Digital Flow Switch for Air

PF2A Series

CE UK CA

RoHS

For Air

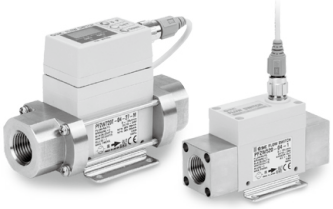
***PF2A* Series**

The high flow rate type/PF2A7□H has been remodeled. Please select the new type/PF3A7□H instead.

3-Screen Display

4-channel Flow Monitor

***PFG200* Series** p. 307



For Water ***PF2W* Series**

New digital flow switch product, **PF3W series**, with the **compact design and expanded flow rate range** has been launched. Please examine to use **PF3W series (page 329)**. For details about PF2W series, refer to the catalog at SMC website.

1 *Flow rate setting and monitoring are possible with the digital display.*

2 *Two types are available: Integrated and Remote type.*

3 *Three types of output: Switch, accumulated pulse, and analog outputs.*

4 *Switching from instantaneous flow rate to accumulated flow is possible.*
(Accumulated flow rate is reset when the power supply turns OFF.)

5 *Two independent flow rate settings are possible.*

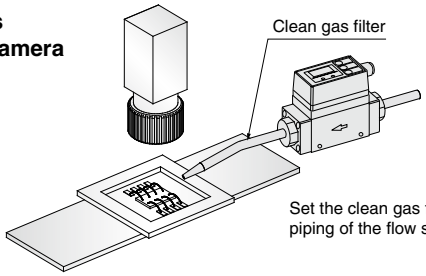
6 *Water resistant construction conforming to IP65*

For Air

PF2A Series

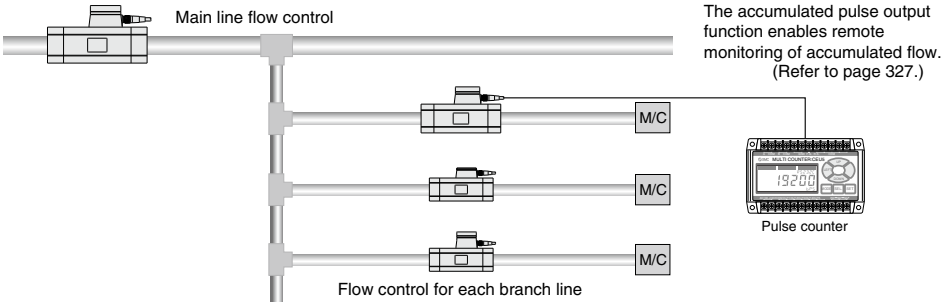
Application Examples

Flow control of N_2 gas to prevent detection camera shimmering and lead frame oxidation



Set the clean gas filter on the outlet side piping of the flow switch.

Makes it possible to monitor the air flow from the main line to each branch line.



The accumulated pulse output function enables remote monitoring of accumulated flow.
(Refer to page 327.)

3-Screen Display

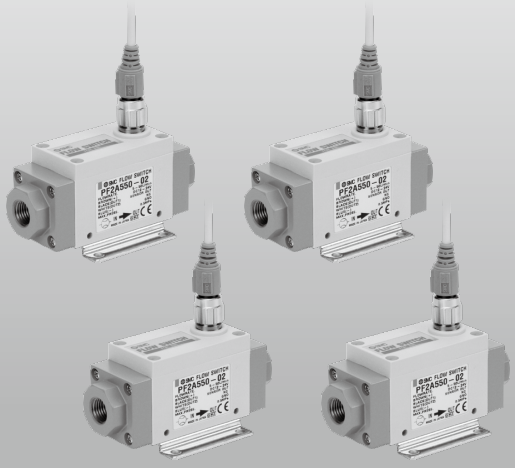
4-Channel Flow Monitor

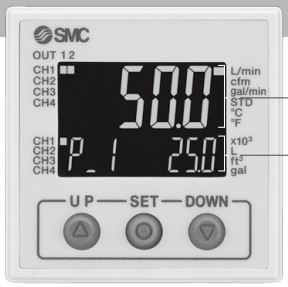
PFG200 Series

CE UKCA RoHS

IO-Link

Up to 4 flow sensors can be connected!





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

Main screen	Measured value (Current flow value)	
Sub screen	Left side	Right side
	Label (Display item), Set value (Threshold value)	

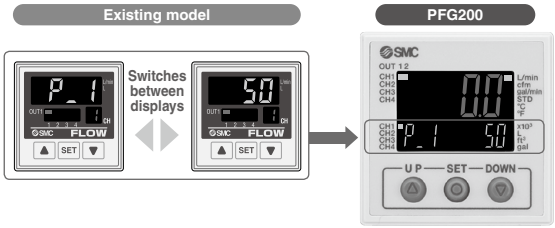
● **Input Range Selection**

Visualization of Settings

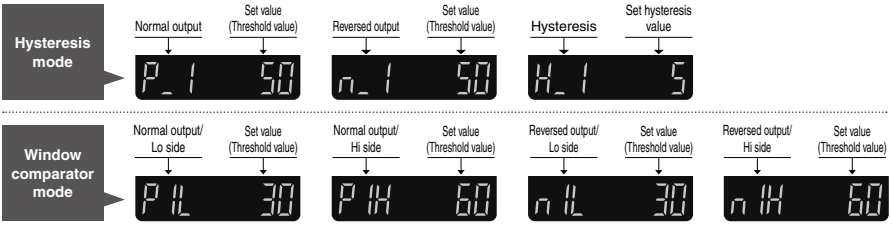
Set value (Threshold value)	P_1	Hysteresis value	H_1	Peak value	H_H1
Bottom value	H_Lo	Channel display	CH_1		

Visualization of Settings

Item and set value are displayed together.
Easy to confirm the displayed item

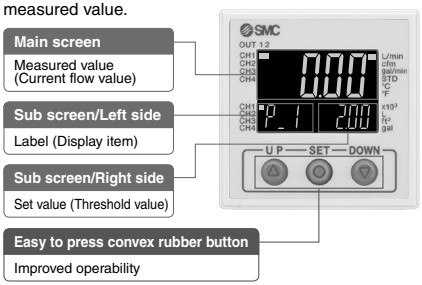


Mode Examples

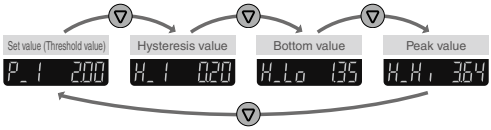


Easy Screen Switching

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



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



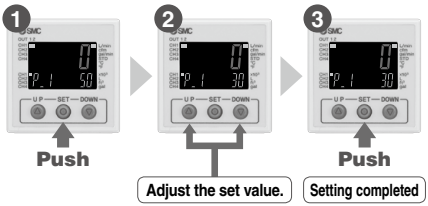
∗ One additional arbitrary display mode can be added via the function settings.

CH display | Other channel | Customer defined label | Display OFF

Simple 3-Step Setting

After selecting the channel, when the SET button is pressed and the set value (P_1) is displayed, the set value (threshold value) can be set.

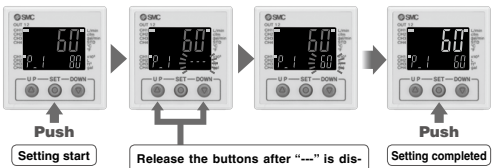
When the SET button is pressed and the hysteresis (H_1) is being displayed, the hysteresis value can be set.



Now with a snap shot function for set value reading

Snap shot function

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

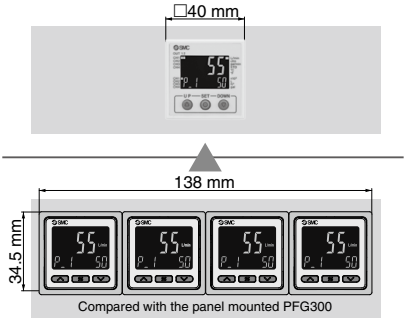


SMC

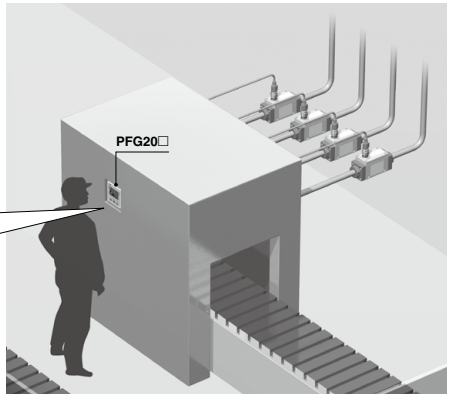
Centralized Control Saves Installation Space.

