Mecmesin

testing to perfection

Assembly and Installation of the Helixa Precision Torque Tester

Mecmesin

FORCE & TORQUE TEST SOLUTIONS

www.mecmesin.com

431-439-08

October 2018

Important

It is essential that you familiarise yourself with the contents of this *Assembly and Installation Manual*, and the separate *Guide to Safe Use of Mains Powered Test Systems* before attempting to operate your Helixa Test System.

Control console warranty

The Helixa-*xt* console is pre-configured at Mecmesin for use with the Helixa-*xt* stand. With the exception of the Advanced Builder Option, which requires a configuration change to the console, any unauthorised changes to the console configuration and set-up will invalidate the warranty.

The 24-month end-user warranty for the console itself is with a third party. Please contact your local Mecmesin agent for assistance with this warranty.

The Microsoft® Windows® 10 Enterprise 2016 operating system is pre-installed and licensed by Mecmesin and supplied with an End User License Agreement, and Certificate of Authenticity.

The console is supplied for the sole purpose of operating, and collecting data from, your Mecmesin –xt system. Any use other than this is not recommended and may result in performance degradation and/or damage to your console. Although network and USB storage device connection is allowed, this is at the user's risk. No liability can be accepted by Mecmesin for virus, malware or ransomware contamination

Scope

This reference manual covers the Helixa-*i* and the Helixa-*xt* range of test stands. For programming, refer to these manuals:

431-382 *Emperor Force and Torque Testing Software, Operator Manual*

431-389 *Emperor™ Programming for Mecmesin-xt Force and Torque Test Systems*

Part no. 431-439-07

Contents

1. Items Supplied with the Test Stand

1.1 Helixa-*i* test stand

- The Helixa test stand
- Appropriate mains cables for test stand and console (Helixa-*xt*)
- 4 × rubber feet
- 4 × bench-securing lugs
- 4 × attachment screws for either feet or lugs
- Top mass platen and fixings
- Balance hanger for external weights
- Allen keys
- Alignment tool
- CD with software and manuals for backing up or running on a PC
- Manual: *A Guide to the Safe Use of Mains Powered Test Frames*

1.2 Helixa-*xt* test stand (additional)

- Console fitted with arm, power cable and RS232 cable
- Torx wrenches for fitting the console to the stand.

2. Installation

2.1 Unpacking the stand

When you first receive the stand please check that there is no obvious damage to the packaging. If there is any sign that the packaging or the test stand itself has been damaged, please contact Mecmesin or your authorised distributor immediately. Do not use the stand until you have done so.

We strongly recommend that the packaging is kept, as this can be useful if the machine needs to be returned for calibration.

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.

2.2 Lifting the test stand

The unpackaged weight of the test stand is given in the Specification table at the back of this manual. Do not try to lift heavy loads unaided. Use suitable lifting equipment if necessary.

2.3 Locating the stand

The test stand must be positioned on a suitable, level, stable work surface.

2.4 Releasing the crosshead

For safety in transit the internal counterbalance weights are secured internally. (See Section 4.2 'Securing the counterweights' for instructions.)

Release the securing lever on the right hand side of the column by half a turn anticlockwise.

The crosshead can now be raised and lowered manually, or by using the height-adjustment knob on the left, and secured with the lever on the right side of the column.

2.5 Mains power supply

Mecmesin test stands can be used on 110–120 or 220–240 V ac 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 *the one where the arrows meet* (the power inlet is inverted for some test stands):

Removing the fuse carrier

Carrier removed to replace fuse

Selector set to 220-240 V

3. Assembly and Stand Controls

3.1 Fitting the feet to the stand

Fitting rubber feet …

… or bench-securing lugs, to the base of the Helixa

The Helixa is supplied with rubber feet. Lay the stand carefully on its back, and fit the four rubber feet to the base of the stand. **Please note:** The Helixa is heavy and it is recommended that two persons move the stand for this operation. Handle the Helixa only by its base and column, not the crosshead or spindle deck.

3.2 Stability and bench-mounting

Helixa-*xt* as a free-standing unit conforms to BS EN 61010-1:2010 section 7.4(a) requirements for stability. However, it is recommended that the control console remains mounted at the mid-point of the column. If you require the console unit to be mounted higher than the mid-point of the column, and/or use additional weights in the mass platen or external rear hanger, then fit the four bench-securing lugs to the Helixa-*xt* or Helixa-*i* for complete stability (shown above).

3.3 Fitting the top mass platen

Secure the top mass platen to the top of the Helixa torque cell (HTC) using the two M6 countersunk screws supplied.

