

# VACUUBRAND® Vacuum

## A complete range of vacuum solutions

VACUUBRAND has been a pioneer in laboratory vacuum for over 40 years, and brings convenience, performance, reliability, and economy to laboratory vacuum supply. VACUUBRAND® pump-control options also offer distinct productivity advantages compared with uncontrolled pumps, central vacuum system, and competitive vacuum products.

Why choose a VACUUBRAND® pump instead of an oil-sealed pump or a competitive oil-free pump?

- **Oil-Free without Compromise:** VACUUBRAND® chemistry-design diaphragm pumps combine dry operation, fluoropolymer flowpaths, and distinctive engineering for excellent corrosion-resistance and low maintenance.
- **Whisper Quiet:** These are among the quietest diaphragm vacuum pumps available, operating at decibel levels comparable to a quiet conversation.
- **Lower Lifetime Cost:** The high flowrates, corrosion-resistant flowpath materials, and durability of VACUUBRAND® pumps can save thousands of dollars per pump per year in operation and maintenance costs. Visit [www.brandtech.com](http://www.brandtech.com) for details.
- **High Performance:** Working vacuum flow rates of VACUUBRAND® pumps are up to 40% better than competitive dry pumps for faster evaporative applications and higher productivity.
- **Innovation:** VACUUBRAND® NT series pumps provide even deeper vacuum and higher flow rates than our previous models, while improving on the quiet operation, low vibration and long service intervals that are hallmarks of VACUUBRAND® pumps. And service is even easier than before!



MD1C-AK-EK  
Vacuum Pump  
2mbar, 0.88cfm

**Quiet. Powerful.**  
**Low Maintenance.**  
**Unbeaten Economy.**



# Products



## A Comprehensive Range of Vacuum Solutions

BrandTech offers a complete range of vacuum solutions, from oil-free pumps with chemical-resistant flowpaths like the MD4C NT (shown), to fully integrated, electronically-controlled vacuum systems. Should your application require deeper vacuum, the VACUUBRAND® line of HYBRID and rotary vane pumps offer the same high performance and durability.

## High Performance

Vacuum pumps and systems from VACUUBRAND feature highly uniform “planar” diaphragms. These consistent diaphragms ensure tight tolerances, long service life, high-performance, and easy replacement without tedious, trial-and-error calibrations.



MD4C NT  
Vacuum Pump  
1.5mbar, 2.2cfm

## Quality Assurance

Each VACUUBRAND® pump and system must pass rigorous product testing before leaving the factory. It's your assurance of a reliable pump.

## Corrosion-Resistant Materials

All parts in the vapor flowpath of our chemistry-design pumps are manufactured from PTFE, PTFE compound, or fluorinated plastic materials for superior chemical resistance to corrosive vapors and exceptionally long service life. Aluminum-FKM pumps are also available for non-evaporative and non-corrosive applications.

## Durability

VACUUBRAND® vacuum pumps and systems typically have service intervals of up to 10,000-15,000 hours (that's years in most applications). Most service can be done in the lab in a matter of minutes.

## The Essential Vacuum Pump

### Become a Vacuum Expert: A Short Course in Lab Vacuum

#### How deep of a vacuum do I need?

Vacuum pump specifications are typically stated as ultimate vacuum and flow rate. The ultimate vacuum required is task dependant. Most laboratory applications operate best in the range of 1-100mbar. For filtration, liquid aspiration and other pressure-differential (“fluid movement”) applications, 100mbar is sufficient, achieving 90% of the possible potential difference. An ultimate vacuum of 7mbar is effective for rotary evaporation of most solvents more volatile than water. For challenging applications like rotary evaporation of very high temperature boiling point solvents or centrifugal concentration of high boilers like DMF, a 2mbar ultimate vacuum is needed. VACUUBRAND® oil-free diaphragm pumps can do the job for all the above applications. VACUUBRAND® oil-free pumps are whisper quiet, economical and environmentally friendly, requiring no costly oil changes, or cold traps to protect the pump. A good rule of thumb is “never use an oil pump when an oil-free pump will do the job.” Freeze drying requires deeper vacuum typically referred to as “fine vacuum” in the range of  $10^{-3}$ -1mbar. Rotary vane or hybrid pumps are required for these applications.

#### Solvent Recovery

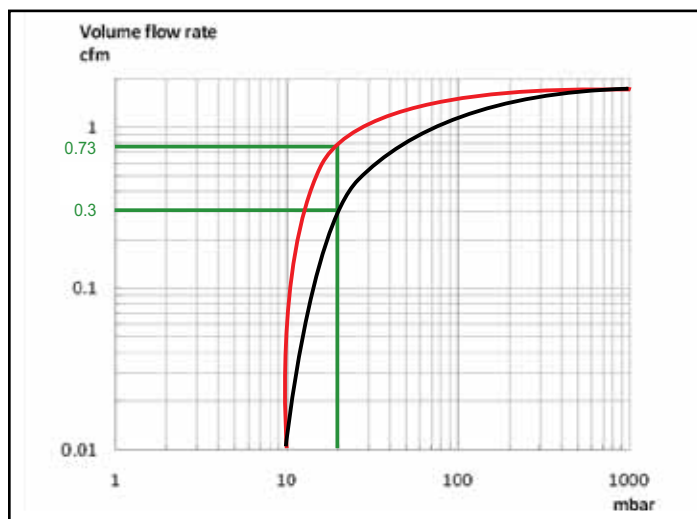
Catchpots and condensers protect the pump and your lab atmosphere from application vapors. An inlet catchpot captures condensed vapors from the vacuum line before they degrade pump performance. The outlet condenser (cooled by external means) and catchpot provide near 100% recovery of vapors that pass harmlessly through the pump’s corrosion-resistant fluoropolymer flowpath, typically eliminating the need for a cold trap to protect the pump or environment. For more details on the economic benefits of eliminating cold traps, see page 77. Depending on the temperature of your application and the vapor pressure of your solvent, you may not even need a condenser, an outlet catchpot may be sufficient.

#### Control

Gauges and controllers enable you to monitor and manage your laboratory vacuum applications. Whether you simply need to monitor your application, provide on/off control, need flow rate control or require precise adaptive vacuum control, VACUUBRAND offers mercury free gauges and controllers, as well as integrated systems to meet your requirements.

#### What about “flow rate?”

The flow rate required for an application is determined by the application, system leakage and your time requirements. The “free air capacity” (also known as displacement) specification of a vacuum pump represents its peak ability to move vapor at atmospheric pressure. It’s important to note that actual flow rate decreases from the displacement specification to zero as a pump reaches its ultimate vacuum. A pump’s flow curve illustrates its working flow rate through its operating range and can be useful for the selection of the correct pump for an application (see figure below). If a pump can’t provide enough flow under vacuum, the application will proceed more slowly or in some cases not at all. VACUUBRAND® pumps are designed to retain more flow rate throughout their working range, and only drop off sharply close to their ultimate vacuum.



Comparison of two vacuum pumps with the same ultimate vacuum and free air capacity specifications. Note the difference in flow rate between the two pumps at 20mbar.

#### Corrosion Resistance

Evaporative and other corrosive applications can be very destructive to ordinary vacuum pumps. Conventional rotary vane pumps require frequent oil changes and cold traps to minimize the damaging effects of corrosive chemical vapors. VACUUBRAND® oil-free chemistry-design pumps incorporate a fully chemistry resistant fluoropolymer flow path for excellent corrosion resistance and low maintenance. For non-corrosive, non-evaporative applications, VACUUBRAND also offers a comprehensive line of high-performance Aluminum-FKM diaphragm pumps.

Whether your vacuum application requires a simple pump or a fully integrated vacuum system with solvent recovery and electronic control, VACUUBRAND has the right pump for your lab.

### The Essential Oil-Free, Corrosion-Resistant Vacuum Pump

High performance VACUUBRAND® chemistry-design diaphragm pumps provide dry vacuum levels as deep as 0.6mbar, making them an excellent choice for most applications from benchtop research to pilot plant installations. Pumps without controls are well-suited

to high flow applications like vacuum ovens, or for applications in which the control is provided by the vacuum application apparatus. Even operations that don't require solvent recovery or sophisticated control benefit from a pump designed with your applications in mind.

#### Continuous Condensate Purge

All chemistry-design multistage models feature an integrated gas ballast that permits continuous purging of condensed vapor from the pump without a noisy, intermittent purge valve.

MZ2C NT  
Vacuum Pump  
7mbar, 1.4cfm



#### High Flow Rates

VACUUBRAND® diaphragm pumps are engineered for high performance with minimal wear. Powerful motors give the pumps the torque needed to sustain high flow rates at working vacuum. Higher flow rates mean faster applications.

