SMC

SMC SOLUTIONS FOR CHROMATOGRAPHY

Shaping the future of analysis

Expertise
Passion
Automation

Chromatography

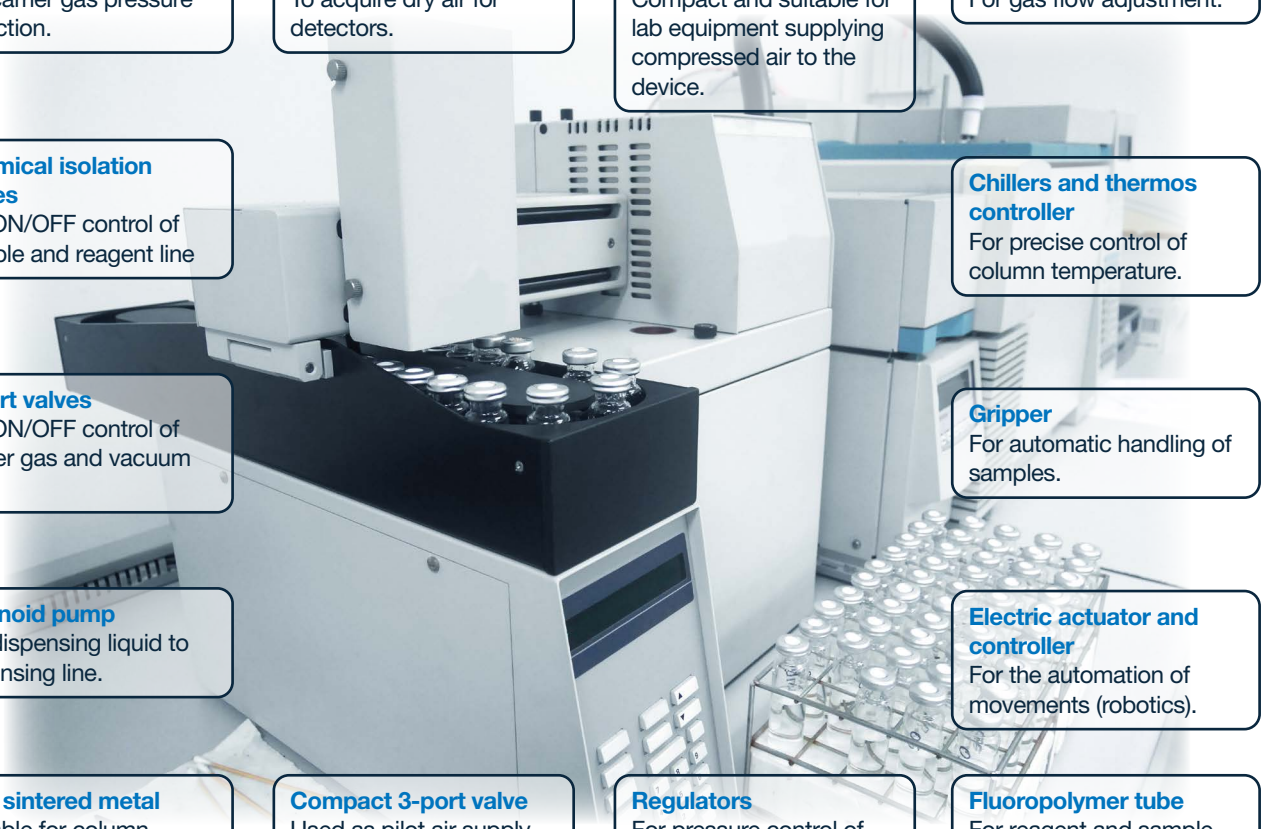
Chromatography has become a cornerstone of modern analytical science, supporting breakthroughs in pharmaceuticals, biotechnology, environmental monitoring, petrochemical analysis and countless industrial research applications. As analytical challenges grow more complex—requiring faster processing, higher sensitivity and uncompromising reproducibility—instrument manufacturers face the need for equally advanced control technologies that guarantee stability throughout the entire analytical workflow.

SMC stands at the forefront of this evolution. With more than 700,000 automation and fluid-control components available worldwide, we deliver one of the most extensive, reliable and technically advanced product ecosystems in the industry. Our solutions, ranging from high-precision pneumatic systems to advanced microfluidics, **high-purity gas and liquid handling, vacuum technology and custom-designed manifolds**, are engineered to enhance the accuracy and long-term performance of chromatographic instruments.

