PalmSens
Compact Electrochemical Interfaces

MUX8-*R2*™ multiplexer

Compatible with
PalmSens3, PalmSens4 and EmStat3 Blue

v. 4-2020

Contents

Description

The MUX8-R2 multiplexer can be used to extend a PalmSens3, PalmSens4, EmStat3 Blue, or a channel of a MultiPalmSens4 potentiostat. The multiplexer allows to increase productivity by automatically switching between multiple electrochemical cells each with their own WE, RE and CE electrodes.

PalmSens4 connected to MUX8-R2 multiplexer

Stacking up to 128 channels

Each multiplexer has a Link connector which can be used to daisy chain to another MUX8-R2 multiplexer, expanding the number of channels. A maximum of 16 multiplexers can be connected in a daisy chain, giving a maximum of 128 channels.
The PSTrace software detects automatically how many multiplexers are daisy chained and shows the available number of channels in the user interface.

Magnetic feet for easy stacking

Configurations

The MUX8-R2 multiplexer is designed for use up to 128 channels with 2- or 3- electrode sensors or cells.

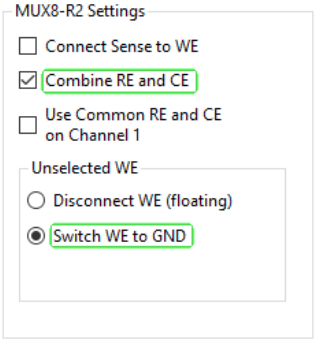
The multiplexer can be used with different electrode or sensor configurations:

1. Eight separate cells or sensors each with a working/sense, reference and counter electrode
2. Eight separate cells or sensors each with a working/sense and combined reference and counter electrode
3. Cell or sensor array with eight working/sense electrodes sharing one reference and one counter electrode
4. Cell or sensor array with eight working/sense electrodes sharing one combined reference/counter electrode

In all configurations the cells can be multiplexed, leaving the non-selected working electrodes either at open circuit (individually floating) or at Ground potential.

When in configurations 3 and 4, the unselected channels are switched to Ground, they will have the working electrode's potential. This is due to the fact that the active WE is always at Ground potential.

You can easily change the hardware configuration of the MUX8-R2 as part of the measurement settings in our PSTrace software or the PStouch app for Android.



Hardware settings can be changed in the software

Connections

The MUX8-R2 has the following connectors:

CONNECTOR	FUNCTION
INPUT	Y-cable connects to both potentiostat sensor connector and (digital) AUX
AUX	Can be used to measure auxiliary input like temperature or pH, and to switch external hardware using two digital control lines that can be set in PSTrace
LINK	Connects to Input of next multiplexer, for daisy-chaining multiple multiplexers.
USB-C	For providing extra power in case more than 2 multiplexers are connected to a single instrument.
CHANNEL 1-4	Connects to sensor cables 1-4
CHANNEL 5-8	Connects to sensor cables 5-8

Cell Connections

Option A (default):

The channels are divided in two sets of four sensor cables joined with a D-Sub connector.

Order code: [CBL-MUX08R2-SNS-5S]

