Support / Product / OmniTest Support / Software / VectorPro / VectorPro test software

## **Revision ID**

12916

Manual 431-965

# 1 OmniTest Twin Column Test Systems User Manual



# 2 The Scope of this document

This reference manual covers the operation of an OmniTest Twin Column force test stand (Mk1 and Mk2), intended for use with Mecmesin enhanced load sensors (ELS), extensometer devices and other Mecmesin accessories. Operation of additional accessories is covered in separate documentation.

The following manuals may aid you in the use of your test stand:

- Guide to Safe Use of Mains Powered Test stands (part no. 431-398)
- VectorPro<sup>™</sup> for OmniTest and dVu Test Stands (part no. 431-955)
- Long Travel Extensometer Installation Guide (part no. 431-957)

The Mk1 OmniTest versions may also be referred to as "Blue" and Mk2 OmniTest versions as "Black".

# 3 Important

It is essential that you familiarise yourself with the contents of this Manual and the separateGuide to Safe Use of Mains Powered Test stands (part no. 431-398) before attempting to operate your OmniTest Twin Column Test stand.

### 3.1 User Manual icons

Throughout this manual, the icons shown below are used to identify important health and safety information as well as additional installation/operation guidance. Do not proceed until each individual message is read and thoroughly understood.

### 3.1.1 Warning

The **warning** icon highlights a situation or condition that may lead to possible personal injury or damage to the associated equipment.

### 3.1.2 Caution

The **caution** icon indicates a situation or condition that could cause the equipment to malfunction leading to possible damage.

### 3.1.3 Information

The **information** icon indicates additional or supplementary information about the action, activity or application.

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# 4 Items Supplied with your Test Stand

When ordering your OmniTest Twin Column test stand you will be supplied with the following parts:

ltem	Quantity
OmniTest Twin Column test stand	1
Mains cable	1
110V transformer (only included for relevant territories)	1
Document: A Guide To Safe Use Of Mecmesin Mains Powered Test	1
Systems	
Online manual information card	1

Accompanying VectorPro™ software is available to download online from our support center (https://help.mecmesin.com/download/software).

### 4.1 Accessories available

For a full range of enhanced load sensors (ELS), extensometers and accessories, please visitMecmesin.com or contact your local distributor (www.mecmesin.com/distributors).

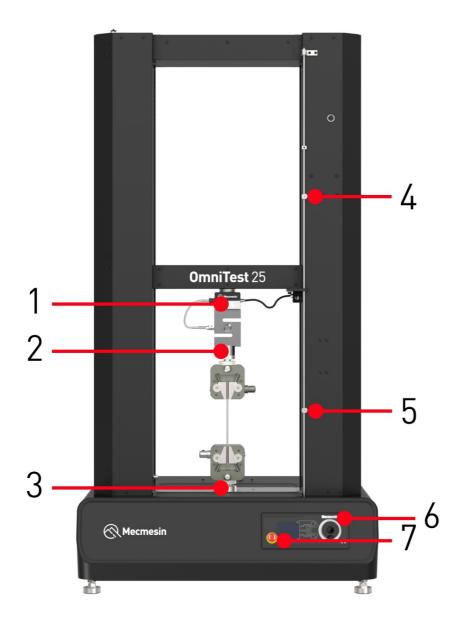
• For connection of the stand to your computer system a Mecmesin supplied 2m USB B to USB A cable communications cable is required (part no. 351-093).



Here you can see some of the grips and fixtures that are available.

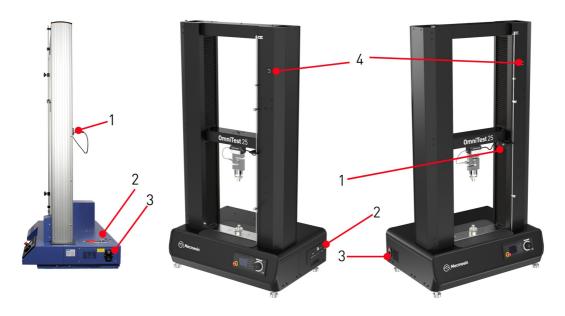
# 5 OmniTest Twin Column System Diagram

# 5.1 Front View



1	ELS loadcell mounted through crosshead	
2	Upper QC mounting adaptor (QC20 'type C', or QC32 'type L')	
3	Lower QC mounting adaptor (QC20 'type C', or QC32 'type L')	
4	Upper adjustable safety limit switch	
5	Lower adjustable safety limit switch	
6	Multi-function scroll wheel and menu selection button	
7	Emergency stop button	

# 5.2 Side View



1 ELS loadcell connection to OmniTest
2 Connectors panel
3 Mains input socket and power switch
4 Interlock port (black OmniTest)

# 6 Initial setup

### 6.1 Unpacking the Stand

When you first receive the stand please check that there is no obvious damage to the packaging.

