

### INTRODUCTION

The CaloBox is a new system for indirect calorimetry in mice and other small animals. Its ease-of-use and compact design facilitates standard measurements as well as advanced applications – simply connect the CaloBox to an animal cuvette and press „Start“.

Common applications in research and teaching are: animal metabolism, nutrition, heat regulation, thermo-regulation, bioenergetics, animal behavior, energy balance, resting metabolic rate, energetics of locomotion, and many more.

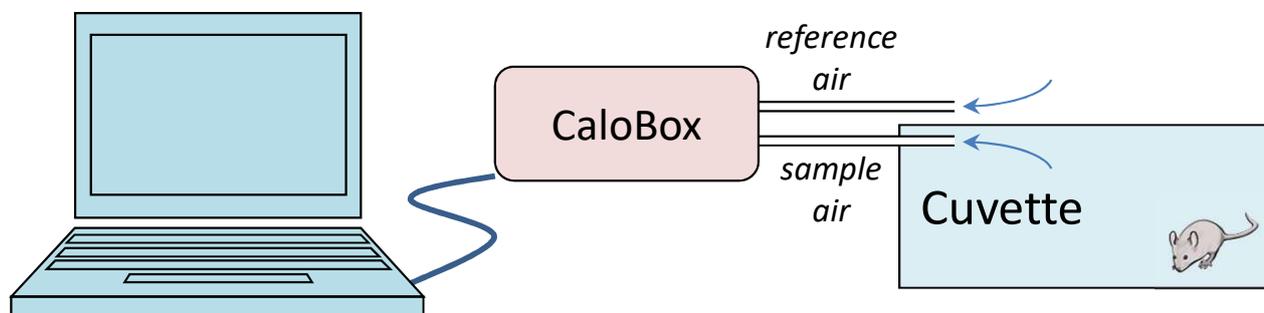
### Key Features

- Automated measurement of metabolic rate, energy expenditure (EE), and respiratory exchange ratio (RER)
- Push button operation
- No tedious drying of the airflow required
- Compact design
- Flexible applications
- Built-in battery option
- All raw sensor data is stored



CaloBox Measurement Unit

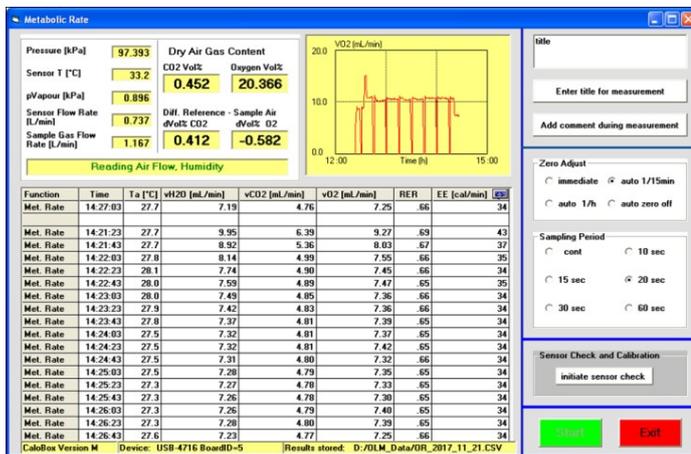
### CaloBox Schematic Setup



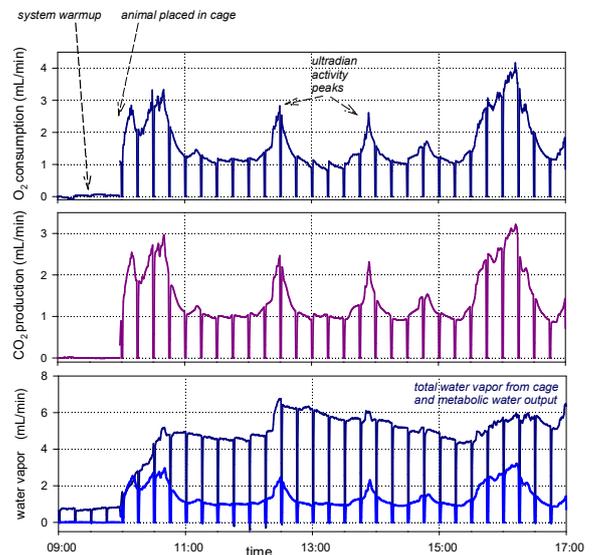
### General Functions:

- Internal pumps for air flow through animal cuvette 30..150 L/h
- Down to 4 sec reliable measurement interval
- No drying of sample or reference air required
- Measurement of O<sub>2</sub> , CO<sub>2</sub>, and water vapor content in sample air; Comparison to reference air
- Calculation of metabolic rates:
  - O<sub>2</sub> consumption per unit time ( $\dot{V}O_2$  )
  - Carbon dioxide production ( $\dot{V}CO_2$  )
  - Water vapor evaporation ( $\dot{V}H_2O$ )
  - Respiratory exchange ratio (RER, RQ)
- Calculates energy expenditure (EE) based on  $\dot{V}O_2$  and RER
- Automatic adjustment of gas sensors with reference air in preset intervals (zero adjustment)
- Continuous record and result display
- Raw data of all sensors stored for user defined calculations

CaloBox – Operational setup with mouse cuvette



CaloBox software interface



Typical data (djungarian hamster)

Technical Specifications:

- Dimensions: 35 x 30 x 16 cm; weight 3.5 kg
- Mass flowmeter for sample air: 0..5 sLpm (0..150 L/h), response time 60 msec, repeatability +/- 0.5%
- Electrochemical O<sub>2</sub>-cell: Range 0..25 Vol%, response time 12 sec, accuracy +/- 2%
- CO<sub>2</sub> measurement: NDIR-cell (non dispersive infrared), range 0..5 000 ppm (0..0.5 Vol%), response time 20 sec, accuracy +/-30 ppm
- HT-Sensor: relative humidity resolution 0.025%, temperature sensor resolution 0.04°C
- Thermocouple: resolution +/- 0.1 °C
- Calculation of metabolic rate using Haldane transformation
- Long-life membrane pumps

PhenoSys Collaboration

The PhenoSys CaloBox is a *PhenoSys Collaboration* product. These products are brought to market together with the scientists who developed them.

CaloBox is a joint product of Prof. Dr. Gerhard Heldmaier and PhenoSys.