



Gas Distribution Systems:

**Maximum Efficiency with
Special Gas**



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Introduction Swagelok



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Agenda

- What is Gas Distribution?
- Key Considerations
- Source Inlet Connection
- Primary Gas Reduction Control
- Automatic Change Over
- Point of Use



Poll

- **Wat is uw grootste uitdaging op het gebied van Gasdistributiesystemen**

Start de Poll

^ Uw grootste uitdaging

Wat is uw grootste uitdaging op het gebied van Gasdistributiesystemen?

Veiligheid waarborgen

Uptime & Betrouwbaarheid

Kostenbeheersing

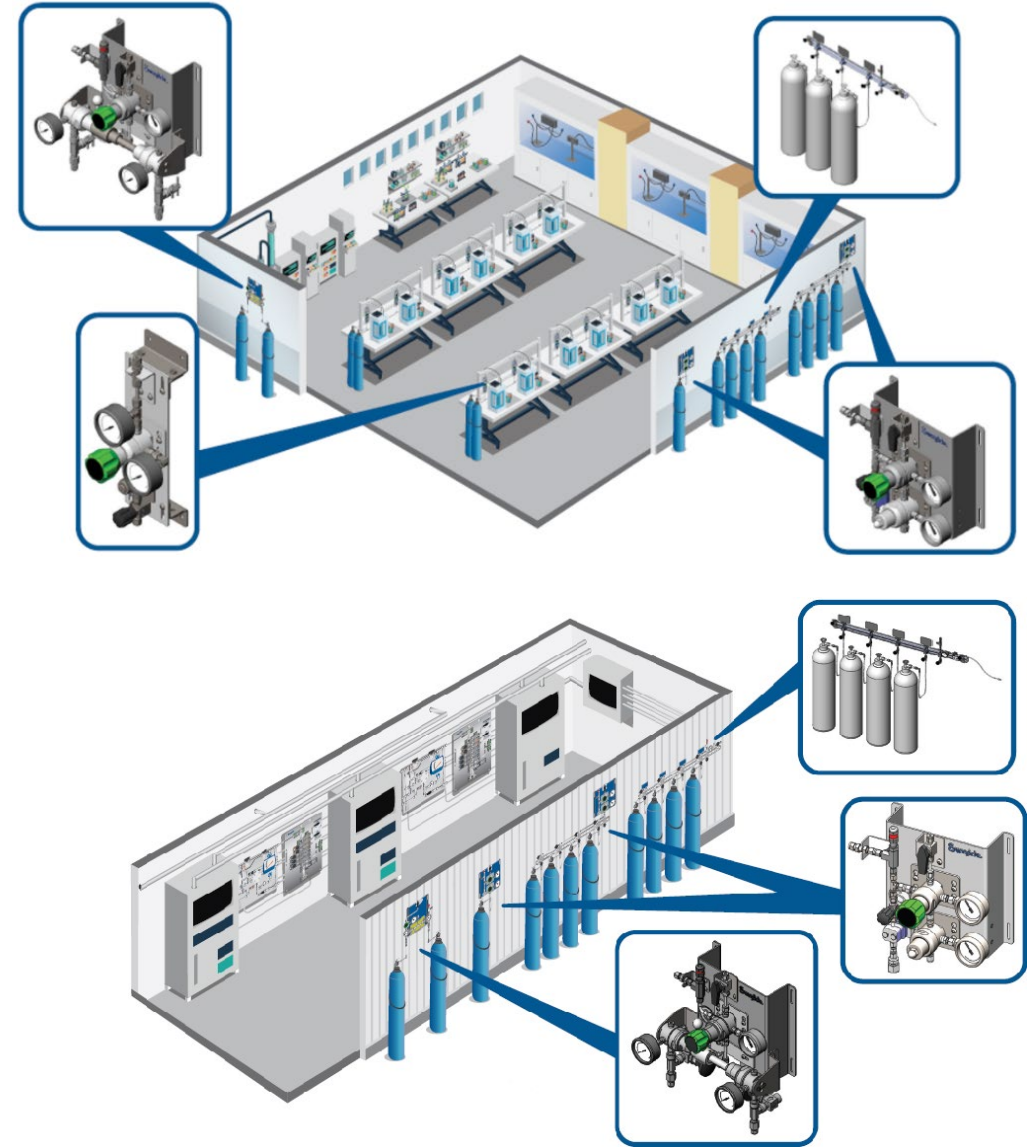
Onderhoud & Resources

What is a Gas Distribution Application?



