



**Instruction Manual**  
**Digital Flow Sensor - Remote Monitor**  
**PF2A3## / PF2W3## / PF2D3## series**



The intended use of the remote flow monitor is to monitor and display flow information provided from a digital flow sensor.

**1 Safety Instructions**

These safety instructions are intended to prevent hazardous situations and/or equipment damage. These instructions indicate the level of potential hazard with the labels of "Caution," "Warning" or "Danger." They are all important notes for safety and must be followed in addition to International Standards (ISO/IEC)<sup>1)</sup>, and other safety regulations.

- <sup>1)</sup> ISO 4414: Pneumatic fluid power - General rules relating to systems.
- ISO 4413: Hydraulic fluid power - General rules relating to systems.
- IEC 60204-1: Safety of machinery - Electrical equipment of machines. (Part 1: General requirements)
- ISO 10218-1: Manipulating industrial robots -Safety, etc.

- Refer to product catalogue, Operation Manual and Handling Precautions for SMC Products for additional information.
- Keep this manual in a safe place for future reference.

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

**Warning**

- Always ensure compliance with relevant safety laws and standards.**
- All work must be carried out in a safe manner by a qualified person in compliance with applicable national regulations.
- This product is class A equipment intended for use in an industrial environment. There may be potential difficulties in ensuring electromagnetic compatibility in other environments due to conducted or radiated disturbances.
- Refer to the operation manual on the SMC website (URL: <https://www.smcworld.com>) for more safety instructions.

**Warning**

- Special products (-X) might have specifications different from those shown in the specifications section. Contact SMC for specific drawings.

**2 Specifications**

**2.1 PF2A3## specifications (for Air)**

Model		PF2A3##					
Applicable sensor		PF2A 510	PF2A 550	PF2A 511	PF2A 521	PF2A 551	
Flow	Rated flow range (L/min)	1 to 10	5 to 50	10 to 100	20 to 200	50 to 500	
	Instantaneous	Flow setting range (L/min)	0.5 to 10.5	2.5 to 52.5	5 to 105	10 to 210	25 to 525
		Min. setting / unit (L/min)	0.1	0.5	1.0	2.0	5.0
Accumulated	Display flow rate range	0 to 999999 L					
	Min. setting / display unit	1 L					
Switch output	Output type	NPN or PNP open collector output					
	Output mode	Instantaneous flow output (hysteresis, window comparator mode), Accumulated flow output, Accumulated pulse output					
	Switch operation	Normal output, Reversed output					
	Max. load current	80 mA					
	Max. voltage	30 VDC (NPN output)					
	Internal volt. drop	1.5 V or less (at 80 mA)					
	Response time	1 s or less					
	Repeatability	±1% F.S. max.					
	Accuracy	±5% F.S. max.					
	Hysteresis	Hysteresis mode: Variable Window comparator mode: Fixed (3 digits)					
Output protection	Short circuit protection						
Accumulated pulse width	50 ms						
Accumulated pulse conversion	0.1 L/pulse	0.5 L/pulse	1 L/pulse	2 L/pulse	5 L/pulse		

**2.2 PF2W3## specifications (for Water)**

Model		PF2W3##				
Applicable sensor		PF2W 504(T)	PF2W 520(T)	PF2W 540(T)	PF2W 511(T)	
Flow	Rated flow range (L/min)	0.5 to 4.0	2 to 16	5 to 40	10 to 100	
	Instantaneous	Flow setting range (L/min)	0.35 to 4.50	1.7 to 17.0	3.5 to 45.0	7 to 110
		Min. setting / unit (L/min)	0.05	0.1	0.5	1
Accumulated	Display flow rate range	0 to 999999 L				
	Min. setting / display unit	1 L				
Switch output	Output type	NPN or PNP open collector output				
	Output mode	Instantaneous flow output (hysteresis, window comparator mode), Accumulated flow output, Accumulated pulse output				
	Switch operation	Normal output, Reversed output				
	Max. load current	80 mA				
	Max. voltage	30 VDC (NPN output)				
	Internal volt. drop	1.5 V or less (at 80 mA)				
	Response time	1 s or less				
	Repeatability	±3% F.S. max.			±1% F.S. max.	
	Accuracy	±5% F.S. max.			±3% F.S. max.	
	Hysteresis	Hysteresis mode: Variable Window comparator mode: Fixed (3 digits)				
Output protection	Short circuit protection					
Accumulated pulse width	50 ms					
Accumulated pulse conversion	0.05 L/pulse	0.1 L/pulse	0.5 L/pulse	1 L/pulse		