If any damage is discovered, do not proceed with the installation and contact your local supplier immediately who will decide the most appropriate action and rectify the situation as quickly as possible.

We strongly recommend that the packaging is retained, as this can be useful if the machine needs to be returned for calibration or shipped between sites.

Section 1 lists items that should be included with your test stand. Please contact Mecmesin or your authorised distributor if any items are missing or damaged.

## 6.2 Moving the Test Stand

The unpackaged weight of the test stand is given in the specification table at the back of this manual. Suitable lifting equipment must be used in conjunction with the test stands lifting points.

### 6.3 Environment Conditions

In line with BS EN 61010-1 it is recommended that your Mecmesin OmniTest Twin Column test stand is operated in an environment that matches the following conditions:

- Indoor use only, recommended to be operated in a lab environment
- Altitude up to 2 000 m
- Temperature range between 10 °C to 40 °C. Please note that the instrument should not be used for long durations at higher temperatures
- The maximum relative humidity is 80 % for temperatures up to 31 °C decreasing linearly to 50 % at 40 °C. It is crucial that the surrounding environment does not cause water to form on the device.
- Mains supply voltage fluctuations up to a maximum of  $\pm 10$  % of the nominal voltage.
- The environments should also take considerations of excessive dust or metal particulates as ingress of these into the device can cause damage to the system.

- 7 Initial Setup
- 7.1 Mains Power Supply: BLACK (Mk2) OmniTest 10/25/50

The BLACK (Mk2) OmniTest Twin Column test stands can only be used with 220-250 Vac supplies.

In the event that a 110-120 Vac supply must be used, an external transformer, part no. 164-366, is required to connect from the mains supply to the test stand. The fuse holder alignment indicator should at all times indicate a 220-240V input.



Title

BLACK (Mk2) OmniTest fuse housing must not be changed from 220-240 Vac orientation, as supplied.

## 7.2 Mains Power Supply: BLUE (Mk1) OmniTest 10/25/50

The BLUE (Mk2) OmniTest Twin Column test stands can be used on 110–120 or 220–240 Vac 50-60 Hz supplies. The rear fuse carrier will be set for your local requirement but is reversible, so should you replace a fuse, the correct local voltage must be selected.

The voltage that is selected is indicated by which arrow is pointing to the white line located at the bottom of the device.

This is illustrated in the image below, shown within the red circle:





### 7.3 ELS: Enhanced Load Sensor

Enhanced load sensors or ELS for short, are smart devices used to capture load readings for OmniTest Twin Column test stands, all calibration information is held on the individual load cell meaning they can be swapped from system to system and the calibration will follow with no input required.

These load cells are available in a range of sizes and designs to best suit your requirements. See the specifications section of this document for details relating to capture rate and accuracy.



A selection of enhanced load sensors (not all ELS devices shown are compatible with twin column test stands).

## 7.4 Fitting an ELS to your Test stand

### 7.4.1 Loadcells up to 25 kN

The OmniTest Twin Column uses an M18 bolt that passes through the crosshead and screws into the top of the load cell.

To fit your ELS to your test stand pass the M18 bolt through the crosshead align the ELS below, use a 14mm Allen key to secure the ELS in place.

For large load cells, it may be necessary for one person to hold the ELS while the other secures the bolt.

Please follow all localised safety guidelines or procedures when manually handling heavy or irregular shaped items.



Securing the loadcell with the central M18 holt

#### Please note

It is also important to ensure that attached grips and fixtures do not overload the ELS. If in doubt, please check the weight of any addition grips and fixtures prior to fitting these.

### 7.4.2 50 kN Pancake loadcell



50 kN pancake loadcell showing 8 attachment holes and connection cables

The 50 kN ELS-P loadcell uses an additional method of attachment, which should be performed first.



Attach this loadcell to the crosshead using the eight M8x60 socket cap head bolts, using two to locate the loadcell's electronics housing. These screws are 12.9 grade steel with a recommended maximum torque value of 41 N.m. If required the torque values can be checked after first use.

Once attached, pass the M18 bolt through the crosshead into the ELS-P below and use a 14mm Allen key to further secure the loadcell, as with the lower capacity loadcells. If fitting a QC upper fixture, this will attach from below via an adapter ring with one M18 and 6xM6 cap head bolts.