66% reduction in installation space

(Compared with the panel mounted PFG20□)

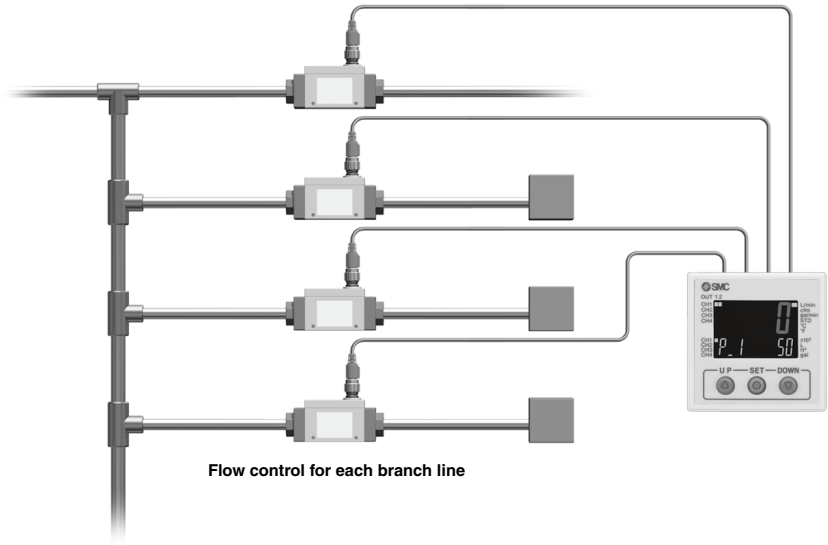


Compared with the panel mounted PFG300



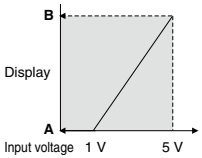
Accumulated Flow Measurement

A single product can manage the accumulated flow in four lines.



Flow control for each branch line

Input Range Selection (for Pressure/Flow rate)



The sensor input range can be set to the required value and displayed. (Voltage input: 1 to 5 V)
Pressure switch/Flow switch can be displayed.

A is displayed for 1 V. B is displayed for 5 V.
The range can be set as required.
Refer to page 323-2 for the specification of the sensors which can be connected.
For the individual specifications of each connectable sensor, refer to the **Web Catalog**.

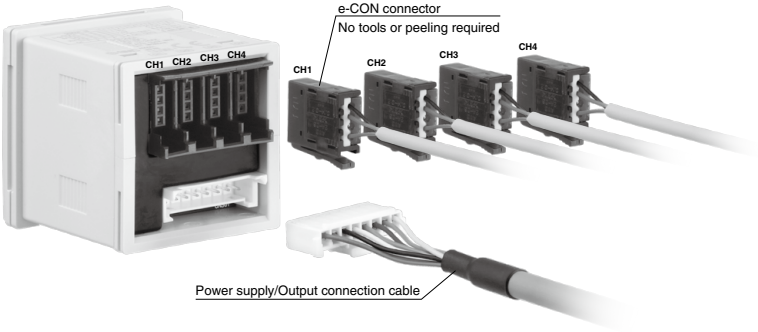
■ Pressure Sensor for General Fluids PSE56□

	A	B
PSE560	0.000	1.000
PSE561	0	−101
PSE562	0	101
PSE563	−101	101

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

Connectors

Connection and removal of wiring is easy.



Functions p. 325-3, 325-4

■ Peak/Bottom value indication function
This function constantly detects and updates the maximum (minimum) flow when the power is supplied, and allows to hold the maximum (minimum) flow value.

■ Key-lock function
This function prevents operation errors such as accidentally changing setting values.

■ External input function
The accumulated value, peak value, and bottom value can be reset remotely.

■ Error display function
This function displays error location and content when a problem or error has occurred.

■ Delay time setting
The time from when the instantaneous flow reaches the set value to when the switch output operates can be set.

■ Zero-cut setting
When the flow display value is close to zero, this function forces the display to zero.

■ Selection of power-saving mode
Power-saving mode can be selected.
It shifts to power-saving mode automatically when there is no button operation for 30 seconds.

■ Setting of security code
Users can select whether a security code must be entered to release the key lock.

■ Accumulated value hold
The accumulated value is not cleared even when the power supply is turned OFF.

■ Snap shot function
The current flow rate value can be stored to the switch output ON/OFF set point.

■ Output check function
It is possible to check the switch output operation and process data value.

■ Channel to channel copy function
The set values can be copied to other channel.

■ Channel select function
Flow value for the selected channel is displayed.

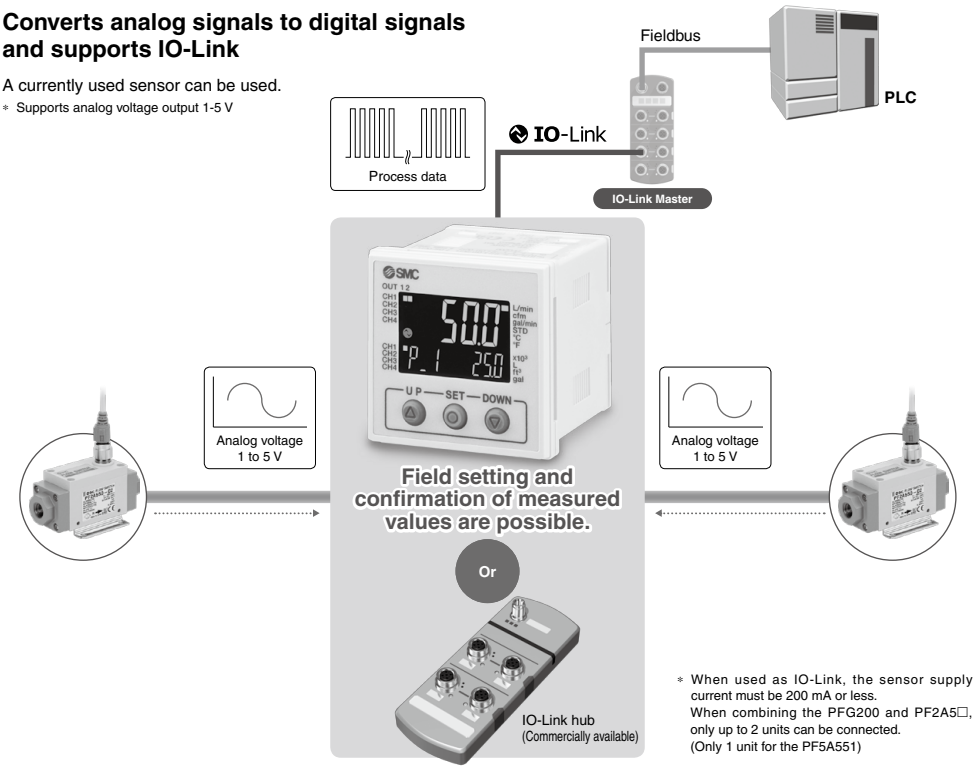
■ Channel scan function
Flow values for each channel are displayed in turn every 2 seconds.

Hub Function

Converts analog signals to digital signals and supports IO-Link

A currently used sensor can be used.

* Supports analog voltage output 1-5 V



* When used as IO-Link, the sensor supply current must be 200 mA or less.
When combining the PFG200 and PF2A5□, only up to 2 units can be connected.
(Only 1 unit for the PF5A551)

Process Data

Bit offset	79	78	77	76	75	74	73	72	71	70	69	68	67	66	65	64
Item	CH1 measured value: 16-bit signed integer															
Bit offset	63	62	61	60	59	58	57	56	55	54	53	52	51	50	49	48
Item	CH2 measured value: 16-bit signed integer															
Bit offset	47	46	45	44	43	42	41	40	39	38	37	36	35	34	33	32
Item	CH3 measured value: 16-bit signed integer															
Bit offset	31	30	29	28	27	26	25	24	23	22	21	20	19	18	17	16
Item	CH4 measured value: 16-bit signed integer															

Measurement data of sensors for 4 channels are combined and cyclically sent as a process data.

Bit offset	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
Item	Error	System error	Fixed output	Reservation	CH4 diagnosis	CH3 diagnosis	CH2 diagnosis	CH1 diagnosis	CH4 OUT2	CH4 OUT1	CH3 OUT2	CH3 OUT1	CH2 OUT2	CH2 OUT1	CH1 OUT2	CH1 OUT1

Each channel has 2 outputs*1.

Diagnosis item	· Internal product malfunction · Outside of zero-clear range
Diagnosis item	· Output overcurrent
Diagnosis item	· Display upper and lower limits are exceeded. · The accumulated flow upper and lower limits are exceeded

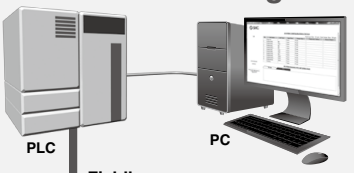
Implement diagnostic bits in the process data.

*1 During SIO mode, only CH1 has 2 switch outputs. CH2-4 has one output each.

IO-Link

IO-Link is an open communication interface technology between the sensor/actuator and the I/O terminal that is an international standard, IEC61131-9.

