3-Colour Display Digital Flow Switch for Water

CE c UL us *4
*4 Excludes -X445

RoHS

IP65

3-colour/2-screen display

Main screen
Sub screen *3

OUT 1 13.7 ℓ/min
P 8.0
FLOW SWITCH
FOR WATER

| Main screen | Instantaneous flow rate*1 |
| Sub screen *3 | Set value |

OUT 1 10.0 ℓ/min 18400. FOR WATER
OUT 1 13.7 ℓ/min H: 16.0 FOR WATER
OUT 2 13.7 ℓ/min SMC_PF FOR WATER
13.7 ℓ/min c 25 FOR WATER

Instantaneous flow rate*1

| Accumulated value | Peak/Bottom value | Line name | Fluid temperature*2 |

*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.

New ◊ IO-Link compatible products have been added to the integrated display type. p. 16

Made to order
PF3W7□-X445

Integrated flow adjustment valve and temperature sensor

Flow adjustment valve

Temperature sensor

Remote type

Remote sensor unit

Remote type
3-colour display Digital flow monitor

PVC piping type
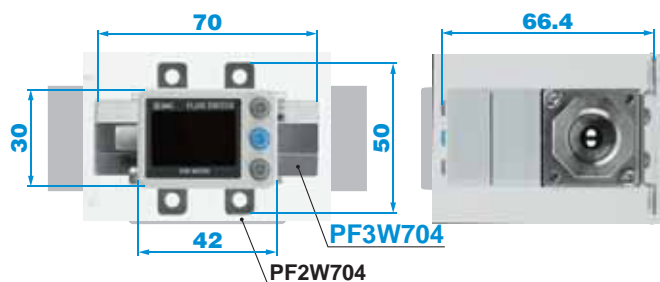
- Applicable fluid: Deionised water, chemical liquids, etc.
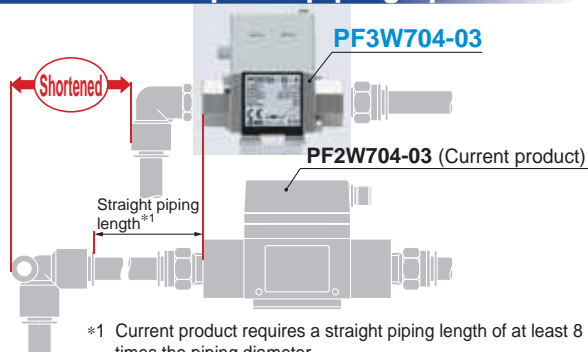- Integrated type and remote type added to series

PF3W Series

SMC

CAT.EUS100-80D-UK

40% smaller than the current product

70

66.4

30

50

42

PF3W704

PF2W704

Reduced required piping space

PF3W704-03

Shortened

PF2W704-03 (Current product)

Straight piping length[*1]

*1 Current product requires a straight piping length of at least 8 times the piping diameter.
Refer to straight piping length and accuracy on pages 9 and 19.

Temperature sensor

Display range: –10 to 110 °C
(Temperature sensor alone)

Smallest settable increment: 1 °C

**Analogue output:
Current output/Voltage output**

Temperature display

PF3W720S-04-0T-MR

Temperature sensor

Flow adjustment valve

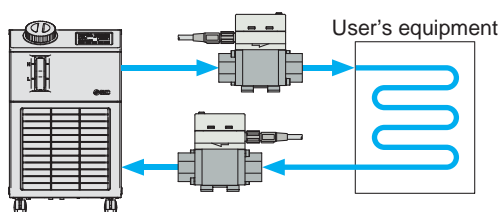**Space saving with reduced piping labour**

Fluid temperature: 0 to 90 °C

Ethylene glycol aqueous solution can be used.

Example) Flow control of the circulating fluid in a chiller
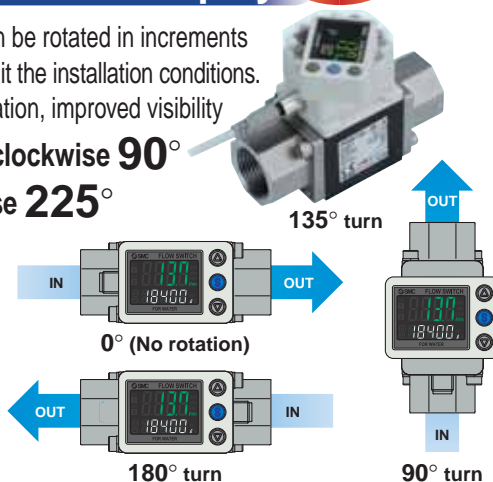
User's equipment

Non-grease

Rotatable display

Display can be rotated in increments of 45° to suit the installation conditions.
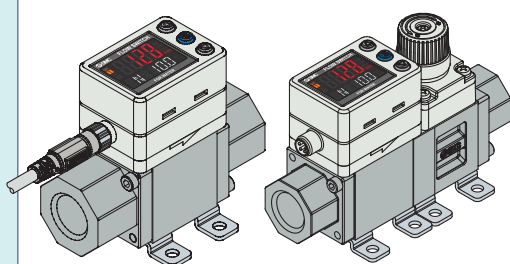Easy operation, improved visibility
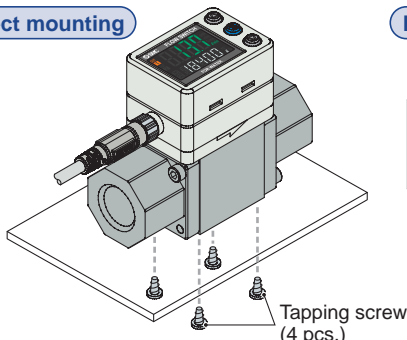
Counterclockwise 90°

Clockwise 225°

135° turn

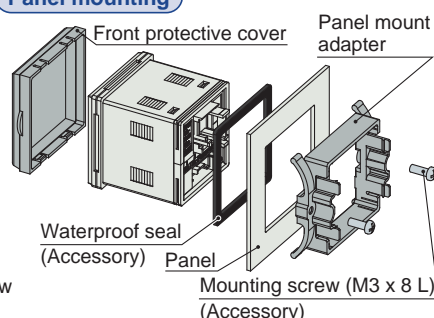IN   OUT

0° (No rotation)

OUT   IN

180° turn

OUT

IN

90° turn

◎Mounting

Bracket mounting

Direct mounting

Tapping screw (4 pcs.)

Panel mounting

Front protective cover

Panel mount adapter

Waterproof seal (Accessory)

Panel

Mounting screw (M3 x 8 L) (Accessory)

1

SMC

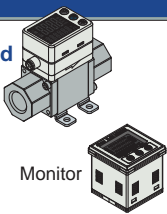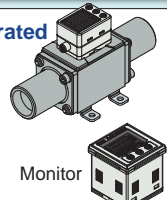## Added: Measured flow rate **250 l/min** type

Variations

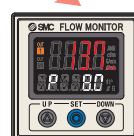| Type	Applicable fluid	Rated flow range [l/min]	Flow adjustment valve/Temperature sensor				Port size Rc, NPT, G
			None	Flow adjustment valve	Temperature sensor	Flow adjustment valve + Temperature sensor	
Integrated / **Remote** Sensor / Monitor	Water Ethylene glycol aqueous solution	0.5 to 4	●	●	●	●	3/8
		2 to 16	●	●	●	●	3/8, 1/2
		5 to 40	●	●	●	●	1/2, 3/4
		10 to 100	●	—	●	—	3/4, 1
		50 to 250	●	—	●	—	1¼, 1½
PVC piping type **Integrated** / **Remote** Sensor / Monitor	Deionised water	10 to 100	●	—	—	—	25A
	Chemical liquids	30 to 250	●	—	—	—	30A

3-colour display **Digital flow monitor: The set value can be copied to up to 10 flow monitors simultaneously.**

The settings of the master monitor (source of copy) can be copied to the slave monitors.

Copy

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

Master monitor (Source of copy)
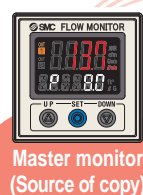
Slave side (Copy destination)→ 1 unit   2 units   10 units

PF3WS04-03-1T-R
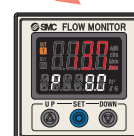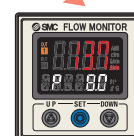
Indicator

Visually check the status of the sensor via the indicator.
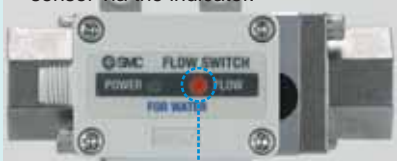
Flow rate: High	☀ Blinking green/Fast
Flow rate: Low	☀ Blinking green/Slow
Rated flow or less	⬤ OFF
Rated flow or more	🔴 Red ON

Connector reduces wiring labour

e-con connector: No tools or peeling required.

M8 connector

Power supply/output connection lead wire
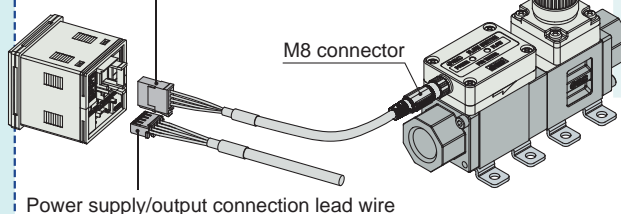
PVC piping type

Wetted Parts

Pipe	CPVC (Heat-resistant PVC)
Body	PPS
Seal	FKM

IO-Link Compatible PF3W7□-X445

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.

PLC

Fieldbus

PC

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
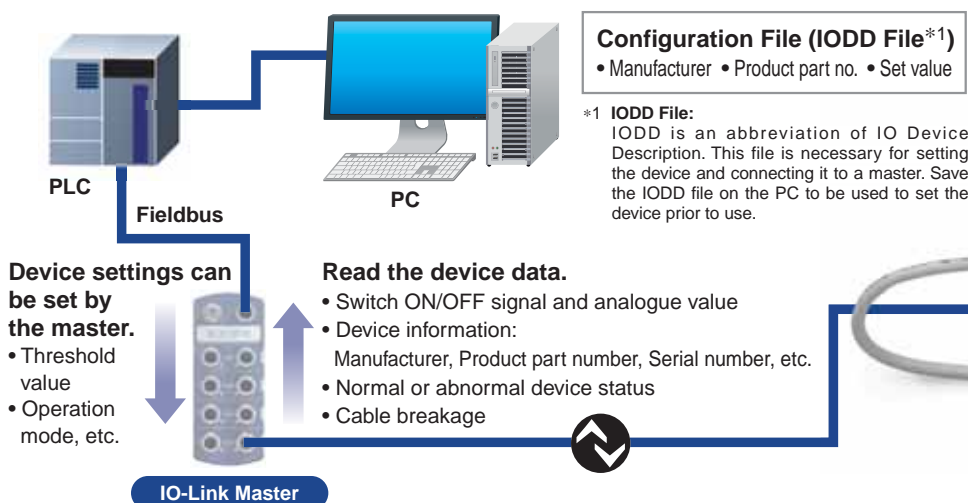
Implement diagnostic bits in the process data.

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 (error)	0: OFF 1: ON
9	Diagnosis (flow rate)	0: OFF 1: ON
10	Diagnosis (temperature)	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 range
• Accumulated flow error
• Above the rated temperature range
• Below the rated temperature range
• Internal product malfunction
• Temperature sensor failure

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.

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)															

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

Chiller

Digital flow switch for water

User's equipment
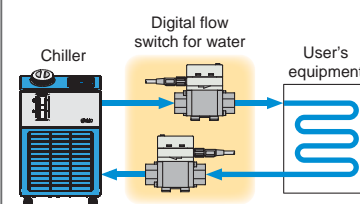
Display function

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

SIO mode	Start-up mode	Preoperate mode	Operate mode
ModE Sio	ModE Strt	ModE PrE	ModE oPE
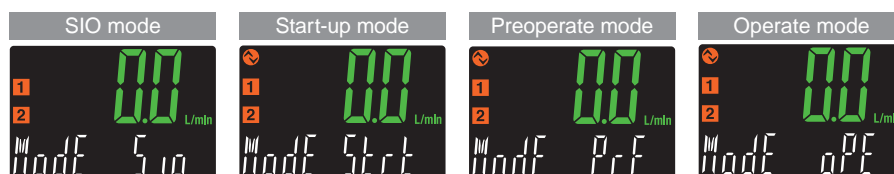
Operation and Display

Communication with master	IO-Link status indicator light	Status			Screen display	Description
Yes	⬤[*1]	Normal		Operate	ModE oPE	Normal communication status (readout of measured value)
	(Flashing)[*1]			Start up	ModE Strt	At the start of communication
				Preoperate	ModE PrE	
		IO-Link mode	Abnormal	Version does not match	Er 15 V1.0	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.

3

SMC

CONTENTS

3-Colour Display Digital Flow Switch for PVC Piping
PF3W

3-Colour Display Digital Flow Monitor for Water
PF3W3

Function
Details

SMC

4

Digital Flow Switch for Water
PF3W Series $C\epsilon$ $_c\mathbf{\Re}_{US}$

RoHS

How to Order

Remote sensor unit **Output specification/Temperature sensor**

For how to order of remote monitor unit, refer to page 24.

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 remote monitor (PF3W3 series), select analogue output of 1 to 5 V of flow rate (output symbol "-1" or "-1T").

∗ Analogue output of 4 to 20 mA with temperature sensor is made to order. (Refer to page 15.)

