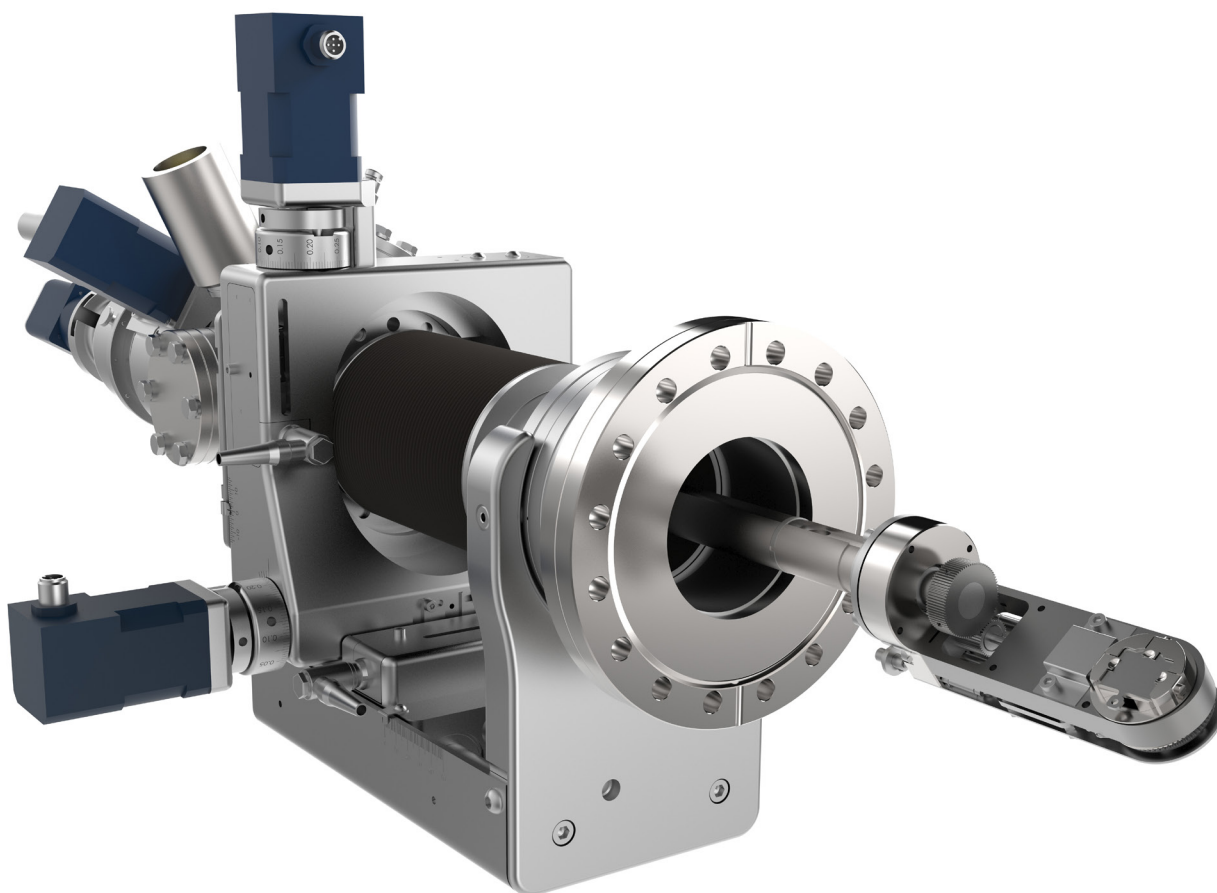


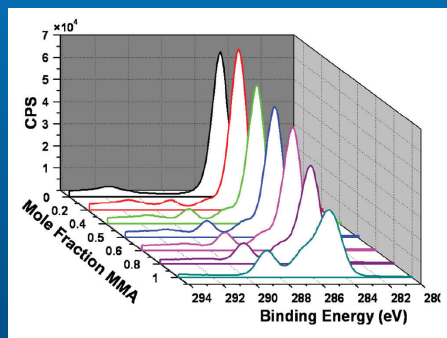
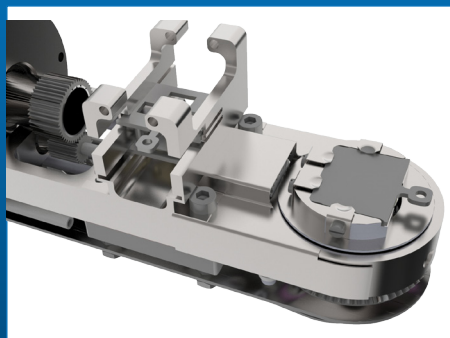
UHV Design

UHV MOTION AND HEATING



MultiCentre

The Analytical Stage



MultiCentre The Analytical Stage

Configurable analytical stages offering up to 5 axes of motion and options for sample biasing, heating to 1200°C and cooling to <30K. MultiCentres can be configured to accept most common surface analysis sample holders including pucks, flags and ESCA stubs.