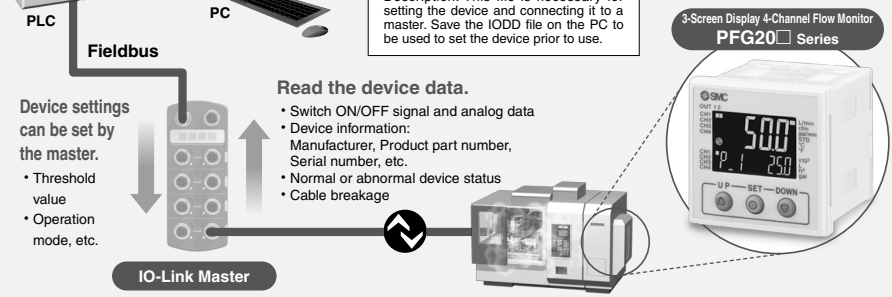
Visualization of operation/equipment status
Remote monitoring and control by communication



Configuration File (IODD File*1)

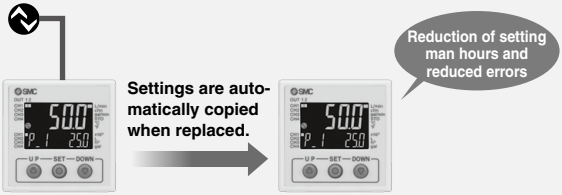
• Manufacturer • Product part no. • Set value

*1 IODD File
IODD is an abbreviation of IO Device Description. This file is necessary for setting the device and connecting it to a master. Save the IODD file on the PC to be used to set the device prior to use.

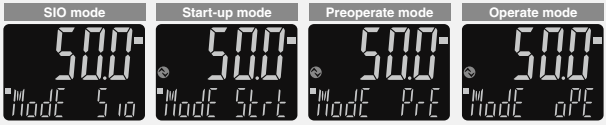


Automatic setting function [Data storage function]

When replacing the sensor monitor with the same type (the same device ID), the parameters (set values) stored in the IO-Link master are automatically copied (set) to the new sensor monitor.



Displays the output communication status and indicates the presence of communication data



Operation and Display

Communication with master	IO-Link status indicator light	Status			Screen display *2	Description
Yes	*1	IO-Link mode	Normal	Operate	ModE oPE	Normal communication status (readout of measured value)
				Start up	ModE Strt	At the start of communication
				Preoperate	ModE PrE	
	*1 (Flashing)		Abnormal	Version does not match	Er 15 V 10	IO-Link version does not match that of the master. The master uses version 1.0. * The applicable IO-Link version is 1.1.
No				Communication disconnection	ModE oPE / ModE Strt / ModE PrE	Normal communication was not received for 1 second or longer.
	OFF	SIO mode			ModE SIO	General switch output

*1 In IO-Link mode, the IO-Link indicator is ON or flashes. *2 When the sub screen is set to Mode
* "ModE LoC" is displayed when the data storage lock is enabled. (Except for version mismatch or when in SIO mode)

For Air

Digital Flow Switch

PF2A Series

How to Order

Integrated Display Type **PF2A7 10 – □ 01 – 27 □ – M**

Flow rate range

10	1 to 10 L/min
50	5 to 50 L/min
11	10 to 100 L/min
21	20 to 200 L/min
51	50 to 500 L/min

Thread type

Nil	Rc
N	NPT
F	G*

* Conforming to ISO228-1.

Port size

Symbol	Port size	Flow rate (L/min) 10	50	100	200	500	Applicable model
01	1/8	●	●				PF2A710/750
02	1/4	●	●				
03	3/8			●	●		PF2A711/721
04	1/2					●	PF2A751

Output specifications

Symbol	Output specification
27	NPN open collector 2 outputs
67	PNP open collector 2 outputs

Lead wire (Refer to page 326.)

Symbol	Lead wire with M12 connector (3 m)
N	Without lead wire

Unit specifications

Nil	With unit switching function Note1)
M	Fixed SI unit Note2)

Note1) Under Japan's new Measurement Act, this is only for overseas sales (SI units are to be used inside Japan).

Note2) Fixed units: Instantaneous flow rate: L/min Accumulated flow: L

Specifications

Refer to pages 202 and 203 for Flow Switch Precautions. For details about the Specific Product Precautions, refer to the Operation Manual on the SMC website, http://www.smcworld.com Click here for details.

Model		PF2A710	PF2A750	PF2A711	PF2A721	PF2A751
Measured fluid		Air, Nitrogen				
Flow rate measurement range		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		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
Rated flow range		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
Minimum set unit		0.1 L/min	0.5 L/min	1 L/min	2 L/min	5 L/min
Accumulated pulse flow rate exchange value (Pulse width: 50 ms)		0.1 L/pulse	0.5 L/pulse	1 L/pulse	2 L/pulse	5 L/pulse
Display units (Note 1, 2)	Instantaneous flow rate	L/min, CFM x 10^{-2}		L/min, CFM x 10^{-1}		
	Accumulated flow	L, ft^3 x 10^{-1}				
Operating fluid temperature		0 to 50°C				
Accuracy Note 3)		±5% F.S.				
Repeatability		±1% F.S.		±2% F.S.		
Temperature characteristics		±3% F.S. (15 to 35°C, 25°C reference), ±5% F.S. (0 to 50°C, 25°C reference)				
Current consumption		150 mA or less		160 mA or less		170 mA or less
Weight Note 4)		250 g		290 g		
Port size (Rc, NPT, G)		1/8, 1/4		3/8		1/2
Detection type		Heater type				
Indicator light		3-digit, 7-segment LED				
Operating pressure range		–50 kPa to 0.5 MPa		–50 kPa to 0.75 MPa		
Proof pressure		1.0 MPa				
Accumulated flow range Note 5)		0 to 999999 L				
Output specifications (Note 6)	Switch output	NPN open collector	Maximum load current: 80 mA; Internal voltage drop: 1 V or less (with load current of 80 mA) Maximum applied voltage: 30 V; 2 outputs			
		PNP open collector	Maximum load current: 80 mA Internal voltage drop: 1.5 V or less (with load current of 80 mA); 2 outputs			
	Accumulated pulse output	NPN or PNP open collector (same as switch output)				
Status LED's		Lights up when output is turned ON OUT1: Green; OUT2: Red				
Response time		1 sec. or less				
Hysteresis		Hysteresis mode: Variable (can be set from 0), Window comparator mode Note 7): 3-digit fixed				
Power supply voltage		12 to 24 VDC ±10%				
Environment	Enclosure	IP65				
	Operating temperature range	Operating: 0 to 50°C, Stored: –25 to 85°C (with no freezing and condensation)				
	Withstand voltage	1000 VAC for 1 minute between terminals and housing				
	Insulation resistance	50 MΩ or more (500 VDC measured via megohmmeter) between terminals and housing				
Standards and regulations		CE/UKCA marking				

Note 1) For digital flow switch with unit switching function. (Fixed SI unit [(L/min, or L, m^3 or m^3 x 10^3)] will be set for switch type without the unit switching function.)
Note 2) Flow rate display can be switched between the basic condition of 0°C, 101.3 kPa and the standard condition (ANR) of 20°C, 101.3 kPa, and 65% RH.
Note 3) The piping on the IN side must have a straight section of piping whose length is 8 times the piping diameter or more. If a straight section of piping is not installed, the accuracy may vary by ±5% F.S. or more.
Note 4) Without lead wire.
Note 5) Accumulated flow rate is reset when the power supply turns OFF.
Note 6) Switch output and accumulated pulse output can be selected during initial setting.
Note 7) Window comparator mode — Since hysteresis will reach 3 digits, keep P_1 and P_2 or n_1 and n_2 apart by 7 digits or more. (In case of output OUT2, n_1, 2 to be n_3, 4 and P_1, 2 to be P_3, 4.)
Note 8) The flow switch conforms to the CE/UKCA marking.
Note 9) For details about wiring and thread type, refer to the Operation Manual that can be downloaded from SMC website (http://www.smcworld.com).
Note 10) Any products with tiny scratches, smears, or display color variation or brightness which does not affect the performance are verified as conforming products.

