



# Contents

## Vacuum Pump Systems

### Vacuum Pump Systems - oil sealed (RUTA) ..... 3

#### General

Overview ..... 6

Types of Pumps Systems ..... 7

#### Products

##### Pump Systems

Oil Sealed Vacuum Pump System RUTA

Three-Stage Pump Systems

with Two-Stage TRIVAC Backing Pumps

Adaptor Version ..... 10

Frame Version ..... 12

Two-Stage Pump Systems

with Single-Stage SOGEVAC Backing Pumps

Adaptor Version ..... 14

Frame Version ..... 18

Two- and Three-Stage RUTA Pump Systems

with Single- and Two-Stage Rotary Piston Vacuum Pumps as Backing Pump ..... 22

RBS - B/BCS Roots Pump Systems (Only available for purchase in North and South America)

with Two-Stage TRIVAC Backing Pumps ..... 24

HTS Close-Coupled Pump Systems (Only available for purchase in North and South America)

with Single-Stage SOGEVAC Backing Pumps ..... 28

Central Vacuum Supply Systems with SOGEVAC Pumps ..... 32

Tank Mounted Medical Vacuum Systems (Only available for purchase in North and South America) ..... 40

### Vacuum Pump Systems - dry compressing (RUTA) ..... 42

#### Products

##### Pump Systems

Dry Compressing Vacuum Pump System RUTA

with SCREWLINE Backing Pump

Adaptor Version

without palette ..... 42

with palette ..... 44

with SCREWLINE Backing Pump

Frame Version ..... 48

Adaptor Version ..... 54

SP Close-Coupled Pump Systems (Only available for purchase in North and South America)

with SCREWLINE Dry Compressing Backing Pumps ..... 56

#### Further Products

Dry Compressing Vacuum Pump System RUTA

Adaptor Version

with DRYVAC DV 650 Backing Pump ..... 60

Frame Version

with DRYVAC DV 650 Backing Pump ..... 62

with DRYVAC DV 1200 Backing Pump ..... 64

DRYVAC Pump Systems	
Adaptor Version	
Load Lock Pump Systems .....	66
Process Pump Systems .....	68
with RUVAC WH Backing Pump .....	70
enclosed .....	72
RUVAC RAV Roots Vacuum Pumps with Pre-Admission Cooling .....	74
TVD Pump Systems for Drying, Evaporation and Distillation Applications .....	76
<b>Accessories for oil sealed and dry compressing Pump Systems</b>	
Sound Proofing .....	78
Isolation against Vibrations .....	78
Dust Separators .....	78
Frequency Converter RUVATRONIC RT 5 .....	78
Electric Controller .....	79
Pressure Control .....	79
Dust Filter F-xxx-C .....	80
Bellows with Vibration Absorbers .....	82
Bus Interfaces for Monitoring .....	83
<b>Miscellaneous to oil sealed and dry compressing Pump Systems</b>	
Checklist for Inquiries (Fax Form) .....	84
<b>High Vacuum Pump Systems TMP .....</b>	<b>85</b>
<b>General</b>	
General .....	85
Applications and Accessories .....	85
<b>With oil sealed Forevacuum Pumps .....</b>	<b>86</b>
<b>Products</b>	
Turbomolecular Pump Systems	
PT 50 .....	86
PT 151 / PT 361 .....	88
PT 50 KIT .....	92
PT 151 / PT 361 KIT .....	92
<b>With dry compressing Forevacuum Pumps .....</b>	<b>94</b>
<b>Products</b>	
Turbomolecular Pump Systems	
PT 80 DRY / PT 80 H DRY .....	94
TURBOLAB 80 .....	96
PT 151 DRY / PT 361 DRY .....	100
PT 300 DRY .....	104
Turbomolecular Pump Systems (Only available for purchase in North and South America)	
PT-Flex DRY .....	106

**Accessories for High Vacuum Pump Systems TMP**

Control Unit for Turbomolecular Pump Systems ..... 110  
Adsorption Traps with Aluminium Oxide Insert ..... 111  
TSC - TurboSystem Controller (Only available for purchase in North and South America) ..... 112  
TPC - TurboPump Controller (Only available for purchase in North and South America) ..... 114

**UNIVEX High Vacuum Experimentation Systems ..... 117**

**General**

General ..... 117  
  
Applications and Accessories for  
UNIVEX High Vacuum Experimentation Systems / Process Components ..... 117

**Products**

Bell Jar System  
UNIVEX 300 ..... 118  
Options for the UNIVEX 300 ..... 121  
  
Door Systems  
UNIVEX 350 ..... 122  
UNIVEX 350 G ..... 126  
UNIVEX 450 B ..... 130  
  
Special Systems  
UNIVEX 450 for Dactyloscopy (Vacuum Metal Deposition) ..... 134  
UNIVEX 450 C / Test Systems with a Vacuum Chamber ..... 135

**Accessories for UNIVEX High Vacuum Experimentation Systems**

Standard Accessories for UNIVEX Systems ..... 136  
  
Components  
for Thermal Evaporation of High Melting Point Materials (metals) ..... 138  
for Thermal Evaporation of Low Melting Point Materials (organic) ..... 140  
for Electron-Beam Evaporation ..... 140  
for Sputtering ..... 141  
for Glow Discharge Cleaning ..... 142  
for Film Thickness Measurements ..... 143  
  
Substrate Manipulation Solutions ..... 144

**Calibration Systems ..... 146**

CS Calibration Systems ..... 146

# General to UNIVEX High Vacuum Experimentation Systems

## General

The UNIVEX multi-purpose experimentation systems were developed by Oerlikon Leybold Vacuum for applications in research and development, as well as for setting up pilot production systems.

Their range of applications focuses chiefly on vacuum coating technology as well as vacuum process engineering experiments.

The universal experimentation systems from Oerlikon Leybold Vacuum are based on a modern modular concept suited for customized expansion.

## Applications and Accessories for UNIVEX High Vacuum Experimentation Systems

	UNIVEX 300	UNIVEX 350	UNIVEX 350 G	UNIVEX 450 B	Sonderausführungen
<b>Applications</b>	Bell jar system	Door systems			
Passive components	■	■	■	■	■
Sensor technology	■	■	■	■	■
Opto-electronics	■	■	■	■	■
Tribology	■	■	■	■	■
Soldering	■	■	■	■	■
Dactyloscopy (Vacuum metal deposition)					■
Glove box applications	■	■	■	■	■
Special applications	■	■	■	■	■
Thermal conduction experiments	■				■

## Accessories / Process Components

	Page	UNIVEX 300	UNIVEX 350	UNIVEX 350 G	UNIVEX 450 B	Sonderausführungen
Standard accessories	136	■	■	■	■	■
Thermal evaporation	138 / 140	■	■	■	■	■
Electron-beam evaporation	140	■	■	■	■	■
DC sputtering	141	■	■	■	■	■
RF sputtering	141		■	■	■	■
Glow discharge cleaning	142	■	■	■	■	■
Film thickness measurement	143	■	■	■	■	■
Substrate manipulation (rotation, heating, cooling, bias)	144	■	■	■	■	■

# Products

## Bell Jar System

### UNIVEX 300



UNIVEX 300, typical arrangement with stainless steel bell jar and process components

#### **Bench System with a Vacuum Bell Jar (300 mm diameter)**

##### **Typical Applications**

- Vacuum coating in research and development
- Special experiments

##### **Basic Unit**

- The pump system and the electrical supply system are housed in a 19" rack cabinet
- Moreover, the 19" cabinet provides space for a vacuum gauge and a thickness measuring instrument as well as power supply units for the process components
- The basic unit may be placed on a bench top

##### **Vacuum Chamber**

- The base plate is attached to the lateral intake port of the basic unit

- Either a vacuum chamber made of stainless steel or glass may be placed on the base plate

##### **Pump System**

- The standard pumping equipment comprises a TRIVAC D 8 B two-stage rotary vane pump and a TURBOVAC 361 turbomolecular pump

##### **Vacuum Measurement**

- Depending on the type of application, a combination vacuum gauge operating according to the cold cathode or hot cathode principle may be installed