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

Remote sensor unit **PF3W 5** `04` `—` `03` `—` `1T` `—` `—` `—` `—`

Integrated display **PF3W 7** `04` `—` `03` `—` `AT` `—` `M` `—` `—`

Type

5	Remote sensor unit
7	Integrated display

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
21	50 to 250 l/min

Flow adjustment valve

Symbol	With/without flow adjustment valve	Rated flow range				
		04	20	40	11	21
—	None	●	●	●	●	●
S	Yes	●	●	●	—	—

∗ 100 and 250 l/min types with flow adjustment valves are not available.

∗ The flow adjustment valve of this product is not suitable for applications which require constant adjustment of flow rate.

∗1 External input: The accumulated value, peak value, and bottom value can be reset.

∗2 For units with temperature sensor, only OUT2 can be set as either temperature output or flow rate output. Setting when shipped is for temperature output.

Thread type

—	Rc
N	NPT
F	G∗1

∗1 ISO 228 equivalent

Port size

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

Integrated display **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	

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 temperature sensor can only display the flow rate.

Made to order

X109	EPDM seal material
X128	Analogue 4 to 20 mA 2-output type∗1
X143	Brass piping material specification
X445	IO-Link compatible∗2

∗1 Applicable only for remote type with temperature sensor (Refer to page 15.)
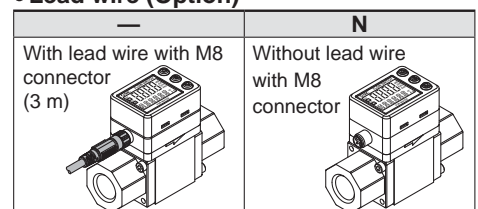∗2 Integrated display type only

Bracket (Option)

—	None
R	With bracket
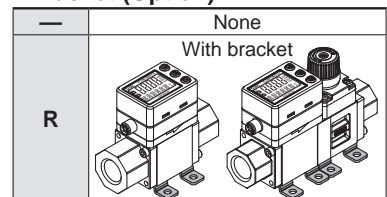
∗ Bracket is not available for 250 l/min type.

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

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 flow adjustment valve, 2 brackets are required.

Lead wire (Option)

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

SMC

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	PF3W721
Applicable fluid	Water and ethylene glycol aqueous solution (with 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	50 to 250 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")	20 to 350 l/min (Flow under 20 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	20 to 350 l/min
Smallest settable increment	0.01 l/min	0.1 l/min		1 l/min	2 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	2 L/pulse
Fluid temperature	0 to 90 °C (No freezing or condensation)				0 to 70 °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 maximum flow				60 kPa or less at the maximum flow
Accumulated flow range*4	99999999.9 L		999999999 L		
	By 0.1 L	By 0.5 L	By 1 L		

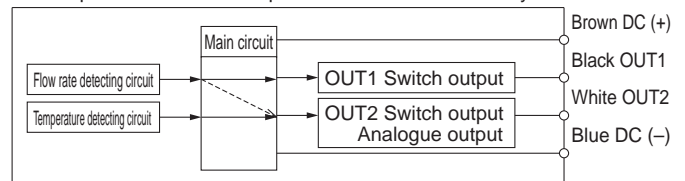| Switch output		NPN or PNP open collector output				
	Max. load current	80 mA				
	Max. applied voltage	28 VDC				
	Internal voltage drop	NPN: 1 V or less (at load current of 80 mA) PNP: 1.5 V or less (at load current of 80 mA)				
	Response time*2, 5	0.5 s/1 s/2 s				
	Output protection	Short-circuit 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				
Environment	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 minute between terminals and housing				
	Insulation resistance	50 MΩ or more (500 VDC measured via megohmmeter) between terminals and housing				
Standards and regulations		CE marking, (EMC directive, RoHS directive), 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	1 1/4, 1 1/2
Weight	Without temperature sensor/Without flow adjustment valve	210 g	260 g	410 g	720 g	890 g
	With temperature sensor/Without flow adjustment valve	285 g	335 g	530 g	860 g	1075 g
	Without temperature sensor/With flow adjustment valve	310 g	360 g	610 g	—	—
	With temperature sensor/With flow adjustment valve	385 g	435 g	730 g	—	—
	With lead wire with connector	+85 g				

*1 Refer to the graph of measurable range for ethylene glycol aqueous solution on page 10. Measurement is possible as long as the fluid does not corrode the wetted parts and 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 and proof pressure may change according to the fluid temperature. Refer to the graphs on page 8.
*4 Cleared when the power supply is turned off. The hold function can be selected. (Intervals of 2 or 5 minutes can be selected.)
  If the 5-minute interval is selected, the life of the memory element (electronic parts) is limited to 1 million times. (If energised for 24 hours, life is calculated as 5 minutes x 1 million = 5 million minutes = 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 "Wetted Parts Construction" on page 10.
*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.

PF3W Series

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

Specifications (Remote Sensor Unit)

Refer to page 25 for monitor unit specifications.

Model	PF3W504	PF3W520	PF3W540	PF3W511	PF3W521
Applicable fluid	Water and ethylene glycol aqueous solution (with 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	50 to 250 l/min
Fluid temperature	0 to 90 °C (No freezing or condensation)				0 to 70 °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 maximum flow				60 kPa or less at the maximum flow
Analogue output — Response time[3]	1 s				
Analogue output — Voltage output	Voltage output: 1 to 5 V Output impedance: 1 kΩ				
Analogue output — 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				
Environment — Enclosure	IP65				
Environment — Operating temperature range	0 to 50 °C (No freezing or condensation)				
Environment — Operating humidity range	Operation, Storage: 35 to 85 % R.H. (No condensation)				
Environment — Withstand voltage[4]	1000 VAC for 1 minute between terminals and housing				
Environment — Insulation resistance	50 MΩ or more (500 VDC measured via megohmmeter) between terminals and housing				
Standards and regulations	CE marking, (EMC directive, RoHS directive), 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	1 1/4, 1 1/2
Weight — Without temperature sensor/Without flow adjustment valve	195 g	245 g	395 g	705 g	875 g
Weight — With temperature sensor/Without flow adjustment valve	270 g	320 g	515 g	840 g	1060 g
Weight — Without temperature sensor/With flow adjustment valve	295 g	345 g	595 g	—	—
Weight — With temperature sensor/With flow adjustment valve	370 g	415 g	715 g	—	—
With lead wire with connector	+85 g				

[1] Refer to the graph of measurable range for ethylene glycol aqueous solution on page 10. Measurement is possible as long as the fluid does not corrode the wetted parts and 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 8.
[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 "Wetted Parts Construction" on page 10.
[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.

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.

Sensor	Flow range
	0.5 l/min 2 l/min 5 l/min 20 l/min 40 l/min 100 l/min 140 l/min 250 l/min 350 l/min
PF3W704 PF3W504	0.5 l/min – 4 l/min; 0.35 l/min – 5.5 l/min; 0.35 l/min – 5.5 l/min
PF3W720 PF3W520	2 l/min – 16 l/min; 1.7 l/min – 22 l/min; 1.7 l/min – 22 l/min
PF3W740 PF3W540	5 l/min – 40 l/min; 3.5 l/min – 55 l/min; 3.5 l/min – 55 l/min
PF3W711 PF3W511	10 l/min – 100 l/min; 7 l/min – 140 l/min; 7 l/min – 140 l/min
PF3W721	50 l/min – 250 l/min; 20 l/min – 350 l/min; 20 l/min – 350 l/min
PF3W521	50 l/min – 250 l/min; 20 l/min – 280 l/min; 20 l/min – 280 l/min

Rated flow range ▬   Display flow range ▬   Set flow range ▬

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

SMC

Analogue Output
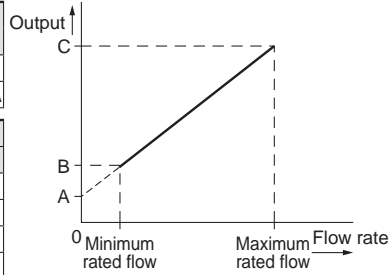
Flow rate/Analogue output

	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]	
	Minimum	Maximum
PF3W704/504	0.5	4
PF3W720/520	2	16
PF3W740/540	5	40
PF3W711/511	10	100
PF3W721/521	50	250

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
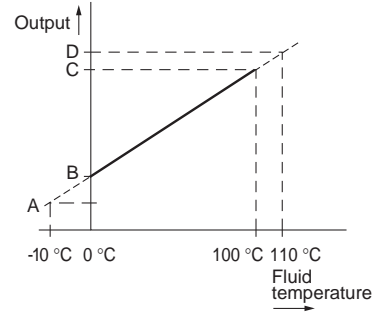
Operating Pressure and Proof Pressure

PF3W704/720/740/504/520/540
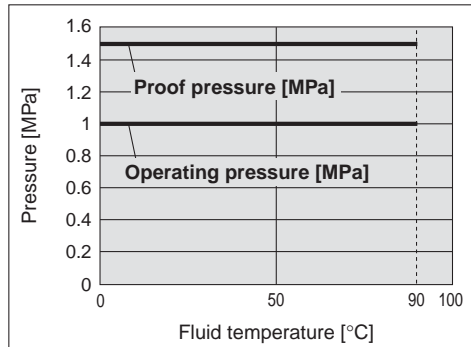
PF3W704S/720S/740S/504S/520S/540S
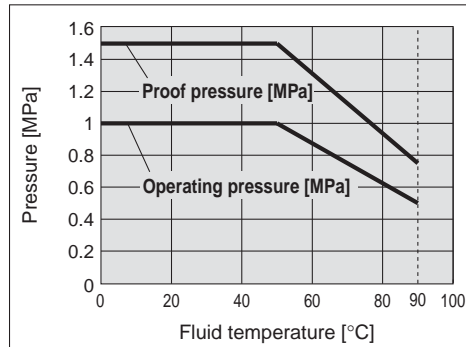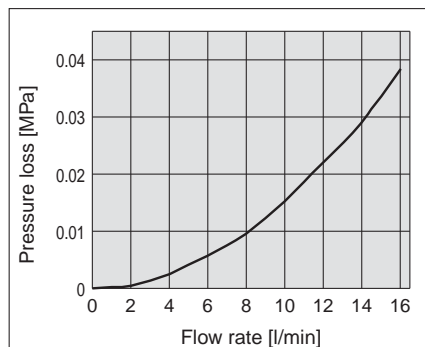

PF3W711/511
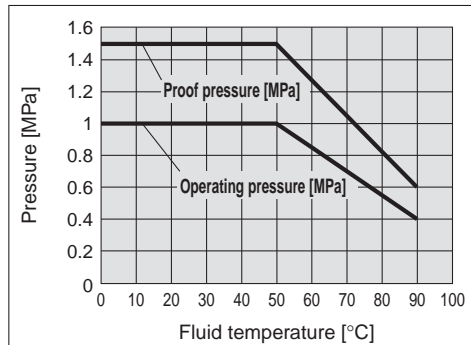
PF3W721/521
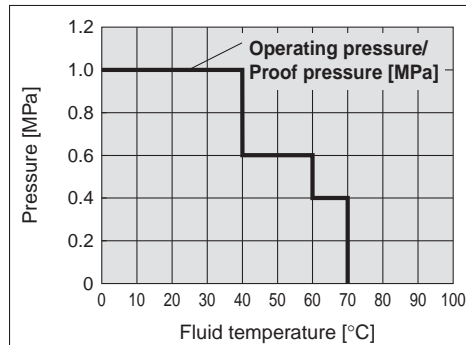
PF3W Series

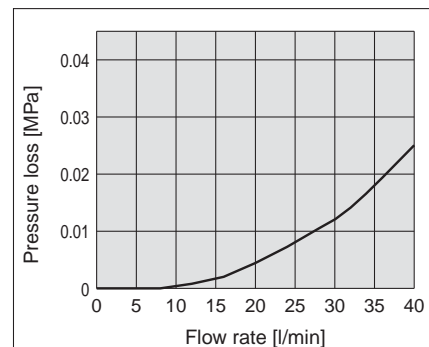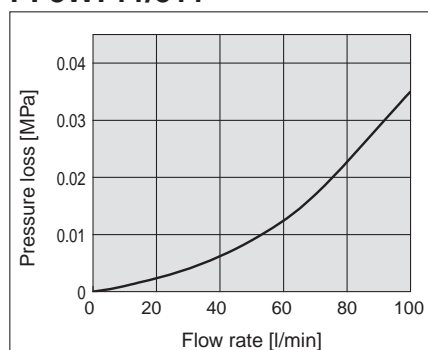## Flow Rate Characteristics (Pressure Loss: Without Flow Adjustment Valve)
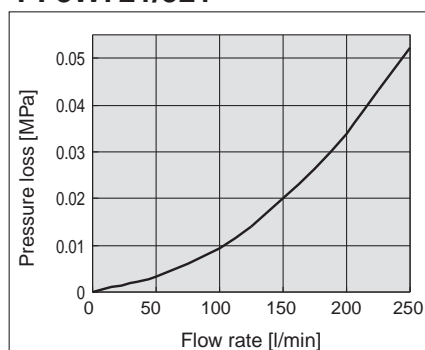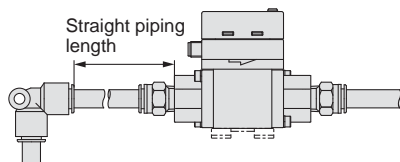
PF3W704/504
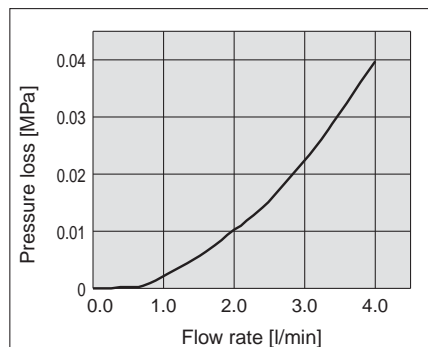
PF3W720/520