Set Flow Rate Range and Rated Flow Range

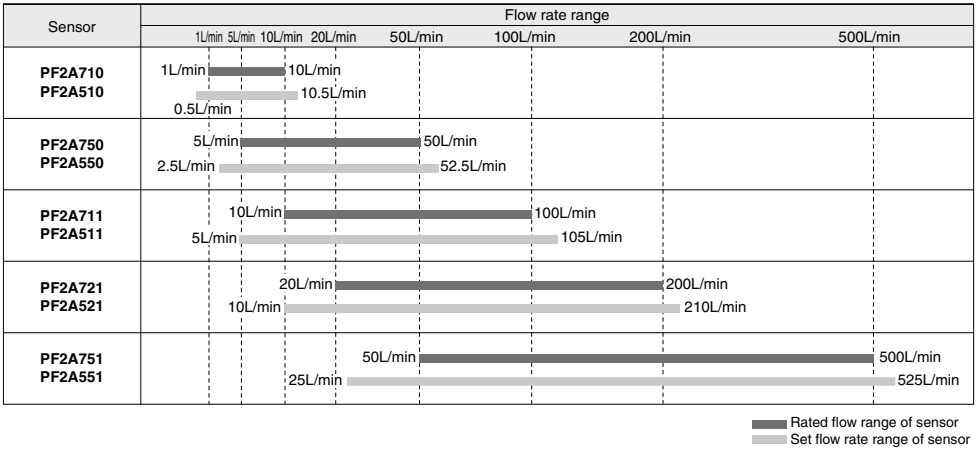
Set the flow rate within the rated flow range.

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

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

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

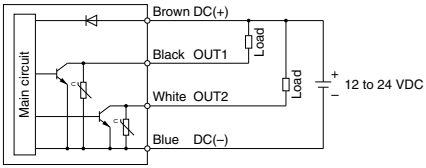
<For Air/PF2A>



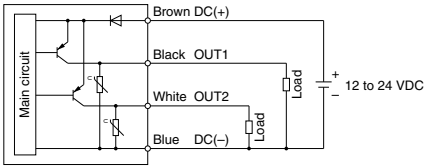
Internal Circuits and Wiring Examples

PF2A7□□

-27
NPN (2 outputs)



-67
PNP (2 outputs)



How to Order

Remote Type Sensor Unit **PF2A5 10 – □ 01 □ – □ – C**

Flow rate range

10	1 to 10 L/min
50	5 to 50 L/min
11	10 to 100 L/min
21	20 to 200 L/min
51	50 to 500 L/min

Thread type

Nil	Rc
N	NPT
F	G*

* Conforming to ISO228-1.

Port size

Symbol	Port size	Flow rate (L/min) 10	50	100	200	500	Applicable model
01	1/8	●	●				PF2A510/550
02	1/4	●	●				
03	3/8			●	●		PF2A511/521
04	1/2					●	PF2A551

Lead wire (Refer to page 326.)

Nil	Lead wire with M12 connector (3 m)
N	Without lead wire

Option (Only for output specifications "1")
(Refer to page 326.)

Nil	None
C	e-con connector (1 pc.)

The cable and connector are shipped unassembled.

Output specifications

Symbol	Specification	Applicable monitor unit model
Nil	Output for monitor unit	PF2A300 series
1	Output for monitor unit + analog output (1 to 5 V)	PF2A300/PFG200 series
2	Output for monitor unit + analog output (4 to 20 mA)	PF2A300 series

Specifications

Refer to pages 202 and 203 for Flow Switch Precautions. For details about the Specific Product Precautions, refer to the Operation Manual on the SMC website, http://www.smcworld.com Click here for details.

Model		PF2A510	PF2A550	PF2A511	PF2A521	PF2A551
Measured fluid		Air, Nitrogen				
Detection type		Heater type				
Rated flow range		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
Operating pressure range		–50 kPa to 0.5 MPa		–50 kPa to 0.75 MPa		
Proof pressure		1.0 MPa				
Operating fluid temperature		0 to 50°C				
Accuracy Note 1, 2)		±5% F.S.				
Repeatability Note 1)		±1% F.S. (Connected with PF2A3□□), ±3%F.S. Max. (Connected with PFG20□)				
Temperature characteristics		±2% F.S. (15 to 35°C, 25°C reference) ±3% F.S. (0 to 50°C, 25°C reference)				
Output specifications Note 3)	Output for monitor unit	Analog voltage output (non-linear) output impedance 1 kΩ output for monitor unit PF2A3□□				
	Analog output	Voltage output 1 to 5 V (within the flow rate range) Accuracy: ±5%F.S., Min. load impedance: 100 kΩ (Output impedance: 1 kΩ)				
		Current output 4 to 20 mA (within the flow rate range) Accuracy: ±5%F.S., Max. load impedance: 300 Ω or less (at 12 VDC), 600 Ω or less (at 24 VDC)				
Power supply voltage		12 to 24 VDC ±10%				
Current consumption		100 mA or less				110 mA or less
Environment	Enclosure	IP65				
	Operating temperature range	Operating: 0 to 50°C, Stored: –25 to 85°C (with no freezing and condensation)				
	Withstand voltage	1000 VAC for 1 minute between terminals and housing				
	Insulation resistance	50 MΩ or more (500 VDC measured via megohmmeter) between terminals and housing				
Standards and regulations		CE/UKCA marking				
Weight Note 4)		200 g		240 g		
Port size (Rc, NPT, G)		1/8, 1/4		3/8		1/2

Note 1) The system accuracy when combined with PF2A3□□/PFG20□.
Note 2) The piping on the IN side must have a straight section of piping whose length is 8 times the piping diameter or more. If a straight section of piping is not installed, the accuracy may vary by ±5% F.S. or more.
Note 3) Output system can be selected during initial setting.
Note 4) Without lead wire. (Add 20 g for the types of analog output whether voltage or current output selected.)
Note 5) Flow rate unit measured under the following conditions: 0°C and 101.3 kPa.
Note 6) The sensor unit conforms to the CE/UKCA marking.
Note 7) For details about wiring and thread type, refer to the Operation Manual that can be downloaded from SMC website (http://www.smcworld.com).
Note 8) Any products with tiny scratches, smears, or display color variation or brightness which does not affect the performance are verified as conforming products.

How to Order

Remote Type Monitor Unit **PF2A3 [0] [0] – A – [M]**

Flow rate range

Symbol	Flow rate range	Type for sensor unit
0	1 to 10 L/min	PF2A510
	5 to 50 L/min	PF2A550
1	10 to 100 L/min	PF2A511
	20 to 200 L/min	PF2A521
	50 to 500 L/min	PF2A551

Output specifications

Symbol	Output specification	Applicable model
0	NPN open collector 2 outputs	PF2A300, 310
1	PNP open collector 2 outputs	PF2A301, 311

Mounting

A	Panel mounting

Unit specifications

Nil	With unit switching function Note1)
M	Fixed SI unit Note2)

Note1) Since the unit for Japan is fixed to SI due to new measurement law, this option is for overseas.

Note2) Fixed units:
Instantaneous flow rate: L/min
Accumulated flow: L

Specifications

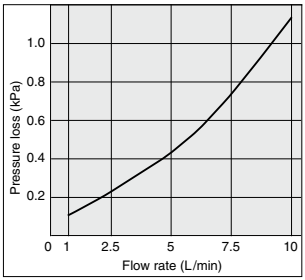
Refer to pages 202 and 203 for Flow Switch Precautions. For details about the Specific Product Precautions, refer to the Operation Manual on the SMC website, http://www.smcworld.com Click here for details.

Model		PF2A300/301		PF2A310/311		
Flow rate measurement range Note 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 Note 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 Note 1)		0.1 L/min	0.5 L/min	1 L/min	2 L/min	5 L/min
Accumulated pulse flow rate exchange value (Pulse width: 50 ms) Note 1)		0.1 L/pulse	0.5 L/pulse	1 L/pulse	2 L/pulse	5 L/pulse
Note 2, 3) Display units	Instantaneous flow rate	L/min, CFM x 10^{-2}		L/min, CFM x 10^{-1}		
	Accumulated flow	L, ft^3 x 10^{-1}				
Accumulated flow range Note 4)		0 to 999999 L				
Accuracy Note 5)		±5% F.S.				
Repeatability Note 5)		±1% F.S.				
Temperature characteristics		±1% F.S. (15 to 35°C, 25°C reference) ±2% F.S. (0 to 50°C, 25°C reference)				
Current consumption		50 mA or less		60 mA or less		
Weight		45 g				
Output specifications Note 6)	Switch output	NPN open collector (PF2A300, PF2A310)		Maximum load current: 80 mA Internal voltage drop: 1 V or less (with load current of 80 mA) Maximum applied voltage: 30 V 2 outputs		
		PNP open collector (PF2A301, PF2A311)		Maximum load current: 80 mA Internal voltage drop: 1.5 V or less (with load current of 80 mA) 2 outputs		
	Accumulated pulse output	NPN or PNP open collector (same as switch output)				
Indicator light		3-digit, 7-segment LED				
Status LED's		Lights up when output is turned ON OUT1: Green; OUT2: Red				
Power supply voltage		12 to 24 VDC ±10%				
Response time		1 sec. or less				
Hysteresis		Hysteresis mode: Variable (can be set from 0), Window comparator mode Note 7): Fixed (3-digits)				
Environment	Enclosure	IP40				
	Operating temperature range	Operating: 0 to 50°C, Stored: –25 to 85°C (with no freezing and condensation)				
	Withstand voltage	1000 VAC for 1 minute between terminals and housing				
	Insulation resistance	50 MΩ or more (500 VDC measured via megohmmeter) between terminals and housing				
Standards and regulations		CE/UKCA marking				

