SMC Life Science

SMC Life Science
Analytical – Instrumentation – Microfluidics – Process Technology

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Life Science Products

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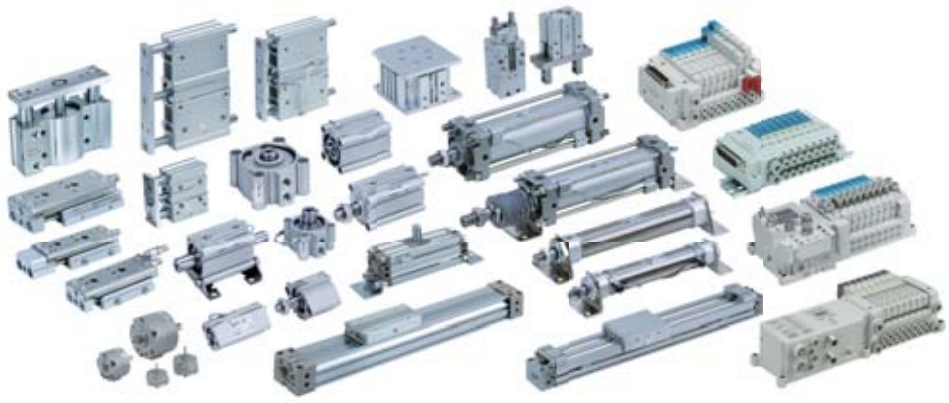
SMC is pursuing worldwide customer satisfaction and supporting automation through the most advanced pneumatic technologies.

The 21st century - with the rapid revolution in global information technologies, business methods are undergoing great changes. In these quickly developing, ever-changing times, customer satisfaction can only be achieved with a clear understanding of our customers' goals and objectives. Therefore, SMC has built an organization that listens carefully to our customers and responds quickly and specifically to their needs. SMC has established a wide spread global network of locations in all major countries of the Americas, Europe and Asia/Oceania as well as emerging countries such as Brazil, Russia, India and China, 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 a solid communication network to meet our customers' needs and expectations.



Technical Development

Our engineering staff now exceeds 1,450 and is located in Technical centers in Japan, the United States, Europe and China.

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 new world class products.

Production and Supply

Our product line offers 12,000 basic models with over 700,000 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 prices is accomplished through our unique production system, and by maximizing our local production capabilities, a stable supply of product is guaranteed.

Sales & Communication Network

With 400 sales offices in 82 countries worldwide, our sales force of over 7,951 maintains close communication with customers.

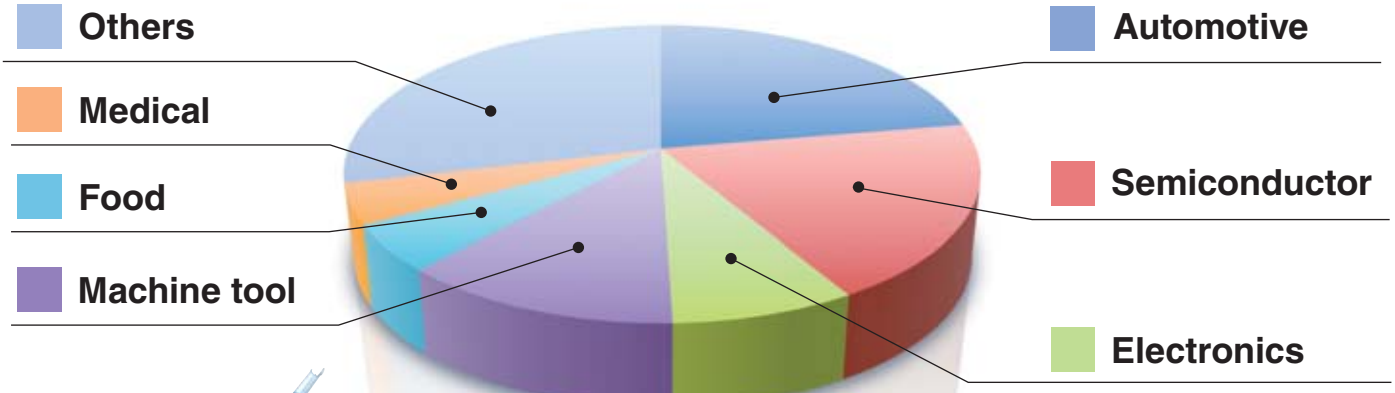
By establishing a strong base in each country and region with a large experienced sales force, SMC provides the best possible service in the industry. Maintaining close communication with our customers throughout the world keeps our engineering teams and our products at the leading edge of the industry.

Pneumatics contributes to automation in every industry.

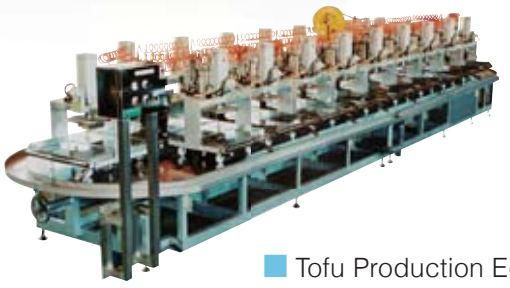
The stage is set for infinite application expansion of pneumatic control technologies.

The development of sophisticated automation in the industrial world has been a spark for the rapid growth in the use of pneumatic components. From a mainstay of core industries such as automotive, electronics and machinery, pneumatic components have moved into a wide range of other industrial fields. High technology applications are growing especially fast, making pneumatics indispensable in high tech industries such as information technology. Additionally, pneumatic components are playing an increasing role in the automation of the field of medicine, nursing care and other consumer applications for future development of automation industry.

Sales Composition by Industrial Sector (Japan)



Air Shoot Pitching Machine/ TOPGUN



Tofu Production Equipment

Automated Hematology Analyzer

Bottle Filler

Automobile Assembly Lines

Coater/Developer

Electronic Parts
Mounting Equipment

IC Test Handler

IC Test System

ESL Paper Pack Filling Machine

Thermo Former

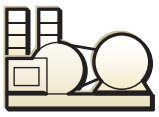
Automatic Rice Sorter

Air Jet Loom

12,000 basic models, and 700,000 variations. A wide range of variations to accommodate diverse applications.

A complete line-up of pneumatic control systems

As a general supplier of pneumatic components, SMC provides products compatible with 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

These components provide clean dry air through dehumidification and filtration.

Air Dryer

Air Preparation Filter

Air Line Equipment

Air Filters, Regulators, Lubricators

These components remove foreign particles from compressed air, provide pressure control or supply lubrication.

Air Line Equipment

Directional Control Valves

Solenoid Valves

These components direct the flow of compressed air supplied to cylinders and other actuators.

Solenoid Valve

Actuators

Air Cylinders, Rotary Actuators, Air Grippers

These components use the compressed air switched by directional control valves to create force for linear and rotary action, and gripping.

Air Cylinder

Air Gripper

SMC products are moving into peripheral related markets.

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.

Detection Switches

These switches monitor various fluids such as air or water to control pressure and/or flow rate.

Pressure Switch

Flow Switch

Temperature Control Equipment

Our temperature control equipment allows precise temperature control in Thermo-chillers with refrigeration technology and Thermo-cons with thermo-electric device technology.

Thermo-chiller

Thermo-con

Electric Actuators

Highly accurate, multi-positioning electric actuators with servo motors and lead screws, and high-speed, shockless transfer electric actuators with servo motors and belts have been realized.

Electric Actuator & Dedicated Controller

Vacuum Equipment

Vacuum equipment generates a vacuum state by supplying compressed air for work piece adsorption and transfer application.

Vacuum Ejector

Vacuum Pad

High Vacuum Valves

High vacuum valves are used for semiconductor manufacturing equipment.

High Vacuum Angle Valve

Chemical Liquid Valves

Air operated chemical liquid valves are compatible with acid, alkali and super pure water, which are required for the production of semiconductors in high-purity environments.

Air Operated Chemical Liquid Valve

Technical Development

SMC's staff of 1,450 experienced engineers provides quick solutions for our customers' specific needs.

As demonstrated by merging with the most advanced fields, typified by the information technology industry, expanding to life science fields, environment responsiveness, and energy saving activities, pneumatic control is entering a new era of high technology. SMC is responding with improvements in quality, precision, durability, and incorporating high level multiple functions, miniaturization and new materials. We pursue research and development in multiple fields, producing a succession of new products to satisfy customers' specified demands. In addition, we make products that can be applied worldwide by considering international standards from their inception. Our highly qualified engineering staff, comprised of specialists from every field, is ready to give prompt and detailed solutions to the diverse needs of our customers.

CAD

Laboratory

Clean Room

3D Measuring Instrument

Life Testing Room

SMC's engineering staff

Analyzer

3D Printer

CT Scanner

Environmental Test Rooms

SMC's research and development division is adapting to the changing times by researching electronic control technologies and/or developing products for fields such as the semiconductor industry. Within our product development facilities, we have provided our customers with extensive experimental equipment for cooperative research.

Technical Development

Global engineering network. Technical centers are located in the United States, Europe and China, as well as 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, Europe and China, 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 Japan Technical Center has expanded to a new twin-tower building from where it will oversee worldwide technical development.

JTC (Japan Technical Center)
Japan

The JTC staffed with 1,100 employees and the center of SMC research and development, produces new products for the global market based on our customers' current and future needs.

CTC (China Technical Center)
China

The CTC strengthens the system through product development and technical services with about 100 employees in order to quickly respond to a wide range of needs and requirements in the Chinese market.

SMC's Global Engineering Network

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

The UTC is enhancing engineering capabilities to quickly respond to customers' needs through product development and technical services offered in the North American market. Approximately 130 employees deal with various requirements from customers.

ETC (European Technical Centre)
U.K.

The ETC has been established in the existing SMC U.K. factory site in Milton Keynes. Here, approximately 60 experienced engineers from SMC European subsidiaries are gathered to handle projects from their respective countries. This has enabled improved communication, faster and more accurate information, and a higher level of customer satisfaction.

GTC (German Technical Centre)
Germany

In the European industrial center, the GTC with about 60 employees develops products and provides technical services by quickly responding to customers' requirements.

Production and Supply

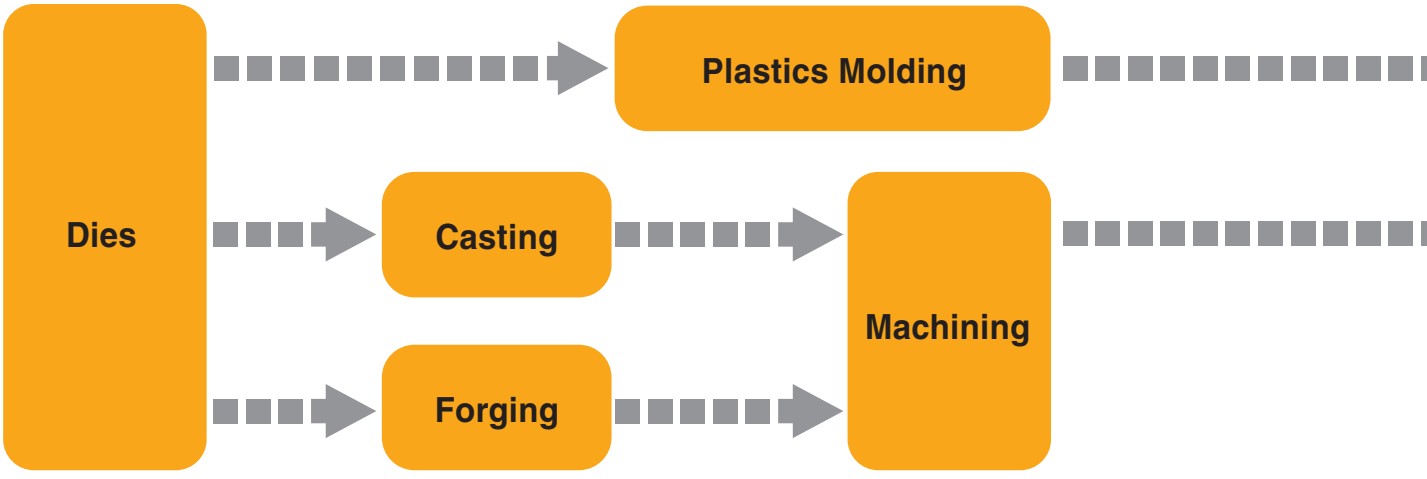
Die Maintenance

Aluminum Melting Furnace Line

NC Machinery Line

Piston Rod Machinery Line

SMC's Integrated Production System



Impact Molding

Punching Press

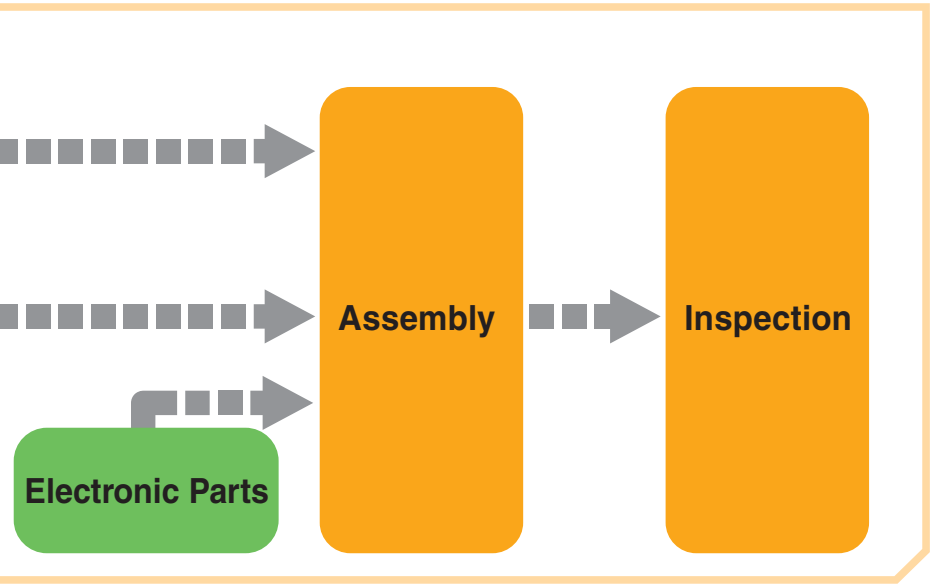
SMC's unique production system achieves high quality, low cost and a short lead time.

SMC products reflect a market trend towards greater diversification with a vast array of 12,000 basic models and over 700,000 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 in order to supply our products with a high level of quality, reasonable pricing and shorter delivery times to our customers. 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 has achieved shorter lead times for its product.

Valve Body Machining

Plastics Molding

Coil Winding



Clean Room

Assembly/Inspection of
Temperature Control Equipment

Electronic Substrate Mounting

Automatic Assembly Equipment

Production and Supply

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

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

1 Production Facilities (Japan)

Soka Area
(Saitama Pref.)
Total land area : 31,757 m²
Total floor area : 47,920 m²

Tsukuba Factory
(Ibaraki Pref.)
Total land area : 63,263 m²
Total floor area : 51,295 m²

Shimotsuma Factory
(Ibaraki Pref.)
Total land area : 108,676 m²
Total floor area : 28,589 m²

Kamaishi Area
(Iwate Pref.)
Total land area : 86,196 m²
Total floor area : 52,396 m²

Tohno Factory
(Iwate Pref.)
Total land area : 78,845 m²
Total floor area : 28,602 m²

Yamatsuri Area
(Fukushima Pref.)
Total land area : 315,761 m²
Total floor area : 44,362 m²

Distribution Center
(Ibaraki Pref.)
Total land area : 32,207 m²
Total floor area : 19,514 m²

2 Key Overseas Production Facilities

China Factory

SMC (China) Co., Ltd.
Total land area : 172,558 m²
Total floor area : 115,389 m²

SMC (Beijing) Manufacturing Co., Ltd.
Total land area : 315,857 m²
Total floor area : 147,056 m²

Singapore Factory

SMC Manufacturing (Singapore) Pte. Ltd.
Total land area : 47,911 m²
Total floor area : 37,800 m²

3 Overseas Local Production Facilities

North, Central & South America

U.S.A.

Brazil

Mexico

Chile
Argentina
Bolivia

Europe/Africa

Germany

U.K.

Italy

Russia

Czech Republic

Switzerland
Austria
Sweden
France
Spain
Turkey
South Africa

Asia/Oceania

Australia

South Korea

India

Singapore
Malaysia
New Zealand
Hong Kong
China (Guangzhou)
Taiwan
Thailand

Sales & Communication Network

A “30% global market share” has been achieved with local subsidiaries in 50 countries worldwide.

Taking its first step with Australia in 1967, SMC continued to move quickly into the international marketplace, and has steadily established local subsidiaries and distributors in major countries around the world, currently reaching 400 locations in 82 countries. With the expansion of its international network, SMC has earned a solid reputation as a reliable international brand, and has exceeded 30% 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.

SMC Service in North & Central/South America

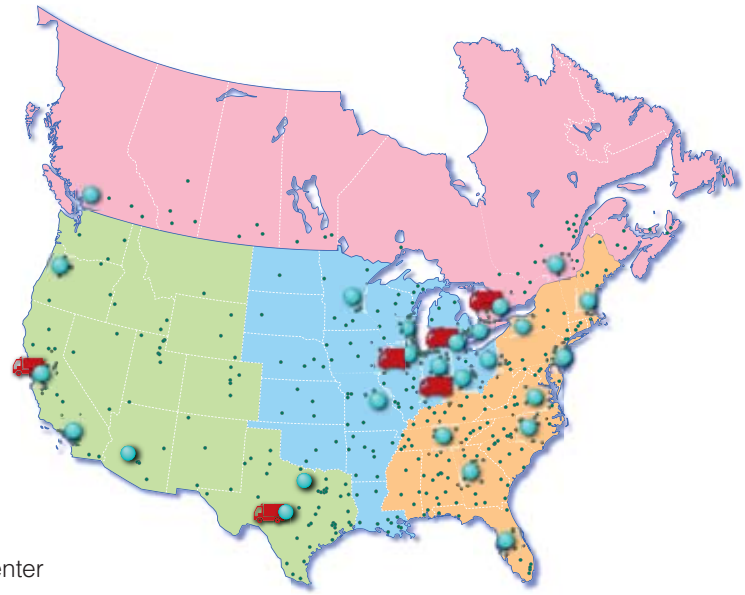
The Americas Zone supports customer requirements with more than 70 sales branches, 7 local production facilities and over 2,000 employees.
Additional distribution provides support to Central/South America as well as the Caribbean region. With this network, they offer customer requirements for specials, application assistance and local product provision. They also provide assistance in education on pneumatics by using a training kit and/or materials.
SMC cooperates closely with Japanese companies in America to responsibly provide all possible services.

Argentina	SMC Argentina S.A.
Bolivia	SMC Pneumatics Bolivia S.r.l.
Brazil	SMC Pneumáticos do Brasil Ltda.
Canada	SMC Pneumatics (Canada) Ltd.
Chile/Colombia	SMC Pneumatics (Chile) S.A.

Mexico	SMC Corporation (México), S.A. de C.V.
Peru	SMC Corporation Peru S.A.C.
U.S.A.	SMC Corporation of America
Venezuela	SMC Neumatica Venezuela S.A.

*The names of countries listed are alphabetically indexed.

U.S.A./Canada



Distributor
Sales Branch
Distribution Center

U.S.A.

Canada

Mexico

Ecuador

Venezuela

Peru

Bolivia

Brazil

Chile/Colombia

Argentina

Sales & Communication Network

SMC Service in Europe/Africa

Austria	SMC Pneumatik GmbH (Austria)
Belgium	SMC Pneumatics N.V./S.A.
Bulgaria	SMC Industrial Automation Bulgaria EOOD
Croatia	SMC Industrijska Automatika d.o.o.
Czech Republic	SMC Industrial Automation CZ s.r.o.
Denmark	SMC Pneumatik A/S
Estonia	SMC Oneumatics Estonia Ou
Finland	SMC Pneumatics Finland Oy
France	SMC Pneumatique SA
Germany	SMC Pneumatik GmbH
Hungary	SMC Hungary Ipari Automatizálási Kft.
Ireland	SMC Pneumatics (Ireland) Ltd.
Italy/Greece	SMC Italia S.p.A.
Kazakhstan	LLP "SMC Kazakhstan"
Latvia	SMC Pneumatics Latvia SIA

Lithuania	UAB "SMC Pneumatics"
Netherlands	SMC Pneumatics B.V.
Norway	SMC Pneumatics Norway AS
Poland	SMC Industrial Automation Polska Sp.z.o.o.
Romania	SMC Romania S.r.l.
Russia	SMC Pneumatik LLC.
Slovakia	SMC Priemyselná Automatizáciá, spol. s.r.o.
Slovenia	SMC Industrijska Avtomatika d.o.o.
South Africa	SMC Pneumatics (South Africa) Pty Ltd
Spain/Portugal	SMC España S.A.
Sweden	SMC Pneumatics Sweden AB
Switzerland	SMC Pneumatik AG
Turkey	SMC Pnömatik A.Ş.
U.K.	SMC Pneumatics (U.K.) Ltd.

*The names of countries listed are alphabetically indexed.

By means of our service system in Europe and Africa, SMC offers its products and services in 42 countries. Through our extensive sales network, SMC provides excellent levels of customer services. The major production facilities in Germany, United Kingdom and Italy, the European Central Warehouse (ECW), and local subsidiaries that manufacture simple special order products empower us to meet the demands of all of our customers anywhere in Europe. As well, we have founded the European Technical Centre (ETC) in the United Kingdom. Approximately 60 engineers from eight countries, including Japan, are stationed there to work on customers' projects. Communication at the Centre is conducted smoothly in not only English but also in other languages, thereby building solid business partnerships across Europe and Africa.

Italy/Greece

U.K.

Germany

Switzerland

Austria

Sweden

France

Ireland

Spain/Portugal

Czech Republic

Denmark

Finland

Norway

Netherlands

Belgium

Poland

Slovakia

Hungary

Romania

Bulgaria

Slovenia

Croatia

Estonia

Latvia

Lithuania

Russia

Turkey

South Africa

Australia	SMC Pneumatics (Australia) Pty. Ltd.
China(Beijing)	SMC (China) Co., Ltd.
China(Guangzhou)	SMC Pneumatics (Guangzhou) Ltd.
Hong Kong	SMC Pneumatics (Hong Kong) Ltd.
India	SMC Pneumatics (India) Pvt. Ltd.
Indonesia	PT. SMC Pneumatics Indonesia
Japan	SMC Corporation
Malaysia	SMC Pneumatics (S.E.A.) Sdn. Bhd.

New Zealand	SMC Pneumatics (N.Z.) Ltd.
Philippines	Shoketsu SMC Corporation
Singapore	SMC Pneumatics (S.E.A.) Pte. Ltd.
South Korea	SMC Pneumatics Korea Co., Ltd.
Taiwan	SMC Pneumatics (Taiwan) Co., Ltd.
Thailand	SMC (Thailand) Ltd.
UAE	SMC Pneumatics Middle East FZE
Viet Nam	SMC Pneumatics (VN) Co., Ltd.

*The names of countries listed are alphabetically indexed.

SMC Service in Asia/Oceania

SMC's Asia/Oceania service network includes 15 local subsidiaries, 10 production facilities, more than 120 sales offices, and about 2,200 staff members, and covers 25 countries and regions including ASEAN countries, Asian NIES, Australia and New Zealand, and 2 of 4 BRIC countries—India and China. Support for countries such as Israel and Saudi Arabia are taken care of by major local dealers that work closely with SMC Japan. SMC established a reliable support system for users operating in Asia/Oceania.

China (Beijing)

China (Guangzhou)

Hong Kong

Taiwan

South Korea

Philippines

Viet Nam

Thailand

Malaysia

Indonesia

Singapore

India

Australia

New Zealand

New Zealand

Japan

Composite Valve Manifold for Air, Gas and Liquid

Custom Engineered Plastic Manifold & Valve Technology

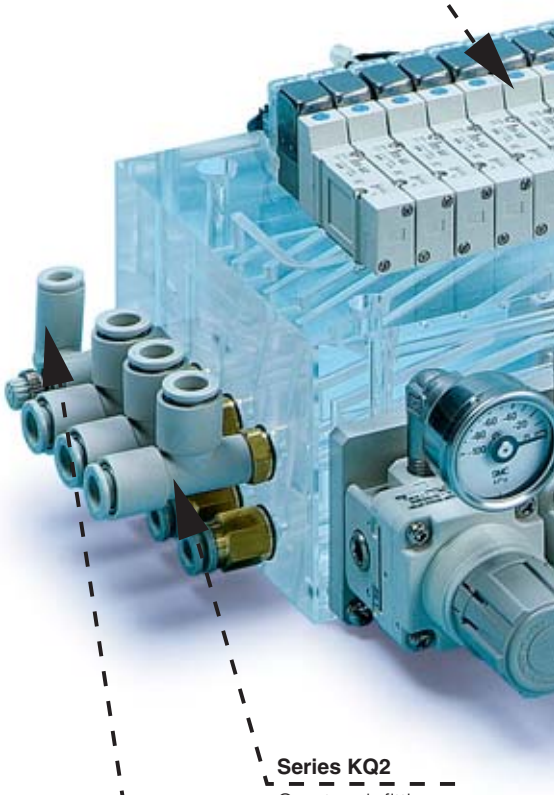
- Reduced Space
- Reduced Weight
- Reduced Installation Time and Error
- Reduced Cost of Ownership

Main specifications of Plastic Manifold Note)

Material	Acrylic Resin (PMMA), Polyvinyl Chloride (PVC), Polyetherimide (PEI), Polysulfone (PSU).
Fluid	Air, Gas and Liquid
Operating pressure	-100 kPa to 0.7 MPa (30 inHg to 100 psi)
Operating temperature	0 to 40 °C (32 to 104 °F)
Ambient temperature	-5 to 50 °C (23 to 122 °F)

Note) Contact SMC for details.

