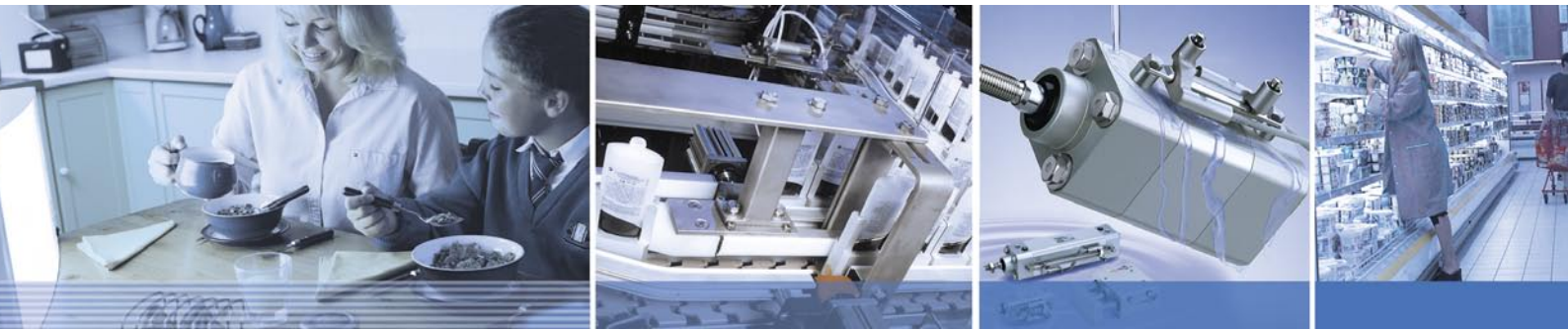
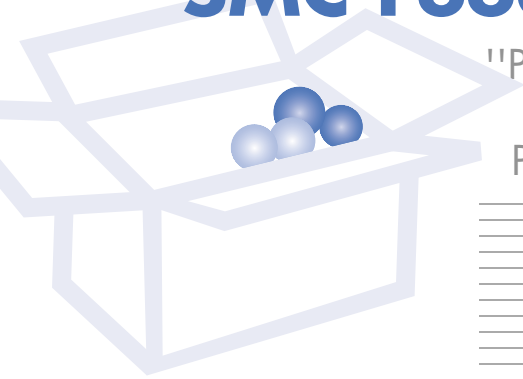
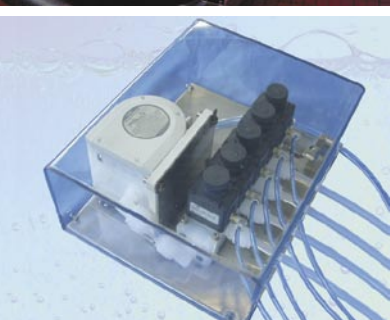




SMC Food & Packaging Industry

"Partners in Packaging" Dedicated to
product innovation for the Food
Processing and Packaging Industry





SMC Food & Packaging Industry

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, electrical, food and **packaging processing**, pneumatic components have moved into a wide range of other industrial fields. High technology applications are growing fast, making pneumatics indispensable in **high-tech industries** such as Information Technology. Additionally, pneumatic components are playing an increasing role in the field of medicine, nursing care and consumer applications.

SMC has built an organisation that listens carefully to our customers and responds quickly and specifically to their needs.

In these fast-moving and competitive times customer satisfaction can only be achieved by having a clear understanding of our customer's goals and objectives.

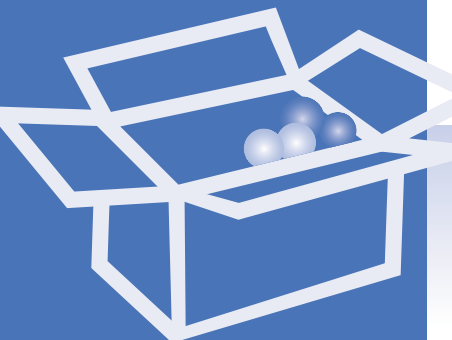
To this end, we have established a global network of highly skilled engineers to focus their activities specifically on both the Food and Packaging Industries.

We know the strict regulations that govern the production process within these industry sectors, and meet these market demands by providing solutions which often combine today's most advanced technologies.

SMC offers our European customers:

- Fully trained specialist sales and engineering teams in all our European subsidiaries
- Special products designed and built to meet the challenges of both the Food and Packaging Industries
- Special customised solutions to meet even the most demanding applications

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SMC Solutions

Vacuum &
Instrumentation

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

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



Technical Development

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

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



Sales and Communication Network

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

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

Production and Supply

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

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

Technical Development

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

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

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



The Tsukuba Technical Centre has expanded into its newly completed twin-tower building.

At the center of SMC's research and development division, a staff of 1,000 is engaged in research and development activities for the entire world.



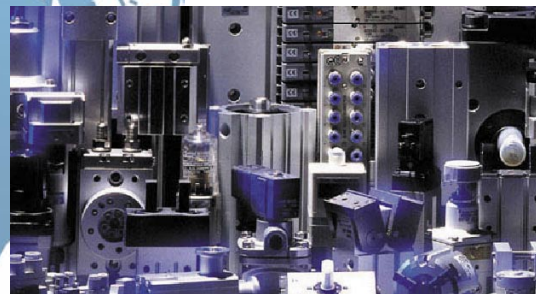
UTC (US Technical Centre) U. S. A.

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



ETC (European Technical Centre) U. K.

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



Production and Supply

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

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

Production Facilities (Japan)



Soka Factory #1, New Building

Soka Area (13 Factories/Saitama Prf.)

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



Overseas Local Production Facilities



Canada SMC Pneumatics(Canada)Ltd.



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



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



■ Tsukuba Factory (Ibaragi Prf.)

Tsukuba #1 Factory & #2 Factory
Total Land Area: 57,191m²
Floor Space: 45,094m²



■ Kamaishi Factory (Iwate Prf.)

Total Land Area: 82,657m²
Floor Space: 41,623m²



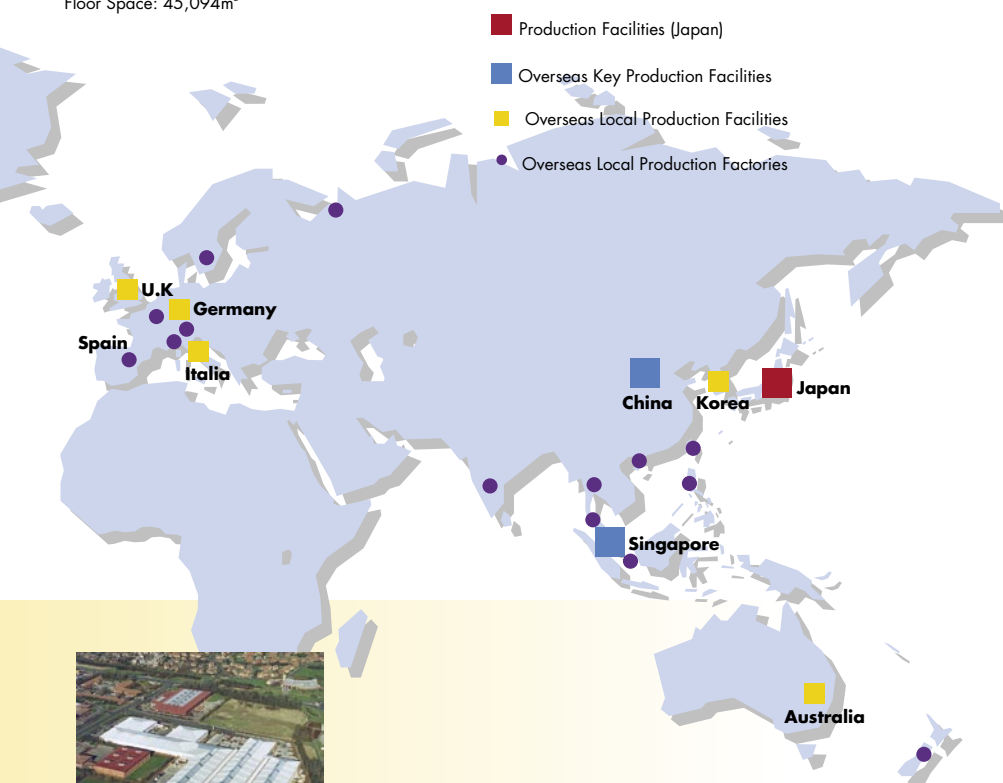
■ Tohno Factory (Iwate Prf.)

Total Land Area: 79,428m²
Floor Space: 10,737m²



■ Yamatsuri Factory (Fukushima Prf.)

Total Land Area: 124,227m²
Floor Space: 26,298m²



■ U.K SMC Pneumatics (U.K) Ltd.



■ Italy SMC Italia S.p.A



■ Germany SMC Pneumatik GmbH



■ Korea SMC Pneumatics Korea Co.,Ltd.



■ Australia SMC Pneumatics (Australia) Pty.Ltd.

Overseas Key Production Facilities



■ SMC (China) Co., Ltd.

Total Land Area: 82,940m²
Floor Space: 55,352m²



■ SMC Manufacturing (Singapore) Pte. Ltd.

Total Land Area: 23,942m²
Floor Space: 18,424m²

Overseas Local Production Factories

North/South America

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

Europe/Africa

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

Asia/Oceania

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

Sales and Communication Network

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

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

Canada SMC Pneumatics (Canada) Ltd.



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

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



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

North/South America

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

U.K SMC Pneumatics (U.K)



Germany SMC Pneumatik



China SMC (China)



Italy SMC Italia



France SMC Pneumatique



Spain SMC España, S.A.



Korea SMC Pneumatics Korea Co.,Ltd.



Taiwan SMC Pneumatics (Taiwan)Co.,Ltd.



Singapore SMC Pneumatics



Europa/Africa

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

Asia/Oceania

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

SMC Pneumatics (Australia) Pty. Ltd.

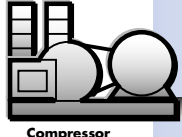


- Head office
- Branch office

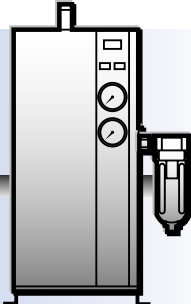
10,000 basic models, and 560,000 variations. A wide range of variations to accommodate diverse applications.

A complete line-up of pneumatic control systems

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



Compressor

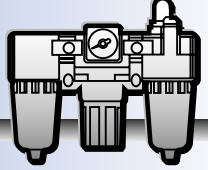


Air Preparation Equipment

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



Air cleaning equipment

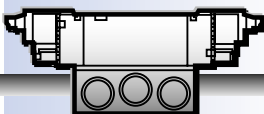


Air Line Equipment

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



Air line equipment



Directional Control Components

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



Solenoid valves

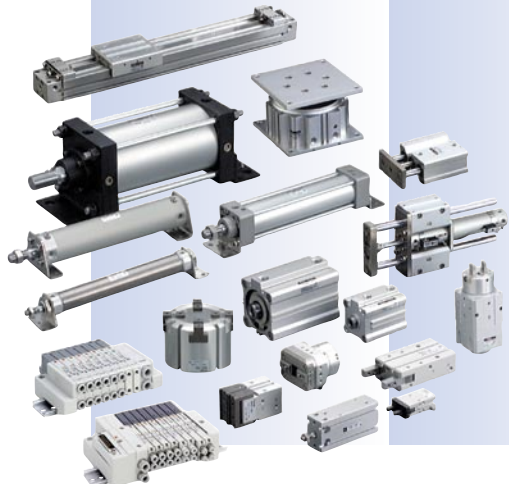


Actuators

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



Air cylinders, Air grippers



SMC Product Conforming to International Standards

SMC products complying with EN/ISO, CSA/UL standards are supporting you to comply with EC directives and CSA/UL standards.



The CE mark indicates that machines and components meet essential requirements of all the EC Directives applied.

It has been obligatory to apply CE marks indicating conformity with EC Directives when machines and components are exported to the member Nations of the EU.

Once "A manufacturer himself" declares a product to be safe by means of CE marking (declaration of conformity by manufacturer), free distribution inside the member Nations of the EU is permissible.

■ CE Mark

SMC provides CE marking to products to which EMC and Low Voltage Directives have been applied, in accordance with CETOP (European hydraulics and pneumatics committee) guide lines.

■ As of February 1998, the following 18 countries will be obliged to conform to CE mark legislation

Iceland, Ireland, United Kingdom, Italy, Austria, Netherlands, Greece, Liechtenstein, Sweden, Spain, Denmark, Germany, Norway, Finland, France, Belgium, Portugal, Luxembourg

■ EC Directives and Pneumatic Components

• Machinery Directive

The Machinery Directive contains essential health and safety requirements for machinery, as applied to industrial machines e.g. machine tools, injection molding machines and automatic machines. Pneumatic equipment is not specified in Machinery Directive. However, the use of SMC products that are certified as conforming to EN Standards, allows customers to simplify preparation work of the Technical Construction File required for a Declaration of Conformity.

• Electromagnetic Compatibility (EMC) Directive

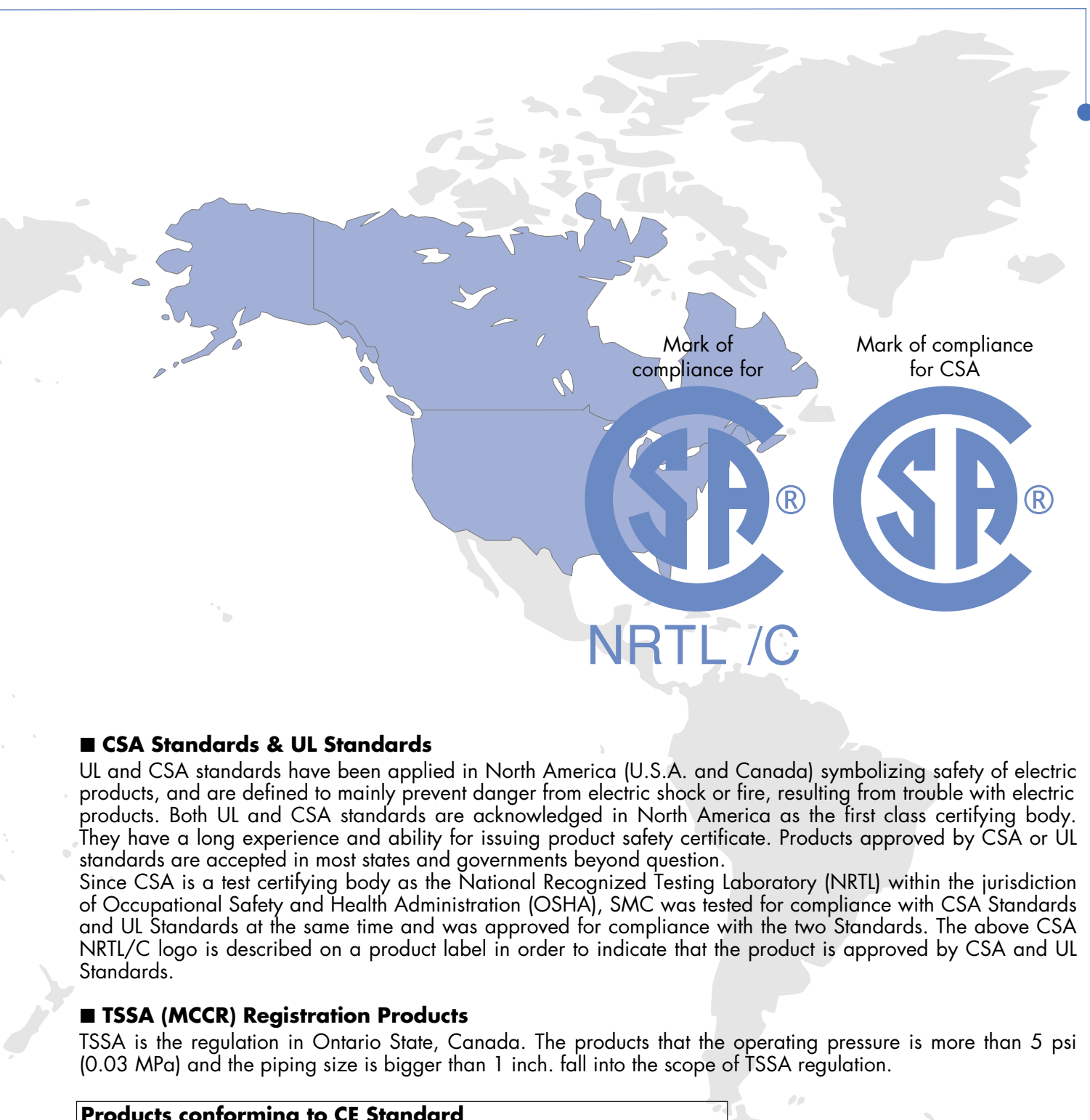
The EMC Directive specifies electromagnetic compatibility. Equipment which may generate electromagnetic interference or whose function may be compromised by electromagnetic interference is required to be immune to electromagnetic affects (EMS/immunity) without emitting excessive electromagnetic affects (EMI/emission).

• Low Voltage Directive

This directive is applied to products, which operate above 50 VAC to 1000 VAC and 75 VDC to 1500 VDC operating voltage, and require electrical safety measures to be introduced.

• Simple Pressure Vessels Directive

This directive is applied to welded vessels whose maximum operating pressure (PS) and volume of vessel (V) exceed 50 bar/L. Such vessels require EC type examination and then CE marking.



■ CSA Standards & UL Standards

UL and CSA standards have been applied in North America (U.S.A. and Canada) symbolizing safety of electric products, and are defined to mainly prevent danger from electric shock or fire, resulting from trouble with electric products. Both UL and CSA standards are acknowledged in North America as the first class certifying body. They have a long experience and ability for issuing product safety certificate. Products approved by CSA or UL standards are accepted in most states and governments beyond question.

Since CSA is a test certifying body as the National Recognized Testing Laboratory (NRTL) within the jurisdiction of Occupational Safety and Health Administration (OSHA), SMC was tested for compliance with CSA Standards and UL Standards at the same time and was approved for compliance with the two Standards. The above CSA NRTL/C logo is described on a product label in order to indicate that the product is approved by CSA and UL Standards.

■ TSSA (MCCR) Registration Products

TSSA is the regulation in Ontario State, Canada. The products that the operating pressure is more than 5 psi (0.03 MPa) and the piping size is bigger than 1 inch. fall into the scope of TSSA regulation.

Products conforming to CE Standard



With CE symbol for simple visual

In this catalog each accredited product series is indicated with a CE mark symbol. However, in some cases, every available models may not meet CE compliance. Please visit our web site for the latest selection of available models with CE mark.

<http://www.smcworld.com>



SMC Corporation's Web Site Information

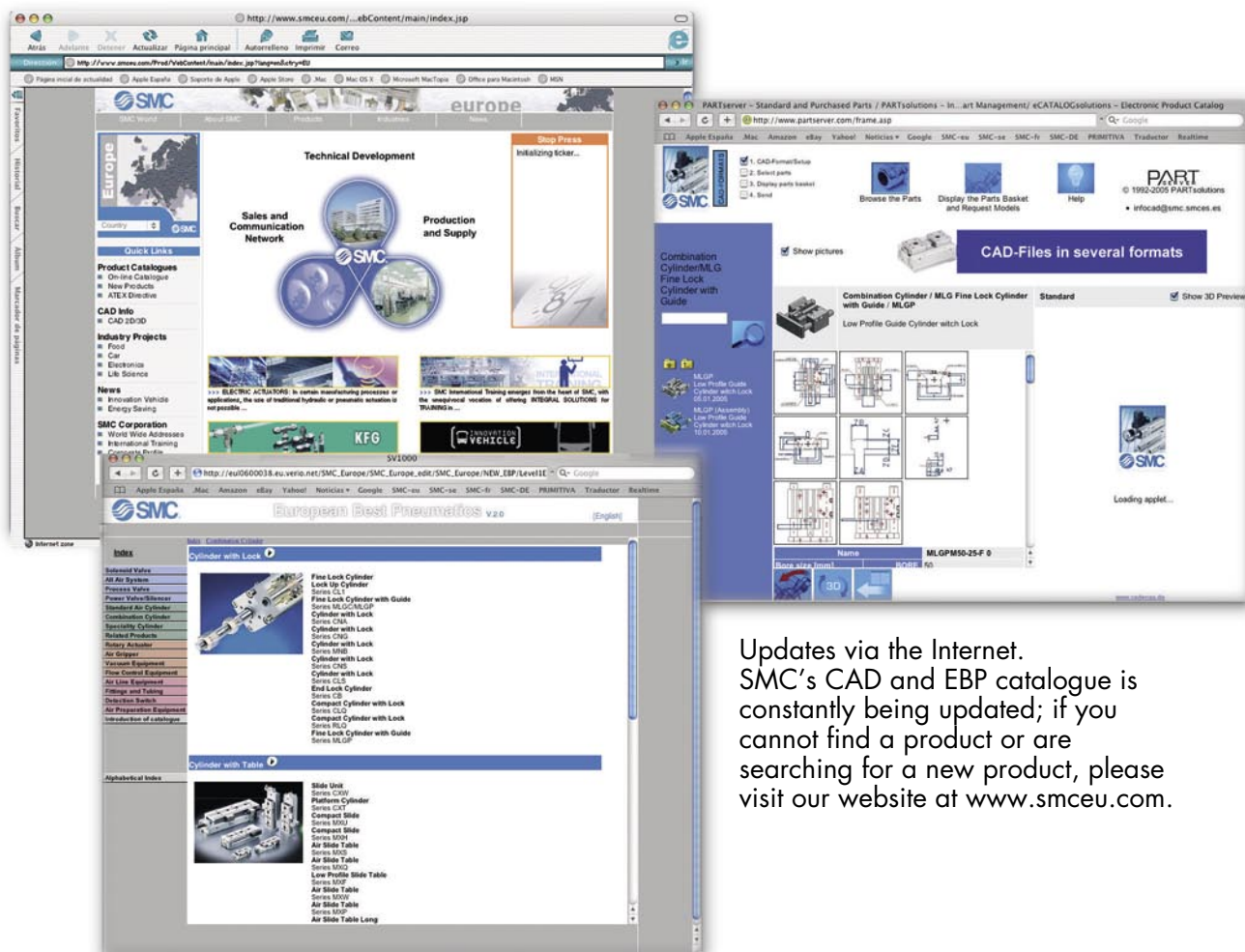


SMC's improved Web Site—offering “easy-to-use” options!.

<http://www.smcworld.com>

<http://www.smceu.com>

Simply access our latest information for all your business - delivered without delay!.



Updates via the Internet.
SMC's CAD and EBP catalogue is
constantly being updated; if you
cannot find a product or are
searching for a new product, please
visit our website at www.smceu.com.

CAD and European Best Pneumatics catalogue on CD.



Thread Designations

Port and fitting threads used on SMC equipment are all defined by international standards, there are two basic types, metric threads and imperial threads.

Metric threads used are M3, M5 and M6, standard pitches and parallel form. These seal using a washer. The imperial threads vary in size from 1/16" to 2", with the range 1/8" to 1/2" most common.

The female threads shown in this catalogue are mainly G form parallel threads to ISO 228, which seal using a washer face. The other female thread form commonly used by SMC is the Rc, which is a taper thread form.

Below is a list of common female imperial thread designations and notes.

