

Paddle Style Flow Switch

Series IF3

IF3 series flow switches detect and confirm liquid flow, generally used in fields such as air conditioning, water supply equipment, etc.

- Piping sizes ranges from 3/4B to 6B.
- Wide range of applicable fluids.
Wetted metal part materials: Copper alloy, Stainless steel
- Various enclosures (No water protected).
Open type, Dripproof/Rainproof, Splashproof /Low jetproof type



How to Order

IF3 1 1 - N 10 - 1 1

● Paddle style flow switch

● Enclosure

0	Open type
1	Dripproof/Rainproof type (Equivalent to IP42)
2	Splashproof/Low jetproof type (Equivalent to IP44)

● ON-flow range

0	14 to 60 l/min
1	20 to 1500 l/min
3	36 to 2600 l/min

● Thread type

Nil	Rc
N	NPT

● Seal material of wetted parts

0	NBR
1	FPM

● Metal material for wetted parts

0	Brass, Phosphor bronze
1	Stainless steel 304

● Port size

06	3/4
10	1

Note 1) IF3□0 is available for "06".
Note 2) IF3□1 and IF3□3 are available for "10".

Specifications

Fluid	Copper alloy	Water/Non corrosive liquid
	Stainless steel 304	Liquid, which do not corrode stainless steel 304.
Max. pressure	1 MPa	
Water resistance	1.75 MPa	
Insulation resistance	100 MΩ (500 DC by megameter)	
Withstand voltage	1500 VAC for one min.	
Contact	1ab	
Port size	3/4, 1	

Micro Switch Ratings

Voltage	Non inductive load (A)				Inductive load (A)			
	Load resistance		Light load		Inductive load		Motor load	
	N.C.	N.O.	N.C.	N.O.	N.C.	N.O.	N.C.	N.O.
125 VAC	15	15	4	2	10	10	4	2
250 VAC	15	15	3	1.5	10	10	3	1.5
8 VDC	15	15	3	1.5	15	15	5	2.5
14 VDC	15	15	3	1.5	10	10	5	2.5
30 VDC	6	6	3	1.5	5	5	5	2.5
125 VDC	0.5	0.5	0.3	0.3	0.05	0.05	0.05	0.05
250 VDC	0.25	0.25	0.2	0.2	0.03	0.03	0.03	0.03

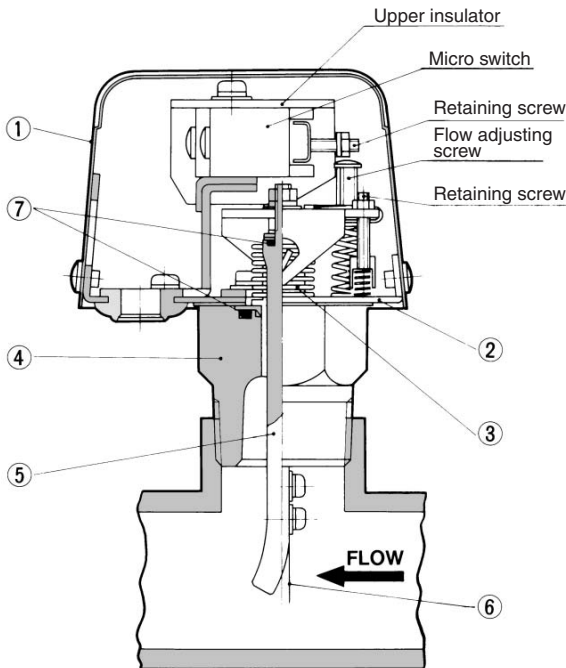
Fluid and Ambient Temperature Range

Fluid temperature	Applicable ambient temperature ^(Note)
70°C or less	70°C (70°C) or less
80°C	58°C (60°C) or less
90°C	47°C (50°C) or less
100°C	35°C (40°C) or less

Note) () For IF32□

* To protect the microswitch, ambient temperature must be lowered when the fluid temperature exceeds 70°C.

