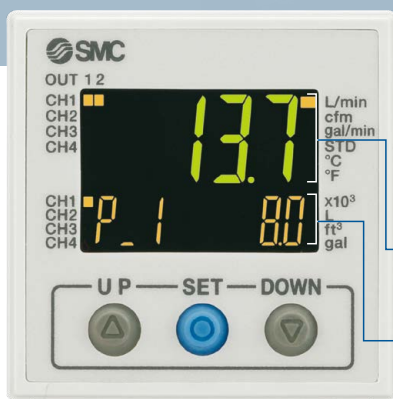


3-Screen Display 4-Channel Flow Monitor

Up to 4 flow sensors can be connected!

New



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)

Visualization of Settings

Set value (Threshold value)	P.1
Hysteresis value	H.1
Peak value	H.H.
Bottom value	H.Lo
Channel display	CH.1

• Input Range Selection **p. 3**

Applicable Flow Sensor Variations

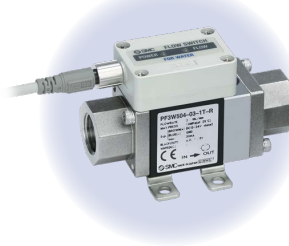
Digital Flow Switch for Air
PF2A



3-Color Display
Digital Flow Switch for Water
PF3W-Z



3-Color Display
Digital Flow Switch for Water
PF3W



Digital Flow Switch for Deionized Water and Chemical Liquids
PF2D



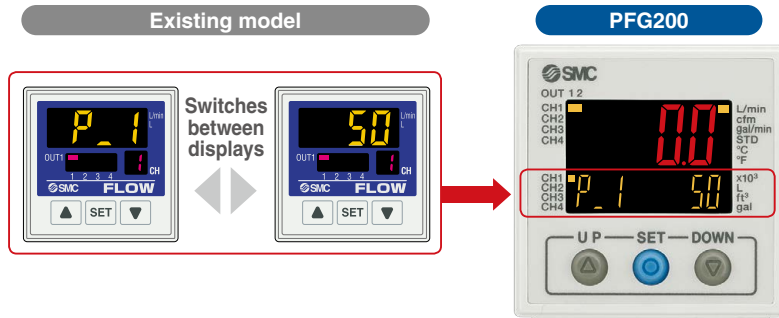
PF200 Series



CAT.ES100-157A

Visualization of Settings

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



Mode Examples

Hysteresis mode	Normal output	Set value (Threshold value)	Reversed output	Set value (Threshold value)	Hysteresis	Set hysteresis value		
	P.L	50	n.L	50	H.L	5		
Window comparator mode	Normal output/ Lo side	Set value (Threshold value)	Normal output/ Hi side	Set value (Threshold value)	Reversed output/ Lo side	Set value (Threshold value)	Reversed output/ Hi side	Set value (Threshold value)
	P.L	30	P.H	60	n.L	30	n.H	60

Easy Screen Switching

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

- Main screen**: Measured value (Current flow value)
- Sub screen/Left side**: Label (Display item)
- Sub screen/Right side**: Set value (Threshold value)
- Easy to press convex rubber button**: Improved operability

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.

- Push**: Press SET button to show P_1.
- Adjust the set value.**: Adjust the value to 30.
- Push**: Press SET button to show H_1.

Now with a snap shot function for set value reading

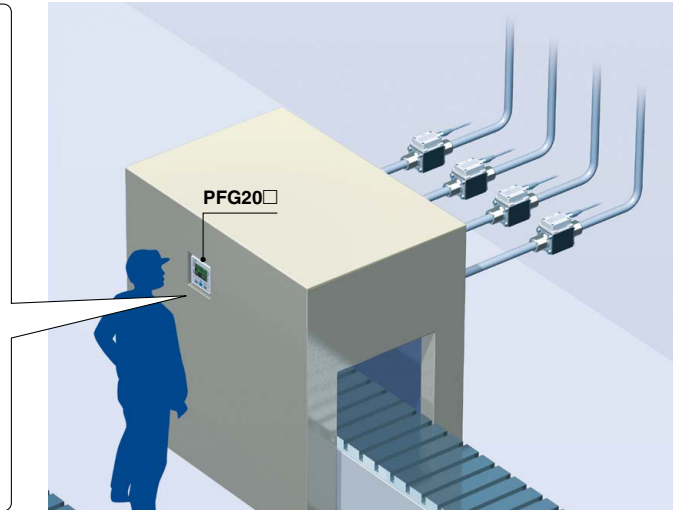
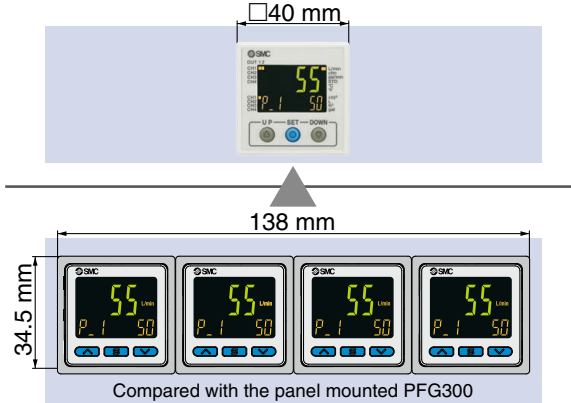
Snap shot function: Pressing the UP and DOWN buttons simultaneously for a minimum of 1 second will make the set value (threshold value) the same as the current pressure value.

- Setting start**: Push UP and DOWN buttons.
- Release the buttons after "---" is displayed on the right side sub screen.**
- Setting completed**: Push SET button.

Centralized Control Saves Installation Space.

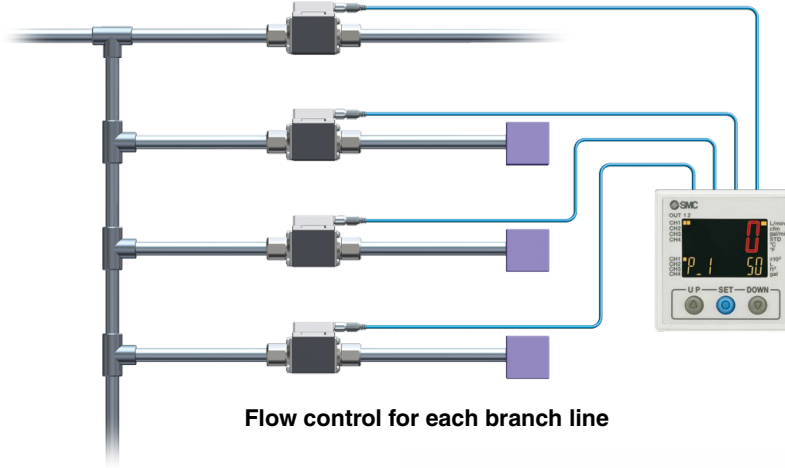
66% reduction in installation space

(Compared with the panel mounted PFG200□)



Accumulated Flow Measurement

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



A Single Monitor Various Applications

3 channels are displayed simultaneously.

(Customer defined channel can be set.)