**2 Specifications (continued)**

**2.3 PF2D3## specifications (for Pure water / Chemical fluids)**

Model		PF2D3##			
Applicable sensor		PF2D504	PF2D520	PF2D540	
Flow	Rated flow range (L/min)	0.4 to 4.0	1.8 to 20.0	4 to 20	
	Instantaneous	Flow setting range (L/min)	0.25 to 4.50	1.3 to 21.0	2.5 to 45.0
		Min. setting / unit (L/min)	0.05	0.1	0.5
Accumulated	Display flow rate range	0 to 999999 L			
	Min. setting / display unit	1 L			
Switch output	Output type	NPN or PNP open collector output			
	Output mode	Instantaneous flow output (hysteresis, window comparator mode), Accumulated flow output, Accumulated pulse output			
	Switch operation	Normal output, Reversed output			
	Max. load current	80 mA			
	Max. voltage	30 VDC (NPN output)			
	Internal volt. drop	1.5 V or less (at 80 mA)			
	Response time	1 s or less			
	Repeatability	±0.5% F.S. max.			
	Accuracy	±0.5% F.S. max.			
	Hysteresis	Hysteresis mode: Variable Window comparator mode: Fixed (3 digits)			
Output protection	Short circuit protection				
Accumulated pulse width	50 ms				
Accumulated pulse conversion	0.05 L/pulse	0.1 L/pulse	0.5 L/pulse		

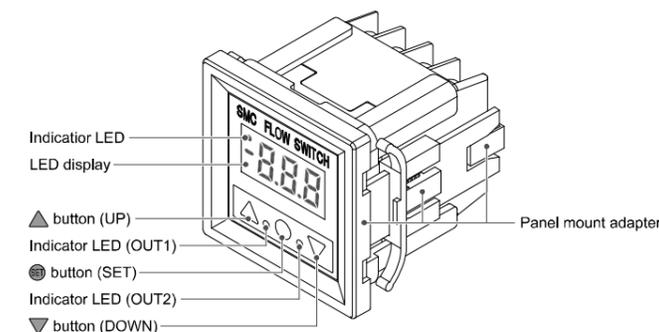
**2.4 Common specifications**

Item	Specification	
Display	Display part	Digit: 3 digits 7 segments, Colour: Red
	Indicator LED	OUT1: When ON, Green LED ON OUT2: When ON, Red LED is ON
Supply voltage	12 to 24 VDC ±10%	
Power consumption	60 mA or less (no load)	
Environment	Enclosure	IP40
	Temperature range	Operation: 0 to 50°C, Storage: -25 to 85°C (no freezing or condensation)
	Humidity range	Operation, Storage: 35 to 85%R.H. (no condensation)
	Temperature characteristics	±1% F.S. max. (15 to 35°C, 25°C ref.) ±2% F.S. max. (0 to 50°C, 25°C ref.)
	Withstand voltage	1000 VAC, for 1minute between external terminals and case
Materials	Enclosure: m-PPO, Terminal block: brass Panel mount adapter: POM, m-PPO, SUS	
Product weight	45 g	

**2.5 Cable specifications**

Conductor	Nominal cross section	approx. 0.15 mm <sup>2</sup>
	Individual wire diameter	approx. 0.5 mm
Insulator	Outside diameter	approx. 0.9 mm
	Wire colours	Brown, Black, Grey, Red, Green, Blue, White, Yellow
Sheath	Material	Heat resistant polyethylene
	Outer diameter	approx. Ø4.8 mm
Cable weight	65 g	

