



# UniVert

## Mechanical Test System

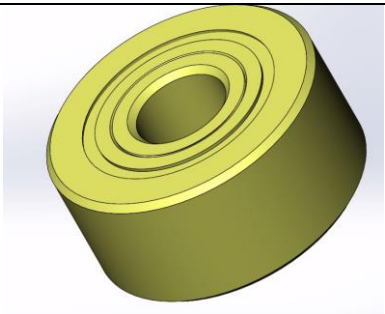
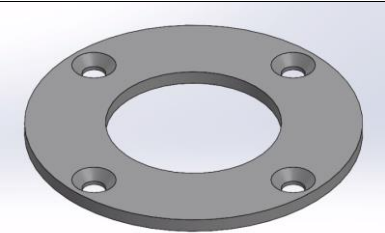
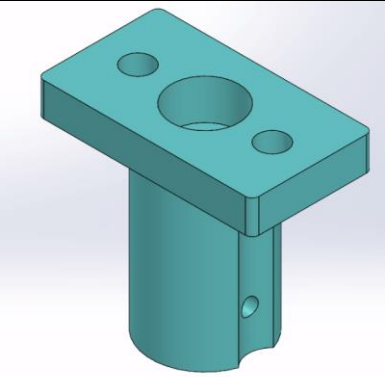
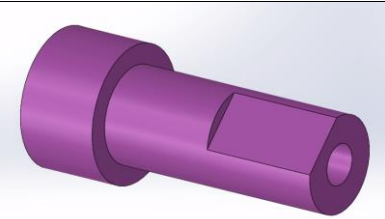

***Torsion Axis  
Set up Guide  
version 1.0***

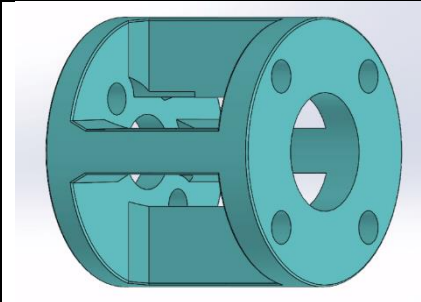

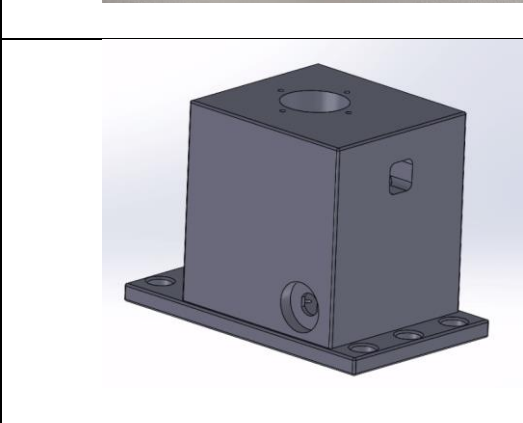
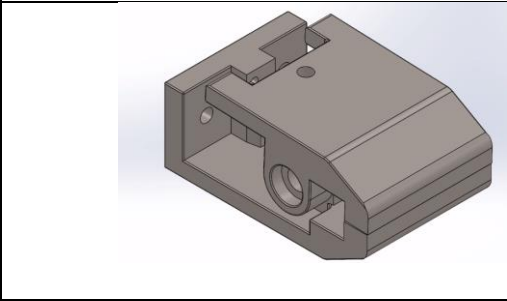


## Table of Contents

List Of Components .....	1
Setting up a Torsion Test with Drill Chuck Jaws .....	3
Settings up a Torsion Test with Grips .....	10
Test Setup.....	17

