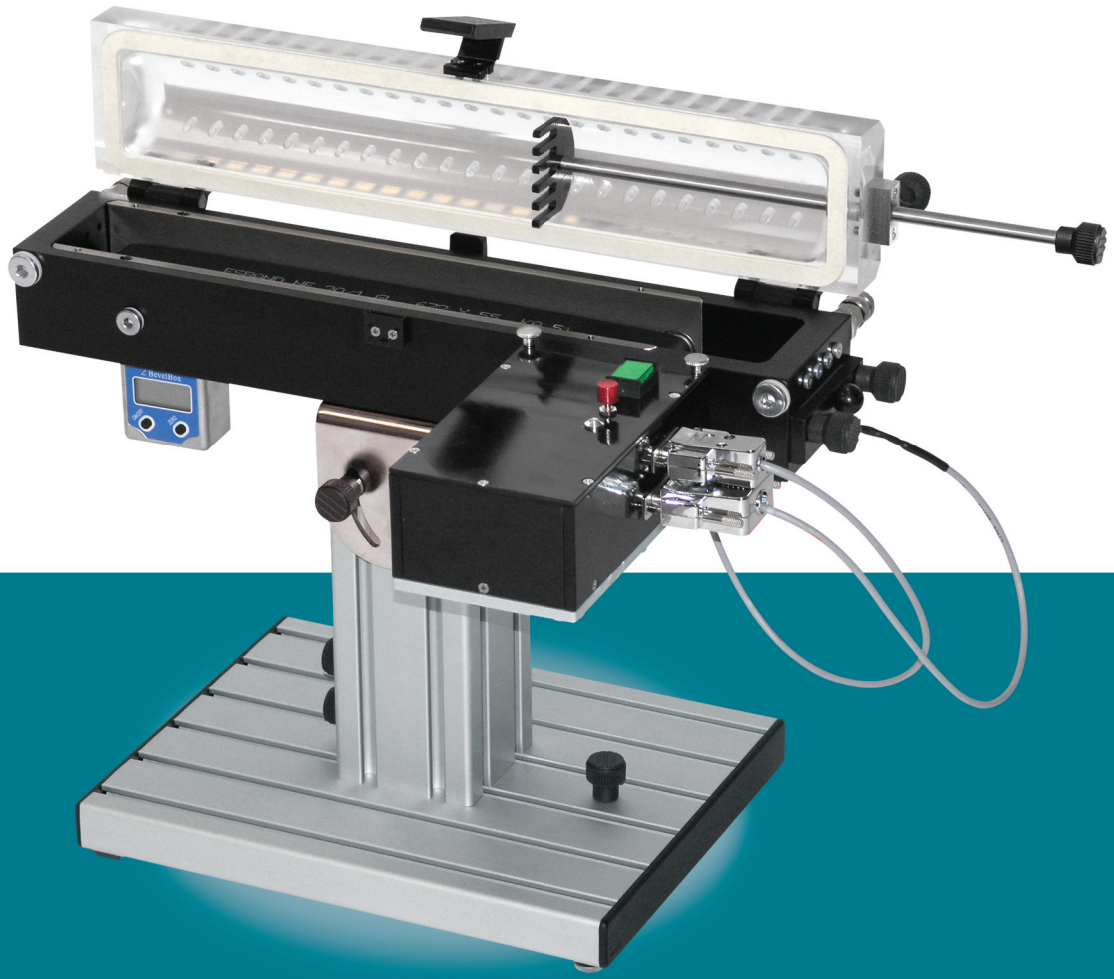
Sophisticated Life Science Research Instrumentation



TSE PhenoMaster System

Treadmill Module for Mice and Rats

– Specifications subject to change without notice –

TSE PhenoMaster System – Treadmill Module for Mice and Rats

The System

The TSE Phenomaster Treadmill Module for small laboratory animals is a fully computerized electronically controlled system for exercise calorimetry or for investigating the effectiveness of drugs on impaired motor coordination of the skeletal muscles. The treadmill is driven by a servo-controlled motor which provides precise operator-defined tread speed.

The treadmill apparatus basically consists of a rotating running belt whose surface is manufactured to provide optimal grip for the animal. Separating panels divide the running surface into separate exercise lanes each suited for an individual animal. Individual floor grids are mounted in of each lane. On demand the floor grids can be equipped to apply an electric stimulus of variable length and intensity.

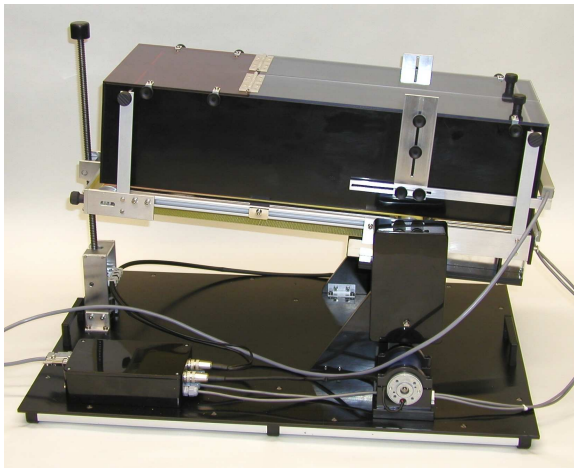
The motor-controlled, stepless adjustable incline of the running surface allows to control the labor of the animal.

Treadmills which are intended for *calorimetric* experiments have *one* compartment that can be covered by an air-tight cover.