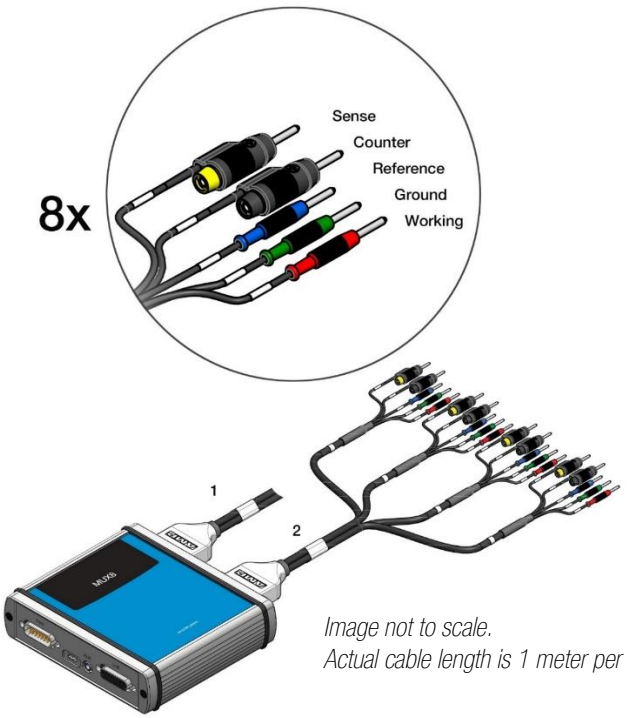


Image not to scale.
Actual cable length is 1 meter per channel.

Option B:

The cable here shown at the right can be used in case the multiplexer needs to be connected to a fixed setup by means of soldering or screw-terminals.

Order code: [CBL-HD-MUX08R2]

Option C:

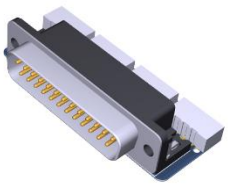
You can also connect one or two screw-terminals directly in the multiplexer.

Order code: [MUX08R2-ST]

Option D:

The SPE adapter for our MUX8-R2 multiplexer allows you to connect 8x Screen Printed Electrodes (SPE's). The pitch of the SPE connector is 2.54 mm and compatible with the most popular brands of SPE's.

Order code: [MUX08R2-SPE]



Supported Switching Modes

In *sequential* mode each channel is set before the next measurement starts. In *alternating* mode, the channels are quickly scanned during each interval time giving a virtual-simultaneous measurement across the selected channels.

	Supported Switching Mode	
Voltammetric techniques:	**Sequentially**	**Alternatingly**
▪ Linear Sweep Voltammetry	✓	
▪ Cyclic Voltammetry	✓	
▪ Fast Cyclic Voltammetry	✓	
▪ AC Voltammetry	✓	
▪ Differential Pulse Voltammetry	✓	
Pulsed techniques:		
▪ Square Wave Voltammetry	✓	
▪ Normal Pulse Voltammetry	✓	
▪ Stripping Chronopotentiometry	✓	
Amperometric techniques		
▪ Chronoamperometry	✓	✓
▪ Zero Resistance Amperomery	✓	✓
▪ Multistep Amperometry	✓	
▪ Fast Amperometry	✓	
▪ Pulsed Amperometric Detection	✓	
▪ Multiple-Pulse Amperometric Detection	✓	
Galvanostatic techniques		
▪ Linear Sweep Potentiometry	✓	
▪ Chronopotentiometry	✓	✓
▪ Multistep Potentiometry	✓	
▪ Open Circuit Potentiometry	✓	✓
▪ Stripping Chronopotentiometry	✓	
Other		
▪ Mixed Mode	✓	
▪ Impedance Spectroscopy (EIS/GEIS)	✓	

