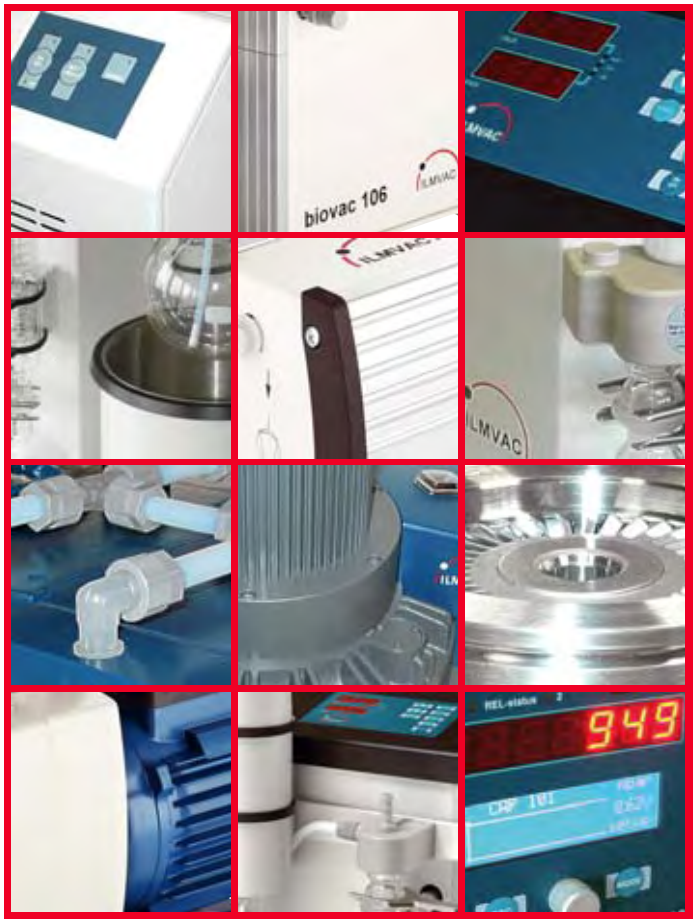
ILMVAC

vacuum meets the future

Vacuum Technology



Vacuum Generation

Vacuum Measurement and Control

Vacuum Accessories

Content

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Vacuum Pump Systems / Plants

Combination Pump Systems chemvac

The Combination Pump Systems chemvac are used for producing fine vacuum. They are corrosion optimized combinations of a two stage rotary vane pump and a chemically resistant diaphragm pump. The suction-side of the rotary vane pump is connected with the recipient for its evacuation. The integrated diaphragm pump evacuates the interior of the oil housing of the rotary vane pump. This negative pressure prevents the condensation of gases exhausted via the operation valve of the rotary vane pump and transports these over a separator system into the exhaust air.

Roots pump systems

ILMVAC Roots Pump Systems are complete, optimized and compact vacuum systems consisting of a roots pump and a two-stage backing pump. Roots pump systems are well established in many fields of production and research where large pumping speeds are required at pressures in the rough- and fine-vacuum range.

Turbomolecular pump systems

CDK turbomolecular pump systems are functional units for generating high and ultra-high vacuum. They are completely mounted in a housing and ready for operation. The individual components are perfectly matched to each other. The SST turbomolecular pump is equipped with dry-running, solid-lubricated hybrid ceramic bearings which prevent the vacuum being contaminated by greases, oils or their decomposition products.
The automatic shut-off system stops the backing pump when the required final vacuum is reached.

With STP turbomolecular pump systems the turbomolecular pump, the controller and the vacuum gauges are mounted on the central aluminium profile pillar at an optimum working height. The backing pump is solidly mounted on a mobile base plate, to which the profile pillar is also attached.

Oil diffusion systems

All systems comprise an oil diffusion pump, a rotary vane backing pump, a backing pressure gauge PIA 1.2, a high vacuum valve, backing/roughing valve, baseplate and pillar frame and all connections.
The optimum composition of components result in high pumping speed.
The ultimate pressure is reached very quickly due to the optimized design.

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Vacuum aspiration systems

ILMVAC aspiration systems provide for the safe transfer of liquid in all sectors of industry and in the laboratory.
The use of different pipet tips allows for safe and efficient removal of numerous fluids.

Vacuum anaerobic system anavac 104

The anaerobic aeration system anavac 104 consists of a controller as central unit, which is connected with a diaphragm pump, a reaction gas container and a rinsing gas system. The parameters of the aeration system are preset from the manufacturer. Over the interface RS 232 these can be changed easily by means of a PC or laptop as required. A detailed description is to be found in the manual. Via the start button the fully automatic process is released. The ventilation with the reaction gas follows the evacuation of the attached anaerobic container up to the adjusted pressure. The preset number of cycles is repeated automatically.

Vacuum connections for networks

ILMVAC vacuum networks can be constructed in an infinite number of ways to produce exactly the right solution for any requirement. The wide range of interchangeable valve models and connecting devices make the job of extending or reconfiguring the network easy. Constructed from chemically resistant materials, the network components are ideally suited for laboratory as well as industrial use. Any of our pumps can be used with these networks, the most common being diaphragm and scroll pumps.

Vacuum measurement and control

Whether your process operates in rough, fine or high vacuum, ILMVAC has the measurement solution for you. In addition, many of our measuring devices also have the onboard electronics to provide process control.

Vacuum flange components and valves

Please ask for our special catalog or visit our website to inform about our wide range of vacuum components.

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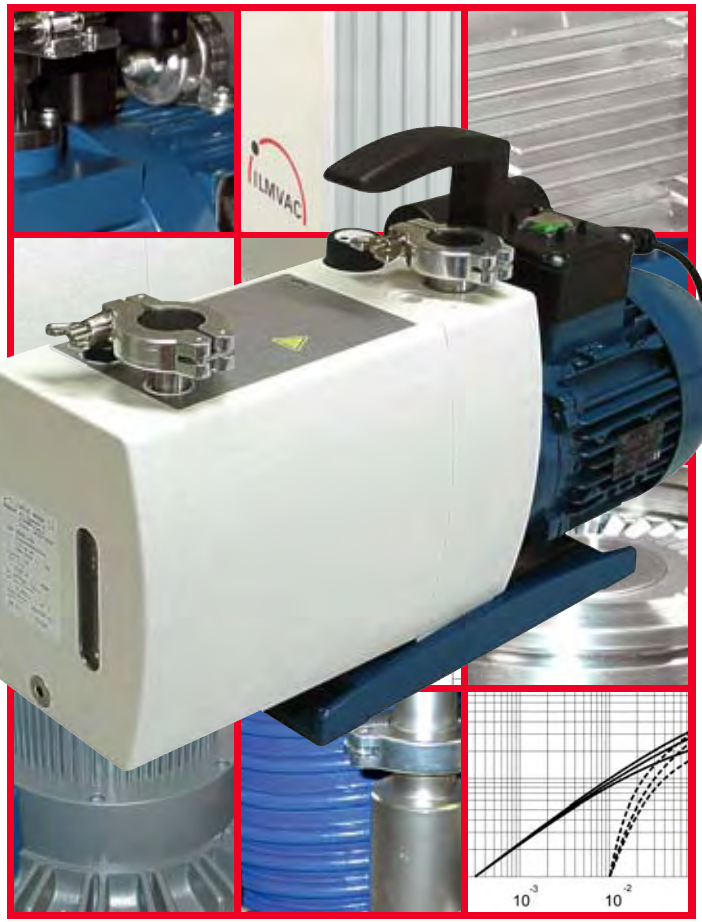
Applications

The following table is a guide to application compatibility.
Our specialists will help you to find the best solution for your application.

product application / ILMVAC product range	Semiconductor fabrication	Vacuum coating	Research and development	Transfer chamber	Chemistry / pharmacy	Metallurgy	Production of lamps	Automobile industry	Laser technology	Packing	Altitude Simulation	Analysis technology	Environmental technology	Refrigeration and climate technology	Electrical engineering	Mechanical engineering
Scroll pumps		X	X		X		X	X	X			X	X	X	X	X
Rotary vane pumps	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Diaphragm pumps		X	X		X	X	X	X	X	X	X		X		X	X
Turbomolecular pumps		X	X	X	X	X						X				
Oil diffusion pumps		X	X			X	X				X	X			X	X
LVS Laboratory Vacuum Systems			X		X							X	X			
Roots pump systems		X	X		X	X	X	X	X	X	X		X		X	X
Turbomolecular pump systems		X	X			X	X				X	X			X	X
Special pump systems	X	X	X	X	X	X	X	X		X	X		X	X	X	X
High vacuum systems		X	X									X			X	
Leak testing systems			X			X	X	X		X				X	X	X
Valves and flange components	X	X	X		X	X	X	X	X	X	X	X	X	X	X	X
Measurement and control	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X

Vacuum Pumps



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Scroll Pumps

Rotary Vane Pumps

Diaphragm Pumps

Turbomolecular Pumps

Oil Diffusion Pumps

Vacuum Generation - Scroll Pumps

Scroll Pumps, Dry Run

The new ILMVAC scroll pumps Dry Run I and II are completely dry-running vacuum generators. They have been particularly designed for applications involving condensable vapors and are ideal for chemical applications in laboratories and in industries. The scroll pumps can be operated either as a single pump or in pump combinations.
A special coating of all parts being in contact with the medias provides a good chemical resistance. However, chemical resistivity tolerance may vary according to the individual application.
The pump has a gas ballast device for the pumping of vapors up to a certain maximum suction pressure. Should condensate form in the pump body, the unique vertical construction of the pump allows it to flow out of the pressure port directly. The working pressure covers the rough and high vacuum ranges.

Ranges of application:
- chemical applications
- vacuum concentration
- vacuum drying
- freeze drying
- fine vacuum distillation
- degassing processes
- refrigeration technology
- vacuum furnaces
- dry-running backing-pump for turbomolecular pumps
- glove boxes

Ideal replacement for rotary vane pumps:
- electron microscopy
- accelerators
- vacuum methods with high degree of purity
- coating
- backing pumps for turbomolecular pumps
- refrigeration technology

Scope of delivery:
Scroll pump complete ready-to-use with mains connection cable and plug.

Accessory Maintenance Kit:
- quick and flexible repair of the pump
- simple assembly
- contains all usual wear and tear components

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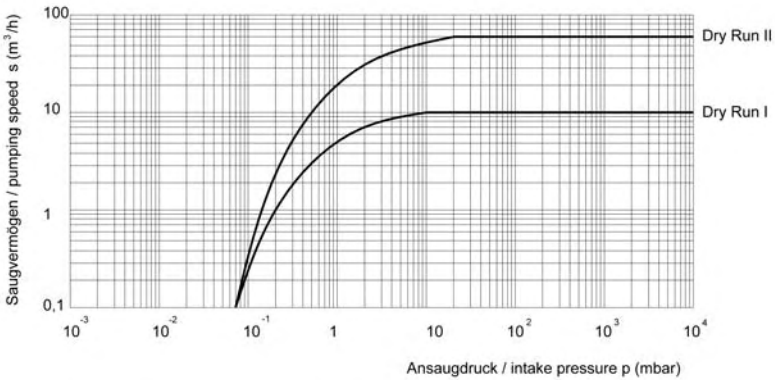
Special characteristics

- water vapor tolerance 50 mbar
- connection flange DN 25 KF
- motor power 550 W
- dimensions (W/D/H) 470/320/440 mm
- weight 30 kg



Technical Features

Type	Ultimate pressure total mbar	Pumping speed 50/60 Hz m³/h	l/min
Dry Run I	7×10^{-2}	9,5/11,2	158/187
Dry Run II	7×10^{-2}	14,5/17,2	242/287

Ordering Information

Type	Mains supply V / Hz	Mandatory accessories Connection cable	PU pcs.	Order-No.
Dry Run I	230 / 50/60 CEE	no	1	460002
Dry Run I	230 / 50/60 UK	no	1	460002-01
Dry Run I	230 / 50/60 CH	no	1	460002-02
Dry Run I	115 / 50/60 US	no	1	460002-03
Dry Run II	230 / 50/60 CEE	no	1	460003
Dry Run II	230 / 50/60 UK	no	1	460003-01
Dry Run II	230 / 50/60 CH	no	1	460003-02
Dry Run II	115 / 50/60 US	no	1	460003-03
Maintenance Kit for Dry Run I and II		no	1	402201

Vacuum Generation - Rotary Vane Pumps

Rotary Vane Pumps

ILMVAC has been developing and producing rotary vane pumps for 60 years. You can rely on our competence and experience. Our superior material selection and optimized design ensures the best performance and reliability. The result is a professional solution for research and industry.

Rotary vanes and bearings are lubricated automatically at an optimized oil pressure. This results in lower ultimate pressures and stabilizes the temperature of the pump. Hence, the lifetime is extended even under extreme conditions. The selected materials have good chemical resistance, making even the standard models suitable for chemical applications. The bearings are resistant against NH_3, amines and many solvents.

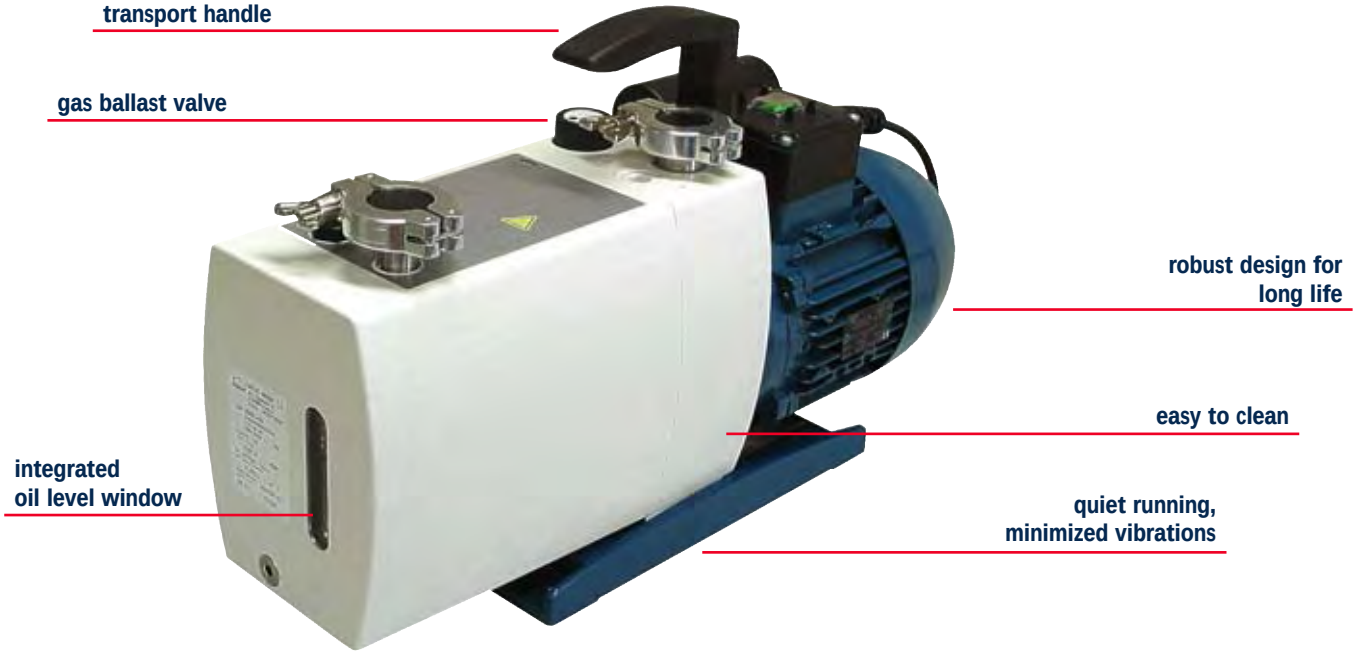
Ranges of application:

- vacuum drying
- freeze drying
- vacuum concentration

Scope of delivery:
Rotary vane pump complete with oil charging, centering ring and clamping ring.

On request:

- rotary vane pumps helium-tight
- rotary vane pumps with special oil
- rotary vane pumps with other voltages



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Special characteristics

- high water vapor tolerance for chemical applications
- compact, robust and functional construction
- low noise emission
- minimized oil contamination of the chamber by migration or suck-back
- high pumping speed
- free of non-ferrous metals
- low ultimate pressures are reached quickly
- direct drive with elastic coupling
- long service intervals
- low energy consumption
- easy reassembly when servicing
- continuous operation possible
- attach simply and switch on

Two-stage
Rotary Vane Pumps
P - Z Series
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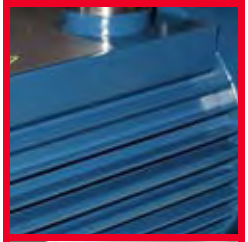

Two-stage
Rotary Vane Pump
PK 2 DC
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Two-stage
Rotary Vane Pump
P 65 D
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Two-stage
Rotary Vane Pumps
P-DF
with variable pumping speed
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One-stage
Rotary Vane Pumps
PS Series
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For accessories see page 122 - 130

Two-stage Rotary Vane Pumps, Types PZ and PK

The rotary vane pumps of the PZ and PK series from ILMVAC are characterized by their high water vapor tolerance and reliability. These pumps are ideally suited for use in the laboratory. They are low maintenance, compact and exceptionally quiet.

Special characteristics:

- low maintenace
- compact
- low weight
- small dimensions
- high water vapor tolerance
- high pumping speed
- easy to service
- high reliability
- quiet running

Ranges of application:

- in the rough and fine vacuum range
- chemical laboratories
- backing pump for turbomolecular pumps, roots pumps and diffusion pumps
- freeze drying
- process engineering

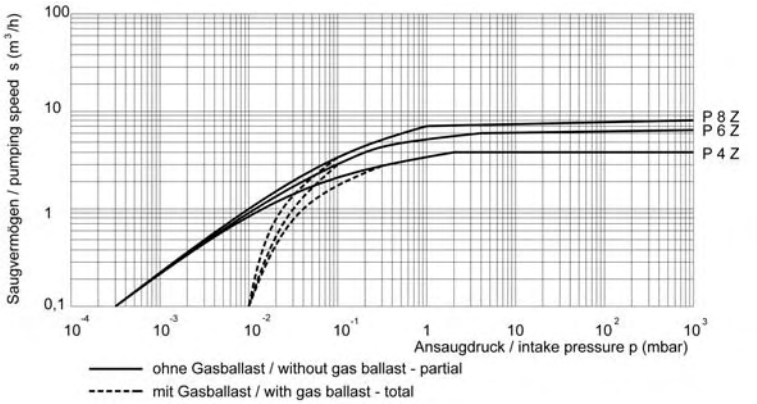
Two-stage Rotary Vane Pumps, Types P4Z, P6Z, P8Z, P12Z, P17Z, P23Z

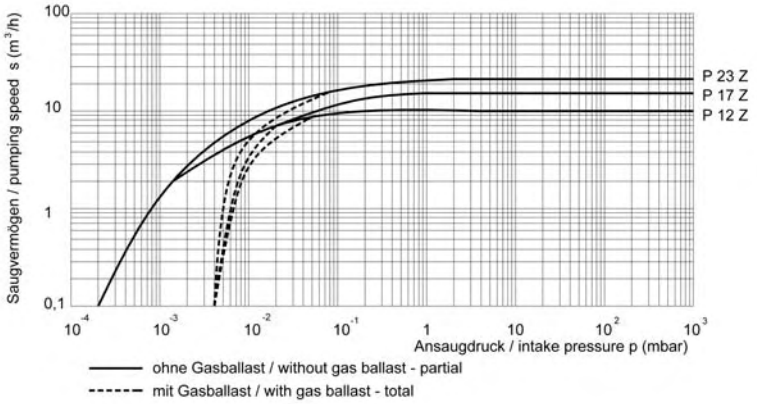
NEW

The new series of rotary vane pumps P-Z have a high water vapor tolerance and a very compact design. With a comprehensive range of accessories these pumps are applicable to a wide range of applications. Due to their low weight, small dimensions and the high pumping speed, these chemically resistant pumps are ideal for use in laboratories. They are low maintenance, compact and exceptionally quiet. To prevent accidental damage the oil control glass is integrated into the housing. The casings of the pumps are easy to clean.

Ranges of application:

- in the rough and fine vacuum range
- chemical laboratories
- as backing pump
- freeze drying
- process engineering





Scope of delivery:
Rotary vane pump complete with anti-suck back valve, oil charging, centering ring, clamping ring and motor overload protection.

Note:
Country specific mains connection cable must be ordered separately, see page 146.

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Special characteristics:

- two stage rotary vane pump
- high pumping speed
- high water vapor tolerance (60 mbar for P4Z, P6Z, P8Z and 35 mbar for P12Z, P17Z, P23Z)
- max. leak rate of inlet valve $7x10^{-5}$ mbar l/sec
- integrated oil control glass
- high temperature heat dissipation
- very low noise when running
- high reliability
- small dimensions
- low weight
- easy to service
- low maintenace
- easy to clean

Technical Features

Type	Ult. pressure w/o. gas ballast total mbar	Ult. pressure w/o. gas ballast partial mbar	Ult. pressure w. gas ballast total mbar	Pumping speed pneurop 50/60 Hz m^3/h	Pumping speed pneurop 50/60 Hz l/min	Dimensions (W/D/H) mm	Weight kg	Motor power W	Oil charge ml	Connections suction/ pressure side
P4Z	$2x10^{-3}$	$2x10^{-4}$	$1x10^{-2}$	4.6/5.5	77/92	405/150/215	17.5	370	1100	DN 16 KF
P6Z	$2x10^{-3}$	$2x10^{-4}$	$1x10^{-2}$	5.8/6.6	97/110	415/150/215	19.5	370	1000	DN 16 KF
P8Z	$2x10^{-3}$	$2x10^{-4}$	$1x10^{-2}$	7.2/8.6	120/143	430/150/215	21.5	370	1200	DN 25 KF
P12Z	$2x10^{-3}$	$1.5x10^{-4}$	$3x10^{-3}$	11.0/13.2	183/220	522/166/256	30.0	550	1400	DN 25 KF
P17Z	$2x10^{-3}$	$1.5x10^{-4}$	$3x10^{-3}$	16.0/19.2	267/320	522/171/256	33.0	750	1200	DN 25 KF
P23Z	$2x10^{-3}$	$1.5x10^{-4}$	$3x10^{-3}$	21.0/25.2	350/420	522/171/256	33.5	750	1000	DN 25 KF

Ordering Information

Type	Mains supply V / Hz	Mandatory accessories Connection cable	PU pcs.	Order-No.
P4Z	230 / 50/60	yes	1	302102
P4Z	115 / 50/60	yes	1	302102-01
P4Z	230/400V / 50/60Hz CEE	no	1	302102-02
P6Z	230 / 50/60	yes	1	302103
P6Z	115 / 50/60	yes	1	302103-01
P6Z	230/400V / 50/60Hz CEE	no	1	302103-02
P8Z	230 / 50/60	yes	1	302104
P8Z	115 / 50/60	yes	1	302104-01
P8Z	230/400V / 50/60Hz CEE	no	1	302104-02
P12Z	230 / 50/60	yes	1	302314
P12Z	115 / 50/60	yes	1	302314-01
P12Z	230/400V / 50/60Hz CEE	no	1	302314-02
P17Z	230 / 50/60	yes	1	302315
P17Z	115 / 50/60	yes	1	302315-01
P17Z	230/400V / 50/60Hz CEE	no	1	302315-02
P23Z	230 / 50/60	yes	1	302316
P23Z	115 / 50/60	yes	1	302316-01
P23Z	230/400V / 50/60Hz CEE	no	1	302316-02

Note:
Country specific mains connection cable separately to the device, see page 146.

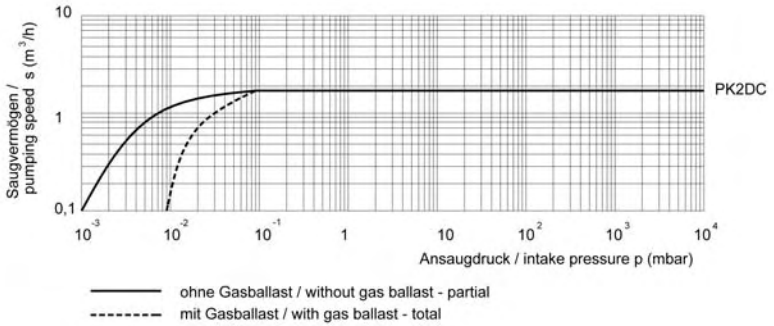
Two-Stage Rotary Vane Pump, Type PK 2 DC

Very small, highly efficient and chemically resistant rotary vane pump for laboratory applications.

Special characteristics:
- free of non-ferrous metals
- media contacting parts made of chemically resistant material
- all elastomers in Viton
- vanes of special plastics
- overload protected motor, IP 54 splash-proof
- water vapor tolerance 33 mbar

Ranges of application:
- vacuum distillation
- vacuum filtration
- vacuum drying
- refrigeration technique etc.

Scope of delivery:
Rotary vane pump ready-to-use with oil charging, centering ring, clamping ring, motor protection, main power switch, mains connection cable and plug.



Technical Features

Type	Ult. pressure w/o. gas ballast total mbar	Ult. pressure w/o. gas ballast partial mbar	Ult. pressure w. gas ballast total mbar	Pumping speed pneurop 50/60 Hz m³/h	Pumping speed pneurop 50/60 Hz l/min	Dimensions (W/D/H) mm	Weight kg	Motor power W	Oil charge ml	Connections suction/ pressure side
PK 2 DC	$1x10^{-2}$	$1x10^{-3}$	0.5	1.8/2.2	30/36	300/120/150	8	120	250	DN 16 KF

Ordering Information

Type	Mains supply V / Hz	Mandatory accessories Connection cable	PU pcs.	Order-No.
PK 2 DC	230 / 50/60 CEE	no	1	302010
PK 2 DC	230 / 50/60 UK	no	1	302010-05
PK 2 DC	230 / 50/60 CH	no	1	302010-06
PK 2 DC	115 / 50/60 US	no	1	302010-02

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Two-stage Rotary Vane Pump, Type P 65 D

The rotary vane pump P 65 D is low maintenance and is characterized by its high pumping speed. The pump is ideally suited for use in industry applications.

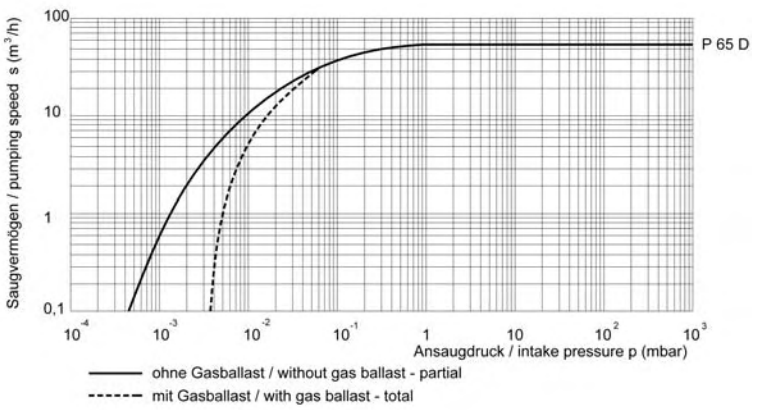
Special characteristics:

- two-stage rotary vane pump
- high pumping speed
- max. leak rate of inlet valve $7x10^{-5}$ mbar l/sec
- high water vapor tolerance, 33 mbar
- high temperature heat dissipation
- easy to service
- oil control glass
- very low noise when running
- compact
- low weight
- low maintenace
- high reliability
- easy to clean

Ranges of application:

- rough and fine vacuum range
- industry
- as backing pump for roots pumps
- freeze drying
- process engineering

Scope of delivery:
Rotary vane pump complete with oil charging, centering ring and clamping ring, without motor protection and mains connection cable.
The pump must be installed by an electrician.



Technical Features

Type	Ult. pressure w/o. gas ballast total mbar	Ult. pressure w/o. gas ballast partial mbar	Ult. pressure w. gas ballast total mbar	Pumping speed pneurop 50/60 Hz m³/h	Pumping speed pneurop 50/60 Hz l/min	Dimensions (W/D/H) mm	Weight kg	Motor power W	Oil charge ml	Connections suction/ pressure side
P 65 D	$3x10^{-3}$	$5x10^{-4}$	$6x10^{-2}$	60/72	1000/1200	735/242/365	90	2200	4500	DN 40 KF

Ordering Information

Type	Mains supply V / Hz	Mandatory accessories Connection cable	PU pcs.	Order-No.
P 65 D	230/400 / 50/60	no	1	302140

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Two-Stage Rotary Vane Pumps, Type P-DF, variable pumping speed

For some technical or laboratory applications we recommend these rotary vane pumps with variable pumping speed. The pumping speed is controlled without any complicated valve mechanism. They are used when pumping speed needs to be varied without the expense of complex down stream flow control. The individual parameters can be easily setup by the end-user or our technicans if requested. The parameters may be optimized to the process. The variable pumping speed pumps are energy saving and have an extended life time as well as longer service intervals. Rotary vanes and bearings are lubricated automatically at an optimized oil pressure. This results in lower ultimate pressures and stabilizes the temperature of the pump. Selected materials guarantee good chemical resistance. Even for many chemical applications the standard model is suitable.

Special characteristics:

- speed controlled to match performance to demand
- low, ultimate pressures are reached quickly
- high water vapor tolerance, 30 mbar
- low noise emission
- high temperature heat dissipation
- low maintenance
- low weight
- compact, robust and functional construction
- an intake valve prevents oil back-streaming
- direct drive with elastic coupling
- easy reassembly when servicing and cleaning
- continuous operation due to high technology design
- integrated oil control glass
- high reliability

Ranges of application:

- in the rough and fine vacuum range
- chemical laboratories
- backing pump for turbomolecular pumps, roots pumps and diffusion pumps
- freeze drying
- process engineering

Scope of delivery:
Rotary vane pump with frequency converter ready-to-use with oil charging, centering ring, clamping ring, mains switch, mains cable and plug.

Technical Features

Type	Ult. pressure w/o. gas ballast total mbar	Ult. pressure w/o. gas ballast partial mbar	Ult. pressure w. gas ballast total mbar	Pumping speed pneurop 50/60 Hz m^3/h	Pumping speed pneurop 50/60 Hz l/min	Dimensions (W/D/H) mm	Weight kg	Motor power W	Oil charge ml	Connections suction/ pressure side
P 30 DF	$2x10^{-3}$	$1.5x10^{-4}$	$3x10^{-3}$	30	500	650/270/270	38	1100	1100	DN 25 KF
P 40 DF	$2x10^{-3}$	$1.5x10^{-4}$	$3x10^{-3}$	37	617	650/270/270	39	1500	1100	DN 25 KF

Ordering Information

Type	Mains supply V / Hz	Mandatory accessories Connection cable	PU pcs.	Order-No.
P 30 DF	230 / 50/60 CEE	no	1	302473
P 40 DF	230 / 50/60 CEE	no	1	302472

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Rotary Vane Pump Systems

ILMVAC produces customized rotary vane pump systems for applications in research, development and industry.

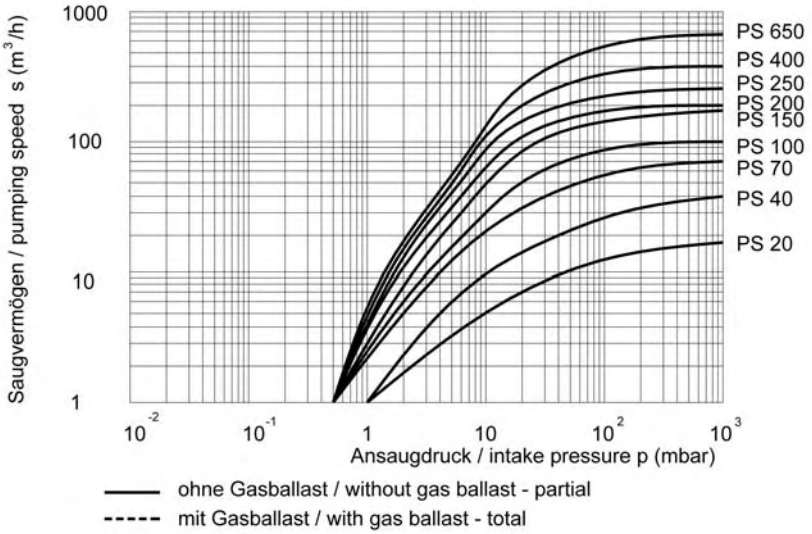
Examples are to be found from page 84 in this catalog.