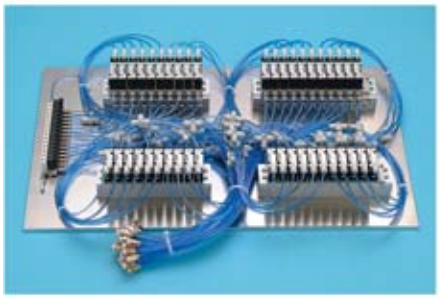
Series SY3000
Solenoid Valves
5 port, Manifold Type



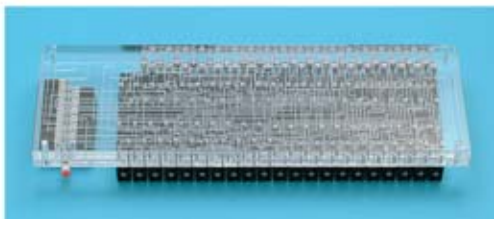
Series KQ2
One-touch fittings

Series AS
Speed Controller

Conventional System

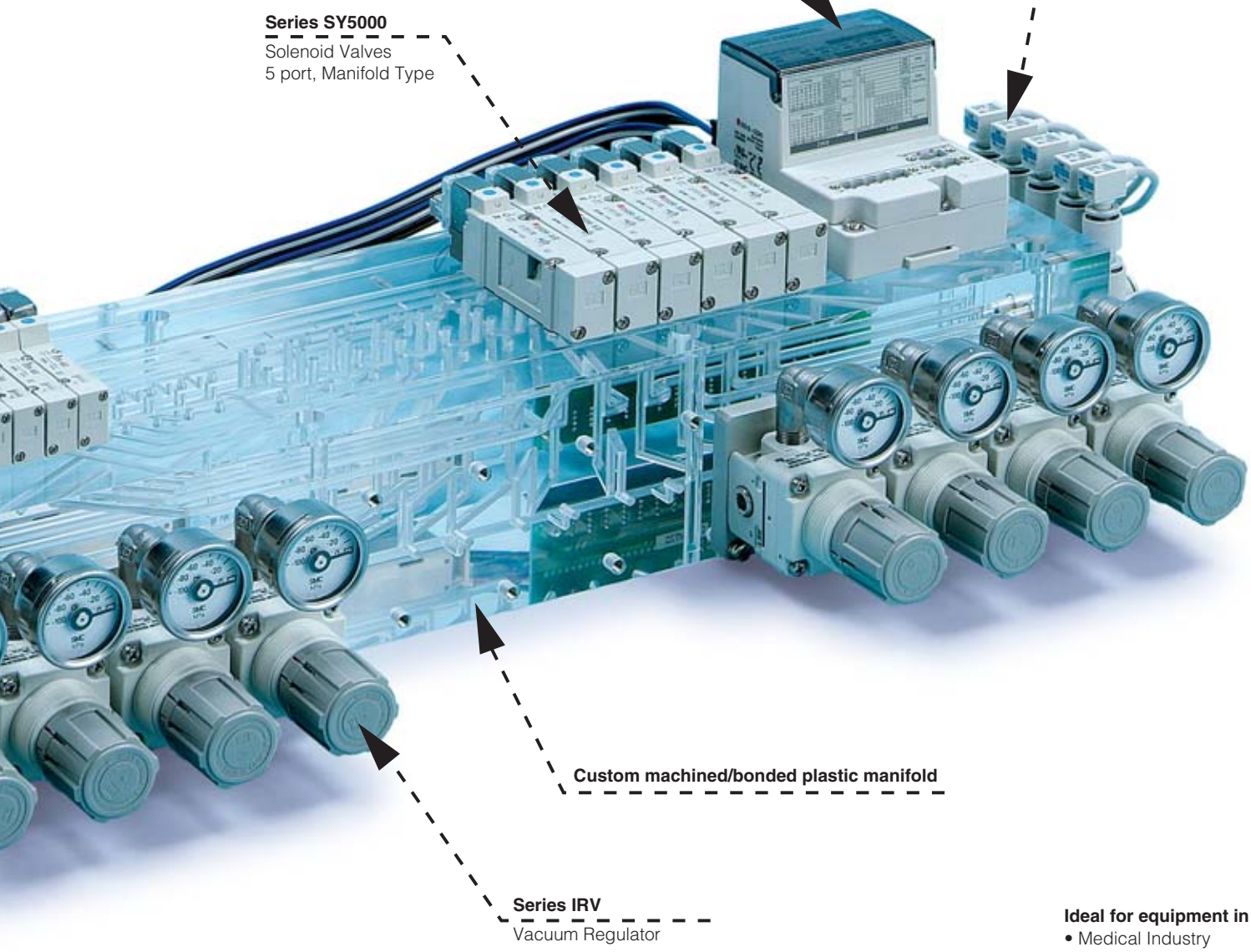


Installation of valves on plastic manifold



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!



Ideal for equipment in

- Medical Industry
- Analytical Industry
- Chemical Industry

Tested and Packed to Customers Specifications

Reliable quality of products 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 “ISO 9001” and “ISO 14001” , and created a complete structure for quality assurance and environmental controls. SMC products strive to meet its customers’ expectations while also considering the company’s contribution in society.

Quality Management System

ISO9001

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.

Environmental Management System

ISO14001

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

SMC's 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 Electrical and Electronic Equipment

* Directive for collecting and recycling electrical and electronic equipment waste

RoHS directive

The Restriction of the use of certain Hazardous Substances in electrical and electronic equipment

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

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

RoHS directive

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

February 2003 RoHS directive proclamation

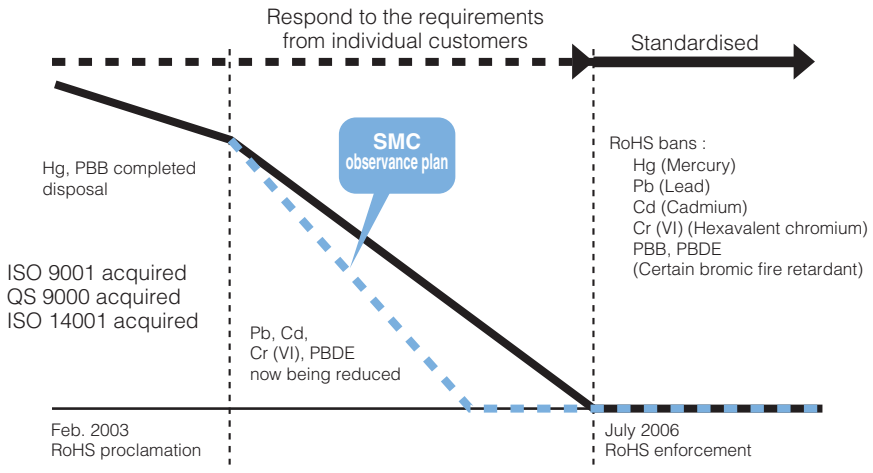
↓

July 2006 RoHS directive enforcement

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

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

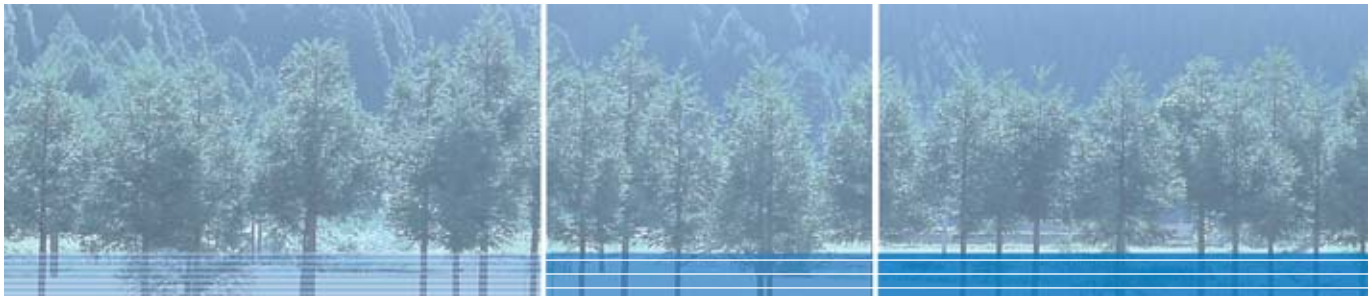
SMC's Product Supply Plan Based On the RoHS Directive



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

Due to revision of RoHS directive, SMC products will be in its scope:
Medical products: From July 2014
IVD products: From July 2017
Industrial products: From July 2017
Products in its scope need to show the conformity to revised RoHS directive with CE mark.
SMC will try to satisfy your requirements.

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



Flow Characteristics and Measurement

Liquids

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

Q = Flow rate m^3/h
ΔP= Pressure drop (bar, absolute) / 1 bar ~ 0.1 MPa
N_1 = Conversion value 0.865
G = Relative density, [water 1.0]
C_V = Valve flow rate

Relative density of liquids

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

Gases

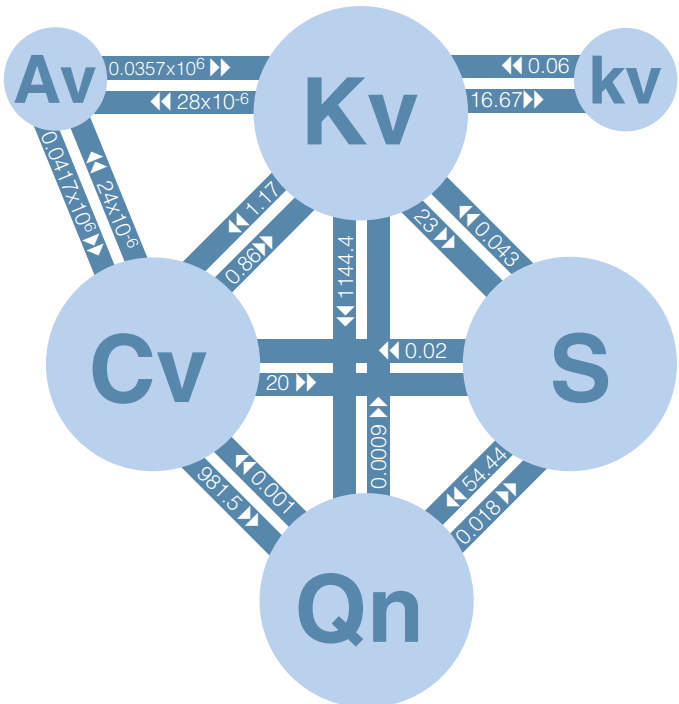
$Q = N_2 \bullet C_V \bullet \sqrt{\frac{\Delta P \bullet P_2}{G \bullet T}}$	
$^{(1)}Q = \frac{N_3 \bullet C_V \bullet P_1}{\sqrt{G \bullet T}}$	$^{(1)}P_2 \leq \frac{P_1}{2}$

Q = Flow rate m^3/h
C_V = Valve flow rate
N_2 = Conversion value for 137
N_3 = Conversion value for 246
T = Gas temperature °K (°C = + 273)
ΔP = (P_1— P_2) Pressure drop in bar (absolute) / 1 bar ~ 0.1 MPa
P_1 = Supply pressure in bar (absolute)
P_2 = Output Pressure in bar (absolute)
G = Relative density [air 1.0]

Relative density of gases

Liquid	Relative density related to air 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
Air	1.000

Conversion factors for different flow units



The **Kv** conversion value indicates the quantity of warm water (from 5 to 40 °C), expressed in m^3/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 m^2.

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** [mm^2] This indication determined by air measurement refers to a valve or a whole arrangement of elements and corresponds to the cross-section area of the pertinent orifice plate opening with same flow.

SMC Life Science

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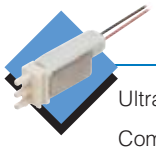

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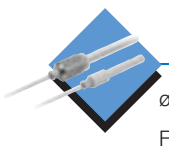

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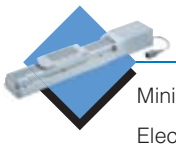

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Super Compact Direct Acting
2/3 Port Solenoid Valve for Chemicals
Series LVM

- Wetted part material:
  - Body plate: PEEK
  - Diaphragm: Choice of EPDM, FKM and FFKM
- Service life: 10 million cycles or more (Based on SMC test conditions)
- Valve chamber volume

Unit: µl

Series	LVM09/090	LVM10 (For LVM11)	LVM10/100	LVM15/150	LVM20/200
Valve chamber volume	18	11	20	50	84

- Change in volume depending on the open/closed status of the valve (pumping volume) 0.01 µl or less (Rocker type)
  "Pumping volume" refers to the volume of water that is expelled from the valve chamber by the opening and closing action of the valve (once, with no applied pressure).
  With a normal diaphragm valve, because the valve chamber volume varies depending on the ON or OFF status, a difference in volume is discharged into the outlet side of the valve when the valve is switched from ON to OFF. However, with a rocker type valve, there is almost no change in volume, thus no fluid is discharged into the outlet side of the valve.
- Type with power-saving circuit can be selected.
  Holding power consumption can be reduced substantially.

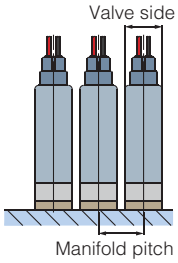
Unit: W

Series		LVM09/090	LVM10/100	LVM15/150	LVM20/200
Power consumption	Inrush	3.3	2.5	5.5	4
	Holding	0.9	1	1	0.6

- Space-saving

Unit: mm

Series	LVM090	LVM10/100	LVM150	LVM200
Valve width	9.5	13	16	20
Manifold pitch	10.5	14	17	21

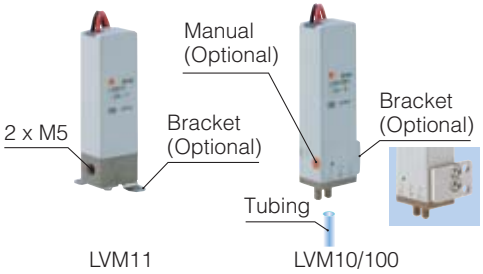


- Applications: Various analytical and inspection equipment
  Analytical instruments for blood, urine, immune system, etc.

Piping/Mounting Variations

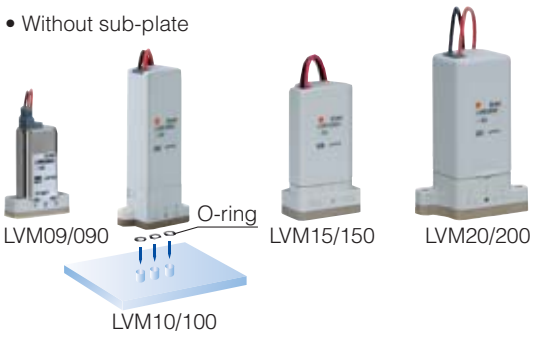
Body ported

- M5 thread
- Tubing type

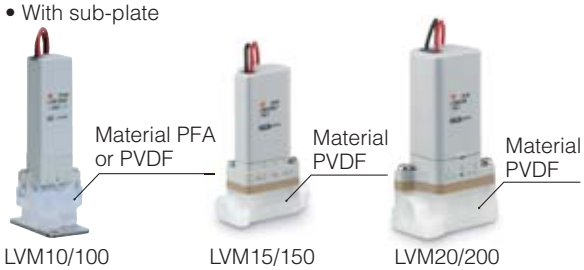


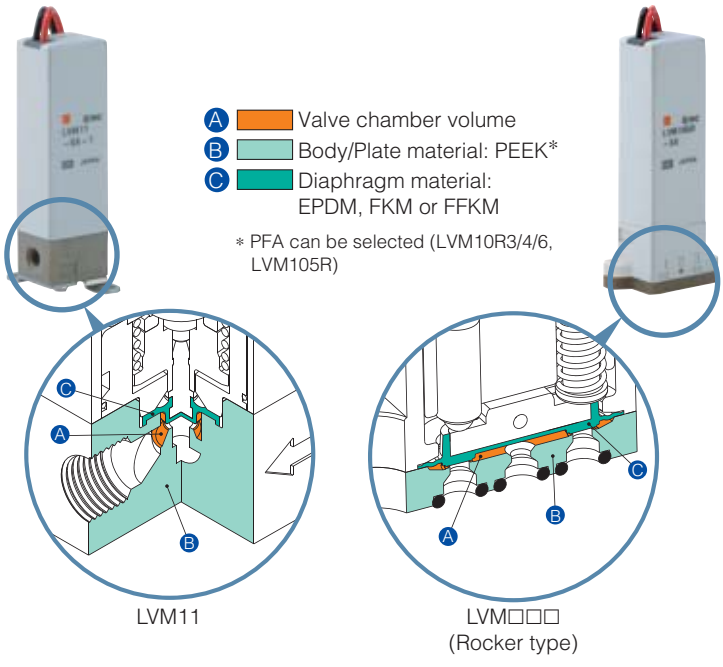
Base mounted

- Without sub-plate



- With sub-plate





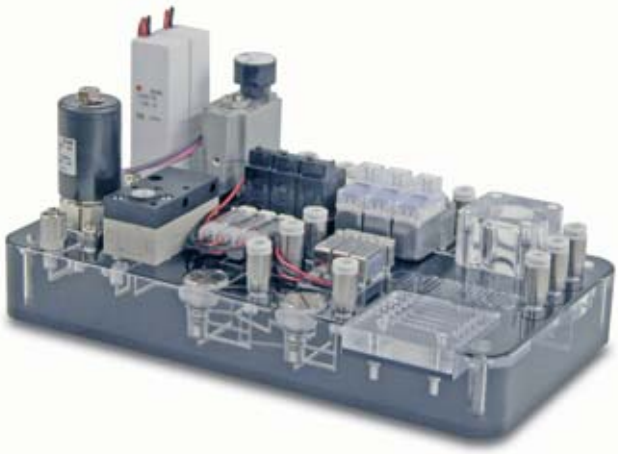
Super Compact Direct Acting
2/3 Port Solenoid Valve for Chemicals
Series LVM

Series Variations

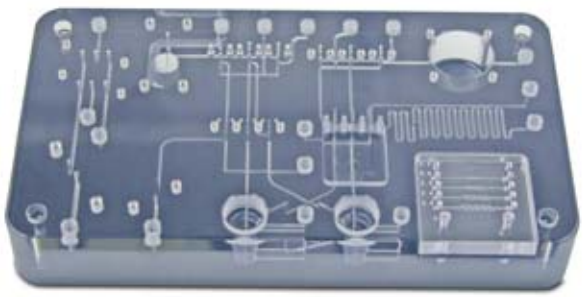
	Model	Valve construction	Valve type	Number of ports	Operating pressure range	Orifice diameter [mm]	Valve width	Flow characteristics				Fluid temperature [°C]	Volume of valve chamber	Weight [g]	Power consumption [W]
								Water		Air					
								Av	Cv	C	b				
	LVM09R3	Diaphragm type direct operated poppet (Rocker type)	N.C.	2	-75 kPa to 0.2 MPa	1.1	9.5	0.43 x 10^{-6}	0.018	0.06	0.2	0 to 50 (with no condensation)	18	20	2
	LVM09R4		N.O.												
	LVM095R		Universal	3											
	LVM11	Diaphragm type direct operated poppet	N.C.	2	0 to 0.25 MPa	1.5	13	0.96 x 10^{-6}	0.04	0.13	0.22		11	30	2.5 at inrush 1 at holding
	LVM10R1	Diaphragm type direct operated poppet (Rocker type)	N.C.	2	-75 kPa to 0.25 MPa	1.4	13	0.72 x 10^{-6}	0.03	0.1	0.2		20	34	1.5
	LVM10R2		N.O.												
	LVM102R		Universal	3											
	LVM10R3		N.C.	2	-75 kPa to 0.25 MPa	1.4	13	0.72 x 10^{-6}	0.03	0.1	0.2		20	34	1.5
	LVM10R4		N.O.												
	LVM10R6		N.C.												
	LVM105R		Universal	3											
	LVM15R3		N.C.	2	-75 kPa to 0.25 MPa (Max. 0.6 MPa)	1.6 (1)	16	0.96 x 10^{-6} (0.36 x 10^{-6})	0.04 (0.015)	0.13 (0.05)	0.22 (0.2)		50	45	5.5 at inrush 1 at holding
	LVM15R4		N.O.												
	LVM155R		Universal	3											
	LVM20R3		N.C.	2	-75 kPa to 0.3 MPa	2	20	1.56 x 10^{-6}	0.065	0.23	0.27		84	80	2.5
	LVM20R4		N.O.												
	LVM205R		Universal	3											

∗ The values for Av and Cv are based on JIS B 2005:1995, C and b are based on JIB B 8390:2000.

Composite Valve Manifold for Air, Gas and Liquid
Custom designed solutions



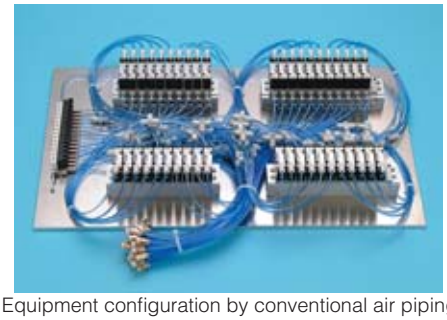
- Space saving
- Simple piping
- Mistakes in piping and wiring are prevented by elimination of complicated piping procedures
- A3 dimensional configuration of fluid passages that is not achievable by drilling or injection molding is materialized by diffusion bonding technology. A variety of layouts are 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
- Lightweight is achieved through use of resin manifolds
  Acrylic, polyethermide, polycarbonate, polysulfone, Vinyl chloride are available
- Custom designed solutions only



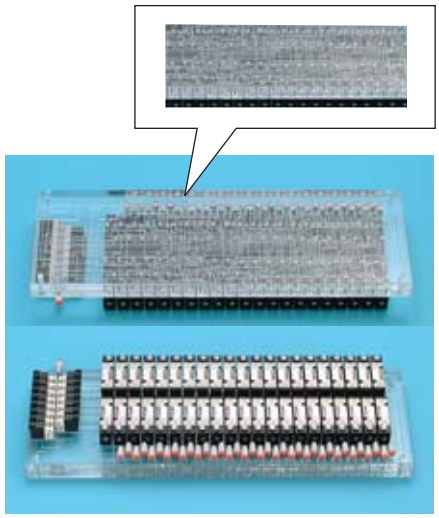
Manifold Specifications

Material	Acrylic Resin (PMMA), Polyvinyl Chloride (PVC), Polyetherimide (PEI), Polysulfone (PSU)
Fluid	Air, Liquid (Check chemical compatibility)
Operating pressure	-100 KPa ~ 0.7 MPa
Ambient temperature	-5 ~ 50 °C
Fluid temperature	0 ~ 40 °C

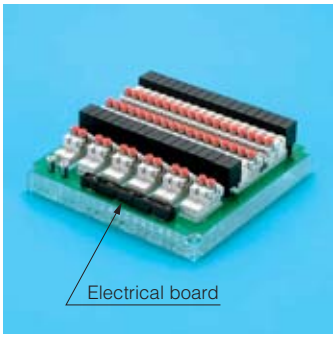
Note) Contact SMC for details.

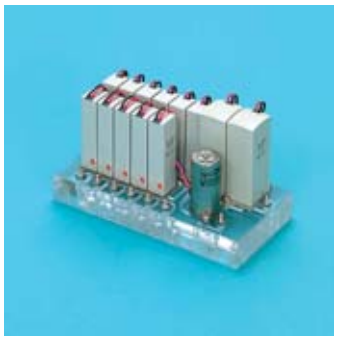


Equipment configuration by conventional air piping



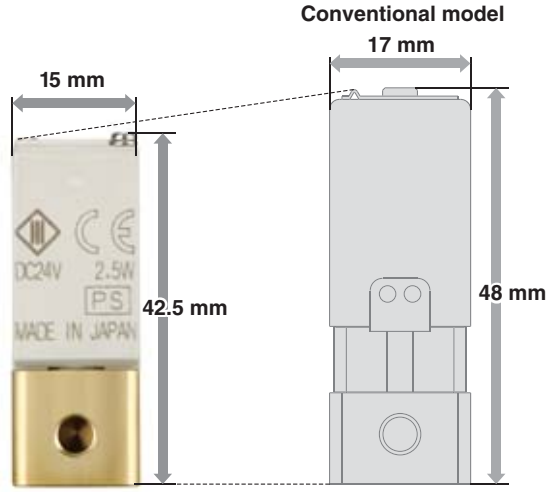
Highly Integrated Resin System





Compact Direct Operated 2 Port Solenoid Valve
Series VDW

- Body material for air
  Aluminum, Resin (PPS)
- Body material for medium vaccum
  C37 (Brass), Stainless Steel
- Body material for water
  C37, Resin (PPS), SUS
- Lightweight 80 g
- Compact
- Environmental performance IP65
- Power consumption 2.5 W (size 1); 3 W (size 2)
- Flame resistance UL94V-0 conformed
- Improved armature durability
- Low-noise construction
- Piping variations: screw piping, one-touch fitting



(Compared with Size 1, C37/Stainless steel body)

Compact / Lightweight 2 Port Solenoid Valve
For Air/Water
Series VDW30/40-XF

- Compact / Lightweight resin body (PPS). Weight: 120 g (VDW30-XF)
- Power consumption (VDW30-XF):
  - 3 W (Standard)
  - 0.5 W (With power-saving circuit)
- Quick faster function reduces piping labour
- No torque control needed, easy handling

Process Valves for Fluids Control

Series VC/VDW/VQ

Series	Type	Orifice size (Ømm) [Flow (Cv)]	Port size	Valve type*
	VCC12/13 2/3 port air operated valve for water and chemical-based fluids			
	• Manifold	3.8 [0.33]	1/4	N.C.
	VCH40/400 5.0 MPa Pneumatic Equipment Series			
	• Body ported	16~18 [4.5~6.3]	1/2, 3/4, 1	N.C./N.O.
	VDW Compact Direct Operated 2 Port Solenoid Valve for air, medium vacuum and water			
	• Body ported	1, 1.6, 2.3, 3.2 [0.04~0.30]	M5, 1/8 On-touch fitting: Ø 3.2, Ø 4, Ø 6	N.C.
	VDW30/40-XF Compact / Lightweight 2 Port Solenoid Valve for water and air			
	• Body ported	1~6 [0.04~1.1]	P7, P10 (Quick fastener) C4, C6, C8, C10 (One-touch fitting)	N.C.
	VDW200/300 Compact direct operated 3 port solenoid valve for water and air			
	• Body ported	1~4 [0.03~0.46]	M5, 1/8, 1/4	C.O.
	VQ20/30 2 port solenoid valve for air			
	• Body ported • Manifold	3.4~4.8 [0.33~0.81]	Ø 6, Ø 8, Ø 10, Ø 12	N.C.

∗ N.C.: normally closed; N.O.: normally open; C.O.: common

Series VN

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. C.O.
	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. C.O.
	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; C.O.: double acting

Process Valves for Fluids Control

Series VXB

Series	Type	Orifice size (Ømm) [Flow (Cv)]	Port size	Valve type*
	VXB Angle seat valve for steam, water and air			
	• Body ported	12~19 [3.5~7.6]	3/8, 1/2, 3/4	N.C.

