For Air

Digital Flow Switch/High Flow Rate Type

Series PFA

How to order

Integrated display type

PFA7 □ H — □ □ — □ □ — □

Flow rate range

03	150 to 3000/min
06	300 to 6000/min
12	600 to 12000/min

High flow rate type

Port specification

Nil	Rc
N	NPT
F	G

Port size

Symbol	Port size	Flow rate (/min) 3000	6000	12000	Applicable model
10	1	●			PFA703H
14	1 1/2		●		PFA706H
20	2			●	PFA712H

Output specification

28	NPN open collector 1 output + Analog output (1 to 5V)
29	NPN open collector 1 output + Analog output (4 to 20mA)
68	PNP open collector 1 output + Analog output (1 to 5V)
69	PNP open collector 1 output + Analog output (4 to 20mA)

Switching of switch output and cumulative pulse output is possible with NPN or PNP open collector outputs.

Wiring specification

Nil	3m lead wire with connector
N	Without lead wire

Unit specification

Nil	With unit switching function
M	Fixed SI unit Note)

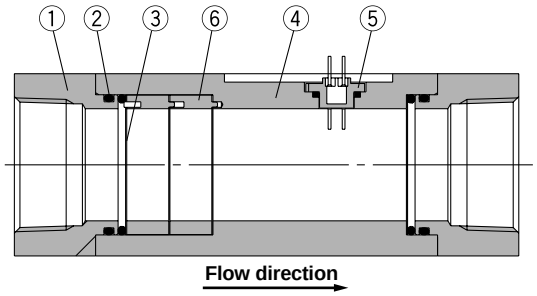
Note) Fixed units:
Real-time flow rate: /min
Accumulated flow: , m³, m³ x 10³

Specifications

Model		PFA703H	PFA706H	PFA712H
Measured fluid		Dry air		
Detection type		Heater type		
Flow rate measurement range Note 5)		150 to 3000/min	300 to 6000/min	600 to 12000/min
Minimum setting unit Note 5)		5/min	10/min	
Display units Note 1)	Real-time flow rate	/min, CFM		
	Accumulated flow	, m³, m³ x 10³, ft³, ft³ x 10³, ft³ x 10⁶		
Operating pressure range		0.1 to 1.5MPa		
Withstand pressure		2.25MPa		
Pressure loss		20kPa (at maximum flow rate)		
Accumulated flow range		0 to 9,999,999,999		
Operating temperature range		0 to 50°C (with no condensation)		
Linearity Note 2)		±1.5% F.S. or less (0.7MPa, at 20°C)		
Repeatability		±1.0% F.S. or less (0.7MPa, at 20°C)		
Pressure characteristics		±1.5% F.S. or less (0.1 to 1.5MPa, based on 0.7MPa)		
Temperature characteristics		±2.0% F.S. or less (0 to 50°C, based on 25°C)		
Output specifications	Switch output Note 3)	NPN open collector Max. load current: 80mA, Max. applied voltage: 30V, Internal voltage drop: 1V or less (with load current of 80mA)		
		PNP open collector Max. load current: 80mA, Internal voltage drop: 1.5V or less (with load current of 80mA)		
	Accumulated pulse output Note 3)	NPN or PNP open collector Flow rate per pulse: 100/pulse, 10.0ft³/pulse ON time per pulse: 50msec/pulse		
	Analog output Note 4)	Output voltage: 1 to 5V, Load impedance: 100kΩ or more		
		Output current: 4 to 20mA, Load impedance: 250kΩ or more		
Response time		1s or less		
Hysteresis		Hysteresis mode: Variable (can be set from 0), Window comparator mode: (can be set from 0 to 3% F.S.)		
Power supply voltage		24VDC (ripple ±10% or less)		
Current consumption		150mA or less		
Withstand voltage		1000VAC for 1 min. between external terminal block and case		
Insulation resistance		50MΩ (500VDC) between external terminal block and case		
Noise resistance		1000Vp-p, Pulse width 1μs, Rise time 1ns		
Vibration resistance		10 to 500Hz at the smaller of amplitude 1.5mm or acceleration 98m/s² in X, Y, Z directions, 2 hours each		
Impact resistance		490m/s² in X, Y, Z directions, 3 times each		
Weight		1.1kg (without lead wire)	1.3kg (without lead wire)	2.0kg (without lead wire)
Enclosure		Equivalent to IP65		
Port size (Rc, NPT, G)		1	1 1/2	2

Note 1) For the type with unit switching function [The type without the unit switching function will have a fixed SI unit (/min, or , m³ or m³ x 10³).]
Note 2) The high flow rate type is with CE marking. However, the linearity with applied noise is ±5% F.S. or less.
Note 3) Switch output and accumulated pulse output selections are made by button operation.
Note 4) The analog output operates only for real-time flow rate, and does not operate for accumulated flow.
Note 5) Flow rate display can be switched between the basic condition of 0°C, 101.3kPa and the standard condition (ANR) of 20°C, 101.3kPa, 65% RH.

