

Production of industrial gases and gas purification using PSA systems

Valve solutions for pressure swing adsorption systems

Pressure swing adsorption (PSA) is the general designation for a gas purification system based on selective adsorption. Nitrogen (N₂) or oxygen (O₂) separated from air with a PSA system. If industrial gases are often on-site, PSA systems offer a cost-effective and reliable source of supply. GEMÜ offers the ideal valve portfolio for this type of system.

Process description:

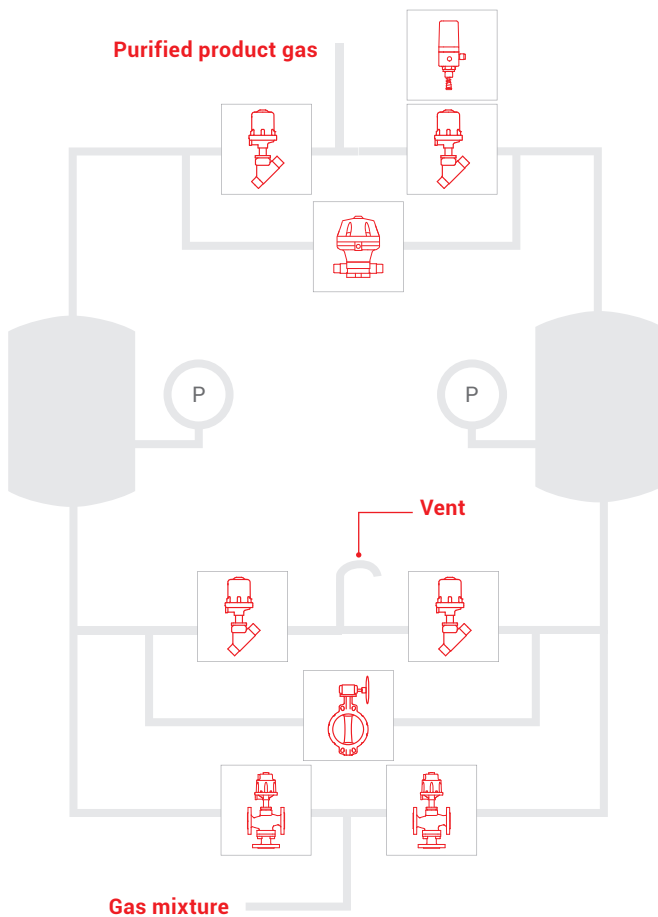
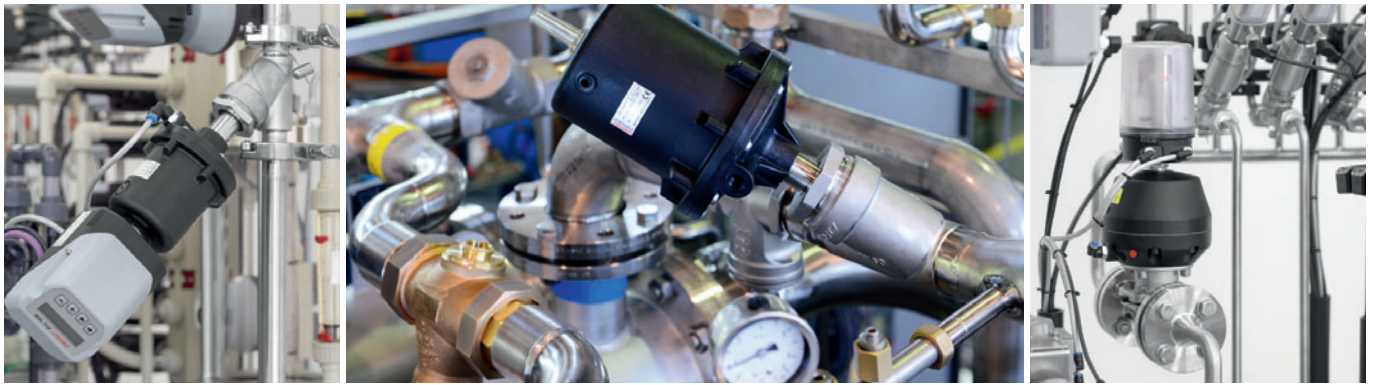
The operating principle at the basis of PSA systems is the "pressure swing". By transferring gas over-pressure between parallel adsorption tanks, continuous operation of the system is possible with high energy savings. In the production of nitrogen, for example, compressed dry and filtered air flows into one purification tank. Molecular sieves in the tank selectively adsorb oxygen, while purified nitrogen flows out. At the same time, the second tank is regenerated (vented and flushed). The cycling of the two tanks between sorption (purification) and desorption (regeneration) allows for continuous operation. Prior to every sorption cycle, a pressure swing is conducted, by which pressurised gas from the saturated tank is transferred to the regenerated tank.

Suitable GEMÜ products:

- GEMÜ 536 or 534 – metal globe valves, pneumatically operated
- GEMÜ 554 – metal angle seat globe valve, pneumatically operated
- GEMÜ 553 – modular distribution system manifold
- GEMÜ 560 – angle seat check valve
- GEMÜ M-block – metal multi-port globe valve block
- GEMÜ 620 or 695 – metal diaphragm valves, pneumatically operated
- GEMÜ 481 – soft seated, metal butterfly valve, pneumatically operated
- GEMÜ 800 – flowmeter with a permanently engraved scale

Key process data:

- Medium: Dry air, nitrogen, oxygen, hydrogen, methane, carbon dioxide, steam, etc.
- Operating temperatures: 25 to 45 °C
- Operating pressure: 1 to 10 bar
- Special features: Bidirectional flow, quick pressure compensation and high cycle duties



Why GEMÜ:

For valve designs in PSA systems, GEMÜ offers technically advanced solutions tailored to each process step.

Whether a robust globe valve for high switching cycles or a modular systems for a particularly compact design is required, thanks the wide range of valve types and accessories, we deliver the complete valves, measurement and control systems from a single source.

Our pneumatic actuators may be fitted with positioners and process controllers in-house, tested and delivered as a complete package. In this way, you may save time and logistical efforts in the installation of the system on site, as well as reduce documentation. This means that you save time and logistical efforts required for installation of the system on-site and reduced documentation.

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