What sets SMC apart in the chromatography market is our ability to combine **technical expertise**, **global manufacturing capacity** and **deep application knowledge**. From LC and GC to MS and hybrid analytical platforms, our products enable stable flow control, chemical resistance, precise pressure regulation and contamination-free operation—essential qualities for reliable analytical results.

Whether improving sample preparation, stabilising carrier gas delivery, or protecting sensitive detectors and vacuum systems, SMC's components are **designed around durability**, **compatibility** and **repeatable performance**. For customers seeking standard components, tailored adaptations, or fully customised assemblies, SMC offers comprehensive solutions that contribute to shaping the future of chromatographic analysis worldwide.

SMC solutions for chromatography



Pressure sensor
For carrier gas pressure detection.

Air dryer
To acquire dry air for detectors.

Compact compressor
Compact and suitable for lab equipment supplying compressed air to the device.

Flow controller
For gas flow adjustment.

Chemical isolation valves
For ON/OFF control of sample and reagent line

Chillers and thermos controller
For precise control of column temperature.

2-port valves
For ON/OFF control of carrier gas and vacuum line.

Gripper
For automatic handling of samples.

Solenoid pump
For dispensing liquid to the rinsing line.

Electric actuator and controller
For the automation of movements (robotics).

SUS sintered metal
Suitable for column. For filtration in the system.

Compact 3-port valve
Used as pilot air supply for main gas valve.

Regulators
For pressure control of carrier gas.

Fluoropolymer tube
For reagent and sample line with chemical resistance.

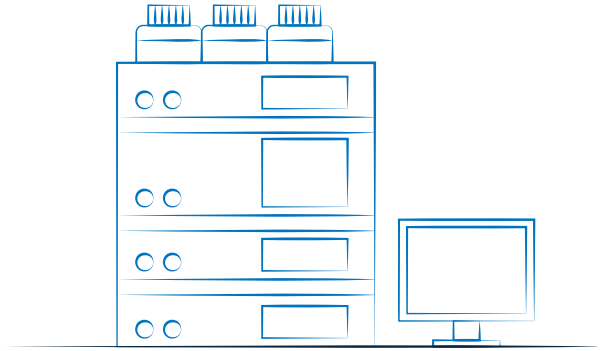
SMC solutions bring together a wide range of technologies designed to ensure optimal performance across all chromatographic systems. Each component is engineered to meet the demanding requirements of modern analytical instruments, providing **precise gas and liquid management** as well as stable **control of pressure, flow and vacuum**.

Our portfolio includes high-purity valves, precision regulators, dispense pumps, filters, air dryers, sensors, chemical-resistant tubing and a wide selection of auxiliary components that enable instrument manufacturers to design equipment that is more reliable, compact and efficient.

Whether used in Liquid Chromatography (LC), Gas Chromatography (GC), or Mass Spectrometry (MS), SMC products deliver stability, chemical compatibility, low particle generation and seamless integration into complex architectures. This lineup not only represents individual components but also a **complete solution designed to enhance analytical repeatability, reduce maintenance requirements and optimise the end-user experience.**

Combining innovation, quality and global availability, SMC provides a comprehensive range of products that cover every critical stage of the chromatographic process—ensuring every instrument performs with the highest levels of precision and reliability.

Liquid Chromatography – LC



Liquid chromatography—from conventional LC to HPLC and UHPLC—demands precise and stable management of liquids, gases and thermal conditions. Fluctuations in flow, pressure or temperature can significantly impact resolution, peak shape, detection limits and overall reproducibility. To meet these demanding requirements, SMC provides an extensive suite of components **engineered specifically for the challenges of liquid chromatography**.

Our **isolated-structure valves** ensure chemically inert, **contamination-free flow** paths suitable for aggressive mobile phases and organic solvents. Their metal-free, oil-free architecture and diaphragm isolation minimise heat transfer and prevent unwanted chemical interaction, guaranteeing stable operation even during prolonged analytical cycles. Complementing these valves, SMC's solenoid-driven **dispense pumps** deliver microlitre-level dosing precision for rinsing, auto-sampling and reagent delivery—**with repeatability as tight as ±1 %**, ensuring reliable sample preparation and consistent injection conditions.

Beyond fluid control, SMC supports advanced LC system automation through electric actuators with integrated controllers and compact grippers. These solutions **enable precise, repeatable positioning and handling** in autosamplers, vial transfer mechanisms, fraction collectors and sample preparation modules, while simplifying system architecture and reducing wiring and control complexity.

