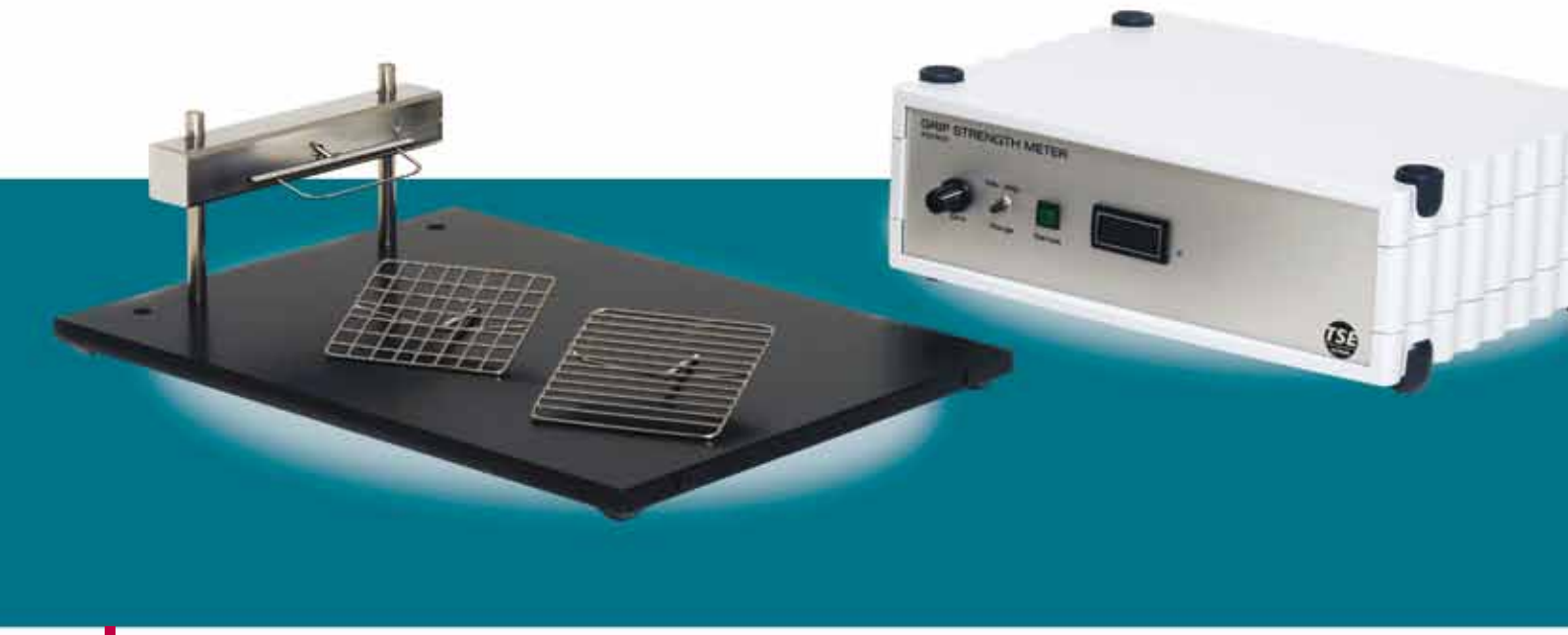
Sophisticated Life Science Research Instrumentation