##### **Advantages to the User**

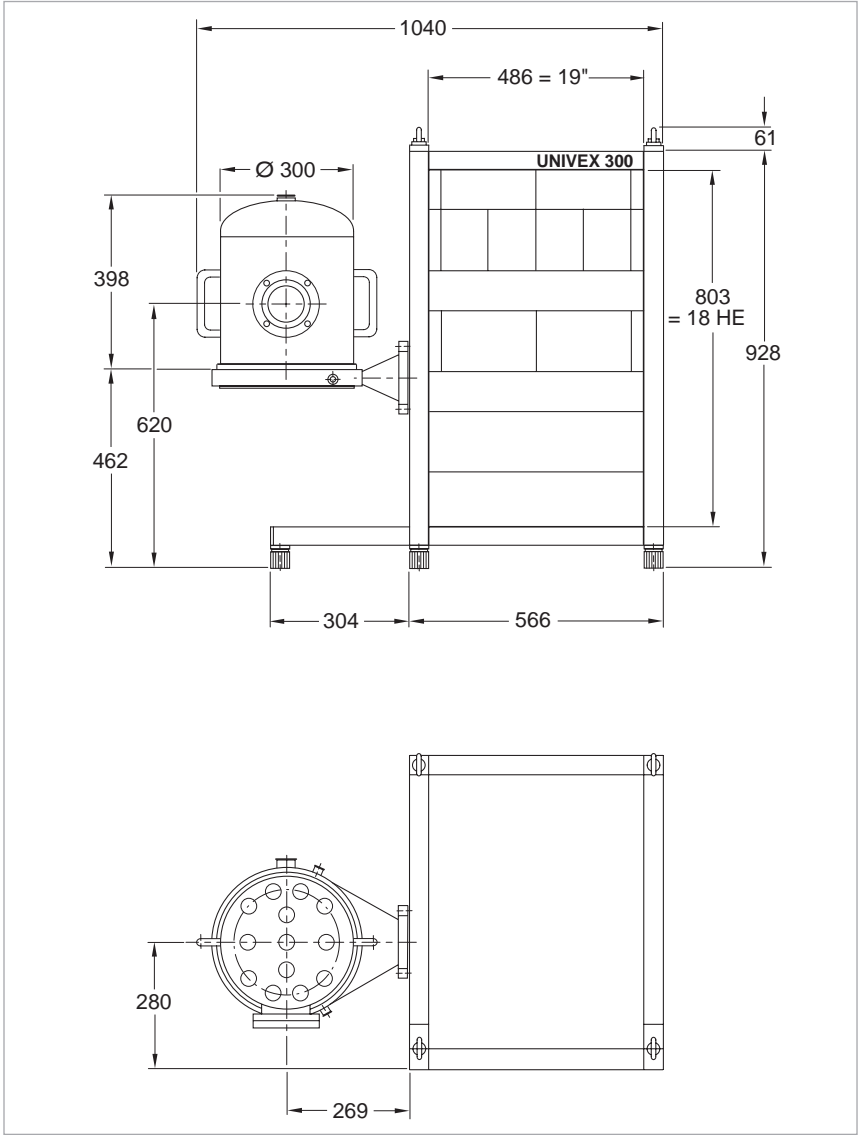
- Modular system design
- Any kind of process component may be installed (except RF)
- Process components may be retrofitted without problems

- Free access to vacuum bell jar, base plate and chamber units
- Very simple to operate and use
- Pump system adapted to the individual use

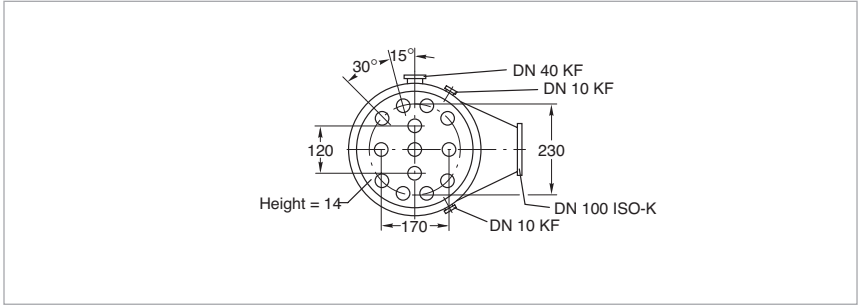
##### **Options**

- Upon request, the UNIVEX 300 may be equipped with a manual lifting facility for the bell jar or also a PLC controller for process automation
- For processes in which aggressive media need to be pumped, a sealed gas version of the turbomolecular pump and a rotary vane pump with a special oil filling can be supplied
- For particularly sensitive processes, a dry compressing backing pump like the SCROLLVAC SC 30 D can be used

**More information on these options is available upon request.**



Dimensional drawing for the UNIVEX 300 with base plate and stainless steel bell jar



Dimensional drawing for the base plate on the UNIVEX 300

## Technical Data

## UNIVEX 300

### Stainless Steel with Viewing Window (optional: Pyrex glass)

Vacuum chamber		Base panel with bell jar fitted from the top
Diameter	mm	300
Base plate		
Material		Stainless steel
High vacuum connection flange	DN	100 ISO-K, attached at the side
Dimensions (H x dia.)	mm	60 x 350
Installation bores	mm	∅ 34.5 (13 x) <sup>1)</sup>
Further side flanges	DN	2 x 10 ISO-KF, 1 x 40 ISO-KF <sup>1)</sup>
Vacuum bell jar		Stainless steel with viewing window (optional: Pyrex glass)
High vacuum pump		TURBOVAC 361
Nominal pumping speed for N <sub>2</sub>	l x s <sup>-1</sup>	345
Power supply		TURBOTRONIK NT 20
Backing pump		TRIVAC D 8 B
Nominal pumping speed	m <sup>3</sup> x h <sup>-1</sup>	9.7
Controller		Power supply with main switch slot module
Electrical connection		230 V, 50 Hz, max. 16 A <sup>2)</sup> , <sup>3)</sup>
Cooling water connection		
Hose DN 10	bar	4 to 7
Cooling water consumption, approx.	l x min <sup>-1</sup>	1 <sup>3)</sup>
Weight, approx.	kg	170 <sup>3)</sup>

## Ordering Information

## UNIVEX 300

	Part No.
UNIVEX 300	upon request

<sup>1)</sup> Standard configuration, other hole patterns / flanges upon request

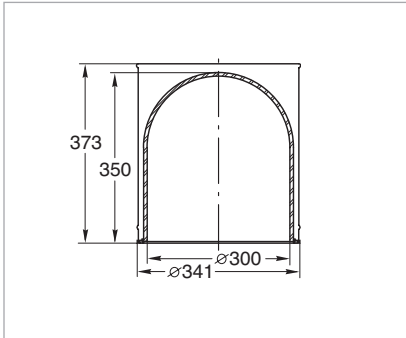
<sup>2)</sup> Other voltages and frequencies upon request

<sup>3)</sup> Without chamber installations / process components



# Options for the UNIVEX 300

## Pyrex Glass Bell Jar (Vacuum Chamber)



Dimensional drawing for the glass bell jar with implosion protection

### Technical Data

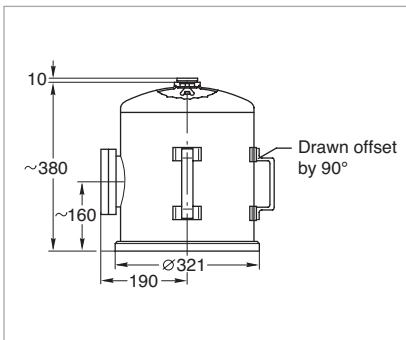
Technical Data		Bell Jar, Pyrex Glass
Dimensions (H x dia.)	mm	350 x 300
Height, cylindrical section	mm	200
Seal		FPM (FKM)
Weight	kg	5.6

### Ordering Information

Ordering Information		Bell Jar, Pyrex Glass
		Part No.
Bell jar, Pyrex glass		upon request <sup>1)</sup>

<sup>1)</sup> With punched steel cover for implosion protection

## Stainless Steel Bell Jar (Vacuum Chamber)



Dimensional drawing for the stainless steel bell jar

### Technical Data

Technical Data		Bell Jar, Stainless Steel
Dimensions (H x dia.)	mm	380 x 321
Height, cylindrical section	mm	300
Seal		FPM (FKM)
Weight	kg	9.6

### Ordering Information

Ordering Information		Bell Jar, Stainless Steel
		Part No.
Bell jar, stainless steel		upon request <sup>2)</sup>

<sup>2)</sup> With DN 100 viewing window and 2 carrying handles; hole at the top (34.5 mm dia.)

# Door Systems

## UNIVEX 350



UNIVEX 350



UNIVEX 350, custom version with higher vacuum chamber and on castors



UNIVEX 350, custom version with second coating module

### Laboratory System with Cubic Vacuum Chamber and Front Door (350 mm diameter)

#### Typical Applications

- Vacuum coating in research and development
- Pre-production trials
- Special experiments

#### Design

- The UNIVEX 350 consists of two separable 19" rack mount cabinets
- The process chamber and the pump system are accommodated in one cabinet
- Accommodated in the second cabinet section is the electric power supply with the PLC based system controller with graphic touchscreen. Moreover, the supply units for the process components are also accommodated in this cabinet section

#### Vacuum Chamber

- The base plate is attached to the base frame
- The door is equipped with a viewing window
- Bottom plate and lid are provided with installation holes
- Additional flanges at the side for pump system and process components

#### Pump System

- The standard pumping equipment comprises a TRIVAC D 25 B two-stage rotary vane pump and a TURBOVAC 600 C turbomolecular pump

