

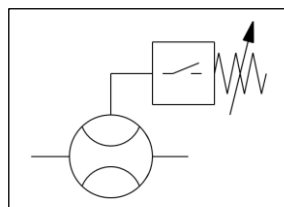


ORIGINAL INSTRUCTIONS



Refer to Declaration of Conformity for relevant Directives

Instruction Manual
Paddle Type Flow Switch
Series IF3



The intended use of this products is to detect and confirm liquid flow.

1 Safety Instructions

These safety instructions are intended to prevent hazardous situations and/or equipment damage. These instructions indicate the level of potential hazard with the labels of "Caution," "Warning" or "Danger." They are all important notes for safety and must be followed in addition to International Standards (ISO/IEC^{*)}, and other safety regulations.
^{*)} ISO 4414: Pneumatic fluid power - General rules relating to systems.
 ISO 4413: Hydraulic fluid power - General rules relating to systems.
 IEC 60204-1: Safety of machinery - Electrical equipment of machines. (Part 1: General requirements)
 ISO 10218-1: Manipulating industrial robots - Safety, etc.
 • Refer to product catalogue, Operation Manual and Handling Precautions for SMC Products for additional information.
 • Keep this manual in a safe place for future reference.

	Caution	Caution indicates a hazard with a low level of risk which, if not avoided, could result in minor or moderate injury.
	Warning	Warning indicates a hazard with a medium level of risk which, if not avoided, could result in death or serious injury.
	Danger	Danger indicates a hazard with a high level of risk which, if not avoided, will result in death or serious injury.

Warning

- Always ensure compliance with relevant safety laws and standards.
- All work must be carried out in a safe manner by a qualified person in compliance with applicable national regulations.

2 Specifications

Fluid	Copper Alloy	Water/non-corrosive liquid
	Stainless Steel 304	Liquid, which does not corrode stainless steel 304
Max. Pressure	1 MPa	
Water Resistance	1.75 MPa	
Insulation Resistance	100MΩ (500 DC by megameter)	
Withstand Voltage	1500 VAC for one minute.	
Contact	1ab	
Port Size	3/4, 1	

2 Specification - continued

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
125VAC	15	15	3	1.5	15	15	5	2.5
250VAC	15	15	2.5	1.25	15	15	3	1.5
8VDC	15	15	3	1.5	15	15	5	2.5
14VDC	15	15	3	1.5	10	10	5	2.5
30VDC	6	6	3	1.5	5	5	5	2.5
125VDC	0.5	0.5	0.5	0.5	0.05	0.05	0.05	0.05
250VDC	0.25	0.25	0.25	0.25	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 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.

Enclosure

Open Type	Using indoors away from water drop
Drip-proof/rain-proof (JIS C 0920)	When using indoors or outdoors, where it is exposed to water drop. (Equivalent to IP42)
Splash-proof/ Low jet-proof (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 Rate Characteristics

Fluid: water, Outlet Pressure: 0 MPa

Sealing thread depth: 9mm (3/4), 11mm (1)

Flow Switch	Mounting		Flow Range (L/min)				On-Flow rate/setting (m/s)
			Minimum		Maximum		
	Port size	Paddle size	On flow	Off flow	On flow	Off flow	
IF3□0-06	3/4	Long	14	7	38	33	0.66~1.79
	3/4	Middle	18	9	50	44	0.85~2.36
	3/4	Short	22	11	60	53	1.04~2.83
IF3□1-10	1	Short	20	10	60	55	0.56~1.67
	1 1/4	Short	34	17	100	90	0.57~1.67
	1 1/2	Short	52	26	160	140	0.63~1.95
	2	Middle	45	23	140	125	0.34~1.06
	2 1/2	Middle	90	45	280	250	0.41~1.29
	3	Long	80	40	250	220	0.26~0.81
	4	Long	170	85	550	480	0.33~1.05
	5	Long	300	150	1000	870	0.37~1.24
	6	Long	460	230	1500	1300	0.40~1.32
IF3□3-10	1	Short	36	18	110	100	1.00~3.05
	1 1/4	Short	54	27	160	140	0.90~2.67
	1 1/2	Short	90	45	270	230	1.10~3.29
	2	Middle	90	45	270	230	0.68~2.05
	2 1/2	Middle	160	80	500	420	0.74~2.30
	3	Long	160	80	500	420	0.52~1.63
	4	Long	320	160	1000	800	0.61~1.91
	5	Long	560	280	1800	1450	0.69~2.23
	6	Long	80	400	2600	2000	0.70~2.28

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.

