CATALOG 2016 / 2017

TECHNOLOGY FOR VACUUM SYSTEMS

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Technology for Vacuum Systems

vacuubrand®

TRADEMARK-INDEX

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IBERO-EDELSTAHL

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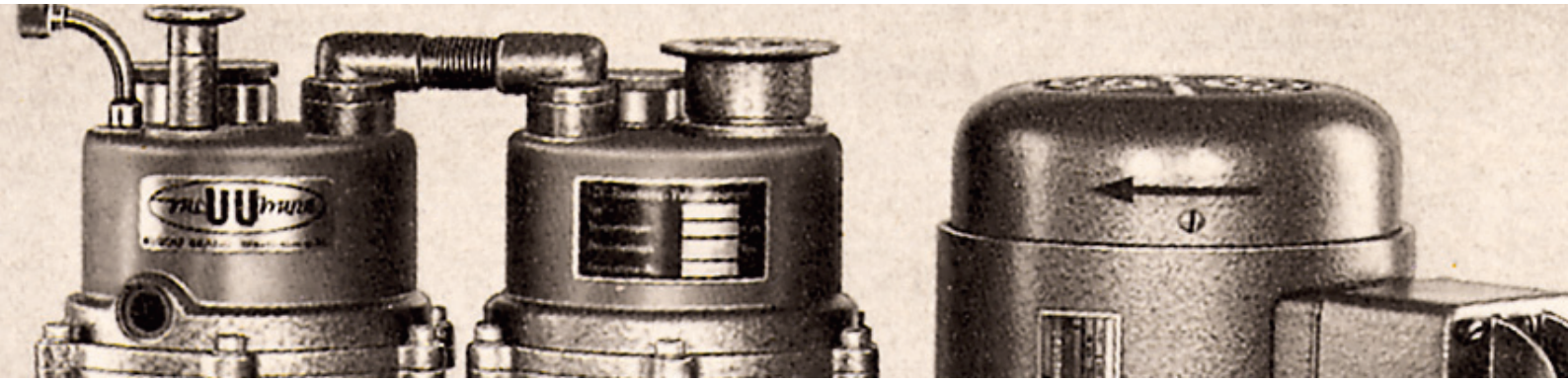
Our technical literature is only intended to inform our customers. The validity of general empirical values and results obtained under test conditions for specific applications depends upon a number of factors beyond our control. It is, therefore, strictly the users responsibility to verify carefully the validity of values and suitability of products for their specific requirements. No claims arising from the information provided in this catalog will consequently be entertained. Technical data are subject to change without notice. Pictures may depict accessories which are not supplied as standard under the catalog number printed.

For reasons of corrosion and resistance, materials containing fluorine (such as PTFE) have to be used for chemical applications or the pumps are operated with PFPE (perfluorpolyether) fluid. We would like to point out that there are special requirements for cleaning und disposal of these materials/fluids.

Protection class: According to standard IEC 60529



VACUUBRAND
YOUR NUMBER ONE FOR VACUUM!

RETROSPECTIVE

1961: The new vacuum technology department begins manufacturing their first vacuum pumps at RUDOLF BRAND in Wertheim, Germany. With innovative and high quality products, business expands so much in the following years that VACUUBRAND GMBH + CO KG is spun off on January 1, 1985 as an independent company. Today, more than 50 years after the first BRAND vacuum pump, VACUUBRAND offers the most comprehensive family of products for generating, measuring and regulating vacuum for rough and fine vacuum applications in the laboratory. The company has earned a place among the ranks of the leading vacuum suppliers in the world.

TECHNOLOGY

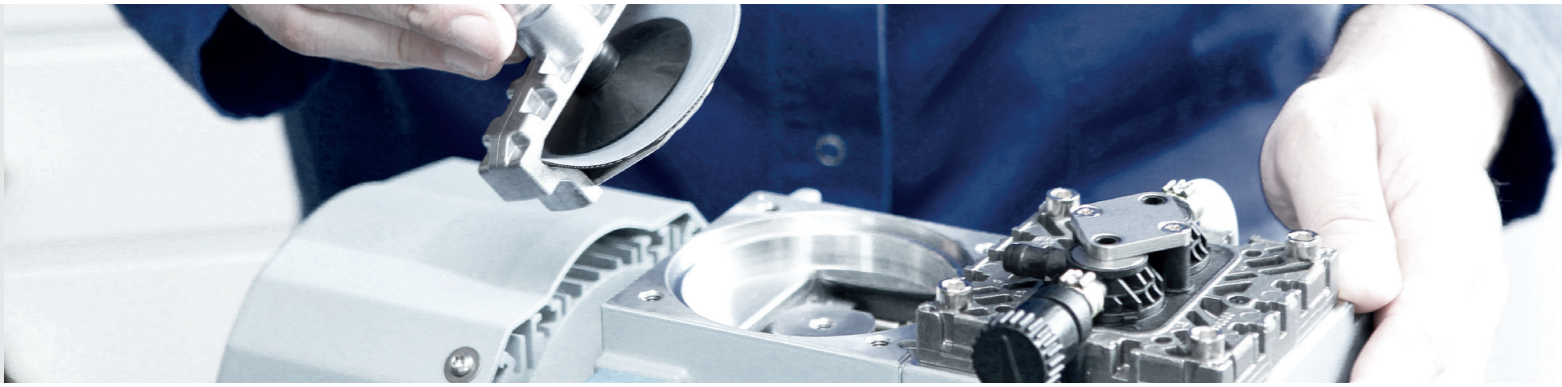
From the outset, we had one priority: offering laboratory users equipment that meets the highest quality standards. "Intelligent pumps" make work easier in laboratories, permitting chemists and technicians to concentrate on their real work. We engineer and produce nearly all pump and controller components in our own facility in Wertheim, Germany. That enables us to respond quickly to the special needs of our customers, and design and build the quality into our products by mastering the many disciplines that ensure that quality.
Relying on state-of-the-art technology and machine tools, we produce rotary vane and diaphragm pumps, chemistry pumping units, chemistry vacuum systems, vacuum gauges and controllers, valves and components of the innovative VACUU·LAN® local vacuum network.

INDIVIDUALITY

Different laboratories make a wide variety of demands on vacuum systems. This is why we offer tailor-made solutions to our customers. We select the optimum vacuum pumps for the needed vacuum range, and encourage you to add capabilities and accessories to the basic equipment, depending upon your needs. But we can also meet very specific customer needs. With our in-house engineering and manufacturing, we can design and produce specialized equipment in short runs in our facilities in Wertheim.

QUALITY

What is the first thing customers have been associating with the VACUUBRAND name for decades? Quality!
We maintain and work continuously to perfect an integrated management system in all departments in conformity with ISO 9001 and ISO 14001. Our standard of performance is quality, customer focus, employee involvement and environmental orientation. Each vacuum pump goes through a performance test of hours to days at our facility, measuring specifications and equipment reliability with PC-controlled measuring and test machines and a fully automatic final test stand. That is how we guarantee that vacuum pumps from VACUUBRAND are not only designed to an exceptionally high level engineering standard, but also offer extraordinary economic advantages because of their low service costs and above-average lifetimes.



VACUUBRAND
WE DO MORE THAN YOU EXPECT

TRAINING

We offer special seminars and practical courses in VACUUBRAND´s own training center to teach the basics of vacuum technology and vacuum generation. The hands-on and user-oriented seminar programme also teaches topics such as the correct application of vacuum pumps and systems in chemistry, pharmacy, physics and medicine. Service seminars are especially important for service and repair of vacuum pumps within the customer´s workshops. Pumps, pumping units and measuring instruments can be tried out in a "mobile laboratory", the VACUUBRAND exhibition bus. Our application specialists would also be glad to come to your company to train your team in vacuum theory, technology and service.

SERVICE

Our vacuum pumps are very reliable but pending on the type and the application they need a bit of service occasionally. Our pumps are designed for easy service, so you can do it in your own workshops, or have us do it. Your workshop employees are welcome to take an intensive training course at our facility. And, if worse comes to worst, our service would be glad to help you do repair fast and at low cost. For all practical purposes, pumps we repair are like new and can be used all over your laboratory. We routinely repair VACUUBRAND pumps that have already been in use for 20 years or more. Quality pays!

CALIBRATION

VACUUBRAND is accredited according to DIN EN ISO/IEC 17025 by the Deutsche Akkreditierungsstelle GmbH (DAkkS) as a calibration laboratory within the German Calibration Service (Deutscher Kalibrierdienst, DKD). Its accreditation includes calibrating vacuum meters and other absolute pressure measuring instruments in the measuring range of 1300 to 10^{-3} mbar. We are authorised to issue DAkkS calibration certificates. VACUUBRAND´s service offers DAkkS calibrations for own products and products of other manufacturers.

DISTRIBUTION

Our standard products are available from all leading laboratory dealers at home and abroad. The best advice is very important for us: Therefore, we support the dealers for years with our own staff who are specialists in technical consulting. Just call one of our local sales offices or ask our team in Wertheim. This team is the right partner for OEM products and custom designs. Please contact us using the contact details farther in the back of the catalog on page 214 and 215

VACUUBRAND
OUR PEOPLE MAKE THE DIFFERENCE

TECHNOLOGY

It is very easy to explain the secret of VACUUBRAND´s success. We can only survive as a company in the heat of competition if we have the best team - right through the company. We set great store by individualised training and development for our employees. In more than 50 years in excess of 150 young people have successfully launched their professional careers in our company. We have an interdisciplinary exchange of knowledge with our very high degree of internal production in the various departments. That creates a high level of motivation and together it makes us efficient and productive.

CHEMISTRY DIAPHRAGM PUMPS / DIAPHRAGM PUMPS

CHEMISTRY DIAPHRAGM PUMPS AND ATEX PUMPS

Because they are oil-free, resistant to chemicals and able to recover solvents, diaphragm pumps are usually the best choice for generating vacuum in laboratory, and for equipment integration (OEM). They have a very wide range of application in evacuating and repumping gases in chemical and physical laboratories. Depending upon their designs, VACUUBRAND chemistry diaphragm pumps reach ultimate vacuums of 100 mbar to 0.6 mbar and volume flow rates of 1 - 19 m³/h. These are absolutely oil-free mechanical vacuum pumps. They are easy to handle, and diaphragm pumps neither use water nor generate waste water or contaminated oil. The components of VACUUBRAND chemistry diaphragm pumps in contact with process vapors and gases are made of fluorinated plastics that are resistant to chemicals. They are also very compatible with condensate. VACUUBRAND also features ATEX equipment category 2 chemistry diaphragm pumps (for instance for zone 1). Since there are no sliding surfaces and as the expansion chamber is hermetically sealed against the drive system, they are just right for use in environments in which it is important to eliminate ignition sources.

DIAPHRAGM PUMPS FOR NON CORROSIVE GASES

VACUUBRAND offers high-performance vacuum pumps made of aluminium and resilient materials for diaphragms and valves that are compatible with non-corrosive gases. Depending upon the design, these diaphragm pumps reach ultimate vacuums of 100 mbar to 0.3 mbar and volume flow rates of 1 - 18 m³/h. They have a wide range of applications in laboratories and industrial operations. Highly flexible, quiet-running diaphragms made of FKM materials with fabric reinforcement provide long diaphragm lifetimes that make these pumps ideal for OEM equipment and instrument applications. A typical use is as a fore-vacuum pump for state-of-the-art wide-range turbo pumps or as a source of vacuum in an analytical apparatus. The NT series pump models have a patented drive system for low vibration and noise, and feature an innovative connection system for high gas tightness.

CHEMISTRY PUMPING UNITS / ROTARY VANE PUMPS

CHEMISTRY PUMPING UNITS

VACUUBRAND vacuum pumping units cover the entire range of rough and fine vacuum, and all the way into the high vacuum range. We select the vacuum pumps at the heart of our pumping units to deliver the flow rate needed throughout the operating vacuum range, and that provide the best protection for the likely exposure to corrosive vapors and condensates. Our pumping units offer a full range of control options. The most advanced is VARIO® control for chemistry diaphragm pumps, in which vacuum is precisely controlled by continuously adapting the pumping speed to the system demands. VARIO® chemistry pumping units from VACUUBRAND make it possible to automatically find the vapor pressure and adapt the vacuum to the process without keying in any parameters. VARIO® control instantaneously and precisely adjusts the volume flow rate to the changing process conditions, resulting in high evaporation rates and shorter process times. This unique control approaches boiling points gently to prevent overpumping and foaming, for sample protection and optimum solvent recovery. In comparison with pumps operating at a fixed speed, VARIO® vacuum control significantly reduces total pumping time, conserving energy and boosting wear-part lifetimes.

"XS" ROTARY VANE PUMPS

Rotary vane pumps are used whenever it is necessary to have a process vacuum of up to 10^{-3} mbar. VACUUBRAND rotary vane pumps are high-performance, yet compact, and can be equipped with an extensive line of VACUUBRAND accessories. They have an innovative lubrication system with a built-in oil pump and have a large oil volume. This extends oil change and service intervals and protects the pump at start-up. The effective gas ballast feature, with its high-flow gas ballast, provides high vapor pumping capability for water and solvents. VACUUBRAND rotary vane pumps´ volume flow rate is specified at atmospheric pressure, as is customary with PNEUROP®. For process effiency, however, the high volume flow rate of VACUUBRAND pumps under process conditions, as well as a consistently high volume flow rate over a wide pressure range, is the key to your satisfaction in real-world application. After switch-off the aggregate is vacuum-sealed to protect your application from undesired venting and oil back flow.

VACUUM GAUGES AND CONTROLLERS / COMPONENTS

VACUUM GAUGES AND CONTROLLERS

Besides our pumps, VACUUBRAND also manufactures an innovative line of electronic measuring and control instruments for vacuum work. You can select the measuring instruments that are the best - technically and economically - for virtually any vacuum application. High precision chemically resistant, long lived gauge heads with ceramic diaphragm vacuum sensors are used with instruments that operate in a range to 0.1 mbar. The new vacuum gauge VACUU·VIEW extended (measurement range: 1100-0.001 mbar) is characterized by an extraordinary chemical stability and robustness. Our ATEX-approved measuring instruments are ideal for vacuum monitoring in process engineering applications. Beyond the CVC 3000 vacuum controller for regulating for a wide range of vacuum applications, our line includes equipment designed especially for control of vacuum and cooling water (for condensation of application vapors) in local area networks. In addition to the performance and versatility of our instruments themselves, VACUUBRAND is accredited by the Deutsche Akkreditierungsstelle GmbH (DAkkS) as a calibration laboratory. Our laboratory is certified to calibrate vacuum measuring instruments and controllers in a pressure range of 1300 to 10^{-3} mbar with confirmation of tracing back to the national standards.

VACUUM VALVES, SMALL FLANGE COMPONENTS KF, AND VACUU·LAN®-COMPONENTS

VACUUBRAND´s range of valves and small flange components offer versatility for special situations, as well as the convenience of standardization of dimensions in conformity with DIN 28403 (ISO 2861-1). This range of products is based on the pipe, T- and cross pieces, elbows, flexible lines, connecting elements and sealing/clamping rings in the sizes of KF DN 10, KF DN 16, KF DN 25 and KF DN 40 listed by PNEUROP®. Our wide range of designs and material options includes the right solution for virtually any application. VACUUBRAND valve product lines satisfy most lab vacuum requirements for constant gas flow-through, service with aggressive gases and even products that combine excellent sealing with limited gas regulation. We offer ball valves, diaphragm valves, butterfly in-line valves and high-vacuum bellow-sealed corner valves. Our electromagnetic valves are actuated with vacuum controllers to achieve electronic control of vacuum processes. And specialized valves make it possible to connect several laboratory workstations to a single vacuum pump via our unique VACUU·LAN® local vacuum networks.

WH_2O REALLY CARES®

Environmental protection has been a major priority at VACUUBRAND for decades. We continuously streamline our processes to prevent waste and minimize energy use. The result of our efforts is a healthy working environment for our employees and a minimum impact on our surroundings. We are proud of what we have achieved so far and we would welcome you to inspect our facilities!

Our manufacturing operations have had an environmental management system for years in conformity with ISO 14001. But VACUUBRAND innovations have also contributed to environmental improvements in your operations with products that:

- lower your energy use and costs
- reduce waste of resources and emissions of pollutants
- improve laboratory working conditions.

All our products are designed to combine high-performance with long product lives, low service demands and low energy use. Efficiency in vacuum supply and control of vacuum applications reduces resource utilization, keeps expenses low and enhances lab productivity. Efficient operation and low service costs not only save resources but ultimately offset purchase costs. Add to these contributions the fact that our diaphragm pumps have for years been replacing the old water jet pumps that formerly wasted and contaminated millions of tons of water per year, and we are proud of all that our vacuum pumps have contributed to a greener world.

Environmental protection is important to everybody - let´s all act responsibly !

CO_2MMITTED TO CHANGE®

Finding new ways to improve the environmental performance of products starts with a commitment to do so. We search continuously for ways to reduce energy use and resource consumption in both the manufacture and the use of our products.

- VACUUBRAND has promoted the use of oil-free pumps to replace classical rotary vane pumps in many applications, reducing contaminated oil disposal.
- Innovative design improvements increase the pumping speed of our NT-series 8-cylinder pumps by 30%, permitting them to replace even larger rotary vane pumps.
- The Peltronic® emission condenser developed by VACUUBRAND and introduced in 2007 collects solvent vapors and is operating completely without cooling water conserving the valuable resource water
- VACUU·LAN® local vacuum networks save energy and equipment costs by using small, in-lab pumps to supply on-demand vacuum for many users. This eliminates the need for central vacuum supply systems, with often over-sized pumps, and high maintenance and energy costs.
- VACUUBRAND VARIO® control technology continuously optimizes pumping speed automatically, perfectly adapting the flow rate to the actual process demand of the vacuum application. The process runs faster and energy consumption is up to 90% less than with conventional pumps.
- New product developments by VACUUBRAND

are characterized by reduced material usage, lower carbon footprint and active environmental protection.

CHOOSING VACUUM EQUIPMENT

FOR ROTARY EVAPORATORS / PARALLEL EVAPORATORS

Vacuum requirements for rotary evaporators can vary greatly depending upon the solvent and evaporating temperature. This is the reason why a modern vacuum system includes built-in vacuum regulation to help you reach optimum evaporating rates. This significantly shortens the process duration and minimizes environmental and laboratory air pollution.

PUMP REQUIREMENTS

- excellent chemical and condensate compatibility
- effective gas ballast system to prevent condensation in the pump
- very good ultimate vacuum even with gas ballast operation for continuous evaporation
- low ultimate vacuum required for low evaporation temperatures or high boiling solvents
- emission condenser for solvent recovery to minimize the impact on environmental and laboratory air
- for applications with large amounts of inflammable solvents: pumps and gauges with ATEX approval

PC 3001 VARIO^{pro} / pg. 64

PC 520 NT / pg. 57

MZ 2C NT +AK+EK / pg. 51

FOR VACUUM CONCENTRATORS

Vacuum concentration makes many demands on the supporting vacuum system, both in terms of the ultimate vacuum and in the selection of accessories. The pump needs high resistance to chemicals, as well as good tolerance of condensates. The type of solvents in use and the nature of the samples both have a strong influence on the ultimate vacuum needed and the appropriate type of process controls. Determining the optimum heat transfer into the sample material is also vital to avoid the need to upgrade your pump later.

PUMP REQUIREMENTS

- great resistance to chemicals
- ultimate vacuum as much as 7 mbar or 1.5 mbar
- sufficient volume flow rate (2 m³/h and more)
- good tolerance of condensate
- inclusion of a vacuum inlet separator (AK) made of glass to protect the pump from particles and droplets of liquid
- emission condenser for solvent recovery and to minimize environmental and laboratory air pollution

MZ 2C NT +AK+EK / pg. 51

MD 4C NT +AK+EK / pg. 70

PC 3001 VARIO^{pro} / pg. 64

FOR DRYING CHAMBERS

Vacuum drying chambers are used for drying very sensitive substances and when it is necessary to guarantee excellent residual drying. They generally need a very good ultimate vacuum depending upon the degree of drying, maximum acceptable temperature and the solvents used. At certain process parameters, there are large quantities of vapors that can only be handled with pump systems of a sufficiently large volume flow rate.

PUMP REQUIREMENTS

- for aqueous samples: oil-free diaphragm vacuum pumps (not necessarily chemical-resistant type) or for deep ultimate vacuum oil sealed rotary vane pumps
- outstanding chemical resistance and condensate tolerance for drying solvent-based samples
- ultimate vacuum down to 7 mbar improves performance compared with water-jet pumps or house vacuum
- vacuum inlet separator (AK) to protect the pump from particles and liquid droplets
- emission condenser for solvent recovery and to minimize environmental and laboratory air pollution
- for applications with large amounts of inflammable solvents: pumps and gauges with ATEX approval

MZ 2C NT +AK+EK / pg. 51

MD 4C NT +AK+EK / pg. 70

PC 3003 VARIO / pg. 86

FOR GEL DRYERS

Gel electrophoresis is a very common method in life science laboratories for separation and determination of DNA fragments or proteins. Depending on the nature of the samples, these gels have to be produced with specific separation properties. Vacuum is typically used to gently dry the gels so that they are available for gel electrophoresis, or storage for later usage. Gel dryers make more limited demands on vacuum system than many lab applications. The ultimate vacuum requirement depends on the gels used and the degree of drying needed. In most cases two-stage diaphragm pumps with 7 mbar ultimate vacuum are ideal.

PUMP REQUIREMENTS

- excellent chemical and condensate compatibility
- ultimate vacuum as much as 7 mbar or 1.5 mbar
- sufficient volume flow rate: 2 m³/h or higher
- vacuum inlet separator (AK) to protect the pump from particles and liquid droplets
- for major condensate accumulation it is helpful to have a vacuum inlet separator (AK) and if necessary one at the outlet, too. An exhaust emission condenser (EK) ideally electronically operated (Peltronic®, without coolant) can minimize environmental and laboratory air pollution with solvent vapors
- vacuum regulation, such as with a manual flow-control valve

MZ 2C NT +2AK / pg. 50

MZ 2C NT +AK+M+D / pg. 53

PC 201 NT / pg. 72

FOR NUCLEIC ACID PURIFICATION USING VACUUM MANIFOLDS

DNA/RNA and plasmid preparation in Life Sciences is an important method of sample preparation for further molecular biology research and analytics. Some DNA/RNA preparation protocols require the use of vacuum for filtration and wash steps. As in other filtration applications, the differential pressure to atmospheric pressure is the driving force here that accelerates the process. For the fitting of adsorbent filled purification columns for Spin Filters or for 8-well filter strips, e.g., specially designed vacuum manifolds with Spin Filter adapters and 96-well filter plates are available, respectively. Wherever regulated vacuum is required, the manufacturers generally provide a vacuum manifold already equipped with vacuum indicator and manual regulation valve. Depending the design of the manifold and the number of samples, higher flow rate vacuum pumps can be very helpful to compensate for sudden loss of suction from open sample vessels (e.g., when a sample filtration has broken through). The vacuum requirements are of the medium range.

PUMP REQUIREMENTS

- ultimate vacuum as much as 100 mbar or 70 mbar is ideal, in specific cases down to 7 mbar
- vacuum regulation, such as with a manual flow-control valve
- excellent chemical and condensate compatibility
- because vacuum manifolds rarely have a collection bottle for liquids between the pump and manifold, we recommend a vacuum inlet separator (AK) to protect the pump
- the separator at the outlet (AK) collects condensate produced at the pump outlet when vacuum is released

ME 1C / pg. 36

ME 2C NT / pg. 38

MZ 2C NT +2AK / pg. 50

FOR FILTRATION AND SOLID PHASE EXTRACTION

Filtration is accelerated either with the aid of pressure or vacuum. For vacuum filtration the regulation and ultimate vacuum requirements are generally modest. With vacuum filtration at 100 mbar, 90% of the atmospheric pressure is available as the driving force for filtration. Improving the vacuum level even further has only a minor impact on the process. However, in some cases two-stage pumps with their high pumping speed may accelerate the filtration process. In these cases control of the vacuum, e.g., by a manual vacuum controller with a vacuum gauge is recommended to avoid evaporation of solvents from the filtration bottle.

PUMP REQUIREMENTS

- single-stage diaphragm pump with up to 70 mbar ultimate vacuum is ideal
- outstanding chemical resistance and superior vapor tolerance for solid phase extraction or filtration samples containing solvents
- for a defined flow or drip rate, a manual control valve and a vacuum gauge is helpful
- vacuum inlet separator (AK) to protect the pump from particles and liquid droplets
- emission condenser for solvent recovery to minimize the impact of solvent vapors on environmental and laboratory air
- the automation of a filtration process is possible with chemistry pumping units that are equipped with electronic vacuum controllers

ME 1C / pg. 36

ME 2C NT / pg. 38

ME 4C NT +2AK / pg. 38

FOR LYOPHILIZATION, DRYING WITH MINIMAL RESIDUES, AND MOLECULAR DISTILLATION

These applications are beyond the vacuum range of diaphragm pumps. They call for vacuum systems with ultimate vacuums of 10^{-1} to 10^{-3} mbar; single- and two-stage rotary vane pumps provide these pressures at various volume flow rates. A convenient option especially for chemical applications is our chemistry-HYBRID pump RC 6, a combination of a rotary vane and a chemistry diaphragm pump. The special design often allows operation without an additional cold trap. The integrated diaphragm pump enhances condensate compatibility, reduces service needs and results in a longer pump life. The lower service demands greatly reduce lifetime costs of the RC 6 pump compared with a conventional rotary vane pump.

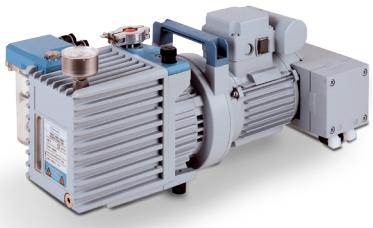
PUMP REQUIREMENTS

- ultimate vacuum down to 10^{-3} mbar: Two-stage rotary vane pumps
- depending upon process conditions, excellent pump condensate compatibility may be important for extended service life of the pump
- low ultimate vacuum even with open gas ballast for continuous condensate purge
- chemical resistance is an important consideration when drying substances containing solvents
- chemistry-HYBRID pump RC 6 is recommended

RZ 2.5 / pg. 144

RC 6 / pg. 150

HP 40 B2/RZ 6 / pg. 158



LOCAL AREA VACUUM NETWORKS FOR LABORATORIES

VACUU·LAN® vacuum networks make it possible to supply several different applications with one vacuum pump. This is a money- and space-saving solution when a lot of users are working with vacuum in one laboratory and avoids the numerous drawbacks of a central ("house") vacuum supply. For the vacuum outlets at workplaces very versatile modules are obtainable which can be easily upgraded. All of the components are available for new laboratory furnishings or for installation in existing or renovated laboratories. The modules are very resistant to chemicals and have built-in check valves to ensure that adjacent applications do not contaminate or interfere with one another.

There is a broad choice of vacuum pumping units, workplace modules and accessories available well-proven in daily laboratory use. Thanks to a very modular system and simple connections between the components planning is easy and can be done in a timely manner. A few steps only and some application parameters are guiding us to an optimal configuration of a productive vacuum network.

- For further information ask for our detailed VACUU·LAN® manual, please. Get the benefits of a personal project consultation with our experienced sales staff. (Overview VACUU·LAN® pg. 186)

PC 3004 VARIO / pg. 76

EK Peltronic / pg. 94

Modular VACUU·LAN® concept / pg. 186

FORE-VACUUM GENERATION FOR TURBO MOLECULAR PUMPS

Many analytical applications such as mass spectrometry, electron microscopy or surface analysis are carried out in high vacuum. Turbomolecular pumps are typically used to generate the needed vacuum. Such turbo pumps need an auxiliary backing pump, or "roughing pump", as they cannot compress to atmospheric pressure. Using oil-free diaphragm pumps for fore-vacuum generation in connection with state-of-the-art turbo pumps (with "molecular drag" stage) decisively improves the cleanliness of the vacuum generation, and often reduces service requirements as well. In many cases, such an oil-free high vacuum is absolutely mandatory.

PUMP REQUIREMENTS

- ultimate vacuum of the diaphragm pump sufficient to meet the backing pressure requirements of the high vacuum pump – down to 0.3 mbar, with VARIO® diaphragm pumps
- high pumping speed even at pressures close to ultimate vacuum
- low power consumption
- low anti-suckback leakage rate, no venting during a power failure
- high reliability, designed for continuous operation (24/7)
- good tolerance of condensate
- high ultimate vacuum stability and service intervals comparable to turbo pumps
- reliable starting even under vacuum
- small size, low weight and low vibration

MZ 2D NT / pg. 122

MD 1 / pg. 124

MV 2 NT / pg. 130

OIL-FREE VACUUM FOR KILO LABS

In kilo labs and pilot plants, materials are produced in quantities of a few hundred grams to several kilograms for pharmaceutical development, safety studies and early clinical trials for new drugs. Based on their extraordinary chemical resistance, our high performance chemistry diaphragm vacuum pumps are perfectly suitable for these applications. The pumps operate without fluids such as water or oil, and thus reduce operating and maintenance costs. Variable-speed pumping systems offer unique control advantages in these applications, and are easily integrated into process control via PC or programmable logic controller.

PUMP REQUIREMENTS

- high resistance against aggressive chemicals
- high pumping speed over a wide pressure range
- low ultimate vacuum even with open gas ballast for continuous condensate purge
- precise vacuum control via speed controlled pumps and ease of integration into process control systems
- compatibility with vapors of inflammable solvents, and/or ATEX compatibility in potentially explosive atmospheres

PC 3004 VARIO / pg. 76

MV 10C NT / pg. 88

MV 10C EX / pg. 103

LIQUID ASPIRATION

By means of low pressure generated by a vacuum pump liquids can be sucked into a collection bottle. Automatic vacuum control is recommended then. Sufficient vacuum in the collection bottle is essential to support aspiration, but should not be so deep to risk evaporation of solvents. Adjustable suction power (and hence vacuum level) enables sensitive or powerful aspiration as needed. For optimum operational safety and convenience self-closing quick couplings and a liquid level detector at the bottle are helpful. All components in contact with sucked-in media should have high chemical resistance and be autoclavable. Depending on aspiration safety protocols a collection flask made either of polypropylene or glass may be preferred.

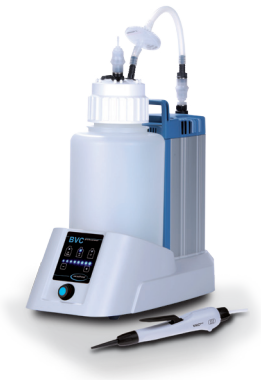
PUMP REQUIREMENTS

- single stage chemistry diaphragm pump with good suction power
- extraordinary chemical resistance of the complete system for samples containing solvents, as well as for aspirated and pre-loaded disinfectants
- conveniently adjustable vacuum level for adaption to application requirements
- collection flask with protection filter to protect pump and workplace from biologically hazardous material
- high operational comfort to minimize fatigue and operator errors

VACUUBRAND manufactures numerous vacuum technology solutions for life science laboratories. In addition to the BVC aspiration systems below, we offer a large selection of pumps and systems for other common applications:

- filtration - vacuum concentration (centrifuges) - gel drying - vacuum blotting - freeze drying - microplate washing - DNA purification on a vacuum manifold

BVC professional / pg. 165



BVC control / pg. 164

BVC basic / pg. 163

OEM PRODUCTS: ACCORDING TO INDIVIDUAL REQUIREMENTS

For more than 50 years, VACUUBRAND has been a proven business partner for OEM solutions in laboratories, analysis and industry. Our products meet customers´ highest technical, economic and environmental standards. Our company has maintained a ISO 9001-certified management system for years. Production facilities and product development are located in Germany. A formidable development team and our integrated production, along with state-or-the-art machinery and automatic testing equipment, give us a high level of flexibility.

YOUR SUCCESS IS THE MEASURE OF OUR WORK

- We understand that in many cases the vacuum source is the heart of your application. There are many different demands placed on the vacuum source in OEM applications. To meet your needs, we look at the challenge comprehensively: What are the technology parameters? How does the design need to be adapted to the installation situation? What external certifications (e.g., according to UL and CSA standards) or special test specifications are needed? Of course, the product must also satisfy your cost objectives; ready-to-install vacuum components should boost your economic efficiency by saving you the need to purchase and store add-on components. Finally, our standard procedures include full documentation for OEM products, and we make provision for you to verify their technical parameters and call up test findings. Contact VACUUBRAND to discuss your needs with our engineers.

MD 1 VARIO-SP / pg. 138

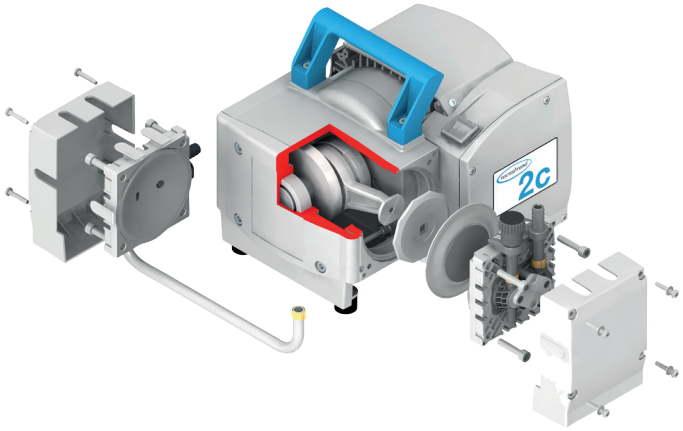
MD 4 NT / pg. 126

RZ 6 / pg. 132

OIL-FREE VACUUM FOR CORROSIVE GASES AND VAPORS

CHEMISTRY DIAPHRAGM PUMPS

Typical applications for chemistry diaphragm pumps include evacuating chemically aggressive gases and vapors from such equipment as rotary evaporators, vacuum drying cabinets and centrifugal concentrators. Chemistry diaphragm pumps from VACUUBRAND feature uncompromising chemistry designs. Their construction with fluoropolymers makes them very resistant to chemical vapors from inlet to exhaust and very tolerant to condensates. Our two-, three- and four-stage pumps also have a gas ballast valve that provides continuous purge with minimal impact on ultimate vacuum when working with condensable vapors. Pumping chambers are hermetically separated from the drive system ensuring long lifetimes of mechanical parts. Most importantly, diaphragm pumps are oil-free, for vastly reduced service demands compared with oil-sealed pumps. They eliminate the cost of water and its contamination well-known from water-jet aspirators, and the waste-oil disposal of rotary vane pumps.



CHEMICALLY RESISTANT

- PTFE sandwich diaphragms and valves made of perfluoro elastomer (FFKM) or PTFE
- internal tubing and fittings made of PTFE/ETFE/ECTFE compounds
- exceptional diaphragm lifetimes with ultra-durable PTFE sandwich design

DURABLE

- head cover and clamping disc made of fluoro compounds with stability core for unsurpassed long-term performance
- very long service intervals for low lifetime cost-of-ownership
- patented drive system for extra quiet, ultra-low-vibration operation

PRACTICAL

- patented valve mounting system to simplify service access (NT)
- smooth surfaces for easy cleaning (NT)
- sealing system provides reduced leakage rates for improved ultimate vacuum (NT)

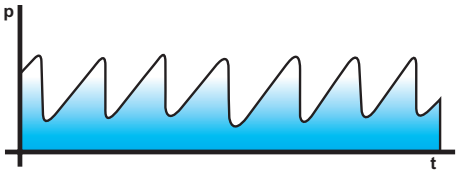
OPTIMIZED LABORATORY PROCESSES - VACUUM CONTROL

Vacuum applications in the laboratory and in industrial operations require versatile vacuum control to:

- prevent sample loss by foaming or boiling over
- reduce process times for distillation and evaporation processes
- reproducible results for drying and evaporation processes
- reduce time committed to process oversight through automation
- protect the environment by recovering waste solvent vapors

Two-point regulation by ON/OFF vacuum pump switching

- A two point-vacuum controller switches a pump on and off as required. The actual vacuum level inevitably fluctuates around the target pressure. This system is well suitable for vacuum networks.

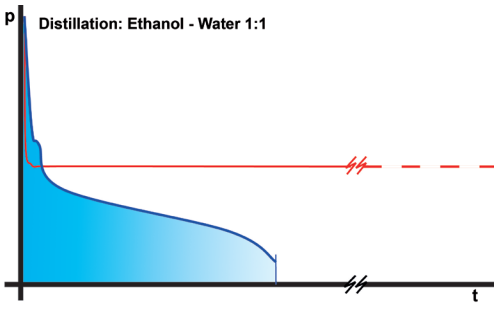


Two-point vacuum control via in-line solenoid valve

- For pumps without a variable speed motor, the CVC 3000 controller manages the vacuum with an in-line solenoid valve. The actual vacuum level fluctuates around the target pressure, too, but much less than with pump on/off-switching. This makes the system better suitable for process control.

VARIO® controller for fully automatic concentration without need for parameter input
VARIO®-diaphragm pumps and chemistry pumping units control the vacuum automatically and accurately by adjusting the speed of the diaphragm pump. The vacuum controller CVC 3000 in the VARIO®-pumping units detects the boiling pressure automatically and adjusts the vacuum continuously and optimally to the vapor pressure by an adaptive control algorithm.

- eliminates manual re-adjustment, which saves over-sight time
- optimized pressures reduce foaming, avoiding sample loss
- waste vapor recovery rates near 100 % keep the lab air clean and protect the environment
- continuous optimization of boiling pressures results in shortest process times, even with complex solvent mixtures
- pump runs only as fast as needed - minimizing energy consumption, extending service intervals and reducing noise



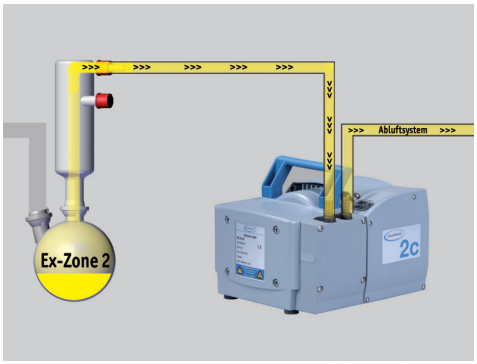
Competitive product in the automatic mode - First boiling pressure is determined, and then maintained. Evaporation stops because the vacuum is not continuously adapted to changing boiling pressures in mixtures

VACUUBRAND VARIO® controlled vacuum adapts automatically to all boiling points in the mixture, continuously optimizing the process for fast run times without bumping.

TECHNICAL HIGHLIGHTS

Nearly all VACUUBRAND diaphragm pumps and measuring instruments have been approved for ATEX equipment category 3 in the vapor path

Following a very intensive and comprehensive testing process – according to ATEX Directive 2014/34/EC – VACUUBRAND has now verified that most of its diaphragm pumps and pumping units do not have ignition sources in the internal, wetted parts area, and so meet the requirements of ATEX equipment category 3. This includes capacitive vacuum sensors, measuring devices and solenoid operated valves.



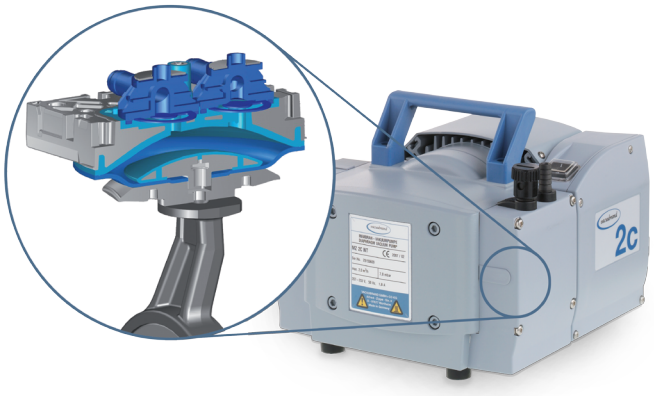
Environment, no Ex-zone
Wetted parts Zone 2

- applicable for pumping of Ex-mixtures “infrequently“ or “for a short period“
- during normal operation there is no ignition source in the internal, wetted parts area
- at gas temperatures up to 40°C the maximum surface and gas temperatures in the internal, wetted parts area remain below the limits specified in ATEX temperature class T3
- for areas with hazardous atmosphere around the pump and for “occasional” pumping of Ex-mixtures the special ATEX pumps for category 2 (inside and around the pump, for example, for Zone 1) continue to be recommended

The VACUUBRAND stability core principle: for unprecedented long-term performance

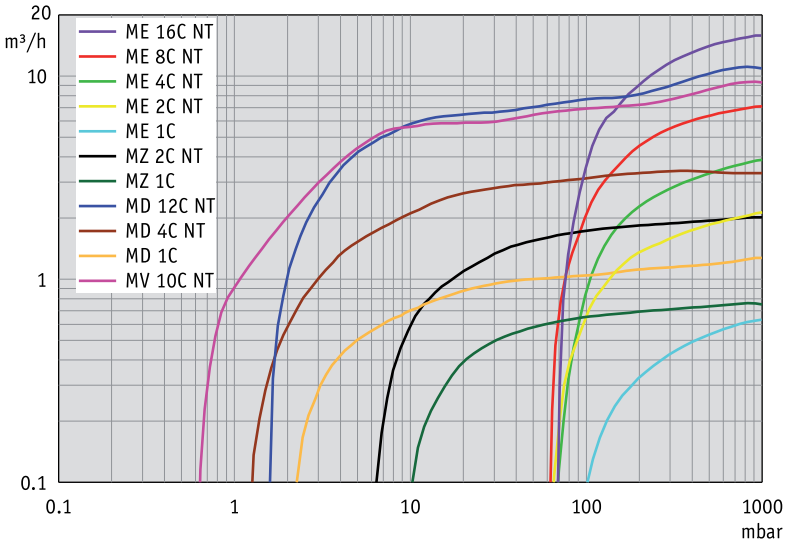
VACUUBRAND chemistry diaphragm pumps provide optimum performance and unsurpassed service intervals even in harsh chemical applications. We achieve this unmatched reliability by manufacturing the most highly stressed components – the head cover and clamping disk – in a sophisticated multi-step process.

- high quality carbon-fiber-reinforced fluoroplastics provide long term chemical resistance
- this thick-walled, diffusion resistant, molded fluoroplastic is supported by a stable metallic core for durability
- mechanical precision finishing ensures reproducible VACUUBRAND quality
- 100 % quality control testing after "run-in" at destination-market electrical voltage



CHEMISTRY DIAPHRAGM PUMPS, CHEMISTRY VACUUM SYSTEMS AND CHEMISTRY PUMPING UNITS

Our chemistry diaphragm pumps are available in a full range of volume flow rates and ultimate vacuum options. Single-stage models reach as much as 70 mbar (absolute) vacuum. Connecting pump heads in series as two-, three- or four-stage pumps improves an ultimate vacuum to as much as 0.6 mbar. Connecting heads in parallel provides higher flow rates. Our line offers combinations that satisfy virtually any laboratory need.



The pumping speed of all pumps is measured according to ISO 21360

Nomenclature for VACUUBRAND pumps is built from the following codes designating specific features or components:

M = diaphragm (membrane) pump

E, Z, D, V = number of pump stages
E = single stage, up to 70 mbar
Z = two stages, up to 7 mbar
D = three stages, up to 1.5 mbar
V = four stage, up to 0.6 mbar

C = chemistry design, with fluoropolymer flowpath

NT = labels the series of pumps comprising the New Technology

AK = separator catchpot for inlet or outlet condensates, collects particles and droplets, keeps condensate in vacuum line from flowing into the pump, protecting pump performance and providing additional noise reduction on the pressure side

EK = exhaust vapor (emission) condenser for nearly 100 % solvent recovery in compact design, protecting environment and lab air

TE = dry ice or water ice cooled emission condenser for solvent recovery

PC = "Pumping Unit, Chemistry" - a chemistry pump with vacuum control and solvent recovery

Chemistry vacuum system = a chemistry pump with accessories like inlet catchpot and/or solvent recovery

Chemistry pumping unit = a chemistry vacuum system with vacuum control and solvent recovery

SYNCHRO = pumping unit for simultaneous operation of two independent vacuum applications by a single pump

Ultimate vacuum (abs.)	Chemistry diaphragm pumps Basic pump	Chemistry vacuum systems with solvent recovery	Chemistry pumping units vacuum control and solvent recovery	 with two vacuum ports to operate two applications simultaneously
down to 70 mbar	**ME 1C** pg. 36 0.7 m³/h **ME 2C NT** pg. 38 2.1 m³/h **ME 4C NT** pg. 38 3.9 m³/h **ME 8C NT** pg. 40 7.1 m³/h **ME 16C NT** pg. 42 16.3 m³/h **ME 16C NT VARIO** pg. 42 19.3 m³/h	**ME 4C NT +2AK** pg. 38 3.9 m³/h **ME 8C NT +2AK** pg. 40 7.1 m³/h **ME 16C NT +EK** pg. 42 16.3 m³/h	**PC 3016 NT VARIO** 19.3 m³/h pg. 44	
down to 7 mbar	**MZ 1C** pg. 46 0.75 m³/h **MZ 2C NT** pg. 48 2.0 m³/h **MZ 2C NT VARIO** pg. 58 2.8 m³/h	**MZ 2C NT +2AK** pg. 50 2.0 m³/h **MZ 2C NT +AK+EK** pg. 51 2.0 m³/h **MZ 2C NT +AK+M+D** 2.0 m³/h pg. 53	**PC 101 NT** pg. 54 2.0 m³/h **PC 510 NT** pg. 55 2.0 m³/h **PC 3002 VARIO** pg. 58 2.8 m³/h	**MZ 2C NT +AK SYNCHRO+EK** 2.0 m³/h pg. 52 **PC 511 NT** pg. 56 2.0 m³/h **PC 520 NT** pg. 57 2.0 m³/h
down to 1.5 mbar	**MD 1C** pg. 60 1.3 m³/h **MD 4C NT** pg. 66 3.4 m³/h **MD 4CRL NT** pg. 68 3.4 m³/h **MD 4C NT VARIO** pg. 76 4.6 m³/h **MD 12C NT** pg. 78 11.1 m³/h **MD 12C NT VARIO** 12.9 m³/h pg. 82	**MD 1C +AK+EK** pg. 62 1.3 m³/h **PC 3001 basic** pg. 63 2.0 m³/h **MD 4C NT +2AK** pg. 69 3.4 m³/h **MD 4C NT +AK+EK** 3.4 m³/h pg. 70 **MD 12C NT +EK** pg. 80 11.1 m³/h **MD 12C NT +AK+EK** 11.1 m³/h pg. 80	**PC 3001 VARIO**pro pg. 64 2.0 m³/h **PC 201 NT** pg. 72 3.4 m³/h **PC 610 NT** pg. 73 3.4 m³/h **PC 3004 VARIO** pg. 76 4.6 m³/h **PC 3012 NT VARIO** 12.9 m³/h pg. 82 **PC 3012 NT VARIO DUO** 25 m³/h pg. 84	**MD 4C NT +AK SYNCHRO+EK** 3.4 m³/h pg. 71 **PC 611 NT** pg. 74 3.4 m³/h **PC 620 NT** pg. 75 3.4 m³/h
down to 0.6 mbar	**MV 10C NT** pg. 88 9.5 m³/h **MV 10C NT VARIO** pg. 90 11.6 m³/h	**MV 10C NT +EK** pg. 88 9.5 m³/h	**PC 3003 VARIO** pg. 86 2.8 m³/h **PC 3010 NT VARIO** 11.6 m³/h pg. 90	

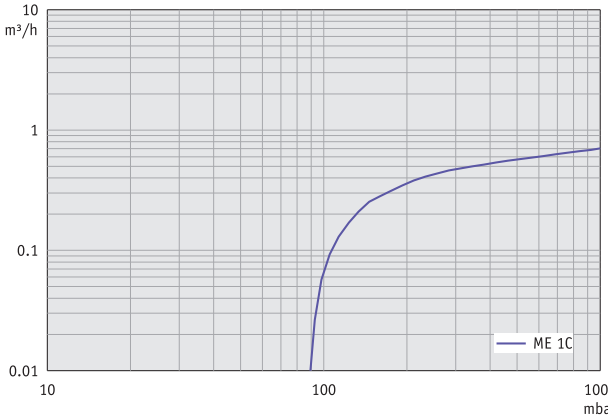
All mentioned pumping speeds are for 50 Hz (if applicable)

- convenient, quick and simple to use due to the new top-mounted power switch
- whisper quiet and very low vibration
- requires minimal benchtop space
- maintenance-free drive system and proven long diaphragm life
- high chemical resistance

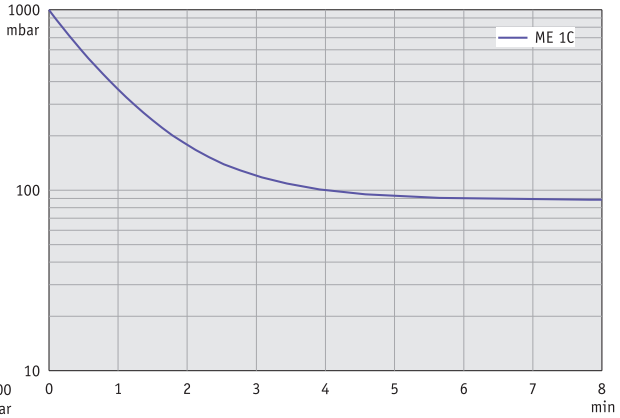
ME 1C

Vacuum filtration is one of the most common applications used for sample preparation in chemistry, microbiology, waste water control and other analytical processes. The ME 1C diaphragm pump offers a compact, high performance and easy-to-use solution which is perfect for single filtrations. This development, based on the highly successful technology of the oil-free diaphragm pump MD 1C, provides a well-proven and extraordinarily long diaphragm life time. The functional, space saving and innovative design with easily accessible, top-mounted power switch ensures convenient and quick operation for day-to-day lab work. Robust PTFE diaphragms and valves provide optimal chemical resistance. A manual vacuum regulator valve with dial gauge for adjustment of pumping speed and ultimate vacuum is available as accessory.

Pumping speed graph at 50 Hz



Pump down graph at 50 Hz
(10 l volume)



Further information and diagrams for 60 Hz mains frequency at www.vacuubrand.com
Pumping speeds and pump down times are only for information. Ultimate vacuum specification: See "Technical Data"

TECHNICAL DATA	ME 1C
Number of heads / stages	1 / 1
Max. pumping speed 50/60 Hz	0.7 / 0.85 m³/h
Ultimate vacuum (abs.)	100 mbar
Max. back pressure (abs.)	1.1 bar
Inlet connection	Hose nozzle DN 8-10 mm
Outlet connection	Hose nozzle DN 8-10 mm
Rated motor power	0.04 kW
Degree of protection	IP 40
Dimensions (L x W x H), approx.	247 x 121 x 145 mm
Weight, approx.	5.0 kg

ACCESSORIES

Rubber vacuum tubing DN 8 mm (686001)
Chemistry vacuum regulator valve unit for ME/MZ 1C (696843)
Silencer DN 8 - 10 mm (636588)

ITEMS SUPPLIED

Pump completely mounted, ready for use, with manual.

ORDERING INFORMATION			ME 1C
230 V ~ 50-60 Hz	CEE	Ex*	721100
230 V ~ 50-60 Hz	CH, CN	Ex*	721101
230 V ~ 50-60 Hz	UK, IN	Ex*	721102
100-120 V ~ 50-60 Hz	US		721103
100-120 V ~ 50-60 Hz / 200-230 V ~ 50-60 Hz		Ex*	**721105

With NRTL certification for Canada and the USA
Ex*: ATEX: II 3G IIC T3 X, Internal Atm. only
**Please order power cable separately

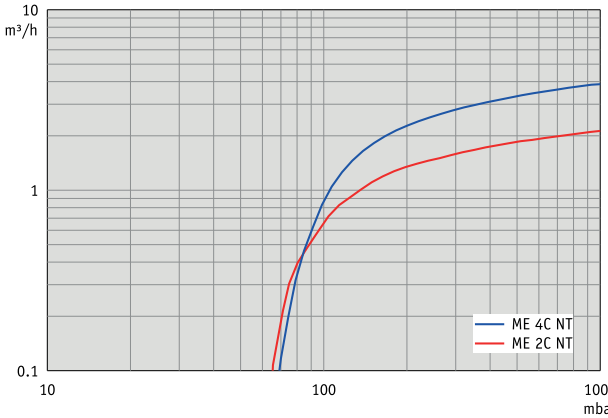
CHEMISTRY DIAPHRAGM PUMPS 70 mbar - 2.1 / 3.9 m³/h

- outstanding chemical resistance
- high performance even at low vacuum levels
- whisper quiet
- low vibration
- long diaphragm life, maintenance-free drive system

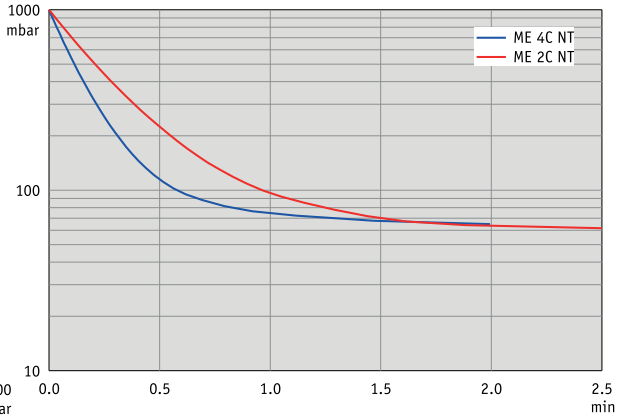
ME 2C NT - ME 4C NT - ME 4C NT +2AK

Chemistry-design diaphragm pumps are an excellent solution for continuous, oil-free pumping of corrosive gases and vapors. The one-stage construction provides the advantageous combination of high pumping speed and low ultimate vacuum down to 70 mbar. All major parts in contact with pumped media are made of chemically resistant fluoroplastics. Well-proven PTFE sandwich diaphragms increase reliability and extend operating life. The NT-series features further improved performance data, higher tolerance for condensates and simplified maintenance. The ME 4C NT is also available as chemistry vacuum system ME 4C NT +2AK with inlet separator to protect the pump against particles and liquid droplets, plus outlet separator to collect condensate.

Pumping speed graph at 50 Hz



Pump down graph at 50 Hz
(10 l volume)



Further information and diagrams for 60 Hz mains frequency at www.vacuubrand.com
Pumping speeds and pump down times are only for information. Ultimate vacuum specification: See "Technical Data"

TECHNICAL DATA	ME 2C NT
Number of heads / stages	1 / 1
Max. pumping speed 50/60 Hz	2.1 / 2.4 m³/h
Ultimate vacuum (abs.)	70 mbar
Max. back pressure (abs.)	1.1 bar
Inlet connection	Hose nozzle DN 8-10 mm
Outlet connection	Hose nozzle DN 8-10 mm
Rated motor power	0.18 kW
Degree of protection	IP 40
Dimensions (L x W x H), approx.	243 x 211 x 198 mm
Weight, approx.	10.2 kg

TECHNICAL DATA	ME 4C NT
Number of heads / stages	2 / 1
Max. pumping speed 50/60 Hz	3.9 / 4.3 m³/h
Ultimate vacuum (abs.)	70 mbar
Max. back pressure (abs.)	1.1 bar
Inlet connection	Hose nozzle DN 8-10 mm
Outlet connection	Hose nozzle DN 8-10 mm
Rated motor power	0.18 kW
Degree of protection	IP 40
Dimensions (L x W x H), approx.	254 x 243 x 198 mm
Weight, approx.	11.1 kg

ORDERING INFORMATION			ME 2C NT
230 V ~ 50-60 Hz	CEE	Ex*	730100
230 V ~ 50-60 Hz	UK, IN	Ex*	730102
100-115 V ~ 50-60 Hz / 120 V ~ 60 Hz	US		730103
100-115 V ~ 50-60 Hz / 120 V ~ 60 Hz / 200-230 V ~ 50-60 Hz		Ex*	**730105

ORDERING INFORMATION			ME 4C NT
230 V ~ 50-60 Hz	CEE	Ex*	731200
230 V ~ 50-60 Hz	CH, CN	Ex*	731201
230 V ~ 50-60 Hz	UK, IN	Ex*	731202
100-115 V ~ 50-60 Hz / 120 V ~ 60 Hz	US		731203

ACCESSORIES

VACUU·LAN® Mini-Network (2614455)
Rubber vacuum tubing DN 8 mm (686001)

ITEMS SUPPLIED

Pump completely mounted, ready for use, with manual.

ORDERING INFORMATION			ME 4C NT +2AK
100-115 V ~ 50-60 Hz / 120 V ~ 60 Hz / 200-230 V ~ 50-60 Hz		Ex*	**2614080

With NRTL certification for Canada and the USA
Ex*: ATEX: II 3G IIC T3 X, Internal Atm. only
**Please order power cable separately

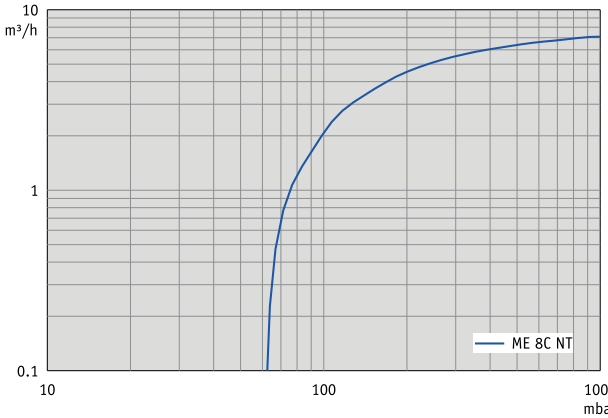
CHEMISTRY DIAPHRAGM PUMPS 70 mbar - 7.1 m³/h

- outstanding chemical resistance and superior vapor tolerance
- exceptionally high performance even at low vacuum
- compact design
- whisper quiet and very low vibration
- long diaphragm life, maintenance-free drive system

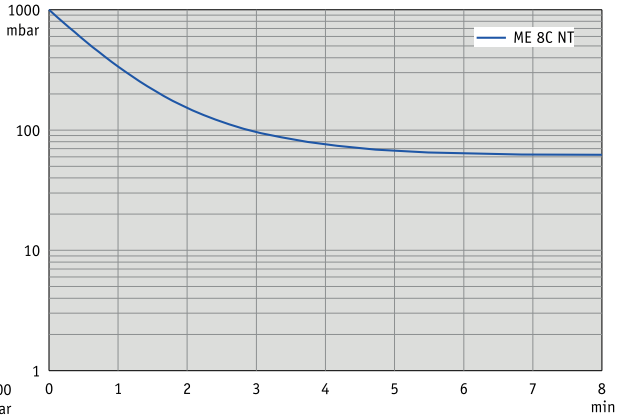
ME 8C NT - ME 8C NT +2AK

Chemistry-design diaphragm pumps are an excellent solution for continuous, oil-free pumping of corrosive gases and vapors. The one-stage construction provides the advantageous combination of high pumping speed and low ultimate vacuum down to 70 mbar. All major parts in contact with pumped media are made of chemically resistant fluoroplastics. Well-proven PTFE sandwich diaphragms for increased reliability and extended operating life. These large pumps have an exceptionally high pumping speed. The NT-series features further improved performance data and superior vapor tolerance. Version "+2 AK" with separator catchpots for inlet and outlet condensates.

