

# 3-Color Display Digital Flow Switch for Large Flow



IP65

Applicable fluid **Air, N<sub>2</sub>**

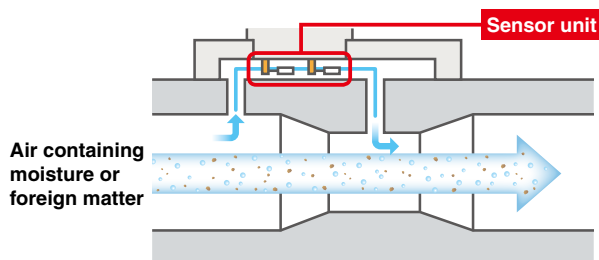
Flow range: Max. **12000 L/min**

Flow ratio<sup>\*1</sup> **100:1** Wide range of flow measurement with one product

\*1 The flow ratio is 20 : 1 for the current model (PF2A7□H/Large flow type).

Model	Port size	Applicable flow range [L/min]									
		30	60	120	500	1000	3000	6000	10000	12000	
PF3A703H	1	30		3000 L type				3000			
PF3A706H	1 1/2	60		6000 L type				6000			
PF3A712H	2	120		12000 L type				12000			

Improved drainage and resistance to foreign matter



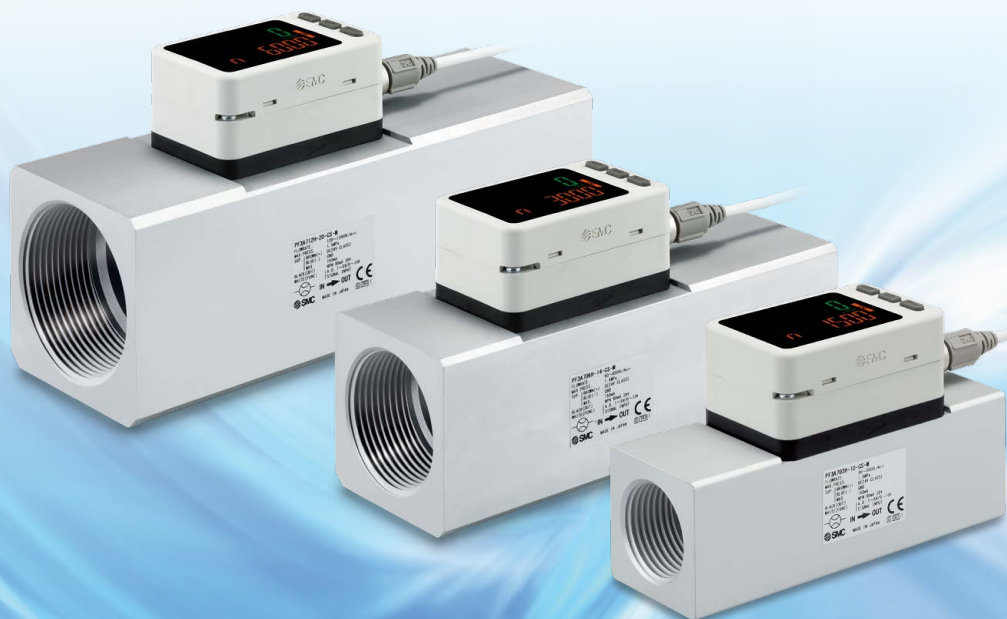
Bypass construction reduces the moist air or foreign matter in contact with the sensor, reducing the accuracy deterioration and damage of the sensor.

Pressure loss: **75% reduction<sup>\*1</sup>**  
(20 kPa → 5 kPa)

\*1 Compared with the current model (PF2A7□H/Large flow type).

Through bore construction

Reduced pressure loss  
Maintenance-free fluid passage



New

3-Screen Display Digital Flow Monitor

Allows for the monitoring of remote lines



PF3A703H Series p. 14

**PF3A7□H Series**



CAT.ES100-117B

## 3-color/ 2-screen display

\* 2-screen display: 2-row display of main screen and sub screen

Upper Main display: **Green** At set point

Set value **Orange** Instantaneous flow rate **Green** **Red**  
 (Lower Sub display) (Upper Main display)



Upper Main display: **Red** At set point



The lower/sub display can be changed by pressing the up/down buttons.

■ Accumulated value



■ Peak/Bottom value



■ Line name



\* Either "Input of line name" or "Display OFF" can be added via the function settings.

## Smallest settable increment: **2 L/min**

Current model (PF2A7□H/Large flow type): 5 L/min

## Grease-free

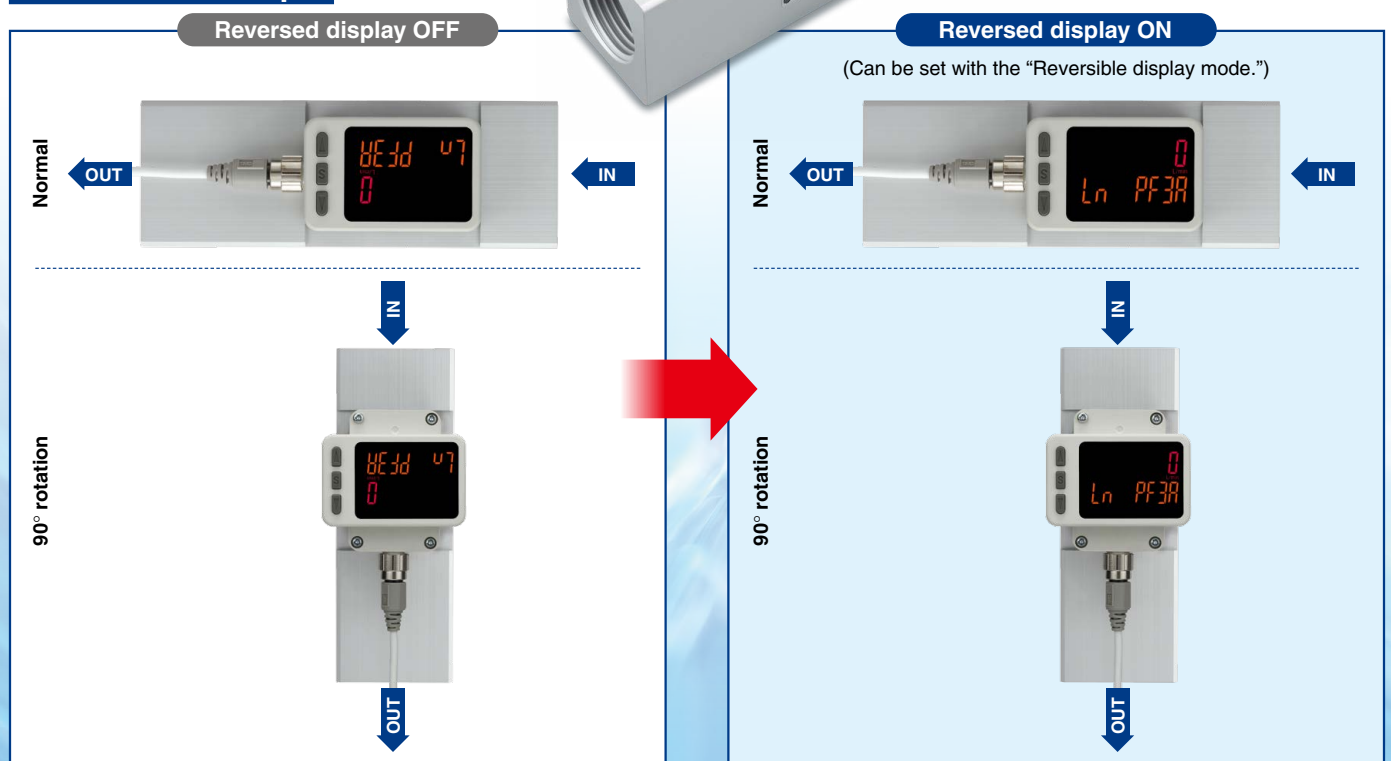
## Display rotates 90° and can be reversed.

The display can be rotated in increments of 90° according to the installation. The display can be reversed for easy operation.

**Clockwise 90°** Easy operation, improved visibility



### Installation Example

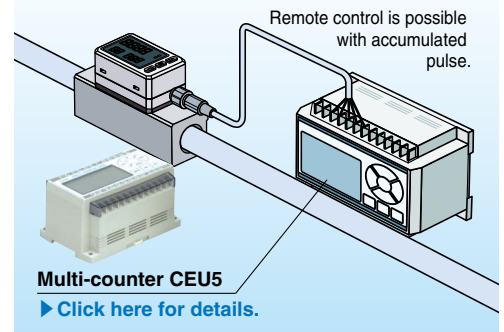


## ■ Functions (Refer to pages 20 and 21 for details.)

- Output operation
- Simple setting mode
- Display color
- Reference condition
- Response time
- FUNC output switching function (Analog output ⇔ External input)
- Selectable Analog output function
- External input function
- Forced output function
- Accumulated value hold
- Peak/Bottom value display
- Display OFF mode
- Setting of security code
- Keylock function
- Reset to the default settings
- Reversible display mode
- Zero cut function
- Selection of display on sub screen
- Analog output free range function
- Error display function

## ■ Application

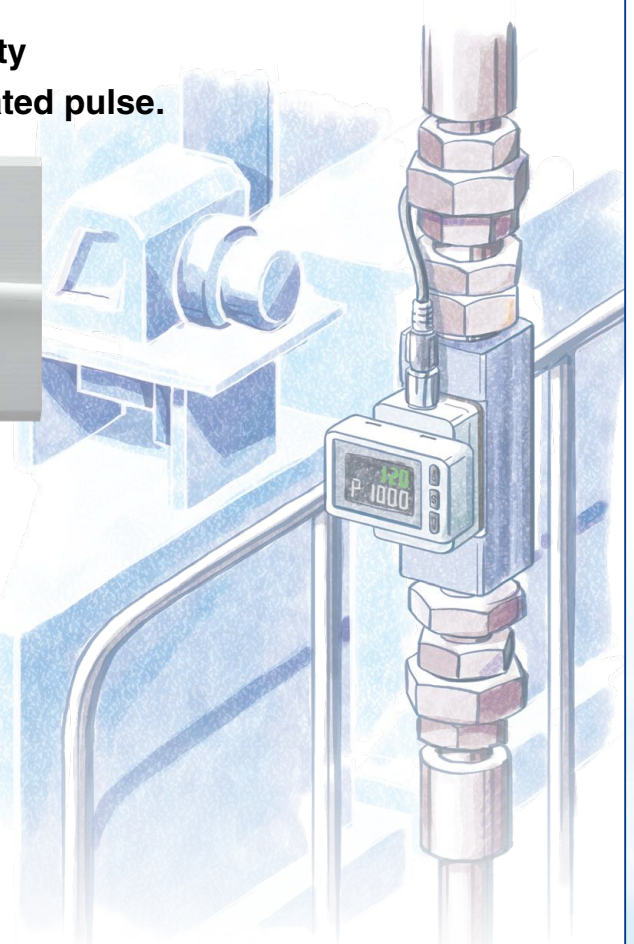
### ■ Flow control of equipment, main line, and branch line



## Digital flow switch to save energy!

Flow control is necessary for promoting energy saving in any application. Saving energy starts from numerical control of the flow consumption of equipment and lines and clarification of the purpose and effect.

- **Digital display allows visualization.**
- **3-color/2-screen display, Improved visibility**
- **Remote control is possible with accumulated pulse.**



### Energy Saving Program

For details, refer to the SMC website.

<http://www.smcworld.com> SMC Model Selection Software Search

#### Energy Saving Program

Allows you to perform various calculations necessary to improve the pneumatic energy saving.

This software is the download version. After downloading the software, install it into your personal computer.

Download the program

Ver. 4.1.02 2017/01/23 Update  
How to Install

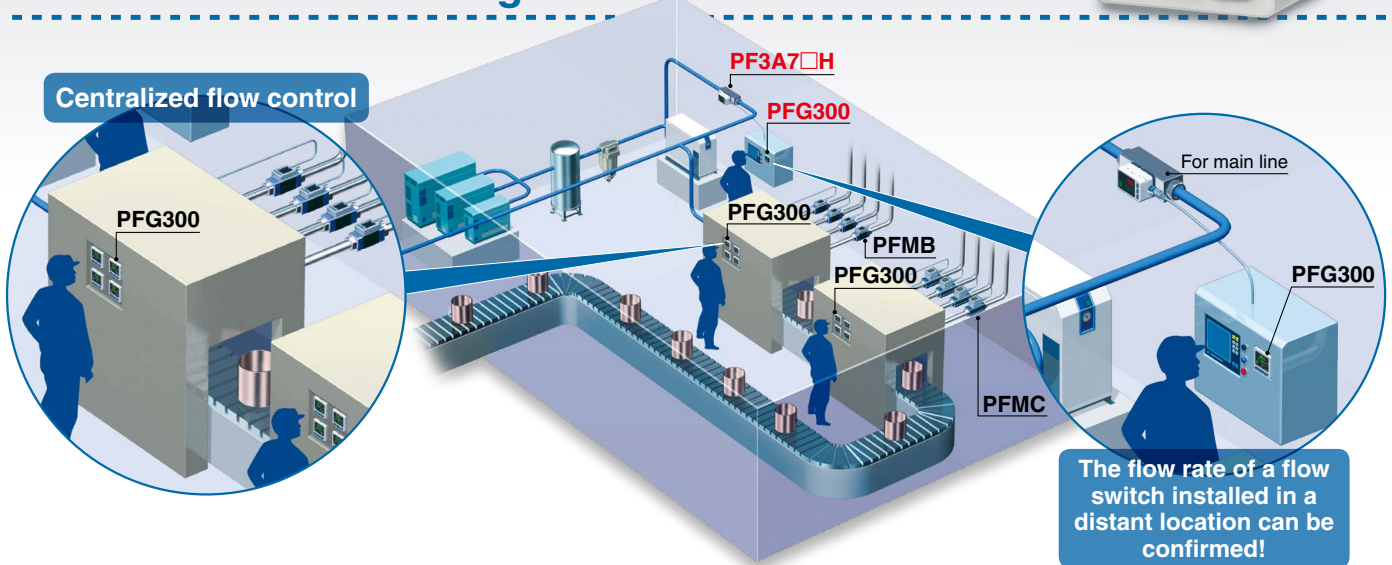


# 3-Screen Display Digital Flow Monitor

## PFG300 Series p. 14

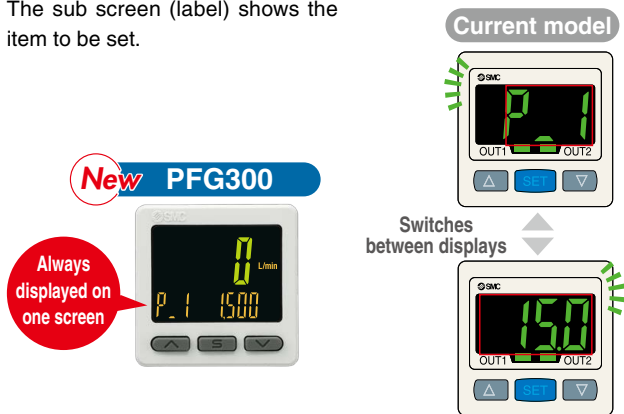


### Allows for the Monitoring of Remote Lines



### Visualization of Settings

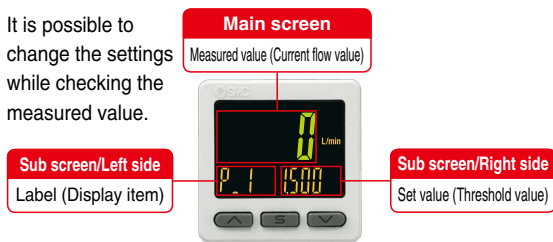
The sub screen (label) shows the item to be set.



