

## INTRODUCTION

The multi-channel Olfactometer provides fast-switching odor stimulation. It is a sophisticated tool for visualizing and quantifying activity in olfactory sensory neurons and the olfactory bulb for investigating olfactory quality coding. Our Olfactometer systems allow perfect control of multiple stimuli and stimulus concentration.

The preparation of high quality odor pulses is a complex process. With the automated Olfactometer and its software this becomes standard laboratory routine. The Olfactometer can be used and integrated easily for the behavioral assessment of odor-detection and for other odor discrimination behavior.

## MODE OF OPERATION

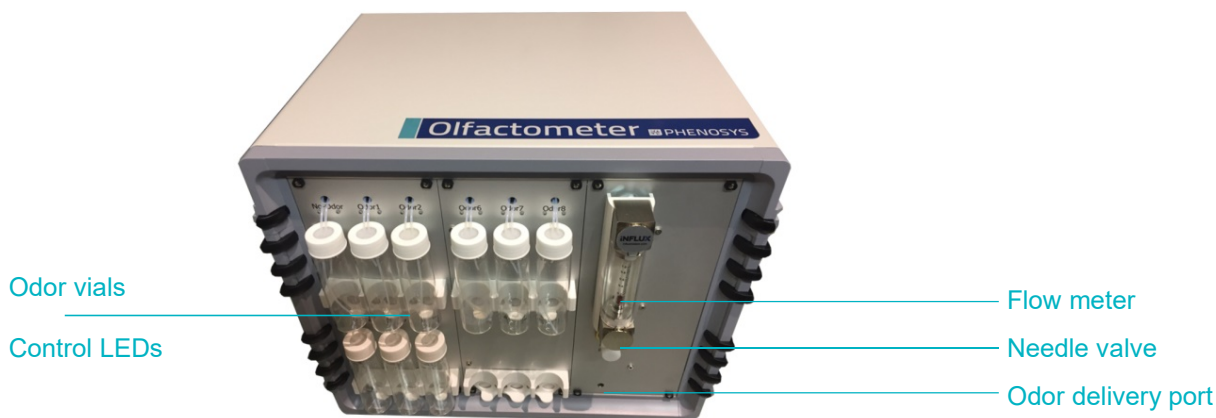
The Olfactometer has one or more parallel odor channels leading to one or two odor delivery ports. Each odor channel is an air dilution odor delivery system.

The air flow through the odorant line is controlled by a mass flow controller (up to 100 sccm/min). For most of the time, this continuous air (or nitrogen) flow is diverted through an empty, neutral vial. During odor delivery, the gas flow is routed through one of the odorant vials.

After exiting the odor vial, the odorant flow merges with the air dilution line. This is controlled by another MFC (up to 1000 sccm/min).

The final port valve rapidly switches the gas stream delivered to the odor output port between a neutral, continuous air flow and the odor carrying flow.

## SETUP



Only Teflon is exposed to the substances downstream of the MFCs. Special valves with low dead volume are used and continuously flushed with neutral gas when not in use with odors. After activation of the odor flow, its concentration equilibrates within 0.5-1 sec.

The final valve creates rapid onset/offset odor pulses delivered as transient stimuli. This dual synchronous 3-way valve rapidly switches between odor and neutral background gas streams towards either odor delivery port or exhaust.

Nearly rectangular sharp odor stimuli can be generated. Thin Teflon tubing throughout the system ensures the fast odor delivery and minimizes overall odor contamination.

An additional flow meter and a manual gas valve allow the matching of the flow rates of the neutral background line with the odor line to eliminate unwanted pressure jumps during stimulus presentation.

## APPLICATIONS

- Olfactory stimulation with pure or mixed odors, or concentration variation
- For electrophysiology or imaging studies of olfactory quality coding
- Investigation of higher cognitive functions using odors
- Translational research: test routines for specific disease models

## KEY ADVANTAGES

- Multiple odor sources
- Fast switching of odor pulses
- High-pressure small diameter tubing system
- Training, two-odor, and multiple-odor discrimination tasks
- Concentration variation through high precision mass flow controllers

## OPTIONS

- Additional odor modules (3 vials each)
- Multiple combinations: 1 or 2 separate odor channels leading to 1 or 2 different stimulus ports
- Can be combined with operant systems, e.g. JetBall, other behavioral testing
- Operant schedules