Attaching the top mass platen to the torque cell

3.4 Fitting a torque cell to the crosshead

Ensure the stand is switched off.

Slide the HTC down onto the dovetail bracket at the front of the crosshead. Slide it fully downwards against the stop, and tighten the securing screw using the appropriate Allen key. Do not over-tighten.

Slide the HTC onto the dovetail …

tighten securely …

Align the electrical connector of the HTC with the socket on the test stand. Gently push the connector to locate, then tighten the knurled locking ring to secure it.

connect the torque cell

secure the cable, and adjust free length

Secure the torque cell cable using the clip on the right hand side of the column, and adjust it so that there is no tension through the travel of the crosshead.

3.5 Swapping Helixa torque cells (HTCs)

You can swap HTCs by simply disconnecting one cell and fitting another. First, return to the Main Screen and switch off the stand before unplugging the HTC. When the new cell has been connected, switch the stand on again, and after a few seconds the new HTC will be automatically recognised. The Helixa will read in the new cell's range, serial number and calibration status.

3.6 Attaching grips and fixtures

Grips and other holding fixtures are usually paired, with one being attached to the main spindle drive, and the other to the torque cell. Fixtures on the main spindle have a self-centring fitting and four screws, whilst the torque cell has a square drive attachment.

> **Important**: very low capacity torque cells are very sensitive and can be damaged easily by inadvertent overload. Take great care to engage and withdraw fixtures perpendicular to the cell and without any twisting movement.

3.7 The Helixa front control panel

The Helixa front control panel

3.7.1 Emergency stop button

The emergency stop button will stop all movement of the drive spindle. Pushing the button will override all other controls. When pressed, the button stays latched down, preventing any movement of the motor. To re-set the button, rotate it about 30 degrees clockwise.

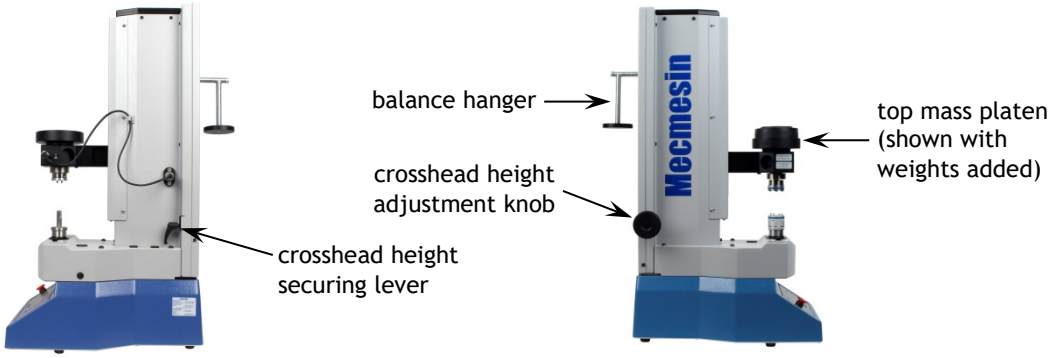
3.7.2 Jog buttons

Jog buttons are used to position the main spindle's rotation, so that samples can be secured. These buttons are replicated in the Emperor software, either on the console (Helixa-*xt*) or the controlling PC (Helixa-*i*). The two sets of buttons function in different ways.

	Stand jog buttons speed	Software jog buttons speed
Quick Test	Factory set fixed rate	Jog speed increments or decrements each time the jog button is pressed
Program Test	Factory set fixed rate	Rate set in *Program test set-up* > *Test Settings*
Advanced Test	Factory set fixed rate	Rate as set in *Set-up* > *Preferences*

4. The Counterbalance Mechanism

The Helixa moving crosshead is counterbalanced by a system of weights. In this way, the entire weight of the crosshead, HTC, fixture and sample part to be held, can be finely counterbalanced. This may be required so as not to interfere with measuring the torque on (for example) a rising screw thread, or conversely, to apply a specific downwards force during torque testing, by the addition of weights to the top mass platen.

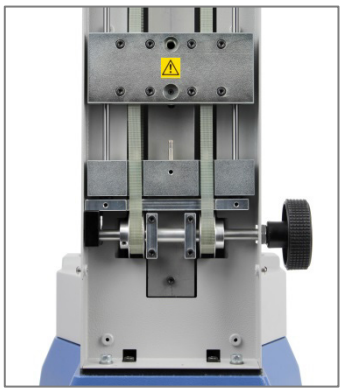


The large black adjustment knob on the left of the column can be used to raise and lower the crosshead. The crosshead can also be moved by hand, and can be fixed in place using the lever on the right of the column. Internally, sliding counterweights operate. The two parts may be connected or separated to apply all of the weight (2.25 kg), or only the upper weight (1.5 kg). The hanger without weights adds a further 200 g.

