3-Colour Display

Digital Flow Switch for Water

* Output specification: Excludes JT/KT

RoHS

IP65

IO-Link

(PF3W7-L Series)

Lightweight

Max. 53 %*1 reduction

Rated flow range [l/min]	Weight [g]	
	PF3W7	PF3W7-Z
0.5 to 4	285	42 % reduction 166
2 to 16	335	45 % reduction 184
5 to 40	530	53 % reduction 248
10 to 100	860	13 % reduction 748

*1 40 l/min, With temperature sensor

New

Output specification variations have been added.

PF3W7-Z:

Analogue voltage 2-output type (flow rate + temperature)

Analogue current 2-output type (flow rate + temperature)

New

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

PFG200 Series p. 3

Variations

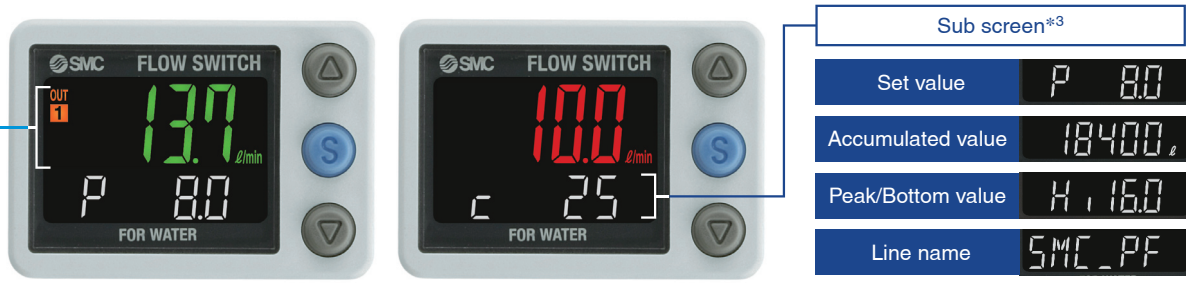
Type	Rated flow range [l/min]	Flow adjustment valve/Temperature sensor				Port size Rc, NPT, G	Applicable fluid
		None	Flow adjustment valve	Temperature sensor	Flow adjustment valve + Temperature sensor		
Integrated / Remote sensor	0.5 to 4	●	●	●	●	3/8	Water, Ethylene glycol aqueous solution
	2 to 16	●	●	●	●	3/8, 1/2	
	5 to 40	●	●	●	●	1/2, 3/4	
	10 to 100	●	—	●	—	3/4, 1	

PF3W-Z/L Series

SMC

CAT.EUS100-133B-UK

3-colour/2-screen display



*1 Main screen shows the instantaneous flow rate only. *2 Fluid temperature can be displayed only when the digital flow switch with a temperature sensor is selected.
*3 Sub screen can be turned off. Mode display can be selected for IO-Link compatible type.

Compatible with the temperature sensor & flow adjustment valve

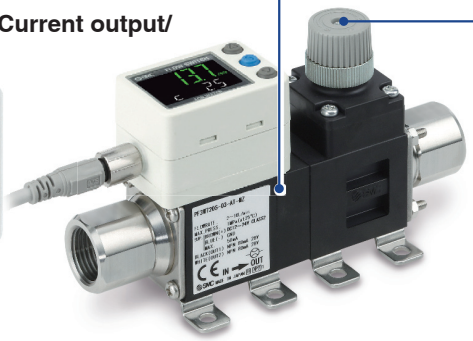
Temperature sensor

- Display range: -10 to 110 °C (Temperature sensor alone)
- Smallest settable increment: 1 °C
- Analogue output: Current output/ Voltage output

Temperature display

Flow adjustment valve

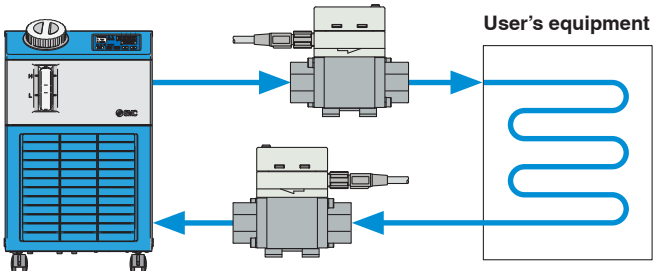
- Reduced piping labour
- Space saving



Fluid temperature: 0 to 90 °C

Ethylene glycol aqueous solution can be used.

Example) Flow control of the circulating fluid in a chiller

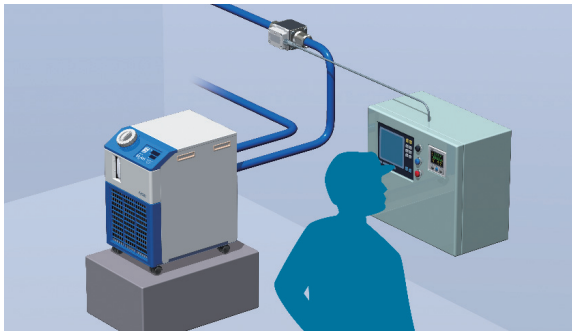


Non-grease

New

Compatible with the analogue 2-output type (flow rate + temperature)

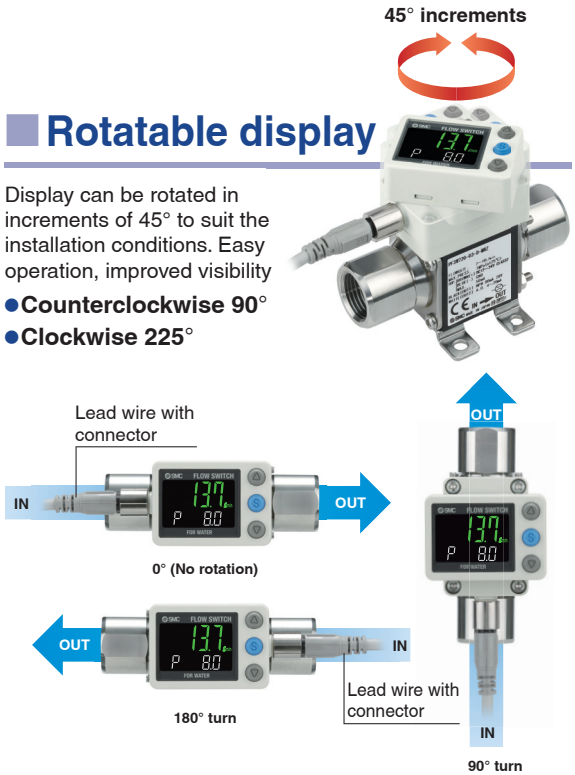
Enables the monitoring of flow rate and temperature conditions not only at the installation site but also remotely



Rotatable display

Display can be rotated in increments of 45° to suit the installation conditions. Easy operation, improved visibility

- Counterclockwise 90°
- Clockwise 225°

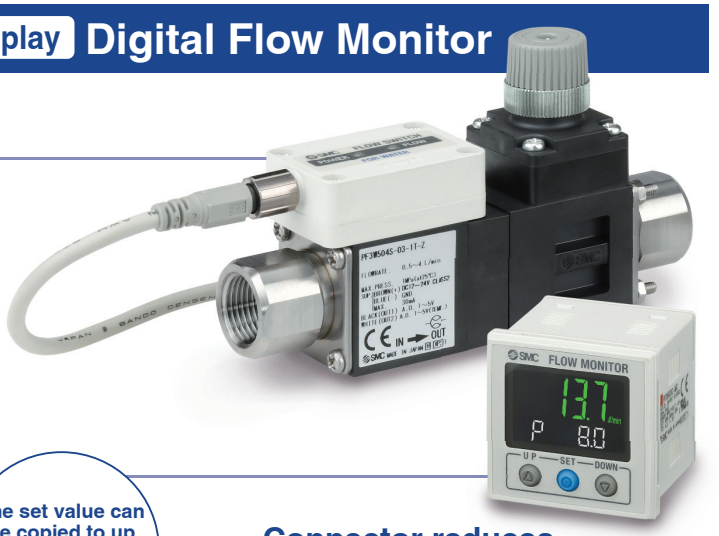


Remote Sensor Unit & 3-Colour Display Digital Flow Monitor

Indicator

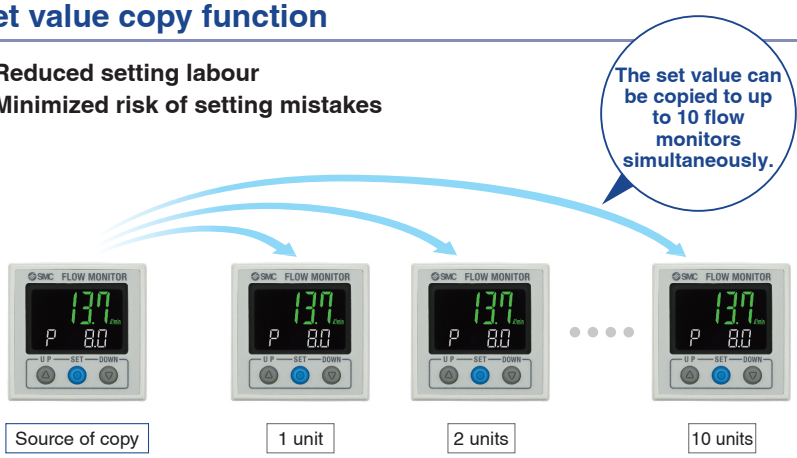
Visually check the status of the sensor via the indicator.

Flow rate: High		Blinking green/Fast
Flow rate: Low		Blinking green/Slow
Rated flow or less		OFF
Rated flow or more		Red ON

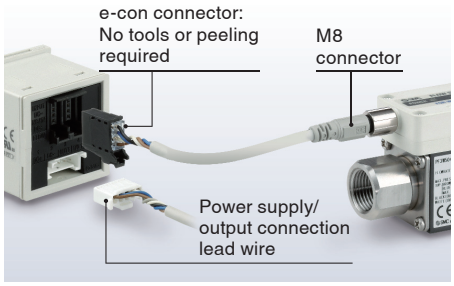


Set value copy function

- **Reduced setting labour**
- **Minimized risk of setting mistakes**



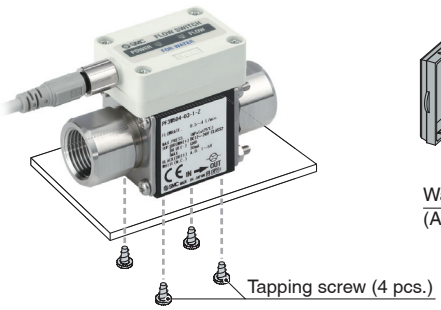
Connector reduces wiring labour.



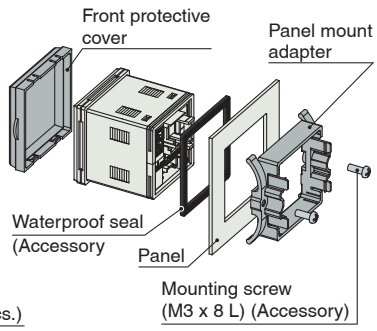
Mounting

Bracket mounting

Direct mounting



Panel mounting



Digital Flow Switch for Water *PF3W*

For details, refer to the **Web Catalogue on www.smc.eu**.

Applicable fluid			Rated flow range [l/min]	Flow adjustment valve/Temperature sensor				Port size Rc, NPT, G
				None	Flow adjustment valve	Temperature sensor	Flow adjustment valve + Temperature sensor	
	Flow range: 250 L type	Water Ethylene glycol aqueous solution	50 to 250	●	—	●	—	1 1/4, 1 1/2
PVC piping type 		Deionised water Chemical liquids	10 to 100	●	—	—	—	25 A
			30 to 250	●	—	—	—	30 A

3-Screen Display

4-Channel Flow Monitor

PFG200 Series

Up to **4** flow sensors can be connected!

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

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

- Input Range Selection

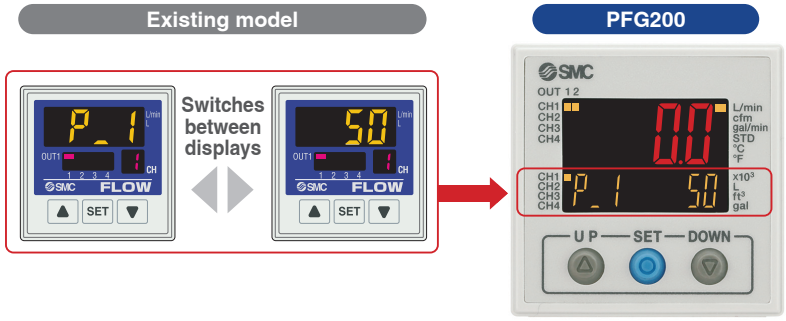
Visualisation of Settings

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

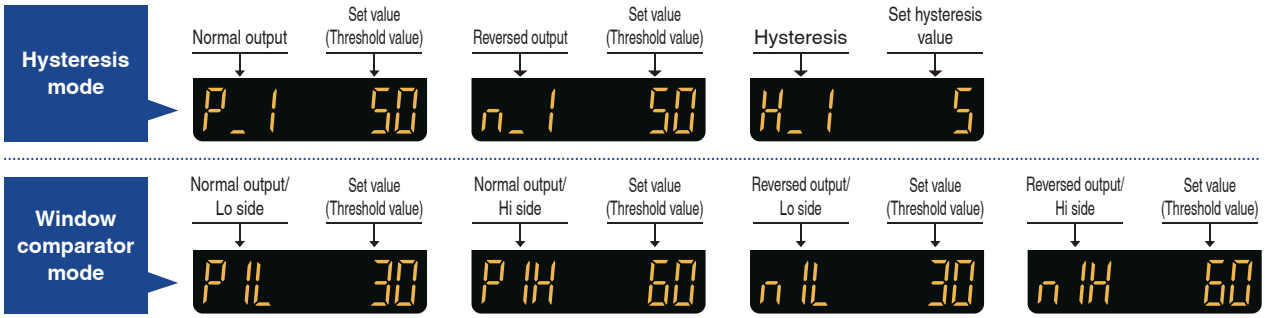
SMC

Visualisation of Settings

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

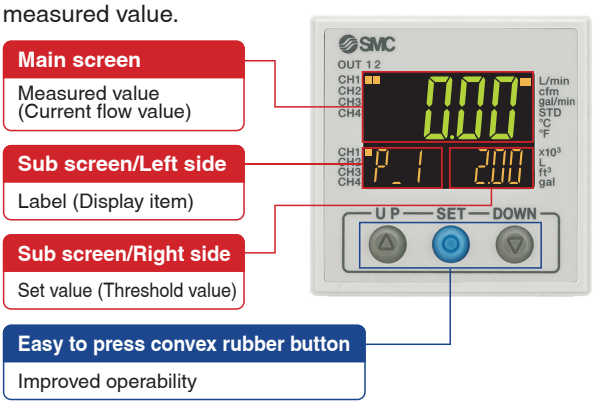


Mode Examples

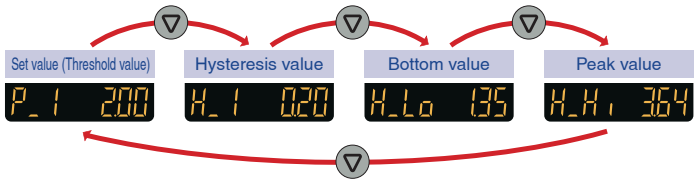


Easy Screen Switching

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



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



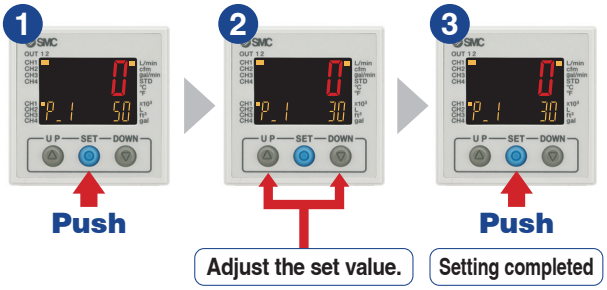
* One additional arbitrary display mode can be added via the function settings.

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

Simple 3-Step Setting

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

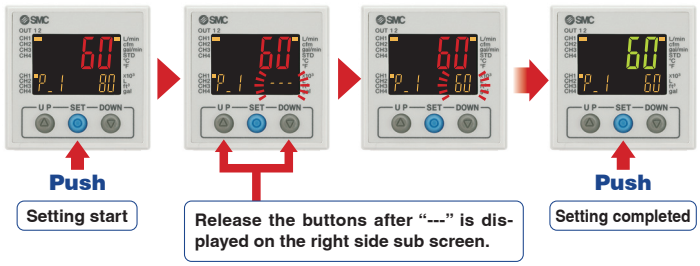
When the SET button is pressed and the hysteresis (H_1) is being displayed, the hysteresis value can be set.



Now with a snap shot function for set value reading

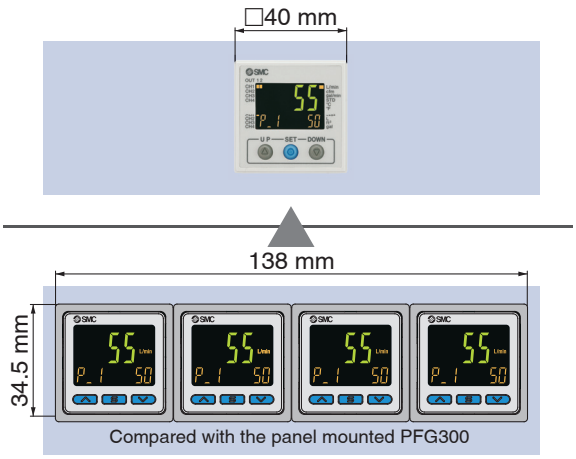
Snap shot function

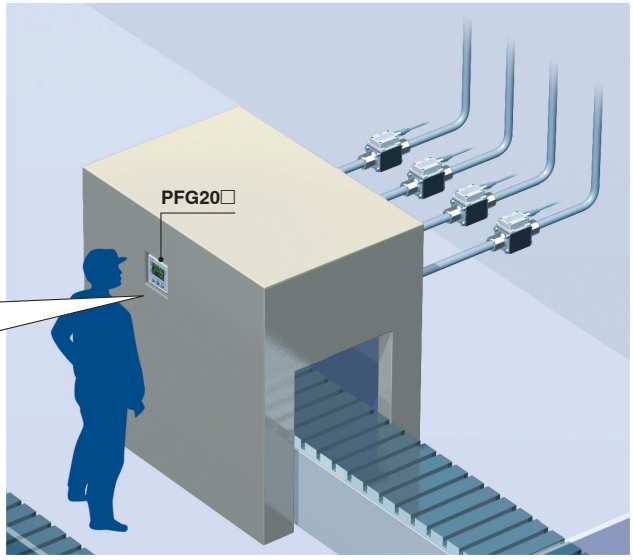
Pressing the △ and ▽ buttons simultaneously for a minimum of 1 second will make the set value (threshold value) the same as the current pressure value.



Centralised Control Saves Installation Space.

