

# OPERATION MANUAL

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## REDOX Measurement Unit



## LAMBDA REDOX measurement unit

LAMBDA REDOX allows the measurement of the Red-Ox potential (ORP) and the digital transfer of the data to the PC through its RS-485 interface. The measured data can be visualized and recorded for example by the industrial fermentation software SIAM.

The measurement of Red-Ox potential (ORP) can be made with the laboratory fermenter-bioreactor LAMBDA MINIFOR, using a sterilizable combined pH/temperature probe with an additional Pt electrode fixed on its glass body. This probe is connected to the MINIFOR fermenter-bioreactor in the same way as the standard pH probe.

It does not require any additional connector, cable or side neck. However, the MINIFOR fermenter-bioreactor must have been equipped with the Redox option in advance. The output RedOx signal is then provided on the "PUMP" ("Redox") socket at the rear side of the MINIFOR base unit.

## LAMBDA Laboratory Instruments

is developer and producer of special laboratory instruments mainly for biotechnology, microbiology, food and agricultural, chemical and pharmaceutical research and development as well as for general laboratory and research applications.

**LAMBDA MINIFOR** – highly innovative and compact fermenter/bioreactor system for laboratory scale fermentation and cell cultures

**LAMBDA OMNICOLL** – fraction collector-sampler for unlimited number of fractions

**LAMBDA PRECIFLOW, MULTIFLOW, HIFLOW and MAXIFLOW** peristaltic pumps – reliable, precise and extremely compact

**LAMBDA SAFETY POWDER DOSER** – allows automatic feeding of powders without spoon. Safe operation with hazardous material (GLP)

**LAMBDA VIT-FIT** polyvalent syringe pump with extremely robust mechanics – programmable infusion and filling from micro syringes to large volume syringes of 150 ml without adapter

**LAMBDA MASSFLOW** – precise gas flow measurement and control with data acquisition option

**LAMBDA PUMP-FLOW INTEGRATOR** – with LAMBDA pumps and doser allows the visualization and recording of the pumped volume

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# 1 SETTING UP THE REDOX MEASUREMENT UNIT

## 1.1 Power supply

LAMBDA REDOX measurement unit is powered by MINIFOR Fermentor-Bioreactor. REDOX measurement unit is connected with the corresponding 8-pole cable (art. no. 4810) to the "PUMP" ("Redox") - socket at the rear of the MINIFOR laboratory fermenter-bioreactor.

The other end of the 8-pole cable (art. no. 4810) is plugged into the "MINIFOR Redox" - socket at the rear of the REDOX measurement unit.

## 1.2 "Remote RS-485" socket of REDOX unit

"Remote RS-485" socket at the rear of the REDOX measurement unit is used for the connection of additional instruments like peristaltic pumps, Massflow gas flow controllers, MINI-4-GAS gas mix over quadruple plug box, etc. to the MINIFOR fermentor-bioreactor.

In principle 12V, GND and RS-485 pins should be passed over from the Minifor to the connected instruments via "Remote RS-485 socket" at the rear of REDOX measurement unit.

## 1.3 Measurement of Red-Ox (ORP) potential

The measured Red-ox potential (ORP) data are transferred by the 8-pole cable (art. no. 4810), which also functions as a RS connection cable, of the MINIFOR.

When connected with MINIFOR through the cable, numbers on the display of LAMBDA REDOX will light and indicate the value of the redox potential in the working medium.

The working range of the LAMBDA REDOX measurement unit is from -999 to +999 mV. Negative values are indicated by lighting of the yellow "MINUS" LED.

# 2 PC CONTROL

The measured Red-Ox potential (ORP) data can be visualized and recorded for example by the industrial fermentation software SIAM.

SIAM is an industrial fermentation software which is intended for the automation of fermentation and cell culture processes at laboratories. The COM port and the device address are freely configurable.