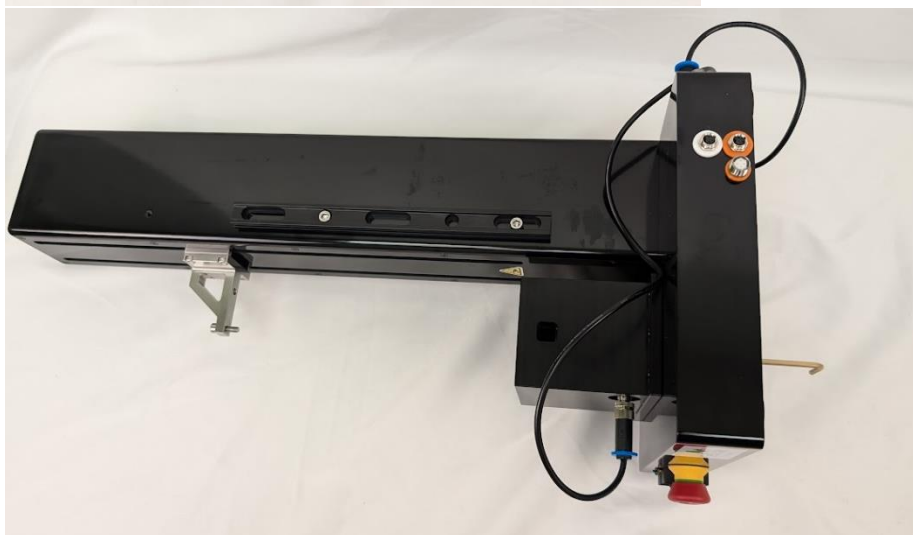
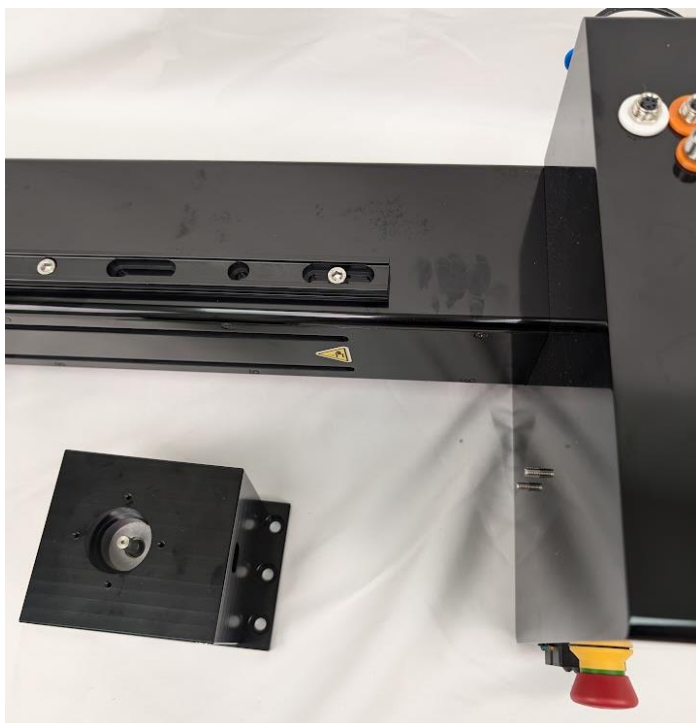
List Of Components

<b>Thrust Bearing</b>	
<b>Bearing Retaining Ring</b>	
<b>Torsion Lower Grip Mount</b>	
<b>Torsion Motor Coupling</b>	
<b>Torsion Motor Coupling Chuck</b>	

<p><b>Torsion Top Grip Mount</b></p>	
<p><b>Torsion Motor Auxiliary Cable</b></p>	
<p><b>Torsion Actuator</b></p>	
<p><b>Torsion Grip</b></p>	

## Setting up a Torsion Test with Drill Chuck Jaws

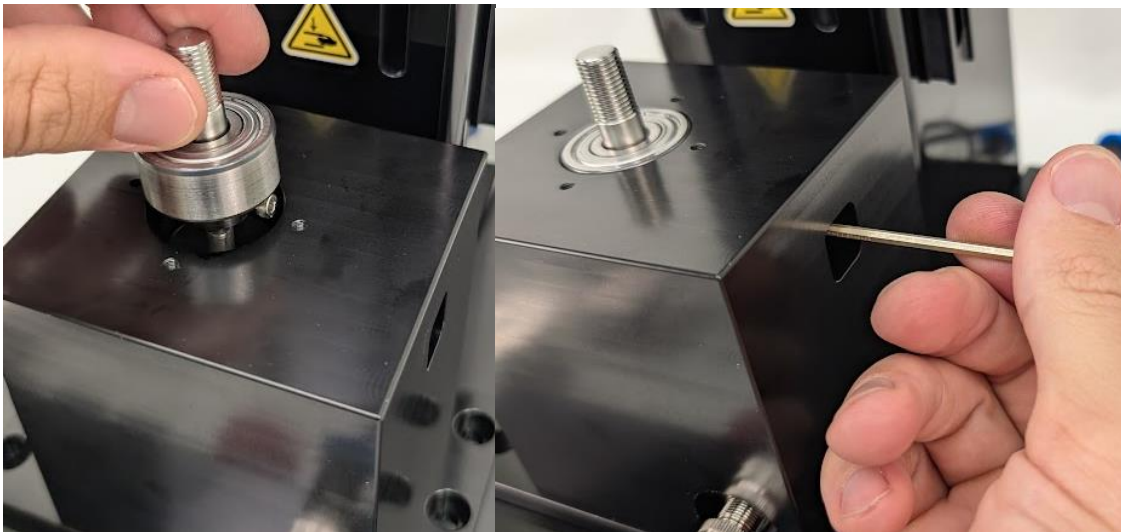
1. Install the torsion actuator to the baseplate of the UniVert using the 2 x M5x18mm SHCS fasteners and 4mm hex key. The Blue Motor Connector must be facing the front of the system in the orientation seen below:



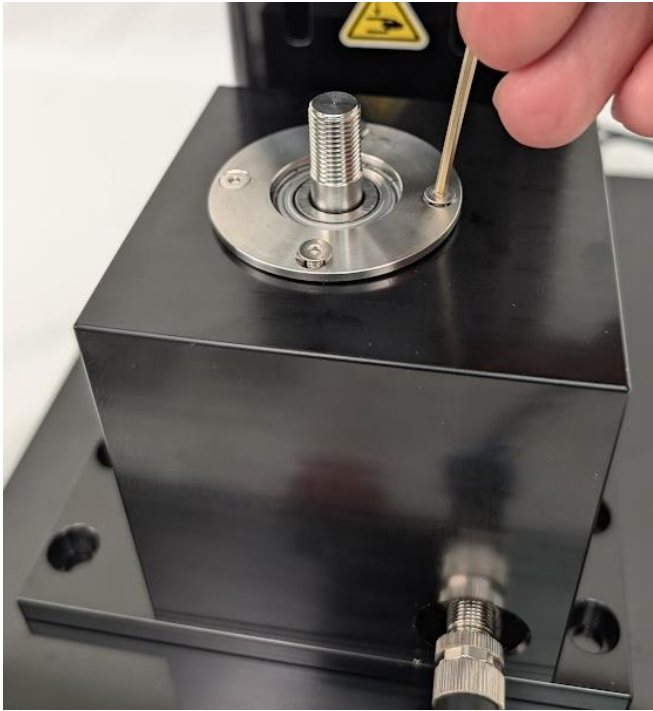
2. Slide the Torsion Motor Coupling Chuck through the thrust bearing.



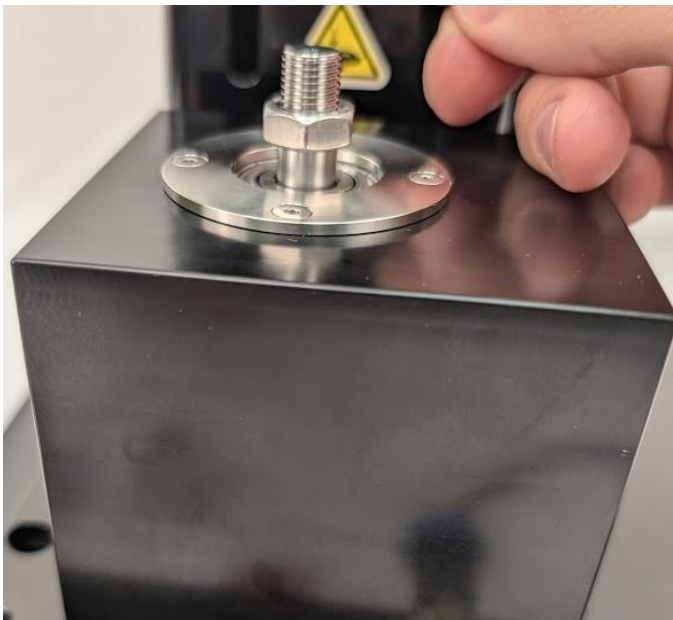
3. Slide the bearing and motor coupling assembly onto the motor shaft, the flat side of the motor shaft needs to be aligned with the flat side of the coupling. Make sure the locking set screw is facing the opening as seen below. The coupling can be tightened onto the motor shaft using the 2.5mm hex key.



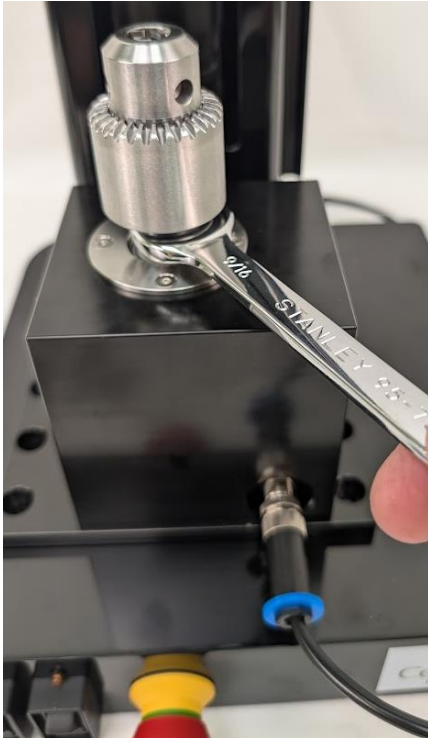
4. The bearing retaining ring is installed next using 4 x M3x6mm FHCS and the 2mm hex key.



5. Next the 3/8"-24 nut is installed onto the Motor coupling shaft



6. The drill chuck jaws can be installed onto the motor coupling shaft and the nut can be tightened against the drill chuck using the 9/16” wrench. Using the Drill chuck key to counter rotate the drill chuck can ensure this nut will not come loose during testing





7. The 3/8-24x 3/4" SHCS can be inserted into the Torsion Top Grip Mount and the Drill chuck can be threaded on and tightened using the 5/16" hex key.



