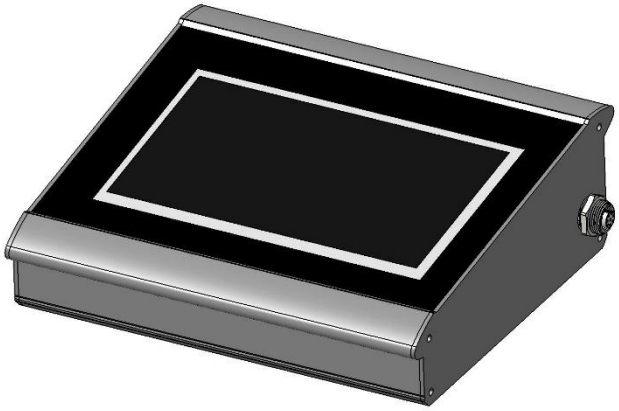
Product Manual
I3 Control Box Membrane Chromatography



Customer	i3 Membrane GmbH
Product name	i3 Membrane Control Box
Item Number Elektrosil	MU-05.0008 (C sample)
Project Number Elektrosil	22-00111
Date of release	2025-01-28
Version of document	04
Customer	i3 Membrane GmbH

Version

Rev.	Date	Author	Description
04	2025-01-28	JBO	Added: application area, altitude, relative humidity, overvoltage category, pollution degree of environment, suitability for damp locations
03	2024-11-20	YL	Adding technical drawing
02	2024-10-28	YL	Updating screen shots for graphical user interface
01	2024-10-17	YL	Document creation

Content

1. Product safety

1. Elektrosil assumes no warranty for this product if it is used under conditions other than those specified in the specification.
2. Please handle the device with care. It can be damaged by hard impacts.
3. Connection of electricity beyond the defined interfaces, dust, water, dampness, or other erosion elements can lead to safety issues or product failure.
4. Please ensure that the hardware is stored according to the specified storage temperature.
5. Please ensure that the hardware is used according to the specified operation temperature.
6. Do not turn on the device directly if it was stored in a temperature condition beyond the range for operation.
7. Please ensure that the hardware is only operated indoors in the laboratory environment (Pollution Degree 2).
8. For power supply, only use the power supply defined by Elektrosil, such as EA1019HVRS(T09)
9. For operating the device, only use the connection cables delievered by Elektrosil
10. To remove the power supply: Do not pull on the cable, always pull on the plug.
11. Do not open the casing. Opening the casing voids any warranty claimed regarding the i3 control box.
12. Do not clean the device with a corrosive cleaning agent.

