

SMC Life Science Analytical – Instrumentation – Microfluidics – Process Technology







# Table of Contents



Corporate Guide	Page
Introduction	4
Technical Development	10
Production and Supply	14
Sales and Communication Network	18
Custom Engineered Plastic Manifold & Valve Technology	24
Quality Assurance	26
Green Procurement	27
Flow Conversion/Calculations	28
SMC and Advanced Pressure Technology (APTech)	95
Energy Saving Program	96
International Training	97
SMC's Global Service Network	Q.S



# **Life Science Products**

roducts Index ..... 29



# 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.



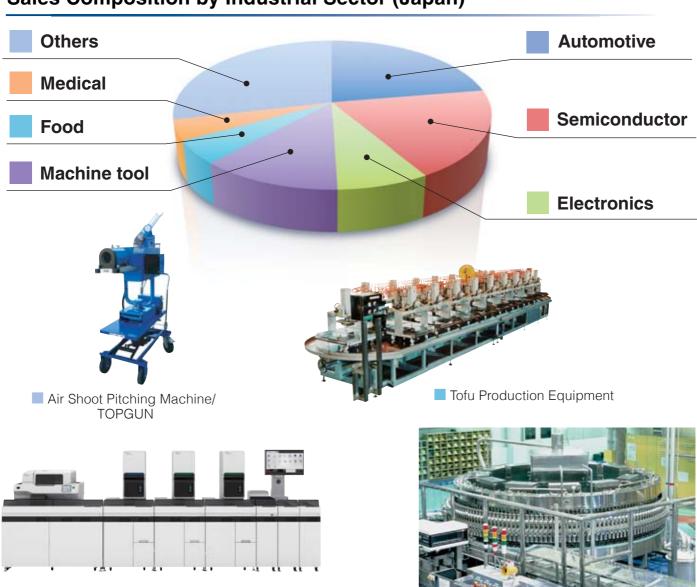
# Pneumatics contributes to automation in every industry.

# 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)

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





Automatic Rice Sorter





# 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 Dryers, Mist Separators**

These components provide clean dry air through dehumidification and filtration.





Air Dryer

Air Preparation Filter



# Air Filters, Regulators, Lubricators

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





Air Line Equipment



**Directional Control** 

**Valves** 

Air Line Equipment

# **Solenoid Valves**

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



Solenoid Valve



# **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-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**

operated chemical liquid valves 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.



CAE



Clean Room



Life Testing Room



Laboratory



3D Measuring Instrument





Analyzer



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.



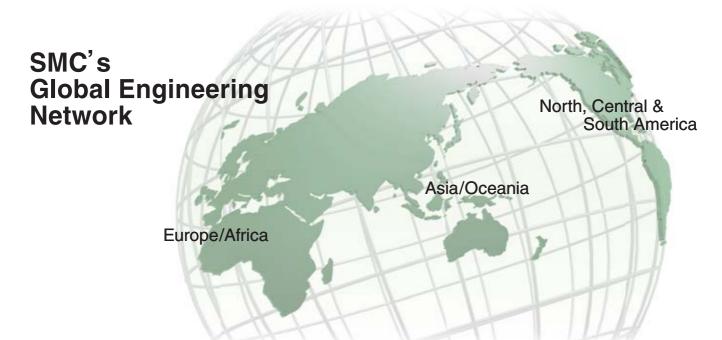
JTC (Japan Technical Center)
Japan

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.





# **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 Plastics Molding Dies Casting Machining



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.



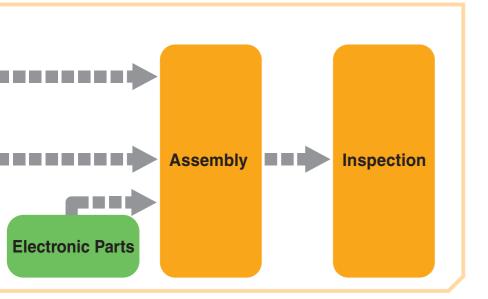
Valve Body Machining



Plastics Molding



Coil Winding





Clean Room



Electronic Substrate Mounting



Automatic Assembly Equipment



Assembly/Inspection of Temperature Control 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)



















# **China Factory**

SMC (China) Co., Ltd. Total land area: 172,558 m<sup>2</sup> Total floor area: 115,389 m<sup>2</sup> SMC (Beijing) Manufacturing Co., Ltd.

Total land area: 315,857 m<sup>2</sup> Total floor area: 147,056 m<sup>2</sup>



# **Singapore Factory**

SMC Manufacturing (Singapore) Pte. Ltd.

Total land area: 47,911 m<sup>2</sup> Total floor area: 37,800 m<sup>2</sup>

# **Overseas Local Production Facilities**

# North, Central & South America



U.S.A.



Brazil



Mexico

# Chile Argentina Bolivia





Germany



Russia



U.K.



Czech Republic



Italy

Switzerland Austria Sweden France Spain Turkey South Africa



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.

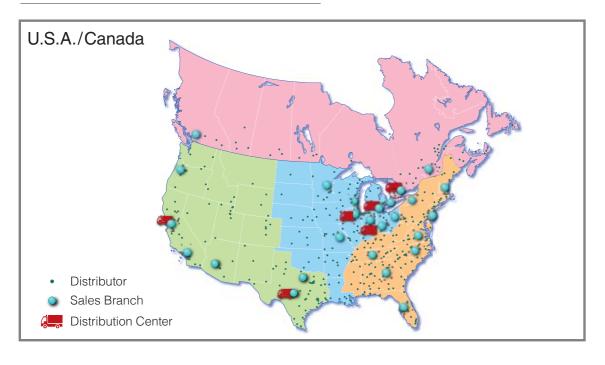
Additional distribution provides support to Central/South America as well as the Caribbean region. With this network, they offer customer requirements for specials, application assistance and local product provision. They also provide assistance in education on pneumatics by using a training kit and/or 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.

<sup>\*</sup>The names of countries listed are alphabetically indexed.







# **Sales & Communication Network**

# SMC Service in Europe/Africa

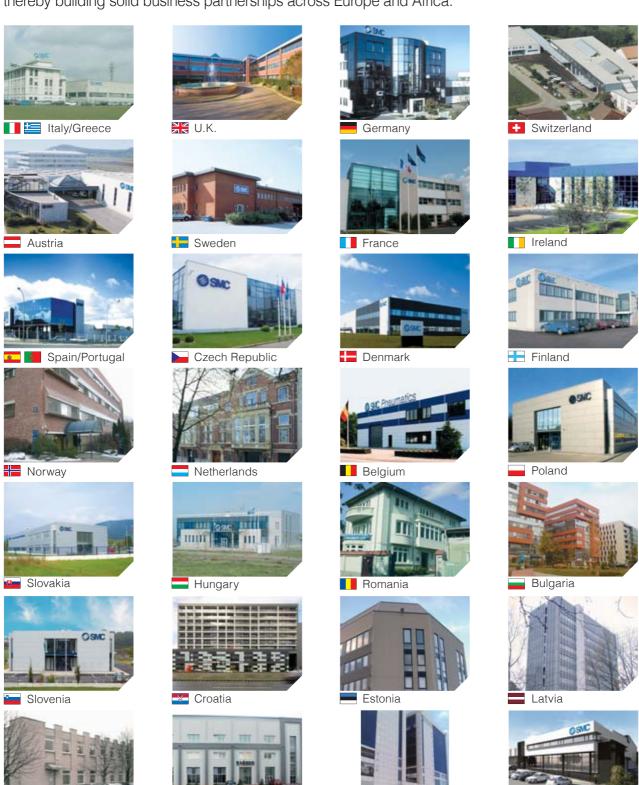


Austria	SMC Pneumatik GmbH (Austria)
Belgium	SMC Pneumatics N.V./S.A.
Bulgaria	SMC Industrial Automation Bulgaria EOOD
Croatia	SMC Industrijska Automatika d.o.o.
Czech Republic	SMC Industrial Automation CZ s.r.o.
Denmark	SMC Pneumatik A/S
Estonia	SMC Oneumatics Estonia Ou
Finland	SMC Pneumatics Finland 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.

<sup>\*</sup>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.



Turkey

South Africa

Lithuania

Russia





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.

<sup>\*</sup>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.



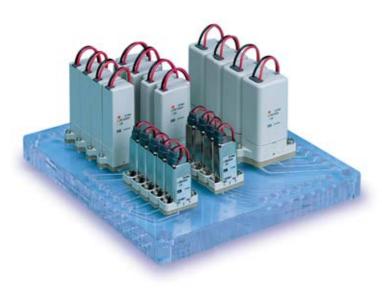






# **Composite Valve Manifold for Air, Gas and Liquid**

# **Custom Engineered Plastic Manifold & Valve Technology**



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

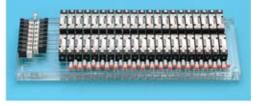
# Main specifications of Plastic Manifold Note)

Material	Acrylic Resin (PMMA), Polyvinyl Chloride (PVC),
Material	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)

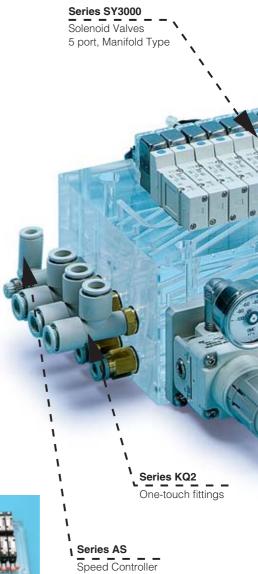
Note) Contact SMC for details.

# Installation of valves on plastic manifold





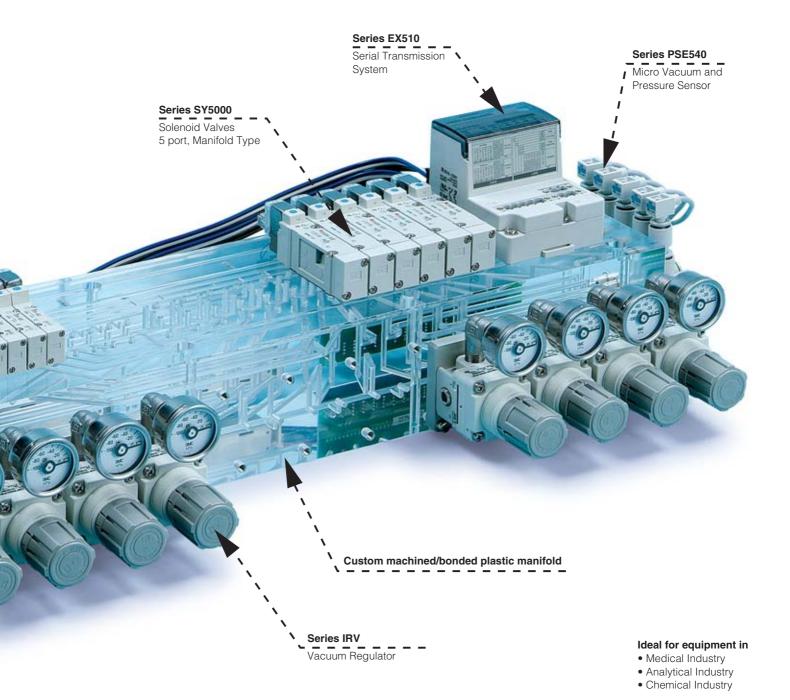






# SMC offers you the benefit of single Source Supply of plastic manifolds and valves!!

- 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!





# 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.

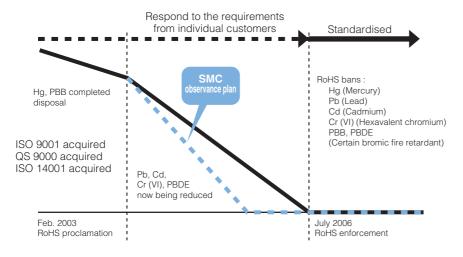
Although industrial products, including pneumatic products, are not subject to WEEE & RoHS directives, SMC nonetheless strives to meet the needs of our customers.

February 2003 RoHS directive proclamation



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

# 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<sup>3</sup>/h

 $\Delta P$ = 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

#### Gases

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

Q = Flow rate m<sup>3</sup>/h

 $C_V = Valve flow rate$ 

 $N_2$  = Conversion value for 137

 $N_3$  = Conversion value for 246

T = Gas temperature °K (°C = + 273)

 $\Delta P = (P_1 - P_2)$  Pressure drop in bar (absolute) / 1 bar ~ 0.1 MPa

P<sub>1</sub> = Supply pressure in bar (absolute)

P<sub>2</sub> = Output Pressure in bar (absolute)

G = Relative density [air 1.0]

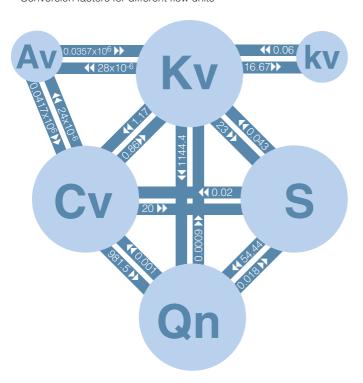
# Relative density of liquids

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

### Relative density of gases

Liquid	Relative density
	related to 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  ${\bf Kv}$  conversion value indicates the quantity of warm water (from 5 to 40 °C), expressed in m³/h, flowing through a valve which causes a pressure drop of 1 bar.

 ${\bf kv}$  conversion value is equivalent to the Kv mentioned above, however converted to I/min.

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

The Av flow rate coefficient is indicated in m2.

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

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



;

-			_			
SM		tο		$\sim$ 1	Or	100
	_		-01	6	CI.	ILC

Gas and Chemical Liquid Valve/ <b>Series LVM</b> 30
Highly Integrated resin System32
2/3 Port Valve for Water, Air, Vacuum/ <b>Series VDW</b> 33
Process Valves for Fluids Control/
<b>Series VC/VDW/VQ, VN</b> 34
Process Valves for Fluids Control/ <b>Series VXB, VX</b> 35
Process Pump/ <b>Series PA□, PB</b>

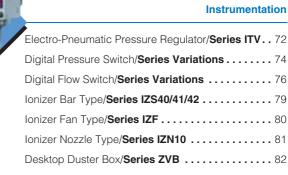
**Chemical/Liquid Valves** 

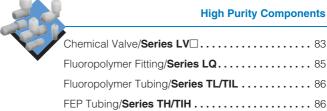
	Air Valves
Ultra Compact. 3 Port Solenoid Valve/Series	<b>S070</b> 38
Compact Unit Manifold Valve/Series VV061	39
3 Port Solenoid Valve for Air/Series V100	40
Compact Proportional Valve/Series PVQ	41
Pinch Valve/Series XT34	41

Air preparation
Air Preparation Equipment/Series Variations 42
Membrane Air Dryer/ <b>Series IDG</b>
Flexible piping/ <b>Series IDG1</b>
Moisture Control Tube/ <b>Series IDK</b>
Pressure Regulation Equipment/ <b>Series AR</b>
Precision Clean Regulator/ <b>Series SRP</b>
Clean Regulator/ <b>Series SRH</b>
Precision Regulator/ <b>Series IR</b>
Clean Exhaust Filter/ <b>Series SFE</b>
Clean Filter/ <b>Series SF</b> □
Special Regulator for Oxygen Concentrator/Series SRA 50
Refrigerated Air Dryer/ <b>Series IDFA</b> 51

	Fittings & Tubing
	ø2 Miniature Piping/ <b>Series M/AS/TU</b> 5.
•	Fittings & Tubing Overwiew5
	S Couplers/ <b>Series KK</b> □

	6	Actuators
	Miniaturization of equipment/Series Variati	<b>ons</b> 60
	Electric Gripper/ <b>Series LEH</b> □	6
	Electric Actuator Slider Type/ <b>Series LEF</b> □	62
	High-Rigidity Slider Type/ <b>Series LEJ</b> □	63
	Electric Actuator Guide Rod Slider/Series I	<b>EL</b> 64
	Low Profile Slider Type/ <b>Series LEM</b>	64
	Electric Miniature Actuator/Series LEP	64
	Electric Actuator Rod Type/Series LEY	65
	Electric Actuator Guide Rod Type/Series L	<b>EYG</b> 66
	Electric Slide Table/ <b>LES</b> □	67
	Electric Rotary Table/Series LER	67
	Controller/Driver/Series LEC	68
	Controller/Driver/Series JXC	69
	Electric Cylinders/Series LZ	70
	Card Motor/Series LAT3	70
	Electric Actuators Application Examples	7
200	Instr	umentatior
V	Electro-Pneumatic Pressure Regulator/Seri	<b>es ITV</b> 72









## **Vacuum Equipment**

Vacuum Ejector/ <b>Series ZU</b>	91
Compact Vacuum Unit/Series ZB	91
Vacuum Unit/Series ZK2	91
Vacuum Regulator/Series IRV	92
Application examples	94

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



# **Piping/Mounting Variations**

## **Body ported**

• M5 thread

• Tubing type

Manual (Optional)

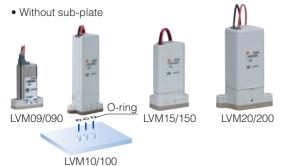
Bracket (Optional)

Tubing

LVM11

LVM10/100

# Base mounted





• 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.