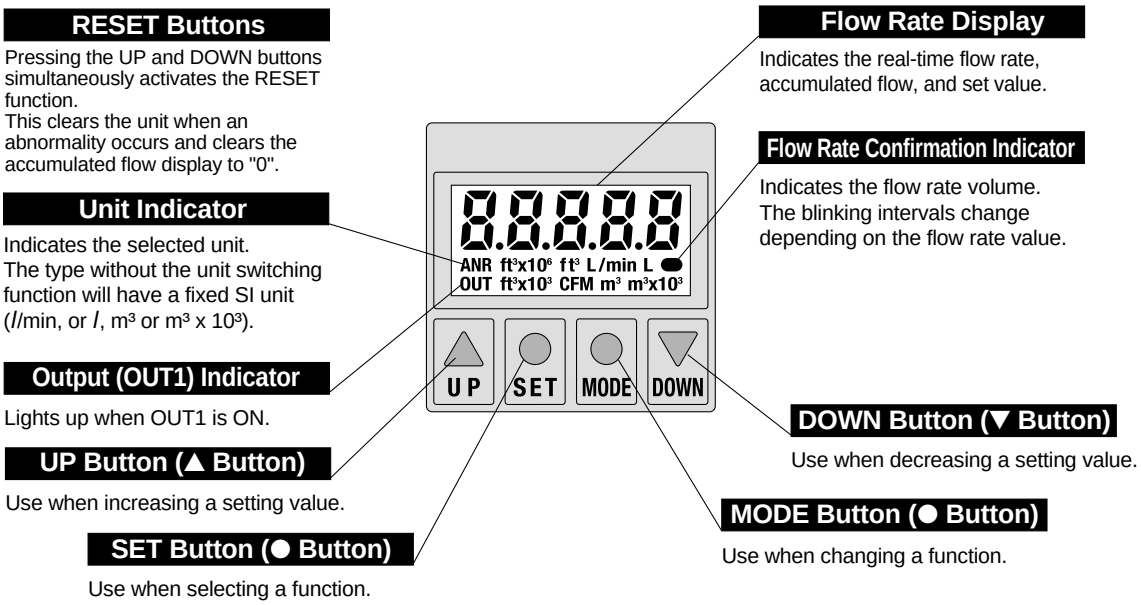
Construction



Parts list

No.	Description	Material	Note
1	**Attachment**	Aluminum alloy	Anodized
2	**Seal**	H, NBR	—
3	**Mesh**	Stainless steel	—
4	**Body**	Aluminum alloy	Anodized
5	**Sensor**	PPS	—
6	**Spacer**	PBT	—

Operating Unit Descriptions



Error Correction

Take the following corrective actions when errors occur.

LED display	Problem	Corrective action
Err-1	A current of more than 80mA is flowing to OUT1.	Check the load and wiring for OUT1.
Err-3	The setting data has changed due to some influence.	Perform the RESET operation, and set all data again.
-----	The flow rate is over the flow rate measurement range.	Reduce the flow rate until it is within the flow rate measurement range, using an adjustment valve, etc.

Connectors

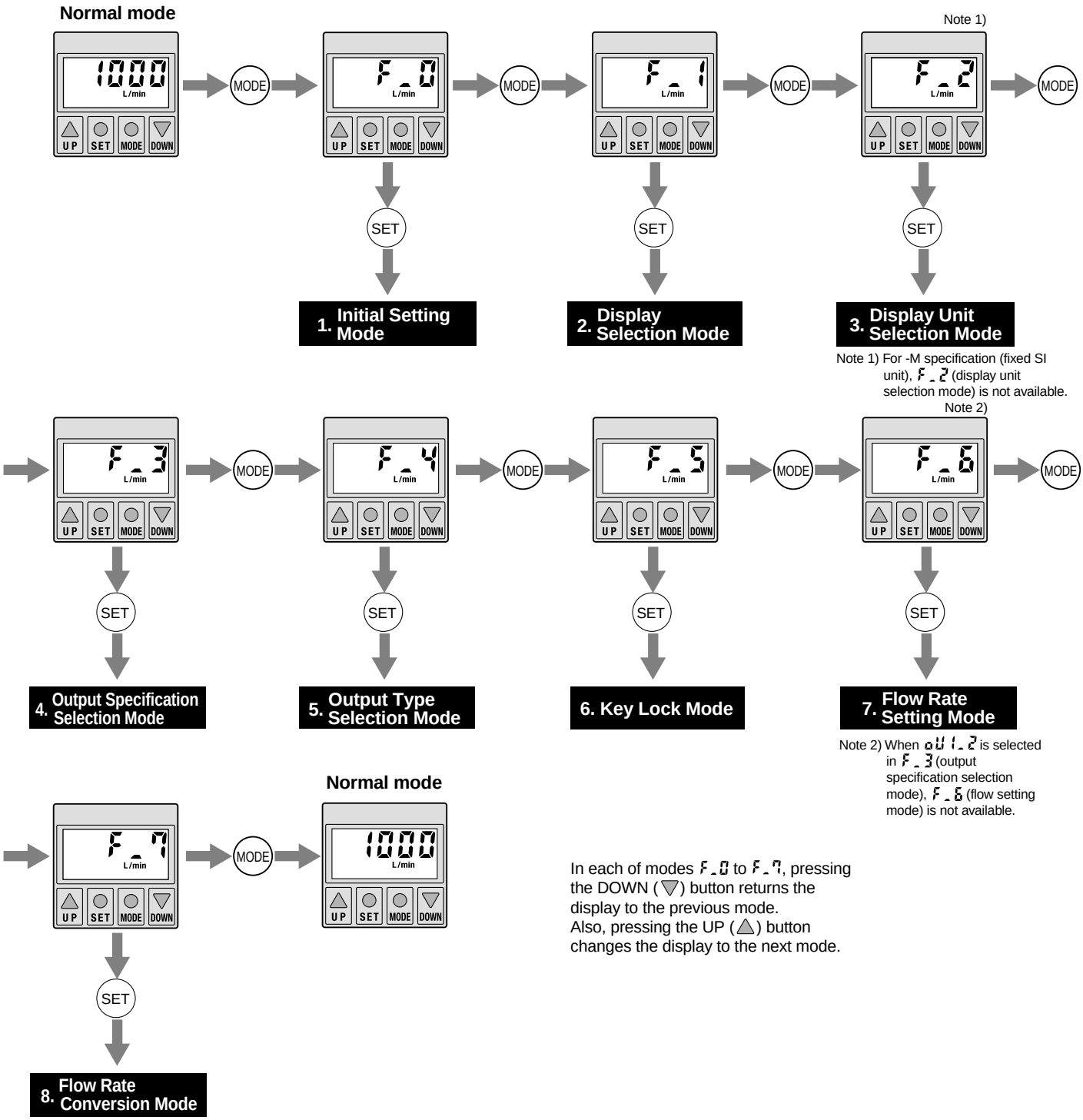
Since the connectors (female contacts) shown below can be used, please refer to the respective manufacturers.