**3 Name and function of parts**



Item	Description
Indicator LED	Indicates the reference condition selected. LED is ON (Red) when normal condition is selected (only the PF2A3##).
LED display	Displays the flow value, setting mode, and error indication.
Indicator LED (OUT1)	Indicates the output status of OUT1. LED is ON (Green) when OUT1 is ON. The LED flashes when an over current error occurs. When the accumulated pulse output mode is selected, the indicator LED will turn OFF.
Indicator LED (OUT2)	Indicates the output status of OUT2. LED is ON (Red) when OUT2 is ON. The LED flashes when an over current error occurs. When the accumulated pulse output mode is selected, the indicator LED will turn OFF.
▲ button (UP)	Selects the mode or increases the ON/OFF Set value.
⊕ button (SET)	Press this button to change to another mode and to set a value.
▼ button (DOWN)	Selects the mode or decreases the ON/OFF Set value.
Panel mount adapter	Adapter to mount the product to the panel.

**4 Installation**

**4.1 Installation**

**Warning**

- Do not install the product unless the safety instructions have been read and understood.
- Use the product within the specified operating rated flow, operating pressure and temperature range.
- Tighten to the specified tightening torque. If the tightening torque is exceeded the mounting screws, brackets and the product can be broken. Insufficient torque can cause displacement of the product from its correct position.
- Do not drop, hit or apply excessive shock to the product.

**4.2 Environment**

**Warning**

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

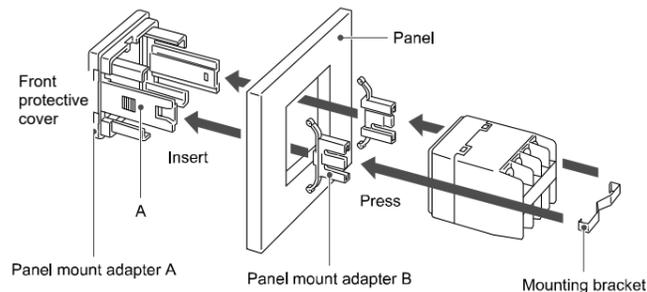
**4.3 Mounting**

- Never mount the product in a location that will be used as a foothold.
- Refer to the operation manual on the SMC website (URL: <https://www.smcworld.com>) for mounting dimensions.

## 4 Installation (continued)

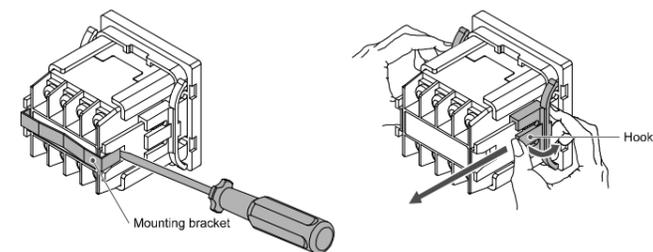
### 4.4 Mounting with Panel mount adapter

- Mount the product as shown below.
- Remove the panel mount adapter from the product if it has been delivered assembled.
- Insert panel mount adapter B into section A of panel mount adapter A.
- Push panel mount adapter B from behind until the display is fixed onto the panel.
- The pin of panel mount adapter B engages the notched part of panel adapter section A to fix the display.
- The product can be mounted on a panel with a thickness of 1.0 to 3.2 mm.
- Suitable for panel thickness of 1.0 to 3.2 mm.
- Panel mount adapter (Part No.: ZS-22-E).



### Removing the panel mount adapter

- Remove the mounting bracket using a flat blade screwdriver.
- Lever the hook to the outside to remove the adapter (See below).
- If the panel mount adapter is pulled with the hook engaged, the product or the panel mount adapter may be damaged.