One-stage Rotary Vane Pumps, Type PS 20 - PS 650

The robust rotary vane pumps of the PS-series are well suited for applications in the rough vacuum range. Recommended for routine use in industry as well as for research and development. The highly reproducible CNC manufacturing process guarantees production of high precision components. The PS-series is constructed for continuous operation.

Special characteristics:

- suction pressure range 0.5 (1) - 1000 mbar
- high pumping speed
- quiet running
- low noise level depending on type 63 - 80 dB(A)
- reliable air cooling
- functional and safe, even in continuous operation
- low maintenance requirements
- motors acc. to IEC-standard



Scope of delivery:
Rotary vane pump with integrated exhaust filter and anti-suck back valve, oil charging, centering ring and clamping ring, without motor protection and mains connection cable.
The pump must be installed by an electrician.

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url: www.ilmvac.us

Technical Features

Typ	Ultimate presure w/o gas ballast total mbar	Pumping speed pneurop 50 Hz m³/h	l/min	Dimensions (W/D/H) mm	Weight kg	Motor power W	Oil charge ml	Connections suction/ pressure side
PS 20	1.0	18	300	245/338/219	20	550	1000	DN 25 KF
PS 40	1.0	40	667	300/485/285	38	1500	1000	DN 40 KF
PS 70	0.5	70	1167	374/800/380	65	2400	2000	DN 40 KF
PS 100	0.5	100	1667	374/850/380	77	2400	2000	DN 63 ISO-K
PS 150	0.5	160	2667	531/970/480	135	4000	7000	DN 63 ISO-K
PS 200	0.5	190	3167	513/1070/480	158	5500	7000	DN 63 ISO-K
PS 250	0.5	240	4000	531/1160/480	181	7800	7000	DN 63 ISO-K
PS 400	0.5	400	6667	672/1392/565	400	11000	14000	DN 100 ISO-K
PS 650	0.5	630	10500	682/1610/565	525	15000	14000	DN 100 ISO-K

Ordering Information

Type	Mains supply V / Hz	Mandatory accessories Connection cable	PU pcs.	Order-No.
PS 20	230 / 50 CEE	no	1	301861
PS 20	3x230/400 / 50/60	no	1	301851
PS 40	230 / 50 CEE	no	1	301862
PS 40	3x230/400 / 50/60	no	1	301852
PS 70	3x230/400 / 50/60	no	1	301853
PS 100	3x230/400 / 50/60	no	1	301854
PS 150	3x230/400 / 50/60	no	1	301855
PS 200	3x230/400 / 50/60	no	1	301856
PS 250	3x400/690 / 50/60	no	1	301857
PS 400	3x400/690 / 50/60	no	1	301858
PS 650	3x400/690 / 50/60	no	1	301859

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Vacuum Generation - Diaphragm Pumps

Diaphragm Pumps

For dry, oil-free applications in the rough and fine vacuum range, ILMVAC diaphragm pumps are used worldwide in production, laboratories, industry, education, and science research. As an economically and ecologically superior alternative to water jet vacuum pumps the ILMVAC diaphragm pump range always offers a versatile, practical solution for many diverse applications between atmosphere and 1 mbar.

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Special characteristics

- robust
- long lifetime
- very quiet running pumps
- low initial costs
- compact space saving design
- sandwich diaphragm
- very easy to service
- low operating costs

ILMVAC diaphragm pumps are available with

- different materials for chemical or physical processes
- regulated or unregulated vacuum
- pumping speeds from 5 - 267 l/min (0.3 - 16 m³/h)
- ultimate pressures from 75 down to < 1 mbar

ILMVAC diaphragm pumps

can be used in a wide range of applications. The components and materials selected provide optimal application in laboratory and industry. Also used as regeneration pumps in combination pump systems (chemvac), they fulfill their tasks due to the outstanding chemical resistance and the excellent vacuum parameters.

All ILMVAC diaphragm pumps are compact and functionally designed. Maintenance and service work is fast and easy. ILMVAC diaphragm pumps guarantee outstanding operation and a long life span. They work very quietly and contamination of process gases with oil cannot occur. ILMVAC diaphragm pumps are manufactured and tested in accordance with DN 28 432.

MPC series
for chemical applications
page 30 - 35

MPC series,
ATEX approved for
chemical applications in
explosive environments
page 36

MP series for
physical applications
page 37

ecoflex series for

for chemical applications
page 34 - 35

for physical applications
page 42 - 43

For accessories see page 131 - 139

ecoflex diaphragm pumps

are equipped with a state of the art vacuum control by controlling the pumping speed of the pumps. The vacuum is precisely adjusted to the needs of the process, resulting in more effective and reproducible processes. The additional pressure reduction allows the distillation of gas mixtures almost automatically and without fractionated operation. The operation costs can be reduced by 80%. ecoflex diaphragm pumps guarantee a positive economical and ecological balance.

Chemically resistant ecoflex diaphragm pumps (MPC) are resistant to aggressive solvents and acidic vapors. The diaphragms and gas contacting parts consist of PTFE and PTFE compounds. The pump and connection heads are carbon fiber reinforced to provide electrical conductivity and prevent electrostatic charging.

Diaphragm Pumps MPC for Chemical Applications

The diaphragm pumps for chemical applications -Type MPC- are resistant to aggressive solvents and acidic vapors typically used in laboratory processes. The diaphragms and all gas contaminated parts are made from PTFE and PTFE compounds. The pump and connection heads are carbon fiber reinforced to provide electrical conductivity and prevent electrostatic charging. A long life and minimal maintenance make these pumps a great option.

Ranges of application:

- for oil-free applications
- alternative to water jet pumps
- vacuum distillation
- vacuum drying
- vacuum filtration
- vacuum concentration
- degassing processes
- lifting of solvent and acidic vapors
- as backing pump

NEW
MPC 301 E

NEW
MPR 060 E
with power pack

Scope of delivery:
Diaphragm pump for chemical applications complete with ON/OFF switch and integrated protective switchgear for the motor, hose nozzles for hose inside diameters 8 mm and/or small flanges DN 16 KF and optimized vibration damping feet.

Note:
Country specific mains connection cable separately to the pump, see page 146.

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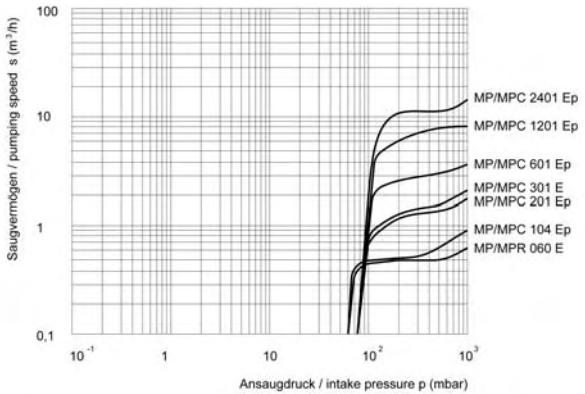
Diaphragm Pumps MPC, Ultimate Pressure < 75 mbar

Special characteristics:
-- one-stage chemically resistant diaphragm pumps
-- suction/pressure flanges: hose nozzle DN 8 for hose inside diameter 8 mm or small flange DN 16 KF



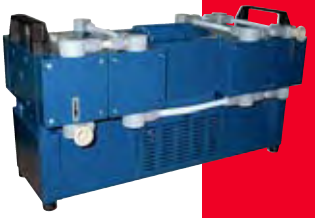
Technical Features

Type	Ult. pressure total DIN 28432 mbar	Pumping speed 50/60 Hz m³/h	Pumping speed 50/60 Hz l/min	Dimensions (W/D/H) mm	Weight kg	Motor power W	Connections suction/pressure side
MPR 060 E	< 60	0.6/-	14/-	115/165/145	2.8	20	DN 6/8 / DN 6/8
MPC 104 Ep	< 60	0.9/1.0	15/16.6	235/140/290	6.0	68	DN 8 / DN 8
MPC 201 Ep	< 75	1.8/2.0	30/33	195/235/145	6.5	60	DN 8 / DN 8
MPC 301 E	< 75	2.3/2.5	38/41	162/260/252	8.9	180	DN 8 / DN 8
MPC 601 Ep	< 75	3.8/4.2	63/70	230/265/169	11.2	180	DN 8 / DN 8
MPC 1201 Ep	< 75	8.3/9.1	138/151	230/380/169	18.3	180	DN 8 / DN 8
MPC 2401 Ep	< 75	15.5/17.0	258/283	540/300/240	32.8	370/440	DN 16 KF / DN 16 KF

Ordering Information

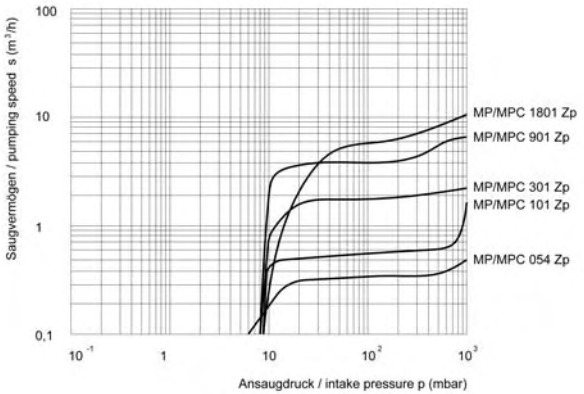
Type	Mains supply V / Hz	Mandatory accessories Connection cable	PU pcs.	Order-No.
MPR 060 E with power pack 24 V DC	90-260 / 50/60	yes	1	420322
MPC 104 Ep	230 / 50/60	yes	1	4000572
MPC 104 Ep	115/230 / 50/60	yes	1	4000572-01
MPC 201 Ep	230 / 50/60 CEE	no	1	400173
MPC 201 Ep	230 / 50/60 UK	no	1	400173-02
MPC 201 Ep	230 / 50/60 CH	no	1	400173-03
MPC 201 Ep	115 / 50/60 US	no	1	400173-04
MPC 301 E	230 / 50/60	yes	1	4000742
MPC 301 E	115 / 50/60	yes	1	4000742-01
MPC 601 Ep	230 / 50/60	yes	1	4000492
MPC 601 Ep	115 / 50/60	yes	1	4000492-03
MPC 601 Ep	230/400 / 50/60 CEE	no	1	4000492-04
MPC 1201 Ep	230 / 50/60	yes	1	4000532
MPC 1201 Ep	115 / 50/60	yes	1	4000532-03
MPC 1201 Ep	230/400 / 50/60 CEE	no	1	4000532-04
MPC 2401 Ep	230 / 50/60	yes	1	4001792
MPC 2401 Ep	115 / 50/60	yes	1	4001792-03
MPC 2401 Ep	230/400 / 50/60 CEE	no	1	4001792-04

Note:
Country specific mains connection cable separately to the device, see page 146.



Diaphragm Pumps MPC, Ultimate Pressure < 8 mbar

Special characteristics:
- two-stage chemically resistant diaphragm pumps
- suction/pressure flanges: hose nozzle DN 8 for hose inside diameter 8 mm or small flange DN 16 KF



Technical Features

Type	Ult. pressure total DIN 28432 mbar	Pumping speed 50/60 Hz m³/h	l/min	Dimensions (W/D/H) mm	Weight kg	Motor power W	Connections suction/pressure side
MPC 054 Zp	< 5	0.5/0.55	8/9.1	235/140/290	6.0	68	DN 8 / DN 8
MPC 101 Zp	< 8	1.0/1.1	16.7/18	195/235/145	6.5	60	DN 8 / DN 8
MPC 301 Zp	< 8	2.3/2.5	38/41	230/265/169	11.2	180	DN 8 / DN 8
MPC 901 Zp	< 8	6.8/7.5	113/125	230/380/169	18.3	180	DN 8 / DN 8
MPC 1801 Zp	< 8	12.0/13.3	201/222	540/300/240	32.8	370/440	DN 16 KF / DN 16 KF

Ordering Information

Type	Mains supply V / Hz	Mandatory accessories Connection cable	PU pcs.	Order-No.
MPC 054 Zp	230 / 50/60	yes	1	4000542
MPC 054 Zp	115/230 / 50/60	yes	1	4000542-01
MPC 101 Zp	230 / 50/60 CEE	no	1	400171
MPC 101 Zp	230 / 50/60 UK	no	1	400171-01
MPC 101 Zp	230 / 50/60 CH	no	1	400171-07
MPC 101 Zp	115 / 50/60 US	no	1	400171-06
MPC 301 Zp	230 / 50/60	yes	1	4000482
MPC 301 Zp	115 / 50/60	yes	1	4000482-03
MPC 301 Zp	230/400 / 50/60 CEE	no	1	4000482-04
MPC 901 Zp	230 / 50/60	yes	1	4000522
MPC 901 Zp	115 / 50/60	yes	1	4000522-03
MPC 901 Zp	230/400 / 50/60 CEE	no	1	4000522-04
MPC 1801 Zp	230 / 50/60	yes	1	4001552
MPC 1801 Zp	115 / 50/60	yes	1	4001552-03
MPC 1801 Zp	230/400 / 50/60 CEE	no	1	4001552-04

Note:
Country specific mains connection cable separately to the device, see page 146.

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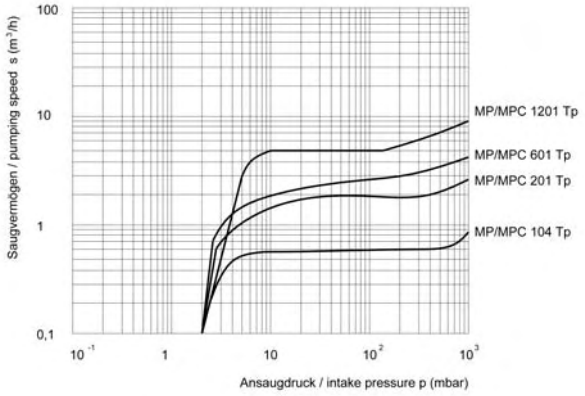
Diaphragm Pumps MPC, Ultimate Pressure < 2 mbar

Special characteristics:
- three-stage chemically resistant diaphragm pumps
- suction/pressure flanges: hose nozzle DN 8 for hose inside diameter 8 mm or small flange DN 16 KF



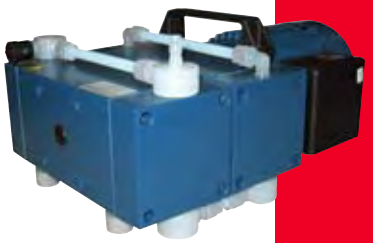
Technical Features

Type	Ult. pressure total DIN 28432 mbar	Pumping speed 50/60 Hz m³/h	l/min	Dimensions (W/D/H) mm	Weight kg	Moto-power W	Connections suction/pressure side
MPC 104 Tp	< 2	0.8/0.9	13/15	235/140/340	7.1/7.9	60	DN 8 / DN 8
MPC 201 Tp	< 2	2.0/2.2	33/36	200/260/150	10.3	90	DN 8 / DN 8
MPC 601 Tp	< 2	4.5/4.9	75/81	230/380/169	18.3	180	DN 8 / DN 8
MPC 1201 Tp	< 2	8.3/9.1	135/151	540/300/240	32.8	370/440	DN 16 KF / DN 16 KF

Note:
Country specific mains connection cable separately to the device, see page 146.

Ordering Information

Type	Mains supply V / Hz	Mandatory accessories Connection cable	PU pcs.	Order-No.
MPC 104 Tp	230 / 50/60	yes	1	400082
MPC 104 Tp	115 / 50/60	yes	1	400082-03
MPC 201 Tp	230 / 50/60 CEE	no	1	400177
MPC 201 Tp	230 / 50/60 UK	no	1	400177-01
MPC 201 Tp	230 / 50/60 CH	no	1	400177-08
MPC 201 Tp	115 / 50/60 US	no	1	400177-05
MPC 601 Tp	230 / 50/60	yes	1	4000512
MPC 601 Tp	115 / 50/60	yes	1	4000512-03
MPC 601 Tp	230/400 / 50/60 CEE	no	1	4000512-04
MPC 1201 Tp	230 / 50/60	yes	1	4001782
MPC 1201 Tp	115 / 60	yes	1	4001782-03
MPC 1201 Tp	230/400 / 50/60 CEE	no	1	4001782-04



Diaphragm Pumps MPC for Chemical Applications

The new generation of intelligent vacuum engineering. ecoflex diaphragm pumps are equipped with a state of the art vacuum control by controlling the pumping speed of the pumps. The vacuum is precisely adjusted to the needs of the process, resulting in more effective and reproducible processes. The additional pressure reduction allows the distillation of gas mixtures almost automatically and without fractionated operation. Operation costs can be reduced by 80%, and ecoflex diaphragm pumps guarantee a positive economical and ecological balance.

Chemically resistant ecoflex diaphragm pumps (MPC) are resistant to aggressive solvents and acidic vapors. The diaphragms and gas contacting parts consist of PTFE and PTFE compounds. The pump and connection heads are carbon fiber reinforced to provide electrical conductivity and prevent electrostatic charging.

Special characteristics

- two- or three-stage chemically resistant diaphragm pumps
- precisely regulated vacuum
- process orientated pumping spped
- automatic vacuum adjustment
- accurate processes with distillation, drying etc.
- optimal condensation due to constant vacuum
- optimal product yield
- low noise level
- reduced wear and tear
- long service intervals
- reduced operating costs by reduced energy consumption
- long life span
- selection of different process cycles
- menu-led programming via the display of the vacuum controller
- operating over windows via PC (optional)
- serial interface RS 232 for PC connection
- storage of all program and measuring data

Scope of delivery:
- diaphragm pump with special motor and vacuum control box VCB 424
- connections: hose nozzle DN 8 for hose inside diameters 8 mm

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Diaphragm Pumps MPC, Ultimate Pressure < 8 mbar, ecoflex

The pumping speed diagram of the ecoflex diaphragm pumps is identical to the one of the standard types listed on pages 32 - 33.

Technical Features

Type	Ult. pressure total DIN 28432 mbar	Pumping speed 50/60 Hz m³/h	Pumping speed 50/60 Hz l/min	Dimensions (W/D/H) mm	Weight kg	Motor power W	Connections suction/pressure side
MPC 301 Zp ecoflex	< 8	2.6	38	260/310/190	15.5	200	DN 8 / DN 8

Ordering Information

Type	Mains supply V / Hz	Mandatory accessories Connection cable	PU pcs.	Order-No.
MPC 301 Zp ecoflex	230 / 50/60 CEE	no	1	4200112
MPC 301 Zp ecoflex	230 / 50/60 UK	no	1	4200112-01
MPC 301 Zp ecoflex	230 / 50/60 CH	no	1	4200112-02
MPC 301 Zp ecoflex	115 / 50/60 US	no	1	4200112-05

Diaphragm Pumps MPC, Ultimate Pressure < 2 mbar, ecoflex

Technical Features

Type	Ult. pressure total DIN 28432 mbar	Pumping speed 50/60 Hz m³/h	Pumping speed 50/60 Hz l/min	Dimensions (W/D/H) mm	Weight kg	Motor power W	Connections suction/pressure side
MPC 601 Tp ecoflex	< 2	4.9	75	260/420/190	22.6	390	DN 8 / DN 8
MPC 1201 Tp ecoflex	< 2	8.3	138	540/300/320	34.0	370	DN 16 KF / DN 16 KF

Ordering Information

Type	Mains supply V / Hz	Mandatory accessories Connection cable	PU pcs.	Order-No.
MPC 601 Tp ecoflex	230 / 50/60 CEE	no	1	4200132
MPC 601 Tp ecoflex	230 / 50/60 UK	no	1	4200132-01
MPC 601 Tp ecoflex	230 / 50/60 CH	no	1	4200132-02
MPC 601 Tp ecoflex	115 / 50/60 US	no	1	4200132-05
MPC 1201 Tp ecoflex	230 / 50/60	yes	1	4200152

Note:
Country specific mains connection cable separately to the device, see page 146.

Diaphragm Pumps MPC for Chemical Applications, ATEX Approved

For the evacuation of combustible atmospheres inside or outside of a highly combustible environment, an evaluation of the process is to be executed after guideline 1999/92/EG (ATEX 137) by the user. According to the results from this evaluation a suitable device of category 1, 2 or 3 has to be selected to fulfill the demands for zone 0, 1 or 2 requirements to and the regulations of the guideline 94/9/EG (ATEX 95).

The ILMVAC GmbH developed different diaphragm pump types on the basis of experiences of many years for EX applications. They provide the application in the device category 2 or 3 / zone 1 or 2. All devices are provided with inspection certificate and fulfill the demands relevant to the ATEX guideline.

Diaphragm pump MPC 301 Zp, Ex ATEX Cat.2

Ex-Designation	II 2G c II B T4x
Type Examination Certificate no.	IBExU 04 ATEX B017X
Inert gas flushing of the drive	20 l/h
Sound preesure level	< 44 dB(A)
Three-phase a.c. motor	without motor protection switch, switch and cable

Diaphragm pump MPC 601 Tp, Ex ATEX Cat.2

Ex-Designation	II 2G c II B T4x
Type Examination Certificate no	IBExU 04 ATEX B018X
Inert gas flushing of the drive	20 l/h
Sound preesure level	< 44 dB(A)
Three-phase a.c. motor	without motor protection switch, switch and cable

Diaphragm Pumps MPC, ATEX Approved

Technical Features

Type	Ult. pressure total DIN 28432 at 1500 min^{-1}	Pumping speed 50 Hz at 1500 min^{-1}		Dimensions (W/D/H)	Weight	Motor power	Connections suction/pressure side
	mbar	m³/h	l/min	mm	kg	W	
MPC 301 Zp, Ex ATEX Cat.2	< 8	2.3	38	240/300/260	22.9	180	DN 8
MPC 601 Tp, Ex ATEX Cat.2	< 2	4.5	75	240/425/272	29.7	370	DN 16 KF

Ordering Information

Type	Mains supply V / Hz	Mandatory accessories Connection cable	PU pcs.	Order-No.
MPC 301 Zp, Ex ATEX Kat.2	400 / 50	no	1	4000481-04
MPC 601 Tp, Ex ATEX Kat.2	400 / 50	no	1	4000511-04

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Diaphragm Pumps MP for Physical Applications

The MP series of diaphragm pumps for physical applications provide a compact design and oil free evacuation. They are available in one- or multistage configuration - with controlled (ecoflex) or uncontrolled pumping speed. The pumps provide a very long life.

Ranges of application:

- for physical applications
- dry oil-free in the rough vacuum range
- alternative to water jet pumps
- degassing processes
- manipulation technology
- as backing pumps

Scope of delivery:
Diaphragm pump complete with ON/OFF switch and integrated protective switchgear for the motor, hose nozzles for hose inside diameters 8 mm and/or small flanges DN 16 KF and optimized anti vibration feet.

NEW
MP 301 E

NEW
MP 060 E
with power pack

Note:
Country specific mains connection cable separately to the pump, see page 146.

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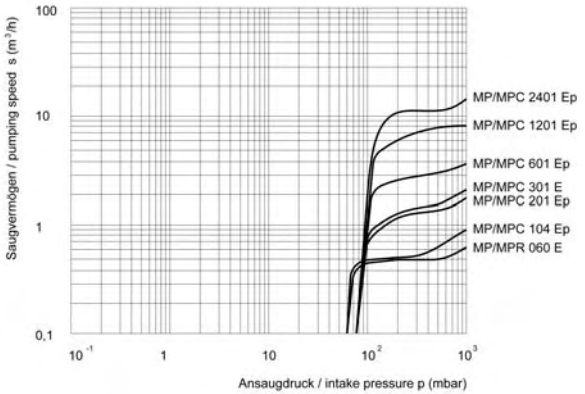
url: www.ilmvac.com.cn

Diaphragm Pumps MP, Ultimate Pressure < 75 mbar

Special characteristics:
- one-stage diaphragm pumps
- suction/pressure flanges: hose nozzle DN 8 for hose inside diameter 8 mm or small flange DN 16 KF
- option: gas ballast valve



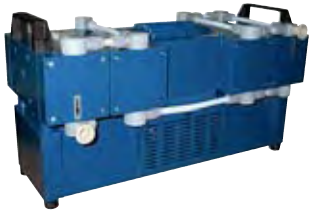
Technical Features

Type	Ult. pressure total DIN 28432 mbar	Pumping speed 50/60 Hz m³/h	l/min	Dimensions (W/D/H) mm	Weight kg	Motor power W	Connections suction/pressure side
MP 060 E	< 60	0.60/-	14/-	115/165/145	2.8	20	DN 6/8 / DN 6/8
MP 104 Ep	< 60	0.9/1.0	15/16.6	235/140/290	6.0	68	DN 8 / DN 8
MP 201 Ep	< 75	1.8/2.0	30/33	195/235/145	6.5	60	DN 8 / DN 8
MP 301 E	< 75	2.3/2.5	38/41	162/260/252	8.9	180	DN 8 / DN 8
MP 601 Ep	< 75	3.8/4.2	63/70	230/265/169	11.2	180	DN 8 / DN 8
MP 1201 Ep	< 75	8.3/9.1	138/151	230/380/169	18.3	370	DN 16 KF / DN 8
MP 2401 Ep	< 75	15.5/17.0	258/283	540/300/240	32.8	370/440	DN 16 KF / DN 16 KF

Ordering Information

Type	Mains supply V / Hz	Mandatory accessories Connection cable	PU pcs.	Order-No.
MP 060 E with power pack 24 V DC	100-240 / 50	yes	1	420312
MP 104 Ep	230 / 50/60	yes	1	4000592
MP 104 Ep	115/230 / 50/60	yes	1	4000592-01
MP 201 Ep	230 / 50/60 CEE	no	1	400172
MP 201 Ep	230 / 50/60 UK	no	1	400172-02
MP 201 Ep	230 / 50/60 CH	no	1	400172-03
MP 201 Ep	115 / 50/60 US	no	1	400172-04
MP 301 E	230 / 50/60	yes	1	4000732
MP 301 E	115 / 50/60	yes	1	4000732-01
MP 601 Ep	230 / 50/60	yes	1	4000292
MP 601 Ep	115 / 50/60	yes	1	4000292-03
MP 601 Ep	230/400 / 50/60 CEE	no	1	4000292-04
MP 1201 Ep	230 / 50/60	yes	1	4000392
MP 1201 Ep	115 / 50/60	yes	1	4000392-03
MP 1201 Ep	230/400 / 50/60 CEE	no	1	4000392-04
MP 2401 Ep	230 / 50/60	yes	1	4001532
MP 2401 Ep	115 / 60	yes	1	4001532-03
MP 2401 Ep	230/400 / 50/60 CEE	no	1	4001532-04

Note:
Country specific mains connection cable separately to the device, see page 146.



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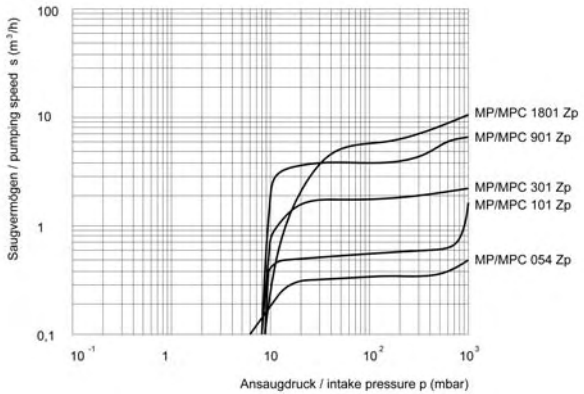
Diaphragm Pumps MP, Ultimate Pressure < 8 mbar

Special characteristics:
- two-stage diaphragm pumps
- suction/pressure flanges: hose nozzle DN 8 for hose inside diameter 8 mm or small flange DN 16 KF
- option: gas ballast valve



Technical Features

Type	Ult. pressure total DIN 28432 mbar	Pumping speed 50/60 Hz m³/h	Pumping speed 50/60 Hz l/min	Dimensions (W/D/H) mm	Weight kg	Motor power W	Connections suction/pressure side
MP 054 Zp	< 5	0.5/0.55	8/9.1	235/140/290	6.0	68	DN 8 / DN 8
MP 101 Zp	< 8	1.0/1.1	16.7/18	195/235/145	6.5	60	DN 8 / DN 8
MP 301 Zp	< 8	2.3/2.5	38/41	230/265/169	11.2	180	DN 8 / DN 8
MP 901 Zp	< 8	6.8/7.5	113/125	230/380/169	18.3	370	DN 16 KF / DN 8
MP 1801 Zp	< 8	12.0/13.3	201/222	540/300/240	32.8	370/440	DN 16 KF / DN 16 KF

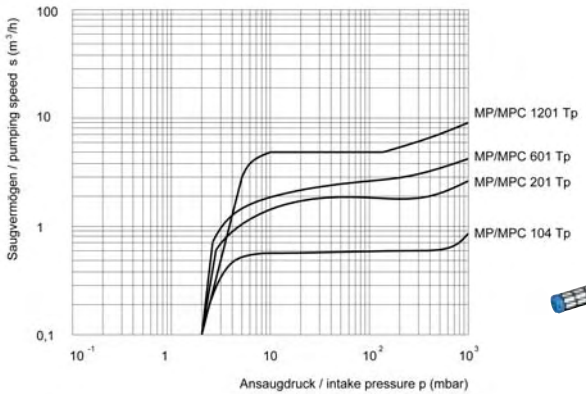
Ordering Information

Type	Mains supply V / Hz	Mandatory accessories Connection cable	PU pcs.	Order-No.
MP 054 Zp	230 / 50/60	yes	1	4000552
MP 054 Zp	115/230 / 50/60	yes	1	4000552-01
MP 101 Zp	230 / 50/60 CEE	no	1	400170
MP 101 Zp	230 / 50/60 UK	no	1	400170-03
MP 101 Zp	230 / 50/60 CH	no	1	400170-05
MP 101 Zp	115 / 50/60 US	no	1	400170-06
MPC 301 Zp	230 / 50/60	yes	1	4000282
MPC 301 Zp	115 / 50/60	yes	1	4000282-03
MPC 301 Zp	230/400 / 50/60 CEE	no	1	4000282-04
MPC 901 Zp	230 / 50/60	yes	1	4000322
MPC 901 Zp	115 / 50/60	yes	1	4000322-03
MPC 901 Zp	230/400 / 50/60 CEE	no	1	4000322-04
MPC 1801 Zp	230 / 50/60	yes	1	4001542
MPC 1801 Zp	115 / 60	yes	1	4001542-03
MPC 1801 Zp	230/400 / 50/60 CEE	no	1	4001542-04

Note:
Country specific mains connection cable separately to the device, see page 146.

Diaphragm Pumps MP, Ultimate Pressure < 2 mbar

Special characteristics:
- three-stage diaphragm pumps
- suction/pressure flanges: hose nozzle DN 8 for hose inside diameter 8 mm or small flange DN 16 KF
- option: gas ballast valve



Technical Features

Type	Ult. pressure total DIN 28432 mbar	Pumping speed 50/60 Hz m³/h	l/min	Dimensions (W/D/H) mm	Weight kg	Motor power W	Connections suction/pressure side
MP 201 Tp	< 2	2.0/2.2	33/36	200/260/150	10.3	90	DN 8 / DN 8
MP 601 Tp	< 2	4.5/4.9	75/81	230/380/169	18.3	370	DN 16 KF / DN 8
MP 1201 Tp	< 2	8.3/9.1	138/151	540/300/240	32.8	370/440	DN 16 KF / DN 16 KF

Ordering Information

Type	Mains supply V / Hz	Mandatory accessories Connection cable	PU pcs.	Order-No.
MP 201 Tp	230 / 50/60 CEE	no	1	400176
MP 201 Tp	230 / 50/60 UK	no	1	400176-02
MP 201 Tp	230 / 50/60 CH	no	1	400176-03
MP 201 Tp	115 / 50/60 US	no	1	400176-04
MP 601 Tp	230 / 50/60	yes	1	4000312
MP 601 Tp	115 / 50/60	yes	1	4000312-03
MP 601 Tp	230/400 / 50/60 CEE	no	1	4000312-04
MP 1201 Tp	230 / 50/60	yes	1	4001522
MP 1201 Tp	115 / 50/60	yes	1	4001522-03
MP 1201 Tp	230/400 / 50/60 CEE	no	1	4001522-04

Note:
Country specific mains connection cable separately to the device, see page 146.