#### Vacuum Measurement

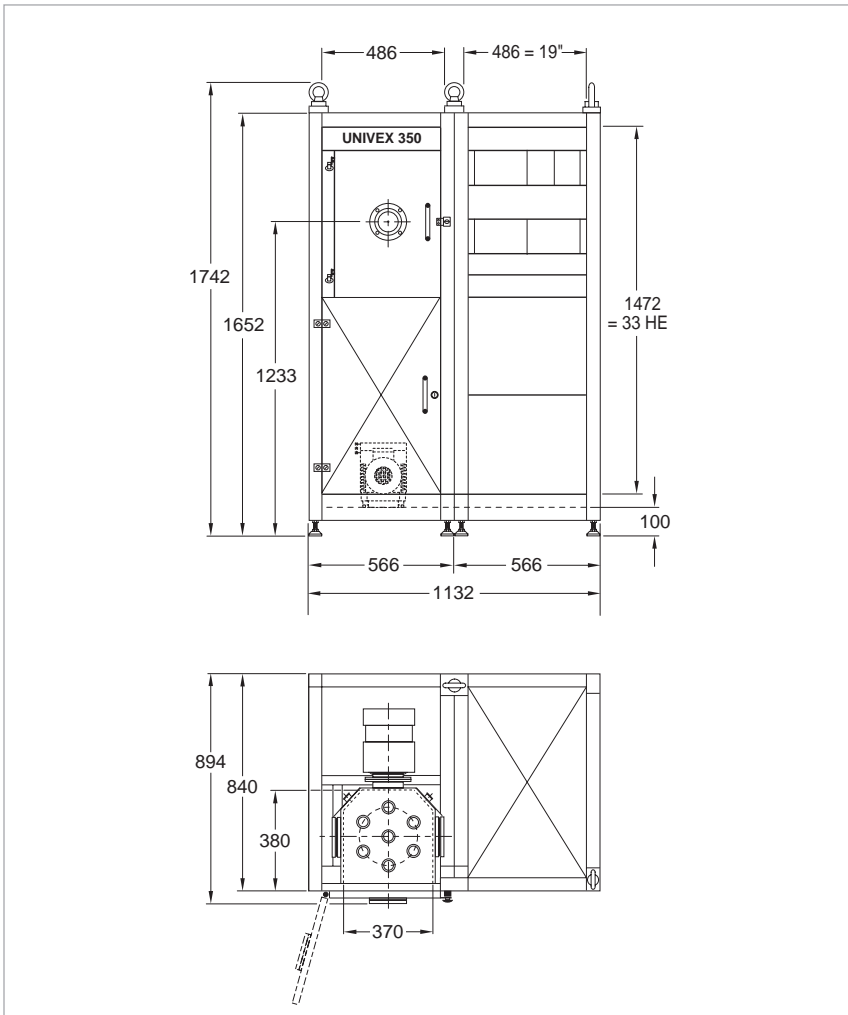
- Depending on the type of application, a combination vacuum gauge operating according to the cold cathode or hot cathode principle may be installed

#### Advantages to the User

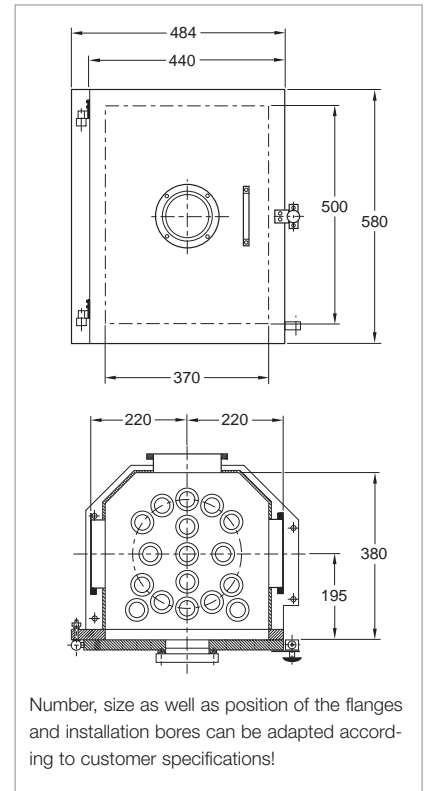
- Modular system design
- Freedom of installation and retrofitting of process components without problems
- Vacuum chamber with front door for added flexibility
- Convenient access to the chamber installations
- Very simple to operate and use via programmable control
- For installation into clean-room walls
- High frequency sputtering possible
- Pump system adapted to the individual process

## Options

- A water-cooled vacuum chamber can also be supplied
- Evaporation protection plates which may be easily disassembled are available
- Fitting of a second coating module with a vacuum chamber (fitted to the right of the electrical cabinet) is possible
- For processes requiring large volumes of gas or which require low operating pressures, the UNIVEX 350 can also be equipped with a turbomolecular pump having a higher pumping speed (TURBOVAC 1000, for example) or with cryopumps
- For processes which involve pumping corrosive gases, a corrosion resistant version of the turbomolecular pump and a rotary vane pump with a filling of special oil may be supplied
- For especially sensitive processes also a dry compressing pump like the SCROLLVAC SC 30 D can be used as the backing pump



Dimensional drawing for the UNIVEX 350



Number, size as well as position of the flanges and installation bores can be adapted according to customer specifications!

Dimensional drawing for the vacuum chamber

## Technical Data

## UNIVEX 350

Vacuum chamber		
Material		Stainless steel
Dimensions		
Inside width	mm	370
Inside depth	mm	380
Inside height	mm	500
Connections <sup>1)</sup>		
Front side		Door with window
Rear side	DN	160 ISO-K (pump system connection), 2 x 16 ISO-KF, 2 x 40 ISO-KF
Bottom plate		15 installation holes 34.5 mm dia.
Cover plate		7 installation holes 34.5 mm dia.
Left side	DN	160 ISO-K
Right side	DN	160 ISO-K
High vacuum pump		TURBOVAC 600 C
Nominal pumping speed for N <sub>2</sub>	l x s <sup>-1</sup>	560
Power supply		TURBOTRONIK NT 20
Backing pump		TRIVAC D 25 B
Nominal pumping speed	m <sup>3</sup> x h <sup>-1</sup>	29.5
Controller		PLC with graphic touchscreen
Required supplies		
Voltage		400 V, 3 phases + N, 50/60 Hz <sup>2)</sup>
Cooling water		
Inlet pressure	bar (abs.)	4 to 7
Consumption, approx.	l x min <sup>-1</sup>	1 <sup>3)</sup>
Feed temperature	°C	+15 to +25
Compressed air	bar (abs.)	4 to 7
Weight, approx.	kg	400 <sup>3)</sup>

## Ordering Information

## UNIVEX 350

	Part No.
UNIVEX 350	upon request

<sup>1)</sup> Standard configuration, other hole patterns/flanges upon request

<sup>2)</sup> Other voltages and frequencies upon request

<sup>3)</sup> Without chamber installations / process components



# UNIVEX 350 G



UNIVEX 350 G, consisting of electrical cabinet (left) and coating module (right)

## Laboratory System for Glove Box Attachment with Cubic Vacuum Chamber and Front Sliding Door (350 mm diameter)

### Typical Applications

- Vacuum coating in research and development
- Pre-production trials
- Special experiments

### Design

- The UNIVEX 350 G consists of a coating module and a 19" rack cabinet
- Installed in the coating module is the process chamber and the pump system
- Accommodated in the cabinet is the electric power supply with the PLC based system controller with graphic touchscreen. Moreover, the supply units for the process components are also accommodated in this cabinet section

### Vacuum Chamber

- The base plate is attached to the base frame
- The sliding front door is operated manually and closed pneumatically
- Bottom plate and lid are provided with installation holes
- Additional flanges at the side for pump system and process components

### Pump System

- The standard pumping equipment comprises a TRIVAC D 25 B two-stage rotary vane pump and a TURBOVAC 600 C turbomolecular pump

### Vacuum Measurement

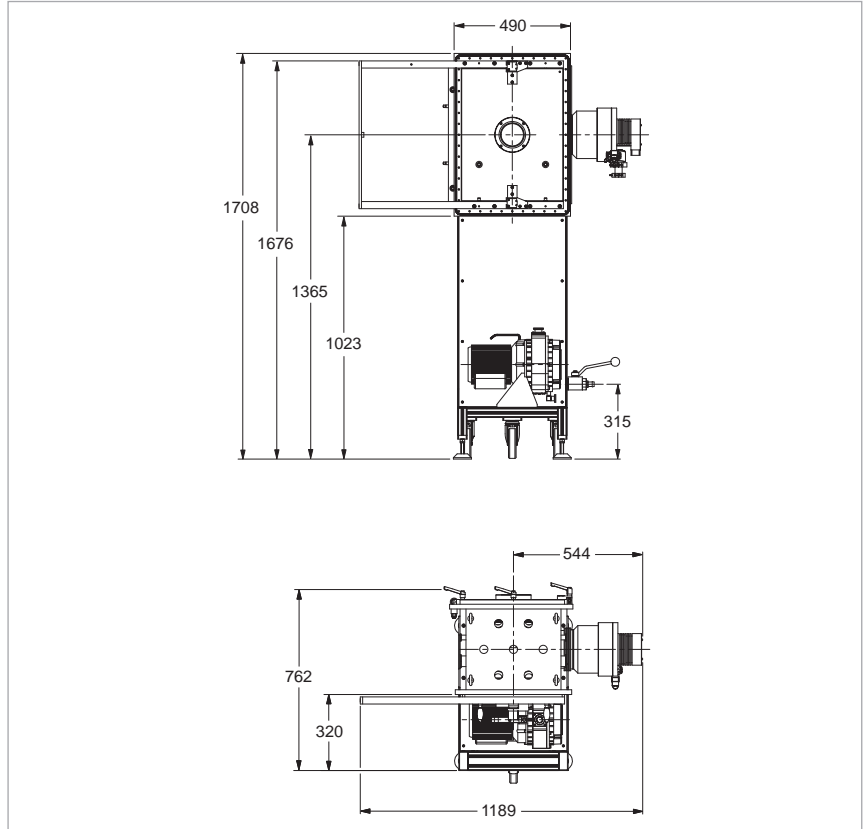
- Depending on the type of application, a combination vacuum gauge operating according to the cold cathode or hot cathode principle may be installed

