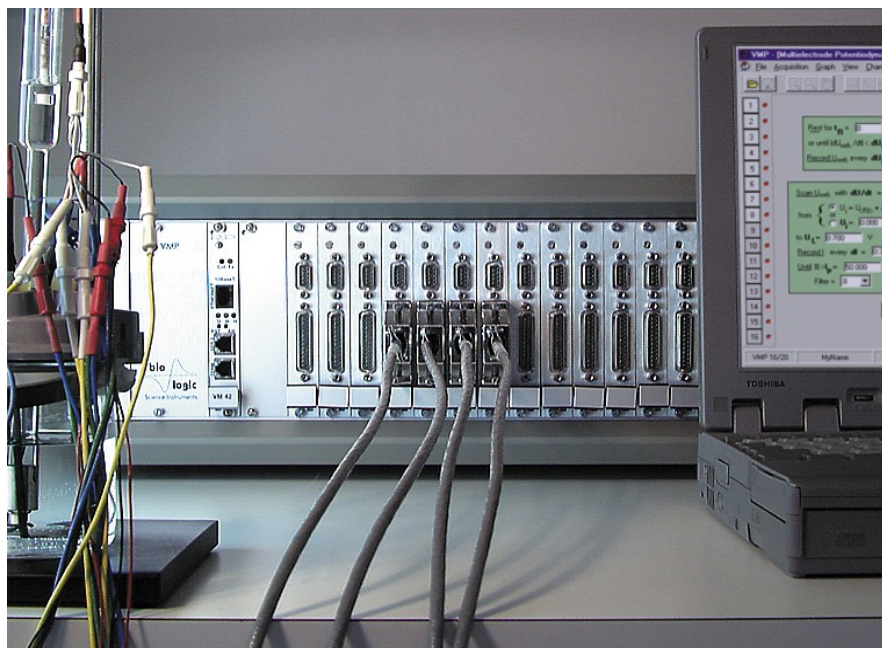


## A MultiPotentiostat / Galvanostat designed for ....



## ... biosensors development and intercalation compounds study ...

The VMP Multipotentiostat is a eight to sixteen channel capable system. Each channel can deliver +/-10 mA current. This research grade instrument is especially dedicated to electrochemical sensors development thanks to its high current resolution and to battery cell test (button cells and supercapacitors). It can also be used for general electrochemistry measurements (linear sweep voltammetry, chronoamperometry and chronopotentiometry methods) or corrosion tests (Tafel fit, Rp fit, pitting).

You can connect the **VMP** directly to the PC or via the network with an Ethernet communication allowing the installation on a Local Area Network. Thus, the VMP is a multi-users instrument (recommended for education). Moreover, each channel has analog inputs / outputs to manage external instruments (QCM, spectro UV-Visible) and record the generated data.

The VMP with **EC-Lab (v9.16) software** is the ultimate electrochemical workstation with more than 35 protocols and many analysis tools. The VMP is the only instrument in its category capable to switch quickly from a potential control to a current control.

### General Specifications:

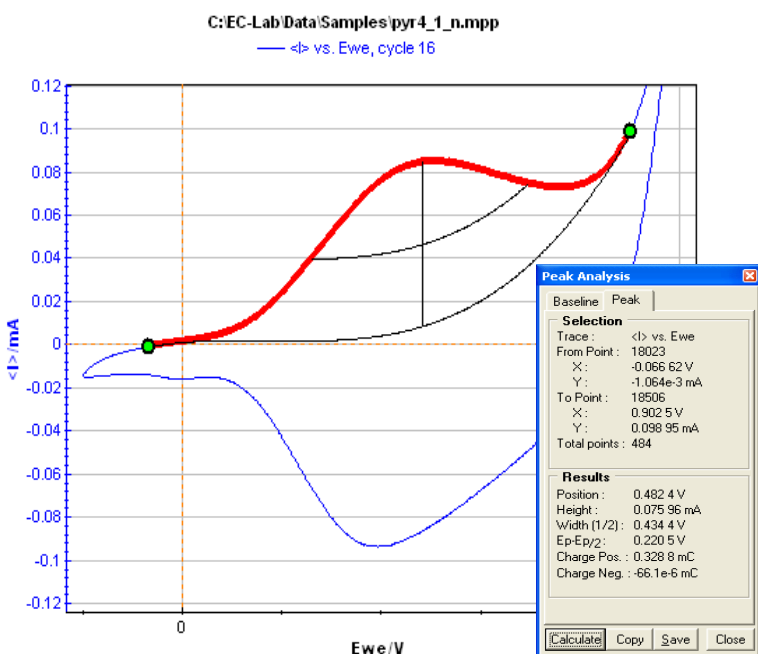
- 3 current ranges from 1  $\mu$ A to 10 mA with a minimum 3 pA resolution
- Dynamic potential range: +/-10 V
- Potential Resolution: 100  $\mu$ V
- Sampling rate : 20 ms
- Communication: Ethernet 10baseT

