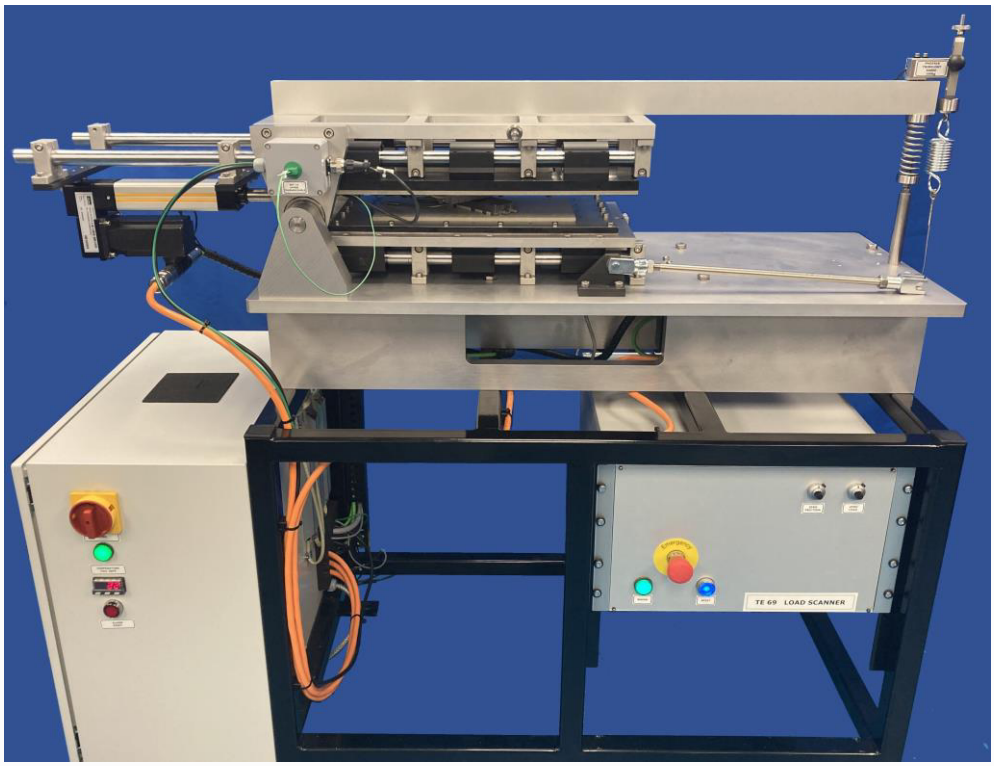
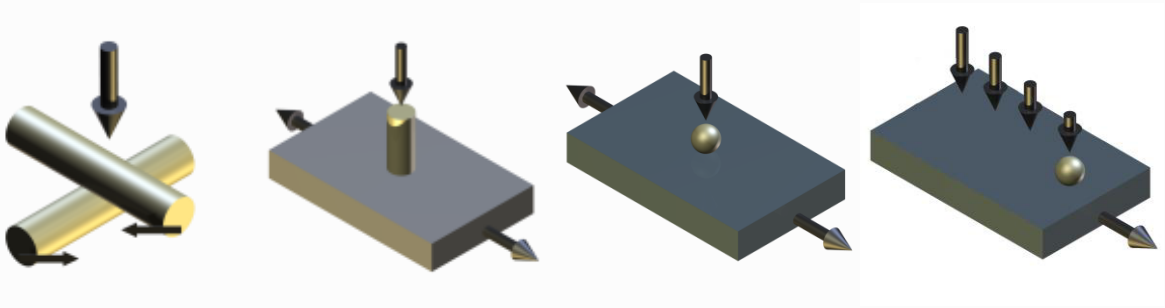
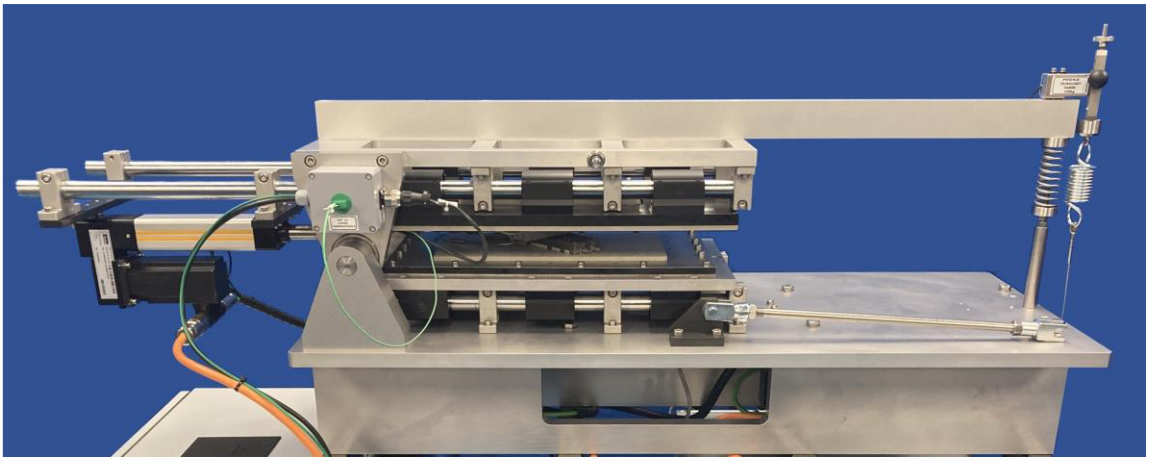
TE 69 LOAD SCANNER