### Advantages to the User

- Intended for fitting to the rear side of a glove box
- Convenient access to the process through the glove box by means of the sliding front door
- Easy access to the chamber unit through the rear service door
- Only the sliding door is located in the glove box. All other system components can be easily accessed from the outside
- Modular system design
- Freedom of installation and retrofitting of process components without problems
- Very simple to operate and use via programmable control
- High frequency sputtering possible
- Pump system adapted to the individual process

## Options

- Easy to disassemble coating protection panels are available
- For short pumpdown times, a bypass line bypassing the high vacuum pump can be provided
- For processes producing increased amounts of gas or for low operating pressures, the UNIVEX 350 G may also be equipped with turbomolecular pumps offering a higher pumping speed (TURBOVAC 1100 C, for example) or cryogenic pumps may be specified
- For processes which involve pumping corrosive gases, a corrosion resist version of the turbomolecular pump and a rotary vane pump with a special oil filling can be supplied
- For particularly sensitive processes, a dry compressing backing pump like the SCROLLVAC SC 30 D can be used

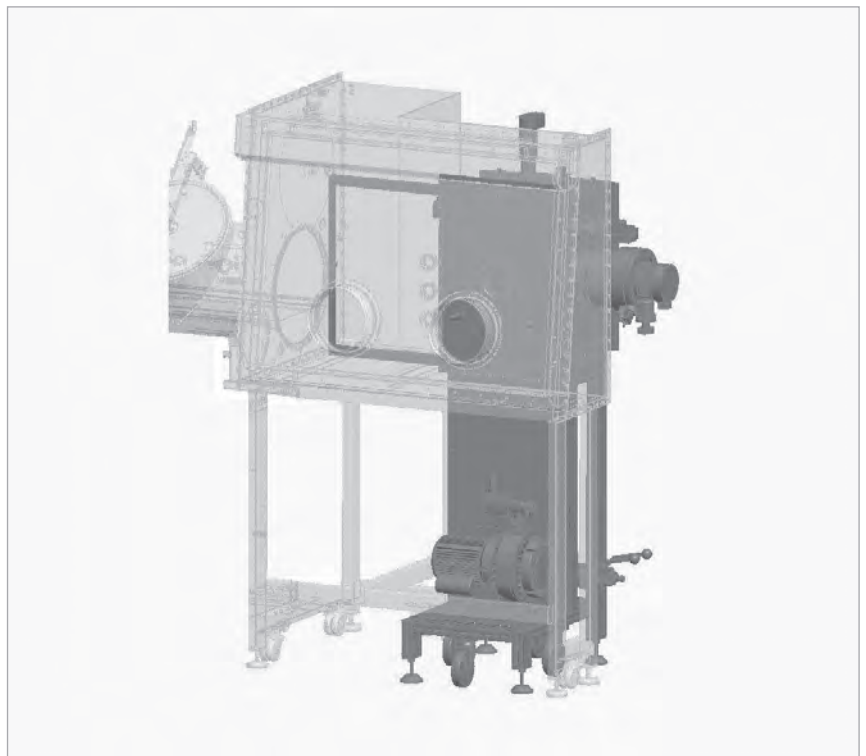


Dimensional drawing for the UNIVEX 350 G

## Turnkey Solutions

Upon request Oerlikon Leybold Vacuum will also arrange the delivery of turnkey solutions consisting of the UNIVEX 350 G coating system and a glove box from a single source.

**More information on such systems is available upon request.**



3D view of a glove box with the UNIVEX 350 G coating module fitted to the rear

## Technical Data

## UNIVEX 350 G

Vacuum chamber		
Material		Stainless steel
Dimensions		
Inside width	mm	370
Inside depth	mm	380
Inside height	mm	500
Connections <sup>1)</sup>		
Front side		Sliding door for glove box access; manually operated and pneumatically closing
rear side		turning door for service access; manually locked
Bottom plate		15 installation holes 34.5 mm dia.
Cover plate		7 installation holes 34.5 mm dia.
Left side	DN	160 ISO-K (pump system connection), 40 ISO-KF, 16 ISO-KF
Right side	DN	40 ISO-KF, 16 ISO-KF
High vacuum pump		TURBOVAC 600 C
Nominal pumping speed for N <sub>2</sub>	l x s <sup>-1</sup>	560
Power supply		TURBOTRONIK NT 20
Backing pump		TRIVAC D 25 B
Nominal pumping speed	m <sup>3</sup> x h <sup>-1</sup>	29.5
Controller		PLC with graphic touchscreen
Required supplies		
Voltage		400 V, 3 phases + N, 50/60 Hz <sup>2)</sup>
Cooling water		
Inlet pressure	bar (abs.)	4 to 7
Consumption, approx.	l x min <sup>-1</sup>	1 <sup>3)</sup>
Feed temperature	°C	+15 to +25
Compressed air	bar (abs.)	4 to 7
Weight, approx.	kg	350 <sup>3)</sup>

## Ordering Information

## UNIVEX 350 G

	Part No.
UNIVEX 350 G	upon request

<sup>1)</sup> Standard configuration, other hole patterns / flanges / viewing windows upon request

<sup>2)</sup> Other voltages and frequencies upon request

<sup>3)</sup> Applies only to the coating module, without chamber units / process components

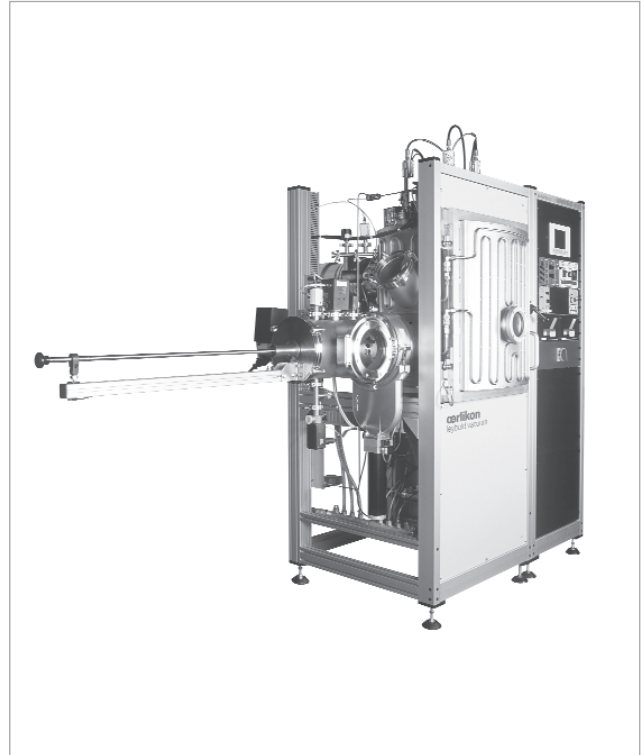




# UNIVEX 450 B



UNIVEX 450 B with water-cooled vacuum chamber (option)



UNIVEX 450 B with water-cooled process chamber and manually operated load lock chamber (option)

## Laboratory System with Cubic Vacuum Chamber and Front Door (500 mm diameter)

### Typical Applications

- Vacuum coating in research and development
- Pre-production trials
- Special experiments

### Design

- The UNIVEX 450 B consists of two separable 19" cabinet sections
- Accommodated in one cabinet section is the process chamber and the pump system
- Accommodated in the second cabinet section is the electric power supply with the PLC based system controller with graphic touchscreen. Moreover, the supply units for the process components are also accommodated in this cabinet section

### Vacuum Chamber

- The base plate is attached to the base frame
- The door is equipped with a viewing window
- Bottom plate and lid are provided with installation holes
- Additional flanges at the side for pump system and process components

### Pump System

- The standard pumping equipment comprises a TRIVAC D 65 B two-stage rotary vane pump and a TURBOVAC 1100 C turbomolecular pump

### Vacuum Measurement

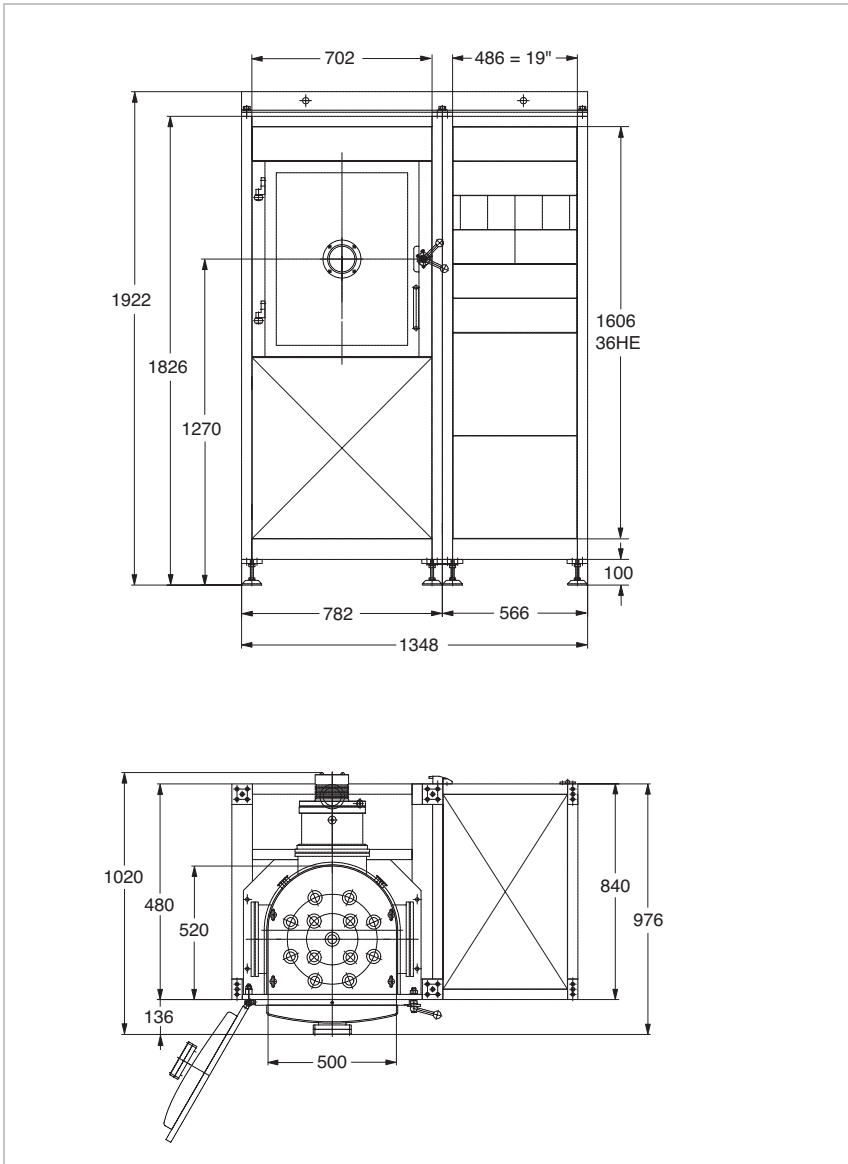
- Depending on the type of application, a combination vacuum gauge operating according to the cold cathode or hot cathode principle may be installed

