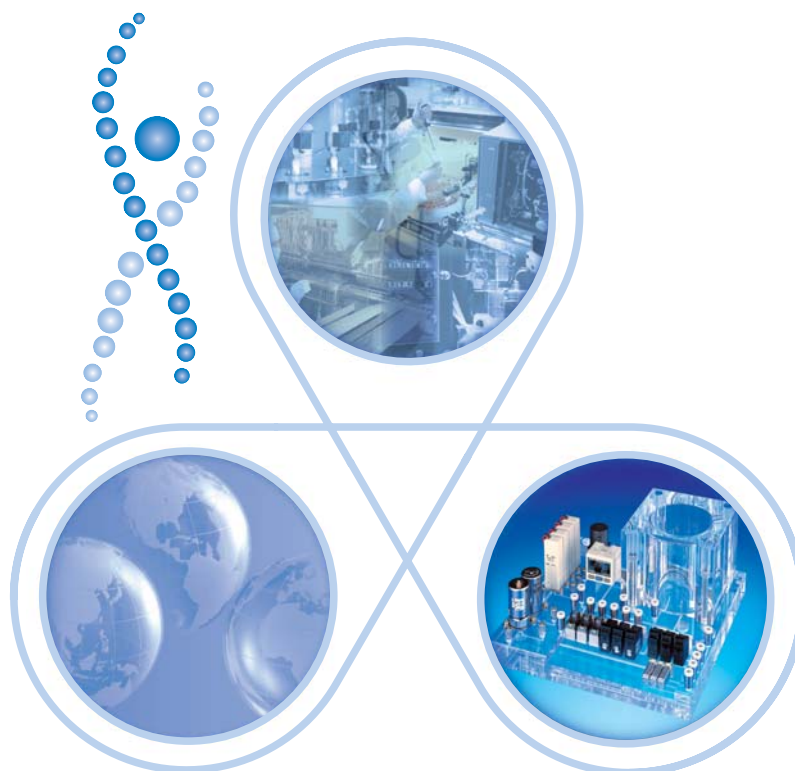




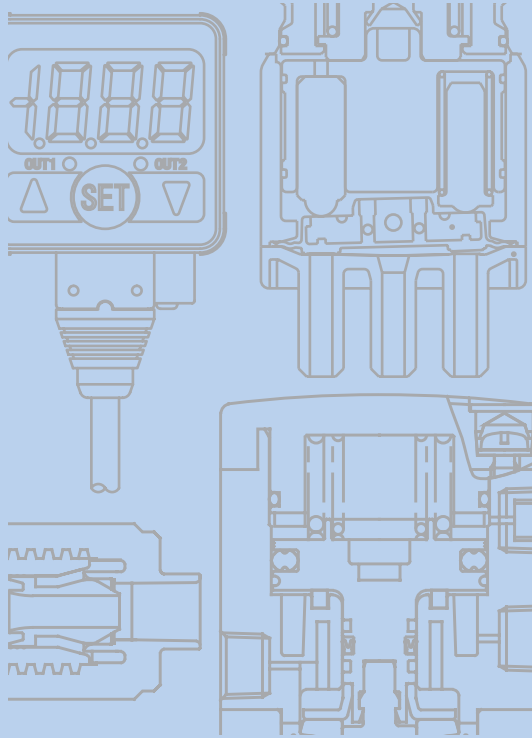
SMC Life Science



Analytical • Instrumentation • Microfluidics



SMC Life Science



Tsukuba Technical Centre

Table of Contents



Corporate Guide

Page

Introduction	4
Technical Development	6
Production and Supply	8
Sales and Communication Network	12
Product Range	14
Related Markets	15
Custom Engineered Plastic Manifold & Valve Technology	16
Quality Assurance	18
Green Procurement	19
Flow Conversion/Calculations	20
International Training	80
Energy Saving Program	81
SMC's Global Service Network	82



Life Science Products

Products Index	21
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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



Membrane Air Dryer Heatless Air Dryer Series IDG/ID



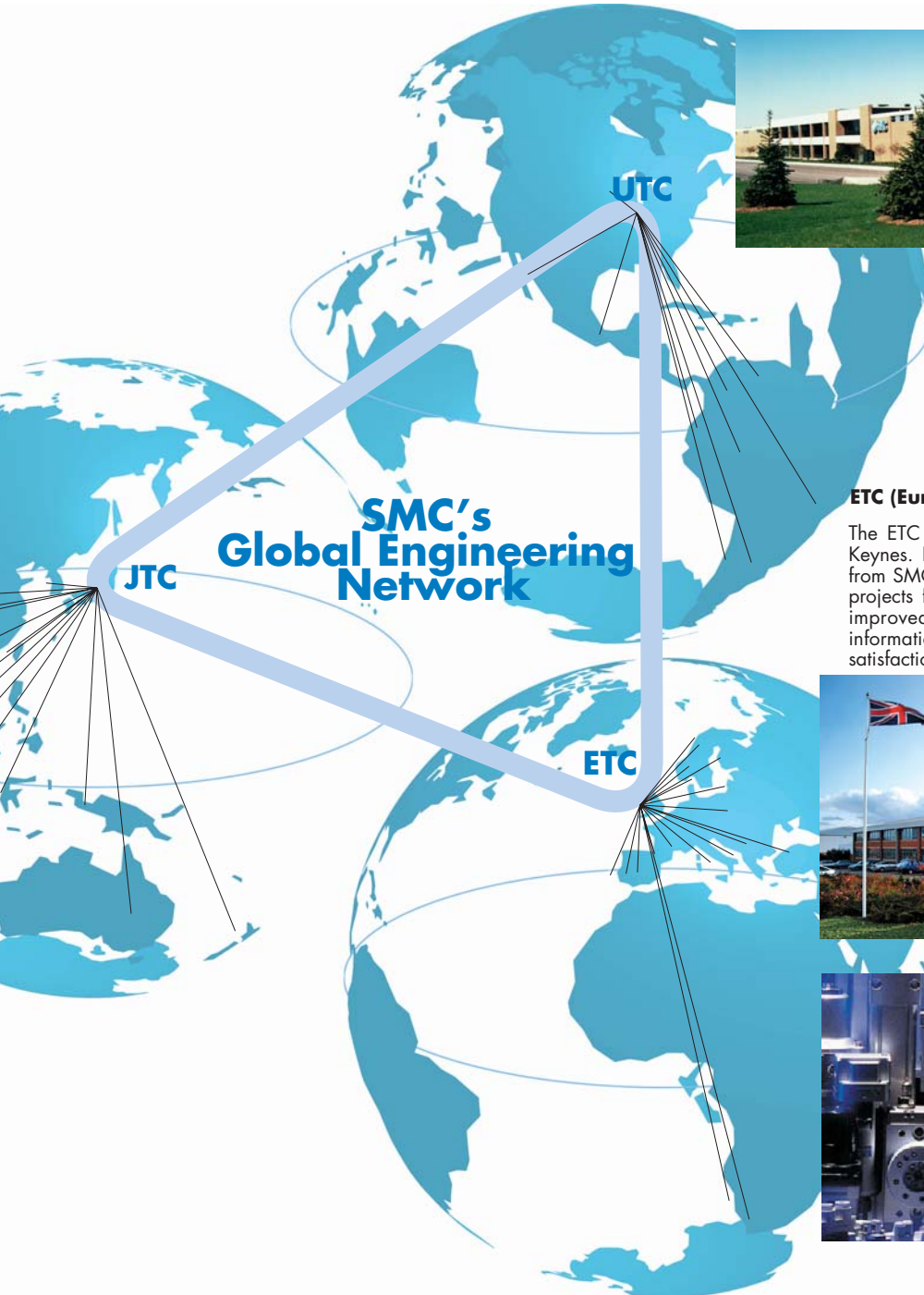
Custom Engineered Plastic Manifold & Valve Technology





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.

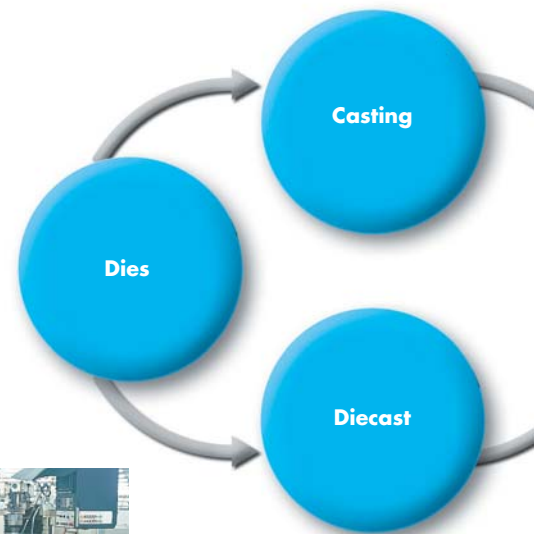


Production and Supply

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)



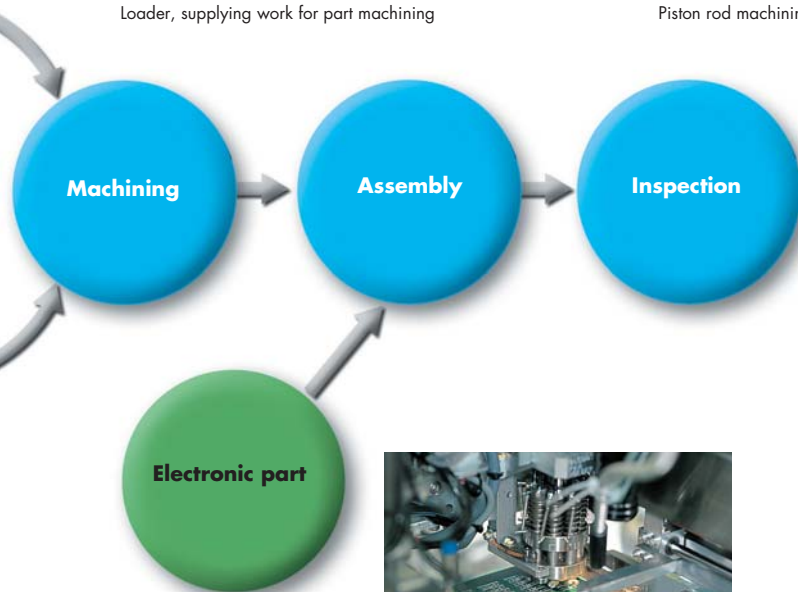
Loader, supplying work for part machining



Piston rod machining line



Coil winding

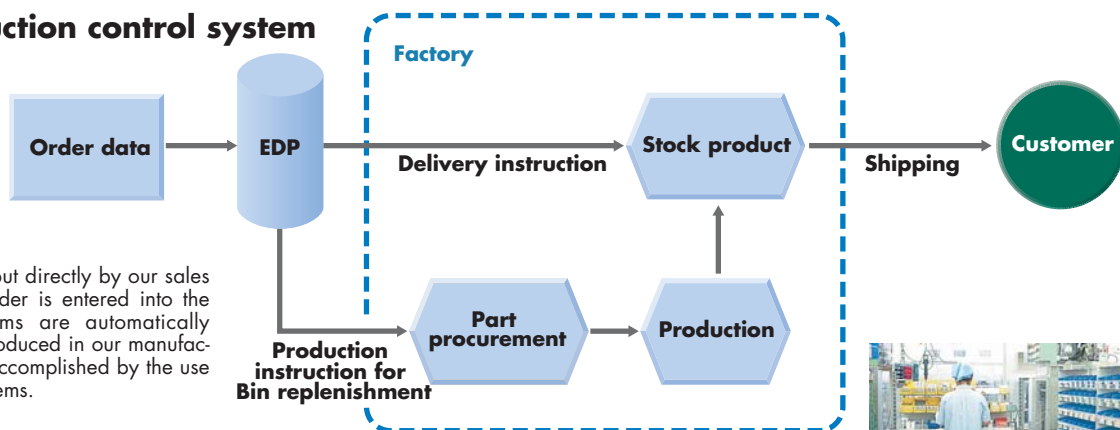


IC chip, being mounted on printed board



Assembly and inspection of temperature controller

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 Facilities



■ 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 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

● Overseas Local Production Facilities

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 (Canada) 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



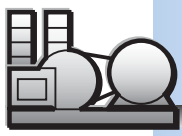
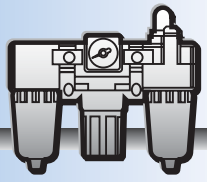
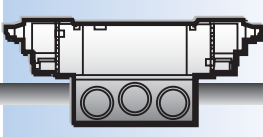
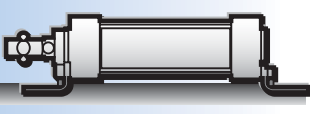
SMC Pneumatics (Australia) Pty. Ltd.

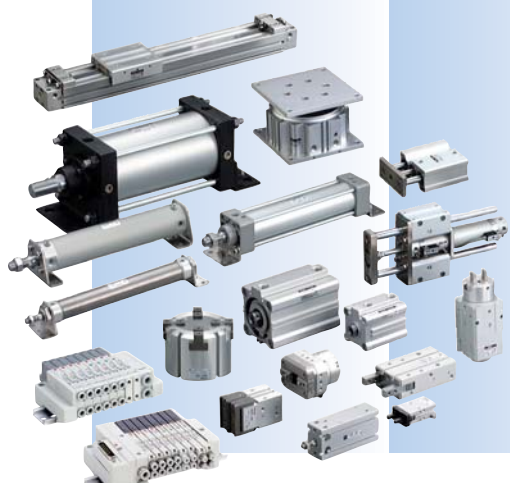
- Head office
- Branch office

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.

 Compressor  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
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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

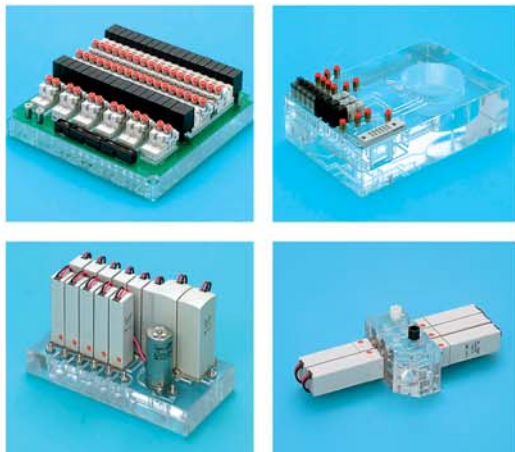


New technology products



Composite Valve Manifold for Air, Gas and Liquid

Custom Engineered Plastic Manifold & Valve Technology



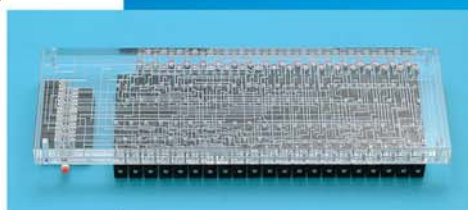
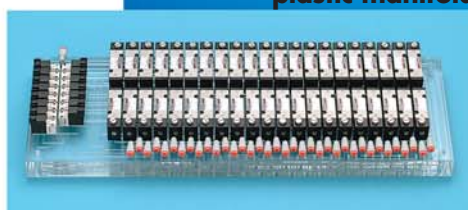
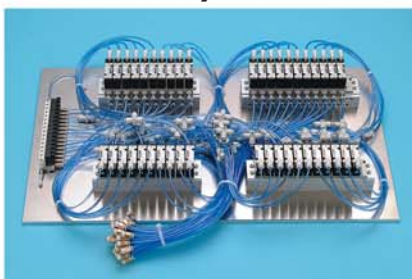
- Reduced Space
- Reduced Weight
- Reduced Installation Time and Error
- Reduced Cost of Ownership

