Flow Switch

Diaphragm Style
Series IFW5

IFW Series Flow Switches detect and confirm flow. They are applicable to general industrial machines and various other applications.

●Low flow setting possible (1 ℓ/min)

●Simple flow setting

Without removing the cover, you can set it with a screwdriver from the outside.

PAT. PEND

How to Order

IFW5 10 — N 03 — 1 1 — Q

Diaphragm Style Flow Switch

Flow range

10	1 to 10 ℓ/min
20	10 to 20 ℓ/min
50	20 to 50 ℓ/min

Thread

—	Rc(PT)
N	NPT
F	G(PF)

Port size

03	3/8
04	1/2
06	3/4

Terminal Box

0	Without Terminal Box (Contact: 1ab)
1	With Terminal Box (Contact: 1ab)
2	WithTerminal Box (Contact: 2b)

Light

0	Without neon light
1	With neon light (110V AC, red)
2	With neon light (110V AC, green)
3	With neon light (220V AC, red)
4	With neon light (220V AC, green)

Specifications

Fluid	Water, Non-corrosive liquid*	
Operating pressure	0.1 to 0.6MPa	
Proof pressure	1.2MPa	
Operating temperature	5 to 60°C	
Operation	Diaphragm	
Insulation	100MΩ (DC500)	
Voltage proof	1500V AC for one min.	
Contact	Without Terminal Box: 1ab	
	With Terminal Box: 1a or 1b	
Port size	3/8, 1/2, 3/4	
Body material in contact with fluid material	Body	BC6
	Rod	C3604B
	Diaphragm	NBR

*When using, contact an SMC representative.

Micro Switch Ratings

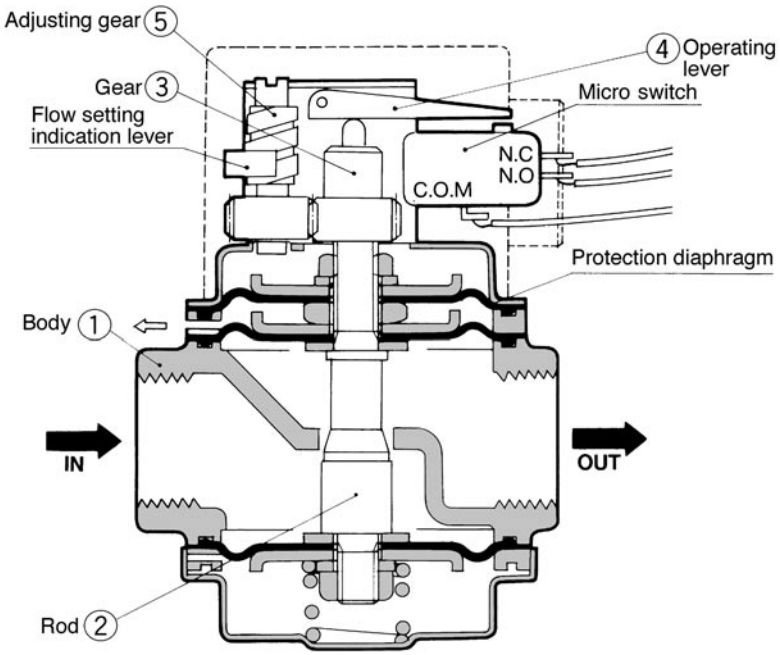
Voltage	Non-inductive Load (A)				Inductive load (A)			
	Resistance load		Lamp load		Inductive load		Motor load	
	N.C.	N.O.	N.C.	N.O.	N.C.	N.O.	N.C.	N.O.
125V AC	5	5	1.5	0.7	4	4	2.5	1.3
250V AC	5	5	1	0.5	4	4	1.5	0.8
8V DC	7	5	3	3	5	4	3	3
14V DC	5	5	3	3	4	4	3	3
30V DC	5	5	3	3	4	4	3	3
125V DC	0.4	0.4	0.1	0.1	0.4	0.4	0.1	0.1
250V DC	0.3	0.3	0.05	0.05	0.3	0.3	0.05	0.05

Model

Model	Flow range (ℓ/min)	Max. flow (ℓ/min)	Hysteresis(1) (ℓ/min)
IFW510	1 to 10	20	1 or less
IFW520	10 to 20	25	1.5 or less
IFW550	20 to 50	60	3 or less

Note 1) Hysteresis is the flow rate that is necessary for moving the microswitch from the operation position (ON signal) to the return position (OFF signal).

