STARTLE/PPI SYSTEM

For psychosis, schizophrenia and sensorimotor studies.

ugobasile.com

ugo basile®
YOUR COMPANION IN DISCOVERY SINCE 1963

Pre-Pulse Inhibition of Startle Reflex (PPI)

New Startle/PPI System simplifies complexity and enhances performance. Easy convertible to Fear Conditioning.

View of the experiment results via the dedicated software interface.

Startle PPI 3.0 - What's new?

The Startle/PPI system has been recently upgraded to provide enhanced precision, flexibility, and ease of use.
The main improvements include:

- **Easy Platform Calibration**: The sensitivity and offset of the load cell can now be calibrated directly via firmware/software, without manual intervention. Each system comes with a platform calibrator, allowing users to standardize sensitivity across multiple cubicles, depending on the animal's weight and the type of restrainer used.
- **Sound Calibration Flexibility**: The new systems allow sound levels to be calibrated without user intervention on the electronic board.
- **Simplified Connection Between PPI and Fear Conditioning Modules**: Thanks to the new CBOARD01 board, speakers for different modules are managed independently. No manual unplugging is needed. Switching from PPI to FC now only requires connecting one cable.
- **Optimized Auxiliary TTL Signals**: The AUX1 (linked to stimuli) and AUX2 (for environmental controls) signals are now accessible via an optional TTL I/O Interface, offering a cleaner and more customizable setup tailored to the experimental protocol.

The latest software version includes:

- Calibration of load cell sensitivity directly via firmware/ software
- Fine-tuning of response thresholds.
- Resizable graph in the VIEW page.
- User-defined cubicle numbering (1, 2, 3, or 4), no longer dependent on the operating system.
- Additional updates for an even more intuitive user experience.

Background

- The Startle/PPI system is a valuable tool to investigate complex human disorders, such as schizophrenia, which shows a dysfunction in the sensorimotor mechanism, as other forms of phycosis.
- Sensorimotor gating refers to the ability of a sensory event to suppress or decrease a motor response, in this case, a startle response.
- The pulse alone startle reflex provides an index of the animal reaction to the startle pulse in terms of maximal peak, the pre-pulse alone startle reflex provides an index of the animal reaction to the pre-pulse startle i and the %PPI indicates the inhibition of the startle reflex, due to the pre-pulse (in healthy animals).
- The %PPI is calculated as the decrease of the startle response after the pre-pulse is delivered, divided by the startle amplitude and is calculated for each of the pulse intensities).

Typical device applications

Several clinical studies have shown that a number of human disorders have impaired PPI including: schizophrenia, Huntington's disease, fragile X syndrome, and autism. Utilization of Startle PPI tests in rodents has a translational value to assess the effects of a number of treatment modalities such as putative anti-psychotics, and to explore genetic and neurobiological mechanisms underlying behaviors of relevance to psychosis.

PPI deficits have been shown also in obsessive compulsive disorder, Tourette'ssyndrome and post traumatic stress disorder (Braff et al. 2001).

Detrimental effects on motor and sensory gating have also been shown to be associated to synthetic cannabinoids (Corli et al. 2023), to substances like ketamine (MArti et al. 2021) and the psychoactive effect of LSD impairs the correct brain processing (PPI) (Tirri et al. 2022).

Product Description

The Ugo Basile system is fully automated both for the preparation of the procedure and for the analysis of data. Main features include:

- Automatic detection of Startle Reflex in mice and rats.
- A typical system combines the following elements:
  - Dedicated Software;
  - Up to 4 Isolation Cubicles that include an infrared (I.R.) light, a loudspeaker and a silent fan (under 50 dB), all conveniently positioned inside the sound attenuating box;
- Stimulating/Recording Platform: one model for mice, one model for rats.
- Different animal holders to match animal dimensions.
- Flexible testing, easy to set up. Simply define trial number, sound and light stimulus and timing of experimental sequences (all fully randomizable):
  - Pulse; Pre-pulse; Inter-Pulse Interval; Inter-Stimulus Interval.