1ch

- Flow control of N₂ gas to prevent lead frame oxidation
- N₂ blow prevents distortion of camera image due to air turbulence.

2ch

- Flow control of the air for spray painting

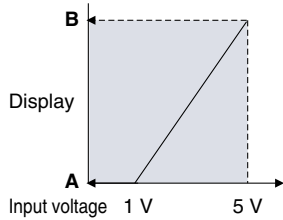
3ch 4ch

- Flow control of the circulating fluid in a chiller

User's equipment

* The product is not designed to be explosion proof.

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 pages 9 and 10 for the specification of the sensors which can be connected.

For the individual specifications of each connectable sensor, refer to the **Web Catalog**.

■ For Digital Flow Switch for Air / PF2MC7



	A	B
PF2MC7501	0	500
PF2MC7102	0	1000
PF2MC7202	0	2000

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

■ For Flow Sensor / PFMV5



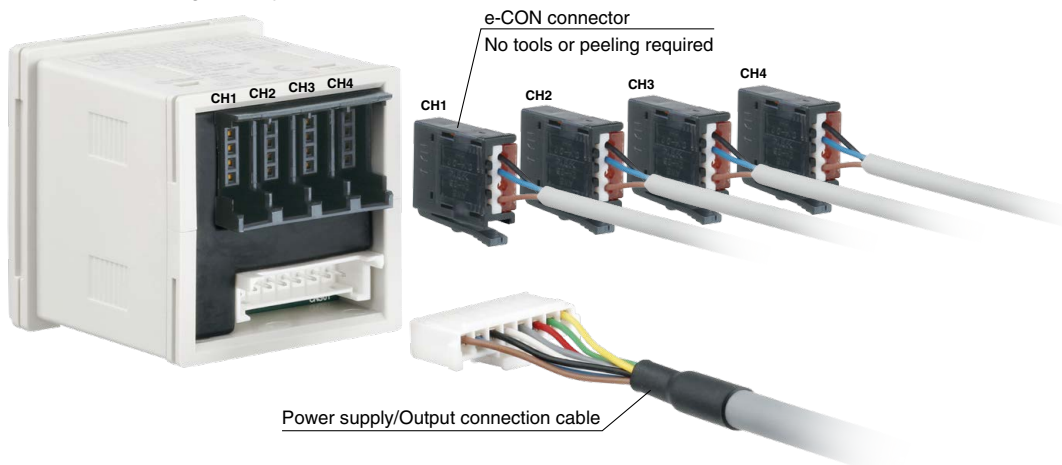
Setting of the display for analog voltage

	A	B
PFMV5 Series	1.00	5.00

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

Connectors

Connection and removal of wiring is easy.



Functions pp. 16 to 18

■ 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

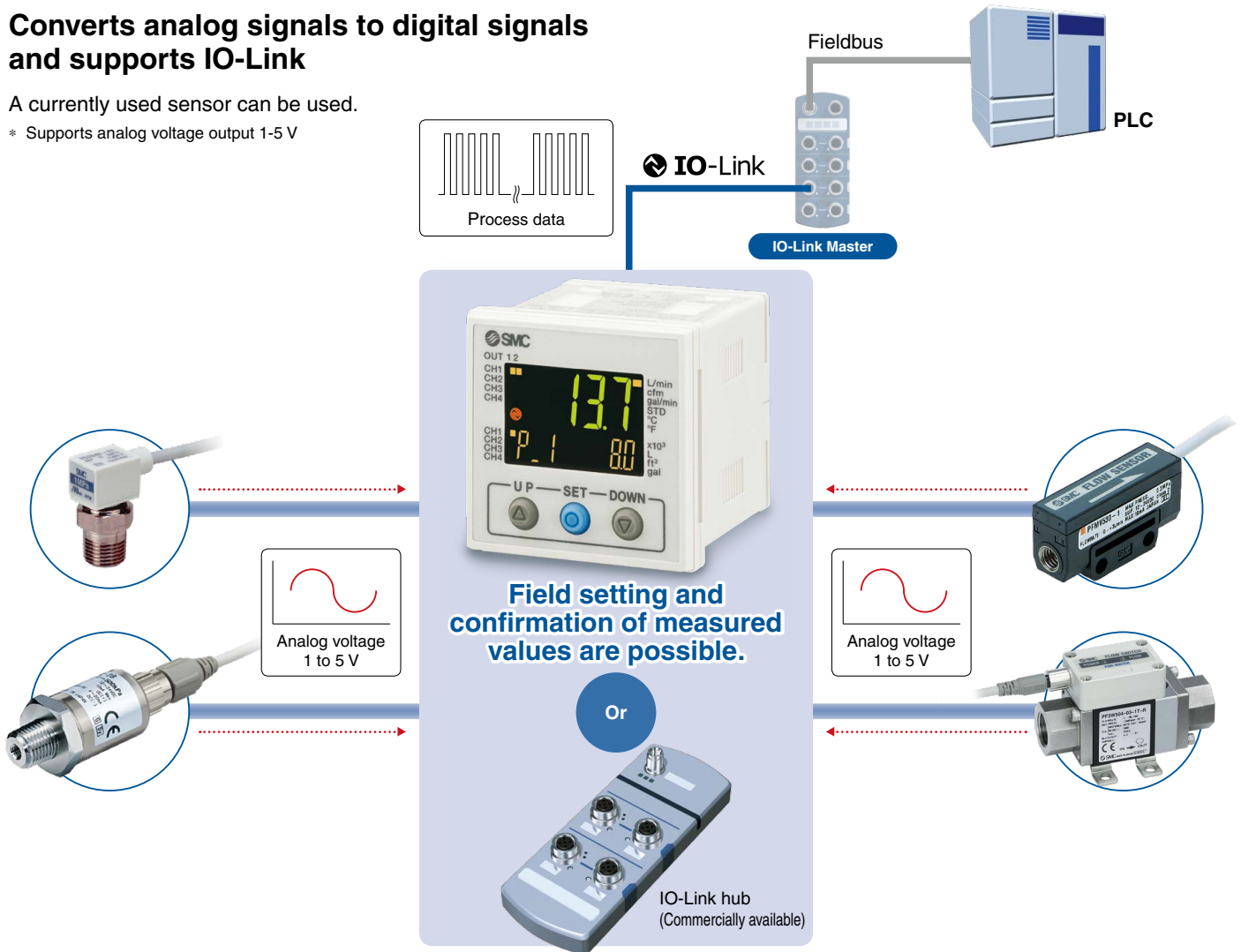
Flow values for each channel are displayed in turn every 2 seconds.

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



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															
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

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

Each channel has 2 outputs*1.

Implement diagnostic bits in the process data.