What is a Gas Distribution Application?

- Gas distribution is a critical function for many industrial, research, and production facilities. Safely, reliably, and effectively delivering gases to where they are needed provide the foundation for a strong operation.
- Gas distribution systems work to deliver gases from a high-pressure source to the facility at the pressure and flow rate required by each application.
- Most often built around one or a series of pressure regulation steps, gas distribution systems may have four typical subsystems:
 - Source inlet connection
 - Primary gas pressure control
 - Automatic changeover
 - Point-of-use



Key Considerations (Safety)

- Gas distribution systems may transport gases that can be harmful to:
 - **Operators**
 - **Equipment**
 - **Environment**
- The primary function of a gas distribution system is to **reduce high-source pressure** gases to lower, usable pressures prior to their point of use.
- When considering the components used within gas distribution systems, it is important to ensure both the **pressure** and **temperature** ratings as well as their method of operation matches system requirements.
- Pressure control valves like **relief valves** and **pressure regulators** must be sized so that they can handle the **full range of potential pressures and flows** to ensure the system can function well and remain safe for operators.



Key Considerations (Reliability/Uptime)

- When a gas distribution system is down, it may affect other processes, laboratory tests, or equipment such as analyzers. A system going down can create the need for
 - **Maintenance (downtime)**
 - **Expense of replacement parts**
- For gas distribution systems, **reliability** goes beyond just prevention of leaks and worn components. Throughout the life of the system, gases need to be delivered within the required **Pressure & Flow range** to keep all systems running.
- Properly sizing **pressure control** and **flow isolation components** to meet a wide range of parameters is important to ensure that the system can be used **effectively without modification** as needs change.



Key Considerations (Cost Reduction/Avoidance)

- Gas distribution systems must deliver gases to their intended point of use and nowhere else. Even the most **common gases** can add up to be a significant portion of a **facility's costs**.
- Gas can be an expensive item, so **leaks** in gas distribution systems or **unused gas** in supply bottles mean **wasted money**. This cost becomes even more impactful when considering expensive gases like helium, hydrogen, or special mixtures.
- **Threaded connections**, while a popular choice for gas distribution systems, can be prone to leakage. Using compression fittings where possible minimizes the potential for leakage, especially following maintenance operations where connections are **broken and remade**.
- Replacing or maintaining gas distribution systems that leak or do not function properly uses money and **resources** that could be **better used elsewhere**.



Key Considerations (Time/Resources)

- Across industries, users have **less time** and **fewer resources** to **build and maintain gas distribution** systems on-site. Additionally, as an **aging workforce** retires, knowledge and expertise to specify the appropriate product (specifically pressure regulators) or design for their applications are being reduced.
- Sites are running on tight project timelines and don't have **time** or **budget** to spend on testing systems during installation. However, when systems fail to function properly, time and resources must be committed to troubleshooting and maintenance.
- In order to minimize the impact of planned or unplanned maintenance on gas distribution systems, it is important that the system design allows **for quick access and easy replacement** of components. By minimizing the time required to access parts for maintenance, technicians can be **more productive** and get systems up and running **quicker**, keeping the site running.