Pumping speed graph at 50 Hz



Pump down graph at 50 Hz
(100 l volume)



Further information and diagrams for 60 Hz mains frequency at www.vacuubrand.com
Pumping speeds and pump down times are only for information. Ultimate vacuum specification: See "Technical Data"

TECHNICAL DATA	ME 8C NT
Number of heads / stages	4 / 1
Max. pumping speed 50/60 Hz	7.1 / 7.8 m³/h
Ultimate vacuum (abs.)	70 mbar
Max. back pressure (abs.)	1.1 bar
Inlet connection	Hose nozzle DN 8-10 mm
Outlet connection	Hose nozzle DN 8-10 mm
Rated motor power	0.25 kW
Degree of protection	IP 40
Dimensions (L x W x H), approx.	325 x 243 x 198 mm
Weight, approx.	14.3 kg

TECHNICAL DATA	ME 8C NT +2AK
Number of heads / stages	4 / 1
Max. pumping speed 50/60 Hz	7.1 / 7.8 m³/h
Ultimate vacuum (abs.)	70 mbar
Max. back pressure (abs.)	1.1 bar
Inlet connection	Hose nozzle DN 8-10 mm
Outlet connection	Hose nozzle DN 8-10 mm
Rated motor power	0.25 kW
Degree of protection	IP 40
Dimensions (L x W x H), approx.	319 x 243 x 374 mm
Weight, approx.	16.7 kg

ACCESSORIES

Rubber vacuum tubing DN 8 mm (686001)

ITEMS SUPPLIED

Pump completely mounted, ready for use, with manual.

ORDERING INFORMATION			ME 8C NT
230 V ~ 50-60 Hz	CEE	Ex*	734200
230 V ~ 50-60 Hz	CH, CN	Ex*	734201
230 V ~ 50-60 Hz	UK, IN	Ex*	734202
120 V ~ 60 Hz	US		734203
100 V ~ 50-60 Hz	US		734206

ORDERING INFORMATION		ME 8C NT +2AK
100-115 V ~ 50-60 Hz / 120 V ~ 60 Hz / 200-230 V ~ 50-60 Hz	Ex*	**734405

With NRTL certification for Canada and the USA
Ex*: ATEX: II 3G IIC T3 X, Internal Atm. only
**Please order power cable separately

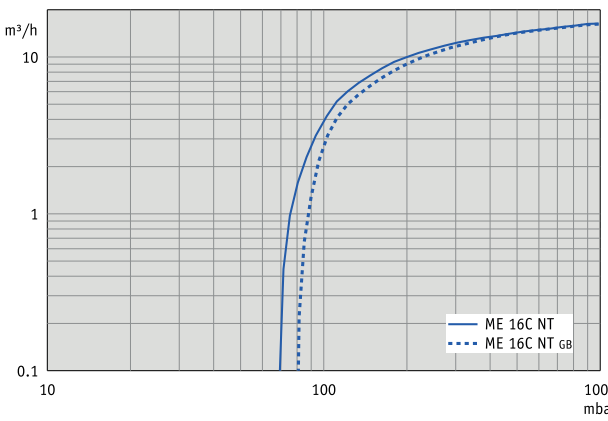
CHEMISTRY DIAPHRAGM PUMPS 70 mbar - 16.3 m³/h

- outstanding chemical resistance and superior vapor tolerance
- very high pumping speed even at low vacuum levels
- compact design
- whisper quiet and very low vibration
- excellent environmental friendliness due to efficient solvent recovery

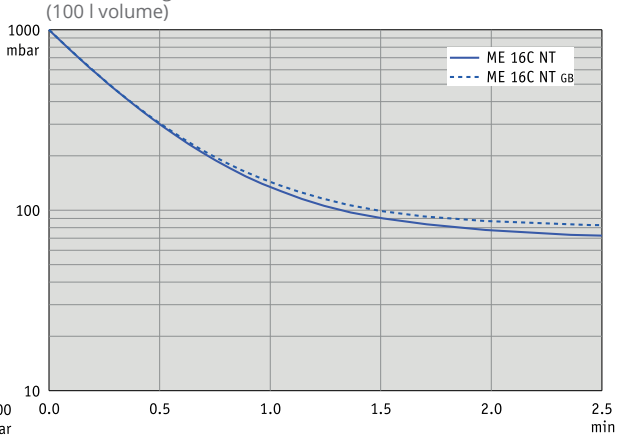
ME 16C NT - ME 16C NT +EK

Chemistry diaphragm pumps of the NT design are an excellent solution for continuous, oil-free pumping of corrosive gases and vapors. The one-stage construction provides the advantageous combination of high pumping speed and low ultimate vacuum down to 70 mbar. All major parts in contact with pumped media are made of chemically resistant fluoroplastics. Well-proven PTFE sandwich diaphragms for increased reliability and extended operating life. The eight cylinders pump ME 16C NT provides a particularly high performance together with a compact design. Upgraded with an outlet exhaust vapor condenser (EK) the ME 16C NT +EK provides an environmental friendly system with efficient solvent recovery. Eight-cylinder NT pumps feature quiet operation, smooth and easy to clean surfaces.

Pumping speed graph at 50 Hz with/without gas ballast



Pump down graph at 50 Hz with/without gas ballast (100 l volume)



Further information and diagrams for 60 Hz mains frequency at www.vacuubrand.com
Pumping speeds and pump down times are only for information. Ultimate vacuum specification: See "Technical Data"

TECHNICAL DATA	ME 16C NT
Number of heads / stages	8 / 1
Max. pumping speed 50/60 Hz	16.3 / 18.4 m³/h
Ultimate vacuum (abs.)	70 mbar
Ultim. vac. (abs.) with gas ballast	100 mbar
Max. back pressure (abs.)	1.1 bar
Inlet connection	Small flange KF DN 25
Outlet connection	Hose nozzle DN 15 mm
Rated motor power	0.44 kW
Degree of protection	IP 40
Dimensions (L x W x H), approx.	533 x 260 x 359 mm
Weight, approx.	28.1 kg

TECHNICAL DATA	ME 16C NT +EK
Number of heads / stages	8 / 1
Max. pumping speed 50/60 Hz	16.3 / 18.4 m³/h
Ultimate vacuum (abs.)	70 mbar
Ultim. vac. (abs.) with gas ballast	100 mbar
Max. back pressure (abs.)	1.1 bar
Inlet connection	Small flange KF DN 25
Outlet connection	Hose nozzle DN 8-10 mm
Rated motor power	0.44 kW
Degree of protection	IP 40
Dimensions (L x W x H), approx.	528 x 387 x 395 mm
Weight, approx.	29.1 kg

ACCESSORIES ME 16C NT

PTFE tubing KF DN 25 (1000 mm: 686033)
Inlet separator KF DN 25 (699979)
Centering and sealing ring KF DN 25 C Al/FEP (635722)
Emission condenser kit for eight cyl. NT pump models (699948)

ACCESSORIES ME 16 C NT +EK

PTFE tubing KF DN 25 (1000 mm: 686033)
Inlet separator KF DN 25 (699979)
Centering and sealing ring KF DN 25 C Al/FEP (635722)

ITEMS SUPPLIED

Pump completely mounted, ready for use, with manual.

ORDERING INFORMATION			ME 16C NT
230 V ~ 50-60 Hz	CEE	Ex*	741300
230 V ~ 50-60 Hz	UK, IN	Ex*	741302
100-115 V ~ 50-60 Hz / 120 V ~ 60 Hz	US		741303

ORDERING INFORMATION			ME 16C NT +EK
230 V ~ 50-60 Hz	CEE	Ex*	741500
100-115 V ~ 50-60 Hz / 120 V ~ 60 Hz	US		741503

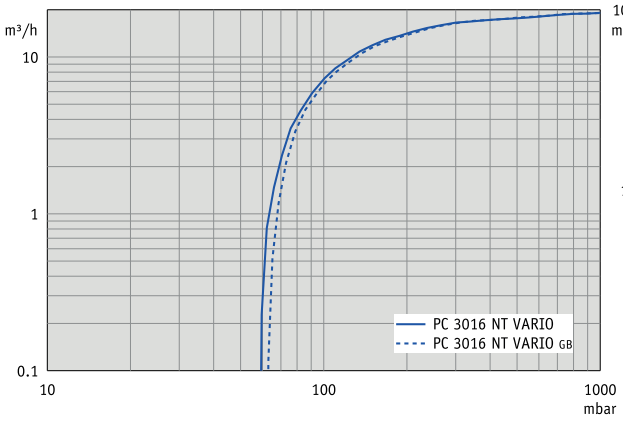
Ex*: ATEX: II 3G IIC T3 X, Internal Atm. only

- VARIO®: Automatic adjustment of the vacuum level throughout the process for high process reproducibility and unattended operation
- VARIO®: short process times due to zero-fluctuation (hysteresis-free) vacuum control, even for large amounts of vapor
- VARIO®: easily operated CVC 3000 vacuum controller with clear text menus and integrated venting valve
- very high pumping speed even at low vacuum levels
- systems +EK and PC 3016 NT VARIO: excellent environmental friendliness due to efficient solvent recovery

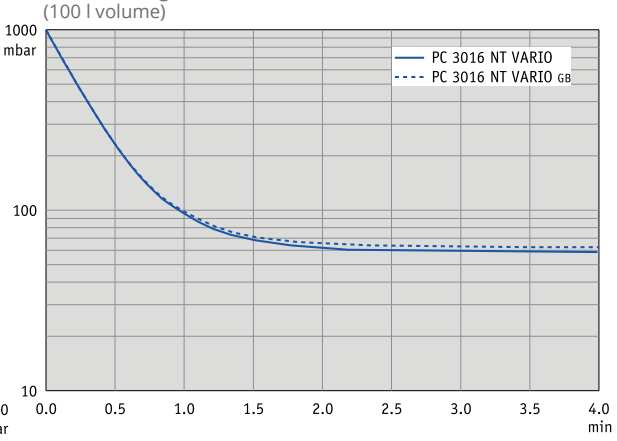
ME 16C NT VARIO - PC 3016 NT VARIO

These powerful pumps feature exceptionally high pumping speed. VARIO® pumping units provide precise vacuum control by adjusting the diaphragm pump´s motor speed. They feature fully automatic evaporation control at the push of a button. The PC 3016 NT VARIO pumping unit is a proven concept for evaporations with large amounts of solvents. The inlet separator (AK) retains particles and liquid droplets, the waste vapor condenser at the outlet (EK) is highly efficient and compact. The condenser enables near-100-percent solvent recovery, efficient recycling, and active protection of the environment. Eight-cylinder NT pumps features quiet operation with smooth, easy-to-clean surfaces.

Pumping speed graph
with/without gas ballast



Pump down graph
with/without gas ballast
(100 l volume)



Further information at www.vacuubrand.com
Pumping speeds and pump down times are only for information. Ultimate vacuum specification: See "Technical Data"

TECHNICAL DATA	ME 16C NT VARIO
Vacuum controller	CVC 3000
Number of heads / stages	8 / 1
Max. pumping speed	19.3 m³/h
Ultimate vacuum (abs.)	70 mbar
Ultim. vac. (abs.) with gas ballast	100 mbar
Max. back pressure (abs.)	1.1 bar
Inlet connection	Small flange KF DN 25
Outlet connection	Hose nozzle DN 15 mm
Vacuum sensor connection	PTFE tubing connection 10/8 mm, hose nozzle DN 6/10 mm
Rated motor power	0.53 kW
Degree of protection	IP 40
Dimensions (L x W x H), approx.	533 x 260 x 420 mm
Weight, approx.	28.1 kg

TECHNICAL DATA	PC 3016 NT VARIO
Vacuum controller	CVC 3000
Number of heads / stages	8 / 1
Max. pumping speed	19.3 m³/h
Ultimate vacuum (abs.)	70 mbar
Ultim. vac. (abs.) with gas ballast	100 mbar
Max. back pressure (abs.)	1.1 bar
Inlet connection	Small flange KF DN 25 / hose nozzle DN 15 mm
Outlet connection	Hose nozzle DN 8-10 mm
Vacuum sensor connection	PTFE tubing connection 10/8 mm, hose nozzle DN 6/10 mm
Rated motor power	0.53 kW
Degree of protection	IP 40
Dimensions (L x W x H), approx.	616 x 387 x 420 mm
Weight, approx.	29.7 kg

ACCESSORIES ME 16C NT VARIO

PTFE tubing KF DN 25 (1000 mm: 686033)
Inlet separator KF DN 25 (699979)
Centering and sealing ring KF DN 25 C Al/FEP (635722)
Emission condenser kit for eight cyl. NT pump models (699948)
Vent valve VBM-B (674217)

ACCESSORIES PC 3016 NT VARIO

PTFE tubing KF DN 25 (1000 mm: 686033)
Vent valve VBM-B (674217)
Centering and sealing ring KF DN 25 C Al/FEP (635722)

ITEMS SUPPLIED

Pumping unit completely mounted, ready for use, with manual

ORDERING INFORMATION			ME 16C NT VARIO
200-230 V ~ 50-60 Hz	CEE	Ex*	741700
100-120 V ~ 50-60 Hz	US		741703

ORDERING INFORMATION			PC 3016 NT VARIO
200-230 V ~ 50-60 Hz	CEE	Ex*	741800
100-120 V ~ 50-60 Hz	US		741803

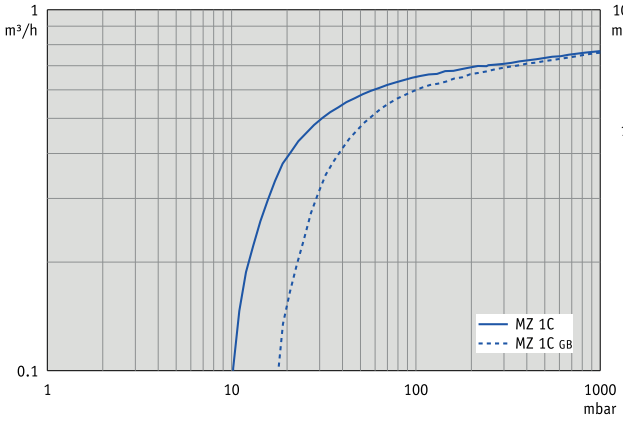
Ex*: ATEX: II 3G IIC T3 X, Internal Atm. only

- outstanding chemical resistance and superior vapor tolerance
- convenient, quick and simple to use due to the new top mounted power switch
- optimized vacuum even with gas ballast for continuous purge
- whisper quiet and very low vibration
- maintenance-free drive system and proven long diaphragm life

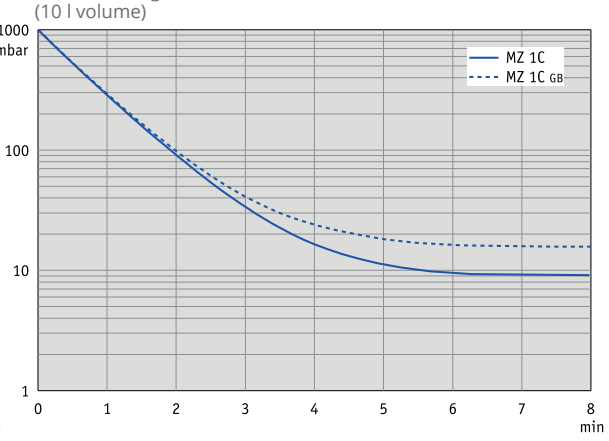
MZ 1C

Chemistry-design diaphragm pumps are an excellent solution for continuous, oil-free pumping of corrosive gases and vapors. The two-stage construction provides the advantageous combination of high pumping speed and low ultimate vacuum. All major parts in contact with pumped media are made of chemically resistant fluoroplastics. Well-proven PTFE-sandwich diaphragms increase reliability and extend operating life. The MZ 1C pump is equipped with a gas ballast valve for continuous condensate purge increasing the pumping capability of condensable vapors. It features slim design for space-saving installation and good vacuum performance. A manual vacuum regulator valve with dial gauge for adjustment of pumping speed and ultimate vacuum is available as accessory.

Pumping speed graph at 50 Hz with/without gas ballast



Pump down graph at 50 Hz with/without gas ballast (10 l volume)



Further information and diagrams for 60 Hz mains frequency at www.vacuubrand.com
Pumping speeds and pump down times are only for information. Ultimate vacuum specification: See "Technical Data"

TECHNICAL DATA	MZ 1C
Number of heads / stages	2 / 2
Max. pumping speed 50/60 Hz	0.75 / 0.9 m³/h
Ultimate vacuum (abs.)	12 mbar
Ultim. vac. (abs.) with gas ballast	20 mbar
Max. back pressure (abs.)	1.1 bar
Inlet connection	Hose nozzle DN 8-10 mm
Outlet connection	Hose nozzle DN 8-10 mm
Rated motor power	0.06 kW
Degree of protection	IP 40
Dimensions (L x W x H), approx.	312 x 121 x 170 mm
Weight, approx.	6.7 kg

ACCESSORIES

Chemistry vacuum regulator valve unit for ME/MZ 1C (696843)
Rubber vacuum tubing DN 8 mm (686001)

ITEMS SUPPLIED

Pump completely mounted, ready for use, with manual.

ORDERING INFORMATION			MZ 1C
230 V ~ 50-60 Hz	CEE	Ex*	724100
230 V ~ 50-60 Hz	UK, IN	Ex*	724102
100-120 V ~ 50-60 Hz	US		724103
100-120 V ~ 50-60 Hz / 200-230 V ~ 50-60 Hz			
		EX*	**724105
230 V ~ 50-60 Hz	CN	Ex*	724106

Ex*: ATEX: II 3G IIC T3 X, Internal Atm. only
**Please order power cable separately

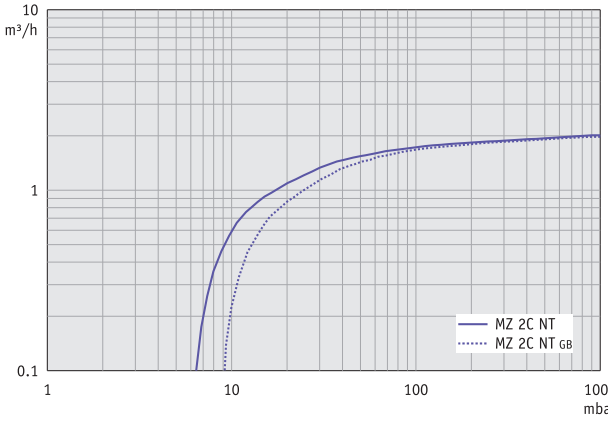
CHEMISTRY DIAPHRAGM PUMPS 7 mbar - 2.0 m³/h

- outstanding chemical resistance and superior vapor tolerance
- high performance even at low vacuum levels
- optimized vacuum even with gas ballast for condensate purge
- whisper quiet and low vibration
- long diaphragm life, maintenance-free drive system

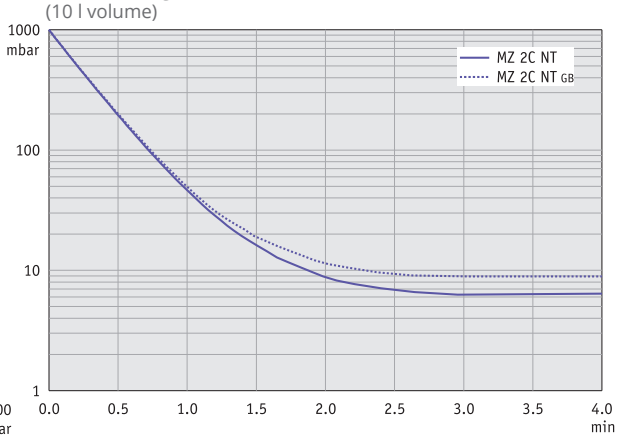
MZ 2C NT

Chemistry-design diaphragm pumps are an excellent solution for continuous, oil-free pumping of corrosive gases and vapors. The two-stage construction provides the advantageous combination of high pumping speed and low ultimate vacuum. All parts in contact with pumped media are made of chemically resistant fluoroplastics. Well-proven PTFE sandwich diaphragms increase reliability and extend operating life. The MZ 2C NT pump is equipped with a gas ballast valve for continuous condensate purge increasing the pumping capability of condensable vapors. This pump is our most popular chemistry diaphragm pump, and is the heart of a family of VACUUBRAND pumping systems. The NT-series features further improved performance data and superior vapor tolerance.

Pumping speed graph at 50 Hz with/without gas ballast



Pump down graph at 50 Hz with/without gas ballast (10 l volume)



Further information and diagrams for 60 Hz mains frequency at www.vacuubrand.com
Pumping speeds and pump down times are only for information. Ultimate vacuum specification: See "Technical Data"

TECHNICAL DATA	MZ 2C NT
Number of heads / stages	2 / 2
Max. pumping speed 50/60 Hz	2.0 / 2.3 m³/h
Ultimate vacuum (abs.)	7 mbar
Ultim. vac. (abs.) with gas ballast	12 mbar
Max. back pressure (abs.)	1.1 bar
Inlet connection	Hose nozzle DN 8-10 mm
Outlet connection	Hose nozzle DN 8-10 mm
Rated motor power	0.18 kW
Degree of protection	IP 40
Dimensions (L x W x H), approx.	243 x 243 x 198 mm
Weight, approx.	11.1 kg

ACCESSORIES

Rubber vacuum tubing DN 8 mm (686001)

ITEMS SUPPLIED

Pump completely mounted, ready for use, with manual.

ORDERING INFORMATION			MZ 2C NT
230 V ~ 50-60 Hz	CEE	Ex*	732300
230 V ~ 50-60 Hz	CH	Ex*	732301
230 V ~ 50-60 Hz	UK, IN	Ex*	732302
230 V ~ 50-60 Hz	CEE/CN	Ex*	732307
100-115 V ~ 50-60 Hz / 120 V ~ 60 Hz	US		732303
100-115 V ~ 50-60 Hz / 120 V ~ 60 Hz / 200-230 V ~ 50-60 Hz			
Inlet: Small flange KF DN 16		Ex*	**732345

With NRTL certification for Canada and the USA
Ex*: ATEX: II 3G IIC T3 X, Internal Atm. only
**Please order power cable separately

- outstanding chemical resistance and superior vapor tolerance
- high performance even at low vacuum levels
- optimized vacuum even with gas ballast for condensate purge
- whisper quiet and very low vibration
- separators at inlet and outlet to collect condensates

MZ 2C NT +2AK

MZ 2C NT chemistry diaphragm pump, with inlet separator and outlet catchpot
This chemistry vacuum system has a wide range of applications like evacuation, evaporation and pumping of gases and vapors in chemical, biological and pharmaceutical laboratories where there are no requirements for condensation of solvent vapors at the outlet. Typical applications are vacuum concentrators, gel dryers and filtration. The separator at the inlet (AK), made of glass with protective coating, retains particles and liquid droplets. The separator at the outlet collects condensate, avoids condensate backflow towards the pump, and reinforces the whisper-quiet operation of the pump.

TECHNICAL DATA same as MZ 2C NT, except

Inlet connection	Hose nozzle DN 8-10 mm
Outlet connection	Hose nozzle DN 8-10 mm
Dimensions (L x W x H), approx.	319 x 243 x 309 mm
Weight, approx.	13.6 kg

ACCESSORIES

Rubber vacuum tubing DN 8 mm (686001)
Upgrade kit manometer with valve (699906)

ITEMS SUPPLIED

Pumping unit completely mounted, ready for use, with manual.

ORDERING INFORMATION		MZ 2C NT +2AK	
230 V ~ 50-60 Hz	CEE	Ex*	732500
230 V ~ 50-60 Hz	CH, CN	Ex*	732501
230 V ~ 50-60 Hz	UK, IN	Ex*	732502
100-115 V ~ 50-60 Hz / 120 V ~ 60 Hz	US		732503

With NRTL certification for Canada and the USA
Ex*: ATEX: II 3G IIC T3 X, Internal Atm. only

- outstanding chemical resistance and superior vapor tolerance
- high performance even at low vacuum levels
- optimized vacuum even with gas ballast for condensate purge
- whisper quiet and very low vibration
- excellent environmental friendliness due to efficient solvent recovery

MZ 2C NT +AK+EK

MZ 2C NT pump with pump protection and vapor capture components
This chemistry vacuum system has a wide range of applications like evacuation, evaporation and pumping of gases and vapors in chemical, biological and pharmaceutical laboratories. Typical applications are rotary evaporators, vacuum concentrators and vacuum drying ovens. The separator at the inlet (AK), made of glass with protective coating, retains particles and liquid droplets. The waste vapor condenser at the outlet (EK) is highly efficient and compact. The condenser enables near-100-percent solvent recovery, efficient recycling, and active protection of the environment.

TECHNICAL DATA same as MZ 2C NT, except

Inlet connection	Hose nozzle DN 8-10 mm
Outlet connection	Hose nozzle DN 8-10 mm
Coolant connection	2 x hose nozzle DN 6-8 mm
Dimensions (L x W x H), approx.	326 x 243 x 402 mm
Weight, approx.	14.2 kg

ACCESSORIES

Rubber vacuum tubing DN 8 mm (686001)
Upgrade kit manometer with valve (699906)

ITEMS SUPPLIED

Pumping unit completely mounted, ready for use, with manual.

ORDERING INFORMATION **MZ 2C NT +AK+EK**

230 V ~ 50-60 Hz	CEE	Ex*	732600
230 V ~ 50-60 Hz	CH	Ex*	732601
230 V ~ 50-60 Hz	UK, IN	Ex*	732602
230 V ~ 50-60 Hz	CN	Ex*	732607
100-115 V ~ 50-60 Hz / 120 V ~ 60 Hz	US		732603

ORDERING INFORMATION

		*****MZ 2C NT +AK+EK PELTRONIC**
230 V ~ 50-60 Hz	Ex*	**2613944

With NRTL certification for Canada and the USA (Exception: 2613944)
Ex*: ATEX: II 3G IIC T3 X, Internal Atm. only
**Please order power cable separately
***Further information Peltronic® pg. 92

- outstanding chemical resistance and superior vapor tolerance
- high performance even at low vacuum levels
- optimized vacuum even with gas ballast for condensate purge
- simultaneous operation of two independent vacuum applications, with reliable check valves to prevent interference between applications
- excellent environmental friendliness due to efficient solvent recovery

MZ 2C NT +AK SYNCHRO+EK

MZ 2C NT pump with full vapor capture and ports to operate two applications
This chemistry vacuum system provides the simultaneous operation of two processes with only one pump. Typical applications are rotary evaporators, vacuum concentrators and vacuum drying ovens. Each vacuum connection is provided with a manual flow control valve to regulate the effective pumping speed. The separator at the inlet (AK), made of glass with a protective coating, retains particles and liquid droplets. The waste vapor condenser at the outlet (EK) is highly efficient and compact. The condenser enables near-100-percent solvent recovery, efficient recycling and active protection of the environment.

TECHNICAL DATA same as MZ 2C NT, except

Inlet connection	2 x hose nozzle DN 8-10 mm
Outlet connection	Hose nozzle DN 8-10 mm
Coolant connection	2 x hose nozzle DN 6-8 mm
Dimensions (L x W x H), approx.	326 x 248 x 402 mm
Weight, approx.	14.5 kg

ACCESSORIES

Kit analog gauge for NT SYNCHRO (699907)
Rubber vacuum tubing DN 8 mm (686001)

ITEMS SUPPLIED

Pumping unit completely mounted, ready for use, with manual.

ORDERING INFORMATION MZ 2C NT +AK SYNCHRO+EK

230 V ~ 50-60 Hz	CEE	Ex*	732800
230 V ~ 50-60 Hz	CH	Ex*	732801
230 V ~ 50-60 Hz	UK, IN	Ex*	732802
230 V ~ 50-60 Hz	CN	Ex*	732807
100-115 V ~ 50-60 Hz / 120 V ~ 60 Hz	US		732803

With NRTL certification for Canada and the USA
Ex*: ATEX: II 3G IIC T3 X, Internal Atm. only

- outstanding chemical resistance and superior vapor tolerance
- high performance even at low vacuum levels
- optimized vacuum even with gas ballast for condensate purge
- whisper quiet and very low vibration
- manual vacuum control, analog vacuum display

MZ 2C NT +AK+M+D

MZ 2C NT chemistry-diaphragm pump with pump protection and manual control
This chemistry vacuum system has a wide range of applications like evacuation, evaporation and pumping of gases and vapors in chemical, biological and pharmaceutical laboratories where there are no requirements for condensation of solvent vapors at the outlet. The manual flow control valve regulates the effective pumping speed at the vacuum connection, the vacuum manometer offers an analog vacuum display. This system is well proven for filtration. The separator at the inlet (AK), made of glass with a protective coating, retains particles and liquid droplets.

TECHNICAL DATA same as MZ 2C NT, except

Inlet connection	Hose nozzle DN 8-10 mm
Outlet connection	Hose nozzle DN 8-10 mm
Dimensions (L x W x H), approx.	310 x 243 x 313 mm
Weight, approx.	13.4 kg

ACCESSORIES

Rubber vacuum tubing DN 8 mm (686001)

ITEMS SUPPLIED

Pumping unit completely mounted, ready for use, with manual.

ORDERING INFORMATION		MZ 2C NT +AK+M+D
230 V ~ 50-60 Hz	CEE	Ex* 732700
100-115 V ~ 50-60 Hz / 120 V ~ 60 Hz	US	732703

With NRTL certification for Canada and the USA
Ex*: ATEX: II 3G IIC T3 X, Internal Atm. only

- outstanding chemical resistance and superior vapor tolerance
- high performance even at low vacuum levels
- optimized vacuum even with gas ballast for condensate purge
- excellent environmental friendliness due to efficient solvent recovery
- manual vacuum control, analog vacuum display

PC 101 NT

Chemistry pumping unit with vacuum dial gauge, manual flow control and vapor capture
This chemistry pumping unit has a wide range of applications like evacuation, evaporation and pumping of gases and vapors in chemical, biological and pharmaceutical laboratories. Typical applications are rotary evaporators and vacuum drying ovens. The manual flow control valve regulates the effective pumping speed at the vacuum connection, the vacuum manometer offers an analog vacuum display. The waste vapor condenser at the outlet (EK) is highly efficient and compact. The condenser enables near-100-percent solvent recovery, efficient recycling and active protection of the environment.

TECHNICAL DATA same as MZ 2C NT, except

Inlet connection	Hose nozzle DN 8-10 mm
Outlet connection	Hose nozzle DN 8-10 mm
Coolant connection	2 x hose nozzle DN 6-8 mm
Dimensions (L x W x H), approx.	326 x 243 x 402 mm
Weight, approx.	14.5 kg

ACCESSORIES

Rubber vacuum tubing DN 8 mm (686001)

ITEMS SUPPLIED

Pumping unit completely mounted, ready for use, with manual.

ORDERING INFORMATION			PC 101 NT
230 V ~ 50-60 Hz	CEE	Ex*	733000
230 V ~ 50-60 Hz	UK, IN	Ex*	733002
100-115 V ~ 50-60 Hz / 120 V ~ 60 Hz	US		733003

With NRTL certification for Canada and the USA
Ex*: ATEX: II 3G IIC T3 X, Internal Atm. only

- easily operated vacuum controller CVC 3000 with clear text menus, with integrated venting valve
- chemistry design flow control valve with large cross section for unrestricted performance
- excellent environmental friendliness due to efficient solvent recovery
- whisper quiet and very low vibration
- optimized vacuum even with gas ballast

PC 510 NT

Chemistry pumping unit with electronic vacuum control
Chemistry pumping units of this series are well-proven for vacuum generation and control for many evaporation processes. The popular two-stage MZ 2C NT chemistry diaphragm pump is the heart of these pumping units, frequently used for medium-sized vacuum applications involving "common" solvents. The pumping units are equipped with a CVC 3000 vacuum controller with a solenoid valve for electronic vacuum control. The exhaust vapor condenser is outstandingly efficient and compact. It provides near-100-percent recovery of solvents, for economical recycling and environmental protection.

TECHNICAL DATA same as MZ 2C NT, except

Vacuum controller	CVC 3000
Inlet connection	Hose nozzle DN 8-10 mm
Outlet connection	Hose nozzle DN 8-10 mm
Coolant connection	2 x hose nozzle DN 6-8 mm
Dimensions (L x W x H), approx.	419 x 243 x 444 mm
Weight, approx.	16.7 kg

ACCESSORIES

Coolant valve VKW-B (674220)
Vent valve VBM-B (674217)
Liquid level sensor (699908)
Rubber vacuum tubing DN 8 mm (686001)

ITEMS SUPPLIED

Pumping unit completely mounted, ready for use, with manual.

ORDERING INFORMATION			PC 510 NT
230 V ~ 50-60 Hz	CEE	Ex*	733100
230 V ~ 50-60 Hz	CH, CN	Ex*	733101
230 V ~ 50-60 Hz	UK, IN	Ex*	733102
100-115 V ~ 50-60 Hz / 120 V ~ 60 Hz	US		733103

Ex*: ATEX: II 3G IIC T3 X, Internal Atm. only

- easily operated vacuum controller CVC 3000 with clear text menus, with integrated venting valve
- chemistry design flow control valve with large cross section for unrestricted performance
- excellent environmental friendliness due to efficient solvent recovery
- PC 511 NT allows simultaneous operation of two independent vacuum applications, with reliable check valves to prevent interference between systems
- optimized vacuum even with gas ballast

PC 511 NT

Chemistry pumping unit with two inlet ports with vacuum control
Chemistry pumping units of this series are well-proven for vacuum generation and control for many evaporation processes. The popular two-stage MZ 2C NT chemistry diaphragm pump is the heart of these pumping units, frequently used for medium-sized vacuum applications involving "common" solvents. The pumping units are equipped with a CVC 3000 vacuum controller with a solenoid valve for electronic vacuum control. The exhaust vapor condenser is outstandingly efficient and compact. It provides near-100-percent recovery of solvents, for economical recycling and environmental protection. The PC 511 NT is equipped with an additional manually controlled vacuum port. Check valves help to protect against cross-contamination and interference, permitting simultaneous operation of two vacuum applications with one pump.

TECHNICAL DATA same as MZ 2C NT, except

Vacuum controller	CVC 3000
Inlet connection	2 x hose nozzle DN 8-10 mm
Outlet connection	Hose nozzle DN 8-10 mm
Coolant connection	2 x hose nozzle DN 6-8 mm
Dimensions (L x W x H), approx.	435 x 243 x 444 mm
Weight, approx.	16.9 kg

ACCESSORIES

Coolant valve VKW-B (674220)
Vent valve VBM-B (674217)
Liquid level sensor (699908)
Rubber vacuum tubing DN 8 mm (686001)

ITEMS SUPPLIED

Pumping unit completely mounted, ready for use, with manual.

ORDERING INFORMATION **PC 511 NT**

230 V ~ 50-60 Hz	CEE	Ex*	733200
230 V ~ 50-60 Hz	CH, CN	Ex*	733201
230 V ~ 50-60 Hz	UK, IN	Ex*	733202
100-115 V ~ 50-60 Hz / 120 V ~ 60 Hz	US		733203

Ex*: ATEX: II 3G IIC T3 X, Internal Atm. only

- two intuitive CVC 3000 vacuum controllers with clear text menus, with integrated venting valve
- two chemistry-design solenoid valves with large cross section for unrestricted performance
- excellent environmental friendliness due to efficient solvent recovery
- simultaneous operation of two independent vacuum applications
- optimized vacuum even with gas ballast

PC 520 NT

Chemistry pumping unit with two electronically controlled inlet ports
This chemistry vacuum pumping unit is an economic space-saving solution for simultaneous operation of two independent vacuum applications with one single pump. Each vacuum port is equipped with a CVC 3000 vacuum controller with solenoid valve for electronic vacuum control. Both vacuum ports have integrated check valves against cross contamination and interference. The popular MZ 2C NT two-stage chemistry diaphragm pump is the heart of this pumping unit. It is frequently used for medium-sized vacuum applications involving "common" solvents. The exhaust waste vapor condenser is outstandingly efficient and compact. It provides near-100-percent recovery of solvents, for economical recycling and environmental protection.

TECHNICAL DATA same as MZ 2C NT, except

Vacuum controller	2 x CVC 3000
Inlet connection	2 x hose nozzle DN 8-10 mm
Outlet connection	Hose nozzle DN 8-10 mm
Coolant connection	2 x hose nozzle DN 6-8 mm
Dimensions (L x W x H), approx.	435 x 361 x 444 mm
Weight, approx.	17.7 kg

ACCESSORIES

Coolant valve VKW-B (674220)
Vent valve VBM-B (674217)
Liquid level sensor (699908)
Rubber vacuum tubing DN 8 mm (686001)

ITEMS SUPPLIED

Pumping unit largely mounted, ready for use, with manual.

ORDERING INFORMATION			PC 520 NT
230 V ~ 50-60 Hz	CEE	Ex*	733300
230 V ~ 50-60 Hz	CH, CN	Ex*	733301
230 V ~ 50-60 Hz	UK, IN	Ex*	733302
100-115 V ~ 50-60 Hz / 120 V ~ 60 Hz	US		733303

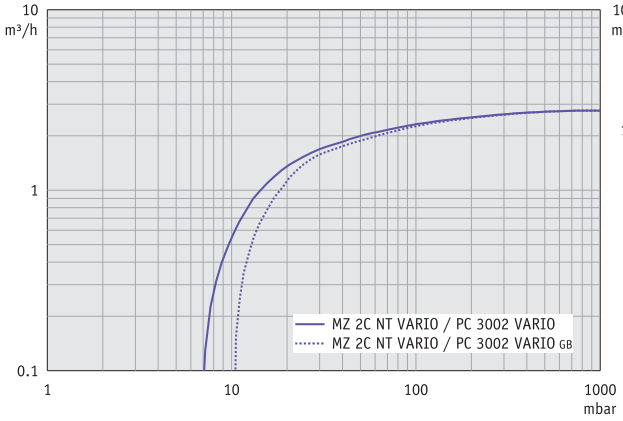
Ex*: ATEX: II 3G IIC T3 X, Internal Atm. only

- VARIO®: automatic adaptation of the vacuum level throughout the process for high process reliability and unattended operation
- VARIO®: short process times due to zero-fluctuation (hysteresis-free) vacuum control
- VARIO®: easily operated CVC 3000 vacuum controller with clear text menus, with integrated venting valve
- extraordinary diaphragm life for minimum operational and servicing costs
- PC 3002 VARIO: excellent environmental friendliness due to efficient solvent recovery

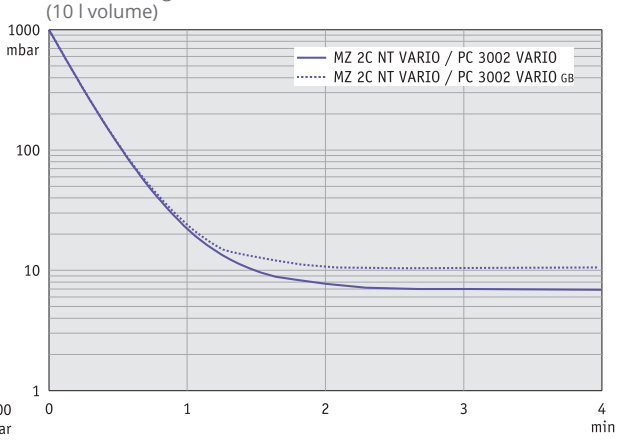
MZ 2C NT VARIO AND PC 3002 VARIO

VARIO® pumps and pumping units provide precise vacuum control by adaptation of the diaphragm pump´s motor speed. They feature fully automatic evaporation control on the push of a button. The basic pump is the MZ 2C NT VARIO two-stage chemistry diaphragm pump which meets medium vacuum requirements for most solvents. The pumping unit PC 3002 VARIO is a well proven choice for evaporation of large amounts of solvents. The separator at the inlet collects particles and liquid droplets. The waste vapor condenser at the outlet enables near-100-percent solvent recovery, efficient recycling and active environmental protection. The on-demand motor speed control results in unparalleled length of service intervals for wearing parts such as diaphragms.

Pumping speed graph
with/without gas ballast



Pump down graph
with/without gas ballast
(10 l volume)



Further information at www.vacuubrand.com
Pumping speeds and pump down times are only for information. Ultimate vacuum specification: See "Technical Data"

TECHNICAL DATA	MZ 2C NT VARIO
Vacuum controller	CVC 3000
Max. pumping speed	2.8 m³/h
Ultimate vacuum (abs.)	7 mbar
Ultim. vac. (abs.) with gas ballast	12 mbar
Max. back pressure (abs.)	1.1 bar
Inlet connection	Hose nozzle DN 8-10 mm
Outlet connection	Hose nozzle DN 8-10 mm
Vacuum sensor connection	PTFE tubing connection 10/8 mm, hose nozzle DN 6/10 mm
Rated motor power	0.53 kW
Degree of protection	IP 20
Dimensions (L x W x H), approx.	243 x 243 x 245 mm
Weight, approx.	13.8 kg

TECHNICAL DATA	PC 3002 VARIO
Vacuum controller	CVC 3000
Max. pumping speed	2.8 m³/h
Ultimate vacuum (abs.)	7 mbar
Ultim. vac. (abs.) with gas ballast	12 mbar
Max. back pressure (abs.)	1.1 bar
Inlet connection	Hose nozzle DN 8-10 mm
Outlet connection	Hose nozzle DN 8-10 mm
Coolant connection	2 x hose nozzle DN 6-8 mm
Vacuum sensor connection	Internally connected
Rated motor power	0.53 kW
Degree of protection	IP 40
Dimensions (L x W x H), approx.	419 x 243 x 444 mm
Weight, approx.	17.4 kg

ACCESSORIES

Coolant valve VKW-B (674220)
Vent valve VBM-B (674217)
Liquid level sensor (699908)
Rubber vacuum tubing DN 8 mm (686001)

ITEMS SUPPLIED MZ 2C NT VARIO, PC 3002 VARIO

Pumping unit completely mounted, ready for use, with manual.

ITEMS SUPPLIED PC 3002 VARIO EK PELTRONIC

Pumping unit completely mounted with Peltronic® emission condenser, with manual.

ORDERING INFORMATION			MZ 2C NT VARIO
200-230 V ~ 50-60 Hz	CEE	Ex*	732400
200-230 V ~ 50-60 Hz	CH, CN	Ex*	732401
100-120 V ~ 50-60 Hz	US		732403

ORDERING INFORMATION			PC 3002 VARIO
200-230 V ~ 50-60 Hz	CEE	Ex*	733500
200-230 V ~ 50-60 Hz	CH, CN	Ex*	733501
200-230 V ~ 50-60 Hz	UK, IN	Ex*	733502
100-120 V ~ 50-60 Hz	US		733503

****PC 3002 VARIO EK PELTRONIC**

on request

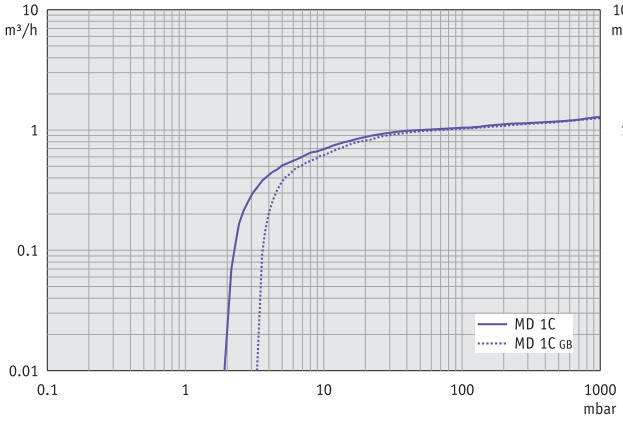
Ex*: ATEX: II 3G IIC T3 X, Internal Atm. only
** Further information Peltronic® pg. 92

- excellent ultimate vacuum even with gas ballast
- exceptionally high performance even at low vacuum
- outstanding chemical resistance and superior vapor tolerance
- whisper quiet and ultra low vibration
- proven long diaphragm life, maintenance-free drive system

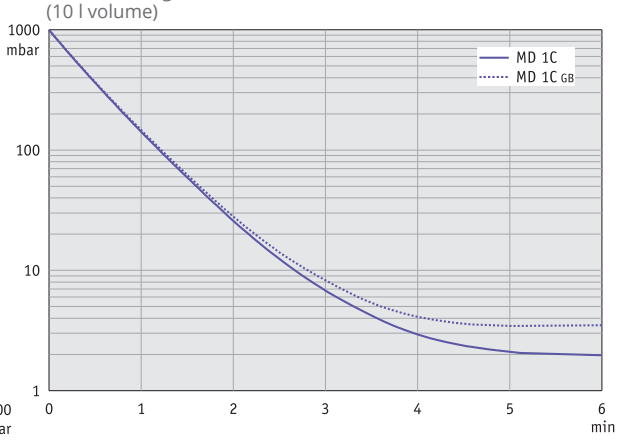
MD 1C

Three-stage chemistry-design diaphragm pumps are an excellent solution for continuous, oil-free pumping of corrosive gases and vapors and meet high requirements regarding ultimate vacuum. The three-stage construction provides the advantageous combination of high pumping speed and deep ultimate vacuum in a pump with a very small footprint. All parts in contact with pumped media are made of chemically resistant fluoroplastics. Well-proven PTFE sandwich diaphragms increase reliability and extend operating life. The MD 1C with gas ballast valve is optimally prepared for pumping easily condensable vapors (high boiling solvents).

Pumping speed graph at 50 Hz
with/without gas ballast



Pump down graph at 50 Hz
with/without gas ballast
(10 l volume)



Further information and diagrams for 60 Hz mains frequency at www.vacuubrand.com
Pumping speeds and pump down times are only for information. Ultimate vacuum specification: See "Technical Data"

TECHNICAL DATA	MD 1C
Number of heads / stages	4 / 3
Max. pumping speed 50/60 Hz	1.3 / 1.5 m³/h
Ultimate vacuum (abs.)	2 mbar
Ultim. vac. (abs.) with gas ballast	4 mbar
Max. back pressure (abs.)	1.1 bar
Inlet connection	Hose nozzle DN 8-10 mm
Outlet connection	Hose nozzle DN 8 mm
Rated motor power	0.08 kW
Degree of protection	IP 42
Dimensions (L x W x H), approx.	316 x 143 x 175 mm
Weight, approx.	6.9 kg

ACCESSORIES

Rubber vacuum tubing DN 8 mm (686001)

ITEMS SUPPLIED

Pump completely mounted, ready for use, with manual.

ORDERING INFORMATION			MD 1C
200-230 V ~ 50-60 Hz	CEE	Ex*	696600
200-230 V ~ 50-60 Hz	CH	Ex*	696601
200-230 V ~ 50-60 Hz	UK, IN	Ex*	696602
200-230 V ~ 50-60 Hz	CN	Ex*	696606
100-120 V ~ 50-60 Hz	US		696603
120 V ~ 60 Hz	US		**696613

Ex*: ATEX: II 3G IIC T3 X, Internal Atm. only
** With NRTL certification for Canada and the USA

- outstanding chemical resistance and superior vapor tolerance
- exceptionally high performance even at low vacuum
- excellent ultimate vacuum even with gas ballast
- whisper quiet and ultra low vibration
- excellent environmental friendliness due to efficient solvent recovery

MD 1C +AK+EK

MD 1C chemistry diaphragm pump with separator at the inlet and exhaust vapor condenser
This chemistry vacuum system has a wide range of applications like evacuation, evaporation and pumping of gases and vapors. This system is usable for increased vacuum requirements with high boiling solvents and often replaces rotary vane pumps. Typical applications are rotary evaporators and vacuum drying ovens. The separator at the inlet (AK), made of glass with a protective coating, retains particles and liquid droplets. The waste vapor condenser at the outlet (EK) is highly efficient and compact. The condenser enables near-100-percent solvent recovery, efficient recycling and active protection of the environment.

TECHNICAL DATA same as MD 1C, except

Inlet connection	Hose nozzle DN 8-10 mm
Outlet connection	Hose nozzle DN 8-10 mm
Coolant connection	2 x hose nozzle DN 6-8 mm
Dimensions (L x W x H), approx.	316 x 239 x 405 mm
Weight, approx.	10.2 kg

ACCESSORIES

Rubber vacuum tubing DN 8 mm (686001)
Flow control valve (677137)

ITEMS SUPPLIED

Pumping unit completely mounted, ready for use, with manual.

ORDERING INFORMATION **MD 1C +AK+EK**

200-230 V ~ 50-60 Hz	CEE	Ex*	696620
200-230 V ~ 50-60 Hz	CH, CN	Ex*	696621
200-230 V ~ 50-60 Hz	UK, IN	Ex*	696622
100-120 V ~ 50-60 Hz	US		696623
120 V ~ 60 Hz	US		**696633

Ex*: ATEX: II 3G IIC T3 X, Internal Atm. only
**With NRTL certification for Canada and the USA

- outstanding chemical resistance and superior vapor tolerance
- high flow rate even at low vacuum
- excellent ultimate vacuum even with gas ballast
- continuously adjustable manual adaptation of pumping speed via jog wheel
- upgradable to PC 3001 VARIO^{pro} system with two accessory packages: Kit 1, with CVC 3000 and inlet separator; Kit 2, with emission condenser and catchpot

PC 3001 BASIC

Chemistry pumping unit with manual speed control
This very compact chemistry pumping unit is an excellent solution when working with high boiling solvents. Typical applications are vacuum generation for rotary evaporators, vacuum concentrators and filtrations. With the continuously variable jog wheel, the pumping speed is manually adjustable to the process requirements. There are two optional kits available to easily upgrade the PC 3001 basic to the fully functional PC 3001 VARIO^{pro} complete with CVC 3000 vacuum controller, inlet separator and vapor condenser at the outlet.

TECHNICAL DATA same as PC 3001 VARIO^{pro}, without CVC 3000, EK, AK

Inlet connection	Hose nozzle DN 6-10 mm
Outlet connection	Hose nozzle DN 8-10 mm / silencer
Dimensions (L x W x H), approx.	251 x 256 x 400 mm
Weight, approx.	6.4 kg

ACCESSORIES

Rubber vacuum tubing DN 6 mm (686000)
Rubber vacuum tubing DN 8 mm (686001)
Upgrade kit CVC 3000 with inlet separator (699921)
Upgrade kit emission condenser (699922)

ITEMS SUPPLIED

Pumping unit completely mounted, ready for use, with manual.

ORDERING INFORMATION			PC 3001 BASIC
100-120 V / 200-230 V ~ 50-60 Hz	CEE	Ex*	696720
100-120 V / 200-230 V ~ 50-60 Hz	UK, IN	Ex*	696722
100-120 V / 200-230 V ~ 50-60 Hz	US	Ex*	696723

With NRTL certification for Canada and the USA
Ex*: ATEX: II 3G IIC T3 X, Internal Atm. only

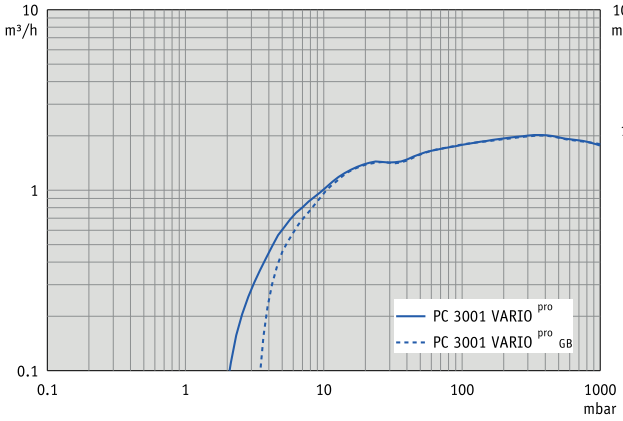
CHEMISTRY DIAPHRAGM PUMPS 2 mbar - 2.0 m³/h

- VARIO®: easily operated CVC 3000 vacuum controller with clear text menus and integrated venting valve
- VARIO®: automatic optimization of the vacuum level throughout the process for high process reproducibility and unattended operation, short process times due to zero-fluctuation (hysteresis-free) vacuum control - even for large amounts of vapor
- compact and powerful; excellent ultimate vacuum, even with continuous condensate purge
- whisper quiet and ultra low vibration
- excellent environmental friendliness due to low power consumption and efficient solvent recovery

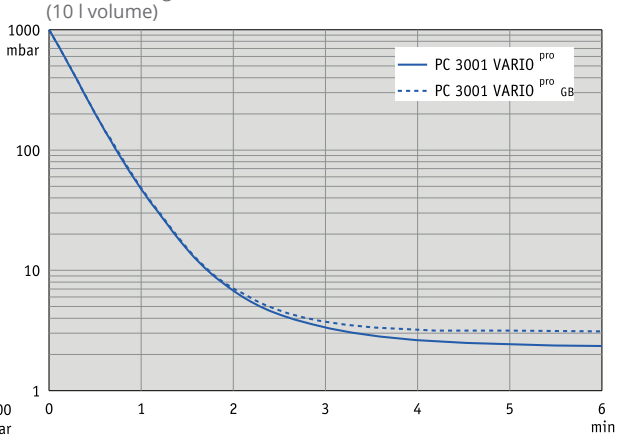
PC 3001 VARIO^{PRO}

This VARIO® chemistry pumping unit optimizes vacuum conditions automatically by precisely and continuously adjusting the diaphragm pump´s motor speed. Thanks to the motor speed control the pump operates only when vacuum is needed, saving energy and reducing maintenance. The integrated vacuum controller enables fully automatic evaporation at a push of a button. Low space requirements, light weight and low operational noise contribute further to this unit's flexibility and popularity for laboratory use. The PC 3001 VARIO^{pro} is ideal for vacuum applications with high boiling point solvents. The inlet separator, made of glass with a protective coating, prevents droplets and particles from entering the pump. The highly efficient insulated exhaust vapor condenser has a very compact design and provides near-100-percent recovery of solvents. The ´TE´ version of the PC 3001 VARIO^{pro} uses a dry ice condenser to provide a cooling-water-free option for vapor capture if no cooling water connection is available or water conservation is critical. The PC 3001 VARIO^{pro} with the Peltronic® emission condenser works without any cooling media. For exceptionally large amounts of vapor - like from parallel evaporators without condenser - the PC 3001 VARIO^{pro} +IK with its condenser on the vacuum side is an excellent choice.

Pumping speed graph
with/without gas ballast



Pump down graph
with/without gas ballast
(10 l volume)



Further information at www.vacuubrand.com
Pumping speeds and pump down times are only for information. Ultimate vacuum specification: See "Technical Data"

TECHNICAL DATA	PC 3001 VARIO[PRO]
Vacuum controller	CVC 3000
Number of heads / stages	4 / 3
Max. pumping speed	2.0 m³/h
Ultimate vacuum (abs.)	2 mbar
Ultim. vac. (abs.) with gas ballast	4 mbar
Max. back pressure (abs.)	1.1 bar
Inlet connection	Hose nozzle DN 6-10 mm
Outlet connection	Hose nozzle DN 8-10 mm
Coolant connection	2 x hose nozzle DN 6-8 mm
Max. power	0.16 kW
Degree of protection	IP 20
Dimensions (L x W x H), approx.	300 x 306 x 400 mm
Weight, approx.	7.7 kg

TECHNICAL DATA	PC 3001 VARIO[PRO] TE
Vacuum controller	CVC 3000
Number of heads / stages	4 / 3
Max. pumping speed	2.0 m³/h
Ultimate vacuum (abs.)	2 mbar
Ultim. vac. (abs.) with gas ballast	4 mbar
Max. back pressure (abs.)	1.1 bar
Inlet connection	Hose nozzle DN 6-10 mm
Outlet connection	Hose nozzle DN 8-10 mm
Max. power	0.16 kW
Degree of protection	IP 20
Dimensions (L x W x H), approx.	300 x 341 x 493 mm
Weight, approx.	8.2 kg

ORDERING INFORMATION		PC 3001 VARIO[PRO]	
100-120 V / 200-230 V ~ 50-60 Hz	CEE	Ex*	696700
100-120 V / 200-230 V ~ 50-60 Hz	CH	Ex*	696701
100-120 V / 200-230 V ~ 50-60 Hz	UK, IN	Ex*	696702
100-120 V / 200-230 V ~ 50-60 Hz	US	Ex*	696703
100-120 V / 200-230 V ~ 50-60 Hz	CN	Ex*	696706

ORDERING INFORMATION	PC 3001 VARIO[PRO] TE	
100-120 V / 200-230 V ~ 50-60 Hz	Ex*	**696715

ORDERING INFORMATION	PC 3001 VARIO[PRO] EK PELTRONIC	
100-120 V / 200-230 V ~ 50-60 Hz	Ex*	**696735

ORDERING INFORMATION	PC 3001 VARIO[PRO] +IK	
100-120 V / 200-230 V ~ 50-60 Hz	Ex*	**696745

ACCESSORIES

Rubber vacuum tubing DN 6 mm (686000)
Rubber vacuum tubing DN 8 mm (686001)
Coolant valve VKW-B (674220)
Vent valve VBM-B (674217)
Liquid level sensor (699908)

ITEMS SUPPLIED

Pumping unit completely mounted, ready for use, with manual.

With NRTL certification for Canada and the USA (Exception: 696735)
Ex*: ATEX: II 3G IIC T3 X, Internal Atm. only
** Please order power cable separately

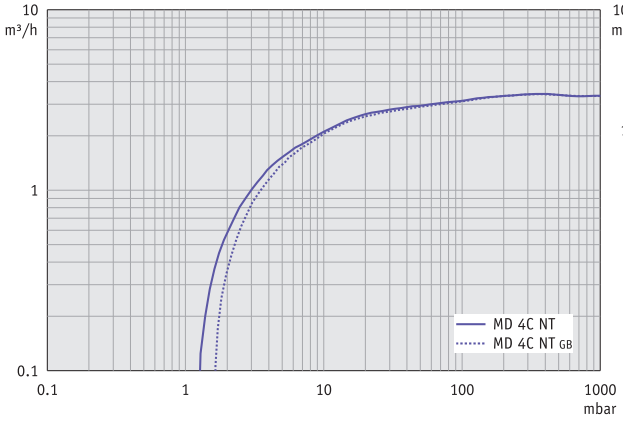
CHEMISTRY DIAPHRAGM PUMPS 1.5 mbar - 3.4 m³/h

- outstanding chemical resistance and superior vapor tolerance
- exceptionally high performance even at low vacuum
- excellent ultimate vacuum even with gas ballast
- whisper quiet and very low vibration
- long diaphragm life, maintenance-free drive system

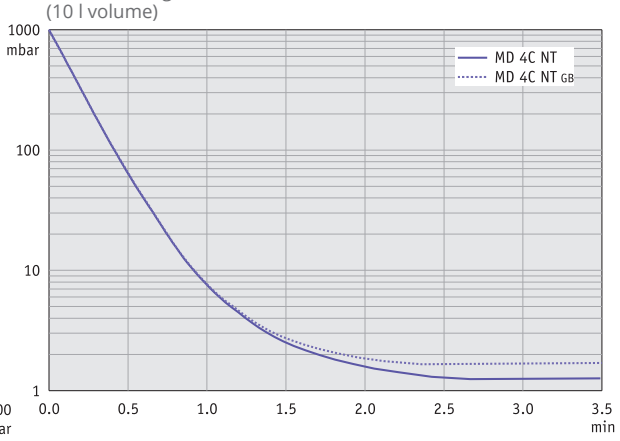
MD 4C NT

Three-stage chemistry-design diaphragm pumps are an excellent solution for continuous, oil-free pumping of corrosive gases and vapors and meet even challenging requirements. The three-stage design provides the advantageous combination of high pumping speed and very low ultimate vacuum. All parts of the MD 4C NT in contact with pumped media are made of chemically resistant fluoroplastics. Well-proven PTFE sandwich diaphragms provide increased reliability and extended operating life. Due to the gas ballast valve and its very good ultimate vacuum (even with gas ballast) the MD 4C NT is also suitable for pumping condensable vapors of high-boiling solvents. The NT-series features further improved performance data, easy service and superior vapor tolerance.

