3-Colour Display

Digital Flow Switch for Large Flow

New

RoHS

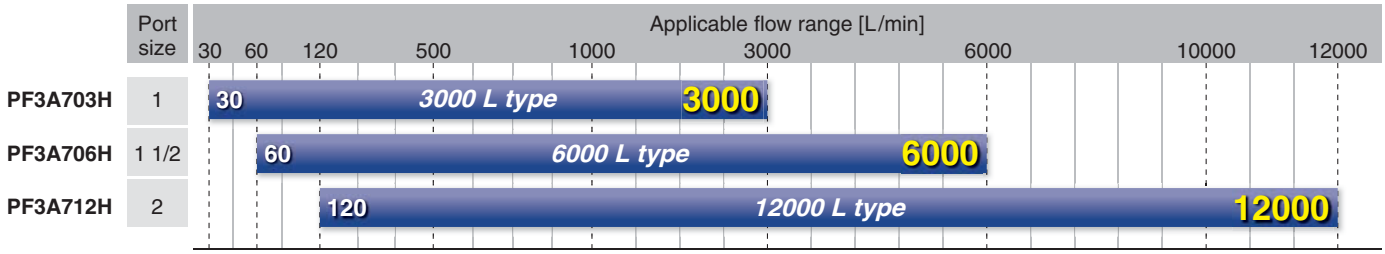
IP65

Applicable fluid Air, N_2

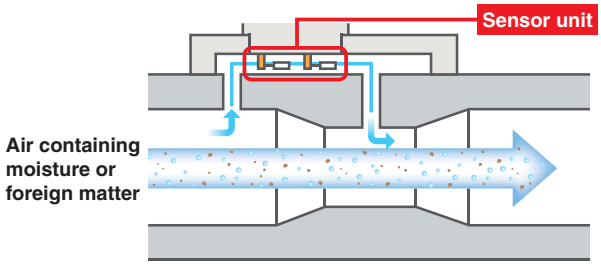
Flow range: Max. 12000 l/min

Flow ratio*1 100:1 Wide range of flow measurement with one product

*1 The flow ratio is 20 : 1 for the current model (PF2A7□H/Large flow type).



Improved drainage and resistance to foreign matter



Bypass construction reduces the moist air or foreign matter in contact with the sensor, reducing the accuracy deterioration and damage of the sensor.

Pressure loss: 75 % reduction*1 (20 kPa → 5 kPa)

*1 Compared with the current model (PF2A7□H/Large flow type).

Through bore construction

Reduced pressure loss
Maintenance-free fluid passage

PF3A7□H Series

SMC

CAT.EUS100-117A

3-colour/ 2-screen display

＊ 2-screen display: 2-row display of main screen and sub screen

Upper Main display: Green At set point

Set value Orange
(Lower Sub display)

Instantaneous flow rate Green Red
(Upper Main display)

Upper Main display: Red At set point

The lower/sub display can be changed by pressing the up/down buttons.

■Accumulated value

■Peak/Bottom value

■Line name

Smallest settable increment: 2 l/min

Current model (PF2A7□H/Large flow type): 5 l/min

Grease-free

Display rotates 90° and can be reversed.

The display can be rotated in increments of 90° according to the installation. The display can be reversed for easy operation.

Clockwise 90° **Easy operation, improved visibility**

Installation Example

Reversed display OFF

Normal

90° rotation

Reversed display ON

(Can be set with the “Reversible display mode.”)

Normal

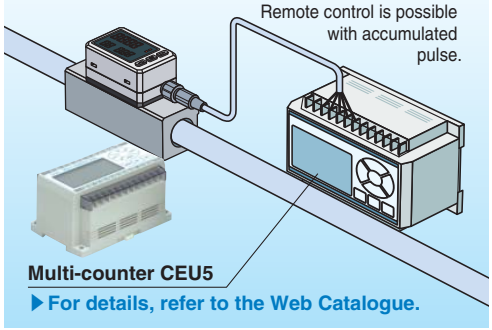
90° rotation

Functions (Refer to pages 10 and 11 for details.)

- Output operation
- Simple setting mode
- Display colour
- Reference condition
- Response time
- FUNC output switching function (Analogue output ⇔ External input)
- Selectable Analogue output function
- External input function
- Forced output function
- Accumulated value hold
- Peak/Bottom value display
- Display OFF mode
- Setting of security code
- Keylock function
- Reset to the default settings
- Reversible display mode
- Zero cut function
- Selection of display on sub screen
- Analogue output free range function
- Error display function

Application

■Flow control of equipment, main line, and branch line

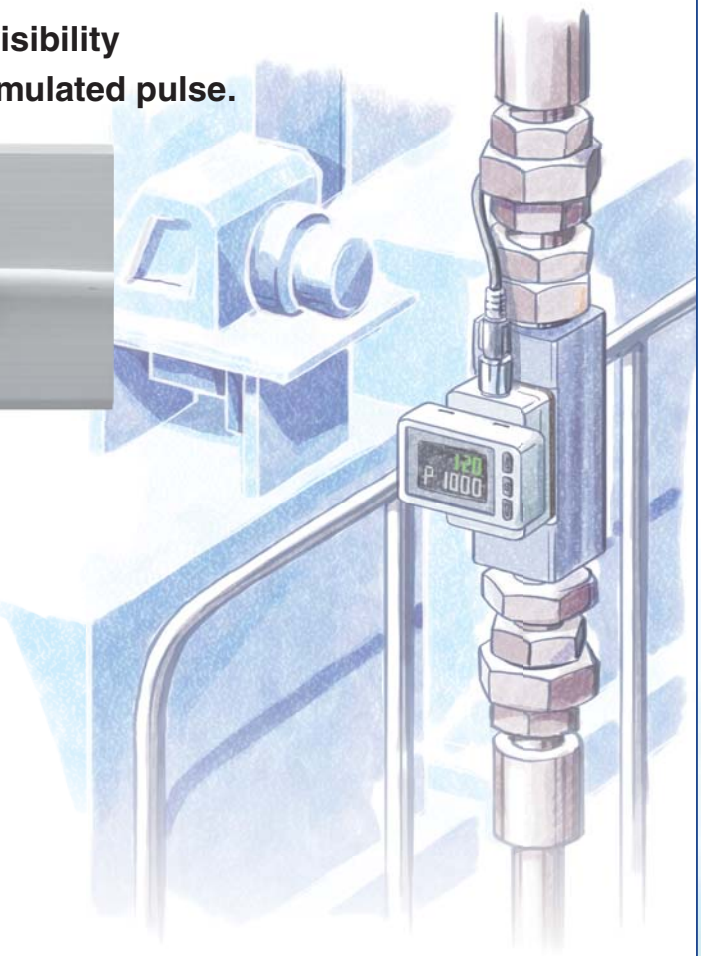


▶For details, refer to the Web Catalogue.

