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LTE Installation Guide

Mecmesin
FORCE & TORQUE TEST SOLUTIONS
www.mecmesin.com

431-957-01

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1. Introduction

Mecmesin Long Travel Extensometer (LTE) installation guide.

Mecmesin LTE devices are designed to be used with Mecmesin OmniTest and dVu test systems only. Safe operation and use must be observed at all times, failure to follow instruction may lead to loss of warranty or injury.

For further information, including test setting, please refer to the Vector Pro MT user manual (431-955).

Part no. 431-957-01

2. Contents

3. Overview

This installation guide describes the safe fitting of the Mecmesin long travel extensometer (LTE), available in lengths 700mm and 1100mm to your OmniTest or dVu test system.

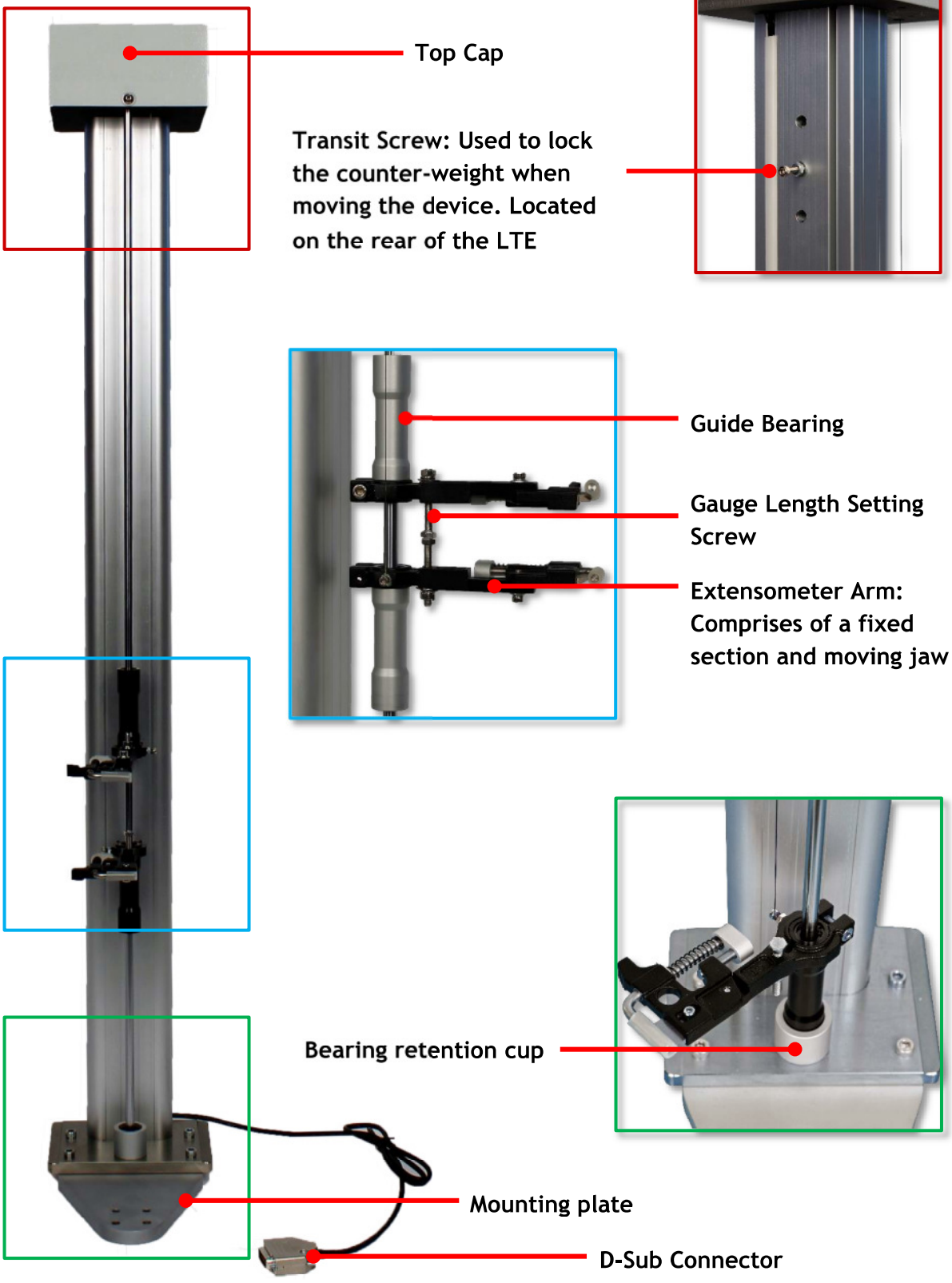
This guide will show you how to setup your device and the different configuration options possible.