To further enhance system stability, **SMC chillers** provide **accurate thermal management** for detectors, columns and sensitive fluid circuits. By maintaining stable operating temperatures, chillers help reduce baseline drift, improve retention time consistency and protect critical components from thermal stress.

SMC also offers high-performance sintered metal filters, chemical-resistant fluoropolymer tubing, compact compressors for laboratories without a clean air supply and advanced regulators that protect both mobile and stationary phase stability.

For detector and fraction collector applications—including ELS, NQAD, RF, RI, PDA, CD and EC—SMC solutions **ensure precise flow control, clean gas and liquid handling, stable pressure regulation** and **reliable thermal conditions.**

Whether for autosampler control, solvent delivery, waste separation, precise mobile-phase switching, automated handling, thermal regulation or detector support, SMC delivers a comprehensive range of solutions that cover every stage of the LC workflow—from sample introduction to detection and fraction collection.

Where you can use SMC products:

- **Reagent line**
- **Column**
- **Sample line**
- **Liquid waste**
- **Water rinsing**
- **Gas line**
- **Dry air**
- **Air line.**

Mobile and stationary phase

LVM Series

Compact 2/3-port valve for chemical fluids

- For mobile phase control
- Oil-free metal-free
- Isolated structure (diaphragm)
- Less heat increase due to power saving circuit.

HRSC Series

Non-F-gas (CO_2 refrigerant) refrigerated thermo-chiller

- Up to 11.5 Kw cooling capacity
- Uses natural refrigerant (CO_2) with GWP=1
- Temperature stability: ±0.1 °C.

ESD Series

Sintered metal

- Suitable for column
- SUS material
- Flexible design.

HEF Series

Peltier-type thermo-con

- Low-noise design (37 dB)
- Set temperature range: 10 to 60 °C
- Temperature stability: ±0.1 °C.

HECR Series

Peltier rack-mounted type

- Cooling capacity: 0.8 to 1.2 kW
- Temperature stability: ±0.01 °C to ±0.03 °C
- Set temperature range: 10 to 60 °C.

Auto sampler

LVM Series

Compact 2/3-port valve for chemical fluids

- For sample supply and liquid waste
- Oil-free metal-free
- Isolated structure (diaphragm)
- Less heat increase due to power saving circuit.

LSP Series

Liquid dispense pump (solenoid type)

- For stable water rinsing
- 5 µl to 200 µl per shot with 3 optional sizes
- Stable dispense volume: repeatability: ±1 %.

Detector and fraction collector

LVM Series

Compact 2/3-port valve for chemical fluids

· For separation of purification and liquid waste
· Oil-free metal-free
· Isolated structure (diaphragm)
· Available with power-saving circuit.

SRH Series

Clean regulator

· For carrier gas pressure control
· Contamination-controlled SUS steel material
· Oil-free.

VDW Series

Compact direct-operated 2-port valve

· For carrier gas ON/OFF
· Low noise construction.

IDG Series

Membrane air dryer

· For dry air supply
· Power supply not required
· Compatible with low dew points (-60 °C)
· No vibration or heat discharge.

AC Series

Air combination

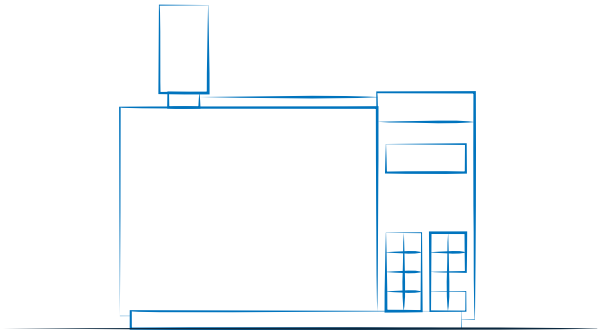
· For pressure control and filtration
· Modular design with uniform body style
· Better visibility & environmental resistance.

CRP Series

Compact compressor

· For lab use with no air source
· Max. flow rate of 10 l/min (ANR).