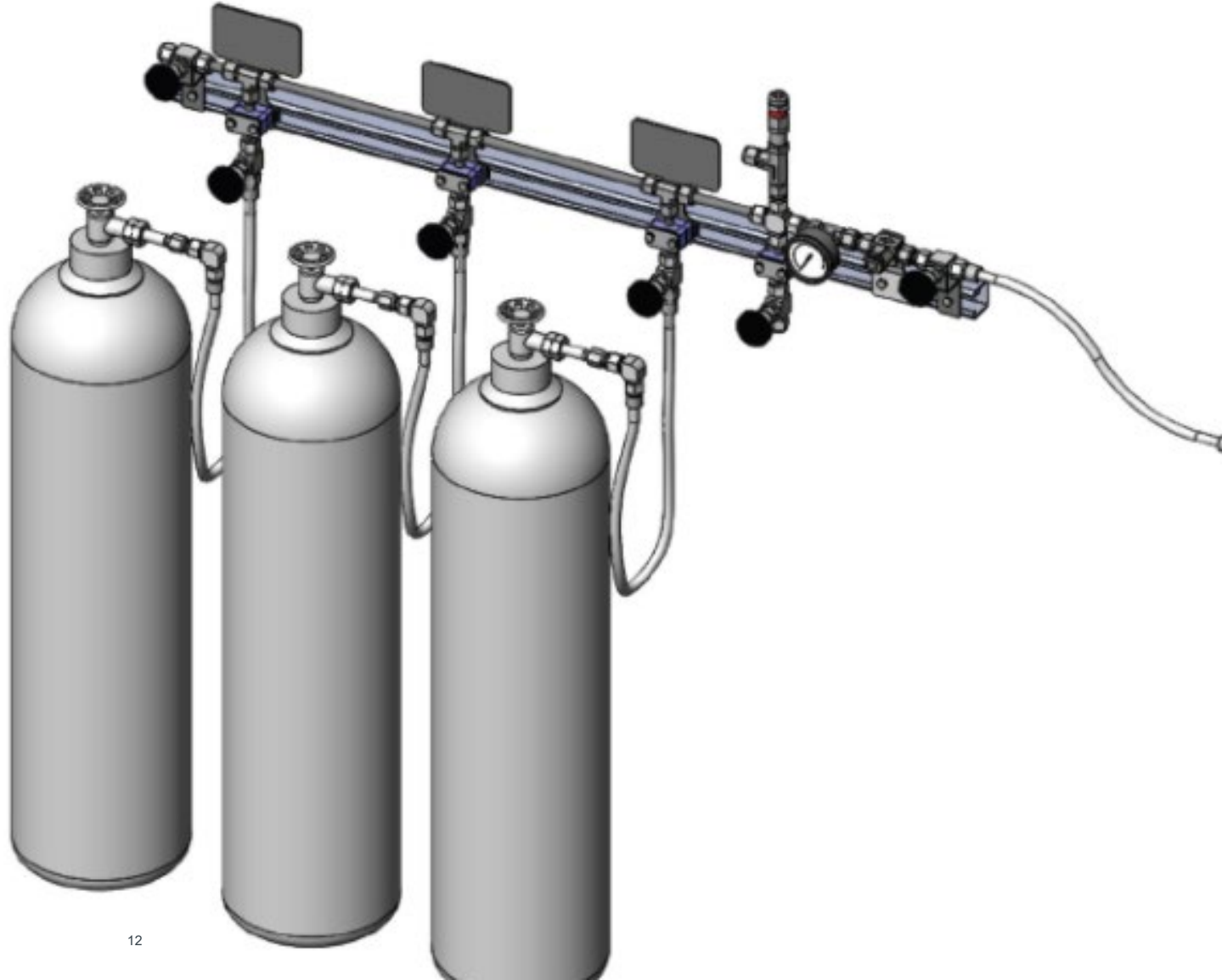
What is a Gas Distribution Application?



Source Inlet Connection (SSI)

Ability to connect multiple cylinders with efficient space management.