Connector size	Number of pins	Manufacturers	Applicable series
M12	4	C. CORRENS & CO., LTD.	VA-4D
		OMRON Corporation	XS2
		Yamatake-Honeywell Co., Ltd.	PA5-4I
		Hirose Electric Company	HR24
		DDK Ltd.	CM01-8DP4S

Note) C. CORRENS & CO., LTD. is the general agent in Japan for Hirschmann.

Operation

Function configuration



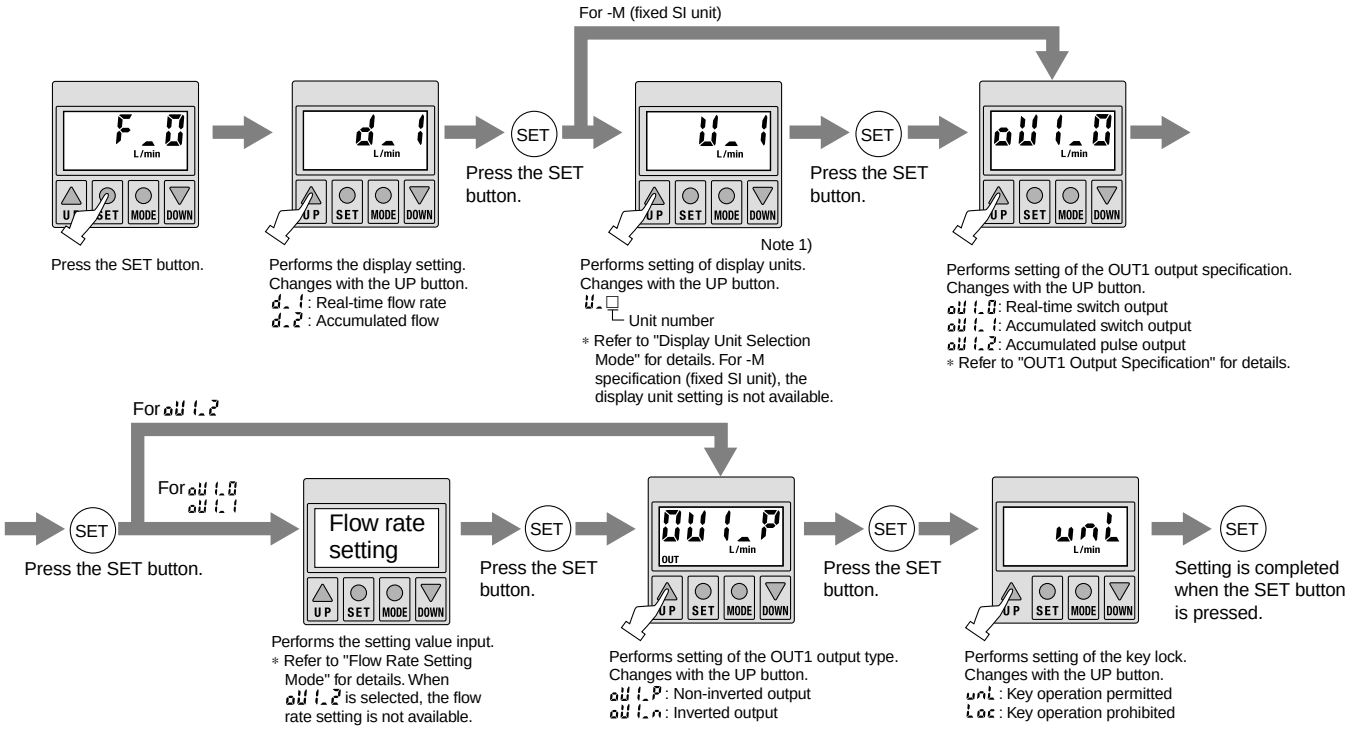
Note 1) For -M specification (fixed SI unit), F_2 (display unit selection mode) is not available.

