MUX8 and MUX16

for PalmSens and EmStat Blue

Contents

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MUX8 and MUX16 multiplexers

The MUX8 and MUX16 are multiplexers for use with a PalmSens or EmStat Blue potentiostat.

MUX8

The MUX8 multiplexer is designed for up to 8 channels with 2- or 3- electrode sensors or cells. The multiplexer can be used with different electrode or sensor configurations:
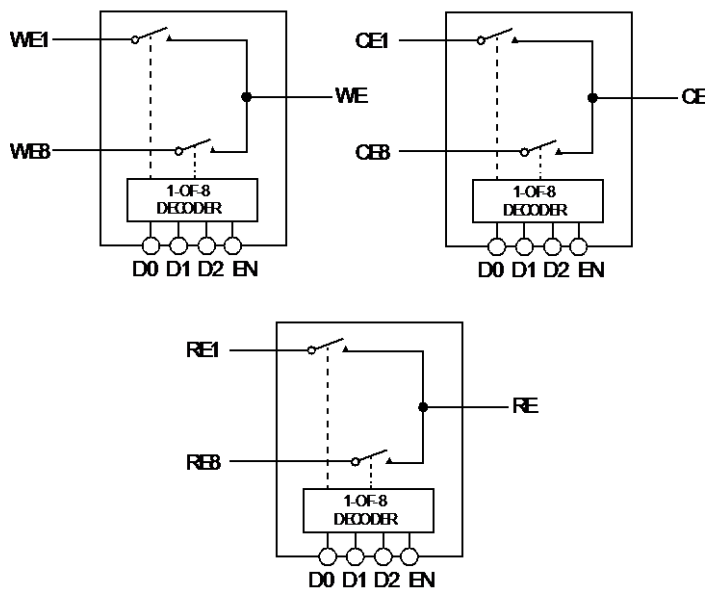
1. Eight separate cells or sensors each with a working, reference and counter electrode
2. Eight separate cells or sensors each with a working and combined reference and counter electrode
3. Cell or sensor array with eight working electrodes sharing one reference and one counter electrode
4. Cell or sensor array with eight working electrodes sharing one combined reference/counter electrode

In all configurations the cells can be multiplexed, leaving the non-selected cells or sensors at open circuit.

Configurations 2, 3 and 4 also have the possibility to apply the specified potential to all cells or sensors continuously.

The hardware configuration of the MUX can be changed by using the small switches found at the bottom of the MUX.

MUX8 functional diagram

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MUX16

The MUX16 multiplexer is designed for up to 16 channels with 2 electrode sensors or cells. It can have a shared counter and reference electrode, or each working electrode with its own combined reference/counter electrode.

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

1   Sixteen separate cells or sensors each with a working and combined reference and counter electrode
2   Cell or sensor array with sixteen working electrodes sharing one reference and one counter electrode
3   Cell or sensor array with sixteen working electrodes all sharing one combined reference/counter electrode

In all configurations the electrodes can be multiplexed, leaving the non-selected electrodes at open circuit or having the potential applied to all working electrodes continuously.

The hardware configuration of the MUX can be changed by using the small switches found at the bottom of the MUX.

MUX16 functional diagram
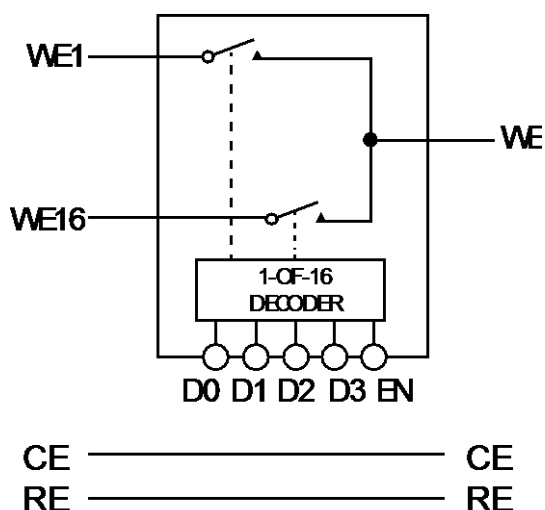
Apply potential on all channels simultaneously

It is not possible to apply a potential simultaneously to more than one sensor or cell each with three electrodes unless a two electrode system is used. For applying a potential on multiple three electrode systems a multi-channel potentiostat is required. This is a multi-channel instrument with one potentiostat for each channel.

Another option is to use the auxiliary output of PalmSens or EmStat as standby potential for channels that are not selected. This allows applying a potential on all unselected channels within the auxiliary output range of the potentiostat. This range is 0-4 V for EmStat and PalmSens2 and 0-3 V for PalmSens3.

Software

The multiplexers can be used with PSTrace software for Windows or via PStouch for Android.

software for Windows   and Android

PSTrace for Windows provides support for all techniques and device functionalities.
PSTouch for Android supports all techniques.

Minimum PC requirements for PSTrace: - Windows XP, Vista, 7, 8, or 10 (32-bit or 64-bit)
- 1 gigahertz (GHz) or faster 32-bit (x86) or 64-bit
  (x64) processor
- 1 gigabyte (GB) RAM (32-bit) or 2 GB RAM (64-bit).

See for more information: www.palmsens.com/software

See next page for system specifications.

Supported electrochemical techniques

All techniques supported by the potentiostat can be used with the multiplexer in a way where all channels are measured sequentially. The techniques Amperometric Detection / Chronoamperometry and Open Circuit Potentiometry can also be measured alternatingly. In this mode all selected channels are measured during each interval. This results in a pseudo-parallel measurement. The switching time is 32 ms allowing a minimum interval time of 0.25 seconds for 8 channels and 0.50 seconds for 16 channels in alternating mode.

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System specifications

MUX8 multiplexer

- number of channels — 2 - 8
- multiplexer — switches 8 x (WE, CE and RE)
- on resistance — 2 ohm typical
- charge injection — 1 pC typical
- leakage current — 10 pA typical at 25 ºC
- cable — shielded flat cable for 8 x WE, 8 x CE and 8 x RE
  or optionally the MUX8 Terminal Block with screw terminals.
  8 x WE
  8 x RE
  8 x CE
  1 x CE-Direct, used when all WE's share one counter electrode
  1 x RE-Direct, used when all WE's share one reference electrode

MUX16 multiplexer

- number of channels — 2 - 16
- multiplexer — 16 x WE only, CE and RE are not switched
- on resistance — 2 ohm typical
- charge injection — 1 pC typical
- leakage current — 10 pA typical at 25 ºC
- cable — shielded flat cable for 16 x WE, 1 x CE and 1 x RE
  or optionally the MUX16 Terminal Block with screw terminals
  - 16 x WE
  - 1 x CE-Direct
  - 1 x RE-Direct

General

- housing — aluminum: 89 mm x 35 mm x 85 mm
- weight — 300 g
- power — 5 V from PalmSens
- communication — DSub-15 cable to PalmSens and standard PalmSens electrode cable

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MUX accessories

Connection Terminal

The optional Connection Terminal is an easy to handle PCB to manage your own cable connections. The connection PCB comes in a grounded metal housing.

Connection Terminal pre-equipped

Each of the pre-equipped shielded sensor cables has four banana plugs (working, counter, reference electrode and ground) and the connection PCB comes in a grounded metal housing.

The Connection Terminal is joined to the MUX8 or MUX16 directly via their DSub connectors.

High density cable

This high density sensor cable, with stripped end leads, for older moldels (pre 2013) of the CH8 multiplexer, is suitable to connect up to eight working, counter and reference electrodes. The newer multiplexer models (MUX) are used with a DSub-37 connector.

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