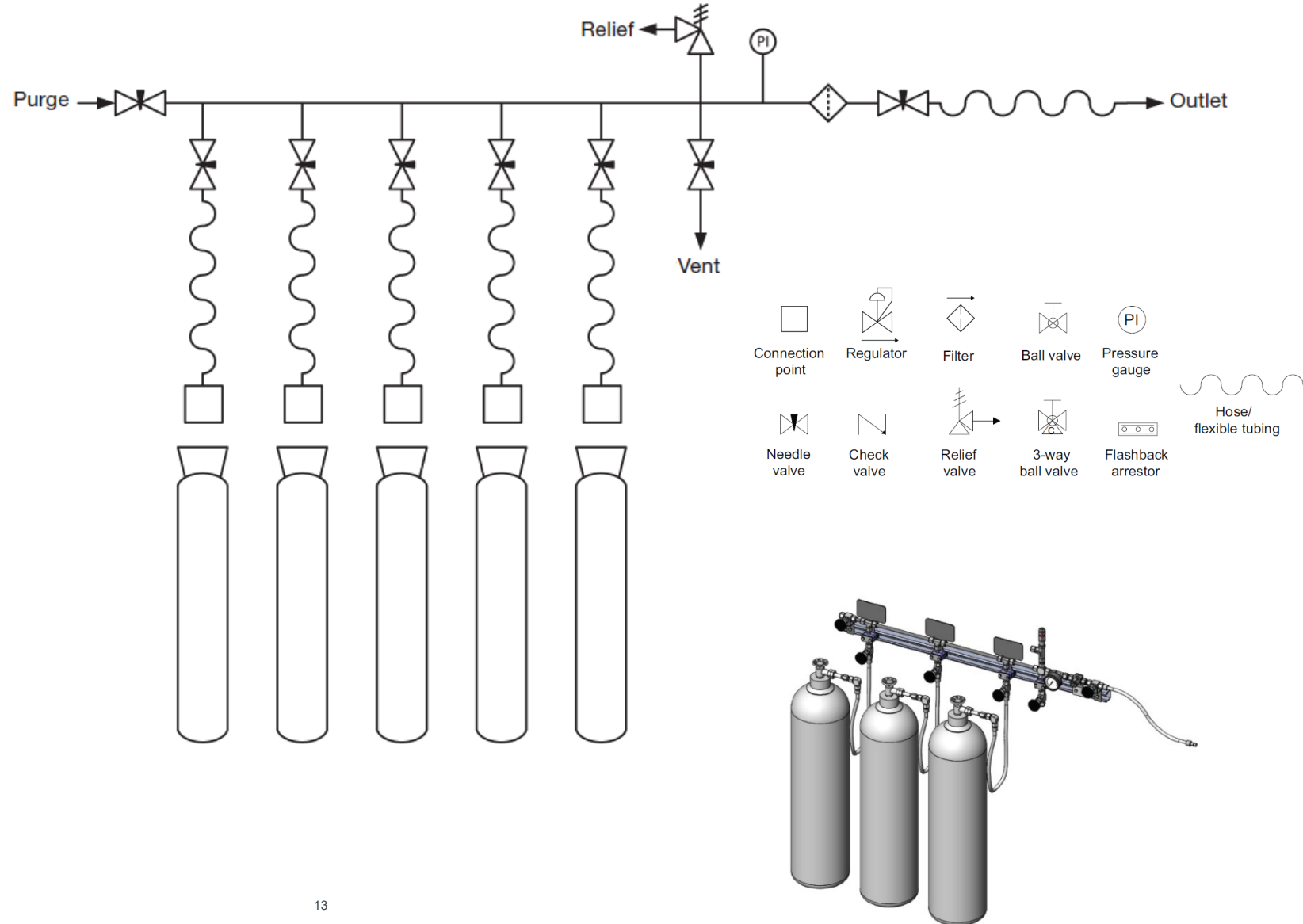
- Establishes a connection between the high-pressure gas source and the distribution system
- Can be one bottle or multiple bottles
- Highly configurable options ensures operator safety
- Option to vent individual lines to maximize uptime