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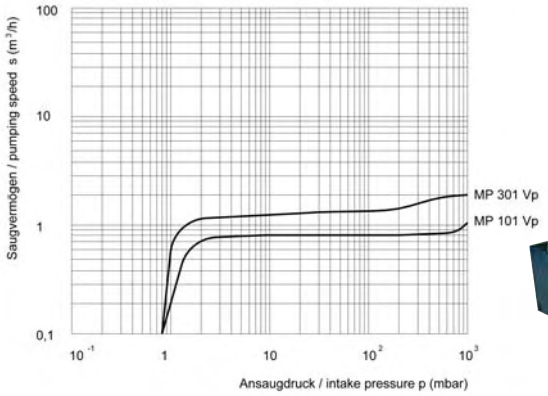
Diaphragm Pumps MP, Ultimate Pressure < 1 mbar

Special characteristics:
- four-stage diaphragm pumps
- suction/pressure flanges: hose nozzle DN 8 for hose inside diameter 8 mm or small flange DN 16 KF
- option: gas ballast valve



Technical Features

Type	Ult. pressure total DIN 28432 mbar	Pumping speed 50/60 Hz m³/h	l/min	Dimensions (W/D/H) mm	Weight kg	Motor power W	Connections suction/pressure side
MP 101 Vp	< 1	1.0/1.1	16.7/18	200/260/150	10.3	90	DN 8 / DN 8
MP 301 Vp	< 1	2.3/2.5	38/41	230/380/169	18.3	370	DN 16 KF / DN 8

Ordering Information

Type	Mains supply V / Hz	Mandatory accessories Connection cable	PU pcs.	Order-No.
MP 101 Vp	230 / 50/60 CEE	no	1	400180
MP 101 Vp	230 / 50/60 UK	no	1	400180-01
MP 101 Vp	230 / 50/60 CH	no	1	400180-02
MP 101 Vp	115 / 50/60 US	no	1	400180-03
MP 301 Vp	230 / 50/60	yes	1	4000722
MP 301 Vp	115 / 50/60	yes	1	4000722-03
MP 301 Vp	230/400 / 50/60 CEE	no	1	4000722-04

Note: Country specific mains connection cable separately to the device, see page 146.

Diaphragm Pumps MP ecoflex for Physical Applications

The new generation of intelligent vacuum engineering. ecoflex diaphragm pumps are equipped with a state of the art vacuum control by controlling the pumping speed of the pumps. The vacuum is precisely adjusted to the needs of the process, resulting in more effective and reproducible processes. The additional pressure reduction allows the distillation of gas mixtures almost automatically and without fractionated operation.

Operation costs can be reduced by 80%, and ecoflex diaphragm pumps guarantee a positive economical and ecological balance.

Special characteristics

- two-, three or four-stage diaphragm pumps
- precisely regulated vacuum
- process orientated pumping spped
- automatic vacuum adjustment
- accurate processes with distillation, drying etc.
- optimal condensation due to constant vacuum
- optimal product yield
- low noise level
- reduced wear and tear
- long service intervals
- reduced operating costs by reduced energy consumption
- long life span
- selection of different process cycles
- menu-led programming via the display of the vacuum controller
- operating over windows via PC (optional)
- serial interface RS 232 for PC connection
- storage of all program and measuring data

Scope of delivery:
- diaphragm pump with special motor and vacuum control box VCB 424
- connections: hose nozzle DN 8 for hose inside diameters 8 mm or small flange DN 16 KF

Diaphragm Pumps MP, Ultimate Pressure < 8 mbar, ecoflex

The pumping speed diagram of the ecoflex diaphragm pumps is identical to the one of the standard types listed on pages 39 - 41.

Technical Features

Type	Ult. pressure total DIN 28432 mbar	Pumping speed 50/60 Hz m^3/h	Pumping speed 50/60 Hz l/min	Dimensions (W/D/H) mm	Weight kg	Motor power W	Connections suction/pressure side
MP 301 Zp ecoflex	< 8	2.6	38	260/310/190	15.5	200	DN 8 / DN 8

Ordering Information

Type	Mains supply V / Hz	Mandatory accessories Connection cable	PU pcs.	Order-No.
MP 301 Zp ecoflex	230 / 50/60 CEE	no	1	4200102
MP 301 Zp ecoflex	230 / 50/60 UK	no	1	4200102-01
MP 301 Zp ecoflex	230 / 50/60 CH	no	1	4200102-02
MP 301 Zp ecoflex	115 / 50/60 US	no	1	4200102-03

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Diaphragm Pumps MP, Ultimate Pressure < 2 mbar, ecoflex

The pumping speed diagram of the ecoflex diaphragm pumps is identical to the one of the standard types listed on pages 39 - 41.

Technical Features

Type	Ult. pressure total DIN 28432 mbar	Pumping speed 50/60 Hz m³/h	Pumping speed 50/60 Hz l/min	Dimensions (W/D/H) mm	Weight kg	Motor power W	Connections suction/pressure side
MP 601 Tp ecoflex	< 2	4.9	75	260/420/190	22.6	390	DN 8 / DN 8
MP 1201 Tp ecoflex	< 2	8.3	138	540/300/320	34.0	370	DN 16 KF / DN 16 KF

Ordering Information

Type	Mains supply V / Hz	Mandatory accessories Connection cable	PU pcs.	Order-No.
MP 601 Tp ecoflex	230 / 50/60 CEE	no	1	4200142
MP 601 Tp ecoflex	230 / 50/60 UK	no	1	4200142-01
MP 601 Tp ecoflex	230 / 50/60 CH	no	1	4200142-02
MP 601 Tp ecoflex	115 / 50/60 US	no	1	4200142-03
MP1201 Tp ecoflex	230 / 50/60	yes	1	4200162

Note:
Country specific mains connection cable separately to the device, see page 146.

Diaphragm Pumps MP, Ultimate Pressure < 1 mbar, ecoflex

Technical Features

Type	Ult. pressure total DIN 28432 mbar	Pumping speed 50/60 Hz m³/h	Pumping speed 50/60 Hz l/min	Dimensions (W/D/H) mm	Weight kg	Motor power W	Connections suction/pressure side
MP 301 Vp ecoflex	< 1	2.6	38	260/420/190	22.6	390	DN 16 KF / DN 8

Ordering Information

Type	Mains supply V / Hz	Mandatory accessories Connection cable	PU pcs.	Order-No.
MP 301 Vp ecoflex	230 / 50/60 CEE	no	1	4200122
MP 301 Vp ecoflex	230 / 50/60 UK	no	1	4200122-01
MP 301 Vp ecoflex	230 / 50/60 CH	no	1	4200122-02
MP 301 Vp ecoflex	115 / 50/60 US	no	1	4200122-03

Vacuum Generation - Turbomolecular Pumps

Turbomolecular Pumps

For generating high and ultra-high vacuum. SST turbomolecular pumps are equipped with an integrated rough vacuum stage. Dry, solid-lubricated hybrid bearings with ceramic balls prevent the vacuum being contaminated by oils, greases or their decomposition products.

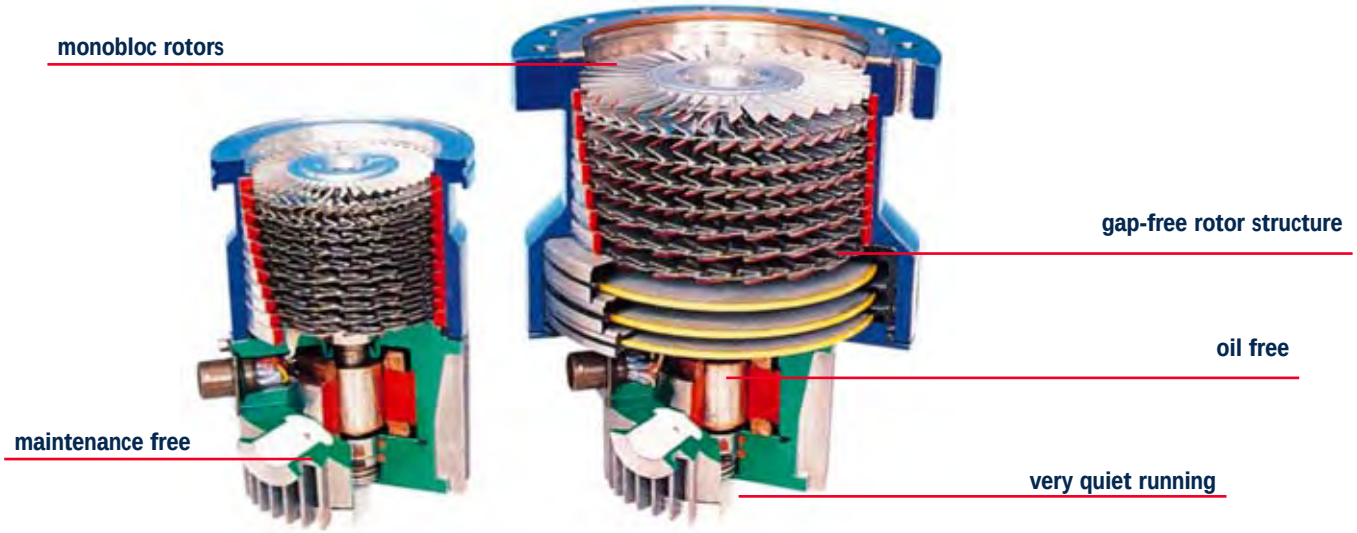
Special characteristics

- monobloc rotors with extremely low residual vibrations
- special blade design for a high pumping speed and a high compression ratio, particularly for light gases
- the gap-free rotor structure provides fast degassing on the high vacuum side
- fore-vacuum limiting pressure up to several mbars
- oil free, so no self-generation of light gases from hydrocarbon cracking products
- any operating position
- very quiet running, minimal noise level
- maintenance free under normal operation
- small dimensions, low weight

Ranges of application:

- for the high and ultra high vacuum ranges
- analysis technology
- electron microscopy
- surface analysis
- semiconductor industry with sputtering processes, etching
- research
- leak detection
- production of optical layers

Note:
Ultimate pressure statements and determination of the ultimate pressure according to DIN 28428:
Pressure achieved in the defined measuring dome after 48 hours and 24 hours baking of the measuring arrangement. The high vacuum flange (suction flange) of the turbomolecular pump is metal-sealed, that is it is designed as a ConFlat (CF) flange.



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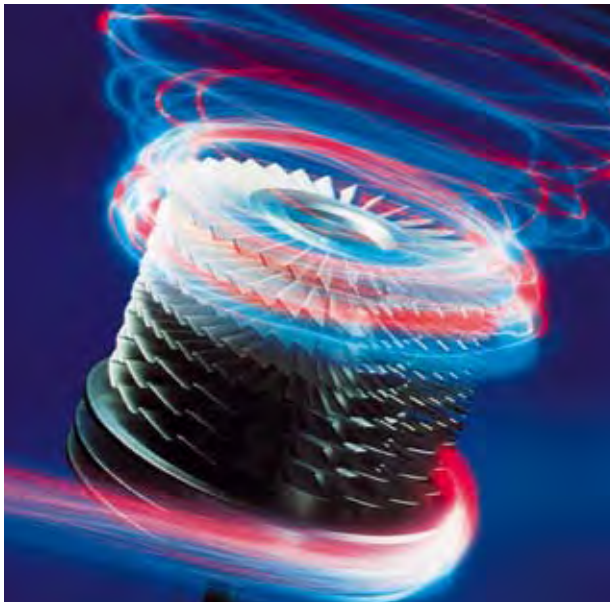


Turbomolecular Pumps
SST Series
page 46 - 47

Turbomolecular Pumps
SST Compact Series
page 48 - 49

Turbomolecular Pump
Systems CDK - in a
Housing, Compact
page 78 - 79

Turbomolecular Pump
Systems STP - on the
Pillar, Mobile
page 80 - 81

Special Turbomolecular
Pump Systems
page 94 - 95

For accessories
see
page 140 - 142

Turbomolecular Pumps
Series SST

SST turbomolecular pumps cover pumping speeds of 80, 300, 500, 700 and 1000 l/s.

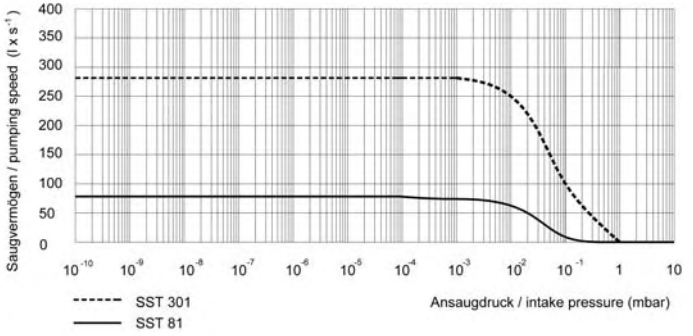
All modules, including the turbomolecular pumps, can be delivered separately, and can also be pre-assembled in accordance with the customers requirements.

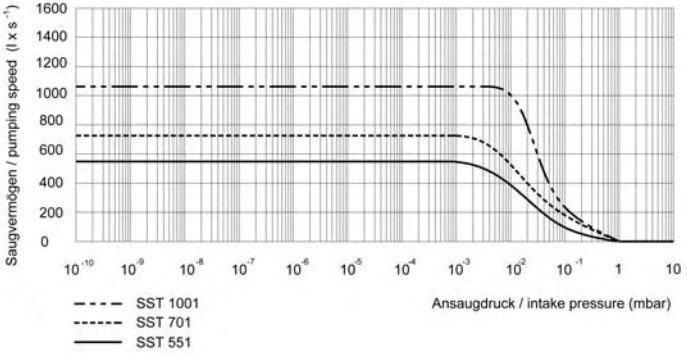
Special characteristics:

- oil free and therefore produces hydrocarbon free vacuum
- long bearing life, maintenance free operation
- low noise and vibration levels
- high pumping speed and compression ratio
- operates in any orientation
- optional air or water cooling
- compact and light weight

Scope of delivery:
Turbomolecular pump complete ready-to-use with mains connection cable and plug.

NEW





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url: www.ilmvac.us

Technical Features

Type	Ult. pressure DIN 28428 mbar	Pumping speed eff N_2/He/H_2 l/s	Dim. (W/H) mm	Weight kg	Connection flanges suction/pressure side	Speed /min	Run up time s	Cooling
SST 81	$5x10^{-10}$	77/65/50	95/145	2.0	DN 63 ISO - K / DN 16 KF	1350	60	air cooling
SST 81 UHV	$5x10^{-10}$	77/65/50	114/145	2.98	DN 63 ISO - K / DN 16 KF	1350	60	air cooling
SST 81/40	$5x10^{-10}$	50/56/50	95/164	2.0	DN 40 KF - K / DN 16 KF	1350	60	air cooling
SST 81/40 UHV	$5x10^{-10}$	50/56/46	95/162	2.98	DN 40 CF / DN 16 KF	1350	60	air cooling
SST 301	$5x10^{-10}$	280/230/210	144/177	4.2	DN 160 ISO - K / DN 16 KF	56000	180	air cooling
SST 301 UHV	$5x10^{-10}$	280/230/210	144/177	4.2	DN 160 ISO - K / DN 16 KF	56000	180	air cooling
SST 301R	$5x10^{-10}$	250/230/210	144/177	4.2	DN 100 ISO - K / DN 16 KF	56000	180	air cooling
SST 301R UHV	$5x10^{-10}$	250/230/210	144/177	4.2	DN 100 CF / DN 16 KF	56000	180	air cooling
SST 551	$1x10^{-10}$	550/600/510	204/256	16.0	DN 160 ISO - K / DN 25 KF	42000	300	air cooling
SST 551 UHV	$1x10^{-10}$	550/600/510	204/256	16.0	DN 160 CF / DN 25 KF	42000	300	air cooling
SST 551R UHV	$1x10^{-10}$	350/600/510	204/256	16.0	DN 100 CF / DN 25 KF	42000	300	air cooling
SST 701	$1x10^{-10}$	690/620/510	204/255	16.0	DN 200 ISO - K / DN 25 KF	42000	300	air cooling
SST 701 UHV	$1x10^{-10}$	690/620/510	204/255	16.0	DN 200 CF / DN 25 KF	42000	300	air cooling
SST 1001	$1x10^{-10}$	1050/900/920	232/209	21.2	DN 250 ISO - K / DN 40 KF	38000	240	air cooling
SST 1001R	$1x10^{-10}$	790/900/920	232/209	21.2	DN 160 ISO - K / DN 40 KF	38000	240	air cooling
SST 1001R UHV	$1x10^{-10}$	950/900/920	232/209	21.2	DN 200 CF / DN 40 KF	38000	240	air cooling

Ordering Information

Type	Mains supply V / frequency mod.	Mandatory accessories Connection cable	PU pcs.	Order-No.
SST 81	24	no	1	400287
SST 81 UHV	24	no	1	400289
SST 81/40	24	no	1	400288
SST 81/40 UHV	24	no	1	400290
SST 301	24	no	1	400276
SST 301 UHV	24	no	1	400276-03
SST 301R	24	no	1	400276-01
SST 301R UHV	24	no	1	400276-02
SST 551	24	no	1	400285
SST 551 UHV	24	no	1	400285-01
SST 551R UHV	24	no	1	400285-02
SST 701	24	no	1	400278
SST 701 UHV	24	no	1	400278-01
SST 1001	24	no	1	400280
SST 1001 UHV	24	no	1	400280-01
SST 1001R UHV	24	no	1	400280-02

Turbomolecular Pumps, Series SST Compact

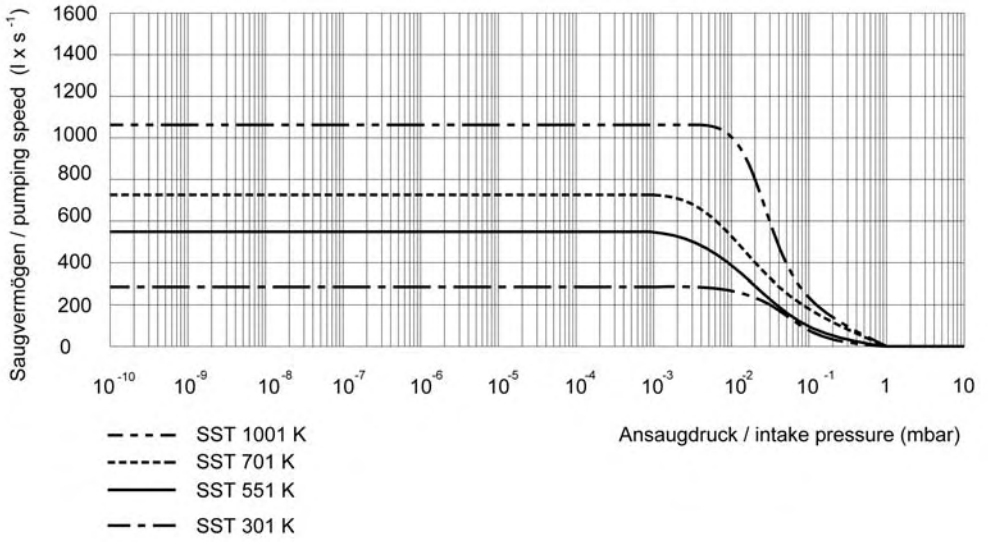
NEW

SST Compact Turbomolecular Pumps are very user friendly with on-board mini-Controllers. They can be put into use qickly and easily with little system assembly required as the controller is pre-configured.

The scope of supply includes the pump with Mini-controller (115/230V, 50/60 Hz) splinter screen, connecting cable and cooling fan. Also included is a CD with the operation software, which permits the communication between the PC and the mini controller.

SST Compact Turbomolecular Pumps are available with pumping speeds of 300, 500, 700 and 1000 l/s.

Scope of delivery:
Turbomolecular pump complete ready-to-use with mains connection cable and plug as well as with control software on CD.



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Technical Features

Type	Ult. pressure DIN 28428 mbar	Pumping speed eff N_2/He/H_2 l/s	Dim. (W/H) mm	Weight kg	Connection flanges suction/pressure side	Speed /min	Run up time s	Cooling
SST 301 K	$5x10^{-10}$	280/230/210	144/238	4.5	DN 160 ISO-K / DN 16 KF	56000	180	air cooling
SST 301 UHV K	$5x10^{-10}$	280/230/210	144/238	4.5	DN 160 CF / DN 16 KF	56000	180	air cooling
SST 301R K	$5x10^{-10}$	250/230/210	144/238	4.5	DN 100 ISO-K / DN 16 KF	56000	180	air cooling
SST 301R UHV K	$5x10^{-10}$	250/230/210	144/238	4.5	DN 100 CF / DN 16 KF	56000	180	air cooling
SST 551 K	$1x10^{-10}$	550/600/510	204/326	19.0	DN 160 ISO-K / DN 25 KF	42000	300	air cooling
SST 551 UHV K	$1x10^{-10}$	550/600/510	204/326	19.0	DN 160 CF / DN 25 KF	42000	300	air cooling
SST 551R UHV K	$1x10^{-10}$	350/600/510	204/326	19.0	DN 100 CF / DN 25 KF	42000	300	air cooling
SST 701 K	$1x10^{-10}$	690/620/510	204/325	19.0	DN 200 ISO-K / DN 25 KF	42000	300	air cooling
SST 701 UHV K	$1x10^{-10}$	690/620/510	204/325	19.0	DN 200 CF / DN 25 KF	42000	300	air cooling
SST 1001 K	$1x10^{-10}$	1050/900/920	232/323	26.6	DN 250 ISO-K / DN 40 KF	38000	240	air cooling
SST 1001R K	$1x10^{-10}$	790/900/920	232/323	26.6	DN 250 ISO-K / DN 40 KF	38000	240	air cooling
SST 1001R UHV K	$1x10^{-10}$	950/900/920	232/323	26.6	DN 160 ISO-K / DN 40 KF	38000	240	air cooling

Ordering Information

Type	Mains supply V / frequency modulation	Mandatory accessories Connection cable	PU pcs.	Order-No.
SST 301 K	115/230 / 50/60	no	1	400277
SST 301 UHV K	115/230 / 50/60	no	1	400277-04
SST 301RK	115/230 / 50/60	no	1	400277-05
SST 301R UHV K	115/230 / 50/60	no	1	400277-06
SST 551 K	115/230 / 50/60	no	1	400286
SST 551 UHV K	115/230 / 50/60	no	1	400286-01
SST 551R UHV K	115/230 / 50/60	no	1	400286-02
SST 701 K	115/230 / 50/60	no	1	400279
SST 701 UHV K	115/230 / 50/60	no	1	400279-01
SST 1001 K	115/230 / 50/60	no	1	400281
SST 1001R K	115/230 / 50/60	no	1	400281-01
SST 1001R UHV K	115/230 / 50/60	no	1	400281-02

Vacuum Generation - Oil Diffusion Pumps

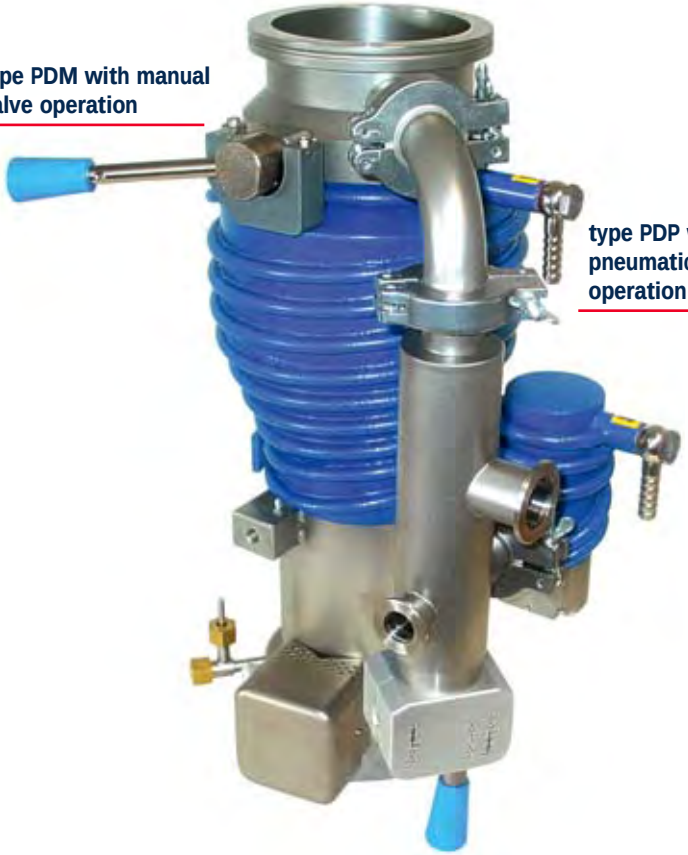
Oil Diffusion Pumps, PDM and PDP

For the high vacuum range using the oil diffusion technology. Oil diffusion pumps must be combined with a baking pump. The fore-vacuum must not exceed 0.1 mbar. ILMVAC also offers complete oil diffusion pump systems.

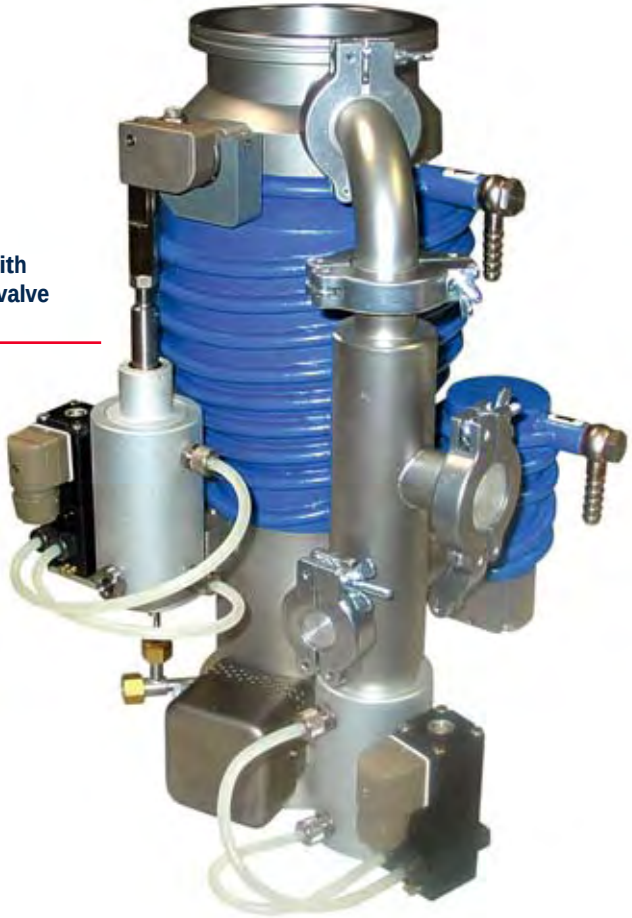
Ranges of application:
The oil diffusion pumps are ideal for numerous applications in research and development. Low back streaming ensures clean pumping.

Scope of delivery:
All oil diffusion pumps are complete pump systems including a high vacuum valve, a baffle, a backing valve and a roughing valve.
A mains connection cable is not available. The oil diffusion pumps must be installed by an electrician.

type PDM with manual valve operation



type PDP with pneumatic valve operation



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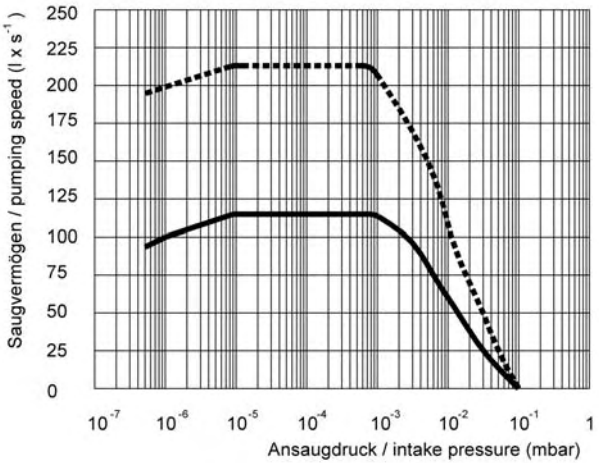
Special characteristics:

- high pumping speed, the ultimate pressure is reached very quickly due to the optimized design
- min. ultimate pressure (with silicone oil XT 704) 5 x 10^{-7} mbar
- oil vapor back flow at 10^{-4} mbar 2 x 10^{-4} mg x cm^{-2} x min^{-1}
- low cooling water consumption, cooling water connection with hose nozzles 2x DN 10
- type PDM with manual valve operation
- type PDP with pneumatic valve operation



Technical Features

Type	min. Ult. pressure with XT 704 mbar	Pumping speed at 10^{-3} to 10^{-5} mbar l/s	Dim. (W/D/H) mm	Weight kg	Connection flanges suction/pressure side	Oil charge ml	Heating power W	Cooling water consumption l/min
PDM 63	5x10^{-7}	110	220/115/370	8.0	DN 63 ISO-K / DN 16 KF	55	520	0.7
PDM 100	5x10^{-7}	210	300/260/450	11.8	DN 100 ISO-K / DN 25 KF	100	630	1.0
PDP 63	5x10^{-7}	110	220/115/370	9.0	DN 63 ISO-K / DN 16 KF	55	520	0.7
PDP 100	5x10^{-7}	210	300/260/450	14.5	DN 100 ISO-K / DN 25 KF	100	630	1.0

Ordering Information

Type	Mains supply V / frequency modulation	PU pcs.	Order-No.
PDM 63	230 / 50/60	1	400010
PDM 63	115 / 50/60	1	400010-03
PDM 100	230 / 50/60	1	400011
PDM 100	115 / 50/60	1	400011-03
PDP 63	230 / 50	1	400012
PDP 100	230 / 50	1	400013

Diaphragm Pump Systems

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Laboratory Vacuum Systems LVS

Vacuum Distillation Systems ilmdest

Hold Back Pump HBP 101

Cascade Diaphragm Pump Systems MPKC univac

Laboratory Vacuum Systems, LVS

ILMVAC Laboratory Vacuum Systems LVS are compact pump systems for conventional vacuum distillation. Equipped with a chemical resistant diaphragm pump (see the Diaphragm Pumps section), they are the ideal solution for many applications in chemical laboratories and research. ILMVAC Laboratory Vacuum Systems are equipped with or without pressure regulation depending upon their use.

ILMVAC Laboratory Vacuum Systems are available with a wide range of features, and in various designs, which enables them to be easily adapted to a multitude of applications. Depending on their use, the pumping speed and ultimate pressure of the LVS can be changed by simply exchanging the pump, e.g. an LVS 310 Zp can be converted into an LVS 610 Tp by simply changing the diaphragm pump, and this requires no technical assistance.

Your safety is important to us:
Therefore all the modules in our pump systems that come into contact with gas are made of high quality, chemically resistant components. This enables even acidic and solvent vapors to be evacuated without difficulty. All glass components are coated with a transparent shatter protection, through which the process remains visible. Since low cooling water temperatures reuduce the environmental impact, all LVSs come with an insulated condenser. Other condensers are available on request.

Time is money:
We would like to offer our customers optimal solutions. Therefore we have developed the design of our laboratory vacuum systems even further. Major components of the pump systems are more accessible. The diaphragm pump used can be easily detached from the base plate if necessary. This makes maintenance and service work quick and easy.

Systematic environmental protection:
Almost 100% solvent recovery, oil-free vacuum, and a long life make our laboratory vacuum systems excellent economical and ecological laboratory vacuum generators.

Ranges of application:
- vacuum distillation
- laser technology
- packaging industry
- environmental technology
- vacuum concentrators

External operating pad:
All controlled LVSs can be equipped with an operating pad separate from the device. Subsequent retrofitting with an operating pad is also possible.

insulated emission separator

easy to program controller

clear design

500 ml round bottom flasks, plastic coated

dry-running, chemical resistant diaphragm pump

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Special characteristics

- dry-running, chemical resistant diaphragm vacuum pump system
- compact design, all essential components are installed onto the pump carrier
- quick and easy maintenance ensured by the good accessibility of the diaphragm pump
- practical, preconfigured pump types
- user-friendly operation
- low vibration
- almost 100% solvent recovery

modular design:
therefore most flexible configuration
by simply exchanging the pump

external operating pad

Laboratory Vacuum Systems
LVS standard
Ultimate Pressure 8 or 2 mbar
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Laboratory Vacuum Systems
LVS economic
Ultimate Pressure 8 or 2 mbar
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Laboratory Vacuum Systems
LVS ecoflex
Ultimate Pressure 8 or 2 mbar
page 64 - 65

Distillation Systems
ilmdest and ilmdest +
and
Hold Back Pump HBP 101
page 66 - 69

Cascade Diaphragm Pump Systems
MPKC univac
page 70 - 71

For accessories
see
page 131 - 139

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Laboratory Vacuum Systems
LVS standard
Ultimate Pressure 8 or 2 mbar

ILMVAC Laboratory Vacuum Systems are equipped with or without pressure regulation depending upon their use. The pressure regulation is implemented in the standard version by a chemical-resistant solenoid valve. The operation of the controller has been intentionally simplified, and it is easy to learn. Visualization and settings can be made from a PC.

