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INTRODUCTION

PREVAC TRANSFER SOLUTION

Many areas of research and innovation techniques require us to:

- provide smooth and precise motion in several directions,
- examine specific, small regions,
- transport hot or cold samples,
- place samples into the appropriate position for analysis,
- move the sample to another location or chamber,
- detach the sample from one device and mount it in another while maintaining UHV integrity.

MULTI-AXES MANIPULATOR

- High precision manipulation in all directions
- Wide range of sample holders
- Wide range of temperatures, depending on application: cooling down to 4.8 K, heating up to 2000 °C
- Fully motorised or manual. Fully software controlled

RADIAL DISTRIBUTION CHAMBER

- Standard or telescopic transferring arm
- Base pressure: \(10^{-11}\) mbar range, \(10^{-10}\) mbar during transferring
- Up to 8 transfer positions to other chambers with automatic sample positioning
- Numerous viewports
- Equipped with UHV connecting flanges and additional ports for future versatility
- Transfer mechanism with rack-and-pinion motion feedthrough
- Ball pen principle locking mechanism for PTS & Flag sample holders
- Fast and reliable transfer of both hot and cold samples
- Transfer between the chambers less than 45 sec (manual mode)
- Standard transfer length from 395 to 904 mm (can be customised)
- Fully motorised, semi motorised or manual. Fully software controlled and automated

LINEAR TRANSFER

- Range 320 - 1600 mm
- Smooth and fast translation movement
- Rotation
- Ball pen principle locking mechanism for PTS & Flag sample holders
- Easy operation
INTRODUCTION

TRANSFER CHAMBERS

MANIPULATORS & TRANSFERRING SYSTEMS

TRANSFERRING TUNNEL

- Unlimited number of sections
- Wide range of sample holders (e.g. PTS, flag style, plate style)
- Base pressure: 10^{-11} mbar range
- Fully motorised or manual versions
- Easy operation
PTS SAMPLE HOLDERS | for up to 1 inch samples

The PTS sample holder system is a transferrable sample holder for flexible surface analysis and sample preparation. It is capable of both heating and cooling the sample and can be configured with many other features depending upon the particular application. The basic holder has a thermal heat shield, cooling connection and six electrical contacts.

Key features:
- different heating methods
- detachable contacts for heating
- detachable cooling

![BOTTOM VIEW](image)

- heater
- to receiving station
- bias or second thermocouple
- heater
- to transfer arm
- thermocouple

<table>
<thead>
<tr>
<th>Type</th>
<th>without heating &amp; cooling</th>
<th>with resistive heating</th>
<th>with EB heating</th>
<th>with direct heating</th>
</tr>
</thead>
<tbody>
<tr>
<td>standard</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>for high pressure reactor</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>dedicated</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>for cleaver</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>for SPM applications</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>for IR spectrometer</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>others</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>for powder samples</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>with quartz balance</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>with Faraday cup</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>for 1&quot; - 2&quot; targets</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>adapters for flag sample holders</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>without heating &amp; cooling</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>with resistive heating</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>with EB heating</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>with direct heating</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Other customized PTS sample holders with random options are available. Examples are presented below.

- with angular device
- with mask
- with additional contacts
- for HP reactor covered with Au
- with Peltier module
## PTS SAMPLE HOLDERS | for up to 1 inch samples

<table>
<thead>
<tr>
<th>Type</th>
<th>Heating methods</th>
<th>Heating temp.</th>
<th>Cooling temp.</th>
<th>Thermo-couple</th>
<th>Table material</th>
<th>Options / features</th>
</tr>
</thead>
<tbody>
<tr>
<td>standard</td>
<td>without heating &amp; cooling</td>
<td>Ti</td>
<td>K</td>
<td>Cu</td>
<td>• BIAS</td>
<td>• 4 additional contacts*</td>
</tr>
<tr>
<td></td>
<td>with heating &amp; cooling</td>
<td>resistive</td>
<td>600 °C</td>
<td>100 K</td>
<td>K</td>
<td>Cu</td>
</tr>
<tr>
<td></td>
<td>resistive</td>
<td>900 °C</td>
<td>100 K</td>
<td>K</td>
<td>SS</td>
<td>• suitable to work with reactive gases</td>
</tr>
<tr>
<td></td>
<td>EB</td>
<td>900 °C</td>
<td>90 K</td>
<td>K</td>
<td>Cu</td>
<td>• suitable to work with reactive gases</td>
</tr>
<tr>
<td></td>
<td>resistive</td>
<td>1000 °C</td>
<td>100 K</td>
<td>K</td>
<td>Mo</td>
<td>• suitable to work with reactive gases</td>
</tr>
<tr>
<td></td>
<td>EB</td>
<td>1200 °C</td>
<td>90 K</td>
<td>K</td>
<td>Mo</td>
<td>• suitable to work with reactive gases</td>
</tr>
<tr>
<td></td>
<td>EB</td>
<td>2000 °C</td>
<td>90 K</td>
<td>K</td>
<td>Mo</td>
<td>• suitable to work with reactive gases</td>
</tr>
<tr>
<td>dedicated</td>
<td>for high pressure reactor</td>
<td>resistive</td>
<td>700 °C</td>
<td>183 K</td>
<td>C/K</td>
<td>Ti, SS, Alloy C-276, SS covered with Au</td>
</tr>
<tr>
<td></td>
<td>for cleaver</td>
<td>resistive</td>
<td>600 °C</td>
<td>100 K</td>
<td>K</td>
<td>Cu</td>
</tr>
<tr>
<td></td>
<td>for SPM applications</td>
<td>direct</td>
<td>600 °C</td>
<td>100 K</td>
<td>K</td>
<td>Cu</td>
</tr>
<tr>
<td></td>
<td>resistive</td>
<td>600 °C (1000°C on request)</td>
<td>100 K</td>
<td>K</td>
<td>Cu</td>
<td>• sample size: 5x5 mm, min. height 8 mm</td>
</tr>
<tr>
<td></td>
<td>EB</td>
<td>1000 °C</td>
<td>100 K</td>
<td>K</td>
<td>Cu</td>
<td>• sample size: 5x5 mm, min. height 8 mm</td>
</tr>
<tr>
<td></td>
<td>EB</td>
<td>2000 °C</td>
<td>100 K</td>
<td>K</td>
<td>Cu</td>
<td>• sample size: 5x5 mm, min. height 8 mm</td>
</tr>
<tr>
<td></td>
<td>for IR spectrometer</td>
<td>resistive</td>
<td>600 °C</td>
<td>100 K</td>
<td>K</td>
<td>Ti, Mo, Cu</td>
</tr>
<tr>
<td>others</td>
<td>for powder samples</td>
<td>resistive</td>
<td>1000 °C</td>
<td>100 K</td>
<td>K</td>
<td>Mo, SS</td>
</tr>
<tr>
<td></td>
<td>with quartz balance</td>
<td>resistive</td>
<td>1000 °C</td>
<td>100 K</td>
<td>K</td>
<td>SS</td>
</tr>
<tr>
<td></td>
<td>with Faraday cup</td>
<td>resistive</td>
<td>1000 °C</td>
<td>100 K</td>
<td>K</td>
<td>SS</td>
</tr>
<tr>
<td></td>
<td>for 1” - 2” targets</td>
<td>resistive</td>
<td>1000 °C</td>
<td>100 K</td>
<td>K</td>
<td>Ti, SS</td>
</tr>
<tr>
<td>adapters for flag sample holders</td>
<td>without heating &amp; cooling</td>
<td>resistive</td>
<td>1000 °C</td>
<td>100 K</td>
<td>K</td>
<td>Mo</td>
</tr>
<tr>
<td></td>
<td>with resistive heating and cooling</td>
<td>resistive</td>
<td>1000 °C</td>
<td>100 K</td>
<td>K</td>
<td>Mo</td>
</tr>
<tr>
<td></td>
<td>with EB heating and cooling</td>
<td>EB</td>
<td>2000 °C</td>
<td>100 K</td>
<td>C/K</td>
<td>Mo</td>
</tr>
<tr>
<td></td>
<td>with direct/resistive heating and cooling</td>
<td>direct</td>
<td>1000 °C</td>
<td>100 K</td>
<td>K</td>
<td>Mo</td>
</tr>
<tr>
<td></td>
<td>dedicated for laser heating</td>
<td>laser</td>
<td>1000 °C</td>
<td>100 K</td>
<td>K</td>
<td>Mo</td>
</tr>
</tbody>
</table>

* require dedicated stage

Above tables shows commonly used sample holders. Approximately 200 individual designs of sample holders have been manufactured to date.
PTS SAMPLE HOLDERS | for up to 8 inch samples

Above tables shows commonly used sample holders. Approximately 200 individual designs of sample holders have been manufactured to date.

Other customized PTS sample holders with random options are available. Examples are presented below.
PLATE STYLE SUBSTRATE HOLDERS

Substrate holders (for wafers, molybloc or molybdenum) dedicated for different deposition techniques, such as MBE, magnetron sputtering, thermal evaporation and others. Available in 1", 2", 3", 4" diameter size as standard (6", 8" and larger on request). The holder can be configured with adaptations for single and multiples of other types of sample holders, for example flag style plates. Standard material is molybdenum or titanium, other materials are available on request.

Above table shows commonly used sample holders. Approximately 200 individual designs of sample holders have been manufactured to date.

NOTE | heating and cooling method and temperature depends on the manipulator.
FLAG STYLE SAMPLE HOLDERS

Commonly used sample holder for a wide range of applications. Available as a simple bare plate or configurations including: with 4x M2 screws for sample fixing, plate with post/pedestal or prepared for electron bombardment, resistive or direct current heating. The holder also can be equipped with a thermocouple for accurate sample temperature measurement. Available materials: titanium, molybdenum, copper, tantalum, aluminum, stainless steel.