The MultiCentre and associated accessories provide a complete solution for sample manipulation and transfer. Typical applications include analytical instrumentation for surface analysis equipment and synchrotron end stations.

The MultiCentre range includes the XL-T Series which provides compact single bellows stages and the XL-R series which utilises dual bellows with dual-point support to provide increased stability, precision and range.

Each series offers a full range of options including motorisation, resistive or e-beam heating, temperature measurement, sample biasing/current measurement and LN₂ and LHe cooling options. MultiCentres are unique in their ability to provide continuous azimuthal rotation and temperature measurement even when cooling with LN2 and when heating to 1200°C.

MULTICENTRE KEY ADVANTAGES

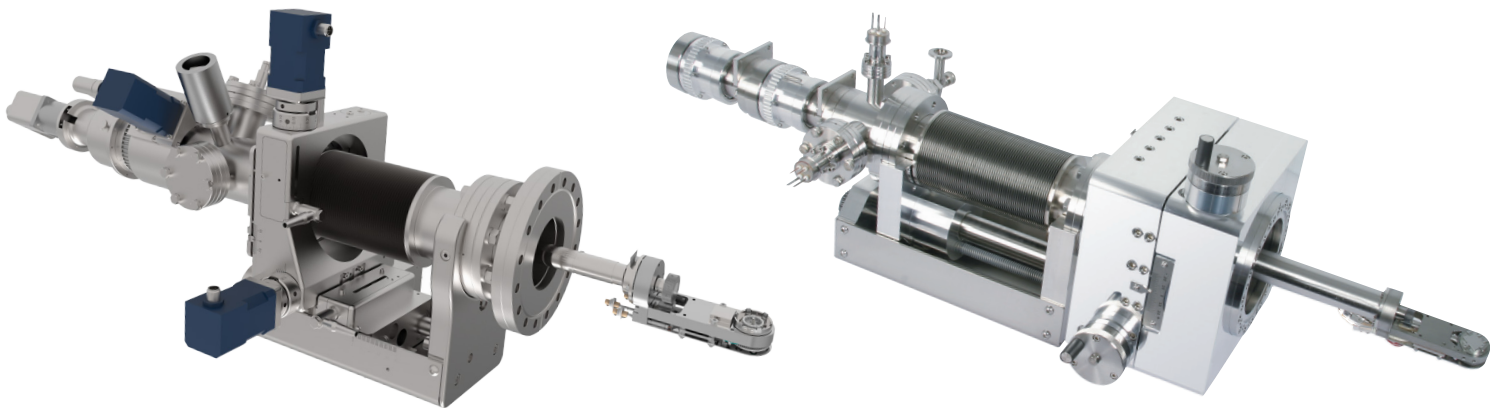
- » Compact and high stability, high precision stages
- » Modular stage design allows functionality to be configured to suit application
- » Innovative sample stage with ultra compact swept volume and unique range of additional stage options
- » Heating to 1200°C & cooling to <30K (with LN2 precooling to reduce LHe consumption and costs)
- » Unique ability to provide continuous azimuthal rotation and LN2 cooling
- » Flag, puck and ESCA sample compatible stages

Future-proofed modular design

The innovative MultiCentre range can be configured to match your application requirements. Should your requirements change in the future, the MultiCentre can be upgraded to include additional functionality.

For example, the unique uncluttered stage design provides space to include additional sample parking stages.

This ability to add additional functionality when required provides an economic route to future proofing your purchase, ensuring that the MultiCentre will remain at the forefront of surface science applications.

