowerPole	Qty. 96