

New

3-color display Digital Flow Switch for Water

3-color / 2-screen display

IP65

RoHS



Main screen

Instantaneous flow rate Note 1)

Main screen
Sub screen



Sub screen
Note 3)

Set value

Accumulated value

Peak value, Bottom value

Line name

Fluid temperature Note 2)

Note 1) Main screen shows the instantaneous flow rate only.

Note 2) Fluid temperature can be displayed only when the digital flow switch with a temperature sensor is selected.

Note 3) Sub screen can be turned off.

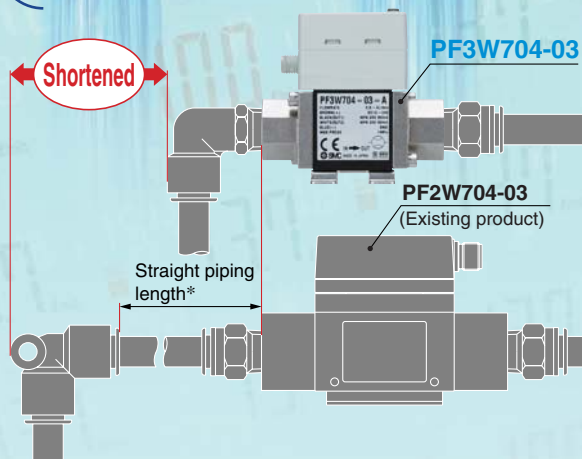
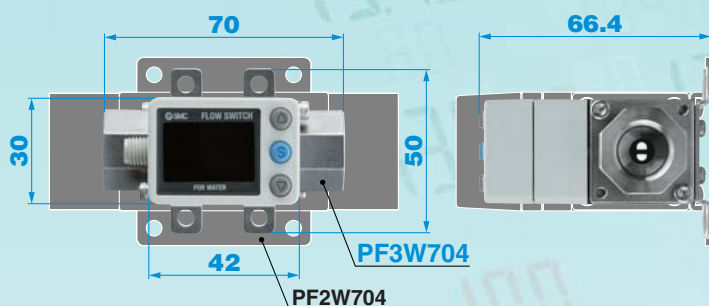
Integrated temperature sensor

One digital flow switch can control both the **temperature** and the **flow** of the fluid.



40% smaller than existing product

Reduced piping space



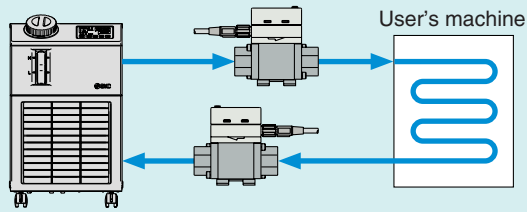
Series **PF3W**

* Existing product requires a straight piping length at least 8 times the piping diameter.

● Fluid temperature: **0 to 90°C**

● Aqueous solution of ethylene glycol can be used

Example) Flow control of the circulating fluid in a chiller



● Non-grease type

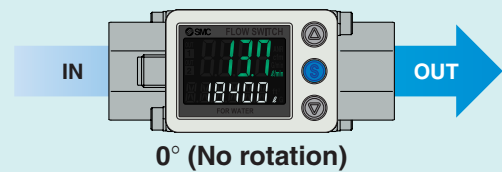
● Rotatable display

Display can be rotated in increments of 45 degrees to suit the installation conditions. Easy operation, improved visibility.

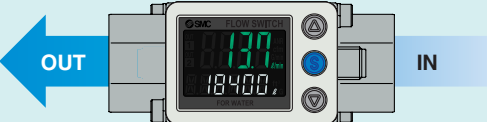
Counterclockwise **90°**
Clockwise **225°**



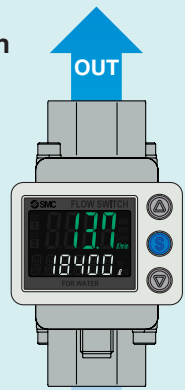
135 degree turn



0° (No rotation)



180 degree turn



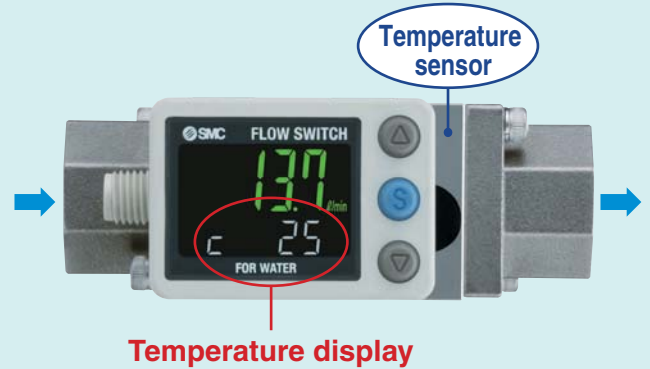
90 degree turn

● Temperature sensor type (Option)

Display range: **-10 to 110°C** (Temperature sensor alone)

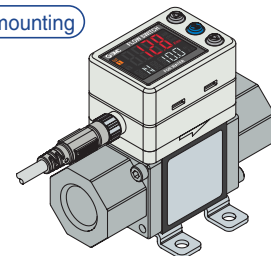
Minimum setting unit: **1°C**

Analog output: Current output/Voltage output

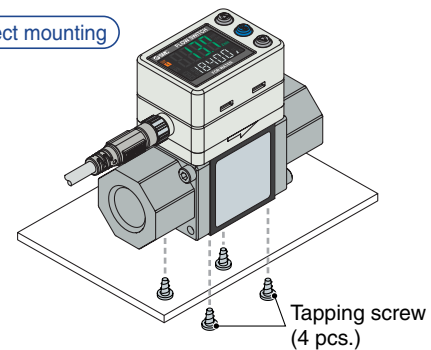


○ Mounting

Bracket mounting



Direct mounting



○ Flow Range

Series	Applicable flow range		Unit: l/min
PF3W704	0.5	4	
PF3W720	2	16	
PF3W740	5	40	

3-color display



Digital Flow Switch for Water Series PF3W

Integrated display



How to Order

Integrated display

PF3W 7 04 - 03 - A T - M

Type

7 Integrated display

Rated flow range (Flow range)

Symbol	Rated flow range
04	0.5 to 4 ℓ/min
20	2 to 16 ℓ/min
40	5 to 40 ℓ/min

Thread type

Nil	Rc
N	NPT
F	G

Port size

Symbol	Port size	Rated flow range		
		04	20	40
03	3/8	●	●	—
04	1/2	—	●	—
06	3/4	—	—	●

Output specification

Symbol	OUT1	OUT2
A	NPN	NPN
B	PNP	PNP
C	NPN	Analog 1 to 5 V
D	NPN	Analog 4 to 20 mA
E	PNP	Analog 1 to 5 V
F	PNP	Analog 4 to 20 mA
G	NPN	External input
H	PNP	External input

External input

The accumulated value, peak value, and bottom value can be reset.

Temperature sensor

Nil	None
T	With temperature sensor

The output related to the temperature sensor is **OUT2 only**.
This option is not available with the output types G and H.

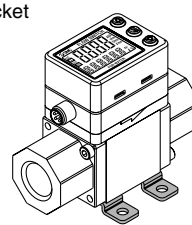
Calibration certificate (Only flow sensor)

Nil	None
A	With calibration certificate

* The certificate is written in both English and Japanese.

Bracket

Nil	None
R	Bracket



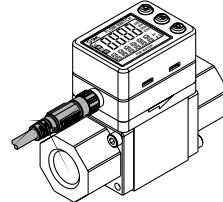
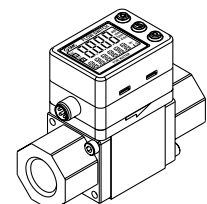
Unit specification

M Fixed SI unit (Note)

Note) Fixed unit: Instantaneous flow rate: ℓ/min
Accumulated flow: ℓ
Temperature: °C

Lead wire

Nil	With lead wire and M8 connector
N	Without lead wire, with M8 connector

Options/Part No.