Laboratory Vacuum Systems LVS standard for One Unregulated Connection

This laboratory vacuum systems have a modular design.

Scope of delivery:

- chemically resistant diaphragm pump with gas ballast valve
- suction-side separator with round-bottom flask 500 ml
- pressure-side separator with round-bottom flask 500 ml
- assembled and wired ready for connection
- one unregulated connection
- suction connection DN 8 for hose inner diameter 8 mm

Technical Features

Type	Ult. pressure total DIN 28432	Pumping speed 50/60 Hz		Dim. (W/D/H)	Weight
	mbar	m^3/h	l/min	mm	kg
LVS 300 Zp	< 8	2.3/2.5	38/42	360/310/395	16.1
LVS 600 Tp	< 2	4.5/4.9	75/82	360/310/395	23.2

Ordering Information

Type	Mains supply V / Hz	Mandatory accessories Connection cable	PU pcs.	Order-No.
LVS 300 Zp	230 / 50/60	yes	1	113041
LVS 300 Zp	115 / 50/60	yes	1	113041-03
LVS 600 Tp	230 / 50/60	yes	1	113051
LVS 600 Tp	115 / 50/60	yes	1	113051-03

Note:
Country specific mains connection cable separately to the device, see page 146.

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Laboratory Vacuum Systems LVS standard with One Unregulated Connection

Economically and pollution free. These laboratory vacuum systems are additionally equipped with an insulated emission condenser apart from the configuration with chemically resistant diaphragm pump and separator. This condenser recovers solvents, which are collected in the separator. A contamination of laboratory air is excluded to a large extent by this configuration. These systems find a broad application everywhere, where vapors or gases must be evacuated economically and environmentally friendly.

Scope of delivery:

- chemically resistant diaphragm pump with gas ballast valve
- suction-side separator with round-bottomed flask 500 ml
- pressure-side insulated emission condenser with round-bottom flask 500 ml with safety valve
- one unregulated connection
- assembled and wired ready for connection
- suction connection DN 8 for hose inner diameter 8 mm

Technical Features

Type	Ult. pressure total DIN 28432 mbar	Pumping speed 50/60 Hz m³/h	l/min	Dim. (W/D/H) mm	Weight kg
LVS 101 Zp	< 8	1.0/1.1	17/18	360/310/445	11.6
LVS 301 Zp	< 8	2.3/2.5	38/42	360/310/445	16.3
LVS 201 Tp	< 2	1.8/2.0	30/33	360/310/445	15.0
LVS 601 Tp	< 2	4.5/4.9	75/82	360/310/445	23.5

Ordering Information

Type	Mains supply V / Hz	Mandatory accessories Connection cable	PU pcs.	Order-No.
LVS 101 Zp	230 / 50/60	yes	1	113022
LVS 101 Zp	115 / 50/60	yes	1	113022-03
LVS 301 Zp	230 / 50/60	yes	1	113042
LVS 301 Zp	115 / 50/60	yes	1	113042-03
LVS 201 Tp	230 / 50/60	yes	1	113032
LVS 201 Tp	115 / 50/60	yes	1	113032-03
LVS 601 Tp	230 / 50/60	yes	1	113052
LVS 601 Tp	115 / 50/60	yes	1	113052-03

Note:
Country specific mains connection cable separately to the device, see page 146.

Laboratory Vacuum Systems LVS standard for Two Unregulated Connections

The two unregulated connections provide the systems to run two applications simultaneously. A suction side separator provides protection of the chemically resistant vacuum pump. The pressure-side insulated emission condenser provides environmentally friendly operation by recovering and collecting the solvent residues.

Scope of delivery:

- chemically resistant diaphragm pump with gas ballast valve
- suction-side separator with round-bottom flask 500 ml
- pressure-side insulated emission condenser with round-bottom flask 500 ml with safety valve
- two unregulated connections
- assembled and wired ready for connection
- suction connection DN 8 for hose inner diameter 8 mm

Technical Features

Type	Ult. pressure total DIN 28432 mbar	Pumping speed 50/60 Hz m³/h	l/min	Dim. (W/D/H) mm	Weight kg
LVS 302 Zp	< 8	2.3/2.5	38/42	360/310/445	16.3
LVS 602 Tp	< 2	4.5/4.9	75/82	360/310/445	23.5

Ordering Information

Type	Mains supply V / Hz	Mandatory accessories Connection cable	PU pcs.	Order-No.
LVS 302 Zp	230 / 50/60	yes	1	113043
LVS 302 Zp	115 / 50/60	yes	1	113043-03
LVS 602 Tp	230 / 50/60	yes	1	113053
LVS 602 Tp	115 / 50/60	yes	1	113053-03

Note:
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Laboratory Vacuum Systems LVS standard for One Regulated Connection

These laboratory vacuum systems provide precisely controlled vacuum processes. The system is equipped with a digital vacuum controller, which holds and controls the pressure within a set range. A suction-side separator protects the vacuum pump by holding back particles and drops of fluid. The pressure-side insulated emission condenser provides environmentally friendly operation by recovering and collecting the solvent residues.

Scope of delivery:

- chemically resistant diaphragm pump with gas ballast valve
- controller with sensor and venting valve
- suction-side separator with round-bottom flask 500 ml
- pressure-side insulated emission condenser with round-bottom flask 500 ml with safety valve
- one regulated connection
- assembled and wired ready for connection
- suction connection DN 8 for hose inner diameter 8 mm

Technical Features

Type	Ult. pressure total DIN 28432	Pumping speed 50/60 Hz		Dim. (W/D/H)	Weight
	mbar	m³/h	l/min	mm	kg
LVS 110 Zp	< 8	1.0/1.1	17/18	360/310/445	11.7
LVS 310 Zp	< 8	2.3/2.5	38/42	360/310/445	17.8
LVS 210 Tp	< 2	1.8/2.0	30/33	360/310/445	15.7
LVS 610 Tp	< 2	4.5/4.9	75/82	360/310/445	24.7
LVS 1210 Tp	< 2	8.3/9.1	138/152	540/310/445	36.3

Ordering Information

Type	Mains supply V / Hz	Mandatory accessories Connection cable	PU pcs.	Order-No.
LVS 110 Zp	230 / 50/60	yes	1	113024
LVS 110 Zp	115 / 50/60	yes	1	113024-03
LVS 310 Zp	230 / 50/60	yes	1	113044
LVS 310 Zp	115 / 50/60	yes	1	113044-03
LVS 210 Tp	230 / 50/60	yes	1	113034
LVS 210 Tp	115 / 50/60	yes	1	113034-03
LVS 610 Tp	230 / 50/60	yes	1	113054
LVS 610 Tp	115 / 50/60	yes	1	113054-03
LVS 1210 Tp	230 / 50/60	yes	1	113064
LVS 1210 Tp	115 / 60	yes	1	113064-03

Note:
Country specific mains connection cable separately to the device, see page 146.

Laboratory Vacuum Systems LVS standard for One Regulated and One Unregulated Connection

These systems provide the simultaneous operation of a regulated and a non-regulated vacuum application. A suction-side separator protects the vacuum pump by holding back particles and drops of fluid. The pressure-side insulated emission condenser provides environmentally compatible operation by recovering and collecting the solvent residues.
With an additional VCB 424 cv vacuum control box (see chapter Measurement and Control) the non-regulated connection can simply be transformed into a regulated one.

Scope of delivery:
- chemically resistant diaphragm pump with gas ballast valve
- controller with sensor, venting valve and check valves
- suction-side separator with round-bottom flask 500 ml
- pressure-side insulated emission condenser with round-bottom flask 500 ml with safety valve
- one regulated and one unregulated connection
- assembled and wired ready for connection
- suction connection DN 8 for hose inner diameter 8 mm

Technical Features

Type	Ult. pressure total DIN 28432 mbar	Pumping speed 50/60 Hz m^3/h	l/min	Dim. (W/D/H) mm	Weight kg
LVS 311 Zp	< 8	2.3/2.5	38/42	360/310/445	18.1
LVS 611 Tp	< 2	4.5/4.9	75/82	360/310/445	25.0

Ordering Information

Type	Mains supply V / Hz	Mandatory accessories Connection cable	PU pcs.	Order-No.
LVS 311 Zp	230 / 50/60	yes	1	113045
LVS 311 Zp	115 / 50/60	yes	1	113045-03
LVS 611 Tp	230 / 50/60	yes	1	113055
LVS 611 Tp	115 / 50/60	yes	1	113055-03

Note:
Country specific mains connection cable separately to the device, see page 146.

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Laboratory Vacuum Systems LVS standard for Two Regulated Connections

These systems provide the precise and simultaneous operation of two regulated vacuum applications. The systems are equipped with a digital vacuum controller, which holds and controls the pressure within a set range. A suction-side separator protects the vacuum pump by holding back particles and drops of fluid. The pressure-side insulated emission condenser provides environmentally compatible operation by recovering and collecting the solvent residues.

Scope of delivery:

- chemically resistant diaphragm pump with gas ballast valve
- controller with sensor and venting valve
- suction-side separator with round-bottom flask 500 ml
- pressure-side insulated emission condenser with round-bottom flask 500 ml with safety valve
- two regulated connections with check valves
- assembled and wired ready for connection
- suction connection DN 8 for hose inner diameter 8 mm

Technical Features

Type	Ult. pressure total DIN 28432	Pumping speed 50/60 Hz		Dim. (W/D/H)	Weight
	mbar	m^3/h	l/min	mm	kg
LVS 320 Zp	< 8	2.3/2.5	38/40	360/310/445	18.5
LVS 620 Tp	< 2	4.5/4.9	75/82	360/310/445	25.3

Ordering Information

Type	Mains supply V / Hz	Mandatory accessories Connection cable	PU pcs.	Order-No.
LVS 320 Zp	230 / 50/60	yes	1	113046
LVS 320 Zp	115 / 50/60	yes	1	113046-01
LVS 620 Tp	230 / 50/60	yes	1	113056
LVS 620 Tp	115 / 50/60	yes	1	113056-01

Note:
Country specific mains connection cable separately to the device, see page 146.

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Laboratory Vacuum Systems
LVS economic

ILMVAC laboratory vacuum systems economic are equipped with a vacuum controller and an intelligent stand-by mode. For the regulation of the pumping speed the pump is turmed on or off according to the required vacuum. By a direct adjustment of the increase of pressure rate it is possible to suppress the pump to be activated. The system becomes active only if a potential consumer is connected. The economic control leads to a noticeable reduction of the operating cost without additional price.
A suction side separator provides protection for the chemically resistant vacuum pump. The pressure-side insulated emission condenser provides environmentally compatible operation by recovering and collecting the solvent residues.

Special characteristics:

- dry-running, chemical resistant diaphragm vacuum pump system
- equipped with a vacuum controller 424
- vacuum control by stand-by mode
- continuosly ready to run
- optimized operating costs
- longer life and service intervals
- programming of the controller either on board or via PC
- storage of all programming and measuring data possible
- compact design, all essential components are installed onto the pump carrier
- quick and easy maintenance ensured by the good accessibility of the diaphragm pump
- practical, preconfigured pump types
- user-friendly operation
- low vibration
- almost 100% solvent recovery

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Laboratory Vacuum Systems LVS economic
Ultimate Pressure 8 or 2 mbar

Scope of delivery:

- chemically resistant diaphragm pump with gas ballast valve
- controller with sensor and venting valve
- suction-side separator with round-bottom flask 500 ml
- pressure-side insulated emission condenser with round-bottom flask 500 ml with safety valve
- one regulated connection
- assembled and wired ready for connection
- suction connection DN 8 for hose inner diameter 8 mm

Technical Features

Type	Ult. pressure total DIN 28432 mbar	Pumping speed 50/60 Hz m³/h	l/min	Dim. (W/D/H) mm	Weight kg
LVS 110 Zp economic	< 8	1.0/1.1	17/18	360/310/445	12.9
LVS 310 Zp economic	< 8	2.3/2.5	38/42	360/310/445	17.6
LVS 210 Tp economic	< 2	1.8/2.0	30/33	360/310/445	15.7
LVS 610 Tp economic	< 2	4.5/4.9	75/82	360/310/445	24.7
LVS 1210 Tp economic	< 2	8.3/9.1	138/152	540/310/445	36.1

Ordering Information

Type	Mains supply V / Hz	Mandatory accessories Connection cable	PU pcs.	Order-No.
LVS 110 Zp economic	230 / 50/60	yes	1	113028
LVS 110 Zp economic	115 / 50/60	yes	1	113028-03
LVS 310 Zp economic	230 / 50/60	yes	1	113048
LVS 310 Zp economic	115 / 50/60	yes	1	113048-03
LVS 210 Tp economic	230 / 50/60	yes	1	113038
LVS 210 Tp economic	115 / 50/60	yes	1	113038-03
LVS 610 Tp economic	230 / 50/60	yes	1	113058
LVS 610 Tp economic	115 / 50/60	yes	1	113058-03
LVS 1210 Tp economic	230 / 50/60	yes	1	113068
LVS 1210 Tp economic	115 / 60	yes	1	113068-03

Note:
Country specific mains connection cable separately to the device, see page 146.

Laboratory Vacuum Systems
LVS ecoflex

ILMVAC laboratory vacuum systems ecoflex are equipped with a vacuum controller 424 and a chemical-resistant diaphragm pump with appropriate speed reguation. This gives demand-oriented and precise control of the pumping speed. The vacuum processes run more efficiently and are easier to reproduce. When necessary, for example when evaporating mixed solvents, the setpoint can easily be adjusted while the process is running. As the pump works precisely at the set pressure point, the reduced energy consumption leads to significantly lower running costs. Precisely controlled vacuum also leads to lower wear on the vacuum pump, and thus to a longer life.

Independently of the quantity of gas the ecoflex system always provides the optimal pumping speed. A suction side separator provides protection for the chemically resistant vacuum pump. The pressure-side insulated emission condenser provides environmentally compatible operation by recovering and collecting the solvent residues.

Special characteristics:

- dry-running, chemical resistant diaphragm vacuum pump system
- equipped with a VCZ 424 vacuum controller
- precise control of the pumping speed
- automatic pressure tracking is possible
- reproducible processes
- very silent operation
- increased life
- optimized operating costs
- very accurate processes
- simple programming of the controller
- visualization on the PC
- compact design, all essential components are installed onto the pump carrier
- quick and easy maintenance ensured by the good accessibility of the diaphragm pump
- practical, preconfigured pump types
- user-friendly operation
- low vibration
- almost 100% solvent recovery

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Laboratory Vacuum Systems LVS ecoflex
Ultimate Pressure 8 or 2 mbar

Scope of delivery:

- chemically resistant diaphragm pump with gas ballast valve
- controller with sensor and venting valve
- suction-side separator with round-bottom flask 500 ml
- pressure-side insulated emission condenser with round-bottom flask 500 ml with safety valve
- one regulated connection
- assembled and wired ready for connection
- suction connection DN 8 for hose inner diameter 8 mm

Technical Features

Type	Ult. pressure total DIN 28432 mbar	Pumping speed 50/60 Hz m³/h	l/min	Dim. (W/D/H) mm	Weight kg
LVS 310 Zp ecoflex	< 8	2.6	43	360/310/445	19.9
LVS 110 Tp ecoflex	< 2	1.2	20	250/260/435	9.5
LVS 210 Tp ecoflex	< 2	2.2	37	360/310/445	19.0
LVS 610 Tp ecoflex	< 2	4.9	82	360/310/445	26.8
LVS 1210 Tp ecoflex	< 2	9.1	152	540/310/445	37.1

Ordering Information

Type	Mains supply V / Hz	Mandatory accessories Connection cable	PU pcs.	Order-No.
LVS 310 Zp ecoflex	230 / 50/60	yes	1	113074
LVS 310 Zp ecoflex	115 / 50/60	yes	1	113074-03
LVS 110 Tp ecoflex	90-240 / 50/60	yes	1	113184
LVS 210 Tp ecoflex	230 / 50/60	yes	1	113124
LVS 210 Tp ecoflex	115 / 50/60	yes	1	113124-03
LVS 610 Tp ecoflex	230 / 50/60	yes	1	113084
LVS 610 Tp ecoflex	115 / 50/60	yes	1	113084-03
LVS 1210 Tp ecoflex	230 / 50/60	yes	1	113094

Note:
Country specific mains connection cable separately to the device, see page 146.

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Vacuum Distillation Systems ilmdest and ilmdest +

The economical, complete solution for distillations.

ilmdest vacuum distillation systems automatically recognize the boiling points of solvents and solvent mixtures and distill it most efficiently without fractionated operation. Distillation and vacuum pump form one single unit. The water bath provides for the necessary temperature for the distillation of the solvent mixture.

Through extensive application tests we have developed an approach which makes it possible to replace a rotary evaporator with a static evaporator flask in the water heating bath. The economics are impressive! ilmdest vacuum distillation systems provide the same results as rotary evaporator systems and achieve solvent recovery rates of appr. 100 %.

For details please read the test reports of the Hold-Back-Pump on www.ILMVAC.com.

Special characteristics:

- independent process cycle without complex control and regulation of temperature and pressure
- no controller technology required
- self regulated ultimate pressure
- ventilation at the process end
- solvent recovery rates close to 100%
- economical alternative to regulated vacuum pump systems
- environmentally friendly
- low emissions
- low noise level, 45 dB(A)
- easy to service design
- available for different mains supplies
- pressure indication by optional sensor
- simply connect the unit and switch it on

Ranges of application:

For the evaporation of solvents and solvent mixtures down to 10 mbar.

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Vacuum Distillation Systems
ilmdest and ilmdest +

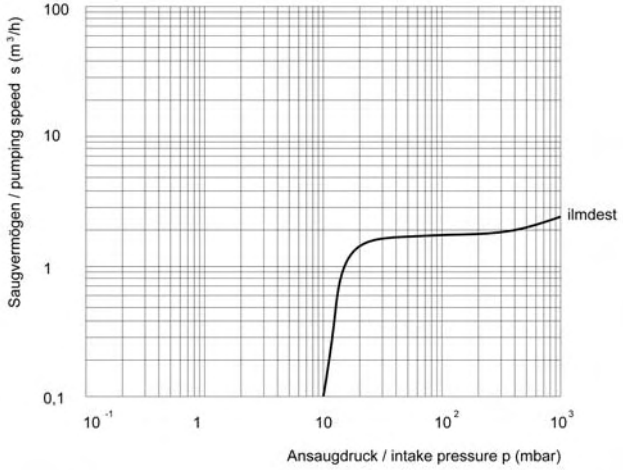
Systems:

ilmdest:
Hold Back Pump HBP 101 with lift, without water bath (must be provided by the user).

ilmdest +: complete system of Hold-Back-Pump HBP 101 with lift, with water bath.

Scope of delivery, ilmdest:
- Hold back pump with controlling and evaporation mechanism, with lift, without water bath
- ventilation valve
- exhaust connection: clamping ring union 8 for hose 8/ 6x1
- cooling water connection: hose nozzle DN 8 for hose inside diameter 8 mm
- 1000 ml round bottom flask at the exhaust side (other sizes, see accessories)
- optional: sensor, see accessories

Scope of delivery, ilmdest + same as ilmdest and in addition:
- 9 l water bath, heating power 1800 W, mains supply 230 V, 50/60 Hz, dia.Ø 280 mm, height 305 mm, weight 4.5 kg



Technical Features

Type	Ult. pressure DIN 28432 mbar	Pumping speed 50/60 Hz m³/h	l/min	Dim. (W/D/H) mm	Weight kg	Motor power W
ilmdest	10	2.3/2.5	38/41	310/270/550	22.0	200
ilmdest +	10	2.3/2.5	38/41	310/550/550	26.8	200

Ordering Information

Type	Mains supply V / Hz	Mandatory accessories Connection cable	PU pcs.	Order-No.
Imdest	230 / 50/60	yes	1	112005
ilmdest	115 / 50/60	yes	1	112005-03
ilmdest +	230 / 50/60	yes	1	112008
ilmdest +	115 / 50/60	yes	1	112008-02

Note:
Country specific mains connection cable separately to the device, see page 146.

Hold Back Pump
HBP 101

The self regulating vacuum system.

The truly new and unique development for completely automatic and environmentally friendly vacuum distillations. The solvent recovery yield of almost 100 % guarantees very low emission rates to the environment.

The rotary evaporator flask is connected directly to the Hold-Back-Pump. After the heater bath and the rotary drive are prepared for the process the Hold-Back-Pump is switched on to produce the vacuum needed.

The evaporation pressure is reached automatically for any solvent or solvent mix without a vacuum controller and the distillation is processed automatically without interruption no matter how many different solvents are being distilled. The fractions are collected in a container of your choice at atmospheric pressure.

Hold-Back-Pumps operate without a controller by bringing physical condensation laws into practice. The solvent itself contains the necessary information for automatic pressure regulation. The boiling point of the solvent, or solvent mixture need not be known, monitored or controlled externally. The product is concentrated in just one evaporation cycle, quickly and without loss since the process is maintained at the optimum boiling point. There are no environmentally dangerous emissions, since the whole process is executed in a closed circuit.

Hold-Back-Pumps guarantee a fully-automatic process without any manual adjustment or regulation and without time consuming and costly electronic controller. The distillation result is considerably better and more economically sound than when using a diaphragm pump system with control valve or speed control.

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url: www.ilmvac.us

Special characteristics:

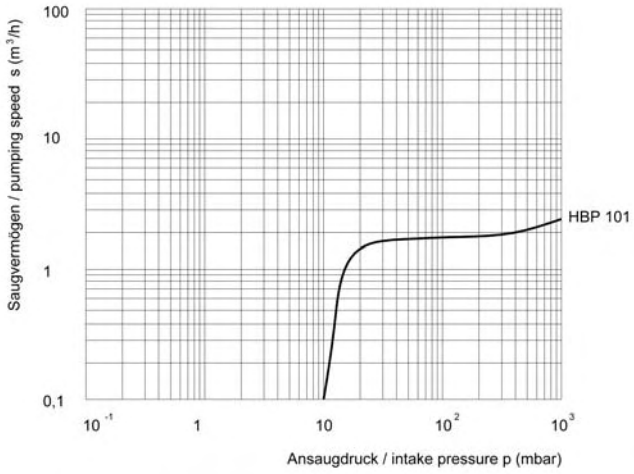
- independent process cycle without complex control and regualtion of temerature and pressure
- no controller technology required
- ultimate pressure self regulating
- solvent recovery rates close to 100%
- economical alternative to regulated vacuum pump systems
- environmentally friendly
- small emissions
- low noise level, 45 dB(A)
- easy to service design
- avaiable for different main supplies
- pressure indication by optional sensor

Ranges of application:

For the evaporation of solvents and solvent mixtures down to 10 mbar

Scope of delivery:

- hold back pump with controlling, without evaporation mechanism, lift and water bath
- suction connection: GI 14 with squeezing ring for hose 10/ 8x1 or hose nozzle DN 8 for hose inside diameter 8 mm
- exhaust connection: hose nozzle DN 8 for hose inside diameter 8 mm
- cooling water connection: hose nozzle DN 8 for hose inside diameter 8 mm
- round bottom flask at the exhaust side 1000 ml (other sizes, see chapter Device Accessories)
- optional: sensor, see chapter Device Accessories



Technical Features

Type	Ult. pressure DIN 28432 mbar	Pumping speed 50/60 Hz m³/h	l/min	Dim. (W/D/H) mm	Weight kg	Motor power W
HBP 101	10	2.3/2.5	38/41	310/270/490	18.8	200

Ordering Information

Type	Mains supply V / Hz	Mandatory accessories Connection cable	PU pcs.	Order-No.
HBP 101	230 / 50/60	yes	1	112009
HBP 101	115 / 50/60	yes	1	112009-03

Note:
Country specific mains connection cable separately to the device, see page 146.

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Cascade Diaphragm Pump Systems
MPKC univac

The MPKC univac systems are particularly well suited for the central supply of vacuum to several consumers over a network. Up to 8 diaphragm pumps can be built into a mobile framework, and an easy to operate and maintain control system is integrated into the switchbox. Suction and exhaust manifolds link the diaphragm pumps to central DN 25 KF ports. Condensates are captured both before and after the pumps in easily drained traps. The ultimate vacuum level of each system is determined by the particular type of pump.

The VCZ controller regulates the pump system with its unique software. The diaphragm pumps are started sequentially according to demand.

The teach function monitors the background operating conditions and adjusts the system automatically. Thus switching on the pumps takes place only as required, which is defined by the consumption itself.

A programmable upper pressure value guarantees that the system constantly is in stand-by mode. Operating parameters are entered at the controller or via PC (RS 232) with special ilmvac-control software.

Ranges of application:

- chemical industries
- education laboratories
- vacuum networks
- freeze drying
- evacuation of solvent vapors
- ceramics sintering plants
- plasma etching plants
- lifting of aggressive gases and vapors

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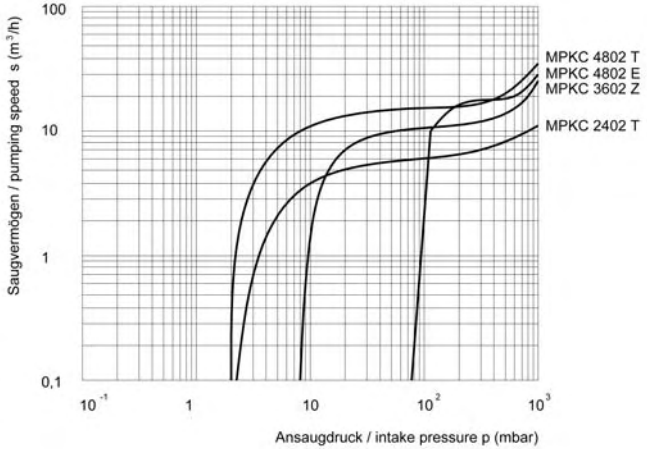
Special characteristics:

- 4 or 8 chemically resistant diaphragm pumps
- low ultimate pressure
- high pumping speed
- low energy consumption
- pollution free
- intelligent control
- simple operation
- service friendly design
- customised configurations possible
- vacuum and pressure connections DN 25 KF
- mobile
- space saving

Scope of delivery:
univac diaphragm pump system complete ready-to-use with mains connection cable and plug.



Technical Features

Type	Ult. pressure total DIN 28432 mbar	Pumping speed 50/60 Hz m³/h	l/min	Dim. (W/D/H) mm	Weight kg
MPKC 4802 E	< 75	32/38.4	533/640	380/930/670	98
MPKC 3602 Z	< 8	24/28.8	400/480	380/930/670	98
MPKC 2402 T	< 2	15/18	250/300	380/930/670	98
MPKC 4802 T	< 2	35/42	583/700	380/1570/670	120

Ordering Information

Type	Diaphragm pumps	Mains supply V / Hz	Mandatory accessories Connection cable	PU pcs.	Order-No.
MPKC 4802 E	4, einstufig	230 / 50/60 CEE	no	1	4201082
MPKC 3602 Z	4, zweistufig	400 / 50/60 CEE	no	1	4201062
MPKC 2402 T	4, dreistufig	400 / 50/60 CEE	no	1	4201052
MPKC 4802 T	8, dreistufig	400 / 50/60 CEE	no	1	4201072

Vacuum Pump Systems / Plants

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Combination Pump Systems chemvac

Roots Pump Systems RUD

Turbomolecular Pump Systems

Oil Diffusion Pump Systems

Special Pump Systems/Plants

Leak Testing Plants

Helium Leak Detector System

Vacuum Generation - Combination Pump Systems chemvac

Combination Pump Systems chemvac

The combination of a diaphragm pump with a rotary vane pump was developed to take advantage of the strong points of each type of pump. The chemical diaphragm pump can withstand corrosive gases and remove the resulting condensate prior to its absorption in the double stage rotary vane pump oil by constantly distilling the oil during operation. The rotary vane pump provides a much lower ultimate vacuum and will have a long life with the pump oil being free of contaminates.

A common problem with applications in the fine vacuum range is the use of oil sealed pumps which are not sufficiently tolerant of chemical vapor. Diaphragm pumps can not provide the ultimate pressure required (between 1 and 0.001 mbar). Here the chemvac combination pumps are the solution.

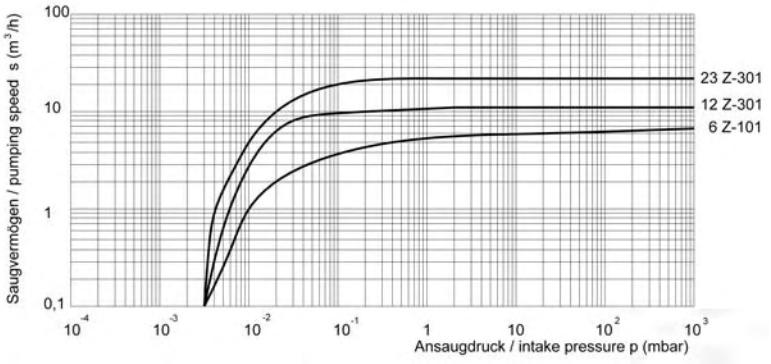
Ranges of application:

For the fine vacuum range in special applications, e.g.

- for aggressive gases and vapors
- for evacuation of solvent recovery vapors
- for pumping of vapors which are soluble in oil

chemvac Combination Pump Systems are used for producing fine vacuum. They are corrosion optimized combinations of a two stage rotary vane pump and a chemically resistant diaphragm pump. The suction-side of the rotary vane pump is connected with the recipient for its evacuation. The integrated diaphragm pump evacuates the interior of the oil housing of the rotary vane pump. This negative pressure prevents the condensation of gases exhausted via the operation valve of the rotary vane pump and transports these over a separator system into the exhaust air. The result is a pump system with the vacuum capabilities of a rotary vane pump combined with the solvent and acid handling capabilities of a PTFE diaphragm pump.

In addition to the following standard range we offer on request further combination pump systems. Systems with different mains voltage and frequency on request.



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Special characteristics:

- operates at the pumping speed of the rotary vane pump
- longer oil exchange intervals
- reduced corrosion
- simple pressure condensation after the diaphragm pump
- no use of a suction side cold trap in most cases

In addition to the following standard range we offer on request further combination pump systems. Systems with different mains voltage and frequency on request.

Scope of delivery:
chemvac Combination Pump System complete with oil charging switch, KF small flange connections, centering and clamp rings.

Technical Features

Type	Ult. pressure pneurop mbar	Pumping speed pneurop 50/60 Hz m^3/h	l/min	Dim. (W/D/H) mm	Weight kg
6 Z - 101 chemvac	$2x10^{-3}$	5.8/6.6	97/110	500/300/340	25.5
12 Z - 301 chemvac	$2x10^{-3}$	11.0/13.2	183/220	590/310/420	42.5
23 Z - 301 chemvac	$2x10^{-3}$	21.0/25.2	350/420	590/310/420	46.0

Ordering Information

Type	Mains supply V / Hz	Mandatory accessories Connection cable	PU pcs.	Order-No.
6 Z - 101 chemvac	230 / 50/60	yes	1	109023
6 Z - 101 chemvac	115 / 50/60	yes	1	109023-01
12 Z - 301 chemvac	230 / 50/60	yes	1	109024
12 Z - 301 chemvac	115 / 50/60	yes	1	109024-01
23 Z - 301 chemvac	230 / 50/60	yes	1	109025
23 Z - 301 chemvac	115 / 50/60	yes	1	109025-01

Note:
Country specific mains connection cable separately to the device, see page 146.

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Vacuum Generation - Roots Pump Systems

Roots Pump Systems
RUD

ILMVAC Roots Pump Systems are complete, optimized and compact vacuum systems consisting of a roots pump and a two-stage backing pump. Roots pump systems are well established in many fields of production and research where large pumping speeds are required at pressures in the rough- and fine-vacuum range.

Note:
The electrical connection to mains supply must be made by the user within the isolator box.