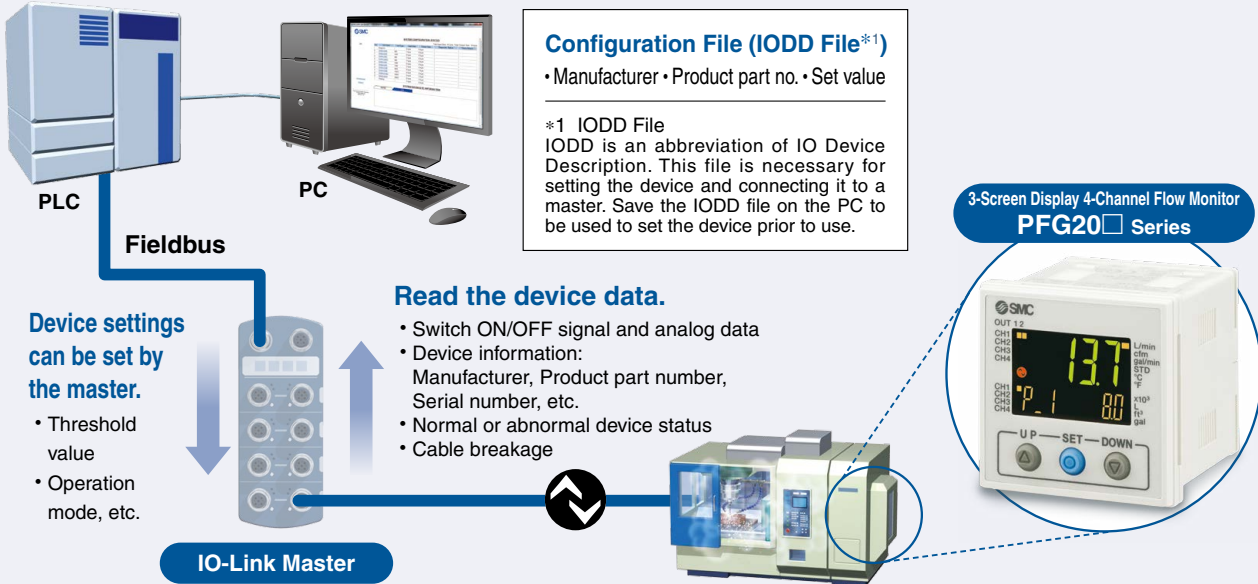
Diagnosis item	· Internal product malfunction · Outside of zero-clear range	Diagnosis item	· Output overcurrent	Diagnosis item	· Display upper and lower limits are exceeded. · The accumulated flow upper and lower limits are exceeded
----------------	---	----------------	----------------------	----------------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

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

IO-Link

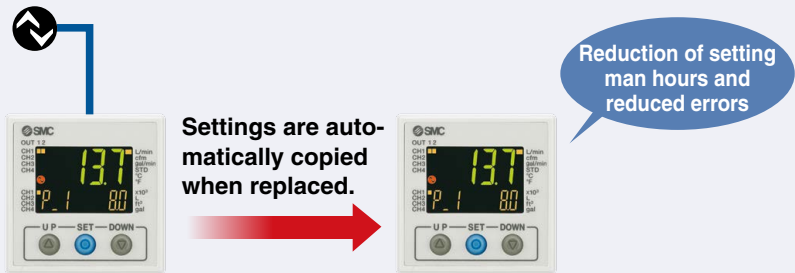
IO-Link is an open communication interface technology between the sensor/ actuator and the I/O terminal that is an international standard, IEC61131-9.

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



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

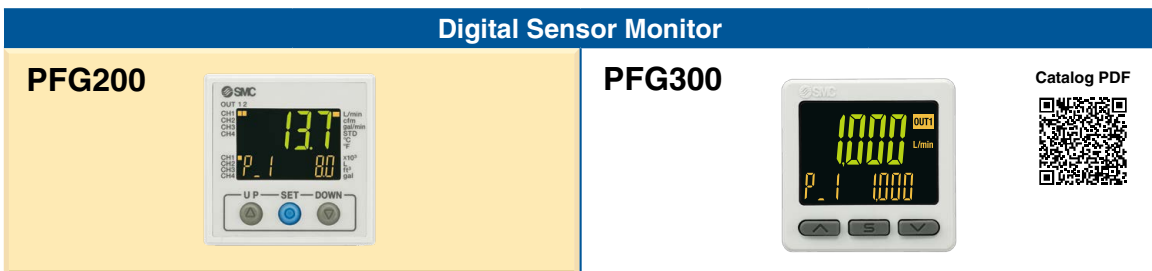


Operation and Display

Communication with master	IO-Link status indicator light	Status	Screen display #2	Description
Yes	*1	Normal	Operate	Mode oPE Normal communication status (readout of measured value)
			Start up	Mode Start At the start of communication
			Preoperate	Mode Pre
No	*1 (Flashing)	Abnormal	Version does not match	Er 15 v 1.0 IO-Link version does not match that of the master. The master uses version 1.0. * The applicable IO-Link version is 1.1.
			Communication disconnection	Mode oPE Mode Start 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)

Series Variations



Basic Specifications	Repeatability	±0.1 % (F.S.)	±0.1 % (F.S.)
	Voltage	12 to 24 VDC	12 to 24 VDC
	No. of outputs for switch	5 outputs	2 outputs
	Analog output	—	1 to 5 V
	Operating temperature	0 to 50 °C	0 to 50 °C
Functions	Number of screens	3	3
	Enclosure	Front face: IP65 Others: IP40	IP40
	3 Step	Yes	Yes
	Wiring	Connector	Connector

Applicable Flow Sensors

Catalog PDF

<p>For Air</p> <p>PF2A5</p>	<p>For Water</p> <p>PF3W5-Z</p> <p>PF3W5</p>
<p>For Deionized Water and Chemical Liquids</p> <p>PF3W5</p>	<p>PF2D5</p>

For Air

PFMB

For Air

PF2MC7

PF3A7

CONTENTS

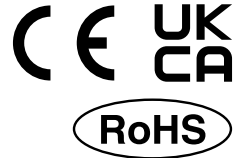
3-Screen Display 4-Channel Flow Monitor *PFG200 Series*



How to Order	p. 8
Specifications	p. 9
Applicable Flow Sensors	p. 11
Internal Circuits and Wiring Examples	p. 11
Dimensions	p. 15
Function Details	p. 16
Safety Instructions	Back cover

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: kPa, MPa, Pa

Option 3

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

* Cable is shipped together, but not connected.

Option 1

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

* Options are not assembled, but shipped together.

Option 2

None	
Nil	None
4C	Sensor connector (4 pcs.) * For PF2A5□, PF2/3W5□
4D	Sensor connector (4 pcs.) * For PF2D5□

* Connector is not connected, but shipped together.

