

# 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.

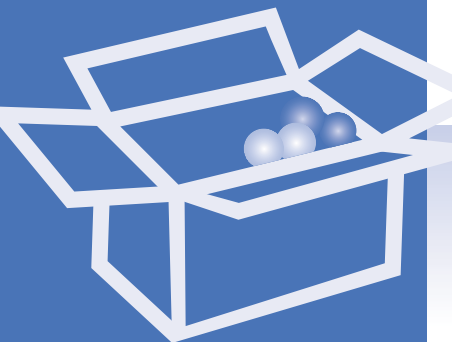
To this end, we have established a global network of highly skilled engineers to focus their activities specifically on both the Food and Packaging Industries.

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

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

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



## Technical Development

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

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



## Sales and Communication Network

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

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

## Production and Supply

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

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

# Technical Development

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

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

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



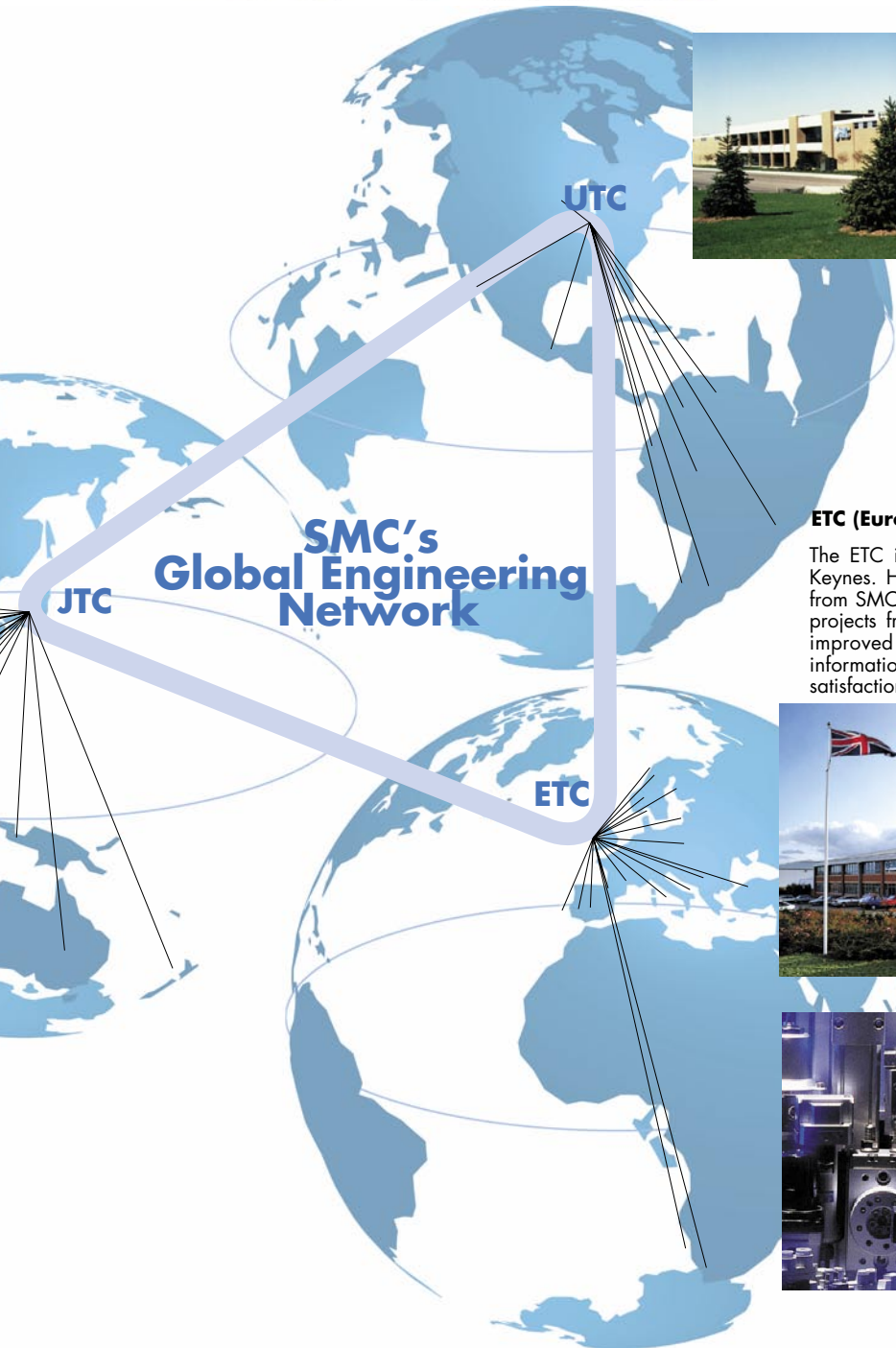
The Tsukuba Technical Centre has expanded into its newly completed twin-tower building. At the center of SMC's research and development division, a staff of 1,000 is engaged in research and development activities for the entire world.





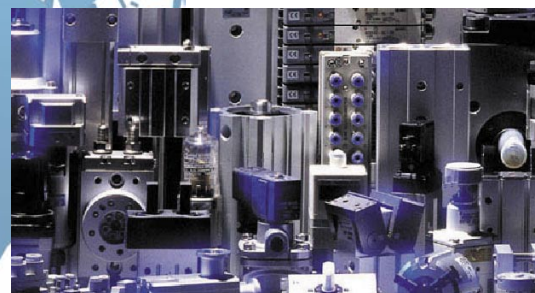
### **UTC (US Technical Centre) U. S. A.**

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: 24,945m<sup>2</sup>  
Floor Space: 30,050m<sup>2</sup>



Canada

U.S.(Indianapolis)

U.S.(Los Angeles)

## 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: 57,191m<sup>2</sup>  
Floor Space: 45,094m<sup>2</sup>



**Kamaishi Factory (Iwate Prf.)**  
Total Land Area: 82,657m<sup>2</sup>  
Floor Space: 41,623m<sup>2</sup>



**Tohno Factory (Iwate Prf.)**  
Total Land Area: 79,428m<sup>2</sup>  
Floor Space: 10,737m<sup>2</sup>



**Yamatsuri Factory (Fukushima Prf.)**  
Total Land Area: 124,227m<sup>2</sup>  
Floor Space: 26,298m<sup>2</sup>



**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: 82,940m<sup>2</sup>  
Floor Space: 55,352m<sup>2</sup>



**SMC Manufacturing (Singapore) Pte. Ltd.**  
Total Land Area: 23,942m<sup>2</sup>  
Floor Space: 18,424m<sup>2</sup>

## Overseas Local Production Facilities

### North/South America

<b>Chile</b>	SMC Pneumatics (Chile) S.A.
<b>Mexico</b>	SMC Corporation (Mexico), S.A.de C.V.
<b>Argentina</b>	SMC Argentina S.A.

### Europa/Africa

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

### Asia/Oceania

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

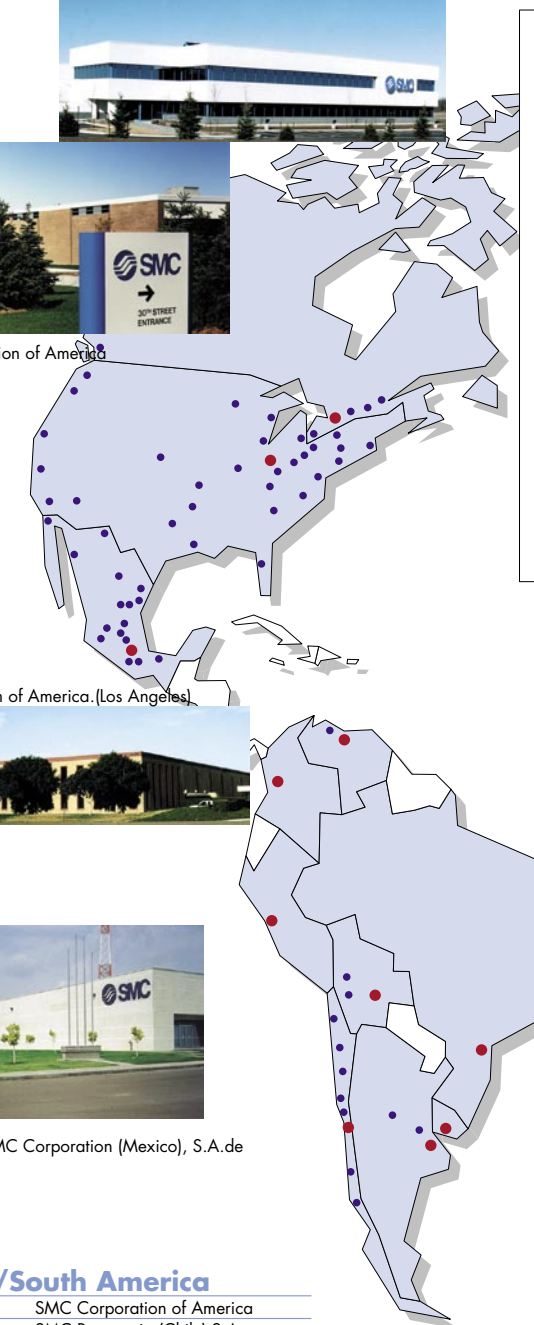


**U.S.A** SMC Corporation of America (Indianapolis)

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



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



### North/South America

<b>U.S.A</b>	SMC Corporation of America
<b>Chile</b>	SMC Pneumatics(Chile) S.A.
<b>Mexico</b>	SMC Corporation(Mexico), S.A. de C.V.
<b>Canada</b>	SMC Pneumatics(Canada)Ltd.
<b>Argentina</b>	SMC Argentina S.A.
<b>Bolivia</b>	SMC Pneumatics Bolivia S.r.l.
<b>Venezuela</b>	SMC Neumática Venezuela S.A.
<b>Brazil</b>	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**



**SMC Pneumatics (Australia) Pty. Ltd.**



**Europa/Africa**

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

**Asia/Oceania**

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

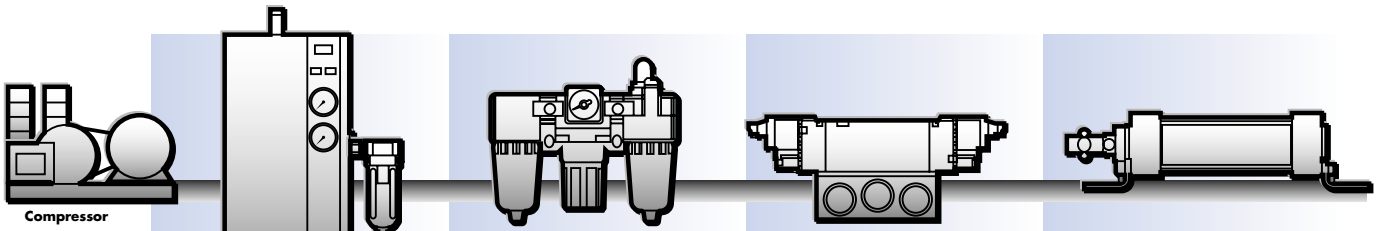
● Head office  
● Branch office



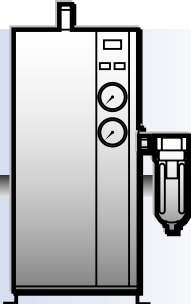
# 10,000 basic models, and 560,000 variations. A wide range of variations to accommodate diverse applications.

## 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**

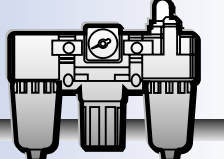


**Air Preparation Equipment**

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




Air cleaning equipment

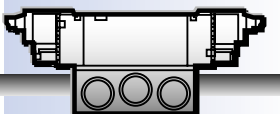


**Air Line Equipment**

**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

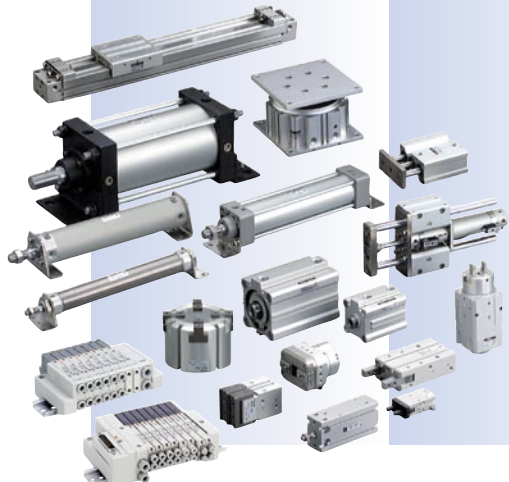


**Actuators**

**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**



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

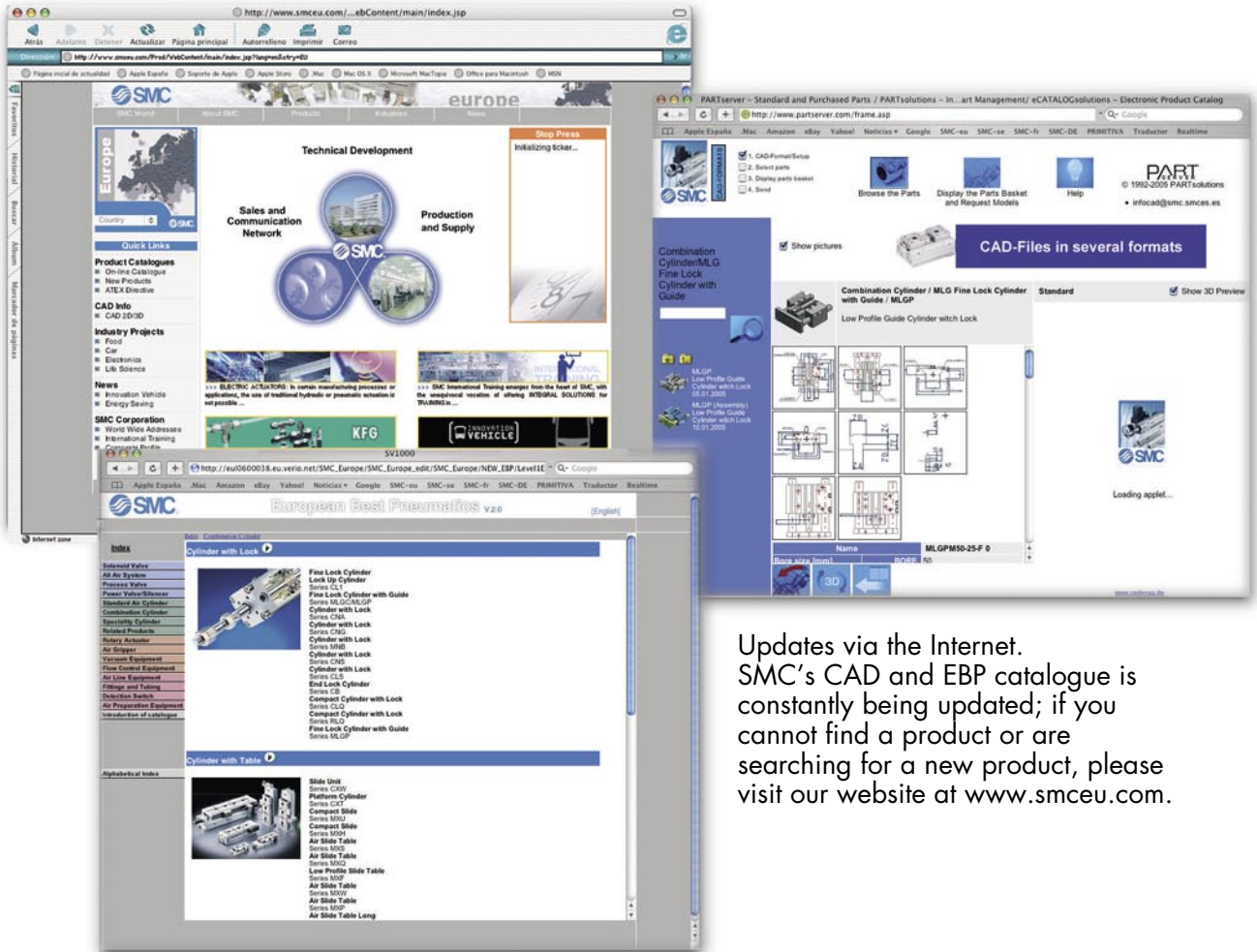


SMC's improved Web Site—offering "easy-to-use" options!.

