

## ACTIVATION FURNANCE FOR ELECTROCHEMICAL SENSORS

### Type: ACTIVATION FURNANCE

#### Description

The activation furnace is a device used for curing individual sensors of the AC1 type. At a defined temperature (up to 1000 °C) depending on the electrode and sensor materials. When the sensor is cured, the surface of the electrodes is cleaned from surface oxides and organic impurities, which results in regeneration of the sensor or its activation. In this way, for example, old sensors with immobilized enzyme layers can be cured for reuse - see example at the end of the document.



#### Device description:

The activation furnace is intended for curing SPE sensors. The temperature range is from 10°C to + 1000°C. The device consists of its own thermostat and a switched power supply which is used for safety reasons. On the front panel there is a Thermostat with membrane keyboard and display. In the right part there is a block with a silicon tube into which the sensor is inserted. A K-type thermometer (1300°C) is installed in the central part of the silicon tube. There is a fan in the back, which is used to dissipate heat around the block. In the back part there is a socket for connecting a 12V power supply and a rocker switch.

Description of the display and control using buttons.

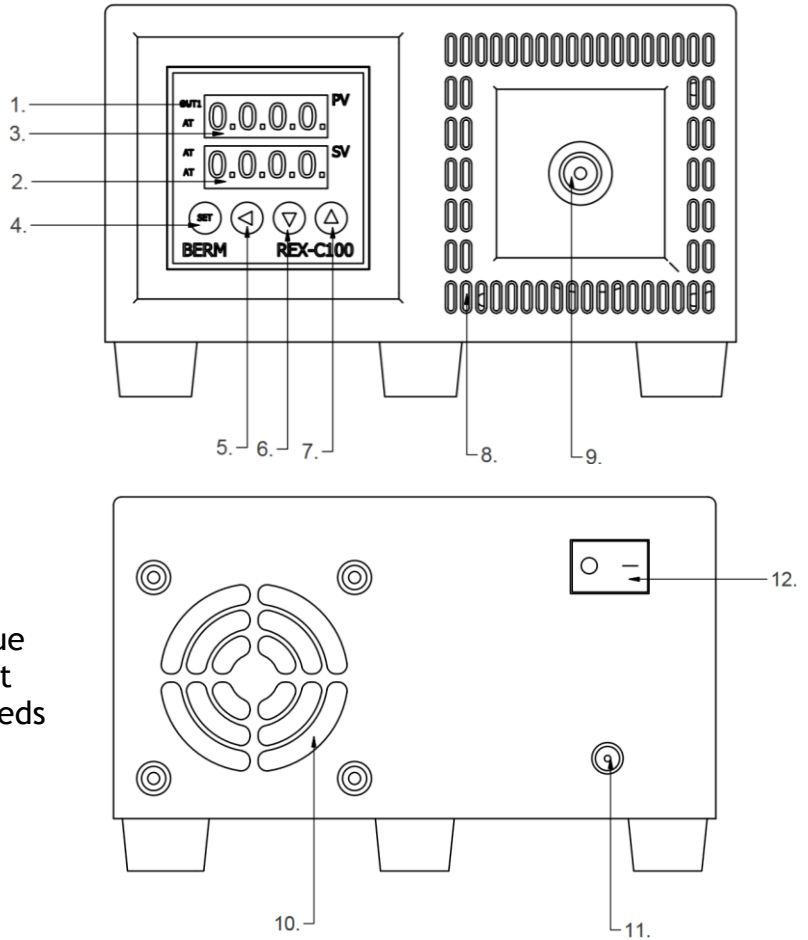
The current temperature of the tempered space is displayed in red on the first line of the display (top). The temperature is displayed in °C.

The second line of the display shows the set temperature in °C in green



**Controls:**

1. Function indicators
  - AT: Used only for factory settings.
  - OUT: Warm-up indicator.
  - ALM1: Excessive temperature (heating off)
  - ALM2: Excessive temperature (increased cooling level is activated)
2. Green display of the set temperature
3. Red display of actual temperature
9. burning space (warming up)
8. Cooling space
7. UP button to increase the value
6. DOWN button to decrease the value
5. press the SET key to shift the digit which lights brightly up to the hundreds digit.
4. SET button to confirm settings
10. Fan hole
11. Connecting the power cable
12. On and off switch



Place the device on a flat, heat-resistant surface. Keep at least 30 cm of free space around the device in all directions. The surface may be heated by the heat coming from the device. Keep flammable objects away from the heating element and ensure adequate ventilation.