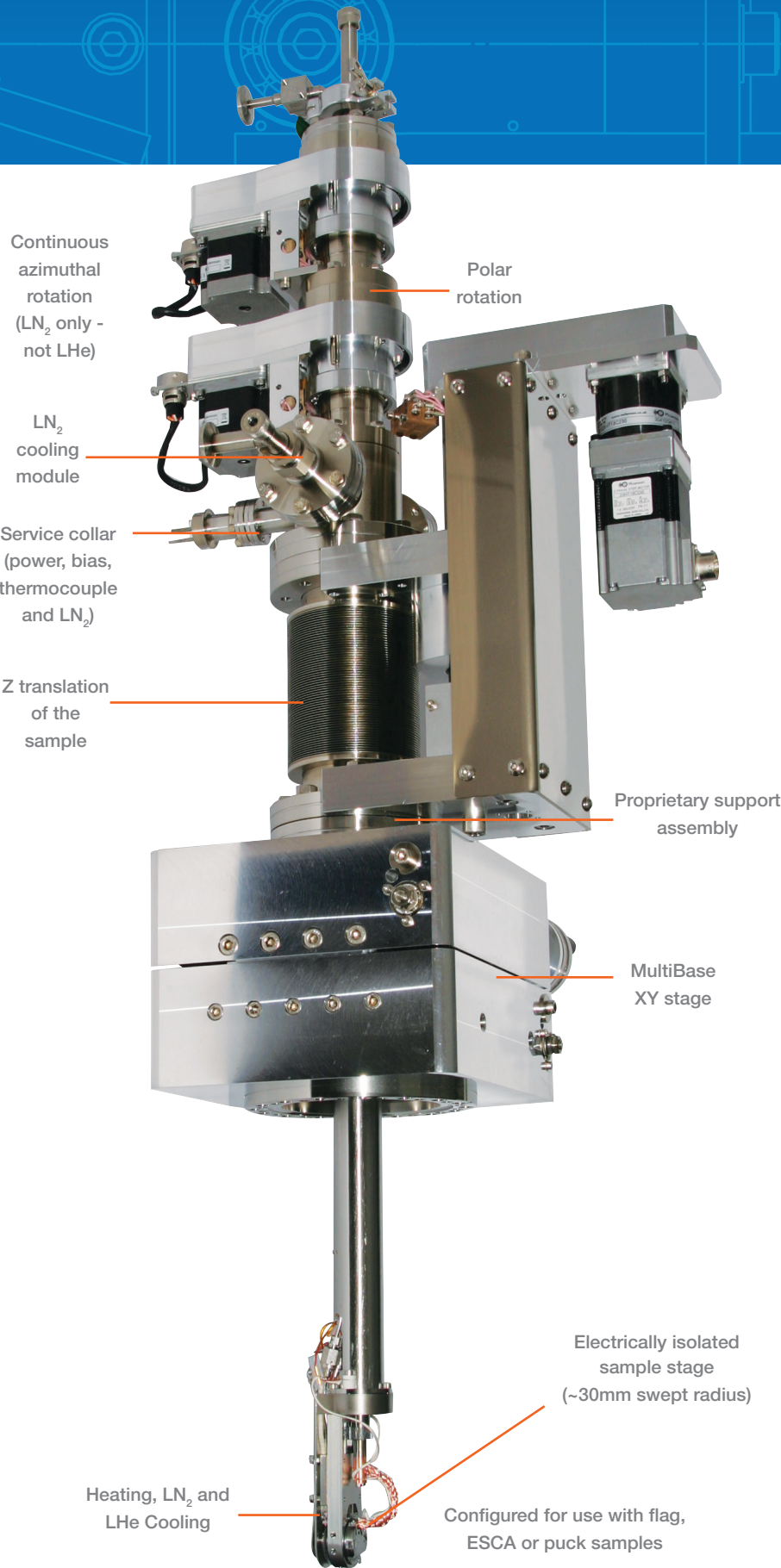


XL-T Series

Compact stages

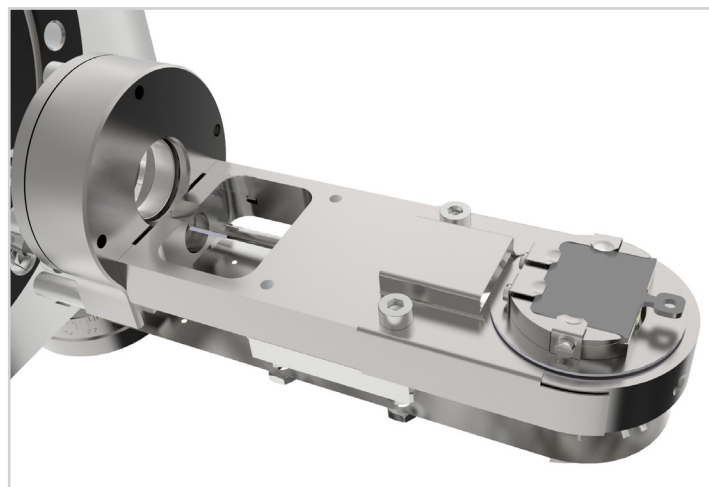
XL-R Series

High stability, precision stages

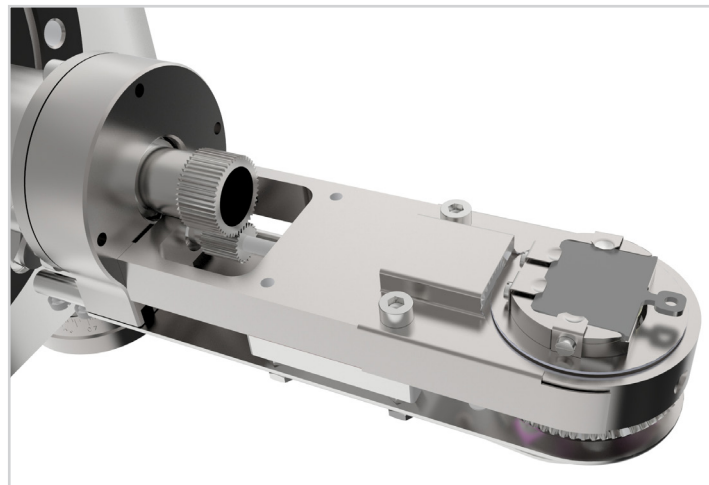


MultiCentre configuration


4-Axis



5-Axis



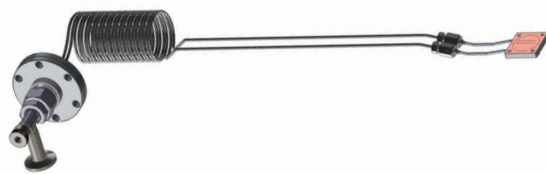
Heater Module




Resistive Heating to 900°C
Robust self-supporting Tantalum foil heater, for minimum outgassing and large ratio of heated to open surface area ensuring heater longevity. The foil is also Yttria coated to provide additional robustness in oxidising atmospheres and for protection in the event of an accidental vent. Note: heating limited to 600°C with LHe option.

E-beam Heating to 1200°C
For higher temperature requirements the e-beam heating option achieves sample temperatures up to 1200°C. To upgrade to e-beam heating simply requires a change of power supply unit.

Cooling Options



LN₂ Cooling to <-150°C (123K)
Innovative LN₂ cooling module provides sample cooling down to <-150°C (123K) with continuous azimuthal rotation and temperature measurement. Typically the LN₂ cooling can achieve sample temperatures to <-170°C (103K).
The LN₂ circuit is routed through the hollow shaft with the coils inside the service collar to minimise the swept volume of the stage head.



LHe Cooling to -243°C (30K)
Based on UHV Design's own continuous flow cryostat, cryogenic temperatures below -243°C (30K) can be achieved in less than one hour.