Digital flow switch to save energy!

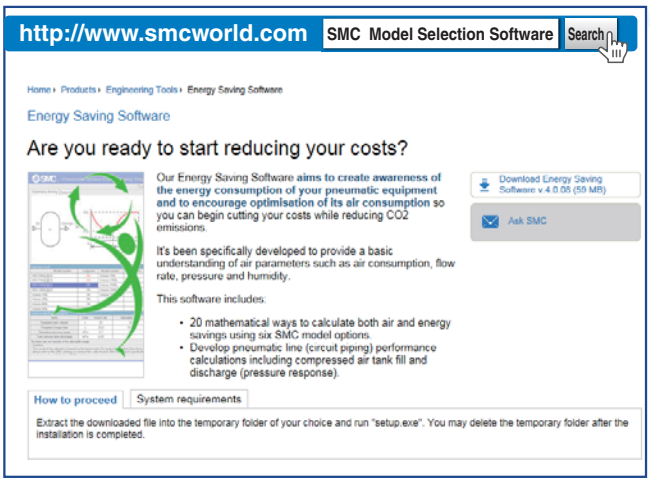
Flow control is necessary for promoting energy saving in any application. Saving energy starts from numerical control of the flow consumption of equipment and lines and clarification of the purpose and effect.

- **Digital display allows visualisation.**
- **3-colour/2-screen display, Improved visibility**
- **Remote control is possible with accumulated pulse.**



Energy Saving Program

For details, refer to the SMC website.



Flow Switch Flow Rate Variations

Series	Applicable fluid	Detection method	Smallest settable increment	Rated flow range [L/min]
PF2A 	Air N_2	Thermal type (Thermistor)	0.1 L/min	1 – 10
			0.5 L/min	5 – 50
			1 L/min	10 – 100
			2 L/min	20 – 200
			5 L/min	50 – 500
PF3A7□H New 	**Air N_2**	**Thermal type (Platinum sensor) Bypass flow type**	**2 L/min**	**30 – 3000**
			5 L/min	**60 – 6000**
			10 L/min	**120 – 12000**
PFM 	Dry air N_2 Argon CO_2	Thermal type (MEMS)	0.01 L/min	0.2 – 10
			0.1 L/min	0.5 – 25
				1 – 50
				2 – 100
PFMB 	Dry air N_2	Thermal type (MEMS) Bypass flow type	1 L/min	2 – 200
				5 – 500
				10 – 1000
				20 – 2000
PFMC 	Dry air N_2	Thermal type (MEMS) Bypass flow type	1 L/min	5 – 500
				10 – 1000
				20 – 2000

Series	Applicable fluid	Detection method	Smallest settable increment	Rated flow range [L/min]
PFMV 	Dry air N_2	Thermal type (MEMS)	0.001 L/min	0 – 0.5
			0.01 L/min	0 – 1
				0 – 3
			0.001 L/min	−0.5 – 0.5
			0.01 L/min	−1 – 1
				−3 – 3

Flow Switch Variations / Basic Performance Table

Series	PFMV	PFM	PFMB	PFMC	PF2A	New PF3A7□H
						
Enclosure	IP40	IP40	IP40	IP65	IP65	**IP65**
Fluid	Dry air, N_2	Dry air, N_2, Ar, CO_2	Dry air, N_2	Dry air, N_2	Air, N_2	**Air, N_2**
Setting	Digital	Digital	Digital	Digital	Digital	**Digital**
Rated flow range	0 to 0.5 l/min 0 to 1 l/min 0 to 3 l/min −0.5 to 0.5 l/min −1 to 1 l/min −3 to 3 l/min	0.2 to 10 l/min 0.5 to 25 l/min 1 to 50 l/min 2 to 100 l/min	2 to 200 l/min 5 to 500 l/min 10 to 1000 l/min 20 to 2000 l/min	5 to 500 l/min 10 to 1000 l/min 20 to 2000 l/min	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	**30 to 3000 l/min 60 to 6000 l/min 120 to 12000 l/min**
Power supply voltage	12 to 24 VDC ±10 %	24 VDC ±10 %	12 to 24 VDC ±10 %	12 to 24 VDC ±10 %	12 to 24 VDC ±10 %	**24 VDC ±10 %**
Temperature characteristics (25 °C standard)	±2 % F.S. (15 to 35 °C) ±5 % F.S. (0 to 50 °C) Monitor unit: ±0.5 % F.S. (0 to 50 °C)	±2 % F.S. (15 to 35 °C) ±5 % F.S. (0 to 50 °C)	±2 % F.S. (15 to 35 °C) ±5 % F.S. (0 to 50 °C)	±2 % F.S. (15 to 35 °C) ±5 % F.S. (0 to 50 °C) Monitor unit: ±0.5 % F.S. (0 to 50 °C)	±3 % F.S. (15 to 35 °C) ±5 % F.S. (0 to 50 °C)	**±5 % F.S. (0 to 50 °C)**
Repeatability	±1 % F.S. (Fluid: Dry air) Analogue output: ±5 % F.S. Monitor unit: ±0.1 % F.S. Analogue output: ±0.5 % F.S.	±1 % F.S. (Fluid: Dry air) Analogue output: ±3 % F.S.	±1 % F.S. (Fluid: Dry air)	±1 % F.S. (Fluid: Dry air) Monitor unit: ±0.1 % F.S. Analogue output: ±0.5 % F.S.	±1 % F.S. (PF2A7□0) ±2 % F.S. (PF2A7□1)	**±1 % F.S.**
Hysteresis	Hysteresis mode: Variable Window comparator mode: Variable	Hysteresis mode: Variable Window comparator mode: Variable	Hysteresis mode: Variable Window comparator mode: Variable	Hysteresis mode: Variable Window comparator mode: Variable	Hysteresis mode: Variable Window comparator mode: Fixed (3 digits)	**Hysteresis mode: Variable Window comparator mode: Variable**
Output	NPN/PNP open collector Analogue voltage output Analogue current output	NPN/PNP open collector Accumulated pulse output Analogue voltage output Analogue current output	NPN/PNP open collector Accumulated pulse output Analogue voltage output Analogue current output	NPN/PNP open collector Accumulated pulse output Analogue voltage output Analogue current output	NPN/PNP open collector Accumulated pulse output	**NPN/PNP open collector Accumulated pulse output Analogue voltage output Analogue current output**
Display	2-colour LCD display	2-colour LED display	2-colour LED display 2-colour LCD display	3-colour LCD display	LED display	**3-colour LCD display**

