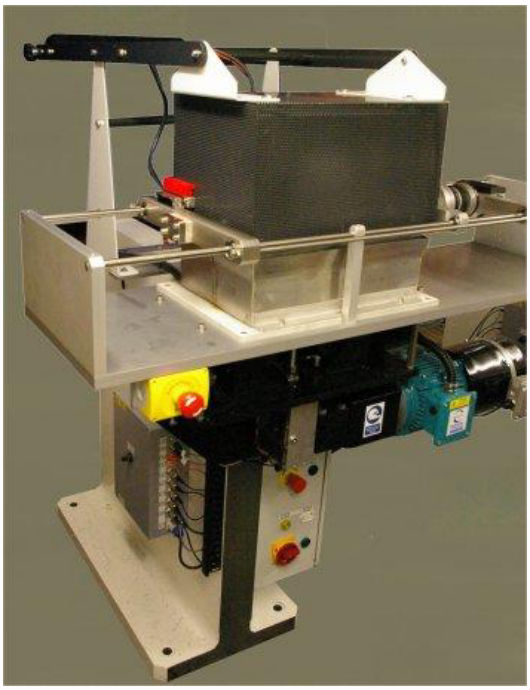
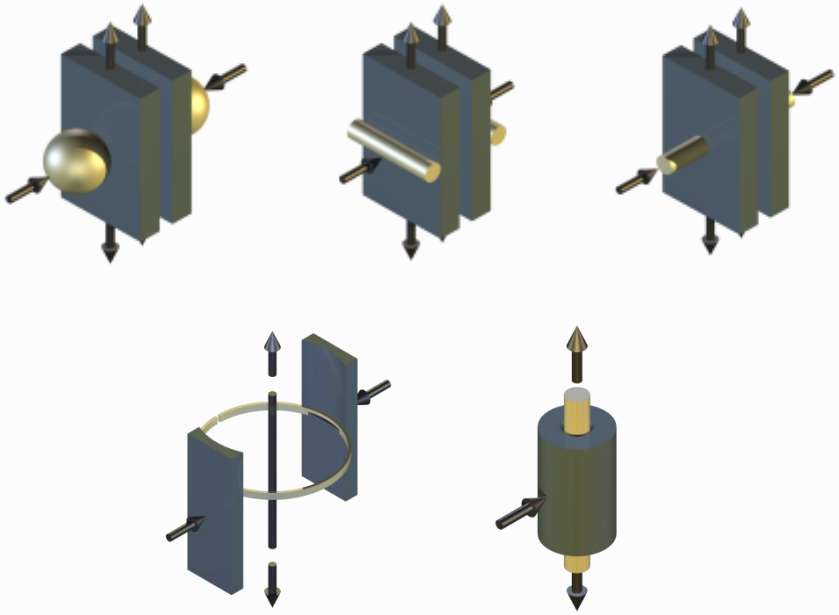
TE 33 ENGINE TRIBOMETER