Designation	Taper or parallel	Note
G	Parallel	As used in this catalogue
Rc	Taper	Also common in SMC products. Defined in ISO 7/1
BSP	Parallel	Obsolete designation to BS84. Use G instead.
BSPT	Taper	Obsolete designation to BS21. Use Rc instead
NPT	Taper	American standard, incompatible with Rc, BSP or BSPT due to different flank angles. Available from SMC to special order but not common in EU
Rp	Parallel	Defined in ISO 7/1

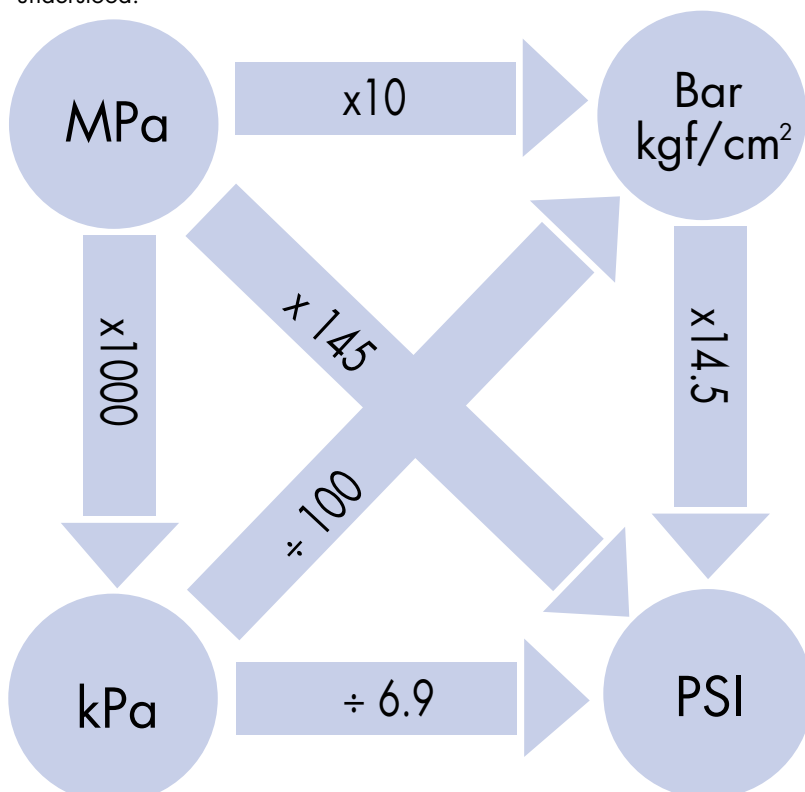
Pressure Measurement

The SI unit of pressure is the Pascal (Pa); one Pascal is defined as one Newton of force per square metre of area. Pressures in this catalogue are shown using Pascals.

Because one Pascal is a very low pressure the unit is normally quoted as kilopascals (kPa) or megapascals (MPa).
 $1 \text{ MPa} = 1000 \text{ kPa} = 1,000,000 \text{ Pa}$

Vacuum levels are also measured in Pascals, normally as negative kilopascals (-kPa).

SMC have historically used kgf/cm² or bar, a conversion graphic is shown below. This includes lbf/in² (psi), which is still widely understood.



Example.

A typical industrial compressed air main has a working pressure of 0.5Mpa. This equals 5 bar, 500kPa, 5kgf/cm² (approx) or 72.5 psi (approx).

Note: The conversions involving kgf/cm² and psi are approximations, maximum errors should not exceed ±2%.

Flow Characteristics and Measurement

Introduction to Flow

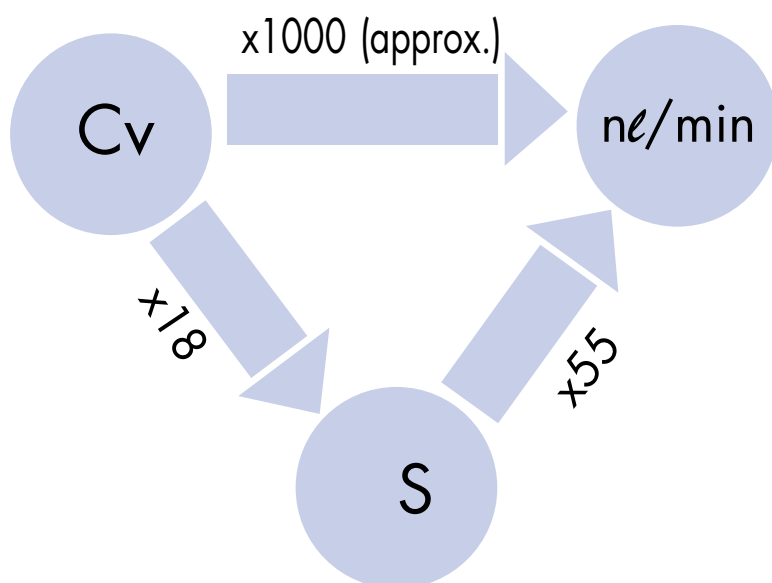
The flow through a valve or fitting is expressed in many ways, according to different international and manufacturer standards. Many units of measurement have been used. Also the allowable pressure loss, testing methodology and other assumptions were not consistent between different makers.

Commonly used measurement units are Cv, litres/minute (ANR) and effective area (S) for air applications. In addition Cv, Kv, kv and Av can be used for liquid applications.

The ISO standard 6358: 1989 defines compressed air flow in terms of conductance and critical pressure ratio, C and b respectively. This measure is used for most compressed air products within this catalogue. For valves designed for use with liquids, Cv or Av is used in this catalogue.

Conversions between flow units

For most purposes, an approximate conversion between S (effective area), Cv and nl/min can be made as follows.



* Details of the applicable standards, calculation and test methods can be found at the back of this book.



Key Industry Products

Key Industry Products

Stainless Cylinders



Corrosion resistant

Series	Action	Bore size (mm)
CJ5-S	Double acting	10, 16
CG5-S		20, 25, 32, 40, 50, 63, 80, 100
Features	Material	
	- External metal parts: Stainless steel 304 - Seal parts: NBR or FKM are selectable.	
	Ambient and fluid temperature: -10 to 70°C (without auto switch)	
	-10 to 60°C (with auto switch)	
	Grease for food processing machines FDA	

Stainless Steel Cylinder with ISO 6432 Dimensions



Made to Order

Corrosion resistant

Hygienic

Series	Action	Bore size (mm)
—	Double acting	16, 20, 25, 32, 40, 50
Features	Hygienic design for splash area Material • External metal parts: Stainless steel 304 Seal parts: NBR or FKM are selectable. Ambient and fluid temperature: –10 to 70°C (without auto switch) –10 to 60°C (with auto switch)	

Stainless Speed Controller



Corrosion resistant

Series	Applicable tubing O.D. (mm)	Connection thread
ASG	4, 6, 8, 10, 12	M5, 1/8, 1/4, 3/8, 1/2
Features	Material • Metal parts: Stainless steel 316 Seal parts: Special FKM Ambient and fluid temperature: −5 to 60°C	

Stainless Steel 316 One-touch Fittings



Corrosion resistant

Heat resistant

Series	Applicable tubing O.D. (mm)	Connection thread
KQG	4, 6, 8, 10, 12	M5, 1/8, 1/4, 3/8, 1/2
Features	Material • Metal parts: Stainless steel 316 Seal parts: Special FKM Operating fluid temperature: -5 to 150°C Grease-free Can be used with steam. Certified to meet current Food Sanitation Law standards.	

Stainless Steel 316 Insert Fittings



Corrosion resistant

Heat resistant

Series	Applicable tubing O.D. (mm)	Connection thread
KFG	4, 6, 8, 10, 12	1/8, 1/4, 3/8, 1/2
Features	Material: Stainless steel 316 Operating fluid temperature: -5 to 150°C Grease-free Can be used with steam.	

Stainless Steel 316 Miniature Fittings

Corrosion resistant



Series	Applicable tubing O.D. (mm)	Connection thread
M	3.2, 4, 6	M5, 1/8
Features	Material: Stainless steel 316 Operating fluid temperature: 0 to 60°C	

S Couplers / Stainless Type

Corrosion resistant

Heat resistant



Series	Connection thread
KKA	1/8, 1/4, 3/8, 1/2, 3/4, 1, 1 1/4, 1 1/2
Features	Material • Metal parts: Stainless steel 304 Seal parts: Special FKM Operating fluid temperature: -5 to 150°C Grease-free

Air Operated Chemical Valve

Corrosion resistant

Heat resistant



Series	Actuation	Port size	Orifice diameter mmφ
Thread type LVA	N.C./N.O./C.O.	1/8 to 1	2 to 22
Features	Body material: Stainless steel Diaphragm material: PTFE, NBR, EPDM are selectable. Operating fluid temperature: 0 to 100°C (when the diaphragm is PTFE.) 0 to 60°C (when the diaphragm is NBR or EPDM.)		

Clean Regulator (Contamination Controlled Steel Regulator)

Corrosion resistant



Series	Body size	Connection thread
SRH	3.2, 4, 6	1/8, 1/4, 3/8, 1/2
Features	Outstanding corrosion resistance. All metal parts in contact with fluid use stainless steel SUS316 Oil free. Parts assembled without any use of oils. Depending upon the application, PTFE (Grade A) or fluororubber (Grade B) can be selected for the diaphragm material.	

Floating Joint (Stainless Steel Type)

Corrosion resistant



Series	Body size	Connection thread
JS	10, 16, 20, 32, 40, 63	M4, M5, M8, M10 x 1.25, M14 x 1.5, M18 x 1.5
Features	Centering is unnecessary. A high level of machining accuracy is unnecessary. It is compact and is suitable for high tensile stresses. Long service life (with dustproof cover). Rotating angle... ±5°. Also Absorbs radial misalignment.	

ISO

Profile Design ISO/VDMA Cylinder Piston Rod and End Nut Made of Stainless Steel (-XC6)

Made to Order

Corrosion resistant



Series	Action	Bore size (mm)
CP95 (-XC6)	Double acting	32, 40, 50, 63, 80, 100
Features	Piston rod and rod end nut are changed from standard materials to stainless steel.	

Hygienic Design Cylinders



Type	Series	Action	Bore size (mm)
Round type	HYB	Double acting	20, 25, 32, 40, 50, 63, 80, 100
Basic type	HYQ		20, 25, 32, 40, 50, 63
ISO standard type	HYC		32, 40, 50, 63
With guide	HYG		20, 25, 32, 40, 50, 63
Features	Water resistant cylinders configured for easy cleaning Five times increase in service life, compared to other water resistant cylinders Grease for food is available. Ambient and fluid temperature: 0 to 70°C (without auto switch) 0 to 60°C (with auto switch) FDA grease as option.		

Hygienic NAMUR Interface Valve 3/5 Port Solenoid Valve



Series	Port size	Cv factor	Power consumption
VFN (-X19)	NPT1/4"	1.4	0.5 W
Features	Conformed to VDMA standard. IP67 (for M12 connector) Ambient and fluid temperature: -10 to 60°C 3 and 5 port can be changed by changing the function plate. Electrical entry: M12, DIN terminal		

Related Products

Water Resistant Cylinders



Type	Series	Bore size (mm)
Air cylinder	CM2	20, 25, 32, 40
Air cylinder	CG1	20, 25, 32, 40, 50, 63, 80, 100
Compact cylinder	CQ2	20, 25, 32, 40, 50, 63, 80, 100
Air cylinder	CA2	40, 50, 63, 80, 100
Compact guide cylinder	MGPM	20, 25, 32, 40, 50, 63, 80, 100
Guide cylinder	MGGM	32, 40, 50, 63, 80, 100
Features	Using a special scraper improved water resistance, compared to standard cylinders	

Related Made to Order

XC4	With heavy duty scraper
XC35	With coil scraper

Cylinder / Made to Order

XB6	Heat resistant cylinder (−10 to 150°C)	Heat resistant
XB14	Cylinder with heat resistant auto switch (0 to 150°C)	Heat resistant
XB7	Cold resistant cylinder (−40 to 70°C)	

XC6	Piston rod and rod end nut made of stainless steel	Corrosion resistant
XC7	Tie-rod, cushion valve, tie-rod nut, etc. made of stainless steel	Corrosion resistant
XC27	Double clevis pin and double knuckle pin made of stainless steel	Corrosion resistant

Clean One-touch Fittings

Corrosion resistant



Series	Applicable tubing O.D.	Connection thread
KP	4, 6, 8, 10, 12	1/8, 1/4, 3/8, 1/2
Features	Material • Resin parts: Polypropylene Seal parts: EPDM Operating fluid temperature: -20 to 80°C	

FEP Tubing

Corrosion resistant Heat resistant



Series	Tubing O.D.		Color
	Metric size	Inch size	
TH/THH	4, 6, 8, 10, 12	1/8, 3/16, 1/4 3/8, 1/2, 3/4	Translucent, Black, Red, Blue
Features	Material: FEP (Fluororesin) Maximum operating temperature: 200°C (This can vary depending on the operating conditions.) Certified to meet current Food Sanitation Law standards.		

Air Operated Chemical Valve

Corrosion resistant Heat resistant



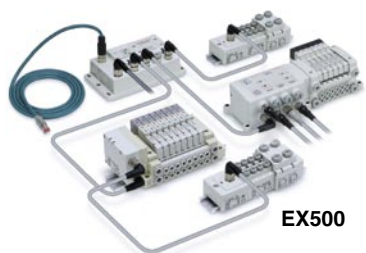
Series	Actuation	Applicable tubing O.D.	Orifice diameter mmø
Integral fitting LVC	N.C./N.O./C.O.	mm: 4 to 25 inch: 1/8 to 1	4 to 22
Features	Body material: PFA Diaphragm material: PTFE Operating fluid temperature: 0 to 100°C		

Serial Transmission

Serial Transmission



EX250



EX500

Series	Enclosure	Communication protocol	Applicable valve
EX250	IP67	DeviceNet	SV1000/2000/3000 VQC1000/2000/4000
		PROFIBUS-DP	
		CC-Link	
		Actuator Sensor interface (AS-I, ASI)	
		CAN Open	
Features	• IP67 compliant • Input/Output available		
EX500	IP65	Remote I/O (Rockwell Automation Inc.)	SV1000/2000/3000/4000 VQC1000/2000/4000
		DeviceNet	
		PROFIBUS-DP	
		CC-Link	
		EtherNet/IP™	
Features	• IP65 compliant • Input/Output available		

5.0 MPa Compatible

Pilot Operated 2 Port Solenoid Valve

High-pressure



Series	Maximum operating pressure (MPa)	Port size
VCH41 (N.C.) VCH42 (N.O.)	5.0	3/4, 1
Features	Service life: 10 million cycles (based on SMC's test condition) Adopting a polyurethane elastomer poppet in a valve seat Improved durability under a high-pressure environment	

Pilot Operated 3 Port Solenoid Valve

High-pressure



Series	Maximum operating pressure (MPa)	Port size
VCH410	5.0	1/2, 3/4, 1
Features	Service life: 10 million cycles (based on SMC's test condition) Adopting a polyurethane elastomer poppet in a valve seat Improved durability under a high-pressure environment	

Made to Order

Manifold unit

Check Valve

High-pressure



Series	Maximum operating pressure (MPa)	Port size
VCHC40	5.0	3/4, 1
Features	Service life: 10 million cycles (based on SMC's test condition) Adopting a polyurethane elastomer poppet in a valve seat Improved durability under a high-pressure environment	

Direct Operated Regulator (Relieving type)

High-pressure



Series	Maximum operating pressure (MPa)	Port size
VCHR30 VCHR40	Inlet pressure 5.0 Set pressure 0.5 to 5.0	3/4, 1 1, 1 1/2
Features	Service life: 10 million cycles (based on SMC's test condition) Adopting a polyurethane elastomer poppet in a valve seat Improved durability under a high-pressure environment	

Made to Order

6.0 MPa pilot operated regulator (Air operated type)

Silencer

High-pressure



Series	Maximum operating pressure (MPa)	Port size
VCHN3 VCHN4	5.0 (Relief valve release pressure: 1.8)	3/4, 1 1, 1 1/4, 1 1/2
Features	Noise reduction 35 dB(A) Clogging-reduction with double-layer construction	

5.0 MPa Compatible

5.0 MPa Pressure Sensor

Made to Order

High-pressure



Series	Rated pressure range (MPa)	Proof pressure (MPa)
PSE (X512)	0 to 5.0	10.0

Related Equipment/ Digital Pressure Switch

High-pressure



Series	Rated pressure range (MPa)	Proof pressure (MPa)
ISE75	0.4 to 10.0	30.0
ISE75H	0.5 to 15.0	45.0
Features	2-color display IP67	

High Frequency, High Speed Response and Long Service Life

5 Port Solenoid Valve / Metal Seal Type



Series	Sonic conductance: C	Applicable cylinder size (mm)	Power consumption (W)
VQC1000	0.72 dm³/(s·bar)	50	0.5
VQC2000	2.6 dm³/(s·bar)	80	
VQC4000	6.9 dm³/(s·bar)	140	
Features	Response time 10 ms (VQC1000) 20 ms (VQC2000) 17 ms (VQC4000) Dispersion accuracy ±2 ms (VQC1000/2000) ±3 ms (VQC4000) Long service life 200 million cycles (VQC1000/2000) 100 million cycles (VQC4000) (based on SMC's test condition) IP67. Metal seal available.		

5 Port Solenoid Valve / Metal Seal Type



Series	Sonic conductance: C	Applicable cylinder size (mm)	Power consumption (W)
VQZ1000	0.7 dm³/(s·bar)	40	0.35
VQZ2000	1.9 dm³/(s·bar)	63	
VQZ3000	3.0 dm³/(s·bar)	80	
Features	Response time 17 ms (VQZ1000) 18 ms (VQZ2000) 21 ms (VQZ3000) Dispersion accuracy ±2 ms Long service life 200 million cycles (based on SMC's test condition)		

Low Friction Cylinders / Metal Seal Type



Series	Type	Bore size (mm)	Minimum operating pressure (MPa)
MQQ	Compact	10, 16, 20, 25, 30, 40	0.005
MQM	Anti-lateral load	6, 10, 20, 25	ø6: 0.02, ø10 to 25: 0.005 (MQML□□H: 0.01)
MQP	Low friction	4, 6, 10, 16, 20	0.001 to 0.7 (Except for moving parts weight)
Features	Long service life of 10,000 km or 100 million full cycles (based on SMC's test condition) Achieves speeds up to 3,000 mm/s or continuous actuation up to 50 cpm (MQML□□H)		

3 Port Solenoid Valve

Made to Order



Series	Port size	Sonic conductance: C
XT323	1/8	2 dm ³ /(s·bar)
Features	Operating frequency 300 to 1500 C.P.M	

Low Torque Metal Seal Type Rotary Joint



Series	Number of circuits	Connection diameter
MQR	1, 2, 4, 8, 12, 16	M5
Features	Rotational torque unaffected by supply pressure and temperature fluctuations. Use of metal seals prevents the spool from sticking to the rotating surface even after a long period of non-operation. Operating pressure: -100kPa to 1MPa. Piping ports are aligned in a spiral line for easy piping.	

Mechanical Joint Type Rodless Cylinder

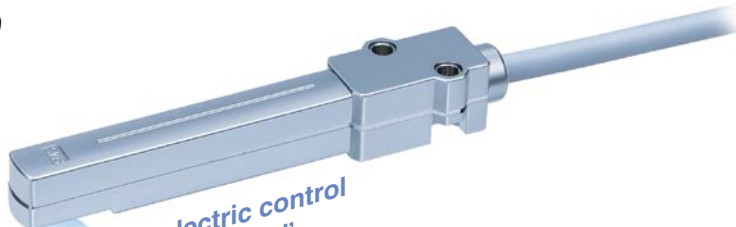


Series	Bore size (mm)	Maximum available Stroke (mm)
MY2C	16, 25, 40	5000 (3000 for ø16)
MY2H	16, 25, 40	1500 (1000 for ø16)
Features	A complete reduction in height of the cylinder allows mounting in a narrow space. The low profile design of the cylinder built with with a high precision single or double axis guide, provides same load capacity as the earlier Series MY1. Three types of guide options to suit a variety of applications.	

Ionizer

Surface Potenciometric Sensor Series IZD10

Electrostatic removal



The importance of the static electric control is put on confirming the "actual status".

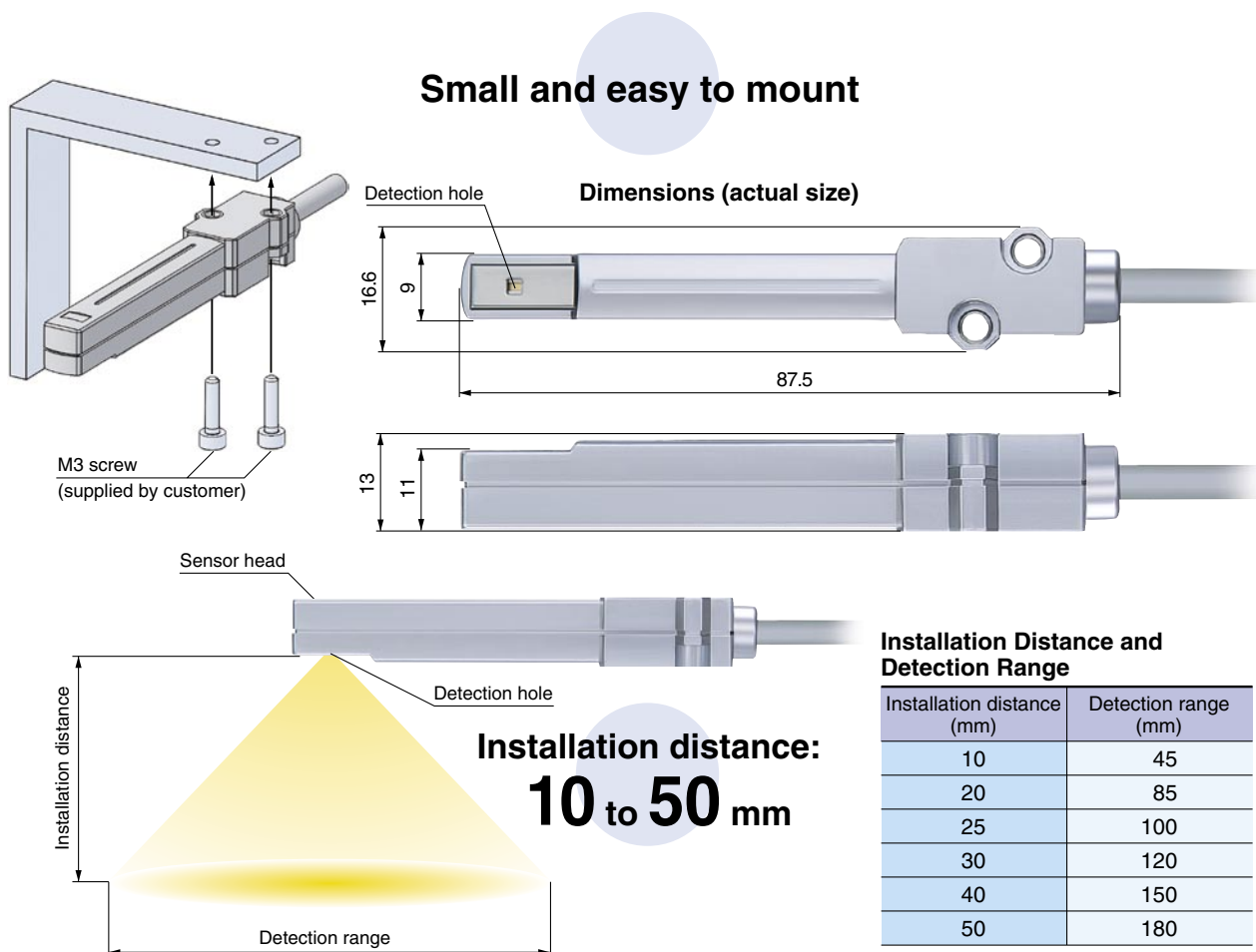
- Detects the electric potential difference applied on a work piece, and outputs in an analog voltage.
 - Output voltage: 1 to 5 V (output impedance: approx. 100 Ω)
- Measurement potential difference: ± 0.4 kV (detected at a 25 mm distance)

Surface potentiometric sensor monitor Series IZE11

- Output: Switch output x 2 + Analog output (1 to 5 V, 4 to 20 mA)
- Minimum unit setting: 0.001 kV
- Display accuracy: $\pm 0.5\%$ F.S. ± 1 digit or less
- Detection distance correction function (adjustable in 1 mm increments)



Surface Potentiometric Sensor / Series IZD10



Surface Potentiometric Sensor Monitor / Series IZE11

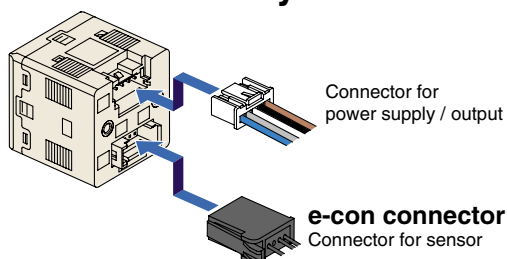
2-color display (red/green)

Able to set the display color in 4 patterns.