<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](http://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

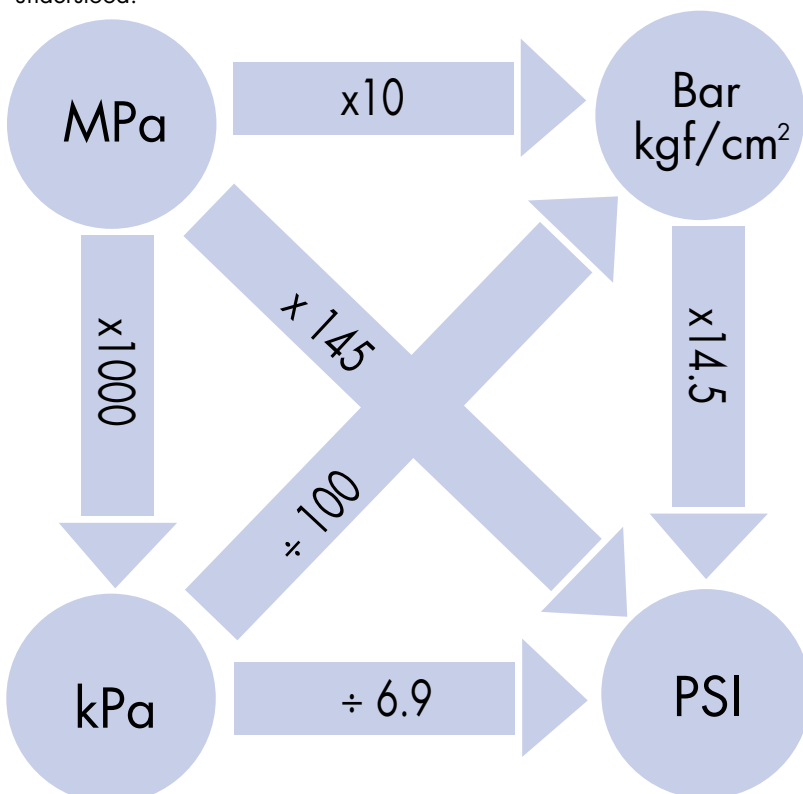
## Pressure Measurement

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 MPa = 1000 kPa = 1,000,000 Pa

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

SMC have historically used kgf/cm<sup>2</sup> or bar, a conversion graphic is shown below. This includes lbf/in<sup>2</sup> (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/cm<sup>2</sup> (approx) or 72.5 psi (approx).

Note: The conversions involving kgf/cm<sup>2</sup> and psi are approximations, maximum errors should not exceed  $\pm 2\%$ .

# Flow Characteristics and Measurement

## Introduction to Flow

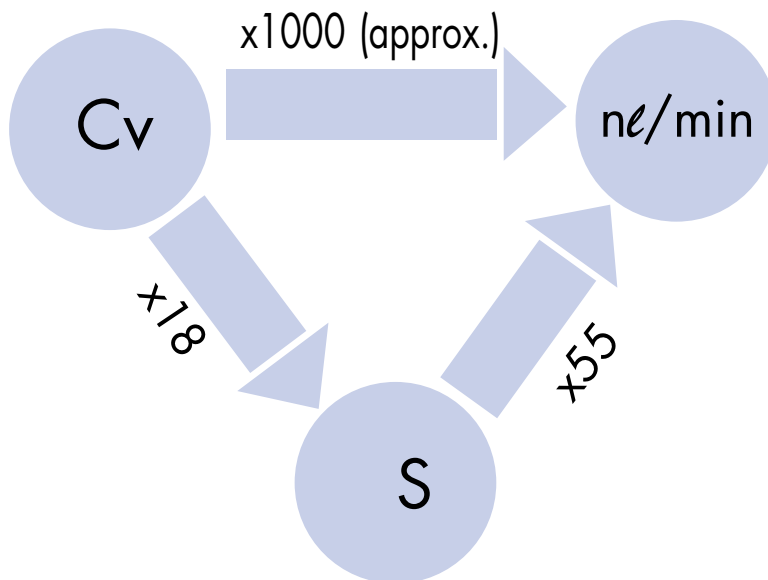
The flow through a valve or fitting is expressed in many ways, according to different international and manufacturer standards. Many units of measurement have been used. Also the allowable pressure loss, testing methodology and other assumptions were not consistent between different makers.

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)
<b>CJ5-S</b>	Double acting	10, 16
<b>CG5-S</b>		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
<b>ASG</b>	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
<b>KQG</b>	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
<b>KFG</b>	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
<b>M</b>	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
<b>KKA</b>	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	<b>LVA</b>	N.C./N.O./C.O.	1/8 to 1
Features	Body material: Stainless steel Diaphragm material: PTFE, NBR, EPR are selectable. Operating fluid temperature: 0 to 100°C (when the diaphragm is PTFE.) 0 to 60°C (when the diaphragm is NBR or EPR.)		

## Clean Regulator (Contamination Controlled Steel Regulator)

Corrosion resistant



Series	Body size	Connection thread
<b>SRH</b>	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
<b>JS</b>	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)
<b>CP95 (-XC6)</b>	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

Hygienic



Type	Series	Action	Bore size (mm)
Round type	<b>HYB</b>	Double acting	20, 25, 32, 40, 50, 63, 80, 100
Basic type	<b>HYQ</b>		20, 25, 32, 40, 50, 63
ISO standard type	<b>HYC</b>		32, 40, 50, 63
With guide	<b>HYG</b>		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

Made to Order

Hygienic



Series	Port size	Cv factor	Power consumption
<b>VFN (-X19)</b>	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	<b>CM2</b>	20, 25, 32, 40
Air cylinder	<b>CG1</b>	20, 25, 32, 40, 50, 63, 80, 100
Compact cylinder	<b>CQ2</b>	20, 25, 32, 40, 50, 63, 80, 100
Air cylinder	<b>CA2</b>	40, 50, 63, 80, 100
Compact guide cylinder	<b>MGPM</b>	20, 25, 32, 40, 50, 63, 80, 100
Guide cylinder	<b>MGGM</b>	32, 40, 50, 63, 80, 100
Features	Using a special scraper improved water resistance, compared to standard cylinders	

### Related Made to Order

<b>XC4</b>	With heavy duty scraper
<b>XC35</b>	With coil scraper

### Cylinder / Made to Order

<b>XB6</b>	Heat resistant cylinder (-10 to 150°C)	Heat resistant
<b>XB14</b>	Cylinder with heat resistant auto switch (0 to 150°C)	Heat resistant
<b>XB7</b>	Cold resistant cylinder (-40 to 70°C)	

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

## Resin Products

### Clean One-touch Fittings

Corrosion resistant



Series	Applicable tubing O.D.	Connection thread
<b>KP</b>	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	
<b>TH/THH</b>	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

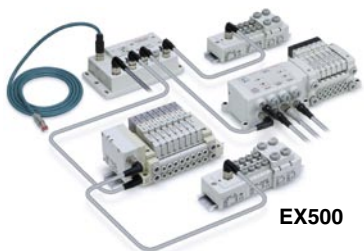
Corrosion resistant Heat resistant



Series	Actuation	Applicable tubing O.D.	Orifice diameter mmφ
Integral fitting <b>LVC</b>	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



Series	Enclosure	Communication protocol	Applicable valve
<b>EX250</b>	IP67	DeviceNet	SV1000/2000/3000 VQC1000/2000/4000
		PROFIBUS-DP	
		CC-Link	
		Actuator Sensor interface (AS-I, ASI)	
		CAN Open	
Features	<ul style="list-style-type: none"> <li>• IP67 compliant</li> <li>• Input/Output available</li> </ul>		
<b>EX500</b>	IP65	Remote I/O (Rockwell Automation Inc.)	SV1000/2000/3000/4000 VQC1000/2000/4000
		DeviceNet	
		PROFIBUS-DP	
		CC-Link	
		EtherNet/IP™	
Features	<ul style="list-style-type: none"> <li>• IP65 compliant</li> <li>• Input/Output available</li> </ul>		

## Pilot Operated 2 Port Solenoid Valve

High-pressure



Series	Maximum operating pressure (MPa)	Port size
VCH41 (N.C.)	5.0	3/4, 1
VCH42 (N.O.)		
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	Inlet pressure 5.0 Set pressure 0.5 to 5.0	3/4, 1
VCHR40		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	5.0 (Relief valve release pressure: 1.8)	3/4, 1
VCHN4		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)
<b>PSE (X512)</b>	0 to 5.0	10.0

### Related Equipment/ Digital Pressure Switch

High-pressure



Series	Rated pressure range (MPa)	Proof pressure (MPa)
<b>ISE75</b>	0.4 to 10.0	30.0
<b>ISE75H</b>	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)
<b>VQC1000</b>	0.72 dm <sup>3</sup> /(s·bar)	50	0.5
<b>VQC2000</b>	2.6 dm <sup>3</sup> /(s·bar)	80	
<b>VQC4000</b>	6.9 dm <sup>3</sup> /(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)
<b>VQZ1000</b>	0.7 dm <sup>3</sup> /(s·bar)	40	0.35
<b>VQZ2000</b>	1.9 dm <sup>3</sup> /(s·bar)	63	
<b>VQZ3000</b>	3.0 dm <sup>3</sup> /(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)
<b>MQQ</b>	Compact	10, 16, 20, 25, 30, 40	0.005
<b>MQM</b>	Anti-lateral load	6, 10, 20, 25	ø6: 0.02, ø10 to 25: 0.005 (MQML□□H: 0.01)
<b>MQP</b>	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
<b>XT323</b>	1/8	2 dm <sup>3</sup> /(s·bar)
Features	Operating frequency 300 to 1500 C.P.M	

## Low Torque Metal Seal Type Rotary Joint



Series	Number of circuits	Connection diameter
<b>MQR</b>	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

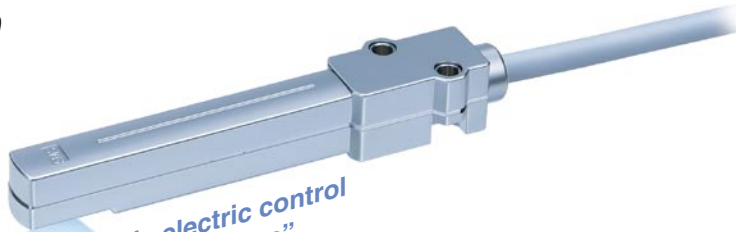


Series	Bore size (mm)	Maximum available Stroke (mm)
<b>MY2C</b>	16, 25, 40	5000 (3000 for $\phi 16$ )
<b>MY2H</b>	16, 25, 40	1500 (1000 for $\phi 16$ )
Features	A complete reduction in height of the cylinder allows mounting in a narrow space. The low profile design of the cylinder built with with a high 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 Potentiometric 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  $\Omega$ )
- Measurement potential difference:  $\pm 0.4$  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.  $\pm 1$  digit or less
- Detection distance correction function (adjustable in 1 mm increments)



## Surface Potentiometric Sensor / Series IZD10

**Small and easy to mount**

**Dimensions (actual size)**

M3 screw  
(supplied by customer)

Sensor head

Detection hole

Installation distance

Detection range

**Installation distance:  
10 to 50 mm**

**Installation Distance and  
Detection Range**

Installation distance (mm)	Detection range (mm)
10	45
20	85
25	100
30	120
40	150
50	180

## Surface Potentiometric Sensor Monitor / Series IZE11

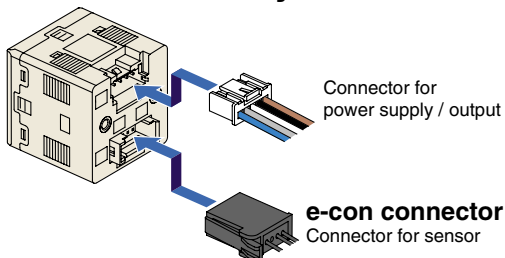
### 2-color display (red/green)

Able to set the display color in 4 patterns.



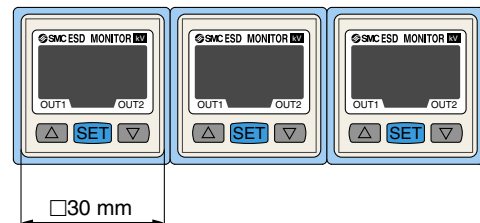
Pattern	ON	OFF
①	Red	Green
②	Green	Red
③	Red	Red
④	Green	Green

### 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**  
**Series IZS31**

# Ionizer

**Controlled ion balance by sensor**

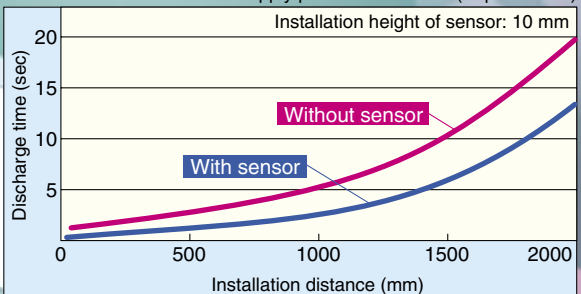
- ~ The choice of 2 types of the sensors are available. ~
- Rapid elimination of static electricity by a feedback sensor
- Ion balance control by an auto-balance sensor

**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.**

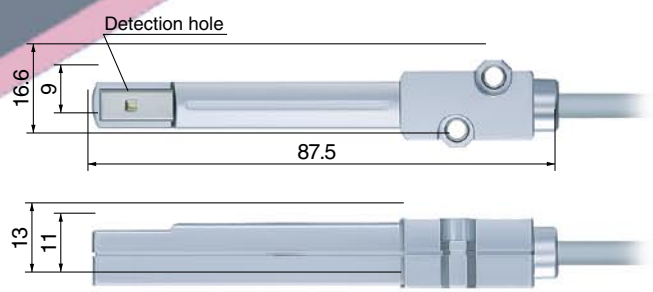
Supply pressure: 0.1 MPa (7ℓ per nozzle)