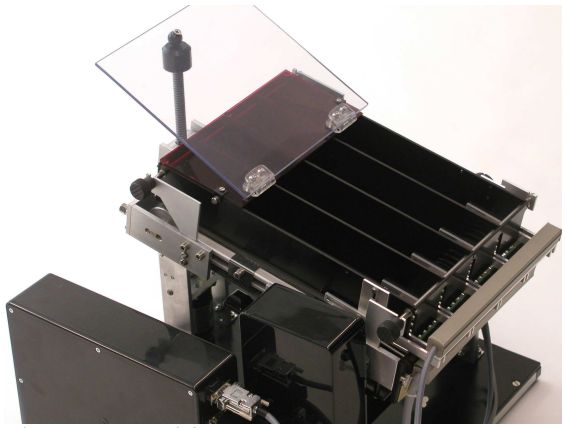
Calo Treadmill for calorimetric purposes

This instrument is equipped with an air inlet and an air outlet for providing air and one connection for sampling purposes.

The treadmill runs according to a user-defined exercise protocol created with the help of the flexible **PhenoMaster** software.



2-lane rat model

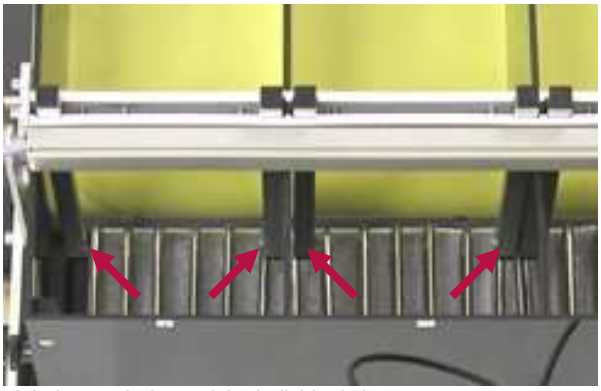


4-lane Mouse model

Each lane is controlled by its own timer which can be operated independently from each other.

Timer knobs for operating the individual lanes

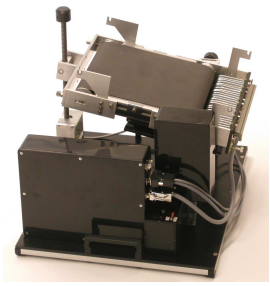
Each single lane is equipped with a **light barrier** that recognizes the animal's "fall off" from the rear end of the running surface.

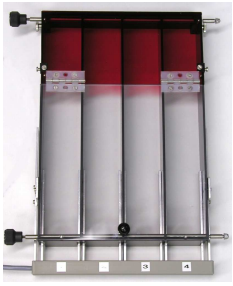


Light beams in front of the individuals lanes

The operator can define individual speed profiles including up to 100 steps per profile. Within each step initial speed, final speed as well as acceleration/ deceleration time can be defined.

Treadmills for non-calorimetric purposes: For cleaning purposes the compartment area, the floor grid as well as the excrement tray can easily be removed from the treadmill.





Each Treadmill is supplied with a data communication port for transfer of measuring data to a PC

Shocker

On demand the floor grids can be equipped to apply an *electric stimulus* of variable length and intensity if a fall on the floor grid is detected. The floor grids of the individual lanes can shock independently from each other.

Microprocessor-equipped shock modules are available designed to provide constant current stimulation with output adjustable via software up to 3.1 mA (up to 4.5 mA available on request).

The shock modules have integrated current flow detectors and all electronics needed for automatically switching polarity of the grid rods. The current chosen is applied independent of the actual cross-over resistance (max. 73 kΩ at 1.5 mA) and is therefore independent of the animal's location on the grid.

Shock length: 0.1-10s.
Shock intensity: 0-3.1 mA (up to 4.5 mA on demand)
Cross-over resistance: (max. 73 kΩ at 1.5 mA)

Rat model

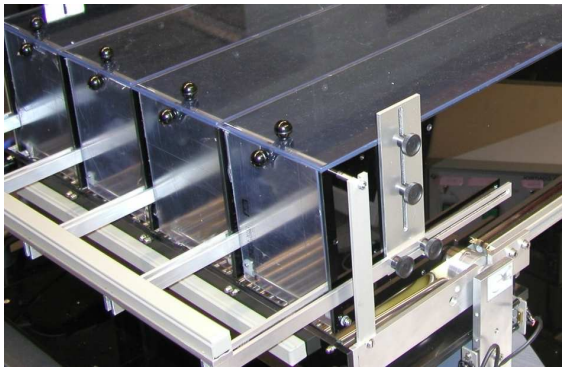
Constant mode:	speed 0.07 - 2.0 m/s
Accelerating mode:	initial speed 0.07 - 2.0 m/s final speed 0.07 - 2.0 m/s
Acceleration time:	0 - 600s (0 = constant speed)
Shock intensity:	0 - 3.1 mA*
Shock length:	0.1 - 10.0s*
Incline	-10°- 25° stepless adjustable
BNC socket (optional):	A TTL *high* signal is produced when the motor starts as well as at each change of speed. and/ or: Direct current output depending on the actual speed.

Mouse model

Constant mode:	speed 0.07 - 1.0 m/s
Accelerating mode:	initial speed 0.07 - 1.0 m/s final speed 0.07 - 1.0 m/s
Acceleration time:	0 - 600s (0 = constant speed)
Shock intensity:	0 - 3.1 mA*
Shock length:	0.1 - 10.0s*
Incline	-10°- 25° stepless adjustable
BNC socket (optional):	A TTL *high* signal is produced when the motor starts as well as at each change of speed. and/ or: Direct current output depending on the actual speed.