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
For PF2A5□, PF2W5□, PF3W5□ Sensor connector (e-CON)	ZS-28-CA-4	1 pc., Finished O.D.: $\phi 1.15$ to $\phi 1.35$, Cover color: Blue
For PF2D5□ Sensor connector (e-CON)	ZS-28-CA-2	1 pc., Finished O.D.: $\phi 0.9$ to $\phi 1.0$, Cover color: Red
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

PFG200 Series

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



Specifications

Series		PFG200 Series						
Applicable SMC flow sensor	PF2A510	PF2A550	PF2A511	PF2A521	PF2A551	PF2(3)W504	PF2(3)W520	
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	0.5 to 4 L/min	2 to 16 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	0.35 to 4.50 L/min (Flow under 0.35 L/min is displayed as "0.00")	1.7 to 17.0 L/min (Flow under 1.7 L/min is displayed as "0.0")	
Instantaneous flow rate display/Min. setting unit	0.1 L/min	0.5 L/min	1 L/min	2 L/min	5 L/min	0.05 L/min	0.1 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	0 to 99,999,999.9 L	0 to 999,999,999 L	
Accumulated flow display/Min. setting unit	1L				10 L	0.1 L	1 L	
Accumulated pulse flow rate exchange value	0.1L/pulse	0.5 L/pulse	1 L/pulse	2 L/pulse	5 L/pulse	0.05 L	0.1 L	
Unit	L/min, cfm (depends on selected range)					L/min, gal/min (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						
Accuracy	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).						
	Display accuracy (Linearity)	±5.0% F.S. Max.*4						
	Repeatability	±3.0% F.S. Max.*4						
	Temperature characteristics	±0.5% F.S. Max. (Reference: 25°C)						
	Output type	NPN or PNP open collector output: 5 outputs						
Switch output (SIO mode)	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 11 to 14.)					
Connection method		e-CON						
Protection		Over voltage protection (up to a voltage of 26.4 VDC)						
Display	External input*8	Voltage free input: 0.4 V or less (Reed or Solid state) for 30 ms or longer						
	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)						
Environment	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						
	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						
Standards	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)						
Weight	Standards	CE/UKCA marking						
	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.

3-Screen Display 4-Channel Flow Monitor **PFG200 Series**

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



Series		PFG200 Series					
Applicable SMC flow sensor	PF2(3)W540	PF2(3)W511	PF3W521	PF2D504	PF2D520	PF2D540	
Rated flow range	5 to 40 L/min	10 to 100 L/min	50 to 250 L/min	0.4 to 4 L/min	1.8 to 20 L/min	4 to 40 L/min	
Instantaneous flow rate display/Set flow rate range	3.5 to 45.0 L/min (Flow under 0.35 L/min is displayed as "0.00")	7 to 110 L/min (Flow under 7 L/min is displayed as "0")	20 to 280 L/min (Flow under 20 L/min is displayed as "0")	0.25 to 4.50 L/min (Flow under 0.25 L/min is displayed as "0.00")	1.3 to 21.0 L/min (Flow under 1.3 L/min is displayed as "0.0")	2.5 to 45.0 L/min (Flow under 2.5 L/min is displayed as "0.0")	
Instantaneous flow rate display/Min. setting unit	0.5 L/min	1 L/min	2 L/min	0.05 L/min	0.1 L/min	0.5 L/min	
Accumulated flow display/Set flow rate range	0 to 999,999,999L			0 to 99,999,999.9 L		0 to 999,999,999 L	
Accumulated flow display/Min. setting unit	1 L			0.1 L		1 L	
Accumulated pulse flow rate exchange value	0.5 L	1 L	2 L	0.05 L	0.1 L	0.5 L	
Unit	L/min, gal/min (depends on selected range)			L/min, gal/min (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. Max.*4					
Switch output (SIO mode)	Temperature characteristics	±0.5% F.S. Max. (Reference: 25°C)					
	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 11 to 14.)					
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 e-CON (1 pc.)	60 g 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)					

*6 The response time indicates when the set value is 90% in relation to the step input.

*7 The configuration file can be downloaded from the SMC website, <https://www.smcworld.com>

*8 This setting is only possible for the PFG200/PFG201.

*9 Products with tiny scratches, marks, or display color or brightness variations which do not affect the performance of the product are verified as conforming products.

PFG200 Series

Applicable Flow Sensors

Applicable SMC flow sensor	Rated flow range [L/min]													
	0.4	0.5	1	2	4	5	10	20	40	50	100	200	250	500
PF2A510			1				10							
PF2A550				5					50					
PF2A511							10				100			
PF2A521								20				200		
PF2A551									50					500
PF2(3)W504	0.5		4											
PF2(3)W520			2				16							
PF2(3)W540				5				40						
PF2(3)W511							10				100			
PF3W521									50				250	
PF2D504	0.4		4											
PF2D520			1.8				20							
PF2D540				4				40						