Pumping speed graph at 50 Hz with/without gas ballast



Pump down graph at 50 Hz with/without gas ballast (10 l volume)



Further information and diagrams for 60 Hz mains frequency at www.vacuubrand.com
Pumping speeds and pump down times are only for information. Ultimate vacuum specification: See "Technical Data"

TECHNICAL DATA	MD 4C NT
Number of heads / stages	4 / 3
Max. pumping speed 50/60 Hz	3.4 / 3.8 m³/h
Ultimate vacuum (abs.)	1.5 mbar
Ultim. vac. (abs.) with gas ballast	3 mbar
Integral leakage rate	typ. 0.02 mbar l/s
Max. back pressure (abs.)	1.1 bar
Inlet connection	Hose nozzle DN 8-10 mm
Outlet connection	Hose nozzle DN 8-10 mm
Rated motor power	0.25 kW
Degree of protection	IP 40
Dimensions (L x W x H), approx.	325 x 243 x 198 mm
Weight, approx.	14.3 kg

ACCESSORIES

Rubber vacuum tubing DN 8 mm (686001)

ITEMS SUPPLIED

Pump completely mounted, ready for use, with manual.

ORDERING INFORMATION			MD 4C NT
230 V ~ 50-60 Hz	CEE	Ex*	736400
230 V ~ 50-60 Hz	CH	Ex*	736401
230 V ~ 50-60 Hz	UK, IN	Ex*	736402
230 V ~ 50-60 Hz	CN	Ex*	736406
100-115 V ~ 50-60 Hz / 120 V ~ 60 Hz	US		736403

With NRTL certification for Canada and the USA
Ex*: ATEX: II 3G IIC T3 X, Internal Atm. only

- outstanding chemical resistance
- exceptionally high performance even close to the very low ultimate vacuum
- integral leakage rate 0.001 mbar l/s verified at every single pump
- whisper quiet and very low vibration
- long diaphragm life, maintenance-free drive system

MD 4CRL NT

For applications requiring an especially high leak tightness of the pump, we recommend the MD 4CRL NT. The three-stage construction provides the advantageous combination of high pumping speed and very low ultimate vacuum. All major parts of the MD 4CRL NT in contact with pumped media are made of chemically resistant fluoroplastics or a special, highly corrosion-resistant stainless steel. Well-proven PTFE sandwich diaphragms provide increased reliability and extended operating life. Every single pump is tested for an integral leakage rate of 0.001 mbar l/s.

TECHNICAL DATA	**MD 4CRL NT**
Number of heads / stages	4 / 3
Max. pumping speed 50/60 Hz	3.4 / 3.8 m³/h
Ultimate vacuum (abs.)	1.5 mbar
Integral leakage rate	0.001 mbar l/s
Max. back pressure (abs.)	1.1 bar
Inlet connection	Small flange KF DN 16
Outlet connection	Small flange KF DN 16
Rated motor power	0.25 kW
Degree of protection	IP 40
Dimensions (L x W x H), approx.	325 x 243 x 198 mm
Weight, approx.	19.8 kg

ACCESSORIES

PTFE tubing KF DN 16 (1000 mm: 686031)
Stainless steel tubing KF DN 16 (1000 mm: 673336)

ITEMS SUPPLIED

Pump completely mounted, ready for use, with manual.

ORDERING INFORMATION		**MD 4CRL NT**
100-115 V ~ 50-60 Hz / 120 V ~ 50-60 Hz / 200-230 V ~ 50-60 Hz	Ex*	**736445

With NRTL certification for Canada and the USA
Ex*: ATEX: II 3G IIC T3 X, Internal Atm. only
** Please order power cable separately

- outstanding chemical resistance and superior vapor tolerance
- exceptionally high performance even at low vacuum
- excellent ultimate vacuum even with gas ballast
- whisper quiet and very low vibration
- separators at inlet and outlet to collect condensates

MD 4C NT +2AK

MD 4C NT chemistry diaphragm pump with inlet separator and outlet catchpot
This chemistry vacuum system has a wide range of applications like evacuation, evaporation and pumping of gases and vapors in chemical, biological and pharmaceutical laboratories that do not require condensation of solvent vapors at the outlet. This system is well proven for high vacuum requirements with high boiling solvents. Typical applications are vacuum concentrators, rotary evaporators and drying ovens. The separator at the inlet (AK), made of glass with a protective coating, retains particles and liquid droplets. The catchpot at the outlet collects condensate, avoids condensate backflow towards the pump and reinforces the whisper-quiet operation of the pump.

TECHNICAL DATA same as MD 4C NT, except

Inlet connection	Hose nozzle DN 8-10 mm
Outlet connection	Hose nozzle DN 8-10 mm
Dimensions (L x W x H), approx.	319 x 243 x 374 mm
Weight, approx.	16.7 kg

ACCESSORIES

Rubber vacuum tubing DN 8 mm (686001)
Upgrade kit manometer with valve (699906)

ITEMS SUPPLIED

Pumping unit completely mounted, ready for use, with manual.

ORDERING INFORMATION		MD 4C NT +2AK	
230 V ~ 50-60 Hz	CEE	Ex*	736600
100-115 V ~ 50-60 Hz / 120 V ~ 60 Hz	US		736603

With NRTL certification for Canada and the USA
Ex*: ATEX: II 3G IIC T3 X, Internal Atm. only

- outstanding chemical resistance and superior vapor tolerance
- exceptionally high performance even at low vacuum
- excellent ultimate vacuum even with gas ballast
- whisper quiet and very low vibration
- excellent environmental friendliness due to efficient solvent recovery

MD 4C NT +AK+EK

MD 4C NT pump with separator at the inlet and exhaust vapor condenser
This chemistry vacuum system has a wide range of applications like evacuation, evaporation and pumping of gases and vapors in chemical, biological and pharmaceutical laboratories. This system is ideal for high vacuum requirements with high boiling solvents. Typical applications are rotary evaporators and drying ovens. The separator at the inlet (AK), made of glass with a protective coating, retains particles and liquid droplets. The waste vapor condenser at the outlet (EK) is highly efficient and compact. The condenser enables near-100-percent solvent recovery, efficient recycling of solvents and active protection of the environment.

TECHNICAL DATA same as MD 4C NT, except

Inlet connection	Hose nozzle DN 8-10 mm
Outlet connection	Hose nozzle DN 8-10 mm
Coolant connection	2 x hose nozzle DN 6-8 mm
Dimensions (L x W x H), approx.	326 x 243 x 402 mm
Weight, approx.	17.3 kg

ACCESSORIES

Rubber vacuum tubing DN 8 mm (686001)
Upgrade kit manometer with valve (699906)

ITEMS SUPPLIED

Pumping unit completely mounted, ready for use, with manual.

ORDERING INFORMATION **MD 4C NT +AK+EK**

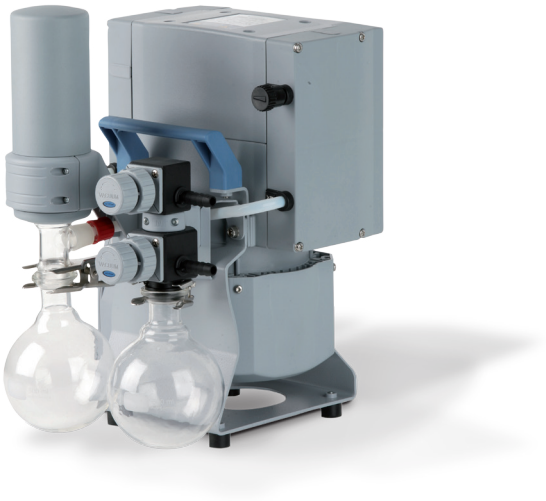
230 V ~ 50-60 Hz	CEE	Ex*	736700
230 V ~ 50-60 Hz	CH, CN	Ex*	736701
230 V ~ 50-60 Hz	UK, IN	Ex*	736702
100-115 V ~ 50-60 Hz / 120 V ~ 60 Hz	US		736703

ORDERING INFORMATION
*****MD 4C NT +AK+EK PELTRONIC**

230 V ~ 50-60 Hz	Ex*	**2613972

With NRTL certification for Canada and the USA (Exception: 2613972)
Ex*: ATEX: II 3G IIC T3 X, Internal Atm. only
**Please order power cable separately
***Further information Peltronic® pg. 92

- outstanding chemical resistance and superior vapor tolerance
- exceptionally high performance even at low vacuum
- excellent ultimate vacuum even with gas ballast
- simultaneous operation of two independent vacuum applications, with reliable check valves to prevent interference between systems
- excellent environmental friendliness due to efficient solvent recovery



MD 4C NT +AK SYNCHRO+EK

MD 4C NT pump with full vapor capture and ports to operate two applications
This chemistry vacuum system provides the simultaneous operation of two processes with only one pump. Typical applications are rotary evaporators, vacuum concentrators and vacuum drying ovens. Each vacuum connection is provided with a manual valve to regulate the effective flow at each port. The MD 4C NT pump offers more than sufficient pumping speed also for the parallel operation of two challenging applications. The separator at the inlet (AK), made of glass with a protective coating, retains particles and liquid droplets. The waste vapor condenser at the outlet (EK) is highly efficient and compact. The condenser enables near-100-percent solvent recovery, efficient recycling and active protection of the environment.

TECHNICAL DATA same as MD 4C NT, except

Inlet connection	2 x hose nozzle DN 8-10 mm
Outlet connection	Hose nozzle DN 8-10 mm
Coolant connection	2 x hose nozzle DN 6-8 mm
Dimensions (L x W x H), approx.	326 x 248 x 402 mm
Weight, approx.	17.6 kg

ACCESSORIES

Kit analog gauge for NT SYNCHRO (699907)
Rubber vacuum tubing DN 8 mm (686001)

ITEMS SUPPLIED

Pumping unit completely mounted, ready for use, with manual.

ORDERING INFORMATION MD 4C NT +AK SYNCHRO+EK

230 V ~ 50-60 Hz	CEE	Ex*	736800
230 V ~ 50-60 Hz	CH, CN	Ex*	736801
230 V ~ 50-60 Hz	UK, IN	Ex*	736802
100-115 V ~ 50-60 Hz / 120 V ~ 60 Hz	US		736803

With NRTL certification for Canada and the USA
Ex*: ATEX: II 3G IIC T3 X, Internal Atm. only

- outstanding chemical resistance and superior vapor tolerance
- exceptionally high performance even at low vacuum
- excellent ultimate vacuum even with gas ballast
- manual vacuum control, analog vacuum display
- excellent environmental friendliness due to efficient solvent recovery

PC 201 NT

Chemistry pumping unit with vacuum dial gauge, manual flow control and vapor capture
This chemistry pumping unit has a wide range of applications like evacuation, evaporation and pumping of gases and vapors in chemical, biological and pharmaceutical laboratories. Typical applications are rotary evaporators, vacuum concentrators and vacuum drying ovens with high boiling solvents. The manual flow control valve regulates the effective pumping speed at the vacuum connection; the vacuum manometer offers an analog vacuum display. The separator at the inlet (AK), made of glass with a protective coating, retains particles and liquid droplets. The exhaust waste vapor condenser enables near-100-percent solvent recovery.

TECHNICAL DATA same as MD 4C NT, except

Inlet connection	Hose nozzle DN 8-10 mm
Outlet connection	Hose nozzle DN 8-10 mm
Coolant connection	2 x hose nozzle DN 6-8 mm
Dimensions (L x W x H), approx.	326 x 243 x 402 mm
Weight, approx.	17.5 kg

ACCESSORIES

Rubber vacuum tubing DN 8 mm (686001)

ITEMS SUPPLIED

Pumping unit completely mounted, ready for use, with manual.

ORDERING INFORMATION			PC 201 NT
230 V ~ 50-60 Hz	CEE	Ex*	737000
100-115 V ~ 50-60 Hz / 120 V ~ 60 Hz	US		737003

With NRTL certification for Canada and the USA
Ex*: ATEX: II 3G IIC T3 X, Internal Atm. only

- easily operated vacuum controller CVC 3000 with clear text menus, with integrated venting valve
- exceptionally high performance even at low vacuum
- excellent ultimate vacuum even with gas ballast
- chemistry design flow control valve with large cross section for unrestricted performance
- excellent environmental friendliness due to efficient solvent recovery

PC 610 NT

Chemistry pumping unit with electronic vacuum control
Chemistry pumping units of the PC 600 series are well-proven for vacuum generation and control for many evaporation processes. The basic pump is the three-stage chemistry diaphragm pump MD 4C NT which meets high vacuum requirements for most high boiling solvents. Typical applications are rotary evaporators and vacuum drying ovens. The pumping unit is equipped with a vacuum controller CVC 3000 with solenoid valve for electronic vacuum control. The exhaust vapor condenser is outstandingly efficient and compact. It provides near-100-percent recovery of solvents, for economical recycling and environmental protection.

TECHNICAL DATA same as MD 4C NT, except

Vacuum controller	CVC 3000
Inlet connection	Hose nozzle DN 8-10 mm
Outlet connection	Hose nozzle DN 8-10 mm
Coolant connection	2 x hose nozzle DN 6-8 mm
Dimensions (L x W x H), approx.	419 x 243 x 444 mm
Weight, approx.	19.9 kg

ACCESSORIES

Coolant valve VKW-B (674220)
Vent valve VBM-B (674217)
Liquid level sensor (699908)
Rubber vacuum tubing DN 8 mm (686001)

ITEMS SUPPLIED

Pumping unit completely mounted, ready for use, with manual.

ORDERING INFORMATION			PC 610 NT
230 V ~ 50-60 Hz	CEE	Ex*	737100
230 V ~ 50-60 Hz	CH, CN	Ex*	737101
230 V ~ 50-60 Hz	UK	Ex*	737102
100-115 V ~ 50-60 Hz / 120 V ~ 60 Hz	US		737103

Ex*: ATEX: II 3G IIC T3 X, Internal Atm. only

- easily operated vacuum controller CVC 3000 with clear text menus, with integrated venting valve
- exceptionally high performance even at low vacuum
- excellent ultimate vacuum even with gas ballast
- high pumping speed for unrestricted simultaneous operation of two independent vacuum applications; check valves against cross contamination
- excellent environmental friendliness due to efficient solvent recovery

PC 611 NT

Chemistry pumping unit with two ports - one electronic and one manual - for high boiling solvents
Chemistry pumping units of these series are well-proven for vacuum generation and control for many evaporation processes. This pumping unit makes it possible to operate two vacuum systems simultaneously with just one pump. The basic pump is the three-stage MD 4C NT chemistry diaphragm pump which meets high vacuum requirements for most high boiling solvents. This pump offers more than sufficient pumping speed also for the parallel operation of two challenging applications. The pumping unit is equipped with a CVC 3000 vacuum controller with solenoid valve for electronic vacuum control. At the second vacuum connection a manual flow control valve allows to regulate the effective pumping speed at this port. Both vacuum ports have integrated check valves to protect against cross contamination.

TECHNICAL DATA same as MD 4C NT, except

Vacuum controller	CVC 3000
Inlet connection	2 x hose nozzle DN 8-10 mm
Outlet connection	Hose nozzle DN 8-10 mm
Coolant connection	2 x hose nozzle DN 6-8 mm
Dimensions (L x W x H), approx.	435 x 243 x 444 mm
Weight, approx.	20.1 kg

ACCESSORIES

Coolant valve VKW-B (674220)
Vent valve VBM-B (674217)
Liquid level sensor (699908)
Rubber vacuum tubing DN 8 mm (686001)

ITEMS SUPPLIED

Pumping unit completely mounted, ready for use, with manual.

ORDERING INFORMATION			PC 611 NT
230 V ~ 50-60 Hz	CEE	Ex*	737200
230 V ~ 50-60 Hz	CH, CN	Ex*	737201
230 V ~ 50-60 Hz	UK, IN	Ex*	737202
100-115 V ~ 50-60 Hz / 120 V ~ 60 Hz	US		737203

Ex*: ATEX: II 3G IIC T3 X, Internal Atm. only

- easily operated vacuum controller CVC 3000 with clear text menus, with integrated venting valve
- exceptionally high performance even at low vacuum
- excellent ultimate vacuum even with gas ballast
- high pumping speed for unrestricted simultaneous operation of two independent vacuum applications; check valves against cross contamination
- excellent environmental friendliness due to efficient solvent recovery

PC 620 NT

Chemistry pumping unit with two electronically controlled inlet ports for high boiling solvents
This chemistry vacuum pumping unit is an economic space-saving solution for simultaneous operation of two independent vacuum applications with one single pump. Each vacuum port is equipped with a vacuum controller CVC 3000 with a solenoid valve for electronic vacuum control. The basic pump is the three-stage MD 4C NT chemistry diaphragm pump which meets high vacuum requirements for most high boiling solvents. This pump offers more than sufficient pumping speed also for the parallel operation of two challenging applications. Both vacuum ports have integrated check valves against cross contamination and interference. The exhaust vapor condenser is outstandingly efficient and compact. It provides near-100-per-cent recovery of solvents, for economical recycling and environmental protection.

TECHNICAL DATA same as MD 4C NT, except

Vacuum controller	2 x CVC 3000
Inlet connection	2 x hose nozzle DN 8-10 mm
Outlet connection	Hose nozzle DN 8-10 mm
Coolant connection	2 x hose nozzle DN 6-8 mm
Dimensions (L x W x H), approx.	435 x 361 x 444 mm
Weight, approx.	20.9 kg

ACCESSORIES

Coolant valve VKW-B (674220)
Vent valve VBM-B (674217)
Liquid level sensor (699908)
Rubber vacuum tubing DN 8 mm (686001)

ITEMS SUPPLIED

Pumping unit largely mounted, ready for use, with manual.

ORDERING INFORMATION			PC 620 NT
230 V ~ 50-60 Hz	CEE	Ex*	737300
230 V ~ 50-60 Hz	CH, CN	Ex*	737301
230 V ~ 50-60 Hz	UK, IN	Ex*	737302
100-115 V ~ 50-60 Hz / 120 V ~ 60 Hz	US		737303

Ex*: ATEX: II 3G IIC T3 X, Internal Atm. only

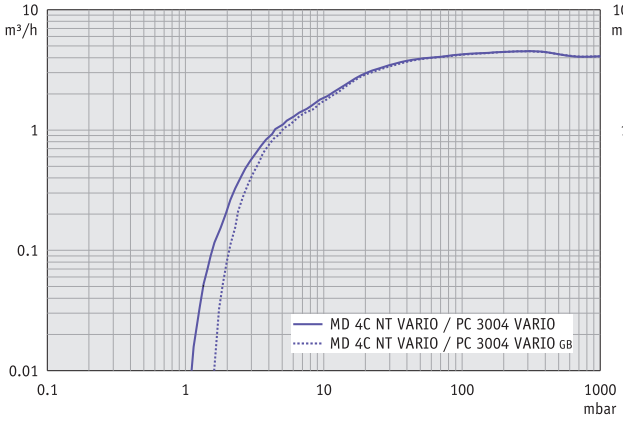
CHEMISTRY DIAPHRAGM PUMPS 1.5 mbar - 4.6 m³/h

- VARIO®: automatic adaptation of the vacuum level throughout the process for high process reliability and unattended operation
- VARIO®: short process times due to high pumping speed and zero-fluctuation (hysteresis-free) vacuum control
- VARIO®: easily operated CVC 3000 vacuum controller with clear text menus, with integrated venting valve
- extraordinary diaphragm life, therefore minimum operational and servicing costs
- PC 3004 VARIO: Excellent environmental friendliness due to efficient solvent recovery

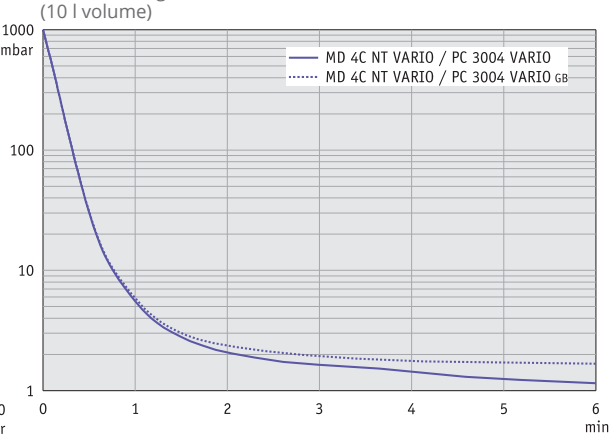
MD 4C NT VARIO - PC 3004 VARIO

VARIO® pumps and pumping units provide precise vacuum control by adaptation of the diaphragm pump´s motor speed. They feature fully automatic evaporation control on the push of a button. The basic pump is the three-stage MD 4C NT VARIO chemistry diaphragm pump which meets high vacuum requirements for most high boiling solvents. The PC 3004 VARIO offers a well proven choice for evaporation of large amounts of solvents. The separator at the inlet, made of glass with protective coating, retains particles and liquid droplets. The waste vapor condenser at the outlet enables near-100-percent solvent recovery, efficient recycling and active environmental protection. The on-demand motor speed control results in unsurpassed lifetimes of service parts, such as diaphragms. If no cooling water connection is available or water conservation is critical, the PC 3004 VARIO with the Peltronic® emission condenser works without any cooling media.

Pumping speed graph
with/without gas ballast



Pump down graph
with/without gas ballast
(10 l volume)



Further information at www.vacuubrand.com
Pumping speeds and pump down times are only for information. Ultimate vacuum specification: See "Technical Data"

TECHNICAL DATA	MD 4C NT VARIO
Vacuum controller	CVC 3000
Number of heads / stages	4 / 3
Max. pumping speed	4.6 m³/h
Ultimate vacuum (abs.)	1.5 mbar
Ultim. vac. (abs.) with gas ballast	3 mbar
Max. back pressure (abs.)	1.1 bar
Inlet connection	Hose nozzle DN 8-10 mm
Outlet connection	Hose nozzle DN 8-10 mm
Vacuum sensor connection	PTFE tubing connection 10/8 mm, hose nozzle DN 6/10 mm
Rated motor power	0.53 kW
Degree of protection	IP 20
Dimensions (L x W x H), approx.	325 x 243 x 245 mm
Weight, approx.	16.3 kg

TECHNICAL DATA	PC 3004 VARIO
Vacuum controller	CVC 3000
Number of heads / stages	4 / 3
Max. pumping speed	4.6 m³/h
Ultimate vacuum (abs.)	1.5 mbar
Ultim. vac. (abs.) with gas ballast	3 mbar
Max. back pressure (abs.)	1.1 bar
Inlet connection	Hose nozzle DN 8-10 mm
Outlet connection	Hose nozzle DN 8-10 mm
Coolant connection	2 x hose nozzle DN 6-8 mm
Vacuum sensor connection	Internally connected
Rated motor power	0.53 kW
Degree of protection	IP 40
Dimensions (L x W x H), approx.	419 x 243 x 444 mm
Weight, approx.	20.6 kg

ACCESSORIES

Coolant valve VKW-B (674220)
Vent valve VBM-B (674217)
Liquid level sensor (699908)
Rubber vacuum tubing DN 8 mm (686001)

ITEMS SUPPLIED

Pumping unit completely mounted, ready for use, with manual.

ORDERING INFORMATION			MD 4C NT VARIO
200-230 V ~ 50-60 Hz	CEE	Ex*	736500
200-230 V ~ 50-60 Hz	CH	Ex*	736501
100-120 V ~ 50-60 Hz	US		736503
200-230 V ~ 50-60 Hz	CN	Ex*	736506

ORDERING INFORMATION			PC 3004 VARIO
200-230 V ~ 50-60 Hz	CEE	Ex*	737500
200-230 V ~ 50-60 Hz	CH, CN	Ex*	737501
200-230 V ~ 50-60 Hz	UK, IN	Ex*	737502
100-120 V ~ 50-60 Hz	US		737503

ORDERING INFORMATION		PC 3004 VARIO EK PELTRONIC
200-230 V ~ 50-60 Hz	Ex*	**2614327

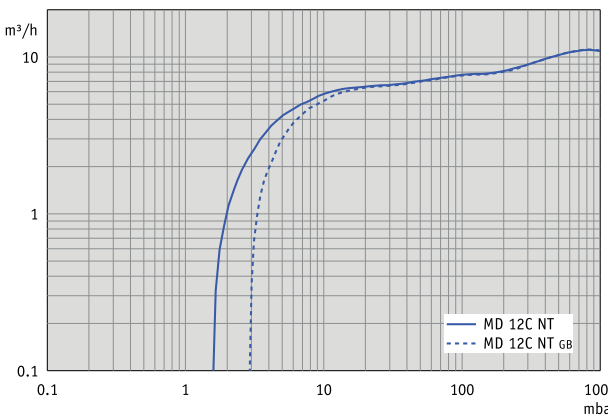
Ex*: ATEX: II 3G IIC T3 X, Internal Atm. only
**Please order power cable separately

- outstanding chemical resistance and superior vapor tolerance
- reduced process time due to particularly high pumping speed even near ultimate vacuum
- whisper quiet and very low vibration
- very good ultimate vacuum even with open gas ballast valve for condensate purge
- long diaphragm lifetime, maintenance-free drive system

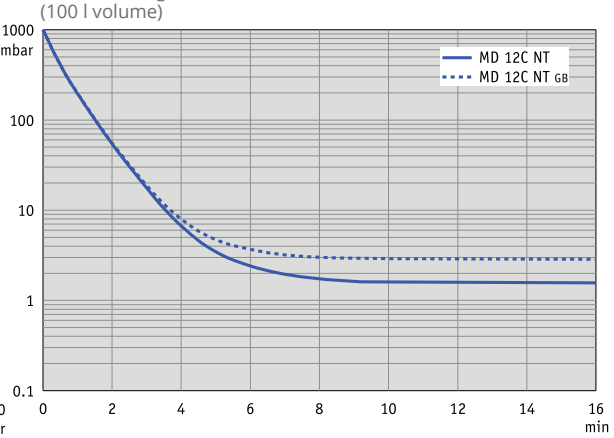
MD 12C NT

Three-stage chemistry diaphragm pumps are an excellent solution for continuous, oil-free pumping of corrosive gases and vapors and meet the highest requirements. The three-stage design of the eight-cylinder MD 12C NT pump provides the advantageous combination of high pumping speed and very low ultimate vacuum. All internal parts in contact with pumped media are made of chemically resistant fluoroplastics. Well-proven PTFE sandwich diaphragms provide increased reliability and extended operating life. With its gas ballast valve the MD 12C NT is optimally prepared for pumping easily condensable vapors, thanks to the very good ultimate vacuum even with open gas ballast valve also for high boiling solvents. Upgrade kits such as inlet separator (AK) and exhaust vapor condenser (EK) enable a later adaptation to changed process requirements. Eight-cylinder NT pumps features quiet operation with smooth, easy-to-clean surfaces.

Pumping speed graph at 50 Hz
with/without gas ballast



Pump down graph at 50 Hz
with/without gas ballast
(100 l volume)



Further information and diagrams for 60 Hz mains frequency at www.vacuubrand.com
Pumping speeds and pump down times are only for information. Ultimate vacuum specification: See "Technical Data"

TECHNICAL DATA	MD 12C NT
Number of heads / stages	8 / 3
Max. pumping speed 50/60 Hz	11.1 / 12.3 m³/h
Ultimate vacuum (abs.)	2 mbar
Ultim. vac. (abs.) with gas ballast	4 mbar
Max. back pressure (abs.)	1.1 bar
Inlet connection	Small flange KF DN 25
Outlet connection	Hose nozzle DN 15 mm
Rated motor power	0.44 kW
Degree of protection	IP 40
Dimensions (L x W x H), approx.	533 x 260 x 359 mm
Weight, approx.	28.1 kg

ACCESSORIES

PTFE tubing KF DN 25 (1000 mm: 686033)
Inlet separator KF DN 25 (699979)
Centering and sealing ring KF DN 25 C Al/FEP (635722)
Emission condenser kit for eight cyl. NT pump models (699948)

ITEMS SUPPLIED

Pump completely mounted, ready for use, with manual.

ORDERING INFORMATION			MD 12C NT
230 V ~ 50-60 Hz	CEE	Ex*	743300
230 V ~ 50-60 Hz	CH, CN	Ex*	743301
230 V ~ 50-60 Hz	UK, IN	Ex*	743302
100-115 V ~ 50-60 Hz / 120 V ~ 60 Hz	US		743303

Ex*: ATEX: II 3G IIC T3 X, Internal Atm. only

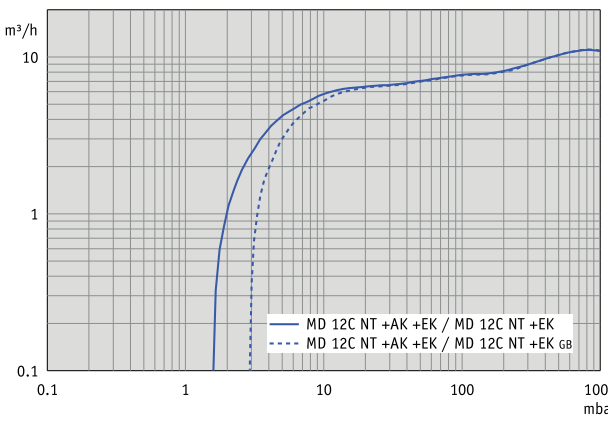
CHEMISTRY DIAPHRAGM PUMPS 2 mbar - 11.1 m³/h

- outstanding chemical resistance and superior vapor tolerance
- reduced process time due to particularly high pumping speed even near ultimate vacuum
- whisper quiet and very low vibration
- very good ultimate vacuum even with open gas ballast valve for condensate purge
- efficient solvent recovery and inlet separator equip the MD 12C NT +AK+EK system for rough operating conditions

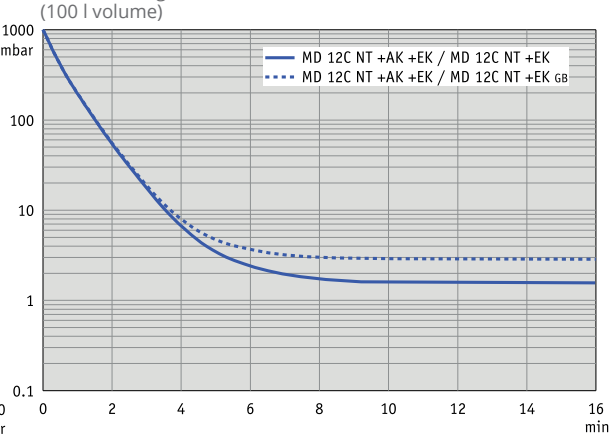
MD 12C NT +EK - MD 12C NT +AK+EK

These chemistry vacuum systems have a wide range of applications like evacuation, evaporation and pumping of gases and vapors. They provide particularly high pumping speed and are ideal for higher vacuum requirements, e.g., with high boiling solvents. The base MD 12C NT pump obtains a very good ultimate vacuum even with open gas ballast valve for condensate purge and delivers high pumping speed in a compact design. The pump design offers exceptionally high chemical resistance supporting almost universal usage in chemistry and pharmaceutics. The inlet separator (AK) retains particles and liquid droplets, the waste vapor condenser at the outlet (EK) is highly efficient and compact. The condenser enables near-100-percent solvent recovery, efficient recycling, and active protection of the environment.

Pumping speed graph at 50 Hz with/without gas ballast



Pump down graph at 50 Hz with/without gas ballast (100 l volume)



Further information and diagrams for 60 Hz mains frequency at www.vacuubrand.com
Pumping speeds and pump down times are only for information. Ultimate vacuum specification: See "Technical Data"

TECHNICAL DATA	MD 12C NT +EK
Number of heads / stages	8 / 3
Max. pumping speed 50/60 Hz	11.1 / 12.3 m³/h
Ultimate vacuum (abs.)	2 mbar
Ultim. vac. (abs.) with gas ballast	4 mbar
Max. back pressure (abs.)	1.1 bar
Inlet connection	Small flange KF DN 25
Outlet connection	Hose nozzle DN 8-10 mm
Coolant connection	2 x hose nozzle DN 6-8 mm
Rated motor power	0.44 kW
Degree of protection	IP 40
Dimensions (L x W x H), approx.	528 x 387 x 395 mm
Weight, approx.	29.1 kg

TECHNICAL DATA	MD 12C NT +AK+EK
Number of heads / stages	8 / 3
Max. pumping speed 50/60 Hz	11.1 / 12.3 m³/h
Ultimate vacuum (abs.)	2 mbar
Ultim. vac. (abs.) with gas ballast	4 mbar
Max. back pressure (abs.)	1.1 bar
Inlet connection	Small flange KF DN 25 / hose nozzle DN 15 mm
Outlet connection	Hose nozzle DN 8-10 mm
Coolant connection	2 x hose nozzle DN 6-8 mm
Rated motor power	0.44 kW
Degree of protection	IP 40
Dimensions (L x W x H), approx.	616 x 387 x 395 mm
Weight, approx.	29.7 kg

ACCESSORIES MD 12C NT +EK

PTFE tubing KF DN 25 (1000 mm: 686033)
Inlet separator KF DN 25 (699979)
Centering and sealing ring KF DN 25 C Al/FEP (635722)

ACCESSORIES MD 12C NT +AK +EK

PTFE tubing KF DN 25 (1000 mm: 686033)
Centering and sealing ring KF DN 25 C Al/FEP (635722)

ITEMS SUPPLIED

Pumping unit completely mounted, ready for use, with manual.

ORDERING INFORMATION		MD 12C NT +EK	
230 V ~ 50-60 Hz	CEE	Ex*	743500
230 V ~ 50-60 Hz	CH, CN	Ex*	743501
230 V ~ 50-60 Hz	UK, IN	Ex*	743502
100-115 V ~ 50-60 Hz / 120 V ~ 60 Hz	US		743503

ORDERING INFORMATION		MD 12C NT +AK+EK	
230 V ~ 50-60 Hz	CEE	Ex*	743600
230 V ~ 50-60 Hz	CH, CN	Ex*	743601
230 V ~ 50-60 Hz	UK, IN	Ex*	743602
100-115 V ~ 50-60 Hz / 120 V ~ 60 Hz	US		743603

****MD 12C NT +AK+EK PELTRONIC**

on request

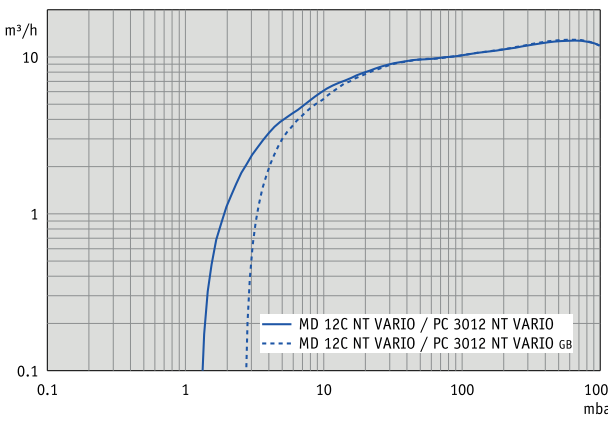
Ex*: ATEX: II 3G IIC T3 X, Internal Atm. only
**Further information Peltronic® pg. 92

- VARIO®: automatic adjustment of the vacuum level throughout the process for high process reproducibility and unattended operation
- VARIO®: short process times due to zero-fluctuation (hysteresis-free) vacuum control, even for large amounts of vapor
- VARIO®: removable CVC 3000 vacuum controller, can be arranged flexibly, easily operated with clear text menus
- extraordinary diaphragm life for minimum operational and servicing costs
- PC 3012 NT VARIO: excellent environmental friendliness due to efficient solvent recovery, inlet separator for demanding applications

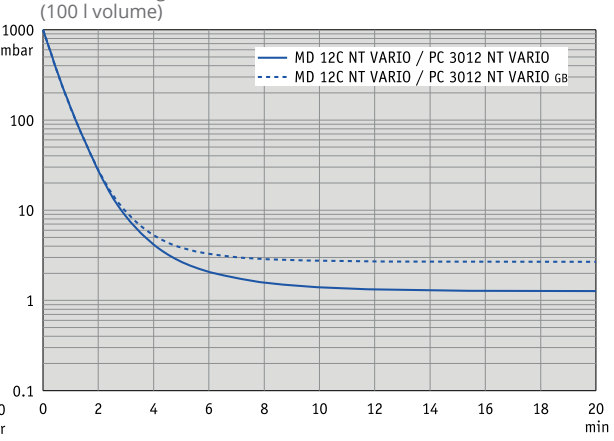
MD 12C NT VARIO - PC 3012 NT VARIO

These VARIO® pumping units feature a very high pumping speed even close to the outstanding ultimate vacuum and are ideal for high vacuum requirements with most high boiling solvents. They provide precise vacuum control by continuously adjusting the pump´s motor speed. The controller provides fully automatic evaporations without any need for parameter input. The pump design offers exceptionally high chemical resistance supporting almost universal usage in chemistry and pharmaceutics. The PC 3012 NT VARIO pumping unit relies on a well-proven operating concept for evaporations with large amounts of solvents. The inlet separator (AK) retains particles and liquid droplets, the waste vapor condenser at the outlet (EK) is highly efficient and compact. The condenser enables near-100-percent solvent recovery, efficient recycling, and active protection of the environment. The MD 12C NT VARIO can be equipped with these accessories later.

Pumping speed graph
with/without gas ballast



Pump down graph
with/without gas ballast
(100 l volume)



Further information at www.vacuubrand.com
Pumping speeds and pump down times are only for information. Ultimate vacuum specification: See "Technical Data"

TECHNICAL DATA	MD 12C NT VARIO
Vacuum controller	CVC 3000
Number of heads / stages	8 / 3
Max. pumping speed	12.9 m³/h
Ultimate vacuum (abs.)	1.5 mbar
Ultim. vac. (abs.) with gas ballast	3 mbar
Max. back pressure (abs.)	1.1 bar
Inlet connection	Small flange KF DN 25
Outlet connection	Hose nozzle DN 15 mm
Vacuum sensor connection	PTFE tubing connection 10/8 mm, hose nozzle DN 6/10 mm
Rated motor power	0.53 kW
Degree of protection	IP 40
Dimensions (L x W x H), approx.	533 x 260 x 420 mm
Weight, approx.	28.1 kg

TECHNICAL DATA	PC 3012 NT VARIO
Vacuum controller	CVC 3000
Number of heads / stages	8 / 3
Max. pumping speed	12.9 m³/h
Ultimate vacuum (abs.)	1.5 mbar
Ultim. vac. (abs.) with gas ballast	3 mbar
Max. back pressure (abs.)	1.1 bar
Inlet connection	Small flange KF DN 25 / hose nozzle DN 15 mm
Outlet connection	Hose nozzle DN 8-10 mm
Coolant connection	2 x hose nozzle DN 6-8 mm
Vacuum sensor connection	PTFE tubing connection 10/8 mm, hose nozzle DN 6/10 mm
Rated motor power	0.53 kW
Degree of protection	IP 40
Dimensions (L x W x H), approx.	616 x 387 x 420 mm
Weight, approx.	29.7 kg

ACCESSORIES MD 12C NT VARIO

PTFE tubing KF DN 25 (1000 mm: 686033)
Inlet separator KF DN 25 (699979)
Centering and sealing ring KF DN 25 C Al/FEP (635722)
Emission condenser kit for eight cyl. NT pump models (699948)

ACCESSORIES PC 3012 NT VARIO, PC 3012 NT VARIO EK PELTRONIC

PTFE tubing KF DN 25 (1000 mm: 686033)
Centering and sealing ring KF DN 25 C Al/FEP (635722)

ITEMS SUPPLIED

Pumping unit completely mounted, ready for use, with manual.

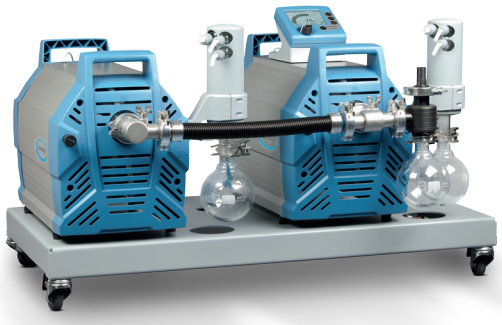
ORDERING INFORMATION		MD 12C NT VARIO	
200-230 V ~ 50-60 Hz	CEE	Ex*	743700
200-230 V ~ 50-60 Hz	UK, IN	Ex*	743702
100-120 V ~ 50-60 Hz	US		743703

ORDERING INFORMATION		PC 3012 NT VARIO	
200-230 V ~ 50-60 Hz	CEE	Ex*	743800
200-230 V ~ 50-60 Hz	CH, CN	Ex*	743801
200-230 V ~ 50-60 Hz	UK, IN	Ex*	743802
100-120 V ~ 50-60 Hz	US		743803

ORDERING INFORMATION	***PC 3012 NT VARIO EK PELTRONIC	
200-230 V ~ 50-60 Hz	Ex*	**743814

Ex*: ATEX: II 3G IIC T3 X, Internal Atm. only
**Please order power cable separately
***Further information Peltronic® pg. 92

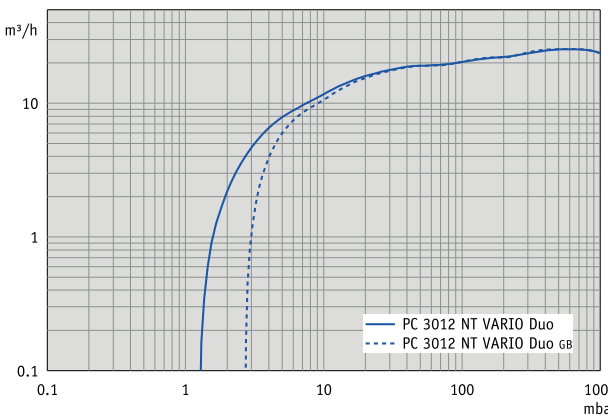
- VARIO®: automatic adaptation of the vacuum level throughout the process for high process reliability and unattended operation
- VARIO®: short process times due to powerful vacuum pump and accurate (hysteresis-free) vacuum control, even for large amounts of steam
- VARIO®: removable vacuum controller CVC 3000, variable to arrange, easy to use with multilingual full-text menus, simply integratable by digital or analog interfaces
- unmatched diaphragm life with minimal operating and maintenance costs
- excellent environmental friendliness due to minimized energy consumption, no operating fluid needs (oil, water) and efficient solvent recovery



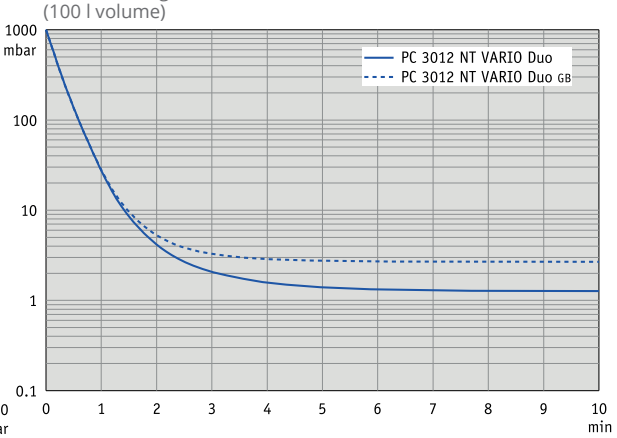
PC 3012 NT VARIO DUO

The VARIO® DUO pumping units are consisting of a combination of two individual VARIO® pumping units, connected in parallel on the suction side and driven synchronously by one vacuum controller CVC 3000. The vacuum is controlled accurately. The speed of the two individual pumps is exactly adjusted to the vacuum needs. The controller allows both fully automatic distillations without any user pre-settings as well as specific and reproducible program sequences. The integration into existing control systems via digital and analog interfaces is also possible. The consequent design to highest chemical resistance provides the ideal prerequisite for universal use in chemistry and pharmacy - without any operating fluid such as water or oil.

Pumping speed graph
with/without gas ballast



Pump down graph
with/without gas ballast
(100 l volume)



Further information at www.vacuubrand.com
Pumping speeds and pump down times are only for information. Ultimate vacuum specification: See "Technical Data"

TECHNICAL DATA	PC 3012 NT VARIO DUO
Vacuum controller	CVC 3000
Number of heads / stages	16 / 3
Max. pumping speed	25 m³/h
Ultimate vacuum (abs.)	1.5 mbar
Ultim. vac. (abs.) with gas ballast	3 mbar
Max. back pressure (abs.)	1.1 bar
Inlet connection	Small flange KF DN 25 / hose nozzle DN 15 mm
Outlet connection	2 x hose nozzle DN 10 mm
Coolant connection	4 x hose nozzle DN 6-8 mm
Vacuum sensor connection	PTFE tubing connection 10/8 mm, hose nozzle DN 6/10 mm
Rated motor power	1.06 kW
Degree of protection	IP 40
Dimensions (L x W x H), approx.	611 x 925 x 560 mm
Weight, approx.	65 kg

ACCESSORIES

PTFE tubing KF DN 25 (1000 mm: 686033)
Centering and sealing ring KF DN 25 C Al/FEP (635722)

ITEMS SUPPLIED

Pumping unit consisting of two PC 3012 NT VARIO pumps mounted in parallel on common base plate, controlled by one CVC 3000 vacuum controller, ready for use, with manual.

ORDERING INFORMATION	PC 3012 NT VARIO DUO	
200-230 V ~ 50-60 Hz	Ex*	**2614930

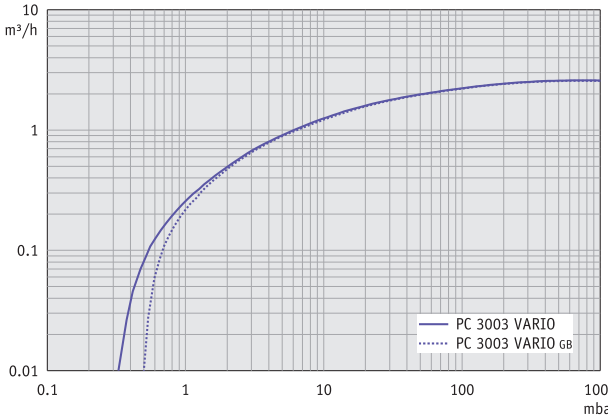
Ex*: ATEX: II 3G IIC T3 X, Internal Atm. only
**Please order power cable separately

- VARIO®: automatic optimization of vacuum levels throughout the process for high process reliability and unattended operation
- VARIO®: short process times due to powerful pump and zero-fluctuation (hysteresis-free) vacuum control
- VARIO®: easily operated CVC 3000 vacuum controller with clear text menus and integrated venting valve
- ideal for high-boiling solvents and evaporation at low temperatures
- excellent environmental friendliness due to efficient solvent recovery

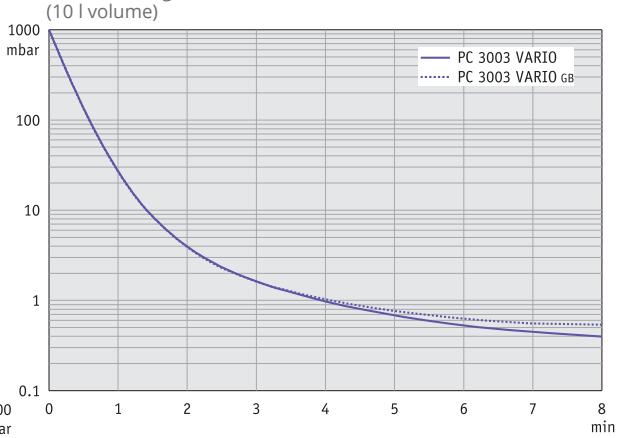
PC 3003 VARIO

This VARIO® pumping unit provides precise vacuum control by adjusting the diaphragm pump´s motor speed. It features fully automatic evaporation control at the push of a button. The PC 3003 VARIO provides an excellent ultimate vacuum and is therefore the best solution for evaporations of high boiling solvents even at low temperatures. It combines extraordinary performance with a compact design and very low noise. The separator at the inlet, made of glass with protective coating, retains particles and liquid droplets to protect pump performance. The exhaust vapor condenser at the outlet enables near-100-percent solvent recovery. The on-demand motor speed control results in unsurpassed lifetimes for service parts, such as diaphragms.

Pumping speed graph
with/without gas ballast



Pump down graph
with/without gas ballast
(10 l volume)



Further information at www.vacuubrand.com
Pumping speeds and pump down times are only for information. Ultimate vacuum specification: See "Technical Data"

TECHNICAL DATA	PC 3003 VARIO
Vacuum controller	CVC 3000
Number of heads / stages	4 / 4
Max. pumping speed	2.8 m³/h
Ultimate vacuum (abs.)	0.6 mbar
Ultim. vac. (abs.) with gas ballast	1.5 mbar
Max. back pressure (abs.)	1.1 bar
Inlet connection	Hose nozzle DN 8-10 mm
Outlet connection	Hose nozzle DN 8-10 mm
Coolant connection	2 x hose nozzle DN 6-8 mm
Rated motor power	0.53 kW
Degree of protection	IP 40
Dimensions (L x W x H), approx.	419 x 243 x 444 mm
Weight, approx.	20.6 kg

ACCESSORIES

Coolant valve VKW-B (674220)
Vent valve VBM-B (674217)
Liquid level sensor (699908)
Rubber vacuum tubing DN 8 mm (686001)

ITEMS SUPPLIED

Pumping unit completely mounted, ready for use, with manual.

ORDERING INFORMATION			PC 3003 VARIO
200-230 V ~ 50-60 Hz	CEE	Ex*	738400
200-230 V ~ 50-60 Hz	CH, CN	Ex*	738401
200-230 V ~ 50-60 Hz	UK, IN	Ex*	738402
100-120 V ~ 50-60 Hz	US		738403

****PC 3003 VARIO EK PELTRONIC**

on request

Ex*: ATEX: II 3G IIC T3 X, Internal Atm. only
**Further information Peltronic® pg. 92

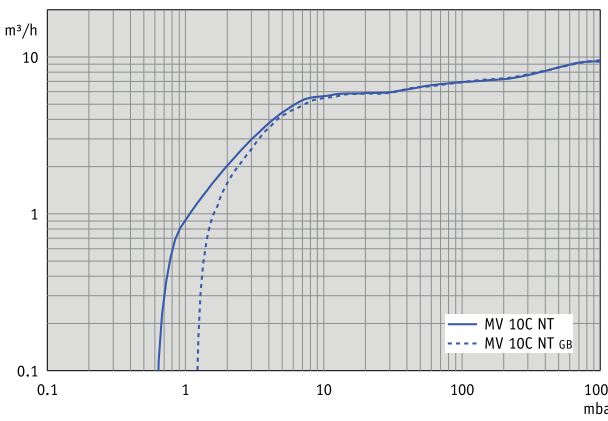
CHEMISTRY DIAPHRAGM PUMPS 0.9 mbar - 9.5 m³/h

- outstanding chemical resistance and superior vapor tolerance
- reduced process time due to very high flow rates even close to ultimate vacuum
- very low vibration and quiet
- excellent ultimate vacuum even with gas ballast
- on models with EK: excellent environmental friendliness due to efficient solvent recovery

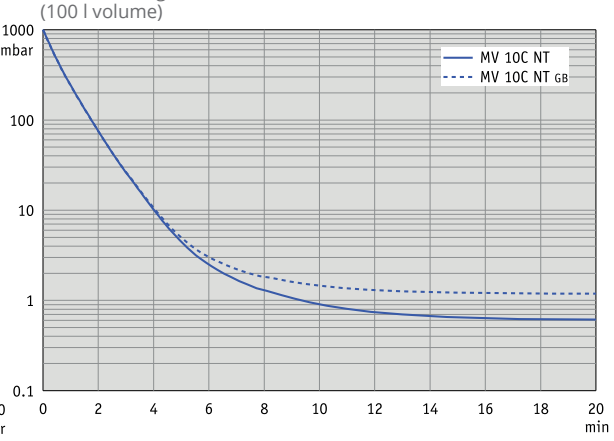
MV 10C NT - MV 10C NT +EK

Four-stage chemistry-design diaphragm pumps are an excellent solution for continuous, oil-free pumping of corrosive gases and vapors and meet highest requirements. The four-stage design of the eight-cylinder pump MV 10C NT provides the advantageous combination of high pumping speed and very low ultimate vacuum of 0.9 mbar in a very compact design. All internal parts in contact with pumped media are made of chemically resistant fluoroplastics. Well-proven PTFE sandwich diaphragms increase reliability and extend operating life. Upgraded with an exhaust waste vapor condenser (EK) the MV 10C NT +EK provides an excellent, environmentally friendly system with efficient solvent recovery. A separator for the inlet (AK) made of glass (with protective coating) against particles and liquid droplets is available as an optional accessory.

Pumping speed graph at 50 Hz with/without gas ballast



Pump down graph at 50 Hz with/without gas ballast (100 l volume)



Further information and diagrams for 60 Hz mains frequency at www.vacuubrand.com
Pumping speeds and pump down times are only for information. Ultimate vacuum specification: See "Technical Data"

TECHNICAL DATA	MV 10C NT
Number of heads / stages	8 / 4
Max. pumping speed 50/60 Hz	9.5 / 10.7 m³/h
Ultimate vacuum (abs.)	0.9 mbar
Ultim. vac. (abs.) with gas ballast	1.5 mbar
Max. back pressure (abs.)	1.1 bar
Inlet connection	Small flange KF DN 25
Outlet connection	Hose nozzle DN 15 mm
Rated motor power	0.44 kW
Degree of protection	IP 40
Dimensions (L x W x H), approx.	533 x 260 x 359 mm
Weight, approx.	28.1 kg

TECHNICAL DATA	MV 10C NT +EK
Number of heads / stages	8 / 4
Max. pumping speed 50/60 Hz	9.5 / 10.7 m³/h
Ultimate vacuum (abs.)	0.9 mbar
Ultim. vac. (abs.) with gas ballast	1.5 mbar
Max. back pressure (abs.)	1.1 bar
Inlet connection	Small flange KF DN 25
Outlet connection	Hose nozzle DN 8-10 mm
Coolant connection	2 x hose nozzle DN 6-8 mm
Rated motor power	0.44 kW
Degree of protection	IP 40
Dimensions (L x W x H), approx.	528 x 387 x 395 mm
Weight, approx.	29.1 kg

ACCESSORIES MV 10C NT

PTFE tubing KF DN 25 (1000 mm: 686033)
Inlet separator KF DN 25 (699979)
Centering and sealing ring KF DN 25 C Al/FEP (635722)
Emission condenser kit for eight cyl. NT pump models (699948)

ACCESSORIES MV 10C NT +EK

PTFE tubing KF DN 25 (1000 mm: 686033)
Inlet separator KF DN 25 (699979)
Centering and sealing ring KF DN 25 C Al/FEP (635722)

ITEMS SUPPLIED

Pumping unit completely mounted, ready for use, with manual.

ORDERING INFORMATION			MV 10C NT
230 V ~ 50-60 Hz	CEE	Ex*	744300
230 V ~ 50-60 Hz	UK, IN	Ex*	744302
100-115 V ~ 50-60 Hz / 120 V ~ 50-60 Hz	US		744303

ORDERING INFORMATION			MV 10C NT +EK
230 V ~ 50-60 Hz	CEE	Ex*	744500
100-115 V ~ 50-60 Hz / 120 V ~ 50-60 Hz	US		744503

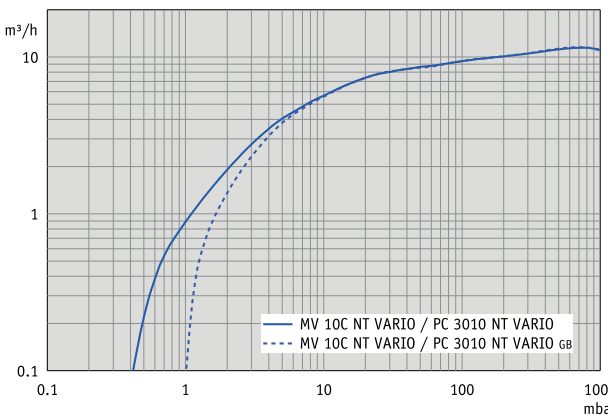
Ex*: ATEX: II 3G IIC T3 X, Internal Atm. only

- VARIO®: automatic optimization of the vacuum level throughout the process for high process reproducibility and unattended operation
- VARIO®: short process times due to zero-fluctuation (hysteresis-free) vacuum control, even for large amounts of vapor
- VARIO®: removable CVC 3000 vacuum controller, can be arranged flexibly, easily operated with clear text menus
- extraordinary diaphragm life for minimum operational and servicing costs
- PC 3010 NT VARIO: excellent environmental friendliness due to efficient solvent recovery

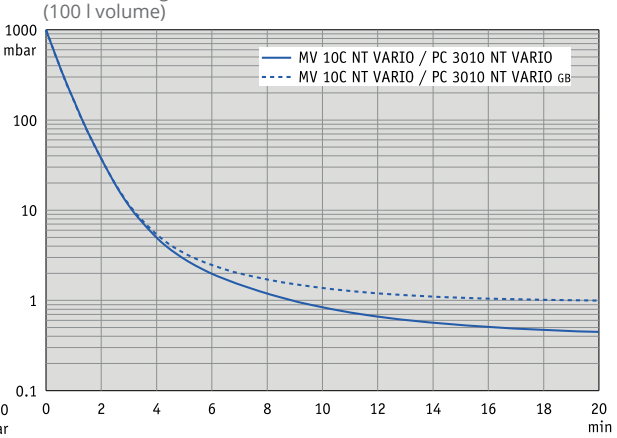
MV 10C NT VARIO - PC 3010 NT VARIO

These VARIO® pumps and pumping units feature a very high pumping speed and attain an outstanding ultimate vacuum. They are ideal for high vacuum requirements, e.g., for evaporation of most high boiling solvents even at low temperatures. They provide precise vacuum control by adjusting the diaphragm pump´s motor speed. The controller provides fully automatic evaporations without any need of parameter input. The pump design offers exceptionally high chemical resistance supporting almost universal usage in chemistry and pharmaceutics. The PC 3010 NT VARIO pumping unit relies on a well-proven operating concept for example for evaporation of large amounts of solvents. The inlet separator (AK) retains particles and liquid droplets, the waste vapor condenser at the outlet (EK) is highly efficient and compact. The condenser enables near-100-percent solvent recovery, efficient recycling, and active protection of the environment. For the MV 10C NT VARIO these accessories are optionally available and can be mounted later.