3-Colour Display

Digital Flow Switch for Large Flow

PF3A7□H Series

RoHS

How to Order

PF3A 7 03 H – □ 10 – ES □ – □ □

Type

7	Integrated display

Rated flow range

03	30 to 3000 l/min
06	60 to 6000 l/min
12	120 to 12000 l/min

Large flow type

Thread type

—	Rc
N	NPT
F[*1]	G

*1 ISO 1179-1 compliant

Port size

Symbol	Port size	Rated flow range		
		03	**06**	**12**
10	1	●	—	—
14	1 1/2	—	●	—
20	2	—	—	●

Output specification

Symbol	OUT	FUNC[*2]
CS	NPN	Analogue voltage output[*3] ⇔ External input[*4]
DS	NPN	Analogue current output ⇔ External input[*4]
ES	PNP	Analogue voltage output[*3] ⇔ External input[*4]
FS	PNP	Analogue current output ⇔ External input[*4]

*2 Analogue output or external input can be selected by pressing the buttons. Analogue output is set as default setting.
*3 1 to 5 V or 0 to 1 0 V can be selected by pressing the button. The default setting is 1 to 5 V.
*4 The accumulated value, peak value, and bottom value can be reset.

Options

—	With lead wire and M12 connector (3 m)[*5]
N	Without lead wire and M12 connector

*5 Option is shipped together, but not assembled.

Unit specification

—	Units selection function[*6]
M	SI unit only[*7]

*6 This product is for overseas use only according to the New Measurement Act. (The SI unit type is provided for use in Japan.)
*7 Fixed unit: Instantaneous flow: l/min
Accumulated flow: L

Calibration certificate[*8]

—	None
A[*9]	Yes

*8 Certificate in both English and Japanese
*9 Made to order

Option/Part No.
When only optional parts are required, order with the part number listed below.

Part no.	Option	Note
ZS-37-A	Lead wire and M12 connector	Length: 3 m

For flow switch precautions, refer to the "Handling Precautions for SMC Products" on the SMC website. For details about the specific product precautions, refer to the "Operation Manual" on the SMC website.

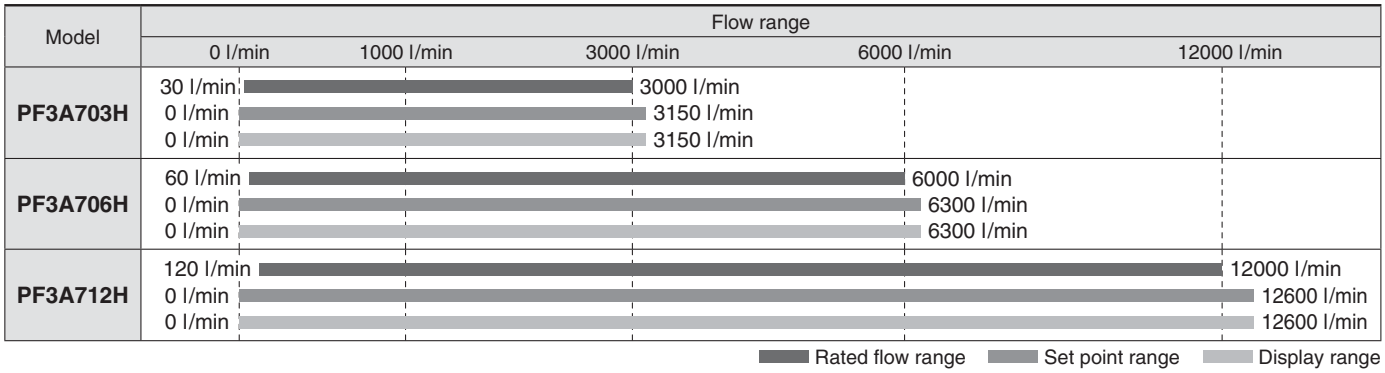
Specifications

Model			PF3A703H	PF3A706H	PF3A712H
Fluid	Applicable fluid*1		Air, Nitrogen		
	Fluid temperature		0 to 50 °C		
Flow	Detection method		Thermal type		
	Rated flow range		30 to 3000 l/min	60 to 6000 l/min	120 to 12000 l/min
	Set point range*2	Instantaneous flow	30 to 3150 l/min	60 to 6300 l/min	120 to 12600 l/min
		Accumulated flow	0 to 999,999,999,990 L		
	Smallest settable increment	Instantaneous flow	2 l/min	5 l/min	10 l/min
		Accumulated flow	10 L	100 L	
	Accumulated volume per pulse (Pulse width = 50 msec.)		Select from 100 L/pulse or 1000 L/pulse.		
	Accumulated value hold function*3		Interval of 2 or 5 minutes can be selected.		
Pressure	Rated pressure range		0.1 to 1.5 MPa		
	Proof pressure		2.25 MPa		
	Pressure loss		Refer to "Pressure Loss" graph.		
	Pressure characteristics*4		±2.5 % F.S. (0.1 to 1.0 MPa, 0.5 MPa standard)		
Electrical	Power supply voltage		24 VDC ±10 %		
	Current consumption		150 mA or less		
	Protection		Polarity protection		
Accuracy	Display accuracy		±3.0 % F.S.		
	Analogue output accuracy		±3.0 % F.S.		
	Repeatability		Switch output/Display: ±1.0 % F.S. Analogue output: ±1.0 % F.S.		
	Temperature characteristics		±5.0% F.S. (Ambient temperature of 0 to 50 °C, 25 °C standard)		
Switch output	Output type		NPN open collector PNP open collector		
	Output mode		Select from Instantaneous output (Hysteresis mode or Window comparator mode), Accumulated output, or Accumulated pulse output.		
	Switch operation		Select from Normal or Reversed output.		
	Max. load current		80 mA		
	Max. applied voltage (NPN only)		28 VDC		
	Internal voltage drop (Residual voltage)		NPN output type: 1 V or less (at load current of 80 mA) PNP output type: 2 V or less (at load current of 80 mA)		
	Response time*5		Select from 1 s, 2 s, or 5 s.		
	Hysteresis*6		Variable from 0		
	Protection		Over current protection		
Analogue output*7	Output type		Voltage output: 1 to 5 V (0 to 10 V can be selected*8), Current output: 4 to 20 mA		
	Impedance	Voltage output	Output impedance: Approx. 1 kΩ		
		Current output	Maximum load impedance: Approx. 600 Ω		
	Response time*9		Linked with the response time of the switch output.		
External input*10	Input type		No-voltage input: 0.4 V or less		
	Input mode		Select from Accumulated flow external reset or Peak/Bottom reset.		
	Input time		30 ms or more		
Display	Reference condition*11		Select from Standard condition or Normal condition.		
	Unit*12	Instantaneous flow	l/min, CFM (ft³/min)		
		Accumulated flow	L, ft³		
	Display range*13	Instantaneous flow	0 to 3150 l/min (Flow under 30 l/min is displayed as "0")	0 to 6300 l/min (Flow under 60 l/min is displayed as "0")	0 to 12600 l/min (Flow under 120 l/min is displayed as "0")
		Accumulated flow	0 to 999,999,999,990 L		
	Minimum display unit	Instantaneous flow	2 l/min	5 l/min	10 l/min
		Accumulated flow	10 L	100 L	
	Display		LCD, 2-screen display (Main screen/Sub screen) Main screen: Red/Green, Sub screen: Orange Main screen: 5 digits, 7 segment, Sub screen: 6 digits, 7 segment		
	Indicator LED		OUT indicator: Red LED is ON when output is ON		
Environment	Enclosure		IP65		
	Withstand voltage		1000 VAC for 1 minute between terminals and housing		
	Insulation resistance		50 MΩ (500 VDC measured via megohmmeter) between terminals and housing		
	Operating temperature range		Operating: 0 to 50 °C, Stored: -10 to 60 °C (No freezing or condensation)		
	Operating humidity range		Operating/Stored: 35 to 85 %RH (No condensation)		
Standards			CE, RoHS		
Piping	Piping specification		Rc1, NPT1, G1	Rc1 1/2, NPT1 1/2, G1 1/2	Rc2, NPT2, G2
Main materials of parts in contact with fluid			Aluminium alloy, PPS, HNBR [Sensor: Pt, Au, Fe, Lead glass (exempted from the RoHS application), Al_2O_3]		
Length of lead wire with connector			3 m		
Weight	Piping specification	Rc	610 g	1190 g	1680 g
		NPT	610 g	1190 g	1680 g
		G	630 g	1220 g	1720 g
	Lead wire with connector		+90 g		