When optional parts are required separately, use the following part numbers to place an order.

Option	Part no.	Note
Bracket	ZS-40-K	With 4 tapping screws (3 x 8) for PF3W704/720
	ZS-40-L	With 4 tapping screws (3 x 8) for PF3W740
Lead wire with M8 connector	ZS-40-A	Lead wire length: 3 m

Series PF3W

Specifications

Model	PF3W704	PF3W720	PF3W740
Measured fluid	Water and aqueous solution of ethylene glycol (with a viscosity of 3 mPa·s or less) ^{Note 1)}		
Detection method	Karman vortex		
Rated flow range	0.5 to 4 ℓ/min	2 to 16 ℓ/min	5 to 40 ℓ/min
Display flow range	0.35 to 5.5 ℓ/min	1.7 to 22 ℓ/min	3.5 to 55 ℓ/min
Switch point range	0.35 to 5.5 ℓ/min	1.7 to 22 ℓ/min	3.5 to 55 ℓ/min
Minimum setting unit	0.01 ℓ/min	0.1 ℓ/min	
Conversion of accumulated pulse (Pulse width: 50 ms)	0.05 ℓ/pulse	0.1 ℓ/pulse	0.5 ℓ/pulse
Fluid temperature	0 to 90°C (with no freezing and condensation)		
Display unit	Instantaneous flow rate: ℓ/min, Accumulated flow: ℓ 5 times/second		
Accuracy	Display value: ±3% F.S. Analog output: ±3% F.S.		
Repeatability	±2% F.S. ^{Note 2)}		
Temperature characteristics	±5% F.S. or less (25°C reference)		
Operating pressure range	0 to 1 MPa		
Proof pressure	1.5 MPa		
Pressure loss	45 kPa (at the maximum flow)		
Accumulated flow range ^{Note 3)}	99999999.9 ℓ		99999999 ℓ
	By 0.1 ℓ	By 0.5 ℓ	By 1 ℓ
Switch output	NPN or PNP open collector output		
Maximum load current	80 mA		
Maximum applied voltage	28 VDC		
Internal voltage drop	NPN: 1 V or less (at 80 mA load current) PNP: 1.5 V or less (at 80 mA load current)		
Response time ^{Note 4)}	0.5 s/1 s/2 s		
Output protection	Short circuit protection		
Output mode	Select from hysteresis mode, window comparator mode, accumulated output mode, or accumulated pulse output mode.		
Flow mode	Select from hysteresis mode or window comparator mode.		
Temperature mode			
Response time ^{Note 5)}	0.5 s/1 s/2 s (linked with the switch output)		
Voltage output	Voltage output: 1 to 5 V Output impedance: 1 kΩ		
Current output	Output current: 4 to 20 mA Load impedance: 300 Ω or less for 12 VDC, 600 Ω or less for 24 VDC		
Hysteresis	Variable		
External input	Voltage free input: 0.4 V or less (Reed or Solid state) for 30 ms or longer		
Display method	2-screen display (Main screen: 4-digit, 7-segment, 2-color; Red/Green Sub screen: 6-digit, 11-segment, White)		
Indicator light	Output 1, Output 2: Orange		
Power supply voltage	12 to 24 VDC ±10%		
Current consumption	50 mA or less		
Environment	Enclosure	IP65	
	Operating temperature range	0 to 50°C (with no freezing and condensation)	
	Operating humidity range	Operation, Storage: 35 to 85% R.H. (with no condensation)	
	Withstand voltage ^{Note 6)}	1000 VAC for 1 minute between external terminal and case	
	Insulation resistance	50 MΩ or more (500 VDC mega meter) between external terminal and case	
	Vibration resistance	10 to 500 Hz and 1.5 mm amplitude or 98 m/s ² , whichever is smaller, in each direction for 2 hours	
Impact resistance	490 m/s ² 3 times each in directions of X, Y, and Z respectively (un-powered)		
Standards and regulations	CE marking, UL (CSA), RoHS		
Material of wetted part ^{Note 7)}	PPS, Stainless steel 304, FKM, SCS13 Non-grease type		
Piping port size	3/8	3/8 (1/2)	1/2 (3/4)
Weight	210 g (285 g)	260 g (335 g)	410 g (530 g)
() : With temperature sensor	295 g (370 g)	345 g (420 g)	495 g (615 g)

Note 1) Refer to Measurable range for aqueous solution of ethylene glycol on page 3.

Note 2) When 0.5 s is selected for the response time of the switch output, the repeatability becomes ±3% F.S.

Note 3) Cleared by turning off the power supply. It is possible to select the function to memorize it. (Every 2 or 5 minutes) When 5 minutes memorizing is selected, the life of the memory device (electronic part) is 1 million times (5 minutes x 1 million times = 5 million minutes = Approx. 9.5 years for 24 hour energizing). Calculate the lifetime for your operating conditions before using the memorizing function, and do not exceed it.

Note 4) The response time when the set value is 90% in relation to the step input (The response time is 7 s when it is output by the temperature sensor.)

Note 5) The response time until the set value reaches 90% in relation to the step input (The response time is 7 s when it is analog output by the temperature sensor.)

Note 6) When the temperature sensor is used, it will be 250 VAC.

Note 7) Refer to Construction on page 5 for details.

Temperature Sensor Specifications

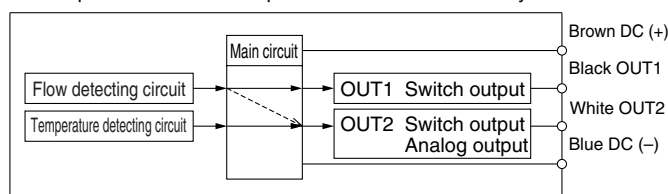
Rated temperature range	0 to 100°C ^{Note 1)}
Setting / Display temperature range	-10 to 110°C
Minimum setting unit	1°C
Display unit	°C
Display accuracy	±2°C
Analog output accuracy	±3% F.S.
Response time	7 s ^{Note 2)}
Ambient temperature characteristics	±5% F.S.

Note 1) The rated temperature range is for the temperature sensor alone.

The fluid temperature range specification of the flow switch as a whole is 0 to 90°C.

Note 2) The response time is for the temperature sensor alone.

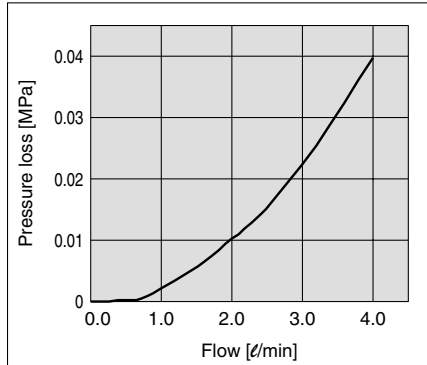
The output related to the temperature sensor is OUT2 only.



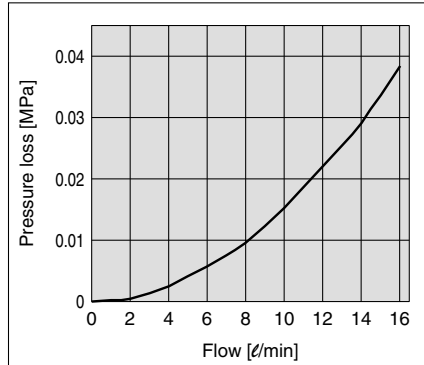
The OUT2 can be selected from the output for temperature or flow by button operation.