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

Conventional System



Installation of valves on plastic manifold

Series LVM

Isolation liquid valve with custom connection

Series VDW

Liquid valve

Series PVQ

Proportional valve

Series V100

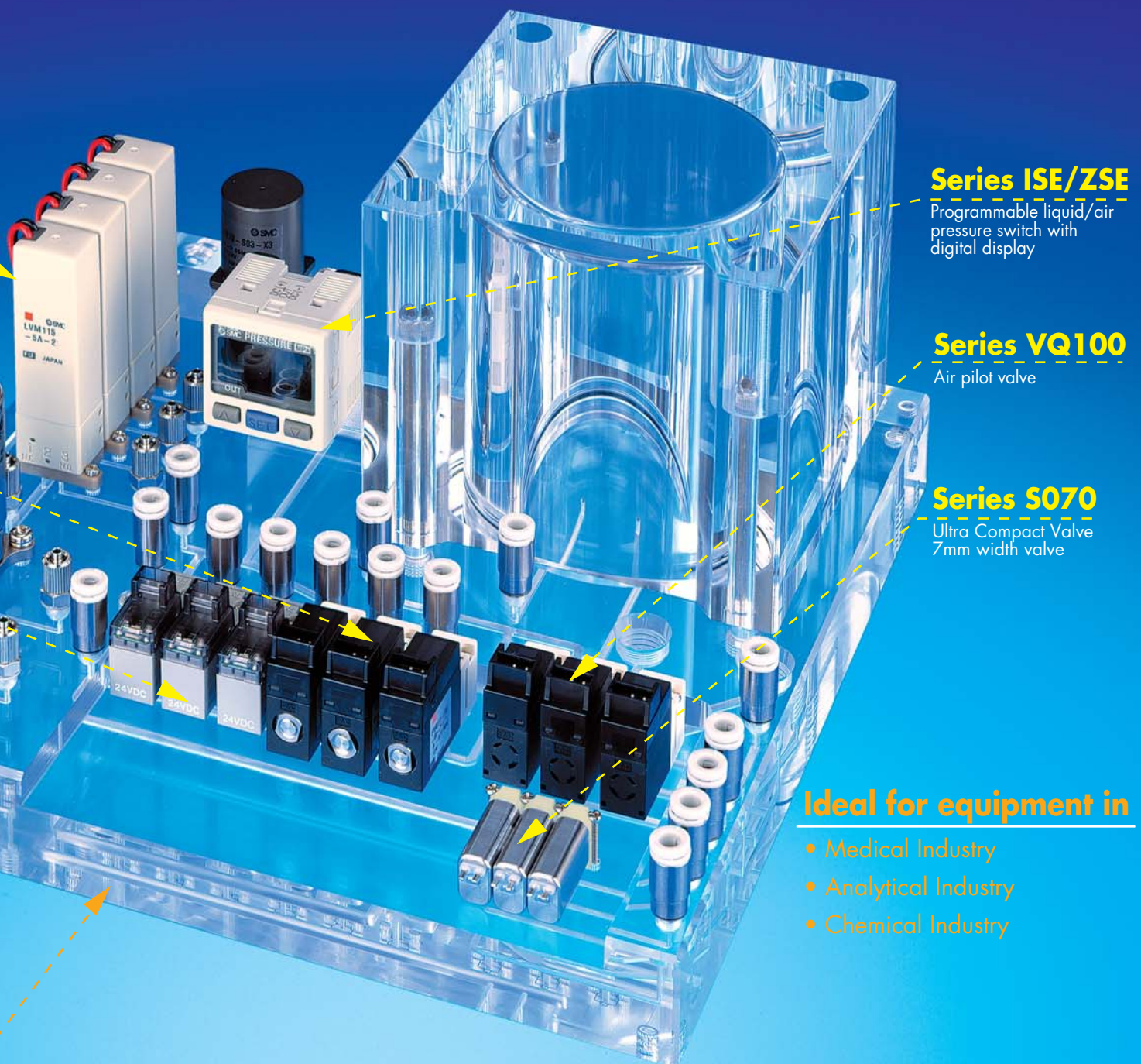
Air pilot valve



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!



Tested and Packed to Customers Specifications

Quality Assurance

Reliable product quality in the global market

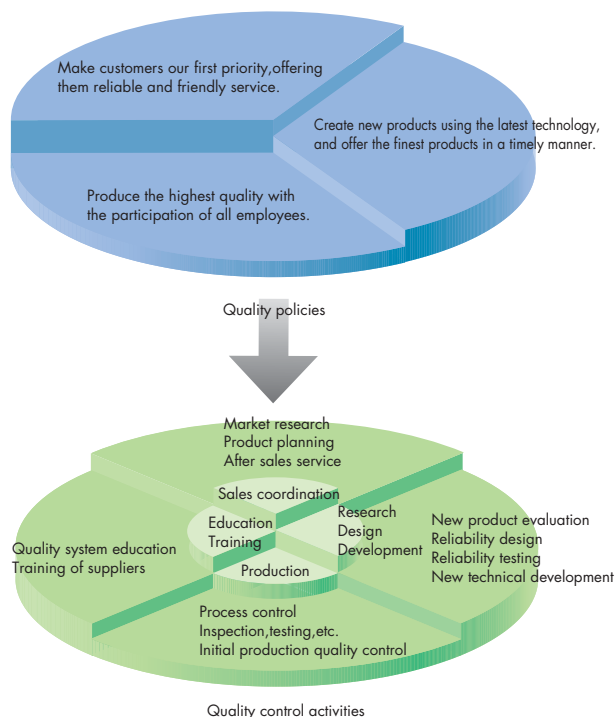
To enable our customers throughout the world to use our products with even greater confidence, SMC has obtained certification for international standards "ISO9001" and "ISO14001", and have created a complete structure for quality assurance and environmental controls. SMC products aspire to meet its customers'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



SMC's quality control system



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.



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/ISO 14001]
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/ISO 14001]
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 of 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 chromium 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.

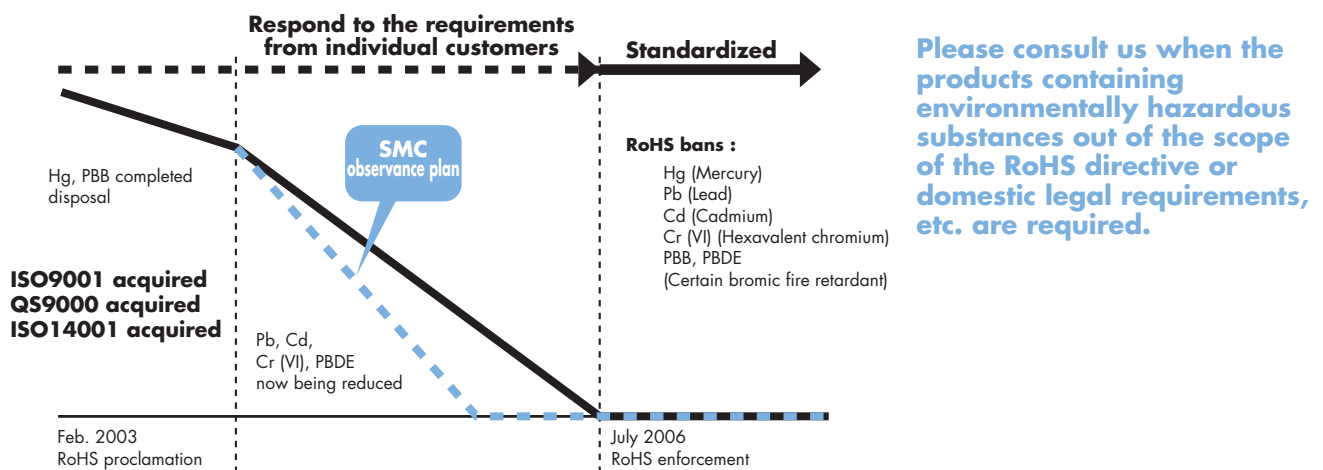
February 2003 RoHS directive proclamation



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



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



Flow Characteristics and Measurement

Liquids

$$\text{Flow rate: } Q = N_1 \cdot C_v \cdot \sqrt{\frac{\Delta P}{SG}}$$

$$\text{Pressure drop: } P = \frac{Q^2 \cdot (SG)}{N_1^2 C_v^2}$$

Q = Flow rate m³/h

ΔP = Pressure drop (bar, absolute) / 1 bar ~ 0.1 MPa

N₁ = Conversion value 0.865

G = Relative density, [water 1.0]

C_v = Valve flow rate

Gases

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

$$\text{Q}^{(1)} = \frac{N_3 \cdot C_v \cdot P_1}{\sqrt{(SG) \cdot T}} \quad \text{P}_2^{(1)} \leq \frac{P_1}{2}$$

Q = Flow rate m³/h

C_v = Valve flow rate

N₂ = Conversion value for 295

N₃ = Conversion value for 250

T = Gas temperature °K (°C + 273)

ΔP = (P₁ - P₂) Pressure drop in bar (absolute) / 1 bar ~ 0.1 MPa

P₁ = Supply pressure in bar (absolute)

P₂ = Output Pressure in bar (absolute)

G = Relative density

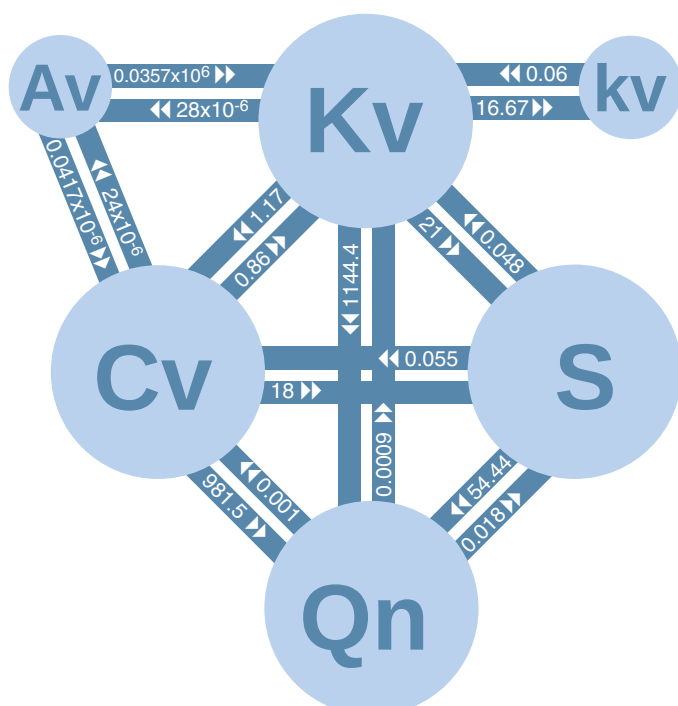
Relative density of liquids

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

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.



Chemical/Liquid Valves

Gas and Chemical Liquid Valve/ Series LVM	22
Highly Integrated resin System	25
2/3 Port Valve for Water, Air, Vacuum/ Series VDW	26
Process Valves for Various Fluids Control/ Series VC	27
Process Valves for Various Fluids Control/ Series VX	28
Process Valves for General Pneumatic Fluids/ Series VN	29
Process Pump/ Series P	30



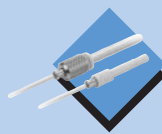
Air Valves

Ultra Compact. 3 Port Solenoid Valve/ Series S070	32
Ultra Compact. 5 Port Solenoid Valve/ Series S0700	33
Compact Unit Manifold Valve/ Series VV061	34
3 Port Solenoid Valve for Air/ Series V100	35
3 Port Solenoid Valve for Air/ Series VQ100	36
Compact Proportional Valve/ Series PVQ	37
2 Port High Flow Diaphragm Valve/ Series DXT474	38
Pinch Valve/ Series XT34	39



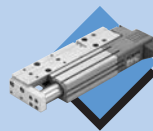
Air preparation

Air Preparation Equipment/ Series Variations	40
Air Filter/ Series AF	42
Membrane Air Dryer/ Series IDG	43
Pressure Regulation Equipment/ Series AR	44
Precision Regulator/ Series IR	45
Precision Clean Regulator/ Series SRP	46
Clean Regulator/ Series SRH	47
Clean Gas Filter/ Series SF	48
Special Regulator for Oxygen Concentrator/ Series SRA	49
Electro-Pneumatic Pressure Regulator/ Series ITV	62
Refrigerated Air Dryer/ Series IDFA	50



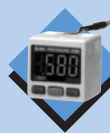
Fittings & Tubing

ø2 Miniature Piping/ Series KJ/M/AS/TU	51
Fittings & Tubing Overview	52
S Couplers/ Series KK	58



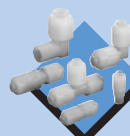
Actuators

Miniaturization of equipment/ Series Variations	59
Electric Actuators/ Series Variations	60



Instrumentation

Electro-Pneumatic Pressure Regulator/ Series ITV	62
Digital Pressure Switch/ Series Variations	64
Digital Flow Switch/ Series Variations	66
Ionizer with Surface Potential Sensor/ Series IZS30	68



High Purity Components

Chemical Valve/ Series LV	70
High Purity Fluoropolymer Fittings & Tubing/ Series LQ, TL/TIL	72



Temperature Control Equipment

Custom Design Temperature Control and Water Related Equipment/ Series Variations	74
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Vacuum Equipment

Vacuum Equipment/ Series Variations	76
Vacuum Regulator/ Series IRV	78
Application examples	79

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**



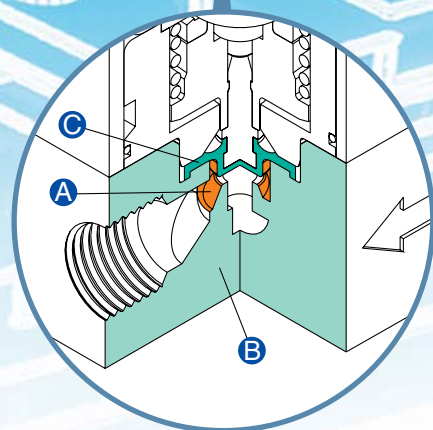
Specifications

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.

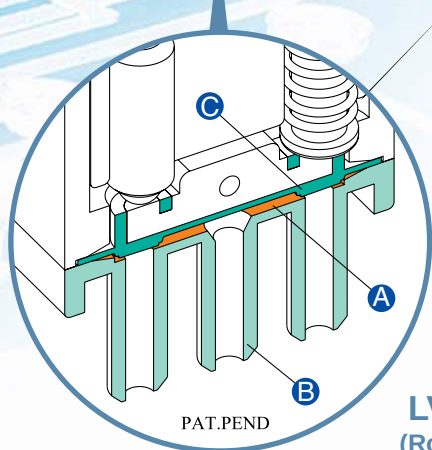


LVM11



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



2-M5 x 0.8

Bracket
(Optional)

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

Tubing type



Manual
(Optional)

Bracket (Optional)

Tubing

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)



O-ring

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

Base mounted type (With sub-plate)



Bracket (Optional)

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

Chemical /
Liquid Valves

Air
Valves

Air
preparation

Fittings
& Tubing

Actuators

Instrumentation

High Purity
Components

Temperature
Control

Vacuum
Equipment

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 subtracted.