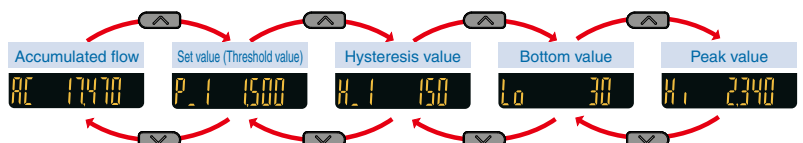
Mode Examples	Hysteresis mode					
	Normal output	Set value (Threshold value)	Reversed output	Set value (Threshold value)	Hysteresis	Set hysteresis value
	P.1	1500	n.1	1500	H.1	150
Mode Examples	Window comparator mode					
	Normal output/Lo side	Set value (Threshold value)	Normal output/Hi side	Set value (Threshold value)		
	P.L	900	P.H	1800		
	Reversed output/Lo side	Set value (Threshold value)	Reversed output/Hi side	Set value (Threshold value)		
	n.L	900	n.H	1800		

### Easy Screen Switching

It is possible to change the settings while checking the measured value.



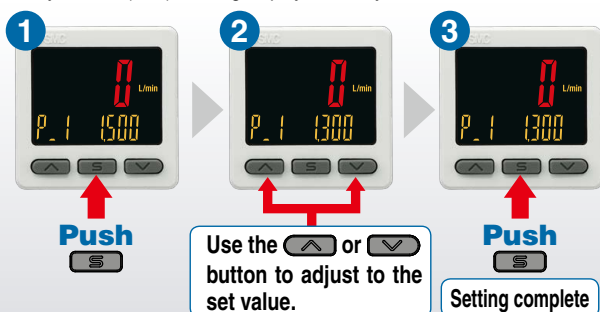
The sub screen can be switched by pressing the up/down buttons.



\* Either "Input of line name" or "Display OFF" can be added via the function settings.

### Simple 3-Step Setting

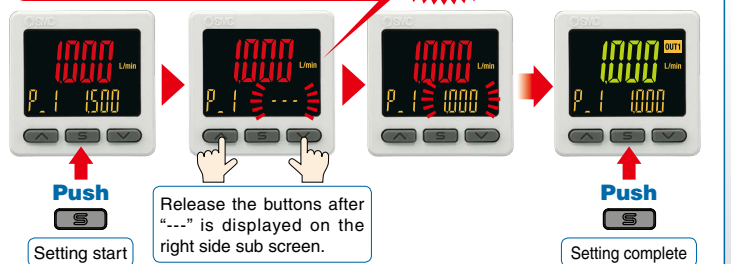
When the S button is pressed and the set value (P\_1) is being displayed, the set value (threshold value) can be set. When the S button is pressed and the hysteresis (H\_1) is being displayed, the hysteresis value can be set.



#### With a snap shot function for set value reading

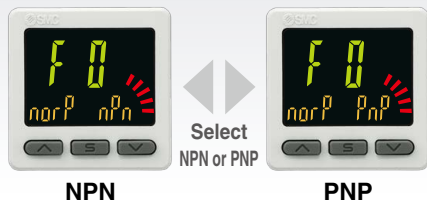
Pressing the and buttons simultaneously for a minimum of 1 second will make the set value (threshold value) the same as the current flow value.

**Snap shot function**



## NPN/PNP Switch Function

The number of stock items can be reduced.



Analog output of 0 to 10 V is also available.

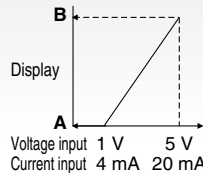
Voltage output	1 to 5 V 0 to 10 V	Switchable
Current output	4 to 20 mA	Fixed

## Input Range Selection (for Pressure/Flow rate)

The displayed value to the sensor input can be set as required.

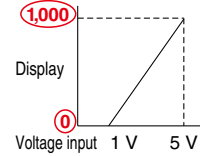
(Voltage input: 1 to 5 V/Current input: 4 to 20 mA)

Pressure switch/Flow switch can be displayed.



A is displayed for 1 V (or 4 mA).  
B is displayed for 5 V (or 20 mA).  
The range can be set as required.

■ Pressure Sensor for General Fluids/PSE570



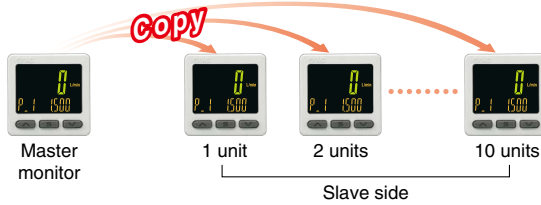
	A	B
PSE570	0	1,000
PSE573	-100	100
PSE574	0	500

Set A and B to the values shown in the table above.

## Convenient Functions

### ● Copy function

The settings of the master monitor can be copied to the slave monitors.



### ● Security code

The key locking function keeps unauthorized persons from tampering with the settings.

### ● Power saving mode

Power consumption is reduced by turning off the monitor.

Current consumption*1	Reduction rate*2
25 mA or less	Approx. 50% reduction

\*1 During normal operation \*2 In power saving mode

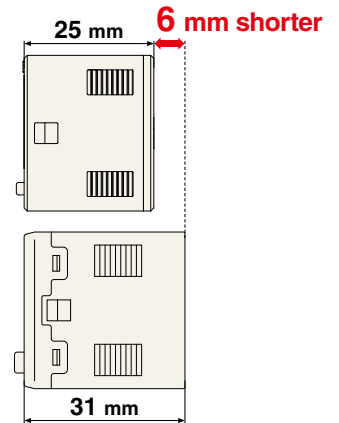
### ● External input function

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

## Compact & Lightweight

● Compact: Max. 6 mm shorter

● Lightweight: Max. 5 g lighter (30 g → 25 g)



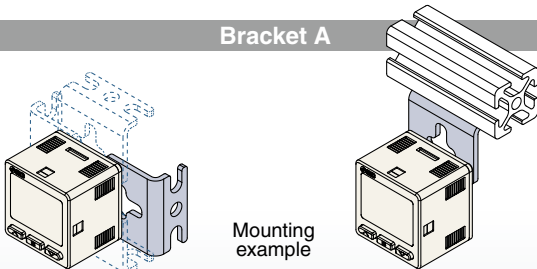
## Functions (▶ Refer to pages 22 to 24 for details.)

- Output operation
- Simple setting mode
- Display color
- Delay time setting
- Digital filter setting
- FUNC output switching function
- Selectable analog output function
- External input function
- Forced output function
- Accumulated value hold
- Peak/Bottom value display
- Setting of security code
- Keylock function
- Reset to the default settings
- Display with zero cut-off setting
- Selection of display on sub screen
- Analog output free range function
- Error display function
- Copy function
- Selection of power saving mode

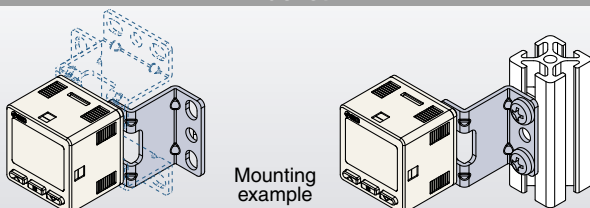
## Mounting

The bracket configuration allows for mounting in four orientations.

### Bracket A



### Bracket B

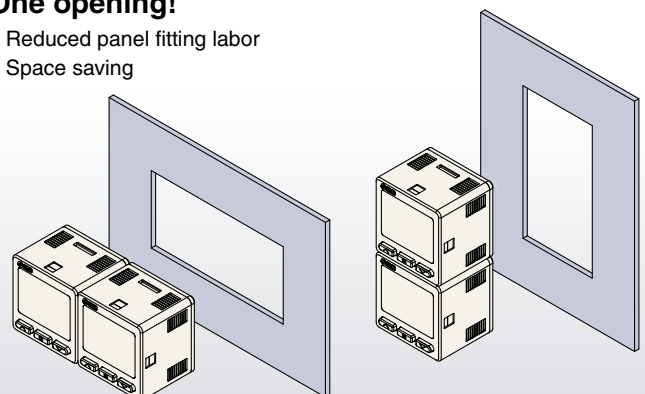


### Panel mount









Mountable side by side both vertically and horizontally


### One opening!

- Reduced panel fitting labor
- Space saving






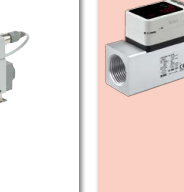


# Flow Switch Flow Rate Variations

Series	Availability of the digital flow monitor PFG300	Applicable fluid	Detection method	Smallest settable increment	Rated flow range [L/min]																						
					0.2	0.5	1	2	5	10	20	25	50	100	150	200	300	500	600	1000	2000	3000	6000	12000			
<b>PF2A</b> 	—	Air N <sub>2</sub>	Thermal type (Thermistor)	0.1 L/min	1	10																					
				0.5 L/min		5	50																				
				1 L/min			10	100																			
				2 L/min				20	200																		
				5 L/min						50	500																
<b>PF3A7□H</b> p. 9 	<b>PFG300</b> p. 14 	Air N <sub>2</sub>	Thermal type (Platinum sensor)	2 L/min			30	3000																			
				Bypass flow type	5 L/min				60	6000																	
					10 L/min						120	12000															
<b>PFM</b> 	—	Dry air N <sub>2</sub> Ar CO <sub>2</sub>	Thermal type (MEMS)	0.01 L/min	0.2	10																					
				0.5 L/min				25																			
				0.1 L/min	1	50																					
					2	100																					
<b>PFMB</b> 	<b>PFG300</b> 	Dry air N <sub>2</sub>	Thermal type (MEMS)  Bypass flow type	2	2	200																					
				1 L/min	5	500																					
					10	1000																					
					20	2000																					
					5	500																					
<b>PFMC</b> 	<b>PFG300</b> 	Dry air N <sub>2</sub>	Thermal type (MEMS)  Bypass flow type	1 L/min	5	500																					
				10	1000																						
				20	2000																						

Series	Applicable fluid	Detection method	Rated flow range [L/min]												
			-3	-2	-1	-0.5	0	0.5	1	2	3				
<b>PFMV</b> 	Dry air N <sub>2</sub>	Thermal type (MEMS)	0	0	0.5										
			0	0	1										
			0	0	3										
						-0.5	0.5								
								-1	1						
										-3	3				

