Digital Flow Switch (Display Part)

Operation Manual

For Air
- **PF2A 300/301 Series**
- **PF2A 310/311 Series**

For Pure Water/Chemical Fluid
- **PF2D 300/301 Series**

For Water
- **PF2W 300/301 Series**
- **PF2W 330/331 Series**

SMC Corporation

URL http://www.smcworld.com

Thank you for purchasing the SMC PF2∗ 3∗∗ Series Digital Flow Switch.
Please read this manual carefully before operating digital flow switch and understand digital flow switch, its capabilities and limitations.
Please keep this manual handy for future reference.

OPERATOR

- This operation manual has been written for those who have knowledge of machinery and apparatus that use pneumatic equipment and have full knowledge of assembly, operation and maintenance of such equipment.
- Please read this operation manual carefully and understand it before assembling, operating or providing maintenance service to the flow switch.

CONTENTS

SAFETY

The Digital Flow Switch and this manual contain essential information for the protection of users and others from possible injury and property damage and to ensure correct handling.
Please check that you fully understand the definition of the following messages (signs) before going on to read the text, and always follow the instructions.
Please read the operation manuals of related apparatus and understand it before operating the flow switch.

IMPORTANT MESSAGES	
Read this manual and follow its instructions. Signal words such as WARNING and NOTE, will be followed by important safety information that must be carefully reviewed.	
⚠WARNING	Indicates a potentially hazardous situation which could result in death or serious injury if you do not follow instructions.
NOTE	Gives you helpful information.

⚠WARNING

Do not disassemble, remodel (including change of printed circuit board) or repair.
An injury or failure can result.

Do not operate beyond specification range.
Fire, malfunction or switch damage can result.
Please use it after confirming the specification.

Do not operate in atmosphere of an inflammable, an explosive and corrosive gas.
Fire or an explosion can result.
This flow switch is not an explosion-proof type.

NOTE

Follow the instructions given below when handling your flow switch.
Otherwise, the switch may be damaged or may fail, thereby resulting in malfunction.

- Do not drop it, bring it into collision with other objects or apply excessive shock (490m/s^2 or more).
- Wiring correctly.
- Do not wiring while power is on.
- Although the flow switch complies with the CE Marking, since it does not have the thunder serge protection, please carry out protection to thunder serge by the equipment side.
- Although the flow switch complies with the CE Marking, since the equipment and apparatus which are made to generate the serge (Electro-magnetic lifter, High frequency induction furnace, Motor etc.) around the flow switch should perform measure against serge come out.
- Do not use with power cable or high-voltage cable in the same wire route.
- Do not use in a place in which water, oil, or a chemical splashes.
- Do not push the setting buttons by a sharply pointed object.
- Turn on the power supply of a flow switch for Air, when flow is zero. Some initial drift occurs during ten minutes after turning the power on.
- Start measurement by the flow switch three seconds after turning on the power. (Also in momentary interception of the power supply by reset etc.) Please take a measure by the program of equipment etc.
- Maintain the switch status for measurement output before setting when initializing or setting a flow rate of the flow switch.
  Measure after checking impacts to the equipment.
  Carry out a setup since a control system is shut down if required.

Model Indication Method

Separate Type Display Part

PF2□ 3□□–A□

Unit Specification

No Symbol : Unit selection function provided
–M : SI units fixed

Output Specification

0 : NPN open collector output
1 : PNP open collector output

Flow Rate Range

PF2A 3	**0 :** 1 to 10L/min, **1 :** 10 to 100L/min, 50 to 500L/min	5 to 50L/min 20 to 200L/min,
PF2D 3	**0 :** 0.4 to 4L/min, 4 to 40L/min	1.8 to 20L/min,
PF2W 3	**0 :** 0.5 to 4L/min, 5 to 40L/min **3 :** 10 to 100L/min	2 to 16L/min,

Fluid

A : Air
D : Pure Water/Chemical Fluid
W : Water

NOTE 1: The new Measurement Low prohibits use in Japan of flow switches with a unit selection function.
NOTE 2: Fixed unit for instantaneous flow rate is :L/min
for integrated flow rate is :L

· About sensor part

The type of the sensor part combined with a display part is indicated to be PF∗5∗∗ with this manual.
Refer to the following correspondence table for the sensor part type combined with each display part.