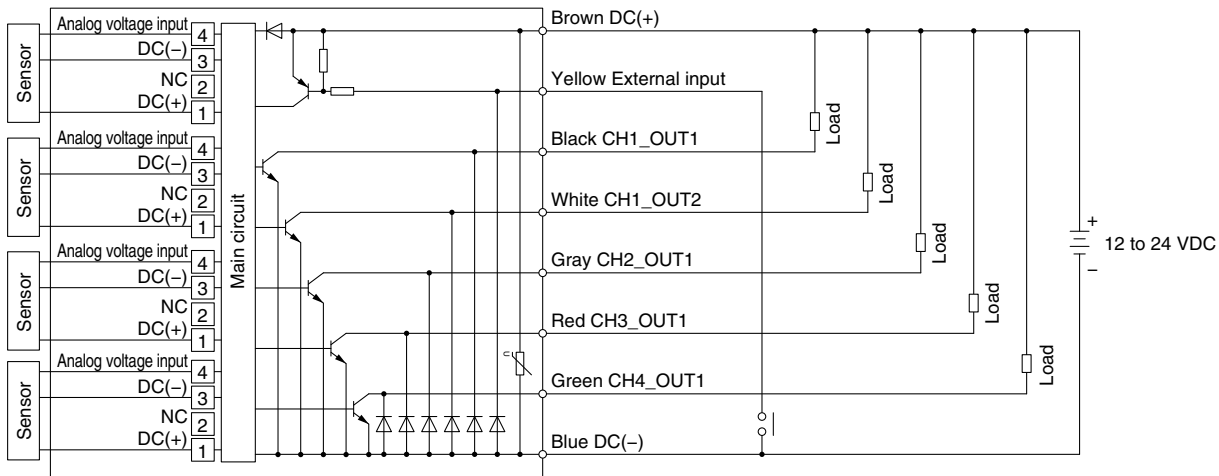
Internal Circuits and Wiring Examples

PFG20 

• Input/Output specifications

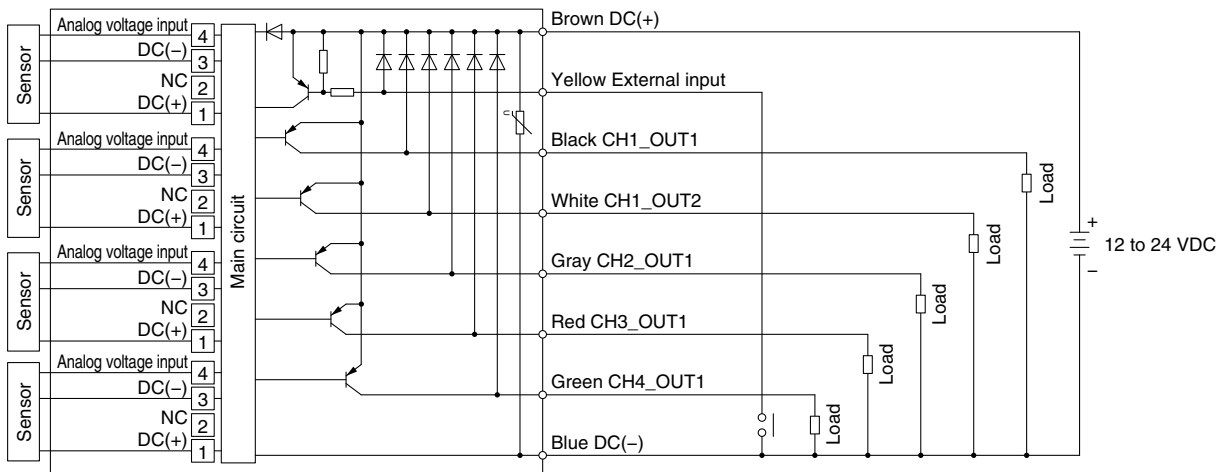
0

• NPN open collector 5 outputs + External input



1

• PNP open collector 5 outputs + External input



Internal Circuits and Wiring Examples

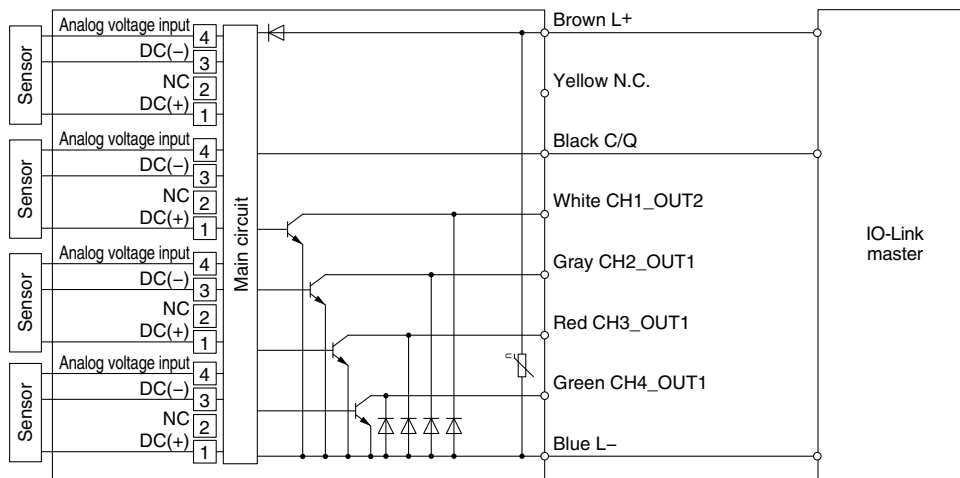


• Input/Output specifications

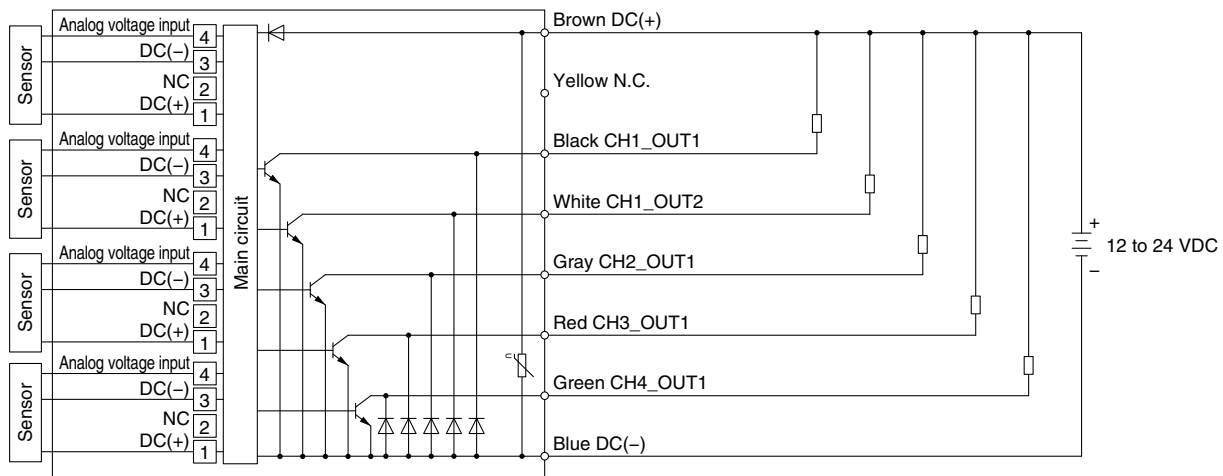
2

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

When used as an IO-Link device

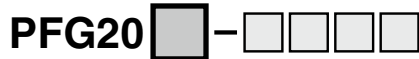


When used as a switch output device



PFG200 Series

Internal Circuits and Wiring Examples

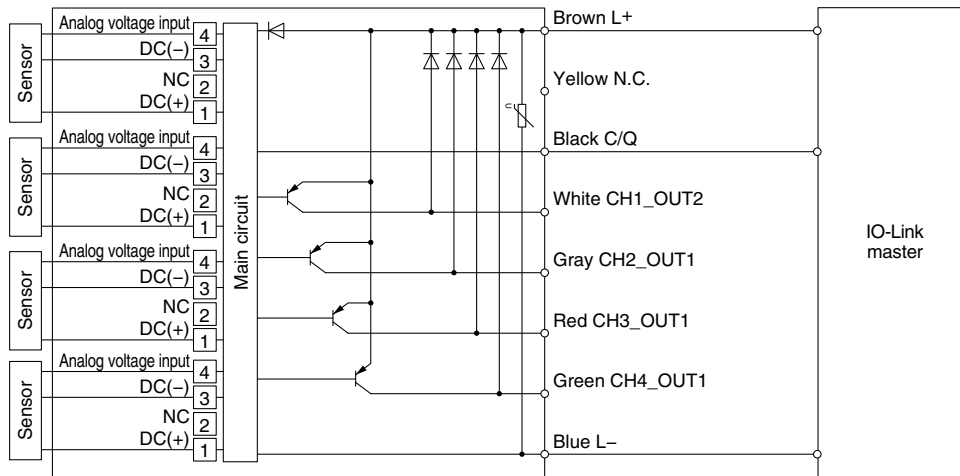