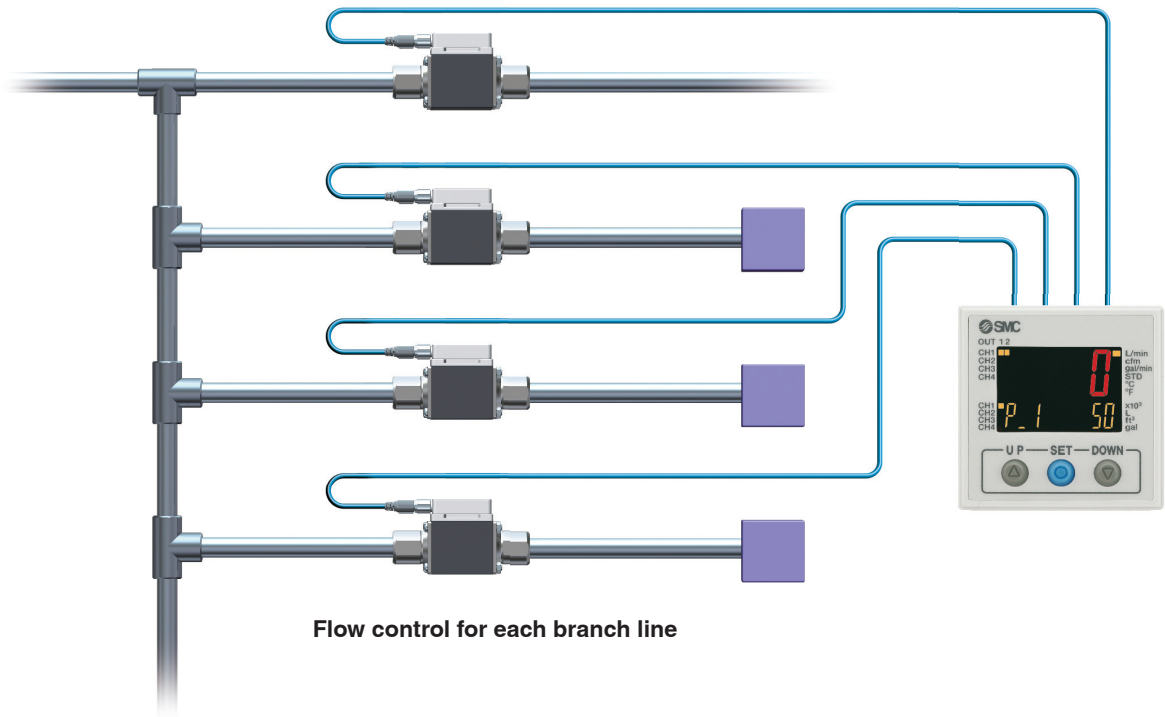
66 % reduction in installation space (Compared with the panel mounted PFG20□)





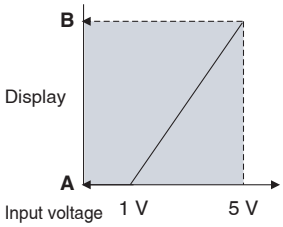
Accumulated Flow Measurement

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



Flow control for each branch line

Input Range Selection (for Pressure/Flow rate)



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

A is displayed for 1 V. B is displayed for 5 V.
The range can be set as required.
Refer to page 32 for the specification of the sensors which can be connected.
For the individual specifications of each connectable sensor, refer to the **Web Catalogue**.

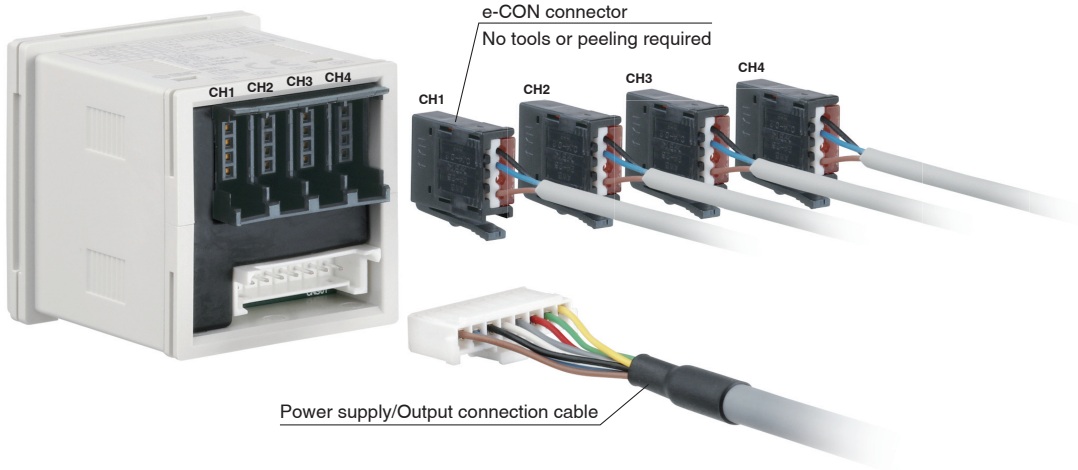
■ For Pressure Sensor for General Fluids / PSE56□

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

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

Connectors

Connection and removal of wiring is easy.



Functions

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

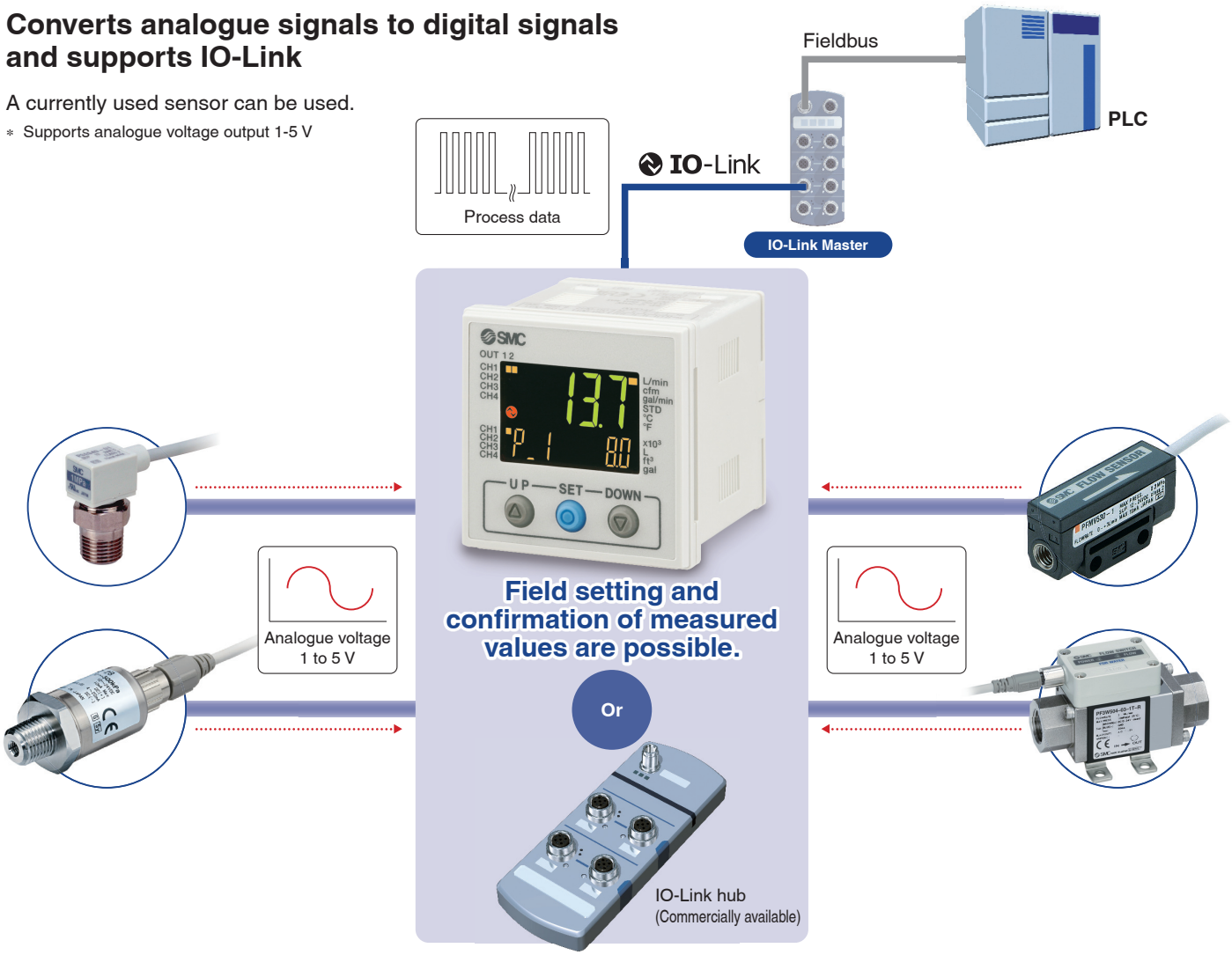
■ Channel scan function
Flow values for each channel are displayed in turn every 2 seconds.

Hub Function

Converts analogue signals to digital signals and supports IO-Link

A currently used sensor can be used.

∗ Supports analogue 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															

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

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

Each channel has 2 outputs∗1.

Diagnosis item	· Internal product malfunction · Outside of zero-clear range

Diagnosis item	· Output overcurrent

Diagnosis item	· Display upper and lower limits are exceeded. · The accumulated flow upper and lower limits are exceeded

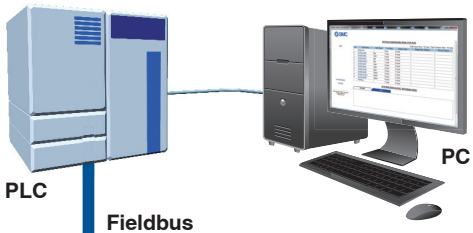
Implement diagnostic bits in the process data.

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

IO-Link Compatible

p. 15

Supports the IO-Link communication protocol



Configuration File (IODD File*1)
• Manufacturer • Product part no. • Set value

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

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.

Device settings can be set by the master.
• Threshold value
• Operation mode, etc.

Read the device data.
• Switch ON/OFF signal and analogue value
• Device information:
Manufacturer, Product part number, Serial number, etc.
• Normal or abnormal device status
• Cable breakage

IO-Link Master

IO-Link Compatible Device:
Digital Flow Switch for Water

Implement diagnostic bits in the process data.

The diagnostic bit in the cyclic process data makes it easy to find problems with the equipment.
It is possible to find problems with the equipment in real time using the cyclic (cycle) data and to monitor such problems in detail with the noncyclic (aperiodic) data.

Process Data

Bit offset	Item	Note
0	OUT1 output	0: OFF 1: ON
1	OUT2 output	0: OFF 1: ON
8	Diagnosis (flow rate)	0: OFF 1: ON
9	Diagnosis (temperature)	0: OFF 1: ON
15	Diagnosis (error)	0: OFF 1: ON
16 to 31	Measured temperature value	Signed 16 bit
32 to 47	Measured flow rate value	Signed 16 bit

Diagnosis items
• Over current error • Above the rated flow/temperature range, Accumulated flow error • Below the rated temperature range • Internal product malfunction • Temperature sensor failure

Bit offset	47	46	45	44	43	42	41	40	39	38	37	36	35	34	33	32
Item	Measured flow rate value (PD)															

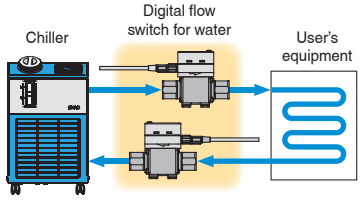
Bit offset	31	30	29	28	27	26	25	24	23	22	21	20	19	18	17	16
Item	Measured temperature value (PD) ∗ The area is not used when the product without temperature sensor is selected.															

Bit offset	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
Item	Error	Reservation					Temperature	Flow rate	Reservation						OUT2	OUT1
	Diagnosis						Diagnosis								Switch output	

Application Examples

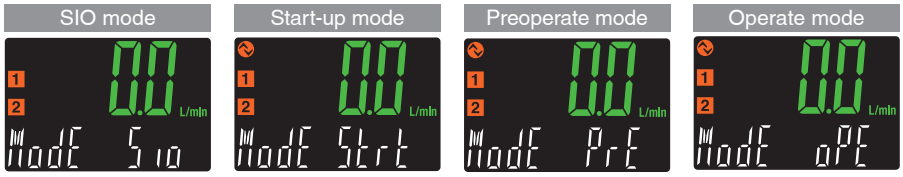
For the predictive maintenance of cooling water problems

Monitors flow rate and temperature's "switch ON/OFF signals" and "analogue values" to determine the cooling status
The process and cooling status can be compared.



Display function

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



Operation and Display

Communication with master	IO-Link status indicator light	Status			Screen display*2	Description
Yes	*1	IO-Link mode	Normal	Operate	MODE OPE	Normal communication status (readout of measured value)
				Start up	MODE STRT	At the start of communication
				Preoperate	MODE PRE	
	*1 (Flashing)		Abnormal	Version does not match	Er 15 V 1.0	The IO-Link version does not match that of the master. The master uses version 1.0.
				Lock	MODE LOC	Backup and restore required due to data storage lock.
No				Communication disconnection	MODE OPE / MODE STRT / MODE PRE	Normal communication was not received for 1 second or longer.
	OFF	SIO mode			MODE SIO	General switch output

∗1 In IO-Link mode, the IO-Link indicator will be ON or flashing. ∗2 When the lower line (sub screen) is set to mode display

CONTENTS

3-Colour Display Digital Flow Switch for Water *PF3W-Z Series*

3-Colour Display IO-Link Compatible Digital Flow Switch for Water *PF3W7-L Series*

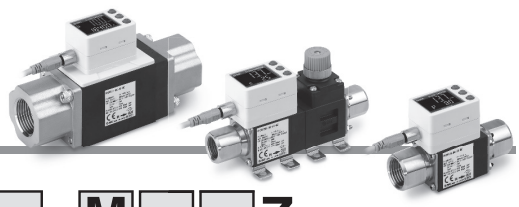
3-Colour Display Digital Flow Monitor for Water *PF3W3 Series*

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

Integrated Display

3-Colour Display Digital Flow Switch for Water

PF3W7-Z Series



How to Order

PF3W 7 [04] [ ] – [ ] [03] – [AT] [ ] – [M] [ ] [ ] Z

❶ ❷ ❸ ❹ ❺ ❻ ❼ ❽ ❾ ❿

❶ Type

7	Integrated display

❷ Rated flow range (Flow range)

Symbol	Rated flow range
04	0.5 to 4 l/min
20	2 to 16 l/min
40	5 to 40 l/min
11	10 to 100 l/min

❸ Flow adjustment valve

Symbol	With/without flow adjustment valve	Rated flow range			
		04	20	40	11
—	Without	●	●	●	●
S	With	●	●	●	—

∗ 100 l/min type with a flow adjustment valve is not available.
∗ The flow adjustment valve of this product is not suitable for applications which require the constant adjustment of the flow rate.

❹ Thread type

—	Rc
N	NPT
F	G∗1

∗1 ISO 228 compliant

❺ Port size

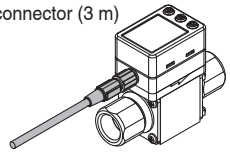
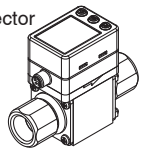
Symbol	Port size	Rated flow range			
		04	20	40	11
03	3/8	●	●	—	—
04	1/2	—	●	●	—
06	3/4	—	—	●	●
10	1/1	—	—	—	●

❻ Output specification/Temperature sensor

Symbol	OUT1	OUT2		Temperature sensor
	Flow rate	Flow rate	Temperature	
A	NPN	NPN	—	None
B	PNP	PNP	—	
C	NPN	Analogue 1 to 5 V	—	
D	NPN	Analogue 4 to 20 mA	—	
E	PNP	Analogue 1 to 5 V	—	
F	PNP	Analogue 4 to 20 mA	—	
G	NPN	External input∗1	—	
H	PNP	External input∗1	—	
AT	NPN	(NPN) ⇄∗2	NPN	With temperature sensor
BT	PNP	(PNP) ⇄∗2	PNP	
CT	NPN	(Analogue 1 to 5 V) ⇄∗2	Analogue 1 to 5 V	
DT	NPN	(Analogue 4 to 20 mA) ⇄∗2	Analogue 4 to 20 mA	
ET	PNP	(Analogue 1 to 5 V) ⇄∗2	Analogue 1 to 5 V	
FT	PNP	(Analogue 4 to 20 mA) ⇄∗2	Analogue 4 to 20 mA	
JT∗4	Analogue 1 to 5 V∗3	—	Analogue 1 to 5 V∗3	
KT∗4	Analogue 4 to 20 mA∗3	—	Analogue 4 to 20 mA∗3	

∗1 External input: The accumulated value, peak value, and bottom value can be reset.
∗2 For units with a temperature sensor, OUT 2 can only be set as either temperature output or flow rate output. The setting when shipped is for temperature output.
∗3 For the analogue 2-output type, the analogue output is as follows: OUT1 = flow rate and OUT2 = temperature.
∗4 Output types "JT" and "KT" are not UL (CSA) compliant.

❼ Lead wire (Option)

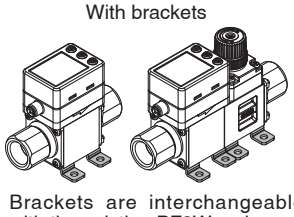
—	N
With lead wire with M8 connector (3 m)  ∗ The lead wire with M8 connector is interchangeable with the existing PF3W series.	Without lead wire with M8 connector 

❽ Integrated display/Unit specification

Symbol	Instantaneous flow	Accumulated flow	Temperature
M	l/min	L	°C
G	gal/min	gal	°C
F	gal/min	gal	°F
J	l/min	L	°F

∗ G, F, J: Made to order
Reference: 1 [l/min] ↔ 0.2642 [gal/min]
1 [gal/min] ↔ 3.785 [l/min]
°F = 9/5 °C + 32

❾ Brackets (Option)

—	None
R	With brackets  ∗ Brackets are interchangeable with the existing PF3W series.

❿ Calibration certificate (Only for flow rate)

—	None
A	With calibration certificate

∗ The certificate is written in both Japanese and English.
Units with a temperature sensor can only display the flow rate.

Options/Part Nos.