#### Extremely Low Maintenance

Totally dry, there's no oil to change or monitor! Typical diaphragm lifetimes are 10,000-15,000 hours of use—that's years in most applications, so there is very little downtime and low service costs. When it is finally time for service, precision-formed diaphragms eliminate tedious, trial-and-error stroke length recalibration.

#### Corrosion Resistance

Chemistry-design models are made with chemically resistant fluoropolymer heads, diaphragms, and valves. Cold traps are not required for most applications!

#### Small Footprint

Compact pumps fit easily on benchtops or under hoods.

#### Whisper Quiet

VACUUBRAND® pumps are extremely quiet. Most laboratory models operate at about the same sound pressure level as a hushed conversation. NT series pumps have been redesigned to be even quieter!

### The VACUUBRAND® nameplate – the sign of a quality product

VACUUBRAND continuously works to perfect an integrated management system in all departments; conforming with ISO 9001 and ISO 14001. The 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 the VACUUBRAND facility, measuring specifications and equipment reliability with computer-controlled measuring

and test instruments, with a fully automated final test. An interlock system prevents the manufacturing of a serialized nameplate until all test parameters are met. This ensures that every vacuum pump bearing the VACUUBRAND® name is not only designed to an exceptionally high level engineering standard, but also offer extraordinary lifetime economy because of their low service costs and above-average lifetimes.



## New & Innovative Vacuum Products

### NEW! VACUUBRAND® ME1 and ME1C Vacuum Pumps

Vacuum filtration is one of the most common applications used for sample preparation in chemistry, microbiology, waste water control and other analytical processes. The new ME1 and ME1C diaphragm pumps offer a compact, high performance and easy-to-use solution which is perfect for both single and multiple filtrations. These new pumps provide a well-proven and extraordinary long diaphragm life time of 10,000-15,000 operating hours. They are whisper quiet with low vibration. The functional, space saving and innovative design with readily accessible top mounted power switch ensures convenient and quick operation. Both models feature robust PTFE diaphragms and valves for optimal chemical resistance. The ME1C features a full fluoropolymer flowpath, for a complete chemistry-design pump. An optional vent control valve with dial gauge enables variable fine adjustment of the pumping speed. Not intended for pressure filtration.

Both pumps feature an ultimate vacuum of 100mbar (75Torr), providing 90% of the possible potential difference for fluid movement applications, while minimizing evaporation. Free air capacity is 0.5cfm (14lpm) suitable for several filtration applications.



ME1 and ME1C  
Vacuum Pumps

#### ORDERING INFORMATION

	Cat. No.	2011 List Price
NEW! VACUUBRAND® ME1 Vacuum Pump 100-120V, 50-60Hz	721003	\$795.00
NEW! VACUUBRAND® ME1C Vacuum Pump 100-120V, 50-60Hz	721103	995.00

### VACUUBRAND® Tyro12™ Vacuum Pump

The Tyro12™ is an economical new vacuum pump for a wide variety of laboratory tasks when budgets are a concern. Offering 15mbar (12Torr) ultimate vacuum and 35lpm (1.2cfm) free air capacity, the Tyro12™ is suitable for rotary evaporation, gel drying, and many other evaporative tasks. With integrated gas ballast and heavy-duty valves, the Tyro12™ is especially tolerant of condensed vapors, and can evaporate the following solvents at room temperature:

- water
- tert-butanol and lighter alcohols
- ethyl acetate
- dichloromethane
- n-hexane
- chloroform
- toluene

Many other common solvents can be evaporated in heated applications. The Tyro12™ is also an excellent choice for filtration and other general laboratory needs.

Despite its low price tag the Tyro12™ is a full chemistry diaphragm pump, with a corrosion-resistant fluoropolymer vapor path. The VACUUBRAND® name ensures a robust, reliable pump.

For more information, visit [www.brandtech.com](http://www.brandtech.com).



Tyro12™  
Vacuum Pump

#### ORDERING INFORMATION

	Cat. No.	2011 List Price
VACUUBRAND® Tyro12™ Vacuum Pump 100-120V, 50-60Hz	696203	\$1,550.00

### The VACUUBRAND® 3000-series of Controllers and Gauges with VACUU•BUS®

VACUUBRAND® 3000-series controllers and gauges utilize innovative VACUU•BUS® plug-and-play auto-configuration technology. All peripheral components – capacitive, Pirani and Pirani/Penning transducers, vacuum valves, vent valves, and cooling water valves, are automatically recognized and communicate with the display unit for easy setup of your vacuum system.

The VACUUBRAND® CVC 3000 absolute pressure vacuum controller used in conjunction with a VACUU•BUS® solenoid isolation valve offers four different control modes including up to ten multi-step programs, as featured in the VACUUBRAND® PC510/511/520 NT and PC 610/611/620 NT systems. When used in conjunction with a VARIO™ pump, the CVC 3000 has an additional adaptive control “Auto” mode that finds and follow boiling point curves automatically. The CVC 3000 operates in fourteen different languages - excellent for multi-lingual laboratories.



CVC 3000  
Vacuum Controller

DCP 3000  
Vacuum Gauge

The DCP 3000 Vacuum Gauge system uses a unified display system in conjunction with several available VACUU•BUS® transducers to measure from atmosphere to as low as  $5 \times 10^{-3}$  mbar. Transducers are automatically recognized, and can be paired for seamless measurement across several orders of magnitude.

For more information, see the Gauges and Controllers section of the catalog on page 86.

### Peltronic™ Exhaust Vapor Condenser

The VACUUBRAND® Peltronic™ electronic condenser captures vapors without an external coolant such as water, dry ice or liquid nitrogen. The vapor flow-path is highly chemical resistant. Peltronic™ condensers are especially well-suited for applications where cooling water supply is not convenient, but the environmental and economic benefits of vapor capture at the pump are desired.

Capturing solvent vapors at the outlet of the pump is an effective way to protect the environment from residuals that would otherwise pollute the lab environment, or be exhausted into the atmosphere via a fume hood or snorkel.

The Peltronic™ condenser features VACUU•BUS® connections for interfacing to a CVC 3000 controller, and a catchpot level sensor. See page 87. Includes 10/8mm PTFE inlet connection and catchpot. Order power cable separately.



Peltronic™  
Exhaust Vapor  
Condenser

#### ORDERING INFORMATION

	Cat. No.	2011 List Price
Peltronic™ Exhaust Vapor Condenser		
100-120V/200-230V, 50-60Hz	699905	\$2546.00
Power cable (US plug)	612065	22.60

## Networked Vacuum

### **NEW! VACUU•LAN® Mini-Network**

The VACUU•LAN® Mini-Network is a great way to perform up to three applications from a single pump, increasing utility without eating up valuable lab space. It builds on VACUUBRAND's pioneering technology in vacuum local area networks for new laboratories and renovations, transferring the technology into a simple-to-install unit to add capability to existing labs. Three VACUU•LAN® vacuum ports with flow control are mounted onto a bar—each port

has an integrated check valve to minimize interference and the possibility of cross-contamination. Corrosion resistant materials are used throughout the vapor flowpath for long life in chemistry labs. The bar can be mounted to ring stands or laboratory framework with the pre-installed mounting support rods, or can be easily attached to walls. Vacuum can be supplied by any VACUUBRAND® chemistry-design pump, or even diaphragm pumps from other manufacturers.



#### **ORDERING INFORMATION**

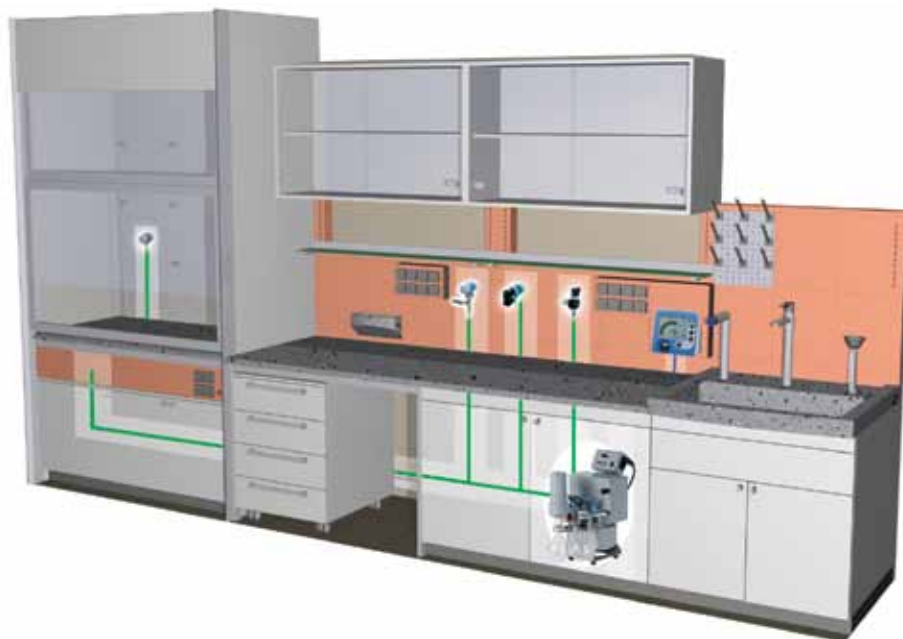
	<b>Cat. No.</b>	<b>2011 List Price</b>
VACUU•LAN® Mini-Network	2614455	\$1,250.00

### **VACUU•LAN® Networks for New Lab Construction and Renovation**

Fully-customized VACUU•LAN® vacuum local area networks can provide the vacuum for your laboratory construction or renovation project. The modular network can be integrated into laboratory furniture and fume hoods, and powered by a quiet, compact VACUUBRAND® chemistry design vacuum pump that fits under your lab bench. With a VACUU•LAN® vacuum local area network, you have high-performance vacuum (as deep as 2mbar/1.5Torr) at each bench or fume hood

port, without the instability and user interference of a central vacuum system, and without the bench space required for individual pumps. Individual ports can even be configured for electronic control, for fully programmable vacuum supply directly from the network. This modular approach offers long-term flexibility; install the vacuum you need where you need it, only when you need it.