Note 2) When out1_2 is selected in F_3 (output specification selection mode), F_6 (flow setting mode) is not available.

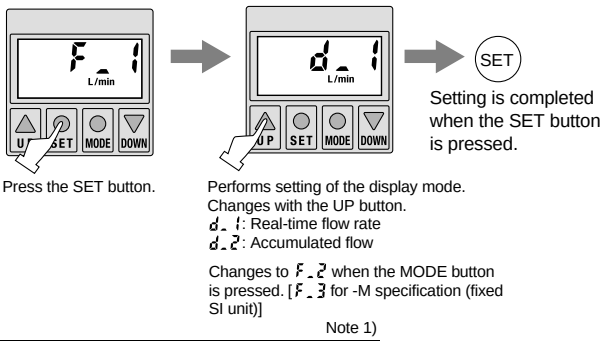
In each of modes F_0 to F_7, pressing the DOWN (▽) button returns the display to the previous mode.
Also, pressing the UP (△) button changes the display to the next mode.

Operation

1. Initial Setting Mode



2. Display Selection Mode



3. Display Unit Selection Mode

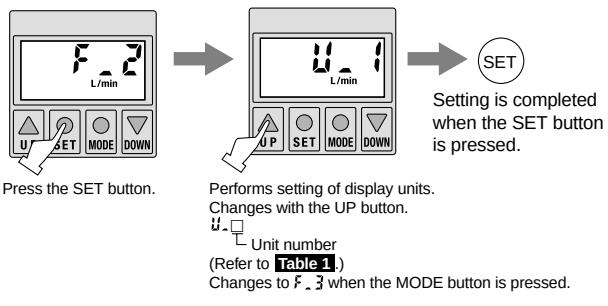
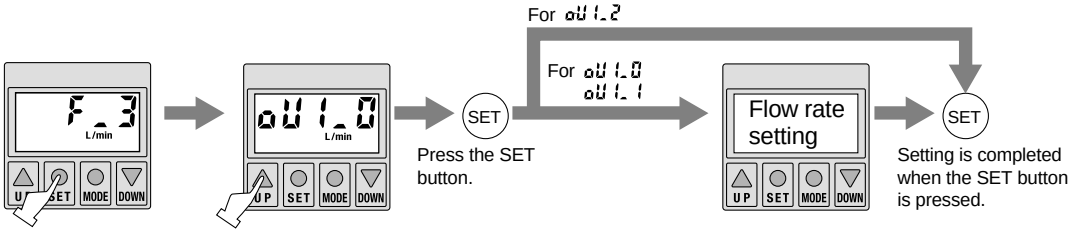


Table 1

Display	Real-time flow rate	Accumulated flow
U_1	l/min	l, m³, m³ x 10³
U_2	CFM	ft³, ft³ x 10³, ft³ x 10⁶

Note 1) For the type with unit switching function
[The type without the unit switching function will have a fixed SI unit (l/min, or l, m³ or m³ x 10³)].

4. Output Specification Selection Mode

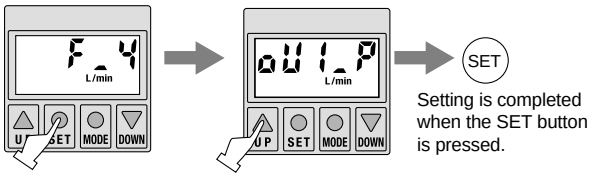


Press the SET button.

Performs setting of the OUT1 output specification.
Changes with the UP button.
oU1_0 : Real-time switch output
oU1_1 : Accumulated switch output
oU1_2 : Accumulated pulse output
Refer to the OUT1 output specifications.
Changes to F_4 when the "MODE" button is pressed.

Performs the setting value input.
* Refer to "Flow Rate Setting Mode" for details. When oU1_2 is selected, the flow rate setting is not available.