*1 Air quality grade is JIS B 8392-1:2012 [3:6:-] and ISO 8573-1:2010 [3:6:-].
*2 Set point range will change according to the setting of the zero cut function.
*3 When using the accumulated value hold function, use the operating conditions to calculate the product life, and do not exceed it. The maximum update limit of the memory device is 1 . 5 million times. If the product is operated 24 hours per day, the product life will be as follows:
- 5 min interval: life is calculated as 5 min x 1.5 million = 7.5 million min = 14.3 years
- 2 min interval: life is calculated as 2 min x 1.5 million = 3 million min = 5.7 years

If the accumulated flow external reset is repeatedly used, the product life will be shorter than calculated life.
*4 When the pressure range is 1.0 to 1.5 MPa, the pressure characteristics will be ±5 % F.S. (standard pressure is 0.5 MPa). Do not release the OUT side piping port of the product to the atmosphere without connecting piping. If the product is used with the piping port released to atmosphere, accuracy may vary.
*5 The time from when the flow is changed by a step input (when the flow rate changes from 0 to the maximum value of the rated flow range instantaneously) until the switch output turns ON (or OFF) when set at 90% of the rated flow rate.
*6 If the flow fluctuates around the set value, the width for setting more than the fluctuating width needs to be set. Otherwise, chattering will occur.
*7 Analogue output or external input can be selected by pressing the buttons. Refer to the graph for analog output.
*8 When selecting 0 to 1 0 V, refer to the analog output graph for the allowable load current.
*9 The time from when the flow is changed by a step input (when the flow rate changes from 0 to the maximum value of the rated flow range instantaneously) until the analog output reaches 90 % of the rated flow rate.
*10 Analogue output or external input can be selected by pressing the buttons.
*11 The flow rate given in the specification is the value at standard condition.
*12 Can be selected only for models with the units selection function.
*13 Display range will change according to the setting of the zero cut function.
* Any products with tiny scratches, smears, or display colour variation or brightness which does not affect the performance are verified as conforming products.

Flow Range



Analogue Output

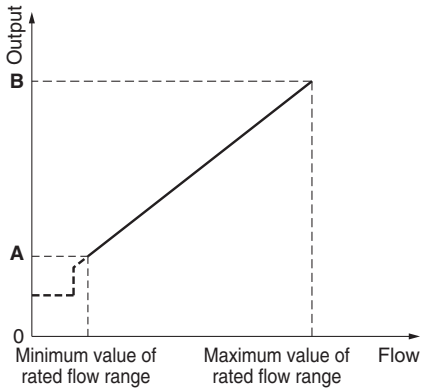
Flow/Analogue Output

	0 l/min	A*2	B
Voltage output (1 to 5 V)*1	1 V	1.04 V	5 V
Current output*1	4 mA	4.16 mA	20 mA

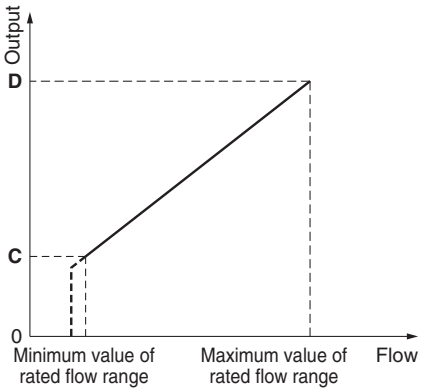
	0 l/min	C*2	D
Voltage output (0 to 10 V)*1*3	0 V	0.1 V	10 V

Model	Minimum value of rated flow range*4	Maximum value of rated flow range
PF3A703H	30 l/min	3000 l/min
PF3A706H	60 l/min	6000 l/min
PF3A712H	120 l/min	12000 l/min

*1 Analogue output accuracy is within ±3 % F.S.
*2 A and C will change according to the setting of the zero cut function.
*3 The analogue output current from the connected equipment should be 20 μA or less when selecting 0 to 10 V. When more than 20 μA current flows, it is possible that the accuracy is not satisfied below 0.5 V.
*4 The minimum value of the rated flow range will change according to the setting of the zero cut function.