* if shocker is present

The animals are placed on the running surface from above. If desired, the rat model can be equipped with front doors in order to place the animals on the grid from the front.



Front doors of the rat model

The Software

The Treadmill can be run according to a user-defined exercise protocol created with the help of the flexible *PhenoMaster software*. It currently runs under the common Windows™ operating systems.

Data transfer from the Treadmill to the PC is accomplished by one or two special *PCI interface cards* which are to be inserted into the PC.

The Treadmill is then connected to the PC via a **process control unit.**

Process control unit

Experimental Procedure

Prior to each experiment the animal and trial data can be defined.

Entering Animal & Control Parameters

All descriptive parameters which describe the animal and the test can be made before starting the experiment.

Four different test modes can be run:

Training
In the *Training* mode each time that a light barrier is interrupted the timer for the particular lane will be stopped automatically and then immediately restarted. The time interval up to the interruption of the light barrier is recorded. Electric stimuli can only be applied manually.

Single
In the *Single* mode the timer is stopped when the light barrier is interrupted and an electric stimulus is applied. The time interval up to the interruption of the light barrier is recorded. The timer must then be restarted manually.

Training+Single
If both modes are activated then the timer must be restarted after the light barrier has been interrupted. Electric stimuli can only be applied manually.

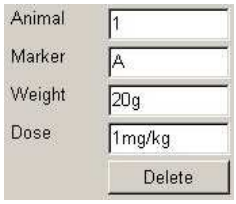
Training and Single *de*activated
A shock is applied after a light barrier has been interrupted; at the same time the timer for the particular belt is stopped automatically and then automatically restarted immediately. The time interval up to the interruption of the light barrier is recorded.

- File name
- Experiment no.
- User name
- Substance
- Comments
- Shock intensity (if shocker is present)
- Shock length (if shocker is present)
- Minimum interval
- Min. Dur. LBI
- Runtime
- Angle of gradient
- Measuring mode (whether training, single or training+single activated or deactivated)
- Animal table for up to 200 animals
- Speed Profile (initial speed, final speed acceleration/deceleration time). Up to 100 steps programmable.

Date and Time are added automatically by the system.

The animal table as well as the speed profile table can be saved and reloaded for subsequent experiments.

During the experiment some of the animal data for each single animal can be changed if desired.



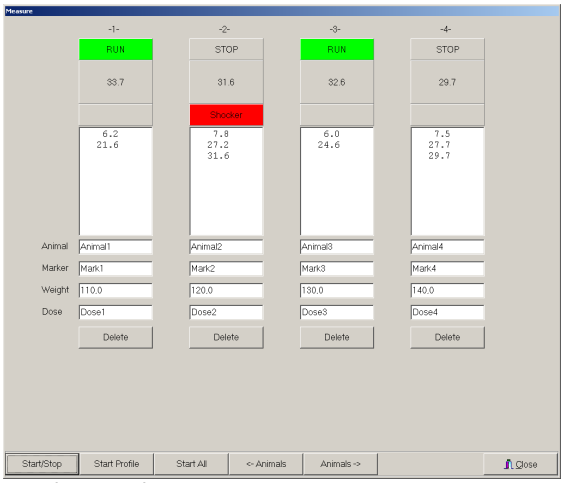
Experiment Start

After the test preparation has finished the treadmill drive and the speed profile can be started. The animals are quickly placed one by one onto the running surface and each individual timer is started by simultaneously pressing the timer knob below the corresponding lane. Alternatively, all timers can be started *simultaneously* by pressing the “Start All” button in the measurement window of the software.

The Running Experiment

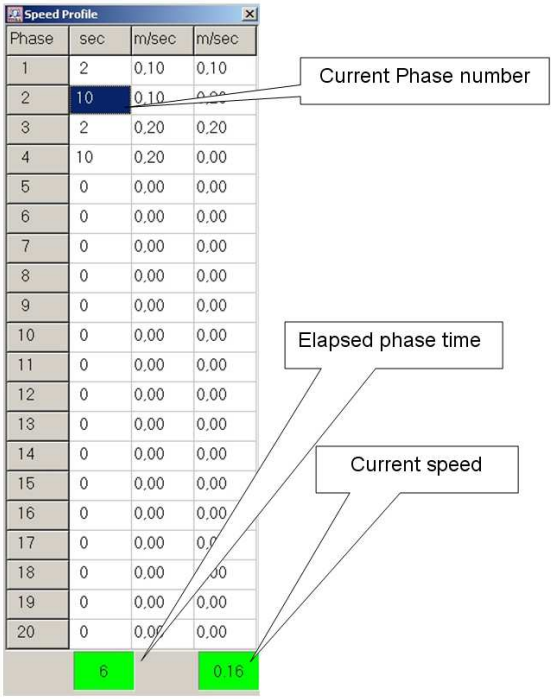
The speed profile can be started by pressing the “Start Profile” button. The current step of the speed profile along with the current speed is then continuously displayed on the bottom of the trial monitor window.

An overview of the current status of all lines can be seen at a glance.



