

RMUX16



16 Channel Multiplexing Extension

(Operation Manual)

Caution!!!

Please read the [risk assessment document](#) before operating the potentiostat.

Prevent the inputs of the potentiostat from electrostatic discharge (ESD)! ESD may damage the potentiostat. ESD-related damages are not covered by the warranty of the potentiostat. The user must make sure to discharge his-/herself from any electrical charge before touching the potentiostat (TIP: use grounded ESD-matts).

Maintain the maximum input voltage of the device and the selected voltage range.

Use electrically insulated thermocouples.

Do not expose the RMUX16 card to heat.

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1 Introduction

RMUX16 is a plug-and-play card for an extension slot of the ZENNIUM PRO/X. It allows to connect up to 16 electrochemical cells to the electrochemical workstation simultaneously. For measurement, a user-defined number of cells are measured (multiplexed) sequentially. Plugged into an empty extension slot it will be recognized automatically by the Thales software.

The counter electrode and the reference electrode outlets of the internal ZENNIUM PRO/X potentiostat are switched to the active cell only. The working electrode and the test electrode are connected internally and have a common outlet. The inactive cells are open circuit.

The Zennium PRO/X can control up to four RMUX16 add-on cards with up to 64 multiplexed channels.

1.1 Packing List

- RMUX16 addon card
- This manual

The cell cable set RMUX16 CS is required for the measurement with the RMUX16 add-on card. This set includes the potentiostat connection cable (Lemos plug to ODU plugs Probe E/I) and the 16-channel cell connection cable (D-SUB to 4mm banana plugs) with 16x CE, 16x Ref, 16x WE.

The type of electrochemical workstation (or serial number) must be specified when ordering.

2 Technical Data

Channels	16 (with common working electrode)
Input Impedance:	100 G Ω 30 pF
Maximal Current:	\pm 500 mA
Connector:	44-pin D-Sub
Maximum RMUX16 Supported:	4 (64 channels in total)

3 Installation

For the installation of the RMUX16:

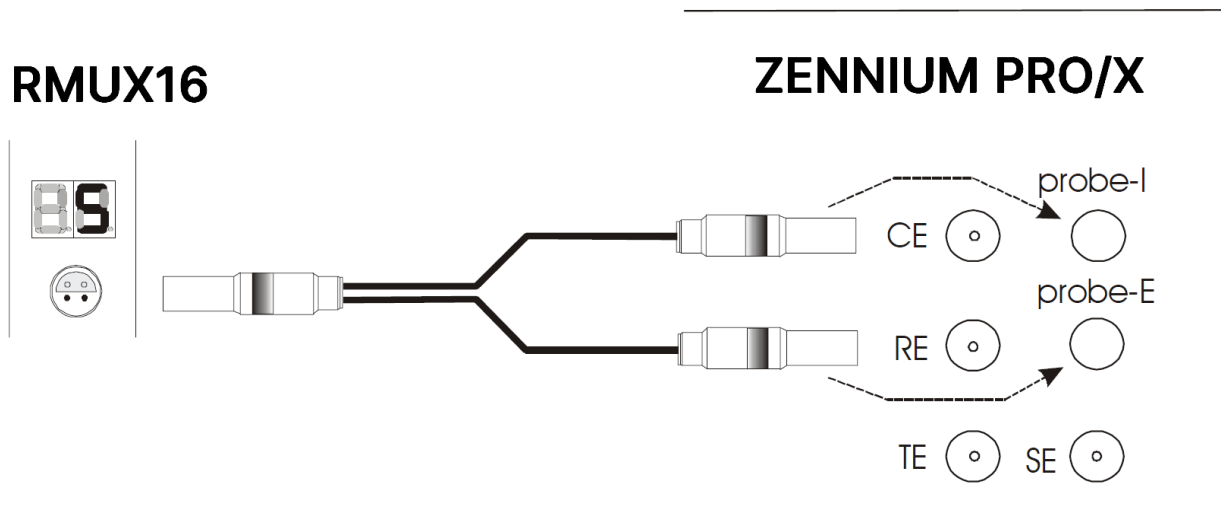
1. Switch off the ZENNIUM PRO/X and disconnect it from mains
2. Remove one of the empty slot front panels named extension by twisting the four screws at the top and the bottom
3. Plug in the RMUX16 card and fasten the two screws at the top and the bottom of its front panel
4. Connect the ZENNIUM PRO/X to mains and switch it on

The hardware installation is finished now. The Thales software will detect the RMUX16 card automatically when started.

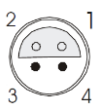
4 Connection

Caution! Before connecting either the RMUX16 to the ZENNIUM PRO/X or the cells to the RMUX16, switch off the potentiostat!

The RMUX16 functions are controlled through the internal system bus, whereas the connections of the analog signals have to be set up externally. For that purpose a Y-adapter cable is **required** (RMUX16 cable set). The one-tailed-end connector is to be plugged into the RMUX16 outlet, the two-tailed-end plugs go to the probe-I and probe-E plugs of the ZENNIUM PRO/X. The connectors do only fit to their corresponding outlet and therefore cannot be mixed up.



