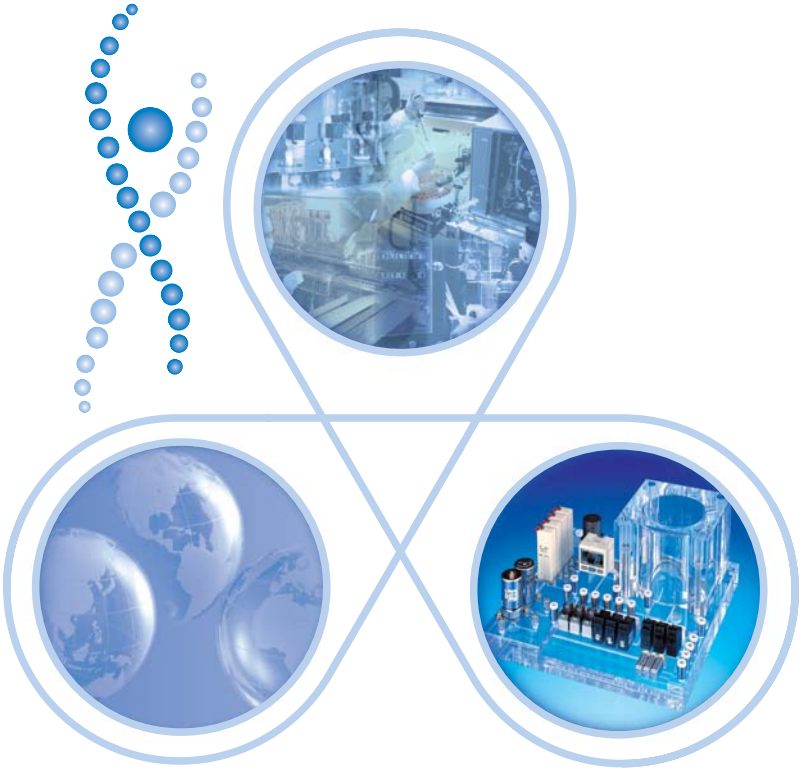
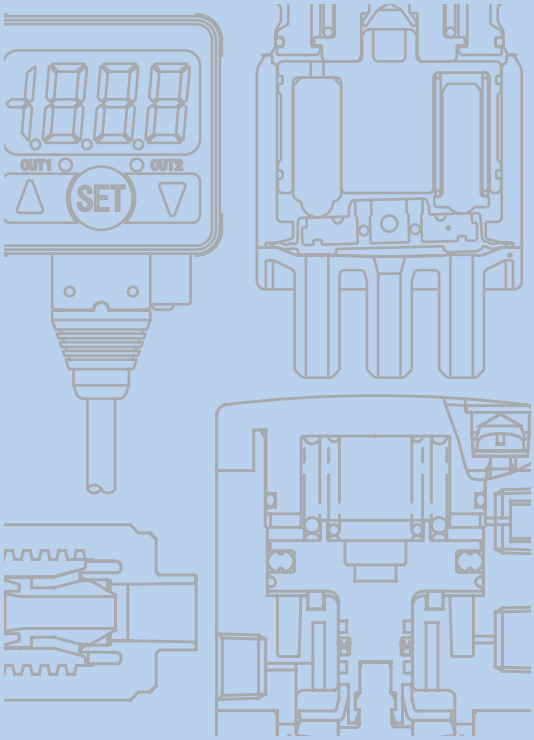
CAT.M01Ⓒ

SMC Life Science



Analytical•Instrumentation•Microfluidics

SMC Life Science



Tsukuba Technical Centre

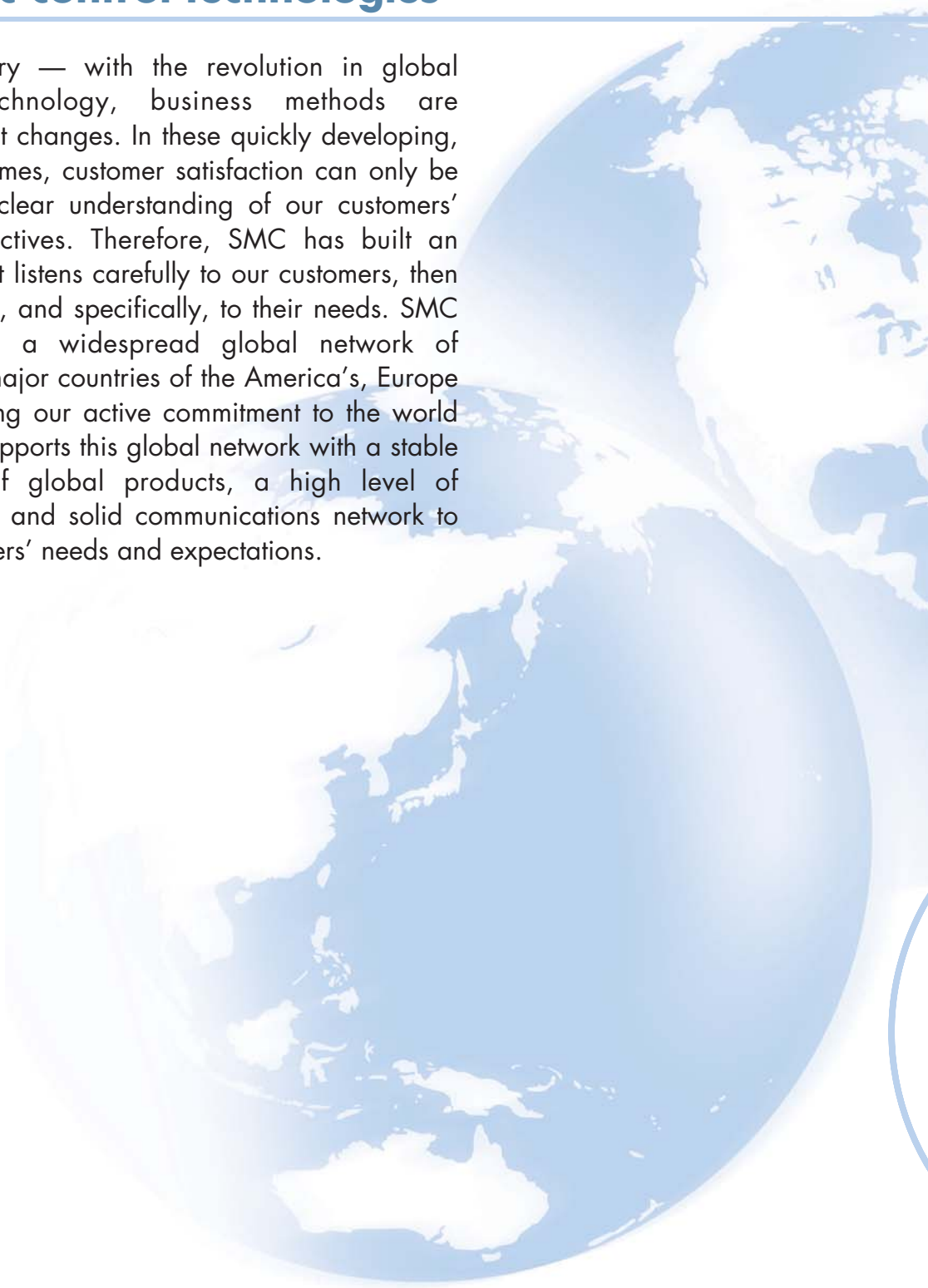
Table of Contents

Corporate Guide

Life Science Products

SMC is pursuing customer satisfaction and supporting automation worldwide through the design and production of the worlds most advanced pneumatic and fluidic control technologies

The 21st century — with the revolution in global information technology, business methods are undergoing great changes. In these quickly developing, ever changing times, customer satisfaction can only be achieved by a clear understanding of our customers' goals and objectives. Therefore, SMC has built an organization that listens carefully to our customers, then responds quickly, and specifically, to their needs. SMC has established a widespread global network of locations in all major countries of the America's, Europe and Asia showing our active commitment to the world market. SMC supports this global network with a stable supply chain of global products, a high level of technical service and solid communications network to meet our customers' needs and expectations.



Technical Development

Our engineering staff now exceeds 1,000 and are located in Technical centres in Japan, United States and Europe.

Quick, clear and detailed responses to customer requests are communicated through our sales group, and our engineers are constantly on the alert for new trends that lead to world class new products.

Sales and Communication Network

Local subsidiaries have been established in 43 countries worldwide, with over 230 sales offices.
Our sales force of over 4,000 maintains close communication with customers.

By establishing a strong base in each country and region with a large experienced sales force, SMC provides the best possible service in the industry. Maintaining close communication with our customers throughout the world keeps our engineering teams and our products at the leading edge of industry.

Production and Supply

Our product line offers 10,000 basic models with over 560,000 variations. Global production facilities provide a stable supply of products to customers in all markets.

The vast array of products satisfies nearly every application. Fast delivery of these high quality products at competitive costs is accomplished through our unique production system, and by maximizing our local production capabilities, a stable supply of product is guaranteed.

Technical Development

To provide a global engineering network technical centres have been established in the United States and Europe, together with Japan

Following the basic concept of developing products from the customer's standpoint, SMC is dedicating a large staff and large financial resources to research and development. This is undertaken to promote research on basic technology with future potential and to produce products that are adapted to the needs of the marketplace in a timely manner. To provide positive and speedy response to the problems presented by customers throughout the world, technical centers have been established in the United States and Europe, creating a powerful global engineering network with Japan as its nucleus. All of the technical centers share information and maintain close contact in order to quickly respond to requirements locally, and to offer the same high quality of technical service throughout the world.

The Tsukuba Technical Center has expanded to a new twin-tower building from where it will oversee worldwide technical development.

The Tsukuba Technical Centre has expanded into its newly completed twin-tower building.
At the center of SMC's research and development division, a staff of 1,000 is engaged in research and development activities for the entire world.

Isolation Liquid 2/3 Port Valve Series LVM

2/3 Port Solenoid Valve Series VDW

3 Port Solenoid Valve Series V060

3 Port Solenoid Valve Series V100

3 Port Solenoid Valve Series VQ100

Ultra Compact Valve Series S070

Proportional Valve Series PVQ

Electric Actuator Series LJ, LG, LX

Electric Gripper

Digital Pressure Switch Series ISE/ZSE

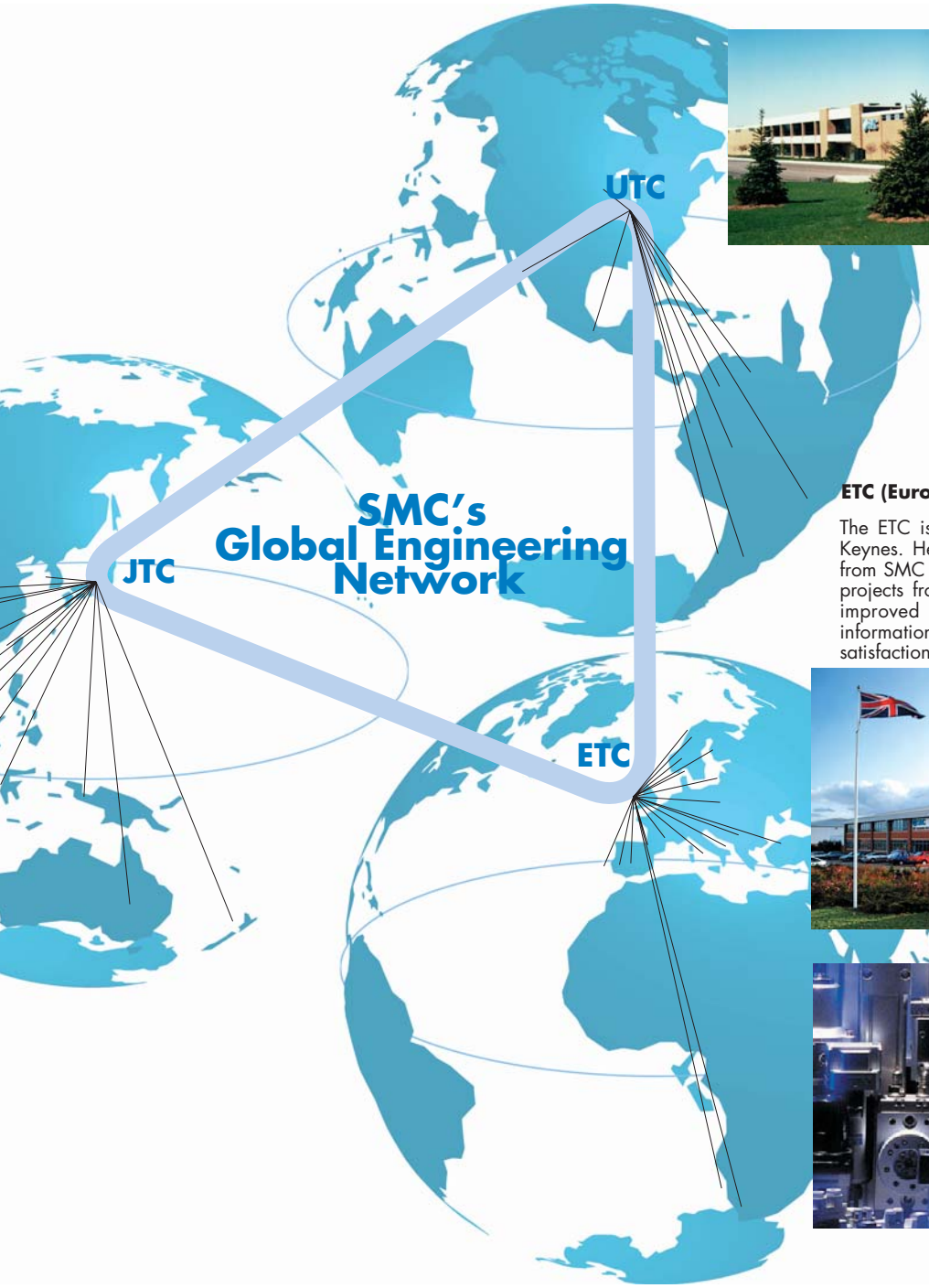
Compact Electro-Pneumatic Regulator. Series ITV

Menbrane Air Dryer Heatless Air Dryer. Series IDG/ID

Custom Engineered Plastic Manifold & Valve Technology

UTC (US Technical Centre) U. S. A.

The UTC has been established to meet the project requirements of customers in North America. The UTC has approximately 100 engineers available for customer support.



ETC (European Technical Centre) U. K.

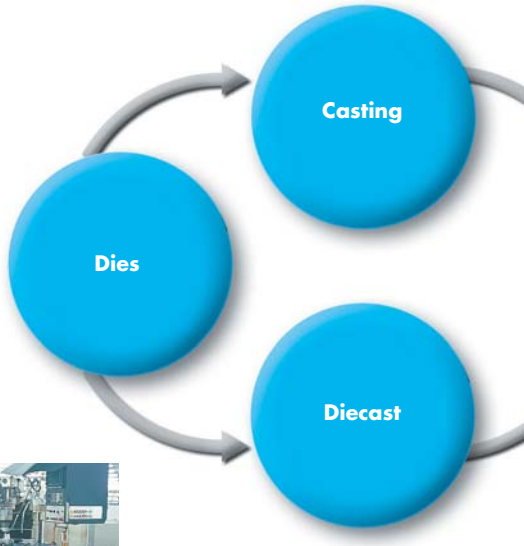
The ETC is located close to SMC's UK factory in Milton Keynes. Here, approximately 100 experienced engineers from SMC European subsidiaries are gathered to work on projects from their respective countries. This has enabled improved communication, faster and more accurate information exchange, and a higher level of customer satisfaction.

Production and Supply

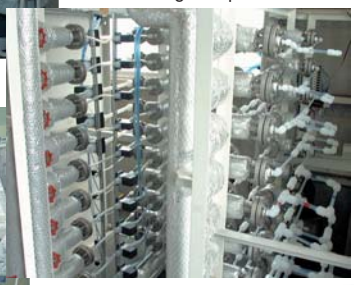
SMC's unique production system achieves high quality, optimised cost and short lead times.

SMC products reflect a market trend towards greater diversification with a vast array of 10,000 basic models and over 560,000 variations. This is made possible by an integrated production system that includes casting, machining, surface treatment, coating, assembly and inspection, all performed in SMC's factories. Furthermore, we use a unique production control system in which instructions for all production operations are performed automatically based on information from orders received. As a result, SMC can secure high quality, optimised cost and a short lead time of its product.

SMC's integrated production system




Laboratory


High temperature test line


Clean room


Test equipment for hydrofluoric and nitric acids


Dies


Aluminum casting machine line

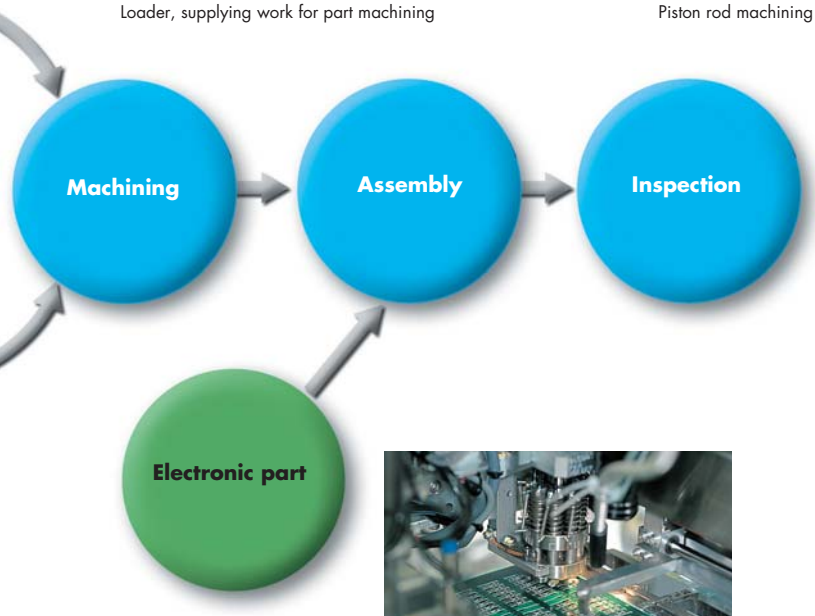

Tool control


Machining line (6-axis automatic machine tools)

Loader, supplying work for part machining

Piston rod machining line

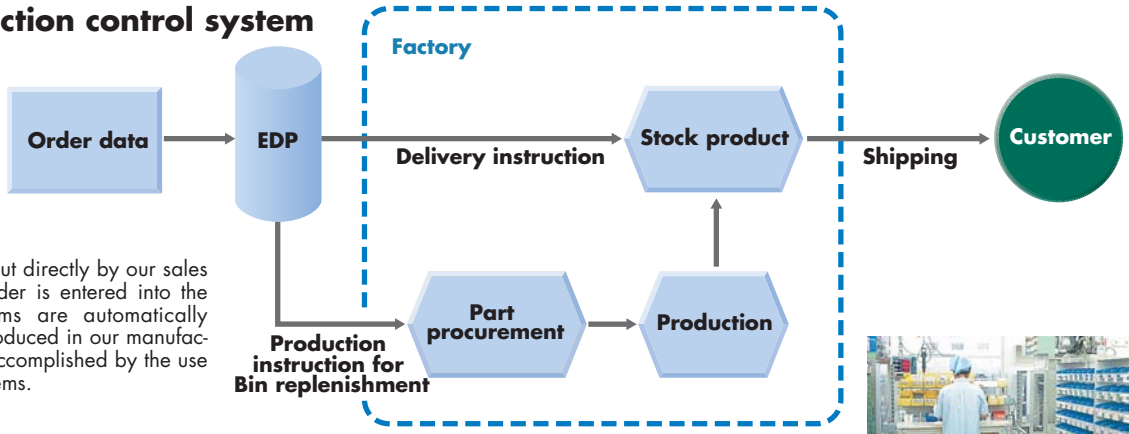
Coil winding



Assembly and inspection of temperature controller

IC chip, being mounted on printed board

SMC's production control system



Customer orders are input directly by our sales personnel. Once the order is entered into the SMC EDP system, items are automatically drawn from stock, or produced in our manufacturing facilities. This is accomplished by the use of bin management systems.

Bin control shelf

Production and Supply

A global production network supports a stable and continuous supply of high quality products throughout the world.

SMC delivers products for world markets from five key factory locations in Japan, in the Tsukuba district of Ibaragi prefecture and the Soka district of Saitama prefecture, as well as from other key locations in China and Singapore. Additionally, to respond quickly and with increased flexibility to the demands of the local market, overseas production facilities have been established in SMC subsidiaries around the world.

Production Facilities (Japan)

Soka Factory #1, New Building

Soka Area (13 Factories/Saitama Prf.)

Soka #1 Factory & #2 Factory
Total Land Area: 24,945m²
Floor Space: 30,050m²

Overseas Local Production Facilities

Canada SMC Pneumatics(Canada)Ltd.

U.S.A SMC Corporation of America (Indianapolis)

U.S.A SMC Corporation of America(Los Angeles)

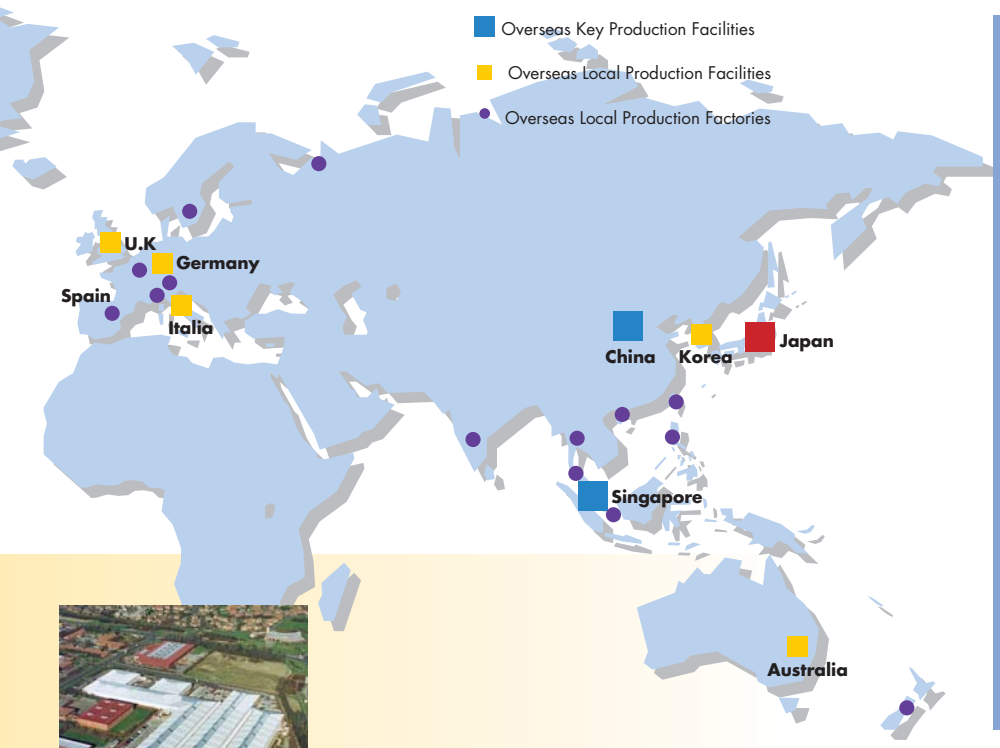
Tsukuba Factory (Ibaragi Prf.)
Tsukuba #1 Factory & #2 Factory
Total Land Area: 57,191m²
Floor Space: 45,094m²

Kamaishi Factory (Iwate Prf.)
Total Land Area: 82,657m²
Floor Space: 41,623m²

Tohno Factory (Iwate Prf.)
Total Land Area: 79,428m²
Floor Space: 10,737m²

Yamatsuri Factory (Fukushima Prf.)
Total Land Area: 124,227m²
Floor Space: 26,298m²

Production Facilities (Japan)
Overseas Key Production Facilities
Overseas Local Production Facilities
Overseas Local Production Factories



Overseas Key Production Facilities

SMC (China) Co., Ltd.
Total Land Area: 82,940m²
Floor Space: 55,352m²

SMC Manufacturing (Singapore) Pte. Ltd.
Total Land Area: 23,942m²
Floor Space: 18,424m²

U.K SMC Pneumatics (U.K) Ltd.

Italy SMC Italia S.p.A

Germany SMC Pneumatik GmbH

Korea SMC Pneumatics Korea Co.,Ltd.

Australia SMC Pneumatics (Australia) Pty.Ltd.

Overseas Local Production Factories

North/South America

Chile	SMC Pneumatics (Chile) S.A.
Mexico	SMC Corporation (Mexico), S.A.de C.V.
Argentina	SMC Argentina S.A.

Europa/Africa

Switzerland	SMC Pneumatik AG
Austria	SMC Pneumatics GmbH (Austria)
Sweden	SMC Pneumatics Sweden AB
France	SMC Pneumatique S.A.
Spain	SMC España, S.A.

Asia/Oceania

Australia	SMC Pneumatics (Aust.)Pty.Ltd.
Singapore	SMC Pneumatics (S.E.A.)Pte.Ltd.
Malaysia	SMC Pneumatics (S.E.A.)Sdn.Bhd.
New Zealand	SMC Pneumatics (N. Z.) Ltd.
Hong Kong	SMC Pneumatics (Hong Kong) Ltd.
Taiwan	SMC Pneumatics (Taiwan)Co.,Ltd.
Philippines	SMC Pneumatics (Phils.),Inc.
Thailand	SMC Thailand Ltd.
India	SMC Pneumatics (India) Pvt.Ltd.

Sales and Communication Network

Our goal of 20% global market share has been achieved, with local subsidiaries in 43 countries across the world.

Taking its first step in Australia in 1967, SMC continued to move quickly into the international marketplace, and has steadily established local subsidiaries in the major countries around the world. The current total has reached 230 locations in 43 countries. With the expansion of its international network, SMC has earned a solid reputation as a reliable international brand, and has exceeded the goal of "20% global market share". We will continue to view the world as a single market and further develop our sales organization with even greater energy to provide "customer satisfaction" by responding accurately to individual demands of different customers in countries and regions around the world.

Canada SMC Pneumatics (Cnada) Ltd.

U.S.A SMC Corporation of America (Indianapolis)

U.S.A SMC Corporation of America.(Los Angeles)

Mexico SMC Corporation (Mexico), S.A.de

North/South America

U.S.A	SMC Corporation of America
Chile	SMC Pneumatics(Chile) S.A.
Mexico	SMC Corporation(Mexico), S.A.de C.V.
Canada	SMC Pneumatics(Canada)Ltd.
Argentina	SMC Argentina S.A.
Bolivia	SMC Pneumatics Bolivia S.r.l.
Venezuela	SMC Neumática Venezuela S.A.
Brazil	SMC Pneumáticos do Brasil Ltda.

U.K SMC Pneumatics (U.K)

Germany SMC Pneumatik

China SMC (China)

Italy SMC Italia

France SMC Pneumatique

Spain SMC España, S.A.

Korea
SMC Pneumatics Korea Co.,Ltd.

Taiwan SMC Pneumatics (Taiwan)Co.,Ltd.

Singapore SMC Pneumatics

Europa/Africa

Italy	SMC Italia S.p.A
U.K	SMC Pneumatics (U.K) Ltd.
Germany	SMC Pneumatik GmbH
Switzerland	SMC Pneumatik AG
Austria	SMC Pneumatics GmbH (Austria)
Sweden	SMC Pneumatics Sweden AB
France	SMC Pneumatique S.A.
Ireland	SMC Pneumatics (Ireland) Ltd.
Spain	SMC España, S.A.
Czech Republic	SMC Industrial Automation CZ s.r.o.
Hungary	SMC Hungary kft.
Romania	SMC Romania S.r.l.
Slovenia	SMC Industrijska Avtomatika d.o.o.
Slovakia	SMC Priemyselna Automatizacia Spol s.r.o.
Finland	SMC Pneumatics Filand OY
Norway	SMC Pneumatics Norway AS
Russia	SMC Pneumatik LLC
Denmark	SMC Pneumatik A/S
Poland	SMC Industrial Automation Polska Sp.z.o.o
Latvia	SMC Pneumatics Latvia SIA
Estonia	SMC Pneumatics Estonia Oü
The Netherlands	SMC Pneumatics B.V.
Greece	S. Parianopoulos S.A. (Distributor)
South Africa	Hyflo Southern Africa(Pty.)Ltd.(Distributor)

Asia/Oceania

Australia	SMC Pneumatics (Aust.) Pty.Ltd. SMC
Singapore	Pneumatics (S.E.A.)Pte.Ltd.
Malaysia	SMC Pneumatics (S.E.A.)Sdn.Bhd.
New Zealand	SMC Pneumatics (N. Z.) Ltd.
Hong Kong	SMC Pneumatics (Hong Kong) Ltd.
Taiwan	SMC Pneumatics (Taiwan)Co.,Ltd.
Philippines	SMC Pneumatics (Phils.),Inc.
China	SMC (China) Co.,Ltd.
Thailand	SMC Thailand Ltd.
India	SMC Pneumatics (India) Pvt.Ltd.
Korea	SMC Pneumatics Korea Co.,Ltd.
Indonesia	PT SMC Pneumatics Indonesia
Israel	Baccara Geva (Distributor)
Turkey	Entek Pnömatik San.ve Tic.Ltd.Sti. (Distributor)
Japan	SMC Corporation

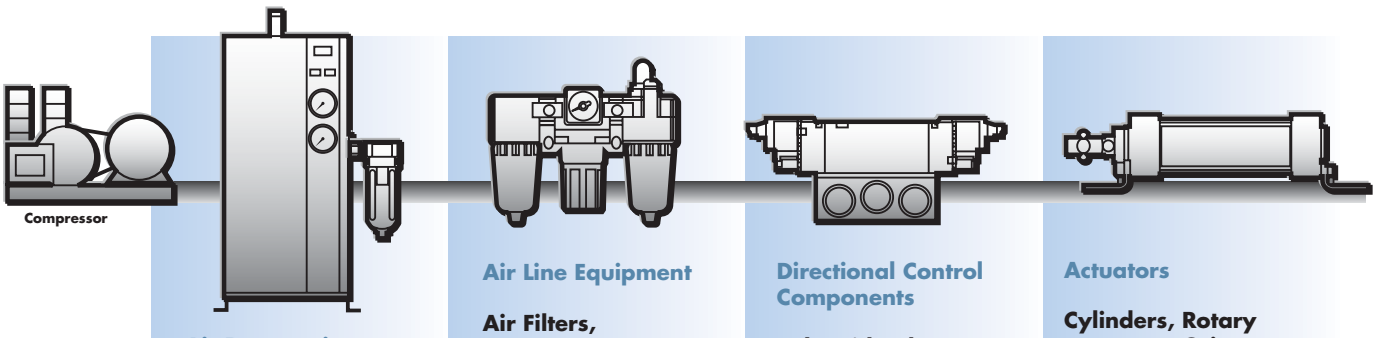
SMC Pneumatics (Australia) Pty. Ltd.