Below table shows commonly used sample holders. Approximately 200 individual designs of sample holders have been manufactured to date.

<table>
<thead>
<tr>
<th>Type</th>
<th>Heating method</th>
<th>Heating temperature</th>
<th>Thermocouple</th>
<th>Table material</th>
</tr>
</thead>
<tbody>
<tr>
<td>basic</td>
<td>for EB heating</td>
<td>EB</td>
<td>2000 °C</td>
<td>Ta</td>
</tr>
<tr>
<td>for DIR heating</td>
<td>direct heating with 10A</td>
<td>Mo, Ta</td>
<td></td>
<td></td>
</tr>
<tr>
<td>for EB/RES heating</td>
<td>EB / resistive heating</td>
<td>1400 °C / 1100 °C</td>
<td>Mo, Ta</td>
<td></td>
</tr>
<tr>
<td>with thermocouple</td>
<td></td>
<td></td>
<td>K</td>
<td>Mo, Ta, Cu, Ti, SS</td>
</tr>
<tr>
<td>with thermocouple, dedicated for laser heating</td>
<td>laser beam heating</td>
<td>K</td>
<td>Mo, Ta, Cu, Ti, SS</td>
<td></td>
</tr>
<tr>
<td>dedicated for high pressure reactor</td>
<td></td>
<td></td>
<td></td>
<td>Mo, Ta, Cu, Ti, SS</td>
</tr>
<tr>
<td>special design with post/pedestal</td>
<td></td>
<td></td>
<td></td>
<td>Mo, Ta, Cu, Ti, SS</td>
</tr>
</tbody>
</table>

NOTE | Cooling temperature depends on manipulator
**DESCRIPTION**

The radial distribution chambers (RDC, UFO) are designed to transfer samples between multiple preparation and analysis chambers that are connected to it. The chambers are normally mounted at the centre of a series of chambers, acting as a central distribution hub for cluster tools.

**APPLICATION**

The transportation and rotating mechanism of the RDC chamber provides repeatable and accurate sample transfer to other chambers. The radial distribution chamber mechanism is a development of the linear rack-and-pinion transporter, where a single ended rack-and-pinion is precisely rotated by a precision rotary drive until it is aligned in a preset position at a radial port. Once locked into position, the same rotary drive transfers the rack out through the port.

**FEATURES**

- **Standard** or **telescopic** transferring arm
- Chamber body diameters from 550 to 1200 mm
- Configured with TSP and transfer mechanism with rack-and-pinion rotary motion feedthrough
- **Time to transfer between two chambers < 45 seconds** (manual mode) - fast transfer time allows cold samples to stay cold (temperature rise also depends on initial temperature and heat capacity)
- Fast and reliable drop-proof transfer of both hot and cold samples
- Up to 8 transfer positions to other UHV chambers with automatic sample positioning
- **Guaranteed base pressure: 10^{-11} mbar range** after 48h of bakeout. 10^{-10} mbar during transferring
- Numerous viewports
- Equipped with UHV connecting flanges and additional ports for future versatility

**PRINCIPLES OF OPERATION**

By rotating only one rotary feedthrough you can move the transfer arm in and out, rotate the sample holder around the arm axis, rotate the mechanism between transfer ports and lock/unlock the sample holder.

**TECHNICAL DATA**

- **Travelling flange**: DN 63CF - DN 160CF
- **Viewport flange**: DN 160CF
- **Chamber diameter**: 550 - 1200 mm (other on request)
- **Max transfer length Z**: 395 - 904 mm, depends on chamber diameter, transferring arm and sample holder type (other on request)
- **Positional control**: manual / semi motorised (option) / motorised (option)
- **Bakeout temperature**: up to 150 °C

**OPTIONS**

- **R1 axis rotation**: (90° left, 90° right, 180°). Rotation is independent for each port.
Radial Distribution Chamber (RDC)

**TRANSFER LENGTH**

<table>
<thead>
<tr>
<th>Chamber diameter D [mm]</th>
<th>Maximum transfer length Z [mm] for PTS (1&quot;) sample holders</th>
<th>for flag style sample holders</th>
</tr>
</thead>
<tbody>
<tr>
<td>550 telescopic</td>
<td>555</td>
<td>572</td>
</tr>
<tr>
<td>700 telescopic</td>
<td>780</td>
<td>797</td>
</tr>
<tr>
<td>700</td>
<td>395</td>
<td>414</td>
</tr>
<tr>
<td>750</td>
<td>444</td>
<td>463</td>
</tr>
<tr>
<td>800</td>
<td>493</td>
<td>512</td>
</tr>
<tr>
<td>900</td>
<td>591</td>
<td>610</td>
</tr>
<tr>
<td>1000</td>
<td>689</td>
<td>708</td>
</tr>
<tr>
<td>1200</td>
<td>885</td>
<td>904</td>
</tr>
</tbody>
</table>

**BASE PRESSURE**

Base pressure: $10^{-11}$ mbar range (depend on pumping system). Radial distribution chamber can be equipped with application matched vacuum pumps to achieve the best pressure range.

- Getter pump
- Titanium sublimation pump
- Ion pump
- Turbo pump

**SAMPLE HOLDERS**

Radial Distribution Chamber design allows to transfer a wide range of various sample holders:
- PTS, flag style, puck style, deposition or special design holders up to 8"
- with heating by direct, indirect or e-beam methods up to 2000°C
- with high cooling efficiency down to 4.8 K (LHe)
- dedicated for e.g. quartz balance, Faraday cup, high pressure reactors, powder materials, IR spectroscopy and many others

**MODES OF OPERATION**

- Fully motorised
- Semi motorised
- Manual
**LINEAR TRANSFER**

**DESCRIPTION**

The linear transfer is designed to transport sample holder/sample between chambers. It is commonly used to transfer sample from load lock chamber to system main chambers. The linear transfers are pumped by the system vacuum pump set or else with a dedicated pump set. The entire movement range of the transfer mechanism is via a rotary motion feedthrough. The range of the transfer movement is from 320 to 1600 mm.

There are two types of linear transfers available:
- **1 axis** - with forward movement only
- **2 axes** - with forward movement and continuous rotation around the movement axis

**TECHNICAL DATA**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Base flange</td>
<td>DN 63CF</td>
</tr>
<tr>
<td>Max. transfer length Z</td>
<td>320 - 1600 mm, depends on chamber length and sample holder type (other on request)</td>
</tr>
<tr>
<td>Transferring arm</td>
<td>standard / telescopic mechanism</td>
</tr>
<tr>
<td>Positional control</td>
<td>manual / motorised (option)</td>
</tr>
<tr>
<td>Bakeout temperature</td>
<td>up to 150 °C</td>
</tr>
</tbody>
</table>

**OPTIONS**

- **R1 axis rotation** (90° left, 90° right, 180°)

**TWO SIDED LINEAR TRANSFER**

Two sided linear transfer allows for transferring through linear transfer chamber in both directions. Chamber can be equipped with additional ports for connecting e.g. pump. The range of the transfer movement is from 500 to 2000 mm.

**MAXIMUM TRANSFER LENGTH**

<table>
<thead>
<tr>
<th>Max. transfer length Z [mm]</th>
<th>Housing length L [mm]</th>
</tr>
</thead>
<tbody>
<tr>
<td>320</td>
<td>592</td>
</tr>
<tr>
<td>500</td>
<td>772</td>
</tr>
<tr>
<td>750</td>
<td>1022</td>
</tr>
<tr>
<td>1000</td>
<td>1272</td>
</tr>
<tr>
<td>1250</td>
<td>1522</td>
</tr>
<tr>
<td>1500</td>
<td>1772</td>
</tr>
<tr>
<td>1600</td>
<td>1872</td>
</tr>
</tbody>
</table>
TRANSFERRING TUNNEL

DESCRIPTION
Transferring tunnel is used to transfer samples between UHV chambers, in a stable and easy-to-operate way. Up to 15 sample holders can be loaded and transferred via the dedicated sample holder trolley. The chamber is made of stainless steel and includes flanges for pump, viewports, gauges and valves. Guaranteed base pressure range 10⁻¹¹ mbar after bakeout at 150 ºC.

SAMPLE HOLDERS
A special transferring trolley is ready to contain up to 15 pcs of PTS or flag holders or 3 pcs of plate style holder.

OPTIONS
- R1 axis rotation (90° left, 90° right). Rotation is independent for each port.

ADDITIONAL INFORMATION
The movement of a special trolley is realized through linear magnetic drive and rail transfer inside tube. All motion elements: rotary feedthrough, drive belt with set of magnets, section motor, etc. are mounted outside the vacuum in order to guarantee the best vacuum performance and for ease of service. The trolley with 15 positions for sample holders is mounted in vertical position. The trolley switches its angular position in variable sections automatically, a solution which guarantees easy operation and smooth transferring into dedicated Radial Distribution chamber. The linear motion is fully automatic, each section includes its own optical sensor and motor to guarantee completely independent movement of each section as well as high precision and full protection of the system. The fast entry load lock chamber mechanism is used for loading sample holder cassette.
**REORIENTATION CHAMBER**

**DESCRIPTION**
The reorientation chamber is a simple device that connects two or more chambers and contains a manual rotary reorientation mechanism that receives, reorients and transfers a sample holder from one transfer mechanism to another.

**SPECIFICATION**
Reorientation chambers are usually pumped via the distribution chamber pump set (independent pumping is also possible if requested). The chamber is equipped with several large viewports. Reorientation Chamber allows easy extension UHV system of every quantity of chambers.