• Data shows the reference value. Operating flow values may differ from those shown above as a result of sealing depth and direction of mounting, piping conditions or variations among individual items, so take precautions when using at levels near the minimum and maximum values of the set flow rate.

Warning

Special products might have specifications different from those shown in this section. Contact SMC for specific drawings.

3 Installation

3.1 Installation

Warning

- Do not install the product unless the safety instructions have been read and understood.

Caution

- Mount the switch ensuring that the flow direction coincides with the flow direction arrow on the switch body.
- 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*0 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.
- It cannot be used when a water hammer or pulsation pressure is applied to the fluid.

3.2 Environment

Warning

- Do not use in an environment where corrosive gases, chemicals, salt water or steam are present.
- Do not use in an explosive atmosphere.
- Do not expose to direct sunlight. Use a suitable protective cover.
- Do not install in a location subject to vibration or impact in excess of the product's specifications.
- Do not mount in a location exposed to radiant heat that would result in temperatures in excess of the product's specifications.

3.3 Piping

Caution

- Before connecting piping make sure to clean up chips, cutting oil, dust etc.
- When installing piping or fittings, ensure sealant material does not enter inside the port. When using seal tape, leave 1 thread exposed

on the end of the pipe/fitting.

- Ensure that a straight run of pipe, at least 5 times the pipe ID, is provided either side of the switch body.
- The screw-in depth should be 9mm ± 1mm for 3/4B and 11mm ± 1.2mm for 1B.
- Only horizontal mounting is possible with respect to the horizontal pipe.
- Wire the microswitch according to the symbols on the upper body of the product.

3.4 Lubrication

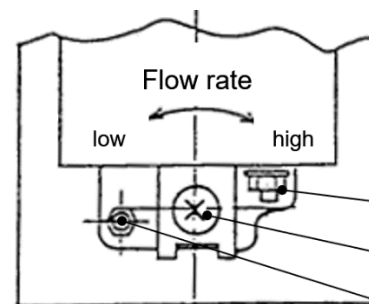
Caution

Lubrication is not required.

4 Settings

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.



Do not adjust.

The flow adjusting screw

Do not adjust.

4 Settings - continued

- 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 ON signal is output when the flow rate has decreased. Refer to the flow rate characteristics table for details on the operation flow rate.
- 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.

5 How to Order

Refer to drawings or catalogue for 'How to Order'.

6 Outline Dimensions (mm)

Refer to drawings or catalogue for outline dimensions.

7 Maintenance

General Maintenance

Caution

- Not following proper maintenance procedures could cause the product to malfunction and lead to equipment damage.
- If handled improperly, compressed air can be dangerous.
- Maintenance of pneumatic systems should be performed only by qualified personnel.
- Before performing maintenance, turn off the power supply and be sure to cut off the supply pressure. Confirm that the air is released to atmosphere.
- After installation and maintenance, apply operating pressure and power to the equipment and perform appropriate functional and leakage tests to make sure the equipment is installed correctly.
- If any electrical connections are disturbed during maintenance, ensure they are reconnected correctly, and safety checks are carried out as required to ensure continued compliance with applicable national regulations.
- Do not make any modification to the product.

- Do not disassemble the product, unless required by installation or maintenance instructions.

8 Limitations of Use

Limited warranty and Disclaimer/Compliance Requirements

Refer to Handling Precautions for SMC Products.

9 Product disposal

This product should not be disposed of as municipal waste. Check your local regulations and guidelines to dispose this product correctly, in order to reduce the impact on human health and the environment.

10 Contacts

Refer to www.smcworld.com or www.smc.eu for contacts.

SMC Corporation

URL : <http://www.smcworld.com> (Global) <http://www.smc.eu> (Europe)
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 Specifications are subject to change without prior notice from the manufacturer.
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