### Advantages to the User

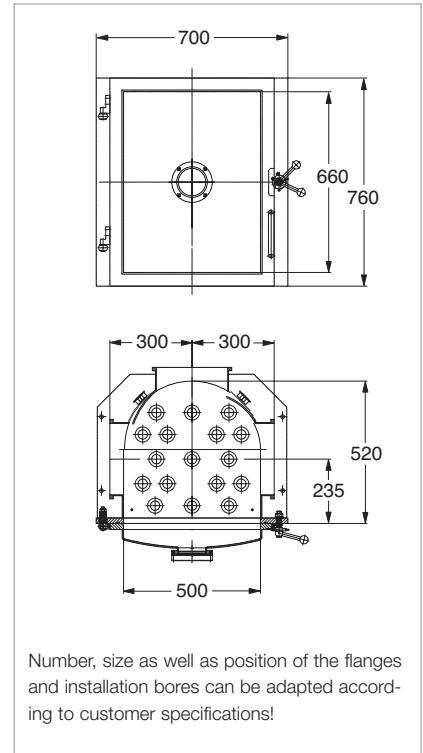
- Modular system design
- Freedom of installation and retrofitting of process components without problems
- Vacuum chamber with door
- Convenient access to the chamber installations
- Very simple to operate and use via programmable control
- Suited for being installed in a clean room wall
- High frequency sputtering possible
- Pump system adapted to the individual process

## Options

- The chamber can also be delivered in a water-cooled version
- Easy to disassemble coating protection panels are available
- For short pumpdown times, a bypass line bypassing the high vacuum pump can be provided
- Fitting of a second coating module with a vacuum chamber (fitted to the right of the electrical cabinet) is possible
- For processes producing increased amounts of gas or for low operating pressures, the UNIVEX 450 B may also be equipped with turbomolecular pumps offering a higher pumping speed (TURBOVAC T 1600, for example) or cryogenic pumps may be specified
- For processes in which aggressive media need to be pumped, a seal gas version of the turbomolecular pump and a rotary vane pump with a special oil filling can be supplied
- For particularly sensitive processes, a dry compressing backing pump like the SCROLLVAC SC 30 D can be used



Dimensional drawing for the UNIVEX 450 B



Number, size as well as position of the flanges and installation bores can be adapted according to customer specifications!

Dimensional drawing for the vacuum chamber

## Technical Data

## UNIVEX 450 B

Vacuum chamber		
Material		Stainless steel
Dimensions		
Inside width	mm	500
Inside depth	mm	500
Inside height	mm	650
Connections <sup>1)</sup>		
Front side		Door with window
Rear side	DN	250 ISO-K (pump system connection), 4 x 16 ISO-KF, 2 x 40 ISO-KF
Bottom plate		20 installation holes 34.5 mm dia.
Cover plate		10 installation holes 34.5 mm dia.
Left side	DN	250 ISO-K
Right side	DN	250 ISO-K
High vacuum pump		TURBOVAC 1100 C
Nominal pumping speed for N <sub>2</sub>	l x s <sup>-1</sup>	1050
Power supply		TURBOTRONIK NT 20
Backing pump		TRIVAC D 25 B
Nominal pumping speed	m <sup>3</sup> x h <sup>-1</sup>	29.5
Controller		PLC with graphic touchscreen
Required supplies		
Voltage		400 V, 3 phases + N, 50/60 Hz <sup>2)</sup>
Cooling water		
Inlet pressure	bar (abs.)	4 to 7
Consumption, approx.	l x min <sup>-1</sup>	1 <sup>3)</sup>
Feed temperature	°C	15 to 25
Compressed air	bar (abs.)	4 to 7
Weight, approx.	kg	500 <sup>3)</sup>

## Ordering Information

## UNIVEX 450 B

	Part No.
UNIVEX 450 B	upon request

<sup>1)</sup> Standard configuration, other flanges / hole patterns / viewing windows upon request

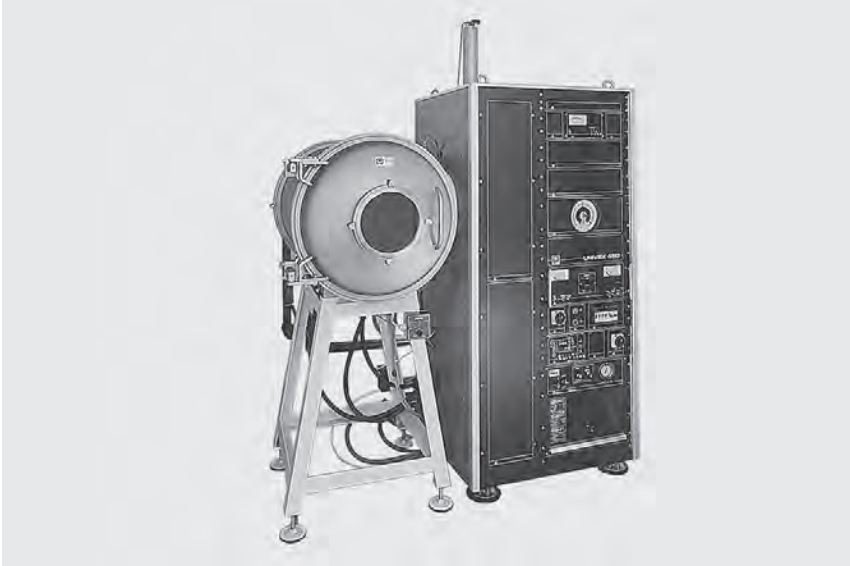
<sup>2)</sup> Other voltages and frequencies upon request

<sup>3)</sup> Applies only to the basic unit without coating equipment



# Special Systems

## UNIVEX 450 for Dactyloscopy (VMD)



UNIVEX 450 for dactyloscopy

Dactyloscopy is the science of fingerprint identification. Oerlikon Leybold Vacuum has designed a system that uses a process known in the forensics world as Vacuum Metal Deposition (VMD), for developing fingerprints.

VMD is a well established forensic tool for the development of latent fingerprints. Latent prints are formed by perspiration or grease from the skin surface which is left on a different surface. They are not visible to the naked eye and must therefore be “developed” before they can be seen.

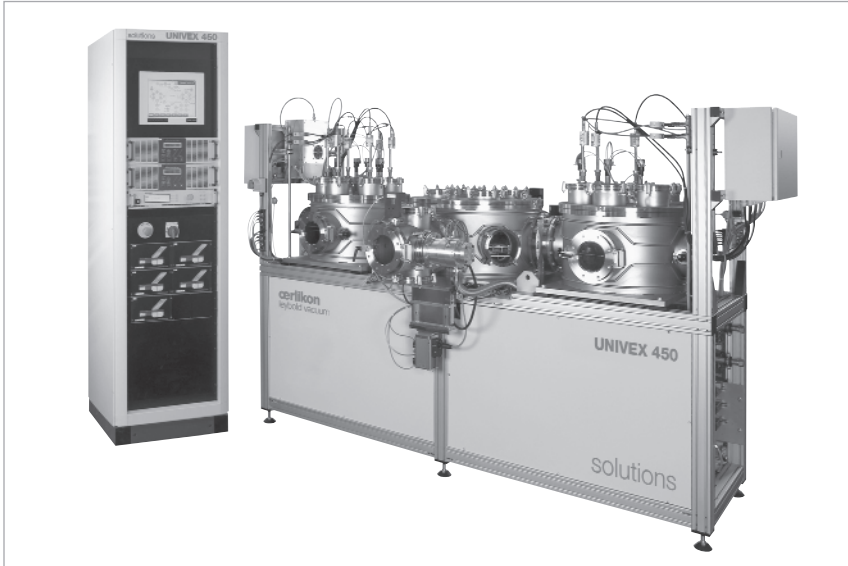
The process requires a piece of evidence suspected of having these

latent prints to be placed inside a vacuum chamber. After pumping the chamber down to a relatively low pressure ( $10^{-5}$  mbar (Torr)), a monolayer of gold is then evaporated onto the evidence. These gold atoms will then be absorbed by the greasy *ridges* that make up the print but will remain behind in the *valleys* between the ridges. Next, a second metal layer of zinc is deposited. Zinc has a unique property in that it only adheres to other metals such as gold left behind in the *valleys*. The end result will be a very distinct negative image of a fingerprint. The image is photographed and reversed for final identification.

