Spir-0 Breathing cycle monitor

Spir-0 is an innovative subject breathing activity monitoring tool, extremely compact and simple to use. Its operating principle is based on a fiber optic sensor which makes it compatible with use in MRI, fMRI and EEG environments and applications.

Spir-0 is able to accurately measure the respiratory behavior of a subject by detecting small variations in the air flow during the inhalation and exhalation phases of a subject breathing and thus provide an accurate representation of the entire respiratory cycle.

A further advantage is the very low invasiveness of the sensor: all that is needed is to position the terminal part of the optical fiber (diameter <1mm) in the entrance to one nostril from which the system will be able to perform an automatic calibration step followed by monitoring and recording for the subjects breathing. ***Spir-0*** is supplied with comfortable PTFE nasal adapters compatible with Sniff-0 and hence able to house the optical fiber while carefully guiding odours to the subject's nostrils without inhibiting normal breathing.

The software supplied with ***Spir-0***, in addition to the normal visualization and recording functions, is able to identify the precise moment when the subject begins to inhale or exhale; this feature is extremely useful when attempting to synchronize the presentation of odours with a specific point in the subject's breathing cycle such as upon start of inhalation. ***Spir-0*** can be used independently or in conjunction with ***Sniff-0*** for perfectly synchronized trigger events.

Main features

- Real-time system: precise trigger management, local and USB recording, and a dynamic graphical user interface means you can manage your experiments in real time
- USB interface to communicate to the host PC through an emulated serial port supported by all operating systems
- Compatible with the most diffused application frameworks such as MatLab®, Octave, LabView®, Python
- Custom build electronics module minimises noise and delays to allow a precise breathing cycle measurement as well as synchronization from/to external TTL compatible devices
- Programmable embedded module with ethernet and USB communication, web-based GUI, customizable for your research needs
- MRI & EEG compatible with only a fibre optic cable leading to the subject. Controller can be placed >10m distant
- Simple, elegant, light weight and portable housing safeguards your equipment wherever you may want to use it

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SPECIFICATIONS	
OS support	*Web based interface* *Windows®, MAC®, GNU/Linux using RNDIS USB driver* *Any operating system with a web browser through the Ethernet connection*
Communication	*USB 2.0 / USB 3.0 compatible (no additional software needed if RNDIS is supported by the host)* *Ethernet 10/100 built-in port*
Supported languages	*Session recording, basic programming through web interface* *More complex setup customization can be achieved using the most diffused software packages such as Python, MatLab®, Octave, C, C++, LabView®*
I/O	*Digital I/O for real-time triggering applications* *1 BNC connector Input (0-5V, 10V tolerant)* *1 BNC connector Output (0-5 V)*
Storage	*1 USB hot port to connect a USB memory stick* *1 MicroSD up to SDXC format (up to 2TB)*
Optical fiber	*FC/APC connector, SM800, standard lengths 2-4-8m*
Triggering Speed	*Up to 100Hz; Pulses as short as 5ms*
Compliance	*UL/EN/IEC60601-1-2, 4th Ed., medical safety EC60601-1 3rd and 3.1st Ed.*
Dimensions	*220x165x32mm*
Power	*12V operating voltage via 110-220V 50-60Hz provided universal power supply (CE/FCC compliant)*

FEATURES	
Sensitivity	*0,3 °C*
Sample rate	*5 Hz*
Experiment report	*CSV format, easy import in any spreadsheet, on USB stick or MicroSD*
Visual feedback	*RGB led that displays system and breath status*
Calibration	*Multifunctional button on the front panel to allow calibration and session managing*

RELATED PRODUCTS	
Olfactometer	*Sniff-0*
Video triggering device	*Response Box*
Audio triggering device	*Audio Box plugin*
Virtual/Augmented Reality	*Unity-based compatible library*

OPTIONS / ADD-ONS

- *Alternative tube and nasal adapter lengths and materials*
- *Customizable fiber length*
- *Customized solutions to meet your specific research needs*
- *Audio Box plugin*