GAS Chromatography – GC



Gas chromatography hinges on the ability to maintain absolute stability and cleanliness in the gas streams that control carrier delivery, detector operation and instrument actuation. Even small fluctuations in pressure or flow can alter retention times, disrupt resolution, or compromise detection sensitivity. **SMC's GC-focused components are specifically engineered to maintain the consistency and precision required for high-performance GC systems.**

Our portfolio includes ultra-stable regulators for carrier gas pressure control, low-leakage valves for precise ON/OFF switching of gas lines, proportional flow control valves for dynamic flow management and high-purity sintered metal filters designed to protect columns and sensitive internal components. These products are optimised for minimal particle generation, superior leak-tightness and long-term chemical stability—ensuring accurate gas delivery even under demanding, high-throughput analytical conditions.

Beyond gas management, SMC supports advanced GC system automation through electric actuators with integrated controllers and compact grippers. These solutions enable precise, repeatable positioning and handling in autosamplers, vial loading mechanisms, sample injection systems and fraction collection processes, while reducing system complexity and improving operational reliability.

To further enhance analytical stability, SMC chillers provide precise thermal control for detectors, columns and critical gas or fluid circuits. Stable temperature regulation helps minimise baseline drift, improve retention time repeatability and protect sensitive components from thermal fluctuations during continuous operation.

In addition to carrier gas management, SMC offers a wide variety of components for sampling systems, detector gas paths (FID, TCD, ECD, FPD, SCD, BID and others), and pneumatic piloting functions. Our air preparation units—filters, dryers and pressure regulators—ensure a clean and consistent air supply for instrument actuation and internal pneumatic controls, supporting both compact benchtop GC instruments and large-scale industrial analysers.

The integration of SMC's GC solutions results in improved baseline stability, enhanced resolution, faster stabilisation times and reduced maintenance requirements. By delivering unmatched reliability, automation capability and repeatability, SMC helps manufacturers develop GC systems that meet the stringent expectations of analytical laboratories worldwide.

Where you can use SMC products:

- **Liquid N_2 line**
- **Column**
- **Sample line**
- **Gas line**
- **Air pilot signal.**

Mobile and stationary phase

S070 Series +

Compact direct operated 3-port valve

· For ON/OFF control of main valve
· 7 mm-wide compact solenoid valve manifold
· Weight of valve alone: 5 g.

V100 Series +

Compact direct operated 3-port valve

· For ON/OFF control of main valve
· Power consumption: 0.1 w (with power-saving circuit)
· Coil temperature rise: 1 °C.

JSY/SY Series +

5-port valve

· For pilot air to control multiple gas valve ports.

VDW Series +

Compact direct operated 2-port valve

· For carrier gas ON/OFF
· Low-noise construction.

PFCA7 Series +

Flow controller

· Flow control for air, Ar, CO_2, N_2, O_2
· Time to flow set: 0.5 seconds or less
· Repeatability: ±1 % F.S.

PF2M Series +

Digital flow switch

· 2 to 200 l/min range
· Air, Ar, CO_2, N_2, O_2
· Grease-free.

ESD Series

Sintered metal

· Suitable for column
· SUS material
· Flexible design.

HRSC Series

Non-F-gas (CO_2 refrigerant) refrigerated thermo-chiller

· Up to 11.5 Kw cooling capacity
· Uses natural refrigerant (CO_2) with GWP=1
· Temperature stability: ±0.1 °C.

HEF Series

Peltier-type thermo-con

· Low-noise design (37 dB)
· Set temperature range: 10 to 60 °C
· Temperature stability: ±0.1 °C.

HECR Series

Peltier rack-mounted type

· Cooling capacity: 0.8 to 1.2 kW
· Temperature stability: ±0.01 °C to ±0.03 °C
· Set temperature range: 10 to 60 °C.

Auto sampler

LVM Series

Compact 2/3-port valve for chemical fluids

- Low particle generation
- Oil-free metal-free
- Isolated structure (diaphragm)
- Available with power saving circuit.

VDW Series

Compact direct-operated 2-port valve

- For air, medium vacuum, water
- Body material: aluminium, PPS, brass, SUS steel
- Low-noise construction.

PSE56□ Series

Pressure sensor for general fluids

- Wetted parts: 316 stainless steel
- IP65
- Analogue output (Voltage/Current).

EQY□H Series

Integrated controller rod type

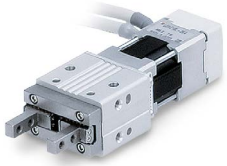
- Body size: 16, 25 and 32 mm
- Stroke: 30 to 500 mm
- Horizontal work load: up to 100 kg
- Vertical work load: up to 46 kg.