The pin assignment of the Lemosa outlet on the RMUX16 front panel is as follows:



Type: Lemosa ERA0S.304 CLL

(front view)

1 = counter electrode

2 = test electrode power

3 = reference electrode

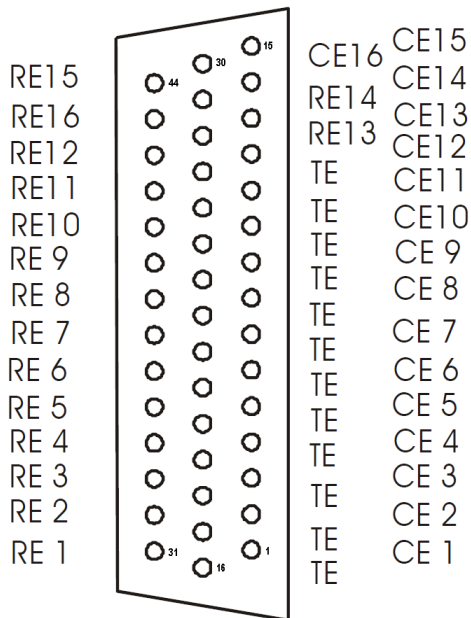
4 = test electrode sense

5 Cell Connections

The **optional** RMUX16 cable set (RMUX16 CS) comes with a multi-lead cell cable which is connected to the 44-pin D-Sub outlet of the RMUX16.



The multi-tail cable provides three leads for each of 16 cells. The color coding is as follows:



Black - test electrode

Green - reference electrode

Red - counter electrode

The lead-triplets are labelled with the corresponding channel number. For the connection of the cells, please only use the factory-made cable.

Caution! If an RMUX16 channel is used for measurement, please make sure that nothing is connected to the ZENNIUM PRO/X potentiostat BNC outlets.

(front view)

6 Front Panel Display

The RMUX16 card provides a two-digit seven-segment front panel display and shows the currently selected RMUX16 channel. If the measurement device is set to MAIN device, than the RMUX16 display is deactivated and the potentiostat will perform measurements on DUT connected to the BNC outlets on the potentiostat front panel.

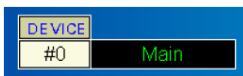
7 Software Control

After the installation Thales will detect the RMUX16 card automatically during its start-up procedure. It will enable the selection of the RMUX channels in all RMUX compatible software sections.

7.1 Testsampling & Control Potentiostat

Main Menu -> EIS Menu -> Control Potentiostat

To select a RMUX16 channel in the Testsampling page click on the DEVICE button:



An input window will open which allows you to set the number of the active channel. "0" will select the ZENNIUM PRO/X potentiostat outlets, the numbers "1" to "16" will select the corresponding RMUX16 channel.

7.2 Series Measurements

To set up a series measurement which scans through a definable number of channels go to the Define Series Measurement page:

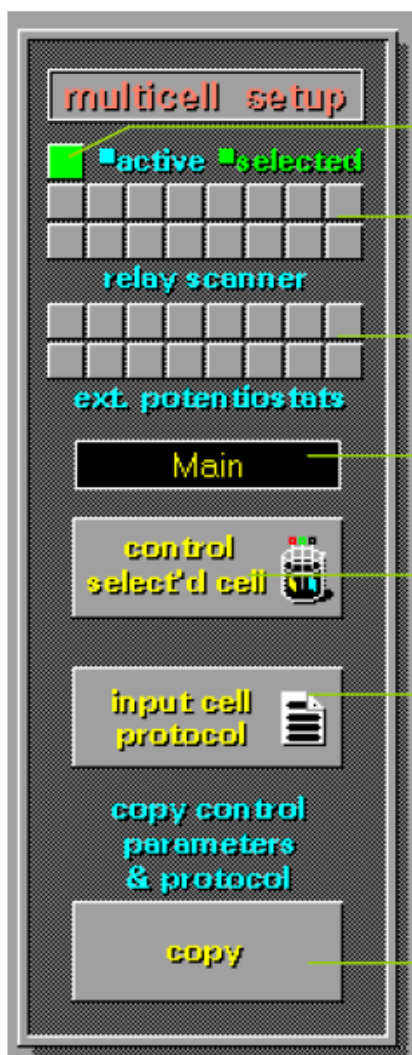
Main Menu -> EIS Menu -> Define Series Measurement



Select the option Loop Multiple Cells.



The right-hand side of the window will show the Multicell Setup, then:



The right-hand side of the window will show the Multicell Setup, then:

Main potentiostat

RMUX16 channels 1 - 16

EPC42 channels 1 - 16

Displays selected channel

Opens Testsampling page

Opens comment window

Copies all control parameters & protocol

The squares on the top indicate the status of each channel:

grey -> inactive

blue -> active

green -> selected

The upper row shows the channels 1 to 8 (from left to right), the lower row shows the channels 9 to 16 (from left to right).

By clicking with the mouse on a square you cycle through the above mentioned states of a channel: inactive -> active -> selected -> inactive -> ...

The upper two rows are showing the RMUX16 channels, the lower two rows show the channels of external potentiostats connected through EPC42 cards. The single square above the RMUX16 rows represents the main potentiostat. You may select one of these by clicking on it.

The box below displays the name of the selected channel. Clicking on Control Selected Cell opens the Testsampling page. Here you may configure the selected channel as described in the chapter Testsampling & Potentiostatic Control.

Input Cell Protocol opens a window where you may input your comments which will be saved along with the measurement data.

The Copy button copies the cell parameters and the protocol entries of the selected channel to all active cells. This is useful if all channels must have the same parameters.