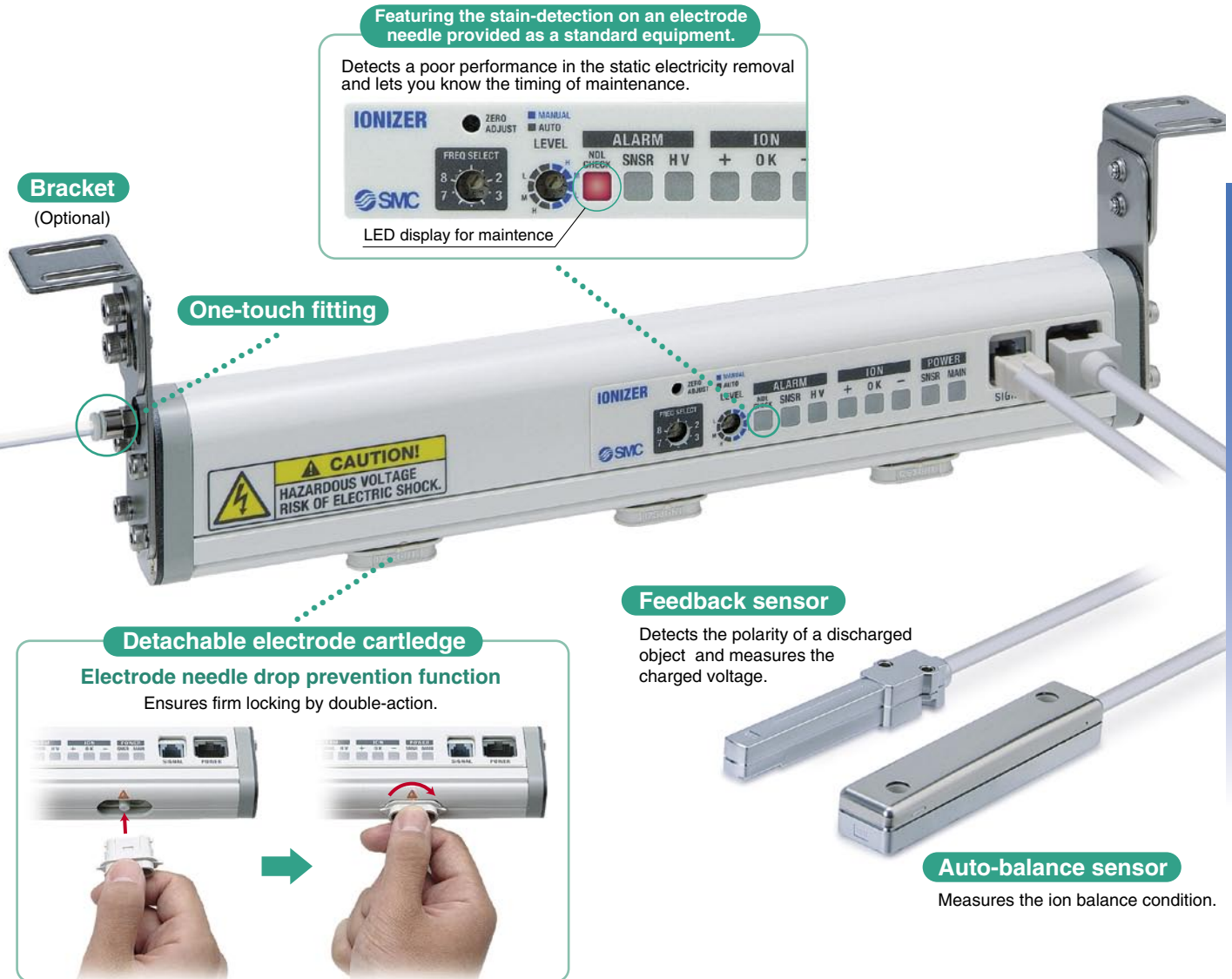


<Conditions> Static electricity elimination features are based on the data using the charged plate (size: 150 mm x 150 mm, capacitance: 20 pF) as defined in the U.S. ANSI standards (ANSI/ESD, STM3, 1-2000). Use this as a guideline purpose only for model selection because the value varies depending on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

**Compact feedback sensor**

**Dimensions**





Featuring the stain-detection on an electrode needle provided as a standard equipment.

Detects a poor performance in the static electricity removal and lets you know the timing of maintenance.

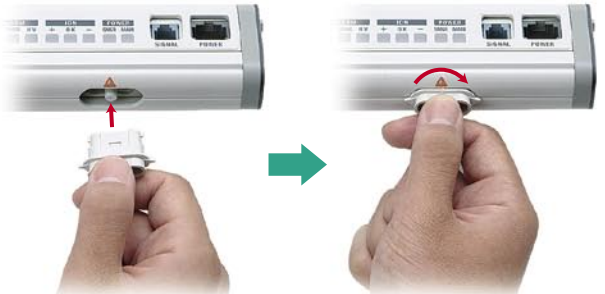


**Bracket**  
(Optional)

**One-touch fitting**

**Detachable electrode cartledge**

**Electrode needle drop prevention function**  
Ensures firm locking by double-action.



**Feedback sensor**

Detects the polarity of a discharged object and measures the charged voltage.



**Auto-balance sensor**

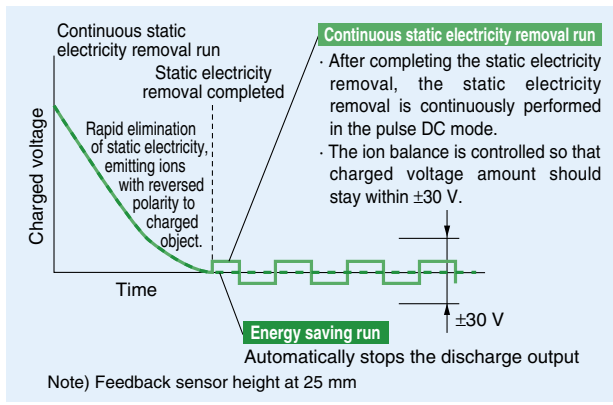
Measures the ion balance condition.

## 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.

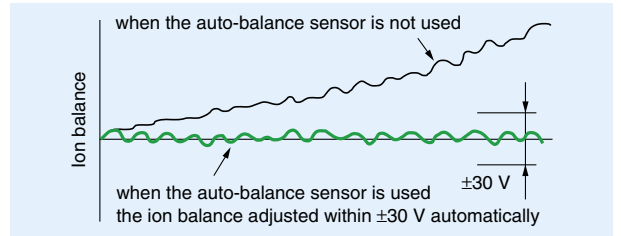
- 1) **Continuous static electricity removal run mode:** Continuously eliminates static electricity with pulse DC by controlling the ion balance so that the charged potential on a work piece would be within  $\pm 30$  V even after completing the static electricity removal.
- 2) **Energy saving run mode:**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



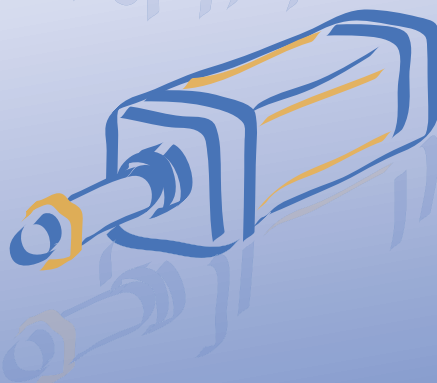
### 3 DC mode

**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.

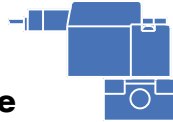


# General Catalogue Overview

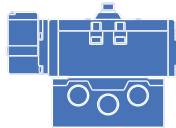












### 3 Port Solenoid Valve



Series	Type	Flow (Cv) 1 → 2 (P → A)	Port size	Applicable in vacuum use	
	<b>V100</b> 3 port direct operated solenoid valve - Rubber seal				
	<ul style="list-style-type: none"> <li>• Sub-plate</li> <li>• Manifold</li> </ul>	0.008~0.024	M5	-101.2 kPa	
	<b>S070</b> 3 port compact direct operated solenoid valve				
	<ul style="list-style-type: none"> <li>• Body ported</li> <li>• Sub-plate</li> <li>• Manifold</li> </ul>	0.011~0.021	M3, M5 ø2, ø4	-101.2 kPa	
	<b>SYJ300/500/700</b> 3 port pilot operated solenoid valve - Rubber seal				
	<ul style="list-style-type: none"> <li>• Body ported</li> <li>• Sub-plate</li> <li>• Manifold</li> </ul>	0.086~0.77	M3, M5 1/8, ø4 ø6, ø8	-101.2 kPa	
	<b>SY300/500</b> 3 port solenoid valve - Rubber seal				
	<ul style="list-style-type: none"> <li>• Body ported</li> <li>• Manifold</li> </ul>	0.13~0.61	M5, 1/8 ø4, ø6, ø8	-101.2 kPa	
	<b>EVT307/317</b> 3 port direct operated solenoid valve - Rubber seal				
	<ul style="list-style-type: none"> <li>• Body ported</li> <li>• Manifold</li> </ul>	0.12~0.62	1/8, 1/4	-101.2 kPa	
	<b>VT325</b> 3 port direct operated solenoid valve - Rubber seal				
	<ul style="list-style-type: none"> <li>• Body ported</li> <li>• Manifold</li> </ul>	1.4	1/4, 3/8	-101.2 kPa	
	<b>EVP300/500/700</b> 3 port pilot operated poppet solenoid valve - Rubber seal				
	<ul style="list-style-type: none"> <li>• Body ported</li> <li>• Sub-plate</li> <li>• Manifold</li> </ul>	0.26~3.5	1/8, 1/4, 3/8, 1/2	-101.2 kPa	
	<b>VKF300</b> 3 port direct operated poppet solenoid valve				
	<ul style="list-style-type: none"> <li>• Body ported</li> <li>• Sub-plate</li> <li>• Manifold</li> </ul>	0.13~0.15	M5, 1/8 ø4, ø6	-101.2 kPa	

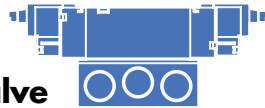


## 5 Port ISO Solenoid Valve











Series	Type	Flow (Cv) 1 → 2 (P → A)	Port size	Manifold station *	
	<b>VQ7-6/7-8</b> ISO solenoid valve - Rubber seal/Metal seal				
	<ul style="list-style-type: none"> <li>• ISO5599/1 sizes: 1 and 2</li> <li>• Sub-base</li> <li>• Manifold</li> </ul>	0.9~3.3	1/4, 3/8, 1/2	1~10	 SEE IN BEST PNEUMATICS CATALOGUE
	<b>EVS7-6/7-8/7-10</b> ISO solenoid valve with M12 connector - Rubber seal/Metal seal				
	<ul style="list-style-type: none"> <li>• ISO5599/1 sizes: 1, 2 and 3</li> <li>• Sub-base</li> <li>• Manifold</li> </ul>	0.9~4.0	1/4, 3/8, 1/2, 3/4, 1	1~10	 SEE IN BEST PNEUMATICS CATALOGUE
	<b>EVS1-01/1-02</b> ISO solenoid valve with M8, M12 connector - Rubber seal/Metal seal				
	<ul style="list-style-type: none"> <li>• ISO15407-1 sizes: 1 and 2</li> <li>• Sub-base</li> <li>• Manifold **</li> </ul>	0.60~1.0	1/8, 1/4	**	
	<b>VP7-6/7-8</b> ISO solenoid valve - Rubber seal				
	<ul style="list-style-type: none"> <li>• ISO5599/1 sizes: 1 and 2</li> <li>• Sub-base</li> <li>• Manifold</li> </ul>	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 *	
	<b>SV1000/2000/3000/4000</b>				
	5 port solenoid valve - Rubber seal				
	<ul style="list-style-type: none"> <li>• Sub-base</li> <li>• Manifold</li> </ul>	0.24~2.2	1/8, 1/4, 3/8, 1/2, ø3.2, ø4, ø6, ø8, ø10, ø12	2~20	
	<b>SY3000/5000/7000/9000</b>				
	5 port solenoid valve - Rubber seal				
	<ul style="list-style-type: none"> <li>• Body ported</li> <li>• Sub-base</li> <li>• Manifold</li> </ul>	0.13~2.5	M5, 1/8, 1/4, 3/8, 1/2, ø4, ø6, ø8, ø10, ø12	2~20	
	<b>SY3000/5000/7000</b>				
	5 port solenoid valve - Rubber seal- Cassette type				
	<ul style="list-style-type: none"> <li>• Manifold Cassette type</li> </ul>	0.14~0.98	M5, 1/8, 1/4, ø4, ø6, ø8, ø10	2~20	
	<b>SYJ3000/5000/7000</b>				
	4/5 port solenoid valve - Rubber seal				
	<ul style="list-style-type: none"> <li>• Body ported</li> <li>• Sub-base</li> <li>• Manifold</li> </ul>	0.10~0.74	M3, M5, 1/8, 1/4, ø4, ø6, ø8	2~20	
	<b>SX3000/5000/7000</b>				
	5 port solenoid valve - Rubber seal				
	<ul style="list-style-type: none"> <li>• Body ported</li> <li>• Sub-base</li> <li>• Manifold</li> </ul>	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.

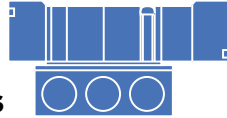
	<b>SI (Serial Interface) Systems Overview</b>				
	<ul style="list-style-type: none"> <li>• SMC can offer many interfaces to connect to different systems.</li> </ul>				
					







## 5 Port Solenoid Valve

Series	Type	Flow (Cv) 1 → 2 (P → A)	Port size	Manifold station *	
	<b>VQC1000/2000/4000</b> 5 port solenoid valve - Rubber seal/Metal seal				
	<ul style="list-style-type: none"> <li>• Manifold</li> </ul>	0.16~2.1	M5, ø4, ø6, ø8	1~12	
	<b>SQ1000/2000</b> 5 port solenoid valve - Rubber seal				
	<ul style="list-style-type: none"> <li>• Body ported</li> <li>• Manifold</li> </ul>	0.14~0.56	M5, ø4, ø6, ø8	1~12	
	<b>VQ0000/1000/2000</b> 5 port solenoid valve - Rubber seal/Metal seal				
	<ul style="list-style-type: none"> <li>• Body ported</li> <li>• Manifold</li> </ul>	0.07~0.80	M5, ø4, ø6, ø8	1~12	
	<b>VQ4000/5000</b> 5 port solenoid valve - Rubber seal/Metal seal				
	<ul style="list-style-type: none"> <li>• Sub-base</li> <li>• Manifold</li> </ul>	1.5~4.4	1/4, 3/8, 1/2, ø8, ø10, ø12	1~12	
	<b>VQD1000</b> 4 port direct operated poppet solenoid valve - Rubber seal				
	<ul style="list-style-type: none"> <li>• Body ported</li> <li>• Sub-base</li> <li>• Manifold</li> </ul>	0.05~0.07	M5	1~20	
	<b>VQZ1000/2000/3000</b> 3/5 Port Solenoid Valve - Body Ported Type				
	<ul style="list-style-type: none"> <li>• High speed and long life</li> <li>• IP65 DIN Connector</li> <li>• Metal Seal construction</li> </ul>		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**

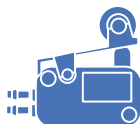
Series	Type	Flow (Cv) 1 → 2 (P → A)	Port size	
 <p><b>SYA3000/5000/7000</b> 5 port air operated valve</p>				
5 port valve	<ul style="list-style-type: none"> <li>• Body ported</li> <li>• Sub-plate</li> <li>• Manifold</li> </ul>	0.15~1.3	M5, 1/8, 1/4 ø4, ø6, ø8, ø10	
 <p><b>EVFA3000/5000</b> 5 port air operated valve</p>				
5 port valve	<ul style="list-style-type: none"> <li>• Body ported</li> <li>• Sub-plate</li> <li>• Manifold</li> </ul>	0.64~2.7	1/8, 1/4, 3/8, 1/2	
 <p><b>SYJA300/500/700</b> 3 port air operated valve</p>				
3 port valve	<ul style="list-style-type: none"> <li>• Body ported</li> <li>• Sub-plate</li> <li>• Manifold</li> </ul>	0.086~0.77	M3, M5 1/8, 1/4	
 <p><b>EVPA300/500/700</b> 3 port air operated valve</p>				
3 port valve	<ul style="list-style-type: none"> <li>• Body ported</li> <li>• Sub-plate</li> <li>• Manifold</li> </ul>	0.74~3.8	1/8, 1/4, 3/8, 1/2	





**Mechanical Valves**



Series	Type	Effective area (mm <sup>2</sup> )	Port size	
 <p><b>VM1000</b> 2, 3 port micro mechanical valve</p>				
2, 3 port, N.C.		1	Barbed connection to suit ø4mm tube	
 <p><b>EVM100/200/400</b> 2, 3 port mechanical valve</p>				
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	







## Mechanical Valves



Series	Type	Effective area (mm <sup>2</sup> )	Port size	
	<b>EVM800</b> Heavy duty 3 port mechanical valve			
	3 port, universal porting	6	1/8	
	<b>EVZM550/450, VFM350/250</b> 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	