EQFS□H Series

Integrated controller slider type

- Body size: 16, 25, 32 and 40 mm
- Stroke: 50 to 1200 mm
- Horizontal work load: up to 80 kg
- Vertical work load: up to 40 kg.

LEH Series



Gripper

- 2 and 3 finger grippers available
- Body size: 10, 16, 20, 25, 32 and 40 mm
- Open and close speed: up to 100 mm/s
- Gripping force: up to 210 N (LEHZ), up to 180 N (LEHF) & up to 130 N (LEHS).

Detector

JSP Series +

Proportional control valve

· Large flow: up to 300 l/min for air, 3 l/min for water
· Flow control according to the current
· Choice of body material: stainless steel, brass
· Suitable for PM detection monitors.

PVQ Series +

Proportional flow control valve

· Flow control of the system
· Flow control according to the current.
· Choice of body material: stainless steel, brass.

VDW Series +

Compact direct-operated 2-port valve

· For detection and makeup gas ON/OFF
· Body material: aluminium, PPS, brass, SUS steel
· Low-noise construction.

AC Series +

Air combination

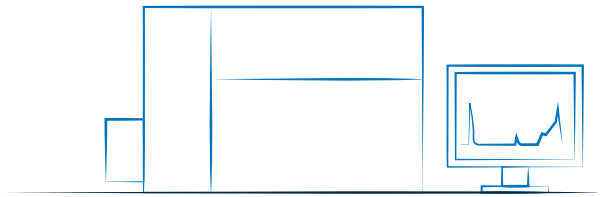
· For pressure control and filtration
· Modular design with uniform body style
· Better visibility & environmental resistance.

SRH Series +

Clean regulator

· For carrier gas pressure control.
· Contamination-controlled SUS steel material
· Oil-free.

Mass Spectrometer – LC-MS/GC-MS



Mass spectrometry systems require an extremely controlled environment: stable vacuum levels, high-purity gas flows, and precise regulation of pressure and flow at multiple stages of ionization, separation, and detection. SMC's technologies are uniquely suited to supporting these conditions, offering products that **ensure cleanliness, ultra-low leakage, thermal stability and long-term operational integrity**.

For gas and vacuum control, SMC provides a complete suite of high-vacuum valves—solenoid or air-operated—capable of internal leak rates as low as 10^{-9} to 10^{-10} Pa·m³/s. These valves ensure the consistent vacuum conditions critical for ion optics, quadrupole assemblies, time-of-flight chambers and high-resolution mass analysis. Our low-noise solenoid valves, precision regulators and proportional flow controllers support stable gas delivery for ion sources, collision cells and auxiliary flows.

SMC's membrane air dryers, capable of achieving exceptionally low dew points (down to -60 °C), play a key role in preventing condensation, contamination and baseline drift in sensitive MS environments. Air preparation units, pressure sensors, compatible fittings and specialised tubing further ensure that every part of the instrument's pneumatic and microfluidic architecture meets the highest purity standards.

From QMS and TOF-MS to ion traps and sector mass analysers, **SMC components help MS manufacturers achieve reliable vacuum integrity, consistent ionization conditions and long-term measurement stability**—allowing end users to perform high-accuracy analyses with confidence.

Where you can use SMC products:

- **Gas line**
- **Dry air**
- **Air line**
- **Vacuum line**
- **High vacuum line**
- **Filtration.**

GC-MS and LC-MS

AC Series

Air combination

- For pressure control and filtration
- Modular design with uniform body style
- Better visibility & environmental resistance.

IDG Series

Membrane air dryer

- For dry air supply
- Power supply not required
- Compatible with low dew points (-60 °C)
- No vibration or heat discharge.

HRSC Series

Non-F-gas (CO_2 refrigerant) refrigerated thermo-chiller

- Up to 11.5 Kw cooling capacity
- Uses natural refrigerant (CO_2) with GWP=1
- Temperature stability: ±0.1 °C.

JSX Series

Compact direct-operated 2-port valve

- For gas ON/OFF control
- Power consumption: 14 % reduction
- Stainless body and coil.

VDW Series

Compact direct-operated 2/3-port valve

- For air, medium vacuum, water
- Internal leakage: 1.3×10^{-6} Pa·m³/s for vacuum
- Body material: aluminium, PPS, brass, SUS steel
- Low-noise construction.

