

UHV Manipulators

MultiCentre
UHV Probe Manipulators



EpiCentre
MBE Manipulators



MultiCentre UHV Probe Manipulators

Manipulators for research and development in surface physics, in synchrotron applications and other analysis methods in UHV

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MultiCentre UHV Probe Manipulators

Manipulators for research and development in surface physics, synchrotron applications and other analytical methods in UHV

Introduction

UHV manipulators enable mechanical motion in vacuum systems necessary in connection with probe analysis. There are applications requiring various lead-through axis as for rotation, tilting, deposition height adjustment, transfer solutions or probe heating. The British expert UHV Design, represented by VACOM, is specialised to build sophisticated manipulators with up to 6 independently movable axes by using different modular components. These manipulators are characterised by high resolution and enable a precise positioning of probes or metrology in a vacuum chamber. Typical applications are the electron spectroscopy, laser optical analysis, beamlines or thin film deposition (e. g. MBE, CVD).

MultiCentre probe handling system



- Complete solution for research and analysis
- Translation in all 3 directions
- Up to 2 rotation axes (polar and azimuthal)
- Highly stressable
- High resolution and accuracy
- Probe transfer with bayonet connector
- Probe heating by PBN heater elements or e-beam heater
- Electrically isolated receptor
- Manual actuation or stepper motor
- Optional with LN₂ or cryostatic cooling vectorial
- Optional with rotatable XY translator
- Custom solutions

Technical data

- Max. probe diameter 33 mm
- XY stroke ± 7 mm (± 9.9 mm vectorial or ± 20.5 mm (± 29 mm vectorial))
- Z stroke 25 mm to 1000 mm
- XY stroke resolution
 - manual actuation: 0.01 mm
 - stepper motor: 0.0005 mm
- Z stroke resolution
 - manual actuation: 0.25 mm (optional 0.005 mm with digital linear scale)
 - stepper motor drive: 0.0005 mm
- Probe rotation
 - polar: $\pm 200^\circ$ with $< 1^\circ$ breakup
 - azimuthal: $\pm 100^\circ$ with $< 0.5^\circ$ resolution (manual actuation or stepper motor)
- Probe heater (optional)
 - PBN heater element: $> 1000^\circ\text{C}$
 - e-beam heater: $> 1200^\circ\text{C}$
- Probe cooling $< -150^\circ\text{C}$ (with LN₂)
- Temperature measurement type K thermocouple (type N optional)
- Electrical probe isolation $> \pm 500$ V, > 500 MOhm

For more information and technical data of XY and XYZ translators please see the Mechanical Feedthroughs chapter.



Manipulator with receptor for sample holder



Puck handling system with bayonet connector



PBN heater



e-beam heating



Sample transfer with bayonet connector for the sample holder

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Rotatable Axis MultiBase stage

The axis rotating XY translator MultiBase enables to change the direction of the X and the Y axis without dismantling the translator. The connecting flanges on the vacuum system and on the Z translator stay fixed, while the drive of the XY translator can be turned around them. This unique feature allows the ability to align the motion axis with the connecting axis of a chamber. This feature is especially beneficial if the axis of a beam system, the optics, etc. is connected to ports which do not stand in an exactly parallel or vertical position to the manipulators axis.