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

Description	Part no.	Qty.	Note	
Bracket∗1	ZS-40-K	1	For PF3W704/720/504/520	With 4 tapping screws (3 x 8)
	ZS-40-L	1	For PF3W740/540	With 4 tapping screws (3 x 8)
	ZS-40-M	1	For PF3W711/511	With 4 tapping screws (4 x 10)
Lead wire with M8 connector	ZS-40-A	1	Lead wire length: 3 m	

∗1 For units with a flow adjustment valve, 2 brackets are required.
∗ Interchangeable with the existing PF3W series

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

Specifications (Integrated Display)

Model			PF3W704	PF3W720	PF3W740	PF3W711
Applicable fluid			Water and Ethylene glycol aqueous solution (with a viscosity of 3 mPa·s [3 cP] or less)*1			
Detection method			Karman vortex			
Rated flow range			0.5 to 4 l/min	2 to 16 l/min	5 to 40 l/min	10 to 100 l/min
Display flow range			0.35 to 5.50 l/min (Flow under 0.35 l/min is displayed as "0.00.")	1.7 to 22.0 l/min (Flow under 1.7 l/min is displayed as "0.0.")	3.5 to 55.0 l/min (Flow under 3.5 l/min is displayed as "0.0.")	7 to 140 l/min (Flow under 7 l/min is displayed as "0.")
Set flow range			0.35 to 5.50 l/min	1.7 to 22.0 l/min	3.5 to 55.0 l/min	7 to 140 l/min
Smallest settable increment			0.01 l/min	0.1 l/min		1 l/min
Conversion of accumulated pulse (Pulse width: 50 ms)			0.05 L/pulse	0.1 L/pulse	0.5 L/pulse	1 L/pulse
Fluid temperature			0 to 90 °C (No freezing or condensation)			
Display unit			Instantaneous flow: l/min, Accumulated flow: L			
Accuracy			Display value: ±3 % F.S. Analogue output: ±3 % F.S.			
Repeatability			±2 % F.S.*2			
Temperature characteristics			±5 % F.S. (25 °C standard)			
Operating pressure range*3			0 to 1 MPa			
Proof pressure*3			1.5 MPa			
Pressure loss (without flow adjustment valve)			45 kPa or less at the max. flow			
Accumulated flow range*4			99999999.9 L		999999999 L	
			By 0.1 L	By 0.5 L	By 1 L	
Switch output			NPN or PNP open collector output			
	Max. load current		80 mA			
	Max. applied voltage		28 VDC			
	Internal voltage drop		NPN: 1 V or less (at load current of 80 mA) PNP: 1.5 V or less (at load current of 80 mA)			
	Response time*2, 5		0.5 s/1 s/2 s			
	Output protection		Short-circuit protection			
	Output mode	**Flow rate**	Select from Hysteresis, Window comparator, Accumulated output, or Accumulated pulse output modes.			
		Temperature	Select from Hysteresis mode or Window comparator mode.			
Analogue output	**Response time***6		0.5 s/1 s/2 s (linked with the switch output)			
	Voltage output		Voltage output: 1 to 5 V Output impedance: 1 kΩ			
	Current output		Output current: 4 to 20 mA Max. load impedance: 300 Ω for 12 VDC, 600 Ω for 24 VDC			
Hysteresis			Variable			
External input			Voltage free input: 0.4 V or less (reed or solid state), input for 30 ms or longer			
Display method			2-screen display (Main screen: 4-digit, 7-segment, 2-colour, Red/Green Sub screen: 6-digit, 11-segment, White) Display values updated 5 times per second			
Indicator light			Output 1, Output 2: Orange			
Power supply voltage			12 to 24 VDC ±10 %			
Current consumption			50 mA or less			
Environmental resistance	**Enclosure**		IP65			
	Operating temperature range		0 to 50 °C (No freezing or condensation)			
	Operating humidity range		Operation, Storage: 35 to 85 % R.H. (No condensation)			
	Withstand voltage*7		1000 VAC for 1 min between terminals and housing			
	Insulation resistance		50 MΩ or more (500 VDC measured via megohmmeter) between terminals and housing			
Standards and regulations			CE/UKCA marking, UL (CSA)			
Wetted parts material*8			PPS, Stainless steel 304, FKM, SCS13			
			Non-grease			
Piping port size*9			3/8	3/8, 1/2	1/2, 3/4	3/4, 1
Weight	Without temperature sensor/Without flow adjustment valve		153 g	171 g	228 g	720 g
	With temperature sensor/Without flow adjustment valve		166 g	184 g	248 g	748 g
	Without temperature sensor/With flow adjustment valve		241 g	259 g	429 g	—
	With temperature sensor/With flow adjustment valve		254 g	272 g	449 g	—
	With lead wire with connector		+85 g			

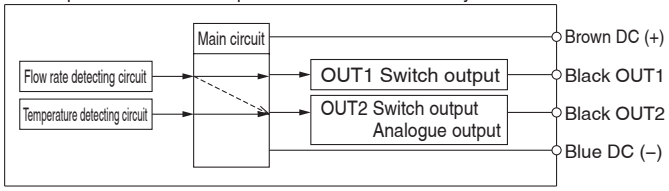
*1 Refer to the "Measurable Range for Ethylene Glycol Aqueous Solution" graph on page 19. Measurement is possible as long as the fluid does not corrode the wetted parts and the viscosity is 3 mPa·s (3 cP) or less. Be aware that water leakage may occur due to internal seal shrinkage or swelling depending on the type of fluid.
*2 If 0.5 s is selected for the response time of the switch output, the repeatability will be ±3 % F.S.
*3 The operating pressure range, proof pressure, and available flow range vary depending on the fluid temperature. Refer to the graphs on pages 17 and 19.
*4 It is cleared when the power supply is turned OFF. The hold function can be selected. (Intervals of 2 or 5 mins can be selected.)
If the 5-min interval is selected, the life of the memory element (electronic parts) is limited to 1 million times. (If energized for 24 hours, life is calculated as 5 mins x 1 million = 5 million mins = about 9.5 years.) Therefore, if using the hold function, calculate the memory life for your operating conditions, and use within this life.
*5 The response time when the set value is 90 % in relation to the step input (The response time is 7 s when it is output by the temperature sensor.)
*6 The response time until the set value reaches 90 % in relation to the step input (The response time is 7 s when it is analogue output by the temperature sensor.)
*7 When the temperature sensor is used, it will be 250 VAC.
*8 For details, refer to the "Wetted Parts Construction" on page 19.
*9 When the piping diameter or piping passage is restricted, the specifications may not be satisfied.
* Products with tiny scratches, marks, or display colour or brightness variations which do not affect the performance of the product are verified as conforming products.

Temperature Sensor Specifications

Rated temperature range	0 to 100 °C*1
Set/Display temperature range	-10 to 110 °C
Smallest settable increment	1 °C
Display unit	°C
Display accuracy	±2 °C
Analogue output accuracy	±3 % F.S.
Response time	7 s*2
Ambient temperature characteristics	±5 % F.S.

*1 The rated temperature range refers solely to that of the temperature sensor. The fluid temperature range specification of the flow switch as a whole is **0 to 90 °C**.
*2 The response time refers solely to that of the temperature sensor.

The output related to the temperature sensor is OUT2 only.

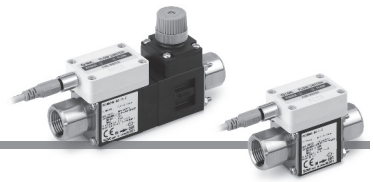


The OUT2 can be selected from either the output for temperature or flow rate by button operation.

Remote Sensor Unit

3-Colour Display Digital Flow Switch for Water

PF3W5-Z Series



How to Order

PF3W 5 04 □ – □ 03 – 1T □ – □ □ □ Z

❶ ❷ ❸ ❹ ❺ ❻ ❼ ❽ ❾ ❿

❶ Type

5	Remote sensor unit

❷ Rated flow range (Flow range)

Symbol	Rated flow range
04	0.5 to 4 l/min
20	2 to 16 l/min
40	5 to 40 l/min
11	10 to 100 l/min

❸ Flow adjustment valve

Symbol	With/without flow adjustment valve	Rated flow range			
		04	**20**	**40**	**11**
—	Without	●	●	●	●
S	With	●	●	●	—

∗ 100 l/min type with a flow adjustment valve is not available.
∗ The flow adjustment valve of this product is not suitable for applications which require the constant adjustment of the flow rate.

❹ Thread type

—	Rc
N	NPT
F	G∗1

∗1 ISO 228 compliant

❺ Port size

Symbol	Port size	Rated flow range			
		04	**20**	**40**	**11**
03	3/8	●	●	—	—
04	1/2	—	●	●	—
06	3/4	—	—	●	●
10	1/1	—	—	—	●

❻ Output specification/Temperature sensor

Symbol	OUT1	OUT2	Temperature sensor
	Flow rate	Temperature	
1	Analogue 1 to 5 V	—	None
2	Analogue 4 to 20 mA	—	
1T	Analogue 1 to 5 V	Analogue 1 to 5 V	With temperature sensor

∗ To use in combination with the remote monitor (PFG200/PF3W3 series), select 1 to 5 V for the flow rate analogue output (output symbol "-1" or "-1T").

❼ Lead wire (Option)

—	With lead wire with M8 connector (3 m)
N	Without lead wire with M8 connector

∗ The lead wire with M8 connector is interchangeable with the existing PF3W series.

❽ Remote sensor unit/Unit printed on label

Symbol	Instantaneous flow	Temperature
—	l/min	°C
G	l/min (gal/min)	°C/°F

∗ G: Made to order
Reference: 1 [l/min] ↔ 0.2642 [gal/min]
1 [gal/min] ↔ 3.785 [l/min]
°F = 9/5 °C + 32

❾ Brackets (Option)

—	None
R	With brackets

∗ Brackets are interchangeable with the existing PF3W series.

❿ Calibration certificate (Only for flow rate)

—	None
A	With calibration certificate

∗ The certificate is written in both Japanese and English.
Units with a temperature sensor can only display the flow rate.

Options/Part Nos.

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

Description	Part no.	Qty.	Note	
Bracket∗1	**ZS-40-K**	1	For PF3W704/720/504/520	With 4 tapping screws (3 x 8)
	ZS-40-L	1	For PF3W740/540	With 4 tapping screws (3 x 8)
	ZS-40-M	1	For PF3W711/511	With 4 tapping screws (4 x 10)
Lead wire with M8 connector	**ZS-40-A**	1	Lead wire length: 3 m	

∗1 For units with a flow adjustment valve, 2 brackets are required.
∗ Interchangeable with the existing PF3W series

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

Specifications (Remote Sensor Unit)

Model		PF3W504	PF3W520	PF3W540	PF3W511
Applicable fluid		Water and Ethylene glycol aqueous solution (with a viscosity of 3 mPa·s [3 cP] or less)*1			
Detection method		Karman vortex			
Rated flow range		0.5 to 4 l/min	2 to 16 l/min	5 to 40 l/min	10 to 100 l/min
Fluid temperature		0 to 90 °C (No freezing or condensation)			
Accuracy		±3 % F.S.			
Repeatability		±2 % F.S.			
Temperature characteristics		±5 % F.S. (25 °C standard)			
Operating pressure range*2		0 to 1 MPa*2			
Proof pressure*2		1.5 MPa			
Pressure loss (without flow adjustment valve)		45 kPa or less at the max. flow			
Analogue output	**Response time***3	1 s			
	Voltage output	Voltage output: 1 to 5 V Output impedance: 1 kΩ			
	Current output	Output current: 4 to 20 mA Max. load impedance: 300 Ω for 12 VDC, 600 Ω for 24 VDC			
Indicator light		For power supply status, flow rate indicator (Blinking speed changes in response to flow rate.), and other error indicator			
Power supply voltage		12 to 24 VDC ±10 %			
Current consumption		30 mA or less			
Environmental resistance	**Enclosure**	IP65			
	Operating temperature range	0 to 50 °C (No freezing or condensation)			
	Operating humidity range	Operation, Storage: 35 to 85 % R.H. (No condensation)			
	Withstand voltage*4	1000 VAC for 1 min between terminals and housing			
	Insulation resistance	50 MΩ or more (500 VDC measured via megohmmeter) between terminals and housing			
Standards and regulations		CE/UKCA marking, UL (CSA)			
Wetted parts material*5		PPS, Stainless steel 304, FKM, SCS13			
		Non-grease			
Piping port size*6		3/8	3/8, 1/2	1/2, 3/4	3/4, 1
Weight	**Without temperature sensor/Without flow adjustment valve**	138 g	156 g	213 g	705 g
	With temperature sensor/Without flow adjustment valve	151 g	169 g	233 g	728 g
	Without temperature sensor/With flow adjustment valve	226 g	244 g	414 g	—
	With temperature sensor/With flow adjustment valve	239 g	257 g	434 g	—
	With lead wire with connector	+85 g			

*1 Refer to the "Measurable Range for Ethylene Glycol Aqueous Solution" graph on page 19. Measurement is possible as long as the fluid does not corrode the wetted parts and the viscosity is 3 mPa·s (3 cP) or less. Be aware that water leakage may occur due to internal seal shrinkage or swelling depending on the type of fluid.
*2 The operating pressure range and proof pressure may change according to the fluid temperature. Refer to the graphs on page 17.
*3 The response time until the set value reaches 90 % in relation to the step input (The response time is 7 s when it is analogue output by the temperature sensor.)
*4 When the temperature sensor is used, it will be 250 VAC.
*5 For details, refer to the "Wetted Parts Construction" on page 19.
*6 When the piping diameter or piping passage is restricted, the specifications may not be satisfied.
* Products with tiny scratches, marks, or display colour or brightness variations which do not affect the performance of the product are verified as conforming products.

Temperature Sensor Specifications

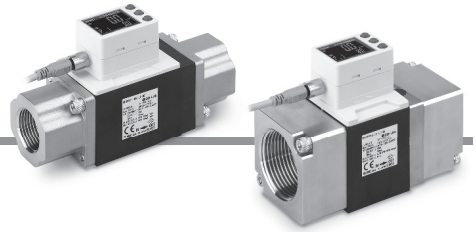
Rated temperature range	0 to 100 °C*1
Analogue output accuracy	±3 % F.S.
Response time	7 s*2
Ambient temperature characteristics	±5 % F.S.

*1 The rated temperature range refers solely to that of the temperature sensor. The fluid temperature range specification of the flow switch as a whole is **0 to 90 °C**.
*2 The response time refers solely to that of the temperature sensor.

IO-Link **Integrated Display**

3-Colour Display **Digital Flow Switch for Water**

PF3W7-L Series



How to Order

Flow range

0.5 to 4 l/min	2 to 16 l/min
5 to 40 l/min	10 to 100 l/min

PF3W 7 ❶04 ❷ – ❸ ❹03 – ❺LT ❻Q – ❼M ❽ ❾ Z

Flow range

50 to 250 l/min

PF3W 7 ❶21 ❷ – ❸ ❹12 – ❺LT ❻Q – ❼M ❽ ❾

Type

7	Integrated display

Rated flow range (Flow range)

21	50 to 250 l/min

❶ Rated flow range (Flow range)

04	0.5 to 4 l/min
20	2 to 16 l/min
40	5 to 40 l/min
11	10 to 100 l/min

❷ Flow adjustment valve

Symbol	With/without flow adjustment valve	Rated flow range			
		04	20	40	11
—	None	●	●	●	●
S	Yes	●	●	●	—

∗ 100 l/min type with a flow adjustment valve is not available.
∗ The flow adjustment valve of this product is not suitable for applications which require the constant adjustment of the flow rate.

❸ Thread type

—	Rc
N	NPT
F	G∗1

∗1 ISO 228 compliant

❹ Piping port size

Symbol	Port size	Rated flow range				
		04	20	40	11	21
03	3/8	●	●	—	—	—
04	1/2	—	●	●	—	—
06	3/4	—	—	●	●	—
10	1	—	—	—	●	—
12	1-1/4	—	—	—	—	●
14	1-1/2	—	—	—	—	●

❺ Output specification/Temperature sensor

Symbol	OUT1	OUT2	Temperature sensor
	Flow rate/Temperature	Flow rate/Temperature	
L	IO-Link/Switch output (N/P)	—	None
L2	IO-Link/Switch output (N/P)	Switch output (N/P)	
LT	IO-Link/Switch output (N/P)	—	Yes
L2T	IO-Link/Switch output (N/P)	Switch output (N/P)	

∗ Temperature output or flow output can be selected for the digital flow switch with a temperature sensor.
∗ The output specification of L, L2, and L2T should be ordered as made to order.

❻ Lead wire (Option)

—	With lead wire with M8 connector (3 m)
N	None
Q	With M12-M8 conversion lead wire (0.1 m)∗1

∗1 A 3 m lead wire is also available separately.
∗ The lead wire with M8 connector and the M12-M8 conversion lead wire are interchangeable with the existing PF3W series.

❼ Integrated display/Unit specification

Symbol	Instantaneous flow	Accumulated flow	Temperature
—	With display unit switching function		°C
M	l/min	L	°C

Unit can be changed.
Instantaneous flow: l/min ↔ gal/min
Accumulated flow : L ↔ gal
∗ Reference: 1 [l/min] ↔ 0.2642 [gal/min]
1 [gal/min] ↔ 3.785 [l/min]

❽ Brackets (Option)

—	None
R	With brackets

∗ Brackets are interchangeable with the existing PF3W series.

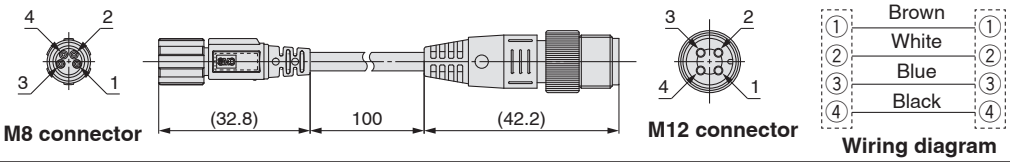
❾ Calibration certificate (Only for flow rate)

—	None
A	With calibration certificate

∗ The certificate is written in both Japanese and English. The integrated display type with a temperature sensor can only display the flow rate. The temperature sensor is not calibrated.

ZS-40-M12M8-A
M12-M8 conversion lead wire

∗ The lead wire with M8 connector and the M12-M 8 conversion lead wire are interchangeable with the existing PF3W series.



∗ For wiring, refer to the Operation Manual on the SMC website, https://www.smc.eu

SMC

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

Specifications (Integrated Display)

Model			PF3W704-L	PF3W720-L	PF3W740-L	PF3W711-L	PF3W721-L
Accumulated flow range∗1			999999999.9 L		9999999999 L		
			By 0.1 L		By 1 L		
Switch output	**Max. applied voltage**		30 V (NPN output)				
	Internal voltage drop		1.5 V or less (at load current of 80 mA)				
	Delay time∗2		3.5 ms Variable from 0 to 60 s/0.01 s increments				
	Output mode	**Flow rate**	Select from Hysteresis, Window comparator, Accumulated output, Accumulated pulse output, Error output, or Switch output OFF modes.				
Power supply voltage	**When used as a switch output device**		12 to 24 VDC, including ripple (p-p) 10 %				
	When used as an IO-Link device		18 to 30 VDC, including ripple (p-p) 10 %				
Digital filter∗3			Select from 0.5 s, 1.0 s, 2.0 s, 5.0 s, 10.0 s, 15.0 s, 20.0 s, or 30.0 s.				
Environment	**Withstand voltage**		250 VAC for 1 min between external terminals and case				
Standards and regulations			CE/UKCA marking, UL (CSA)				

∗1 It is cleared when the power supply is turned OFF.
The hold function can be selected. If the 5-min interval is selected, the life of the memory element (electronic parts) is limited to 3.7 million times. (If energized for 24 hours, life is calculated as 5 mins x access times (3.7 million) = 18.5 million mins = about 35 years.) Therefore, if using the hold function, calculate the memory life for your operating conditions, and use within this life.
∗2 Does not include the value of the digital filter
∗3 The response time until the set value reaches 90 % in relation to the step input (The response time is 7 s when it is output by the temperature sensor.)

