

Lab and Field RESPIROMETRY

Summary Sheet

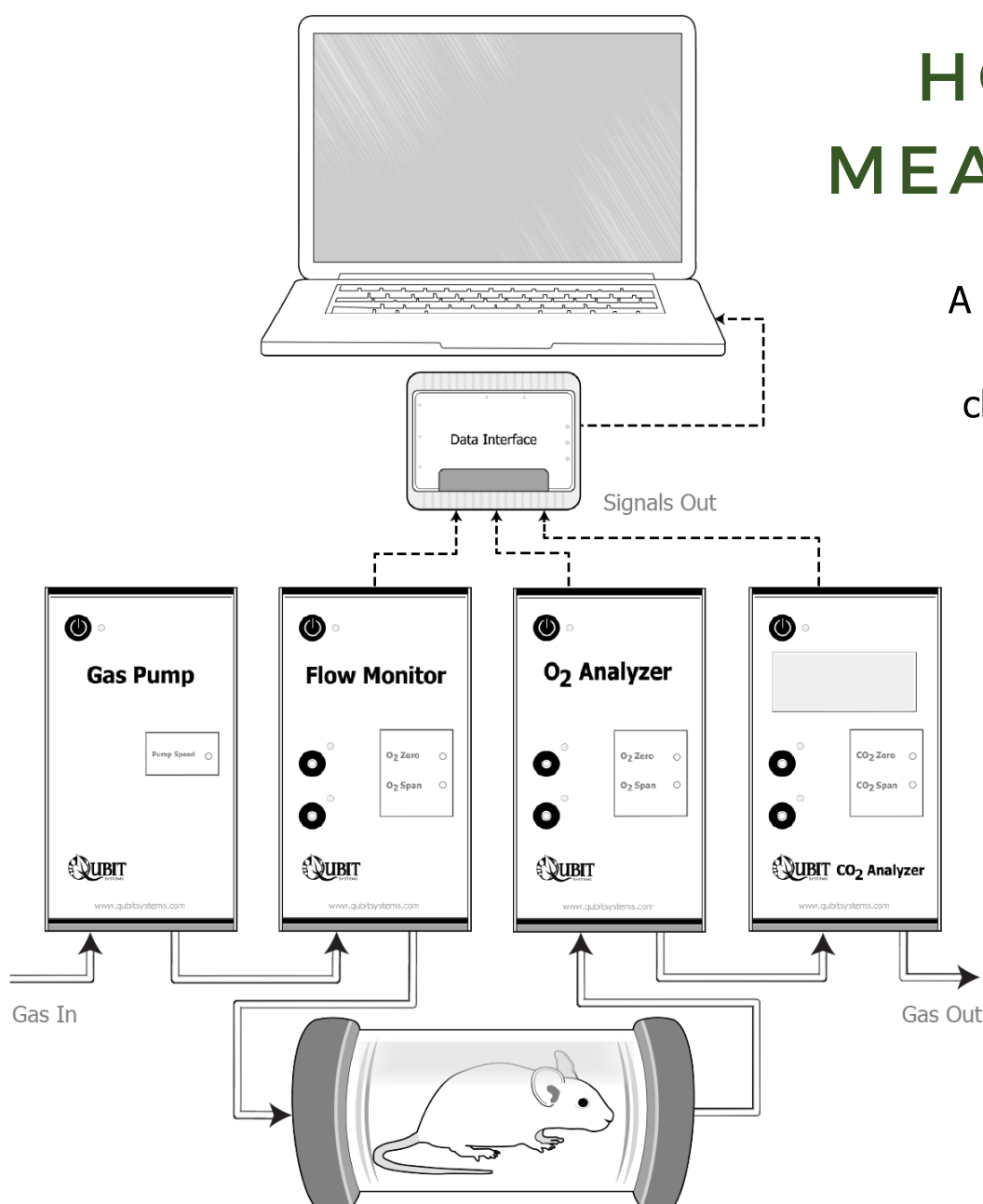
WHAT IS RESPIROMETRY?

Respirometry is the measurement of oxygen uptake rate (VO_2) and/or CO_2 production rate (VCO_2) to monitor energy expenditure and metabolism in living organisms under a variety of conditions, at rest or during activity. Measurements can be made almost anywhere with the right equipment.

The data provide valuable insights into a broad range of physiological and behavioral phenomena.

HOW IS IT MEASURED?

A respirometry system typically includes a chamber in which the sample is accommodated.



OPEN

In open systems, the differences in the concentrations of gases entering and leaving the chamber are measured, as is the flow rate of the air moving through the chamber.

Essentially, Exchange Rate = Flow Rate x Differential.

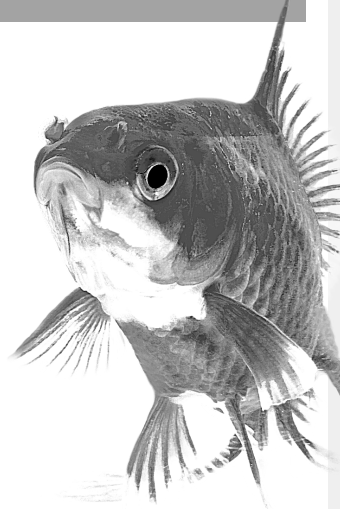
OR

CLOSED

In closed systems, the rate of accumulation of gases is measured in a sealed chamber or with recirculatory gas flow. Gas concentrations are recorded in software and VO_2 , VCO_2 , and associated parameters are computed.

AQUATIC

The same principles apply to aquatic respirometry as to terrestrial respirometry, except that the analyzers usually measure dissolved gas concentrations. Numerous types of dissolved O_2 sensors are available. Dissolved CO_2 may be measured directly or by monitoring pH. Open flow, intermittent flow, closed flow, and stop flow systems may be used for aquatic respirometry.



There are numerous methods for measuring respirometry in humans. Most require that the subject wears a face mask with O_2 being monitored in the inhaled and exhaled breath. Breath flow and volume are also monitored to provide the necessary data for computing VO_2 and VCO_2 . Some human respirometry systems are equivalent to animal systems in which the subject is enclosed in a chamber. Some chambers are room-sized, allowing normal human activities.

HUMAN