- To reduce this counterbalance by one-third, insert an Allen key through the hole in the back cover, which aligns when the crosshead is at its highest extent. Loosen the screw until you feel the counterweights separate, by pressing down on the crosshead.
- To reconnect the two counterweights, raise the crosshead to its highest position, and retighten the connecting screw.

Normal view, counterweight connecting screw circled

Back cover removed



Counterweights separated

The counterweights are attached to two drive belts whose tension can be adjusted for freedom of movement.

4.1 Adding counterbalance weight, and applying top-load

A balance hanger can be screwed into the rear weight, for additional weights to be suspended. The moving crosshead itself has a mass platen for the addition of specific weights. In combination, the required balance or load can be achieved.

Attach the balance hanger

Suspend additional weights

Apply top-load mass

4.2 Securing the counterweights

For safety in transit, the main counterweights inside the column are always secured, and will need to be released during installation. Ensure the release lever is locked to prevent immediate movement. Using an Allen key, release the grub screw through the hole in the weights, visible at the base of the long central slot. Release the lever to move the crosshead using the wheel on the left of the column.

Warning! When transporting the system please ensure the counterweights are secured in place, failure to do so may lead to the system becoming damaged.

5. Helixa-*xt* : Fitting the Control Console

5.1 Fitting the console to a Helixa-*xt*

The console is supplied assembled onto an arm and bracket. This needs to be attached to the black mounting plate on the side of the column, with the supplied tamper-resistant Torx screws, using the appropriate Torx wrench provided. **Note:** Do not use any other tools other than those provided.

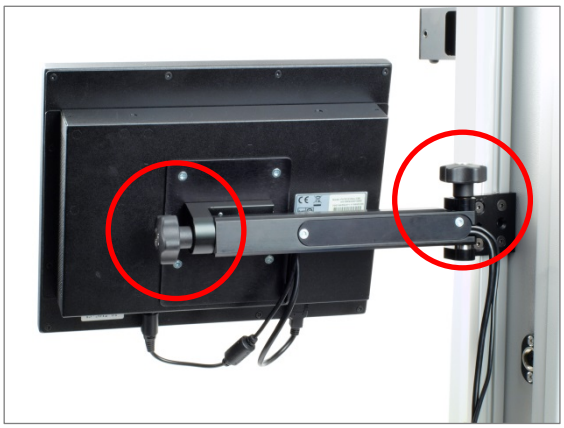
Support the console with one hand and, with the top screw held in place by the supplied Torx wrench, locate the bracket on the mounting plate and engage the screw, as shown below. When almost tight, fit the lower screw. Tighten both, and release the console.

The console mounting plate

Fix the upper Torx screw first

Adjust the console height by slackening the grub screw through the hole between the fixing screws as shown below, whilst supporting the console. Re-tightening at the required height. The angle and rotation of the console can also be adjusted. Slacken the appropriate knob and reposition the bracket, or rotate the arm onto alternative sprung-pin locations. Retighten each knob firmly so that the console does not move when the screen is pressed.

Adjust the console height



Adjust tilt and swing

5.2 Connecting the console power lead and RS232 lead

The console is powered from a separate universal supply plugged into a mains socket.

Caution: use only the mains adaptor supplied by Mecmesin, do not use any other type.

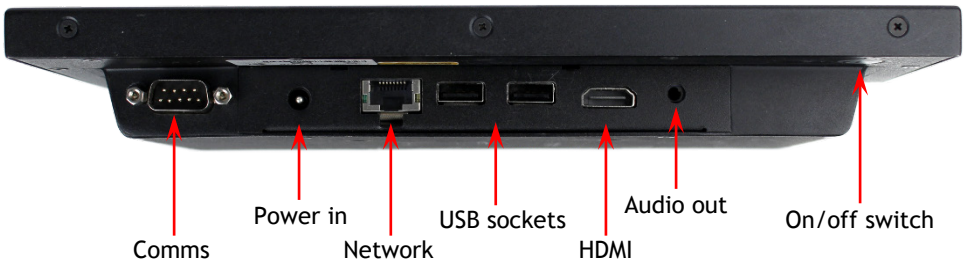
The power lead and data cable will already be connected—check that they are firmly fitted to the console. Plug the power adaptor into a suitable socket. Plug the data cable into the 9-way socket labelled 'PC' on the rear of the Helixa. Normally it will not be necessary to remove the data cable from socket COM1, but should this be required, return the console to the front screen display before removing the RJ50 connector.