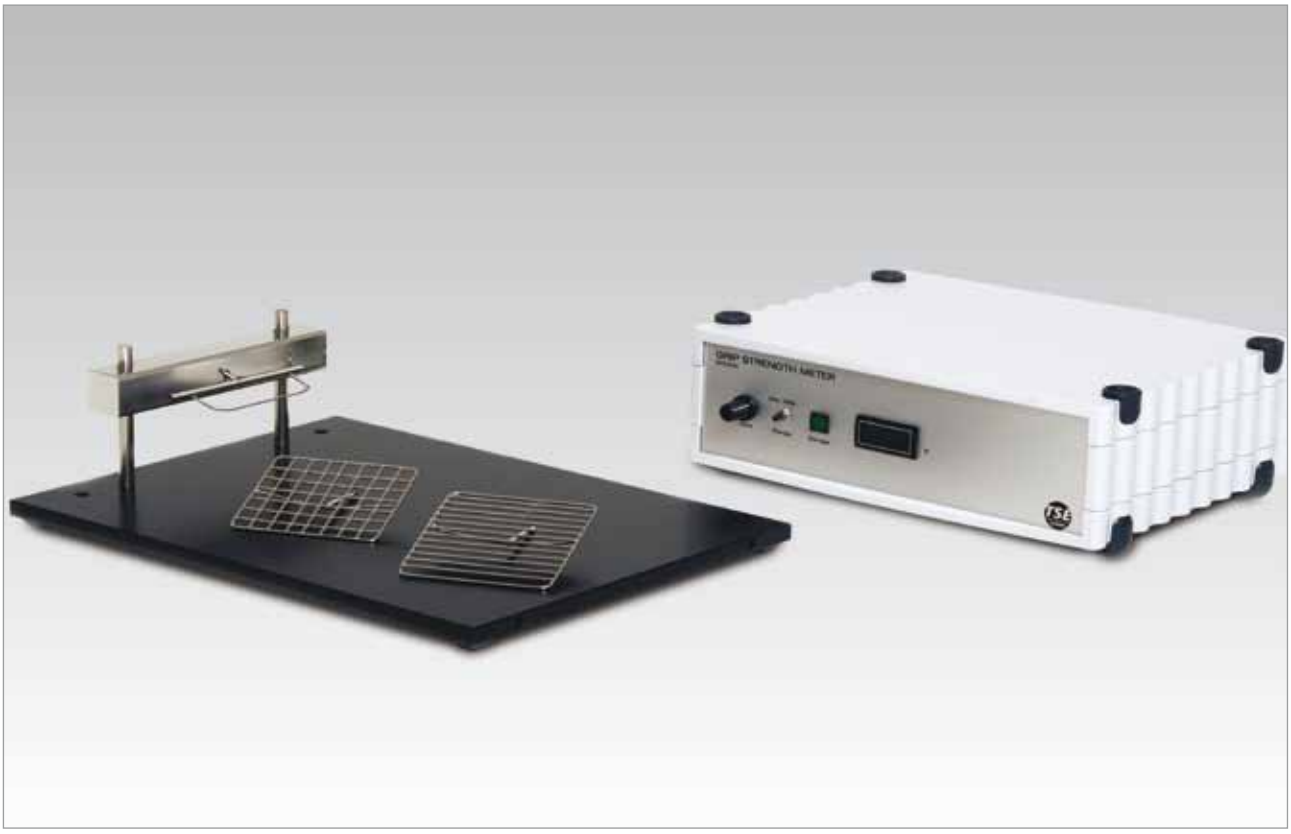
TSE Grip Strength Meter

For mice & and other small laboratory animals

Contents

- General Information 3
- System Components 4
- Technical Data 5
- Performing an Experiment 5
- Partial List of Users 7
- Publications 8
- Ordering Information 9
- Product Overview 13

– Specifications subject to change without notice –



TSE Grip Strength Meter

General Information

The **TSE Grip Strength Meter System** is a measuring system for determining the gripping strength, i.e. holding strength, of a small laboratory animal.

Within the context of neuromuscular investigations this test system can be used to quantify the effects of hormones, toxins, muscle relaxants as well as disease or the aging process on the muscular strength of the animal.

The system can be configured for rats, mice or other small laboratory animals.

In the trial setup the animal pulls a special height-adjustable grip which is mounted to a high-precision force sensor.

The standard sensor for mice allows a measurement of up to 600 Pond, the standard sensor for rats up to 2000 Pond.
Other measuring ranges are available on request (see ordering information).

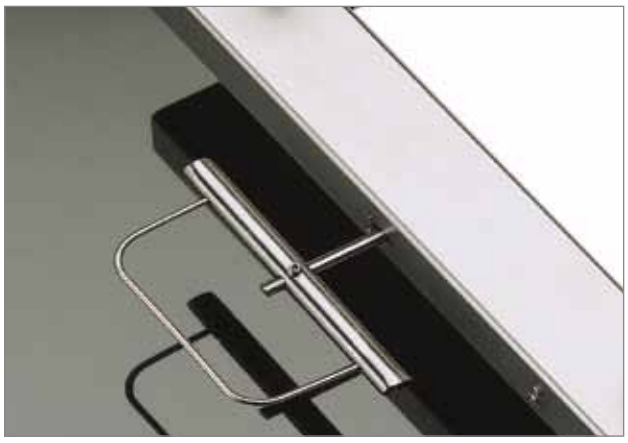
If the animal releases the grip then the force value is shown on a digital display of a connected control unit. In addition, the analog waveform can be outputted on a chart recorder.

For maximum convenience the setup can be connected to a computer via COM or USB connection.

The **TSE GSM software for Windows** allows easy data acquisition. If the animal releases the grip, the force value is shown on the computer monitor and is simultaneously stored in a CSV file for further statistical calculations.

