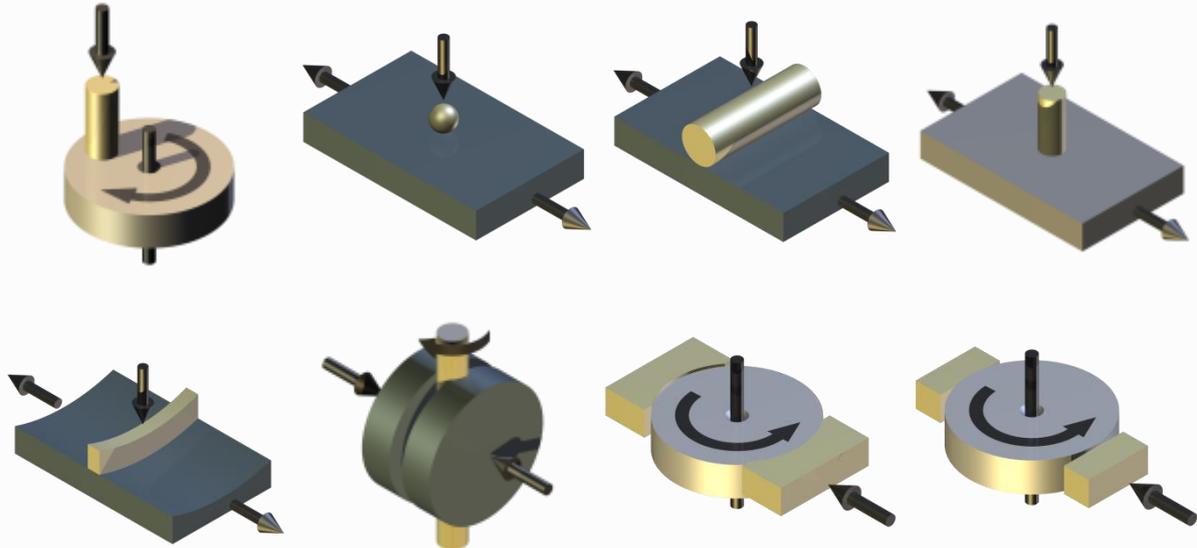
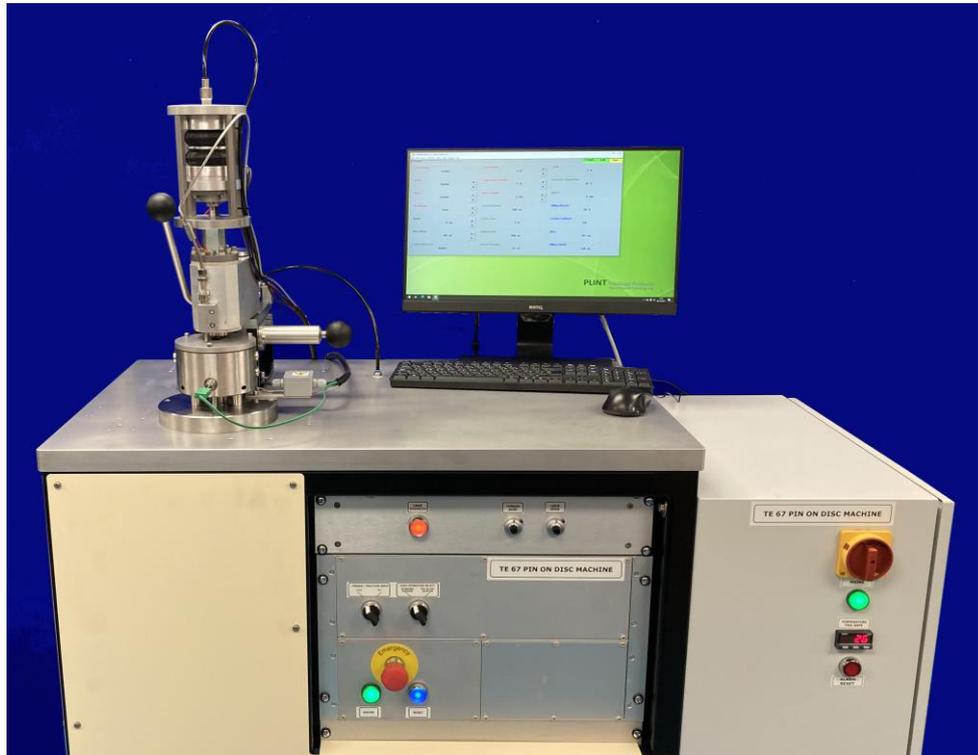


