

FACT SHEET

● Modular Olfactometer OL023

The modular olfactometer OL023 is a complex device for generating well-defined, reproducible olfactory or pain stimuli in the nose, without tactile or thermal stimulation. The rise time of the stimulus is fast enough to allow the recording of olfactory evoked potentials (OEP).

The integration of intelligent electronics greatly simplifies the use of the modules.

The PC control software (MolfControl) is an essential part of the device. It was developed to make operation intuitive and minimise the risk of operating errors.

A simple USB port serves as a connection between a PC and the olfactometer.



OL023 (Variant OM4b) – basic rack – partially equipped.

The modular character allows the customer to start with a simple version (OM2) in order to expand the olfactometer step by step later.

The rack has integrated water heating and a vacuum and pressure pump. All noise-generating units are housed with sound-absorbing material to minimise noise pollution.

The air treatment system allows a longer use of the olfactometer compared to the previous olfactometer type. The air drying and air cleaning cartridge can be replaced quickly and easily. A humidity sensor alarms the user if the drying material is getting saturated.

An additional air purification cartridge is in the exhaust line to prevent possible contamination of the room. This system only works with saturated air and NOT with gases like CO₂ and H₂S. If gases are used a room ventilation is needed.

The controller module communicates with the PC and the olfactometer modules. It is also able to pass on information to existing EEG systems (modifications may be necessary). It is also possible to trigger the olfactometer externally or for the olfactometer to trigger an external device.

The system does not require an external supply, except for the power supply. It can be connected to a normal power outlet (in case of a 220/240V or 110/120V environment).

If an in-house pressure supply is available (see technical data), this can also be used. The internal pressure pump is then not used, which reduces the noise level of the unit significantly.

The modular system

The basic idea of the modular olfactometer is the division of the components into individual modules. This makes it possible to create an individual olfactometer for the customer's needs.

Humidification modules

The humidification modules are easy to change and clean. They serve as containers for the water for control and dilution, as well as for the odours. Each module is individually surrounded by warming water.

There are 4 different inserts available:

- **Cartridge large** (control and dilution, but also for odorants)
- **Cartridge small** (designed for small quantities of liquid odorants)
- **Cartridge textile** (designed for solids and textiles)
- **Cartridge pads** (designed with filter pads with up to 4 layers for droplets of liquids)



Flow modules

The rack can be equipped with the following modules:

- **Flow module (XX lpm)**
 - This flow module contains a mass flow controller (MFC) which has a 10 litres per minute (lpm) flow as standard. Due to a high flexible system this MFC can be replaced by every other flow range on request (e.g. 4 lpm)
 - Independent calibration curves allow the usage of different gases with the same MFC
 - This module can be used for Control, Dilution or Odorant flow
- **ME Module (XXlpm)**
 - This flow module contains a mass flow controller (MFC), which has a flow rate of 12 lpm as standard. If desired, this MFC can be replaced by any other flow range (e.g. 4 lpm). It is responsible for the suction (negative flow) and is part of the basic equipment of the unit
- **Trigger Module**
 - This module contains the stimuli release technology
- **Switch module**
 - The module provides the possibility to bundle odorant channels.
 - Two different operations are possible:
 - Switch module in flow module inlet: Up to 4 gases can be hooked up and independently distributed to the MFC. A mixing of these gases is not possible. The gases can then be selected by software
 - Switch module in flow module outlet: Up to 4 odorant channels can be supplied by one MFC. No mixing possible.
 - If no mixing is considered this option avoids the selection of 3 additional flow modules.

Connection hose

The diameter of the olfactometer head is 65mm. The bending radius of the hose is 70mm. By simply dismantling the hose head, it is possible to feed the hose through a 50 mm diameter hole. This feature is particularly interesting for use in MRI.

The standard connection tube is designed to deliver 6 different odorants to the patient's nostril. For birhinal applications, two connection tubes are used.

Burghart Messtechnik offers customized hose lengths from 3 to 15m meters. During the time the most popular lengths are 3m for EEG examinations and 12m for fMRI application.