Sensor module shown with standard grip for mice

Sensor module shown with mesh grip for rats



Grasping grip for rats and mice

Control unit

System Components

BASIC System

The BASIC system is supposed to be connected to a chart recorder. It is available for rats and mice. It comprises

- a base plate
- a control unit ("amplifier unit") that provides power for the force sensor and carries out amplification and filtering of the measuring signal. The measured force (in Pond) can be read off from the digital display
- a special height-adjustable sensor module that contains the force sensor (species-specific maximum force range)
- two species-specific stainless steel grips that can be easily exchanged:

For MOUSE

1. Standard grip "4-Paw-Measurement" (fore- and hindlimbs), angled (20 degrees)
2. Grasping grip "2-Paw-Measurement" (forelimbs only), straight

For RAT

1. Mesh grip "2-Paw-Measurement" (forelimbs), angled (25 degrees)
2. Grasping grip "2-Paw-Measurement" (forelimbs), straight

PC BASED System

The PC BASED system comprises all the components of the BASIC system **plus**

- the TSE GSM software for Windows
- a RS-232 cable to connect the control unit to the serial port of the computer. A RS232/USB adapter is included so that the connection can also be made via a USB port of the PC

1 Pond = 9.807 x 10-3 Newton

Technical Data

Base plate	400 x 300 x 23 mm (DxWxH)
Force Sensor	
Dimensions	19 x 3 x 3 mm (stainless steel)
Rated capacity (Standard sensor)	Mouse: 600 g (Pond) Rat: 2000 g (Pond)
Measuring range	Mouse: 20…600 g (Pond) Rat: 50…2000 g (Pond)
Safe overload	300%
Non-linearity	0.02%
Repeatability	0.02%
Hysteresis	0.02%
Control unit	
Digital output	Maximum force
Analog output	0 to +9 VDC
Display	3-place LCD
Voltage	110…240 V
Total weight	app. 6 kg
Mouse Grips	
Standard Grip	
Dimensions	Approx. 96 x 105 mm, wire 2 mm diameter, angled at 20 degrees
Minimum height*	Approx. 4 mm
Maximum height*	Approx. 75 mm
Grasping Grip	
Dimensions	Approx. 60 x 30 mm, wire 2 mm diameter
Minimum height*	Approx. 17 mm
Maximum height*	Approx. 70 mm
Rat Grips	
Mesh Grip	
Dimensions	Approx. 98 x 86 mm, wire 2 mm diameter, hole sizes 10 x 10 mm, angled at 25 degrees
Minimum height*	Approx. 6 mm
Maximum height*	Approx. 75 mm
Grasping Grip	
Dimensions	Approx. 60 x 30 mm, wire 2 mm diameter
Minimum height*	Approx . 17 mm
Maximum height*	Approx . 70 mm

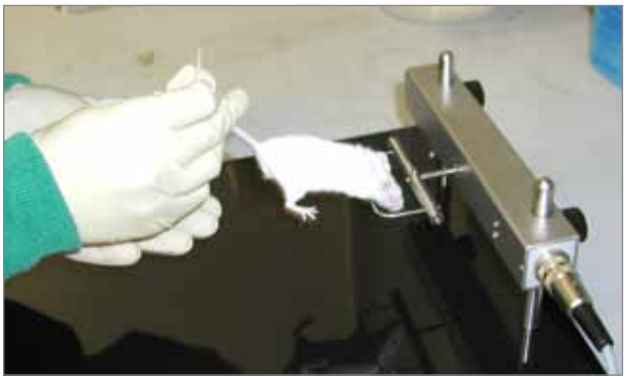
*front rung, above base plate

Performing an Experiment…

… with the BASIC system

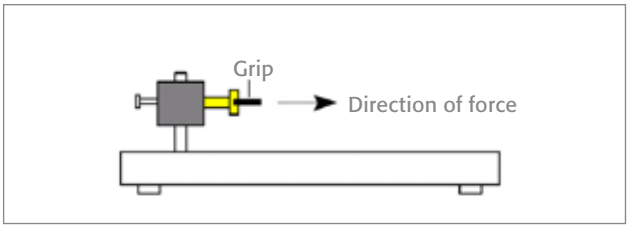
The chart recorder – a recorder with an input range of 0 ... 10V is required – has to be calibrated first in order to read off absolute values from the waveform. This is done using a calibration weight.

The measurement is then started by triggering the **gripping reflex** of the animal.



Sensor module shown with grasping grip for mice

If the animal holds on firmly to the grip then this is pulled backwards with a continuous movement.



The movement should be horizontal to the base plate and in line with the attachment axis of the grip.

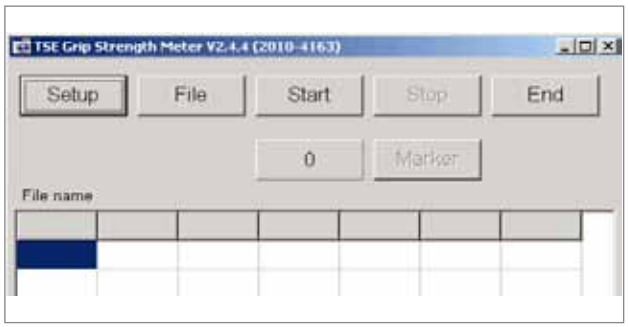
The measured force is outputted on the display of the control unit, and the waveform is displayed on the chart recorder.