Two decades of global experience developing VACUU•LAN® laboratory vacuum local area networks, for small college labs and major research institutions, make this VACUUBRAND innovation the smart choice for your laboratory vacuum. For more information on this innovative technology, contact BrandTech Scientific.



## Vacuum Pumps with Manual Control

### Vacuum Pumps with Manual Control

Popular VACUUBRAND® chemistry-design vacuum pumps are available with manual flow control to provide the most basic management of vacuum where electronic control is unnecessary to achieve good results.

Centrifugal concentration, gel drying, and even simple rotary evaporation applications can often be effectively managed with manual control systems.

#### Outlet Condenser with Catchpot

An outlet condenser is an effective way to capture vapors that pass through a chemistry diaphragm pump, helping protect the lab atmosphere and the environment. With the vapors at the outlet being at atmospheric pressure, the extremely cold temperatures required with an inlet side cold trap are necessary. For most applications tap water is sufficient, or in line with a rotary evaporator condenser coil.

*PC101 NT  
Vacuum System  
7mbar, 1.4cfm*



#### Gas Ballast

All VACUUBRAND® multistage chemistry diaphragm pumps come equipped with an adjustable gas ballast to allow purging of any internal condensation that may occur. The high flow rates at working vacuum of VACUUBRAND® pumps allow for continuous gas ballast with minimal effect on ultimate vacuum.

#### Bourdon Analog Gauge

Dial (Bourdon) relative pressure gauge provides approximate vacuum levels and trend indication on the PC101 NT and PC201 NT.

#### Diaphragm Valve

A manually controlled PTFE diaphragm valve restricts the flow into the pump. The vacuum level is determined by the equilibrium between the vapor flow from the application balanced against the restricted flow. Using this method of control for evaporative applications has a number of advantages over bleeder valves, including enhanced safety when working with flammable solvents, as well as reduced noise.

#### Inlet Catchpot

All VACUUBRAND® PC systems feature an "AK" inlet catchpot. This helps protect the pump from any condensation in the vacuum line, as well as particles that may be generated by the application, preserving the performance of the pump for consistent performance. VACUUBRAND® catchpots are safety coated to help protect against breakage.



## Vacuum Pumps with Two-Point Electronic Control

### Pumps with Two-Point Electronic Control

Many applications that require a specific vacuum level to operate properly, such as most rotary evaporation, will benefit significantly by adding electronic control to the vacuum pump. VACUUBRAND® employs a digital controller and solenoid valve to provide “two-point control.” Unlike vacuum controllers that turn the pump on and off (common in controllers integrated into evaporators and even in competitive vacuum pumps), the solenoid

alternately connects and isolates the pump from the application as needed to maintain vacuum levels while the pump keeps running. This keeps the pump warm, and minimizes the condensation in the pump that can shorten diaphragm life and impair performance. When the gas ballast is open, this control approach also permits continuous purging of condensates from the pump for high flow rate, trouble-free operation.

#### Controller

When mated to a VACUU•BUS™ solenoid valve, the mercury-free, digital CVC3000 controller provides two-point vacuum control. A digital readout shows actual vacuum levels, while a digitally simulated analog indicator simplifies trend and “at-a-glance” monitoring. See page 86 for more details..

#### Solenoid valve

The CVC3000 controller opens and closes the solenoid valve to keep vacuum levels between pre-set tolerances as vapor flow from the application changes.

PC510 NT  
Vacuum System  
7mbar, 1.4cfm



### Save money with a VACUUBRAND® system!

Because VACUUBRAND® pumps provide high flow-rates at working vacuum levels, they can provide cost savings, both initially, and over the life of the pump.

- **Synchro™ Multi-tasking systems** harness the power of the VACUUBRAND® pump for two applications. A unique check-valve system allows two different vacuum levels to be set for two different applications, without backflushing or cross-contamination. VACUU•LAN® systems expand on this concept to outfit a lab bench, or even an entire room, with a single pump.
- **Dry ice** costs for cold traps used with rotary vane (and sometimes recommended with lesser diaphragm pumps) can easily exceed the pump purchase price in the first year. Our PTFE flowpath and superior flow rates often eliminate the need for cold traps, and the associated costs of dry ice or liquid nitrogen.
- **Productivity savings** with the self-adjusting VARIO® systems free you up to perform other work with minimal pump oversight. Their continually optimized vacuum levels speed evaporation by up to 30%! Service intervals are also lengthened considerably for even more operating cost savings.

Find out more details on how to save money with VACUUBRAND® vacuum pumps at [www.brandtech.com](http://www.brandtech.com).

## Vacuum Pumps with Adaptive Electronic Control

### Self-regulating Electronic Control – VARIO®!

VACUUBRAND® VARIO® vacuum systems offer users unsurpassed control of critical vacuum applications. A low maintenance chemistry-design pump is integrated with a variable speed motor and a mercury-free, digital controller. The system automatically finds and follows boiling curves, continuously optimizing the vacuum level without having to program presets. It's the ultimate productivity tool! VARIO® pumps are an excellent choice for reactors.

- **Faster:** Because the vacuum level is continuously optimized, evaporation times are up to 30% faster when compared to other electronically-controlled pumps.
- **Easier:** Just press "Start" and the VARIO® pump begins pumping down, and finds the first boiling point. It maintains and continually optimizes vacuum levels to vapor flow — even for azeotropic mixtures!
- **Less "Babysitting":** The VARIO® controller automatically adjusts vacuum levels, reducing the need for manual adjustment or complex pumping programs. The pump even shuts itself off at pre-set levels or when evaporation is complete.
- **Virtually No Bumping:** The VARIO® controller automatically reduces the pumping speed as each boiling point is approached so "overpumping" is substantially reduced.
- **Less Maintenance:** Because the pump only operates enough to maintain optimum vacuum, wear is lessened, extending the service interval greatly.
- **GLP/GMP Validation:** An integrated bidirectional RS232 port allows control and monitoring of every parameter for process validation, and the execution of complex pumping programs. Use our VACU•CONTROL™ software (PC only) for easy control and monitoring (call for details).



PC3001 VARIO  
Vacuum System  
2mbar, 1.0cfm



Low-profile outlet condenser reduces height requirements.

### PC3001 basic Vacuum System

The **PC3001 basic** provides 2mbar ultimate vacuum and 28lpm with a speed control knob for manual vacuum control. This compact, quiet, energy efficient, low maintenance pumping unit can be upgraded to a PC3001 VARIO system with two supplemental modules. Module 1 adds an inlet catchpot to protect the pump and full VARIO® control. Module 2 adds an outlet condenser for solvent recovery. Add one or both!

More information at [www.brandtech.com](http://www.brandtech.com).

#### ORDERING INFORMATION

	2011	
	Cat. No.	List Price
<b>PC3001 basic</b>		
100-120V/200-230V, 50-60Hz	696723	\$4,835.00
Supplemental Module 1	699921	2,204.00
Supplemental Module 2	699922	468.00



### VARIO® Control without Solvent Recovery

For applications that already have integrated solvent recovery, or that operate with a cold trap, VARIO® control is also available as a pump/controller combination, without solvent recovery accessories.



MD4C NT VARIO  
Vacuum Pump  
1.5mbar, 2.71cfm

## Dual Application Vacuum Systems

### Pumps with Dual Application Control

VACUUBRAND® dual application vacuum systems harness the power of the VACUUBRAND® oil-free pumps to increase lab efficiency and reduce the cost of vacuum generation. Operating two different applications from a single pump saves money and lab bench space.