## 2.1 Setting up the address of REDOX

To look up/modify the instrument address:

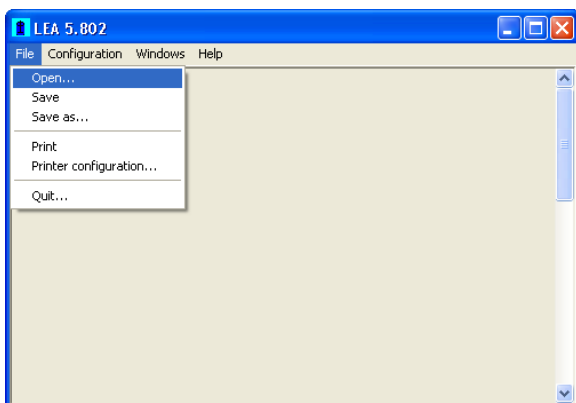
- ✓ Disconnect the 8-pole cable from REDOX unit.
- ✓ Press the **ADRS** button continuously and at the same time connect the 8-pole cable to REDOX unit again.
- ✓ The message "**A**" and two numbers will appear on the display. This number from 00 to 99 is the current address of the REDOX measurement unit.
- ✓ To change the address press the buttons **▲ ▲ ▲** under the display until the desired number is obtained.
- ✓ To confirm and save the address, press the **OK** button.

## 2.2 Configuration of SIAM software for REDOX

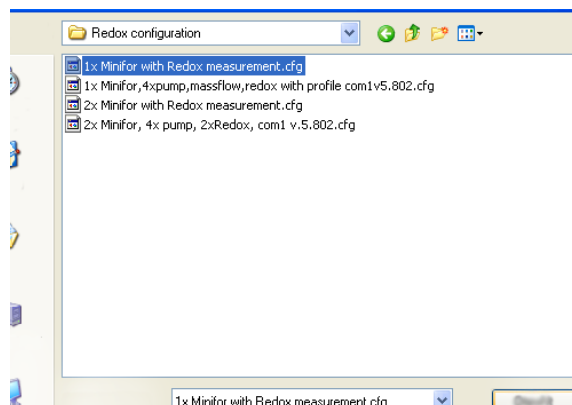
SIAM industrial fermentation software will be provided with the pre-configured program according to the requirement of the customer.

A short video tutorial to set-up the COM port on the PC could be found at <https://www.youtube.com/watch?v=fCQX7vRp9aY>

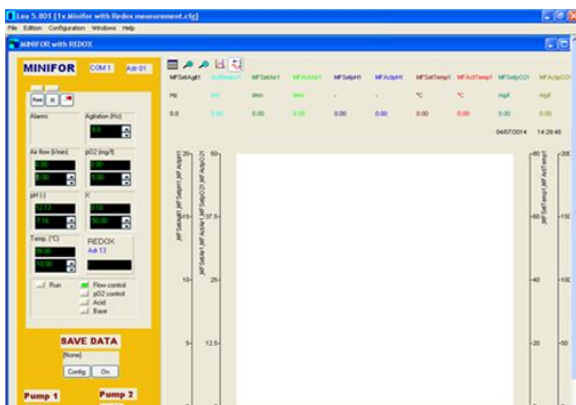
After installing the software to the PC or notebook, run the software SIAM/LEA 5.802.



**Figure 2.2-1** To open the pre-configured program file, select *OPEN* command under the menu *FILE*.



**Figure 2.2-2** A new window will pop-up to choose the desired configuration file. Under the folder *CONFIG* select the desired *.CFG* file