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

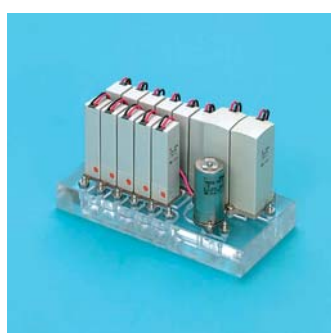
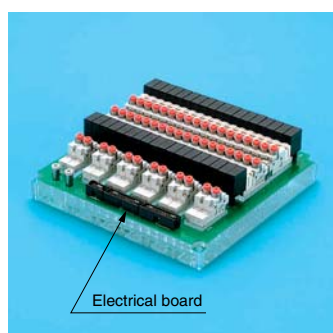
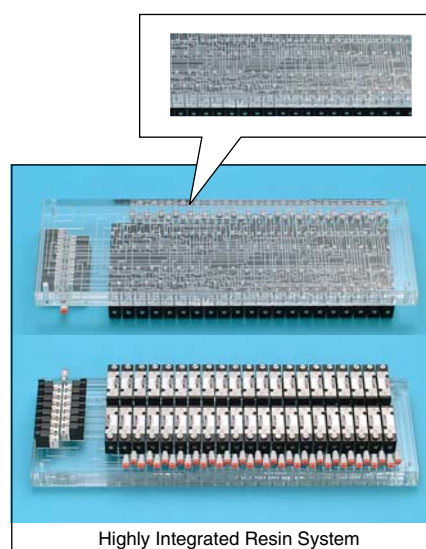
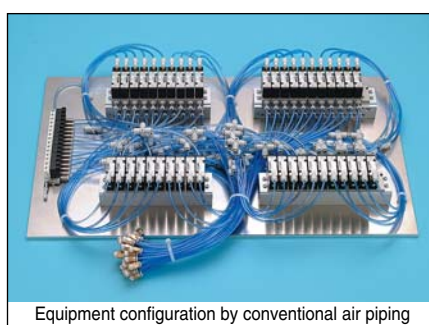
Made to Order

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, polyetherimide, 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



Chemical /
Liquid Valves

Air
Valves

Air
preparation

Fittings
& Tubing

Actuators

Instrumentation

High Purity
Components

Temperature
Control

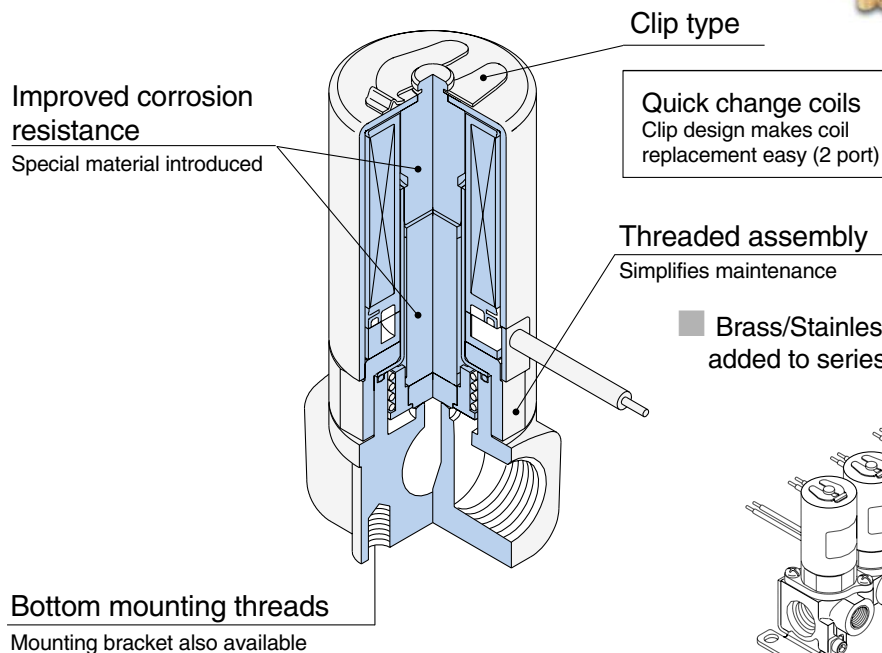
Vacuum
Equipment

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

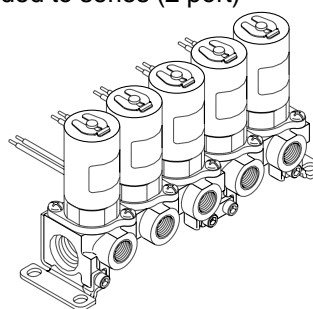


VDW
ES70-20

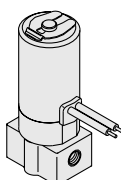
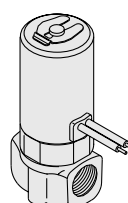
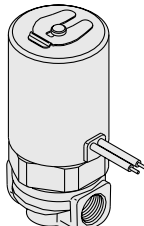
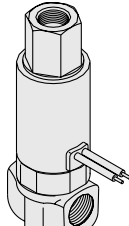
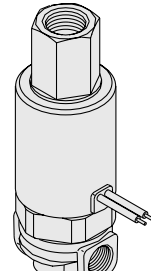
- Compact (compared to series VX)
Single valve volume: Reduced **75%** (VDW20)
Manifold length: Reduced **18%** (VDW30, 7 stations)
- Light weight (compared to series VX)
100g: Reduced approx. **50%** (for orifice size equivalent to $\phi 2$)
- Improved durability (nearly twice the life of the previous 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

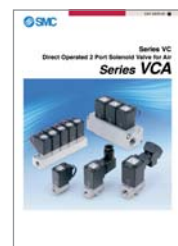
2 port			3 port	
$\phi 17$	$\phi 20.5$	$\phi 28$	$\phi 20.5$	$\phi 28$
				
VDW10	VDW20	VDW30	VDW200	VDW300

Process Valves for Various Fluids Control

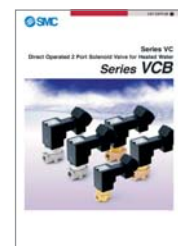
Series VC

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.

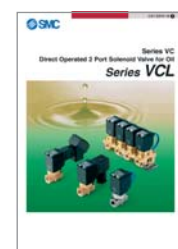
* N.C.: normally closed; N.O.: normally open; COM.: common



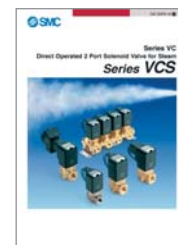
VCA
ES70-21



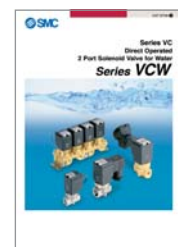
VCB
ES70-22



VCL
ES70-18



VCS
ES70-19



VCW
E708

Chemical /
Liquid Valves

Air
Valves

Air
preparation

Fittings
& Tubing

Actuators

Instrumentation

High Purity
Components

Temperature
Control

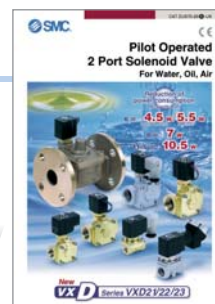
Vacuum
Equipment

Process Valves for Various Fluids Control

Series VX



VX21/22/23
EUS70-23



VXD21/22/23
EUS70-29

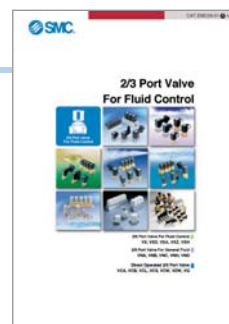


VX31/32/33
EUS70-26

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 high 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 open; COM.: common

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

Chemical /
Liquid Valves

Air
Valves

Air
preparation

Fittings
& Tubing

Actuators

Instrumentation

High Purity
Components

Temperature
Control

Vacuum
Equipment

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

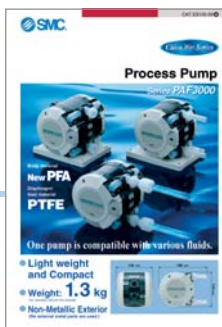
Model	Diaphragm material	Check valve material	Fluids contact areas material	* Discharge flow rate (mℓ/min)	Option
PB1011	PTFE	PTFE	Polypropylene PP, Stainless steel (SUS316) Seals: FKM	8 to 2000	• Silencer • Foot
PB1013				8 to 500	

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

PA/PAX/PB
E830



PAF
ES100-59



PA
P-E00-5



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).

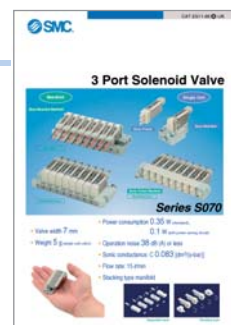
- Non-Metallic exterior (no external metal parts are used).

- 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		

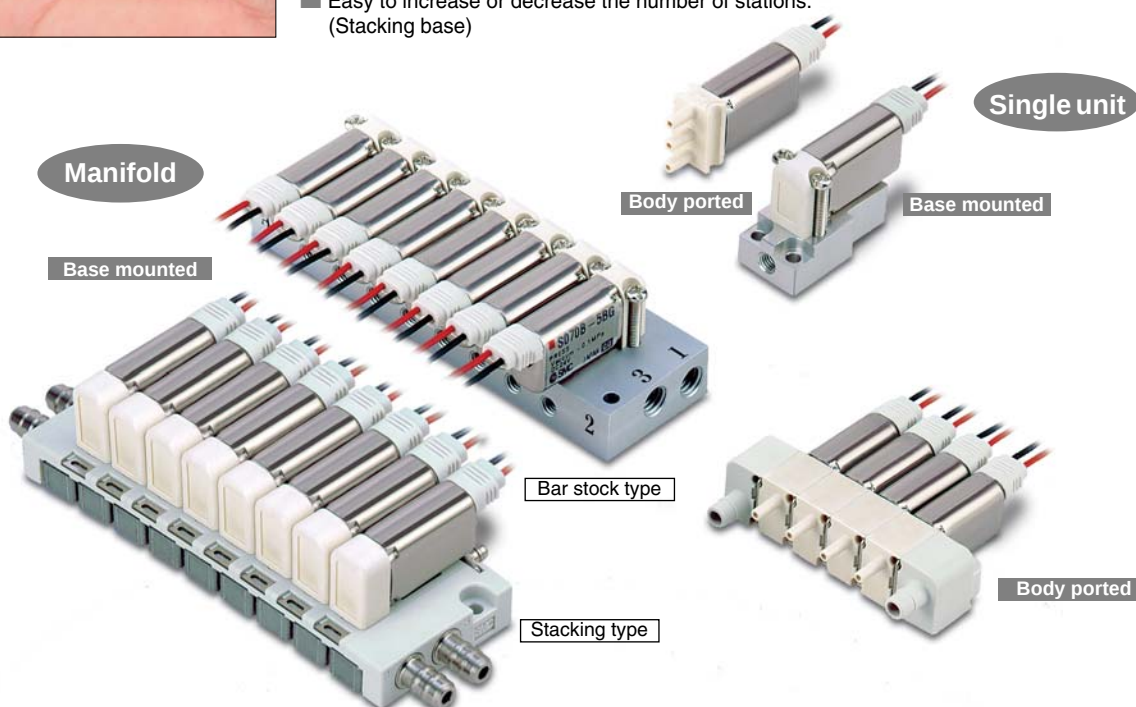
7mm Wide, Super Compact Direct Acting 3 Port Solenoid Valve Series S070



S070
ES11-85



- 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)



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

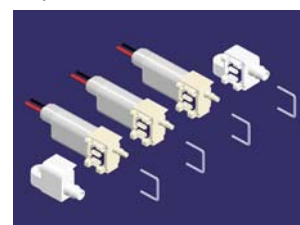
Solenoid specifications

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



Separable base



Stacking type

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)

Weight **28g**
(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

Manifold

Plug-in manifold

Single unit

Base mounted

With power saving circuit

Plug connector

Grommet

8.5mm pitch

7.5mm pitch

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

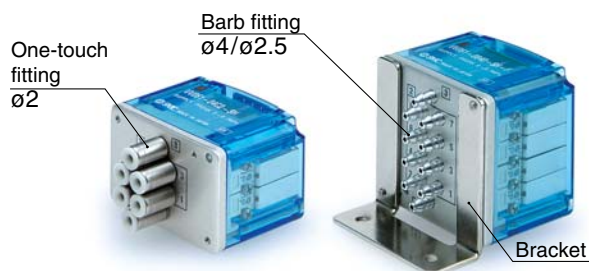
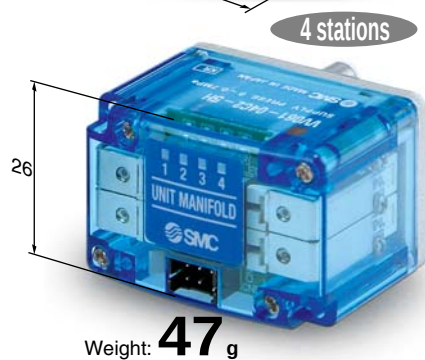
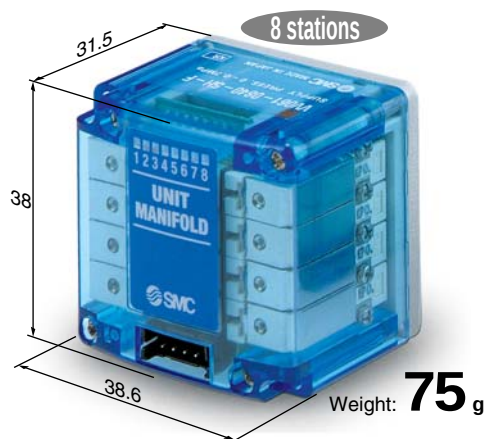
Flow characteristics

	Flow characteristics		
	C[dm ³ /(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

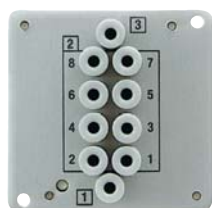
Three type options of the 4-position dual 3 port valve

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

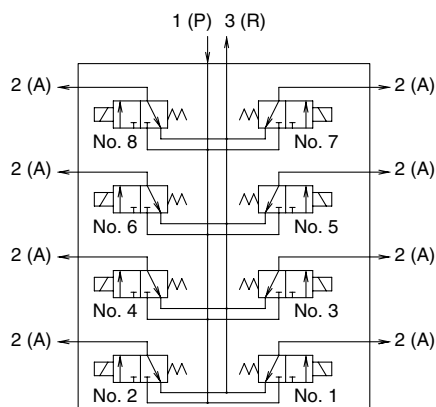
Unit Manifold Valve, 3 Port Solenoid Valve Series VV061



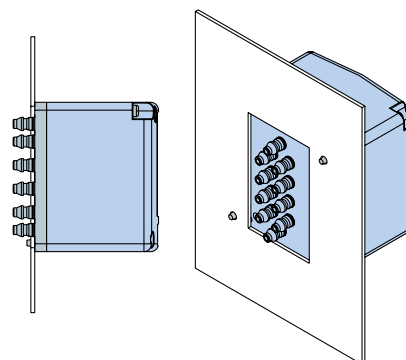
■ Reduced environmental impact substance RoHS compliant



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 continuous loading time type)	0.23 W	

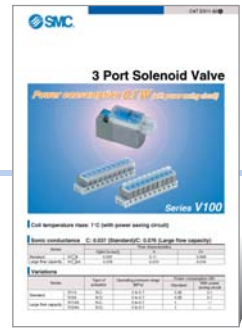
Flow Characteristics

Type	Effective area (mm ²)	
	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

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

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



V100
ES11-82

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

Series		Flow characteristics		
		C[dm ³ /(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

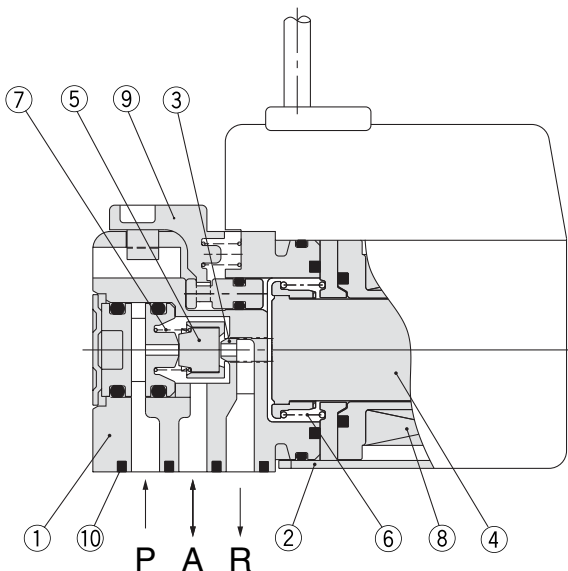
Fluid	Air
Ambient and fluid temperature (°C)	−10 to 50 (No freezing)
Response time (ms) ^{Note 1)}	ON: 5 or less OFF: 4 or less
Max. operating frequency (Hz)	20
Manual override	Non-locking push, Locking slotted
Lubrication	Not required
Mounting position	Unrestricted
Impact/Vibration resistance (m/s ²) ^{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, Dispersion accuracy ± 1 ms
(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.