4. Component Parts

Within the box you will find the following parts:

- **1 × Mecmesin LTE-700mm or LTE-1100mm**
- **1 x LTE Mounting Plate**
- **1 × QC Fitting – Part No. 432-284**
- **4 × M6 Fixing Screws**
- **4 × M6 Transit Nuts**
- **1 x Installation Guide**

5. LTE System Diagram

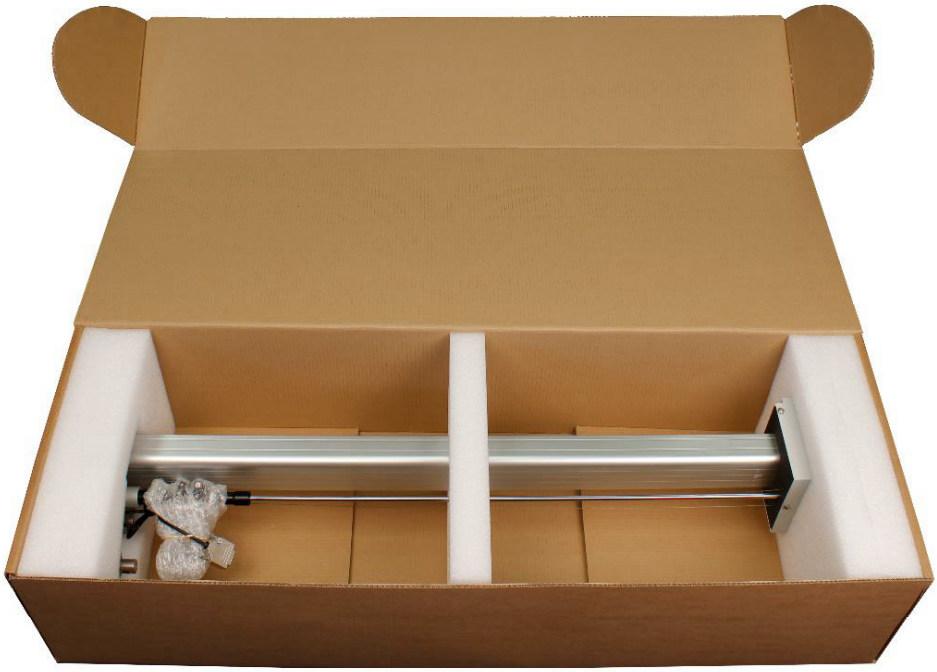


▲ Side View

▲ Rear View

6. Unpacking the Device

Step 1 - Removing the Packaging



▲ LTE in protective packaging

Mecmesin LTE devices come packaged with protective foam supports at either end and in the middle of the device.

The middle section splits in two, prior to removing the device remove the top half and place it to one side.

Step 2 - Removing the LTE from the Packaging

Hazard! Take care lifting the LTE and follow recommended safe lifting practices. It is advised that you always move the device between two people due to the extensometer having an uneven weight distribution.

Carefully lift one end of the device and remove the foam support from the end of the LTE, then place this end back down in the box.

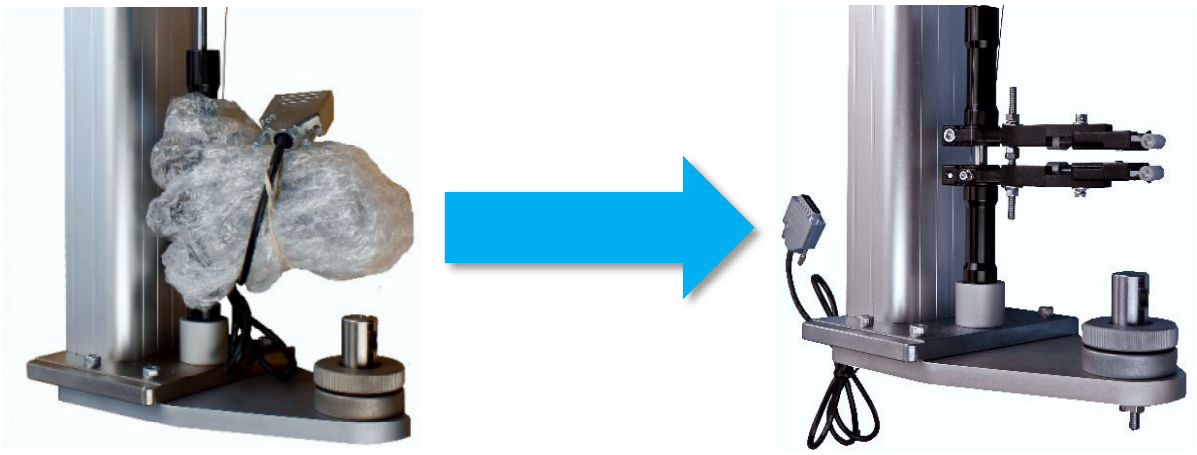
Repeat this for the other end so both ends are now free to move upwards.

▲ Careful removal of the device is best done with two people

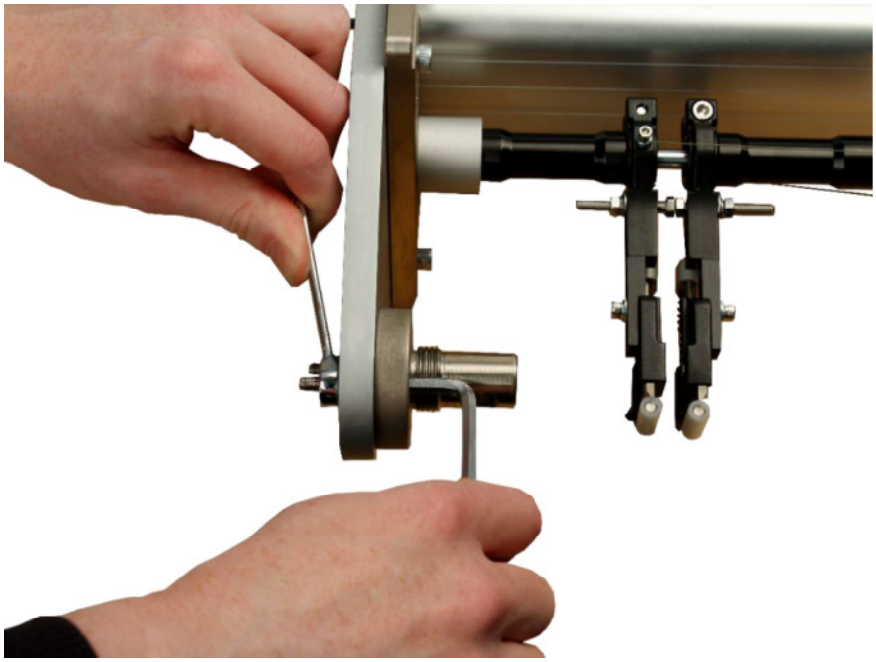
Now with assistance carefully lift the device from the box and place it on a flat surface, taking care to ensure that the cable does not become caught on anything nearby.