### Benefits of this method

- Simple thermal deposition process with proven results
- VMD has been shown to detect latent prints even after other methods have been tried and failed (e.g. cyanoacrylate or fuming)
- Large surface areas (up to 80 x 40 cm) can be coated
- Process time can be as little as 10 minutes depending on the material makeup of the evidence
- Good contrast on multicolour surfaces
- Deposition process does not damage the evidence. Zinc can be removed using regular household vinegar

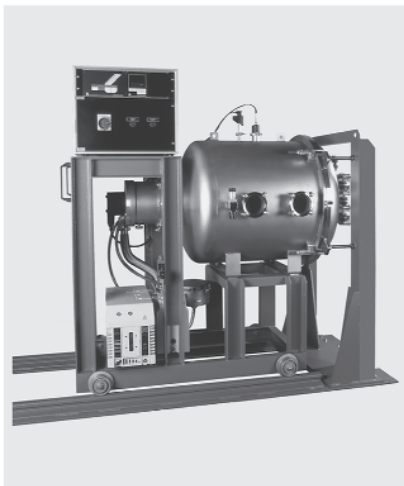
## UNIVEX 450 C



For special applications we can also supply cluster systems based on the UNIVEX concept. These clusters are equipped according to customers requirements and incorporate separate processing and load lock and transfer chambers.

UNIVEX 450 C with coating module and electrical cabinet (example photograph).  
The coating module consists of two process chambers (left and right) as well as the loadlock and transfer chamber in between

## Test Systems with a Vacuum Chamber



We can also supply vacuum chambers with custom pump systems for testing of various components.

Test system with a 700 mm dia. chamber

# Accessories

## Standard Accessories for UNIVEX Systems

### Blank-Off Screw Fitting

For 34.5 mm dia. hole.



Blank-off screw fitting

### PS 113 A Safety Switch

For safety interlock arrangements in connection with the UNIVEX system controller, respectively optionally connected power supply equipment (for sputtering, electron-beam evaporation or vacuum etching, for example).



PS 113 A Safety Switch

### Variable Leak Valve with Isolation Valve

For manually controlled admission of gas in connection with plasma processes (sputtering, etching and glow discharge cleaning).

### Technical Data

Material		Stainless steel
Seal		FPM (FKM)
Weight	kg	0.1

### Ordering Information

	Part No.
Blank-off screw fitting	<b>030 40</b>

### Blank-Off Screw Fitting

### Technical Data

Switching pressure	mbar	approx. 6 below atmospheric pressure
Return switching pressure	mbar	3 below atmospheric pressure
Switching inaccuracy	mbar	2
Max. permissible operating pressure (abs.)	mbar	2000
Storage temperature range	°C	-25 to +85
Nominal temperature range	°C	0 to +85
Switching contact		Changeover contacts, gold-plated, for prog. controls
Contact life		> 10 <sup>5</sup> switching cycles
Switching capacity	mA / V AC mA / V AC	100 / 24 30 / 24
Electrical connection		6.3 mm flat plug
Vacuum connection	DN	16 ISO-KF
Materials in contact with the medium		Stainless steel 1.4305, 1.4310, Stainless steel 1.4300 PTFE coated
Protection class	IP	44

### Ordering Information

	Part No.
Low pressure safety switch PS 113 A, DN 16 ISO-KF; complete with 3 m long cable	<b>230 011</b>

### Safety Switch

### Technical Data

Gas admission rate $q_L$	mbar x l x s <sup>-1</sup>	$5 \times 10^{-6}$ to $1 \times 10^{-3}$
Connection flange	DN	16 ISO-KF

### Ordering Information

	Part No.
Variable leak valve with isolation valve	<b>215 010</b>

### Variable Leak Valve with Isolation Valve

### Variable Leak Valve with Isolation Valve

(see also Catalog Part "Valves")



### Gas Flow Controller (MFC)

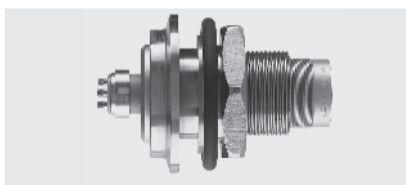
For controlled admission of gas in connection with automated plasma processes (sputtering, etching, glow discharge cleaning). Intended to be remotely controlled by the customer's PC or PLC, i.e. a separate MFC controller unit is not included in the delivery.

### Electrically Operated Vapor Source Shutter

For covering the source during thermal or electron-beam evaporation. With gear motor and shutter panel; can be fitted to the inside sections of the chamber.

### 6-Way Measurement Feedthroughs

For connection of the vapor source shutter; for 34.5 mm holes, plug-in soldered contact on the inside.



6-way measurement feedthrough

### Control Cable, 6-Way

For connection between measurement feedthrough and power supply unit for the vapor source shutter, complete with connection plugs.

### Interlocking Kit

For providing touch protection against high-voltage carrying parts within the vacuum chamber. The safety contact must be connected to the interlock input at the high-voltage power supply unit thereby ensuring that the equipment can be enabled only while the chamber door is closed.

### Technical Data

Gas flow, max.	sccm	selectable between 10 and 500
Supply voltage	V DC	24
Control signal	V	0 - 5 analog

### Ordering Information

	Part No.
Gas flow controller	upon request

### Technical Data

Control voltage	V DC	24 (pulses per second)
Dimensions of the shutter panel	mm	different, for example 42 x 42 or 100 mm dia.
Weight	kg	0.2

### Ordering Information

	Part No.
Electrically operated vapor source shutter	upon request

### Technical Data

Rating per conductor	V A	max. 700 16
Seal		FPM (FKM)
Weight	kg	0.3

### Ordering Information

	Part No.
6-way measurement feedthrough	upon request

### Technical Data

Lenght	m	3
Weight	kg	0.2

### Ordering Information

	Part No.
6-way control cable	upon request

### Technical Data

Mechanical closing contact	Safety door switch
Electrical closing contact	floating

### Ordering Information

	Part No.
Interlocking kit for UNIVEX vacuum chamber	upon request

### Gas Flow controller

### Gas Flow controller

### Vapor Source Shutter

### Vapor Source Shutter

### Measurement Feedthrough

### Measurement Feedthrough

### Control Cable

### Control Cable

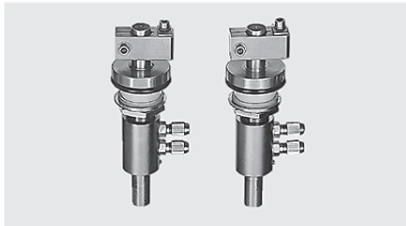
### Interlocking Kit

### Interlocking Kit

# Components for Thermal Evaporation of High Melting Point Materials (metals)

## Single Thermal Evaporator

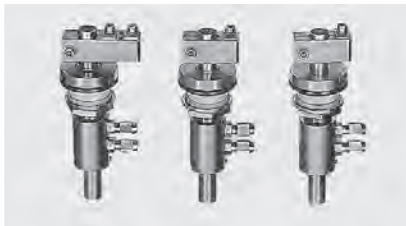
Consisting of two water-cooled high voltage feedthroughs with terminal blocks for 34.5 mm dia. holes.



Single thermal evaporator

## Dual Thermal Evaporator

Consisting of three water-cooled high voltage feedthroughs with terminal blocks for 34.5 mm dia. holes.



Dual thermal evaporator

## Power Supply Cables

For single and dual thermal evaporators, equipped with terminals and clamping pieces.

### Technical Data

Rating per conductor	V	max. 100
	A	500
Seals		FPM (FKM)
Water connection	mm	Hose 4/6 dia.
Weight	kg	2.5

### Single Thermal Evaporator

### Ordering Information

	Part No.
Single thermal evaporator	upon request

### Single Thermal Evaporator

### Technical Data

Rating per conductor	V	max. 100
	A	500
Seals		FPM (FKM)
Water connection	mm	Hose 4/6 dia.
Weight	kg	3.9

### Dual Thermal Evaporator

### Ordering Information

	Part No.
Dual thermal evaporator	upon request

### Dual Thermal Evaporator

### Technical Data

Length	m	2 <sup>1)</sup>
Rating	V	max. 100
	A	500
Cross section	mm <sup>2</sup>	120
Weight	kg	3.5

### Power Supply Cable

### Ordering Information

	Part No.
Power supply cable	upon request <sup>2)</sup>

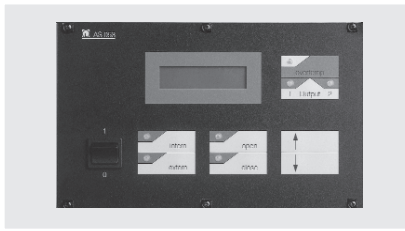
### Power Supply Cable

<sup>1)</sup> Standard length. Other lengths can be specified

<sup>2)</sup> For the single thermal evaporator, two supply lines are required  
For the dual thermal evaporator, three supply lines are required

### AS 053 Power Supply Unit

For supplying thermal evaporators and one solenoid-actuated source shutter. With LCD display for current read out and membrane key pad.