Display Part		Flow Rate Range	Sensor Part
PF2A	30∗	1 to 10L/min	PF2A 510
		5 to 50L/min	PF2A 550
	31∗	10 to 100L/min	PF2A 511
		20 to 200L/min	PF2A 521
		50 to 500L/min	PF2A 551
PF2D	30∗	0.4 to 4L/min	PF2D 504
		1.8 to 20L/min	PF2D 520
		4 to 40L/min	PF2D 540
PF2W	30∗	0.5 to 4L/min	PF2W 504 or 504T
		2 to 16L/min	PF2W 520 or 520T
		5 to 40L/min	PF2W 540 or 540T
	33∗	10 to 100L/min	PF2W 511

Names and Functions of Individual Parts

Body

Output (OUT1) Lamp (Green):
Lit when OUT1 is ON. Flickers when an overcurrent error occurs.

Output (OUT2) Lamp (Red):
Lit when OUT2 is ON. Flickers when an overcurrent error occurs.

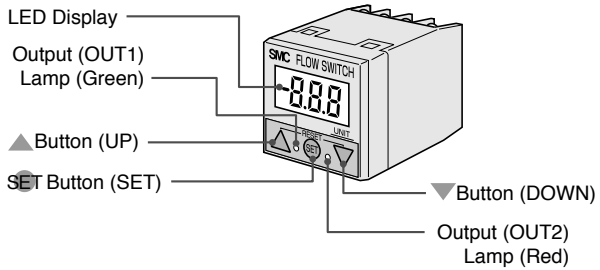
LED Display:
Displays a flow rate, set mode status, selected display unit and error code.

▲ Button (UP): Selects a mode and increases a set ON/OFF value.

▼ Button (DOWN): Selects a mode and decreases a set ON/OFF value.

SET Button (SET): Changes the mode and sets a set value.

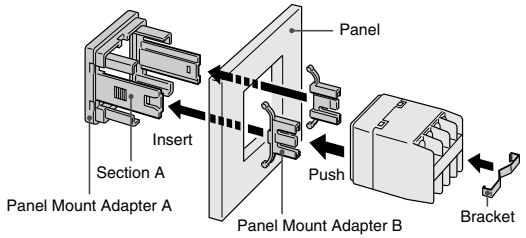
RESET
Pressing the ▲ and ▼ buttons simultaneously will activate the RESET function.
Use this function to clear errors when a trouble occurs.



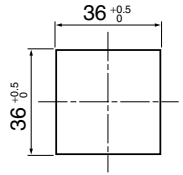
Installation

Mounting

- Install the Display Part on the panel, once the Panel Mount Adaptor B removes.
- Insert Panel Mount Adapter B supplied as an accessory into Section A of Panel Mount Adapter A.
  Push Panel Mount Adapter B from behind till the display is fixed onto the panel.
  The pin of Panel Mount Adapter B engages the notched part of Panel Adapter A to fix the display.
- The switch can be mounted on a panel with a thickness of 1.0 to 3.2mm.
- See the illustration below for panel cut dimensions.



Panel Cut Dimensions

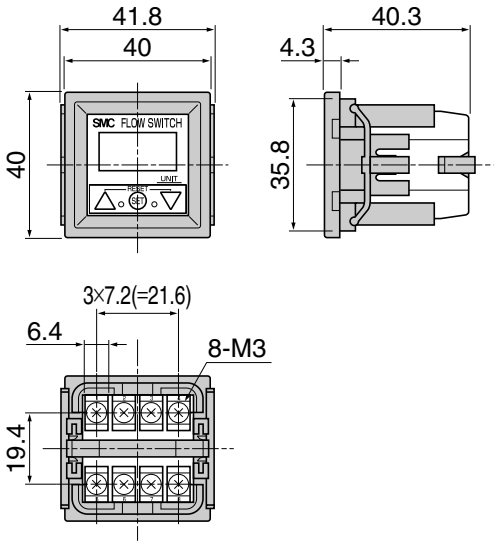


Panel Thickness: 1 to 3.2mm

Accessories

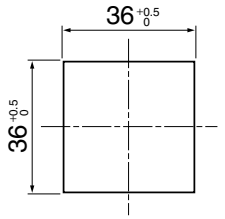
Panel Mount Adapter type ZS-22-E
(
Panel Mount Adapter A
Panel Mount Adapter B
Bracket are included
)