Step 3 - Unpacking the Arms and Removing the QC

The next step is to remove the arms from the protective bubble wrap. Ensure that you take care when removing the bubble wrap not to contact the arms, counterweight string or the extensometer cable with any cutting instruments as this may cause irreversible damage.



Use a 4mm Allen key and a 10mm spanner to remove the QC adapter from the LTE device and place it to one side.



▲ Removing the QC adapter

It is recommended you do this with the device on its side and with the transit screw in place.

7. Preparing the Device for Test

Step 1 - Removing the Transit Screw

First, place the LTE in an upright position on a flat surface, where it is unlikely to topple or be knocked by accident. If necessary secure the base with a mass or clamp to ensure the device will not topple.

At the top of the device, on the rear of the column, there is an M5 retention screw that prevents the counterweight (that is located within the device) from moving. This screw's purpose is to secure the counterweight inside the device to make it safe for transportation.

▲ Loosening the transit screw located on the rear of the LTE

The transit screw should be loosened, using a 3mm Allen key applied in a counterclockwise direction.

You should loosen the screw until the counterweight is free. The releasing of the counterweight should be audible but can be checked by observing the free movement of the top arm across its entire travel.

Step 2 – Checking the Movement of the Arms

▲ Removing the lower arm from the retaining O-ring

When being transported, the lower arm is fixed to the bottom of the LTE by a small retention cup with an internal O-ring.

To remove the arm from the retention cup, simply pull the arm upwards while applying a twisting motion in alternating directions.

Once the arm is free to move you should check that both arms travel up and down the extensometer correctly without excess friction. It is crucial to check the free movement of the pulley cord.

The pulley chord should remain under constant tension when the counterweight is released.

If you see any issues with the movement, see **Section 12,** *Troubleshooting* for more information or if in doubt, please contact your local support agent or Mecmesin Technical Support for further information.

Step 3 - Securing the Transit Screw

Once you are happy that the arms are free to travel without any issues you should lock off the transit screw in its disengaged position using the attached M5 nut.

▲ Securing the transit screw, located on the rear of the panel

Ensure that when you secure the nut you do not wind the screw in as this can prevent the system from moving.

Once you have secured the screw double check that the system is free to operate by moving both arms together from the bottom of the LTE to the top.

If you see any issues, see **Section 12,** *Troubleshooting* for more information. Further support is available by contacting your local support agent or Mecmesin Technical Support for further information.

8. Configuring the Device

Mecmesin LTE devices can be configured to suit the needs of your application, as well as enabling variable specimen length and grip depth. You can also configure the device to mount on the left-hand or right-hand side of your test system.

These next steps will show the various configuration options which are available to you.

Adjusting the Depth of the Arms

Depending on the depth of your specimen and the grips being used you may need to adjust the arms to set the depth for the centre of the extensometer jaws.

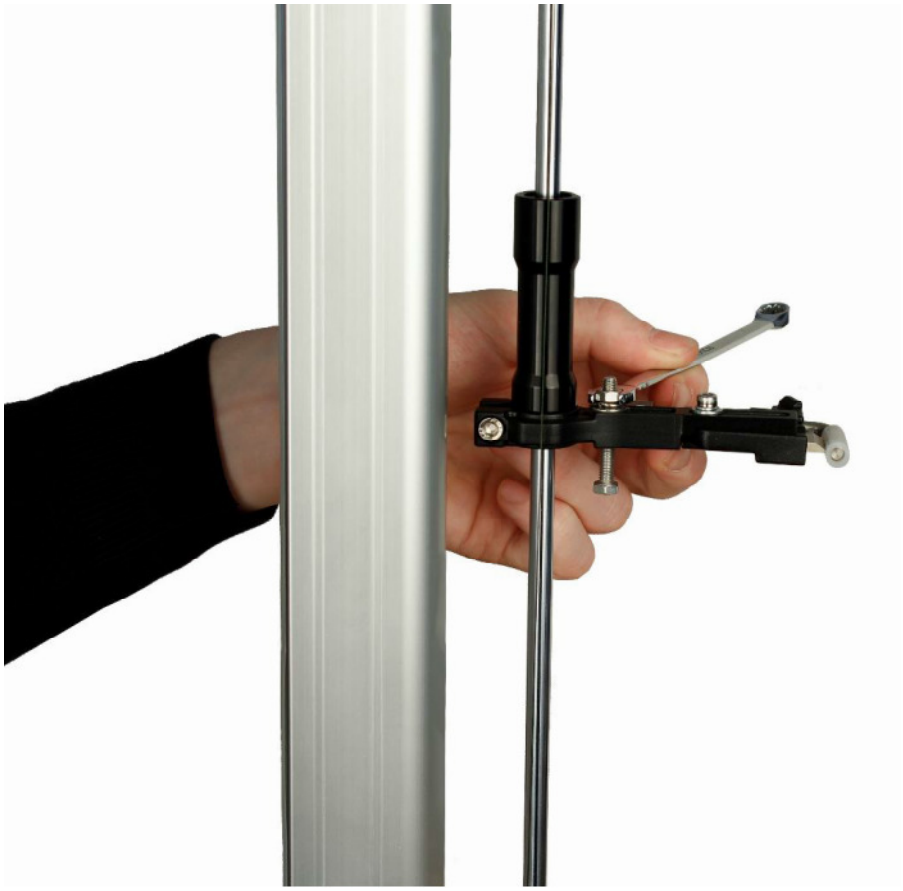
To adjust the arms loosen the M5 cap head screw located on the top of the upper arm and on the bottom of the lower arm, then slide the arms forward or back to suit your setup and lock off using the same M5 cap screw.