Pattern	ON	OFF
①	Red	Green
②	Green	Red
③	Red	Red
④	Green	Green

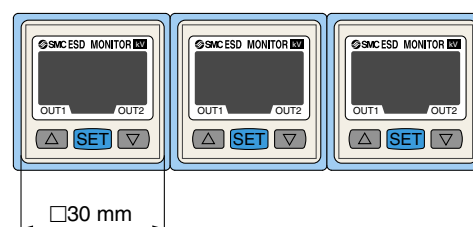
Connection by connector



Mountable even with a

sensor touched with each other

Able to reduce the man-hour for cutting a panel.



Functions

- Detection distance correction
- Peak / Bottom value displayable
- Key lock
- Zero-adjust
- Error display
- Switch output anti-chattering

Ionizer

Controlled ion balance by sensor

~ The choice of 2 types of the sensors are available. ~

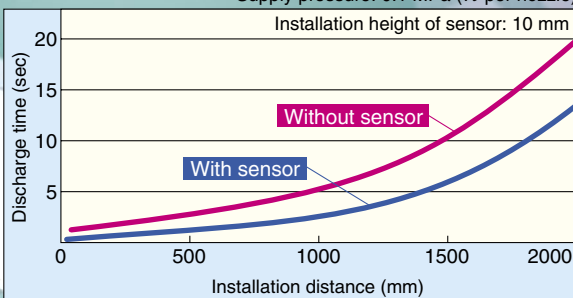
- Rapid elimination of static electricity by a feedback sensor
- Ion balance control by an auto-balance sensor

Discharge time 0.3 seconds

Conditions / Static buildup decreased from 1000 V to 100 V
Discharged object: Charged plate monitor (150 mm x 150 mm, capacitance 20 pF)
Installation distance: 200 mm (Tungsten electrode with air purge)

Continuously emits ions in accordance with the polarity applied onto a work piece.

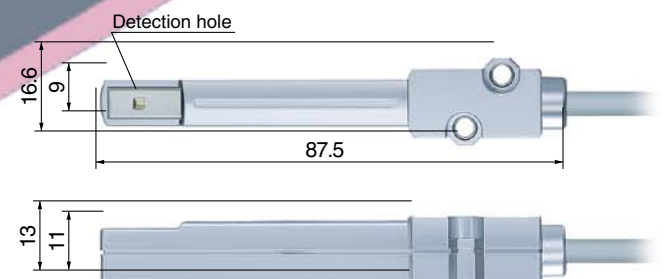
Supply pressure: 0.1 MPa (7 $\bar{c}$ per nozzle)

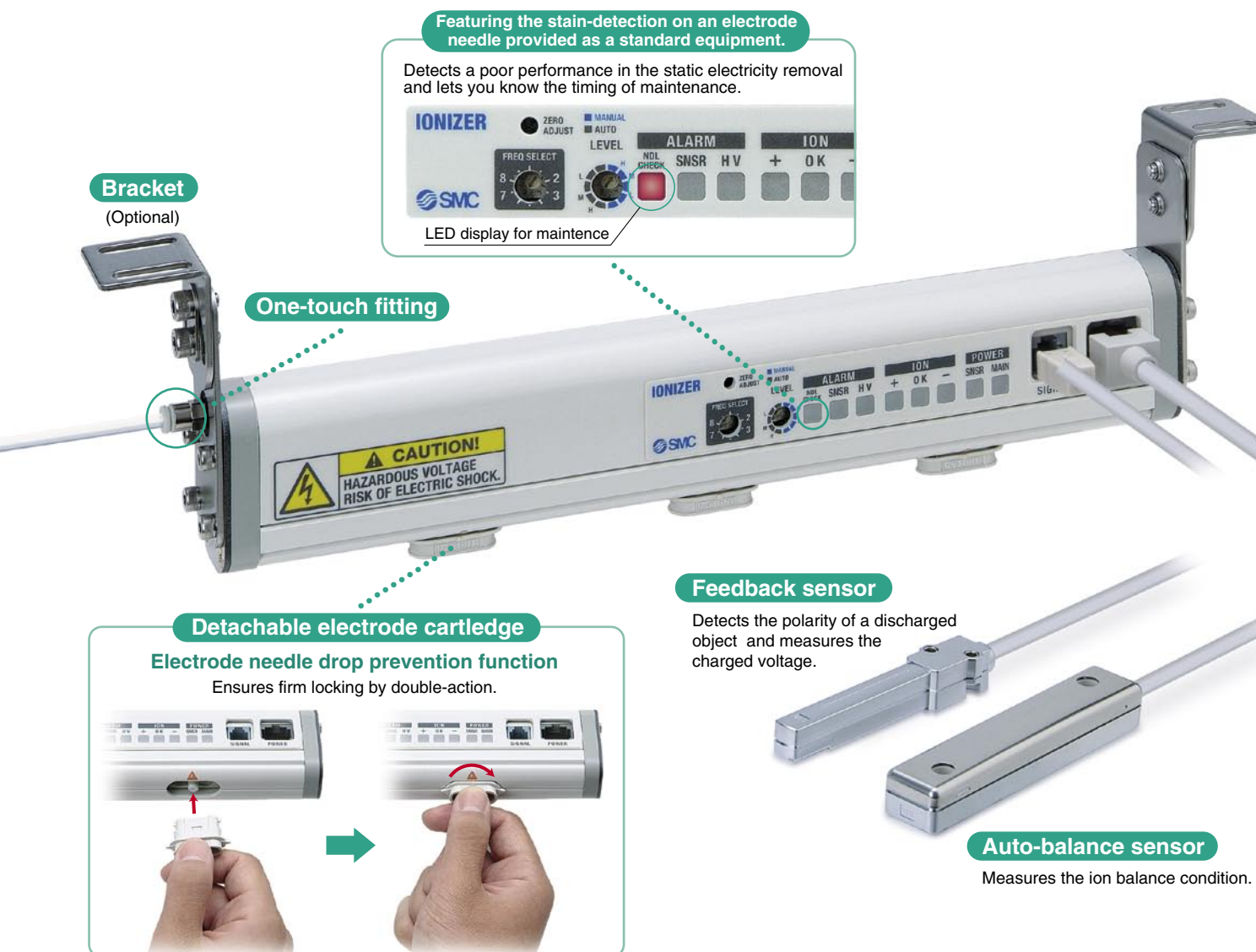


<Conditions> Static electricity elimination features are based on the data using the charged plate (size: 150 mm x 150 mm, capacitance: 20 pF) as defined in the U.S. ANSI standards (ANSI/ESD, STM3, 1-2000). Use this as a guideline purpose only for model selection because the value varies depending on the material and/or size of a subject.

Compact feedback sensor

Dimensions





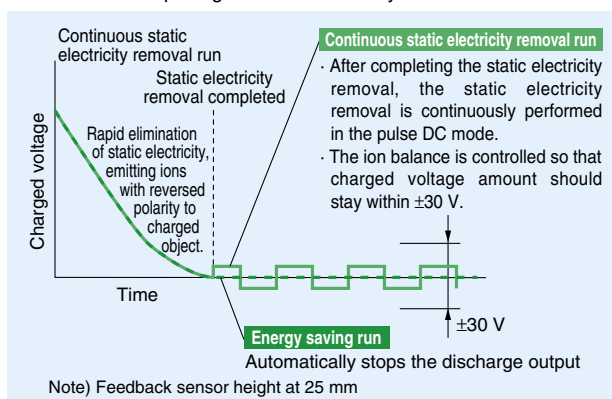
Static electricity elimination mode by application and its features

1 Sensing DC mode

Detects the charged voltage amount by a feedback sensor, emitting ions with reversed polarity to charged objects. Suited for a rapid elimination of a work piece with a higher amount of charged voltage.

1) Continuous static electricity removal run mode: Continuously eliminates static electricity with pulse DC by controlling the ion balance so that the charged potential on a work piece would be within ± 30 V even after completing the static electricity removal.

2) Energy saving run mode: Automatically stops emitting electricity even after completing the static electricity removal.

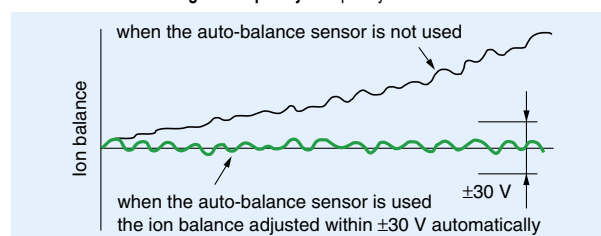


2 Pulse DC mode *operable even when a sensor is not used.

Automatically adjusts the ion balance by an auto-balance sensor. Suitable for eliminating static electricity in space, and preventing a work piece from being charged.

• **Ion balance automatic adjustment:** The auto-balance sensor detects the ion balance to adjust the ion balance automatically. The ion balance is not affected by the height of an ionizer by positioning an auto-balance sensor near a work piece.

• **Selection of a wide range of frequency:** Frequency is selectable from 1 Hz to 60 Hz.



3 DC mode

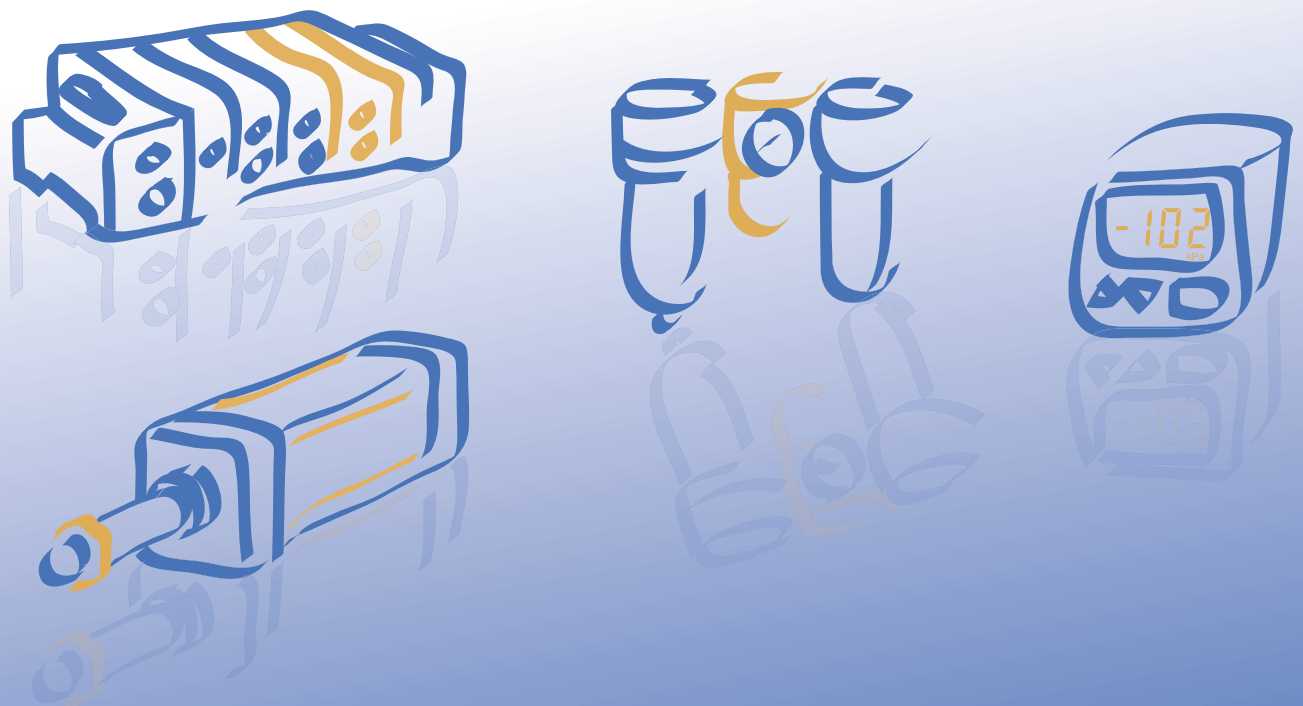
Makes the positive / negative ion generated.

• Suitable for a work piece whose charged polarity is predetermined, running at faster speed or for eliminating static electricity roughly out of a work piece.

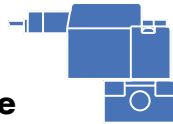
• Possible to make a work piece charged intentionally in such a static electricity painting.

* However, please take measures such as an earthing since there is a possibility of facilities other than a work piece being charged unintentionally.

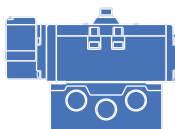
General Catalogue Overview



3 Port Solenoid Valve



Series	Type	Flow (Cv) 1 → 2 (P → A)	Port size	Applicable in vacuum use	
	V100 3 port direct operated solenoid valve - Rubber seal				
	• Sub-plate • Manifold	0.008~0.024	M5	-101.2 kPa	
	S070 3 port compact direct operated solenoid valve				
	• Body ported • Sub-plate • Manifold	0.011~0.021	M3, M5 ø2, ø4	-101.2 kPa	
	SYJ300/500/700 3 port pilot operated solenoid valve - Rubber seal				
	• Body ported • Sub-plate • Manifold	0.086~0.77	M3, M5 1/8, ø4 ø6, ø8	-101.2 kPa	
	SY300/500 3 port solenoid valve - Rubber seal				
	• Body ported • Manifold	0.13~0.61	M5, 1/8 ø4, ø6, ø8	-101.2 kPa	
	EVT307/317 3 port direct operated solenoid valve - Rubber seal				
	• Body ported • Manifold	0.12~0.62	1/8, 1/4	-101.2 kPa	
	VT325 3 port direct operated solenoid valve - Rubber seal				
	• Body ported • Manifold	1.4	1/4, 3/8	-101.2 kPa	
	EVP300/500/700 3 port pilot operated poppet solenoid valve - Rubber seal				
	• Body ported • Sub-plate • Manifold	0.26~3.5	1/8, 1/4, 3/8, 1/2	-101.2 kPa	
	VKF300 3 port direct operated poppet solenoid valve				
	• Body ported • Sub-plate • Manifold	0.13~0.15	M5, 1/8 ø4, ø6	-101.2 kPa	

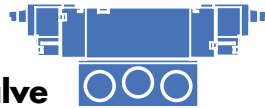


5 Port ISO Solenoid Valve

Series	Type	Flow (Cv) 1 → 2 (P → A)	Port size	Manifold station *	
	VQ7-6/7-8 ISO solenoid valve - Rubber seal/Metal seal				
	• ISO5599/1 sizes: 1 and 2 • Sub-base • Manifold	0.9~3.3	1/4, 3/8, 1/2	1~10	 SEE IN BEST PNEUMATICS CATALOGUE
	EVS7-6/7-8/7-10 ISO solenoid valve with M12 connector - Rubber seal/Metal seal				
	• ISO5599/1 sizes: 1, 2 and 3 • Sub-base • Manifold	0.9~4.0	1/4, 3/8, 1/2, 3/4, 1	1~10	 SEE IN BEST PNEUMATICS CATALOGUE
	EVS1-01/1-02 ISO solenoid valve with M8, M12 connector - Rubber seal/Metal seal				
	• ISO15407-1 sizes: 1 and 2 • Sub-base • Manifold **	0.60~1.0	1/8, 1/4	**	
	VP7-6/7-8 ISO solenoid valve - Rubber seal				
	• ISO5599/1 sizes: 1 and 2 • Sub-base • Manifold	1.1~3.3	1/4, 3/8, 1/2	1~10	 SEE IN BEST PNEUMATICS CATALOGUE

* It is possible to make longer manifolds but the wiring for each station must be specified on a configuration table. Please contact SMC for clarification.

** SMC do not currently offer manifolds for series EVS1 valves, as they are a commodity item on the open market.



5 Port Solenoid Valve

Series	Type	Flow (Cv) 1 → 2 (P → A)	Port size	Manifold station *	
	SV1000/2000/3000/4000 5 port solenoid valve - Rubber seal				
	- Sub-base - Manifold	0.24~2.2	1/8, 1/4, 3/8, 1/2, ø3.2, ø4, ø6, ø8, ø10, ø12	2~20	
	SY3000/5000/7000/9000 5 port solenoid valve - Rubber seal				
	- Body ported - Sub-base - Manifold	0.13~2.5	M5, 1/8, 1/4, 3/8, 1/2, ø4, ø6, ø8, ø10, ø12	2~20	
	SY3000/5000/7000 5 port solenoid valve - Rubber seal- Cassette type				
	Manifold Cassette type	0.14~0.98	M5, 1/8, 1/4, ø4, ø6, ø8, ø10	2~20	
	SYJ3000/5000/7000 4/5 port solenoid valve - Rubber seal				
	- Body ported - Sub-base - Manifold	0.10~0.74	M3, M5, 1/8, 1/4, ø4, ø6, ø8	2~20	
	SX3000/5000/7000 5 port solenoid valve - Rubber seal				
	- Body ported - Sub-base - Manifold	0.13~1.3	M5, 1/8, 1/4, 3/8, ø4, ø6, ø8, ø10	2~20	

* It is possible to make longer manifolds but the wiring for each station must be specified on a configuration table. Please contact SMC for clarification.

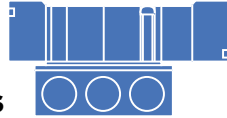
	SI (Serial Interface) Systems Overview			
	SMC can offer many interfaces to connect to different systems.			



5 Port Solenoid Valve

Series	Type	Flow (Cv) 1 → 2 (P → A)	Port size	Manifold station *	
	VQC1000/2000/4000 5 port solenoid valve - Rubber seal/Metal seal				
	• Manifold	0.16~2.1	M5, ø4, ø6, ø8	1~12	
	SQ1000/2000 5 port solenoid valve - Rubber seal				
	• Body ported • Manifold	0.14~0.56	M5, ø4 ø6, ø8	1~12	 SEE IN BEST PNEUMATICS CATALOGUE
	VQ0000/1000/2000 5 port solenoid valve - Rubber seal/Metal seal				
	• Body ported • Manifold	0.07~0.80	M5, ø4 ø6, ø8	1~12	 SEE IN BEST PNEUMATICS CATALOGUE
	VQ4000/5000 5 port solenoid valve - Rubber seal/Metal seal				
	• Sub-base • Manifold	1.5~4.4	1/4, 3/8, 1/2 ø8, ø10, ø12	1~12	 SEE IN BEST PNEUMATICS CATALOGUE
	VQD1000 4 port direct operated poppet solenoid valve - Rubber seal				
	• Body ported • Sub-base • Manifold	0.05~0.07	M5	1~20	 SEE IN BEST PNEUMATICS CATALOGUE
	VQZ1000/2000/3000 3/5 Port Solenoid Valve - Body Ported Type				
	• High speed and long life • IP65 DIN Connector Metal Seal construction		M5, 1/4, ø3.2, ø4, ø6, ø8, ø10	2~20	

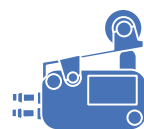
* It is possible to make longer manifolds but the wiring for each station must be specified on a configuration table. Please contact SMC for clarification.



Air Operated Valves

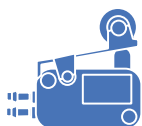
Series	Type	Flow (Cv) 1 → 2 (P → A)	Port size	
 SYA3000/5000/7000 5 port air operated valve				
5 port valve	• Body ported • Sub-plate • Manifold	0.15~1.3	M5, 1/8, 1/4 ø4, ø6, ø8, ø10	SEE IN BEST PNEUMATICS CATALOGUE
 EVFA3000/5000 5 port air operated valve				
5 port valve	• Body ported • Sub-plate • Manifold	0.64~2.7	1/8, 1/4, 3/8, 1/2	SEE IN BEST PNEUMATICS CATALOGUE
 SYJA300/500/700 3 port air operated valve				
3 port valve	• Body ported • Sub-plate • Manifold	0.086~0.77	M3, M5 1/8, 1/4	SEE IN BEST PNEUMATICS CATALOGUE
 EVPA300/500/700 3 port air operated valve				
3 port valve	• Body ported • Sub-plate • Manifold	0.74~3.8	1/8, 1/4, 3/8, 1/2	SEE IN BEST PNEUMATICS CATALOGUE

Mechanical Valves



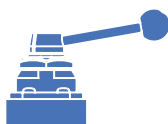
Series	Type	Effective area (mm ²)	Port size	
 VM1000 2, 3 port micro mechanical valve				
2, 3 port, N.C.		1	Barbed connection to suit ø4mm tube	SEE IN BEST PNEUMATICS CATALOGUE
 EVM100/200/400 2, 3 port mechanical valve				
EVM100: 2, 3 port, N.C. EVM200: 2, 3 port, N.C. EVM400: 3 port, N.C.		EVM100: 2.5 EVM200: 19 EVM400: 7	VM100: 1/8 VM200: 1/4 VM400: 1/8	SEE IN BEST PNEUMATICS CATALOGUE

Mechanical Valves



Series	Type	Effective area (mm ²)	Port size	
	EVM800 Heavy duty 3 port mechanical valve			
	3 port, universal porting	6	1/8	SEE IN BEST PNEUMATICS CATALOGUE
	EVZM550/450, VFM350/250 5 port mechanical valve			
	EVZM550: 5 port, rubber spool EVZM450: 5 port, metal spool EVFM350: 5 port, rubber spool EVFM250: 5 port, metal spool	EVZM550: 10.8 EVZM450: 9.9 EVFM350: 5 EVFM250: 5	EVZM550: 1/8 EVZM450: 1/8 EVFM350: 1/8 EVFM250: 1/4	SEE IN BEST PNEUMATICS CATALOGUE

Hand Valves



	VHK 2, 3 port finger valve			
	2, 3 port, In-line	2.0~17.5	M5, 1/8, 1/4, 3/8, 1/2, ø4, ø6, ø8, ø10, ø12	SEE IN BEST PNEUMATICS CATALOGUE
	VH 4 port hand valve			
	4 port, robust construction	7.5~194	1/4, 3/8, 1/2, 3/4, 1	SEE IN BEST PNEUMATICS CATALOGUE
	VHS 3 port hand valve, residual pressure relief			
	3 port air isolating valve	21~93	1/4, 3/8, 1/2, 3/4	SEE IN BEST PNEUMATICS CATALOGUE



Silencers/Exhaust Cleaners



Series	Type	Effective area (mm ²)	Port size	
	AN/25 Silencer standard type			
	noise reductions up to 30dB	35~960	M3, M5, 1/8, 1/4, 3/8, 1/2, 3/4, 1, 1 1/4, 1 1/2, 2 Stem for ø6, 8, 10, 12	 SEE IN BEST PNEUMATICS CATALOGUE
	AN□1 Silencer high noise reduction type			
	High noise attenuation (40dB)	10~610	1/8, 1/4, 3/8, 1/2, 3/4, 1, 1 1/4, 1 1/2, 2	 SEE IN BEST PNEUMATICS CATALOGUE
	AMC Exhaust cleaner (reclassifier)			
	Removes oil for exhaust air 99.9% of mist removed	16~550	Male thread: 3/8, 3/4, 1, 1 1/2, 2 Female thread: 1/4, 3/8, 1/2, 3/4	 SEE IN BEST PNEUMATICS CATALOGUE
	AMP Exhaust cleaner for clean rooms			
	An exhaust cleaner that can be used inside a clean room. Equivalent to Class 10.	15~55	1/4, 3/8, 1/2, 3/4	 SEE IN BEST PNEUMATICS CATALOGUE

Series	Type	Orifice size (mmø) [Flow (Cv)]	Port size	Valve * type	
	VCA20/30/40 Direct operated 2 port solenoid valve for air				
	• Body ported • Manifold	3~10 [0.29~1.9]	1/4, 3/8, 1/2, 3/4	N.C.	
	VCB20/30/40 Direct operated 2 port solenoid valve for heated water				
	• Body ported	2~10 [0.16~2.1]	1/8, 1/4, 3/8, 1/2, 3/4	N.C.	
	VCL20/30/40 Direct operated 2 port solenoid valve for oil				
	• Body ported • Manifold	2~10 [0.16~2.1]	1/8, 1/4, 3/8, 1/2, 3/4	N.C.	
	VCS20/30/40 Direct operated 2 port solenoid valve for steam				
	• Body ported • Manifold	2~10 [0.16~2.1]	1/8, 1/4, 3/8, 1/2, 3/4	N.C.	
	VCW20/30/40 Direct operated 2 port solenoid valve for water				
	• Body ported • Manifold	2~10 [0.16~2.1]	1/8, 1/4, 3/8, 1/2, 3/4	N.C.	
	VDW10/20/30 Compact direct operated 2 port solenoid valve for water and air				
	• Body ported • Manifold	1~4 [0.04~0.44]	M5, 1/8, 1/4	N.C.	
	VDW200/300 Compact direct operated 3 port solenoid valve for water and air				
	• Body ported	1~4 [0.03~0.44]	M5, 1/8, 1/4	COM.	
	VQ20/30 2 port solenoid valve for air				
	• Body ported • Manifold	3.4~4.8 [0.33~0.81]	ø6, ø8, ø10, ø12	N.C.	