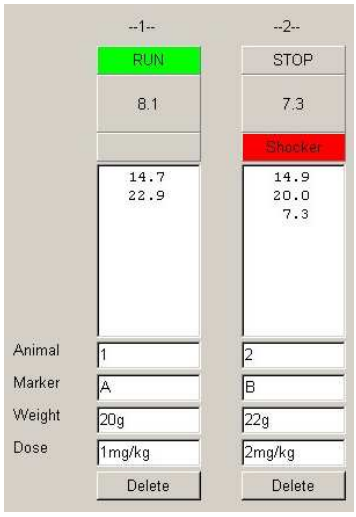
Running experiment

During an experiment, information about the current phase number, the current speed and the elapsed phase time is displayed in the speed profile table.



On top of each lane the current status of each compartment is reported (status panel: RUN or STOP).

If an entry has been made in the field „Shock length“ a shock of the preset length and intensity either can be applied manually or is delivered automatically, depending on the measuring mode selected (the optional shocker module is required). An active shocker is displayed with a red message field (“Shocker”).



The **time elapsed** can be seen below the status line. If an animal fall off from the rear end of the running surface and interrupts the light beam sensor the time spent on the lane until the interruption is recorded. It is shown in the table below.

The treadmill can be stopped manually anytime by pressing the “Start/Stop” switch again.

“Delete” will delete the last value, even while a measurement is running. The corresponding value is displayed as a negative value in the results table then.

Data Output

Preview

The measuring values stored in the file can be displayed after the experiment has been finished or after loading an already existing data file.

In general, the preview window provides information about animal ID, marker, weight, dose, date, time, lane number, the phase number in which the light barrier interruption occurred, the time from start of phase up to light barrier interruption and the time from start of timer up to start of profile.

Animal	Marker	Weight	Dose	Date	Time	L	Sec	m/sec	m	W	S	Ph	Phs	Tps
Animal1	Mark1	110,0	Dose1	18.07.05	16:42	1	5,5	0,10	0,55	0,04	1	1	8,5	-3,0
Animal1	Mark1	110,0	Dose1	18.07.05	16:43	1	16,8	0,36	4,14	0,16	0	2	19,4	-22,6
Animal1	Mark1	110,0	Dose1	18.07.05	16:43	1	9,6	0,50	4,66	0,22	1	3	5,4	-45,9
Animal1	Mark1	110,0	Dose1	18.07.05	16:43	1	10,4	0,24	8,55	0,11	1	4	5,1	-66,8
Animal2	Mark2	120,0	Dose2	18.07.05	16:42	2	7,9	0,10	0,79	0,05	0	1	10,9	-3,0
Animal2	Mark2	120,0	Dose2	18.07.05	16:43	2	8,9	0,26	1,78	0,12	1	2	12,0	-23,2
Animal2	Mark2	120,0	Dose2	18.07.05	16:43	2	19,9	0,50	9,70	0,24	1	3	13,8	-44,0
Animal2	Mark2	120,0	Dose2	18.07.05	16:43	2	6,3	0,50	3,16	0,24	1	3	23,8	-67,5
Animal3	Mark3	130,0	Dose3	18.07.05	16:42	3	16,1	0,10	1,61	0,05	0	1	19,1	-3,0
Animal3	Mark3	130,0	Dose3	18.07.05	16:43	3	17,9	0,39	4,75	0,20	1	2	21,4	-23,6
Animal3	Mark3	130,0	Dose3	18.07.05	16:43	3	9,0	0,50	4,50	0,26	1	3	7,9	-49,0
Animal3	Mark3	130,0	Dose3	18.07.05	16:43	3	13,9	0,41	6,89	0,21	1	4	1,9	-68,1
Animal4	Mark4	140,0	Dose4	18.07.05	16:42	4	12,1	0,10	1,22	0,06	0	1	15,1	-3,0
Animal4	Mark4	140,0	Dose4	18.07.05	16:43	4	11,5	0,31	2,66	0,17	1	2	15,6	-24,2
Animal4	Mark4	140,0	Dose4	18.07.05	16:43	4	12,8	0,50	6,35	0,28	1	3	10,1	-47,4
Animal4	Mark4	140,0	Dose4	18.07.05	16:43	4	9,0	0,50	4,51	0,28	1	3	27,7	-68,7

Example: Preview window *Single* mode

The preview window provides additional information about:

- Time from start of timer up to interruption of light barrier
- Current speed at time of light barrier interruption
- **Training** mode/ **Training** and **Single** deactivated: Distance covered (sum of single paths of previous measurement)

- **Single** mode/ **Training**+**Single** mode: Distance covered during the time interval
- Animal performance (in watts) for the observed time interval from start of timer up to light barrier interruption (this column will only be produced when a value larger than 0 has been entered in the Angle of Gradient field).
- **Training** mode/ **Training**+**Single** mode: Manual delivery of an electric stimulus (0= no stimulus delivered; 1=stimulus).

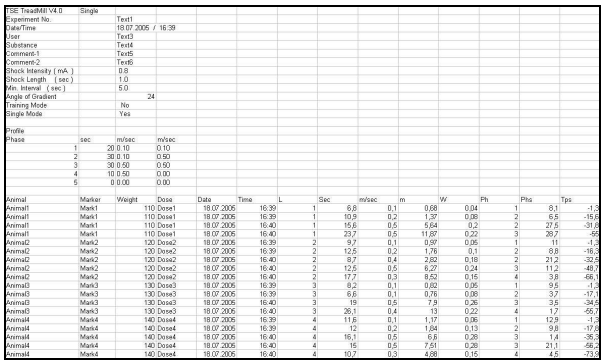
The data can be sorted by Animal, Marker, Weight, Dose, Date + Time, lane number, seconds or distance covered.