Construction/Operation



Operation principles

Liquid flow creates a pressure differential nearby the orifice of the port of the body. One set of diaphragms monitors the pressure differential and operates the micro switch through the rod ② and operating lever ④.

The rod moves downward with increased flow, and upward with decreased flow. Moving the gear ③ upward or downward by the adjusting gear ⑤ manually offers an electric signal at various flow rates.

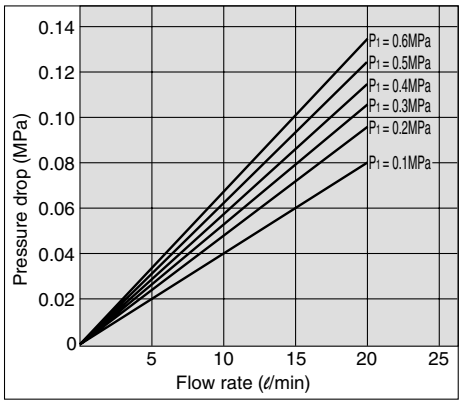
Parts List

No.	Description	Material
①	Body	BC6
②	Rod	C3604B
③	Gear	POM

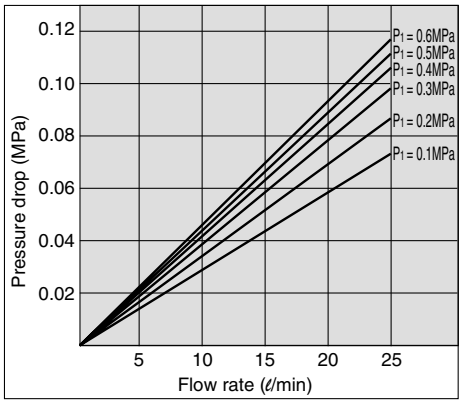
No.	Description	Material
④	Operating lever	SPCC
⑤	Adjusting gear	POM