# Flow Switch Variations / Basic Performance Table

Series	PFMV  PFMV3	PFM 	PFMB  PFG300	PFMC  PFG300	PF2A 	PF3A7□H <a href="#">p. 9</a>  PFG300 <a href="#">p. 14</a>
Enclosure	IP40	IP40	IP40	IP65 [Monitor unit: IP40]	IP65	IP65 [Monitor unit: IP40]
Fluid	Dry air, N <sub>2</sub>	Dry air, N <sub>2</sub> , Ar, CO <sub>2</sub>	Dry air, N <sub>2</sub>	Dry air, N <sub>2</sub>	Air, N <sub>2</sub>	Air, N <sub>2</sub>
Setting	Digital	Digital	Digital	Digital	Digital	Digital
Rated flow range	0 to 0.5 L/min -0.5 to 0.5 L/min 0 to 1 L/min -1 to 1 L/min 0 to 3 L/min -3 to 3 L/min	0.2 to 10 L/min 0.5 to 25 L/min 1 to 50 L/min 2 to 100 L/min	2 to 200 L/min 5 to 500 L/min 10 to 1000 L/min 20 to 2000 L/min	5 to 500 L/min 10 to 1000 L/min 20 to 2000 L/min	1 to 10 L/min 5 to 50 L/min 10 to 100 L/min 20 to 200 L/min 50 to 500 L/min	30 to 3000 L/min 60 to 6000 L/min 120 to 12000 L/min
Power supply voltage	12 to 24 VDC ±10%	24 VDC ±10%	12 to 24 VDC ±10%	12 to 24 VDC ±10%	12 to 24 VDC ±10%	24 VDC ±10%
Temperature characteristics (25°C standard)	±2% F.S. (15 to 35°C) [Monitor unit] ±0.5% F.S. (0 to 50°C) ±5% F.S. (0 to 50°C)	±2% F.S. (15 to 35°C) ±5% F.S. (0 to 50°C)	±2% F.S. (15 to 35°C) [Monitor unit] ±0.5% F.S. (0 to 50°C) ±5% F.S. (0 to 50°C)	±2% F.S. (15 to 35°C) [Monitor unit] ±0.5% F.S. (0 to 50°C) ±5% F.S. (0 to 50°C)	±3% F.S. (15 to 35°C) ±5% F.S. (0 to 50°C)	±5% F.S. [Monitor unit] ±0.5% F.S. (0 to 50°C)
Repeatability	±2% F.S. (Fluid: Dry air) [Monitor unit] ±0.1% F.S. Analog output: ±0.3% F.S. ±5% F.S.	±1% F.S. (Fluid: Dry air) Analog output: ±3% F.S.	±1% F.S. (Fluid: Dry air) [Monitor unit] ±0.1% F.S. ±1 digit	±1% F.S. (Fluid: Dry air) [Monitor unit] ±0.1% F.S. ±1 digit	±1% F.S. (PF2A7□0) ±2% F.S. (PF2A7□1)	±1% F.S. [Monitor unit] ±0.1% F.S. ±1 digit
Hysteresis	Hysteresis mode: Variable Window comparator mode: Variable	Hysteresis mode: Variable Window comparator mode: Variable	Hysteresis mode: Variable Window comparator mode: Variable	Hysteresis mode: Variable Window comparator mode: Variable	Hysteresis mode: Variable Window comparator mode: Fixed (3 digits)	Hysteresis mode: Variable Window comparator mode: Variable
Output	NPN/PNP open collector Analog voltage output Analog current output	NPN/PNP open collector Accumulated pulse output Analog voltage output Analog current output	NPN/PNP open collector Accumulated pulse output Analog voltage output Analog current output	NPN/PNP open collector Accumulated pulse output Analog voltage output Analog current output	NPN/PNP open collector Accumulated pulse output	NPN/PNP open collector Accumulated pulse output Analog voltage output Analog current output
Display	[Monitor unit] 2-color LCD display	2-color LED display	2-color LED display   2-color LCD display [Monitor unit 3-color LCD display]	3-color LCD display	LED display	3-color LCD display

\* The monitor unit shows the PFG300 and PFMV3.





# CONTENTS

**3-Color Display**

**Digital Flow Switch for Large Flow *PF3A7□H Series***

**3-Screen Display**

**Digital Flow Monitor *PFG300 Series***



**3-Color Display**

**Digital Flow Switch for Large Flow *PF3A7□H Series***

How to Order .....	p. 9
Specifications .....	p. 10
Flow Range .....	p. 11
Analog Output .....	p. 11
Pressure Loss .....	p. 11
IN Side Straight Section and Accuracy .....	p. 12
Internal Circuits and Wiring Examples .....	p. 12
Construction: Parts in Contact with Fluid .....	p. 13
Dimensions .....	p. 13

**3-Screen Display**

**Digital Flow Monitor *PFG300 Series***

How to Order .....	p. 14
Specifications .....	p. 15
Internal Circuits and Wiring Examples .....	p. 16
Dimensions .....	p. 17

**PF3A7□H/Function Details .....** p. 20

**PFG300/Function Details .....** p. 22

**Safety Instructions .....** Back Cover

PF3A7□H

PFG300

Function  
Details

# 3-Color Display

## Digital Flow Switch for Large Flow

# PF3A7□H Series



### How to Order

PF3A 7 03 H - □ 10 - CS □ - M □

#### Type

7	Integrated display
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#### Rated flow range

03	30 to 3000 L/min
06	60 to 6000 L/min
12	120 to 12000 L/min

#### Large flow type

#### Thread type

Nil	Rc
N	NPT
F*1	G

\*1 ISO 1179-1 compliant

#### Port size

Symbol	Port size	Rated flow range		
		03	06	12
10	1	●	—	—
14	1 1/2	—	●	—
20	2	—	—	●

#### Calibration certificate\*8

Nil	None
A*9	Yes

\*8 Certificate in both English and Japanese

\*9 Made to order

#### Unit specification

Nil	Units selection function*6
M	SI unit only*7

\*6 This product is for overseas use only according to the New Measurement Act. (The SI unit type is provided for use in Japan.)

\*7 Fixed unit: Instantaneous flow: L/min  
Accumulated flow: L

#### Options

Nil	With lead wire and M12 connector (3 m)*5
N	Without lead wire and M12 connector

\*5 Option is shipped together, but not assembled.

#### Output specification

Symbol	OUT	FUNC*2	Applicable monitor unit model
CS	NPN	Analog voltage output*3 ↔ External input*4	PFG300 series
DS	NPN	Analog current output ↔ External input*4	PFG310 series
ES	PNP	Analog voltage output*3 ↔ External input*4	PFG300 series
FS	PNP	Analog current output ↔ External input*4	PFG310 series

\*2 Analog output or external input can be selected by pressing the buttons. Analog output is set as default setting.

\*3 1 to 5 V or 0 to 10 V can be selected by pressing the button. The default setting is 1 to 5 V.

\*4 The accumulated value, peak value, and bottom value can be reset.

#### Option/Part No.

When only optional parts are required, order with the part number listed below.

Part no.	Option	Note
ZS-37-A	Lead wire and M12 connector	Length: 3 m

For flow switch precautions and specific product precautions, refer to the "Operation Manual" on the SMC website. Click [here](#) for details.

## Specifications

Model		PF3A703H	PF3A706H	PF3A712H	
Fluid	Applicable fluid*1	Air, Nitrogen			
	Fluid temperature	0 to 50°C			
Flow	Detection method	Thermal type			
	Rated flow range	30 to 3000 L/min	60 to 6000 L/min	120 to 12000 L/min	
	Set point range*2	Instantaneous flow	30 to 3150 L/min	60 to 6300 L/min	120 to 12600 L/min
		Accumulated flow	0 to 999,999,999,990 L	0 to 999,999,999,900 L	
	Smallest settable increment	Instantaneous flow	2 L/min	5 L/min	10 L/min
		Accumulated flow	10 L	100 L	
	Accumulated volume per pulse (Pulse width = 50 ms)	Select from 100 L/pulse or 1000 L/pulse.			
Accumulated value hold function*3	Interval of 2 or 5 minutes can be selected.				
Pressure	Rated pressure range	0.1 to 1.5 MPa			
	Proof pressure	2.25 MPa			
	Pressure loss	Refer to "Pressure Loss" graph.			
	Pressure characteristics*4	±2.5% F.S. (0.1 to 1.0 MPa, 0.5 MPa standard)			
Electrical	Power supply voltage	24 VDC ±10%			
	Current consumption	150 mA or less			
	Protection	Polarity protection			
Accuracy	Display accuracy	±3.0% F.S.			
	Analog output accuracy	±3.0% F.S.			
	Repeatability	Switch output/Display: ±1.0% F.S. Analog output: ±1.0% F.S.			
	Temperature characteristics	±5.0% F.S. (Ambient temperature of 0 to 50°C, 25°C standard)			
Switch output	Output type	NPN open collector PNP open collector			
	Output mode	Select from Instantaneous output (Hysteresis mode or Window comparator mode), Accumulated output, or Accumulated pulse output.			
	Switch operation	Select from Normal or Reversed output.			
	Max. load current	80 mA			
	Max. applied voltage (NPN only)	28 VDC			
	Internal voltage drop (Residual voltage)	NPN output type: 1 V or less (at load current of 80 mA) PNP output type: 2 V or less (at load current of 80 mA)			
	Response time*5	Select from 1 s, 2 s, or 5 s.			
	Hysteresis*6	Variable from 0			
Analog output*7	Protection	Over current protection			
	Output type	Voltage output: 1 to 5 V (0 to 10 V can be selected*8), Current output: 4 to 20 mA			
	Impedance	Voltage output	Output impedance: Approx. 1 kΩ		
		Current output	Maximum load impedance: Approx. 600 Ω		
Response time*9	Linked with the response time of the switch output.				
External input*10	Input type	No-voltage input: 0.4 V or less			
	Input mode	Select from Accumulated value external reset or Peak/Bottom value reset.			
	Input time	30 ms or longer			
Display	Reference condition*11	Select from Standard condition or Normal condition.			
	Unit*12	Instantaneous flow	L/min, CFM (ft <sup>3</sup> /min)		
		Accumulated flow	L, ft <sup>3</sup>		
	Display range*13	Instantaneous flow	0 to 3150 L/min (Flow under 30 L/min is displayed as "0")	0 to 6300 L/min (Flow under 60 L/min is displayed as "0")	0 to 12600 L/min (Flow under 120 L/min is displayed as "0")
		Accumulated flow*14	0 to 999,999,999,990 L		
	Minimum display unit	Instantaneous flow	2 L/min	5 L/min	10 L/min
		Accumulated flow	10 L	100 L	
Display	LCD, 2-screen display (Main screen/Sub screen) Main screen: Red/Green, Sub screen: Orange Main screen: 5 digits, 7 segment, Sub screen: 6 digits, 7 segment				
Indicator LED	OUT indicator: Red LED is ON when output is ON				
Environment	Enclosure	IP65			
	Withstand voltage	1000 VAC for 1 minute between terminals and housing			
	Insulation resistance	50 MΩ (500 VDC measured via megohmmeter) between terminals and housing			
	Operating temperature range	Operating: 0 to 50°C, Stored: -10 to 60°C (No freezing or condensation)			
Operating humidity range	Operating/Stored: 35 to 85% RH (No condensation)				
Standards	CE, RoHS				
Piping	Piping specification	Rc1, NPT1, G1	Rc1 1/2, NPT1 1/2, G1 1/2	Rc2, NPT2, G2	
Main materials of parts in contact with fluid	Aluminum alloy, PPS, HNBR [Sensor: Pt, Au, Fe, Lead glass (exempted from the RoHS application), Al <sub>2</sub> O <sub>3</sub> ]				
Length of lead wire with connector	3 m				
Weight	Piping specification	Rc	610 g	1190 g	1680 g
		NPT	610 g	1190 g	1680 g
		G	630 g	1220 g	1720 g
	Lead wire with connector	+90 g			

\*1 Air quality grade is JIS B 8392-1:2012 [3:6:-] and ISO 8573-1:2010 [3:6:-].  
 \*2 Set point range will change according to the setting of the zero cut function.  
 \*3 When using the accumulated value hold function, use the operating conditions to calculate the product life, and do not exceed it. The maximum update limit of the memory device is 1.5 million times. If the product is operated 24 hours per day, the product life will be as follows:  
 - 5 min interval: life is calculated as 5 min x 1.5 million = 7.5 million min = 14.3 years  
 - 2 min interval: life is calculated as 2 min x 1.5 million = 3 million min = 5.7 years  
 If the accumulated flow external reset is repeatedly used, the product life will be shorter than calculated life.  
 \*4 When the pressure range is 1.0 to 1.5 MPa, the pressure characteristics will be ±5% F.S. (standard pressure is 0.5 MPa). Do not release the OUT side piping port of the product to the atmosphere without connecting piping. If the product is used with the piping port released to atmosphere, accuracy may vary.  
 \*5 The time from when the flow is changed by a step input (when the flow rate changes from 0 to the maximum value of the rated flow range instantaneously) until the switch output turns ON (or OFF) when set to be 90% of the rated flow rate.

\*6 If the flow fluctuates around the set value, the width for setting more than the fluctuating width needs to be set. Otherwise, chattering will occur.  
 \*7 Analog output or external input can be selected by pressing the buttons.  
 \*8 Refer to the graph for analog output.  
 \*9 When selecting 0 to 10 V, refer to the analog output graph for the allowable load current.  
 \*10 The time from when the flow is changed by a step input (when the flow rate changes from 0 to the maximum value of the rated flow range instantaneously) until the analog output reaches 90% of the rated flow rate.  
 \*11 Analog output or external input can be selected by pressing the buttons.  
 \*12 The flow rate given in the specification is the value under standard conditions.  
 \*13 Setting is only possible for models with the units selection function.  
 \*14 Display range will change according to the setting of the zero cut function.  
 \*15 The accumulated flow display is the upper 6-digit and lower 6-digit (total of 12 digits) display. When the upper digits are displayed, x 10<sup>6</sup> lights up.  
 \* Products with tiny scratches, marks, or display color or brightness variations which do not affect the performance of the product are verified as conforming products.