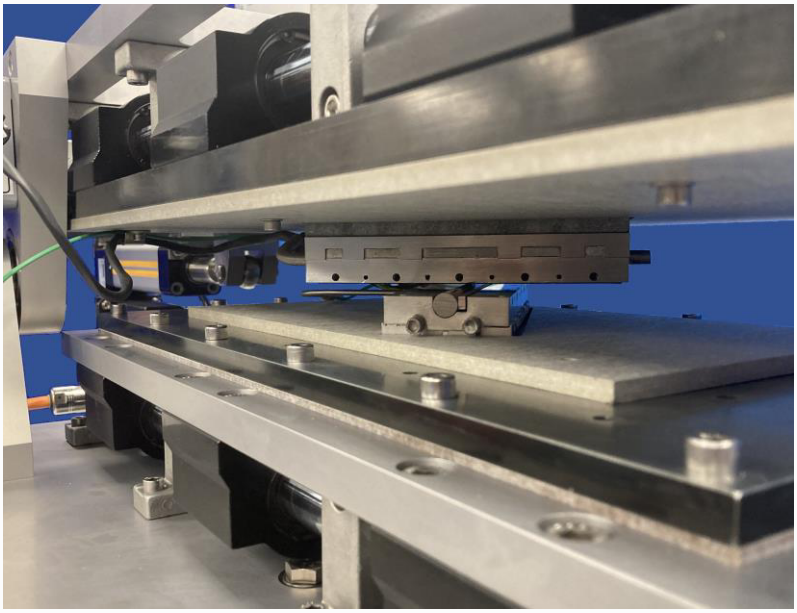


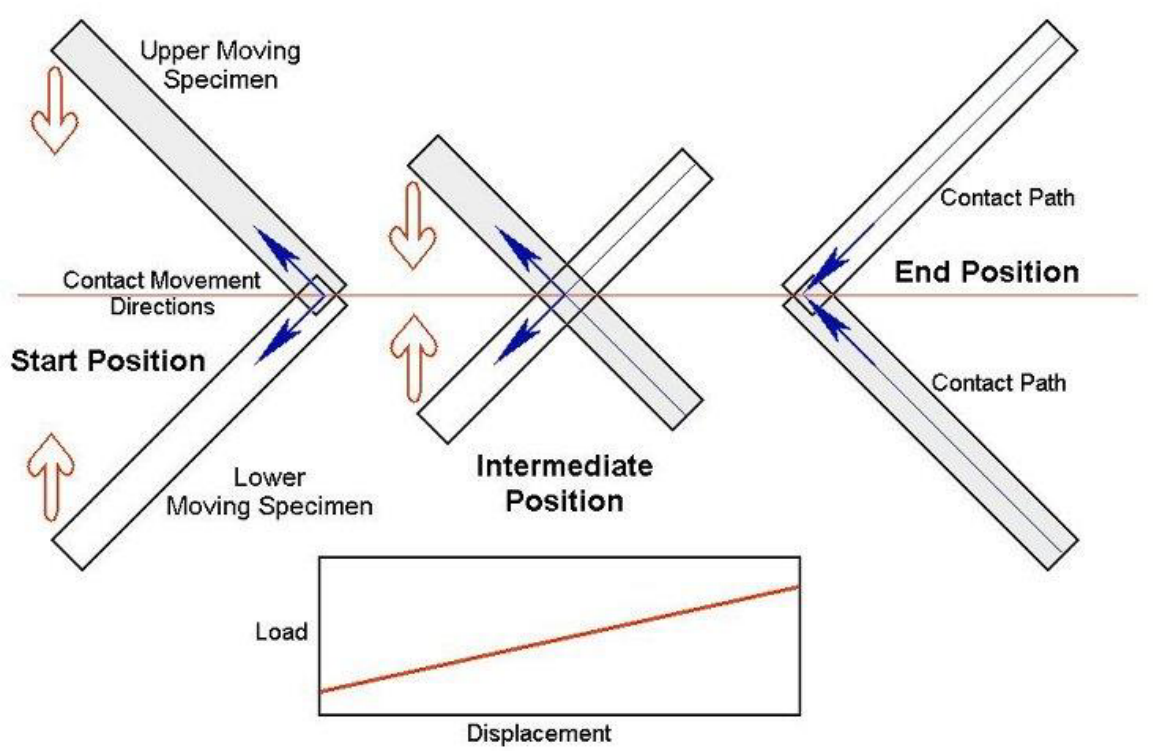
Description

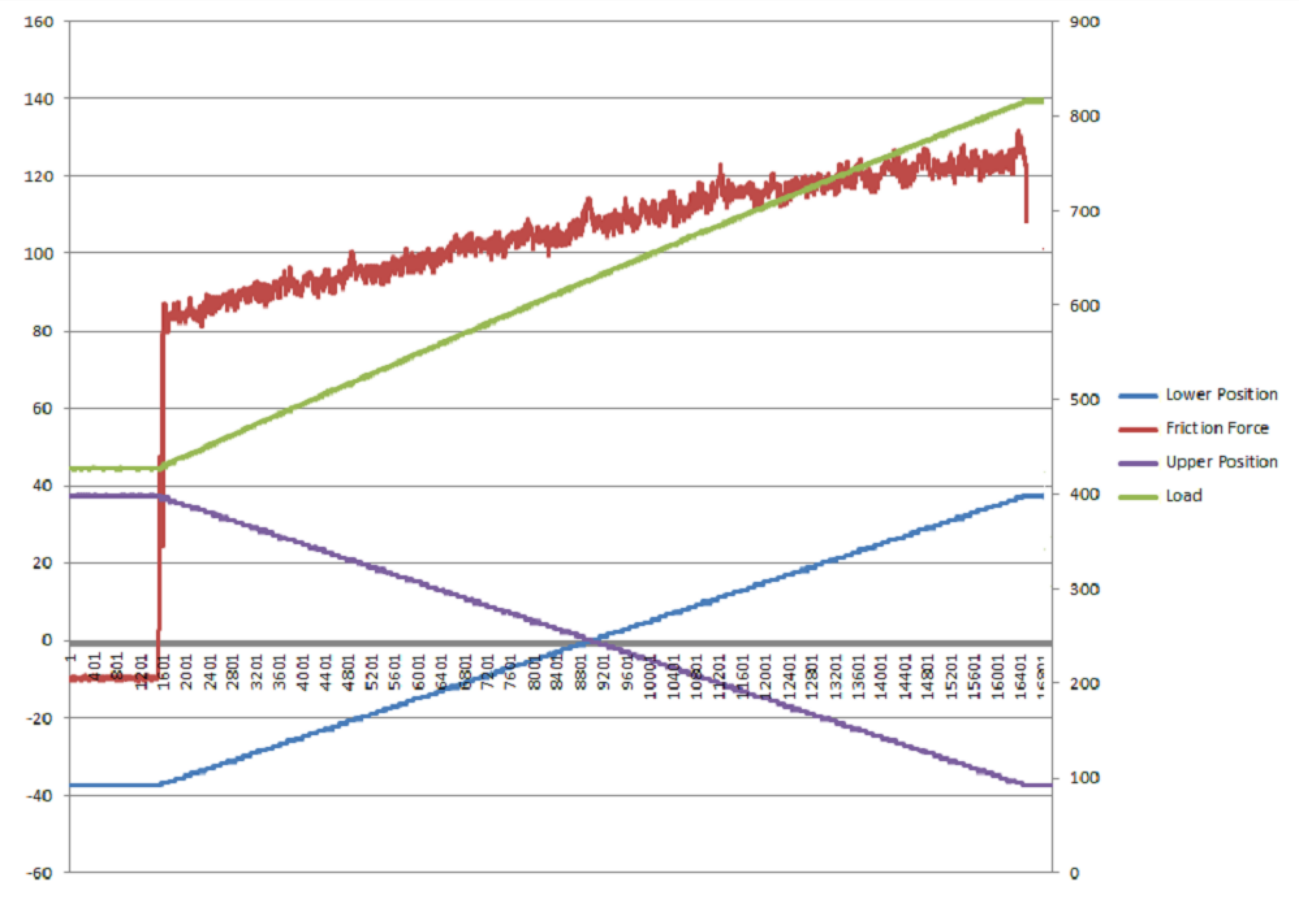
The TE 69 Load Scanner is based on modified version of an instrument developed by Professors Sture Hogmark and Staffan Jacobson at Uppsala University, Department of Materials Science, Sweden. The original Uppsala design has just one actuator to generate sliding motion, while at the same time tensioning a spring, to apply load. With the TE 69, the samples are indexed and the load applied by three independently controlled, but synchronised motion, actuators. This provides a significant increase in the functionality of the machine.