## Hand Valves



	<b>VHK</b> 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	
	<b>VH</b> 4 port hand valve			
	4 port, robust construction	7.5~194	1/4, 3/8, 1/2, 3/4, 1	
	<b>VHS</b> 3 port hand valve, residual pressure relief			
	3 port air isolating valve	21~93	1/4, 3/8, 1/2, 3/4	



## Silencers/Exhaust Cleaners





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

Series	Type	Orifice size (mmø) [Flow (Cv)]	Port size	Valve * type	
	<b>VCA20/30/40</b> Direct operated 2 port solenoid valve for air				
	<ul style="list-style-type: none"> <li>• Body ported</li> <li>• Manifold</li> </ul>	3~10 [0.29~1.9]	1/4, 3/8, 1/2, 3/4	N.C.	
	<b>VCB20/30/40</b> Direct operated 2 port solenoid valve for heated water				
	<ul style="list-style-type: none"> <li>• Body ported</li> </ul>	2~10 [0.16~2.1]	1/8, 1/4, 3/8, 1/2, 3/4	N.C.	
	<b>VCL20/30/40</b> Direct operated 2 port solenoid valve for oil				
	<ul style="list-style-type: none"> <li>• Body ported</li> <li>• Manifold</li> </ul>	2~10 [0.16~2.1]	1/8, 1/4, 3/8, 1/2, 3/4	N.C.	
	<b>VCS20/30/40</b> Direct operated 2 port solenoid valve for steam				
	<ul style="list-style-type: none"> <li>• Body ported</li> <li>• Manifold</li> </ul>	2~10 [0.16~2.1]	1/8, 1/4, 3/8, 1/2, 3/4	N.C.	
	<b>VCW20/30/40</b> Direct operated 2 port solenoid valve for water				
	<ul style="list-style-type: none"> <li>• Body ported</li> <li>• Manifold</li> </ul>	2~10 [0.16~2.1]	1/8, 1/4, 3/8, 1/2, 3/4	N.C.	
	<b>VDW10/20/30</b> Compact direct operated 2 port solenoid valve for water and air				
	<ul style="list-style-type: none"> <li>• Body ported</li> <li>• Manifold</li> </ul>	1~4 [0.04~0.44]	M5, 1/8, 1/4	N.C.	
	<b>VDW200/300</b> Compact direct operated 3 port solenoid valve for water and air				
	<ul style="list-style-type: none"> <li>• Body ported</li> </ul>	1~4 [0.03~0.44]	M5, 1/8, 1/4	COM.	
	<b>VQ20/30</b> 2 port solenoid valve for air				
	<ul style="list-style-type: none"> <li>• Body ported</li> <li>• Manifold</li> </ul>	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	
	<b>VX21/22/23</b>				
	Direct operated 2 port solenoid valve for air, gas, vacuum, water, steam, oil				
	<ul style="list-style-type: none"> <li>• Body ported</li> <li>• Manifold</li> </ul>	2~10 [0.17~2.20]	1/8, 1/4, 3/8, 1/2	N.C./N.O.	
	<b>VXD21/22/23</b>				
	Pilot operated 2 port solenoid valve for air, gas, water, oil				
	<ul style="list-style-type: none"> <li>• Body ported</li> </ul>	10~25 [1.9~13]	1/4, 3/8, 1/2, 3/4, 1	N.C./N.O.	
	<b>VXZ22/23</b>				
	Pilot operated 2 port for zero pressure differential/For air, gas, vacuum, water, oil				
	<ul style="list-style-type: none"> <li>• Body ported</li> </ul>	10~25 [1.9~12]	1/4, 3/8, 1/2, 3/4, 1	N.C./N.O.	
	<b>VXH22</b>				
	Pilot operated 2 port for high pressure/For air, water, oil				
	<ul style="list-style-type: none"> <li>• Body ported</li> </ul>	10 [2.0~2.3]	1/4, 3/8, 1/2	N.C.	
	<b>VX31/32/33</b>				
	Direct operated 3 port for air, gas, vacuum, water, steam, oil				
	<ul style="list-style-type: none"> <li>• Body ported</li> <li>• Manifold</li> </ul>	1.5~4 [0.08~0.38]	1/8, 1/4, 3/8	N.C./N.O. COM.	
	<b>VXA21/22, VXA31/32</b>				
	Direct operated 2/3 port for air, gas, vacuum, water, oil				
	<ul style="list-style-type: none"> <li>• Body ported</li> <li>• Manifold</li> </ul>	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	
	<b>VNA</b>				
	2 port valve for compressed air and air-hydro circuit control				
	<ul style="list-style-type: none"> <li>• Body ported</li> </ul>	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.	
	<b>VNB</b>				
	2 port valve for flow control				
	<ul style="list-style-type: none"> <li>• Body ported</li> </ul>	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 (mm $\phi$ ) [Flow (Av x 10 <sup>-5</sup> )]	Port size	Valve * type	
	<b>VNC</b> 2 port valve for coolant applications				
	<ul style="list-style-type: none"> <li>• Body ported</li> </ul>	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.	
	<b>VND</b> 2 port valve for steam				
	<ul style="list-style-type: none"> <li>• Body ported</li> </ul>	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)



















 <p>■ High purity chemical valve/Integrated fitting Type: <b>LVC</b></p>	 <p>■ High purity chemical valve/Threaded Type: <b>LVA</b></p>	 <p>■ High purity chemical valve/Manually operated Type: <b>LVH</b></p>	 <p>■ High purity chemical valve/Compact Type: <b>LVD</b></p>	
 <p>■ Air operated chemical valve/Non-metallic exterior Type: <b>LVQ</b></p>	 <p>■ High purity fluoropolymer/Fittings Type: <b>LQ</b></p>	 <p>■ High purity fluoropolymer/Needle valve Type: <b>LVN</b></p>	 <p>■ High purity fluoropolymer/Tubing Type: <b>TL/TIL</b></p>	
 <p>                     ■ Process pump/Automatically switching/Air operated type: <b>PA</b>                      ■ Process pump/Automatically switching with built-in pulsation attenuator/Air operated type: <b>PAX</b>                      ■ Process pump/Built-in solenoid valve/Air operated type: <b>PB</b> </p>				

### 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
<b>CJ1</b> 	Air cylinder																					
	Port size																					
<b>CJP</b> 	Pin cylinder																					
	M5 M5 M5 15																					
<b>CG1</b> 	Air cylinder																					
	Port size																					
<b>CS1</b> 	Air cylinder																					
	1/2 1/2 3/4 3/4 3/4 1 1																					
<b>C76</b> 	Air cylinder																					
	1/8 1/4																					
<b>C85</b> 	ISO cylinder																					
	M5 M5 M5 M5 1/8 1/8																					
<b>C95</b> 	ISO/VDMA cylinder																					
	1/8 1/4 1/4 3/8 3/8 1/2 1/2 3/4 3/4 1																					
<b>CP95</b> 	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		
<b>CUJ</b> 	Port size																							
	●																							
M3 M3 M3 M3																								
<b>CU</b> 																								
	●																							
M5 M5 M5 M5 3/8																								
<b>CU□□-□A</b> 																								
	●																							
M5 M5 1/8																								
<b>CQS</b> 																								
	●																							
M5 M5 M5 M5																								
<b>CQM</b> 																								
	●																							
M5 M5 M5 M5 1/8 1/8 1/4 1/4 3/8 3/8																								
<b>C55</b> 																								
	●																							
M5 M5 1/8 1/8 1/8 1/8																								
<b>CQ2</b> 																								
	●																							
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																								
<b>RQ</b> 																								
	●																							
M5 M5 1/8 1/8 1/4 1/4 3/8 3/8																								
<b>MU</b> 																								
	●																							
M5 1/8 1/8 1/4 1/4																								











### 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
<b>MTS</b> 	Port size																					
	With internal guide function																					
				●			●	●	●	●	●											
			M5			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
<b>MY1B</b> 	Port size																					
	Basic type																					
				●			●	●	●	●	●	●	●	●								
			M5			M5	M5	1/8	1/8	1/4	3/8	3/8	1/2	1/2								
<b>MY1M</b> 	Port size																					
	Slide bearing guide type																					
							●	●	●	●	●	●										
						M5	M5	M5	1/8	1/8	1/4	3/8										
<b>MY1C</b> 	Port size																					
	Cam follower guide type																					
							●	●	●	●	●	●										
						M5	M5	M5	1/8	1/8	1/4	3/8										
<b>MY1H</b> 	Port size																					
	High precision guide type																					
				●			●	●	●	●	●											
			M5			M5	M5	1/8	1/8	1/4												
<b>MY1HT</b> 	Port size																					
	High rigidity/High precision guide type																					
												●	●									
											3/8	3/8										
<b>MY1□W</b> 	Port size																					
	With protective cover																					
				●	●	●	●	●	●													
			M5	M5	1/8	1/8	1/4	3/8	3/8													
<b>MY2C/H/HT</b> 	Port size																					
	Compact and low profile design																					
							●			●		●										
						M5			1/8		1/4											
<b>MY3A/3B</b> 	Port size																					
	Short type																					
							●			●		●		●								
						M5			1/8		1/4		3/8									



### Magnetically Coupled Rodless Cylinder



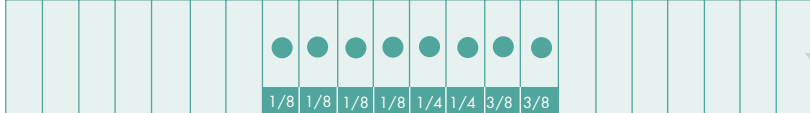

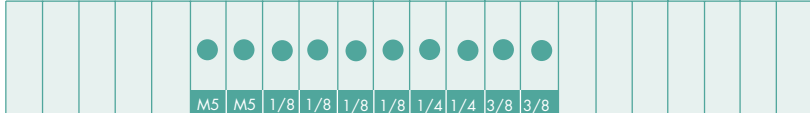
Series	Description/Bore Sizes (mm)																						
	2,5	4	6	8	10	12	15	20	25	32	40	50	63	80	100	125	140	160	180	200	250	300	
<b>CY3B/3R</b> 	Port size																						
	Basic type																						
			●		●		●	●	●	●	●	●											
		M5		M5		M5	1/8	1/8	1/8	1/4	1/4	1/4											
 SEE IN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

### Compact Guide Cylinder



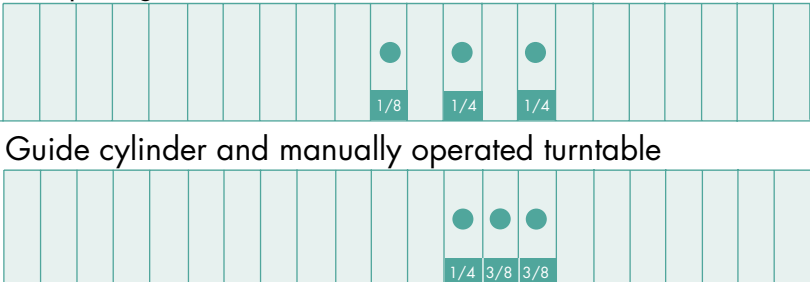
Series	Description/Bore Sizes (mm)																						
	2,5	4	6	8	10	12	16	20	25	32	40	50	63	80	100	125	140	160	180	200	250	300	
<b>MGJ</b> 	Port size																						
	Miniature guide rod cylinder																						
			●		●																		
		M3		M3																			
 SEE IN BEST PNEUMATICS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

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
<b>MGP</b> 	Port size																				
	End Lock type																				
<b>MGPS</b> 	Heavy duty guide rod type																				
																					
<b>MGPA</b> 	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
<b>MGF</b> 	Port size																				
	Compact guide table																				
<b>MGT</b> 	Guide cylinder and manually operated turntable																				
																					






### 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
<b>MGZ/MGZR</b> 	Port size																				
	Double power cylinder																				
																					





### 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	
<b>CXW</b> 	Port size																						
	Built-in shock absorber																						
					●			●	●	●	●												
					M5			M5	M5	1/8	1/8												SEE IN BEST PNEUMATICS CATALOGUE







### 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	
<b>CXSJ</b> 	Port size																						
	Compact type																						
			●		●			●	●	●	●												
			M3		M5			M5	M5	M5	1/8												SEE IN BEST PNEUMATICS CATALOGUE
<b>CXS</b> 	Port size																						
	Basic type																						
				●		●			●	●	●	●											
				M5		M5			M5	M5	1/8	1/8											SEE IN BEST PNEUMATICS CATALOGUE
<b>CXS□□A</b> 	Port size																						
	With air cushion																						
									●	●	●												
									M5	1/8	1/8												SEE IN BEST PNEUMATICS CATALOGUE
<b>CXS□□R</b> 	Port size																						
	With end lock. For retraction side																						
			●		●			●	●	●	●												
			M5		M5			M5	M5	1/8	1/8												SEE IN BEST PNEUMATICS CATALOGUE
<b>CXSW</b> 	Port size																						
	Double rod cylinder																						
				●		●			●	●	●	●											
				M5		M5			M5	M5	1/8	1/8											SEE IN BEST PNEUMATICS CATALOGUE







### 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
<b>CLQ</b> 	Cam plate	One direction	Port size													 SEE IN BEST PNEUMATICS CATALOGUE
			Compact cylinder with lock													
<b>MLGP</b> 	Cam plate	One direction	Port size													 SEE IN BEST PNEUMATICS CATALOGUE
			Compact guide cylinder with lock													


### 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
<b>RLQ</b> 	Spring locking	One direction	Port size													 SEE IN BEST PNEUMATICS CATALOGUE
			Compact cylinder with air cushion & lock													
<b>MLU</b> 	Spring locking	One direction	Port size													 SEE IN BEST PNEUMATICS CATALOGUE
			Plate cylinder with lock													
<b>ML1C</b> 	Spring locking	Both directions	Port size													 SEE IN BEST PNEUMATICS CATALOGUE
			Hyrodless 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
<b>REA</b> 	Rodless Cylinder/Basic type																				
	Port size ● ● ● ● ● 1/8 1/8 1/4 1/4 1/4																				
<b>REAR/REBR</b> (300 mm/s) (600 mm/s) 	Rodless Cylinder/Direct mount type																				
	● ● ● ● ● M5 M5 1/8 1/8 1/8 1/4																				
<b>REAS</b> 	Rodless Cylinder/Slider type/Slide bearing																				
	● ● ● ● ● M5 M5 1/8 1/8 1/8 1/4																				
<b>REAL</b> 	Rodless Cylinder/Slider type/Ball bushing bearing																				
	● ● ● ● ● M5 M5 1/8 1/8 1/8 1/4																				
<b>REAH/REBH</b> (300 mm/s) (600 mm/s) 	Rodless Cylinder/High precision guide type																				
	● ● ● ● ● M5 M5 1/8 1/8 1/8																				
<b>REC</b> 	Sine cylinder																				
	● ● ● ● 1/8 1/8 1/8 1/4																				

### High Power Cylinder

<b>RHC</b> 	High power cylinder																		
	● ● ● ● ● ● ● 1/4 1/4 3/8 3/8 1/2 1/2 3/4 3/4																		







### Low Friction Cylinder

<b>MQQ/MQM/MQP</b> 	Low friction cylinder																		
	● ● ● ● ● M5 M5 M5 M5 M5 1/8 1/8 1/8																		



















## Shock Absorber

Series	Thread size											
	M8	M10	M14	M16	M20	M25	M27	M30	M32			
<b>RB</b> 	<b>Standard</b>											
	Max. energy absorption (J)		2.94	5.88	19.6		58.8		147			 <small>SEE IN BEST PNEUMATICS CATALOGUE</small>
	Stroke absorption (mm)		6	7	12		15		25			
<b>RBL</b> 	<b>Coolant resistant</b>											
	Max. energy absorption (J)			5.88	19.6		58.8		147			 <small>SEE IN BEST PNEUMATICS CATALOGUE</small>
	Stroke absorption (mm)			7	12		15		25			
<b>RBQ</b> 	<b>Compact type</b>											
	Max. energy absorption (J)					1.96	11.8	19.6		33.3	49.0	 <small>SEE IN BEST PNEUMATICS CATALOGUE</small>
	Stroke absorption (mm)					4	7	8		8.5	13	