● Head office
● Branch office

10,000 basic models, and 560,000 variations. A wide range of variations to accommodate diverse applications.

A complete line-up of pneumatic control systems

Customers' needs, today, are in a state of transition, from standardization to diversification. As a general supplier of pneumatic components, SMC provides the ideal products for multiple applications and complete systems. Therefore, a broad range of pneumatic variations is offered for each system component. This complete array of products results in SMC pneumatic systems that are capable of specifically meeting infinitely diverse requirements.



Air Preparation Equipment

Air Dryers, Mist Separators
This equipment provides clean dry air through dehumidification and filtration.

Air cleaning equipment

Air Line Equipment

Air Filters, Regulators & Lubricators
This equipment removes foreign particles from compressed air and pressure control to extend life and reduce compressed air costs.

Air line equipment

Directional Control Components

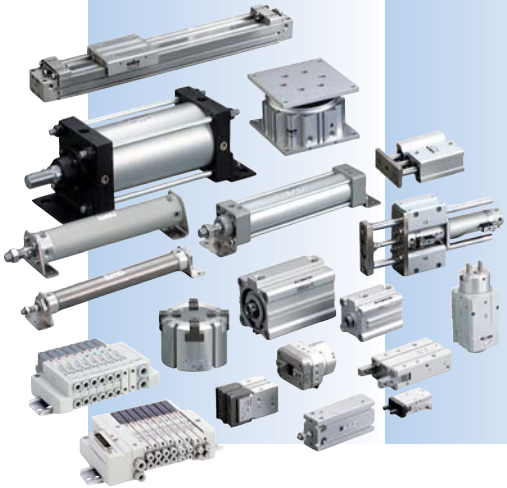
Solenoid valves
These components direct the flow of compressed air that is supplied to cylinders and other actuators.

Solenoid valves

Actuators

Cylinders, Rotary actuators, Grippers
These components use the compressed air switched by directional control components to create force for linear and rotary action.

Air cylinders, Air grippers



SMC products are moving into new-peripherals and pneumatics-related markets.

During the last twenty years pneumatics has moved into numerous industrial applications.

SMC products are not confined to the limits of conventional pneumatic control components, but are reaching out to cover peripheral markets as well. SMC products are developed to satisfy unique requirements, and we are committed to developing products for new markets to satisfy all of our customers.

High vacuum products

Clean wet products

Clean room products

Wafer transfer products

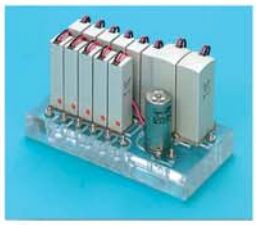
Process/Temperature control products

New technology products

Composite Valve Manifold for Air, Gas and Liquid

Custom Engineered Plastic Manifold & Valve Technology






- Reduced Space
- Reduced Weight
- Reduced Installation Time and Error
- Reduced Cost of Ownership

Main specifications of Plastic Manifold Note)

Material	Acrylic, ULTEM, PVC, Polysulphone, etc.
Fluid	Air, Gas and Liquid
Operating pressure	-100kPa to 0.7MPa (30 inHg to 100psi)
Operating temperature	0 to 40°C (32 to 104°F)
Ambient temperature	-5 to 50°C (23 to 122°F)

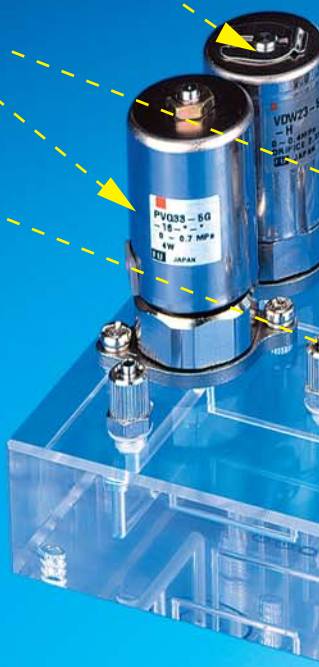
Note) Contact SMC for details

Series LVM
Isolation liquid valve with custom connection

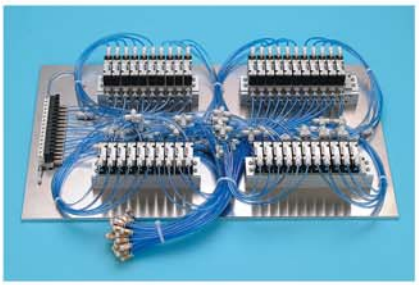
Series VDW
Liquid valve

Series PVQ
Proportional valve

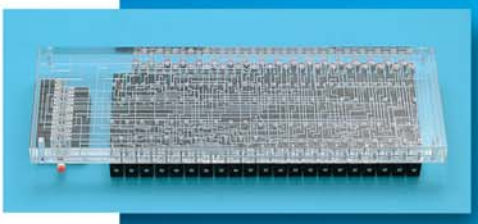
Series V100
Air pilot valve



Conventional System



Installation of valves on plastic manifold

Custom machined/bonded plastic manifold

SMC offers you the benefit of single Source Supply of plastic manifolds and valves!!

- The widest selection of valves to suit the customers's exact specifications!
- The best in-house design resources enables integrated and compact manifold design!
- The best Before/After-sales services through world-wide network!

Series ISE/ZSE
Programmable liquid/air pressure switch with digital display

Series VQ100
Air pilot valve

Series S070
Ultra Compact Valve
7mm width valve

Ideal for equipment in

- Medical Industry
- Analytical Industry
- Chemical Industry

Tested and Packed to Customers Specifications

Quality Assurance

Reliable product quality in the global market

To enable our customers throughout the world to use our products with even greater confidence, SMC has obtained certification for international standards "ISO9001" and "ISO14001", and have created a complete structure for quality assurance and environmental controls. SMC products aspire to meet its customers' expectations while also considering the company's contribution in society.

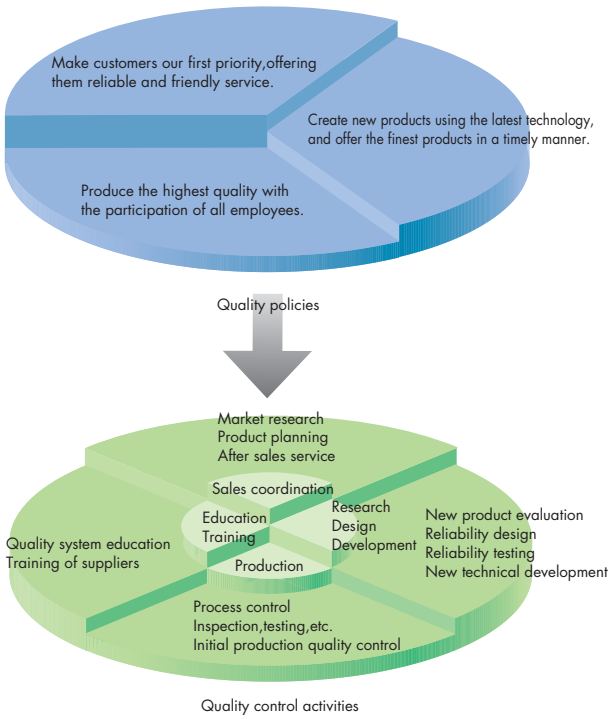
ISO9001 Quality management system

This is an international standard for quality control and quality assurance. SMC has obtained a large number of certifications in Japan and overseas, providing assurance to our customers throughout the world.

ISO14001 Environmental management system

This is an international standard related to environmental management systems and environmental inspections. While promoting environmentally friendly automation technology, SMC is also making diligent efforts to preserve the environment.

SMC's quality control system



ISO certification obtained

Applicable Products and Services Design,development and manufacture of the following products:

Miniature 3, 4 and 5 port solenoid valves for pneumatics.
Standard compact cylinders for pneumatics.
Standard miniature cylinders for pneumatics.
Modular type pressure control valves for pneumatics.
Pneumatic fittings.
Electro-pneumatic positioners for pneumatics.
Miniature rotary actuators for pneumatics.
Solid state auto switches.
Constant temperature circulation equipment for semiconductors.
Vacuum ejectors(miniature type)

Related Facilities Included in the Registration

Tsukuba Technical Centre (design,development)
Soka Factory No.1 (includes distribution center&Matsubara factory)
Soka factory No.2 (manufacturing)
Tsukuba factory No.1 (manufacturing)
Tsukuba factory No.2 (manufacturing)
Kamaishi factory (manufacturing)
Yamatsuri factory (manufacturing)
Tono factory(manufacturing)
SMC Australia [ISO 9001]
SMC China [ISO 9002]
SMC Germany [ISO 9001]
SMC Hong Kong [ISO 9002]
SMC India [ISO 9002]
SMC Italy [ISO 9002]
SMC Italy (Sud) [ISO 9001/ISO14001]
SMC Korea [ISO 9002]
SMC New Zealand [ISO 9001]
SMC Singapore [ISO 9002]
SMC Spain [ISO 9002]
SMC Sweden [ISO 9002]
SMC Switzerland [ISO 9002]
SMC Taiwan [ISO 9002]
SMC UK [ISO 9001/ISO14001]
SMC US [ISO 9001]

SMC's Activities for Green Procurement

EU directives

Following the announcement of the latest EU (European Union) directive on environmentally harmful substances, customers requesting Green Procurement options has increased substantially.

WEEE directive

Waste **E**lectrical and **E**lectronic **E**quipment

* Directive for collecting and recycling electrical and electronic equipment waste

RoHS directive

The **R**estriction **o**f the use of certain **H**azardous **S**ubstances in electrical and electronic equipment

* Directive for restricting 6 specific substances contained in electrical and electronic equipment

Mercury, Lead, Cadmium, Hexavalent Chromium, PBB, and PBDE

RoHS directive

The RoHS directive compels EU membership countries to abolish or reduce the use of heavy metals such as mercury, lead, cadmium and hexavalent chrominum as well as bromic fire retardants such as PBB and PBDE by June 30, 2006.

Although industrial products, including pneumatic products, are not subject to WEEE & RoHS directives, SMC nonetheless strives to meet the needs of our customers.

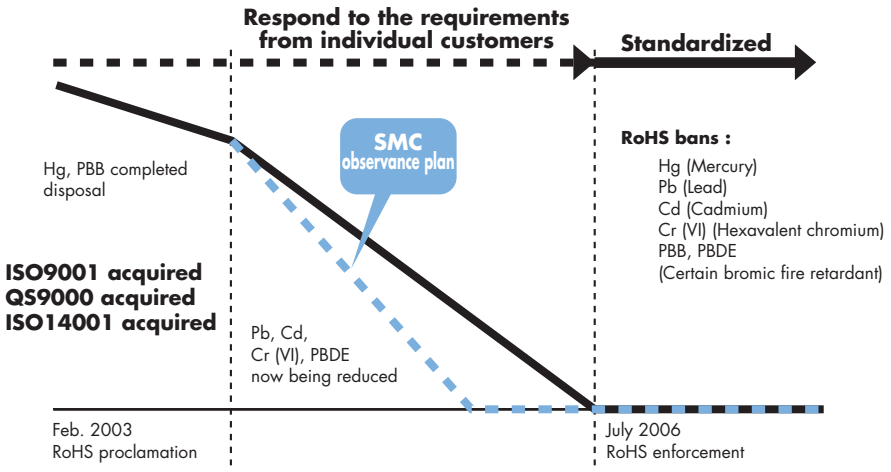
February 2003 RoHS directive proclamation

↓

July 2006 RoHS directive enforcement

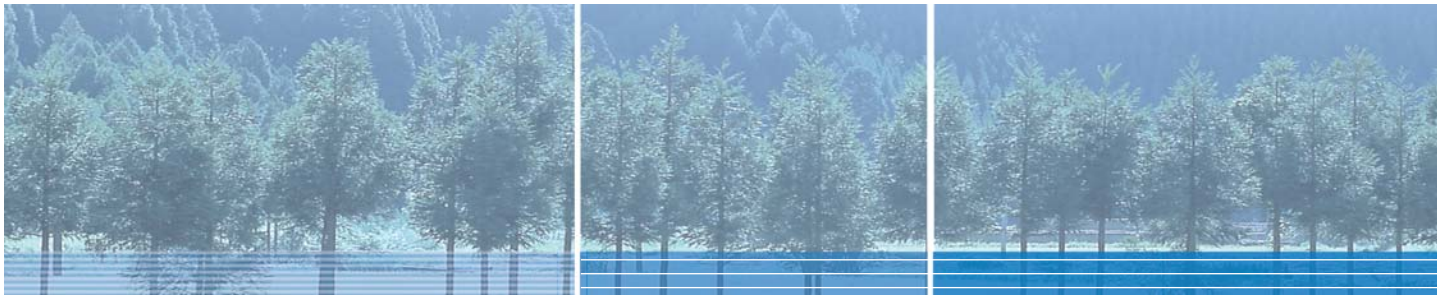
The sale of products containing environmentally hazardous substances subject to the RoHS directive will be prohibited in the EU.

SMC's Product Supply Plan Based On the RoHS Directive



Please consult us when the products containing environmentally hazardous substances out of the scope of the RoHS directive or domestic legal requirements, etc. are required.

RoHS-compliant product supply plan for customers who need them.



Flow Characteristics and Measurement

Liquids

Flow rate:	$Q = N_1 \cdot C_V \cdot \sqrt{\frac{\Delta P}{SG}}$
Pressure drop:	$P = \frac{Q^2 \cdot (SG)}{N_1^2 \, C_V^2}$

Q = Flow rate m³/h
ΔP= Pressure drop (bar, absolute) / 1bar ~ 0.1 MPa
N_1 = Conversion value 0.865
G = Relative density, [water 1.0]
C_V = Valve flow rate

Relative density of liquids

Liquid	Relative density related to water G at 20°C
Acetone	0.792
Alcohol	0.792
Benzene	0.902
Gasoline	0.902
Kerosene	0.815
Water	1.000

Gases

$$Q = N_2 \cdot C_V \cdot \sqrt{\frac{P_1^2 \; P_2^2}{(SG) \cdot T}}$$

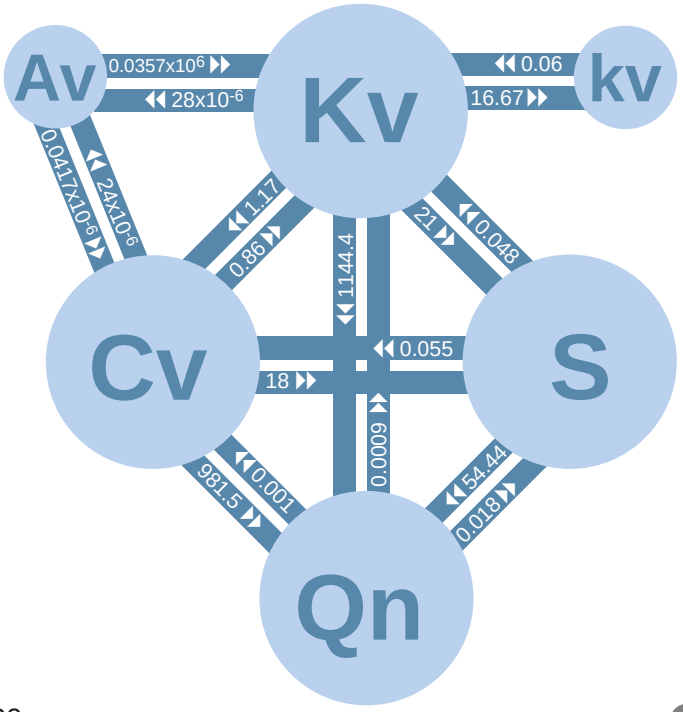
$$^{(1)}Q = \frac{N_3 \cdot C_V \cdot P_1}{\sqrt{(SG) \cdot T}} \qquad ^{(1)}P_2 \leq \frac{P_1}{2}$$

Q = Flow rate m³/h
C_V = Valve flow rate
N_2 = Conversion value for 295
N_3 = Conversion value for 250
T = Gas temperature °K (°C = + 273)
ΔP = (P_1— P_2) Pressure drop in bar (absolute) / 1 bar ~ 0.1 MPa
P_1 = Supply pressure in bar (absolute)
P_2 = Output Pressure in bar (absolute)
G = Relative density

Relative density of gases

Liquid	Relative density related to water G at 20°C
Ammonia	0.587
Argon	1.38
Acetylene	0.907
Butane	2.07
Helium	0.137
Carbon dioxide	1.529
Methane	0.554
Propane	1.562
Oxygen	1.105
Sulphur dioxide	2.264
Nitrogen	0.967
Hydrogen	0.0695

Conversion factors for different flow units



The **Kv** conversion value indicates the quantity of warm water (from 5 to 40°C), expressed in m³/h, flowing through a valve which causes a pressure drop of 1 bar.

kv conversion value is equivalent to the Kv mentioned above, however converted to l/min.

The **Cv**-value common in the USA indicates, the quantity of water at 60°F, expressed in Gal/min, flowing through a valve which causes a pressure drop of 1 psi.

The **Av** flow rate coefficient is indicated in m².

Qn indicates the volumetric flow rate of compressed air in l/min passing through a valve when the supply pressure is 6 bar and the pressure drops 1 bar.

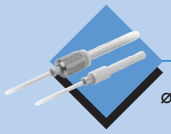
Equivalent cross-section **S** (mm2) This indication determined by air measurement refers to a valve or a whole arrangement of elements and corresponds to the cross-section area of the pertinent orifice plate opening with same flow.

SMC Life Science

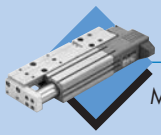
Chemical/Liquid Valves

Air Valves

Air preparation

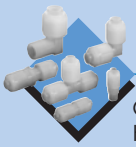


Fittings & Tubing



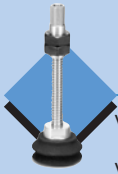
Actuators

Instrumentation



High Purity Components

Temperature Control Equipment



Vacuum Equipment

Super Compact Direct Acting 2/3 Port Solenoid Valve for Chemicals Series LVM

Meeting the most advanced needs of process control

■ Valve chamber volume of 20 μℓ or less

Body designed for smooth flow with minimal dead volume and superior elimination of residual liquid.

Internal volume — LVM11: 11 μℓ or less
LVM1□R, LVM11□: 20 μℓ or less

∗ The internal volume enclosed by the body and the diaphragm

■ **Wetted part material**

Body and plate: PFA or PEEK

Diaphragm: EPDM, FKM or FFKM can be selected.
Note) FFKM is available as a special order.

■ **Service life: 10 million cycles or more.** Note) Based on SMC test conditions.

■ **Power consumption: 1W** (LVM11) **/ 1.5W** (LVM1□R,LVM11□)

■ **Lightweight: 30g** (LVM11) **/ 34g** (LVM1□R,LVM11□)

■ **Valve width: 13mm**

Valve width 9.5 mm (LVM090), 20 mm (LVM200) are also available.

Series LVM090
Valve width: 9.5 mm

Series LVM200
Valve width: 20 mm

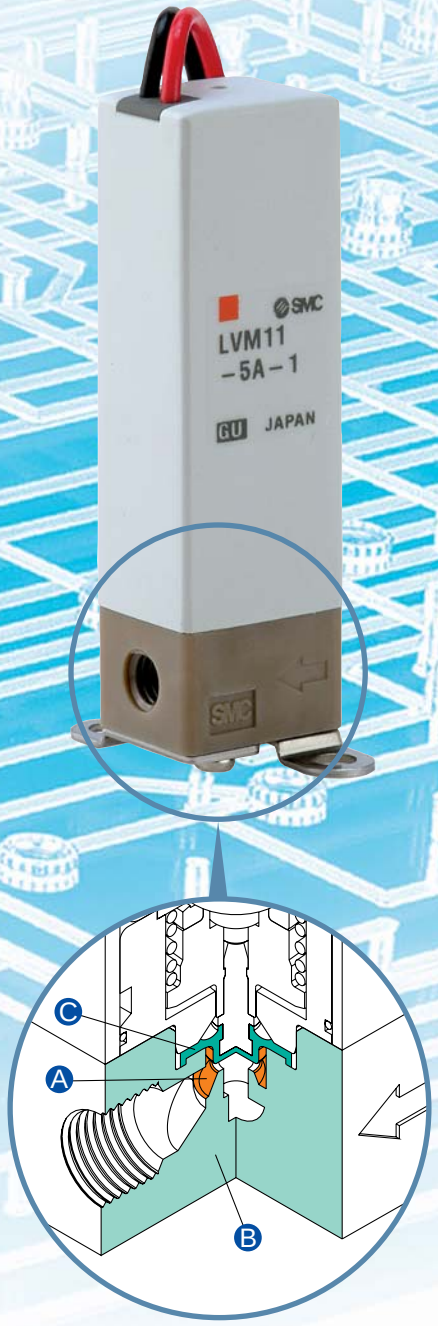
Specifications

Series	LVM090	LVM100	LVM200
Max. operating pressure	0.2 MPa	0.25 MPa	0.3 MPa
Orifice diameter	1.1 mm	1.4 mm	2 mm
Flow characteristics (Cv factor)	0.018	0.03	0.065

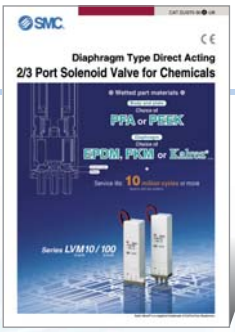
For detailed dimensions, specifications, and delivery, please contact SMC.

■ **Applications: Various analytical and inspection equipment**

Analytical instruments for blood, urine, immune system, etc.

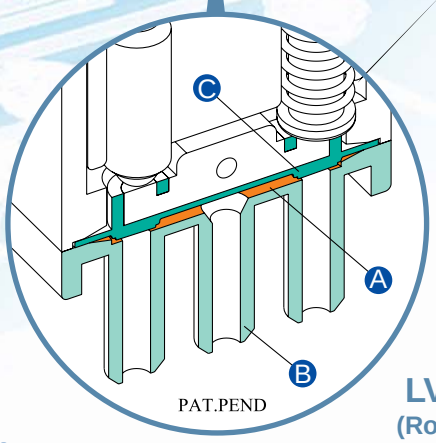


LVM11



LVM10/100
ES70-30

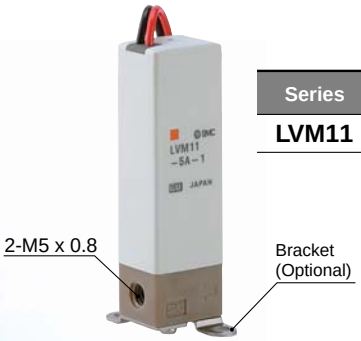
Series LVM10/100



LVM1□□
(Rocker type)

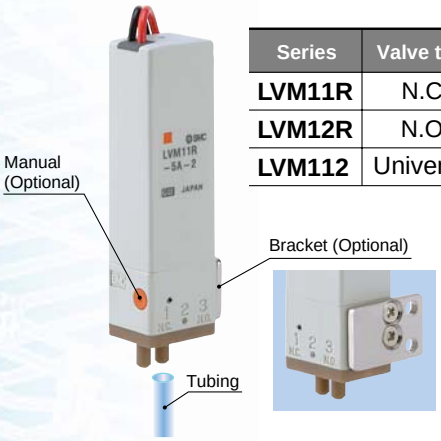
- A Internal volume
- B Body and plate material: PEEK
- C Diaphragm material: EPDM, FKM or Kalrez®

Body ported type



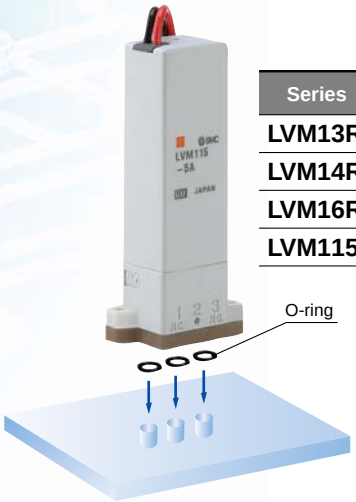
Series	Valve type	Port	Orifice diameter	Cv factor
LVM11	N.C.	2 port	1.5 mm	0.04

Tubing type



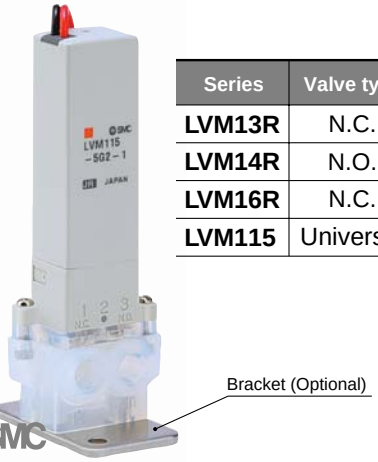
Series	Valve type	Port	Orifice diameter	Cv factor
LVM11R	N.C.	2 port	1.4 mm	0.03
LVM12R	N.O.			
LVM112	Universal	3 port		

Base mounted type (Without sub-plate)



Series	Valve type	Port	Orifice diameter	Cv factor
LVM13R	N.C.	2 port	1.4 mm	0.03
LVM14R	N.O.			
LVM16R	N.C.			
LVM115	Universal	3 port		

Base mounted type (With sub-plate)



Series	Valve type	Port	Orifice diameter	Cv factor
LVM13R	N.C.	2 port	1.4 mm	0.03
LVM14R	N.O.			
LVM16R	N.C.			
LVM115	Universal	3 port		

Super Compact Direct Acting 2/3 Port Solenoid Valve for Chemicals Series LVM

Specifications

Model	Body ported type	Body ported type (Tubing type)			Base mounted type			
	LVM11	**LVM11R**	**LVM12R**	**LVM112**	**LVM13R**	**LVM14R**	**LVM16R**	**LVM115**
Valve construction	Diaphragm type direct operated poppet	Diaphragm type direct operated poppet (Rocker type)						
Valve type	N.C.	N.C.	N.O.	Universal	N.C.	N.O.	N.C.	Universal
Number of ports	2	2		3	2			3
Fluid Note 1)	Air, Water, Pure water, Diluent, Cleaning solvent							
Operating pressure range	0 to 0.25 MPa	–75 KPa to 0.25 MPa						
Orifice diameter	1.5 mm	1.4 mm						
Flow characteristics (Cv factor)	0.04	0.03						
Response time	10 ms or less							
Leakage	Zero leakage, either external or internal (at hydraulic pressure)							
Proof pressure Note 2)	0.38 MPa							
Ambient temperature	0 to 50°C							
Fluid temperature	0 to 50°C (with no condensation)							
Volume of valve chamber Note 3)	11 µℓ	20 µℓ						
Mounting orientation Note 4)	Free							
Enclosure	IP40 or equivalent							
Weight	30 g	34 g (Without sub-plate), 42 g (With sub-plate)						
Rated voltage	12, 24 VDC							
Allowable voltage fluctuation Note 5)	±10% of rated voltage							
Type of coil insulation	Class B							
Power consumption	2.5 W at inrush, 1 W at holding (with built-in power saving circuit)	1.5 W						
Coil switching noise Note 6)	50 dB							

Note 1) Select an appropriate material for the wetted part when fluid such as a cleaning solvent is used. Also, be sure to confirm the fluid compatibility in advance.
Note 2) Indicates the pressure which does not generate breakage, cracks or external leakage after a one-minute airtight test.
Note 3) Indicates the volume of clearance inside the valve chamber after the volume of the diaphragm is subracted.
Note 4) Since the body (orifice shape) is designed to eliminate residual liquid, mounting in a vertical direction with the coil at the top is recommended. When residual liquid is not considered, any mounting style is available.
Note 5) When the response speed is regarded as important, prevent negative fluctuation of the voltage by adequate regulation.
Note 6) The value is based on SMC's measurement conditions. The noise level will vary with conditions.