Flow-rate Characteristics (Pressure Loss)

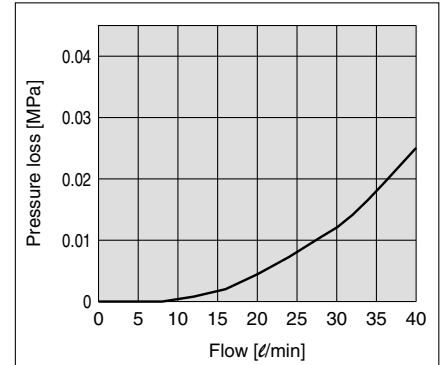
PF3W704



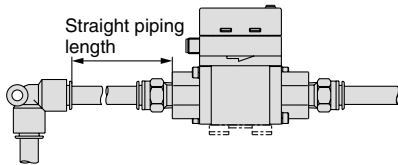
PF3W720



PF3W740

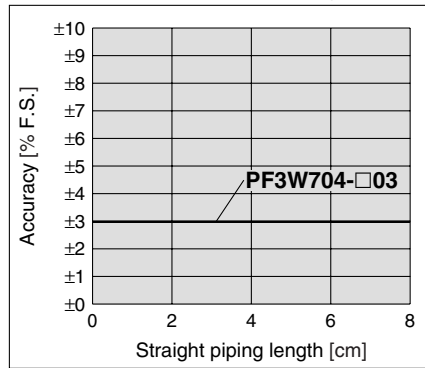


Straight Piping Length and Accuracy (Reference)

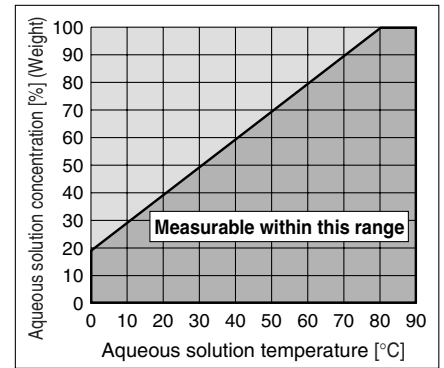


- The smaller the piping size, the more the product is affected by the straight piping length.
- Fluid pressure has almost no affect.
- Use a straight pipe that is 8 cm or longer in length to satisfy the $\pm 3\%$ F.S. specification.

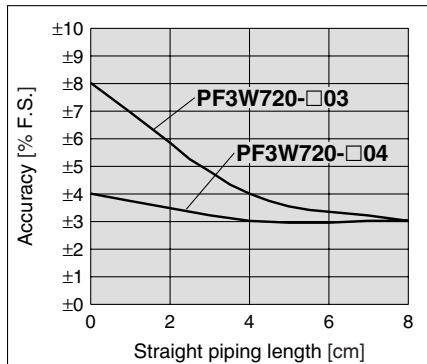
PF3W704 Pressure: 0.3 MPa Piping diameter: $\phi 12$



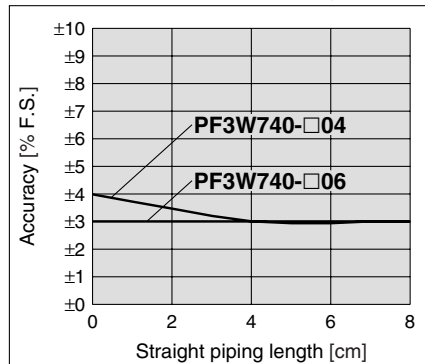
Measurable Range for Aqueous Solution of Ethylene Glycol (Reference)



PF3W720 Pressure: 0.3 MPa Piping diameter: $\phi 12$



PF3W740 Pressure: 0.3 MPa Piping diameter: $\phi 16$

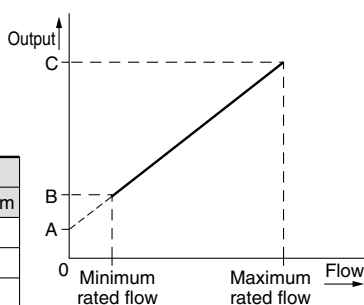


Analog Output

Flow/Analog output

	A	B	C
Voltage output	1 V	1.5 V	5 V
Current output	4 mA	6 mA	20 mA

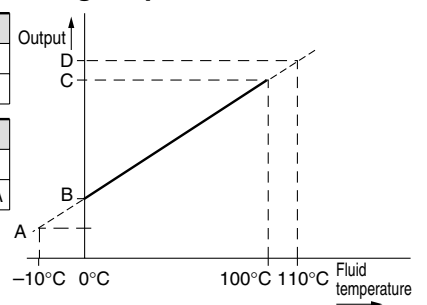
Model	Rated flow [l/min]	
	Minimum	Maximum
PF3W704	0.5	4
PF3W720	2	16
PF3W740	5	40



Fluid temperature/Analog output

	A	B
Voltage output	0.6 V	1 V
Current output	2.4 mA	4 mA

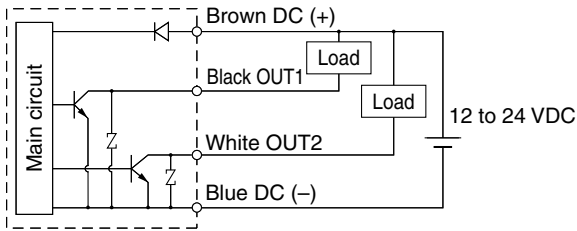
	C	D
Voltage output	5 V	5.4 V
Current output	20 mA	21.6 mA



Series PF3W

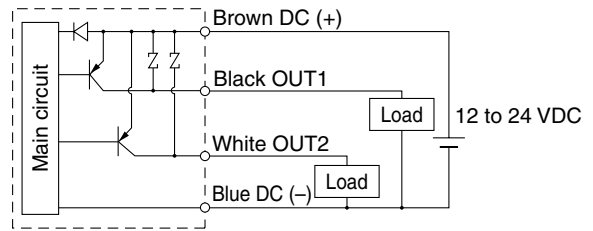
Example of Internal Circuit and Wiring

NPN 2 Output type PF3W7□□-□□-A(T)-□□□



Max. 28 V, 80 mA
Internal voltage drop 1 V or less

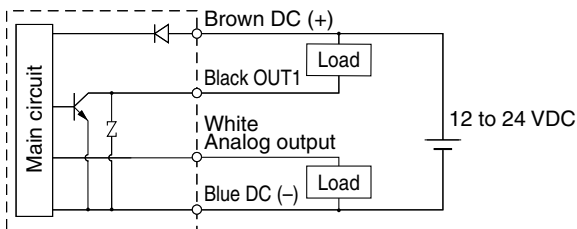
PNP 2 Output type PF3W7□□-□□-B(T)-□□□



Max. 80 mA
Internal voltage drop 1.5 V or less

NPN + Analog output type PF3W7□□-□□-C(T)-□□□

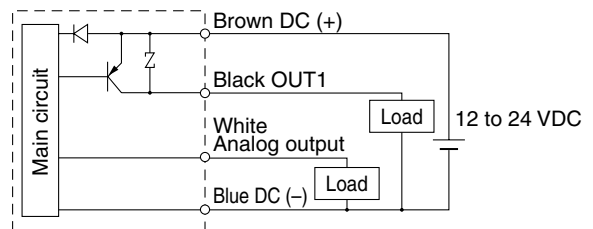
PNP + Analog output type PF3W7□□-□□-D(T)-□□□



Max. 28 V, 80 mA
Internal voltage drop 1 V or less
C: Analog output 1 to 5 V
Output impedance 1 kΩ
D: Analog output 4 to 20 mA
Load impedance
Max. 300 Ω (at 12 VDC)
Max. 600 Ω (at 24 VDC)

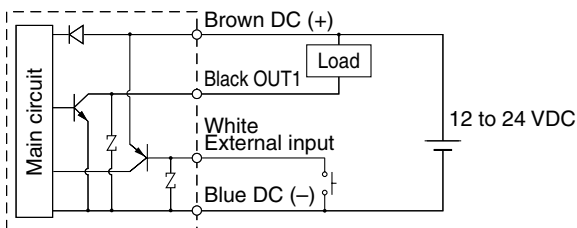
PNP + Analog output type PF3W7□□-□□-E(T)-□□□