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

Series	Type	Orifice size (mmø) [Flow (Cv)]	Port size	Valve * type	
	VX21/22/23 Direct operated 2 port solenoid valve for air, gas, vacuum, water, steam, oil				
	• Body ported • Manifold	2~10 [0.17~2.20]	1/8, 1/4, 3/8, 1/2	N.C./N.O.	
	VXD21/22/23 Pilot operated 2 port solenoid valve for air, gas, water, oil				
	• Body ported	10~25 [1.9~13]	1/4, 3/8, 1/2, 3/4, 1	N.C./N.O.	
	VXZ22/23 Pilot operated 2 port for zero pressure differential/For air, gas, vacuum, water, oil				
	• Body ported	10~25 [1.9~12]	1/4, 3/8, 1/2, 3/4, 1	N.C./N.O.	
	VXH22 Pilot operated 2 port for high pressure/For air, water, oil				
	• Body ported	10 [2.0~2.3]	1/4, 3/8, 1/2	N.C.	
	VX31/32/33 Direct operated 3 port for air, gas, vacuum, water, steam, oil				
	• Body ported • Manifold	1.5~4 [0.08~0.38]	1/8, 1/4, 3/8	N.C./N.O. COM.	
	VXA21/22, VXA31/32 Direct operated 2/3 port for air, gas, vacuum, water, oil				
	• Body ported • Manifold	VXA21/22: 3~10 [0.38~2.8] VXA31/32: 1.5~4 [0.08~0.38]	VXA21/22: 1/8, 1/4, 3/8, 1/2 VXA31/32: 1/8, 1/4, 3/8	VXA21/22: N.C./N.O. VXA31/32: COM.	

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

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

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

Series	Type	Orifice size (mmø) [Flow (Av x 10 ⁻⁵)]	Port size	Valve * type	
	VNC 2 port valve for coolant applications				
	• Body ported	7~50 [30~1500]	1/8, 1/4, 3/8, 1/2, 3/4, 1, 1 1/4, 1 1/2, 2	N.C./N.O. COM.	
	VND 2 port valve for steam				
	• Body ported	7~50 [26~1500]	1/8, 1/4, 3/8, 1/2, 3/4, 1, 1 1/4, 1 1/2, 2	N.C./N.O.	

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

Equipment for Fluids Control/Related Products (Please contact SMC)



■ High purity chemical valve/Integrated fitting
Type: **LVC**



■ High purity chemical valve/Threaded
Type: **LVA**



■ High purity chemical valve/Manually operated
Type: **LVH**



■ High purity chemical valve/Compact
Type: **LVD**



■ Air operated chemical valve/Non-metallic exterior
Type: **LVQ**



■ High purity fluoropolymer/Fittings
Type: **LQ1**



■ High purity fluoropolymer/Needle valve
Type: **LVN**



■ High purity fluoropolymer/Tubing
Type: **TL/TIL**



- Process pump/Automatically switching/Air operated type: **PA**
- Process pump/Automatically switching with built-in pulsation attenuator/Air operated type: **PAX**
- Process pump/Built-in solenoid valve/Air operated type: **PB**



Standard Cylinders

Series	Description/Bore Sizes (mm)																						
	2,5	4	6	8	10	12	16	20	25	32	40	50	63	80	100	125	140	160	180	200	250	300	
	Port size																						
CJ1 	Air cylinder																						
	●	●																					
	ø4	ø4																					
CJP 	Pin cylinder																						
			●		●		15	●															
			M5		M5		M5																
CG1 	Air cylinder																						
									●	●	●	●	●	●	●								
CS1 	Air cylinder																						
																●	●	●	●	●	●	●	
																1/2	1/2	3/4	3/4	3/4	1	1	
C76 	Air cylinder																						
									●	●													
									1/8	1/4													
C85 	ISO cylinder																						
			●	●	●	●	●	●															
			M5	M5	M5	M5	1/8	1/8															
C95 	ISO/VDMA cylinder																						
									●	●	●	●	●	●	●		●		●	●			
									1/8	1/4	1/4	3/8	3/8	1/2	1/2		3/4		3/4	1			
CP95 	ISO/VDMA cylinder																						
									●	●	●	●	●	●									
									1/8	1/4	1/4	3/8	3/8	1/2									

Compact Cylinders

Series	Description/Bore Sizes (mm)																						
	2,5	4	6	8	10	12	16	20	25	32	40	50	63	80	100	125	140	160	180	200	250	300	
	Port size																						
CUJ 	Mini-free mount cylinder																						
			●	●	●	●																	
			M3	M3	M3	M3																	
CU 	Free mount cylinder																						
				●		●		●	●	●	●												
				M5		M5		M5	M5	M5	3/8												
CU□□-□A 	Free mount cylinder with air cushion																						
								●	●	●													
								M5	M5	1/8													
CQS 	Compact cylinder																						
								●	●	●	●												
								M5	M5	M5	M5												
CQM 	Compact cylinder guide rod type																						
								●	●	●	●	●	●	●	●	●							
								M5	M5	M5	M5	1/8	1/8	1/4	1/4	3/8	3/8						
C55 	ISO 21287 Standard Compact cylinder																						
								●	●	●	●	●	●										
								M5	M5	1/8	1/8	1/8	1/8										
CQ2 	Compact cylinder																						
								●	●	●	●	●	●	●	●	●	●	●	●	●	●		
								M5	M5	M5	M5	1/8	1/8	1/4	1/4	3/8	3/8	3/8	3/8	3/8	1/2	1/2	
RQ 	Compact cylinder with air cushion																						
								●	●	●	●	●	●	●									
								M5	M5	1/8	1/8	1/4	1/4	3/8	3/8								
MU 	Plate cylinder																						
								●	●	●	●	●											
								M5	1/8	1/8	1/4	1/4											

Slide table (Compact Slide)

Series	Description/Bore Sizes (mm)																						
	2,5	4	6	8	10	12	16	20	25	32	40	50	63	80	100	125	140	160	180	200	250	300	
	Port size																						
MXH 	With linear guide																						
			●		●		●	●															
			M5		M5		M5	M5															
MXU 	With miniature linear guide																						
			●		●		●																
			M5		M5		M5																



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Slide table (Compact Slide)

Series	Description/Bore Sizes (mm)																						
	2,5	4	6	8	10	12	16	20	25	32	40	50	63	80	100	125	140	160	180	200	250	300	
Port size																							
MXJ 	Compact air slide table																						
		●	●	●																			
		M3	M3	M3																			
MXS 	With cross roller guide																						
			●	●		●	●	●	●														
			M3	M5		M5	M5	1/8	1/8														
MXQ 	With recirculating linear guide																						
			●	●		●	●	●	●														
			M5	M5		M5	M5	1/8	1/8														
MXF 	Low profile table unit, with cross roller guide																						
				●		●	●	●															
			M3		M5	M5	M5																
MXW 	Long strokes available, with recirculating linear guide																						
				●		●	●	●	●														
			M5		M5	M5	1/8	1/8															
MXP 	Super compact table unit, with linear guide																						
			●	●	●	●	●																
			M3	M5	M5	M5	M5																
MXY 	Super compact table unit, long stroke type, with linear guide																						
			●	●		●																	
			M5	M5		M5																	

Precision Cylinder

Series	Description/Bore Sizes (mm)																						
	2,5	4	6	8	10	12	16	20	25	32	40	50	63	80	100	125	140	160	180	200	250	300	
MTS 	Port size																						
	With internal guide function																						
				●		●	●	●	●	●													
			M5		M5	M5	M5	M5	1/8	1/8													
																							



Mechanically Jointed Rodless Cylinder

Series	Description/Bore Sizes (mm)																						
	2,5	4	6	8	10	12	16	20	25	32	40	50	63	80	100	125	140	160	180	200	250	300	
MY1B 	Port size																						
	Basic type																						
					●		●	●	●	●	●	●	●	●	●								
				M5		M5	M5	1/8	1/8	1/4	3/8	3/8	1/2	1/2									
MY1M 	Slide bearing guide type																						
							●	●	●	●	●	●	●										
							M5	M5	M5	1/8	1/8	1/4	3/8										
MY1C 	Cam follower guide type																						
							●	●	●	●	●	●	●										
							M5	M5	M5	1/8	1/8	1/4	3/8										
MY1H 	High precision guide type																						
					●		●	●	●	●	●												
					M5		M5	M5	1/8	1/8	1/4												
MY1HT 	High rigidity/High precision guide type																						
												●	●										
												3/8	3/8										
MY1□W 	With protective cover																						
							●	●	●	●	●	●	●										
							M5	M5	1/8	1/8	1/4	3/8	3/8										
MY2C/H/HT 	Compact and low profile design																						
							●		●		●												
							M5		1/8		1/4												
MY3A/3B 	Short type																						
							●		●		●		●										
							M5		1/8		1/4		3/8										



Magnetically Coupled Rodless Cylinder

Series	Description/Bore Sizes (mm)																						
	2,5	4	6	8	10	12	15	20	25	32	40	50	63	80	100	125	140	160	180	200	250	300	
	Port size																						
CY3B/3R 	Basic type																						
			●		●		●	●	●	●	●	●	●										
			M5		M5		M5	1/8	1/8	1/8	1/4	1/4	1/4										
 SEE IN BEST PNEUMATICS CATALOGUE																							



Compact Guide Cylinder

Series	Description/Bore Sizes (mm)																						
	2,5	4	6	8	10	12	16	20	25	32	40	50	63	80	100	125	140	160	180	200	250	300	
	Port size																						
MGJ 	Miniature guide rod cylinder																						
			●		●																		
			M3		M3																		
MGP 	Compact guide cylinder																						
						●	●	●	●	●	●	●	●	●									
						M5	M5	1/8	1/8	1/8	1/8	1/4	1/4	3/8	3/8								
MGP□□A 	With air cushion																						
						●	●	●	●	●	●	●	●	●									
						M5	1/8	1/8	1/8	1/8	1/4	1/4	3/8	3/8									



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More MGP variations continue on the next page.

Compact Guide Cylinder

Series		Description/Bore Sizes (mm)																						
		2,5	4	6	8	10	12	16	20	25	32	40	50	63	80	100	125	140	160	180	200	250	300	
		Port size																						
MGP 	End Lock type																							
MGPS 	Heavy duty guide rod type																							
MGPA 	High precision guidance type																							

Guide Cylinder

Series	Description/Bore Sizes (mm)																						
	2,5	4	6	8	10	12	16	20	25	32	40	50	63	80	100	125	140	160	180	200	250	300	
	Port size																						
MGF 	Compact guide table																						
												●		●		●							
												1/8		1/4		1/4							
MGT 	Guide cylinder and manually operated turntable																						
													●	●	●								
														1/4	3/8	3/8							

Double Power Cylinder

Series	Description/Bore Sizes (mm)																						
	2,5	4	6	8	10	12	16	20	25	32	40	50	63	80	100	125	140	160	180	200	250	300	
Port size																							
 MGZ/MGZR	Double power cylinder																						
											●	●	●	●	●	●							
												M5	1/8	1/8	1/4	1/4	1/4	3/8					



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Slide Unit

Series	Description/Bore Sizes (mm)																						
	2,5	4	6	8	10	12	16	20	25	32	40	50	63	80	100	125	140	160	180	200	250	300	
	Port size																						
CXW 	Built-in shock absorber																						
					●		●	●	●	●													
					M5		M5	M5	1/8	1/8													
																							



Dual Rod Cylinder

Series	Description/Bore Sizes (mm)																						
	2,5	4	6	8	10	12	15	20	25	32	40	50	63	80	100	125	140	160	180	200	250	300	
Port size																							
CXSJ 	Compact type																						
			● M3		● M5		● M5	● M5	● M5	● 1/8													
CXS 	Basic type																						
			● M5		● M5		● M5	● M5	● 1/8	● 1/8													
CXS□□A 	With air cushion																						
								● M5	● 1/8	● 1/8													
CXS□□R 	With end lock. For retraction side																						
			● M5		● M5		● M5	● M5	● 1/8	● 1/8													
CXSW 	Double rod cylinder																						
			● M5		● M5		● M5	● M5	● 1/8	● 1/8													



Compact Cylinder with Lock

Series	Locking method	Locking direction	Description/Bore Sizes (mm)																
			16	20	25	32	40	50	63	80	100	125	140	160	180	200	250		
CLQ		Cam plate	One direction	Port size															
				Compact cylinder with lock															
				M5 (M5) M5 (M5) 1/8 (1/8) 1/8 (1/8) 1/4 (1/8) 1/4 (1/8) 3/8 (1/8) 3/8 (1/4)															
MLGP		Cam plate	One direction	Compact guide cylinder with lock															
				1/8 (M5) 1/8 (M5) 1/8 (1/8) 1/8 (1/8) 1/4 (1/8) 1/4 (1/8) 3/8 (1/8) 3/8 (1/4)															
				SEE IN BEST PNEUMATICS CATALOGUE															

Cylinder with spring locking

Series	Locking method	Locking direction	Description/Bore Sizes (mm)																
			16	20	25	32	40	50	63	80	100	125	140	160	180	200	250		
RLQ		Spring locking	One direction	Port size															
				Compact cylinder with air cushion & lock															
																			
MLU		Spring locking	One direction	Port size															
				Plate cylinder with lock															
																			
ML1C		Spring locking	Both directions	Port size															
				Hy-rodless cylinder															
																			

Sine Cylinder

Series	Description/Bore Sizes (mm)																							
	2,5	4	6	8	10	12	15	20	25	32	40	50	63	80	100	125	140	160	180	200	250	300	Port size	
REA 																								
REAR/REBR (300 mm/s) (600 mm/s) 																								
REAS 																								
REAL 																								
REAH/REBH (300 mm/s) (600 mm/s) 																								
REC 																								

High Power Cylinder

RHC 	High power cylinder																							
										●	●	●	●	●	●	●								SEE IN BEST PNEUMATICS CATALOGUE
										1/4	1/4	3/8	3/8	1/2	1/2	3/4	3/4							

Low Friction Cylinder

MQQ/MQM/MQP 	Low friction cylinder																							
	●	●		●		●	●	●	●	●														SEE IN BEST PNEUMATICS CATALOGUE
	M5	M5		M5		M5	M5	1/8	1/8	1/8														

Stopper Cylinder

Series	Description/Bore Sizes (mm)																							
	2,5	4	6	8	10	12	15	20	25	32	40	50	63	80	100	125	140	160	180	200	250	300		
RSQ 	Port size																							
	Fixed mounting height																							
								●	●	●		●	●	●										
							M5	M5	1/8		1/8	1/8	1/8											SEE IN BEST PNEUMATICS CATALOGUE
RSG 	Adjustable mounting height																							
											●	●												
												1/8	1/8											
RSH/RS1H 	Heavy Duty																							
							●			●		●	●	●										
								M5			1/8		1/8	1/4	1/4									
RSA 																								
											●	●	●											
												1/8	1/4	1/4										

3 Position Cylinder

RZQ 	3 position cylinder																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																				
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Escapements

MIW/MIS 	Escapements																				
				●		●		●	●	●											
				M3		M5		M5	M5	1/8											

Stroke Reading Cylinder

Series	Description/Bore Sizes (mm)																						
	2,5	4	6	8	10	12	16	20	25	32	40	50	63	80	100	125	140	160	180	200	250	300	
CE1/CEU5 	Port size																						
	CE1: cylinder, CEU5: Multi-counter																						
							●		●		●	●	●	●									
						M5		M5		1/8	1/8	1/4	1/4									SEE IN BEST PNEUMATIC CATALOGUE	

Hygienic Design Cylinder

Series	Description/Bore Sizes (mm)																							
	2,5	4	6	8	10	12	15	20	25	32	40	50	63	80	100	125	140	160	180	200	250	300		
HYB 	Port size																							
	Hygienic design cylinder/ISO standard type																							
																								
																							</	

Stainless Steel Cylinder

CJ5-S CG5-S 	Stainless steel cylinder																			
C5G 	Stainless steel cylinder with ISO 6432 dimensions																			

Shock Absorber

Series		Thread size									
		M8	M10	M14	M16	M20	M25	M27	M30	M32	
RB		Standard									
		Max. energy absorption (J)									
		Stroke absorption (mm)									
RBL		Coolant resistant									
		Max. energy absorption (J)									
		Stroke absorption (mm)									
RBQ		Compact type									
		Max. energy absorption (J)									
		Stroke absorption (mm)									

								</			

Flotating Joint

Series	Description/Bore Sizes (mm)																			
	2,5	4	6	8	10	12	16	20	25	32	40	50	63	80	100	125	140	160	180	200
JA 	Standard type																			
			●		●		●	●	●	●	●	●	●	●	●	●	●	●		
JAH 	Heavy load																			
											●	●	●	●	●					
JB 	For compact cylinders																			
						●	●	●	●	●	●	●	●	●	●					
JS 	Stainless steel type																			
					●		●	●	●	●	●	●	●	●						

Vane Style Series Variations

Series	Sizes																Rotating angle				
	0.5	1	2	3	7	10	15	20	30	40	50	63	70	80	100	200	90°	100°	180°	190°	270°
: Single vane (): Double vane																					
Torque (at 0.5 MPa) N.m																					
CRB2	Rotary actuator																				
						●	●	●	●	●							●		●		●
						0.12 (0.25)	0.32 (0.65)	0.70 (1.45)	1.83 (3.70)	3.73 (7.59)											SEE IN BEST PNEUMATICS CATALOGUE
CRBU2	Rotary actuator/Free mount type																				
						●	●	●	●	●							●		●		●
						0.12 (0.25)	0.32 (0.65)	0.7 (1.45)	1.83 (3.70)	3.73 (7.59)											SEE IN BEST PNEUMATICS CATALOGUE
CRB1	Rotary actuator																				
											●	●			●	●	●		●		●
											5.69 (11.8)	10.8 (22.7)			18 (36.5)	35.9 (72.6)					SEE IN BEST PNEUMATICS CATALOGUE
MSUA	Rotary table/High precision type																				
	●			●	●			●									●		●		●
	0.11 (0.23)			0.31 (0.62)	0.69 (1.42)			1.78 (3.63)													SEE IN BEST PNEUMATICS CATALOGUE
MSUB	Rotary table																				
	●			●	●			●									●		●		●
	0.11 (0.23)			0.31 (0.62)	0.69 (1.42)			1.78 (3.63)													SEE IN BEST PNEUMATICS CATALOGUE

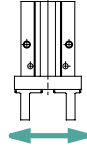
Rack and Pinion Style Series Variations

Series	Sizes																Rotating angle				
	0.5	1	2	3	7	10	15	20	30	40	50	63	70	80	100	200	90°	100°	180°	190°	270°
: Single rack pinion (): Double rack pinion																					
Torque (at 0.5 MPa) N.m																					
CRJ																	Mini-rotary actuator				
	●	●															●	●	●	●	
	0,042	0,095																			
CRA1																	Rotary actuator				
									●	●	●			●	●		●		●		
									1,91	9,27	17,2			31,7	74,3						
CRQ2																	Compact rotary actuator				
					●	●	●	●	●								●		●		
					(0,3)	(0,75)	(1,84)	(3,11)	(5,3)								80° to 100°		170° to 180°		
MSQ																	Mini rotary table (With adjustment bolt)				
	●	●	●	●															●		
	(0,09)	(0,18)	(0,29)	(0,56)															0° to 190°		
MSQ																	Rotary table (With adjustment bolt, with internal absorber)				
					●	●	●	●	●	●	●			●	●				●		
					(0,89)	(1,84)	(2,73)	(4,64)	(6,79)	(10,1)	(19,8)								0° to 190°		
MSQ																	Rotary table (With external absorber)				
					●	●	●	●									●		●		
					(0,89)	(1,84)	(2,73)	(4,64)													

Rotary Cylinder

Series	Bore size (mm)		Standard stroke (mm)										Rotating angle				
	32	40	5	10	15	20	25	30	40	50	75	100	90°	100°	180°	190°	270°
MRQ																	
	Rotary Cylinder																
	●	●		●	●	●	●	●	●	●	●	●	●	●	●	●	●
													80° to 100°		170° to 190°		

Parallel Style Series Variations



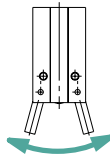
Series	Sizes																
	6	8	10	12	15	16	20	25	30	32	40	50	63	80	100	125	
	External gripping force (at 0.5 MPa) N																
MHZA2/MHZAJ2-6			Compact series (without auto switch)														 SEE IN BEST PNEUMATICS CATALOGUE
	●																
	3.3																
MHZ2			Standard type														 SEE IN BEST PNEUMATICS CATALOGUE
	●		●			●	●	●		●	●						
	3.3		11			34	42	65		158	254						
MHZJ2			Standard type with dust cover														
	●		●			●	●	●									
	3.3		11			34	42	65									
MHZL2			Long stroke type														 SEE IN BEST PNEUMATICS CATALOGUE
			●			●	●	●									
			11			34	42	65									
MHF2			Low profile														 SEE IN BEST PNEUMATICS CATALOGUE
	●		●			●	●										
	19		48			90	141										
MHL2			Wide opening														 SEE IN BEST PNEUMATICS CATALOGUE
		●				●	●	●		●	●						
		14				45	74	131		228	396						
MHR2			Rotary actuated (2 finger)														 SEE IN BEST PNEUMATICS CATALOGUE
		●		●		●		●									
		12		24		33		58									
MHR3			Rotary actuated (3 finger)														 SEE IN BEST PNEUMATICS CATALOGUE
		●		●													
		12		24													
MHK2			Wedge Cam Operation Slide Guide														 SEE IN BEST PNEUMATICS CATALOGUE
		●		●	●	●											
		15		31	46	80											

A diagram showing a vertical assembly. It consists of a base with two downward-pointing legs. Above the base is a rectangular block. Inside this block, there are two vertical lines. On each side of these lines, there are two small circles, one above the other. Below the entire assembly is a large, light blue double-headed arrow pointing left and right.