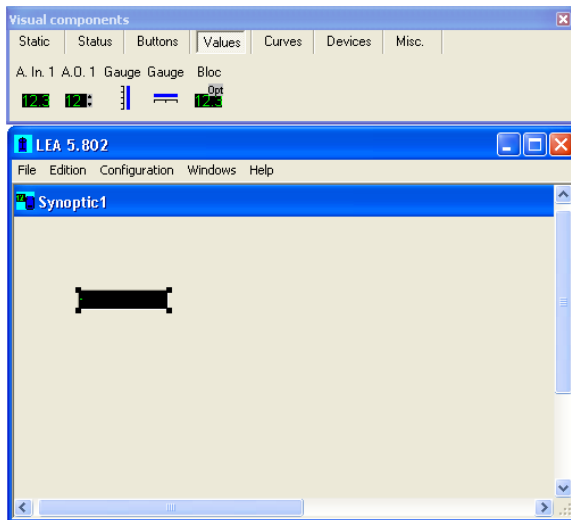


**Figure 2.2-3** The selected program will open.

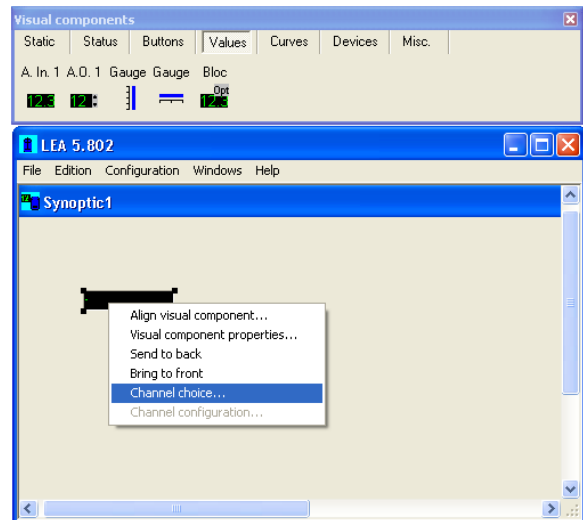
Creating a new configuration file for MINIFOR with REDOX could also be done. More information about creating a program configuration file based on the requirements in SIAM industrial fermentation software could be found at [http://lambda-instruments.com/pdf/SIAM\\_Industrial-Fermentation-Software-User-Manual.pdf](http://lambda-instruments.com/pdf/SIAM_Industrial-Fermentation-Software-User-Manual.pdf)

Enter the configuration mode in the program and generate a new window.

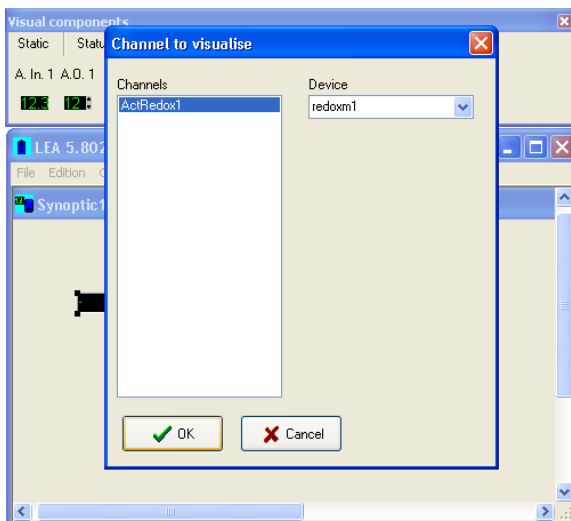
Select *Visual Components* in the *Configuration* menu to display the visual components toolbar from which components can be selected to place in the synoptic window. This allows an application to be built step by step.



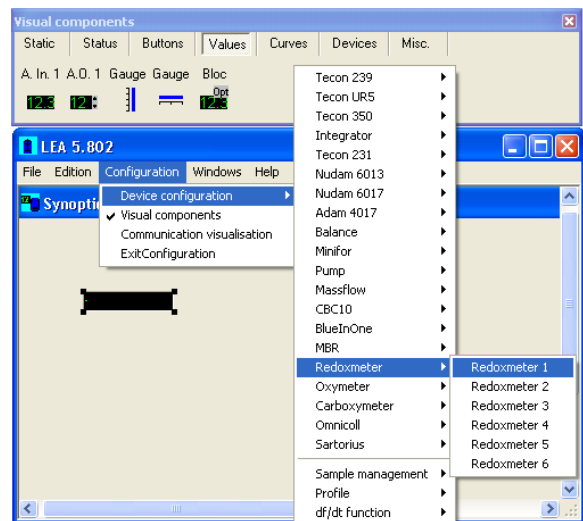
**Figure 2.2-4** Select the Analog Input icon (*A. In. 1*) under the *Values* in visual components tool bar and click the cursor on the synoptic window.