Example Configurations

4-Axis Heat & LN₂ cooling
Heating to 1200°C with cooling to <-150°C (123K)



5-Axis Heat & LN₂ cooling
Heating to 1200°C with cooling to <-150°C (123K)



5-Axis Heat & LHe cooling
Heating to 600°C with cooling to -243°C (30K)



Configure to suit your application

Choose 4-axis for polar rotation only, and 5-axis if azimuthal rotation is also required. In addition, heating and cooling can also be specified. If sample heating is required, resistive heating to 900°C and e-beam heating to 1200°C options are available. If sample cooling is required, LN2 cooling to <-150°C (123K) and LHe to -243°C (30K) options can be included.

Page 10 outlines further stage options and a range of sample transfer techniques and products.

XL-T Series

Single bellows, compact analytical stages

The XL-T series is an entry level single bellows compact stage, offering a full range of functions. Based on the proven design of the TETRAXE XYZT manipulator, its rugged construction and smaller platform is ideal for surface science chambers where space is at a premium.

- XL-T KEY ADVANTAGES**
- » Single bellows 3, 4 or 5 axes
 - » +/- 12.5mm X and Y motion
 - » 50-300mm Z motion
 - » Puck, Flag or ESCA sample handling
 - » E-beam heating, LN₂ cooling plus biasing options
 - » Continuous azimuthal rotation & LN₂ cooling