## 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	250	300			
<b>JA</b> 	<b>Standard type</b>																								
			●		●		●	●	●	●	●	●	●	●	●	●	●	●	●						
<b>JAH</b> 	<b>Heavy load</b>																								
												●	●	●	●	●									 <small>SEE IN BEST PNEUMATICS CATALOGUE</small>
<b>JB</b> 	<b>For compact cylinders</b>																								
																									 <small>SEE IN BEST PNEUMATICS CATALOGUE</small>
<b>JS</b> 	<b>Stainless steel type</b>																								
					●		●	●	●	●	●	●	●												


### 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°
<b>CRB2</b> 	Torque (at 0.5 MPa) N.m																			
	: Single vane ( ) : Double vane																			
<b>CRBU2</b> 	Rotary actuator																			
	0.12 0.32 0.70 1.83 3.73 (0.25) (0.65) (1.45) (3.70) (7.59)														● ● ● ● ●					
<b>CRB1</b> 	Rotary actuator/Free mount type																			
	0.12 0.32 0.7 1.83 3.73 (0.25) (0.65) (1.45) (3.70) (7.59)														● ● ● ● ●					
<b>CRB1</b> 	Rotary actuator																			
	5.69 10.8 18 35.9 (11.8) (22.7) (36.5) (72.6)														● ● ● ● ●					
<b>MSUA</b> 	Rotary actuator/Free mount type																			
	0.11 0.31 0.69 1.78														● ● ● ● ●					
<b>MSUB</b> 	Rotary table/High precision type																			
	0.11 0.31 0.69 1.78 (0.23) (0.62) (1.42) (3.63)														● ● ● ● ●					
<b>MSUB</b> 	Rotary table																			
	0.11 0.31 0.69 1.78 (0.23) (0.62) (1.42) (3.63)														● ● ● ● ●					

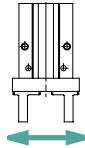
### Rack and Pinion Style Series Variations










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°
<b>CRJ</b> 	Torque (at 0.5 MPa) N.m																				
	: Single rack pinion ( ): Double rack pinion																				
<b>CRA1</b> 																					
	1,91    9,27    17,2    31,7    74,3																				
<b>CRQ2</b> 																					
	(0,3) (0,75) (1,84) (3,11) (5,3)																80° to 100°    170° to 180°				
<b>MSQ</b> 																					
	(0,09) (0,18) (0,29) (0,56)																0° to 190°				
<b>MSQ</b> 																					
	(0,89) (1,84) (2,73) (4,64) (6,79) (10,1) (19,8)																0° to 190°				
<b>MSQ</b> 																					
	(0,89) (1,84) (2,73) (4,64)																0° to 190°				

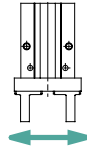
### Rotary Cylinder

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°				
<b>MRQ</b> 																					
	80° to 100°    170° to 190°																				

Parallel Style Series Variations



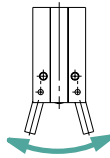
Series	Sizes															
	6	8	10	12	15	16	20	25	30	32	40	50	63	80	100	125
	External gripping force (at 0.5 MPa) N															
<b>MHZA2/MHZAJ2-6</b>	Compact series (without auto switch)															
	●															
	3.3															
<b>MHZ2</b>	Standard type															
	●	●			●	●	●		●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









### 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																	
<b>MHS2</b>			Slide guide type - 2 Finger														
									●	●	●		●	●	●	●	
<b>MHS3</b>			Slide guide type - 3 Finger														
									●	●	●		●	●	●	●	
<b>MHSJ3</b>			Slide guide type - 3 Finger with dust cover														
									●	●	●		●	●	●	●	
<b>MHSH3</b>			Slide guide type - 3 Finger, through hole type														
									●	●	●		●	●	●	●	
<b>MHSL3</b>			Slide guide type - 3 Finger, long stroke type														
									●	●	●		●	●	●	●	
<b>MHS4</b>			Slide guide type - 4 Finger														
									●	●	●		●	●	●	●	

### Angular Style Series Variations



Series	Sizes															
	6	7	10	12	15	16	20	25	30	32	40	50	63	80	100	125
External gripping moment (at 0.5 MPa) N.m																
<b>MHC2-6/MHCA2-6</b>	Short body type															
	●															
	0.038															
<b>MHCM2-7S</b>	Compact type															
	●															
	0.017															
<b>MHC2</b>	Standard type															
		●				●	●	●								
		0.10				0.39	0.70	1.36								
<b>MHT2</b>	Toggle type															
										●	●	●	●			
										12.4	36	63	106			
<b>MHY2</b>	180° angular, cam style															
		●				●	●	●								
		0.16				0.54	1.10	2.28								
<b>MHW2</b>	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	63	80	100	125
External gripping force (at 0.5 MPa) N																		
<b>MRHQ</b>	Rotary Gripper																	
	●	●			●			●	●	●								
	±10°	±10°			9			30	40	65								

## Simplified Options



### 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-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.



### 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



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



### 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**.



### 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

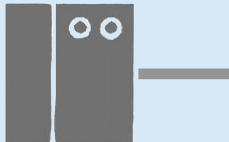
Note 1) When the oil mist concentration (compressor discharge concentration) in the inlet side is approx. 30 mg/m<sup>3</sup> (ANR) or less.  
 Note 2) It means the compressed air quality grade based on ISO8573-1:1991 (JIS B8392-1:2000) (Refer to page 4.), as well as the best quality grade which is achieved 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 <sup>3</sup> (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.	Atmospheric pressure dew point: -14 to -23°C 0.7 MPa pressure dew point: 15 to 3°C		1.7 g/m <sup>3</sup> (ANR) to 0.8 g/m <sup>3</sup> (ANR)	3, 4, -
C	Dry air • General pneumatic equipment • General painting	0.3 μm	Max. 1 mg/m <sup>3</sup> (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 <sup>3</sup> (ANR) to 0.8 g/m <sup>3</sup> (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 <sup>3</sup> (ANR) 0.08 ppm	35 particles or less of 0.3 μm diameter or larger / 10 l (ANR) (100 particles or less /ft <sup>3</sup> or less)	No oil odor	Atmospheric pressure dew point: -30 to -60°C 0.7 MPa pressure dew point: -6 to -42°C	0.5 g/m <sup>3</sup> (ANR) to 0.02 g/m <sup>3</sup> (ANR)	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 <sup>3</sup> (ANR) 0.008 ppm						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 <sup>3</sup> (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 <sup>3</sup> (ANR) 0.008 ppm						Oil odor	
H	Low dew point clean air (for clean room) • Blowing semi-conductor parts in a clean room	Max. 0.004 mg/m <sup>3</sup> (ANR) 0.0032 ppm	Particle with 0.1 μm diameter or larger 0 pc/6 l	No oil odor						

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

Main Line		Sub Line					
Air Tank	Air-cooled Aftercooler Water-cooled Aftercooler	Main Line Filter	Refrigerated Air Dryers		Drain Catch	Mist Separator	Heater
AT	HAA, HAW	AFF	IDF	IDU	AMG	AM	
Volume 100 to 3,000 L	1,000 to 5,700 300 to 18,000	300 to 42,000	100 to 65,000	320 to 12,400	300 to 12,000		80
100°C	70°C (Value is different depending on the model.)	60°C	50°C	60 to 80°C (Value is different depending on the model.)	60°C		5
		3 μm			Water droplet removal rate: 99 %	0.3 μm	
						1 mg/m <sup>3</sup> (ANR) [0.8 ppm]	
			-17°C Inlet temperature 35°C	-17°C Inlet temperature 55°C			-30°C Inlet temp

**AT (Air Tank):** Pulsation attenuation, Accumulation, Cooling. 2nd class pressure vessel. Not required when connected to a compressor. Applicable compressor: 5.5 kW (7 horsepower) to 220 kW (300 horsepower).

**Aftercoolers (HAA/HAW):** Cooling. Select Air-cooled Aftercooler or Water-cooled Aftercooler. In case of reciprocating compressor: Required because it becomes hot, and carbon or tar material is generated. In case of screw compressor: Not required. Applicable compressor: 7.5 kW (10 horsepower) to 37 kW (50 horsepower) for HAA; 2.2 kW (3 horsepower) to 110 W (150 horsepower) for HAW.

**AFF (Main Line Filter):** Separation, Filtration. Applicable compressor: 2.2 kW (3 horsepower) to 240 kW (320 horsepower). Not required when connected to a compressor.

**IDF (Refrigerated Air Dryer):** Dehumidification. Outlet air dew point at pressure 10°C (At 0.7 MPa) (0.7 MPa, at 35°C). Applicable compressor: 0.75 kW (1 horsepower) to 370 kW (500 horsepower).

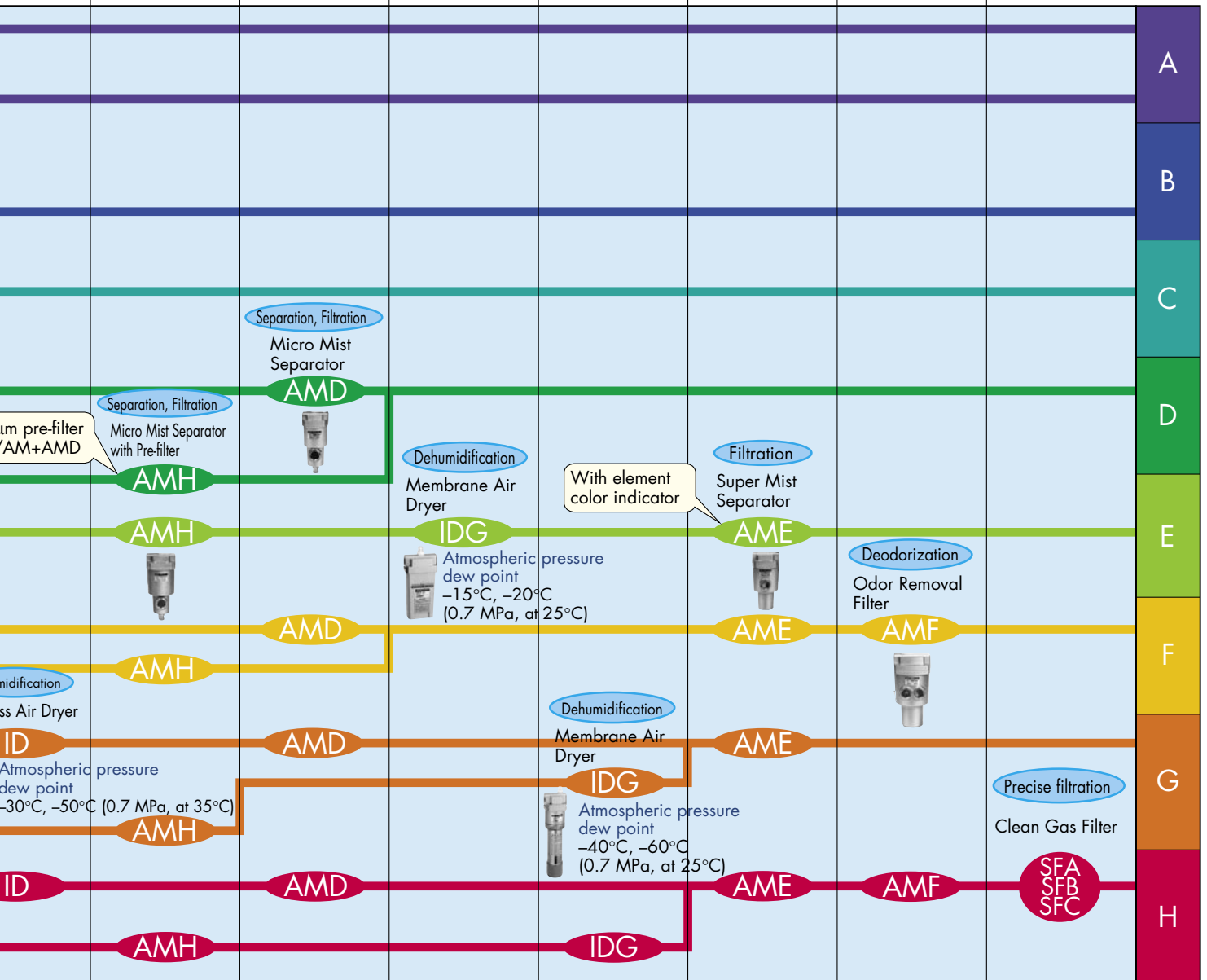
**IDU (Refrigerated Air Dryer):** Dehumidification. Outlet air dew point at pressure 10°C (0.7 MPa, at 55°C). Applicable compressor: 2.2 kW (3 horsepower) to 75 W (100 horsepower).

**AMG (Drain Catch):** Waterdrop separation.

**AM (Mist Separator):** Separation, Filtration. With 0.3 μm Integrated /

**Callouts:**  
 - Screw compressor: Air tank is not required because pulsation is small, but it is required for the purpose of accumulation.  
 - Not required when connected to a compressor.

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
200 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		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 <sup>3</sup> (ANR) [0.08 ppm]				0.01 mg/m <sup>3</sup> (ANR) [0.008 ppm]	0.004 mg/m <sup>3</sup> (ANR) [0.0032 ppm]	
					35 particles or less of 0.3 μm diameter or larger/10 μ (ANR) 100 particles or less /ft <sup>3</sup> 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 <sup>3</sup> (ANR) [ppm]		Droplet	Water steam	
						Removal rate (%)		
Air Filter	AF	5	—	△	×	△		
Main Line Filter	AFF	3						
Mist Separator	AM	0.3		1 [0.8]				
Micro Mist Separator	AMD			0.1 [0.08]				
Super Mist Separator	AME	0.01	35 particles or less of 0.3 μm diameter or larger/10 ℓ (ANR) (100 particles/ft <sup>3</sup> or	0.01 [0.008]		×	×	
Odor Removal Filter	AMF		—	△	Deodorization of oil smell	×		
Clean Gas Filter	SFA SFB SFC		Particle with 0.1 μm diameter or larger 0 pc/6 ℓ					
Drain Catch	AMG	△	—			99		
Air-cooled Aftercooler	HAA		×	×	×	△	△	
Water-cooled Aftercooler	HAW							
Refrigerated Air Dryer	IDF/IDU							-14 to -23
Heatless Air Dryer	ID						×	-30 to -60
Membrane Air Dryer	IDG							-14 to -60

Red: Reducible ×: Not reducible △: 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.

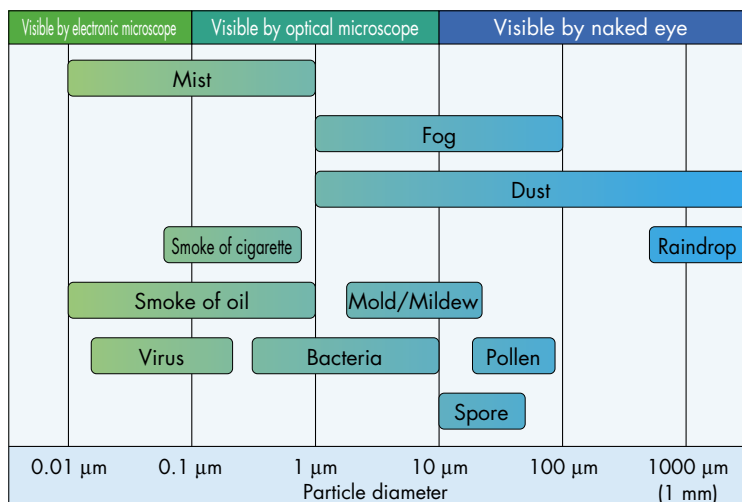
Atmospheric pressure dew point: The dew point under atmospheric pressure

<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)



### 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 (°C)	Max. oil concentration (mg/m <sup>3</sup> )
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°C  
Oil concentration: 0.1 mg/m<sup>3</sup>  
The quality grade is shown as 1, 4, 2.

