For Air P. 1




Flow rate measurement range ℓ/min	Integrated type	Remote type		
		Sensor unit	Display unit	Display unit (4ch)
1 to 10	PF2A710	PF2A510	PF2A30□	PF2A20□
5 to 50	PF2A750	PF2A550		
10 to 100	PF2A711	PF2A511	PF2A31□	
20 to 200	PF2A721	PF2A521		
50 to 500	PF2A751	PF2A551		
150 to 3000	PF2A703H	—	—	—
300 to 6000	PF2A706H			
600 to 12000	PF2A712H			

For Water P. 15




Flow rate measurement range ℓ/min	Integrated type	Remote type		
		Sensor unit	Display unit	Display unit (4ch)
0.5 to 4	PF2W704(T)	PF2W504(T)	PF2W30□	PF2W20□
2 to 16	PF2W720(T)	PF2W520(T)		
5 to 40	PF2W740(T)	PF2W540(T)		
10 to 100	PF2W711	PF2W511	PF2W33□	

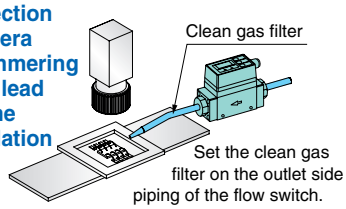
For Deionized Water and Chemicals P. 44



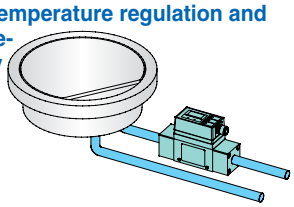
Flow rate measurement range ℓ/min	Remote type		
	Sensor unit	Display unit	Display unit (4ch)
0.4 to 4	PF2D504	PF2D30□	PF2D20□
1.8 to 20	PF2D520		
4.0 to 40	PF2D540		

Application Examples

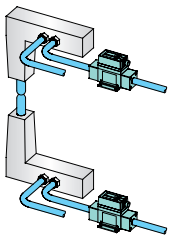
Flow control of N_2 gas to prevent detection camera shimmering and lead frame oxidation



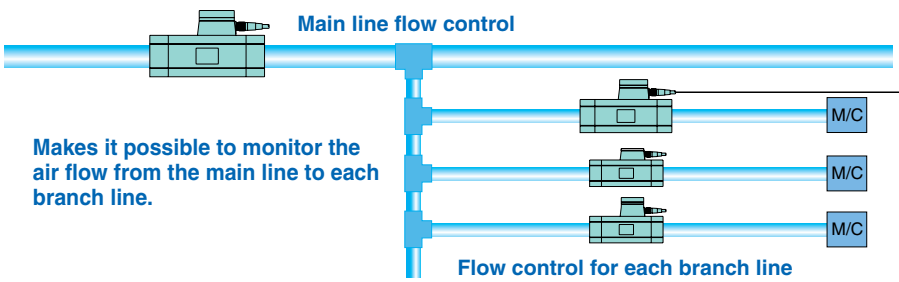
Flow control of cooling water for wafer temperature regulation and high frequency power supply



Flow control of pressurized cooling water for welding gun



Main line flow control



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 36.)

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

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 35.)

Nil	M12 3 m lead wire with connector
N	Without lead wire

Option (Refer to page 35.)

Nil	None
C	e-con connector x 1 pc.

The cable and connector are shipped unassembled.

Output specification

Symbol	Specification	Applicable display unit (monitor) model
Nil	Output for display unit	Series PF2A300
1	Output for display unit + analog output (1 to 5 V)	Series PF2A200/300
2	Output for display unit + analog output (4 to 20 mA)	Series PF2A300