# 7.5 Connecting an ELS to the OmniTest Twin Column

### 7.5.1 BLUE OmniTest

To connect your ELS to your OmniTest stand simply plug the Mecmesin ELS to OmniTest cable (part number 352-275-V01) into both the load cell and the ELS shroud located on the back of the stand.



Connecting the ELS to the test stand.

7.5.2 BLACK OmniTest

The ELS is connected to the socket on the moving crosshead as shown below



As enhanced load sensors are 'smart' devices all calibration and capacity information is passed to the stand automatically as the sensor is connected.

# 7.6 Connecting the OmniTest Twin Column to a PC

To connect your OmniTest Twin Column test stand to VectorPro™ software, connect the USB B port to a PC using

Important! Please install **VectorPro<sup>TM</sup>** software on your desired PC**before connecting the test stand** to your PC. For more information please refer to the **Installing VectorPro** section from the VectorPro Introduction and Initial Setup User Manual.

## 7.7 Cable Management

It is essential that no cables are permitted to interfere with the controls or any moving parts. Cables that fowl movement or interfere with moving parts can cause injury or damage to the test system.

# 7.8 Updating Stand Firmware: Vector Instrument Programmer (VIP)

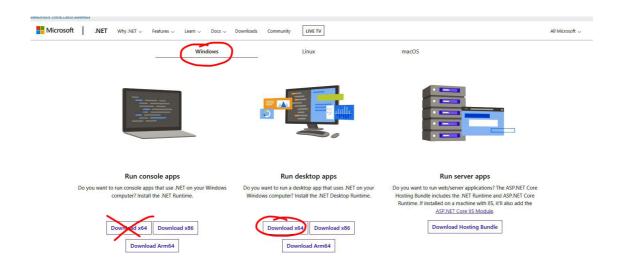
#### DO NOT DISCONNECT THE DEVICE WHILE UPDATING

From time to time, a new OmniTest firmware version will be released. This could be for several reasons including introduction of new features, improvements and enhancements, or fixing reported issues. To simplify the process and to give you control over your updates, we have developed an application called Vector Instrument Programmer (VIP) to allow you to update any device, powered by Vector Technology, as and when you prefer. To update your OmniTest you will need to download the VIP application and ensure that the PC that your OmniTest is connected to is also able to access the internet. You will also need a Vector Cloud Services account (free of charge). At the time of writing the following products are compatible with VIP:

- OmniTest systems
- MultiTest dV and dV(u) systems
- Vortex dV, VortexPro and HelixaPro
- Vector Instruments (VFG, VFTI and VTG)

### 7.8.1 Pre-requisites

- Vector Cloud Services account: VIP utilises the Cloud to access the latest releases of firmware and so you will need a Vector Cloud Services account. This is easy to do and you will only have to priovide a valid email account. No credit card details will be requested.
- .NET runtime 6: Another pre-requisite is for the free Microsoft utility ".NET runtime 6" to be installed. Be sure to install the "Download x64" option in the Windows tab under the "Run desktop apps" option as shown below. The download can be found here https://dotnet.microsoft.com/en-us/download/dotnet/6.0/runtime? cid=getdotnetcore

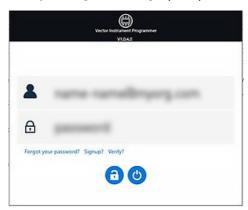


VIP is self updating so installation only needs to be done once. Updates to VIP are pushed to the app when available. The app does not place an icon on the desktop, but you can create a shortcut from the VIP exectable file found at this location on your PC - C:\Program Files (x86)\PPT Group\Vector Instrument

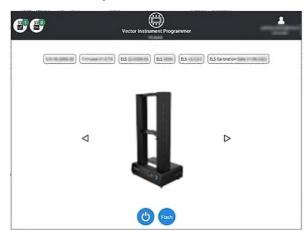
 ${\bf Programmer.} {\bf Vector Instrument Programmer.} {\bf exe.}$ 

### 7.8.2 How to use VIP

1. Sign in using your Vector Cloud Services account credentials. If you don't have an account, then you can create one by clicking on the "Signup?" option.



2. Connect your Vector device to the PC running VIP using the USB cable tha came with your product. You should see the device appear in the app. I you have more than one device connected then this will be indicated in the top left corner where the USB icon is. You can switch between devices by using the left and right indicators either side of the deice picture.



