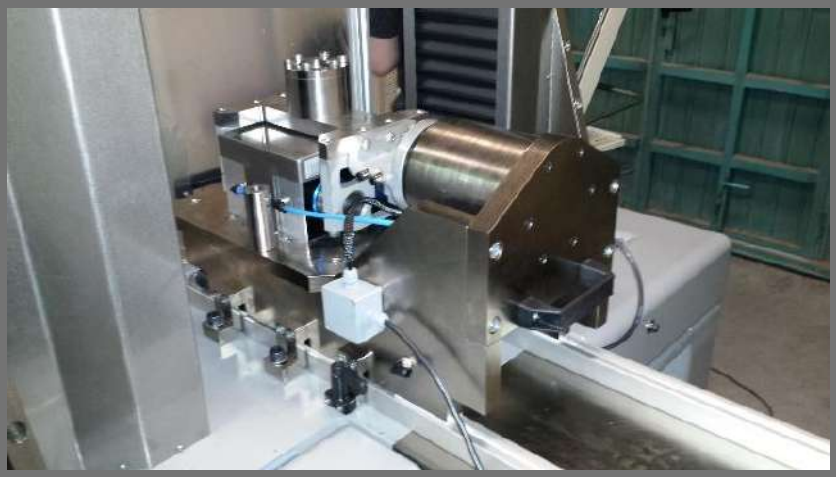
2017

MICROTEST

MTFR Series

Modular Linear Reciprocating and Fretting Tribometers



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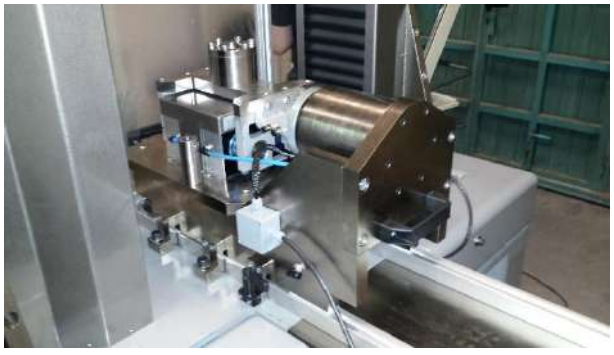
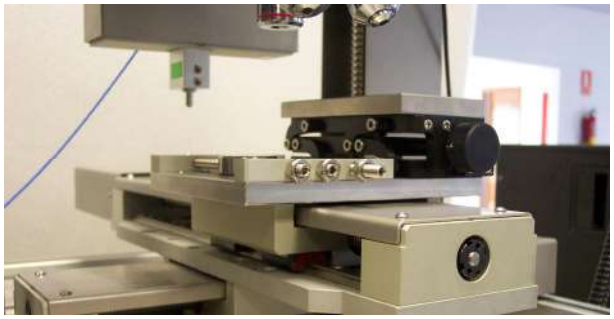
OVERVIEW

MICROTEST MTFR/XXX/Ni, is a fully automatic and computer controlled, reciprocating/ fretting tribometer. Interchangeable modules can be adapted for different type of tests. Different sensor systems and instrumentation can also be added to fulfill individual testing requirements. For this proposal, a linear displacement (reciprocating) drive system along with a high temperature furnace are proposed according to the technical specifications of this tender. Microtest MTFR/XXX/Ni is a high frequency reciprocating tribometer very versatile and suitable for studying the fretting wear characteristics of a wide range of materials and components with different sample geometries.

The basic module allows the use of the equipment for linear reciprocating tests: evaluation of lubricants, materials, components, coatings and surface treatments. The combination with different modules expands its capabilities: high temperature tests, wear fretting tests under normal load, pin-on-disk module, lubrication tests, tribo-corrosion, etc. The equipment can be adapted easily to different contact conditions, including adaption to different sample sizes and shapes. Depending on the range of use, the tribometer can be manufactured to cover strokes from a few micrometers to 30mm or even more. The range of frictional force can reach 1500N or even 2000N in our special version. Typical values of nominal frictional forces are: 50N, 100N, 200N, 500N, 1000N, 1500N and 2000N. The use of linear voice coil actuators allows us to offer a wide range of frequencies from <0.1Hz to 500Hz with amplitudes up to 30mm or more. A modified version of this tribometer makes use of piezo-electric actuators to expand this range of frequencies in the case of fretting tests with lower amplitudes.