PNP + Analog output type PF3W7□□-□□-F(T)-□□□



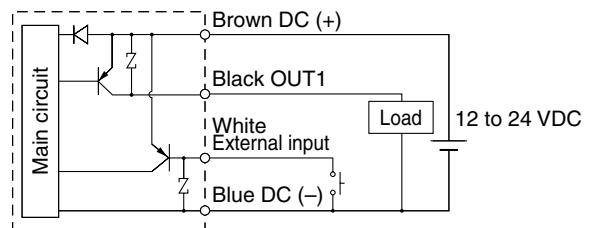
Max. 80 mA
Internal voltage drop 1.5 V or less
E: Analog output 1 to 5 V
Output impedance 1 kΩ
F: Analog output 4 to 20 mA
Load impedance
Max. 300 Ω (at 12 VDC)
Max. 600 Ω (at 24 VDC)

NPN + External input type PF3W7□□-□□-G-□□□



Max. 28 V, 80 mA
Internal voltage drop 1 V or less
External input: Voltage free input
Reed or solid state input
30 msec or more

PNP + External input type PF3W7□□-□□-H-□□□



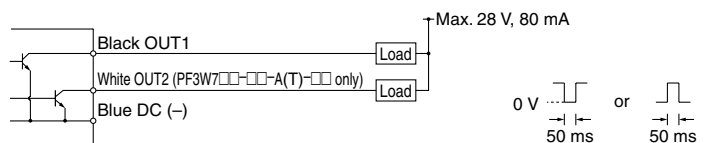
Max. 80 mA
Internal voltage drop 1.5 V or less
External input: Voltage free input
Reed or solid state input
30 msec or more

Example of wiring for accumulated pulse output

NPN 2 Output type PF3W7□□-□□-A(T)-□□□

PNP + Analog output type PF3W7□□-□□-C(T)-□□□/PF3W7□□-□□-D(T)-□□□

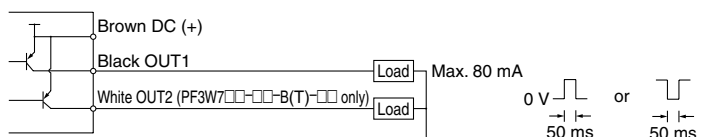
NPN + External input type PF3W7□□-□□-G-□□□



PNP 2 Output type PF3W7□□-□□-B(T)-□□□

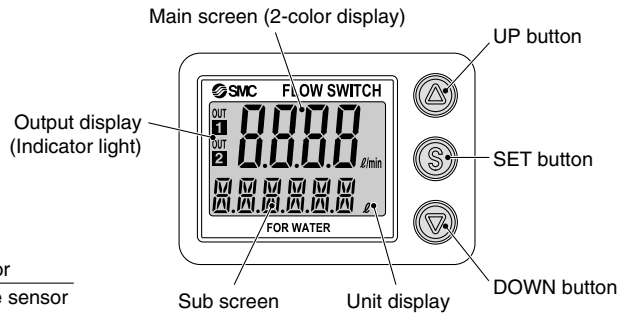
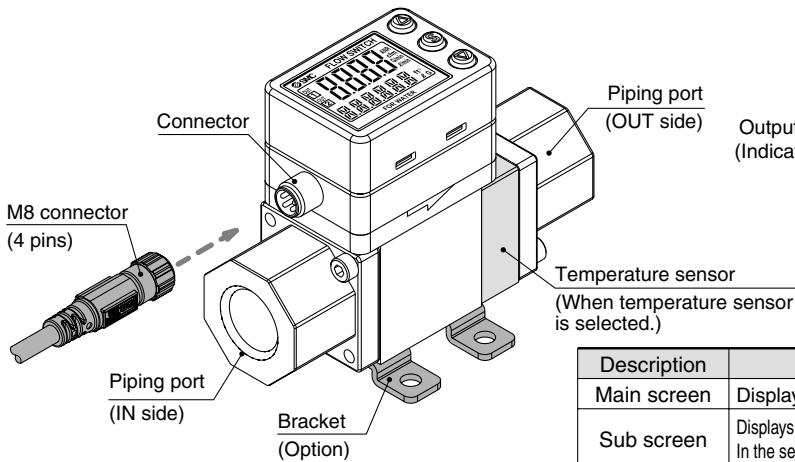
PNP + Analog output type PF3W7□□-□□-E(T)-□□□/PF3W7□□-□□-F(T)-□□□

PNP + External input type PF3W7□□-□□-H-□□□



When accumulated pulse output is selected, the indicator light is turned off.

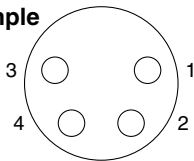
Descriptions



Description	Item
Main screen	Displays the flow, status of setting mode, and error code.
Sub screen	Displays the accumulated flow, set value, peak/bottom value, fluid temperature, and line name. In the setting mode, the set status is displayed. (Refer to page 9 for details.)
Output display	Displays the output status of OUT1 and OUT2. When ON: Orange light turns on.
UP button	Selects the mode and the display shown at the sub screen, and increases the ON/OFF set values.
SET button	Press this button to change the mode and to set a set value.
DOWN button	Selects the mode and the display shown at the sub screen, and decreases the ON/OFF set values.
Unit display	Displays the unit selected.
Piping port	Connected to the fluid inlet at IN and to the fluid outlet at OUT.
Temperature sensor	Detects the fluid temperature.

Connector (Body side)
Pin number

Example

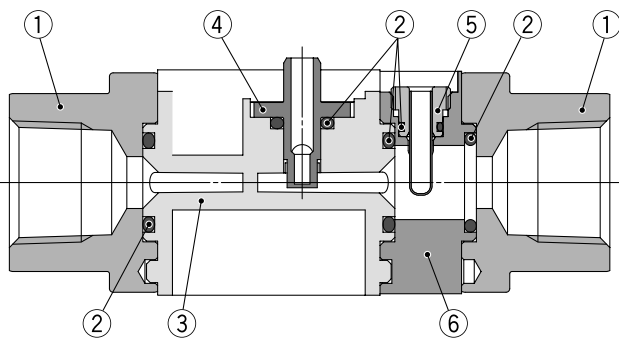


Pin no.	Pin name
1	DC (+)
2	OUT2
3	DC (-)
4	OUT1

Cable specifications of the lead wire with M8 connector

Conductor	Nominal cross section	AWG23
	O.D.	0.72
Insulator	Material	Heat resistant PVC
	O.D.	1.14
	Color	Brown, White, Black, Blue
Sheath	Material	Heat/oil resistant PVC
	Color	Light gray
Finished O.D.		ø3.4

Construction



No.	Description	Material	Note
1	Attachment	SCS13	Stainless steel 304 equivalent
2	Seal	FKM	
3	Body	PPS	
4	Sensor	PPS	
5	Temperature sensor	Stainless steel 304	With brazing (JIS Z 3261: BAg-7, ISO 3677: B-Ag56CuZnSn-620/650)
6	Temperature sensor body	Stainless steel 304	

Detection Principle

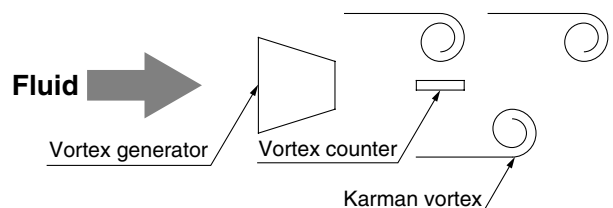
Detection principle of the digital flow switch for water

When a stick (vortex generator) is placed in a stream, vortices will be created alternately downstream from it. These vortices are stable under certain conditions. The frequency is proportional to the flow speed, and the formula below is established.

$$f = k \times v$$

f: Vortex frequency
v: Flow speed
k: Proportionality constant (determined by the size and the shape of generated vortex)