Communication Specifications (IO-Link mode)

IO-Link type	Device
IO-Link version	V1.1
Communication speed	COM2 (38.4 kbps)
Configuration file	IODD file∗1
Minimum cycle time	3.5 ms
Process data length	Input data: 6 bytes, Output data: 0 byte
On request data communication	Yes
Data storage function	Yes
Event function	Yes
Vendor ID	131 (0 x 0083)
Device ID∗2	PF3W704□-□□-L□□-□□□Z: 352 (0 x 0160) PF3W720□-□□-L□□-□□□Z: 353 (0 x 0161) PF3W740□-□□-L□□-□□□Z: 354 (0 x 0162) PF3W711□-□□-L□□-□□□Z: 355 (0 x 0163) PF3W721□-□□-L□□-□□□ : 356 (0 x 0164) PF3W704□-□□-L□T-□□□Z : 357 (0 x 0165) PF3W720□-□□-L□T-□□□Z : 358 (0 x 0166) PF3W740□-□□-L□T-□□□Z : 359 (0 x 0167) PF3W711□-□□-L□T-□□□Z : 360 (0 x 0168) PF3W721□-□□-L□T-□□□ : 361 (0 x 0169)

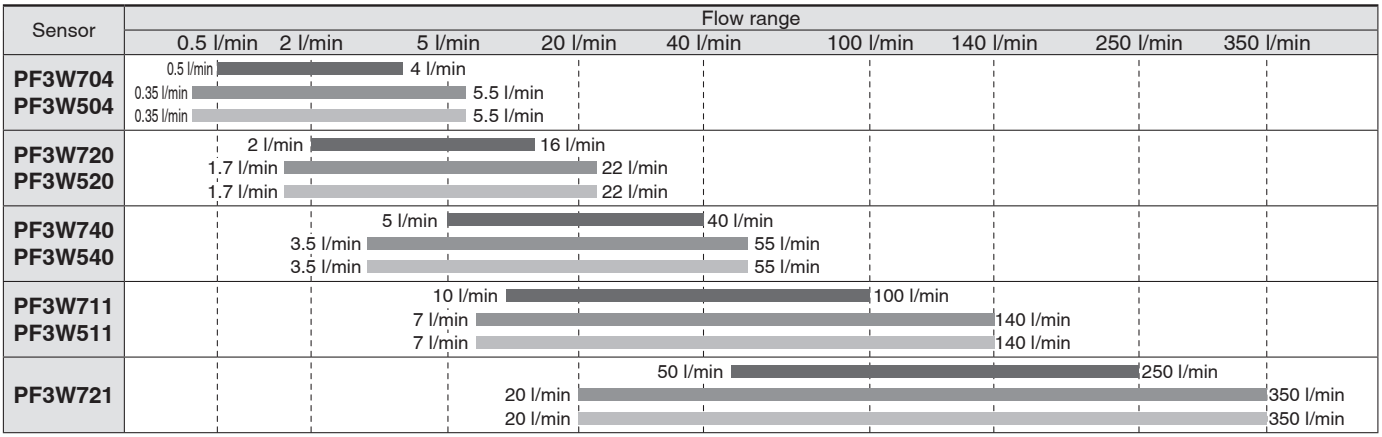
∗1 The configuration file can be downloaded from the SMC website, https://www.smc.eu
∗2 The device ID differs according to each product type (flow range, whether or not a temperature sensor is provided, etc.).

Set Flow Range and Rated Flow Range

⚠ Caution

Set the flow rate within the rated flow range.

The set flow range is the range of flow rate within which setting is possible. The rated flow range is the range within which the sensor specifications (accuracy, etc.) are satisfied. It is possible to set a value outside of the rated flow range if it is within the set flow range. However, the satisfaction of the specifications cannot be guaranteed.



∗ For the PF3W5 series, the display flow range and set flow range are the same as those of the flow monitor PF3W3 series.

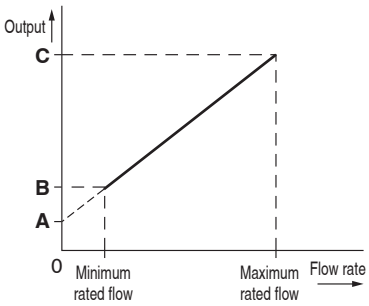
Rated flow range | Display flow range | Set flow range

Analogue Output

Flow rate/Analogue output

	A	B			C
		4/16/40	100	250	
Voltage output	1 V	1.5 V	1.4 V	1.8 V	5 V
Current output	4 mA	6 mA	5.6 mA	7.2 mA	20 mA

Model	Rated flow [l/min]	
	Min.	Max.
PF3W704/504	0.5	4
PF3W720/520	2	16
PF3W740/540	5	40
PF3W711/511	10	100

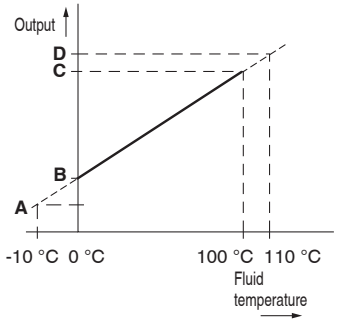


Fluid temperature/Analogue output

PF3W7/5

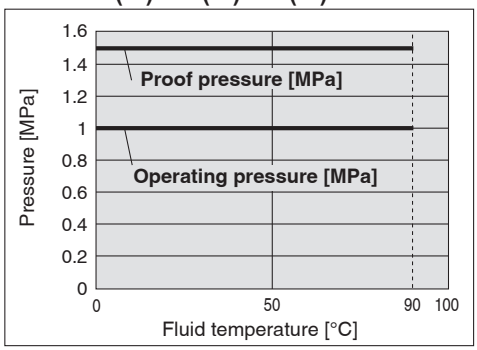
	A	B
Voltage output	0.6 V	1 V
Current output	2.4 mA	4 mA

	C	D
Voltage output	5 V	5.4 V
Current output	20 mA	21.6 mA

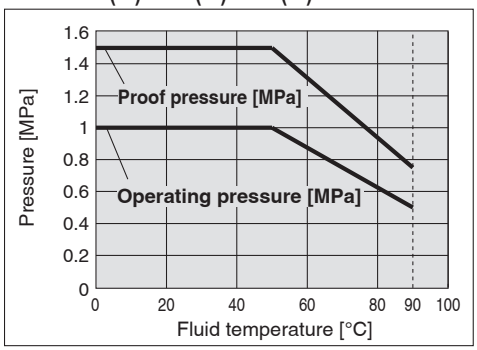


Operating Pressure and Proof Pressure

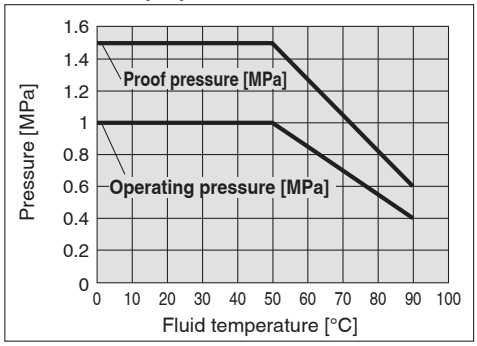
PF3W704(-L)/720(-L)/740(-L)/504/520/540



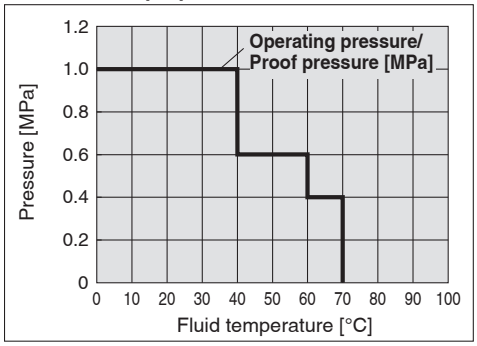
PF3W704S(-L)/720S(-L)/740S(-L)/504S/520S/540S



PF3W711(-L)/511

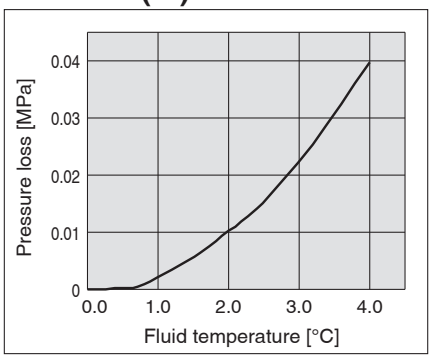


PF3W721(-L)

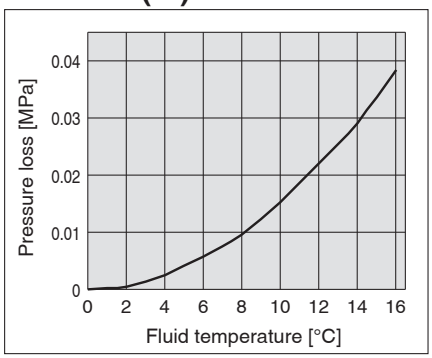


Flow Rate Characteristics (Pressure Loss: Without Flow Adjustment Valve)

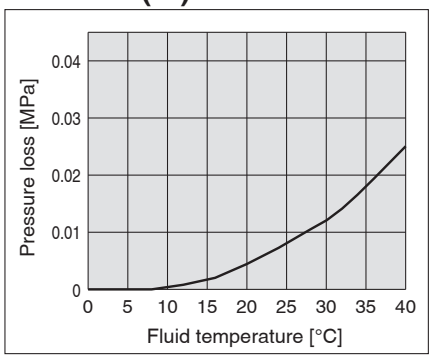
PF3W704(-L)/504



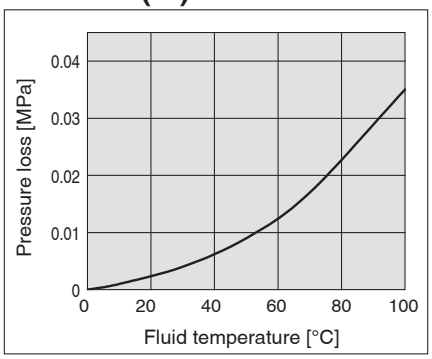
PF3W720(-L)/520



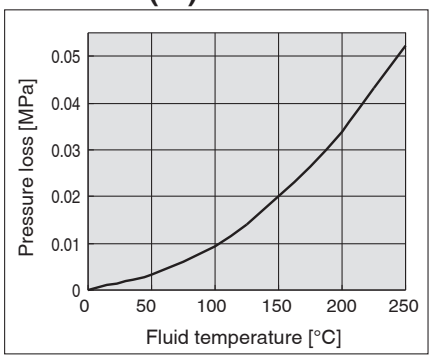
PF3W740(-L)/540



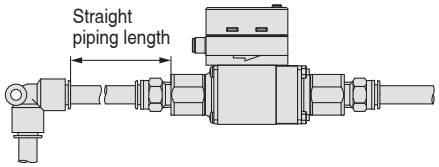
PF3W711(-L)/511



PF3W721(-L)



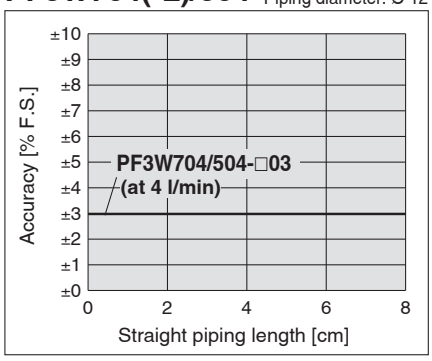
Straight Piping Length and Accuracy (Reference Value)



- The smaller the piping size, the more the product is affected by the straight piping length.
- Fluid pressure has almost no affect.
- Low flow rate lessens the effect of the straight piping length.
- Use a straight pipe that is 8 cm or longer in length to satisfy the ±3 % F.S. specification. (11 cm or longer for the 100 l/min type)

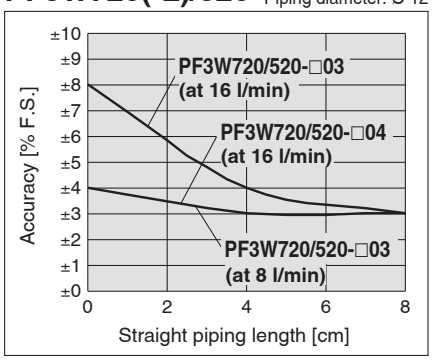
PF3W704(-L)/504

Pressure: 0.3 MPa
Piping diameter: ∅ 12



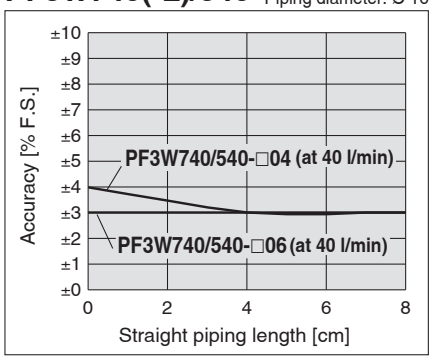
PF3W720(-L)/520

Pressure: 0.3 MPa
Piping diameter: ∅ 12



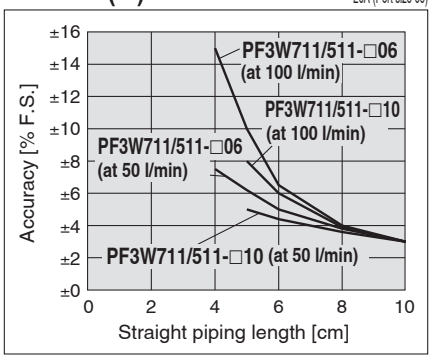
PF3W740(-L)/540

Pressure: 0.3 MPa
Piping diameter: ∅ 16



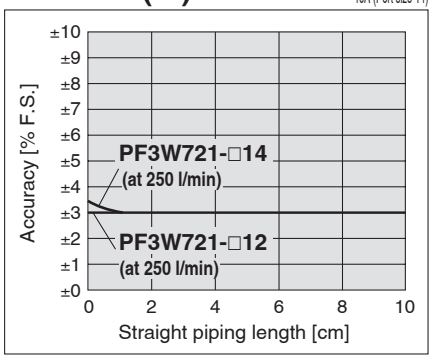
PF3W711(-L)/511

Pressure: 0.3 MPa Piping diameter: 25A (Port size 10)
20A (Port size 06)



PF3W721(-L)

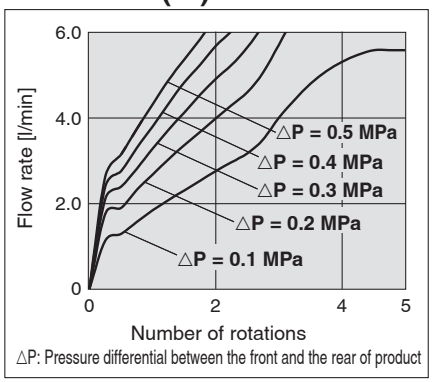
Pressure: 0.3 MPa Piping diameter: 32A (Port size 12)
40A (Port size 14)



∗ No data for 4 cm, or for under 5 cm, as these cannot be used due to piping dimensions.

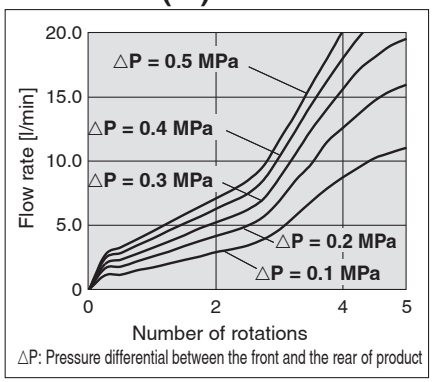
Flow Rate Characteristics of Flow Adjustment Valve

PF3W704S(-L)/504S



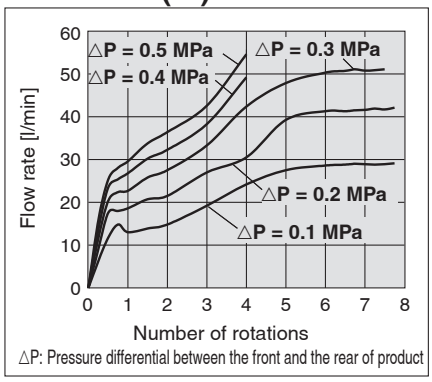
△P: Pressure differential between the front and the rear of product

PF3W720S(-L)/520S



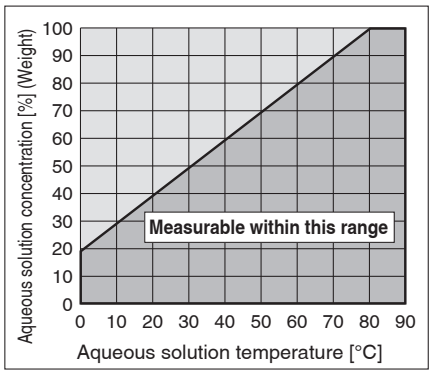
△P: Pressure differential between the front and the rear of product

PF3W740S(-L)/540S



△P: Pressure differential between the front and the rear of product

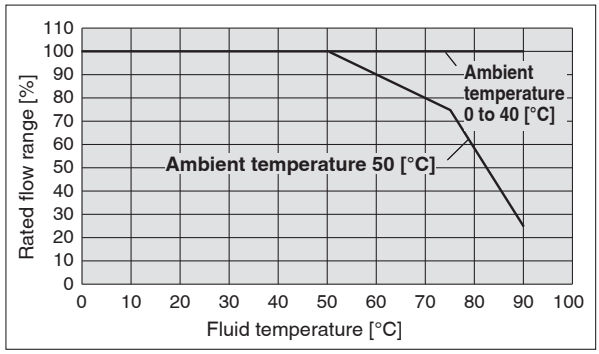
Measurable Range for Ethylene Glycol Aqueous Solution (Reference Value)



Available Flow Range

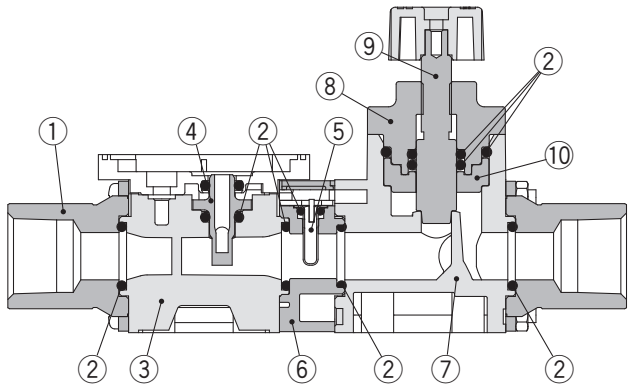
∗ For the analogue current 2-output type (symbol: "KT") only (Includes the analogue voltage 2-output type (symbol: "JT"), excludes other specifications)

PF3W704/720/740/711



∗ If the analogue current 2-output type is installed in an environment with high temperatures, the temperature of the product may rise. In such a case, be sure to cool the product.