PF3W740/540

PF3W711/511
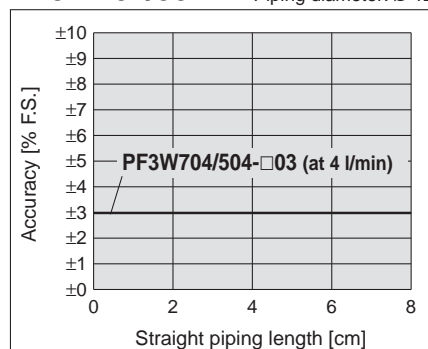

PF3W721/521

Straight Piping Length and Accuracy (Reference Value)

Straight piping length

- 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.
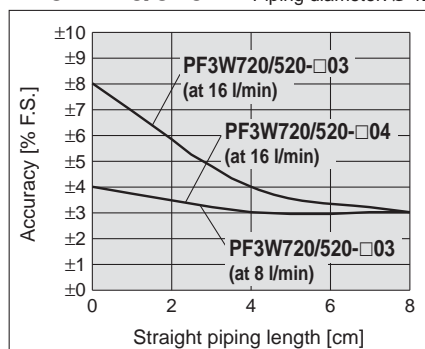 (11 cm or longer for 100 l/min and 250 l/min types)
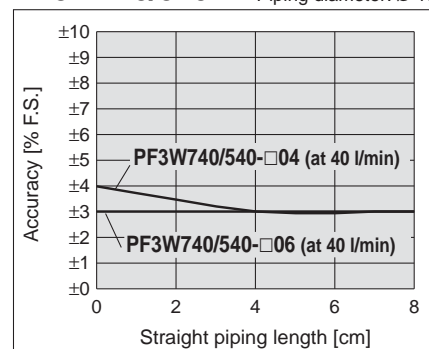
PF3W704/504
Pressure: 0.3 MPa
Piping diameter: Ø 12

PF3W704/504-□03 (at 4 l/min)

PF3W720/520
Pressure: 0.3 MPa
Piping diameter: Ø 12

PF3W720/520-□03 (at 16 l/min)

PF3W720/520-□04 (at 16 l/min)

PF3W720/520-□03 (at 8 l/min)

PF3W740/540
Pressure: 0.3 MPa
Piping diameter: Ø 16

PF3W740/540-□04 (at 40 l/min)

PF3W740/540-□06 (at 40 l/min)

PF3W711/511
Pressure: 0.3 MPa Piping diameter: 25A (Port size 10)
20A (Port size 06)

PF3W711/511-□06 (at 100 l/min)

PF3W711/511-□10 (at 100 l/min)

PF3W711/511-□06 (at 50 l/min)

PF3W711/511-□10 (at 50 l/min)
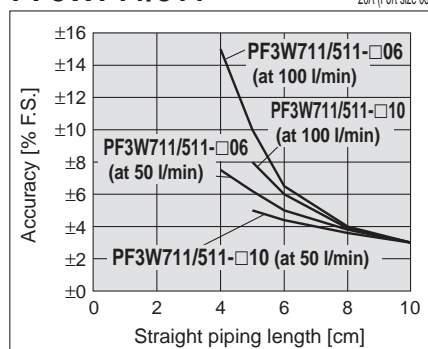
PF3W721/521
Pressure: 0.3 MPa Piping diameter: 32A (Port size 12)
40A (Port size 14)

PF3W721/521-□14 (at 250 l/min)

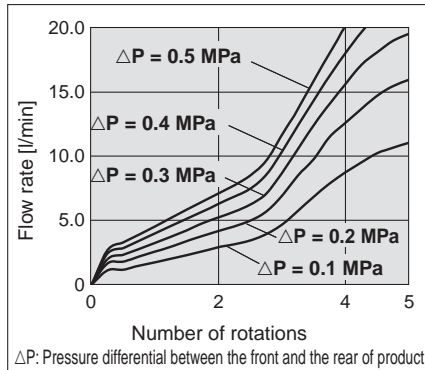PF3W721/521-□12 (at 250 l/min)
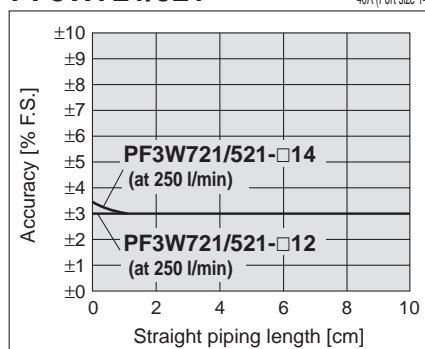
∗ No data for 4 cm, or for under 5 cm, as these cannot be used due to piping dimensions.
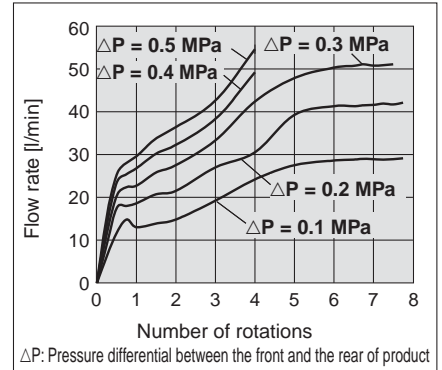
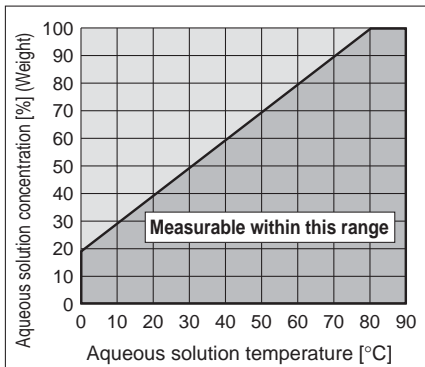## Flow Rate Characteristics of Flow Adjustment Valve

PF3W704S/504S

Flow rate [l/min] vs Number of rotations
△P = 0.5 MPa
△P = 0.4 MPa
△P = 0.3 MPa
△P = 0.2 MPa
△P = 0.1 MPa

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

PF3W720S/520S

Flow rate [l/min] vs Number of rotations
△P = 0.5 MPa
△P = 0.4 MPa
△P = 0.3 MPa
△P = 0.2 MPa
△P = 0.1 MPa

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

PF3W740S/540S

Flow rate [l/min] vs Number of rotations
△P = 0.5 MPa △P = 0.3 MPa
△P = 0.4 MPa
△P = 0.2 MPa
△P = 0.1 MPa

△P: Pressure differential between the front and the rear of product
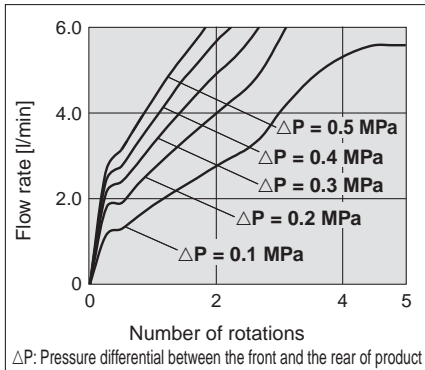
Measurable Range for Ethylene Glycol Aqueous Solution (Reference Value)

Aqueous solution concentration [%] (Weight) vs Aqueous solution temperature [°C]

Measurable within this range

Wetted Parts Construction
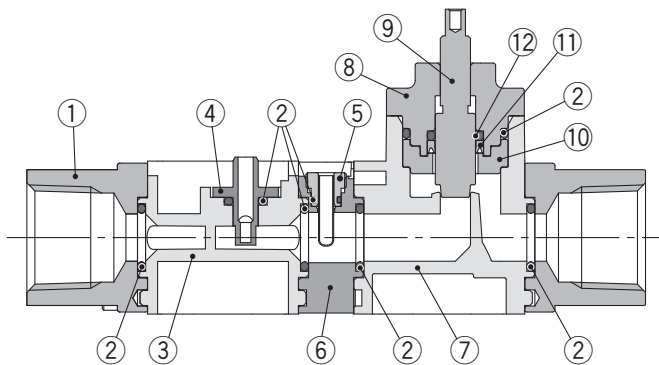
Component Parts

No.	Description	Material	Note
1	Attachment	SCS13	Stainless steel 304 equivalent PF3W704/720/740/711/504/520/540/511
		Stainless steel 304	PF3W721/521
2	Seal	FKM	
3	Body	PPS	
4	Sensor	PPS	
5	Temperature sensor	Stainless steel 304	With brazing (JIS Z 3261: BAg-7, ISO 3677: B-Ag56CuZnSn-620/650)
6	Temperature sensor body	Stainless steel 304	
7	Flow adjustment valve body	PPS	
8	Flow adjustment valve cover	PPS	
9	Flow adjustment valve shaft	Stainless steel 304	
10	Shaft support	PPS	
11	Y seal	FKM	
12	Cap seal	FKM	

PF3W *Series*

Internal Circuits and Wiring Examples

PF3W7☐☐

-A(T)
NPN (2 outputs)

Main circuit | Brown DC(+)
Black OUT1 — Load
White OUT2 — Load
Blue DC(−)
+ − 12 to 24 VDC

-B(T)
PNP (2 outputs)

Main circuit | Brown DC(+)
Black OUT1 — Load
White OUT2 — Load
Blue DC(−) — Load
+ − 12 to 24 VDC
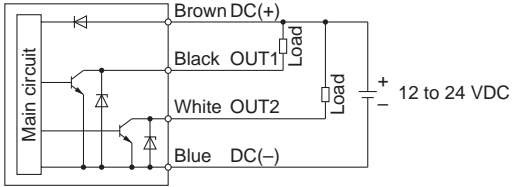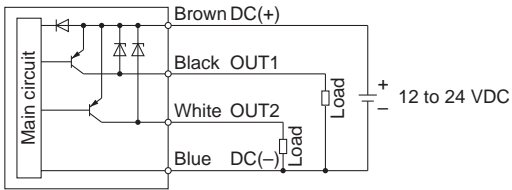
-C(T)/D(T)
C(T): NPN + Analogue voltage output
D(T): NPN + Analogue current output

Main circuit | Brown DC(+)
Black OUT1 — Load
White Analogue output — Load
Blue DC(−) — Load
+ − 12 to 24 VDC
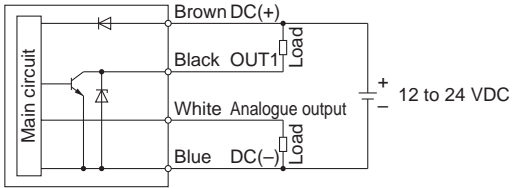
-E(T)/F(T)
E(T): PNP + Analogue voltage output
F(T): PNP + Analogue current output

Main circuit | Brown DC(+)
Black OUT1 — Load
White Analogue output — Load
Blue DC(−) — Load
+ − 12 to 24 VDC

-G
NPN + External input

Main circuit | Brown DC(+)
Black OUT1 — Load
White External input
Blue DC(−)
+ − 12 to 24 VDC

-H
PNP + External input

Main circuit | Brown DC(+)
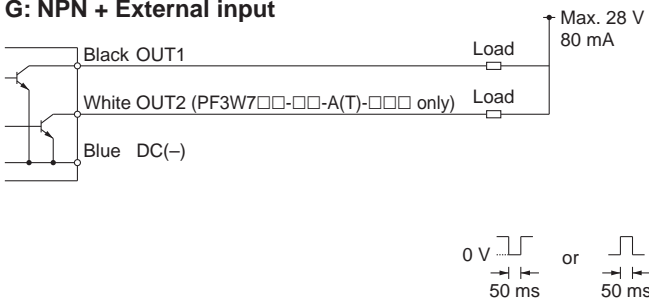Black OUT1 — Load
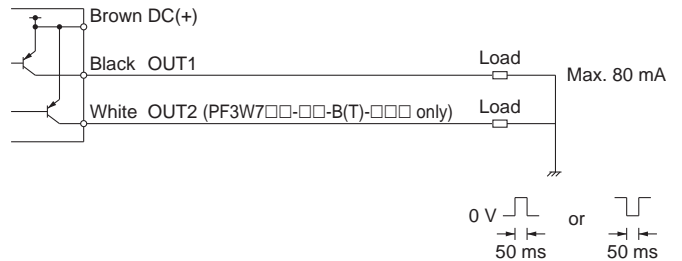White External input
Blue DC(−)
+ − 12 to 24 VDC
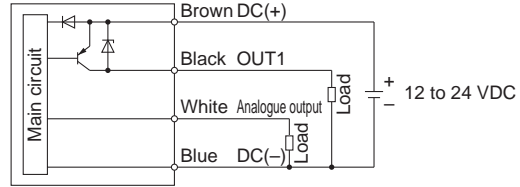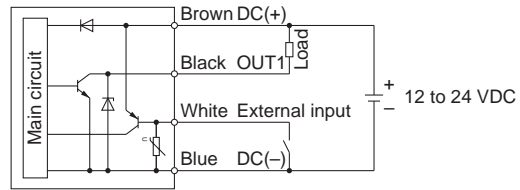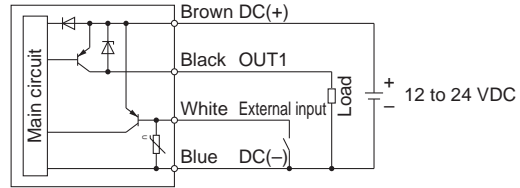
Accumulated pulse output wiring examples