SEE IN
BEST PNEUMATICS
CATALOGUE

Angular Style Series Variations



Series	Sizes													
	6	7	10	12	15	16	20	25	30	32	40	50	63	80
External gripping moment (at 0.5 MPa) N.m														
MHC2-6/MHCA2-6	Short body type													
	0.038													
MHCM2-7S	Compact type													
	0.017													
MHC2	Standard type													
			0.10			0.39	0.70	1.36						
MHT2	Toggle type													
										12.4	36	63	106	
MHY2	180° angular, cam style													
			0.16			0.54	1.10	2.28						
MHW2	180° angular, rack and pinion style													
						0.30	0.73		1.61	3.70	8.27			

Rotary Gripper

Series	Rotation angle		Sizes											
	90°	180°	6	7	10	12	15	16	20	25	30	32	40	50
External gripping force (at 0.5 MPa) N														
MRHQ	Rotary Gripper													
	±10°	±10°			9			30	40	65				

Simplified Options


LZ


Electric Cylinders

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


E-MY2


e-Rodless Actuator

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


LX


Short Stroke Electric Actuators

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

More Advanced Options


LJ1


Single Axis Electric Actuator

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


LG1


Low Profile Single Axis Electric Actuator

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


LTF


Electric Actuator with Integrated Guide

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

Compressed Air Purification System Flow

Note 1) When the oil mist concentration (compressor discharge concentration) in the inlet side is approx. 30 mg/m³ (ANR) or less.

Note 2) It means the compressed air quality grade based on ISO8573-1:1991 (JIS B8392-1:2000) (Refer to page 4.), as well as the best quality grade which is achieved by each system.

System No.	Application example	Impurity in compressed air							Note 2) Quality grade
		Filtration (95% filtered particle size)	Note 1) Oil mist concentration	Cleanliness	Oil smell	Moisture			
						Dew point	Water contents		
A	Water drops removed air • Air blowing (Simple removal of particles) • General pneumatic tool	3 μm	—	—		Atmospheric pressure dew point: 6°C 0.7 MPa pressure dew point: 40°C	7 g/m ³ (ANR) (At 0.7 MPa 25°C)	3, -, -	
B	Dry air • It is used for the same usage as “A” and when the temperature drop in the middle of pipe is large.								
C	Dry air • General pneumatic equipment • General painting	0.3 μm	Max. 1 mg/m ³ (ANR) · 0.8 ppm	—	Oil odor	Atmospheric pressure dew point: -14 to -23°C 0.7 MPa pressure dew point: 15 to 3°C	1.7 g/m ³ (ANR) to 0.8 g/m ³ (ANR)	2, 4, 3	
D	Dry & Clean air • High grade painting • Sequence control • Measurement device • Instrumentation • Dry & Cleaning (Precision parts)	0.01 μm	Max. 0.1 mg/m ³ (ANR) · 0.08 ppm					1, 4, 2	
E	Dry & Clean air • When a refrigerated air dryer is not provided in sub line. • Integrated into the equipment (Machine tools, 3D measurement device, etc)		Max. 0.01 mg/m ³ (ANR) · 0.008 ppm	35 particles or less of 0.3 μm diameter or larger / 10 ℓ (ANR) (100 particles or less /ft ³ or less)	No oil odor			1, 4, 1	
F	Deodorized air • Stirring, transporting, drying and packaging • Food industry (Except for direct blowing to foods)		Max. 0.004 mg/m ³ (ANR) · 0.0032 ppm						
G	Low dew point clean air • Drying electric and electronic parts • Drying a filling tank • Transporting powders • Ozone generator • Activation device in a low temperature room			Max. 0.01 mg/m ³ (ANR) · 0.008 ppm		Oil odor	Atmospheric pressure dew point: -30 to -60°C	0.5 g/m ³ (ANR) to 0.02 g/m ³ (ANR)	1, 2, 1
H	Low dew point clean air (for clean room) • Blowing semi-conductor parts in a clean room		Max. 0.004 mg/m ³ (ANR) · 0.0032 ppm	Particle with 0.1 μm diameter or larger 0 pc/6 ℓ	No oil odor	0.7 MPa pressure dew point: -6 to -42°C			

Product name

Model

Air flow rate ℓ/min (ANR)

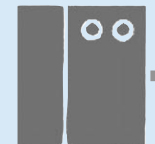
Max. inlet air temperature

Filtration
(95% filtered particle size)Note 1)
Outlet oil mist concentration: Max.

Outlet cleanliness

Atmospheric pressure dew point
[Inlet air pressure at 0.7 MPa]

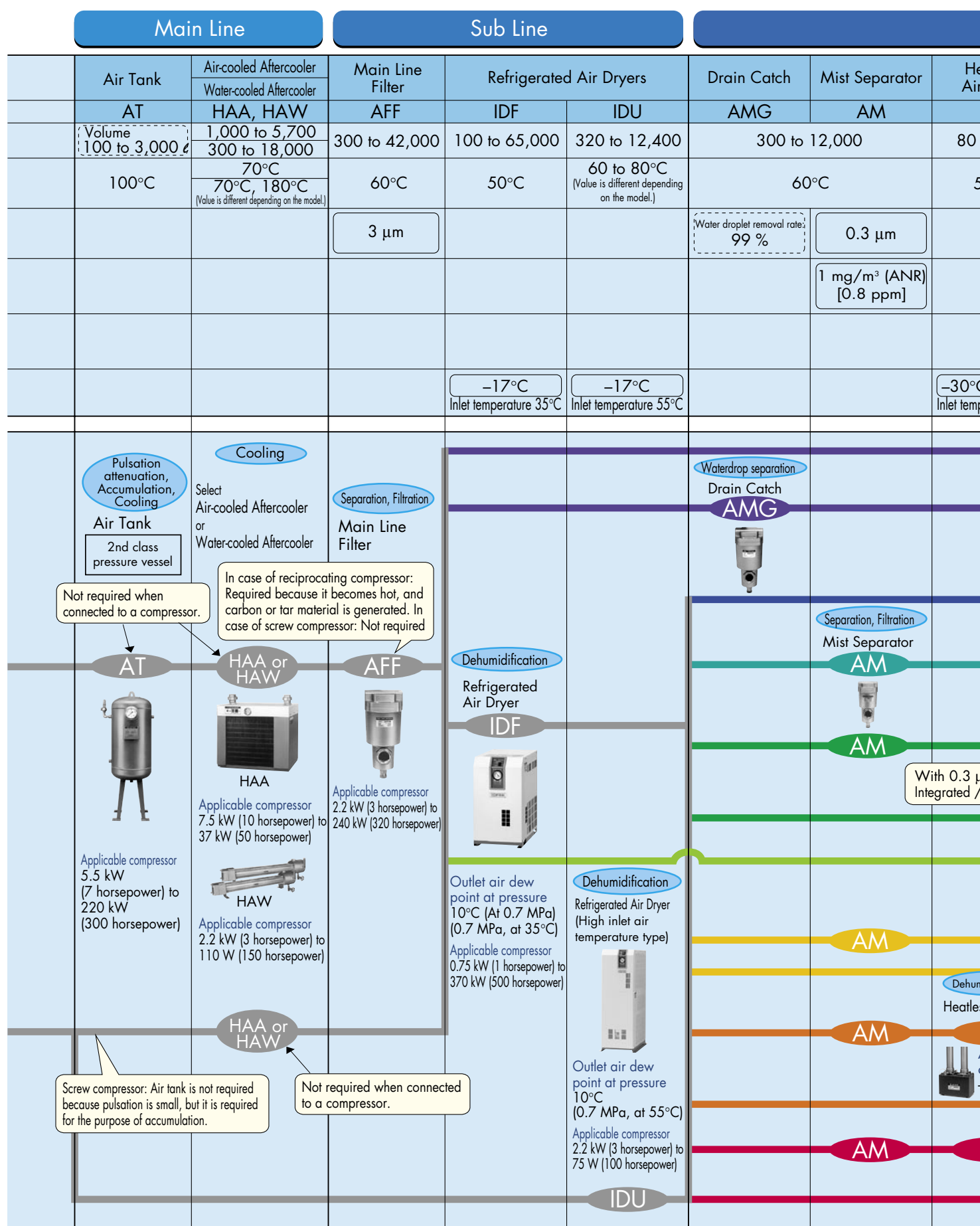
Reciprocating compressor



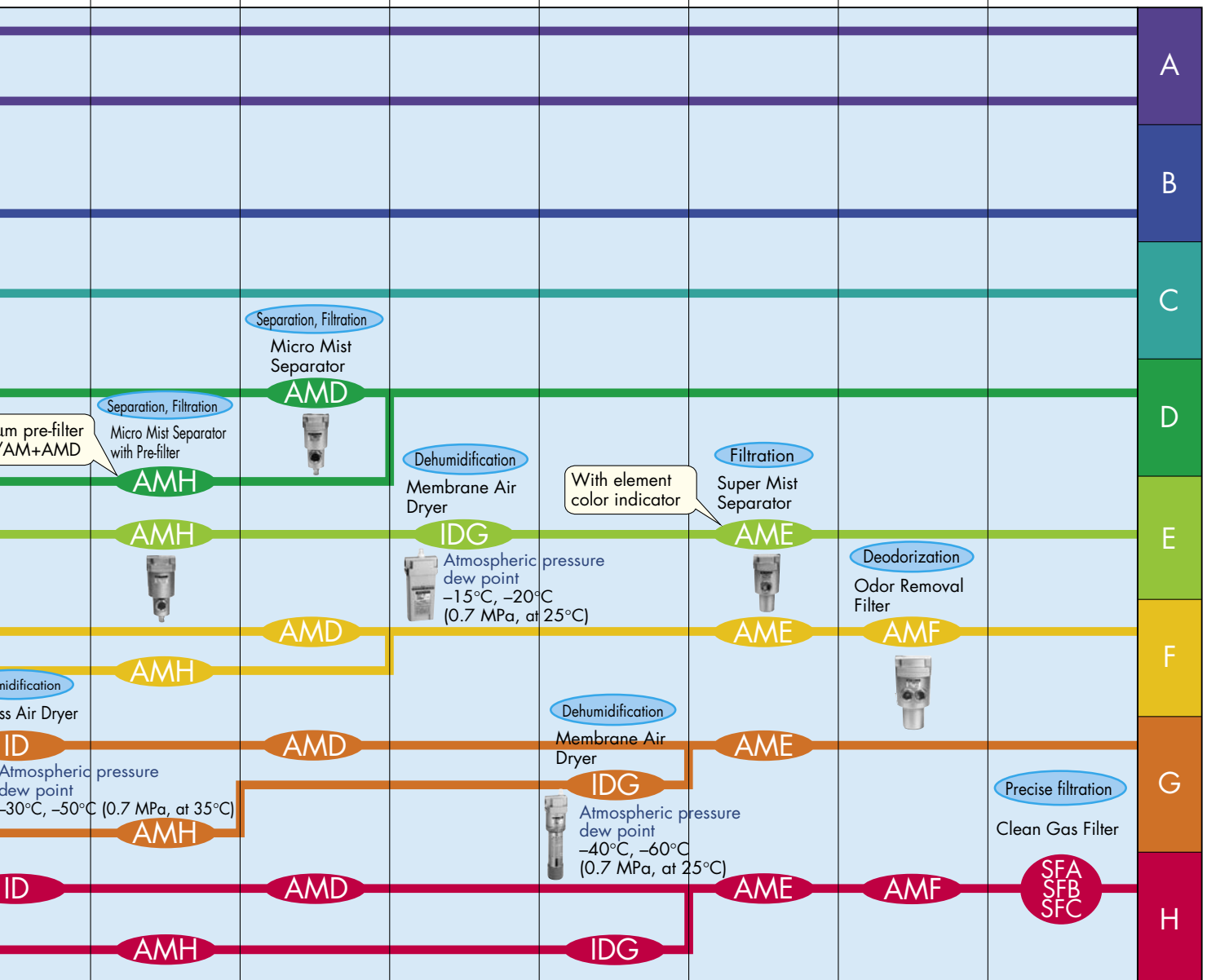
Screw compressor

Detailed specifications page

Variant model page



Local Line							
Heatless Air Dryer	Micro Mist Separator with Pre-filter	Micro Mist Separator	Membrane Air Dryer		Super Mist Separator	Odor Removal Filter	Clean Gas Filters
ID	AMH	AMD	IDG		AME	AMF	SFA, SFB, SFC
to 780	200 to 12,000	200 to 40,000	10 to 1,000	75 to 300 50 to 150	200 to 12,000	200 to 40,000	26 to 300
50°C	60°C		50°C, 55°C (Value is different depending on the model.)	50°C	60°C		80°C, 120°C (Value is different depending on the model.)
	0.01 μm (0.3 μm with pre-filter)	0.01 μm			0.01 μm		0.01 μm
	0.1 mg/m ³ (ANR) [0.08 ppm]				0.01 mg/m ³ (ANR) [0.008 ppm]	0.004 mg/m ³ (ANR) [0.0032 ppm]	
					35 particles or less of 0.3 μm diameter or larger/10 μ (ANR) 100 particles or less / ft ³ or less		Particle with 0.1 μm diameter or larger 0 pc/6
[-50°C] Inlet temperature 35°C			-15°C -20°C Inlet temperature 25°C	-40°C -60°C Inlet temperature 25°C			



Technical Information

Impurities Reducible by Air Preparation Equipment

Product name	Model	Solid foreign matter		Oil mist	Smell	Moisture					
		Filtration Minimum solid diameter that can be removed more than 95 % (μm)	Outlet cleanliness	Outlet oil mist concentration Max. mg/m^3 (ANR) [ppm]		Droplet	Water steam				
						Removal rate (%)					
Air Filter	AF	5	—	Δ	$\times$	Δ	$\times$				
Main Line Filter	AFF	3		1 [0.8]							
Mist Separator	AM	0.3		0.1 [0.08]							
Micro Mist Separator	AMD	0.01		35 particles or less of 0.3 μm diameter or larger/10 ℓ (ANR) (100 particles/ ft^3 or				0.01 [0.008]	Deodorization of oil smell		
Super Mist Separator	AME		$\times$		$\times$						
Odor Removal Filter	AMF					—	Δ				
Clean Gas Filter	SFA SFB SFC					Particle with 0.1 μm diameter or larger 0 pc/6 ℓ	$\times$				
Drain Catch	AMG					Δ				—	99
Air-cooled Aftercooler	HAA	$\times$	$\times$	$\times$	Δ	Δ					
Water-cooled Aftercooler	HAW										
Refrigerated Air Dryer	IDF/IDU						$\times$	$\times$	$\times$	$\times$	-14 to -23
Heatless Air Dryer	ID										-30 to -60
Membrane Air Dryer	IDG										-14 to -60

Red: Reducible $\times$: Not reducible Δ : Reducible as secondary effect.

Dew Point

When air is cooled under the constant pressure and water vapor becomes saturated into dew. The temperature at which the condensed water is formed is defined as the dew point.

Atmospheric pressure dew point: The dew point under atmospheric pressure

<Ex.> Blow the compressed air into atmospheric:

Dew appears when cooled under the atmospheric pressure.

Pressure dew point: The dew point under applied pressure

<Ex.> Compressed air line:

Condensed into dew when cooled lower than the pressure dew point.

Particle Diameter (Reference)

Visible by electronic microscope		Visible by optical microscope		Visible by naked eye	
Mist		Fog		Dust	
Smoke of cigarette		Smoke of oil		Raindrop	
Virus		Bacteria		Pollen	
Mold/Mildew		Spore			
0.01 μm	0.1 μm	1 μm	10 μm	100 μm	1000 μm (1 mm)

ISO Compressed Air Quality Grade

The grade of compressed air purity with solid particles, water, and oil as defined by ISO 8573-1: 1991 (JIS B8392-1: 2000).

Quality Grade	Max. particle size (μm)	Min. pressure dew point ($^{\circ}\text{C}$)	Max. oil concentration (mg/m^3)
1	0.1	-70	0.01
2	1	-40	0.1
3	5	-20	1.0
4	15	3	5
5	40	7	25
6	—	10	—

How to use the table:

Ex. In case of following condition

Solid particle size: 0.1 μm

Pressure dew point: 3 $^{\circ}\text{C}$

Oil concentration: 0.1 mg/m^3

The quality grade is shown as 1, 4, 2.

Effects caused by fluids to pneumatic components

	Cylinder and accessories				Speed controllers and fittings			Tubing		Cylinder and accessories			Speed controllers and fittings	
	Housing Stainless steel 1.4301	CG5, CG5		Seal	KP		Seal	TPH/TPS	Aluminium AL	MGP, XC6, CQ2, XC6		Seal	Housing	KG
		nitrile rubber NBR (-40 bis 70°C)	fluorine rubber FKM (-10 bis 150°C)		Housing Polypropylene PP (-20 bis 80°C)		EPDM ölfrei	Polyethylen PE (-20 bis 80°C)		nitrile rubber NBR (-40 bis 70°C)	fluorine rubber FKM		POM (0 bis 60°C)	NBR (-40 bis 70°C)
Inorganic acid	hydrochloric acid (10%)	C	A	A	A	A	A	A	C	B	A	A	C	B
	Chromate (50%)	C	A	A	A	A	B	A	D	D	A	A	C	D
	Boric acid	A	A	A	A	A	A	A	C	A	A	A	A	A
	Sulfuric acid	C	A	A	A	A	A	A	D	C	A	A	C	C
	phosphoric acid	C	A	A	A	A	A	A	C	B	A	A	C	B
Inorganic alkaline	ammoniumhydroxid	A	B	C	-	A	A	A	B	B	C	C	C	B
	caustic soda	B	B	A	-	A	A	A	D	B	B	B	C	B
	kaliumhydroxid, watery (lime water)	B	A	A	A	A	A	A	C	A	A	A	A	A
	magnesium hydroxide	A	A	A	A	A	A	A	B	B	A	A	A	B
Organic dissolver	acetylene	A	A	A	A	A	A	A	A	A	A	A	A	A
	formic acid	B	A	C	A	A	A	A	C	B	C	C	C	B
	citric acid (10%)	B	A	A	A	A	A	A	D	A	A	A	B	A
	acetic acid	B	D	D	B	A	A	B	C	D	D	D	C	D
	lactic acid - watery	B	A	A	A	A	A	A	D	A	A	A	B	A
Others (oil, gas, etc.)	linseed oil	A	A	A	A	A	B	A	B	A	A	A	A	A
	potassium chloride - soppy	C	A	A	A	A	A	A	D	A	A	A	A	A
	calcium chloride - watery	C	A	A	A	A	A	A	D	A	A	A	A	A
	petroleum	A	A	A	A	A	D	A	A	A	A	A	A	A
	sodium hypochlorite - soppy	C	A	A	A	A	B	A	D	B	A	A	C	B
	common salt	A	A	A	A	A	A	A	-	A	A	A	A	A
	carbon dioxide	A	A	A	-	A	B	-	A	A	A	A	-	A
	natural gas	A	A	A	A	A	D	A	A	A	A	A	A	A

A = Only small attacks or practically none.

B = Moderate attacks.

C = Strong attacks.

D = Attacked till complete disintegration.

- = Not Tested

Compressed-air conditioning

Air Pressure for the food and stimulant manufacture

(Air pressure preparation with a refrigerant drier, dew point by +3°C)

General recommendation with air pressure application for the food industry (classification of the air pressure quality in order to meet DIN ISO 8573-1): Oil class 1; Particle class 1; Water class 4.

Packaging machine for food medium and pharmaceutical environments



Preliminary filter, 5µm
Solid partical < 0.5µm
Rest oil content < 5mg/m3



Microfilter, 0.1µm - 0.3µm
Solid partical < 0.1µm
Rest oil content < 0.1mg/m3



Supermicrofilter, 0.01µm
Solid partical < 0.01µm
Rest oil content < 0.01mg/m3

In case of direct contact with products additionally odour free



Solid partical, 0.01µm
Rest oel content < 0.01µm
Odor free < 0.004mg/m3

* Note) Pharmaceutical, brewery, dairy industry's include the addition of a sterile filter in the application.

Filtration degree in order to DIN ISO 8573-1

Class	Dust rest ratio µm	Dust rest ratio mg/m3	Oil rest ration mg/m3	water rest ratio DTP °C	water rest ratio g/m3
1	0.1	0.1	0.01	-70	0.003
2	1	1	0.1	-40	0.117
3	5	5	1	-20	0.88
4	15	8	5	+3	5.95
5	40	10	25	+7	7.73
6	-	-	-	+10	9.96
7	-	-	-	not specified	

Modular Assemblies

Series	Combination component	Port size	Set pressure (MPa)	
AC 	Modular F.R.L. combination: AC			
	Air filter, Regulator, Lubricator (AF + AR + AL)	M5, 1/8, 1/4, 3/8, 1/2, 3/4, 1	0.05 to 0.85 Note)	 SEE IN BEST PNEUMATICS CATALOGUE
	Filter regulator, Lubricator (AW + AL)	M5, 1/8, 1/4, 3/8, 1/2, 3/4	0.05 to 0.85 Note)	
	Air Filter, Regulator (AF + AR)	1/8, 1/4, 3/8, 1/2, 3/4, 1	0.05 to 0.85 Note)	
	Air filter, Mist separator, Regulator (AF + AFM + AR)	1/8, 1/4, 3/8, 1/2, 3/4	0.05 to 0.85	
	Filter regulator, Mist separator (AW + AFM)	1/8, 1/4, 3/8, 1/2, 3/4	0.05 to 0.85	

Note) Set pressure for M5 type is 0.05 to 0.7 MPa.

Modular Range

Series	Port size	Set pressure	Bowl capacity	Filtration	
AF10 to 60 	Air filter: AF				
	M5, 1/8, 1/4, 3/8, 1/2, 3/4, 1	–	–	5 µm	 SEE IN BEST PNEUMATICS CATALOGUE
AFM20 to 40 	Mist separator: AFM				
	1/8, 1/4, 3/8, 1/2, 3/4	–	–	0.3 µm	 SEE IN BEST PNEUMATICS CATALOGUE
AFD20 to 40 	Mist separator: AFD				
	1/8, 1/4, 3/8, 1/2, 3/4	–	–	0.01 µm	 SEE IN BEST PNEUMATICS CATALOGUE

Modular Range

Series	Port size	Set pressure	Bowl capacity	Filtration	
AR10 to 60 	Regulator: AR				
	M5, 1/8, 1/4, 3/8, 1/2, 3/4, 1	0.05 to 0.85 MPa	–	–	
AR20K to 60K 	Regulator with back flow mechanism: AR□K				
	1/8, 1/4, 3/8, 1/2, 3/4, 1	0.05 to 0.85 MPa	–	–	
AL10 to 60 	Lubricator: AL				
	M5, 1/8, 1/4, 3/8, 1/2, 3/4, 1	–	70 to 135 cm ³	–	
AW10 to 60 	Filter regulator: AW				
	M5, 1/8, 1/4, 3/8, 1/2, 3/4, 1	-0.05 to 0.85 MPa	–	5 µm	
AW20K to 40K 	Filter regulator with back flow function: AW□K				
	1/8, 1/4, 3/8, 1/2, 3/4	0.05 to 0.85 MPa	–	5 µm	
AWM 	Mist separator regulator: AWM				
	1/8, 1/4, 3/8, 1/2	0.05 to 0.85 MPa	–	0.3 µm	
AWD 	Micro mist separator regulator: AWD				
	1/8, 1/4, 3/8, 1/2	0.05 to 0.85 MPa	–	0.01 µm	

Modular Accessories

	Port size	Function	
Piping adapter	 M5, 1/8, 1/4, 3/8, 1/2, 3/4, 1	Allows installation/removal of the component without removing the piping.	 SEE IN BEST PNEUMATICS CATALOGUE
T-interface	 M5, 1/8, 1/4, 3/8, 1/2	Redirects the air flow.	 SEE IN BEST PNEUMATICS CATALOGUE
Pressure switch with piping adapter	 1/8, 1/4, 3/8, 1/2, 3/4	Compact switch and piping adapter integrated into one piece.	 SEE IN BEST PNEUMATICS CATALOGUE
Check valve	 1/8, 1/4, 3/8	Prevents back flow from lubricator.	 SEE IN BEST PNEUMATICS CATALOGUE
Pressure switch	 —	Compact switch	 SEE IN BEST PNEUMATICS CATALOGUE
Cross interface	 M5, 1/8, 1/4, 3/8, 1/2	Allows piping in all 4 directions.	 SEE IN BEST PNEUMATICS CATALOGUE
Residual pressure relief 3 port valve	 1/8, 1/4, 3/8, 1/2, 3/4, 1	Releases residual pressure in lines.	 SEE IN BEST PNEUMATICS CATALOGUE
Spacers and brackets	 —	Brackets for modular assemblies	 SEE IN BEST PNEUMATICS CATALOGUE

Soft Start-up Valve

Series	Port size	Set pressure	Notes	
AV 	Soft start-up valve: AV2000 to 5000			
	1/4, 3/8, 1/2, 3/4, 1	0.1 to 1 MPa	A start-up valve that gradually increases downstream pressure after energisation and rapidly exhaust air when de-energised.	 SEE IN BEST PNEUMATICS CATALOGUE

Pressure Control Equipment

Series	Port size	Set pressure	Notes	
ARJ 	Miniature regulator: ARJ1020F, ARJ210, ARJ310			
	M5, 1/8 ø4, ø6	0.1 to 0.7 MPa	One Touch tube connection. Panel mountable.	
AR 	Pilot operated regulator: AR425 to 925, ar435 to 935			
	1/4, 3/8, 1/2, 3/4, 1 1/4, 1 1/2, 2	0.02 to 0.83 MPa		
ARM 	Compact manifold regulator: ARM10/11			
	ø4, ø6, ø10, 1/4, 3/8	0.05 to 0.7 MPa		
ARM 	Manifold regulator: ARM1000/200/2500/3000			
	1/8, 1/4, 3/8,	0.05 to 0.85 MPa		
ARP 	Direct operated precision regulator: ARP3000			
	1/4	0.005 to 0.3 MPa	Sensitivity 0.001 MPa. direct-driven, bleed type (with relieving function)	
ARX20 	Regulator for 2 MPa: ARX20			
	1/8, 1/4	0.05 to 0.85 MPa	Compliant for inlet supply pressure of 2 MPa. Best suited for adjusting pressure discharged from small compressors.	
IR 	Precision regulator: IR1000/2000/3000			
	1/8, 1/4, 3/8, 1/2	0.005 to 0.8 MPa	Tension controller Contact pressure control Sensitivity: 0.2% F.S. Max. Repeatability: ±0.5% F.S. Max.	
IRV 	Vacuum regulator: IRV1000/2000/3000			
	1/8, 1/4, 3/8, 1/2	-100 to -1.3 kPa	Able to adjust the vacuum pressure for vacuum line.	