Special characteristics:

- roots pump with frequency convertor, enables the roots and backing pumps to be started simultaneously
- optimised pumping curve for rapid system evacuation
- avoids expensive by-pass lines and valving systems
- robust construction within a steel frame

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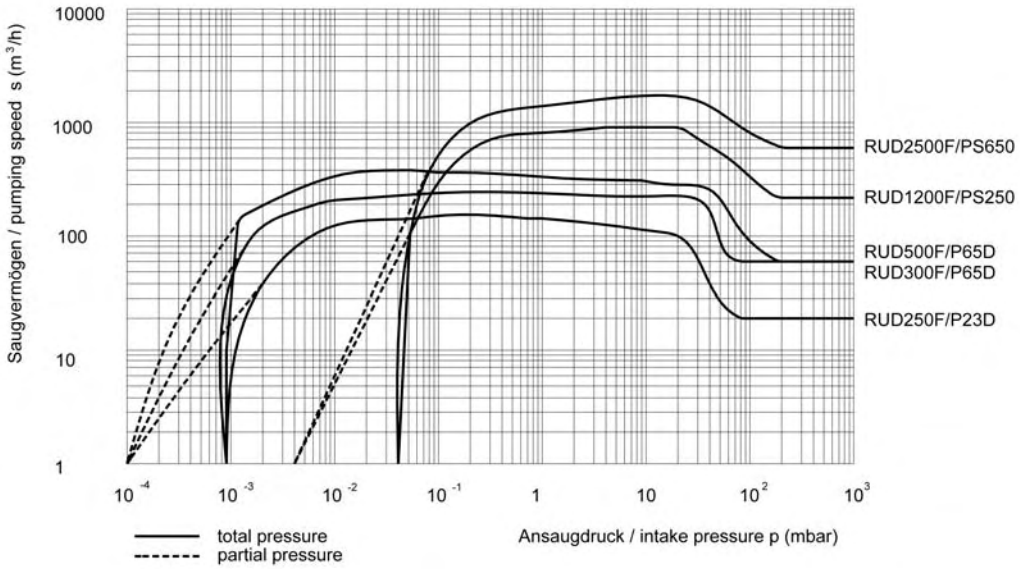


Technical Features

Type	Ult. pressure total mbar	Pumping speed at 0.1 mbar m³/h	Pumping speed at 1 mbar m³/h	Dim. (W/D/H) mm	Weight kg
RUD 250F / P23Z	$<1x10^{-3}$	170	-	520/730/900	150
RUD 300F / P65D	$<1x10^{-3}$	270	-	600/850/1000	230
RUD 500F / P65D	$<1x10^{-3}$	400	-	600/1000/1100	350
RUD 1200F / PS250	$<5x10^{-2}$	-	800	960/1400/1250	560
RUD 2500F / PS650	$<5x10^{-2}$	-	1520	1200/1800/1600	1350

Ordering Information

Type	Mains supply V / Hz	PU pcs.	Order-No.
RUD 250F / P23Z	1x230 / 50	1	102020
RUD 250F / P23Z	1x115 / 50	1	102020-01
RUD 300F / P65D	3x400 / 50	1	102021
RUD 300F / P65D	3x200 / 50	1	102021-01
RUD 500F / P65D	3x400 / 50	1	102022
RUD 500F / P65D	3x200 / 50	1	102022-01
RUD 1200F / PS250	3x400 / 50	1	102023
RUD 1200F / PS250	3x200 / 50	1	102023-01
RUD 2500F / PS650	3x400 / 50	1	102024
RUD 2500F / PS650	3x200 / 50	1	102024-01

Vacuum Generation - Turbomolecular Pump Systems

Turbomolecular Pump Systems
CDK - in a Housing, Compact

The functional units for generating high and ultra-high vacuums are completely mounted in a housing and ready for operation. The individual components are perfectly matched to each other. The SST turbomolecular pump is equipped with dry-running, solid-lubricated hybrid ceramic bearings which prevent the vacuum being contaminated by greases, oils or their decomposition products. This means that the design excludes residual hydrocarbon gas spectra.

CDK turbomolecular pump systems are compact and dry running. The automatic shut-off system stops the backing pump when the required final vacuum is reached.

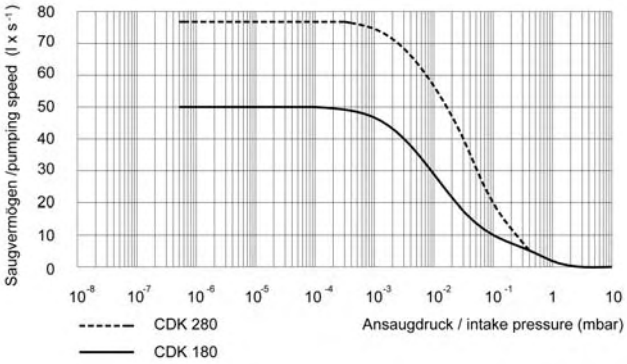
CDK turbomolecular pump systems comprise:
- an SST turbomolecular pump with integrated drag stages stage
- a three-stage diaphragm pump - types CDK 180/280 or
- a piston-diaphragm pump set - types CDK 181/281
- a solenoid valve in the fore vacuum piping to the turbomolecular pump
- a power supply unit for supplying all the modules
- a fan for the cooling required in the device casing

Automatic switch off:
All CDK turbomolecular pump systems have an automatic switch off device for the fore vacuum system. The backing pump system is switched off as soon as the ultimate pressure has been reached in the receptacle. The solenoid valve in the backing line to the turbomolecular pump is closed simultaneously. This prevents reverse venting of the turbomolecular pump and receptacle.

The major advantages of this automatic switch off are:
- the service life of the diaphragm pump is substantially increased to up to 10,000 operating hours
- the noise level is noticeably reduced by at least 3 dB(A)
- the operating costs for energy consumption are reduced, this becomes especially noticeable when several CDK turbomolecular pump systems are used.

The SST turbomolecular pump consists of:
- monobloc rotors with extremely low residual vibrations
- special blade design for high pumping speeds and high compression ratios, particularly for light gases
- the gap-free rotor structure gives fast degassing on the high vacuum side

Ultimate pressure statements: see note in chapter SST turbomolecular pumps



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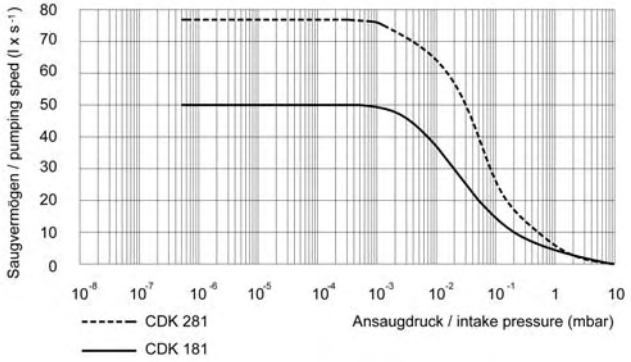
Special characteristics:

- very long life span- up to 10,000 operating hours
- very low noise level: CDK 180/280 below 51 dB (A), CDK 181/281 below 53 dB (A)
- optimized, hydrocarbon free backing pump system
- rapid evacuation to high vacuum
- compact and low weight
- very long service intervals



Technical Features

Type	Ult. pressure mbar	Pumping speed eff N_2/He/H_2 l/s	Dim. (W/D/H) mm	Weight (230 / 115 V) kg
Pumping speed fore vacuum 0.7 m³				
CDK 180	$5x10^{-7}$	50/56/46	193/344/400	13.7 / 14.4
CDK 180 UHV	$5x10^{-8}$	50/56/46	193/344/400	14.7 / 15.4
CDK 280	$5x10^{-7}$	77/65/50	193/344/381	13.7 / 14.4
CDK 280 UHV	$5x10^{-8}$	77/65/50	193/344/381	14.7 / 15.4
Pumping speed fore vacuum 1.5 m³				
CDK 181	$5x10^{-7}$	50/56/46	193/414/400	15 / 15
CDK 181 UHV	$5x10^{-8}$	50/56/46	193/414/400	16 / 16
CDK 281	$5x10^{-7}$	77/65/50	193/414/400	15 / 15
CDK 281 UHV	$5x10^{-8}$	77/65/50	193/414/400	16 / 16

Ordering Information

Type	Mains supply V / Hz	Mandatory accessories Connection cable	PU pcs.	Order-No.
CDK 180	230 / 50/60	yes	1	101224
CDK 180	115 / 50/60	yes	1	101224-01
CDK 180 UHV	230 / 50/60	yes	1	101225
CDK 180 UHV	115 / 50/60	yes	1	101225-01
CDK 280	230 / 50/60	yes	1	101226
CDK 280	115 / 50/60	yes	1	101226-01
CDK 280 UHV	230 / 50/60	yes	1	101227
CDK 280 UHV	115 / 50/60	yes	1	101227-01
CDK 181	230 / 50/60	yes	1	101228
CDK 181	115 / 50/60	yes	1	101228-01
CDK 181 UHV	230 / 50/60	yes	1	101229
CDK 181 UHV	115 / 50/60	yes	1	101229-01
CDK 281	230 / 50/60	yes	1	101230
CDK 281	115 / 50/60	yes	1	101230-01
CDK 281 UHV	230 / 50/60	yes	1	101231
CDK 281 UHV	115 / 50/60	yes	1	101231-01

Note:
Country specific mains connection cable separately to the device, see page 146.

Turbomolecular Pump Systems
STP - on the Pillar, Mobile

Complete, ready-to-use units for generating high vacuum with an extremely high pumping speed in the roughing range.

The turbomolecular pump, the controller and the vacuum gauges are mounted on the central aluminium profile pillar at an optimum working height. The backing pump is solidly mounted on a mobile base plate, to which the profile pillar is also attached. The vacuum apparatus (receptacle) may be either flange-mounted directly to the suction port of the turbomolecular pump, or the turbomolecular pump can be removed from its holder on the profile pillar and connected to the receptacle. The mobility of the pillar pump systems enables them to be positioned as near as possible to the receptacles, which means that only short vacuum lines are needed. A short vacuum line guarantees low flow losses and high pumping speeds at the receptacle. All the individual components are perfectly matched to each other. The SST turbomolecular pump is equipped with dry-running, solid-lubricated hybrid ceramic bearings which prevent the vacuum being contaminated by greases, oils or their decomposition products. This means that the design excludes residual hydrocarbon gas spectra.

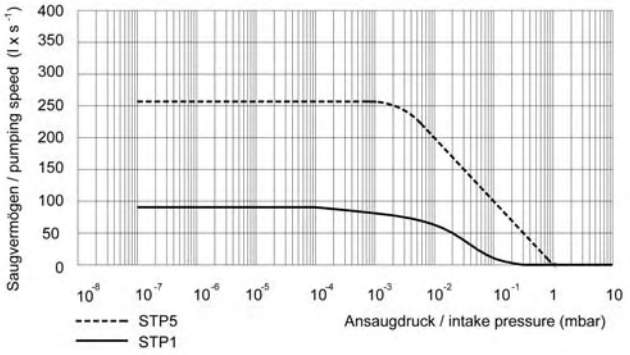
This STP series provides flexibility in the layout of the pump system for your needs. You can change your backing pump at any time. An automatic shutdown turns off the backing pump when reaching the required pressure.

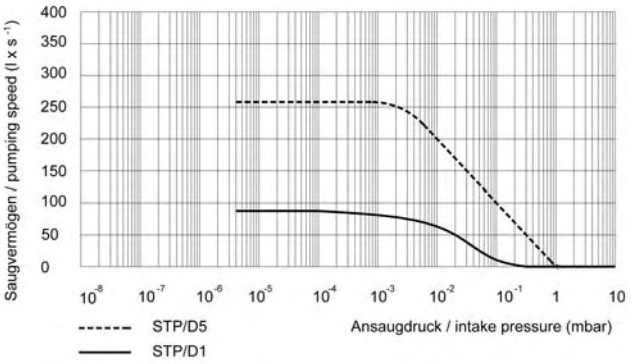
Pillar turbomolecular pump systems comprise:
- an SST turbomolecular pump with an integrated drag stages
- type STP pump systems: a P 4 Z oil lubricated, two-stage rotary vane pump
- type STP/D pump systems: a MP 601 Tp dry running, three-stage diaphragm pump
- a backing line gauge MRV 100 with measuring sensor CAP 121 for the automatic switch off (types STP/D)
- a solenoid valve in the backing line to the turbomolecular pump
- an aluminum profile pillar, with fixing and holding elements, mounted on a mobile base plate

Automatic switch off:
All STP turbomolecular pump systems have an automatic switch off device for the backing pump system. The backing pump combination is switched off as soon as the ultimate pressure has been reached in the receptacle. The solenoid valve in the backing line to the turbomolecular pump is closed simultaneously. This prevents reverse venting of the turbomolecular pump and receptacle.

The major advantages of this automatic switch off are:
- The service lives of the diaphragm pump are substantially increased to up to 10,000 operating hours
- The noise level is noticeably reduced by at least 3 dB(A)
- The operating costs for energy consumption are reduced, this becomes especially noticeable when several STP turbomolecular pump systems are used.

Ultimate pressure statements:
see note in chapter SST turbo molecular pumps





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Special characteristics:

- high pumping speed in the roughing range
- mobile baseplate
- only short backing line piping necessary
- no residual hydrocarbons - STP / D versions
- energy-saving

Technical Features

Type	Ult. pressure mbar	Pumping speed for N_2 l/s	Dim. (W/D/H) mm	Weight kg
with rotary vane pump, oil lubricated				
STP/1	$1x10^{-7}$	77	480/500/700	20
STP/1	$1x10^{-7}$	77	450/450/800	20
STP/5	$1x10^{-7}$	250	480/500/700	25
STP/5	$1x10^{-7}$	250	450/450/800	25
with dry running diaphragm pum				
STP/D1	$5x10^{-6}$	77	480/500/700	20
STP/D1	$5x10^{-6}$	77	480/500/700	20
STP/D5	$5x10^{-6}$	250	480/500/700	25
STP/D5	$5x10^{-6}$	250	480/500/700	25

Ordering Information

Type	Mains supply V / Hz	Mandatory accessories Connection cable	PU pcs.	Order-No.
STP/1	230 / 50	yes	1	101311
STP/1	115 / 50/60	yes	1	101311-03
STP/5	230 / 50	yes	1	101315
STP/5	115 / 50/60	yes	1	101315-03
STP/D1	230 / 50	yes	1	101331
STP/D1	115 / 50/60	yes	1	101331-04
STP/D5	230 / 50	yes	1	101335
STP/D5	115 / 50/60	yes	1	101335-03

Note:
Country specific mains connection cable separately to the device, see page 146.

Vacuum Generation - Oil Diffusion Pump Systems

Oil Diffusion Pump Systems, DP

Complete, ready to use pumping system with a pillar design, for the production of high vacuum using oil diffusion principles.

All systems comprise oil diffusion pump, rotary vane backing pump, backing pressure gauge PIA 1.2, high vacuum valve, backing/roughing valve, baseplate and pillar frame and all connections.

Special characteristics:

- optimum composition of components
- high pumping speed, the ultimate pressure is reached very quickly due to the optimized design
- ultimate pressure (with silicone oil XT 704) 1 x 10^{-6} mbar
- oil vapour back flow at 10-4 mbar 2 x 10-4 mg x cm^{-2} x min^{-1}
- low cooling water consumption, cooling water connection with hose nozzles 2x DN 10
- type DP/DM water cooling, with manual valve operation
- type DP/DP water cooling, with pneumatic valve operation
- type DP-L/DM air cooling, with manual valve operation

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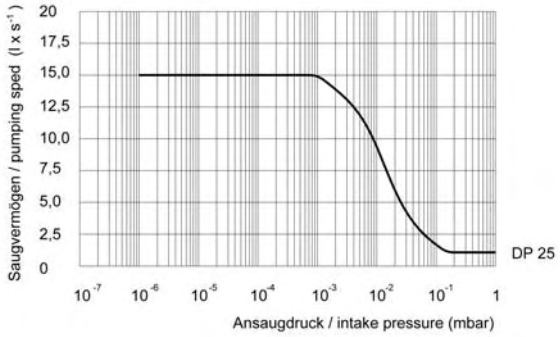

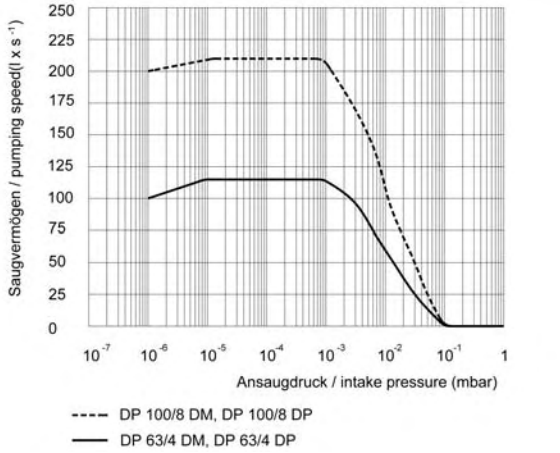

Technical Features

Type	Ultimate pressure mbar	Pumping speed for N_2 l/s	Dimensions (W/D/H) mm	Weight kg
DP 25L/4DM	$1x10^{-6}$	15	500/480/795	25.0
DP 63/4DM	$1x10^{-6}$	110	500/480/694	29.0
DP 100/8DM	$1x10^{-6}$	210	500/480/694	37.0
DP 63/4DP	$1x10^{-6}$	110	500/480/694	30.0
DP 100/8DP	$1x10^{-6}$	210	500/480/694	40.5

Ordering Information

Type	Mains supply V / Hz	Mandatory accessories Connection cable	PU pcs.	Order-No.
DP 25L/4DM	230 / 50	yes	1	100221
DP 25L/4DM	115 / 50/60	yes	1	100221-01
DP 63/4DM	230 / 50	yes	1	100226
DP 63/4DM	115 / 50/60	yes	1	100226-01
DP 100/8DM	230 / 50	yes	1	100227
DP 100/8DM	115 / 50/60	yes	1	100227-01
DP 63/4DP	230 / 50	yes	1	100228
DP 100/8DP	230 / 50	yes	1	100229

Note:
Country specific mains connection cable separately to the device, see page 146.

Special Pump Systems

ILMVAC offers various vacuum systems with dry and oil lubricated pumps, whose pumping speed and ultimate pressure were developed exactly to the customer's requirements. The vacuum systems specified below are modifiable for similar applications. Please cunsult your ILMVAC partner to discuss your specific needs.

Laboratory Rotary Vane Pump System P 4 Z

Universally applicable and mobile rotary vane pump system for the laboratory. Two cooling traps arranged in series provide protection for the suction side of the rotary vane vacuum pump P4Z from condensable vapors.

Pumping speed	77/92 l/min
Suction connection on the table plate	DN 25 KF
Ultimate pressure without gas ballast total	$5x10^{-3}$ mbar
Pumping speed pneurop 50/60 Hz	4.6/5.5 m^3/h
Dimensions (W/D/H)	680/480/680 mm
Weight	32 kg

Ordering Information

Type	Power supply V / Hz	PU pcs.	Order-No.
Laboratory Rotary Vane Pump System P 4 Z	230 / 50/60	1	110006

Tel.: +49(0)3677 604-0
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Rotary Vane Pump System with P 4 Z - GK

Universally applicable, compact, on a mobile baseplate installed laboratory vacuum pump system. A cooling trap provide protection for the suction side of the rotary vane vacuum pump P4Z from condensable vapors.

Pumping speed	77/92 l/min
Suction connection	DN 25 KF
Ultimate pressure without gas ballast total	$5x10^{-3}$ mbar
Pumping speed pneurop 50/60 Hz	4.6/5.5 m^3/h
Dimensions (W/D/H)	405/150/215 mm
Weight	17.5 kg

Ordering Information

Type	Power supply V / Hz	PU pcs.	Order-No.
Rotary Vane Pump System with P 4 Z - GK	230 / 50/60	1	110007

Tel.: +44(0)1444 254762
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E-Mail: sales@ilmvac.com.cn
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In-House Vacuum System HVP 250

Powerful rotary vane vacuum pump system for the central vacuum supply in the laboratory and in the industry. Two condensate separators arranged at the suction side prevent the penetration of liquids from the vacuum network into the pump.

Pumping speed	66.7 l/s
Max. inlet pressure	1 bar
Max. outlet pressure	1 bar
Suction connection	DN 50 KF
Pressure connection	DN 63 ISO-K
Ultimate pressure without gas ballast total	0.5 mbar
Pumping speed pneurop 50 Hz	240 m^3/h
Dimensions (W/D/H)	1250/1050/1130 mm
Weight	230 kg

Ordering Information

Type	Power supply V / Hz	PU pcs.	Order-No.
In-House Vacuum System HVP 250	3x400/690 / 50	1	110003

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Turbomolecular pump system SST 551 / P 65 D automatic

Automatically operating high vacuum pump system for the laboratory and the industry. Due to its mobility flexibly applicable e.g. for the evacuating of high vacuum recipients, vaporization plants and drying plants.

Pumping speed for helium	600 l/s
Suction connection	DN 160 ISO-K
Ultimate pressure DIN 28428	$<5x10^{-7}$ mbar
Pumping speed	550 l/s
Dimensions (W/D/H)	1400/500/1000 mm
Weight	150 kg

Ordering Information

Type	Power supply V / Hz	PU pcs.	Order-No.
Turbomolecular pump system SST 551 / P 65 D automatic	3x230/400 / 50	1	101406

High-Vacuum Pump System DHV 900/2 - UHL

Special pump system for evacuating and filling UV lamps for research and manufacturing.

Connections for UV lamp	2 pieces
Connections for filling gases	2 pieces
Ultimate pressure of the fore pump	3 mbar
Ultimate pressure DIN 28428	$<10^{-5}$ mbar
Pumping speed for N_2	250 l/s
Dimensions (W/D/H)	802/665/1300 mm
Weight	70 kg

Ordering Information

Type	Power supply V / Hz	PU pcs.	Order-No.
High-Vacuum Pump System DHV 900/2 - UHL	230 / 50	1	200704

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High-Vacuum Pump System DHV 2000 UVS

Special pump system for evacuating and filling UV lamps for the application in production facilities.

Connections for UV lamp	26 pieces
Connections for filling gases	6 pieces
Ultimate pressure of the fore pump	0.1 mbar
Ultimate pressure DIN 28428	$<10^{-6}$ mbar
Pumping speed	250 l/s
Dimensions (W/D/H)	2500/1200/2000 mm
Weight	200 kg

Ordering Information

Type	Power supply V / Hz	PU pcs.	Order-No.
High-Vacuum Pump System DHV 2000 UVS	230 / 50	1	101403

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Leak Testing Plants

ILMVAC manufactures high-quality, cost optimized high throughput leak testing equipment for specific products. These systems operate as quality control tools, automatically monitoring components and assigning them a final pass or fail.

- fulfilment of legal statutes and environmental guidelines
- broad spectrum of the products which can be examined (e. g. wheel rims, housings, air conditioning systems, air conditioning systems, condensers, airbags, valves and other components)
- optimal measuring procedures for the respective test task
- fully automatic test sequences and thus exclusion of human errors
- operator-independent measuring procedures

Leak Testing Plant DPA 8000

The Helium Leak Testing Plant DPA 8000 is a special model for Siemens AG. It is used to test high-voltage switch casings. The plant works fully automatically and manually loaded. The leak testing plant is a very complex testing system. It consists of the following modules:

- test chamber for three test pieces
- vacuum pump unit
- leak finding unit
- helium recovery unit
- high pressure unit
- test gas supply
- valve block
- control desk
- control cabinet

The test differentiates between very coarse, coarse and fine leaks. The measured results are automatically evaluated and documented. The plant is operated from a central control desk with a PC. All functions and procedures are dynamically visualized. A helium recovery unit ensures economical test gas consumption.

Ordering Information

Type	Power supply V / Hz	PU pcs.	Order-No.
DPA 8000	3x400 / 50	1	108003

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Leak Testing Plant
DPA 4 - TFO

The Helium Leak Testing Plant DPA 4-TFO has been developed and constructed for detecting leaks in the plastic upper parts of tank filters. The plant works fully automatically. The test pieces just have to be inserted into the test holder manually, and removed again after the test. The leak testing plant is designed as a benchtop model and consists of the following components:

- test table with test bell
- evacuation unit
- leak finding unit
- helium recovery unit
- control cabinet with control desk

This plant is designed for two limit leak rates. For the EU standard of 1 x 10^{-3} mbar x l/s and for the US standard of 1 x 10^{-5} mbar x l/s. The test for each piece takes around 30 seconds. The measured results are automatically evaluated and documented. The plant is operated from the desk-shaped control cabinet.
A small helium recovery unit keeps the test gas consumption at a minimum.

Ordering Information

Type	Power supply V / Hz	PU pcs.	Order-No.
DPA 4-TFO	3x400 / 50	1	108005

Leak Testing Plant
FPA 603-2.1

The Helium Leak Testing Plant FPA 603-2.1 is used for detecting leaks in aluminum motor vehicle wheel rims. The leak testing plant is fully integrated into the internal wheel rim transport system and works fully automatically. It consists of the following modules:

- test units A and B
- leak testing unit
- pump units
- leak finding unit
- helium recovery unit
- pipe system
- control cabinet
- handling system

The limit leak rate to be tested is 3.3 x 10^{-4} mbar x l/s. The plant can test abaout 200 wheel rims per hour. The size of the wheel rims that can be tested ranges between 5.5 x 13 and 13 x 22. The plant has its own helium recovery system to keep down the operating costs for the helium test gas. The plant is PLC controlled. The operator guidance is completely visualized on a touch panel of the control cabinet.

Ordering Information

Type	Power supply V / Hz	PU pcs.	Order-No.
FPA 603-2.1	3x400 / 50	1	100262

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Leak Testing Plant
KHL 3

For automatic leak testing of dryers of automobile air conditioning units. Adjusted to detect leaks in the range between 10^{-5} to 10^{-6} mbar x l/s. Manually loading of the dryers. The system contains three test chambers with exchangeable holding devices for different sized dryers.
The test frequency is adjustable and sequenced by a control unit: leak test, evacuation for rough leak determination and air admittance. This results in a highly efficient throughput (approx. 3/min). Tested leak free probes will be stamped automatically. The vacuum system consists of a powerful roots pump system. For the rough leak testing a compressed air operated vacuum jet pump evacuates the probe. For the fine leak testing the probe is pressurized with 2 bar helium and afterwards with 50 bar nitrogen. Leaks down to typically 1.5 x 10^{-5} mbar x l/s are discoverd due to the high pressure and the gas mixture chosen. The leak detection module comprises a mass spectrometer pumped with a turbomolecular pump and with backing pump with a calibrated test leak with isolation valve. All control elements including the free programmable PC control (soft-SPS) are mounted in a 19 inch control cabinet. Monitor and displaying instruments are placed on the front display panel.

Ordering Information

Type	Power supply V / Hz	PU pcs.	Order-No.
KHL 3	3x400 / 50	1	108001

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Helium Leak Detector System HeliCheck 20

The HeliCheck 20 is a newly developed leak detector with a patented calibration system to enable operation with atmospheric air. The 90 degree deflector helium analyser is situated in a splittable housing along with all the coarse leak, fine leak, evacuating, venting and calibration valves and turbo pump. The lower housing contains the dry diaphragm backing pump which ensures a hydrocarbon free process. Operation is highly intuitive via a TFT touch screen panel and the system can be integrated with a computer system for automatic testing when required.

Special characteristics:

- small size and low weight
- easy to use - even without prior knowledge through menu driven touch screen
- no test for the leak calibration necessary
- integration into vacuum systems and automatic leak detection equipment
- extremely short start-up time Max 2.5 min
- short recovery time

Applications:

- components leak (valves, piping, vacuum chambers)
- auto industry (fuel tanks, brake systems, air conditioning systems, air bag)
- electrical and electronics (lighting and electron tubes)
- industry (coating systems, glove - boxes, vacuum, melting, Sinteröfen
- research (accelerator, irradiation systems, fusion research)

Technical Features

Minimum detectable leak rate	$1x10^{-10}$ mbar x l/s
Largest detectable leak rate	1 mbar x l / s
Start up time	max. 2.5 min
Response time	0.2 s
max. backing pressure	5 mbar
Operating temperature	+10 to +35 °C
Power consumption	200 VA

Ordering Information

Type	Power supply V / Hz	Dimensions (W/D/H) mm	Weight kg	PU pcs.	Order-No.
HeliCheck 20	90-260 / 50/60	260/370/387	23.5	1	610001

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Vacuum Aspiration Systems and Anaerobic Systems

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Vacuum Aspiration

ILMVAC aspiration systems provide for the safe transfer of liquid in all sectors of industry and in the laboratory.

The use of different pipet tips allows for safe and efficient removal of numerous fluids.

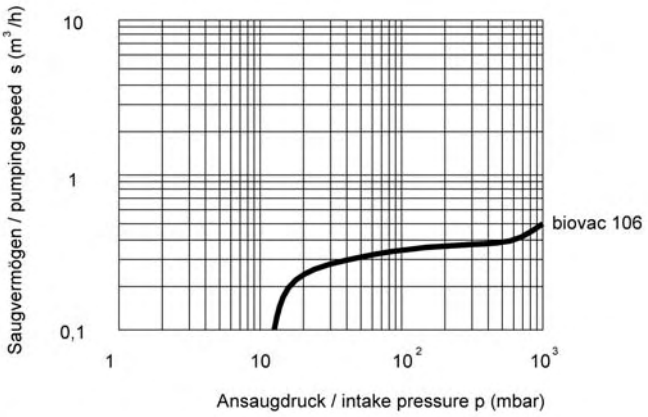
Safety Aspiration System, biovac 106

The portable biovac 106 Safety Aspiration System with an integrated chemically resistant diaphragm pump is used for the safe and precise aspiration of non-flamable chemical, biological, and medical liquids.

The fluids can be removed easily and very precisely from slides, Petri dishes, cell culture containers etc., by using different pipets or glass tips which are inserted into the plot of the pipetting holder.

A membrane filter up to a porosity of 0.22 µm can be inserted into a holder located in the lid of the receiver vessel by the user as required for the work to be done. According to the filter porosity used, it is possible to achieve different rates of filtration in order to reduce the risk when handling bacteria and viruses. A profile gasket serves as sealing between the head piece and the receiver container. The pump heads and connecting heads of the chemically resistant long life diaphragm pump are made from PP.

The system is switched on and off directly at the device switch or the optionally available foot switch. The connection to the diaphragm pump is made by a rapid-action coupling, which has a shut-off valve on the receiver side. Receiver and pipetting holder (plot) are connected with a hose. The built-in hose coupling seals both sides hermetically. This enables the possibly contaminated fluids collected in the receiver to be disposed of completely separately.



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Special characteristics:

- chemically resistant diaphragm pump
- operation via ON/OFF switch or optional foot switch
- autoclavable receptacle
- receiver container made from vacuum resistant glass, 2 litre
- plot with gasket profile, float valve and fine filter housing with bayonet fixing
- bacteria-, virus filters dia. 55mm, up to a pore size min. 0.22 µm
- rapid-action coupling hose connectors with automatic isolation valves
- hand-piece with pipet holder
- 1- and 8-channel pipet in the scope of supply
- consumables are available on request

Technical Features

Ultimate pressure DIN 28432	< 150 mbar
Pumping speed 50/60 Hz	12/16 m^3/h
Inlet connection	hand piece (pipetting holder)
Exhaust connection	hose nozzle DN 8 for hose inside diameter 8 mm
Receiver	2 l, with float valve and holder for non-woven filters, option 1 l
Fuse	3.15 A (F)
Noive level	45 dB(A)
Power	45 W

Ordering Information

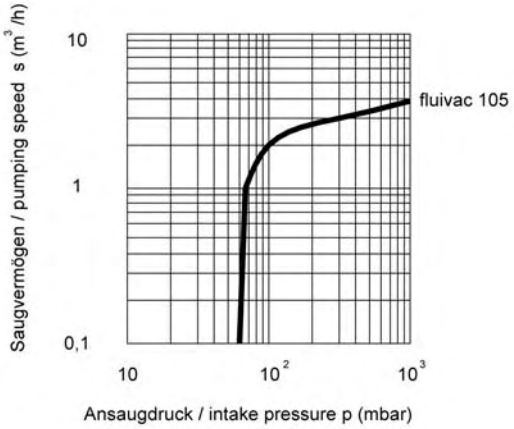
Type	Power supply V / Hz	Dim. (W/D/H) w/o hose mm	Weight kg	PU pcs.	Order-No.
biovac 106	115/230 / 50/60	357/145/277	8	1	112012

Safety Aspiration System, fluivac 105

fluivac 105 is ideal for aspirating large amounts of surplus liquid in laboratory and industrial applications.
The system consists of a chemically resistant diaphragm pump with high pumping speed and a 5 liter receiver container. The mobile design of the system makes it quite flexible. It can easily be rolled to the location where it is needed. A folding handle saves valuable lab space.

