UHV piezo actuated gas inlet valve

Manufacturer: Pfeiffer Vacuum
Distributor: Andreas Mattil – Technischer Vertrieb
Product: The PRV is an Ultra High Vacuum (UHV) gas inlet valve designed for ease of use, precise control and minimal dead volume. Ideal for mass spectrometry ion sources, sputtering and any UHV application requiring precise gas control, this valve offers superior performance and reliability.
Features:

- No manual adjustment required, Bakeable up to 100 °C
- Versatile installation: Can be installed in any location, including hard to reach areas
- Minimal dead volume.
- Design and Functionality (Standard Connections): 3 mm Swagelok connector for gas line, DN40 CF flange for vacuum side, BNC socket for power connection

The PRV is based on the discontinued Pfeiffer Vacuum UDV140 and features a rugged, reliable, maintenance-free design with an M5 threat on the UHV side. The valve uses two sapphire plates pressed together, with one plate having a central hole and a channel to the vacuum side. A piezo actuator lifts one side of the top sapphire plate to allow gas flow, with the flow rate controlled by the applied DC voltage. More features: Sapphire and stainless steel in contact with UHV, flexible Viton seal on gas side. When the BNC connector is removed, the valve closes automatically by discharging the piezo via a resistor or when the DC voltage is set to 0 V. Achieves vacuum pressures between $5 \cdot 10^{-4}$ mbar and $< 10^{-8}$ mbar for typical laboratory gases such as Ar or O_2, $< 10^{-11}$ mbar when the gas line is evacuated.

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Product of the Month

Triple filter mass spectrometer

Manufacturer: Hiden Analytical Europe
Product: High performance, specialist triple filter mass spectrometer 3F PIC Series with pulse ion counting detection for fast event studies
Features: Hiden's 3F PIC Series quadrupoles are high precision triple filter analysers with digital detectors for the ultimate sensitivity and time resolution in fast event studies such as UHV TPD. 3F PIC Series analysers are available with UHV compatible mass filter shrouds and a low profile ion source for close positioning to the desorption surface.

The HAL 3F PIC features a 7 decade dynamic range, triple stage mass filter, speeds of up to 1000 measurements per second and an ultimate detection limit of $5 \cdot 10^{-16}$ mbar.

Mass range options are 50, 300, 510, 1000, 2500 or 5000 amu.
Applications:

- UHV TPD
- Surface science
- Single crystal studies
- Molecular beam studies
- Flash desorption analysis
- High performance RGA
- Desorption studies
- Bakeout cycles
- Contamination studies

Application specific software enables the user to control temperature ramp profiles and collect data in the same program, or to simply collect MS data and temperature in the same program.

Both analogue and digital inputs are provided for synchronous acquisition start and sample temperature data display alongside mass channel data.

Multiple ion detection mode allows more than 100 channels to be monitored simultaneously, each with a unique set of MS parameters. It is possible to choose species from the internal library or via NIST MS database with direct import/export to MASsoft Professional software.

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High-precision at low-cost

Manufacturer: Laser Components
Product: High-power and high-volume Pulsed Laser Diodes (1550UA Series) at 1550 nm
Features: The 1550UA Series is a new addition to the existing line of high-quality and affordable high-volume Pulsed Laser Diodes (PLDs). This is in addition to the 905UA Series but now at a higher wavelength. The 1550UA Series offers a hermetically sealed metal housing featuring optimal thermal stability, excellent overdrive capabilities, and precise chip alignment. System integrators can take advantage of high-volume production without reducing the reliability of a system.
Applications: Mainly being used in Time-of-Flight (ToF), and Laser Range Finding (LRF) systems, the 1550 nm solution will improve the transmission through rain, fog, snow, and other harsh weather for Defense & Aerospace, and automotive LiDAR applications. Additionally, the added benefit of using the higher wavelength of 1550 nm improves eye safety compared to 905 nm lasers.

For customers considering upgrading from commercial-grade PLDs to higher-resolution, the 1550UA Series is a cost-effective solution. It is capable of operating at –45 to 85°C, to withstand the difficult conditions of various environments. Available in a TO-56 package with multiple sources sizes, the 1550UA Series can also be customized to meet the needs of each area of use.