When the animal releases the grip the measured value is shown on the display (this value is "frozen" by the instrument).

After a trial is finished the next experiment can be started immediately without resetting the display.

… with the PC BASED system

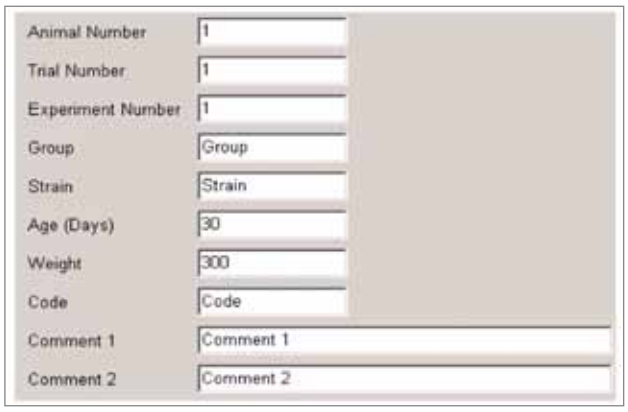
When the TSE GSM program has been started the following buttons are available on the main screen:



GSM main screen

Setup Setup window for entering control parameters
File Definition of data file
Start Starts data acquisition mode
Stop Stops data acquisition mode
End Exits the program
Marker Creates a text entry in the results table

Now the Animal and Trial Data…



Animal and trial data

…as well as the Control Parameters have to be entered in the setup.

Sensor Limit: Here the maximum capacity (Pond) of your system has to be selected in order to obtain correct measurements: 600 (mice) or 2000 (rats).

Store Date (on/off): Clicking the option on stores current date with each measuring value.

Store Time (on/off): Clicking the option on stores current time with each measuring value.

Store Maximum (on/off): Activating this checkbox stores the maximum value during a single measurement. When the animal is pulled backwards the software measures the force continuously. In some cases the value output by the display on the instrument and by the green display area is not the maximum value. In this case it might be interesting for the user to also have the maximum value outputted.

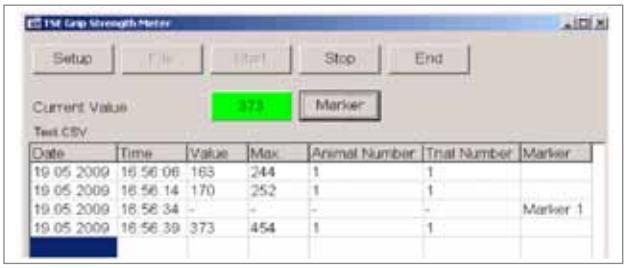
Com Port No.: Number of the serial port where the sensor is connected (USB connections are addressed as virtual COM ports).

Control parameters

The **List Separator** and the **Decimal Separator** for the export file are also selected here.

With the START button the system is put into the "Ready" state. The gripping reflex of the animal is now triggered.

The measured force is outputted on the control unit display. When the animal releases the grip the measured value is shown on the display of the instrument - this value is now transferred to the PC and displayed in the trial monitor of the GSM software.



Display of measured values

Simultaneously the value is stored in a CSV file.

After a trial is finished the next experiment can be started immediately without resetting the display.

The CSV result file can be used for further-reaching statistical calculations in statistics packages (e.g. SAS) or spread sheets (e.g. EXCEL).