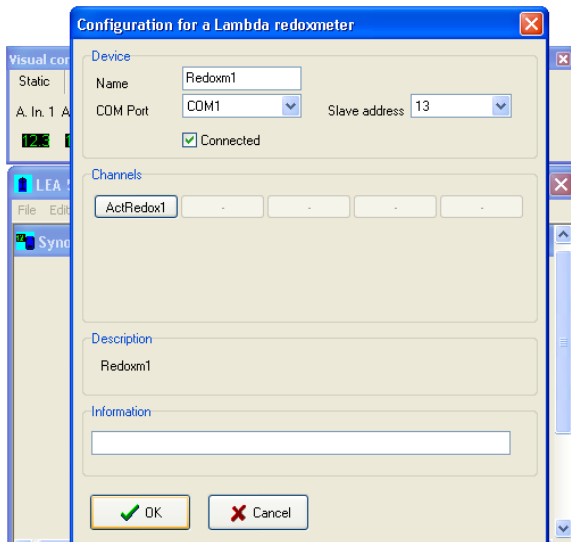
**Figure 2.2-5** To connect the Analog Input icon to Redox, click on the display and right click. Choose *Channel choice* from the list.



**Figure 2.2-6** CHANNEL TO VISUALISE window will pop-up. Under the DEVICE, type or browse for *redoxm1* (Redox Minifor 1) and select the channel *ActRedox1* (Actual value on the Redox measurement unit).



**Figure 2.2-7** Click on *CONFIGURATION* main menu and select *DEVICE CONFIGURATION*. A list of instruments that can be controlled by SIAM will be displayed. Select *REDOXMETER 1* under the sub-menu *REDOXMETER*.



**Figure 2.2-8** Set the COM port number and the address of the REDOX measurement unit. Don't forget to select *CONNECTED* option.

## 3 TECHNICAL SPECIFICATIONS

### 3.1 General specification

<i>Type:</i>	LAMBDA REDOX – Red-Ox potential (ORP) measuring unit for MINIFOR Fermentor-Bioreactor
<i>Working range:</i>	-999 to 999 mV in 1 mV steps
<i>Interface:</i>	RS-485
<i>Power supply:</i>	Powered by MINIFOR Fermentor-Bioreactor
<i>Dimensions:</i>	10.5 (H) x 8 (W) x 17 (D) cm
<i>Weight:</i>	0.7 kg
<i>Safety:</i>	CE, meets IEC 1010/1 norm for laboratory instruments
<i>Operation temperature:</i>	0-40 °C
<i>Operation humidity:</i>	0-90% RH, not condensing

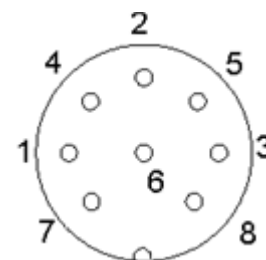


For safety reasons the voltage of the external signal must **not exceed** 48 V to earth!