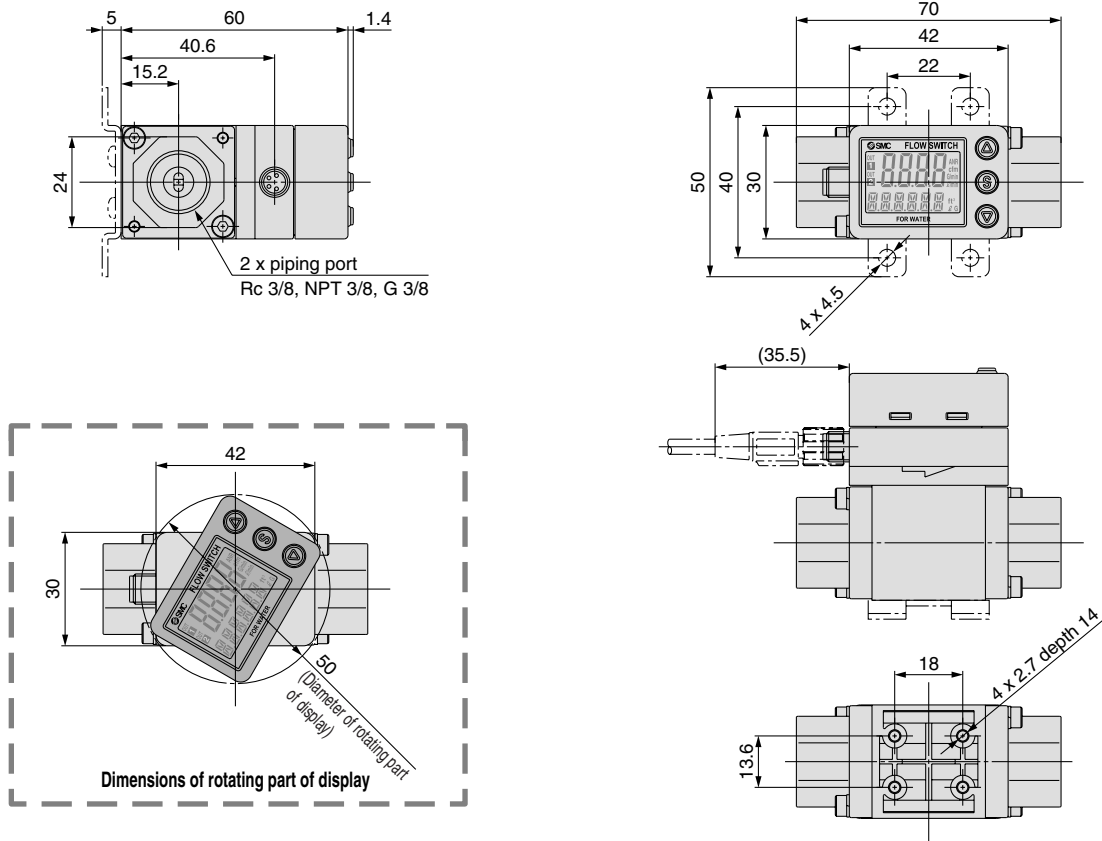
Therefore, the flow rate can be measured by detecting this frequency.



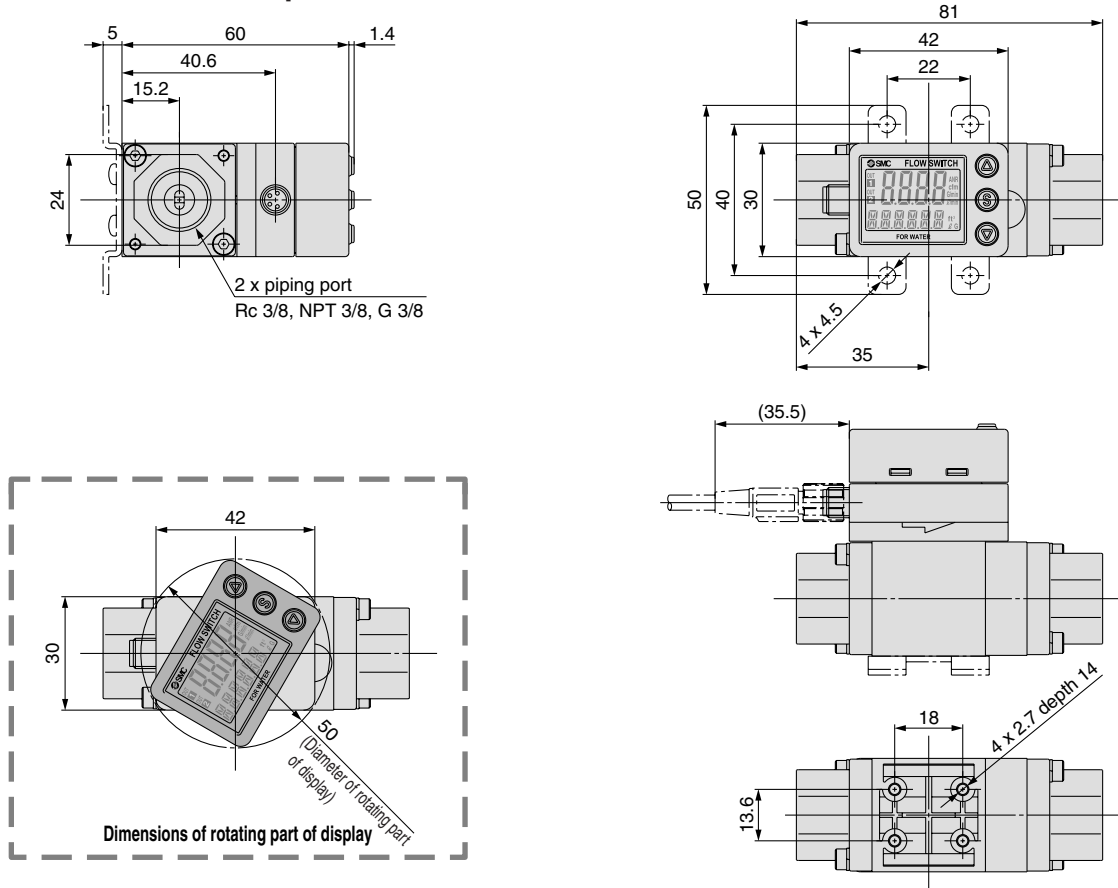
Series PF3W

Dimensions

PF3W704-□03-□



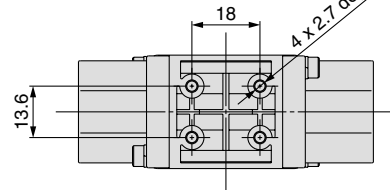
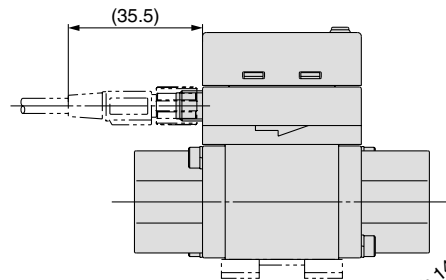
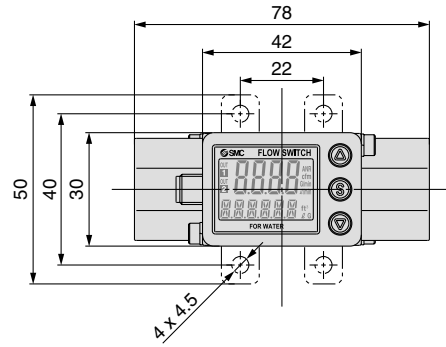
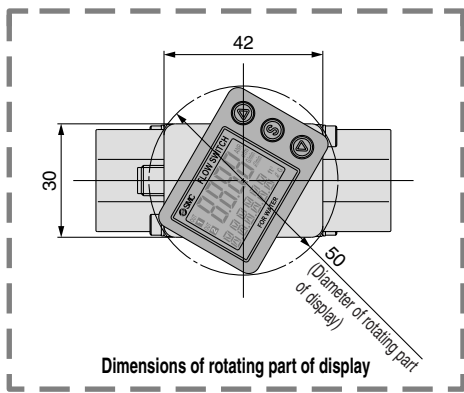
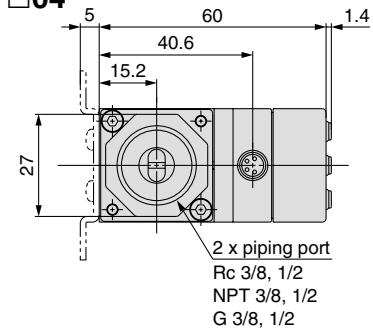
PF3W704-□03-□T/With temperature sensor