# PF3A7□H Series

## Flow Range

Model	Flow range				
	0 L/min	1000 L/min	3000 L/min	6000 L/min	12000 L/min
PF3A703H	30 L/min	3000 L/min			
	30 L/min	3150 L/min			
	0 L/min	3150 L/min			
PF3A706H	60 L/min	6000 L/min			
	60 L/min	6300 L/min			
	0 L/min	6300 L/min			
PF3A712H	120 L/min	12000 L/min			
	120 L/min	12600 L/min			
	0 L/min	12600 L/min			

Rated flow range   
  Set point range   
  Display range

## Analog Output

### Flow/Analog Output

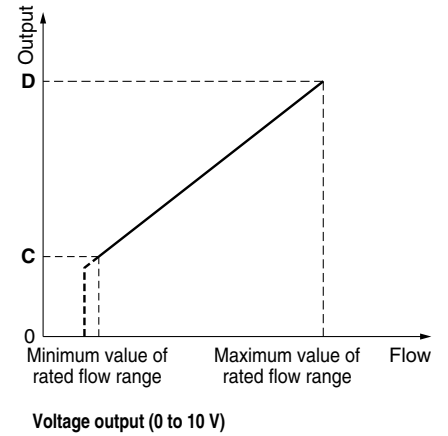
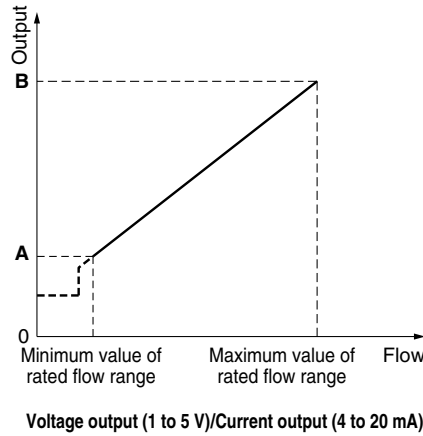
	0 L/min	A*2	B
Voltage output (1 to 5 V)*1	1 V	1.04 V	5 V
Current output*1	4 mA	4.16 mA	20 mA

	0 L/min	C*2	D
Voltage output (0 to 10 V)*1*3	0 V	0.1 V	10 V

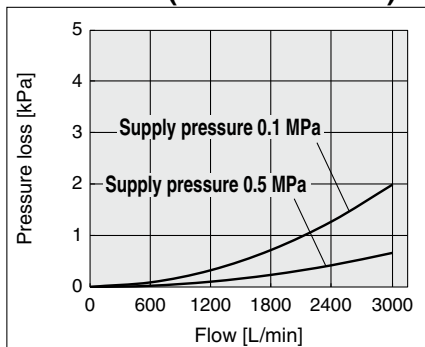
Model	Minimum value of rated flow range*4	Maximum value of rated flow range
PF3A703H	30 L/min	3000 L/min
PF3A706H	60 L/min	6000 L/min
PF3A712H	120 L/min	12000 L/min



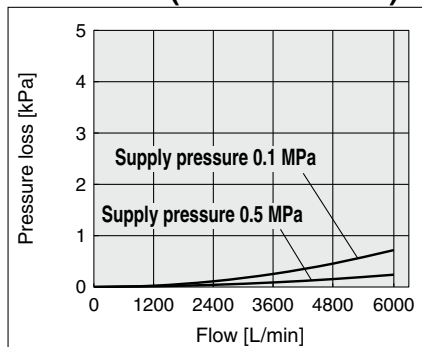
- \*1 Analog output accuracy is within  $\pm 3\%$  F.S.
- \*2 A and C will change according to the setting of the zero cut function.
- \*3 The analog output current from the connected equipment should be  $20 \mu\text{A}$  or less when selecting 0 to 10 V. When more than  $20 \mu\text{A}$  current flows, it is possible that the accuracy is not satisfied below 0.5 V.
- \*4 The minimum value of the rated flow range will change according to the setting of the zero cut function.

## Pressure Loss (Reference Data)

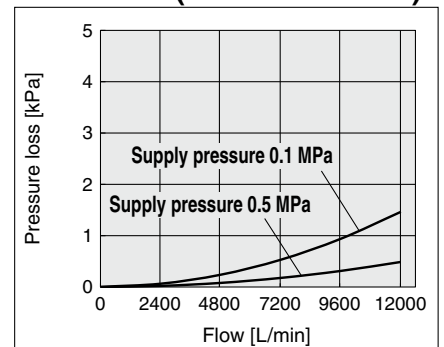
### PF3A703H (for 3000 L/min)



### PF3A706H (for 6000 L/min)

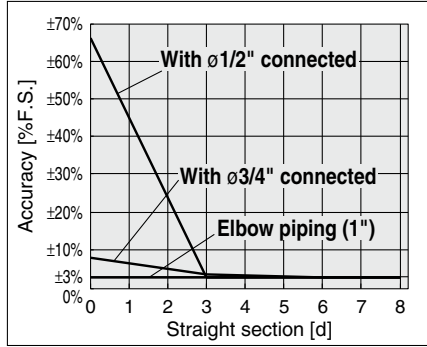


### PF3A712H (for 12000 L/min)

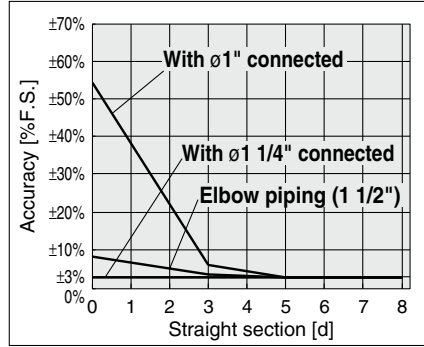


### IN Side Straight Section and Accuracy (Reference Data)

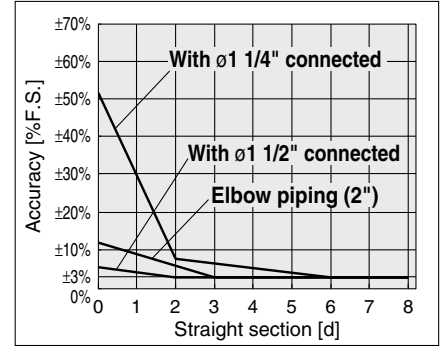
**PF3A703H (for 3000 L/min)**



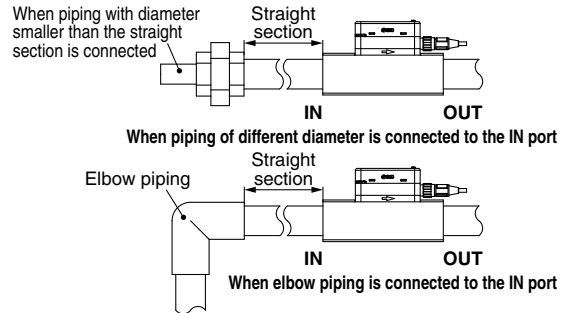
**PF3A706H (for 6000 L/min)**



**PF3A712H (for 12000 L/min)**

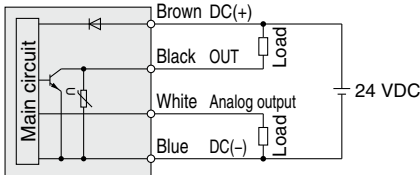


- Do not connect equipment or piping which may generate a fluctuation in the flow or drift at the IN side of the product. When installing a regulator at the IN side of the product, make sure that hunting is not generated.
  - The piping on the IN side must have a straight section of piping whose length is more than 8 times the piping I.D.
- If a straight section of piping is not installed, the accuracy may vary by  $\pm 3\%$  F.S. or more.  
 \* "Straight section" means a section of piping without any bends or rapid changes in the cross sectional area.



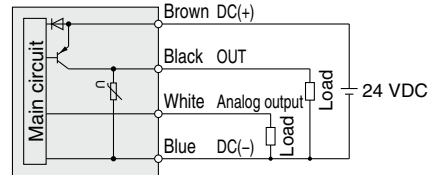
### Internal Circuits and Wiring Examples

**NPN + Analog output selected**  
**PF3A7□□H-□□-CS/DS□□□□**



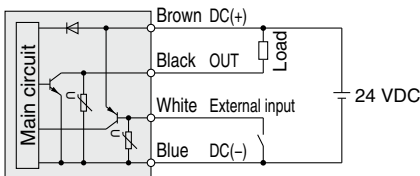
Max. applied voltage: 28 V, Max. load current: 80 mA, Internal voltage drop: 1 V or less  
 CS: Analog output: 1 to 5 V or 0 to 10 V  
 Output impedance: 1 k $\Omega$   
 DS: Analog output: 4 to 20 mA  
 Max. load impedance: 600  $\Omega$   
 Min. load impedance: 50  $\Omega$

**PNP + Analog output selected**  
**PF3A7□□H-□□-ES/FS□□□□**



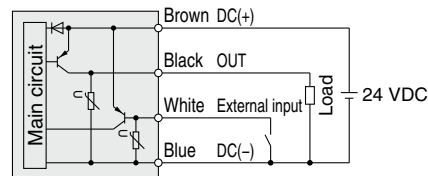
Max. load current: 80 mA, Internal voltage drop: 2 V or less  
 ES: Analog output: 1 to 5 V or 0 to 10 V  
 Output impedance: 1 k $\Omega$   
 FS: Analog output: 4 to 20 mA  
 Max. load impedance: 600  $\Omega$   
 Min. load impedance: 50  $\Omega$

**NPN + External input selected**  
**PF3A7□□H-□□-CS/DS□□□□**



Max. applied voltage: 28 V, Max. load current: 80 mA, Internal voltage drop: 1 V or less  
 External input: Input voltage 0.4 V or less (Reed or Solid state input) for 30 ms or longer

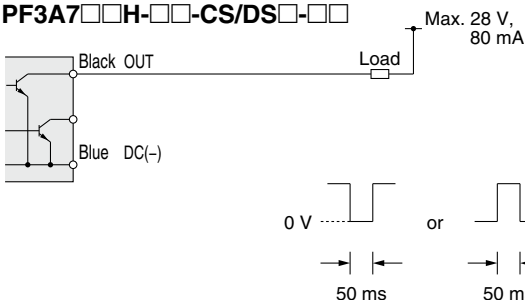
**PNP + External input selected**  
**PF3A7□□H-□□-ES/FS□□□□**



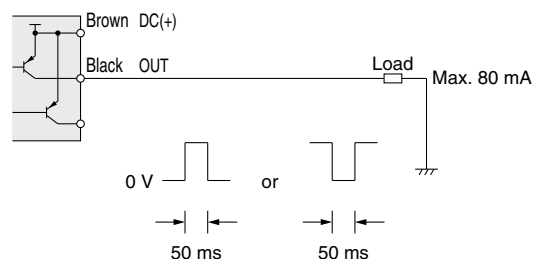
Max. load current: 80 mA, Internal voltage drop: 2 V or less  
 External input: Input voltage 0.4 V or less (Reed or Solid state input) for 30 ms or longer

### Accumulated pulse output wiring examples

**PF3A7□□H-□□-CS/DS□□□□**



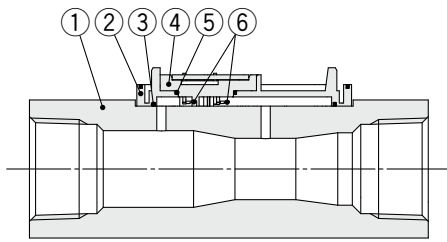
**PF3A7□□H-□□-ES/FS□□□□**



# PF3A7□H Series

## Construction: Parts in Contact with Fluid

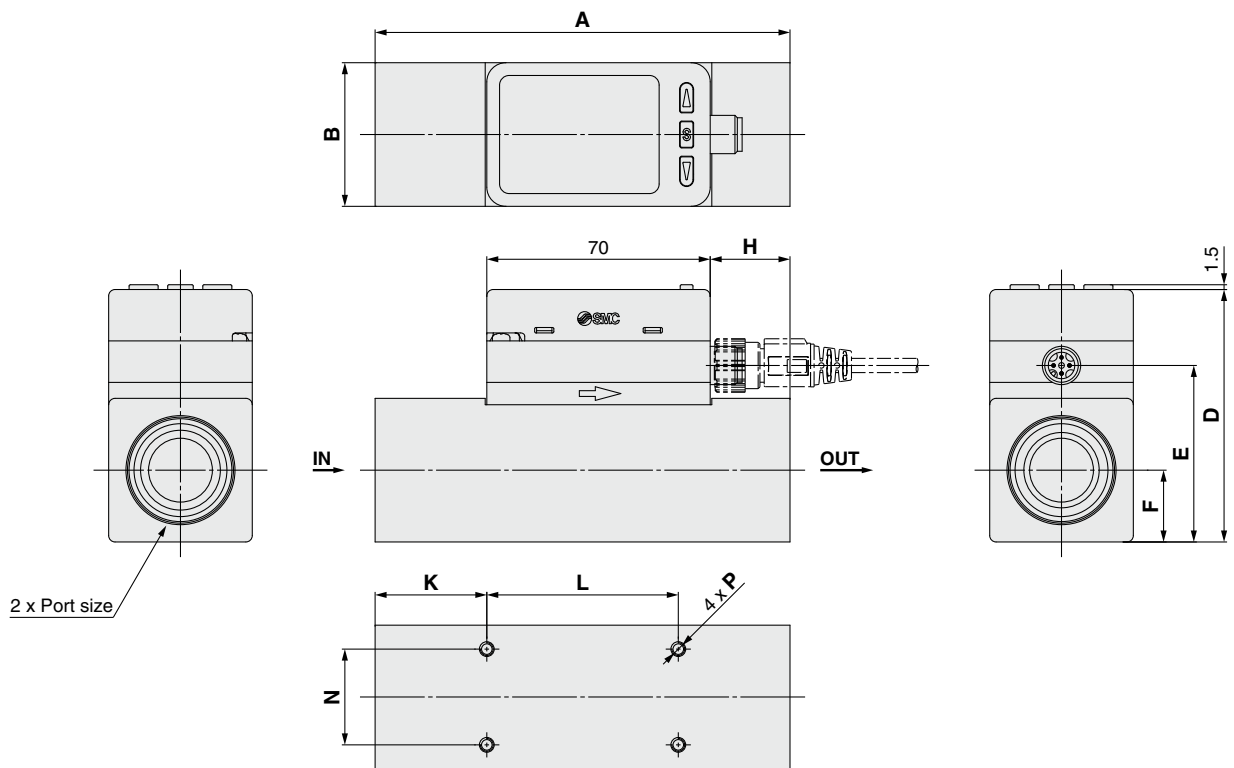
PF3A703H/706H/712H



### Component Parts

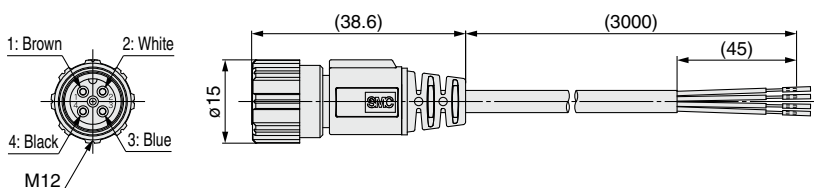
No.	Description	Material	Note
1	Body	Aluminum alloy	Anodized
2	Branch passage	PPS	—
3	Gasket	HNBR	—
4	Sensor base	PPS	—
5	Gasket	HNBR	—
6	Sensor	Au, Pt, Al <sub>2</sub> O <sub>3</sub>	—

## Dimensions



Model	Symbol	Port size	A	B	D	E	F	H	K	L	N	P
PF3A703H		Rc1, NPT1, G1	130	45	79.1	55.3	22.5	25	35	60	30	M4 x 0.7 depth 7
PF3A706H		Rc1 1/2, NPT1 1/2, G1 1/2	170	60	94.1	70.3	30	68	45	80	40	M5 x 0.8 depth 8
PF3A712H		Rc2, NPT2, G2	200	70	104.1	80.3	35	85	50	100	50	M6 x 1.0 depth 9

## Lead wire and M12 connector (Part no.: ZS-37-A)



Pin no.	Pin name	Wire color
1	DC(+)	Brown
2	FUNC	White
3	DC(-)	Blue
4	OUT	Black

\* 4-wire type lead wire and M12 connector used for the PF3A series.