To avoid complications during MRI examinations, the head of the connection tube is made of non-ferromagnetic materials.

Minimum equipment of an OL023

4x flow module 10lpm (Control, Dilution, Odorant 1 and Odorant 2), 1x flow module ME 12lpm, 1x trigger module, 1x controller module.

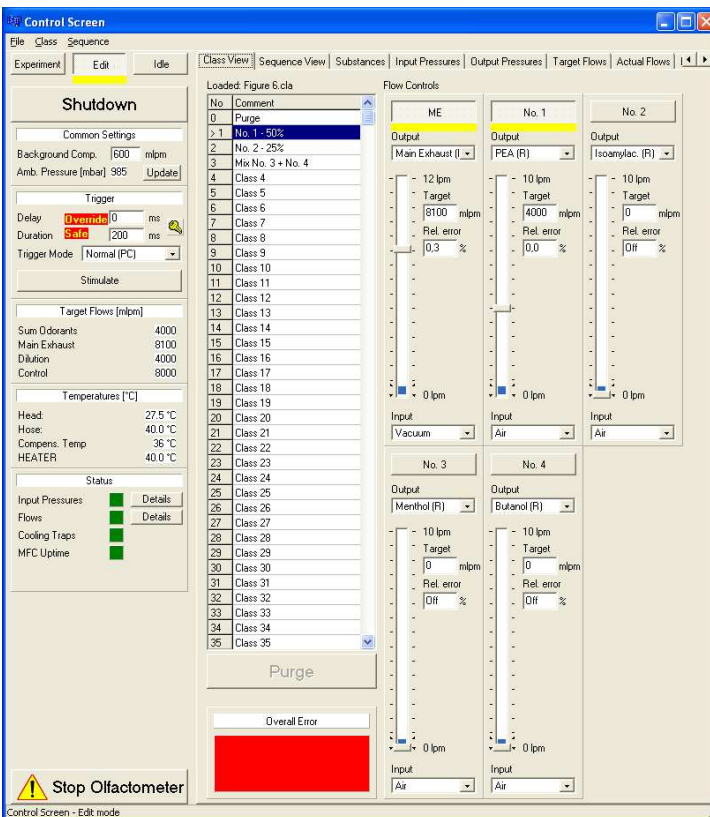
Software



The olfactometer can be operated via its own software (MolfControl). Dialogue-guided standard procedures help to avoid application problems and support the user in the proper use of the programme. This improves usability and ensures intuitive operation.

The software can be installed in German and English.

The class editor



The user interface of the class editor (setting of flows and concentrations) is designed for intuitive operation. Flows can be set and saved comfortably.

This works class by class. I.e. a wide variety of flow settings, with a wide variety of concentrations of the odour or gas, are assigned to individual classes.

It is also possible to mix up to 6 different odorants (does not work with switching module).