## 5 Wiring

### 5.1 Wiring

#### Caution

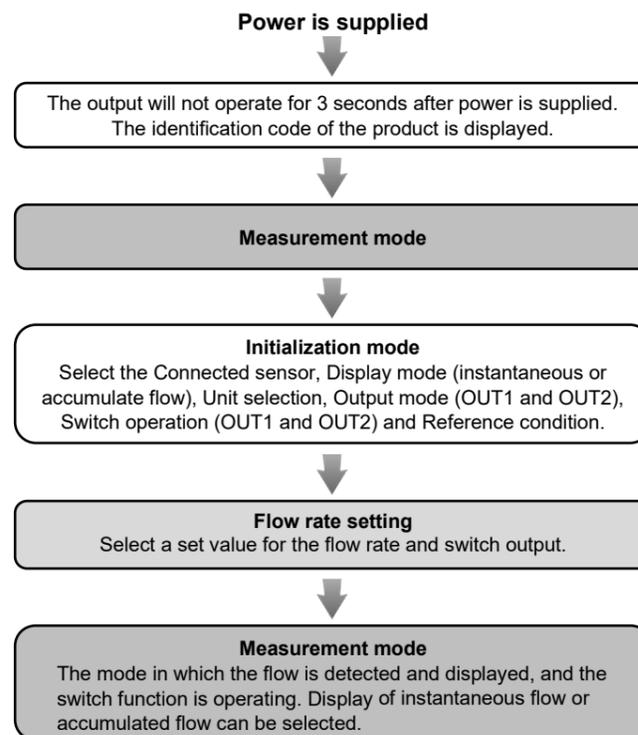
- Wiring should only be performed with the power supply turned OFF.
- Confirm proper insulation of wiring.
- Use separate routes for the product wiring and any power or high voltage wiring. Otherwise, malfunction may result due to noise.
- Keep wiring as short as possible to prevent interference from electromagnetic noise and surge voltage.
- Ensure that the FG terminal is connected to ground when using a commercially available switch-mode power supply. Switching noise will be superimposed and the product specification can no longer be met. This can be prevented by inserting a noise filter, such as a line noise filter and ferrite core, between the switch-mode power supply and the product, or by using a series power supply instead of a switch-mode power supply.

### 5.2 Wiring connections

- Use suitable crimp terminals for connection to the terminal block.
- Attention should be paid to avoid short circuits.

No.	Description
1	DC (-) (for sensor)
2	DC (+) (for sensor)
3	Sensor input
4	N.C.
5	DC (-) (supply voltage)
6	DC (+) (supply voltage)
7	OUT1
8	OUT2

## 6 Outline of Setting



Refer to the operation manual on the SMC website (URL: <https://www.smcworld.com>) for further Setting details.

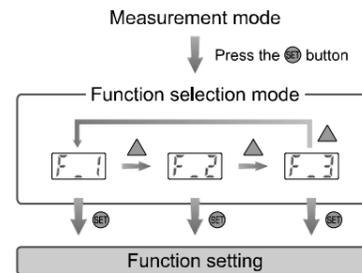
## 7 Initialization

- Press and hold the SET button for 2 seconds or more. Release the SET button when one of the values in the display column in the table below is displayed.
- Select the flow rate range according to the flow sensor connected. Press the UP and DOWN button to select the flow rate range, then press the SET button.

Product	Display	Flow rate range	Sensor
PF2A30#	10L	1 to 10 L/min	PF2A510
	50L	5 to 50 L/min	PF2A550
PF2A31#	11L	10 to 100 L/min	PF2A511
	21L	20 to 200 L/min	PF2A521
PF2W30#	04L	0.5 to 4 L/min	PF2W504(T)
	20L	2 to 16 L/min	PF2W520(T)
PF2W33#	40L	5 to 40 L/min	PF2W540(T)
	11L	10 to 100 L/min	PF2W511(T)
PF2D30#	04d	0.4 to 4 L/min	PF2D504
	20d	1.8 to 20 L/min	PF2D520
	40d	4 to 40 L/min	PF2D540

## 8 Function selection mode

- In measurement mode, press the SET button, to display [F\_#].
- This [F\_#] indicates the mode for changing each function setting.



\*: When OUT1 or OUT2 is assigned to instantaneous output mode during initialization mode, [F\_1] and [F\_2] are displayed. When OUT1 or OUT2 is assigned to accumulated output mode, [F\_3] is displayed.