Construction



Component Parts

No.	Description	Material		
		IF30□	IF31□	IF32□
①	Cover	SPCD	SPCD	12 ADC
②	Mounting plate	SPCC	Stainless steel 304	Stainless steel 304
③	Bellows	PBP or Stainless steel 304		
④	Body	C3604B or Stainless steel 304		
⑤	Mobile bar	C2700W or Stainless steel XM7		
⑥	Paddle	Stainless steel 304		
⑦	O-ring	NBR or FPM		

Enclosure

Open type	Using indoors away from water drop.
Dripproof/Rainproof type (JIS C 0920)	When using indoors or outdoors, where it is exposed to water drop. (Equivalent to IP42)
Splashproof/Low jetproof type (JIS C 0920)	Sealed construction. When using in a bad environment, such as outdoors, or areas exposed to water stream temporarily, or near the coast. (Equivalent to IP44)

Flow Characteristics

Fluid: Water, Outlet pressure: 0 MPa
Sealing thread depth: 9 mm (3/4), 11 mm (1)

Flow switch	Mounting		Flow range (l/min)				ON-flow rate/setting (m/s)
			Minimum		Maximum		
	Port size	Paddle size	ON flow	OFF flow (min)	ON flow	OFF flow (min)	
IF3□0-06	3/4	Long	14	7	38	33	0.66 to 1.79
	3/4	Middle	18	9	50	44	0.85 to 2.36
	3/4	Short	22	11	60	53	1.04 to 2.83
IF3□1-10	1	Short	20	10	60	55	0.56 to 1.67
	1 1/4	Short	34	17	100	90	0.57 to 1.67
	1 1/2	Short	52	26	160	140	0.63 to 1.95
	2	Middle	45	23	140	125	0.34 to 1.06
	2 1/2	Middle	90	45	280	250	0.41 to 1.29
	3	Middle	80	40	250	220	0.26 to 0.81
	4	Long	170	85	550	480	0.33 to 1.05
	5	Long	300	150	1,000	870	0.37 to 1.24
	6	Long	460	230	1,500	1,300	0.40 to 1.32
IF3□3-10	1	Short	36	18	110	100	1.00 to 3.05
	1 1/4	Short	54	27	160	140	0.90 to 2.67
	1 1/2	Short	90	45	270	230	1.10 to 3.29
	2	Middle	90	45	270	230	0.68 to 2.05
	2 1/2	Middle	160	80	500	420	0.74 to 2.30
	3	Long	160	80	500	420	0.52 to 1.63
	4	Long	320	160	1,000	800	0.61 to 1.91
	5	Long	560	280	1,800	1,450	0.69 to 2.23
	6	Long	800	400	2,600	2,000	0.70 to 2.28

ON-flow: Flow volume under which a microswitch starts activation while flow is increasing.

OFF-flow: Flow volume under which a microswitch starts activation while flow is decreasing.

- The maximum flow is twice the maximum ON-flow.
- Operating flow volume varies depending on sealing depth and direction, etc. Data shows the reference value.