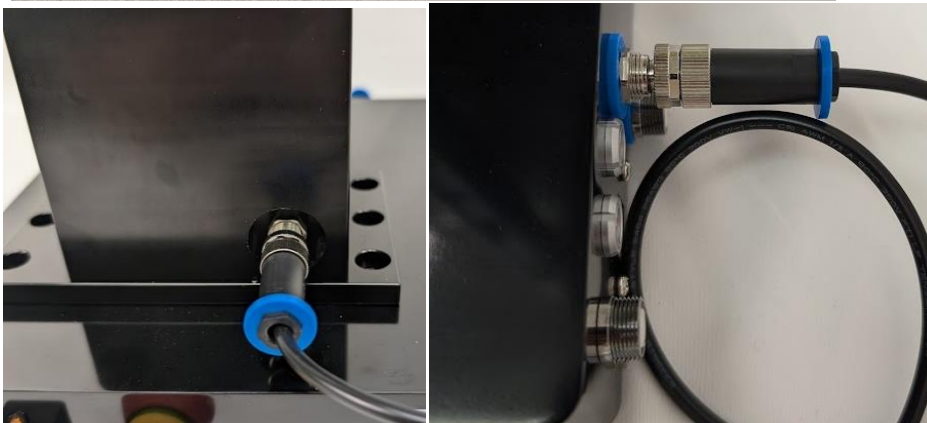
8. The top grip drill chuck assembly can be mounted to the measuring end of the loadcell using 4 x M4x10mm SHCS and the 3mm hex key.



9. The loadcell assembly can be mounted to the system using the M5x16mm SHCS and the 4mm hex key.

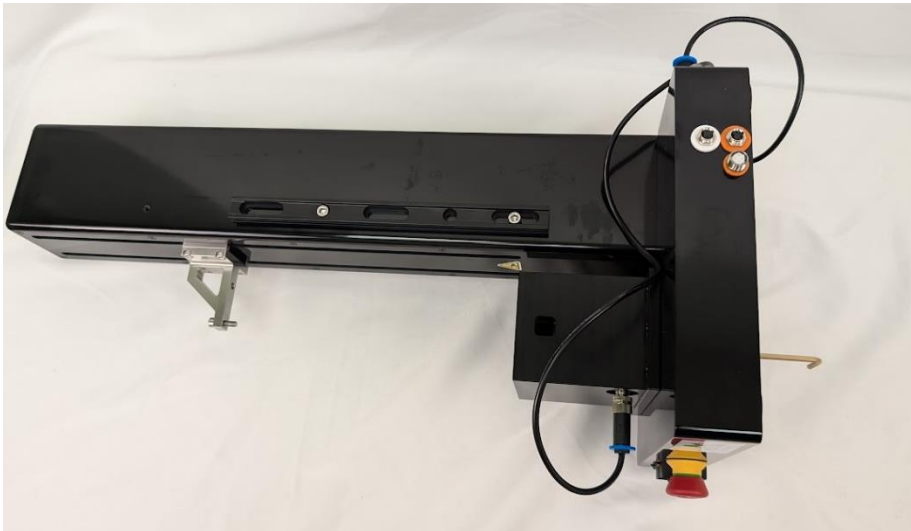
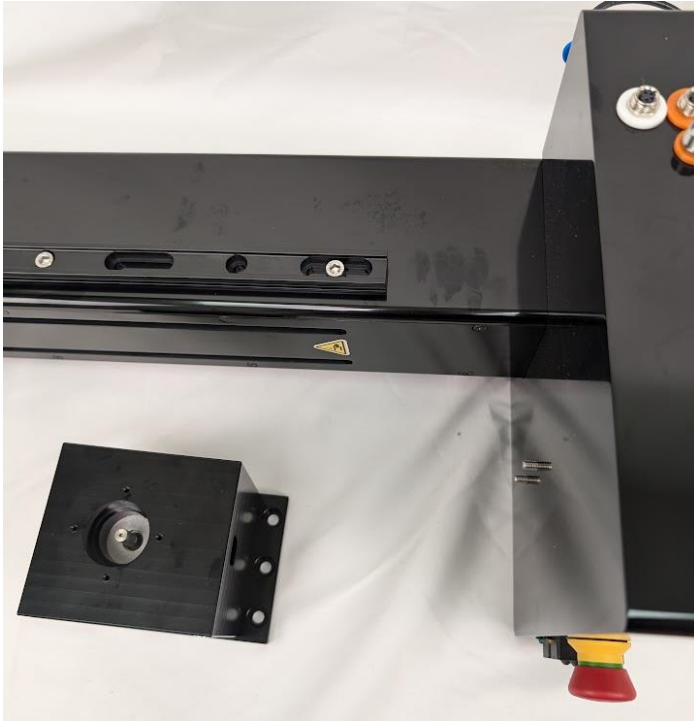


10. You can use the provided drill chuck key to mount your sample in the drill chuck fixtures.
11. The Torsion motor auxiliary cable can be connected to the blue motor connections on the front of the Torsion Actuator and the back of the UniVert.
12. The Torsion loadcell has two connections: one for the torsion axis and one for the main axis. The torsion axis connector (blue) can be plugged into the blue connection on the back of the UniVert. The main axis loadcell connector can be installed to the unmarked loadcell connection.