▲ Adjusting the arm depth

Adjusting the Gauge Length

To cover a range of different specimens you can also adjust the gauge length of the arms. Please note the minimum calibrated gauge length is 25mm.

To set the gauge length, loosen the M5 retaining nut located on the gauge length setting screw and then wind the screw to adjust the gap between the two extensometer arms. Once adjusted lock the nut off against the arm to secure.



▲ Using a spanner to loosen the retaining nut

Measuring the Gauge Length

The gauge length should be measured using vernier callipers or a slip gauge.

It is important to ensure that you measure between the flats of the knife edges, measuring from other points will mean your measured gauge length is incorrect.

▲ Measuring the gauge length using a digital vernier calliper

To set a specific gauge length it is best to adjust each screw visually initially to get you close to the gauge length you desire, then measure and adjust again.

This may need to be repeated a few times to ensure your gauge length is precise.

Changing the Orientation of the Extensometer

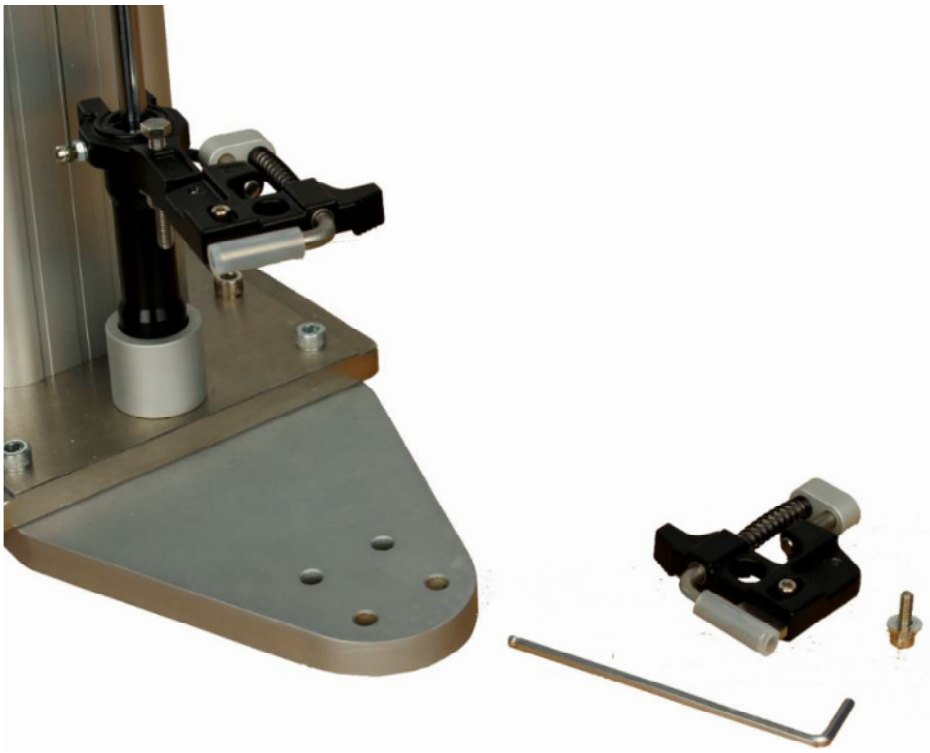
Your Mecmesin LTE can be configured to operate in either a left-hand or right-hand orientation depending on which you require.

▲ Left-hand setup

▲ Right-hand setup

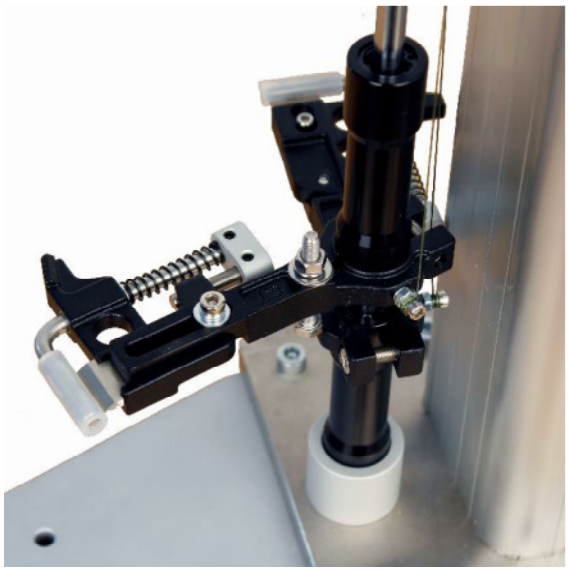
To swap your extensometer from one orientation to the other you simply have to remove both jaw sections from each arm and then swap the top and the bottom one in relation to the fixed arms.