### Cable Specifications

Conductor	Nominal cross section	AWG23
Insulator	Outside diameter	Approx. 1.1 mm
	Color	Brown, Blue, Black, White
Sheath	Finished outside diameter	∅4

# 3-Screen Display

# Digital Flow Monitor

# PFG300 Series



PF3A7□H

PFG300

Function Details

## How to Order

**PFG 3 0 0 - RT - M - L**

### Type

**3** Remote type monitor unit

### Input specification

Symbol	Description	Applicable flow switch model
<b>0</b>	Voltage input	PF3A7□H-CS/ES series
<b>1</b>	Current input	PF3A7□H-DS/FS series

### Output specification

<b>RT</b>	2 outputs (NPN/PNP switching type) + Analog voltage output*1, 2
<b>SV</b>	2 outputs (NPN/PNP switching type) + Analog current output*2
<b>XY</b>	2 outputs (NPN/PNP switching type) + Copy function

\*1 Can switch between 1 to 5 V and 0 to 10 V

\*2 Can be switched to external input or copy function

### Unit specification

<b>Nil</b>	Units selection function*3
<b>M</b>	SI unit only*4

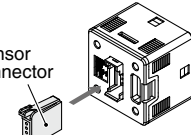
\*3 This product is for overseas use only according to the New Measurement Act. (The SI unit type is provided for use in Japan.)

\*4 Fixed unit: Instantaneous flow: L/min  
Accumulated flow: L

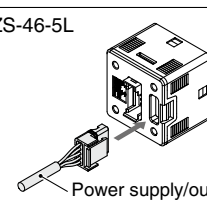
### Option 4

	Operation manual	Calibration certificate
<b>Nil</b>	○	—
<b>Y</b>	—	○
<b>K</b>	○	○
<b>T</b>	—	○

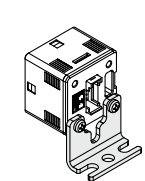
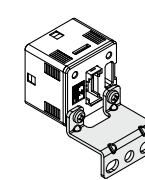
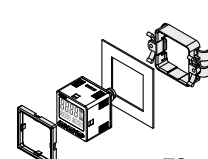
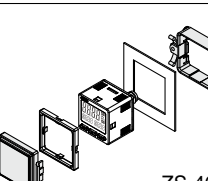
### Option 3

<b>Nil</b>	None
<b>C</b>	ZS-28-CA-4 

### Option 1

Symbol	Description
<b>Nil</b>	Without lead wire
<b>L</b>	Power supply/output connection lead wire (Lead wire length: 2 m) 

### Option 2

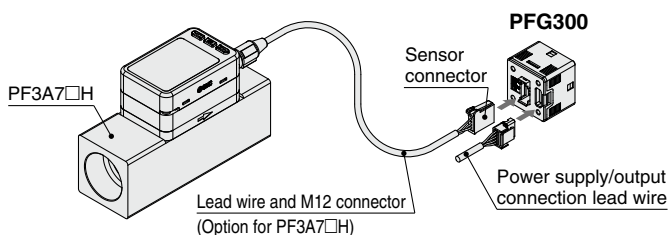
Symbol	Description
<b>Nil</b>	None
<b>A1</b>	Bracket A (Vertical mounting)  ZS-46-A1
<b>A2</b>	Bracket B (Horizontal mounting)  ZS-46-A2
<b>B</b>	Panel mount adapter  ZS-46-B
<b>D</b>	Panel mount adapter + Front protection cover  ZS-46-D

## Options/Part Nos.

When only optional parts are required, order with the part numbers listed below.

Part no.	Option	Note
<b>ZS-28-CA-4</b>	Sensor connector	For PF3A7□H
<b>ZS-46-A1</b>	Bracket A	Tapping screw: Nominal size 3 x 8 L (2 pcs.)
<b>ZS-46-A2</b>	Bracket B	Tapping screw: Nominal size 3 x 8 L (2 pcs.)
<b>ZS-46-B</b>	Panel mount adapter	
<b>ZS-46-D</b>	Panel mount adapter + Front protection cover	
<b>ZS-46-5L</b>	Power supply/output connection lead wire	5-core, 2 m
<b>ZS-27-01</b>	Front protection cover	

## Connection Example



# PFG300 Series

For flow switch precautions and specific product precautions, refer to the "Operation Manual" on the SMC website. Click [here](#) for details.

## Specifications

Model		PFG300 series			
Applicable SMC flow switch	Model	PF3A703H	PF3A706H	PF3A712H	
	<b>Rated flow range</b> *1	30 to 3000 L/min	60 to 6000 L/min	120 to 12000 L/min	
Flow	<b>Set point range</b>	Instantaneous flow	-150 to 3150 L/min	-300 to 6300 L/min	-600 to 12600 L/min
		Accumulated flow	0 to 999,999,999,990 L	0 to 999,999,999,900 L	
	<b>Smallest settable increment</b>	Instantaneous flow	2 L/min	5 L/min	10 L/min
		Accumulated flow	10 L	100 L	
	<b>Accumulated volume per pulse (Pulse width = 50 ms)</b>		10 L/pulse	100 L/pulse	
	<b>Accumulated value hold function</b> *3	Intervals of 2 or 5 minutes can be selected. The stored accumulated flow is held even when the power supply is OFF.			
Electrical	<b>Power supply voltage</b>	12 to 24 VDC $\pm 10\%$ (24 VDC when the PF3A7□H is connected)			
	<b>Current consumption</b>	25 mA or less			
	<b>Protection</b>	Polarity protection			
Accuracy	<b>Display accuracy</b>	$\pm 0.5\%$ F.S. $\pm$ Minimum display unit (Ambient temperature of 25°C)			
	<b>Analog output accuracy</b>	$\pm 0.5\%$ F.S. (Ambient temperature of 25°C)			
	<b>Repeatability</b>	$\pm 0.1\%$ F.S. $\pm 1$ digit			
	<b>Temperature characteristics</b>	$\pm 0.5\%$ F.S. (Ambient temperature: 0 to 50°C, 25°C standard)			
Switch output	<b>Output type</b>	Select from NPN or PNP open collector output.			
	<b>Output mode</b>	Select from Hysteresis, Window comparator, Accumulated output, Accumulated pulse output, Error output, or Switch output OFF modes.			
	<b>Switch operation</b>	Select from Normal or Reversed output.			
	<b>Max. load current</b>	80 mA			
	<b>Max. applied voltage (NPN only)</b>	30 VDC			
	<b>Internal voltage drop (Residual voltage)</b>	NPN output: 1 V or less (at load current of 80 mA), PNP output: 1.5 V or less (at load current of 80 mA)			
	<b>Response time</b> *2	3 ms or less			
	<b>Delay time</b> *2	Select from 0.00, 0.05 to 0.1 s (increment of 0.01 s), 0.1 to 1.0 s (increment of 0.1 s), 1 to 10 s (increment of 1 s), 20 s, 30 s, 40 s, 50 s, or 60 s.			
	<b>Hysteresis</b> *4	Variable from 0			
	<b>Protection</b>	Short circuit protection			
Analog output*5	<b>Output type</b>	Voltage output: 1 to 5 V, 0 to 10 V (only when the power supply voltage is 24 VDC) Current output: 4 to 20 mA (0 L/min to maximum value of the rated flow)			
	<b>Impedance</b>	Voltage output	Output impedance: 1 k $\Omega$		
		Current output	Maximum load impedance: 300 $\Omega$ (at power supply voltage of 12 V), 600 $\Omega$ (at power supply voltage of 24 VDC)		
	<b>Response time</b> *2	50 ms or less			
External input*6	<b>External input</b>	Input voltage: 0.4 V or less (Reed or Solid state) for 30 ms or longer			
	<b>Input mode</b>	Select from Accumulated value external reset or Peak/Bottom value reset.			
Sensor input	<b>Input type</b>	Voltage input: 1 to 5 VDC (Input impedance: 1 M $\Omega$ ), Current input: 4 to 20 mA DC (Input impedance: 51 $\Omega$ ) (0 L/min to maximum value of the rated flow)			
	<b>Connection method</b>	Connector (e-CON)			
	<b>Protection</b>	Over voltage protection (Up to 26.4 VDC)			
Display	<b>Display mode</b>	Select from Instantaneous flow or Accumulated flow.			
	<b>Unit</b> *7	Instantaneous flow	L/min, cfm (ft <sup>3</sup> /min)		
		Accumulated flow	L, ft <sup>3</sup> , L x 10 <sup>6</sup> , ft <sup>3</sup> x 10 <sup>6</sup>		
	<b>Display range</b>	Instantaneous flow	-150 to 3150 L/min	-300 to 6300 L/min	-600 to 12600 L/min
		Accumulated flow*9	0 to 999,999,999,990 L	0 to 999,999,999,900 L	
	<b>Minimum display unit</b>	Instantaneous flow	2 L/min	5 L/min	10 L/min
		Accumulated flow	10 L	100 L	
	<b>Display type</b>	LCD			
	<b>Number of displays</b>	3-screen display (Main screen, Sub screen)			
	<b>Display color</b>	1) Main screen: Red/Green, 2) Sub screen: Orange			
<b>Number of display digits</b>	1) Main screen: 5 digits (7 segments), 2) Sub screen: 9 digits (7 segments)				
<b>Indicator LED</b>	LED ON when switch output is ON. OUT1/2: Orange				
Digital filter*8		Select from 0.00, 0.05 to 0.1 s (increment of 0.01 s), 0.1 to 1.0 s (increment of 0.1 s), 1 to 10 s (increment of 1 s), 20 s, or 30 s.			
Environment	<b>Enclosure</b>	IP40			
	<b>Withstand voltage</b>	1000 VAC for 1 minute between terminals and housing			
	<b>Insulation resistance</b>	50 M $\Omega$ or more (500 VDC measured via megohmmeter) between terminals and housing			
	<b>Operating temperature range</b>	Operating: 0 to 50°C, Stored: -10 to 60°C (No condensation or freezing)			
	<b>Operating humidity range</b>	Operating/Stored: 35 to 85% RH (No condensation or freezing)			
Standards		CE marking (EMC directive/RoHS directive)			
Weight	<b>Body</b>	25 g (Excluding the power supply/output connection lead wire)			
	<b>Lead wire with connector</b>	+39 g			

\*1 Rated flow range of the applicable flow switch

\*2 Value without digital filter (at 0.00 s)

\*3 When using the accumulated value hold function, use the operating conditions to calculate the product life, and do not exceed it. The maximum access limit of the memory device is 1.5 million times. If the product is operated 24 hours per day, the product life will be as follows:

• 5 min interval: life is calculated as 5 min x 1.5 million = 7.5 million min = 14.3 years

• 2 min interval: life is calculated as 2 min x 1.5 million = 3 million min = 5.7 years

If the accumulated value external reset is repeatedly used, the product life will be shorter than the calculated life.

\*4 If the flow fluctuates around the set value, the width for setting more than the fluctuating width needs to be set. Otherwise, chattering will occur.

\*5 Setting is only possible for models with analog output.

\*6 Setting is only possible for models with external input.

\*7 Setting is only possible for models with the units selection function.

\*8 The response time indicates when the set value is 90% in relation to the step input.

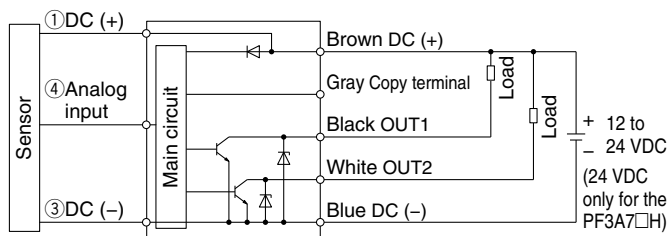
\*9 The accumulated flow display is the upper 6-digit and lower 6-digit (total of 12 digits) display. When the upper digits are displayed, x 10<sup>6</sup> lights up.

\* Products with tiny scratches, marks, or display color or brightness variations which do not affect the performance of the product are verified as conforming products.