## Settings up a Torsion Test with Grips

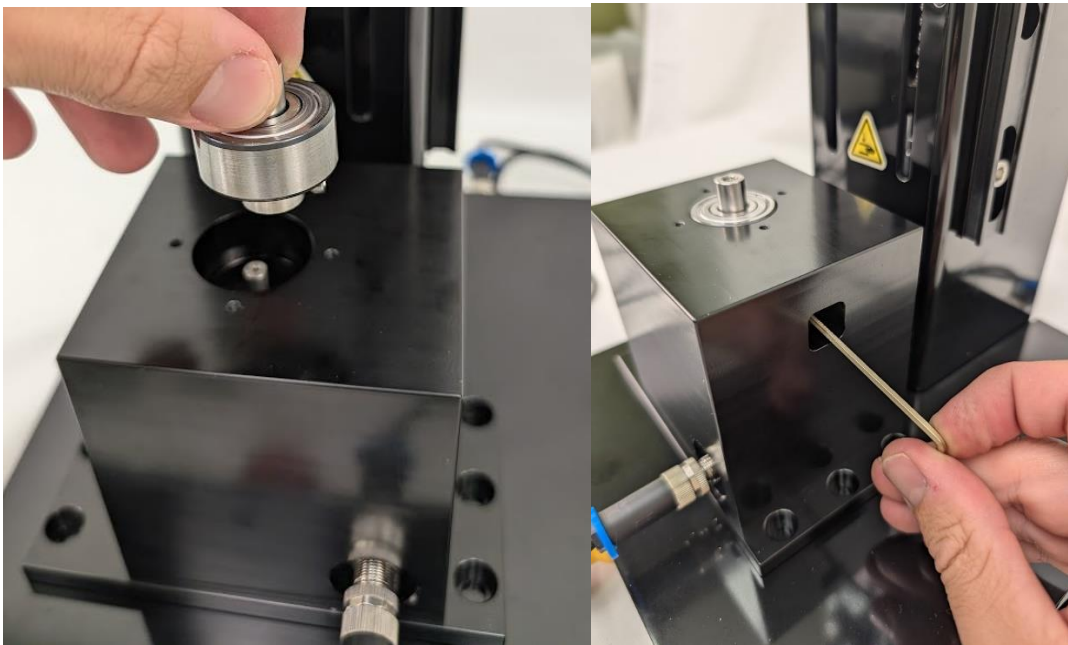
1. Install the torsion actuator to the baseplate of the UniVert using the 2 x M5x18mm SHCS fasteners and 4mm hex key. The Blue Motor Connector must be facing the front of the system in the orientation seen below:



2. Slide the Torsion Motor Coupling through the thrust bearing



3. Slide the bearing and motor coupling assembly onto the motor shaft, the flat side of the motor shaft needs to be aligned with the flat side of the coupling. The coupling can be tightened onto the motor shaft using the M3 set screw.





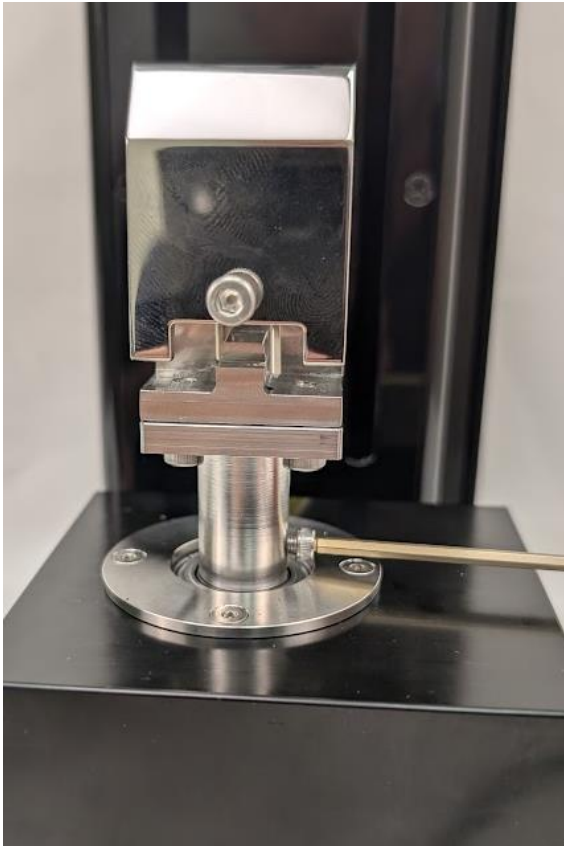
4. The bearing retaining ring is installed next using 4 x M3x6mm FHCS and the 2.5mm hex key.