Specifications

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				
Linearity Note 1)		±5% F.S. or less				
Repeatability Note 1)		±1% F.S. or less (Connected with PF2A3□□), ±3%F.S. or less (Connected with PF2A2□□)				
Temperature characteristics		±2% F.S. or less (15 to 35°C, based on 25°C) ±3% F.S. or less (0 to 50°C, based on 25°C)				
Output specifications Note 2)	**Output for display unit**	Analog voltage output (non-linear) output impedance 1 kΩ output for display unit PF2A3□□				
	Analog output	Voltage output 1 to 5 V (within the flow rate range) Linearity: ±5% F.S. or less; allowable load resistance: 100 kΩ or more.				
		Current output 4 to 20 mA (within the flow rate range) Linearity: ±5% F.S. or less; allowable load resistance: 300 Ω or less with 12 VDC, 600 Ω or less with 24 VDC				
Power supply voltage		12 to 24 VDC (ripple ±10% or less)				
Current consumption (No load)		100 mA or less				110 mA or less
Resistance	**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 min. between external terminal and case				
	Insulation resistance	50M Ω or more (500 VDC Mega) between external terminal and case.				
	Vibration resistance	10 to 500 Hz with a 1.5 mm amplitude or 98 m/s^2 acceleration, whichever is smaller.				
	Impact resistance	490 m/s^2 in X, Y, Z directions 3 times each				
	Noise resistance	1000 Vp-p, Pulse width 1 μs, Rise time 1 ns				
Weight Note 3)		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 PF2A2□□/3□□.
Note 2) Output system can be selected during initial setting.
Note 3) Without lead wire. (Add 20 g for the types of analog output whether voltage or current output selected.)
Note 4) Flow rate unit measured under the following conditions: 0°C and 101.3 kPa.
Note 5) The sensor unit conforms to the CE mark.

Series PF2A

How to Order

Remote Type Display 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 specification

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 specification

Nil	With unit switching function
M	Fixed SI unit Note)

Note) Fixed units:
Real-time flow rate: ℓ/min
Accumulated flow: ℓ

Specifications

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	Real-time 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				
Linearity Note 5)		±5% F.S. or less				
Repeatability Note 5)		±1% F.S. or less				
Temperature characteristics		±1% F.S. or less (15 to 35°C, based on 25°C) ±2% F.S. or less (0 to 50°C, based on 25°C)				
Current consumption (No load)		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		Illuminates up when output is ON OUT1: Green; OUT2: Red				
Power supply voltage		12 to 24 VDC (ripple ±10% or less)				
Response time		1 sec. or less				
Hysteresis		Hysteresis mode: Variable (can be set from 0), Window comparator mode Note 7): Fixed (3-digits)				
Resistance	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 min. between external terminal and case				
	Insulation resistance	50M Ω or more (500 VDC Mega) between external terminal and case.				
	Vibration resistance	10 to 500 Hz with a 1.5 mm amplitude or 98 m/s^2 acceleration, in each X, Y, Z direction for 2 hrs, whichever is smaller.				
	Impact resistance	490 m/s^2 in X, Y, Z directions 3 times each				
	Noise resistance	1000 Vp-p, Pulse width 1 μs, Rise time 1 ns				

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 display unit conforms to the CE mark.

How to Order

4-channel Flow Monitor
Remote Type Display Unit

PF2A20 0 — M □ □

Output specification

0	NPN4 outputs
1	PNP4 outputs

Unit specification

Nil	With unit switching function
M	Fixed SI unit Note)

Note) Fixed units:
Real-time flow rate: ℓ/min
Accumulated flow: ℓ

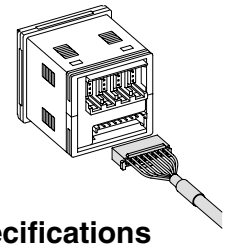
Option 1 (Refer to page 35.)

Nil	None
A	Panel mounting
B	Front protective cover + Panel mounting

Option 2 (Refer to page 35.)

Nil	None
4C	Sensor connector (4 pc.)

Accessory / Power supply output cable (2 m)



Connectable remote type sensor part is PF2A5□□-□-1 (with analog output 1 to 5 V).