Body ported type

Body ported type (Tubing type)

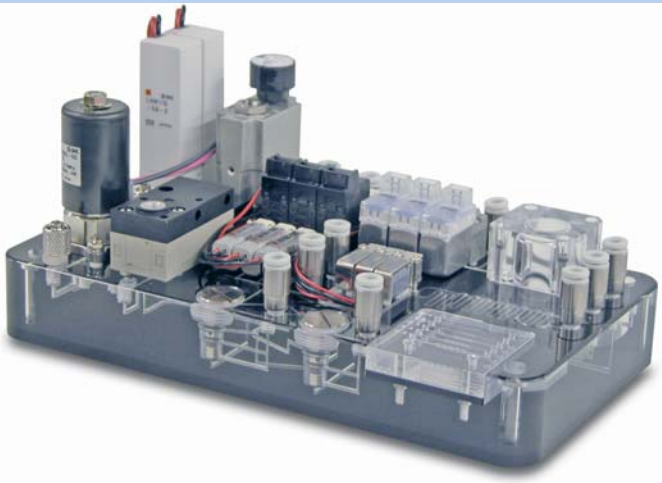
Base mounted type (Without sub-plate)

Base mounted type (With sub-plate)

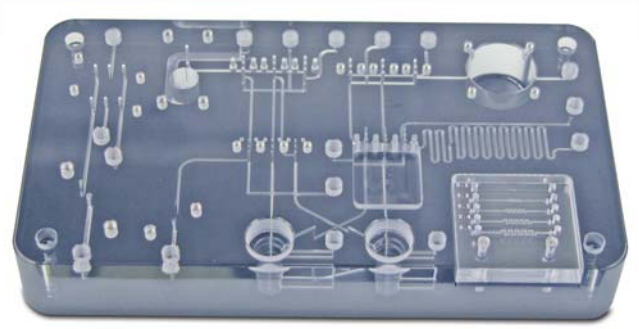
Composite Valve Manifold for Air, Gas and Liquid

Made to Order

Custom designed solutions

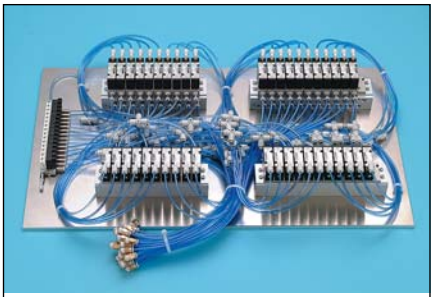


- Space saving
- Simple piping
- Mistakes in piping and wiring are prevented by elimination of complicated piping procedures.
- A 3 dimensional configuration of fluid passages that is not achievable by drilling or injection molding is materialized by diffusion bonding technology. A variety of layouts are available to satisfy users' needs.
- Reduction of the footprint by integrating control equipment such as solenoid valves and sensors on a manifold.
- Simple wiring
  - Electrical wiring is simplified by integrating the printed circuit board onto the manifold.
  - Wiring labour is significantly reduced by integration of electrical wiring.
- Light weight is achieved through use of resin manifolds.
  Acrylic, polyethermide, polycarbonate, polysulfone, Vinyl chloride are available.
- Custom designed solutions only.

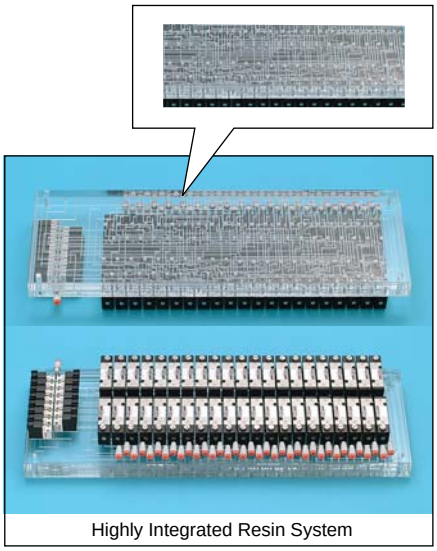


Manifold Specifications

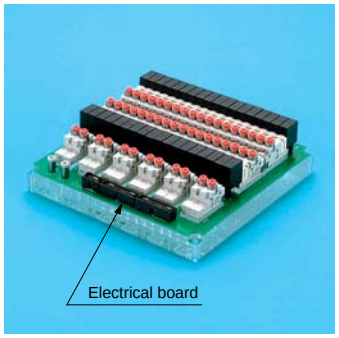
Material	PMMA, PVC, PEI, ULTEM, POLYCARBONATE & PSU
Fluid	Air, Liquid (Check chemical compatibility)
Operating pressure	-100KPa~0.7MPa
Ambient temperature	-5~50°C
Fluid temperature	0~40°C

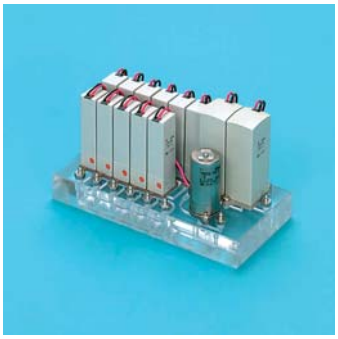


Equipment configuration by conventional air piping

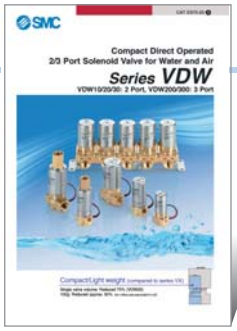


Highly Integrated Resin System



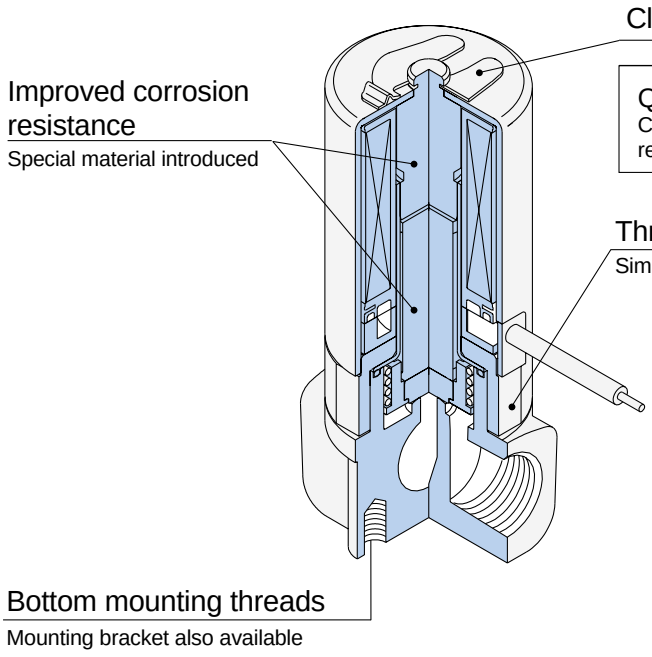


2/3 Port Solenoid Valve for Water, Air and Vacuum Series VDW

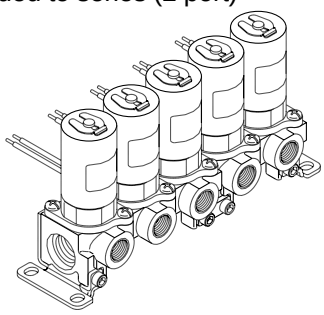


VDW
ES70-20

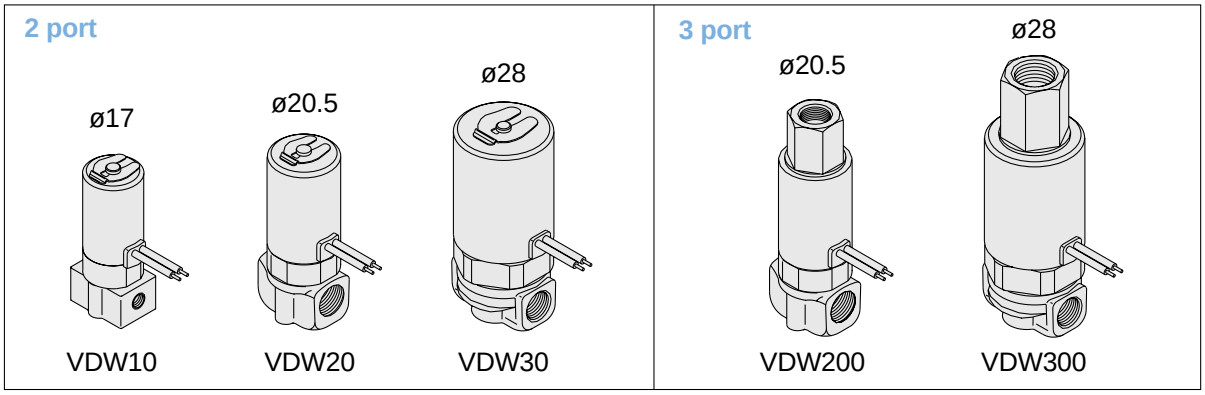
- Compact (compared to series VX)
  Single valve volume: Reduced **75%** (VDW20)
  Manifold length: Reduced **18%** (VDW30, 7 stations)
- Light weight (compared to series VX)
  100g: Reduced approx. **50%** (for orifice size equivalent to ø2)
- Improved durability (nearly twice the life of the previous series)
  The use of a unique magnetic material reduces the operating resistance of moving parts, while improving service life, wear and corrosion resistance.
- High flow rate: Cv factor 0.03 to 0.44 (2 port)
- Universal porting VDW200/300 (3 port)



- Brass/Stainless steel manifolds added to series (2 port)



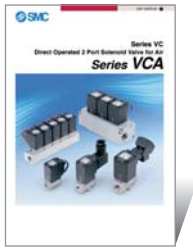
- Series of compact designs



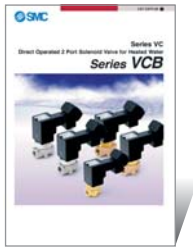
Process Valves for Various Fluids Control
Series VC

Series	Type	Orifice size (ømm) [Flow (Cv)]	Port size	Valve * type
	**VCA20/30/40** Direct operated 2 port solenoid valve for air			
	• Body ported • Manifold	3~10 [0.33~2.1]	1/4, 3/8, 1/2, 3/4	N.C.
	**VCB20/30/40** Direct operated 2 port solenoid valve for heated water			
	• Body ported	2~10 [0.16~2.1]	1/8, 1/4, 3/8, 1/2, 3/4	N.C.
	**VCL20/30/40** Direct operated 2 port solenoid valve for oil			
	• Body ported • Manifold	2~10 [0.16~2.1]	1/8, 1/4, 3/8, 1/2, 3/4	N.C.
	**VCS20/30/40** Direct operated 2 port solenoid valve for steam			
	• Body ported • Manifold	2~10 [0.16~2.1]	1/8, 1/4, 3/8, 1/2, 3/4	N.C.
	**VCW20/30/40** Direct operated 2 port solenoid valve for water			
	• Body ported • Manifold	2~10 [0.16~2.1]	1/8, 1/4, 3/8, 1/2, 3/4	N.C./N.O.
	**VDW10/20/30** Compact direct operated 2 port solenoid valve for water and air			
	• Body ported • Manifold	1~4 [0.04~0.44]	M5, 1/8, 1/4	N.C.
	**VDW200/300** Compact direct operated 3 port solenoid valve for water and air			
	• Body ported	1~4 [0.03~0.44]	M5, 1/8, 1/4	COM.
	**VQ20/30** 2 port solenoid valve for air			
	• Body ported • Manifold	3.4~4.8 [0.33~0.81]	ø6, ø8, ø10, ø12	N.C.

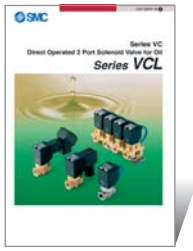
∗ N.C.: normally closed; N.O.: normally opem; COM.: common



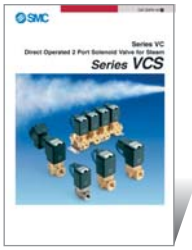
VCA
ES70-21



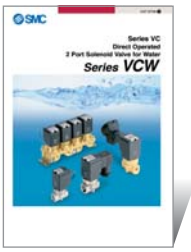
VCB
ES70-22



VCL
ES70-18



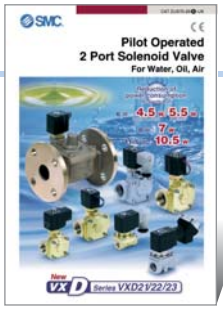
VCS
ES70-19



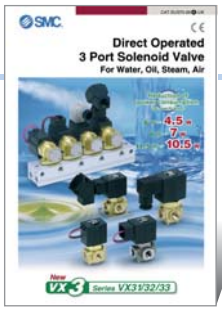
VCW
E708

Process Valves for Various Fluids Control
Series VX

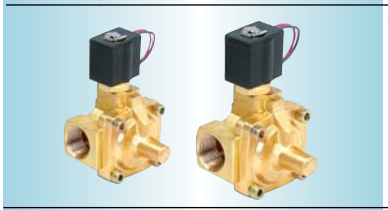
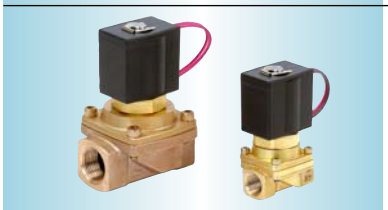
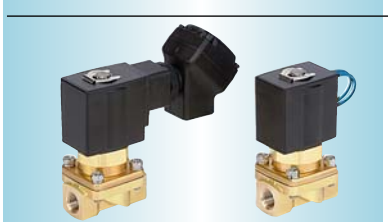
VX21/22/23
EUS70-23



VXD21/22/23
EUS70-29

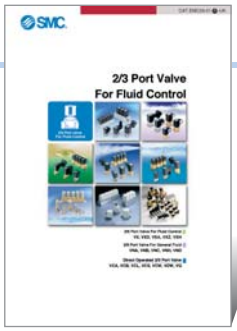


VX31/32/33
EUS70-26

Series	Type	Orifice size (ømm) [Flow (Cv)]	Port size	Valve * type
	**VX21/22/23** Direct operated 2 port solenoid valve for air, gas, vacuum, water, steam, oil			
	• Body ported • Manifold	2~10 [0.17~2.20]	1/8, 1/4, 3/8, 1/2	N.C./N.O.
	**VXD21/22/23** Pilot operated 2 port solenoid valve for air, gas, water, oil			
	• Body ported	10~25 [1.9~13]	1/4, 3/8, 1/2, 3/4, 1	N.C./N.O.
	**VXP21/22/23** Pilot operated 2 port solenoid valve for steam, air, gas, water, oil			
	• Body ported	10~50 [1.9~49]	1/4, 3/8, 1/2, 3/4, 1, 1 1/4, 1 1/2, 2	N.C./N.O.
	**VXZ22/23** Pilot operated 2 port for zero pressure differential/For air, gas, vacuum, water, oil			
	• Body ported	10~25 [1.9~12]	1/4, 3/8, 1/2, 3/4, 1	N.C./N.O.
	**VXH22** Pilot operated 2 port for hihg pressure/For air, water, oil			
	• Body ported	10 [1.9~2.4]	1/4, 3/8, 1/2	N.C.
	**VX31/32/33** Direct operated 3 port for air, gas, vacuum, water, steam, oil			
	• Body ported • Manifold	1.5~4 [0.08~0.50]	1/8, 1/4, 3/8	N.C./N.O. COM.
	**VXA21/22, VXA31/32** Direct operated 2/3 port for air, gas, vacuum, water, oil			
	• Body ported • Manifold	VXA21/22: 3~10 [0.33~2.4] VXA31/32: 1.5~4 [0.08~0.50]	VXA21/22: 1/8, 1/4, 3/8, 1/2 VXA31/32: 1/8, 1/4, 3/8	VXA21/22: N.C./N.O. VXA31/32: COM.

* N.C.: normally closed; N.O.: normally open; COM.: common

Process Valves for General Pneumatic Fluids
Series VN



Process Valve
EMC03-01

Series	Type	Orifice size (ømm) [Flow (Cv)]	Port size	Valve * type
	**VNA** 2 port valve for compressed air and air-hydro circuit control			
	• Body ported	10~50 [0.88~43]	1/8, 1/4, 3/8, 1/2, 3/4, 1, 1 1/4, 1 1/2, 2	N.C./N.O. COM.
	**VNB** 2 port valve for flow control			
	• Body ported	7~50 [0.80~43]	1/8, 1/4, 3/8, 1/2, 3/4, 1, 1 1/4, 1 1/2, 2	N.C./N.O. COM.
	**VNC** 2 port valve for coolant applications			
	• Body ported	7~50 [1.25~100]	1/8, 1/4, 3/8, 1/2, 3/4, 1, 1 1/4, 1 1/2, 2	N.C./N.O.
	**VND** 2 port valve for steam			
	• Body ported	7~50 [1.08~62]	1/8, 1/4, 3/8, 1/2, 3/4, 1, 1 1/4, 1 1/2, 2	N.C./N.O.

* N.C.: normally closed; N.O.: normally opem; COM.: common

Note: Information on our range of pilot valves is shown on page 32 of this catalogue

Process Pump
Series P□

A compact pump suitable for transfer and recovery of a wide variety of fluids.

Series PA3000/5000

45 ℓ/min

- Compact, large capacity diaphragm type pump.
- Long life, 2 to 5 times that of conventional pumps:
  The diaphragm diameter has been enlarged, the stroke reduced and a new material introduced.
- A simple configuration makes maintenance easy too:
  A new structural design allows the diaphragm and check valve to be replaced individually.
- Self-priming type makes priming unnecessary:
  Able to pump up to 1 m in a dry state (without priming). (At ordinary temperatures with fresh water) Able to pump up to 6 m in a wet state (with priming).
- High abrasion resistance/low dust generation:
  Since it is a diaphragm type there are no sliding parts in the liquid contact area.

Variations

Model	Diaphragm material	Check valve material	Fluids contact areas material	∗ Discharge flow rate (ℓ/min)	Option
PA31□0	PTFE, NBR	PTFE, PFA	ADC12	1 to 20	• Silencer
PA32□0			SCS14		
PA51□0			ADC12	5 to 45	
PA52□0			SCS14		

∗ Each of the values above indicates use at ordinary temperatures with fresh water.

Series PAX

10 ℓ/min

- Built-in pulsation attenuator.

A pulsation attenuating function to suppress discharge pressure pulsation is a new built-in feature.
This controls problems such as discharge piping vibration, scattering of liquid from the discharge outlet, and foaming in tanks. In addition, internalization of this feature makes it unnecessary to provide extra space and separate piping, etc.

Variations

Model	Diaphragm material	Check valve material	Fluids contact areas material	∗ Discharge flow rate (ℓ/min)	Option
PAX1112	PTFE	PTFE, SCS14	ADC12	0.5 to 10	• Silencer
PAX1212			SCS14		

∗ Each of the values above indicates use at ordinary temperatures with fresh water.

Series PB

2 ℓ/min

- Pump with built-in micro-solenoid valve.

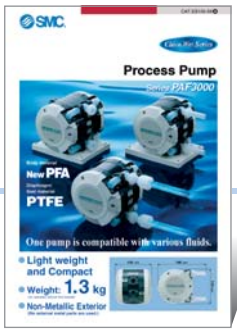
A solenoid valve drive type diaphragm pump that fits in the palm of the hand.
- Polypropylene body: 60 x 60 x 41
- Maximum discharge: 2l/min
- Connection port size: Rc(PT)1/8

- Space is saved due to the centralization of piping and wiring areas on the top and bottom surfaces.
- Simple adjustment of the discharge flow rate
  Adjustment of the discharge flow rate can be easily performed with the number of ON/OFF cycles of the internal solenoid valve VJ300.

Variations

Model	Diaphragm material	Check valve material	Fluids contact areas material	∗ Discharge flow rate (mℓ/min)	Option
PB1011	PTFE	PTFE	Polypropylene PP, Stainless steel (SUS316) Seals: FKM	8 to 2000	• Silencer • Foot
PB1013				8 to 500	

∗ Each of the values above indicates use at ordinary temperatures with fresh water.



Series PA3

13 ℓ/min

- High corrosion resistance: Side body, ports: **New PFA** Diaphragm/O-rings: **PTFE**
- Light weight and Compact: **2.1** kg (without foot bracket).
- Long service life: Diaphragm are made from **denatured PTFE** for superior resistance and longer service life.
- Clean: You can order your process pump assembled in a **Clean room** environment and double-packaged (Order number PAP331). Side bodies and ports are **moulded** to achieve a great reduction in dust generation.

Variations

Model		Body material	Diaphragm material	Assembly environment	Discharge flow rate (ℓ/min)	Option
Automotive operation	PA3310	New PFA	PTFE	Standard	1 to 13*	• Foot • Silencer
	PAP3310			Clean room		
Air pilot actuation	PA3313			Standard	0.1 to 9	• Foot
	PAP3313			Clean room		

* With 3/8" inlet/outlet tube: 1 to 12

Series PAF3000

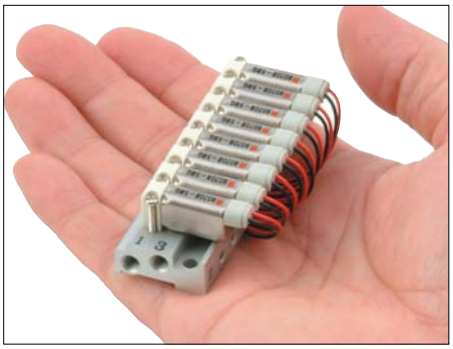
20 ℓ/min

- Body material: **New PFA**
- Diaphragm/Seal material: **PTFE**
- Light weight and Compact: **1.3** kg
  (Air operated, without foot bracket).
- Non-Metallic exterior (no external metal parts are used).
- Large flow rate: The flow rate has been increased by **50**% even though it is almost the same size as the PA3 series. Max. flow rate: **20** ℓ/min (automatically operated).

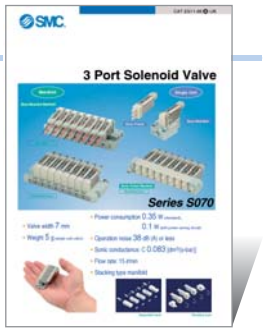
Variations

Model		Body material	Diaphragm material	Discharge flow rate (ℓ/min)	Fitting type	Option
Automatically operated	PAF3410	New PFA	Denatured PTFE	1 to 20	Female thread Tube extension With nut	Foot Silencer
Air operated	PAF3413			1 to 15		

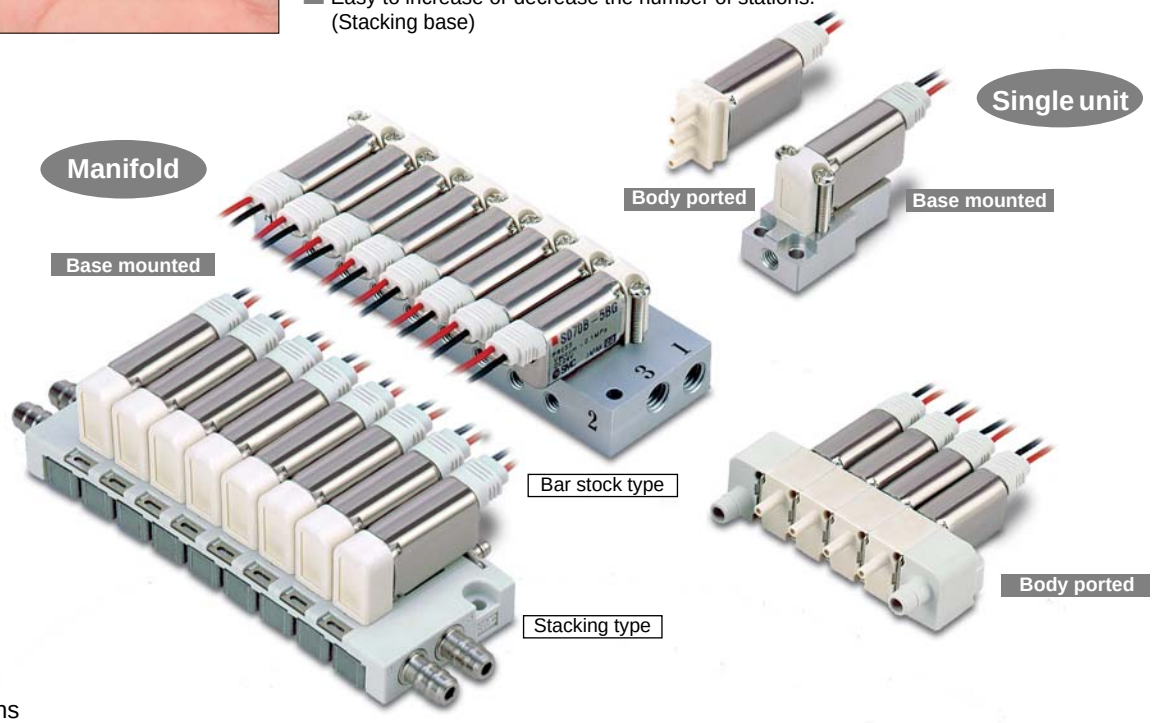
7mm Wide, Super Compact Direct Acting 3 Port Solenoid Valve Series S070



- Valve width: **7mm**
- Power consumption: **0.35W**(standard)
  0.1W(with power saving circuit)
- Sonic conductance: **C 0.083[dm³/(s·bar)]**
- Extremely light weight **5g** (Valve single unit)
- Operation noise **38dB(A)** or less
- Easy to increase or decrease the number of stations. (Stacking base)



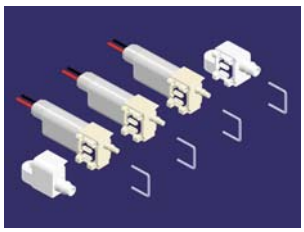
S070
ES11-85



Specifications

Valve construction	Poppet
Fluid	Air / Inert gas / Low vacuum (1.33×10^2 Pa)
Maximum operating pressure	0.3 MPa (0.35 W, 0.1 W), 0.5 MPa (0.5 W)
Proof pressure	1 MPa
Ambient and fluid temperature	–10 to 50°C
Lubrication	Not required
Impact/Vibration resistance	30/150 m/s²
Enclosure	IP40
Weight	5 g (single unit valve)
Mounting orientation	Free


Separable base


Stacking type

Solenoid specifications

Power consumption	0.35 W (standard), 0.5 W (high voltage), 0.1 W (holding)
Rated coil voltage	3, 5, 6, 12, 24 VDC
Allowable voltage fluctuation	±10% of the rated voltage
Coil insulation type	Equivalent to class B

Flow characteristics

Power consumption	Maximum operating pressure	Flow characteristics			Response time ms	
		C[dm³/(s·bar)]	b	Cv	ON	OFF
0.5 W DC	0.5 MPa	0.042	0.27	0.011	3 or less	3 or less
	0.3 MPa	0.083	0.28	0.021	5 or less	3 or less
0.35 W DC	0.3 MPa	0.042	0.27	0.011	3 or less	3 or less
	0.1 MPa	0.083	0.28	0.021	5 or less	3 or less
0.1 W DC (at holding) with power saving circuit	0.3 MPa	0.021	0.27	0.006	3 or less	6 or less
	0.1 MPa	0.042	0.28	0.011	5 or less	6 or less

7mm Wide, Pilot Operated, 5 Port Solenoid Valve Series S0700

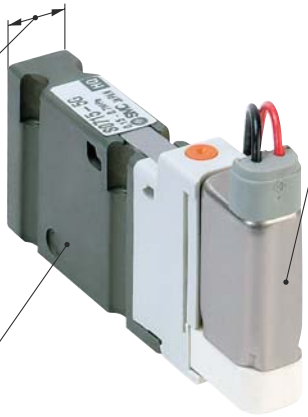
■ Width **7mm**
(A single solenoid unit)

■ Power consumption **0.1w**
(With power saving circuit)

■ Sonic conductance:
0.36[dm3/(s•bar)]
CV:0.1

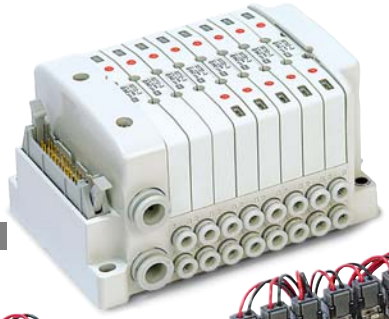
■ 4-position dual 3 port valve

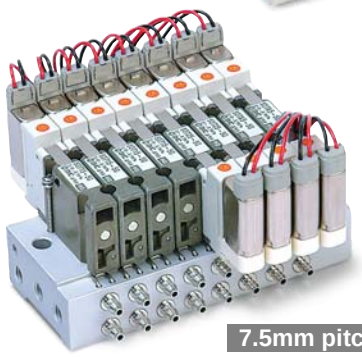
■ Weight **28g**
(A single solenoid unit)



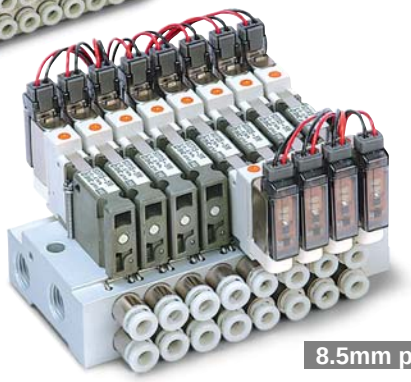
Manifold

Plug-in manifold





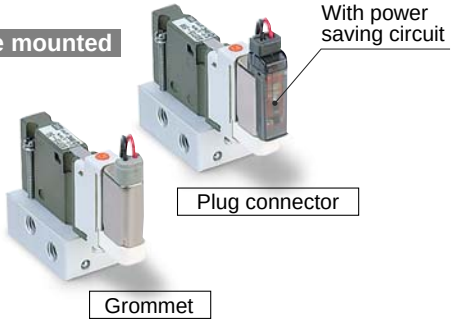
7.5mm pitch



8.5mm pitch

Single unit

Base mounted



■ Specifications

Fluid	Air, inert gas
Max. operating pressure	0.7MPa(0.35W)
Proof pressure	1MPa
Ambient and fluid temperature	-10 to 50°C
Enclosure	IP40

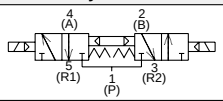
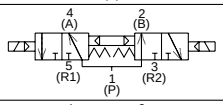
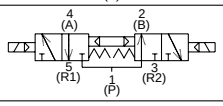
■ Solenoid specifications

Power consumption	0.35W(Standard) 0.1W(With power saving circuit, when energized)
Coil rated voltage	12 / 24VDC

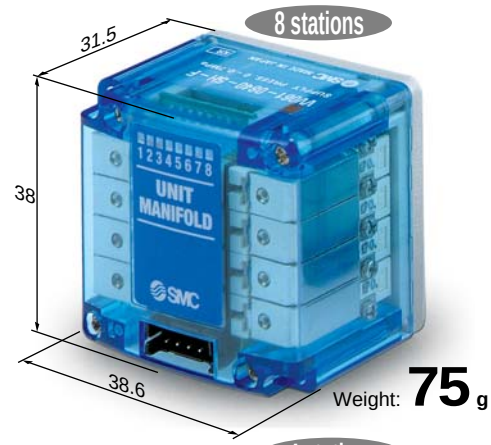
■ Flow characteristics

	Flow characteristics		
	C[dm³/(s·bar)]	b	v
2-position, single/double	0.36	0.39	0.1
4-position, dual 3 port	0.32	0.33	0.08

■ Three type options of the 4-position dual 3 port valve

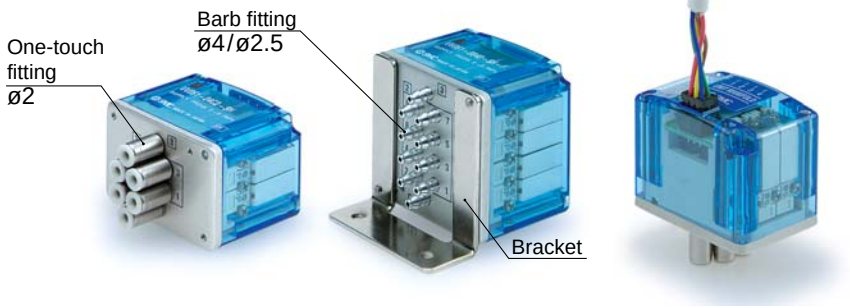
Side A	Side B	JIS symbol
N.C.	N.C.	
N.O.	N.O.	
N.C.	N.O.	