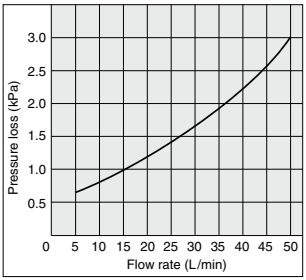
Note 1) The flow rate measurement range can be modified depending on the setting.
Note 2) For digital flow switch with unit switching function. (Fixed SI unit [L/min or L] will be set for switch types without the unit switching function.)
Note 3) Flow rate display can be switched between the basic condition of 0°C, 101.3 kPa and the standard condition (ANR) of 20°C, 101.3 kPa, and 65% RH.
Note 4) Accumulated flow rate is reset when the power supply turns OFF.
Note 5) The system accuracy when combined with PF2A5□□.
Note 6) Switch output and accumulated pulse output can be selected during initial setting.
Note 7) Window comparator mode — Since hysteresis will reach 3 digits, keep P_1 and P_2 or n_1 and n_2 apart by 7 digits or more. (In case of output OUT2, n_1, 2 to be n_3, 4 and P_1, 2 to be P_3, 4.)
Note 8) The monitor unit conforms to the CE/UKCA marking.
Note 9) For details about wiring, refer to the Operation Manual that can be downloaded from SMC website (http://www.smcworld.com).
Note 10) Any products with tiny scratches, smears, or display color variation or brightness which does not affect the performance are verified as conforming products.

Flow Rate Characteristics (Pressure Loss)

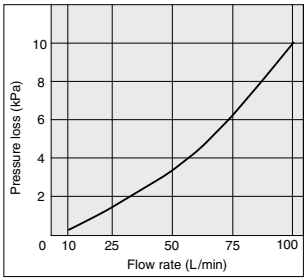
PF2A710, 510



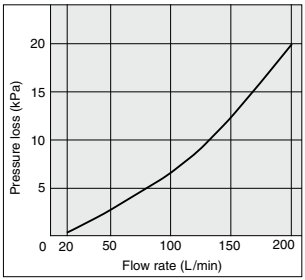
PF2A750, 550



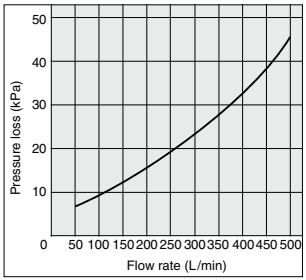
PF2A711, 511



PF2A721, 521

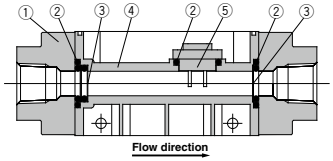


PF2A751, 551

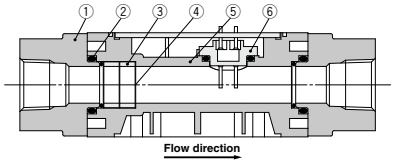


Wetted Parts Construction/Sensor Unit

PF2A710/750
PF2A510/550



PF2A711/721/751
PF2A511/521/551



Parts list

No.	Description	Material
1	**Attachment**	ADC
2	**Seal**	NBR
3	**Mesh**	Stainless steel
4	**Body**	PBT
5	**Sensor**	PBT

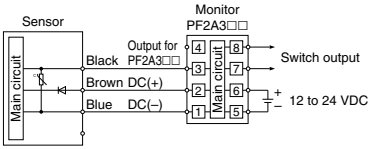
Parts list

No.	Description	Material
1	**Attachment**	ADC
2	**Seal**	NBR
3	**Spacer**	PBT
4	**Mesh**	Stainless steel
5	**Body**	PBT
6	**Sensor**	PBT

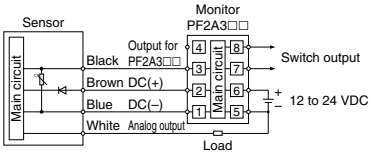
Internal Circuits and Wiring Examples

For PF2A5□□/PF2A3

Nil

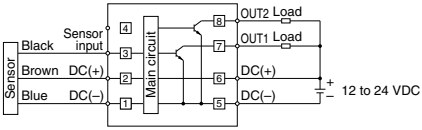


-1/2
Analog voltage output
Analog current output

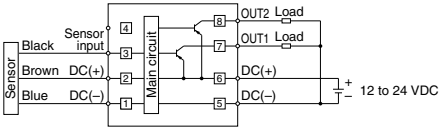


PF2A3□

-0
NPN (2 outputs)

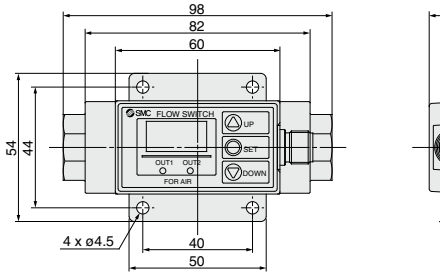


-1
PNP (2 outputs)

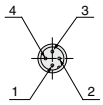


Dimensions: Integrated Display Type For Air

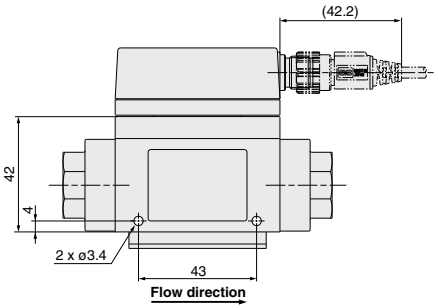
PF2A710, 750



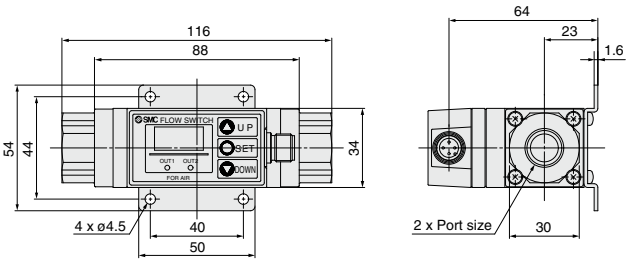
Connector pin numbers

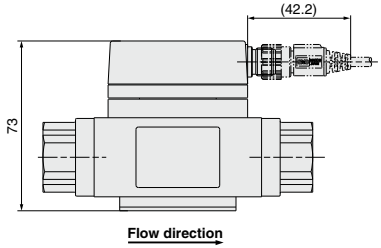


Pin no.	Pin description
1	DC(+)
2	OUT2
3	DC(–)
4	OUT1



PF2A711, 721, 751

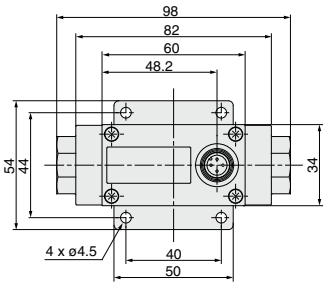


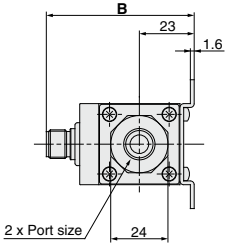


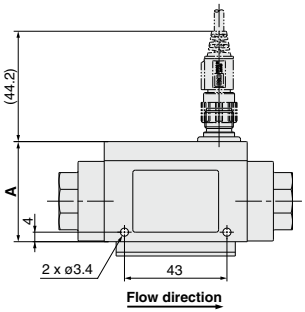
Be sure to allow straight pipe length that is minimum 8 times the port size upstream and downstream of the switch piping.

Dimensions: Remote Type Sensor Unit For Air

PF2A510, 550







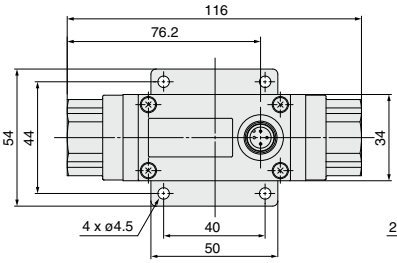
(mm)

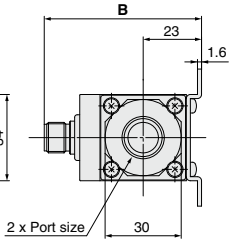
Output specifications	A	B
Output for monitor unit only	42	62
Output for monitor unit + Analog output	52	72

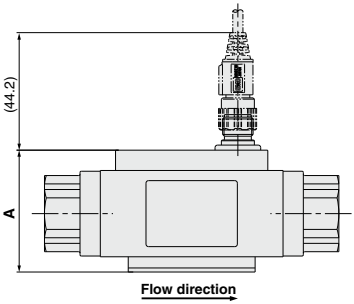
Connector pin numbers

Pin no.	Pin description
1	DC(+)
2	NC/Analog output
3	DC(–)
4	OUT

PF2A511, 521, 551





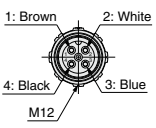


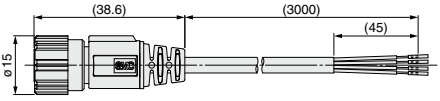
(mm)

Output specifications	A	B
Output for monitor unit only	48	62
Output for monitor unit + Analog output	58	72

Be sure to allow straight pipe length that is minimum 8 times the port size upstream and downstream of the switch piping.