2. Functional description

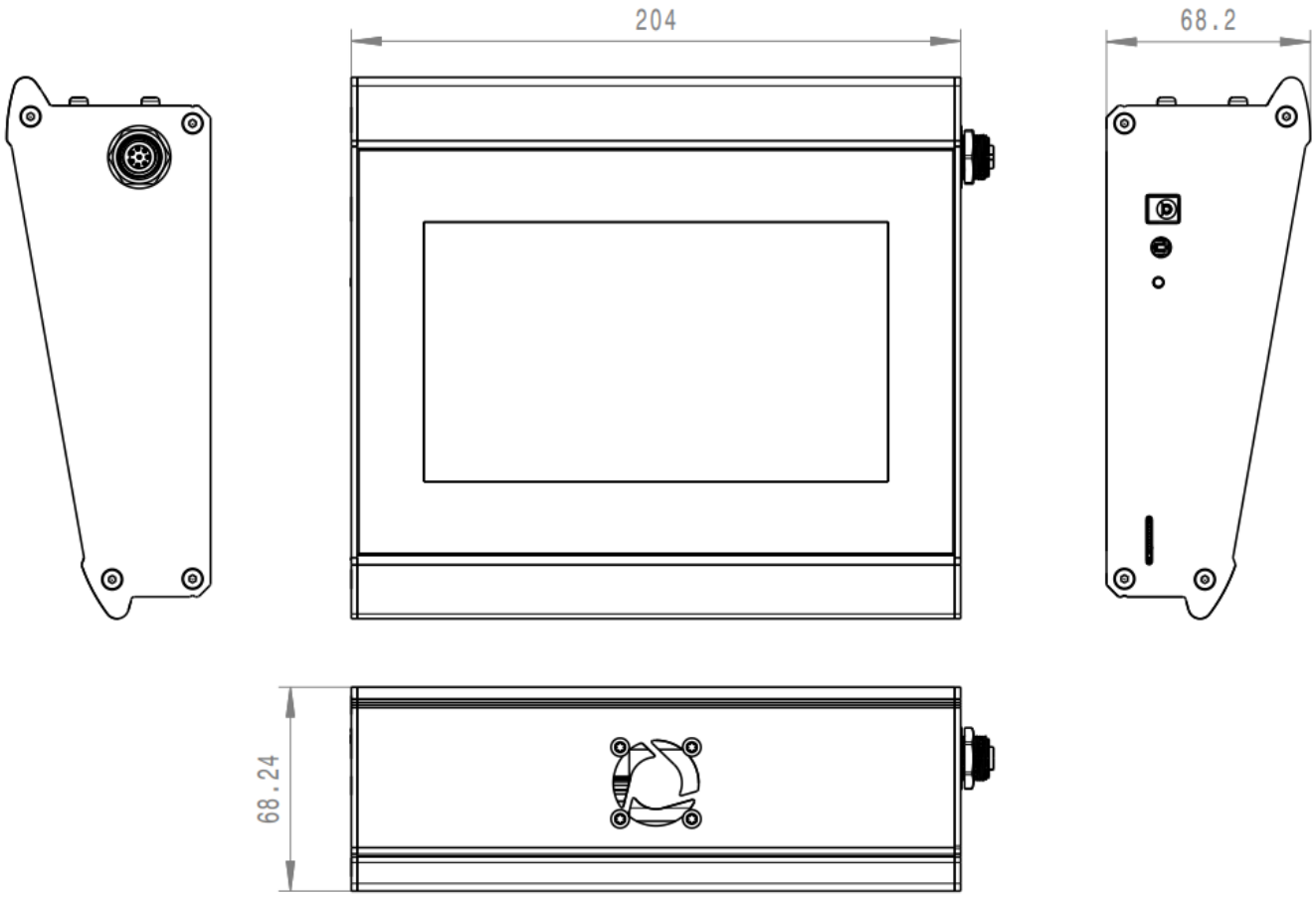
The i3 Membrane Control Box is used to control the applied voltages (max. +/- 5V) to the membrane electrodes. Voltage profiles are set via a 7-inch touch display. The voltage sequence, voltage/current measurements, and time are graphically displayed in real-time.
For operations of the control box, a micro SD card is required, where the measurement data is stored.
The electrical supply of the i3 Membrane Control Box is provided by a separate power supply unit (EA1019HVRS(T09)).
The control box is equipped with a button that allows controlled shutdown and startup of the device.
The power supply must only be disconnected from power when the device is shut down.

3. Electrical Properties

Nr.	Designation	Specification MU-05.0007
3 – 1	Rated voltage	DC 12V
3 – 2	Operating voltage	DC 12V to 12.4V
3 – 3	Operating current max.	2 A
3 – 4	Total input power i3 Control Box max.	24 W
3 – 5	Permissible ambient temperature during operation	0°C to 40°C
3 – 6	Permissible storage temperature	-10°C to 50°C
3 – 7	Permissible relative humidity	15% to 90%
3 – 8	Overvoltage category	1
3 – 9	Operating altitude	-30,5m to 2000m
3 – 10	Storage and shipping altitude	-30,5m to 10.000m

4. Mechanical Properties

Nr.	Designation	Specification MU-05.0008
4 – 1	Dimensions	Control Box Height: 68 mm Length: 204 mm Width: 180 mm
4 – 2	Weight	Control Box 1140g Power supply in the box 150g Cable 140g Sum: 1430g
4 – 3	Colour of casing	silver
4 – 4	Material of casing	Extruded profile: Al Mg Si 0.5 anodized; Lids: Al Mg Si 0.5 anodized
4 – 5	Power Socket i3 Control Box	Socket 2/5,5mm