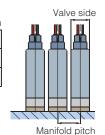
Type with power-saving circuit can be selected.
 Holding power consumption can be reduced substantially.

Unit: W

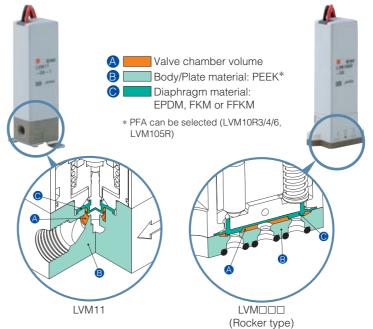
Series		LVM09/090	LVM10/100	LVM15/150	LVM20/200
Power	Inrush	3.3	2.5	5.5	4
consumption	Holding	0.9	1	1	0.6

Space-saving

• Space-saving	9			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.

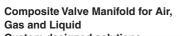


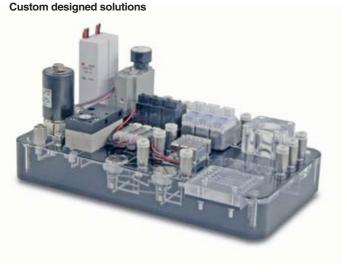
# Super Compact Direct Acting 2/3 Port Solenoid Valve for Chemicals Series LVM

Series Variations

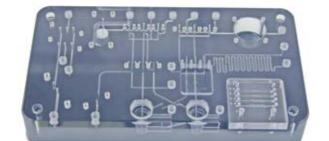
Series Variation	S	<u> </u>			1	I	I																	
		Valve construction	be.	Number of ports	Operating pressure range	r [mm]	Orifice diameter [mm]	· [mm]	cha	Flow characteristics			Fluid temperature [°C]	Volume of valve chamber	[6]	Power consumption [W]								
	Model	Valve	Valve type	ambe	Operati range	ifice	Valve width	Water	1		Air	uid mpera	lume amb(	Weight [g]	wer									
	Ĭ		> 8	ź	Q ra	Ď ij	\ \ \ \	Av	Cv	С	b	Fl.	S do	Š	8 8 8 8									
_	LVM09R3	Diaphragm type direct operated poppet (Rocker type)	N.C.	2	.2 MPa																			
10 mm	LVM09R4	phragm operated ocker ty	N.O.		-75 kPa to 0.2 MPa	1.1	9.5	0.43 x 10 <sup>-6</sup>	0.018	0.06	0.2		18	20	2									
7.1	LVM095R	Dia direct (	Universal	3	-75 k																			
	LVM11	Diaphragm type direct operated poppet	N.C.	2	0 to 0.25 MPa	1.5	13	0.96 x 10 <sup>-6</sup>	0.04	0.13	0.22		11	30	2.5 at inrush 1 at holding									
	LVM10R1		N.C.	2	5 МРа																			
1 mm	LVM10R2		N.O.	۷	-75 kPa to 0.25 MPa	1.4	13	0.72 x 10 <sup>-6</sup>	0.03	0.1	0.2	ation)	20	34	1.5									
11	LVM102R		Universal	3		-75 K	-75 KI	-75 k	-75 kF	-75 Kł	-75 K	-75 KF	-75 KF	-75 KF	-75 KF							0 to 50 (with no condensation)		
Δ	LVM10R3	<u>.</u>	N.C.		Па							0 00 4:												
A	LVM10R4	eddoc	N.O.	ω	1.4	10	0.72 x 10 <sup>-6</sup>	0.03	0.1	0.2		20	0.4	1.5										
\$# #-	LVM10R6	ated p	N.C.		Pa to	1.4	13	0.72 x 10 °	0.03	0.1	0.2		20	34	1.5									
	LVM105R	ect oper ar type)	Universal	3	-75 k																			
Δ	LVM15R3	type dire (Rocke	N.C.	2	MPa Pa)								50		5.5									
5.00	LVM15R4	Diaphragm type direct operated poppet (Rocker type)	N.O.	_	-75 kPa to 0.25 MP (Max. 0.6 MPa)	1.6 (1)	16	0.96 x 10 <sup>-6</sup> (0.36 x 10 <sup>-6</sup> )	0.04 (0.015)	0.13 (0.05)				45	at inrush									
100	LVM155R	Diag	Universal	3	-75 kP¿ (Ma>										at holding									
M	LVM20R3		N.C.	2	МРа	ИРа																		
1.2	LVM20R4		N.O.	-	-75 kPa to 0.3 MPa	2	20	1.56 x 10 <sup>-6</sup>	0.065	0.23	0.27		84	80	2.5									
	LVM205R		Universal	3	-75 KF																			

 $<sup>\</sup>ast$  The values for Av and Cv are based on JIS B 2005:1995, C and b are based on JIB B 8390:2000.





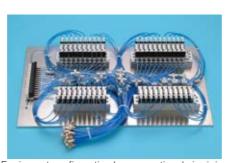
- Space saving
- Simple piping
- Mistakes in piping and wiring are prevented by elimination of complicated piping procedures
- A3 dimensional configuration of fluid passages that is not achievable by drilling or injection molding is materialized by diffusion bonding technology. A variety of layouts are 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



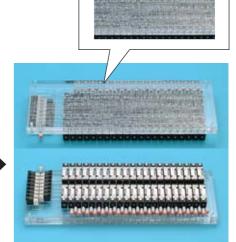
#### Manifold Specifications

mainiora operinoatione					
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				

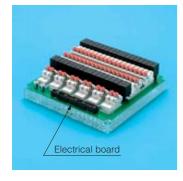
Note) Contact SMC for details.



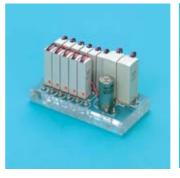




Highly Integrated Resin System









# 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

# Conventional model 17 mm 15 mm 42.5 mm 48 mm

(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	Туре	Orifice size (Ømm) [Flow (Cv)]	Port size	Valve type*		
	VCC12/13 2/3 port air operated valv	e for water and chemical-ba	ased fluids			
	Manifold	3.8 [0.33]	1/4	N.C.		
10 1	VCH40/400 5.0 MPa Pneumatic Equip	oment Series				
	Body ported	16~18 [4.5~6.3]	1/2, 3/4, 1	N.C./N.O.		
1000	VDW Compact Direct Operated 2 Port Solenoid Valve for air, medium vacuum and water					
10	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.		
A. A	VDW200/300 Compact direct operated	3 port solenoid valve for wa	ater and air			
	Body ported	1~4 [0.03~0.46]	M5, 1/8, 1/4	C.O.		
	VQ20/30 2 port solenoid valve for a	air				
	Body ported     Manifold	3.4~4.8 [0.33~0.81]	Ø 6, Ø 8, Ø 10, Ø 12	N.C.		

<sup>\*</sup> N.C.: normally closed; N.O.: normally open; C.O.: common

# Series VN

Series	Туре	Port size	Valve type*	
The same of the sa	VNA 2 port valve for compress	ed 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.
17-	VNB 2 port valve for flow contr	ol		
	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.
See a see a	VNC 2 port valve for coolant a	oplications		
9	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.

<sup>\*</sup> 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*
Allo Min	VXB Angle seat valve for steam	n, water and air		
	Body ported	12~19 [3.5~7.6]	3/8, 1/2, 3/4	N.C.

<sup>\*</sup> N.C.: normally closed

# Series VX

Series	Туре	Orifice size (Ømm) [Flow (Cv)]	Port size	Valve type*		
	VX21/22/23 Direct operated 2 port solenoid valve for air, medium vacuum, water, oil					
CO CO	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 solen	oid valve for air, gas, water,	oil, heated water, high	temperature oil		
10	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 sole	noid valve for steam, air, ga	as, water, oil			
	Body ported	10~50 [1.9~49]	1/4, 3/8, 1/2, 3/4, 1, 1 <sup>1</sup> / <sub>4</sub> , 1 <sup>1</sup> / <sub>2</sub> , 2	N.C./N.O.		
	VXZ22/23 Pilot operated 2 port solel water, oil, heated water, h	noid valve for zero different igh temperature oil	tial pressure/For air, ga	as, vacuum,		
	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					
1000	Body ported	10~25 [2.4~12]	1/4, 3/8, 1/2, 3/4, 1	N.C.		
	VXH22 Pilot operated 2 port sole	noid valve for high pressur	e/For air, water, oil			
	Body ported	10 [1.9~2.4]	1/4, 3/8, 1/2	N.C.		
10	VX31/32/33 Direct operated 3 port sol	enoid valve for water, oil, s	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					
TO THE	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	er, oil			
	Body ported     Manifold VXE2	2~50 [0.18~49]	1/8, 1/4, 3/8, 1/2, 3/4, 1	N.C.		

<sup>\*</sup> N.C.: normally closed; N.O.: normally open; COM.: common



#### Process Pump Series PA□, PB

• Series PA3000/5000 45 I/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 Check valve material material		Body material	Discharge flow rate [I/min]*	Option
PA31□0			ADC12	1 to 20	
PA32□0	DTEE NDD	DTEE DEA	SCS14	1 10 20	• Silencer
PA51□0	PTFE, NBR	PTFE, PFA	ADC12	E +- 4E	
PA52□0			SCS14	5 to 45	

<sup>\*</sup> 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

PAX1112         PTFE         PTFE, SCS14         ADC12         0.5 to 10         • Silencer	Model	Diaphragm material	Check valve material	Body material	Discharge flow rate [I/min]*	Option
	PAX1112	DTEE	DTEE 00014	ADC12	0.E to 10	- 0:1
17,0012.12	PAX1212	PIFE	PIFE, SCS14	SCS14	0.5 to 10	• Silencer

<sup>\*</sup> Each of the values above indicates use at ordinary temperatures with fresh water.

# • Series PB 2 I/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 [I/min]	Option
PB1011A	Built-in solenoid valve	Polypropylene (PP)		PTFE	FKM	8 to 2000	
PB1013A	Air operated	1 dispropsiene (i i )	PTFE	PP	SUS316	8 to 1000	Silencer     Foot
PB1313A	Air operated	New PFA		PTFE, New PFA	PTFE	0 10 1000	

 $<sup>\</sup>ast$  Each of the values above indicates use at ordinary temperatures with fresh water.





- 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

Mod	del	Body material	Diaphragm material	Assembly environment	Discharge flow rate [l/min]	Option
Automatically	PA3310			Standard	1 to 13*	• Foot • Silencer
operated	PAP3310	Now DEA	DTEE	Clean room		
Air operated	PA3313	New PFA	New PFA PTFE -		0.1 to 0	• Foot
Aii operated	PAP3313			Clean room	0.1 to 9	• Foot

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

#### • Series PAF3000/5000 45 I/min



- 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

Mod	del	Body material	Diaphragm material	Discharge flow rate [I/min]	Fitting type	Option	
Automatically	PAF3410			1 to 20			
operated	PAF5410			5 to 45	Female thread Tube extension	• Foot Note 1)	
Air operated	PAF3413	New PFA	New PFA	w PFA Denatured PTFE	1 to 15	With nut	• Silencer Note 2)
7 III Oporatou	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
LSP12□	50 to 100 μl/shot	Diaphragm/Check
LSP13□	100 to 200 µl/shot	valve: EPDM or FKM



#### 7 mm Wide, Super Compact Direct Acting 3 Port Solenoid Valve Series \$070

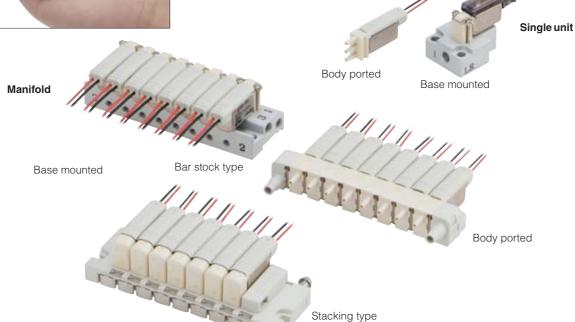


• Valve width: 7 mm

• Power consumption: 0.35 W (standard)

0.1 W (with power saving circuit)

- Sonic conductance: C 0.060 [dm<sup>3</sup>/(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)



### Specifications

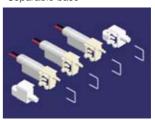
Valve construction	Poppet	
Fluid	Air / Inert gas / Low vacuum (1.33 x 10 <sup>2</sup> Pa)	
Maximum operating pressure	0.3 MPa (0.35 W, 0.1 W), 0.5 MPa (0.5 W)	
Proof pressure	1 MPa	
Ambient and fluid temperature	−10 to 50 °C	
Lubrication	Not required	
Impact/Vibration resistance	30/150 m/s <sup>2</sup>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

### Solenoid specifications

odiendia apecinications	
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



Separable base



Stacking type

#### Flow characteristics

Flow characteristics						
Power consumption	Maximum operating	Flow characteristics			Response time ms	
Fower consumption	pressure	C [dm <sup>3</sup> /(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
0.5 W DC	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
0.33 W DC	0.1 MPa	0.060	0.28	0.016	5 or less	3 or less
0.1 W DC (at holding)	0.3 MPa	0.021	0.27	0.006	3 or less	6 or less
with power saving circuit	0.1 MPa	0.042	0.28	0.011	5 or less	6 or less
` ` ` `	0.3 MPa 0.1 MPa 0.3 MPa	0.042 0.060 0.021	0.27 0.28 0.27	0.011 0.016 0.006	3 or less 5 or less 3 or less	3 or le 3 or le 6 or le