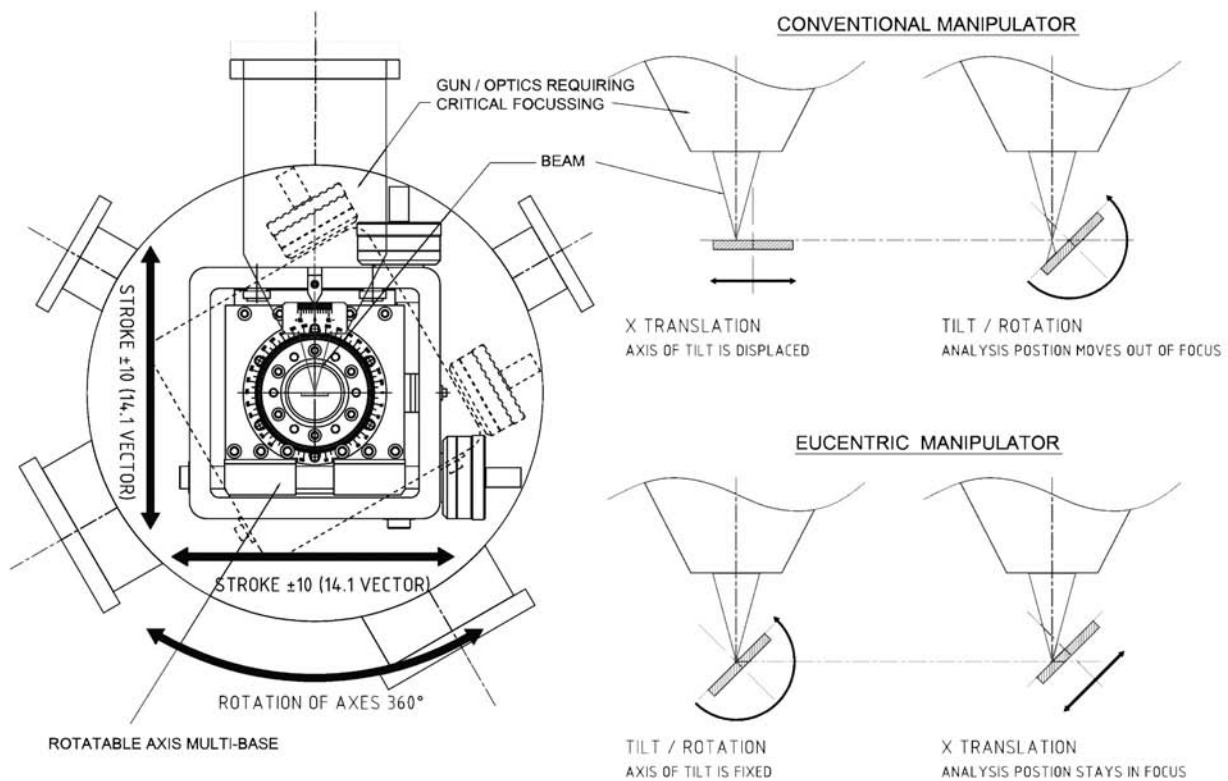
The combination of the MultiBase stage with a motion option along the Z axis, rotatable feedthroughs and other optional modules for probe positioning or for probe heating and cooling, provides a completely eucentric manipulator system. A slide ring seal or a differentially pumped rotatable housing is not necessary.



Technical data

- Mounting flange DN63CF, DN100CF or DN160CF
- Travelling flange DN40CF or DN63CF, ±14 mm or ±31 mm
- Max. stroke stainless steel 316L
- Diaphragm bellows ±0.01 mm manual drive
- XY resolution ±0.0005 mm with stepper motor
- Rotation of axes 360°

For more information and technical data of XY and XYZ translators please see the Mechanical Feedthroughs chapter.



EpiCentre MBE Manipulators

Manipulators for probe heating in MBE, CVD and sputter processes or other applications with heated probes



The modular EpiCentre manipulators offer a complete UHV solution for the heating, rotation, positioning, manipulation and insertion of probes or substrates.

- 3 series - EpiCentre 100, 342 and 282
- Probe heating up to 1200 °C
- Sample size up to Ø 200 mm
- PgG and PBNG graphite heating elements
- Temperature uniformity
- Heat-proof mechanical construction and bearing
- Applicable for corrosive processes
- Simultaneous probe rotation and heating
- Manual or motor drive



Custom sample holder



PBN heater element with heat-proof housing



MagiGear rotary feedthrough for sample rotation



Differentially pumped quartz enclosure for heater elements

EpiCentre Model 346

Simple manipulators for probe heating and probe rotation



- Adjustable distance between heater and probe with linear translator
- DC servo motor for probe rotation
- Optional quartz enclosure for heater element to protect from corrosive gases
- Custom sample holder
- Fixed total length according to customers' specification