∗ N.C.: normally closed

Series VX

Series	Type	Orifice size (Ømm) [Flow (Cv)]	Port size	Valve type*
	VX21/22/23 Direct operated 2 port solenoid valve for air, medium vacuum, water, oil			
	• Body ported • Manifold	2~10 [0.23~2.21]	1/8, 1/4, 3/8, 1/2 Ø 6, Ø 8, Ø 10, Ø 12	N.C./N.O.
	VXD21/22/23 Pilot operated 2 port solenoid valve for air, gas, water, oil, heated water, high temperature oil			
	• Body ported	10~25 [1.3~13]	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, $1\frac{1}{4}$, $1\frac{1}{2}$, 2	N.C./N.O.
	VXZ22/23 Pilot operated 2 port solenoid valve for zero differential pressure/For air, gas, vacuum, water, oil, heated water, high temperature oil			
	• Body ported	10~25 [1.7~10.2]	1/4, 3/8, 1/2, 3/4, 1	N.C./N.O.
	VXS Pilot operated 2 port solenoid valve for zero differential pressure/For steam			
	• Body ported	10~25 [2.4~12]	1/4, 3/8, 1/2, 3/4, 1	N.C.
	VXH22 Pilot operated 2 port solenoid valve 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 solenoid valve for water, oil, steam, air			
	• 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.
	VXE2, VXED2, VXEZ2 Energy saving type 2 port solenoid valve for air, water, oil			
	• Body ported • Manifold VXE2	2~50 [0.18~49]	1/8, 1/4, 3/8, 1/2, 3/4, 1	N.C.

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

Process Pump
Series PA□, PB

• Series PA3000/5000
45 l/min

- Compact, large capacity diaphragm type pump.
- 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	Body 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	Body 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

- Smaller, lighter, 25 % reduction in volume (comparison with old-model PB series)
- Long service life: 1.5 times (comparison with old-model PB series)
- Discharge: 8 to 2000 ml/min
- Weight: 0.11 kg
- Low particle generation due to the diaphragm structure
- Flammable fluids can be used. (Air operated)
- Self-priming makes priming unnecessary. Sucks the liquid even if the pump is dry
- Assembled in a clean room. Double packaged (PB1313A)
- Easy to adjust the flow rate by the frequency of ON/OFF of the solenoid valve

Variations

Model	Actuation	Body material	Diaphragm material	Check valve material	Fluid contact part material	* Discharge flow rate [l/min]	Option
PB1011A	Built-in solenoid valve	Polypropylene (PP)	PTFE	PTFE PP	FKM SUS316	8 to 2000	• Silencer • Foot
PB1013A	Air operated					8 to 1000	
PB1313A	Air operated	New PFA		PTFE, New PFA	PTFE		

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

• Series PA3
13 l/min

- High corrosion resistance:
  - Side body, ports: New PFA
  - Diaphragm/O-rings: PTFE
- Lightweight 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
Automatically operated	PA3310	New PFA	PTFE	Standard	1 to 13*	• Foot • Silencer
	PAP3310			Clean room		
Air operated	PA3313			Standard	0.1 to 9	• Foot
	PAP3313			Clean room		

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

• Series PAF3000/5000
45 l/min

Female thread Tube extension With nut

- Body material: New PFA
- Diaphragm/Seal material: PTFE
- Lightweight and Compact: 1.3 kg (PAF3000/Air operated, without foot bracket)
- No metallic parts are used (Metal-free), Pump made from fluororesin
- 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 Note 1) • Silencer Note 2)
	PAF5410			5 to 45		
Air operated	PAF3413			1 to 15		
	PAP5413			5 to 38		

Note 1) Equipped with the PAF5000 series as standard equipment.
Note 2) Automatically operated only.

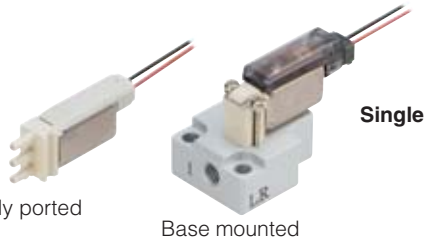
Liquid Dispense Pump (Solenoid type)
Series LSP

- Discharge rate can be adjusted.
- Discharge rate stability (repetition accuracy ±1 %)
  ∗ ±2 % at 5 to 15 µl
- Shut-off function
- Self-contained system does not need any priming.
- Fluid used: Water, deionized water, diluent, and cleaning fluid

Model	Discharge rate adjustment range	Wetted part material
LSP11☐	5 to 50 µl/shot	Body: PEEK or PP Diaphragm/Check valve: EPDM or FKM
LSP12☐	50 to 100 µl/shot	
LSP13☐	100 to 200 µl/shot	

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

- Valve width: 7 mm
- Power consumption: 0.35 W (standard)
  0.1 W (with power saving circuit)
- Sonic conductance: C 0.060 [dm^3/(s•bar)]
- Extremely lightweight 5 g (Valve single unit)
- Operation noise 38 dB(A) or less
- Easy to increase or decrease the number of stations. (Stacking base)



Single unit

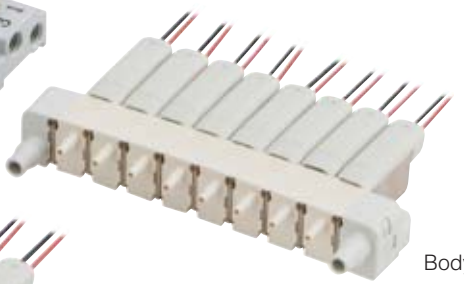
Body ported

Base mounted

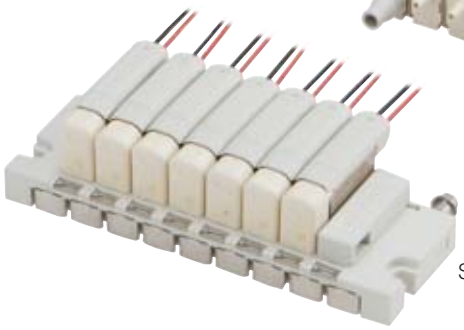
Manifold

Base mounted

Bar stock type



Body ported

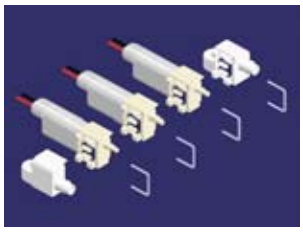


Stacking type

Specifications

Valve construction	Poppet
Fluid	Air / Inert gas / Low vacuum (1.33 x 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/s^2
Enclosure	IP40
Weight	5 g (single unit valve)
Mounting orientation	Free

Separable base



Stacking type

Solenoid specifications

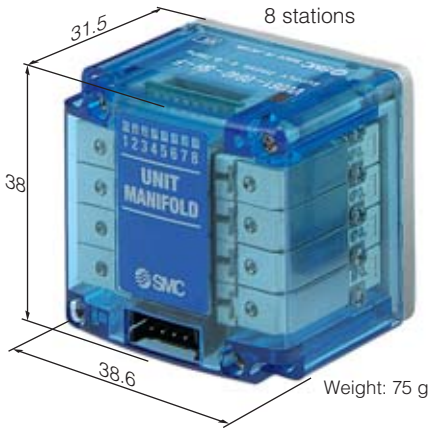
Power consumption	0.35 W (standard), 0.5 W (high voltage), 0.1 W (holding)
Rated coil voltage	3, 5, 6, 12, 24 V DC
Allowable voltage fluctuation	10 % of the rated voltage
Coil insulation type	Equivalent to class B

Flow characteristics

Power consumption	Maximum operating pressure	Flow characteristics			Response time ms	
		C [dm^3/(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	0.060	0.28	0.016	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	0.060	0.28	0.016	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

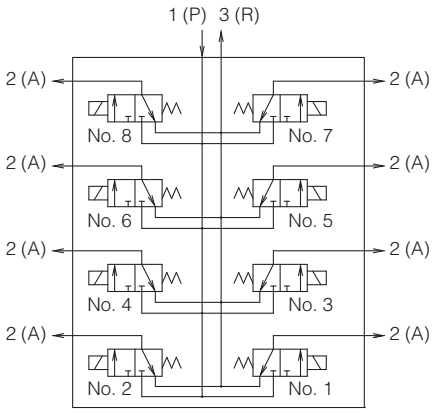
Unit Manifold Valve, 3 Port Solenoid Valve
Series VV061

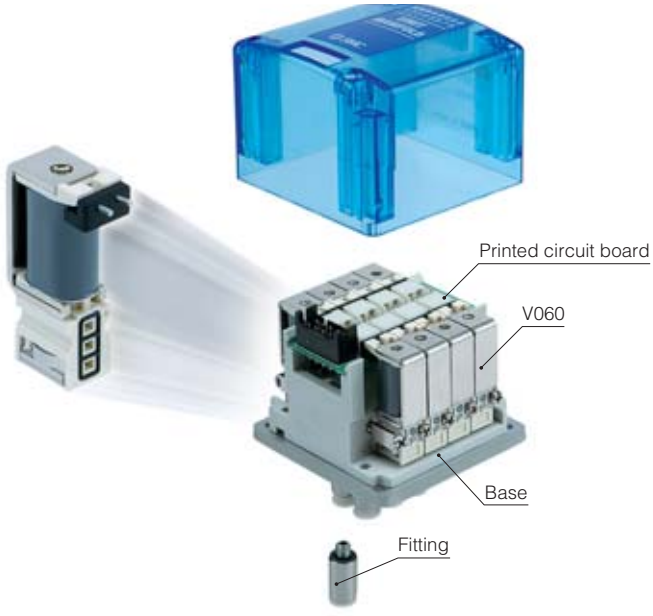
- Directly operated 3 port solenoid valve
- Valve width 6 mm. Mounting the V060 series
- Variety of valve connection options and systems
- Lightweight 47 g (2 stations)
- Valve, PCB, base and fittings are fully integrated, forming a single compact unit. New concept unit manifold



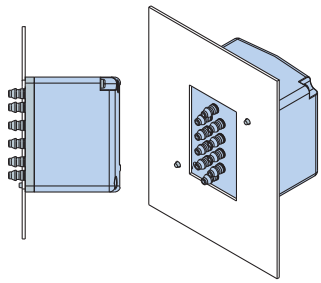
Reduced environmental impact substance RoHS compliant

In case of 8 stations





Panel mount



Unit Manifold Valve Specifications

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

Flow Characteristics

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

3 Port Solenoid Valve
Series V100

- Power consumption 0.35 W. With power saving circuit 0.1 W
- Coil temperature rises: only 1 °C (with power saving circuit)
- Indicator light/surge voltage supressor integrated in the connector body
- Valve width 10 mm

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

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

Variations

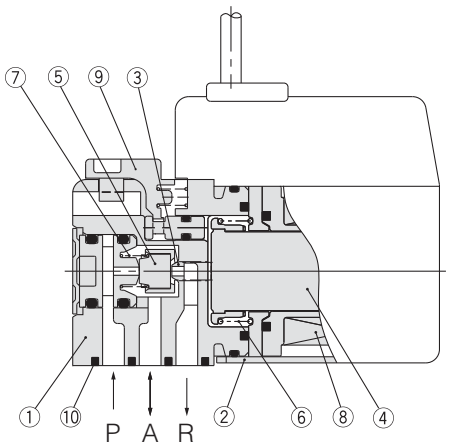
Series		Type of actuation	Operating pressure range [MPa]	Power consumption [W]	
				Standard	With power saving circuit
Standard	V114	N.C.	0 to 0.7	0.35	0.1
	V124	N.O.	0 to 0.7	0.35	0.1
Large flow capacity	V114A	N.C.	0 to 0.7	1	—
	V124A	N.O.	0 to 0.7	1	—

Specifications

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

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

Note 2) - Impact resistance:
No malfunction resulted in an impact test using a drop impact tester. The test was performed one time each in the axial and right angle directions of the main valve and armature, for both energized and de-energized states. (Value in the initial stage).
- Vibration resistance:
No malfunction resulted in 45 to 2000 Hz, a one-sweep test performed in the axial and right angle directions of the main valve and armature for both energized and de-energized states. (Value in the initial stage)



Component Parts

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

Replacement Parts

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

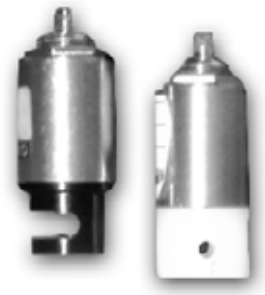
Compact Proportional Valve
Series PVQ

- Service life: Lasts 25 million cycles. (PVQ30)
  Specially coated sliding surface realised 25 million cycles within a set operation range
- Body material:
  - Brass (C36) (PVQ10)
  - Brass (C37) or Stainless steel (PVQ30)
  - Seal material: FKM (PVQ10, PVQ30)
- Valve returns to closed position when power supply is turned off
- Leakage amount: 5 cm3/min or less at OFF
- Can be used for vacuum applications
- Operation noise during opening/closing of the valve reduced.
- Repeatability: 3 % or less
  Hysteresis: 10 % or less
- Oil free option is available as made-to-order

Specifications

Model	PVQ13				PVQ31		PVQ33
Piping type	Base mounted				Body ported		Base mounted
Valve construction	Direct operated poppet				Direct operated poppet		
Valve type	N.C.				N.C.		
Orifice size [mm]	0.3	0.4	0.6	0.8	1.6	2.3	4.0
Max. operating pressure [MPa]	0.7	0.45	0.2	0.1	0.7	0.35	0.12
Flow rate [l/min]	0 to 5	0 to 6		0 to 5	0 to 100		0 to 75
Applied current (Power supply)	0 to 85 mA (24 V DC) 0 to 170 mA (12 V DC)				0 to 165 mA (24 V DC) 0 to 330 mA (12 V DC)		
Port size	M5				1/8		
Fluid	Air, Inert gas				Air, Inert gas		
Ambient temperature	0 to 50 °C				0 to 50 °C		
Hysteresis	10 % or less				10 % or less		13 % or less
Repeatability	3 % or less				3 % or less		

Pinch Valve
Series XT34



- SMC series XT34-155 is a compact N.O. air actuated pinch valve When used in conjunction with tubing material, the “pinching” action of the valve can be used to permit or restrain the flow of media. The XT34 is suitable for a wide range of medical applications including:
  - Hematology Analyzers
  - Immunoaassay Analyzers
  - Clinical Chemistry Analyzers
  - Blood Gas Analyzers
  - Medical Diagnostic Equipment
  - Blood Cell Counters
- Features and Benefits
  - Body material is nickel-plated brass
  - Tube holder is constructed of Polyacetal material

Specifications

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

Media compatibility

Blood	Reagents
Bleach	Soap
Saline	Water

How to order

Silicon tube size		
	Inside Diameter	Outside Diameter
XT34-155-1	0.062 inch (1.57 mm)	0.187 inch (4.75 mm)
XT34-155-2	0.032 inch (0.81 mm)	0.156 inch (3.96 mm)

Air Preparation

Large Flow Air filter

Series	Port size	Filtration	Notes
	AF Filter		
	M5, G 1/8, G 1/4, G 3/8, G 1/2, G 3/4, G 1	5 µm (Option: 2, 10, 20, 40, 70, 100 µm)	Optional manual or automatic drain
	AFM Mist Separator		
	G 1/8, G 1/4, G 3/8, G 1/2, G 3/4	0.3 µm	Optional manual or automatic drain
	AFD Micro-Mist Separator		
	G 1/8, G 1/4, G 3/8, G 1/2, G 3/4	0.01 µm	Optional manual or automatic drain
	AF800/900 Air Filter		
	G 1 1/2, G 2	Standard 5 µm filter elements	Auto or manual drain

Oil Mist Separators

Series	Port size	Rated flow [l/min] (ANR)	Filtration
	AFF Main Line Filter		
	G 1/4, G 3/8, G 1/2, G 3/4, G 1, G 1 1/2, G 2	300 to 12000	3 µm
	AM Mist Separator		
	G 1/4, G 3/8, G 1/2, G 3/4, G 1, G 1 1/2, G 2	300 to 12000	0.3 µm
	AMD Micro-Mist Separator		
	G 1/4, G 3/8, G 1/2, G 3/4, G 1, G 1 1/2, G 2	200 to 12000	0.01 µm
	AMH Micro-Mist Separator with Prefilter		
	G 1/4, G 3/8, G 1/2, G 3/4, G 1, G 1 1/2, G 2	200 to 12000	0.01 µm
	AME Super Mist Separator		
	G 1/4, G 3/8, G 1/2, G 3/4, G 1, G 1 1/2, G 2	200 to 12000	0.01 µm

Odour Removal Filter

Series	Port size	Rated flow [l/min] (ANR)	Filtration
	AMF Odor Removal		
	G 1/4, G 3/8, G 1/2, G 3/4, G 1, G 1 1/2, G 2	200 to 12000	0.01 µm

Water separator

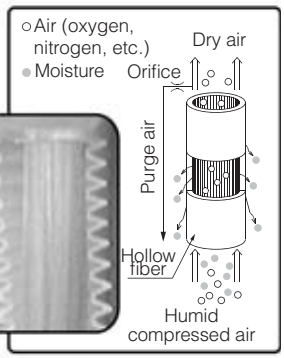
Series	Port size	Max. flow capacity [l/min] (ANR)	Notes
	AMG Water Separator		
	G 1/8, G 1/4, G 3/8, G 1/2, G 3/4, G 1, G 1 1/2, G 2	300 to 12000	It eliminates the waterdroplets in the compressed air

Water separator

Series	Port size	Notes
	AD Auto drain valve: AD402/600	
	1/4, 3/8, 1/2, 3/4, 1	Drainage is automatically discharged in a reliable manner, without requiring human operators. Highly resistant to dust and corrosion.
	AMJ Drain separator for vacuum	
	1/4, 3/8, 1/2, 3/4, 1	Remove water droplets from air by simply installing in vacuum equipment connection line. Effective for removing water droplets from the air sucked into vacuum pumps and ejectors, etc.
	ADH Heavy duty auto drain: ADH4000	
	1/2	Easy maintenance. Float style auto drain allows automatic drain discharge without electric power.
	AMP Exhaust Cleaner for Clean Rooms	
	1/4, 3/8, 1/2, 3/4	An exhaust cleaner that can be used inside a clean room. Particles of 0.3 µm or larger are 35 particles or less/10 ℓ. Silencing effect: 40 dB (A) or more.
	GP46 Pressure Gauge with Switch	
	1/8, 1/4	A pressure switch function has been added to the gauge. The pressure switch is equipped with a light for verifying operation. The pressure gauge is equipped with a limit indicator. To be used for verifying the supply pressure
	GD40 Pressure differential gauge: GD40-2-01	
	1/8	The pressure differential at the inlet and the outlet of compressed air equipment can be viewed at a glance on the pressure differential gauge. It is ideal for the maintenance control of filters.
	PPA Compact Manometer	
	M5	Pressure measurements can easily be taken any time, anywhere. Back light for easy viewing in dark locations.

Membrane Air Dryer
Series IDG

Dehumidification principle



- 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 (IDG30LA, IDG50LA, IDG60LA) IDG75LA, IDG100LA. Outlet air atmospheric pressure dew point -60 °C (IDG60SA, IDG75SA, IDG100SA)

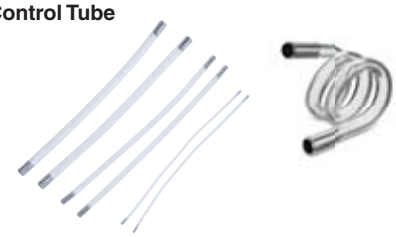
Applications
- Machine tools (air bearings, lasers, etc.)
- Precision measuring equipment (3-D measuring machines)
- Semiconductor manufacturing equipment
  Semiconductor inspection equipment
- Dental equipment
- Chemical analysis equipment
- Ozonizers, Hydrogen gas generating equipment
- Packaging machines, 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

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.

Flexible Piping
Series IDG1

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

Moisture Control Tube
Series IDK

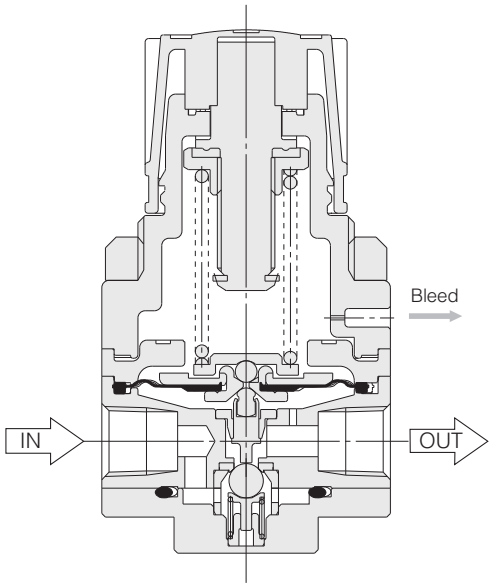


- Prevents condensation in piping for small cylinders/air grippers
- Diffuses water vapour in the piping to the outside

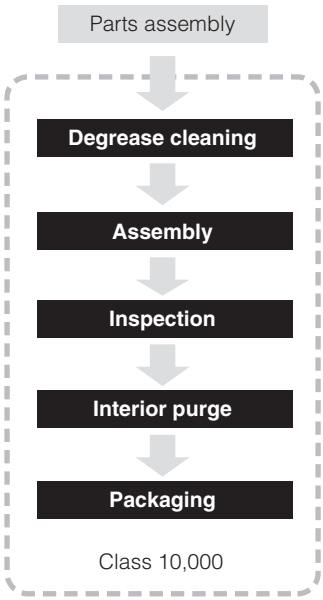
Pressure Control Equipment/Regulator
Series AR

	Series	Application/Characteristics	Port size	Set pressure [MPa]
	Miniature regulator ARJ1020F ARJ210 ARJ310	Direct operated relieving style Back flow function	M5 to 1/8 Ø 4, Ø 6	0.1 to 0.7
	Regulator AR10-A AR20-60-B	Direct operated relieving style Modular style	M5 1/8 to 1	0.05 to 0.7 0.05 to 0.85
	Regulator with built-in pressure gauge ARG20-40	Built-in pressure gauge Space saving	1/8 to 1/2	0.05 to 0.85
	Pilot operated regulator AR425-925 AR435-935	Internal pilot Relieving style	1/4 to 2	0.05 to 0.85 0.02 to 0.2
	Compact manifold Regulator ARM10/11	Manifold (Common IN or Individual IN) Different types can be mixed on a manifold	Ø 4, Ø 6, Ø 10, Ø 1/4", Ø 5/16" 3/8", Ø 5/32"	0.05 to 0.7
	Miniature manifold Regulator ARM5	Width: 14 mm. The one-touch fitting size can be changed. Backflow function is equipped as a standard.	Ø 4, Ø 6 Ø 5/32", Ø 1/4"	0.05 to 0.7
	Regulator manifold ARM2500/3000	Manifold (Common IN/Individual IN) Modular style	1/4 , 3/8	0.05 to 0.85
	Direct operated precision regulator ARP20-30-40	Setting sensitivity: 0.001MPa Direct operated relieving style	1/8 to 1/2	0.005 to 0.6
	Regulator with check valve AR20K-60K-B	Built-in check valve (with backflow function) Direct operated relieving style	1/8 to 1	0.05 to 0.85
	Regulator for 2MPa ARX20	Piston type regulator	1/8 , 1/4	0.05 to 0.85

Precision Clean Regulator
Series SRP
High precision, low flow consumption stainless steel regulator



Manufacturing process



- 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 ARP30 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 10000 environment

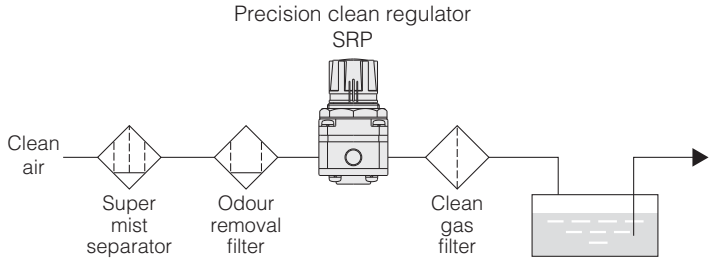
Specifications

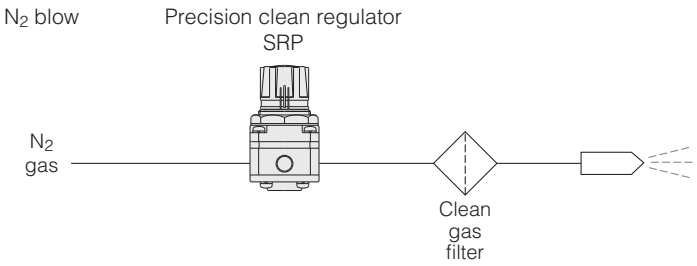
Connection port size		M5, Rc 1/8
Fluid		Air, N_2, CO_2, Ar
Proof pressure [MPa]		1.5
Maximum operating pressure [MPa]		1.0
Regulating pressure range MPa	Low pressure type	0.005 to 0.2
	High pressure type	0.01 to 0.4
Ambient and fluid temperature [°C]		0 to 60
Fluid consumption [l/min] (ANR) Note 1)		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





Clean Regulator
Series SRH
Contamination controlled stainless steel regulator

- Outstanding corrosion resistance
  All metal parts in contact with fluid use stainless steel SUS316
- Oil free
  Parts assembled without any use of oils
- 2 types of diaphragm material available
  Depending upon the application, PTFE (Grade A) or fluororubber (Grade B) can be selected for the diaphragm material.
- Designed to minimize residual fluid
  Design includes an intake/exhaust port in the diaphragm compartment which facilitates flow.
  Valve springs are partitioned by the diaphragm.
- Pulsation suppressing design

Consistent clean room production
Washed, assembled and inspected in a Class 100 environment, and sealed in double bags

Specifications

Model		SRH3□□0	SRH4□□0	SRH3□□1	SRH4□□1
Relief mechanism		Non-relief		Relief	
Port size		Rc 1/8, 1/4 URJF 1/4	Rc 1/4, 3/8, 1/2 URJF 3/8	Rc 1/8, 1/4	Rc 1/4, 3/8, 1/2
Fluid	Grade A	Clean air, N_2, Ar, CO_2, Pure water		Clean air, N_2	
	Grade B	Air, N_2, Ar, CO_2, Water		Air, N_2	
Proof pressure		1.5 MPa			
Max. operating pressure		1 MPa			
Set pressure	Low pressure type	0.01 to 0.2 MPa			
	High pressure type	0.05 to 0.7 MPa			
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		360 g	730 g	360 g	730 g

Regulator (Stainless Steel 316) with Port Sizes Rc 3/4, Rc 1

- Regulator made of stainless steel 316 with port sizes Rc 3/4 and Rc 1
- EPDM or FPM is used for valves (seals), O-rings and diaphragms
- Oil-free
  Oil is not used for any of the parts and all wetted parts are degreased.
  Note) Products must be assembled under normal conditions.