Print

The print function will generate a report which is output to a printer giving details of the file name, date and time, some of the control settings, some descriptive parameters and the speed profile that was used. The report will list the results of the compartments in use.

Data Files

The activity data as well as some of the animal and trial parameters can be stored as export files (CSV or txt) for import into statistical or spreadsheet packages (e.g. EXCEL).



TSE TreadMill V4.0	Single														
Experiment No.		Text1													
Date/Time		18.07.2005 / 16:39													
User		Text3													
Substance		Text4													
Comment-1		Text5													
Comment-2		Text6													
Shock Intensity (mA)		0.8													
Shock Length (sec)		1.0													
Min. Interval (sec)		5.0													
Angle of Gradient		24													
Training Mode		No													
Single Mode		Yes													
Profile															
Phase	sec	m/sec	m/sec												
	1	20	0.10	0.10											
	2	30	0.10	0.60											
	3	30	0.50	0.60											
	4	10	0.50	0.00											
	5	0	0.00	0.00											

Animal	Marker	Weight	Dose	Data	Time	L	Sec	m/sec	m	W	Ph	Phs	Tps
Animal1	Mark1	110	Dose1	18.07.2005	16:39	1	6,8	0,1	0,68	0,04	1	8,1	-1,3
Animal1	Mark1	110	Dose1	18.07.2005	16:39	1	10,9	0,2	1,37	0,08	2	6,5	-15,8
Animal1	Mark1	110	Dose1	18.07.2005	16:40	1	15,6	0,5	5,64	0,2	2	27,5	-31,9
Animal1	Mark1	110	Dose1	18.07.2005	16:40	1	23,7	0,5	11,87	0,22	3	28,7	-69
Animal2	Mark2	120	Dose2	18.07.2005	16:39	2	9,7	0,1	0,97	0,06	1	11	-1,3
Animal2	Mark2	120	Dose2	18.07.2005	16:39	2	12,5	0,2	1,76	0,1	2	8,8	-16,3
Animal2	Mark2	120	Dose2	18.07.2005	16:40	2	8,7	0,4	2,82	0,18	2	21,2	-32,5
Animal2	Mark2	120	Dose2	18.07.2005	16:40	2	12,5	0,5	6,27	0,24	3	11,2	-48,7
Animal2	Mark2	120	Dose2	18.07.2005	16:40	2	17,7	0,3	8,52	0,15	4	3,8	-66,1
Animal3	Mark3	130	Dose3	18.07.2005	16:39	3	8,2	0,1	0,82	0,05	1	9,5	-1,3
Animal3	Mark3	130	Dose3	18.07.2005	16:39	3	6,6	0,1	0,76	0,08	2	3,7	-17,1
Animal3	Mark3	130	Dose3	18.07.2005	16:40	3	19	0,5	7,9	0,26	3	3,5	-34,5
Animal3	Mark3	130	Dose3	18.07.2005	16:40	3	26,1	0,4	13	0,22	4	1,7	-56,7
Animal4	Mark4	140	Dose4	18.07.2005	16:39	4	11,6	0,1	1,17	0,06	1	12,9	-1,3
Animal4	Mark4	140	Dose4	18.07.2005	16:39	4	12	0,2	1,84	0,13	2	9,8	-17,9
Animal4	Mark4	140	Dose4	18.07.2005	16:40	4	16,1	0,5	6,8	0,28	3	1,4	-36,3
Animal4	Mark4	140	Dose4	18.07.2005	16:40	4	16	0,5	7,51	0,28	3	21,1	-56,2
Animal4	Mark4	140	Dose4	18.07.2005	16:40	4	10,7	0,3	4,08	0,15	4	4,5	-73,9

File structure after import into EXCEL

Partial List of Users

- Bayerische Julius-Maximilians-Universität Würzburg, Würzburg, Germany
- Academia Sinica, Taipei, Taiwan
- Charité - Universitätsmedizin Berlin, Berlin - Dahlem, Germany
- DSM Nutritional Products Ltd., Kaiseraugst, Switzerland
- GSF-Forschungszentum f. Umwelt & Gesundheit, GmbH, Neuherberg, Germany
- National University of Singapore, Singapore, Singapore
- Ruprechts-Karls-Universität Heidelberg, Heidelberg, Germany
- Ruprechts-Karls-Universität Heidelberg – Mannheim, Mannheim, Germany
- Sanofi-Aventis Deutschland GmbH, Frankfurt am Main, Germany
- Universitetet i Oslo, Oslo, Norway
- Universität Rostock, Rostock, Germany
- Universitätsklinik Hamburg-Eppendorf – UKE, Hamburg, Germany