# Unit Manifold Valve, 3 Port Solenoid Valve Series VV061

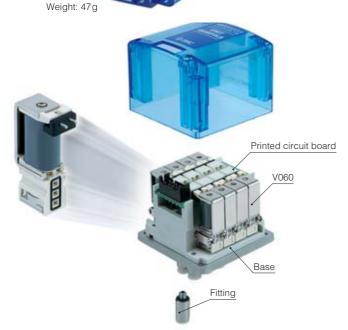




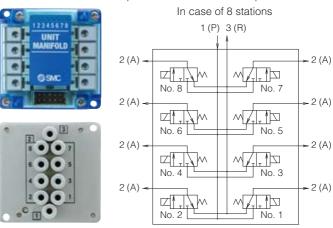
- Valve width 6 mm. Mounting the V060 series
- Variety of valve connection options and systems
- Lightweight 47 g (2 stations)
- Valve, PCB, base and fittings are fully integrated, forming a single compact unit. New concept unit manifold



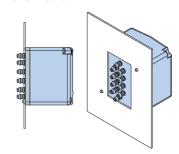




### Reduced environmental impact substance RoHS compliant



### Panel mount



### Unit Manifold Valve Specifications

Offic Marinola Varv	e opeometrions			
Fluid		Д	ir	
Operating	Standard	0 to 0.7 MPa		
pressure range 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	
Specifications	High flow type	-100 kPa to 0.2 MPa	-100 kPa to 0 MPa	
Power Standard		0.55 W		
consumption	Power saving circuit (Long and countinuous loading time type)	0.23 W		

### Flow Characteristics

Type	Effective area [mm <sup>2</sup> ]			
Туре	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[dm <sup>3</sup> /(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			Operating pressure range	Power consumption [W]	
		Type of actuation	[MPa]	Standard	With power saving circuit
Ot a stall a stall	V114	N.C.	0 to 0.7	0.35	0.1
Standard	V124	N.O.	0 to 0.7	0.35	0.1
Large flow capacity	V114A	N.C.	0 to 0.7	1	_
Large new capacity	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:

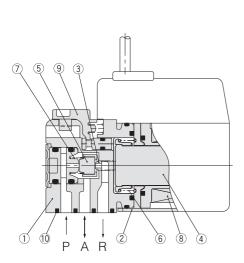
No malfunction resulted in 45 to 2000 Hz, a one-sweep test performed in the axial and right angle directions of the main valve and armature for both energized and de-energized states. (Value in the initial stage)



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** 



- 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 m	ounted		Body porte	ed	Base mounted
Valve construction		Direct opera	ated poppe	t		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 [I/min]	0 to 5	0 to	o 6	0 to 5	0 t	o 100	0 to 75
Applied current (Power supply)		0 to 85 mA 0 to 170 mA				0 to 165 mA (24 0 to 330 mA (12	- /
Port size		M	15		1/8		
Fluid		Air, Ine	ert gas		Air, Inert gas		
Ambient temperature		0 to 50 °C			0 to 50 °C		
Hysteresis		10 % or less		10 % or less 13 % or less		13 % or less	
Repeatability		3 % o	r 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

opeometric .			
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

Se	eries	Port size	Filtration	Notes
green,	(Marie)	AF Filter		
P 5		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
	274	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
Dil Miet Congretore				

Rated flow [I/min] (ANR)

Filtration

# Oil Mist Separators

Series

Port size

Hall E	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		
(Inch)	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		
100	AME Super Mist Separator				
000	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 [I/min] (ANR)	Filtration
	AMF Odor Removal		
6	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 [I/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

Water separator				
Series	Port size	Notes		
	AD Auto drain valve: AD402/600			
W	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: ADH	4000		
	1/2	Easy maintenance. Float style auto drain allows automatic drain discharge without electric power.		
4	AMP Exhaust Cleaner for Clean Rooms			
7	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 $\ell$ . 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







# Flexible Piping Series IDG1



- 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.

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





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

# Pressure Control Equipment/Regulator Series AR

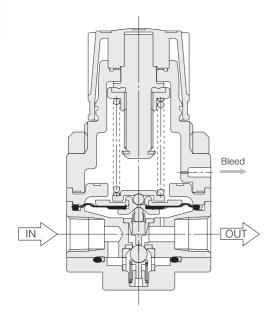
	Series	Application/Characteristics	Port size	Set pressure [MPa]
	Miniature regulator ARJ1020F ARJ210 ARJ310	Direct operated relieving style Back flow function	M5 to 1/8 Ø 4, Ø 6	0.1 to 0.7
	Regulator AR10-A AR20-60-B	Direct operated relieving style Modular style	M5 1/8 to 1	0.05 to 0.7 0.05 to 0.85
	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
ACCION TO A TABLE TO A	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

Parts assembly

Degrease cleaning

Assembly

Inspection

Interior purge

Packaging

Class 10,000

- 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

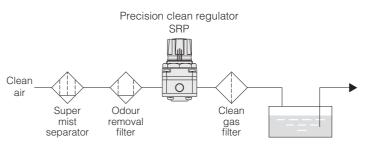
#### Specifications

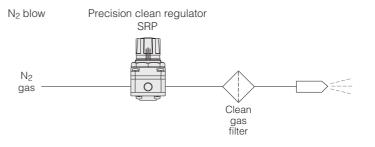
Specifications			
Connection port size		M5, Rc 1/8	
Fluid		Air, N2, CO2, Ar	
Proof pressure [MPa	]	1.5	
Maximum operating p	oressure [MPa]	1.0	
Regulating pressure	Low pressure type	0.005 to 0.2	
range MPa	High pressure type	0.01 to 0.4	
Ambient and fluid ten	nperature [°C]	0 to 60	
Fluid consumption [I/I	min] (ANR) Note 1)	0.5 or less	
Sensitivity		0.3 % of full span	
Repeatability		±1 % of full span	
	Metal	SUS316	
Fluid-contact parts	Resin	Fluororesin	
i luid-contact parts	Rubber	Fluoro rubber	
	Other	Ceramics	
Assembly environment	nt	Clean room class 10000	
Parts cleaning		HCFC141b ultrasonic cleaning	
arts clearing		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



#### Consistent clean room production

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



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

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

Parts assembled without any use of oils

- 2 types of diaphragm material available
   Depending upon the application, PTFE (Grade A) or fluororubber (Grade B) can be selected for the diaphragm material.
- Designed to minimize residual fluid
   Design includes an intake/exhaust port in the diaphragm
   compartment which facilitates flow.
   Valve springs are partitioned by the diaphragm.
- Pulsation suppressing design

#### Specifications

Mod	del	SRH3□□0	SRH4□□0	SRH3□□1	SRH4□□1			
Relief mechar	nism	Non-	-relief	Relief				
Port size		Rc 1/8, 1/4 URJF 1/4	1 1 1 1		Rc 1/4, 3/8, 1/2			
Fluid	Grade A	Clean air, N2, Ar, CO2, Pure water		Clean	air, N2			
riuiu	Grade B	Air, N2, Ar,	CO2, Water	Air	N2			
Proof pressur	е		1.5 MPa					
Max. operatin	g pressure	1 MPa						
Set	Low pressure type	0.01 to 0.2 MPa						
pressure	High pressure type	0.05 to 0.7 MPa						
Ambient & flu temperatures	id	0 to 60 °C (With no condensation)						
Fluid-contact m	aterial (metal)	Stainless steel SUS316 (Body is SUS316L)						
Diaphragm	Grade A		PT	FE				
material	Grade B		Fluoror	ubber				
Weight		360 g	730 g	360 g	730 g			

- 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					
Fluid	Pure water Air, N2				
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 6	0° C		
Fluid-contact material (metal)	Stainless steel 316				
Diaphragm material	EPDM Fluororubber				
Mass		210	10 g		



#### Precision Regulator Series IR1000/2000/3000-A





- New structure without fixed throttle does not require a mist separator
- Air consumption 1 I/min or less
- Precision:

Sensitivity: 0.2 % F.S.Repeatability: ±0.5 % F.S.

• High flow rate:

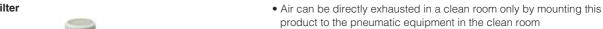
- IR1000-A: 720 I/min - IR2000-A: 1900 I/min

• Lightweight:

- IR1000-A: 0.13 Kg

#### Series Variations

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

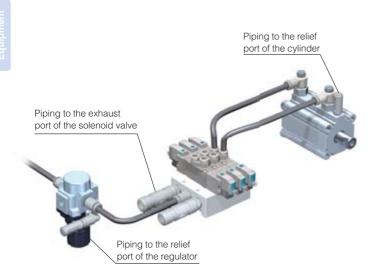


- No need for piping for exhaust air and relief air. Reduces piping installation work and space
- Filtration rating 0.01 µm. (Filtration efficiency 99.99 %)
- Maximum flow capacity 200 I/min (ANR)
- Noise reduction 30 dB (A) or more

### Mounting Variations

	Wiedriting Variations												
	Series	Maximum flow capacity		e thr type		Р	lug-i	n typ	е			touch type	
		[I/min] (ANR)	M5	R 1/8	R 1/4	Ø 4	Ø6	Ø8	Ø 10	Ø 4	Ø6	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 [I/min] (ANR) (Max. flow rate at 0.7 MPa)	Pressure [MPa]	Temperature [°C]	Replacement of element
	Disc style	SFA10□		26		5 to 80	Replaceable
	O do	SFA20□	0.01 µm (Filtering efficiency 99,99 %)	70			
		SFA30□	(Membrane element)	140	0.99		
	Straight style	SFB10□		45			
Cartridge type		SFB20□ (Strainer)	Nominal 120 µm (Sintered metallic element)	400			
Cartride	Straight style	SFD200	0.01 µm (Filtering efficiency 99,99 %)	500	1.0 Nitrogen:	5 to 45	
	Straight style	SFD101 (aluminium)	(Hollow fibre elements)	100	0.99 MPa		
	Made to	SFD102 Order (Stainless steel)					
	Straight style	SFB30□		45			
Disposable type	Multiple disc style	SFC10□	0.01 µm (Filtering efficiency 99,99 %) (Membrane element)	240	0.99	5 to 120	Non replaceable
	Straight style	SFD100		100	1.0 Nitrogen: 0.99 MPa	5 to 45	



#### Special Regulator for Oxygen Concentrator **Series SRA**



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

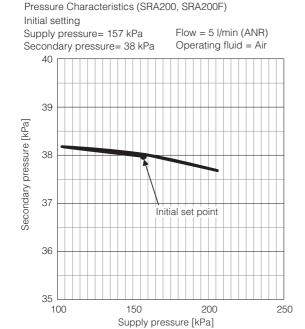
#### Specifications

Model		SRA200-01	SR200F-08	SRA202-00-X234	SRA202-00-X235		
D	Inlet	Rc 1/8	Ø 8 O.D. Tubing	Ø 4.8 I.E	). Tubing		
Port size	Outlet	Rc 1/8	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			MPa		
Operating pressure	Outlet						
Set pressure		0.01 to (	0.1 MPa	0.13 to 0.15 MPa			
Fluid		Oxyg	en, Air	Arg	gon		
Lubrication			Use no oil a	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 I/min		0.2 to 5 l/min	to 5 I/min 0.2 to 2 I/min		

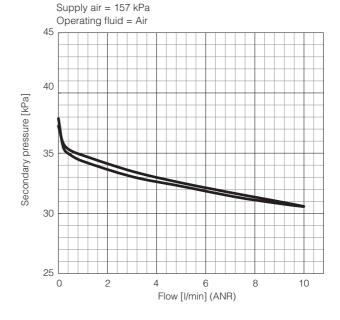
How to Order Thread type Fitting type SRA200F - 06 SRA200 - F | 01 Thread type Port size \_Tubing O.D. 06 6 mm F G N NPT

Base mounted type (bottom piping)

SRA202 - 00 - X234SRA202 - 00 - X235



Flow Characteristics (SRA200, SRA200F)



# 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

Madal		Operating range			Power consumption	Air port	Refrigerant	Weight	Nominal Air Flow Rate t [m³/h (ANR)]		
Model	Inlet air pressure [MPa]	Inlet air temperature [°C]	Ambient temperature [°C]	voltage	[W]	connections	nemgerani	[kg]	-,4,- (3 °C PDP)	-,5,- (7 °C PDP)	-,6,- (10 °C PDP)
IDFA3E-23	0.15 to 1.0					Rc 3/8		18	12	15	17
IDFA4E-23	0.13 to 1.0	1.0			180	Rc1/2		22	24	31	34
IDFA6E-23-K							R134a	23	36	46	50
IDFA8E-23-K			2 to 40	Single	208	Rc 3/4	(HFC)	27	65	83	91
IDFA11E-23-K		5 to 50	(Relative	phase	385			28	80	101	112
IDFA15E-23-K	0.15 to 1.6		humidity of 85 % or less)	230 V AC 50 Hz	470	Rc 1		46	120	152	168
IDFA22E-23-K	0.13 to 1.0		70 70 01 1000)	00112	760	R 1		54	182	231	254
IDFA37E-23-K					760	R 1 1/2	R407C	62	273	347	382
IDFA55E-23-L					1130	R 2	(HFC)	100	390	432	510
IDFA75E-23-L					1700	n Z		116	660	720	822
IDFA100F-40			2 to 45	Three	2500	R2	5.4076	245	860	1040	1230
IDFA125F-40	0.15 to 1.0	5 to 60	(Relative humidity of	phase	e	R 2 1/2	R407C (HFC)	270	1100	1320	1550
IDFA150F-40			85 % or less)	400 V AC	2700	DIN flange 80		350	1340	1690	1920

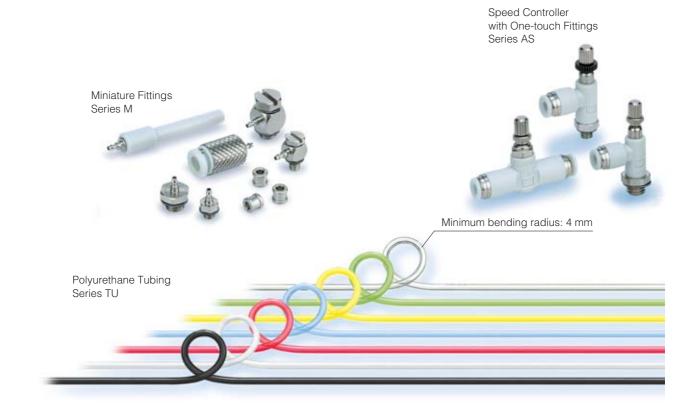
Note 1) Thread adapters to convert Rc thread to R thread are included with IDFA3E to IDFA15E.

Note 2) The standard condition (ANR) is under the conditions of 20 °C at atmospheric preessure and relative humidity of 65 %.

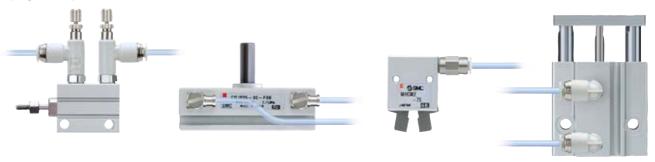
Note 3) The performance data for pressure dew point is in accordance with the following operating conditions from ISO 7183: Inlet air pressure: 0.7 MPa; Inlet air temperature: 35 °C (saturated); Cooling air temperature: 25 °C.