HEF Series

Peltier-type thermo-con

- Low-noise design (37 dB)
- Set temperature range: 10 to 60 °C
- Temperature stability: ±0.1 °C.

XL/XS Series

High-vacuum valve

- XS for solenoid, XL for air operated
- Internal leakage: 1.3×10^{-6} Pa·m³/s for XS, $\times10^{-10}$ for XL
- External leakage: 1.3×10^{-11} Pa·m³/s.

ESD Series

Sintered metal

- For filtration of nebuliser and sheath gas
- SUS material
- Flexible design.

JSP Series

Proportional control valve

- Large flow: up to 300 l/min for air, 3 l/min for water
- Flow control according to the current
- Choice of body material: stainless steel, brass
- Suitable for PM detection monitors.

PVQ Series

Proportional flow control valve

- Flow control of the system
- Flow control according to the current.
- Choice of body material: stainless steel, brass.

KQ2 Series

One-touch fitting line

- From vacuum to 1 MPa
- Body types: total of 51 models
- Selectable surface treatments.

KQG2/KQB2 Series

One-touch metal fitting

- Complies with FDA
- Grease free
- KQG2 for SUS316, KQB2 for brass with electroless nickel-plated.

KFG2 Series

SUS insert fitting

- Complies with FDA
- Grease-free
- SUS316.

TH/TIH FEP- Series

Fluoropolymer tubing

- Fluoropolymer material
- Complies with FDA.

TPH Series

Polyolefin tubing

- Complies with FDA.

Other related products

The chromatography ecosystem extends far beyond flow-control and pressure-regulation components. Fully aware of this, SMC provides a diverse selection of complementary technologies **designed to enhance instrument performance, simplify design and improve ease of maintenance**.

Our resin manifolds, made from PEEK and PFA, offer high chemical resistance and customisable configurations for autosamplers and mobile-phase selection blocks. Pinch valves ensure contamination-free liquid control with rapid tube replacement. Clean air filters deliver 0.01 µm filtration performance.

SMC also provides nitrogen generators requiring only compressed air. These auxiliary components help instrument manufacturers create complete, robust systems that meet the stringent purity and durability requirements of advanced analytical environments.

AK Series +

Regulator

- Single or two-stage regulator
- High inlet pressure type: max. 3500 psig (24.1 MPa)
- Body material: stainless steel or brass
- Corrosion-resistant Ni-Cr-Mo alloy (2.4602) internals available.

LPV Series +

Pinch valve solenoid type

- Easy tube replacement
- Highly resistant to contamination.

Resin manifold

- For mobile phase and auto sampler
- High chemical resistance (PEEK/PFA)
- Compact design and custom design available.

AP Series +

Diaphragm valve

- Suitable for UHP gas supply line
- Body material: 316L SS secondary remelt
- Air-operated type/Manually-operated type
- High pressure type: max. 3000 psig (20.7 MPa).

SFD Series +

Clean air filter

- Nominal filtration rating: 0.01 µm with efficiency of 99.99 %
- Initial pressure drop: 0.03 MPa.
- SUS body available.

NMG Series +

Nitrogen generator

- Nitrogen concentration: max. 99.9 or more (type-1)
- Outlet air flow rate: 20 l/min (ANR) (type-1)
- Only needs a compressed air supply.