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

Black OUT1 — Load
White OUT2 (PF3W7☐☐-☐☐-A(T)-☐☐☐ only) — Load
Blue DC(−)
Max. 28 V 80 mA

0 V ⎍ or ⎍
50 ms   50 ms

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

Brown DC(+)
Black OUT1 — Load
White OUT2 (PF3W7☐☐-☐☐-B(T)-☐☐☐ only) — Load
Max. 80 mA

0 V ⎍ or ⎍
50 ms   50 ms

PF3W5☐☐

-1/2
1: Analogue voltage output
2: Analogue current output

Main circuit | 1 kΩ | Brown DC(+)
Black 1 to 5 V/4 to 20 mA — Load
White N.C.
Blue DC(−)
+ − 12 to 24 VDC
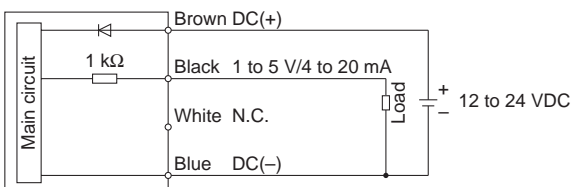
-1T
Analogue voltage output
(With temperature sensor output)

Main circuit | 1 kΩ | Brown DC(+)
1 kΩ | Black 1 to 5 V — Load
Temperature sensor
White 1 to 5 V — Load
Blue DC(−)
+ − 12 to 24 VDC

SMC
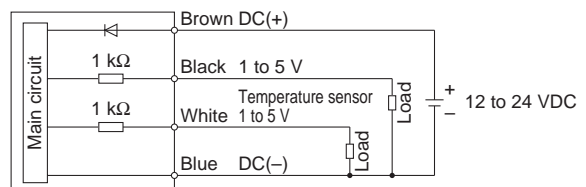
Dimensions

PF3W704/720/740/711/721
Integrated display

Connector pin number

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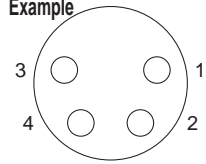
Pin no.	Pin name
1	DC (+)
2	OUT2
3	DC (−)
4	OUT1

For PF3W721

2 x Piping port

IN   OUT
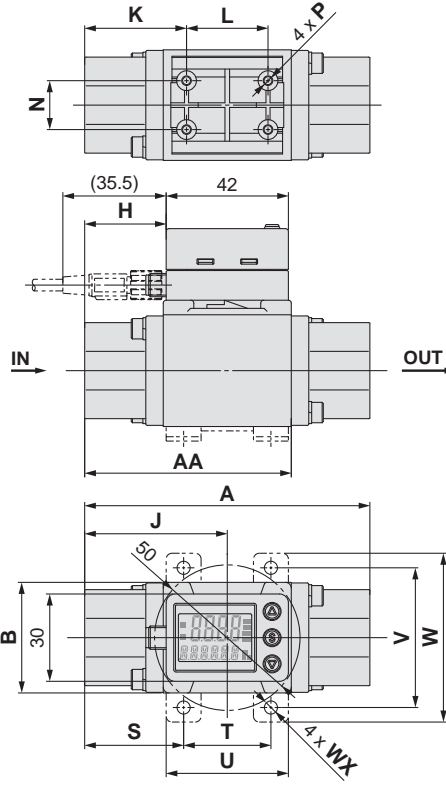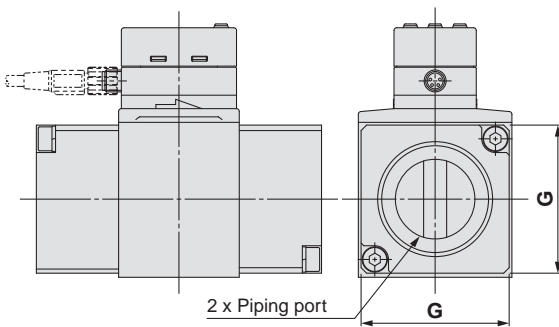
PF3W504/520/540/511/521
Remote sensor unit

For PF3W521

2 x Piping port

IN   OUT

2 x Piping port

[mm]
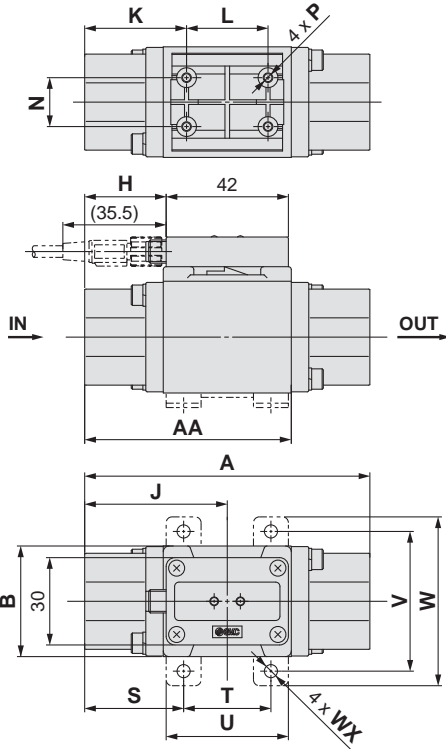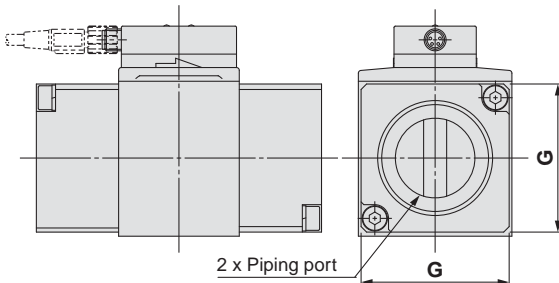
Model	Port size (Rc, NPT, G)	A	AA	B	D	DD	E	F	G	H	J	K	L	N	P	Bracket dimensions							
																S	T	U	V	W	WX	Y	Z
PF3W704/504	3/8	70	50	30	60	45.6	40.6	15.2	24	14	35	26	18	13.6	Ø 2.7 depth 14	24	22	32	40	50	4.5	5	1.5
PF3W720/520	3/8, 1/2	78	54	30	60	45.6	40.6	15.2	27	18	39	30	18	13.6	Ø 2.7 depth 12	28	22	32	40	50	4.5	5	1.5
PF3W740/540	1/2, 3/4	98	71	38	68	53.6	48.6	19.2	32	28	49	35	28	16.8	Ø 2.7 depth 12	34	30	42	48	58	4.5	5	1.5
PF3W711/511	3/4, 1	124	92	46	77	62.6	57.6	23.0	41	42	63	48	28	18.0	Ø 3.5 depth 14	44	36	48	58	70	5.5	7	2.0
PF3W721/521	1 1/4, 1 1/2	104	74	56	91	76.6	71.6	28.5	54	31	52	39.5	25	27.5	Ø 3.5 depth 14	—	—	—	—	—	—	—	—
	G1 1/4	108	76							33	54	41.5											
	G1 1/2	112	78							35	56	43.5											

PF3W *Series*

Dimensions

PF3W704/720/740/711/721-□-□T
Integrated display: With temperature sensor
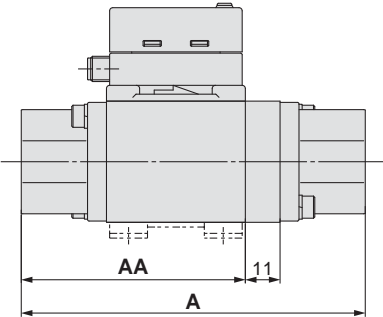
Model	A	AA
PF3W704/504-□-□T	81	50
PF3W720/520-□-□T	89	54
PF3W740/540-□-□T	109	71
PF3W711/511-□-□T	135	92
PF3W721/521-□-□T	115	74
PF3W721/521-F12-□T	119	76
PF3W721/521-F14-□T	123	78

[mm]

PF3W504/520/540/511/521-□-□T
Remote sensor unit: With temperature sensor

PF3W704S/720S/740S
Integrated display: With flow adjustment valve
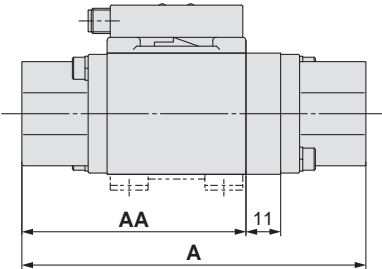
PF3W504S/520S/540S
Remote sensor unit: With flow adjustment valve

[mm]
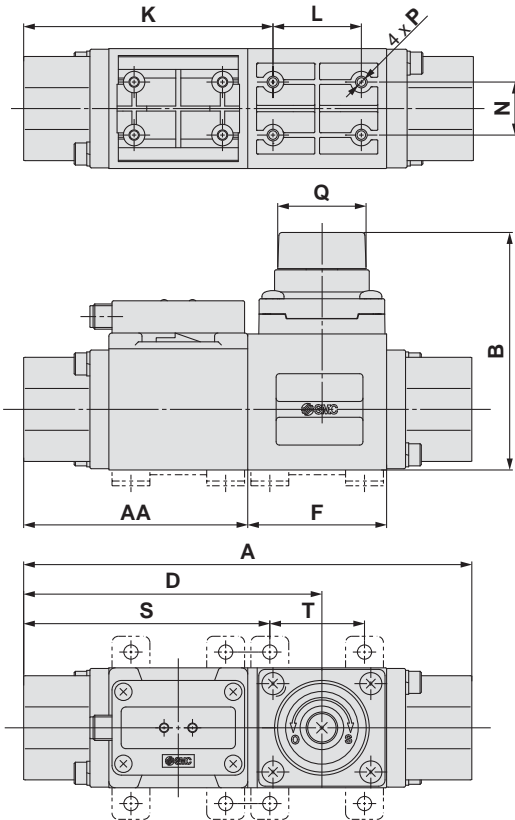
Model	A	AA	B	D	F	K	L	N	P	Q	Q number of rotations	Bracket dimensions	
												S	T
PF3W704S/504S	104	50	63.6 (Max. 68.6)	70.2	34	58.5	18	13.6	Ø 2.7 depth 10	Ø 19	6	56.5	22
PF3W720S/520S	112	54	63.6 (Max. 68.6)	74.2	34	62.5	18	13.6	Ø 2.7 depth 10	Ø 19	6	60.5	22
PF3W740S/540S	142	71	75.25 (Max. 81)	94.5	44	79.0	28	16.8	Ø 2.7 depth 10	Ø 28	7	78.0	30

SMC

Dimensions

PF3W704S/720S/740S-□-□T
Integrated display: With temperature sensor and flow adjustment valve
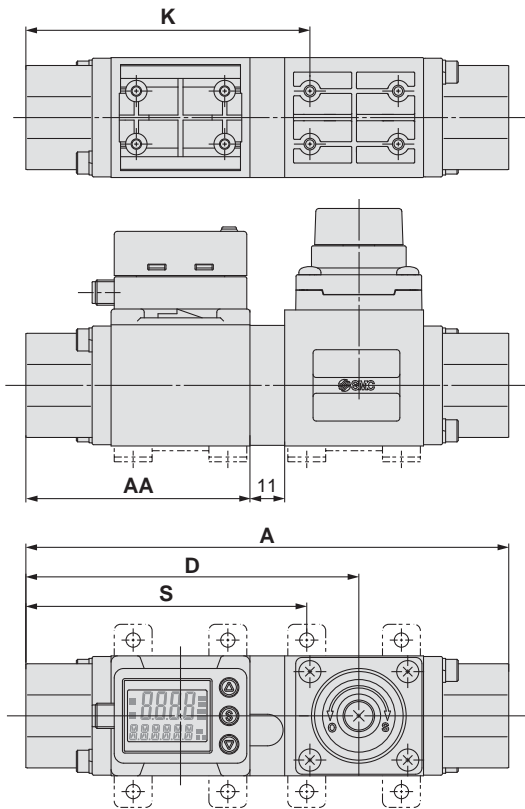
PF3W504S/520S/540S-□-□T
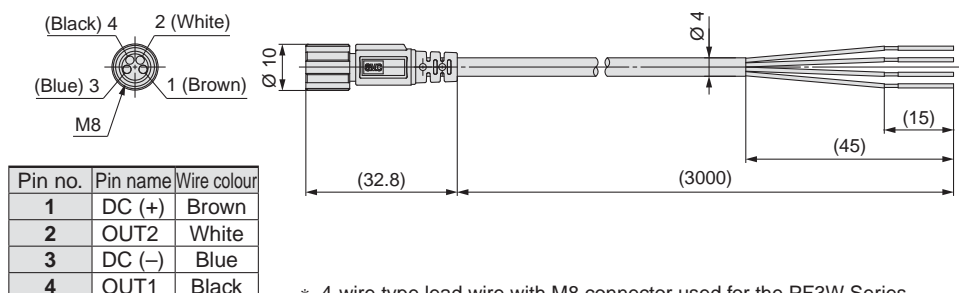**Remote sensor unit: With temperature sensor and flow adjustment valve**
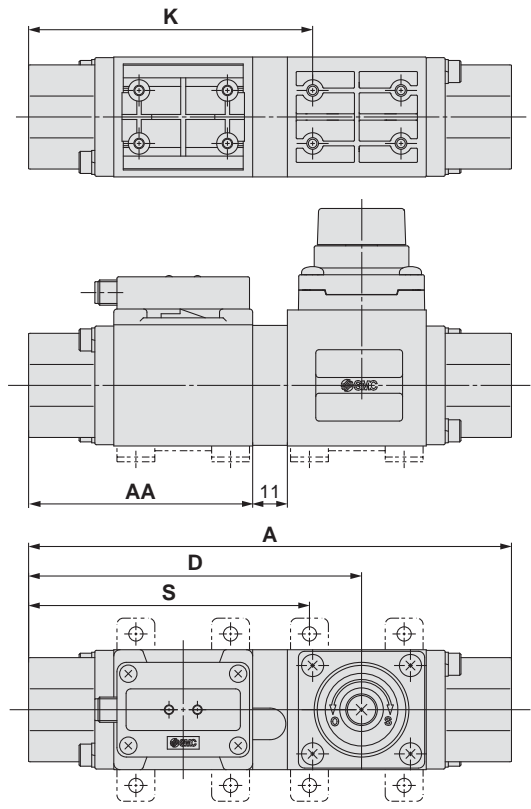
[mm]

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	AWG23
	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.		Ø 4

∗ 4-wire type lead wire with M8 connector used for the PF3W Series
∗ For wiring, refer to the "Operation Manual" on the SMC website (http://www.smcworld.com).