ZSE□
ISE□

PSE

ZSE3

PS

ZSE1
ISE2

ZSP

ISA2

IS□

ZSM

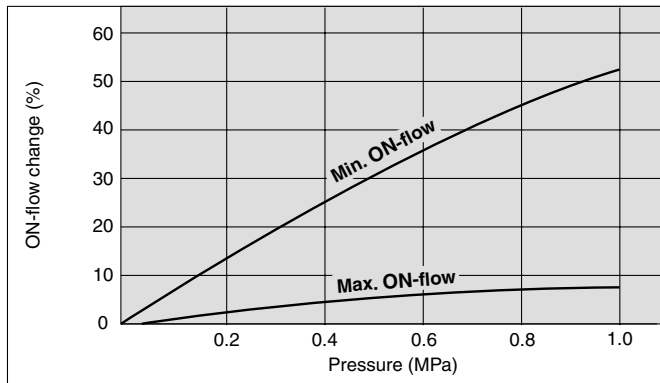
PF2□

IF□

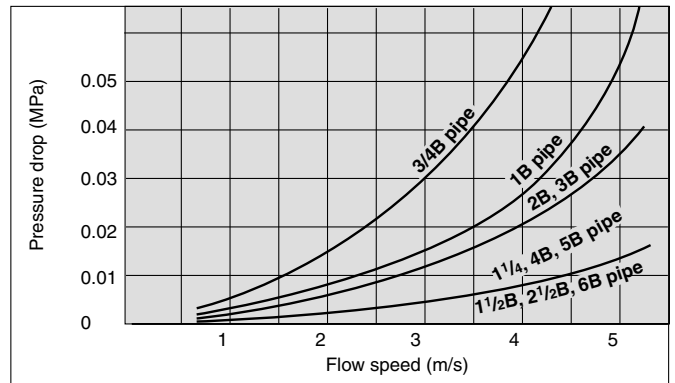
Data

Series IF3

ON-flow Change due to Pressure



Pressure Drop Curve



⚠ Precautions

Be sure to read before handling. Refer to pages 16-14-3 to 16-14-4 for Safety Instructions and Common Precautions on the products mentioned in this catalog, and refer to pages 16-1-11 to 16-1-13 for Precautions on every series.

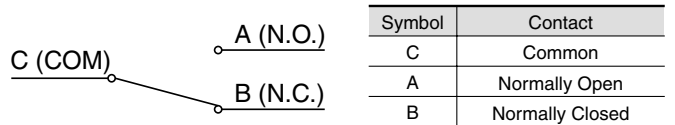
Mounting & Wiring

⚠ Caution

- Mount the switch on top of horizontal pipe so that fluid flow is in the direction of the arrow. Sealing depth should be 9 mm ± 1 mm for 3/4B and 11 mm ± 1.2 mm for 1B.
- Mounting orientation is only allowed to install it perpendicularly to the horizontal pipe.
- Provide a straight pipe portion that corresponds to approximately 5 times the bore of the pipe before and after the area of the pipe on which the product is installed, thus keeping the product as far away as possible from the elements that disturb the flow, such as elbows or valves.
- Three types of paddles, short, medium, and long, are provided with each model. Use one of them according to the pipe size and the set flow rate.
- When installing a paddle on IF3*O type, piping may be interfered with by the tip of a paddle. Because this is used to detect a small flow rate, and to narrow the distance between a paddle and piping, additional machining of the paddle tip may be necessary to eliminate interference between the two.
- Use pipe fittings that comply with JIS specifications. For 3/4B to 3B, use commercially available union tees of different diameters. For 4B to 6B, use a 1B socket that has been cut in half and welded.
- When using piping which is non-standard, piping may interfere with the paddle. When this happens, please machine the paddle accordingly.
- It cannot be used when a water hammer or pulsation pressure is applied to the fluid.

- Wired the microswitch according to the symbols on the upper insulators. (They will be opposite the terminal symbols on the microswitch. The terminals are screw terminals.)
- Threads used for the terminals are M4 type.

Internal wiring diagram



Adjusting

⚠ Caution

- Flow adjustment is done by turning the flow adjusting screw with Phillips screwdriver. Turning clockwise can increase the set flow and turning counterclockwise can decrease the set flow.
- Flow rate % relation to the number of turns is shown in the table below. However, this is just a guide. For precise setting use a flow meter.

Flow adjusting screw (Rotations)	0	1	2	3	4	5	6	7	8	9	10	11	12
Contact ON-flow (%)	30	40	50	59	68	74	80	85	89	93	96	98	100

- The flow rate setting point is set at the ON-flow rate. Therefore, in case of 1a contact, ON signal is output when the fluid with higher flow than the setting flow rate is flown. In the case of the 1b contact, the OFF signal is output when the flow rate has decreased. Refer to the flow rate characteristics table for details on the operation flow rate.
- Do not touch the two types of stop screws that are indicated in the construction diagram.
- To prevent the chattering that is associated with the fluctuation of the operating flow rate, set the difference between the set flow rate and the operating flow rate so that it is as large as possible.
- Use at or below the maximum operating pressure and maximum flow rate.
- Spare parts
Short, medium, and long paddles are provided as a 3 piece set with each model, so arrange them as indicated below. There is no compatibility between the paddle for a 3/4B connecting bore and for a 1B because their installation pitches differ.
Arrangement example: Paddle set for IF300-06-00 (Part number are not existed.)