Unit Manifold Valve, 3 Port Solenoid Valve Series VV061

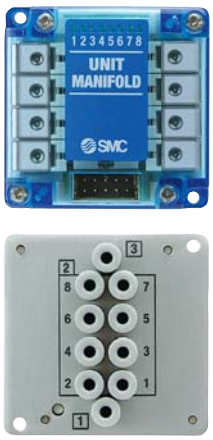


■ Valve, PCB, base and fittings are fully integrated, forming a single compact unit. New concept unit manifold

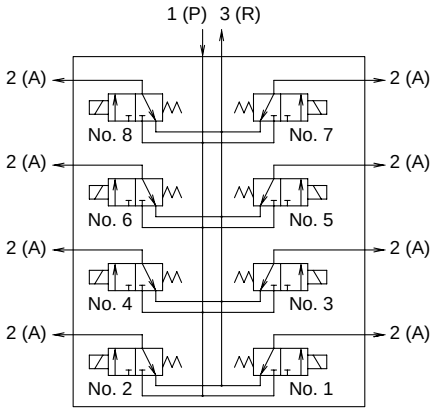
■ **6 mm width** valve. Mounting the V060 series.



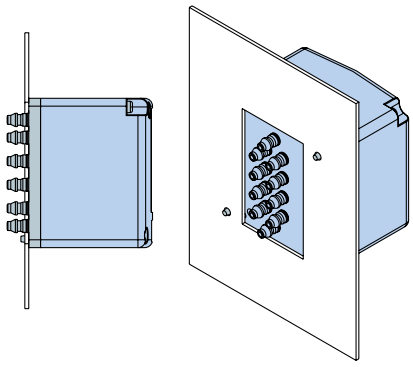
■ Reduced environmental impact substance RoHS compliant



In case of 8 stations



Panel mount



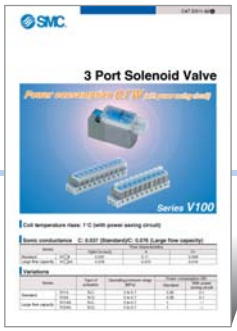
■ Unit Manifold Valve Specifications

Fluid		Air	
Operating pressure range	Standard	0 to 0.7 MPa	
	High flow type	0 to 0.3 MPa	
Vacuum specifications	Port	1 (P) port	3 (R) port
	Standard	–100 kPa to 0.6 MPa	–100 kPa to 0 MPa
	High flow type	–100 kPa to 0.2 MPa	–100 kPa to 0 MPa
Power consumption	Standard	0.55 W	
	Power saving circuit (Long and countinuous loading time type)	0.23 W	

■ Flow Characteristics

Type	Effective area (mm²)	
	1 (P)→2 (A)	2 (A)→3 (R)
Standard	0.07	0.11
High flow type	0.16	0.21

3 Port Solenoid Valve
Series V100



V100
ES11-82

■ Power Consumption **0.1W** (with power saving circuit)

■ Coil temperature rises: **1°C** (with power saving circuit)

■ Sonic conductance C: 0.037 (Standard)/C: 0.076 (Large flow capacity)

Series		Flow characteristics		
		C[dm³/(s·bar)]	b	Cv
Standard	V1□4	0.037	0.11	0.008
Large flow capacity	V1□4A	0.076	0.070	0.016

■ Variations

Series		Type of actuation	Operating pressure range (MPa)	Power consumption (W)	
				Standard	With power saving circuit
Standard	V114	N.C.	0 to 0.7	0.35	0.1
	V124	N.O.	0 to 0.7	0.35	0.1
Large flow capacity	V114A	N.C.	0 to 0.7	1	—
	V124A	N.O.	0 to 0.7	1	—

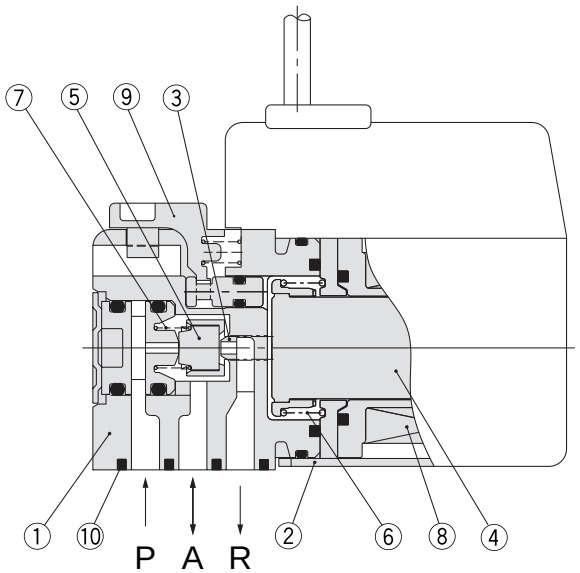
■ Specifications

Fluid	Air
Ambient and fluid temperature (°C)	–10 to 50 (No freezing)
Response time (ms) Note 1)	ON: 5 or less OFF: 4 or less
Max. operating frequency (Hz)	20
Manual override	Non-locking push, Locking slotted
Lubrication	Not required
Mounting position	Unrestricted
Impact/Vibration resistance (m/s²) Note 2)	150/30
Enclosure	Dust proof

Note 1) Based on dynamic performance test JIS B8374-1981 (standard type: at coil temperature of 20°C, with rated voltage, without surge voltage suppressor)

Note 2)
Impact resistance: No malfunction resulted in an impact test using a drop impact tester. The test was performed one time each in the axial and right angle directions of the main valve and armature, for both energized and de-energized states. (Value in the initial stage).

Vibration resistance: No malfunction resulted in 45 to 2000 Hz, a one-sweep test performed in the axial and right angle directions of the main valve and armature for both energized and de-energized states. (Value in the initial stage)



Component Parts

No.	Description	Material
1	Body	Resin
2	Cover	Stainless steel
3	Push rod	Resin
4	Armature assembly	Stainless steel, Resin
5	Poppet	FKM
6	Return spring	Stainless steel
7	Poppet spring	Stainless steel
8	Coil assembly	—
9	Manual override	Resin

Replacement Parts

No.	Description	Part no.	Material	Note
10	Gasket assembly	V100-31-1A	FKM, Steel	Gasket, 2 screws
11	Sub-plate	V100-74-1	Aluminum die-cast	—

3 Port Solenoid Valve for Air/Inert Gas Series VQ100

High speed, stable response, and extra-long service life.

ON: 3.5ms, OFF: 2ms, Dispension accuracy ±1ms
(With indicator light and surge voltage suppressor; supply pressure 0.5MPa)
200million cycles or more (clean and dry air)
(Factors determined in a life test by SMC)

Compact with large flow capacity.

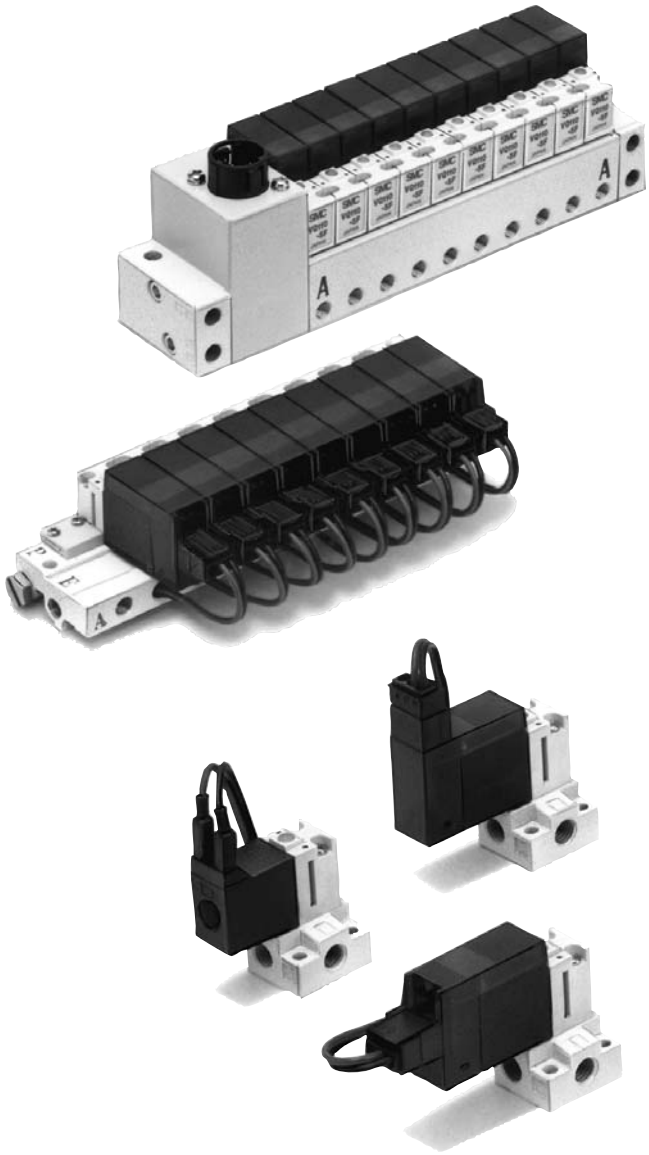
Body width: 9.8mm,
Nℓ/min: 19.63 (Standard, high pressure style)
Nℓ/min: 39.26 (Option, large flow style)

Options:

External non-leak
Latching style
Negative COM specifications
AC voltage
Normally open
Vacuum (1)
Note 1) Consult SMC for vacuum specifications.

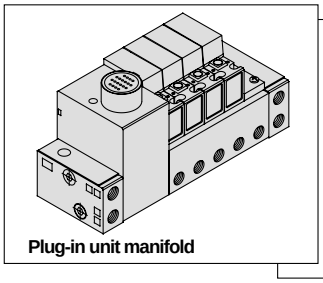
Copper-free specifications

The fluid contacting section is copper-free and the standard style can be used as it is.

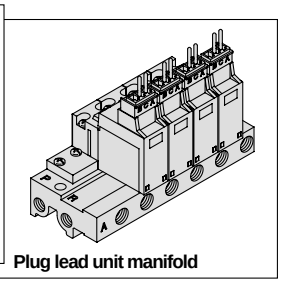


A wide variation of wiring

Manifold

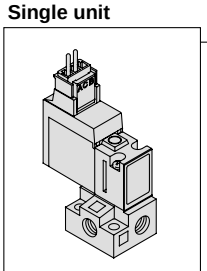


Plug-in unit manifold

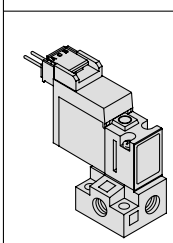


Plug lead unit manifold

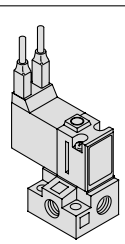
Single unit



L plug connector



M plug connector



Grommet

Compact Proportional Valve Series PVQ

SMC supports innovations in automatic and energy saving systems by way of electropneumatic control for medical, general industry, etc.

Series PVQ30

Series PVQ10

■ High Accuracy.
Repeatability: 5% or less, Hysteresis: 10% or less.

■ Compact.
Compact body with12mm witch (PVQ10) realizes more space-saving.

■ Long Life.
10 million cycles or more (PVQ30).

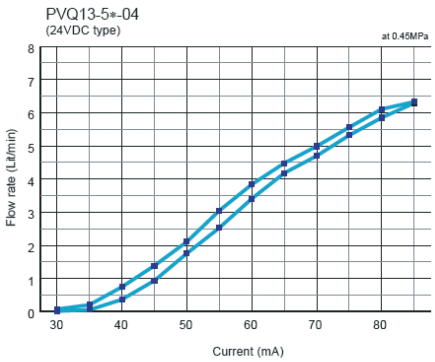
■ Low Leakage.

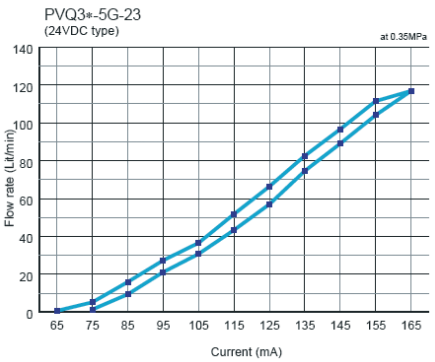
■ direct poppet construction enables leakage, while de-energized.

■ External Leakage.

Specifications

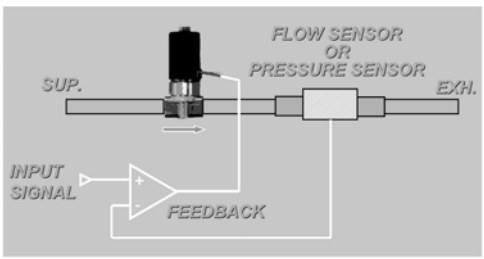
Model	PVQ10				PVQ30		
	03	04	06	08	16	23	32
Orifice (mm)	0.3	0.4	0.64	0.8	1.6	2.3	4.0
Fluid	Air, Inert Gas, Water						
Ambient and fluid temperature	0~50ºC						
Port size	M5				Rc1/8		
Max. operating pressure (MPa)	0.7	0.45	0.2	0.1	0.7	0.35	0.12
Histeresis	10% or less						
Repeatability	3% or less						
Proof pressure	1MPa						
Rated voltage	12, 24 VDC						
Power consumption	0 to 2W				0 to 4W		
Coil insulation	Class B						

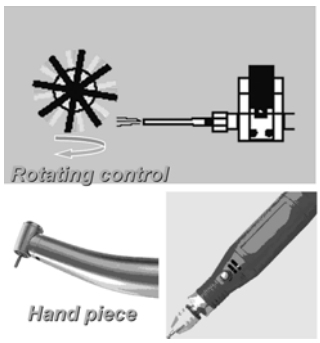




■ Applications

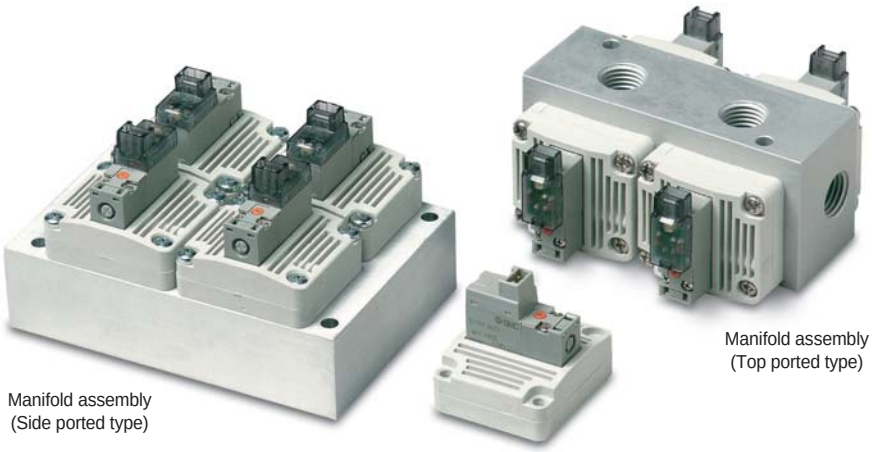
- Air blow, Flow control.
- Hand piece control or dental unit and other respiratory equipment.
- Cooling for laser machinery, etc.
- Analyzer, instrumentation.





2 Port High Flow Diaphragm Valve Series DXT474

DXT474
US N280



Manifold assembly
(Side ported type)

Manifold assembly
(Top ported type)

L type plug connector

- There are no sliding parts in the valve (ex: spool, pistons, etc.), so the valve is able to function continuously and reliably at low pressure.
- Oxygen compatible.
- The sealing function is performed by diaphragm. Therefore, the valve is non-lubricated for applications that are sensitive to lubrication.
- Except for the SY100 pilot valve, flourine rubber seals (Viton) are used to aid in protection against ozone.
- SY 100 used for pilot valve to provide low power consumption.
- Simple structure allows for compactness (12 mm height without pilot valve) and high flow (max. Cv 1.2).
- Normally open and normally closed type valves are available.
- Air operated type valves available for applications where two or more valves are to be shifted by one pilot valve.
- Manifold mounted to aid in many types of manifold interfaces and flow requirements. Currently, two type of manifold designs are available (side ported and top ported type) for oxygen concentrator.
- Pilot exhaust is routed to main system exhaust to reduce noise in the manifolds.

The DXT474 diaphragm was developed as an operating valve for an oxygen concentrator application for the medical industry, but it can be a valuable solution for applications that require a low pressure 2 port valve that has a high reliability and life with high flow capability.

Valve Specifications

Fluid	Air
Operating pressure range MPa (psi)	0.04~0.3 (6~43)
Effective area mm^2 (Cv)	Max. 21.6 (1.2)
Response time (ms)	Less than 75
Fluid and ambient temperature (^oC)	Max. 50
Max. operating frecuency (Hz)	5
Lubrication	Not required
Impact/Vibration m/s^2	150/30 (8.3 - 2000Hz)
Electrical Entry	Grommet, L and M type plug connector
Coil rated voltage VDC	24, 12, 6, 5, 3
Allowable voltage	-10 to +10%
Power consumption (W)	0.75 (with light: 0.80)

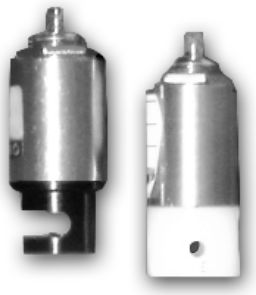
Pinch Valve
Series XT34

SMC series XT34-155 is a compact N.O. air actuated pinch valve When used in conjunction with tubing material, the “pinching” action of the valve can be used to permit or restrain the flow of media. The XT34 is suitable for a wide range of medical applications including:

- Hematology Analyzers
- Immunoaassay Analyzers
- Clinical Chemistry Analyzers
- Blood Gas Analyzers
- Medical Diagnostic Equipment
- Blood Cell Counters

Features and Benefits

- Body material is nickel-plated brass
- Tube holder is constructed of Polyacetal material



Specifications

Max. operating pressure MPa (psi)	0.34 (50)
Min. operating pressure MPa (psi)	0.15 (22)
Operating temperature	0~60°C (32°~140°F)
Weight	36g

Media compatibility

Blood	Reagents
Bleach	Soap
Saline	Water

How to order

SILICON TUBE SIZE		
	Inside Diameter	Outside Diameter
XT34-155-1	0.062 inch (1.57mm)	0.187 inch (4.75mm)
XT34-155-2	0.032 inch (0.81mm)	0.156 inch (3.96mm)

Air Preparation

Large Flow Air filter

Series		Port size	Filtration	Notes
AF800/900		Large flow air filter: AF800/900		
		1 1/4, 1 1/2, 2	Standard 5 µm filter element	Auto or manual drain

Oil Mist Separators

Series		Filtration	Rated flow (l/min (ANR)	Port size
AFF		Main Line Filter: AFF		
		3 µm (95% particle size collection)	300 to 42000	1/8, 1/4, 3/8, 1/2, 3/4, 1, 1 1/2, 2
AM		Mist Separator: AM		
		0.3 µm (95% particle size collection)	300 to 12000	1/8, 1/4, 3/8, 1/2, 3/4, 1, 1 1/2, 2
AMD		Micro mist separator: AMD		
		0.01 µm (95% particle size collection)	200 to 12000	1/8, 1/4, 3/8, 1/2, 3/4, 1, 1 1/2, 2
AMH		Micro mist separator with prefilter: AMH		
		0.01 µm (95% particle size collection)	200 to 12000	1/8, 1/4, 3/8, 1/2, 3/4, 1, 1 1/2, 2
AME		Super mist separator: AME		
		0.01 µm (95% particle size collection)	200 to 12000	1/8, 1/4, 3/8, 1/2, 3/4, 1, 1 1/2, 2

Water Separator

Series		Port size	Max. flow capacity (l/min (ANR)	Notes
AMG		Water separator: AMG		
		1/8, 1/4, 3/8, 1/2, 3/4, 1, 1 1/2, 2	300 to 12000	It eliminates the waterdroplets in the compressed air.

Odour Removal Filter

Series		Filtration	Rated flow (l/min (ANR)	Port size
AMF		Odour removal filter: AMF		
		0.01 µm (95% particle size collection)	200 to 12000	1/8, 1/4, 3/8, 1/2, 3/4, 1, 1 1/2, 2

Related Products

Series		Port size	Notes
AD		Auto drain valve: AD402/600	
		1/4, 3/8, 1/2, 3/4, 1	Drainage is automatically discharged in a reliable manner, without requiring human operators. Highly resistant to dust and corrosion.
AMJ		Drain separator for vacuum: AMJ	
		1/4, 3/8, 1/2, 3/4, 1	Remove water droplets from air by simply installing in vacuum equipment connection line. Effective for removing water droplets from the air sucked into vacuum pumps and ejectors, etc.
ADH		Heavy duty auto drain: ADH4000	
		1/2	Easy maintenance. Float style drain allows automatic drain discharge without electric power.
AMP		Exhaust Cleaner for Clean Rooms: AMP	
		1/4, 3/8, 1/2, 3/4	An exhaust cleaner that can be used inside a clean room. Particles of 0.3µm or larger are 3.5 particles/ℓ or less. Silencing effect: 40dB (A) or more.
GP46		Pressure Gauge with Switch: GP46	
		1/8, 1/4	A pressure switch function has been added to the gauge. The pressure switch is equipped with a light for verifying operation. The pressure gauge is equipped with a limit indicator. To be used for verifying the supply pressure
GD40		Pressure differential gauge: GD40-2-01	
		1/8	The pressure differential at the inlet and the outlet of compressed air equipment can be viewed at a glance on the pressure differential gauge. It is ideal for the maintenance control of filters.
PPA		Compact Manometer: PPA	
		M5	Pressure measurements can easily be taken any time, anywhere. Back light for easy viewing in dark locations.

Air Filter/Modular Style
Series AF

AC
ES40-42

	Modular range			Large flow
	AF	AFM	AFD	AF800/900
Model				
Model	Air Filter	Mist Separator	Micro Mist Separator	Large Flow Air Filter
Filtration	5 µm	0.3 µm	0.01 µm	5 µm
Port size	**AF10** _ M5 x 0.8 **AF20** _ 1/8, 1/4 **AF30** _ 1/4, 3/8 **AF40** _ 1/4, 3/8, 1/2 **AF40-06** _ 3/4 **AF50** _ 3/4, 1 **AF60** _ 1	**AFM20** _ 1/8, 1/4 **AFM30** _ 1/4, 3/8 **AFM40** _ 1/4, 3/8, 1/2 **AFM40-06** _ 3/4	**AFD20** _ 1/8, 1/4 **AFD30** _ 1/4, 3/8 **AFD40** _ 1/4, 3/8, 1/2 **AFD40-06** _ 3/4	**AF800** _ 1 1/4, 1 1/2 **AF900** _ 2
Accessories	• Bracket • Float style auto drain • Pressure differential auto-drain	• Bracket • Float style auto drain • Pressure differential auto-drain	• Bracket • Float style auto drain • Pressure differential auto-drain	• Float style auto drain

Membrane Air Dryer
Series IDG

IDG
ES30-7

Series IDG1

Flexible piping is possible

■ Low flow rate type tube configuration
Outlet air flow rate:**10ℓ/min (ANR)**

■ Dew point indicator confirms air drying at a glance.
(except IDG1) (optional on IDG3, IDG5, IDG3H, IDG5H)

■ Compact

■ Lightweight

■ Space saving

■ Also available with fittings for purge air discharge.
When purge air discharge is undesirable in the area around the membrane air dryer, it can be discharged to atmosphere via tubing (optional).

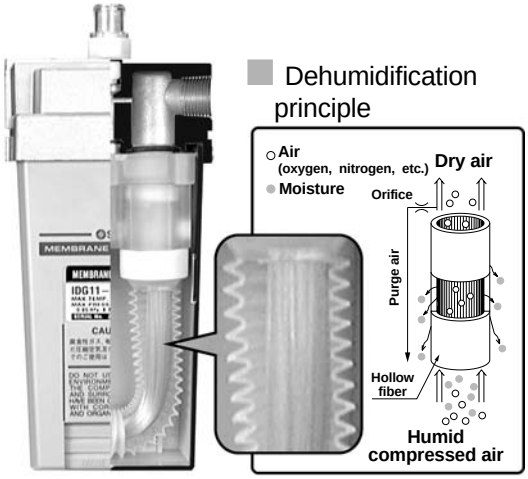
■ Discharged air noise reduced with built-in silencer.
(Except IDG1, IDG3, IDG3H, IDG5, IDG5H, IDG30, IDG30H, IDG30L, IDG50, IDG50H, IDG50L)

■ Environmentally friendly (non-freon).

■ Power supply not required
A power supply is completely unnecessary.
Wiring labour is not required and there is no need to consider electrical standards, etc.

■ No vibration or heat discharge
There are no mechanical moving parts as in the case of refrigeration equipment.

■ Compatible with low dew points
Outlet air atmospheric pressure dew point –40˚C
(IDG30L, IDG50L, IDG60L)
IDG75L, IDG100L
Outlet air atmospheric pressure dew point –60˚C
(IDG60S, IDG75S, IDG100S)



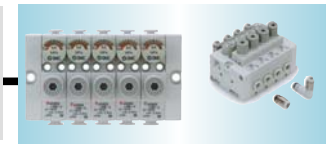
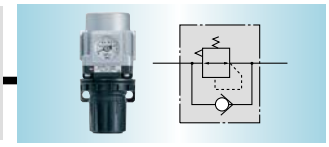
■ Dehumidification principle

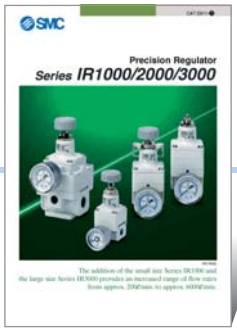
■ The membrane air dryer uses hollow fibres composed of a macro molecular membrane through which moisture passes easily, but is difficult for air (oxygen and nitrogen) to pass through.

When humid, compressed air is supplied to the inside of the hollow fibres, only moisture permeates the membrane and moves to the outside due to the pressure difference between the moisture inside and outside of the fibres. The compressed air becomes dry air and continues out of the dryer. Part of the dry air from the outlet side is passed through a very small orifice to reduce the pressure and purge the outside of the hollow fibres. The moisture which permeated to the outside of the hollow fibres is discharged to the atmosphere by this purge air. In this way, the partial pressure outside of the hollow fibres remains low and dehumidification is continuously performed.