Wetted Parts Construction



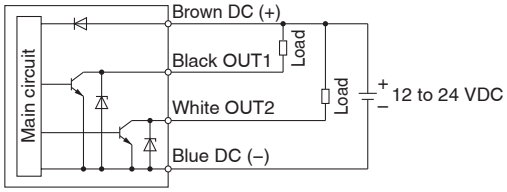
Component Parts

No.	Description	Material	Note
1	**Attachment**	Stainless steel 304	PF3W704/720/740/504/520/540
		SCS13	Stainless steel 304 equivalent, PF3W711/511
2	**Seal**	FKM	
3	**Body**	PPS	
4	**Sensor**	PPS	
5	**Temperature sensor**	Stainless steel 304	
6	**Temperature sensor body**	PPS	
7	**Flow adjustment valve body**	PPS	
8	**Flow adjustment valve cover**	PPS	
9	**Flow adjustment valve shaft**	Stainless steel 304	
10	**Shaft support**	PPS	

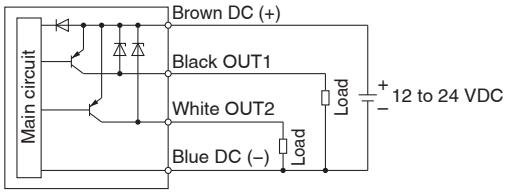
Internal Circuits and Wiring Examples

PF3W7□□

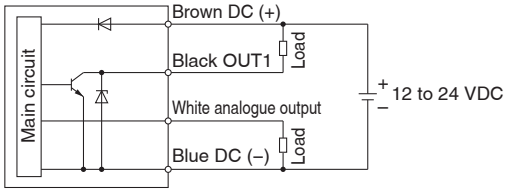
-A(T)
NPN (2 outputs)



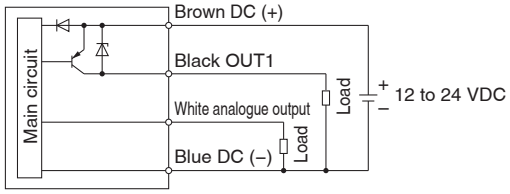
-B(T)
PNP (2 outputs)



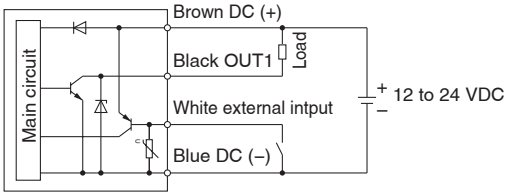
-C(T)/D(T)
C(T): NPN + Analogue voltage output
D(T): NPN + Analogue current output



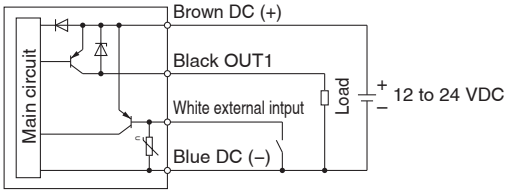
-E(T)/F(T)
E(T): PNP + Analogue voltage output
F(T): PNP + Analogue current output



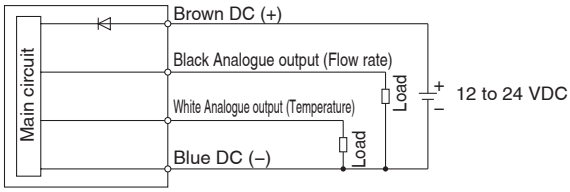
-G
NPN + External input



-H
PNP + External input

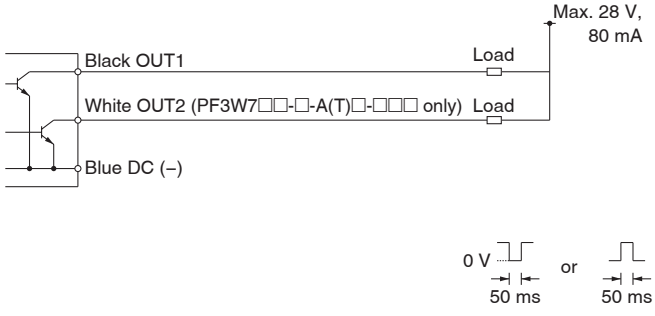


-JT/KT
JT: Analogue voltage output + Analogue voltage output
KT: Analogue current output + Analogue current output

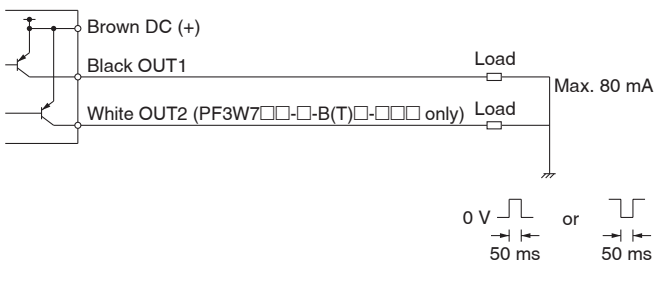


Accumulated pulse output wiring examples

-A(T)/C(T)/D(T)/G
A(T): NPN (2 outputs)
C(T), D(T): NPN + Analogue output
G: NPN + External input



-B(T)/E(T)/F(T)/H
B(T): PNP (2 outputs)
E(T), F(T): PNP + Analogue output
H: PNP + External input



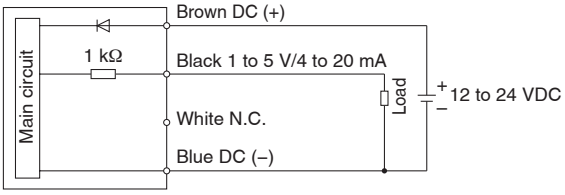
Internal Circuits and Wiring Examples

PF3W5□□

-1/2

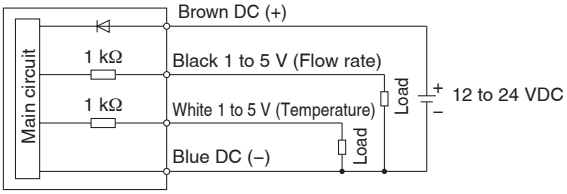
1: Analogue voltage output

2: Analogue current output



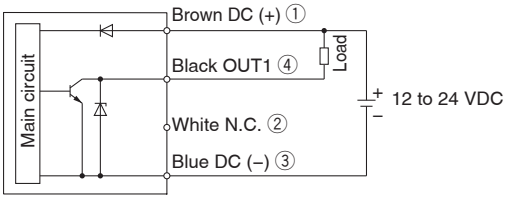
-1T

1T: Analogue voltage output + Analogue voltage output



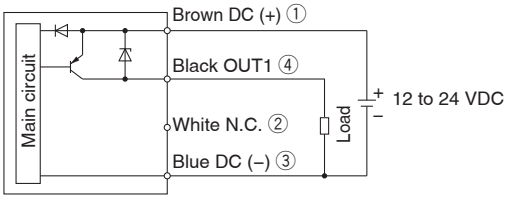
PF3W7□□-L

NPN output type



Max. 28 V, 80 mA
Internal voltage drop 1.5 V or less

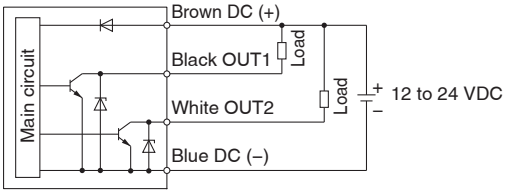
PNP output type



Max. 80 mA
Internal voltage drop 1.5 V or less

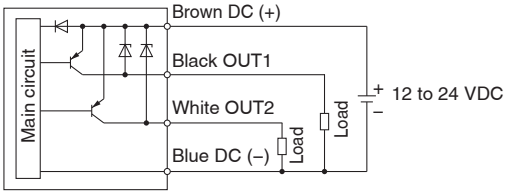
PF3W7□□-L2

NPN 2 output type



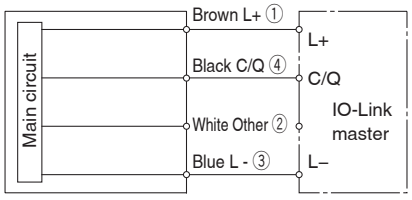
Max. 28 V, 80 mA
Internal voltage drop 1.5 V or less

PNP 2 output type



Max. 80 mA
Internal voltage drop 1.5 V or less

When used as an IO-Link device



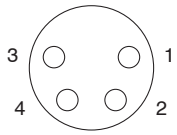
∗ The numbers in the diagrams show the connector pin layout.

Dimensions

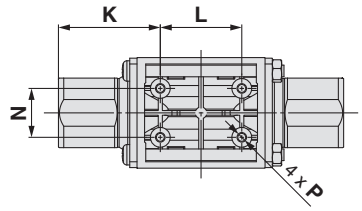
PF3W704(-L)/720(-L)/740(-L)/711(-L)/721(-L)
Integrated display

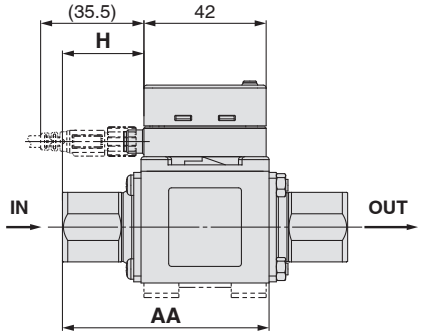
Connector pin number

Example

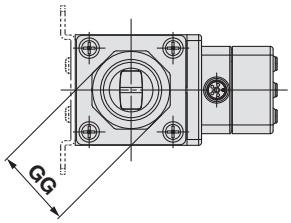


Pin no.	Pin name
1	DC(+)
2	OUT2
3	DC(–)
4	OUT1

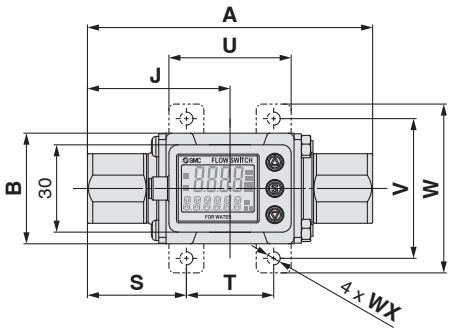


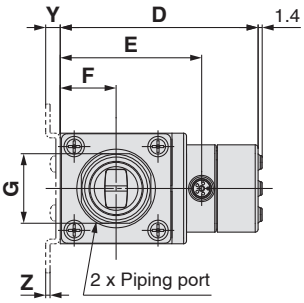


Piping port: G thread

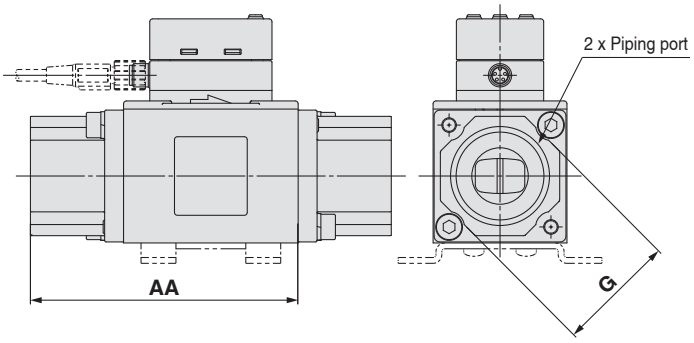


Model	Port size G	GG
PF3W704	3/8	23.9
PF3W720	3/8	23.9
	1/2	26.9
PF3W740	1/2	26.9
	3/4	31.9

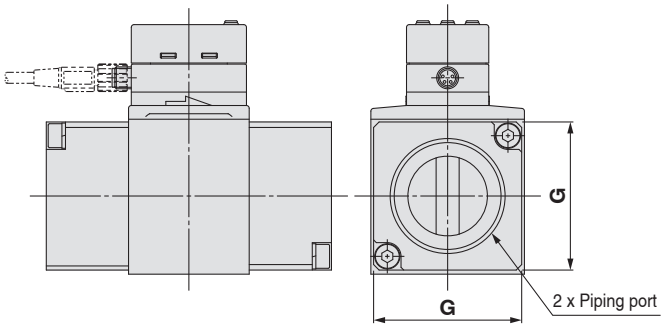




For PF3W711(-L)



For PF3W721-L



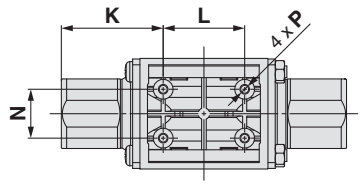
[mm]

Model	Port size (Rc, NPT)	A	AA	B	D	E	F	G	H	J	K	L	N	P	Bracket dimensions							
															S	T	U	V	W	WX	Y	Z
PF3W704(-L)	3/8	70	50	30	60	40.6	15.2	20.9	14	35	26	18	13.6	ø2.7 depth 14	24	22	32	40	50	4.5	5	1.5
PF3W720(-L)	3/8, 1/2	78	54	30	60	40.6	15.2	20.9 23.9	18	39	30	18	13.6	ø2.7 depth 12	28	22	32	40	50	4.5	5	1.5
PF3W740(-L)	1/2, 3/4	98	71	38	68	48.6	19.2	23.9 29.9	28	49	35	28	16.8	ø2.7 depth 12	34	30	42	48	58	4.5	5	1.5
PF3W711(-L)	3/4, 1	124	92	46	77	57.6	23.0	41	41	63	48	28	18.0	ø3.5 depth 14	44	36	48	58	70	5.5	7	2.0
PF3W721-L	1 1/4, 1 1/2	104	74	56	91	71.6	28.5	54	31	52	39.5	25	27.5	ø3.5 depth 14	—	—	—	—	—	—	—	—
	G1 1/4	108	76						33	54	41.5											
	G1 1/2	112	78						35	56	43.5											

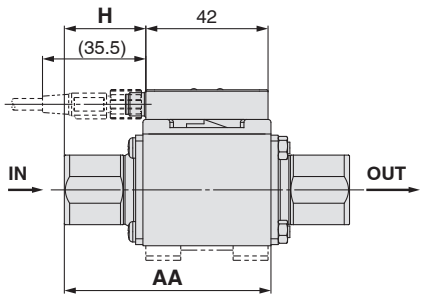
Dimensions

PF3W504/520/540/511

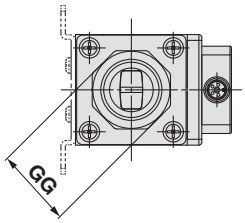
Remote sensor unit

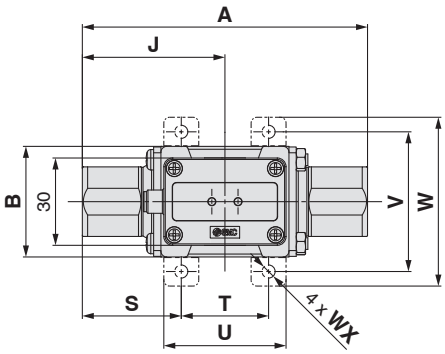


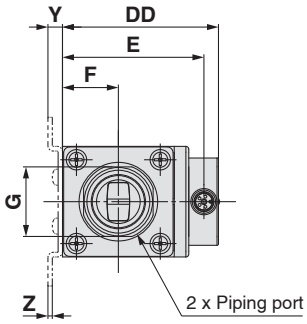
Model	Port size G	GG
PF3W504	3/8	23.9
PF3W520	3/8	23.9
	1/2	26.9
PF3W540	1/2	26.9
	3/4	31.9



Piping port: G thread





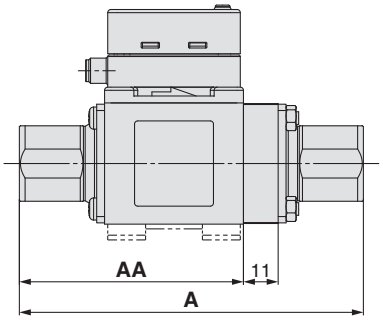


[mm]

Model	Port size (Rc, NPT)	A	AA	B	DD	E	F	G	H	J	K	L	N	P	Bracket dimensions							
															S	T	U	V	W	WX	Y	Z
PF3W504	3/8	70	50	30	45.6	40.6	15.2	20.9	14	35	26	18	13.6	ø2.7 depth 14	24	22	32	40	50	4.5	5	1.5
PF3W520	3/8, 1/2	78	54	30	45.6	40.6	15.2	20.9 23.9	18	39	30	18	13.6	ø2.7 depth 12	28	22	32	40	50	4.5	5	1.5
PF3W540	1/2, 3/4	98	71	38	53.6	48.6	19.2	23.9 29.9	28	49	35	28	16.8	ø2.7 depth 12	34	30	42	48	58	4.5	5	1.5
PF3W511	3/4, 1	124	92	46	62.6	57.6	23.0	41	41	63	48	28	18.0	ø3.5 depth 14	44	36	48	58	70	5.5	7	2.0

Dimensions

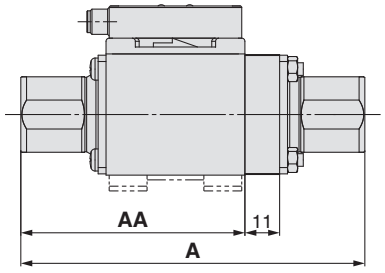
PF3W704/720/740-□-□T
PF3W704/720/740-L□T
Integrated display: With temperature sensor



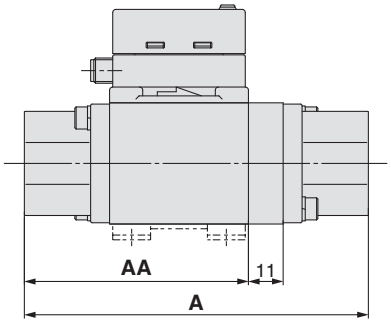
[mm]

Model	A	AA
PF3W704/504-□-□T	81	50
PF3W720/520-□-□T	89	54
PF3W740/540-□-□T	109	71

PF3W504/520/540-□-□T
Remote sensor unit: With temperature sensor



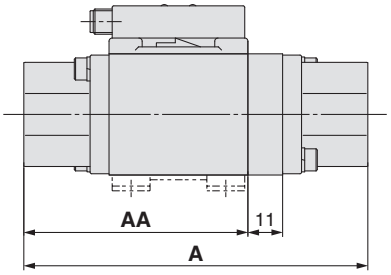
PF3W711/721-□-□T
PF3W711/721-L□T
Integrated display: With temperature sensor



[mm]

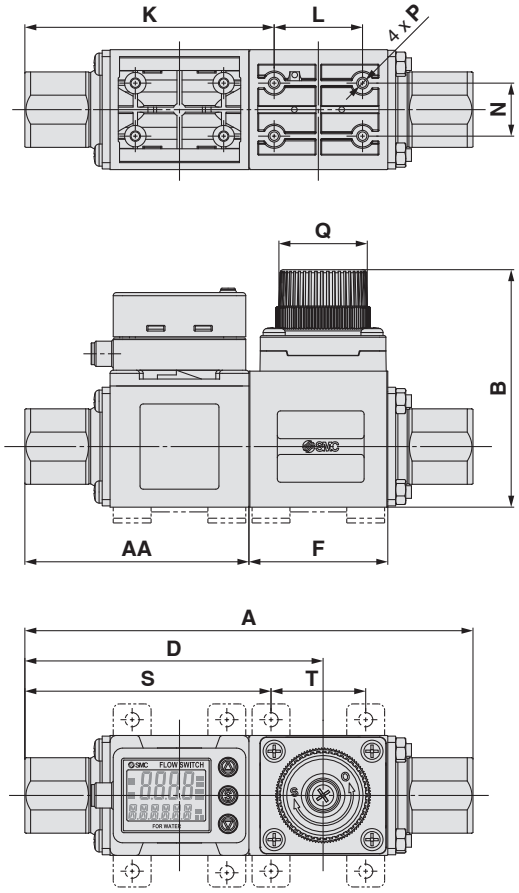
Model	A	AA
PF3W711/511-□-□T	135	92
PF3W721-□-□T	115	74
PF3W721-F12-□T	119	76
PF3W721-F14-□T	123	78