These vacuum systems are available with manual control, electronic control, or both. Integrated check valves minimize interaction between applications.



PC511 NT  
Vacuum System  
7mbar, 1.4cfm

#### Manual Control

PTFE diaphragm valve provides approximate control of vacuum levels for less demanding applications.

#### Electronic Control

Solenoid valve, operated by a CVC3000 controller, provides precise two-point electronic control for important applications.

All dual application systems include a high-performance 7mbar or 1.5mbar VACUUBRAND® NT series vacuum pump. Select a 7mbar system (MZ2C NT Synchro™, PC511 NT, or PC520 NT) for most lab applications and 1.5mbar systems (MD4C NT Synchro™, PC611 NT, PC620 NT) for larger applications or those with higher boiling point solvents.

### Have more than 2 applications?

Expanding on the concept of the dual-application system, VACUUBRAND offers the VACUU•LAN® system - a modular integrated Vacuum Local Area Network for laboratories. Far more than a "small central vacuum system," VACUU•LAN® provides performance that approaches that of individual diaphragm vacuum pumps dedicated to each application, but with less bench space, noise and cost. A modular design allows for easy reconfiguration, upgrading or even relocation. VACUU•LAN® systems can be installed in new laboratories, or retrofitted into existing ones. VACUU•LAN® is also popular for lab rebuilds and science parks. For more information, contact BrandTech Scientific.



MZ2C NT Synchro™  
Vacuum System  
7mbar, 1.4cfm

**MZ2C NT Synchro™ (7mbar) and MD4C NT Synchro (1.5mbar)** vacuum systems feature two manually-controlled vacuum ports. These manual controllers regulate flow, providing approximate vacuum levels suitable for less critical applications.



PC520 NT  
Vacuum System  
7mbar, 1.4cfm

**PC520 NT (9mbar) and PC620 NT (1.5mbar)** systems have two electronically controlled vacuum ports for precise automated control of two applications running simultaneously.

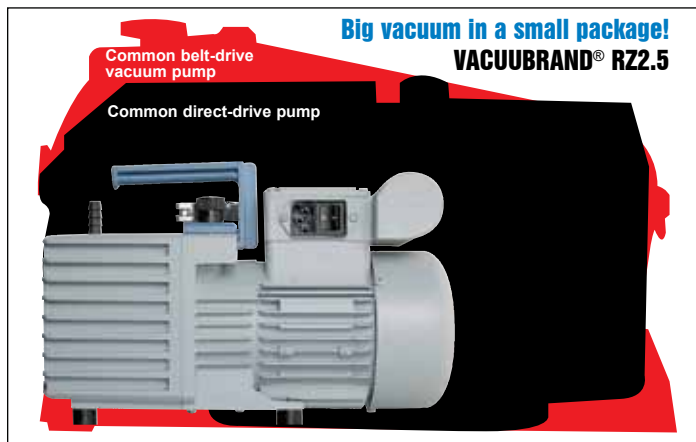
### VACUUBRAND XS-Series Rotary Vane Vacuum Pumps for Fine Vacuum Applications

- **Quiet:** XS-pumps are extremely low-noise and low vibration, even compared to earlier VACUUBRAND® rotary vane models.
- **Rugged:** The new XS series have been designed from the ground-up for service in chemistry labs. They provide exceptional water vapor tolerances with minimal impact on ultimate vacuum. Internal components have been redesigned to improve corrosion resistance, reduce wearing forces, enhance performance and simplify maintenance. Internal steel surfaces have even been nitrogen-plasma treated for chemical resistance and mechanical hardness.
- **Energy Efficient:** Pumps have very low power consumption, and generate low levels of waste heat compared to competitive models.
- **Great Value:** On top of all of these advantages, VACUUBRAND® XS-series rotary vane pumps are competitively priced with other popular pumps.

#### Don't forget...

Adding accessories to your rotary vane pump can extend the pump lifetime and make your workplace more pleasant.

- **Inlet Hose Barbs:** Match the pump to your vacuum hose. Inlet centering and clamping rings (and outlet, where applicable) are included.
- **Inlet Catchpot:** Collects condensates and particles from the vacuum line, where they contaminate pump oil and can reduce pump lifetime.
- **Oil Mist Filter:** Captures up to 99% of oil-mist from the outlet of your pump, keeping your lab atmosphere and bench top clean (included with RC6).
- **Pump Oil B:** For best performance, and long life, use Pump Oil B. Its special high-viscosity formula is an excellent choice for VACUUBRAND® pumps.



#### Extremely compact compared to popular pump models

- Compared with a belt-drive pump, the RZ2.5 takes up 1/3 of the bench space, weighs half as much, and occupies less than 1/4 the volume, despite superior flowrates.
- Compared with competitive direct drive pumps, the RZ2.5 takes up half of the space and weighs half as much.

For a detailed comparison see <http://www.brandtech.com/RVpumpcompare.pdf>.

#### ORDERING INFORMATION

Accessories for your VACUUBRAND® XS series rotary vane pump and RC6	Cat. No.	2011 List Price
KF16 to 10mm (3/8") hose barb, fits RZ2.5, RZ6, and RC6 inlet, aluminum	662511	\$37.00
KF25 to 12mm (1/2") hose barb, fits RZ9 inlet and outlet, aluminum	662518	46.20
KF25 to 19mm (3/4") hose nipple, fits RZ9 inlet and outlet, aluminum	662532	51.40
<b>Other flanges, clamping rings and centering rings available.</b>		
Inlet catchpot for RZ2.5	698000	357.00
Inlet catchpot for RZ6 and RC6	698006	523.00
Inlet catchpot for RZ9	698007	447.00
Oil mist filter for RZ2.5	698003	496.00
Oil mist filter for RZ9	698017	613.00
Pump Oil B, 1 liter bottle	687010	46.20
Pump Oil B, 5 liter can	687011	159.00

Model	Free Air Capacity 60Hz (cfm) <sup>1</sup>	Ultimate vacuum w/o gas ballast (mbar)	Ultimate vacuum w/ gas ballast (mbar)	Inlet Connection (flange)	Outlet Connection (hose barb or flange)	Cat. No. 120V US plug	2011 List Price
RZ2.5	1.65	2 x 10 <sup>-3</sup>	1 x 10 <sup>-2</sup>	KF16	10mm	698123	\$2,358.00
RZ6	4.0	2 x 10 <sup>-3</sup>	1 x 10 <sup>-2</sup>	KF16	10mm	698133	3,126.00
RZ9	6.0	2 x 10 <sup>-3</sup>	1 x 10 <sup>-2</sup>	KF25	KF25	698143	4,011.00