■ Applications
- Machine tools (air bearings, lasers, etc.)
- Precision measuring equipment (3-D measuring machines)
- Semiconductor manufacturing equipment
  Semiconductor inspection equipment
- Dental equipment
- Chemical analysis equipment
- Ozonizers, Hydrogen gas generating equipment
- Packaging machines, Paper making machines, Food processing machines
- Printed circuit board IC mounting machines
- Fine particle drying, Transfer equipment
- Electrostatic and high grade coating
- Drying and cleaning of precision parts
- Condensation prevention in control panels
- General pneumatic equipment and pneumatic tools

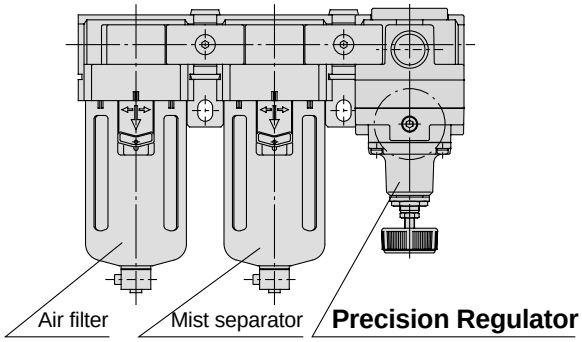
Pressure Control Equipment/Regulator
Series AR

Series	Application/Characteristics	Port size	Set pressure (MPa)	
Miniature regulator **ARJ1020F** **ARJ210** **ARJ310**	Direct operated relieving style Back flow function	M5 to 1/8 ø4, ø6	0.1 to 0.7	
Regulator **AR10-60**	Direct operated relieving style Modular style	M5 1/8 to 1	0.05 to 0.7 0.05 to 0.85	
Regulator with built-in pressure gauge **ARG20-40**	Built-in pressure gauge Space saving	1/8 to 1/2	0.05 to 0.85	
Pilot operated regulator **AR425-925** **AR435-935**	Internal pilot Relieving style	1/4 to 2	0.05 to 0.85 0.02 to 0.2	
Compact manifold Regulator **ARM10/11**	Manifold (Common IN or Individual IN) Different types can be mixed on a manifold	1/4 to 3/8 ø4, ø6, ø10	0.05 to 0.7	
Miniature manifold Regulator **ARM5**	Width: 14 mm. The one-touch fitting size can be changed. Backflow function is equipped as a standard.	ø4, ø6 ø5/32", ø1/4"	0.05 to 0.7	
Regulator manifold **ARM2500/3000**	Manifold (Common IN/Individual IN) Modular style	1/4 , 3/8	0.05 to 0.85	
Direct operated precision regulator **ARP3000**	Setting sensitivity: 0.001MPa Direct operated relieving style	1/4	0.005 to 0.3	
Regulator with check valve **AR20K-60K**	Built-in check valve (with back flow function) Direct operated relieving style	1/8 to 1/2	0.05 to 0.85	
Regulator with residual pressure exhaust mechanism **AR2550-4050**	Exhaust of residual pressure for safety purpose Direct operated relieving style	1/4 to 3/4	0.05 to 0.85	
Regulator for 2MPa **ARX20**	Piston type regulator	1/8 , 1/4	0.05 to 0.85	

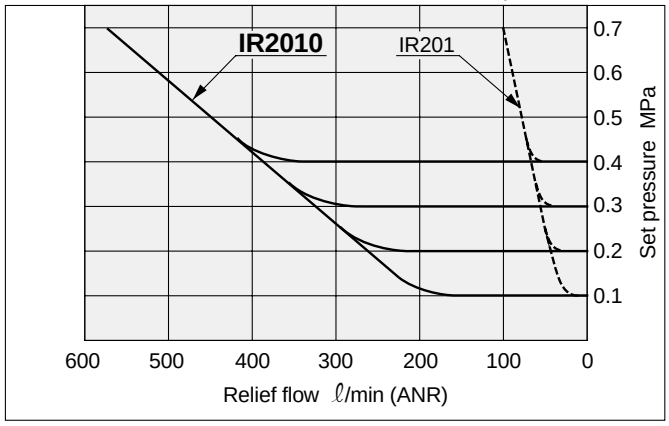


Precision Regulator Series IR1000/2000/3000

- Low pressure capability.
- Smallest size in series
  IR1000: Width 35mm, Weight 140g
- Expanded regulating pressure range
  Conventional 0.7MPa→0.8MPa
- Relief flow increased by 5 times
  (Compared to SMC IR201, 401)
- Modular body introduced: Can be combined with AF (air filter) and AFM (mist separator)



Conditions: Back pressure 0.7MPa



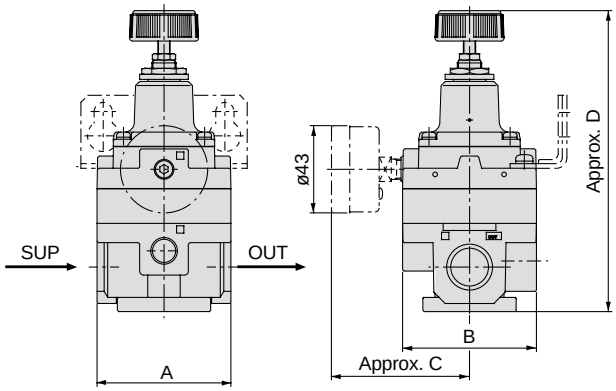
Series Variations

Model		IR1000	IR2000	IR3000
Maximum set pressure	0.2MPa	●	●	●
	0.4MPa	●	●	●
	0.8MPa	●	●	●
Port size	Rc(PT) 1/8	●		
	Rc(PT) 1/4		●	●
	Rc(PT) 3/8			●
	Rc(PT) 1/2			●
Accessories	Bracket	●	●	●
	Pressure gauge	●	●	●
Air operated type			●	●

Order Made Specifications

Symbol	Specifications/Content
10—	Clean room specifications
20—	Copper-free specifications
80—	Ozone resistant specifications
—T	For high temperature
—L	For low temperature
—X1	Non-grease specifications
IRM□□	Manifold (except series IR2120, IR3000)

Dimensions



mm

Model	A	B	C	D
IR1000	35	35	43	90
IR3000	66	66	68	148

Precision Clean Regulator Series SRP

High precision, low flow consumption stainless steel regulator

Achieves flow consumption"under a litre"
Bleed volume 0.5ℓ/min(ANR) or less
(downstream pressure at 0.2MPa)
∗ Approx. 1/4 of the ARP3000 direct operated precision regulator.

Excellent corrosion resistance
SUS316 is used for all metal parts in contact with the fluid.

Precision
Setting sensitivity: 0.3%F.S.
Repeatability: 1%F.S.

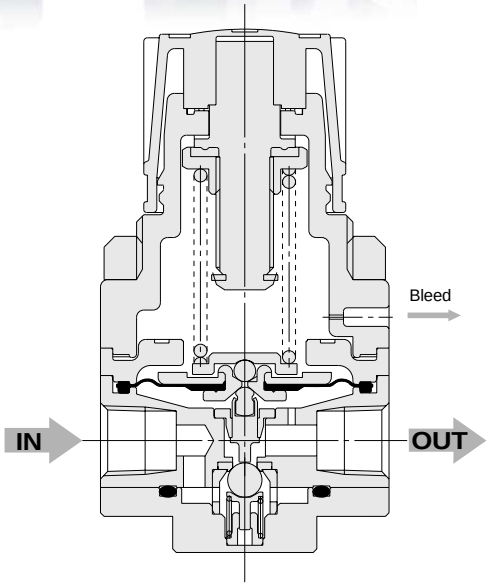
Oil free
Parts composition with no use of oils.
HFC1416 ultrasonic cleaning of all fluid-contact parts.

Consistent clean room production
Cleaned, assembled, inspected, and sealed in double packaging in a Class 10,000 environment.

Specifications

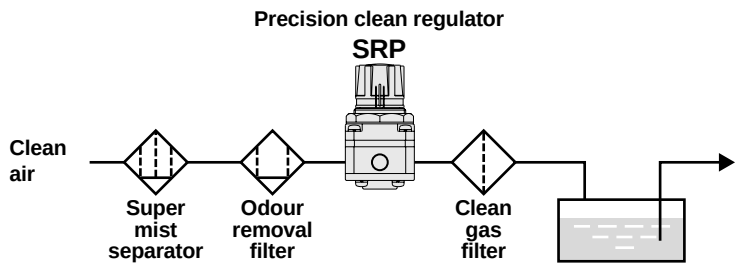
Connection port size		M5, Rc 1/8
Fluid		Air, N_2, CO_2, Ar
Proof pressure MPa		1.5
Maximum operating pressure MPa		1.0
Regulating pressure range MPa	Low pressure type	0.005 to 0.2
	High pressure type	0.01 to 0.4
Ambient and fluid temperature (°C)		0 to 60
Fluid consumption ℓ/min (ANR) Note 1)		0.5 or less
Sensitivity		0.3% of full span
Repeatability		±1% of full span
Fluid-contact parts	Metal	SUS316
	Resin	Fluororesin
	Rubber	Fluoro rubber
	Other	Ceramics
Assembly environment		Clean room class 10000
Parts cleaning		HCFC141b ultrasonic cleaning of all fluid-contact parts

Note 1) At set pressure of 0.2MPa

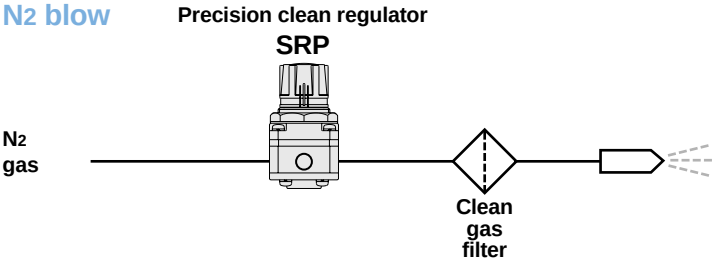


Applications

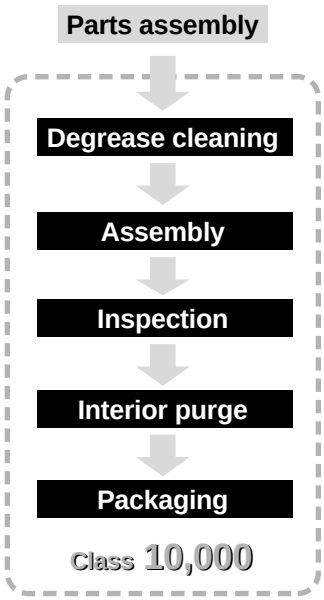
Pressure feed of chemicals



N_2 blow



Manufacturing process



Clean Regulator Series SRH

Contamination controlled stainless steel regulator

Outstanding corrosion resistance
All metal parts in contact with fluid use stainless steel SUS316

Oil free
Parts assembled without any use of oils

2 types of diaphragm material available
Depending upon the application, PTFE (Grade A) or fluororubber (Grade B) can be selected for the diaphragm material.

Designed to minimize residual fluid
- Design includes an intake/exhaust port in the diaphragm compartment which facilitates flow.
- Valve springs are partitioned by the diaphragm.

Pulsation suppressing design

Specifications

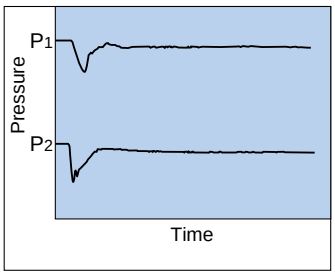
Model		SRH3□□0	SRH4□□0	SRH3□□1	SRH4□□1
Relief mechanism		Non-relief		Relief	
Port size		Rc1/8, 1/4 URJF1/4	Rc1/4, 3/8, 1/2 URJF3/8	Rc1/8, 1/4	Rc1/4, 3/8, 1/2
Fluid	Grade A	Clean air, N_2, Ar, CO_2, Pure water		Clean air, N_2	
	Grade B	Air, N_2, Ar, CO_2, Water		Air, N_2	
Proof pressure		1.5MPa			
Max. operating pressure		1MPa			
Set pressure	Low pressure type	0.01 to 0.2MPa			
	High pressure type	0.05 to 0.7MPa			
Ambient & fluid temperatures		0 to 60°C (With no condensation)			
Fluid-contact material (metal)		Stainless steel SUS316 (Body is SUS316L)			
Diaphragm material	Grade A	PTFE			
	Grade B	Fluororubber			
Weight		360g	730g	360g	730g

Consistent clean room production

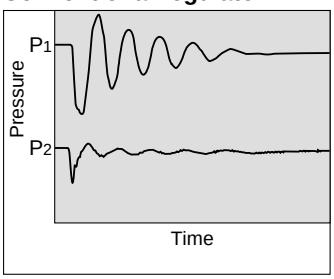
Washed, assembled and inspected in a Class 100 environment, and sealed in double bags

Step response comparison

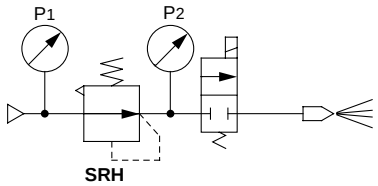
SRH



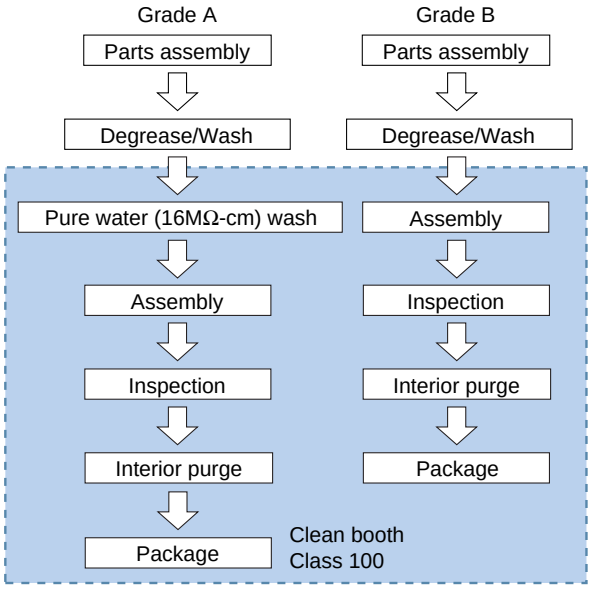
Conventional regulator

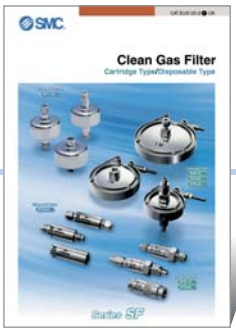


Circuit diagram



Manufacturing process





SMC Clean Gas Filter Series SF

Integrated production in a clean environment

Under a clean environment, all components are washed by ultrasonic wave/ ultra-pure deionized water. Assembly, inspection and antistatic double packaging processes are done in an integrated production system.

Assembly environment

- Clean room M5.5 (ISO class 7)*
- Clean bench M3.5 (ISO class 5)*

* Fed.std.209E ( ): based on ISO 14644-1

Shipping inspection

At the time of shipment, the SFm series clean gas filter, is 100% inspected, and only those that pass our inspection are allowed for delivery.

Cartridge type

- 0.1 µm purification test
- Airtight test

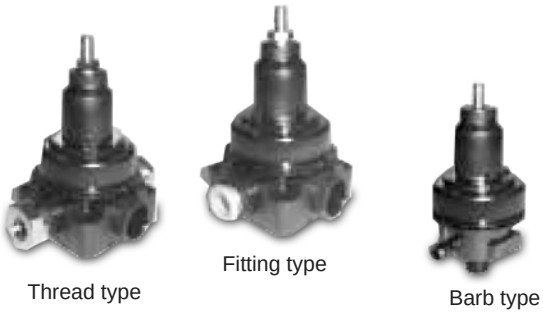
Disposable type

- 0.1 µm purification test
- Helium leak test
- Pressure holding test

		Series	Filtration	Flow rate ℓ/min (ANR) (Max. flow rate at 0.7 MPa)	Pressure MPa	Temperature °C	Replacement of element
Cartridge type	 Disc style	**SFA10□**	0.01 µm	26	1.0	5 to 80	Replaceable
		SFA20□		70			
		SFA30□		140			
	 Straight style	**SFB10□**		26			
		SFB20□ (Strainer)	120 µm	400			
Disposable type	 Straight style	**SFB30□**	0.01 µm	26	15	5 to 120	Nonreplaceable
	 Multiple disc style	**SFC10□**		300	1.8		

Special Regulator for Oxygen Concentrator Series SRA

- This regulator is applicable for use with **95%** concentration oxygen. Oil-free, material resistible against oxygen.
- Precise pressure regulation and high repeatability.
- Light and compact.
- Applicable for use with medical devices.



Thread type　Fitting type　Barb type

Specifications

Model		SRA200-01	SR200F-08	SRA202-N01-X200A
Port size	Inlet	Rc 1/8	ø8 O.D. Tubing	
	Outlet	Rc 1/8	ø8 O.D. Tubing	
Proof pressure		0.45 MPa		
Operating pressure	Inlet	0.3 MPa		
	Outlet	Set pressure + 0.06 MPa		
Set pressure		0.01 to 0.1		
Fluid		Oxygen, Air		
Lubrication		Use no oil and grease		
Relieving structure		Non-relieving type		
Ambient and fluid temperature		0 to 40°C		
Flow rate range of operating fluid		0.2 to 6 L/min		

How to Order

Thread type

SRA200 – F 01

Thread type

Nil	Rc
F	G
N	NPT

Port size

01	1/8
02	1/4

Fitting type

SRA200F – 06

Tubing O.D.

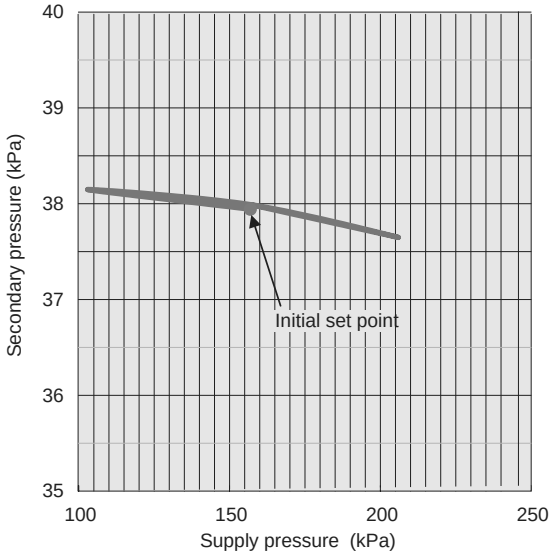
06	6 mm
08	8 mm

Barb type

SRA202 – N01 – X200A

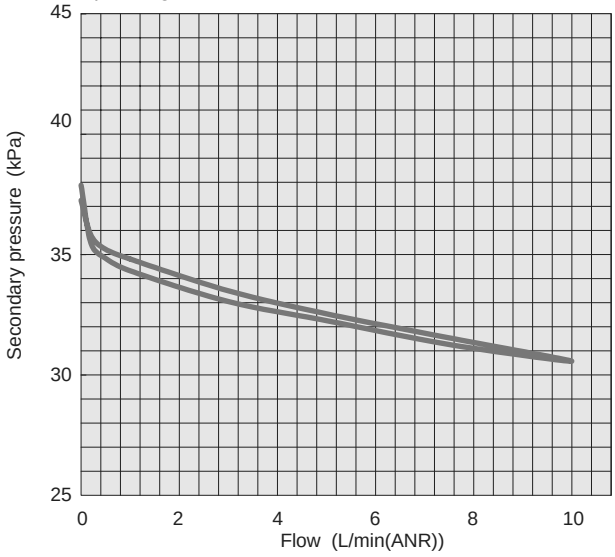
Pressure Characteristics (SRA200, SRA200F)

Initial setting
Supply pressure= 157kPa
Secondary pressure= 38kPa
Flow = 5L/min (ANR)
Operating fluid = Air



Flow Characteristics (SRA200, SRA200F)

Supply air = 157kPa
Operating fluid = Air



Refrigerated Air Dryer Series IDFA

High performance, reliable and trouble free compressed air treatment from SMC

- High efficiency heat exchanger.
- Ozone friendly refrigerants.
- Conforms to stringent ISO8573-1 standards.
- State of the art design ensures a constant 3°C pressure dew point.
- Environmentally ozone friendly HFC134a and HFC407C refrigerant gases.
- Simple control system, incorporating an easy to read evaporator gauge.
- Stainless steel heat exchanger providing long life and low pressure drops.
- Compact design for ease of installation.
- ø10 mm One-touch condensate drain port.

Standard Specifications

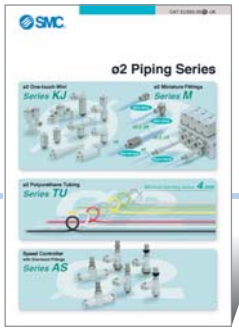
Model	Operating range			Power supply voltage	Power consumption (W)	Air port connections	Refrigerant	Weight (kg)
	Inlet air pressure (bar)	Inlet air temperature (°C)	Ambient temperature (°C)					
IDFA3E-23	1.5 to 10	5 to 50	2 to 40 (Relative humidity of 85% or less)	Single Phase 230 VAC 50Hz	180	Rc 3/8	HFC134a	18
IDFA4E-23						Rc1/2		22
IDFA6E-23-K	1.5 to 16					Rc 3/4		23
IDFA8E-23-K					208			27
IDFA11E-23-K					385			28
IDFA15E-23-K					470	Rc 1		46
IDFA22E-23-K					810	R 1	HFC407C	54
IDFA37E-23-K						R 1 1/2		62

Nominal Air Flow Rate [m^3/h (ANR)] *

Model	ISO 8573.1 Water vapour class		
	4 (3°C Pressure dew point)	5 (7°C Pressure dew point)	6 (10°C Pressure dew point)
IDFA3E-23	12	15	17
IDFA4E-23	24	31	34
IDFA6E-23-K	36	46	50
IDFA8E-23-K	65	83	91
IDFA11E-23-K	80	101	112
IDFA15E-23-K	120	152	168
IDFA22E-23-K	182	231	254
IDFA37E-23-K	273	347	382

* The performance data for m^3/h (ANR) is in accordance with the following operating conditions from ISO 7183:
- Inlet air pressure: 7 bar
- Inlet air temperature: 35°C (saturated)
- Ambient temperature: 25°C

ø2 Piping Series
Series KJ•M•AS•TU



TU/M
EUS50-25

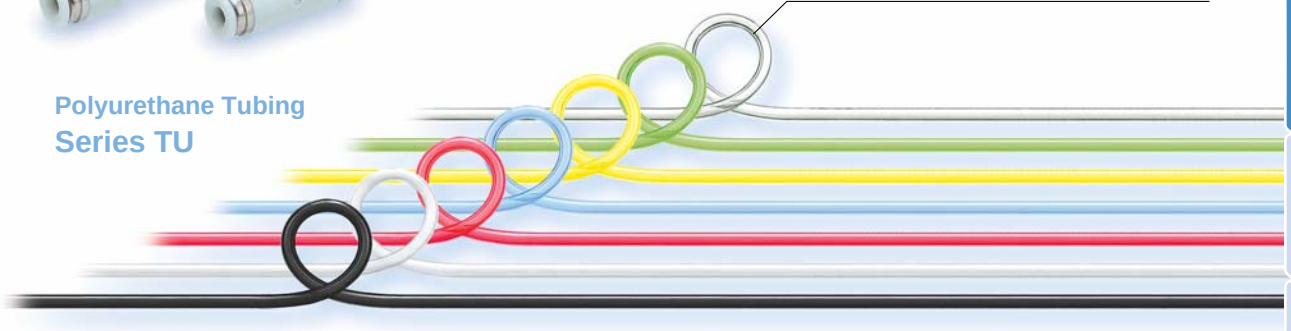
One-touch Mini
Series KJ

Miniature Fittings
Series M

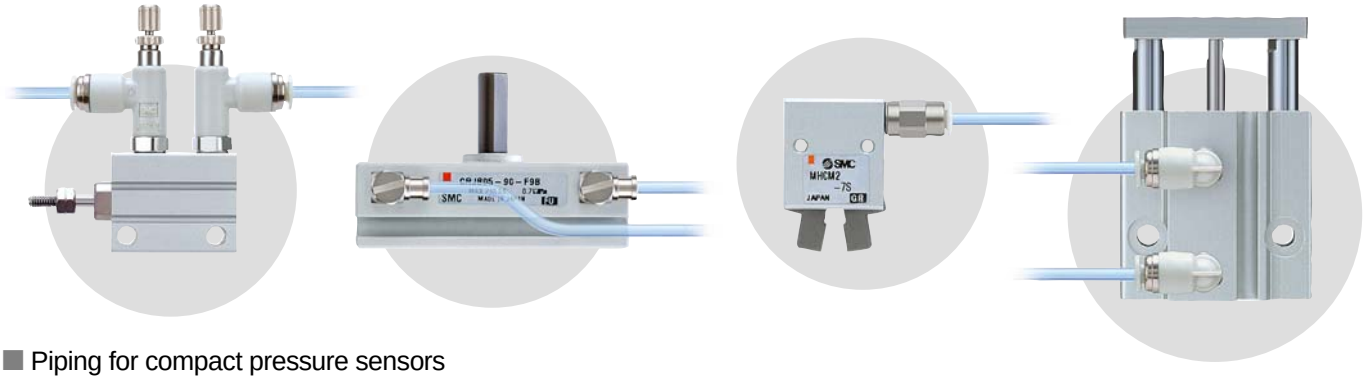
Speed Controller
with One-touch Fittings
Series AS

■ Minimum bending radius: **4 mm**

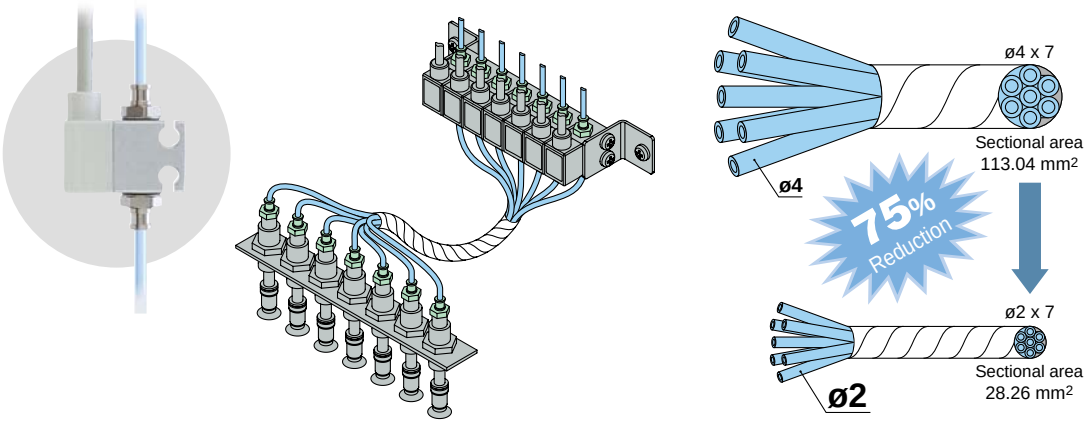
Polyurethane Tubing
Series TU



■ Piping for compact actuators



■ Piping for compact pressure sensors



General Purpose Fittings Series

Variations

One-touch connection and release
Possible to use in vacuum to –100 kPa

One-touch Mini
Series KJ

Applicable tubing—Metric size

One-touch connection and release
Possible to use in vacuum to –100 kPa

One-touch Fittings
Series KQ2

Applicable tubing—Metric size

Low-torque rotation for fast swivel and oscillating applications

Rotary One-touch Fittings
Series KS (Standard)
Series KX (High speed)

Applicable tubing—Metric size

One-touch connection and release
One-touch In/Out connection for compact and concentrated tubing applications

One-touch Fittings/Manifold
Series KM

Applicable tubing—Metric size

Possible to use in vacuum to –101.3 kPa

Insert Fittings
Series KF

Applicable tubing—Metric size

Tubing connection/disconnection without use of tools

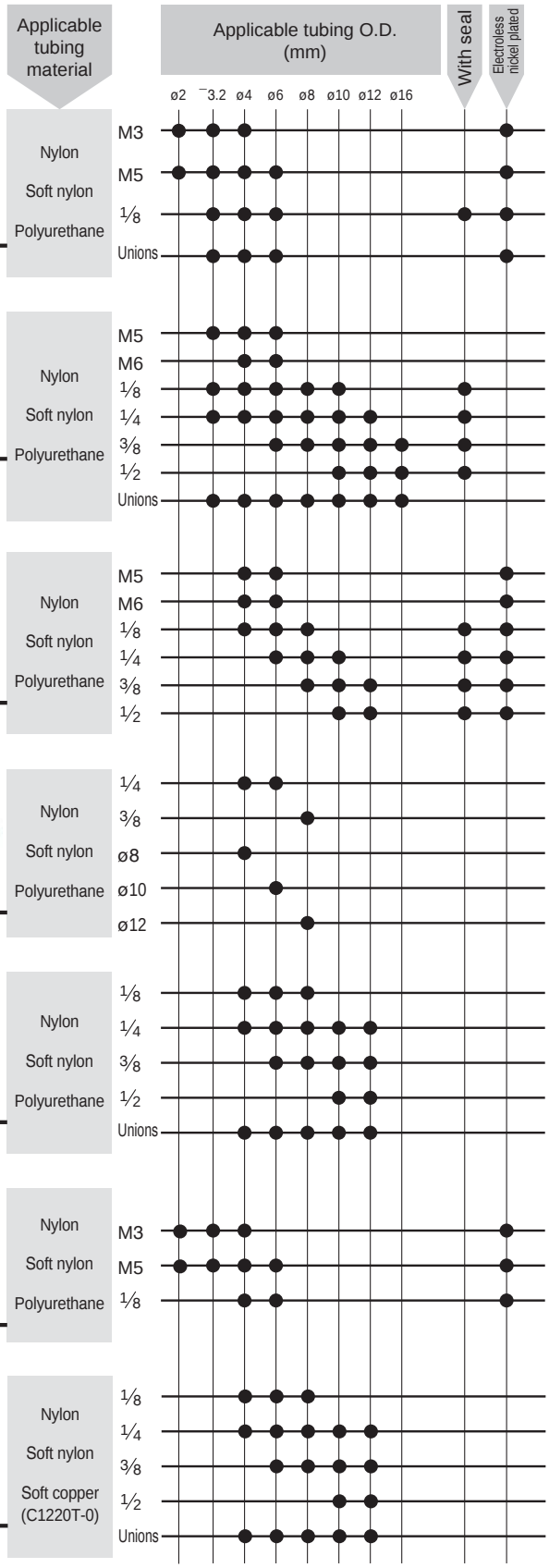
Miniature Fittings
Series M

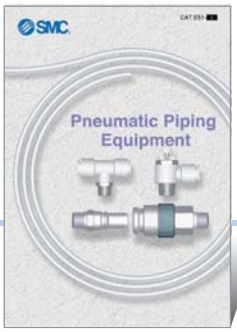
Applicable tubing—Metric size

Accepts soft copper tube

Self-align Fittings
Series H/DL/L/LL

Applicable tubing—Metric size





General Purpose Fittings Series

Variations

One-touch connection and release
Built-in self-seal mechanism

Tube Coupler
Series KC

Applicable tubing—Metric size

Multi-connector with One-touch Fittings
Series DMK

Applicable tubing—Metric size

Rectangular Multi-connector
Series KDM

Applicable tubing—Metric size

Centralized distribution of supply air

Piping Module
Series KB

Applicable tubing—Metric size

Applicable tubing material	Applicable tubing O.D. (mm) ø3.2 ø4 ø6 ø8 ø10 ø12 ø16	With seal	Electroless nickel plated
Nylon, Soft nylon, Polyurethane	M5		
	1/8		
	1/4		
	3/8		
	1/2		
	Unions		
Nylon, Soft nylon, Polyurethane	6 tubes		
	12 tubes		
Nylon, Soft nylon, Polyurethane	10 tubes		
	20 tubes		
Nylon, Soft nylon, Polyurethane			

Clean Series Fittings

For air Blow applications

Clean One-touch Fittings
Series KP

Applicable tubing—Metric size

For driving System Air Piping

Clean One-touch Fittings
Series KPQ/KPG

Applicable tubing—Metric size

Applicable tubing material	Applicable tubing O.D. (mm) ø3.2 ø4 ø6 ø8 ø10 ø12 ø16	With seal	Electroless nickel plated
Recomended: Polyolefin, Soft Polyolefin	1/8		
	1/4		
	3/8		
	1/2		
	Unions		
Polyurethane: Serie 10-	M5		
	1/8		
	1/4		
	3/8		
	1/2		
	Unions		