5. Output Type Selection Mode



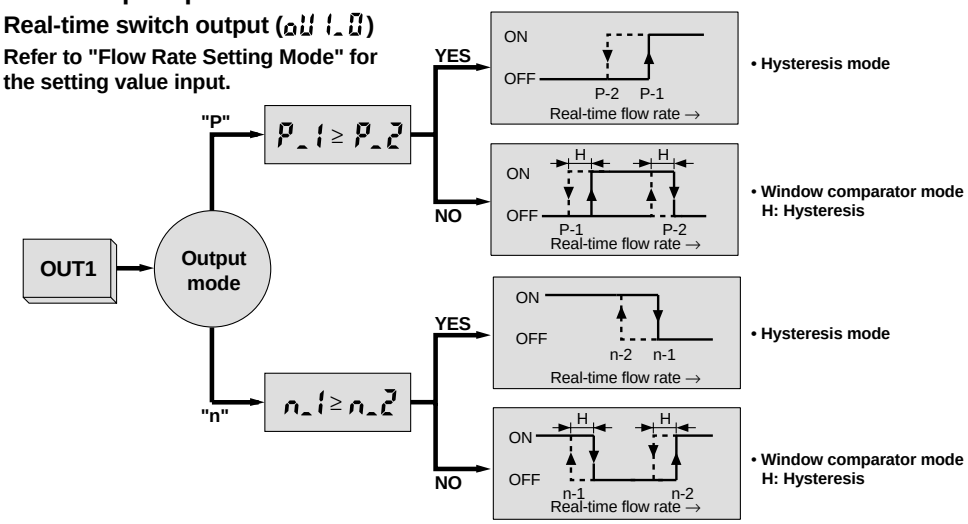
Press the SET button.

Performs setting of the OUT1 output type.
Changes with the UP button.
oU1_P : Non-inverted output
oU1_n : Inverted output
Changes to F_5 when the MODE button is pressed.

OUT1 output specifications

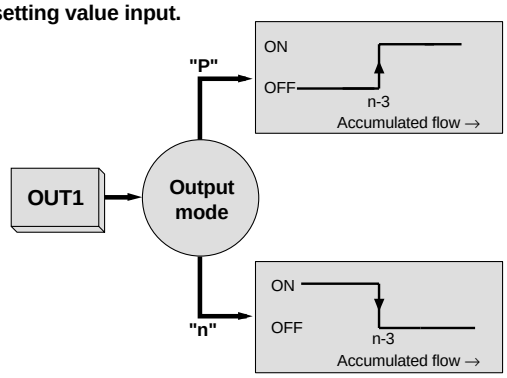
Real-time switch output (oU1_0)

Refer to "Flow Rate Setting Mode" for the setting value input.



Accumulated switch output (oU1_1)

Refer to "Flow Rate Setting Mode" for the setting value input.



Accumulated pulse output (oU1_2)

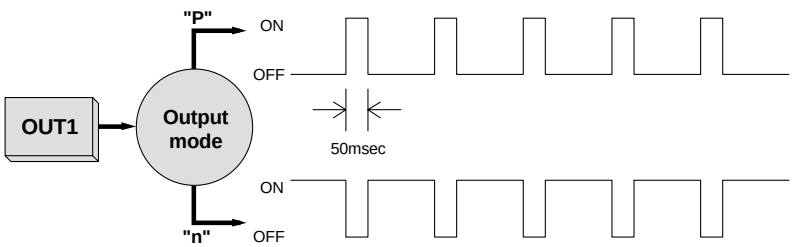


Table 2 Flow rate value per pulse Note 1)

Display	Accumulated flow
U_1	100 l/pulse
U_2	10.0ft³/pulse

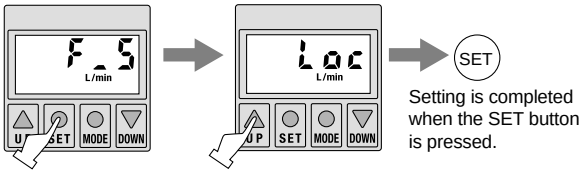
Note 1) For the type with unit switching function
[The type without the unit switching function will have a fixed SI unit (l/min, or l, m³ or m³ x 10³).]

Operation

6. Key Lock Mode

Prevents the misoperation of buttons.

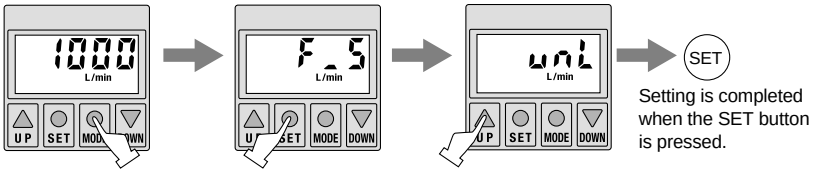
Start of key locking



Press the SET button.

Changes with the UP button.
unL : Key operation permitted
Loc : Key operation prohibited
Changes to F_6 when the MODE button is pressed.
(Changes to F_7 when oUt_2 is selected in F_3.)

Release of key locking



Press the MODE button continuously for 3 seconds or more.

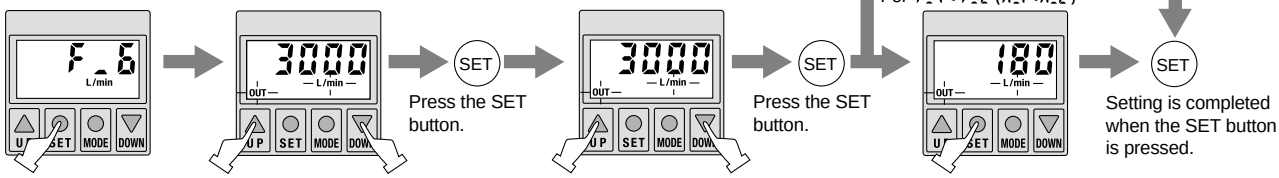
Press the SET button.