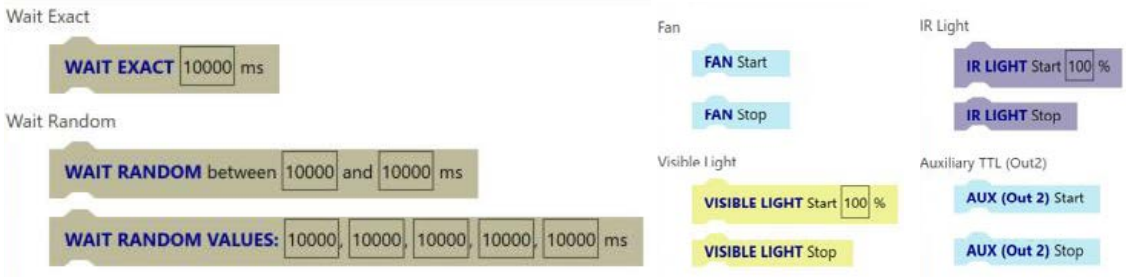
Procedures and Data Analysis

Pulses and pre-pulses consist of white noise and frequency sounds, lights or air-puffs.

The animal is restrained in a Plexiglas tube sitting on a force sensor. The dedicated software analyses data automatically, as startle response amplitude and %PPI.

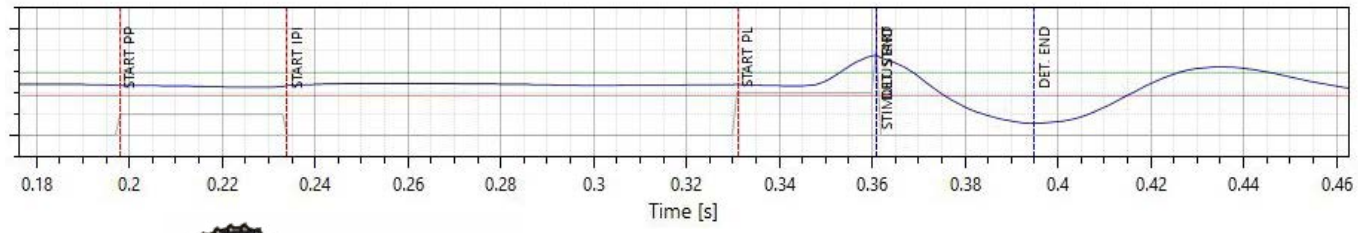
The various procedures expose the animals to "Trials" of different nature:

- Pulse alone trial: only the strong stimulus is presented
- Pre-pulse alone trial: only the weak stimulus is presented
- Pre-pulse-pulse trial: the strong stimulus is preceded by the weak (pre-pulse) stimulus
- No-stim trials: no stimulus is delivered but the response of the animal is recorded to serve as a baseline



Experimental parameters can all be adjusted, linked, spaced in time, etc., to virtually build in a seamless and user-friendly manner virtually any type of startle and startle/ PPI protocols.

Results and data are shown in a very intuitive way, as a summary data in the proprietary interface and as raw data (.csv), for those who wish to use their own analysis systems



Two stimulating/Recording available: one for mouse, one for rat.

Different animal holders to match animal dimension. From left to right: Mouse Holder small (SKU 48003-320), Mouse Holder large (SKU 48003-321), for rodents up to 100gr (SKU 48003-360), for rodents up to 250gr (SKU 48003-370), for rodents up to 450 gr (SKU 48003-390), for rodents up to 800gr (SKU 48003-380).

Features	Benefits
User-friendly software included	Exceptional flexibility and intuitivity in the software protocol building
Configure your own Experimental Schedules directly on your PC	Maximum Flexibility, full event randomization
Multiple stimuli	The user can decide to use pre-pulses and pulses with white noise, frequency noise, light, air puff
Multiple cage system	High throughput with up to 4 cages running at the same time

Main references

- Bilel, S. et al. (2025), "Acute Effects of the Psychedelic Phenethylamine 25I-NBOMe in C57BL/6J Male Mice". International Journal of Molecular Sciences
- Bassi, M. et al., (2024), "Pharmaco-toxicological effects of the novel tryptamine hallucinogen 5-MeO-MiPT on motor, sensorimotor, physiological, and cardiorespiratory parameters in mice—from a human poisoning case to the preclinical evidence", Psychopharmacology
- Corli, G., et al., (2023), "MAM-2201 acute administration impairs motor, sensorimotor, prepulse inhibition, and memory functions in mice: a comparison with its analogue AM-2201", Psychopharmacology
- Bilel, S. et al. (2023), "Cognitive dysfunction and impaired neuroplasticity following repeated exposure to the synthetic cannabinoid JWH-018 in male mice", Brithis Journal of Pharmacology
- Tirri, M. et al., (2022), "Effect of -NBOMe Compounds on Sensorimotor, Motor, and Prepulse Inhibition Responses in Mice in Comparison With the 2C Analogs and Lysergic Acid Diethylamide: From Preclinical Evidence to Forensic Implication in Driving Under the Influence of Drugs", Frontiers in Psychiatry
- Marti, M. et al., (2021) "New insights into methoxetamine mechanisms of action: Focus on serotonergic 5-HT2 receptors in pharmacological and behavioral effects in the rat", Experimental Neurology
- Tirri, M. et al., (2020), "Acute DOB and PMA Administration Impairs Motor and Sensorimotor Responses in Mice and Causes Hallucinogenic E cts in Adult Zebrafish", Brain Sciences
- Bilel, S., et al. (2019), "Pharmacological and Behavioral Effects of the Synthetic Cannabinoid AKB48 in Rats", Frontiers in Neuroscience
- Braff, D. L., et al., (2001), "Human studies of prepulse inhibition of startle: normal subjects, patient groups, and pharmacological studies", Psychopharmacology
- Koch, M. "The Neurobiology of Startle" Prog Neurobiol. 59(2):107-28, 1999
- H.S. Hoffman, M. Fleshker, (1963), "Startle Reaction: Modification By Background Acoustic Stimulation", Science
- Marsh, R.R., et al., (1975) "The Role of Small Changes in the Acoustic Environment in Modifying the Startle Reflex" J Exp Psychol Anim Behav Process, 1(3)