Partial List of Users

- AMT, Amsterdam, The Netherlands
- ARMGO Pharma, Inc., New York, NY, USA
- Bayerische Julius-Maximilians-Universität Würzburg, Würzburg, Germany
- Chang Gung Memorial Hospital, Niaosong Township, Kaohsiung County, Taiwan
- Charité - Universitätsmedizin Berlin, Berlin, Germany
- Columbia University, New York, NY, USA
- CSL Behring Biotherapies for LiveTM, Marburg, Germany
- DSM Nutritional Products Ltd., Kaiseraugst, Switzerland
- DZNE, Rostock, Germany
- EGIS Pharmaceuticals Ltd., Budapest, Hungary
- Evotec Neurosciences GmbH, Hamburg, Germany
- F. Hoffmann-La Roche AG, Basel, Switzerland
- Freie Universität Berlin, Berlin, Germany
- Georg-August-Universität Göttingen, Göttingen, Germany
- GSF-Forschungszentum f. Umwelt & Gesundheit, GmbH, Neuherberg, Germany
- Harvard Medical School HMS, Boston, MA, USA
- Heinrich-Heine-Universität, Düsseldorf, Germany
- Indiana University School of Medicine, Indianapolis, IN, USA
- Industrial Toxicology Research Centre, Lucknow (U.P.), India
- Ingenium Pharmaceuticals AG, Neuherberg, Germany
- IVAX Drug Research Institute Ltd., Budapest, Hungary
- Johann Wolfgang Goethe-Universität, Frankfurt/Main, Germany
- Johannes Gutenberg-Universität Mainz, Mainz, Germany
- Johns Hopkins University, Baltimore, MD, USA
- Karolinska Institute, Stockholm, Sweden
- King's College London, London, Great Britain
- Leibniz-Institut für Neurobiologie, Magdeburg, Germany
- Max-Planck-Institut für Experimentelle Medizin, Göttingen, Germany
- MDS Pharma Services, Bothell, WA, USA
- MedImmune, LLC, Gaithersburg, MD, USA
- Medizinische Universität Graz, Graz, Austria
- National University of Singapore, Singapore, Singapore
- Netherlands Institute for Neuroscience (NIN), AZ Amsterdam, The Netherlands
- Sanofi-Aventis Deutschland GmbH, Frankfurt/Main, Germany
- SANOFI-SYNTHELABO RECHERCHE, Toulouse, France
- Slovak Academy of Sciences, Bratislava, Slowakia Republic
- Universita di Padova, Padova, Italy
- University College London, London, Great Britain
- University of California - San Diego - UCSD, LaJolla, CA, USA
- University of California, Irvine, Irvine, CA, USA
- University of Helsinki, Helsinki, Finland
- University of Melbourne, Melbourne, VIC, Australia
- University of Pennsylvania, Philadelphia, PA, USA
- University of Washington, St. Louis, MO, USA
- Universitätsklinik Hamburg-Eppendorf - UKE, Hamburg, Germany
- Universiteit Leiden, RA Leiden, The Netherlands
- vivo Science GmbH, Gronau, Germany
- Yale University, New Haven, CT, USA

Publications

- **Strong MK, Blanco JE, Anderson KD, Lewandoski G, Steward O.** An investigation of the cortical control of forepaw gripping after cervical hemisection injuries in rats. Experimental Neurology 2009; 217: 96-107.
- **Schmidt S, Richter M, Montag D, Sartorius T, Gawlik V, Hennige AM, Scherneck S, Himmelbauer H, Lutz SZ, Augustin R, Kluge R, Ruth P, Joost HG, Schürmann A.** Neuronal functions, feeding behavior, and energy balance in Slc2a3+/- mice. American Journal of Physiology - Endocrinology and Metabolism 2008; 295(5): E1084-94.
- **Shyu WC, Lin SZ, Chiang MF, Chen DC, Su CY, Wang HJ, Liu RS, Tsai CH, Li H.** Secretoneurin promotes neuroprotection and neuronal plasticity via the Jak2/Stat3 pathway in murine models of stroke. The Journal of Clinical Investigation 2008; 118(1): 133-48.
- **Wallis K, Sjögren M, van Hogerlinden M, Silberberg G, Fisahn A, Nordström K, Larsson L, Westerblad H, Morreale de Escobar G, Shupliakov O, Vennström B.** Locomotor deficiencies and aberrant development of subtype-specific GABAergic interneurons caused by an unliganded thyroid hormone receptor alpha1. The Journal of Neuroscience 2008; 28(8): 1904-15.
- **Vauti F, Goller T, Beine R, Becker L, Klopstock T, Holter SM, Wurst W, Fuchs H, Gailus-Durner V, de Angelis MH, Arnold HH**. The mouse Trm1-like gene is expressed in neural tissues and plays a role in motor coordination and exploratory behaviour. Gene 2007; 389: 174-85.
- **Morellini F, Schachner M.** Enhanced novelty-induced activity, reduced anxiety, delayed resynchronization to daylight reversal and weaker muscle strength in tenascin-C-deficient mice. European Journal of Neuroscience 2006; 23(5): 1255-68.
- **Shyu WC, Lin SZ, Chiang MF, Su CY, Li H**. Intracerebral peripheral blood stem cell (CD34+) implantation induces neuroplasticity by enhancing beta1 integrin-mediated angiogenesis in chronic stroke rats. The Journal of Neuroscience 2006; 26(13): 3444-53.
- **Anderson KD, Gunawan A, Steward O.** Quantitative assessment of forelimb motor function after cervical spinal cord injury in rats: Relationship to the corticospinal tract. Experimental Neurology 2005; 194(1): 161-74.
- **Beglopoulos V, Montag-Sallaz M, Rohlmann A, Piechotta K, Ahmad M, Montag D, Missler M.** Neurexophilin 3 is highly localized in cortical and cerebellar regions and is functionally important for sensorimotor gating and motor coordination. Molecular and Cellular Biology 2005; 25(16): 7278-88.
- **Tyynismaa H, Mjosund KP, Wanrooij S, Lappalainen I, Ylikallio E, Jalanko A, Spelbrink JN, Paetau A, Suomalainen A**. Mutant mitochondrial helicase Twinkle causes multiple mtDNA deletions and a late-onset mitochondrial disease in mice. Proceedings of the National Academy of Sciences 2005; 102(49): 17687-92.
- **Anderson KD, Abdul M, Steward O**. Quantitative assessment of deficits and recovery of forelimb motor function after cervical spinal cord injury in mice. Experimental Neurology 2004; 190: 184-91.
- **Baier PC, Schindehutte J, Thinyane K, Flugge G, Fuchs E, Mansouri A, Paulus W, Gruss P, Trenkwalder C**. Behavioral changes in unilaterally 6-hydroxy-dopamine lesioned rats after transplantation of differentiated mouse embryonic stem cells without morphological integration. Stem Cells 2004; 22(3): 396-404.
- **Liebetanz D, Hagemann K, von Lewinski F, Kahler E, Paulus W**. Extensive exercise is not harmful in amyotrophic lateral sclerosis. European Journal of Neuroscience 2004; 20(11): 3115-20.
- **Schmidt A, Marescau B, Boehm EA, Jan Renema WK, Peco R, Das A, Steinfeld R, Chan S, Wallis J, Davidoff M, Ullrich K, Waldschutz R, Heerschap A, De Deyn PP, Neubauer S, Isbrandt D**. Severly altered guanidino compound levels, disturbed body weight homeostasis and impaired fertility in a mouse model of guanidinoacetate N-methyltransferase (GAMT) deficiency. Human Molecular Genetics 2004; 13(9): 905-21.
- **Zheng C, Nennesmo I, Fadeel B, Henter JI**. Vascular endothelial growth factor prolongs survival in a transgenic mouse model of ALS. Annals of Neurology 2004; 56(4): 564-7.
- **Montag-Sallaz M, Montag D**. Severe cognitive and motor coordination deficits in Tenascin-R-deficient mice. Genes, Brain and Behavior 2003; 2: 20-31.
- **Brakebusch C, Seidenbecher C, Asztely F, Rauch U, Matthies H, Meyer H, Krug M, Bockers T, Zhou X, Kreutz M, Montag D, Gundelfinger E, Fassler R**. Brevican-deficient mice display impaired hippocampal CA1 long-term potentiation but show no obvious deficits in learning and memory. Molecular and Cellular Biology 2002; 21: 7417-27.
- **Montag-Sallaz M, Schachner M, Montag D**. Misguided axonal projections, neural cell adhesion molecule 180 mRNA upregulation, and altered behavior in mice deficient for the close homolog of L1. Molecular and Cellular Biology 2002; 22: 7967-81.