Using the UP button, set the display to unL.

7. Flow Rate Setting Mode

Performs the setting value input.
The input method depends on the OUT1 output specification.

Real-time switch output (oUt_0)



Press the SET button.

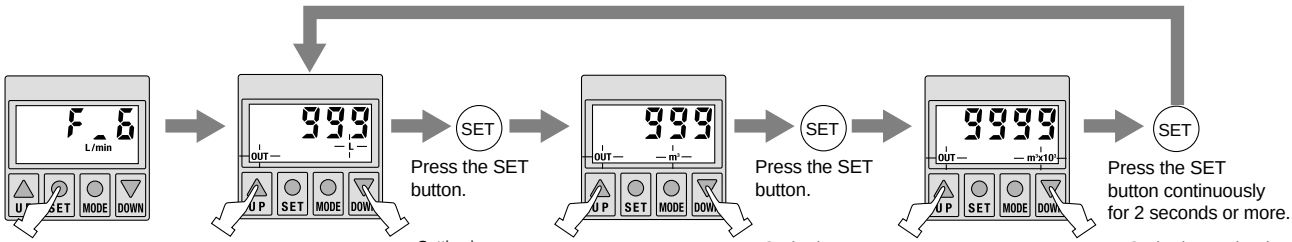
Enter the setting value.
The setting value and P_1 (or n_1) are displayed alternately.
UP Button: Increases the setting value
DOWN Button: Decreases the setting value

Enter the setting value.
The setting value and P_2 (or n_2) are displayed alternately.
UP Button: Increases the setting value
DOWN Button: Decreases the setting value

P_1 < P_2 (n_1 < n_2): Window comparator mode
Performs setting of the hysteresis value.
The hysteresis value and HIS are displayed alternately.
UP Button: Increases the setting value
DOWN Button: Decreases the setting value
The hysteresis value can be set between 0 to 3% of the rated flow rate value. However, if the difference between P_1 (n_1) and P_2 (n_2) is less than 6% of the rated flow rate value, the difference between P_1 (n_1) and P_2 (n_2) will be half for the maximum hysteresis setting value.

P_1 ≥ P_2 (n_1 ≥ n_2): Hysteresis mode
Hysteresis value setting is not available.

Accumulated switch output (oUt_1)



Press the SET button.
The setting value can be set up to 9,999 [m³ x 10³], 999 [m³] or 999 [ℓ].

Enter the setting value.
The setting value and P_3 (or n_3) are displayed alternately.
UP Button: Increases the setting value
DOWN Button: Decreases the setting value

Setting is completed when the SET button is pressed continuously for 2 seconds or more.

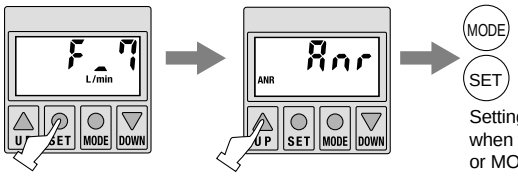
Enter the setting value.
The setting value and P_3 (or n_3) are displayed alternately.
UP Button: Increases the setting value
DOWN Button: Decreases the setting value

Setting is completed when the SET button is pressed continuously for 2 seconds or more.

Enter the setting value.
The setting value and P_3 (or n_3) are displayed alternately.
UP Button: Increases the setting value
DOWN Button: Decreases the setting value

Setting is completed when the SET button is pressed continuously for 2 seconds or more.

8. Flow Rate Conversion Mode



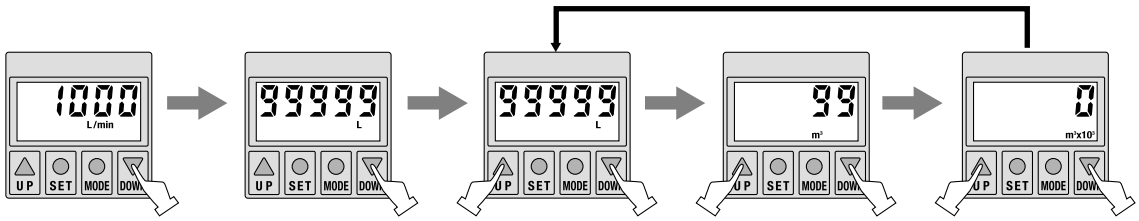
Press the SET button.

Performs the setting of flow rate conversion conditions. Changes with the UP button.
Anr : 20°C, 101.3kPa, 65% RH (ANR)
nor : 0°C, 101.3kPa

Setting is completed when the SET button or MODE button is pressed.

Flow rate display confirmation

Confirming the accumulated flow when real-time flow rate is selected.