To achieve this first remove the jaw sections by undoing the M5 cap screw located on the top of the upper arm and the bottom of the lower arm.



▲ Using a 3mm Allen key to remove the moving jaw section

Once you have removed both jaw sections from the arms, swap the top jaw with the bottom jaw. Mount the arms so that the removable jaw section sits inside the fixed arms. See the images below for correct mounting.



As seen in the images above the jaw always mounts inside the sliding arm section regardless of the LTE's orientation.

9. Fitting the LTE to the Test System

Step 1 - Mounting the LTE

Hazard! Take care fitting the LTE to your test system. It is recommended that you fit the device with two people present, one to support the LTE and one to tighten the bolts through the QC fitting.

First, lift the device onto your test system, it is recommended that one person lifts the device while another guides them into place ensuring that the cable does not become trapped under the base of the LTE. Once the device is in place secure the QC fitting using the 4 x M6 bolts supplied. The LTE can be mounted on either left-hand or right-hand side of the machine depending on the orientation of the jaws. See the previous section for how to change the orientation of the extensometer.

▲ Using a 4mm Allen key to secure the QC fitting

In the image above you can see the process of securing the extensometer to the base plate of an OmniTest-5.0 test system. Ensure that the hole in QC post is in the correct orientation to your grips before securing the QC fitting. The screws should be wound in successively with each only fully tightened once all screws are in place, this is to help prevent misalignment of the threads.

Step 2 - Fitting Grips

▲ **Completed setup ready for test**

First, fit the stainless steel adjustment ring on to the QC post. Once this is in place, fit your grip on top of the post and secure the retaining pin.

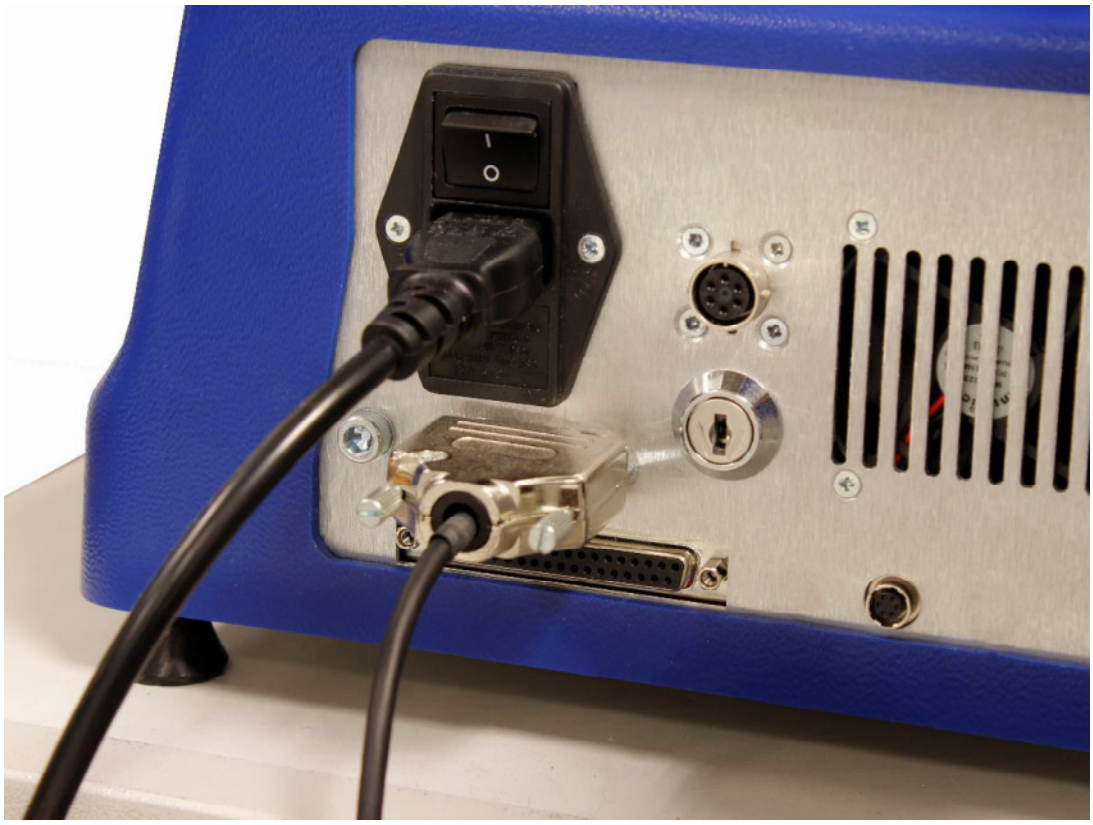
Then wind the adjustment ring up to tighten the grip, how tight you wind the ring is dependent on application and grip type.

Step 3 - Connecting the LTE

Mecmesin LTE devices connect to your test system using a 15-Way D-Sub connector.

To connect the device to your test system first ensure that your test system is switched off, then plug the D-Sub connector into the connectors panel located at the rear of the machine.

Secure the connector by tightening the two threaded posts.