TE 67 PIN ON DISC MACHINE



Description

The TE 67 Pin on Disc Machine has the classic configuration of a pin or ball loaded vertically downwards onto a horizontally rotating disc. It also accommodates a variety of other test geometries.

The principle features of the unit are:

- very rigid pin and disc carriers, to allow nominally flat-on-flat contact
- use of pneumatic loading on the pin to reduce inertial loading effects in the contact

The pneumatic loading system is an important difference with other pin on disc designs that use dead weights and a load beam. Loading system inertia can significantly affect the friction and wear response.

The test disc is mounted on the machine spindle and secured by a central screw. The spindle is driven through a pulley belt by a vector controlled a.c. motor, mounted with the machine frame. The motor has encoder feedback to ensure stable running speeds and a large turn-down ratio.

The pin carrier assembly consists of a massive aluminium block pivoted about a vertical axis through its centre. The track radius is set by moving the pin carrier assembly radially.



A strain gauge load cell is mounted at the rear of the pin carrier block, preventing the block pivoting about its axis, hence sensing the friction force exerted on the pin. The low rotational inertia of the carrier block about this axis ensures a good signal bandwidth for the friction measurement.

The pin carrier assembly can be rotated out of its locked horizontal position to allow access for changing specimens and examining the surfaces.

The test pin is inserted into a collet clamp on the loading piston. An in-line load cell measures the applied load and provides feedback for pneumatic load control. Both steady and fluctuating loads can be applied.

Movement of the loading piston is measured with an LVDT as an indication of wear.

The pin loading capsule is electrically isolated from the carrier block and a slip-ring is provide on the machine spindle, allowing measurement of contact potential, via a Lunn-Furey circuit.

A sliding contact thermocouple is used to sense disc temperature.

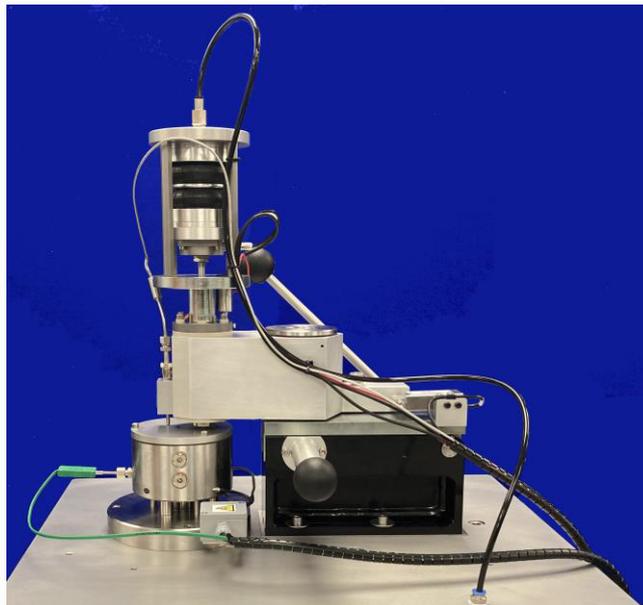
Test may be run in pin/ball on disc mode according to the guidelines laid out in ASTM G 99, DIN 50324 and ISO/DIS 7148-2 and in reciprocating mode according to ASTM F 732.

Test may be run in pin/ball on disc mode according to the guidelines laid out in ASTM G 99, DIN 50324 and ISO/DIS 7148-2 and in reciprocating mode according to ASTM F 732.