Fitting Series for Special Environments

For use where weld spatter is generated
Flame resistant material UL-94, V-0

FR One-touch Fittings **Series KR**

Applicable tubing—Metric size

For use where weld spatter is generated
Flame resistant material UL-94, V-0

FR One-touch Fittings Manifold **Series KRM**

Applicable tubing—Metric size

For use in corrosive environments
Stainless series

One-touch Fittings **Series KG**

Applicable tubing—Metric size

For use in corrosive environments
Stainless series 316

One-touch Fittings **Series KQG**

Applicable tubing—Metric size

For use in corrosive environments
Stainless series 316

Insert Fittings **Series KFG**

Applicable tubing—Metric size

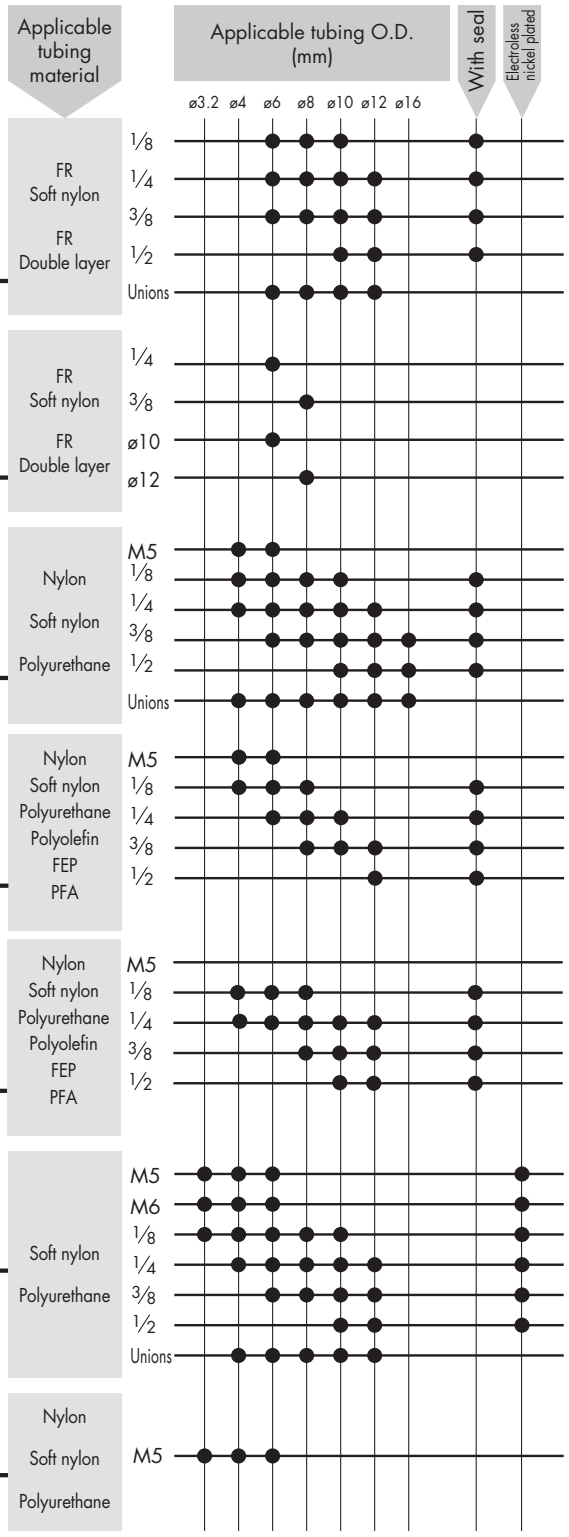
For preventing static electricity

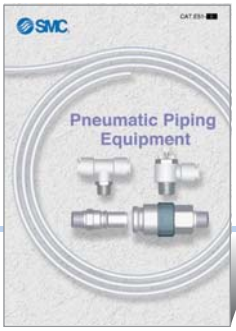
Antistatic One-touch Fittings **Series KA**

For use in corrosive environments
Stainless steel (SUS316)

Miniature Fittings **Series MS**

Applicable tubing—Metric size





General tubing 1.5 MPa max. at 20°C

Nylon Tubing
Series T/TIA

Slightly flexible 1.0 MPa max. at 20°C

Soft Nylon Tubing
Series TS/TISA

Flexible 0.8 MPa max. at 20°C

Polyurethane Tubing
Series TU/TIUB

Extremely flexible 0.6 MPa max. at 20°C

Soft Polyurethane Tubing
Series TUS

0.8 MPa standard type, 1.0 MPa for high pressure type

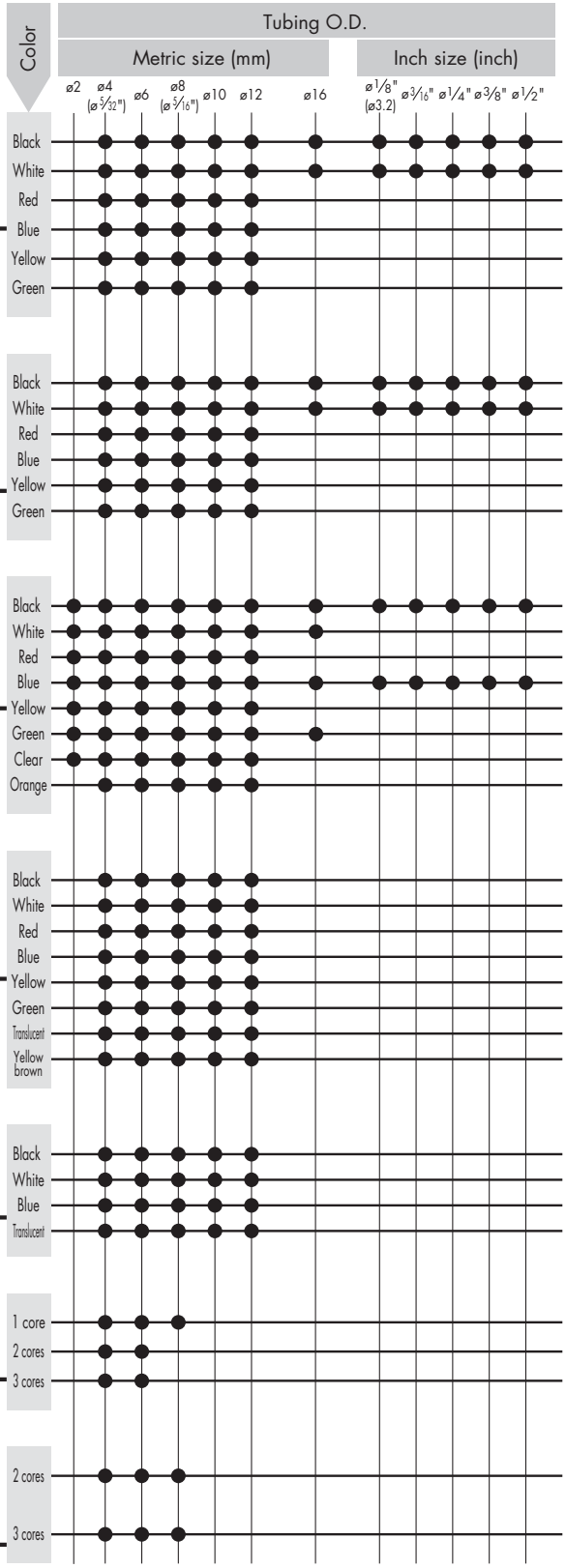
Hard Polyurethane Tubing
Series TUH

For flexible and moving applications

Polyurethane Coil Tubing
Series TCU

For flexible multi-tube applications

Polyurethane Flat Tubing
Series TFU



Tubing

Use in spatter generating atmosphere/
Flame resistant material

FR Soft Nylon Tubing
Series TRS

Flame resistance (Equivalent to UL-94 standard, V-0)

FR Double Layer Tubing
Series TRB

Flame resistance (Equivalent to UL-94 standard, V-0)

FR Double Layer Polyurethane Tubing
Series TRBU

Flame resistance (Equivalent to UL-94 standard, V-0)

Antistatic Polyurethane Tubing
Series TAU

For preventing static electricity
For preventing static electricity

Antistatic Soft Polyurethane Tubing
Series TAS

Outstanding corrosion resistance.

Super PFA High Purity Fluoropolymer Tubing
Series TL/TIL

Outstanding corrosion resistance.

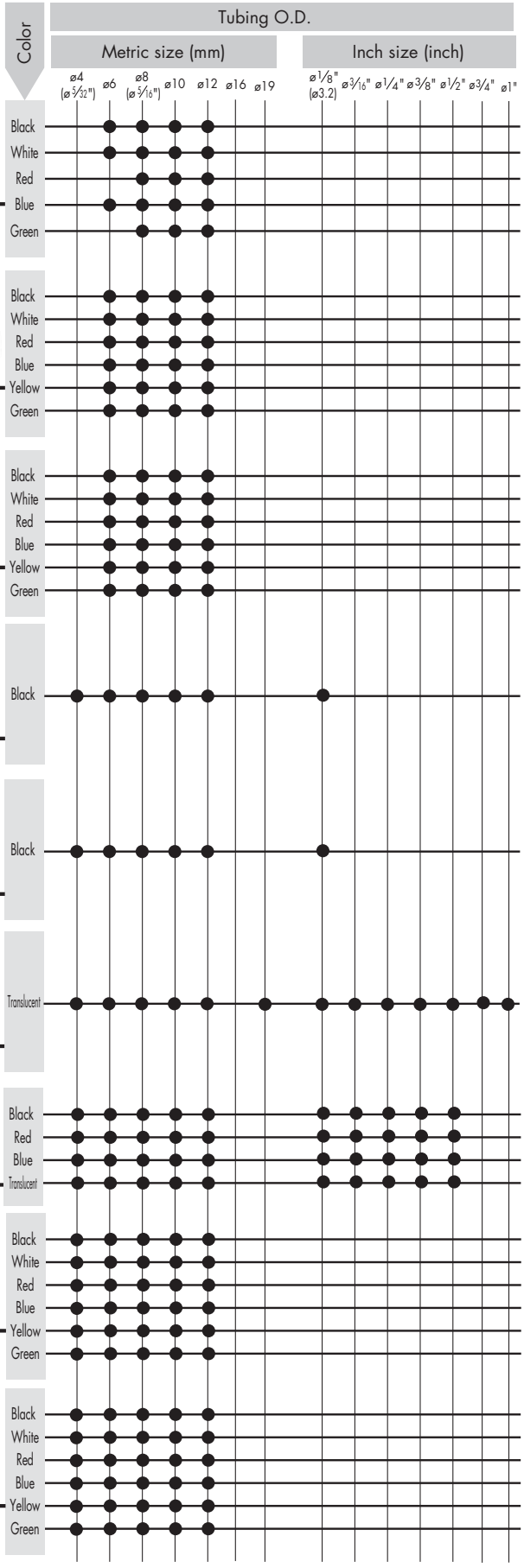
FEP Fluoropolymer Tubing
Series TH/TIH

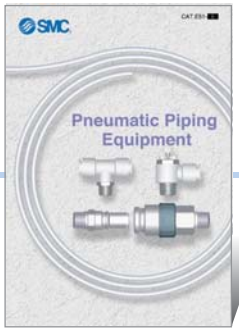
Clean tubing

Polyolefin Tubing
Series TPH

Clean tubing

Soft Polyolefin Tubing
Series TPS





Pneumatic Piping Equipment
E-51-B

Related Products

Related Products:

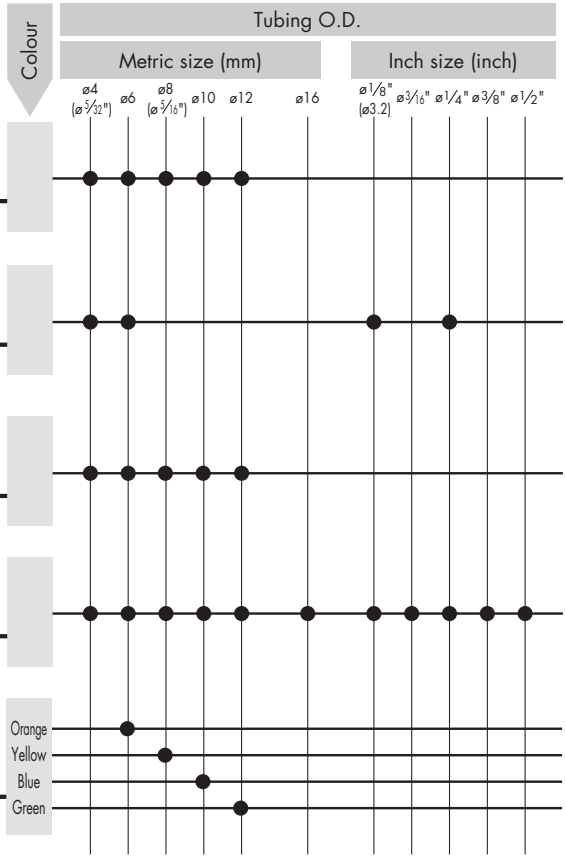
Multi-tube Holder
Series TM

Tube Releasing Tool
Series TG

Tube Stand & Tube Reel
Series TB/TBR

Tube Cutter
Series TK

The outer layer for double layer tubing, Series TRB, TRBU is peeled off easily.
Double Layer Tube Stripper
Series TKS



Rotary Joint

Low Torque Metal Seal Type Rotary Joint
Series MQR

Number of circuits (number of ports): 1, 2, 4, 8, 12, 16

Blow Gun

Blow Gun
Series VMG

Pressure loss is less than 1%.

Nozzles

Nozzles for Blowing
Series KN

Nozzle system for air blowing and back pressure sensing.

S Couplers Series KK□

S Couplers with sleeve lock
Series KK

Male thread type

Series	Port size					
	M5	R1/8	R1/4	R3/8	R1/2	R3/4
KK2	○	○				
KK3		○	○	○		
KK4		○	○	○	○	
KK6				○	○	○

Female thread type

Series	Port size				
	M5	Rc1/8	Rc1/4	Rc3/8	Rc1/2
KK2	○				
KK3		○	○	○	
KK4			○	○	
KK6				○	○

Nut fitting type (for fiber reinforced urethane hose)

Series	Applicable hose I.D./O.D. mm					
	5/8	6/9	6.5/10	8/12	8.5/12.5	11/16
KK3	○	○	○			
KK4	○	○	○	○	○	
KK6				○	○	○

One-touch fitting type (Straight/Elbow/Bulkhead)

Series	Applicable tubing O.D. mm						
	ø3.2	ø4	ø6	ø8	ø10	ø12	ø16
KK2	○	○	○				
KK3		○	○	○	○		
KK4			○	○	○	○	
KK6						○	○

Series KK3/4/6

Series KK2

S Couplers without sleeve lock
Series KKH

Male thread type

Series	Port size			
	R1/8	R1/4	R3/8	R1/2
KKH3	○	○	○	
KKH4	○	○	○	○

Female thread type

Series	Port size		
	Rc1/8	Rc1/4	Rc3/8
KKH3	○	○	○
KKH4		○	○

Nut fitting type (for fiber reinforced urethane hose)

Series	Applicable hose I.D./O.D. mm				
	5/8	6/9	6.5/10	8/12	8.5/12.5
KKH3	○	○	○		
KKH4	○	○	○	○	○

Stainless steel type
Series KKA

Male/Female thread type

Series	Port size							
	R·Rc1/8	R·Rc1/4	R·Rc3/8	R·Rc1/2	R·Rc3/4	R·Rc1	R·Rc1 1/4	R·Rc1 1/2
KKA3	○	○	○					
KKA4		○	○	○				
KKA6			○	○	○			
KKA7				○	○	○		
KKA8					○	○	○	
KKA9						○	○	○

Manufactured by RECTUS AG
Series KK13

Male thread type

Series	Port size			
	R1/8	R1/4	R3/8	R1/2
KK13	○	○	○	○

Female thread type

Series	Port size			
	Rc1/4	Rc3/8	Rc1/2	G1/4
KK13	○	○	○	○

Barb fitting type

Series	Applicable hose I.D.			
	1/4"	1/4"	3/8"	1/2"
KK13	○	○	○	○

Plug nut fitting type (for fiber reinforced urethane hose)

Series	Applicable hose I.D./O.D. mm					
	5/8	6/9	6.5/10	8/12	8.5/12.5	11/16
KK13	○	○	○	○	○	○

Miniaturization of equipment

Space Saving Products series now available for further miniaturisation.

CUJ Series

Mini Free-Mount Cylinder

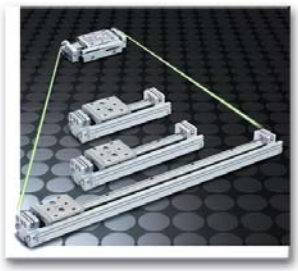
CXSJ Series

Dual Rod Cylinder

MGJ Series

Miniature Guide Rod Cylinder

MXY Series



Air Slide Table
- Long stroke:
Max.stroke:400mm

MXP Series

Air Slide Table
- Short stroke:
Max.stroke:30mm

MTS Series

Precision Cylinder

CRJ Series

Rotary Actuator
- Single rack-and-pinion type

MSQ Series

Rotary Actuator
- Double rack-and-pinion type

CJ5/CG5 Series

Stainless Steel Cylinder

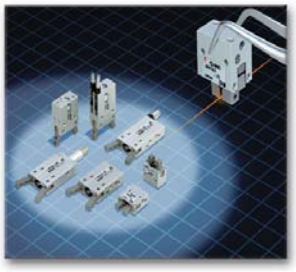
SMAC Series

Moving Coil Actuators

PSE Series

Pressure sensors

MH Series



Air Grippers

Electric actuators

Simplified Options

Electric Cylinders
Series LZ

Looking for a **simple electric cylinder** that can be **operated like an air cylinder** for simple **end to end motion?** Then the LZ electric cylinder available in **two sizes** and driven with a **24VDC motor** should fit the bill. When used in combination with the LC3 directional control driver which is **operated with ON/OFF signals** similar to that used for a solenoid valve, cylinder speeds **up to 200mm/s** and thrust **up to 196N** are possible. Available with **multiple mounting options** and **strokes up to 200mm** this cylinder is the perfect solution for simple applications where there is **no compressed air supply.**

■ Basic Specifications

Thrust	Horizontal mounting: Up to 80 N (LDZ□3) Vertical mounting: Up to 40 N (LDZ□3L) Horizontal mounting: Up to 196 N (LDZ□5) Vertical mounting: Up to 100 N (LDZ□5L)
Speed	Up to 200 mm/s
Standard strokes	25, 40, 100, 200 mm
Motor type	24 VDC

∗ Contact SMC for detailed specifications and how to order

e-Rodless Actuator
Series E-MY2

These rodless actuators combine the speed, controllability and performance of an electric actuator with the **easy functionality** of an air cylinder through the use of a simple and quick **three step set-up operation.** With a belt driven construction and strokes between **50-1000mm** this actuator is capable of velocities up to **1000 mm/sec** and **0.5g** acceleration. Available in two sizes with either a **cam follower guide** or **high precision type** for maximum payloads of 5 or 10kg.

■ Basic Specifications

Maximum load weight	Up to 5 kg (E-MY2□16) Up to 10 kg (E-MY2□25)
Speed	100 up to 1000 mm/s
Standard strokes	100, 200, 300, 400, 500, 600, 700, 800, 900, 1000 mm
Motor type	Stepper with encoder

∗ Contact SMC for detailed specifications and how to order

Short Stroke Electric Actuators
Series LXF•LXP•LXS

Currently available in **three compact model types**; a low profile slide table (LXF), a guide rod type (LXP) and a slide table version with increased rigidity (LXS). Incorporating either **2 or 5 phases stepper motors,** these **high performance** actuators deliver some really impressive **muscle power** and can move loads of up to 10kg **at speeds up to 200mm/sec.** Additionally, they are also **highly accurate,** with position repeatability of between +/- 0.03 and +/- 0.05 mm dependent on model type.

■ Basic Specifications **Series LXF**

Maximum work load	Up to 3 kg
Speed	Up to 200 mm/s
Standard strokes	25, 50, 75, 100 mm
Motor type	Stepper

■ Basic Specifications **Series LXP**

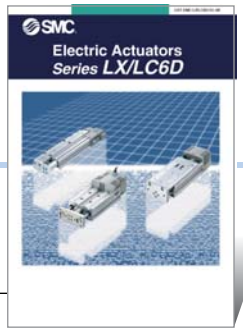
Maximum work load	Up to 6 kg (Horizontal mounting) Up to 5 kg (Vertical mounting)
Speed	Up to 200 mm/s
Standard strokes	50, 75, 100, 125, 150, 175, 200 mm
Motor type	Stepper

■ Basic Specifications **Series LXS**

Maximum work load	Up to 10 kg (Horizontal mounting) Up to 5 kg (Vertical mounting)
Speed	Up to 200 mm/s
Standard strokes	50, 75, 100, 125, 150 mm
Motor type	Stepper

∗ Contact SMC for detailed specifications and how to order

LC8/LJ1/LG1/LTF
EUS10-53



LX
EMC-LX/LC6D-01

E-MY2
EUS100-51

More Advanced Options

Single Axis Electric Actuator
Series LJ1

This **comprehensive range** of electric actuators is available with two types of precise linear guides and three types of feed screws and are also designed for use with our LC8 positioning driver. With **high positioning accuracy,** dual mounting and multiple cable entry options, these actuator are designed to provide **X-Y axis capability** and are the **perfect solution** for pick and place and palletizing operations.

■ Basic Specifications

Maximum work load	Up to 60 kg
Speed	Up to 1000 mm/s
Standard strokes	100, 200, 300, 400, 500, 600, 800, 1000, 1200, 1500 mm
Motor type	AC Servomotor

∗ Contact SMC for detailed specifications and how to order

Low Profile Single Axis Electric Actuator
Series LG1

With its **space saving design,** this compact electric actuator, with top or bottom mounting options, offers **high rigidity** and **high linear precision** guide control. Designed for use with our latest Series LC8 Positioning Driver for AC servomotors, these actuators offer **excellent accuracy and high production flexibility.**

■ Basic Specifications

Maximum work load	Up to 30 kg
Speed	Up to 1000 mm/s
Standard strokes	100, 200, 300, 400, 500, 600, 700, 800, 900, 1000, 1200 mm
Motor type	AC Servomotor

∗ Contact SMC for detailed specifications and how to order

Electric Actuator with Integrated Guide
Series LTF

This **light weight and compact actuator** is the result of designing an **integrated linear guide** into the support frame to form a **one piece structure.** Additionally the **circulating type ball bearing liner guide** and **martensitic stainless steel frame** creates a table with high rigidity and high sliding accuracy. Available in two sizes with **100 & 200W AC servomotors** for use with the LC8 positioning driver, this actuator is perfect for use in high performance applications wanting a space saving design.

■ Basic Specifications

Maximum work load	Up to 50 kg
Speed	Up to 1000 mm/s
Standard strokes	100, 200, 300, 400, 500, 600, 700, 800, 900, 1000 mm
Motor type	AC Servomotor

∗ Contact SMC for detailed specifications and how to order

Positioning Driver (for AC servomotor)
Series LC8

- Up to 117 programmable positioning steps can be operated using I/O from a PLC.
- All system parameters can be set using an easy to use Windows® based software.
- Up to 6 slave units can be attached for multi-axis systems.
- For use with Series LJ1, LG1 and LTF electric actuators.

Electro-Pneumatic Pressure Regulator Series ITV

Stepless control of air pressure proportional to an electrical signal

- Sensitivity: **0.2** kPa (100kPa specification)
- Linearity: Within ±**1**% (F.S.)
- Hysteresis: Within ±**0.5** % (F.S.)

IP65 Equivalent to IP65

CE (Series ITV0000/1000/2000/3000)

Series ITV0000
7ℓ/min(ANR) ✻

Series ITV1000
200ℓ/min(ANR) ✻

- Parts in contact with fluids are oil free.
- Residual pressure is Zero with no electrical signal.

Series ITV3000
4000ℓ/min(ANR) ✻

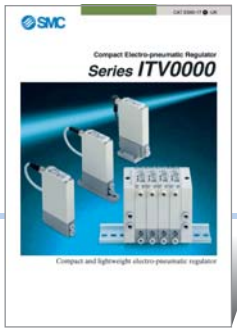
Series ITV2000
1500ℓ/min(ANR) ✻

Controller for electro-pneumatic pressure regulator
Series IC

Digital signal is converted to analog signal.

✻Pressure range 0.9MPa Supply pressure 1.0MPa

ITV
ES60-15



ITV0000
ES60-17

	Series	Model	Set pressure range	Sensitivity	Accuracy
Electro-pneumatic pressure regulator	**Series ITV0000** 7ℓ/min(ANR)* 	ITV001	0.001~0.1MPa	0.2kPa	Linearity Within ±1% F.S. Hysteresis Within ±0.5% F.S.
		ITV003	0.001~0.5MPa	1.0kPa	
		ITV005	0.001~0.9MPa	1.8kPa	
		ITV009	-1~-100KPa	0.2kPa	
	Series ITV1000 200ℓ/min(ANR)*  •Parts in contact with fluids are oil free. •Residual pressure is Zero with no electrical signal.	ITV101	0.005~0.1MPa	0.2kPa	
		ITV103	0.005~0.5MPa	1.0kPa	
		ITV105	0.005~0.9MPa	1.8kPa	
	Series ITV2000 1500ℓ/min(ANR)* 	ITV201	0.005~0.1MPa	0.2kPa	
		ITV203	0.005~0.5MPa	1.0kPa	
		ITV205	0.005~0.9MPa	1.8kPa	
		ITV209	-1.3~-80kPa	0.16kPa	
	Series ITV3000 4000ℓ/min(ANR)* 	ITV301	0.005~0.1MPa	0.2kPa	
		ITV303	0.005~0.5MPa	1.0kPa	
		ITV305	0.005~0.9MPa	1.8kPa	

	Series	Model	Pressure range	Input	Output
Controller	**Series IC**  Digital signal is converted to analog signal.	IC1	0.1MPa	10 bit parallel input 4 points inputs	0~10VDC 4~20mADC
		IC3	0.5MPa		
		IC5	0.9MPa		
		IC9	-0.1MPa		

* Pressure range 0.9MPa Supply pressure 1.0MPa

With guard function for supply pressure / ITV1000,2000,3000

Made to Order

- Detects drop of supply pressure
  Idle operation of solenoid valve is stopped and pressure at secondary side is exhausted.
- Detection pressure 100±80kPa/ITV1000,2000,3000
  Note) Only 4 to 20mA input signal option available at this time. No monitor voltage output available.

Digital pressure Switch Series Variations

PSE
EUS100-56

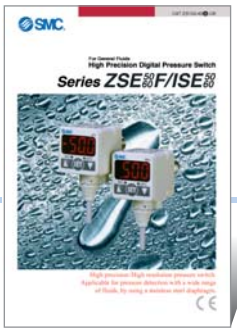
Individual sensor and controller type

	Sensor				Controller	
	PSE53□	PSE54□	PSE56□	PSE550	PSE300	PSE200
Model						
Fluid	General pneumatic		General fluids	General pneumatic	Sensor input amount: 1 input	Sensor input amount: 4 input
Calibration method	Push-button calibration					
Set pressure range	0 to 1 MPa 0 to –101 kPa 0 to 101 kPa –101 to 101 kPa	0 to 1 MPa 0 to –101 kPa –100 to 100 kPa	0 to 1 MPa 0 to –101 kPa –100 to 100 kPa 0 to 500 kPa	0 to 2 kPa (and specials)	–0.1 to 1 MPa 10 to –101 kPa –100 to 100 kPa –10 to 100 kPa –50 to 500 kPa –0.2 to 2 kPa	–0.1 to 1 MPa 10 to –101 kPa –101 to 101 kPa –10 to 100 kPa
Voltage	12 to 24 VDC (Ripple p-p 10% or less)				12 to 24 VDC (Ripple p-p 10% or less)	
Temperature characteristics	±2% F.S. or less (25°C)		±2% F.S. or less (0 to 50°C: based on 25°C) ±3% F.S. or less (–10 to 60°C: based on 25°C)	±3% F.S. or less (25°C)	±0.5% F.S. or less (0 to 50°C)	
Repeatability	±1% F.S. or less	±0.2% F.S. or less		±0.3% F.S. or less	±0.1% F.S. or less	
Hysteresis					Hysteresis mode: Variable Window comparator mode: Variable	Hysteresis mode: Variable Window comparator mode: Fixed (3 digits)
Output	1 to 5 V		1 to 5 V 4 to 20 mA		NPN/PNP open collector 2 outputs Analog output	NPN/PNP open collector 1 CH: 2 outputs 2 to 4 CH: 1 output each
Display (Resolution)					2 colour	1 colour
Enclosure	IP40		IP65	IP40	IP40	Front only IP65 The rest IP40
Note					Panel mounting possible Selectable pressure unit Auto shift function Auto preset function	Display calibration function Anti-chattering function Peak hold Bottom hold

ZSEISE30
ES100-42

ZSEISE40
P-E99-1

ISE70/75/75H
ES100-52



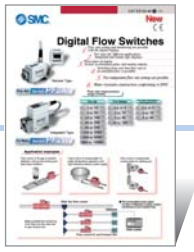
ZSEISE50/60
ES100-43

Integrated sensor and controller type

	ZSE30 ISE30	ZSE40 ISE40	ISE70	ISE75 ISE75H	ZSE50F ISE50	ZSE60F ISE60
Model						
Fluid	General pneumatic		General fluids			
Calibration method	Push-button calibration					
Set pressure range	–101 to 101 kPa –0.1 to 1 MPa	–100 to 100 kPa 10 to –101.3 kPa –0.1 to 1 MPa	0 to 1 MPa	0.4 to 10 MPa 0.5 to 15 MPa	–100 to 100 kPa –0.1 to 1 MPa	
Voltage	12 to 24 VDC (Ripple ±10% or less)					
Temperature characteristics	±2% F.S. or less (0 to 50°C: based on 25°C)			±3% F.S. or less (0 to 50°C: based on 25°C)		
Repeatability	ZSE30: ±0.2 F.S. ±2 digits or less ISE30: ±0.2 F.S. ±1 digit or less	±0.2% F.S. ±1 digit or less	±0.5% F.S.		ZSE50/60F: ±0.2% F.S. ±1 digit or less ISE50/60: ±0.3% F.S.	
Hysteresis	Hysteresis mode: Variable Window comparator mode: Variable	Hysteresis mode: Variable Window comparator mode: Fixed (3 digits) Digit is min. calibration unit.	Hysteresis mode: Variable Window comparator mode: Variable		Hysteresis mode: Variable Window comparator mode: Fixed (3 digits) Digit is min. calibration unit.	
Output	NPN/PNP, 1 output open collector 1-5 V, 4-20 mA Analog output	NPN/PNP, 2 outputs open collector Analog output	1 setup NPN/PNP open collector PNP open collector		NPN/PNP, 2 outputs open collector Analog output	
Display (Resolution)	Red/Green LED (2 colour)	Red LED (1 colour)	Red/Green LED (2 colour)		Red LED (1 colour)	
Enclosure	IP40	IP65	IP67		IP65	
Note	Panel mounting possible Selectable pressure unit	Panel mounting possible Selectable pressure unit Auto shift function Compound pressure	Selectable pressure unit		R thread Panel mounting possible Selectable pressure unit Auto shift function	URJ TSJ Panel mounting possible Selectable pressure unit Auto shift function

Digital Flow Switch Series Variations

PFM
ES100-63

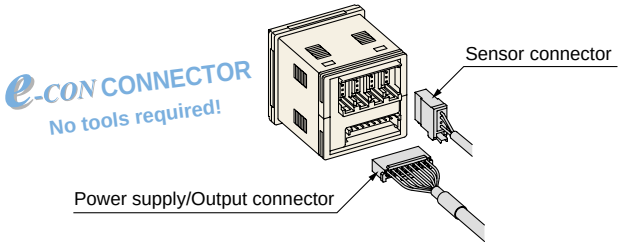


PF2A/W
ES100-48

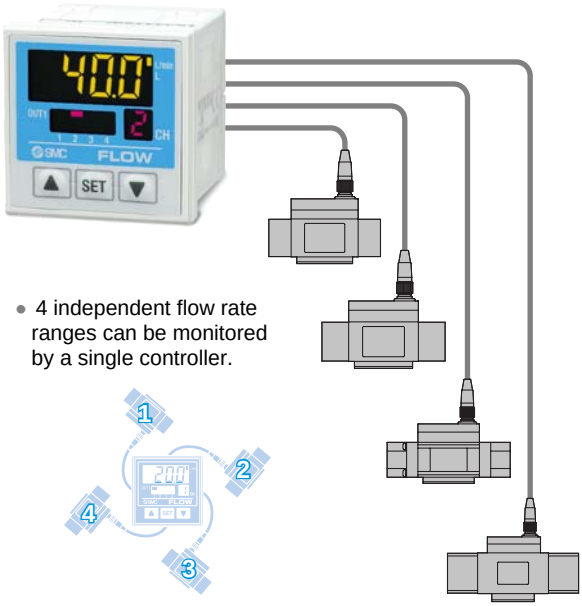
PF2D
ES100-50

- Flow rate setting and monitoring are possible with the digital display.
- Two types are available: Integrated and Remote type.
- Three types of output: Switch, accumulated pulse, and analog outputs.
- Switching from real-time flow rate to accumulated flow is possible.
- Two independent flow rate settings are possible.
- Water resistant construction conforming to IP65

Connection



A single controller can monitor the flow rate of 4 different sensors.