Outline with Dimensions (in mm)



View from backside

Panel Cut Dimensions



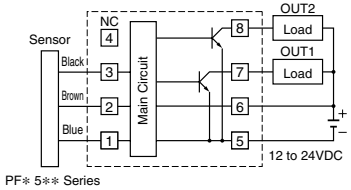
Panel Thickness: 1 to 3.2mm

Example of Internal Circuit and Wiring

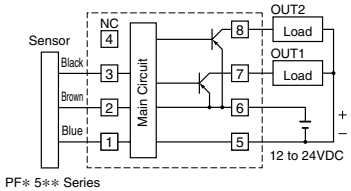
Output Specification

Be sure to select a sensor in SMC PF∗ 5∗∗ series for accurate measurement of flow rates.
The display outputs only switch output.
Analog output is output directly by the sensor part. See the operation manual of the sensor part for the complete information.

–0
NPN Open Collector Output
2Outputs
Max. 30V, 80mA
Internal Voltage Drop 1V or less



–1
PNP Open Collector Output
2Outputs
Max 80mA
Internal Voltage Drop 1.5V or less



Connection

- Turn the power off before making connection.
- Install the cable separately from the route for power cable or high-voltage cable. Otherwise, malfunction may potentially result due to noise.
- Use compression terminals for connection to the terminal board. See the full view of dimensions diagram for details of the terminal board.

Setting

Setting Procedures

Measurement Mode

▼

Initialize
Set a Flow Rate Range, display mode (instantaneous or integrated flow rate), output method and output mode

▼

Flow Rate Setting
Input a set value for a flow rate for switch output.

▼

Measurement Mode
The Measurement mode detects and displays a flow rate and performs switch operation. An instantaneous flow rate or integrated flow rate can be selected when measuring a flow rate.

Initialize

Keep pressing the SET button longer than two seconds. Remove the finger off the SET button when one of the characters of LED display column of the following table is displayed.

1. Flow Rate Range Setting

Select the flow rate range suitable for the sensor connected. 
Press the ▲ button and select the flow rate range.
Press the SET button to set.

Display Part		LED Display	Sensor Part (Flow Rate Range)	
PF2A	30∗	**10L**	PF2A 510	(1 to 10L/min)
		50L	PF2A 550	(5 to 50L/min)
	31∗	**11L**	PF2A 511	(10 to 100L/min)
		21L	PF2A 521	(20 to 200L/min)
		51L	PF2A 551	(50 to 500L/min)
PF2D	30∗	**04d**	PF2D 504	(0.4 to 4L/min)
		20d	PF2D 520	(1.8 to 20L/min)
		40d	PF2D 540	(4 to 40L/min)
PF2W	30∗	**04L**	PF2W 504	(0.5 to 4L/min)
			PF2W 504T	(0.5 to 4L/min)
		20L	PF2W 520	(2 to 16L/min)
			PF2W 520T	(2 to 16L/min)
		40L	PF2W 540	(5 to 40L/min)
			PF2W 540T	(5 to 40L/min)
	33∗	**11L**	PF2W 511	(10 to 100L/min)

2. Display Mode Setting

Select whether to display instantaneous flow rate or integrated flow rate. 
To change the Display mode, press the ▲ button and select the desired flow rate to display. Then press the SET button.
[d_1] and [d_2] respectively indicate the instantaneous flow rate and integrating flow rate.

3. Selecting Display Unit

(In case [-M] is not assigned to unit specification in model indication)

Refer to page 14.

4. Output Method Setting

Three output methods are available, namely, instantaneous switch, integrating switch and integrating pulse. The method for output to OUT1 or OUT2 is set as follows.

1) First, the output method for OUT1 is set.
   *Press the ▲ button and select the instantaneous switch, integrating switch or integrating pulse.
   *Press the SET button to set.
   [o10] [o11] and [o12] respectively indicate the instantaneous switch, integrating switch and integrating pulse.