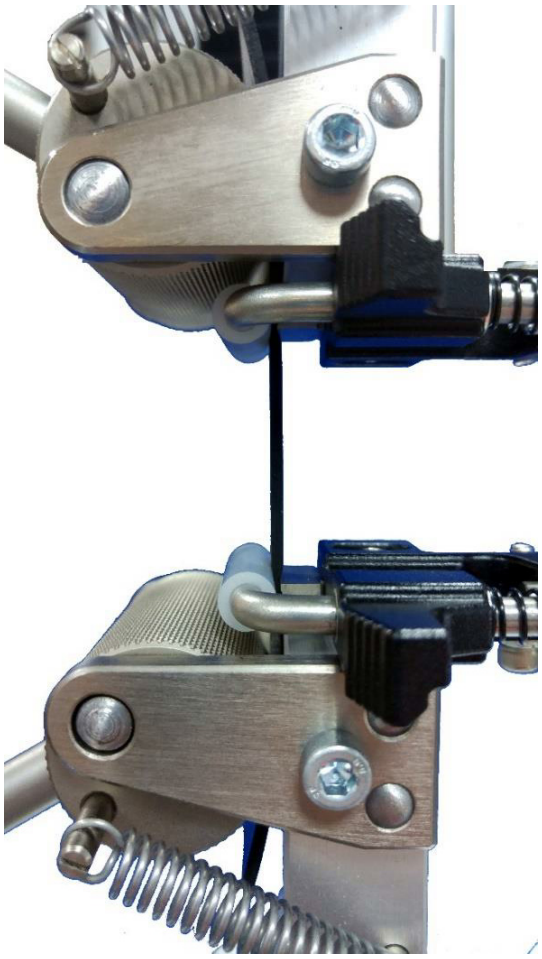


▲ LTE connected to an OmniTest-5.0 (Please note rear panel connections may vary).

Step 4 - Mounting your Specimen

Your Mecmesin long travel extensometer is now ready for testing, ensure when mounting your specimen that the extensometer jaws are properly adjusted, this is to ensure they are not deflecting the sample in any direction.

It is also important to make sure the specimen is mounted in parallel to the square faces of your test system and isn't running at an angle between the two jaws.



▲ A correctly mounted specimen

In the image above you can see a specimen which has been correctly mounted.

Note there is no deflection being caused by the extensometer jaws and the specimen is mounted in the centre of both the test systems grips and the extensometers jaws.

Step 5 - Ready to Test

Configure your test within Vector Pro MT and hit 'play' when you are ready! For more information please consult the following document:

- **431-955** – VectorPro MT for OmniTest and MT-dVu Test Stands.

10. Storing and Transporting the LTE

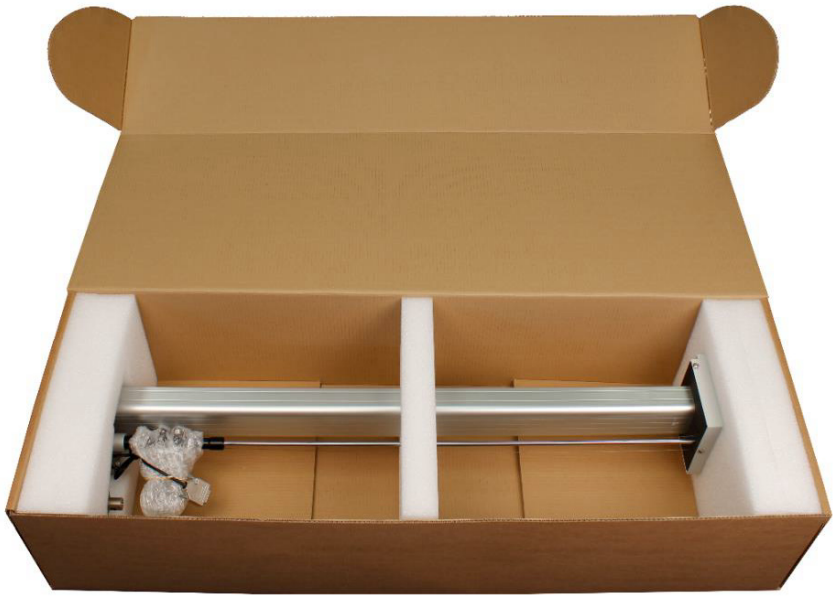
If storing your extensometer ensure that the transit screw is in place and both arms are secured at the base of the stand.

First, secure both arms to the bottom of the device and lock the lower arm into the retaining O-ring, this ensures that the counterweight is in the correct position to be secured by the transit screw.

Next screw the transit screw in and lock it off using the retaining nut. With the transit screw in place the device can be stored either upright or on its side, please ensure the device is secure and unlikely to topple as this can lead to damage to the device or possible injury.

It is recommended that you keep the original packaging for the device if you are planning to transport it between locations.

When transporting the device ensure that the transit screw is in place and there are no loose components in the box, both extensometer arms should be bubble wrapped and the box should be suitably secured.



▲ LTE packed within its original box

11. Specification

Long Travel Extensometer	
Full-Scale Travel:	**LTE 700** 700mm
	LTE 1100 1100mm
Resolution:	0.010mm (0.00039”)
Accuracy:	+/- 1% of reading or +/- 150 µm (0.0059”) (whichever is greater)
Minimum Gauge Length:	25mm (0.984”)
Device Maximum Dimensions:	**LTE 700** Height – 1050mm (41.34”) Width – 230mm (9.06”) Depth - 150mm (5.91”)
	LTE 1100 Height – 1500mm (59.06”) Width – 230mm (9.06”) Depth - 150mm (5.91”)
Approximate Weight:	**LTE 700** 10.47kg (23.08lb) (LTE 700)
	LTE 1100 11.82kg (26.06lb) (LTE 1100)
Device Connector:	15-Way D-Sub
Part Number:	**LTE 700** 432-700
	LTE 1100 432-704

