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REMS AutoSampler

Automated TEER Measurement System

The REMS system includes a computer with the necessary hardware and software already installed.

The **REMS AutoSampler** automates measurements of electrical resistance of transepithelial, transendothelial or Caco-2 cell membranes being grown to confluence on microporous filters of high throughput screening (HTS) 24- and 96-well microplates. It is a PC-controlled, tissue resistance measurement system that offers reproducibility, accuracy and flexibility for this kind of measurement. Automated measurement of tissue resistance in cell culture microplates provides the important advantages of speed, precision, decreased opportunity for contamination and the instant availability of measured resistance data on a computer. These measurements are useful in applications such as drug bioavailability studies and studies on the mechanisms of drug transport.

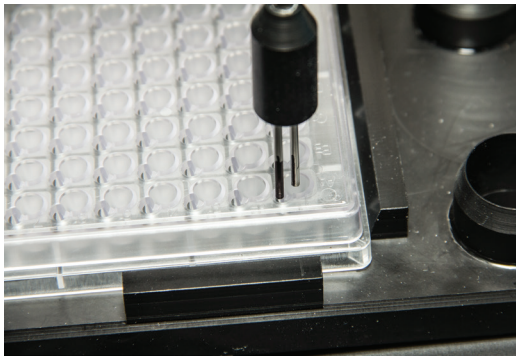
The main components of the **REMS AutoSampler** include:

- Robotic sampler that moves the electrode over each well of the microplate
- Electrode located on the robotic arm
- Base plate for the 24- and 96-well tray
- Windows-based data acquisition card
- REMS interface unit
- REMS software to operate the system on a Windows-based computer
- PC with Windows 7

The **REMS AutoSampler** automates TEER measurements previously made with WPI's **EVOM²** Epithelial Voltohmmeter. Automated tissue resistance measurements up to 20kΩ can be performed on 24- or 96-well HTS microplates.

The **REMS AutoSampler** is designed to facilitate integration with other robotic systems. Special locating bars are installed on the **REMS** base platform that allow other system robots to place an HTS tray into a precise location on the **REMS** base.

The **REMS AutoSampler** automatically



The ability of the REMS AutoSampler to precisely locate the electrode results in highly reproducible TEER measurements.

REMS AutoSampler

Automated TEER Measurement System

Each probe of the REMS electrode contains a pair of electrodes for injecting current and measuring voltage.

measures and records tissue resistance from a user-specified matrix of culture wells on the microplate. According to the specified sequence, the robotic arm moves over the identified wells taking TEER measurements. By means of a x-y-z locating system, the electrode arm is positioned precisely and reproducibly over each well.

TEER measurements are stored in the computer as the electrode moves from one well to the next. The Windows-based software provides user-friendly features to acquire, display and store the tissue resistance measurements.

The **REMS** electrode is very compact and robust in design. Each of two rod-shaped probes, 1.5mm in diameter, consists of a pair of electrodes: one electrode for injecting current and the other for measuring the voltage. The use of two pairs of electrodes eliminates the error caused by the electrode-liquid interface. To take a measurement, the robot inserts one probe into the center of the filter well and the other into the opening slot of the 24- or 96-well plate. The use of AC current to measure resistance provides several advantages over DC current, including:

- Absence of offset voltages on measurements
- There is a zero net current being passed through the membrane and, therefore, it is not adversely affected by a current charge
- No electrochemical deposition of electrode metal

The **REMS AutoSampler** also features two rinse stations and a calibration check station. If occasional rinsing of the REMS electrode is required, it may be sent to a rinse station by pressing a rinse station button on the menu bar.

REMS (Automated Tissue Resistance Measuring System) Includes robot sampler, base plate, data acquisition board, computer with display, keyboard and mouse, software for Windows 7 or 8 (32 or 64bit), and electrode for either 24-well plate (Corning Costar HTS Transwell-24 or Falcon HTS Multiwell) or 96-well plate (Millipore Multiscreen CaCo) or Corning 96-well plate *(specify when ordering)*.

REMS-24	Replacement REMS STX Electrode for 24-well HTS Plate
REMS-24M	Replacement REMS HTS Electrode for Millicell-24 Cell Culture Insert Plates
REMS-96	Replacement REMS STX Electrode for Millipore™ 96-well Plate
REMS-96C	Replacement REMS STX Electrode for Corning 96-well Plate

SPECIFICATIONS

MEMBRANE RESISTANCE RANGE	0 to 2000- and 0 to 20kΩ
AC SQUARE WAVE CURRENT	±20µA @ 12.5Hz
ELECTRODE POSITIONING (Resolution in X, Y and Z)	±1mm
ELECTRODE PERFORMANCE (Repeatability in X, Y and Z)	±0.25 mm
ELECTRODE ARM SPEED (X- and Y-axis)	250 mm/sec
(Z-axis)	247.3 mm/sec
TYPICAL MEASUREMENT TIME (24-well)	1 min, 10 sec
SCAN PATTERN	Choice of any well pattern sampling
LINE VOLTAGE	User specified: 100/120 V or 220/240 V
DIMENSIONS	53.5 × 43.7 × 37.1cm
	(21.1 × 17.2 × 14.6 in.)
WEIGHT	24kg (52 lb.)

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