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

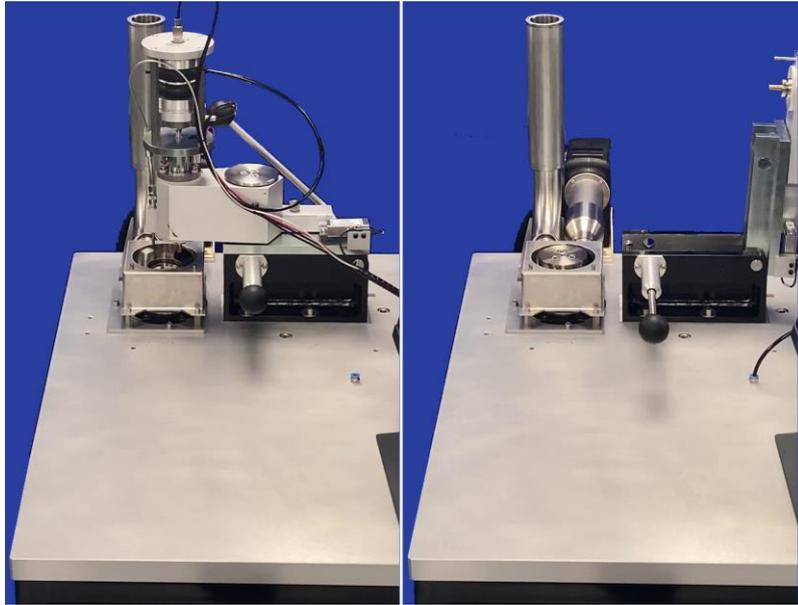
Pin on Disc Accessories

TE 67/LE Lubricant Enclosure



This is a heated, non-rotating, fluid bath for lubricated tests at temperatures up to 200°C.

TE 67/HT1 Pin on Disc Heating – Hot Air

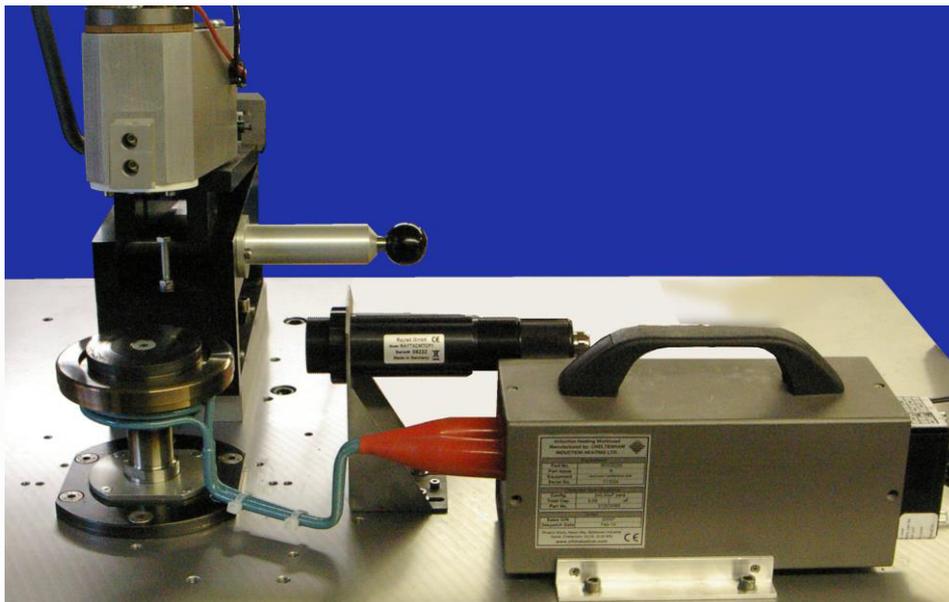


This is a hot air gun system for dry tests at temperatures up to 400°C.

TE 67/HT2 Pin on Disc Heating – Gas Fired

This comprises a propane torch, with the flame directed into an enclosure around the disc carrier, with exhaust discharged up a chimney. The maximum temperature with this arrangement is 750°C.