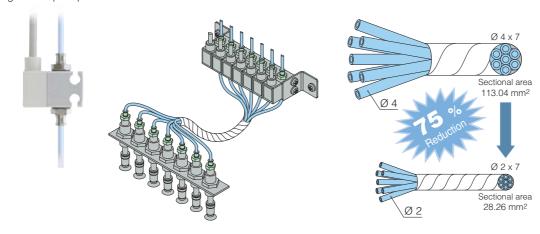
ø2 Piping Series Series M∙AS•TU







Piping for compact pressure sensors

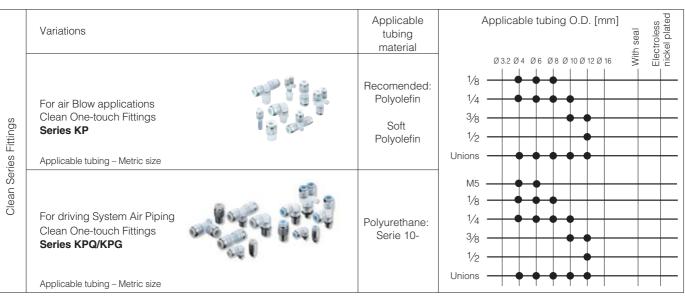


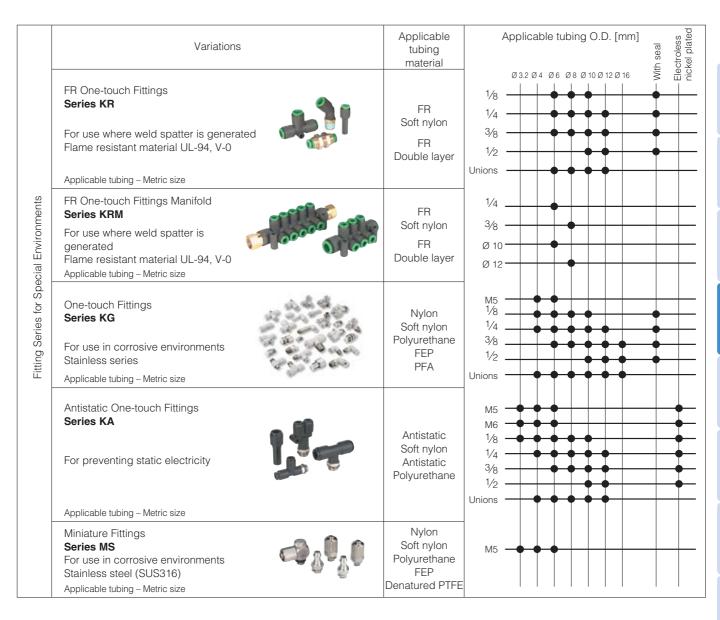


	Variations	Applicable tubing material	Applicable tubing O.D. [mm] earling of the search of the s
	One-touch Fittings Series KQ2  One-touch connection and release Possible to use in vacuum to -100 kPa  Applicable tubing – Metric size	Nylon, Soft nylon, Polyurethane, FEP, PFA	M3 M5 M6 1/8 1/4 3/8 1/2 Unions
	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	M5 M6 1/8 1/4 3/8 1/2
General Purpose Fittings Series	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	1/4 3/8 Ø 8 Ø 10 Ø 12
	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	1/8 1/4 3/8 1/2 Unions
	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	1/8 1/4 3/8 1/2
	Stainless Steel 316 One-touch Fittings Series KQG2 Compact and light Seal parts: Special FKM Grease free	FEP, PFA, Nylon, Soft nylon, Polyurethane, Polyolefin	M5
	Metal One-touch Fittings Series KQB2 Compact and light Grease free	FEP, PFA, Nylon, Soft nylon, Polyurethane, Polyolefin	M5 R 1/8 G 1/8 R 1/4 G 1/4 R 3/8 G 3/8 R 1/2 G 1/2

# **SMC**

	Variations	Applicable tubing material	Applicable tubing O.D. [mm] page of Mith Seal (Mith Sea
	Miniature Fittings Series M  Tubing connection/disconnection without use of tools  Applicable tubing – Metric size	Nylon, Soft nylon, Polyurethane, FEP, Denatured PTFE	M3 — — — — — — — — — — — — — — — — — — —
General Purpose Fittings Series	Self-align Fittings Series H/DL/L/LL  Accepts soft copper tube  Applicable tubing – Metric size	Nylon, Soft nylon, Soft copper (C1220T-0)	1/8 1/4 3/8 1/2 Unions
	Tube Coupler Series KC  One-touch connection and release Built-in self-seal mechanism  Applicable tubing – Metric size	Nylon, Soft nylon, Polyurethane	M5
Gene	Multi-connector with One-touch Fittings Series DMK  Applicable tubing – Metric size	Nylon, Soft nylon, Polyurethane, FEP, PFA	6 tubes 12 tubes
	Rectangular Multi-connector Series KDM  Applicable tubing – Metric size	Nylon, Soft nylon, Polyurethane, FEP, PFA	10 tubes 20 tubes
	Piping Module Series KB  Centralised distribution of supply air Applicable tubing – Metric size	Nylon, Soft nylon, Polyurethane, FEP, PFA	







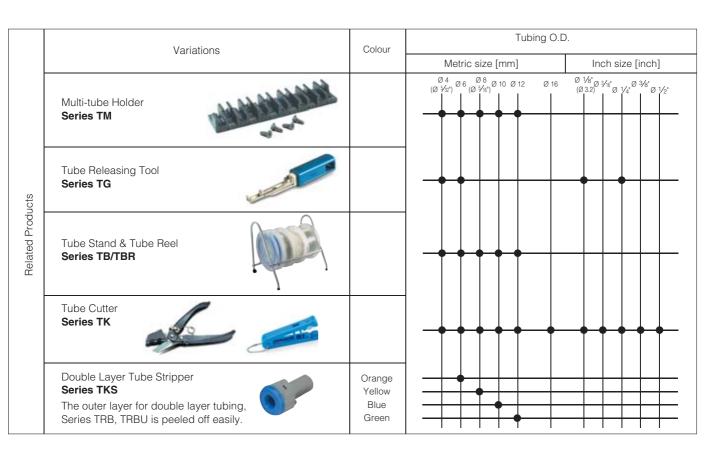
	Variations	Colour	Tubing O.D.	
	Variations	Colour	Tubing O.D.    Metric size [mm]	
	Nylon Tubing Series T/TIA  General tubing 1.5 MPa max. at 20 °C	Black White Red Blue Yellow Green	02 04 08 010 012 016 0 1/6 0 1/4 0 3/6 0 1/2 0 1/6 (0 3/2 ) 0 1/6 0 1/4 0 3/6 0 1/2 0 1/6 0 1/2 0 3/6 0 1/2 0 1/2 0 1/2 0 1/2 0 1/2 0 1/2	
	Soft Nylon Tubing Series TS/TISA	Black White Red		
	Slightly flexible 1.0 MPa max. at 20 °C	Blue Yellow Green		
	Polyurethane Tubing Series TU/TIUB	Black White Red Blue		
Tubing	Flexible 0.8 MPa max. at 20 °C	Yellow Green Clear Orange		
	Soft Polyurethane Tubing Series TUS	Black White Red Blue		
'	Extremely flexible 0.6 MPa max. at 20 °C	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	2 cores		
	For flexible multi-tube applications	3 cores	<del>                                    </del>	
	FR Soft Nylon Tubing Series TRS	Black		
	Use in spatter generating atmosphere/Flame resistant material	White Red Blue		
	Flame resistance (Equivalent to UL-94 standard, V-0)	Green		



	Variations	Colour	Tubing O.D.
	variations		Metric size [mm] Inch size [inch]
	FR Double Layer Tubing Series TRB	Black White Red Blue	Ø2 Ø3 Ø4 Ø6 Ø8 Ø10 Ø12 Ø16 Ø19 Ø25 Ø16 Ø32) Ø16 Ø32 Ø346 Ø32) Ø144 Ø346 Ø142 Ø144 Ø144
	Flame resistance (Equivalent to UL-94 standard, V-0)	Yellow Green	
-	FR Double Layer Polyurethane Tubing Series TRBU	Black White Red Blue Yellow	
	Flame resistance (Equivalent to UL-94 standard, V-0)	Green	
-	Antistatic Polyurethane Tubing Series TAU	Black	
	Antistatic Soft Nylon Tubing Series TAS  For preventing static electricity	Black	
Tubing	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	
<u> </u>	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**



Rotary Joint

Low Torque Metal Seal Type Rotary Joint Series MQR



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

Gun Blow ( 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





#### Male thread type

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

Female thread type

0:			Port size		
Series	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)

One todo	one todor name type (or dignit Libew/Baiknedd)										
Series	Applicable tubing O.D. [mm]										
Series	Ø 3.2	Ø 4	Ø6	Ø8	Ø 10	Ø 12	Ø 16				
KK2											
KK3			•	•	•						
KK4			•	•	•						
KK6						•	•				

#### S Couplers without sleeve lock Series KKH





Series	Port size							
Selles	R 1/8		R 3/8	R 1/2				
KKH3	•	•	•					
KKH4								

Female thread type

Series	Port size					
Series	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]							
Jenes	5/8	6/9	6.5/10	8/12	8.5/12.5			
KKH3		•						
KKH4								

Stainless steel type



# Energy saving by pressure loss reduction Series KK130



Male/Female thread type

Series					Port size			
Jenes	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						•	•	•

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								
Series	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					
Series	1/4"	1/4"	3/8"	1/2"		
KK130	•	•	•	•		

Nut fitting type (for fiber reinforced urethane hose)

Carias		Applicable hose I.D./O.D. [mm]								
Series	5/8	6/9	6.5/10	8/12	8.5/12.5	11/16				
KK130	•		•		•	•				

One-touch fitting type

Ono todoi	1 111111119 131	-									
Corion		Applicable tube O.D.									
Series	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 TableLong stroke: Max. stroke: 400 mm

### **MXP Series**



Air Slide TableShort stroke: Max. stroke: 30 mm

### **MTS Series**



Precision Cylinder

### **CRJ Series**



Rotary ActuatorSingle rack-and-pinion type

### **MSQ Series**



Rotary ActuatorDouble 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



# 2 Finger Electric Gripper With Dust Cover Series LEHZJ



#### 2 Finger Electric Gripper Series LEHF



# 3 Finger Electric Gripper



- 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)	Gripping	force [N]	Opening/ closing speed	Weig	ht [g]
	[mm]	Standard	Compact	[mm/s]	Standard	Compact
10	4	C to 14	2 to 6	5 to 80	165	135
16	6	6 to 14	3 to 8	3 10 60	220	190
20	10	16 to 40	11 to 28	5 to 100	430	365
25	14	16 (0 40	11 10 28	3 10 100	585	520
32	22	52 to 130 —		5 to 120	1120	_
40	30	84 to 210	_	5 10 120	1760	_

- 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)	Gripping	force [N]	Opening/ closing speed	Weight [g]		
	[mm]	Standard	Compact	[mm/s]	Standard	Compact	
10	4	C to 14	3 to 6	5 to 80	170	140	
16	6	6 to 14	4 to 8	3 10 60	230	200	
20	10	10 to 10	11 to 20	5 to 100	440	375	
25	14	16 10 40	16 to 40 11 to 28 5 to 100		545	610	

- 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

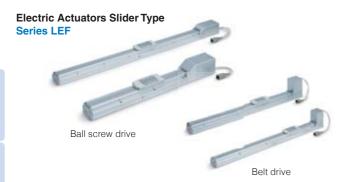
Size	Stroke (Both sides) [mm]	Gripping force [N]	Opening/ closing speed [mm/s]	Weight [g]
10	16 (32)	3 to 7	5 to 80	340 (370)
20	24 (48)	11 to 28		610 (750)
32	32 (64)	48 to 120	5 to 100	1625 (1970)
40	40 (80)	72 to 180		1980 (2500)

- ( ): For long stroke specification
  - 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	Gripping	force [N]	Opening/ closing speed	Wei	ight [g]
Size	[mm]	Standard	Compact	[mm/s]	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**



- 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				Worklo	ad [kg]		Screw lead	Positioning	
method	Specifications	Series	Stroke [mm]	Horizontal	Vertical	Speed [mm/s]	[mm]	repeatability [mm]	Controller series
		(11-)LEFS16	50 to 500	14 [9]	2	10 to 700 [500]	10	±0.02	
		(11-)LL1 310	30 10 300	15 [10]	4	5 to 360 [250]	5	{±0.015}	
		(44) 55005	50	12 [10]	0.5	20 to 1100 [1000]	20 Note)	±0.02	
		(11-)LEFS25	50 to 800 (600)	25 [20]	7.5	12 to 750 [500]	12	±0.02	
				30 [20]	15	6 to 400 [250]	6	{±0.015}	0 1 15000
	Step motor (Servo/24 V DC)	(44) 55000	50	20 [15]	4	24 to 1200 [1200]	24 Note)	±0.02	Series LECP6, LECP1, LECPA
		(11-)LEFS32	50 to 1000 (800)	45 [40]	10	16 to 800 [500]	16	±0.02	
				50 [45]	20	8 to 520 [250]	8	{±0.015}	
			450 . 4000	25 [20]	2	30 to 1200 [500]	30 Note)	±0.02	
		(11-)LEFS40	150 to 1200 (1000)	55 [50]	2	20 to 1000 [500]	20	±0.02	
			(1000)	65 [60]	23	10 to 300 [250]	10	{±0.015}	
Ball screw		(11-)LEFS16A	50 to 500	7	2	10 to 700	10	±0.02	
drive		(11-)LEF310A	30 10 300	10	4	5 to 360	5	{±0.015}	
	Servo motor (24 V DC) (11-)LEF			5	1	20 to 1100	20 Note)	±0.02	Series LECA6
		(11-)LEFS25A	50 to 800 (600)	11			±0.02		
		` ,		18	5	6 to 400	6	{±0.015}	
				10	4	max. 1500	20 Note)		
		(11-)LEFS25S	50 to 800 (600)	20	8	max. 900	12		
				20	15	max. 450	6		
	A O O			30	5	max. 1500	24 Note)	. 0.00	Series LECSA,
	AC Servo motor (100/200 W)	(11-)LEFS32S	50 to 1000 (800)	40	10	max. 1000	16	±0.02 {±0.01}	LECSB, LECSC, LECSS, LECSS-T,
	(100,0001)			45	20	max. 500	8	(==:::)	LECYU, LECYM
			450 to 4000	30	7	max. 1500	30 Note)		
		(11-)LEFS40S	150 to 1200 (1000)	50	15	max. 1000	20		
			(1000)	60	30	max. 500	10		
	Ctop motor	LEFB16	300 to 1000	1 [1]		48 to 1100			Series LECP6,
	Step motor (Servo/24 V DC)	LEFB25	300 to 2000	10 [5]	_	48 to 1400	48		LECP1, LECPA
	(00.10/21120)	LEFB32	300 to 2000	19 [14]		48 to 1500		±0.08	2201 1, 220171
Dolt deb :-	Servo motor	LEFB16A	300 to 1000	1	_	5 to 2000	48		Series LECA6
Beit arive	Bolt drivo	LEFB25A	300 to 2000	2	_	3 10 2000	40		OGIIGS LLOAU
		LEFB25S	300 to 2000	5					Series LECSA,
	AC Convo motor	LEFB32S	300 to 2500	15	_	max. 2000	54	±0.06	LECSB, LECSC, LECSS, LECSS-T,
. ( ) :	(100/200 VV)	LEFB40S	300 to 3000	25					LECYU, LECYM

- \* ( ) 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]
		(11-)LEFG16-S	50 to 500
Ball screw drive	Step motor (Servo/24 V DC)	(11-)LEFG25-S	50 to 800 (600)
ball screw drive	Servo motor (24 V DC) AC Servo motor	(11-)LEFG32-S	50 to 1000 (800)
		(11-)LEFG40-S	150 to 1200 (1000)
		LEFG16-BT	300 to 1000
	Step motor (Servo/24 V DC) Servo motor (24 V DC)	LEFG25-BT	300 to 2000
Belt drive	OCIVO MOIOI (24 V DO)	LEFG32-BT	300 to 2000
beit drive		LEFG25-BS	300 to 2000
	AC Servo motor	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<sup>2</sup>.