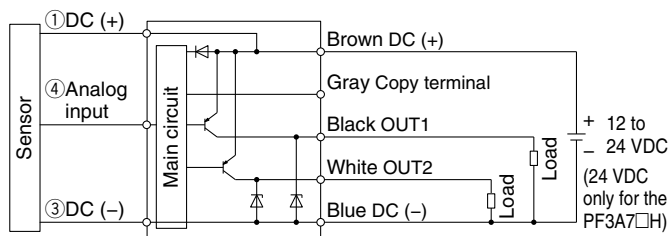


**Internal Circuits and Wiring Examples**

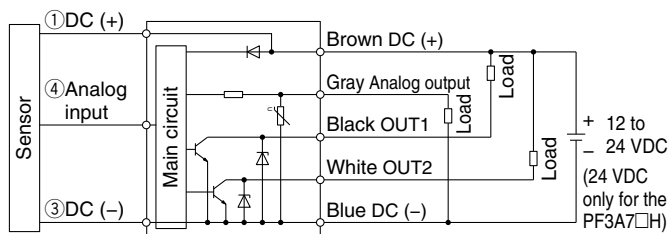
**-XY  
-RT  
-SV  
NPN (2 outputs) + Copy function**



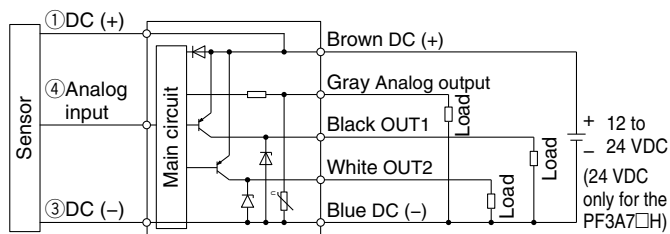
**-XY  
-RT  
-SV  
PNP (2 outputs) + Copy function**



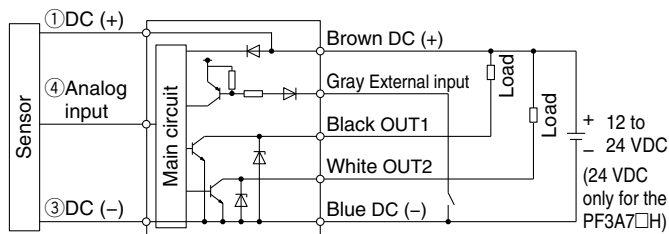
**-RT: NPN (2 outputs) + Analog voltage output  
-SV: NPN (2 outputs) + Analog current output**



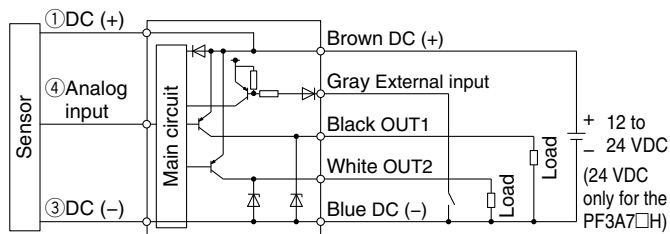
**-RT: PNP (2 outputs) + Analog voltage output  
-SV: PNP (2 outputs) + Analog current output**



**-RT: NPN (2 outputs) + External input  
-SV: NPN (2 outputs) + External input**

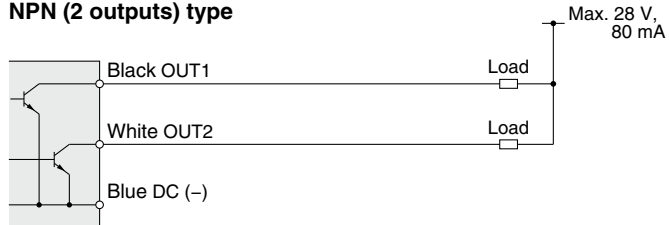


**-RT: PNP (2 outputs) + External input  
-SV: PNP (2 outputs) + External input**

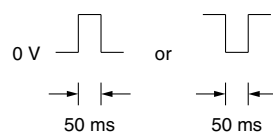
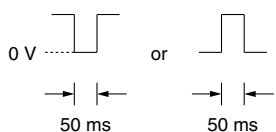
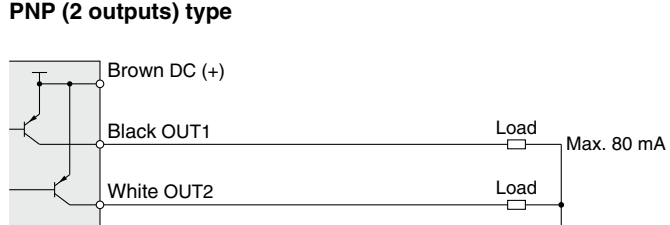


**Accumulated pulse output wiring examples**

**NPN (2 outputs) type**



**PNP (2 outputs) type**



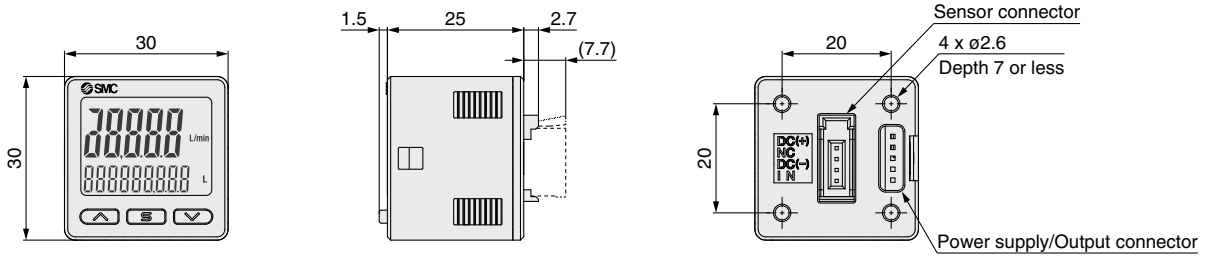
PF3A7□H

PFG300

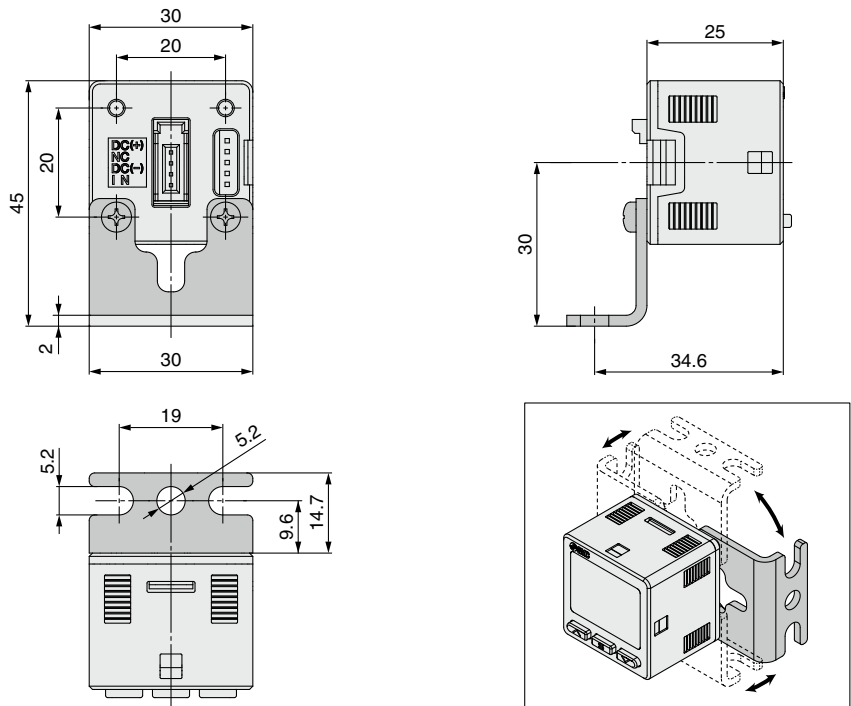
Function Details

# PFG300 Series

## Dimensions

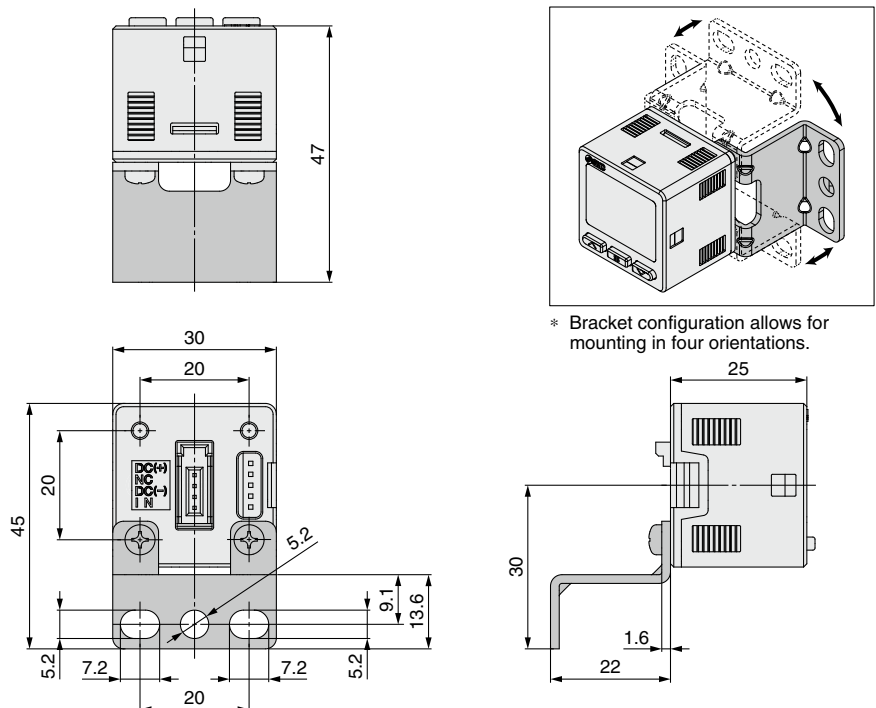


### Bracket A (Part no.: ZS-46-A1)



\* Bracket configuration allows for mounting in four orientations.

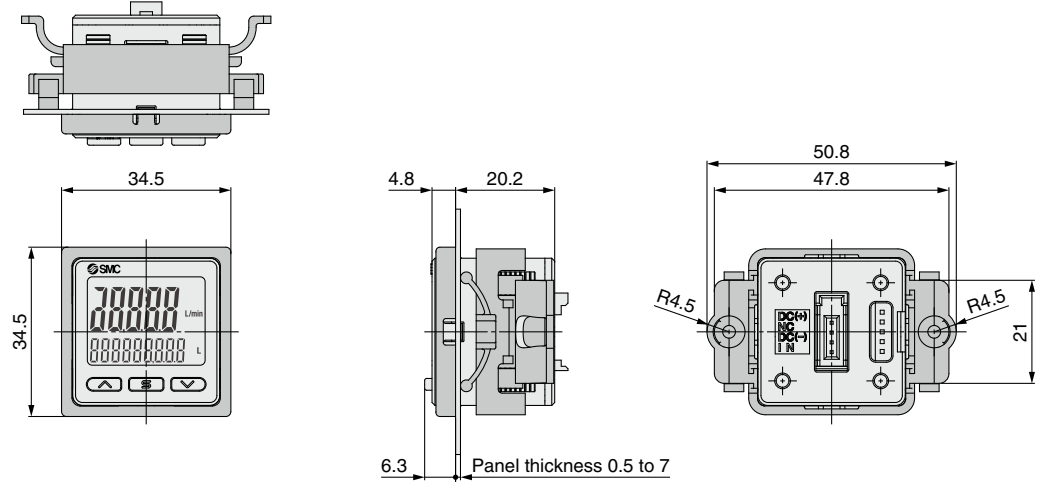
### Bracket B (Part no.: ZS-46-A2)



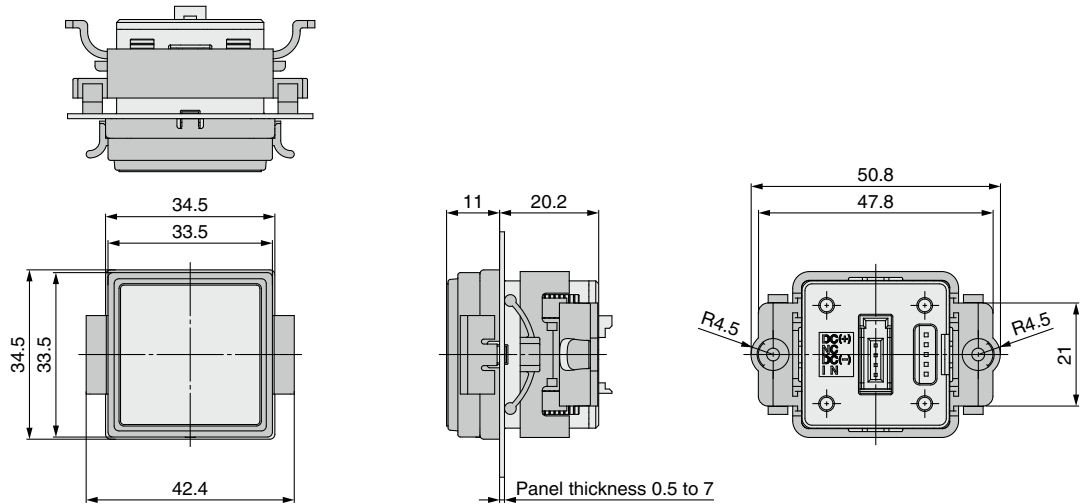
\* Bracket configuration allows for mounting in four orientations.