2) Select one output method for OUT2 from three output methods by pressing the ▲ button, as in OUT1.
   *Press the SET button to set.
   [o20] [o21] and [o22] respectively indicate the instantaneous switch, integrating switch and integrating pulse.

5. Output Mode Setting

Two output modes are available, namely, the Reverse Output mode and Non-Reverse Output mode. An output mode for OUT1 and OUT2 is set.

1) First, the output method for OUT1 is set.
   *Press the ▲ button and select the Reverse Output mode or Non-Reverse Output mode.
   *Press the SET button to set.
   [1_n] and [1_P] respectively indicate the Reverse Output mode and Non-Reverse Output mode.

2) Select one output method for OUT2 from the Reverse Output mode and Non-Reverse Output mode by pressing the ▲ button, as in OUT1.
   *Press the SET button to set.
   [2_n] and [2_P] respectively indicate the Reverse Output mode and Non-Reverse Output mode.

Selecting Display Unit

In case [-M] is not assigned to unit specification in model indication

Two units each in instantaneous flow rate or integrated flow rate can be selected freely. Pressing the ▲ or ▼ button in unit setting will change to a unit and a set value will be converted automatically. Press the SET button to set and to move to setting the output method.

Display Part		LED Display	Instantaneous Flow Rate	Integrated Flow Rate
PF2A	30∗ 31∗	**U_1**	L/min	L
		U_2	CFM×10^{-2}, CFM×10^{-1}	ft^3×10^{-1}
PF2D	30∗	**U_1**	L/min	L
		U_2	gal(us)/min	gal(us)
PF2W	30∗ 33∗	**U_1**	L/min	L
		U_2	gal(us)/min	gal(us)

Selecting Flow rate Display Unit

(Only for PF2A 3∗∗ for Air)

Two units in normal condition or standard condition (ANR) can be selected.

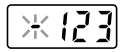
Normal condition: 0˚C/ 101.3kPa
Standard condition: 20˚C/ 101.3kPa/ 65%RH

Press the ▲ button and select the display unit, then press the SET button to set. [nor] means Normal condition and [Anr] means Standard condition.

When normal condition is selected the indicator shown in right illustration will be lit.

Indicator →

Display Function of Integrated Flow Rate Value



- Press the ▼ button first, then the SET button, to press both buttons simultaneously. Integration starts when [–] flickers.
- Lower three digits of an integrated value are always displayed. Press the ▼ button when wishing to check upper three digits.
- Pressing the ▲ button enables to display an instantaneous flow rate even during integration.
- To stop integration, press the ▼ button first, then the SET button, to press both buttons simultaneously.
  The display will keep the present integrated value.
  To clear display of an integrated value, press both the ▲ and ▼ buttons simultaneously longer than two seconds.
  To further continue integration from the saved value, repress the ▼ button first, then the SET button, to press both buttons simultaneously.

Instantaneous Flow Rate Setting Mode

Manual

Manually set an actuation value of the instantaneous-value switch in case the instantaneous switch is selected in initialization.
The output method is also set in accordance with the value set manually. Set the output method while referring to the output method described below.

1. Keep pressing the SET button and remove the finger off when [F-1] is displayed.

2. Repress the SET button to set for input of a set value in [n_1] (P_1 in the Non-Reverse Output mode) for OUT1.

   In case the Reverse Output mode is selected in initialization, [n_1] and the set value will be displayed alternately.
   (In case the Non-Reverse Output mode is selected in initialization, [P_1] and the set value will be displayed alternately.)
3. Press the ▲ or ▼ buttons to select a desired set value.
   Press the ▲ button to increase the set value or the ▼ button to decrease the set value.
4. Press the SET button to set the set value and to move to the setting mode for [n_2] (P_2 in the Non-Reverse Output mode).