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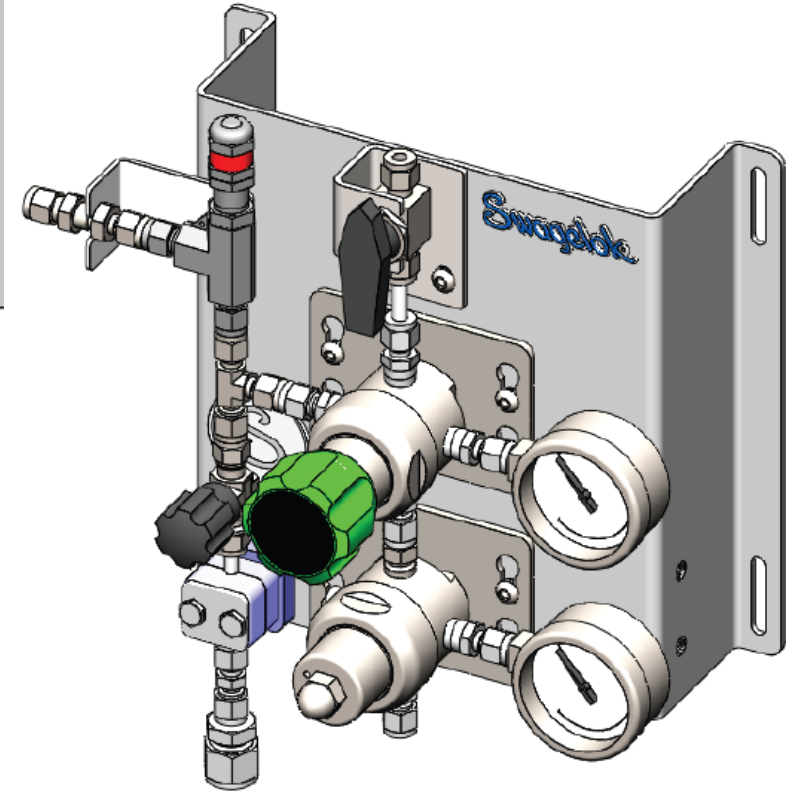
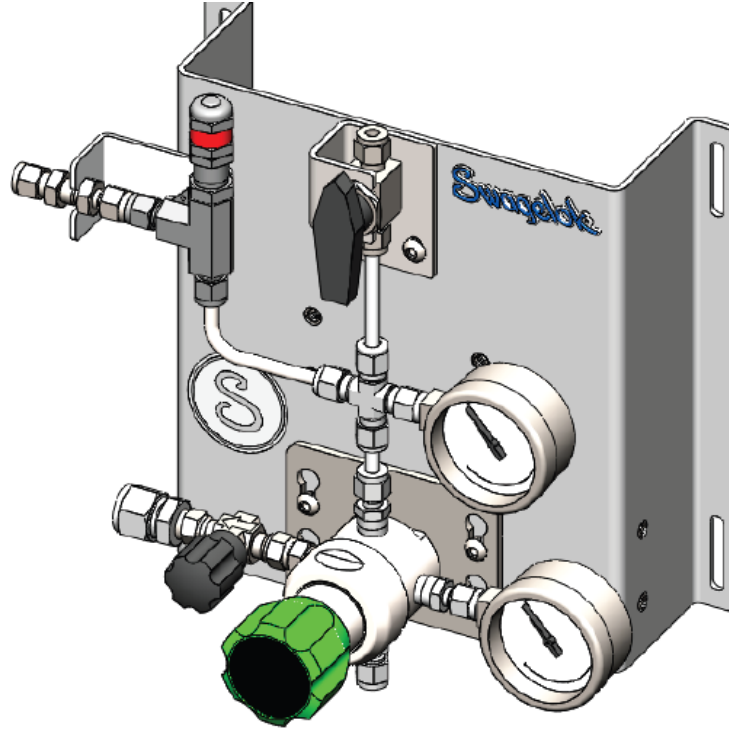


Creep Seat damage



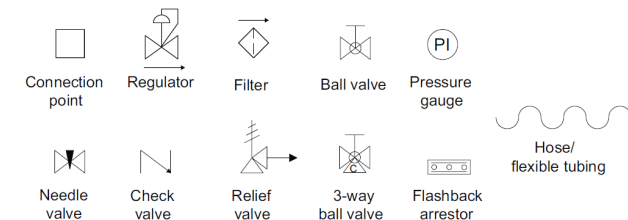
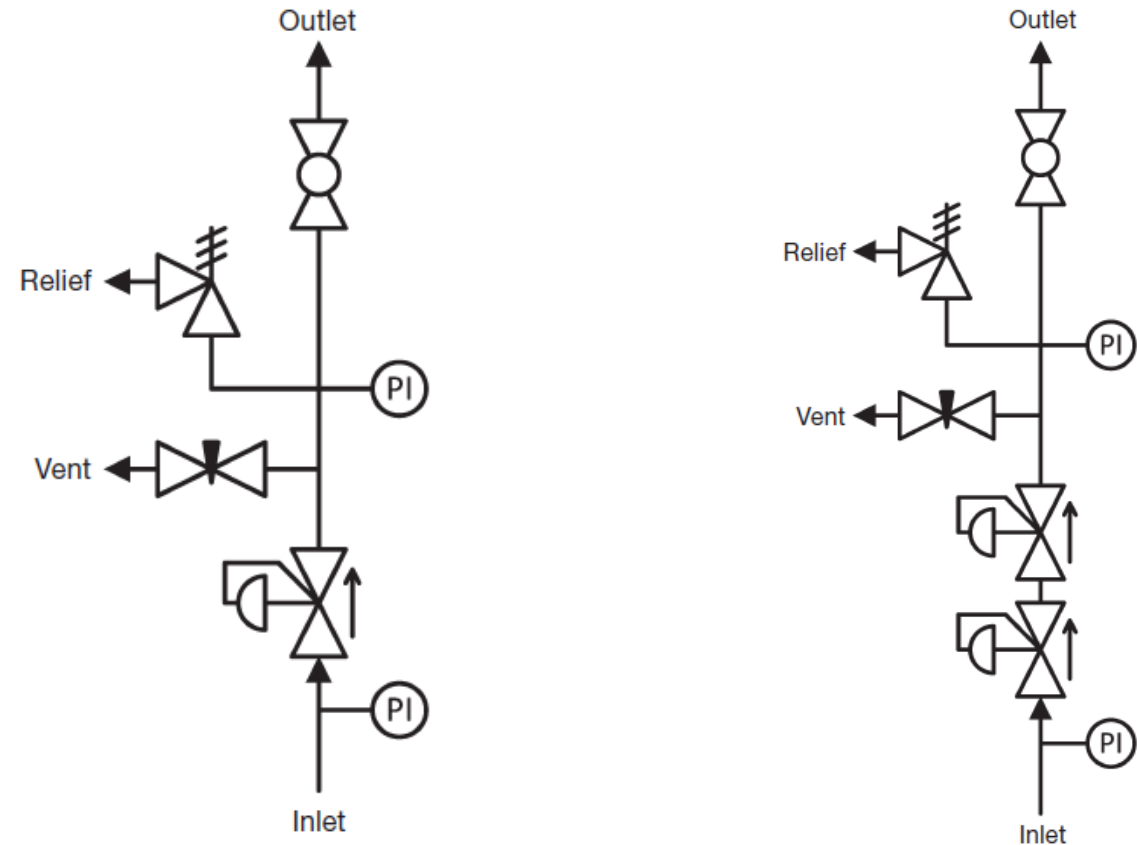
Primary Gas Reduction Control (SGP)