Drive				Worklo	ad [kg]	Max. speed	Screw lead	Positioning	
method	Specifications	Series	Stroke [mm]	Horizontal	Vertical	[mm/s]	[mm]	repeatability [mm]	Controller series
				15 Note)	3 Note)	1800	24 Note)		
		(11-)LEJS40	200 to 1200	30	5	1200	16		
Ball screw	Ball screw			55	10	600	8	±0.02 (±0.01)	Series LECSA,
drive	AC Servo motor			30 Note)	6 Note)	1800	30 Note)	±0.02 (±0.01)	LECSB, LECSC,
	(100/200 W)	(11-)LEJS63	300 to 1500	45	10	1200	20		LECSS, LECSS-T,
				85	20	600	10		LECYU, LECYM
Bolt drive	Belt drive	LEJB40	200 to 2000	20		2000	27	±0.04	1
Delt drive	Belt drive		300 to 3000	30	_	3000	42	±0.04	

 $<sup>\</sup>ast$  ( ) 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	LEL25M	Sliding bearing	100 to 1000	3	48 to 500	48	±0.08	Series LECP6,
(Servo/24 V DC)	LEL25L	Ball bushing bearing	100 10 1000	5	48 to 1000	40	±0.08	LECP1



Low Profile Slider Type



- 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 <sup>2</sup> ]	Screw lead [mm]	Positioning repeatability [mm]	Controller series
		LEMB25	50 to 2000	6					
		LEMB32	30 10 2000	11	1000				
	LEMC25		50 to 2000	10	1000				Series
Belt drive	Step motor	LEMC32	30 10 2000	20		20000	48	±0.08	LECP6,
Dell drive	(Servo/24 V DC)	LEMH25	50 to 1000	10		20000	40	±0.00	LECP1,
		LEMH32	50 to 1500	20	2000				LECP2
		LEMHT25	50 to 1000	10	2000				
		LEMHT32	50 to 1500	20					

<sup>\*</sup> 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	Specifications Type Series		Stroke	Screw lead	Pushing	force [N]		Workload ontal) [Kg]		Workload cal) [Kg]	Speed (h [mr	orizontal) n/s]	Positioning repeatability	Controller
			[mm]	[mm]	Basic	Compact	Basic	Compact	Basic	Compact	Basic	Compact	[mm]	Series
		LEPY6		4	14 to 20		2.0		0.5		10 to 50			
	Miniature	LEFTO	25, 50	8	7 to 10		1.0		0.25		20 to 300			
	rod type	LEPY10	75	5	25 to 50	24 to 40	6.0	4.0	1.5	1.5	10 to	200		Series
Step motor		LEFTIU		10	12.5 to 25	12 to 20	3.0	2.0	1.0	1.0	20 to	350	±0.05	LECP6,
(Servo/24 V DC)		LEPS6		4	14 to 20		1.0		0.5		10 to 50		±0.05	LECP1,
	Miniature slide table	LEFSU	25, 50	8	7 to 10		0.75		0.25		20 to 300			LECPA
	type	LEPS10	25, 50	5	25 to 50	24 to 40		2.0	1.5	1.5	10 to	200		
	,,,	LLF310		10	12.5 to 25	12 to 20		1.5	1.0	1.0	20 to	350		

### **Electric Actuator Rod Type Series LEY**



- 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.
- $\bullet$  High precision rod type electric actuator, in-line type LEYH $\Box D$ available.

		Stroke	Pushing force	Workloa	ad [kg]		Screw lead	Positioning	
Specifications	Series	[mm]	[N]	Horizontal	Vertical	Speed [mm/s]	[mm]	repeatability [mm]	Controller series
			38	6 [4]	2	15 to 500	10		
	LEY16□	30 to 300	74	17 [11]	4	8 to 250	5		
			141	30 [20]	8	4 to 125	2.5		
	L EVOE ( ) ( )	00   400	122	20 [12]	8 ((7))	18 to 500 ((400))	12		
	LEY25□(-X5)	30 to 400	238	40 [30]	16 ((15))	9 to 250 ((200))	6		
			452	60 [30]	30 ((29)	5 to 125 ((100))	3		Series LECP6, LECP1. LECPA
Step motor (Servo/24 V DC)			189	30 [20]	11 ((10))	24 to 500 ((400))	16		LEGPT, LEGPA
	LEY32□(-X5)	30 to 500	370	45 [40]	22 ((21))	12 to 300 [250] ((200))	8		
			707	60 [40]	43 ((42))	6 to 150 [125] ((100))	4	±0.02	
			283	50 [30]	13	24 to 500 [300]	16		
	LEY40□	30 to 500	553	60 [60]	27	12 to 350 [150]	8		
			1058	80 [60]	53	6 to 175 [75]	4		
			30	3	2	2 to 500	10		Series LECA6
	LEY16□A	30 to 300	58	6	4	1 to 250	5		Series LLCA0
Servo motor			111	12	8	1 to 125	2.5		
(24 V DC)			35	7	3 ((2))	2 to 500 ((400))	12		
	LEY25□A(-X5)	30 to 400	72	15	6 ((5))	1 to 250 ((200)	6		
			130	30	12 ((11))	1 to 125 ((100))	3		
			131	18	8	max. 900	12		
	LEY(H)25□S(-X5)	30 to400	255	50	16	max. 450	6		
AC Servo motor			485	50	30	max. 225	3		Series LECSA,
(100/200/400 W)			157(197)	30	9	1200 (1000)	20 (16)		LECSB, LECSC,
	LEY(H)32□S(-X5)	30 to 500	308(385)	60	19	600 (500)	10 (8)	±0.02 {±0.01}	LECSS, LECSS-T, LECYU, LECYM
			588(736)	60	37	300 (250)	5 (4)	10.02 (10.01)	LECTU, LECTIVI
			521	40	19	max. 1000	20		
AC Servo motor	LEY (H) 63□S	100 to 800	(100/200/400 W)	70	38	max. 500	10		
(400 W)	LLI (F) USLIS	100 10 000	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

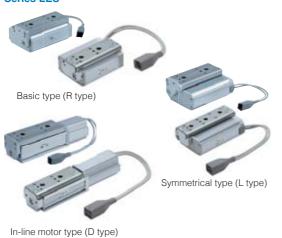
- High rigidity through additional guide rods
- Two motor types available: step motor and servo motor
- Optional non-magnetising type lock mechanism for the motor.

			Pushing force	Workloa	ad [kg]		Screw lead	Positioning		
Specifications	Series	Stroke [mm]	[N]	Horizontal	Vertical	Speed [mm/s]	[mm]	repeatability [mm]	Controller series	
			38	6 [4]	1.5	15 to 500	10			
	LEYG16	20 to 200	74	17 [11]	3.5	8 to 250	5			
			141	30 [20]	7.5	4 to 125	2.5			
			122	20 [12]	7	18 to 500	12			
	LEYG25□	30 to 300	238	40 [30]	15	9 to 250	6			
Step motor			452	60 [30]	29	5 to 125	3		Series LECP6,	
(Servo/24 V DC)			189	30 [20]	9	24 to 500	16		LECP1, LECPA	
	LEYG32□	30 to 300	370	45 [40]	20	12 to 300 [250]	8			
			707	60 [40]	41	6 to 150 [125]	4	. 0. 00		
			283	50 [30]	11	24 to 500 [300]	16	±0.02		
	LEYG40□	30 to 300	553	60 [60]	25	12 to 350 [150]	8			
			1058	80 [60]	51	6 to 175 [75]	4	1		
			30	3	1.5	2 to 500	10			
	LEY16G□A	30 to 200	58	6	3.5	1 to 250	5			
Servo motor			111	12	7.5	1 to 125	2.5		Series LECA6	
(24 V DC)			35	7	2	2 to 500	12		Selles LECAO	
	LEY25G□A	30 to 300	72	15	5	1 to 250	6			
			130	30	11	1 to 125	3			
			131	18	7	max. 900	12			
	LEY(H)G25□S	30 to 300	255	50	15	max. 450	6	]	Series LECSA,	
AC Servo motor			485	50	29	max. 225	3	±0.02 {±0.01}	LECSB, LECSC,	
(100/200 W)			157 (197)	30	7 (10)	1200 (1000)	20 (16)	±0.02 (±0.01)	LECSS, LECSS-T,	
	LEY(H)G32□S	30 to 300	308 (385)	60	17 (22)	600 (500)	10 (8)		LECYU, LECYM	
			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



# • Up to 64 points positioning.

applications

 Reduced cycle time: max.acceleration 5000 mm/s<sup>2</sup>; max. speed 400 mm/s.

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

• 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.

				D 1:	Workload [kg]		0 1	0 1 1	Positioning	
	Specifications	Series	Stroke [mm]	Pushing force [N]	Horizontal	Vertical	Speed [mm/s]	Screw lead [mm]	repeatability [mm]	Controller series
Compact type	Step motor (Servo/24 V DC)	LES8□	30, 50, 75	15	1	0.5	10 to 200	4		Series LECP6, LECP1, LECPA
			30, 30, 73	10	1	0.25	20 to 400	8		
		1 = 0.4.0	30, 50, 75, 100	55	3	3	10 to 200	5	±0.05	
		LES16□		35	3	1.5	20 to 400	10		
		1 <b>50</b> 05	30, 50, 75 100, 125, 150	180	5	5	10 to 200	8		
		LES25□		100	5	2.5	20 to 400	16		
ıpa		LES8□A	30, 50, 75	11	1	1	1 to 200	4		Series LECA6
Con				7.5	1	0.5	1 to 400	8		
	Servo motor (24 V DC)	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		
	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		
High rigidity type				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



- Up to 64 positioning points.
- Rotation angles: 90°, 180°, 320° (310° for LER10), 360°.
- Maximum acceleration 3000°/s2.

Charifications	Series	Rotating torque [N·m]		Speed	d [°/s]	Positioning repeatability [°]		Controller series
Specifications		Basic	High torque	Basic	High torque	Basic	High torque	Controller series
0	LER10	0.22	0.32				Series LECP6,	
Step motor (Servo/24 V DC)	LER30	0.8	1.2	30 to 420	20 to 280	±0.05 [±0.01] (±0.03)		LECP1,
(00100/24 0 00)	LER50	6.6	10					LECPA Note)

<sup>\* []</sup> indicates value when an external stopper is mounted.

<sup>\* ( )</sup> indicates value when "high precision type" is selected.



#### 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, LFH LFM
- 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
- $\bullet$  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.
- $\bullet$  LECYU MECHATROLINK-III type, with speeds of 100 Mbps and cycles of 125  $\mu s.$

#### 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 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
- ullet Two sizes that offer an equivalent thrust to a  $\varnothing$  16 and  $\varnothing$  25 air cylinder

#### **Basic Specifications**

Edele opecinications						
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

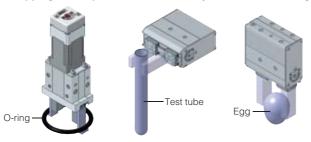
Series	Stroke [mm]	Sensor (optical linear encoder)	Linear motor	ar motor I linear dilide I Pilening I = = = = = = = = = = = = = = = = = =		Pushing mearurement	Maximum load mass [g]		Maximum speed	
		Resolution [µm]	Туре		Instantaneous max. thrust [N]	Accuracy [µm]		Horizontal	Vertical	[mm/s]
	10		Moving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

<sup>\* ( )</sup> indicates value when LAT3F is selected.



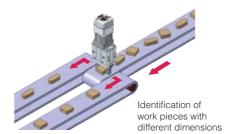
#### **Applications**

• Gripping of components that are easily deformed or damaged

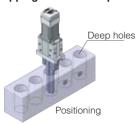


Speed and gripping force control and positioning

• Alignment and selection of randomly lined parts







• Soft touch/High frequency

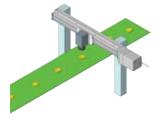


• Gripping of cylindrical and spherical parts



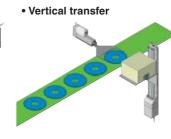
Speed and gripping force control



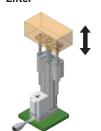








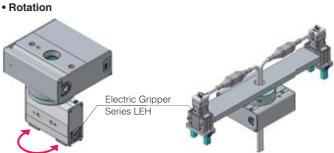
• Lifter



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

Stopper





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 I/min (ANR)\*



### Series ITV1000 200 I/min (ANR)\*



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

### Series ITV2000 1500 I/min (ANR)\*



### Series ITV3000 4000 I/min (ANR)\*



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

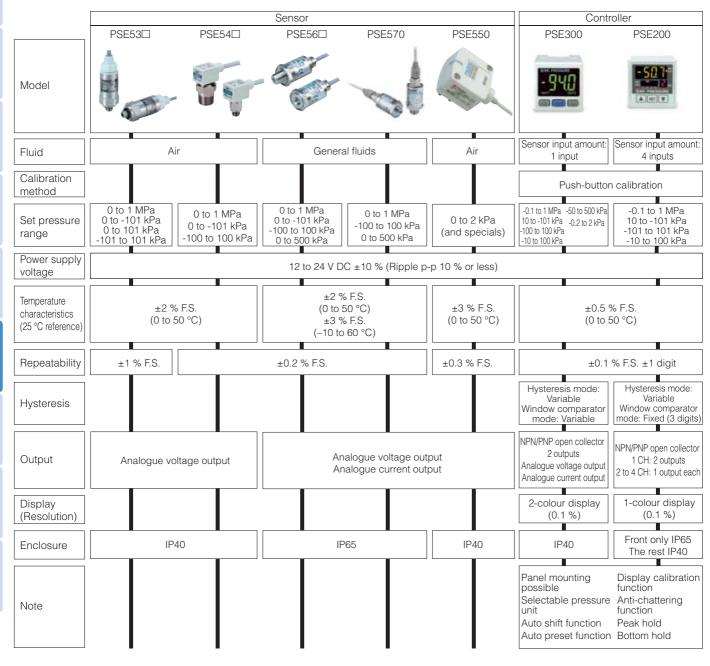


- Fieldbus compatibility added to series ITV1000/2000/3000 specifications.
- Reduced wiring.
- Now with RS-232C serial communications capability.
- CC-Link, DeviceNet, Profibus

	Series	Input	Model	Set pressure range	Sensitivity	Accuracy
	Series ITV0000 6 I/min (ANR)*		ITV001	0.001 ~ 0.1 MPa	0.2 kPa	
	Colonia	Current DC 4 to 20 mA (Sink type) Current DC 0 to 20 mA	ITV003	0.001 ~ 0.5 MPa	1.0 kPa	
	S	(Sink type) Voltage DC 0 to 5 V Voltage DC 0 to 10 V	ITV005	0.001 ~ 0.9 MPa	1.8 kPa	
		Voltage Be o to 10 V	ITV009	-1 ~ -100 KPa	0.2 kPa	
	Series ITV1000 200 I/min (ANR)*  • Parts in contact with		ITV101	0.005 ~ 0.1 MPa	0.2 kPa	
	fluids are oil free.		ITV103	0.005 ~ 0.5 MPa	1.0 kPa	Linearity
	The state of the s		ITV105	0.005 ~ 0.9 MPa	1.8 kPa	Within ±1 % F.S.
	<b>Series ITV2000</b> 1500 l/min (ANR)*	Current DC 4 to 20 mA (Sink type) Current DC 0 to 20 mA	ITV201	0.005 ~ 0.1 MPa	0.2 kPa	
١.		(Sink type) Voltage DC 0 to 5 V Voltage DC 0 to 10 V	ITV203	0.005 ~ 0.5 MPa	1.0 kPa	Hysteresis
regulat		CC-Link compatible DeviceNet™ compatible PROFIBUS DP compatible RS-232C communication	ITV205	0.005 ~ 0.9 MPa	1.8 kPa	Within 0.5 %
oressure	Since Mind		ITV209	-1.3 ~ -80 kPa	0.16 kPa	F.S.
Electro-pneumatic pressure regulator	Series ITV3000 4000 l/min (ANR)*		ITV301	0.005 ~ 0.1 MPa	0.2 kPa	
Electro-p			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.