   In case the Reverse Output mode is selected in initialization, [n_2] and the set value will be displayed alternately.
   (In case the Non-Reverse Output mode is selected in initialization, [P_2] and the set value will be displayed alternately.)
5. Press the ▲or ▼ buttons to select a desired set value.
   Press the ▲ button to increase the set value or the ▼ button to decrease the set value.
6. Press the SET button to set the set value and to move to the setting mode for OUT2.
   Set the set value as in OUT1.
   In case the Reverse Output mode is selected for the OUT2 setting in initialization, [n_3] or [n_4] and the set value will be displayed alternately.
   In case the Non-Reverse Output mode is selected in initialization, [P_3] or [P_4] and the set value will be displayed alternately.
7. Completing settings for [n_1] to [n_4] ([P_1] to [P_4] in the Non-Reverse Output mode) will finish flow rate setting and the mode will return to the Measurement mode.

Auto Presetting

The flow rate flowing through the flow switch will be set as a reference value and a Hysteresis (H) will be set automatically at a value 3digits lower when setting auto preset input.
The output method for setting by auto presetting is only hysteresis mode.

1. Keep pressing the SET button and remove the finger off when [F_1] is displayed.

2. Press the ▲ button and change [F_1] in the display to [F_2].

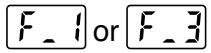
3. Press the SET button and set the auto preset state of OUT1.
   The display will change to show [AP1] .
   (In case OUT1 setting is not needed, press the ▲ and ▼ button simultaneously.)

4. Prepare the equipment to set the flow rate of OUT1 and flow fluid of the required flow rate.
5. Pressing the SET button will automatically read the flow rate. A value 3digits lower will be set automatically as a Hysteresis (H). The display will show [A1L] and the set value alternately.
6. Press the SET button and set auto preset state of OUT2.
   The display will change to show [AP2].
   (In case OUT2 setting is not needed, press the ▲ and ▼ buttons simultaneously.)

7. Prepare the equipment to set the flow rate of OUT2 and flow fluid of the required flow rate.
8. Pressing the SET button will automatically read the flow rate. A value 3digits lower will be set automatically as a Hysteresis (H). The display will show [A2L] and the set value alternately.
9. Press the SET button to finish the Auto Presetting mode and the mode will return to the Measurement mode.

Integrated Flow Rate Setting Mode

- The switch is set to an integrated flow rate.
- Integrated flow rate is displayed by switching lower three digits and upper three digits. Settings are made also by dividing into lower three digits and upper three digits.



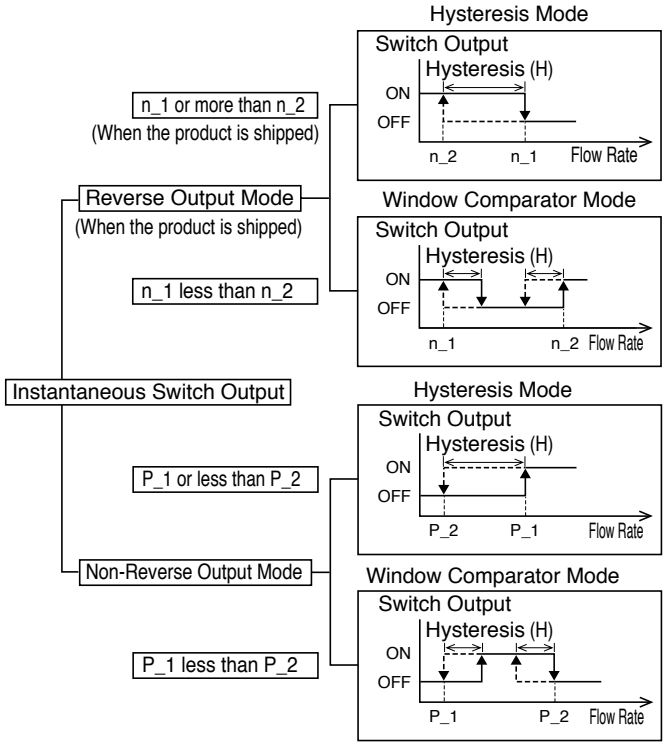
1. Keep pressing the SET button and remove the finger off when [F_1] or [F_3] is displayed.
   Proceed to Step 3. if [F_3] is displayed.
   ([F_1] will be displayed in case the instantaneous switch is selected for any switch output in initialization. In other cases, [F_3] will be displayed.)
2. When [F_1] is displayed, push the ▲ button till the display shows [F_3]. The subsequent setting operation will be the same as that when [F_3] is displayed. Set as follows.
3. Set as follows if [F_3] is displayed.
   1) Press the SET button and display the lower three digits of the integrated flow rate of OUT1.
   2) Press the ▲ or ▼ buttons and adjust the set value to the desired value.
   3) Press the SET button to set. The upper three digits of OUT1 will be displayed.
   4) Press the ▲ or ▼ buttons and adjust the set value to the desired value.
   5) Press the SET button to set. The lower three digits of OUT2 will be displayed.
   6) Press the ▲ or ▼ buttons and adjust the set value to the desired value.
   7) Press the SET button to set. The upper three digits of OUT2 will be displayed.
   8) Press the ▲ or ▼ buttons and adjust the set value to the desired value.
   9) Press the SET button to finish setting of an integrated flow rate and the mode will return to the Measurement mode.