Pumping speed graph
with/without gas ballast



Pump down graph
with/without gas ballast
(100 l volume)



Further information at www.vacuubrand.com
Pumping speeds and pump down times are only for information. Ultimate vacuum specification: See "Technical Data"

TECHNICAL DATA	MV 10C NT VARIO
Vacuum controller	CVC 3000
Number of heads / stages	8 / 4
Max. pumping speed	11.6 m³/h
Ultimate vacuum (abs.)	0.6 mbar
Ultim. vac. (abs.) with gas ballast	1.2 mbar
Max. back pressure (abs.)	1.1 bar
Inlet connection	Small flange KF DN 25
Outlet connection	Hose nozzle DN 15 mm
Vacuum sensor connection	PTFE tubing connection 10/8 mm, hose nozzle DN 6/10 mm
Rated motor power	0.53 kW
Degree of protection	IP 40
Dimensions (L x W x H), approx.	533 x 260 x 420 mm
Weight, approx.	28.1 kg

TECHNICAL DATA	PC 3010 NT VARIO
Vacuum controller	CVC 3000
Number of heads / stages	8 / 4
Max. pumping speed	11.6 m³/h
Ultimate vacuum (abs.)	0.6 mbar
Ultim. vac. (abs.) with gas ballast	1.2 mbar
Max. back pressure (abs.)	1.1 bar
Inlet connection	Small flange KF DN 25 / hose nozzle DN 15 mm
Outlet connection	Hose nozzle DN 8-10 mm
Coolant connection	2 x hose nozzle DN 6-8 mm
Vacuum sensor connection	PTFE tubing connection 10/8 mm, hose nozzle DN 6/10 mm
Rated motor power	0.53 kW
Degree of protection	IP 40
Dimensions (L x W x H), approx.	616 x 387 x 420 mm
Weight, approx.	29.7 kg

ACCESSORIES MV 10C NT VARIO

PTFE tubing KF DN 25 (1000 mm: 686033)
Inlet separator KF DN 25 (699979)
Centering and sealing ring KF DN 25 C Al/FEP (635722)
Emission condenser kit for eight cyl. NT pump models (699948)

ORDERING INFORMATION			MV 10C NT VARIO
200-230 V ~ 50-60 Hz	CEE	Ex*	744700
200-230 V ~ 50-60 Hz	UK, IN	Ex*	744702
100-120 V ~ 50-60 Hz	US		744703

ACCESSORIES PC 3010 NT VARIO

PTFE tubing KF DN 25 (1000 mm: 686033)
Centering and sealing ring KF DN 25 C Al/FEP (635722)

ITEMS SUPPLIED

Pumping unit completely mounted, ready for use, with manual.

ORDERING INFORMATION			PC 3010 NT VARIO
200-230 V ~ 50-60 Hz	CEE	Ex*	744800
200-230 V ~ 50-60 Hz	CH, CN	Ex*	744801
200-230 V ~ 50-60 Hz	UK, IN	Ex*	744802
100-120 V ~ 50-60 Hz	US		744803

Ex*: ATEX: II 3G IIC T3 X, Internal Atm. only

PELTRONIC® EMISSION CONDENSER (EK)

The Peltronic® emission condenser performs condensation of solvent vapors without external coolant such as water or dry ice. It works electronically and uses Peltier elements as cooling system. All wetted parts are highly chemically resistant. The condenser is especially designed to be added to existing pumping units and allows the replacement of common condensers working with external coolant. The condenser is ideally suited for applications where cooling water is not available or desired, or in case of cost and productivity concerns associated with dry ice condensers. It is often used to reduce cooling water usage for environmental reasons or to prevent the risk of flooding from cooling water plumbing leakage. This frequently is requested for vacuum networks built into lab furniture. If the Peltronic® is connected to a CVC 3000 vacuum controller it is switched on/off automatically on demand.

Peltronic® emission condenser

TECHNICAL DATA	PELTRONIC
Rated mains voltage / mains frequency	100-120 V / 200-230 V ~ 50-60 Hz
Cooling capacity at 21°C ambient temp.	50 W
Ambient temperature range	10 - 40 °C
Condensation set-point temperature	10 °C
Inlet connection	PTFE tubing connection 10/8 mm
Outlet connection	PTFE tubing connection 10/8 mm, hose nozzle DN 10 mm
Volume of condensate catchpot	500 ml
Power draw	7 - 160 W (controlled)
Heat dissipation	7 - 200 W
Dimensions (L x W x H), approx.	175 x 179 x 392 mm
Weight, approx.	4.3 kg

ITEMS SUPPLIED

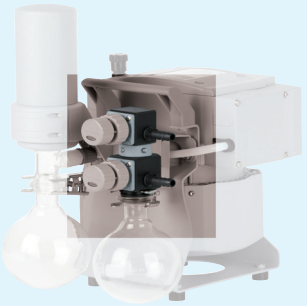
Condenser ready for use with electronic control, status indicator, temperature control, switch, PTFE tubing ready to connect to many VACUUBRAND pumping units, catchpot 500ml, catchpot clamp. Universal power supply; please order power cable separately.

Ordering Information Page 95

SUPPLEMENTARY MODULES FOR CHEMISTRY PUMPING UNITS

The upgrade kit SYNCHRO for a second vacuum connection can be equipped, depending on the application, with a manual flow control valve (677137) or an in-line solenoid valve (636668) for electronic vacuum control with the CVC 3000 vacuum controller. These funtional elements for individual vacuum control are necessary to operate the vacuum ports. Order this essential accessory separately, please.

Upgrade kit for chemistry pumping units for a second inlet port



Upgrade kit I: Inlet separator and CVC 3000 controller for PC 3001 basic
Inlet separator, vacuum controller CVC 3000 and assembling accessory to upgrade the PC 3001 basic to a pumping unit with electronic vacuum control. The separator protects the pump effectively and extends diaphragm lifetime considerably.

Upgrade kit II: Complete exhaust vapor condenser assembly for PC 3001 basic
Exhaust waste vapor condenser with catchpot for efficient solvent recovery.

Upgrade kits for PC 3001 basic

The liquid level sensor is designed to be mounted at the neck of a VACUUBRAND 500 ml catchpot and works with the CVC 3000 controller. It monitors the liquid level in catchpots of emissions condensers and inlet separators. The process is halted and an alarm sounded if the catchpots are close to overflowing. The sensor detects all common solvents without any contact to the solvents.

Liquid level sensor for catchpot 500ml

Suitable for all VACUUBRAND exhaust vapor condensers and catch pots with glass joint connections

Solvent drain for exhaust vapor condenser

Ordering Information Page 95

SUPPLEMENTARY MODULES FOR CHEMISTRY PUMPING UNITS

For all NT diaphragm pumps with flange KF DN 25 (all types ME 16(C) NT, MD 12(C) NT, MV 10(C) NT and their pumping units). Inlet with small flange KF DN 25 and hose nozzle DN 15 mm.

Inlet separator AK with round bottom flask 500 ml, with connections KF DN 25 and hose nozzle DN 15 mm

This upgrade kit enables the remote operation of all vacuum pumping units with the CVC 3000. The kit consists of a stand, a 2 m cable, and parts for assembly (including a cover plate for the controller mounting space of PC 3001 VARIO^{pro} and pumping units with plastic housing).

Conversion kit for remote pump control with the CVC 3000

With VACUU·CONTROL® the user can control and monitor his application at any time, for example from the office, using a LAN or WLAN - enabled device. So at the same time users can focus on and carry out other work whilst monitoring the process remotely. The vacuum process is automatically documented with the datalogger function and is fully traceable. The remote VACUU·CONTROL® can be used as a flexible alternative to building in a CVC 3000 controller into the laboratory furniture. The monitoring of multiple vacuum systems via a central control station is also possible.

Further information pg. 182

Remote Control VACUU·CONTROL

The VACUU·LAN® Mini-Network is a space saving VACUU·LAN® network assembly with three VACUU·LAN® valve modules pre-plumbed on a channel that can be attached to a wall or lab frame. The Mini-Network tubing is to be connected to a new VACUUBRAND diaphragm vacuum pump, or an oil-free vacuum pump that you already own, with vacuum tubing, and your one pump now supports three applications. Each VACUU·LAN® Mini-Network includes three manual flow control valves for continuously variable pumping speed adjustment. Ball Valve control and electronically controlled ports are optionally available. Each port is check-valve controlled to minimize interference among applications.

Mini-Network VACUU·LAN® with 3 vacuum connections (manual valves)

ORDERING INFORMATION ACCESSORIES FOR CHEMISTRY DIAPHRAGM PUMPS

ORDERING INFORMATION PAGE 92

Peltronic® Emission condenser	699905

ORDERING INFORMATION PAGE 93

Upgrade kit for chemistry pumping units for a second inlet port	699920
Upgrade kit for chemistry pumping units with plastic housing (PC 510 NT, PC 610 NT) for a second inlet port	699942
Add-on manual flow control valve C2	677137
Add-on in-line solenoid valve C3-B	636668
Vacuum controller CVC 3000	683160
Upgrade kit I: Inlet separator and CVC 3000 controller for PC 3001 basic	699921
Upgrade kit II: Complete exhaust vapor condenser assembly for PC 3001 basic	699922
Solvent drain for exhaust vapor condenser, Adapter from KS 35 to hose nozzle DN 6/10mm	2618398
Liquid level sensor for VACUUBRAND catchpot 500 ml	699908

ORDERING INFORMATION PAGE 94

Conversion kit for remote pump control with the CVC 3000	699923
Small flange KF DN 16 / G1/2" as outlet for diaphragm pumps ME 16(C) NT, MD 12(C) NT, MV 10(C) NT	672101
VACUU·CONTROL® LAN	683120
VACUU·CONTROL® WLAN	683110
Mini-Network VACUU·LAN® with 3 vacuum connections (manual valves)	2614455
Inlet separator AK with connections KF DN 25 (ME 16C NT, MD 12C NT, MV 10C NT)	699979

ORDERING INFORMATION ACCESSORIES / SPARE PARTS

Upgrade kit exhaust vapor condenser for NT series (ME 16C NT, MD 12C NT, MV 10C NT)	699948
Upgrade kit manometer for vacuum ports at pumping units NT SYNCHRO and PC 511 / 611 NT	699907
Cooling water valve VKW 230 V UK	676012
Cooling water valve VKW 230 V CEE	676014
Round bottom flask 500ml with spherical joint, coated	638497
Catchpot clip stainless steel suitable for all VACUUBRAND glass catchpots	637627
VACUU·BUS®-compatible accessories Page 184	

CHEMISTRY DIAPHRAGM PUMPS WITH ATEX-APPROVAL

ATEX CHEMISTRY DIAPHRAGM PUMPS AND ATEX CHEMISTRY VACUUM SYSTEMS

When intended for use in areas with potentially explosive atmospheres, European Community Directive 2014/34/EC (ATEX) requires equipment in conformity with ATEX standards. VACUUBRAND offers Category 2 chemistry diaphragm pumps and vacuum systems in conformity with ATEX (for use in zones where an explosive atmosphere is likely to occur). These chemistry diaphragm pumps are appropriate for such locations because they are highly resistant to chemicals, oil-free, have no sliding surfaces, and the expansion chamber is hermetically sealed against the drive zone. ATEX chemistry vacuum systems with solvent recovery provide safe, convenient vacuum while protecting the environment.

ATEX chemistry diaphragm pumps and vacuum systems are now available with variable speed motor for vacuum control as VARIO®-version.

The VACUUBRAND range of ATEX chemistry diaphragm pumps is supplemented by an ATEX vacuum gauge with excellent corrosion resistance and long-term stability. (Note: Compliance with EC Directive 2014/34/EC does not ensure compliance with similar codes in countries outside of the EC. These pumps are not available in every location. Contact your local VACUUBRAND representative for availability.)

MV 10C EX
Four stage ATEX chemistry diaphragm pump

POWERFUL

Ultimate vacuum 12 to 2 mbar
Pumping speed 1.9 to 8.1 m³/h

EXPLOSION PROOF

ATEX conformity:
pumping chamber (pumped gas):
II 2G IIC T3 X
environment (around the pump):
II 2G IIB T4 X (with inert gas purge)
II 3G IIB T4 X (without inert gas purge)

CHEMICALLY RESISTANT MATERIALS

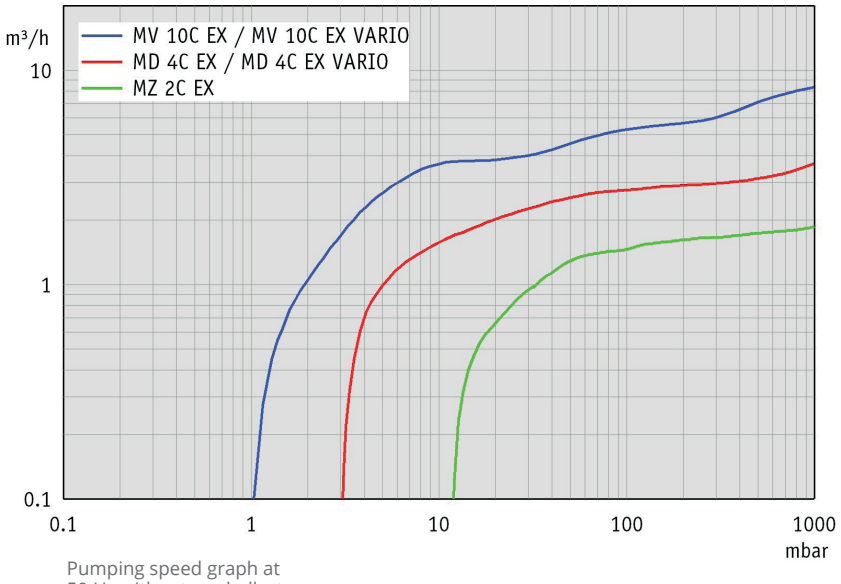
Wetted materials: Fluoroplastics (PTFE, ETFE, FFKM) and stainless steel

ATEX CHEMISTRY DIAPHRAGM PUMPS AND ATEX CHEMISTRY VACUUM SYSTEMS

Explosion proof
Oil-free
Chemically resistant materials

- **Flame-proof motor** with built-in and self-retaining overcurrent and excess temperature protection for direct 230 V/50 Hz single-phase connection; the customer does not need any additional overcurrent protection system
- **Antistatic materials** diaphragm pump heads made of antistatic carbon-reinforced fluoroplastics, heavily loaded parts with metallic stability core; connecting elements and other parts made of antistatic materials
- **Chemically resistant** wetted materials: Fluoroplastics (PTFE, ETFE, FFKM) and stainless steel
- **Gas ballast** included as separate inert gas connection
- **Overpressure safety relief valve** internal and at the outlet
- **Safety diaphragm design** with inert gas purge feature to permit optional installation of a diaphragm crack-detection system

The ATEX range of products is supplemented by the DVR 3 ATEX vacuum gauge (ATEX Cat. 2) with excellent corrosion resistance and long-term stability



Pumping speed graph at
50 Hz without gas ballast

Further information at www.vacuubrand.com
Pumping speeds and pump down times are only for information. Ultimate vacuum specification: See "Technical Data"

- outstanding chemical resistance and superior vapor tolerance
- flame proof motor with integrated, self-locking overload and excess temperature protection for direct 230V / 50Hz single phase power supply
- no need for any additional and specific overcurrent protection device
- overpressure safety relief valve at outlet

MZ 2C EX

TECHNICAL DATA	MZ 2C EX
ATEX conformity	Pumping chamber (pumped gases): II 2G IIC T3 X
	Environment with inert purge gas: II 2G IIB T4 X
	Environment without inert purge gas: II 3G IIB T4 X
	Motor: II 2G Ex d IIB T4 Gb
Number of heads / stages	2 / 2
Max. pumping speed at 50 Hz	1.9 m³/h
Ultimate vacuum (abs.)	12 mbar
Ultim. vac. (abs.) with gas ballast	18 mbar
Max. back pressure (abs.)	1.1 bar
Max. gas inlet temperature	40 °C
Inlet connection	Small flange KF DN 16
Outlet connection	Small flange KF DN 16
Rated motor power	0.15 kW
Degree of protection	IP 54
Dimensions (L x W x H), approx.	337 x 287 x 251 mm
Weight, approx.	21.6 kg

ACCESSORIES

PTFE tubing KF DN 16 (1000 mm: 686031)

ITEMS SUPPLIED

Pump completely mounted, ready for use, with manual, 2 m cable without plug.

ORDERING INFORMATION		MZ 2C EX
230 V ~ 50 Hz	Open wires	696920

CHEMISTRY DIAPHRAGM PUMPS WITH ATEX-APPROVAL 12 mbar - 1.9 m³/h

- outstanding chemical resistance and superior vapor tolerance
- flame proof motor with integrated, self-locking over-load and excess temperature protection for direct 230V / 50Hz single phase power supply
- no need for any additional and specific overcurrent protection device
- overpressure safety relief valve at outlet
- safety diaphragm technology with option for inert gas purge and detection of diaphragm breakage

MZ 2C EX +AK+EK

TECHNICAL DATA	MZ 2C EX +AK+EK
ATEX conformity	Pumping chamber (pumped gases): II 2G IIC T3 X
	Environment with inert purge gas: II 2G IIB T4 X
	Environment without inert purge gas: II 3G IIB T4 X
	Motor: II 2G Ex d IIB T4 Gb
Number of heads / stages	2 / 2
Max. pumping speed at 50 Hz	1.9 m³/h
Ultimate vacuum (abs.)	12 mbar
Ultim. vac. (abs.) with gas ballast	18 mbar
Max. back pressure (abs.)	1.1 bar
Max. gas inlet temperature	40 °C
Inlet connection	Small flange KF DN 16
Outlet connection	Hose nozzle DN 8-10 mm
Rated motor power	0.15 kW
Degree of protection	IP 52
Dimensions (L x W x H), approx.	357 x 308 x 470 mm
Weight, approx.	25.4 kg

ACCESSORIES

PTFE tubing KF DN 16 (1000 mm: 686031)

ITEMS SUPPLIED

Pumping unit completely mounted with inlet separator and emission condenser, ready for use, with manual, 2 m cable without plug. Shatter and shock protection for glass parts are to be provided by the customer.

ORDERING INFORMATION		MZ 2C EX +AK+EK
230 V ~ 50 Hz	Open wires	696921

Further information at **www.vacuubrand.com**/atex

- outstanding chemical resistance and superior vapor tolerance
- flame proof motor with integrated, self-locking over-load and excess temperature protection for direct 230V / 50Hz single phase power supply
- no need for any additional and specific overcurrent protection device
- overpressure safety relief valves internally and at outlet

MD 4C EX

TECHNICAL DATA	MD 4C EX
ATEX conformity	Pumping chamber (pumped gases): II 2G IIC T3 X
	Environment with inert purge gas: II 2G IIB T4 X
	Environment without inert purge gas: II 3G IIB T4 X
	Motor: II 2G Ex d IIB T4 Gb
Number of heads / stages	4 / 3
Max. pumping speed at 50 Hz	3.7 m³/h
Ultimate vacuum (abs.)	3 mbar
Ultim. vac. (abs.) with gas ballast	10 mbar
Max. back pressure (abs.)	1.1 bar
Max. gas inlet temperature	40 °C
Inlet connection	Small flange KF DN 25
Outlet connection	Small flange KF DN 16
Rated motor power	0.25 kW
Degree of protection	IP 54
Dimensions (L x W x H), approx.	440 x 265 x 305 mm
Weight, approx.	29.3 kg

ACCESSORIES

PTFE tubing KF DN 16 (1000 mm: 686031)
PTFE tubing KF DN 25 (1000 mm: 686033)

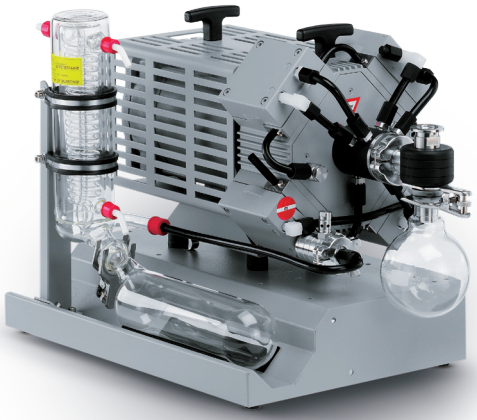
ITEMS SUPPLIED

Pump completely mounted, ready for use, with manual, 2 m cable without plug.

ORDERING INFORMATION		MD 4C EX
230 V ~ 50 Hz	Open wires	696930

Further information at **www.vacuubrand.com**/atex

- outstanding chemical resistance and superior vapor tolerance
- flame proof motor with integrated, self-locking over-load and excess temperature protection for direct 230V / 50Hz single phase power supply
- no need for any additional and specific overcurrent protection device
- overpressure safety relief valves internally and at outlet
- safety diaphragm technology with option for inert gas purge and detection of diaphragm breakage



MD 4C EX +AK+EK

TECHNICAL DATA	MD 4C EX +AK+EK
ATEX conformity	Pumping chamber (pumped gases): II 2G IIC T3 X
	Environment with inert purge gas: II 2G IIB T4 X
	Environment without inert purge gas: II 3G IIB T4 X
	Motor: II 2G Ex d IIB T4 Gb
Number of heads / stages	4 / 3
Max. pumping speed at 50 Hz	3.7 m³/h
Ultimate vacuum (abs.)	3 mbar
Ultim. vac. (abs.) with gas ballast	10 mbar
Max. back pressure (abs.)	1.1 bar
Max. gas inlet temperature	40 °C
Inlet connection	Small flange KF DN 25
Outlet connection	Hose nozzle DN 8-10 mm
Rated motor power	0.25 kW
Degree of protection	IP 54
Dimensions (L x W x H), approx.	600 x 365 x 420 mm
Weight, approx.	37.4 kg

ACCESSORIES

PTFE tubing KF DN 25 (1000 mm: 686033)

ITEMS SUPPLIED

Pumping unit completely mounted with inlet separator and emission condenser, ready for use, with manual, 2 m cable without plug. Shatter and shock protection for glass parts are to be provided by the customer.

ORDERING INFORMATION		MD 4C EX +AK+EK
230 V ~ 50 Hz	Open wires	696931

- outstanding chemical resistance and superior vapor tolerance
- flame proof motor with integrated, self-locking overload and excess temperature protection for direct 230V / 50Hz single phase power supply
- no need for any additional and specific overcurrent protection device
- overpressure safety relief valves internally and at outlet

MV 10C EX

TECHNICAL DATA	MV 10C EX
ATEX conformity	Pumping chamber (pumped gases): II 2G IIC T3 X
	Environment with inert purge gas: II 2G IIB T4 X
	Environment without inert purge gas: II 3G IIB T4 X
	Motor: II 2G Ex d IIB T4 Gb
Number of heads / stages	8 / 4
Max. pumping speed at 50 Hz	8.1 m³/h
Ultimate vacuum (abs.)	2 mbar
Ultim. vac. (abs.) with gas ballast	10 mbar
Max. back pressure (abs.)	1.1 bar
Max. gas inlet temperature	40 °C
Inlet connection	Small flange KF DN 25
Outlet connection	Small flange KF DN 16
Rated motor power	0.5 kW
Degree of protection	IP 54
Dimensions (L x W x H), approx.	560 x 430 x 410 mm
Weight, approx.	63.2 kg

ACCESSORIES

PTFE tubing KF DN 16 (1000 mm: 686031)
PTFE tubing KF DN 25 (1000 mm: 686033)

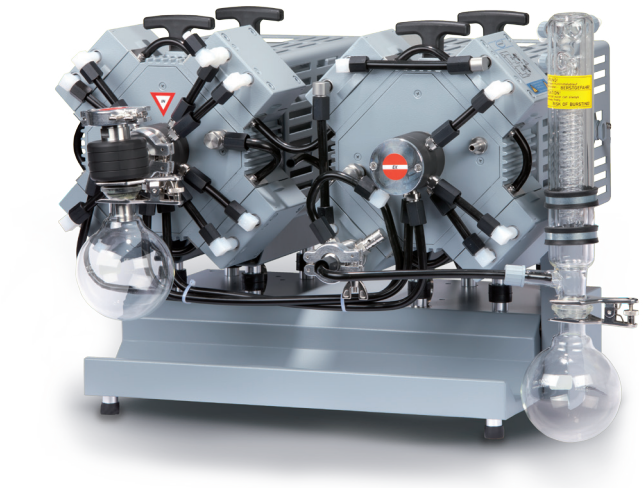
ITEMS SUPPLIED

Pump completely, ready for use, with manual, 2 m cable without plug at each of the two motors.

ORDERING INFORMATION		MV 10C EX
230 V ~ 50 Hz	Open wires	696945

CHEMISTRY DIAPHRAGM PUMPS WITH ATEX-APPROVAL 2 mbar - 8.1 m³/h

- outstanding chemical resistance and superior vapor tolerance
- flame proof motor with integrated, self-locking over-load and excess temperature protection for direct 230V / 50Hz single phase power supply
- no need for any additional and specific overcurrent protection device
- overpressure safety relief valves internally and at outlet
- safety diaphragm technology with option for inert gas purge and detection of diaphragm breakage



MV 10C EX +AK+EK

TECHNICAL DATA	MV 10C EX +AK+EK
ATEX conformity	Pumping chamber (pumped gases): II 2G IIC T3 X
	Environment with inert purge gas: II 2G IIB T4 X
	Environment without inert purge gas: II 3G IIB T4 X
	Motor: II 2G Ex d IIB T4 Gb
Number of heads / stages	8 / 4
Max. pumping speed at 50 Hz	8.1 m³/h
Ultimate vacuum (abs.)	2 mbar
Ultim. vac. (abs.) with gas ballast	10 mbar
Max. back pressure (abs.)	1.1 bar
Max. gas inlet temperature	40 °C
Inlet connection	Small flange KF DN 25
Outlet connection	Hose nozzle DN 8-10 mm
Rated motor power	0.5 kW
Degree of protection	IP 54
Dimensions (L x W x H), approx.	649 x 525 x 452 mm
Weight, approx.	64 kg

ACCESSORIES

PTFE tubing KF DN 25 (1000 mm: 686033)

ITEMS SUPPLIED

Pumping unit completely mounted with inlet separator and emission condenser, ready for use, with manual, 2 m cable without plug at each of the two motors. Shatter and shock protection for glass parts are to be provided by the customer.

ORDERING INFORMATION		MV 10C EX +AK+EK
230 V ~ 50 Hz	Open wires	2614250

- full advantage of ATEX chemistry diaphragm pumps

VARIO®:

- short process times due to hysteresis-free VARIO® vacuum control
- VARIO®-pump operates on demand only as fast as necessary – minimal power consumption, extended maintenance intervals, silent operation
- vacuum controller CVC 3000 (optional) for precise vacuum control and fully automatic processes
- complete system accessories I/O module, supply / isolation amplifier and ATEX vacuum sensor - from one source

MD 4C EX VARIO

TECHNICAL DATA	MD 4C EX VARIO
ATEX conformity	Pumping chamber (pumped gases): II 2G IIC T3 X
	Environment with inert purge gas: II 2G IIB T4 X
	Environment without inert purge gas: II 3G IIB T4 X
	Motor: II 2G Ex d IIB T4 Gb
Number of heads / stages	4 / 3
Max. pumping speed	3.7 m³/h
Ultimate vacuum (abs.)	3 mbar
Ultim. vac. (abs.) with gas ballast	10 mbar
Max. back pressure (abs.)	1.1 bar
Max. gas inlet temperature	40 °C
Inlet connection	Small flange KF DN 25
Outlet connection	Small flange KF DN 16
Rated motor power	0.25 kW
Degree of protection	IP 54
Dimensions (L x W x H), approx.	469 x 265 x 305 mm
Weight, approx.	28 kg

ACCESSORIES

PTFE tubing KF DN 16 (1000 mm: 686031)
PTFE tubing KF DN 25 (1000 mm: 686033)
Analog I/O module VACUU·BUS 4-20mA / 0-10V (635425)
Signal conditioner 0-10V/4-20mA (635426)
Power/input isolating amplifier 4-20mA (635427)
Vacuum sensor ATEX +-1 mbar 4-20mA (635423)
Vacuum sensor ATEX +-5 mbar 4-20mA (635424)
Vacuum controller CVC 3000 (636559+612090)
VACUU·BUS® male plug with cable 2m (612462)

ITEMS SUPPLIED

Pump completely mounted, ready for use, with manual, speed control via 4-20 mA current loop (4 mA = 0 rpm, 20mA = 1500 rpm). Control signal cable 10 m, mains cable 2 m, without plugs.

ORDERING INFORMATION		MD 4C EX VARIO
230 V ~ 50 Hz	Open wires	696936

CHEMISTRY DIAPHRAGM PUMPS WITH ATEX-APPROVAL 3 mbar - 3.7 m³/h

- full advantage of ATEX chemistry diaphragm pumps with separator AK and emission condenser EK

VARIO®:

- short process times due to hysteresis-free VARIO® vacuum control
- VARIO®-pump operates on demand only as fast as necessary – minimal power consumption, extended maintenance intervals, silent operation
- Vacuum controller CVC 3000 (optional) for precise vacuum control and fully automatic processes
- complete system accessories I/O module, supply / isolation amplifier and ATEX vacuum sensor - from one source

MD 4C EX VARIO +AK+EK

TECHNICAL DATA	MD 4C EX VARIO +AK+EK
ATEX conformity	Pumping chamber (pumped gases): II 2G IIC T3 X
	Environment with inert purge gas: II 2G IIB T4 X
	Environment without inert purge gas: II 3G IIB T4 X
	Motor: II 2G Ex d IIB T4 Gb
Number of heads / stages	4 / 3
Max. pumping speed	3.7 m³/h
Ultimate vacuum (abs.)	3 mbar
Ultim. vac. (abs.) with gas ballast	10 mbar
Max. back pressure (abs.)	1.1 bar
Max. gas inlet temperature	40 °C
Inlet connection	Small flange KF DN 25
Outlet connection	Hose nozzle DN 8-10 mm
Rated motor power	0.25 kW
Degree of protection	IP 54
Dimensions (L x W x H), approx.	600 x 365 x 420 mm
Weight, approx.	36 kg

ACCESSORIES

PTFE tubing KF DN 25 (1000 mm: 686033)
Analog I/O module VACUU·BUS 4-20mA / 0-10V (635425)
Signal conditioner 0-10V/4-20mA (635426)
Power/input isolating amplifier 4-20mA (635427)
Vacuum sensor ATEX +-1 mbar 4-20mA (635423)
Vacuum sensor ATEX +-5 mbar 4-20mA (635424)
Vacuum controller CVC 3000 (636559+612090)
VACUU·BUS® male plug with cable 2m (612462)

ITEMS SUPPLIED

Pumping unit completely mounted with inlet separator and emission condenser, ready for use, with manual. Shatter and shock protection for glass parts are to be provided by the customer. Speed control via 4-20 mA current loop (4 mA = 0 rpm, 20mA = 1500 rpm). Control signal cable 10 m, mains cable 2 m, without plugs.

ORDERING INFORMATION		MD 4C EX VARIO +AK+EK
230 V ~ 50 Hz	Open wires	696937

- full advantage of ATEX chemistry diaphragm pumps

VARIO®:

- short process times due to hysteresis-free VARIO® vacuum control
- VARIO®-pump operates on demand only as fast as necessary – minimal power consumption, extended maintenance intervals, silent operation
- vacuum controller CVC 3000 (optional) for precise vacuum control and fully automatic processes
- complete system accessories I/O module, supply / isolation amplifier and ATEX vacuum sensor - from one source

MV 10C EX VARIO

TECHNICAL DATA	MV 10C EX VARIO
ATEX conformity	Pumping chamber (pumped gases): II 2G IIC T3 X
	Environment with inert purge gas: II 2G IIB T4 X
	Environment without inert purge gas: II 3G IIB T4 X
	Motor: II 2G Ex d IIB T4 Gb
Number of heads / stages	8 / 4
Max. pumping speed	8.1 m³/h
Ultimate vacuum (abs.)	2 mbar
Ultim. vac. (abs.) with gas ballast	10 mbar
Max. back pressure (abs.)	1.1 bar
Max. gas inlet temperature	40 °C
Inlet connection	Small flange KF DN 25
Outlet connection	Small flange KF DN 16
Rated motor power	0.5 kW
Degree of protection	IP 54
Dimensions (L x W x H), approx.	560 x 457 x 410 mm
Weight, approx.	61 kg

ACCESSORIES

PTFE tubing KF DN 16 (1000 mm: 686031)
PTFE tubing KF DN 25 (1000 mm: 686033)
Analog I/O module VACUU·BUS 4-20mA / 0-10V (635425)
Signal conditioner 0-10V/4-20mA (635426)
Power/input isolating amplifier 4-20mA (635427)
Vacuum sensor ATEX +-1 mbar 4-20mA (635423)
Vacuum sensor ATEX +-5 mbar 4-20mA (635424)
Vacuum controller CVC 3000 (636559+612090)
VACUU·BUS® male plug with cable 2m (612462)

ITEMS SUPPLIED

Pump with two motors (with control and mains cables at each of the two motors) completely mounted, ready for use, with manual. Speed control via 4-20 mA current loop (4 mA = 0 rpm, 20mA = 1500 rpm). Control signal cable 10 m, mains cable 2 m, without plugs.

ORDERING INFORMATION		MV 10C EX VARIO
230 V ~ 50 Hz	Open wires	696946

- full advantage of ATEX chemistry diaphragm pumps with separator AK and emission condenser EK

VARIO®:

- short process times due to hysteresis-free VARIO® vacuum control
- VARIO® pump operates on demand only as fast as necessary – minimal power consumption, extended maintenance intervals, silent operation
- vacuum controller CVC 3000 (optional) for precise vacuum control and fully automatic processes
- complete system accessories I/O module, isolation amplifier and ATEX vacuum sensor - from one source

MV 10C EX VARIO +AK+EK

TECHNICAL DATA	MV 10C EX VARIO +AK+EK
ATEX conformity	Pumping chamber (pumped gases): II 2G IIC T3 X
	Environment with inert purge gas: II 2G IIB T4 X
	Environment without inert purge gas: II 3G IIB T4 X
	Motor: II 2G Ex d IIB T4 Gb
Number of heads / stages	8 / 4
Max. pumping speed	8.1 m³/h
Ultimate vacuum (abs.)	2 mbar
Ultim. vac. (abs.) with gas ballast	10 mbar
Max. back pressure (abs.)	1.1 bar
Max. gas inlet temperature	40 °C
Inlet connection	Small flange KF DN 25
Outlet connection	Hose nozzle DN 8-10 mm
Rated motor power	0.5 kW
Degree of protection	IP 54
Dimensions (L x W x H), approx.	651 x 555 x 452 mm
Weight, approx.	63 kg

ACCESSORIES

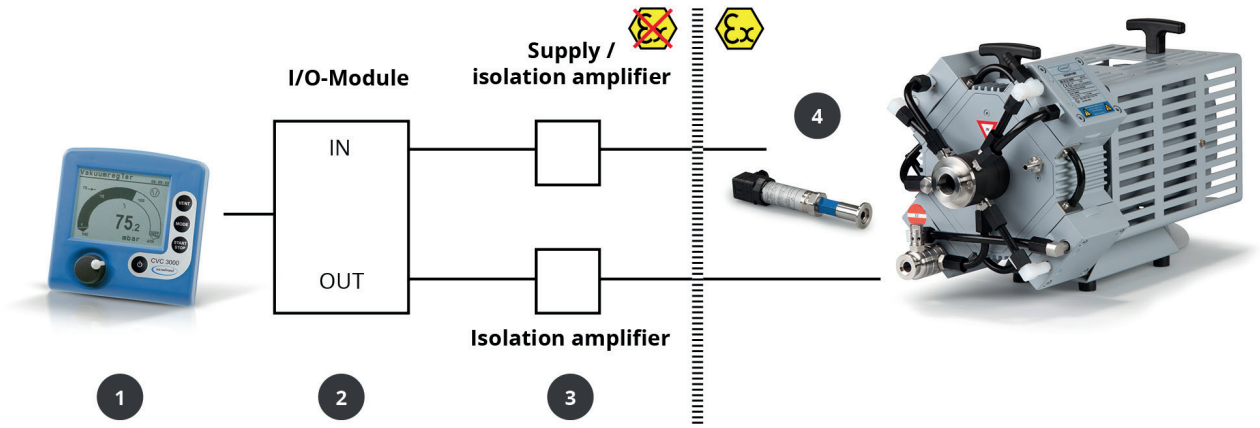
PTFE tubing KF DN 25 (1000 mm: 686033)
Analog I/O module VACUU·BUS 4-20mA / 0-10V (635425)
Signal conditioner 0-10V/4-20mA (635426)
Power/input isolating amplifier 4-20mA (635427)
Vacuum sensor ATEX +-1 mbar 4-20mA (635423)
Vacuum sensor ATEX +-5 mbar 4-20mA (635424)
Vacuum controller CVC 3000 (636559+612090)
VACUU·BUS® male plug with cable 2m (612462)

ITEMS SUPPLIED

Pumping unit with two motors (with control and mains cables at each of the two motors) and inlet separator and emission condenser completely mounted, ready for use, with manual. Shatter and shock protection for glass parts are to be provided by the customer. Speed control via 4-20 mA current loop (4 mA = 0 rpm, 20mA = 1500 rpm). Control signal cable 10 m, mains cable 2 m, without plugs.

ORDERING INFORMATION	MV 10C EX VARIO +AK+EK	
230 V ~ 50 Hz	Open wires	696947

ACCESSORIES FOR VACUUBRAND ATEX VARIO®-PUMPS



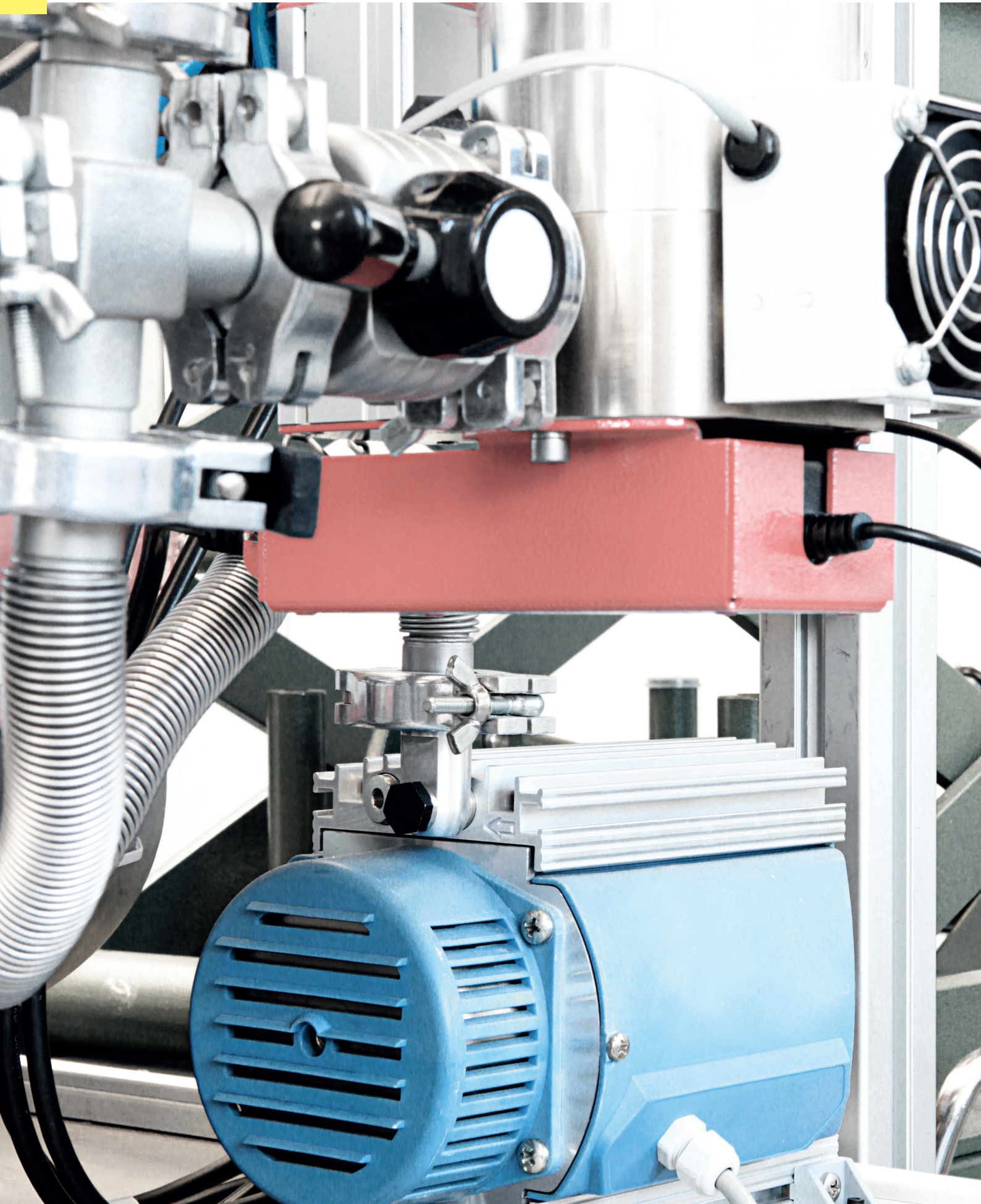
1 **CVC 3000** Setup outside of hazardous area, without integrated vacuum sensor

Control range	1080 / 810 - 0.1 / 0.1 mbar/torr
Interface externally	RS 232C
Interface to pump / sensor	Analog-I/O-module, connectable via isolation amplifier
Dimensions (L x W x H), approx.	144 x 124 x 115 mm
Weight, approx.	0.44 kg

ORDERING INFORMATION

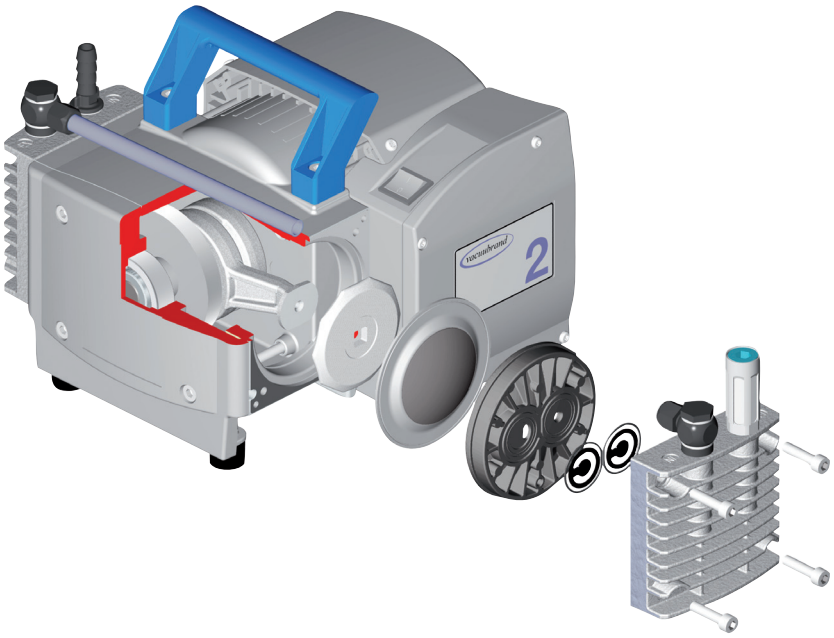
1	CVC 3000, 100-230 V ~ 50-60 Hz	CEE/CH/UK/US/AUS/CN	636559+612090
	VACUU·BUS® plug with cable 2m		612462
2	Analog-I/O-Module 4-20mA/0-10V VACUU·BUS®		635425
3	Signal conditioner 0-10V/4-20mA EX		635426
	Power/input isolating amplifier 4-20mA EX		635427
4	ATEX-sensor	Accuracy: +-1 mbar	635423
	ATEX-sensor	Accuracy: better than +-5 mbar	635424

OIL-FREE VACUUM FOR NON-CORROSIVE GASES AND VAPORS



DIAPHRAGM PUMPS

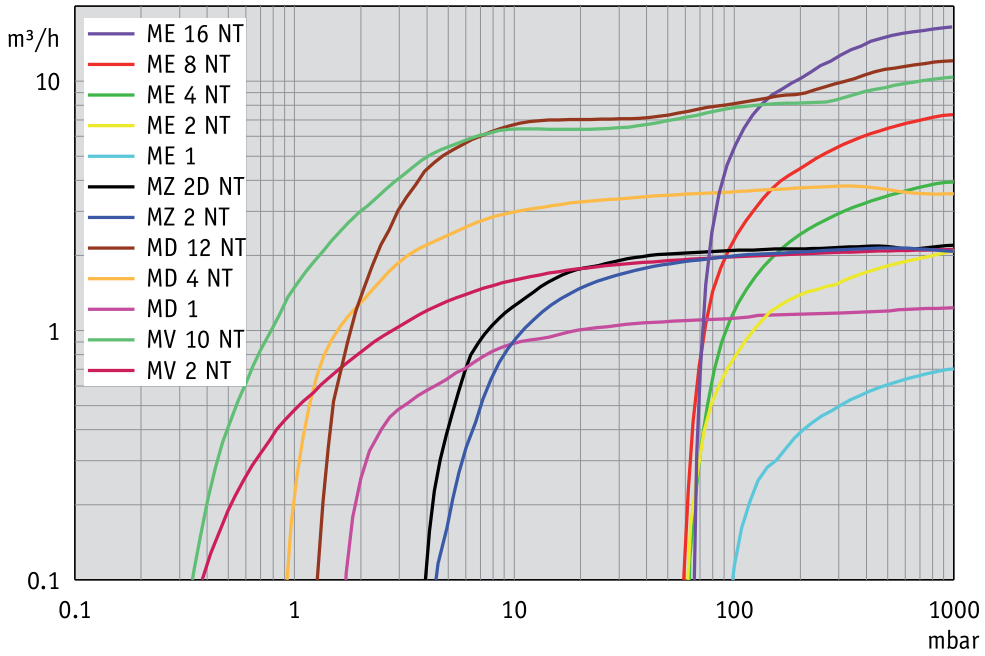
VACUUBRAND´s aluminum design diaphragm pump is a perfect match for many applications in the laboratory and operations because it is oil-free and whisper quiet, and because it requires so little service. Diaphragms have especially long lives and hermetically seal the drive space from the pumping chamber to protect mechanical parts from corrosion. The pumps achieve their distinctively high performance from high pumping chamber volume relative to the minimal dead space. Highly flexible FKM double diaphragms with fabric reinforcement ensure an extremely long diaphragm lifetime. The pumps operate absolutely oil free and do not have any sliding components in the gas path. In normal operation they are completely free of abrasion. Besides contributing to the long service intervals the lack of abrasion also eliminates most of the particulate impurities frequently generated inside of scroll or piston pumps. This makes VACUUBRAND diaphragm pumps the right choice for clean applications.



- internal connection technology for a very low leakage rate and reliable performance. Stable ultimate vacuum, even after a very long operating time
- no abrasion - therefore dust and contamination-free
- long diaphragm life due to highly flexible FKM double diaphragms, fabric-reinforced
- FKM valves with excellent durability and vacuum performance
- with patented drive system for quiet and vibration-free running

DIAPHRAGM PUMPS

The VACUUBRAND diaphragm pump line includes pumps with a wide range of flow rate and ultimate vacuum. Single-stage diaphragm pumps reach as much as 70 mbar (absolute) vacuum. By connecting pump heads in series of two, three or four stages, we can create pumps with ultimate vacuum reaching 0.3 mbar on some models. Connecting the heads in parallel produces higher flow rates. VACUUBRAND pumps combine these options to create pumps with the capabilities you need for most applications.



The pumping speed of all pumps is measured according to ISO 21360
Further information and diagrams for 60 Hz mains frequency at www.vacuubrand.com
Pumping speeds and pump down times are only for information. Ultimate vacuum specification: See "Technical Data"

Nomenclature for VACUUBRAND pumps is built from the following codes designating specific features or components:
M = diaphragm (membrane) pump
E, Z, D, V = number of pump stages from single (E) to four (V) stage design
NT = labels the series of pumps comprising the New Technology
VARIO® = speed controlled pump with vacuum controller CVC 3000

Many vacuum applications in laboratories and industrial operations require electronic vacuum control. VACUUBRAND´s unique VARIO® control system offers the distinctive advantages and convenience of the CVC 3000 vacuum controller

- precise vacuum control by continuously adjusting the motor speed of the diaphragm pump from 0-100%
- when used as a backing pump for turbomolecular drag pumps (with backing pressure in the mbar range): Patented turbo mode with automatic speed adjustment for even better forevacuum
- this results in lower heating and better residual gas performance of the turbo pump
- unrivaled long diaphragm and valve lifetime by reducing the number of diaphragm strokes
- very quiet, extremely low-vibration operation and significantly reduced energy consumption



Ultimate vacuum (abs.)	Diaphragm pumps without vacuum control	Diaphragm pumps with manual vacuum and pressure control	Diaphragm pumps with electronic vacuum control
down to 70 mbar	**ME 1** pg. 114 0.7 m³/h **ME 2 NT** pg. 116 2.0 m³/h **ME 4 NT** pg. 116 4.0 m³/h **ME 8 NT** pg. 120 7.3 m³/h **ME 16 NT** pg. 120 16.4 m³/h	**ME 4R NT** pg. 118 3.8 m³/h	
down to 4 mbar	**MZ 2 NT** pg. 122 2.2 m³/h **MZ 2D NT** pg. 122 2.3 m³/h		
down to 1 mbar	**MD 1** pg. 124 1.2 m³/h **MD 4 NT** pg. 126 3.8 m³/h **MD 12 NT** pg. 128 12.1 m³/h		**MD 4 NT VARIO** pg. 126 5.7 m³/h **MD 12 NT VARIO** pg. 128 13.4 m³/h
down to 0.3 mbar	**MV 2 NT** pg. 130 2.2 m³/h **MV 10 NT** pg. 132 10.4 m³/h		**MV 2 NT VARIO** pg. 130 3.3 m³/h **MV 10 NT VARIO** pg. 132 12.1 m³/h

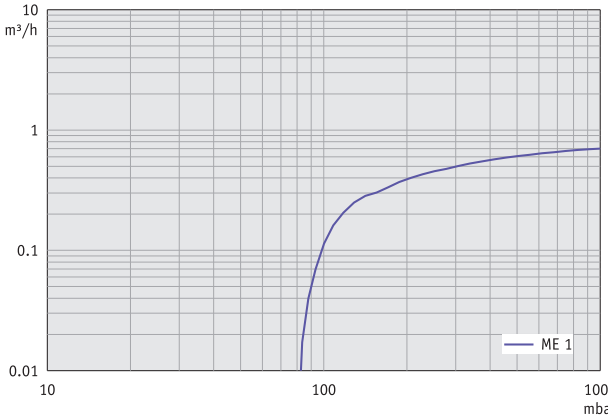
All mentioned pumping speeds are for 50 Hz (if applicable)

- convenient, quick and simple to use due to the new top mounted power switch
- whisper quiet and very low vibration
- requires minimal benchtop space
- maintenance-free drive system and proven long diaphragm life
- wetted materials: PTFE, aluminum

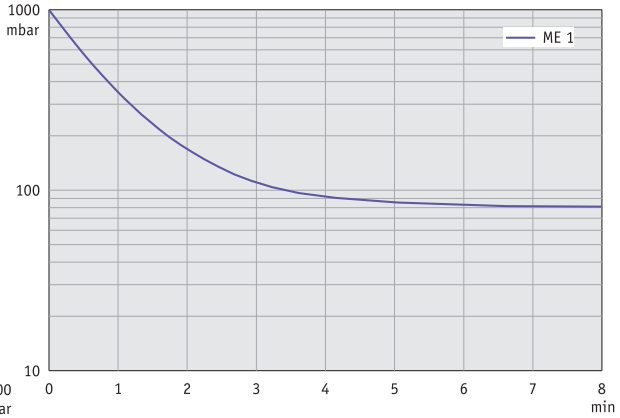
ME 1

Vacuum filtration is one of the most common applications used for sample preparation in chemistry, microbiology, waste water control and other analytical processes. The ME 1 diaphragm pump offers a compact, high performance and easy-to-use solution which is perfect for single port filtrations. These oil-free diaphragm pumps provide a well-proven and extraordinarily long diaphragm life time with typically 15,000 operating hours. The functional, space saving and innovative design with visible top mounted power switch ensures convenient and quick operation for day to day lab work. The PTFE diaphragm and valves are rugged and provide high chemical resistance. An optional manual regulator valve with dial gauge enables variable fine adjustment of the pumping speed and ultimate vacuum.

Pumping speed graph at 50 Hz



Pump down graph at 50 Hz
(10 l volume)



Further information and diagrams for 60 Hz mains frequency at www.vacuubrand.com
Pumping speeds and pump down times are only for information. Ultimate vacuum specification: See "Technical Data"

TECHNICAL DATA	ME 1
Number of heads / stages	1 / 1
Max. pumping speed 50/60 Hz	0.7 / 0.85 m³/h
Ultimate vacuum (abs.)	100 mbar
Max. back pressure (abs.)	1.1 bar
Inlet connection	Hose nozzle DN 6-10 mm
Outlet connection	Silencer / G1/8"
Rated motor power	0.04 kW
Degree of protection	IP 40
Dimensions (L x W x H), approx.	247 x 121 x 145 mm
Weight, approx.	5.0 kg

ACCESSORIES

Rubber vacuum tubing DN 6 mm (686000)
Rubber vacuum tubing DN 8 mm (686001)
Vacuum regulator valve unit for ME 1 (696842)

ITEMS SUPPLIED

Pump completely mounted, ready for use, with manual.

ORDERING INFORMATION			ME 1
230 V ~ 50-60 Hz	CEE	Ex*	721000
230 V ~ 50-60 Hz	CH, CN	Ex*	721001
230 V ~ 50-60 Hz	UK, IN	Ex*	721002
100-120 V ~ 50-60 Hz	US		721003
100-120 V ~ 50-60 Hz / 200-230 V ~ 50-60 Hz		Ex*	**721005

With NRTL certification for Canada and the USA
Ex*: ATEX: II 3G IIC T3 X, Internal Atm. only
**Please order power cable separately

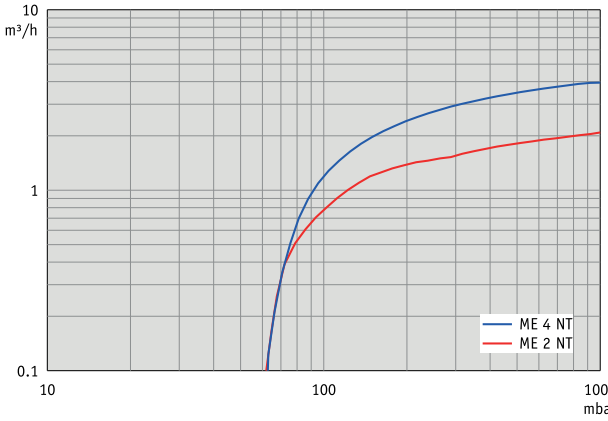
DIAPHRAGM PUMPS 70 mbar - 2.0 / 4.0 m³/h

- contamination-free pumping and evacuation
- high flow rate even near ultimate vacuum
- whisper quiet
- ME 4 NT with low vibration and higher pumping speed
- exceptionally long diaphragm life and maintenance-free drive system for low lifetime costs

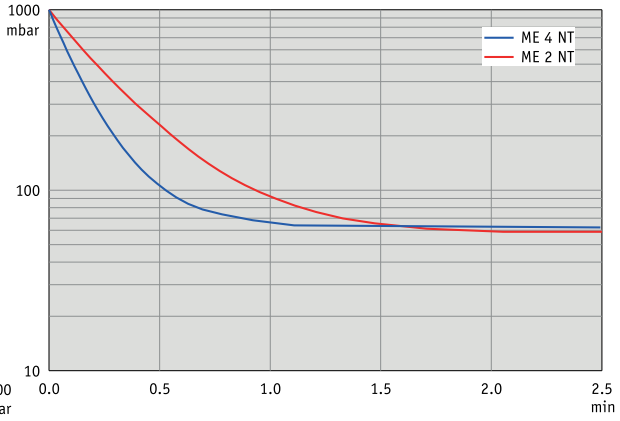
ME 2 NT - ME 4 NT

Diaphragm pumps are an excellent solution for continuous, oil-free evacuation and pumping of gases. All parts in contact with pumped media are made of aluminum and selected plastics, allowing a wide range of applications for non-corrosive gases. The one-stage construction provides the advantageous combination of high pumping speed and an ultimate vacuum down to 70 mbar. The highly flexible fabric-reinforced double diaphragm made of FKM is ideal for extended operating life. The NT-series features further improved performance data.

Pumping speed graph at 50 Hz



Pump down graph at 50 Hz
(10 l volume)



Further information and diagrams for 60 Hz mains frequency at www.vacuubrand.com
Pumping speeds and pump down times are only for information. Ultimate vacuum specification: See "Technical Data"

TECHNICAL DATA	ME 2 NT
Number of heads / stages	1 / 1
Max. pumping speed 50/60 Hz	2.0 / 2.2 m³/h
Ultimate vacuum (abs.)	70 mbar
Max. back pressure (abs.)	2 bar
Inlet connection	Hose nozzle DN 8-10 mm
Outlet connection	Silencer / G1/4"
Rated motor power	0.18 kW
Degree of protection	IP 40
Dimensions (L x W x H), approx.	243 x 211 x 198 mm
Weight, approx.	10.2 kg

TECHNICAL DATA	ME 4 NT
Number of heads / stages	2 / 1
Max. pumping speed 50/60 Hz	4.0 / 4.4 m³/h
Ultimate vacuum (abs.)	70 mbar
Max. back pressure (abs.)	2 bar
Inlet connection	Hose nozzle DN 8-10 mm
Outlet connection	2 x silencer / G1/4"
Rated motor power	0.18 kW
Degree of protection	IP 40
Dimensions (L x W x H), approx.	243 x 239 x 198 mm
Weight, approx.	11.0 kg

ORDERING INFORMATION			ME 2 NT
230 V ~ 50-60 Hz	CEE	Ex*	730000
230 V ~ 50-60 Hz	UK, IN	Ex*	730002
100-115 V ~ 50-60 Hz / 120 V ~ 60 Hz	US		730003

ORDERING INFORMATION			ME 4 NT
230 V ~ 50-60 Hz	CEE	Ex*	731000
230 V ~ 50-60 Hz	CH, CN	Ex*	731001
230 V ~ 50-60 Hz	UK, IN	Ex*	731002
100-115 V ~ 50-60 Hz / 120 V ~ 60 Hz	US		731003
100-115 V ~ 50-60 Hz / 120 V ~ 60 Hz / 200-230 V ~ 50-60 Hz		Ex*	**731005

ACCESSORIES

Vacuum regulator valve with manometer (696840)
VACUU·LAN® Mini-Network (2614455)
Rubber vacuum tubing DN 8 mm (686001)

ITEMS SUPPLIED

Pump completely mounted, ready for use, with manual.