<sup>1</sup> Pumping speed at 50Hz is 83% of stated value





### ORDERING INFORMATION

Model	Controller(s)	Solvent Recovery	Ultimate Vacuum		Free Air Capacity at 60Hz		Cat. No.*	2011
			mbar	Torr	cfm	lpm		List Price
<b>Oil-Free Diaphragm Vacuum Pumps</b>								
NEW! ME1C	No	No	100	75	0.5	14	721103	\$995.00
ME2C	No	No	< 80	< 60	1.3	37	696124	2,044.00
ME4C NT	No	No	< 70	< 52	2.6	73	731203	2,750.00
ME8C NT	No	No	< 70	< 52	4.7	133	734203	5,850.00
ME16C	No	No	< 80	< 60	6.8	193	696466	11,062.00
Tyro12™	No	No	15	12	1.2	35	696203	1,550.00
MZ2C NT	No	No	7	~ 5	1.4	38	732303	2,750.00
MZ2C NT+2AK	No	Yes	7	~ 5	1.4	38	732503	3,872.00
MD1C	No	No	2	1.5	0.88	25	696613	3,290.00
MD1C+AK+EK	No	Yes	2	1.5	0.88	25	696633	5,222.00
MD4C NT	No	No	1.5	1.1	2.2	63	736403	6,561.00
MD12C	No	No	2	1.5	5.2	148	710153	11,072.00
MV10C	No	No	9x10 <sup>-1</sup>	0.7	4.4	125	710203	11,417.00
<b>Chemistry-HYBRID Vacuum Pumps</b>								
RC6	No	No	2x10 <sup>-3</sup>	1.5x10 <sup>-3</sup>	4.1	115	698563	6,849.00
<b>Oil-Free Single Application Vacuum Systems</b>								
PC101 NT	1 Manual	Yes	7	5	1.4	38	733003	3,852.00
PC510 NT	1 Electronic	Yes	7	5	1.4	38	733103	6,540.00
PC3001 basic								
100-120V/200-230V, 50-60Hz	1 Manual	No	2	1.0	0.94	28	696723	4,835.00
PC201 NT	1 Manual	Yes	1.5	1.1	2.2	63	737003	6,978.00
PC610 NT	1 Electronic	Yes	1.5	1.1	2.2	63	737103	10,248.00
<b>Oil-Free Dual Application Vacuum Systems</b>								
MZ2C NT Synchro™	2 Manual	Yes	7	5	1.4	38	732803	4,696.00
PC511 NT	1 Electronic +1 Manual	Yes	7	5	1.4	38	733203	7,045.00
PC520 NT	2 Electronic	Yes	7	5	1.4	38	733303	9,553.00
MD4C NT Synchro™	2 Manual	Yes	1.5	1.1	2.2	63	736803	7,853.00
PC611 NT	1 Electronic +1 Manual	Yes	1.5	1.1	2.2	63	737203	10,485.00
PC620 NT	2 Electronic	Yes	1.5	1.1	2.2	63	737303	13,647.00
<b>Oil-Free VARIO® Adaptive Single Application Vacuum Systems</b>								
MZ2C NT VARIO	Adaptive	No	7	5	1.7	47	732403	6,174.00
MD4C NT VARIO	Adaptive	No	1.5	1.1	2.7	77	736503	9,882.00
MV10C VARIO-B	Adaptive	No	6x10 <sup>-1</sup>	4.5x10 <sup>-1</sup>	5.0	143	710603	16,956.00
PC3001 VARIO	Adaptive	Yes	2	1.0	0.94	28	696703	7,822.00
PC3002 VARIO	Adaptive	Yes	7	5	1.7	47	733503	7,570.00
PC3003 VARIO	Adaptive	Yes	6x10 <sup>-1</sup>	4.5x10 <sup>-1</sup>	1.7	47	738403	11,324.00
PC3004 VARIO	Adaptive	Yes	1.5	1.1	2.7	77	737503	10,809.00
PC3010 VARIO	Adaptive	Yes	6x10 <sup>-1</sup>	4.5x10 <sup>-1</sup>	5.0	143	710703	18,665.00
PC3012 VARIO	Adaptive	Yes	2	1.5	5.8	166	710903	18,809.00
<b>Rotary Vane Vacuum Pumps</b>								
RZ2.5	No	No	2x10 <sup>-3</sup>	1.5x10 <sup>-3</sup>	1.6	47	698123	2,358.00
RZ6	No	No	2x10 <sup>-3</sup>	1.5x10 <sup>-3</sup>	4	113	698133	3,126.00
RZ9	No	No	2x10 <sup>-3</sup>	1.5x10 <sup>-3</sup>	6.0	170	698143	4,011.00
RZ16								
230V, 50-60Hz, CEE plug	No	No	2x10 <sup>-3</sup>	1.5x10 <sup>-3</sup>	11.2	318	698050	4,938.00

\* All pumps 120V, 60Hz unless noted

## Selecting the Best Pump for Your Application

### Vacuum Pump Selection Guide—Online!

Not sure which vacuum pump or system is best for your lab? Find out using the BrandTech Scientific Vacuum Pump Selection Guide!

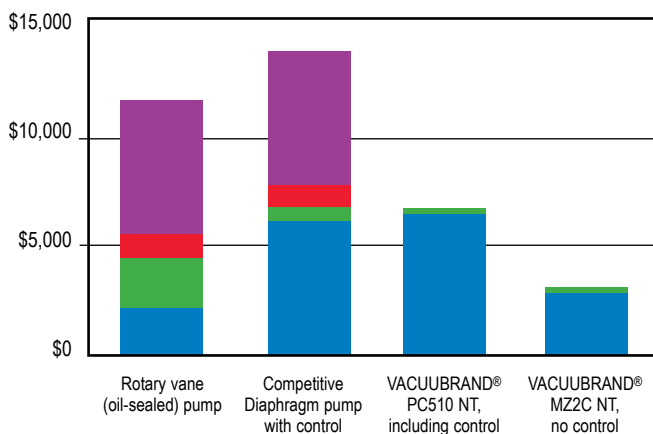
This free guide has been designed to recommend the best VACUUBRAND® vacuum pump or system for a wide variety of laboratory applications, including fluid aspiration, centrifugal concentration, rotary evaporation, and more.

Simply choose Product Selection Help located under the Support tab at [www.brandtech.com](http://www.brandtech.com) to find the guide. Answer a few simple questions about your application. The software suggests the pump, controls, and solvent capture accessories that are right for your application. It even offers options for limited budgets or applications where control is critical.

### Pump Economy

Where comparing the costs of vacuum pumps, it is important to include accessories that are needed and lifetime repair and maintenance costs. Rotary vane pumps require mist filters, catchpots, cold traps (including dry ice, liquid nitrogen or electricity costs) plus frequent oil changes. Competitive diaphragm pumps have much shorter service intervals (3,000-4,000 hours) compared with VACUUBRAND® dry pumps (10,000-15,000 hours). And competitive diaphragm pumps typically recommend cold traps, adding substantially to operating costs and inconvenience.

### 5-Year Cost Comparison—Vacuum Pumps



**Refrigerant:** 5lb. dry ice per day, \$1/lb. for 250 days/year  
**Added Accessories:** exhaust filter and cold trap  
**Maintenance:** oil changes, filter replacements, service parts  
**Pump Purchase Cost**

### It's as easy as 1,2,3...

1. Select your application from the list located in the top left hand corner of your screen.



2. Answer a few questions about your application, and click on the "Submit" button.



3. It's that simple! A photo and description of your recommended pump will appear on the right of your screen. The software even recommends other options with more control or lower cost.



## Vacuum for Filtration and SPE

### Filtration and SPE

Fluid movement applications, such as filtration and solid phase extraction, typically don't require deep vacuum levels or high flow rates.

Normally, these applications are best served by the VACUUBRAND® ME1C and ME4C NT. Users seeking additional capability or users with special circumstances, however, may want to consider the VACUUBRAND® MZ2C NT+2AK or MD1C+AK+EK pumps with integrated solvent recovery.

When choosing the pump for your filtration or solid phase extraction application, consider the following factors:

#### How much vacuum do I need?

Vacuum filtration and solid phase extraction typically require just enough vacuum depth to generate a pressure differential between the receiving vessel and atmospheric pressure. These applications do not usually require control unless the vacuum level is too low and may cause filtrate boiling.

The ME1C vacuum pump is an excellent selection for most fluid movement applications. It is a simple, compact, stand alone pump with sufficient vacuum and flow to perform effective vacuum filtration or solid phase extraction and is powerful enough to support up to two simultaneous applications.



ME1C Vacuum Pump  
100mbar, 0.5cfm

#### How much flow do I need?

Labs running more than three simultaneous filtration applications may require a pump with higher flow rates to maintain sufficient vacuum at all workstations.

The ME4C NT vacuum pump is an excellent pump for these circumstances. Like the ME1C, it is a simple, compact stand alone pump. However, its higher flow rate ensures better results and faster process times in large-scale filtration and solid phase extraction labs.

#### Do I need solvent recovery?

During normal filtration and solid phase extraction applications, filtrates under vacuum in the receiving vessel can evaporate and pass through the pump into the lab, or contaminate the pump itself. This problem can be minimized by a vacuum pump with integrated solvent recovery to collect those vapors, such as the MZ2C NT+2AK or the MD1C+AK+EK.

The solvent recovery and higher performance of these pumps also allows them to support a broader range of applications. They are an excellent choice for labs seeking to support multiple applications with only one pump.



MZ2C NT+2AK  
Vacuum Pump  
7mbar, 1.4cfm

### ORDERING INFORMATION

Model	Controller(s)	Solvent Recovery	Ultimate Vacuum		Free Air Capacity at 60Hz		Cat. No.*	2011 List Price
			mbar	Torr	cfm	lpm		
<b>Oil-Free Diaphragm Vacuum Pumps</b>								
NEW! ME1C	No	No	100	75	0.5	14	721103	\$995.00
ME2C	No	No	< 80	< 60	1.3	37	696124	2,044.00
ME4C NT	No	No	70	52	2.6	73	731203	2,750.00
MZ2C NT+2AK	No	Yes	7	5	1.4	38	732503	3,872.00
MD1C+AK+EK	No	Yes	2	1.5	0.88	25	696633	5,222.00

#### Accessory

Vacuum regulation valve with manometer for ME1C	696843	299.00
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\* All pumps 120V, 60Hz unless noted

## Vacuum Oven/Gel Dryer Vacuum Solutions

### Vacuum Oven Solutions

#### How much vacuum do I need?

Vacuum ovens typically require a pump with deeper vacuum levels than other heated applications because the evaporative effect of elevated temperature is often offset by the poor thermal transfer of the oven environment.

#### How much flow do I need?

Vacuum ovens also require higher vacuum pump flow rates than other lab applications due to the relatively large sample capacity of most vacuum ovens.