The standard load scanner test configuration is used for assessing the friction and wear properties of materials and lubricants. Two elongated test specimens, preferably bars or rods, are used. The orientation of the test specimens and their relative sliding motion during testing is arranged in such a way that the contact spot moves along a contact path on each specimen; each spot along this path on one specimen will only make contact with one spot on the other specimen, and vice-verse. The contact spot is the area over which the contact load is distributed.




Upper Moving Specimen
Contact Movement Directions
Start Position
Lower Moving Specimen
Intermediate Position
Contact Path
End Position
Contact Path
Load
Displacement


160
140
120
100
80
60
40
20
0
-20
-40
-60
900
800
700
600
500
400
300
200
100
0
Lower Position
Friction Force
Upper Position
Load

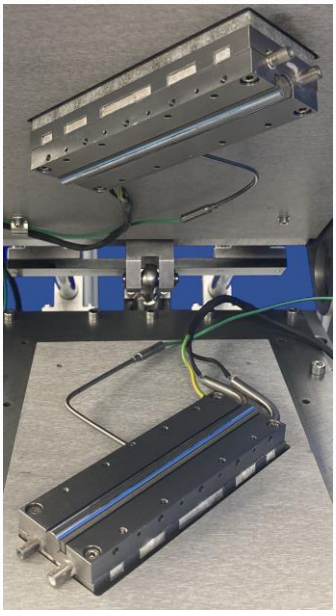
The relative motion is generated by two servo-controlled ball-screw actuators, with one connected to the lower specimen carriage and the other to the upper specimen carriage. The carriages are moved synchronously, in equal but opposite directions, so that the point of contact does not move relative to the machine.

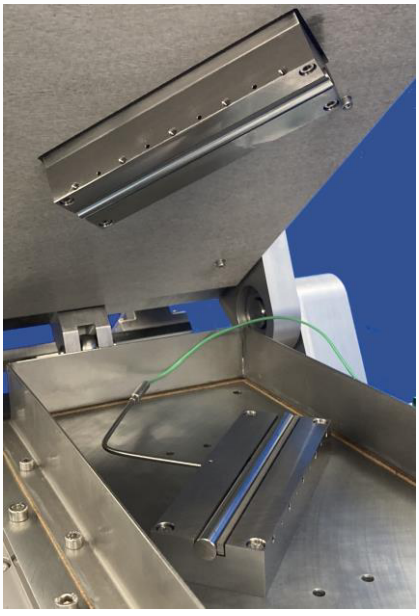
The upper specimen carriage is mounted on a pivoted lever arm and load is applied by means of a pulley mechanism and spring, connected between the arm and a third servo actuator. This allows control of the load profile, independent of the motion control. Instead of the load rising and falling with forward and reverse motion, as per the original Uppsala design, the system can be programmed to apply a steady or increasing load on the forward stroke, but remove the load for the reverse stroke, thus producing repeated, unidirectional motion.

Standard Load Scanner Applications

A single pass experiment resembles the test procedure often used in scratch testing of coated specimens. For coatings evaluation, it is normal to have one specimen coated and select the material from the practical application, for the counter specimen.