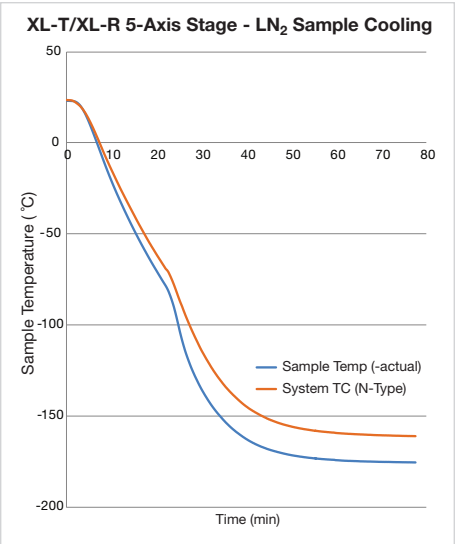
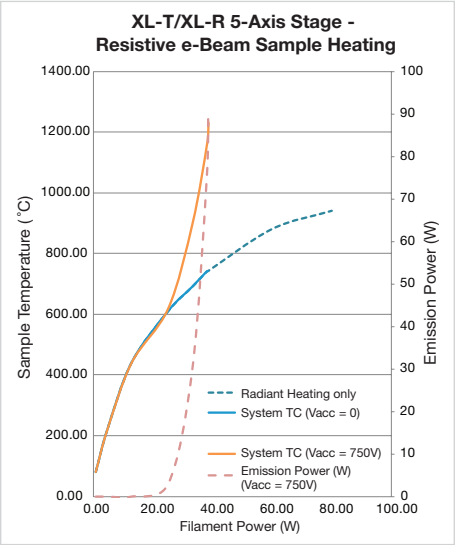
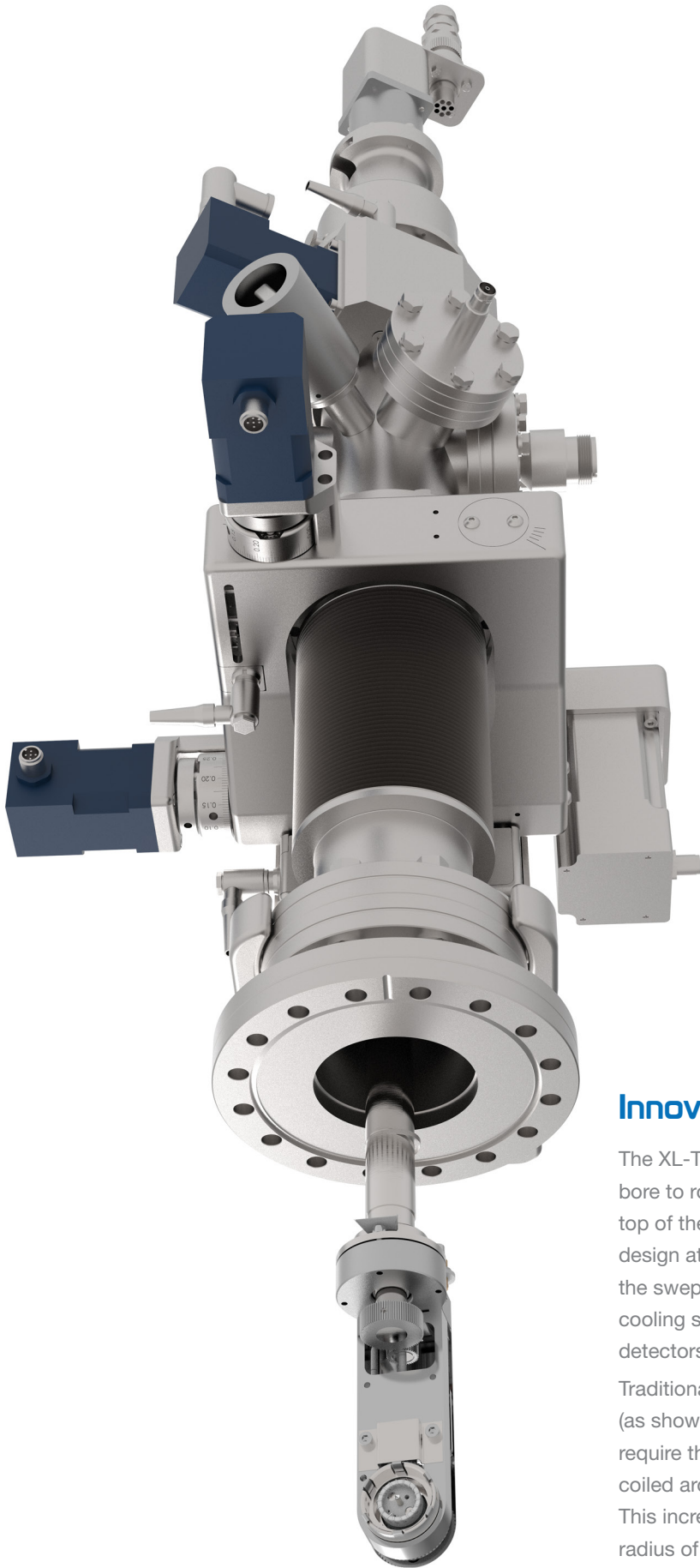
The large 65mm internal diameter bellows bore allows for all services, including LN₂ cooling coils, to be routed at the top of the stage resulting in a very uncluttered, compact design at the sample stage, significantly reducing the swept radius.

