RMUX4

4 Channel Multiplexing Extension

(Operation Manual)

ZAHNER

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 RMUX4 card to heat.

1 Introduction

The RMUX4 card allows to simultaneously connect up to four electrochemical cells to the potentiostat. The RMUX4 card is designed for corrosion experiments and has high input impedance. The OCP at all channels can be measured simultaneously along with one active channel for e.g., EIS measurement.

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

Up to four RMUX4 cards can be installed in a ZENNIUM X or ZENNIUM PRO potentiostat which allows simultaneous connection to up to 16 electrochemical cells.

1.1 Packing List

- RMUX4 addon card
- This manual

The cell cable set RMUX4 CS is required for the measurement with the RMUX4 add-on card. This set includes the potentiostat connection cable (Lemosa plug to ODU plugs Probe E/I) and four cell connection cables (Lemosa to 4mm banana plugs) with CE, Ref, WE.

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

2 Technical Data

Channels	4 (with common working electrode)
Input Impedance:	200 GΩ ‖ 40 pF
Maximal Current:	±500 mA
Connector:	4x Lemosa ERA0S.304 CLL
Maximum RMUX4 Supported:	4 (16 channels in total)

3 Installation

For the installation of the RMUX4:

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 RMUX4 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 RMUX4 card automatically when started.

3.1 Setup RMUX4 Shunt Capacity

The RMUX4 card adds a shunt capacity to the main potentiostat shunt impedance due to the cabling and signal routing. When using the RMUX4 CS standard cable set this capacity is about 18 pF and must be entered to the global settings:
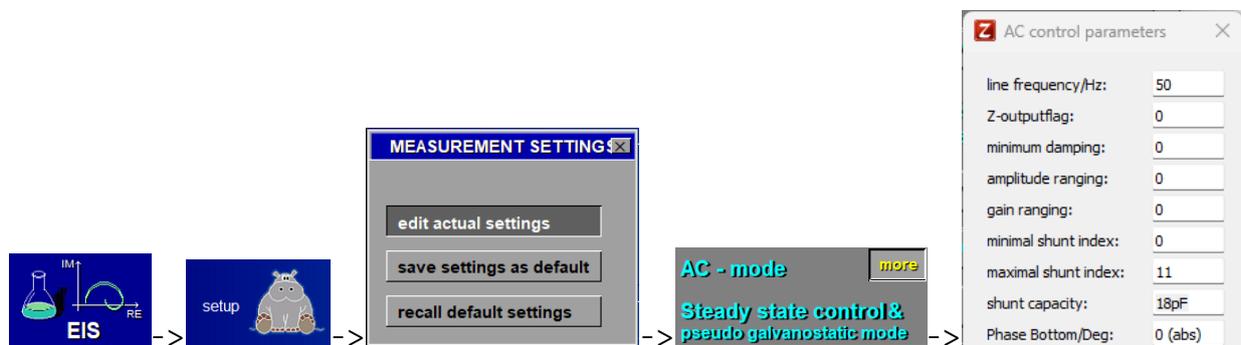
This changes can be saved permanently:
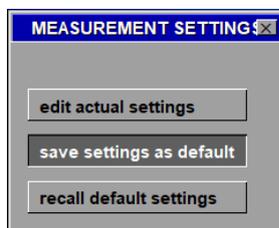
Caution: This shunt capacity correction value also applies to the main channel!

4 Connection

Caution! Before connecting either the RMUX4 to the ZENNIUM PRO/X or the cells to the RMUX4, switch off the potentiostat!