5. Install the bottom grip onto the Torsion Lower Grip Mount using the M4x 10mm SHCS



6. Install the lower grip assembly onto the Torsion Motor Coupling and tighten the M3 set screw.



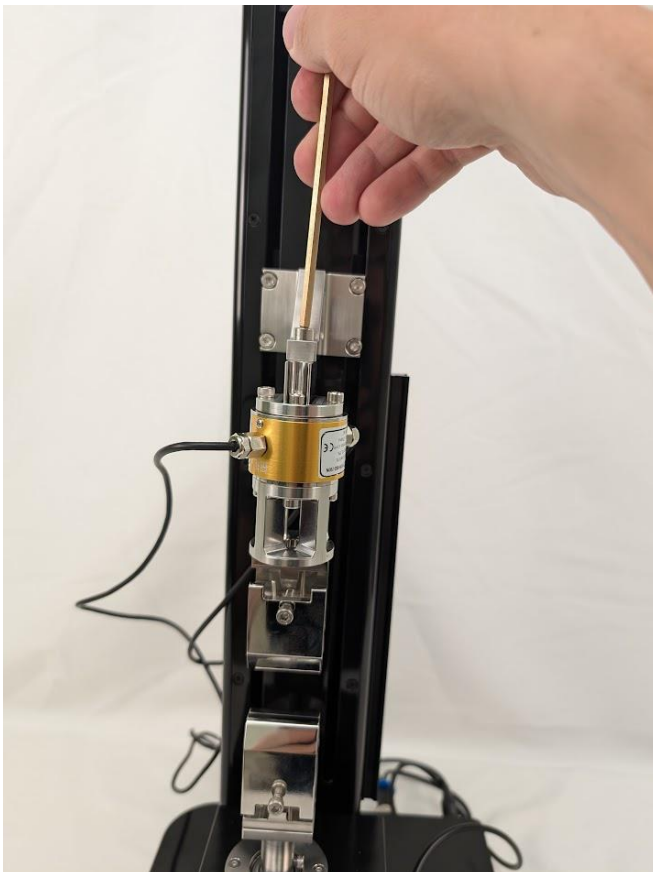
7. The Upper grip can be fastened to the Torsion Top Grip Mount (side with 2 holes) using 2 x M4x10mm SHCS



8. This assembly can be installed to the loadcell using 4 x M4x10mm

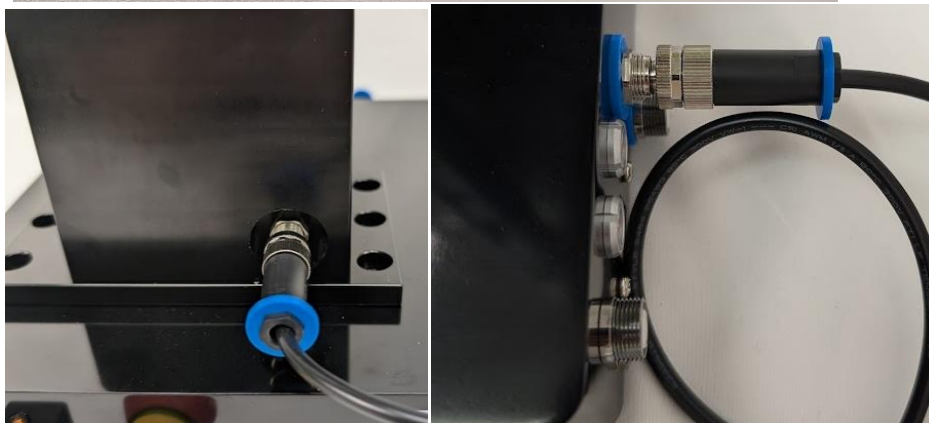


9. The upper grips and loadcell assembly can now be fastened to the UniVert cross head using an M5x15mm SHCS





10. The Torsion motor auxiliary cable can be connected to the blue motor connections on the front of the Torsion Actuator and the back of the UniVert.
11. The Torsion loadcell has two connections: one for the torsion axis and one for the main axis. The torsion axis connector (blue) can be plugged into the blue connection on the back of the UniVert. The main axis loadcell connector can be installed to the unmarked loadcell connection.