Specifications

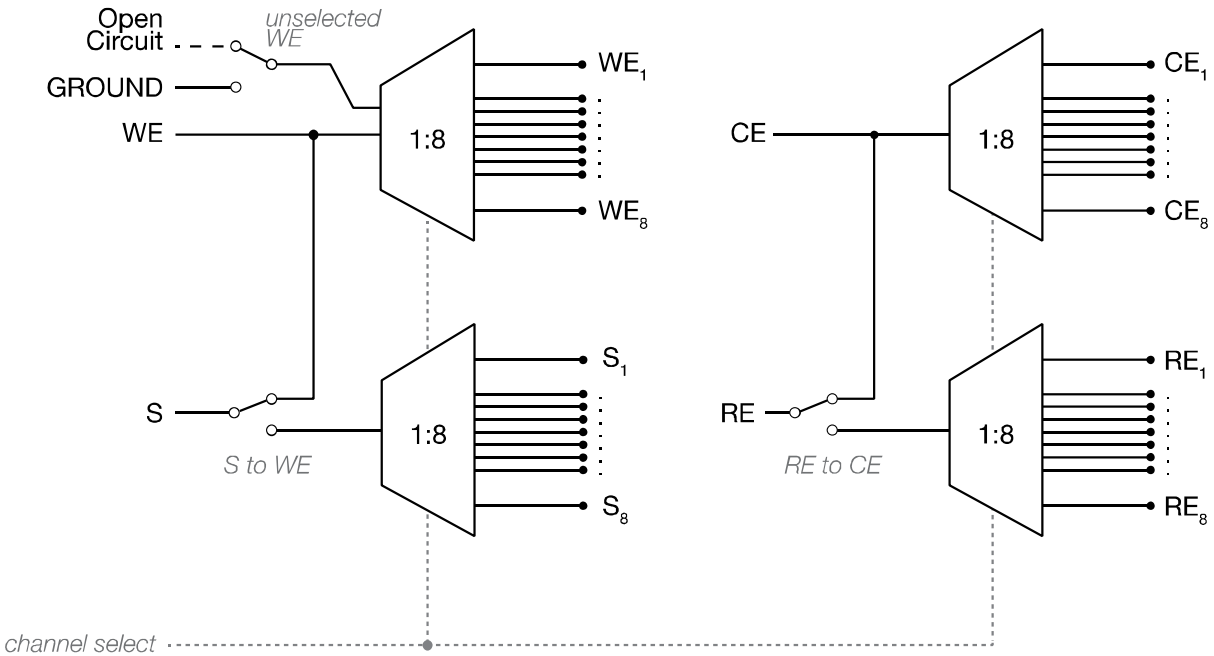
System specifications	
▪ **number of channels**	8 (up to 128 channels when daisy chained)
▪ **multiplexer**	switches 8 x (WE, S, RE and CE)
▪ **on resistance for WE**	1.5 ohm typical
▪ **charge injection for WE**	20 pC typical
▪ **leakage current**	< 20 pA (5 pA typical) at 25 °C
▪ **switching time**	2 ms
▪ **compliance voltage**	±10 V

Limitations for Electrochemical Impedance Spectroscopy (EIS)	
▪ **max. frequency**	- 100 kHz when switching WE/S, RE and CE - 1 MHz when switching WE/S and RE+CE combined (2 electrodes configuration)

Software

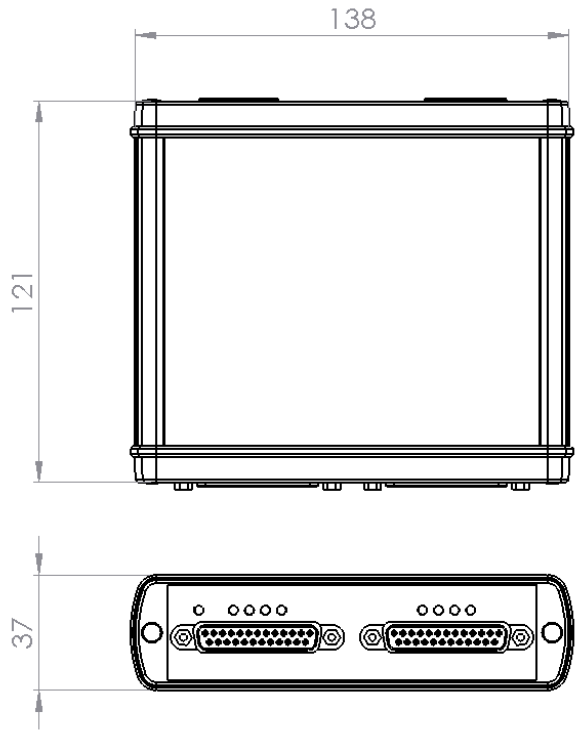
The MUX8-R2 is supported by PSTrace and MultiTrace for Windows and the PStouch app for Android.

Functional Diagram



Dimensions

Dimensions in mm:



EmStat MUX8-R2™

Multiplexer with integrated potentiostat: EmStat3MUX8

The MUX8-R2 multiplexer is also available with integrated EmStat3 potentiostat. This very compact combination allows for a high productivity with a small footprint.

For more information:
www.palmsens.com/product/mux8/

Please don't hesitate to contact PalmSens for more details:
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