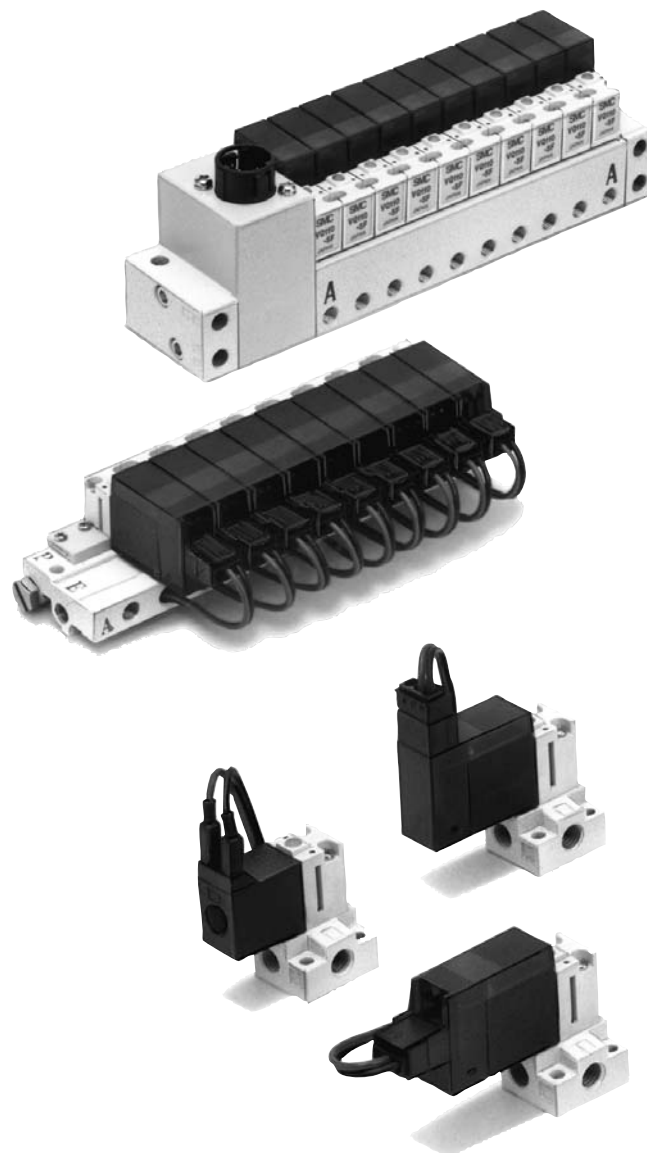
Body width: 9.8mm,
N_l/min: 19.63 (Standard, high pressure style)
N_l/min: 39.26 (Option, large flow style)

■ Options:

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

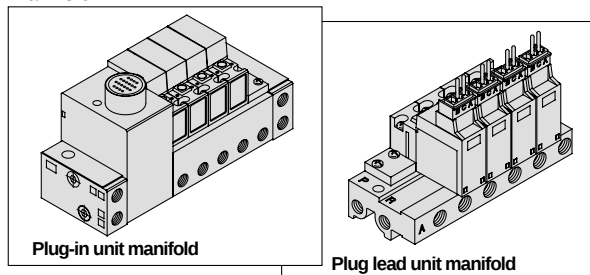
■ Copper-free specifications

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

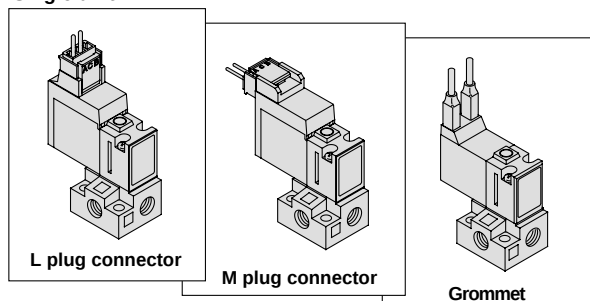


■ A wide variation of wiring

Manifold



Single unit



Compact Proportional Valve Series PVQ

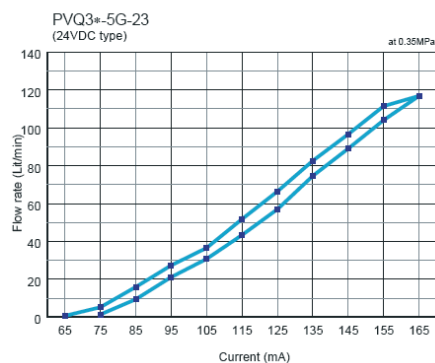
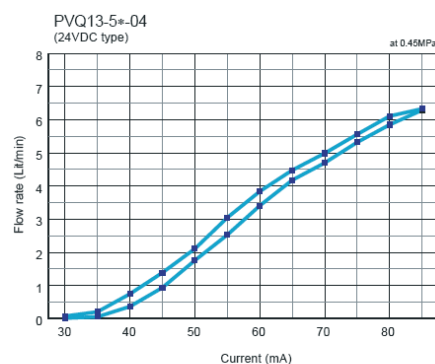
SMC supports innovations in automatic and energy saving systems by way of electropneumatic control for medical, general industry, etc.

- **High Accuracy.**
Repeatability: 5% or less, Hysteresis: 10% or less.
- **Compact.**
Compact body with 12mm width (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.**



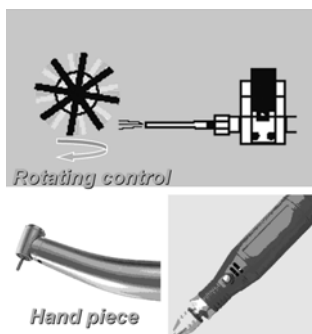
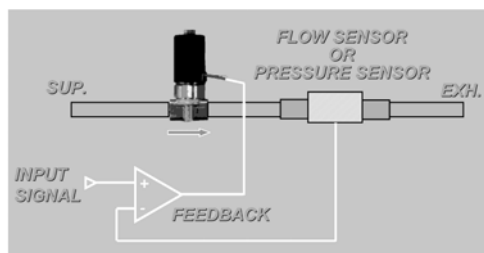
Specifications

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	0~50°C						
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

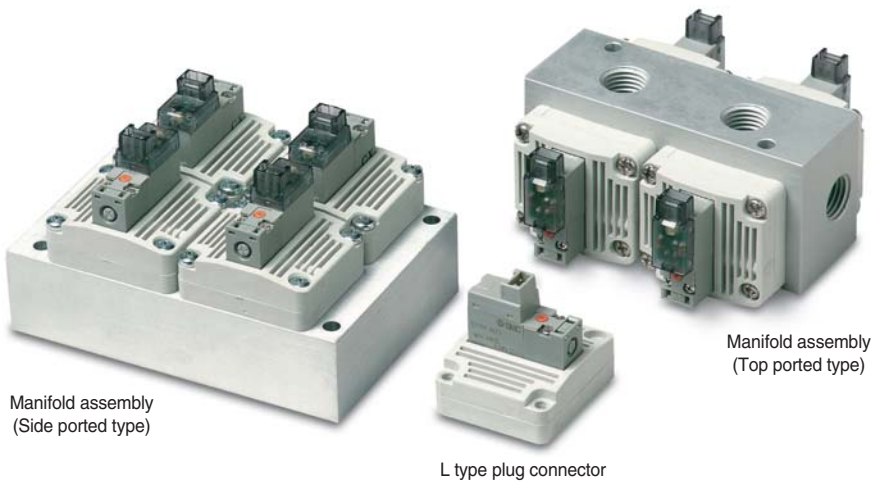
- Air blow, Flow control.
- Hand piece control or dental unit and other respiratory equipment.
- Cooling for laser machinery, etc.
- Analyzer, instrumentation.



2 Port High Flow Diaphragm Valve Series DXT474



DXT474
US N280



- 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, fluorine 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 (°C)	Max. 50
Max. operating frequency (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)

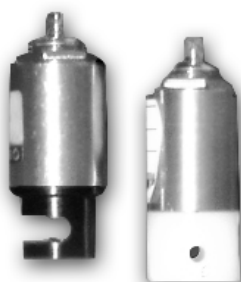
Pinch Valve Series XT34

■ 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
- Immunoassay 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)

Chemical /
Liquid Valves

Air
Valves

Air
preparation

Fittings
& Tubing

Actuators

Instrumentation

High Purity
Components

Temperature
Control

Vacuum
Equipment

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 water droplets 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 	1/4, 3/8, 1/2, 3/4, 1	Auto drain valve: AD402/600 Drainage is automatically discharged in a reliable manner, without requiring human operators. Highly resistant to dust and corrosion.
AMJ 	1/4, 3/8, 1/2, 3/4, 1	Drain separator for vacuum: AMJ 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 	1/2	Heavy duty auto drain: ADH4000 Easy maintenance. Float style drain allows automatic drain discharge without electric power.
AMP 	1/4, 3/8, 1/2, 3/4	Exhaust Cleaner for Clean Rooms: AMP 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 	1/8, 1/4	Pressure Gauge with Switch: GP46 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 	1/8	Pressure differential gauge: GD40-2-01 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 	M5	Compact Manometer: PPA Pressure measurements can easily be taken any time, anywhere. Back light for easy viewing in dark locations.

Chemical /
Liquid Valves

Air
Valves

Air
preparation

Fittings
& Tubing

Actuators

Instrumentation

High Purity
Components

Temperature
Control

Vacuum
Equipment

Air Filter/Modular Style Series AF



AC
ES40-42

Chemical /
Liquid Valves

Air
Valves

Air
preparation

Fittings
& Tubing

Actuators

Instrumentation

High Purity
Components

Temperature
Control

Vacuum
Equipment

	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

Series IDG1

Flexible piping is possible

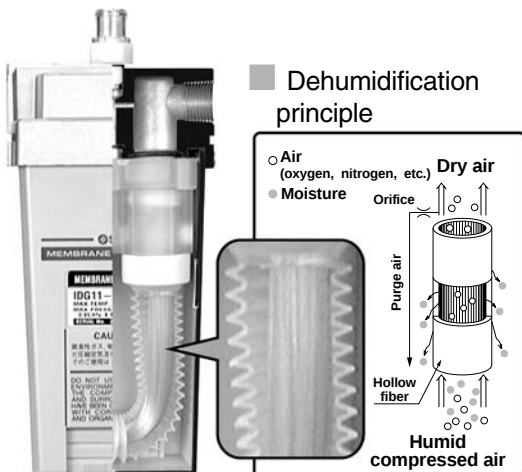
- Low flow rate type tube configuration
Outlet air flow rate: 10 l/min (ANR)



IDG
ES30-7

- 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)

Dew point indicator



Dehumidification principle

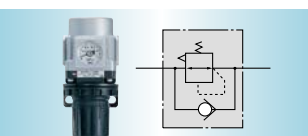
- The membrane air dryer uses hollow fibres composed of a macro molecular membrane through which moisture passes easily, but is difficult for air (oxygen and nitrogen) to pass through.

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

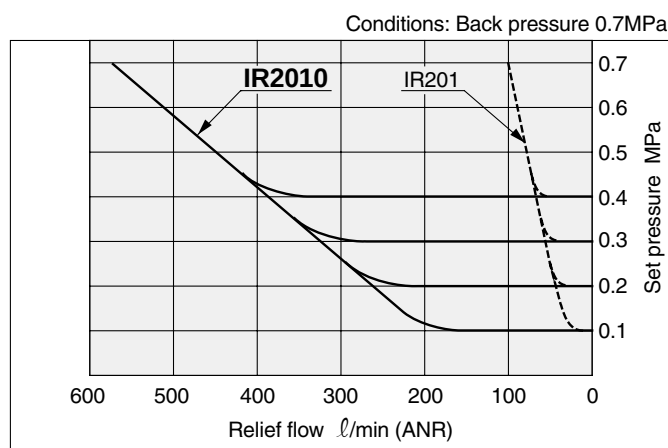
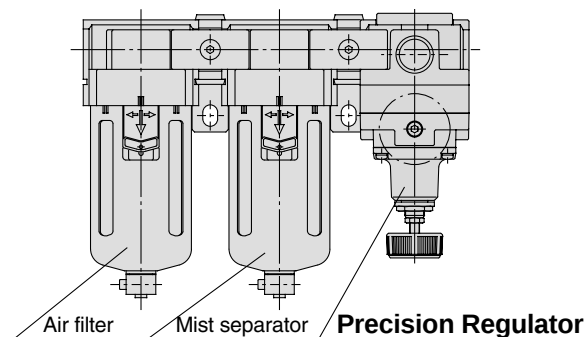
	Series	Application/Characteristics	Port size	Set pressure (MPa)	
Chemical / Liquid Valves	Miniature regulator ARJ1020F ARJ210 ARJ310	Direct operated relieving style Back flow function	M5 to 1/8 ø4, ø6	0.1 to 0.7	
Air Valves	Regulator AR10-60	Direct operated relieving style Modular style	M5 1/8 to 1	0.05 to 0.7 0.05 to 0.85	
Air preparation	Regulator with built-in pressure gauge ARG20-40	Built-in pressure gauge Space saving	1/8 to 1/2	0.05 to 0.85	
Fittings & Tubing	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	
Actuators	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	
Instrumentation	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	
High Purity Components	Regulator manifold ARM2500/3000	Manifold (Common IN/Individual IN) Modular style	1/4, 3/8	0.05 to 0.85	
Temperature Control	Direct operated precision regulator ARP3000	Setting sensitivity: 0.001MPa Direct operated relieving style	1/4	0.005 to 0.3	
Vacuum Equipment	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

IR
E611



- 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)



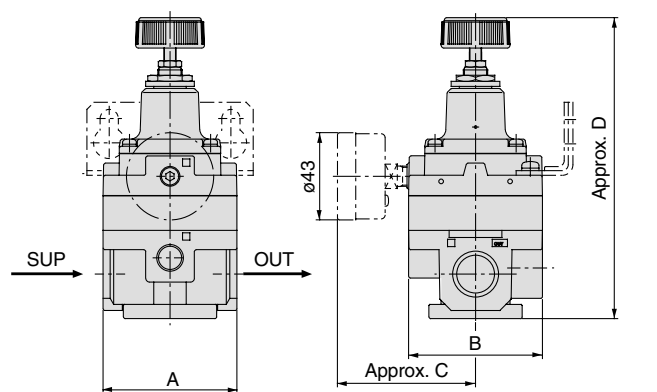
Series Variations

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



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 0.5 l/min (ANR) or less
(downstream pressure at 0.2 MPa)

* 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.

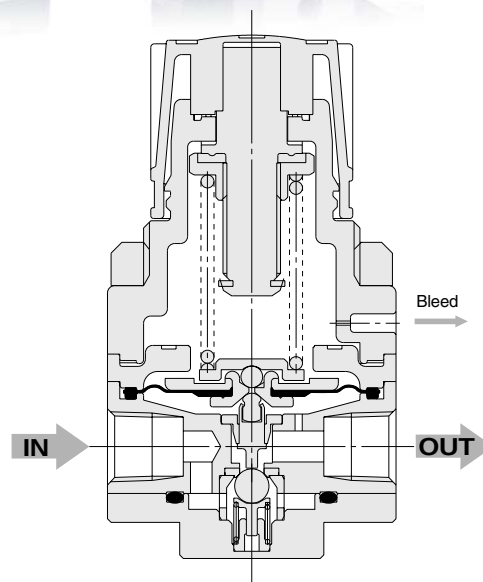
■ Consistent clean room production

Cleaned, assembled, inspected, and sealed in double packaging in a Class 10,000 environment.