ZS-37-A
Lead wire with M12 connector



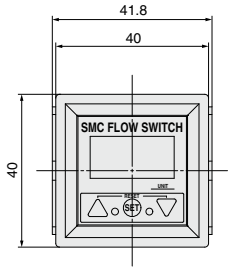


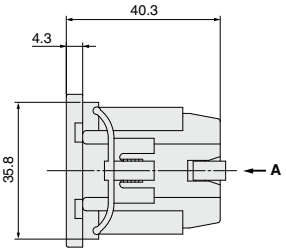
Lead Wire Specifications

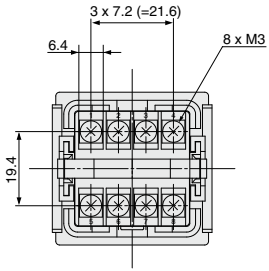
Conductor	Nominal cross section	AWG23
	O.D.	Approx. 0.7 mm
Insulator	Material	Cross-linked vinyl
	O.D.	Approx. 1.1 mm
	Color	Brown, White, Black, Blue
Sheath	Material	Oil-resistant vinyl
Finished O.D.	ø4	

Dimensions: Remote Type Monitor Unit For Air

PF2A3□□-A
Panel mount adapter type

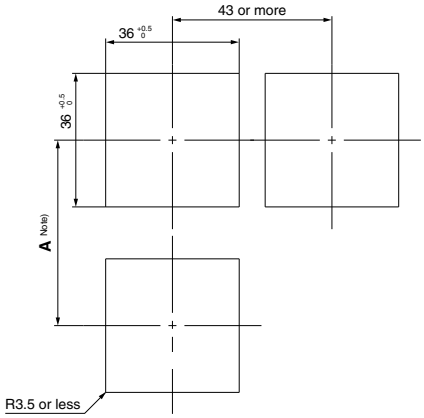






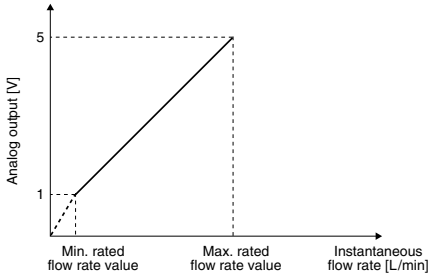
View A

Panel fitting dimensions



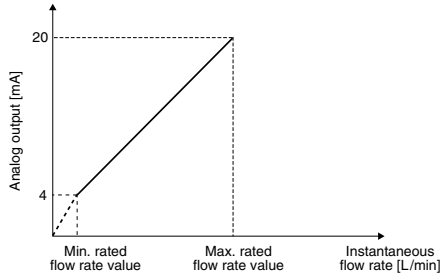
Note) Decide the length of A taking into account the size of terminal you use.
∗ The applicable panel thickness is 1 to 3.2 mm.

Analog output
1 to 5 VDC



Part no.	Normal condition		Standard condition	
	Min. rated flow rate value [L/min]	Max. rated flow rate value [L/min]	Min. rated flow rate value [L/min]	Max. rated flow rate value [L/min]
PF2A510-□-1	1	10	1.1	10.7
PF2A550-□-1	5	50	5.4	53.5
PF2A511-□-1	10	100	11	107
PF2A521-□-1	20	200	21	214
PF2A551-□-1	50	500	54	535

4 to 20 mA DC



Part no.	Normal condition		Standard condition	
	Min. rated flow rate value [L/min]	Max. rated flow rate value [L/min]	Min. rated flow rate value [L/min]	Max. rated flow rate value [L/min]
PF2A510-□-2	1	10	1.1	10.7
PF2A550-□-2	5	50	5.4	53.5
PF2A511-□-2	10	100	11	107
PF2A521-□-2	20	200	21	214
PF2A551-□-2	50	500	54	535

3-Screen Display
4-Channel Flow Monitor
PFG200 Series

How to Order

PFG20 0 – M □ □ □

Input/Output specification

Symbol	Description
0	NPN 5 outputs + External input
1	PNP 5 outputs + External input
2∗1	IO-Link + NPN 4 outputs or NPN 5 outputs (SIO mode)
3∗1	IO-Link + PNP 4 outputs or PNP 5 outputs (SIO mode)

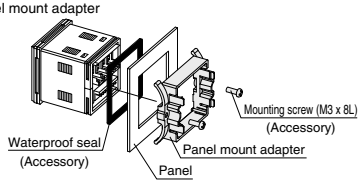
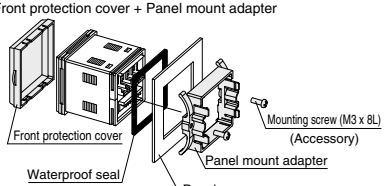
∗1 When the flow monitor is used as an IO-Link device, the total power supply current of the connected sensors should be 200 mA or less.

Unit specification

Nil	With unit selection function∗2
M	SI units only∗3

∗2 Under the New Measurement Act, switches with the unit selection function are no longer allowed for use in Japan.
∗3 Fixed unit: Instantaneous flow: L/min
Accumulated flow: L

Option 1

Nil	None
A	Panel mount adapter 
B	Front protection cover + Panel mount adapter 

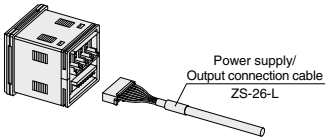
∗ Options are not assembled, but shipped together.

Option 2

Nil	None
4C	Sensor connector (4 pcs.)

∗ Connector is not connected, but shipped together.

Option 3

Nil	Power supply/Output connection cable (2 m) 
N	None

∗ Cable is shipped together, but not connected.

Options/Part Nos.

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

Description	Part no.	Note
Power supply/Output connection cable	ZS-26-L	Length: 2 m
PF2A5□□	ZS-28-CA-4	1 pc., Finished O.D.: ø1.15 to ø1.35, Cover color: Blue
Panel mount adapter	ZS-26-B	Mounting screw (M3 x 8 L, 2 pcs.), With waterproof seal
Panel mount adapter + Front protection cover	ZS-26-C	Mounting screw (M3 x 8 L, 2 pcs.), With waterproof seal
Front protection cover	ZS-26-01	—
Power supply with M12 connector cable (Made to Order)	ZS-26-LM12	For use when using an M12 connector for IO-Link communication