PF3W511-□-□T
Remote sensor unit: With temperature sensor

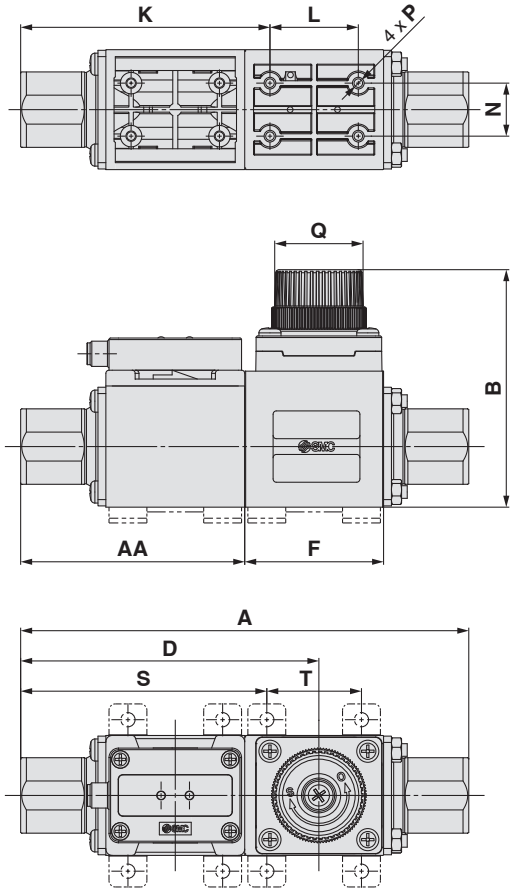


Dimensions

PF3W704S(-L)/720S(-L)/740S(-L)
Integrated display: With flow adjustment valve



PF3W504S/520S/540S
Remote sensor unit: With flow adjustment valve

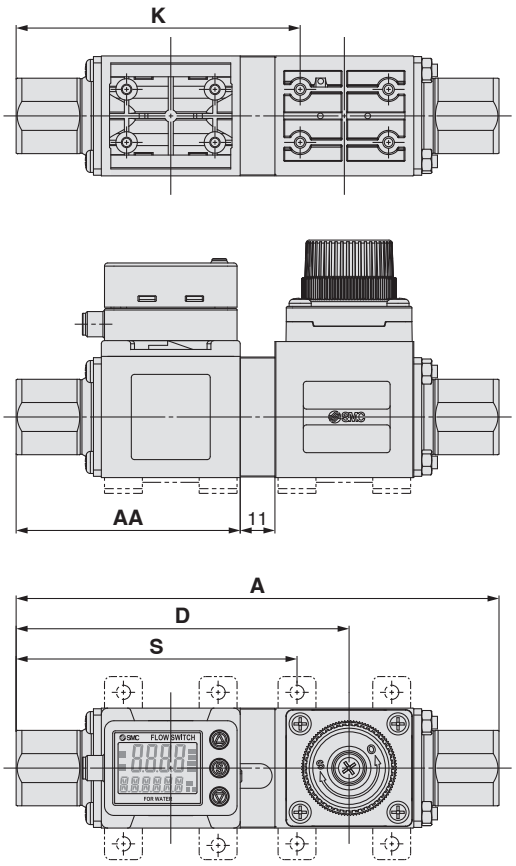


[mm]

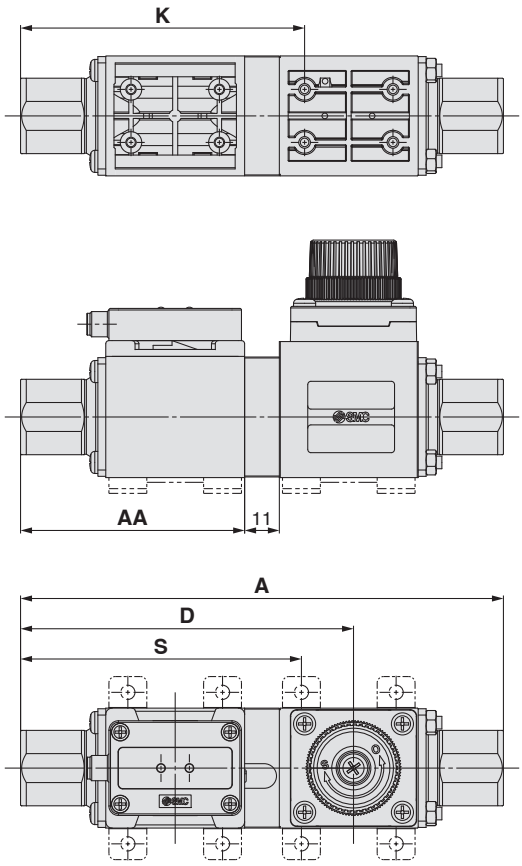
Model	A	AA	B	D	F	K	L	N	P	Q	Number of Q rotations	Bracket dimensions	
												S	T
PF3W704S(-L)/504S	104	50	63.6 (Max. 68.6)	70.2	34	58.5	18	13.6	ø2.7 depth 10	ø19	6	56.5	22
PF3W720S(-L)/520S	112	54	63.6 (Max. 68.6)	74.2	34	62.5	18	13.6	ø2.7 depth 10	ø19	6	60.5	22
PF3W740S(-L)/540S	142	71	75.25 (Max. 81)	94.5	44	79.0	28	16.8	ø2.7 depth 10	ø28	7	78.0	30

Dimensions

PF3W704S/720S/740S-□-□T
Integrated display: With temperature sensor and flow adjustment valve



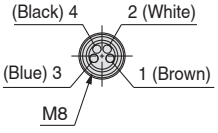
PF3W504S/520S/540S-□-□T
Remote sensor unit: With temperature sensor and flow adjustment valve



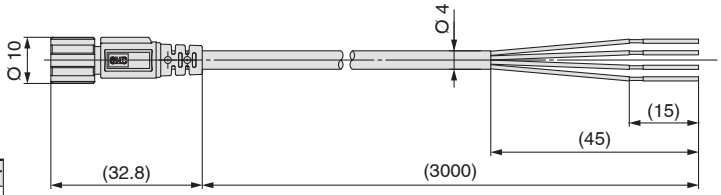
[mm]

Model	A	AA	D	K	S
PF3W704S/504S-□-□T	115	50	81.2	69.5	67.5
PF3W720S/520S-□-□T	123	54	85.2	73.5	71.5
PF3W740S/540S-□-□T	153	71	105.5	90.0	89.0

ZS-40-A
Lead wire with M8 connector



Pin no.	Pin name	Wire colour
1	DC (+)	Brown
2	OUT2	White
3	DC (–)	Blue
4	OUT1	Black



Lead Wire Specifications

Conductor	**Nominal cross section**	AWG 23
	O.D.	Approx. 0.7 mm
Insulator	**Material**	Heat-resistant PVC
	O.D.	Approx. 1.1 mm
	Colour	Brown, White, Black, Blue
Sheath	**Material**	Heat- and oil-resistant PVC
Finished O.D.		ø4

* 4-wire type lead wire with M8 connector used for the PF3W series
* For wiring, refer to the Operation Manual on the SMC website, https://www.smc.eu

3-Colour Display

Digital Flow Monitor for Water

PF3W3 Series

How to Order

PF3W 30 A □ – M V C □

Type

3	Remote monitor unit

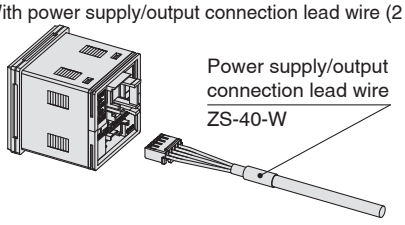
For remote sensor units, select the analogue output 1 to 5 V type.
Applicable sensors: PF3W5□□-□□-1(T)

Output specification

Symbol	OUT1	OUT2
A	NPN	NPN
B	PNP	PNP
C	NPN	Analogue 1 to 5 V
D	NPN	Analogue 4 to 20 mA
E	PNP	Analogue 1 to 5 V
F	PNP	Analogue 4 to 20 mA
G	NPN	External input
H	PNP	External input
J	Analogue 1 to 5 V	Analogue 1 to 5 V
K	Analogue 4 to 20 mA	Analogue 4 to 20 mA

In combination with the remote sensor unit with a temperature sensor, only OUT2 can be set for temperature sensor output.

Lead wire

—	With power supply/output connection lead wire (2 m) 
N	Without power supply/output connection lead wire

The lead wire does not come connected, but it is shipped together with the product.

Remote monitor unit/Unit specification

Symbol	Instantaneous flow	Accumulated flow	Temperature
M	l/min	L	°C
G	gal/min	gal	°C
F	gal/min	gal	°F
J	l/min	L	°F

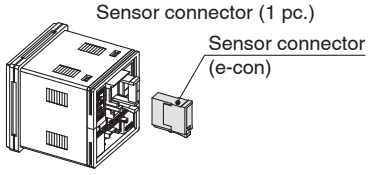
∗ G, F, J: Made to order
Reference: 1 [l/min] ↔ 0.2642 [gal/min]
1 [gal/min]↔3.785 [l/min]
°F = 9/5 °C + 32

Calibration certificate (Only flow monitor)

—	None
A	With calibration certificate

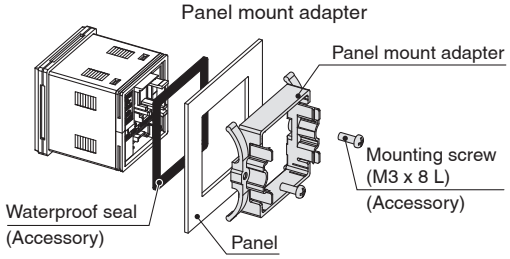
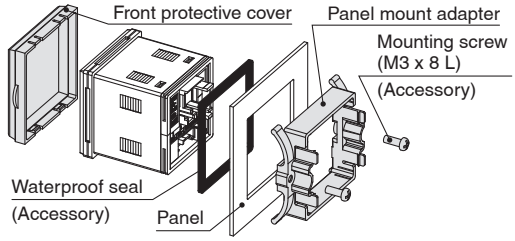
∗ The certificate is written in both Japanese and English.

Option 2

—	None
C	Sensor connector (1 pc.) 

The connector does not come connected, but it is shipped together with the product.

Option 1

—	None
T	Panel mount adapter 
V	Front protective cover + Panel mount adapter 

Options/Part Nos.

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

Description	Part no.	Note
Panel mount adapter	**ZS-26-B**	With waterproof seal and screws
Front protective cover + Panel mount adapter	**ZS-26-C**	With waterproof seal and screws
Front protective cover only	**ZS-26-01**	Separately order panel mount adapter, etc.
Power supply/output connection lead wire	**ZS-40-W**	Lead wire length: 2 m
Sensor connector (e-con)	**ZS-28-CA-4**	1 pc.
Lead wire with connector for copying	**ZS-40-Y**	A maximum of 10 units can be connected.

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

Specifications

Model			PF3W30□			
Display flow range			0.35 to 4.50 l/min (Flow under 0.35 l/min is displayed as "0.00.")	1.7 to 18.0 l/min (Flow under 1.7 l/min is displayed as "0.0.")	3.5 to 45.0 l/min (Flow under 3.5 l/min is displayed as "0.0.")	7 to 112 l/min (Flow under 7 l/min is displayed as "0.")
Set flow range			0.35 to 4.50 l/min	1.7 to 18.0 l/min	3.5 to 45.0 l/min	7 to 112 l/min
Smallest settable increment			0.01 l/min	0.1 l/min		1 l/min
Conversion of accumulated pulse			0.05 L/pulse	0.1 L/pulse	0.5 L/pulse	1 L/pulse
Display unit			Instantaneous flow: l/min, Accumulated flow: L			
Accuracy			Display value: ±0.5 % F.S. Analogue output: ±0.5 % F.S.			
Repeatability			±0.5 % F.S.			
Temperature characteristics			±0.5 % F.S. (25 °C standard)			
Accumulated flow range∗1			99999999.9 L		999999999 L	
			By 0.1 L	By 0.5 L	By 1 L	
Switch output			NPN or PNP open collector output			
	Max. load current		80 mA			
	Max. applied voltage		28 VDC			
	Internal voltage drop		NPN: 1 V or less (at load current of 80 mA) PNP: 1.5 V or less (at load current of 80 mA)			
	Response time∗2		1 s/2 s			
	Output protection		Short-circuit protection			
	Output mode	**Flow rate**	Select from Hysteresis, Window comparator, Accumulated output, or Accumulated pulse output modes.			
		Temperature	Select from Hysteresis mode or Window comparator mode.			
Analogue output	**Response time**∗3		1 s/2 s (linked with the switch output)			
	Voltage output		Voltage output: 1 to 5 V Output impedance: 1 kΩ			
	Current output		Output current: 4 to 20 mA Max. load impedance: 300 Ω for 12 VDC, 600 Ω for 24 VDC			
Hysteresis			Variable			
External input			Voltage free input: 0.4 V or less (reed or solid state), input for 30 ms or longer			
Input/output			Input for copy mode			
Display method			2-screen display (Main screen: 4-digit, 7-segment, 2-colour, Red/Green Sub screen: 6-digit, 11-segment, White), Display values updated 5 times per second			
Indicator light			Output 1, Output 2: Orange			
Power supply voltage			12 to 24 VDC ±10 %			
Current consumption			50 mA or less			
Connection			Power supply output 5P connector, sensor connection 4P connector (e-con)			
Environmental resistance	**Enclosure**		IP40 (Only front face of the panel is IP65 when panel mount adapter and waterproof seal of optional parts are used.)			
	Operating temperature range		0 to 50 °C (No freezing or condensation)			
	Operating humidity range		Operation, Storage: 35 to 85 % R.H. (No condensation)			
	Withstand voltage		1000 VAC for 1 min between terminals and housing			
	Insulation resistance		50 MΩ or more (500 VDC measured via megohmmeter) between terminals and housing			
Standards and regulations			CE/UKCA marking, UL (CSA)			
Weight	**Without power supply/output connection lead wire**		50 g			
	With power supply/output connection lead wire		100 g			

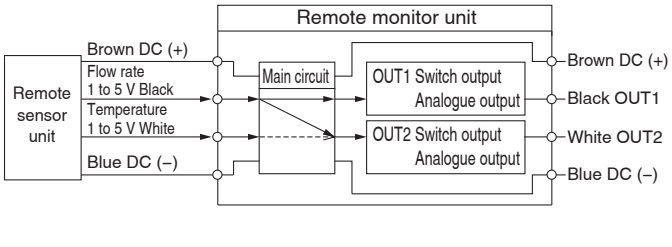
∗1 It is cleared when the power supply is turned OFF. The hold function can be selected. (Intervals of 2 or 5 mins can be selected.)
If the 5-min interval is selected, the life of the memory element (electronic parts) is limited to 1 million times. (If energized for 24 hours, life is calculated as 5 mins x 1 million = 5 million mins = about 9.5 years.) Therefore, if using the hold function, calculate the memory life for your operating conditions, and use within this life.
∗2 The response time when the set value is 90 % in relation to the step input (The response time is 7 s when it is output by the temperature sensor.)
∗3 The response time until the set value reaches 90 % in relation to the step input (The response time is 7 s when it is analogue output by the temperature sensor.)
∗ Products with tiny scratches, marks, or display colour or brightness variations which do not affect the performance of the product are verified as conforming products.

Temperature Sensor Specifications

Rated temperature range	0 to 100 °C∗1
Set/Display temperature range	-10 to 110 °C
Smallest settable increment	1 °C
Display unit	°C
Analogue output accuracy	±3 % F.S.
Response time	7 s∗2
Ambient temperature characteristics	±5 % F.S.

∗1 The rated temperature range refers solely to that of the temperature sensor. The fluid temperature range specification of the flow switch as a whole is **0 to 90 °C**.
∗2 The response time refers solely to that of the temperature sensor.

The output related to the temperature sensor is OUT2 only.



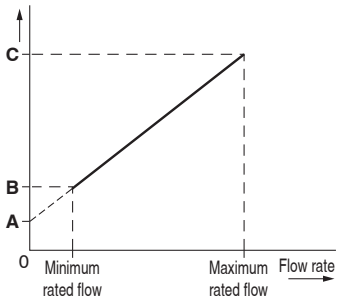
Analogue Output

Flow rate/Analogue output

	A	B			C
		04/20/40	11	21	
Voltage output	1 V	1.5 V	1.4 V	1.5 V	5 V
Current output	4 mA	6 mA	5.6 mA	5.9 mA	20 mA

The values of B vary according to the range.

Model	Flow rate [l/min]	
	Min.	Max.
PF3W504	0.5	4
PF3W520	2	16
PF3W540	5	40
PF3W511	10	100

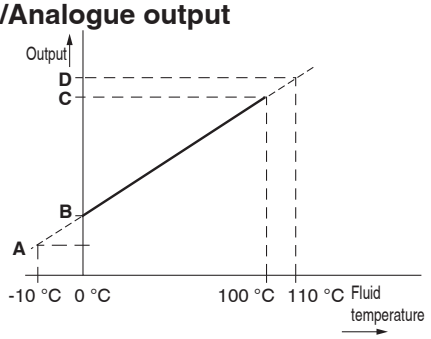


Fluid temperature/Analogue output

	A	B
Voltage output	0.6 V	1 V
Current output	2.4 mA	4 mA

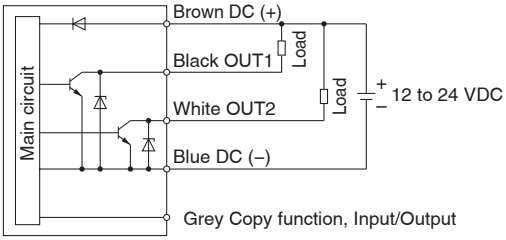
	C	D
Voltage output	5 V	5.4 V
Current output	20 mA	21.6 mA

Be sure to use in combination with the remote sensor unit with a temperature sensor.