• Input/Output specifications

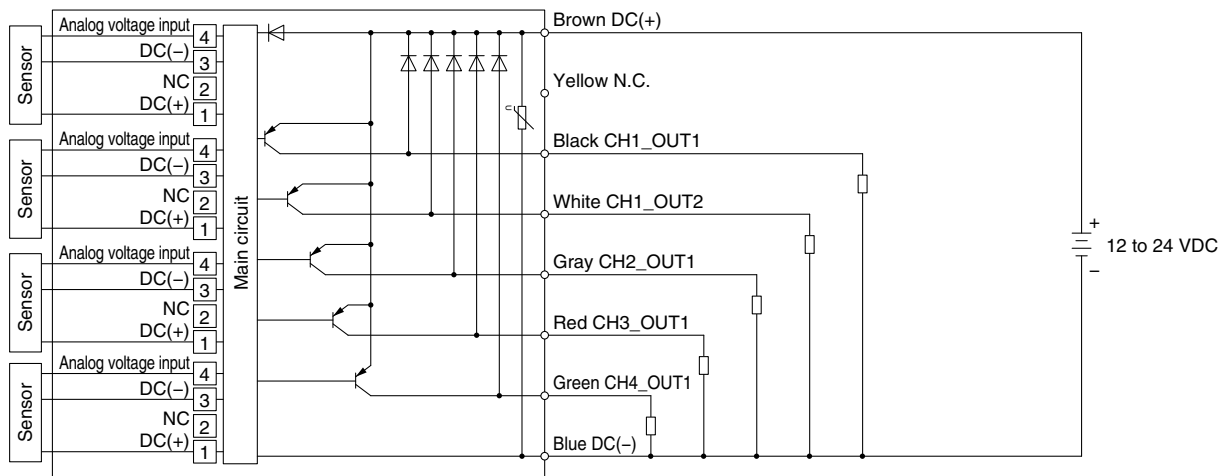
3

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

When used as an IO-Link device



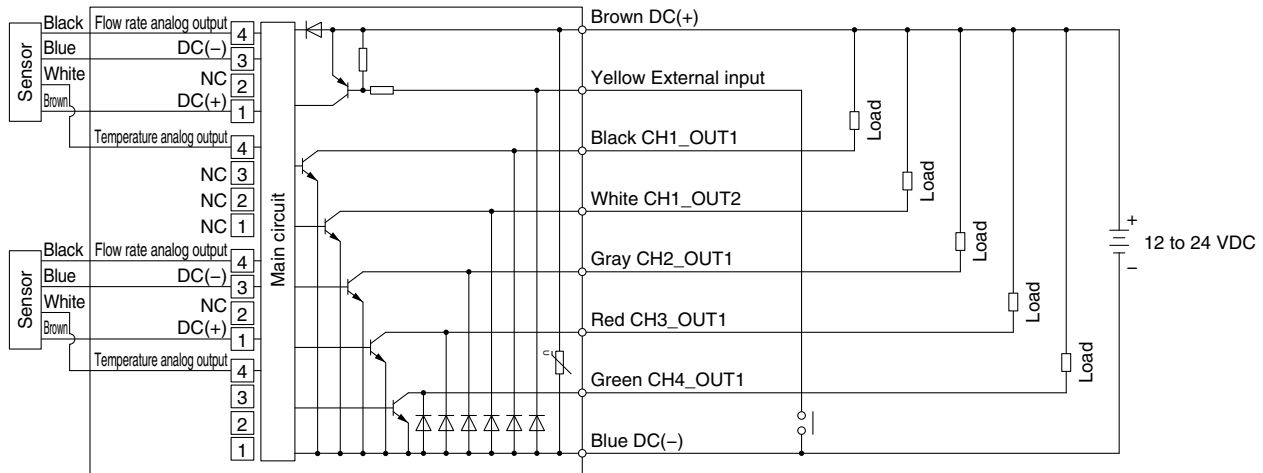
When used as a switch output device



Internal Circuits and Wiring Examples

When using the PF3W5□-1T (with temperature sensor) and measuring instantaneous flow and temperature simultaneously

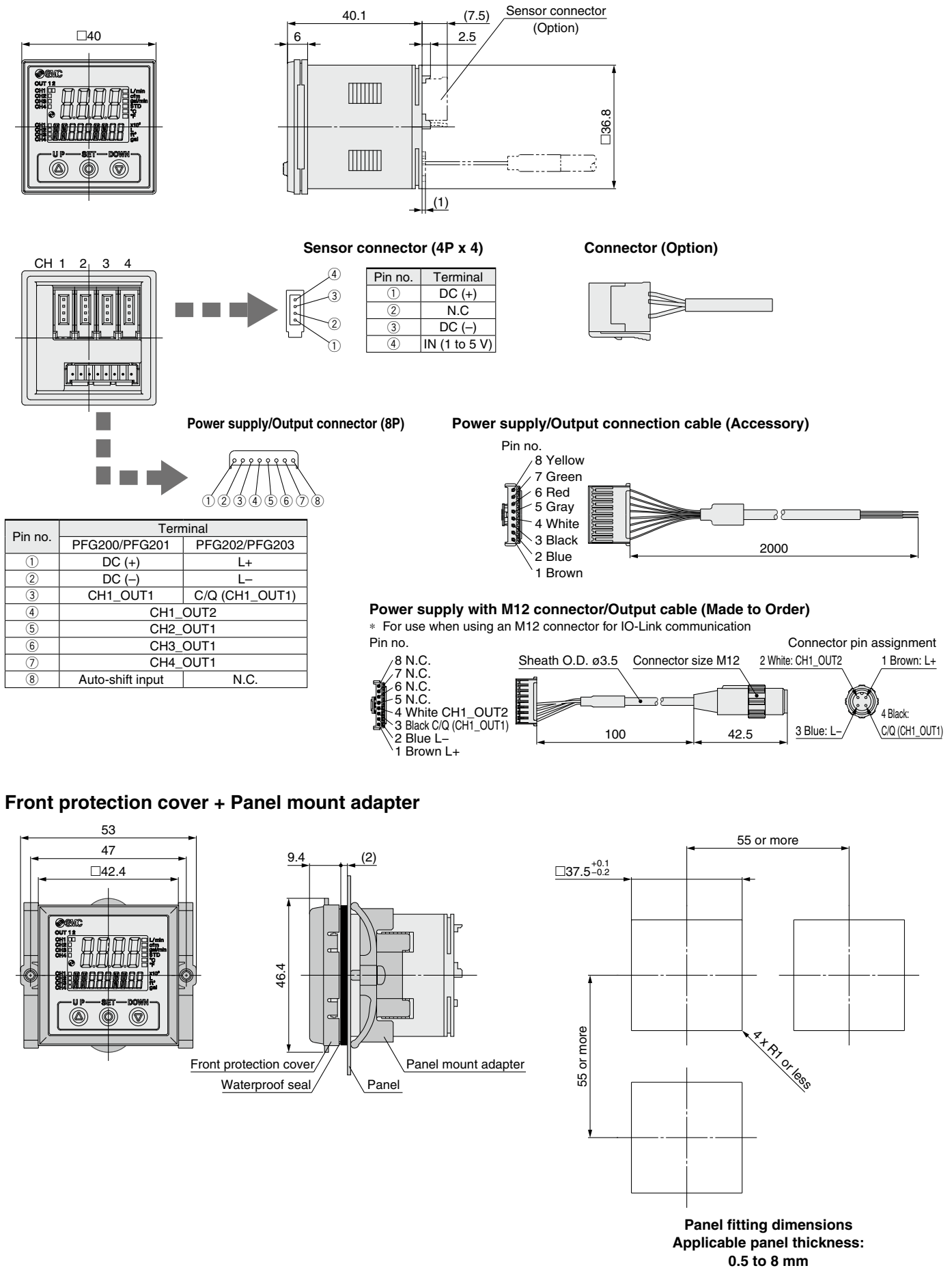
Example) PF3W520-03-1T (2 units) + PFG200-M (for 4 analog outputs with 2 units)



* When connecting the flow rate analog output and temperature analog output using a digital flow switch with a temperature sensor, use two e-con connectors per sensor.