Technical data

- Probe Ø
 - Ø 25 mm - 200 mm (1" - 8") (bigger diameters on request)
- Standard heating elements
 - PgG and PBNG (others upon request)
- Max. temperature
 - 1200 °C for standard heater modules
 - 1000 °C for quartz-enclosed heater modules (based on a test with a Mo block)
- Temperature uniformity
 - nominally ±2.5 °C across the central 90 % of a Si wafer
- Rotation speed
 - up to 80 rpm
- Biasing capability
 - 2 kV DC (optional)
- Thermocouple options
 - type C (tungsten rhenium) or
 - type K (Chromel®/Alumel®)
- Sample Ø / flange size / rotary feedthrough
 - Ø 25 - 75 mm (1 - 3") / DN200CF / 1 stage
 - Ø 100 mm (4") / DN250CF / 1 or 2 stage
 - Ø 125 - 150 mm (5 - 6") / DN250CF / 2 stage
- Options
 - differentially pumped quartz enclosure for heating elements
 - motor drive for linear motion
 - custom sample holder

EpiCentre 100

Modular assembled heater manipulator with numerous options



- Individually configurable due to modular configuration
- Separate linear motion of sample holder and complete system
- Adjustable distance between heater element and sample
- Adjustable distance to coating source
- DC servo motor for probe rotation
- Optional quartz enclosure for heating element to protect from corrosive gases
- Custom sample holders
- Biasing capabilities up to 2 kV DC or 80 W HF
- Motorizable
- Process adjusted

Technical data

- Sample diameter
 - 25 mm - 200 mm (1" - 8")
 - (bigger diameters on request)
- Standard heater elements
 - PgG and PBNG (others upon request)
- Max. temperature
 - 1200 °C for standard heater modules,
 - 1000 °C for quartz-enclosed heater modules
 - (based on a test with a Mo block)
- Temperature uniformity
 - nominally ± 2.5 °C across the central 90 % of
 - a Si wafer
- Rotation speed
 - up to 80 rpm
- Thermocouples
 - type C (tungsten rhenium) or
 - type K (Chromel®/Alumel®)
- Biasing capability
 - 2 kV DC or 2 kV DC isolated/ 80 W RF power
- Sample Ø / flange size / rotary feedthrough
 - Ø 25 - 50 mm (1 - 2") / DN100 - 160CF / 1 stage
 - Ø 75 mm (3") / DN160CF / 1 stage
 - Ø 100 mm (4") / DN200CF / 1 or 2 stage
 - Ø 125 mm (5") / DN200CF / 2 stage
 - Ø 150 mm (6") / DN250CF / 2 stage
 - Ø 200 mm (8") / DN300CF / 2 stage
- Options
 - differential pumped quartz enclosure for hot plates
 - motor drive for linear motion
 - special design of the grip

EpiCentre Model 282

Heater manipulator with 90° sample holder - compatible with VG V80H MBE systems



- Right-angled sample holder
- Mounting geometry compatible with VG V80H
- Azimuthal rotation with DC servo motor
- Manually driven polar rotation
- Bracket for beamflux monitor
- Low maintenance heater modules
- Uniform heating
- High temperature resistant mechanical construction with shielded bearings and long life cycle
- Optional stepper motor for positioning

Technical data

- Sample diameter 75 mm (3")
- Standard heater elements PgG and PBNG (others upon request)
- Max. temperature 850 °C (based on heating a Mo test disc)
- Heating current < 12 A at 650 W
- Rotational speed up to 65 rpm (temperature-dependent)
- Thermocouples type C (tungsten rhenium)
- Sample holder molybdenum sample cradle for Ø 90 mm substrate holder
- Flange size DN160CF with CF ports for all essential connections (power, thermocouples, beamflux monitor)
- Options
 - quartz enclosure to protect the heater element
 - stepper motor drive for polar positioning

Fitting dimensions EpiCentre Model 282