■ Specifications

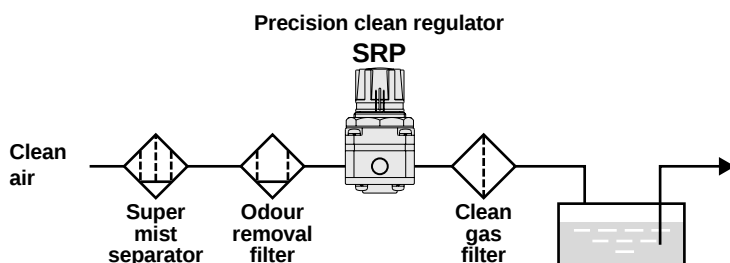
Connection port size		M5, Rc 1/8
Fluid		Air, N ₂ , CO ₂ , Ar
Proof pressure MPa		1.5
Maximum operating pressure MPa		1.0
Regulating pressure range MPa	Low pressure type	0.005 to 0.2
	High pressure type	0.01 to 0.4
Ambient and fluid temperature (°C)		0 to 60
Fluid consumption l/min (ANR) Note 1)		0.5 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 0.2 MPa

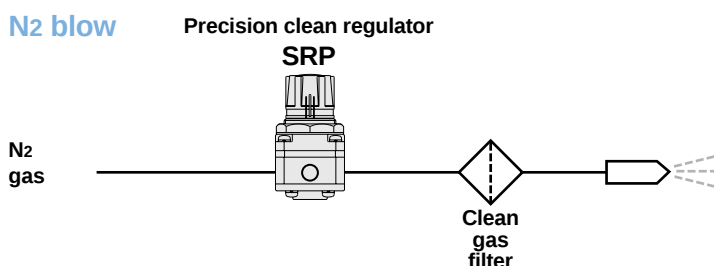


Applications

Pressure feed of chemicals

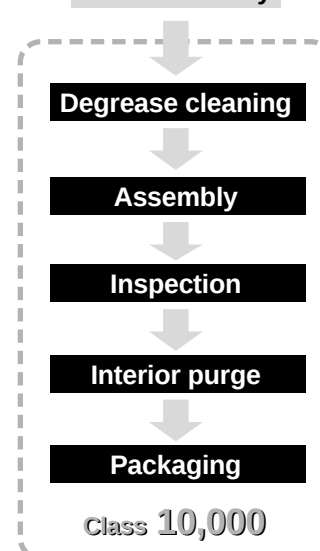


N₂ blow



Manufacturing process

Parts assembly



Clean Regulator Series SRH

SRP
ES120-4



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, N2, Ar, CO2, Pure water		Clean air, N2	
	Grade B	Air, N2, Ar, CO2, Water		Air, N2	
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

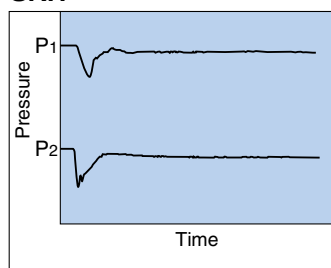
Consistent clean room production

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

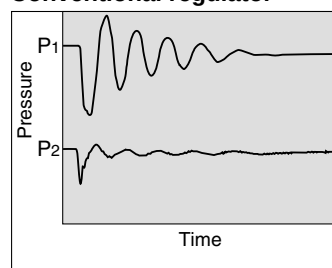


Step response comparison

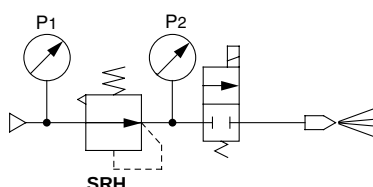
SRH



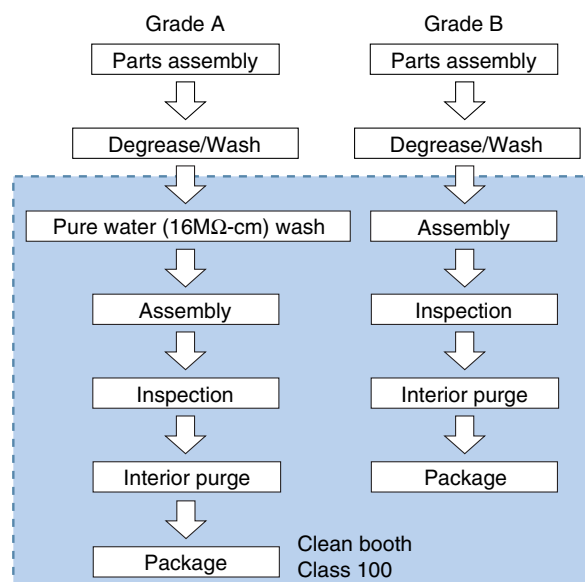
Conventional regulator



Circuit diagram

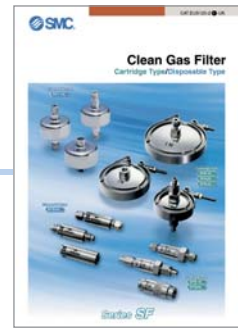


Manufacturing process



SMC Clean Gas Filter Series SF

SF
EUS120-2



■ 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

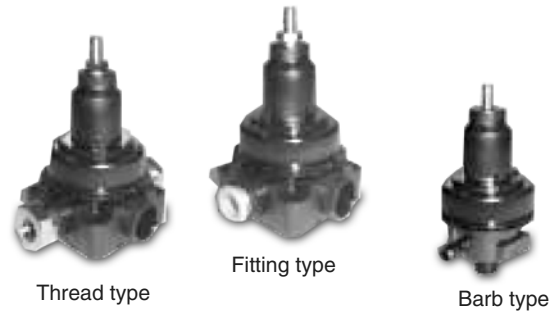
Disposable type

- 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 $^{\circ}\text{C}$	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□	120 μm	26			
		SFB20□ (Strainer)		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.



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

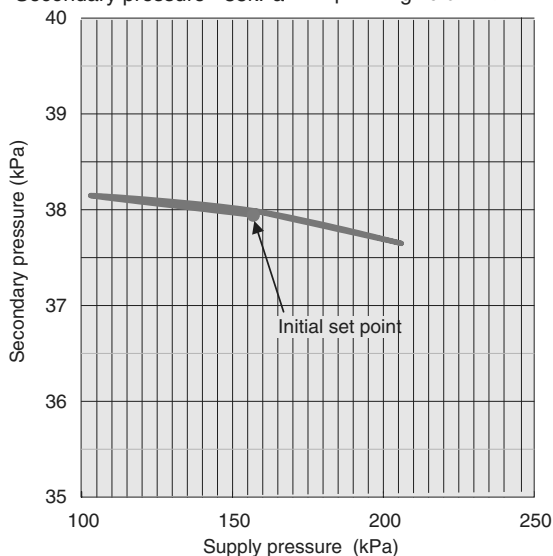
Barb type

SRA202 - N01 - X200A

Pressure Characteristics (SRA200, SRA200F)

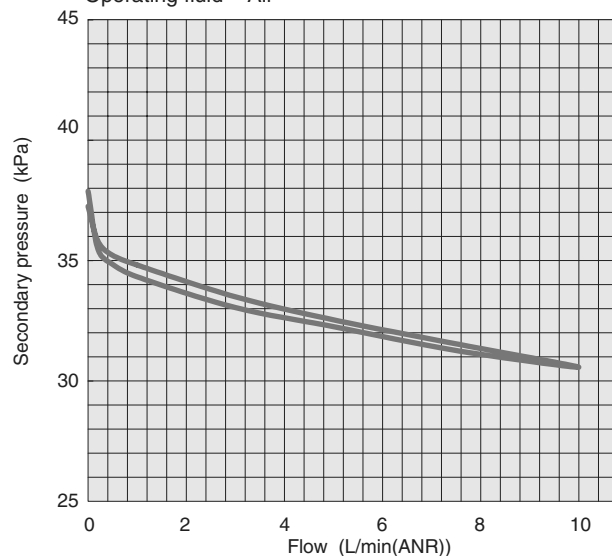
Initial setting

Supply pressure= 157kPa Flow = 5L/min (ANR)
Secondary pressure= 38kPa 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	Rc 3/4				23			
IDFA8E-23-K					27			
IDFA11E-23-K					28			
IDFA15E-23-K					46			
IDFA22E-23-K					810	R 1	54	
IDFA37E-23-K						R 1 1/2	62	

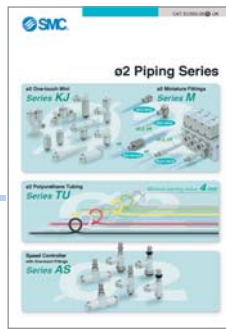
Nominal Air Flow Rate [m³/h (ANR)] *

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 m³/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

Speed Controller
with One-touch Fittings
Series AS

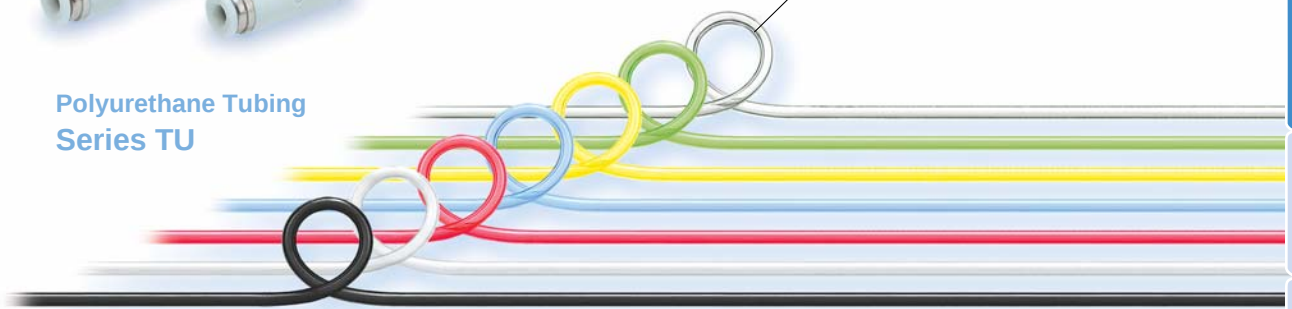
One-touch Mini
Series KJ

Miniature Fittings
Series M

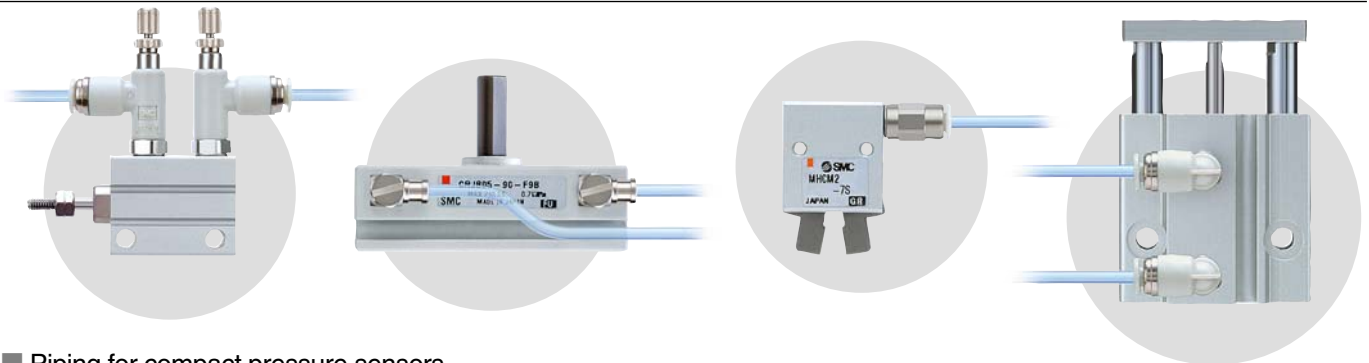


Minimum bending radius: **4 mm**

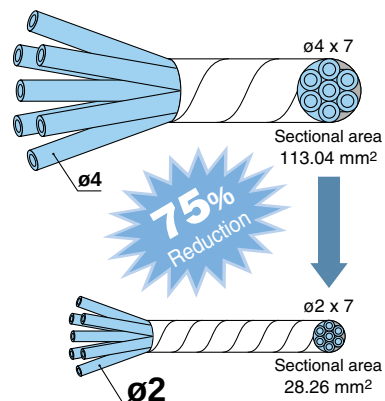
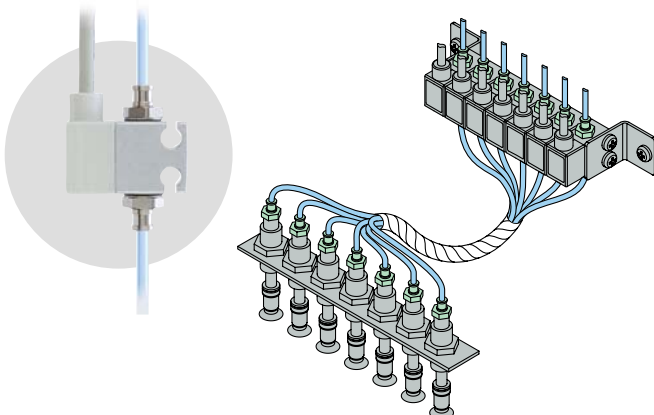
Polyurethane Tubing
Series TU



■ Piping for compact actuators



■ Piping for compact pressure sensors



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



Applicable
tubing
material

Nylon

Soft nylon

Polyurethane

Nylon
Soft nylon
Polyurethane

Nylon

Soft nylon

Polyurethane

Nylon
Soft nylon
Polyurethane

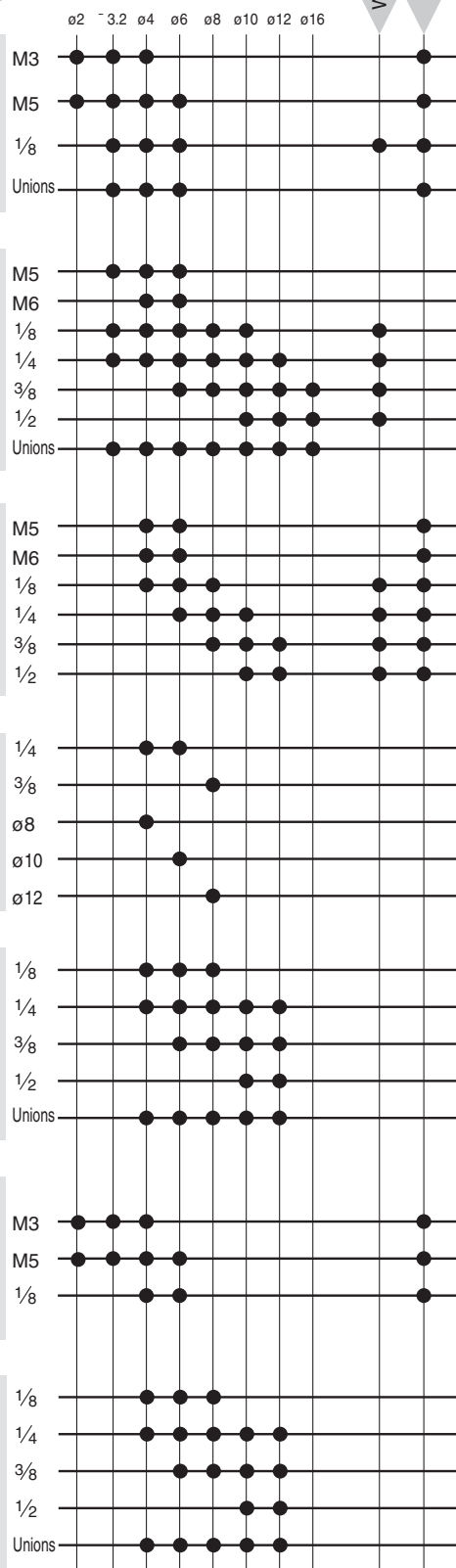
Nylon
Soft nylon
Polyurethane

Nylon
Soft nylon
Polyurethane

Soft nylon
Soft copper
(C1220T-0)

Applicable tubing O.D.
(mm)

With seal



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



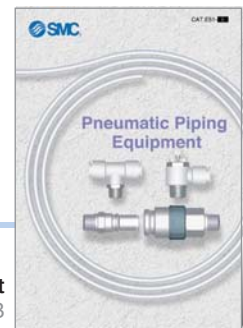
Centralized distribution of supply air

Piping Module Series KB

Applicable tubing—Metric size



Pneumatic Piping Equipment E-51-B



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

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)							With seal	Electroless nickel plated
		ø3.2	ø4	ø6	ø8	ø10	ø12	ø16		
Recommended:	1/8									
	1/4									
	3/8									
	1/2									
	Unions									
Polyolefin										
Soft Polyolefin	M5									
	1/8									
Polyurethane: Serie 10-	1/4									
	3/8									
Polyurethane: Serie 10-	1/2									
	Unions									
Polyurethane: Serie 10-										