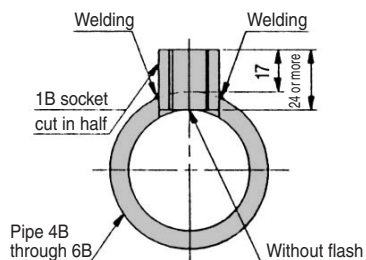
Applicable fittings

For pipe fitting 3/4B through 3B

For pipe fitting 4B through 6B

Piping B	Reducing tees B
1	1 x 1 x 1
1 1/4	1 1/4 x 1 1/4 x 1
1 1/2	1 1/2 x 1 1/2 x 1
2	2 x 2 x 1
2 1/2	2 1/2 x 2 1/2 x 1
3	3 x 3 x 1

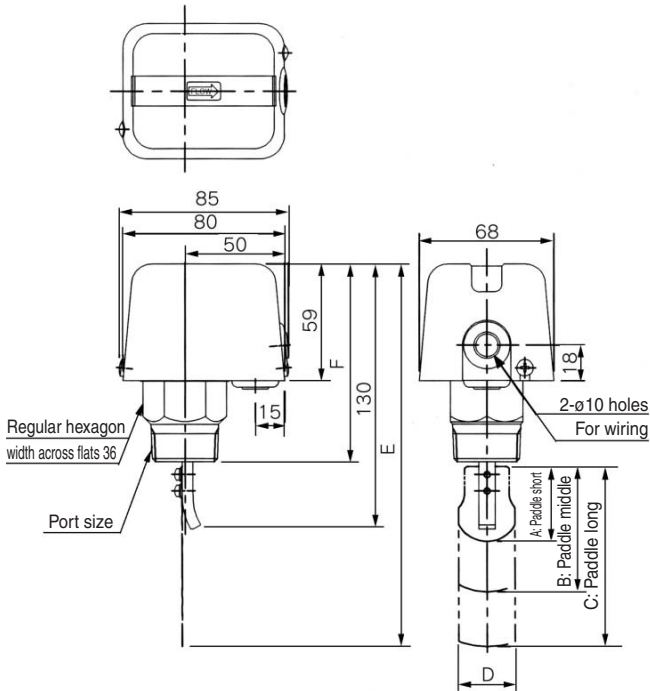
Reducing tees B: JIS B 2301
Socket : JIS B 2302
Pipe : JIS B 3452