## Effects caused by fluids to pneumatic components

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

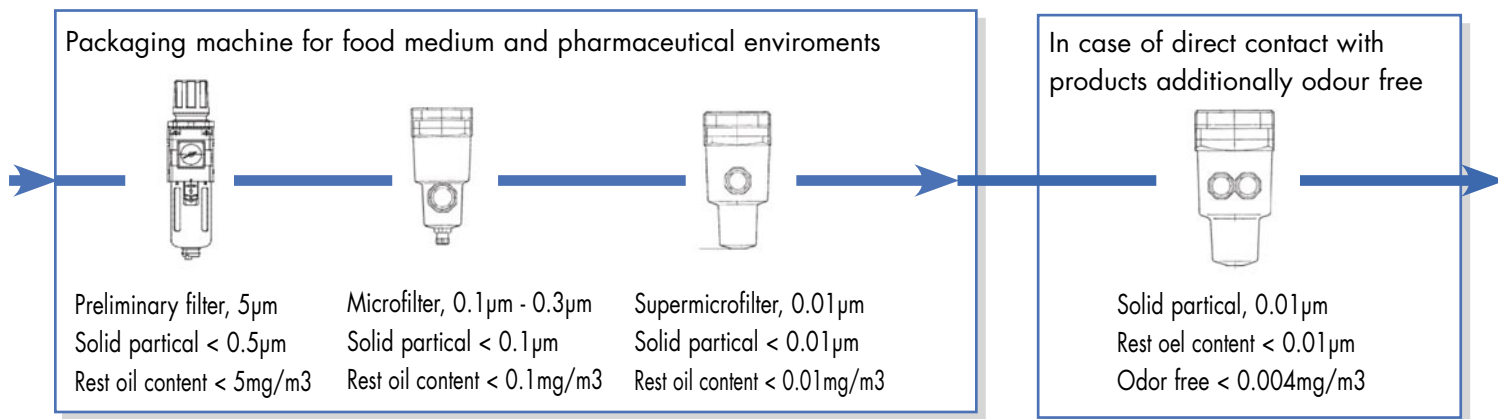
A = Only small attacks or practically none.  
 B = Moderate attacks.  
 C = Strong attacks.  
 D = Attached till complete disintegration.  
 - = Not Tested



## 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.



\* 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)	
<b>AC</b> 	Modular F.R.L. combination: AC			
	Air filter, Regulator, Lubricator <b>(AF + AR + AL)</b>	M5, 1/8, 1/4, 3/8, 1/2, 3/4, 1	0.05 to 0.85 Note)	 <small>SEE IN BEST PNEUMATICS CATALOGUE</small>
	Filter regulator, Lubricator <b>(AW + AL)</b>	M5, 1/8, 1/4, 3/8, 1/2, 3/4	0.05 to 0.85 Note)	
	Air Filter, Regulator <b>(AF + AR)</b>	1/8, 1/4, 3/8, 1/2, 3/4, 1	0.05 to 0.85 Note)	
	Air filter, Mist separator, Regulator <b>(AF + AFM + AR)</b>	1/8, 1/4, 3/8, 1/2, 3/4	0.05 to 0.85	
Filter regulator, Mist separator <b>(AW + AFM)</b>	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	
<b>AF10 to 60</b> 	Air filter: AF				
	M5, 1/8, 1/4, 3/8, 1/2, 3/4, 1	-	-	5 µm	 <small>SEE IN BEST PNEUMATICS CATALOGUE</small>
<b>AFM20 to 40</b> 	Mist separator: AFM				
	1/8, 1/4, 3/8, 1/2, 3/4	-	-	0.3 µm	 <small>SEE IN BEST PNEUMATICS CATALOGUE</small>
<b>AFD20 to 40</b> 	Mist separator: AFD				
	1/8, 1/4, 3/8, 1/2, 3/4	-	-	0.01 µm	 <small>SEE IN BEST PNEUMATICS CATALOGUE</small>



### Modular Range

Series	Port size	Set pressure	Bowl capacity	Filtration	
<b>AR10 to 60</b> 	Regulator: AR				
	M5, 1/8, 1/4, 3/8, 1/2, 3/4, 1	0.05 to 0.85 MPa	-	-	
<b>AR20K to 60K</b> 	Regulator with back flow mechanism: AR□K				
	1/8, 1/4, 3/8, 1/2, 3/4, 1	0.05 to 0.85 MPa	-	-	
<b>AL10 to 60</b> 	Lubricator: AL				
	M5, 1/8, 1/4, 3/8, 1/2, 3/4, 1	-	70 to 135 cm <sup>3</sup>	-	
<b>AW10 to 60</b> 	Filter regulator: AW				
	M5, 1/8, 1/4, 3/8, 1/2, 3/4, 1	-0.05 to 0.85 MPa	-	5 μm	
<b>AW20K to 40K</b> 	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	
<b>AWM</b> 	Mist separator regulator: AWM				
	1/8, 1/4, 3/8, 1/2	0.05 to 0.85 MPa	-	0.3 μm	
<b>AWD</b> 	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.	
 T-interface	M5, 1/8, 1/4, 3/8, 1/2	Redirects the air flow.	
 Pressure switch with piping adapter	1/8, 1/4, 3/8, 1/2, 3/4	Compact switch and piping adapter integrated into one piece.	
 Check valve	1/8, 1/4, 3/8	Prevents back flow from lubricator.	
 Pressure switch	—	Compact switch	
 Cross interface	M5, 1/8, 1/4, 3/8, 1/2	Allows piping in all 4 directions.	
 Residual pressure relief 3 port valve	1/8, 1/4, 3/8, 1/2, 3/4, 1	Releases residual pressure in lines.	
 Spacers and brackets	—	Brackets for modular assemblies	









### Soft Start-up Valve

Series	Port size	Set pressure	Notes	
<b>AV</b> 	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.	







## Pressure Control Equipment

Series	Port size	Set pressure	Notes	
<b>ARJ</b> 	Miniature regulator: ARJ1020F, ARJ210, ARJ310 M5, 1/8 ø4, ø6	0.1 to 0.7 MPa	One Touch tube connection. Panel mountable.	
<b>AR</b> 	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		
<b>ARM</b> 	Compact manifold regulator: ARM10/11 ø4, ø6, ø10, 1/4, 3/8	0.05 to 0.7 MPa		
<b>ARM</b> 	Manifold regulator: ARM1000/200/2500/3000 1/8, 1/4, 3/8,	0.05 to 0.85 MPa		
<b>ARP</b> 	Direct operated precision regulator: ARP3000 1/4	0.005 to 0.3 MPa	Sensitivity 0.001 MPa. direct-driven, bleed type (with relieving function)	
<b>ARX20</b> 	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.	
<b>IR</b> 	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.	
<b>IRV</b> 	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
<b>ITV0000</b> 	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. 
<b>ITV1/2/3000</b> 	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. 
<b>ITV2090/2091</b> 	Electronic vacuum regulator: ITV2090/2091 1/4	-1.3 to -80 MPa	Pressure controlled by electrical signals. 
<b>VBA + tank</b> 	Booster regulator: VBA + reservoir tank UKT138 1/8, 1/4, 3/8, 1/2	0.05 to 0.85 MPa	


### Lubrication Equipment

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


### Air Dryers

Series	Specifications	Notes
<b>IDFA</b> 	<b>Refrigerated Air Dryer: IDFA</b>  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.
<b>IDG</b> 	<b>Membrane Air Dryer: IDG</b>  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.


### Large Flow Air filter

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


### Oil Mist Separators

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





### Water Separator

Series	Port size	Max. flow capacity (l/min (ANR))	Notes
<b>AMG</b> 	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
<b>AMF</b> 	Odour removal filter: AMF		
	0.01 µm (95% particle size collection)	200 to 12000	1/8, 1/4, 3/8, 1/2, 3/4, 1, 1 1/2, 2

### Related Products

Series	Port size	Notes
<b>AD</b> 	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.
<b>AMJ</b> 	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.
<b>ADH</b> 	Heavy duty auto drain: ADH4000	
	1/2	Easy maintenance. Float style drain allows automatic drain discharge without electric power.
<b>GD40</b> 	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.

## 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 FITTING PARTS CATALOGUE
	M5	●	●	●	●				●		
	Soft nylon										
	Polyurethane										
Unions	1/8	●	●	●					●	●	SEE FITTING PARTS CATALOGUE
	1/4										
	3/8										
	1/2										
	3/4										
	1										
	1 1/2										
Nylon	M5		●	●					●		SEE FITTING PARTS CATALOGUE
	M6		●	●					●		
	Soft nylon										
	1/8										
Polyurethane	1/4										
	3/8										
	1/2										
	3/4										
	1										
Nylon	1/4		●	●							SEE FITTING PARTS CATALOGUE
	Soft nylon										
	3/8										
	ø8										
Polyurethane	ø10										
	ø12										
	1/2										
Nylon	1/8		●	●	●						SEE FITTING PARTS CATALOGUE
	Soft nylon										
	3/8										
	1/2										
Unions	1/8	●	●	●	●	●			●	●	
	1/4										
	3/8										
	1/2										
Nylon	1/8		●	●	●						SEE FITTING PARTS CATALOGUE
	Soft nylon										
	3/8										
	1/2										
Soft copper (C1220T-0)	1/2										
	3/4										
	1										
	1 1/2										

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)						With seal	Electroless nickel plated	SEE IN BEST PNEUMATIC CATALOGUE
	ø3.2	ø4	ø6	ø8	ø10	ø12			
Nylon Soft nylon Polyurethane	M5	●	●					●	SEE IN BEST PNEUMATIC CATALOGUE
	1/8	●	●	●	●			●	
	1/4	●	●	●	●	●		●	
	3/8			●	●	●		●	
	1/2					●		●	
Unions	●	●	●	●	●			●	
Nylon Soft nylon Polyurethane	M5	●	●						SEE IN BEST PNEUMATIC CATALOGUE
	1/8		●	●	●	●			
	1/4			●	●	●			
	1/2					●	●		
Nylon Soft nylon Polyurethane	1/8								SEE IN BEST PNEUMATIC CATALOGUE
	1/4								
	3/8								
	1/2								
Nylon Soft nylon Polyurethane	1/8								SEE IN BEST PNEUMATIC CATALOGUE
	1/4								
	3/8								
	1/2								
	3/4								
Nylon Soft nylon Polyurethane	1/8								SEE IN BEST PNEUMATIC CATALOGUE
	1/4								
	3/8								
	1/2								
Nylon Soft nylon Polyurethane	6 tubes		●	●					SEE IN BEST PNEUMATIC CATALOGUE
	12 tubes		●	●					
Nylon Soft nylon Polyurethane	10 tubes	●	●	●	●			●	SEE IN BEST PNEUMATIC CATALOGUE
	20 tubes	●	●	●	●			●	
Nylon Soft nylon Polyurethane			●	●	●	●		●	SEE IN BEST PNEUMATIC CATALOGUE

Fitting Series for Special Environments

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 FITTING MANUFACTURER
	1/4		•	•	•	•			
	3/8		•	•	•	•			
	1/2				•	•			
	Unions		•	•	•	•			
FR Soft nylon FR Double layer	1/4		•						SEE FITTING MANUFACTURER
	3/8			•					
	ø10			•					
ø12				•					SEE FITTING MANUFACTURER
					•				
Nylon Soft nylon Polyurethane	M5	•	•						SEE FITTING MANUFACTURER
	1/8	•	•	•	•				
	1/4	•	•	•	•	•			
	3/8	•	•	•	•	•			
	1/2			•	•	•			
Unions	•	•	•	•	•	•			
Nylon Soft nylon Polyurethane Polyolefin FEP PFA	M5	•	•						SEE FITTING MANUFACTURER
	1/8	•	•	•	•				
	1/4	•	•	•	•				
	3/8			•	•	•			
	1/2				•	•			
Unions	•	•	•	•	•	•			
Soft nylon Polyurethane	M5	•	•						SEE FITTING MANUFACTURER
	M6	•	•						
	1/8	•	•	•	•				
	1/4	•	•	•	•				
	3/8			•	•	•			
1/2				•	•				
Unions	•	•	•	•	•	•			
Nylon Soft nylon Polyurethane	M5	•	•						SEE FITTING MANUFACTURER
		•	•						

Clean Series Fittings

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 FITTING MANUFACTURER
	1/4	•	•	•	•				
	3/8			•	•				
	1/2				•	•			
	Unions	•	•	•	•	•	•		
Polyurethane: Serie 10-	1/8	•	•						SEE FITTING MANUFACTURER
	1/4	•	•	•	•				
	3/8			•	•				
	1/2				•	•			
	Unions	•	•	•	•	•	•		

Tubing

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	•	•	•	•	•	•	•	•	•	•	•	•	•	•
White	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Red	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Blue	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Yellow	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Green	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Black	•	•	•	•	•	•	•	•	•	•	•	•	•	•
White	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Red	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Blue	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Yellow	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Green	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Clear	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Orange	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Black	•	•	•	•	•	•	•	•	•	•	•	•	•	•
White	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Red	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Blue	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Yellow	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Green	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Translucent	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Yellow brown	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Black	•	•	•	•	•	•	•	•	•	•	•	•	•	•
White	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Blue	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Translucent	•	•	•	•	•	•	•	•	•	•	•	•	•	•
1 core	•	•	•	•	•	•	•	•	•	•	•	•	•	•
2 cores	•	•	•	•	•	•	•	•	•	•	•	•	•	•
3 cores	•	•	•	•	•	•	•	•	•	•	•	•	•	•
2 cores	•	•	•	•	•	•	•	•	•	•	•	•	•	•
3 cores	•	•	•	•	•	•	•	•	•	•	•	•	•	•

Tube & Fittings



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	ø8 (ø 5/16")	ø10	ø12	ø16	ø 1/8" (ø 3.2)	ø 3/16"	ø 1/4"	ø 3/8"	ø 1/2"
	•	•	•	•	•			•		•	
		•	•								
			•	•							
				•	•						
Orange		•									
Yellow			•								
Blue				•							
Green					•						

Rotary Joint

Low Torque Metal Seal  
Type Rotary Joint  
**Series MQR**



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

Blow Gun

Blow Gun  
**Series VMG**



Pressure loss is less than 1%.

Nozzles

Nozzles for Blowing  
**Series KN**



Nozzle system for air blowing  
and back pressure sensing.

