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new products

The descriptions of the new products

listed in this section are based on information supplied to us by the manufacturers. PHYSICS TODAY can assume no responsibility for their accuracy. For more information about a particular product, visit the website at the end of the product description.

Andreas Mandelis

Focus on cryogenics and vacuum

Cryogenic temperature controller

Cryogenic Control Systems has designed the model 44C temperature controller for use as a general purpose cryogenic instrument. It extends operation into the ultralow (>1 K) temperature range and acts as an interface to control external equipment, including cryocooler and ^3He refrigerator systems, making it a potential “one box” solution for various applications. The model 44C provides four sensor inputs, each of which uses a ratiometric AC resistance bridge to support a wide range of temperature measurements.



Three control loop outputs feature power levels from 50 mW to 50 W for operation between ultralow- and high-temperature conditions. All control modes are supported by all outputs. The front panel incorporates high-resolution, thin-film transistor liquid-crystal display graphics with a wide viewing angle. A bright white LED backlight shows instrument status at a glance, even from across the room. Cryogenic Control Systems Inc, 17279 La Bresa, Rancho Santa Fe, CA 92067, <http://www.cryocon.com>

High vacuum gate valve

A new series of stainless steel high vacuum gate valves has been introduced

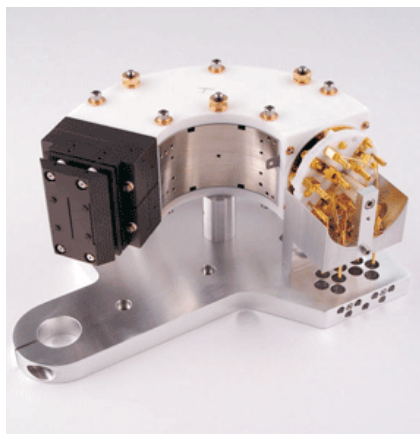
by VAT for high vacuum pump isolation, substrate transfer, and other applications. The VAT series 11.0 HV gate valve features a rugged stainless steel body with minimized flange-to-flange thickness, which allows for maximum conductance and easy system integration, including retrofit applications. The company's VATLOCK gate mechanism minimizes operating shock and is mechanically locked in the closed position. The valves are designed for 200 000 cycles before first service; according to VAT, service is quick, easy, and requires no adjustment after re-assembly. The new series is offered in both manual and pneumatic actuation and comes standard with a position indicator. It is available in sizes ranging from DN63 to 320 mm (2.5- to 12-inch ID) with a choice of ISO, ASA, CF, JIS, or customer-specific flanges. VAT Inc, 500 West Cummings Park, Suites 5450–5650, Woburn, MA 01801, <http://www.vatvalve.com>

Cryogen-free dilution refrigerator for astronomy

Janis Research has successfully tested the JDry-100-ASTRA cryogen-free ^3He - ^4He dilution refrigerator. Working in a wide range of tilting angles of -20 to 53 degrees from vertical, it provides cooling power to a novel type of sensor to study the cosmic microwave background. The system employs a quiet, power-efficient pulse tube cryocooler with a remote distribution valve. The refrigerator takes only 40 hours to cool to the base temperature of 15 mK because it has a common vacuum space and an effective mechanical heat-switch design. The JDry-100-ASTRA has a measured cooling power of $120\text{ }\mu\text{W}$ at 100 mK with a single mechanical vane pump. It can be upgraded to the Janis model GHS2, an automated gas handling system that is equipped with a more powerful oil-free hermetic six-stage Roots pump. The upgrade ensures full remote control of the cooling process and higher cooling power. Janis Research Company Inc, 2 Jewel Drive, P. O. Box 696, Wilmington, MA 01887-0696, <http://www.janis.com>

Multichannel electron energy analyzer

A new electron energy analyzer from LK Technologies employs multichannel



analysis while maintaining high resolution. The EA5000MCA can be supplied as a standalone instrument for photoemission and electron energy-loss spectroscopy or as part of an advanced high-resolution EELS system for surface adsorbate and phonon vibronic and electronic spectroscopy. It employs a wide-gap cylindrical deflection analyzer with nearly ideal fringing field correction, multichannel plates, and a position-sensitive detector with approximately 800 channels. When combined with the company's ELS5000 electron monochromator, the EA5000MCA can have a detection efficiency advantage of 100–150 over conventional high-resolution EELS spectrometers while maintaining energy resolution as high as 1 meV. *LK Technologies Inc, 1590 South Liberty Drive, Suite A, Bloomington, IN 47403, <http://www.lktech.com>*

Compact, magnetically levitated turbopumps

Pfeiffer Vacuum has brought to market HiPace M, a new series of magnetically levitated turbopumps. They cover pumping speeds of 300, 700, and 800 l/s and achieve high compression ratios for all gases. The pumps are characterized by their high flexibility in all installation orientations. A special rotor design affords a long service life and dependable operation. Because they have a designation of protection class IP 54, the pumps can be employed in industrial environments. The low dynamic magnetic field does not interfere with nearby equipment even if it is highly sensitive, making the pumps suitable for the stringent requirements of analytical applications. *Pfeiffer Vacuum Inc, 24 Trafalgar Square, Nashua, NH 03063, <http://www.pfeiffer-vacuum.com>*