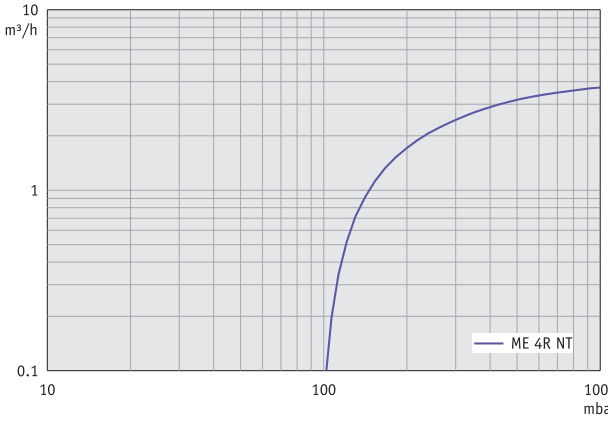
With NRTL certification for Canada and the USA
Ex*: ATEX: II 3G IIC T3 X, Internal Atm. only
**Please order power cable separately

- contamination-free pumping, evacuation and compression
- high flow rate even near ultimate vacuum
- adjustment of outlet pressure and vacuum level with regulator valves
- very low vibration
- exceptionally long diaphragm life and maintenance-free drive system for low lifetime costs

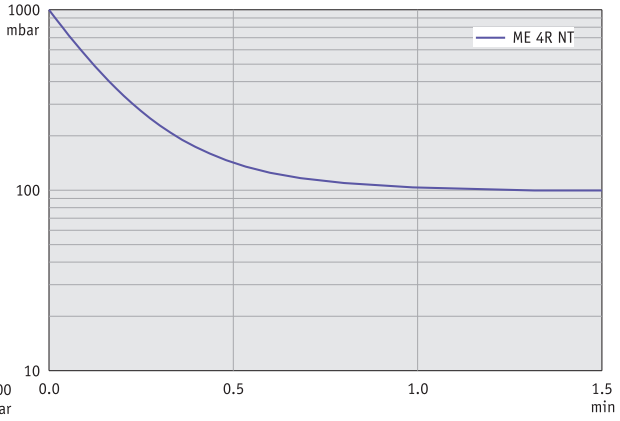
ME 4R NT

This one-stage diaphragm pump works as a vacuum generator and as well as a compressor. All parts in contact with pumped media are made of aluminum and selected plastics (PTFE diaphragms and valves). They enable a wide range of applications for non-corrosive gases. The inlet and outlet connections of the ME 4R NT are equipped with regulator valves for vacuum and overpressure, respectively. Both the compression pressure and vacuum level can be adjusted. Inlet vacuum level and outlet pressure are indicated by manometers.

Pumping speed graph at 50 Hz



Pump down graph at 50 Hz
(10 l volume)



Further information and diagrams for 60 Hz mains frequency at www.vacuubrand.com
Pumping speeds and pump down times are only for information. Ultimate vacuum specification: See "Technical Data"

TECHNICAL DATA	ME 4R NT
Number of heads / stages	2 / 1
Max. pumping speed 50/60 Hz	3.8 / 4.2 m³/h
Ultimate vacuum (abs.)	100 mbar
Max. back pressure (abs.)	4 bar
Inlet connection	Hose nozzle DN 8-10 mm
Outlet connection	Hose nozzle DN 8-10 mm
Rated motor power	0.18 kW
Degree of protection	IP 40
Dimensions (L x W x H), approx.	243 x 239 x 290 mm
Weight, approx.	11.5 kg

ACCESSORIES

Rubber vacuum tubing DN 8 mm (686001)

ITEMS SUPPLIED

Pump completely mounted, ready for use, with manual.

ORDERING INFORMATION		ME 4R NT
230 V ~ 50-60 Hz	CEE	731100
230 V ~ 50-60 Hz	UK, IN	731102
100-115 V ~ 50-60 Hz / 120 V ~ 60 Hz	US	731103

With NRTL certification for Canada and the USA

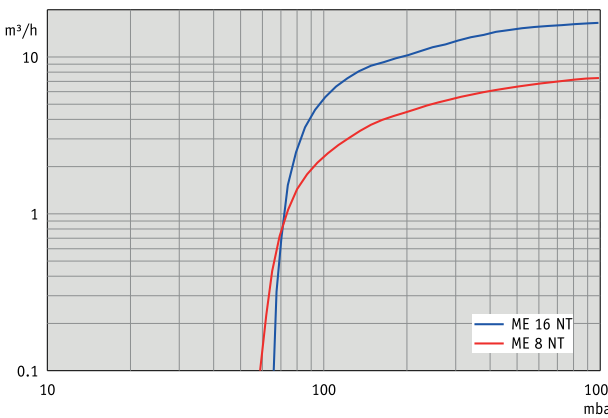
DIAPHRAGM PUMPS 70 mbar - 7.3 / 16.4 m³/h

- contamination-free pumping and evacuation
- high flow rate even near ultimate vacuum
- whisper quiet
- very low vibration
- exceptionally long diaphragm life and maintenance-free drive system for low lifetime costs

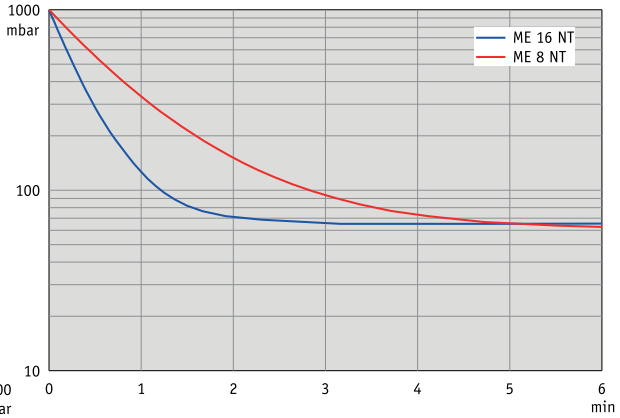
ME 8 NT - ME 16 NT

Diaphragm pumps are an excellent solution for continuous, oil-free evacuation and pumping of gases. The one-stage design provides the advantageous combination of high pumping speed and low ultimate vacuum down to 70 mbar. All parts in contact with pumped media are made of aluminum and selected plastics allowing a wide range of applications for non-corrosive gases. The highly flexible, fabric-reinforced double diaphragms made of FKM are ideal for extended operating life. These pumps are particularly powerful and offer large volume flow. The eight-cylinder pump ME 16 NT features exceptionally high pumping speed, low vibration and a very compact design with smooth and easy-to-clean surfaces.

Pumping speed graph at 50 Hz



Pump down graph at 50 Hz
(100 l volume)



Further information and diagrams for 60 Hz mains frequency at www.vacuubrand.com
Pumping speeds and pump down times are only for information. Ultimate vacuum specification: See "Technical Data"

TECHNICAL DATA	ME 8 NT
Number of heads / stages	4 / 1
Max. pumping speed 50/60 Hz	7.3 / 8.1 m³/h
Ultimate vacuum (abs.)	70 mbar
Max. back pressure at outlet (abs.)	2 bar
Inlet connection	Hose nozzle DN 8-10 mm
Outlet connection	2 x silencer / G1/4"
Rated motor power	0.25 kW
Degree of protection	IP 40
Dimensions (L x W x H), approx.	325 x 239 x 198 mm
Weight, approx.	16.4 kg

TECHNICAL DATA	ME 16 NT
Number of heads / stages	8 / 1
Max. pumping speed 50/60 Hz	16.4 / 18.4 m³/h
Ultimate vacuum (abs.)	70 mbar
Max. back pressure at outlet (abs.)	1.1 bar
Inlet connection	Small flange KF DN 25
Outlet connection	Silencer / G1/2"
Rated motor power	0.44 kW
Degree of protection	IP 40
Dimensions (L x W x H), approx.	554 x 260 x 359 mm
Weight, approx.	30.6 kg

ACCESSORIES ME 8 NT

Rubber vacuum tubing DN 8 mm (686001)

ACCESSORIES ME 16 NT

Stainless steel tubing KF DN 25 (1000 mm: 673337)
Hose nozzle DN 15 mm / G1/2" (642472)
Small flange KF DN 16 / G1/2" (672101)

ITEMS SUPPLIED

Pump completely mounted, ready for use, with manual.

ORDERING INFORMATION			ME 8 NT
230 V ~ 50-60 Hz	CEE	Ex*	734000
230 V ~ 50-60 Hz	CH, CN	Ex*	734001
230 V ~ 50-60 Hz	UK, IN	Ex*	734002
120 V ~ 60 Hz	US		734003
100 V ~ 50-60 Hz	US		734006

ORDERING INFORMATION			ME 16 NT
230 V ~ 50-60 Hz	CEE	Ex*	741000
230 V ~ 50-60 Hz	UK, IN	Ex*	741002
100-115 V ~ 50-60 Hz / 120 V ~ 60 Hz	US		741003

With NRTL certification for Canada and the USA (Exception: ME 16 NT)
Ex*: ATEX: II 3G IIC T3 X, Internal Atm. only

DIAPHRAGM PUMPS

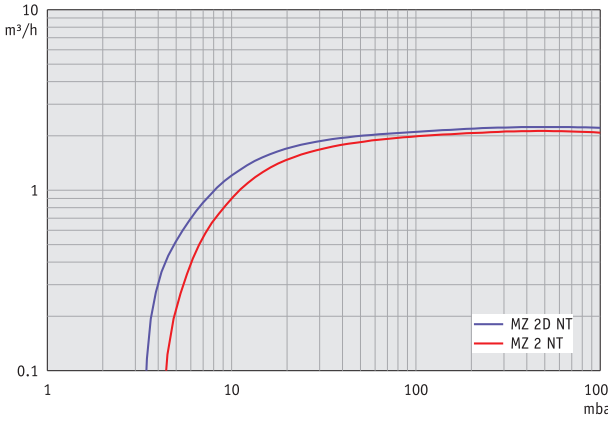
7 / 4 mbar - 2.2 / 2.3 m³/h

- contamination-free pumping and evacuation
- high flow rate even near ultimate vacuum
- good ultimate vacuum
- whisper quiet and very low vibration
- exceptionally long diaphragm life and maintenance-free drive system for low lifetime costs

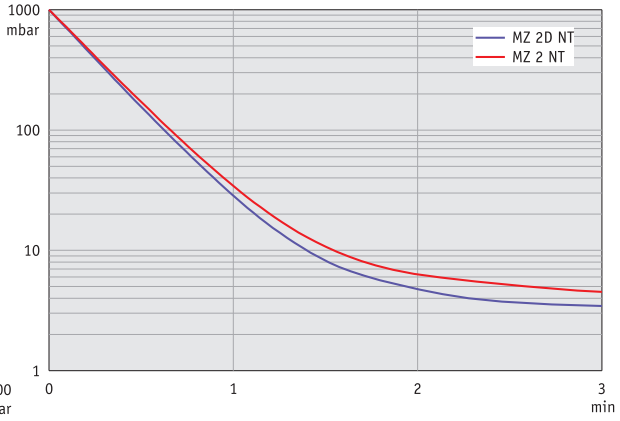
MZ 2 NT - MZ 2D NT

Diaphragm pumps are an excellent solution for continuous, oil-free evacuation and pumping of gases. All parts in these MZ 2 series pumps that are in contact with pumped media are made of aluminum, stainless steel and selected plastics, allowing a wide range of applications for non-corrosive gases. The two-stage construction provides the advantageous combination of high pumping speed and an ultimate vacuum down to 4 mbar. The highly flexible fabric-reinforced double diaphragms made of FKM provide high reliability and extended operating life. The NT-series features further improved performance data and compact design.

Pumping speed graph at 50 Hz



Pump down graph at 50 Hz
(10 l volume)



Further information and diagrams for 60 Hz mains frequency at www.vacuubrand.com
Pumping speeds and pump down times are only for information. Ultimate vacuum specification: See "Technical Data"

TECHNICAL DATA	MZ 2 NT
Number of heads / stages	2 / 2
Max. pumping speed 50/60 Hz	2.2 / 2.4 m³/h
Ultimate vacuum (abs.)	7 mbar
Max. back pressure (abs.)	2 bar
Inlet connection	Hose nozzle DN 8-10 mm
Outlet connection	Silencer / G1/4"
Rated motor power	0.18 kW
Degree of protection	IP 40
Dimensions (L x W x H), approx.	243 x 239 x 198 mm
Weight, approx.	11.0 kg

TECHNICAL DATA	MZ 2D NT
Number of heads / stages	2 / 2
Max. pumping speed 50/60 Hz	2.3 / 2.5 m³/h
Ultimate vacuum (abs.)	4 mbar
Max. back pressure (abs.)	1.1 bar
Inlet connection	Small flange KF DN 16
Outlet connection	Silencer / G1/4"
Rated motor power	0.18 kW
Degree of protection	IP 40
Dimensions (L x W x H), approx.	243 x 242 x 198 mm
Weight, approx.	11.4 kg

ACCESSORIES MZ 2 NT

Small flange KF DN 16 / G1/4" (662590)
Rubber vacuum tubing DN 8 mm (686001)

ACCESSORIES MZ 2D NT

Stainless steel tubing KF DN 16 (1000 mm: 673336)

ITEMS SUPPLIED

Pump completely mounted, ready for use, with manual.

ORDERING INFORMATION			MZ 2 NT
230 V ~ 50-60 Hz	CEE	Ex*	732000
230 V ~ 50-60 Hz	CH, CN	Ex*	732001
230 V ~ 50-60 Hz	UK, IN	Ex*	732002
100-115 V ~ 50-60 Hz / 120 V ~ 60 Hz	US		732003
100-115 V ~ 50-60 Hz / 120 V ~ 60 Hz / 200-230 V ~ 50-60 Hz		Ex*	**732005

ORDERING INFORMATION			MZ 2D NT
230 V ~ 50-60 Hz	CEE	Ex*	732200
230 V ~ 50-60 Hz	UK, IN	Ex*	732202
100-115 V ~ 50-60 Hz / 120 V ~ 60 Hz	US		732203
100-115 V ~ 50-60 Hz / 120 V ~ 60 Hz / 200-230 V ~ 50-60 Hz		Ex*	**732205

With NRTL certification for Canada and the USA
Ex*: ATEX: II 3G IIC T3 X, Internal Atm. only
**Please order power cable separately

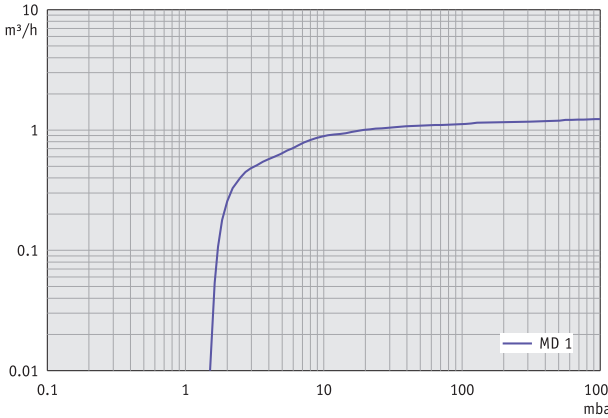
DIAPHRAGM PUMPS 1.5 mbar - 1.2 m³/h

- contamination-free pumping and evacuation
- high flow rate even near ultimate vacuum
- excellent ultimate vacuum
- whisper quiet and ultra-low vibration
- proven long diaphragm life, maintenance-free drive system

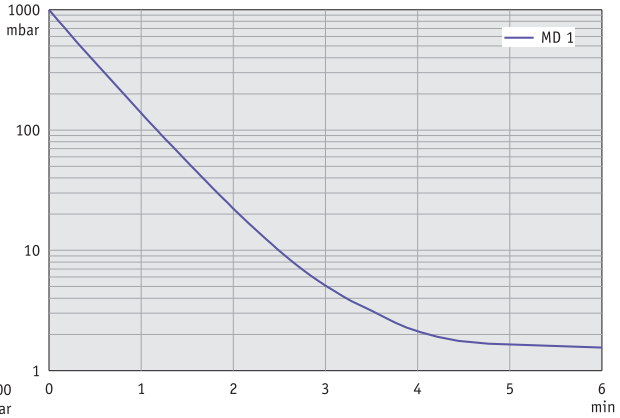
MD 1

The MD 1 diaphragm pump is an excellent choice for oil-free evacuation and pumping of non-corrosive gases down to 1.5 mbar ultimate vacuum. The three-stage design with precisely guided flat diaphragms provides outstanding pumping speed even close to the ultimate vacuum, especially when compared with similarly rated two-stage diaphragm pumps. The MD 1 is an ultra-low vibration pump with very long diaphragm lilfetimes and stable ultimate vacuum documented with years of testing. With a flow path consisting of aluminum and selected plastics (diaphragms and valves made of PTFE/FKM and FKM, respectively) the pumps are suitable for a wide range of applications with non-corrosive gases.

Pumping speed graph at 50 Hz



Pump down graph at 50 Hz
(10 l volume)



Further information and diagrams for 60 Hz mains frequency at www.vacuubrand.com
Pumping speeds and pump down times are only for information. Ultimate vacuum specification: See "Technical Data"

TECHNICAL DATA	MD 1
Number of heads / stages	4 / 3
Max. pumping speed 50/60 Hz	1.2 / 1.4 m³/h
Ultimate vacuum (abs.)	1.5 mbar
Max. back pressure (abs.)	1.1 bar
Inlet connection	Hose nozzle DN 6 mm
Outlet connection	Silencer / G1/8"
Rated motor power	0.08 kW
Degree of protection	IP 42
Dimensions (L x W x H), approx.	303 x 143 x 163 mm
Weight, approx.	6.5 kg

ACCESSORIES

Rubber vacuum tubing DN 6 mm (686000)
Small flange KF DN 16 / G1/8" (637425)

ITEMS SUPPLIED

Pump completely mounted, ready for use, with manual.

ORDERING INFORMATION			MD 1
200-230 V ~ 50-60 Hz	CEE	Ex*	696080
200-230 V ~ 50-60 Hz	CH, CN	Ex*	696081
200-230 V ~ 50-60 Hz	UK, IN	Ex*	696082
100-120 V ~ 50-60 Hz	US		696083
120 V ~ 60 Hz	US		*696073
100-120 V ~ 50-60 Hz / 200-230 V ~ 50-60 Hz		Ex*	**696087

*With NRTL certification for Canada and the USA
Ex*: ATEX: II 3G IIC T3 X, Internal Atm. only
**Please order power cable separately

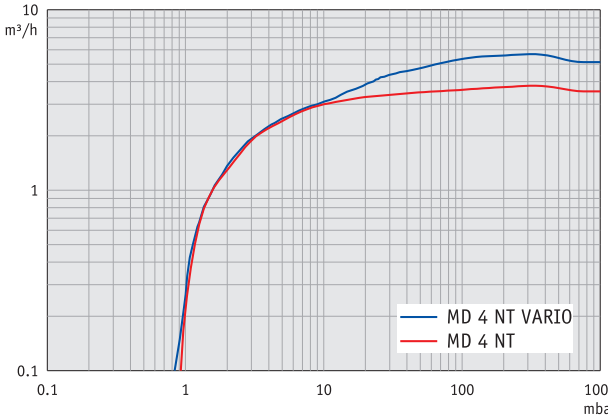
DIAPHRAGM PUMPS 1 mbar - 3.8 / 5.7 m³/h

- contamination-free pumping and evacuation
- high flow rate even near ultimate vacuum
- CVC 3000 controller on VARIO® version offers easy operation with clear text menus
- VARIO® option for self-regulating vacuum optimization throughout the process
- excellent ultimate vacuum, VARIO® version with higher pumping speed and TURBO·MODE for use as backing pump for turbo pumps

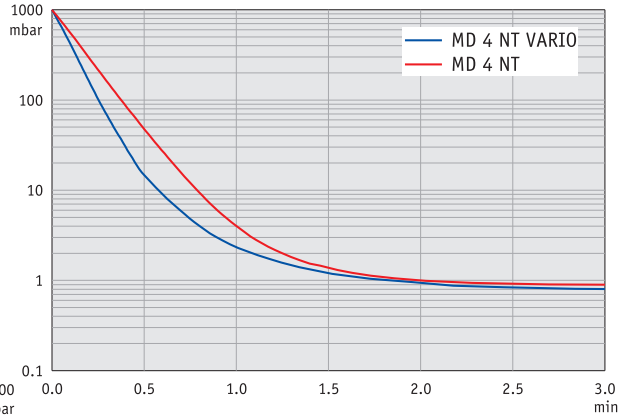
MD 4 NT - MD 4 NT VARIO

These three-stage diaphragm pumps are an excellent solution for continuous, oil-free pumping of non-corrosive gases. They reach an excellent ultimate vacuum of 1 mbar. All parts in contact with pumped gases and vapors are made of aluminum, stainless steel and carefully selected plastics suitable for a wide range of applications with non-corrosive gases. The NT series provides whisper quiet and ultra-low vibration operation, high leak tightness and improved performance. The highly flexible fabric-reinforced double diaphragm made of FKM is ideal for extended operating life. The VARIO® design includes the VARIO® pump and the CVC 3000 vacuum controller with external gauge head. The demand-responsive motor speed control on VARIO® models further extends the already long lifetimes of diaphragms and valves.

Pumping speed graph at 50 Hz



Pump down graph at 50 Hz
(10 l volume)



Further information at www.vacuubrand.com
Pumping speeds and pump down times are only for information. Ultimate vacuum specification: See "Technical Data"

TECHNICAL DATA	MD 4 NT
Number of heads / stages	4 / 3
Max. pumping speed 50/60 Hz	3.8 / 4.3 m³/h
Ultimate vacuum (abs.)	1 mbar
Max. back pressure at outlet (abs.)	1.1 bar
Inlet connection	Small flange KF DN 16
Outlet connection	Silencer / G1/4"
Rated motor power	0.25 kW
Degree of protection	IP 40
Dimensions (L x W x H), approx.	325 x 239 x 198 mm
Weight, approx.	16.4 kg

TECHNICAL DATA	MD 4 NT VARIO
Vacuum controller	CVC 3000
Number of heads / stages	4 / 3
Max. pumping speed	5.7 m³/h
Ultimate vacuum (abs.)	1 mbar
Max. back pressure at outlet (abs.)	1.1 bar
Inlet connection	Small flange KF DN 16
Outlet connection	Silencer / G1/4"
Vacuum sensor connection	Small flange KF DN 16, PTFE tubing connection 10/8 mm, hose nozzle DN 6/10 mm
Rated motor power	0.53 kW
Degree of protection	IP 20
Dimensions (L x W x H), approx.	325 x 235 x 245 mm
Weight, approx.	18.6 kg

ACCESSORIES MD 4 NT

Stainless steel tubing KF DN 16 (1000 mm: 673336)

ACCESSORIES MD 4 NT VARIO

Stainless steel tubing KF DN 16 (1000 mm: 673336)
Vent valve VBM-B (674217)

ITEMS SUPPLIED

Pump completely mounted, ready for use, with manual.

ORDERING INFORMATION			MD 4 NT
230 V ~ 50-60 Hz	CEE	Ex*	736000
230 V ~ 50-60 Hz	CH	Ex*	736001
230 V ~ 50-60 Hz	UK, IN	Ex*	736002
230 V ~ 50-60 Hz	CN	Ex*	736006
100-115 V ~ 50-60 Hz / 120 V ~ 60 Hz	US		736003
100-115 V ~ 50-60 Hz / 120 V ~ 60 Hz / 200-230 V ~ 50-60 Hz		Ex*	**736005

ORDERING INFORMATION			MD 4 NT VARIO
200-230 V ~ 50-60 Hz	CEE	Ex*	736300
200-230 V ~ 50-60 Hz	CH, CN	Ex*	736301
100-120 V ~ 50-60 Hz	US		736303

With NRTL certification for Canada and the USA (Exception: MD 4 NT VARIO)
Ex*: ATEX: II 3G IIC T3 X, Internal Atm. only
**Please order power cable separately

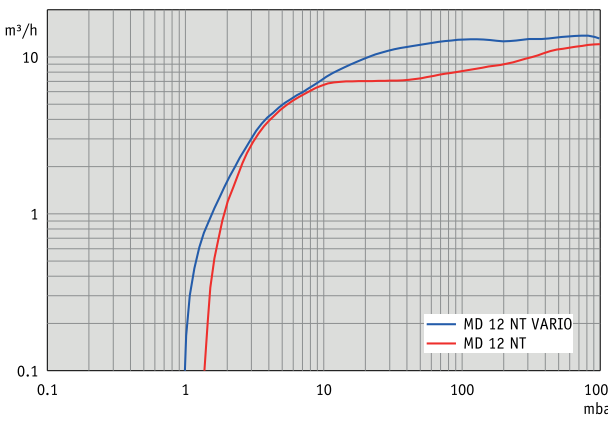
DIAPHRAGM PUMPS 2 / 1.5 mbar - 12.1 / 13.4 m³/h

- contamination-free pumping and evacuation
- high flow rate even near ultimate vacuum
- VARIO® model includes the easily operated CVC 3000 vacuum controller with clear text menus, removable
- VARIO® version offers self-regulating vacuum optimization throughout the process
- TURBO·MODE in VARIO® version with even better ultimate vacuum especially for backing of turbo pumps

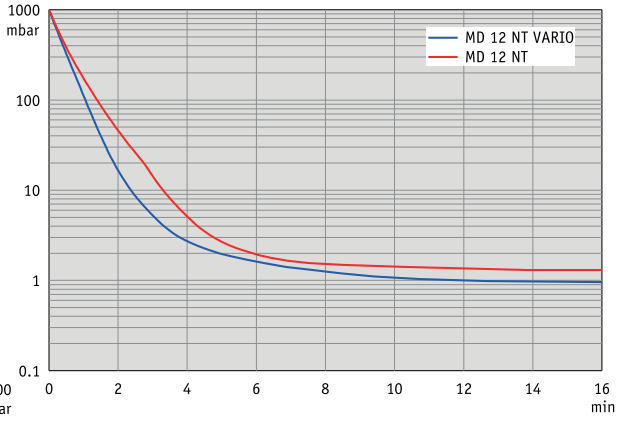
MD 12 NT - MD 12 NT VARIO

These oil-free diaphragm pumps are especially powerful pumps for evacuation and pumping of non aggressive gases. The three-stage design combines especially high pumping speed with excellent ultimate vacuum down to 2 mbar, and down to 1.5 mbar with the VARIO® version. It provides precise vacuum control and consists always of the pump and the CVC 3000 vacuum controller with external gauge head. For the use as backing pump it features continuous adaptation of running speed for optimized forevacuum. The highly flexible, fabric-reinforced double diaphragm made of FKM offers extended operating life that increases significantly in motor speed controlled operation. Like all VACUUBRAND diaphragm pumps they generate an absolutly oil-free and clean vacuum as they work without any sliding seals. Hence generation of dust that might creep back into the high vacuum application, as often found with Scroll or piston pumps, is excluded.

Pumping speed graph at 50 Hz



Pump down graph at 50 Hz
(100 l volume)



Further information at www.vacuubrand.com
Pumping speeds and pump down times are only for information. Ultimate vacuum specification: See "Technical Data"

TECHNICAL DATA	MD 12 NT
Number of heads / stages	8 / 3
Max. pumping speed 50/60 Hz	12.1 / 13.3 m³/h
Ultimate vacuum (abs.)	2 mbar
Max. back pressure (abs.)	1.1 bar
Inlet connection	Small flange KF DN 25
Outlet connection	Silencer / G1/2"
Rated motor power	0.44 kW
Degree of protection	IP 40
Dimensions (L x W x H), approx.	554 x 260 x 359 mm
Weight, approx.	30.6 kg

TECHNICAL DATA	MD 12 NT VARIO
Vacuum controller	CVC 3000
Number of heads / stages	8 / 3
Max. pumping speed	13.4 m³/h
Ultimate vacuum (abs.)	1.5 mbar
Max. back pressure (abs.)	1.1 bar
Inlet connection	Small flange KF DN 25
Outlet connection	Silencer / G1/2"
Vacuum sensor connection	Small flange KF DN 16, PTFE tubing connection 10/8 mm, hose nozzle DN 6/10 mm
Rated motor power	0.53 kW
Degree of protection	IP 40
Dimensions (L x W x H), approx.	554 x 260 x 420 mm
Weight, approx.	31.2 kg

ACCESSORIES MD 12 NT

Stainless steel tubing KF DN 25 (1000 mm: 673337)
Hose nozzle DN 15 mm / G1/2" (642472)
Small flange KF DN 16 / G1/2" (672101)

ACCESSORIES MD 12 NT VARIO

Stainless steel tubing KF DN 25 (1000 mm: 673337)
Hose nozzle DN 15 mm / G1/2" (642472)
Small flange KF DN 16 / G1/2" (672101)
Vent valve VBM-B (674217)

ITEMS SUPPLIED

Pump completely mounted, ready for use, with manual.

ORDERING INFORMATION			MD 12 NT
230 V ~ 50-60 Hz	CEE	Ex*	743000
230 V ~ 50-60 Hz	CH, CN	Ex*	743001
230 V ~ 50-60 Hz	UK, IN	Ex*	743002
100-115 V ~ 50-60 Hz / 120 V ~ 60 Hz	US		743003

ORDERING INFORMATION			MD 12 NT VARIO
200-230 V ~ 50-60 Hz	CEE	Ex*	743100
100-120 V ~ 50-60 Hz	US		743103

Ex*: ATEX: II 3G IIC T3 X, Internal Atm. only

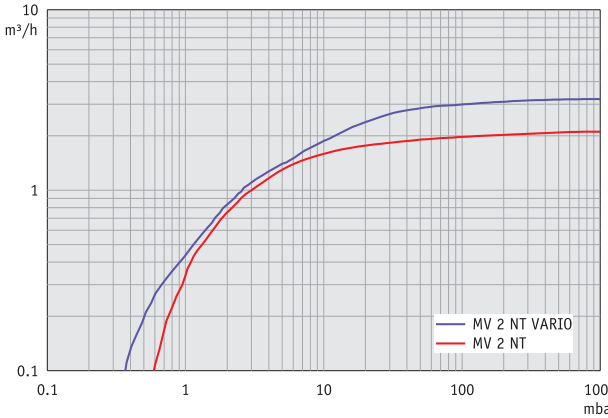
DIAPHRAGM PUMPS 0.5 / 0.3 mbar - 2.2 / 3.3 m³/h

- contamination-free pumping and evacuation
- high flow rate even near ultimate vacuum
- VARIO® version for self-regulating vacuum optimization throughout the process
- CVC 3000 controller on VARIO® version offers easy operation with clear text menus
- excellent ultimate vacuum, and even better ultimate vacuum with VARIO® version in TURBO·MODE for use as backing pump for turbo pumps

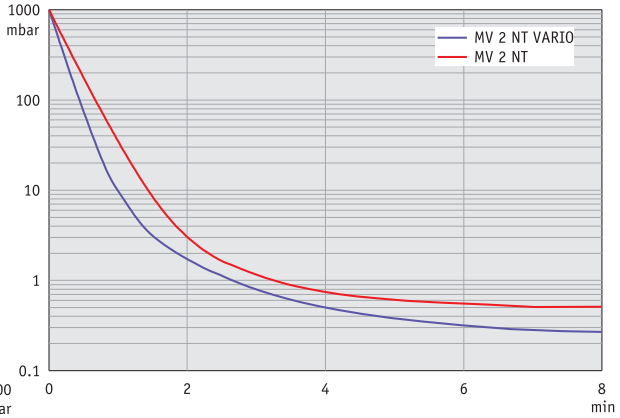
MV 2 NT - MV 2 NT VARIO

Four-stage diaphragm pumps are an excellent solution for continuous, oil-free pumping of gases when the need is to reach fractional millibar ultimate vacuum. All parts in contact with pumped vapors or gases are made of aluminum, stainless steel and carefully selected plastics suitable for a wide range of non-corrosive applications. The NT series pumps provide whisper quiet and ultra-low vibration operation, high leak-tightness and improved vacuum. The highly flexible, fabric-reinforced double diaphragm made of FKM offers extended operating life. The VARIO® version automatically adjusts the vacuum level to optimize the process conditions by continuously adapting the motor speed. The VARIO® system includes the VARIO® pump and the CVC 3000 vacuum controller with external gauge head. The demand-responsive motor speed control results in unsurpassed vacuum performance as well as extended lifetimes for service parts like diaphragms.

Pumping speed graph at 50 Hz



Pump down graph at 50 Hz
(10 l volume)



Further information at www.vacuubrand.com
Pumping speeds and pump down times are only for information. Ultimate vacuum specification: See "Technical Data"

TECHNICAL DATA	MV 2 NT
Number of heads / stages	4 / 4
Max. pumping speed 50/60 Hz	2.2 / 2.4 m³/h
Ultimate vacuum (abs.)	0.5 mbar
Max. back pressure (abs.)	1.1 bar
Inlet connection	Small flange KF DN 16
Outlet connection	Silencer / G1/4"
Rated motor power	0.25 kW
Degree of protection	IP 40
Dimensions (L x W x H), approx.	325 x 239 x 198 mm
Weight, approx.	16.4 kg

TECHNICAL DATA	MV 2 NT VARIO
Vacuum controller	CVC 3000
Number of heads / stages	4 / 4
Max. pumping speed	3.3 m³/h
Ultimate vacuum (abs.)	0.3 mbar
Max. back pressure (abs.)	1.1 bar
Inlet connection	Small flange KF DN 16
Outlet connection	Silencer / G1/4"
Vacuum sensor connection	Small flange KF DN 16, PTFE tubing connection 10/8 mm, hose nozzle DN 6/10 mm
Rated motor power	0.53 kW
Degree of protection	IP 20
Dimensions (L x W x H), approx.	325 x 235 x 245 mm
Weight, approx.	18.9 kg

ACCESSORIES MV 2 NT

Stainless steel tubing KF DN 16 (1000 mm: 673336)

ACCESSORIES MV 2 NT VARIO

Stainless steel tubing KF DN 16 (1000 mm: 673336)
Vent valve VBM-B (674217)

ITEMS SUPPLIED

Pump completely mounted, ready for use, with manual.

ORDERING INFORMATION			MV 2 NT
230 V ~ 50-60 Hz	CEE	Ex*	738000
230 V ~ 50-60 Hz	CH, CN	Ex*	738001
230 V ~ 50-60 Hz	UK, IN	Ex*	738002
100-115 V ~ 50-60 Hz / 120 V ~ 50-60 Hz	US		738003

ORDERING INFORMATION			MV 2 NT VARIO
200-230 V ~ 50-60 Hz	CEE	Ex*	738100
200-230 V ~ 50-60 Hz	CH, CN	Ex*	738101
100-120 V ~ 50-60 Hz	US		738103

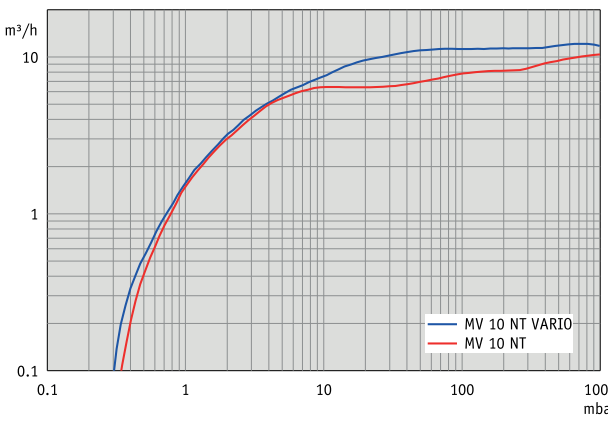
With NRTL certification for Canada and the USA (Exception: MV 2 NT VARIO)
Ex*: ATEX: II 3G IIC T3 X, Internal Atm. only

- contamination-free pumping and evacuation
- high performance even close to the excellent ultimate vacuum
- VARIO® with removable CVC 3000 vacuum controller, can be arranged flexibly, easily operated with clear text menus
- VARIO® version offers self-regulating vacuum optimization throughout the process
- TURBO·MODE in VARIO® version with even better ultimate vacuum especially for backing of turbo pumps

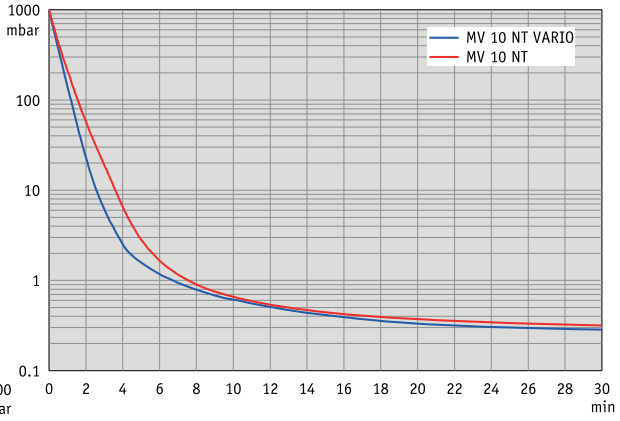
MV 10 NT - MV 10 NT VARIO

Four-stage diaphragm pumps are an excellent solution for continuous, oil-free pumping of gases when the need is to reach fractional millibar ultimate vacuum. All parts in contact with pumped vapors or gases are made of aluminum, stainless steel and carefully selected plastics suitable for a wide range of non-corrosive applications. These pumps provide the advantageous combination of high pumping speed with an extraordinarily good ultimate vacuum down to 0.5 mbar, and down to 0.3 mbar with the VARIO® version with self-adapting motor speed control. The highly flexible, fabric-reinforced double diaphragm made of FKM offers extended operating life. The VARIO® system consists of the VARIO® pump and the CVC 3000 vacuum controller with external gauge head. It provides precise vacuum control, higher pumping speed and improved ultimate vacuum. Eight-cylinder NT pumps feature quiet operation, with smooth and easy-to-clean surfaces.

Pumping speed graph at 50 Hz



Pump down graph at 50 Hz
(100 l volume)



Further information at www.vacuubrand.com
Pumping speeds and pump down times are only for information. Ultimate vacuum specification: See "Technical Data"

TECHNICAL DATA	MV 10 NT
Number of heads / stages	8 / 4
Max. pumping speed 50/60 Hz	10.4 / 11.6 m³/h
Ultimate vacuum (abs.)	0.5 mbar
Max. back pressure (abs.)	1.1 bar
Inlet connection	Small flange KF DN 25
Outlet connection	Silencer / G1/2"
Rated motor power	0.44 kW
Degree of protection	IP 40
Dimensions (L x W x H), approx.	554 x 260 x 359 mm
Weight, approx.	30.6 kg

TECHNICAL DATA	MV 10 NT VARIO
Vacuum controller	CVC 3000
Number of heads / stages	8 / 4
Max. pumping speed	12.1 m³/h
Ultimate vacuum (abs.)	0.3 mbar
Max. back pressure (abs.)	1.1 bar
Inlet connection	Small flange KF DN 25
Outlet connection	Silencer / G1/2"
Vacuum sensor connection	Small flange KF DN 16, PTFE tubing connection 10/8 mm, hose nozzle DN 6/10 mm
Rated motor power	0.53 kW
Degree of protection	IP 40
Dimensions (L x W x H), approx.	554 x 260 x 420 mm
Weight, approx.	31.2 kg

ACCESSORIES MV 10 NT

Stainless steel tubing KF DN 25 (1000 mm: 673337)
Hose nozzle DN 15 mm / G1/2" (642472)
Small flange KF DN 16 / G1/2" (672101)

ACCESSORIES MV 10 NT VARIO

Stainless steel tubing KF DN 25 (1000 mm: 673337)
Hose nozzle DN 15 mm / G1/2" (642472)
Small flange KF DN 16 / G1/2" (672101)
Vent valve VBM-B (674217)

ITEMS SUPPLIED

Pump completely mounted, ready for use, with manual.

ORDERING INFORMATION			MV 10 NT
230 V ~ 50-60 Hz	CEE	Ex*	744000
100-115 V ~ 50-60 Hz / 120 V ~ 60 Hz	US		744003

ORDERING INFORMATION			MV 10 NT VARIO
200-230 V ~ 50-60 Hz	CEE	Ex*	744100
200-230 V ~ 50-60 Hz	CH, CN	Ex*	744101
200-230 V ~ 50-60 Hz	UK	Ex*	744102
100-120 V ~ 50-60 Hz	US		744103

Ex*: ATEX: II 3G IIC T3 X, Internal Atm. only

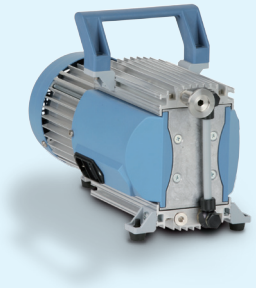
ACCESSORIES FOR DIAPHRAGM PUMPS

Vacuum systems with small flanges require appropriate components for a consistent cross section of the connection from the system to the vacuum pump. Our small flange connections for diaphragm pumps, as well as elastic connection components, allow the integration of the pump into the vacuum distribution system.

Upgrading to small flange connection KF DN 16 for the following diaphragm pumps

ME 4 NT	662591
ME 8 NT, MZ 2 NT	662590
MD 1	637425

at inlet:



Upgrading to small flange connection KF DN 16 for the following diaphragm pumps

MZ 2 NT, MZ 2D NT	662590
MD 1	636553
ME 8 NT, MD 4 NT, MV 2 NT	662512
ME 16 NT, MD 12 NT, MV 10 NT	672101

at outlet:

ACCESSORIES FOR DIAPHRAGM PUMPS

Flexible connections:
Metal vacuum tubing with small flanges KF DN 16

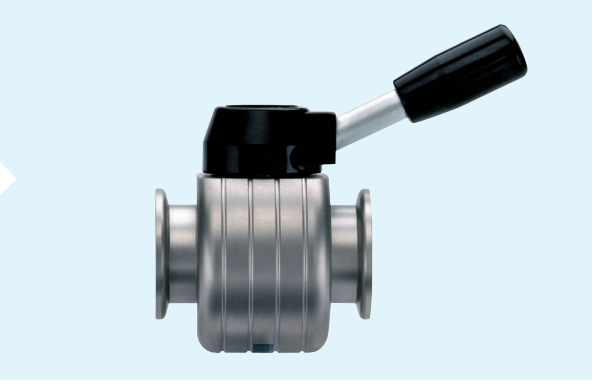
Length 250 mm	673306
Length 500 mm	673316
Length 750 mm	673326
Length 1000 mm	673336

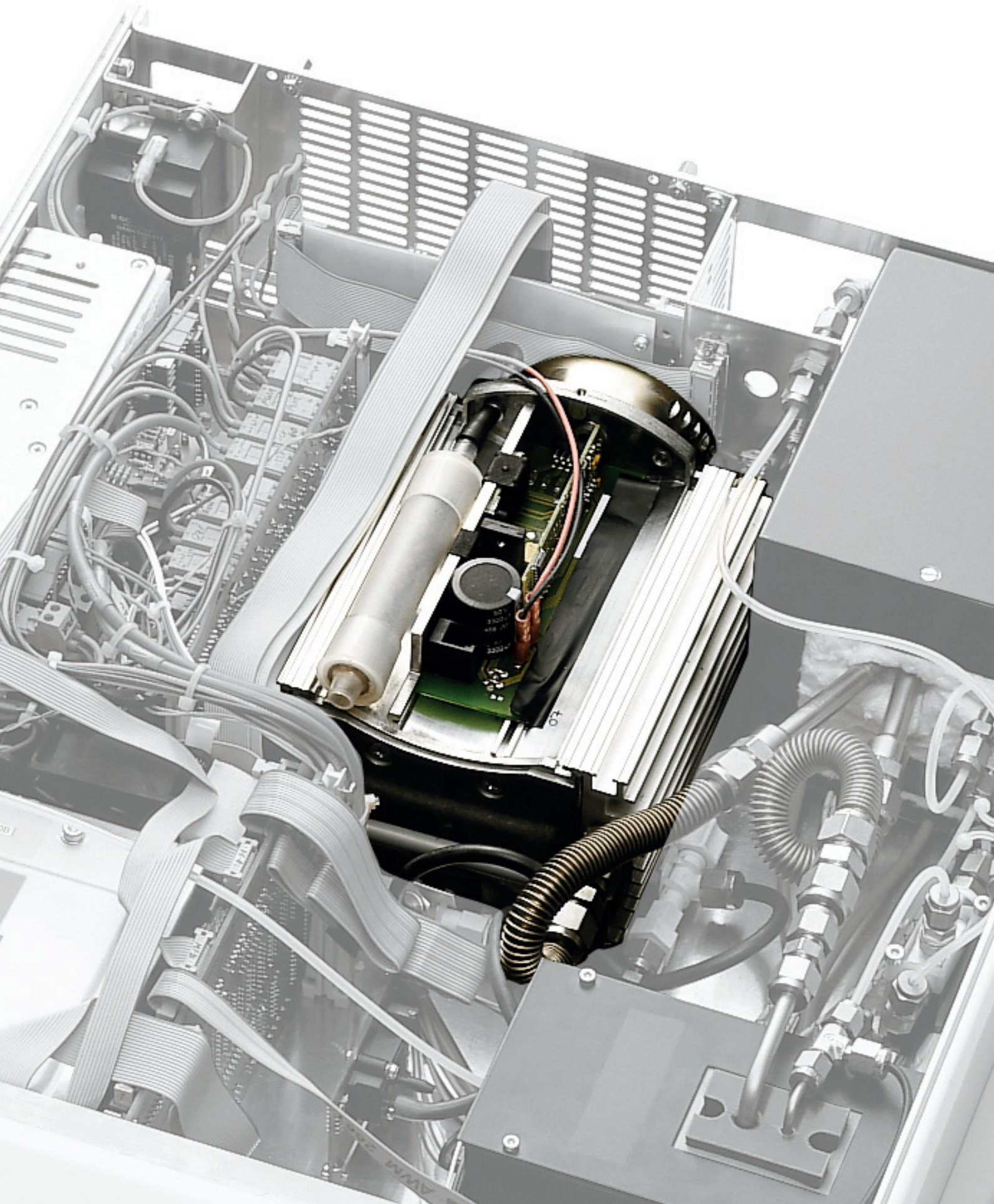
Flexible connections:
PVC-hose with small flange KF DN 16

Length 500 mm	686010
Length 1000 mm	686020

Additional accessories:

Additional flexible connections	Page 210
Small flange components	Page 204
Manually operated valves, e.g., VS 16 / Electrically operated (solenoid) valves	Page 192





DIAPHRAGM PUMPS WITH 24V DC DRIVE PARTICULARLY FOR INTEGRATION INTO OEM PRODUCTS

In OEM applications, we adapt our pumps to your installation requirements: Color, motors, electrical interfaces, fastening and a whole lot more can be adapted to your design requirements. VACUUBRAND VARIO-SP pumps with 24 V DC drive are designed for integration into your equipment control wiring. For decades, VACUUBRAND pumps have been selected by leading equipment and instrument manufacturers world-wide for their most critical designs.

VARIO-SP diaphragm pumps from VACUUBRAND combine our proven diaphragm and cylinder head technology with state-of-the-art drive and control technology. This system component (SP = SystemPump) is frequently used in equipment or systems where it is beneficial and necessary to regulate vacuum parameters. The electronically commutated (brushless) 24 V direct current drive is service-free and features unparalleled compact dimensions. The high-quality and flexible electronic drive system built into the pump makes it easy to integrate the vacuum pump into your overall system. Varying the motor speed makes maximum efficiency possible, including the option of controlling vacuum processes by changing the pump´s volume flow rate. Motor speed control also enhances performance features such as pumping speed, ultimate vacuum, diaphragm and valve live, vibration and sound levels and energy consumption. The motor speed may be set internally (fixed speed) or controlled via an external digital or analog signal.

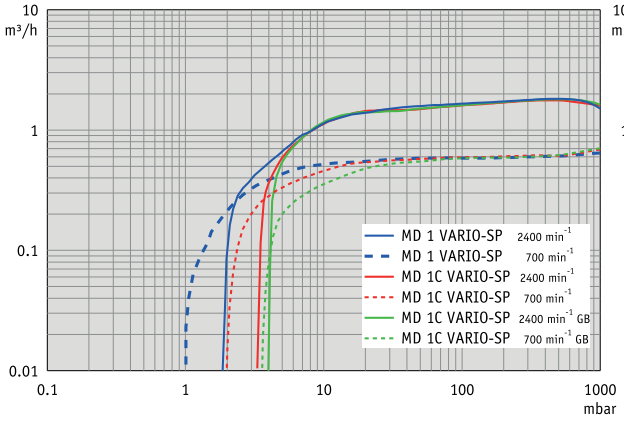
- possible variable speed 200-2400 min^{-1}, allowing a quicker pumping down with high speed
- improved ultimate vacuum at low speed
- significantly longer diaphragm and valve service life
- extremely compact, flexible mounting positions feasible
- much quieter and less vibration
- less energy consumption, less heat dissipation
- speed can be set manually or controlled externally by various analog and digital signals
- supply with 24 V DC for worldwide use

- contamination-free pumping and evacuation
- high flow rate even near ultimate vacuum
- VARIO®-SP = variable speed: Fast pump down at high motor speed, maintain vacuum with reduced motor speed
- very powerful and extremely compact; whisper quiet and ultra-low vibration, especially at low speed
- MD 1C VARIO-SP in chemistry design, with gas ballast valve and outstanding chemical resistance and superior vapor tolerance

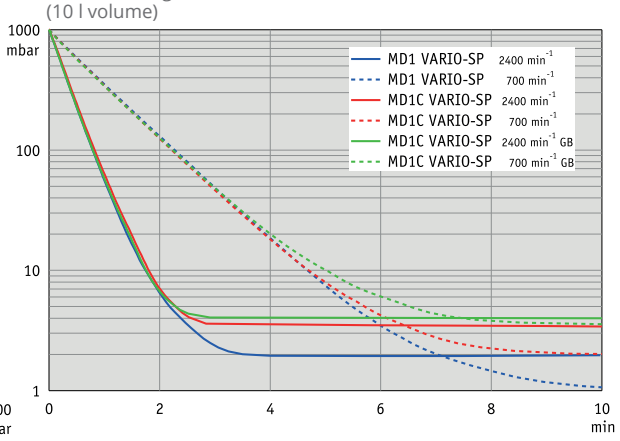
MD 1 VARIO-SP - MD 1C VARIO-SP

The three-stage MD 1 VARIO-SP diaphragm pump with its variable speed drive system attains significantly higher pumping speed and a better ultimate vacuum than the corresponding fixed speed pump. The brushless 24V DC motor (maintenance-free) enables easy integration of the pump into other equipment and operation independent of line voltage. The pump is particularly silent and vibration-free, and has an outstanding lifetime of its diaphragms and valves. For exceptional chemical resistance of the pump´s internal flowpath it is also available as a chemistry design version (MD 1C VARIO-SP).

Pumping speed graph
with/without gas ballast



Pump down graph
with/without gas ballast
(10 l volume)



Further information at www.vacuubrand.com
Pumping speeds and pump down times are only for information. Ultimate vacuum specification: See "Technical Data"

TECHNICAL DATA	MD 1 VARIO-SP
Number of heads / stages	4 / 3
Max. pumping speed (2400 min^{-1})	1.8 m³/h
Ultimate vacuum (abs.)	1 mbar (700 min^{-1})
Max. back pressure (abs.)	1.1 bar
Inlet connection	Hose nozzle DN 6 mm
Outlet connection	Silencer / G1/8"
Rated motor power	0.064 kW
Max. current	7 A
Typ. current (<10 mbar, 1500 min^{-1})	1.5 A
Motor speed range	200 - 2400 min^{-1}
Dimensions (L x W x H), approx.	223 x 143 x 163 mm
Weight, approx.	4.1 kg

TECHNICAL DATA	MD 1C VARIO-SP
Number of heads / stages	4 / 3
Max. pumping speed (2400 min^{-1})	1.8 m³/h
Ultimate vacuum (abs.)	2 mbar (1500 min^{-1})
Ultim. vac. (abs.) with gas ballast	4 mbar (1500 min^{-1})
Max. back pressure (abs.)	1.1 bar
Inlet connection	Hose nozzle DN 8-10 mm
Outlet connection	Hose nozzle DN 8 mm
Rated motor power	0.064 kW
Max. current	7 A
Typ. current (<10 mbar, 1500 min^{-1})	1.5 A
Motor speed range	200 - 2400 min^{-1}
Dimensions (L x W x H), approx.	235 x 143 x 175 mm
Weight, approx.	4.2 kg

ACCESSORIES MD 1 VARIO-SP

Rubber vacuum tubing DN 6 mm (686000)
Small flange KF DN 16 / G1/8" (637425)

ACCESSORIES MD 1C VARIO-SP

Rubber vacuum tubing DN 8 mm (686001)

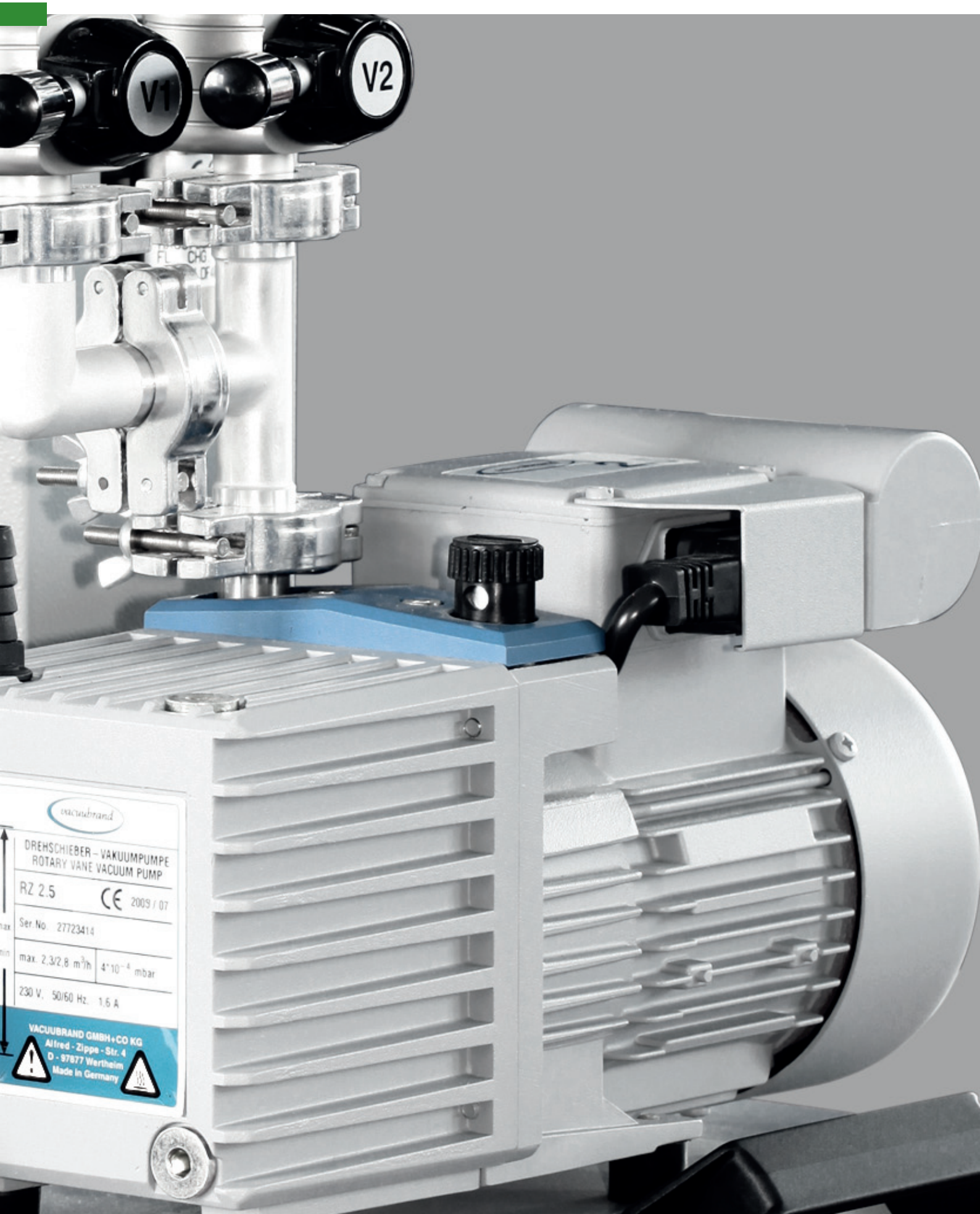
ITEMS SUPPLIED

Pump completely mounted, ready for use, with 2 m cable without plug and with manual.