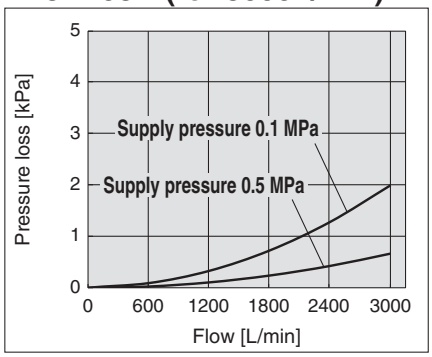
Voltage output (1 to 5 V)/Current output (4 to 20 mA)



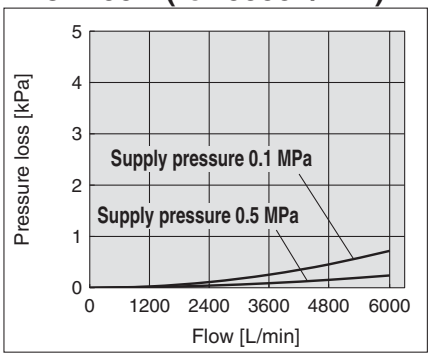
Voltage output (0 to 10 V)

Pressure Loss (Reference Data)

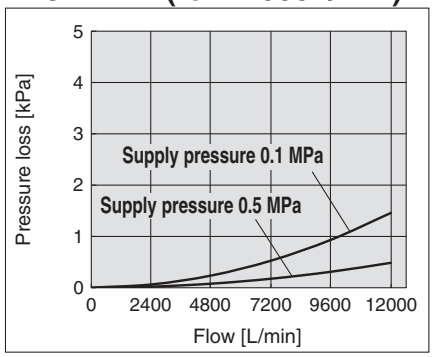
PF3A703H (for 3000 l/min)



PF3A706H (for 6000 l/min)

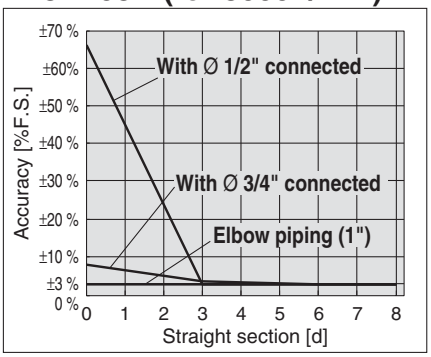


PF3A712H (for 12000 l/min)

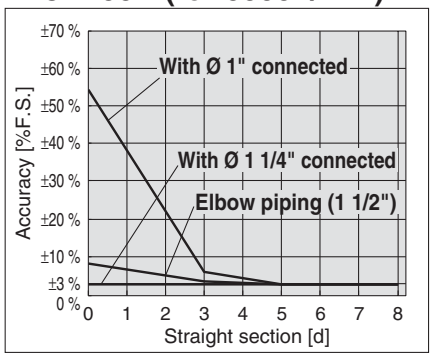


IN Side Straight Section and Accuracy (Reference Data)

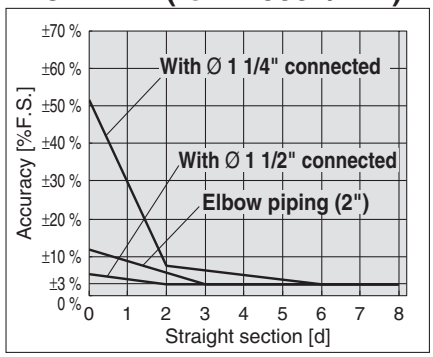
PF3A703H (for 3000 l/min)



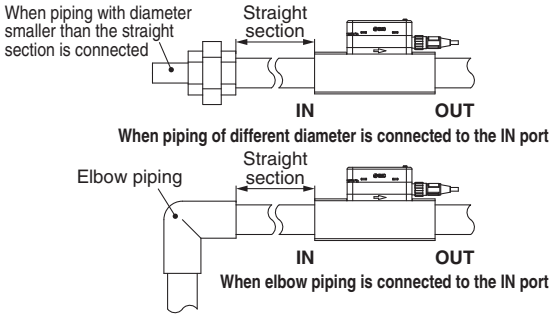
PF3A706H (for 6000 l/min)



PF3A712H (for 12000 l/min)

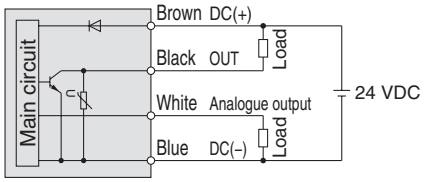


· Do not connect equipment or piping which may generate a fluctuation in the flow or drift at the IN side of the product. When installing a regulator at the IN side of the product, make sure that hunting is not generated.
· The piping on the IN side must have a straight section of piping whose length is more than 8 times the piping I.D.
If a straight section of piping is not installed, the accuracy may vary by ±3 % F.S. or more.
* "Straight section" means a section of piping without any bends or rapid changes in the cross sectional area.



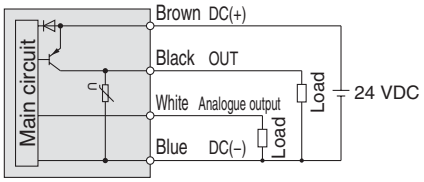
Internal Circuits and Wiring Examples

NPN + Analogue output selected
PF3A7□□H-□□-CS/DS□-□□



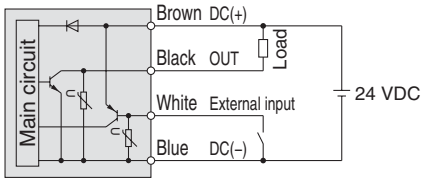
Max. applied voltage: 28 V, Max. load current: 80 mA, Internal voltage drop: 1 V or less
CS: Analogue output: 1 to 5 V or 0 to 10 V
Output impedance: 1 kΩ
DS: Analogue output: 4 to 20 mA
Max. load impedance: 600 Ω
Min. load impedance: 50 Ω

PNP + Analogue output selected
PF3A7□□H-□□-ES/FS□-□□



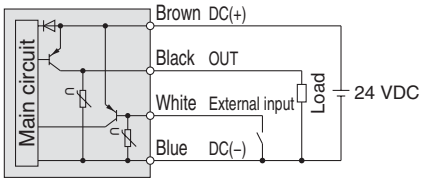
Max. load current: 80 mA, Internal voltage drop: 2 V or less
ES: Analogue output: 1 to 5 V or 0 to 10 V
Output impedance: 1 kΩ
FS: Analogue output: 4 to 20 mA
Max. load impedance: 600 Ω
Min. load impedance: 50 Ω