AS 053 power supply unit

### Technical Data

<b>Cabinet</b>	mm	1/2 19" rack module, 3 HU 400 deep
<b>Outputs</b>		1 x evaporator output, 5 V, 400 A max. can be rewired to 10 V, 200 A max. 1 x shutter output, 24 V DC, 1 s pulse
<b>Inputs</b>		Remote control unit for controlling the evaporation power (0 to 10 V) Remote control for the shutter
<b>Main power supply</b>		230 V, 50/60 Hz, 10 A
<b>Weight</b>	kg	15

### Power Supply Unit

### Ordering Information

	Part No.
AS 053 power supply unit	<b>upon request</b>

### Power Supply Unit

### AS 053/2 Power Supply Unit

For supplying power to two thermal evaporators with vapor source shutters. With LCD display for current read out and membrane key pad.

### Technical Data

<b>Cabinet</b>	mm	19" rack module, 3 HU 400 deep
<b>Outputs</b>		2 x evaporator output, 5 V, 400 A max. can be rewired to 10 V, 200 A max. 2 x shutter output, 24 V DC, 1 s pulse
<b>Inputs</b>		Remote control unit for controlling the evaporation power (0 to 10 V) Remote control for the shutter Switchover evaporator 1 / 2
<b>Main power supply</b>		230 V, 50/60 Hz, 10 A
<b>Weight</b>	kg	30

### Power Supply Unit

### Ordering Information

	Part No.
AS 053/2 power supply unit	<b>upon request</b>

### Power Supply Unit

# Components for Thermal Evaporation of Low Melting Point Materials (organic)

For the purpose of evaporating temperature sensitive materials, commonly of an organic nature, Oerlikon Leybold Vacuum is offering special organic material evaporators.

These ensure a coating process at precisely controlled evaporation temperatures which typically range between 200 °C and 400 °C.

For installation within the UNIVEX systems, Oerlikon Leybold Vacuum supplies organic material evaporators as a complete package, consisting of evaporator source, automatic shutter, rotary vacuum feed through and 19" rack mount controller.

# Components for Electron-Beam Evaporation

Various models of electron-beam evaporators and power supplies are available for installation in the UNIVEX systems.

## **Electron-Beam Evaporator**

The selection of a suitable electron-beam evaporator will primarily depend on the amount of available space, the desired evaporation rate and the film thickness as well as the number and type of materials which need to be evaporated. Single crucible as well as rotatable multi-crucible evaporators are available.

## **Power Supplies**

The power supply unit for the individual electron-beam evaporators is selected depending on the maximum evaporation power which is required, as well as the demanded properties for X/Y beam deflection. Models with output power ratings ranging from 3 kW to 10 kW are available.

As a rule, the maximum output power of the power supply may not exceed the maximum permissible power specified for the evaporator.

## **Safety Regulations for Electron-Beam Evaporator Applications**

When installing electron-beam evaporators within the UNIVEX 300, only the stainless steel bell jar can be used. Moreover, a safety interlocking system will be necessary for all UNIVEX types. For the UNIVEX 300 a separate interlocking kit is available; in the case of the UNIVEX 350 and 450 B this kit is already included.

Additionally a water flow monitor is required for each electron-beam evaporation unit so as to ensure adequate cooling of the electron-beam evaporator.

This water flow monitor is included in the delivery of a UNIVEX system equipped with an electron-beam evaporator.

**Upon request we shall be pleased to provide an offer which specifically matches the requirements of your application.**

# Components for Sputtering

## DC Sputtering

A variety of DC sputtering sources may be fitted within all UNIVEX systems. Their selection will depend on the size of the substrate, the required target material and the available installation space. Circular planar sputtering sources of 50 mm to 200 mm in diameter as well as various rectangular sources are available. The power supply units (providing an output power between 500 W and 3 kW) may be installed within the UNIVEX 19" electrical cabinets.

DC sputtering equipment is suited for all UNIVEX systems.

## RF Sputtering

A variety of RF sputtering sources may be fitted within all UNIVEX systems (exception: UNIVEX 300). Their selection will depend on the size of the substrate, the required target material and the available installation space. Circular planar sputtering sources of 50 mm to 200 mm in diameter as well as various rectangular sources together with the necessary RF matching components are available. The power supply units (providing an output power between 150 W and 1.5 kW) may be installed within the UNIVEX systems.

## Gas Inlet

Sputtering sources can only be operated with a process gas present. For this, manually operated variable leak valves or automatically controlled mass flow controllers are available.

## Throttling the Pumping Speed

In order to protect the high vacuum pump against the high process pressure present during plasma operation, and to reduce process gas consumption, the UNIVEX systems are generally equipped with a three position high vacuum gate valves.

## Safety Regulations in Connection with Sputtering Applications

When installing electron-beam evaporators within the UNIVEX 300, only the stainless steel bell jar can be used. Moreover, a safety interlocking system will be necessary for all UNIVEX types. For the UNIVEX 300 a separate interlocking kit is available; in the case of the UNIVEX 350 and 450 B this kit is already included.

Additionally a water flow monitor is required for each electron-beam evaporation unit so as to ensure adequate cooling of the electron-beam evaporator.

This water flow monitor is included in the delivery of a UNIVEX system equipped with an electron-beam evaporator.

**Upon request we shall be pleased to provide an offer which specifically matches the requirements of your application.**

# Components for Glow Discharge Cleaning

## Glow Discharge Assembly

The glow discharge electrode utilizes a high voltage feedthrough mounted in a 34.5 mm dia. hole along with a connection cable fitted to a central rotary feedthrough.



Glow discharge assembly with high voltage feedthrough and connection cable

## HP 2500 High Voltage Power Supply Unit

For supplying the glow discharge assembly.



High voltage power supply unit HP 2500

## Gas Admission

To operate the glow discharge cleaning accessory, a process gas such as Argon is required. A simple manually operated gas dosing valve or automatically controlled mass flow controllers are available upon request.

## Technical Data

<b>Electrode material</b>		Aluminum
<b>Insulation</b>		Ceramics
<b>Max. ratings</b>	<b>V</b> <b>mA</b>	3000 100
<b>Sealing material of the high voltage feedthrough</b>		FPM (FKM)

## Ordering Information

	<b>Part No.</b>
Glow discharge assembly for UNIVEX 300, 350 and 350 G for UNIVEX 450 B	<b>upon request</b> <b>upon request</b>

## Glow Discharge Assembly

## Glow Discharge Assembly

## Technical Data

<b>Cabinet</b>		19" rack module, 3 HU
<b>Output</b>	<b>V</b> <b>mA</b>	max. 3000 max. 100
<b>Electrical connection</b>	<b>V / Hz</b>	230 / 50/60 Hz
<b>Remote control and locking input</b>		included

## Ordering Information

	<b>Part No.</b>
HP 2500 high voltage power supply unit	<b>upon request</b>

## High Voltage Power Supply Unit

## High Voltage Power Supply Unit

## Throttling the Pumping Speed

In order to protect the high vacuum pump against the high process pressure present during plasma operation, and reduce process gas consumption, the UNIVEX systems are generally equipped with high vacuum gate valves having three positions which are fitted between chamber and high vacuum pump.

# Components for Film Thickness Measurements

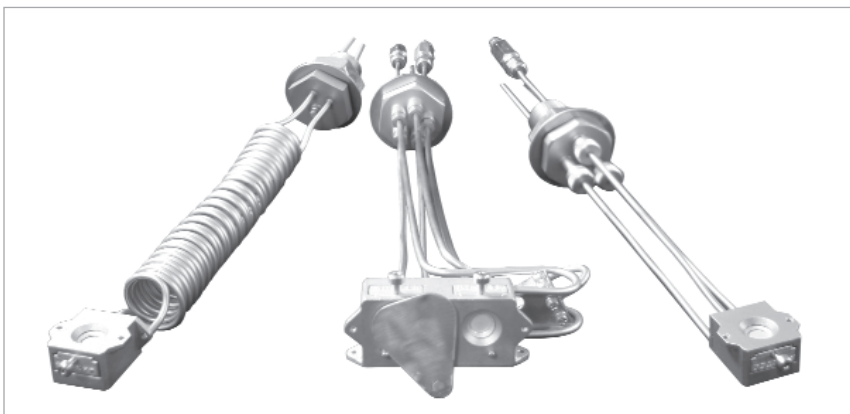
Various thin film thickness measuring instruments may be installed in the UNIVEX units.

The selection depends on the measurements needed and the required degree of automation.

As standard, oscillating crystal systems are used. These may consist of one or several sensing heads with or without shutter, and upon request are available for UHV operation (i.e. are suitable for degassing).

These are driven either by a monitor (allowing only the measurement of deposition rate and film thickness) or by a controller (allowing measurement of the film parameters and control of the deposition rate).

**Upon request we can provide an offer which specifically matches the requirements of your application.**



# Substrate Manipulation Solutions

## Substrate Rotation

In order to improve or change the film properties during the deposition process, rotation of the substrates is often necessary.