Chemical /
Liquid Valves

Air
Valves

Air
preparation

Fittings
& Tubing

Actuators

Instrumentation

High Purity
Components

Temperature
Control

Vacuum
Equipment

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



Pneumatic Piping Equipment E-51-B



Color	Tubing O.D.										
	Metric size (mm)						Inch size (inch)				
	ø2 (ø 3/32")	ø4 (ø 1/8")	ø6 (ø 1/4")	ø8 (ø 3/8")	ø10 (ø 1/2")	ø12 (ø 3/4")	ø16 (ø 1 1/4")	ø 1/8" (ø 3.2)	ø 3/16"	ø 1/4"	ø 3/8" ø 1/2"
Black	●	●	●	●	●	●	●	●	●	●	●
White	●	●	●	●	●	●	●	●	●	●	●
Red	●	●	●	●	●	●	●	●	●	●	●
Blue	●	●	●	●	●	●	●	●	●	●	●
Yellow	●	●	●	●	●	●	●	●	●	●	●
Green	●	●	●	●	●	●	●	●	●	●	●
Black	●	●	●	●	●	●	●	●	●	●	●
White	●	●	●	●	●	●	●	●	●	●	●
Red	●	●	●	●	●	●	●	●	●	●	●
Blue	●	●	●	●	●	●	●	●	●	●	●
Yellow	●	●	●	●	●	●	●	●	●	●	●
Green	●	●	●	●	●	●	●	●	●	●	●
Black	●	●	●	●	●	●	●	●	●	●	●
White	●	●	●	●	●	●	●	●	●	●	●
Red	●	●	●	●	●	●	●	●	●	●	●
Blue	●	●	●	●	●	●	●	●	●	●	●
Yellow	●	●	●	●	●	●	●	●	●	●	●
Green	●	●	●	●	●	●	●	●	●	●	●
Clear	●	●	●	●	●	●	●	●	●	●	●
Orange	●	●	●	●	●	●	●	●	●	●	●
Black	●	●	●	●	●	●	●	●	●	●	●
White	●	●	●	●	●	●	●	●	●	●	●
Red	●	●	●	●	●	●	●	●	●	●	●
Blue	●	●	●	●	●	●	●	●	●	●	●
Yellow	●	●	●	●	●	●	●	●	●	●	●
Green	●	●	●	●	●	●	●	●	●	●	●
Translucent	●	●	●	●	●	●	●	●	●	●	●
Yellow brown	●	●	●	●	●	●	●	●	●	●	●
Black	●	●	●	●	●	●	●	●	●	●	●
White	●	●	●	●	●	●	●	●	●	●	●
Blue	●	●	●	●	●	●	●	●	●	●	●
Translucent	●	●	●	●	●	●	●	●	●	●	●
1 core	●	●	●	●	●	●	●	●	●	●	●
2 cores	●	●	●	●	●	●	●	●	●	●	●
3 cores	●	●	●	●	●	●	●	●	●	●	●
2 cores	●	●	●	●	●	●	●	●	●	●	●
3 cores	●	●	●	●	●	●	●	●	●	●	●

Chemical /
Liquid Valves

Air
Valves

Air
preparation

Fittings
& Tubing

Actuators

Instrumentation

High Purity
Components

Temperature
Control

Vacuum
Equipment

Fittings & Tubing

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/THI

Clean tubing Polyolefin Tubing Series TPH

Clean tubing Soft Polyolefin Tubing Series TPS



Color	Tubing O.D.															
	Metric size (mm)								Inch size (inch)							
	ø4 (ø 3/16")	ø6	ø8 (ø 5/16")	ø10	ø12	ø16	ø19		ø1/8" (ø 3.2)	ø3/16"	ø1/4"	ø3/8"	ø1/2"	ø3/4"	ø1"	
Black	●	●	●	●	●											
White	●	●	●	●	●											
Red		●	●	●	●											
Blue	●	●	●	●	●											
Green		●	●	●	●											
Black		●	●	●	●											
White		●	●	●	●											
Red		●	●	●	●											
Blue		●	●	●	●											
Yellow		●	●	●	●											
Green		●	●	●	●											
Black	●	●	●	●	●				●							
Black	●	●	●	●	●				●							
Translucent	●	●	●	●	●	●			●	●	●	●	●	●	●	●
Black	●	●	●	●	●				●	●	●	●	●	●	●	●
Red	●	●	●	●	●				●	●	●	●	●	●	●	●
Blue	●	●	●	●	●				●	●	●	●	●	●	●	●
Translucent	●	●	●	●	●				●	●	●	●	●	●	●	●
Black	●	●	●	●	●											
White	●	●	●	●	●											
Red	●	●	●	●	●											
Blue	●	●	●	●	●											
Yellow	●	●	●	●	●											
Green	●	●	●	●	●											
Black	●	●	●	●	●											
White	●	●	●	●	●											
Red	●	●	●	●	●											
Blue	●	●	●	●	●											
Yellow	●	●	●	●	●											
Green	●	●	●	●	●											



Pneumatic Piping Equipment
E-51-B

Chemical / Liquid Valves
Air Valves
Air preparation
Fittings & Tubing
Actuators
Instrumentation
High Purity Components
Temperature Control
Vacuum Equipment

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**



Colour	Tubing O.D.									
	Metric size (mm)					Inch size (inch)				
	ø4 (ø 1/8")	ø6 (ø 1/4")	ø8 (ø 3/8")	ø10 (ø 1/2")	ø12 (ø 3/4")	ø16	ø 1/8" (ø 3.2)	ø 3/16"	ø 1/4"	ø 3/8" ø 1/2"
	●	●	●	●	●					
	●	●					●	●		
	●	●	●	●	●					
	●	●	●	●	●	●	●	●	●	●
Orange		●								
Yellow			●							
Blue				●						
Green					●					

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□

KK
EUS50-19



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						●	●

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	●	●	●	●	●

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						●	●	●

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	●	●	●	●	●	●



Series KK3/4/6



Series KK2

S Couplers without sleeve lock Series KKH



Stainless steel type Series KKA



Manufactured by RECTUS AG Series KK13



Miniaturization of equipment

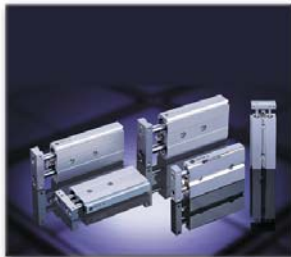
■ Space Saving Products series now available for further miniaturisation.

CUJ Series



■ Mini Free-Mount Cylinder

CXSJ Series



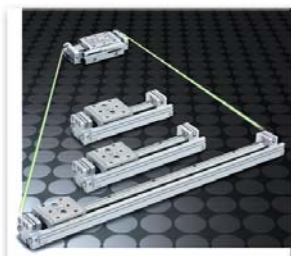
■ Dual Rod Cylinder

MGJ Series



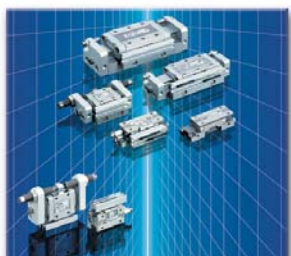
■ Miniature Guide Rod Cylinder

MXV Series



■ Air Slide Table
• Long stroke:
Max.stroke:400mm

MXV 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

Chemical /
Liquid Valves

Air
Valves

Air
preparation

Fittings
& Tubing

Actuators

Instrumentation

High Purity
Components

Temperature
Control

Vacuum
Equipment

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

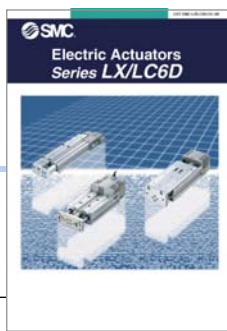
More Advanced Options

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 actuators are designed to provide **X-Y axis capability** and are the **perfect solution** for pick and place and palletizing operations.



LC8/LJ1/LG1/LTF
EUS10-53



LX
EMC-LX/LC6D-01



E-MY2
EUS100-51

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 $\pm 1\%$ (F.S.)
- Hysteresis: Within $\pm 0.5\%$ (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 ITV2000 1500ℓ/min(ANR) *



Series ITV3000 4000ℓ/min(ANR) *



Controller for electro-pneumatic pressure regulator Series IC

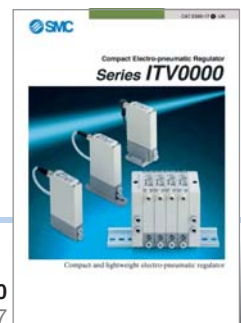
Digital signal is converted to analog signal.



*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 $\pm 1\%$ F.S. Hysteresis Within $\pm 0.5\%$ 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	
Controller	Series IC  Digital signal is converted to analog signal.	Model	Pressure range	Input	Output
		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.



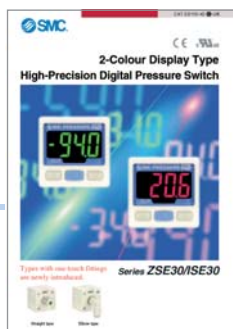
Digital pressure Switch Series Variations



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
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

Chemical /
Liquid Valves

Air
Valves

Air
preparation

Fittings
& Tubing

Actuators

Instrumentation

High Purity
Components

Temperature
Control

Vacuum
Equipment

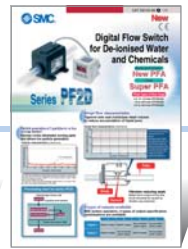
Digital Flow Switch Series Variations



PFM
ES100-63



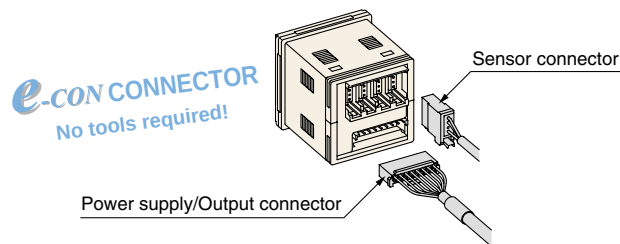
PF2A/W
ES100-48



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

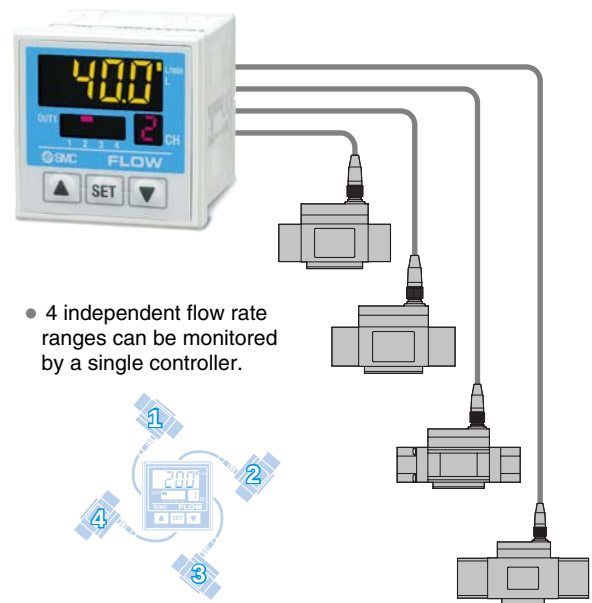
Connection



Function

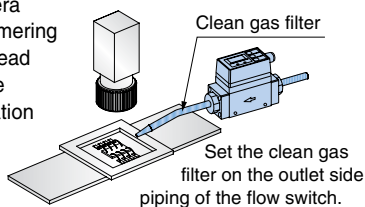
- Copy function**
Possible to copy information from one channel to one or more other channels.
Copying CH1 setting to CH2, 3 and 4.
- Channel scan function**
Allows constant monitoring of the displayed pressure value for each channel.
- Key lock function**
- Unit switching function**
- Peak value and lowest value holding**

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

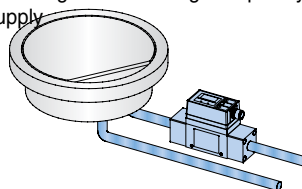


Application Examples

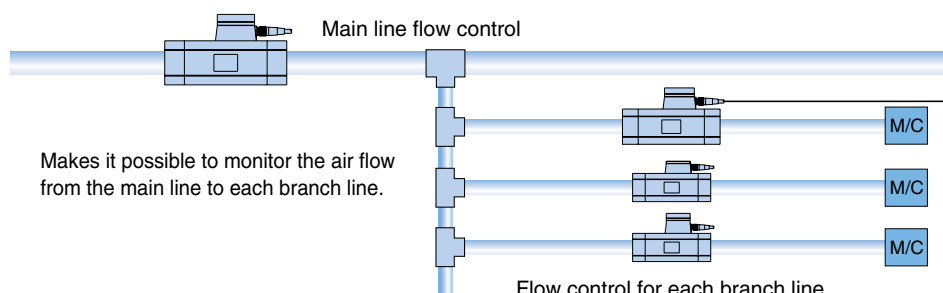
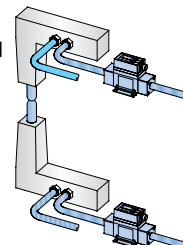
Flow control of N₂ gas to prevent detection camera shimmering and lead frame oxidation



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

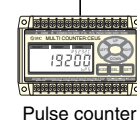


Flow control of pressurized cooling water for welding gun



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

(Refer to page 36.)



Compact 2-color Display Digital Flow Switch Series PFM



For Air Series PF2A

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	

				
Flow rate measurement range ℓ/min	Integrated type	Sensor unit	Remote type 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 □	

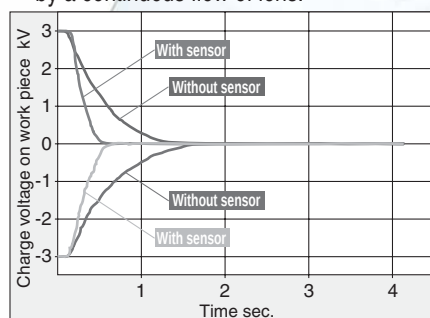
For Deionized Water and Chemicals Series PF2D

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

Ionizer / with surface potential sensor

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

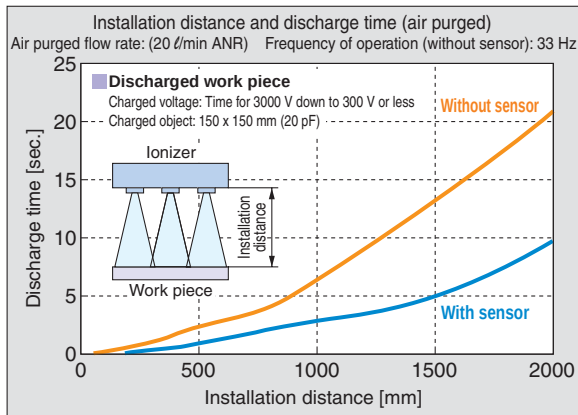


One-touch fitting with check valve
(both ends: standard equipment)



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.



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

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□

Chemical /
Liquid Valves

Air
Valves

Air
preparation

Fittings
& Tubing

Actuators

Instrumentation

High Purity
Components

Temperature
Control

Vacuum
Equipment

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.

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.

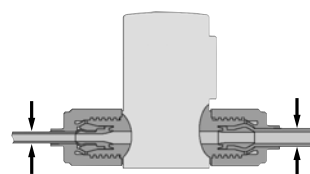
Low particle generation Piston bumper

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

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

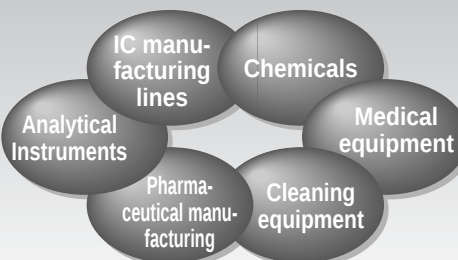


Eliminates problems due to over tightening

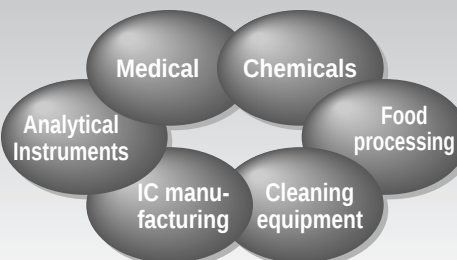
- Special locking mechanism
- High flexural strength (tubing supports)

Main applications and fields

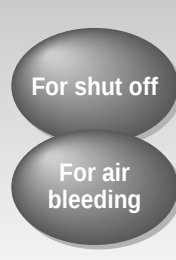
LVC

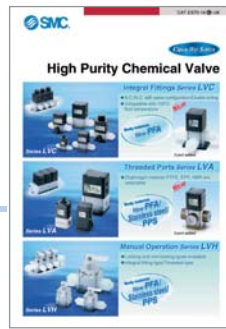


LVA



LVH





Integral Fittings Series LVC



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



Threaded Ports Series LVA



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



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**



Chemical /
Liquid Valves

Air
Valves

Air
preparation

Fittings
& Tubing

Actuators

Instrumentation

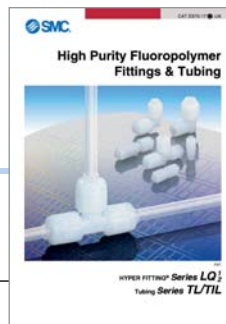
High Purity
Components

Temperature
Control

Vacuum
Equipment

HYPER FITTING® / LQ1•LQ2•LQ3

LQ
ES70-17

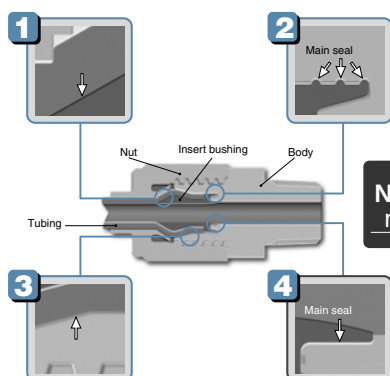


High Purity Fluoropolymer Fittings & Tubing Series LQ1•LQ2

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.