Helixa rear panel. Plug the data cable into the socket marked 'PC'.

5.3 Switching on the Helixa-*xt* system

Switch on the test stand using the main switch located on the rear panel. Four green power lights (LEDs) on the front panel will illuminate.

Switch the touch screen console on by pressing the small on/off switch located on the underside of the console (shown below) to the right of the power lead. After a few seconds the initial login screen will be displayed.



5.4 Connecting other devices

Connect printers or other device using the USB sockets on the console underside.

5.5 The touch screen console

The touch screen is used to control the Emperor-*xt* system.

Please note that this Windows computer does not contain an internal battery. If power to the system is interrupted, unsaved data will be lost.

You can select operations and options by pressing or tapping on the relevant button on the touch screen with a finger or a stylus. In the bottom right of any screen layout requiring typed entry, there is a keyboard icon. Touch this, and a floating keyboard appears so you can type in numbers or text. If this obscures an entry field, just drag it out of the way. Where a layout has no data entry, the keyboard will automatically slide out of sight to the left, but it does not appear automatically when data may be required. Simply tap the keyboard icon whenever you need it.

- a single tap or press is the same as a left mouse button
- press-and-hold is the same as a right mouse button
- a double-tap is a double-click
- touch and drag a finger to select text
- combination keys such as Shift+ and Ctrl+ are used sequentially. For example, to select contents of a field, press Ctrl and then A. To copy, press Ctrl and then C. To paste, press Ctrl and then V.
- touch and drag a window element by its title bar—such as the floating keyboard itself.

The -*xt* console showing the floating keyboard icon bottom right, and keyboard

5.6 Operators and Master users

There are two levels of user, and a password is used to restrict access to either a simple choice of pre-defined tests and some limited functions, or access to the full capabilities of the system.

Operators can select from tests that are pre-defined, and for which reports have already been written, and some functions that can be assigned to each user account.

Masters have full access to all the functions of the system. The master user has control over which users are operators and masters.

Logon with a Master level username and password. If this is the first time you have started the program, you can use:

Default Username: supervisor

Default Password: supervisor

Note: both the username and password are case-sensitive.

For details of access levels and how to create user accounts, see *Emperor™ Programming for Mecmesin-xt Force and Torque Test Systems*.

6. Helixa-*i* : Installing and Connecting with the Emperor™ software

6.1 Helixa-*i*: Installing Emperor Software on Your PC

6.1.1 Minimum system requirements

1.3 GHz processor, 2 GB RAM, 60 GB available hard drive space, running Windows XP Pro with SP1, or above, a CDRW drive, and one available USB port. **Note:** Emperor software cannot run on hardware running Unix or on the Apple Mac.

6.1.2 Access to data folders

Emperor will need access to certain folders listed below. Before installing the program, please make sure that read and write access is granted for these folders. In particular if the computer is part of a centrally controlled Windows Domain system, it may be necessary to consult with your IT department to allow correct access to these locations.

Windows XP User Data location	
Emperor Force	C:\Documents and Settings\All Users\Application Data\Mecmesin\Emperor\Force
Emperor Torque	C:\Documents and Settings\All Users\Application Data\Mecmesin\Emperor\Torque
Windows Vista and later, User Data location	
Emperor Force	C:\ProgramData\Mecmesin\Emperor\Force
Emperor Torque	C:\ProgramData\Mecmesin\Emperor\Torque
All Windows versions Program files location	
Emperor Force	C:\Program Files\Emperor\Force
Emperor Torque	C:\Program Files\Emperor\Torque

Insert the Emperor CD; Emperor should start automatically and ask if you wish to proceed with the installation of the software.

If the installation program does not start automatically or if you have other problems:

- On your computer desktop click the shortcut to 'My Computer'
- Click on the CD drive that contains the Emperor software CD
- Navigate to the Emperor folder
- Right click on the Set-up.exe file, and Run as Administrator

Emperor will begin the process of installing the program onto your hard-drive. Follow the instructions, and accept the licence agreement. You can choose which languages are installed: English only, all languages, or custom, so you can select languages you need.

6.2 Connecting the power lead and USB lead

Connect the stand to a suitable mains socket. Plug the USB end of the supplied cable into your PC and the D-connector end into the 9-way socket labelled 'PC' on the rear of the Helixa.

