

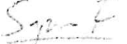
CERTIFICATE OF CALIBRATION

Date of issue: **05/11/2019** Certificate number: **TM0373-03**
 Customer reference: **Mecmesin-calibration** Original
 Issued to: **Newton House**
Spring Copse Business Park
Slinfold
West Sussex
RH13 0SZ

Instrument type: *MultiTest 2.5dV (fitted with Mitutoyo Linear Encoder)*
 Serial number(s): **TM0373**
(1448666)
 Date of calibration: **05/11/2019**

The calibration was performed using the following method and equipment.

Calibration method: **Mecmesin Internal (Length)** details available on request
 Identification of standards used: **LB1A LB2A LB3A LB4A**

Approved signature 
 Name printed here **Supun Fernando** (Authorised Technician)

This is to certify that the above test stand was verified at Mecmesin Ltd's test area using length standards calibrated by appropriate UKAS-approved Laboratories.
 The UKAS Certificates are available for examination on the Mecmesin Ltd website and these detail the traceability chain to UK National Standards.
 Calibration was performed under the environmental conditions present at the time.
 'PASS / FAIL' is determined by the specification stated in the product datasheet.

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Nominal Length mm	Instrument Reading mm	PASS / FAIL
0	0	PASS
100	99.972	PASS
200	199.980	PASS
300	299.962	PASS
400	399.953	PASS

End of Report

Force & Torque Test Solutions

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Technical Advisory Note – Internal Verification of TM0373

TM0373 is the reference used for Mecmesin's internal Long Travel Extensometer Calibration system. This system has been specifically designed for the calibration of long travel extensometers (LTE). The calibration system is comprised of a Mecmesin motorised force tester and an accompanying *Mitutoyo* linear encoder (s/n 1448666).

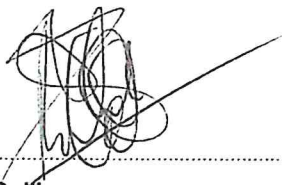
Mechanically, the linear encoder is directly attached to the force tester's moving crosshead. Electronically, the encoder is connected to the control board of the force tester. Consequently, the displacement displayed by the motorised force tester is derived from appropriate conditioning of the encoder's quadrature output signal.

The equipment under test (Long Travel Extensometer) can be fitted to the force tester. The relative extension of the LTE is determined by locating upper arm of the LTE to the moving crosshead and fixing the lower arm in place. Both the linear encoder and the upper LTE arm are attached to crosshead. Therefore, the conditioned displacement output of the LTE can be calibrated against the displacement output of the linear encoder beam whilst the Mecmesin force tester moves its crosshead upwards.

The accuracy of the *Mitutoyo* linear encoder's displacement output, once fitted to the Mecmesin force tester, is regularly checked by internally calibrating the encoder against micrometer setting rods. The method involves using a touch-on load to establish a datum point. A setting rod is then placed in between the datum point and the force tester crosshead, and a touch-on load is used once again to establish the location of the setting rod.

The accuracy of the internal calibration of the *Mitutoyo* linear encoder and any sources of uncertainty of the internal calibration have been included in the overall uncertainty budget for the Long Travel Extensometer Calibration System.

The micrometer settings rods are regularly calibrated by a UKAS accredited laboratory. Therefore, the traceability chain to National standards is maintained through the use of these micrometer setting rods as described above. If the linear encoder is damaged in use, the encoder will be inspected and verified before being used again



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