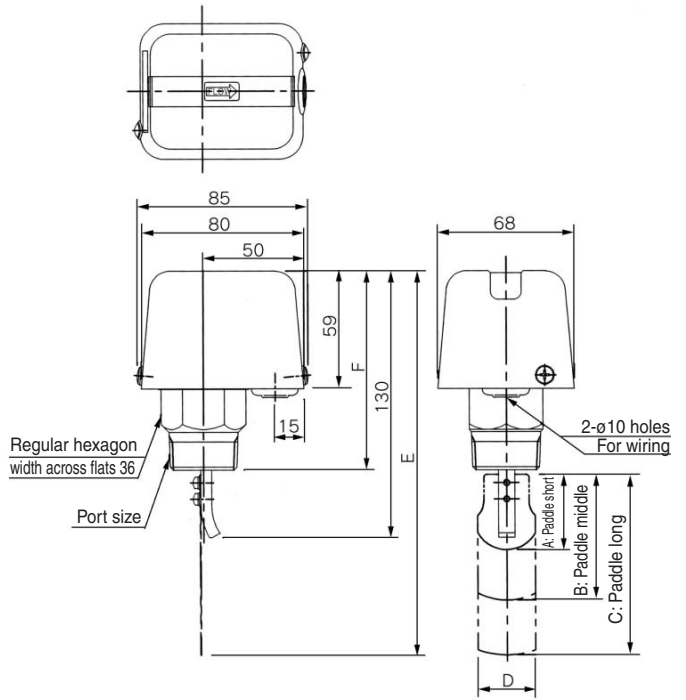
Dimensions

Standard type: 300/301/303

Dripproof/Rainproof type: 310/311/313

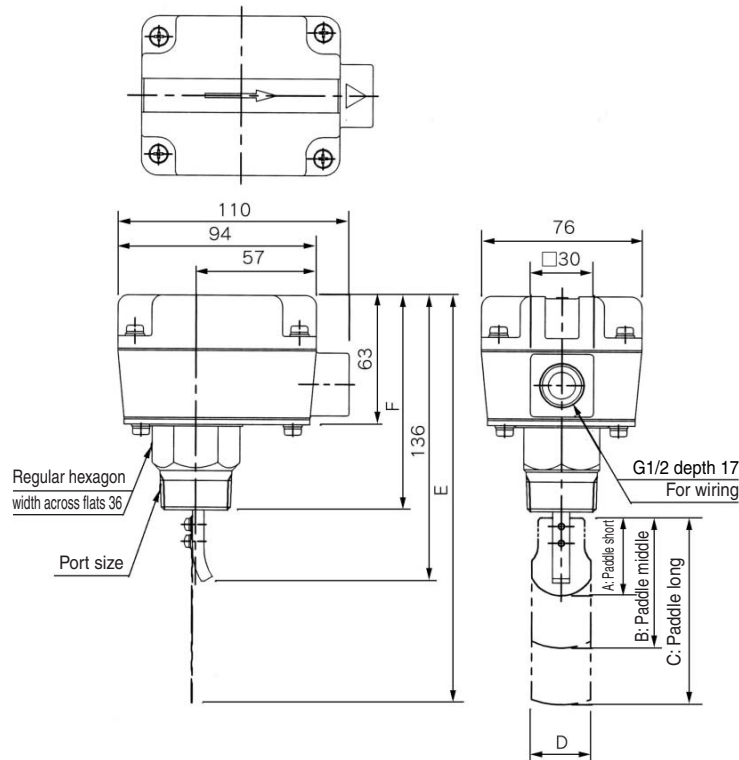


Part no.	Dimensions	Port size	A	B	C	D	E	F
IF300		3/4	28	31	34	22	137	101
IF301		1	37	62	89	28	188	98
IF303		1	29	39	56	28	155	98



Part no.	Dimensions	Port size	A	B	C	D	E	F
IF310		3/4	28	31	34	22	137	101
IF311		1	37	62	89	28	188	98
IF313		1	29	39	56	28	155	98

Splashproof/Low jetproof type: 320/321/323



Part no.	Dimensions	Port size	A	B	C	D	E	F
IF320		3/4	28	31	34	22	143	107
IF321		1	37	62	89	28	194	104
IF323		1	29	39	56	28	161	104