- Primary Gas Reduction Control is used predominately to reduce gas pressure at or near the source prior to a larger gas distribution network.
- Being the first point of gas control, these systems can be built with either single- or dual-stage pressure regulation to accurately deliver gas while minimizing the supply-pressure effect and providing ease of use, depending on system needs.
- Additionally, several vent and relief options can be incorporated to enhance safety.



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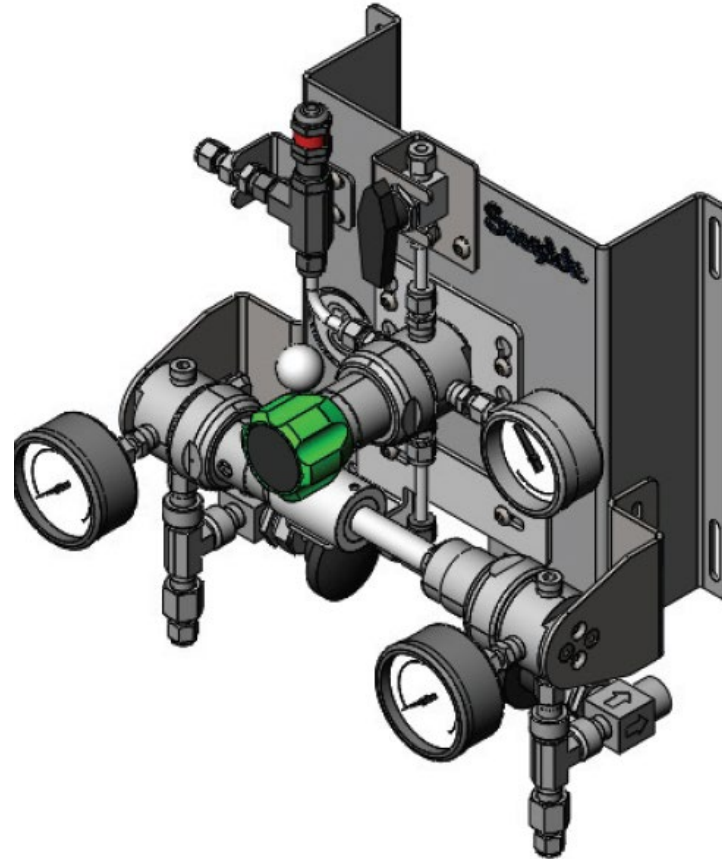