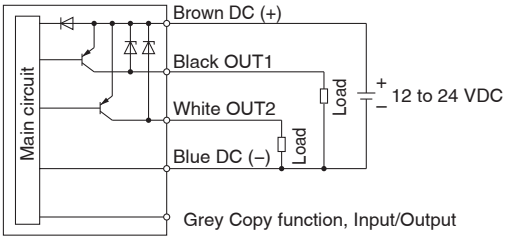


Internal Circuits and Wiring Examples

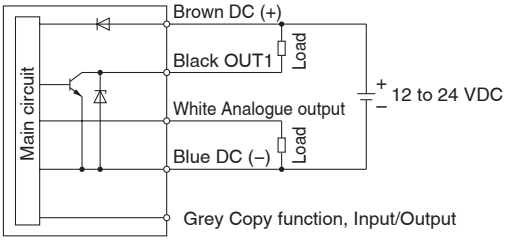
-A
NPN (2 outputs)



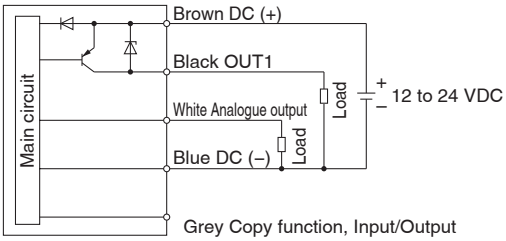
-B
PNP (2 outputs)



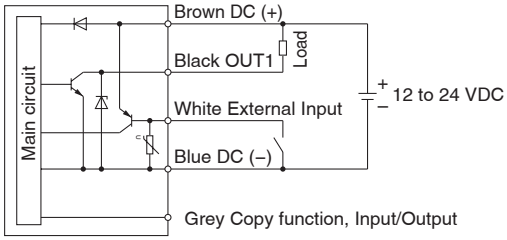
-C/D
C: NPN + Analogue voltage output
D: NPN + Analogue current output



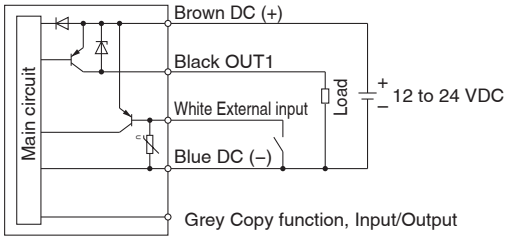
-E/F
E: PNP + Analogue voltage output
F: PNP + Analogue current output



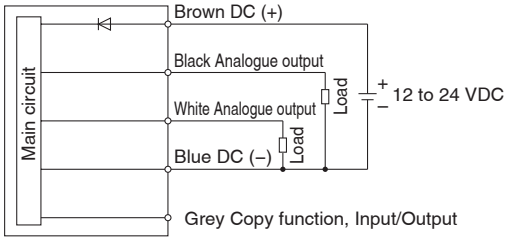
-G
NPN + External input



-H
PNP + External input

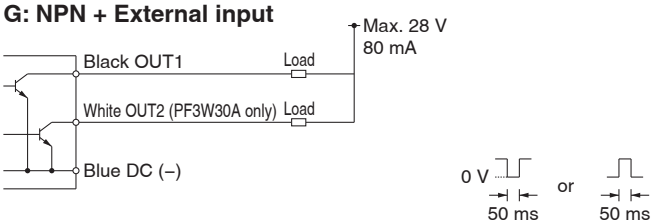


-J/K
J: Analogue voltage output
K: Analogue current output

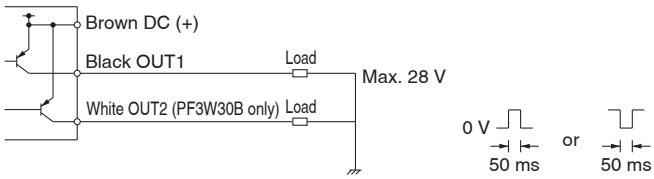


Accumulated pulse output wiring examples

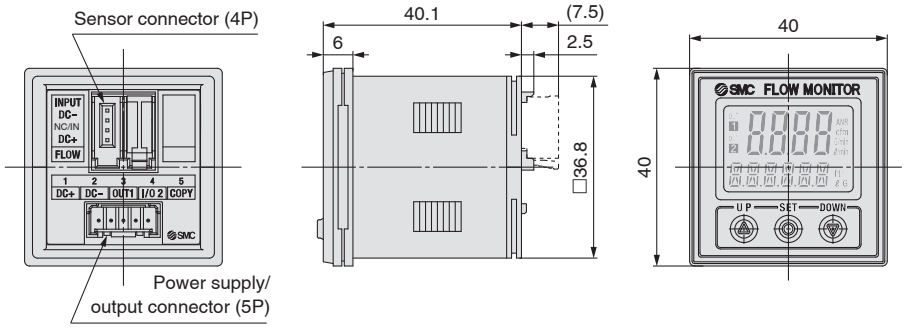
-A/C/D/G
A: NPN (2 outputs)
C, D: NPN + Analogue output
G: NPN + External input



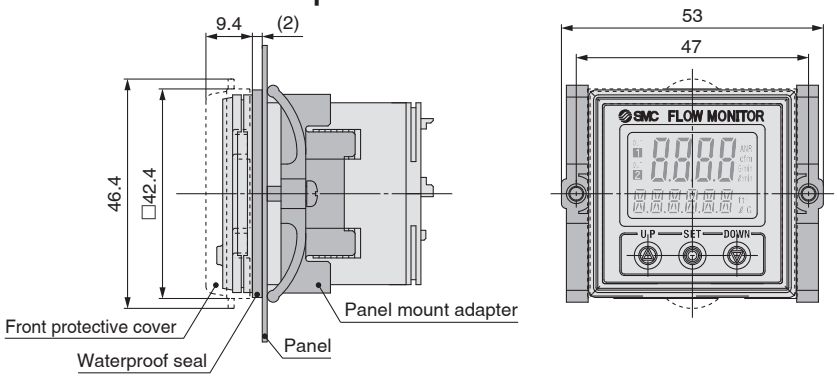
-B/E/F/H
B: PNP (2 outputs)
E, F: PNP + Analogue output
G: PNP + External input



Dimensions

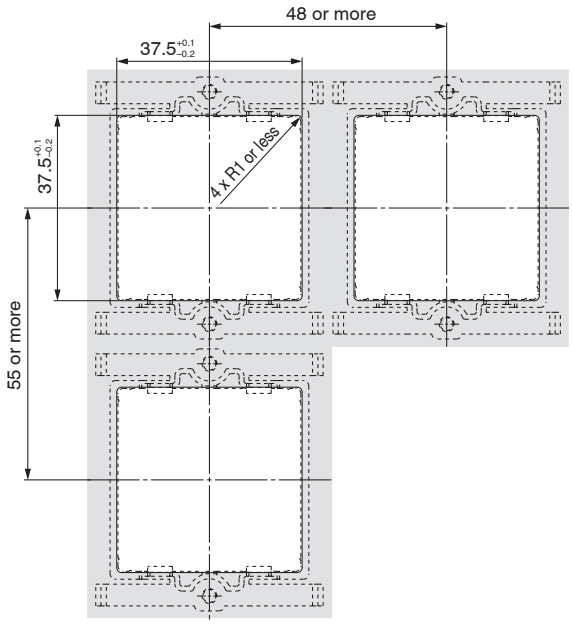


Front protective cover + Panel mount adapter

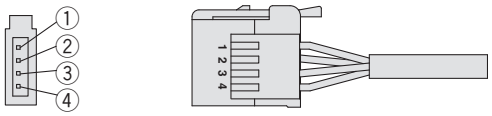


Panel fitting dimensions

Applicable panel thickness:
0.5 to 8 mm (Without waterproof seal)
0.5 to 6 mm (With waterproof seal)



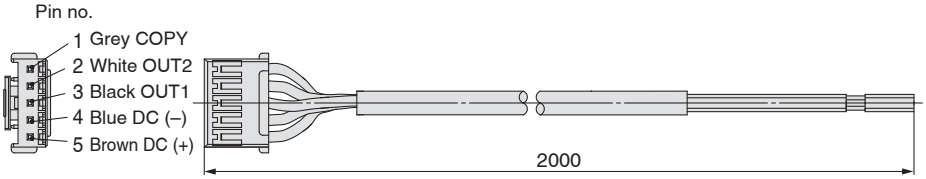
Sensor connector



Pin no.	Terminal	Connector no.	Lead wire colour*1
①	DC (+)	1	Brown
②	N.C./IN	2	White (Not used/Temperature sensor 1 to 5 V input)
③	DC (–)	3	Blue
④	INPUT	4	Black (Flow rate sensor 1 to 5 V input)

*1 When using the lead wire with M8 connector included with the PF3W5 series

Power supply/output connection lead wire



Lead Wire Specifications

Conductor	Nominal cross section	AWG 26
	O.D.	Approx. 0.5 mm
Insulator	Material	Cross-linked vinyl
	O.D.	Approx. 1.0 mm
	Colour	Brown, Blue, Black, White, Grey
Sheath	Material	Oil- and heat-resistant vinyl
Finished O.D.		ø3.5

* For wiring, refer to the Operation Manual on the SMC website, https://www.smc.eu

3-Screen Display
4-Channel Flow Monitor
PFG200 Series

How to Order

PFG20 0 – □ □ □ □

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)

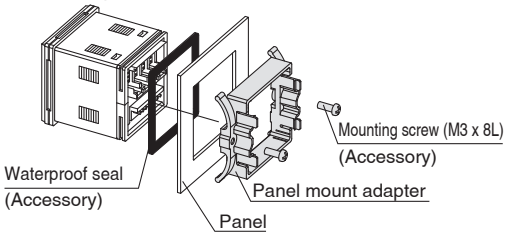
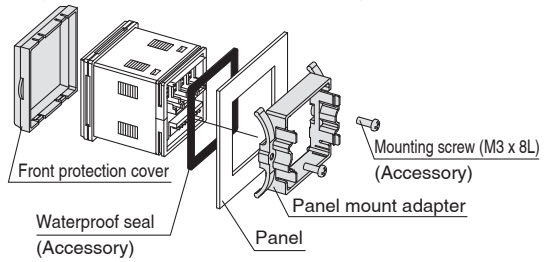
∗1 When the flow monitor is used as an IO-Link device, the total power supply current of the connected sensors should be 200 mA or less.

Unit specification

—	With unit selection function
M	SI units only∗2

∗3 Fixed unit: Instantaneous flow: l/min
Accumulated flow : L

Option 1

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

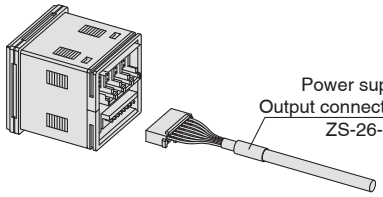
∗ Options are not assembled, but shipped together.

Option 2

—	None
4C	Sensor connector (4 pcs.) ∗ For PF2/3W5□

∗ Connector is not connected, but shipped together.

Option 3

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

∗ Cable is shipped together, but not connected.

Options/Part Nos.

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

Description	Part no.	Note
Power supply/Output connection cable	ZS-26-L	Length: 2 m
For PF2W5□□, PF3W5□□ Sensor connector (e-CON)	ZS-28-CA-4	1 pc., Finished O.D.: ø1.15 to ø1.35, Cover colour: Blue
Panel mount adapter	ZS-26-B	Mounting screw (M3 x 8 L, 2 pcs.), With waterproof seal
Panel mount adapter + Front protection cover	ZS-26-C	Mounting screw (M3 x 8 L, 2 pcs.), With waterproof seal
Front protection cover	ZS-26-01	—
Power supply with M12 connector cable (Made to Order)	ZS-26-LM12	For use when using an M12 connector for IO-Link communication

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

Specifications

Series			PFG20□ Series			
Applicable SMC flow sensor			**PF2(3)W504**	**PF2(3)W520**	**PF2(3)W540**	**PF2(3)W511**
Rated flow range			0.5 to 4 l/min	2 to 16 l/min	5 to 40 l/min	10 to 100 l/min
Instantaneous flow rate display/Set flow rate range			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.")	3.5 to 45.0 l/min (Flow under 3.5 l/min is displayed as "0.0.")	7 to 110 l/min (Flow under 7 l/min is displayed as "0.")
Instantaneous flow rate display/Min. setting unit			0.05 l/min	0.1 l/min	0.5 l/min	1 l/min
Accumulated flow display/Set flow rate range			0 to 99,999,999.9 L	0 to 999,999,999 L	0 to 999,999,999 L	
Accumulated flow display/Min. setting unit			0.1 L	1 L	1 L	
Accumulated pulse flow rate exchange value			0.05 L	0.1 L	0.5 L	1 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			
	Temperature characteristics		±0.5 % F.S. Max. (Reference: 25 °C)			
Switch output (SIO mode)	**Output type**		NPN or PNP open collector output: 5 outputs			
	Output mode		Hysteresis mode, Window comparator mode, Accumulated output, Accumulated pulse output, Error output, Output OFF			
	Switch operation		Normal output, Reversed output			
	Max. load current		80 mA			
	Max. applied voltage (NPN only)		30 VDC			
	Internal voltage drop (Residual voltage)		1.5 V or less (at load current of 80 mA)			
	Delay time*3		5 ms or less, variable from 0 to 60 s/0.01 s increments			
	Hysteresis		Variable from 0*5			
	Protection		Over current protection			
Analogue 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 33 to 35.)			
	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 colour		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 min between terminals and housing			
	Insulation resistance		50 MΩ or more (500 VDC measured via megohmmeter) between terminals and housing			
	Operating temperature range		Operating: 0 to 50 °C, Stored: -10 to 60 °C (No condensation)			
	Operating humidity range		Operating/Stored: 35 to 85 % RH (No condensation)			
Standards			CE/UKCA marking			
Weight	**Body**		51 g (Excludes power supply and output cable)			
	Power supply/Output cable		60 g			
	e-CON (1 pc.)		2 g			
Communication (IO-Link mode)	**IO-Link type**		Device			
	IO-Link version		V1.1			
	Communication speed		COM2 (38.4 kbps)			
	Configuration file		IODD file*7			
	Minimum cycle time		4.8 ms			
	Process data length		Input data: 10 bytes, Output data: 0 bytes			
	On request data communication		Yes			
	Data storage function		Yes			
	Event function		Yes			
	Vendor ID		131 (0 x 0083)			

*1 Check the power supply voltage range of the connected sensor.
*2 Over current on DC (+) side and DC (–) side of the sensor input connector results in breakage of the product.
*3 Value without digital filter (at 0 ms)
*4 The system accuracy when combined with an applicable flow sensor.
*5 If the applied pressure fluctuates around the set value, the hysteresis must be set to a value more than the amount of fluctuation, or chattering will occur.
*6 The response time indicates when the set value is 9 0 % in relation to the step input.
*7 The configuration file can be downloaded from the SMC website, https://www.smc.eu
*8 This setting is only possible for the PFG200/PFG201.
* Products with tiny scratches, marks, or display colour or brightness variations which do not affect the performance of the product are verified as conforming products.

Applicable Flow Sensors

Applicable SMC flow sensor	Rated flow range [l/min]
	0.5 1 2 4 5 10 20 40 50 100 200 250
PF2(3)W504	0.5 – 4
PF2(3)W520	2 – 16
PF2(3)W540	5 – 40
PF2(3)W511	10 – 100
PF3W521	50 – 250