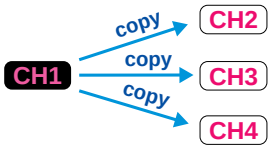


- 4 independent flow rate ranges can be monitored by a single controller.

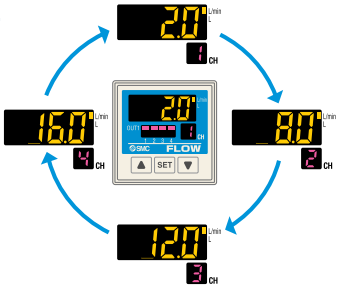
Function

- Copy function
  Possible to copy information from one channel to one or more other channels.

Copying CH1 setting to CH2, 3 and 4.



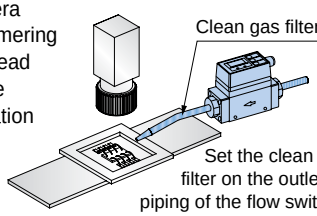
- Channel scan function
  Allows constant monitoring of the displayed pressure value for each channel.



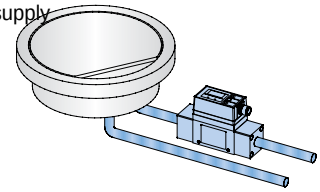
- Key lock function
- Unit switching function
- Peak value and lowest value holding

Application Examples

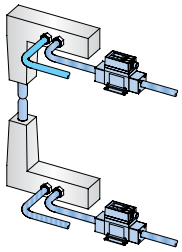
Flow control of N_2 gas to prevent detection camera shimmering and lead frame oxidation

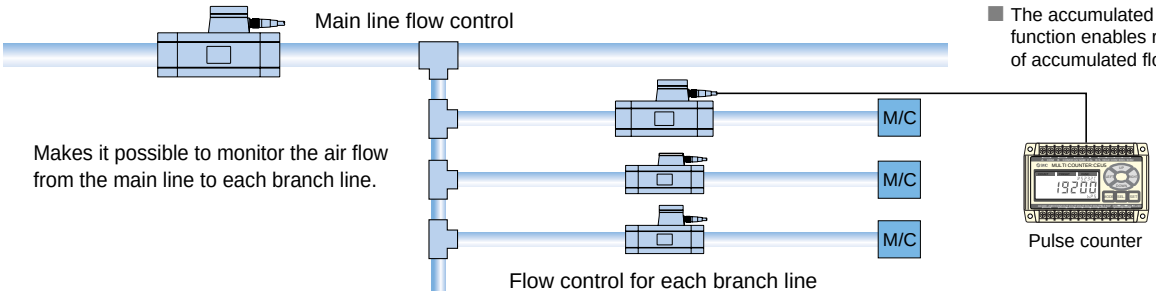


Flow control of cooling water for wafer temperature regulation and high frequency power supply



Flow control of pressurized cooling water for welding gun





■ The accumulated pulse output function enables remote monitoring of accumulated flow.

(Refer to page 36.)

Compact 2-color Display Digital Flow Switch
Series PFM

Flow rate measurement range ℓ/min	Integrated type
0.2 to 10 (0.2 to 5)	**PFM710**
0.5 to 25 (0.5 to 12.5)	**PFM725**
1 to 50 (1 to 25)	**PFM750**
2 to 100 (2 to 50)	**PFM711**

( ): In the case of CO_2

For Air
Series PF2A




Flow rate measurement range ℓ/min	Integrated type	Remote type		
		Sensor unit	Display unit	Display unit (4ch)
1 to 10	**PF2A710**	**PF2A510**	**PF2A30□**	**PF2A20□**
5 to 50	**PF2A750**	**PF2A550**		
10 to 100	**PF2A711**	**PF2A511**	**PF2A31□**	
20 to 200	**PF2A721**	**PF2A521**		
50 to 500	**PF2A751**	**PF2A551**		
150 to 3000	**PF2A703H**	—	—	—
300 to 6000	**PF2A706H**			
600 to 12000	**PF2A712H**			

For Water
Series PF2W




Flow rate measurement range ℓ/min	Integrated type	Remote type		
		Sensor unit	Display unit	Display unit (4ch)
0.5 to 4	**PF2W704(T)**	**PF2W504(T)**	**PF2W30□**	**PF2W20□**
2 to 16	**PF2W720(T)**	**PF2W520(T)**		
5 to 40	**PF2W740(T)**	**PF2W540(T)**		
10 to 100	**PF2W711**	**PF2W511**	**PF2W33□**	

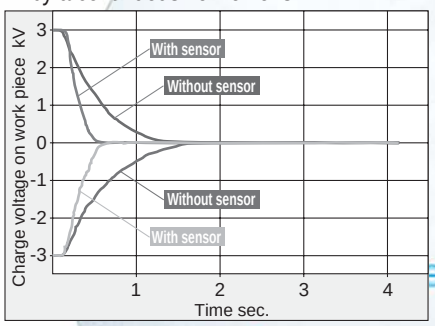
For Deionized Water and Chemicals
Series PF2D



Flow rate measurement range ℓ/min	Remote type		
	Sensor unit	Display unit	Display unit (4ch)
0.4 to 4	**PF2D504**	**PF2D30□**	**PF2D20□**
1.8 to 20	**PF2D520**		
4.0 to 40	**PF2D540**		

Ionizer with surface potential sensor
Series IZS30

Positive and negative electric charge on a work piece is measured and neutralized by a continuous flow of ions.



Discharge time 0.3 seconds

Conditions / Static buildup decreased from 3000 V to 300 V
Discharged object: Charged plate (150 mm x 150 mm, Capacitance 20 pF)
Installation distance: Tungsten electrode with air purge 200 mm from work piece

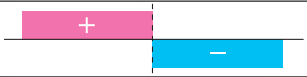
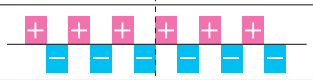
<Conditions>
Height when installed: 250 mm
Air purge: 20 ℓ/min (ANR)
Electrostatic charged plate: 150 mm x 150 mm, 20 pF
Operating frequency without sensor: 33 Hz

Power consumption: 4 W while eliminating static electricity, 2.5 W while standing by

(When a surface potential sensor is used.)

- Automatically stops generating ions when the static electricity has been eliminated.
- Automatically controls the generation of ions and turns the compressed air on/off depending on the existence of a charged material. (When a retrofitted solenoid valve is controlled by using the output signal of an ionizer.)

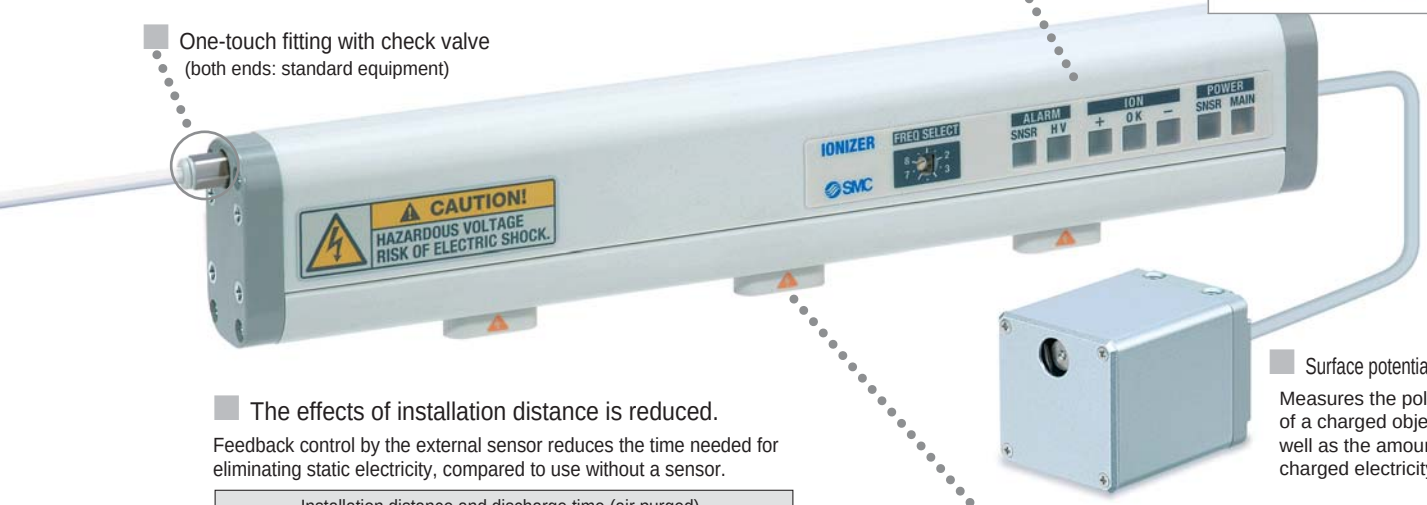
Continuously emits ions of reversed polarity to charged objects as a result of feedback from the external sensor.
(Mode changes to pulse DC mode when a sensor is not used.)

Mode	Ion emission image	Action	How to use
Sensing DC mode (with sensor)		Continuously emits ions of reversed polarity to charged objects as a result of feedback from the external sensor.	Can eliminate static electricity depending on the charged status of the material. Suited for a rapid elimination of static electricity.
Pulse DC mode (without sensor)		Alternatively emits positive and negative ions.	Suited for a continuous material such as a sheet of film and/or for eliminating static electricity in a specific space.

A charged object image

Controller, Built-in high voltage power supply

One-touch fitting with check valve
(both ends: standard equipment)

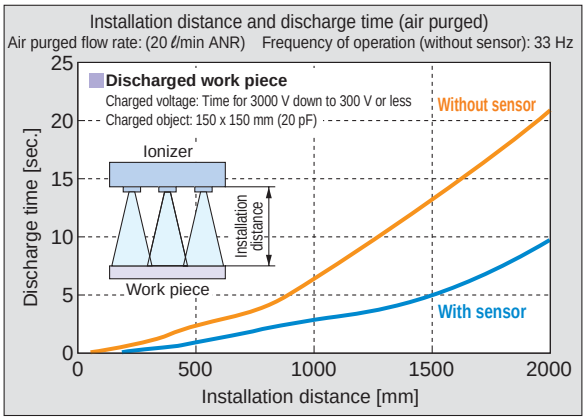


Surface potential sensor

Measures the polarity of a charged object, as well as the amount of charged electricity.

The effects of installation distance is reduced.

Feedback control by the external sensor reduces the time needed for eliminating static electricity, compared to use without a sensor.



Electrodes are supplied in a cartridge.

One-touch electrode replacement.

Specifications

Model		IZS30-300	IZS30-780	IZS30-1260	IZS30-1500	IZS30-1900
Type		Bar type				
Bar length		300 mm	780 mm	1260 mm	1500 mm	1900 mm
Ion generation method		Corona discharge type				
Voltage applied method		Pulse DC method				
Output for emitting electricity		±6000 V				
Ion balance Note 1)		±30 V or less				
Air purge	Operating fluid	Air (clean and dry)				
	Air supply flow rate Note 2)	20ℓ/min (ANR)	50ℓ/min (ANR)	85ℓ/min (ANR)	110ℓ/min (ANR)	140ℓ/min (ANR)
	Operating pressure	0.7 MPa or less				
	Connecting tube O.D.	ø4				
Power supply voltage		21.6 V DC to 26.4 V DC				
Current consumption	Sensor mode while eliminating static electricity	150 mA or less				
	Sensor mode while standing by	100 mA or less				
	Pulse DC mode	100 mA or less				
Input signal	Suspension of eliminating static electricity	NPN transistor (open collector), or contact signal with no voltage				
Output signal	High voltage error	FET (open drain), 28 V DC, 100 mA or less				
	Sensor error					
	Completion of eliminating electricity					
Operating ambient temperature		0 to°50C				
Operating ambient humidity		35 to 80% Rh (non-condensing)				
Material		Cover of ionizer: ABS, Electrodes: Tungsten, Sensor body: Aluminum alloy				
Vibration resistance		Durability 50 Hz Amplitude 1 mm XYZ each 2 hours				
Shock resistance		10 G				
Weight		330 g	710 g	1100 g	1410 g	1930 g

Note 1) With air purge and installation distance of 300 mm. Note 2) The minimum flow rate that can eliminate electricity between a charged object and an ionizer at a distance of 2000 mm.

High Purity Chemical Valve
Series LV□

Stable Sealing Surface
Guide ring

A unique guide ring on the piston rod eliminates lateral motion of the poppet, greatly increasing seal life and reducing particle formation with a stable work surface.

Low particle generation
Piston bumper

A bumper absorbs piston momentum to minimize impact-induced particles.

Prevents Micro-Bubbles
Diaphragm (PTFE)

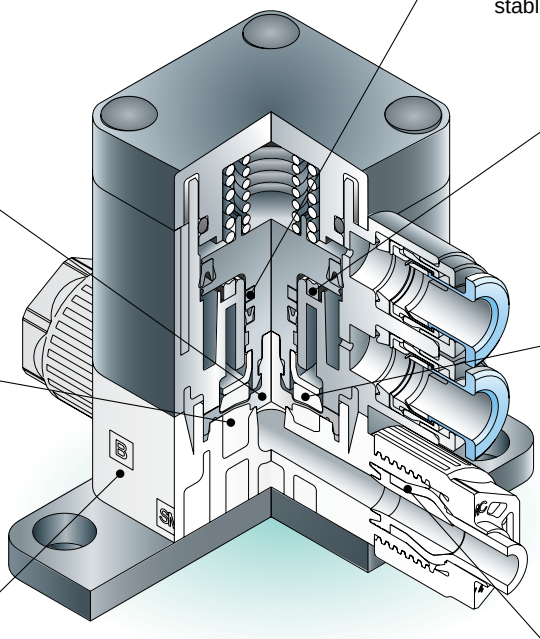
Special diaphragm construction insures gentle opening and closing that prevents the formation of micro-bubbles.

Minimal dead space

In addition to a body designed for smooth flow with minimal internal dead space, integral fittings eliminate the possibility of residual liquid in pipe threads.

Outstanding corrosion resistance
Body (New PFA)

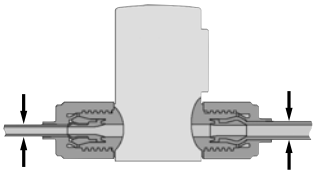
Compatible with chemicals such as acids, bases and ultra DI water.



Back-pressure resistance and long life
Buffer

The diaphragm is supported by a buffer that minimizes deformation, which gives it long life and resistance to back-pressure.

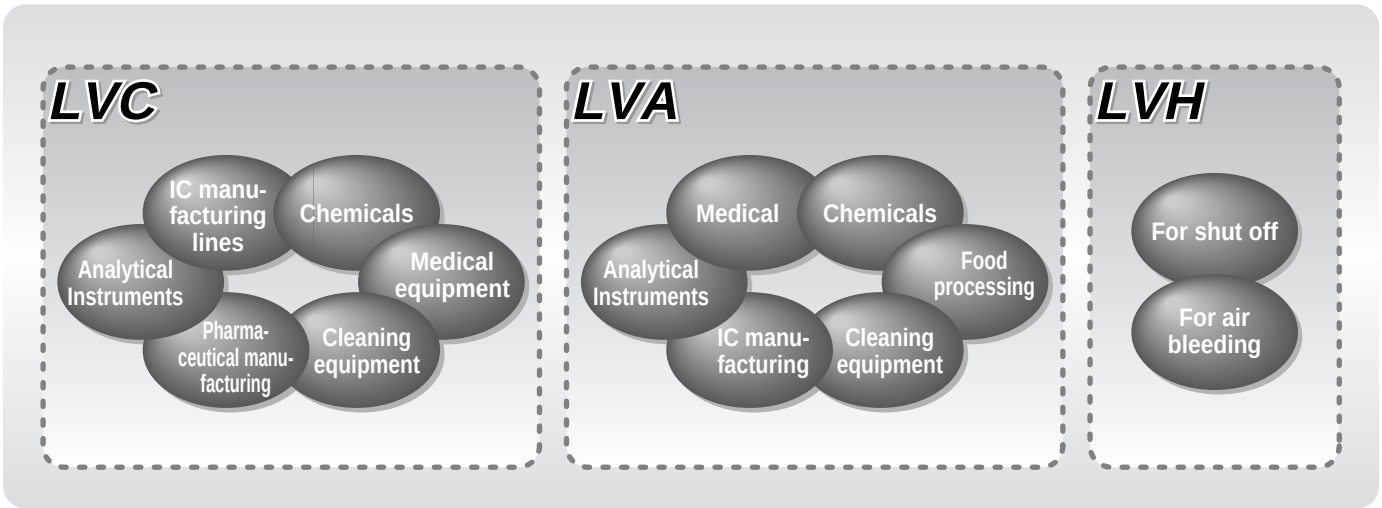
Different tubing sizes can be selected
Hyper fitting

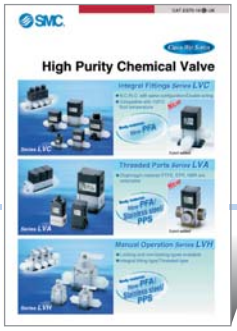


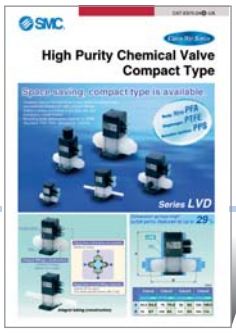
Eliminates problems due to over tightening

- Special locking mechanism
- High flexural strength (tubing supports)

Main applications and fields







Integral Fittings
Series LVC

- N.C./N.O. with same configuration/Double acting.
- Compatible with 100°C fluid temperature.
- Body material: **New PFA**

3 port added

Threaded Ports
Series LVA

- Diaphragm material PTFE, EPR, NBR are selectable.
- Body material: **New PFA /Stainless steel/PPS**

3 port added

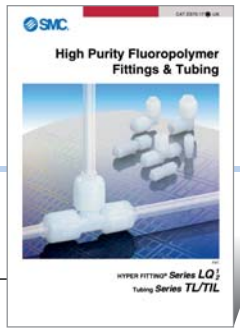
Manual Operation
Series LVH

- Locking and non-locking types available.
- Integral fitting type/Threaded type.
- Body material: **New PFA /Stainless steel/PPS**

Compact type
Series LVD

- Compact type is introduced as a new series to complement conventional Series LVC with integral fittings.
- Mounting base dimensions conform to SEMI Standard, F65-1101. (Except for LVD10)
- Dimension across inlet/outlet ports: Reduced by up to 29%.
- Body : **New PFA** / Diaphragm: **PTFE** / Actuator section: **PPS**

Integral Tubing (construction)



HYPER FITTING® / LQ1•LQ2•LQ3

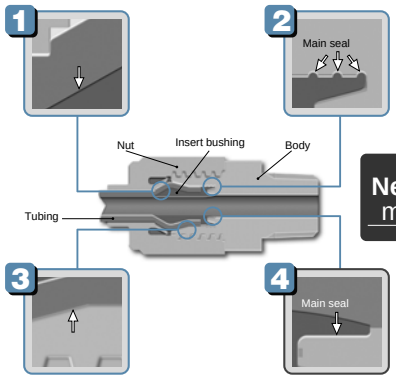
High Purity Fluoropolymer Fittings & Tubing

Series LQ1•LQ2

SMC high purity series responding to the latest demands in process control

Quadruple seal construction
Our new patented high-performance quadruple seal construction, as well as our precision insertion tooling provide maximum leak protection in your process circuitry.

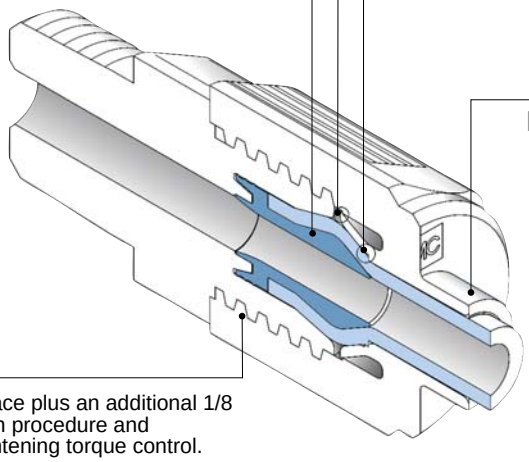
Reducer type: The tubing size can be changed by replacing the nut and the insert bushing on the same body.



New PFA material

A seal lock provided for the nut to prevent loosening, and trapezoidal screw threads tightened at a high torque provide a construction with high seal integrity even when subjected to heat cycles.

A tubing support on the nut provides strong resistance to bending and resist crimping deformation of tubing.



Close adhesion of fittings and tubing facilitates excellent flow through characteristics with minimal liquid residual

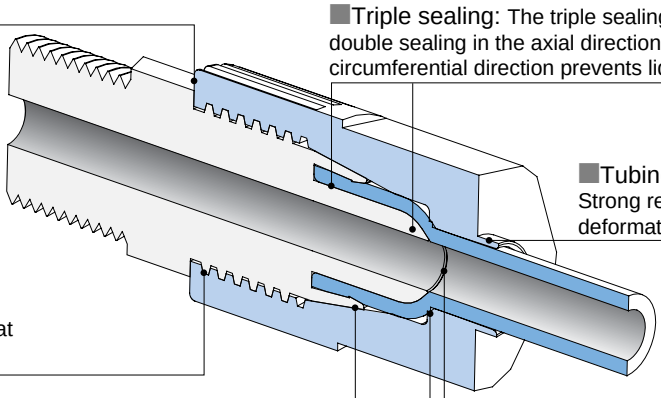
Tightening to the end surface plus an additional 1/8 turn simplifies confirmation procedure and eliminates the need of tightening torque control.

Series LQ3

Collet Type/LQ3

The nut can be easily assembled into the fitting body with no need of alignment.

Triple sealing: The triple sealing construction consisting of double sealing in the axial direction and single sealing in the circumferential direction prevents liquid leakage.



Tubing supports:
Strong resistance to tube bending and deformation.

Locking:
Trapezoidal thread that withstands heat stress prevents oblique nut insertion.

Locking: 2 stage pressing construction of the Collet end ensures sealing and tube locking. The cylindrical part is also provided with the tube locking mechanism. Improved sealing and tube retention.

Improved flow-through characteristics:
Excellent flow-through characteristics are achieved by minimizing liquid deposit.

LQ½ Series

: Only for series LQ1 : Common to series LQ1 and LQ2

Series		Shape
Connector LQ½H	Male	
	Female	
Elbow LQ½L	Male	
	Female	
Run tee LQ½R	Male	
	Female	
Branch tee LQ½B	Male	
	Female	
Union elbow LQ½E		
Union tee LQ½T		
Panel mount union LQ½P		
Union LQ½U		
Union flange LQ1F		

Size	Port size							Tube O.D.															
								Metric size								Inch size							
	None	1/8"	1/4"	3/8"	1/2"	3/4"	1"	ø3	ø4	ø6	ø8	ø10	ø12	ø19	ø25	1/8"	3/16"	1/4"	3/8"	1/2"	3/4"	1"
1	–	○	–	–	–	–	–	○	○	–	–	–	–	–	–	○	–	–	–	–	–	–
2	–	○	○	–	–	–	–	–	●	○	–	–	–	–	–	●	●	○	–	–	–	–
3	–	–	○	○	–	–	–	–	–	●	●	○	–	–	–	–	–	●	○	–	–	–
4	–	–	–	○	○	–	–	–	–	–	–	●	○	–	–	–	–	–	●	○	–	–
5	–	–	–	–	○	○	–	–	–	–	–	–	●	○	–	–	–	–	–	●	○	–
6	–	–	–	–	–	○	○	–	–	–	–	–	–	●	○	–	–	–	–	–	●	○
1	○	–	–	–	–	–	–	○	○	–	–	–	–	–	–	○	–	–	–	–	–	–
2	○	–	–	–	–	–	–	–	●	○	–	–	–	–	–	●	●	○	–	–	–	–
3	○	–	–	–	–	–	–	–	–	●	●	○	–	–	–	–	–	●	○	–	–	–
4	○	–	–	–	–	–	–	–	–	–	–	●	○	–	–	–	–	–	●	○	–	–
5	○	–	–	–	–	–	–	–	–	–	–	–	●	○	–	–	–	–	–	●	○	–
6	○	–	–	–	–	–	–	–	–	–	–	–	–	●	○	–	–	–	–	–	●	○

Note 1) Standard size ○ With Reducer ●
Note 2) The union flange is only available with LQ1 (Size 4, 5, 6).

Item \ Model		LQ1 Series						LQ2 Series			
		LQ1□10	LQ1□20	LQ1□30	LQ1□40	LQ1□50	LQ1□60	LQ2□20	LQ2□30	LQ2□40	LQ2□50
Maximum operating pressure(at 20ºC)		0.7MPa						1.0MPa			
Operating temperature		0 to150˚C						0 to 200˚C			
Applicable tubing size	mm size	ø3 to ø25						ø4 to ø19			
	inch size	1/8"~1"						1/8"~3/4"			

Series TL,TIL

Fluoropolymer tubing

Material: **Super PFA**

Series TH,TIH

FEP tubing

Material: **FEP**

Custom design temperature control and cooling water related equipment

Thermo-chiller
Series HRZ

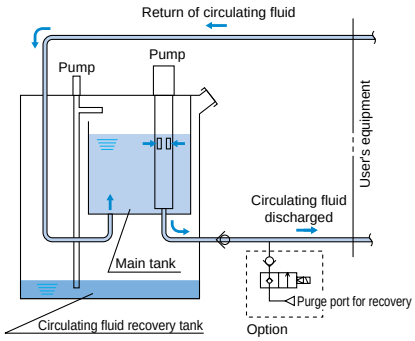
A device for circulating a fluid with a constant temperature (High performance type)

- Temperature setting range: **−20℃ to 40℃/−20℃ to 90℃**
  Cooling capacity: **1kW to 15kW**
- Temperature stability: **±0.1℃**
- Types of circulating fluids:
  Fluorinated fluids, Ethylene glycol aqueous solution
  ∗Contact us for other types of fluids (deionized water, water).
- Built-in flow meter for circulating fluid
- International standards: SEMATECH S2-93, S8-95 , SEMI Standard S2-0703, S8-0701, F47-0200 , CE
  ∗Plan to be **UL** approved.

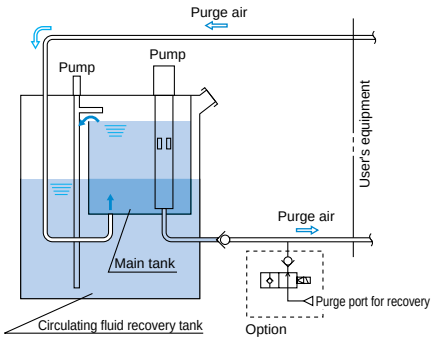
Unique double layer tank structure

●Main tank capacity: **12ℓ, 15ℓ, 22ℓ** → Reduced by **40%** (compared with the conventional model)
●Circulating fluid recovery tank: **15ℓ to 17ℓ**
Effortless circulating fluid recovery during maintenance. The working time can be reduced.