Flow Characteristics

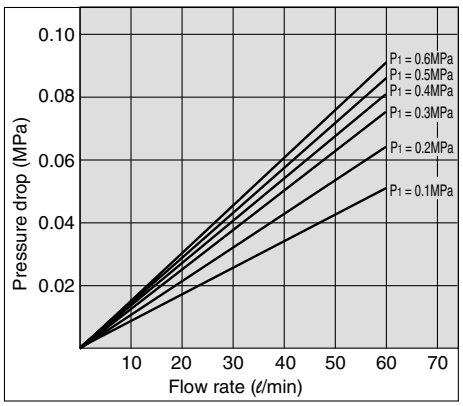
IFW510



IFW520

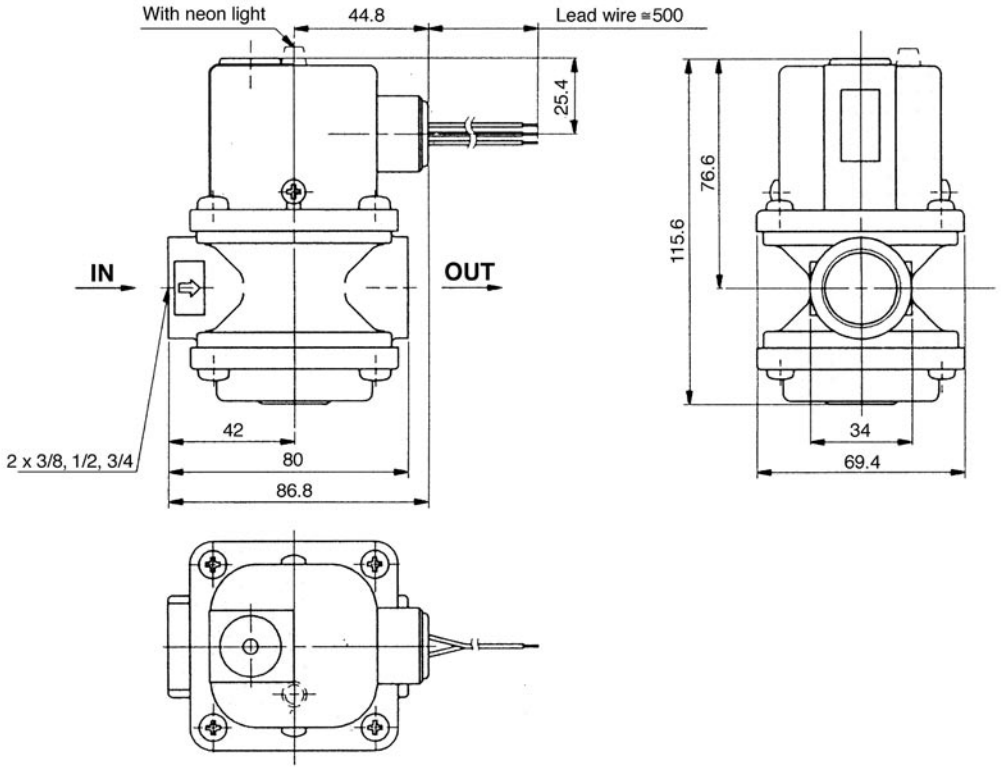


IFW550

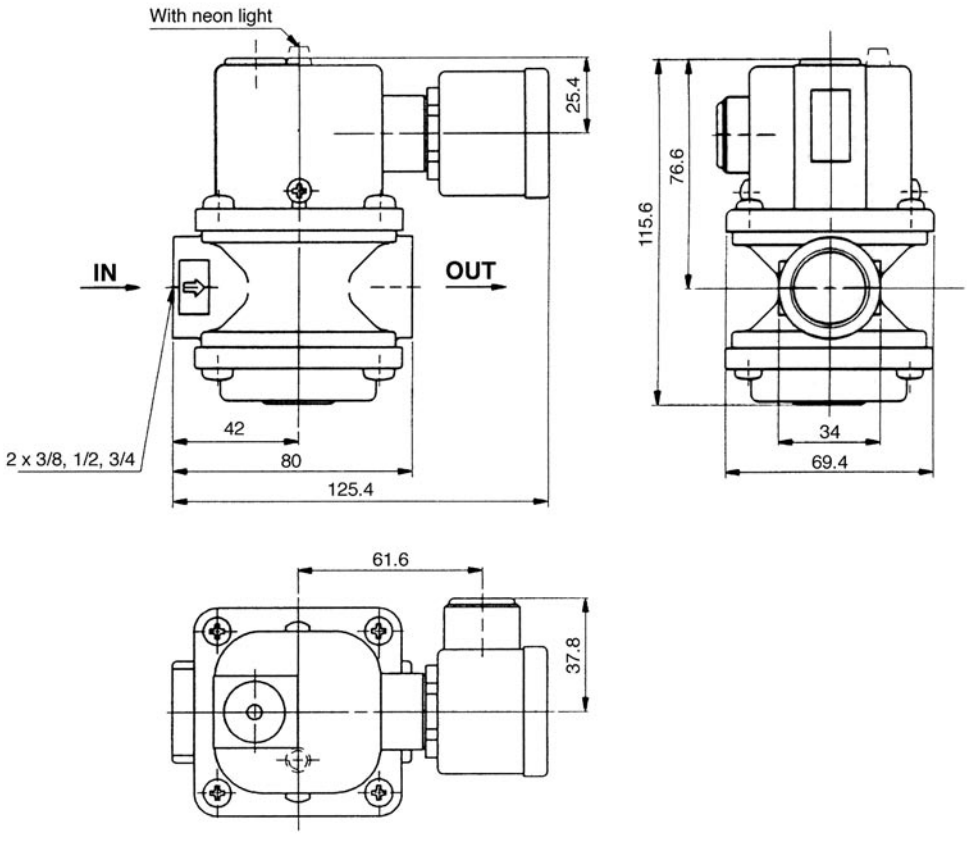


Dimensions

IFW5□0-□□-00 to 04
(Without Terminal Box)