### 3.2 Remote control (Inputs/outputs)

No.	Colour	Description
1	yellow	(+) input remote speed control 0-10V *)
2	grey	step signal from stepping motor (0 and 12V)
3	green	earth, 0 V
4	brown	+ 12 V
5	white	(+) input remote ON/OFF; 0V = ON, 3–12 V = OFF (this logic can be inversed on demand)
6	pink	earth, ground (GND)
7	red	RS 485 B (-)
8	blue	RS 485 A (+)

\*) (zero line connected to the contact no. 3)



**Figure 3.2-1** 8 pole connector

## 4 ACCESSORIES

Art. No.	Accessories
	<b>Probes</b>
800060	Combined redox, pH and temp. probe 12 cm with Variopin connector (Mettler Toledo)
800060-22	Combined redox, pH and temp. probe 22 cm with Variopin connector (Mettler Toledo)
800060-32	Combined redox, pH and temp. probe 32 cm with Variopin connector (Mettler Toledo)
800060-42	Combined redox, pH and temp. probe 42 cm with Variopin connector (Mettler Toledo)
	<b>Control</b>
4810	Pump remote control (analog and digital) cable, 8 poles connector
800202	Quadruple plug box (Power and RS-connection for up to 4 LAMBDA laboratory instruments)

## 5 GUARANTEE

LAMBDA provides a two-year guarantee on material and manufacturing defects, if the instrument was used according to the operation manual.

Conditions of guarantee:

- The instrument must be returned with a complete description of the defect or problem. In order to send back the equipment for repair, you will need a returns authorization number from LAMBDA.
- The customer will send the instrument to our service office.
- Damage or loss of items during transport will not be compensated for by LAMBDA.
- Failure to fulfil these requirements will disqualify the customer from compensation.

Serial Number: \_\_\_\_\_

Guarantee from: \_\_\_\_\_



## 6 APPENDIX

### 6.1 RS communication protocol for LAMBDA REDOX Potential measurement unit

#### 6.1.1 Communication settings:

Speed:	2400 Baud
Data format:	8 bit, odd parity, 1 stop bit
Transmit-Receive switching:	DTR (usually automatic switching)
Transmit-Receive interval:	10 ms

#### 6.1.2 Data format for transmission from the computer (master):

# ss mm **G** qs c      send data  
# ss mm **M** qs c      send data

where:

ss            is the address of the slave receiver  
mm            is the address of the transmitter (master)  
**M** or **G**        command to send data  
qs            control sum  
c              carriage return CR (ASCII 0D)

#### 6.1.3 Data format for transmission to the computer (master):

< mm ss a ddd qs c

where:

a            **r** – for positive value  
              **l** – for negative value  
ddd         data (3 ASCII number 0.....9 - transmission from high to low)  
qs           control sum in hexadecimal format (2 ASCII symbols 0.....9 A B C D E F)

### 6.2 How to set the REDOX measurement unit address?

To look up/modify the instrument address, disconnect the 8-pole cable from the REDOX measurement unit.

Press the **ADRS** button continuously and at the same time connect the 8-pole cable to REDOX measurement unit again. The message “**A**” and two numbers will appear on the display. This number from 00 to 99 is the current address of the powder dosing instrument.

To change the address press the buttons **▲ ▲ ▲** under the display until the desired number is obtained.

To confirm and save the address, press the **OK** button.

### 6.3 RS-connection scheme

The 8-pole DIN connector “REMOTE” is used for the remote control and RS-485 connection.

No.	Colour	Description
1	yellow	(+) input remote speed control 0-10V *)
2	grey	step signal from stepping motor (0 and 12V)
3	green	earth, 0 V
4	brown	+ 12 V
5	white	(+) input remote ON/OFF; 0V = ON, 3–12 V = OFF (this logic can be inversed on demand)
6	pink	earth, ground (GND)
7	red	RS 485 B (-)
8	blue	RS 485 A (+)

\*) (zero line connected to the contact no. 3)

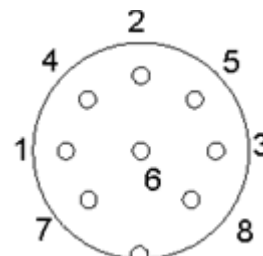


Figure 6.3-1 8 pole connector



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