Helixa rear panel. Plug the USB cable into the socket marked 'PC'.

6.3 Switching on the Helixa-*i* system

Switch on the test stand using the main switch located on the rear panel. Four green power lights (LEDs) on the front panel will illuminate.

6.4 Starting Emperor

Start the program by using the Emperor icon that was installed on your computer desktop—the initial login screen is displayed.

Emperor software provides two levels of user, and a password is used to restrict access to either a simple choice of pre-defined tests or some limited functions, or to give access to the full configuration and programming capabilities of the Emperor system.

Operators can select from tests that are pre-defined, and for which reports have already been written, and some functions that can be assigned to each user account.

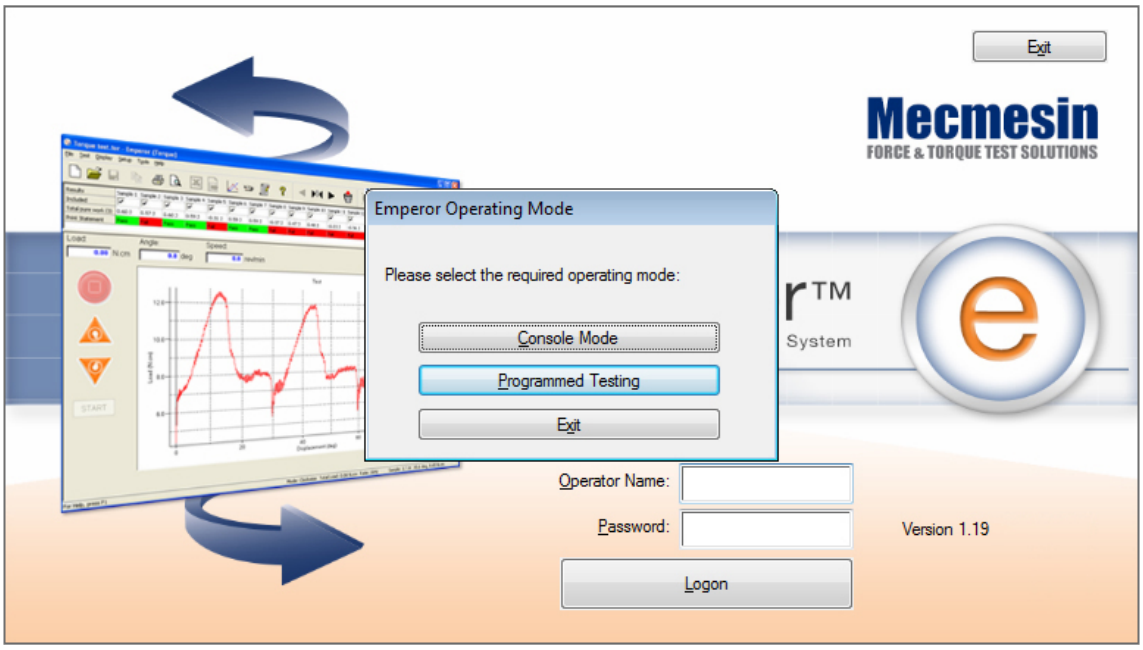
Masters have full access to all the functions of the Emperor system. The master user has control over which users are operators and masters.

Logon with a Master level username and password. If this is the first time you have started the program, you can use:

Default Username: supervisor

Default Password: supervisor

Note: both the username and password are case-sensitive.



On the Operating Mode selection screen, click on Programmed Testing.

This will start Emperor, and you can set your system preferences, user accounts, create and run test programs, review results, perform calculations for analysis, produce test reports and export data for use elsewhere. For full details, see the manual: *Emperor Force and Torque Testing Software, Operator Manual*.

7. Precision Alignment

The vertical alignment between the torque cell and the main spindle can be set accurately with your torque cell for the most precise measurement.

An alignment tool simply attaches to the square drive of the HTC and enables easy alignment of the lower base plate.