The RMUX4 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** (RMUX4 cable set). The one-tailed-end connector is to be plugged into the RMUX4 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.
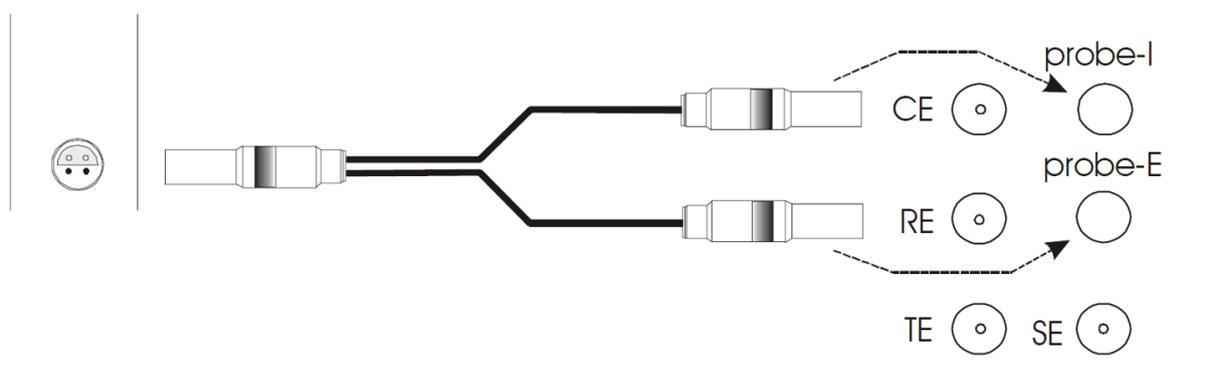
The pin assignment of the Lemosa outlet on the RMUX4 front panel is as follows:
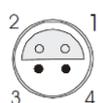
Type: Lemosa ERA0S.304 CLL

(front view)

1 = counter electrode

2 = test electrode power

3 = reference electrode

4 = test electrode sense

5 Cell Connections

The **optional** RMUX4 cable set (RMUX4 CS) comes with four cell cables.

Each cable provides three leads for cell connection. The color coding is as follows:

Black - test electrode

Green - reference electrode

Red - counter electrode

Caution! If an RMUX4 channel is used for measurement, please make sure that nothing is connected to the ZENNIUM PRO/X potentiostat BNC outlets.

When measuring with the RMUX4 addon card, an additional (parasitic) capacity of about 40 pF is determined. It results from the cabling and can be considered in measurements of your specimens as a parallel, parasitic capacitance.

6 Front Panel

The RMUX4 card has a LED indicator at each channel connection which shows the currently selected RMUX4 channel. If the measurement device is set to MAIN device, then all RMUX4 channels are open circuit (LEDs are off) 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 RMUX4 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 RMUX4 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 "4" will select the corresponding RMUX4 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:
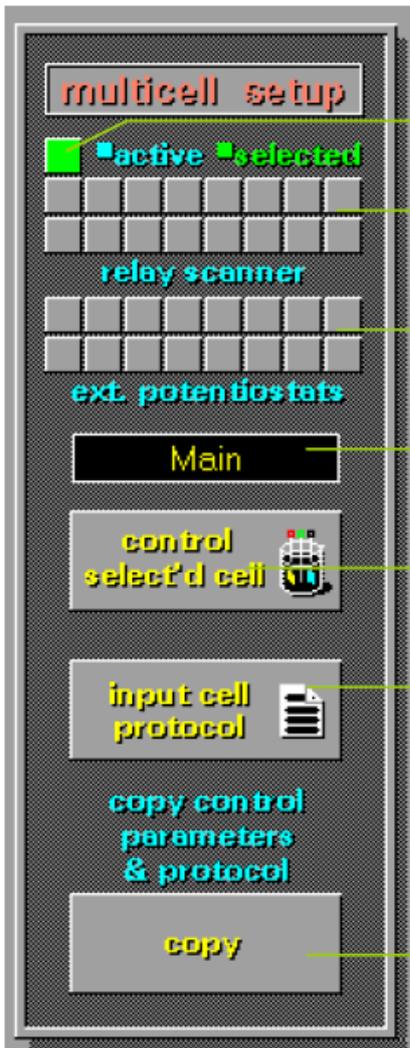
The right-hand side of the window will show the Multicell Setup, then:

Main potentiostat

RMUX4 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 RMUX4 channels, the lower two rows show the channels of external potentiostats connected through EPC42 cards. The single square above the RMUX4 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.