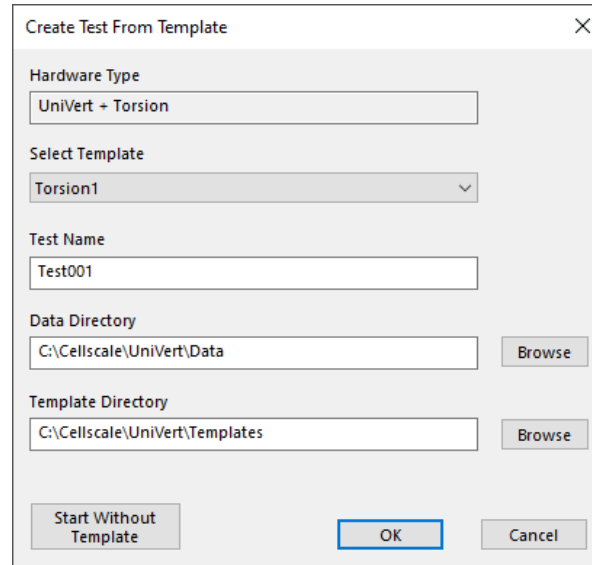


12. You can now place your sample in each of the grips and tighten the grip closure screw located on the front of the grip to ensure your sample is secure.

## Test Setup

The software for the UniVert primary axis is outlined in the main UniVert User Manual. This section will highlight some specific details regarding the Torsion testing attachment.

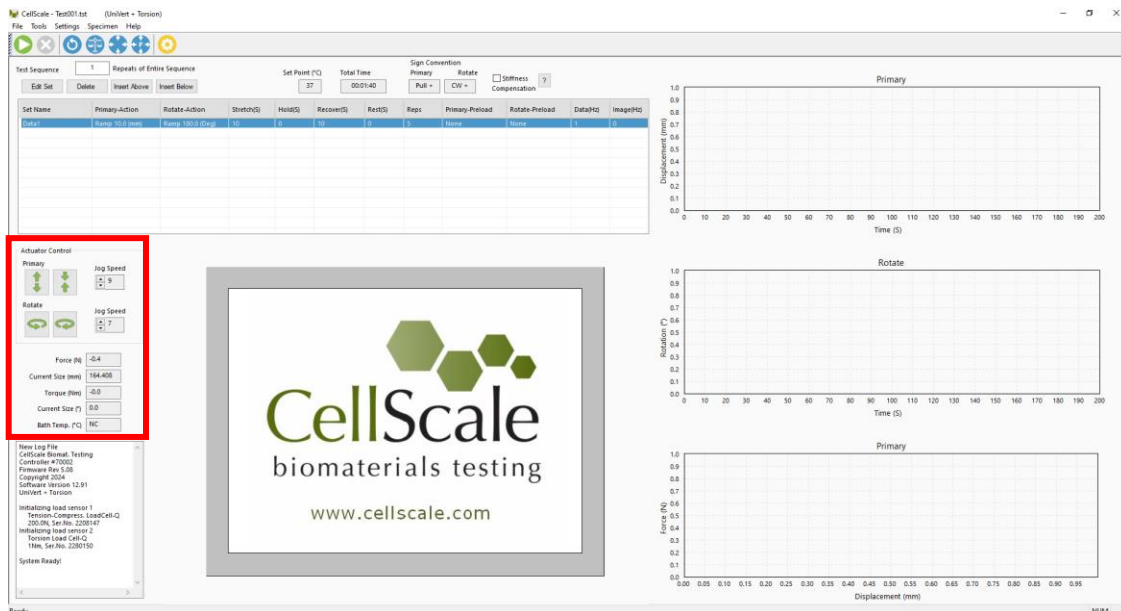
If the Torsion Axis is appropriately connected, the software dialogue box will show UniVert+Torsion in the Hardware Type when starting a new test:



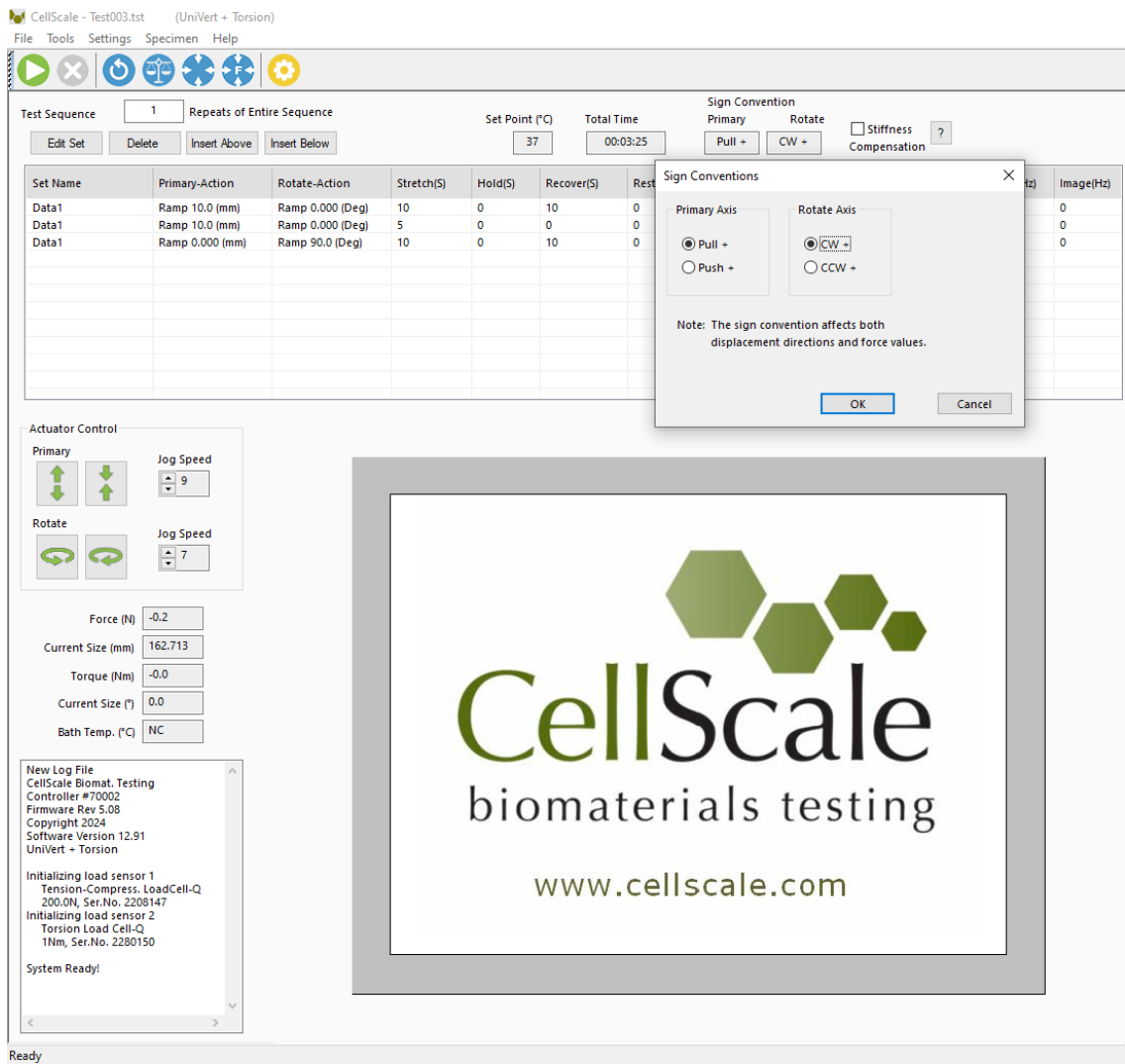
The 'Create Test From Template' dialog box contains the following fields and buttons:

- Hardware Type:** A text box containing 'UniVert + Torsion'.
- Select Template:** A dropdown menu showing 'Torsion1'.
- Test Name:** A text box containing 'Test001'.
- Data Directory:** A text box containing 'C:\CellScale\UniVert\Data' with a 'Browse' button to its right.
- Template Directory:** A text box containing 'C:\CellScale\UniVert\Templates' with a 'Browse' button to its right.
- Buttons:** 'Start Without Template', 'OK', and 'Cancel'.

On the main view of the software there will be jog buttons that control the Primary axis **and** the Rotation axis. There will also be Torque readout in Nm and current size readout for the torsion axis in Degrees.



Across the top of this page is the sign convention for each axis, the primary can be set to Pull+ (Tension Mode) or Push+ (Compression Mode). The Rotate axis can be set to CW+ (Rotates Clockwise) or CCW+ (Rotates Counter Clockwise).



The set parameter editor will have options to control the Rotation Axis. The user can select displacement or force control modes, where displacement is specified in Degrees of rotation and force is specified in Nm of torque.

Set Parameter Editor

Name

Data1

(Example: "Precon1", "HoldA")

Primary Axis

Control Mode

Displacement

Control Function

Ramp

Magnitude

10

mm

Preload

☒ Not Applied
 ☐ Applied on 1st Repetition Only
 ☐ ReApply On Every Repetition

Preload Magnitude (mN)

0

Rotate Axis

Control Mode

Displacement

Control Function

Ramp

Magnitude

180

Deg

Preload

☒ Not Applied
 ☐ Applied on 1st Repetition Only
 ☐ ReApply On Every Repetition

Preload Magnitude (Nm)

0

Cycle

Stretch Duration (S)

10

☐ Do Not Stretch

Hold Duration (S)

0

Recovery Duration (S)

10

☐ Do Not Recover

Rest Duration

0

Repetitions

5

Data Output Frequency (Hz)

1

Image Output Frequency (Hz)

None

OK

Cancel