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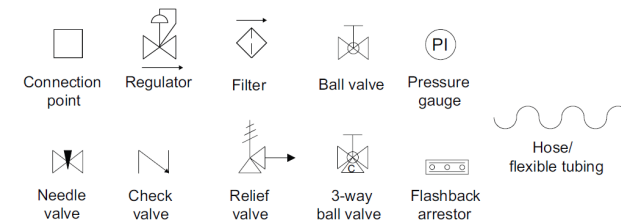
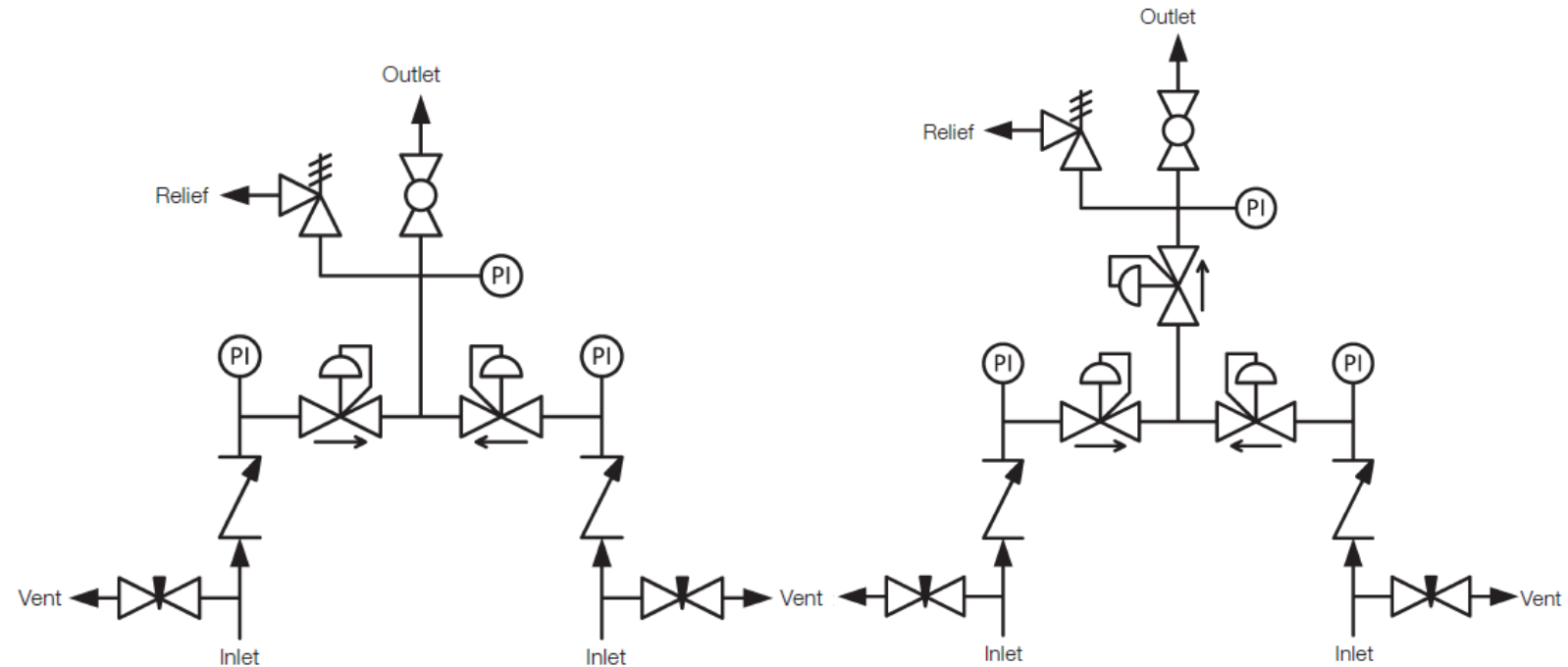
Automatic Change Over (SCO)

- Automatic Changeover is a special type of primary gas control system used when the continuous supply of gas is important.
- The SCO automatically starts drawing from a secondary source of gas once the pressure of the primary source equals the set changeover pressure.
- Once the system is drawing from the secondary source, operators can isolate and replace or refill the primary source while gas is still being supplied to the system.