ZSE
ISE

PSE

ZSE3

PS

ZSE1

ZSP

ISA2

IS

ZSM

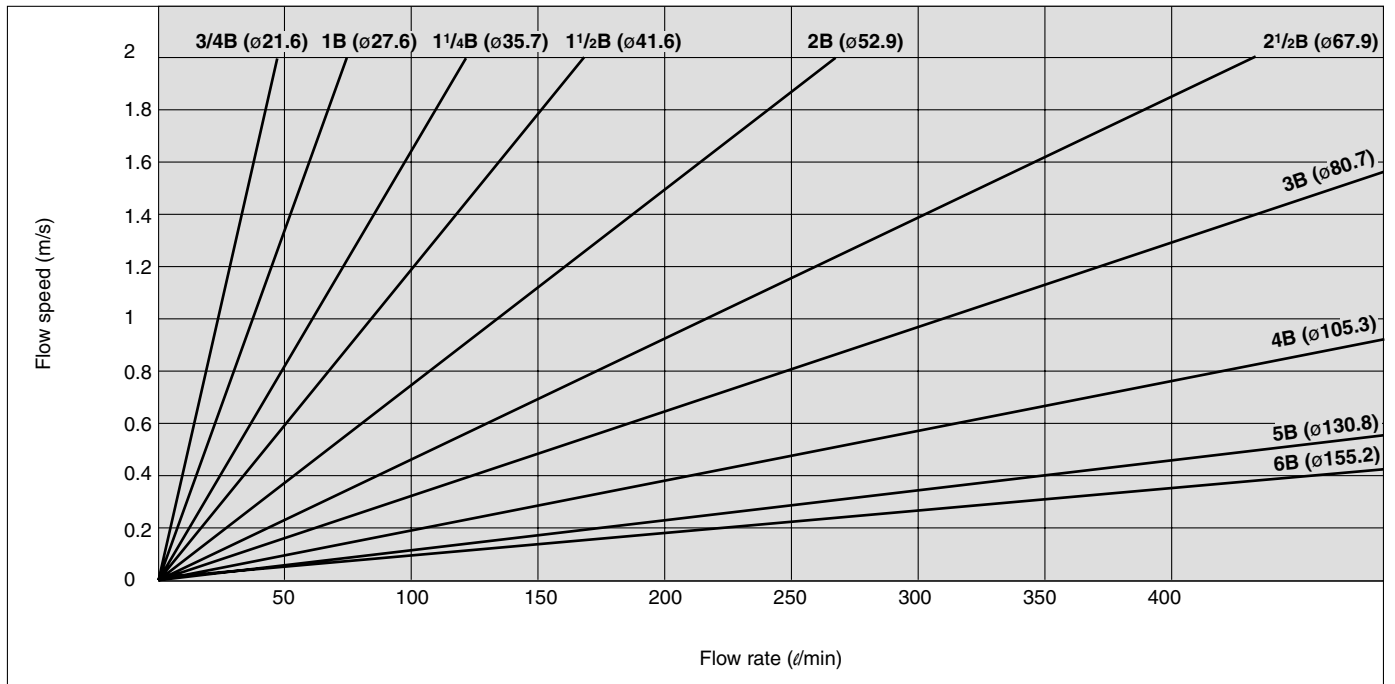
PF2

IF

Data

Series IF3

Flow Rate vs. Flow Speed





(): Gas pipe bore sizes




Safety Instructions

These safety instructions are intended to prevent a hazardous situation and/or equipment damage. These instructions indicate the level of potential hazard by labels of "Caution", "Warning" or "Danger". To ensure safety, be sure to observe ISO 4414 ^{Note 1)}, JIS B 8370 ^{Note 2)} and other safety practices.

 **Caution** : Operator error could result in injury or equipment damage.

 **Warning** : Operator error could result in serious injury or loss of life.

 **Danger** : In extreme conditions, there is a possible result of serious injury or loss of life.

Note 1) ISO 4414: Pneumatic fluid power--General rules relating to systems.

Note 2) JIS B 8370: General Rules for Pneumatic Equipment

Warning

1. The compatibility of pneumatic equipment is the responsibility of the person who designs the pneumatic system or decides its specifications.

Since the products specified here are used in various operating conditions, their compatibility for the specific pneumatic system must be based on specifications or after analysis and/or tests to meet your specific requirements. The expected performance and safety assurance will be the responsibility of the person who has determined the compatibility of the system. This person should continuously review the suitability of all items specified, referring to the latest catalog information with a view to giving due consideration to any possibility of equipment failure when configuring a system.

2. Only trained personnel should operate pneumatically operated machinery and equipment.

Compressed air can be dangerous if an operator is unfamiliar with it. Assembly, handling or repair of pneumatic systems should be performed by trained and experienced operators.