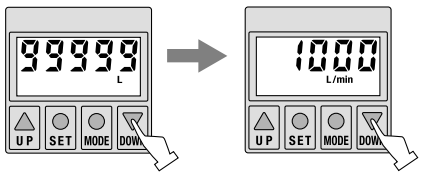


Press the DOWN button.

Displays the accumulated flow while the DOWN button is pressed.
(Returns to the real-time flow rate display when the DOWN button is released.)

Pressing the UP button while pressing the DOWN button changes the accumulated flow unit.

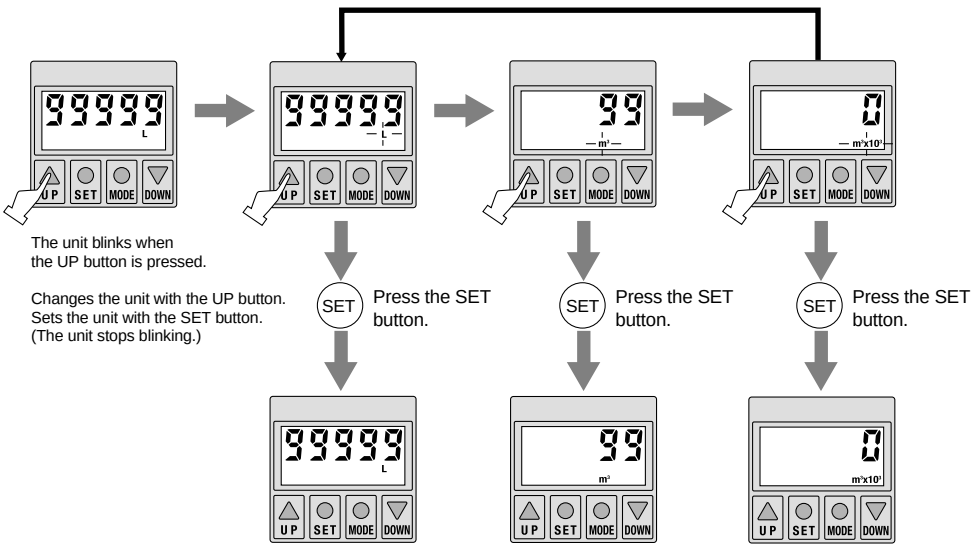
Confirming the real-time flow rate when accumulated flow is selected.



Press the DOWN button.

Displays the real-time flow rate while the DOWN button is pressed.
(Returns to the accumulated flow display when the DOWN button is released.)

Changing the accumulated flow unit (Sets the accumulated flow display unit when accumulated flow is selected.)



The unit blinks when the UP button is pressed.

Changes the unit with the UP button.
Sets the unit with the SET button.
(The unit stops blinking.)

Press the SET button.

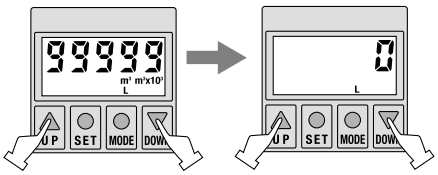
Press the SET button.

Press the SET button.

∗ When the buttons are not operated for 5 seconds, the unit stops blinking automatically and exits from changing of the accumulated flow display unit. The accumulated flow display unit does not change in this case.

Operation

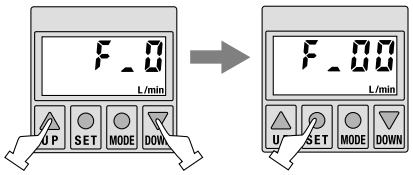
Clearing the accumulated value



Press the UP button while pressing the DOWN button.

The accumulated value clears when the buttons are pressed continuously for 5 seconds or more.

Initializing the setting



In the initial setting mode F_0, press the UP button and DOWN button for 2 seconds or more.

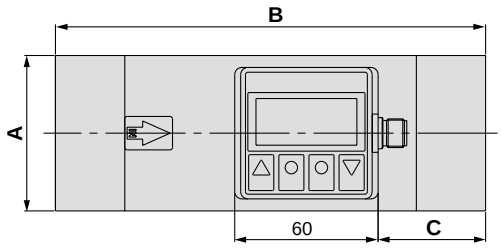
When the SET button is pressed, the setting returns to the factory setting.

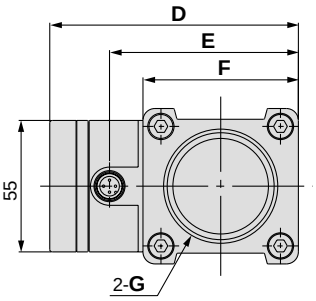
Factory setting
Display setting: Real-time flow rate (d_1)
Unit setting : l/min (U_1)
Switch specification: Real-time switch output (oUt_0)
Output mode: Inverted output (oUt_n)
Flow rate setting value: Real-time flow rate — Full range median value
Accumulated flow — 0
Key lock mode: Unlocked (unL)
Flow rate conversion conditions: 20°, 101.3kPa, 65% RH (ANR) (Anr)

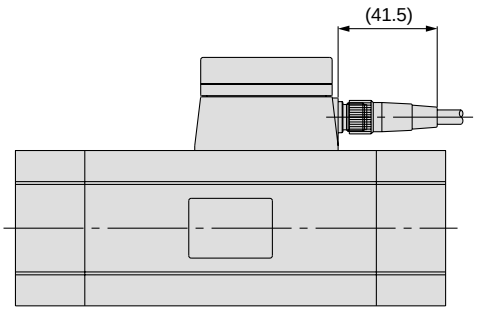
When the MODE button is pressed, the setting changes to F_0 instead of being initialized.