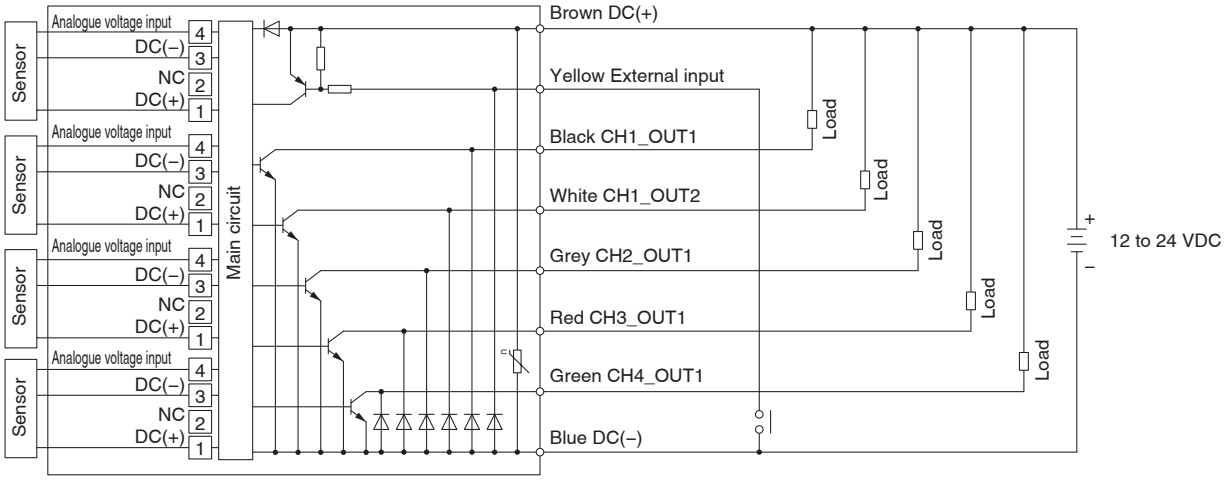
Internal Circuits and Wiring Examples

PFG20□–□□□□

Input/Output specifications

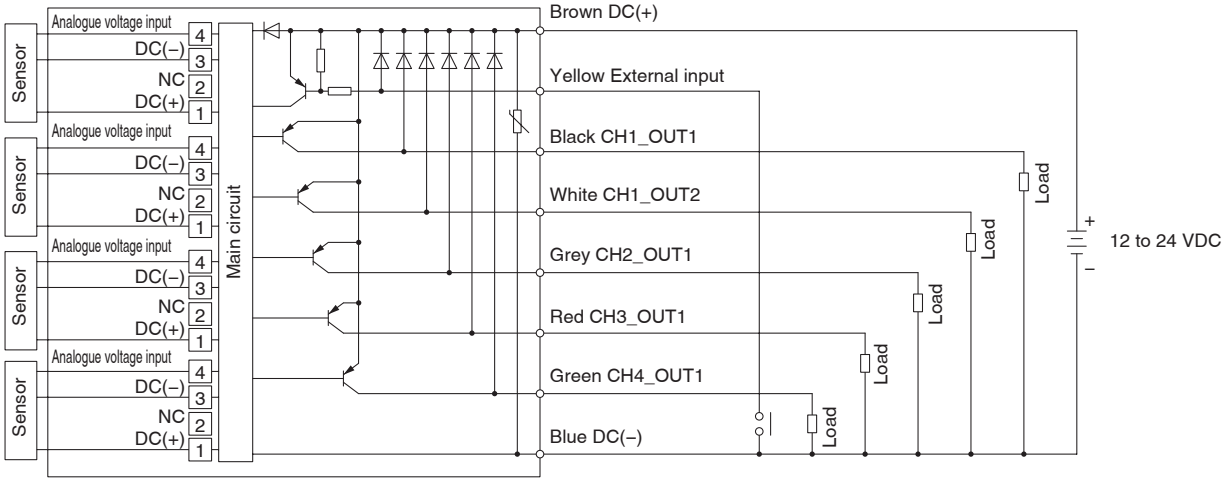
0

· NPN open collector 5 outputs + External input



1

· PNP open collector 5 outputs + External input



Internal Circuits and Wiring Examples

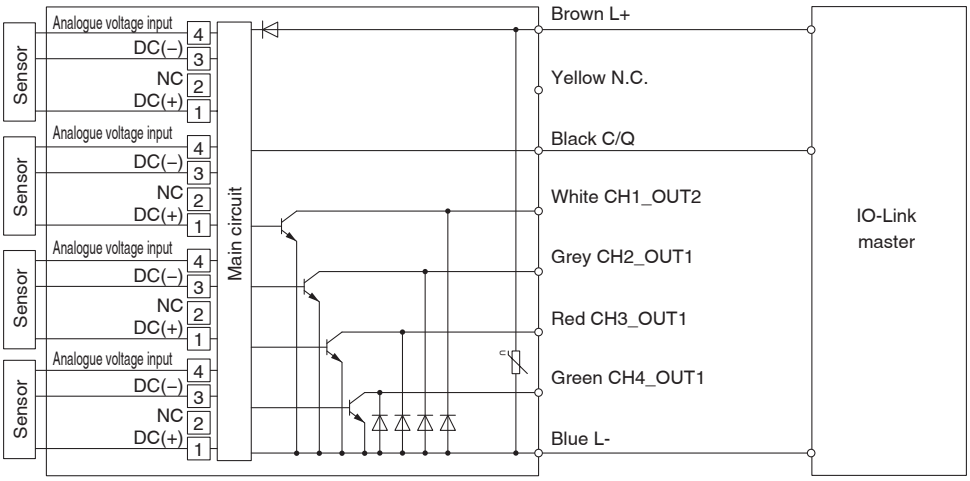
PFG20□–□□□□

Input/Output specifications

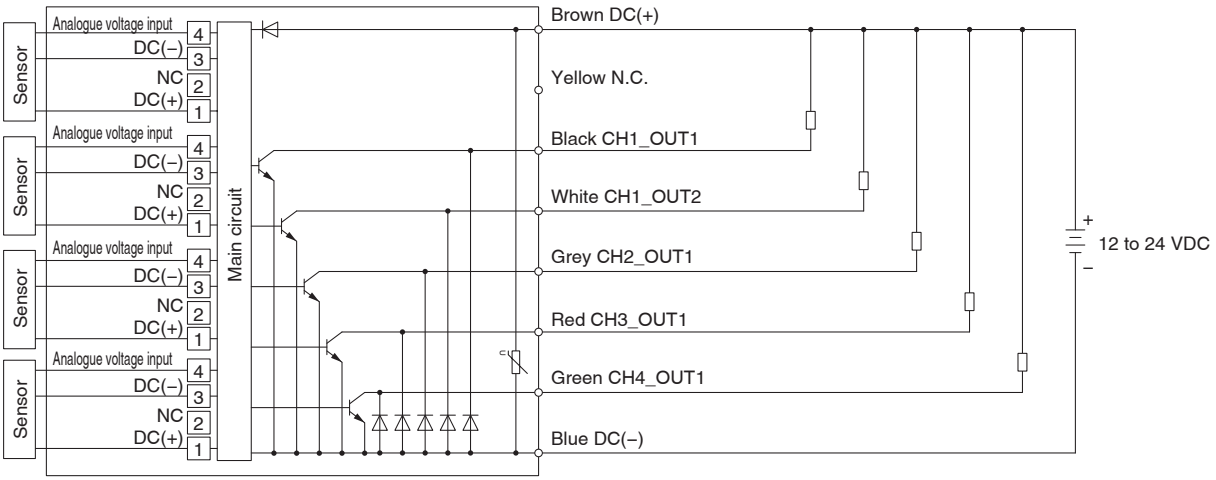
2

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

When used as an IO-Link device



When used as a switch output device



Internal Circuits and Wiring Examples

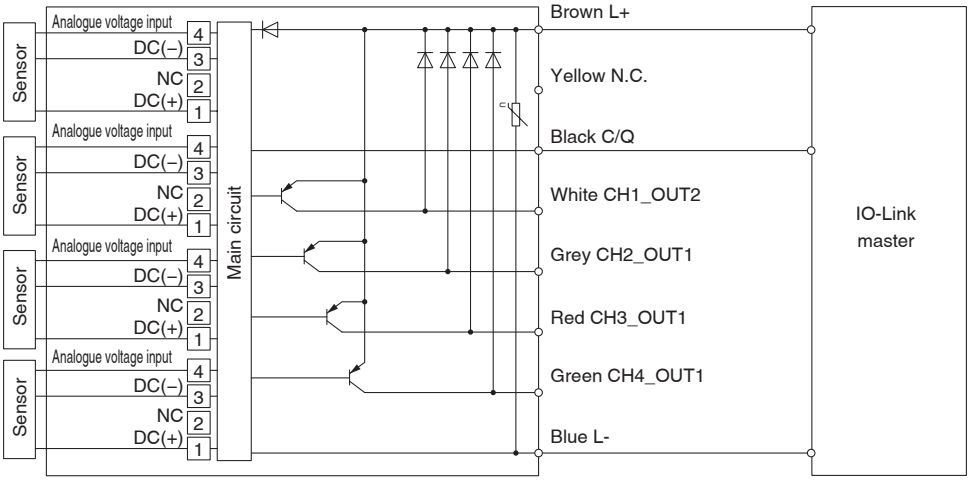
PFG20□–□□□□

Input/Output specifications

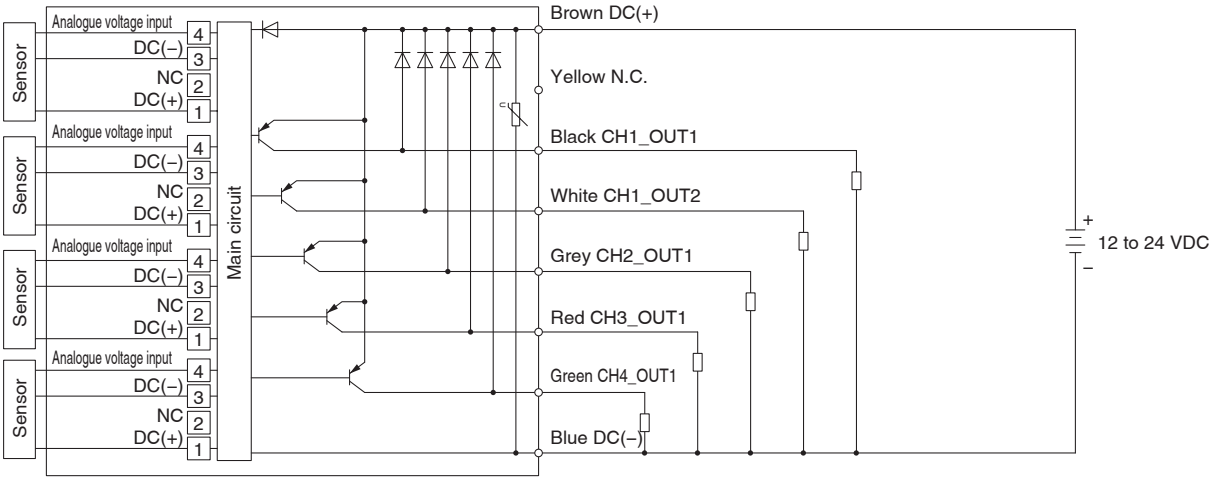
3

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

When used as an IO-Link device

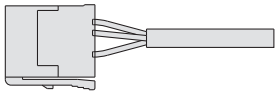


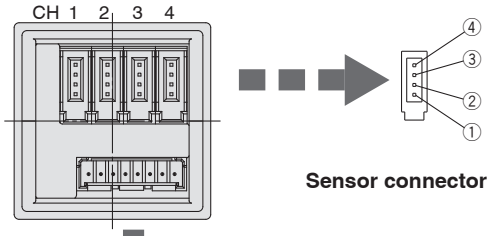
When used as a switch output device



Dimensions

Connector (Option)

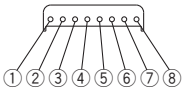


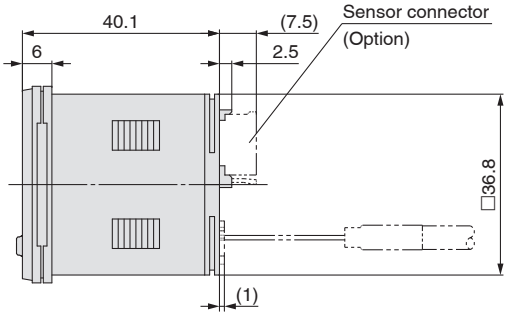


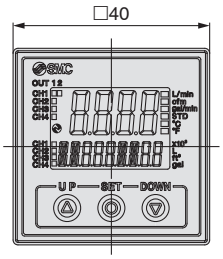
Pin no.	Terminal
①	DC (+)
②	N.C
③	DC (–)
④	IN (1 to 5 V)

Sensor connector (4P x 4)

Power supply/Output connector (8P)

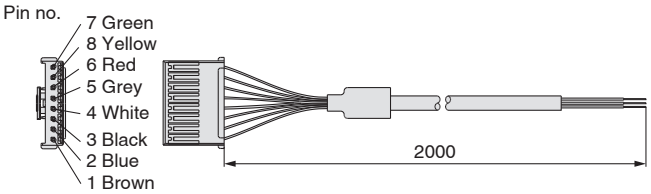






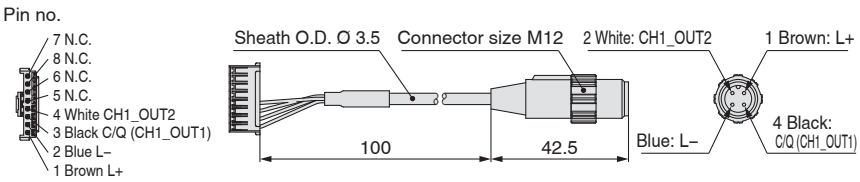
Pin no.	Terminal	
	PFG200/PFG201	PFG202/PFG203
①	DC (+)	L+
②	DC (–)	L–
③	CH1_OUT1	C/Q (CH1_OUT1)
④	CH1_OUT2	
⑤	CH2_OUT1	
⑥	CH3_OUT1	
⑦	CH4_OUT1	
⑧	Auto-shift input	N.C.

Power supply/Output connection cable (Accessory)

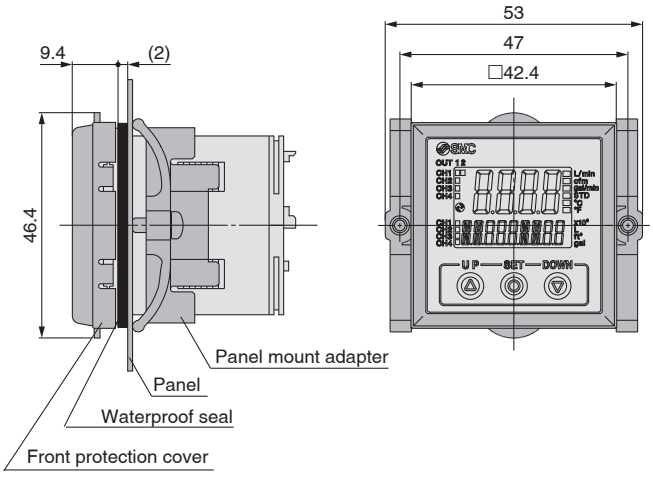


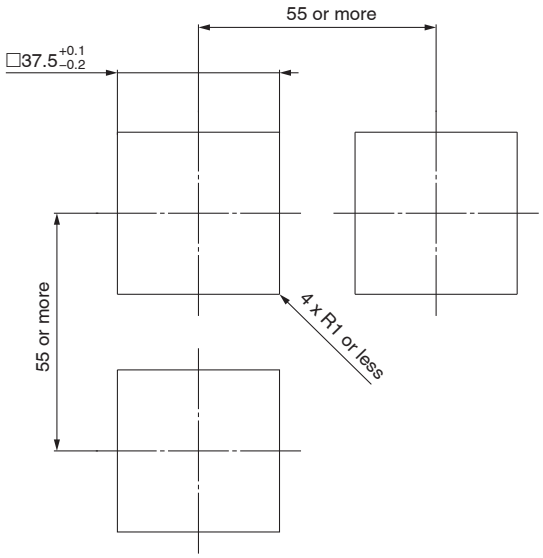
Power supply with M12 connector/Output cable (Made to Order)

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



Front protection cover + Panel mount adapter





Panel fitting dimensions
Applicable panel thickness:
0.5 to 8 mm

Function Details

Integrated Display (PF3W7-Z Series) / IO-Link Compatible (PF3W7-L Series)

■ Delay time setting (PF3W7-L series only)

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.
The total switching time is the switch operation time and the set delay time.
(Default setting: 0 s)

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

■ Output operation

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

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

■ 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

■ Response time (Digital filter)

The response time (digital filter) can be set to suit the application. Setting the response time (digital filter) can reduce chattering of the switch output and flickering of the analogue output and the display. The response time indicates when the set value is 90 % in relation to the step input.

* The temperature sensor output is fixed to 7 s.

Response time (Digital filter)	Applicable model	
	Integrated display PF3W7-Z series	**IO-Link compatible PF3W7-L series**
0.5	●	●
1.0 (Default)	●	●
2.0	●	●
5.0	—	●
10.0	—	●
15.0	—	●
20.0	—	●
30.0	—	●

■ External input function (PF3W7-Z series only)

This function can be used only when the optional external input is present. 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 (EEPROM) will be accessed. Take the life time of the memory device into consideration before using this function.

Peak/Bottom value 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 the confirmation of wiring and prevents system errors due to unexpected output.
For the analogue output type, when ON the output will be 5 V or 20 mA, and when OFF, it will be 1 V or 4 mA.
For IO-Link compatible PF3W7-L series. Diagnostic bit (error, flow rate, and temperature), process data (PD) flow, and temperature measurement can be checked.

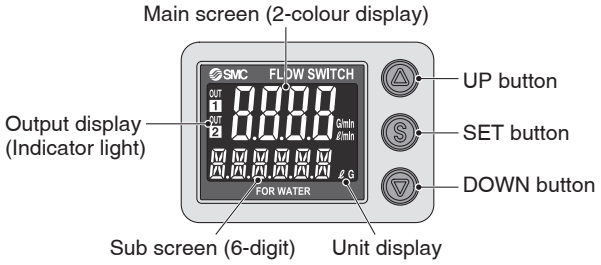
* Also, an increase or decrease of the flow and temperature will not change the on/off status of the output while the forced output function is activated.

■ Accumulated value hold

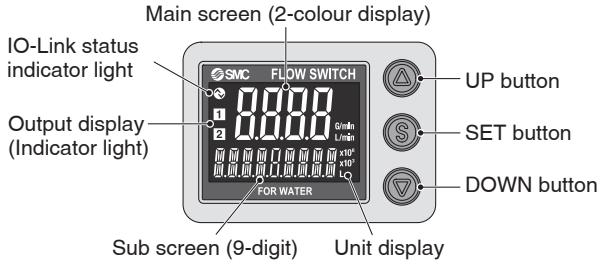
The accumulated value is not cleared even when the power supply is turned off.
The accumulated value is memorized every 2 or 5 minutes during measurement and continues from the last memorized value when the power supply is turned on again.
The maximum writable limit of the memory device is 1 million times for PF3W7-Z and 3.7 million times for PF3W7-L, which should be taken into consideration.

■ Display

Display layout for PF3W7-Z series and PF3W7-L series is different.



For PF3W7-Z



For PF3W7-Z

■ Power-saving mode

The display can be turned off to reduce power consumption.
In power-saving mode, only decimal points blink.
If any button is pressed during power-saving mode, the display is recovered for 30 seconds to check the flow, etc.

■ Setting of security code

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

■ 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.

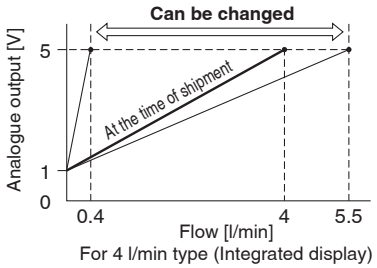
■ Key-lock function

Prevents operation errors such as accidentally changing setting values

Integrated Display (PF3W7-Z Series) / IO-Link Compatible (PF3W7-L Series)

■ Analogue output free range function (PF3W7-Z series only)

This function allows a flow that generates an output of 5 V or 20 mA to be changed. (This function is not available for the analogue output to the temperature.) This function is available if the analogue output type is used. The value can be changed between 10 % of the maximum value of the rated flow and the maximum value of the display range.



For 4 l/min type (Integrated display)

■ Error display function

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

Display	Description	Contents	Action	Applicable model	
				Integrated display PF3W7-Z series	IO-Link compatible PF3W7-L series
Er 1	OUT1 over current error	The switch output (OUT1) load current of 80 mA or more flows.	Turn the power OFF and remove the cause of the over current. Then turn the power ON again.	●	●
Er 2	OUT2 over current error	The switch output (OUT2) load current of 80 mA or more flows.		●	●
HHH	Instantaneous flow error	The flow has exceeded the upper limit of the display flow range.	Decrease the flow rate.	●	●
999999999 (Alternately displays [999] and [999999])	Accumulated flow error	The accumulated flow has exceeded the accumulated flow range.	Reset the accumulated flow.	●	—
9999 (Flashing)	Accumulated flow error	The accumulated flow has exceeded the accumulated flow range.	Reset the accumulated flow.	—	●
c HHH	Over upper limit of temperature	Fluid temperature exceeds 110 °C.	Lower the fluid temperature.	●	●
c LLL	Under lower limit of temperature	Fluid temperature is under –10 °C.	Raise the fluid temperature.	●	●
Er 0	System error	An internal data error has occurred.	Turn the power OFF and turn it ON again.	●	●
Er 4					
Er 6					
Er 8					
Er 7	System error	An internal data error has occurred.	Turn the power OFF and turn it ON again.	—	●
Er40					
Er12	Temperature sensor failure	Temperature sensor may be damaged.	Turn the power OFF and turn it ON again.	●	●
Er15	Version does not match	The IO-Link version does not match that of the master. The master uses version 1.0.	Ensure that the master IO-Link version matches the device version.	—	●

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

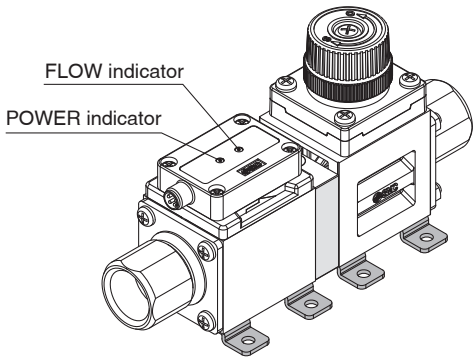
Remote Sensor Unit (PF3W5-Z Series)

■ POWER indicator function

It is possible to check whether power supply is reaching the product. When power is supplied to the product, the indicator lights up green.

■ FLOW indicator function

Status of the flow rate can be checked visually. When the flow rate increases, the green lamp blinks faster. When below the measurable lower limit of flow rate, the lamp turns off, when above the measurable upper limit of flow rate, red lamp turns on.



■ Error display function

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

LED display	Description	Contents	Action
POWER Green Red FLOW FLOW indicator: Red ON	Over upper limit of flow rate	Flow is approximately 110 % or more of the rated flow.	Decrease the flow rate.
POWER Red POWER indicator: Blinking red	Temperature measurement range error	Fluid temperature is either under –10 °C or over 110 °C.	Adjust the fluid temperature within the measurable temperature range.
POWER Red Red FLOW POWER indicator: Blinking red FLOW indicator: Red ON	Over upper limit of flow rate and temperature measurement range error	Refer to above.	Refer to above.

LED display	Description	Contents	Action
POWER Red Red FLOW POWER indicator: Red ON FLOW indicator: Red ON	System error	Internal data error or other errors occur.	Turn the power off and then on again. If the error cannot be rectified, please contact SMC for investigation.
POWER Red Red FLOW POWER indicator: Red ON FLOW indicator: Blinking red			
POWER Red FLOW POWER indicator: Red ON FLOW indicator: OFF		Temperature sensor may be damaged.	

If the error 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.

⚠ **Danger:**	**Danger** indicates a hazard with a high level of risk which, if not avoided, will result in death or serious injury.
⚠ **Warning:**	**Warning** indicates a hazard with a medium level of risk which, if not avoided, could result in death or serious injury.
⚠ **Caution:**	**Caution** indicates a hazard with a low level of risk which, if not avoided, could result in minor or moderate injury.

1) ISO 4414: Pneumatic fluid power – General rules and safety requirements for systems and their components.
ISO 4413: Hydraulic fluid power – General rules and safety requirements for systems and their components.
IEC 60204-1: Safety of machinery – Electrical equipment of machines. (Part 1: General requirements)
ISO 10218-1: Robots and robotic devices - Safety requirements for industrial robots - Part 1: Robots.
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. Our products cannot be used beyond their specifications.
Our products are not developed, designed, and manufactured to be used under the following conditions or environments.
Use under such conditions or environments is not covered.
1. Conditions and environments outside of the given specifications, or use outdoors or in a place exposed to direct sunlight.
2. Use for nuclear power, railways, aviation, space equipment, ships, vehicles, military application, equipment affecting human life, body, and property, fuel equipment, entertainment equipment, emergency shut-off circuits, press clutches, brake circuits, safety equipment, etc., and use for applications that do not conform to standard specifications such as catalogues and operation manuals.
3. Use for interlock circuits, except for use with double interlock such as installing a mechanical protection function in case of failure. Please periodically inspect the product to confirm that the product is operating properly.

⚠ Caution

We develop, design, and manufacture our products to be used for automatic control equipment, and provide them for peaceful use in manufacturing industries.
Use in non-manufacturing industries is not covered.
Products we manufacture and sell cannot be used for the purpose of transactions or certification specified in the Measurement Act.
The new Measurement Act prohibits use of any unit other than SI units in Japan.

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 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.

Revision History

Edition B	- The PFG200 series 4-channel flow monitor has been added. - An analogue voltage 2-output type (flow rate + temperature) has been added. - An analogue current 2-output type (flow rate + temperature) has been added. - Number of pages has been increased from 32 to 44.	BZ

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Printing BX 00 Printed in Spain