**TRANSPORT BOX**

**DESCRIPTION**
Transport boxes are designed for transporting samples between different UHV systems under ultra high vacuum conditions. Sample holders/samples can be stored and transported inside the transport box while maintaining UHV conditions. Vacuum is ensured by an ion pump and it’s monitored by appropriate pressure gauge. The pump is designed so that it can be powered from e.g. a car battery or other power source.

**TECHNICAL DATA**

<table>
<thead>
<tr>
<th></th>
<th>for PTS sample holders</th>
<th>for flag style sample holders</th>
</tr>
</thead>
<tbody>
<tr>
<td>Weight</td>
<td>~7 kg (8 kg with power supply)</td>
<td>~12 kg (13 kg with power supply)</td>
</tr>
<tr>
<td>Pressure range</td>
<td>down to 1x10⁻⁹ mbar</td>
<td>down to 1x10⁻¹⁰ mbar</td>
</tr>
<tr>
<td>Mounting flange (transporting port)</td>
<td>PTS dedicated load lock connection port</td>
<td>DN 40CF</td>
</tr>
<tr>
<td>Storage</td>
<td>up to 2 sample holders</td>
<td>up to 3 sample holders</td>
</tr>
</tbody>
</table>
MANIPULATORS

The manipulators are used for manipulating sample holders and scientific tools with respect to a sample’s position. These manipulators, when combined with sample holders, allow precise placement and manipulation of samples in UHV environments. Manipulator equipment is designed to be modular for convenience and to achieve total flexibility. The individual modules, such as the Z Slide, XY Stage, rotary feedthroughs and motorization modules are compatible to allow complex applications to be built up from a range of simple units.

DEGREES OF FREEDOM

Analytical and preparation manipulators

Deposition manipulators family

Rotating axes designations

Examples of receiving stations

for standard PTS sample holders

for special PTS sample holders

for flag style sample holders

for plate style (molybloc, wafers) sample holders
MODULAR CONCEPT

Stepper motor shift R2 or R3
Rotary feedthrough R2 or R3
Stepper motor shift R2 or R3
Stepper motor shift R2 or R3
Stepper motor shift R1
Stepper Z motor shift
Stepper motor shift Z
X, Y stage
Micrometer
Z chain slide
Receiving station standard
Receiving station
small
Rottary feedthrough R2 or R3
Vacuum part of manipulator LHe cooling
Handwheel R1
Handwheel Z
XY stage
Micrometer
Stepper Z motor shift
Stepper motor shift
Receiving station quartz oscilator
Receiving station R2 rotation and quartz oscilator
Receiving station MBE dedicated
Receiving station R2 rotation
Receiving station quartz oscilator
Receiving station standard
Receiving station small
Receiving station R2 rotation and quartz oscilator
Receiving station MBE dedicated
Receiving station R2 rotation
**DESCRIPTION**

The XY stage is a precision, high rigidity UHV specimen translator having X and Y motions. The standard mounting flange is DN 160CF. A DN 100CF mounting flange version is also available. The stage can work in any orientation.

**APPLICATION**

The XY stages have been designed for ease and convenience of use. X and Y movement are ±25.0 mm, depending on the accessories that are fitted. They can also be used to reposition a chamber port with an axis that is parallel to, but slightly off, the desired direction. In this last usage it is sometimes referred to as an XY adjuster and is a very economical alternative to other devices.

**TECHNICAL DATA**

- **Base flange**
  - DN 100CF or DN 160CF
- **Travelling flange**
  - DN 63CF or DN 100CF
- **Max free diameter**
  - 102 mm
- **X, Y range**
  - ±12.5 mm or ±25 mm
- **Positional control**
  - Micrometer / stepper motor (option)
- **Resolution**
  - 5 μm / 1 μm
- **Bakeout temperature**
  - Up to 150 °C

**MAXIMUM XY RANGES**

<table>
<thead>
<tr>
<th>Base flange</th>
<th>Travelling flange</th>
<th>Ø B [mm]</th>
<th>X, Y range ± [mm]</th>
<th>X, Y range ± [mm]</th>
</tr>
</thead>
<tbody>
<tr>
<td>DN 100CF</td>
<td>DN 63CF</td>
<td>Ø 38</td>
<td>±25</td>
<td>±17.5</td>
</tr>
<tr>
<td>DN 100CF</td>
<td>DN 100CF</td>
<td>Ø 62</td>
<td>±12.5</td>
<td>±9</td>
</tr>
<tr>
<td>DN 160CF</td>
<td>DN 63CF</td>
<td>Ø 38</td>
<td>±25</td>
<td>±17.5</td>
</tr>
<tr>
<td>DN 160CF</td>
<td>DN 100CF</td>
<td>Ø 75</td>
<td>±25</td>
<td>±17.5</td>
</tr>
</tbody>
</table>

○: real stroke (circle)  □: real stroke (square)

**XY STAGE DN 160/100CF RANGES**

- \( \frac{(ØA - ØB)}{2} \) = real stroke (circle)

<table>
<thead>
<tr>
<th>Ø B [mm]</th>
<th>Ø A 50</th>
<th>Ø 80</th>
<th>Ø 100</th>
</tr>
</thead>
<tbody>
<tr>
<td>DN 160/100CF XY ± 12.5 mm</td>
<td>±12.5</td>
<td>±12.5</td>
<td>±12.5</td>
</tr>
<tr>
<td>mounting flange bore ØA=125 mm</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DN 160/100CF XY ± 25.0 mm</td>
<td>±25</td>
<td>±22.5</td>
<td>±12.5</td>
</tr>
<tr>
<td>mounting flange bore ØA=125 mm</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DN 160/100CF XY ± 25.0 mm</td>
<td>±25</td>
<td>±25</td>
<td>±25</td>
</tr>
<tr>
<td>mounting flange bore ØA=152 mm</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

XY stage section
Z SLIDE

**DESCRIPTION**

The Z slide is a precise, high rigidity UHV specimen translator having Z motion. The travelling flange can be chosen depending on the type of accessories. The translator is suitable for vertical or horizontal mounting.

**APPLICATION**

The Z slides have been designed for ease and convenience of use. Z movement is 75 - 800 mm, depending on application. These translators provide greater linear travel than is available from the linear shifts.

**COMPRRESSED / EXTENDED LENGTH**

<table>
<thead>
<tr>
<th>Z range [mm]</th>
<th>Bellow ID39</th>
<th>Bellow ID65</th>
<th>Bellow ID102</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>DN 40/40CF</td>
<td>DN40/60CF</td>
<td>DN100/60CF</td>
</tr>
<tr>
<td>75</td>
<td>142 / 217</td>
<td>148.5 / 223.5</td>
<td>211 / 286</td>
</tr>
<tr>
<td>100</td>
<td>142 / 242</td>
<td>148.5 / 248.5</td>
<td>211 / 311</td>
</tr>
<tr>
<td>150</td>
<td>142 / 229</td>
<td>148.5 / 298.5</td>
<td>211 / 361</td>
</tr>
<tr>
<td>200</td>
<td>142 / 342</td>
<td>148.5 / 348.5</td>
<td>211 / 411</td>
</tr>
<tr>
<td>250</td>
<td>142 / 392</td>
<td>148.5 / 398.5</td>
<td>211 / 461</td>
</tr>
<tr>
<td>300</td>
<td>142 / 442</td>
<td>148.5 / 448.5</td>
<td>211 / 511</td>
</tr>
<tr>
<td>350</td>
<td>207 / 557</td>
<td>213.5 / 563.5</td>
<td>211 / 561</td>
</tr>
<tr>
<td>400</td>
<td>207 / 607</td>
<td>213.5 / 613.5</td>
<td>211 / 611</td>
</tr>
<tr>
<td>450</td>
<td>207 / 657</td>
<td>213.5 / 663.5</td>
<td>211 / 661</td>
</tr>
<tr>
<td>500</td>
<td>207 / 707</td>
<td>213.5 / 713.5</td>
<td>211 / 711</td>
</tr>
<tr>
<td>600</td>
<td>272 / 872</td>
<td>278.5 / 878.5</td>
<td>276 / 876</td>
</tr>
<tr>
<td>700</td>
<td>272 / 972</td>
<td>278.5 / 978.5</td>
<td>276 / 976</td>
</tr>
<tr>
<td>800</td>
<td>272 / 1072</td>
<td>278.5 / 1078.5</td>
<td>276 / 1076</td>
</tr>
</tbody>
</table>

**TECHNICAL DATA**

- **Standard base flange**: DN 40CF, DN 63CF or DN 100CF
- **Standard travelling flange**: DN 40CF, DN 63CF or DN 100CF
- **Z range**: 75 - 800 mm (standard, other on request)
- **Z motion control**: handwheel / stepper motor (option)
- **Resolution** (manual/motorised): 500 μm / standard 10 μm (1 μm on request)
- **Bakeout temperature**: up to 150 °C

**ADDITIONAL INFORMATION**

The Z slides are mostly used together with XY stages. After combining the Z slide with an XY stage we get the XYZ stage with three degrees of freedom. The Z slide can also be fitted with a stepper motor as required.
**DESCRIPTION**

The Z chain slide provides short strokes of Z travel with a wide range of bellows I.D. The slide is provided through three lead screws which are synchronously driven by a drive chain. Manual operation is provided by a handwheel assembly operating through a wormdrive reduction system.

**APPLICATION**

The Z chain slides are heavy duty translators designed to move heavy objects accurately in and out of the vacuum system. They are well suited to applications involving equipment insertion and withdrawal from points where space is restricted.