NPN + External input selected
PF3A7□□H-□□-CS/DS□-□□



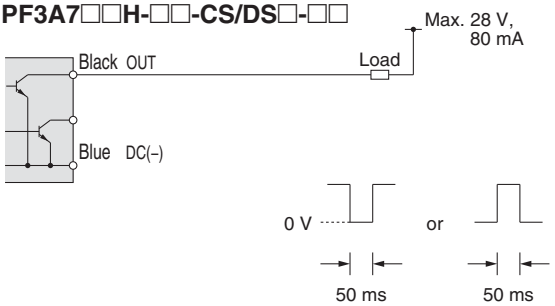
Max. applied voltage: 28 V, Max. load current: 80 mA, Internal voltage drop: 1 V or less
External input: Input voltage 0.4 V or less (Reed or Solid state input) for 30 ms or longer

PNP + External input selected
PF3A7□□H-□□-ES/FS□-□□

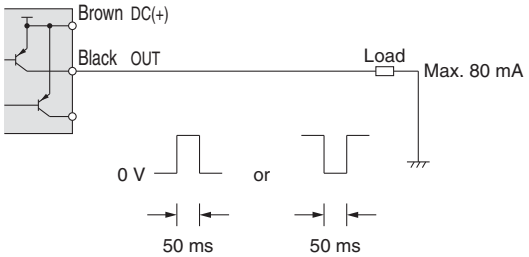


Max. load current: 80 mA, Internal voltage drop: 2 V or less
External input: Input voltage 0.4 V or less (Reed or Solid state input) for 30 ms or longer

Accumulated pulse output wiring examples
PF3A7□□H-□□-CS/DS□-□□

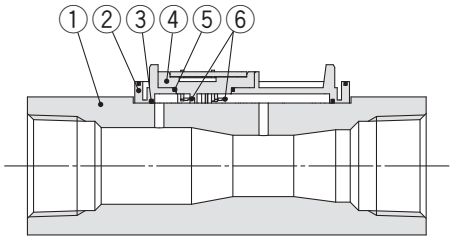


PF3A7□□H-□□-ES/FS□-□□



Construction: Parts in Contact with Fluid (Description)

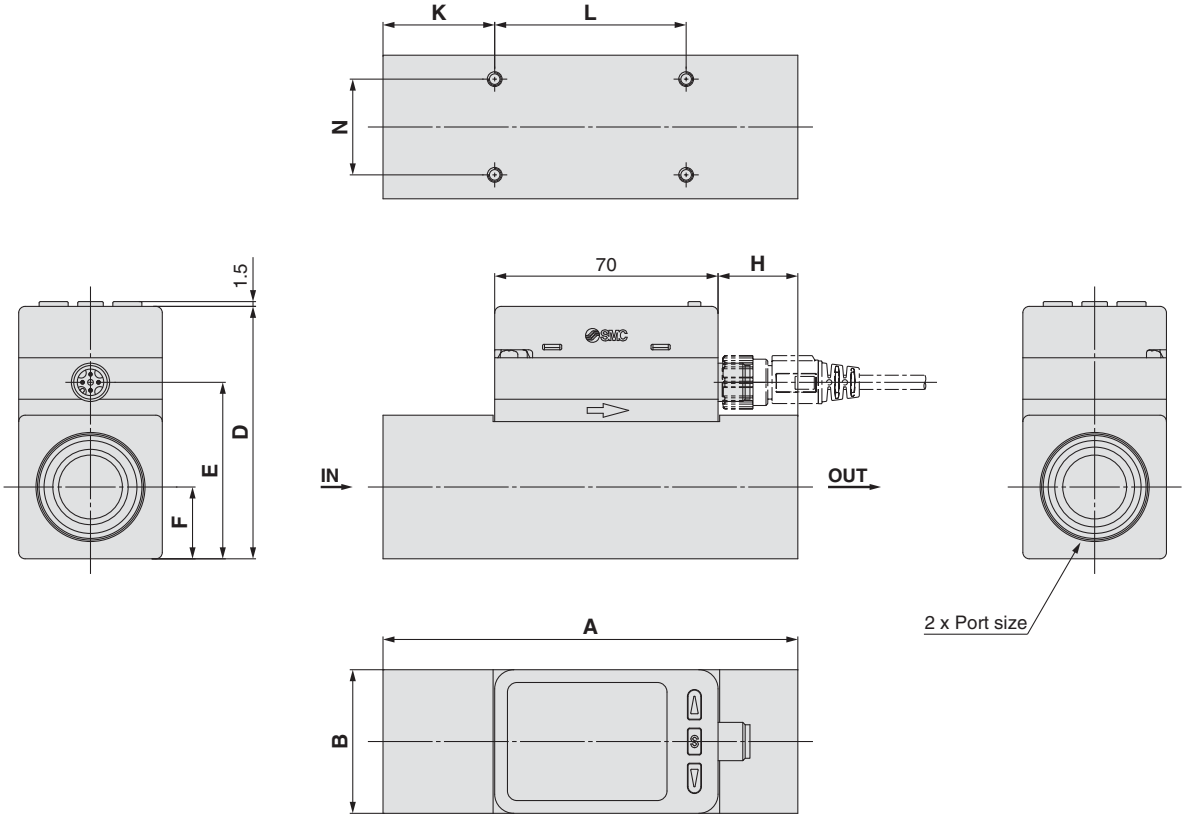
PF3A703H/706H/712H



Component Parts

No.	Description	Material	Note
1	**Body**	Aluminium alloy	Anodized
2	**Branch passage**	PPS	—
3	**Gasket**	HNBR	—
4	**Sensor base**	PPS	—
5	**Gasket**	HNBR	—
6	**Sensor**	Au, Pt, Al_2O_3	—

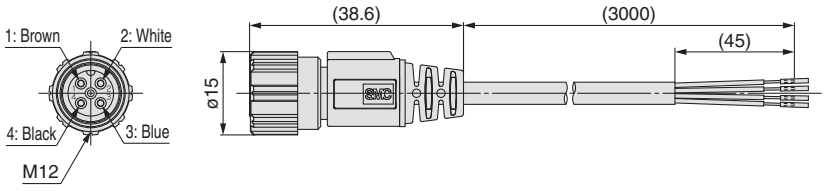
Dimensions



Model \ Symbol	Port size	A	B	D	E	F	H	K	L	N	
PF3A703H	Rc1, NPT1, G1	130	45	79.1	56	22.5	25	35	60	30	4 x M4 x 0.7 depth 7
PF3A706H	Rc1 1/2, NPT1 1/2, G1 1/2	170	60	94.1	71	30	68	45	80	40	4 x M5 x 0.8 depth 8
PF3A712H	Rc2, NPT2, G2	200	70	104.1	81	35	85	50	100	50	4 x M6 x 1.0 depth 9

ZS-37-A

Lead wire and M12 connector



Pin no.	Pin name	Wire colour
1	DC(+)	Brown
2	FUNC	White
3	DC(–)	Blue
4	OUT	Black

* 4-wire type lead wire and M12 connector used for the PF3A series.