3. To see if there is a firmware update for your device, click on the "Flash" button. A popup will appear asking if you want to update along with the currently installed version and the latest available version. If the version numbers are the same then no action is required and you can select "No" to go back to the home page. If the numbers are different then there is an update available.



4. If you wish to update, then select "Yes" and the device will automatically update. A progress bar will show the status of the update and once complete the product will power back on and the software will go back to the home screen.

Software updates will be published when updates are released in the software section of our support center at www.Mecmesin.com. If you are unsure or if you need help updating your product please contact support@mecmesin.com.

# 7.9 Attaching Grips and Fixtures

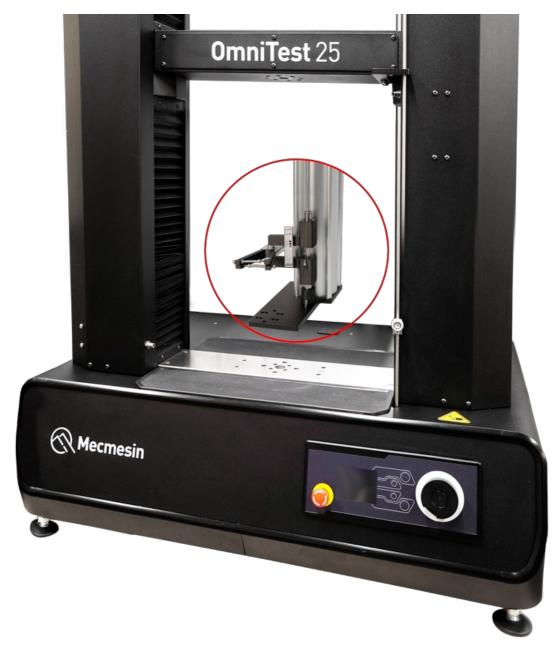
#### ENSURE THAT THE OMNITEST IS NOT IN JOG MODE WHEN ATTACHING ACCESSORIES

For flexible attachment of a variety of accessories, the OmniTest Twin Column features a base plate with numerous threaded holes spread symmetrically across its width as well as fixing points for a standard 20mm QC adapter.



OmniTest Twin Column base plate

Upper grips and accessories are attached directly to the ELS device being used.



Mecmesin LTE-1100 extensometers are available and can be fitted directly to the base plate.

# 7.10 Setting the Limit Stops

Limit stops help prevent damage to load cells and fixtures by stopping the crosshead movement before the moving fixtures come into contact with static parts of the stand. Their positions are adjusted after the fitting of fixtures and test samples.

It is advised that 'Limit stops' are set each time a new application is started, to prevent damage or potential injury to the user.

There are two manually-set limit stops, located for your convenience, on the front of the OmniTest Twin Column.

These are set by loosening the thumb-screw, moving the stop to a new position and retightening.

When the crosshead meets a stop, it activates a switch. This will stop the crosshead movement at an upper or lower limit.





Limit stops on an OmniTest Twin Column

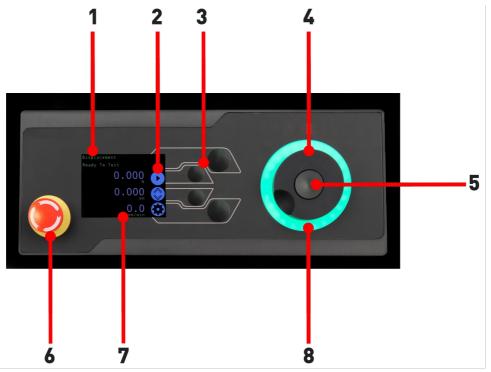
### 7.11 Test Stand States

The test stand can be in one of five states:

- 1. Test readiness ready to start, or complete
- 2. Testing test operation sequence is running
- 3. Stopped test interrupted or emergency stop pressed
- 4. Jog mode for jogging or positioning the crosshead manually
- 5. Settings menu for adjusting your test stands settings

In each state, the selector buttons have functions described by the on-screen icons.

# 8 Front Panel Controls



1	Status messages
2	Button functions
3	Multi-Function selector buttons
4	Multi-function scroll wheel
5	Scroll wheel button
6	Emergency stop
7	Display
8	LED indication dial

# 8.1 Emergency Stop



Push the emergency stop button to immediately stop the crosshead movement. Rotate the button to release it and resume crosshead control. If pressed during a test, do not simply restart a test.

Ensure any residual force is removed using the test stand's jog controls before continuing.