**COMPRESSED / EXTENDED LENGTH**

<table>
<thead>
<tr>
<th>Z range [mm]</th>
<th>Bellow ID102 DN 100/100CF</th>
<th>Bellow ID156 DN 160/160CF</th>
</tr>
</thead>
<tbody>
<tr>
<td>100</td>
<td>104.5</td>
<td>96</td>
</tr>
<tr>
<td></td>
<td>204.5</td>
<td>196</td>
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<tr>
<td>200</td>
<td>125</td>
<td>122.5</td>
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<td></td>
<td>325</td>
<td>322.5</td>
</tr>
<tr>
<td>300</td>
<td>141</td>
<td>150</td>
</tr>
<tr>
<td></td>
<td>441</td>
<td>450</td>
</tr>
</tbody>
</table>

**TECHNICAL DATA**

- **Base flange**: DN 100CF or DN 160CF *
- **Travelling flange**: DN 100CF or DN 160CF *
- **Z range**: 100 - 300 mm
- **Z motion control**: handwheel / stepper motor (option)
- **Resolution**
  - Manual/motorised: 50 μm / standard 10 μm (1 μm on request)
- **Bakeout temperature**: up to 150 °C

* other on request

**ADDITIONAL INFORMATION**

Z chain slides are often integrated with an XY stage. The unit is intended primarily for vertical operation with the load supported on the Z axis. For alternative orientations please contact our technical department. The Z chain slide can be motorised with the stepper motor shift.
LINEAR SHIFT

### DESCRIPTION

The linear shift is a UHV transfer mechanism that is fabricated from a pair of flanges, connected by an edge welded bellows. The free flange moves towards the fixed flange in a controlled, precise motion whilst maintaining parallelism. Its action is similar to the Z slide manipulator, but with slightly reduced travel length and overall positioning resolution. The standard mounting flange is DN 40CF or DN 63CF. The shift is actuated by a handwheel and can work in any orientation.

### APPLICATION

The linear shifts are used in applications that don’t require the higher precision and graduated movement of other linear motion devices. They are normally used for:
- manipulation of surface science tools with respect to the sample position
- manipulation of evaporation and sputter sources
- manipulation of electron and x-ray sources
- manipulation of quartz oscillators
- sample transfer applications

### TECHNICAL DATA

- **Base flange**: DN 40CF or DN 63CF
- **Travelling flange**: DN 40CF
- **Z range**: 25, 50, 75, 100 or 150 mm
- **Bellows ID**: 38.5 mm
- **Positional control**: handwheel / motorisation (option)
- **Resolution**: 1 mm
- **Repeatability**: 1 mm
- **Bakeout temperature**: up to 150 °C
- **Tilt range (LS with tilt)**: ± 4°

### ADDITIONAL INFORMATION

The linear shifts are designed for the linear movement of instruments with minimum tilt or wobble in the movement, maintaining precision alignment before and after pump-down.

### COMPRESSED / EXTENDED LENGTH

<table>
<thead>
<tr>
<th>Z range [mm]</th>
<th>Standard</th>
<th>High stability</th>
<th>with tilt</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>DN 40/40CF</td>
<td>DN 63/40CF</td>
<td>DN 40/40CF</td>
</tr>
<tr>
<td>25</td>
<td>45</td>
<td>47.5</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>70</td>
<td>72.5</td>
<td>-</td>
</tr>
<tr>
<td>50</td>
<td>51</td>
<td>55</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>101</td>
<td>105</td>
<td>-</td>
</tr>
<tr>
<td>75</td>
<td>53</td>
<td>60</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>128</td>
<td>135</td>
<td>-</td>
</tr>
<tr>
<td>100</td>
<td>65</td>
<td>69</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>165</td>
<td>169</td>
<td>-</td>
</tr>
<tr>
<td>150</td>
<td>-</td>
<td>80</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>-</td>
<td>230</td>
<td>-</td>
</tr>
</tbody>
</table>
**DESCRIPTION**

The differentially pumped rotary feedthrough provides 360° of continuous rotary freedom through the vacuum wall of a UHV system. The feedthrough has two stages of differential pumping isolated by graphite-impregnated, expanded viton seals on special sealing surfaces. A pre-loaded ball bearing set accurately controls the rotating stage position.

**APPLICATION**

The differentially pumped rotary feedthrough can be combined with manipulators and any other precision positioning devices.

**DIAMETER & DISTANCE BETWEEN FLANGES**

<table>
<thead>
<tr>
<th>Base flange</th>
<th>ID [mm]</th>
<th>distance L [mm]</th>
</tr>
</thead>
<tbody>
<tr>
<td>DN 40CF</td>
<td>41</td>
<td>37</td>
</tr>
<tr>
<td>DN 63CF</td>
<td>66</td>
<td>48.4</td>
</tr>
<tr>
<td>DN 100CF</td>
<td>103</td>
<td>47</td>
</tr>
<tr>
<td>DN 160CF</td>
<td>153.1</td>
<td>44</td>
</tr>
</tbody>
</table>

**TECHNICAL DATA**

- **Base flange**: DN 40CF, DN 63CF, DN 100CF, DN 160CF
- **R1 rotation control handwheel / stepper motor (option)**
- **Resolution (manual/motorised/external optical encoder)**: 1° / 0.1° / 0.05°
- **Bakeout temperature up to 150 °C**

**ADDITIONAL INFORMATION**

- The feedthroughs are equipped with worm drive providing fine angle adjustment. They are available with an anti-backlash stepper motor.
- Different motors or motor control systems available (stepper motors, servomotors, IcePAP).
**R2/R3 TILT MODULE** (combined with XY stage)

**DESCRIPTION**

The R2/R3 tilt module provides short inclination in relation to one of the orthogonal directions (X or Y axis) in the ± 3° range. Integration with XY stage (through a common bellows) is recommended for best motion range. Module geometry is customized in order to maintain the radius of rotation around the focus point and other customer requirements. The R2/R3 rotation can be motorised or manual.

**APPLICATION**

The R2/R3 tilt module has been designed to achieve the best angular resolution, thanks to a large radius of rotation. In addition, the rigid design allows attachment of heavy loads to the end-effector. Another advantage of this solution is the lack of mechanical parts on the vacuum side. The functionality can be extended by changing the arrangement of chosen modules (R2 tilt, R3 tilt, R1 rotation, XY stage, Z slide).

**TECHNICAL DATA**

- **Base flange**: DN 160CF
- **Travelling flange**: DN 100CF, DN 63CF
- **R3 range**: ± 3°
- **R3 motion control**: handwheel / stepper motor (option)
- **Resolution** (manual/motorised): 0.1° / 0.01°
- **Bakeout temperature**: up to 150 °C

**ADDITIONAL INFORMATION**

R2/R3 tilt modules are often integrated with an XY stage and Z chain slide (or Z slide). For alternative configuration, please contact our technical department.
XYZ MINI MANIPULATOR

**DESCRIPTION**

The XYZ mini manipulator is a precision, high rigidity UHV specimen translator having X, Y and Z motions. The standard mounting flange is DN 63CF and the standard travelling flange is DN 40CF. All three axes are merged in one miniature stage that delivers outstanding performance at exceptionally low prices. The translators can work in any orientation.

**APPLICATION**

The XYZ mini manipulator has been designed for ease and convenience of use. X and Y movement is ±12.5 mm, depending on the accessories that are fitted. Z movement is 75-250 mm, depending on the application.

**COMPRESSED / EXTENDED LENGTH**

<table>
<thead>
<tr>
<th>Z range [mm]</th>
<th>DN 40/40CF bellow ID39</th>
<th>DN 63/40CF bellow ID39</th>
<th>DN 100/40CF bellow ID39</th>
</tr>
</thead>
<tbody>
<tr>
<td>75</td>
<td>179</td>
<td>179</td>
<td>179</td>
</tr>
<tr>
<td></td>
<td>254</td>
<td>254</td>
<td>254</td>
</tr>
<tr>
<td>100</td>
<td></td>
<td>179.5</td>
<td>179.5</td>
</tr>
<tr>
<td></td>
<td></td>
<td>279.5</td>
<td>279.5</td>
</tr>
</tbody>
</table>

**TECHNICAL DATA**

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Base flange</strong></td>
<td>DN 63CF or DN 100CF</td>
</tr>
<tr>
<td><strong>Travelling flange</strong></td>
<td>DN 40CF</td>
</tr>
<tr>
<td><strong>XY range</strong></td>
<td>±12.5 mm</td>
</tr>
<tr>
<td><strong>XY resolution</strong></td>
<td>5 μm</td>
</tr>
<tr>
<td><strong>Z range</strong></td>
<td>75 - 100 mm</td>
</tr>
<tr>
<td><strong>Z resolution</strong></td>
<td>0.5 mm</td>
</tr>
<tr>
<td><strong>Bakeout temperature</strong></td>
<td>up to 150 °C</td>
</tr>
</tbody>
</table>

**ADDITIONAL INFORMATION**

Only the Z movement can be motorised.

**XY MINI STAGE**

Mini Stage for XY axes translations is available as well.

**XY Mini STAGE**

- XY range: ±/− 6mm
- DN 63/40CF
0 axis STAGE / 1-3 axes MANIPULATOR

0 axis STAGE

The 0-axis stage is the most appropriate and economical choice when sample heating and cooling is required without any form of manipulation/rotation etc. It has additional uses such as e.g. a temporary storage or static preparation table when combined with a wobble stick.

- for flag style sample holder
- heating up to 2000 °C
- DN 63CF mounting flange

0 axis STAGE

- for PTS sample holder
- heating*
- DN 63CF mounting flange

HEATING & COOLING OPTION

PTS and flag style range of sample holders dock with the receiving station on each manipulator. Samples are either resistively or electron-beam or direct current heated, depending upon the requirement. They are cooled by using a manipulator mounted cryostat through which liquid nitrogen (LN2) or liquid helium (LHe) flows.