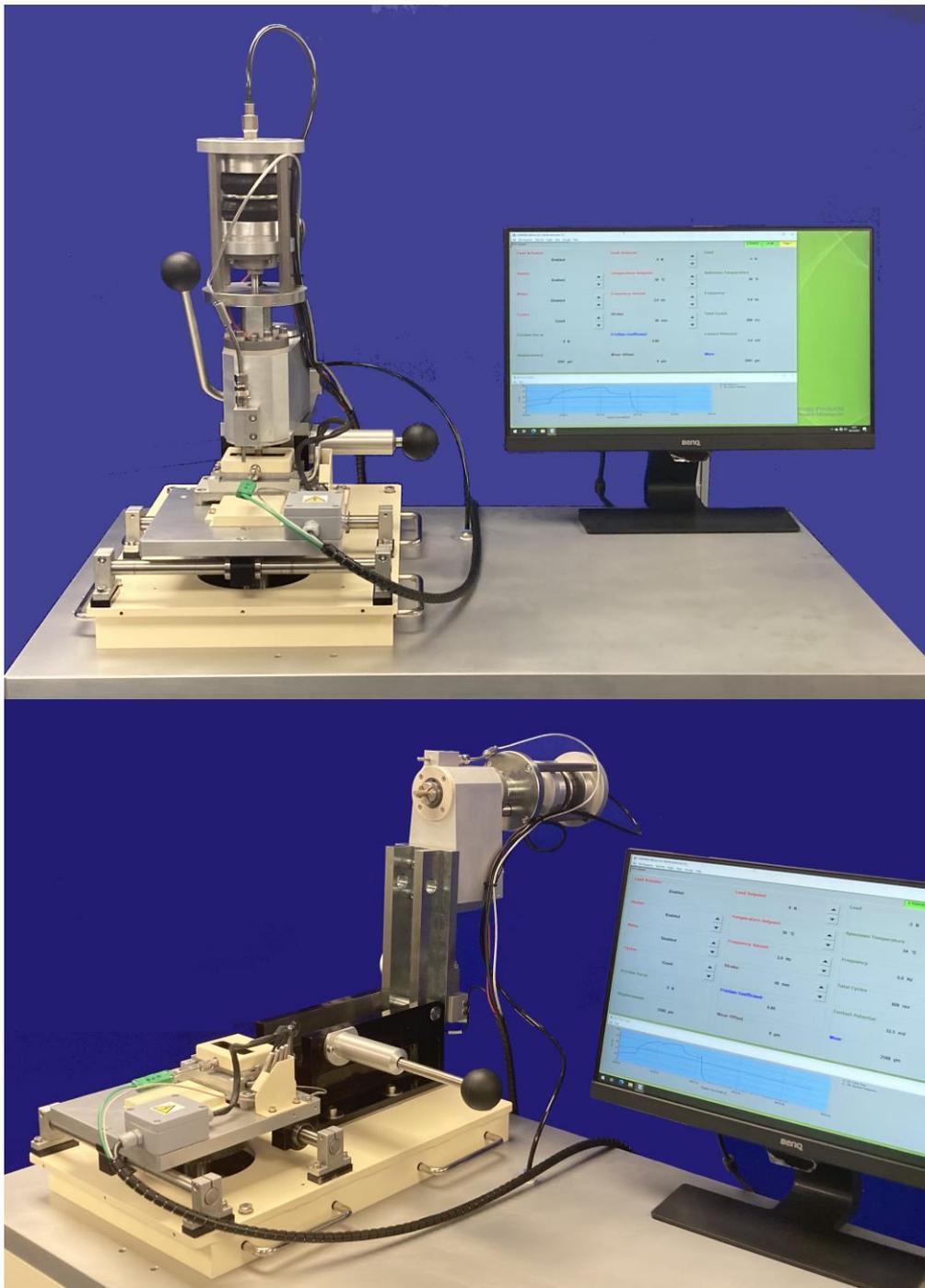
TE 67/IHS Pin on Disc Heating - Induction



This is an induction heating system for disc temperatures up to 750°C, in atmosphere.