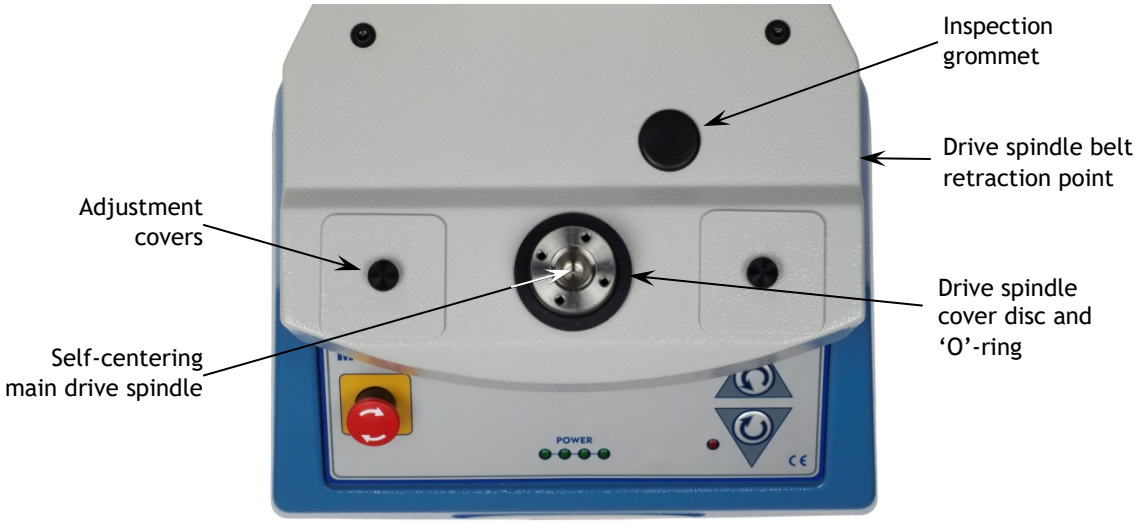
The alignment tool

Alignment assembly

Alignment tool attached

7.1 Procedure

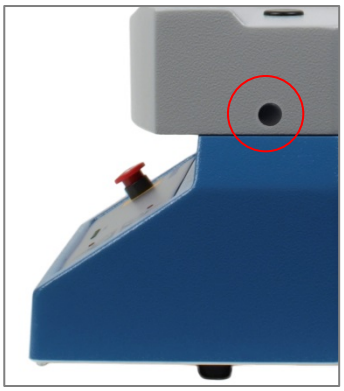
Identify these alignment features:



The supplied T-bar Allen key is used for making adjustments.

1. Switch the Helixa off at the back.
2. Fit the cone-tipped alignment tool to the torque cell as above.
3. Release the spindle drive belt tension. Pull out the small black grommet from the right-hand side of the grey deck as shown. This covers the drive spindle belt retraction point.

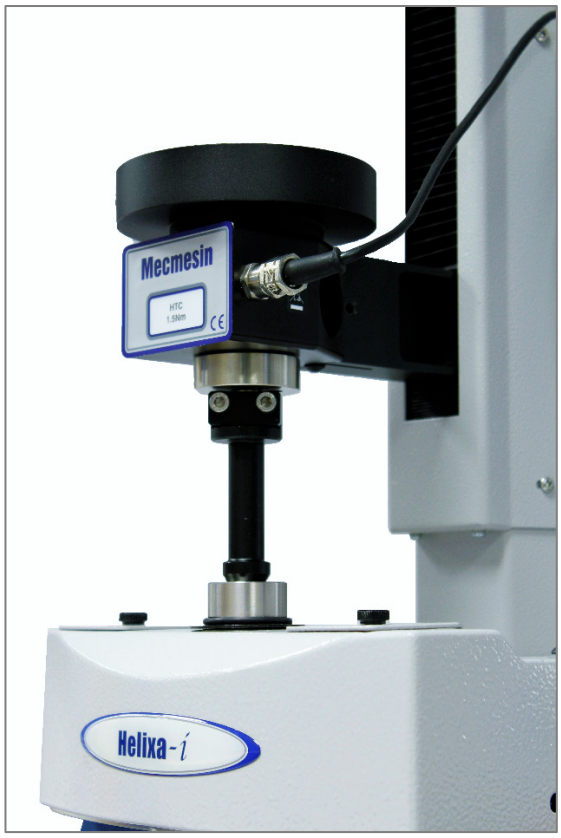
Insert the T-bar Allen key and locate it in the adjustment bolt head. Tighten the screw – around 4.5 turns clockwise.



4. Release the two square covers from the cover assembly to expose the adjustment slots.

5. Release the two socket-cap head screws holding the spindle in position (carefully note positions circled below) and test that the main spindle is free to move.

6. Carefully lower the crosshead until the alignment tool engages fully to self-align the main drive spindle:



With a light hand pressure on top of the HTC to maintain engagement, secure the crosshead using its fixing lever on the right side of the main column, and the main drive spindle will self-align.