1 axis MANIPULATOR

- Z range 220 mm
- for PTS sample holders
- DN 100CF mounting flange
- heating & cooling*

1-3 axes MANIPULATOR

According to the precise individual needs of the client, we can design and provide a wide range of customised UHV manipulators. The manipulators can move sample in any of three orthogonal axes XYZ. Additional rotational movements around these axes (R1, R2, R3) can be achieved using add-on rotary devices. To achieve the highest positioning accuracy, resolution and repeatability, the XYZ manipulator and rotary drive movements can be motorised. Manipulators can work in any orientation.

- R1 axis rotation ± 175°
- for PTS sample holders
- DN 100CF mounting flange
- heating & cooling*

2 axes MANIPULATOR

- Z range ± 50 mm
- R1 axis rotation ± 180°
- for PTS sample holders
- DN 100CF mounting flange
- heating & cooling*

3 axes MANIPULATOR

- XY range ± 12.5 mm
- R1 axis rotation ± 175°
- for PTS sample holders
- DN 160CF mounting flange
- heating & cooling*

* range dependent upon specific PTS sample holder type.
4-5* axes UNIVERSAL MANIPULATOR

**DESCRIPTION**

The 4-5 axes manipulator with X, Y, Z, R1, R2 axes motorised is a high precision, high rigidity, UHV specimen manipulator of modular construction. The modular construction means that the specification can be upgraded or modified by the addition or replacement of well defined modules. All axes of the manipulator are motorised by stepper motors or servomotors. The X, Y and Z axes may also be operated manually as required. The standard mounting flange is DN 100CF or DN 160CF. The 4-5 axes manipulator is a combination of XY stage, Z slide and rotation stages.

**OPTION**

- Full motorisation
- Full software control
- Temperature stabilisation
- Heating option: direct, resistive or EB
- Heaters suitable for reactive gases (resistive heating)

* 6 axes manipulator for PTS sample holders on request.
**TECHNICAL DATA**

- **Standard base flange**: DN 100CF or DN 160CF
- **Pressure range**: 1 bar to $10^{-11}$ mbar
- **Heating method**: resistive, EB, direct
- **Cooling method**: LN$_2$
- **XY range**: $\pm 12.5$ mm
  - positional control: micrometer/motorised*
  - resolution (manual/motorised): 5 μm / 1 μm
- **Z range**: 75-800 mm [other on request]
  - positional control: handwheel/motorised*
  - resolution (manual/motorised): 500 μm / standard 10 μm (1 μm on request)
- **R1 range**: $\pm 175^\circ$
  - positional control: rotary feedthrough/motorised*
  - resolution (motorised): 0.1°
- **R2 range**: 360° continuous / $\pm 90^\circ$
  - positional control: motorised
  - resolution (motorised): 0.1°
- **Bakeout temperature**: up to 150 °C

* stepper motor or servomotor - depend on application. Manipulator can be prepared for customer motors or drivers - on request.

**RECEIVING STATIONS**

- for **standard PTS** sample holder (5-axes manipulator)
- for **flag style** sample holder (5-axes manipulator)
- for **plate style** sample holder (5-axes manipulator)
- for **flag style** sample holders with optional quartz balance (4-axes manipulator)

**ADDITIONAL INFORMATION**

The multi-axes manipulators are configured with a sample receiving station that can accept one of the PTS range of sample holders. The station is equipped with 6 electrical contacts (2 x thermocouple type K, C or E; 2 x sample bias up to 1000V, 2 x heating current up to 20A) and sapphire ball cooling contact for liquid nitrogen cooling. The manipulator includes all of the necessary electrical, gas and mechanical feedthroughs together with stepper motor and stepper motor driver for the XY, Z, R1 and R2 axes.

*4 AXES MANIPULATOR*  *5 AXES MANIPULATOR*
**DESCRIPTION**

The manipulator is a high precision, high rigidity, UHV specimen manipulator of modular construction, suitable for a range of X, Y and Z linear motions and R1, R2 and R3 rotations. The modular construction means that the specification can be upgraded or modified by the addition to replacement of well defined modules.

**OPTION**

- Full motorisation
- Full software control
- Helium recovery system
- Possibility to mount an angular device for PES calibration
- Temperature stabilisation
- Heating option: direct, resistive or EB
**TECHNICAL DATA**

- **Standard base flange**: DN 100CF or DN 160CF
- **Pressure range**: down to $10^{-11}$ mbar
- **Heating methods**: resistive, EB, direct
- **Cooling method**: LHe
- **XY range**: ± 12.5 mm
  - **Positional control**: micrometer/motorised*
  - **Resolution (manual/motorised)**: 5 μm / 1 μm
- **Z range**: up to 600 mm
  - **Positional control**: handwheel/motorised*
  - **Resolution (manual/motorised)**: 1 mm / standard 10 μm
    - (1 μm on request)
- **R1 range**: ± 180° or ± 360°
  - **Positional control**: rotary feedthrough/motorised*
  - **Resolution (motorised)**: 0.1°
- **R2 range**: 360° continuous
  - **Positional control**: motorised*
  - **Resolution (motorised)**: 0.1°
- **R3 range**: -20° to +40°
  - **Positional control**: rotary feedthrough/motorised*
  - **Resolution (motorised)**: 0.1°
- **Bakeout temperature**: up to 150 °C

* stepper motor or servomotor - depend on application.
* Manipulator can be prepared for customer motors or drivers - on request.

**RECEIVING STATION**

- **for flag style sample holder**

**HEATING & COOLING METHODS**

- Sample temperature depend on sample holder type.
- **Direct heating with 10 A**
- **Resistive heating up to 1100 °C**
- **EB heating up to 1400 °C**

- **Liquid helium cooling**:
  - 4 axes manipulator **down to 4 K**
  - 5 axes manipulator **down to 4.8 K / 10 K**
  - 6 axes manipulator **down to 7 K / 15 K**

* parameters achieved without heating option and temp. stabilisation.
** parameters achieved with heating option.
**4-6 axes HELIUM MANIPULATOR CLOSED CYCLE**

**DESCRIPTION**

The manipulator with helium cryostat is a versatile, closed cycle system that has many applications in ultra high vacuum research. The manipulator can be configured with Z slide, XY stage or differentially pumped rotary feedthrough. The modular construction means that the specification can be upgraded or modified by the addition or replacement of well defined modules. The standard mounting flange is DN 100CF. The system typically includes a compressor, high pressure hoses, expander, temperature controller, heater and sensor.

**OPTIONS**

- Full motorisation
- Full software control
- Helium recovery system
- Possibility to mount an angular device for PES calibration
- Additional electrical contacts for silicon sample direct heating
- Low vibration cryostat
- Temperature stabilisation
- Heating option: direct, resistive or EB
### TECHNICAL DATA

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Standard base flange</td>
<td>DN 100CF or DN 160CF</td>
</tr>
<tr>
<td>Pressure range</td>
<td>1 bar to $10^{-11}$ mbar</td>
</tr>
<tr>
<td>Heating methods</td>
<td>resistive, EB, direct</td>
</tr>
<tr>
<td>Cooling method</td>
<td>LHe</td>
</tr>
<tr>
<td>XY range</td>
<td>± 12.5 mm*</td>
</tr>
<tr>
<td>positional control</td>
<td>micrometer/motorised**</td>
</tr>
<tr>
<td>resolution (manual/motorised)</td>
<td>5 μm / 1 μm</td>
</tr>
<tr>
<td>Z range</td>
<td>up to 300 mm</td>
</tr>
<tr>
<td>positional control</td>
<td>handwheel/motorised**</td>
</tr>
<tr>
<td>resolution (motorised)</td>
<td>50 μm / standard 10 μm (1 μm on request)</td>
</tr>
<tr>
<td>R1 range</td>
<td>± 180°</td>
</tr>
<tr>
<td>positional control</td>
<td>rotary feedthrough/motorised**</td>
</tr>
<tr>
<td>resolution (motorised)</td>
<td>0.1°</td>
</tr>
<tr>
<td>R2 range</td>
<td>360° continuous</td>
</tr>
<tr>
<td>positional control</td>
<td>motorised**</td>
</tr>
<tr>
<td>resolution (motorised)</td>
<td>0.1°</td>
</tr>
<tr>
<td>R3 range</td>
<td>- 20° to +40°</td>
</tr>
<tr>
<td>positional control</td>
<td>rotary feedthrough/motorised**</td>
</tr>
<tr>
<td>resolution (motorised)</td>
<td>0.1°</td>
</tr>
<tr>
<td>Bakeout temperature</td>
<td>up to 150 ºC</td>
</tr>
</tbody>
</table>

* for base flange DN 160CF
** stepper motor or servomotor - depend on application. Manipulator can be prepared for customer motors or drivers - on request.

### RECEIVING STATION

For *flag style* sample holders, with second heating stage.

### HEATING & COOLING METHODS

Sample temperature depend on sample holder type.

- **Direct heating with 10 A**
- **Resistive heating (on request)**
- **EB heating up to 1000 ºC** (second heating stage)
- **Liquid helium cooling:**
  - *below 10 K* (5-axes manipulator)*

* parameters achieved without stabilisation and without heating option.

---

*example drawing*
**DESCRIPTION**

The 1-2 axes motorised MBE manipulator is a high precision, high rigidity, UHV specimen manipulator of modular construction, suitable for a range of R1 motorised continuous substrate rotation and Z translation. It is prepared to heat the substrate up to 1400°C (EB heating, UHV conditions) with accuracy +/- 1°C. The station includes the substrate (standard up to 6 inch sample holder) positioner and allows precise angular position of substrate in relation to linear shutter.

