



Modular Universal Surface Tester



Modular tester for friction-fretting-wear, scratch, indentation, adhesion, stiction, viscosity,...on the MICRO scale

Featuring :

6 Decades of Forces : 5 μ N to 10 N

5 Decades of Displacement : 0.1 μ m to 20000 μ m

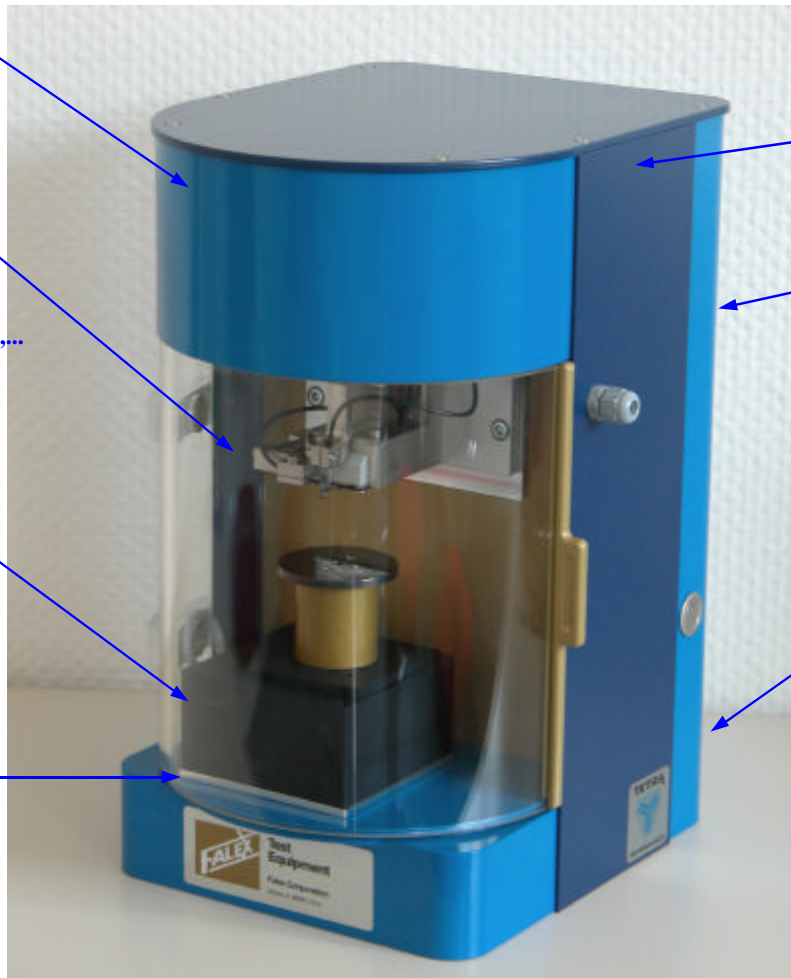
Highest Resolution : 0.020 μ m / 0.2 μ N

Instrument Module and Electronics
Vertical travel: 40 mm

Instruments
Friction-Wear Indenter, Scratch tip, Profiler, Viscosity-Adhesion sensor,...

Motion Module
Pin-on-disk
Reciprocating
Fretting
+
Integrated electronics

Sample Positioning & Scanning Mode
X-Y : 20 mm



Embedded PC
Real-Time Linux
for stand-alone operation

Data Acquisition Electronics
Flash Memory

Connectors
Power Supply
2 x USB
RS232
Ethernet
Monitor
Keyboard
Mouse

For the testing of :
Coatings, Soft Materials
Biological Materials
Additive Interactions

Self -assembled Monolayers
Nanomaterials, Electrical Contacts,
Dental materials, Paper, Textiles, ...



With TETRA Technology

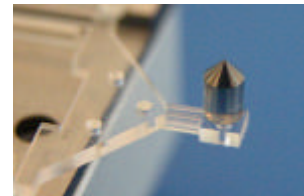
Experiment examples

Tribological :
Dry Friction/Wear
Fretting Resistance
Viscosity, Lubricity
Stribeck Curves

Surface Engineering :
(Micro) Scratch resistance
Adhesion of thin coating
Indentation, Surface fatigue
Surface Mechanical Properties

Mechanical :
MEMS Mechanical properties
Cantilever calibration

Physical testing :
Stiction
Adhesion



YOUR ADVANTAGES :

Modular

Plug-and-Play interchangeable Instrument and Motion Modules, give the largest variation of possible experiments
Start with a Base unit, expand it with additional modules later

Universal

Many different experiments, where surface interaction forces are measured in the micro range with the highest precision on the market.

Independent choice of sensors and motion modules together with dedicated software modules leads to unique experiments

Surface

MEMS and Nano-technology advances require in-depth understanding of Surface Interactions.

On smaller components, surface effects are dominant. Stiction and adhesion are major interactions.

Tester

US Patented technology
Developed according to the Falex high quality standard the advantages for the user are clear :

Ease of use : Interchangeable and manageable counterbody materials, only size limitations.

Interpretation : real physical force interactions through direct dead weight calibration of each cantilever

Precision : Near AFM precision without the calibration difficulties and cost

Features and Specifications

Positioning and scanning module

20 x 20 mm independent axis

Displacement modules

LMS 20 µm/s	0.1 - 20000 µm	10 - 30000
Reciprocating	0.1 - 500 µm	< 15 Hz
Fretting	0.1 - 40 µm	< 1000 Hz
Rotating	5 - 120 rpm (pin-on-disk)	6 - 46 mm Ø

Load ranges (interchangeable 2 axis sensors)

Glass cantilever	5 µN - 1000 µN
Steel cantilever (s)	1 mN - 1000 mN
Strain gage	10 mN - 10000 mN
Special cantilevers :	profiling, stiction, adhesion

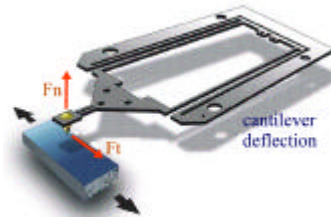
The force ranges are determined by CANTILEVER ELASTIC MODULUS

Special experiments require optimized X- and Z-modulus

- stiction : very low Z
- profiling : low Z & high X
- indentation : high Z & high X
- adhesion : very low Z
- viscosity : low X

Environment

Temperatures ambient to 45°C standard
Closed test environment for humidity control (15 - 85% RH) or inert gasses (dry air, N₂, noble, CO₂)



Control unit :

Embedded Real Time Linux PC runs experiments and controls data-acquisition
Screen and keyboard directly connected to tester. Adaptable Web-based Interface
Optional remote control (Ethernet)

Internal Data Acquisition :

8 Channels : 10 KHz parallel
16 Bit A/D converter
no phase shift

Data Storage :

Flash Memory card, e.g. 1 GB
Memory Limit warning and Storage indicator
Data transmission to external storage or data treatment and analysis through USB or Ethernet

Graphing and Analysis :

TetraView™ software (optional, bundle software)
- runs on separate PC
- view during or after test
- coefficients/mathematical operations

Optional Features :

Optical imaging: Microscope camera objective with microscope up to 1000 x magnification

Profiling: Optical sensor for contouring, roughness and topography, resolution 20 nm, z-range 300 µm

Electrical conductivity: Measurement between two bodies in relative motion

- Electrical conductivity measurement and data acquisition
- ASTM B896-99 Connectability characteristics of electrical conductor material under fretting conditions

Contact temperature: Direct temperature measurement in the tribocontact under sliding conditions

Customized software: Depending on specific requirements, we can provide customized screens, preprogrammed calculations and special data-acquisition formats.