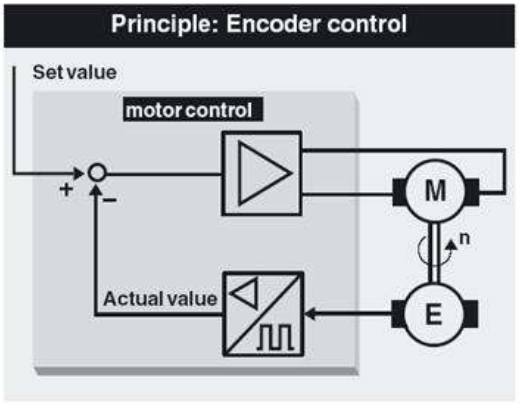
Security elements included: security limit switch detectors, configurable alarms and limits for the measured quantities, emergency stop, electric securities, etc. A overload protection system is installed in the system: force and position alarms (user selectable) to stop the motion and limits for the maximum allowable force or displacement. Different interchangeable modules and sensors can be adapted to this platform and controlled by computer.





MT3-NI-4002 MEASUREMENT AND MOTION CONTROL SYSTEM

An advanced motion control system allows full automation of test sequences using Microtest TRIBOTESTER software. Tests are defined by a sequence of steps, each step containing parameters as set-point, data acquisition rates and alarm level information. Set-points may be adjusted by step change or ramp. The test sequence is followed unless interrupted by the operator or an alarm. Set-points may also be adjusted manually using on screen toggles. The control system is completed with a high speed on-line data acquisition system for: friction force (tangential force), coefficient of friction, normal load, position, wear depth, temperature, stroke position, etc. The acquisition can be programmed for a few cycles at user specified intervals The system is delivered fully and precisely calibrated with traceable certificates for the involved quantities, for in situ measurement of friction and wear (if included). The control system includes the personal computer and the installed software.

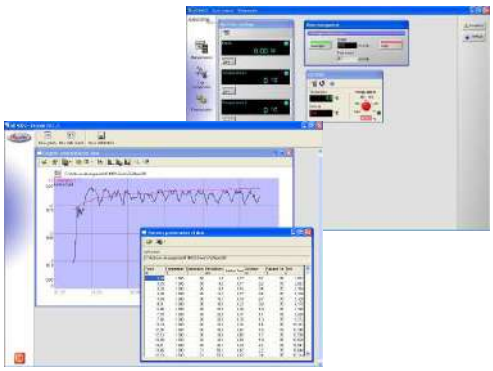


GENERAL FEATURES

- Computer Controlled
- Optional vertical electromechanical system for normal load and displacement.
- High precision motion control electronics.
- High load capacity measurement and control: maximum load from 50N (<0.01N resolution) to 1000N (0.05N resolution) (or 2000N in special cases)
- Exchangeable high resolution force transducers up to 1000N. Normal force and frictional forces.
- Optional in situ Wear Measurement: high resolution capacitive and inductive probes.
- Optional lateral displacement carrier unit, computer controlled.
- Computerized Measurement Control.
- Multi-Channel High Speed Acquisition System.
- Programmable alarms and limits.

TRIBOTESTER SOFTWARE

The TRIBOTESTER MT software provides PC based sequence programmable control and data acquisition. Tests are defined by a sequence of steps, each step containing parameters as set-point, number of cycles, speed, data recording rates and alarm level information. Set-points may be adjusted by step change or ramp. The test sequence is followed unless interrupted by the operator or an alarm. Set-points may also be adjusted manually using on screen toggles.



Selection of the control commands: frequency, number of cycles, etc. The preset timer built in software stops the machine after a set time. Actually, tests can be defined up to more than 500h. For this purpose, the proposed system includes an uninterruptible power source for the whole tribometer and computer.

FORCE MEASUREMENT

Force measurement in reciprocating module: The highly sensitive and repetitive piezoelectric KISTLER 9217A force sensor is used for measuring quasi-static and dynamic friction forces from a few mN upwards. The sensor has a stainless steel sealed case (IP65) and is suitable for this application. The output range is set to match expected friction levels in the contact. The maximum friction level that can be measured is +/- 500 N.