Other Test Configurations

TE 67/R Reciprocating Pin on Plate Adapter

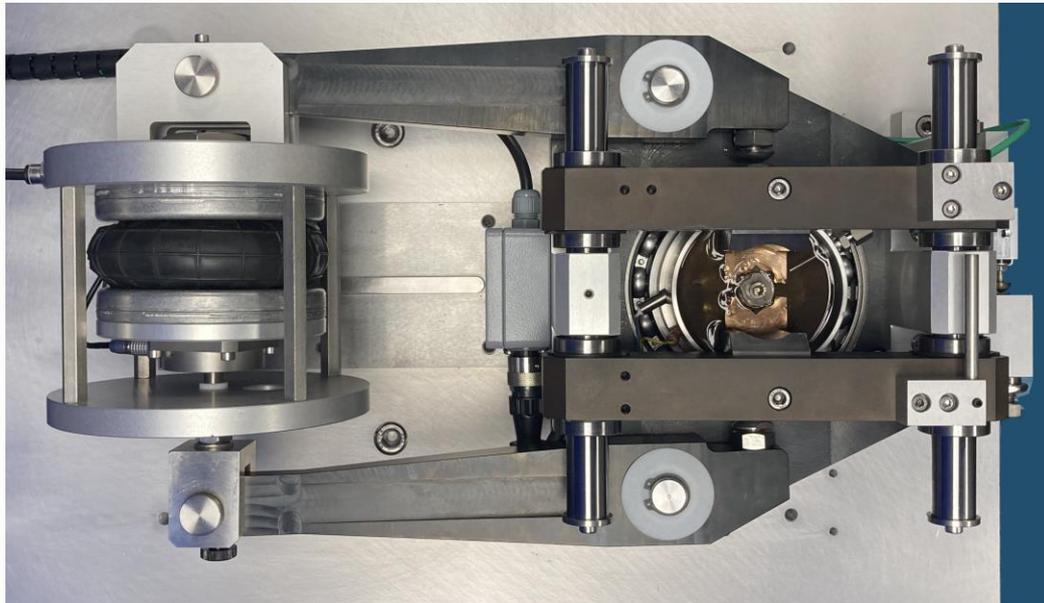


The Reciprocating Pin on Plate Adapter is a complete sub-assembly that mounts on top of the drive spindle. Pure sinusoidal reciprocating motion is generated by a scotch yoke mechanism that can be adjusted to give strokes from 0 to 50 mm. The maximum frequency at 50 mm stroke is 5 Hz. Higher frequencies can be achieved at shorter strokes. Integral heaters allow tests to be run at temperatures up to 400°C.

TE 67/LCA Line Contact Adapter

This is a sample holder for running line contact and piston ring and cylinder liner samples on the TE 67/R. It incorporates a self-alignment mechanism to ensure uniform contact.

TE 67/PV Pin on Vee Block/Block on Ring Adapter



The Pin on Vee Block/Block on Ring Adapter allows test to be run in pin on vee block test geometry and the twin block on ring geometry, with a test specimen loaded on either side of a rotating ring. The block specimens may either be flat or conforming, allowing journal bearing type tests to be performed.

TE 67/LS Lubricant Recirculating System

The Lubricant Recirculating System comprises a temperature-controlled bath with magnetic stirrer and two peristaltic pumps, one to pump heat transfer fluid to, and the other to scavenge fluid from, the test adapter.

TE 67/CAL Calibration Kit for Load and Friction

The two most important parameters to calibrate on the TE 67 are the normal load and the friction force. TE 67/CAL provides a pivoted beam with dead weights able to apply up to 1,000 N to the loading system and a pulley, cord and weights to apply a tangential force to the pin carrier for friction measurement.