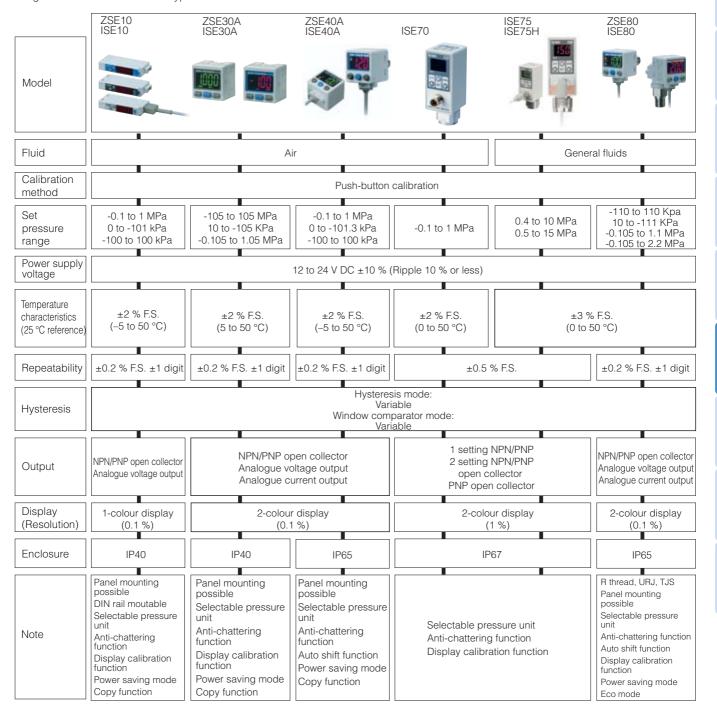
# Digital Pressure Switch Series Variations

Individual sensor and controller type



# Digital Pressure Switch Series Variations

Integrated sensor and controller type





### **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
- 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

# Sensor connector **CON CONNECTOR** No tools required! Power supply/Output connector

Channel scan function

for each channel.

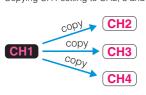
Allows constant monitoring of

the displayed pressure value

#### **Function**

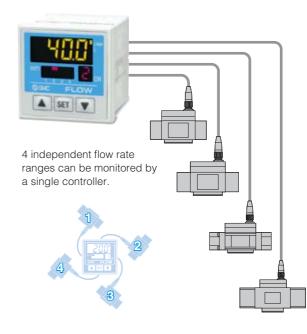
Copy function Possible to copy information from one channel to one or more other channels.

Copying CH1 setting to CH2, 3 and 4.



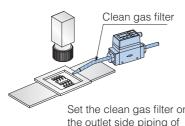
- Key lock function
- Unit switching function
- Peak value and bottom value holding

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



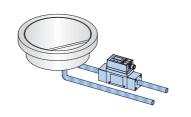
# **Application Examples**

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

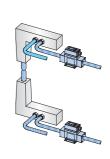


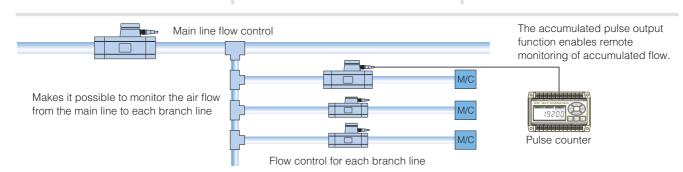
Set the clean gas filter on the outlet side piping of the flow switch.

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



Flow control of pressurized cooling water for welding gun







# Digital Flow Switch

**Series Variations** 

# Series PFM For Air, N<sub>2</sub>, Ar and CO<sub>2</sub>

	To Bridge	C grant 1	025	
Flow rate measurement	Into grated type	Remote type		
range [l/min]	Integrated type	Sensor unit	Display unit	
0.2 to 10 (0.2 to 5)	PFM710	PF2A510		
0.5 to 25 (0.5 to 12.5)	PFM725	PF2A525	PFM3□□	
1 to 50 (1 to 25)	PFM750	PF2A550		
2 to 100 (2 to 50)	PFM711	PF2A511		

( ): In the case of CO2

# Series PFMB For Air and N2

Integrated type
PFMB7201
PFMB7501
PFMB7102
PFMB7202

# Series PFMC For Air and N<sub>2</sub>

Selles Frid For All and N2				
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

Series Frim For Dry All					
		250			
Flow rate measurement	Remote type				
range [I/min]	Sensor unit	Display unit			
0 to 0.5	PFMV505				
0 to1	PFMV510				
0 to 3	PFMV530				
-0.5 to 0.5	PFMV505F	PFMV30□			
-1 to 1	PFMV510F				
-3 to 3	PFMV530F				



# Digital Flow Switch Series Variations

# Series PF2A For Air

			Mr. Alle person A - D - V	SOOT TO THE PERSON OF THE PERS
Flow rate measurement	linta nizata al timo a		Remote type	
range [l/min]	Integrated type	Sensor unit	Display unit	Display unit (4ch)
1 to 10	PF2A710	PF2A510	PF2A30□	
5 to 50	PF2A750	PF2A550	PFZAJULI	
10 to 100	PF2A711	PF2A511		PF2A20□
20 to 200	PF2A721	PF2A521	PF2A31□	
50 to 500	PF2A751	PF2A551		
150 to 3000	PF2A703H			
300 to 6000	PF2A706H	_	_	_
600 to 12000	PF2A712H			

# **Series PF2W For Water**

501100112111011111111111111111111111111						
	O P		A - G - V	<b>400</b>		
Flow rate measurement	Integrated type	Remote type				
range [I/min]	integrated type	Sensor unit	Display unit	Display unit (4ch)		
0.5 to 4	PF2W704(T)	PF2W504(T)				
2 to 16	PF2W720(T)	PF2W520(T)	PF2W30□	PF2W20□		
5 to 40	PF2W740(T)	PF2W540(T)		FFZVVZULI		
10 to 100	PF2W711	PF2W511	PF2W33□			

# **Series PF2D For Deionized Water and Chemicals**

	THE STATE OF THE S	Me the serv	Sime Allow	
Flow rate measurement	Remote type			
range [I/min]	Sensor unit	Display unit	Display unit (4ch)	
0.4 to 4	PF2D504			
1.8 to 20	PF2D520	PF2D30□	PF2D20□	
4.0 to 40	PF2D540			

# Series PF3W For Water

			P 20
Flow rate measurement	Integrated type	Remote type	
range [I/min]		Sensor unit	Display unit
0.5 to 4	PF3W704	PF3W504	
2 to 16	PF3W720	PF3W520	
5 to 40	PF3W740	PF3W540	PF3W30
10 to 100	PF3W711	PF3W511	
50 to 250	PF3W721	PF3W521	

# Series PF3W For Water (PVC Piping)

		طِنْ،	BA
Flow rate measurement	Integrated type	Remo	te type
range [I/min]	integrated type	Sensor unit	Display unit
10 to 100	PF3W711-U25	PF3W511-U25	PF3W30
30 to 250	PF3W721-U30	PF3W521-U30	FF3W3U



- 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

Specificati	ions							
Ionizer mo	odel	IZS40	IZS41-□□ (NPN)	IZS41-□□P (PNP)	IZS42-□□ (NPN)	IZS42-□□P (PNP)		
Ion generation method			Corona discharge type					
Electrode	voltage type	AC, DC	AC, Sensi	ng AC, DC	Dual AC			
Electrode	voltage		±7000 V		±60	00 V		
Ion balanc	ce <sup>Note)</sup>			±30 V				
	Fluid		Air (Clean dry air)					
Air purge	Operating pressure		0.5 MPa or less					
All purge	Proof pressure			0.7 MPa				
	Connecting tube O.D.			Ø 6, Ø 8, Ø 10				
Current co	onsumption	330 mA or less		s (Sensing AC, al run: 480 mA or less)		a or less al run: 740 mA or less)		
Power sup	ply voltage		24 V DC ±10 9	% (100 to 240 V AC: AC a	dapter option)			
Power supply v	voltage in transition wiring	_		24 V DC to	26.4 V DC			
Innut signal	Discharge stop signal		Connect to GND	Connect to +24 V Voltage range: 19 V DC to power supply voltage	Connect to GND	Connect to +24 V Voltage range: 19 V DC to power supply voltage		
Input signal	Electrode contamination detection signal				0 0	Current consumption: 5 mA or less		
Output signal	Maintenance signal		Max. load current: 100 mA Voltage drop 1 V or less	Max. load current: 100 mA Voltage drop 1 V or less	Max. load current: 100 mA Voltage drop 1 V or less	Max. load current: 100 mA Voltage drop 1 V or less		
Output signal	Error signal		(at 100 mA load current) Max. applied voltage: 26.4 V DC	(at 100 mA load current)	(at 100 mA load current) Max. applied voltage: 26.4 V DC	(at 100 mA load current)		
Function		High voltage error detection (Ion discharge stops if error found)		ouilt-in sensor, electrode contami narge stop input, transition wiring				
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 h	umidity		35 to 8	80 % Rh (with no condens	sation)			
Material		Ionizer	cover: ABS, Electrode c	artridge: PBT, Electrode:	Tungsten, Single crystal	silicon		
Impact res	sistance			100 m/s <sup>2</sup>				
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	I/min	4400	I/min	
Applied voltage			±5	kV		
Ion genera	ation method		Corona disc	charge type		
	applying voltage		DC	type		
Offset volta	age (Ion balance) <sup>Note)</sup>		±Ę	5 V		
Power sup	ply voltage		24 V D0	C ±10 %		
Current co	nsumption	0.9 A	or less	1.3 A	or less	
Input	Ionizer stop signal	Connect with 0 V Voltage range: 5 V DC or	Connect with +24 V Voltage range: 19 V DC to	Connect with 0 V Voltage range: 5 V DC or	Connect with +24 V Voltage range: 19 V DC to	
signal	Cleaning input signal	less Current consumption: 5 mA or less	power supply voltage Current consumption: 5 mA or less	less Current consumption: 5 mA or less	power supply voltage Current consumption: 5 mA or less	
Output	Maintenance signal	Maximum load current: 100 mA Residual voltage: 1 V or less	Maximum load current: 100 mA	Maximum load current: 100 mA Residual voltage: 1 V or less	Maximum load current: 100 mA	
signal	Error signal	(Load current: 100 mA) Maximum applied voltage: 26.4 V DC	Residual voltage: 1 V or less (Load current: 100 mA)	(Load current: 100 mA) Maximum applied voltage: 26.4 V DC	Residual voltage: 1 V or less (Load current: 100 mA)	
Ambient temperature		Operating: 0 to 50 °C Stored: -10 to 60 °C				
Ambient h	umidity	Operating, Stored: 35 to 80 % RH (No condensation)				
Material		Case: ABS/PBT/Stainless steel Emitter: Tungsten				
Impact res		100 m/s <sup>2</sup>				
Applicable	e 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	C ±10 %					
Output	NPN open collector output PNP open collector outp							
Air flow	0.66 m <sup>3</sup> /min	0.46 m <sup>3</sup> /min	0.66 m <sup>3</sup> /min	0.46 m <sup>3</sup> /min				
Power consumption	6.1 W or less	3.7 W or less	6.6 W or less 4.8 W or les					
Ambient temperature	Op	peration: 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)						





- 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

lor	nizer model	IZN10-□□ (NPN specification)	IZN10-□□P (PNP specification)			
Ion generation met	hod	Corona d	ischarge type			
Method of applying	yvoltage	High frequency AC type				
Discharge output N	ote 1)	2,	500 V			
Ion balance Note 2)	Energy saving static electricity elimination nozzle	Within ±10 V				
	High flow rate nozzle	With	in ±15 V			
Ozone generation N	Note 3)	0.03 ppm (0.05 ppm for energy sav	ving static electricity elimination nozzle)			
	Fluid	Air (Cle	ean dry air)			
Air purge	Operating pressure Note 4)	0.05 MP	a to 0.7 MPa			
	Connecting tube size	Ø 6 / s	Ø 1/4 inch			
Power supply volta	ge	24 V [	OC ±10 %			
Current consumption	on	80 mA				
	Discharge stop signal	Connected to GND	Connected to +24 V			
Input signal	Reset signal	(ON voltage: 0.6 V or less)	(ON voltage: Between +19 V and power supply voltage)			
	External switch signal	Current consumption: 5 mA or less	Current consumption: 5 mA or less			
	Discharge signal	Max. load current: 40 mA	Max. load current: 40 mA			
Output signal	Error signal	Residual voltage: 1 V or less (load current at 40 mA)	Residual voltage: 1 V or less			
	Maintenance signal	Max. applied voltage: 28 V DC	(load current at 40 mA)			
Effective static election elimination distance	3	20 to	500 mm			
Ambient and fluid t	emperature	0 to	o 55 °C			
Ambient humidity		35 to	65 % RH			
Material		Housing: ABS, Stainless steel Nozzle: Stainless steel Electrode needle: Tungsten				
Vibration resistance	е	Durability: 50 Hz, Amplitu	ude: 1 mm, XYZ each 2 hours			
Shock resistance			10 G			
Weight		120 g				
Standards/Directive	е	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  $M\Omega$  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	Noz	zle type				
Number of ionizers	1	2				
Ion generation method	Corona di	scharge type				
Method of applying voltage	High frequ	ency AC type				
Discharge time	0.3 s (100	00 V→100 V)				
Offset voltage	Within ±10 V (Static neutralisation	n distance: 100 mm from the nozzle)				
Fluid	Air (	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/T	imer [2 / 5 / 10 s]				
Additional air blow setting		blow [50 / 100 ms intervals]				
Operating temperature range	0 to 55	5 °C Note 1)				
Air consumption Note 2)	420 I/min (ANR)	800 I/min (ANR)				
Weight Note 3)	5.1 kg	9.9 kg				
Standards/Directive	CE (EMC Direc	CE (EMC Directive: 2004/108/EC)				

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□

 Prevents Micro-Bubbles Diaphragm (PTFE)

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

• Minimal dead space

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

 Outstanding corrosion resistance Body (New PFA)

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

# Stable Sealing Surface Guide ring

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

> Low particle generation Piston bumper

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

Back-pressure resistance and long life

Buffer

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

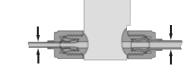
• Different tubing sizes can be selected Hyper fitting











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

# 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-G-AD

Series LVH-G-AD



- For organic solvents
- Air operated: Series LVA- G-AD ,
- Manually operated: Series LVH-G -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



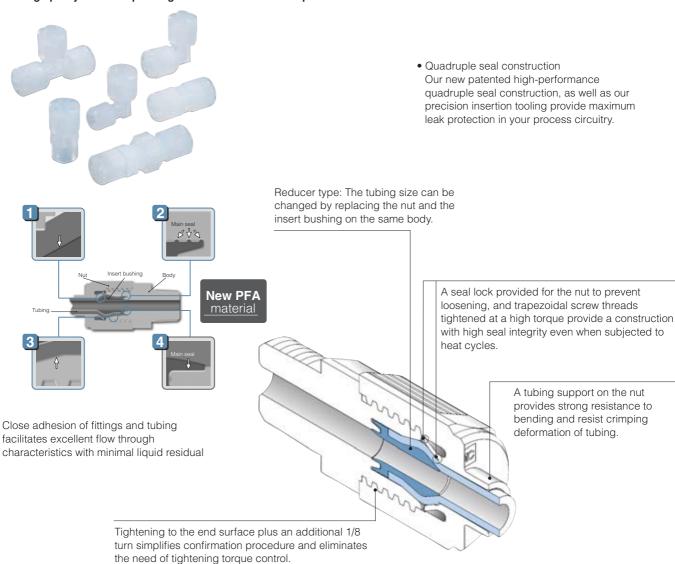
Integral Tubing (construction)



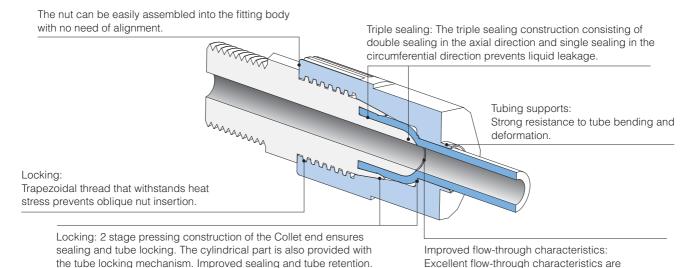
# HYPER FITTING® Series LQ1•LQ2•LQ3

# High Purity Fluoropolymer Fittings & Tubing Series LQ1•LQ2

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



### Series LQ3 Collet Type/LQ3



achieved by minimizing liquid deposit.