## Dimensions

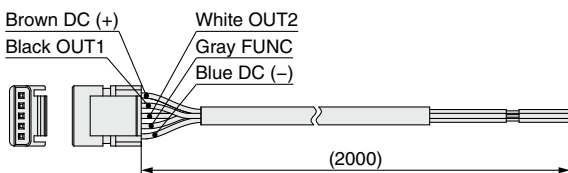
### Panel mount adapter (Part no.: ZS-46-B)



### Panel mount adapter + Front protection cover (Part no.: ZS-46-D)



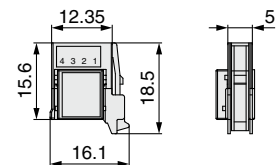
### Power supply/output connection lead wire (Part no.: ZS-46-5L)



### Sensor connector (Part no.: ZS-28-CA-4)

Pin no.	Terminal
1	DC (+)
2	N.C.
3	DC (-)
4	IN*1

\*1 1 to 5 V or 4 to 20 mA



### Cable Specifications

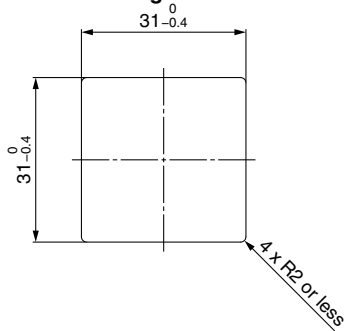
Conductor cross section	0.15 mm <sup>2</sup> (AWG26)	
Insulator	Outside diameter	1.0 mm
	Color	Brown, Blue, Black, White, Gray (5-core)
Sheath	Finished outside diameter	ø3.5

# PFG300 Series

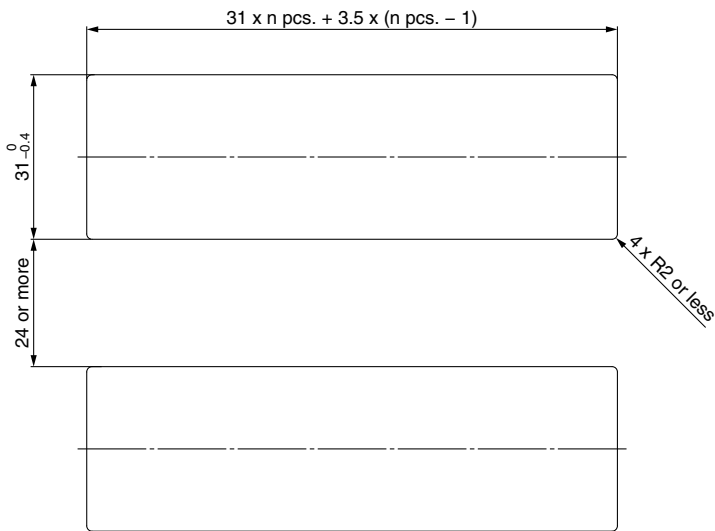
## Dimensions

### Panel fitting dimensions

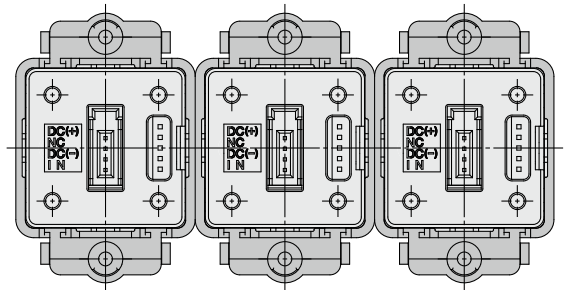
#### Individual mounting



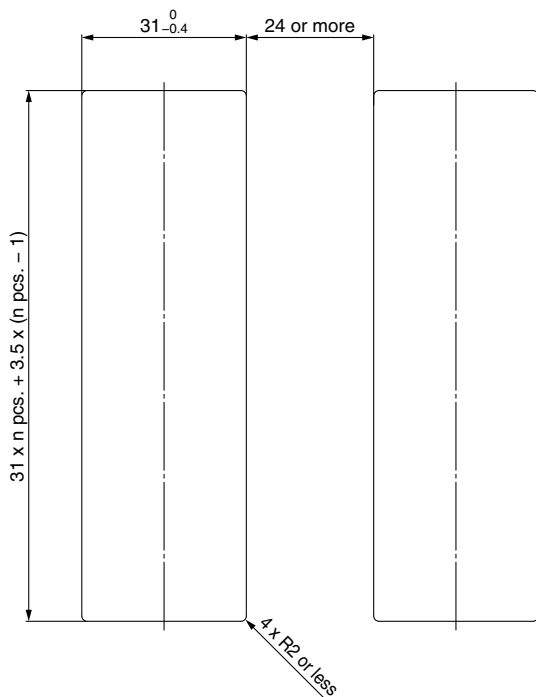
#### Multiple (2 pcs. or more) secure mounting <Horizontal>



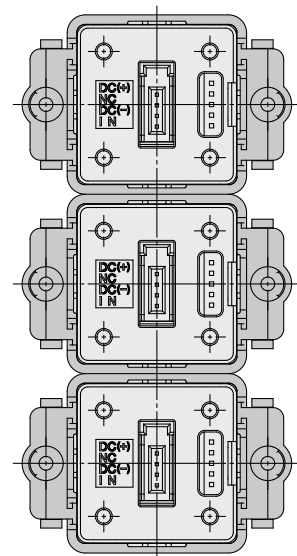
#### Panel mount example <Horizontal>



#### <Vertical>



#### Panel mount example <Vertical>



# PF3A7□H Series

## Function Details

For setting of functions and operation method, refer to the Operation Manual from the SMC website Documents/Download --> Instruction Manuals. Click [here](#) for details.

### Output operation

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

(Default setting: Hysteresis mode, Normal output)

### Simple setting mode

Only the set values for instantaneous flow and accumulated flow can be changed. Output mode, output type, display color, and accumulate pulse output cannot be changed.

### Display color

The display color can be selected for each output condition. The selection of the display color provides visual identification of abnormal values.

Green for ON, Red for OFF
Red for ON, Green for OFF
Red all the time
Green all the time

### Reference condition

The display unit can be selected from standard condition or normal condition.

Standard condition: Flow rate converted to a volume at 20°C and 101.3 kPa (absolute pressure)
Normal condition: Flow rate converted to a volume at 0°C and 101.3 kPa (absolute pressure)

### Response time

The response time can be selected to suit the application. (Default setting: 1 s) The effect of fluctuation and flickering of the display can be reduced by setting the response time to 2 seconds or 5 seconds.

1 s
2 s
5 s

### FUNC output switching function

Analog output or external input can be selected.  
(Default setting: Analog output)

### Selectable analog output function

1 to 5 V or 0 to 10 V can be selected for the analog voltage output type.  
(Default setting: 1 to 5 V)

### External input function

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

**Accumulated value external reset:** A function to reset the accumulated flow value when an external input signal is applied.

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

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

\* When the accumulated value is stored to memory, every time the accumulated value external reset is activated, the memory will be accessed. Take into consideration that the maximum number of times the memory can be accessed is 1.5 million times. The total number of external inputs and the accumulated value memorizing time interval should not exceed 1.5 million times.

**Peak/Bottom value reset:** Peak and bottom value are reset.

### Forced output function

The output is turned on/off in a fixed state 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: When ON, the output will be 5 V (or 10 V when 0 to 10 V is selected) or 20 mA, and when OFF, 1 V (or 0 V when 0 to 10 V is selected) or 4 mA.

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

### Accumulated value hold

Accumulated value is not cleared 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 maximum writable limit of the memory device is 1.5 million times, which should be taken into consideration.

### Peak/Bottom value display

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

### Display OFF mode

This function will turn the display OFF.

In the display OFF mode, three digits "\_ \_ \_" on the right of the sub display will flash.

If any button is pressed during this mode, the display reverts to normal for 30 seconds to allow checking of the flow, etc.

When the flow monitor (PFG300 series) is connected, the displayed values might be different due to an error. When the flow monitor display is used, it is recommended to set this product to the display OFF mode.

### Setting of security code

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

### Key-lock function

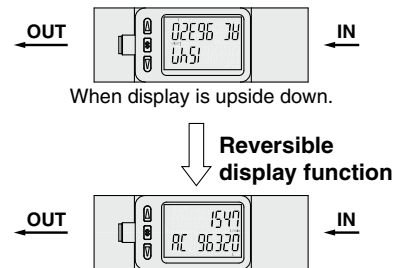
Prevents operation errors such as accidentally changing setting values

### Reset to the default settings

The product can be returned to its factory default settings.

### Reversible display mode

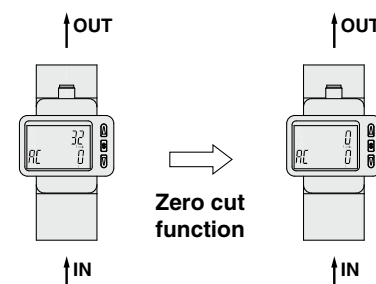
When the switch is used upside down, the orientation of the display can be rotated to make it easier to read by using the reversible display function.



### Zero cut function

When the flow is close to 0 L/min., the product will round the value down and zero will be displayed. A flow value may be displayed even when the flow rate is 0 L/min. due to high pressure or depending on the installation. The zero cut function will force the display to zero. The range to display zero can be changed.

Example) Vertical mounting, with fluid direction: Bottom to top



PF3A7□H

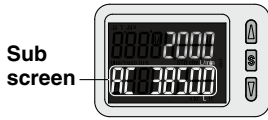
PFG300







Function Details

# PF3A7□H Series

## ■ Selection of display on sub screen

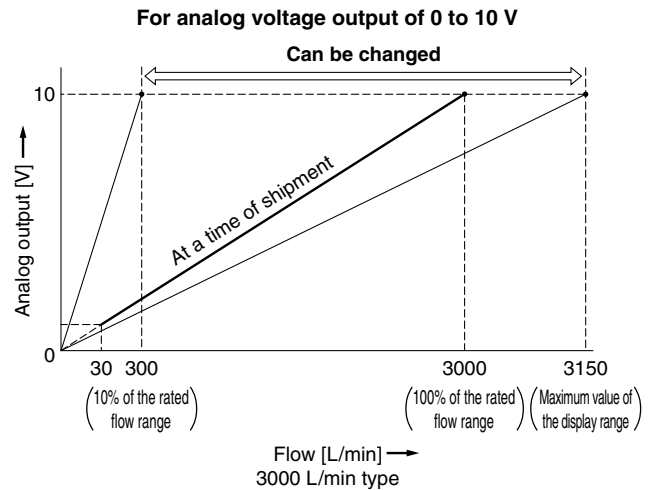
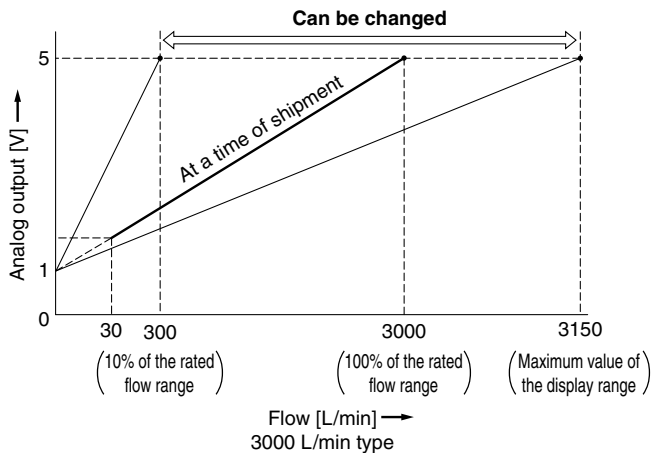
The display on the sub screen in measuring mode can be set.



Accumulated value display	Set value display	Peak value display
Displays the accumulated value 	Displays the set value 	Displays the peak value 
Bottom value display	Line name display	OFF
Displays the bottom value 	Displays the line name (Up to 5 alphanumeric characters can be input.) 	Displays nothing 

## ■ Analog output free range function

This function allows a flow that generates an output of 5 V (or 10 V when 0 to 10 V is selected) or 20 mA to be changed. The value can be changed between 10% of the maximum value of the rated flow and the maximum value of the display range.



## ■ Error display function

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

Display	Error name	Description	Action
Er 1	OUT over current error	A load current of 80 mA or more is applied to the switch output (OUT).	Eliminate the cause of the over current by turning off the power supply and then turn it on again.
HHH	Instantaneous flow error	The flow rate exceeds the maximum value of the display range.	Decrease the flow rate.
999999 flashes x 10 <sup>6</sup>	Accumulated flow error	The flow rate exceeds the accumulated flow rate range.	Clear the accumulated flow rate.
Er 0	System error	Internal data error	Turn the power off and then on again.
Er 4			
Er 6			
Er 7			
Er 8			
Er 10			
Er 12			
Er 13			
Er 14			

If the error cannot be solved after the instructions above are performed, please contact SMC for investigation.

# PFG300 Series

## Function Details

### Output operation

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

(Default setting: Hysteresis mode, Normal output)

### Simple setting mode

Only the set values for instantaneous flow and accumulated flow can be changed. Output mode, output type, display color, and accumulate pulse output cannot be changed.

### Display color

The display color can be selected for each output condition. The selection of the display color provides visual identification of abnormal values.

Green for ON, Red for OFF
Red for ON, Green for OFF
Red all the time
Green all the time

### Delay time setting

The time from when the instantaneous flow reaches the set value to when the switch output operates can be set. Setting the delay time can prevent the switch output from chattering.

(Default setting: 0 s)

0.00 s
0.05 to 0.1 s (increment of 0.01 s)
0.1 to 1.0 s (increment of 0.1 s)
1 to 10 s (increment of 1 s)
20 s
30 s
40 s
50 s
60 s

### Digital filter setting

The time for the digital filter can be set to the sensor input. Setting the digital filter can reduce chattering of the switch output and flickering of the analog output and the display.

The response time indicates when the set value is 90% in relation to the step input.

(Default setting: 0 s)

0.00 s
0.05 to 0.1 s (increment of 0.01 s)
0.1 to 1.0 s (increment of 0.1 s)
1 to 10 s (increment of 1 s)
20 s
30 s

### FUNC output switching function

Analog output, external input, or copy function can be selected.  
(Default setting: Analog output)

### Selectable analog output function

1 to 5 V or 0 to 10 V can be selected for the analog voltage output type.  
(Default setting: 1 to 5 V)

### External input function

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

**Accumulated value external reset:** A function to reset the accumulated flow value when an external input signal is applied.

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

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

\* When the accumulated value is stored to memory, every time the accumulated value external reset is activated, the memory will be accessed. Take into consideration that the maximum number of times the memory can be accessed is 1.5 million times. The total number of external inputs and the accumulated value memorizing time interval should not exceed 1.5 million times.