Dimensions

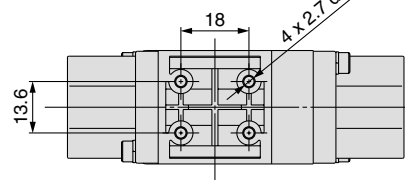
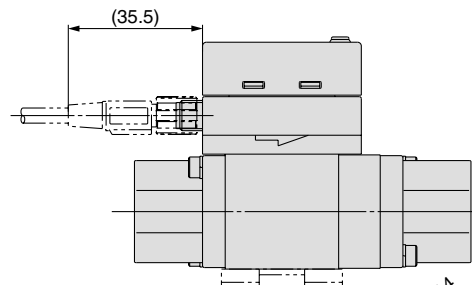
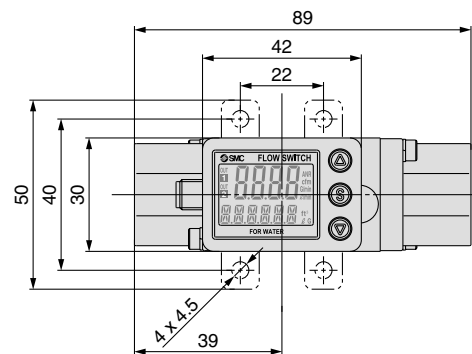
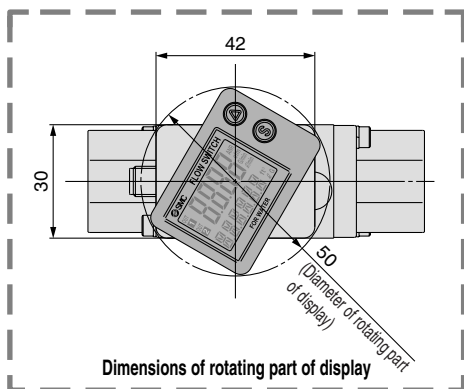
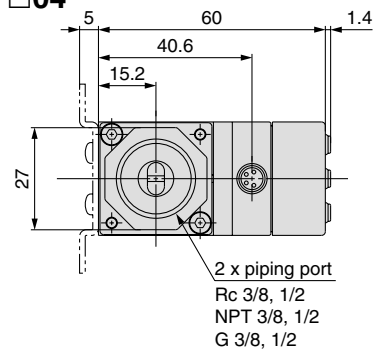
PF3W720-□03-□

□04



PF3W720-□03-□T/With temperature sensor

□04

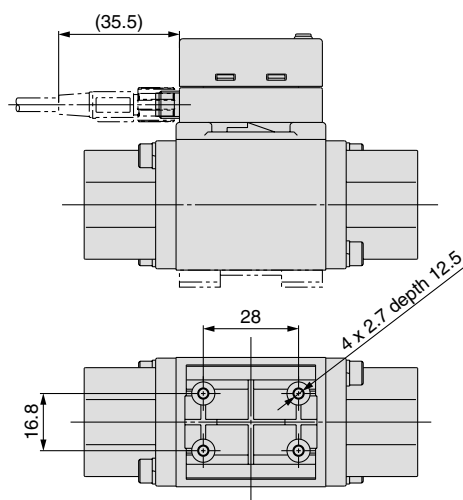
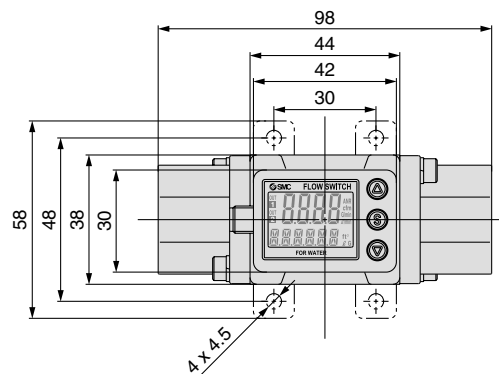
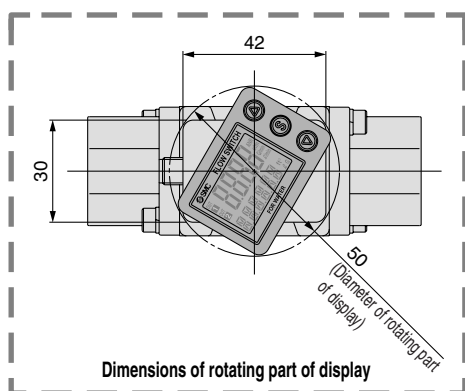
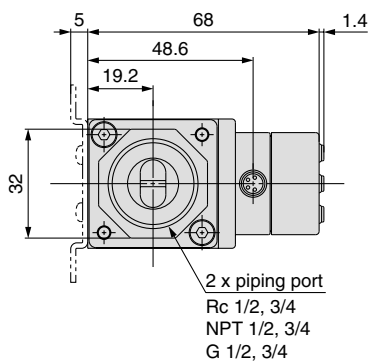


Series PF3W

Dimensions

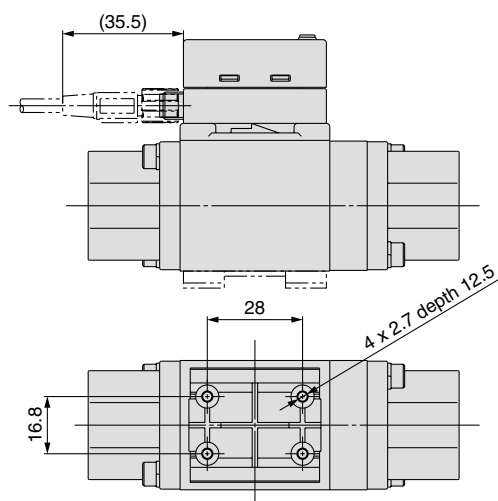
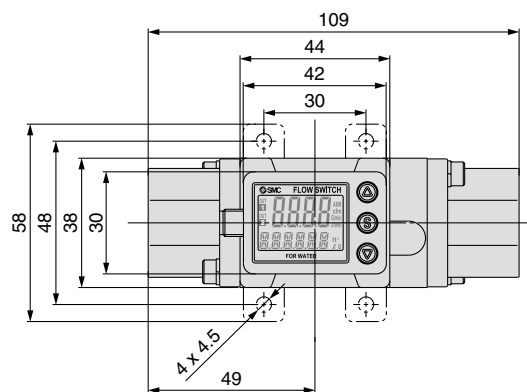
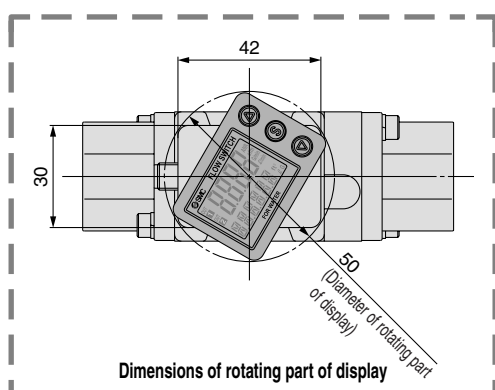
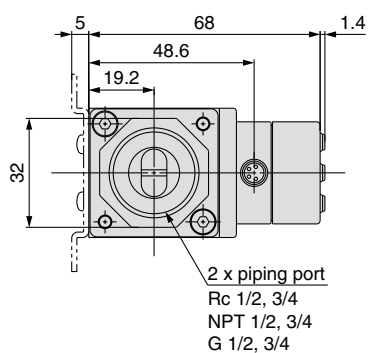
PF3W740-□04-□

□06



PF3W740-□04-□T/With temperature sensor

□06



Function Details 1

■ Output operation

The output operation can be selected from the following:
 Output (hysteresis mode and window comparator mode) corresponding to instantaneous flow rate,
 Output corresponding to accumulated flow,
 Accumulated pulse output

Note) At the time of shipment from the factory, it is set to hysteresis mode and normal output.