ORDERING INFORMATION		MD 1 VARIO-SP
24 V ~ DC	Open wires	696101
	Ex*	

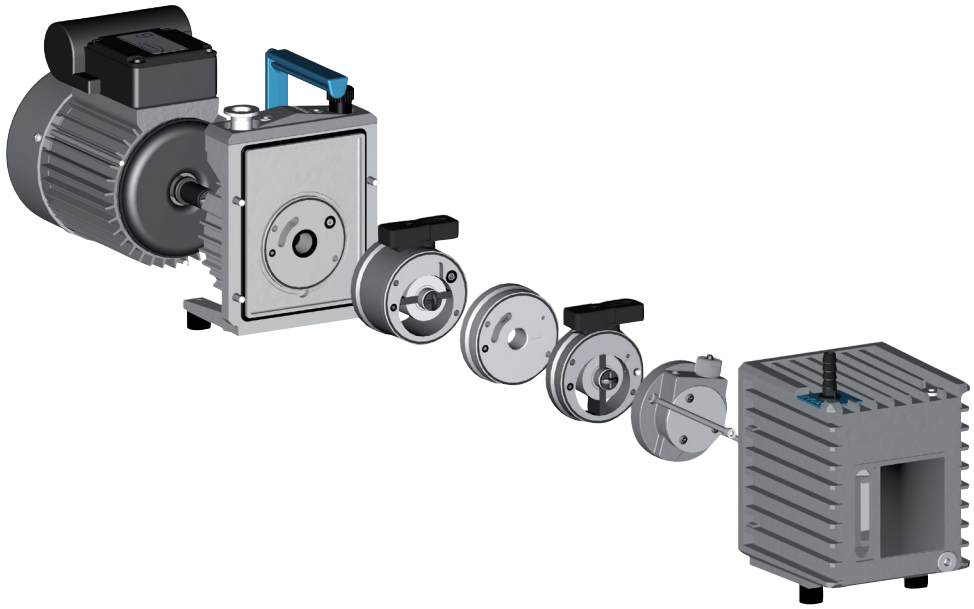
ORDERING INFORMATION		MD 1C VARIO-SP
24 V ~ DC	Open wires	696110
	Ex*	

With NRTL certification for Canada and the USA
Ex*: ATEX: II 3G IIC T3 X, Internal Atm. only


V1
V2
DREHSCHIEBER – VAKUUMPUMPE
ROTARY VANE VACUUM PUMP
RZ 2.5
CE
2009 / 07
Ser.No. 27723414
max. 2.3/2.8 m³/h
4*10⁻⁴ mbar
230 V, 50/60 Hz, 1.6 A
VACUUBRAND GMBH + CO KG
Alfred - Zippe - Str. 4
D - 97877 Wertheim
Made in Germany

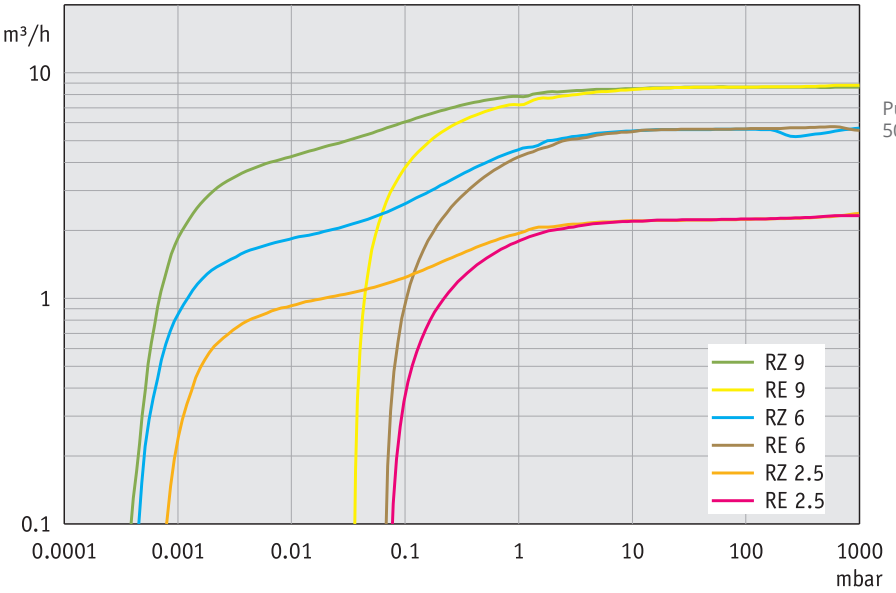
ROTARY VANE PUMPS AND PUMPING UNITS AND CHEMISTRY-HYBRID PUMPS

Rotary vane pumps are used whenever it is necessary to have a process vacuum of up to 10^{-3} mbar. VACUUBRAND rotary vane pumps are high-performance, yet compact, and can be equipped with an extensive line of VACUUBRAND accessories. They have an innovative lubrication system with a built-in oil pump and have a large oil volume. This extends oil change and service intervals and protects the pump at start-up. The effective gas ballast feature, with its high-flow gas ballast, provides high vapor pumping capability for water and solvents. VACUUBRAND rotary vane pumps´ volume flow rate is specified at atmospheric pressure, as is customary with PNEUROP®. For process effiency, however, the high volume flow rate of VACUUBRAND pumps under process conditions, as well as a consistently high volume flow rate over a wide pressure range, is the key to your satisfaction in real-world application. After switch-off the aggregate is vacuum-sealed to protect your application from undesired venting and oil back flow.



- constriction-free vapor pathway allows high volume flow rates, even when close to the ultimate vacuum
- high tolerance for water and solvent vapors, because of the high-volume gas ballast
- quiet running and excellent ultimate vacuum, even with gas ballast
- active corrosion protection: Oil cycle closes vacuum-tight against the intake of corrosive gases and oil impurities into the reservoir when shut down
- lubrication circuit, and large usable oil volume provides extended oil change and service intervals
- compact design, low weight and easy service due to telescopic design

The rotary vane pumps from VACUUBRAND are especially designed for use in chemistry and physics. The powerful gas ballast system helps to prevent condensation inside the pump. Simultaneously the pumps are reaching an outstanding ultimate vacuum even with open gas ballast valve. Rotary vane pumping systems from VACUUBRAND are suggested for applications in the fine vacuum range that demand special precautions to protect the pump and environment. The PC 3 pumping units with two-stage rotary vane pump (RZ 2.5 through RZ 9) have an inlet-side glass cold trap, exhaust oil mist filter and the accessories needed to handle larger amounts of condensable vapors. The RC 6 chemistry-HYBRID pump is the combination of a two-stage rotary vane pump and a chemistry diaphragm pump made of corrosion-resistant materials. By reducing solvent condensation and continuously distilling trapped solvents out of the pump oil the RC 6 offers the service advantages of an oil-free chemistry pump with the low ultimate vacuum of a two-stage rotary vane pump.



Pumping speed graph at 50 Hz without gas ballast

Further information and diagrams for 60 Hz mains frequency at www.vacuubrand.com
Pumping speeds and pump down times are only for information. Ultimate vacuum specification: See "Technical Data"

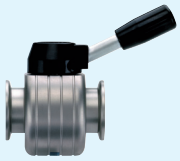
7 GOLDEN RULES WHEN USING OIL-SEALED ROTARY VANE PUMPS

- Before use, warm up pump with inlet blocked to reduce condensation in pump
- Avoid particles to protect mechanical parts
- Never block pump outlet
- Use gas ballast to purge condensable vapors
- Use a cold trap to protect pump from corrosive and condensable vapors
- After application is complete, run pump a few minutes with inlet blocked and gas ballast open to purge solvents from pump
- Check oil and maintain regularly

There are expedient hands-on packages available as a system solution with an exhaust oil mist filter (with built-in safety overpressure valve) and a manual in-line valve, e.g. to warm up the pump. There is also a package available with an additional VACUU·VIEW extended fine vacuum gauge.

Attainable ultimate vacuum	 Series overview RE / RZ	 Pumping unit PC 3	 Package solutions down to 2x10^{-3} mbar	 Chemistry-HYBRID pumps
down to 2x10^{-1} mbar	**RE 2.5** pg. 144 2.3 m³/h **RE 6** pg. 146 5.7 m³/h **RE 9** pg. 148 8.9 m³/h			
down to 2x10^{-3} mbar	**RZ 2.5** pg. 144 2.3 m³/h **RZ 6** pg. 146 5.7 m³/h **RZ 9** pg. 148 8.9 m³/h	**PC 3 / RZ 2.5** pg. 144 2.3 m³/h **PC 3 / RZ 6** pg. 146 5.7 m³/h **PC 3 / RZ 9** pg. 148 8.9 m³/h	**RZ 2.5 +FO +VS 16** 2.3 m³/h pg. 144 **RZ 6 +FO +VS 16** 5.7 m³/h pg. 146 **RZ 6 +FO +VS 16 +VACUU·VIEW extended** 5.7 m³/h pg. 147	**RC 6** pg. 150 5.9 m³/h **PC 8 / RC 6** pg. 150 5.9 m³/h

	 Oils for rotary vane pumps	 Oil mist filters FO	 Separator at inlet AK	 Package fine vacuum control
Page	pg. 152	pg. 155	pg. 154	pg. 180

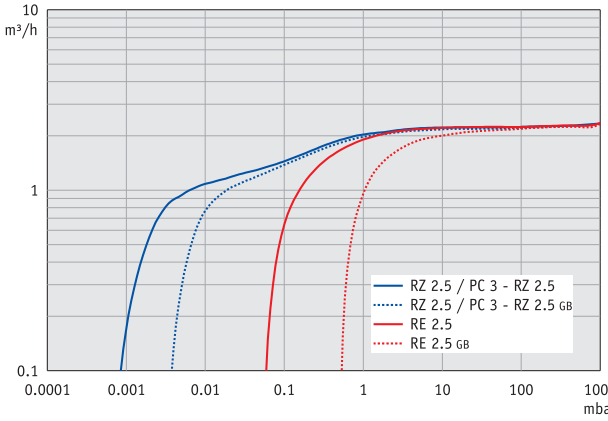
	 Cold traps and inline oil filter	 Manually operated valves, e.g., VS 16	 Electrically operated (solenoid) valves
Page	pg. 156	pg. 197	pg. 202

- high flow rates even at vacuum levels approaching ultimate vacuum
- high water vapor tolerance due to efficient gas ballast; very good ultimate vacuum even with gas ballast
- vacuum-tight at switch-off; external anti-suckback valve not needed
- large oil volume: Long intervals between oil changes
- ease of maintenance due to telescopic design

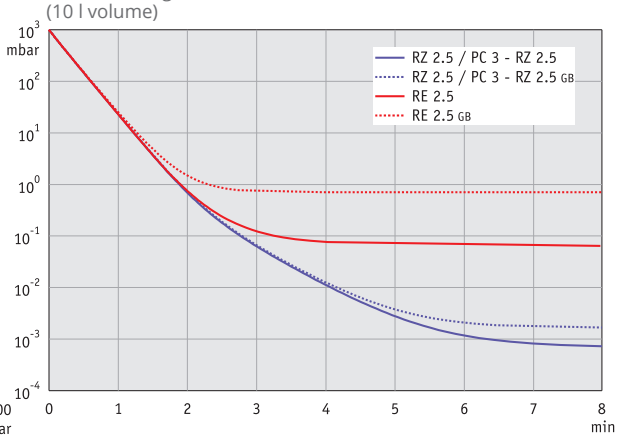
RE 2.5 - RZ 2.5 - PUMPING UNIT PC 3 WITH RZ 2.5

The one-stage RE 2.5 and two-stage RZ 2.5 are high-performance rotary vane pumps with extra compact design and low weight. They are the ideal solution for a wide range of laboratory and process applications that require low ultimate vacuum at medium gas flow rate. The rotary vane pumping unit PC 3 with cold trap (GKF 1000i) at the inlet helps the pump to handle larger volumes of condensable vapors. The pumping unit is compact, user-friendly, and well-arranged, with oil mist filter at the outlet, a valve, and a T-connection for a gauge. The RZ 2.5 is also available combined with the oil mist filter (FO) and the VS 16 valve as a package.

Pumping speed graph at 50 Hz with/without gas ballast



Pump down graph at 50 Hz with/without gas ballast (10 l volume)



Further information and diagrams for 60 Hz mains frequency at www.vacuubrand.com
Pumping speeds and pump down times are only for information. Ultimate vacuum specification: See "Technical Data"

TECHNICAL DATA	RE 2.5	RZ 2.5
Number of stages	1	2
Max. pumping speed at 50/60 Hz	2.3 / 2.8 m³/h	2.3 / 2.8 m³/h
Ultimate partial vacuum (abs.)	3 x 10^{-1} mbar	4 x 10^{-4} mbar
Ultimate vacuum (abs.)	3 x 10^{-1} mbar	2 x 10^{-3} mbar
Ultim. vac. (abs.) with gas ballast	8 x 10^{-1} mbar	1 x 10^{-2} mbar
Water vapor tolerance with gas ballast	40 mbar	40 mbar
Oil capacity (B-Oil) min./max.	0.18 / 0.51 l	0.1 / 0.28 l
Inlet connection	Small flange KF DN 16	Small flange KF DN 16
Outlet connection	Hose nozzle DN 8-10 mm	Hose nozzle DN 8-10 mm
Rated motor power	0.18 kW	0.18 kW
Rated motor speed at 50/60 Hz	1500/1800	1500/1800
Degree of protection	IP 40	IP 40
Dimensions (L x W x H), approx.	316 x 125 x 190 mm	316 x 125 x 190 mm
Weight, approx.	10.2 kg	11.4 kg

ORDERING INFORMATION		RE 2.5
230 V ~ 50-60 Hz	CEE	697150
230 V ~ 50-60 Hz	CH, CN	697151
230 V ~ 50-60 Hz	UK, IN	697152
100-115 V ~ 50-60 Hz / 120 V ~ 60 Hz		
200-230 V ~ 50-60 Hz*	US	**697156

RE 2.5, RZ 2.5 + PERFLUOROPOLYETHER OIL

on request

ORDERING INFORMATION		RZ 2.5
230 V ~ 50-60 Hz	CEE	698120
230 V ~ 50-60 Hz	CH	698121
230 V ~ 50-60 Hz	UK, IN	698122
230 V ~ 50-60 Hz	CEE/CN	698127
100-115 V ~ 50-60 Hz / 120 V ~ 60 Hz		
200-230 V ~ 50-60 Hz*	US	**698126

ORDERING INFORMATION		PC 3 / RZ 2.5
230 V ~ 50-60 Hz	CEE	699890

ORDERING INFORMATION		RZ 2.5 +FO +VS 16
230 V ~ 50-60 Hz	CEE	698029

ACCESSORIES

Stainless steel tubing KF DN 16 (1000 mm: 673336)
Separator inlet side AK R 2/2.5 (698000)
Oil mist filter FO R 2/2.5/5/6 (698003)
Package fine vacuum control KF DN 16 (683201)
Rubber vacuum tubing DN 8 mm (686001)
Small flange KF DN 16 with hose nozzle DN 8-10 mm (662806)

ITEMS SUPPLIED

Pump oil filled and completely mounted, ready for use, with manual.

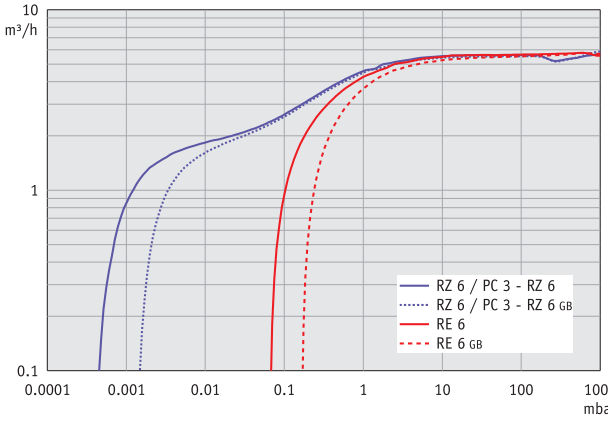
* With NRTL certification for Canada and the USA
** Country specific power cable, please order separately if needed

- high flow rates even at vacuum levels approaching ultimate vacuum
- high water vapor tolerance due to efficient gas ballast; very good ultimate vacuum even with gas ballast
- vacuum-tight at switch-off; external anti-suckback valve not needed
- large oil volume: Long intervals between oil changes
- ease of maintenance due to telescopic design

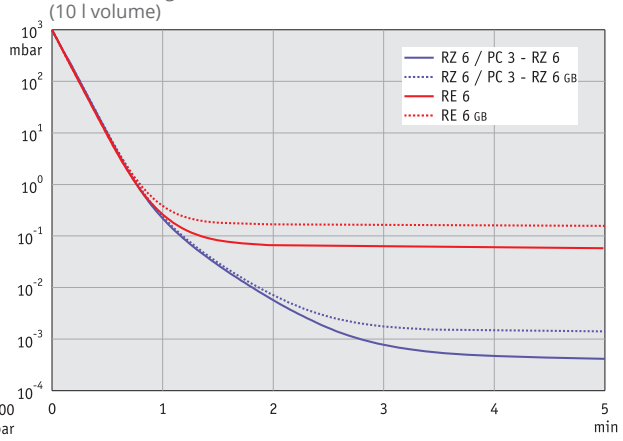
RE 6 - RZ 6 - PUMPING UNIT PC 3 WITH RZ 6

These powerful rotary vane pumps feature a particularly compact design and low weight for pumps of this capacity. They are the ideal solution for a wide range of laboratory and process applications that require low ultimate vacuum at medium to increased gas flow rate. The PC 3 rotary vane pumping unit, with GKF 1000i cold trap at the inlet, helps the pump to handle large amounts of condensable vapors. The PC 3 pumping unit is compact, user-friendly and well-arranged, with an oil mist filter at the outlet, a valve and a T-connection for a gauge. Various packages including pump, oil mist filter, etc. are available.

Pumping speed graph at 50 Hz with/without gas ballast



Pump down graph at 50 Hz with/without gas ballast (10 l volume)



Further information and diagrams for 60 Hz mains frequency at www.vacuubrand.com
Pumping speeds and pump down times are only for information. Ultimate vacuum specification: See "Technical Data"

TECHNICAL DATA	RE 6	RZ 6
Number of stages	1	2
Max. pumping speed at 50/60 Hz	5.7 / 6.8 m³/h	5.7 / 6.8 m³/h
Ultimate partial vacuum (abs.)	1 x 10^{-1} mbar	4 x 10^{-4} mbar
Ultimate vacuum (abs.)	1 x 10^{-1} mbar	2 x 10^{-3} mbar
Ultim. vac. (abs.) with gas ballast	6 x 10^{-1} mbar	1 x 10^{-2} mbar
Water vapor tolerance with gas ballast	40 mbar	40 mbar
Oil capacity (B-Oil) min./max.	0.36 / 0.93 l	0.34 / 0.73 l
Inlet connection	Small flange KF DN 16	Small flange KF DN 16
Outlet connection	Hose nozzle DN 8-10 mm	Hose nozzle DN 8-10 mm
Rated motor power	0.3 kW	0.3 kW
Rated motor speed at 50/60 Hz	1500/1800	1500/1800
Degree of protection	IP 40	IP 40
Dimensions (L x W x H), approx.	370 x 142 x 207 mm	370 x 142 x 207 mm
Weight, approx.	15.4 kg	16.4 kg

ORDERING INFORMATION — RE 6

230 V ~ 50-60 Hz	CEE	697160
230 V ~ 50-60 Hz	CH, CN	697161
230 V ~ 50-60 Hz	UK, IN	697162
100-120 V ~ 50-60 Hz / 200-230 V ~ 50-60 Hz*	US	**697166

RE 6, RZ 6 + PERFLUOROPOLYETHER OIL

on request

ORDERING INFORMATION — RZ 6

230 V ~ 50-60 Hz	CEE	698130
230 V ~ 50-60 Hz	CH	698131
230 V ~ 50-60 Hz	UK, IN	698132
400 V ~ 50 Hz 3 Ph.	CEE	698135
230 V ~ 50-60 Hz	CEE/CN	698138
100-120 V ~ 50-60 Hz / 200-230 V ~ 50-60 Hz*	US	**698136

ORDERING INFORMATION — PC 3 / RZ 6

230 V ~ 50-60 Hz	CEE	699893

ORDERING INFORMATION — PACKAGES FOR ROTARY VANE PUMPS

RZ 6 +FO +VS 16

230 V ~ 50-60 Hz	CEE	698039
230 V ~ 50-60 Hz	CH, CN	698009
230 V ~ 50-60 Hz	UK	698059

RZ 6 +FO +VS 16 +VACUU·VIEW EXTENDED

230 V ~ 50-60 Hz	CEE	698160
230 V ~ 50-60 Hz	CH, CN	698161

ACCESSORIES

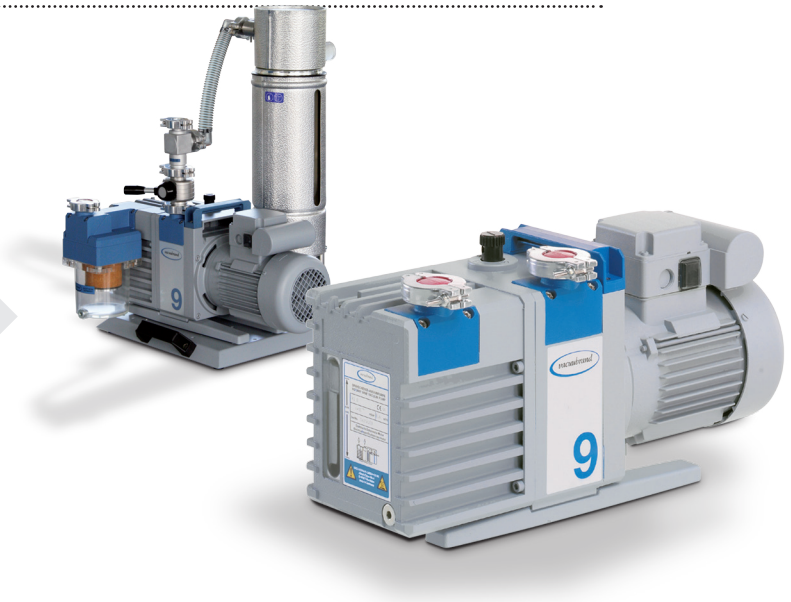
Stainless steel tubing KF DN 16 (1000 mm: 673336)
Separator inlet side AK R 5/6 (698006)
Oil mist filter FO R 2/2.5/5/6 (698003)
Package fine vacuum control KF DN 16 (683201)
Rubber vacuum tubing DN 8 mm (686001)
Small flange KF DN 16 with hose nozzle DN 8-10 mm (662806)

ITEMS SUPPLIED

Pump oil filled and completely mounted, ready for use, with manual.

* With NRTL certification for Canada and the USA
** Country specific power cable, please order separately if needed

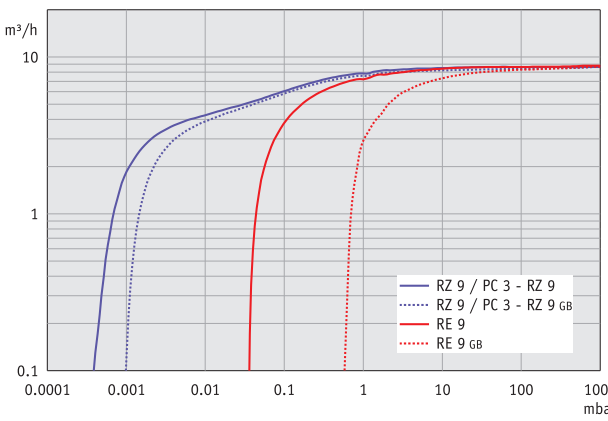
- very high flow rates even at vacuum levels approaching ultimate vacuum
- high water vapor tolerance due to efficient gas ballast; very good ultimate vacuum even with gas ballast
- vacuum-tight at switch-off; external anti-suckback valve not needed
- large oil volume: Long intervals between oil changes
- ease of maintenance due to telescopic design



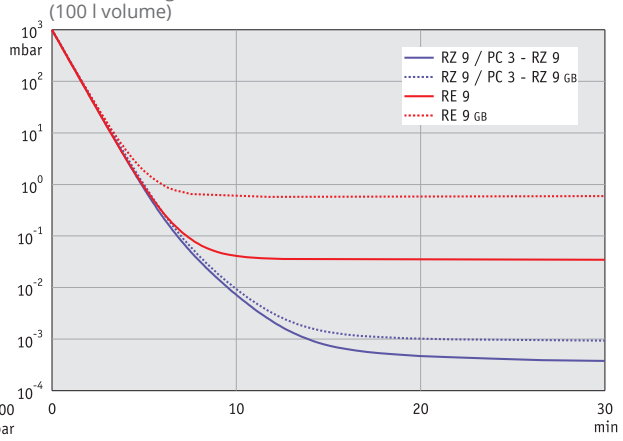
RE 9 - RZ 9 - PUMPING UNIT PC 3 WITH RZ 9

The powerful mid-size one-stage RE 9 and two-stage RZ 9 rotary vane pumps are the ideal solution for a wide range of laboratory and process applications that require high pumping speed. The PC 3 rotary vane pumping unit, with the GKF 1000i cold trap at the inlet, helps the pump to handle large amounts of condensable vapors. The PC 3 pumping unit is compact, user-friendly, and well-arranged, with an oil mist filter at the outlet, a valve, and a T-connection for a vacuum gauge.

Pumping speed graph at 50 Hz with/without gas ballast



Pump down graph at 50 Hz with/without gas ballast (100 l volume)



Further information and diagrams for 60 Hz mains frequency at www.vacuubrand.com
Pumping speeds and pump down times are only for information. Ultimate vacuum specification: See "Technical Data"

TECHNICAL DATA	RE 9	RZ 9
Number of stages	1	2
Max. pumping speed at 50/60 Hz	8.9 / 10.2 m³/h	8.9 / 10.2 m³/h
Ultimate partial vacuum (abs.)	1 x 10^{-1} mbar	4 x 10^{-4} mbar
Ultimate vacuum (abs.)	1 x 10^{-1} mbar	2 x 10^{-3} mbar
Ultim. vac. (abs.) with gas ballast	6 x 10^{-1} mbar	1 x 10^{-2} mbar
Water vapor tolerance with gas ballast	40 mbar	40 mbar
Oil capacity (B-Oil) min./max.	0.4 / 1.4 l	0.2 / 0.8 l
Inlet connection	Small flange KF DN 25	Small flange KF DN 25
Outlet connection	Small flange KF DN 25	Small flange KF DN 25
Rated motor power	0.37 kW	0.37 kW
Rated motor speed at 50/60 Hz	1500/1800 min^{-1}	1500/1800 min^{-1}
Degree of protection	IP 40	IP 40
Dimensions (L x W x H), approx.	460 x 152 x 232 mm	460 x 152 x 232 mm
Weight, approx.	21.4 kg	24.2 kg

ORDERING INFORMATION		RE 9
230 V ~ 50-60 Hz	CEE	697170

ORDERING INFORMATION		RZ 9
230 V ~ 50-60 Hz	CEE	698140
230 V ~ 50-60 Hz	CH, CN	698141
230 V ~ 50-60 Hz	UK, IN	698142
120 V ~ 60 Hz	US	698143
400 V ~ 50 Hz 3 Ph.	CEE	698145

ORDERING INFORMATION		PC 3 / RZ 9
230 V ~ 50-60 Hz	CEE	699895

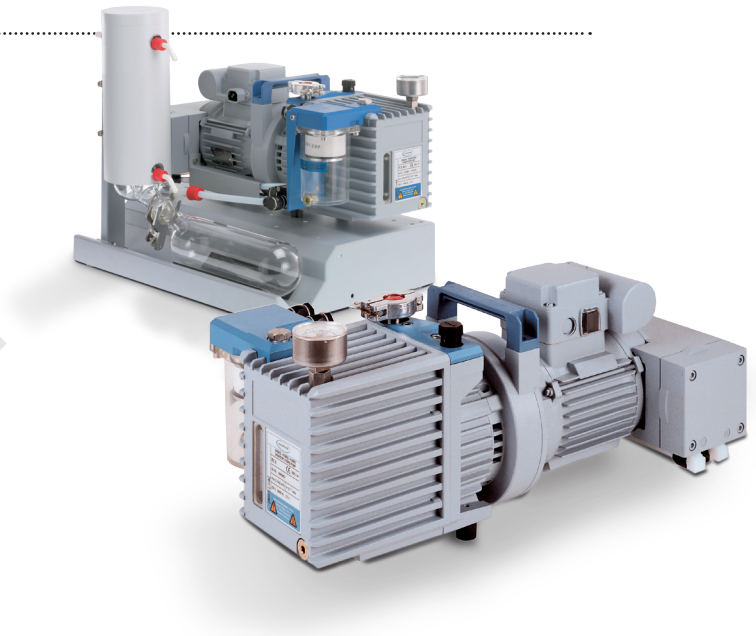
ACCESSORIES

Stainless steel tubing KF DN 25 (1000 mm: 673337)
Separator inlet side AK R 8/9/16 (698007)
Oil mist filter FO R 8/9/16 (698017)
Inline oil filter HF R 8/9/16, until 06/2016 (698010)
Package fine vacuum control KF DN 25 (683202)

ITEMS SUPPLIED

Pump oil filled and completely mounted, ready for use, with manual.

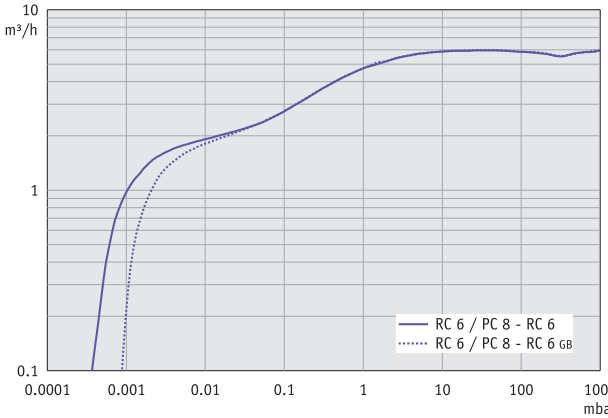
- reduced internal corrosion, even when working with corrosive vapors
- oil changes typically reduced 90% or more compared with rotary vane pumps alone
- excellent environmental friendliness due to efficient solvent recovery (accessory kit PC 8 with emission condenser; or as pumping unit PC 8)
- most economical solution: In practical operation a cold trap is often no longer necessary. For large amounts of vapors a pumping unit PC 3 / RC 6 with cold trap at the inlet is available
- ease of maintenance due to telescopic design



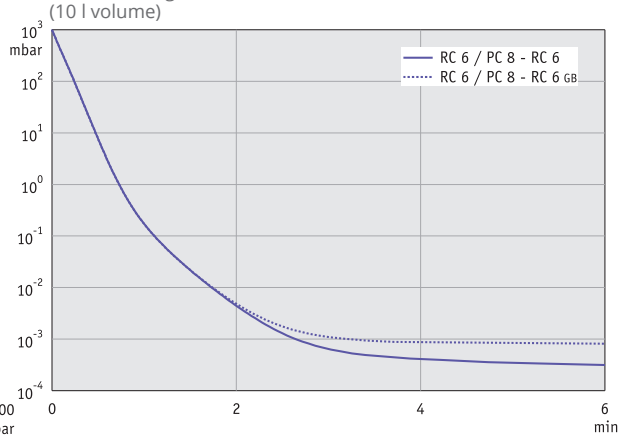
RC 6 - PC 8 WITH RC 6

The RC 6 chemistry-HYBRID pump is a combination of a two-stage rotary vane pump and a two-stage chemistry diaphragm pump for optimized corrosion resistance. The diaphragm pump maintains the oil reservoir under vacuum in order to keep the partial pressures of solvent vapors at levels below their condensation points and to reduce largely the concentration of oxygen and corrosive gases. Therefore the RC 6 chemistry-HYBRID pump has a much higher solvent vapor pumping capability and resistance to aggressive gases than conventional rotary vane pumps. The pumping unit version PC 8 with RC 6 offers excellent environmental friendliness due to efficient solvent recovery.

Pumping speed graph at 50 Hz with/without gas ballast

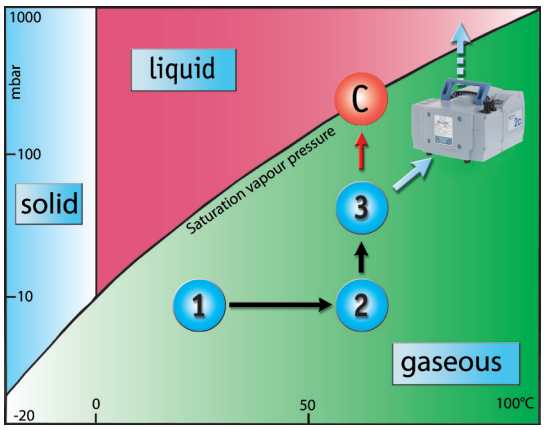


Pump down graph at 50 Hz with/without gas ballast (10 l volume)



Further information and diagrams for 60 Hz mains frequency at www.vacuubrand.com
Pumping speeds and pump down times are only for information. Ultimate vacuum specification: See "Technical Data"

THERMODYNAMIC FUNCTIONAL PRINCIPLE OF THE CHEMISTRY-HYBRID PUMP



1 - Vapor is aspirated at low pressure and ambient temperature.

2 - Vapor is heated to approx. 60°C by heat exchange and compression within pump.

C - Condensation problem with "normal" rotary-vane pumps: On the way to atmospheric pressure, the saturation vapor pressure (transition to liquid state) is reached **inside** the oil-filled section. Result: **Condensation** and **corrosion** inside the pump; **contamination** of the oil.

3 - Chemistry-HYBRID Pump: The chemistry diaphragm pump evacuates the vapors from the oil reservoir of the rotary-vane pump. Under intended operating conditions, **no condensation** takes place inside the oil-filled part and, in particular, within the oil reservoir. (Any condensation taking place inside the oil-free diaphragm pump is much less problematic.) Less condensation means **less corrosion** and **cleaner oil for longer life**. For example, in the case of acid vapors, the evacuation of the oil reservoir to 20 mbar reduces corrosion by a factor of about 50!

TECHNICAL DATA	RC 6
Number of stages	2 + 2
Max. pumping speed at 50/60 Hz	5.9 / 6.9 m³/h
Ultimate partial vacuum (abs.)	4 x 10^{-4} mbar
Ultimate vacuum (abs.)	2 x 10^{-3} mbar
Ultim. vac. (abs.) with gas ballast	1 x 10^{-2} mbar
Water vapor tolerance with gas ballast	>> 40 mbar
Oil capacity (B-Oil) min./max.	0.34 / 0.53 l
Inlet connection	Small flange KF DN 16
Outlet connection	Hose nozzle DN 8-10 mm
Rated motor power	0.37 kW
Rated motor speed at 50/60 Hz	1500/1800 min^{-1}
Degree of protection	IP 40
Dimensions (L x W x H), approx.	510 x 305 x 230 mm
Weight, approx.	24.2 kg

ACCESSORIES

PTFE tubing KF DN 16 (1000 mm: 686031)
Stainless steel tubing KF DN 16 (1000 mm: 673336)
Kit PC 8 with emission condenser (699949)
Filter element oil mist filter RC (640187)
Package fine vacuum control KF DN 16 (683201)
Rubber vacuum tubing DN 8 mm (686001)
Small flange KF DN 16 with hose nozzle DN 8-10 mm (662806)

ITEMS SUPPLIED

Pump completely mounted, ready for use after oil filling (bottle 0.5 l enclosed), with manual.

ORDERING INFORMATION		RC 6
230 V ~ 50-60 Hz	CEE	698560
230 V ~ 50-60 Hz	CH	698561
230 V ~ 50-60 Hz	UK, IN	698562
100-120 V ~ 50-60 Hz	US	698563
230 V ~ 50-60 Hz	CEE/CN	698566

ORDERING INFORMATION	PC 3 / RC 6
230 V ~ 50-60 Hz	*2613307

ORDERING INFORMATION		PC 8 / RC 6
230 V ~ 50-60 Hz	CEE	698570

* Please order power cable separately

OILS FOR ROTARY VANE PUMPS

Oils for rotary vane pumps have to meet high requirements, especially in circumstances of continuous operation:

- low vapor pressure even at high temperatures
- excellent lubricating properties
- low oil back streaming
- excellent resistance to aging
- resistant to break-down
- minimum oxidation

Rotary-vane Pump Oil B

This vacuum pump oil has excellent viscosity characteristics. Its good chemical resistance, low vapor pressure as well as its better stability when pumping oxidants such as acid and alkaline vapors, makes it superior compared to standard mineral oils. This oil is used for the first filling of RE / RZ / RC series pumps.

Many pumped substances can cause deterioration of common pump oil, leading to mechanical problems. **Special oils** should be used as a prevention. **Special oils may maintain lubricating properties but provide only limited protection against corrosion. The start of the pumps at low temperatures can be impeded.**

Rotary-vane Pump Oil K 8

This oil is especially designed for pumping acid vapors but is very hygroscopic and has limited capacity for water vapor. The alkaline additive is consumed during operation making it necessary to change the fluid regularly - even if the pump is not used for several days. Pump oil K 8 does not have the low vapor pressure and the viscosity characteristics of pump oil type B. Pumps will therefore not reach the specified ultimate vacuum and may not start up well at temperatures < 18°C.

Perfluoropolyether Oil

This synthetic oil has excellent chemical resistance. Therefore it is often used for pumping strong oxidants (halogenides, nitrogen oxides, etc.). As this oil type must not be mixed with mineral oils, a pump intended for this oil should be built with it from the outset. All VACUUBRAND rotary vane pumps are available with this oil on request. For changeover of an existing pump to this oil the pump has to be completely disassembled, cleaned and refilled with perfluoropolyether oil at VACUUBRAND (on request).

PFPE oil type I for VACUUBRAND rotary vane pumps RE 2.5, RZ 2.5, RE 6, RZ 6.

PFPE oil type II for all VACUUBRAND rotary vane pumps.

TECHNICAL DATA	ROTARY-VANE PUMP OIL B	ROTARY-VANE PUMP OIL K 8
Vapor pressure (mbar) at operating temperature of pump	$< 1 \times 10^{-3}$	$< 5 \times 10^{-3}$
Flashpoint °C	264	249
Viscosity at 40°C mm²/sec	94	128
Density at 20°C g/cm³	0.87	0.89

TECHNICAL DATA	PERFLUOROPOLYETHER OIL TYP I	PERFLUOROPOLYETHER OIL TYP II
Vapor pressure (mbar) at operating temperature of pump	$< 3 \times 10^{-5}$	$< 3 \times 10^{-5}$
Flashpoint °C	-	-
Viscosity at 40°C mm²/sec	60	60
Density at 20°C g/cm³	1.90	1.89

ORDERING INFORMATION

Pump oil B, 1 l bottle	687010	Rotary-vane pump oil K8, 5 l canister	687101
Pump oil B, 5 l canister	687011	Rotary-vane pump oil K8, 20 l canister	687102
Pump oil B, 20 l canister	687012	Perfluoropolyether oil I, 0.3 l bottle	687610
Pump oil B, 200 l barrel	687013	Perfluoropolyether oil II, 0.5 l bottle	687600
Rotary-vane pump oil K8, 1 l bottle	687100		

PROTECT YOUR PUMP AND THE ENVIRONMENT...

...AT INLET (OF PUMP)

Cold traps (models SKF and GKF)

Cold traps filled with cooling agents, such as dry ice or liquid nitrogen, separate condensate and aggressive media and protect highly efficient*. In addition cold traps filled with liquid nitrogen reduce back-migration of oil vapors considerably. Cold traps improve the effective pumping speed for condensable media significantly.
* Efficient only for inlet pressures < 1 mbar.

Separator (AK)

Separators at the inlet protect pumps from particulates and droplets which may shorten service intervals and even reduce the lifetime and the operating performance of oil-sealed rotary vane pumps.

- direct mounting at the inlet, compact and leak-tight
- high conductance
- direct visibility of condensate through the transparent catchpot
- easy draining of condensate

...AT OUTLET (OF PUMP)

Oil mist filter (FO)

Exhaust gases from oil-sealed rotary vane pumps always carry a certain quantity of oil mist. This is extremely unpleasant, and even harmful, for those working nearby. VACUUBRAND oil mist filters separate nearly 100% of oil mist at the ultimate vacuum of the pump.

- very high degree of separation
- optimal control by transparent catchpot
- easy draining of oil
- direct mounting on the oil reservoir outlet
- integrated pressure relief valve for burst protection in case of blocked filter

...IN THE PUMP

Oil return upgrade kit for R 2.5/6/9 (R 16 on request), for installation on existing oil mist filter FO

The oil return kit puts the oil collected in the oil mist filter back into the oil circuit of the vacuum pump.

- for operation at relatively high vacuum pressure or frequently aerating of the vacuum chamber
- recommended for applications with low oil contamination

Full-flow oil filter (HF, only for R 8/9/16 until manufacturing date 06/2016)

Particles reduce the lifetime of the oil and increase service demands. The full-flow oil filters efficiently filter micro particles out of the oil. The service indicator helps to avoid unnecessary filter changes.

Tips to obtain the best vacuum

- use a suction line with maximum cross-section (corresponding to the pump inlet). With a smaller cross section than the pump inlet the pumping speed especially at low pressures might be severely limited.
- design the suction line between the application and the pump as short as possible. The hose length and type has a major influence on the effective pumping speed at the application.
- for high demands on chemical resistance we recommend corrugated PTFE hoses

- direct mounting at the inlet, compact and leak-tight
- high conductance
- direct visibility of condensate through the transparent catchpot
- easy draining of condensate

SEPARATOR (AK)

Separators at the inlet protect pumps from particulates and droplets which may shorten service intervals and even reduce the lifetime and the operating performance of oil-sealed rotary vane pumps.

TECHNICAL DATA		AK R 2/2.5	AK R 5/6	AK R 8/9/16
Inlet		Small flange KF DN 16	Small flange KF DN 16	Small flange KF DN 25
Outlet		directly mountable	directly mountable	directly mountable
Wetted materials		Aluminum, PMP	Aluminum, PMP	Aluminum, PMP
Volume catchpot	ml	250	250	500
Dimensions (L x W x H), approx.	mm	200 x 80 x 159	223 x 80 x 159	163 x 110 x 161
Weight, approx.	kg	0.65	0.7	1.1
For VACUUBRAND pumps		RE 2, RZ 2, RE 2.5, RZ 2.5	RE 5, RZ 5, RE 6, RZ 6	RE 8, RZ 8, RE 9, RZ 9, RE 16, RZ 16

ORDERING INFORMATION

AK R 2/2.5	698000
AK R 5/6	698006
AK R 8/9/16	698007

- very high degree of separation
- optimal control by transparent catchpot
- easy draining of oil
- direct mounting on the oil reservoir outlet
- integrated pressure relief valve for burst protection in case of blocked filter

OIL MIST FILTER (FO)

Exhaust gases from oil-sealed rotary vane pumps always carry a certain quantity of oil mist. This is extremely unpleasant, and even harmful, for those working nearby. VACUUBRAND oil mist filters separate nearly 100% of oil mist at the ultimate vacuum of the pump.

TECHNICAL DATA		**FO R 2/2.5/5/6**	**FO R 8/9/16**
Inlet		directly mountable	directly mountable
Outlet		Hose nozzle DN 10 mm	Small flange KF DN 25
Permissible volume flow rate	m^3/h	6	20
Wetted materials		Aluminum, PMP, fiberglass epoxy	Aluminum, PMP, fiberglass epoxy
Max. collecting volume	ml	180	195
Dimensions (L x W x H), approx.	mm	119 x 80 x 181	163 x 110 x 196
Weight, approx.	kg	0.8	1.3
For VACUUBRAND pumps		RE 2, RZ 2, RE 2.5, RZ 2.5, RE 5, RZ 5, RE 6, RZ 6	RE 8, RZ 8, RE 9, RZ 9, RE 16, RZ 16

ORDERING INFORMATION

FO R 2/2.5/5/6	698003
FO R 8/9/16	698017

SKF

- sturdy, easy to clean
- easy to disassemble
- two-wall design with good conductance
- long operating time per coolant filling
- easy condensate drainage without disassembling

GKF

- highly reflective insulation jacket for extended coolant life
- vertical window: Direct observation of condensate and coolant levels
- PTFE stopcock: Drain condensate without disassembly
- sheet metal shield for protection against external damage and implosion

COLD TRAPS SKF - GKF

At inlet pressures below 1 mbar cold traps using dry ice or liquid nitrogen as coolant provide important protection for your pump by separating condensates and aggressive media. Cold traps using liquid nitrogen may be essential with very volatile solvents and reduce the back streaming of oil molecules into the vacuum system. Furthermore a cold trap will considerably increase the effective pumping speed for vapors.

TECHNICAL DATA		SKF H 25	SKF H 40	GKF 1000I
Inlet		Small flange KF DN 25	Small flange KF DN 40	NS 29/32 female ground joint
Outlet		Small flange KF DN 25	Small flange KF DN 40	Glass tube 22 mm
Materials		Stainless steel, FKM, NBR	Stainless steel, FKM, NBR	Borosilicate glass, PTFE, FKM
Volume catchpot	ml	500	500	250
Coolant capacity	ml	1000	1000	1000
Typ. coolant life*		12 h	12 h	14 h
Dimensions (L x W x H), approx.	mm	166 x 140 x 303	166 x 140 x 319	D148 x 580

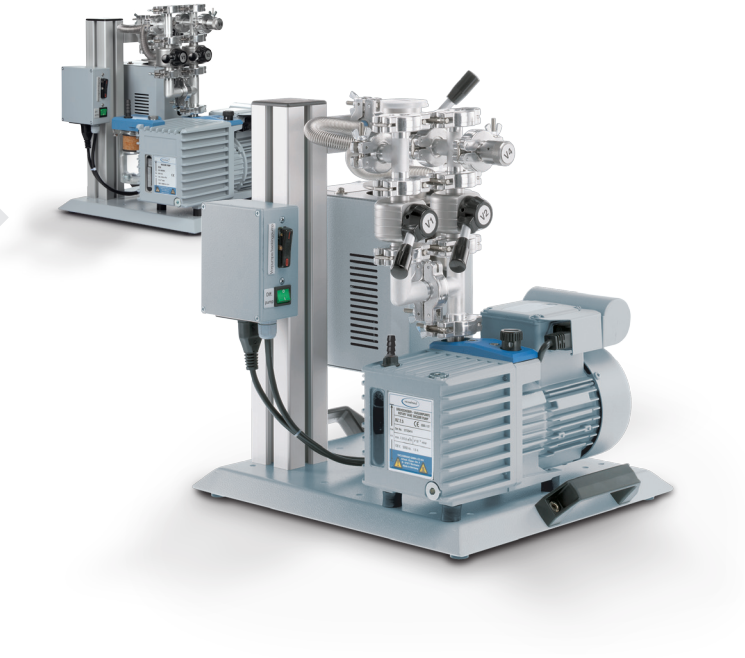
TECHNICAL DATA	FULL-FLOW OIL FILTER (HF, ONLY FOR R 8/9/16 UNTIL MANUFACTURING DATE 06/2016)
Additional oil amount	0.35 l
For VACUUBRAND pumps	RE 8, RZ 8, RE 9, RZ 9, RE 16, RZ 16

ORDERING INFORMATION

Cold trap SKF H 25	667051
Cold trap SKF H 40	667053
Cold trap GKF 1000i	667056
Inline oil filter HF R 8/9/16	**698010
Spare filter element HF R 8/9/16	**698011
Adapter KF DN 16 / tube OD 22 mm (for GKF 1000i)	667057

* typical coolant change intervall for liquid N_2 at pressure < 10^{-2} mbar and 20°C ambient temperature
** Full-flow oil filter (HF, only for R 8/9/16 until manufacturing date 06/2016)

- efficient - The powerful rotary-vane backing pumps generate the necessary backing pressure so that the diffusion pump can always attain its full pumping speed and an ultimate vacuum of approx. 10^{-6} mbar (measured with VACUUBRAND pump fluid and cold trap with liquid nitrogen).
- fast - The pumping unit has a high-vacuum valve at the inlet and a rough vacuum line (bypass). This makes it particularly efficient for rapid evacuation cycles.
- clear directions - Smaller experimental set-ups can be mounted directly on the pumping unit. A clearly visible, condensed operating diagram on the housing of the diffusion pump guides your use and helps prevent operating errors. The diffusion pump can only be switched on if the rotary vane pump is running. All valves and switches are operated from the front.
- compact, sturdy and portable - Pumps, valves and tubing are compactly mounted on a pillar stand. Due to its small overall dimensions, light weight and air cooling, the pumping unit can easily be transported to the systems to be evacuated. The high vacuum pumping units are often used as table-top pumps on laboratory benches so that short vacuum lines can be used.
- economical - The high vacuum pumping units offer outstanding energy savings due to their low power consumption.



HP 40 B2

High-performance, reliable vacuum equipment is essential for successful and time-saving work in many science laboratories. The VACUUBRAND high-vacuum pumping units satisfy these needs and fulfil practical requirements, while providing high vacuum to 10^{-6} mbar. These pumping units consist of an air-cooled diffusion pump, a two-stage rotary vane pump as a backing pump and all connecting parts, including high-vacuum valves, ventilation valves, and a bypass line.

TECHNICAL DATA	HP 40 B2 / RZ 2.5
Backing pump	RZ 2.5
Max. pumping speed of pumping unit	22 l/s
Ultimate vacuum (abs.)	1 x 10^{-6} mbar
Inlet connection	Small flange KF DN 40
Outlet connection	Hose nozzle DN 8-10 mm
Connection of vacuum gauge	2 x small flange KF DN 10
Diffusion pump fluid (DP 704)	30 ml
Heating power	0.2 kW
Heat-up time	7 min
Dimensions (L x W x H), approx.	445 x 385 x 435 mm
Weight, approx.	25.4 kg

TECHNICAL DATA	HP 40 B2 / RZ 6
Backing pump	RZ 6 + FO
Max. pumping speed of pumping unit	22 l/s
Ultimate vacuum (abs.)	1 x 10^{-6} mbar
Inlet connection	Small flange KF DN 40
Outlet connection	Hose nozzle DN 8-10 mm
Connection of vacuum gauge	2 x small flange KF DN 10
Diffusion pump fluid (DP 704)	30 ml
Heating power	0.2 kW
Heat-up time	7 min
Dimensions (L x W x H), approx.	445 x 381 x 460 mm
Weight, approx.	30.9 kg

ACCESSORIES HP 40 B2 / RZ 2.5

Stainless steel tubing KF DN 40 (1000 mm: 673338)
Diffusion pump oil (0.1 l : 687300)
Oil mist filter FO R 2/2.5/5/6 (698003)
Vacuum gauge DCP 3000 with MPT (683175)
Rubber vacuum tubing DN 8 mm (686001)

ACCESSORIES HP 40 B2 / RZ 6

Stainless steel tubing KF DN 40 (1000 mm: 673338)
Diffusion pump oil (0.1 l : 687300)
Vacuum gauge DCP 3000 with MPT (683175)
Rubber vacuum tubing DN 8 mm (686001)

ITEMS SUPPLIED HP 40 B2 / RZ 2.5

Pumping unit HP 40 B2 with backing pump RZ 2.5 completely mounted, ready for use, with manual.

ORDERING INFORMATION		HP 40 B2 / RZ 2.5
230 V ~ 50-60 Hz	CEE/CH/UK	699029

ITEMS SUPPLIED HP 40 B2 / RZ 6

Pumping unit HP 40 B2 with backing pump RZ 6 and oil mist filter completely mounted, ready for use, with manual.

ORDERING INFORMATION		HP 40 B2 / RZ 6
230 V ~ 50-60 Hz	CEE	*2612089

* Country specific power cable, please order separately if needed


BVC
professional

FLUID ASPIRATION SYSTEMS

The compact BioChem-VacuuCenter offers the perfect solution for safe, sensitive and efficient aspiration of supernatants in all application areas. The BVC basic is intended for connection to an external vacuum source. The BVC control and the BVC professional are equipped with a high performance, chemically resistant diaphragm pump. The vacuum level and thus the suction force at the hand control can be sensitively adjusted via a touch panel. In addition, the BVC professional features a non-contact liquid level sensor and self-closing quick couplings (4l PP bottle version). All systems are available either with a vacuum-resistant, autoclavable 4l PP bottle or with a 2l borosilicate glass bottle, e.g., for working with aggressive disinfectants such as chlorine bleach. All versions are ready for connection of a second hand control.

VHC^{pro} - Ergonomic aspiration hand set with tip holder and adapter to accept a variety of common pipettes and tips. Level for manual suction control, rotary knob for permanent aspiration. With 2.5 m tubing

FLEXIBILITY AND COMFORT

- 4l PP or 2l glass bottle - for a perfect fit with process protocols (glass version, e.g., for chlorine bleach)
- compact size with control handle - for flexible, space-saving setup with perfect ergonomics
- very low noise levels in operation - to work comfortably in daily routine
- sensitive suction power adjustment via touch panel - for sample protection and reproducible results
- vacuum pump that responds automatically to demand - no foot pedal switch needed

ECONOMIC EFFICIENCY

- powerful chemical-resistant diaphragm vacuum pump with a very long service life even when working with aggressive disinfectants - minimal costs for maintenance and spare parts
- ready to accept a second hand controller - double use for lower cost per user
- high-quality components for trouble-free operation in continuous professional use

SAFETY

- 0.2 µm protection filter - high protection against contamination of the environment
- hand controller with flow-through suction tube - no contamination of handle with aspirated media
- collection flask made of PP or coated borosilicate glass - completely autoclavable, with 0.2 µm protection filter
- 2l borosilicate glass flask for high chemical resistance, with splinter-proof coating for safety and leakage protection
- BVC professional includes liquid-level sensor to prevent aspiration of liquids into pump. Self-closing couplings (4l PP bottle version) for safe removal of bottle for change and transport

- mechanical vacuum regulator to provide optimum working vacuum and minimize the vapor load on the vacuum network
- stable base and electricity-free operation for convenience
- autoclavable collection bottle designed to reduce aerosol and foam formation; autoclavable quick-couplings available as accessory
- aspiration hand set VacuuHandControl (VHC^{pro}) with flow-through suction tube - no contamination of handle by aspirated media
- hydrophobic 0.2 µm sterilizable filter - contamination risks for the vacuum pumping system are greatly reduced; autoclavable as complete unit together with the collection bottle

BVC basic

The BioChem-VacuuCenter BVC basic is designed for connection to an existing external vacuum source like a diaphragm pump or a vacuum network (e.g., VACUU·LAN®) and does not require electric power. The chemical-resistant mechanical vacuum controller always ensures an optimal operating vacuum. The controller opens only when needed thus limiting the gas load on the vacuum source. The evaporation of collected liquid is minimized. The inlet tubing integrated in the bottle head reduces aerosol and foam formation and ensures a long service life of the hydrophobic protection filter. The aspiration system is available either as BVC basic with 4l PP bottle or as BVC basic G with 2l coated borosilicate glass bottle.

TECHNICAL DATA	**BVC basic**
Collection bottle	4l Polypropylene
Dimensions (L x W x H), approx.	250 x 200 x 490 mm
Weight, approx.	2.8 kg

TECHNICAL DATA	**BVC basic G**
Collection bottle	2l Glass
Dimensions (L x W x H), approx.	230 x 180 x 430 mm
Weight, approx.	3.2 kg

ITEMS SUPPLIED

Complete fluid aspiration system for existing vacuum source, with automatic vacuum control, hose nozzle DN 6/10 mm for connection to a vacuum supply, aspiration hand set VacuuHandControl VHC^{pro}, collection bottle, protection filter and manual.

ORDERING INFORMATION	***BVC basic**
	727000

ORDERING INFORMATION	****BVC basic G**
	727100

* With 4l PP collection bottle for general aspiration tasks, completely autoclavable together with a 0.2 µm protection filter

** With 2l borosilicate glass collection flask with splinter-proof coating and leakage protection, with high chemical resistance for aggressive disinfectants like chlorine bleach; completely autoclavable together with 0.2 µm protection filter.

- powerful and long-lasting chemistry diaphragm pump for universal economical use
- extremely compact, space saving and low noise and thus the ideal tool in the workplace
- easy operation due to electronically adjustable suction power via touch panel, for strong or sensitive suction
- autoclavable collection bottle designed to reduce aerosol and foam formation; with hydrophobic protection filter 0.2 µm, autoclavable quick-couplings available as accessory
- ready to accept a second aspiration hand controller (VHC^{pro}) to support two users

BVC control

The BioChem-VacuuCenter BVC control serves for efficient and convenient aspiration of supernatants. The vacuum level - and thus the suction force - is exactly adjustable by the electronic touch panel and allows a sensitive and reproducible operation. The chemically resistant diaphragm vacuum pump is automatically turned on and off as needed, which reduces the low noise level even further. The BVC control is available in two complete equipment options with different collection flasks. The 2l borosilicate glass bottle with a protective coating has a very high chemical resistance. For larger amounts of liquids the 4l bottle of unbreakable polypropylene (PP) is used. The smooth surfaces allow an easy cleaning of the systems.

TECHNICAL DATA	**BVC control**
Vacuum pump	ME 1C
Ultimate vacuum (abs.)	150 mbar
Dimensions (L x W x H), approx.	408 x 194 x 500 mm
Weight, approx.	7.3 kg

ITEMS SUPPLIED

Fluid aspiration system complete with powerful chemistry diaphragm pump, collection bottle, adjustable suction power control via touch panel, aspiration hand set VHC^{pro} and protection filter, ready for use with manual.

ORDERING INFORMATION		***BVC control**
230 V ~ 50-60 Hz	CEE	727200
230 V ~ 50-60 Hz	CH	727201
230 V ~ 50-60 Hz	UK, IN	727202
100-120 V ~ 50-60 Hz	US	727203
230 V ~ 50-60 Hz	CN	727206

ORDERING INFORMATION		****BVC control G**
230 V ~ 50-60 Hz	CEE	727300
230 V ~ 50-60 Hz	CH, CN	727301
230 V ~ 50-60 Hz	UK, IN	727302
100-120 V ~ 50-60 Hz	US	727303

* With 4l PP collection bottle for general aspiration tasks, completely autoclavable together with a 0.2 µm protection filter

** With 2l borosilicate glass collection flask with splinter-proof coating and leakage protection, with high chemical resistance for aggressive disinfectants like chlorine bleach; completely autoclavable together with 0.2 µm protection filter

- with all the advantages of the BVC control
- non-contact sensor for electronic monitoring of the liquid level in the collection bottle
- disinfection routine for the suction tubing for drawing in disinfectant after switching off the pump
- self-closing quick couplings (as accessory to the BVC professional G) for convenient and safe bottle change, e.g., for work with biohazards
- for professional work and a perfect fit for required safety protocols

BVC professional

The BioChem-VacuuCenter BVC professional serves for aspiration and disposal of biological fluids, providing outstanding levels of comfort and safety for working with biological and biohazardous materials. A non-contact sensor monitors the liquid level in the collection bottle electronically and prevents overfilling. A disinfection routine allows the suction of disinfectants through aspiration hand set and tubing after switching off the pump, and so supports demanding safety protocols. The BVC professional with 4l PP bottle with self-closing quick couplings minimizes risk in transporting hazardous waste and of contamination in the workplace. The version with coated 2l borosilicate glass bottle allows you to work with aggressive disinfectants like chlorine bleach.

TECHNICAL DATA	**BVC professional**
Vacuum pump	ME 1C
Ultimate vacuum (abs.)	150 mbar
Dimensions (L x W x H), approx.	408 x 194 x 500 mm
Weight, approx.	7.3 kg

ITEMS SUPPLIED

Fluid aspiration system complete with powerful chemistry diaphragm pump, collection bottle, adjustable suction power control via touch panel, non-contact liquid level sensor, quick couplings (4l PP version), aspiration hand set VHC^{pro} and protection filter, ready for use with manual.

ORDERING INFORMATION		***BVC professional**
230 V ~ 50-60 Hz	CEE	727400
230 V ~ 50-60 Hz	CH, CN	727401
230 V ~ 50-60 Hz	UK, IN	727402
100-120 V ~ 50-60 Hz	US	727403

ORDERING INFORMATION		****BVC professional G**
230 V ~ 50-60 Hz	CEE	727500
230 V ~ 50-60 Hz	CH, CN	727501
230 V ~ 50-60 Hz	UK, IN	727502
100-120 V ~ 50-60 Hz	US	727503

* 4l PP collection flask, with self-closing quick couplings made of PVDF, completely autoclavable together with protection filter 0.2 µm

** With 2l borosilicate glass collection flask with splinter-proof coating and leakage protection, with high chemical resistance for aggressive disinfectants like chlorine bleach; completely autoclavable together with 0.2 µm protection filter.

Ergonomic aspiration hand set with tip holder and adapter to accept a variety of common pipettes and tips. Level for manual suction control, rotary knob for permanent aspiration. With 2.5 m tubing.

VacuuHandControl VHCpro 688061

VacuuHandControl VHC^{pro}

The stainless steel stand for the VHC^{pro} enables to place the tipped suction handset conveniently and stable during work with cell cultures.

Table stand for VHCpro 635680

Table stand for VHC^{pro}

Silicone tubing (minimum order quantity 2m).