Tube & Fittings


Speed Controller with One-touch Fittings	Image	Model	Port size in the cylinder side	Applicable tubing O.D.		Applicable cylinder bore size (mm)	SEE IN BEST PNEUMATICS CATALOGUE												
				Metric size (mm)															
				Inch size (inch)															
Elbow type		AS12□1F	M3	2	3.2	4	6	8	10	12	1/8	5/32	3/16	1/4	5/16	3/8	1/2	ø2.5 to ø6	SEE IN BEST PNEUMATICS CATALOGUE
		AS12□1F	M5	2	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□1F	1/8, 1/4	2	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□1F	1/4, 3/8	2	3.2	4	6	8	10	12	1/8	5/32	3/16	1/4	5/16	3/8	1/2	ø40 to ø63	
Universal type		AS13□1F	M3	2	3.2	4	6	8	10	12	1/8	5/32	3/16	1/4	5/16	3/8	1/2	ø2.5 to ø6	SEE IN BEST PNEUMATICS CATALOGUE
		AS13□1F	M5	2	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□1F	1/8, 1/4	2	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□1F	1/4, 3/8	2	3.2	4	6	8	10	12	1/8	5/32	3/16	1/4	5/16	3/8	1/2	ø40 to ø63	
Elbow type (Metal body)		AS12□1	M5	2	3.2	4	6	8	10	12	1/8	5/32	3/16	1/4	5/16	3/8	1/2	ø6 to ø20	SEE IN BEST PNEUMATICS CATALOGUE
		AS22□1	1/8	2	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□1	1/4	2	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□1	3/8	2	3.2	4	6	8	10	12	1/8	5/32	3/16	1/4	5/16	3/8	1/2	ø40 to ø63	
In-line type		AS1001F		2	3.2	4	6	8	10	12	1/8	5/32	3/16	1/4	5/16	3/8	1/2	ø2.5 to ø20	SEE IN BEST PNEUMATICS CATALOGUE
		AS2001F		2	3.2	4	6	8	10	12	1/8	5/32	3/16	1/4	5/16	3/8	1/2	ø20 to ø32	
		AS2051F		2	3.2	4	6	8	10	12	1/8	5/32	3/16	1/4	5/16	3/8	1/2	ø20 to ø40	
		AS3001F		2	3.2	4	6	8	10	12	1/8	5/32	3/16	1/4	5/16	3/8	1/2	ø40 to ø63	
Dual speed controller		ASD230F	M5	2	3.2	4	6	8	10	12	1/8	5/32	3/16	1/4	5/16	3/8	1/2	ø6 to ø20	SEE IN BEST PNEUMATICS CATALOGUE
		ASD330F	1/8	2	3.2	4	6	8	10	12	1/8	5/32	3/16	1/4	5/16	3/8	1/2	ø20 to ø32	
		ASD430F	1/4	2	3.2	4	6	8	10	12	1/8	5/32	3/16	1/4	5/16	3/8	1/2	ø20 to ø40	
		ASD530F	1/4	2	3.2	4	6	8	10	12	1/8	5/32	3/16	1/4	5/16	3/8	1/2	ø20 to ø40	
		ASD530F	3/8	2	3.2	4	6	8	10	12	1/8	5/32	3/16	1/4	5/16	3/8	1/2	ø40 to ø63	
		ASD630F	1/2	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	

Speed Controller with Residual Pressure Release Valve	Image	Model	Port size in the cylinder side	Applicable tubing O.D.		Applicable cylinder bore size (mm)	SEE IN BEST PNEUMATICS CATALOGUE											
				Metric size (mm)														
				Inch size (inch)														
With One-touch fitting/Elbow		AS22□1FE	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	SEE IN BEST PNEUMATICS CATALOGUE
		AS22□1FE	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□1FE	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□1FE	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	
With One-touch fitting/Universal		AS23□1FE	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	SEE IN BEST PNEUMATICS CATALOGUE
		AS23□1FE	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□1FE	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□1FE	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	






Residual Pressure Exhaust Valve with One Touch Fitting  
**Series KE**



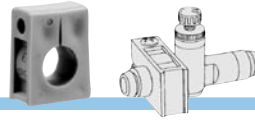
Model	Tubing O.D.
KE□06	6
KE□08	8
KE□10	10
KE□12	12

Check valve  
**Series AK**



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

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

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

Multiple Fitting Holder  
**Series TMA**



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

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

Meter-out control type

Model	Port size
ASS110	1/8
ASS310	1/4, 3/8


Meter-in control type

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

Lip



Model	Port size
AQ2000	1/8, 1/4
AQ3000	1/4, 3/8
AQ5000	1/2, 3/4


Diaphragm



Model	Applicable tubing
AQ240F-04	04
AQ240F-06	06
AQ340F-06	06


Built-in One-touch fittings

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


PFC valve



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

QFC valve

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

## 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 <sup>Note 3)</sup>	X47	X47						
Lubricant: Vaseline	X12	X12	X12				X12	
No lubrication	X57	X57	X57				X57	
Packing: Fluororesin coating <sup>Note 4)</sup>	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 <sup>Note 4)</sup>		<sup>Note 5)</sup> 10-	10-					

## Piping Equipment **Made to Order Products**

 Standardized  Made to order specification available.







											
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.




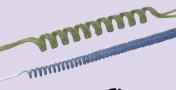

## Piping Equipment

# Made to Order Products










## Speed Controller with Fittings

Made to order specifications	 General	 Dual	 Low speed control	 Low speed control dual	 Stainless steel	 Stainless dual
	<b>AS•F</b>	<b>ASD•F</b>	<b>AS•FM</b>	<b>ASD•FM</b>	<b>AS•FG</b>	<b>ASD•FG</b>
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
	<b>TU</b>	<b>T</b>	<b>TS</b>	<b>TCU</b>	<b>TFU</b>
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**

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











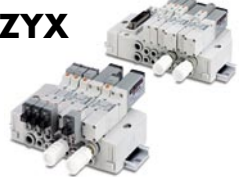

Tube & Fittings

	<b>Clean polyolefin</b>
	<b>TPH TPS</b>
	<b>Standardized</b>





## Vacuum Selection

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




## Vacuum Ejector

Series	
<b>ZU</b> 	<b>In-line vacuum ejector</b> <ul style="list-style-type: none"> <li>• Nozzle diameter: <math>\varnothing 0.5</math>, <math>\varnothing 0.7</math></li> <li>• Vacuum port and supply port are located in-line to facilitate piping</li> <li>• Built-in One-touch fitting (Copper free)</li> </ul> 
<b>ZH</b> 	<b>Vacuum ejector</b> <ul style="list-style-type: none"> <li>• Nozzle diameter: <math>\varnothing 0.5</math>, <math>\varnothing 0.7</math>, <math>\varnothing 1.0</math>, <math>\varnothing 1.3</math>, <math>\varnothing 1.5</math>, <math>\varnothing 1.8</math>, <math>\varnothing 2.0</math></li> <li>• Composite resin nozzle and body</li> <li>• Available in 2 types: box type and direct piping type</li> </ul> 
<b>EZM</b> 	<b>Vacuum ejector</b> <ul style="list-style-type: none"> <li>• Valve and switch are unitized</li> <li>• Adaptable for manifold applications</li> <li>• Maximum suction flow rate increased 40%</li> <li>• Max. vacuum pressure <math>-84</math> kPa <math>\{-630</math> mmHg}</li> </ul> 
<b>ZMA</b> 	<b>Vacuum ejector with solid state timer</b> <ul style="list-style-type: none"> <li>• Incorporates solid state timer function for release valve control (timer setting with PLC is unnecessary)</li> <li>• Allows sharing of switch/valve power supply, and single line for suction signal (valve wiring is unnecessary)</li> <li>• Timer can be easily adjusted without programming</li> </ul> 
<b>ZL</b> 	<b>Multistage ejector</b> <ul style="list-style-type: none"> <li>• Suction flow rate increased by a 3 stage diffuser construction</li> <li>• Functions such as a digital vacuum switch or a vacuum pressure gauge can be selected</li> </ul> 
<b>ZYY/ZYX</b> 	<b>Ejector valve unit</b> <ul style="list-style-type: none"> <li>• Ejector valve unit suitable for vacuum adsorption systems</li> <li>• A combination of solenoid valve for cylinder drive, etc + vacuum ejector</li> </ul> 





## Vacuum Module

Series	
<b>ZX</b> 	<b>Vacuum module</b> <ul style="list-style-type: none"> <li>• Optimal for electronic parts or small precision parts weighing up to 100 g</li> <li>• Supports the ejector system and the vacuum pump system</li> <li>• Modular design</li> <li>• Adaptable for manifold applications</li> </ul> 
<b>ZR</b> 	<b>Large size vacuum module</b> <ul style="list-style-type: none"> <li>• Necessary functions can be combined through modular design</li> <li>• Adaptable for manifold applications</li> <li>• Functions such as a digital vacuum switch or a solenoid valve can be selected</li> <li>• Supports the ejector system and the vacuum pump system</li> <li>• Double solenoids provide a self-holding function</li> </ul> 


## Air Suction Filter

Series		
<b>ZFA</b>		<p><b>Air suction filter</b></p> <ul style="list-style-type: none"> <li>Prevents problems related to vacuum circuits or airborne contaminants</li> <li>Provides a large filter element surface</li> </ul> <p>SEE IN BEST PNEUMATICS CATALOGUE</p>
<b>ZFB</b>		<p><b>Air suction filter with one-touch fittings</b></p> <ul style="list-style-type: none"> <li>Prevents problems related to vacuum circuits or airborne contaminants</li> <li>Piping tube can be connected and disconnected with one touch</li> </ul> <p>SEE IN BEST PNEUMATICS CATALOGUE</p>
<b>ZFC</b>		<p><b>Air suction filter in-line type with one-touch fittings</b></p> <ul style="list-style-type: none"> <li>IN/OUT straight piping</li> <li>One-touch fittings for easy installation and removal</li> <li>Lightweight molded resin parts</li> <li>Cartridge type element replacement</li> </ul> <p>SEE IN BEST PNEUMATICS CATALOGUE</p>



## Vacuum Pad

Series		
<b>ZP</b>		<p><b>Vacuum pad</b></p> <ul style="list-style-type: none"> <li>A variety of models accommodate a wide range of applications</li> <li>Pad type: Flat, Flat with ribs, Deep, Bellows</li> <li>Pad diameter: ø2 to ø125, Made to Order = ø150 to ø250</li> </ul> <p>SEE IN BEST PNEUMATICS CATALOGUE</p>
<b>ZPT/ZPX</b>		<p><b>Vacuum pad: Large/Heavy duty type</b></p> <ul style="list-style-type: none"> <li>Ideal for heavy weight material or objects with a large surface area</li> <li>Example: CRT, Car body</li> <li>Pad diameter: ø40, ø50, ø63, ø80, ø100, ø125</li> </ul> <p>SEE IN BEST PNEUMATICS CATALOGUE</p>
<b>ZPT/ZPX</b>		<p><b>Vacuum pad: Large size bellows type</b></p> <ul style="list-style-type: none"> <li>Ideal for loads with a curved surface, heavy weight loads and loads with large surface area</li> <li>Pad diameter: ø40, ø50, ø63, ø80, ø100, ø125</li> </ul> <p>SEE IN BEST PNEUMATICS CATALOGUE</p>
<b>ZPT/ZPR</b>		<p><b>Vacuum pad: Ball joint type</b></p> <ul style="list-style-type: none"> <li>Ball joint type ideal for use on slanted work surface</li> <li>Pad diameter: ø10, ø13, ø16, ø20, ø25, ø32, ø40, ø50</li> </ul> <p>SEE IN BEST PNEUMATICS CATALOGUE</p>





## Free Mount Cylinder for Vacuum

Series		
<b>ZCUK</b>		<p><b>Vacuum Compact Cylinder</b></p> <ul style="list-style-type: none"> <li>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.</li> <li>Standard vacuum pads (ø2 to ø50) can be mounted</li> </ul> <p>SEE IN BEST PNEUMATICS CATALOGUE</p>













## Drain Separator for vacuum

Series		
<b>AMJ</b>		<p>Drain separator for vacuum</p> <ul style="list-style-type: none"> <li>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.</li> </ul>
		









## Vacuum System Peripherals and Related Products

Series		
<b>IRV</b>		<p>Vacuum Regulator</p> <ul style="list-style-type: none"> <li>Direct operated vacuum pressure adjustment valve that regulates the vacuum pressure.</li> </ul>
		
<b>ITV2090</b>		<p>Electro-pneumatic Regulator</p> <ul style="list-style-type: none"> <li>Controls the vacuum pressure in accordance with external electric signals.</li> </ul>
		





### Digital Pressure Switches (Self-Contained Type)

Series	Fluid	Set pressure range	Output	Note
<b>ZSE/ISE30</b> 	General pneumatic	-101 to 101 kPa -0.1 to 1 MPa	NPN/PNP open collector 1-5 V, 4-20 mA Analogue output	<ul style="list-style-type: none"> <li>Port size: 1/8, ø4, ø6</li> <li>Enclosure: IP40</li> </ul> 
<b>ZSE/ISE40</b> 	General pneumatic	-100 to 100 kPa 10 to -101.3 kPa -0.1 to 1 MPa	NPN/PNP open collector Analogue output	<ul style="list-style-type: none"> <li>Port size: M5, 1/8, ø4, ø6</li> <li>Enclosure: IP65</li> </ul> 
<b>ZSE50F ISE50</b> 	General fluids	-100 to 100 kPa -0.1 to 1 MPa	NPN/PNP open collector Analogue output	<ul style="list-style-type: none"> <li>Port size: M5, 1/4</li> <li>Enclosure: IP65</li> </ul> 
<b>ZSE60F ISE60</b> 	General fluids	-100 to 100 kPa -0.1 to 1 MPa	NPN/PNP open collector Analogue output	<ul style="list-style-type: none"> <li>Port size: URJ 1/4, TSJ 1/4</li> <li>Enclosure: IP65</li> </ul> 
<b>ISE70</b> 	General pneumatic	0 to 1 MPa	1 setup NPN/PNP open collector PNP open collector	<ul style="list-style-type: none"> <li>Port size: 1/4</li> <li>Enclosure: IP67</li> </ul> 
<b>ISE75/75H</b> 	General fluids	0.4 to 10 MPa 0.5 to 15 MPa	1 setup NPN/PNP open collector PNP open collector	<ul style="list-style-type: none"> <li>Port size: 1/4</li> <li>Enclosure: IP67</li> </ul> 





### Digital Pressure Switches (Separate Type)

Series	Fluid	Set pressure range	Output	Note
<b>PSE530</b> 	Pressure sensor	General pneumatic	0 to 1 MPa 0 to -101 kPa 0 to 101 kPa -101 to 101 kPa	<ul style="list-style-type: none"> <li>Port size: M5</li> <li>Enclosure: IP40</li> </ul> 
<b>PSE540</b> 	Compact pressure sensor	General pneumatic	0 to 1 MPa 0 to -101 kPa -100 to 100 kPa	<ul style="list-style-type: none"> <li>Port size: M3, M5, 1/8, <math>\varnothing 4</math>, <math>\varnothing 6</math></li> <li>Enclosure: IP40</li> </ul> 
<b>PSE560</b> 	Pressure sensor for general fluids	General fluids	0 to 1 MPa 0 to -101 kPa -100 to 100 kPa 0 to 500 kPa	<ul style="list-style-type: none"> <li>Port size: M5, 1/8, 1/4</li> <li>Enclosure: IP65</li> </ul> 
<b>PSE550</b> 	Low differential pressure sensor	General pneumatic	-50 to 50 kPa (can detect differential pressure from 0 to 2 kPa)	<ul style="list-style-type: none"> <li>Port size: <math>\varnothing 4</math></li> <li>Enclosure: IP40</li> </ul> 





### Controllers

Series	Sensor input amount	Set pressure range	Output	Note
<b>PSE300</b> 	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	<ul style="list-style-type: none"> <li>Red/Green dual colour LCD display</li> <li>Enclosure: Font only IP65, the rest IP40</li> </ul> 
<b>PSE200</b> 	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	<ul style="list-style-type: none"> <li>Monitor up to 4 individual sensors</li> <li>Enclosure: IP40</li> </ul> 







### Electronic Pressure Switches (Trimmer calibration)



Series	Fluid	Set pressure range	Output	Note
<b>PS1000</b> <b>PS1100</b> 	Simple electronic pressure switch			
	General pneumatic	-0.1 to 0.45 MPa -0.1 to 0.4 MPa	2-wire type	<ul style="list-style-type: none"> <li>Port size: <math>\varnothing 6</math></li> <li>Enclosure: IP40</li> </ul> 
<b>ISA2</b> 	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	<ul style="list-style-type: none"> <li>Port size: 1/8</li> <li>Enclosure: IP66</li> </ul> 