Cable Specifications

Conductor	**Nominal cross section**	AWG23
Insulator	**Outside diameter**	Approx. 1.1 mm
	Colour	Brown, Blue, Black, White
Sheath	**Finished outside diameter**	ø4

PF3A7□H Series
Function Details

For setting of functions and operation method, refer to the Operation Manual from the SMC website Documents/Download --> Instruction Manuals.

■ Output operation

The output operation can be selected from the following:
Output (hysteresis mode and window comparator mode) corresponding to instantaneous flow, or output (accumulated output and pulse output) corresponding to accumulated flow.

∗ At the time of shipment from the factory, it is set to hysteresis mode and normal output.

■ Simple setting mode

Only the set values for instantaneous flow and accumulated flow can be changed. Output mode, output type, display colour, accumulate pulse output cannot be changed.

■ Display colour

The display colour can be selected for each output condition. The selection of the display colour provides visual identification of abnormal values.

Green for ON, Red for OFF
Red for ON, Green for OFF
Red all the time
Green all the time

■ Reference condition

The display unit can be selected from standard condition or normal condition.

Standard condition: Flow rate converted to a volume at 20°C and 101.3 kPa (absolute pressure)
Normal condition: Flow rate converted to a volume at 0°C and 101.3 kPa (absolute pressure)

■ Response time

The response time can be selected to suit the application. (Default setting is 1 second.) The effect of fluctuation and flickering of the display can be reduced by setting the response time to 2 seconds or 5 seconds.

1 sec.
2 sec.
5 sec.

■ FUNC output switching function

Either analogue output or External input can be selected. (Analogue output is the default setting)

■ Selectable Analogue output function

1 to 5 V or 0 to 10 V can be selected for the analogue voltage output type. (Default setting is 1 to 5 V.)

■ External input function

The accumulated flow, peak value and bottom value can be reset remotely.

Accumulated value external reset: A function to reset the accumulated flow value when an external input signal is applied.
In accumulated increment mode, the accumulated value will reset to, and increase from zero.
In accumulated decrement mode, the accumulated value will reset to, and decrease from the set value.

∗ When the Accumulated Value is stored to memory, every time the Accumulated Value External Reset is activated, the memory will be accessed. Take into consideration the maximum number of times the memory can be accessed is 1.5 million times. The total of external input times and accumulated value memorizing time interval should not exceed 1.5 million times.

Peak/Bottom reset: Peak and bottom value are reset.

■ Forced output function

The output is turned on/off in a fixed state when starting the system or during maintenance. This enables confirmation of the wiring and prevents system errors due to unexpected output.
For the analog output type: When ON, the output will be 5 V (or 10 V when 0 to 10 V is selected) or 20 mA, and when OFF, 1 V (or 0 V when 0 to 10 V is selected) or 4 mA.

∗ Also, the increase or decrease of the flow will not change the on/off status of the output while the forced output function is activated.

■ Accumulated value hold

Accumulated value is not cleared even when the power supply is turned off. The accumulated value is memorised every 2 or 5 minutes during measurement, and continues from the last memorised value when the power supply is turned on again.
The maximum writable limit of the memory device is 1.5 million times, which should be taken into consideration.

■ Peak/Bottom value display

The maximum (minimum) flow rate is detected and updated from when the power supply is turned on. In peak (bottom) value display mode, this maximum (minimum) flow rate is displayed.

■ Display OFF mode

This function will turn the display OFF.
In the display OFF mode, three digits "_ _ _ " on the right of the sub display will flash.
If any button is pressed during this mode, the display reverts to normal for 30 seconds to allow checking of the flow, etc.
When the flow monitor (PFG3 series) is connected, the displayed values might be different due to an error. When the flow monitor display is used, it is recommended to set this product to the display OFF mode.

■ Setting of security code

The user can select whether a security code must be entered to release key lock. At the time of shipment from the factory, it is set such that the security code is not required.

■ Keylock function

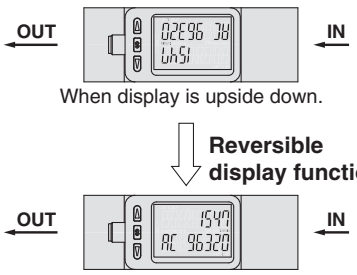
Prevents operation errors such as accidentally changing setting values.

■ Reset to the default settings

The product can be returned to its factory default settings.

■ Reversible display mode

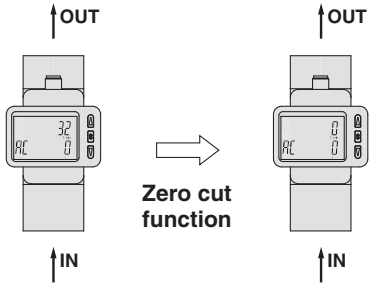
When the switch is used upside down, the orientation of the display can be rotated to make it easier to read by using the reversible display function.



■ Zero cut function

When the flow is close to 0 l/min., the product will round the value down and zero will be displayed. A flow value may be displayed even when the flow rate is 0 l/min. due to high pressure or depending on the installation. The zero cut function will force the display to zero. The range to display zero can be changed.

Example) Vertical mounting, with fluid direction: Bottom to top



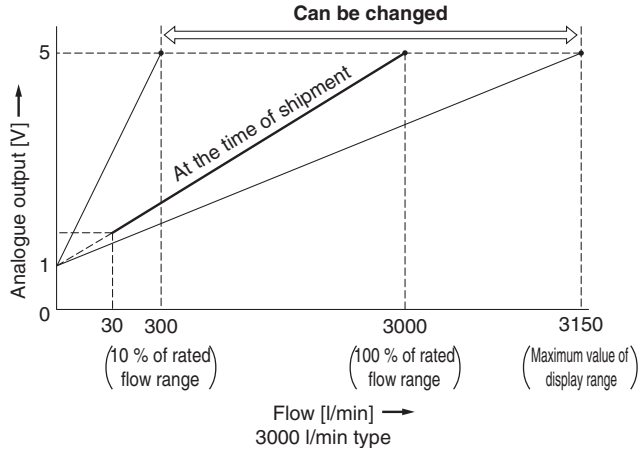
■ Selection of display on sub screen

The display on the sub screen in measuring mode can be set.