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

Specifications

Series			PFG20□ Series				
Applicable SMC flow sensor			**PF2A510**	**PF2A550**	**PF2A511**	**PF2A521**	**PF2A551**
Rated flow range			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
Instantaneous flow rate display/Set flow rate range			0 to 11 L/min	0 to 55 L/min	0 to 110 L/min	0 to 220 L/min	0 to 550 L/min
Instantaneous flow rate display/Min. setting unit			0.1 L/min	0.5 L/min	1 L/min	2 L/min	5 L/min
Accumulated flow display/Set flow rate range			0 to 999,999,999 L				0 to 9,999,999.99 x 10^3 L
Accumulated flow display/Min. setting unit			1L				10 L
Accumulated pulse flow rate exchange value			0.1L/pulse	0.5 L/pulse	1 L/pulse	2 L/pulse	5 L/pulse
Unit			L/min, cfm (depends on selected range)				
Electrical	Power supply voltage	**When used as a switch output device**	12 to 24 VDC ±10% with 10% ripple (p-p) or less				
		When used as an IO-Link device	18 to 30 VDC, including ripple (p-p) 10%*1				
	Current consumption		55 mA or less				
	Protection		Polarity protection				
	Power supply voltage for sensor*1		[Power supply voltage] –1.5 V				
	Power supply current for sensor*2		Max. 110 mA (However, the total power supply current for the four inputs is 440 mA or less, and the total power supply current when used as an IO-Link device is 200 mA or less).				
Accuracy	**Display accuracy (Linearity)**		±5.0% F.S. Max.*4				
	Repeatability		±3.0% F.S.*4				
	Temperature characteristics		±0.5% F.S. (Reference: 25°C)				
Switch output (SIO mode)	**Output type**		NPN or PNP open collector output: 5 outputs				
	Output mode		Hysteresis mode, Window comparator mode, Accumulated output, Accumulated pulse output, Error output, Output OFF				
	Switch operation		Normal output, Reversed output				
	Max. load current		80 mA				
	Max. applied voltage (NPN only)		30 VDC				
	Internal voltage drop (Residual voltage)		1.5 V or less (at load current of 80 mA)				
	Delay time*3		5 ms or less, variable from 0 to 60 s/0.01 s increments				
	Hysteresis		Variable from 0*5				
	Protection		Over current protection				
Analog input	**Input type**		Voltage input: 1 to 5 VDC (Input impedance: 1 MΩ)				
	Number of inputs		4 inputs (Check the "Internal Circuits and Wiring Examples" on pages 323-3 to 323-5.)				
	Connection method		e-CON				
	Protection		Over voltage protection (up to a voltage of 26.4 VDC)				
External input*8			Voltage free input: 0.4 V or less (Reed or Solid state) for 30 ms or longer				
Display	**Display type**		LCD				
	Number of screens		3-screen display (Main screen, Sub screen x 2)				
	Display color		Main screen: Red/Green, Sub screen: Orange				
	Number of display digits		Main screen: 4 digits (7 segments), Sub screen (Left): 4 digits (some digits are 11-segments, 7 segments for other), Sub screen (Right): 5 digits (some digits are 11-segments, 7 segments for other)				
	Indicator light		Lights up when switch output is turned ON. OUT1, OUT2: Orange				
Digital filter*6			Variable from 0 to 30 s/0.01 s increments				
Environment	**Enclosure**		Front face: IP65 (when panel-mounted), Others: IP40				
	Withstand voltage		1000 VAC for 1 minute between terminals and housing				
	Insulation resistance		50 MΩ or more (500 VDC measured via megohmmeter) between terminals and housing				
	Operating temperature range		Operating: 0 to 50°C, Stored: –10 to 60°C (No condensation)				
	Operating humidity range		Operating/Stored: 35 to 85% RH (No condensation)				
Standards			CE/UKCA marking				
Weight	**Body**		51 g (Excludes power supply and output cable)				
	Power supply/Output cable		60 g				
	e-CON (1 pc.)		2 g				
Communication (IO-Link mode)	**IO-Link type**		Device				
	IO-Link version		V1.1				
	Communication speed		COM2 (38.4 kbps)				
	Configuration file		IODD file*7				
	Minimum cycle time		4.8 ms				
	Process data length		Input data: 10 bytes, Output data: 0 bytes				
	On request data communication		Yes				
	Data storage function		Yes				
	Event function		Yes				
	Vendor ID		131 (0 x 0083)				

*1 Check the power supply voltage range of the connected sensor.
*2 Over current on DC (+) side and DC (–) side of the sensor input connector results in breakage of the product.
*3 Value without digital filter (at 0 ms)
*4 The system accuracy when combined with an applicable flow sensor.
*5 If the applied pressure fluctuates around the set value, the hysteresis must be set to a value more than the amount of fluctuation, or chattering will occur.

PFM
PFMB
PFMC
PFMV
PF2A
PF3W
LFE
PF2D
IF

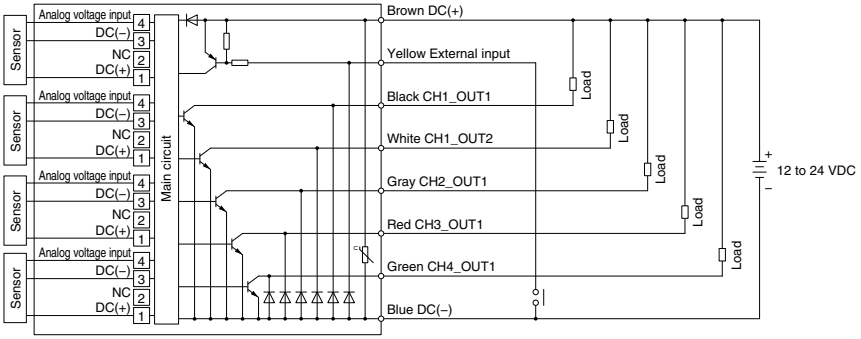
Internal Circuits and Wiring Examples

PFG20□–□□□□

Input/Output specifications

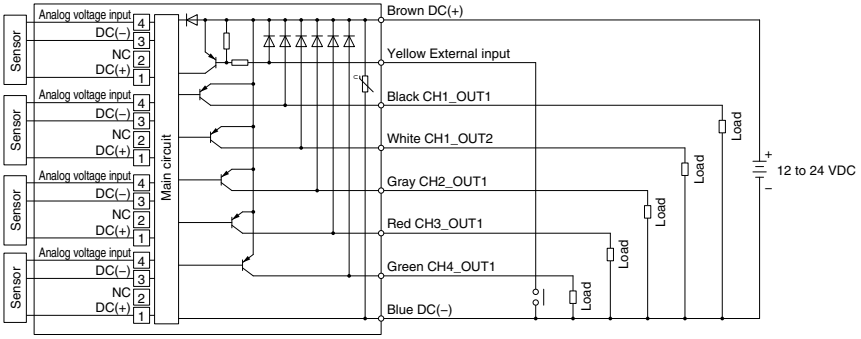
0

· NPN open collector 5 outputs + External input



1

· PNP open collector 5 outputs + External input



Internal Circuits and Wiring Examples

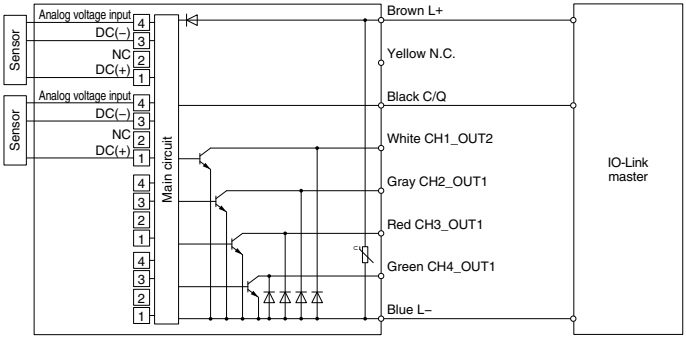
PFG20□–□□□□

Input/Output specifications

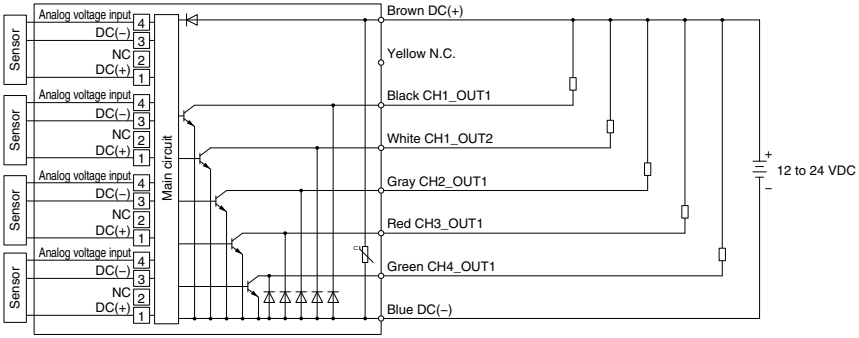
2

· IO-Link/NPN open collector 1 output + NPN open collector 4 outputs

When used as an IO-Link device



When used as a switch output device



PFM
PFMB
PFMC
PFMV
PF2A
PF3W
LFE
PF2D
IF

Internal Circuits and Wiring Examples

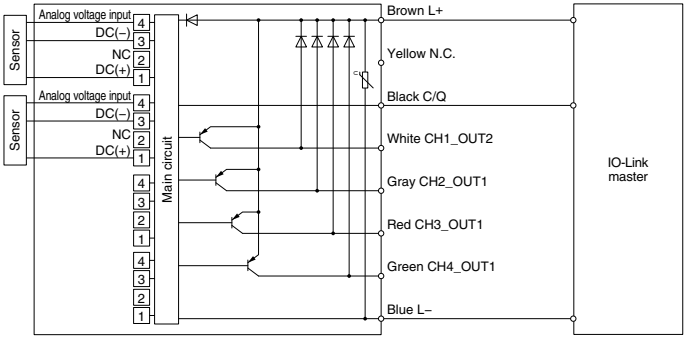
PFG20□–□□□□

Input/Output specifications

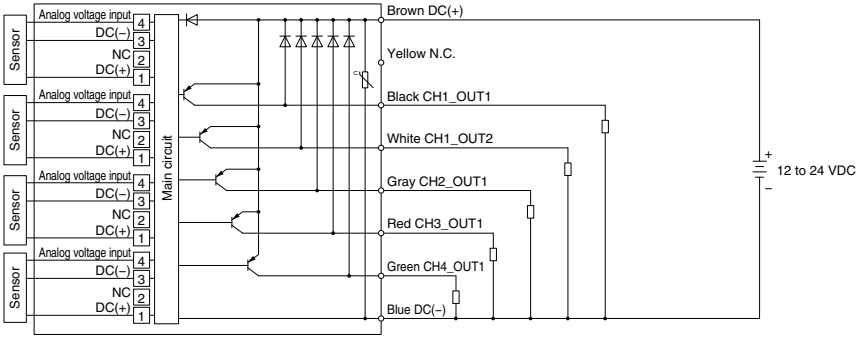
3

· **IO-Link/PNP open collector 1 output + PNP open collector 4 outputs**

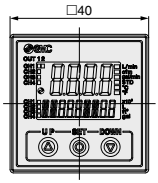
When used as an IO-Link device

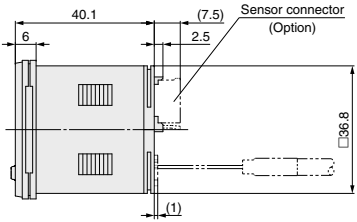


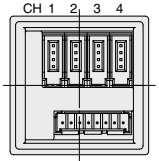
When used as a switch output device



Dimensions



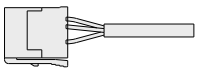




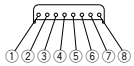
Sensor connector (4P x 4)