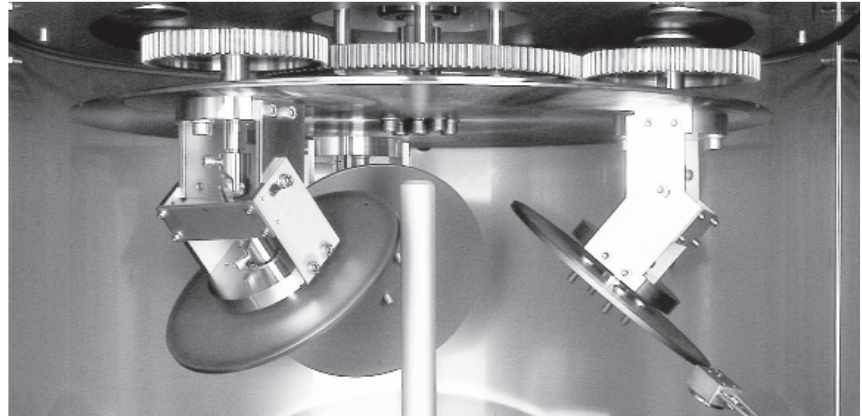
The Oerlikon Leybold Vacuum UNIVEX system is available with a wide range of possible accessories for substrate rotation such as a simple static or rotatable workholder plate or a more elaborate planetary drive mechanism. Additional options include the heating, cooling or biasing of the substrate before, during or after the deposition process. Your specific requirements will dictate how the UNIVEX will be configured.



Rotatable, temperature controlled substrate holder with substrate shutter

## Substrate Holding

For mounting the substrate within the chamber, Oerlikon Leybold Vacuum offers vacuum substrate holders manufactured according to customer's specifications.



Planetary gear

## Substrate Heating

For temperature controlled heating of substrates, Oerlikon Leybold Vacuum offers a variety of different options such as resistance heaters or a wide range of quartz lamp heaters. Depending on the size of the substrate and the temperature range specified, we are prepared to offer customized solutions.

## Substrate Cooling

Heat sensitive substrates or substrate masks require cooling during deposition. Oerlikon Leybold Vacuum offers substrate holders that can be water-cooled, LN<sub>2</sub> cooled or used with special cooling fluids.

## Substrate Bias

Precleaning of the substrate with RF or DC biasing prior to deposition can improve the adhesive properties of the film. Oerlikon Leybold Vacuum offers substrate biasing using insulated substrate mounts and the customer specified power supply units and matching networks when required.





# CS Calibration Systems

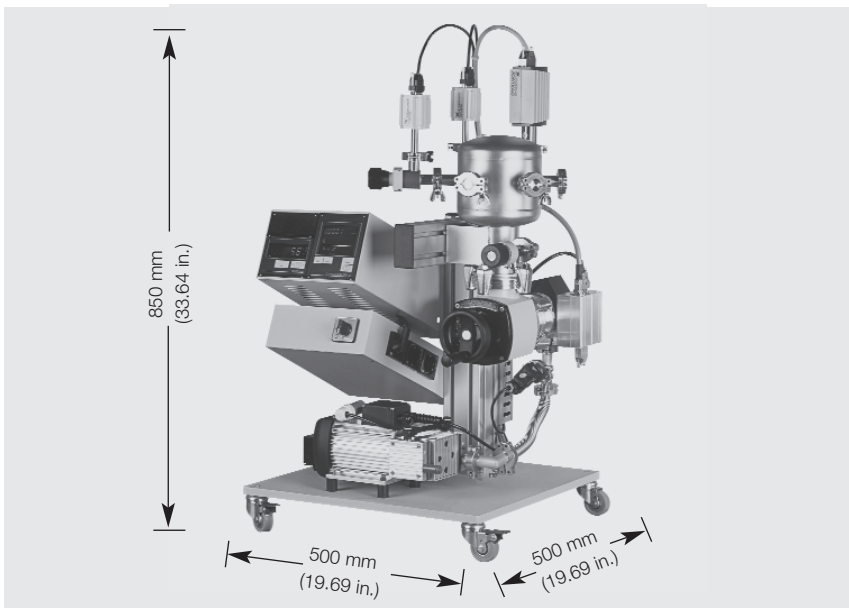
The requirements imposed on vacuum engineering with regard to accuracy of the measurements, reproducibility and unambiguity of the determined vacuum pressures have increased significantly over the last years.

Routine calibrations of vacuum gauges are an important component of quality assurance schemes. The calibration systems from Oerlikon Leybold Vacuum put the customer in a position to check and recalibrate on his own the specified and necessary accuracy of his vacuum gauges.

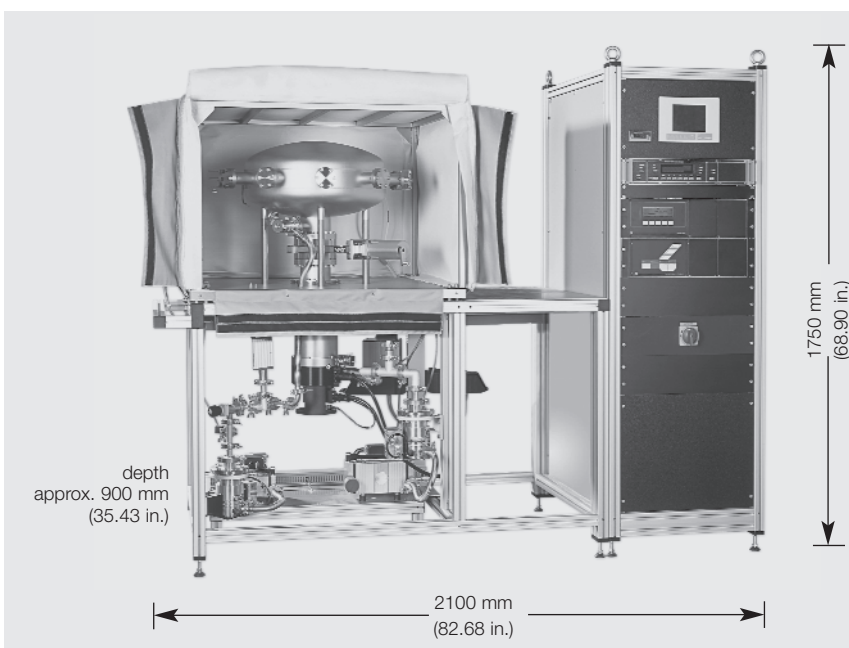
Calibration systems are available for this purpose which cover a calibration range from 1000 mbar to  $1 \times 10^{-7}$  mbar ( $750$  to  $0.75 \times 10^{-7}$  Torr).

Each system is equipped with several certified reference pressure sensors (transmitter standards), which each cover a part of the specified range of calibration pressures. In the pump system, turbomolecular pumps with TRIVAC rotary vane or DIVAC diaphragm pumps are used. A variable leak valve is used to admit the gas into the calibration chamber. In the case of the calibration system CS7, the gas inlet line is, moreover, equipped with it's own pump system.

The CS7 is equipped with a heater for the vacuum chamber, for the purpose of attaining lower chamber pressures more rapidly. The temperature of the heating collars can be controlled whereby the maximum degassing temperature will depend on the components installed (flanges, pressure sensors, valves).



CS3 calibration system



CS7 calibration system

## Advantages to the User

- Vacuum gauges and measurement systems of any make may be calibrated
- Designed in accordance with DIN 28 418/ISO/DIS 3567
- Transfer standards with PTB-, DAKKs- or factory certificate
- Easier DIN/ISO 9000 approval
- Reliable and reproducible measurements
- Quick start-up
- Measurement system free of hydrocarbons when using dry compressing vacuum pumps
- Simple operation
- CE approval

## Technical Data

## Calibration System

		CS3	CS7
Calibration range	mbar (Torr)	1000 to $1 \times 10^{-3}$ (750 to $0.75 \times 10^{-3}$ )	1000 to $1 \times 10^{-7}$ (750 to $0.75 \times 10^{-7}$ )
Pressure measurement range	mbar (Torr)	1000 to $2 \times 10^{-6}$ (750 to $1.5 \times 10^{-6}$ )	1000 to $2 \times 10^{-9}$ (750 to $1.5 \times 10^{-9}$ )
Vacuum chamber connections (in brackets: quantity available on the side of the customer's system)		5 (3) x DN 16 ISO-KF 1 (0) x DN 25 ISO-KF	6 (3) x DN 16 CF 6 (4) x DN 40 CF
Admitting gas		via variable leak valve	via variable leak valve
Extra pump system for admitting gas		no	yes
Heater for the vacuum chamber		no	yes

### Application examples:

Which pressure sensors may be calibrated with which system?

## Typ of Sensor

## Calibration System

	CS3	CS7
<b>Diaphragm sensors</b>		
BOURDONVAC	■	■
Capsule vacuum gauges	■	■
DIIVAC DV 1000	■	■
DI 200, DI 2000	■	■
CTR 90, CTR 91, CTR 100 (1000 - 1 Torr full scale)	■	■
CTR 91 (0.1 Torr full scale)		■
<b>THERMOVAC sensors</b>		
TR 301, TR 306	■	■
TR 211, TR 216, TTR 211, TTR 216, TTR 90, TTR 91, TTR 96, TTR 100	■	■
<b>VISCOVAC sensor (spinning rotor viscosity gauge)</b>		
VK 201		■
<b>PENNINGVAC sensors</b>		
PR 25, PR 26, PR 27, PR 35, PR 36, PR 37, PTR 90, PTR 225		■
<b>IONIVAC sensors</b>		
ITR 90, ITR 100, ITR 200		■
IE 414, IE 514		■

## Ordering Information

## Calibration System

	CS3	CS7
	Part No.	Part No.
Ordering information and options	upon request	upon request

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