The MZ2C NT+2AK vacuum pump is an excellent selection for labs with smaller vacuum ovens (<1.0 cubic foot in capacity). Its performance, small footprint, and integrated solvent recovery make it a popular choice for volatile solvents. Evaporation of higher boiling point solvents, however, may require a more powerful pump, such as the MD1C+AK+EK.

PC201 NT  
Vacuum System,  
1.5mbar, 2.2cfm



Laboratories with larger ovens (one or more cubic feet in capacity) do well with the PC201 NT. It can generate vacuum levels for evaporation of most solvents, and its high flow rate reduces process times.

#### Use a Cold Trap?

Using a cold trap for solvent recovery gives users greater flexibility when selecting a pump for vacuum ovens. The cold trap reduces vapor loads, and eliminates the need for solvent capture by the pump. These applications are typically best-served by a stand alone pump such as the compact, economical MD1C vacuum pump.

### Gel Dryer Vacuum Solutions

#### How much vacuum do I need?

The vacuum level required for gel drying applications is usually determined by the concentration of SDS-PAGE. For standard-sized gels with SDS-PAGE concentrations up to 10%, select the MZ2C NT+2AK. It has the power to provide excellent results in most gel-drying applications and its two catchpots capture condensing vapors for clean operation.



MZ2C NT+2AK  
Vacuum Pump  
7mbar, 1.4cfm

MD1C+AK+EK  
Vacuum Pump  
2mbar, 0.88cfm



For SDS-PAGE concentrations greater than 10%, choose the MD1C+AK+EK. Its integral pump achieves deeper vacuum levels for enhanced evaporative performance, and the catchpots and condenser protect the pump and the lab atmosphere without the cost and inconvenience of a cold trap.

### ORDERING INFORMATION

Model	Controller(s)	Solvent Recovery	Ultimate Vacuum		Free Air Capacity at 60Hz		Cat. No.*	2011 List Price
			mbar	Torr	cfm	lpm		
<b>Oil-Free Diaphragm Vacuum Pumps</b>								
MZ2C NT+2AK	No	Yes	7	5	1.4	38	732503	\$3,872.00
MD1C	No	No	2	1.5	0.88	25	696613	3,290.00
MD1C+AK+EK	No	Yes	2	1.5	0.88	25	696633	5,222.00
<b>Oil-Free Single Application Vacuum Systems</b>								
PC201 NT	1 Manual	Yes	1.5	1.1	2.2	63	737003	6,978.00

\* All pumps 120V, 60Hz unless noted



## Rotary Evaporation Vacuum Solutions

### Rotary Evaporation Vacuum Solutions

Vacuum pumps provide the operational muscle for your rotary evaporator. Apart from the vacuum control, your evaporator is just rotating glassware! BrandTech Scientific offers a full range of vacuum pumps and systems that help optimize your rotary evaporation application.

To find the vacuum pump or system that best meets your needs, answer the following questions.

#### How much vacuum do I need?

The vacuum capacity required from a pump to support a rotary evaporation application is determined by the typical application temperatures and the solvents being evaporated. Virtually all rotary evaporation applications can be accomplished with diaphragm vacuum pumps. The vacuum pump should have the ability to reach the vapor pressure of the solvent at the application temperature.

#### How much control do I need?

Rotary evaporation applications often require significant oversight and control because the heat and high surface area increase evaporation rates. This can lead to solvent “bumping” or boiling over.

##### • Adaptive Vacuum Control

The best way to prevent bumping is with a self-regulating vacuum pump. Adaptive control, an innovation exclusive to VACUUBRAND® VARIO® pumps and systems, combines an electronic controller and speed-controlled motor to automatically perform the following tasks:

- Find and follow boiling points, even for solvent mixtures
- Evaporate up to 30 percent faster
- Shut the pump off when evaporation is completed

For most benchtop rotary evaporators, the PC3001 VARIO vacuum system is an excellent choice. The powerful integral pump provides a deep 2mbar ultimate vacuum – enough to evaporate DMSO at 40°C!



PC3001 VARIO  
Vacuum System  
2mbar, 1.0cfm

##### • Electronic Control

Some rotary evaporation applications might benefit from control, but not require the precision of adaptive control. The PC510 NT system is an excellent choice for these applications. It is a great workhorse system for evaporation of many common solvents in rotary evaporators up to 5 liters in size. The integrated MZ2C NT pump evaporates room temperature solvents that are slightly less volatile than water, and the system includes a controller that allows preset or semi-automatic setting of vacuum level, with appropriate hysteresis adjustment. Solvent recovery is provided by an inlet catchpot and outlet condenser. For larger or more demanding evaporations, select the PC610 NT, with a 1.5mbar pump rated to 2.2cfm. Need to run two evaporators? Consider the PC520 NT or PC620 NT. See pages 74 and 76 for description and ordering information. They'll provide different conditions to two applications at once, saving bench space and the cost of an additional pump or system.

PC510 NT  
Vacuum System  
7mbar, 1.4cfm



##### • Manual Control

For applications that require only minimal control, select the economical PC101 NT vacuum system for basic evaporation and vapor capture. It includes the same 7mbar MZ2C NT pump as the PC510 NT along with a stand, inlet catchpot and outlet condenser, but substitutes a manual flow-control valve and dial gauge for economy. It's an excellent choice for basic evaporation! For vacuum to 1.5mbar, choose the PC201 NT. Or support 2 evaporators with an economical, space-saving Synchro system! See pages 74 and 76 for description and ordering information.

PC101 NT  
Vacuum System  
7mbar, 1.4cfm



### Rotary Evaporation Vacuum Solutions

#### Do I need solvent recovery?

Solvent vapor that makes it past the evaporator's condenser can condense in the vacuum line. For best pump performance, condensed vapors should be kept out of the pump. Solvents that are vapors under vacuum can be captured efficiently at atmospheric pressure at the diaphragm pump outlet.

Consider the MD1C+AK+EK for labs that already have a stand-alone vacuum controller, or one integrated into their evaporator. It features the same chemistry-design pump and solvent recovery as the 2mbar PC3001 VARIO system, but without control. Its integrated inlet catchpot and exhaust condenser prevent condensates from entering the pump and vapors from polluting the lab.

For applications that do not require either control or solvent recovery, consider a stand alone pump such as the MD1C. It provides superior flow rates at working

MD1C+AK+EK  
Vacuum Pump  
2mbar, 0.82cfm



vacuum to competitive pumps, with a significantly lower price and very small footprint. Integrated gas ballast provides high condensate tolerance. The MD1C is also preferred by customers who address vacuum control and solvent recovery through other methods.

#### What about larger or multiple rotary evaporators?

BrandTech and VACUUBRAND offer the most comprehensive line of chemistry-design diaphragm vacuum pumps, including models that can operate rotary evaporators up to 100 liters or larger, with or without integrated VARIO® adaptive control. We also offer systems that will run two different evaporation applications simultaneously without interference! Still not sure? Contact BrandTech Scientific for more information.



MD1C  
Vacuum Pump  
2mbar, 0.88cfm

#### Not sure what pump is right for your needs?

See our Vacuum Pump Selection Guide software on page 77.

#### ORDERING INFORMATION

Model	Controller(s)	Solvent Recovery	Ultimate Vacuum		Free Air Capacity at 60Hz		Cat. No.*	2011 List Price
			mbar	Torr	cfm	lpm		
<b>Oil-Free Diaphragm Vacuum Pumps</b>								
Tyro12™	No	No	15	12	1.2	35	696203	\$1,550.00
MZ2C NT	No	No	7	5	1.4	38	732303	2,750.00
MZ2C+2AK	No	Yes	7	5	1.4	38	732503	3,872.00
MD1C	No	No	2	1.5	0.88	25	696613	3,290.00
MD1C+AK+EK	No	Yes	2	1.5	0.88	25	696633	5,222.00
MD4C NT	No	No	1.5	1.1	2.2	63	736403	6,561.00
<b>Oil-Free Single Application Vacuum Systems</b>								
PC101 NT	1 Manual	Yes	7	5	1.4	38	733003	3,852.00
PC510 NT	1 Electronic	Yes	7	5	1.4	38	733103	6,540.00
PC3001 basic								
100-120V/200-230V, 50-60Hz	1 Manual	No	2	1.0	0.94	28	696723	4,835.00
PC201 NT	1 Manual	Yes	1.5	1.1	2.2	63	737003	6,978.00
PC610 NT	1 Electronic	Yes	1.5	1.1	2.2	63	737103	10,248.00
<b>Oil-Free VARIO® Adaptive Single Application Vacuum Systems</b>								
PC3001 VARIO	Adaptive	Yes	2	1.0	0.94	28	696703	7,822.00
PC3002 VARIO	Adaptive	Yes	7	5	1.7	47	733503	7,570.00
PC3003 VARIO	Adaptive	Yes	6x10 <sup>-1</sup>	4.5x10 <sup>-1</sup>	1.5	42	738403	11,324.00
PC3004 VARIO	Adaptive	Yes	1.5	1.1	2.7	77	737503	10,809.00

\* All pumps 120V, 60Hz unless noted

## Centrifugal Concentration Vacuum Solutions

### Centrifugal Concentration Vacuum Solutions

The high performance and convenience of VACUUBRAND® pumps and systems makes them an excellent choice for most centrifugal concentration applications. VACUUBRAND offers a wide variety of pumps for excellent, reproducible results. When selecting the best pump for your lab, consider the following issues.