Specifications

Model	XT13-394-06	XT13-394-10	INA-48-1-06	INA-48-1-10
Port size	Rc 3/4	Rc 1	Rc 3/4	Rc 1
Relief mechanism	Non-relief			
Fluid	Pure water		Air, N_2	
Proof pressure	1.5 MPa			
Max. operating pressure	1.0 MPa			
Set pressure	0.05 to 0.5 MPa			
Ambient and fluid temperatures	5 to 60 °C			
Fluid-contact material (metal)	Stainless steel 316			
Diaphragm material	EPDM		Fluororubber	
Mass	2100 g			

Precision Regulator
Series IR1000/2000/3000-A

- New structure without fixed throttle does not require a mist separator
- Air consumption 1 l/min or less
- Precision:
  - Sensitivity: 0.2 % F.S.
  - Repeatability: ±0.5 % F.S.
- High flow rate:
  - IR1000-A: 720 l/min
  - IR2000-A: 1900 l/min
- Lightweight:
  - IR1000-A: 0.13 Kg

Series Variations

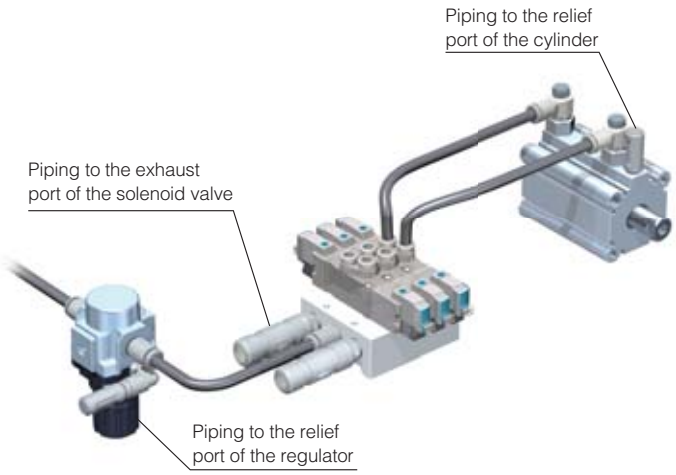
Model		IR1000	IR2000	IR3000
Maximum set pressure	0.2 MPa	●	●	●
	0.4 MPa	●	●	●
	0.8 MPa	●	●	●
Port size	Rc 1/8	●		
	Rc 1/4		●	●
	Rc 3/8			●
	Rc 1/2			●
Accessories	Bracket	●	●	●
	Pressure gauge	●	●	●
Digital pressure switch		●	●	●

Clean Exhaust Filter
Series SFE

- Air can be directly exhausted in a clean room only by mounting this product to the pneumatic equipment in the clean room
- No need for piping for exhaust air and relief air. Reduces piping installation work and space
- Filtration rating 0.01 µm. (Filtration efficiency 99.99 %)
- Maximum flow capacity 200 l/min (ANR)
- Noise reduction 30 dB (A) or more

Mounting Variations

Series	Maximum flow capacity [l/min] (ANR)	Male thread type			Plug-in type				One-touch fitting type			
		M5	R 1/8	R 1/4	Ø 4	Ø 6	Ø 8	Ø 10	Ø 4	Ø 6	Ø 8	Ø 10
SFE1	3	●										
SFE3	30				●				●			
SFE4	65		●			●				●		
SFE5	130		●	●			●				●	
SFE7	200			●				●				●



Clean Gas Filter
Series SFA/SFB/SFC
Clean AIR Filter
Series SFD

- 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 SF☐ series clean gas filter, is 100 % inspected, and only those that pass our inspection are allowed for delivery.
- Cartridge type
  - 0.1 mm purification test
  - Airtight test
- Disposable type
  - 0.1 mm purification test
  - Helium leak test (SFB, SFC)
  - Airtight test (SFD)

			Series	Filtration	Flow rate [l/min] (ANR) (Max. flow rate at 0.7 MPa)	Pressure [MPa]	Temperature [°C]	Replacement of element
Cartridge type	Disc style		SFA10☐	0.01 µm (Filtering efficiency 99,99 %) (Membrane element)	26	0.99	5 to 80	Replaceable
			SFA20☐		70			
			SFA30☐		140			
	Straight style		SFB10☐		45			
			SFB20☐ (Strainer)	Nominal 120 µm (Sintered metallic element)	400			
	Straight style		SFD200	0.01 µm (Filtering efficiency 99,99 %) (Hollow fibre elements)	500	1.0 Nitrogen: 0.99 MPa	5 to 45	
	Straight style Made to Order		SFD101 (aluminium)		100			
			SFD102 (Stainless steel)					
Disposable type	Straight style		SFB30☐	0.01 µm (Filtering efficiency 99,99 %) (Membrane element)	45	0.99	5 to 120	Non replaceable
	Multiple disc style		SFC10☐		240			
	Straight style		SFD100		100	1.0 Nitrogen: 0.99 MPa	5 to 45	

Special Regulator for Oxygen Concentrator
Series SRA

Thread type

Fitting type

Barb type

- 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	SRA202-00-X234	SRA202-00-X235
Port size	Inlet	Rc 1/8	Ø 8 O.D. Tubing	Ø 4.8 I.D. Tubing	
	Outlet	Rc 1/8	Ø 8 O.D. Tubing	Ø 4.8 I.D. Tubing	
Proof pressure		0.45 MPa		0.75 MPa	
Operating pressure	Inlet	0.3 MPa		0.5 MPa	
	Outlet	Set pressure + 0.06 MPa			
Set pressure		0.01 to 0.1 MPa		0.13 to 0.15 MPa	0.1 to 0.3 MPa
Fluid		Oxygen, Air		Argon	
Lubrication		Use no oil and grease			
Relieving structure		Non-relieving type			
Ambient and fluid temperature		0 to 40 °C		0 to 40 °C	
Flow rate range of operating fluid		0.2 to 6 l/min		0.2 to 5 l/min	0.2 to 2 l/min

How to Order

Thread type
SRA200 – F 01

Thread type

—	Rc
F	G
N	NPT

Port size

01	1/8
02	1/4

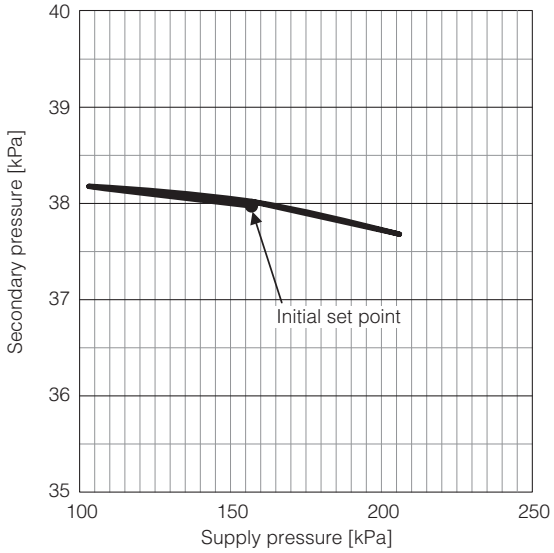
Fitting type
SRA200F – 06

Tubing O.D.

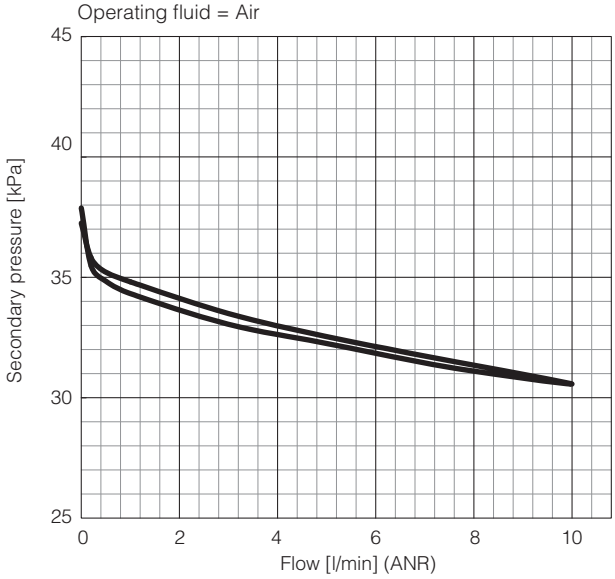
06	6 mm
08	8 mm

Base mounted type (bottom piping)
SRA202 – 00 – X234
SRA202 – 00 – X235

Pressure Characteristics (SRA200, SRA200F)
Initial setting
Supply pressure= 157 kPa
Secondary pressure= 38 kPa
Flow = 5 l/min (ANR)
Operating fluid = Air



Flow Characteristics (SRA200, SRA200F)
Supply air = 157 kPa
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 ISO 8573-1 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
- Ø 10 mm One-touch condensate drain port

Standard Specifications

Model	Operating range			Power supply voltage	Power consumption [W]	Air port connections	Refrigerant	Weight [kg]	Nominal Air Flow Rate [m³/h (ANR)]		
	Inlet air pressure [MPa]	Inlet air temperature [°C]	Ambient temperature [°C]						-,4,- (3 °C PDP)	-,5,- (7 °C PDP)	-,6,- (10 °C PDP)
IDFA3E-23	0.15 to 1.0	5 to 50	2 to 40 (Relative humidity of 85 % or less)	Single phase 230 V AC 50 Hz	180	Rc 3/8	R134a (HFC)	18	12	15	17
IDFA4E-23						Rc1/2		22	24	31	34
IDFA6E-23-K	0.15 to 1.6					Rc 3/4		23	36	46	50
IDFA8E-23-K					208			27	65	83	91
IDFA11E-23-K					385			28	80	101	112
IDFA15E-23-K					470	Rc 1		46	120	152	168
IDFA22E-23-K					760	R 1	R407C (HFC)	54	182	231	254
IDFA37E-23-K						R 1 1/2		62	273	347	382
IDFA55E-23-L					1130	R 2		100	390	432	510
IDFA75E-23-L					1700			116	660	720	822
IDFA100F-40	0.15 to 1.0	5 to 60	2 to 45 (Relative humidity of 85 % or less)	Three phase 400 V AC	2500	R2	R407C (HFC)	245	860	1040	1230
IDFA125F-40					2700	R 2 1/2		270	1100	1320	1550
IDFA150F-40						DIN flange 80		350	1340	1690	1920

Note 1) Thread adapters to convert Rc thread to R thread are included with IDFA3E to IDFA15E.
Note 2) The standard condition (ANR) is under the conditions of 20 °C at atmospheric preessure and relative humidity of 65 %.
Note 3) The performance data for pressure dew point is in accordance with the following operating conditions from ISO 7183: Inlet air pressure: 0.7 MPa; Inlet air temperature: 35 °C (saturated); Cooling air temperature: 25 °C.

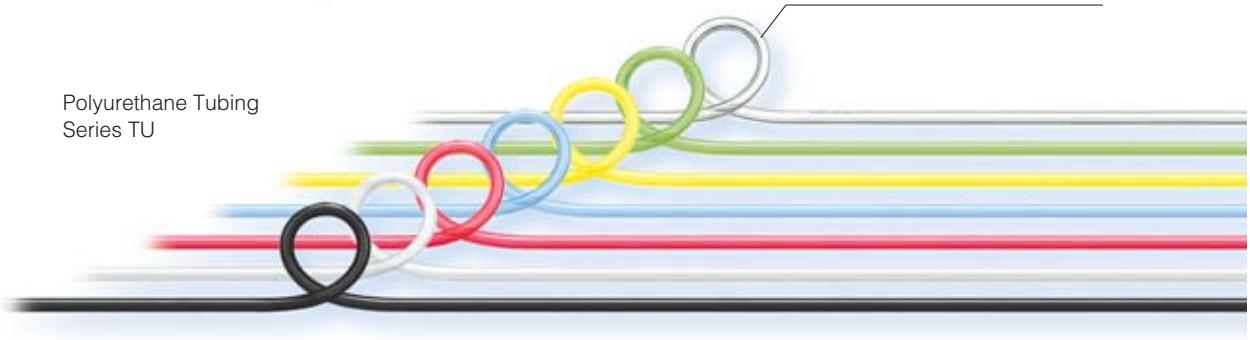
ø2 Piping Series
Series M•AS•TU

Speed Controller
with One-touch Fittings
Series AS

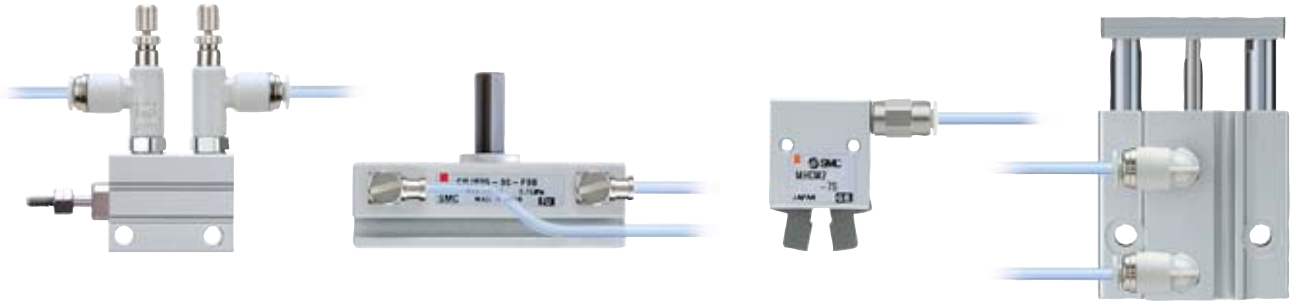
Miniature Fittings
Series M

Minimum bending radius: 4 mm

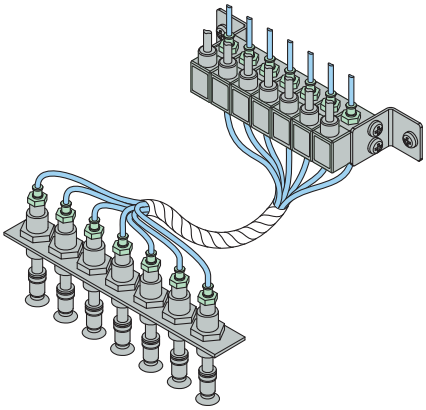
Polyurethane Tubing
Series TU

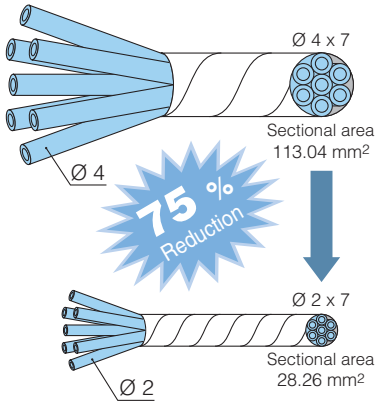


Piping for compact actuators



Piping for compact pressure sensors

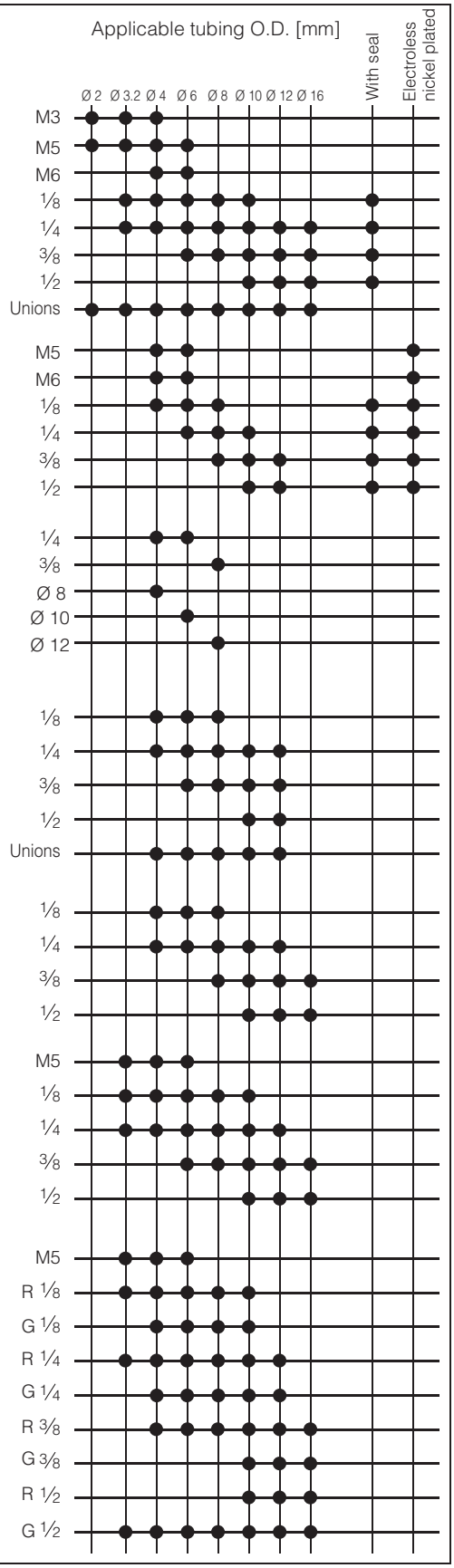




Fittings & Tubing

General Purpose Fittings Series

Variations	Applicable tubing material
One-touch Fittings **Series KQ2** One-touch connection and release Possible to use in vacuum to -100 kPa Applicable tubing – Metric size	Nylon, Soft nylon, Polyurethane, FEP, PFA
Rotary One-touch Fittings **Series KS** (Standard) **Series KX** (High speed) Low-torque rotation for fast swivel and oscillating applications Applicable tubing – Metric size	Nylon, Soft nylon, Polyurethane, FEP, PFA
One-touch Fittings/Manifold **Series KM** One-touch connection and release One-touch In/Out connection for compact and concentrated tubing applications Applicable tubing – Metric size	Nylon, Soft nylon, Polyurethane, FEP, PFA
Insert Fittings **Series KF** Possible to use in vacuum to -101.3 kPa Applicable tubing – Metric size	Nylon, Soft nylon, Polyurethane, Polyolefin, Soft polyolefin, FEP, Super PFA, Denatured PTFE
Stainless Steel 316 Insert Fittings **Series KFG2** Compact and light Rubber material is not used (except swivel elbow) Grease free	FEP, PFA, Modified PTFE, Nylon, Soft nylon, Polyurethane, Soft polyurethane, Hard polyurethane, Polyolefin, Soft polyolefin, Antistatic soft nylon, Antistatic polyurethane
Stainless Steel 316 One-touch Fittings **Series KQG2** Compact and light Seal parts: Special FKM Grease free	FEP, PFA, Nylon, Soft nylon, Polyurethane, Polyolefin
Metal One-touch Fittings **Series KQB2** Compact and light Grease free	FEP, PFA, Nylon, Soft nylon, Polyurethane, Polyolefin

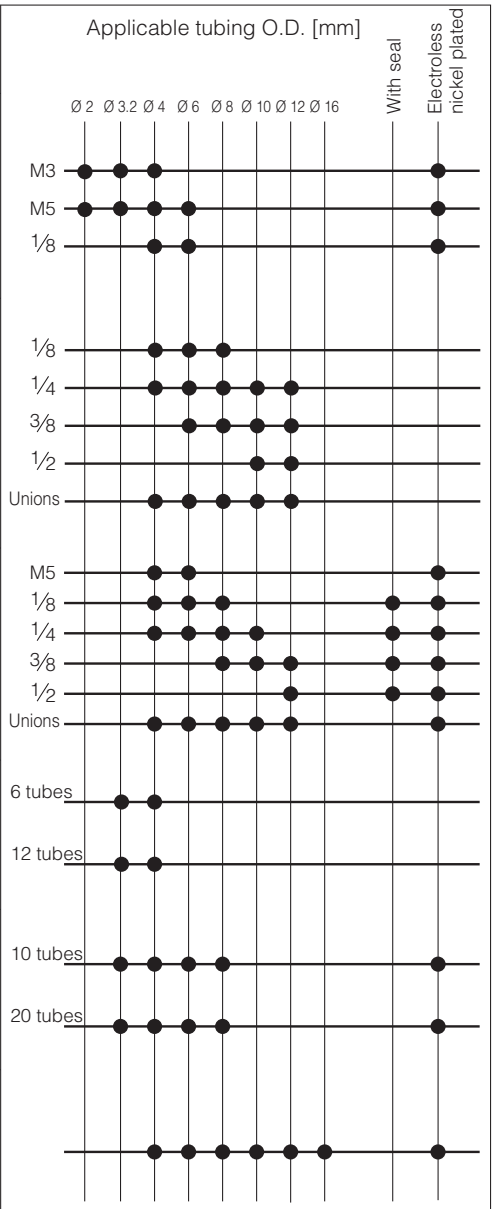


Fittings & Tubing

General Purpose Fittings Series

Variations		Applicable tubing material
Miniature Fittings **Series M** Tubing connection/disconnection without use of tools Applicable tubing – Metric size		Nylon, Soft nylon, Polyurethane, FEP, Denatured PTFE
Self-align Fittings **Series H/DL/L/LL** Accepts soft copper tube Applicable tubing – Metric size		Nylon, Soft nylon, Soft copper (C1220T-0)
Tube Coupler **Series KC** One-touch connection and release Built-in self-seal mechanism Applicable tubing – Metric size		Nylon, Soft nylon, Polyurethane
Multi-connector with One-touch Fittings **Series DMK** Applicable tubing – Metric size		Nylon, Soft nylon, Polyurethane, FEP, PFA
Rectangular Multi-connector **Series KDM** Applicable tubing – Metric size		Nylon, Soft nylon, Polyurethane, FEP, PFA
Piping Module **Series KB** Centralised distribution of supply air Applicable tubing – Metric size		Nylon, Soft nylon, Polyurethane, FEP, PFA

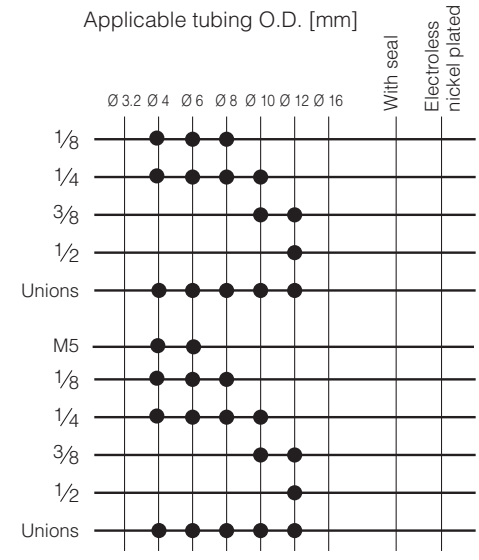
Applicable tubing O.D. [mm]



Clean Series Fittings

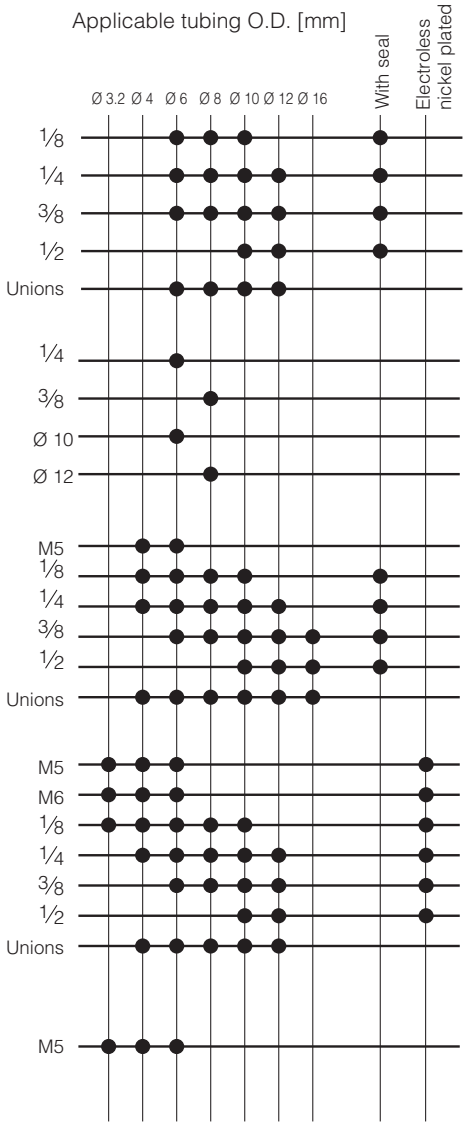
Variations		Applicable tubing material
For air Blow applications Clean One-touch Fittings **Series KP** Applicable tubing – Metric size		Recomended: Polyolefin Soft Polyolefin
For driving System Air Piping Clean One-touch Fittings **Series KPQ/KPG** Applicable tubing – Metric size		Polyurethane: Serie 10-

Applicable tubing O.D. [mm]



Fittings & Tubing

Fitting Series for Special Environments

Variations	Applicable tubing material	Applicable tubing O.D. [mm]
FR One-touch Fittings **Series KR** For use where weld spatter is generated Flame resistant material UL-94, V-0 Applicable tubing – Metric size	FR Soft nylon FR Double layer	
FR One-touch Fittings Manifold **Series KRM** For use where weld spatter is generated Flame resistant material UL-94, V-0 Applicable tubing – Metric size	FR Soft nylon FR Double layer	
One-touch Fittings **Series KG** For use in corrosive environments Stainless series Applicable tubing – Metric size	Nylon Soft nylon Polyurethane FEP PFA	
Antistatic One-touch Fittings **Series KA** For preventing static electricity Applicable tubing – Metric size	Antistatic Soft nylon Antistatic Polyurethane	
Miniature Fittings **Series MS** For use in corrosive environments Stainless steel (SUS316) Applicable tubing – Metric size	Nylon Soft nylon Polyurethane FEP Denatured PTFE	

Fittings & Tubing

Tubing

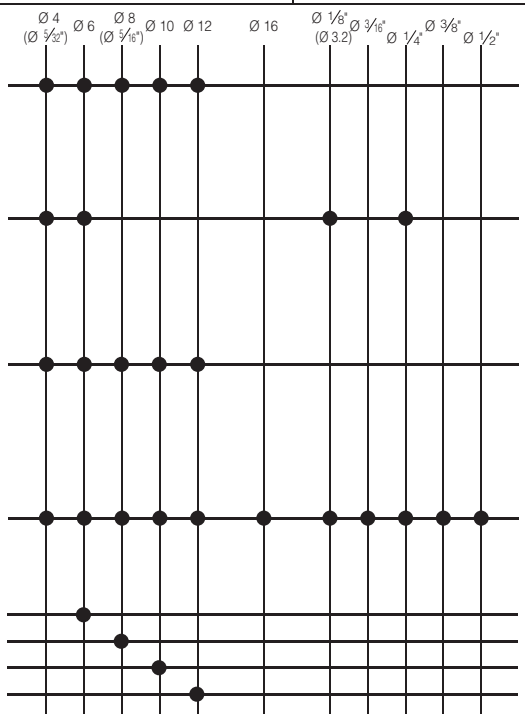
Variations	Colour	Tubing O.D.
		Metric size [mm]: Ø2, Ø4 (Ø5/32"), Ø6, Ø8 (Ø5/16"), Ø10, Ø12, Ø16 — Inch size [inch]: Ø1/8" (Ø3.2), Ø3/16", Ø1/4", Ø3/8", Ø1/2"
Nylon Tubing **Series T/TIA** General tubing 1.5 MPa max. at 20 °C	Black, White, Red, Blue, Yellow, Green	
Soft Nylon Tubing **Series TS/TISA** Slightly flexible 1.0 MPa max. at 20 °C	Black, White, Red, Blue, Yellow, Green	
Polyurethane Tubing **Series TU/TIUB** Flexible 0.8 MPa max. at 20 °C	Black, White, Red, Blue, Yellow, Green, Clear, Orange	
Soft Polyurethane Tubing **Series TUS** Extremely flexible 0.6 MPa max. at 20 °C	Black, White, Red, Blue, Yellow, Green, Translucent Yellow brown	
Flat Tubing **Series TU, TUS, TUZ** Multi-core, Multi Colour Specification	Series TU 2 to 6 cores; Series TUS 2 to 5 cores; Series TUZ 2 to 6 cores	
Hard Polyurethane Tubing **Series TUH** 0.8 MPa standard type, 1.0 MPa for high pressure type	Black, White, Blue, Translucent	
Polyurethane Coil Tubing **Series TCU** For flexible and moving applications	1 core, 2 cores, 3 cores	
Polyurethane Flat Tubing **Series TFU** For flexible multi-tube applications	2 cores, 3 cores	
FR Soft Nylon Tubing **Series TRS** Use in spatter generating atmosphere/Flame resistant material. Flame resistance (Equivalent to UL-94 standard, V-0)	Black, White, Red, Blue, Green	