3. Do not service machinery/equipment or attempt to remove components until safety is confirmed.

1. Inspection and maintenance of machinery/equipment should only be performed once measures to prevent falling or runaway of the driver objects have been confirmed.
2. When equipment is to be removed, confirm the safety process as mentioned above. Cut the supply pressure for this equipment and exhaust all residual compressed air in the system.
3. Before machinery/equipment is restarted, take measures to prevent shooting-out of cylinder piston rod, etc.

4. Contact SMC if the product is to be used in any of the following conditions:

1. Conditions and environments beyond the given specifications, or if product is used outdoors.
2. Installation on equipment in conjunction with atomic energy, railway, air navigation, vehicles, medical equipment, food and beverages, recreation equipment, emergency stop circuits, clutch and brake circuits in press applications, or safety equipment.
3. An application which has the possibility of having negative effects on people, property, or animals, requiring special safety analysis.



Common Precautions

Be sure to read before handling.

For detailed precautions on every series, refer to main text.

Selection

Warning

1. Confirm the specifications.

Products represented in this catalog are designed for use in compressed air applications only (including vacuum), unless otherwise indicated.

Do not use the product outside their design parameters.

Please contact SMC when using the products in applications other than compressed air (including vacuum).

Mounting

Warning

1. Instruction manual

Install the products and operate them only after reading the instruction manual carefully and understanding its contents. Also keep the manual where it can be referred to as necessary.

2. Securing the space for maintenance

When installing the products, please allow access for maintenance.

3. Tightening torque

When installing the products, please follow the listed torque specifications.

Piping

Caution

1. Before piping

Make sure that all debris, cutting oil, dust, etc., are removed from the piping.

2. Wrapping of pipe tape

When screwing piping or fittings into ports, ensure that chips from the pipe threads or sealing material do not get inside the piping. Also, when the pipe tape is used, leave 1.5 to 2 thread ridges exposed at the end of the threads.

Air Supply

Warning

1. Operating fluid

Please consult with SMC when using the product in applications other than compressed air (including vacuum).

Regarding products for general fluid, please ask SMC about applicable fluids.

2. Install an air dryer, aftercooler, etc.

Excessive condensate in a compressed air system may cause valves and other pneumatic equipment to malfunction.

Installation of an air dryer, after cooler etc. is recommended.

3. Drain flushing

If condensate in the drain bowl is not emptied on a regular basis, the bowl will over flow and allow the condensate to enter the compressed air lines.

If the drain bowl is difficult to check and remove, it is recommended that a drain bowl with the auto-drain option be installed.

For compressed air quality, refer to "Air Preparation Equipment" catalog.

4. Use clean air

If the compressed air supply is contaminated with chemicals, synthetic materials, corrosive gas, etc., it may lead to break down or malfunction.

Operating Environment

Warning

1. Do not use in environments where the product is directly exposed to corrosive gases, chemicals, salt water, water or steam.

2. Do not expose the product to direct sunlight for an extended period of time.

3. Do not use in a place subject to heavy vibrations and/or shocks.

4. Do not mount the product in locations where it is exposed to radiant heat.

Maintenance

Warning

1. Maintenance procedures are outlined in the operation manual.

Not following proper procedures could cause the product to malfunction and could lead to damage to the equipment or machine.

2. Maintenance work

If handled improperly, compressed air can be dangerous.

Assembly, handling and repair of pneumatic systems should be performed by qualified personnel only.

3. Drain flushing

Remove drainage from air filters regularly. (Refer to the specifications.)

4. Shut-down before maintenance

Before attempting any kind of maintenance make sure the supply pressure is shut of and all residual air pressure is released from the system to be worked on.

5. Start-up after maintenance and inspection

Apply operating pressure and power to the equipment and check for proper operation and possible air leaks. If operation is abnormal, please verify product set-up parameters.

6. Do not make any modifications to be product.

Do not take the product apart.

Quality Assurance Information (ISO 9001, ISO 14001)

Reliable quality of products in the global market

To enable our customers throughout the world to use our products with even greater confidence, SMC has obtained certification for international standards “ISO 9001” and “ISO 14001”, and created a complete structure for quality assurance and environmental controls. SMC products pursue to meet its customers’ expectations while also considering company’s contribution in society.