Pressure Control Equipment

Series	Port size	Set pressure	Notes	
ITV0000 		Compact electro-pneumatic regulator: ITV0000		
	ø4	0.001 to 0.1 MPa 0.001 to 0.5 MPa 0.001 to 0.9 MPa -1 to -100 kPa	Stepless control of air pressure proportional to an electrical signal.	SEE IN BEST PNEUMATICS CATALOGUE
ITV1/2/3000 		Electro-pneumatic regulator: ITV1000/2000/3000		
	1/8, 1/4, 3/8, 1/2	0.001 to 0.1 MPa 0.001 to 0.5 MPa 0.001 to 0.9 MPa	Stepless control of air pressure proportional to an electrical signal.	
ITV2090/2091 		Electronic vacuum regulator: ITV2090/2091		
	1/4	-1.3 to -80 MPa	Pressure controlled by electrical signals.	
VBA + tank 		Booster regulator: VBA + reservoir tank UKT138		
	1/8, 1/4, 3/8, 1/2	0.05 to 0.85 MPa		SEE IN BEST PNEUMATICS CATALOGUE

Lubrication Equipment

Series	Port size	Bowl capacity	Notes	
AL 		Large flow lubricator: AL800/900		
	1 1/4, 1 1/2, 2	440, 1000 cm ³	Individual lubrication.	SEE IN BEST PNEUMATICS CATALOGUE
ALD/ALDU 		Jet lube: ALD600/900, ALDU600/900		
	3/4, 1, 1 1/4, 1 1/2, 2	2000, 5000 cm ³	Centralized multipoint lubrication.	SEE IN BEST PNEUMATICS CATALOGUE
ALB 		Booster lube: ALB900		
	1, 2, 3 inch flange	5000 cm ³	Centralized multipoint lubrication unit with non-differential pressure type.	SEE IN BEST PNEUMATICS CATALOGUE

Air Dryers

Series	Specifications	Notes	
IDFA 	Refrigerated Air Dryer: IDFA		
	Inlet air pressure: 1.5 to 16 bar Inlet air temperature: 5 to 50°C	High efficiency heat exchanger. Ozone friendly refrigerants. Conforms to stringent ISO8573-1 standards.	SEE IN BEST PNEUMATICS CATALOGUE
IDG 	Membrane Air Dryer: IDG		
	Outlet air flow rate (l/min (ANR)): 25 to 1000 Inlet air flow rate (l/min (ANR)): 62 to 1400	Macro molecular membrane dryers that act like filters.	SEE IN BEST PNEUMATICS CATALOGUE

Large Flow Air filter

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

Oil Mist Separators

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

Water Separator

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

Odour Removal Filter

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

Related Products

Series	Port size	Notes	
AD		Auto drain valve: AD402/600	
	1/4, 3/8, 1/2, 3/4, 1	Drainage is automatically discharged in a reliable manner, without requiring human operators. Highly resistant to dust and corrosion.	 SEE IN BEST PNEUMATICS CATALOGUE
AMJ		Drain separator for vacuum: AMJ	
	1/4, 3/8, 1/2, 3/4, 1	Remove water droplets from air by simply installing in vacuum equipment connection line. Effective for removing water droplets from the air sucked into vacuum pumps and ejectors, etc.	 SEE IN BEST PNEUMATICS CATALOGUE
ADH		Heavy duty auto drain: ADH4000	
	1/2	Easy maintenance. Float style drain allows automatic drain discharge without electric power.	 SEE IN BEST PNEUMATICS CATALOGUE
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.	 SEE IN BEST PNEUMATICS CATALOGUE

Variations

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

One-touch Mini Series KJ

Applicable tubing—Metric size



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

One-touch Fittings Series KQ2

Applicable tubing—Metric size



Low-torque rotation for fast swivel and
oscillating applications

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

Applicable tubing—Metric size



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

One-touch Fittings/Manifold Series KM

Applicable tubing—Metric size



Possible to use in vacuum to -1.0 MPa

Insert Fittings Series KF

Applicable tubing—Metric size



Tubing connection/disconnection without
use of tools

Miniature Fittings Series M

Applicable tubing—Metric size



Accepts soft copper tube

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

Applicable tubing—Metric size



Applicable tubing material		Applicable tubing O.D. (mm)								With seal	Electroless nickel plated	
		2	ø3.2	ø4	ø6	ø8	ø10	ø12	ø16			
Nylon	M3	●	●	●								SEE IN BEST PRACTICES CATALOGUE
	M5	●	●	●	●							
	Soft nylon											
	1/8		●	●	●					●	●	
	Unions	●	●	●							●	
Polyurethane	M5		●	●	●							SEE IN BEST PRACTICES CATALOGUE
	M6			●	●							
	1/8		●	●	●	●	●			●	●	
	1/4		●	●	●	●	●	●		●	●	
	3/8				●	●	●	●	●	●	●	
	1/2					●	●	●	●	●	●	
	Unions	●	●	●	●	●	●	●	●	●	●	
Nylon	M5		●	●	●							SEE IN BEST PRACTICES CATALOGUE
	M6		●	●	●							
	1/8		●	●	●	●	●			●	●	
	1/4			●	●	●	●	●		●	●	
	3/8				●	●	●	●	●	●	●	
	1/2					●	●	●	●	●	●	
Soft nylon	1/4		●	●								SEE IN BEST PRACTICES CATALOGUE
	3/8			●		●						
	ø8			●								
	ø10				●							
Polyurethane	ø12					●						SEE IN BEST PRACTICES CATALOGUE
	ø16						●					
Nylon	1/8		●	●	●							SEE IN BEST PRACTICES CATALOGUE
	1/4		●	●	●	●	●					
	3/8			●	●	●	●	●				
	1/2					●	●	●	●			
	Unions	●	●	●	●	●	●	●	●			
Soft nylon	M3	●	●	●								SEE IN BEST PRACTICES CATALOGUE
	M5	●	●	●	●							
	1/8		●	●						●	●	
Polyurethane	1/8		●	●								SEE IN BEST PRACTICES CATALOGUE
	1/4		●	●	●	●	●					
	3/8			●	●	●	●	●				
	1/2					●	●	●	●			
	Unions	●	●	●	●	●	●	●	●			
Soft copper (C1220T-0)	1/8		●	●	●							SEE IN BEST PRACTICES CATALOGUE
	1/4		●	●	●	●	●					

Variations

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

Tube Coupler Series KC

Applicable tubing—Metric size



General purpose type

S Couplers Series KK

* Table on the right shows the One-touch fittings type.



With shock absorption cover

S Couplers Series KKH



Body material: SUS304

S Couplers Stainless Steel Series KKA



Manufactured by Rectus

S Couplers Series KK13



Multi-connector with One-touch Fittings Series DMK

Applicable tubing—Metric size



Rectangular Multi-connector Series KDM

Applicable tubing—Metric size



Centralized distribution of supply air

Piping Module Series KB

Applicable tubing—Metric size



Applicable
tubing material

Applicable tubing O.D.
(mm)

ø3.2 ø4 ø6 ø8 ø10 ø12 ø16

With seal

Electroless
nickel plated

Nylon
Soft nylon
Polyurethane

M5
1/8
1/4
3/8
1/2
Unions

Nylon
Soft nylon
Polyurethane

M5
1/8
1/4
1/2

Nylon
Soft nylon
Polyurethane

1/8
1/4
3/8
1/2

Nylon
Soft nylon
Polyurethane

1/8
1/4
3/8
1/2
3/4

Nylon
Soft nylon
Polyurethane

1/8
1/4
3/8
1/2

Nylon
Soft nylon
Polyurethane

6 tubes
12 tubes

Nylon
Soft nylon
Polyurethane

10 tubes
20 tubes

Nylon
Soft nylon
Polyurethane

SEE NEXT PNEUMATICS CATALOGUE

SEE NEXT PNEUMATICS CATALOGUE

SEE NEXT PNEUMATICS CATALOGUE

SEE NEXT PNEUMATICS CATALOGUE

SEE NEXT PNEUMATICS CATALOGUE

SEE NEXT PNEUMATICS CATALOGUE

SEE NEXT PNEUMATICS CATALOGUE

SEE NEXT PNEUMATICS CATALOGUE

Variations

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

FR One-touch Fittings Series KR

Applicable tubing—Metric size



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

FR One-touch Fittings Manifold Series KRM

Applicable tubing—Metric size



For use in corrosive environments
Stainless series

One-touch Fittings Series KG

Applicable tubing—Metric size



For use in corrosive environments
Stainless series 316

One-touch Fittings Series KQG

Applicable tubing—Metric size



For preventing static electricity

Antistatic One-touch Fittings Series KA



For use in corrosive environments
Stainless steel (SUS316)

Miniature Fittings Series MS

Applicable tubing—Metric size



Applicable tubing material		Applicable tubing O.D. (mm)						With seal	Electroless nickel plated	
		ø3.2	ø4	ø6	ø8	ø10	ø12			
FR Soft nylon FR Double layer	1/8		●	●	●			●		SEE IN NET PNEUMATICS CATALOGUE
	1/4		●	●	●	●		●		
	3/8		●	●	●	●		●		
	1/2				●	●		●		
	Unions		●	●	●	●				
FR Soft nylon FR Double layer	1/4		●							SEE IN NET PNEUMATICS CATALOGUE
	3/8			●						
	ø10			●						
	ø12				●					
Nylon Soft nylon Polyurethane	M5	●	●	●	●					SEE IN NET PNEUMATICS CATALOGUE
	1/8	●	●	●	●	●		●		
	1/4	●	●	●	●	●	●	●		
	3/8		●	●	●	●	●	●		
	1/2				●	●	●	●		
Nylon Soft nylon Polyurethane Polyolefin FEP PFA	Unions	●	●	●	●	●	●			SEE IN NET PNEUMATICS CATALOGUE
	M5	●	●	●	●					
	1/8	●	●	●	●	●		●		
	1/4		●	●	●	●	●	●		
	3/8			●	●	●	●	●		
Soft nylon Polyurethane	1/2				●	●	●	●		SEE IN NET PNEUMATICS CATALOGUE
	Unions	●	●	●	●	●	●			
	M5	●	●	●						
	M6	●	●	●						
	1/8	●	●	●	●	●		●		
Nylon Soft nylon Polyurethane	1/4	●	●	●	●	●		●		SEE IN NET PNEUMATICS CATALOGUE
	3/8		●	●	●	●	●	●		
	1/2				●	●	●	●		
	Unions	●	●	●	●	●	●			
	M5	●	●	●						

Variations

For air Blow applications

Clean One-touch Fittings Series KP

Applicable tubing—Metric size



For driving System Air Piping

Clean One-touch Fittings Series KPQ/KPG

Applicable tubing—Metric size



Applicable tubing material		Applicable tubing O.D. (mm)						With seal	Electroless nickel plated	
		ø3.2	ø4	ø6	ø8	ø10	ø12			
Recommended: Polyolefin Soft Polyolefin	1/8	●	●	●						SEE IN NET PNEUMATICS CATALOGUE
	1/4	●	●	●	●					
	3/8				●	●				
	1/2				●	●				
	Unions	●	●	●	●	●				
Polyurethane: Serie 10-	1/8	●	●	●						SEE IN NET PNEUMATICS CATALOGUE
	1/4	●	●	●	●					
	3/8				●	●				
	1/2					●				
	Unions	●	●	●	●	●				

Variations

General tubing 1.5 MPa max. at 20°C

Nylon Tubing
Series **T/TIA**

Slightly flexible 1.0 MPa max. at 20°C

Soft Nylon Tubing
Series **TS/TISA**

Flexible 0.8 MPa max. at 20°C

Polyurethane Tubing
Series **TU/TIUB**

Extremely flexible 0.6 MPa max. at 20°C

Soft Polyurethane Tubing
Series **TUS**

0.8 MPa standard type, 10 MPa for high pressure type

Hard Polyurethane Tubing
Series **TH/TUH**

For flexible and moving applications

Polyurethane Coil Tubing
Series **TCU**

For flexible multi-tube applications

Polyurethane Flat Tubing
Series **TFU**

Color	Tubing O.D.													
	Metric size (mm)							Inch size (inch)						
	ø2 (ø 3/32")	ø4 (ø 1/8")	ø6 (ø 1/4")	ø8 (ø 5/16")	ø10 (ø 3/8")	ø12 (ø 1/2")	ø16	ø 1/8" (ø 3.2)	ø 3/16"	ø 1/4"	ø 3/8"	ø 1/2"		
Black	•	•	•	•	•	•	•	•	•	•	•	•	•	SEE LIST IN BIST PNEUMATIC CATALOGUE
White	•	•	•	•	•	•	•	•	•	•	•	•	•	SEE LIST IN BIST PNEUMATIC CATALOGUE
Red	•	•	•	•	•	•	•	•	•	•	•	•	•	SEE LIST IN BIST PNEUMATIC CATALOGUE
Blue	•	•	•	•	•	•	•	•	•	•	•	•	•	SEE LIST IN BIST PNEUMATIC CATALOGUE
Yellow	•	•	•	•	•	•	•	•	•	•	•	•	•	SEE LIST IN BIST PNEUMATIC CATALOGUE
Green	•	•	•	•	•	•	•	•	•	•	•	•	•	SEE LIST IN BIST PNEUMATIC CATALOGUE
Black	•	•	•	•	•	•	•	•	•	•	•	•	•	SEE LIST IN BIST PNEUMATIC CATALOGUE
White	•	•	•	•	•	•	•	•	•	•	•	•	•	
Red	•	•	•	•	•	•	•	•	•	•	•	•	•	
Blue	•	•	•	•	•	•	•	•	•	•	•	•	•	
Yellow	•	•	•	•	•	•	•	•	•	•	•	•	•	
Green	•	•	•	•	•	•	•	•	•	•	•	•	•	SEE LIST IN BIST PNEUMATIC CATALOGUE
Clear	•	•	•	•	•	•	•	•	•	•	•	•	•	
Orange	•	•	•	•	•	•	•	•	•	•	•	•	•	
Black	•	•	•	•	•	•	•	•	•	•	•	•	•	SEE LIST IN BIST PNEUMATIC CATALOGUE
White	•	•	•	•	•	•	•	•	•	•	•	•	•	
Red	•	•	•	•	•	•	•	•	•	•	•	•	•	
Blue	•	•	•	•	•	•	•	•	•	•	•	•	•	
Yellow	•	•	•	•	•	•	•	•	•	•	•	•	•	
Green	•	•	•	•	•	•	•	•	•	•	•	•	•	SEE LIST IN BIST PNEUMATIC CATALOGUE
Translucent	•	•	•	•	•	•	•	•	•	•	•	•	•	
Yellow brown	•	•	•	•	•	•	•	•	•	•	•	•	•	
Black	•	•	•	•	•	•	•	•	•	•	•	•	•	SEE LIST IN BIST PNEUMATIC CATALOGUE
White	•	•	•	•	•	•	•	•	•	•	•	•	•	
Blue	•	•	•	•	•	•	•	•	•	•	•	•	•	
Translucent	•	•	•	•	•	•	•	•	•	•	•	•	•	SEE LIST IN BIST PNEUMATIC CATALOGUE
1 core	•	•	•	•	•	•	•	•	•	•	•	•	•	
2 cores	•	•	•	•	•	•	•	•	•	•	•	•	•	SEE LIST IN BIST PNEUMATIC CATALOGUE
3 cores	•	•	•	•	•	•	•	•	•	•	•	•	•	
2 cores	•	•	•	•	•	•	•	•	•	•	•	•	•	SEE LIST IN BIST PNEUMATIC CATALOGUE
3 cores	•	•	•	•	•	•	•	•	•	•	•	•	•	
3 cores	•	•	•	•	•	•	•	•	•	•	•	•	•	

Related Products

Related Products:

Multi-tube Holder
Series TM



Tube Releasing Tool
Series TG



Tube Stand & Tube Reel
Series TB/TBR



Tube Cutter
Series TK



Double Layer Tube Stripper
Series TKS



Colour	Tubing O.D.											
	Metric size (mm)					Inch size (inch)						
	ø4 (ø 3/16")	ø6 (ø 1/4")	ø8 (ø 5/16")	ø10 (ø 3/8")	ø12 (ø 1/2")	ø16	ø 1/8" (ø 3.2)	ø 3/16"	ø 1/4"	ø 3/8"	ø 1/2"	
	●	●	●	●	●							SEE IN NEXT PAGE'S CATALOGUE
	●	●					●		●			SEE IN NEXT PAGE'S CATALOGUE
	●	●	●	●	●							SEE IN NEXT PAGE'S CATALOGUE
	●	●	●	●	●	●	●	●	●	●	●	SEE IN NEXT PAGE'S CATALOGUE
Orange		●										SEE IN NEXT PAGE'S CATALOGUE
Yellow			●									SEE IN NEXT PAGE'S CATALOGUE
Blue				●								SEE IN NEXT PAGE'S CATALOGUE
Green					●							SEE IN NEXT PAGE'S CATALOGUE

Rotary Joint

Low Torque Metal Seal
Type Rotary Joint
Series MQR



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



Blow Gun

Blow Gun
Series VMG



Pressure loss is less than 1%.



Nozzles

Nozzles for Blowing
Series KN



Nozzle system for air blowing
and back pressure sensing.



Speed Controller with One-touch Fittings

Elbow type

Model

AS12□1F
AS12□1F
AS22□1F
AS32□1F
AS42□1F

Port size
in the cylinder side

M3
M5
1/8, 1/4
1/4, 3/8
1/2

Universal type

AS13□1F
AS13□1F
AS23□1F
AS33□1F
AS43□1F

M3
M5
1/8, 1/4
1/4, 3/8
1/2

Elbow type
(Metal body)

AS12□1
AS22□1
AS22□1
AS32□1
AS42□1

M5
1/8
1/4
3/8
1/2

In-line type

AS1001F
AS2001F
AS2051F
AS3001F
AS4001F

Dual speed
controller

ASD230F
ASD330F
ASD430F
ASD530F
ASD530F
ASD630F

M5
1/8
1/4
1/4
3/8
1/2

Applicable tubing O.D.