KT Series +

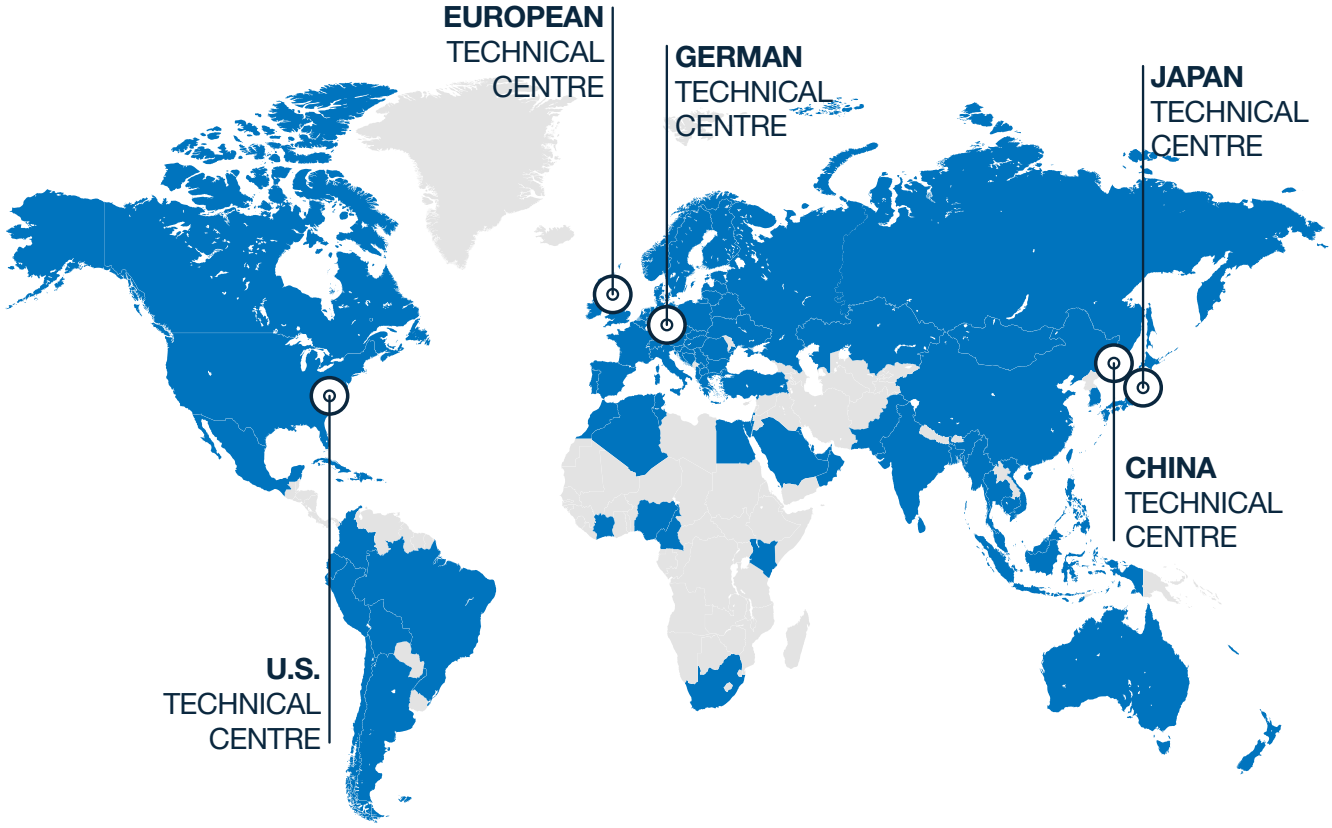
Regulator

- Single stage regulator
- Inlet pressure: max. 10000 psig (69 MPa)
- Body material: stainless steel or brass
- Self-relieving or non-relieving available.

Our support network

SMC's worldwide commitment

One of the things we do best at SMC is **being close to our customers**. Local support, on a global scale.



With **support** in over **500 locations** across **80 countries** and regions **worldwide**, our sales force of **7000 experts** maintains **close communication with customers**.

SMC Business Continuity Plan

Sustainable growth also means ensuring uninterrupted operations

We are committed to ensuring that SMC is prepared for any emergency and that our business activities will not stop in the event of such circumstances. SMC aims to fulfil our product supply responsibilities and maintain our customers' trust by contributing to both sustainable growth and the expansion of technological innovations.

SMC, as a comprehensive manufacturer of automatic control equipment that supports automation, is able to promptly provider products that meet our customers' needs anywhere in the world.

Production BCP
Ensure customer order fulfilment

Reliable delivery for you thanks to our 9 global logistic centres and 38 production sites worldwide. Moreover, flexibility to rapidly respond to any sudden change in the manufacturing environment.

Finance BCP
Safe & Solid financial base

In the event of an emergency, SMC can provide a safe and solid financial base (with cash, deposits, and equity capital) that will sufficiently cover the working capital and funds needed to rebuild buildings and the equipment required for business continuity. This is done to provide peace of mind to our customers and workers alike.

Information security BCP
Vital data kept safe

Strengthen information security for protection against computer viruses and cyberattacks, plus the installation of data centres to establish a disaster recovery system. Your information is safe with us.

Engineering BCP
Consistent technical support

2,000 engineers at our 5 technical centres around the globe.

Sales BCP
Consistent sales support

7,000 sales engineers worldwide ready to recommend the best solution for you. Over 80 global locations to make sure that wherever you are, we are there too.

Discover more

Expertise
Passion
Automation

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