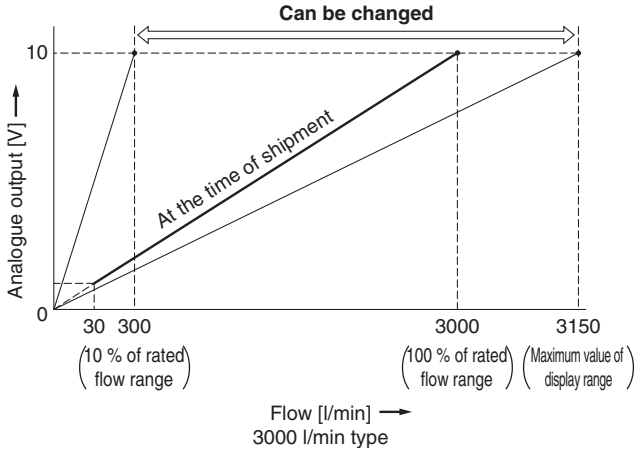
Accumulated value display	Set value display	Peak value display
Displays the accumulated value. 	Displays the set value. 	Displays the peak value. 
Bottom value display	**Line name display**	**OFF**
Displays the bottom value. 	Displays the line name. (Up to 5 alphanumeric characters can be input.) 	Displays nothing. 

■ Analogue output free range function

Allows the flow that generates an output of 5 V (or 10 V when 0 to 10 V is selected) or 20 mA to be changed. The value can be changed between 10 % of the maximum value of the rated flow and the maximum value of the display range.



For analogue voltage output of 0 to 10 V



■ Error display function

When an error or abnormality arises, the location and contents are displayed.

Display	Description	Contents	Action
Er 1	OUT over current error	Load current of 8.0 mA or more is applied to the switch output (OUT).	Eliminate the cause of the over current by turning off the power supply and then turn on it again.
HHH	Instantaneous flow error	The flow rate exceeds the maximum value of the display range.	Decrease the flow rate.
999999 flashes x 10^6	Accumulated flow error	The flow rate exceeds the accumulated flow rate range.	Clear the accumulated flow rate.
Er0	System error	Displayed if an internal error has occurred.	Turn the power off and on again.
Er4			
Er6			
Er7			
Er8			
Er 10			
Er 12			
Er 13			
Er 14			

If the failure cannot be solved after the above instructions are performed, please contact SMC for investigation.

⚠ Safety Instructions

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

⚠ Caution: **Caution** indicates a hazard with a low level of risk which, if not avoided, could result in minor or moderate injury.

⚠ Warning: **Warning** indicates a hazard with a medium level of risk which, if not avoided, could result in death or serious injury.

⚠ Danger : **Danger** indicates a hazard with a high level of risk which, if not avoided, will result in death or serious injury.

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

⚠ Warning

1. The compatibility of the product is the responsibility of the person who designs the equipment or decides its specifications.
Since the product specified here is used under various operating conditions, its compatibility with specific equipment must be decided by the person who designs the equipment or decides its specifications based on necessary analysis and test results. The expected performance and safety assurance of the equipment will be the responsibility of the person who has determined its compatibility with the product. This person should also continuously review all specifications of the product referring to its latest catalogue information, with a view to giving due consideration to any possibility of equipment failure when configuring the equipment.

2. Only personnel with appropriate training should operate machinery and equipment.
The product specified here may become unsafe if handled incorrectly. The assembly, operation and maintenance of machines or equipment including our products must be performed by an operator who is appropriately trained and experienced.

3. Do not service or attempt to remove product and machinery/equipment until safety is confirmed.
1. The inspection and maintenance of machinery/equipment should only be performed after measures to prevent falling or runaway of the driven objects have been confirmed.
2. When the product is to be removed, confirm that the safety measures as mentioned above are implemented and the power from any appropriate source is cut, and read and understand the specific product precautions of all relevant products carefully.
3. Before machinery/equipment is restarted, take measures to prevent unexpected operation and malfunction.

4. Contact SMC beforehand and take special consideration of safety measures if the product is to be used in any of the following conditions.
1. Conditions and environments outside of the given specifications, or use outdoors or in a place exposed to direct sunlight.
2. Installation on equipment in conjunction with atomic energy, railways, air navigation, space, shipping, vehicles, military, medical treatment, combustion and recreation, or equipment in contact with food and beverages, emergency stop circuits, clutch and brake circuits in press applications, safety equipment or other applications unsuitable for the standard specifications described in the product catalogue.
3. An application which could have negative effects on people, property, or animals requiring special safety analysis.
4. Use in an interlock circuit, which requires the provision of double interlock for possible failure by using a mechanical protective function, and periodical checks to confirm proper operation.

⚠ Caution

1. The product is provided for use in manufacturing industries.
The product herein described is basically provided for peaceful use in manufacturing industries.
If considering using the product in other industries, consult SMC beforehand and exchange specifications or a contract if necessary.
If anything is unclear, contact your nearest sales branch.

Limited warranty and Disclaimer/ Compliance Requirements

The product used is subject to the following "Limited warranty and Disclaimer" and "Compliance Requirements". Read and accept them before using the product.

Limited warranty and Disclaimer

1. The warranty period of the product is 1 year in service or 1.5 years after the product is delivered, wichever is first.*2) Also, the product may have specified durability, running distance or replacement parts. Please consult your nearest sales branch.
2. For any failure or damage reported within the warranty period which is clearly our responsibility, a replacement product or necessary parts will be provided. This limited warranty applies only to our product independently, and not to any other damage incurred due to the failure of the product.
3. Prior to using SMC products, please read and understand the warranty terms and disclaimers noted in the specified catalogue for the particular products.

*2) **Vacuum pads are excluded from this 1 year warranty.** A vacuum pad is a consumable part, so it is warranted for a year after it is delivered. Also, even within the warranty period, the wear of a product due to the use of the vacuum pad or failure due to the deterioration of rubber material are not covered by the limited warranty.

Compliance Requirements

1. The use of SMC products with production equipment for the manufacture of weapons of mass destruction (WMD) or any other weapon is strictly prohibited.
2. The exports of SMC products or technology from one country to another are governed by the relevant security laws and regulations of the countries involved in the transaction. Prior to the shipment of a SMC product to another country, assure that all local rules governing that export are known and followed.

⚠ Caution

SMC products are not intended for use as instruments for legal metrology.
Measurement instruments that SMC manufactures or sells have not been qualified by type approval tests relevant to the metrology (measurement) laws of each country. Therefore, SMC products cannot be used for business or certification ordained by the metrology (measurement) laws of each country.

⚠ Safety Instructions | Be sure to read "Handling Precautions for SMC Products" (M-E03-3) before using.

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