TE 67 MICROPROCESSOR CONTROLLED PIN ON DISC MACHINE

Technical Specifications

Rotational Speed:	20 to 2,000 rpm
Equivalent Sliding Speed:	0.05 m/s to 8 m/s
Radius of Test Track:	0 to 35 mm
Pneumatic Loading Capsule:	
Load Range:	25 to 1000 N
Cyclic Loading Amplitude:	up to 50% of setpoint
Cyclic Loading Type:	sine wave or triangular wave
Cyclic Loading Rate:	1 Hz maximum
Dead Weight Loading Capsule:	
Load Range:	5 to 100 N
Friction Force:	0 to 50 N and 0 to 1,000 N
Wear Measurement:	LVDT 0 to 2.5 mm Resolution better than 1 μ m
Contact Potential:	40 mV dc signal
Temperature Sensing:	k-type thermocouples
Disc Specimen:	75 mm diameter x 8 mm thick
Pin Specimen:	8 mm diameter x 35 to 68 mm long
Ball Specimen:	6 mm diameter
Interface:	Serial Link Interface Module
Software:	COMPEND 2000
Motor:	2.2 kW ac vector

Controlled Parameters

Rotational Speed
Temperature
Load
Test Duration

Recorded Parameters

Rotational Speed

Wear
Friction Force
Temperatures
Contact Potential
Number of Revolutions
Test Duration
Sliding Speed
Friction Coefficient
Sliding Distance

TE 67/HT1 Pin on Disc Heating (Air)

Lubricated Tests:
Dry Tests:
Air Heating Power:
Temperature sensing:

up to 200°C
up to 400°C by air
2.8 kW
Optical Pyrometer with
k-type thermocouple output

TE 67/HT2 Pin on Disc Heating (Gas)

Dry Tests
Burner Nominal Power:
Consumption

up to 750°C by gas
4.7 kW with propane @ 4 bar pressure
340 g/hour

TE 67/R Reciprocating Plate Adapter

Stroke:
Frequency:

0 to 50 mm (continuous variation)
2 to 25 Hz
5 Hz max. at 50 mm stroke
25 Hz max. at 2 mm stroke

Heating Power:
Temperature:
Plate Dimensions:

800 W
ambient to 400°C
38 mm x 58 mm x 4 mm thick

TE 67/LE Lubricant Enclosure

Bath Volume:

150 ml

Heating Power: 400 W
Temperature Range: ambient to 200°C

TE 67/LS Lubricant Recirculating System

Bath Volume: 1.2 litres
Peristaltic Pump Flow: 1 litre/minute (maximum)
Heating Power: 550 W
Temperature Range: ambient to 100°C

TE 67/A Annulus on Disc Adapter for Suzuki Method

Annulus Size: 20 mm i.d. x 25 mm o.d. x 15 mm high
Torque Ranges: 54 Nm and 100 Nm
Maximum Load: 500 N
Maximum Speed: 500 rpm

TE 67/RSTE and TE 67/IHS:Rotary Sealed Test Enclosure

Sealed Tests: Ambient to 400°C
Unsealed Tests: Not exceeding 750°C (subject to heating capacity)
Induction Heater: 1 kW

TE 67/PV Pin on Vee Block/Block on Ring Adapter

Contact Configuration: Pin on vee block
Block on ring
Conforming block on ring
Pin on Vee Specimens: Standard Falex specimens
Ring Specimen: Max diameter 35 mm x max width 10 mm
Maximum Load: 20,000 N
Heater Bath Temperature: 200°C

Services

Electricity: 220/240V, single phase, 50 Hz, 7.5 kW
110/120 V, single phase, 60 Hz, 7.5 kW
Clean, dry air: 4 cfm at 8 bar (120 psi)

TE 67/HT2:

Propane with 4 bar regulator 340 g/hour gas consumption

Installation

Floor-standing machine:

900 mm wide x 600 mm deep x 1,200 mm high, 300 kg

Bench-mounting cabinet:

530 mm x 800 mm x 300 mm high, 20 kg

Packing Specifications:

1.93 m³, GW 520 kg, NW 380 kg