# LQ<sup>1</sup><sub>2</sub> Series

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

				Port size					7 101		Tube O.D.									-					
Serie	S	Shape	Size	ze									c siz							ch si					
				None	1/8"	1/4"	3/8"	1/2"	3/4"	1"	Ø3	Ø4	Ø6	Ø8	Ø 10	Ø 12	Ø 19	Ø 25	1/8"	3/16"	1/4"	3/8"	1/2"	3/4"	1"
Connector	Male		1	_	0	_	_	_	_	_	0	0	_	_	_	_	_	_	0	_	_	_	_	_	_
LQ <sub>2</sub> <sup>1</sup> H	Female												0								0				
Elbow	Male		2	-	0	0	-	-	-	-	-	•	0	-	-	-	-	-	•	•	0	-	-	-	-
LQ <sub>2</sub> <sup>1</sup> L	Female		3	-	_	0	0	-	_	-	-	_	•	•	0	_	_	-	_	-	•	0	_	-	_
Run tee	Male		4	-	-	-	0	0	_	_	_	_	_	_	•	0	_	_	_	-	_	•	0	-	_
LQ <sub>2</sub> <sup>1</sup> R	Q'zR Female																								
Branch tee	anch tee Male		5	-	-	-	-	0	0	-	-	-	-	-	-	•	0	-	-	-	-	-		0	-
LQ <sub>2</sub> <sup>1</sup> B			6	-	-	-	-	-	0	0	-	-	_	-	-	-	•	0	-	-	-	-	-	•	0
Union elbow			1	0	_	-	_	_	_	_	0	0	_	_	_	_	_	_	0	_	_	_	_	_	_
Union tee LQ <sub>2</sub> <sup>1</sup> T			2	0	-	-	-	-	-	-	-	•	0	-	-	-	-	-	•	•	0	-	-	-	_
Panel mount u LQ <sub>2</sub> <sup>1</sup> P Union	ınion		3	0	-	-	-	-	-	-	-	-	•	•	0	-	-	-	-	-	•	0	-	-	-
			4	0	-	-	-	-	-	-	-	-	-	_	•	0	-	-	_	-	-	•	0	-	-
LQ <sub>2</sub> <sup>1</sup> U			5	0	_	-	-	-	-	-	_	-	-	-	-	•	0	-	-	-	_	-	•	0	-
Union flange LQ1F			6	0	-	_	-	-	-	-	-	_	_	-	_	_	•	0	-	_	-	-	_	•	0

Note 1) Standard size ○ With Reducer ●

Note 2) The union flange is only available with LQ1 (Size 4, 5, 6).

	Model			LQ1 S	Series				LQ2 S	Series	
Item	Woder	LQ1□10	LQ1□20	LQ1□30	LQ1□40	LQ1□50	LQ1□60	LQ2□20	LQ2□30	LQ2□40	LQ2□50
Maximum operating pre	ssure (at 20 °C)			1.01	MРа				1.0	MPa	
Operating temperate	ure			0 to 2	200 °C			0 to 200 °C			
Applicable tubing size	mm size			Ø 3 to	Ø 25			Ø 4 to Ø 19			
Applicable tubing size	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**





- Montable in a 19-inch rack. Saves space by mounting multiple equipment together in a rack
- Cooling capacity 200 W, 800 W, 1000 W
- $\bullet$  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 /**



- 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

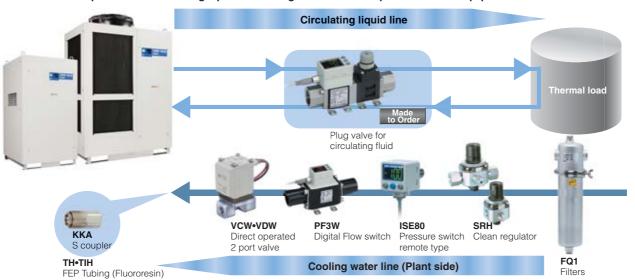


- Set temperature range: 0 to 60 °C
- Temperature stability: ±0.03 °C
- Cooling capacity 140 W, 220 W, 320 W
- Type of fluid: Water, Ethylene glycol aqueous solution, Fluorinated fluid
- Tank capacity: 10 to 39 L • International standards: CE, UL



### 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
- 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



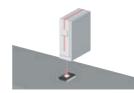
### Laser machining

- Cooling of laser irradiated part



#### Laser marker

- Cooling of laser irradiated part



# Atomising device (food and cosmetics)

- Temperature control of sample and device



# Physical and chemical analysis



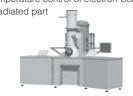
Temperature control of various samples, materials and parts

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



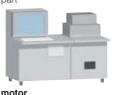
# Electronic microscope

- Temperature control of electron-beam irradiated part



#### Ultrasonic wave inspection machine

- Temperature control of ultrasonic wave laser part

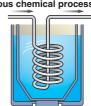


# Linear motor

- Temperature control of moving coil



# Various chemical processes



Indirect temperature control of chemicals and liquids with high viscosity

# **Applications for Thermo-Bath**

# Semiconductor manufacturing



Evaporation of chemicals for MOCVD Temperature control of diffusion gas

# Various tests



Thermal test with immersion





# **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

N.4	ماما	Port size (Applicable tubing O.D.)	Recommended air	Weight	
IVI	odel	IN side, OUT side	flow [I/min] (ANR)	[g]	
	ZFC050-02	Ø2	2	4.9	
	ZFC050-23	Ø 3.2	7	4.0	
	ZFC050-04	Ø 4	10	4.3	
	ZFC100-04	Ø 4	10	44.5	
Metric size	ZFC100-06	Ø6	20	11.5	
WICTIO SIZO	ZFC200-06	Ø6	30	04.5	
	ZFC200-08	Ø8	50	21.5	
	ZFC75	Ø8	70	20.0	
	ZFC76	Ø 10	80	05.0	
	ZFC77	Ø 12	100	25.0	
	ZFC051-01	Ø 1/8"	7	4.0	
	ZFC051-03	Ø 5/32"	10	4.3	
	ZFC101-03	Ø 5/32"	10	44.5	
Inch size	ZFC101-07	Ø 1/4"	20	11.5	
111011 0120	ZFC201-07	Ø 1/4"	30	04.5	
	ZFC201-09	Ø 5/16"	50	21.5	
	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

Mod	dal	Port size (Applicable tube O.D.)	Recommended air	Weight
IVIO	uei	IN side, OUT side	flow [I/min] (ANR)	[g]
	ZFB100-04	Ø 4	10	22
	ZFB100-06	Ø 6	20	22
Metric size	ZFB200-06	Ø 6	30	30
IVIEUTO SIZE	ZFB200-08	Ø 8	50	30
	ZFB300-08	Ø8	75	39
	ZFB300-10	Ø 10	75	39
	ZFB101-05	Ø 3/16"	20	22
	ZFB101-07	Ø 1/4"	20	22
Inch size	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 [I/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					

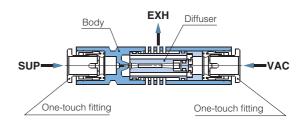


#### Vacuum Ejector, In-line type **Series ZU**

# 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



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		ort Vacuum (V)	Suction cap. [I/min]	Max. Vacuum pressure
. ,		-1	7 (II (I V, I D)	vacaam (v)		'
0.4	ZB0411-K15L-C4				3.5	
0.6	ZB0611-K15L-C4	PV, PD	M5 thread	Ø 4 mm	7	90 kPa
0.4	ZB0421-K15L-C4		depth 4	9 4 111111	3.5	-90 Ki a
0.6	ZB0621-K15L-C4	PV PD			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)

,	0	117	,	,	,
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		29	
1.0	ZK2A10K5CL-06	2 x PNP	0 ~ -101	44	-91 kPa
1.2	ZK2A12K5CL-08	2 x PNP	0 ~ -101	61	-91 Kra
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

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

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



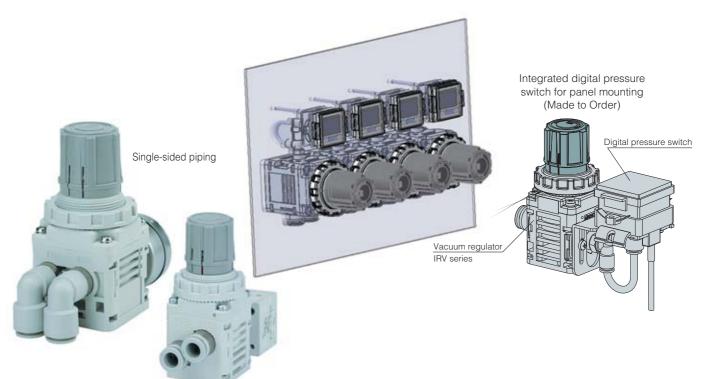
# **Vacuum Regulator Series IRV**



- Single sided connections series. For ease of installation and panel
- 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)

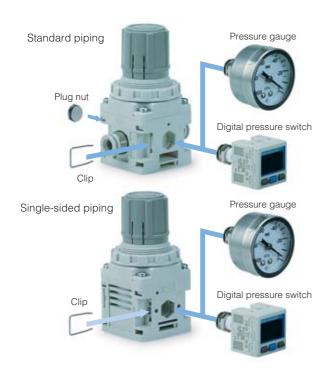






• Easy to attach/detach the pressure gauge or digital pressure switch due to attachment by clip. Variations standard connections mounting direction of the

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 Standard piping





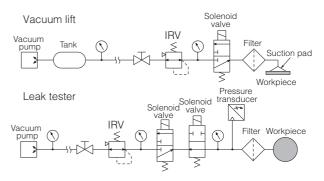
• Built-in one-touch fittings Different size options for both fitting types



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

# Standard piping Single-sided piping Straight Straight Elbow Elbow

# Example of Applications



# Specifications

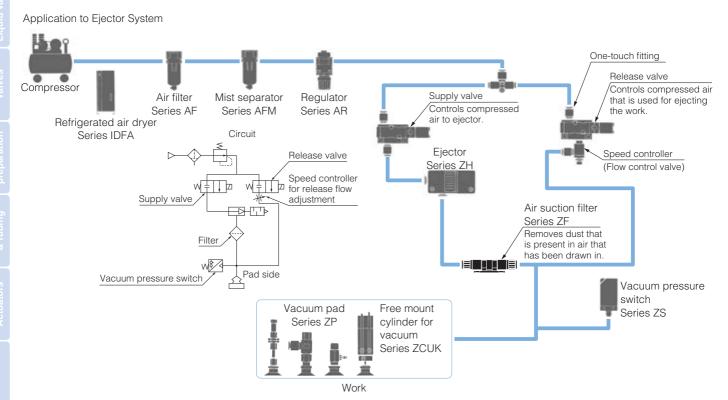
Model		IRV10	IRV20		
Fluid		Air			
Set pressure rar	nge <sup>Note 1)</sup>	-100 to -1.3 kPa			
Atmospheric intal	ke consumption Note 2)	0.6 I/min (ANR) or less			
Knob resolution		0.13 kPa or less			
Ambient and flu	id temperature	5 to 60 °C			
Weight (Without	Standard piping	135 g	OFO ~		
accessories)	Single-sided piping	125 g	250 g		

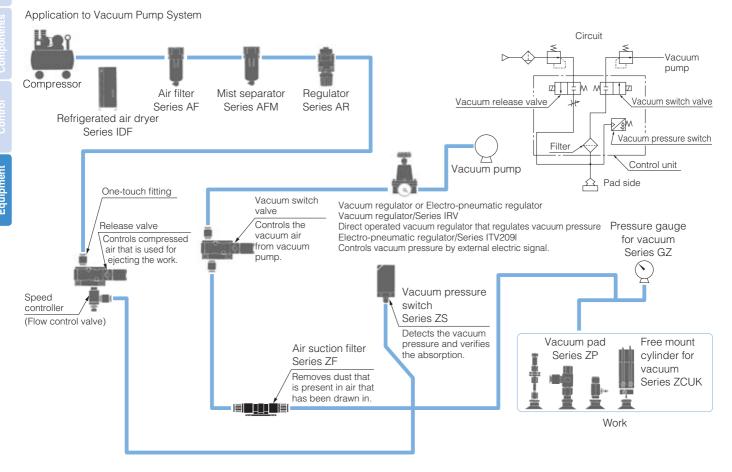
Note 1) The range varies in accordance with the vacuum pump pressure. Note 2) The product normally takes in air from the atmosphere.



## 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







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**

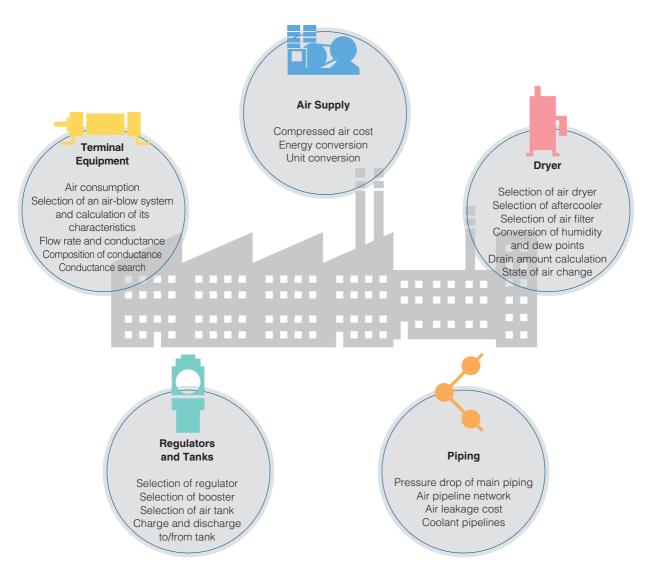


This program contributes to the energy savings of a pneumatic system from the design stage to analysis of the present state and simulation of possible improvements.