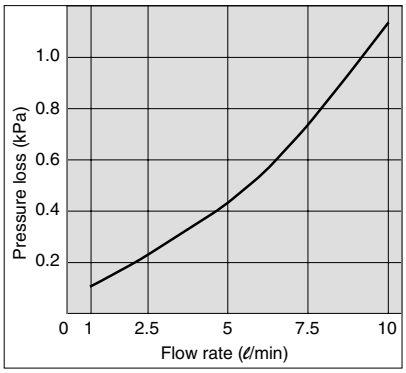
Specifications

Model		PF2A200/201				
Applicable flow rate sensor		PF2A510-□-1	PF2A550-□-1	PF2A511-□-1	PF2A521-□-1	PF2A551-□-1
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 1, 2) Display units	Real-time flow rate	ℓ/min, CFM x 10^{-2}		ℓ/min, CFM x 10^{-1}		
	Accumulated flow	ℓ, ft^3 x 10^{-2}		ℓ, ft^3 x 10^{-1}		
Accumulated flow range Note 1)		0 to 999999 ℓ, 0 to 999999 ft^3 x 10^{-2}		0 to 999999 ℓ, 0 to 999999 ft^3 x 10^{-1}		
Power supply voltage		24 VDC (ripple ±10% or less) (With power supply polarity protection)				
Current consumption		55 mA or less (Not including the current consumption of the sensor)				
Power supply voltage for sensor		Same as [Power supply voltage]				
Power supply current for sensor Note 3)		Max. 110 mA (However, the total current for the 4 inputs is 440 mA maximum or less.)				
Sensor input		1 to 5 VDC (Input impedance: Approx. 800K Ω)				
	No. of inputs	4 inputs				
	Input protection	Excess voltage protection				
Output specifications Note 4)	Switch output (Real-time switch output, Accumulated switch output)	NPN open collector (PF2A200)	Maximum load current: 80 mA Internal voltage drop: 1 V or less (with load current of 80 mA) Maximum applied voltage: 30 V			
		PNP open collector (PF2A201)	Maximum load current: 80 mA Internal voltage drop: 1 V or less (with load current of 80 mA)			
	Accumulated pulse output	NPN open collector or PNP open collector (same as switch output)				
	No. of outputs	4 outputs (1 output per 1 sensor input)				
	Output protection	With short circuit protection				
Hysteresis		Hysteresis mode: Variable (can be set from 0), Window comparator mode: Fixed (3-digits)				
Response time Note 5)		1s or less				
Linearity Note 5)		±5% F.S. or less				
Repeatability Note 5)		±3% F.S. or less				
Temperature characteristics		±2% F.S. or less (0 to 50°C, based on 25°C)				
Display method		For measured value display: 4-digits, 7-segment LED (Orange) For channel display: 1-digit, 7-segment LED (Red)				
Status LED's		Illuminates when output is ON OUT1: Red				
Resistance	Enclosure	IP65 for the front face only, and IP40 for the remaining parts.				
	Operating temperature range	Operating: 0 to 50°C, Stored: –10 to 60°C (with no freezing and condensation)				
	Operating humidity range	Operating or Stored: 35 to 85%RH (with no condensation)				
	Vibration resistance	10 to 500 Hz with a 1.5 mm amplitude or 98 m/s^2 acceleration, in each X, Y, Z direction for 2 hrs, whichever is smaller. (de-energized)				
	Impact resistance	980 m/s^2 in X, Y, Z directions 3 times each (de-energized)				
	Noise resistance	500 Vp-p, Pulse width 1 μs, Rise time 1 ns				
Connection		Power supply / Output connection: 8P connector, Sensor connection: 4P connector (e-con)				
Material		Housing: PBT, Display: PET, Backside rubber: CR				
Weight		60 g (Except for any accessories that are shipped together)				

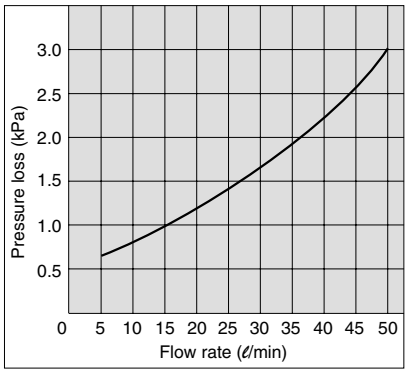
Note 1) Fixed SI unit [ℓ/min or ℓ] will be set for switch types without the unit switching function. ("-M" is suffixed at the end of part number.) Accumulated flow is reset when the power supply turns OFF.
Note 2) Flow rate display can be switched between the basic condition of 0°C, 101.3 kPa and the standard condition (ANR) of 20°C, 101.3 kPa, and 65% RH.
Note 3) If Vcc side on sensor input connector part is short-circuited with the 0V side, the flow monitor inside will be damaged.
Note 4) Switch output and accumulated pulse output can be selected during initial setting.
Note 5) The system accuracy when combined with an applicable flow sensor.
Note 6) This product conforms to the CE mark.