### Connecting and switching on:

Connect the adapter's power cable connector on the back of the device and plug the other end of the adapter into a protectively grounded power outlet. Turn on the device with the on/off switch. On switch position = (I) Off switch position = (0) After switching on, the fan starts and the device test is performed. After about 3 seconds, the last set temperature and the last actual temperature will be displayed and the device will start heating until this temperature is reached.

### Temperature setting:

Simply press the "SET" button to enter the settings. After pressing, the lower line lights up more prominently, in which the desired temperature can be set by moving the arrows. Movement along the row is done with the left arrow. The down arrow decreases the value of the number, the up arrow increases the value of the number. The temperature setting is confirmed by pressing the "SET" button again. The oven starts to raise the temperature immediately after confirmation, reaching the desired temperature takes about 5 minutes, stabilization about 10 minutes. (I don't know if it's good to state this, because the firing is 15 minutes and in the final the sensor is baked for 5 minutes to the exact temperature, then the temperature is reduced for another 5-10 minutes before the sensor can be removed normally).

### Curing procedure:

Before inserting the sensor, it is advisable to preheat the tip to approx. 150°C and, after reaching this temperature, insert the sensor with suitable tweezers into the center of the silicon tube approx. 2cm from the edge of the block. After insertion, the required temperature can be set, e.g. 850°C, and then burn for 15 minutes. After the time has passed, it is necessary to set a lower temperature again to approx. 150°C and only after reaching the temperature is it advisable to pull the sensor out of the pan with tweezers. It is advisable to put the sensors on a non-flammable mat. Do not remove the sensors from the oven at high temperatures of up to approx. 400-900°C and do not place them on a cold metal surface (they could shatter due to thermal shock).

### Important warning:



This device is a high-temperature device, so it is necessary to take extra care when handling the device due to possible burns or ignition of the device due to improper handling!! It is recommended to build the device on a non-flammable base and keep at least 30 cm of free space around the device. Danger of inhaling harmful substances, take extra care and ventilate when firing.

Before turning off the device, the temperature must not be set to a higher temperature than 150°C!! Set the temperature to max. 150°C, ideally room temperature, and switch off the device after reaching the temperature (cooling down).

Due to the characteristics of the system, the setting range is larger than the operating range. If the temperature is set outside the range from +10 °C to +900 °C, an overload may occur of the product.

### **Physical Parameters**

Operating voltage 100-240VAC, 50/60 Hz, 2.0A Max.

Temperature range: 50 to 900°C

Accuracy: ± 0.5 °C at 100 °C

Stability: ± 0.1 °C at 100 °C

Emission level of the measuring surface: 0.9

Diameter of emission surface: 57 mm

Operating temperature: 5 °C to 25 °C

Dimensions (L x W x H) 150 x 150 x 85 mm

Weight approx. 640gms (without cable)

### **Technical Parameters**

- Adjustable temperature up to 900 °C
- Input 100-240 VAC, 50/60 Hz, 2.0 A
- Output 12V~11.5 A, 138 W MAX

The package includes a power supply.



### **Device Usage**

- Regeneration of AC1. electrochemical sensors by curing

### **Ordering Information**

- The order is specified by whole product code
- Minimum order quantity - 1 Activation furnace  
Delivery time for standard Activation furnace is 6 weeks from receipt of order

### Example of device usage

Cyclic voltammetry scans of AC1.W2.RS sensor with old layer of immobilised enzyme, measured in 1 M KCl and 0.005 M FeFe solutions. On the voltammograms after curing, the smoothing of the baseline is visible in the KCl environment, and the cathodic and anodic peaks are clearly visible (indicated by the arrows in the graph below) in the FeFe environment - the sensor was successfully regenerated.