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Career in consulting

d-fine is a European consulting company with over 1,500 employees and a growing international presence with eleven offices distributed across seven countries. Our projects focus on quantitative challenges in data analytics, data science, modelling, and the development of sustainable technological solutions. To expand our consulting & solutions teams, we are looking for students/graduates (m/f/d) of physics with a very good academic record, fluency in German and English and a high mathematical and/or technological affinity.

At *d-fine*, you have the choice between the working models „Blue“, „Orange/ Orange Flex“ and „Yellow“: „Blue“ covers project assignments with a broad range of topics throughout Europe with a flexible choice of residence within the respective entity. Travel to the customer takes place according to project requirements. „Orange“ focuses on regional assignments and guarantees remote or on-site project assignments at your office location. „Orange Flex“ combines both models in the form of a fixed office location with limited travel activity of a maximum of 8 nights per month. “Yellow“ involves working in a fixed team and on a pre-selected range of tasks in the energy industry. You work mainly remotely and choose your place of residence flexibly within Germany.

In addition to exciting tasks and projects, we offer you an intensive onboarding program, a collegial team, attractive career and salary model, as well as a wide range of additional benefits, such as our extensive training program as part of the d-fine academy.

Applications are always welcome.

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Master's programme 'Quantum Technologies`

After months of intensive joint work by a team consisting of physicists, mathematicians, computer scientists and electrical engineers on the development and design of the Master's distance learning programme 'Quantum Technologies' at the University of Kaiserslautern-Landau (RPTU), the first cohort of students has now successfully started their studies. They are the first ones actively engaging with the specially developed learning material.

Designed to meet students where they are, with their wide range of professional backgrounds, with the aim of sharing a common passion for quantum physics, the programme initially starts with customized mathematical and physical foundations before moving on in the advanced semesters to a deeper understanding, particularly in the areas of Quantum Communication, Quantum Computing, Quantum Sensing, and Quantum Simulation.

Very well received by the first cohort of students was the first on-campus phase at the RPTU-campus in Kaiserslautern to move from theoretical foundations to hands-on discussions, collaborative learning, and practical applications.

We are looking forward to welcoming new students in the winter semester 2025/2026. The next possible standard application period for the distance learning programme will therefore open in mid-May 2025 and close on 15 July 2025. The semester will start in October 2025.

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Measuring gravitational waves with glass

Fraunhofer IOF researchers from Jena have manufactured highly sensitive sensors made entirely of glass for the Einstein Telescope. From 2035, the Einstein Telescope will be able to study gravitational waves with unprecedented accuracy. In order to minimize the impact of noise on the measurements, the telescope is to be built up to 300 metres underground. But even there, there are still mechanical vibrations, caused for example by distant earthquakes or road traffic above ground. Highly sensitive vibration sensors will measure these remaining vibrations. Researchers from the Fraunhofer Institute for Applied Optics and Precision Engineering IOF in Jena have developed and built these vibration sensors for the Einstein Telescope in collaboration with the Max Planck Institute for Gravitational Physics, Hanover (Albert Einstein Institute AEI).

The vibration sensors consist of two core components: a movable resonator and a laser that reads the movement of the resonator. The resonator was built in Jena and the laser was added in Hanover. Researchers at Fraunhofer IOF have created a filigree mechanical resonator made of pure silica glass (>99.8 % SiO_2). It combines a low natural frequency of 15 Hertz with a high-quality factor (>100,000) and a compact size of just five centimeters in diameter.

The production of such a delicate resonator is a complex process. It includes milling and polishing work as well as laser processing methods. Furthermore, a special plasma-activated bonding process is used to create a bond at atomic level between the glass surfaces of the resonator.

In the future, the new glass resonators can be used wherever systems need to be monitored with a number of compact acceleration or position sensors. In addition to gravitational wave research, this is the case with satellites, for example, for determining their orbits, measuring the earth's surface or inertial navigation. The resonators can also be used to improve the measurement accuracy of atomic interferometers and in EUV lithography systems for processing semiconductors.

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