**Peak/Bottom value reset:** Peak and bottom value are reset.

### Forced output function

The output is turned on/off in a fixed state when starting the system or during maintenance. This enables the confirmation of wiring and prevents system errors due to unexpected output.

For the analog output type: When ON, the output will be 5 V (or 10 V when 0 to 10 V is selected) or 20 mA, and when OFF, 1 V (or 0 V when 0 to 10 V is selected) or 4 mA.

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

### Accumulated value hold

The accumulated value is not cleared 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 maximum writable limit of the memory device is 1.5 million times, which should be taken into consideration.

### Peak/Bottom value display

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

### Setting of security code

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

### Key-lock function

Prevents operation errors such as accidentally changing setting values

### Reset to the default settings

The product can be returned to its factory default settings.

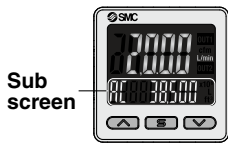
### Display with zero cut-off setting

When the flow is close to 0 L/min, the product will round the value down and zero will be displayed. A flow value may be displayed even when the flow rate is 0 L/min due to high pressure or depending on the installation. The zero cut function will force the display to zero. The range to display zero can be changed.

# PF300 Series

## ■ Selection of display on sub screen

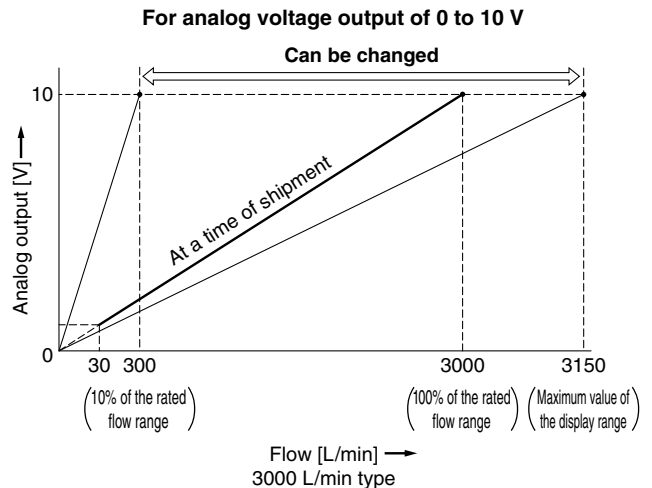
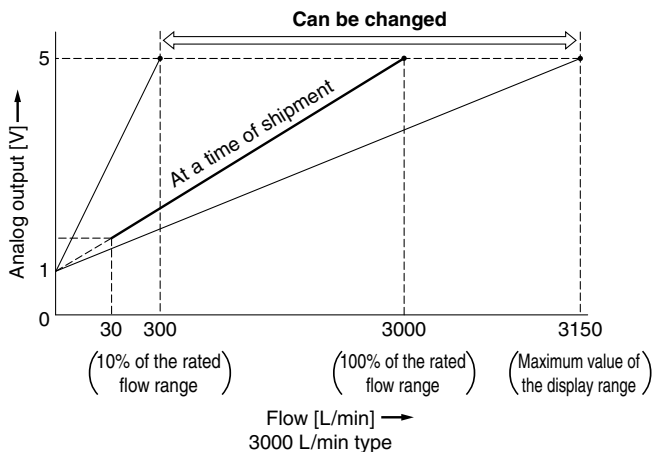
The display on the sub screen in measuring mode can be set.



Set value display	Accumulated value display	Peak value display
Displays the set value 	Displays the accumulated value 	Displays the peak value 
Bottom value display	Line name display	OFF
Displays the bottom value 	Displays the line name (Up to 5 alphanumeric characters can be input.) 	Displays nothing 

## ■ Analog output free range function

This function allows a flow that generates an output of 5 V (or 10 V when 0 to 10 V is selected) or 20 mA to be changed. The value can be changed between 10% of the maximum value of the rated flow and the maximum value of the display range.



## ■ Error display function

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

Display	Error name	Description	Action
Er1 Er2	OUT over current error	A load current of 80 mA or more is applied to the switch output (OUT).	Eliminate the cause of the over current by turning off the power supply and then turning it on again.
HHH	Instantaneous flow error	The flow rate exceeds the maximum value of the display range.	Decrease the flow rate.
LLL	Reverse flow error	There is a reverse flow equivalent to -5% or more. (Except PF3A7□H series)	Change the flow to the correct direction.
999999 flashes x 10 <sup>6</sup>	Accumulated flow error	The flow rate exceeds the accumulated flow rate range.	Clear the accumulated flow rate.
Er0 Er4 Er6 Er7 Er8 Er14 Er40	System error	Internal data error	Turn the power off and then on again.
Er13	Copy error	The copy function does not operate properly.	After clearing the error by pressing the  and  buttons simultaneously for a minimum of 1 second, check the wiring and the model, and then attempt to copy again.

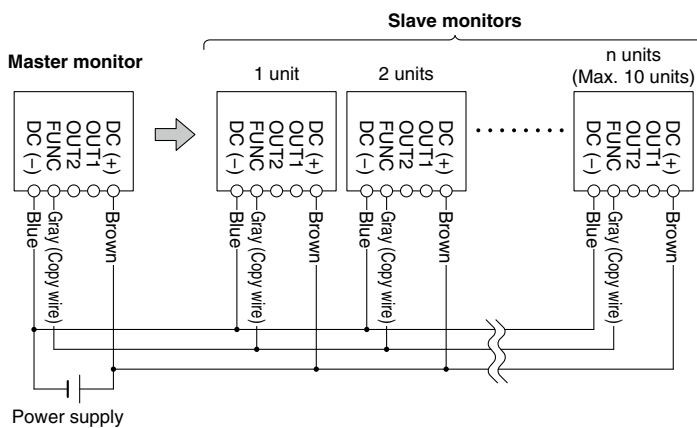
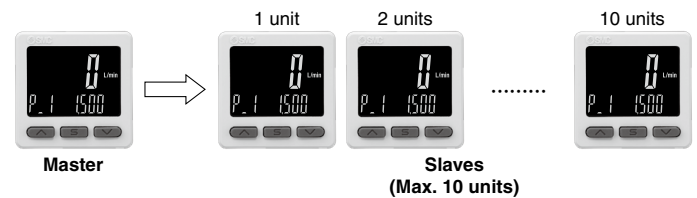
If the error cannot be solved after the instructions above are performed, please contact SMC for investigation.



■ **Copy function**

The settings of the master monitor can be copied to the slave monitors, reducing setting labor and minimizing the risk of setting mistakes.

**The set value can be copied to up to 10 flow monitors simultaneously.**  
(Maximum transmission distance: 4 m)



- 1) Wire as shown in the figure on the left.
- 2) Select the slave monitor which is to be the master, and change it into a master using the buttons. (In the default setting, all flow monitors are set as slaves.)
- 3) Press the **S** button on the master monitor to start copying.

■ **Selection of power saving mode**

Power saving mode can be selected.

It shifts to the power saving mode without button operation for 30 seconds.

It is set to the normal mode (Power saving mode is OFF.) at a time of shipment from the factory.

(During power saving mode, [ECo] will flash in the sub screen and the operation light is ON (only when the switch is ON).)

\* There may be a difference in the displayed value on the connected flow switch and the flow monitor. When the flow monitor display is being used, it is recommended to set the flow switch display to OFF mode.


PF3A7□H


PFG300


Function Details

## 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, whichever is first.\*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.

### Caution

#### SMC products are not intended for use as instruments for legal metrology.

Measurement instruments that SMC manufactures or sells have not been qualified by type approval tests relevant to the metrology (measurement) laws of each country. Therefore, SMC products cannot be used for business or certification ordained by the metrology (measurement) laws of each country.

#### Revision History

**Edition B** \* The digital flow monitor PFG300 series has been added.  
\* Number of pages has been increased from 16 to 28.

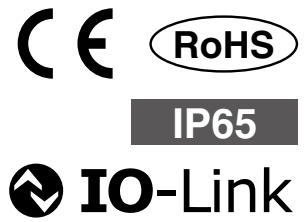
VZ

## Safety Instructions

Be sure to read the “Handling Precautions for SMC Products” (M-E03-3) and “Operation Manual” before use.

# 3-Color Display Digital Flow Switch for Large Flow

Applicable fluid **Air, N<sub>2</sub>**



## IO-Link

The flow rate value and the device status can be figured out easily via the process data.



<b>Diagnostic contents</b>	Over current error, Rated/Accumulated flow error, Flow/Temperature sensor failure, Internal product malfunction
----------------------------	---

### How to Order

**PF3A 7 03 H - 10 - L Q - M**

- Type**

7	Integrated display
---	--------------------
- Rated flow range**

03	30 to 3000 L/min
06	60 to 6000 L/min
12	120 to 12000 L/min
- Large flow type**
- Thread type**

Nil	Rc
N	NPT
F*1	G

\*1 ISO 1179-1 compliant
- Port size**

Symbol	Port size	Rated flow range		
		03	06	12
10	1	●	—	—
14	1 1/2	—	●	—
20	2	—	—	●
- Calibration certificate\*9**

Nil	None
A*10	Yes

\*9 The certificate is in both English and Japanese.  
\*10 Made to order
- Unit specification**

Nil	Units selection function*7
M	SI unit only*8

\*7 This product is for overseas use only. (The SI unit type is provided for use in Japan in accordance with the New Measurement Act.)  
\*8 Fixed unit: Instantaneous flow: L/min  
Accumulated flow : L
- Options**

Nil	With lead wire and M12 connector (3 m)*5
N	Without lead wire and M12 connector
Q	Lead wire and M12-M12 connector (3 m)*6

\*5 Option is shipped together, but not assembled.  
\*6 The lead wire has an M12 (female) connector on one side and an M12 (male) connector on the other side.
- Output specification**

Symbol	OUT	FUNC*2	Applicable monitor unit model
L	IO-Link: Switch output (N/P)	—	—
L3	IO-Link: Switch output (N/P)	Analog voltage output*3 ⇔ External input*4	PFG300 series
L4	IO-Link: Switch output (N/P)	Analog current output ⇔ External input*4	PFG310 series

#### Options/Part Nos.

When only optional parts are required, order with the part number listed below.

Part no.	Option	Note
ZS-37-A	Lead wire and M12 connector	Length: 3 m
ZS-49-A	Lead wire and M12-M12 connector	Male/female conversion Length: 3 m

\*2 Analog output or external input can be selected by pressing the buttons. Analog output is set as default setting. Output signal "L" cannot be used as the FUNC terminal is not connected.  
\*3 1 to 5 V or 0 to 10 V can be selected by pressing the button. The default setting is 1 to 5 V.  
\*4 The accumulated value, peak value, and bottom value can be reset.

## PF3A7□H-L Series



# PF3A7□H-L Series

For flow switch precautions and specific product precautions, refer to the Operation Manual on the SMC website.

## Specifications (Integrated Display)

Model		PF3A703H-L	PF3A706H-L	PF3A712H-L
Electrical	Power supply voltage	When used as a switch output device	24 VDC ±10%	
		When used as an IO-Link device	18 to 30 VDC ±10%	
Switch output	Output type		Select from NPN or PNP open collector output.	
	Output mode		Select from Hysteresis, Window comparator, Accumulated output, Accumulated pulse output, Error output, or Switch output OFF modes.	
	Max. applied voltage		30 V (NPN output)	
	Internal voltage drop (Residual voltage)		1.5 V or less (at load current of 80 mA)	
	Delay time*1		3.3 ms or less, variable from 0 to 60 s/0.01 s increments	
Analog output	Response time*2		Linked to the set value of the digital filter	
Display	Display		LCD, 2-screen display (Main screen/Sub screen) Main screen: Red/Green, Sub screen: Orange Main screen/Sub screen: 9 digits (7 segments 7 digits, 11 segments 2 digits)	
	Digital filter*3		Select from 1 s, 2 s, or 5 s.	
Standards		CE marking (EMC Directive, RoHS Directive)		

\*1 The time from when the instantaneous flow reaches the set value to when the switch output operates can be set.

\*2 The time from when the flow is changed by a step input (when the flow rate changes from 0 to the maximum value of the rated flow range instantaneously) until the analog output reaches 90% of the rated flow rate.

\*3 The time for the digital filter can be set to the sensor input. The response time indicates when the set value is 90% in relation to the step input.

## Communication Specifications (IO-Link mode)

IO-Link type	Device
IO-Link version	V 1.1
Communication speed	COM2 (38.4 kbps)
Configuration file	IODD file*1
Minimum cycle time	3.3 ms
Process data length	Input data: 4 bytes, Output data: 0 byte
On request data communication	Yes
Data storage function	Yes
Event function	Yes
Vendor ID	131 (0 x 0083)
Device ID*2	PF3A703H-□□-L□-□□ : 400 (0 x 0190)
	PF3A703H-□□-L3□-□□: 401 (0 x 0191)
	PF3A703H-□□-L4□-□□: 402 (0 x 0192)
	PF3A706H-□□-L□-□□ : 403 (0 x 0193)
	PF3A706H-□□-L3□-□□: 404 (0 x 0194)
	PF3A706H-□□-L4□-□□: 405 (0 x 0195)
	PF3A712H-□□-L□-□□ : 406 (0 x 0196)
	PF3A712H-□□-L3□-□□: 407 (0 x 0197)
	PF3A712H-□□-L4□-□□: 408 (0 x 0198)

\*1 The configuration file can be downloaded from the SMC website, <https://www.smcworld.com>

\*2 The device ID differs according to each product type (output specification).

Other specifications that are not listed are the same as those of the standard product. For details, refer to the **Web Catalog**.

**⚠ Safety Instructions** Be sure to read the "Handling Precautions for SMC Products" (M-E03-3) and "Operation Manual" before use.