When a temperature sensor is attached, the output to the temperature sensor is selectable only for OUT2.
 (Refer to How to Order for details.)

■ Indication color

The indication color can be selected for each output condition. The selection of the indication color provides visual identification of abnormal values. (The indication color depends on OUT1 setting.)

ON: Green, OFF: Red
ON: Red, OFF: Green
Always: Red
Always: Green

■ Response time

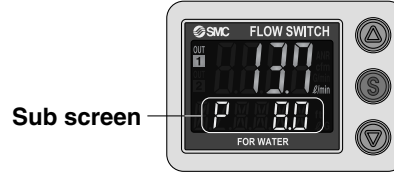
The response time can be selected depending on the application. (1 second for default setting)
 Abnormalities can be detected more quickly by setting the response time to 0.5 seconds.
 The effect of the pump fluctuation and flickering of the display can be reduced by setting the response time to 2 seconds.

0.5 seconds
1 second
2 seconds

Note) The output of the temperature sensor is fixed to 7 seconds.

■ Selection of display of sub screen

The display of sub screen in measuring mode can be set.



Set value display	Accumulated value display
Displays the set value. (The set value of OUT2 cannot be displayed.) 	Displays the accumulated value. (The accumulated value of OUT2 cannot be displayed.)
Peak value display	Bottom value display
Displays the peak value. 	Displays the bottom value.
Line name display	Fluid temperature display
Displays the line name. (Up to 6 alphanumeric characters can be input.) 	Displays the fluid temperature. (When the temperature sensor type is selected.)
OFF	
Displays nothing. 	

Function Details 2

External input function

This function can be used when external input is available. The accumulated value, peak value, and bottom value can be reset by remote control.

Accumulated flow external reset:

This function resets the accumulated value to "0" when an input signal is applied.

In accumulated increment mode, the value will be zero when reset, and the accumulated value will increase from zero.

In accumulated decrement mode, the value will be the set value when reset, and the accumulated value will decrease from the set value.

* When the accumulated value is memorized, every time the accumulated value external reset is activated, the memory device (EEPROM) will be accessed. Take into consideration the maximum number of times the memory device can be accessed, 1 million times. The total of external input times and accumulated value memorizing time interval should not exceed 1 million times.

Peak and bottom reset: Peak and bottom value are reset.

Forced output function

Output is turned ON/OFF compulsorily when starting the system or during maintenance. This enables confirmation of the wiring and prevents system errors due to unexpected output.

For the analog output type, the output will be 5 V or 20 mA for ON and 1 V or 4 mA for OFF.

* Also, the increase or decrease of the flow and temperature will not change the on/off status of the output while the forced output function is activated.

Accumulated value hold

Accumulated value can be saved on the unit even when the power supply is turned off.

The accumulated value is memorized every 2 or 5 minutes during measurement, and continues from the last memorized value when the power supply is turned on again.

The lifetime of the memory element is 1 million access cycles. Take this into consideration before using this function.

Error indication function

When an error or abnormality arises, the location and contents are displayed.

Indication	Description	Contents	Action
E _r 1	OUT1 over current error	Load current of 80 mA or more is applied to the switch output (OUT1).	Eliminate the cause of the over current by turning off the power supply and then turn on it again.
E _r 2	OUT2 over current error	Load current of 80 mA or more is applied to the switch output (OUT2).	
HHH	Excessive instantaneous flow	Flow exceeds the upper limit of indicated flow rate range (rated flow x approx. 1.4).	Decrease the flow.
9999999999 (alternately displays [999] and [999999])	Excessive accumulated flow	Flow exceeds the accumulated flow range. (Decimal points start flashing due to the flow range.)	Reset the accumulated flow value. (This error does not matter when the accumulated flow is not used.)
E _r 0	System error	Internal data error	Turn off the power supply and then turn on it again. If the failure cannot be solved, ask SMC for repair.
E _r 4			
E _r 6			
E _r 8			
E _r 12	Temperature sensor failure	The temperature sensor may be damaged.	

Power saving mode

The display can be turned off to reduce the power consumption (by approx. 12%).

In power saving mode, decimal points flash on the main screen. If any button is pressed during power saving mode, the display is recovered for 30 seconds to check the flow, etc.

Setting of secret code

Users can select whether a secret code must be entered to release key lock. At the time of shipment from the factory, it is set such that the secret code is not required.

Peak/Bottom value indication

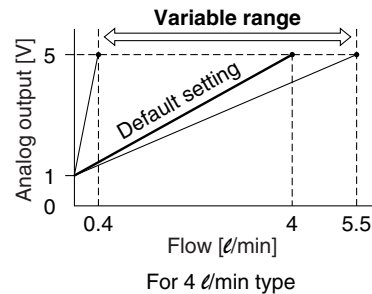
The maximum (minimum) flow is detected and updated from when the power supply is turned on. In peak (bottom) value indication mode, this maximum (minimum) flow is displayed.

Keylock function

Prevents operation errors such as accidentally changing setting values.

Analog output free range function

Flow that generates an output of 5 V or 20 mA can be changed. (This function is not available for the analog output to the temperature.) This function is available if the analog output type is used. The value can be changed within 10% of maximum rated flow to maximum display flow range.





Series PF3W

Specific Product Precautions 1

Be sure to read before handling.

Refer to back cover for Safety Instructions, "Handling Precautions for SMC Products" (M-E03-3) for Flow Switches Precautions.

Design/Selection

Warning

1. Since the type of fluid varies depending on the product, be sure to verify the specifications.

The switches do not have an explosion proof rating. To prevent a possible fire hazard, do not use with inflammable gases or fluids.

2. Design the system so that the fluid always fills the detection passage.

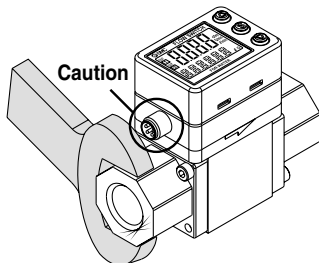
Especially for vertical mounting, introduce the fluid from the bottom to the top. If the flow goes downwards, air bubbles in the fluid will not be able to get out, causing malfunction. (There should not be a problem as long as the fluid passage is completely filled with water.)

Mounting

Caution

1. Apply a wrench only to the metal part of the piping when installing the flow switch onto the system piping.

Do not apply the wrench to any part other than the piping attachment or the switch may be damaged. Pay attention so that the wrench does not hit the M8 connector. This will damage the connector.



2. Avoid piping in which the piping size of the IN side of the switch changes suddenly.

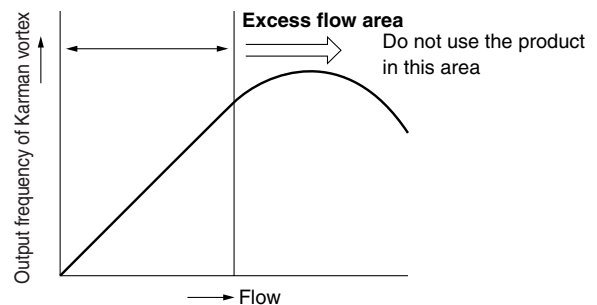
When abruptly reducing the size of piping or when there is a restriction such as a valve on the IN side, the pressure distribution in the piping changes and makes accurate measurement impossible. Therefore, flow restriction measures such as these should be implemented on the OUT side of the switch.

Also, leaving the OUT side open or bringing about excessive flow volume will increase the risk of cavitation and may make accurate measurement impossible. Increasing the fluid pressure is one means of reducing cavitation. Try a procedure such as mounting a throttle on the OUT side of the switch. Check to make sure there is no malfunction before using. If the orifice of OUT side is fully closed to operate the pump, the switch may malfunction due to the effect of the pulsation (pressure fluctuation). Ensure that there is no malfunction before usage.