Specifications - Operation

Sound Range	From 65 dB to 120 dB
Pulse/pre pulse sound range	From 65 dB to 120 dB
Sound Frequency Range	From 100 Hz to 18 KHz
IR Light	0-100% (Environment)
Flash Light	0-100% (20K Lux) S/R Platform)
Data Export	.csv, .xlsx format
PC Requirements	Windows 64-bit environment – Intel Core i7 processor or higher, 8GB RAM.

Specifications - General

Power Requirements	Universal input 100-240 VAC, 50-60Hz, 60W
Background Noise (Ventilation)	from 0.1 to 3mA, in 0.1mA steps
Operating environment	10°C to 40°C; 5% to 95% RH (non-condensing)

Physical	Outer size	Internal size
Dimensions of Cubicle	52(d)x62(w)x58(h)cm	39(d)x47(w)x49(h)cm

Ordering information

48101	NEW - One animal Startle/PPI system (cubicle, sound, IR/visible light and software) to be completed with Mouse/Rat Platform and restrainers. Not compatible with previous system
48101-2	NEW - Two animal Startle/PPI system (cubicle, sound, IR/visible light and software) to be completed with Mouse/Rat Platform and restrainers. Not compatible with previous system
48101-3	NEW - Three animal Startle/PPI system (cubicle, sound, IR/visible light and software) to be completed with Mouse/Rat Platform and restrainers. Not compatible with previous system
48101-4	NEW - Four animal Startle/PPI system (cubicle and software) to be completed with Mouse/Rat Platform and restrainers. Not compatible with previous system

To complete the Startl/PPI System, it's necessary to choose one of the following platforms, according to the animal used for the esperiment:

48008	Startle PPI platform 3.0 for Mouse, including set of two Mouse Holders
48009	Startle PPI platform 3.0 for Rat, to be completed with Rat Restrainers

Available Rat Restrainers:

48003-360	Startle PPI Cylindrical Mouse Restrainer (up to 100g)
48003-370	Startle PPI Cylindrical Rat Restrainer (up to 250g)
48003-380	Startle PPI Cylindrical Rat Restrainer (up to 450-800g)
48003-390	Startle PPI Cylindrical Rat Restrainer (up to 450g)

Optional items:

48000-200	4-Channel Air-Puff Dispenser, for Startle/PPI System. It requires connection to a cylinder or a gas line, with reducer. Each Startle/PPI unit requires in addition one kit 48000-204 including delivery system to stimulate animal with air.
48000-204	Air-puff kit, for each Startle/PPI Unit, to be attached to dispenser 48000-200. It includes all accessories for air delivery, except the animal cage
47400-050	B/W USB Camera, including 2.1mm & 4.3mm lenses with visible light block filter, M12 Lens Adaptor, 2m USB cable and cubicle ceiling support (for FC 46001)

Extra warranty (standard 12 months + 12 months with product registration)
Additional UB-Care can be added for other 12 or 24 months

Related Products

OPERON
Product Code: 49500/49503

Fear Conditioning System
Product Code: 46001/46001-4

Activity Cage
Product Code: 49603

Active Avoidance
Product Code: 40532/40533

ugobasile.com

more than 40,000 citations in the main bibliographic search engines.

Rev2.2 April 2025

Ugo Basile SRL
Via Giuseppe Di Vittorio, 2
21036 Gemonio (VA) ITALY
Tel. +39 0332 744574
Get a quote: sales@ugobasile.com

Partner area