Any or all axes of motion can be motorised (including Polar and Azimuthal rotation).

Contact us for details of suitable controllers.

A unique feature is the continuous azimuthal rotation even when cooling with LN₂. This is achieved via a proprietary design which not only acts as a bearing for rotation, but provides electrical isolation of the sample.

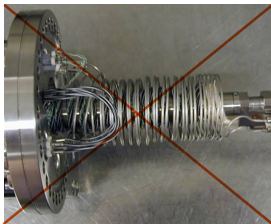
MODEL	Puck-Style	Flag-Style	ESCA Stub
Mounting flange	CF64 114mm (4.5") OD CF or CF100 152mm (6") OD CF		
X-Y travel	+/- 12.5mm		
Z travel	50, 100, 150, 200, 250 and 300mm		
Polar rotation	+/- 180°		
Azimuthal rotation	Continuous with LN ₂ cooling		N/A
Maximum sample size	25mm diameter	15mm x 18mm	14mm diameter
Resistive heating	> 900°C	> 900°C	> 900°C
e-beam heating	> 1200°C	> 1200°C	N/A
LN ₂ cooling	< -150°C (<-170°C typically achievable) (< -150°C with continuous azimuthal rotation)		< -140°C
Sample current measurement	Isolation > +/- 1000V Resistance > 500MOhm		



Innovative uncluttered stage

The XL-T uses the large 65mm internal diameter bellows bore to route all services, including LN₂ cooling coils, at the top of the stage resulting in a very uncluttered, compact design at the sample stage. This significantly reduces the swept radius and eliminates the cycling stress on the cooling system whilst freeing up space for sources and detectors on multitechnique chambers.

Traditional stage designs (as shown on the right) require the services to be coiled around the shaft. This increases the swept radius of the stage, provides potential snagging areas and, after multiple cycles, the cooling pipes fatigue to the point of failure.



XL-R Series

Dual bellows, high stability, high precision stages

The XL-R series is a truly modular dual bellows stage. Incorporating dual-point shaft support with Z travel up to 1,000mm the XL-R series provides the ultimate in precision and stability.

- XL-R KEY ADVANTAGES
- » Dual bellows with 3, 4 or 5 axes
 - » Up to +/- 40mm XY Motion
 - » Dual-point support for ultimate stability
 - » 100-1000mm Z Motion
 - » Puck, Flag or ESCA sample handling
 - » E-beam heating, LN₂ cooling plus biasing options

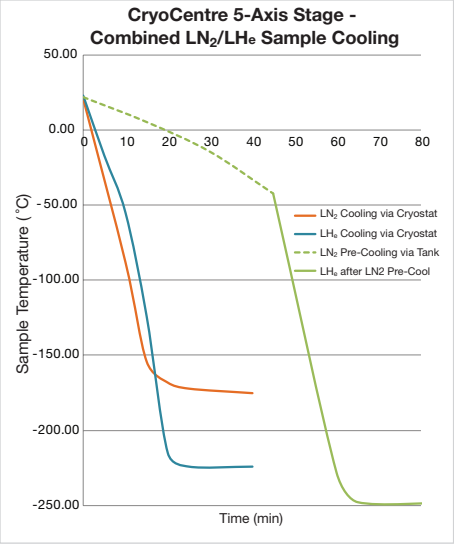
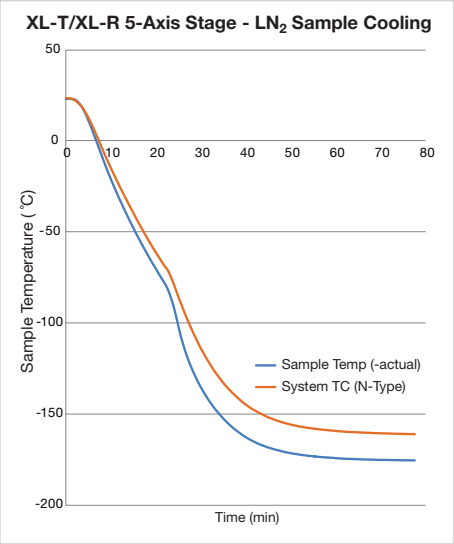
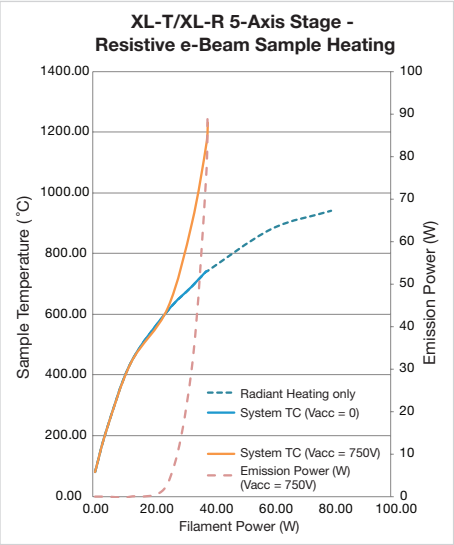
With the addition of an integrated dual-point support, the XL-R series offers greatly increased stability, making it an ideal choice for surface analytical and synchrotron end-station applications where long travel and stability are essential.