Ordering Information

Cat. No.	Description
1. Mouse Systems	
BASIC	
303500-M/E-1	**Grip Strength Meter Mouse, BASIC** **600g load cell *** Consisting of: Grip Strength Meter sensor module for mouse, complete with 2 grips (mounted on a base plate, height-adjustable) + amplifier system **Grips:** ■ Standard grip "4-Paw-Measurement" (fore- and hindlimbs), angled at 20 degrees ■ Grasping grip "2-Paw-Measurement" (forelimbs only), straight **Technical data:** ■ Measuring range 0-600 g (alternative 0-1 kg, 0-2 kg, 0-3 kg, 0-6 kg) ■ Safe overload 300 % R.C. ■ Ultimative overload 400 % R.C. ■ Accuracy +/- 0.02 % R.O. ■ Repeatability +/- 0.01 % R.O.
PC BASED	
303500-M/C-1	**Grip Strength Meter Mouse, PC-BASED** **600g load cell *** Consisting of: Grip Strength Meter sensor module for mouse, complete with 2 grips (mounted on a base plate, height-adjustable) + amplifier system + software package GSM for WINDOWS **Grips:** ■ Standard grip "4-Paw-Measurement" (fore- and hindlimbs), angled at 20 degrees ■ Grasping grip "2-Paw-Measurement" (forelimbs only), straight **Technical data:** ■ Measuring range 0-600 g (alternative 0-1 kg, 0-2 kg, 0-3 kg, 0-6 kg) ■ Safe overload 300 % R.C. ■ Ultimative overload 400 % R.C. ■ Accuracy +/- 0.02 % R.C. ■ Repeatability +/- 0.01 % R.O. For connection to PC via COM (RS232) port or USB connector

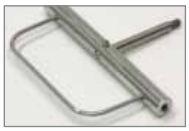
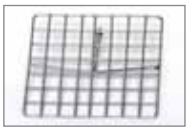
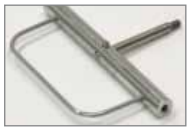
Ordering Information