Vacuum UV spectrometer

McPherson's vacuum UV spectrometer, model 234/302, is now available with improved efficiency over a wide wavelength range. New platinum-coated gratings are suitable for use at windowless wavelengths shorter than 120 nm (> 10 eV). The compact 200-mm focal-length spectrometer can be supplied with various gratings to spread optimization over the entire 30- to 550-nm wavelength range. Extreme and vacuum UV radiation and emission spectra can be analyzed with subnanometer spectral resolution. An adjustable slit width provides for optimal light throughput and for better spectral resolution to resolve closely spaced spectral lines. The installed grating can be tuned to longer or shorter wavelengths and different wavelength swaths can be collected simultaneously without compromising resolution or signal strength. Model 234/302 can be used for applications such as general-purpose spectroscopy, plasma physics, and process monitoring. *McPherson Inc, 7A Stuart Road, Chelmsford, MA 01824, <http://www.mcphersoninc.com>*

Thin-film phase-plate technology for cryogenics

Life sciences researchers, particularly those involved in cryoelectron microscopy and cryoelectron tomography, now have access to thin-film phase-plate technology in instruments manufactured by JEOL. The company claims that the phase-contrast imaging capability of its phase-plate-outfitted transverse electron microscope (TEM) increases specimen contrast by orders of magnitude. While phase-plate technology is an accepted tool for live-cell imaging with a light microscope (LM), it is a novel approach to imaging with a TEM. Similar to the LM, the TEM employs a phase plate that shifts the phase of only the scattered electrons, resulting in amplitude contrast rather than phase contrast as the electrons interfere with the unscattered electrons in the image plane. According to JEOL, nearly perfect phase-contrast specimens, such as frozen-hydrated samples, can now be imaged with superior contrast. The technique benefits studies in which the image contrast is a limiting factor, such as single-particle imaging and

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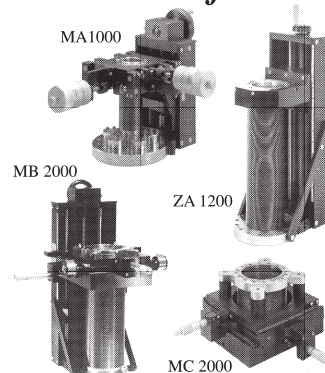
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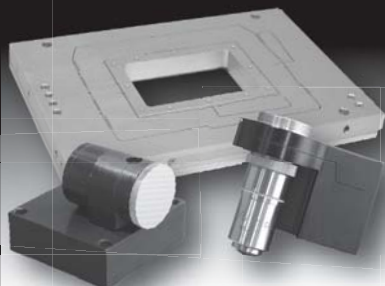
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Self-cleaning pumps for saturated vapors

The new model N860.3FT.40P, a patent-pending self-drying diaphragm pump from KNF Neuberger, is designed to reduce process time for vacuum ovens, vacuum concentrators, and rotary evaporators. Saturated vapors condense and accumulate in a vacuum pump's heads due to insufficient flow through the unit. The condensates reduce pump efficiency and extend processing time. The self-drying "PowerDry" feature of the N860.3FT.40P uses an electronically controlled valve to periodically allow ambient air into the pump. The sudden flow of air forces liquids out of the pump heads, immediately restoring efficiency and reducing processing time. Chamber vacuum levels are unaffected. KNF's solid polytetrafluoroethylene heads and diaphragms provide the maximum corrosion resistance available. Because there is no pump oil to replace and dispose of, the pumps are virtually maintenance free. *KNF Neuberger Inc, 2 Black Forest Road, Trenton, NJ 08691-1810, <http://www.knf.com>*

Vacuum controller

The new, compact Vacvision vacuum controller from Oerlikon Leybold Vacuum is equipped with a large thin-film transistor graphic display with a touch panel. It offers intuitive operation, a guided configuration menu, simple hardware interfacing with color-coded cable connections, and a plug-and-play function. The controller automatically detects one fore-vacuum and one high-vacuum pump. Up to three active vacuum gauge heads and five valves can be connected. The Vacvision also offers the option of connecting a venting facility, seal gas, heaters, and coolers at the turbomolecular pumps. The controlling functions include predefined, configurable process setups. The signals from the fore-vacuum transmitters can be used to start the turbomolecular pumps and the high vacuum transmitters. The new controller can be installed in a 19-inch rack or used as a benchtop unit. Vacvision offers a platform capable of configuring vacuum systems in different ways and operating them with great flexibility. *Oerlikon Leybold Vacuum*

GmbH, Bonner Strasse 498 (Bayenthal), 50968 Cologne, Germany, <http://www.oerlikon.com>