Any or all axes of motion can be motorised (including polar and azimuthal rotation).

Contact us for details of suitable controllers.

All stage modules use proven kinematic designs that eliminate thermal stressing problems, such that even after repeated bakeout at 250°C, smooth operation is assured.

MODEL	Puck-Style	Flag-Style	ESCA Stub
Mounting flange	CF100 152mm (6") OD CF / CF150 203mm (8") OD CF		
X-Y travel	+/- 19mm or +/- 40mm		
Z travel	100, 200, 300, 400, 600, 800 and 1000mm		
Polar rotation	+/- 180° (+/- 100° with LHe option)		
Azimuthal rotation	Continuous with LN ₂ cooling (+/- 100° with LHe cooling)		N/A
Maximum sample size	25mm diameter	15mm x 18mm	14mm diameter
Resistive heating	> 900°C	> 900°C (600°C with LHe option)	> 900°C
e-beam heating	> 1200°C	> 1200°C (Not available with LHe option)	N/A
LN ₂ cooling	< -150°C (<-170°C typically achieved)		< -140°C
LHe cooling	Not available	<30K	N/A
Sample current measurement	Isolation > +/- 1000V Resistance > 500MOhm.		



Sample Handling

Compatible sample handling throughout all experimental modules is essential to maintain full system integration. UHV Design offers a range of industry-standard transfer solutions which includes Flag-style, Puck-style and ESCA Stub options, all three of which can be fitted to either wobblesticks or PowerProbes.

Puck-Style



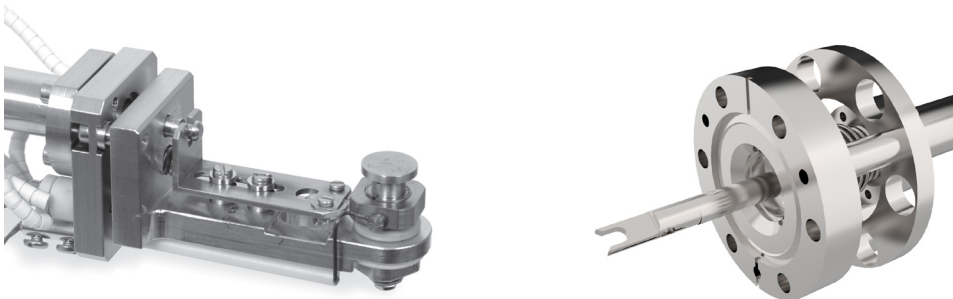
Puck-style gripper available with Wobblestick or PowerProbe

Flag-Style



Flag-style gripper available with Wobblestick or PowerProbe. For Wobblestick sample transfer there is an option to include a toggle switch (b) (see opposite) on the stage to raise and lower the thermocouple before and after sample transfer.

ESCA Stub

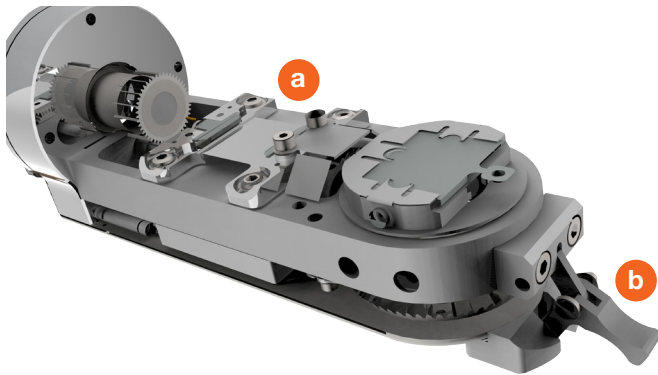


ESCA stub gripper only available on Wobblestick (Section 5).