Flow Characteristics (Pressure Loss)

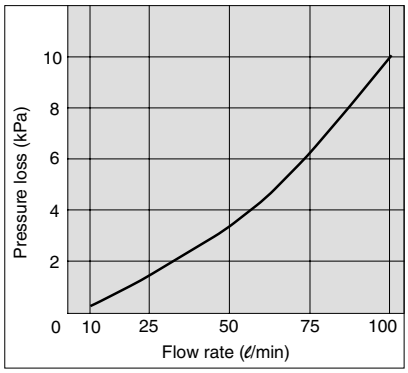
PF2A710, 510



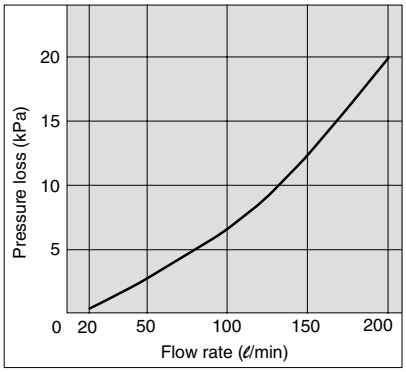
PF2A750, 550



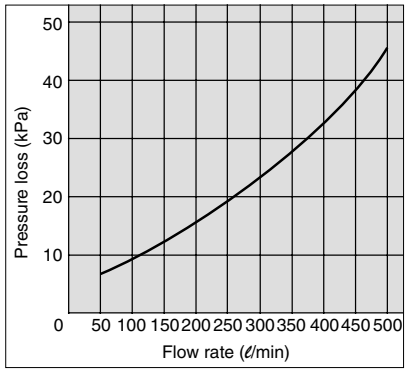
PF2A711, 511



PF2A721, 521

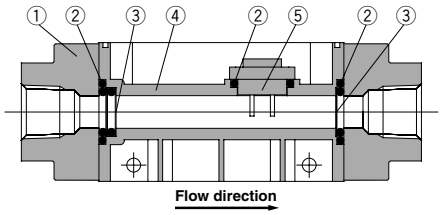


PF2A751, 551

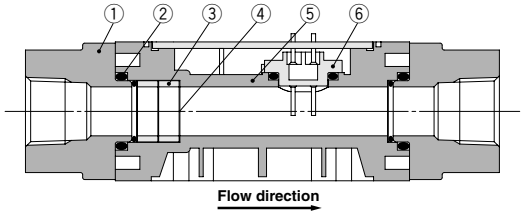


Sensor Unit Construction

PF2A710/750
PF2A510/550



PF2A711/721/751
PF2A511/521/551



Parts list

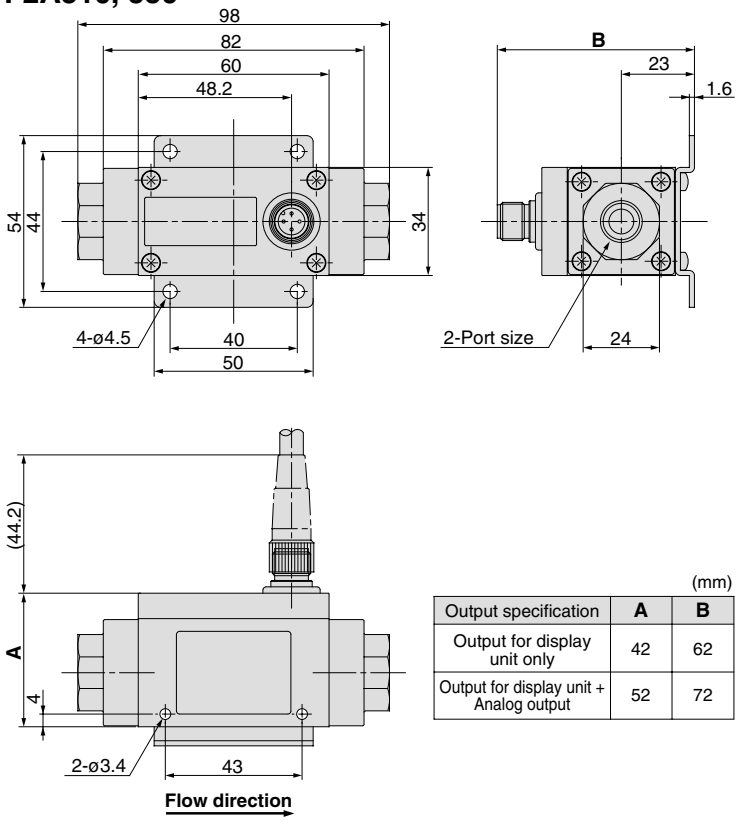
No.	Description	Material
1	**Attachment**	ADC
2	**Seal**	NBR
3	**Mesh**	Stainless steel
4	**Body**	PBT
5	**Sensor**	PBT