Ordering Information

Standard Treadmill Systems 303401 Series

303401-M-01/C	**Treadmill for 1 Mouse PC-based** ■ automatic inclination adjustment: -10°to +25° ■ speed: 0.07 - 2 m/sec. ■ length of lane: 350 mm ■ width of lane: 65 mm ■ length of stimulus area: 100 mm ■ width of stimulus area: 65 mm ■ Stimulus area optional shockable For connecting to Control Unit Treadmill. For exercise calorimetry or for investigating the effectiveness of drugs on impaired motor coordination of the skeletal muscles. The system is electronically controlled. The speed is controlled electronically. Individual speed profiles including up to 100 steps per profile can be defined. The treadmill speed is displayed digitally. Some of the functions: ■ 1 timer for measuring time spent on the treadmill ■ Loading and storing individual speed profiles ■ Loading and storing individual animal tables (up to 200 animals per table) ■ Performing 4 different experiment modes (Training, Single, Training+Single, Training+Single deactivated) ■ constant speed ■ accelerating speed (initial speed 0.07 - 2 m/sec., final speed 0.07 - 2 m/sec., accelerating time 0-600 sec.) ■ shock intensity: 0 - 3.1 mA (only with optional shocker) ■ shock length: 0.1 - 10.0 sec. (only with optional shocker) Required: Control Unit Treadmill 303401-C-01
303401-M-02/C	**Treadmill for 2 Mice PC-based** Similar to 303401-M-01/C but: ■ Up to 2 animals can be investigated at the same time ■ 2 timers for measuring time spent on the treadmill Required: Control Unit Treadmill 303401-C-02
303401-M-04/C	**Treadmill for 4 Mice PC-based** Similar to 303401-M-01/C but: ■ Up to 4 animals can be investigated at the same time ■ 4 timers for measuring time spent on the treadmill Required: Control Unit Treadmill 303401-C-04

303401-M-06/C	**Treadmill for 6 Mice PC-based** Similar to 303401-M-01/C but: ■ Up to 6 animals can be investigated at the same time ■ 6 timers for measuring time spent on the treadmill Required: Control Unit Treadmill 303401-C-06
303401-M-08/C	**Treadmill for 8 Mice PC-based** Similar to 303401-M-01/C but: ■ Up to 8 animals can be investigated at the same time ■ 8 timers for measuring time spent on the treadmill Required: Control Unit Treadmill 303401-C-08

303401-R-01/C	**Treadmill for 1 Rat PC-based** ■ automatic inclination adjustment: -10°to +25° ■ speed: 0.07 - 2 m/sec. ■ length: of lane 500 mm ■ width: of lane 130 mm ■ length of stimulus area: 150 mm ■ width of stimulus area: 130 mm ■ stimulus area optional shockable For connecting to Control Unit Treadmill. For exercise calorimetry or for investigating the effectiveness of drugs on impaired motor coordination of the skeletal muscles. The system is electronically controlled. The speed is controlled electronically. Individual speed profiles including up to 100 steps per profile can be defined. The treadmill speed is displayed digitally. Some of the functions: ■ 1 timer for measuring time spent on the treadmill ■ Loading and storing individual speed profiles ■ Loading and storing individual animal tables (up to 200 animals per table) ■ Performing 4 different experiment modes (Training, Single, Training+Single, Training+Single deactivated) ■ constant speed ■ accelerating speed (initial speed 0.07 - 2 m/sec., final ■ speed: 0.07 - 2 m/sec., accelerating time 0-600 sec.) ■ shock intensity: 0 - 3.1 mA (only with optional shocker) ■ shock length: 0.1 - 10.0 sec. (only with optional shocker) Required: Control Unit Treadmill 303401-C-01
303401-R-02/C	**Treadmill for 2 Rats PC-based** Similar to 303401-R-01/C but: ■ Up to 2 animals can be investigated at the same time ■ 2 timers for measuring time spent on the treadmill Required: Control Unit Treadmill 303401-C-02
303401-R-04/C	**Treadmill for 4 Rats PC-based** Similar to 303401-R-01/C but: ■ Up to 4 animals can be investigated at the same time ■ 4 timers for measuring time spent on the treadmill Required: Control Unit Treadmill 303401-C-04
303401-R-06/C	**Treadmill for 6 Rats PC-based** Similar to 303401-R-01/C but: ■ Up to 6 animals can be investigated at the same time ■ 6 timers for measuring time spent on the treadmill Required: Control Unit Treadmill 303401-C-06
303401-R-08/C	**Treadmill for 8 Rats PC-based** Similar to 303401-R-01/C but: ■ Up to 8 animals can be investigated at the same time ■ 8 timers for measuring time spent on the treadmill Required: Control Unit Treadmill 303401-C-08