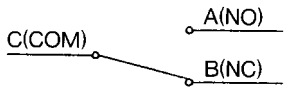


IFW5□0-□□-10 to 24
(With Terminal Box)



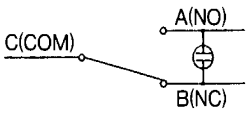
Internal Wiring Diagram

IFW5□0-□□-00, 10, 20



Symbol	Contact	Color of Lead
C	COMMON	Black
A	NORMALLY OPEN	White
B	NORMALLY CLOSED	Red

IFW5□0-□□01 to 04, 11 to 14, 21 to 24



Symbol	Contact	Color of Lead
C	COMMON	Black
A	NORMALLY OPEN	White
B	NORMALLY CLOSED	Red

⚠ Precautions

Be sure to read before handling. Refer to p.0-26 and 0-27 for Safety Instructions and common precautions on the products mentioned in this catalogue.

Mounting Terminals

⚠ Caution

①Mount the switch so that the flow of liquid is in the same direction as that of the arrow on the body.
②The flow switch can be installed either horizontally or vertically.
③For wiring, refer to the internal wiring diagram.
④If a terminal box is not available, wire by selecting the contact at 1a or 1b. At that time, insulate the lead wires that will not be used.
⑤Because this is an open style, it cannot be used where water or oil splashes.
⑥It cannot be used if a water hammer or pulsation pressure is applied to the fluid.
⑦To prevent improper operation or diaphragm damage due to the presence of debris or cutting chip in the fluid, provide a filter of approximately 100 mesh on the primary side of the flow switch.

Adjusting

⚠ Caution

①To adjust flow, remove grommet of the upper cover and rotate flow adjusting gear using a screwdriver. (clockwise rotation: increase of adjusting flow rate, counterclockwise rotation: decrease of adjusting flow rate)
②Align the indicator needle to the graduation on the left side of the window name plate if the IN side pressure is 0.1MPa, and to the graduation on the right side if the pressure is 0.2MPa. (Refer to Fig.1.)
③The flow rate setting point is set at the ON flow rate. Therefore, in the case of the 1a contact, the ON signal is output if fluid with a higher flow rate than the set flow rate has flowed. In the case of the 1b contact, the OFF signal is output when the flow rate has decreased from the set flow rate for the amount that corresponds to the hysteresis.
④If the IN side pressure exceeds 0.2MPa, the setting cannot be made with the graduation on the window name plate. Therefore, perform the setting by installing a flow rate gauge on the secondary side of the flow switch.
⑤To 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.
⑥Use at or below the maximum operating pressure and maximum flow rate.

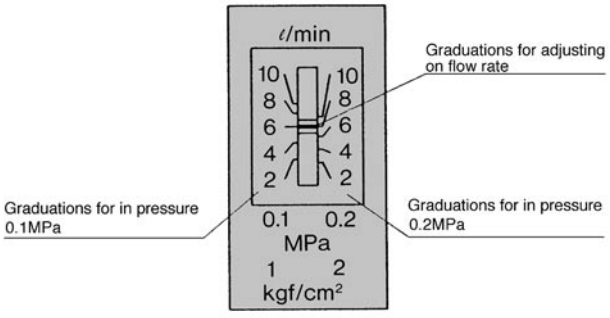


Fig.1
Viewing faceplate

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 range from 3/4ᴮ to 6ᴮ.**
- **Wide range of applicable fluids.**
  Materials in contact with fluid: Copper alloy, Stainless steel
- **Various enclosures (water proof).**
  Standard style, Drip proof style, Splash proof style.