Parts list

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

Dimensions: Remote Type Sensor Unit for Air

PF2A510, 550

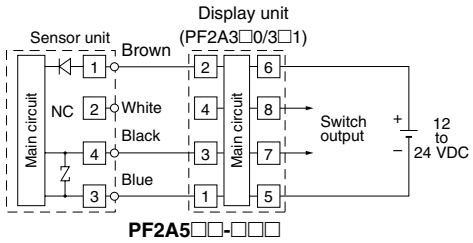


(mm)

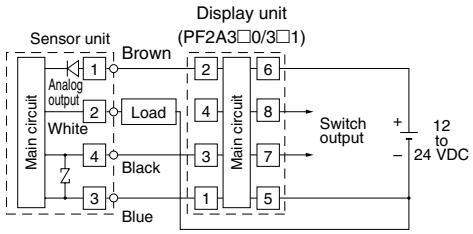
Output specification	A	B
Output for display unit only	42	62
Output for display unit + Analog output	52	72

Internal circuits and wiring examples

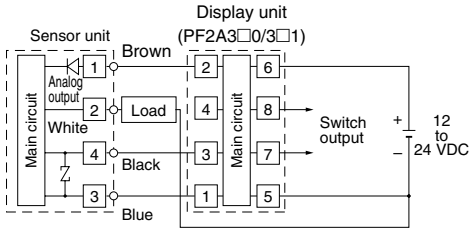
1 to 8 are the terminal numbers.



PF2A5□□-□□□

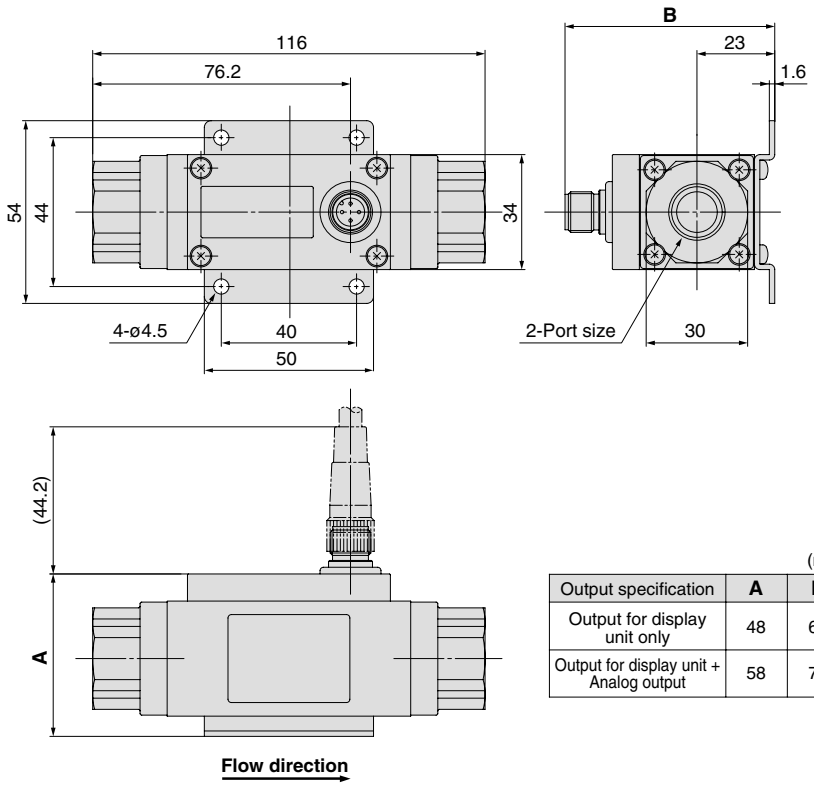


Load is an analog input equipment such as a voltmeter.
PF2A5□□-□□□-1 (With voltage output type)



Load is an analog input equipment such as a voltmeter.
PF2A5□□-□□□-2 (With voltage output type)

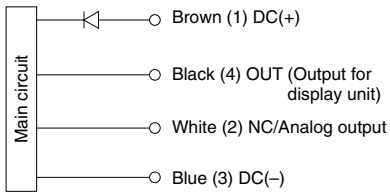
PF2A511, 521, 551



(mm)

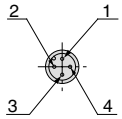
Output specification	A	B
Output for display unit only	48	62
Output for display unit + Analog output	58	72

Wiring



∗ Use this sensor by connecting it to a SMC remote type display unit Series PF2A2□□/3□□.