## EC-Lab<sup>®</sup>: an efficient monitoring software

The VMP is provided with EC-Lab<sup>®</sup> software (v9.16). This software offers many usual techniques including several tools to build complex protocols. The created protocols can be saved as “**Customs Applications**”.

The DC techniques are made with blocks that can be linked using a table with sequences. Each parameter can be modified while the experiment is running. All the modifications made are automatically saved in the raw data file. The tool bars and the windows can be adjusted by the user.

The technology of the VMP allows the user to define data sampling and recording conditions without any limit on the recorded data point number. The VMP is a complete autonomous instrument during the experiment thanks to its operating system.



### Included Techniques

- ◆ **General Electrochemistry :**
  - Cyclic Voltammetry
  - Staircase Voltammetry
  - Chronoamperometry,
  - Chronopotentiometry, coulometry
  - Open Circuit potential
  - DPV
- ◆ **General Corrosion:** LP, Tafel, Cyclic Polarization , Multipitting CPT (Critical Pitting Temperature), ZRA (Zero Resistance Ammeter)
- ◆ **Battery:** GCPL, PGCA, APGC, CPW, CLD Modular potentio (MP) Potentiostatic and dynamic Modular galvano (MG) galvanostatic and dynamic

The graphic window can be shared into different graphs. Each one is active and independent from the others. The user can at the same time follow the experiment evolution and analyze data previously stored. Several graphic tools are also available such as linear fit, integral fit, Min/Max determination, peak analysis and wave analysis in convective regime .

This window can have a double Y-axis. Axes can be modified by the user. A “Axis processing” option allows less conventional plots. The properties to configure traces (color, style, ...) and units are available for the user.

### Board Specifications :

#### • Cell control

**Converters:** 18 bits dynamic DAC

**Compliance :**  $\pm 10$  V

**Maximum current:**  $\pm 10$  mA continuous

**Maximum potential resolution :** 100  $\mu$ V on 2 V and 300  $\mu$ V on 20 V.

**Maximum current resolution :** 0.0003 % of the dynamic range, programmable down to 3 pA on the 1  $\mu$ A range.

**Accuracy (DC):** < 0.003% FSR\* +0,05% of measurement

**Rise Time (10% - 90%):** < 2  $\mu$ S (without charge)

#### • Current measurement

**Converter:** 16 bits

**ranges:**  $\pm 1$   $\mu$ A,  $\pm 100$   $\mu$ A,  $\pm 10$  mA

**Options:** 2, 5, 10 or 20 A current booster

**Maximal Resolution :** 0.0003 % FSR\* if  $I < 10\%$  of the range

0,003% FSR\* if  $I > 10\%$  of the range

**Sampling rate:** 20  $\text{ms}^{-1}$

**Accuracy (DC)** < 0.1% FSR\*

#### • Potential measurement

**Converters:** 16 bits ADC ; 12 bits DC shift DACs

**Ranges:**  $\pm 1$  V,  $\pm 10$  V

**Maximal Resolution :** 0.003 % FSR\*, down to 30  $\mu$ V

**Sampling rate :** 20  $\text{ms}^{-1}$

**Accuracy (DC):** < 0.1% FSR\*

#### • Reference Electrodes

**Inputs:** 3 potential measurements leads, with 2 differential voltage measurements

**Impedance:**  $10^{12}$  ohms in parallel with 20 pF

**Bias current :** < 5 pA

#### • Additional Inputs/Outputs

Each potentiostat/Galvanostat board has the following inputs / outputs :

**3 analog inputs:** 16-bit resolution with automatic ranges of  $\pm 2.5$  V,  $\pm 5$  V,  $\pm 10$  V

**1 external input trigger:** TTL level

**1 external output trigger:** TTL level

**• Power :** 85-264 V AC, 47-440 Hz

Specifications subject to change

\*FSR: Full Scale Range