Background

The TE 55 Lubricity Test Machine is a multi-function unit with adapters for ball on cylinder (BOCLE type) and cylinder on cylinder (TAFLE type) and crossed cylinder contact (Brugger and Reichert type) configurations. The control unit includes a SLIM 2000 Serial Link Interface Module and COMPEND 2000 Windows based control and data acquisition software. The main unit is based on the TE 53 Multi-Purpose Friction and Wear Tester. The machine may be used for evaluating both fuels and lubricants and any other general tribological tests involving sliding or sliding and rolling contacts, but does not aim to meet the requirements of any specified test standard.
Description

A bearing housing carries two parallel shafts. The lower shaft carries a flat profile ring or roller and is connected to an ac geared motor with frequency inverter variable speed drive.

In ball on cylinder configuration the upper shaft carries a holder for the fixed specimen and is restrained from rotating. In two roller configuration the upper shaft carries a roller and is driven from the lower shaft through a pair of gears. Seven fixed amounts of percentage slip are provided. The upper roller is mounted on a self-aligning bearing to achieve full width line contact between the specimens.

The TE 55 features a sealed chamber surrounding the test specimens and this allows for the continuous supply of conditioned test fluid into the contact zone, a vital part of controlling the conditions of the test or running with the contact fully immersed with test fluid. The enclosure incorporates a heater element to maintain the test fluid temperature.

The upper shaft is carried in a spherical bearing at one end that permits rotation about the gear contact line and has a floating bearing at the other end. This allow the shaft to pivot freely in the vertical and horizontal axes. Load is applied by dead weights through a 5:1 lever and acts on the front end of the shaft by pressing on the outer race of the floating bearing.

Horizontal movement in the direction perpendicular to the upper shaft axis and is resisted by a strain gauge transducer. This gives measurements of the tangential forces in the contact which are displayed as friction force on the control unit.

Control and Data Acquisition

The TE 55 has PC based sequence programmable control and data acquisition. This is provided by an integrated Serial Link Interface Module and COMPEND 2000 software running on a host PC, operating under Windows. Data is stored to hard disc in standard spread sheet compatible file formats (.csv or .tsv).

Tests are defined by a sequence of steps, each step containing set-point, 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.
TE 55 LUBRICITY TEST MACHINE

Technical Specifications
Contact Geometry: Ball on Cylinder
Cylinder on Cylinder
Crossed Cylinder
Speed Range: 30 to 850 rpm
Equivalent Velocity: up to 4 m/s
Slip Rate Gears: 1.79, 5.13, 8.70, 10.53, 13.33, 18.18 and 22.22%
Friction Range: 130 N
Load Range: 50 to 750 N
Bath Temperature: ambient to 150°C
Heater Power: 250 W
Temperature Sensor: k-type thermocouple
Cylinder Size: 60 mm diameter
Sliding Specimen: 12.7 mm ball, roller or block
Interface: Serial Link Interface Module
Software: COMPEND 2000
Motor: 0.25 kW ac geared motor

Controlled Parameters
Rotational Speed
Reservoir Temperature
Test Duration

Recorded Parameters
Rotational Speed
Friction Force
Temperature
Number of Revolutions
Test Duration
Sliding Speed
Friction Coefficient
Sliding Distance
Services
Electricity: 220/240V, single phase, 50 Hz, 1.2 kW
           110/120 V, single phase, 60 Hz, 1.2 kW

Installation
Bench-mounting machine: 1,000 mm x 200 mm x 250 mm high, 50 kg
Bench-mounting cabinet: 530 mm x 520 mm x 400 mm high, 25 kg
Packing Specification: 0.48 m3, GW 165 kg, NW 105 kg