## 8.2 Multi-function Scroll Wheel Control

### 8.2.1 Scroll Wheel Colour Indication

The LED light ring surrounding the scroll wheel shows three colours, indicating three states, these states are:



**Green Light** 

Pulsating: Ready to start testing

Rotating: Scrolling through a menu



#### **Amber Light**

**Static:** The current test has completed **Rotating:** The crosshead is moving

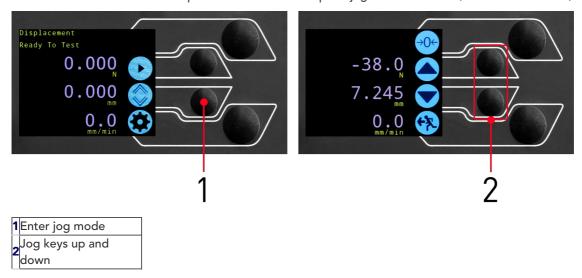


#### **Red Light**

**Static:** The test has stopped or a limit has been triggered

### 8.2.2 Jog Mode

When in jog mode the scroll wheel drives the crosshead directly up (clockwise) or down (anticlockwise). This offers more variable control when compared to the two fixed speed jog control buttons (circled in red below).



The scroll wheel can also be used as a speed controller. The jog buttons move the crosshead at the set speeds (configured in the 'Jog Settings' menu picture below).

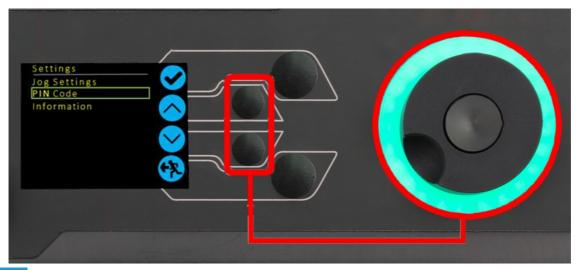
Rotating the wheel clockwise whilst holding a jog button will increase the jog speed and rotating the wheel anticlockwise whilst holding a jog button will decrease the speed.

OmniTest twin column test stands also feature a precision jog mode, rotating the scroll wheel while holding the central scroll wheel button moves the test stand at its minimum speed, this is useful when fitting specimens into grips or if precision positional control is required.

### 8.2.3 Navigational Control

The scroll wheel can also be used to navigate the menus. When in a selection menu, the scroll wheel cycles

through the selections and their values. This is an alternate navigational option to using the up and down arrow buttons.



### 8.2.4 The Central Button

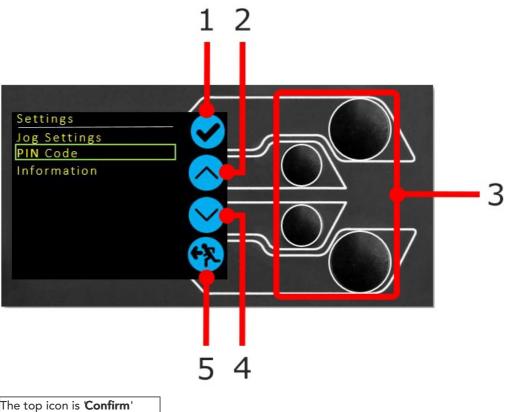
The central button is used to confirm a menu selection. It is equivalent to the tick button.

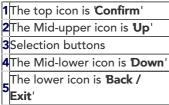
It can also be used to activate fine jog control. Use by rotating the scroll wheel while holding the central scroll button. This drives the test stand at its minimum speed.

### 8.3 OmniTest Display Panel

The display indicates the stand status, displays live values and is used to configure the test stand settings.

The purposes of the four selection push-buttons are indicated on-screen by an adjacent icon. Below is an image showing a typical example of the on-screen icons in relation to the physical buttons.





### 8.4 Test Stand States

The test stand can be in one of five states:

- 1. Pre-Test ready to start, or complete,
- 2. Testing test operation sequence is running,
- 3. Test Stop- test interrupted or emergency stop pressed,
- 4. Jog Mode for jogging or positioning the crosshead manually,
- 5. Settings Menu for adjusting the test stand settings,

In each state, the selector buttons have functions described by the on-screen icons.

### 8.5 On-Screen Icons

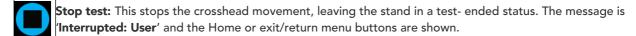
On-screen icons vary depending on the current state of the test stand and the menu functions the physical buttons perform at that point. Below are reference tables to help explain the icon definitions.