Fittings & Tubing

Tubing

Variations	Colour	Tubing O.D.
		Metric size [mm] / Inch size [inch]
FR Double Layer Tubing **Series TRB** Flame resistance (Equivalent to UL-94 standard, V-0)	Black White Red Blue Yellow Green	
FR Double Layer Polyurethane Tubing **Series TRBU** Flame resistance (Equivalent to UL-94 standard, V-0)	Black White Red Blue Yellow Green	
Antistatic Polyurethane Tubing **Series TAU**	Black	
Antistatic Soft Nylon Tubing **Series TAS** For preventing static electricity	Black	
Super PFA High Purity Fluoropolymer Tubing **Series TL/TIL** Outstanding corrosion resistance. Food Sanitation Law compliant.	Translucent	
PFA Fluoropolymer **Series TLM/TILM** Outstanding corrosion resistance. Passed The Food Sanitation Act Compliance test and FDA Elution testing	Black Red Blue Translucent	
FEP Fluoropolymer Tubing **Series TH/TIH** Outstanding corrosion resistance. Food Sanitation Law compliant.	Black Red Blue Translucent	
Denatured PTFE Tubing **Series TD/TID** Outstanding corrosion resistance. Food Sanitation Law compliant.	Translucent	
2-Layer Soft Fluoropolymer Tubing **Series TQ** Outstanding corrosion and abrasion resistance.	Translucent	
Clean tubing Polyolefin Tubing **Series TPH**	Black White Red Blue Yellow Green	
Clean tubing Soft Polyolefin Tubing **Series TPS**	Black White Red Blue Yellow Green	

Fittings & Tubing Tools

	Variations		Colour	Tubing O.D.
Related Products	Multi-tube Holder **Series TM**			
	Tube Releasing Tool **Series TG**			
	Tube Stand & Tube Reel **Series TB/TBR**			
	Tube Cutter **Series TK**			
	Double Layer Tube Stripper **Series TKS** The outer layer for double layer tubing, Series TRB, TRBU is peeled off easily.		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□

S Couplers with sleeve lock
Series KK

Series KK3/4/6

Series KK2

Male thread type

Series	Port size					
	M5	R 1/8	R 1/4	R 3/8	R 1/2	R 3/4
KK2	●	●				
KK3		●	●	●		
KK4		●	●	●	●	
KK6				●	●	●

Female thread type

Series	Port size				
	M5	Rc 1/8	Rc 1/4	Rc 3/8	Rc 1/2
KK2	●				
KK3		●	●	●	
KK4			●	●	
KK6				●	●

Nut fitting type (for 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]						
	Ø 3.2	Ø 4	Ø 6	Ø 8	Ø 10	Ø 12	Ø 16
KK2	●	●	●				
KK3		●	●	●	●		
KK4			●	●	●	●	
KK6						●	●

S Couplers without sleeve lock
Series KKH

Male thread type

Series	Port size			
	R 1/8	R 1/4	R 3/8	R 1/2
KKH3	●	●	●	
KKH4	●	●	●	●

Female thread type

Series	Port size		
	Rc 1/8	Rc 1/4	Rc 3/8
KKH3	●	●	●
KKH4		●	●

Nut fitting type (for reinforced urethane hose)

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

Stainless steel type
Series KKA

Male/Female thread type

Series	Port size							
	R·Rc 1/8	R·Rc 1/4	R·Rc 3/8	R·Rc 1/2	R·Rc 3/4	R·Rc 1	R·Rc 1 1/4	R·Rc 1 1/2
KKA3	●	●	●					
KKA4		●	●	●				
KKA6			●	●	●			
KKA7				●	●	●		
KKA8					●	●	●	
KKA9						●	●	●

Energy saving by pressure loss reduction
Series KK130

Male thread type

Series	Port size							
	R 1/8	R 1/4	R 3/8	R 1/2	NPT 1/8	NPT 1/4	NPT 3/8	NPT 1/2
KK130	●	●	●	●	●	●	●	●

Female thread type

Series	Port size							
	R 1/8	R 1/4	R 3/8	R 1/2	NPT 1/8	NPT 1/4	NPT 3/8	NPT 1/2
KK130	●	●	●	●	●	●	●	●

Barb fitting type (for rubber hose)

Series	Hose nominal			
	1/4"	1/4"	3/8"	1/2"
KK130	●	●	●	●

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
KK130	●	●	●	●	●	●

One-touch fitting type

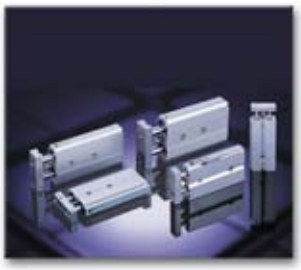
Series	Applicable tube O.D.							
	6	8	10	12	1/4"	5/16"	1/4"	5/16"
KK130	●	●	●	●	●	●	●	●

Miniaturization of equipment
• Space Saving Products series now available for further miniaturisation.

CUJ Series

• Mini Free-Mount Cylinder

CXSJ Series



• Dual Rod Cylinder

MGJ Series

• Miniature Guide Rod Cylinder

MXY Series

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

MXP Series

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

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

LAT3 Series

• Card Motor

PSE Series

• Pressure Sensors

MH Series

• Air Grippers

Electric Actuators

2 Finger Electric Gripper
Series LEHZ

- Compact and light, various gripping forces
- Drop prevention function (self-lock mechanism) is provided
- Energy saving: power consumption reduced by self-lock mechanism
- Gripping check function is provided

Size	Stroke (Both sides) [mm]	Gripping force [N]		Opening/ closing speed [mm/s]	Weight [g]	
		Standard	Compact		Standard	Compact
10	4	6 to 14	2 to 6	5 to 80	165	135
16	6		3 to 8		220	190
20	10	16 to 40	11 to 28	5 to 100	430	365
25	14				585	520
32	22	52 to 130	—	5 to 120	1120	—
40	30	84 to 210	—		1760	—

2 Finger Electric Gripper With Dust Cover
Series LEHZJ

- Sealed-construction dust cover
- Drop prevention function (self-lock mechanism) is provided
- Energy saving: power consumption reduced by self-lock mechanism
- Gripping check function is provided

Size	Stroke (Both sides) [mm]	Gripping force [N]		Opening/ closing speed [mm/s]	Weight [g]	
		Standard	Compact		Standard	Compact
10	4	6 to 14	3 to 6	5 to 80	170	140
16	6		4 to 8		230	200
20	10	16 to 40	11 to 28	5 to 100	440	375
25	14				545	610

2 Finger Electric Gripper
Series LEHF

- Long stroke, can hold various types of workpieces
- Drop prevention function (self-lock mechanism) is provided
- Energy saving: power consumption reduced by self-lock mechanism
- Gripping check function is provided

Size	Stroke (Both sides) [mm]	Gripping force [N]	Opening/ closing speed [mm/s]	Weight [g]
10	16 (32)	3 to 7	5 to 80	340 (370)
20	24 (48)	11 to 28	5 to 100	610 (750)
32	32 (64)	48 to 120		1625 (1970)
40	40 (80)	72 to 180		1980 (2500)

( ): For long stroke specification

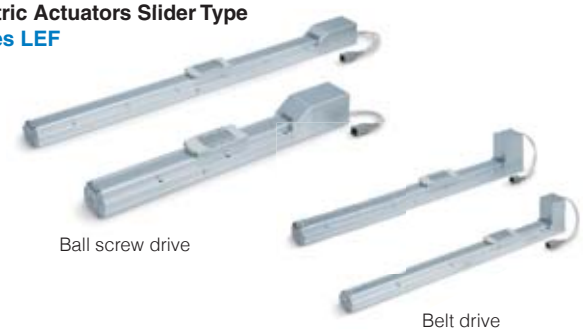
3 Finger Electric Gripper
Series LEHS

- Can hold round workpieces
- Drop prevention function (self-lock mechanism) is provided
- Energy saving: power consumption reduced by self-lock mechanism
- Gripping check function is provided

Size	Stroke/ Diameter [mm]	Gripping force [N]		Opening/ closing speed [mm/s]	Weight [g]	
		Standard	Compact		Basic	Compact
10	4	2.2 to 5.5	1.4 to 3.5	5 to 70	185	150
20	6	9 to 22	7 to 17	5 to 80	410	345
32	8	36 to 90	—	5 to 100	975	—
40	12	52 to 130	—	5 to 120	1265	—

Electric Actuators

Electric Actuators Slider Type
Series LEF



Ball screw drive

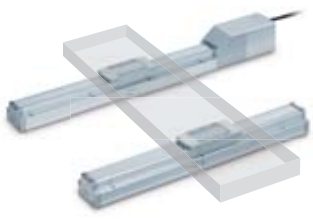
Belt drive

- Simple installation: possible to mount the main body without removing the external cover.
- Two transmission options: belt drive (LEFB); ball screw drive (LEFS).
- Support guide series LEFG designed to support workpieces with significant overhand.
- High precision slider type actuator LEFSH available.
- Optional non-magnetising type lock mechanism for the motor.

Drive method	Specifications	Series	Stroke [mm]	Workload [kg]		Speed [mm/s]	Screw lead [mm]	Positioning repeatability [mm]	Controller series
				Horizontal	Vertical				
Ball screw drive	Step motor (Servo/24 V DC)	(11-)LEFS16	50 to 500	14 [9]	2	10 to 700 [500]	10	±0.02 {±0.015}	Series LECP6, LECP1, LECPA
				15 [10]	4	5 to 360 [250]	5		
		(11-)LEFS25	50 to 800 (600)	12 [10]	0.5	20 to 1100 [1000]	20 Note)	±0.02	
				25 [20]	7.5	12 to 750 [500]	12	±0.02 {±0.015}	
				30 [20]	15	6 to 400 [250]	6		
		(11-)LEFS32	50 to 1000 (800)	20 [15]	4	24 to 1200 [1200]	24 Note)	±0.02	
				45 [40]	10	16 to 800 [500]	16	±0.02 {±0.015}	
				50 [45]	20	8 to 520 [250]	8		
		(11-)LEFS40	150 to 1200 (1000)	25 [20]	2	30 to 1200 [500]	30 Note)	±0.02	
				55 [50]	2	20 to 1000 [500]	20	±0.02 {±0.015}	
				65 [60]	23	10 to 300 [250]	10		
	Servo motor (24 V DC)	(11-)LEFS16A	50 to 500	7	2	10 to 700	10	±0.02 {±0.015}	Series LECA6
				10	4	5 to 360	5		
		(11-)LEFS25A	50 to 800 (600)	5	1	20 to 1100	20 Note)	±0.02	
				11	2.5	12 to 750	12	±0.02 {±0.015}	
				18	5	6 to 400	6		
	AC Servo motor (100/200 W)	(11-)LEFS25S	50 to 800 (600)	10	4	max. 1500	20 Note)	±0.02 {±0.01}	Series LECSA, LECSB, LECSC, LECSS, LECSS-T, LECYU, LECYM
				20	8	max. 900	12		
				20	15	max. 450	6		
		(11-)LEFS32S	50 to 1000 (800)	30	5	max. 1500	24 Note)		
				40	10	max. 1000	16		
				45	20	max. 500	8		
		(11-)LEFS40S	150 to 1200 (1000)	30	7	max. 1500	30 Note)		
				50	15	max. 1000	20		
				60	30	max. 500	10		
Belt drive	Step motor (Servo/24 V DC)	LEFB16	300 to 1000	1 [1]	—	48 to 1100	48	±0.08	Series LECP6, LECP1, LECPA
		LEFB25	300 to 2000	10 [5]		48 to 1400			
		LEFB32	300 to 2000	19 [14]		48 to 1500			
	Servo motor (24 V DC)	LEFB16A	300 to 1000	1	—	5 to 2000	48		Series LECA6
		LEFB25A	300 to 2000	2					
	AC Servo motor (100/200 W)	LEFB25S	300 to 2000	5	—	max. 2000	54	±0.06	Series LECSA, LECSB, LECSC, LECSS, LECSS-T, LECYU, LECYM
		LEFB32S	300 to 2500	15					
		LEFB40S	300 to 3000	25					

∗ ( ) indicates value when “Clean room specification type 11-LEFS” is selected.
∗ [ ] indicates value when “LECPA controller” is selected.
∗ { } indicates value when “high precision slider type electric actuator (11-)LEFSH” is selected.
Note) Not available for 11-LEFS.

Series LEFG – Support guide



Drive method	Specifications	Series	Stroke [mm]
Ball screw drive	Step motor (Servo/24 V DC) Servo motor (24 V DC) AC Servo motor	(11-)LEFG16-S	50 to 500
		(11-)LEFG25-S	50 to 800 (600)
		(11-)LEFG32-S	50 to 1000 (800)
		(11-)LEFG40-S	150 to 1200 (1000)
Belt drive	Step motor (Servo/24 V DC) Servo motor (24 V DC)	LEFG16-BT	300 to 1000
		LEFG25-BT	300 to 2000
		LEFG32-BT	300 to 2000
	AC Servo motor	LEFG25-BS	300 to 2000
		LEFG32-BS	300 to 2500
		LEFG40-BS	300 to 3000

High-Rigidity Slider Type
Series LEJ

- Low-profile / low centre of gravity (62 mm height).
- High precision and high rigidity by using a double axis linear guide.
- Two transmission options: ball screw drive (LEJS); belt drive (LEJB).
- Clean room specification available, ball screw drive: 11-LEJS.
- High precision slider type electric actuator LEJSH available.
- Max. acceleration/deceleration: 20000 mm/s^2.

Drive method	Specifications	Series	Stroke [mm]	Workload [kg]		Max. speed [mm/s]	Screw lead [mm]	Positioning repeatability [mm]	Controller series
				Horizontal	Vertical				
Ball screw drive	AC Servo motor (100/200 W)	(11-)LEJS40	200 to 1200	15 Note)	3 Note)	1800	24 Note)	±0.02 (±0.01)	Series LECSA, LECSB, LECSC, LECSS, LECSS-T, LECYU, LECYM
				30	5	1200	16		
				55	10	600	8		
		(11-)LEJS63	300 to 1500	30 Note)	6 Note)	1800	30 Note)		
				45	10	1200	20		
				85	20	600	10		
Belt drive		LEJB40	200 to 2000	20	—	2000	27	±0.04	
		LEJB63	300 to 3000	30	—	3000	42		

∗ ( ) indicates value when “high precision type” is selected.
Note) Not available for 11-LEJS.

Electric Actuator Guide Rod Slider
Series LEL

- Low-profile/flat electric actuator: 48 mm height.
- Compatible with sliding bearing and ball bushing bearing:
  Sliding bearing: reduced noise (60 dB or less).
  Ball bushing bearing: high-speed transport (1000 mm/s); suitable for moment loads.
- Optional non-magnetising type lock mechanism for the motor.
- Manual override screw for adjustment operation.
- Adjustable position, speed and positioning: 64 points to adapt any possible application.

Drive method	Series	Bearing	Stroke [mm]	Workload (horizontal) [kg]	Speed [mm/s]	Equivalent lead [mm]	Positioning repeatability [mm]	Controller series
Step motor (Servo/24 V DC)	LEL25M	Sliding bearing	100 to 1000	3	48 to 500	48	±0.08	Series LECP6, LECP1
	LEL25L	Ball bushing bearing		5	48 to 1000			

Low Profile Slider Type
Series LEM

- Belt drive actuator with step motor.
- Table height reduced by using belt drive and offset guide.
- Mounting interchangeable with the E-MY series.
- Basic type: Series LEMB. Light load transfer. Combining with external guide. Long stroke.
- Cam follower guide type: Series LEMC. Workpiece direct mounting. Long stroke
- Linear guide single axis type: Series LEMH. Workpiece direct mounting. Provide more moment resistance than the cam follower guide type. High speed transfer
- Linear guide double axis type: Series LEMHT. Workpiece direct mounting. Provide more moment resistance than the cam follower guide type. High speed transfer.

Drive method	Specifications	Series	Stroke [mm]	Workload (horizontal) [kg]	Max. Speed [mm/s]	Max. Acceleration/ deceleration [mm/s^2]	Screw lead [mm]	Positioning repeatability [mm]	Controller series
Belt drive	Step motor (Servo/24 V DC)	LEMB25	50 to 2000	6	1000	20000	48	±0.08	Series LECP6, LECP1, LECP2
		LEMB32		11					
		LEMC25	50 to 2000	10					
		LEMC32		20					
		LEMH25	50 to 1000	10	2000				
		LEMH32	50 to 1500	20					
		LEMHT25	50 to 1000	10					
		LEMHT32	50 to 1500	20					

∗ The acceleration/deceleration is dependent on the work load.

Electric Miniature Actuator
Series LEP

- Compact and lightweight.
- Motor type selectable:
  High-pushing force type - basic type
  Compact and lightweight motor type (size 10 only)
- Manual override screw for adjustment operation.
- Possible to set position, speed and force (64 points).

Specifications	Type	Series	Stroke [mm]	Screw lead [mm]	Pushing force [N]		Max. Workload (horizontal) [Kg]		Max. Workload (vertical) [Kg]		Speed (horizontal) [mm/s]		Positioning repeatability [mm]	Controller series
					Basic	Compact	Basic	Compact	Basic	Compact	Basic	Compact		
Step motor (Servo/24 V DC)	Miniature rod type	LEPY6	25, 50 75	4	14 to 20	—	2.0	—	0.5	—	10 to 50	—	±0.05	Series LECP6, LECP1, LECPA
				8	7 to 10		1.0		0.25		20 to 300			
		LEPY10		5	25 to 50	24 to 40	6.0	4.0	1.5	1.5	10 to 200			
				10	12.5 to 25	12 to 20	3.0	2.0	1.0	1.0	20 to 350			
	Miniature slide table type	LEPS6	25, 50	4	14 to 20	—	1.0	—	0.5	—	10 to 50	—		
				8	7 to 10		0.75		0.25		20 to 300			
		LEPS10		5	25 to 50	24 to 40	2.0		1.5	1.5	10 to 200			
				10	12.5 to 25	12 to 20	1.5		1.0	1.0	20 to 350			

Electric Actuator Rod Type
Series LEY

Motor parallel type

In-line motor type

- Dust/drip proof specification available: LEY25-X5; LEY32-X5; LEY63-P.
- High precision rod type electric actuator LEYH available.
- Standard auto-switches can be mounted.
- Mounting flexibility.
- Motor mounting direction can be selected.
- Optional non-magnetising type lock mechanism for the motor.

Series LEY□D – In-line Motor Type

- Reduced actuator height by in-line motor mounting.
- Compact: with reduction in width and height.
- Dust/drip proof specification available: LEY25D-X5; LEY32D-X5; LEY63D-P.
- High precision rod type electric actuator, in-line type LEYH□D available.

Specifications	Series	Stroke [mm]	Pushing force [N]	Workload [kg]		Speed [mm/s]	Screw lead [mm]	Positioning repeatability [mm]	Controller series
				Horizontal	Vertical				
Step motor (Servo/24 V DC)	LEY16□	30 to 300	38	6 [4]	2	15 to 500	10	±0.02	Series LECP6, LECP1, LECPA
			74	17 [11]	4	8 to 250	5		
			141	30 [20]	8	4 to 125	2.5		
	LEY25□(-X5)	30 to 400	122	20 [12]	8 ((7))	18 to 500 ((400))	12		
			238	40 [30]	16 ((15))	9 to 250 ((200))	6		
			452	60 [30]	30 ((29)	5 to 125 ((100))	3		
	LEY32□(-X5)	30 to 500	189	30 [20]	11 ((10))	24 to 500 ((400))	16		
			370	45 [40]	22 ((21))	12 to 300 [250] ((200))	8		
			707	60 [40]	43 ((42))	6 to 150 [125] ((100))	4		
	LEY40□	30 to 500	283	50 [30]	13	24 to 500 [300]	16		
			553	60 [60]	27	12 to 350 [150]	8		Series LECA6
			1058	80 [60]	53	6 to 175 [75]	4		
Servo motor (24 V DC)	LEY16□A	30 to 300	30	3	2	2 to 500	10		
			58	6	4	1 to 250	5		
			111	12	8	1 to 125	2.5		
	LEY25□A(-X5)	30 to 400	35	7	3 ((2))	2 to 500 ((400))	12		
			72	15	6 ((5))	1 to 250 ((200)	6		
			130	30	12 ((11))	1 to 125 ((100))	3		
AC Servo motor (100/200/400 W)	LEY(H)25□S(-X5)	30 to400	131	18	8	max. 900	12	±0.02 {±0.01}	Series LECSA, LECSB, LECSC, LECSS, LECSS-T, LECYU, LECYM
			255	50	16	max. 450	6		
			485	50	30	max. 225	3		
	LEY(H)32□S(-X5)	30 to 500	157(197)	30	9	1200 (1000)	20 (16)		
			308(385)	60	19	600 (500)	10 (8)		
			588(736)	60	37	300 (250)	5 (4)		
AC Servo motor (400 W)	LEY (H) 63□S	100 to 800	521	40	19	max. 1000	20		
			(100/200/400 W)	70	38	max. 500	10		
			1910	80	72	max. 250	5		
			3343 Note)	200 Note)	115 Note)	max. 70 Note)	2.86 Note)		

∗ ( ) indicates value when “in-line type” is selected.
∗ (( )) indicates value when “dust/drip proof specification -X5” is selected.
∗ [ ] indicates value when “LECPA controller” is selected.
∗ { } indicates value when “high precision slider type electric actuator LEYH” is selected.
Note) Not available for in-line motor type.

Electric Actuator Guide Rod Type
Series LEYG

Motor parallel type

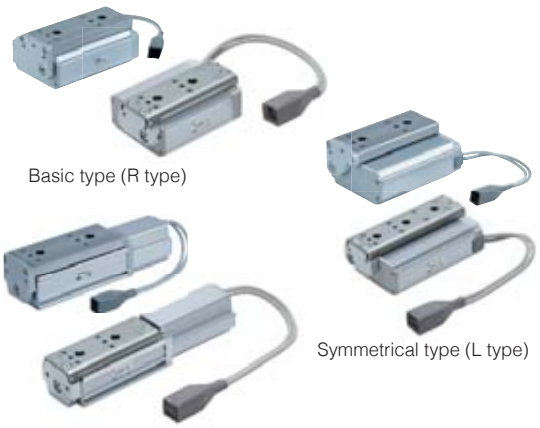
In-line motor type

- High rigidity through additional guide rods
- Two motor types available: step motor and servo motor
- Optional non-magnetising type lock mechanism for the motor.

Specifications	Series	Stroke [mm]	Pushing force [N]	Workload [kg]		Speed [mm/s]	Screw lead [mm]	Positioning repeatability [mm]	Controller series
				Horizontal	Vertical				
Step motor (Servo/24 V DC)	LEYG16	20 to 200	38	6 [4]	1.5	15 to 500	10	±0.02	Series LECP6, LECP1, LECPA
			74	17 [11]	3.5	8 to 250	5		
			141	30 [20]	7.5	4 to 125	2.5		
	LEYG25□	30 to 300	122	20 [12]	7	18 to 500	12		
			238	40 [30]	15	9 to 250	6		
			452	60 [30]	29	5 to 125	3		
	LEYG32□	30 to 300	189	30 [20]	9	24 to 500	16		
			370	45 [40]	20	12 to 300 [250]	8		
			707	60 [40]	41	6 to 150 [125]	4		
	LEYG40□	30 to 300	283	50 [30]	11	24 to 500 [300]	16		
			553	60 [60]	25	12 to 350 [150]	8		
			1058	80 [60]	51	6 to 175 [75]	4		
Servo motor (24 V DC)	LEY16G□A	30 to 200	30	3	1.5	2 to 500	10		Series LECA6
			58	6	3.5	1 to 250	5		
			111	12	7.5	1 to 125	2.5		
	LEY25G□A	30 to 300	35	7	2	2 to 500	12		
			72	15	5	1 to 250	6		
			130	30	11	1 to 125	3		
AC Servo motor (100/200 W)	LEY(H)G25□S	30 to 300	131	18	7	max. 900	12	±0.02 {±0.01}	Series LECSA, LECSB, LECSC, LECSS, LECSS-T, LECYU, LECYM
			255	50	15	max. 450	6		
			485	50	29	max. 225	3		
	LEY(H)G32□S	30 to 300	157 (197)	30	7 (10)	1200 (1000)	20 (16)		
			308 (385)	60	17 (22)	600 (500)	10 (8)		
			588 (736)	60	35 (44)	300 (250)	5 (4)		

∗ ( ) indicates value when “in-line type” is selected.
∗ [ ] indicates value when “LECPA controller” is selected.
∗ { } indicates value when “high precision slider type electric actuator LEYGH” is selected.

Electric Slide Type
Series LES



Basic type (R type)

Symmetrical type (L type)

In-line motor type (D type)

Compact slide table for fast, controlled, and pick and place applications

- Up to 64 points positioning.
- Reduced cycle time: max.acceleration 5000 mm/s^2; max. speed 400 mm/s.
- Optional non-magnetising type lock mechanism for the motor.

Series LES□R – Basic Type

- Compact and space saving by built-in motor.
- High precision type LESH□R available.

Series LES□D – In-line Motor Type

- Reduced width and height by in-line motor mounting.
- High precision type LESH□D available.

Series LES□L – Symmetrical Type

- Compact and space saving by built-in motor.
- The locations of the table and cable are opposite those of the basic type.
- High precision type LESH□L available.