Spare tubing for VHC / VHCpro 636156

Spare tubing for VHC / VHC^{pro}

This adapter is designed for pipette tips 2 - 200 µl and has got a tip ejector to remove the used pipette tip.

Adapter for pipette tips with tip ejector 635638

Adapter for pipette tips with tip ejector

This adapter allows parallel operation of eight pipette tips (size 2 - 200 µl or 5 - 300 µl). It is designed to match the dimensions of standardized 96-well microplates and has got a tip ejector to remove the used pipette tips.

VHCpro 8-channel tip adapter with ejector 635679

VHC^{pro} 8-channel tip adapter with ejector

Hose nozzle and inlet tube for minimized foam and aerosol formation (VHC / VHC^{pro} not included). For BVC professional with 4l bottle PP please order article 635807 instead

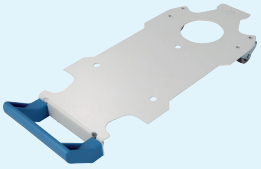
Extension kit second VHC / VHCpro connection 699943

Extension kit second VHC / VHC^{pro} connection

The BVC shuttle is a mobile underframe for all models BVC control and BVC professional. It serves to pull out the BVC easily from under the safety cabinet for cleaning and removal of bottle for change.

BVC shuttle 696880

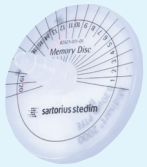
BVC shuttle



Hydrophobic 0.2 µm protection filter, to protect pump system and work environment. Autoclavable up to 20 times.

Protection filter 0.2 µm 638266

Protection filter 0.2 micron



Quick coupling made of PVDF, with adapter to connect a VHC / VHC^{pro} to a collection bottle, very good chemical resistance, complete with inlet tube for minimized foam and aerosol formation, autoclavable

Quick coupling VHC / VHCpro - bottle 635807

Quick coupling VHC / VH-C^{pro} - bottle

Quick coupling made of PVDF, to connect a collection bottle to a BVC unit. Very good chemical resistance. Autoclavable. When disconnected, the collection bottle closes vacuum tight.

Quck coupling set connection bottle - pump 635808

Quck coupling set connection bottle - pump

4l heavy-walled, vacuum-proof collection bottle with high chemical resistance (PP). Special bottle head for minimized foam and aerosol formation, with hose nozzle for VacuuHandControl VHC / VHC^{pro} and additional port to connect a second VHC / VHC^{pro} (optional). Hydrophobic filter element 0.2 µm to protect pump and environment. Hose for connection to BVC. Fully autoclavable.

4l collection bottle made of polypropylene (PP) 635810

4l collection bottle made of polypropylene (PP)

2l borosilicate glass collection bottle with high chemical resistance, with splinter-proof coating, special bottle head for minimized foam and aerosol formation, hose nozzle for VacuuHandControl VHC^{pro}and additional port to connect a second VHC^{pro} (optional), hydrophobic filter element 0.2 µm to protect pump and environment, hose for connection to pump unit BVC or BVC basic; fully autoclavable.

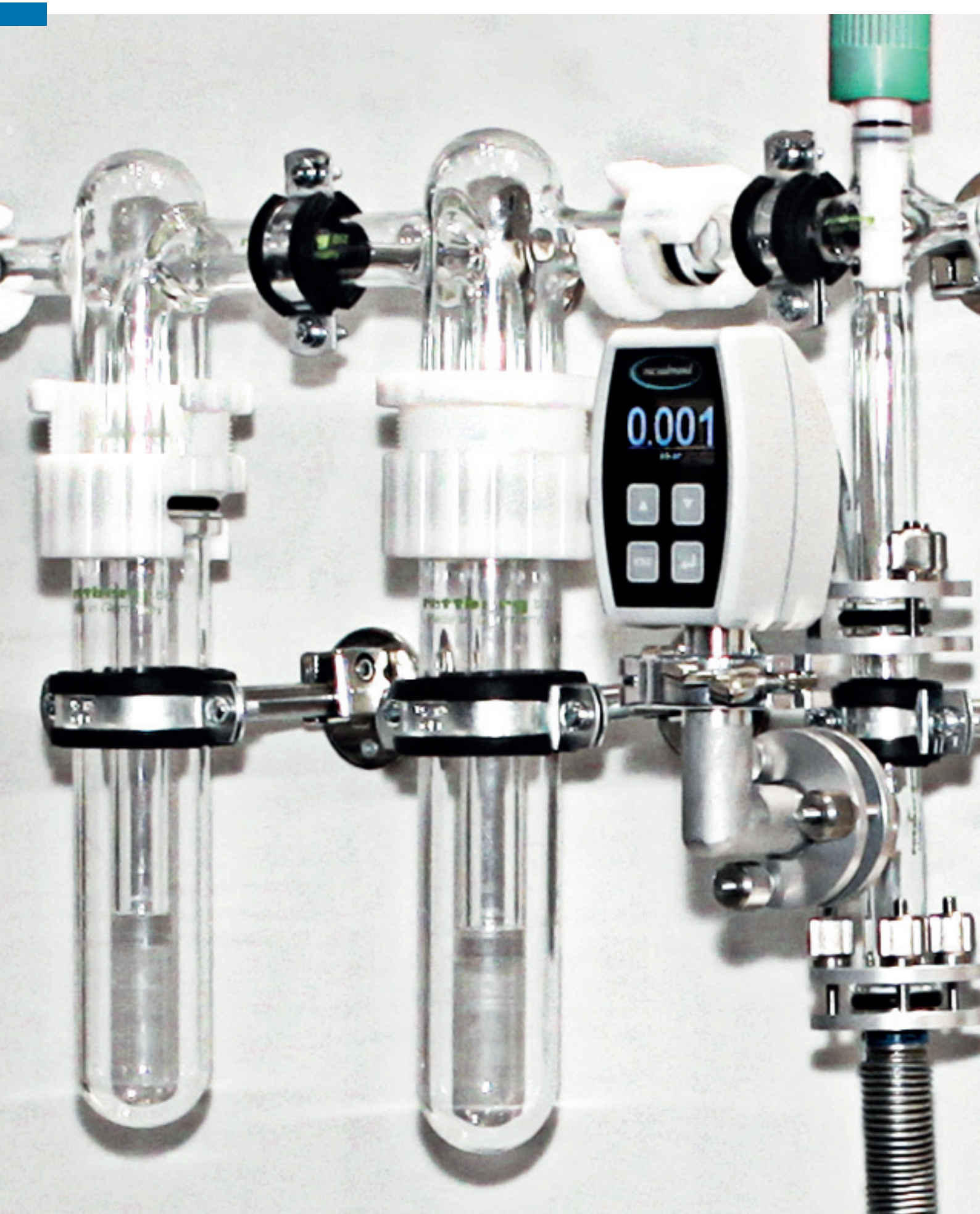
2l collection bottle made of borosilicate glass 635809

2l collection bottle made of borosilicate glass

Holder for 2 liter glass bottle for BVC control or BVC professional (included in BVC control G and BVC professional G).

Adapter for 2l glass bottle 635839

Adapter for 2l glass bottle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VACUUM GAUGES AND CONTROLLERS

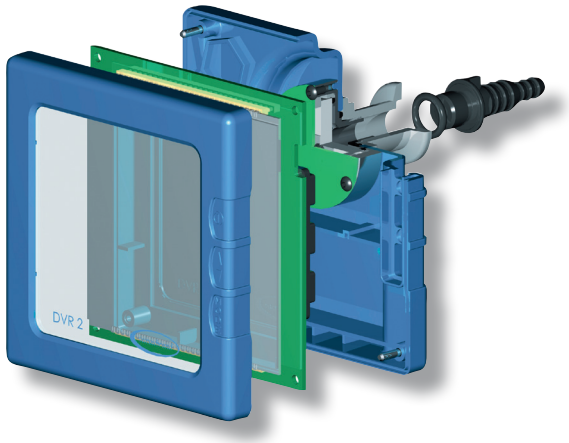
The vacuum gauges DCP 3000, VACUU·VIEW and VACUU·VIEW extended (and also the CVC 3000 vacuum controllers) as well as the recommended accessories use VACUU·BUS® as their communication system. Uniform plug and socket connections make the system flexible and allow extension of the lines up to 30 m. The measuring instruments and components are completely self-configuring. Components connected to the gauges and controllers are automatically recognized, configured and supervised. At the DCP 3000 up to eight external vacuum sensors (four VACUU·VIEW, VSK 3000 and four VACUU·VIEW extended, VSP 3000) can be connected for simultaneous monitoring on the spot. Additionally the DCP 3000 can be used for relative pressure measurements (using VSK 3000 vacuum sensors as a reference) and as a data logger for up to 32,000 measurement values. For high vacuum measurements the DCP 3000 allows the connection with the combined Penning/Pirani gauge head MPT.
The final touch is put on this range of products with an ATEX-approved measuring instrument for use in locations with and measuring of potentially explosive atmospheres per ATEX category 2.

MEASUREMENT PRINCIPLE

State-of-the-art vacuum gauges for laboratory and industrial operation have to meet high standards in terms of gauge head resistance to chemicals, reliability in rugged applications and operator-friendly interfaces. VACUUBRAND has a comprehensive range of electronic measuring instruments for the range of atmospheric pressure to 5 x 10^{-9} mbar.

Ceramic diaphragm

We use a capacitive ceramic diaphragm gauge head in the rough vacuum range from atmospheric pressure to 0.1 mbar that measures independently of the type of gas and is exceptionally resistant to chemicals. It also has outstanding measuring accuracy, very low temperature depencence and excellent long-term stability.



Thermal conductivity (Pirani), chemically resistant plastics / ceramics

Pirani vacuum sensors are preferably used in the lower rough and fine vacuum ranges from below 10 to 10^{-3} mbar. They measure the heat conductivity of a gas that depends on the gas density and, therefore, pressure. The accuracy of this measuring process is best in the range of 10 to 10^{-2} mbar. The indicated pressure depends on the type of gas and deviates from the air adjustment (at the factory) depending upon the heat conductivity of the specific gas being measured. The VACUUBRAND products VACUU·VIEW extended and VSP 3000 feature an exceptional chemical resistance and robustness compared with conventional Pirani sensors (with metallic filament) as its wetted parts are made of special plastics and ceramics.

Combined thermal conductivity (Pirani) / cold cathode (Penning)

Cold cathode vacuum gauges ("Penning") are ionization gauges for the range 10^{-2} mbar to 5 x 10^{-9} mbar. They measure the gas density via a discharge current and therefore gas type dependent. They are advantageously combined with a Pirani gauge with automatic switching to it in the range above 10^{-2} mbar to atmospheric pressure. Due to their limited chemical resistance they are preferably used in clean high vacuum applications. VACUUBRAND offers for such applications the vacuum gauge DCP 3000 with the combined Pirani and cold cathode gauge head MPT.

Vacuum gauges	Measurement principle	Measuring range	Page
DVR 2	Ceramic diaphragm	1080 - 1 mbar (hPa) 810 - 1 torr	pg. 172
DVR 3	Ceramic diaphragm	1080 - 1 mbar (hPa) 810 - 1 torr	pg. 173
VACUU·VIEW	Ceramic diaphragm	1100 - 0.1 mbar (hPa) 825 - 0.075 torr	pg. 174
VACUU·VIEW extended	Ceramic diaphragm sensor + ceramic jacketed Pirani sensor	1100 - 0.001 mbar (hPa) 825 - 0.001 torr	pg. 175
Set DCP 3000 + VSK 3000	Ceramic diaphragm	1080 - 0.1 mbar (hPa) 810 - 0.1 torr	pg. 176
Set DCP 3000 + VSP 3000	Thermal conductivity (Pirani), chemically resistant plastics / ceramics	1000 - 1 x 10^{-3} mbar (hPa) 750 - 1 x 10^{-3} torr	pg. 177
Set DCP 3000 + MPT	Combined thermal conductivity (Pirani) / cold cathode (Penning)	1000 - 5 x 10^{-9} mbar (hPa) 750 - 3.7 x 10^{-9} torr	pg. 177

Vacuum controller	Measurement principle	Measuring range	Page
CVC 3000 Basic device - controls vacuum, cooling water and venting to demand	Ceramic diaphragm	1080 - 0.1 mbar (hPa) 810 - 0.1 torr	pg. 179
CVC 3000 detect Controller package with integrated valve - for automatic detection of the boiling pressure	Ceramic diaphragm	1080 - 0.1 mbar (hPa) 810 - 0.1 torr	pg. 181

- enhanced battery life due to choosable shutdown time and sampling rate, typical battery life one year continuous operation
- large analog and digital vacuum display: quick trend detection, precise readout
- user-selectable pressure units (mbar, hPa, Torr)
- with adjustable support rod for stand mounting operation
- capacitive alumina ceramic diaphragm vacuum sensor with excellent chemical resistance, accuracy and long term stability

DVR 2

TECHNICAL DATA	DVR 2
Upper measuring limit	1080 / 810 mbar/hPa / torr
Lower measuring limit	1 / 1 mbar/hPa / torr
Measurement principle	Ceramic diaphragm (alumina), capacitive, gas indep., absolute pressure
Accuracy of measurement	< +- 1 mbar/hPa/torr / +- 1 digit (after adjustment, constant temp.)
Temperature coefficient	< 0.07 mbar/hPa/0.05 torr /K
Vacuum connection	Small flange KF DN 16 and hose nozzle DN 6/10 mm
Permissible ambient temp. range storage / operation	-10 - 60 / 10 - 40 °C
Max. media temp. for continuous operation / short times	40 / 80 °C
Automatic switch-off	User-selectable: 1-1000 min (default 15 min) or continuous operation
Measurement cycle	User-selectable: Automatic or 1 x per 3s, 1 x per 1s, 3 x per 1s
Material of outer housing	Robust plastic housing with good chemical resistance
Degree of protection	IP 40
Power supply	9 V Lithium battery, 1.2 Ah Ultralife U9VL
Dimensions (L x W x H), approx.	115 x 115 x 66 mm
Weight, approx.	0.375 kg

ACCESSORIES

PTFE tubing KF DN 16 (1000 mm: 686031)
Battery 9V Lithium 1.2 Ah (612220)
DAkkS calibration with first delivery (900214)
DAkkS recalibration (900215)
Rubber vacuum tubing DN 6 mm (686000)

ITEMS SUPPLIED

Vacuum gauge complete with integrated vacuum sensor and battery, ready for use, with support rod and manual.

ORDERING INFORMATION	DVR 2
DVR 2	682902

- large analog and digital vacuum display
- mains independent power supply unit BVE 9V, with ATEX approval, mercury and cadmium free
- enhanced battery life due to automatic shutdown and variable sampling rate
- high reliability, low EMI emission level near detection limit, high degree of immunity to electromagnetic interference for use in industrial environments
- capacitive alumina ceramic diaphragm vacuum sensor with excellent chemical resistance, accuracy and long term stability

DVR 3

TECHNICAL DATA	DVR 3
ATEX-approval	II 2G Ex ia IIC T4
Upper measuring limit	1080 / 810 mbar/hPa / torr
Lower measuring limit	1 / 1 mbar/hPa / torr
Measurement principle	Ceramic diaphragm (alumina), capacitive, gas indep., absolute pressure
Accuracy of measurement	< +- 1 mbar/hPa/torr / +- 1 digit (after adjustment, constant temp.)
Temperature coefficient	< 0.07 mbar/hPa/0.05 torr /K
Vacuum connection	Small flange KF DN 16 and hose nozzle DN 6/10 mm
Permissible ambient temp. range storage / operation	-10 - 60 / 10 - 40 °C
Max. media temp. for continuous operation / short times	40 / 80 °C
Automatic switch-off	User-selectable: 1-1000 min (default 15 min) or continuous operation
Measurement cycle	User-selectable: Automatic or 1 x per 3s, 1 x per 1s, 3 x per 1s
Material of outer housing	Robust plastic housing (conductive) with good chemical resistance
Degree of protection	IP 40
Power supply	Power supply unit BVE 9 V, ATEX - certification II 2G Ex ia IIC T5
Dimensions (L x W x H), approx.	116 x 116 x 66 mm
Weight, approx.	0.43 kg

ACCESSORIES

PTFE tubing KF DN 16 (1000 mm: 686031)
Stainless steel tubing KF DN 16 (1000 mm: 673336)
Power supply unit BVE 9 V (637986)
DAkkS calibration with first delivery (900214)
DAkkS recalibration (900215)

ITEMS SUPPLIED

Vacuum gauge complete with integrated vacuum sensor and power supply unit, ready for use, with manual.

ORDERING INFORMATION	DVR 3
DVR 3	682903

- highest precision in the range from atmosphere down to 0.1 mbar, perfect gauge for all rough vacuum applications
- compact design with integrated sensor for useful setup in laboratory and process
- chemically resistant ceramic diaphragm sensor, highly reliable at harsh laboratory conditions even in case of aggressive chemicals
- illuminated display, easy to read
- Display with menu driven handling easy to use e.g. for unit settings

VACUU·VIEW

TECHNICAL DATA	VACUU·VIEW
Upper measuring limit	1100 / 825 mbar/hPa / torr
Lower measuring limit	0.1 / 0.075 mbar/hPa / torr
Measurement principle	Ceramic diaphragm (alumina), capacitive, gas indep., absolute pressure
Accuracy of measurement	< +- 1 mbar/hPa/torr / +- 1 digit (after adjustment, constant temp.)
Temperature coefficient	< 0.07 mbar/hPa/0.05 torr /K
Vacuum connection	Small flange KF DN 16 and hose nozzle DN 6/10 mm
Permissible ambient temp. range storage / operation	-10 - 60 / 10 - 40 °C
Max. media temp. for continuous operation / short times	40 / 80 °C
Material of outer housing	Robust plastic housing with good chemical resistance
Power supply	100-230 V ~ 50-60 Hz
Dimensions (L x W x H), approx.	50 x 62 x 103 mm
Weight, approx.	0.19 kg

ACCESSORIES

PTFE tubing KF DN 16 (1000 mm: 686031)
Stainless steel tubing KF DN 16 (1000 mm: 673336)
DAkkS calibration with first delivery (900214)
DAkkS recalibration (900215)
Rubber vacuum tubing DN 6 mm (686000)

ITEMS SUPPLIED

Vacuum gauge with integrated vacuum sensor, ready for operation, with kit hose nozzle DN 6/10 mm, wall-plug power supply and manual.

ORDERING INFORMATION		VACUU·VIEW
100-230 V ~ 50-60 Hz		
CEE/CH/UK/US/AUS/CN	Ex*	683220

Ex*: ATEX: II 3G IIC T4 X, Internal Atm. only

- Precision and chemical resistance in an exceptionally wide range from atmosphere down to 10^{-3} mbar, one gauge only for both rough and fine vacuum
- compact design with integrated sensors for useful setup in laboratory and process
- the chemical resistant combination of ceramic diaphragm sensor and ceramic jacketed Pirani sensor ensures a long product life even with aggressive chemicals
- illuminated display, easy to read
- display with menu driven handling, easy to use e.g. for unit settings

VACUU·VIEW EXTENDED

TECHNICAL DATA	VACUU·VIEW EXTENDED
Upper measuring limit	1100 / 825 mbar/hPa / torr
Lower measuring limit	0.001 / 0.001 mbar/hPa / torr
Measurement principle	Ceramic diaphragm sensor + ceramic jacketed Pirani sensor
Accuracy of measurement	+- 15% of indicated value in the range from 0.01-10 mbar / +-3mbar for > 10mbar
Temperature coefficient	+- 0.2 mbar/hPa/0.15 torr /K
Vacuum connection	Small flange KF DN 16 and hose nozzle DN 6/10 mm
Permissible ambient temp. range storage / operation	-10 - 60 / 10 - 40 °C
Max. media temp. for continuous operation / short times	40 / 80 °C
Material of outer housing	Robust plastic housing with good chemical resistance
Power supply	100-230 V ~ 50-60 Hz
Dimensions (L x W x H), approx.	50 x 62 x 103 mm
Weight, approx.	0.19 kg

ACCESSORIES

PTFE tubing KF DN 16 (1000 mm: 686031)
Stainless steel tubing KF DN 16 (1000 mm: 673336)
DAkkS calibration with first delivery (900214)
DAkkS recalibration (900215)
Rubber vacuum tubing DN 6 mm (686000)

ITEMS SUPPLIED

Vacuum gauge with integrated vacuum sensors, ready for operation, with kit hose nozzle DN 6/10 mm, wall-plug power supply and manual.

ORDERING INFORMATION	VACUU·VIEW EXTENDED	
100-230 V ~ 50-60 Hz		
CEE/CH/UK/US/AUS/CN	Ex*	683210

Ex*: ATEX: II 3G IIC T4 X, Internal Atm. only

- up to four gauge heads VSK 3000 (Atm. - 0.1 mbar) and four VSP 3000 (Atm. - 10^{-3} mbar) can be simultaneously connected
- VSK 3000 capacitive alumina ceramic diaphragm vacuum sensor with very high chemical resistance, offers gas-type independent absolute pressure measurement
- outstanding measuring accuracy, temperature and long term stability
- rugged, splash-water proof vacuum sensor, also for rough operating conditions
- relative pressure measurement option (VSK 3000) and data logger feature (up to 32,000 values, readout via RS 232C)

DCP 3000 WITH VSK 3000

TECHNICAL DATA	SET DCP 3000 + VSK 3000
Vacuum sensor	VSK 3000
Cable length of vacuum sensor	2 m
Upper measuring limit	1080 / 810 mbar/hPa / torr
Lower measuring limit	0.1 / 0.1 mbar/hPa / torr
Measurement principle	Ceramic diaphragm (alumina), capacitive, gas indep., absolute pressure
Accuracy of measurement	< +- 1 mbar/hPa/torr / +- 1 digit (after adjustment, constant temp.)
Temperature coefficient	< 0.07 mbar/hPa/0.05 torr /K
Vacuum connection	Small flange KF DN 16, PTFE tubing connection 10/8 mm, hose nozzle DN 6/10 mm
Permissible ambient temp. range storage / operation	-10 - 60 / 10 - 40 °C
Max. media temp. for continuous operation / short times	40 / 80 °C
Material of outer housing	Robust plastic housing with good chemical resistance
Degree of protection, front side of display unit	IP 42
Dimensions of display unit (L x W x H)	144 x 124 x 114 mm
Weight of display unit	0.44 kg

ACCESSORIES

PTFE tubing KF DN 16 (1000 mm: 686031)
DAkkS calibration with first delivery (900214)
DAkkS recalibration (900215)
Vent valve VBM-B (674217)
Vacuum sensor VSK 3000 (636657)
Vacuum sensor VSP 3000 (636163)
Rubber vacuum tubing DN 6 mm (686000)
Rubber vacuum tubing DN 8 mm (686001)

ITEMS SUPPLIED

Vacuum gauge with external vacuum sensor VSK 3000, ready for operation, with kit hose nozzle DN 6/10 mm, wall-plug power supply and manual.

ORDERING INFORMATION		SET DCP 3000 + VSK 3000
100-230 V ~ 50-60 Hz		
CEE/CH/UK/US/AUS/CN	Ex*	683170

With NRTL certification for Canada and the USA
Ex*: ATEX: II 3G IIC T3 X, Internal Atm. only

- up to four gauge heads VSK 3000 (Atm. - 0.1 mbar) and four VSP 3000 (Atm. - 10^{-3} mbar) can be simultaneously connected
- rugged VSP 3000 vacuum sensor made of plastics and ceramics with high chemical resistance
- rugged, splash-water proof VSP 3000 vacuum sensor, also for rough operating conditions
- VSP 3000 with wide measurement range from atmospheric pressure to fine vacuum
- combination of VSP 3000 with controller CVC 3000 and vacuum valves type VV-B allows fine vacuum control

DCP 3000 WITH VSP 3000

TECHNICAL DATA	SET DCP 3000 + VSP 3000
Vacuum sensor	VSP 3000
Cable length of vacuum sensor	2 m
Upper measuring limit	1000 / 750 mbar/hPa / torr
Lower measuring limit	1 x 10^{-3} / 1 x 10^{-3} mbar/hPa / torr
Measurement principle	Thermal conductivity (Pirani), chemically resistant plastics / ceramics
Accuracy of measurement	+- 15% of indicated value in the range 0.01-10 mbar/hPa/torr
Vacuum connection	Small flange KF DN 16 and hose nozzle DN 6/10 mm
Permissible ambient temp. range storage / operation	-10 - 60 / 10 - 40 °C
Wetted materials	Alumina ceramics, PBT, PUR
Degree of protection, front side of display unit	IP 42
Dimensions of display unit (L x W x H)	144 x 124 x 114 mm
Weight of display unit	0.44 kg

ACCESSORIES

Stainless steel tubing KF DN 16 (1000 mm: 673336)
DAkkS calibration with first delivery (900214)
DAkkS recalibration (900215)
Vent valve VBM-B (674217)
Vacuum sensor VSK 3000 (636657)
Vacuum sensor VSP 3000 (636163)
Vacuum sensor MPT 200 (683177)
Rubber vacuum tubing DN 6 mm (686000)
Rubber vacuum tubing DN 8 mm (686001)

ITEMS SUPPLIED SET DCP 3000 + VSP 3000

Vacuum gauge with external vacuum sensor VSP 3000, ready for operation, with wall-plug power supply and manual.

ITEMS SUPPLIED SET DCP 3000 + MPT

Vacuum gauge with external vacuum sensor MPT, ready for operation, with wall-plug power supply and manual.

ORDERING INFORMATION	SET DCP 3000 + VSP 3000	
100-230 V ~ 50-60 Hz	CEE/CH/UK/US/AUS/CN	683190

ORDERING INFORMATION	SET DCP 3000 + MPT	
100-230 V ~ 50-60 Hz	CEE/CH/UK/US/AUS/CN	683175

VACUUM CONTROLLER

A lot of applications in the laboratory call for electronic vacuum control, that is, constantly adapting the pump´s volume flow rate to process requirements. The maximum volume flow rate of the unregulated pump can be changed in various ways:

- by cyclically turning the pump on/off (vacuum controller CVC 3000 in conjunction with vacuum management module VMS-B)
- by cyclically opening/closing an in-line solenoid valve (CVC 3000 or CVC 3000 detect) or
- by continuously adjusting the pump speed (VARIO®-pumps with CVC 3000)

The controller can be used both in vacuum networking solutions where parameters are set once for controlling the vacuum or as a stand-alone controller. The CVC 3000 with its large display, the user-friendly full-text menus and the stable stand is also perfect for use on the lab bench.

Many accessories can be easily connected to vacuum controllers: A coolant valve, an external venting valve or a liquid level sensor for catchpots are often required. Communication with sensors, VARIO® - pumps, the Peltronic® condenser and all other connected components takes place via the VACUU·BUS® control system. It is self-configuring, meaning that connected components will be automatically detected, configured and monitored by the vacuum controller. The self-configuration of the vacuum controllers due to the VACUU·BUS® system makes them especially user-friendly and rules out any mix-up of components. Chemically resistant IP 67 connectors allow the connection of many components.

VACUU·BUS®

- self-configuring "plug and play"
- tight, chemically highly resistant connector plugs
- no danger of confusion of the plugs
- automatic connection to all VACUU·BUS® components including sensors, valves and pumps

- controls vacuum, cooling water and venting on demand
- intuitive operation with turn-and-tap jog wheel and clear text menus, with integrated venting valve
- interactive communication (PC) through RS 232C serial interface
- self-configuring due to VACUU·BUS® system: valves (vacuum, venting, coolant), sensors (vacuum, liquid level), Peltronic® condenser

CVC 3000

TECHNICAL DATA	CVC 3000
Control range	1080 / 810 mbar/hPa / torr - 0.1 / 0.1 mbar/hPa / torr
Measurement principle	Ceramic diaphragm (alumina), capacitive, gas indep., absolute pressure
Accuracy of measurement	< +- 1 mbar/hPa/torr / +- 1 digit (after adjustment, constant temp.)
Temperature coefficient	< 0.07 mbar/hPa/0.05 torr /K
Vacuum connection	PTFE tubing connection 10/8 mm, hose nozzle DN 6/10 mm
Venting valve, connection	Integrated, hose nozzle DN 4-5 mm
Ambient temperature range (storage)	-10 - 60 °C
Ambient temperature range (operation)	10 - 40 °C
Max. media temp. continuous operation	40 °C
Max. media temperature for short times	80 °C
Material of outer housing	Robust plastic housing with good chemical resistance
Degree of protection	IP 20
Degree of protection, front side of display unit	IP 42
Dimensions (L x W x H), approx.	144 x 124 x 115 mm
Weight, approx.	0.44 kg

ACCESSORIES

Rubber vacuum tubing DN 6 mm (686000)
PTFE tubing DN 10/8 mm (638644)
DAkkS calibration with first delivery (900214)
DAkkS recalibration (900215)
VACUU·BUS® accessories
Vacuum sensor VSK 3000 (636657)
Vacuum sensor VSP 3000 (636163)
Kit KF DN 16 for VKR/VSK/CVC (699939)
In-line solenoid vacuum valve VV-B 6C (674291)

ITEMS SUPPLIED

Vacuum controller complete with integrated ceramic vacuum sensor and venting valve. With wall-plug power supply, ready for use, with manual.

ORDERING INFORMATION		CVC 3000
100-230 V ~ 50-60 Hz		
CEE/CH/UK/US/AUS/CN	Ex*	683160

ORDERING INFORMATION PACKAGE CVC3000 + VV-B6C		
Package CVC3000 with in-line isolation valve VV-B6C		
100-230 V ~ 50-60 Hz		
CEE/CH/UK/US/AUS/CN	Ex*	683169
Built-in versions upon request		

With NRTL certification for Canada and the USA (with integrated sensor or VSK 3000)
Ex*: ATEX: II 3G IIC T3 X, Internal Atm. only (with integrated sensor or VSK 3000)

- the CVC 3000 runs vacuum processes by control of external vacuum, venting and cooling water valves
- intuitive operation with turn-and-tap jog wheel and clear text menus
- rugged VACUU·VIEW extended vacuum gauge with high chemical resistance and mechanical robustness
- VACUU·VIEW extended with wide measurement range from atmospheric pressure to fine vacuum (10^{-3} mbar)
- the in-line solenoid valve is chemically highly resistant (series C)

PACKAGES FOR FINE VACUUM CONTROL WITH CVC 3000 FOR ROTARY VANE PUMPS

TECHNICAL DATA	**CVC 3000 + VACUU·VIEW EXTENDED, KF DN 16 / KF DN 25**
Control range	1100 / 825 mbar/hPa / torr - 1 x 10^{-3} / 1 x 10^{-3} mbar/hPa / torr
Pressure transducer, cable length	VACUU·VIEW extended / 2 m
Measurement principle	Ceramic diaphragm sensor + ceramic jacketed Pirani sensor
Accuracy of measurement	+- 15% of indicated value in the range from 0.01-10 mbar / +-3mbar for > 10mbar
Vacuum connection	Small flange KF DN 16 / hose nozzle DN 10 mm
	Small flange KF DN 25 / hose nozzle DN 15 mm

ITEMS SUPPLIED

CVC 3000 + VACUU·VIEW EXTENDED, KF DN 16

Package for fine vacuum control, consisting of: Vacuum controller CVC 3000 (without internal vacuum sensor and venting valve) with VACUU·VIEW extended and power supply, in-line solenoid valve VV-B 15C KF DN 16, T-piece KF DN 16, hose nozzle DN 10 mm (PP), clamping and sealing rings, ready for use, with manual.

ORDERING INFORMATION

CVC 3000 + VACUU·VIEW EXTENDED, KF DN 16

100-230 V ~ 50-60 Hz
CEE/CH/UK/US/AUS/CN 683201

ITEMS SUPPLIED

CVC 3000 + VACUU·VIEW EXTENDED, KF DN 25

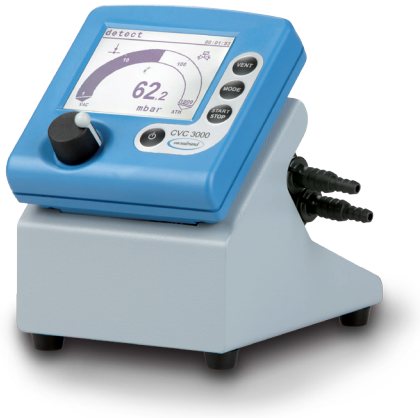
Package for fine vacuum control, consisting of: Vacuum controller CVC 3000 (without internal vacuum sensor and venting valve) with VACUU·VIEW extended and power supply, in-line solenoid valve VV-B 15C KF DN 25, T-piece KF DN 25, hose nozzle DN 15 mm (PP), clamping and sealing rings, ready for use, with manual.

ORDERING INFORMATION

CVC 3000 + VACUU·VIEW EXTENDED, KF DN 25

100-230 V ~ 50-60 Hz
CEE/CH/UK/US/AUS/CN 683202

- detect function for independent vapor pressure detection - time saving for other tasks
- compact unit with chemically resistant vacuum valve and common laboratory hose connections - immediately ready for use
- the vacuum measuring is integrated within the valve block - direct connection of the CVC 3000 detect between pump and vacuum application
- integrated venting valve - simple pressure balance or ventilation with inert gas at the end of the process
- non-return valve - no interference of parallel applications at a common vacuum source



CVC 3000 DETECT

The CVC 3000 detect is a ready to use two-set-point vacuum controller - available both as bench-top device and as a unit designed for attaching to a lab scaffold. It consists of the vacuum controller CVC 3000 with integrated ceramic vacuum sensor and venting valve that forms together with a non-return valve and the chemically resistant solenoid valve a very compact and easy to install unit for vacuum control. The electronic vacuum control increases the process efficiency and decisively improves the solvent recovery for existing vacuum sources like oil-free vacuum pumps or vacuum networks. In the “detect” mode the controller does approach and detect the boiling pressure and switches to the two-point vacuum control mode by itself. Manual settings are possible at any time during current operation.

ACCESSORIES

DAkkS calibration with first delivery (900214)
DAkkS recalibration (900215)
VACUU·BUS® accessories
Rubber vacuum tubing DN 6 mm (686000)
Rubber vacuum tubing DN 8 mm (686001)

ITEMS SUPPLIED
VACUUM-CONTROLLER CVC 3000 DETECT, BENCH-TOP DEVICE

Vacuum controller CVC 3000 detect bench-top device, complete with vacuum solenoid valve, non-return valve, integrated ceramic diaphragm vacuum sensor and venting valve. With power supply, ready to use, with manual

ITEMS SUPPLIED
VACUUM CONTROLLER CVC 3000 DETECT FOR ATTACHING TO A LAB SCAFFOLD

Vacuum controller CVC 3000 detect for lab scaffold, complete with vacuum solenoid valve, non-return valve, integrated ceramic diaphragm vacuum sensor and venting valve. With mounting bracket for lab scaffold, power supply, ready to use, with manual

TECHNICAL DATA Display unit

Page 179

ORDERING INFORMATION
VACUUM-CONTROLLER CVC 3000 DETECT, BENCH-TOP DEVICE

100-230 V ~ 50-60 Hz

CEE/CH/UK/US/AUS/CN	Ex*	2614860

ORDERING INFORMATION
VACUUM CONTROLLER CVC 3000 DETECT FOR ATTACHING TO A LAB SCAFFOLD

100-230 V ~ 50-60 Hz

CEE/CH/UK/US/AUS/CN	Ex*	2614120

With NRTL certification for Canada and the USA
Ex*: ATEX: II 3G IIC T3 X, Internal Atm. only

- Remote monitoring and controlling of pumping units or vacuum systems with CVC 3000 or DCP 3000 through easy integration with computer networks
- full simultaneous operation via the CVC 3000 / DCP 3000 or by remote control
- LAN and WLAN-adapter enables the control with fixed or mobile devices (PCs, smartphones, tablets, note-books,...)
- available as an add-on for all CVC 3000 and DCP 3000 from software version 2.0 onwards (2009)
- process documentation via integrated datalogger and notification signal at the end of the process

VACUU·CONTROL®

Remote controlling, monitoring or recording of vacuum systems

The web-based remote control VACUU·CONTROL® enables the monitoring and control of vacuum pumping units via computers or mobile devices such as Smartphones. With the LAN or WLAN adapter all pumping units and vacuum systems equipped with the CVC 3000 vacuum controller or a DCP 3000 vacuum gauge can be integrated into a computer network (Exception: fine vacuum control with CVC 3000 is not supported). In this way it is possible for multiple pumping units to be controlled or monitored from a single PC on the one hand or alternatively an individual pumping unit can be observed from several devices. The vacuum system can be operated fully and simultaneously at any time directly at the pumping unit. With the built-in datalogger function, processes are automatically documented. Notification of the end of the process automatically appears when a selective pressure is reached or after a set time.
With VACUU·CONTROL® the user can control and monitor his application at any time, for example from the office, using a LAN or WLAN - enabled device. So at the same time users can focus on and carry out other work whilst monitoring the process remotely. The vacuum process is automatically documented with the datalogger function and is fully traceable. The remote VACUU·CONTROL® can be used as a flexible alternative to building in a CVC 3000 controller into the laboratory furniture. The monitoring of multiple vacuum systems via a central control station is also possible.

ORDERING INFORMATION

VACUU·CONTROL® WLAN	Sub-D 9-pol	683110
VACUU·CONTROL® LAN	Sub-D 9-pol / RJ45	683120

ITEMS SUPPLIED, VACUU·CONTROL® WLAN

Remote control adapter WLAN for integration into WLAN PC networks, with web based, graphical user interface, delivered completely with cable for connection to RS 232C interface of controller CVC 3000 or vacuum gauge DCP 3000.

ITEMS SUPPLIED, VACUU·CONTROL® LAN

Remote control adapter LAN with RJ45 socket for integration into LAN PC network, with web based, graphical user interface, delivered completely with cable for connection to RS 232C interface of controller CVC 3000 or vacuum gauge DCP 3000. Incl. LAN patch cable and crossover adapter.

DAKKS CALIBRATION FOR VACUUM GAUGES AND VACUUM CONTROLLERS

Calibration of vacuum gauges in the VACUUBRAND laboratory for DAkkS calibration

The monitoring and calibration of measurement instruments is an important requirement of quality management systems (e.g., ISO 9001, QS 9000). In particular, the traceability to nationally recognized standards must be ensured. VACUUBRAND is accredited by the national accreditation body for the Federal Republic of Germany (DAkkS) as a calibration laboratory for vacuum measuring instruments. VACUUBRAND´s DAkkS laboratory is approved to calibrate and certify vacuum gauges in the range from 1300 to 10^{-3} mbar (abs.) and to issue the corresponding DAkkS Calibration Certificates. VACUUBRAND also offers DAkkS calibration as a service for vacuum gauges from other manufacturers.

DAkkS
Deutsche
Akkreditierungsstelle

Deutsche Akkreditierungsstelle GmbH

Beliehene gemäß § 8 Absatz 1 AkkStelleG i.V.m. § 1 Absatz 1 AkkStelleGBV
Unterzeichnerin der Multilateralen Abkommen
von EA, ILAC und IAF zur gegenseitigen Anerkennung

Akkreditierung

Die Deutsche Akkreditierungsstelle GmbH bestätigt hiermit, dass das Kalibrierlaboratorium

VACUUBRAND GmbH & CO KG
Alfred-Zippe-Straße 4, 97877 Wertheim

die Kompetenz nach DIN EN ISO/IEC 17025:2005 besitzt, Kalibrierungen in folgenden Bereichen durchzuführen:

Mechanische Messgrößen
– **Vakuumtechnik**

Die Akkreditierungsurkunde gilt nur in Verbindung mit dem Bescheid vom 07.07.2016 mit der Akkreditierungsnummer D-K-15154-01-00 und ist gültig bis 06.07.2021. Sie besteht aus diesem Deckblatt, der Rückseite des Deckblatts und der folgenden Anlage mit insgesamt 2 Seiten.

Registrierungsnummer der Urkunde: **D-K-15154-01-00**

Braunschweig, 07.07.2016

Im Auftrag
Dr. Michael Wolf
Abteilungsleiter

Siehe Hinweise auf der Rückseite

ORDERING INFORMATION	DAKKS CALIBRATION WITH FIRST DELIVERY	
DVR 2, DVR 3, CVC 3000, VACUU·VIEW, VACUU·VIEW extended, VSK 3000, VSP 3000, DCP 3000 + VSK 3000, DCP 3000 + VSP 3000		900214

ORDERING INFORMATION	DAKKS RECALIBRATION	
DVR 2, DVR 3, CVC 3000, VACUU·VIEW, VACUU·VIEW extended, VSK 3000, VSP 3000, DCP 3000 + VSK 3000, DCP 3000 + VSP 3000, DVR 4, DVR 4S, DVR 5, VAP 5, CVC 2 II, CVC 2000 II, VNC 1, VNC 2		900215

VACUU·BUS®-COMPATIBLE ACCESSORIES

For the CVC 3000 vacuum controller and the DCP 3000 gauges we feature a unique range of accessories including valves (for vacuum, coolant and venting), external sensors (for vacuum and liquid level) and modules (for communication or switching). These accessory components are plug-and-play and self-configuring due to the VACUU·BUS® digital bus system for read-out or control and communication with VARIO® pumps. Uniform plug-and-socket connections prevent confusion and make it possible to arbitrarily connect nearly any required number of components, even over distances of up to 30 m. The plugs are liquid-tight and highly resistant to chemicals.

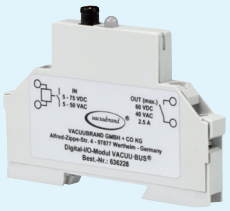
Bus plug at CVC 3000

The Vacuum-Management-System module VMS-B switches a vacuum pump according to actual demand from one or two applications. It is operated by one or two vacuum controllers CVC 3000. If two CVC 3000 are connected to the VMS-B it switches off the pump only if both applications do not need a vacuum supply anymore.

VMS-B module for vacuum controller CVC 3000 to switch a vacuum pump

The Digital-I/O-Module is a digital interface for VACUU·BUS® compatible vacuum gauges and controllers. There is a galvanically isolated input gate and a potential-free semiconductor relay for output switching. By default the Digital-I/O-Module is configured as bidirectional fault indicator module to communicate malfunctions in a vacuum system to the process control system, or in case of external malfunction to interrupt the process.

Digital-I/O-Module VACUU·BUS®



The Analog-I/O-Module is an analog interface for the VACUU·BUS® system of vacuum measuring gauges and controllers. The input and output signal follows the industry standard of 0-10 V. In the default configuration of the module the actual vacuum value is indicated as a 0-10V output. Therefore the controller CVC 3000 and the measuring gauge DCP 3000 can be easily connected to a plotter and used for GMP documentation. Other module configurations allow input and output of vacuum level and motor speed as 0-10V signals.

Analog-I/O-Module VACUU·BUS®

VACUU·BUS®-COMPATIBLE ACCESSORIES

The liquid level sensor is designed to be mounted at the neck of a VACUUBRAND 500 ml catchpot and works with the CVC 3000 controller. It monitors the liquid level in catchpots of emission condensers and inlet separators. The process is halted and an alarm sounded if the catchpots are close to overflowing. The sensor detects all common solvents without any contact to the solvents.

Liquid level sensor for VACUUBRAND catchpot 500 ml

ORDERING INFORMATION

Vacuum sensor VSK 3000	636657
Vacuum sensor VSP 3000	636163
Vacuum sensor MPT	683176
Vacuum gauge VACUU·VIEW	683220
Vacuum gauge VACUU·VIEW extended	683210
In-line valve VV-B 6 with KF DN 16 or hose nozzle DN 6/10	674290
In-line valve VV-B 6C with KF DN 16 or hose nozzle DN 6/10	674291
In-line valve VV-B 15C with KF DN 16	674210
In-line valve VV-B 15C with KF DN 25	674215
Coolant valve VKW-B, G3/4" / G1/2", with hose nozzle DN 6	674220
Air admittance valve VB M-B with KF DN 16 and hose nozzle DN 6/10	674217
Liquid level sensor for VACUUBRAND catchpot 500 ml	699908
Extension cable VACUU·BUS® 2 m	612552
Extension cable VACUU·BUS® 10 m	2618493
Y-adapter VACUU·BUS®	636656
VACUU·BUS® wall feedthrough (plug-socket), for wall thickness of 1 - 10 mm	636153
Digital-I/O-Module VACUU·BUS®	636228
Analog-I/O-Module 0-10V VACUU·BUS®	636229
VMS-B module for vacuum controller CVC 3000 to switch a vacuum pump	676030


Vakuumregler
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1000
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VAC
ATM
VENT
MODE
START
STOP
CVC 3000
vacuubrand

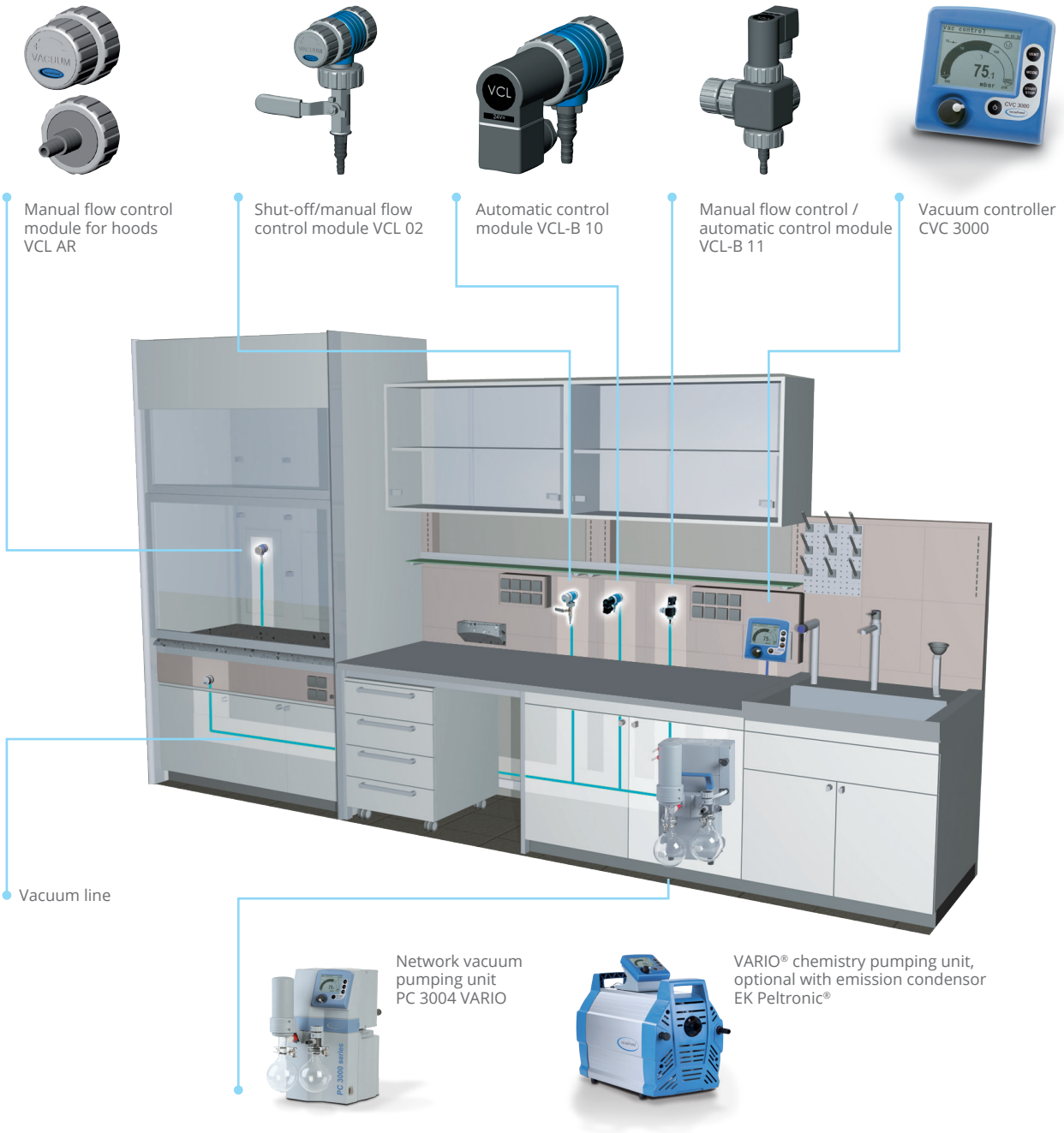
LOCAL AREA VACUUM NETWORK
VACUU·LAN® - VACUUM FOR MANY USERS

- For new and existing laboratories
- One laboratory, one vacuum pump, several applications and workstations
- Individual configuration with chemical resistant PTFE tubing
- Space-saving installation with small investment
- Demand controlled energy saving vacuum
- Independent work without mutual interference - due to integrated non-return valves
- Flexibility - easy upgrade and quick replacement of components
- Environmentally friendly - solvent recovery near 100 %
- Higher safety for the laboratory - additional components (e.g., emission condenser Peltronic®, flask with liquid level sensor, solvent drain)
- Minimal energy consumption and maximum maintenance intervals by pump on demand control with VARIO® technology

Vacuum network installation at a laboratory of a university, equipped with emission condenser Peltronic®, without additional cooling water connections inside the floor cupboard.

Ask for VACUU·LAN® information material

LABORATORY WORKPLACE
VACUU·LAN® FITS ALL



Vacuum ports are connected with a network vacuum pump via easy-to-install PTFE tubes. The vacuum pump is typically integrated into a chemistry vacuum pumping unit with separator, emission condenser and a vacuum controller for vacuum network control.

MODULAR CONCEPT
VACUU·LAN® IN FOUR STEPS

Step 1 - Pump selection

Examples of use	Vacuum ports*	Vacuum pump	
70 mbar - Vacuum filtration, Liquid aspiration	6-8 10-12	ME 4C NT +2AK PC 3016 NT VARIO	(with pump on demand control)
7 mbar - Rotary evaporation, Concentration. For many common solvents.	4-6 6-8	MZ 2C NT +AK+EK PC 3002 VARIO	(with pump on demand control)
2 mbar - Drying of small quantities, Rotary evaporation. For high-boiling solvents.	6-8 6-10	MD 4C NT +AK+EK PC 3004 VARIO	(with pump on demand control)

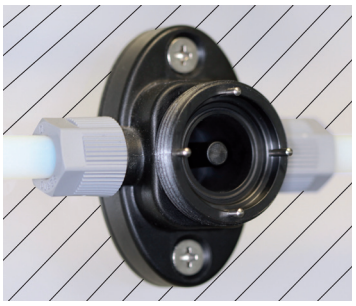
*In case of low simultaneous usage larger networks with more connections per pump are possible. Talk to our experts!

Step 2 - Choosing the VACUU·LAN® (VCL) mounting bases

Mounting bases are the connecting parts between pipeline network and vacuum port. On the mounting base the complete VCL module will be placed later. The mounting bases are used for the assemby of the VCL module on the wall or integrated in the furniture.

Mounting base A1

- for the subsequent refurbishment of laboratories
- the network tubing will be laid visibly on the wall or on the furniture



Mounting base A5

- for integrated installation
- the vacuum lines run hidden, the connection elements are mounted on the front side

Step 3 - Select VACUU·LAN® (VCL) modules and the operating functions

Select the required operation functions for each work place

Manual control

- Manual flow control module VCL 01

with flow control diaphragm valve to open and close the vacuum port, and to fine-tune the pumping speed.

- Shut-off / manual flow control module VCL 02

with flow control diaphragm to fine-tune the pumping speed, combined with a ball valve for quick opening or closing of the vacuum line - the fine adjustment is retained when the ball valve is closed and reopened.

- Shut-off module VCL K

with ball valve for quick opening or closing of the vacuum line.

- Manual flow control module for hoods VCL AR

consisting of a flow control diaphragm valve unit and a separate vacuum port for installation in laboratory exhaust hoods.

- Control and measuring module VCL RM, VCL RMS

similar to module VCL 01, but with additional mechanical bourdon vacuum gauge for quick reading, RMS for lateral wall mounting.

Electromagnetic control

- Automatic control module VCL-B 10

electromagnetic (solenoid) valve for automatic vacuum control in conjunction with vacuum controller CVC 3000. All components with convenient VACUU·BUS® control connections. Valve seal made of fluoroelastomer with excellent chemical resistance for continuous use.

- Manual flow control / automatic control VCL-B 11

with flow control diaphragm to fine-tune the pumping speed and electromagnetic valve for automatic vacuum control. With advantageous bus control VACUU·BUS®.

- Controller module

CVC 3000E with in-line valve for integrated installation + vacuum connection VCL A/A5.

Step 4 - PTFE network and connection elements

For detailed planning or design of the connection elements and PTFE tube as well as control options, contact our product specialists. Ask us!

Laboratory with space-saving vacuum supply in the cabinet. Convenient pump control with integrated CVC 3000E.

VACUU·LAN® - network with separate controller CVC 3000E for vacuum network control. Space-saving integration in the laboratory furniture.

VCL - MOUNTING BASES

Supplied with VCL modules (A1 - for retrofitting; A5 - for built-in installation)

VCL - MODULES

ORDERING INFORMATION - MOUNTING BASE A1 MANUALLY

Manual flow control module	VCL 01	677106
Shut off / manual flow control module	VCL 02	677107
Control and measuring module VCL RMS		2612120+677131
Control and measuring module VCL RM		2612991+677131

ORDERING INFORMATION - MOUNTING BASE A1 ELECTROMAGNETIC

Automatic control module	VCL-B 10	677208

ORDERING INFORMATION PTFE PIPE AND CONNECTION ELEMENTS

PTFE tubing DN 10/8 mm	638644
VCL connector angle	638434
VCL connector T-piece	638435

ORDERING INFORMATION - MOUNTING BASE A5 MANUALLY

Manual flow control module	VCL 01	*677190
Shut off / manual flow control module	VCL 02	*677191
Manual control module for hoods	VCL AR	*677195
Control and measuring module VCL RMS		*2612120+677135
Control and measuring module VCL RM		*2612991+677135

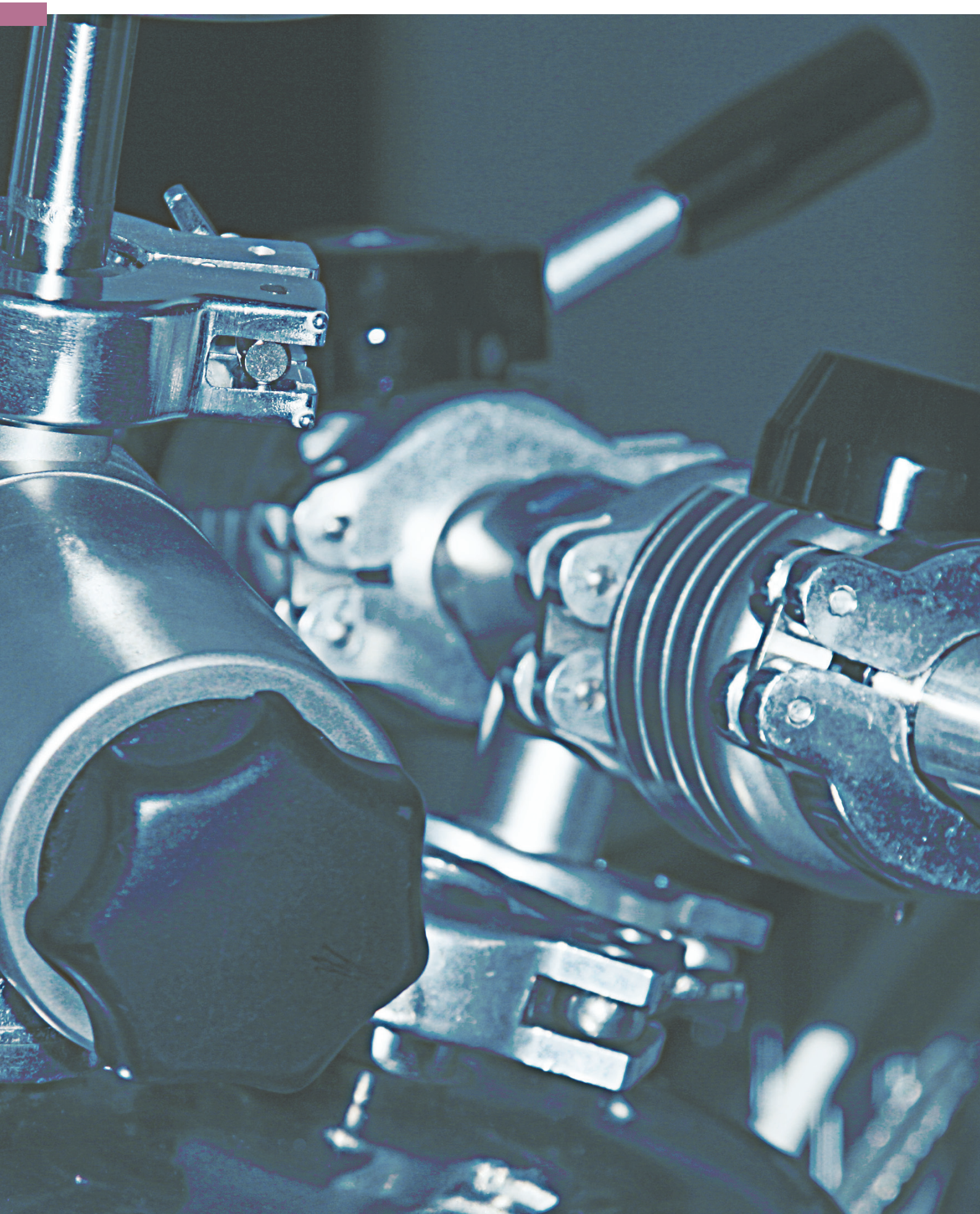
ORDERING INFORMATION - MOUNTING BASE A5 ELECTROMAGNETIC

Automatic control module	VCL-B 10	*677292
Automatic / manual flow control module VCL-B 11		*677293

ORDERING INFORMATION - CONTROLLER MODULE

CVC 3000E	683180
Vacuum connection VCL A A5/C9	*677167

* Additional T-piece (638435) or angle connector (638434) required



VACUUM VALVES AND SMALL FLANGE COMPONENTS

At VACUUBRAND, we make our own valves and components and inspect them carefully before shipment to ensure integrity. Our wide range of vacuum valves and small-flange components can be used alone or in combination, in the most simple or complex vacuum systems. Our components are appropriate both for connections to VACUUBRAND pumps and for all valves and components with DIN 28403 (ISO 2861-1) small flange (KF) dimensions. Many components and subassemblies are available in stainless steel, aluminum, brass or plastic. We offer elastomer seals made of NBR and FKM as well as metallic seals made of aluminum or indium. We round out the line with a great variety of resilient connecting elements and small-flange components that serve most vacuum system needs.

VACUUBRAND offers besides solenoid operated valves the following lines of manual vacuum valves:

- **Ball valves**

They are the simplest type of shut-off device. They open up the entire cross-section. Therefore they can be used with load lock chambers.

- **Diaphragm valve**

VM diaphragm valves are engineered for applications with corrosive and aggressive gases and vapors. Stainless steel housings and PTFE diaphragms offer excellent resistance for use in chemistry laboratories.