Compact vacuum pumps for filtration

BrandTech now offers Vacuubrand ME1 and ME1C diaphragm pumps for single and multiple filtrations. 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 pumps deliver speeds of 14 lpm and an ultimate vacuum of 100 mbar. They provide a long diaphragm life of 10 000–15 000 operating hours, low vibration, and ease of use. Both models have polytetrafluoroethylene diaphragms and valves for optimal chemical resistance. The ME1C features a full fluoropolymer flow path for pumping applications in chemistry. An optional vent control valve with a dial gauge enables variable fine adjustment of the pumping speed. Both vacuum pumps are oil-free and are significantly quieter than rotary vane pumps, water-jet aspirators, and competitive diaphragm pumps. *BrandTech Scientific Inc, 11 Bokum Road, Essex, CT 06426-1506, <http://www.brandtech.com>*

Dry screw vacuum pumps

Edwards has launched a compact GXS pump that features unique screw technology designed so users can optimize processes. The pump mechanism can be cleaned easily using the high flow purge and solvent flush accessory, which eliminates the need to partially strip the pump and decreases costly downtime associated with using alternative products that require manual cleaning. Compared with other available products, the pump provides faster pump-down and gives ultimate vacuum down to 1×10^{-3} mbar (7.5×10^{-4} torr) in a variety of applications from light-duty to load-lock and harsh processes. The GXS shafts are supported at both ends for increased rigidity, resulting in improved dust handling, reduced vibration, and noise levels below 64 dB. *Edwards Limited, 1 Highwood Drive, Suite 101, Tewksbury, MA 01876, <http://www.edwardsvacuum.com>*

Rectangular vacuum valves

Kurt J. Lesker has introduced rectangular gate valves with wide openings for vacuum coating applications such as semiconductor processing and solar and LCD/flat panels. The new valves are rated up to 2 million cycles and are available with openings in the 200- to 2000-mm range. The bellows-sealed rectangular gate valves have a patented "L-motion" link assembly and dual shafts without springs in the actuator for faster, smoother actuation with reduced vibration. The design also results in less wear, less particulate generation, and faster cycle times. The dust seal on the vacuum side of the bonnet flange virtually eliminates process particulate from entering the bellows, leading to a long cycle life. The valves feature mechanical locking, so they lock into position at the end of blade travel during valve closure. The design's benefits are that any back pressure on the gate will not affect sealing properties and the valves remain shut on loss of operating air pressure. *Kurt J. Lesker Company, P. O. Box 10, 1925 Route 51, Clairton, PA 15025-3681, <http://www.lesker.com>*

Corrosion- and ozone-resistant vacuum valves

A series of corrosion- and ozone-resistant valves from MKS Instruments are designed for longer life in extremely harsh semiconductor and solar processes. The valves feature patented technology that completely seals off their bellows, keeping reactive and corrosive gases such as O_3 , NF_3 , and Cl_2 from contacting with and collecting on a bellows's surface when a valve is open. The bellows-sealed poppet valve ensures a long life and easy maintenance. Angle and in-line configurations allow for ease of integration into new tool designs. High-flow port sizes, including NW40 and NW50, use maximum internal diameters for greater conductance. The corrosion-resistant valve is available with an air solenoid for electro-pneumatic valve control and a limit-switch assembly for remote indication in the open or closed position. In the event of power loss, the valve will automatically close. *MKS Instruments, 2 Tech Drive, Suite 201, Andover, MA 01810, <http://www.mksinst.com>*

Cryogenic optical measurement platform

Montana Instruments has released its new Cryostation, a stable, wide optical access research platform that allows complete computer control of a sample's temperature. Temperature drift is a problem in both liquid-helium and closed-cycle systems. Using active and passive temperature stabilization, the Cryostation achieves long- and short-term temperature stability of < 10 mK peak to peak, even at temperatures below 4 K. Peak-to-peak vibrations are < 5 nm, and rms vibrations are < 0.25 nm. When experimental setup and room-temperature measurements are made in the Cryostation, the sample area can be completely unobstructed. For lower or higher temperature work, the radiation and vacuum case can be set in place without disturbing the sample. The platform includes four thermometers and three heaters, and it provides users with nine electrical connections into the sample area for custom devices. *Montana Instruments Corporation, 2317 Birdie Drive, Bozeman, MT 59715, <http://www.montanainstruments.com>*



Huntington offers both researchers and equipment manufacturers custom vacuum chambers, a complete line of sample transfer and manipulation devices, valves and other components to complete your vacuum system.

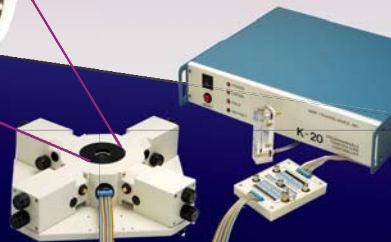
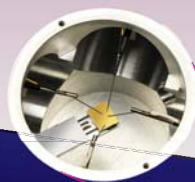
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