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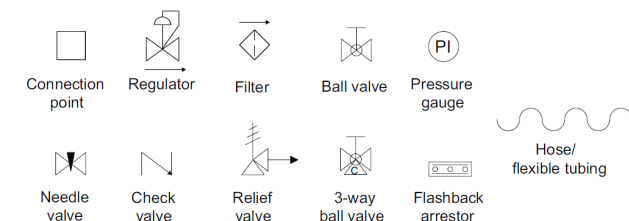
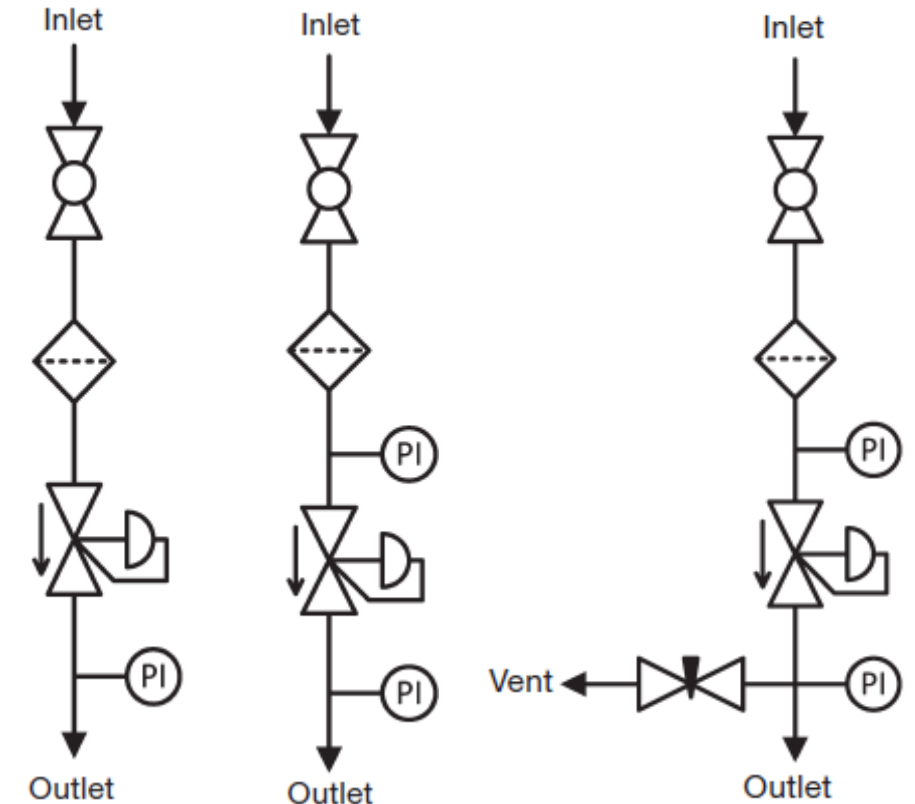
Point Of Use (SPU)

- Point of use system is the last point of control prior to the gas being used. Used at the end of a gas distribution system, point-of-use systems supply gas to lab benches, vent hoods, and single or small collections of equipment.
- Gas is fed to point of use systems either from a site supply header or from individual gas bottles after having the pressure reduced through a gas panel.
- Point of use systems are available with several bracket options to enable wall, benchtop, or underdesk mounting. They also can be configured with top-to-bottom or bottom-to-top flow path configurations to accommodate installations that can vary widely between sites, buildings, or even within the same system.



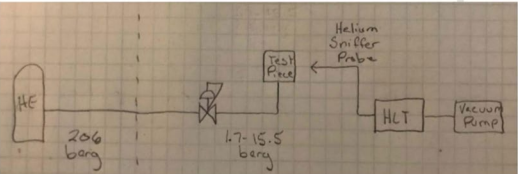
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Gas Distribution System Evaluation and Advisory

Gas Distribution System Evaluation and Advisory Services™ – Service Report



HE supply system

Problem Statement: The customer expresses that the current HLT provides random false failure readings and the point of use regulator is difficult to dial in the pressure precisely

Process Conditions:
Pressure: 206barg
Temperature: 20°C
Flow: Static conditions

Evaluation Table

System Location	Observation	Evaluation	Recommended Action	SEQF	Rating (1-5)	Relative Value	Cost to Implement
Source	Pressure ratings downstream the regulator: 1.7- 15.5 barg Upstream pressure: 206barg	A Full bottle pressure of 206bar to the point of use regulator creates unnecessary high-pressure lines inside the lab environment.	Add a first stage high pressure regulator near to the supply bottle to reduce the incoming pressure to ±30barg	Safety	3	▲▲	\$5

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Service Report



Gas Distribution System Evaluation and Advisory Services™

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Questions?



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