Output Selection

Instantaneous Switch Output Method

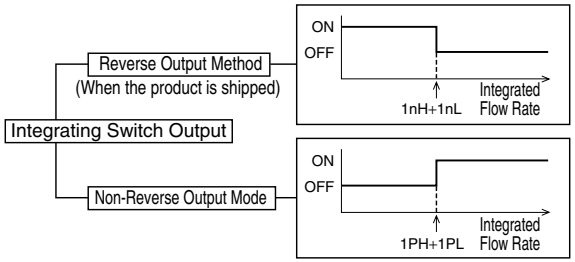
Four output methods can be selected by selecting an output mode and by combining large and small set values of OUT1 and OUT2. One of these four output methods can be selected for each output.

- OUT1 and OUT2 can be set independently.
- 1digit flow rate conversion will be a minimum set unit. See the specification for the set flow rate units.
- When setting in the Auto Presetting mode, the Hysteresis mode will be set automatically. Hysteresis in this case will be 3digits fixed.
- In the Window Comparator mode, leave between [P_1] and [P_2] or between [n_1] and [n_2] values more than seven digits.
- The following is given using OUT1 as an example. The descriptions for OUT2 are the same as those for OUT1, under the conditions that [n_1] and [n_2] should be replaced by [n_3] and [n_4] and [P_1] and [P_2] should be replaced by [P_3] and [P_4].



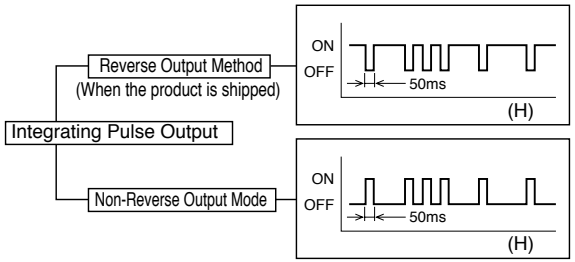
Integrating Switch Output

- Two output methods can be selected by selecting an output mode. One of these two output methods can be selected for each output.
- OUT1 and OUT2 can be set independently.
- The following is given using OUT1 as an example. The descriptions for OUT2 are the same as those for OUT1, under the conditions that 1nL and 1nH should be replaced by 2nL and 2nH and 1PL and 1PH should be replaced by 2PL and 2PH.



Integrating Pulse Output

- Pulse output for integrated flow rate measurement.



Other Functions

Key Lock Function

This function prevents errors such as changing a set value by mistake.

Lock

- Keep pressing the SET button longer than three seconds. The display will change to show [F_1] → [***] → [unL.] Remove the finger off the button when [unL] is displayed. ([***]: Refer to the LED display column in the table, Page11)

- Press the ▲ button to set the display to [Loc]
- Press the SET button and return to the Measurement mode.

Unlock

- Press the SET button longer than three seconds. Remove the finger off the button when [Loc] is displayed.

- Press the ▲ button to change the display to [unL]
- Press the SET button and return to the Measurement mode.