5. Features

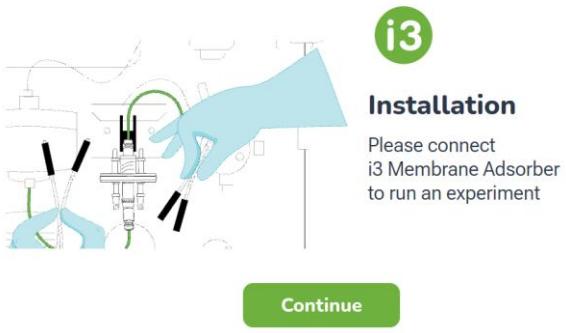
Button

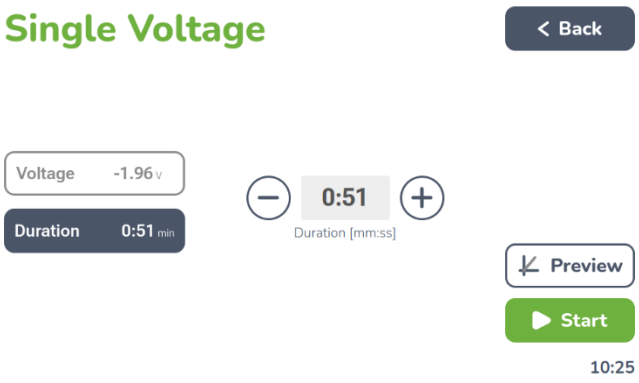
The control box will automatically start up once connected to the power. Pressing the button (for at least approx. 1s) will initiate a controlled shutdown of the device.

LED-Indicator

Once the control box starts up, the LED indicates green. After the controlled shutdown, the LED switches to red.

Graphical User Interface (GUI)

	The graphical user interface (Version 3.2.1) of the control box starts automatically after the device starting up. The start up display indicates to connect the cable with i3 Membrane Adsorber. After connecting the adsorber. Tipp "Continue" to proceed.
	After a successful resistance check, the process can be continued.
	Following options are available in the overview menu: • „Run Check": Verify the electrical resistance of the membrane • „Settings": Change date and time in the user interface. (After rebooting the GUI-time will be reset to system time) • „Single Voltage": Enable a single DC voltage at the output. • „Presets": Configure the pre-defined voltage profiles. • „Custom Sequence": Specified voltage sequence by user up to 99 data points. • „Journal": Storage of the last 200 enabled voltage sequences.
	In order to enable a single DC voltage the voltage level and duration are required.



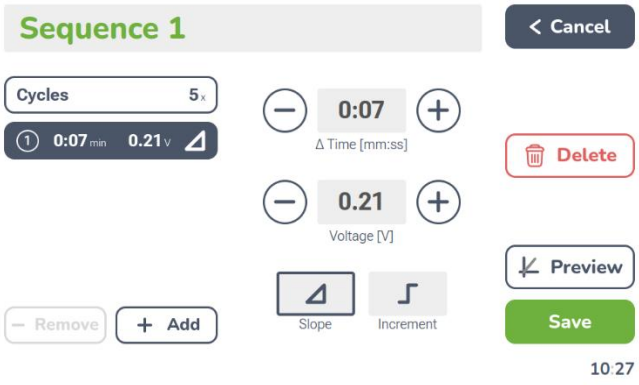
The menu „Presets" contains four different voltage profiles:

- The square waveform
- The triangle waveform
- The sawtooth waveform
- The descending triangle waveform

Following parameters must be set for each of the four waveforms:

- „Voltage": voltage level
- „Duration": Duration of the enabled voltage output. (On Time)
- „Delay": Duration of the disabled voltage output. (Off Time)
- „Start Delay": Delayed time, untill the first voltage output in the first cycle is enabled.

Cycles: Number of the repeatation



In „Custom Sequence" a specific voltage profile with maximal 99 data points can be configured.
Each data point contains the parameters such as voltage level, a delta-time and the type of the transistion corresponding to the previous data point.

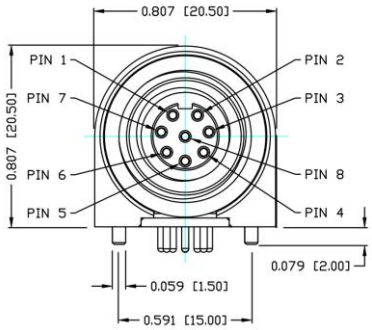
The submenu „Journal" provides an overview of the enabled voltage sequences. With this the stored sequence can be reactived again.

Micro SD-Card

With the current status of the samples, a micro-SD card is provided for storing the measurement data and is already inserted at delivery. The SD card must always be inserted before powering on or starting up the control box and must not be removed throughout the entire active controlling process.

Connector

To control voltage on the membrane, the control box has an eight-pole socket. For a secure connection, the nut should be tightened solidly. The following illustration and table contain the defined pin assignment.



Pin out to connector	Pin out on the membrane
1; 7	Female electrode 2
2; 8	Male electrode 1
3; 4	Male electrode 2
5; 6	Female electrode 1