How to Order

IF3 1 1 — N 10 — 1 1 — Q

Paddle Style Flow Switch

Enclosure

0	Standard (Non water proof)
1	Drip proof
2	Splash proof

ON flow range

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

Thread

—	Rc(PT)
N	NPT

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".

Metal material in contact with fluid

0	Copper alloy
1	SUS304

Seal material

0	NBR
1	FPM

Specifications

Fluid	Copper alloy	Water, Non corrosive liquid
	SUS304	Liquid compatible with stainless steel
Max. operating pressure	1MPa	
Proof pressure	1.75MPa	
Isolation	100MΩ (DC500)	
Voltage proof	1500V AC for one min.	
Contact	1ab	
Port size	3/4, 1	

Micro Switch Ratings

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

Fluid and Ambient Temperature Range

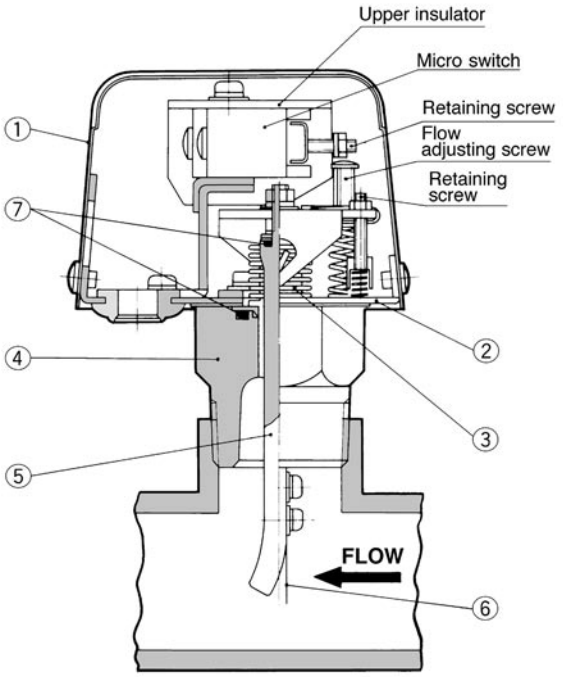
Fluid temperature	Corresponding ambient temperature(1)
70°C or less	70C° (70C°) or less
80°C	58C° (60C°) or less
90°C	47C° (50C°) or less
100°C	35C° (40C°) or less

Note 1) ( ) For IF32□

Enclosure

Standard	Indoor applications away from moisture
Drip proof (JIS C0920)	Indoor or outdoor applications can tolerate water drip
Splash proof (JIS C0920)	Sealed construction can tolerate hosing or salt laden atmosphere

Construction



Main parts list

No.	Description	Material		
		IF30□	IF31□	IF32□
①	Cover	SPCD	SPCD	ADC12
②	Mounting plate	SPCC	SUS304	SUS304
③	Bellows	PBP or SUS304		
④	Body	C3604B or SUS304		
⑤	Mobile bar	C2700W or SUSXM7		
⑥	Paddle	SUS304		
⑦	O ring	NBR or FPM		