TRIBOMETER MODULES

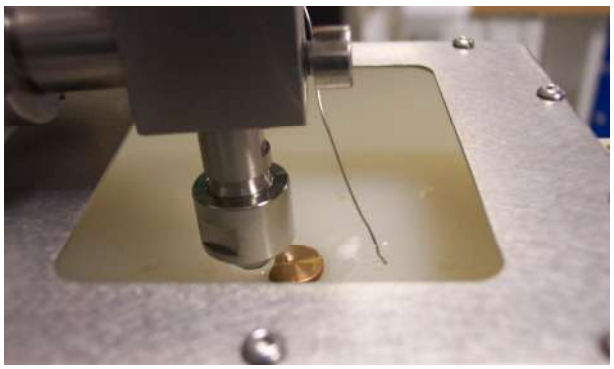
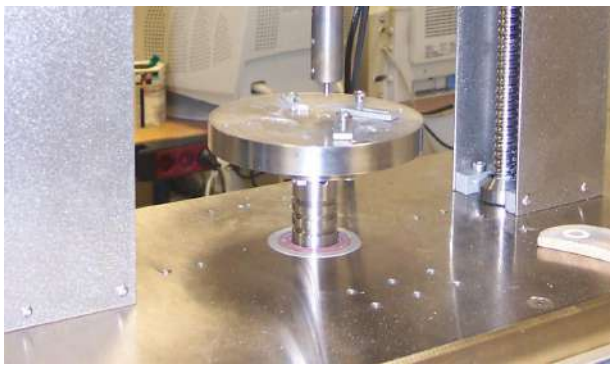
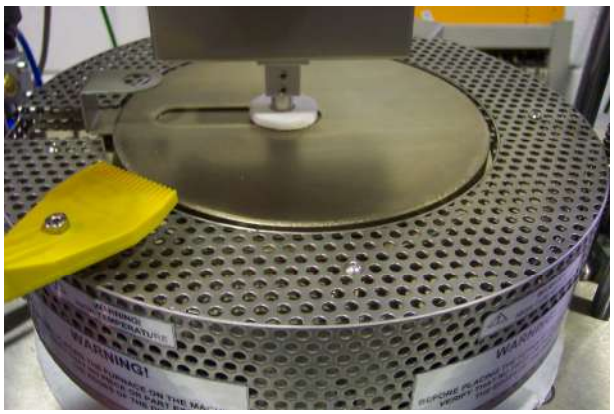
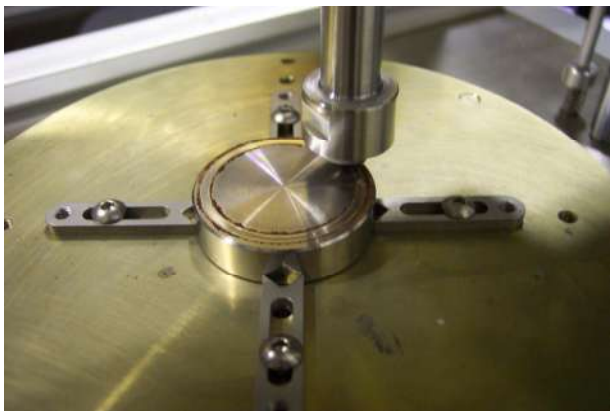
Easily interchangeable rotary, reciprocating, linear and block on ring drives/stages on same tester. Software should automatically detect the installed configuration:

- Rotary Drive Module (computer controlled continuous and oscillating)
- Linear Reciprocating Module (as standard)
- High frequency fretting (piezo-actuator)
- Linear Drive (Long Stroke)
- Block On Ring Module
- High temperature module
- Lubrication unit
- Chamber heating module

OTHER ELEMENTS AND ACCESORIES

Different instrumentation and measuring systems can be integrated in MTEM4 Tribometers, such as:

- High Temperature module (up to 800°C or more).
- Acoustic Emission System (AE Option).
- Lubrication System (LUB option).
- Electrical Contact resistance Measurement.
- Wear sensors
- IR Thermal Imaging System.

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