Error Display and Troubleshooting

In case an error occurs, take the following actions:

LED Display	Error Nature	Troubleshooting
Er 1	A current exceeding 80mA is flowing to OUT1.	Turn the power off. Check the load and wiring of OUT1.
Er2	A current exceeding 80mA is flowing to OUT2.	Turn the power off. Check the load and wiring of OUT2.
Er4	Set data has been changed due to some reason.	Reset and return the settings to those that were set when the equipment was delivered to you. If the settings cannot be reset to those that were set when the equipment was shipped, your equipment has to be examined by us.
- - -	A fluid is flowing at a flow rate higher than the rated rate.	Reduce the flow below the rated value. Error display will automatically be reset when the flow lowers below the rated value.

To reset display of Error 1, 2 or 4, press the ▲ and ▼ buttons simultaneously.

Specification

Model		PF2A 300/301		PF2A 310/311		
Flow Rate Indication Range (*1)		0.5 to 10.5 L/min	2.5 to 52.5 L/min	5 to 105 L/min	10 to 210 L/min	25 to 525 L/min
Set Flow Rate Range (*1)		0.5 to 10.5 L/min	2.5 to 52.5 L/min	5 to 105 L/min	10 to 210 L/min	25 to 525 L/min
Minimum Set Unit (*1)		0.1L/min	0.5L/min	1L/min	2L/min	5L/min
Flow rate conversion value (Pulse width: 50msec) (*1)		0.1L/pulse	0.5L/pulse	1L/pulse	2L/pulse	5L/pulse
Unit (*2, 3)	Instantaneous Flow Rate	L/min, CFM×10^{-2}		L/min, CFM×10^{-1}		
	Integrated Flow Rate	L, ft^3×10^{-1}				
Integrated Flow Rate Range		0 to 999999L				
Linearity (*4)		±5%F.S. or less				
Repeatability		±1%F.S. or less (*4)		±1%F.S. or less		
Temperature Characteristic		±1%F.S. or less (15 to 35˚C, 25˚C standard) ±2%F.S. or less (0 to 50˚C, 25˚C standard)				
Current Consumption		50mA or less (No load)		60mA or less (No load)		
Mass (Weight)		45g				
Output Specification (*5)	Switch Output	NPN Open Collector PF2A 300, PF2A 310		Maximum Load Current: 80mA, Internal voltage drop: 1V or less (@ load current 80mA) Maximum Input Voltage: 30V 2 outputs		
		PNP Open Collector PF2A 301, PF2A 311		Maximum Load Current: 80mA, Internal voltage drop: 1.5V or less (@ load current 80mA) 2 outputs		
	Integrating Pulse Output	NPN or PNP Open Collector (same specification as that of switch output)				

Common Specification	
Ambient Temperature Range	Operation: 0 to 50˚C, storage: -25 to 85˚C (No condensation or freezing)
Withstand Voltage	1000VAC, 1minute, between group of external terminals and case
Insulation Resistance	50MΩ or more (@ 500VDC M), between group of external terminals and case
Resistance to Noise	1000Vp-p pulse width 1μs, rise 1ns
Vibration proof	10 to 500Hz and amplitude 1.5mm or acceleration 98m/s^2 whichever is smaller, 2hours each directions of X, Y and Z respectively
Impact proof	490m/s^2, 3times each directions of X, Y and Z respectively
Displayed Digits	3 digits 7-segment LED
Operation Indicator Lamp	Lit when ON Output (OUT1): Green, Output (OUT2): Red
Power Supply Voltage	12 to 24VDC, ripple ±10% or less
Response Time	1sec or less
Hysteresis	Hysteresis Mode: Variable (Settable starting 0), Window Comparator mode (*6): Fixed (3digits)
Enclosure	IP40

*1: The flow rate indication range is corresponding to the flow rate range set up by the initialization.
*2: With a unit selection function
(Without a unit selection function, fixed to SI units(L/min or L))
*3: Two units in normal condition (0˚C/ 101.3kPa) or standard condition (20˚C/ 101.3kPa/ 65%RH) can be selected.
*4: This is an overall accuracy combined with PF2A 5**.
*5: Select whether to switch output or pulse output of integrated flow rate by the initialization.
*6: Window Comparator mode. Hysteresis (H) will be in 3digits.
Separate [P_1] and [P_2], as well as [n_1] and [n_2], more than 7digits.
(In case of the output 2, n_1,2 becomes n_3,4 and P_1,2 becomes P_3,4)
*7: The display part conforms entirely to the CE standard.