#### 8.5.1 A: Pre-Test

lcon	Action
	No sensor connected
0	Enable jog mode
	Go to settings
	Move to the home position (Set within VectorPro or test start position)

#### 8.5.2 B: Test Stop

	Action	
con	ACTIO	1



Emergency stop button pushed: Message: 'Emergency Stop!!!!'. Remedy the situation causing the required stop, then release the emergency stop to regain control. Note: there is no on-screen icon for the emergency stop.

**Upper limit switch triggered:** The crosshead has reached the upper travel limit, as set by the OmniTest limit switches, and stopped. Further travel in this direction is prevented.

**Lower limit switch triggered:** The crosshead has reached the lower travel limit, as set by the OmniTest limit switches, and stopped. Further travel in this direction is prevented.

#### 8.5.3 C: Jog Mode

lcon	Action
→0←	Zero (tare) all OmniTest readings
	Move the crosshead upward at the set jog speed
	Crosshead has reached an upper limit (load signal from a connected gauge, set to Stop, or a limit switch) and stopped
	Move the crosshead downward at the set jog speed
	Crosshead has reached a lower limit (load signal from a connected gauge, set to Stop, or a limit switch) and stopped

Icon Action



Exit jog mode

8.5.4 D: Settings Menu

lcon	Action
	Confirm selection (or press the scroll wheel button)
<u>^</u>	Navigate ' <b>up</b> ' a menu selection or value (or turn the wheel clockwise)
<b>▽</b>	Navigate ' <b>down</b> ' a menu selection or value (or turn the wheel anticlockwise)
	Exit settings screen

# 9 Automatic ELS Firmware Update

All OmniTest twin column test stands with firmware 3.1.0.0 and above have the ability to update the firmware of any ELS device. This feature is seamlessly managed through the front panel and ensures that the latest firmware is on the ELS devices.

#### Step 1

#### Connect the ELS Device





To start the update connect the ELS to the test system, then switch the test stand on.

#### Please note

Analogue short travel extensometers can also be updated in a similar method, simply plug the extensometer device into the corresponding connector on the rear of your OmniTest.

### Step 2

#### Starting the Upgrade



On the display located on the front panel of the test stand, the screen shown in the image above will be presented.

The new '**Stored**' firmware is listed at the top of the display and the current ELS firmware is displayed below. In this instance the ELS current firmware is 1.0.8.000, starting the update will flash the device to version 2.1.000.

If more than one ELS is connected (load cell and a short analogue extensometer) the additional devices will be listed. To start the update of the first ELS device press the 'tick' icon.

#### Please note

If you press the 'Cross' icon the upgrade can be started manually by opening the information screen located within the settings menu and scrolling to the ELS firmware version. This will have a '\*' next to it, pressing the 'tick' icon will open the firmware upgrade screen pictured above.

#### Step 3

#### Flashing the Device



The flashing of the device is carried out automatically and progresses through several stages.

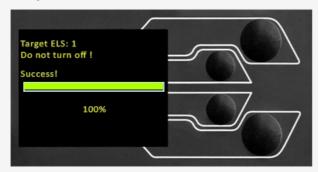
In the image above initial programming is taking place. The progress can be monitored using the bar and percentage readout shown onscreen.

#### **Important**

It is important that the test stand is not turned off or disconnected. Disconnection of the ELS could lead to irreversible damage.

#### Step 4

#### **Complete the Flash Process**



Once the process is at 100% the display will indicate that the firmware upgrade has been successful.

The display panel will then prompt the update of the next ELS device currently connected or the return to the start screen (if no additional ELS devices are connected).

The version of the ELS firmware can be checked manually by accessing the **Information**' screen located in the '**Settings**' menu. See the specification tables for more information.

# 10 OmniTest Twin Column Settings

All settings are made by moving the selection marker to the required item or digit and confirming with the tick button or using the central scroll wheel button.

## 10.1 Jog settings

Within the jog settings menu, you can configure the jog speed and force limits while in jog mode.

Below is a detailed breakdown of each setting and the options available for each setting.

Setting	Action	Range
		0.050 to 1200 mm/min
Up Speed	Configure the jog speed in an upward motion	0.002 to 47.24
		inch/min
		0.050 to 1200 mm/min
Down Speed	Configure the jog speed in a downward motion	0.002 to 47.24
		inch/min
		Up to 2500 N
Tension Limit	Configure the tensile force limit for jog operations	Up to 562 lbf
Compression	Configure the compressive force limit for jog	Up to 2500 N
Limit	operations	Up to 562 lbf

## 10.2 PIN Code

Within the PIN code menu, it is possible to set a four-digit number that can be used to lock the menu feature of your OmniTest Twin Column.