### Mechanical Pressure Switches

Series	Fluid	Set pressure range	Contacts (Voltage)	Note
<b>IS1000</b> 	Mechanical style pressure switch			
	General pneumatic	0.1 to 0.6 MPa	1a (to 100 VDC to 100 VAC)	<ul style="list-style-type: none"> <li>Port size: 1/8</li> </ul> 
<b>IS3000</b> 	Pneumatic pressure switch			
	General pneumatic	0.1 to 0.7 MPa	1ab (24 to 125 VDC to 100 to 250 VAC)	<ul style="list-style-type: none"> <li>Port size: 1/4</li> </ul> 

### Digital Flow Switches

Series	Fluid	Flow rate range	Output	Note
<b>PF2A</b> 	Digital flow switch for air			
	General pneumatic	1 to 12000 l/min	NPN/PNP open collector 3 outputs	<ul style="list-style-type: none"> <li>Port size: 1/8, 1/4, 3/8, 1/2, 1, 1 1/2, 2</li> <li>Enclosure: IP65</li> </ul> 
<b>PF2W</b> 	Digital flow switch for water			
	Water	0.5 to 100 l/min	NPN/PNP open collector 3 outputs	<ul style="list-style-type: none"> <li>Port size: 3/8, 1/2, 3/4, 1</li> <li>High temperature fluid (water 90°C)</li> <li>Enclosure: IP65</li> </ul> 
<b>PF2D</b> 	Digital flow switch for deionized water and chemicals			
	Deionized water and chemicals	0.4 to 40 l/min	NPN/PNP open collector 4 outputs	<ul style="list-style-type: none"> <li>Body and sensor: New PFA</li> <li>Tube: Super PFA.</li> <li>Port size: 3/8, 1/2, 3/4 inch tube.</li> <li>Enclosure: IP65</li> </ul> 

	<b>IP8000/8100</b> ■ Electro-Pneumatic Positioner			
	<ul style="list-style-type: none"> <li>Electro-pneumatic positioner for process valves or other equipment.</li> <li>Lever arm and rotary shaft versions.</li> </ul> 			



# 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

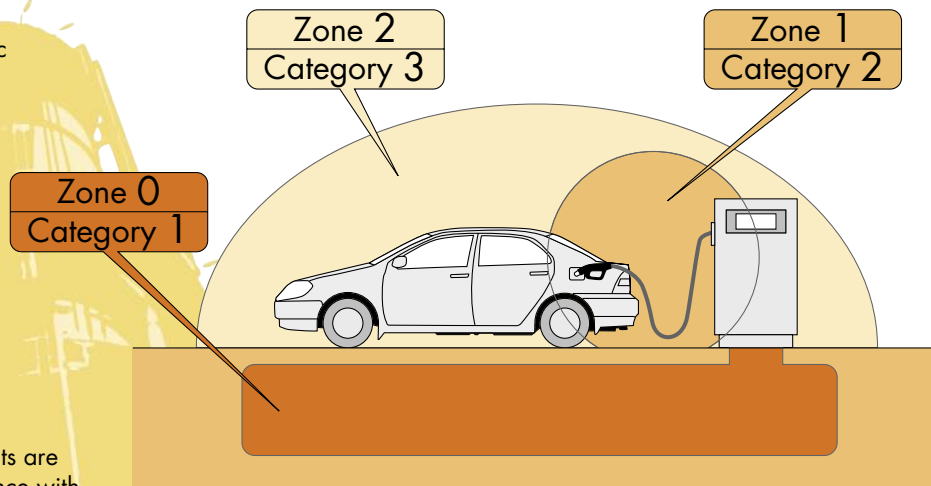
Potentially explosive atmospheres are atmospheres likely to become explosive due to local and operational conditions. The ATEX directive regards explosive atmospheres which are defined as mixtures with air, under atmospheric conditions, of flammable substances in the form of gases, vapours, mists or 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"

  II 3 G / D

 ATEX compliance

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

\*G=Gas D=Dust

EEx nA II T6 X


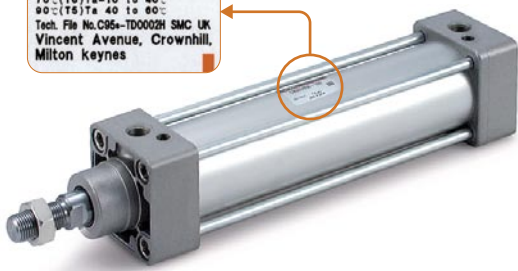
VQCxxx  
HO  
Tamb =-10°C to +50°C  
IP65  
T 80°C

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

	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
<b>Types of Protection</b>			
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	

↑ Max. Surface temperature

T1 450°C  
T2 300°C  
T3 200°C  
T4 135°C  
T5 100°C  
T6 85°C


 

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

## ■ SMC product information

	Product	Series	Category
Others	Hand valve	VH200/201/400/401	Out of scope <sup>1)</sup>
	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!**



- 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

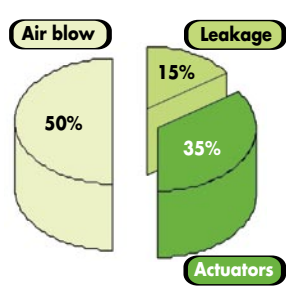


As world leaders in **Pneumatics**, we have developed an energy saving programme which recognises the key areas in many factories where energy loss can be saved.

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

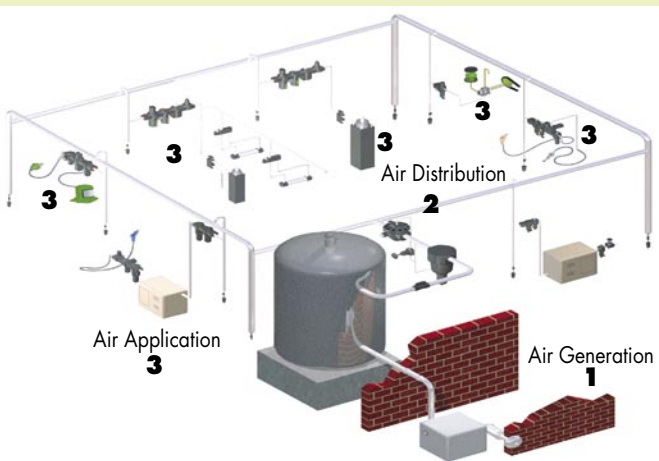


### In terms of energy savings for compressed air, there are three big areas:

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

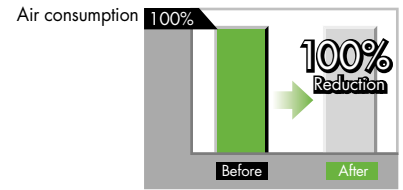
**2. Air Distribution.** Piping, fittings, valves, FRL units,...

**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!

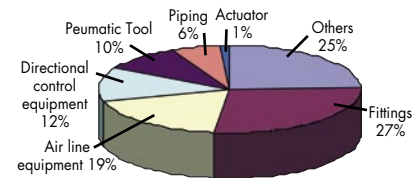
Hole Diameter	Air Leakage (dm <sup>3</sup> /min (ANR))	Annual Loss (€/year)
0.5	13	44.5
2	204	682
5	1275	4256

Line pressure: 5 Bar Working hours: 2500 Hrs/year  
Compressed Air unit Cost: 0.022 €/m<sup>3</sup>

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.

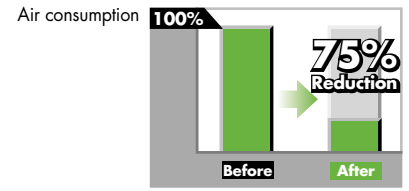


- Stop air consumption during non operational times – install a 3/2 or 2/2 port solenoid valve to cut off the compressed air supply when it is not needed.



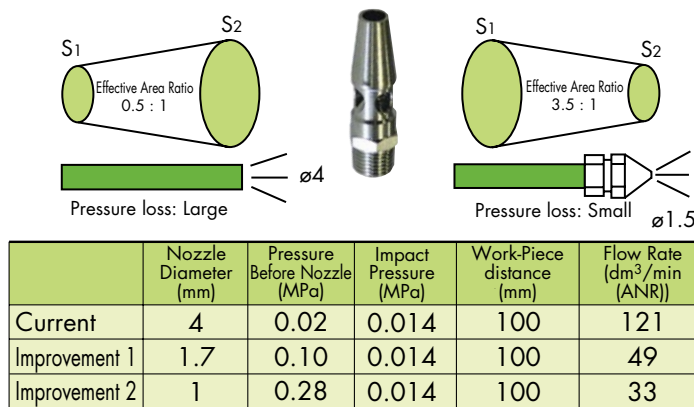
- Accurately estimate the correct air pressure for the system – over pressurisation will result in more compressed air leakage and higher energy costs.

# 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.

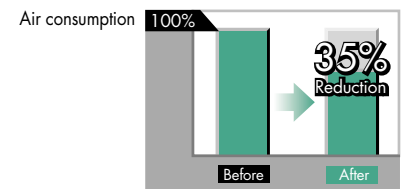
An “open blow” system where the air is blown through the air outlet without the use of end fittings (nozzles) is now recognised as one of the biggest consumers of compressed air.



## 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 cylinders 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.

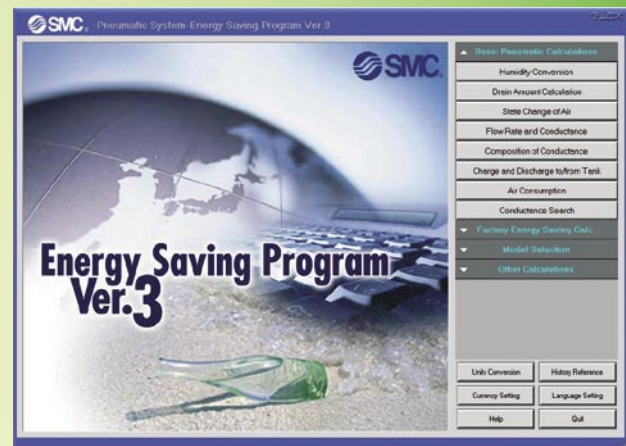
## ENERGY SAVING QUICK &amp; EASY

- **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 PROGRAMME 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

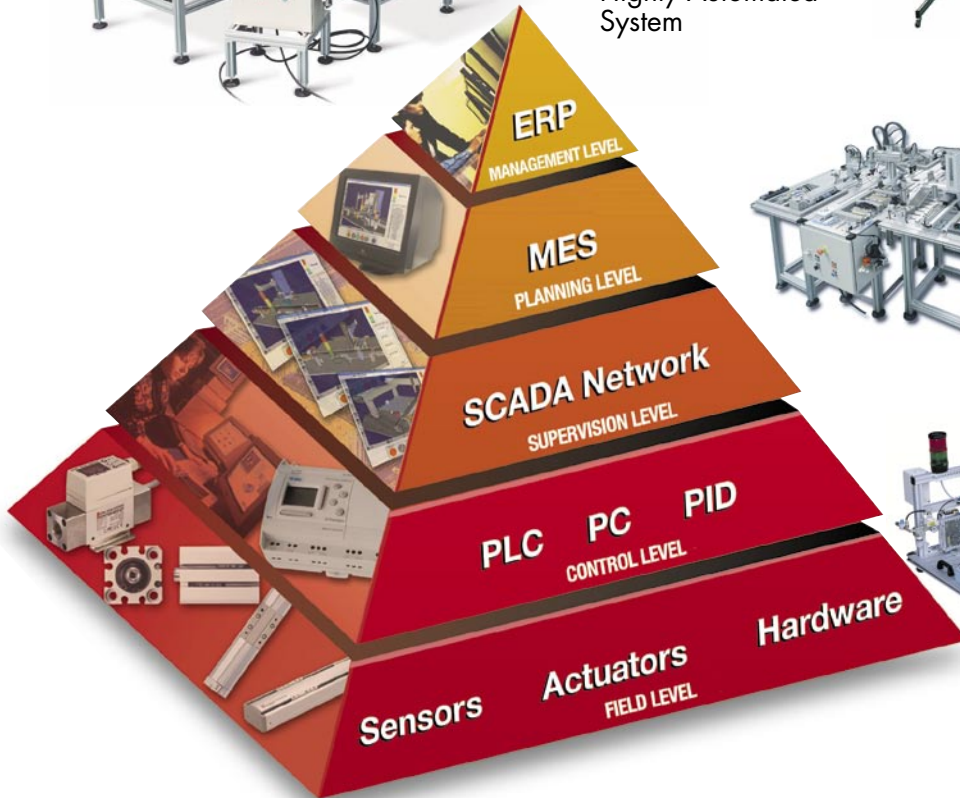
Integral SOLUTIONS for the development of the professional skills required by Industry.



HAS-200  
Highly Automated System



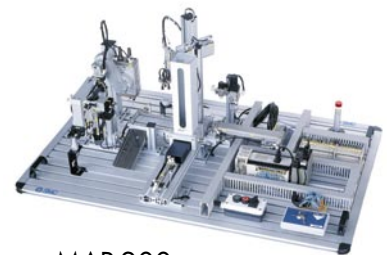
FMS-200  
Flexible Manufacturing System



MAS-200  
Modular Assembling System



IPC-200  
Industrial Process Control



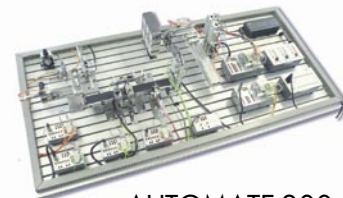
MAP-200  
Manipulation Systems



PNEUMATE-200  
Your mate in Pneumatics!



PNEUTRAINER-200  
Pneumatics/ Electro-pneumatics



AUTOMATE-200  
Your mate in automation!

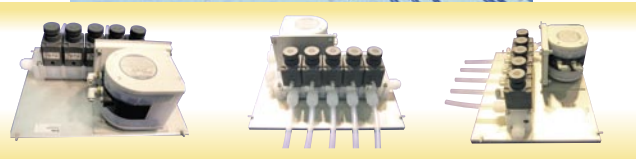
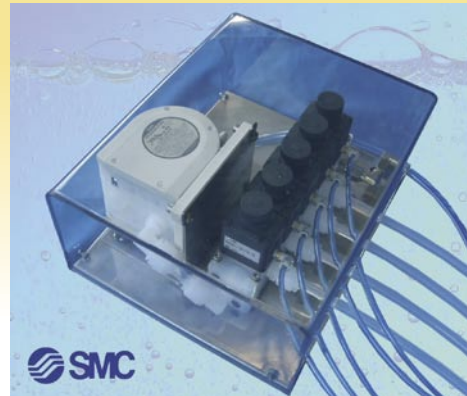
SMC International Training emerges from the heart of SMC as a clear commitment to offer Training adapted to the needs of industry; training focused on the development of the professional skills required for the most diverse sectors (Automotive, Pharmaceutical, Semiconductors, Food processing, etc.).

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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## Customised or Special Solutions

- 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.
- From small alterations to products in our standard range – “simple specials”- to full blown customised – “one off” – solutions, we have the ability, skills and people to meet even the most challenging of applications.
- We are therefore firmly committed to developing new products to satisfy our both our European and Global customers.



## Innovation Vehicle

- Recognising that innovation and the latest developments in component technology are the life blood to busy engineers who cannot always visit exhibitions, we are please to announce the launch of our own innovative solution.
- Now our customers need only leave their offices for a few minutes to see real life applications, using our latest new products, by visiting our impressive, custom made, Innovation Vehicle as it extensively tours throughout Europe.
- The vehicle which is 15 metres long and 4 metres high features 10 dynamic product display panels which combine our latest key European products.
- If you would like more information on the Innovation Vehicle's circular European route, please contact your local subsidiary for further details.



## Demonstration Cases and Minipanel

- If you would like to see some real examples of our specialist Food and Packaging components, all our European sales engineers have access to a comprehensive selection of demonstration cases and Japanese produced mini panels. These product demonstration tools can literally transform a small meeting room into a customised mini exhibition for you and your colleagues within a few minutes.
- If you interested in seeing more of our industry specific products, simply contact your local subsidiary to arrange your exclusive product presentation.









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