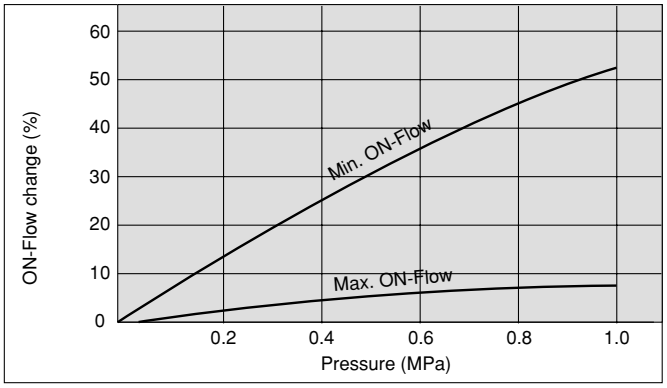
Flow Characteristics List

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

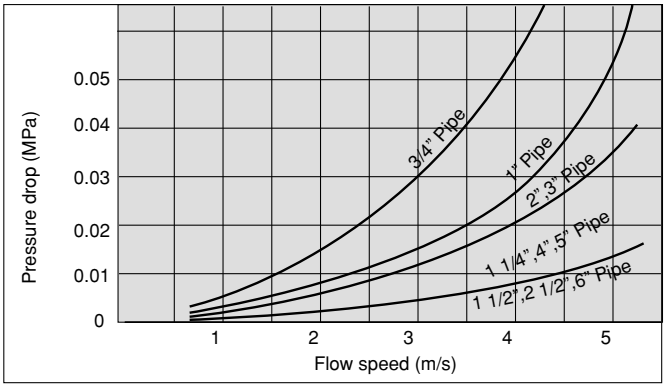
Flow Switch	Mounting		Flow range (ℓ/min)				ON-flow rate/setting (meter/sec.)
			Minimum		Maximum		
	Port size	Paddle size	ON flow	OFF flow min	ON flow	OFF flow min	
IF3□0-06	3/4	Long	14	7	38	33	0.66 to 1.79
	3/4	Middle	18	9	50	44	0.85 to 2.36
	3/4	Short	22	11	60	53	1.04 to 2.83
IF3□1-10	1	Short	20	10	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: Switch point at increase of flow.
OFF-flow: Switch point at decrease of flow.
· Maximum flow can be up to twice of ON-flow.
· Accurate operating flow depends on correct sealing depth and direction of flow.

ON-Flow Change due to Pressure



Pressure Drop Curve



⚠ Precautions

Be sure to read before handling. Refer to p.0-26 and 0-27 for Safety Instructions and common precautions on the products mentioned in this catalogue.

Mounting & Wiring

⚠ Caution

①Mount the switch on top of horizontal pipe so that fluid flow is in the direction of the arrow. Sealing depth should be 9mm±1mm for 3/4"and 11mm±1.2mm for 1".
②In terms of the direction of installation, this product can only be installed perpendicularly to the horizontal pipe.
③Provide 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.
④Three 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.
⑤Use 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.

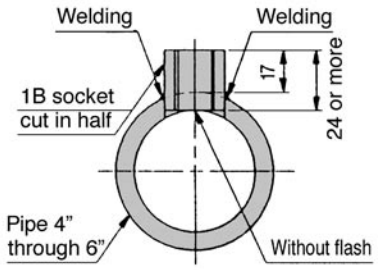
Applicable Fittings

For pipe fitting 3/4" through 3"

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

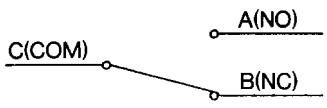
Reducing tees: JISB2301
Socket: JISB2302
Pipe: JISB3452

For pipe fitting 4" through 6"



⑥It cannot be used in case a water hammer or pulsation pressure is applied to the fluid.
⑦Wire 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.)