Quality management system ISO 9001

This is an international standard for quality control and quality assurance. SMC has obtained a large number of certifications in Japan and overseas, providing assurance to our customers throughout the world.



Environmental management system ISO 14001

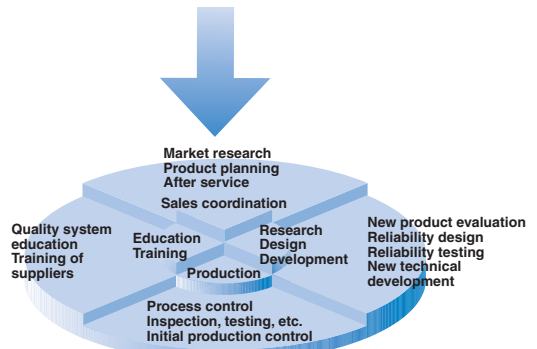
This is an international standard related to environmental management systems and environmental inspections. While promoting environmentally friendly automation technology, SMC is also making diligent efforts to preserve the environment.



SMC’s quality control system



Quality policies



Quality control activities

SMC Product Conforming to Inter

SMC products complying with EN/ISO, CSA/UL standards are supporting



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.

national Standards

you to comply with EC directives and CSA/UL standards.



■ CSA Standards & UL Standards

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

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

■ TSSA (MCCR) Registration Products

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

Products conforming to CE Standard

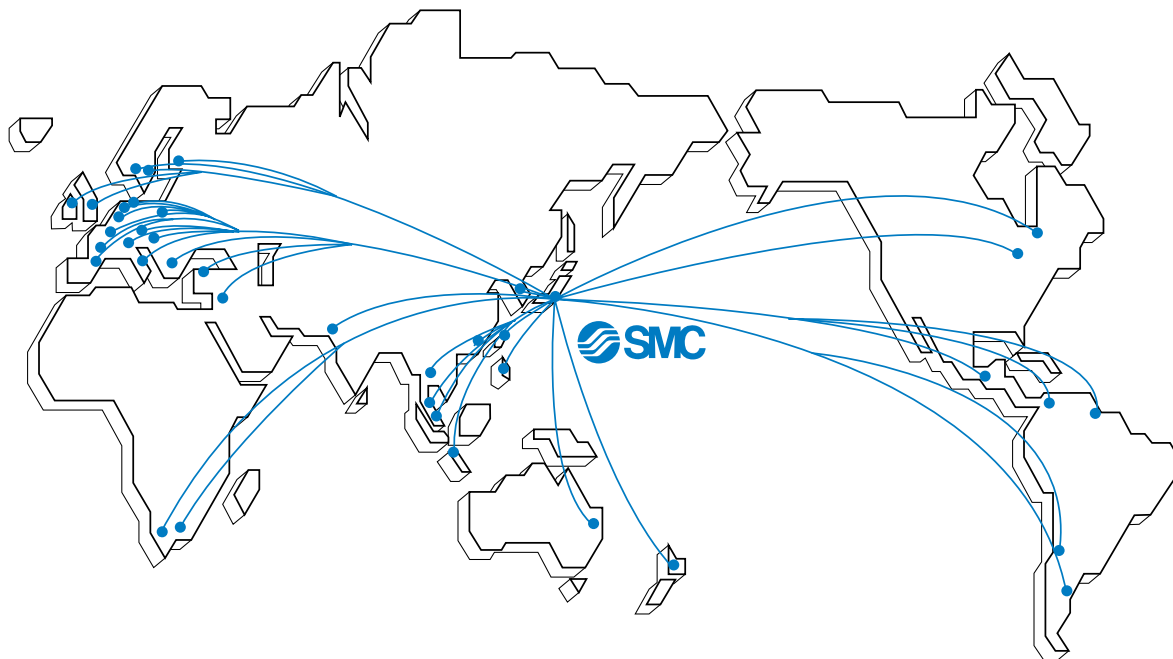


With CE symbol for simple visual recognition

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's Global Service Network



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