Handling

Warning

1. When using a switch for high temperature fluid, the switch itself also becomes hot due to the high temperature fluid. Avoid touching the switch directly as this may cause a burn.
2. The product is a flow meter using Karman vortex. The flow meter using Karman vortex has lower output frequency at excess flow state. Do not use the product within the excess flow area in the chart below.



Operating Environment

Warning

1. Never use in the presence of explosive gases.

The switches do not have an explosion proof rating. Never use in the presence of an explosive gas as this may cause a serious explosion.
2. Use the switch within the specified fluid and ambient temperature range.

The fluid temperature range is 0 to 90°C and ambient temperature range is 0 to 50°C. Take measures to prevent the fluid from freezing when it is below 5°C, since this may damage the switch and lead to a malfunction. Never use the switch in an environment where there are drastic temperature changes even when these temperatures are within the specification.
3. If the temperature of the fluid is lower than the ambient temperature, condensation will be generated which may damage the product or cause malfunction.

Do not install the product upside down or vertically. Water droplets may cause damage earlier.

Maintenance

Warning

1. Take precautions when using the switch for an interlock circuit.

When a pressure switch is used for the interlock circuit, devise a multiple interlock system to prevent trouble or malfunction, and verify the operation of the switch and interlock function on a regular basis.



Series PF3W

Specific Product Precautions 2

Be sure to read before handling.

Refer to back cover for Safety Instructions, “Handling Precautions for SMC Products” (M-E03-3) for Flow Switches Precautions.

Measured Fluid

Warning

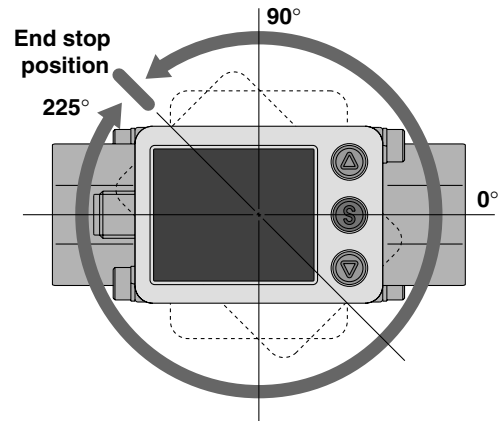
1. Check regulators and flow adjustment valves before introducing the fluid.
If pressure or flow rate beyond the specified range are applied to the switch, the sensor unit may be damaged.
2. The fluids applicable for the switch are water and ethylene glycol aqueous solution (viscosity of 3 mPa·s or less).
3. Install a filter on the IN side when there is a possibility of foreign matter being mixed with the fluid.
If foreign matter adheres to the switch’s vortex generator or vortex counter, accurate measurement will no longer be possible. We recommend a filter with filtration of approx. 40 mesh.

Others

Warning

1. After the power is turned on, the switch’s output remains off while a message is displayed (for approx. 3 seconds). Therefore, start the measurement after a value is displayed.
2. Perform settings after stopping control systems.
3. Do not apply excessive rotational force to the monitor unit.

The monitor of the integrated display type is rotatable. It can rotate by 90 degrees counterclockwise and 225 degrees clockwise, in increments of 45 degrees. The stopper may be damaged if the monitor unit is turned with excessive force.



Set Flow Range and Rated Flow Range

Caution

Set the flow within the rated flow range.

The set flow range is the range of flow rate that is possible in setting.

The rated flow range is the range that satisfies the sensor’s specifications (accuracy, etc.).




It is possible to set a value outside of the rated flow range, however, the specification is not guaranteed.

Sensor	Flow range				
	0.5 ℓ/min	2 ℓ/min	5 ℓ/min	20 ℓ/min	40 ℓ/min
PF3W704	0.5 ℓ/min — 4 ℓ/min				
	0.35 ℓ/min — 5.5 ℓ/min				
	0.35 ℓ/min — 5.5 ℓ/min				
PF3W720	2 ℓ/min — 16 ℓ/min				
	1.7 ℓ/min — 22 ℓ/min				
	1.7 ℓ/min — 22 ℓ/min				
PF3W740	5 ℓ/min — 40 ℓ/min				
	3.5 ℓ/min — 55 ℓ/min				
	3.5 ℓ/min — 55 ℓ/min				

Rated flow range
 Display flow range
 Set flow range

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)*1), and other safety regulations.

-  **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.

- *1) 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.

Warning

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

Since the product specified here is used under various operating conditions, its compatibility with specific equipment must be decided by the person who designs the equipment or decides its specifications based on necessary analysis and test results. The expected performance and safety assurance of the equipment will be the responsibility of the person who has determined its compatibility with the product. This person should also continuously review all specifications of the product referring to its latest catalog information, with a view to giving due consideration to any possibility of equipment failure when configuring the equipment.

2. Only personnel with appropriate training should operate machinery and equipment.

The product specified here may become unsafe if handled incorrectly. The assembly, operation and maintenance of machines or equipment including our products must be performed by an operator who is appropriately trained and experienced.

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

1. The inspection and maintenance of machinery/equipment should only be performed after measures to prevent falling or runaway of the driven objects have been confirmed.
2. When the product is to be removed, confirm that the safety measures as mentioned above are implemented and the power from any appropriate source is cut, and read and understand the specific product precautions of all relevant products carefully.
3. Before machinery/equipment is restarted, take measures to prevent unexpected operation and malfunction.

4. Contact SMC beforehand and take special consideration of safety measures if the product is to be used in any of the following conditions.

1. Conditions and environments outside of the given specifications, or use outdoors or in a place exposed to direct sunlight.
2. Installation on equipment in conjunction with atomic energy, railways, air navigation, space, shipping, vehicles, military, medical treatment, combustion and recreation, or equipment in contact with food and beverages, emergency stop circuits, clutch and brake circuits in press applications, safety equipment or other applications unsuitable for the standard specifications described in the product catalog.
3. An application which could have negative effects on people, property, or animals requiring special safety analysis.
4. Use in an interlock circuit, which requires the provision of double interlock for possible failure by using a mechanical protective function, and periodical checks to confirm proper operation.

Caution

1. The product is provided for use in manufacturing industries.

The product herein described is basically provided for peaceful use in manufacturing industries.

If considering using the product in other industries, consult SMC beforehand and exchange specifications or a contract if necessary.

If anything is unclear, contact your nearest sales branch.

Limited warranty and Disclaimer/ Compliance Requirements

The product used is subject to the following “Limited warranty and Disclaimer” and “Compliance Requirements”.

Read and accept them before using the product.

Limited warranty and Disclaimer

1. The warranty period of the product is 1 year in service or 1.5 years after the product is delivered.*2)
Also, the product may have specified durability, running distance or replacement parts. Please consult your nearest sales branch.
2. For any failure or damage reported within the warranty period which is clearly our responsibility, a replacement product or necessary parts will be provided.
This limited warranty applies only to our product independently, and not to any other damage incurred due to the failure of the product.
3. Prior to using SMC products, please read and understand the warranty terms and disclaimers noted in the specified catalog for the particular products.

*2) **Vacuum pads are excluded from this 1 year warranty.**

A vacuum pad is a consumable part, so it is warranted for a year after it is delivered.

Also, even within the warranty period, the wear of a product due to the use of the vacuum pad or failure due to the deterioration of rubber material are not covered by the limited warranty.

Compliance Requirements

1. The use of SMC products with production equipment for the manufacture of weapons of mass destruction (WMD) or any other weapon is strictly prohibited.
2. The exports of SMC products or technology from one country to another are governed by the relevant security laws and regulations of the countries involved in the transaction. Prior to the shipment of a SMC product to another country, assure that all local rules governing that export are known and followed.

Safety Instructions

Be sure to read “Handling Precautions for SMC Products” (M-E03-3) before using.

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