#### How much vacuum do I need?

Centrifugal concentration generally requires greater pump capacity than other evaporative applications because it is usually performed at room temperature. Fortunately, VACUUBRAND® diaphragm pumps are available with enough power to evaporate at room temperature solvents with boiling points as high as that of DMF.

The performance demands of most tabletop concentrators are often well served with one of VACUUBRAND's three-stage vacuum pumps, the MD1C or MD4C NT. Both of these pumps are powerful enough to evaporate DMF. Select the MD1C for supporting smaller concentrators and the MD4C NT with its higher flow rate for larger benchtop concentrators.

For very high boiling point solvents at room temperature such as DMSO or ethylene glycol, rotary vane technology may be required. We suggest the unique RC6 Chemistry-HYBRID pump for deeper vacuum with maximum convenience.

#### Do I need solvent recovery?

Large centrifugal concentrators often come with cold traps, reducing the need for integrated solvent recovery with the pump. Concentrators without cold traps should have solvent recovery integrated with the pump to prevent pump contamination and pollution of the laboratory.

When using a small concentrator without a cold trap, choose the MD1C+AK+EK. It provides excellent flow rates at working vacuum to effectively operate a smaller concentrator without a cold trap – something not possible with competitive pumps – and captures solvent vapors itself.

#### Are my samples prone to bumping?

When samples often bump in a centrifugal concentrator, control may be necessary to prevent cross-contamination. Depending on the volatility, flow control—as in our PC101 NT or PC201 NT—may be sufficient. For more volatile solvents, use our VARIO® systems that adjust vacuum levels automatically.

#### What about larger concentrators?

Recently there have been several “mega” sized concentrators developed for combinatorial chemistry and the drug discovery marketplace. Please contact BrandTech Scientific for assistance in selecting the best pump for these applications.

### ORDERING INFORMATION

Model	Controller(s)	Solvent Recovery	Ultimate Vacuum		Free Air Capacity at 60Hz		Cat. No.*	2011 List Price
			mbar	Torr	cfm	lpm		
<b>Oil-Free Diaphragm Vacuum Pumps</b>								
MD1C	No	No	2	1.5	0.88	25	696613	\$3,290.00
MD1C+AK+EK	No	Yes	2	1.5	0.88	25	696633	5,222.00
MD4C NT	No	No	1.5	1.1	2.2	63	736403	6,561.00
<b>Chemistry-HYBRID Vacuum Pumps</b>								
RC6	No	No	2x10 <sup>-3</sup>	1.5x10 <sup>-3</sup>	4.1	115	698563	6,849.00
<b>Oil-Free Single Application Vacuum Systems</b>								
PC101 NT	1 Manual	Yes	7	5	1.4	38	733003	3,852.00
PC201 NT	1 Manual	Yes	1.5	1.1	2.2	63	737003	6,978.00
<b>Oil-Free VARIO® Adaptive Single Application Vacuum Systems</b>								
PC3001 VARIO	Adaptive	Yes	2	1.0	0.94	28	696703	7,822.00
PC3002 VARIO	Adaptive	Yes	7	5	1.7	47	733503	7,570.00
PC3003 VARIO	Adaptive	Yes	6x10 <sup>-1</sup>	4.5x10 <sup>-1</sup>	1.7	47	738403	11,324.00
PC3004 VARIO	Adaptive	Yes	1.5	1.1	2.7	77	737503	10,809.00

\* All pumps 120V, 60Hz unless noted

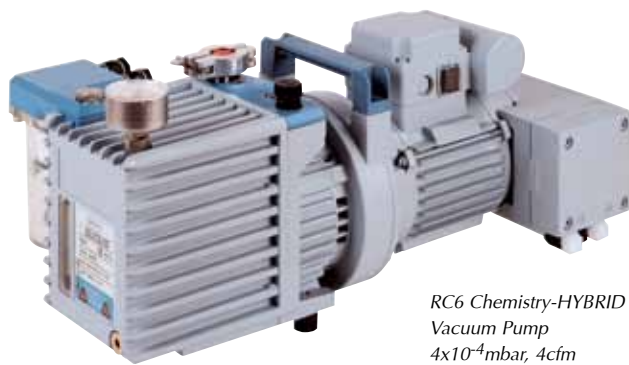
### Freeze Drying Vacuum Solutions

Lyophilization is a demanding vacuum application that requires a deeper vacuum than can be achieved with diaphragm technology alone. It is usually best-served by the VACUUBRAND innovative RC6 Chemistry-HYBRID pump.

#### How much vacuum do I need?

Lyophilization applications typically require vacuum levels as deep as  $10^{-3}$  mbar. Traditionally, this requirement has been provided by oil-sealed rotary vane pumps, protected by a dry ice or liquid nitrogen cold trap.

To help users combat the high costs and contamination of rotary vane pumps, VACUUBRAND developed the new RC6 Chemistry-HYBRID pump. The RC6 combines a rotary vane pump for vacuum capacity with a chemistry-design diaphragm pump that continuously distills solvents from the pump oil. This design reduces oil changes and maintenance costs by up to 90 percent\*\*. The RC6 is suitable for freeze dryers with condensers up to six liters. It is available as a pump, or integrated with an outlet condenser as the PC8/RC6.



RC6 Chemistry-HYBRID Vacuum Pump  
 $4 \times 10^{-4}$  mbar, 4 cfm

#### What about larger applications?

Freeze dryers with condensers larger than six liters will require an oil-sealed rotary vane pump. VACUUBRAND offers a full line of rotary vane pumps with the power to easily meet the demands of larger applications and the innovative design and quality assurance of VACUUBRAND® pumps.



RZ16 Vacuum Pump  
 $2 \times 10^{-3}$  mbar, 11.2 cfm

For freeze dryers between twelve and twenty-five liters, we suggest the VACUUBRAND® RZ16 rotary vane vacuum pump. For applications larger than twenty-five liters, contact BrandTech Scientific.

#### Rotary Vane options?

BrandTech Scientific recommends that you should “never use an oil pump when an oil-free pump will do the job.” Sometimes, however, certain applications require deeper vacuum levels than oil-free pumps can provide.

When these situations arise, consider the RC6 Chemistry-HYBRID pump or a VACUUBRAND® rotary vane vacuum pump such as the RZ2.5, RZ6, RZ9, or RZ16. These pumps feature the same high performance, innovative design, and quality assurance as VACUUBRAND® oil-free vacuum pumps and systems. See page 75 for more information.

#### ORDERING INFORMATION

Model	Controller(s)	Solvent Recovery	Ultimate Vacuum		Free Air Capacity at 60Hz		2011
			mbar	Torr	cfm	lpm	List Price
<b>Chemistry-HYBRID Vacuum Pumps</b>							
RC6	No	No	$2 \times 10^{-3}$	$1.4 \times 10^{-3}$	4.1	115	\$6,849.00
<b>Rotary Vane Vacuum Pumps</b>							
RZ2.5	No	No	$5 \times 10^{-3}$	$3.8 \times 10^{-3}$	1.65	47	2,358.00
RZ6	No	No	$2 \times 10^{-3}$	$1.5 \times 10^{-3}$	4.0	113	3,126.00
RZ9	No	No	$2 \times 10^{-3}$	$1.5 \times 10^{-3}$	6.0	165	4,011.00
RZ16	No	No	$2 \times 10^{-3}$	$1.5 \times 10^{-3}$	11.2	318	4,938.00

\* All pumps 120V, 60Hz unless noted

\*\* The RC6 Chemistry-HYBRID pump, like other oil-sealed pumps, should always be operated with a cold trap.



# Aluminum-FKM Diaphragm

VACUUBRAND® Aluminum-FKM (e.g., Viton®) vacuum pumps are intended specifically for non-corrosive, non-evaporative applications. They are excellent for laboratory and process-plant applications including gas transfer, backing turbo pumps, and vacuum filtration. All wetted parts of these pumps are made of aluminum, FKM, and polyethylene. Aluminum-FKM pumps should not be used with organic solvents, corrosives, or vapors inconsistent with the materials of construction.