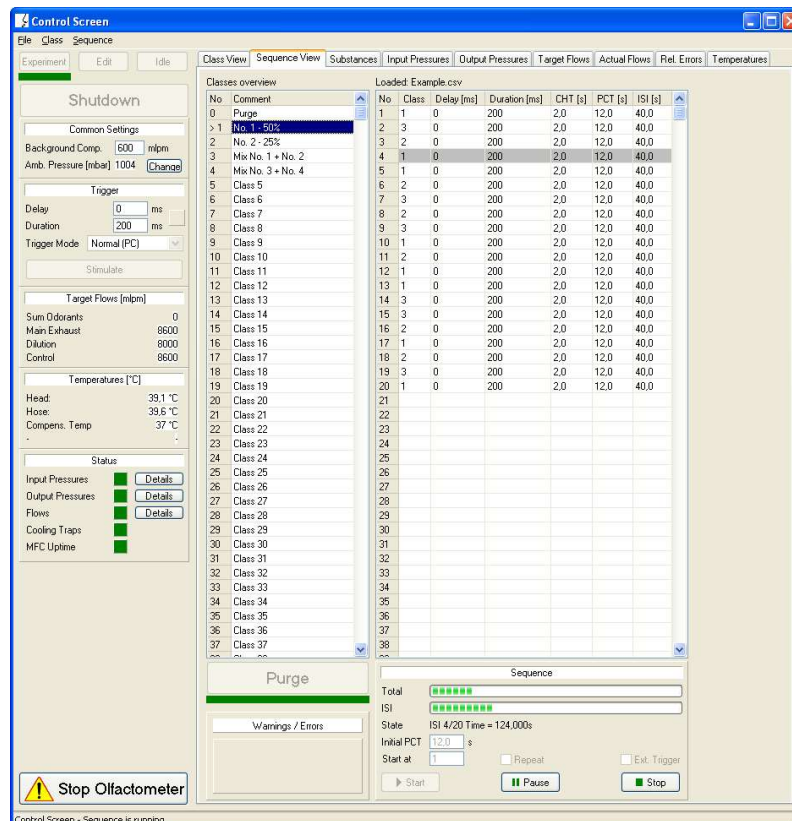
The stored classes are used for the sequence of your experiment. This is done in the sequence view, which allows a variety of combinations and scenarios.

This sequence is a table of classes that are processed one after the other.

The sequence

Once your classes (types of stimuli) are defined, you can set the order in which they are presented to the subject, and the timing for each stimulus in a sequence.

Once a sequence has been created, it can be saved and reloaded at any time. This gives you the possibility to quickly repeat an already created experiment under the same conditions as soon as the OL023 is ready for use.



The Purge-System

To avoid wasting odour during the ISI (inter-stimulus interval), the software has a purge function. During the ISI, the odorant flow is switched off and replaced by a higher flow of the dilution module. The start and offset of this purge time can be set in the sequence table and reduces odorant consumption.

The guided device start-up

A standard start-up procedure has been implemented which prompts the user to perform various tests to ensure that the OL023 is operating correctly and that the test results obtained are usable. These tests include a pressure input test, a leak test and a water heating test.

Device Safety

The olfactometer is equipped with a variety of safety features to prevent damage to the unit and injury to patients. The control screen of the olfactometer shows possible faults and malfunctions. This helps to identify and rectify faults.

Technical Data

General Data

Device name and type	Modular Olfactometer OL023
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Mechanical Data

Overall weight (OM8b without water)	400kg
Overall width	1.4m plus connection hose
Overall depth	0.7m
Overall height (basic rack)	1.7m
Protection class	IP 21

Electrical Data

Mains power connection	Europe: 230 VAC, 50-60Hz USA: NEMA5-30 or NEMAL5-30 (needed to be supplied by customer)
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Peak power consumption	3500VA
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Computer

Minimal hardware requirements	PC or laptop with USB-port, 1 GHz processor, 0,5 GB RAM,
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Operating system	Microsoft Windows 10™ English or German
Screen resolution	Minimal 1280x1024, 32 bit colour depth

Additional Continuous Supply and Waste Requirements

Compressed air supply OM8b (only if external pressure is used)	60 litres / minute clean, breathable air at 3 to 16 bar (43.5 to 232 psi)
Exhaust duct (passive or active) OM8b	for 40 litres per minute odorant waste
Stimulation gases (if desired)	up to 8 litres / minute at 1.6 to 2.0 bar (23 to 29 psi)

Ranges and Precision

Temperature measurement:	1.0 to 49.0 °C +/- 1 °C
Input pressure measurement:	0 to 3000 mbar +/- 20 mbar
Output pressure measurement:	0 to 1000 mbar +/- 5 mbar
Atmospheric pressure measurement:	800 to 1100 mbar +/- 2 mbar
Volume flows (standard range)	0.4 to 10 lpm +/- 2%

Ambient Conditions

Temperature during operation	+10°C to +40°C
Temperature during storage	5°C to +40°C
Rel. humidity during operation	10% to 75%
Rel. humidity during storage	10% to 80%

Operation and storage without frost, dew, dripping water, rain or direct sunlight.