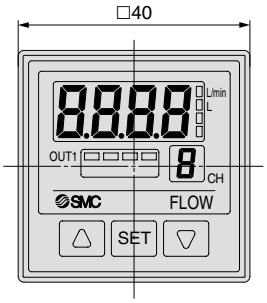
Connector pin numbers

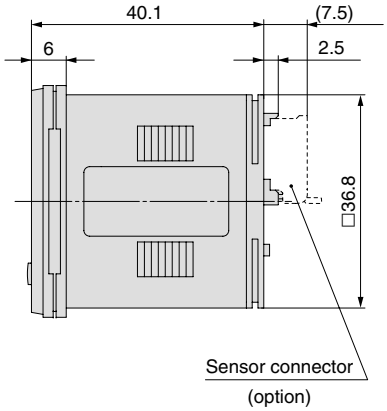


Pin no.	Pin description
1	DC(+)
2	NC/Analog output
3	DC(–)
4	OUT

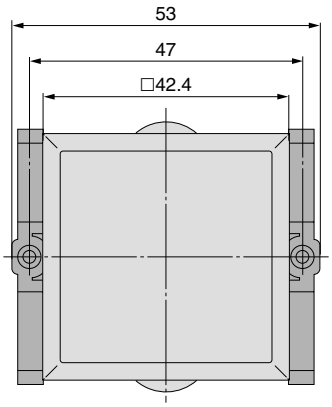
Dimensions: Remote Type Display Unit **for Air** (4-channel Flow Monitor)

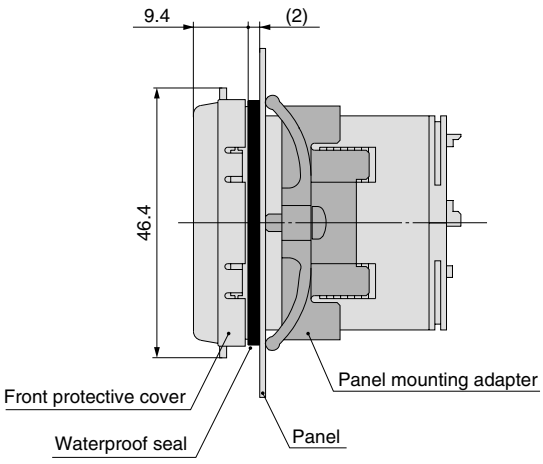
PF2A200, 201

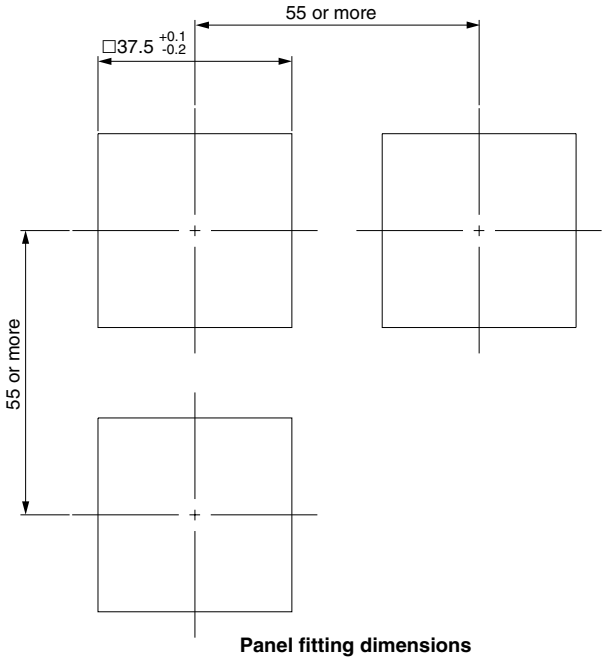




Front protective cover + Panel mounting







Panel fitting dimensions
Applicable panel thickness: 0.5 to 8 mm