Specifications		Series	Stroke [mm]	Pushing force [N]	Workload [kg]		Speed [mm/s]	Screw lead [mm]	Positioning repeatability [mm]	Controller series
					Horizontal	Vertical				
Compact type	Step motor (Servo/24 V DC)	LES8□	30, 50, 75	15	1	0.5	10 to 200	4	±0.05	Series LECP6, LECP1, LECPA
				10	1	0.25	20 to 400	8		
		LES16□	30, 50, 75, 100	55	3	3	10 to 200	5		
				35	3	1.5	20 to 400	10		
		LES25□	30, 50, 75 100, 125, 150	180	5	5	10 to 200	8		
				100	5	2.5	20 to 400	16		
	Servo motor (24 V DC)	LES8□A	30, 50, 75	11	1	1	1 to 200	4		Series LECA6
				7.5	1	0.5	1 to 400	8		
		LES16□A	30, 50, 75, 100	35	3	3	1 to 200	5		
				20	3	1.5	1 to 400	10		
		LES25□A Note)	30, 50, 75 100, 125, 150	62	5	4	1 to 200	8		
				38	5	2	1 to 400	16		
High rigidity type	Step motor (Servo/24 V DC)	LESH8□	50, 75	15	2	0.5	10 to 200	4		Series LECP6, LECP1, LECPA
				10	1	0.25	20 to 400	8		
		LESH16□	50, 100	55	8	2	10 to 200	5		
				35	5	1	20 to 400	10		
		LESH25□	50, 100, 150	180	12	4	10 to 150	8		
				100	8	2	20 to 400	16		
	Servo motor (24 V DC)	LESH8□A	50, 75	11	2	0.5	1 to 200	4		Series LECA6
				7.5	1	0.25	1 to 400	8		
		LESH16□A	50, 100	35	5	2	1 to 200	5		
				20	2.5	1	1 to 400	10		
		LESH25□A Note)	50, 100, 150	62	6	2.5	1 to 150	8		
				38	4	1.5	1 to 400	16		

Note) Not available for in-line motor type.

Electric Rotary Table
Series LER

- Up to 64 positioning points.
- Rotation angles: 90°, 180°, 320° (310° for LER10), 360°.
- Maximum acceleration 3000°/s^2.

Specifications	Series	Rotating torque [N·m]		Speed [°/s]		Positioning repeatability [°]		Controller series
		Basic	High torque	Basic	High torque	Basic	High torque	
Step motor (Servo/24 V DC)	LER10	0.22	0.32	30 to 420	20 to 280	±0.05 [±0.01] (±0.03)		Series LECP6, LECP1, LECPA Note)
	LER30	0.8	1.2					
	LER50	6.6	10					

∗ [ ] indicates value when an external stopper is mounted.
∗ ( ) indicates value when "high precision type" is selected.
Note) LECPA: not available for 360° rotation angle.

Controller/Driver
Series LEC

Series LECP1 – Programmless Type Controller
- Compatible with actuators Series LEF, LEL, LEY, LES, LEP, LER, LEH, LEM.
- Applicable to 14 points of positioning.
- Speed and acceleration: 16-level adjustment via switches.
- No software to put into operation.

Series LECP2 – Programmless Type Controller (with stroke study)
- Compatible with actuators Series LEM.
- 2 stroke end points +12 intermediate points positioning.
- Control panel setting.
- Wire-saving design.

Series LECPA – Step Motor Driver, Pulse Input Type
- Compatible with actuators Series LEF, LEY, LES, LEP, LER, LEH.
- A driver that uses pulse signals to allow positioning at any position. The actuator can be controlled from the customers' positioning unit.

Series LEC – Step Data Input Type Controller
- Compatible with actuators Series LEF, LEL, LEY, LES, LEP, LER, LEH, LEM.
- Two types: to control step motor (LECP6) and servo motor (LECA6).
- Used to positioning up to 64 points in the positioning or force mode.
- Software or teaching box for programming the parameters.

Series LEC-G – Compatible Gateway (GW) Unit, for Electric Actuators
- Compatible with controllers Series LECP6, LECPA6
- Applicable Fieldbus protocols: CC-Link, DeviceNet, PROFIBUS, EtherNET/IP
- Position, speed, etc. values can be checked on the PLC.
- Serial communication RS485.
- Up to 12 controllers are connectable.

Series LECS – AC Servo Motor Driver

Smooth position, speed and force control with no need for further adjustments

- Compatible with actuators Series LEY, LEF, LEJ.
- LECSA – Pulse input type (for incremental encoder)
  Positioning type, with up to 7 positioning points by point table.
- LECSB – Pulse input type (for absolute encoder)
  10/6 parallel inputs/outputs.
- LECSC – CC-Link direct input type (for abolute encoder)
  Suitable for multipoint positioning, being possible to set position data/speed data and operation start/stop.
- LECSS – SSCNET III type (for absolute encoder)
  Optimum for interpolation and with enhanced noise resistance by using fiber optics for communication.
- LECSS-T – SSCNET III/H type (for absolute encoder)
  Optical communication protocol with STO - Safe Torque Off - function (in accordance with IEC61800-5-2) and homing done by Z-phase, ideal for machines with axis motion.

Series LECY – AC Servo Motor Driver, MECHATROLINK Compatible

- Compatible with actuator Series LEY, LEF, LEJ.
- STO (Safe Torque Off) function in accordance with IEC61800-5-2.
- Homing can be performed by mechanical end stop.
- Lock cable integrated with motor cable.
- LECYM - MECHATROLINK-II type, with speeds of 10 Mbps and cycles of 250 µs.
- LECYU - MECHATROLINK-III type, with speeds of 100 Mbps and cycles of 125 µs.

Controller/Driver
Series JXC

Series JXC83 –Multi-axis control in only one step

- Compatible with actuators Series LEF, LEY, LES, LEP, LER, LEH.
- 4-axis synchronised control.
- Linear / arc interpolation.
- Positioning / pushing operations.
- Absolute / relative position instruction.
- Step data input: 2048 points.

Series JXC91 – EtherNet/IP™ Direct Input Type
Dual communication control through EtherNet/IP™

- Compatible with actuators Series LEF, LEL, LEY, LES, LEP, LER, LEH, LEM.
- Dual communication ports - linear or ring topology (DLR) connection.
  Less wiring.
  Good recovery after disconnection.
  Easy identification of disconnected spot.
- Full numerical data input, up to connection of max. 256 units.

Simplified Options
Electric Actuators

Electric Cylinders
Series LZ

- Able to operate the stroke with only ON/OFF signals. It can be operated like an air cylinder
- Simple extension and retraction motion control
- Thrust control
- Suitable for an environment where an air supply is not available
- Two sizes that offer an equivalent thrust to a Ø 16 and Ø 25 air cylinder

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, 50, 100, 200 mm
Motor type	24 V DC

∗ Contact SMC for detailed specifications and how to order

Card Motor
Series LAT3

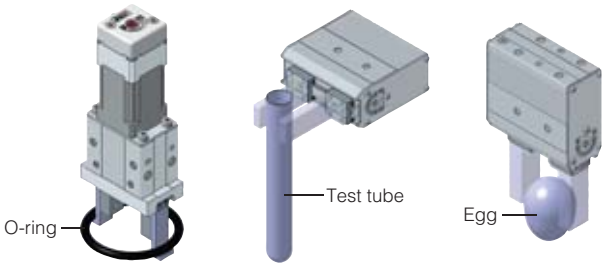
- System size reduction: linear motor, linear guide and position sensor integrated into one unit
- 3 in 1: transfer, force control & measurement
- Compact and lightweight: 9 mm thick, 130 g
- Easy programming and operating setting
- High precision and reduced cycle time: max. operating frequency 500 cpm

Series	Stroke [mm]	Sensor (optical linear encoder)	Linear motor	Linear guide	Pushing	Positioning repeatability	Pushing mearurement	Maximum load mass [g]		Maximum speed [mm/s]
		Resolution [µm]	Type		Instantaneous max. thrust [N]	Accuracy [µm]		Horizontal	Vertical	
LAT3(F)	10	30 (1.25)	Moving magnetic type linear motor	Linear guide with circulating balls	5.2	±90 (±5)	±100 (±10)	500	100	400
	20				6					
	30				5.5				50	

∗ ( ) indicates value when LAT3F is selected.

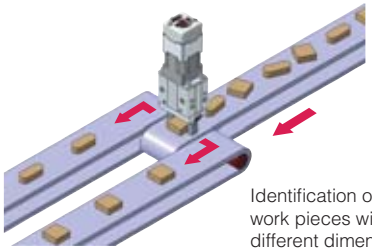
Applications

• Gripping of components that are easily deformed or damaged

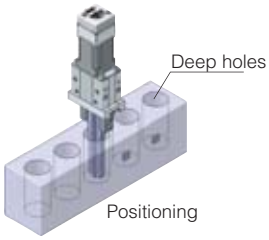


Speed and gripping force control and positioning

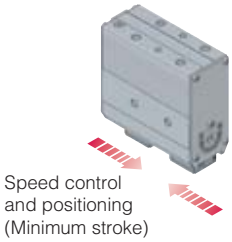
• Alignment and selection of randomly lined parts



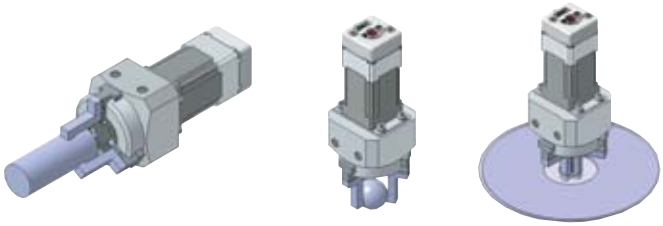
• Gripping in a narrow space



• Soft touch/High frequency

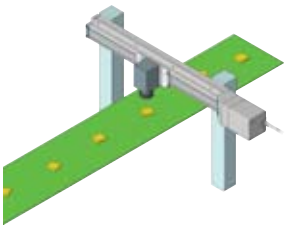


• Gripping of cylindrical and spherical parts

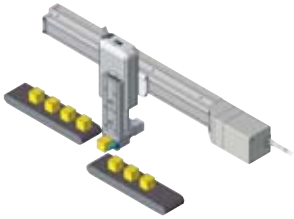


Speed and gripping force control

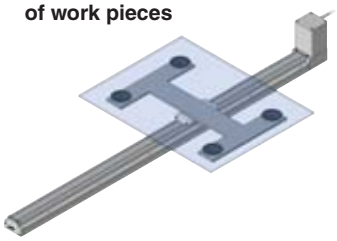
• Precise positioning of work pieces



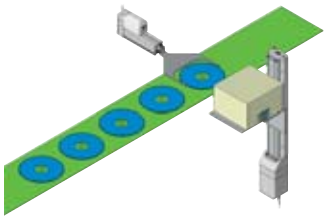
• Pick and place



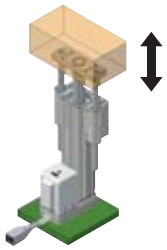
• Load and unload transfer of work pieces



• Vertical transfer

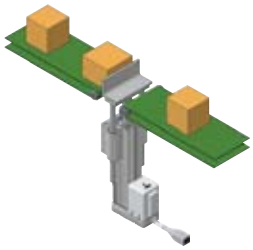


• Lifter



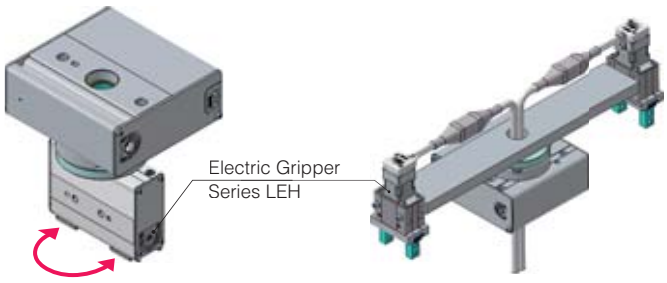
LEYG□M (Slide bearing)
LEYG□L (Ball bushing bearing)

• Stopper



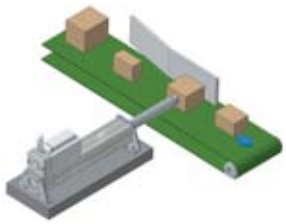
LEYG□M (Slide bearing)

• Rotation

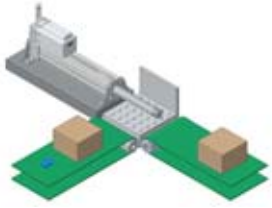


Rotation transfer after gripping
in combination with a gripper

• Pushing operation



• Delivery



• Press fitting

• Rotation

Electro-Pneumatic Pressure Regulator
Series ITV

- Stepless control of air pressure proportional to an electrical signal
- Sensitivity: 0.2 kPa (100 kPa specification)
- Linearity: Within ±1 % (F.S.)
- Hysteresis: Within 0.5 % (F.S.)
- IP65

Series ITV0000
6 l/min (ANR)*

Series ITV1000
200 l/min (ANR)*

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

Series ITV2000
1500 l/min (ANR)*

Series ITV3000
4000 l/min (ANR)*

Electro-Pneumatic Pressure Regulator / Fieldbus compatibility
Series ITV1000/2000/3000

- Fieldbus compatibility added to series ITV1000/2000/3000 specifications.
- Reduced wiring.
- Now with RS-232C serial communications capability.
- CC-Link, DeviceNet, Profibus

* Pressure range 0.9 MPa. Supply pressure 1.0 MPa. Set Pressure 0.6 MPa.

	Series	Input	Model	Set pressure range	Sensitivity	Accuracy
Electro-pneumatic pressure regulator	**Series ITV0000** 6 l/min (ANR)* 	Current DC 4 to 20 mA (Sink type) Current DC 0 to 20 mA (Sink type) Voltage DC 0 to 5 V Voltage DC 0 to 10 V	ITV001	0.001 ~ 0.1 MPa	0.2 kPa	Linearity Within ±1 % F.S. Hysteresis Within 0.5 % F.S.
			ITV003	0.001 ~ 0.5 MPa	1.0 kPa	
			ITV005	0.001 ~ 0.9 MPa	1.8 kPa	
			ITV009	-1 ~ -100 KPa	0.2 kPa	
	Series ITV1000 200 l/min (ANR)* • Parts in contact with fluids are oil free. 	Current DC 4 to 20 mA (Sink type) Current DC 0 to 20 mA (Sink type) Voltage DC 0 to 5 V Voltage DC 0 to 10 V CC-Link compatible DeviceNet™ compatible PROFIBUS DP compatible RS-232C communication	ITV101	0.005 ~ 0.1 MPa	0.2 kPa	
			ITV103	0.005 ~ 0.5 MPa	1.0 kPa	
			ITV105	0.005 ~ 0.9 MPa	1.8 kPa	
	Series ITV2000 1500 l/min (ANR)* 		ITV201	0.005 ~ 0.1 MPa	0.2 kPa	
			ITV203	0.005 ~ 0.5 MPa	1.0 kPa	
			ITV205	0.005 ~ 0.9 MPa	1.8 kPa	
			ITV209	-1.3 ~ -80 kPa	0.16 kPa	
	Series ITV3000 4000 l/min (ANR)* 		ITV301	0.005 ~ 0.1 MPa	0.2 kPa	
			ITV303	0.005 ~ 0.5 MPa	1.0 kPa	
			ITV305	0.005 ~ 0.9 MPa	1.8 kPa	
	Series ITVX 	Current DC 4 to 20 mA (Sink type) Current DC 0 to 20 mA (Sink type) Voltage DC 0 to 5 V Voltage DC 0 to 10 V	ITVX2030	0.01 ~ 3.0 MPa	60 kPa	Linearity Within ±1 % F.S. Hysteresis 1 % or less F.S.
	Series ITVH 	Current DC 4 to 20 mA (Sink type) Current DC 0 to 20 mA (Sink type) Voltage DC 0 to 5 V Voltage DC 0 to 10 V	ITVH2020	0.2 ~ 2.0 MPa	40 kPa	Linearity Within ±1 % F.S. Hysteresis 1 % or less F.S.

* Pressure range 0.9 MPa. Supply pressure 1.0 MPa. Set pressure 0.6 MPa.

Digital Pressure Switch
Series Variations

Individual sensor and controller type

	Sensor					Controller	
Model	PSE53☐	PSE54☐	PSE56☐	PSE570	PSE550	PSE300	PSE200
Fluid	Air		General fluids		Air	Sensor input amount: 1 input	Sensor input amount: 4 inputs
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 1 MPa -100 to 100 kPa 0 to 500 kPa	0 to 2 kPa (and specials)	-0.1 to 1 MPa -50 to 500 kPa 10 to -101 kPa -0.2 to 2 kPa -100 to 100 kPa -10 to 100 kPa	-0.1 to 1 MPa 10 to -101 kPa -101 to 101 kPa -10 to 100 kPa
Power supply voltage	12 to 24 V DC ±10 % (Ripple p-p 10 % or less)						
Temperature characteristics (25 °C reference)	±2 % F.S. (0 to 50 °C)		±2 % F.S. (0 to 50 °C) ±3 % F.S. (–10 to 60 °C)		±3 % F.S. (0 to 50 °C)	±0.5 % F.S. (0 to 50 °C)	
Repeatability	±1 % F.S.	±0.2 % F.S.			±0.3 % F.S.	±0.1 % F.S. ±1 digit	
Hysteresis						Hysteresis mode: Variable Window comparator mode: Variable	Hysteresis mode: Variable Window comparator mode: Fixed (3 digits)
Output	Analogue voltage output		Analogue voltage output Analogue current output			NPN/PNP open collector 2 outputs Analogue voltage output Analogue current output	NPN/PNP open collector 1 CH: 2 outputs 2 to 4 CH: 1 output each
Display (Resolution)						2-colour display (0.1 %)	1-colour display (0.1 %)
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

Digital Pressure Switch
Series Variations

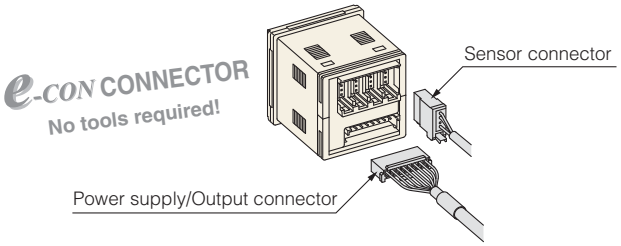
Integrated sensor and controller type

Model	ZSE10 ISE10	ZSE30A ISE30A	ZSE40A ISE40A	ISE70	ISE75 ISE75H	ZSE80 ISE80
Fluid	Air				General fluids	
Calibration method	Push-button calibration					
Set pressure range	-0.1 to 1 MPa 0 to -101 kPa -100 to 100 kPa	-105 to 105 MPa 10 to -105 KPa -0.105 to 1.05 MPa	-0.1 to 1 MPa 0 to -101.3 kPa -100 to 100 kPa	-0.1 to 1 MPa	0.4 to 10 MPa 0.5 to 15 MPa	-110 to 110 Kpa 10 to -111 KPa -0.105 to 1.1 MPa -0.105 to 2.2 MPa
Power supply voltage	12 to 24 V DC ±10 % (Ripple 10 % or less)					
Temperature characteristics (25 °C reference)	±2 % F.S. (–5 to 50 °C)	±2 % F.S. (5 to 50 °C)	±2 % F.S. (–5 to 50 °C)	±2 % F.S. (0 to 50 °C)	±3 % F.S. (0 to 50 °C)	
Repeatability	±0.2 % F.S. ±1 digit	±0.2 % F.S. ±1 digit	±0.2 % F.S. ±1 digit	±0.5 % F.S.		±0.2 % F.S. ±1 digit
Hysteresis	Hysteresis mode: Variable Window comparator mode: Variable					
Output	NPN/PNP open collector Analogue voltage output	NPN/PNP open collector Analogue voltage output Analogue current output		1 setting NPN/PNP 2 setting NPN/PNP open collector PNP open collector		NPN/PNP open collector Analogue voltage output Analogue current output
Display (Resolution)	1-colour display (0.1 %)	2-colour display (0.1 %)		2-colour display (1 %)		2-colour display (0.1 %)
Enclosure	IP40	IP40	IP65	IP67		IP65
Note	Panel mounting possible DIN rail moutable Selectable pressure unit Anti-chattering function Display calibration function Power saving mode Copy function	Panel mounting possible Selectable pressure unit Anti-chattering function Display calibration function Power saving mode Copy function	Panel mounting possible Selectable pressure unit Anti-chattering function Auto shift function Power saving mode Copy function	Selectable pressure unit Anti-chattering function Display calibration function		R thread, URJ, TJS Panel mounting possible Selectable pressure unit Anti-chattering function Auto shift function Display calibration function Power saving mode Eco mode

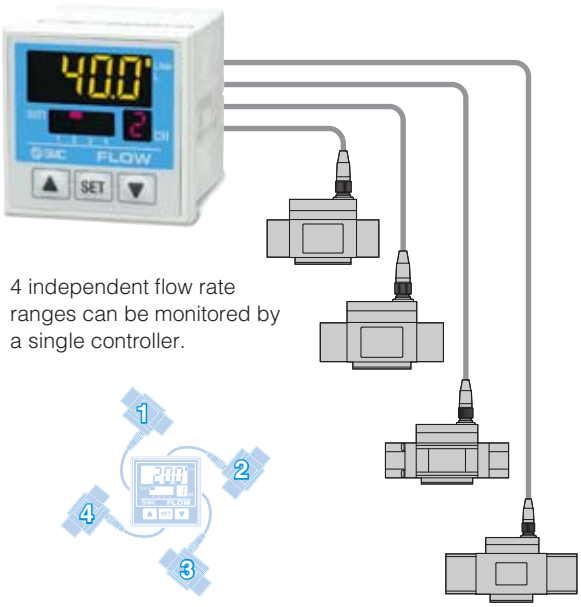
Digital Flow Switch
Series Variations

- 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 analogue outputs
- Switching from instantaneous flow rate display to accumulated flow display is possible
- Two independent flow rate settings are possible
- Water resistant construction conforming to IP65

Connection



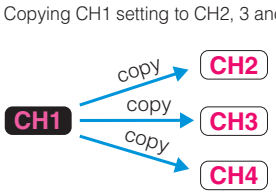
A single controller can monitor the flow rate of 4 different sensors



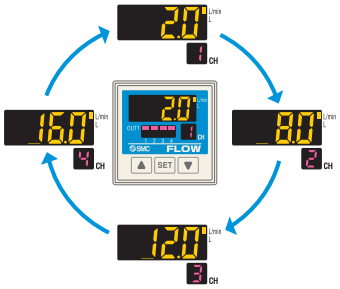
4 independent flow rate ranges can be monitored by a single controller.

Function

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



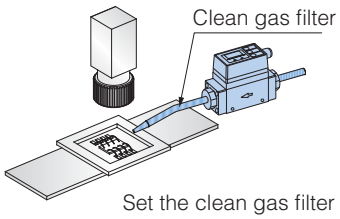
Channel scan function
Allows constant monitoring of the displayed pressure value for each channel.



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

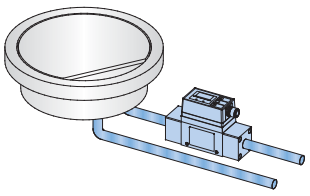
Application Examples

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

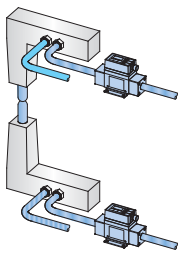


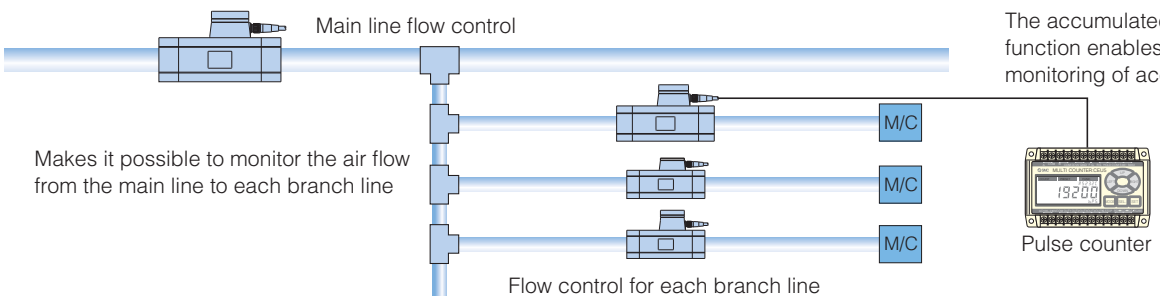
Set the clean gas filter on the outlet side piping of the flow switch.

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.

Pulse counter

Digital Flow Switch
Series Variations

Series PFM For Air, N_2, Ar and CO_2

Flow rate measurement range [l/min]	Integrated type	Remote type	
		Sensor unit	Display unit
0.2 to 10 (0.2 to 5)	PFM710	PF2A510	PFM3□□
0.5 to 25 (0.5 to 12.5)	PFM725	PF2A525	
1 to 50 (1 to 25)	PFM750	PF2A550	
2 to 100 (2 to 50)	PFM711	PF2A511	

( ): In the case of CO_2

Series PFMB For Air and N_2

Flow rate measurement range [l/min]	Integrated type
2 to 100	PFMB7201
5 to 500	PFMB7501
10 to 1000	PFMB7102
20 to 2000	PFMB7202

Series PFMC For Air and N_2

Flow rate measurement range [l/min]	Integrated type
5 to 500	PFMC7501
10 to 1000	PFMC7102
20 to 2000	PFMC7202

Series PFMV For Dry Air

Flow rate measurement range [l/min]	Remote type	
	Sensor unit	Display unit
0 to 0.5	PFMV505	PFMV30□
0 to1	PFMV510	
0 to 3	PFMV530	
-0.5 to 0.5	PFMV505F	
-1 to 1	PFMV510F	
-3 to 3	PFMV530F	

Digital Flow Switch
Series Variations

Series PF2A For Air

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

Series PF2W For Water

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☐	

Series PF2D For Deionized Water and Chemicals

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		

Series PF3W For Water

Flow rate measurement range [l/min]	Integrated type	Remote type	
		Sensor unit	Display unit
0.5 to 4	PF3W704	PF3W504	PF3W30
2 to 16	PF3W720	PF3W520	
5 to 40	PF3W740	PF3W540	
10 to 100	PF3W711	PF3W511	
50 to 250	PF3W721	PF3W521	

Series PF3W For Water (PVC Piping)

Flow rate measurement range [l/min]	Integrated type	Remote type	
		Sensor unit	Display unit
10 to 100	PF3W711-U25	PF3W511-U25	PF3W30
30 to 250	PF3W721-U30	PF3W521-U30	

Ionizer Bar Type
Series IZS40/41/42

- Standard type Series IZS40.
  Simple operation: Only power ON/OFF required.
- Feedback sensor type Series IZS41.
  Feedback sensor enables the rapid elimination of static electricity.
  - Energy saving run mode.
  - Continuous neutralization run mode.
- Dual AC type Series IZS42.
  Reduced potential amplitude: 25 V or less.
- Reduction of adjustment and maintenance time using an auto balance sensor:
  - Built-in type (Standard): The sensor is installed within the ionizer body and may be mounted anywhere.
- Setting ionizer with remote control.
  - Can recognize and control up to 16 ionizers through address setting.
- Low maintenance electrode cartridges.
- Transition wiring may be used.