Control Units for Standard Treadmill Systems

303401-C-01	**Control-Unit for Treadmill for 1 Mouse or 1 Rat** For connecting to a Treadmill for 1 Mouse or 1 Rat. The experiment will be controlled user-defined via the flexible Treadmill-Software. Possible entries in the main menu are: ■ file name ■ experiment no ■ user ■ animal ■ mean/Sd ON/OF (if desired) ■ substance ■ weight ■ dosage ■ comment (2 lines) ■ initial speed ■ final speed ■ accelerating time ■ programmable speed profiles (including up to 100 steps per file) ■ shock intensity (only with optional shocker) ■ shock length (only with optional shocker) ■ The system stores all data in ASCII-format and offers them for further processing. ■ Output for each measuring group: ■ number of measurements ■ animal number ■ mean value (if desired) ■ standard deviation (if desired) ■ Output for each measurement: ■ time spent on the running surface ■ distance covered (total or during time interval, depending on the experiment mode) ■ manual delivery of electric stimulus (in some experiment modes) ■ speed when the animal falls off the running surface ■ animal performance in watts (when a value larger than 0 has been entered in the *Angle of Gradient* field) ■ phase number in which the light barrier interruption occurred ■ time from start of phase up to light barrier interruption ■ time from start of timer up to start of profile ■ complete and comprising of (for connecting to PC): ■ Control Unit / special interface Treadmill-01 ■ software package Treadmill-01 for WINDOWS Option: 1-channel shocker 303401-SH-01 to be mounted into Control Unit Treadmill. Required: Treadmill for 1 Mouse PC-based 303401-M-01/C or Treadmill for 1 Rat PC-based 303401-R-01/C
303401-C-02	**Control Unit for Treadmill for 2 Mice or 2 Rats** Similar to 303401-C-01 but: ■ For connecting to a Treadmill for 2 Mice or 2 Rats ■ Control Unit / special interface Treadmill-02 ■ software package Treadmill-02 for WINDOWS Option: 2-channel shocker 303401-SH-02 to be mounted into Control Unit Treadmill. Required: Treadmill for 2 Mice PC-based 303401-M-02/C or Treadmill for 2 Rats PC-based 303401-R-02/C
303401-C-04	**Control Unit for Treadmill for 4 Mice or 4 Rats** Similar to 303401-C-01 but: ■ For connecting to a Treadmill for 4 Mice or 4 Rats ■ Control Unit / special interface Treadmill-04 ■ software package Treadmill-04 for WINDOWS Option: 4-channel shocker 303401-SH-04 to be mounted into Control Unit Treadmill. Required: Treadmill for 4 Mice PC-based 303401-M-04/C or Treadmill for 4 Rats PC-based 303401-R-04/C

303401-C-06	**Control Unit for Treadmill for 6 Mice or 6 Rats** Similar to 303401-C-01 but: ■ For connecting to a Treadmill for 6 Mice or 6 Rats ■ Control Unit / special interface Treadmill-06 ■ software package Treadmill-06 for WINDOWS Option: 6-channel shocker 303401-SH-06 to be mounted into Control Unit Treadmill. Required: Treadmill for 6 Mice PC-based 303401-M-06/C or Treadmill for 6 Rats PC-based 303401-R-06/C
303401-C-08	**Control Unit for Treadmill for 8 Mice or 8 Rats** Similar to 303401-C-01 but: ■ For connecting to a Treadmill for 8 Mice or 8 Rats ■ Control Unit / special interface Treadmill-08 ■ software package Treadmill-08 for WINDOWS Option: 8-channel shocker 303401-SH-08 to be mounted into Control Unit Treadmill. Required: Treadmill for 8 Mice PC-based 303401-M-08/C or Treadmill for 8 Rats PC-based 303401-R-08/C

Shockers for Standard Treadmill Systems

303401-SH-01	**Shocker 1-channel for Treadmill for 1 Mouse or 1 Rat PC-based** Forces the animal to stay on the treadmill. Reliable electrical sensing of the animal. Microprocessor-equipped shock modules designed to provide constant current stimulation with output adjustable via software up to 3.1 mA (up to 4.5 mA available on request). Integrated current flow detector and all electronics needed for automatically switching polarity of grid rods. The current chosen is applied independent of the actual cross-over resistance (max. 73 kOhm at 1.5 mA) and therefore independent of the animal's location. Some of the functions: ■ shock intensity: 0 -3.1 mA (also available up to 4.5 mA) ■ shock length: 0.1 -10.0 sec. To be mounted into the Control Unit Treadmill 303401-C-01
303401-SH-02	**Shocker 2-channel for Treadmill for 2 Mice or 2 Rats PC-based** Similar to 303401-SH-01 but: To be mounted into the Control Unit Treadmill 303401-C-02
303401-SH-04	**Shocker 4-channel for Treadmill for 4 Mice or 4 Rats PC-based** Similar to 303401-SH-01 but: To be mounted into the Control Unit Treadmill 303401-C-04
303401-SH-06	**Shocker 6-channel for Treadmill for 6 Mice or 6 Rats PC-based** Similar to 303401-SH-01 but: To be mounted into the Control Unit Treadmill 303401-C-06
303401-SH-08	**Shocker 8-channel for Treadmill for 8 Mice or 8 Rats PC-based** Similar to 303401-SH-01 but: To be mounted into the Control Unit Treadmill 303401-C-08