New PFA material

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

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

■ 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.

■ 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.

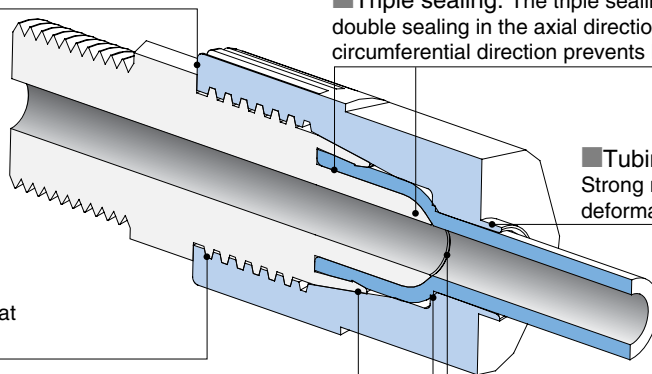
■ Tubing supports: Strong resistance to tube bending and deformation.

■ 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.



LQ $\frac{1}{2}$ Series

□ : Only for series LQ1

■ : Common to series LQ1 and LQ2

Series		Shape	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"								
Connector LQ¹/₂H	Male		1	—	○	—	—	—	—	—	—	—	○	○	—	—	—	—	—	○	—	—	—	—	—	—	—	—	—	—	—	—	—
	Female		2	—	○	○	—	—	—	—	—	—	●	○	—	—	—	—	—	●	●	○	—	—	—	—	—	—	—	—	—	—	—
Elbow LQ¹/₂L	Male		3	—	—	○	○	—	—	—	—	—	—	●	●	○	—	—	—	—	—	●	○	—	—	—	—	—	—	—	—	—	—
	Female		4	—	—	—	○	○	—	—	—	—	—	—	—	●	○	—	—	—	—	—	—	●	○	—	—	—	—	—	—	—	—
Run tee LQ¹/₂R	Male		5	—	—	—	—	○	○	—	—	—	—	—	—	—	●	○	—	—	—	—	—	—	—	—	—	—	●	○	—	—	—
	Female		6	—	—	—	—	—	○	○	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	●	○	—
Branch tee LQ¹/₂B	Male		1	○	—	—	—	—	—	—	—	—	○	○	—	—	—	—	—	○	—	—	—	—	—	—	—	—	—	—	—	—	—
	Female		2	○	—	—	—	—	—	—	—	—	—	●	○	—	—	—	—	—	●	●	○	—	—	—	—	—	—	—	—	—	—
Union elbow LQ¹/₂E			3	○	—	—	—	—	—	—	—	—	—	●	●	○	—	—	—	—	—	—	●	○	—	—	—	—	—	—	—	—	—
Union tee LQ¹/₂T			4	○	—	—	—	—	—	—	—	—	—	—	—	—	●	○	—	—	—	—	—	—	●	○	—	—	—	—	—	—	—
Panel mount union LQ¹/₂P			5	○	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Union LQ¹/₂U			6	○	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Union flange LQ1F			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 20°C)		0.7MPa						1.0MPa			
Operating temperature		0 to 150°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)



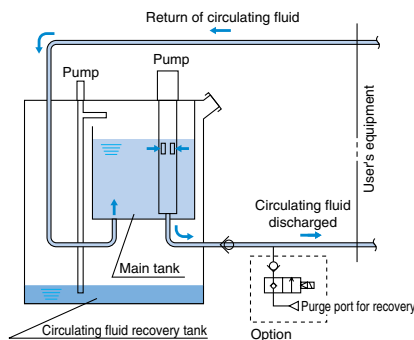
- Temperature setting range: -20°C to 40°C / -20°C to 90°C
Cooling capacity: **1kW to 15kW**
- Temperature stability: $\pm 0.1^{\circ}\text{C}$
- Types of circulating fluids:
Fluorinated fluids, Ethylene glycol aqueous solution
*Contact us for other types of fluids (deionized water, water).
- Built-in 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.

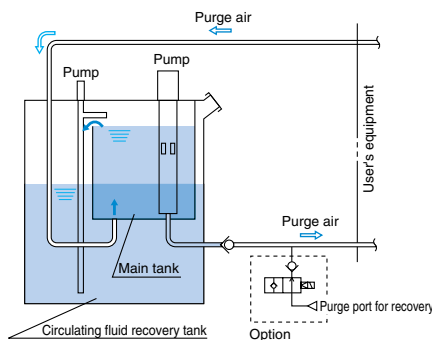
Unique double layer tank structure

- 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.

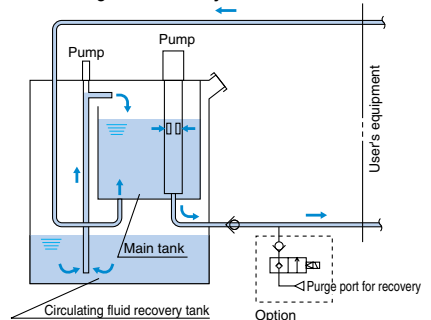
① Normal operation



② Recovery of circulating fluid



③ Fluid returns to the main tank from the circulating fluid recovery tank.



Thermo-cooler Series HRG

Controls circulating water at a constant temperature



- Temperature stability: $\pm 0.5^{\circ}\text{C}$, $\pm 1.0^{\circ}\text{C}$ (Selectable from 2 standards)
- Cooling capacity: **1.1kW, 2.3kW, 4.8kW** (at 60Hz)
- Set temperature: $\pm 5\sim 35^{\circ}\text{C}$
- Useful for a wide variety of industries: from General to Semiconductor.

Thermo-con Series HEC

Circulator Electronic Cooling / Heating Type



- Temperature stability: $\pm 0.01^{\circ}\text{C}$ 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 **eti** NRTL
- 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

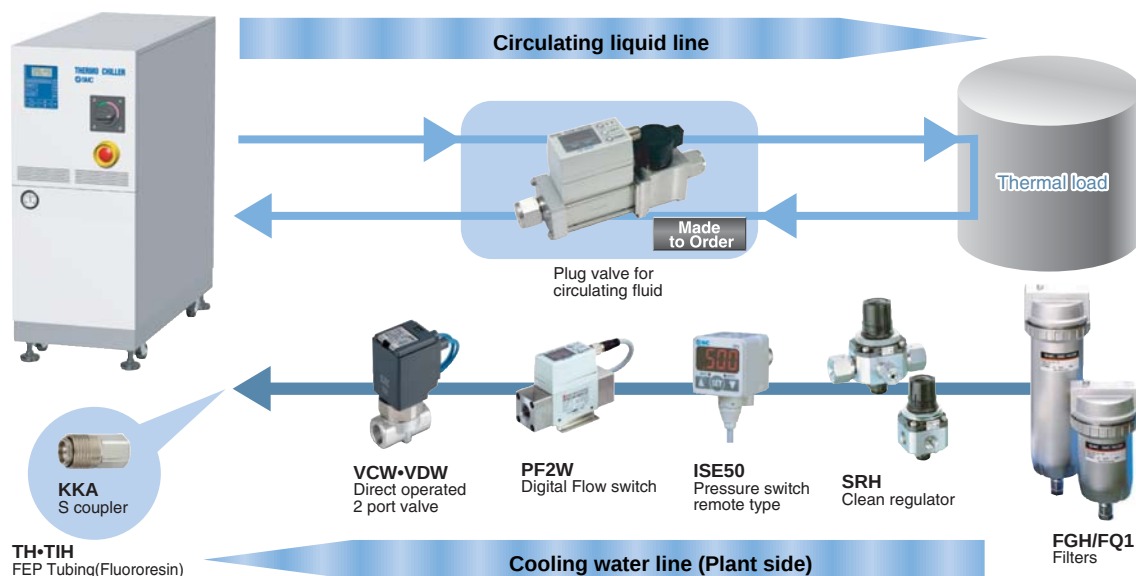
Constant Temperature Bath Electronic Cooling / Heating Type



- set temperature range: -15°C to 60°C
- Temperature stability: $\pm 0.1^{\circ}\text{C}$ (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 **eti** NRTL
- 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.)	Recommended flow rate (ℓ/min (ANR))	Weight (g)
		IN side, OUT side		
Metric size	ZFC050-02	ø2	2	4.9
	ZFC050-23	ø3.2	7	4.3
	ZFC050-04	ø4	10	
	ZFC100-04	ø4	10	
	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	
	ZFC101-07	ø1/4"	20	11.5
	ZFC201-07	ø1/4"	30	
	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.)	Recommended air flow ℓ/min (ANR)	Weight g
		IN side, OUT side		
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



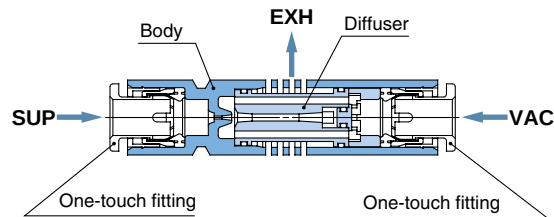
ZFC
E832

Vacuum Ejector, In-line type Series ZU

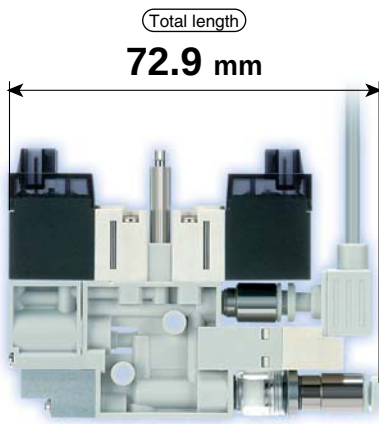
Space-saving ejector that can be installed in-line with the piping



- 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



Total length
72.9 mm

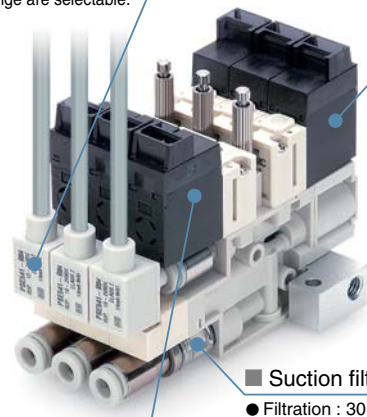
Total width
9.9 mm

Total height
52.5 mm

Weight **50 g**

- Available with or without pressure sensor
- 2 kinds of pressure range are selectable.

- 0 to -101kPa
- -100 to 100kPa



- Supply valve
- N.C.
- Latching

- Suction filter
- Filtration : 30 μm

- Release valve
- N.C.

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



Manifold

Single unit

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 0 l/min(ANR) .

Compact

Light weight

IRV1000

60

$\text{l/min (ANR) (Note)}$

IRV2000

100

$\text{l/min (ANR) (Note)}$

IRV3000

150

$\text{l/min (ANR) (Note)}$

□ **35mm**

120g

□ **50mm**

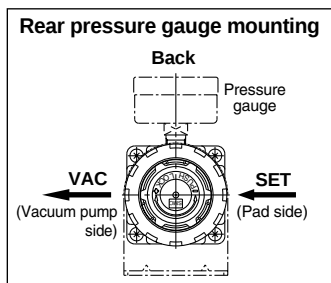
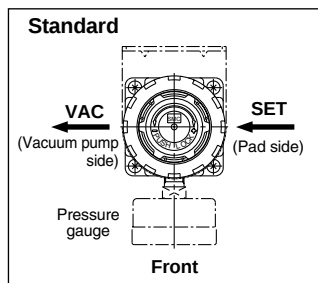
270g

□ **66mm**

700g

■ Panel mounting capability is standard

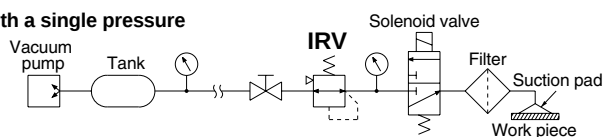
■ Pressure gauge can be mounted from the front or rear