#### Please note

Once this has been set you cannot access the menu without the PIN, so it is crucial that you keep a record of this safe. To remove the PIN code set the four-digit number to '0000'.

# 10.3 Pre-load Threshold

This menu displays the pre-load threshold as configured by  $VectorPro^{TM}$ , changes here will be overwritten by VectorPro next time you start a test.

## 10.4 Information

This screen is used to display key information relating to your OmniTest Twin Column and connected ELS devices. Here you can see software, hardware and firmware properties as well as the calibration date for the test stand and the number of overloads that have occurred for the current ELS.

# 11 Connectors Panel



- 1. Extensometer port
- 2. Digital IO port (not currently implemented)
- 3. Calibration date and serial number
- 4. Interlock override switch
- 5. Interlock port
- 6. USB-B Comms port
- 7. ELS 2 and 3 (not currently implemented)

# 12 OmniTest Twin Column Specification

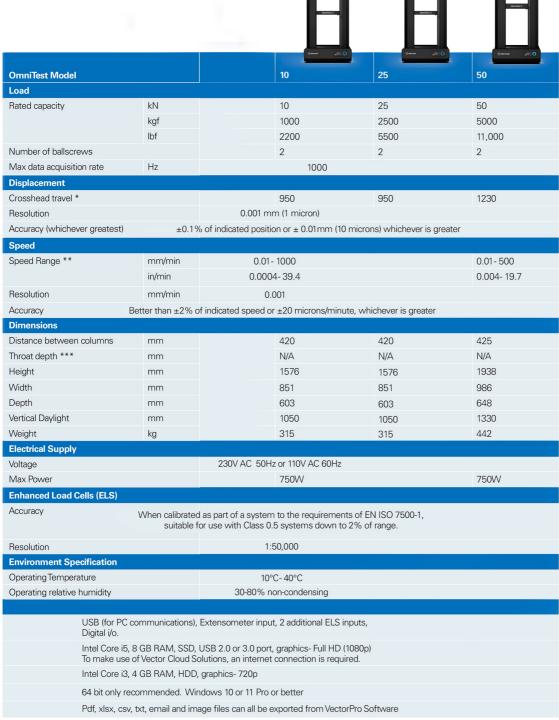
## 12.1 BLUE OmniTest

OmniTest Test Sta	nd	10	25	50		
Data d Caracita	κN	10	25	50		
Rated Capacity kN	gf	1000	2500	5000		
	bf	2200	5500	11000		
Number of Ballscre	ews	2				
System accuracy		Class 0.5, according to the requirements of BS EN ISO7500 (requires optional onsite UKAS accredited system calibration)				
Maximum sampling	g rate	500 Hz				
Load holding		Yes	Yes			
Displacement		•				
Crosshead Travel		950 mm (37.4")	950 mm (37.4")	1100 mm (43.3")		
Resolution		1 μm	·			
Accuracy		±0.1% of indicated po	sition or ±10 microns, which	ever is greatest		
Speed		· ·				
Calibrated Speed	nm/mir	0.05 to 1000	0.05 to 1000*	0.05 to 400**		
Range	n/min	0.002 to 40	0.002 to 40	0.002 to 15		
Speed Resolution		0.001 mm/min (0.0000	4 In/min)			
Accuracy		±2% of indicated spee	d or ±20 µ/min whichever is	greater		
Dimensions						
Height		1500 mm (59.1")	1500 mm (59.1")	1931 mm (76")		
Width		826 mm (32.5")	826 mm (32.5")	826 mm (32.5")		
Depth		542 mm (21.3")	542 mm (21.3")	572 mm (22.5")		
Vertical Daylight		1140 mm (44.9")	1140 mm (44.9")	1330 mm (52.4")		
Distance between columns		400 mm (15.7")	400 mm (15.7")	420 mm (16.5")		
Weight		140 kg (309 lbs)	140 kg (309 lbs)			
Electrical Supply		•	1			
Voltage		230V AC 50Hz or 110\	/ AC 60Hz			
Maximum Power Requirement		450 watts				
Enhanced Load Se	nsor (E	LS)				
Accuracy		±0.5% of reading down to 5% of range				
Sensor Measurement		>1:25000 filtered from 24 bit				
Resolution						
Internal Sampling Rate		20 kHz				
<b>Environment Spec</b>	ificatio	n				
Operating Temper	ature	10°C - 40°C				
Operating Relative Humidity		Normal Industry and laboratory conditions. 30%-80% (non-condensing)				

<sup>\* 25</sup> kN - recommended maximum speed = 500 mm/min (20 in/min) above 10 kN