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

3-Colour Display Digital Flow Switch for PVC Piping *PF3W*

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

Function Details

PF3W *Series*
Made to Order

Please contact SMC for detailed dimensions, specifications, and lead times.

Made to Order

Symbol

-X109

1 EPDM seal material

Seal material for wetted parts changed to EPDM

PF3W5☐–☐☐–☐☐–☐☐☐–<u>X109</u>
PF3W7☐–☐☐–☐☐–☐☐☐–<u>X109</u>

• EPDM seal material

Refer to page 5 for details of How to Order.

∗ Not compatible with units with flow adjustment valve
  Please special-order separately.

Symbol

-X128

2 Analogue 4 to 20 mA 2-output type

Output specification of remote type with a temperature sensor: Analogue 4 to 20 mA 2 outputs

PF3W5☐☐–☐☐–2T☐–☐☐☐–<u>X128</u>

• Analogue 4 to 20 mA 2-output type

Refer to page 5 for details of How to Order.

∗ Remote monitor unit is equipped as standard.

Symbol

-X143

3 Brass piping material specification

Piping (attachment) material changed to brass

PF3W5☐–☐☐–☐☐–☐☐☐–<u>X143</u>
PF3W7☐–☐☐–☐☐–☐☐☐–<u>X143</u>

• Brass piping (attachment) material specification
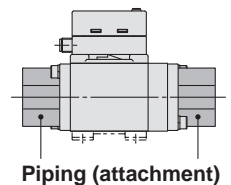
Piping (attachment)

Refer to page 5 for details of How to Order.

∗ Not compatible with units with flow adjustment valve
  Please special-order separately.
  Surface treatment is not applied on piping.

SMC

4 IO-Link compatible

Symbol
-X445

Supports the IO-Link communication protocol

How to Order

PF3W 7 20 – □ 04 – LT Q – M □ □ – X445

Integrated display ● ❶ ❷ ❸ ❹ ❺ ❻ ❼ ❽ ●IO-Link compatible

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
21	50 to 250 l/min

❷ Thread type

—	Rc
N	NPT
F	G*1

*1 ISO 228 compliant

❸ Piping port size

Symbol	Port size	Applicable 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	—	—	—	—	●

❹ Output specification/Temperature sensor

Symbol	Output specification		Temperature sensor
	OUT1	OUT2	
LT	IO-Link: Switch output (N/P)	—	Yes

❺ Lead wire (Option)

—	With lead wire with M8 connector (3 m)
N	Without lead wire with M8 connector
Q	With M12-M8 conversion lead wire (0.1 m)*2

*2 A cable (3 m) with an M 1 2 connector is also available separately.
Refer to the **Web Catalogue** for details.

❻ Unit specification

Symbol	Instantaneous flow	Accumulated flow	Temperature
—	gal/min	gal	°C
M	l/min	L	°C

* Reference: 1 [l/min] = 0.2642 [gal/min]
1 [gal/min] = 3.785 [l/min]

❼ Bracket (Option)

—	None
R	With bracket

❽ Calibration certificate (Only for flow rate)

—	None
A	Yes

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

Specifications

	Model	PF3W704	PF3W720	PF3W740	PF3W711	PF3W721
	Accumulated flow range*1	999999999.9 L		9999999999 L		
		By 0.1 L		By 1 L		
Switch output	Maximum 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 minute between external terminals and case				
	Standards and regulations	CE marking, (EMC directive, RoHS directive)				

*1 Cleared when the power supply is turned off
The hold function can be selected. If the 5 -minute interval is selected, the life of the memory element (electronic parts) is limited to 3 . 7 million times. (If energised for 24 hours, life is calculated as 5 minutes x access times (3 . 7 million) = 1 8 . 5 million minutes = about 3 5 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.)
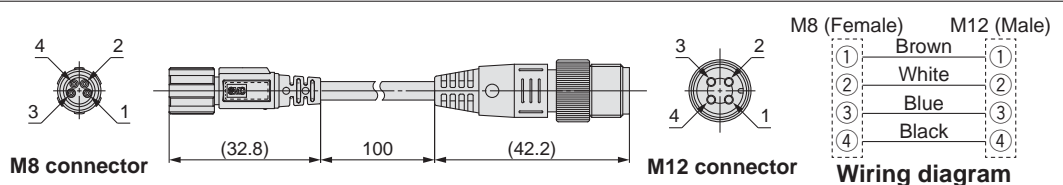
Communication Specifications (IO-Link mode)

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 (0x0083)
Device ID*2	PF3W704-□-LT□-M-X445: 330 (0x014A) PF3W720-□-LT□-M-X445: 310 (0x0136) PF3W740-□-LT□-M-X445: 317 (0x013D) PF3W711-□-LT□-M-X445: 331 (0x014B) PF3W721-□-LT□-M-X445: 332 (0x014C)

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

Other specifications and dimensions that are not indicated are the same as those of the standard product. For details, refer to page 6 and later.

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

M8 (Female)   M12 (Male)

	Brown	
①	White	①
②	Blue	②
③	Black	③
④		④

M8 connector (32.8) 100 (42.2) **M12 connector** **Wiring diagram**

* For wiring, refer to the "Operation Manual" on the SMC website (http://www.smcworld.com).

Digital Flow Switch for PVC Piping
PF3W Series C E c **UL** US

RoHS

How to Order

For how to order of remote monitor unit, refer to page 24.
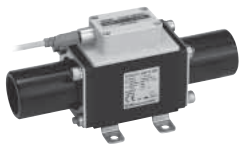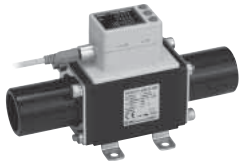
Remote sensor unit
Output specification

Symbol	OUT1
1	Analogue 1 to 5 V
2	Analogue 4 to 20 mA

∗ To use in combination with remote monitor (PF3W3 series), select analogue output of 1 to 5 V of flow rate (output symbol "-1").

Remote sensor unit/Unit printed on label

Symbol	Instantaneous flow
—	l/min
G	l/min (gal/min)

∗ G: Made to order
Reference: 1 [l/min] ↔ 0.2642 [gal/min]
1 [gal/min] ↔ 3.785 [l/min]

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 temperature sensor can only display the flow rate.

Remote sensor unit **PF3W 5** ☐ – **U** ☐ – **1** ☐ – ☐ ☐ – ☐

Integrated display **PF3W 7** **11** – **U** **25** – **A** ☐ – **M** ☐ ☐ – ☐

Made to order

X109	EPDM seal material

(Refer to page 23.)

Type

5	Remote sensor unit
7	Integrated display

Rated flow range (Flow range)

Symbol	Rated flow range
11	10 to 100 l/min
21	30 to 250 l/min

Connection type

U	PVC pipe

Bracket (Option)

—	None
R	With bracket

∗ Bracket is not available for 250 l/min type.

PVC pipe O.D.

Symbol	Port size	Rated flow range 11	Rated flow range 21	Pipe O.D.∗1
25	25A	●	—	32 mm
30	30A	—	●	38 mm

∗1 JIS K 6742 equivalent

Integrated display
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

External input: The accumulated value, peak value, and bottom value can be reset.

Integrated display/Unit specification

Symbol	Instantaneous flow	Accumulated flow
M	l/min	L
G	gal/min	gal

∗ G: Made to order
Reference: 1 [l/min] ↔ 0.2642 [gal/min]
1 [gal/min] ↔ 3.785 [l/min]

Lead wire (Option)

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

Options/Part Nos.

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

Description	Part no.	Qty.	Note
Bracket	**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

SMC

3-Colour Display Digital Flow Switch for PVC Piping *PF3W Series*

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

Specifications (Integrated Display)

Model		PF3W711	PF3W721
Applicable fluid		Water and ethylene glycol aqueous solution (with viscosity of 3 mPa·s [3 cP] or less)*1	
Detection method		Karman vortex	
Rated flow range		10 to 100 l/min	30 to 250 l/min
Display flow range		7 to 140 l/min (Flow under 7 l/min is displayed as "0")	20 to 350 l/min (Flow under 20 l/min is displayed as "0")
Set flow range		7 to 140 l/min	20 to 350 l/min
Smallest settable increment		1 l/min	2 l/min
Conversion of accumulated pulse		1 L/pulse	2 L/pulse
Fluid temperature		0 to 70 °C (No freezing or condensation)	
Display unit		Instantaneous flow: l/min, Accumulated flow: L, Display values updated 5 times per second	
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 MPa	
Pressure loss		45 kPa or less at the maximum flow	
Accumulated flow range*4		999999999 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.	
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)	
Indicator light		Output 1, Output 2: Orange	
Power supply voltage		12 to 24 VDC ±10 %	
Current consumption		50 mA or less	
Environment	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	1000 VAC for 1 minute between terminals and housing	
	Insulation resistance	50 MΩ or more (500 VDC measured via megohmmeter) between terminals and housing	
Standards and regulations		CE marking, (EMC directive, RoHS directive), UL (CSA)	
Wetted parts material*7		PPS, FKM, CPVC	
		Non-grease	
Piping port size*8		25A	30A
Weight	Without lead wire with connector	285 g	340 g
	With lead wire with connector	370 g	425 g

*1 Refer to the graph of measurable range for ethylene glycol aqueous solution on page 10. Measurement is possible as long as the fluid does not corrode the wetted parts and viscosity is 3 mPa·s (3 cP) or less. Refer to the list of applicable fluids on page 31. 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 and proof pressure may change according to the fluid temperature. Refer to the graph below.
*4 Cleared when the power supply is turned off. The hold function can be selected. (Intervals of 2 or 5 minutes can be selected.)
   If the 5-minute interval is selected, the life of the memory element (electronic parts) is limited to 1 million times. (If energised for 24 hours, life is calculated as 5 minutes x 1 million = 5 million minutes = 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
*6 The response time until the set value reaches 90 % in relation to the step input
*7 For details, refer to "Wetted Parts Construction" on page 20.
*8 When the piping diameter or piping passage is restricted, the specifications may not be satisfied.
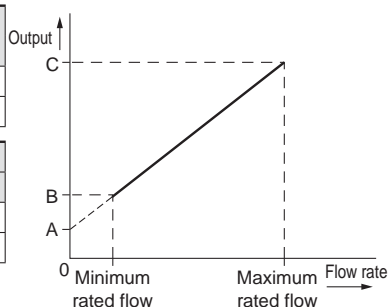* Products with tiny scratches, marks, or display colour or brightness variations which do not affect the performance of the product are verified as conforming products.
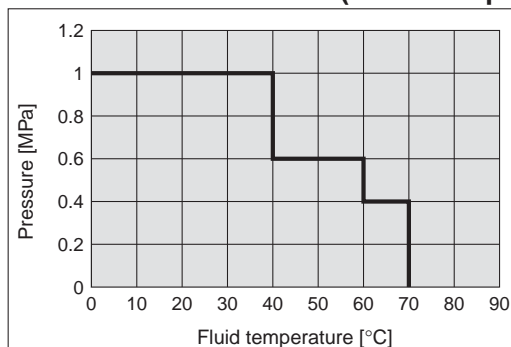
Analogue Output

Flow rate/Analogue output

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

Model	Rated flow [l/min]	
	Minimum	Maximum
PF3W711/511	10	100
PF3W721/521	30	250

Operating Pressure and Proof Pressure

PF3W711/721/511/521 (for PVC Piping)

18

PF3W Series

Specifications (Remote Sensor Unit)

Model		PF3W511	PF3W521
Applicable fluid		Water and ethylene glycol aqueous solution (with viscosity of 3 mPa·s [3 cP] or less)[*1]	
Detection method		Karman vortex	
Rated flow range		10 to 100 l/min	30 to 250 l/min
Fluid temperature		0 to 70 °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 MPa	
Pressure loss		45 kPa or less at the maximum 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	
Environment	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	1000 VAC for 1 minute between terminals and housing	
	Insulation resistance	50 MΩ or more (500 VDC measured via megohmmeter) between terminals and housing	
Standards and regulations		CE marking, (EMC directive, RoHS directive), UL (CSA)	
Wetted parts material[*4]		PPS, FKM, CPVC	
		Non-grease	
Piping port size[*5]		25A	30A
Weight	Without lead wire with connector	270 g	325 g
	With lead wire with connector	355 g	410 g