Internal wiring diagram



Symbol	Contact
C	COMMON
A	NORMALLY OPEN
B	NORMALLY CLOSED

Adjusting

⚠ Caution

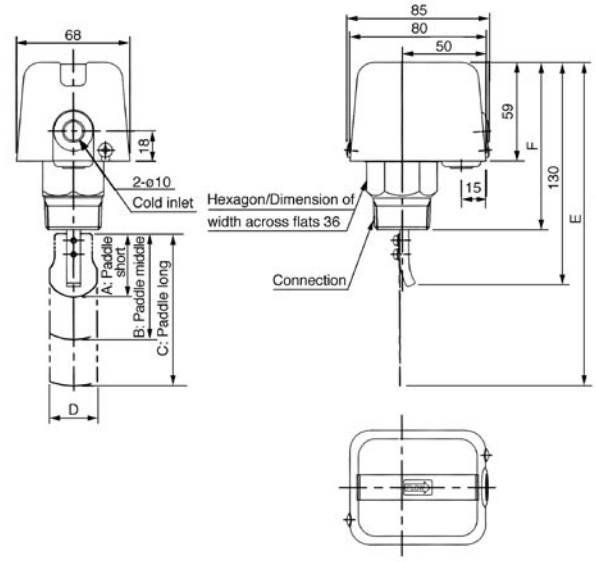
①To adjust flow, remove grommet of the upper cover and rotate flow adjusting gear using the minus driver.
(clockwise rotation: increase of adjusting flow rate, counterclockwise rotation: decrease of adjusting flow rate)
②Flow rate % relation to the number of turns is shown in the table below. However, this is just a guide. For precise setting use a flow meter.

Number of turns	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

③The flow rate setting point is set at the ON flow rate. Therefore, in the case of the 1a contact, the ON signal is output if fluid with a higher flow rate than the set flow rate has flowed. 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.
④Do not touch the two types of stop screws that are indicated on the construction diagram.
⑤To 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.
⑥Use at or below the maximum operating pressure and maximum flow rate.
⑦Spare 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 3/4" connecting bore and for a 1" because their installation pitches differ.
Arrangement example:
Paddle set for IF300-06-00

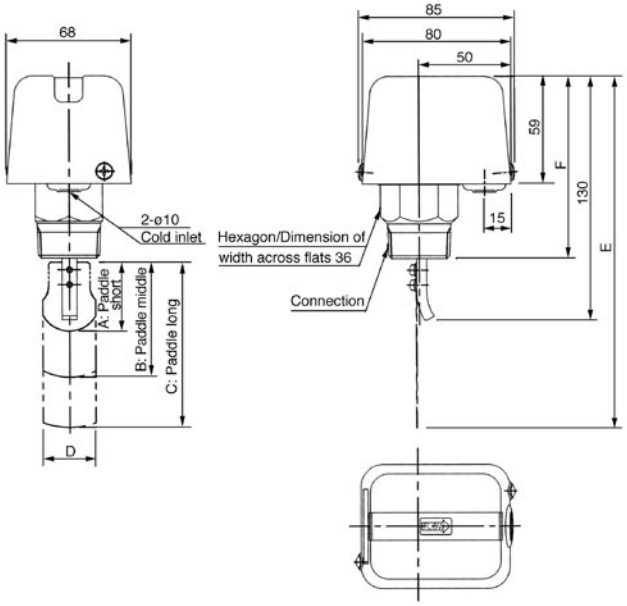
Dimensions

Standard style: 300/301/303



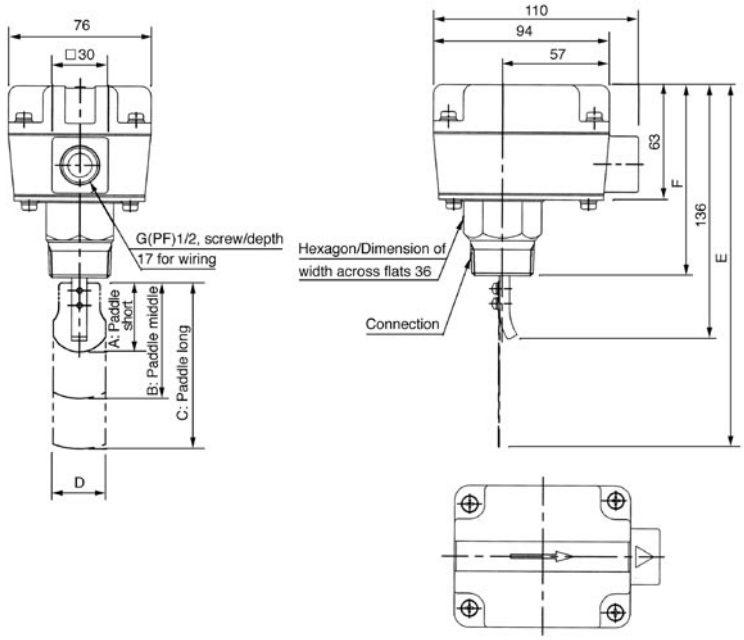
Model \ Dimensions	Connection	A	B	C	D	E	F
IF300	3/4	28	31	34	22	137	101
IF301	1	37	62	89	28	188	98
IF303	1	29	39	56	28	155	98