Modular Treadmill Systems 303402 Series

303402-M-ML/C	**Modular Treadmill for 1 Mouse, PC-based** ■ up to 7 Additional Lanes 303402-M-SL/C connectable ■ air-tight animal compartment - allows VO2 and VCO2 measurements with the CaloSys calorimeter system ■ inclination adjustment: -10°to +25° ■ speed: 0.07 - 2 m/sec. ■ length of lane: 350mm ■ width of lane: 65 mm ■ length of stimulus area: 100 mm ■ width of stimulus area: 65 mm ■ stimulus area optional shockable For connecting to Control Unit Treadmill. For exercise calorimetry or for investigating the effectiveness of drugs on impaired motor coordination of the skeletal muscles. The system is electronically controlled. The speed is controlled electronically. Individual speed profiles including up to 100 steps per profile can be defined. The treadmill speed is displayed digitally. Some of the functions: ■ 1 timer for measuring time spent on the treadmill ■ Loading and storing individual speed profiles ■ Loading and storing individual animal tables (up to 200 animals per table) ■ Performing 4 different experiment modes (Training, Single, Training+Single, Training+Single deactivated) ■ constant speed ■ accelerating speed (initial speed 0.07 - 2 m/sec., final ■ speed 0.07 - 2 m/sec., accelerating time 0-600 sec.) ■ shock intensity: 0 - 3.1 mA (only with optional shocker) ■ shock length: 0.1 - 10.0 sec. (only with optional shocker) Required: Control Unit Treadmill 303402-C-ML
303402-R-ML/C	**Modular Treadmill for 1 Rat, PC-based** ■ up to 7 Additional Lanes 303402-R-SL/C connectable ■ air-tight animal compartment - allows VO2 and VCO2 measurements with the CaloSys calorimeter system ■ inclination adjustment: -10°to +25° ■ speed: 0.07 - 2 m/sec. ■ length of lane: 500 mm ■ width of lane: 130 mm ■ length of stimulus area: 150 mm ■ width of stimulus area: 130 mm ■ stimulus area optional shockable For connecting to Control Unit Treadmill. For exercise calorimetry or for investigating the effectiveness of drugs on impaired motor coordination of the skeletal muscles. The system is electronically controlled. The speed is controlled electronically. Individual speed profiles including up to 100 steps per profile can be defined. The treadmill speed is displayed digitally. Some of the functions: ■ 1 timer for measuring time spent on the treadmill ■ Loading and storing individual speed profiles ■ Loading and storing individual animal tables (up to 200 animals per table) ■ Performing 4 different experiment modes (Training, Single, Training+Single, Training+Single deactivated) ■ constant speed ■ accelerating speed (initial speed 0.07 - 2 m/sec., final speed 0.07 - 2 m/sec., accelerating time 0-600 sec.) ■ shock intensity: 0 - 3.1 mA (only with optional shocker) ■ shock length: 0.1 - 10.0 sec. (only with optional shocker) Required: Control Unit Treadmill 303402-C-ML

Control Units for Modular Treadmill Systems

303402-C-ML	**Control Unit for Modular Treadmill "Master Lane", for 1 Mouse or 1 Rat** Up to 7 Control Unit extension units 303402-C-SL for Modular Treadmill "Additional Lane" connectable. For connecting of a Modular Treadmill "Master Lane", for 1 Mouse (303402-M-ML/C) or 1 Rat (303402-R-ML/C). The experiment will be controlled user-defined via the flexible Treadmill-Software. Possible entries in the main menu are: ■ file name ■ experiment no. ■ trial no. ■ user ■ animal ■ mean/Sd ON/OF (if desired) ■ group no. ■ dosage ■ comment (2 lines) ■ initial speed ■ final speed ■ accelerating time ■ programmable speed profiles (including up to 100 steps per file) ■ shock intensity (only with optional shocker) ■ shock length (only with optional shocker) ■ The system stores all data in ASCII-format and offers them for further processing ■ Output for each measuring group: ■ number of measurements ■ mean value (if desired) ■ standard deviation (if desired) ■ Output for each measurement: ■ staying time ■ distance covered (total or during time interval, depending on the experiment mode) ■ manual delivery of electric stimulus (in some experiment modes) ■ speed when the animal falls off the running surface ■ animal performance in watts (when a value larger than 0 has been entered in the **Angle of Gradient** field) ■ phase number in which the light barrier interruption occurred ■ time from start of phase up to light barrier interruption ■ time from start of timer up to start of profile Complete and comprising of (for connecting to PC): ■ Control Unit / special-interface Treadmill-01 ■ software package Treadmill-01 for WINDOWS ■ option: 1-channel shocker 303402-SH-ML to be mounted into Control Unit for Modular Treadmill. Required: Modular Treadmill "Master Lane" for 1 Mouse (303402-M-ML/C) or 1 Rat (303402-R-ML/C)
303402-C-SL	**Control Unit extension unit for Modular Treadmill "Additional Lane", for 1 Mouse or 1 Rat** Similar to 303402-C-ML but: For connecting to Control Unit for Modular Treadmill "Master Lane" 303402-C-ML. Up to 7 Control Unit extension units 303402-C-SL for Modular Treadmill "Additional Lane" connectable to Control Unit for Modular Treadmill "Master Lane" 303402-C-ML. For connecting of a Modular Treadmill "Additional Lane", for 1 Mouse (303402-M-SL/C) or 1 Rat (303402-R-SL/C). Required: Control Unit for Modular Treadmill "Master Lane" 303402-C-ML

Shockers for Modular Treadmill Systems

303402-SH-ML	**Shocker 1-channel for Modular Treadmill, for 1 Mouse or 1 Rat PC-based** Forces the animal to stay on the treadmill. Reliable electrical sensing of the animal. Microprocessor equipped shock modules designed to provide constant current stimulation with output adjustable via software up to 3.1 mA (up to 4.5 mA available on request). Integrated current flow detector and all electronics needed for automatically switching polarity of grid rods. The current chosen is applied independent of the actual cross-over resistance (max. 73 kOhm at 1.5 mA) and therefore independent of the animal's location. Some of the functions: ■ shock intensity: 0-3.1 mA (also available up to 4.5 mA) ■ shock length: 0.1-10.0 sec. To be mounted into the Control Unit Treadmill 303402-C-ML

Sophisticated Life Science Research Instrumentation

TSE Systems is a leading supplier of sophisticated research instrumentation in the global life science market. Our focus is on providing the total customer solution, with modular designs of integrated hardware and software platforms for neuroscience, metabolic and behavioral phenotyping, drug screening and toxicology. It is our corporate goal to become the number one manufacturer of highly sophisticated products in each market we serve.

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