Specifications

Ionizer model		IZS40	IZS41-□□ (NPN)	IZS41-□□P (PNP)	IZS42-□□ (NPN)	IZS42-□□P (PNP)
Ion generation method		Corona discharge type				
Electrode voltage type		AC, DC	AC, Sensing AC, DC		Dual AC	
Electrode voltage		±7000 V			±6000 V	
Ion balance Note)		±30 V				
Air purge	Fluid	Air (Clean dry air)				
	Operating pressure	0.5 MPa or less				
	Proof pressure	0.7 MPa				
	Connecting tube O.D.	Ø 6, Ø 8, Ø 10				
Current consumption		330 mA or less	440 mA or less (Sensing AC, Automatic run/Manual run: 480 mA or less)		700 mA or less (Automatic run/Manual run: 740 mA or less)	
Power supply voltage		24 V DC ±10 % (100 to 240 V AC: AC adapter option)				
Power supply voltage in transition wiring		—	24 V DC to 26.4 V DC			
Input signal	Discharge stop signal	—	Connect to GND Voltage range: 5 V DC or less Current consumption: 5 mA or less	Connect to +24 V Voltage range: 19 V DC to power supply voltage Current consumption: 5 mA or less	Connect to GND Voltage range: 5 V DC or less Current consumption: 5 mA or less	Connect to +24 V Voltage range: 19 V DC to power supply voltage Current consumption: 5 mA or less
	Electrode contamination detection signal					
Output signal	Maintenance signal	—	Max. load current: 100 mA Voltage drop 1 V or less (at 100 mA load current) Max. applied voltage: 26.4 V DC	Max. load current: 100 mA Voltage drop 1 V or less (at 100 mA load current)	Max. load current: 100 mA Voltage drop 1 V or less (at 100 mA load current) Max. applied voltage: 26.4 V DC	Max. load current: 100 mA Voltage drop 1 V or less (at 100 mA load current)
	Error signal					
Function		High voltage error detection (Ion discharge stops if error found)	Ion balance control with the built-in sensor, electrode contamination detection, High voltage error detection (ion discharge stops if error found), ion discharge stop input, transition wiring, remote control (sold separately), external sensor connection			
Effective operating distance		50 to 2000 mm	50 to 2000 mm (Sensing AC mode: 200 to 2000 mm, Manual run/Automatic run: 100 to 2000 mm)		50 to 2000 mm (Manual run/Automatic run: 100 to 2000 mm)	
Ambient and fluid temperature		0 to 40 °C				
Ambient humidity		35 to 80 % Rh (with no condensation)				
Material		Ionizer cover: ABS, Electrode cartridge: PBT, Electrode: Tungsten, Single crystal silicon				
Impact resistance		100 m/s^2				
Standards/Directive		CE (EMC Directive: 2004/108/EC)				

Note) Conditions: installation distance = 300 mm, air purge used

Ionizer Fan Type
Series IZF21/31

- Extensive and rapid static neutralisation.
- Ion balance: ±5 V.
- Optional adjustable louver to adjust the static neutralisation area.
- Improved performance and easier maintenance through several functions and features:
  - Functions: averaging function, automatic balance adjustment function, optional automatic cleaning function, flow rate adjustment function.
  - Tool-less replaceable emitter cartridge.
  - Optional filter to prevent the entry of foreign matter to the motor and to avoid short-circuit between emitters.
- Modular, compact and slim design.

Specifications

Model		IZF21-☐	IZF21-P	IZF31-☐	IZF31-P
		NPN	PNP	NPN	PNP
Maximum air flow		1800 l/min		4400 l/min	
Applied voltage		±5 kV			
Ion generation method		Corona discharge type			
Method of applying voltage		DC type			
Offset voltage (Ion balance) Note)		±5 V			
Power supply voltage		24 V DC ±10 %			
Current consumption		0.9 A or less		1.3 A or less	
Input signal	Ionizer stop signal	Connect with 0 V Voltage range: 5 V DC or less Current consumption: 5 mA or less	Connect with +24 V Voltage range: 19 V DC to power supply voltage Current consumption: 5 mA or less	Connect with 0 V Voltage range: 5 V DC or less Current consumption: 5 mA or less	Connect with +24 V Voltage range: 19 V DC to power supply voltage Current consumption: 5 mA or less
	Cleaning input signal				
Output signal	Maintenance signal	Maximum load current: 100 mA Residual voltage: 1 V or less (Load current: 100 mA) Maximum applied voltage: 26.4 V DC	Maximum load current: 100 mA Residual voltage: 1 V or less (Load current: 100 mA)	Maximum load current: 100 mA Residual voltage: 1 V or less (Load current: 100 mA) Maximum applied voltage: 26.4 V DC	Maximum load current: 100 mA Residual voltage: 1 V or less (Load current: 100 mA)
	Error signal				
Ambient temperature		Operating: 0 to 50 °C Stored: -10 to 60 °C			
Ambient humidity		Operating, Stored: 35 to 80 % RH (No condensation)			
Material		Case: ABS/PBT/Stainless steel Emitter: Tungsten			
Impact resistance		100 m/s^2			
Applicable standard/directive		CE (EMC directive: 2014/30/EC)			

Note) Based on EN 61340-5-1:2007 standards

Ionizer Fan Type
Series IZF10

- Ion balance ±13V
- Compact design and lightweight
- Two types available:
  - rapid deionizing type: 1.5 seconds deionizing time
  - low noise type: 29 dB(A)
- Alarm functions: high-voltage error, electrode needle contamination detector

Specifications

Ionizer model	IZF10-☐☐	IZF10-L-☐☐	IZF10-P-☐☐	IZF10-LP-☐☐
Ion generation method	Corona discharge type (DC)			
Power supply voltage	24 V DC ±10 %			
Output	NPN open collector output		PNP open collector output	
Air flow	0.66 m^3/min	0.46 m^3/min	0.66 m^3/min	0.46 m^3/min
Power consumption	6.1 W or less	3.7 W or less	6.6 W or less	4.8 W or less
Ambient temperature	Operation: 0 to 50 °C, Storage: -10 to 60 °C			
Ambient humidity	Operation, Storage: 35 to 80 % RH (No condensation)			
Weight	280 g (With bracket: 360 g)			

Ionizer Nozzle Type
Series IZN10

- Ion balance ±15 V (±10 V with energy saving nozzle)
- Compact: high voltage source integrated in the body
- 3 types of nozzle to adapt several applications:
  - energy saving static electricity elimination nozzle
  - high flow rate nozzle
  - Female threads for piping noozle
- Slim design
- Easy maintenance: possibility of cleaning electrode without losing the assembly angle
- External switch input function (2 inputs)
- Electrode needle contamination detector

Specifications

Ionizer model		IZN10-□□ (NPN specification)	IZN10-□□P (PNP specification)
Ion generation method		Corona discharge type	
Method of applying voltage		High frequency AC type	
Discharge output Note 1)		2,500 V	
Ion balance Note 2)	Energy saving static electricity elimination nozzle	Within ±10 V	
	High flow rate nozzle	Within ±15 V	
Ozone generation Note 3)		0.03 ppm (0.05 ppm for energy saving static electricity elimination nozzle)	
Air purge	Fluid	Air (Clean dry air)	
	Operating pressure Note 4)	0.05 MPa to 0.7 MPa	
	Connecting tube size	Ø 6 / Ø 1/4 inch	
Power supply voltage		24 V DC ±10 %	
Current consumption		80 mA	
Input signal	Discharge stop signal	Connected to GND (ON voltage: 0.6 V or less) Current consumption: 5 mA or less	Connected to +24 V (ON voltage: Between +19 V and power supply voltage) Current consumption: 5 mA or less
	Reset signal		
	External switch signal		
Output signal	Discharge signal	Max. load current: 40 mA Residual voltage: 1 V or less (load current at 40 mA) Max. applied voltage: 28 V DC	Max. load current: 40 mA Residual voltage: 1 V or less (load current at 40 mA)
	Error signal		
	Maintenance signal		
Effective static electricity elimination distance		20 to 500 mm	
Ambient and fluid temperature		0 to 55 °C	
Ambient humidity		35 to 65 % RH	
Material		Housing: ABS, Stainless steel Nozzle: Stainless steel Electrode needle: Tungsten	
Vibration resistance		Durability: 50 Hz, Amplitude: 1 mm, XYZ each 2 hours	
Shock resistance		10 G	
Weight		120 g	
Standards/Directive		CE (EMC Directive: 2004/108/EC) UL U.S. Standard for Electrostatic Air Cleaner, UL867, fourth edition CSA Canadian Standard for Electrostatic Air Cleaner, CAN/CSA C22.2 No. 187-M1986	

Note 1) Measured with a probe of 1000 MΩ and 5 pF.
Note 2) Measured with a distance of 100 mm between the charged object and the ionizer at an air purge pressure of 0.3 MPa.
Note 3) Value above background level, measured with a distance of 300 mm from the front of the nozzle at an air purge pressure of 0.3 MPa.
Note 4) Static electricity cannot be eliminated without an air purge.
Also, failure of the air purge can increase internal ozone condensation, adversely affecting the ioniser and peripheral equipment. Be sure to perform an air purge while energising the ioniser.

Desktop Duster Box
Series ZVB

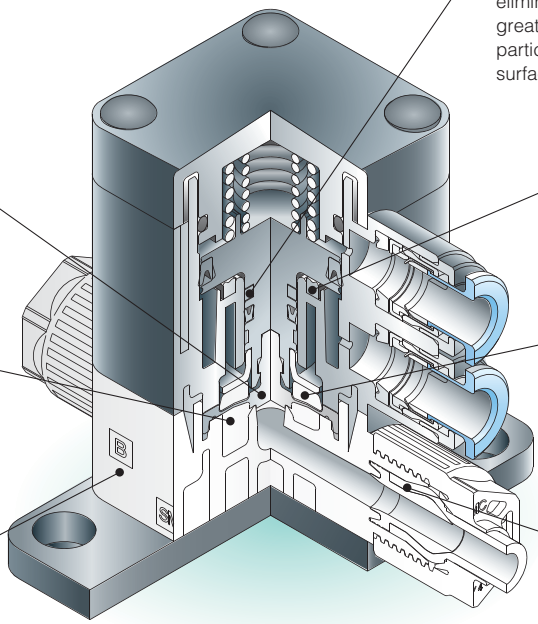
- Integration of three processes – static neutralisation, dust removal and dust collection – in a single box by using nozzle type ionizers.
  - Efficient static neutralisation with a diffusion-type nozzle.
  - Dust removal with dedicated nozzles for the air blow.
  - Dust collection with a maintenance-free pneumatic dust collector.

  All this thanks to a structure that separates ion blow and air blow.
- Ion balance: ±10 V.
- Use of emitters that are easy to remove, replace and clean.
- Optional photoelectric sensor reflecting plate for automatic workpiece detection and immediate start of the operation.

Model	ZVB20-B	ZVB40-B
Ionizer type	Nozzle type	
Number of ionizers	1	2
Ion generation method	Corona discharge type	
Method of applying voltage	High frequency AC type	
Discharge time	0.3 s (1000 V→100 V)	
Offset voltage	Within ±10 V (Static neutralisation distance: 100 mm from the nozzle)	
Fluid	Air (Dry air)	
Operating pressure range	0.2 to 0.8 MPa	
Power supply voltage	85 to 264 VAC 50 / 60 Hz (when using the exclusive AC adaptor)	
Operating time setting	Continuous/Timer [2 / 5 / 10 s]	
Additional air blow setting	Continuous blow/Pulse blow [50 / 100 ms intervals]	
Operating temperature range	0 to 55 °C Note 1)	
Air consumption Note 2)	420 l/min (ANR)	800 l/min (ANR)
Weight Note 3)	5.1 kg	9.9 kg
Standards/Directive	CE (EMC Directive: 2004/108/EC)	

Note 1) No freezing
Note 2) When supply pressure to the dust collector is set to 0.3 MPa (ZVB20) / 0.4 MPa (ZVB40) and additional air blow supply pressure to 0.2 MPa. Based on SMC's measuring conditions.
Note 3) Overall weight excluding optional parts

High Purity Chemical Valve
Series LV□



- Stable Sealing Surface
  Guide ring

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

- 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.

- Low particle generation
  Piston bumper

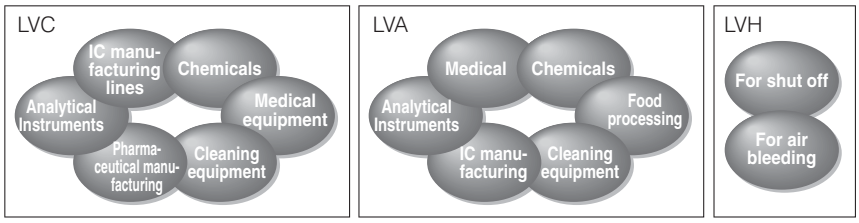
  A bumper absorbs piston momentum to minimize impact-induced particles.

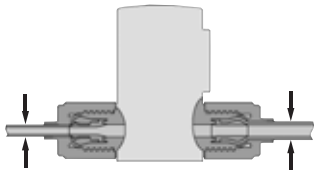
- Back-pressure resistance and long life
  Buffer

  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

Main applications and fields





- Eliminates problems due to over tightening
  - Special locking mechanism
  - High flexural strength (tubing supports)

Large Bore Size
Series LVC80-Z
Series LVH80M-Z

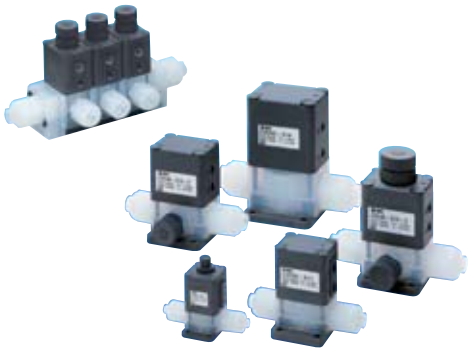
- Large bore size
- Air operated: Series LVC80-Z
- Manually operated: Series LVH80M-Z
- Applicable tubing O.D.: 1 1/4", 1 1/2"
- Height: 189 mm
- Lower pilot pressure 0.4 to 0.6 MPa

For organic solvents
Series LVA-$\frac{D}{T}$G-$\frac{AD}{AN}$

Series LVH-$\frac{D}{T}$G-$\frac{AD}{AN}$

- For organic solvents
- Air operated: Series LVA-$\frac{D}{T}$G-$\frac{AD}{AN}$
- Manually operated: Series LVH-$\frac{D}{T}$G-$\frac{AD}{AN}$
- Body: SUS; Actuator: ADC; Buffer: FKM/EPDM (selectable)
- Can be specified for EP polishing (Made to Order)
- Fitting type: Double-ferrule fittings, metal gasket seal fittings, tubing extension
- Not subject to list control under the Export Trade Control Order

Integral Fittings
Series LVC



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

3 port added

Threaded Ports
Series LVA

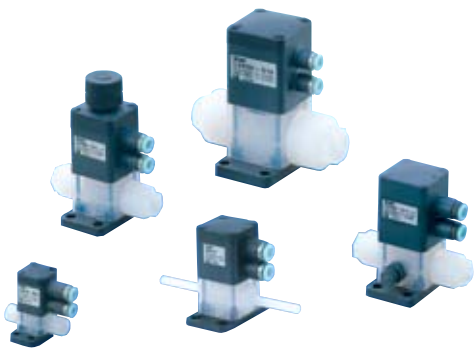
- Diaphragm material PTFE, EPR, NBR are selectable
- Body material: New PFA /Stainless steel/PPS

3 port added

Manual Operation
Series LVH

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

Compact type
Series LVD



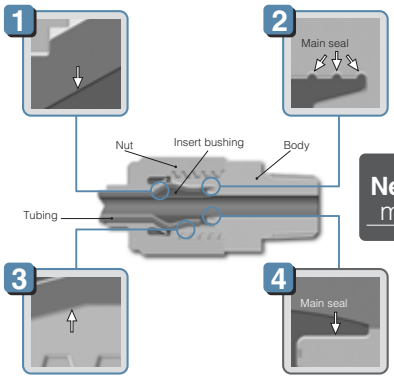
- Compact type is introduced as a new series to complement conventional Series LVC with integral fittings
- Mounting base dimensions conform to SEMI Standard, F65-1101 (Except for LVD10)
- Dimension across inlet/outlet ports: Reduced by up to 29 %
- Body: New PFA / Diaphragm: PTFE / Actuator section: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

Integral Tubing
(construction)

HYPER FITTING®
Series LQ1•LQ2•LQ3

High Purity Fluoropolymer Fittings & Tubing
Series LQ1•LQ2
SMC high purity series responding to the latest demands in process control

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

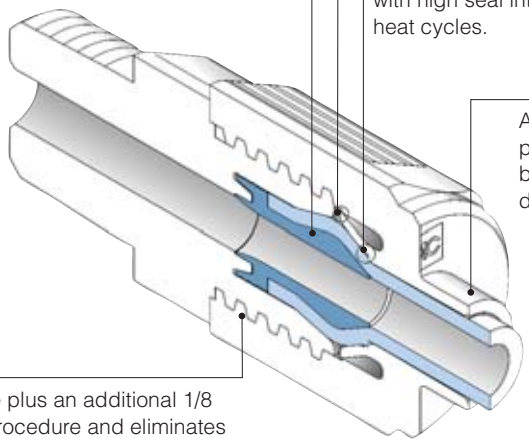


New PFA material

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.



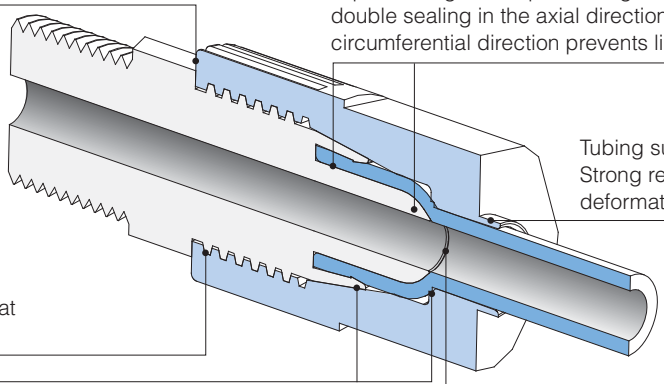
Close adhesion of fittings and tubing facilitates excellent flow through characteristics with minimal liquid residual

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

Series LQ3
Collet Type/LQ3

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

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



Tubing supports:
Strong resistance to tube bending and deformation.

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

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

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

LQ_2^1 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"	Ø 3	Ø 4	Ø 6	Ø 8	Ø 10	Ø 12	Ø 19	Ø 25	1/8"	3/16"	1/4"	3/8"	1/2"	3/4"	1"
Connector LQ_2^1H	Male		1	–	○	–	–	–	–	–	○	○	–	–	–	–	–	–	○	–	–	–	–	–	–
	Female		2	–	○	○	–	–	–	–	–	●	○	–	–	–	–	–	●	●	○	–	–	–	–
Elbow LQ_2^1L	Male		3	–	–	○	○	–	–	–	–	–	●	●	○	–	–	–	–	–	●	○	–	–	–
	Female		4	–	–	–	○	○	–	–	–	–	–	–	●	○	–	–	–	–	–	●	○	–	–
Run tee LQ_2^1R	Male		5	–	–	–	–	○	○	–	–	–	–	–	–	●	○	–	–	–	–	–	●	○	–
	Female		6	–	–	–	–	–	○	○	–	–	–	–	–	–	●	○	–	–	–	–	–	●	○
Branch tee LQ_2^1B	Male																								
	Female																								
Union elbow LQ_2^1E			1	○	–	–	–	–	–	–	○	○	–	–	–	–	–	–	○	–	–	–	–	–	–
Union tee LQ_2^1T			2	○	–	–	–	–	–	–	–	●	○	–	–	–	–	–	●	●	○	–	–	–	–
Panel mount union LQ_2^1P			3	○	–	–	–	–	–	–	–	–	●	●	○	–	–	–	–	–	●	○	–	–	–
Union LQ_2^1U			4	○	–	–	–	–	–	–	–	–	–	–	●	○	–	–	–	–	–	●	○	–	–
Union flange LQ1F			5	○	–	–	–	–	–	–	–	–	–	–	–	●	○	–	–	–	–	–	●	○	–
			6	○	–	–	–	–	–	–	–	–	–	–	–	–	●	○	–	–	–	–	–	●	○

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

Item \ Model		LQ1 Series						LQ2 Series			
		LQ1□10	LQ1□20	LQ1□30	LQ1□40	LQ1□50	LQ1□60	LQ2□20	LQ2□30	LQ2□40	LQ2□50
Maximum operating pressure (at 20 °C)		1.0 MPa						1.0 MPa			
Operating temperature		0 to 200 °C						0 to 200 °C			
Applicable tubing size	mm size	Ø 3 to Ø 25						Ø 4 to Ø 19			
	inch size	1/8"~1"						1/8"~3/4"			

Fluoropolymer tubing
Series TL/TIL

• Material: Super PFA

FEP tubing
Series TH/TIH

• Material: FEP

Custom design temperature control and cooling water related equipment

Thermo-Chiller
Series HRS
Circulating Fluid Temperature Controller

- Internationtal standard: CE. UL
- Cooling capacity (50 Hz) 1100 W/1700 W/2100 W/2600 W/ 4700 W/4900 W
- Lightweight 43 kg / 73 kg
- Temperature stability: ±0.1 °C
- Temperature range setting: 5 to 40 °C
- Options
  - With earth leakage breaker
  - With automatic water fill function
  - High pressure pump
  - DI water applicable

Thermo-Chiller (Standard type)
Series HRS100/150
Circulating Fluid Temperature Controller

- No heater required, circulating fluid is heated using heat exhausted by refrigerating circuit
- Cooling capacity 9 kW, 13 kW
- Max. ambient temperature 35 °C
- Temperature stability ±1.0 °C
- Set temperature range 5 to 35 °C
- Low-noise design: 70 dB(A)
- Outdoor installation: IPX4

Thermo-chiller Large type (Inverter type)
Series HRSH
Circulating Fluid Temperature Controller

- Outstanding energy saving effect with the triple inverter
- Cooling capacity 10 kW, 15 kW, 20 kW, 25 kW
- Max. ambient temperature 45 °C
- Temperature stability ±0.1 °C
- Maintenance free pump
- Low-noise design (max. operation noise 66 dB)

Thermo-Chiller (Basic type)
Series HRSE
Circulating Fluid Temperature Controller

- Simple function and performance Thermo-chiller of the basic type.
- Large energy saving by triple control! Power consumption 33 % energy saving
- Cooling capacity 1000 W, 1400 W, 1900 W
- Temperature stability ±2.0 °C
- Set temperature range 10 to 30 °C
- Compact/Lightweight 35 kg
- Maintenance free: Magnet pump
- Low-noise design: 55 dB (A)

Thermo-con
Series HECR
Peltier-Type Chiller

- Montable in a 19-inch rack. Saves space by mounting multiple equipment together in a rack
- Cooling capacity 200 W, 800 W, 1000 W
- Temperature stability ±0.01 to 0.03 °C
- Set temperature range 10 to 60 °C
- Learning control function
- Low vibration, low noise

Thermo-con
Series HEC
Circulator Electronic Cooling / Heating Type

- Temperature stability: ±0.01 to 0.03 °C
- Set temperature range: 10 to 60 °C
- Cooling capacity: 600 W, 1200 W
- Type of circulating fluid: Water, Fluorinated chemicals
- International standards: CE, UL
- This originally developed heat exchanger achieves a large cooling capacity with a compact body

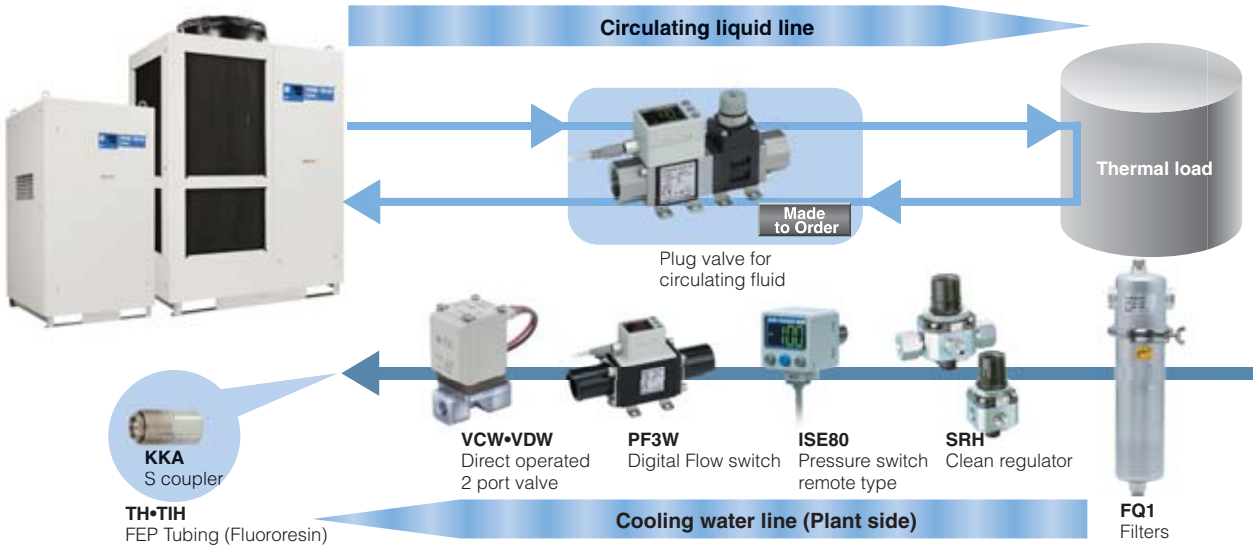
Thermoelectric Bath
Series HEB
Constant Temperature Bath Electronic Cooling / Heating Type

- Set temperature range: –15 °C to 60 °C
- Temperature stability: ±0.01 °C
- Type of fluid: Water, Fluorinated chemicals
- International standards: CE, UL
- Low temperature distribution is achieved by stirring fluid up-and-down and around the tank

Peltier-Type Thermoelectric Bath Lineup
Series INR-244

- Set temperature range: 0 to 60 °C
- Temperature stability: ±0.03 °C
- Cooling capacity 140 W, 220 W, 320 W
- Type of fluid: Water, Ethylene glycol aqueous solution, Fluorinated fluid
- Tank capacity: 10 to 39 L
- International standards: CE, UL