PFG200 Series

Dimensions

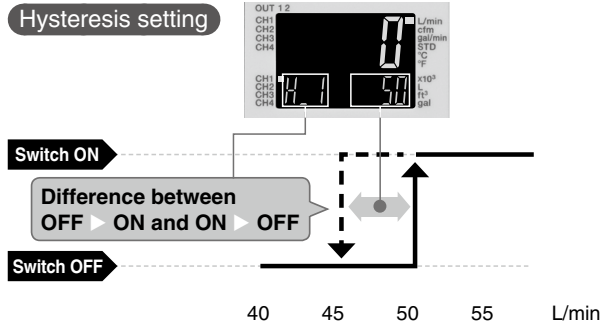
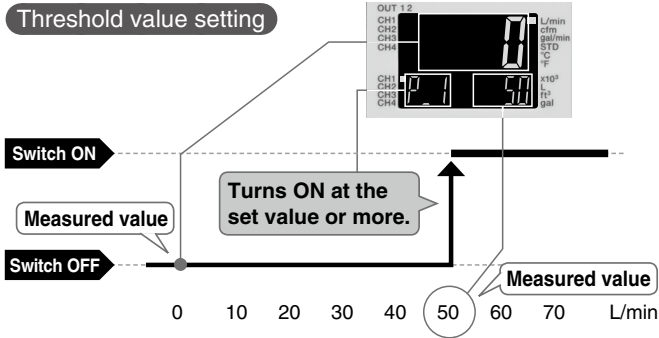


PFG200 Series

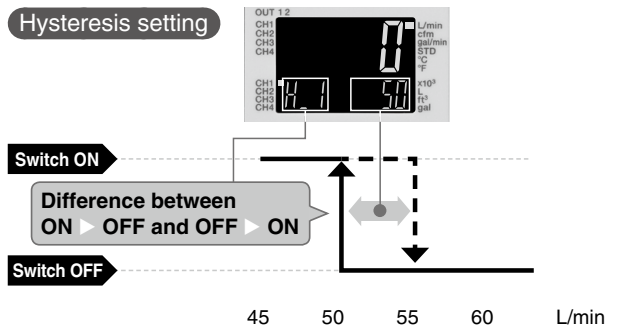
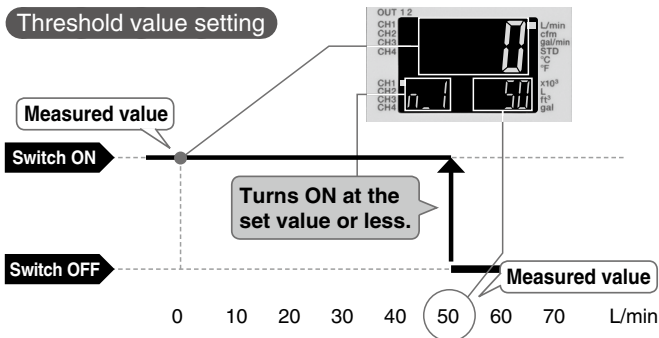
Function Details

Display examples of the main and sub (set value) screens of each mode. (When 100 L/min range is selected)

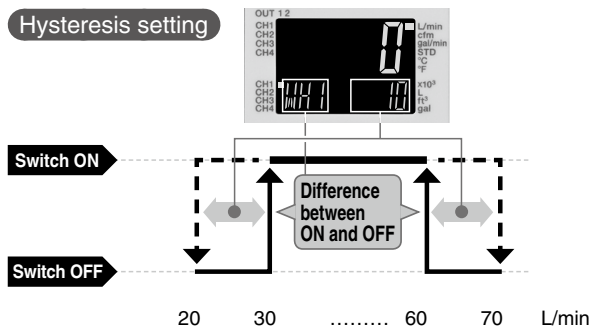
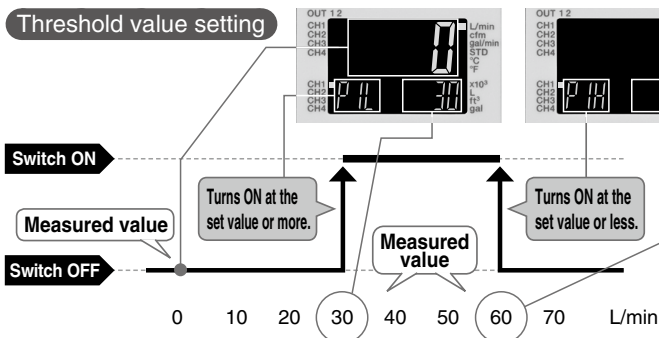
Hysteresis mode, Normal output



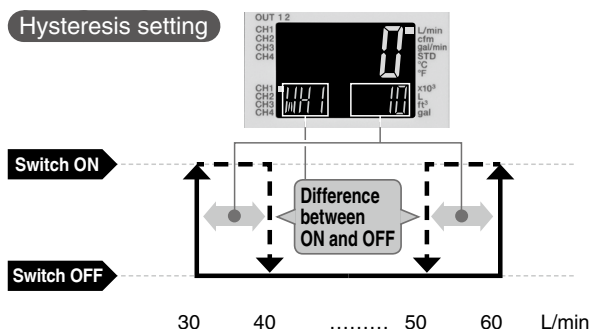
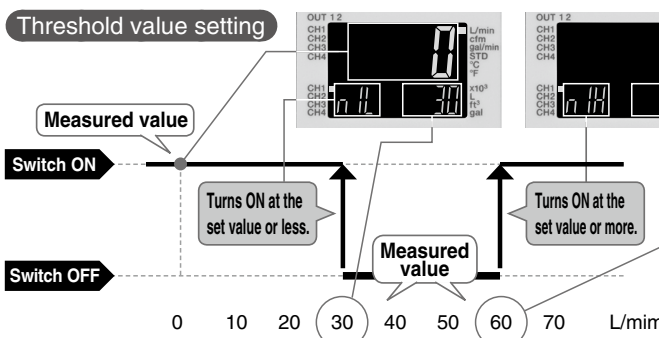
Hysteresis mode, Reversed output



Window comparator mode, Normal output





Window comparator mode, Reversed output



Function Details

A 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.

When the  and  buttons are simultaneously pressed for 1 second or longer, while “holding”, the held value will be reset.

B Key-lock function

This function prevents operation errors such as accidentally changing setting values.

C External input function

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

Accumulated value external reset: The accumulated flow value is reset via external input signal.

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 that the max. number of times the memory can be accessed is 970,000 times. The total number of external inputs and the accumulated value memorizing time interval should not exceed 970,000 times.