Cat. No.	Description
Sensor Module	
303500-M/SEN	**Grip Strength Meter Sensor Module Mouse** **600g load cell *** without base plate For connecting to an existing Grip Strength Meter Consisting of: Grip Strength Meter sensor module for mouse, complete with 2 grips **Grips:** ■ Standard grip "4-Paw-Measurement" (fore- and hindlimbs), angled at 20 degrees ■ Grasping grip "2-Paw-Measurement" (forelimbs only), straight **Technical data:** ■ Measuring range 0-600 g (alternative 0-1 kg, 0-2 kg, 0-3 kg, 0-6 kg) ■ Safe overload 300 % R.C. ■ Ultimative overload 400 % R.C. ■ Accuracy +/- 0.02 % R.O. ■ Repeatability +/- 0.01 % R.O.
2. Rat Systems	
BASIC	
303500-R/E-1	**Grip Strength Meter Rat, BASIC** **2000g load cell **** Consisting of: Grip Strength Meter sensor module for rat, complete with 2 grips (mounted on a base plate, height-adjustable) + amplifier system **Grips (Forelimbs Only):** ■ Mesh grip, angled at 25 degrees ■ Grasping grip, straight **Technical data:** ■ Measuring range 0-2 kg (alternative 0-600 g, 0-1 kg, 0-3 kg, 0-6 kg) ■ Safe overload 300% R.C. ■ Ultimate overload 400% R.C. ■ Accuracy +/- 0.02% R.O. ■ Repeatability +/- 0.01% R.O.

Ordering Information

Cat. No.	Description
PC BASED	
303500-R/C-1	**Grip Strength Meter Rat, PC-BASED** **2000g load cell **** Suited for 2-Paw-Measurement (Forelimbs) Consisting of: Grip Strength Meter sensor module for rat, complete with 2 grips (mounted on a base plate, height-adjustable) + amplifier system + software package GSM for Windows **Grips (Forelimbs only):** ■ Mesh grip, angled at 25 degrees ■ Grasping grip, straight **Technical data:** ■ Measuring range 0-2 kg (alternative 0-600 g, 0-1 kg, 0-3 kg, 0-6 kg) ■ Safe overload 300% R.C. ■ Ultimate overload 400% R.C. ■ Accuracy +/- 0.02% R.O. ■ Repeatability +/- 0.01% R.O. For connection to PC via COM (RS232) port or USB connector.
Sensor Module	
303500-R/SEN	**Grip Strength Meter Sensor Module for Rat** **2000g load cell **** without base plate For connecting to an existing Grip Strength Meter Consisting of: Grip Strength Meter sensor module for rat, complete with 2 grips **Grips (Forelimbs only):** ■ Mesh grip, angled at 25 degrees ■ Grasping grip, straight **Technical data:** ■ Measuring range 0-2 kg (alternative 0-600 g, 0-1 kg, 0-3 kg, 0-6 kg) ■ Safe overload 300% R.C. ■ Ultimate overload 400% R.C. ■ Accuracy +/- 0.02% R.O. ■ Repeatability +/- 0.01% R.O.

Ordering Information

Cat. No.	Description	
3. Individual Components		
Grips Mouse		
303500-M/GST		**Spare Standard Grip** for Grip Strength Meter Mouse "4-Paw-Measurement" (fore- and hindlimbs), angled at 20 degrees
303500-M/GGRASP		**Spare Grasping Grip** for Grip Strength Meter Mouse for "2-Paw-Measurement" (forelimbs), straight
Grips Rat		
303500-R/GMESH		**Spare Mesh Grip** for Grip Strength Meter Rat "2-Paw-Measurement" (forelimbs), angled at 25 degrees
303500-R/GGRASP		**Spare Grasping Grip** for Grip Strength Meter Rat for "2-Paw-Measurement" (forelimbs), straight
Various		
303500-M+R-BP		**Grip Strength Meter Sensor Base Plate for Mouse and Rat**
303500-M+R/AMP		**Grip Strength Meter Amplifier System for Mouse and Rat**
303500-M+R/SW		**Grip Strength Meter Software Package for Grip Strength Meter Mouse and Rat**

* This is the standard sensor for mice. Other force ranges available are: 0-1kg, 0-2kg, 0-3kg, 0-6kg.

** This is the standard sensor for rats. Other force ranges available are: 0-600g, 0-1kg, 0-3kg, 0-6kg.

Please note that the “g” unit given in the table above is equivalent to “pond”.

Product Overview

This overview illustrates additional products which are supplied by TSE Systems. Detailed information concerning each of the items listed below can be found on our website, for any additional information please do not hesitate to contact us:

- **Behavior**
  Conditioning, Activity & Exploration, Video Tracking, Mazes, Startle Response, Anxiety & Depression, Motor Function & Performance, Rotameter

- **PhenoMaster / LabMaster**
  Calorimetry, Drinking & Feeding & Body Weight, Home Cage Activity, Running Wheel

- **New*Behavior* Products**
  IntelliCage (cognitive screening for up to 16 mice living in a social group in a home cage environment)
  NeuroLogger (4 channels wireless EEG recording & activity)

- **Kinematic Analysis**
  MotoRater (evaluation of locomotor functions using high-speed video tracking: Ladder / Walking / Wading / Swimming)