- **Eliminates Oil Changes:** These pumps utilize diaphragm vacuum technology for totally dry operation. There is no oil to change or monitor!
- **Reduces Maintenance:** Diaphragms withstand up to 10,000-15,000 hours of use before replacement – that's years in most applications, minimizing downtime and service costs. When it is finally time for service, their unique design eliminates tedious, trial-and-error stroke length recalibration.
- **Improves Productivity:** These pumps feature specially engineered pump heads for high flow rates at working vacuum. Higher flow rates mean reduced process times and higher throughput.
- **Ensures Reliable Use:** All VACUUBRAND® pumps and systems must pass rigorous product testing before leaving the factory. It's your assurance of a reliable pump.
- **NEW! ME1:** Features PTFE diaphragm and valves for enhanced corrosion resistance.



ME1  
Vacuum Pump  
100mbar, 0.5cfm

## Powerful, Reliable, Vacuum Generation from VACUUBRAND.



# Vacuum Pumps

## Quiet Operation

Aluminum-FKM pumps operate very quietly, at about the same volume as a conversation.



MD12  
Vacuum Pump  
2mbar, 6.1cfm

## Excellent Durability

VACUUBRAND® Aluminum-FKM pumps have service intervals up to 10,000-15,000 hours (that's years in most applications). Most service can be done in the lab in a matter of minutes.

## FKM Double Diaphragm

FKM double planar diaphragm for high performance and increased reliability.

## Broad Product Range

Vacuum as deep as 0.6mbar with flow rates as high as 215lpm!

## ORDERING INFORMATION

Model	Ultimate Vacuum		Free Air Capacity at 60Hz		Cat. No.*	2011 List Price
	mbar	Torr	cfm	lpm		
<b>Aluminum-FKM Diaphragm Vacuum Pumps for non-corrosive applications</b>						
NEW! ME1	100	75	0.5	14	721003	\$795.00
ME2	< 80	< 60	1.3	37	696123	1,318.00
ME4 NT	70	52	2.4	67	731003	2,008.00
ME8 NT	70	52	4.6	130	734003	3,677.00
ME16	< 80	< 60	7.6	215	696426	6,550.00
MZ2 NT	7	5	1.3	37	732003	2,008.00
MD1	1.5	1.1	0.82	23	696073	2,338.00
MD4 NT	1.5	1.1	2.2	63	736003	3,862.00
MD12	2	1.5	6.1	173	710003	6,808.00
MV2 NT	6x10 <sup>-1</sup>	4.5x10 <sup>-1</sup>	1.3	37	738003	4,284.00
MV10	6x10 <sup>-1</sup>	4.5x10 <sup>-1</sup>	5.2	147	710053	7,220.00

## Accessory

Vacuum regulation valve with manometer for ME1	696842	149.00
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\* All pumps 120V, 60Hz unless noted

# Vacuum Gauges & Controls

VACUUBRAND® vacuum gauges and controllers enable you to monitor and control vacuum generation for most laboratory vacuum applications. Gauges are compatible with most laboratory vacuum pumps and house vacuum, and feature both analog and digital displays. They help to rid laboratories of toxic, harmful mercury by replacing McLeod gauges and other manometers.

- **Meets the Requirements of Most Vacuum Applications:** VACUUBRAND® vacuum gauges cover the range from atmospheric pressure to  $5 \times 10^{-9}$  mbar/Torr/hPa. They are easy to read and feature a digital readout and analog indicator to simplify both data recording and trend-monitoring.
- **Rugged Operation:** Gauges and controllers are manufactured without fragile springs or glass tubes and feature corrosion-resistant transducers to ensure rugged, reliable operation.
- **Displays Results in Your Units:** Vacuum gauges and controllers provide results in millibar, Torr, or hectoPascal.
- **Provides Complete Process Control:** The CVC 3000 vacuum controller, in conjunction with a VACUU•BUS® solenoid valve, provides two-point vacuum control in the range from atmospheric pressure to 1 mbar/Torr/hPa. It allows easy adjustment of vacuum setpoints as well as both automatic and manual hysteresis programming.
- **NEW! Integrated Vacuum Controller:** The CVC3000 + C3 matches our sophisticated CVC3000 vacuum controller with a permanently mounted chemistry-design solenoid valve to provide a simple one-piece solution to single-application vacuum control. Works with any vacuum source, even central vacuum; an integrated check valve helps protect your application from vacuum line instability.



DVR2 Vacuum Gauge

## Mercury-free, Digital/Analog Vacuum Instruments.



## Vacuum Gauges & Controllers



**DVR2  
Vacuum Gauge**

Eliminate fragile glass and mercury and inaccurate, corrosion-prone dial gauges in your lab! Analog and digital display for easy monitoring of most lab applications. A transducer of corrosion-resistant ceramic for durability measures absolute pressures from atmosphere to 1mbar/Torr/hPa with user-selectable units. Battery power with adjustable sleep timer for long battery life.



**CVC 3000  
Vacuum Controller**

A vacuum controller with large, legible graphics and a jogwheel interface allows the storage of ten multi-step user programs. VACUU•BUS® technology allows automatic configuration of solenoid control and venting valves, external transducers and more. As part of a VARIO® NT system, it finds and follow boiling point curves. A bi-directional RS232 port allows process validation or computer control.



**NEW! The Versatile DCP3000 Vacuum Gauge System**

The DCP3000 utilizes VACUUBRAND's innovative VACUU•BUS® plug-and-play system to integrate a variety of different vacuum sensors to measure from atmosphere to  $5 \times 10^{-9}$  mbar in your choice of millibar, Torr, or hectoPascal. It is available equipped with your choice of a capacitive transducer, an exclusive corrosion-resistant Pirani transducer, or a combined Pirani/Penning transducer that automatically switches between measuring technologies. The DCP3000 can monitor up to a total of four capacitive/Pirani transducer sets with automatic switching between transducers, or up to four Pirani/Penning transducers. An external vent valve can also be added. Completely mercury-free, the DCP3000 also features a switching power supply, with US, UK, Australian and European plugs.

Measuring Range*:	DVR2 Vacuum Gauge	CVC3000 and DCP3000 + VSK3000 Capacitive Transducer	DCP3000 + VSP3000 Pirani Transducer	DCP3000 + MPT100 Pirani/Penning Transducer
<b>mbar</b>	1-1080	0.1-1080	$1 \times 10^{-3}$ - $1 \times 10^3$	$5 \times 10^{-9}$ - $1 \times 10^3$
<b>Torr</b>	1-812	0.1-810	$7.5 \times 10^{-4}$ - $7.5 \times 10^2$	$3.7 \times 10^{-9}$ - $7.5 \times 10^2$
<b>hPa</b>	1-1080	0.1-1080	$1 \times 10^{-3}$ - $1 \times 10^3$	$5 \times 10^{-9}$ - $1 \times 10^3$
<b>Accuracy</b>	$< \pm 1$ mbar (0.75Torr) $\pm 1$ digit	$< \pm 1$ mbar/Torr/hPa / $\pm 1$ digit (after adjustment, constant temp.)	$\pm 15\%$ of indicated value in the range 0.01-100mbar/Torr/hPa	$1 \times 10^{-7}$ - $1 \times 10^{-2}$ mbar: $\pm 25\%$ ; $1 \times 10^{-2}$ -100 mbar: $\pm 15\%$

### ORDERING INFORMATION

Model	Cat. No.	2011 List Price
DVR2 Vacuum Gauge, battery operated (9V, Lithium)	682902	\$875.00
DCP 3000 + VSK 30000 Vacuum Gauge, 100-230V, 50-60Hz	683170	1,735.00
<b>NEW!</b> DCP 3000 + VSP 30000 Vacuum Gauge, 100-230V, 50-60Hz	683190	1,745.00
<b>NEW!</b> DCP 3000 + MPT 100 Vacuum Gauge, 100-230V, 50-60Hz	683175	4,223.00
Bourdon (dial) Vacuum Gauge for use with Synchro™ systems	677100	292.40
CVC 3000 Vacuum Controller, 100-230V, 50-60Hz (requires VVB6C solenoid valve below)	683160	2,235.00
<b>NEW!</b> CVC 3000 + C3 Vacuum Controller, 100-230V, 50-60Hz (with integrated chemistry solenoid valve)	2614120	3,110.00
VVB6C VACUU•BUS® solenoid valve	674291	911.00
VSK 3000 VACUU•BUS® gauge head	636657	571.00
VVKWB solenoid coolant valve	674220	387.00
VMBM solenoid vent valve	674217	334.00
<b>NEW!</b> Liquid Level Sensor for 500mL catchpot, VACUU•BUS®	699908	556.00
VACUU•BUS® extension cable	612552	66.80
VACUU•BUS® Y cable	636656	116.00

\* Do not exceed atmospheric pressure