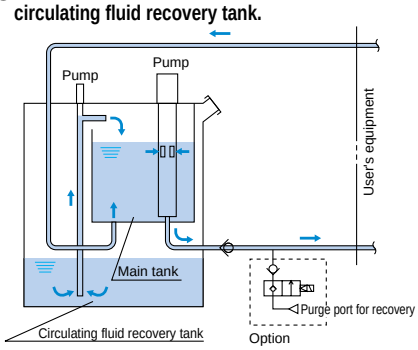
❶Normal operation



❷Recovery of circulating fluid



❸Fluid returns to the main tank from the circulating fluid recovery tank.



Thermo-cooler
Series HRG

Controls circulating water at a constant temperature

- Temperature stability: **±0.5℃, ±1.0℃** (Selectable from 2 standards)
- Cooling capacity: **1.1kW, 2.3kW, 4.8kW** (at 60Hz)
- Set temperature: **±5~35℃**
- Useful for a wide variety of industries: from General to Semiconductor.

Thermo-con
Series HEC

Circulator Electronic Cooling / Heating Type

- Temperature stability: ±0.01°C to 0.03°C
- Set temperature range: 10°C to 60°C
- Cooling capacity (with water): 600W, 1200W
- Type of circulating fluid: Water, Fluorinated chemicals
- International standards: Plan to acquire CE, UL standards
- This originally developed heat exchanger achieves a large cooling capacity with a compact body.
- Fluorinated chemicals (GALDEN® HT135, Fluorinert™ FC-77) compatible with a standard model.

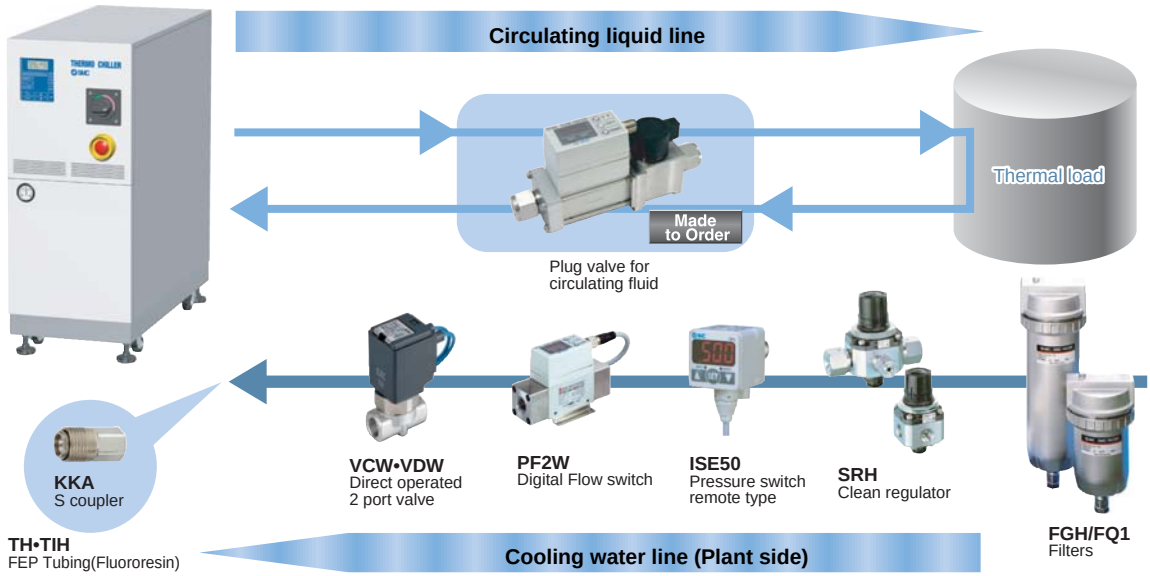
Thermostatic Bath
Series HEB

Constant Temperature Bath Electronic Cooling / Heating Type

- set temperature range: −15°C to 60°C
- Temperature stability: ±0.1°C (Set temperature 10 to 35°C / including temperature distribution)
- Type of constant temperature fluid: Water, Fluorinated chemicals
- International standards: Plan to acquire CE, UL standards
- Thermo-module can be operated efficiently.
- Low temperature distribution is achieved by stirring fluid up-and-down and around the tank.
- Accurate display by measuring the constant temperature fluid with a temperature sensor directly

Temperature control peripherals

Our most suitable products for circulating liquid and cooling lines used in temperature control equipment



Vacuum Equipment

Air suction filter
Series ZFC

- Prevents vacuum equipment trouble due to airborne contaminants.
- Space saving
- Installation and removal are easy with One-touch fittings
- Cartridge type with replaceable element

Model

Model		Port size (Applicable tubing O.D.) IN side, OUT side	Recommended flow rate (ℓ/min (ANR))	Weight (g)
Metric size	**ZFC050-02**	ø2	2	4.9
	ZFC050-23	ø3.2	7	4.3
	ZFC050-04	ø4	10	
	ZFC100-04	ø4	10	11.5
	ZFC100-06	ø6	20	
	ZFC200-06	ø6	30	21.5
	ZFC200-08	ø8	50	
Inch size	**ZFC051-01**	ø1/8"	7	4.3
	ZFC051-03	ø5/32"	10	
	ZFC101-03	ø5/32"	10	11.5
	ZFC101-07	ø1/4"	20	
	ZFC201-07	ø1/4"	30	21.5
	ZFC201-09	ø5/16"	50	

Note) Flow rate when the initial pressure drop is 3 kPa or less.

Specifications

Fluid	Air, Nitrogen
Operating pressure	–100 to 0 kPa
Vacuum release pressure	Max. 0.5 MPa
Operating and ambient temperature range	0 to 60°C (No freezing)
Filtration	10 µm
Element differential pressure resistance	[ZFC10□, 20□] 0.15 MPa [ZFC05□] 0.10 MPa

Air suction filter
Series ZFB

Model

	Model	Port size (Applicable tube O.D.) IN side, OUT side	Recommended air flow ℓ/min (ANR)	Weight g
Metric size	**ZFB100-04**	ø4	10	22
	ZFB100-06	ø6	20	22
	ZFB200-06	ø6	30	30
	ZFB200-08	ø8	50	30
	ZFB300-08	ø8	75	39
	ZFB300-10	ø10	75	39
Inch size	**ZFB101-05**	ø3/16"	20	22
	ZFB101-07	ø1/4"	20	22
	ZFB201-07	ø1/4"	30	30
	ZFB301-11	ø3/8"	75	40
	ZFB401-13	ø1/2"	100	62

Specifications

Fluid	Air/Nitrogen
Operating pressure	–100 to 0 kPa
Proof pressure	0.5MPa
Operating and ambient range	0 to 60°C (Non-freezing)
Filtration	30µm
Element differential pressure resistance	0.15MPa
Applicable tube material	Nylon/Soft Nylon/Polyurethane

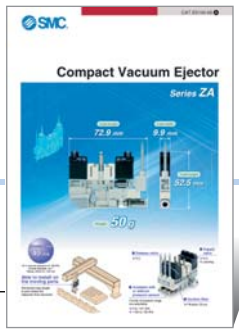
Air suction filter
Series ZFA

Model

Model	Port size	Recommended air flow (ℓ/min (ANR))	Weight (kg)
ZFA 100	1/8	50	0.14
ZFA 200	1/4	200	0.19

Specifications

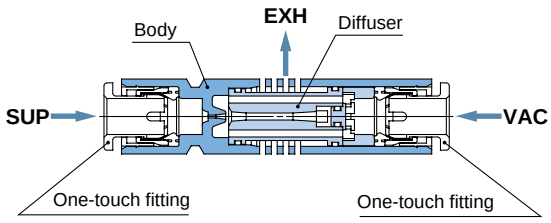
Fluid	Air/Nitrogen
Operating pressure range	–100 to 0 kPa
Proof pressure	0.5MPa
Operating temperature range	5 to 60°C
Filtration	30µm
Element differential pressure resistance	0.15MPa



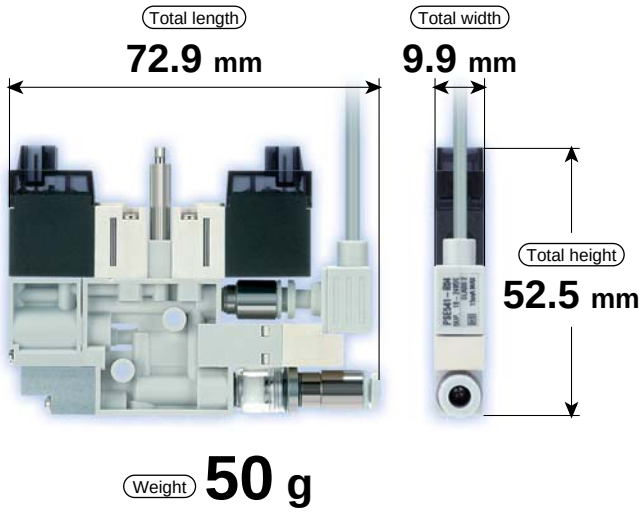
Vacuum Ejector, In-line type
Series ZU

Space-saving ejector that can be installed in-line with the piping

- 6mm fittings to connect into pipework.
- Integrated exhaust.
- Very lightweight and compact.
- Choice of 2 nozzle diameters and 2 vacuum levels.



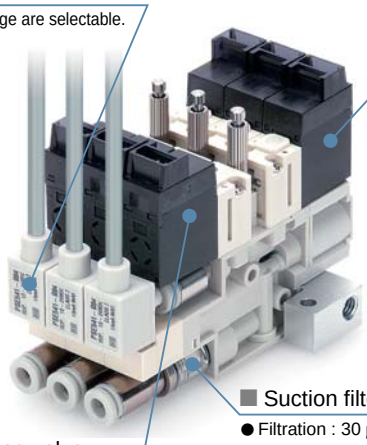
Compact Vacuum Ejector
Series ZA



■ Available with or without pressure sensor

2 kinds of pressure range are selectable.

- 0 to –101kPa
- –100 to 100kPa



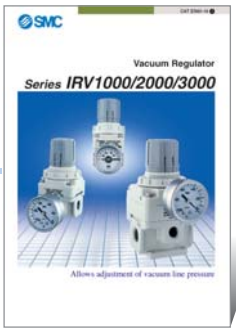
General Specifications

Maximum operating pressure	0.5 MPa
Minimum operating pressure	0.2 MPa
Proof pressure	0.6 MPa
Operating temperature range	5 to 50 °C (No condensation)
Operating fluid	Air
Power consumption	0.5W (With power-saving circuit), 1W (Standard)

Ejector Specifications

Nozzle diameter (mm)	0.5	0.7
Standard supply pressure	0.40MPa	0.45MPa
Maximum vacuum pressure	–74kPa	–78kPa
Maximum suction flow (ℓ/min (ANR))	4	8
Air consumption (ℓ/min (ANR))	12	25

Vacuum regulator
Series IRV



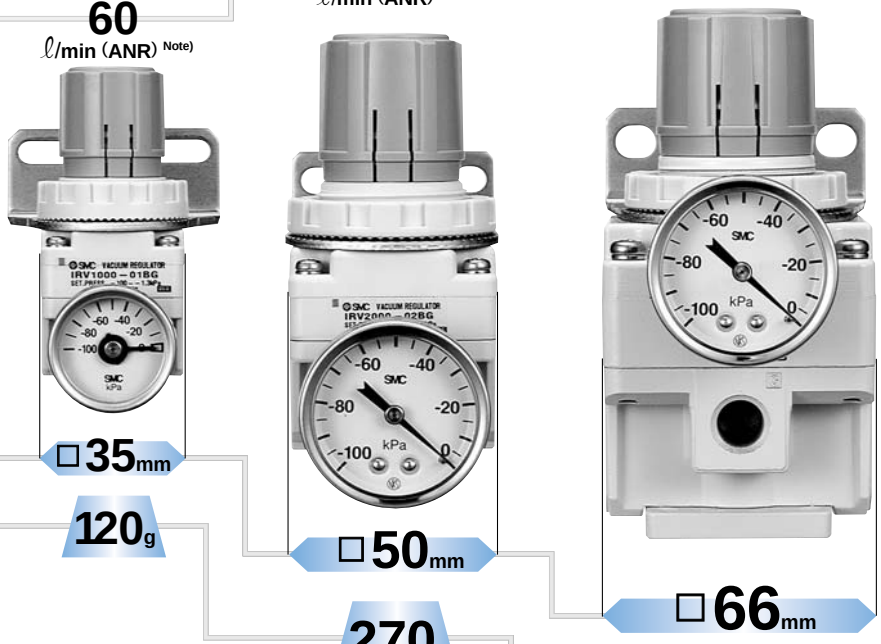
ZFC
E832

3 sizes offered in the series

Variations have been expanded to three sizes from only one in the previous series T203.
Selection is possible to accommodate the applicable flow rate.

Note) Flow rate corresponds to VAC pressure of –101kPa, SET pressure of –80kPa, and initial flow rate setting of 0ℓ/min(ANR).

IRV1000 60 ℓ/min (ANR) Note)
IRV2000 100 ℓ/min (ANR) Note)
IRV3000 150 ℓ/min (ANR) Note)



Compact

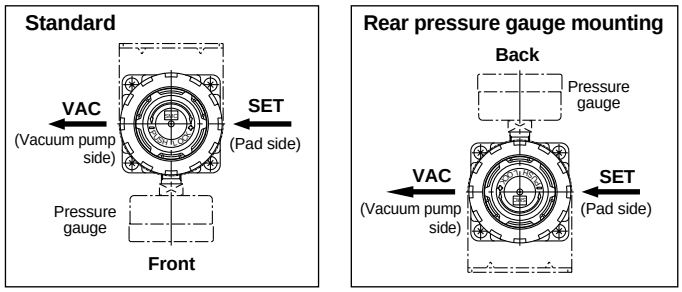
□35mm (IRV1000)
□50mm (IRV2000)
□66mm (IRV3000)

Light weight

120g (IRV1000)
270g (IRV2000)
700g (IRV3000)

■ Panel mounting capability is standard

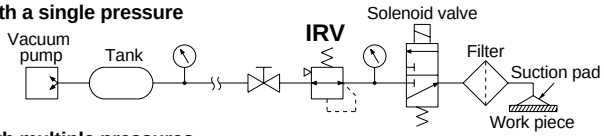
■ Pressure gauge can be mounted from the front or rear



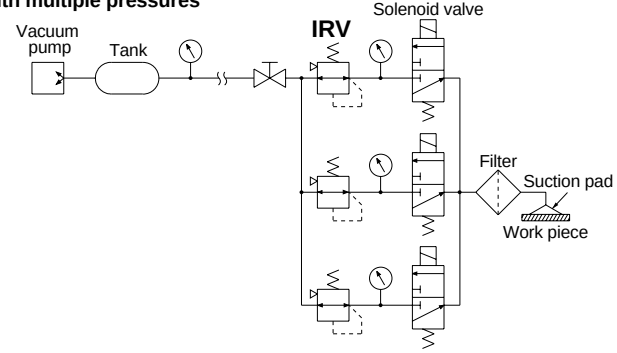
Applications

Lifting of work pieces

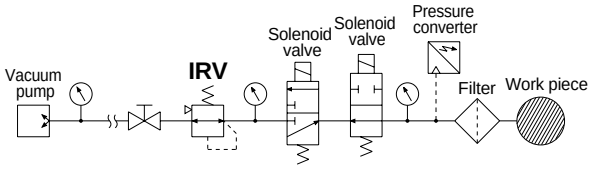
With a single pressure



With multiple pressures



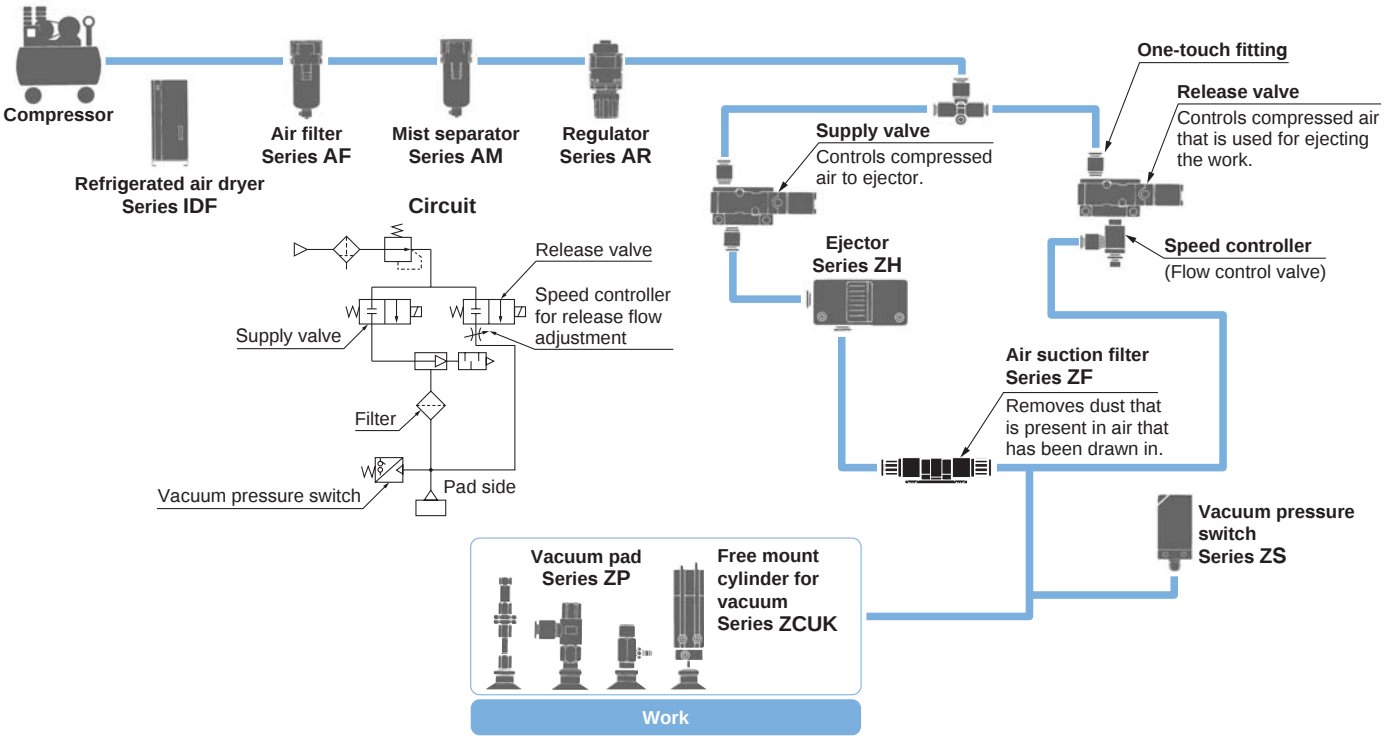
Leak tester



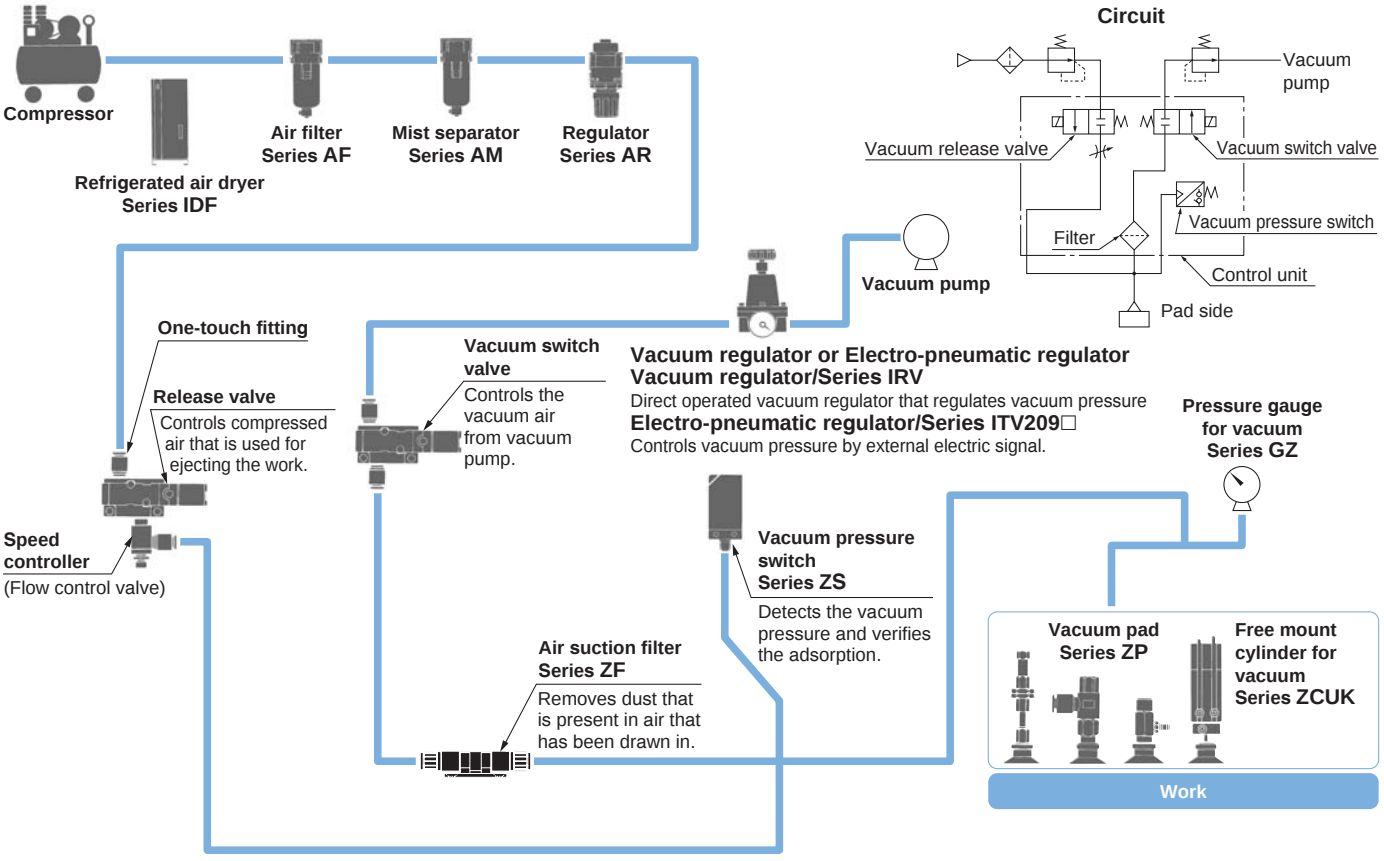
Vacuum equipment
Application examples

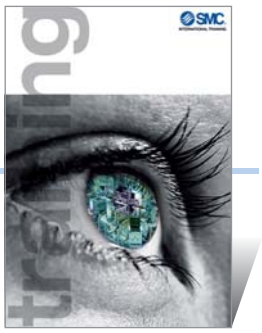
- **Field:** Semiconductor, electronics, automotive assembly, food processing and medical equipment, all types of manufacturing assembly equipment
- **Machinery:** Robotic hand/material handling, automotive assembling machines, automatic transfer equipment, pick and place, printing machinery
- **Application:** Vacuum adsorption transfer, vacuum adsorption retention, vacuum generated air flow

Application to Ejector System



Application to Vacuum Pump System





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Integral SOLUTIONS for the development of the professional skills required by industry.

The training division of SMC Corporation has a clear commitment to offer training adapted to the needs of industry; focused on the development of the professional skills required for the most diverse sectors (Automotive, Pharmaceutical, Semiconductors, Food processing, etc.).

The experience of the SMC International Training team in both the industrial and the educational fields, has allowed the development of a wide range of training systems, adapted to all kind of needs and budget.

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Automation Simulator

www.smctraining.com

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Highly Automated System

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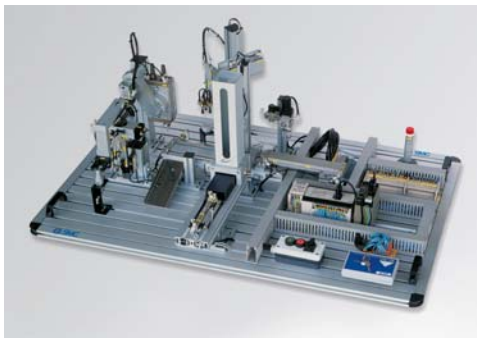
MAS-200
Modular Assembling System

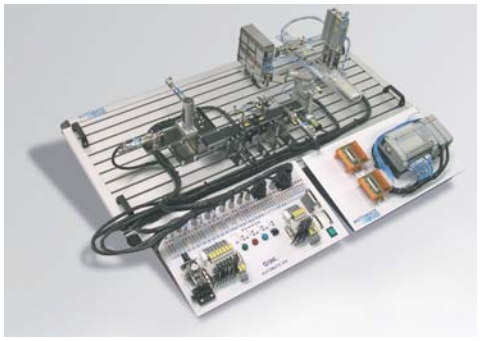
IPC-200
Industrial Process Control



MAP-200
Manipulation Systems

PNEUTRAINER-200
Pneumatics/ Electro-pneumatics

VAC-200
Vacuum Trainer



AUTOMATE-200
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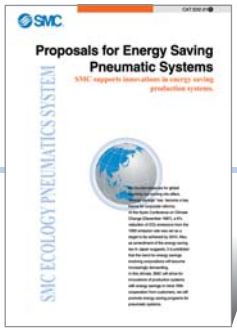
Your mate in Pneumatics!



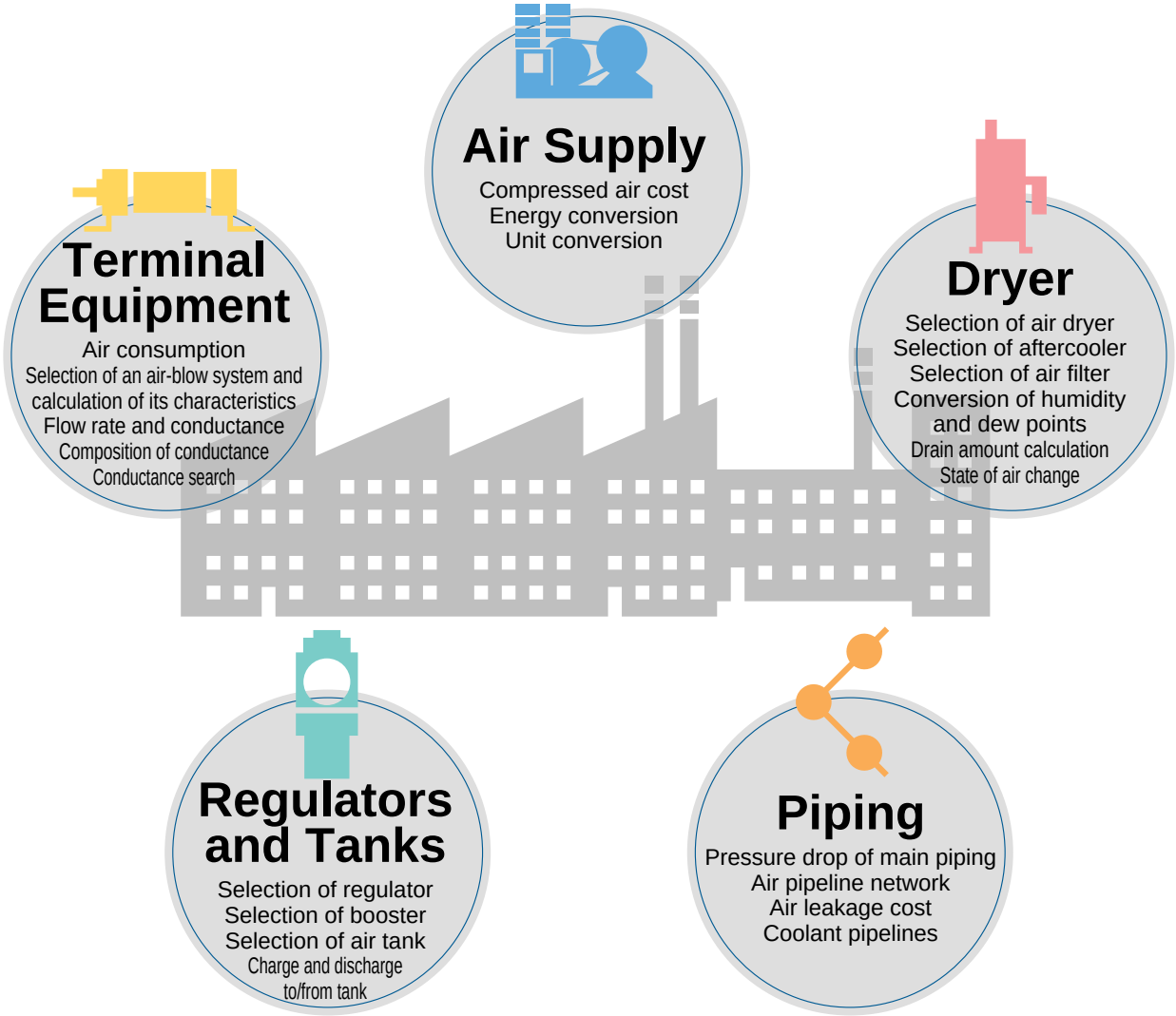
Energy Saving Program

This program contributes to the energy savings of a pneumatic system from the design stage to analysis of the present state and simulation of possible improvements.

Main added features and improvements

- Calculation of gas, liquid, and steam
- Conductance search
- Pressure/Flow rate graph
- Simplified input operation

This energy saving program was developed to provide a better understanding about the different states of air (e.g. consumption, flow, pressure, and humidity) between the air supply and related equipment within a facility.



Supply of "Energy saving program Ver.3-Web service version"
"Energy saving program Ver.3-Web service version" on the Internet is registered on SMC's web site (http://www.smcworld.com). It provides both Japanese and English versions.

SMC's Global Service Network

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