- **Analgesia**
  Hot Plate, Tail Flick, Randall Selitto, Power Meter (Incapacitance Tester)

- **Physiology**
  Blood Pressure Monitoring – invasive & non-invasive, Telemetry, Volume Meter, Bronchospasm Measuring, Animal Respirators, Anesthesia Equipment

- **Inhalation**
  Head Nose Only and Whole Body Exposure Units, Aerosol Generation & Conditioning, Aerosol Analysis, Inhalation Software

- **Stereotaxic Instruments**

- **Isolated Organs**
  Organ Bath Systems, Langendorff and Working Heart Systems

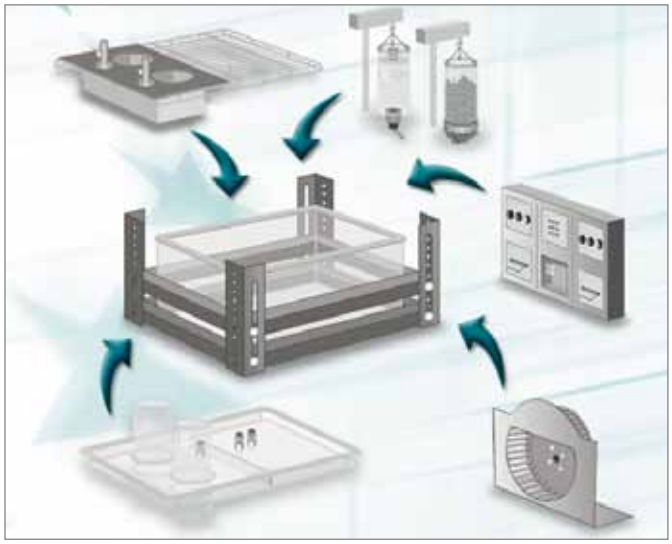
- **Microtomes**
  Krumdieck Tissue Slicer

- **Pumps & Infusion**
  Syringe Pumps, Animal Infusion Systems

- **Surgery & Handling**
  Operating Tables, Homeothermic Blankets, Temperature and ECG Pads

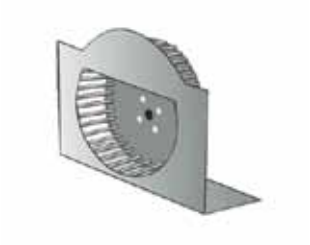
PhenoMaster - Overview

TSE PhenoMaster System is an automated modular high throughput research system for the assessment of specific gene associated functions on the behavioral and physiological phenotype of small laboratory animals. It allows for the multi-dimensional in-vivo phenotyping of individual mutant strains by means of automated long-term monitoring of the animals in a home cage environment, by integrated operant behavioral assays as well as by additional temporary dedicated behavioral test paradigms.



PhenoMaster – modular system concept

Drinking & feeding weighing stations



Modular running wheel

Dedicated home cage lid (CaloCage)

Home cage with infrared light-beam frame

Modules & options available:

- Spontaneous home cage activity (infrared light-beam frame X,Y,Z)
- Drinking & feeding behavior
- Body weight monitoring
- Voluntary running wheel activity with additional functionalities (time/ distance/ workload control, automated motor skill testing)
- Operant wall for cognitive tests
- Illumination (selective / aversive light stimuli)
- Air-puff or electrical shock option for aversive stimulation
- Indirect calorimetry for metabolic phenotyping
- Telemetry / transponders for physiological phenotyping

Temporary paradigms:

- Open field test
- Hole-board test
- Light / dark test
- Place preference

Operant wall

For further information please refer to the PhenoMaster Website (www.Phenomaster.com) or the dedicated TSE PhenoMaster brochure.

System control, data acquisition, storage and data analysis tools are provided by the PhenoMaster platform. Flexible data export offers the link to professional data mining solutions. PhenoMaster thus opens a new dimension for phenomics approaches.

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.

For further information please contact us.

North America Headquarters
TSE Systems, Inc.
17826 Edison Avenue
Chesterfield, MO 63005
USA

Phone: +1-636-536-6502
Fax: +1-636-536-0840

Toll-Free (USA / Canada)
Phone: +1-866-466-8873
Fax: +1-866-467-8873

European / Asian Headquarters
TSE Systems GmbH
Siemensstr. 21
61352 Bad Homburg
Germany

Phone: +49-(0)6172-789-0
Fax: +49-(0)6172-789-500

India

Axiom Biotek, Inc.
Inc. Uniline House,
2nd Floor
198 / 23, Ramesh Market,
East of Kailash
New Delhi 110 065
India

Phone: +91-11-4657-9762
Fax: +91-11-2648-1469
E-mail: India@TSE-Systems.com

info@TSE-Systems.com www.TSE-Systems.com

TSE_Grip Strength Meter System_20101014