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

D Error display function

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

Error name	Error code	Description	Action
Over current error		The load current applied to the switch output has exceeded the maximum value. *1 indicates the channel with an error.	Turn the power off and remove the cause of the over current. Then supply the power again.
Above the upper limit of the display range		The flow rate or temperature exceeds the upper limit of the setting range.	Decrease the flow rate or temperature.
Below the lower limit of the display range		The flow rate or temperature exceeds the lower limit of the setting range. A sensor may be disconnected or mis-wired.	Decrease the flow rate or temperature. Check the sensor connection.
Accumulated flow error		The accumulated flow has exceeded the accumulated flow range.	Reset the accumulated flow.
System error		Internal data error	Turn the power off and then on again. If the failure cannot be solved, please contact SMC for investigation.

If the error cannot be reset after the above measures are taken, or errors other than those above are displayed, please contact SMC for investigation.

E Delay time setting

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

Setting the delay time can prevent the switch output from chattering.

(Default setting: 0 s)

0.00 s
0.05 to 0.1 s (Increments of 0.01 s)
0.1 to 1.0 s (Increments of 0.1 s)
1 to 10 s (Increments of 1 s)
20 s
30 s
40 s
50 s
60 s

F Zero-cut setting (F14)

When the flow display value is close to zero, this function forces the display to zero.

The range to display zero can be changed within the range of 0.0 to 10.0%.

Example: When the PF2A711 (100/Lmin range), zero-cut value = 1.0%, 0 is displayed in the range of -9 to 9 kPa.

G Power-saving mode (F80)

Power-saving mode can be selected.

It shifts to power-saving mode automatically when there is no button operation for 30 seconds.

The product is set to normal mode (Power-saving mode is OFF) at the time of factory shipment.

(When in power-saving mode, [ECo] will flash in the sub screen and the operation light will be ON (only when the switch is ON).)

H Setting of security code (F81)

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

At the time of factory shipment, it is set so that a security code is not required.

I Accumulated value hold

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

The accumulated value is memorized every 5 minutes during measurement and continues from the last memorized value when the power supply is turned ON again.

The life time of the memory device is 970,000 access times. Take this into consideration before using this function.

Function Details

J Snap shot function

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

When the items on the Sub display (left) are selected in either 3 step setting mode, Simple setting mode or Setting of each function mode, by pressing the **⊕** and **⊙** buttons simultaneously for 1 second or longer, the value of the sub display (right) will show "----", and the values corresponding to the current flow rate are automatically displayed.

Output mode	Configurable items	Sub display (left)	Snap shot function
Hysteresis mode	Set value	$P_{.1}(n_{.1})/P_{.2}(n_{.2})$	○
	Hysteresis	$H_{.1}/H_{.2}$	○
Window comparator mode	Set value	$P_{1L}(n_{1L}), P_{1H}(n_{1H})/P_{2L}(n_{2L}), P_{2H}(n_{2H})$	○
	Hysteresis	Y_{H1}/Y_{H2}	×
Accumulated output mode	Set value	P_1, P_2, n_1, n_2	×

K Output check function

The output is forced ON/OFF when starting the system or during maintenance. This enables confirmation of the wiring and prevents system errors due to unexpected output.

* 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.

L Channel to channel copy function (F95)

Information that can be copied includes the following:

F0 (system setting): Connected range, displayed unit

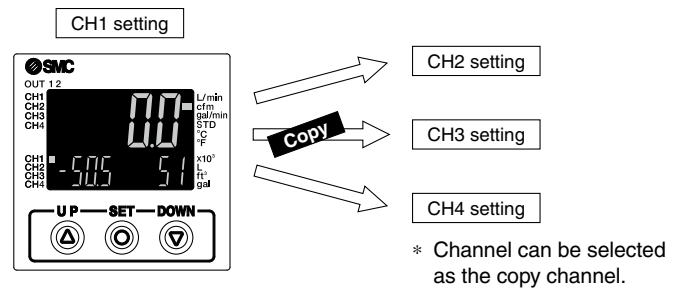
F1 (OUT1 setting), F3 (digital filter), F10 (sub-screen setting), F14 (zero-cut setting)

When CH1 is copied to CH2, CH3, and CH4, information on OUT1 in CH1 will be copied.

When CH2 (CH3, or CH4) is copied to CH1, information on OUT1 in CH2 (CH3, or CH4) will be copied only to OUT1 in CH1.

* When the channel to channel copy function is used, the copied pressure set value may vary by ± 1 digit.

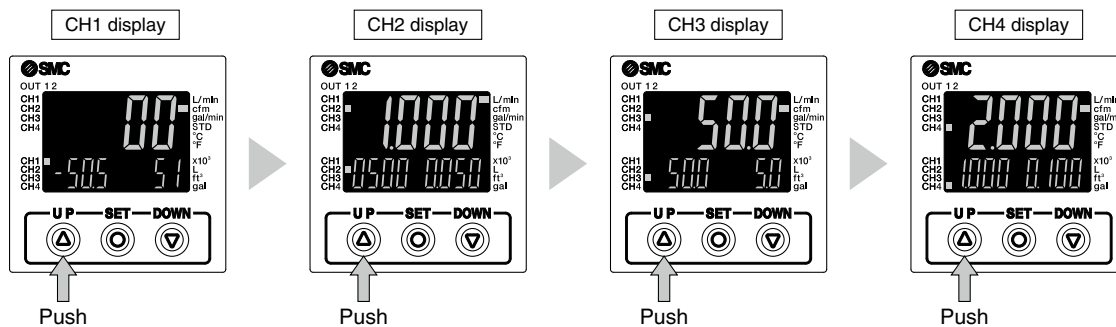
Example) When copying CH1 to another channel



M Channel select function

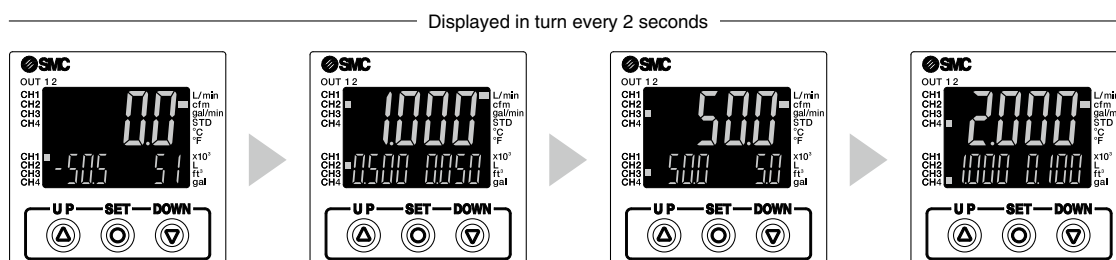
Flow value for the selected channel is displayed.

The function setting of each channel is performed on the selected channel.




N Channel scan function


Flow values for each channel are displayed in turn every 2 seconds.




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 catalog 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 catalog.
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, whichever 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 catalog 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 the “Handling Precautions for SMC Products” (M-E03-3) and “Operation Manual” before use.

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