Additional Stage Options

In addition to the small swept volume and generally uncluttered design, the flat area of the platform adjacent to the sample plate itself can be utilised for additional modules if required. Some examples of our innovative parking stages are shown below.

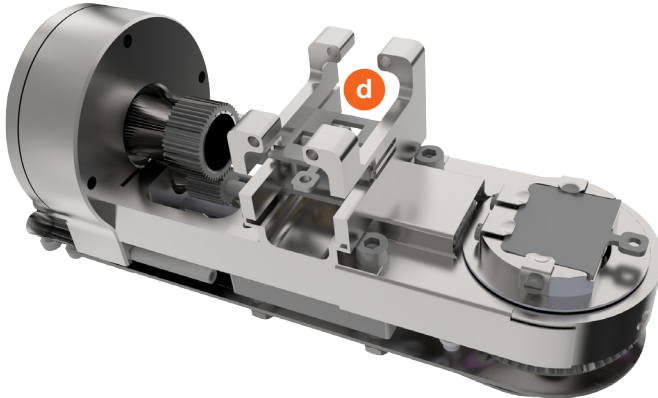
Single flag-style parking position for 5-axis stage



5-axis flag-style heat / cool stage with the following additional features:

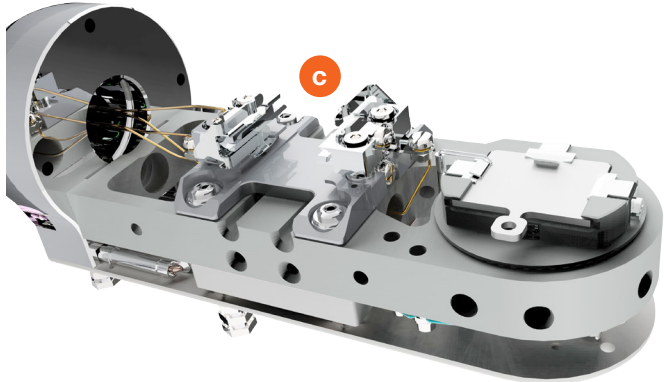
- (a) Single flag-style sample parking position which can loaded from either side by a wobble stick, is electrically floating for biasing and sample current measurement, and can be cooled
- (b) Toggle mechanism which can be operated by a wobble stick to disengage the thermocouple from the back of the sample plate. Normally this functionality is accomplished by the forks on the magnetic transfer arm which engage in the end of the manipulator and disengage the thermocouple in the process

Flag mounted STM tip holder parking stage for 5-axis stage



5-axis flag-style heat / cool stage showing a custom parking position for the conditioning of flag mounted STM tips (d)

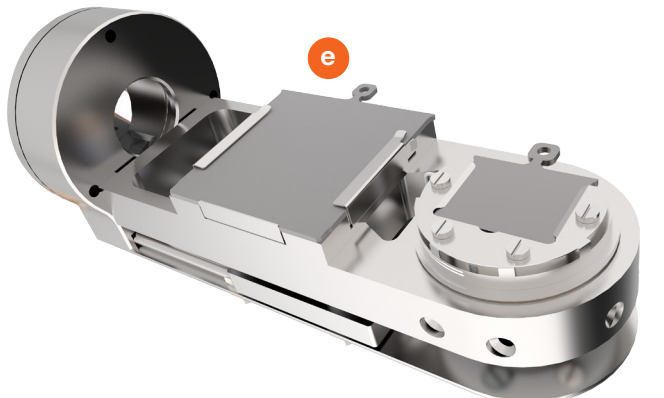
Two level parking positions for 4-axis stage



4-axis flag-style heat / cool stage with a 2 level parking stage (c), both electrically floating and coolable which can be loaded from either side:

- 2 standard flag samples, or
- two direct current heating flag samples, or
- a mixture thereof
- a special flag-style sample plate with a QMB (Quartz Micro-balance) FTM (Film Thickness Monitor) mounted on it, or
- a special flag-style sample plate with an e-beam heater module which when loaded into the lower position can be used to heat a standard flag-style sample in the upper level to 1200°C

Large flag-style parking position for 4-axis stage



4-axis flag-style heat / cool stage - showing an additional parking position for a large (30x30mm) flag-style sample plate (e), which is also electrically isolated for biasing and sample current measurement, and can be cooled

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