<sup>\*\* 50</sup> kN - recommended maximum speed = 250 mm/min (10 in/min) above 25 kN

Software and communications			
	USB port, extensometer input, 3 low voltage additional sensor inputs with future expansion capability		
PC requirements		Intel Core i5 processor, 8 GB RAM, on USB 2.0 or 3.0 port, SSD hard drive with 10 GB free space, screen resolution 1920x1080 (full HD)	
		Intel/AMD dual core processor with 2 GHz or faster clock speed, 4 GB RAM, one USB 2.0 or 3.0 port, hard drive with 10 GB free space, screen resolution 1080x720	
Operating System (OS)	Recommended OS	Windows 10 Pro (64 bit)	
	Compatible OS	Windows 7 or Windows 10 (32 or 64 bit)	
Data output You can export as PDF, XLSX, CSV, TXT, email and image file formats			

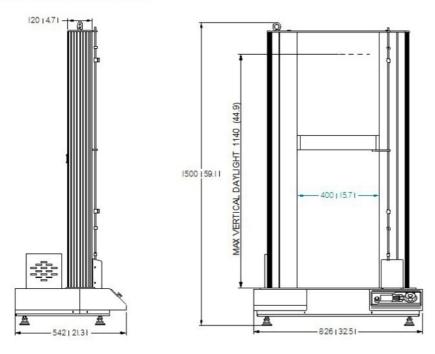


Measured without fixtures
 Speed calibration as standard is between 1mm/min to full speed. Calibration below 1mm/min is available upon request.
 Measured to centreline of loadcell

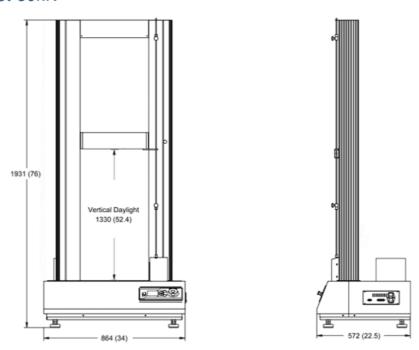
# 13 OmniTest Twin Column Dimensions

## 13.1 BLUE OmniTest

### OmniTest 10kN and 25kN

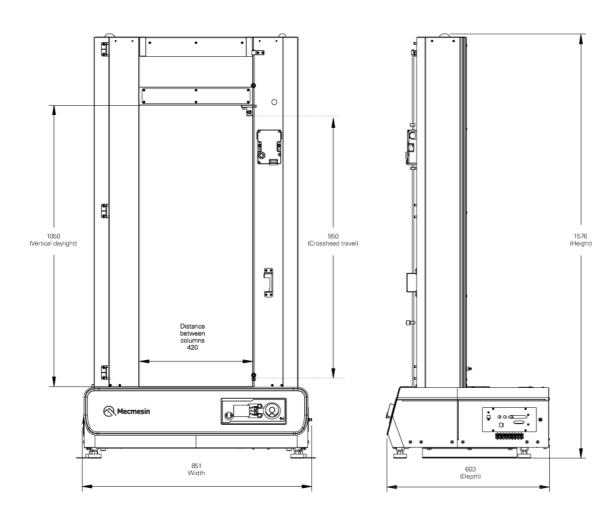


### OmniTest 50kN

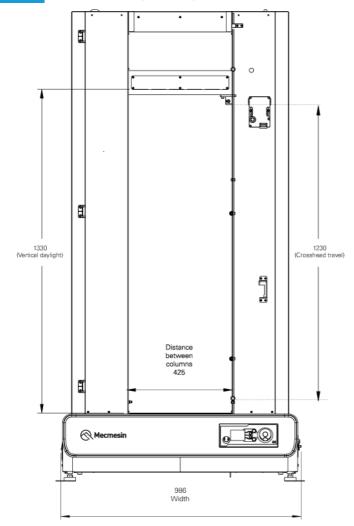


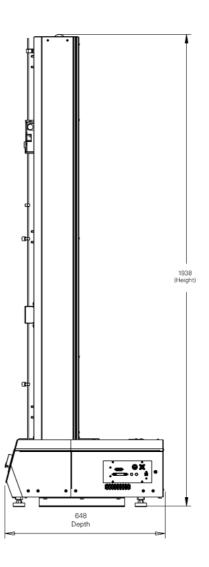
13.2 BLACK OmniTest

13.2.1 OmniTest 10 and 25 BLACK



# 13.2.2 OmniTest 50 (BLACK)





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