Special characteristics:

- chemically resistant diaphragm pump
- operation of the diaphragm pump via ON/OFF switch
- autoclavable container
- receiver container made from vacuum resistant, coated glass, 5 litre
- integrated float valve
- integrated fine filter



Technical Features

Ultimate pressure DIN 28432	< 100 mbar
Pumping speed 50/60 Hz	63/76 m³/h
Suction connection	5 m hose with receptacle
Exhaust connection	hose nozzle for hose inside diameters of 8 mm
Noise level	45 dB(A)
Power	180 W

Ordering Information

Type	Power supply V / Hz	Dimensions (W/D/H) mm	Weight kg	PU pcs.	Order-No.
fluivac 105	230 / 50/60	340/300/605	14	1	112007
fluivac 105	115 / 50/60	340/300/605	14	1	112007-02

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Suction/Receiver Container for Surplus Fluids, biocont

The suction container can be directly mounted onto a central vacuum supply. The pressure inside the 5 litre container will be hold constant automatically at approximately 100 mbar.

Special characteristics:

- autoclavable container
- receiver container made from vacuum resistant, coated glass, 5 litre
- integrated float valve
- integrated filter
- holds pressure constant at approx. 100 mbar

Ordering Information

Type	Power supply V / Hz	Dimensions (W/D/H) mm	Weight kg	PU pcs.	Order-No.
biocont	90-240 / 50/60	220/220/480	5.0	1	112548

Vacuum Anaerobic System, anavac 104

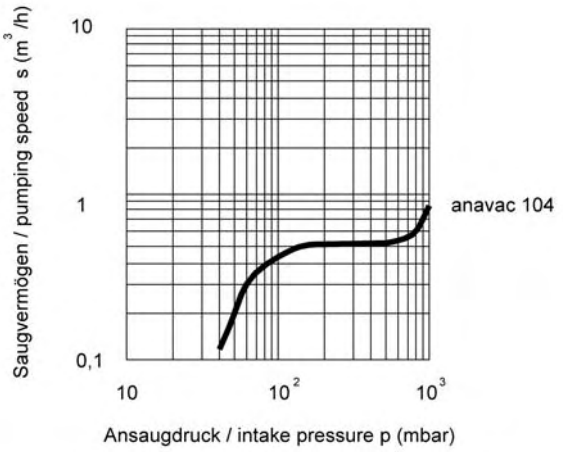
The anaerobic aeration system anavac 104 consists of a controller as central unit, which is connected with a diaphragm pump, a reaction gas container and a rinsing gas system.

The parameters of the aeration system are preset from the manufacturer. Over the interface RS 232 these can be changed easily by means of a PC or laptop as required. A detailed description is to be found in the manual. Via the start button the fully automatic process is released.

The ventilation with the reaction gas follows the evacuation of the attached anaerobic container up to the adjusted pressure. The preset number of cycles is repeated automatically.

With rapid-action couplings the system can be attached to and separated from the reaction gas container.

The anavac 104 is supplied completely installed. The aeration gas and the pressure-reducing valve are not included in the scope of delivery.



Technical Features

Ultimate pressure DIN 28432	< 50 mbar
Pumping speed 50/60 Hz	0.9/1.0 m³/h
Pumping speed 50/60 Hz	15/16.6 l/min
Noise level	44 dB(A)
Power	0.83 kW
Inlet connection	hose nozzle for vacuum hose NW 8
Exhaust connection	hose nozzle for vacuum hose NW 8
Ventilation	screw-type clamping ring coupling 8 / 6x1 mm
Fuse (fine	T1 A

Ordering Information

Type	Power supply V / Hz	Dimensions (W/D/H) mm	Weight kg	PU pcs.	Order-No.
anavac 104	115/230 / 50/60	235/145/280	7	1	112011

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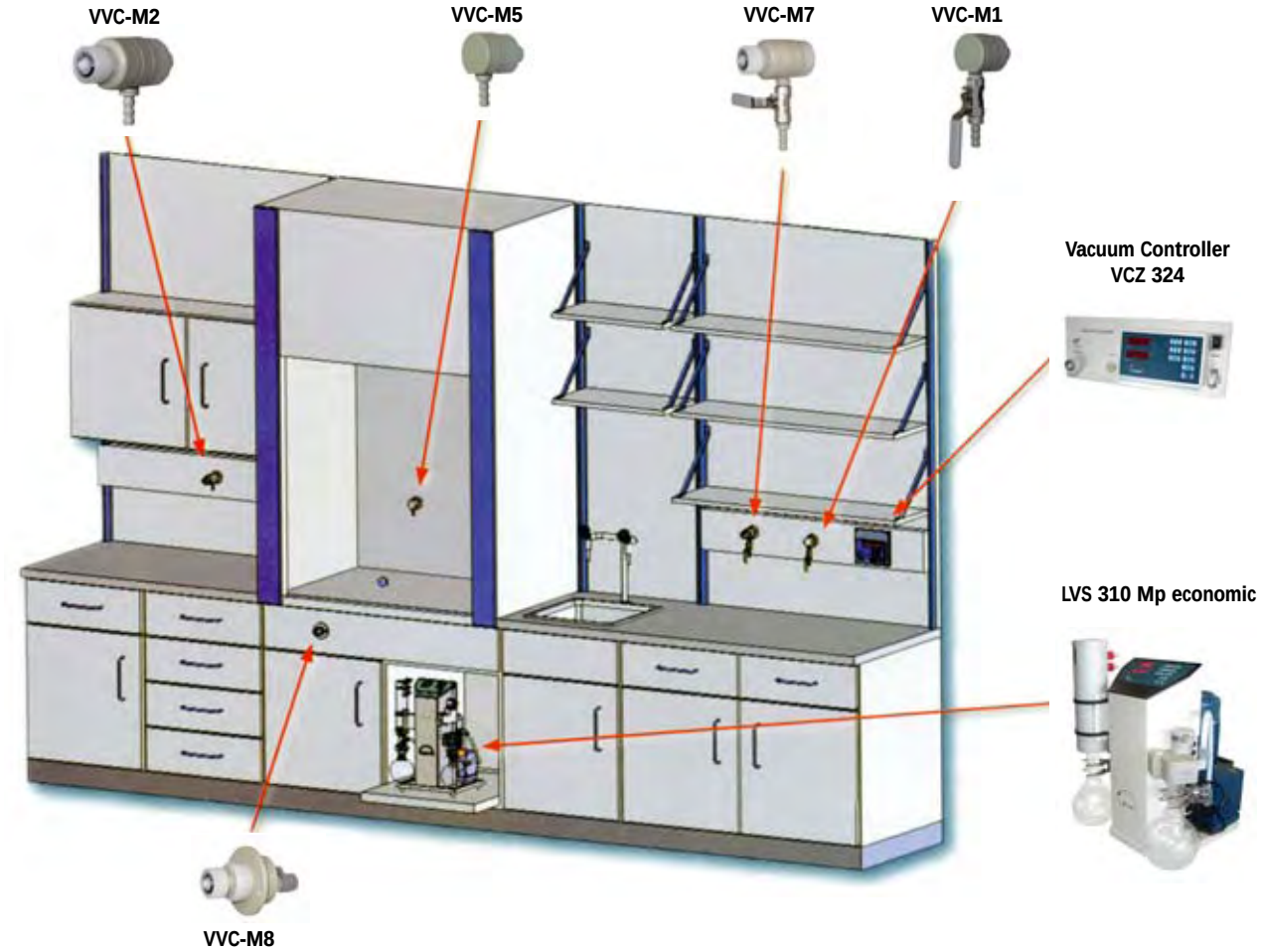
Vacuum Connections for Networks

Vacuum Connections for Networks

The following components are chemically resistant. The valve housings are made of polypropylene. We produce special adapters and connectors for built-in components in furniture, media channels and columns on request. Modifications of the VVC and RWA components to your demands will be produced within a short period of time.

Example for a for a Vacuum Network



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Manually Operated Vacuum Connection Point - also for Networks

With connection male thread 3/8 inch.

Valve with ball valve VVC-M1

With integrated check valve.
Application: workbench
Suction side connection: for hoses DN 8

Ordering Information

Type	Dimensions (W/D/H) mm	Assembly hole A/B mm	Distance mm	PU pcs.	Order-No.
VVC-M1	55/40/150	26/-	-	1	700414

Fine Control Valve VVC-M2

With integrated check valve and control valve.
Application: workbench
Suction side connection: for hoses DN 8

Ordering Information

Type	Dimensions (W/D/H) mm	Assembly hole A/B mm	Distance mm	PU pcs.	Order-No.
VVC-M2	95/40/75	26/-	-	1	700443

Fine Control Valve VVC-M3 with manometer

With integrated check valve, control valve and attenuated stainless steel manometer.
Application: workbench
Suction side connection: for hoses DN 8

Ordering Information

Type	Dimensions (W/D/H) mm	Assembly hole A/B mm	Distance mm	PU pcs.	Order-No.
VVC-M3	55/45/140	26/-	-	1	700444

Valve with ball valve for hoods VVC-M4

With integrated check valve and return piping for e.g. fume hoods.
Application: fume hoods
Suction side connection: for hoses DN 8

Ordering Information

Type	Dimensions (W/D/H) mm	Assembly hole A/B mm	Distance mm	PU pcs.	Order-No.
VVC-M4	55/40/150	26/22	105	1	700417

Vacuum Connection Point VVC-M5

With integrated check valve.
Application: work benches and fume hoods
Suction side connection: for hoses DN 8

Ordering Information

Type	Dimensions (W/D/H) mm	Assembly hole A/B mm	Distance mm	PU pcs.	Order-No.
VVC-M5	55/40/75	26/-	-	1	700418

Fine Control Valve for hoods VVC-M6 with ball valve

With integrated check valve, control valve and return piping.
Application: fume hoods - external operation
Suction side connection: for hoses 10/ 8x1 mm

Ordering Information

Type	Dimensions (W/D/H) mm	Assembly hole A/B mm	Distance mm	PU pcs.	Order-No.
VVC-M1	95/40/150	26/22	105	1	700445

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Fine Control Valve VVC-M7 with ball valve

With integrated check valve and control valve.
Application: work benches
Suction side connection: for hoses DN 8

Ordering Information

Type	Dimensions (W/D/H) mm	Assembly hole A/B mm	Distance mm	PU pcs.	Order-No.
VVC-M7	95/40/150	26/-	-	1	700446

Control Valve for hoods VVC-M8 front panel connection

Without check valve. For front mounting and direct exchangeability to an electro magnetic valve.
Application: fume hoods
Suction side connection: for hoses 10/ 8x1 mm

Ordering Information

Type	Dimensions (W/D/H) mm	Assembly hole A/B mm	Distance mm	PU pcs.	Order-No.
VVC-M8	120/70/70	52 / 2 x M4/60	-	1	700447

Control Valve for hoods VVC-M8-1 with manometer

Without check valve. For front mounting and direct exchangeability to an electro magnetic valve.
With vacuum gauge (Bordon feather), stainless steel, for the front mounting.
Application: fume hoods
Suction side connection: for hoses 10/ 8x1 mm

Ordering Information

Type	Dimensions (W/D/H) mm	Assembly hole A/B mm	Distance mm	PU pcs.	Order-No.
VVC-M8-1	120/70/70	52 / 2 x M4/60	-	1	700447-01

Fine Control Attachment VVC-M9

With control valve.
Application: exchange set for type VVC-E5

Ordering Information

Type	Dimensions (W/D/H) mm	Assembly hole A/B mm	Distance mm	PU pcs.	Order-No.
VVC-M9	52/40/40	-/-	-	1	700448

Fine Control Valve with Ball Valve VVC-M10 and manometer

With integrated check valve, control valve and attenuated stainless steel manometer.
Application: workbench
Suction side connection: for hoses DN 8

Ordering Information

Type	Dimensions (W/D/H) mm	Assembly hole A/B mm	Distance mm	PU pcs.	Order-No.
VVC-M10	95/45/210	26/-	-	1	700449

Measuring connection VVC-M11

For Vacuum hose DN 8.
Application: fume hoods

Ordering Information

Type	Dimensions (W/D/H) mm	Assembly hole A/B mm	Distance mm	PU pcs.	Order-No.
VVC-M11	40/40/85	26/-	-	1	700433

Check valve VVC-M12

For securing the individual workstations in the vacuum networks.
Connections reciprocally for pipework system with hose 10/ 8x1 mm.

Ordering Information

Type	Dimensions (W/D/H) mm	Assembly hole A/B mm	Distance mm	PU pcs.	Order-No.
VVC-M12	-	-/-	-	1	700440

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url: www.ilmvac.us

Automatic Vacuum Connection Point - also for Networks

With solenoid control valve 24 V DC.

Automatic Vacuum Connection Point VVC-E1

With integrated check valve.
Application: workbench
Suction side connection: for hoses DN 8
Connection for vacuum sensor: 1/4 inch
Connection male thread: 3/8 inch

Ordering Information

Type	Dimensions (W/D/H) mm	Assembly hole A/B mm	Distance mm	PU pcs.	Order-No.
VVC-E1	120/70/80	26/-	-	1	700422

Automatic Valve for hoods VVC-E2

With integrated check valve.
Application: fume hoods, external mounting
Suction side connection: for hoses 10/ 8x1 mm
Connection for vacuum sensor: 1/4 inch
Connection male thread: 3/8 inch

Ordering Information

Type	Dimensions (W/D/H) mm	Assembly hole A/B mm	Distance mm	PU pcs.	Order-No.
VVC-E2	120/70/120	26/22	60	1	700423

Automatic Valve Fine Control VVC-E3 with sensor plug

With integrated check valve and control valve.
Application: work benches
Suction side connection: for hoses DN 8
Connection for vacuum sensor: for hoses 8/ 6x1 mm
Connection male thread: 3/8 inch

Ordering Information

Type	Dimensions (W/D/H) mm	Assembly hole A/B mm	Distance mm	PU pcs.	Order-No.
VVC-E3	120/70/150	26/-	-	1	700424

Automatic Valve VVC-E4 with sensor plug

With integrated check valve.
Application: work benches
Suction side connection: for hoses DN 8
Connection for vacuum sensor: for hoses 8/ 6x1 mm
Connection male thread: 3/8 inch

Ordering Information

Type	Dimensions (W/D/H) mm	Assembly hole A/B mm	Distance mm	PU pcs.	Order-No.
VVC-E4	120/70/95	26/-	-	1	700425

Automatic Valve for hoods VVC-E5 front panel connection

Without check valve. For front mounting and direct exchangeability to a spindle valve.
Application: fume hoods
Suction side connection: for hoses 10/ 8x1 mm

Ordering Information

Type	Dimensions (W/D/H) mm	Assembly hole A/B mm	Distance mm	PU pcs.	Order-No.
VVC-E5	120/70/95	52 / 2 x M4/60	-	1	700426

Automatic Attachment VVC-E6

Application: exchange set for VVC-M9

Ordering Information

Type	Dimensions (W/D/H) mm	Assembly hole A/B mm	Distance mm	PU pcs.	Order-No.
VVC-E6	80/70/65	-	-	1	700427

Laboratory Wall Rosette

To cover the leadthrough in the rear wall we supply a laboratory wall rosette (order-no. 828860) with every vacuum manifold type VVC.

Ordering Information

Type	PU pcs.	Order-No.
Laboratory Wall Rosette	1	828860

Tel.: +49(0)3677 604-0
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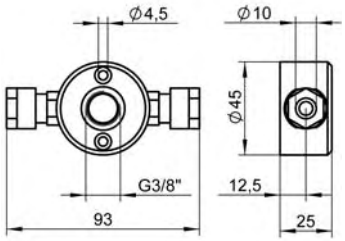
url: www.ilmvac.us

Rear Panel Connections

For the mounting and installation of VVC components.
With an elbow connecting piece (RWA 10 with straight connecting piece) for hoses 10/ 8x1 mm.

Rear Panel Connection RWA 1

For the front panel mounting and visible installation on walls or furniture.

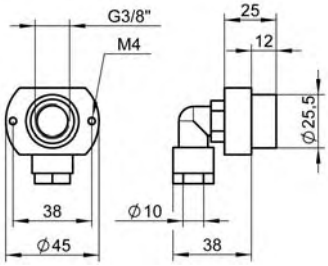


Ordering Information

Type	PU pcs.	Order-No.
RWA 1	1	720888

Rear Panel Connection RWA 2

For the rear panel mounting and installation behind walls or front screens of furniture.

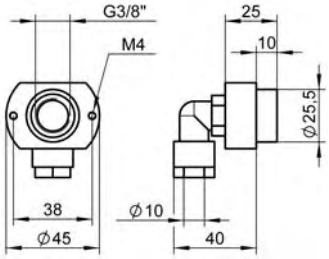


Ordering Information

Type	PU pcs.	Order-No.
RWA 2	1	720800

Rear Panel Connection RWA 3

For the rear panel mounting and installation behind walls or front screens of furniture.

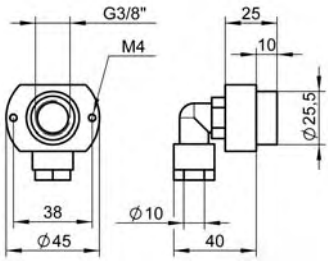


Ordering Information

Type	PU pcs.	Order-No.
RWA 3	1	720800-3

Rear Panel Connection RWA 4

For the front panel mounting and rear panel installation.

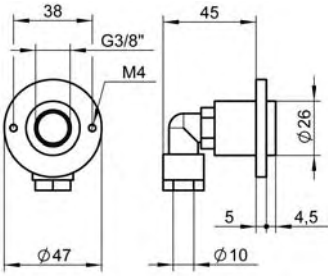


Ordering Information

Type	PU pcs.	Order-No.
RWA 4	1	720800-5

Rear Panel Connection RWA 6

For the rear panel mounting and installation behind walls or front screens of furniture.

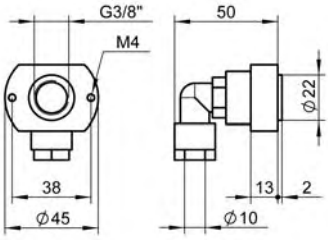


Ordering Information

Type	PU pcs.	Order-No.
RWA 6	1	720887

Rear Panel Connection RWA 7

For the rear panel mounting and installation behind walls or front screens of furniture.



Ordering Information

Type	PU pcs.	Order-No.
RWA 7	1	720800-1

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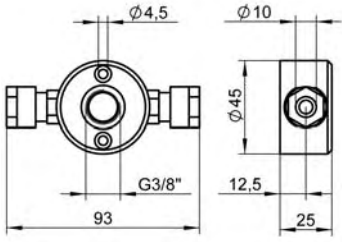
Rear Panel Connection RWA 8

For the front panel mounting and installation behind walls or front screens of furniture.

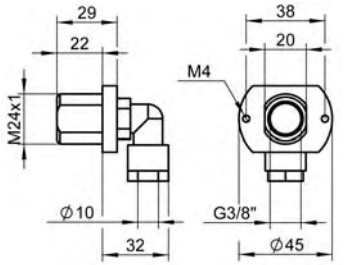


Ordering Information

Type	PU pcs.	Order-No.
RWA 8	1	720800-2

Rear Panel Connection RWA 8-1 (M24 x 1)

For the rear panel mounting and installation behind walls or front screens of furniture.

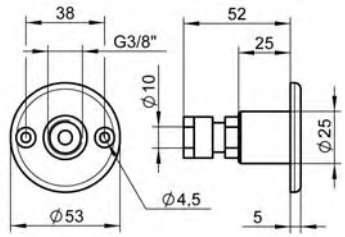


Ordering Information

Type	PU pcs.	Order-No.
RWA 8-1	1	720800-20

Rear Panel Connection RWA 10

For the rear panel mounting and installation behind walls or front screens of furniture.



Ordering Information

Type	PU pcs.	Order-No.
RWA 10	1	720895

Vacuum Measurement and Control

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Rough Vacuum Gauges 1000 - < 1 mbar

Fine Vacuum Gauges 1 - 10^{-3} mbar

Multi-Range and High Vacuum Gauges

Vacuum Controller 1100 to 1 mbar

Vacuum Measurement and Control

The total range of scientifically useful vacuum extends from approx. 1000 mbar (atmospheric pressure) down to 10^{-12} mbar, the ultra high vacuum range.
The instruments for measuring the pressure are vacuum gauges.
No physical measuring technique covers the whole vacuum/pressure range. Particular sensors and gauges must be used for parts of the whole range, rough, fine, high and ultra high vacuum.
These systems are also offered in combination as multi-range vacuum gauges for covering multiple measuring ranges.

Rough vacuum gauges

Measuring range: atmospheric to 1 mbar

Besides the traditional vacuum gauges with mechanical sensors (e.g. Bourdon, capsule gauge) diaphragm manometers with electrical diaphragm sensors are well established (Piezo and capacitance gauges). The pressure to be measured is separated by a diaphragm from a reference vacuum and compared to the latter. The movement of the diaphragm is registered either by a piezo resistive system or the diaphragm is part of a capacitor (capacitance vacuum system). For improved chemical resistance the diaphragm is often made of aluminum oxide ceramic.

The pressure measurement is independent of the type of gas.

Fine vacuum gauges

Measuring range: 1 mbar to approx. 10^{-3} mbar.

The method is based on the thermal conductivity of gases. The gauges are also known as Pirani instruments. The heated filament within the gauge head forms one part of a controlled Wheatstone bridge. The required energy for heating the filament depends on the pressure and therefore is a measure of the pressure.

The pressure measurement is dependent on the type of gas.

Multi range- and High vacuum gauges

Measuring range: 2000 to 6 x 10^{-10} mbar.

Piezo, CAP, micropirani, combi, hot and cold cathode sensors are used in this range. They work according to various measuring principles.

The measuring principles which vacuum gauges use for the high vacuum range mainly depend on the type of gas involved.

The selection of the right vacuum gauge depends not only on the measuring range but also on the operating conditions such as mechanical vibrations, chemical contaminations and accuracy required. The wide range of ILMVAC vacuum gauges covers the different pressure ranges and applications.

Some instruments can also be used as controllers due to the intelligent integrated electronics.

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Rough Vacuum Gauges with Bourdon Feather, VMF

Bourdon tube gauges measure rough vacuum. They are independent on the type of gas.

Mechanical sensor for the rough vacuum range.
Accuracy 1.6 % of full scale value.

Ordering Information

Type	Measuring range max. mbar	Connection	Ø Manometer mm	PU pcs.	Order-No.
VMF 16 Aluminium	1000 - 1	DN 16 KF	50	1	600201
VMF 16 Stainless steel	1000 - 1	DN 16 KF	50	1	600201-1
VMF 8 Stainless steel	1000 - 1	DN 8	50	1	600201-01

Rough Vacuum Gauges with Ceramic Sensor, PIZA 101

For accessories see page 143

Diaphragm vacuum gauges have similarities to the more traditional mechanical gauges (Bourdon, capsule). The movement to the diaphragm is registered either by an piezo resistive system or the diaphragm is part of the capacitor (capacitance vacuum system). For improved chemical resistance the diaphragm is often made of aluminium oxide ceramic. The pressure measurement is independent of the type of gas. Simple programming is done from the front panel.

Robust handheld gauge for the rough vacuum range.
- with capacitive ceramic diaphragm
- clearly laid out soft keypad
- with stand clip for pillar diameter 8-12 mm
- optional table stand and pin clip
- with wide voltage mainspack
- temperature compensated for operating temperature 0 to 60 °C
- calibration available

Accuracy	< 0.8 % FS
Display	digital LCD in mbar, height 13 mm
Resolution	1 mbar
Reproducibility	< 0.5 %
Permiss. max. pressure	2 bar abs.
Power supply	9 V battery or mainspack 9 V/200 mA (included in delivery)
Vacuum connection	1/4 inch female thread, DN 16 KF
Option	hose nozzle DN6, DN8, DN10 - 1/4 inch male thread, see page 132

Ordering Information

Type	Measuring range max. mbar	Dimensions (W/D/H) mm	PU pcs.	Order-No.
PIZA 101	1050 - 1	80/36/125	1	600071

Fine Vacuum Gauges with Pirani Sensor, PIA 1.2

With Pirani thermal conductivity sensor.
The devices are variously applicable. The possible measuring range covers the rough and the fine vacuum range. The measured values are represented on clear LED displays. The pressure indication of these devices is depend on the type of gas.

Robust Pirani vacuum gauge for the rough and fine vacuum range

- complete with Pirani sensor, sensor cable, mains cable
- with clear LED bar graph display
- alternative voltages on request
- with volts free contacts

Accuracy	< 20 % of value
Display	30 segments LED bar graph in mbar, height 5 mm
Thresholds	1 x 230 V, 2 A externally adjustable
Switching accuracy/hysteresis	± 1 digit
Protection class	IP 20
Vacuum connection	DN 16 KF
Recorder output	0.5 - 4.5 V

Ordering Information

Type	Measuring range max. mbar	Dimensions (W/D/H) mm	Mains connection V / Hz	PU pcs.	Order-No..
PIA 1.2	1000 - 10^{-3}	96/118/48	230/50/60 CEE	1	600008
PIA 1.2	1000 - 10^{-3}	96/118/48	230/50/60 UK	1	600008-01
PIA 1.2	1000 - 10^{-3}	96/118/48	110/50/60 US	1	600008-03
PIA 1.2	1000 - 10^{-3}	96/118/48	230/50/60 CH	1	600008-02

For accessories see page 143

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Multi-Range and High Vacuum Gauges

Simply programmable gauges for measurement and control in the rough, fine and high vacuum ranges, with Piezo, CAP, micro-Pirani, combi, hot and cold cathode sensors. For flexible applications. Various transducers and sensors (accessories) enable them to cover a wide range of pressure.

For accessories see page 143

Multi-Range and High Vacuum Gauges with Combination Sensor, PIZA 111

Robust handheld instrument for the rough and fine vacuum range.

- with combination sensor (capacitive and Pirani)
- clearly laid out soft keypad
- with stand clip for pillar diameter 8-12 mm
- optional table stand and pin clip
- temperature compensated for operating temperatures 0 to 60 °C
- calibration available

Accuracy	< 0.2 % FS (capacitive) and 20 % of decade (Pirani)
Display	digital LCD in mbar, height 13 mm
Resolution	1 (1050 - 100) mbar, 0.5 (99 - 1) mbar, 0.1 (0.9 - 0.1) mbar, 0.01 (0.09 - 0.01) mbar, 0.001 (0.009 - 0.001) mbar
Reproducibility	< 0.5 %
Permiss. max. pressure	2 bar abs.
Power supply	9 V battery or mainspack 9 V/200 mA (included in delivery)
Vacuum connection	1/4 inch female thread, DN 16 KF
Option	hose nozzle DN6, DN8, DN10 - 1/4 inch male thread, see page 132

Ordering Information

Type	Measuring range max. mbar	Dimensions (W/D/H) mm	PU pcs.	Order-No.
PIZA 111	1050 - 10^{-3}	80/36/125	1	600072

Multi-Range and High Vacuum Gauges with Various Sensors, MRV 100

Measuring instrument for use in the coarse, fine and high vacuum ranges

- requires a sensor according to measuring range required
- digital measuring instrument
- USB interface and analog voltage output
- well-arranged membrane keypad with jog-dial control
- two relays for programming setpoint values
- can be used for controlling valves

Display	digital LED, height 10 mm graphic display 60 x 18 mm
Resolution	1 digit
Read-out	10 per sec
Thresholds	2 x 230 VAC1, 4 A, independent adjustable
Switching accuracy/hysteresis	±1 digit
Power	max. 20 W
Vacuum connection	dependent on sensor
Ambient conditions	0 - 40 °C and max. 90 % rh, 0 - 60 °C during storage
Recorder output	0 - 10 V

Scope of delivery:
Vacuum gauge without sensor and sensor cable.
Please select an appropriate sensor and sensor cable: see page 143 - 144

Ordering Information

Type	Measuring range max. mbar	Dimensions (W/D/H) mm	Mains connection V / Hz	PU pcs.	Order-No.
MRV 100	depends on sensor	90/120/90	100-240 / 50/60	1	600081

For accessories see page 143

Multi-Range and High Vacuum Gauges with Various Transducers, MRV 3000

Measuring instrument for use in the coarse, fine and high vacuum ranges

- can only be used with transducer and sensor cable
- digital measuring instrument
- RS 232 / RS 485 interface and analog voltage output
- well-arranged membrane keypad
- three relays for programming setpoint values
- can be used for controlling valves
- alarm buzzer to indicate deviations from setpoint values
- the LCD panel is a dialog system or for displaying a second unit of measurement

Display	digital LED in mbar/Torr, height 10 mm
Resolution	1 digit
Read-out	5 per sec
Thresholds	3 x 250 VAC, 4 A, independent adjustable
Switching accuracy/hysteresis	±1 digit
Max. pressure depending on type	2 - 6 bar
Power	max. 25 W
Vacuum connection	depend on transducer
Ambient conditions	0 - 35 °C and max. 90 % rh, 0 - 50 °C during storage
Recorder output	0 - 10 V

Scope of delivery:
Vacuum gauge without transducer and sensor cable.
Please select an appropriate transducer and sensor cable: see page 143 - 144

Ordering Information

Type	Measuring range max. mbar	Dimensions (W/D/H) mm	Mains connection V / Hz	PU pcs.	Order-No.
MRV 3000	depends on tranducer	95/114/95	100-240 / 50/60	1	600080

For accessories see page 143

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url: www.ilmvac.us

Vacuum-Controller 424

Programmable vacuum controller for process control in the rough vacuum range 1100 to 1 mbar.
Through accurate control of vacuum, processes can be optimized for rapid work rate and high reproducibility. Manual and automatic vacuum regulation can also free operators to other tasks as well as reducing environmental impact.
The vacuum control box VCB 424 is a compact benchtop unit, available in four types to allow for control of different vacuum sources.

VCB 424 cv: control valve
With pressure control over control valve integrated at the box. With integrated sensor, venting and check valve.

Measuring sensor	with ceramic diaphragm
Measuring uncertainty	2 mbar, FS
Display	digital in mbar, torr and psi (LED)
Digit height	9 mm, (red)
Measured value read out	10 x per second
Switching accuracy/hysteresis	±1 digit
Thresholds/output	at front panel or PC program ILMVAC-Control per channel: 2 x 10 W - 24 V DC total: 30 W - 24 V DC
Output signal	digital 24 VDC, analog 0...10 V DC, RS 232, RS 485 prepared
Operating voltage	90-264 VAC, 50/60 Hz
Control voltage	24 V DC
Protective system	IP 20
Working temperature	15 to 40 °C
PC connection	9-pole SUB-D (O-modem)
Connection vacuum apparatus	hose nozzle DN 8
Connection vacuum pump	hose nozzle DN 8
Connection inert gas	hose nozzle DN 4
Connection water valve	plug 4-pole 24 V DC
Connection signal line (ef)	plug 4-pole 24 V DC
Inlet connector	for non-heating apparatus

VCB 424 ef: ecoflex
With pressure control over a analog output for the control of an external speed adjusted vacuum pump. With integrated sensor, venting and check valve.
VCB 424 en: economic
With pressure control of an external vacuum pump by stand-by operation. With integrated sensor, venting, control and check valve.
VCB 424 es: external sensor
Integrates all methods of vacuum control. With external sensor and integrated ventilation valve.
1st With a built-in suction valve option
2nd On an analog output to control an external speed controlled vacuum pump
3rd An external vacuum pump through standby operation


600037 / 600039 / 600040


600041

600044


600044-04


600044-05

Ordering Information

Type	Measuring range max. mbar	Dimensions (W/D/H) mm	Weight kg	PU pcs.	Order-No.
VCB 424 cv	1100 - 1	195/178/105	1.6	1	600037
VCB 424 ef	1100 - 1	195/178/105	1.6	1	600039
VCB 424 en	1100 - 1	195/178/105	1.6	1	600040
VCB 424 es	1100 - 1	195/140/105	1.4	1	600041
VCZ 424 without sensor	1100 - 1	145/85/45	0.33	1	600044
VCZ 424 built-in unit energy cell	1100 - 1	300/70/120		1	600044-04
VCZ 424 built-in unit digestorium	1100 - 1	300/70/120		1	600044-05

Vacuum Devices Accessories

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Accessories for Rotary Vane Pumps and chemvac Combination Pumps

Accessories for Diapragm Pumps, Diapragm Pump Systems, Anaerobic Systems, Aspiration Systems

Accessories for Turbomolecular Pumps and Pump Systems

Accessories for Measuring Gauges and Controllers

Mains Connection Cables

Oils for Vacuum Pumps

Accessories for Rotary Vane Pumps and chemvac Combination Pumps

The ILMVAC GmbH offers a wide range of accessories for the rotary vane pumps and chemvac combination pumps. This covers connection sets of the pumps, oil mist filters, separators, condensate separators, oil feedbacks, suction connections, inlet fittings among other things.