### 8.1 Default settings

Item	Default Setting	
[F_1] Input the Set value of instantaneous output	[n_1] * Input Set point 1 (OUT1)	50% of max. rated flow PF2A30#: [ 5.0] L/min (PF2A510)
	[n_2] * Input Set point 2 (OUT1)	PF2A31#: [ 50] L/min (PF2A511)
	[n_3] * Input Set point 3 (OUT2)	PF2W30#: [2.00] L/min (PF2W504)
	[n_4] * Input Set point 4 (OUT2)	PF2W33#: [ 50] L/min (PF2W511) PF2D30#: [2.00] L/min (PF2D504)
[F_2] Input the Set value of instantaneous output (Auto-preset)	-	
[F_3] Input the Set value of accumulated output	[1nL] * Input Set value for lower 3 digits (OUT1)	[ 0]
	[1nH] * Input Set value for upper 3 digits (OUT1)	[ 0]
	[2nL] * Input Set value for lower 3 digits (OUT2)	[ 0]
	[2nH] * Input Set value for upper 3 digits (OUT2)	[ 0]

\* When normal output is selected n becomes P.

## 9 How to Order

Refer to the operation manual or catalogue on the SMC website (URL: <https://www.smcworld.com>) for How to order information.

## 10 Outline Dimensions (mm)

Refer to the operation manual or catalogue on the SMC website (URL: <https://www.smcworld.com>) for Outline Dimensions.

## 11 Limitations of Use

### 11.1 Limited warranty and Disclaimer/Compliance Requirements

Refer to Handling Precautions for SMC Products.

## 12 Troubleshooting

### 12.1 Error indication

Error Name	Error Display	Error Type	Troubleshooting Method
Excessive instantaneous flow	- - -	Flow has exceeded the upper limit of the display flow range.	Reduce the flow.
OUT1 Over current error	Er1	The switch output load current is more than 80 mA (OUT1).	Turn the power off and remove the cause of the over current. Then turn the power ON.
OUT2 Over current error	Er2	The switch output load current is more than 80 mA (OUT2).	Turn the power off and remove the cause of the over current. Then turn the power ON.
System error	Er4	The set data has been changed unexpectedly.	To reset, press and hold the UP and DOWN buttons for 2 sec. or more. Then set all data again.
Excessive accumulated flow	999 (flashing)	The display flow range of accumulated flow has been exceeded.	To reset the accumulated flow value, press and hold the UP and DOWN buttons for 2 sec. or more.

If the error cannot be reset then please contact SMC.

## 13 Maintenance

### 13.1 General Maintenance

#### Caution

- Not following proper maintenance procedures could cause the product to malfunction and lead to equipment damage.
- If handled improperly, compressed air can be dangerous.
- Maintenance of pneumatic systems should be performed only by qualified personnel.
- Before performing maintenance, turn off the power supply and be sure to cut off the supply pressure. Confirm that the air is released to atmosphere.

- After installation and maintenance, apply operating pressure and power to the equipment and perform appropriate functional and leakage tests to make sure the equipment is installed correctly.
- If any electrical connections are disturbed during maintenance, ensure they are reconnected correctly and safety checks are carried out as required to ensure continued compliance with applicable national regulations.
- Do not make any modification to the product.
- Do not disassemble the product, unless required by installation or maintenance instructions.

### How to reset the product after a power cut or when the power has been unexpectedly removed

The settings of the product are retained from before the power cut or de-energizing. The output condition also recovers to that before the power cut or de-energizing, but may change depending on the operating environment. Therefore, check the safety of the whole system before operating the product.

## 14 Product disposal

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

## 15 Contacts

Refer to [www.smcworld.com](http://www.smcworld.com) or [www.smc.eu](http://www.smc.eu) for your local distributor / importer.

# SMC Corporation

URL: <https://www.smcworld.com> (Global) <https://www.smc.eu> (Europe)  
 SMC Corporation, 4-14-1, Sotokanda, Chiyoda-ku, Tokyo 101-0021, Japan  
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