Reciprocating sliding tests, with stroke-wise load variation, can be used to produce conditions ranging from mild wear to scuffing, at different positions on a single pair of specimens.

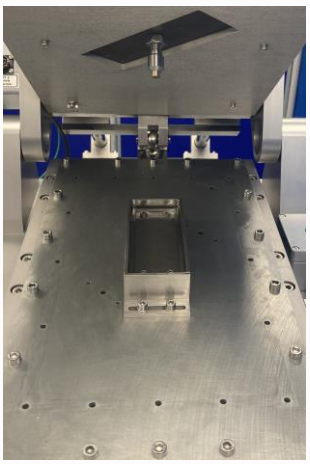
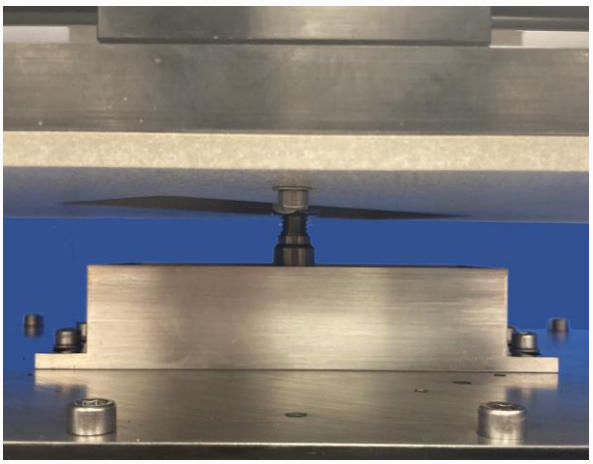




Tests may be run either dry, with the rod samples carried on individual heater blocks, or lubricated, with the lower rod sample carried in a heated lubricant bath.

Alternative Configurations

With the upper specimen carriage parked, the upper sample can be replaced by a pin or an indenter. The lower specimen can now be a plate and the machine used in reciprocating pin on plate mode.


Independent control of the load allows tests to be run with a steady state load, or with a ramped load as in a conventional scratch test.

Control and Data Acquisition

COMPEND 2000 control and data acquisition software, in conjunction with Phoenix Tribology's own USB interface module, provides automatic control of load, speed, stroke length, temperature and test duration, combined with data logging of all measured parameters.

TE 69 LOAD SCANNER

Technical Specifications

Contact Geometry:	Crossed Cylinder on Cylinder Crossed Flat on Flat Pin on Plate Indenter on Plate
Test Modes:	Load scanner with ramped load Pin on plate with constant load Scratch test mode with ramped load Repeat scratch test with unloaded reverse stroke
Maximum Load:	2000 N
Tooling Clamps Unheated:	3.2 mm diameter and 12 mm diameter
Tooling Clamps Heated:	3.2 mm diameter and 12 mm diameter
Cylinder Length:	175 mm
Wear Scar Length – Load Scanner:	100 mm
Wear Scar Length – Pin on Plate:	75 mm
Maximum Stage Travel:	75 mm (each)
Maximum Repetition Rate:	0.3 Hz
Lubricant Bath Temperature:	Ambient to 250°C
Upper Rod Specimen Temperature:	Ambient to 600°C (dry tests only)
Lower Rod Specimen Temperature:	Ambient to 600°C (dry tests only)
Load and Traverse Actuators (Qty: 3):	Servo-controlled Ball Screw Dynamic Force: 700 N Static Force: 700 N Maximum Traverse Speed: 150 mm/s
Load Arm Ratio:	5:1
Actuator Motors:	400 W

Automatically Controlled Parameters

Traverse Speed
Bath Temperature (lubricated tests)
Upper Specimen Temperature (dry tests)
Lower Specimen Temperature (dry tests)

	Test Duration
Mechanically Adjusted Parameters	Starting Load
	Rate of Loading
Recorded Parameters	Traverse Speed
	Load
	Stroke Displacement
	Friction Force
	Bath Temperature (lubricated tests)
	Upper Specimen Temperature (dry tests)
	Lower Specimen Temperature (dry tests)
	Number of Cycles
	Test Duration
	Friction Coefficient
	Sliding Distance

Services

Electricity:	220/240V, single phase, 50 Hz, 3 kW
	110/120 V, single phase, 60 Hz, 3 kW