Separators

Separators for rotary vane pumps types P- and PK - Dp only.

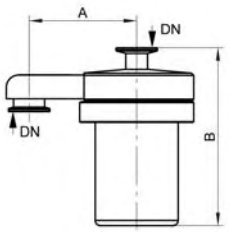
Type AKS:
The separator for the suction side of the rotary vane pumps separates liquids and powders from the gas stream before the enter the pump.

- optimal control of the oil level
- glass catch-pot for easy visibility and cleaning
- mounts directly on the suction flange

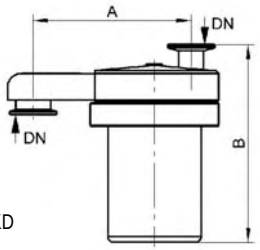
Type AKD:
The separator for the exhaust side of the rotary vane pumps removes oil mist from the exhaust gas stream.

- optimal control of the filter cartridge and the oil level
- effective oil mist elimination
- glass catch-pot for easy visibility and cleaning
- mounts directly on the exhaust flange

Cartridges for AKD 16 and AKD 25: Order no. 800160, see chapter oil mist filter below.



AKS



AKD

Type	Connection flange	Fill volume max. ml	A / B mm	PU pcs.	Order-No.
AKS 16	DN 16 KF	380	105 / 170	1	300884
AKS 25	DN 25 KF	380	105 / 170	1	300886
AKD 16	DN 16 KF	270	135 / 170	1	300883
AKD 25	DN 25 KF	270	135 / 170	1	300885

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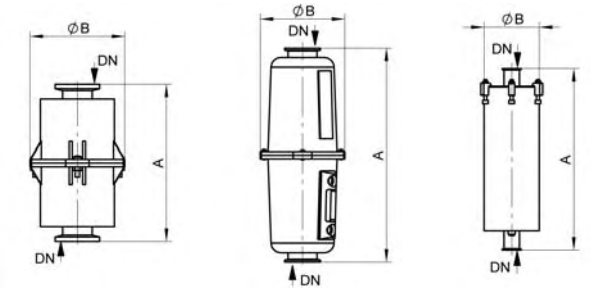
Oil Mist Filters

Special characteristics:
- minimization of the output of oil mist
- direct assembly on the exhaust side of the pump
- trouble free filter change
- transparent housing allows easy monitoring of filter condition (OME 10/16, OME 10/25, OME 30/25)

Scope of delivery:
Oil mist filter complete with filter cartridge.

On request: He-tight oil mist eliminators.

700010 700013 700008



Type	Connection flange	A mm	B mm	PU pcs.	Order-No.
OME 10/16	DN 16 KF	106	64	1	700010
OME 10/25	DN 25 KF	106	64	1	700011
OME 30/25	DN 25 KF	220	64	1	700012
OME 80/25	DN 25 KF	330	130	1	700092
OME 80/40	DN 40 KF	330	130	1	700013
OME 150/40	DN 40 KF	580	130	1	700009
OME 300/40	DN 40 KF	525	160	1	700008

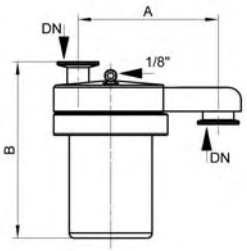
Cartridges for Oil Mist Filters and Separators

For Type	PU pcs.	Order-No.
OME 10/16, OME 10/25 (and AKD)	1	800160
OME 30/25	1	800162
OME 80/25, OME 80/40	1	800163
OME 150/40	1	800164
OME 300/40	1	828690

Oil Feed Backs

Suitably for rotary vane pumps types P 4 Z to P 23 Z.
Consisting of condenser type AKD with inserted float valve to be mounted at the pressure side.

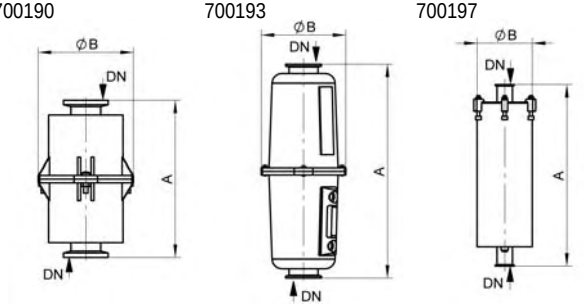
Advantage:
- reduced loss of oil even at higher pressure



Connection flange	Fill volume max. ml	A mm	B mm	PU pcs.	Order-No.
DN 25 KF	270	135	170	1	700323
DN 16 KF	270	135	170	1	700323-01

Activated Charcoal Filters

700190 700193 700197



Special characteristics:
- filter suitably to remove odourous (toxic) vapors
- direct assembly on the exhaust side of the pump
- trouble free filter exchange
- transparent housings for monitoring the filter condition (AKF 10/16, AKF 10/25, AKF 30/25)

Scope of delivery: Activated charcoal filter complete with filter cartridge.

Type	Connection flange	A mm	B mm	PU pcs.	Order-No.
AKF 10/16	DN 16 KF	106	64	1	700190
AKF 10/25	DN 25 KF	106	64	1	700191
AKF 30/25	DN 25 KF	220	64	1	700192
AKF 80/40	DN 40 KF	330	130	1	700193
AKF 150/40	DN 40 KF	580	130	1	700293
AKF 300/40	DN 40 KF	525	160	1	700197

Cartridges for Activated Charcoal Filters

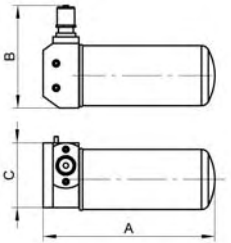
Type	PU pcs.	Order-No.
AKF 10/16, AKF 10/25	1	800159
AKF 30/25	1	800157
AKF 80/40	1	800161
AKF 150/40	1	800168
AKF 300/40	1	828690-1

Full Flow Oil Filters

For rotary vane vacuum pumps P-Z series.
OPF 40C for chemical applications, OPF 40M for physical applications.

Special characteristics:
- simple assembly
- trouble free filter change
- extended service intervals
- additional cleaning of the pump oil
- maintenance display indicates required filter exchange

Scope of delivery:
Full flow oil filter complete with filter cartridge.



Type	A mm	B mm	C mm	PU pcs.	Order-No.
OPF 40C	265	158.5	100	1	700153-01
OPF 40M	147	158.5	100	1	700153-02

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Cartridges for Full Flow Oil Filters

Type	PU pcs.	Order-No.
OPF 40C	1	828599
OPF 40M	1	800170

Inlet Filters for PS Pumps

Special characteristics:
- direct mounting on the pump inlet
- simple exchange of the filter element

Scope of delivery:
Inlet filter complete with filter cartridge.

Type	For	Connection flange	PU pcs.	Order-No.
ASF 20	PS 20	DN 25 KF	1	700435
ASF 70	PS 40, PS 70	DN 40 KF	1	700436
ASF 150	PS 100, PS 150	DN 63 ISO-K	1	700437
ASF 250	PS 200, PS 250	DN 63 ISO-K	1	700438
ASF 650	PS 400, PS 650	DN 100 ISO-K	1	700439

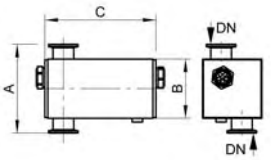
Filter Inserts for Inlet Filters

For	PU pcs.	Order-No.
ASF 20	1	800181
ASF 70	1	800182
ASF 150	1	800183
ASF 250	1	800185
ASF 650	1	800184

Condenser Separators, Stainless Steel

Special characteristics:
- mounting on the pump inlet
- prevents the suction of condensates

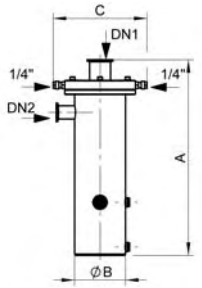
On request:
He-tight condenser separators.



Type	Connection flange	A / B mm	C mm	PU pcs.	Order-No.
PT 16	DN 16 KF	120 / 80	150	1	700144
PT 25	DN 25 KF	120 / 80	220	1	700145
PT 40	DN 40 KF	120 / 80	260	1	700146

Condensers, Stainless Steel

Special characteristics:
- for the condensation of vapors with high boiling points
- optimal protection of the pump

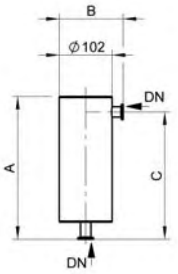


Type DN1 / DN2	Cooling surface m²	A / B mm	C mm	PU pcs.	Order-No.
SKS 40/16	0.2	415 / 115	195	1	700261
SKS 40/25	0.2	415 / 115	195	1	700066

Cooling Traps, Stainless Steel

Cooling Traps Welded

Special characteristics:
- high mechanical strength
- non rusting



Type	A mm	B mm	C mm	PU pcs.	Order-No.
DN 16 KF	285	125	245	1	705123
DN 25 KF	285	125	245	1	705121

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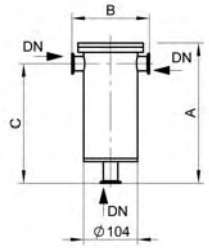
Cooling Traps Dismountable

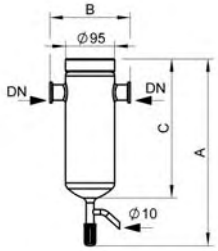
Special characteristics:
- high mechanical strength
- non rusting
- cooling media pressure max. 0.5 bar



Type	A mm	B mm	C mm	PU pcs.	Order-No.
DN 16 KF	270	150	230	1	705109
DN 25 KF	270	150	230	1	705102

Cooling Traps, Borosilicate Glass

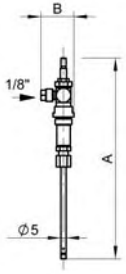
Special characteristics:
- remove condensibles from gas stream
- high chemical resistance
- high thermal stability
- coating against glass breakage
- wall thickness 5 mm
- size of the container for coolant approx. 330 ml



Type	A mm	B mm	C mm	PU pcs.	Order-No.
DN 25 KF	360	155	268	1	705125

Bubbler

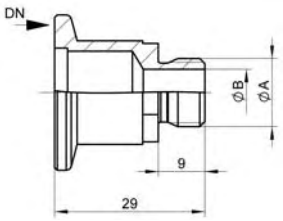
Special characteristics:
- increases the vapor tolerance of the pump by cavitation of the oil in the pump casing



For Type	A mm	B mm	PU pcs.	Order-No.
P 4 - 8 Z	190	28	1	700260
P 12 - 23 Z	194	32	1	710276

Inlet Fittings, Stainless Steel

Special characteristics:
- high corrosion resistance
- low out gassing
- for standard applications with pressures up to 1,2 bar absolute



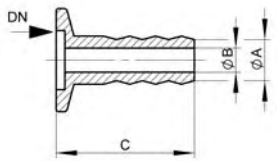
Type	A mm	B / C mm	D mm	PU pcs.	Order-No.
DN 16 KF - 1/8 inch	1/8	6,5 / 9	27	1	710197
DN 16 KF - 1/4 inch	1/4	9 / 9	29	1	710227
DN 25 KF - 1/4 inch	1/4	9 / 9	29	1	710621

Suction Fittings for Vacuum Tubes

Special characteristics:
- transition of KF connection to hose connections
- high chemical resistance, stainless steel or aluminum

Hose nozzle DN 16-12 :
for rotary vane pumps PK 2DC, P 4Z, P 6Z

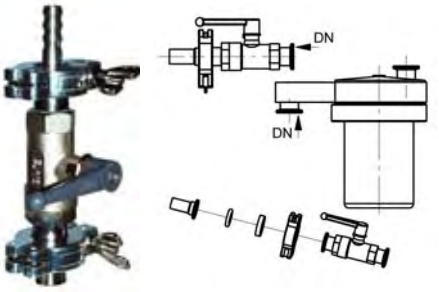
Hose nozzle DN 25-16
for rotary vane pumps P 8Z, P 12Z, P 17Z, P 23Z, P 30DF, P 40DF



Type KF	A mm	B mm	C mm	PU pcs.	Order-No.
DN 16/12 Stainless steel	12	7	40	1	701702-01
DN 16/12 Aluminum	12	7	40	1	701712-01
DN 25/16 Stainless steel	16	12	40	1	701703-01
DN 25/16 Aluminum	16	12	40	1	701713-01

Fitting Sets for Vacuum Pumps

Scope of delivery:
2-way ball valve, KF-flange connecting pieces, external centering ring with O-ring and a normal clamping ring.
PVC-tubing with embedded wire helix support (1.5 m), condenser for the pressure side.



Type	Connection flange	PU pcs.	Order-No.
Set 1	DN 16 KF	1	330001
Set 2	DN 25 KF	1	330002

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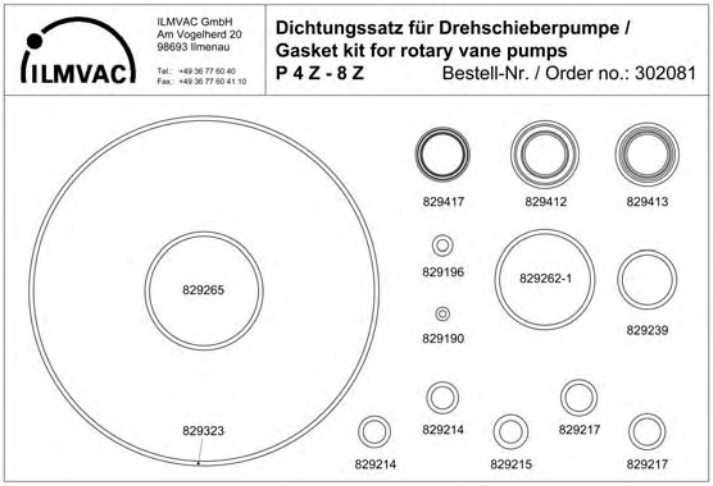
Gasket Kits for Rotary Vane Pumps PK and P and chemvac Combination Pumps

The gasket kits contain all the seals which must be exchanged during a preventive maintenance or repair.

Special characteristics:
- clear arrangement of the parts in blister packings
- fast access
- space saving storage



For Type	PU pcs.	Order-No.
P 4 Z, P 6 Z, P 8 Z, chemvac	1	302081
P 12 Z, P 17 Z, P 23 Z, chemvac	1	302082
PK 2 DC	1	302011
P 65 D	1	302139
P 30 DF, P 40 DF	1	302054

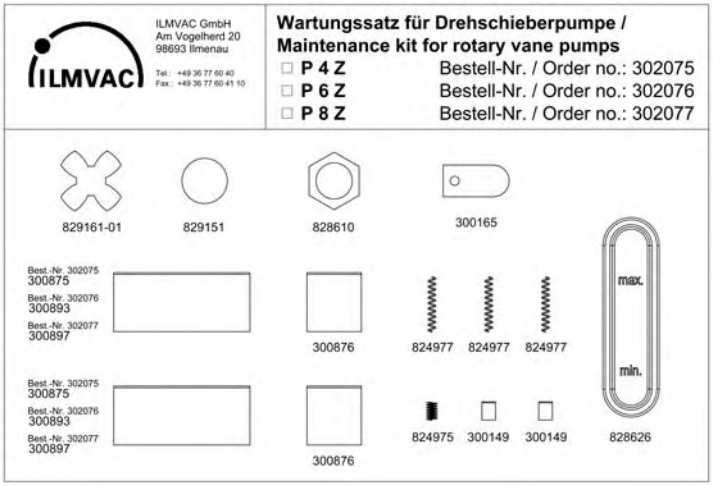
Gasket kits for the PK and P series are to be found on our website.

Maintenance Kits for Rotary Vane Pumps PK, P, PS and chemvac Combination Pumps

The maintenance kits contain, in addition to the seals, all the spare parts which are subject to high wear and tear and therefore have to be replaced.

Special characteristics:

- quick and flexible repair of your pump
- simple assembly
- clear arrangement of the parts in blister packings
- fast access
- space saving storage



For Type	PU pcs.	Order-No.
P 4 Z	1	302075
P 6 Z	1	302076
P 8 Z	1	302077
P 12 Z	1	302079
P 17 Z, P 23 Z	1	302080
PK 2 DC	1	302012-1
P 65 D	1	302138
P 30 DF, P 40 DF	1	302055-03
PS 20	1	301885
PS 40	1	301886
PS 70	1	301887
PS 100	1	301888
PS 150	1	301881
PS 200	1	301884
PS 250	1	301889
PS 400	1	301882
PS 650	1	301883
chemvac P 6 Z - 101 :		
- P 6 Z chemvac	1	302076
- MPC 101 Z chemvac	1	402008-01
chemvac P 12 Z - 301 :		
- P 12 Z chemvac	1	302079
- MPC 301 Z chemvac	1	402041-02
chemvac P 23 Z - 301 :		
- P 23 Z chemvac	1	302080
- MPC 301 Z chemvac	1	402041-02

Maintenance kits for the PK and P series are to be found on our website.

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Accessories for Diapragm Pumps, Diapragm Pump Systems, Anaerobic Systems, Aspiration Systems

This chapter presents a wide range of accessories for ILMVAC diaphragm pumps and diaphragm pump systems such as LVS, ilmdest, hold back pump, univac, biovac, fluivac and anavac.

All glass parts are coated with transparent plastic to provide an effective protection in case of glass breakage. Evaporator flasks and glass parts with thermal insulation are not coated.

Notes:
- The description of the vacuum controller 424 can be found in the chapter Vacuum Measurement and Control in this catalog.
- ILMVAC offers a wide range of components for the installation of centralized vacuum networks. A detailed description of the vacuum network components VVC can be found in the chapter Vacuum Connections for Networks in this catalog.

Screw Adapters

To the connection elements.
Made of Polyvinyldifluoride (PVDF), Polyamide (PA) or Polypropylene (PP).

Type	Picture	Connections	Material	PU pcs.	Order-No.
Straight threaded Joint	1	8 - 1/8”	PVDF	1	829919
Straight threaded Joint	1	8 - 1/4”	PVDF	1	829919-1
Straight threaded Joint	1	10 - 3/8”	PVDF	1	829931-3
Straight threaded Joint	1	10 - 1/4”	PVDF	1	829931
Screwed-in elbow	2	8 - 1/8”	PVDF	1	829936-1
Screwed-in elbow	2	8 - 1/4”	PVDF	1	829929
Screwed-in elbow	2	10 - 3/8”	PVDF	1	829984-2
Screwed-in elbow	2	10 - 1/4”	PVDF	1	829984
Screwed-in elbow	2	10 - M12x1	PP	1	829972
Tee screw adapter	3	10 - 1/4” - 10	PA	1	829938-3
Tee screw adapter	3	10 - 1/4” - 10	PVDF	1	829938-2
Straight screw adapter	4	10 - 10	PVDF	1	829945-2
Elbow screw adapter with adjusting tap	5	8 - A8	PVDF	1	829913-2
Elbow screw adapter with adjusting tap	5	10 - A10	PVDF	1	829913-1
Elbow screw adapter	6	8	PVDF	1	829917
Elbow screw adapter	6	10	PVDF	1	829983
Tee screw adapter	7	8 - 8 - 8	PVDF	1	829930
Tee screw adapter	7	10 - 10 - 10	PVDF	1	829926
Blind plug	8	G 1/8”	PP	1	400567
Blind plug	8	G 1/4”	PP	1	400568
Manifold 7	9	M12x1 - 1xG1/4” - DN8	PP	1	400932
Manifold 5	10	M12x1 - 1xG1/4” - DN16KF	PP	1	400917-01

Vacuum Hoses

To the connection of elements, as ventilation an exhaust hose.

Please indicate the length in meter.

Other vacuum tubings on request.

Material	Ext. diam. mm	Int. diam. mm	Wall thickness mm	PU pcs.	Order-No.
PTFE natural	8	6	1	1	828331
PTFE natural	10	8	1	1	828332
Silicone natural	12	6	3	1	828374
Rubber red	18	8	5	1	828310-4
Rubber red	20	10	5	1	828310-3

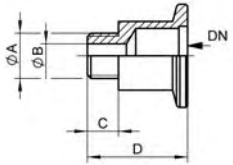
Hose Nozzles

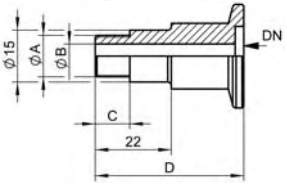
Material: Hose nozzle made of polypropylene (PP), length 40 mm.

Type	PU pcs.	Order-No.
Hose nozzle DN 6, with O-ring, male thread 1/4 Inch	1	710952
Hose nozzle DN 8, with O-ring, male thread 1/4 Inch	1	710953
Hose nozzle DN 8, with O-ring, female thread 1/4 Inch	1	710954
Hose nozzle DN 8, with O-ring, male thread M 12 x 1	1	710798-04
Hose nozzle DN 10, with O-ring, male thread 1/4 Inch	1	710955
Hose nozzle DN 10, male thread M 12 x 1	1	710961

Inlet Fittings

Material: Polypropylene (PP) or aluminum (Al), length 30 mm.
Inlet fittings of stainless steel are listed in the chapter vacuum accessories for rotary vane pumps.





Type	A Inch / mm	B / C mm	D mm	PU pcs.	Order-No.
DN 16 KF - 1/8, Al	1/8	6 / 9	30	1	710716
DN 16 KF - 1/4, Al	1/4	9 / 9	30	1	710108
DN 25 KF - 1/4, Al	1/4	9 / 9	29	1	710700
DN 16 KF - 1/4, PP	1/4	9 / 9	29	1	710116
DN 25 KF - 1/4, PP	1/4	9 / 9	29	1	710117
DN 16 KF - M12x1, PP	M12x1	7 / 10	43	1	710119

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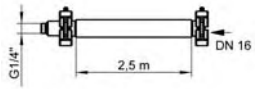
Fitting Sets

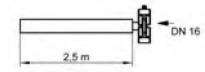
Fitting Sets for diaphragm pumps type 101 Zp and 201 Tp.

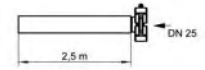
Set 1
consisting of:
- intake flange DN 16 - 1/4
- transition flange with connecting piece DN 16
- interior centering ring with O-ring and normal locking collar DN 16
- PVC hose with supporting spiral DN 16 (2.5 m)

Set 2
consisting of:
- hose nozzle DN 16-8
- an internal centering with O-Ring and normal clampring DN 16
- vacuum flexible tube, 18 / 8x5 mm (2.5 m)

Set 3
consisting of:
- intake flange DN 16 - 1/4
- transition flange with connecting piece DN 16
- interior centering ring with O-ring and normal locking collar DN 16
- PVC hose with supporting spiral DN 16 (2.5 m)





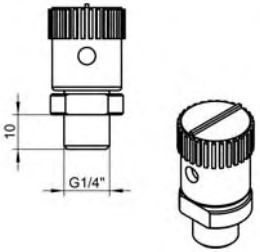


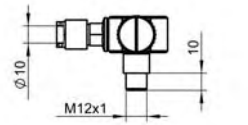
Type	PU pcs.	Order-No.
Fitting Set 1	1	404001
Fitting Set 2	1	404002
Fitting Set 3	1	404003

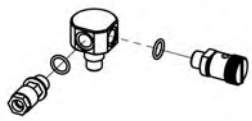
Gas Ballast Valves

When condensable vapors are pumped, they may be compressed above the saturated vapor pressure and condense. Opening the gas ballast valve in the suction line allows air to flow into the pump chamber. This prevents condensation and flushes the pump. Operation leads to higher ultimate pressure and operating temperature.

The gas ballast valve is only provided as standard for MPC type diaphragm pumps. An additional gas ballast valve for MP type diaphragm pumps is listed below.







Type	For	PU pcs.	Order-No.
Gas ballast valve	MPC...p	1	400599-01
Gas ballast valve (additional connection set)	MP...p	1	400599-02

Muffler, PA

For diaphragm pumps type MP when operated without an exhaust hose.
For reducing the noise level.

829901
829901-1

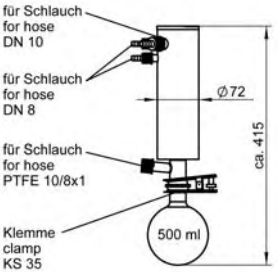
400596

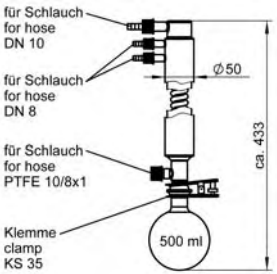
Connections	PU pcs.	Order-No.
1/8 Inch	1	829901-1
1/4 Inch	1	829901
M12 x 1 Male Thread	1	400596

Emission Condensers

Special characteristics:

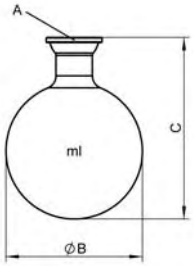
- emission condenser with 500 ml receiver
- cooling surface 0.05 m²
- liquid coolant
- outlet pressure free





Type	For	PU pcs.	Order-No.
KD 500/5 thermally insulated	LVS p	1	700183-08
KD 500/6 thermally insulated	LVS 110 Tp ef	1	700183-09
KD 500/5 without isolation	LVS p (cooler with coating)	1	700183-01

Round Bottom Flasks, Borosilicate Glass



Type	A mm	B mm	C mm	PU pcs.	Order-No.
Round Bottom Flask 500 ml with coating	KS 35	105	140	1	828839
Round Bottom Flask 1000 ml with coating	KS 35	131	170	1	828841-3
Round Bottom Flask 500 ml without coating	KS 35	131	170	1	828841

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Operating Pad

For the external operation of controlled laboratory vacuum systems LVS.
Usable with software version 1.21.

The external operating pad serves for the remote controlled operation of regulated laboratory vacuum systems. Once the sub-micro plug is attached at the LVS it is immediately ready for operation. The LVS vacuum pump stand can be installed, where it is most appropriate and does not have to stand in work height. Important bench-top space remains free. The operation corresponds to the operational sequence of the control pad built in the LVS.

Type	PU pcs.	Order-No.
Operating pad complete for LVS	1	113513

Hold Back Special

Special accessories for the Hold Back Pump HBP 101.

Sensor for HBP 101:
- for measurement of process vacuum level
- sensor with ceramics diaphragm
- supply voltage (sensor) 5 V stabilized
- output signal 0.5 - 4.5 V
- ambient temperature 5 to 40 °C
- vacuum connection GL14 screw connection
- electrical connection cable (1.0 m) with plug connector
- diameter 32 mm, length 60 mm

Adapters for rotary evaporators:
- with short steam inlet tube, dia. 50 mm, length 70 mm
- with long steam inlet tube, dia. 50 mm, length 158 mm
- with fixed steam inlet tube, dia. 26 mm, length 120 mm

Material: borosilicate glass
- with two lateral connections GL 14 mit blind caps and GL 18 with screw connections
- sealing and hose nozzle DN 10
- attachment via glass flange, external dia. 50 mm, internal dia. 35 mm
- device for filling the evaporator flask via hose nozzle DN 8

700181

700181-01

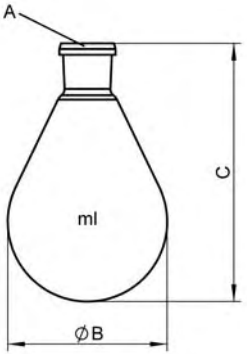
700349

Type	PU pcs.	Order-No.
Sensor for HBP 101	1	112543-10
Adapter - Rotary Evaporator 50/70	1	700181
Adapter - Rotary Evaporator 50/158	1	700181-01
Adapter - Rotary Evaporator 26/120	1	700349

ilmdest Special

Special accessories for the vacuum istillation systems ilmdest and ilmdest +.

Evaporator flask:
- borosilicate glass, without coating
- neck NS 29/32



Sensor for ilmdest:
- for measurement of process vacuum level
- sensor with ceramics diaphragm
- supply voltage (sensor) 5 V stabilized
- output signal 0.5 - 4.5 V
- ambient temperature 5 to 40 °C
- vacuum connection GL14 screw connection
- electrical connection cable (1.0 m) with plug connector
- diameter 32 mm, length 60 mm

Water bath:
- diameter 280 mm, length 305 mm
- weight 4.8 kg
- power 1.8 kW
- power supply 230 V 50/60 Hz or 115 V 50/60 Hz

Type	A	B / C mm	Power supply V / Hz	PU pcs.	Order-No.
Evaporator flask 500 ml	NS 29/32	105/175		1	828838-02
Evaporator flask 1000 ml	NS 29/32	131/200		1	828838
Evaporator flask 2000 ml	NS 29/32	166/220		1	828838-01
Sensor				1	112543
Water bath WB 1			230 / 50/60	1	112536
Water bath WB 1			115 / 50/60	1	112536-15

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anavac Special

Special accessories for the anaerobic system anavac 104.

Type	PU pcs.	Order-No.
Anaerobic container complete for 10 petri dishes	1	112555
Anaerobic container	1	112555-01
Seal for container cover	1	112555-08
Rack for 10 petri dishes	1	112555-06
Inlinefilter 0.22 µm	1	112555-04
Oxygen indicator strips	100	112555-02
Schott union with sleeve dia. innen 6.4 mm, PP	1	829996
Angle with hose connector NW 7.2 mm x 1/4 Zoll x 6.4 mm, PP	1	829996-1
Clamp	1	112555-07

biovac Special

Special accessories for the safety aspiration system biovac 106.

Type	PU pcs.	Order-No.
Foot control complete	1	112529
Plot (Pipetting holder) complete	1	112524-1
Secret glass container complete	1	112523-1
Cover complete for secret glass container	1	828840-1
Bacteria filter for cover of secret glass container	1	828840-2

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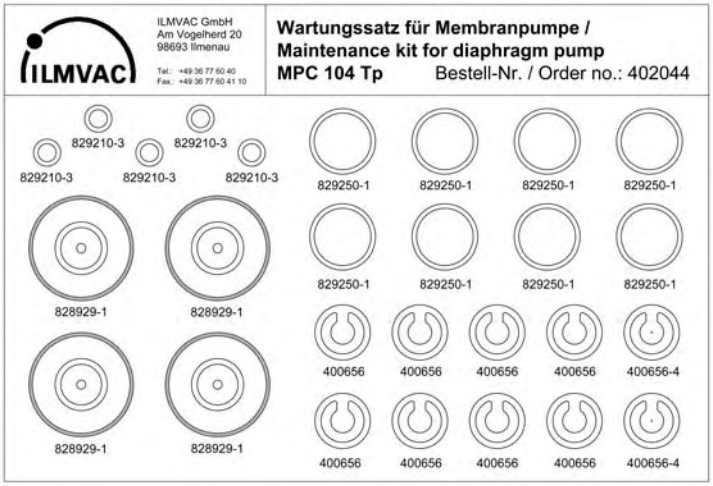
Maintenance Kits for Diapragm Pumps, Diapragm Pump Systems, Anaerobic Systems, Aspiration Systems

The Maintenance Kits contain all necessary seals and wearable parts.

Special characteristics:

- quick and flexible repair of the pump
- simple assembly
- clear arrangement of the parts in blister packings
- fast access
- space saving storage



For Type	PU pcs.	Order-No.
MP/MPR 060 E	1	402031
MP/MPC 301 E	1	402046
MP/MPC 104 Ep, 054 Zp	1	402045
MPC 104 Tp, anavac 104	1	402044
MP/MPC 201 Ep, 101 Zp	1	402008
MP/MPC 201 Tp, MP 101 Vp	1	402015
MP/MPC 601 Ep, 301 Zp, 301 Zp ecoflex, fluivac 105	1	402041
MP/MPC 1201 Ep, 901 Zp, 601 Tp, 301 Vp and ecoflex	1	402042
MP/MPC 2401 Ep, 1801 Zp, 1201 Tp and ecoflex	1	402044
MPC 301 Zp Ex ATEX Cat.2	1	402038
MPC 601 Tp Ex ATEX Cat.2	1	402039
HBP 101, ilmdest	1	402035

Accessories for Turbomolecular Pumps and Pump Systems

This chapter presents a wide range of accessories for ILMVAC turbomolecular pumps and pump systems. It contains splinter screens, ventilators, controllers, heater-bands, water cooling, cables and software.