Metric size (mm)

Inch size (inch)

Applicable cylinder
bore size
(mm)

ø2.5 to ø6
ø6 to ø20
ø20 to ø40
ø40 to ø63
ø63 to ø100

ø2.5 to ø6
ø6 to ø20
ø20 to ø40
ø40 to ø63
ø63 to ø100

ø6 to ø20
ø20 to ø32
ø20 to ø40
ø40 to ø63
ø63 to ø100

ø2.5 to ø20
ø20 to ø32
ø20 to ø40
ø40 to ø63
ø63 to ø100

ø6 to ø20
ø20 to ø32
ø20 to ø40
ø20 to ø40
ø40 to ø63
ø63 to ø100

SEE IN
BEST PNEUMATICS
CATALOGUE

SEE IN
BEST PNEUMATICS
CATALOGUE

SEE IN
BEST PNEUMATICS
CATALOGUE

SEE IN
BEST PNEUMATICS
CATALOGUE

Speed Controller with Residual Pressure Release Valve

With One-touch fitting/Elbow

Model
AS22□1FE
AS22□1FE
AS32□1FE
AS42□1FE

Port size in the cylinder side
1/8
1/4
3/8
1/2

Applicable tubing O.D.													
Metric size (mm)							Inch size (inch)						
3.2	4	6	8	10	12		1/8	5/32	3/16	1/4	5/16	3/8	1/2
•	•	•	•	•									
•	•		•	•									
		•	•	•	•								
				•	•	•							
					•	•							

Speed Controller Stainless Series

Elbow type

Universal type

In-line type

Dual speed controller

Elbow Type

Model	Port size in the cylinder side	Applicable tubing O.D.	Applicable cylinder bore size (mm)
		Metric size (mm) Inch size (inch)	
AS12□1FG	M5	3.2 4 6 8 10 12 1/8 5/32 3/16 1/4 5/16 3/8 1/2	ø6 to ø20
AS22□1FG	1/8	3.2 4 6 8 10 12 1/8 5/32 3/16 1/4 5/16 3/8 1/2	ø20 to ø32
AS22□1FG	1/4	3.2 4 6 8 10 12 1/8 5/32 3/16 1/4 5/16 3/8 1/2	ø20 to ø40
AS32□1FG	1/4	3.2 4 6 8 10 12 1/8 5/32 3/16 1/4 5/16 3/8 1/2	ø40 to ø63
AS32□1FG	3/8	3.2 4 6 8 10 12 1/8 5/32 3/16 1/4 5/16 3/8 1/2	ø40 to ø63
AS42□1FG	1/2	3.2 4 6 8 10 12 1/8 5/32 3/16 1/4 5/16 3/8 1/2	ø63 to ø100
AS13□1FG	M5	3.2 4 6 8 10 12 1/8 5/32 3/16 1/4 5/16 3/8 1/2	ø6 to ø20
AS23□1FG	1/8	3.2 4 6 8 10 12 1/8 5/32 3/16 1/4 5/16 3/8 1/2	ø20 to ø32
AS23□1FG	1/4	3.2 4 6 8 10 12 1/8 5/32 3/16 1/4 5/16 3/8 1/2	ø20 to ø40
AS33□1FG	1/4	3.2 4 6 8 10 12 1/8 5/32 3/16 1/4 5/16 3/8 1/2	ø40 to ø63
AS33□1FG	3/8	3.2 4 6 8 10 12 1/8 5/32 3/16 1/4 5/16 3/8 1/2	ø40 to ø63
AS43□1FG	1/2	3.2 4 6 8 10 12 1/8 5/32 3/16 1/4 5/16 3/8 1/2	ø63 to ø100
AS1001FG		3.2 4 6 8 10 12 1/8 5/32 3/16 1/4 5/16 3/8 1/2	ø6 to ø20
AS2001FG		3.2 4 6 8 10 12 1/8 5/32 3/16 1/4 5/16 3/8 1/2	ø20 to ø32
AS2051FG		3.2 4 6 8 10 12 1/8 5/32 3/16 1/4 5/16 3/8 1/2	ø20 to ø40
AS3001FG		3.2 4 6 8 10 12 1/8 5/32 3/16 1/4 5/16 3/8 1/2	ø40 to ø63
AS4001FG		3.2 4 6 8 10 12 1/8 5/32 3/16 1/4 5/16 3/8 1/2	ø63 to ø100
ASD230FG	M5	3.2 4 6 8 10 12 1/8 5/32 3/16 1/4 5/16 3/8 1/2	ø 6 bis ø 20
ASD330FG	1/8	3.2 4 6 8 10 12 1/8 5/32 3/16 1/4 5/16 3/8 1/2	ø 20 bis ø 32
ASD430FG	1/4	3.2 4 6 8 10 12 1/8 5/32 3/16 1/4 5/16 3/8 1/2	ø 20 bis ø 40
ASD530FG	1/4	3.2 4 6 8 10 12 1/8 5/32 3/16 1/4 5/16 3/8 1/2	ø 20 bis ø 40
ASD530FG	3/8	3.2 4 6 8 10 12 1/8 5/32 3/16 1/4 5/16 3/8 1/2	ø 40 bis ø 63
ASD630FG	1/2	3.2 4 6 8 10 12 1/8 5/32 3/16 1/4 5/16 3/8 1/2	ø 63 bis ø 100
ASG22□F-M5	M5	3.2 4 6 8 10 12 1/8 5/32 3/16 1/4 5/16 3/8 1/2	ø 6 bis ø 20
ASG32□F-01	1/8	3.2 4 6 8 10 12 1/8 5/32 3/16 1/4 5/16 3/8 1/2	ø 20 bis ø 32
ASG42□F-02	1/4	3.2 4 6 8 10 12 1/8 5/32 3/16 1/4 5/16 3/8 1/2	ø 20 bis ø 40
ASG52□F-03	3/8	3.2 4 6 8 10 12 1/8 5/32 3/16 1/4 5/16 3/8 1/2	ø 40 bis ø 63
ASG62□F-04	1/2	3.2 4 6 8 10 12 1/8 5/32 3/16 1/4 5/16 3/8 1/2	ø 63 bis ø 100

SEE IN
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Speed Controller for Low Speed Operation

		Model	Port size in the cylinder side	Applicable tubing O.D.												Applicable cylinder bore size (mm)		
				Metric size (mm)						Inch size (inch)								
				3.2	4	6	8	10	12	1/8	5/32	3/16	1/4	5/16	3/8			1/2
Elbow type		AS12□1FM	M5	●	●	●						●	●	●	●		ø6 to ø20	SEE IN BEST PNEUMATICS CATALOGUE
		AS22□1FM	1/8	●	●	●	●					●	●	●	●		ø20 to ø32	
		AS22□1FM	1/4		●	●	●	●					●	●	●	●	ø20 to ø40	
Universal type		AS13□1FM	M5	●	●	●						●	●	●	●		ø6 to ø20	SEE IN BEST PNEUMATICS CATALOGUE
		AS23□1FM	1/8	●	●	●	●					●	●	●	●		ø20 to ø32	
		AS23□1FM	1/4		●	●	●	●					●	●	●	●	ø20 to ø40	
In-line type		AS1001FM		●	●	●						●	●	●	●		ø6 to ø20	SEE IN BEST PNEUMATICS CATALOGUE
		AS2001FM			●	●						●	●	●	●		ø20 to ø32	
		AS2051FM				●	●						●	●	●		ø20 to ø40	
Dual speed controller		ASD230FM	M5		●	●						●	●	●	●		ø6 to ø20	SEE IN BEST PNEUMATICS CATALOGUE
		ASD330FM	1/8			●	●						●	●	●	●	ø20 to ø32	
		ASD430FM	1/4			●	●	●						●	●	●	ø20 to ø40	

Tamper Proof Speed Controller		Model	Port size in the cylinder side	Applicable tubing O.D.		Applicable cylinder bore size (mm)												
				Metric size (mm)														
				3.2	4	6	8	10	12	1/8	5/32	3/16	1/4	5/16	3/8	1/2		
Elbow type		AS12□1F	M5														ø6 to ø20	SEE IN BEST PNEUMATICS CATALOGUE
		AS22□1F	1/8, 1/4														ø20 to ø40	
		AS32□1F	1/4, 3/8														ø40 to ø63	
		AS42□1F	1/2														ø63 to ø100	
Universal type		AS13□1F	M5														ø6 to ø20	SEE IN BEST PNEUMATICS CATALOGUE
		AS23□1F	1/8, 1/4														ø20 to ø40	
		AS33□1F	1/4, 3/8														ø40 to ø63	
		AS43□1F	1/2														ø63 to ø100	
In-line type		AS1001F															ø6 to ø20	SEE IN BEST PNEUMATICS CATALOGUE
		AS2001F															ø20 to ø32	
		AS2051F															ø20 to ø40	
		AS3001F															ø40 to ø63	
		AS4001F															ø63 to ø100	
Dual speed controller		ASD230F	M5														ø6 to ø20	SEE IN BEST PNEUMATICS CATALOGUE
		ASD330F	1/8														ø20 to ø32	
		ASD430F	1/4														ø20 to ø40	
		ASD530F	1/4														ø20 to ø40	
		ASD530F	3/8														ø40 to ø63	
		ASD630F	1/2														ø63 to ø100	

Speed Controller with Pilot Check Valve		Model	Port size in the cylinder side	Applicable tubing O.D.												Applicable cylinder bore size (mm)	
				Metric size (mm)						Inch size (inch)							
				3.2	4	6	8	10	12	1/8	5/32	3/16	1/4	5/16	3/8	1/2	
		ASP330F-01	1/8			●	●						●	●			ø20 to ø32
		ASP430F-02	1/4			●	●						●	●			ø20 to ø40
		ASP530F-03	3/8				●	●					●	●		ø40 to ø63	
		ASP630F-04	1/2						●	●				●	●	ø63 to ø100	

Speed Controller for Clean Room		Model		Applicable tubing O.D.														Applicable cylinder bore size (mm)	
				Metric size (mm)							Inch size (inch)								
				3.2	4	6	8	10	12	1/8	5/32	3/16	1/4	5/16	3/8	1/2			
		AS1201FP□	M5		●	●											ø6 to ø20		
		AS2201FP□	1/8		●	●	●										ø20 to ø32		
		AS2201FP□	1/4		●	●	●	●									ø20 to ø40		
AS3201FP□	3/8				●	●	●	●								ø40 to ø63			
AS4202FP□	1/2						●	●								ø63 to ø100			

Residual Pressure Exhaust Valve with One Touch Fitting Series KE

Model	Tubing O.D.	
KE□06	6	
KE□08	8	
KE□10	10	
KE□12	12	

Speed Controller Holder Series TMH

Model	Tubing O.D.	
TMH-23J	3.2	
TMH-04J	4	
TMH-06□	6	
TMH-08	8	
TMH-10	10	
TMH-12	12	

Multiple Fitting Holder Series TMA

Model	Tubing O.D.	
TMA-06	6	
TMA-08	8	
TMA-10	10	
TMA-12	12	

Metering valve with silencer Series ASN2

Model	Port size	
ASN2-M5	M5	
ASN2-01	1/8	
ASN2-02	1/4	
ASN2-03	3/8	
ASN2-04	1/2	

Quick exhaust valve Series AQ

Model	Port size	
AQ1500	M5	
AQ1510	1/8	
AQ2000	1/8, 1/4	
AQ3000	1/4, 3/8	
AQ5000	1/2, 3/4	
Model	Applicable tubing	
AQ240F-04	04	
AQ240F-06	06	
AQ340F-06	06	

Speed exhaust controller Series ASV

Model	Port size	
ASV120F-M3	M3	
ASV220F-M5	M5	
ASV310F	1/8, 1/4	
ASV410F	1/8, 1/4, 3/8	
ASV510F	1/4, 3/8, 1/2	

Check valve Series AK

Model	Port size	
AK2000	1/8, 1/4	
AK4000	1/4, 3/8, 1/2	
AK6000	3/4, 1	

Check valve with One-touch fittings, Straight type, Half union type Series AKH

Model	Port size	
AKH04	M5, 1/8	
AKH06	M5, 1/8, 1/4	
AKH08	1/8, 1/4, 3/8	
AKH10	1/4, 3/8, 1/2	
AKH12	3/8, 1/2	

Bushing type Series AKB

Model	Port size	
AKB01	1/8	
AKB02	1/4	
AKB03	3/8	
AKB04	1/2	

Safety speed control valve Series ASS PAT.PEND.

Model	Port size	
ASS100	1/8	
ASS300	1/4, 3/8	
ASS500	1/2, 3/4	
ASS600	3/4, 1	
Model	Port size	
ASS110	1/8	
ASS310	1/4, 3/8	

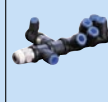
New air-saving PFC valve, QFC valve: Series ASR/ASQ

Model	Port size	
ASR430F-02	1/4	
ASR530F-02	1/4	
ASR530F-03	3/8	
ASR630F-03	3/8	
ASR630F-04	1/2	
Model	Port size	
ASQ430F-02	1/4	
ASQ530F-02	1/4	
ASQ530F-03	3/8	
ASQ630F-03	3/8	
ASQ630F-04	1/2	

Piping Equipment

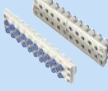
Made to Order Products

One-touch Fittings

Made to order specifications									
	White body	Black body	Miniature one-touch	Rotary (Standard speed)	Rotary (High speed)	Tubing coupler	Manifold	Piping module	
	KQ2	KQ	KJ	KS	KX	KC	KM	KB	
Brass metal parts: Electroless nickel plated	X2	X2					X2		
Brass metal parts: Electroless nickel plated, Packing O-ring: Fluoro rubber ^{Note 3)}	X47	X47							
Lubricant: Vaseline	X12	X12	X12				X12		
No lubrication	X57	X57	X57				X57		
Packing: Fluororesin coating ^{Note 4)}	X17	X17	X17				X17		
Lubricant: Vaseline Brass metal parts: Electroless nickel plated	X16	X16							
Lubricant :Vaseline Brass metal parts: Electroless nickel plated Packing: Fluororesin coating	X29	X29							
Clean series ^{Note 4)}		^{Note 5)} 10-	10-						

Piping Equipment **Made to Order Products**

 Standardized  Made to order specification available.

	 Rectangular multi-connector	 Multi connector	 Stainless steel	 Clean	 Clean	 Antistatic	 Flame resistant	 Flame resistant manifold	 Insert	 Self-align	 Miniature	 Miniature (SUS)
	KDM	DM	KG	KP	KPQ KPG	KA	KR	KRM	KF	H,DL L,LL	M	MS
	X2	X2			Note 6)		X2	X2	X2	X2	Note 1)	
			X12									
			X57								Note 2)	
			X17									
	10-		10-						10-		10-	10-

Note 1) Only M-5E, M-5ER and M-5M are available for X2.

Note 2) Not including M-5UN and MS-5UN.

Note 3) Only available for a part of models.

Note 4) Not including inch sizes.

Note 5) 10-KQ has a white body.

Note 6) SUS304 with KPG.

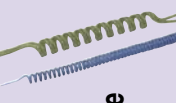
Piping Equipment

Made to Order Products

Speed Controller with Fittings

Made to order specifications	 General	 Dual	 Low speed control	 Low speed control dual	 Stainless steel	 Stainless steel dual	
	AS•F	ASD•F	AS•FM	ASD•FM	AS•FG	ASD•FG	
Lubricant: Vaseline	X12	X12	X12	X12	X12	X12	
Throttle valve (Without check valve)	X214		X214		X214		
Throttle valve (Without check valve) Oil free (Sealant material: PTFE coating)	X21		X21		X21		
Clean series	10-	10-	10-	10-	10-	10-	

Tube

Made to order specifications	 Polyurethane	 Nylon	 Soft nylon	 Coil polyurethane	 Polyurethane flat	
	TU	T	TS	TCU	TFU	
Reel	X3	X3	X3		X3	
Change in the number of coil windings and color				X6		
Change in the number of tubes and color					X4	
Clean series	10-			10-	10-	

Piping Equipment **Made to Order Products**

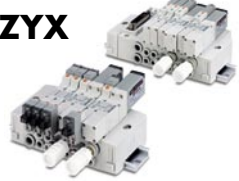
								
Clean	Flame resistant (Metal elbow)	With residual pressure exhaust	Speed exhaust controller	Pilot with built-in check valve	Tamper proof	Tamper proof dual	Flat head screw adjustment	Flat head screw adjustment dual
AS•FPQ AS•FPG	AS•F	AS•FE	ASV•F	ASP•F	AS•F-T	ASD•F-T	AS•F-D	ASD•F-D
	X12	X12	X12	X12	X12	X12	X12	X12
	X214	X214			X214		X214	
	X21	X21			X21		X21	
Standardized	10-				10-	10-	10-	10-

	Clean polyolefin
	TPH TPS
	Standardized

Vacuum Selection

Selecting of vacuum system, vacuum ejector, pad type and typical circuit.

Vacuum Ejector

Series	
ZU 	In-line vacuum ejector • Nozzle diameter: $\varnothing 0.5$, $\varnothing 0.7$ • Vacuum port and supply port are located in-line to facilitate piping • Built-in One-touch fitting (Copper free) 
ZH 	Vacuum ejector • Nozzle diameter: $\varnothing 0.5$, $\varnothing 0.7$, $\varnothing 1.0$, $\varnothing 1.3$, $\varnothing 1.5$, $\varnothing 1.8$, $\varnothing 2.0$ • Composite resin nozzle and body • Available in 2 types: box type and direct piping type 
EZM 	Vacuum ejector • Valve and switch are unitized • Adaptable for manifold applications • Maximum suction flow rate increased 40% • Max. vacuum pressure -84 kPa $\{-630 \text{ mmHg}\}$ 
ZMA 	Vacuum ejector with solid state timer • Incorporates solid state timer function for release valve control (timer setting with PLC is unnecessary) • Allows sharing of switch/valve power supply, and single line for suction signal (valve wiring is unnecessary) • Timer can be easily adjusted without programming 
ZL 	Multistage ejector • Suction flow rate increased by a 3 stage diffuser construction • Functions such as a digital vacuum switch or a vacuum pressure gauge can be selected 
ZYY/ZYX 	Ejector valve unit • Ejector valve unit suitable for vacuum adsorption systems • A combination of solenoid valve for cylinder drive, etc + vacuum ejector 

Vacuum Module

Series	
ZX 	Vacuum module • Optimal for electronic parts or small precision parts weighing up to 100 g • Supports the ejector system and the vacuum pump system • Modular design • Adaptable for manifold applications 
ZR 	Large size vacuum module • Necessary functions can be combined through modular design • Adaptable for manifold applications • Functions such as a digital vacuum switch or a solenoid valve can be selected • Supports the ejector system and the vacuum pump system • Double solenoids provide a self-holding function 

Air Suction Filter

Series	
ZFA 	Air suction filter - Prevents problems related to vacuum circuits or airborne contaminants - Provides a large filter element surface 
ZFB 	Air suction filter with one-touch fittings - Prevents problems related to vacuum circuits or airborne contaminants - Piping tube can be connected and disconnected with one touch 
ZFC 	Air suction filter in-line type with one-touch fittings - IN/OUT straight piping - One-touch fittings for easy installation and removal - Lightweight molded resin parts - Cartridge type element replacement 

Vacuum Pad

Series	
ZP 	Vacuum pad - A variety of models accommodate a wide range of applications - Pad type: Flat, Flat with ribs, Deep, Bellows - Pad diameter: ø2 to ø125, Made to Order = ø150 to ø250 
ZPT/ZPX 	Vacuum pad: Large/Heavy duty type - Ideal for heavy weight material or objects with a large surface area - Example: CRT, Car body - Pad diameter: ø40, ø50, ø63, ø80, ø100, ø125 
ZPT/ZPX 	Vacuum pad: Large size bellows type - Ideal for loads with a curved surface, heavy weight loads and loads with large surface area - Pad diameter: ø40, ø50, ø63, ø80, ø100, ø125 
ZPT/ZPR 	Vacuum pad: Ball joint type - Ball joint type ideal for use on slanted work surface - Pad diameter: ø10, ø13, ø16, ø20, ø25, ø32, ø40, ø50 

Free Mount Cylinder for Vacuum

Series	
ZCUK 	Vacuum Compact Cylinder - In the rectangular, compact cylinder Series CU with a high level of mounting precision, a vacuum passage is provided to facilitate the mounting of a vacuum pad and to save space. - Standard vacuum pads (ø2 to ø50) can be mounted 

Drain Separator for vacuum

Series			
AMJ		Drain separator for vacuum	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.



Vacuum System Peripherals and Related Products

Series			
IRV		Vacuum Regulator	Direct operated vacuum pressure adjustment valve that regulates the vacuum pressure.
ITV2090		Electro-pneumatic Regulator	Controls the vacuum pressure in accordance with external electric signals.



Digital Pressure Switches (Self-Contained Type)

Series	Fluid	Set pressure range	Output	Note	
ZSE/ISE30 	High precision, 2-colour display digital pressure switch				
General pneumatic	-101 to 101 kPa -0.1 to 1 MPa	NPN/PNP open collector 1-5 V, 4-20 mA Analogue output	- Port size: 1/8, ø4, ø6 - Enclosure: IP40	 SEE IN BEST PNEUMATICS CATALOGUE	
ZSE/ISE40 	High precision digital pressure switch				
General pneumatic	-100 to 100 kPa 10 to -101.3 kPa -0.1 to 1 MPa	NPN/PNP open collector Analogue output	- Port size: M5, 1/8, ø4, ø6 - Enclosure: IP65	 SEE IN BEST PNEUMATICS CATALOGUE	
ZSE50F ISE50 	High precision digital pressure switch for general fluids				
General fluids	-100 to 100 kPa -0.1 to 1 MPa	NPN/PNP open collector Analogue output	- Port size: M5, 1/4 - Enclosure: IP65	 SEE IN BEST PNEUMATICS CATALOGUE	
ZSE60F ISE60 	High precision digital pressure switch for general fluids				
General fluids	-100 to 100 kPa -0.1 to 1 MPa	NPN/PNP open collector Analogue output	- Port size: URJ 1/4, TSJ 1/4 - Enclosure: IP65	 SEE IN BEST PNEUMATICS CATALOGUE	
ISE70 	2-colour display digital pressure switch				
General pneumatic	0 to 1 MPa	1 setup NPN/PNP open collector PNP open collector	- Port size: 1/4 - Enclosure: IP67	 SEE IN BEST PNEUMATICS CATALOGUE	
ISE75/75H 	2-colour display digital pressure switch for general fluids				
General fluids	0.4 to 10 MPa 0.5 to 15 MPa	1 setup NPN/PNP open collector PNP open collector	- Port size: 1/4 - Enclosure: IP67	 SEE IN BEST PNEUMATICS CATALOGUE	

Digital Pressure Switches (Separate Type)

Series	Fluid	Set pressure range	Output	Note	
PSE530 	Pressure sensor				
	General pneumatic	0 to 1 MPa 0 to -101 kPa 0 to 101 kPa -101 to 101 kPa		- Port size: M5 - Enclosure: IP40	SEE IN BEST PNEUMATICS CATALOGUE
PSE540 	Compact pressure sensor				
	General pneumatic	0 to 1 MPa 0 to -101 kPa -100 to 100 kPa		- Port size: M3, M5, 1/8, ø4, ø6 - Enclosure: IP40	SEE IN BEST PNEUMATICS CATALOGUE
PSE560 	Pressure sensor for general fluids				
	General fluids	0 to 1 MPa 0 to -101 kPa -100 to 100 kPa 0 to 500 kPa		- Port size: M5, 1/8, 1/4 - Enclosure: IP65	SEE IN BEST PNEUMATICS CATALOGUE
PSE550 	Low differential pressure sensor				
	General pneumatic	-50 to 50 kPa (can detect differential pressure from 0 to 2 kPa)		- Port size: ø4 - Enclosure: IP40	SEE IN BEST PNEUMATICS CATALOGUE

Controllers

Series	Sensor input amount	Set pressure range	Output	Note	
PSE300 	2-colour display controller				
	1 input	-0.1 to 1 MPa 10 to -101 kPa -100 to 100 kPa -10 to 100 kPa -50 to 500 kPa -0.2 to 2 kPa	NPN/PNP open collector 2 outputs Analog output	- Red/Green dual colour LCD display - Enclosure: Font only IP65, the rest IP40	SEE IN BEST PNEUMATICS CATALOGUE
PSE200 	Multi-channel controller				
	4 inputs	-0.1 to 1 MPa 10 to -101 kPa -101 to 101 kPa -10 to 100 kPa	NPN/PNP open collector 1 CH: 2 outputs 2 to 4 CH: 1 output	- Monitor up to 4 individual sensors - Enclosure: IP40	SEE IN BEST PNEUMATICS CATALOGUE

Electronic Pressure Switches (Trimmer calibration)

Series	Fluid	Set pressure range	Output	Note	
PS1000 PS1100 	Simple electronic pressure switch				
	General pneumatic	-0.1 to 0.45 MPa -0.1 to 0.4 MPa	2-wire type	- Port size: $\phi 6$ - Enclosure: IP40	SEE IN BEST PNEUMATICS CATALOGUE
ISA2 	Air catch sensor				
	General pneumatic	30 to 200 kPa (Detection distance 0.01 to 0.25 mm) 50 to 200 kPa (Detection distance 0.03 to 0.50 mm)	NPN/PNP open collector	- Port size: 1/8 - Enclosure: IP66	SEE IN BEST PNEUMATICS CATALOGUE

Mechanical Pressure Switches

Series	Fluid	Set pressure range	Contacts (Voltage)	Note	
IS1000 	Mechanical style pressure switch				
	General pneumatic	0.1 to 0.6 MPa	1a (to 100 VDC to 100 VAC)	Port size: 1/8	SEE IN BEST PNEUMATICS CATALOGUE
IS3000 	Pneumatic pressure switch				
	General pneumatic	0.1 to 0.7 MPa	1ab (24 to 125 VDC to 100 to 250 VAC)	Port size: 1/4	SEE IN BEST PNEUMATICS CATALOGUE

Digital Flow Switches

Series	Fluid	Flow rate range	Output	Note	
PF2A 	Digital flow switch for air				
	General pneumatic	1 to 12000 l/min	NPN/PNP open collector 3 outputs	- Port size: 1/8, 1/4, 3/8, 1/2, 1, 1 1/2, 2 - Enclosure: IP65	
PF2W 	Digital flow switch for water				
	Water	0.5 to 100 l/min	NPN/PNP open collector 3 outputs	- Port size: 3/8, 1/2, 3/4, 1 - High temperature fluid (water 90°C) - Enclosure: IP65	
PF2D 	Digital flow switch for deionized water and chemicals				
	Deionized water and chemicals	0.4 to 40 l/min	NPN/PNP open collector 4 outputs	- Body and sensor: New PFA - Tube: Super PFA. - Port size: 3/8, 1/2, 3/4 inch tube. - Enclosure: IP65	SEE IN BEST PNEUMATICS CATALOGUE

	IP8000/8100 ■ Electro-Pneumatic Positioner				
	- Electro-pneumatic positioner for process valves or other equipment. - Lever arm and rotary shaft versions.				



SMC - provide products

■ Outline of ATEX directive

Since 1st July 2003, equipment used in potentially explosive atmospheres within the EU is required to comply with the ATEX directive.