**OPTIONS**

- H₂O shroud
- LN₂ or H₂O cooling
- side or integrated wedge shutter (possible with H₂O cooling option)
- XY movement stage
- shutter on/off

---

**Example Drawing**

![Example Drawing](image_url)
**APPLICATION**

The 1-2 axes motorised MBE manipulator is designed for MBE applications under ultra-high vacuum conditions. Heating is performed by resistive or EB methods. The manipulator can work in the vertical orientation.

**TECHNICAL DATA**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Standard base flange</td>
<td>DN 100CF to DN 300CF (depending on the sample size, other on request)</td>
</tr>
<tr>
<td>Base pressure range</td>
<td>$10^{-11}$ mbar</td>
</tr>
<tr>
<td>Shutter</td>
<td>integrated or external, pneumatic or manual</td>
</tr>
<tr>
<td>Heating methods</td>
<td>resistive, EB</td>
</tr>
<tr>
<td>Substrate temperature</td>
<td>up to 1200 °C (resistive)</td>
</tr>
<tr>
<td></td>
<td>up to 1400 °C (EB)</td>
</tr>
<tr>
<td>Cooling method</td>
<td>LN$_2$, H$_2$O</td>
</tr>
<tr>
<td>Z range</td>
<td>50 mm (other on request)</td>
</tr>
<tr>
<td>positional control</td>
<td>handwheel/motorised*</td>
</tr>
<tr>
<td>resolution (manual/motorised)</td>
<td>500 μm/standard 10 μm</td>
</tr>
<tr>
<td>R1 range</td>
<td>360° continuous</td>
</tr>
<tr>
<td>positional control</td>
<td>motorised*</td>
</tr>
<tr>
<td>XY range (option)</td>
<td>± 12.5 mm</td>
</tr>
<tr>
<td>positional control</td>
<td>micrometer/motorised*</td>
</tr>
<tr>
<td>resolution (manual/motorised)</td>
<td>5 μm/1 μm</td>
</tr>
<tr>
<td>Max speed</td>
<td>up to 60 rpm</td>
</tr>
<tr>
<td>Bakeout temperature</td>
<td>up to 150 °C / 200 °C (on request)</td>
</tr>
</tbody>
</table>

* stepper motor or servomotor - depend on application. Manipulator can be prepared for customer motors or drivers - on request.

**RECEIVING STATIONS**

- for 4-holes plate style sample holder
- for 4-holes plate style sample holder, with LN$_2$ cooling stage

**HEATER MATERIALS**

- **Graphite** flexible (stable in form), minimal outgassing at the high temperatures, oxidation resistant below 500°C
- **Graphite + PBN coating** flexible (stable in form), minimal outgassing at the high temperatures, oxidation resistant below 800°C (depends on partial pressure of oxygen)
- **Graphite + SiC coating** hard, light and stable in form, oxidation resistant below 1400°C
- **SiC solid (β)** extremely hard, light and stable in form, low thermal expansion, durable to mechanical and electrical shocking, excellent resistance to reactive gases/oxidation

**MANIPULATOR FOR MBE APPLICATION**

- sample holders: generally plate style
- prepared for reaching high temperature
- base pressure: $10^{-11}$ mbar
**DESCRIPTION**

The 1-4 axes motorised manipulator is a high rigidity, UHV specimen manipulator of modular construction, suitable for a range of R1 motorised continuous substrate rotation and Z translation (additionally can be equipped with XY movement module). It is prepared to heat the substrate up to 1000°C with accuracy +/- 1°C. The station includes the substrate (standard up to 6 inch sample holder) positioner and allows precise angular position of substrate in relation to linear shutter.

**OPTIONS**

- H₂O cooling
- side or integrated wedge shutter
- XY movement stage
- BIAS, DC, RF

---

**Example drawing**

- R1 drive
- shutter drive
- Z slide
- handwheel Z
- base flange
- shutter
- custom
- Z range
- 227
- 356
- 29.5

---
TECHNICAL DATA

<table>
<thead>
<tr>
<th>Standard base flange</th>
<th>DN 100CF, DN 160CF or DN 200CF</th>
</tr>
</thead>
<tbody>
<tr>
<td>Base pressure range</td>
<td>10^-10 mbar</td>
</tr>
<tr>
<td>Shutter</td>
<td>integrated or external, pneumatic or manual</td>
</tr>
<tr>
<td>Heating methods</td>
<td>resistive, direct</td>
</tr>
<tr>
<td>Substrate temperature</td>
<td>up to 1000 °C</td>
</tr>
<tr>
<td>Cooling method</td>
<td>H_2O</td>
</tr>
<tr>
<td>Z range</td>
<td>50 mm (other on request)</td>
</tr>
<tr>
<td>positional control</td>
<td>handwheel / motorised*</td>
</tr>
<tr>
<td>resolution</td>
<td>500 μm / standard 10 μm</td>
</tr>
<tr>
<td>(manual/motorised)</td>
<td>(1 μm on request)</td>
</tr>
<tr>
<td>R1 range</td>
<td>360° continuous</td>
</tr>
<tr>
<td>positional control</td>
<td>motorised*</td>
</tr>
<tr>
<td>XY range (option)</td>
<td>± 12.5 mm</td>
</tr>
<tr>
<td>positional control</td>
<td>micrometer/motorised*</td>
</tr>
<tr>
<td>resolution</td>
<td>5 μm / 1 μm</td>
</tr>
<tr>
<td>(manual/motorised)</td>
<td></td>
</tr>
<tr>
<td>Max speed</td>
<td>up to 60 rpm (other on request)</td>
</tr>
<tr>
<td>Bakeout temperature</td>
<td>up to 150 °C</td>
</tr>
</tbody>
</table>

* stepper motor or servomotor - depend on application.
Manipulator can be prepared for customer motors or drivers - on request.

APPLICATION

The 1-4 axes motorized sputtering manipulator is designed for sputter deposition applications under ultra-high vacuum conditions, and for reactive sputtering. Heating is performed by resistive or direct method. The manipulator can work in the vertical orientation.

RECEIVING STATIONS

Double stage receiving station for confocal/planar magnetron configuration in the process chamber.

HEATER MATERIALS

The heater material is optimally adapted depending on the customer's requirements and the specific conditions of the deposition process (e.g., heating temperature, presence of reactive gases). Exemplary heaters: thermocoax, graphite coated with SiC, SiC solid (β).

MANIPULATOR FOR SPUTTERING APPLICATION

- sample holders: plate style, PTS
- base pressure: 10^-10 mbar (working pressure: ~10^-2 mbar)
### 1-4 axes PLD TARGET MANIPULATOR

#### DESCRIPTION

The 1-4 axes motorised PLD target manipulator is a high precision, high rigidity, UHV specimen manipulator with revolver mechanism up to 6 target holders. The target manipulator has two axes of rotation - R1 and R2: by changing the position of R1, different targets are selected. The R2 axis has a continuous rotation around its own axis. The manipulator has additional hole/position (between two targets) to accommodate a laser power meter. The XY motion module allows scanning of the target via laser beam. One axis is motorised - for scanning, second is manual - for adjusting. Additional Z axis is used to set up transfer position for target transferring via Load Lock Chamber. The Z movement can be motorised or manual. Computer controls the target rotation and radial scanning over the complete target diameter (fixed laser beam) for making multi-layer deposition with maximum target usage.

#### ADDITIONAL INFORMATION

- possibility of fixing targets with irregular shapes,
- target sizes: 1”, 2”, standard target thickness: 0.5 - 10 mm,
- continuous, individual rotation of targets,
- select and sequence change of targets,
- shield against mutual pollution of targets,
- radial scan, automatic control,
- target is mounted coaxially (relative to the substrate) and positioned so as to eliminate the likelihood of droplets, clusters settling on the substrate and the effects of possible target peeling,
- target holders are transferable to the load-lock chamber (or storage) for quick replacement,
- water cooling system.

#### APPLICATION

The 1-4 axes motorised PLD target manipulator is designed for pulsed laser deposition applications under ultra-high vacuum conditions. The manipulator can work in vertical or horizontal orientation, depends on PLD process geometry.
4-axes, 6-position target manipulator
for vertical PLD process geometry

- two manipulators: for substrate and target
- substrate holders: plate style, PTS, flag style
- base pressure: $10^{-10}$ mbar

**TECHNICAL DATA**
- Standard base flange: DN 100CF or DN 200CF
- Base pressure range: $10^{-10}$ mbar
- Shutter: integrated, pneumatic
- Cooling method: H₂O
- R2 range: 360° continuous
- Positional control: motorised*
- Resolution (motorised): 0.1°
- Z range: 50 mm (other on request)
- Positional control: handwheel
- Resolution: 500 μm / standard 10 μm (1 μm on request)
- XY range: ± 12.5 mm
- Positional control: micrometer/motorised*
- Resolution: 5 μm / 1 μm
- Max speed: up to 50 rpm (other on request)
- Bakeout temperature: up to 150 °C

* stepper motor or servomotor - depend on application. Manipulator can be prepared for customer motors or drives - on request.

**MANIPULATORS FOR PLD APPLICATION**
- 4-axes, 6-position target manipulator for vertical PLD process geometry
- Side mounting design
- Bottom mounting design

Example drawing
**BEAMLINE MANIPULATORS**

**MIRROR / GRATINGS SYSTEM**
Vacuum mirror chambers are situated along the synchrotron beam line. Mirrors are located inside the chamber and mounted on a vibration isolated special holder which is moved using a multi-axis manipulator in order to determine the correct direction of the beam.