*1 Refer to the graph of measurable range for ethylene glycol aqueous solution on page 10. Measurement is possible as long as the fluid does not corrode the wetted parts and viscosity is 3 mPa·s (3 cP) or less. Refer to the list of applicable fluids on page 31.
*2 The operating pressure range and proof pressure may change according to the fluid temperature. Refer to the graphs below.
*3 The response time until the set value reaches 90 % in relation to the step input
*4 For details, refer to "Wetted Parts Construction" on page 20.
*5 When the piping diameter or piping passage is restricted, the specifications may not be satisfied.
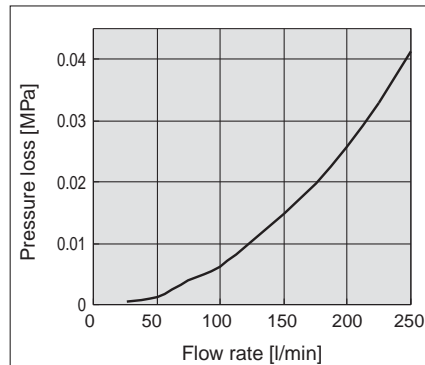* Products with tiny scratches, marks, or display colour or brightness variations which do not affect the performance of the product are verified as conforming products.
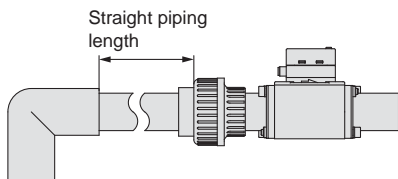
Flow Rate Characteristics (Pressure Loss)

PF3W711/511
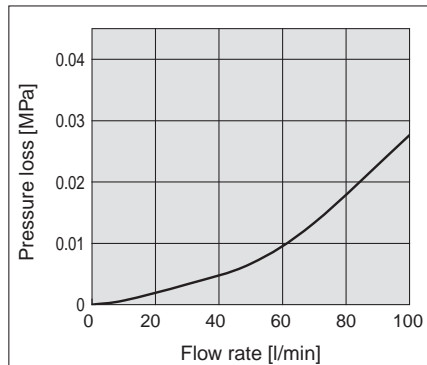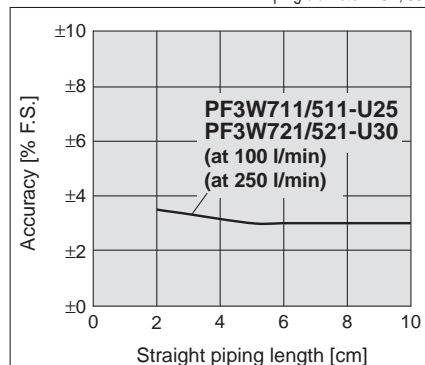

PF3W721/521

Straight Piping Length and Accuracy (Reference Value)

- Fluid pressure has almost no effect.
- To maintain ±3 % F.S. in the specifications, use a straight pipe that is 11 cm or longer in length.
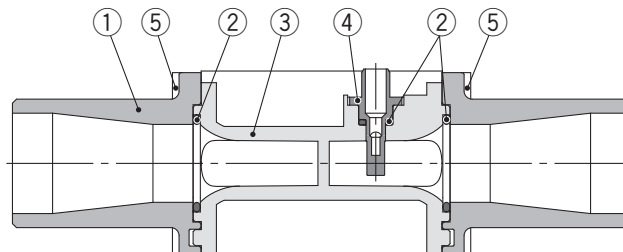
PF3W711/721/511/521

Pressure: 0.3 MPa
Piping diameter: 25A, 30A

PF3W711/511-U25
PF3W721/521-U30
(at 100 l/min)
(at 250 l/min)

SMC

Wetted Parts Construction

Component Parts

No.	Description	Material	Note
1	PVC pipe	CPVC	
2	Seal	FKM	
3	Body	PPS	
4	Sensor	PPS	

Replacement Parts

No.	Description	Part no.	Qty.
1	PVC pipe (25A)	ZS-40-U25	1
	PVC pipe (30A)	ZS-40-U30	1
5	25A retaining plate (With two M5 x 80 hexagonal socket head cap screws)	ZS-40-U25-A	1
	30A retaining plate (With two M5 x 65 hexagonal socket head cap screws)	ZS-40-U30-A	1

∗ Replacing the PVC pipe may cause accuracy to fluctuate by 1 to 2 %.

Internal Circuits and Wiring Examples

PF3W Series
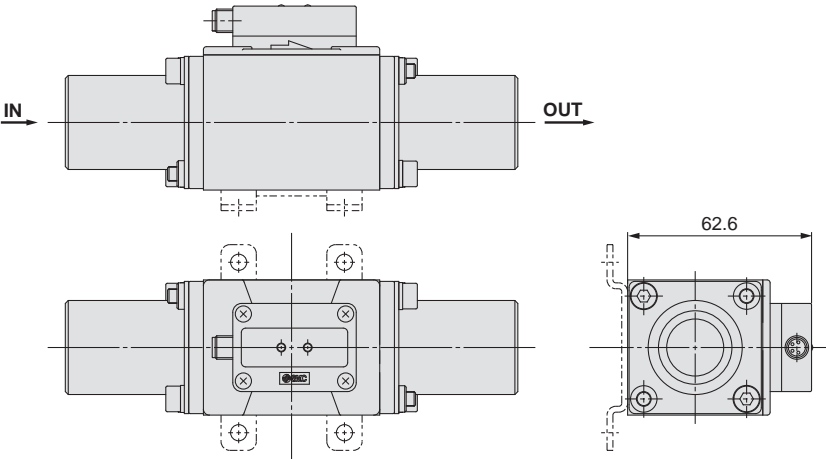
Dimensions

PF3W711-U25
Integrated display

**Connector
pin number**

Example
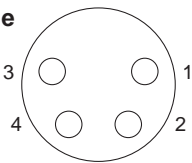
Pin no.	Pin name
1	DC (+)
2	OUT2
3	DC (−)
4	OUT1
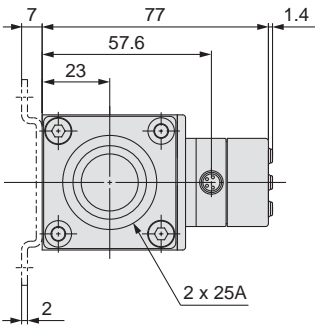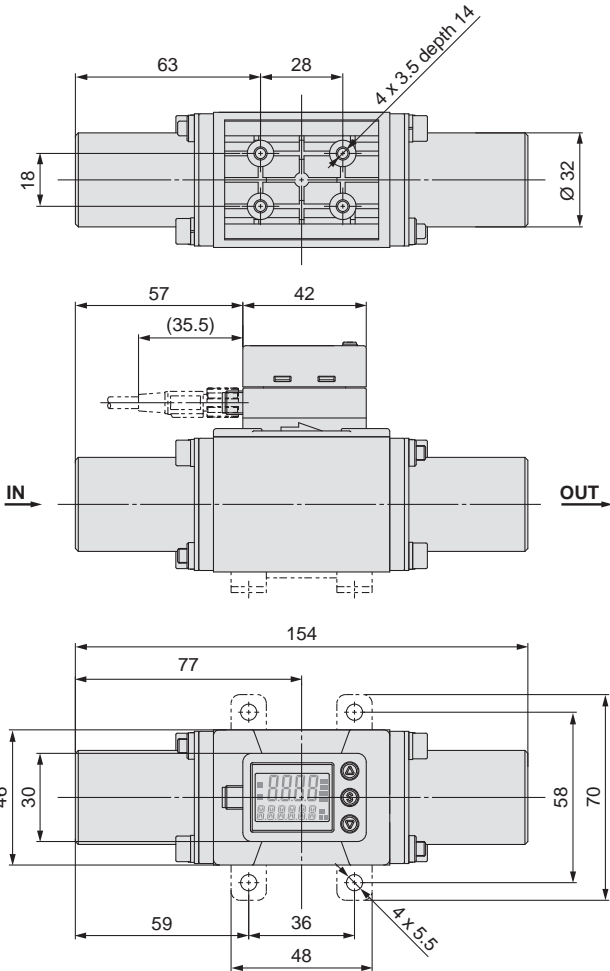
PF3W511-U25
Remote sensor unit

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

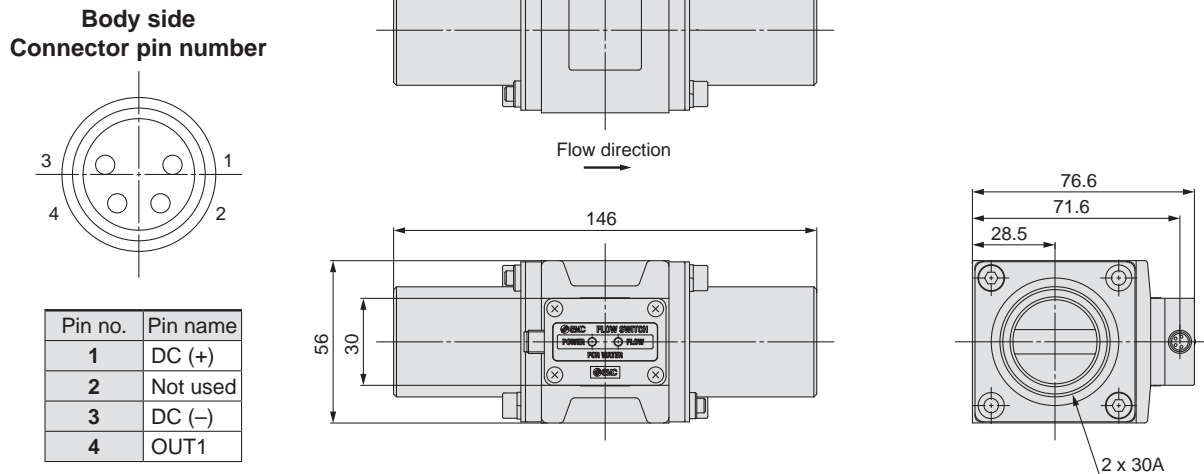| Conductor	Nominal cross section	AWG23
	O.D.	Approx. 0.7 mm
Insulator	Material	Heat-resistant PVC
	O.D.	Approx. 1.1 mm
	Colour	Brown, White, Black, Blue
Sheath	Material	Heat- and oil-resistant PVC
Finished O.D.		Ø 4

∗ 4-wire type lead wire with M8 connector used for the PF3W Series
∗ For wiring, refer to the "Operation Manual" on the SMC website (http://www.smcworld.com).

SMC

Dimensions

PF3W721-U30
Integrated display

25

27.5

Ø 38

4 x 3.5 depth 14

52

42

(35.5)

Body side
Connector pin number

3   1

4   2

Flow direction

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

146

56

30

91

1.4

76.6

71.6

28.5

2 x 30A
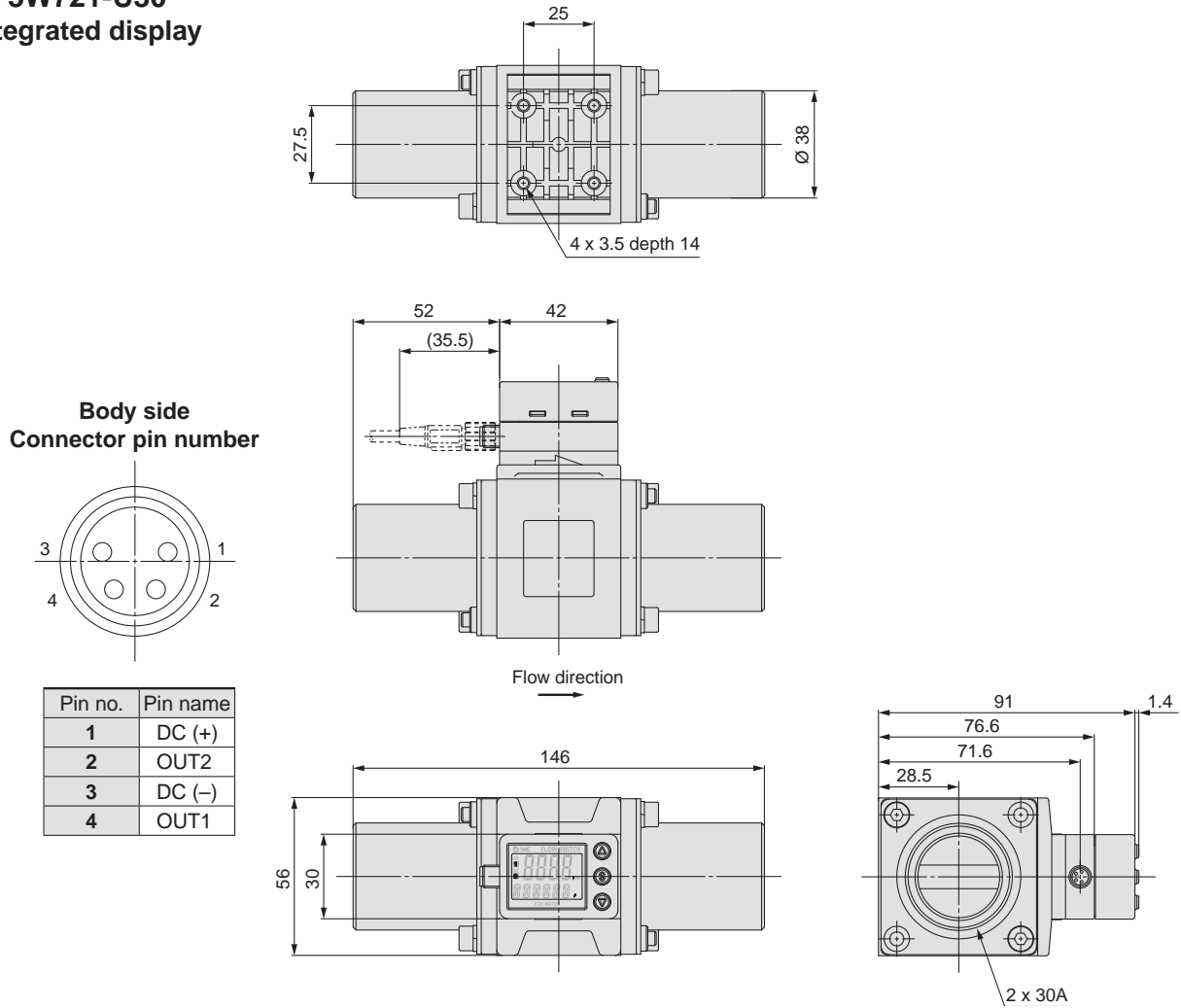
PF3W521-U30
Remote sensor unit

52

42

(35.5)

Body side
Connector pin number

3   1

4   2

Flow direction

Pin no.	Pin name
1	DC (+)
2	Not used
3	DC (−)
4	OUT1

146

56

30

76.6

71.6

28.5

2 x 30A

SMC

Made to Order

Please contact SMC for detailed dimensions, specifications, and lead times.