12. Troubleshooting

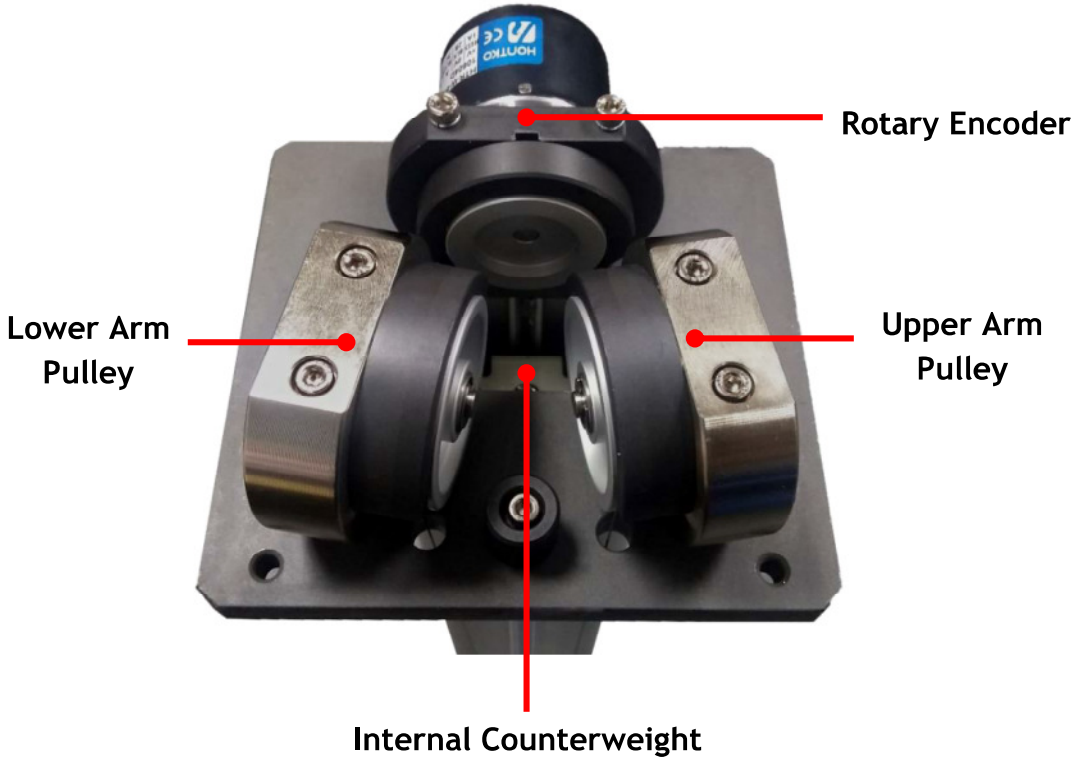
Please note only qualified individuals should work on the extensometer system, damage caused through the dismantling of your extensometer device is not covered by warranty. If in doubt please contact your local Mecmesin agent or Mecmesin Technical Support for more information.

If your extensometer arms move but with a high drag force it is likely that the counterweight string has slipped off one of the internal pulleys. Likely causes for this are:

- The device was dropped,
- The device was laid over without the transit screw in place,
- The arms had a sudden impact or were moved at excessive speed.

To fix this you need to first remove the top cap from the system. This is completed by removing the three M5 button head screws that secure the top cap to the system.

Once removed you will be able to see the internal pulley arrangement pictured below.

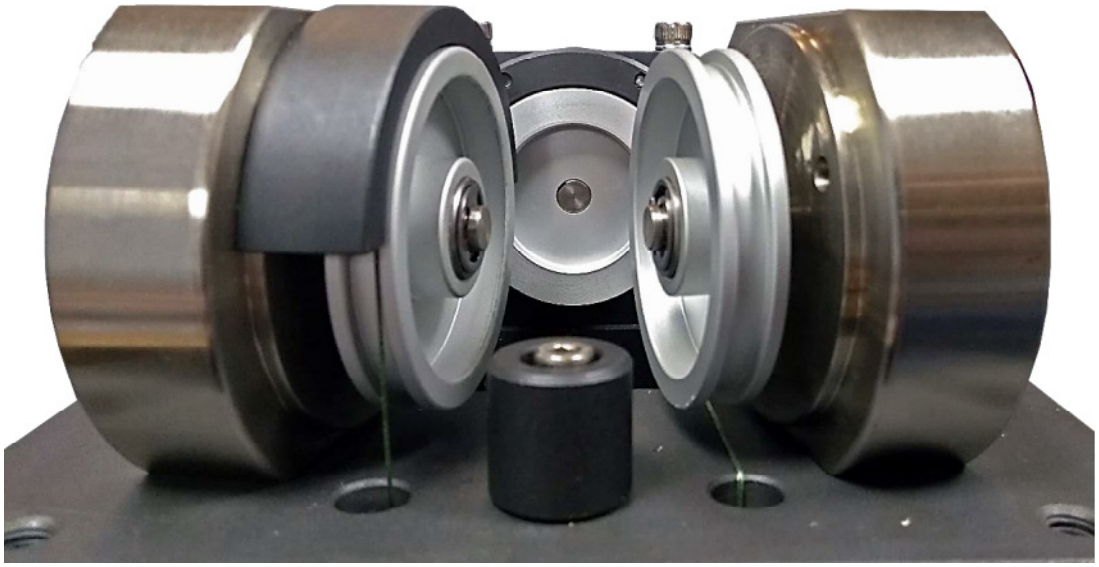


▲ A LTE with the top cap removed for inspection

Issue 1 – Main Pulleys

As the upper and lower arm pulleys are the first internal elements which the counterweight string passes through, they are most likely to be effected by improper usage of the device such as transporting it without the transit screw fitted.