**MIRROR MANIPULATOR KINEMATIC DATA**
Example for cylindrical focusing mirror

<table>
<thead>
<tr>
<th>Axis</th>
<th>Range</th>
<th>Resolution</th>
</tr>
</thead>
<tbody>
<tr>
<td>X</td>
<td>± 10 mm</td>
<td>≤ 10 μm</td>
</tr>
<tr>
<td>Z</td>
<td>± 10 mm</td>
<td>≤ 10 μm</td>
</tr>
<tr>
<td>(X')</td>
<td>± 10 mRad</td>
<td>≤ 0.5 μRad</td>
</tr>
<tr>
<td>(Y')</td>
<td>± 10 mRad</td>
<td>≤ 0.5 μRad</td>
</tr>
<tr>
<td>Z'</td>
<td>± 10 mRad</td>
<td>≤ 0.5 μRad</td>
</tr>
<tr>
<td>Z''</td>
<td>± 15 mm</td>
<td>≤ 10 μm</td>
</tr>
</tbody>
</table>

**SLIT UNIT**
Horizontal and vertical shutters, positioned inside the vacuum chamber, are translated via a single axis manipulator in order to adjust the shape of cross-sectional area of the beam. All manipulators are motorised and software controlled. Shutters are available with or without water cooling. Surfaces can be coated with a fluorescent material. Different material and shapes available according to requirements.

**SLIT UNIT MANIPULATORS KINEMATIC DATA**

<table>
<thead>
<tr>
<th>Manipulator</th>
<th>Axis</th>
<th>Range</th>
<th>Resolution</th>
</tr>
</thead>
<tbody>
<tr>
<td>Photodiode</td>
<td>(Z)</td>
<td>± 25 mm</td>
<td>≤ 10 μm</td>
</tr>
<tr>
<td>HES shutter</td>
<td>(Z)</td>
<td>± 6 mm</td>
<td>≤ 0.5 μm</td>
</tr>
<tr>
<td>VES shutter</td>
<td>(Z)</td>
<td>± 0.5 mm</td>
<td>≤ 0.5 μm</td>
</tr>
<tr>
<td>Chamber shift along the beamline</td>
<td>(Z)</td>
<td>± 100 mm</td>
<td>≤ 50 μm</td>
</tr>
</tbody>
</table>

**VERTICAL WEDGE STAGE**
Very rigid vertical axis stage for e.g. positioning the grating chamber. \(Z\) stroke ± 10 mm, resolution 5 μm, motorised.
SPECIAL MANIPULATORS | GONIOMETERS

**GONIOMETERS**

The precision, 2-axes goniometer stage is designed specifically for anti-clash and sample access. Both axes are fitted with vernier readouts of 0.1° precision. Full 360° R1 rotation in the horizontal plane (with no sources hindering the movement), 90° R2 rotation from vertically upward pointing to horizontal. Stepper motor controller with external panel and computer interface.

The goniometer’s head permits precision sample positioning and alignment motion at the sample location. Installation of a goniometer head enables rotations, translations and flip movements with various accuracies. Sample faces can be held on axis, allowing a single sample site to be investigated during a change of angle. The goniometer is fabricated entirely from UHV compatible materials, has anti-backlash spring-loaded gearing, and can also be fitted with heating, cooling and sample transfer options.

**HIGH PRESSURE CELL MANIPULATOR**

Specially designed 3-axes high pressure cell manipulator with IR laser heating possibility (double Z axes: one for gas cell proper placement and second for high precise sample positioning). For easy disconnection from the gas cell chamber, the manipulator is mounted on the rails.

HP cell manipulator design allows for sample heating by IR laser illumination (the sample temperature over 800 °C is reachable within the cell), resistive heating (up to 700 °C) and LN₂ cooling.

**MULTI-AXES SPECIAL DESIGN MANIPULATORS**

The multi-axes (X,Y,Z1,Z2,R1,R2,R3) motorised manipulator is designed for precision positioning of sample holders under ultra high vacuum conditions. Reasearch table can travel along the XYZ axes, rotate around Z axis, as well as tilt in relation to two orthogonal directions in the +/- 3° range. The second Z movement is possible for additional precise sample positioning while experiment. It is equipped with temperature monitoring system. These manipulators are configured with an inclinometer as standard.
**SPECIAL MANIPULATORS**

**TRIBOMETER MANIPULATORS**
Specially designed 1-2 axis manipulators for study tribological properties between two surfaces in UHV or ambient pressure conditions. Manipulators are prepared for positioning holders for flat and ball samples (up to 1/2”), with heating and LN₂ cooling possibility. They allow applying load from 1 to 10 N (with closed loop control).

**DRIPPER/MANIPULATOR FOR SPIN COATING**
Spin coating manipulators are used to deposit metal thin films, polymer coating, organic thin films and others. An excess amount of the solution is placed by heated dripper on the substrate. The substrate manipulator is then rotating at high speed. The solvent is usually volatile and evaporates when rotating under vacuum, leaving a uniform thin film on the substrate. The deposited films have thicknesses ranging from a few nanometers up to hundreds of nanometers.

**UHV MULTI-AXES SET FOR SURFACE CONTACT EXPERIMENTS**
Custom designed, full-motorised, double stage manipulator for PTS sample holders. Stage stacks (top and bottom) allow frequent movements within its full travel range: X-axis up to 508 mm, Y-axis up to 200 mm, Z-axis: 26 mm, 360° rotation (top stage), ±5° tip & tilt (bottom stage). Receiving stations are prepared for heating and thermal measurements, complete with all electrical and mechanical feed-throughs and connections. Manipulator design also enables measurement of vertical force applied to the sample.

**MANIPULATORS FOR LIQUID EXPERIMENTS**
Specially designed manipulators for conducting electro-chemical experiments in pressures up to 25 mbar. Manipulators have exchangeable vacuum parts with receiving station, depending on the experiment, e.g. 3-axes manipulator for ultrasonic jet with LN₂ catcher; for electrodes with glass beaker.
**DESCRIPTION**

The Wobble Stick allows the transmission of relatively simple hand movements through the vacuum wall. The flexible bellows provide a cone of movement as well as a limited degree of linear movement at the end of the wobble stick. Standard mounting flange is DN 40CF.

**with CLEAVER**

The Wobble Stick with Cleaver is a 3-axis manipulator dedicated to cut the sample in UHV chambers. It has interchangeable knives, fixed with four screws M3 and pressed using plates.

<table>
<thead>
<tr>
<th>Mounting flange</th>
<th>DN 63CF (other on request)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Z travel</td>
<td>130 mm</td>
</tr>
<tr>
<td>R2 angular range</td>
<td>± 7°</td>
</tr>
<tr>
<td>R3 angular range</td>
<td>± 7°</td>
</tr>
<tr>
<td>Blade width</td>
<td>12 mm</td>
</tr>
<tr>
<td>Bakeout temperature</td>
<td>up to 150 °C</td>
</tr>
</tbody>
</table>

**with ROTATING TIP**

The Wobble Stick with Rotating Tip is used mainly to operate in vacuum mechanisms such as shutters, adjustment probes and variable orifices. Non magnetic vacuum parts.

<table>
<thead>
<tr>
<th>Mounting flange</th>
<th>DN 40CF</th>
</tr>
</thead>
<tbody>
<tr>
<td>Z travel</td>
<td>100 mm</td>
</tr>
<tr>
<td>Angular range</td>
<td>± 17°</td>
</tr>
<tr>
<td>Rotation</td>
<td>360°</td>
</tr>
<tr>
<td>Bakeout temperature</td>
<td>up to 150 °C</td>
</tr>
</tbody>
</table>

**with GRIPPING ARMS**

The Wobble Stick with Gripping Arms is generally used to grip and lift samples (15x10x1 mm) with a flat surface. Custom shaft length and Z travel ranges are available on request.

<table>
<thead>
<tr>
<th>Mounting flange</th>
<th>DN 40CF</th>
</tr>
</thead>
<tbody>
<tr>
<td>Z travel</td>
<td>10 mm</td>
</tr>
<tr>
<td>Angular range</td>
<td>± 10°</td>
</tr>
<tr>
<td>Bakeout temperature</td>
<td>up to 150 °C</td>
</tr>
</tbody>
</table>
LOAD LOCK

**DESCRIPTION**

Load lock chambers provide a fast and clean method of introducing samples into UHV systems. The load lock chamber mechanisms combine with our range of load lock chambers to provide the most versatile sample loading conditions at various positions on the UHV system.

**ADDITIONAL INFORMATION**

Load locks may be positioned at various places on the UHV system, such as direct connection to the radial distribution chamber, linear transfer line or glovebox. Our standard range of load lock chambers are suitable for most positions and most applications but we will also be happy to fabricate to your individual specifications.

STORAGE

**DESCRIPTION**

The storage chambers allow storage of up to 10 sample holders under UHV conditions. The storage chamber mechanism combines with our range of storage chambers.

* direct/resistive heating option for 6 pcs holders

**SPECIFICATION**

Storage chambers are usually pumped via the distribution chamber pump set (independent pumping is also possible if requested) and may be equipped with options for cooling or heating. The heating and cooling facilities apply to the sample that is in the load position and depend upon the individual sample holder specifications. The chambers are equipped with UHV connecting flanges and additional ports for future versatility.
**DESCRIPTION**

The HEAT3-PS is used for resistive heating or electron bombardment heating. The power supply can also be used for effusion cell evaporators. The unit is equipped with a PID temperature controller. Ramp heating function controls sample temperature to protect samples from damage. Sample overheating can also be protected by setting the voltage and current limits. The unit can be operated in auto mode (with temperature control) or manual mode (without temperature control). The unit is equipped with autosave function (the device saves your parameters, preset and applies them automatically after restart).

