

Product Note P10



CIM User Guide

CIM specifications

Current compliance	± 5A
Voltage compliance	± 50V
Resistance on-state	0.13 Ohm typical
Resistance off-state	>100 GOhm
Interrupt time	< 2µs
power requirements	powered from cell cable
Size	w x d x h = 3.3 x 6.3 x 1.5 cm
Weight	60 gram
Interfacing/connectivity	HD15, connects in-line with cell cable
Use	only i.c.w. Ivium potentiostats



Functionality

Enable the current interrupt technique for measuring the IR-drop of the electrochemical system.

Installation

The male side of the CIM can be placed directly on the cell connector of the IviumStat/CompactStat. The cell cable can be connected to the female side, as before. The CIM is thus connected between the instrument and the cell cable. When not using the current interrupt technique all signals are passed through this module and it is fully compatible with the situation without CIM. However, the CIM adds ca. 130 mOhm impedance to the cell cable. This should be taken into account when measuring in the 2-electrode mode and it will slightly lower the compliance voltage of the potentiostat. The latter will only have a significant effect when measuring very low impedance objects.

Application

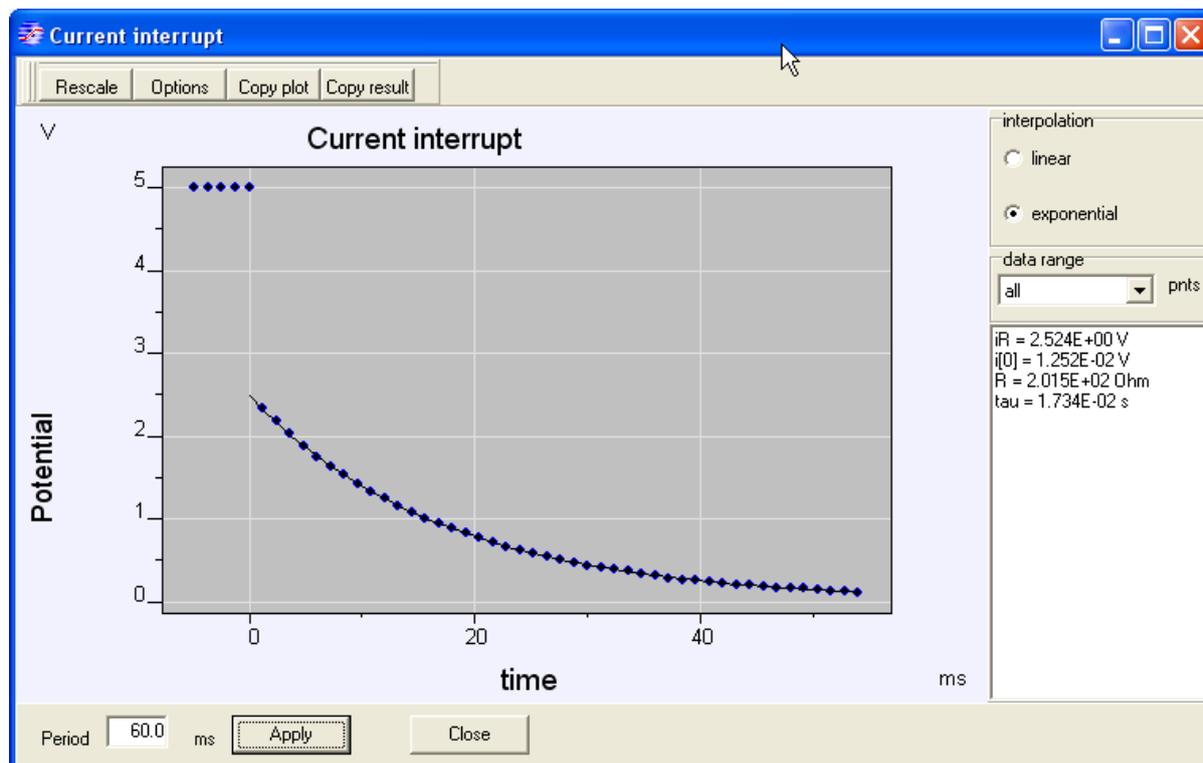
The CIM can be used for measuring the IR-drop of an electrochemical system via the current interrupt technique. As the name of the technique suggests, the current of a running experiment is interrupted instantly and the response of the cell potential is measured in high speed mode. The momentary drop of the cell potential, representing the IR-drop of the electrochemical system, is then shown in a graph of the potential vs. time.

Operation

In the IviumSoft, the current interrupt technique is both integrated as a diagnostic tool (in Direct 'Mode operation'), and integrated in the ChronoPotentiometry (CP) technique.

'Diagnostic' in Direct Mode

To operate the CIM, in the "Direct Mode" set the desired potential in either the potentiostatic 4-electrode or 2-electrode configuration, and then apply so that the the potential is applied to the test object and the current flows. Then in the menu bar choose "Tools>CurrentInterrupt". This will open a pop-up window.



At the bottom of the window the measurement period can be entered, and to the top right the interpolation can be chosen (linear/exponential). Then press "apply". The current is momentarily interrupted and the IR-drop is automatically calculated and the calculated values are given in the legend to the right of the window.

The Current interrupt Tool uses the HiSpeed mode for recording the data. Over the user defined period, 64 datapoints are evenly distributed, with:

- number of datapoints (fixed): 64
- minimum time base: 10 μ s
- minimum period: 0.5 ms
- maximum period: 1000 ms

ChronoPotentiometry

The Current Interrupt Module (CIM) can be used during ChronoPotentiometry. In Advanced mode, the parameter "CI at Level[2]" is available. When checked, it will activate a Current Interrupt during the 2nd level. The data is recorded and shown in the transient window. Note that this is especially useful in high speed mode.



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