Specification (continue)

Model		PF2D 300/301			PF2W 300/301			PF2W 330/331
Flow Rate Indication Range (*1)		0.25 to 4.5 L/min	1.3 to 21.0 L/min	2.5 to 45 L/min	0.35 to 4.5 L/min	1.7 to 17.0 L/min	3.5 to 45 L/min	7 to 110 L/min
Set Flow Rate Range (*1)		0.25 to 4.5 L/min	1.3 to 21.0 L/min	2.5 to 45 L/min	0.35 to 4.5 L/min	1.7 to 17.0 L/min	3.5 to 45 L/min	7 to 110 L/min
Minimum Set Unit (*1)		0.05L/min	0.1L/min	0.5L/min	0.05L/min	0.1L/min	0.5L/min	1L/min
Flow rate conversion value (Pulse width: 50msec) (*1)		0.05 L/pulse	0.1 L/pulse	0.5 L/pulse	0.05 L/pulse	0.1 L/pulse	0.5 L/pulse	1L/pulse
Unit (*2)	Instantaneous Flow Rate	L/min, gal(US)/min						
	Integrated Flow Rate	L, gal(US)						
Integrated Flow Rate Range		0 to 999999L						
Linearity		±0.5%F.S. or less			±5%F.S. or less (*3)			±3%F.S. or less (*3)
Repeatability		±0.5%F.S. or less			±3%F.S. or less (*3)			±1%F.S. or less (*3)
Temperature Characteristic		±1%F.S. or less (15 to 35˚C, 25˚C standard) ±2%F.S. or less (0 to 50˚C, 25˚C standard)			±5%F.S. or less (0 to 50˚C, 25˚C standard)			(*4)
Current Consumption (No load)		60mA or less			50mA or less			60mA or less
Mass (Weight)		45g						
Output Specification (*5)	Switch Output	NPN Open Collector PF2D 300, PF2W 300, PF2W 330			Maximum Load Current: 80mA, Internal voltage drop: 1V or less (@ load current 80mA) Maximum Input Voltage: 30V 2 outputs			
		PNP Open Collector PF2D 301, PF2W 301, PF2W 331			Maximum Load Current: 80mA, Internal voltage drop: 1.5V or less (@ load current 80mA) 2 outputs			
	Integrating pulse Output	NPN or PNP Open Collector (same specification as that of switch output)						

Common Specification	
Ambient Temperature Range	Operation: 0 to 50˚C, storage: -25 to 85˚C (No condensation or freezing)
Withstand Voltage	1000VAC, 1minute, between group of external terminals and case
Insulation Resistance	50MΩ or more (@ 500VDC M), between group of external terminals and case
Resistance to Noise	1000Vp-p pulse width 1μs, rise 1ns
Vibration proof	10 to 500Hz and amplitude 1.5mm or acceleration 98m/s² whichever is smaller, 2hours each directions of X, Y and Z respectively
Impact proof	490m/s², 3times each directions of X, Y and Z respectively
Displayed Digits	3 digits 7-segment LED
Operation Indicator Lamp	Lit when ON Output (OUT1): Green, Output (OUT2): Red
Power Supply Voltage	12 to 24VDC, ripple ±10% or less
Response Time	1sec or less
Hysteresis	Hysteresis Mode: Variable (Settable starting 0), Window Comparator mode (*6) : Fixed (3digits)
Enclosure	IP40

*1: The flow rate indication range is corresponding to the flow rate range set up by the initialization.
*2: With a unit selection function
(Without a unit selection function, fixed to SI units(L/min or L))
*3: This is an overall accuracy combined with PF2W 5∗∗.
*4: ±1%F.S. or less (15 to 35˚C, 25˚C standard),
±2%F.S. or less (0 to 50˚C, 25˚C standard)
*5: Select whether to switch output or pulse output of integrated flow rate by the initialization.
*6: Window Comparator mode. Hysteresis (H) will be in 3digits.
Separate [P_1] and [P_2], as well as [n_1] and [n_2], more than 7digits.
(In case of the output 2, n_1,2 becomes n_3,4 and P_1,2 becomes P_3,4)
*7: The display part conforms entirely to the CE standard.