Pin no.	Terminal
①	DC (+)
②	N.C
③	DC (–)
④	IN (1 to 5 V)

Connector (Option)

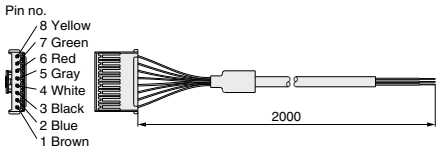


Power supply/Output connector (8P)



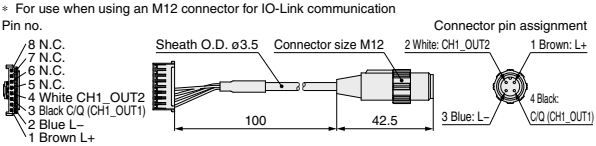
Pin no.	Terminal	
	PFG200/PFG201	PFG202/PFG203
①	DC (+)	L+
②	DC (–)	L–
③	CH1_OUT1	C/Q (CH1_OUT1)
④	CH1_OUT2	
⑤	CH2_OUT1	
⑥	CH3_OUT1	
⑦	CH4_OUT1	
⑧	Auto-shift input	N.C.

Power supply/Output connection cable (Accessory)

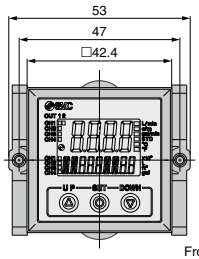


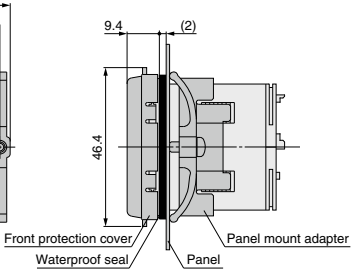
Power supply with M12 connector/Output cable (Made to Order)

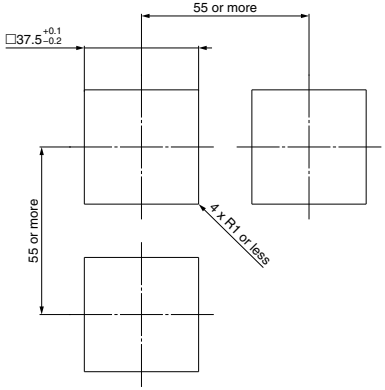
∗ For use when using an M12 connector for IO-Link communication



Front protection cover + Panel mount adapter



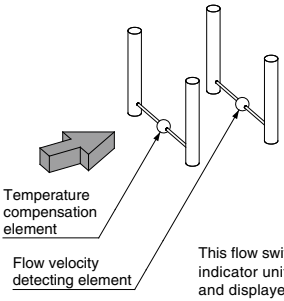




Panel fitting dimensions
Applicable panel thickness:
0.5 to 8 mm

Detection principle of digital flow switch for air

A heated thermistor is installed in the passage, and fluid absorbs heat from the thermistor as it is introduced to the passage. The thermistor's resistance value increases as it loses heat. Since the resistance value increase ratio has a uniform relationship to the flow velocity, the flow velocity can be detected by measuring the resistance value. To further compensate the fluid and ambient temperature, the temperature sensor is also built into the switch to allow stable measurement within the operating temperature range.



This flow switch uses L/min as the flow rate indicator unit. The mass flow is converted and displayed under the conditions of 0°C and 101.3 kPa and 20°C and 101.3 kPa.

Contact SMC regarding the specifications for clean environment.

PF2A Series
Option

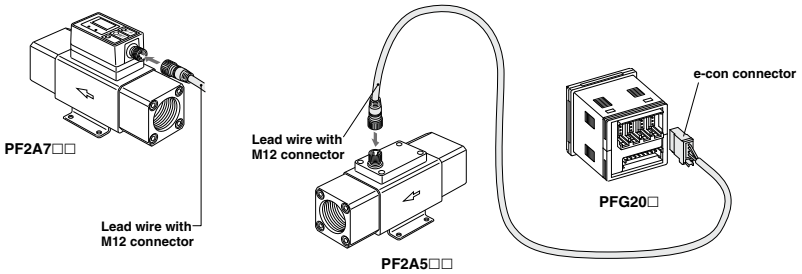
When only optional parts are required, order with the part numbers listed below.

Lead wire with M12 connector

Part no.	Qty.	Lead wire length
ZS-37-A	1	3 m

e-con connector

Part no.	Qty.
ZS-28-CA-4	1



In addition to the lead wire assembly shown above, those listed below (female contact) can be connected.
However, they cannot be connected with an e-con connector because the diameter of the core wire and its coverage diameter are different. For details, contact each manufacturer.
Contact each manufacturer for details including RoHS compliance.

Connector size	Pin no.	Manufacturer	Applicable series
M12	4	Correns Corp.	VA-4D
		OMRON Corp.	XS2
		Azbil Corp.	PA5-4I
		HIROSE ELECTRIC CO., LTD.	HR24
		DDK Ltd.	CM01-8DP4S

In addition to the connectors shown above, those listed below (e-con) can be connected.

Manufacturer	Model
3M Japan Limited	37104-3122-000FL
Tyco Electronics Japan G.K.	2-1473562-4
OMRON Corp.	XN2A-1430

Cable Specifications

No. of cable wire		4
Conductor	**Nominal cross-sectional area**	AWG23
	Dimension	0.72 mm
Insulator	**Dimension**	1.14 mm Brown, White, Blue, Black
Sheath	**Material**	Heat-resistant and oil-resistant lead-free PVC
	O.D.	4.00 mm

Related Product
Multi Counter/*CEU5 Series*

How to Order

CEU5 □ □ — □

Output transistor mode

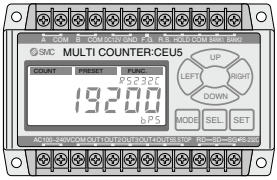
Nil	NPN open collector output
P	PNP open collector output

Power supply voltage

Nil	100 to 240 VAC
D	24 VDC

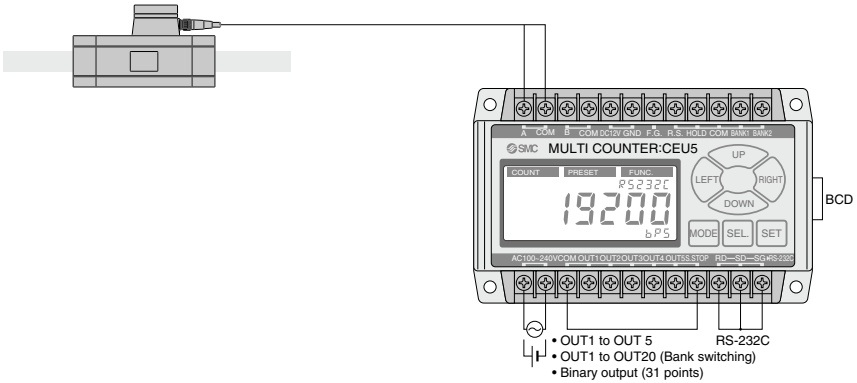
External output

Nil	RS-232C
B	RS-232C + BCD



Connection Method

Connection with the Digital Flow Switch (PF2 series)



- Possible to measure accumulated pulse output of a Digital Flow Switch by an unit of 100 L (litter) and 10 ft^3 (cube foot) using the pre-scaling function* of the multi counter (When inputting to the multi counter, Up or Down is selected as input method.)
- Possible to take advantage of all CEU5 functions using preset mode and function mode.

* The set value is calculated by selecting manual mode. By multiplication by 4, then, per pulse value is set.

<Connection with other manufacturers' encoders>

- Possible to switch multi counter side input method to 2-phase or Up/Down.
- Possible to connect to an encoder if the output method is Open Collector.
- When selecting UP or DOWN, phase A to COM input is counted toward addition direction, phase B to COM input is counted toward subtraction direction.

⚠Caution

When connecting the CEU5 with an encoder from another manufacturer, please thoroughly confirm the specification beforehand. Please note that the CEU5 may not count normally depending on the output method, output frequency and connecting cable length, etc. of the encoders.