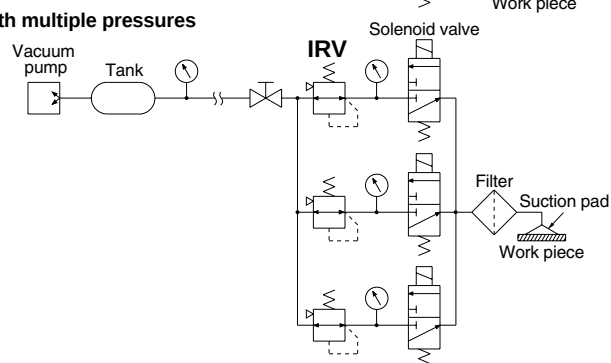
Applications

Lifting of work pieces

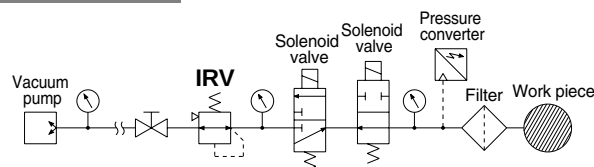
With a single pressure



With multiple pressures



Leak tester

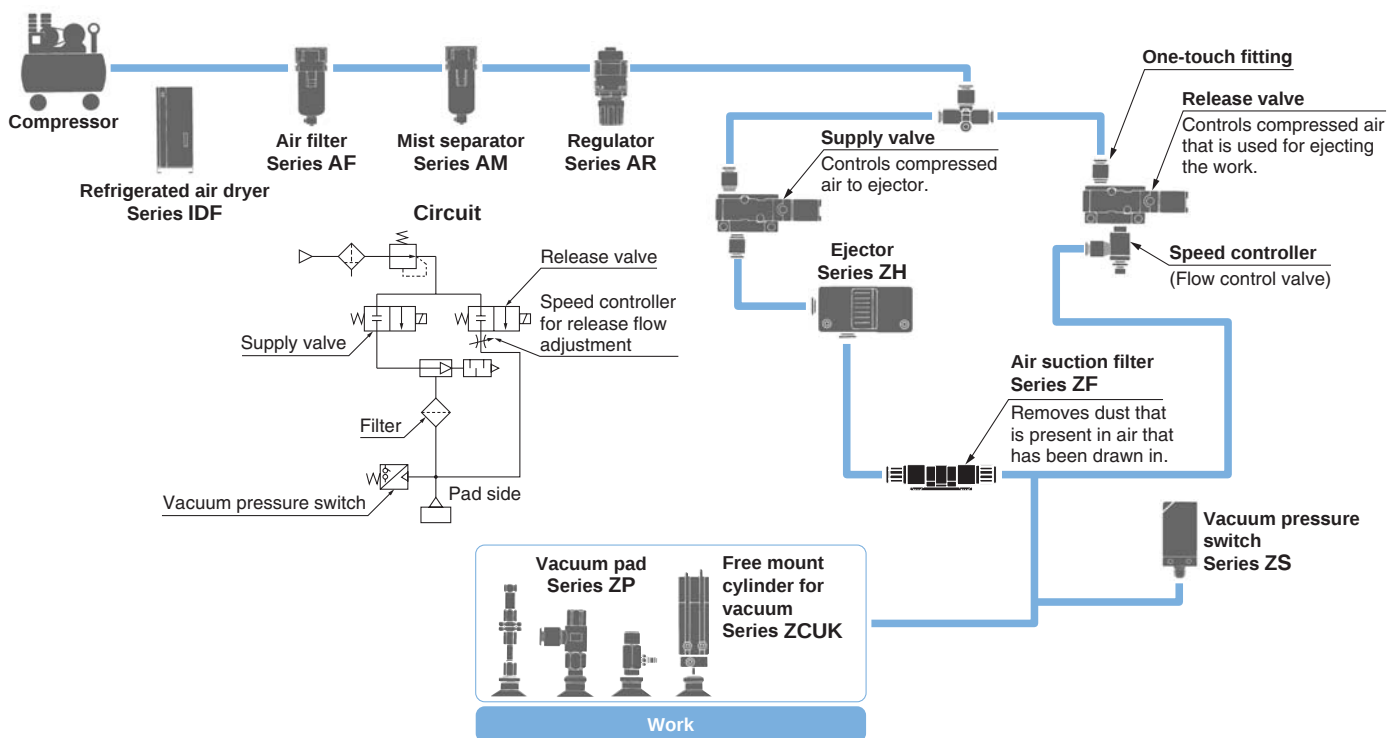


Vacuum equipment

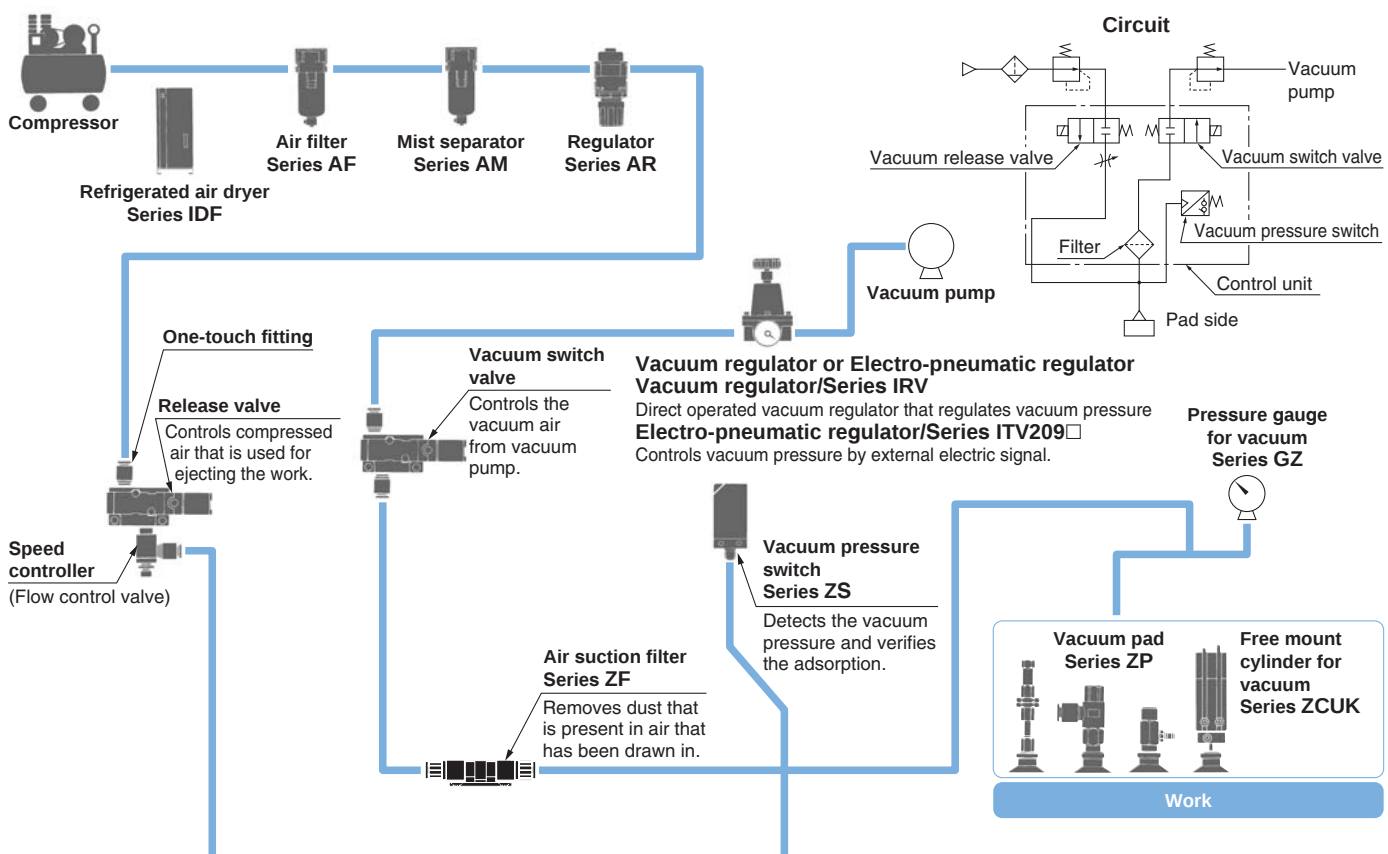
Application examples

- **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



SMC International Training

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.

www.smctraining.com

Training
IT-100



AUTOSIM-200
Automation Simulator



HAS-200
Highly Automated System



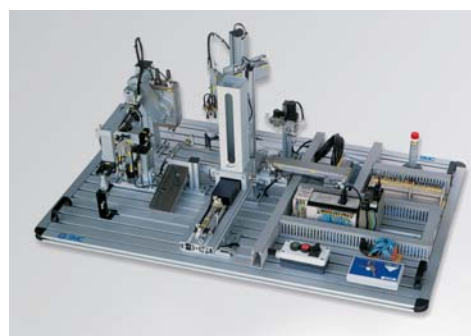
FMS-200
Flexible Manufacturing System



MAS-200
Modular Assembling System



IPC-200
Industrial Process Control



MAP-200
Manipulation Systems



PNEUTRAINER-200
Pneumatics/ Electro-pneumatics



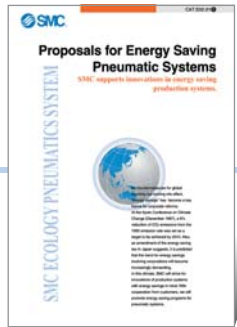
VAC-200
Vacuum Trainer



AUTOMATE-200
Your mate in Automation!



PNEUMATE-200
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

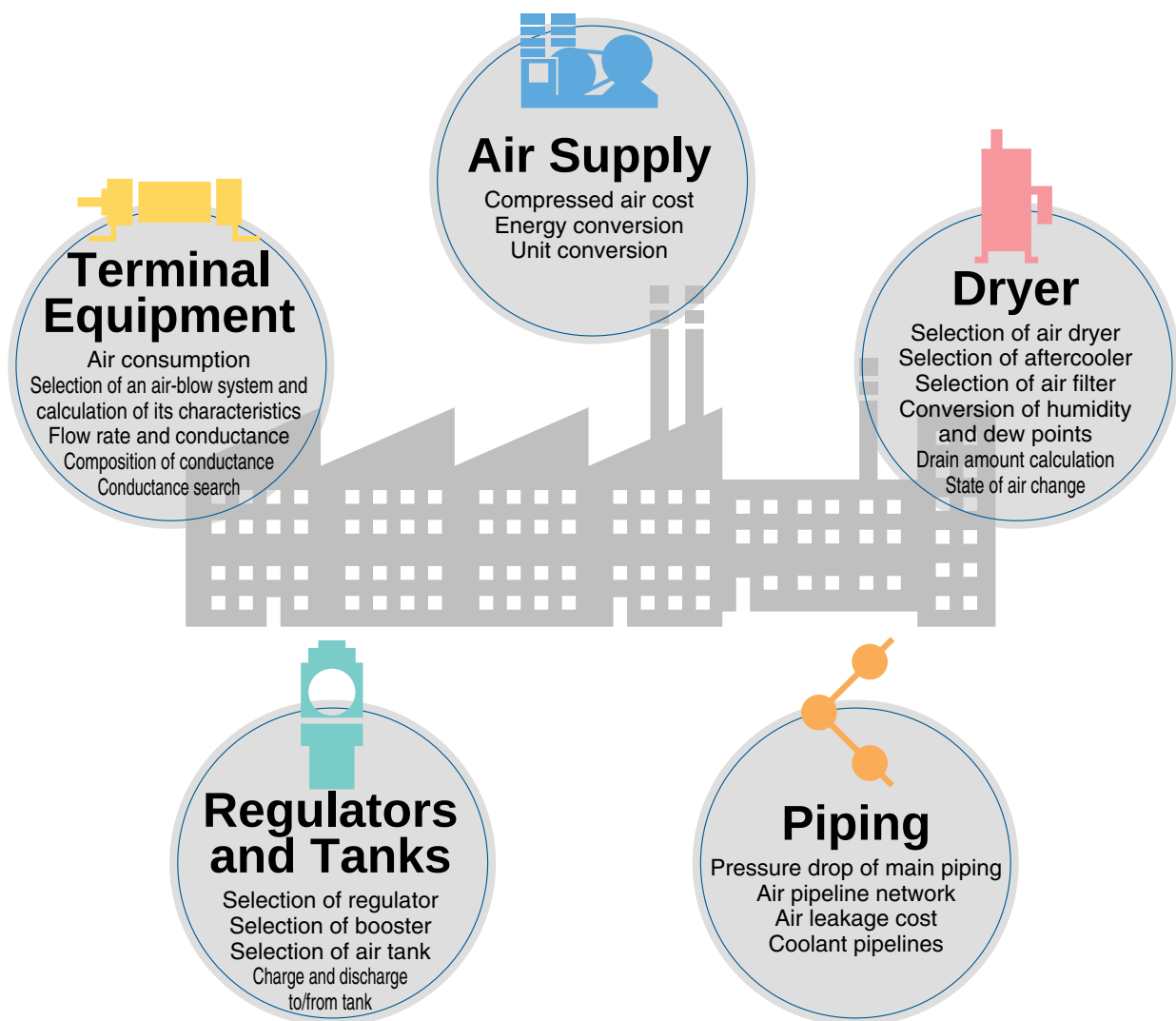
Calculation of gas, liquid, and steam

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



America

U.S.A. **SMC Corporation of America.**

3011 North Franklin Road Indianapolis, IN 46226, U.S.A.
TEL: 317-899-4440 FAX: 317-899-3102

CANADA **SMC Pneumatics (Canada) Ltd.**

6768 Financial Drive Mississauga, Ontario, L5N 7J6 Canada
TEL: 905-812-0400 FAX: 905-812-8686

MEXICO **SMC Corporation (Mexico) S.A. DE C.V.**

Carr. Silao-Trío KM 2.5 S/N, Predio San Jose del Durazno.
C.P. 36100, Silao, Gto. Mexico
TEL: 472-72-255-00 FAX: 472-72-259-44/259-46

CHILE **SMC Pneumatics (Chile) S.A.**

Av. La Montaña 1.115, Km. 16,5 Norte Parque
Industrial Valle Grande, Lampa - Santiago - Chile
TEL: 02-270-8600 FAX: 02-270-8601

ARGENTINA **SMC Argentina S.A.**

Teodoro Garcia 3860 (1427) Buenos Aires, Argentina
TEL: 011-4555-5762 FAX: 011-4555-5762

BOLIVIA **SMC Pneumatics Bolivia S.R.L.**

Avenida Beni Numero 4665
Santa Cruz de la Sierra-Casilla de correo 2281, Bolivia
TEL: 591-3-3428383 FAX: 591-3-344900

VENEZUELA **SMC Neumatica Venezuela S.A.**

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Galicia 1650 esq. Gaboto C.P. 11200 Montevideo, Uruguay
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BRAZIL **SMC Pneumaticos Do Brasil Ltda.**

Rua. Dra. Maria Fidelis, nr. 130, Jardim Piraporinha-Diadema-São Paulo.
CEP: 09950-350, Brasil
TEL: 11-4051-1177 FAX: 11-4071-6636



Europe/Africa

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

Vincent Avenue, Crownhill, Milton Keynes, MK8 0AN, Buckinghamshire, U.K.
TEL: 0800-1382930 FAX: 01908-555064

GERMANY **SMC Pneumatik GmbH**

Boschring 13-15 D-63329 Egelsbach, Germany
TEL: 06103-4020 FAX: 06103-402139

ITALY **SMC Italia S.p.A.**

Via Garibaldi 62, I-20061 Carugate Milano, Italy
TEL: 02-92711 FAX: 02-9271365

FRANCE **SMC Pneumatique S.A.**

1 Boulevard de Strasbourg, Parc Gustave Eiffel, Bussy Saint Georges, F-77600
Marne La Vallée Cedex 3 France
TEL: 01-64-76-10-00 FAX: 01-64-76-10-10

SWEDEN **SMC Pneumatics Sweden AB**

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TEL: 08-603-12-00 FAX: 08-603-12-90

SWITZERLAND **SMC Pneumatik AG**

Dorfstrasse 7, Postfach 117, CH-8484 Weisslingen, Switzerland
TEL: 052-396-3131 FAX: 052-396-3191

AUSTRIA **SMC Pneumatik GmbH (Austria)**

Girakstrasse 8, A-2100 Korneuburg, Austria
TEL: 0-2262-62280 FAX: 0-2262-62285

SPAIN **SMC España, S.A.**

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Rua de Engº Ferreira Dias, 452. 4100-246, Porto, Portugal
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IRELAND **SMC Pneumatics(Ireland)Ltd.**

2002 Citywest Business Campus, Naas Road, Saggart, Co. Dublin, Ireland
TEL: 01-403-9000 FAX: 01-464-0500

NETHERLANDS (Associated company) **SMC Pneumatics BV**

De Ruyterkade 120, NL-1011 AB Amsterdam, Netherlands
TEL: 020-5318888 FAX: 020-5318880

DENMARK **SMC Pneumatik A/S**

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Odder, Denmark
TEL: 70252900 FAX: 70252901



Asia/ Oceania

FINLAND **SMC Pneumatics Finland OY**

Tiistinniityntie 4, FI-02230 Espoo, Finland
TEL: (0)207 513 513 FAX: (0)207 513 595

NORWAY **SMC Pneumatics Norway A/S**

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TAIWAN **SMC Pneumatics (Taiwan) Co.,Ltd.**

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TEL: 03-322-3443 FAX: 03-322-3387

HONG KONG **SMC Pneumatics (Hong Kong) Ltd.**

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89 Tuas Avenue 1, Jurong Singapore 639520
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TEL: 02-8090565 FAX: 02-8090586

MALAYSIA **SMC Pneumatics (S.E.A.) Sdn. Bhd.**

Lot 36 Jalan Delima1/1, Subang Hi-Tech Industrial Park, Batu 3
40000 Shah Alam, Selango, Malaysia
TEL: 03-56350590 FAX: 03-56350602

SOUTH KOREA **SMC Pneumatics Korea Co., Ltd.**

Woolim e-BIZ Center (Room 1008), 170-5, Guro-Dong, Guro-Gu,
Seoul, 152-050, South Korea
TEL: 02-3219-0700 FAX: 02-3219-0702

CHINA **SMC (China) Co., Ltd.**

A2,XingSheng Street, BDA, Beijing, 100176 P.R. China
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134/6 Moo 5, Tiwanon Road, Bangkokdi,
Amphur Muang, Patumthani 12000, Thailand
TEL: 02-963-7099 FAX: 02-501-2937

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14-18 Hudson Avenue Castle Hill, NSW 2154, Australia
TEL: 02-9354-8222 FAX: 02-9894-5719

NEW ZEALAND **SMC Pneumatics (New Zealand) Ltd.**

8C Sylvia Park Road,P.O.Box62-226, Mt.Wellington Auckland, New Zealand
TEL: 09-573-7007 FAX: 09-573-7002



SMC Corporation

Akihabara UDX 15F,
4-14-1, Sotokanda, Chiyoda-ku, Tokyo 101-0021, JAPAN
Phone: 03-5207-8249 FAX: 03-5298-5362
URL <http://www.smcworld.com>
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1st printing KU printing KU 13 UK Printed in Spain.