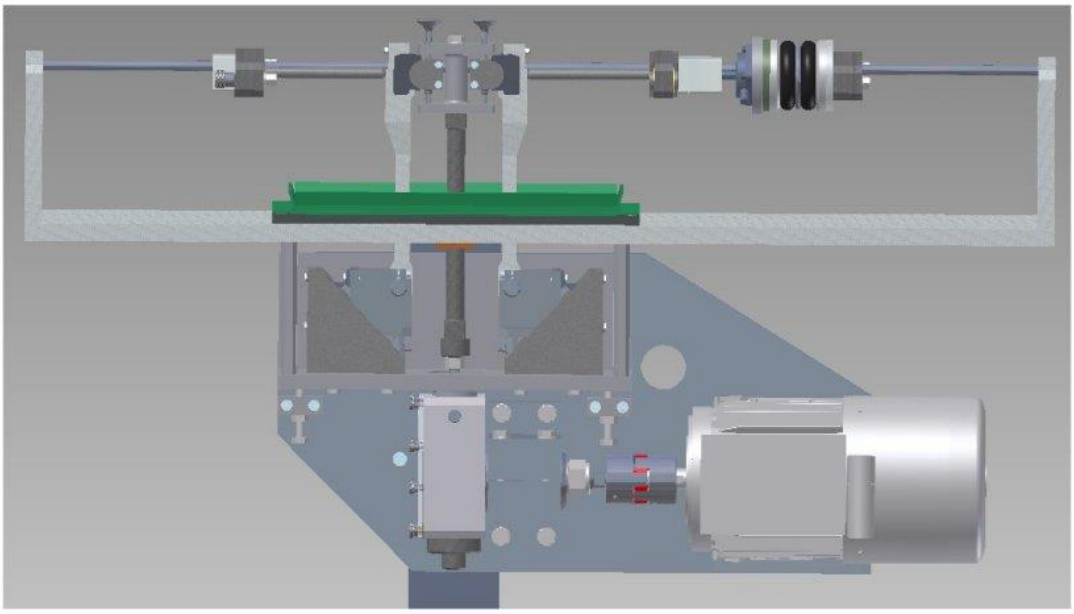




Description

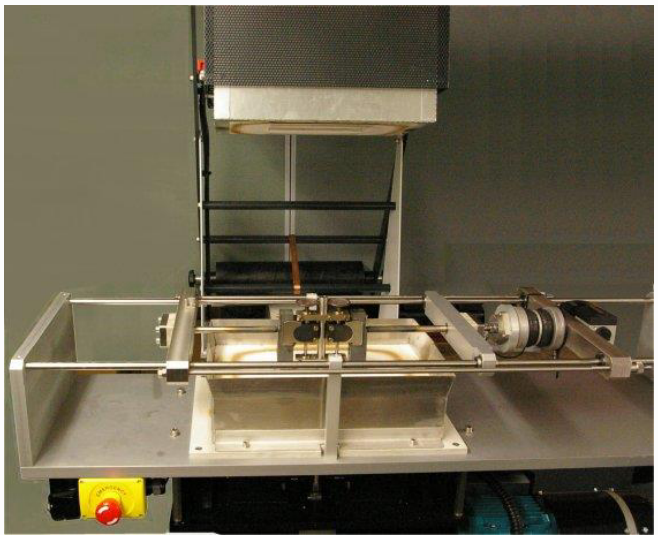
The TE 33 Engine Tribometer is a two-station, vertical axis, long stroke reciprocating tribometer, which combines the reciprocating drive mechanism from the TE 77 High Frequency Friction Machine with the specimen tooling of the DN 55 High Temperature Dry Sliding & Fretting Test Machine.

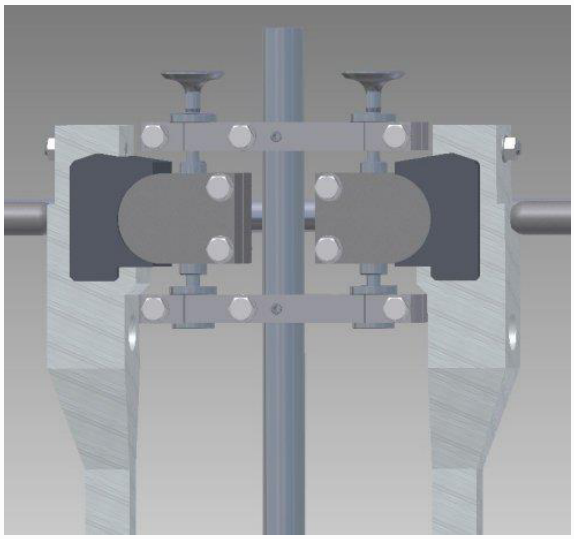
The test assembly is located vertically above the reciprocating drive assembly and comprises two fixed specimen arms supported on flexural pivot bearings, which are in turn mounted on linear flexure assemblies. Motion in a vertical direction is restrained by piezo force transducers. As each arm reacts against its own independent transducer, the friction between the each moving specimen and each fixed specimen is monitored independently. This allows two different material pairs to be tested simultaneously under identical conditions of load and temperature.



Load is applied to either side of the moving specimens by squeezing the two fixed specimen arms together by means of a servo controlled pneumatic bellows assembly, with force transducer feedback. This arrangement ensures that there is no bending moment acting on the moving specimen carrier.

Tooling Options





Various tooling options are available in addition to conventional point, line and area contact configurations. Current options include valve stem and valve guide fixtures, and piston ring against cylinder liner. In this latter configuration, a complete piston ring is loaded against a segment of cylinder liner and means are provided for closing the ring gap and for tilting the ring relative to the liner, thus facilitating conformity and alignment.

Test Assembly Heating Options

Various specimen assembly heating arrangements are available, including:

An electrically heated furnace for tests with standard specimen tooling and valve stem/guide tooling at temperatures up to 1000°C.

A hot air gun heated enclosure for tests with standard specimen tooling and piston ring/liner tooling and with drip feed lubrication at temperatures up to 250°C.

A gas fired enclosure for tests with standard specimen tooling and piston ring/liner tooling and with drip feed lubrication at temperatures up to 400°C.

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Technical Specifications

Contact Configurations:	Point Contact Line Contact Area Contact
Optional Configurations:	Piston-Ring (complete) on Cylinder Liner Valve Stem on Valve Guide
Load Range:	5 to 1000 N
Loading Rate:	50 N/s
Temperature Range:	
Electric Furnace:	1000°C
Hot Air Gun:	250°C
Gas Fired:	400°C
Temperature Sensor:	k-type thermocouple
Frequency Range:	2 to 50 Hz
Stroke Range:	See following tables
Friction Transducer:	Piezo-Electric Type
Force Range:	- 500 to 500 N
Interface:	Serial Link Interface Module
Software:	COMPEND 2000
Motor:	1.1 kW a.c. vector motor with 2048 ppr encoder

Stroke Range

Continuously Variable Cam - 0 to 12.5 mm

Angle - degrees:	Minimum - mm	Maximum - mm
0	0	2
18	1.04	3.04
36	2.65	4.65
54	4.25	6.25
72	5.75	7.75
90	7.09	9.09
108	8.24	10.24
126	9.17	11.17
144	9.85	11.85
162	10.26	12.26
180	10.4	12.4

Step Variable 0 to 12.5 mm:

Angle - degrees:	Nominal Stroke - mm
0	0
18	1.94
36	3.83
54	5.63
72	7.29
90	8.77
108	10.03
126	11.05
144	11.79
162	12.25
180	12.5

Step Variable 12.5 to 25 mm:

0	12.5
18	13.05
36	14.26
54	15.97
72	17.89
90	19.8
108	21.54
126	23
144	24.09
162	24.77
180	25

Controlled Parameters

Frequency
Load
Temperature
Test Duration

Measured Parameters

Load
Friction
Temperature
Frequency
Friction Coefficient

Services

Electricity:	220/240 V, single phase, 50/60 Hz, neutral & earth, 4.5 kW
Clean, dry air:	4 cfm at 8 bar (120 psi)