Symbol

-X109

1 EPDM seal material

Seal material for wetted parts changed to EPDM

PF3W5☐ **– U**☐ **–**☐☐ **–**☐☐☐ **– X109**
PF3W7☐ **– U**☐ **–**☐☐ **–**☐☐☐ **– X109**

EPDM seal material

Refer to page 17 for details of How to Order.

SMC

3-Colour Display

Digital Flow Monitor for Water
PF3W3 Series

RoHS

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 remote sensor unit with temperature sensor, only OUT2 can be set for temperature sensor output.

Lead wire
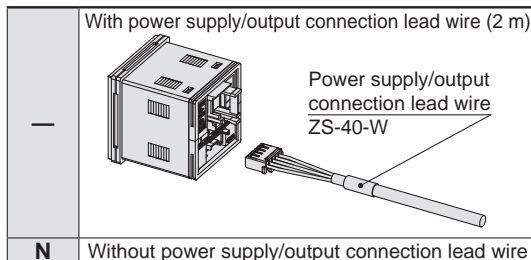
—	With power supply/output connection lead wire (2 m)
	Power supply/output connection lead wire ZS-40-W
N	Without power supply/output connection lead wire

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
	Sensor connector (1 pc.)
C	Sensor connector (e-con)
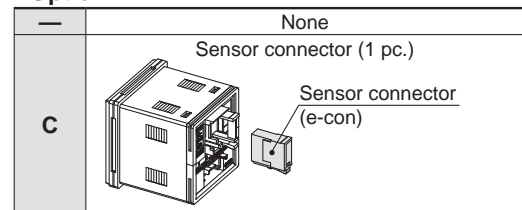
The connector does not come connected, but it is shipped together with the product.

Option 1
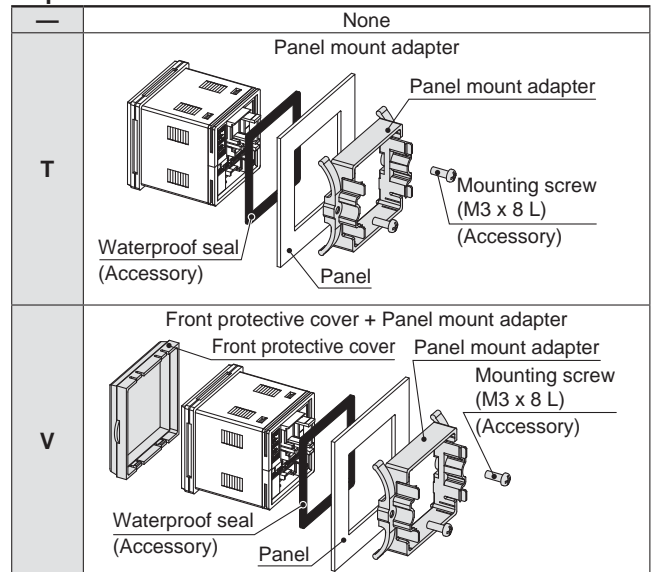
—	None
	Panel mount adapter
T	Panel mount adapter, Mounting screw (M3 x 8 L) (Accessory), Waterproof seal (Accessory), Panel
	Front protective cover + Panel mount adapter
V	Front protective cover, Panel mount adapter, Mounting screw (M3 x 8 L) (Accessory), Waterproof seal (Accessory), Panel

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	Connect up to 10 slave units

PF3W3 *Series*

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")	20 to 280 l/min (Flow under 20 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	20 to 280 l/min
Smallest settable increment	0.01 l/min	0.1 l/min		1 l/min	2 l/min
Conversion of accumulated pulse	0.05 L/pulse	0.1 L/pulse	0.5 L/pulse	1 L/pulse	2 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)				
Environment 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 minute between terminals and housing				
Insulation resistance	50 MΩ or more (500 VDC measured via megohmmeter) between terminals and housing				
Standards and regulations	CE marking, (EMC directive, RoHS directive), UL (CSA)				
Weight Without power supply/output connection lead wire	50 g				
With power supply/output connection lead wire	100 g				

∗1 Cleared when the power supply is turned off. The hold function can be selected. (Intervals of 2 or 5 minutes can be selected.)
    If the 5-minute interval is selected, the life of the memory element (electronic parts) is limited to 1 million times. (If energised for 24 hours, life is calculated as 5 minutes x 1 million = 5 million minutes = 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.
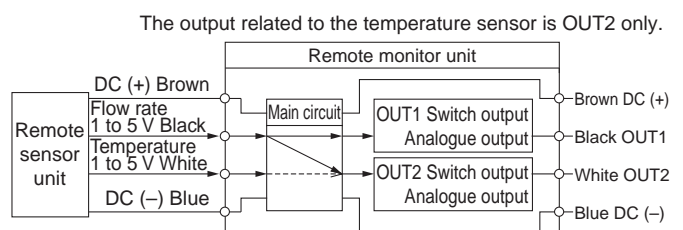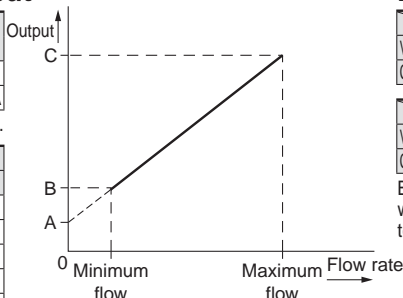
The output related to the temperature sensor is OUT2 only.

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

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.

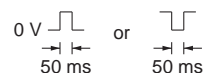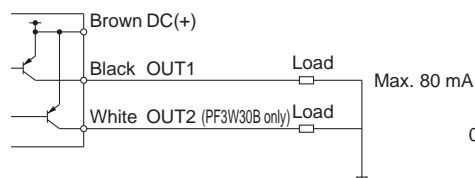| Model	Flow rate [l/min]	
	Minimum	Maximum
PF3W504	0.5	4
PF3W520	2	16
PF3W540	5	40
PF3W511	10	100
PF3W521	30	250

Fluid temperature/Analogue output

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

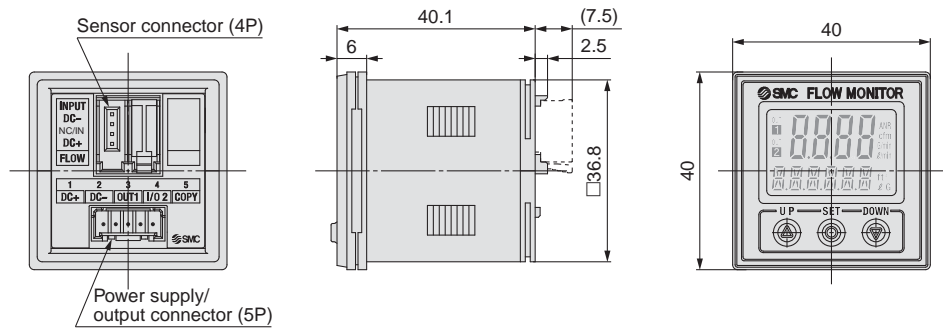|	C	D
Voltage output	5 V	5.4 V
Current output	20 mA	21.6 mA

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

SMC
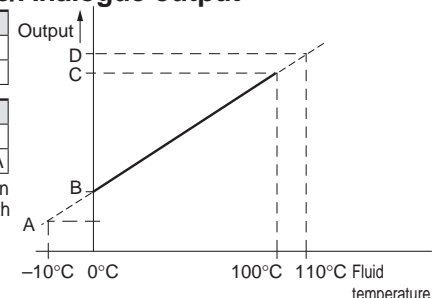
Internal Circuits and Wiring Examples

-A
NPN (2 outputs)
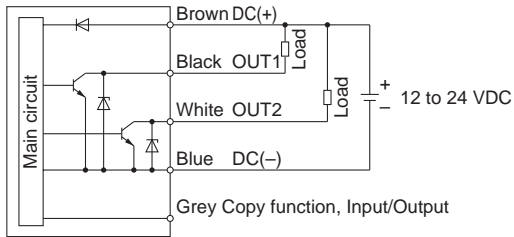
-G
NPN + External input
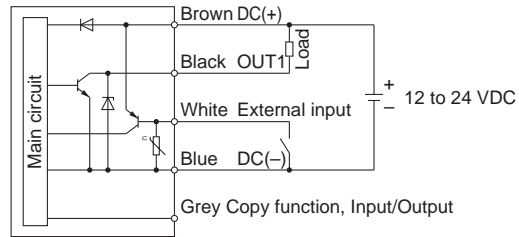
-B
PNP (2 outputs)
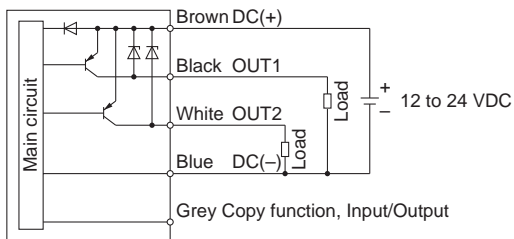
-H
PNP + External input
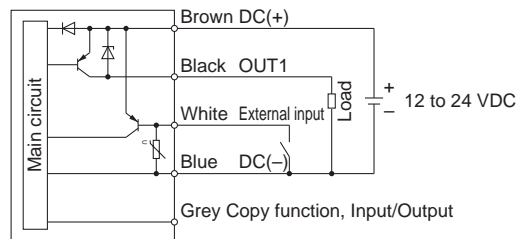
-C/D
C: NPN + Analogue voltage output
D: NPN + Analogue current output
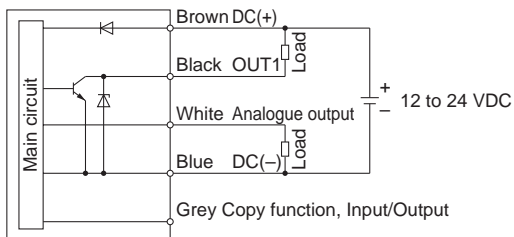
-J/K
J: Analogue voltage output
K: Analogue current output
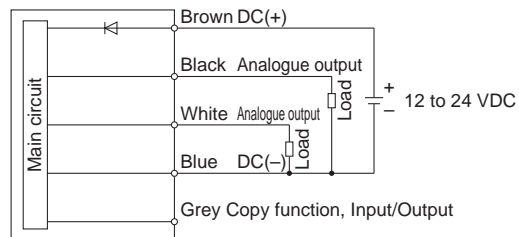
-E/F
E: PNP + Analogue voltage output
F: PNP + Analogue current output
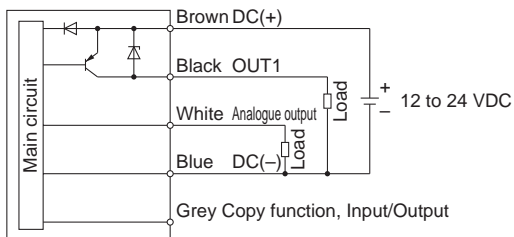
Accumulated pulse output wiring examples

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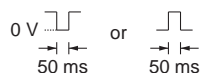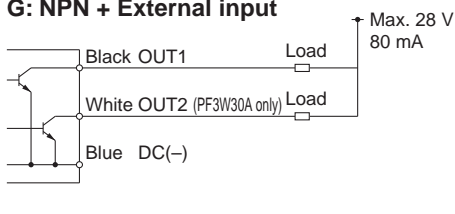
-B/E/F/H
B: PNP (2 outputs)
E, F: PNP + Analogue output
G: PNP + External input

PF3W3 *Series*

Dimensions

Sensor connector (4P)

INPUT
DC−
NC/IN
DC+
FLOW

| 1 | 2 | 3 | 4 | 5 |
| DC+ | DC− | OUT1 | I/O 2 | COPY |

Power supply/
output connector (5P)