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.



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

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

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

# www.smctraining.com



eLEARNING-200
The perfect theory companion



AUTOSIM-200 Automation Simulator



ENS-200 Energy saving trainer



HAS-200 Highly Automated System



FMS-200 Flexible Manufacturing System



MAS-200 Modular Assembling System



IPC-200 Industrial Process Control



MAP-200 Manipulation Systems



PNEUTRAINER-200 Pneumatics/ Electro-pneumatics



HYDROTRAINER-200 Hydraulics - Electrohydrolics



AUTOMATE-200 Your mate in Automation!



PNEUMATE-200 Your mate in Pneumatics!



# SMC's Global Service Network



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

10100 SMC Blvd. Noblesville, IN 46060, U.S.A. TEL: 317-899-4440 FAX: 317-899-0819

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

6768 Financial Drive Mississauga, Ontario, L5N 7J6 Canada

TEL: 905-812-0400 FAX: 905-812-8686

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

Carr. Silao-Trjo KM 2.5 S/N, Predio San Jose del Durazno.

C.P.36100, Silao, Gto.Mexico

TEL: 472-72-2-55-00 FAX: 472-72-2-59-44/2-59-46

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

Av. La Montaña 1.115, Km.16,5 Norte Parque Industrial Valle Grande, Lampa - Santiago - Chile

TEL: 02-270-8600 FAX: 02-270-8601

#### ARGENTINA SMC Argentina S.A.

Teodoro Garcia 3860 (1427) Buenos Aires, Argentina

TEL: 011-4555-5762 FAX: 011-4555-5762

# BOLIVIA SMC Pneumatics Bolivia S.R.L.

Calle Las Garzas Nº 55

Santa Cruz de la Sierra-Codigo Postal 2281, Bolivia

TEL: 591-3-3428383 FAX: 591-3-344900

### VENEZUELA SMC Neumatica Venezuela S.A.

Apartado 40152, Avenida Nueva Granada, Edificio Wanlac,

Local 5, Caracas 1040-A, Venezuela TEL: 2-632-1310 FAX: 2-632-3871

# PERU (Distributor) IMPECO Automatizacion Industrial S.A.

Av. Canevaro 752, Lince, Lima, Peru TEL: 1-471-6002 FAX: 1-471-0935

# ECUADOR (Distributor) La LLave S.A.

Av. Juan Tanca Marengo Km. 2 1/2, Guayaquil, Ecuador

TEL: 593-4-268-2900 FAX: 593-4-223-5776

# URUGUAY (Distributor) BAKO S.A.

Galicia 1650 esq. Gaboto C.P. 11200 Montevideo, Uruguay

TEL: 2-401-6603 FAX: 2-409-4306

## BRAZIL SMC Pneumaticos Do Brasil Ltda.

Rua. Dra. Maria Fidelis, nr. 130, Jardim Piraporinha-Diadema-São Paulo.

CEP: 09950-350, Brasil

TEL: 11-4051-1177 FAX: 11-4071-6636

COLOMBIA (Sucursal de SMC Chile S.A.)

Avenida Ciudad de Quito No.77-78 Bogotá, Colombia

TEL: 57-1-745 5002 FAX: 57-1-745-5005



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

Vincent Avenue, Crownhill, Milton Keynes, MK8 0AN, Buckinghamshire, U.K.

TEL: 0845-121-5122 FAX: 01908-555064

#### **GERMANY SMC Pneumatik GmbH**

Boschring 13-15 D-63329 Egelsbach, Germany

TEL: 06103-4020 FAX: 06103-402139

# ITALY SMC Italia S.p.A.

Via Garibaldi 62, I-20061 Carugate Milano, Italy

TEL: 02-92711 FAX: 02-9271365

#### FRANCE SMC Pneumatique S.A.

1 Boulevard de Strasbourg, Parc Gustave Eiffel, Bussy Saint Georges, F-77600

Marne La Vallee Cedex 3 France

TEL: 01-64-76-10-00 FAX: 01-64-76-10-10

# SWEDEN SMC Pneumatics Sweden AB

Ekhagsvägen 29-31, S-141 71 Huddinge, Sweden

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

### SWITZERLAND SMC Pneumatik AG

Dorfstrasse 7, Postfach 117, CH-8484 Weisslingen, Switzerland

TEL: 052-396-3131 FAX: 052-396-3191

#### AUSTRIA SMC Pneumatik GmbH (Austria)

Girakstrasse 8, A-2100 Korneuburg, Austria TEL: 0-2262-622800 FAX: 0-2262-62285

TEE: 0 2202 022000 17VX: 0 2202 0

# SPAIN **SMC España, S.A.**

Zuazobidea 14, Pol. Ind. Júndiz, 01015-Vitoria, Spain

TEL: 902-184-100 FAX: 945-184-124

# PORTUGAL SMC Sucursal Portugal, S.A.

Rua de Engº Ferreira Dias, 452. 4100-246, Porto, Portugal

TEL: 351-226 166 570 FAX: 351-226 166 589

# IRELAND SMC Pneumatics(Ireland)Ltd.

2002 Citywest Business Campus, Naas Road, Saggart, Co. Dublin, Ireland

TEL: 01-403-9000 FAX: 01-464-0500

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

De Ruyterkade 120, NL-1011 AB Amsterdam, Netherlands

TEL: 020-5318888 FAX: 020-5318880

# GREECE (Distributor) **SMC Hellas EPE**

Anagenniseos 7-9 - P.C. 14342 - N. Philadelphia, Athens, Greece

TEL: 30-210-2717265 FAX: 30-210-2717766

#### DENMARK SMC Pneumatik A/S

SMC Pneumatik A/S

Egeskovvej 1, DK-8700 Horsens TEL: +45 70252900, FAX: +45 70252901



PL72, Tiistinniityntie 4, SF-02231 ESP00, Finland TEL: +358 207 513 513 FAX: +358 207 513 595

# NORWAY SMC Pneumatics Norway A/S

Vollsveien 13C, Granfoss Naeringspark N-1366 LYSAKER, Norway

TEL: 67-12-90-20 FAX: 67-12-90-21

#### BELGIUM (Distributor) SMC Pneumatics N.V./S.A.

Nijverheidsstraat 20, B-2160 Wommelgem Belguim

TEL: 03-355-1464 FAX: 03-355-1466

#### POLAND SMC Industrial Automation Polska Sp.z.o.o.

ul. Poloneza 89, PL-02-826 Warszawa,

TEL: +48 22 211 9600, FAX: +48 22 211 9617

#### TURKEY SMC Pnömatik Sanayi Ticaret ve Servis A.Ş.

Gülbahar Caddesi, Aydın Plaza, No: 9/4

Güneşli - 34212, Istanbul / Turkey

TEL: +90 212 489 0 440 FAX: +90 212 489 0 437

### RUSSIA SMC Pneumatik LLC.

4B Sverdlovskaja nab, St. Petersburg 195009

TEL: +7 812 718 5445 FAX: 812-118-5449

#### **BULGARIA SMC Industrial Automation Bulgaria EOOD**

Business Park Sofia, Building 8 - 6th floor, BG-1715 Sofia

TEL: +359 2 9744492 FAX: +359 2 9744519

#### CZECH REPUBLIC SMC Industrial Automation CZ s.r.o.

Hudcova 78a CZ-61200 Brno, Czech Republic

TEL: 05-414-24611 FAX: 05-412-18034

### CROATIA SMC Industrijska Automatika d.o.o.

Zagrebačka Avenija 104, HR-10000 Zagreb

TEL: +385 1 377 6674 FAX: +385 1 377 6674

### HUNGARY SMC Hungary Ipari Automatizálási kft.

Torbágy út 19, H-2045 Törökbálint

TEL: +36 23 511 390 FAX: +36 23 511 391

#### ROMANIA SMC Romania S.r.l.

Str Frunzei, Nr. 29, Sector 2, Bucharest, Romania

TEL: 01-3205111 FAX: 01-3261489

# SLOVAKIA SMC Priemyselná automatizáciá, s.r.o

Fatranská 1223, 01301 Tepliãka Nad Váhom

TEL: +421 41 3213212 - 6 FAX: +421 41 3213210

### SLOVENIA SMC Industrijska Avtomatika d.o.o.

Mirnska cesta 7, SI-8210 Trebnje

TEL:+386 7 38 85 412 FAX:+386 7 38 85 435

# LATVIA SMC Pneumatics Latvia SIA.

Dzelzavas str. 120g, Riga LV-1021, LATVIA

TEL: +371 67817700 FAX: +371 67817701

# LITHUANIA SMC Pneumatics, UAB

Linkmenu g.25, LT-08217 Vilnius

Phone: +370 5 2308118, Fax: +370 5 2648126

## SOUTH AFRICA SMC Pneumatics (South Africa) Pty Ltd

Block C, Ground Floor, Stonebridge Office Park, 8 Greenstone Place.

Greenstone, Johannesburg 1609. South Africa

TEL: (0)11 568 2407

# EGYPT (Distributor) Saadani Trading & Ind. Services

15 Sebaai Street, Miami, 21411 Alexandria, Egypt

TEL: 3-548-50-34 FAX: 3-548-50-34



# JAPAN SMC Corporation

4-14-1, Sotokanda, Chiyoda-ku, Tokyo 101-0021, JAPAN

TEL: 03-5207-8249 Fax: 03-5298-5362

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

17, Lane 205, Nansan Rd., Sec.2, Luzhu-Hsiang, Taoyuan-Hsien, TAIWAN

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

# HONG KONG SMC Pneumatics (Hong Kong) Ltd.

29/F, Clifford Centre, 778-784 Cheung Sha Wan Road,

Lai Chi kok, Kowloon, Hong Kong

TEL: 2744-0121 FAX: 2785-1314

# SINGAPORE SMC Pneumatics (S.E.A.) Pte. Ltd.

33 Tuas Avenue 8, Singapore 639251

TEL: 065-68610888 FAX: 065-68615815

## VIETNAM SMC Pneumatics (VN) Co., Ltd.

45-47, Street No.2 Block 5, An Phu Ward, District 2, Ho Chi Minh City, Vietnam

TEL: 84-8-6281-1110 FAX: 84-8-6281-1120

### PHILIPPINES Shoketsu-SMC Corporation.

Unit 201, Common Goal Tower, Madrigal Business Park.

Ayala Alabang, Muntinlupa. Philippines

TEL: 02-8090565 FAX: 02-8090586

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

Lot 36 Jalan Delima1/1, Subang Hi-Tech Industrial Park, Batu 3

40000 Shah Alam, Selango, Malaysia

TEL: 03-56350590 FAX: 03-56350602

# SOUTH KOREA SMC Pneumatics Korea Co., Ltd.

Woolim e-BIZ Center (Room 1008), 170-5, Guro-Dong, Guro-Gu,

Seoul, 152-050, South Korea

TEL: 02-3219-0700 FAX: 02-3219-0702

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

7 Wan Yuan St. Beijing Economic & Technological Development Zone 100176

TEL: 010-67882111 FAX:010-67881837

# THAILAND SMC Thailand Ltd.

134/6 Moo 5. Tiwanon Road, Bangkadi.

Amphur Muang, Patumthani 12000, Thailand

TEL: 02-963-7099 FAX: 02-963-9373

#### INDIA SMC Pneumatics (India) Pvt. Ltd.

D-107 to 112, Phase-II, Extension, Noida, Distt. Gautam Budh Nagar,

U.P.201 305, India

TEL: 0120-4568730 FAX: 0120-4568933

# INDONESIA (Distributor) P.T. Riyadi Putera Makmur

Jalan Hayam Wuruk Komplek Glodok Jaya No.27-28, Jakarta 11180, Indonesia

TEL: 021-625-5548 FAX: 021-625-5888

# PAKISTAN (Distributor) Jubilee Corporation

First Floor Mercantile Centre, Newnham road Near Boulton Market,

P.O.Box 6165, Karachi 74000 Pakistan

TEL: 021-243-9070/8449 FAX: 021-241-4589

#### ISRAEL (Distributor) Baccara Automation Control

Kvutzat Geva 18915 Israel

TEL: 04-653-5960 FAX: 04-653-1445

# SAUDI ARABIA (Distributor) **Assaggaff Trading Est.**

P.O.Box 3385, Al-Amir Majed Street, Jeddah 21471, Saudi Arabia

TEL: 02-6761574 FAX: 02-6708173

#### AUSTRALIA SMC Pneumatics (Australia) Pty.Ltd.

14-18 Hudson Avenue Castle Hill, NSW 2154, Australia

TEL: 02-9354-8222 FAX: 02-9894-5719

# NEW ZEALAND SMC Pneumatics (N. Z.) Ltd.

8C Sylvia Park Road, P.O. Box 62-226, Mt.Wellington, Auckland, New Zealand

TEL: 09-573-7007 FAX: 09-573-7002









# **SMC CORPORATION (Europe)**

Austria 2 +43 (0)2262622800 www.smc.at Belgium **2** +32 (0)33551464 **2**+359 (0)2807670 Bulgaria Croatia 2 +385 (0)13707288 Czech Republic **2**+420 541424611 **2** +45 70252900 Denmark **\***+372 6510370 Estonia Finland **\***+358 207513513 **2**+33 (0)164761000 France **1** +49 (0)61034020 Germany **≅**+30 210 2717265 Greece **≅**+36 23511390 Hungary +353 (0)14039000 Ireland **≅** +39 0292711 Italy **≅**+371 67817700 Latvia

www.smcpneumatics.be www.smc.bg www.smc.hr www.smc.cz www.smcdk.com www.smcpneumatics.ee www.smc.fi www.smc-france.fr www.smc.de www.smchellas.gr www.smc.hu www.smcpneumatics.ie www.smcitalia.it www.smclv.lv

office@smc.at info@smcpneumatics.be office@smc.bg office@smc.hr office@smc.cz smc@smcdk.com smc@smcpneumatics.ee smcfi@smc.fi promotion@smc-france.fr info@smc.de sales@smchellas.gr office@smc.hu sales@smcpneumatics.ie mailbox@smcitalia.it info@smclv.lv

Lithuania **2** +370 5 2308118 Netherlands **2**+31 (0)205318888 **2** +47 67129020 Norway **\***+48 (0)222119616 Poland Portugal **2**+351 226166570 **\*** +40 213205111 Romania **2**+7 8127185445 Russia Slovakia +386 (0)73885412 Slovenia **\*** +34 902184100 Spain +46 (0)86031200 Sweden +41 (0)523963131 Switzerland +90 212 489 0 440 Turkey

www.smclt.lt +421 (0)413213212 www.smc.sk

www.smcpneumatics.nl www.smc-norge.no www.smc.pl www.smc.eu www.smcromania.ro www.smc-pneumatik.ru www.smc.si www.smc.eu www.smc.nu www.smc.ch www.smcpnomatik.com.tr

info@smclt.lt info@smcpneumatics.nl post@smc-norge.no office@smc.pl postpt@smc.smces.es smcromania@smcromania.ro info@smc-pneumatik.ru office@smc.sk office@smc.si post@smc.smces.es post@smc.nu info@smc.ch info@smcpnomatik.com.tr +44 (0)845 121 5122 www.smcpneumatics.co.uk sales@smcpneumatics.co.uk

**SMC CORPORATION** Akihabara UDX 15F, 4-14-1, Sotokanda, Chiyoda-ku, Tokyo 101-0021, JAPAN Phone: 03-5207-8249 FAX: 03-5298-5362

CAT.M01-G-UK