In the image below, on the left-hand pulley, you can see the correct routing for the string across the pulley, note that the string is free to move and runs in the pulley without contacting the retention guide fitted to the pulley.



▲ The main pulley assembly, located within the top cap

The pulley shown in the right-hand side of the image displays a typical fault that can occur when the device is improperly handled. Here the string has jumped off the pulley and is now running across the top plate.

Note: To successfully place the counterweight string back on to the pulley the retention guide must be removed, as shown in this image.

In some instances it is also possible for the counterweight string to fall 'behind' the pulley and run on the pulley shaft, this won't always lead to an increase in drag force but will be evident as the displacement reading from the extensometer will be offset.

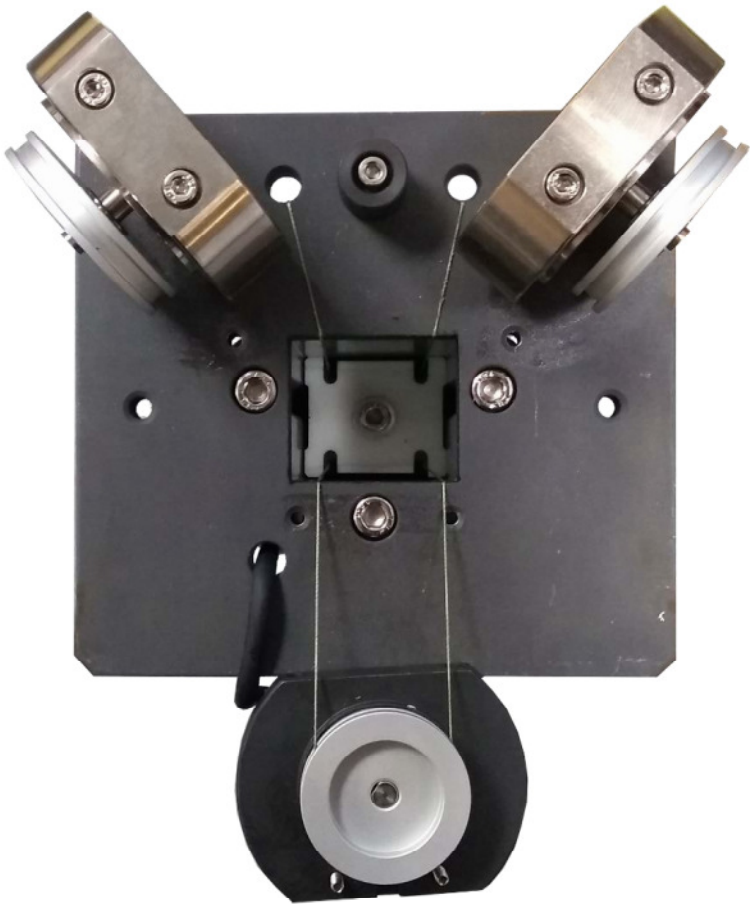
Issue 2 - Counterweight Pulleys

In the event of the device being moved without the transit screw in place, it is possible for the counterweight string to 'slip' off of the internal pulleys located at the top of the counterweight.

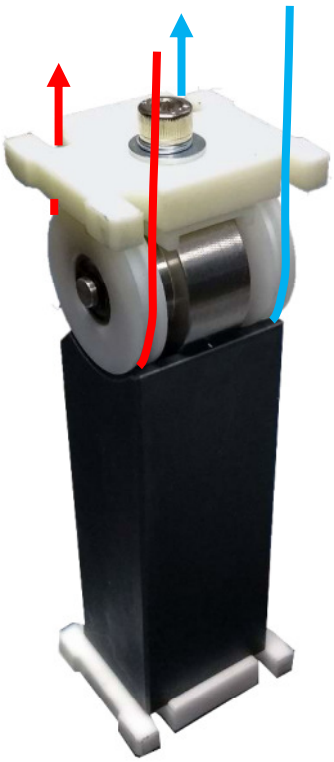
In the event of an entanglement within the counterweight pulleys the counterweight may need to be removed and the string passed back through the pulleys before re-fitting the counterweight into the extensometer.

To complete this the upper and lower main pulley, as well as the encoder will need to be detached from the top of the system.

Please note the counterweight can only be removed with the transit screw removed and both extensometer arms near the bottom of their travel. In the image below you can see the main pulleys have been rotated away from the counterweight and the encoder has been detached.



▲ This image shows the two main pulleys rotated away from the counterweight and encoder detached from the plate



▲ **The internal counterweight, the two arrows depicts the string travel**

In the image above you can see the counterweight removed from the extensometer. Located at the top of the counterweight is two small pulleys, the string passes through the two cut-outs in one side of the plastic top plate across these pulleys and out the two cut-outs on the other side of the plastic top plate (as depicted by the two arrows in the image above).

Once the string has been fitted correctly, carefully lower the counterweight back into the extensometer, ensuring you have hold of the string at all times as this prevents the counterweight from dropping into the extensometer.

The final step is to refit the top pulleys and guide the string back through them and the encoder, before fitting the top cap back to the system.

Effect on Calibration

Please note at a minimum the system should be checked against known lengths (e.g. verified length bars) after correcting any issues with the pulleys.

If in doubt or if the system is reading incorrectly please contact your local Mecmesin agent or Mecmesin Technical Support for more information.

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