40.1   (7.5)
6   2.5
□36.8

40
40

SMC FLOW MONITOR

U P   SET   DOWN

Front protective cover + Panel mount adapter

9.4 (2)

46.4
□42.4

Front protective cover
Waterproof seal
Panel
Panel mount adapter

53
47

SMC FLOW MONITOR

U P   SET   DOWN
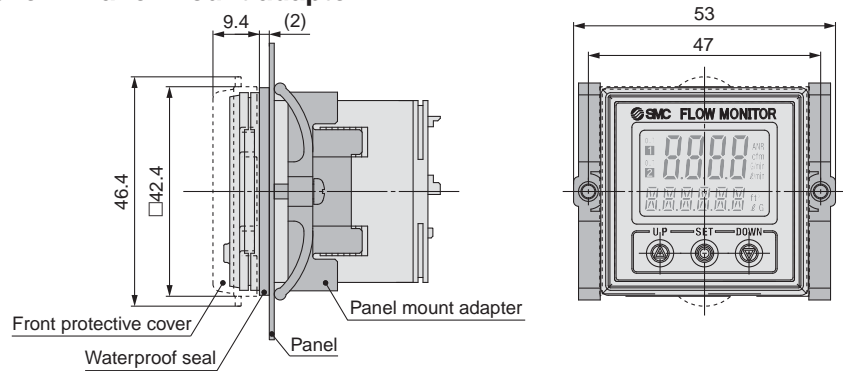
Panel fitting dimensions

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

48 or more
37.5$^{+0.1}_{-0.2}$

37.5$^{+0.1}_{-0.2}$

4 x R1 or less

55 or more
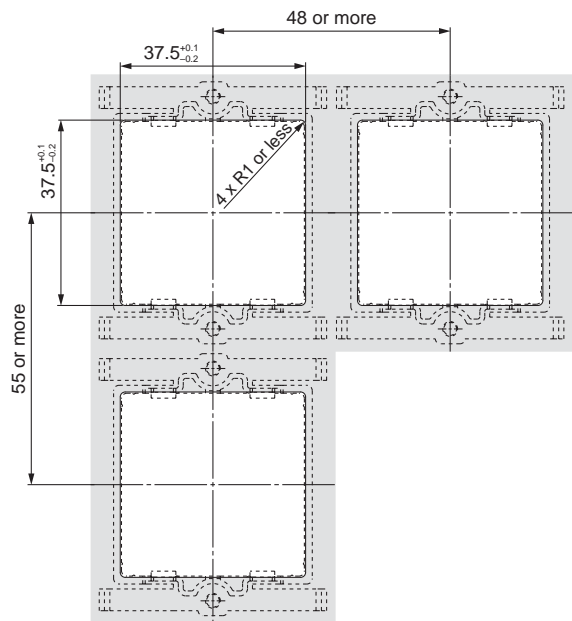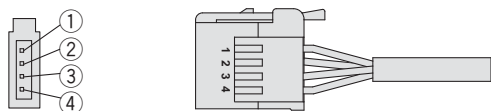
Sensor connector

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

Pin no.

5 Grey COPY
4 White OUT2
3 Black OUT1
2 Blue DC (−)
1 Brown DC (+)

2000
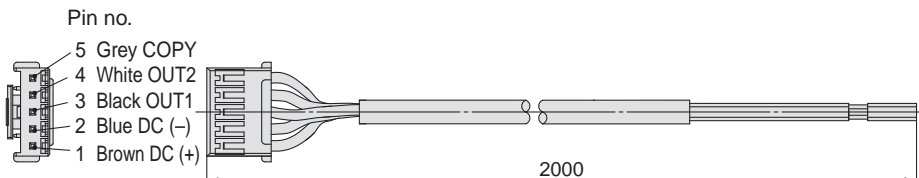
Lead Wire Specifications

Conductor	Nominal cross section	AWG26
	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.		Ø 3.5

∗ For wiring, refer to the "Operation Manual" on the SMC website (http://www.smcworld.com).

SMC

PF3W Series
Function Details

Integrated Display (PF3W7 series)/Remote Monitor Unit (PF3W3 series)

■ Output operation

The output operation can be selected from the following:
Output (hysteresis mode and window comparator mode) correspond-ing 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.

When a temperature sensor is attached, the output to the tempera-ture sensor is selectable only for OUT2.
(Refer to "How to Order" for details.)

■ Display colour

The display colour can be selected for each output condition. The selection of the dis-play colour provides visual identification of abnormal values. (The display colour de-pends on OUT1 setting.)

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

■ Response time

The response time can be selected to suit the application. (1 second for default setting)
Abnormalities can be detected more quickly by setting the response time to 0.5 seconds.
The effect of the pump fluctuation and flickering of the display can be reduced by setting the response time to 2 seconds.

∗ The temperature sensor output is fixed to 7 seconds.

Response time	Applicable model	
	Integrated display PF3W7 series	Remote monitor unit PF3W3 series
0.5 seconds	●	—
1 second	●	●
2 seconds	●	●

■ External input function

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 accumu-lated 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 (EE-PROM) will be accessed. Take into consideration that the maximum number of times the memory can be accessed is 1 million times. The total number of external inputs and the accumulated value memorising time interval should not exceed 1 million times.

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.

∗ 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 memorised every 2 or 5 minutes during measurement and continues from the last memorised value when the power supply is turned on again.
The life time of the memory device is 1 million access times. Take this into consideration before using this function.
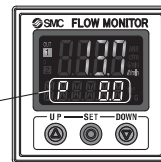
■ Selection of display on sub screen

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

Integrated display   Remote monitor unit

∗ The above are examples of integrated displays. (Same as remote monitor unit)

Set value display	Accumulated value display	Peak value display	Bottom value display
Displays the set value (The set value of OUT2 cannot be displayed.)	Displays the accumulated value (The accumulated value of OUT2 cannot be displayed.)	Displays the peak value	Displays the bottom value

Line name display	Fluid temperature display	OFF
Displays the line name (Up to 6 alphanumeric characters can be input.)	Displays the fluid temperature (When the temperature sensor type is selected.)	Displays nothing

■ 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.

■ Keylock function

Prevents operation errors such as accidentally changing setting values

28

Integrated Display (PF3W7 series)/Remote Monitor Unit (PF3W3 series)

■ Analogue output free range function

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.
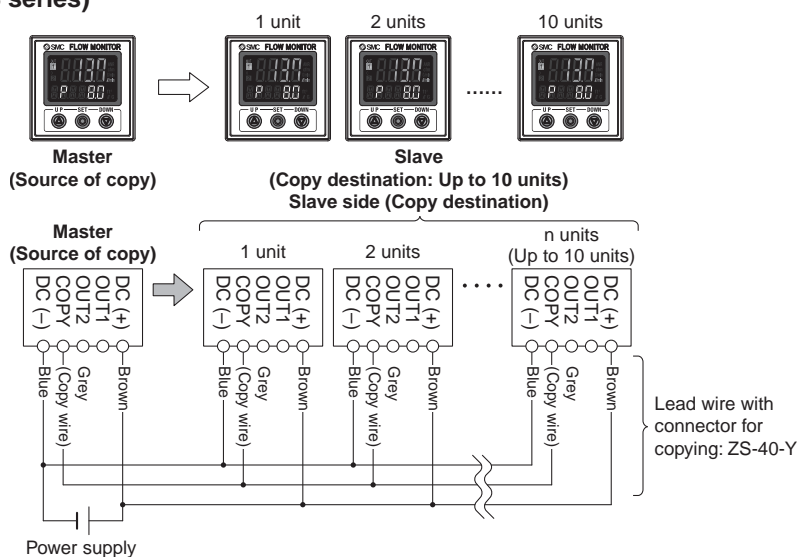

For 4 l/min type (Integrated display)
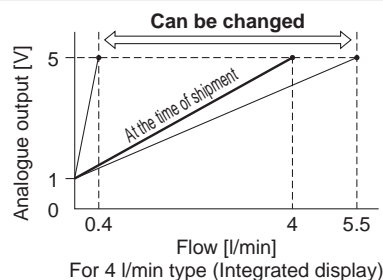
■ Copy function (Remote monitor unit/PF3W3 series)

The settings of the master monitor (source of copy) can be copied to the slave monitors, reducing setting labour and minimising the risk of setting mistakes.

The set value can be copied to up to 10 flow monitors simultaneously.
(Maximum transmission distance: 4 m)

■ Error display function

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

Display	Description	Contents	Action	Applicable model Integrated display PF3W7 series	Applicable model Remote monitor unit PF3W3 series
Er1	OUT1 over current error	A load current of 80 mA or more is applied to the switch output (OUT1).	Eliminate the cause of the over current by turning off the power supply and then turning it on again.	●	●
Er2	OUT2 over current error	A load current of 80 mA or more is applied to the switch output (OUT2).		●	●
HHH	Instantaneous flow error	The flow rate has exceeded the display flow range (rated flow x approx. 1.4).	Decrease the flow rate.	●	●
LLL	Unconnected sensor error	Remote sensor unit is not connected to the monitor unit. Or, sensor output is less than 0.6 V.	Connect the sensor or check the sensor output voltage.	—	●
999999999 (Alternately displays [999] and [999999])	Accumulated flow error	The flow rate exceeds the accumulated flow rate range. (Decimal points start blinking due to the flow range.)	Clear the accumulated flow rate. (This error is irrelevant when accumulated flow is not being used.)	●	●
cHHH	Over upper limit of temperature	Fluid temperature exceeds 110 °C.	Lower the fluid temperature.	●	●
cLLL	Under lower limit of temperature	Fluid temperature is under -10 °C.	Raise the fluid temperature.	●	●
cLLL	Unconnected temperature sensor error	Temperature sensor output wire is not connected.	Connect the temperature output wire.	—	●
cLLL	Unconnected temperature sensor error	Temperature sensor is not connected to the remote sensor unit.	Check if or not the remote sensor unit is connected to a temperature sensor.	—	●
cLLL	Temperature sensor failure	If the above actions to correct the lower limit of fluid temperature and unconnected sensor are taken and error message still appears, the temperature sensor of the remote sensor unit may be damaged.	Please contact SMC for investigation.	—	●
Er0 Er4 Er6 Er8	System error	Internal data error	Turn the power off and then on again. If the error cannot be rectified, please contact SMC for investigation.	●	●
Er12	Temperature sensor failure	Temperature sensor may be damaged.		●	—

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

SMC

Remote Sensor Unit (PF3W5 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.
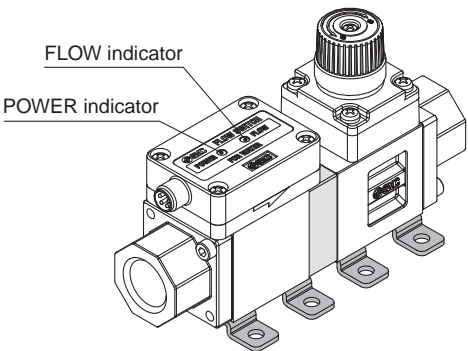
FLOW indicator

POWER indicator

■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 below -10 °C or above 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.

Digital Flow Switch for PVC Piping
PF3W Series
Applicable Fluids

Material and Fluid Compatibility Check List (Guide)

Chemical		Compatibility
Ammonium hydroxide		×
Isobutyl alcohol		×[3]
Isopropyl alcohol		○[1, 2]
Hydrochloric acid	Concentration 30 % or less	○[2]
Hydrogen peroxide	Concentration 5 % or less	○
Nitric acid (except fuming nitric acid)	Concentration 10 % or less	○[2]
Deionised water		○
Sodium hydroxide (caustic soda)	Concentration 50 % or less	×[3]
Sulfuric acid (except fuming sulfuric acid)	Concentration 30 % or less	○
Phosphoric acid	Concentration 50 % or less	○

The material and fluid compatibility check list provides reference values as a guide only, therefore we do not guarantee the application to our product.

∗1 Since static electricity may be generated, implement suitable countermeasures.

∗2 Fluid may pass through. Fluid that has passed through may have an impact on components made of different materials.

∗3 Karman vortex measurement cannot be carried out due to high viscosity.

• SMC is not responsible for its accuracy and any damage happened because of this data.

Table symbols
○: Can be used
○: Can be used under certain conditions
×: Cannot be used

SMC

⚠ Safety Instructions

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

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

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

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

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

⚠Warning

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

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

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

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

Limited warranty and Disclaimer/ Compliance Requirements

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

Limited warranty and Disclaimer

1. The warranty period of the product is 1 year in service or 1.5 years after the product is delivered, wichever is first.*2) Also, the product may have specified durability, running distance or replacement parts. Please consult your nearest sales branch.

2. For any failure or damage reported within the warranty period which is clearly our responsibility, a replacement product or necessary parts will be provided. This limited warranty applies only to our product independently, and not to any other damage incurred due to the failure of the product.

3. Prior to using SMC products, please read and understand the warranty terms and disclaimers noted in the specified catalogue for the particular products.

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

Compliance Requirements

1. The use of SMC products with production equipment for the manufacture of weapons of mass destruction (WMD) or any other weapon is strictly prohibited.

2. The exports of SMC products or technology from one country to another are governed by the relevant security laws and regulations of the countries involved in the transaction. Prior to the shipment of a SMC product to another country, assure that all local rules governing that export are known and followed.

⚠Caution

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

⚠Caution

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

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