ATEX directive

Directive 94/9/EC

Equipment and Protective Systems intended for use in potentially Explosive Atmospheres

● ATEX, New Approach directives and CE marking

Directive 94/9/EC, known as ATEX directive, is one of the directives based on the New Approach towards technical harmonization and standardisation.

The New Approach is a new regulatory technique and strategy laid down by the European Council Resolution of 1985, in order to allow free movement of goods within the EU market and to prevent barriers to trade.

Products in compliance with all provisions of applicable directives (such as Directive 94/9/EC for ATEX) must bear the CE marking. This is an indication that the products comply with the requirements of applicable directives and have been subjected to the conformity assessment procedure provided for in these directives.

● ATEX definitions

Potentially explosive atmospheres are atmospheres likely to become explosive due to local and operational conditions.

The ATEX directive regards explosive atmospheres which are defined as mixtures with air, under atmospheric conditions, of flammable substances in the form of gases, vapours, mists or dusts in which, after ignition has occurred, combustion spreads to the entire unburned mixture. (Quotation from Directive 94/9/EC)

The following applications are explicitly excluded by the ATEX directive and must comply with other specific standards: medical devices, equipment or safety devices to be used with explosive or chemically unstable substances, equipment for domestic and non-commercial environments with explosive atmosphere generated by leakage of fuel gas, personal protective equipment, offshore vessels, mobile units and means of transport.

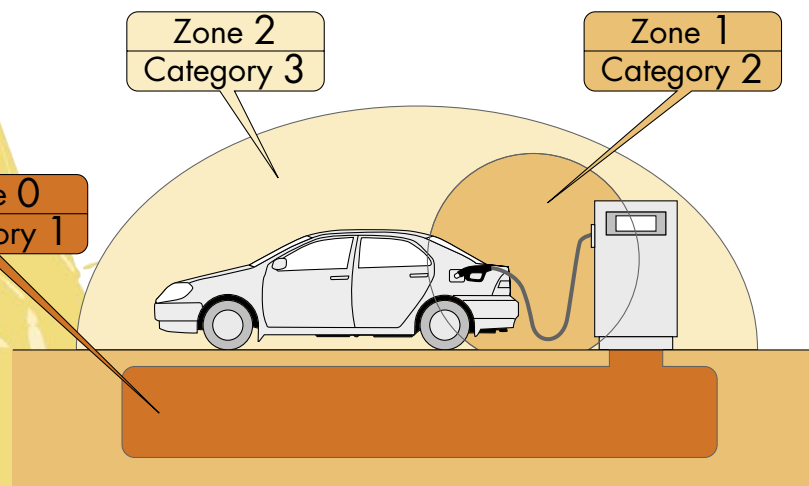
Certified equipment is designed to prevent the generation of ignition sources as defined by the standard EN1127-1:

- hot surfaces
- flames and hot gases
- mechanically generated sparks
- electrical sparks
- stray electric currents, cathodic corrosion protection
- static electricity
- lightning
- electromagnetic fields
- electromagnetic radiations
- ionising radiations
- ultrasonics
- adiabatic compression shock waves, gas flows
- chemical reactions

● Classification

Potentially explosive environments are classified into zones in accordance with Directive 1999/92/EC. These are:

- 0, 1, 2 for gas explosive atmospheres
- 20, 21, 22 for dust explosive atmospheres



The ATEX directive defines categories of equipment and protective systems, which can be used in the corresponding zones as per the following table.

Zone		Equipment category	Presence of the explosive atmosphere
Gas	Dust		
0	20	1	Continuously or for long periods >1000 hours/year
1	21	2	Occasionally 10~1000 hours/year
2	22	3	Rarely or for short periods <10 hours/year

compliant to ATEX Directive

New elements at a glance

Previous legislation covered the most obvious sources of ignition generated by electrical devices.

The ATEX directive and the corresponding harmonised standards have extended the applicability of legislation to all the equipment that is intended for generation, transfer, storage, measurement, control and conversion of energy.

Pneumatic equipment used in potentially explosive atmospheres must, therefore, comply with the new legislation.

Products, which do not contain any potential ignition sources, are out of the scope of the directive.

ATEX label example and explanation

SMC CORPORATION
1-16-4, Shimbashi
Minato-ku, Tokyo, Japan



"Do not un-plug when energized"

CE Ex II 3 G / D

EEx nA II T6 X

VQCxxx
HO
Tamb = -10°C to +50°C
IP65
T 80°C

Part-number
Year
Operating temperature
IP (only for Dust)
T temperature(only for Dust)

CE Ex
ATEX
compliance

Group	II					
Category	1		2		3	
Atmosphere*	G	D	G	D	G	D

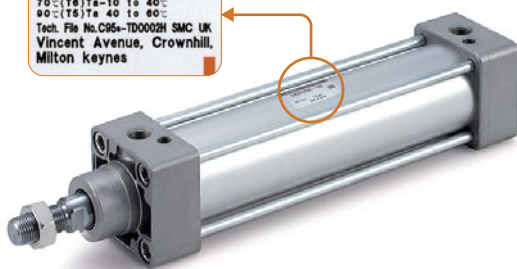
*G=Gas D=Dust

	Category	Standards for Electrical product	Standards for Non-electrical product
General requirements	all	EN 50014	EN13463-1
Dust protection	all	EN 50281-1-1	EN13463-1
Types of Protection			
Constructional safety "c"	2		EN13463-5
Types of Protection "n"	3	EN50021	
Increased Safety "e"	2	EN50019	
Encapsulation "m"	2	EN50028	
Flameproof Enclosure "d"	2	EN50018	EN13463-3
Oil Immersion "o"	2	EN50015	
Pressurized "p"	2	EN50016	EN13463-7
Powder Filling "q"	2	EN50017	
Intrinsically Safety "ia"	1	EN50020	
Intrinsically Safety "ib"	2	EN50020	

X= means that special conditions for use are in the operating manual. E.g.; Not impact proof.

	Max. Surface temperature
T1	450°C
T2	300°C
T3	200°C
T4	135°C
T5	100°C
T6	85°C

CE Ex II 2 GDc
70°C(T6)Ta-10 to 40°C
90°C(T5)Ta 40 to 60°C
Tech. File No.C95-TD0002H SMC UK
Vincent Avenue, Crownhill,
Milton Keynes



■ SMC product information

Product	Series	Category
Hand valve	VH200/201/400/401	Out of scope ¹⁾
Regulator	AR10/20/25/30/40/50/60	
Manifold regulator	ARM2500/3000	
Air filter	AF10/20/30/40/50/60	
Mist separator	AFM20/30/40	
Micro mist separator	AFD20/30/40	
Filter regulator	AW10/20/30/40	
Lubricator	AL10/20/30/40/50/60	
Finger valve	VHK2/3	
3 port residual pressure release valve	VHS20/30/40/50	
Cross interface	Y24~54	
Speed controller	AS	
Check valve	AK, AKH	
Shuttle valve	VR12	
Quick exhaust valve	AQ	
Fitting	KQ	
One-touch fittings	KA, KAB, KC, KEC, KG, KJ, KM, KP*, KQ*, KR*, KS, KW, KX	
Multi-connector	DM*, KDM	
Insert fittings	KF*	
Self-align fittings	H, DL, L, LL	
Miniature fittings	M, MS	
S Couplers	KK*	
Tube	T, TS, TU	
Booster relay	IL100	
Lock up valve	IL201/211/220	
Precision regulator	IR1000~3000	
Vacuum Regulator	IRV1000~3000	
Filter Regulator	IW212~217	
Air-hydro Converter	CCT	
Heavy duty Auto Drain	ADH4000	
Main line Filter	AFF2B~AFF75B	
Mist Separator	AM150~850	
Micro mist Separator	AMD150~850, AMD800~1000	
Super mist Separator	AME150~850	
Odour Removal Filter	AMF150~1000	
Water Separator	AMG150~850	
Micro mist Separator with Prefilter	AMH150~850	
MR unit	AMR3000~6000	
Silencer	AN200-900, AN103	

Note 1) An "Out of scope" product is one that can be used without certification in Zone 1, 2 (gas) or Zone 21, 22 (dust).

 Consult SMC for individual part numbers and details of compliant models.

Actuator

55-C76 Air Cylinder _____
 55-C85 Air Cylinder _____
 55-C95 Air Cylinder _____
 55-CP95 Air Cylinder _____
 55-CS1 Air Cylinder _____
 55-(E)CQ2 Compact Cylinder _____
 55-CXS Dual Rod Cylinder _____
 55-MY1B Mechanically Rodless Cylinder —
 55-MY1M Mechanically Rodless Cylinder —
 55-MY1H Mechanically Rodless Cylinder —

Rotary Actuator

55-CRB1 Rotary Actuator _____
 55-CRB2 Rotary Actuator _____
 55-CRBU2 Rotary Actuator _____
 55-C(D)RQ2 Rotary Actuator _____
 56-C(D)RB1 Rotary Actuator _____
 56-C(D)RB2 Rotary Actuator _____
 56-C(D)RBU2 Rotary Actuator _____
 Auto Switches _____

Instruments

IP5000 Pneumatic Positioner _____
 IP6000-X14 Electro Pneumatic Positiner —
 IP8000-X14 Electro Pneumatic Positiner —

Others

56-PA3000/5000 Process Pump _____
 56-VBA Booster Regulator _____

Directional Valves

52-SY 5 Port Solenoid Valves _____
 56-SV 5 Port Solenoid Valves _____
 56-VQC 5 Port Solenoid Valves _____
 56-EX500 Serial Transmission _____

Safety Precautions

Safety Instructions _____

Are your energy costs spiralling out of control? Using compressed air can be more expensive than you think!

Would you like to reduce your energy costs
and help the environment at the same time?

As world leaders in Automation Control, we can
offer you the best Energy Saving Solutions around.

**CALL  FOR A FREE – no obligation – CONSULTATION
and see the huge savings that can be made!**



**ENERGY
SAVING**



Help reduce global warming
Reduce CO2 emissions
Help meet your ISO 14001 needs
Cut your electricity bills
Benefit from government assistance schemes
Reduce your energy taxes and levies



**ENERGY
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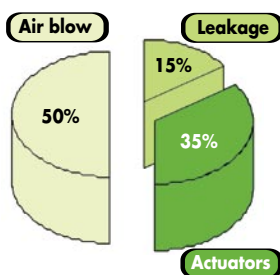


As world leaders in **Pneumatics**, we have developed an energy saving programme which recognises the key areas in many factories where energy loss can be saved.

For example, around 90% of the electricity consumed by a modern compressor is lost in waste heat and not in the production of compressed air. This makes compressed air 10 times more expensive than the cost of the electricity consumed in its production!

By focussing on the installation of an energy efficient compressed air system in your facilities, we can guarantee savings which could make the difference between making a profit or a loss!

Compressed Air Consumption by Application

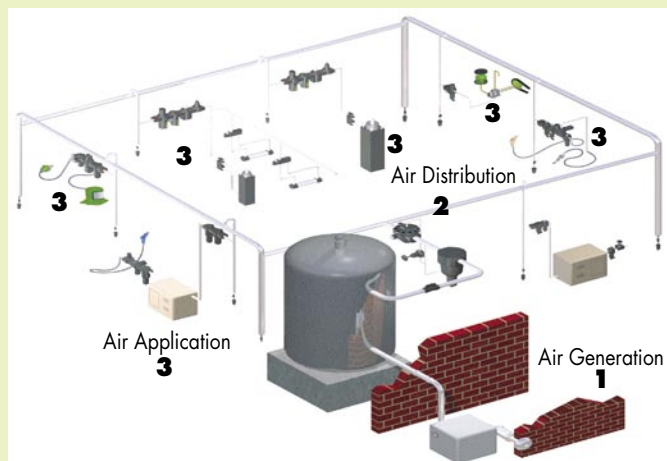


In terms of energy savings for compressed air, there are three big areas:

1. Air Generation. Compressors and other air supply side equipment.

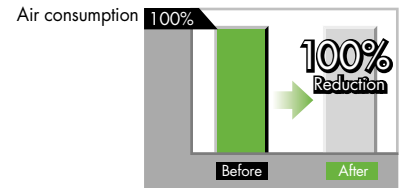
2. Air Distribution. Piping, fittings, valves, FRL units,...

3. Air Applications. Actuators, Air blow, Suction units... Within these areas substantial energy and monetary savings can be made!



Leakage

Reduce the "hiss"



How many times have you walked around a factory accompanied by the ever present background noise of air leakage?

The hissing sound is actually the noise made by escaping air, which not only wastes energy, with potentially harmful long term effects on the environment, but costs organisations substantial amounts of money!

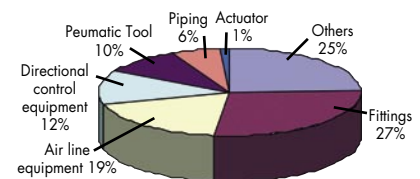
Hole Diameter	Air Leakage (dm ³ /min (ANR))	Annual Loss (€/year)
0.5	13	44.5
2	204	682
5	1275	4256

Line pressure: 5 Bar Working hours: 2500 Hrs/year
Compressed Air unit Cost: 0.022 €/m³

Whilst compressed air systems will always have some leakage, many factories today have leakage which can account for as much as **25-30%** of the compressor's output. If this was reduced to a more acceptable and recognised levels of **5-10%**, the savings made could be the difference between profitability or loss!

So where do you search for leaks? "Just about everywhere!"

However, it is often more common to find them around fittings and piping.....



Wastage related to air leakage

- Compressor overload – resulting in higher operational costs.
- Pressure fluctuation – reduced air tool efficiency and durability.
- Secondary procurement – the need to purchase additional compressors to maintain performance levels.
- Higher maintenance costs.
- Probable increases in machine downtime.

Leak Prevention

- Maintain good air quality in the system - contaminants or moisture in the air system will cause increased leakage and equipment malfunction.
- Special care should be taken during the assembly of all fittings and tubing etc - use a special tube cutter, including leakage resistant equipment and allow sufficient time for accurate installation.

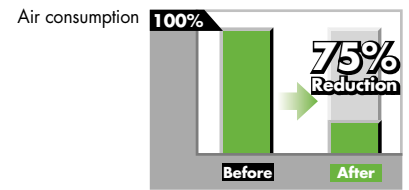


- Stop air consumption during non operational times – install a 3/2 or 2/2 port solenoid valve to cut off the compressed air supply when it is not needed.



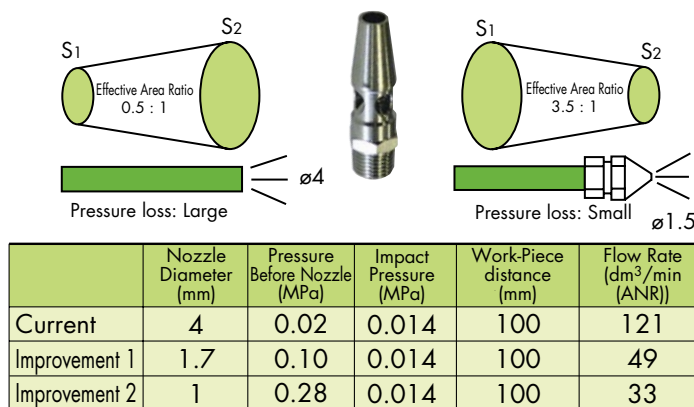
- Accurately estimate the correct air pressure for the system – over pressurisation will result in more compressed air leakage and higher energy costs.

Air blow



Many industries use air blow as part of their manufacturing processes. Often this can account for up to 50% of the total compressed air consumed, but this is often overlooked when energy costs are under scrutiny.

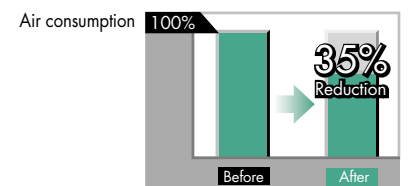
An “open blow” system where the air is blown through the air outlet without the use of end fittings (nozzles) is now recognised as one of the biggest consumers of compressed air.



PREVENTION OF WASTAGE IN AIR BLOW:

- Use a regulator, to insure the right pressure at the nozzle.
- Reduce pressure loss in upstream piping.
- Check the distance to the work piece and select the correct diameter of nozzle.
- Install a solenoid valve to reduce the blow time operation – from constant to intermittent operation.

Actuators



In a single machine the number of air operated cylinders can vary from one to a complex multi-cylinder machine application and today's manufacturers can often use hundreds of pneumatics cylinders in their production facilities.

ACTUATOR RELATED WASTAGE & PREVENTION

- In many cases, the air pressure required to extend the cylinder is greater than the air pressure required to retract the piston rod and yet the same pressure is used – therefore install a pressure regulator.
- Select the stroke and bore size to your speed and load requirements – do not oversize the pneumatic cylinder.
- A solenoid valve's flow characteristics affects a cylinder's response time – the valve should be sized to meet the required operating conditions.
- As the piping length increases, please note that the total stroke time increase as well.



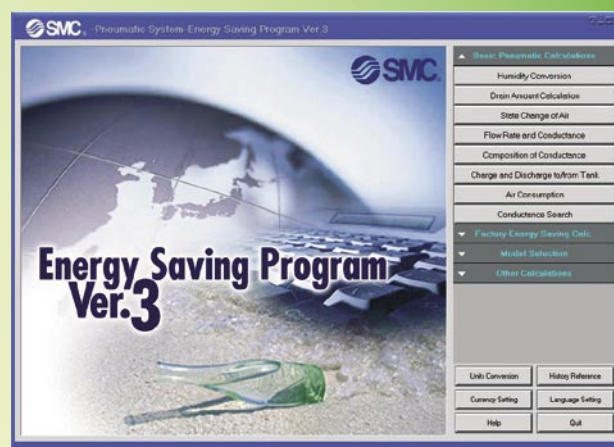
ENERGY SAVING QUICK & EASY

- **Switch off** your **compressors** during idle time – an inoperative compressor draws between 40 and 60% of full load power.
- **Place the valve as close as possible to the cylinder.** this will save the unnecessary energy to pressurize and depressurize the driving piping length,
- Energy saving starts and ends with **measurement.** **Flow & Pressure Switches** can identify the amount of air used before and after any improvements. With them you will find the problem areas and solve the pressure / flow fluctuations.
- **Do not abuse air.** When you are not using air tools, switch them off.
- **Introduce a leak prevention programme** – by regularly reviewing your system for leaks, compressed air wastage can be kept to an absolute minimum.
- **Use a well designed pneumatic system** - by accurately estimating your needs when initially designing your system, the selection of energy efficient products can be made ensuring minimal pressure falls and compressed air wastage.

ENERGY SAVING PROGRAME V.3

We have developed one of the most advanced "user friendly" cd based Energy Saving Programmes available. Within minutes this software can help you specify the best products for your new pneumatic systems and additionally, it can also help you analyse your existing system. With simple simulation the most cost efficient improvements can be seen immediately.

Used in conjunction with our V.2 Model Selection Software, it's the most cost effective way when designing a pneumatic system!



GREEN PROCUREMENT

SMC are firmly committed to producing products that are environmentally cleaner and continuously assess all the materials used. Gradually we are eliminating those materials which are known to be environmentally harmful (RoSH European Directive), such as mercury, lead, cadmium, hexavalent chromium and PBB/PBDE flame retardants.

If you would like to receive more information on SMC's Green Procurement Policy please contact your local SMC office and ask for an electronic copy (pdf) of our latest Green Product leaflet.



I LOVE
THE EARTH
I LOVE
GREEN PRODUCTS

International Training

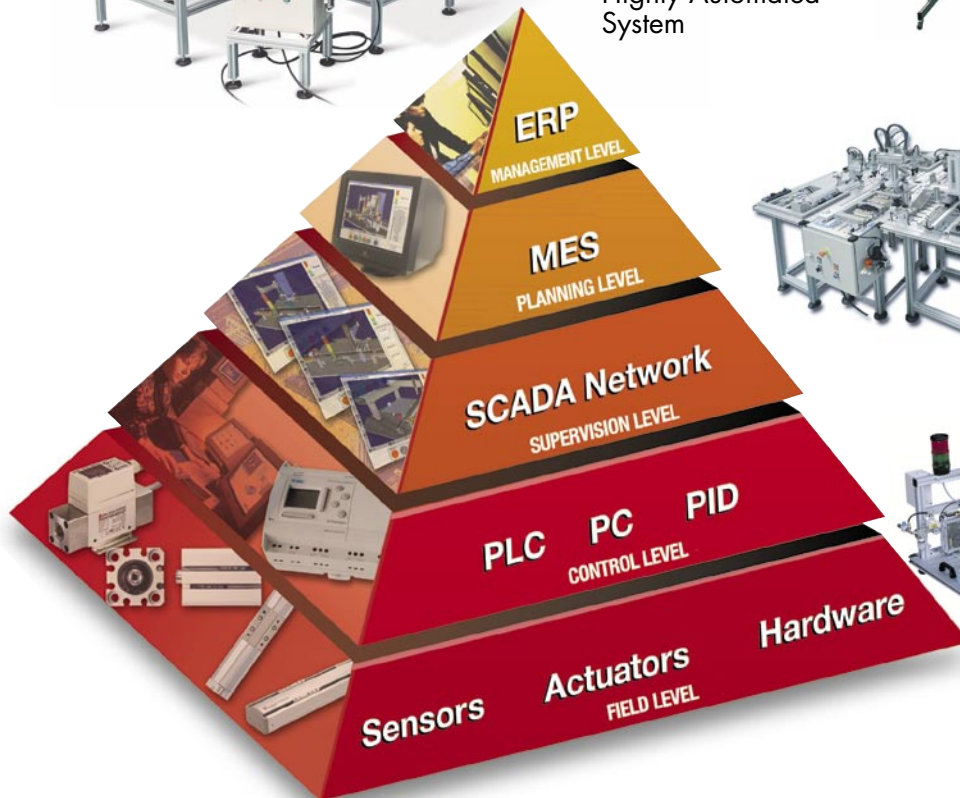
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Highly Automated System



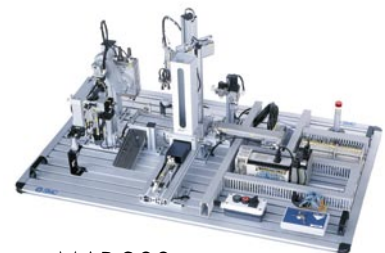
FMS-200
Flexible Manufacturing System



MAS-200
Modular Assembling System



IPC-200
Industrial Process Control



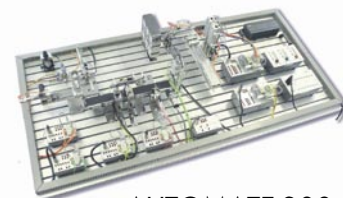
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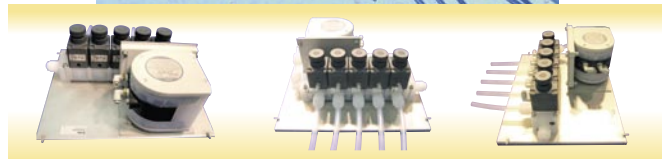
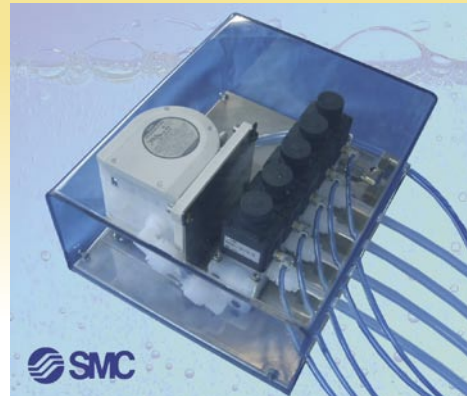
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A knowledgeable team with wide experience in both the industrial and educational sectors, continuously investigates the training demands of the industry in order to offer a customized SOLUTION to every customer.

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- With over 1.000 specialist development engineers based in our technical centres in Japan, USA and Europe we can respond quickly and efficiently to our customers needs.
- SMC products are not just confined to the limits of conventional pneumatics control components but include new peripheral markets as well.
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