7. Check that there is no free movement in the main drive spindle.
8. Carefully retighten the two fixing screws.
9. Release the crosshead fixing lever. Move the crosshead and alignment tool away.
10. Reinsert the T-bar Allen key in the belt retraction point, and turn anti-clockwise to fully release. The adjustment bolt is captive, so cannot be released too far.
11. Refit the grommet, adjustment covers, cover disc and 'O' ring.
12. Push the crosshead and alignment tool carefully into the main spindle once more, to confirm correct alignment.
13. Move the crosshead to the top and remove the alignment fixture from the HTC.

Appendix A
System Specifications

Torque transducer (HTC) range	0.1 N.m	0.2 N.m	0.3 N.m	1.0 N.m	1.5 N.m	3.0 N.m	6.0 N.m
N.m	0 - 0.1	0 - 0.2	0 - 0.3	0 - 1.0	0 - 1.5	0 - 3.0	0 - 6.0
kgf.cm	0 - 1	0 - 2	0 - 3	0 - 10	0 - 15	0 - 30	0 - 60
lbf.in	0 - 0.9	0 - 1.8	0 - 2.7	0 - 8.9	0 - 13.3	0 - 26.5	0 - 53.1
Axial alignment							
Total runout (without fixtures)	Better than ±0.25 mm						
Speed							
Speed range	0.1 to 30 rev/min (clockwise or anticlockwise)						
Speed accuracy	±0.2% of indicated speed						
Speed resolution	0.1 rev/min						
Torque measurement (using Emperor™)							
Torque accuracy	±0.5% of full scale						
Torque resolution	Better than 0.01% of full scale						
Torque units display	mN.m, N.cm, N.m, kgf.cm, gf.cm, ozf.in, lbf.ft, lbf.in						
Sampling rate	1 kHz, 500 Hz, 100 Hz, 50 Hz, 10 Hz						
Displacement							
Maximum displacement (from tared position)	2,500 revs						
Turntable positional accuracy	0.1°						
Software displacement displayed resolution	0.2°						
System resolution (software displacement/turntable positional resolution)	0.045°						
Dimensions							
Height	758 mm						
Width	290 mm (Helixa-*i*) 587 mm (Helixa-*xt*)						
Depth	414 mm (without external weight hanger) 506 mm (with external weight hanger)						
Headroom (without fixtures)	350 mm						
Throat depth	127 mm (without bellows) 111 mm (with bellows)						
Weight	28 kg (Helixa-*i*) 32 kg (Helixa-*xt*)						
Static weights							
Rear counterbalance	40 N (maximum)						
Torque cell mass platen	60 N (maximum)						

Communications	
Digital I/O	6 input, 6 output (TTL)
Printer/datalogger, and results file transfer (Helixa-*xt* only)	RS232 and USB
Network communications (Helixa-*xt* only)	Ethernet RJ45 USB for external wireless connectivity
Power supply	
Maximum input power	120 W
Voltage (nominal)	230 V AC 50 Hz, or 110 V AC 60 Hz
Operating environment	
Recommended temperature range	+10° to +35° C (50° to 95°F)
Humidity	Normal industry and laboratory conditions, non-condensing
Noise emissions	
	Less than 70 db(A)

Mecmesin reserves the right to alter equipment specifications without prior notice.

E&OE

Appendix B
CE Declarations of Conformance

Mecmesin Ltd
Newton House
Spring Copse Business Park
Slinfold
West Sussex, RH13 0SZ
United Kingdom

Mecmesin
FORCE & TORQUE TEST SOLUTIONS

Date of Issue 13th February 2014

EC DECLARATION OF CONFORMITY

We confirm that the Technical Construction Files for the product(s) identified on this certificate comply with the essential safety requirements of the following EU Council directives. Technical documentation to support this is available from the above address.

- Machineries Directive 2006/42/EU
- EMC Directive 2014/30/EU

They were tested to the following standards and other normative documents:

- EN 61000-6-1:2007 Electromagnetic compatibility (EMC). Generic standards. Immunity for residential, commercial and light-industrial environments.
- EN 61000-6-3:2007 +A1:2011 Electromagnetic compatibility (EMC). Generic standards. Emission standard for residential, commercial and light-industrial environments.
- EN 60204-1:2006 +A1:2009 Safety of machinery. Electrical equipment of machines. General requirements
- EN 61010-1:2010 Safety requirements for electrical equipment for measurement, control, and laboratory use. General requirements
- EN 60950-1:2006 +A2:2013 Information technology equipment. Safety. General requirements

Primary Product Name(s): Helixa-i

Derivative Product(s): Helixa-xt

Signed on behalf of Mecmesin Ltd

Technical Director: Patrick Collins

Place: Slinfold, GB.