**FEATURES**

- **Dual heating mode**: resistive and electron bombardment
- **Wide range temperature measurement** (1.4 - 2473.15 K)
- **2D real time chart module**
- **High efficiency**
- **Setpoint based over-voltage and over-current protection**
- **Fully manual or PID temperature controlled (by setpoint and ramp)**
- **Process temperature control with built-in PID controller (with autotuning function for optimized process PID parameters)**
- **Various kind of temperature sensors**: thermocouples K/C/E/N (other on request), Pt, diode
- **Multiple I/O (10 digital/4 analog)** - individual reprogrammable
- **High resolution**: 16-bit analog I/O, 0.1 K temp.
- **One vacuum channel for active gauges**
- **Shutter control function** - up to 2* shutters (e.g. shutters of sources or manipulators)
- **Mobile solutions for remote access and control**
- **Customised menu options** (for robust and effective)
- **Support**: (easy firmware update via USB)

* for double DC module version, 1 shutter per channel

**TECHNICAL DATA**

- **Supply voltage**: 100-130VAC/200-260 VAC, 50-60Hz (power consumption max 1600 W)
- **Resistive heating mode parameters**: 45 V, 17 A - standard; other versions on request
- **EB heating mode parameters**: 1000 V, 300 mA - standard; other versions on request
- **Temperature range**
  - 273.15 K - 2473.15 K for type C thermocouple (dependent on sample holder type or evaporator)
  - 73.15 K - 1645.15 K for type K thermocouple
  - 1.4 K - 500 K for D1670/D1470 silicon diodes (dependent on sample holder type and conditions in chamber)
- **Temperature independent inputs**
  - 2 - for thermocouples K/C/E/N
  - 2 - for silicon diodes D1670/D1470
- **Temperature setpoint ramp rate**
  - adjustable from 0.1 K to 1000 K/s/min
- **ΔT setpoint**
  - 0.1 to 5.0 K/s
- **Vacuum measurement** (optional)
- **Communication interface**: RS232/485, Ethernet
- **Communication protocol**: MODBUS-TCP
- **User interface**: 7" TFT display with touchscreen, digital encoder
- **Interface languages**: English, German, Polish
- **Dimensions**: 448.8 × 132.5 × 375 mm (W×H×D), 19" rack mountable
- **Weight (approx.)**: 8.8 kg (for standard version)

**OPTIONS**

- **Second DC module** available: two resistive heating zones with independent control, or one resistive heating zone with higher output power (90V, 17A or 45V, 30A)
- **Analog I/O card for vacuum measurement** (1 gauge)

**APPLICATION**

- Any thermal process according to the specifications
- Effusion cells supply
- Sample holder heating
- Thermal monitoring
MANIPULATORS & TRANSFERRING SYSTEMS

SOFTWARE APPLICATIONS FOR AUTOMATION AND CONTROLLING

**DESCRIPTION**

Manipulation and transferring systems can be fully software controlled and automated using PREVAC’s electronics and dedicated software which have been developed in-house based on the latest innovation solutions combined with our unique vacuum experience.

**SYNTHESIS**

Synthesium is an innovative software tool optimized for easy and complete control over the entire deposition process and all components in the system.

It contains a convenient and intuitive graphical user interface and allows to operate system in two general modes:
- Manual control of all system elements
- Automated control by predefined recipes

Synthesium software is based on Tango technology and is extremely easy to extend with new hardware. All recipes and new hardware modifications can be done by using open-source tools or in python script. The vacuum deposition system is controlled by industrial standard PC with installed MySQL Database for all data. Synthesium can be installed and operated offline on a separate PC in system simulation mode. This is very useful when the user wants to prepare and test recipes.

- Status of elements like pumps, valves, sources, substrate etc. is represented by graphical modules that are coloured and animated
- Possibility to adjust parameters of all system components (MFC, valves, pumps, gauges, power supplies etc.)
- Possibility to create automatic process of sequences, including loops, subrecipes (macros), calibrations, pauses and many more
- Recipes can be extended with new subrecipes (macros) of any process within python script
- Recipes can be defined in Recipe Editor (XManager) by drag&drop operation or by loading from text file
- Password protected access rights using 1 of 9 levels (e.g. engineer, scientist, operator)
- Process data can be stored in archiver based on MySQL database
- Generation of text protocol files with all needed process information
- Remote access by VNC protocol

**SPECTRUM**

Spectrum is a control and data acquisition software dedicated to EA1S class analysers.

Spectrum, based on the latest developments in techniques and signal processing, is a progressive and optimized software tool for data acquisition and analytical instruments controlling, with very intuitive graphical interface.

Spectrum offers the possibility to define single independent regions as well as grouping them in sequences. Also nesting sequences in major sequences is supported. Measurements can be done in Fixed and Scan mode and in both cases while processing, measurement tools and FWHM display are available. In addition, not only a real-time view of the detector image in 3D as well as energy graph, but also a graph of the 2D detector image and the possibility to filter a chosen intensity range are at the user’s disposal. Intensity graph is shown along geometry axis. In order to guarantee compatibility to existing software, data export to TXT, HDF5 and CasaXPS is available by default.

- Imaging, mapping & depth profiling - Spectrum is offering a package of pre-defined macros for easy experimental setup of these techniques
- Components control - software control of X-ray source, UV source, flood source, Ion source and manipulator
- Interactive scan control - software design has been optimized for more efficient workflow, resulting in a streamlined and simpler design. The control module is interactive and dynamic allowing adaptation of parameters to customer’s needs
- High quality spectra - user can use the Spectrium software for many experimental techniques for any research. It can measure high quality spectra
- Direct export to CasaXPS - possibility to directly export whole recipe data to CasaXPS with one click
- Integration with TANGO and other control systems
- Integration with LabView examples
- Configurable device window
- Multiple views
- Saving user window configuration
- Advance Access Levels Management - provide limited access to particular features for analyzer’s setup and control for specified user groups according to their knowledge
- Multiple detector support - the software is able to acquire data from MCP/CCD, Channeltron and Delayline type detectors

**SYNTHESIUM**

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- Manual control of all system elements
- Automated control by predefined recipes

Synthesium software is based on Tango technology and is extremely easy to extend with new hardware. All recipes and new hardware modifications can be done by using open-source tools or in python script. The vacuum deposition system is controlled by industrial standard PC with installed MySQL Database for all data. Synthesium can be installed and operated offline on a separate PC in system simulation mode. This is very useful when the user wants to prepare and test recipes.

- Status of elements like pumps, valves, sources, substrate etc. is represented by graphical modules that are coloured and animated
- Possibility to adjust parameters of all system components (MFC, valves, pumps, gauges, power supplies etc.)
- Possibility to create automatic process of sequences, including loops, subrecipes (macros), calibrations, pauses and many more
- Recipes can be extended with new subrecipes (macros) of any process within python script
- Recipes can be defined in Recipe Editor (XManager) by drag&drop operation or by loading from text file
- Password protected access rights using 1 of 9 levels (e.g. engineer, scientist, operator)
- Process data can be stored in archiver based on MySQL database
- Generation of text protocol files with all needed process information
- Remote access by VNC protocol
**LASER HEATING**

FOR UHV & HP APPLICATIONS

**DESCRIPTION**

The laser beam is guided by fiber optics close to the sample holder. Temperature of the sample is controlled by a close loop HEAT3-PS solution. Temperature measurement is provided by thermocouple or pyrometer.

**TECHNICAL DATA**

- **Wavelength**: 808 nm (+/- nm)
- **Fiber core diameter**: 400 µm
- **Fiber connector**: SMA905
- **Fiber length**: 5 m
- **Max. power**: 350 W

**APPLICATIONS**

- UHV spectroscopy systems
- UHV deposition system
- Ambient pressure spectroscopy systems (e.g. HPXPS)
- Ambient pressure deposition systems (e.g. PLD)

**DESCRIPTION**

Compact size laser source for fast & effective sample heating with positioner. Source is powered and controlled by HEAT3-PS Power Supply.

**TECHNICAL DATA**

- **Wavelength**: 976 nm
- **Beam diameter**: Ø 3-10 mm (adjustable)
- **Mounting flange**: DN 40CF
- **Max. power**: 200 W

**SOFTWARE CONTROL (option)**

**HEAT3-PS**
The multi-axes manipulator Information list is provided to guide you through the configuration process and to help you choose the modules that, when combined, result in the manipulator best suited to your individual application.

### Z TRAVEL
- 0 mm (XY only)
- 250 mm
- 450 mm
- 650 mm
- 75 mm
- 100 mm
- 125 mm
- 150 mm
- 175 mm
- 200 mm
- 225 mm
- 275 mm
- 300 mm
- 325 mm
- 350 mm
- 375 mm
- 400 mm
- 425 mm
- 475 mm
- 500 mm
- 525 mm
- 550 mm
- 575 mm
- 600 mm
- 625 mm
- 675 mm
- 700 mm
- 725 mm
- 750 mm
- 775 mm
- 800 mm
- Other

### MOUNTING FLANGE
- DN 100CF
- DN 160CF
- Other CF

### MOUNTING ATTITUDE
- Vertical
- Horizontal

### XY TRAVEL
- 0 mm (Z only)
- ±25.0 mm
- Other

### ROTATION
- R1
- R2
- R3
- Differentially pumped rotary feedthrough

### MOTORISATION
- X axis
- Y axis
- Z axis

### THERMOCOUPLES
- Type K
- Type C
- Type E
- Other type

### SAMPLE HOLDERS
- Standard PTS
- Special PTS
- Plate style
- Other

### APPLICATION
Please describe:

### OTHER REQUIREMENTS
Please describe:

### HEATING
- Up to

### COOLING
- Down to