- **High-vacuum bellow valves**

Stainless steel bellows-sealed angle valves with valve body made of aluminum or stainless steel (WIG). The VE WIG series valves with tungsten inert gas-welded valve body meet the toughest standards in terms of leak rate, outgassing and baking-out for the high vacuum range.

- **In-line valves**

VS series valves are space-saving butterfly-type in-line valves with good conductance.

Connection elements for small flange components

The sealing ring for the seal between two components is held in place by the centering ring. The clamping ring is used to hold and mechanically compress the sealing ring.

Clamping rings

Aluminum clamping rings with a wing nut are a rapid connection that can be mounted without any tools for soft (primarily rubber-elastic) seals and indium seals.

Centering rings

Centering rings made of stainless steel are self-centering with sealing ring at the outside

VACUUBRAND trapped O-ring centering ring

The trapped O-ring centering ring is externally centered on the outside diameter of the small flange. The seal is pressed into a radius on the inside of the centering ring so that there are no gaps on the vacuum side. External centering allows the same ring to be used for two consecutive standard-rated widths (such as KF DN 10/16). This also makes transitional centering rings unnecessary.

Small flange components

VACUUBRAND small flange components have particularly reliable sealing properties because the sealing surfaces are lathed for optimum surface roughness. Application range: Up to high vacuum at approximately 10^{-6} mbar. Aluminum components are tested to a leakage rate of $< 10^{-6}$ mbar l/s, stainless steel components are tested to $< 10^{-9}$ mbar l/s.

Flexible connection elements

Flexible hoses made of natural rubber or PVC are enjoying great popularity in laboratories. For more demanding applications VACUUBRAND offers special hoses made of antistatic PTFE with small flanges made of 1.4305 stainless steel. The PTFE tubing is virtually smooth-walled on the inside with high conductance and minimal surface area, which keeps condensate from accumulating like in corrugated hoses. The antistatic PTFE has excellent resistance to chemicals and antistatic properties ($< 10^{7}$ Ohm resistance between the inside and flanges) to prevent electrostatic charging. Stainless steel bellows and corrugated hoses with TIG-welded small flanges meet high requirements in terms of outgassing and cleanliness. These metallic hoses are made of 1.4541 stainless steel and are vacuum annealed.

Clamping rings and centering rings

Vacuum valve VS

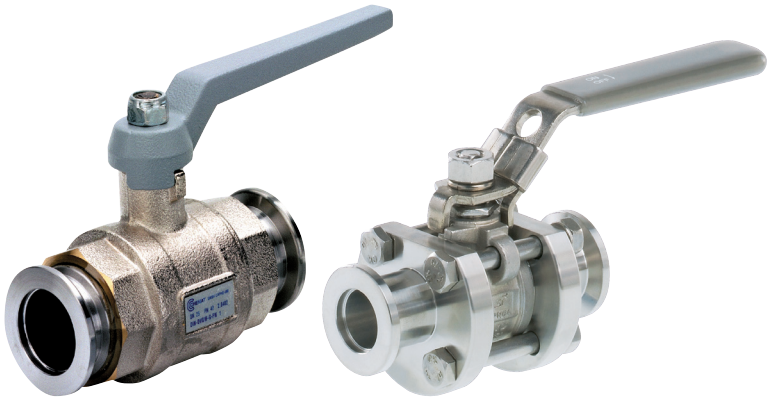
Stainless steel components

High-vacuum right angle bellow valve VE

Gas inlet valve VGL

Ball valve VKE

Valves of the VK series are sturdy isolation devices for the rough and fine vacuum range. A precisely machined ball with a hole through the middle is rotated by means of shaft and lever. When the valve is open, the hole provides unimpeded passage of media over the entire nominal cross section. Ball valves are therefore also used for load locks, e.g., for sample holders, thermocouples or helium supply lines. The VKE series uses stainless steel for the metal parts and fiberglass reinforced PTFE seatings.



BALL VALVES VK

TECHNICAL DATA		VK 16	VK 25	VK 40
Nominal width of flange	mm	16	25	40
Wetted materials		SS, PTFE, brass (partly hard chromium plated)	SS, PTFE, brass (partly hard chromium plated)	SS, PTFE, brass (partly hard chromium plated)
Leakage rate	mbar l/s	1×10^{-6}	1×10^{-6}	1×10^{-6}
Fitting length between flanges	mm	80	100	130
Weight, approx.	kg	0.4	1.0	1.6

TECHNICAL DATA		VKE 16	VKE 25	VKE 40
Nominal width of flange	mm	16	25	40
Wetted materials		SS, PTFE	SS, PTFE	SS, PTFE
Leakage rate	mbar l/s	1×10^{-6}	1×10^{-6}	1×10^{-6}
Fitting length between flanges	mm	80	100	130
Weight, approx.	kg	0.7	1.7	3.1

ORDERING INFORMATION - VK VALVES MADE OF BRASS, HARD-CHROME PLATED BRASS BALL WITH REINFORCED PTFE SEAL SEAT

VK 16	Small flange KF DN 16	665504
VK 25	Small flange KF DN 25	665505
VK 40	Small flange KF DN 40	665506

ORDERING INFORMATION - VKE VALVES MADE OF STAINLESS STEEL WITH REINFORCED PTFE SEAL SEAT

VKE 16	Small flange KF DN 16	675504
VKE 25	Small flange KF DN 25	675505
VKE 40	Small flange KF DN 40	675506

The VS und VS C series valves are butterfly-type valves. A circular valve plate with a sealing ring on the circumference rotates around an axis at right angle to the valve axis. As a result, the valves leave virtually the entire cross section free, offering very good conductance. The valve bodies are made of one piece, machined from solid material, and require (in addition to the valve head seal) only one elastic shaft seal for rotational movement of the shaft. The valves provide low leakage and minimal degassing rate. The VS C series features a valve seal made of perfluorelastomer material (FFKM).

BUTTERFLY VALVES VS

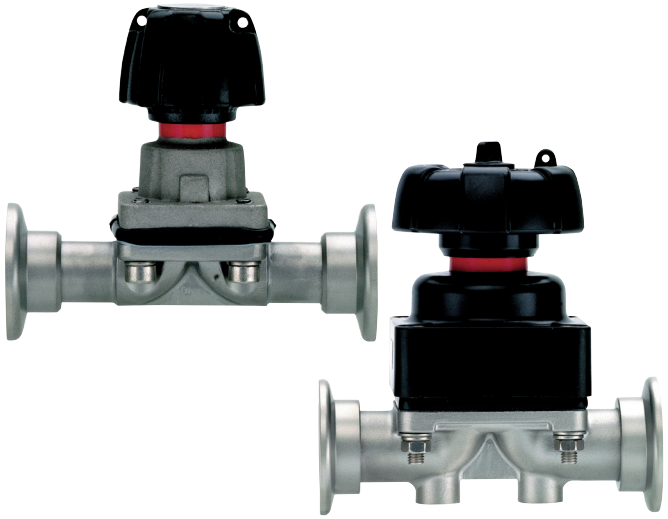
TECHNICAL DATA		VS 16	VS 25	VS 40
Nominal width of flange	mm	16	25	40
Wetted materials		SS, FKM, NBR	SS, FKM, NBR	SS, FKM, NBR
Leakage rate	mbar l/s	1×10^{-6}	1×10^{-6}	1×10^{-6}
Fitting length between flanges	mm	65	65	65
Weight, approx.	kg	0.6	0.8	0.9

TECHNICAL DATA		VS 16C	VS 25C	VS 40C
Nominal width of flange	mm	16	25	40
Wetted materials		SS, FFKM, NBR	SS, FFKM, NBR	SS, FFKM, NBR
Leakage rate	mbar l/s	1×10^{-6}	1×10^{-6}	1×10^{-6}
Fitting length between flanges	mm	65	65	65
Weight, approx.	kg	0.6	0.8	0.9

ORDERING INFORMATION - VS VALVES MADE OF STAINLESS STEEL

VS 16	Small flange KF DN 16	665004
VS 25	Small flange KF DN 25	665005
VS 40	Small flange KF DN 40	665006
VS 16C	Small flange KF DN 16	665007
VS 25C	Small flange KF DN 25	665008
VS 40C	Small flange KF DN 40	665009

VM series valves are hand-operated diaphragm valves. They are used, e.g., as isolation valves, air-admittance valves or manual-control valves. By rotation of the wheel a flexible PTFE diaphragm is moved and pressed against the stainless steel seating or removed from it, closing and opening the valve, respectively. The gas-contacting parts are made of stainless steel and PTFE offering a good resistance to corrosive gases and vapors.



DIAPHRAGM VALVES VM

TECHNICAL DATA		VM 16	VM 25
Nominal width of flange	mm	16	25
Wetted materials		SS, PTFE	SS, PTFE
Leakage rate	mbar l/s	1×10^{-4}	1×10^{-4}
Fitting length between flanges	mm	80	100
Weight, approx.	kg	0.21	0.42

ORDERING INFORMATION

VM 16	Small flange KF DN 16	664010
VM 25	Small flange KF DN 25	664011

High vacuum, helium leak-tested right angle valves VE have stainless steel bellows which seals the drive mechanism without any gap on the vacuum side. Due to the screw-thread mechanism, these valves offer a certain control of conductance. They are mountable in any position because of their air tightness in both positions. The body is either made of solid aluminum or stainless steel (VE WIG). The stainless steel valves are tungsten inert gas welded from the inside for maximum gas tightness and minimum degassing rates.

HIGH VACUUM BELLOW VALVES VE

TECHNICAL DATA		VE 16	VE 25	VE 40
Nominal width of flange	mm	16	25	40
Wetted materials		Aluminum, SS, FKM	Aluminum, SS, FKM	Aluminum, SS, FKM
Leakage rate of housing	mbar l/s	1×10^{-9}	1×10^{-9}	1×10^{-9}
Leakage rate of seat	mbar l/s	1×10^{-7}	1×10^{-7}	1×10^{-7}
Fitting dimension (flanges to center)	mm	40	50	65
Weight, approx.	kg	0.5	0.7	1.3

TECHNICAL DATA		VE 16 WIG	VE 25 WIG	VE 40 WIG
Nominal width of flange	mm	16	25	40
Wetted materials		SS, FKM	SS, FKM	SS, FKM
Leakage rate of housing	mbar l/s	1×10^{-9}	1×10^{-9}	1×10^{-9}
Leakage rate of seat	mbar l/s	1×10^{-7}	1×10^{-7}	1×10^{-7}
Fitting dimension (flanges to center)	mm	40	50	65
Weight, approx.	kg	1.0	1.1	2.9

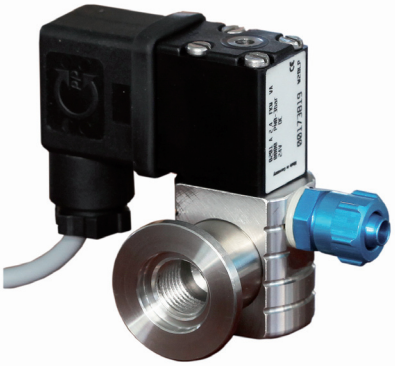
ORDERING INFORMATION - VALVES VE MADE OF ALUMINUM

VE 16	Small flange KF DN 16	664004
VE 25	Small flange KF DN 25	664005
VE 40	Small flange KF DN 40	664006

ORDERING INFORMATION - VALVES VE WIG MADE OF STAINLESS STEEL

VE 16 WIG	Small flange KF DN 16	674020
VE 25 WIG	Small flange KF DN 25	674021
VE 40 WIG	Small flange KF DN 40	674022

These valves are compact air admittance valves with small flange. The VB valve is manually operated. On rotating the knurled screw cap the valve disc is lifted off the seating and air enters through the holes. The valve disc is rotatable. Therefore the valve seat seal is prevented against wear during opening and closing.
The electromagnetic solenoid valve VB M-B with valve orifice diameter 2.4 mm and VACUU·BUS® control connection operates in conjunction with the vacuum controller CVC 3000 or the vacuum gauge DCP 3000. It is frequently used for remote-controlled systems like interlocking systems and inert gas flushing. The gas inlet has a tubing connection, e.g., for inert gas. Larger venting valves are available on request.



AIR ADMITTANCE VALVES VB - VB M-B

TECHNICAL DATA		VB 10	VB M-B
Flange connection		Small flange KF DN 10	Small flange KF DN 16 or hose nozzle DN 6/10 mm
Gas inlet connection			Tubing connection DN 8/6 mm
Wetted materials		SS, NBR	SS, FKM
Leakage rate	mbar l/s	1×10^{-6}	1×10^{-3}
Operation		Manual	VACUU·BUS®
Weight, approx.	kg	0.1	0.25

ORDERING INFORMATION

VB 10	Small flange KF DN 10	666800
VB M-B	Small flange KF DN 16 or hose nozzle DN 6/10 mm	674217

Gas inlet valves are small hand operated valves for admitting gases into a vacuum system. By rotating a knurled screw cap the valve stem is raised from the valve seat. Thus gas enters at a controlled flow rate from the line connected to the gas inlet. The gas inlet valve VGS 10 is mounted with a small flange to the vacuum system and has a hose nozzle DN 8 mm for connection to, e.g., gas cylinders, air driers or for admitting air directly. The vacuum and atmospheric sides of the valve VGL are provided with hard-soldering brass connections, facilitating the valve to be used as a fixed, permanent fitting.

GAS INLET VALVES VGS - VGL

TECHNICAL DATA		VGS 10	VGL
Flange connection		Small flange KF DN 10	Brass sleve 5.1 mm
Gas inlet connection		Hose nozzle DN 8 mm	Brass sleve 5.1 mm
Wetted materials		SS, FKM, NBR	SS, FKM, NBR, brass
Leakage rate of housing	mbar l/s	1×10^{-9}	1×10^{-9}
Leakage rate of seat	mbar l/s	1×10^{-6}	1×10^{-6}
Weight, approx.	kg	0.15	0.12

ORDERING INFORMATION

VGS 10	Small flange KF DN 10	666000
VGL	Brass sleve 5.1 mm	666400

- version C with excellent chemical resistance
- high operating cycles
- significantly better long term tightness even after long operating time
- easy to clean
- versatile connection alternatives via small flange or hose nozzle

SOLENOID-OPERATED VALVES VV - VV C

These straight-through valves with electromagnetic (solenoid) drive are used for operating cycles with short intervals and, therefore, are often used as vacuum control valves. The straightforward design provides a valve with low leakage rate. The valves in version VV C are made of materials with excellent chemical resistance. The valve sealing of the VV-B 6C is made of a special fluoroelastomer with better form stability than common PTFE, much higher chemical resistance than FKM and excellent long-term leak tightness characteristics.

TECHNICAL DATA		**VV-B 6**	**VV 6**
Flange connection		Small flange KF DN 16 or hose nozzle DN 6/10 mm	Small flange KF DN 16 or hose nozzle DN 6/10 mm
Wetted materials		SS, PP, FKM, PPS	SS, PP, FKM, PPS
Leakage rate	mbar l/s	1×10^{-5}	1×10^{-5}
Ambient temperature range	° C	0 - 50	0 - 50
Maximum gas temperature	° C	80	80
Max. switching frequency	/min	120	120
Supply voltage / Plug		VACUU·BUS®	Solenoid 230 V/~ 50-60 Hz IEC plug EN 60320
Cable length	m	2	2.5
Fitting length between flanges	mm	100	100
Weight, approx.	kg	0.53	0.53

TECHNICAL DATA		VV-B 6C	VV-B 15C
Flange connection		Small flange KF DN 16 or hose nozzle DN 6/10 mm	Small flange KF DN 16
Wetted materials		SS, PVDF, PTFE, fluoroelastomer, PPS	SS, PVDF, PTFE
Leakage rate	mbar l/s	1×10^{-2}	1×10^{-4}
Ambient temperature range	° C	0 - 40	0 - 40
Maximum gas temperature	° C	100	100
Max. switching frequency	/min	50	50
Supply voltage / Plug		VACUU·BUS®	VACUU·BUS®
Cable length	m	2	2
Fitting length between flanges	mm	80	109
Weight, approx.	kg	0.35	1.2

TECHNICAL DATA		VV-B 15C	VV 25
Flange connection		Small flange KF DN 25	Small flange KF DN 25
Wetted materials		SS, PVDF, PTFE	SS, FKM, brass (Nickel plated)
Leakage rate	mbar l/s	1×10^{-4}	1×10^{-4}
Ambient temperature range	° C	0 - 40	0 - 50
Maximum gas temperature	° C	100	80
Max. switching frequency	/min	50	120
Supply voltage / Plug		VACUU·BUS®	Solenoid 230 V/~ 50 Hz IEC plug EN 60320
Cable length	m	2	2.5
Fitting length between flanges	mm	117	100
Weight, approx.	kg	1.2	1.4

ORDERING INFORMATION VACUU·BUS® VALVES

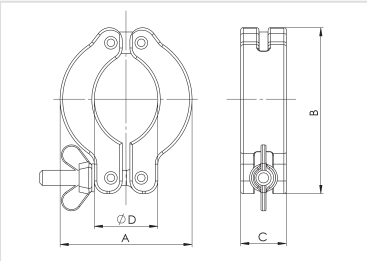
VV-B 6	Small flange KF DN 16 or hose nozzle DN 6/10 mm	674290
VV-B 6C	Small flange KF DN 16 or hose nozzle DN 6/10 mm	674291
VV-B 15C	Small flange KF DN 16	674210
VV-B 15C	Small flange KF DN 25	674215

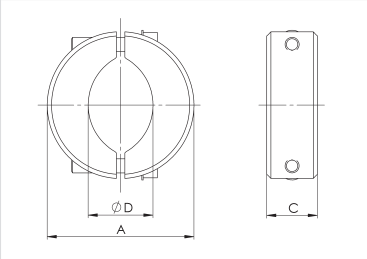
ORDERING INFORMATION

(24 V/= VALVES WITH PLUG 3-POLE EN 60130-9, FOR CONTROLLERS CVC 2[II] AND VNC 1, ONLY)

VV 6	Small flange KF DN 16 or hose nozzle DN 6/10 mm	Solenoid 24 V/=	674090
VV 6	Small flange KF DN 16 or hose nozzle DN 6/10 mm	Solenoid 230 V/~ 50-60 Hz	674094
VV 6C	Small flange KF DN 16 or hose nozzle DN 6/10 mm	Solenoid 24 V/=	674091
VV 15C	Small flange KF DN 16	Solenoid 24 V/=	674110
VV 15C	Small flange KF DN 25	Solenoid 24 V/=	674115
VV 25	Small flange KF DN 25	Solenoid 230 V/~ 50 Hz	674105

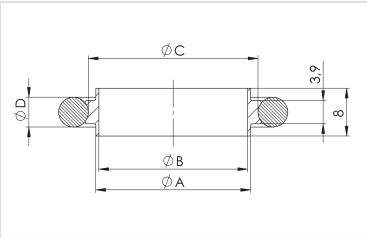
CLAMPING RINGS FOR SMALL FLANGE KF





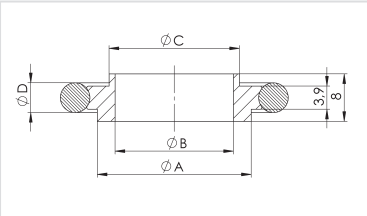
Size*	A	B	C	D	Order-no.
made of aluminum					
KF DN 10/16	45	62	16	22	660000
KF DN 20/25	55	73	16	32	660001
KF DN 32/40	70	90	16	47	660002
KF DN 50	95	120	25	63	660003
made of stainless steel					
KF DN 10/16	52		18	23	660010
KF DN 20/25	62		18	32	660011
KF DN 32/40	80		18	47	660012
KF DN 50	112		20	62	660013

CENTERING RINGS FOR SMALL FLANGE KF MADE OF STAINLESS STEEL



Size*	A	B	C	D	Order-no.
with sealing ring made of FKM					
KF DN 10	12	10	15.3	15 x 5	660120
KF DN 16	17	16	18.5	18 x 5	660124
KF DN 20	22	20	25.5	25 x 5	660121
KF DN 25	26	25	28.5	28 x 5	660125
KF DN 32	34	32	40.5	40 x 5	660122
KF DN 40	41	39	43	42 x 5	660126
KF DN 50	52	50	55.5	55 x 5	660123

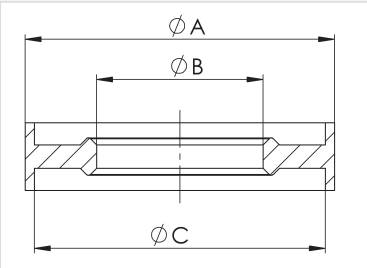
ADAPTING CENTERING RINGS FOR SMALL FLANGE KF MADE OF STAINLESS STEEL



Size*	A	B	C	D	Order-no.
with sealing ring made of FKM					
KF DN 10/16	17	10	12	18 x 5	660127
KF DN 20/25	26	20	22	28 x 5	660128
KF DN 32/40	41	32	34	42 x 5	660129

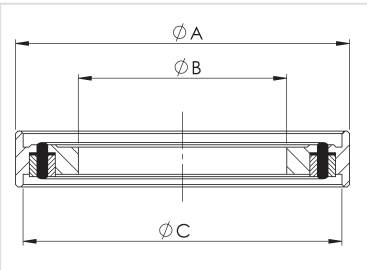
* Dimensions in millimeters

CENTERING AND SEALING RINGS FOR SMALL FLANGE KF (FOR STAINLESS STEEL FLANGES ONLY)



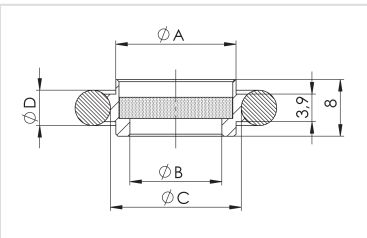
Size*	A	B	C	Order-no.
with aluminum sealing ring				
KF DN 10/16	32	17.2	30.1	660140
KF DN 20/25	42	26.2	40.1	660141
KF DN 32/40	57	41.2	55.1	660142
KF DN 50	77	52.2	75.1	660143

INDIUM SEALING FOR KF - WITH STAINLESS STEEL/ALUMINUM CENTERING RINGS (INSIDE/OUTSIDE)



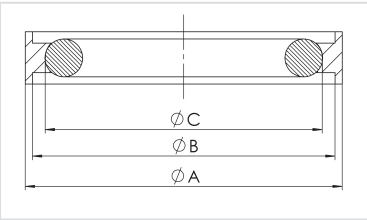
Size*	A	B	C	Order-no.
KF DN 10/16	32	17.2	30.1	660150
KF DN 20/25	42	26.2	40.1	660151
KF DN 32/40	57	41.2	55.1	660152

FILTER CENTERING RINGS FOR SMALL FLANGE KF MADE OF STAINLESS STEEL



Size*	A	B	C	D	Order-no.
with sealing ring made of NBR					
KF DN 10	12	8	15.5	15 x 5	660160
KF DN 16	17	13	18.5	18 x 5	660161
KF DN 25	26	22	28.5	28 x 5	660162
KF DN 40	41	36	43	42 x 5	660163

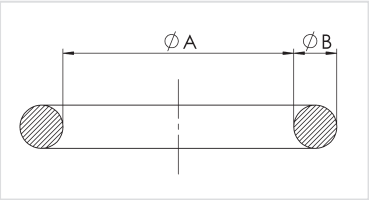
TRAPPED O-RING CENTERING RINGS FOR SMALL FLANGE KF MADE OF PBT (NON-WETTED)



Size*	A	B	C	Order-no.
with sealing ring made of NBR				
KF DN 10/16	32	30.1	27.7	660190
KF DN 20/25	42	40.1	36.7	660191
KF DN 32/40	57	55.1	51	660192
KF DN 50	77	75.1	61	660193
with sealing ring made of FKM				
KF DN 10/16	32	30.1	27.7	660195
KF DN 20/25	42	40.1	36.7	660196
KF DN 32/40	57	55.1	51	660197
KF DN 50	77	75.1	61	660198

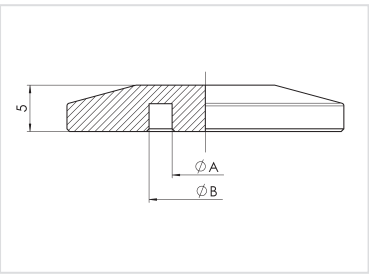
* Dimensions in millimeters

SPARE SEAL RINGS FOR SMALL FLANGE KF



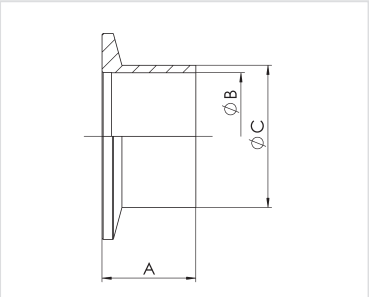
Size*	A	B	Order-no.
made of NBR			
KF DN 10	15	5	660110
KF DN 16	18	5	660115
KF DN 20	25	5	660111
KF DN 25	28	5	660116
KF DN 50	55	5	660113
made of FKM			
KF DN 10	15	5	660130
KF DN 16	18	5	660135
KF DN 20	25	5	660131
KF DN 25	28	5	660136
KF DN 32	40	5	660132
KF DN 40	42	5	660137
KF DN 50	55	5	660133

BLIND SMALL FLANGES KF



Size*	A	B	Order-no.
made of aluminum			
KF DN 10	7.2	12.2	669000
KF DN 16	9.8	17.2	669004
KF DN 25	19.8	26.2	669005
KF DN 40	31.7	41.2	669006
KF DN 50	47.2	52.2	669003
made of stainless steel			
KF DN 10	7.2	12.2	671000
KF DN 16	9.8	17.2	671004
KF DN 25	19.8	26.2	671005
KF DN 40	31.7	41.2	671006
KF DN 50	47.2	52.2	671003

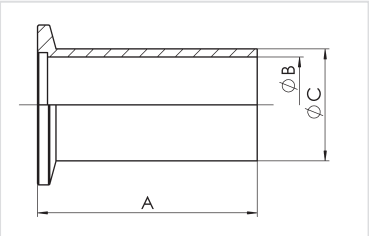
SMALL FLANGES KF WITH WELD STUB SHORT



Size*	A	B	C	Order-no.
made of stainless steel (1.4541)				
KF DN 10	16	10	14	661300
KF DN 16	16	16	20	661304
KF DN 20	20	21	25	661301
KF DN 25	20	24	28	661305
KF DN 32	25	34	38	661302
KF DN 40	25	40.5	44.5	661306
KF DN 50	25	50.6	57	661303

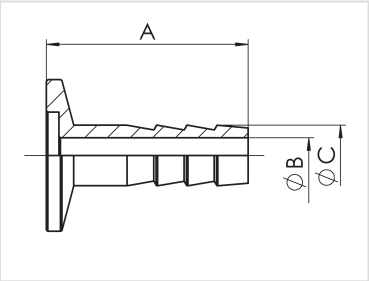
* Dimensions in millimeters

SMALL FLANGES KF WITH WELD STUB LONG



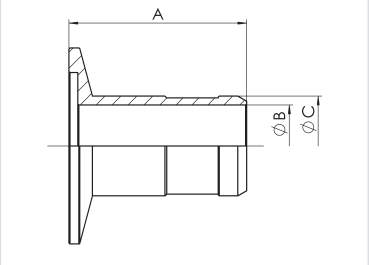
Size*	A	B	C	Order-no.
made of stainless steel (1.4541)				
KF DN 10	52	10	14	662100
KF DN 16	52	16	20	662104
KF DN 20	55	21	25	662101
KF DN 25	55	24	28	662105
KF DN 32	58	34	38	662102
KF DN 40	58	40.5	44.5	662106
KF DN 50	58	50.6	57	662103

SMALL FLANGES KF WITH HOSE NOZZLE



Size*	A	B	C	Tubing ID	Order-no.
made of aluminum					
KF DN 10 / DN 6 mm	40	4	8	6	662500
KF DN 16 / DN 6 mm	40	4	8	6	662510
KF DN 16 / DN 10 mm	40	7	12	10	662511
KF DN 25 / DN 8 mm	40	6	10	8	662516
KF DN 25 / DN 10 mm	40	7	12	10	662517
KF DN 25 / DN 12 mm	40	10	15	12	662518
KF DN 25 / DN 15 mm	40	15	19	15	662519
KF DN 40 / DN 8 mm	40	6	10	8	662521
KF DN 40 / DN 10 mm	40	7	12	10	662522
KF DN 40 / DN 15 mm	40	15	19	15	662523
made of plastic PP (polypropylene)					
KF DN 16 / DN 10 mm	40	7	12	10	662806
KF DN 25 / DN 10 mm	43	7	12	10	662807
KF DN 25 / DN 15 mm	43	14	19	15	662808

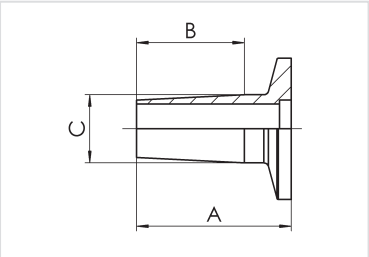
SMALL FLANGES KF WITH HOSE NIPPLE



Size*	A	B	C	Tubing ID	Order-no.
made of aluminum					
KF DN 10 / DN 12 mm	50	9	14	12	662530
KF DN 16 / DN 19 mm	50	15	20	19	662531
KF DN 25 / DN 20 mm	50	15	22	20	662532
KF DN 25 / DN 25 mm	50	23	28	25	662533
KF DN 40 / DN 25 mm	50	23	28	25	662534
KF DN 40 / DN 40 mm	50	37	41	40	662535

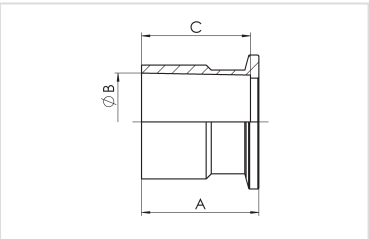
* Dimensions in millimeters

SMALL FLANGES KF WITH MALE GROUND JOINT



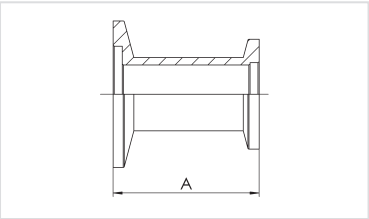
Size and grinding type*	A	B	C	Order-no.
made of stainless steel				
KF DN 10 / NS 14/23	33	23	14.2	662701
KF DN 10 / NS 19/38	47.5	38	18.8	662700
KF DN 25 / NS 19/38	49	38	18.8	662704
KF DN 25 / NS 29/32	41.5	32	29.2	662705
KF DN 40 / NS 29/32	43.5	32	29.2	662706
KF DN 40 / NS 45/40	49.5	40	45	662707

SMALL FLANGES KF WITH FEMALE GROUND JOINT



Size and grinding type*	A	B	C	Order-no.
made of stainless steel				
KF DN 10 / NS 14/35	38	14.5	35	662800
KF DN 10 / NS 19/38	41	18.8	38	662801
KF DN 25 / NS 19/38	41	18.8	38	662802
KF DN 25 / NS 29/32	35	29.2	32	662803
KF DN 40 / NS 29/32	35	29.2	32	662804
KF DN 40 / NS 45/40	43	45	40	662805

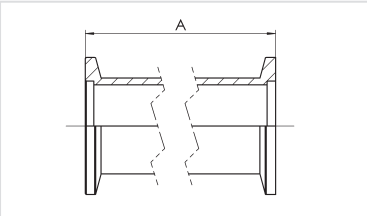
REDUCING PIECES WITH SMALL FLANGES KF



Size*	A	Order-no.
made of aluminum		
KF DN 25/10	40	669040
KF DN 25/16	40	669041
KF DN 40/10	40	669042
KF DN 40/16	40	669043
KF DN 40/25	40	669044
made of stainless steel		
KF DN 25/10	40	672910
KF DN 25/16	40	672911
KF DN 40/10	40	672912
KF DN 40/16	40	672913
KF DN 40/25	40	672914

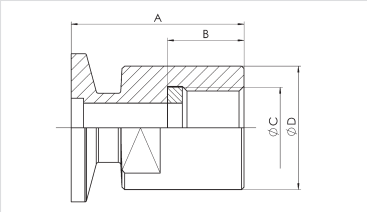
* Dimensions in millimeters

VACUUM TUBING WITH SMALL FLANGES KF



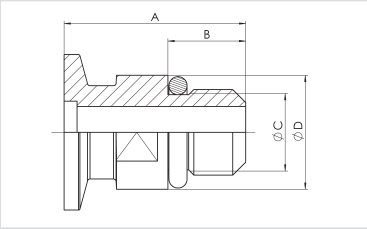
Size*	A	Order-no.
made of aluminum		
KF DN 10	60	669010
KF DN 16	80	669014
KF DN 25	100	669015
KF DN 40	130	669016
made of stainless steel (flange and tube TIG welded)		
KF DN 10	60	673000
KF DN 16	80	673014
KF DN 25	100	673015
KF DN 40	130	673016

SCREW-ON SMALL FLANGE KF MADE OF STAINLESS STEEL (INTERNAL THREAD)



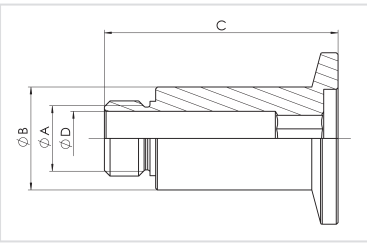
Size*	A	B	C	D	Order-no.
with sealing ring made of NBR					
KF DN 10 / G3/8"	35	15.5	G3/8"	20	672000
KF DN 16 / G1/2"	35	16	G1/2"	25	672001
KF DN 25 / G1"	45	22	G1"	38	672002

SCREW-IN SMALL FLANGES KF MADE OF STAINLESS STEEL (MALE THREAD)



Size*	A	B	C	D	Order-no.
with sealing ring made of NBR					
KF DN 10 / G3/8"	35	15	G3/8"	22	672100
KF DN 16 / G1/2"	35	16	G1/2"	26	672101
KF DN 25 / G1"	45	24	G1"	39	672102

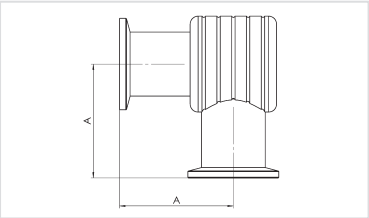
SMALL FLANGES KF WITH THREAD



Size*	A	B	C	D	Order-no.
made of stainless steel					
KF DN 16 / G1/4"	G1/4"	18	41	9.5	662590
KF DN 10 / G1/8"	G1/8"	20	49	6	662600

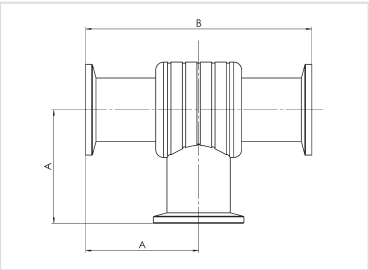
* Dimensions in millimeters

ELBOW PIECES WITH SMALL FLANGES KF



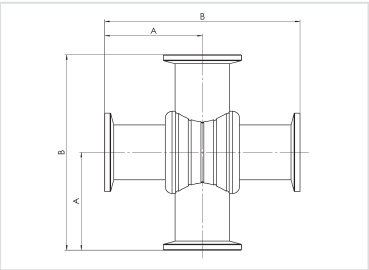
Size*	A	Order-no.
made of aluminum		
KF DN 10/10	30	669400
KF DN 16/16	40	669404
KF DN 25/25	50	669405
KF DN 40/40	65	669406
made of stainless steel		
KF DN 10/10	30	673400
KF DN 16/16	40	673414
KF DN 25/25	50	673415
KF DN 40/40	65	673416

T-PIECES WITH SMALL FLANGES KF



Size*	A	B	Order-no.
made of aluminum			
KF DN 10/10/10	30	60	669500
KF DN 16/16/16	40	80	669504
KF DN 25/25/25	50	100	669505
KF DN 40/40/40	65	130	669506
made of stainless steel			
KF DN 10/10/10	30	60	673500
KF DN 16/16/16	40	80	673514
KF DN 25/25/25	50	100	673515
KF DN 40/40/40	65	130	673516

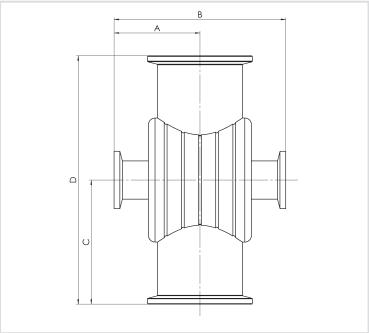
CROSS PIECES WITH SMALL FLANGES KF



Size*	A	B	Order-no.
made of aluminum			
KF DN 10/10/10/10	30	60	669600
KF DN 16/16/16/16	40	80	669604
KF DN 25/25/25/25	50	100	669605
KF DN 40/40/40/40	65	130	669606
made of stainless steel			
KF DN 10/10/10/10	30	60	673600
KF DN 16/16/16/16	40	80	673614
KF DN 25/25/25/25	50	100	673615
KF DN 40/40/40/40	65	130	673616

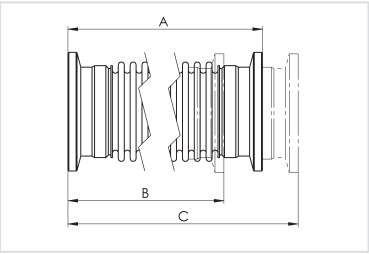
* Dimensions in millimeters

REDUCING CROSS PIECES WITH SMALL FLANGES KF



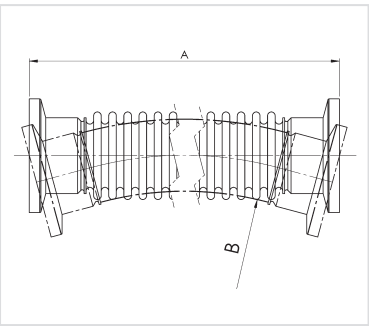
Size*	A	B	C	D	Order-no.
made of aluminum					
KF DN 25/25/16/16	35	70	35	70	669608
KF DN 40/40/16/16	45	90	65	130	669609
made of stainless steel					
KF DN 25/25/10/10	35	70	50	100	673617
KF DN 40/40/10/10	45	90	65	130	673619

METAL BELLOWS WITH SMALL FLANGES KF



Size*	A	B	C	Order-no.
made of stainless steel				
KF DN 10	74	62	86	673210
KF DN 16	74	62	86	673220
KF DN 25	88	72	104	673221
KF DN 40	113	88	138	673222

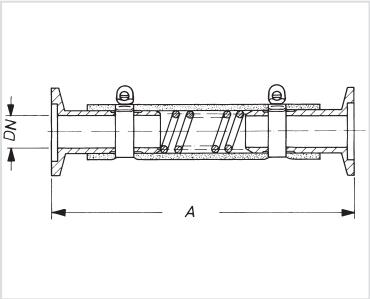
METAL VACUUM TUBINGS WITH SMALL FLANGES KF



Size*	A	B: minimum bend radius for		Order-no.
made of stainless steel (1.4541)		single bending	repeated bending	
KF DN 10	250	19	90	673305
KF DN 10	500	19	90	673315
KF DN 10	750	19	90	673325
KF DN 10	1000	19	90	673335
KF DN 16	250	29	120	673306
KF DN 16	500	29	120	673316
KF DN 16	750	29	120	673326
KF DN 16	1000	29	120	673336
KF DN 25	250	43	155	673307
KF DN 25	500	43	155	673317
KF DN 25	750	43	155	673327
KF DN 25	1000	43	155	673337
KF DN 40	250	65	200	673308
KF DN 40	500	65	200	673318
KF DN 40	750	65	200	673328
KF DN 40	1000	65	200	673338

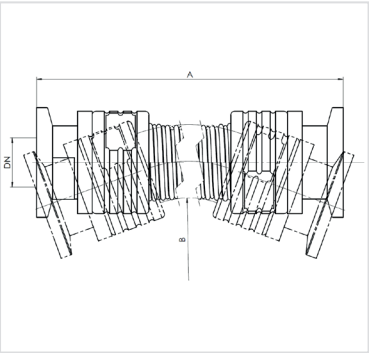
* Dimensions in millimeters

PVC VACUUM TUBINGS WITH INTERNAL SPIRAL WITH SMALL FLANGES KF



Size*	A	Order-no.
small flanges made of aluminum, with internal stainless steel spiral		
KF DN 16	500	686010
KF DN 16	1000	686020
KF DN 25	500	686011
KF DN 25	1000	686021
KF DN 40	500	686012
KF DN 40	1000	686022

PTFE VACUUM TUBINGS WITH SMALL FLANGES KF



made of antistatic PTFE, flanges made of stainless steel (1.4305)

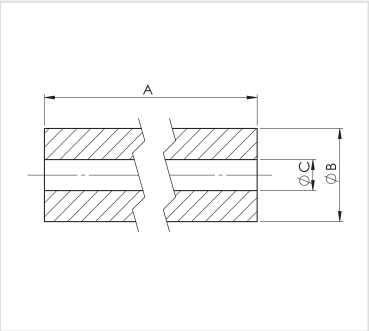
Special features:

- hose ribbed only on the outside, almost smooth walls on the inside. Therefore no accumulation of liquids or particles like in corrugated hoses and high gas conductivity due to reduced turbulence.
- PTFE material with excellent chemical resistance
- PTFE material is antistatic according to BS 5958:1991 / EN ISO 8031, < 10^7 Ohm resistivity between hose and flanges to prevent electro-static charging on the inside or outside. However, the tubing must not be used for grounding of equipment.

Size*	A	B: minimum bend radius for		Order-no.
		single bending	repeated bending	
KF DN 16	500	150	300	686030
KF DN 16	1000	150	300	686031
KF DN 25	500	200	400	686032
KF DN 25	1000	200	400	686033

* Dimensions in millimeters

RUBBER VACUUM TUBINGS AVAILABLE PER METER



Size*	B	C	Order-no.
DN 6 mm	12	6	686000
DN 8 mm	18	8	686001
DN 10 mm	30	10	686002
DN 15 mm	35	15	686003
DN 20 mm	45	19	686005

PTFE TUBING AVAILABLE PER METER

PTFE tubing	DN 10/8 mm	638644

POWER CABLES

IEC PLUG

Power cable KG CEE	612058
Power cable KG CH	676021
Power cable KG UK	676020
Power cable KG US	612065
Power cable KG CN	635997
Power cable KG IL	637353
Power cable LKG CEE	637652
Power cable LKG CH	637653
Power cable LKG UK	637654
Power cable LKG US	637655
Power cable LKG CN	635770
Power cable CEE, Y-shaped with 1 x KG and 1 x LKG	636273

(L)KG = (elbow) instrument coupling IEC 60320 C13

* Dimensions in millimeters

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GENERAL TERMS AND CONDITIONS

1. GENERAL
1.1. These General Terms and Conditions (GT&C) are intended for use in commercial transactions between businesses.

1.2. These GT&C shall apply for all, including future, contracts with the customer. Other terms and conditions shall not become part of the contract, even if VACUUBRAND does not expressly object to them. Subsidiary agreements made before or at the time of conclusion of contract may only be invoked if they are immediately confirmed in writing. The waiver of the requirement for written form shall only be possible in writing. The language of the contract shall be German and/ or English. In the event of a discrepancy between the German language version of these GT&C and a version in any language, the German language version shall prevail.

1.3. VACUUBRAND offers are subject to change and non-binding. VACUUBRAND reserves the right to make technical improvements to VACUUBRAND products.

1.4. VACUUBRAND may electronically store and process data necessary for the purpose of processing the contract.

1.5. A set-off by the customer shall not be permitted unless the counterclaims are undisputed or legally established, or pecuniary counterclaims arising from the right to refuse payment pursuant to Section 320 Bürgerliches Gesetzbuch (BGB) (German Civil Code).

1.6. For commercial transactions between businesses, public law legal persons or special funds under public law and with customers having no general place of jurisdiction in Germany the place of jurisdiction shall be the court responsible in Frankfurt am Main, Germany. VACUUBRAND shall also be entitled to appeal to the court responsible for the head office of the customer. VACUUBRAND shall, furthermore, as plaintiff have the right to invoke the Arbitration Court at the Chamber of Commerce and Industry in Frankfurt am Main, Germany. The Arbitration Court shall, in this case, make the final judgment in accordance with the Rules of Arbitration of the Chamber of Commerce and Industry in Frankfurt am Main without recourse to the ordinary courts of law. The instigation of legal dunning proceedings by VACUUBRAND shall not signify the exertion of its right of choice; it shall be admissible in all cases.

1.7. German law shall apply exclusively under the exclusion of the conflict of laws principles of Private International Law and the UN Convention on Contracts for the International Sale of Goods (CISG).

2. DELIVERY
2.1 The place of performance shall be the factory of VAUUBRAND in Wertheim, Germany. The risk shall transfer to the customer when the goods for delivery are packed and ready for pick-up (EXW (Incoterms® 2010 ex works)). This shall also apply to partial deliveries or where VACUUBRAND has performed additional services, such as shipping; costs for transport, packaging or insurance; exportation and installation. This shall also apply in case of delivery to a consignment warehouse of the customer.

2.2 In the case of a delay in the customer's acceptance of a delivery, VACUUBRAND may, without prejudicing the claim for performance, have the goods put into storage at the cost of the customer or, after providing a warning and setting a deadline for the customer, otherwise dispose of them.

3. DELIVERY PERIOD, DELAY
3.1 Delivery times shall be ex works. Delivery periods shall begin on receipt of order confirmation by the customer; however only after settlement of any technical issues pending from the conclusion of the contract; and after receipt of any documents to be provided to VACUUBRAND by the customer, such as drawings, permits or approvals; and definitely not before receipt of agreed advance payments. The delivery period shall be considered to have been met if readiness for dispatch has been notified before the expiry of this period. Delivery shall be subject to VACUUBRAND receiving its own supplies punctually and in good order.

3.2 Force Majeure and circumstances beyond control of VACUUBRAND, such as strikes, lock-outs, operational disruption, shortages of raw materials and equipment, delayed delivery or non-delivery by VACUUBRAND suppliers, shall extend the delivery periods accordingly and shall release VACUUBRAND from its delivery obligations if they, as a result, render delivery impossible. VACUUBRAND shall also not be liable for the circumstances described above if they arise during an already existing delay. The same shall apply for any additional or amended services requested by the customer.

3.3 VACUUBRAND shall be considered to be in default of delivery only if the customer has issued VACUUBRAND with a reminder, has set a reasonable extension period which has elapsed.3.4 In the case of delay damages, VACUUBRAND's liability for compensation shall be limited to 10% of the value of the delayed delivery/ service. The limitation shall not apply in cases of willful intent, gross negligence and/ or injury to life, limb or health. The customer shall be obliged to immediately inform VACUUBRAND in writing of any likely consequences of delay.

4. PRICES, TERMS OF PAYMENT
4.1 Prices shall be EXW (Incoterms® 2010 ex works), Wertheim and exclusive of statutory VAT, if applicable. Costs of packaging, transportation, freight and insurance shall be borne by the customer. Prices shall also be exclusive of the cost of returning and recycling/disposing of old equipment.

4.2 Invoices shall be payable to VACUUBRAND account in EURO (€) without deductions and free of charges and expenses. Payment shall be made immediately or by the date stated. The determinant factor shall be the receipt of payment. Cheques and bills of exchange shall only be accepted on account of performance and at the cost of the customer.

4.3 In the case of customers, with whom VACUUBRAND is working for the first time or with whom VACUUBRAND does not work regularly, after delay in payment or in the case of reasonable doubt as to the creditworthiness of the customer, VACUUBRAND shall reserve the right to make individual deliveries dependent on a pre-payment or a security deposit to the value of the invoice amount.

4.4 Should the period between conclusion of contract and agreed delivery exceed four (4) months, so may VACUUBRAND, at its discretion, demand a reasonable additional charge equivalent to the increase in its costs up until delivery.

4.5 In the case of an agreed return of goods that are free of defects, the customer shall be charged a checking and processing fee of 15% of the invoice amount (minimum € 10).

4.6 Should the customer be in arrears with payment, VACUUBRAND debt claims against him shall be due immediately, and VACUUBRAND shall not be obliged to make any further deliveries based on current delivery contracts.

4.7 If payment is delayed, VACUUBRAND shall charge - notwithstanding further damage compensation claims - interest on arrears at the statutory rate.

4.8 VACUUBRAND may offset amounts payable to the customer (e.g. from credit notes) against VACUUBRAND claims against the customer.

5. RETENTION OF TITLE, ASSIGNMENT OF FUTURE CLAIMS
5.1 The goods delivered shall remain property of VACUUBRAND until the complete and unlimited payment. Should VACUUBRAND still have further claims against the customer, VACUUBRAND shall then retain its property rights until payment of these has been effected.

5.2 The customer may neither use goods subject to retention of title nor combine them with other objects to which a third party may have rights. Should, however, goods subject to retention of title become, through their combination with other objects, part of a new (complete) item, VACUUBRAND shall be a proportional co-owner of this new item directly, even if this latter component is regarded as the main component. VACUUBRAND's proportion of co-ownership shall be determined by the ratio of the invoice value of the goods to the value of the new item at the time of combination.

5.3 The customer may resell goods subject to retention of title in the course of his normal business as long as he has not assigned, pledged or otherwise encumbered his claims from the resale.

5.4 The customer shall assign to VACUUBRAND in advance as collateral any claims against his customers from the resale of the goods subject to retention of title (see Clause 5.3) and/or newly formed items (see Clause 5.2) to the value of VACUUBRAND's invoice for the goods subject to retention of title. As long as the customer is not in default of payment for the goods subject to retention of title, he may collect the assigned claims in the ordinary course of business. He may, however, only use the proportional proceeds for the payment to VACUUBRAND for the goods subject to retention of title.

5.5 At the customer's request, VACUUBRAND shall release collateral at its discretion if and to the extent that the nominal value of the collateral exceeds 120% of the nominal value of its outstanding debt claims against the customer.

5.6 The customer shall be required to inform VACUUBRAND immediately of any attachments, seizures or any other third-party dispositions relating to the goods that are reserved or co-owned by VACUUBRAND.

5.7 In the event of delay in payment, failure to pay bills of exchange or cheques, or failure or recall of a payment made via SEPA Direct Debit Scheme, suspension of payments or insolvency of the customer or of the end buyer, the rights of the customer under Clause 5.3 shall no longer be valid. The customer must then immediately inform the buyer of VACUUBRAND's extended retention of title; he may use the proportional proceeds relating to the assignment only to pay for the delivered goods. VACUUBRAND shall be entitled to collect the assigned receivables itself.

5.8 In the event of customer's culpable breach of contractual obligations, in particular for the cases covered in Clause 5.7, VACUUBRAND shall be entitled to withdraw from the contract and/ or, without withdrawing from the contract, demand the return of any goods subject to retention of title still in possession of the customer and to collect the assigned receivables itself. In order to ascertain the rights of VACUUBRAND, VACUUBRAND shall be entitled to have all of customer's documents/ books concerning the reserved rights of VACUUBRAND examined by a person who is subject to the professional duty of confidentiality.

6. WARRANTY, LIMITATION OF LIABILITY

6.1 VACUUBRAND warrants that its delivered goods (including any agreed installation) are free of defects at time of risk transfer. The required quality, durability and use of VACUUBRAND's delivered goods are based solely on the agreed written specification, product description and/or operating manuals. Any information beyond this, in particular in preliminary discussions, advertising and/or referencing industrial standards shall only become part of the contract if they are expressly referenced in writing.

6.2 Should the customer require the delivered goods for purposes other than those agreed, he must take responsibility himself for examining their special suitability for this - also in terms of product safety – and ensure their compliance with all relevant technical, legal or regulatory provisions before the intended use. VACUUBRAND shall not be liable for any usability that was not expressly confirmed by VACUUBRAND in writing. In the case of material or design requirements of the customer, VACUUBRAND shall accept no liability for the suitability or permissibility of the desired materials or designs, and shall, in this respect, have no particular testing obligation. Compliance with safety-related and occupational health regulations depends on the location and operating conditions of which VACUUBRAND has no prior knowledge. Action for ensuring compliance shall therefore be the responsibility of the customer or his buyer.

6.3 VACUUBRAND shall not be liable for the consequences of improper handling, use, maintenance and operation of the delivered goods; the consequences of normal wear and tear, in particular of wearing parts such as diaphragms, seals, valves, vanes, condensers, oil and the breakage of glass or ceramic parts; for the consequences of chemical, electrochemical or electrical influences; or non-observance of the operating instructions.

6.4 If a notice of defect is justified, VACUUBRAND shall initially only be required to provide supplementary performance. Supplementary performance shall be, at the discretion of VACUUBRAND, either rectification of the defect or delivery of goods free of defects. Further warranty claims shall only apply in the event of rejection, impossibility or failure of the supplementary performance. The customer shall bear additional expenses, which arise from the fact that the goods were taken after delivery to a location other than the agreed place of performance.

6.5 The customer must, immediately upon receipt of the goods, inspect them carefully, also in terms of product safety, and notify obvious defects immediately in writing; any hidden defects must be immediately notified upon discovery. The customer must notify the carrier immediately of any transport damage. Failure to observe the testing and notification obligation shall void any customer claims for defects.

6.6 VACUUBRAND's liability for slight negligence shall be limited to claims for injury to life, limb or health, to claims under the Produkthaftungsgesetz (German Product Liability Act) or to claims of culpable breach of fundamental contractual obligations through which the purpose of the contract is endangered. Otherwise, its liability for slightly negligent breach of fundamental contractual obligations is limited to the typically occurring damages which VACUUBRAND could have foreseen when the contract was concluded.

6.7 Should the customer use the delivered goods in conjunction with environmentally harmful, toxic, radioactive or otherwise hazardous materials, he shall be obliged to clean them before returning them to VACUUBRAND. If applicable, VACUUBRAND may charge any necessary costs for decontamination/ cleaning and disposal to the customer's account.

7. LIMITATION PERIOD

The warranty period shall be one year and starts from the date of delivery of the goods to the customer. The same shall apply for claims for damages, irrespective of their legal basis. The limitation periods of Section 438 Para. 1 Nos. 1 and 2, Section 479 Para. 1 and Section 634a Para. 1 No. 2 of the BGB (German Civil Code) shall remain unaffected. The restriction of the limitation period shall not apply to claims based on fraudulent concealment of a defect, for claims under the Produkthaftungsgesetz (German Product Liability Act) or for damages resulting from injury to life, limb or health and other damages based on intent or gross negligence. The limitation period in respect of replaced or repaired goods shall only commence anew if VACUUBRAND admitted the defectiveness of the replaced or repaired goods.

8. SOFTWARE USE

8.1 If software is included in the scope of a delivery, the customer shall be granted a non-exclusive right to use the software and its associated documentation. It is provided for use on the designated delivery item. The use of the software on more than one system shall be prohibited.

8.2 The customer shall only be entitled to copy, transfer or translate the software or to convert it from object code to source code to the extent permitted by law (Sections 69a et seq. Urheberrechtsgesetz – German Copyright Act). The customer undertakes to refrain from removing manufacturer information, in particular copyright notices, or from changing these without VACUUBRAND's prior express consent or the prior express consent of the software supplier.

8.3 All other rights to the software and the documentation including copies thereof shall remain with VACUUBRAND and/ or the software supplier. The issue of sublicenses is not permitted.

9. INSTALLATION

9.1 Installation costs may be invoiced on a monthly basis. Fixed installation prices shall only cover the work that has been agreed upon.

9.2 The customer shall be responsible for providing the following at his own expense: lighting, motive power, if necessary, compressed air; water; electrical power for welding and heating, including the necessary connections; electrical installations to connect the products supplied by VACUUBRAND; the devices required (such as lifting equipment); a lockable room that can be used for storing materials; tools and clothing during the installation.

10. SPARE PARTS, MAINTENANCE/REPAIR

10.1 For spare parts the current list prices shall apply.

10.2 Insofar as there is an obligation on the part of VACUUBRAND to maintain/supply spare parts, then this obligation shall be limited to a period of five (5) years from the date of delivery. If spare parts are not manufactured by VACUUBRAND, or are no longer available on the market, for example electronic components, or if the raw material for their production is no longer available, the obligation of VACUUBRAND to deliver spare parts shall lapse.

10.3 Maintenance and calibration services can only be provided if the customer has declared the devices sent to be safe to work on from a health hazard perspective.

11. LEGAL RESERVATION, INDUSTRIAL PROPERTY RIGHTS, CONFIDENTIALITY

11.1 VACUUBRAND reserves ownership and all industrial property rights and copyrights to all moulds, tools or other devices, samples, pictures, and business and technical documents produced or provided by VACUUBRAND. This also applies where the customer has wholly or in part taken on the costs hereof. The customer may use these only in the manner agreed with VACUUBRAND. Without VACUUBRAND's written consent, the customer may not himself manufacture contractual objects delivered or have the same manufactured by third parties.

11.2 Insofar as VACUUBRAND delivers goods according to the designs or other requirements specified by the customer (models, patterns etc.), the customer shall be liable to VACUUBRAND by default for ensuring that, through the manufacture and delivery of these goods, the industrial property rights or other rights of third parties are not infringed. If the customer is at fault he shall reimburse VACUUBRAND all damage resulting from any such infringement of rights.

11.3 Any information acquired through the business relationship and not deemed to be public knowledge must not be disclosed by the customer to third parties.

Status as of: May 2016

EASY CONVERSION

The following tables will easily allow you to convert the pumping speed and the ultimate vacuum of the units used in the catalog into your preferred unit.

Unit conversion online: www.vacuubrand.com/calculate

PUMPING SPEED

m^3/h	cfm	l/sec	l/min
1	0.589	0.278	16.67
0.5	0.295	0.139	8.34
1.5	0.884	0.417	25.01
2	1.18	0.556	33.34
3	1.77	0.834	50.01
4	2.36	1.11	66.68
5	2.95	1.39	83.35
6	3.53	1.67	100.0
7	4.12	1.95	116.7
8	4.71	2.22	133.4
9	5.30	2.50	150.0
10	5.89	2.78	166.7
15	8.84	4.17	250.1
20	11.8	5.56	333.4
30	17.7	8.34	500.1
40	23.6	11.1	666.8

ULTIMATE VACUUM

mbar (hPa)	torr (mm Hg)	Pa N/m^2	psi $lbf/inch^2$
1	0.750	100	1.45×10^{-2}
100	75.0	10000	1.45
70	52.5	7000	1.02
50	37.5	5000	0.725
20	15.0	2000	0.290
15	11.3	1500	0.218
10	7.50	1000	0.145
7	5.25	700	0.102
5	3.75	500	7.25×10^{-2}
2	1.50	200	2.90×10^{-2}
1.5	1.13	150	2.18×10^{-2}
1	0.75	100	1.45×10^{-2}
0.5	0.38	50	7.25×10^{-3}
0.1	7.5×10^{-2}	10	1.45×10^{-3}
10^{-2}	7.5×10^{-3}	1	1.45×10^{-4}
10^{-3}	7.5×10^{-4}	10^{-1}	1.45×10^{-5}
10^{-6}	7.5×10^{-7}	10^{-4}	1.45×10^{-8}

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