CE

Registered in England No. 1302639

431-DoC31-01_L00

Certificate Certificado شهادة Zertifikat сертификат

CERTIFICATE OF COMPLIANCE

This is to certify that the product listed in follows was (were) tested in the BTL EMC Laboratory to comply with the required criteria levels of the follow-mentioned ETSI harmonized standard according to the essential conformity requirements of the R&TTE Directive of 1999/5/EC and related directives .

Equipment	**Panel PC**
Model Name	**SID-10W9; SID-10W9XXXXXXXXX(Where "X" may be any alphanumeric character,or blank or "-")**
Brand Name	**Avalue**
Applicant	**Avalue Technology Inc.**
Address	**7F,228,Lian-cheng Road,Zhonghe Dist.,New Taipei City 235,Taiwan**
Standard(s)	**EN 301 489-1 V1.9.2 (2011-09)** **EN 301 489-17 V2.2.1 (2012-09)** **EN 61000-3-2: 2014 Class D** **EN 61000-3-3: 2013** **EN 300 328 V1.9.1 (2015-02)**
Report(s)	**BTL-ETSE-1-1611051** **BTL-ETSP-1-1611051**

The test data, data evaluation, and equipment configuration contained in our test report(s) above was (were) obtained utilizing the test procedures, test instruments, test sites that has been accredited by the Authority of TAF according to the ISO-17025 quality assessment standard and technical standard(s). The test data contained in the referenced test report relate only to the EUT sample and item(s) tested.

Andy Chiu
Authorized Signatory

BTL INC.
B1, No. 37, Lane 365, Yang-Guang St.,
Nei-Hu District, Taipei City 114, Taiwan.
TEL:+886-2-2657-3299
FAX:+886-2-2657-3331

Testing Laboratory
0659

Appendix C
Microsoft® Windows® 10 Enterprise 2016 LTSB Licensing

Each *-xt* system supplied with a console controller has Microsoft® Windows® 10 Enterprise 2016 Operating System pre-installed and licensed by Mecmesin. Each console is supplied with the following as proof of licensing:

- End User License Agreement (EULA)
- Certificate of Authentication (COA)

End User License Agreement (EULA)

A multi-language EULA is enclosed with each system.

Certificate of Authentication (COA)

The COA is supplied as a sticker located on the rear of each console supplied with a system, as proof of licensing.

This COA sticker lists the following:

- Microsoft® product title
- COA serial number
- Microsoft® SKU (stock keeping unit) number

Figure 1: Certificate of Authentication

Mecmesin

testing to perfection

Mecmesin : a world leader in affordable force and torque testing solutions

Since 1977, Mecmesin has assisted thousands of companies achieve enhanced quality control in design and production. The Mecmesin brand represents excellence in accuracy, build, service, and value. In production centres and research labs worldwide, designers, engineers, operators, and quality managers endorse Mecmesin force and torque testing systems for their high performance across countless applications.

www.mecmesin.com

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Ecuador
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Finland
France
Germany
Greece
Hungary
India
Indonesia
Iran
Ireland
Israel
Italy
Japan
Korea South
Kosovo
Kuwait
Laos
Latvia
Lebanon
Lithuania
Macedonia
Malaysia
Mexico
Morocco
Myanmar (Burma)
Netherlands
New Zealand
Norway
Paraguay
Peru
Philippines
Poland
Portugal
Romania
Russia
Saudi Arabia
Serbia
Singapore
Slovakia
Slovenia
South Africa
Spain
Sri Lanka
Sweden
Switzerland
Syria
Taiwan
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The Mecmesin global distribution network guarantees your testing solution is rapidly delivered and efficiently serviced, wherever you are.

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Head Office - UK
Mecmesin Limited
w: www.mecmesin.com
e: sales@mecmesin.com

France
Mecmesin France
w : www.mecmesin.fr
e: contact@mecmesin.fr

Germany
Mecmesin GmbH
w: www.mecmesin.de
e: info@mecmesin.de

North America
Mecmesin Corporation
w: www.mecmesincorp.com
e: info@mecmesincorp.com

Asia
Mecmesin Asia Co. Ltd
w: www.mecmesinasia.com
e: sales@mecmesinasia.com

China
Mecmesin (Shanghai) Pte Ltd
w: www.mecmesin.cn
e: sales@mecmesin.cn