For CF flange components for high and ultra high vacuum see chapter CF components in the Ilmvac accessories catalog.

Splinter Screens, Stainless Steel

For the protection of the turbomolecular pumps from larger solid particles the splinter screens are inserted into the intake flange. The mesh sizes are between 0.7 and 1.5 mm depending on the pump type. The pumping speed of the turbomolecular pumps is approximately 10 % lower when using a splinter screen.

For Type	Connection flange	PU pcs.	Order-No.
SST 81/40UHV, CDK 180UHV, 181UHV	DN 40 / DN 35 CF	1	400288-2
SST 81/40, CDK 180, 181	DN 40	1	400260-2
SST 81, 81UHV, CDK 280, 280UHV, 281, 281UHV, STP 1, /D1	DN 63	1	400261-2
SST 301R, 301R UHV, SST 551R UHV STP 5, STP /D5	DN 100	1	400276-2
SST 301, 301 UHV, SST 551, 551 UHV, SST 1001 R	DN 160	1	400265-2
SST 701, 701 UHV, SST 1001R UHV	DN 200	1	400267-2
SST 1001	DN 250	1	400280-2

Ventilators

The turbomolecular pumps are equipped with a ventilation cooling as a standard.

For Type	PU pcs.	Order-No.
SST 81	1	400288-3
SST 301	1	400276-3
SST 551, 701	1	400285-3
SST 1001	1	400280-3
SST 301 K	1	400277-3
SST 551 K, 701 K	1	400286-3
SST 1001 K	1	400281-3

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Controller

The controllers consist of the power adapter including a microprocessor-controlled frequency converter for the operation of the turbo molecular pumps. The operation and control are made by a keyboard with display at the front of the pump casing. Here the current operational data can be monitored visually and certain parameters can be set. Optionally the controllers are available with R-S 232/485 or professional bus.

For Type	Power supply V / Hz	PU pcs.	Order-No.
SST 81	115/230 / 50/60	1	400288-1
SST 301	115/230 / 50/60	1	400265-1
SST 551	230 / 50/60	1	400266-1
SST 551	115 / 50/60	1	400276-1
SST 701	230 / 50/60	1	400267-1
SST 701	115 / 50/60	1	400285-1
SST 1001	230 / 50/60	1	400280-1
SST 1001	115 / 50/60	1	400292-1
SST 301 K	115/230 / 50/60	1	400277-1
SST 551 K	115/230 / 50/60	1	400286-1
SST 701 K	115/230 / 50/60	1	400279-1
SST 1001 K	115/230 / 50/60	1	400281-1

Heater-Bands

The heater-bands serve for baking the turbomolecular pumps for the operation within the UHV range (< 10^{-7} mbar). Baking takes place at a temperature > 80 °C and maximum pressure < 10^{-4} mbar without gas load.

For this application the turbomolecular pumps with CF flange are to be selected and an additional water cooling is required.

If turbomolecular pumps with air-cooling are to be baked, the heating duration (heating intervals) must be tuned to a maximum interior temperature of the pump of approx. 50 °C. Higher temperature will switch off the turbomolecular pump automatically.

For Type	Power supply V	PU pcs.	Order-No.
SST 81 UHV, 81/40 UHV	230	1	400260-4
SST 81 UHV, 81/40 UHV	115	1	400268-4
SST 301 UHV, SST 301R UHV	230	1	400276-4
SST 301 UHV, SST 301R UHV	115	1	400265-4
SST 551 UHV, 551R UHV, 701 UHV	230	1	400285-4
SST 551 UHV, 551R UHV, 701 UHV	115	1	400266-4
SST 1001R UHV	230	1	400280-4
SST 1001R UHV	115	1	400292-4

Water Cooling

When baking or when operating with increased gas load (operating pressure approx. 10^{-3} mbar) the turbomolecular pumps are to be equipped with a water cooling.

- water temperature between 15 and 35 °C
- water pressure between 2 and 5 bar

For Type	PU pcs.	Order-No.
SST 81 UHV, 81/40 UHV	1	400293-3
SST 301 UHV, 551 UHV, 701 UHV, 1001 UHV	1	400264-3

Kabel und Software

For special applications of the turbomolecular pumps and turbomolecular pump systems appropriate accessories are offered:

- extension cable for turbomolecular pumps
- extension cable for ventilators
- serial cable and software (CD) for SST - K - pumps (controller - PC - software) - serial cable and software (CD) for CDK - turbomolecular pump systems (via RS 232 reading and writing of operational data of the turbomolecular pump)

Type	Cable length m	PU pcs.	Order-No.
Extension cable for pump SST 81	5	1	400288-5
Extension cable for pump SST 551, 701, 1001	5	1	400265-5
Extension cable for fan SST 81, 301	5	1	400288-6
Serial cable + software for all SST-Compact pumps	-	1	400277-7
Software for CDK turbomolecular pump systems	-	1	101575

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Accessories for Measuring Gauges and Controllers

Hose nozzles with O-ring see chapter Accessories for Diaghragm Pumps.

Sensors and Transducers

Special characteristics:
- different vacuum connections depending on sensor/transducer
- sensor must be partly adjusted with the gauge


620090


620088 / 620089


620001-01 / 620002-01


620053


620077


620078


620080


620082


620083


620052-13

Type	Measuring range max. mbar	Material	Vacuum connection	PU pcs.	Order-No.
PEN 101 for MRV 100	$1x10^{-2}$ - $5x10^{-8}$	Aluminum, nickel plated	DN 25 KF	1	620090
PEN 101 for MRV 100	$1x10^{-2}$ - $5x10^{-8}$	Aluminum, nickel plated	DN 40 CF	1	620090-01
CAP 101 for MRV 100	1000 - 1	Stainless steel	DN 16 KF	1	620088
CAP 121 for MRV 100	200 - 0,1	Stainless steel	DN 16 KF	1	620089
PIZA 111 for PIZA 111 + MRV 100	1100 - $1x10^{-3}$	PP	DN 16 KF	1	620002-01
PIZA 101 for PIZA 101	1050 - 1	PP	DN 16 KF	1	620001-01
pirani for PIA 1.2	1000 - 10^{-3}	Stainless steel	DN 16 KF	1	620053
piezo for MRV 3000	1330 - 1,3	Stainless steel	DN 16 KF	1	620077
piezo/pirani for MRV 3000	2000 - $1,3x10^{-5}$	Stainless steel	DN 16 KF	1	620078
pirani for MRV 3000	1000 - $1,3x10^{-5}$	Stainless steel	DN 16 KF	1	620080
atmosphere to vacuum for MRV 3000	1000 - $7x10^{-10}$	Stainless steel	DN 25 KF	1	620082
multi sensor for MRV 3000	1330 - 6 x 10^{-10}	Stainless steel	DN 25 KF	1	620083
sensor with airvalve for VCZ 424	1100 - 1	PP	DN 16 KF	1	620052-13

Sensor Cables

Operating software ILMVAC-control on CD + connecting cable (from software version 1.22 usable).
For a connection of PC and vacuum controller 424 via a serial interface RS 232 (Com interface - 2 x 9-pole SUB D female - 0-modem).
The accurate description of the operation is contained on a CD.

620091

620003

620084 / 620085

620086 / 620087

For	Cable length m	PU pcs.	Order-No.
PIZA 111 on MRV 100	3	1	620091
PIZA 101 and PIZA 111	2	1	620003
MRV 3000: 620078, 620082 and 620083	3	1	620084
MRV 3000: 620078, 620082 and 620083	5	1	620085
MRV 3000: 620077 and 620080	3	1	620086
MRV 3000: 620077 and 620080	5	1	620087
Operating software ILMVAC-Control complete	-	1	620617

620617

Stand and Clip

For hand held gauges PIZA 101 and PIZA 111.

Type	PU pcs.	Order-No.
Stand	1	620007
Clip	1	620008

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Valves

Water valve WV 1 for Vacuum Control Box VCB 424:
2 way water flow valve for the demand-responsive cooling water supply. Mounting possible in any direction.
- input G 3/4 Inch male thread
- output G 3/4 Inch male thread
- control servo, 24 V DC
- power 2 W
- nominal width 10 mm
- housing PPS, sealing EPDM
- protection class IP 65


700300

Water valve WV 2 for Vacuum Control Box VCB 424 and Laboratory Vacuum Systems LVS:
2 way water flow valve for the demand-responsive cooling water supply. Mounting possible in any direction.
- input G 3/4 Inch locking nut
- output hose nozzle for hose inside diameters 8 mm
- control servo, 24 V DC
- power 4 W
- nominal width 10 mm
- housing PPS, sealing EPDM
- protection class IP 65


700300-02

Water valve WV 3 for Vacuum Control Box VCB 424 and Laboratory Vakuum Systems LVS:
2 way water flow valve for the demand-responsive cooling water supply. Mounting possible in any direction.
- input G 3/4 Inch locking nut
- output hose nozzle for hose inside diameters 8 mm
- voltage/frequency 230 V AC
- nominal width 10 mm
- housing PPS, sealing EPDM
- protection class IP 65


700300-03

Control valve VS 8 MC (for Vacuum Control Box VCB 424 es):
- electro magnetic
- for chemical applications
- housing PVDF, sealing PVDF
- vacuum connection 2 x stainless steel


700255-01

Control valve VS 16 MC (for Vacuum Control Box VCB 424 es):
- electro magnetic
- for chemical applications
- housing PVDF, sealing PVDF
- vacuum connection 2 x stainless steel


700237-01

Type	Pressure range bar	Flow l/m	Dimensions (W/D/H) mm	PU pcs.	Order-No.
WV 1	0.3 - 8	24	69/35/67	1	700300
WV 2	0.5 - 0	24	100/32/82	1	700300-02
WV 3	0.3 - 8	24	50/32/82	1	700300-03
VS 8 MC	0 - 1	-	100/40/85	1	700255-01
VS 16 MC	0 - 1	-	100/40/85	1	700237-01

Mains Connection Cables

Connecting cables for non-heating apparatus with integrally cast plugs.
Connection of the devices to the various national plug systems:

- CEE Earthed plug, 2-pin according to CEE 7/VII
- UK British plug, 2-pin according to BS 1363 A
- CH Swiss plug type 12, 2-pin + earth
- US American plug, 2-pin + ground

Cable sets consisting of connecting cable for non-heating apparatus with integrally cast plug and adaptor cable for attaching the controller to a vacuum pump.


825885


825878


825877


825903

Type	Cable length m	PU pcs.	Order-No.
Mains connection cable black - with plug CEE	1.5	1	825885
Mains connection cable black - with plug UK	1.5	1	825878
Mains connection cable black - with plug CH	1.5	1	825877
Mains connection cable black - with plug US	2.5	1	825903
Cable set for VCB 424 en + es - with plug CEE	1.5 / 0.5	1	620621
Cable set for VCB 424 en + es - with plug UK	1.5 / 0.5	1	620621-1
Cable set for VCB 424 en + es - with plug CH	1.5 / 0.5	1	620621-2
Cable set for VCB 424 en + es - with plug US	2.5 / 0.5	1	620621-3


620621

Oils for Vacuum Pumps

ILMVAC vacuum oil selection guide:

- Rotary Vane Pumps: LABOVAC 10, LABOVAC 11, LABOVAC 12s, LABOVAC 13 and LABOVAC 14
- Roots Pumps: LABOVAC 10
- Oil Diffusion Pumps: XT 704, XT 705 and Santovac 5

LABOVAC oils guarantee best performance by continuous and careful quality control. To cover the whole range of vacuum applications we offer five types of oil with different specifications.

LABOVAC-10:
For general use in rotary vane pumps. Very low vapor pressure (< 10^{-5} mbar). Low oil re-diffusion.

LABOVAC-11:
Synthetic oil for high working temperatures, e.g. for the continuous pumping down of large amounts of vapor.

LABOVAC-12S:
The oil with the lowest vapor pressure and backstreaming. Mineral based. Refined by an extensive molecular distillation process to remove low boiling fractions.

LABOVAC-13:
Perflour-Polyether oil (PFPE) with medium values of vapor pressure and attainable ultimate partial pressure. Especially suited for pumping of oxygen and ozone as well as in etching processes in semiconductor techniques and micromechanics.

Continuation next page

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LABOVAC-14:
Synthetic oil with low vapor pressure, high chemical stability. The oil is particulary well suited for distillation and freeze drying processes.
Labovac 14 is the standard oil for ILMVAC chemvac combination pump systems. Oils with specific properties for special applications available on request.

XT 704 and XT 705 (working fluids for oil diffusion pumps):
Working fluid with high vapor pressure and flash point, constant boiling properties and almost not oxidizing.

Santovac 5 (working fluid for oil diffusion pumps):
Working fluid for lowest ultimate pressures with extremely low backstreaming. Thermically very stable and insensitive against air leakage.

Type	Vapor pressure at 20 °C	Viscosity at 40 °C	Flash point	Density at 15 °C
-	mbar	cST	°C	g/ml
LABOVAC-10	10^{-5}	118	270	0.888
LABOVAC-11	10^{-5}	110	260	0.960
LABOVAC-12S	10^{-8}	94	260	0.886
LABOVAC-13	10^{-6}	120	not applicable	1.890
LABOVAC-14	< 10^{-6}	47.9	257	0.918
XT 704	10^{-7}	39	221	1.07
XT 705	10^{-8}	175	243	1.09
Santovac 5	$4x10^{-10}$	363	288	1.198

Type	Description	Content l	PU pcs.	Order-No.
LABOVAC 10	standard oil	1	1	800122
LABOVAC 10	standard oil	5	1	800120
LABOVAC 10	standard oil	10	1	800123
LABOVAC 10	standard oil	20	1	800124
LABOVAC 10	standard oil	200	1	800119
LABOVAC 11	high temperature oil	1	1	800125
LABOVAC 11	high temperature oil	10	1	800126
LABOVAC 11	high temperature oil	20	1	800127
LABOVAC 12S	paraffin oil	1	1	800128
LABOVAC 12S	paraffin oil	10	1	800129
LABOVAC 12S	paraffin oil	20	1	800130
LABOVAC 13	PFPE fluid	1	1	800131
LABOVAC 13	PFPE fluid	2	1	800132
LABOVAC 13	PFPE fluid	5	1	800133
LABOVAC 13	PFPE fluid	10	1	800134
LABOVAC 14	standard oil for chem. application	1	1	800135
LABOVAC 14	standard oil for chem. application	2	1	800136
LABOVAC 14	standard oil for chem. application	5	1	800137
LABOVAC 14	standard oil for chem. application	10	1	800138
XT 704	silicon oil, working fluid for oil diffusion pumps	0.5	1	800106
XT 705	silicon oil, working fluid for oil diffusion pumps	0.5	1	800107
Santovac 5	Pentaphenylether, working fluid for oil diffusion pumps	0.1	1	800108

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Conversion Tables

Many different units of measurement for vacuum science are in use globally. The following tables assist in converting from one unit to another.

	PA N/m²	bar	mbar	µbar dyn/cm²	Torr mm Hg	atm
Pa	1	1×10^{-5}	1×10^{-2}	10	7.5×10^{-3}	9.87×10^{-6}
bar	1×10^{5}	1	1×10^{3}	1×10^{6}	750	0.987
mbar	100	1×10^{-3}	1	1000	0.75	9.87×10^{-4}
µbar	0.1	1×10^{-6}	1×10^{-3}	1	7.5×10^{-4}	9.87×10^{-7}
Torr	1.33×10^{2}	1.33×10^{-3}	1.33	1330	1	1.32×10^{-3}
atm	1.01×10^{5}	1.013	1013	1.01×10^{6}	760	1

	Pa m³/s W	mbar l/s	Torr l/s	atm cm³/s
Pa m³/s	1	10	7.5	9.87
mbar l/s	0.1	1	0.75	0.987
Torr l/s	0.133	1.33	1	1.32
atm cm³/s	0.101	1.01	0.76	1

	cm	inch	ft
cm	1	0.394	0.033
inch	2.54	1	0.083
ft	30.48	12	1

	K	°C	F
K	1	K-273.15 9/5	K-459.67
°C	°C+273.15	1	9/5 °C+32
F	5/9 (F+459.67)	5/9 (F-32)	1

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Solvent table

Table indicates the required level of vacuum for evaporation at 40°C

Solvent	Formula	Vacuum (mbar) at 40 °C
acetone	C_3H_6O	556
N-amylalcohol, n-pentanol	$C_5H_{12}O$	11
benzene	C_6H_6	236
butanol	C_4H_{10}	25
tert. Butanol, 2-methyl-2-propanol	$C_4H_{10}O$	130
carbon tetrachloride	CCI4	271
chlorobenzene	C_6H_5Cl	36
chloroform	$CHCl_3$	474
cyclohexane	C_6H_{12}	235
diethyl ether	$C_4H_{10}O$	vacuum
1,2-dichloro ethane	$C_2H_4Cl_2$	210
1,2-dichloro ethylene (cis)	$C_2H_2Cl_2$	479
1,2-dichloro ethylene (trans)	$C_2H_2Cl_2$	751
diisopropylether	$C_6H_{14}O$	375
dioxane	$C_4H_8O_2$	107
DMF di methyl foramide	C_3H_7NO	11
alcohol	C_2H_6O	175
ethyl acetate	C_4H8O_2	240
heptane	C_7H_{16}	120
hexane	C_6H_{14}	335
isopropanol	C_3H_8O	137
isoamyl alcohol, 3-methyl-1-butanol	$C_5H_{12}O$	14
ethylmethylketone	C_4H_8O	243
methanol	CH_4O	337
methylene chloride, dichlormethane	CH_2Cl_2	vacuum
pentane	C_5H_{12}	vacuum
n-propyl alcohol	C_3H_8O	67
pentachloro ethane	C_2HCl_5	13
1,1,2,2, tetrachloroethane	$C_2H_2Cl_4$	35
1,1,1, trichlorethylene	$C_2H_3Cl_3$	300
tetrachloroethylene	C_2Cl_4	53
toluene	$C7H_8$	77
trichlorethylene	C_2HCl_3	183
water	H_2O	72
xylene	C_8H_{10}	25

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Index by Order-Numbers

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General Terms for Delivery and Payment of ILMVAC GmbH

§ 1 Scope

1.1. These General Terms for Delivery and Payment ("hereinafter referred to as "Conditions") govern exclusively the entire relationship between ILMVAC and the Customer (shall mean the person doing a commercial business or legal commercial entity which the contractual relationship is upon), especially the conclusion of the contract, delivery of items ("Products") and rendering of services by ILMVAC. These Conditions are applicable in full and as the sole and exclusive agreement, supplemented by the particular conditions reflected in ILMVAC´s sale offers or confirmations together with all other contractual documents defined in these Conditions.

1.2. The application and any incorporation of the general terms and conditions of the Customer are herewith excluded. The Customer waives the application of its own general conditions.

1.3. After the first inclusion of these Conditions, all future businesses between the Customer and ILMVAC shall be governed by these Conditions without any necessity of additional reference unless otherwise agreed.

§ 2 Conclusion of Contract, Intellectual Property

2.1. Catalogue or internet presentations are not legally binding offers and are subject to change without notice.

2.2. The contract (minimum value of 150 Euros - excepting repairs and deliveries of spare parts) shall be concluded with the sending of ILMVAC´s order confirmation in writing or by telefax

2.3. The entire contractual relationship shall be documented in written form. ILMVAC´s employees are not authorised to make any oral agreements.

2.4. ILMVAC´s documents such as diagrams, drawings and specifications of weight and dimensions are only approximately decisive unless such documents are expressly indicated as binding in a written form. Variations customary in the trade are reserved.

2.5. Quotations and other documents, technical and business details, samples and similar material must not be disclosed to third parties without the consent of ILMVAC. ILMVAC reserves the property right and the copyright to such documents. Aforesaid documents including any kind of copy are to be returned to ILMVAC immediately if the order is not awarded.

2.6. In the case that Products are manufactured in accordance with Customer specifications, the Customer shall be solely responsible and liable for the avoidance of infringements of third-party´s industrial or intellectual property rights in respect of these specifications.

§ 3 Prices and Terms of Payment, Right of Retention, Set-Off

3.1. The prices are net prices (ex-works). The Customer is obliged to pay expenses such as packaging, costs of insurance, training, installation and transportation as well as the current legal VAT additionally.

3.2. Price increases beyond ILMVAC´s responsibility (e.g., increases of purchase prices) entitle ILMVAC to pass such increases on to the Customer.

3.3. Unless otherwise agreed, an advance payment of thirty percent shall be due at the time of the conclusion of contract. The second third shall be due with the delivery and the final payment shall be settled within 14 working days after delivery.

3.4. Payments must be done without any deduction unless otherwise agreed expressively in writing.

3.5. Agreed cash discounts will only be granted when all financial obligations from earlier deliveries have been settled by the Customer.

3.6. Unless otherwise agreed, payments must be done in EURO by bank transfer on time to ILMVAC´s account. ILMVAC is not obliged to accept any cheques or bills of exchange or any other promise to pay.

3.7. Repair orders and the delivery of parts are immediately due for net payment.

3.8. Part delivery of products or rendering of services in instalments shall entitle ILMVAC to demand for part payment accordingly.

3.9. ILMVAC is entitled to set off payments of the Customer against older debts, despite stipulations of the Customer to the contrary.

3.10. The Set-Off or the retention of due payments by the Customer are only permitted against ILMVAC´s claims with counter-claims which have been recognised by ILMVAC or are legally binding by a judgement.

3.11. In the event of late payment, ILMVAC shall be entitled to claim for interests of 10 percent above the current interest rate of the European Central Bank, beginning from the date of delay. Additionally, ILMVAC may suspend its performance and delivery duties until receive of the payment still due.

3.12. If the due amount is not paid within three months, ILMVAC shall be entitled to terminate, at its choice, the unpaid part or the entire contract by notice in writing. The Customer compensates ILMVAC for the losses incurred.

§ 4 Delivery, Force Majeure

4.1. Time of Delivery is an estimated time, and shall not be deemed as fixed unless otherwise agreed expressively. Unless otherwise agreed expressively, the time of delivery shown on ILMVAC´s offer or ILMVAC´s order confirmation documents is only presented for information purposes in respect of the approximate internal planning.

4.2. Binding delivery deadlines are deemed to be observed upon the notification of readiness for shipment, at the latest upon the departure from ILMVAC´s factory. The observance of the deadline supposes the performance of the Customer´s contributory actions.

4.3. The observance of delivery dates is subject to correct and timely reception of deliveries by ILMVAC´s suppliers.

4.4. Part deliveries are permitted to a reasonable extent. Part deliveries are considered as independent transactions.

4.5. In the case of a delay with the delivery at a binding delivery date, the Customer shall grant an extension of 7 working days before exercising its legal rights.

4.6. In any event causing delay or prevention of delivery beyond ILMVAC´s control, including, but not limited to, labour strikes, lawful lock-outs, natural occurrences, force majeure and transport or plant interruptions beyond ILMVAC´s responsibility, the binding delivery deadline shall be extended reasonably. This also applies when such reasons occur with a subcontractor of ILMVAC. In the case that the delay or prevention caused by the events as aforesaid last more than 10 calendar days, ILMVAC shall be entitled to rescind the contract with the sole obligation the repay received advance payments. The passage of risk shall not be affected by this provision.

§ 5 Passage of Risk, Place of Performance, Insolvency

5.1. Shipment is for the account and risk of the Customer. Risk passes upon notification of readiness to ship ex works (EXW in accordance with the Incoterms), at the latest with the handing over to the first carrier ex works. This shall also apply when ILMVAC performs additional services, e.g. installation of the products in Customer´s plant, transportation or forwarding expenses of transport.

5.2. The provisions covering the passage of risk shall also apply to part deliveries.

5.3. Unless otherwise agreed in writing, the legally binding place of performance for all obligations out of the entire contractual relationship is Ilmenau.

5.4. ILMVAC is entitled to conclude the transport insurance at Customer's cost.

5.5. Return shipments shall be agreed with ILMVAC in advance.

5.6. Any file for Customer´s insolvency/bankruptcy, substantial deterioration of assets, and considerable financial difficulties shall entitle ILMVAC to cease deliveries. If such circumstances cannot be cleared up by the rescind of the insolvency file within two weeks from the date of filing or the clearing by bank security or advance payment within two weeks from the date the circumstances became known to ILMVAC, then ILMVAC shall be entitled to terminate the contract.

§ 6 Liability for Defects, Liability and Compensation

6.1. The description of the Products, irrespectively where presented (e.g., brochures, internet), are not deemed to be a guaranty but mere characterisations of the products. Variations customary in trade are reserved.

6.2. ILMVAC shall not be liable for the suitability of the delivered Products to the purposes which the Customer intents to achieve unless the approval of such suitability was agreed as ILMVAC´s contractual obligation in written form.

6.3. ILMVAC shall only be liable for substantial defects. A deviation of the agreed quality not causing a malfunction of the delivered products, non-substantial faults of material or workmanship shall not be deemed as substantial defect.

6.4. ILMVAC shall, at its choice, either deliver again, or rectify such defects that ILMVAC is liable for. The defect rectification shall be at ILMVAC´s choice either in its works or at Customers premises.

6.5. Immaterial defects do not entitle the Customer to claim liability for defects.

6.6. Replaced parts shall remain ILMVAC´s property.

6.7. The Customer must check the delivered Products immediately after receipt. Any defect obvious at the time of receipt shall be notified to ILMVAC immediately, at the latest within four calendar days after the day of receipt, but in any case prior to processing, installation or resale.

6.8. Defects not obvious at the time of receipt (hidden defects) shall be notified in writing or fax immediately after detection including a precise description of the defects, its relevance and the process of detecting the failure.

6.9. Failure in timely notice causes the lapse of all claims and remedies for defects against ILMVAC. Therefore, the immediate check of incoming products and the immediate notification of defects is an essential obligation to preserve the rights of Customer (§ 377 HGB - German Code of Commerce). This does not apply to contracts which require a formal acceptance (§§ 631 BGB – German Civil Code).

6.10. When Products are made to Customer´s specifications, ILMVAC is only liable for execution according to such specifications.

6.11. No warranty is given for defects resulting from inappropriate or improper acting of Customer or third parties assisting the Customer such as, but not limited to, inappropriate or improper use, faulty installation or faulty start-up, faulty or negligent handling, improper rectification, unsuitable equipment or replacement materials, faulty construction work, unsuitable subsoil, chemical or other influences for which ILMVAC is not responsible.

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6.12. ILMVAC is only liable for damages based on faulty products in cases of

- intent and gross negligence;
- the culpable injury to life, body, health;
- the fraudulent concealment of defects or for defects which have been guaranteed as non-existent;
- strict liability for personal injuries and material damage, e.g. the German Product Liability Act.

In the event of culpable non-observance of essential duties (cardinal duties) under a contract, ILMVAC is also liable for simple negligence, while the liability is restricted to foreseeable contract-typical damage. Such typical damages are to be measured on the information given to ILMVAC in advance at the time of conclusion of contract.
6.13. Warranty claims for defects of new products are subject to a limited period of one year after reception/handing over, or after a point in time treated as equal. Thereafter, these claims shall be excluded.
6.14. The period of limitation as defined under Number 6.13. shall not apply to cases where Products used for construction purposes are delivered, and for damage compensation as defined under Number 6.12. These claims are subject to the legal period of limitation under the applicable law.
6.16. Second-hand or used products are excluded from warranty claims.
6.17. If the Customer has given a notice of defect to ILMVAC and no defect is found for which ILMVAC is liable, ILMVAC shall be entitled to compensation for the costs and expenses including the expenses of legal advice which ILMVAC has incurred as a result of the notice.

§ 7 Retention of Title, Customer´s Insolvency, Securities
7.1. The products remain ILMVAC´s property until the complete payment of all due accounts payable out of the commercial relationship with the Customer.
7.2. The retention of title shall not affect the passing of risk under Clause 4.
7.3. The Customer may not resell or process the delivered Products until all invoices due are fully paid, and the retention of title terminates therewith in accordance with Number 7.1 .
7.4. If the Products are resold or otherwise transferred by the Customer to a third party in breach of Number 7.3., and ILMVAC looses its property to this third party by law, then the Customer's debt claim from the resale, as well as any other claim (e.g. insurance, unlawful acts) in relation to the third-party, is assigned to ILMVAC already now for security purposes up to the value of the lost property.
7.5. In the event of insolvency/bankruptcy files or the opening of insolvency/bankruptcy procedures over the entity or assets of the Customer, ILMVAC herewith declares in advance its claim to take back the delivered products which the property of ILMVAC still is reserved for. This declaration shall be deemed to be in time with mandatory deadlines under the law of Customer´s country (e.g. Art. L. 621-115 of the French Code du commerce and similar provisions in other countries). ILMVAC shall be entitled to take back its property from Customer´s presmises.
7.6. The Customer may neither pledge of Products nor otherwise permit the use thereof in a way that is detrimental to the security, or the retention of title.
7.7. If the value of all securities exceeds the amount of all secured claims by more than 20 percent, ILMVAC will release a corresponding part upon Customer's request.
7.8. If action is taken by third parties during the period of the retention of ownership in relation to the Product, the Customer is obliged to immediately notify in writing and to immediately draw the attention of the third party to the property and the rights of ILMVAC. The Customer bears the cost of attachment and of replacing the products.
7.9. In case of delay in payment of more than 30 days or breach of the aforementioned obligations, ILMVAC is entitled to terminate after reminder, the Customer being obliged to surrender the conditional commodity.

§ 8 Software
8.1. ILMVAC reserves the property rights and copyright to all software delivered to the Customer. ILMVAC grants to the Customer a single, non-exclusive and non-transferable license to use the software. The license commences from the date of complete payment.
8.2. The software may only be used for the products which it is delivered for. The license is restricted to the number of user as specified in the contract.
8.3. The Customer is not entitled to decompile or modify the software.
8.4. The source code is not part of the delivery unless agreed contrary in written form.
8.5. The Customer shall backup its data on a daily basis. Any possible liability of ILMVAC in respect of loss of data is restricted to the costs of restoring the data from the current backup.

§ 9 Applicable Law, Jurisdiction (Disputes), Legal Expenses
9.1. This agreement shall be governed and construed by the Laws of the Federal Republic of Germany under exclusion of the United Nations Convention on Contracts for the International Sale of Goods (CISG).
9.2. The sole and exclusive place of jurisdiction shall be Ilmenau. Accordingly, any unresolved civil dispute relative to the contractual relationship shall be submitted to the court with jurisdiction at our seat in Ilmenau, Germany.
In deviation of this exclusivity, ILMVAC shall be entitled unilaterally to claim to a court with jurisdiction at the place of residence or at the seat of the Customer at ILMVAC´s choice.
9.3. The prevailing party in any legal dispute arising out of this Contract, shall be entitled, in addition to any other rights the party may have, to reimbursement for its expenses, including court costs and reasonable attorney` s fees.

§ 10 Assignment of Rights, Miscellaneous
10.1. Any transfer of rights and obligations from this Contract needs to be approved by ILMVAC.
10.2. ILMVAC stores data on the business relations under observance of the German Federal Data Protection Act.
10.3. Should any individual provision of these Conditions be void or become void, the validity of the remaining provisions shall not be affected thereby. In such cases, the void provision or provisions shall be replaced automatically by a provision or provisions coming as close as possible to the intended economic purpose of the void provision.

Release date: 2006-11-01

Order Formular

ILMVAC
vacuum meets the future

Invoice address

Name
Street
Zip-code City
Fon
Fax
Email
Country

Delivery address

If it is not the same like invoice address

Name
Street
Zip-code City
Fon
Fax
Email
Country

Herewith we order the following articles:

Our order number
Our customer number
Date

Stamp /Signature

Type	Order-No.	Quantity	Price per unit [EURO]	Total price [EURO]
			Sum [EURO]	

All prices are net prices. Costs of transportation, insurance, training, installation and value added taxes will be invoiced seperately.

Your order is exclusively subject to our terms and conditions of delivery which are presented on the internet www.ilmvac.com. Our terms and conditions are provided by mail upon your request. The terms & conditions form an integral part of the contractual relationship. We refer expressively to the provisions covering the choice of law, jurisdiction and retention of title as an integral part of these terms and conditions with outstanding relevance.

ILMVAC

vacuum meets the future

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