Drip proof style: 310/311/313



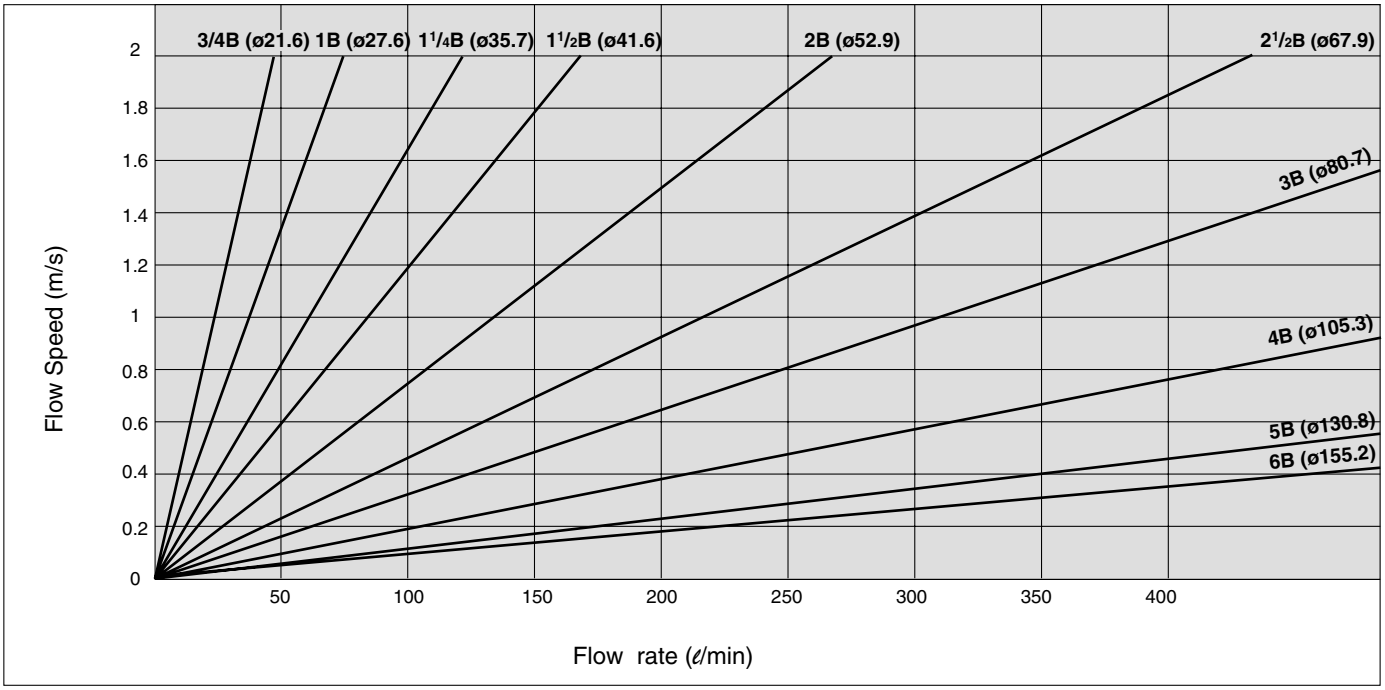
Model \ Dimension	Connection	A	B	C	D	E	F
IF310	3/4	28	31	34	22	137	101
IF311	1	37	62	89	28	188	98
IF313	1	29	39	56	28	155	98

Splash proof style: 320/321/323



Model \ Dimension	Connection	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

Flow Speed



( ) : Gas pipe bore sizes