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



Applications for Thermo-Chiller/Thermo-con

• Medical devices

- X-Ray Tube cooling / digital X-ray-detector / CT
- MRI
- Lithotripter
- Laser applications

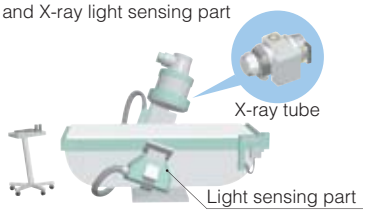
• Analyser

- Clinical Anlalyser
- Spectrometry
- Incubator
- Material Analyser (i.e. Chromatography)
- Electron Microscope

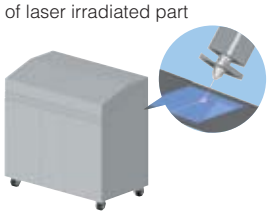
• Pharma / Biotechnology

- Packaging
- Labaratory
- UV-Sterilisation
- Bioreactors
- Coating / Plasma Generators

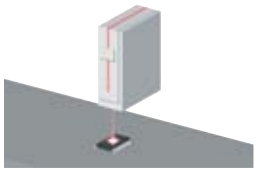
X-ray (digital) instrument
- Temperature control of X-ray tube and X-ray light sensing part



Laser machining
- Cooling of laser irradiated part



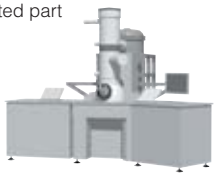
Laser marker
- Cooling of laser irradiated part



Atomising device (food and cosmetics)
- Temperature control of sample and device

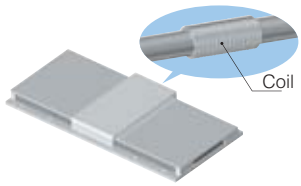
UV curing device (printing, painting, bonding and sealing)
- Cooling of UV lamp

Electronic microscope
- Temperature control of electron-beam irradiated part



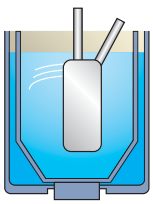
Ultrasonic wave inspection machine
- Temperature control of ultrasonic wave laser part

Linear motor
- Temperature control of moving coil



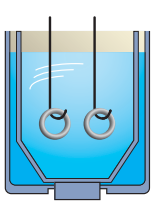
Applications for Thermo-Bath

Semiconductor manufacturing



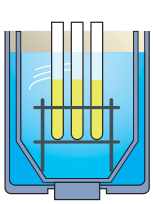
Evaporation of chemicals for MOCVD
Temperature control of diffusion gas

Various tests



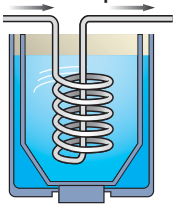
Thermal test with immersion

Physical and chemical analysis



Temperature control of various samples,materials and parts

Various chemical processes



Indirect temperature control of chemicals and liquids with high viscosity

Vacuum Equipment

Air suction filter
Series ZFC

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

Model

Model		Port size (Applicable tubing O.D.) IN side, OUT side	Recommended air flow [l/min] (ANR)	Weight [g]
Metric size	ZFC050-02	Ø 2	2	4.9
	ZFC050-23	Ø 3.2	7	4.3
	ZFC050-04	Ø 4	10	
	ZFC100-04	Ø 4	10	11.5
	ZFC100-06	Ø 6	20	
	ZFC200-06	Ø 6	30	21.5
	ZFC200-08	Ø 8	50	
	ZFC75	Ø 8	70	20.0
	ZFC76	Ø 10	80	25.0
	ZFC77	Ø 12	100	
Inch size	ZFC051-01	Ø 1/8"	7	4.3
	ZFC051-03	Ø 5/32"	10	
	ZFC101-03	Ø 5/32"	10	11.5
	ZFC101-07	Ø 1/4"	20	
	ZFC201-07	Ø 1/4"	30	21.5
	ZFC201-09	Ø 5/16"	50	
	ZFC7E	Ø 5/16"	70	20.0
	ZFC7F	Ø 3/8"	80	25.0

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 (5 µm for ZFC7□)
Element differential pressure resistance	[ZFC10□, 20□] 0.15 MPa [ZFC05□, 7□] 0.10 MPa

Air suction filter
Series ZFB

Model

Model		Port size (Applicable tube O.D.) IN side, OUT side	Recommended air flow [l/min] (ANR)	Weight [g]
Metric size	ZFB100-04	Ø 4	10	22
	ZFB100-06	Ø 6	20	22
	ZFB200-06	Ø 6	30	30
	ZFB200-08	Ø 8	50	30
	ZFB300-08	Ø 8	75	39
	ZFB300-10	Ø 10	75	39
Inch size	ZFB101-05	Ø 3/16"	20	22
	ZFB101-07	Ø 1/4"	20	22
	ZFB201-07	Ø 1/4"	30	30
	ZFB301-11	Ø 3/8"	75	40
	ZFB401-13	Ø 1/2"	100	62

Specifications

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

Air suction filter
Series ZFA

Model

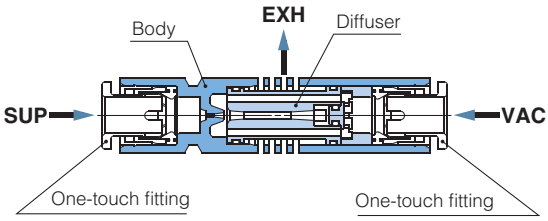
Model	Port size	Recommended air flow [l/min] (ANR)	Weight [kg]
ZFA 100	1/8	50	0.14
ZFA 200	1/4	200	0.19

Specifications

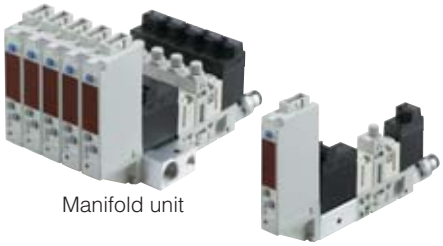
Fluid	Air/Nitrogen
Operating pressure range	-100 to 0 kPa
Proof pressure	0.5 MPa
Operating temperature range	5 to 60 °C
Filtration	30 µm
Element differential pressure resistance	0.15 MPa

Vacuum Ejector, In-line type
Series ZU
Space-saving ejector that can be installed in-line with the piping

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



Compact Vacuum Unit
Series ZB

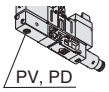
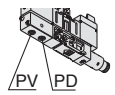


Manifold unit

Single unit

- Compact and lightweight: can be mounted on moving parts.
- High speed absorption: direct operated supply valve and reduction of internal volume.
- Energy saving design: lower supply pressure.
- Digital vacuum switch with copy function available as option.

Single units (N.C. supply valve, N.C. release valve, 24 V DC)

Nozzle Ø [mm]	Part number	Port specification	Port		Suction cap. [l/min]	Max. Vacuum pressure
			Air (PV, PD)	Vacuum (V)		
0.4	ZB0411-K15L-C4	 PV, PD	M5 thread depth 4	Ø 4 mm	3.5	-90 kPa
0.6	ZB0611-K15L-C4				7	
0.4	ZB0421-K15L-C4	 PV PD			3.5	
0.6	ZB0621-K15L-C4				7	

Note 1) Models with digital vacuum switch available upon request
Note 2) Manifold versions available upon request

Vacuum unit
Series ZK2

Manifold unit

Single unit

- Energy saving switch turns off supply valve when vacuum level is reached reducing air consumption. Vacuum level is kept by check valve. Supply valve is turned on again when the vacuum lowers to the set pressure.
- Two-stage ejector reduces air consumption and increases suction flow rate.
- Supply valve with self-holding function.
- Interlink between supply valve and release valve.

Ejector module - Single units (N.C. supply valve, N.C. release valve, 24 V DC)

Nozzle Ø [mm]	Part number	Switch output	Switch pressure range [kPa]	Suction cap. [l/min]	Max. vacuum pressure
0.7	ZK2A07K5CL-06	2 x PNP	0 ~ -101	29	-91 kPa
1.0	ZK2A10K5CL-06	2 x PNP		44	
1.2	ZK2A12K5CL-08	2 x PNP		61	
1.5	ZK2A15K5CL-08	2 x PNP		67	

Ejector module - Single units (N.C. supply valve, N.C. release valve, 24 V DC) with energy saving vacuum switch

Nozzle Ø [mm]	Part number	Switch output	Switch pressure range [kPa]	Suction cap. [l/min]	Max. vacuum pressure
0.7	ZK2A07K5RW-06	2 x PNP	100 ~ -100	29	-91 kPa
1.0	ZK2A10K5RW-06	2 x PNP		44	
1.2	ZK2A12K5RW-08	2 x PNP		61	
1.5	ZK2A15K5RW-08	2 x PNP		67	

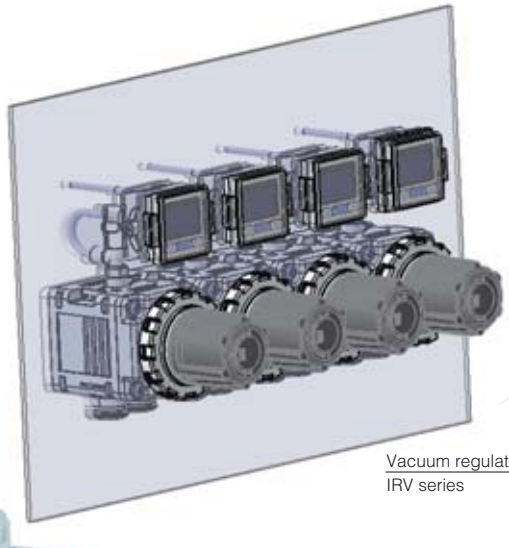
Note) Other sizes, options, manifold and vacuum pump system versions available upon request.

Vacuum Regulator
Series IRV

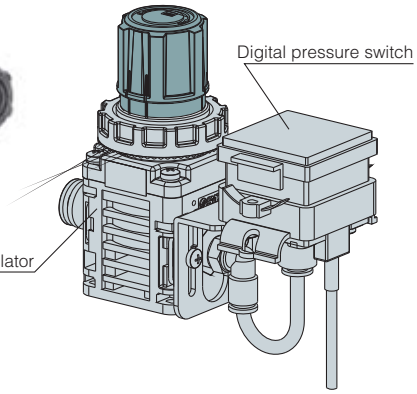
- Single sided connections series. For ease of installation and panel mounting
- Weight reduced by 20 % (Compared with the existing IRV2000 with IRV20 fitting)
- Maximum flow (Over twice the flow of the existing models)
- 140 l/min (ANR). Conventional model IRV1000: 60 l/min (ANR)
- 240 l/min (ANR). Conventional model IRV2000: 100 l/min (ANR)

IRV10 series

IRV20 series



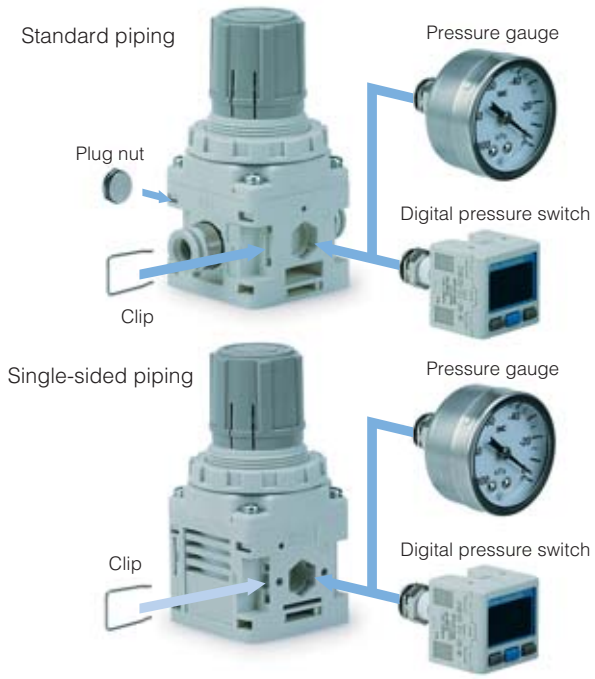
Integrated digital pressure switch for panel mounting (Made to Order)



Single-sided piping

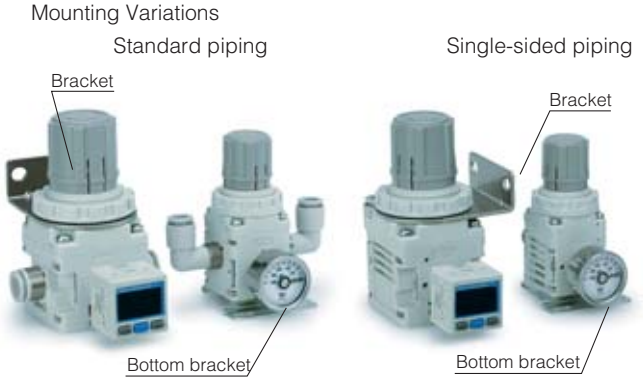
Standard piping

• Easy to attach/detach the pressure gauge or digital pressure switch due to attachment by clip.
Variations standard connections mounting direction of the pressure gauge or digital pressure switch can be changed. (Standard connections only)



• Multiple mounting angles (in 60 increments) for the pressure gauge or digital pressure switch.

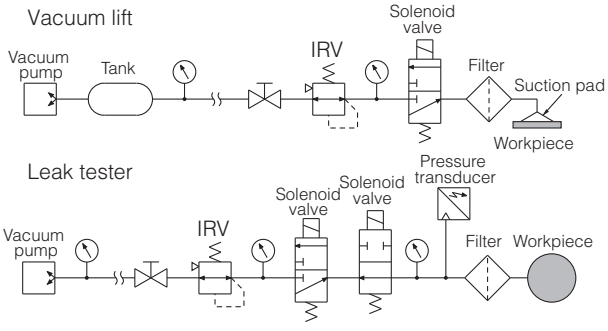
Mounting Variations



• Built-in one-touch fittings
Different size options for both fitting types

Type of fitting	Applicable tubing O.D. [mm]	Series	
		IRV10	IRV20
Straight Elbow	Ø 6	●	●
	Ø 8	●	●
	Ø 10	—	●
	Ø 1/4"	●	●
	Ø 5/16"	●	●
	Ø 3/8"	—	●

Example of Applications



Specifications

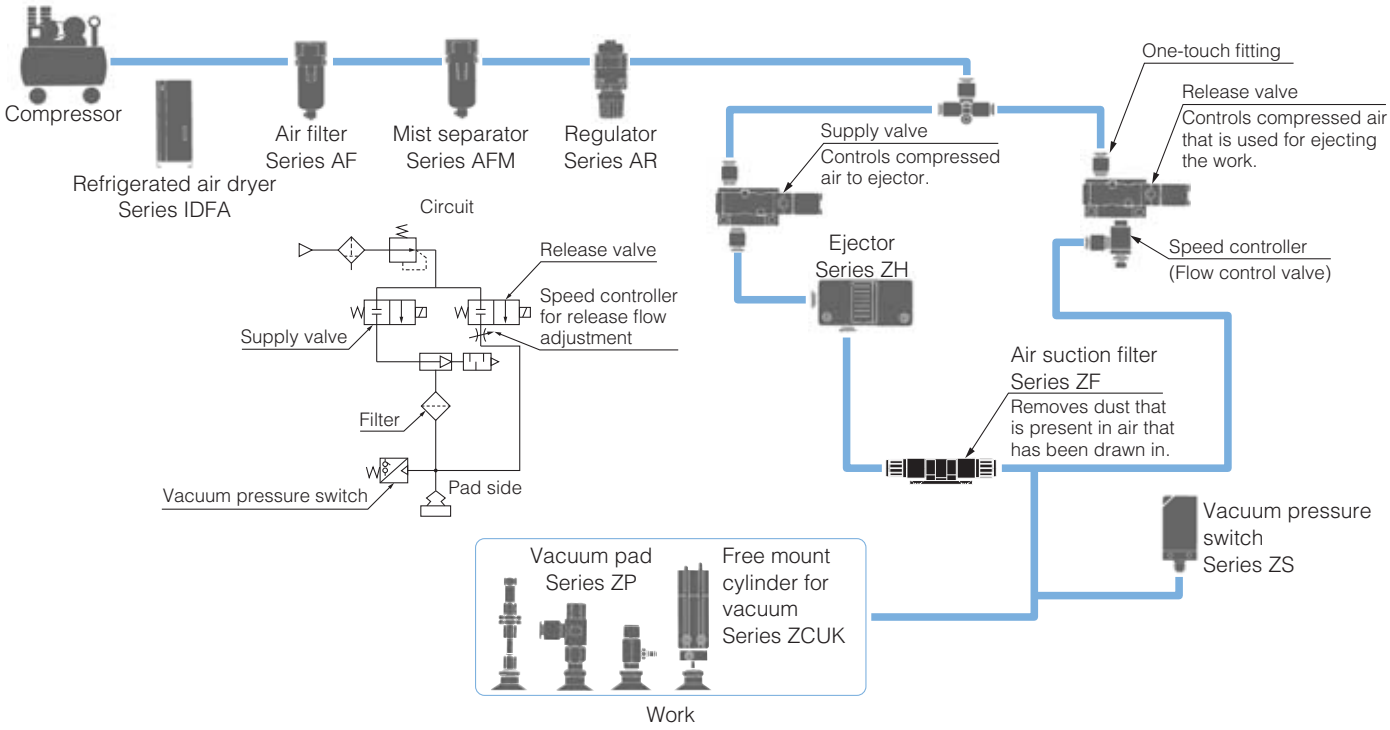
Model		IRV10	IRV20
Fluid		Air	
Set pressure range Note 1)		-100 to -1.3 kPa	
Atmospheric intake consumption Note 2)		0.6 l/min (ANR) or less	
Knob resolution		0.13 kPa or less	
Ambient and fluid temperature		5 to 60 °C	
Weight (Without accessories)	Standard piping	135 g	250 g
	Single-sided piping	125 g	

Note 1) The range varies in accordance with the vacuum pump pressure.
Note 2) The product normally takes in air from the atmosphere.

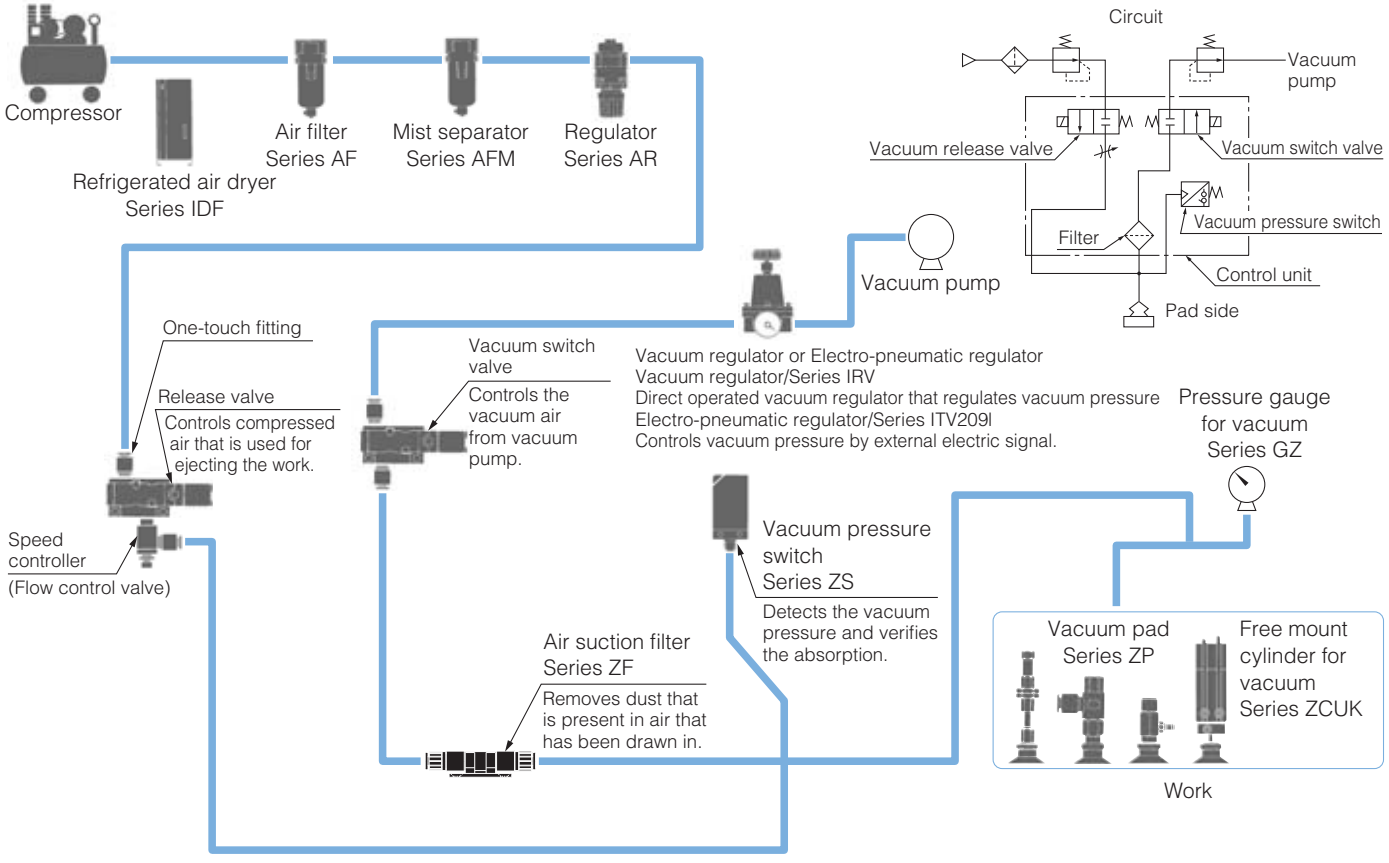
Vacuum equipment
Application examples

- 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 absorption transfer, vacuum absorption retention, vacuum generated air flow

Application to Ejector System



Application to Vacuum Pump System



SMC and Advanced Pressure Technology
APTech

In spring 2007, SMC Corporation Japan purchased Advanced Pressure Technology – better known as APTech – from its directors.

Based in Napa, California, USA, APTech was founded in the late 1980´s by Rene Zakhour. Rene´s objectives were to provide products with uncompromising quality, performance and reliability from a company offering exceptional service and technical support – almost identical values to those which SMC has based its successful approach to business.

From July 2008, our European customers can now purchase – through SMC – APTech´s excellent range of high quality products made exclusively for both the PV and Semiconductor Industries.

These include a great range of High Purity Gas Regulators which are made, tested and packaged in ultra high clean room conditions, thereby ensuring excellent levels of quality (ISO 9001 standard).

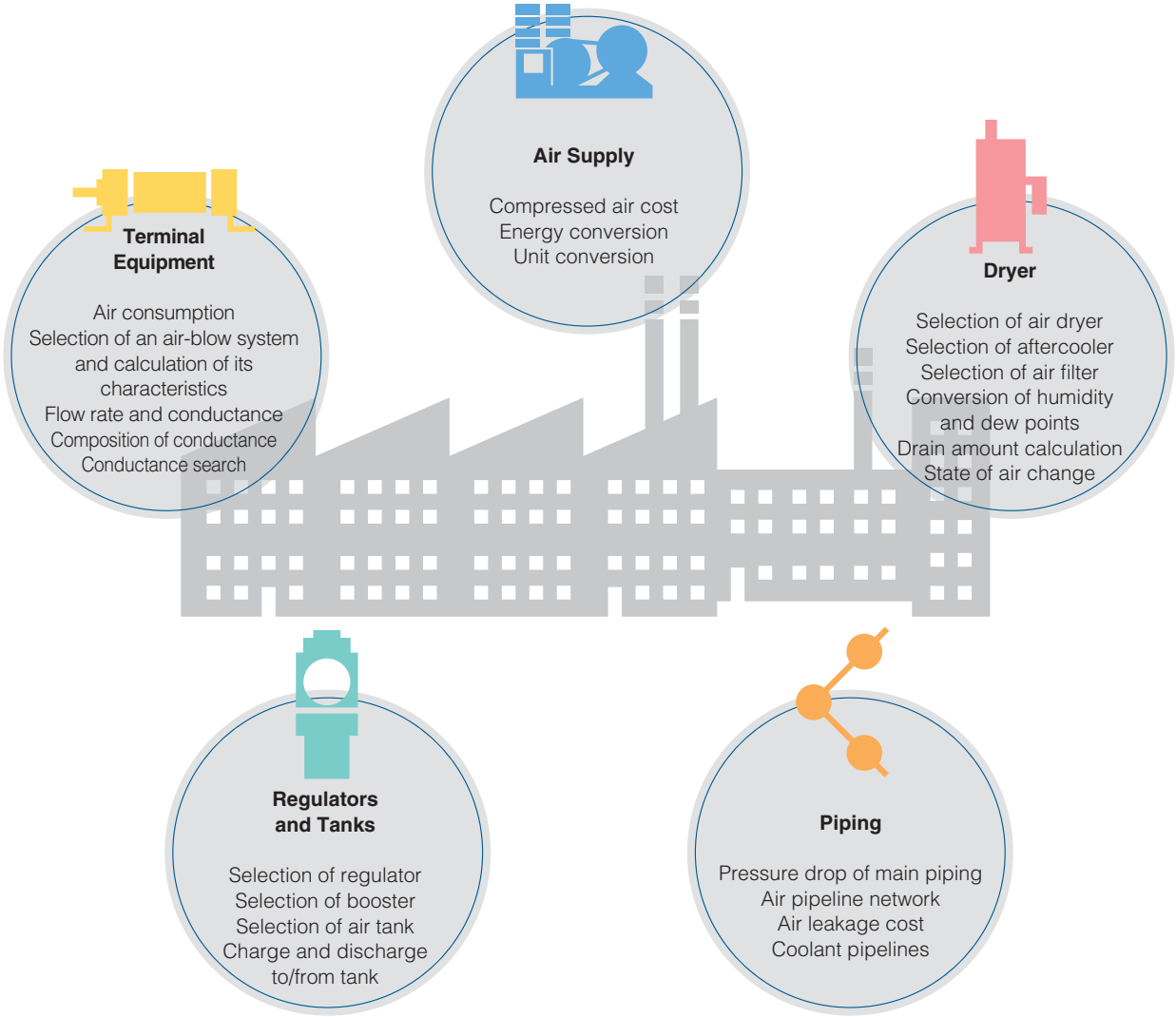
If you would like more information of APTech products ask your local representative for more information today.

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.4.0 – Web service version"
"Energy saving program" is available by installing it to your computer after downloading the program from SMC's website (http://www.smceu.com).
It provides both Japanese and English versions.

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