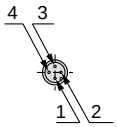
Dimensions

PFA703H/706H/712H



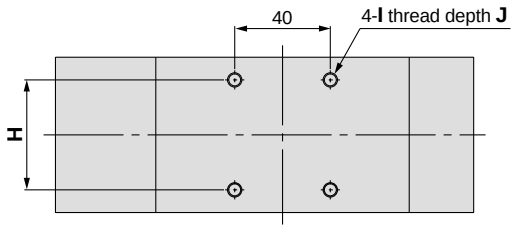






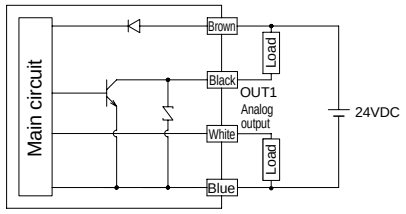
Connector pin numbers

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

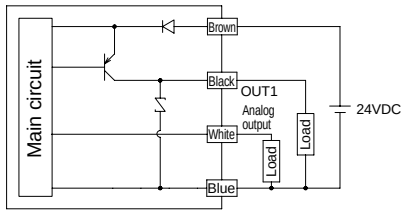


Model	A	B	C	D	E	F	G	H	I	J
PFA703H	55	160	40	92	67	55	Rc 1, NPT 1, G 1	36	M5 x 0.8	8
PFA706H	65	180	45	104	79	65	Rc 1 1/2, NPT 1 1/2, G 1 1/2	46	M6 x 1	9
PFA712H	75	220	55	114	89	75	Rc 2, NPT 2, G 2	56	M6 x 1	9

Internal circuit and wiring examples

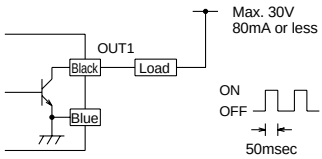


PFA7□□H-□□-$\frac{28}{29}$(-M)

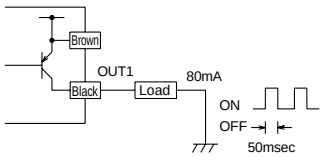


PFA7□□H-□□-$\frac{68}{69}$(-M)

Accumulated pulse output wiring examples



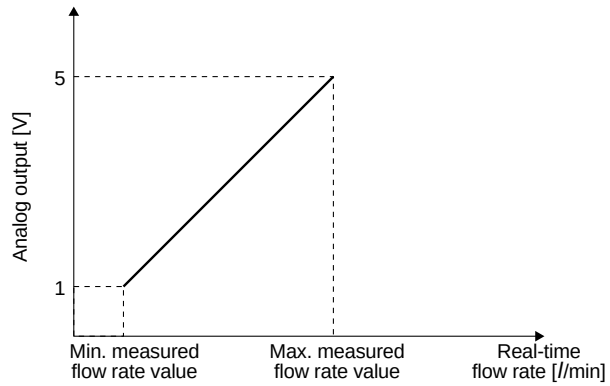
PFA7□□H-□□-$\frac{28}{29}$(-M)



PFA7□□H-□□-$\frac{68}{69}$(-M)

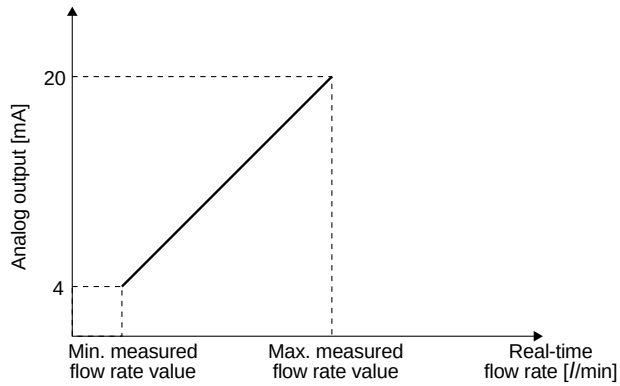
Analog output

1 to 5VDC



Part no.	Minimum measured flow rate value [l/min]	Maximum measured flow rate value [l/min]
PFA703H-□-28 **PFA703H-□-68**	150	3000
PFA706H-□-28 **PFA706H-□-68**	300	6000
PFA712H-□-28 **PFA712H-□-68**	600	12000

4 to 20mADC



Part no.	Minimum measured flow rate value [l/min]	Maximum measured flow rate value [l/min]
PFA703H-□-29 **PFA703H-□-69**	150	3000
PFA706H-□-29 **PFA706H-□-69**	300	6000
PFA712H-□-29 **PFA712H-□-69**	600	12000