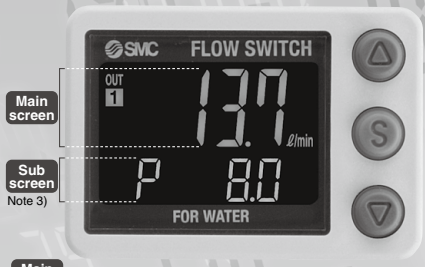
3-Color Display Digital Flow Switch for Water

PF3W Series

3-color/2-screen display

RoHS IP65



Main screen: Instantaneous flow rate Note 1)

Sub screen: Set value

Note 3)

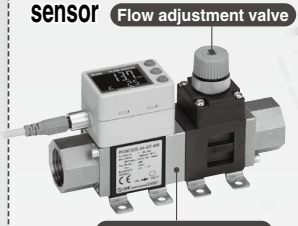
Instantaneous flow rate Note 1)

Accumulated value	Peak/Bottom value	Line name	Fluid temperature Note 2)

Note 1) Main screen shows the instantaneous flow rate only.
Note 2) Fluid temperature can be displayed only when the digital flow switch with a temperature sensor is selected.
Note 3) Sub screen can be turned off.

Flow range: Line up 250 L type

Integrated flow adjustment valve and temperature sensor

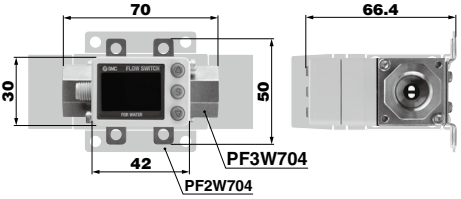


Remote type

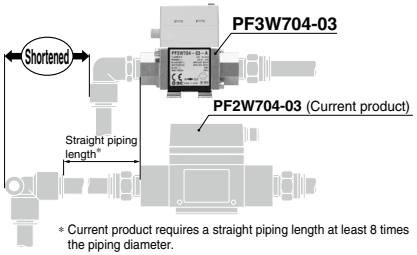
PVC piping type

- Applicable fluid: Deionized water, chemical, etc.
- Integrated type and remote type added to series.

40% smaller than current product



Reducing piping space



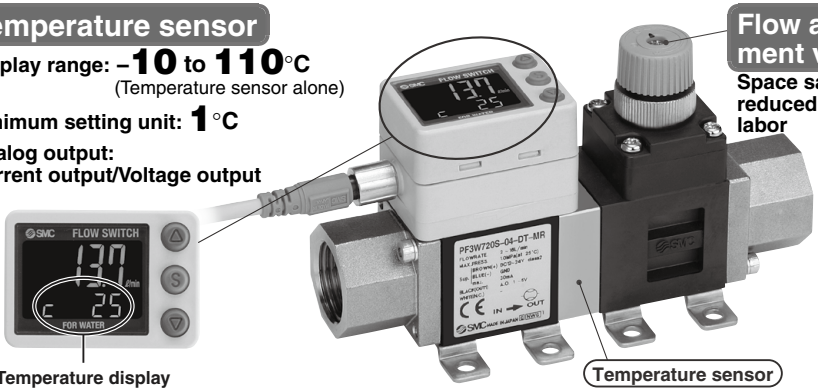
* Current product requires a straight piping length at least 8 times the piping diameter.
Refer to straight piping length and accuracy. (pages 336 and 345)

Temperature sensor

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

Minimum setting unit: 1°C

Analog output:
Current output/Voltage output



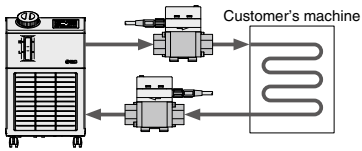
Flow adjustment valve

Space saving and reduced piping labor

Fluid temperature: 0 to 90°C

Ethylene glycol aqueous solution can be used

Example) Flow control of the circulating fluid in a chiller

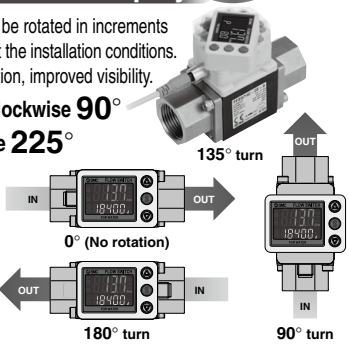


Non-grease

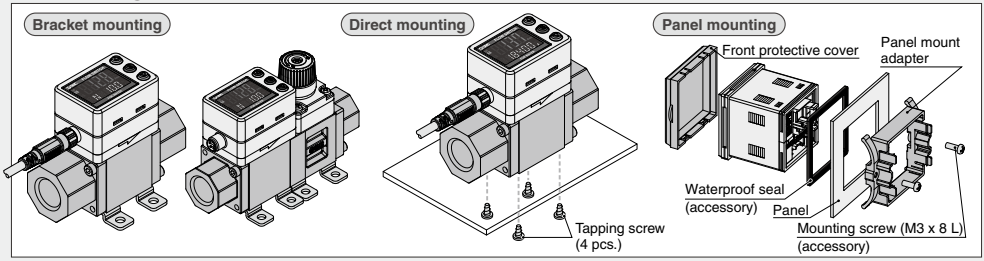
Rotatable display

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

Counterclockwise 90°
Clockwise 225°



◎Mounting



Measured flow rate 250 L/min added

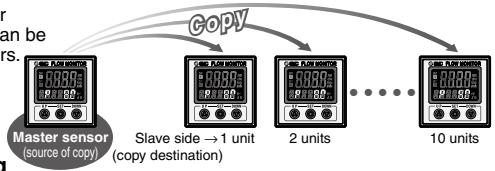
Variations

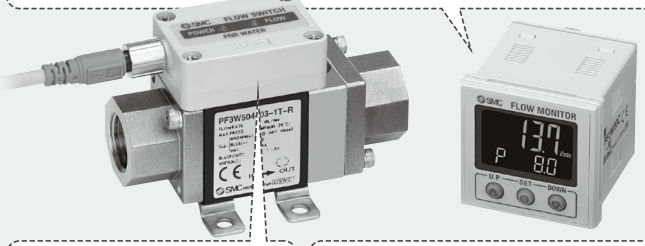
Type	Applicable fluid	Rated flow range (L/min)	Flow adjustment valve/Temperature sensor: None	Flow adjustment valve	Temperature sensor	Flow adjustment valve + Temperature sensor	Port size Rc, NPT, G
Integrated / Remote sensor / Monitor	Water, Ethylene glycol aqueous solution	0.5 to 4	●	●	●	●	3/8
		2 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	Deionized water, Chemical	10 to 100	●	—	—	—	25A
		30 to 250	●	—	—	—	30A

3-color display Digital flow monitor can copy to up to 10 switches simultaneously.

The settings of the master sensor (source of copy) can be copied to the slave sensors.

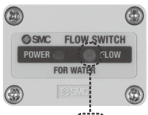
- **Reducing setting labor**
- **Minimizing risk of mistakes in setting**





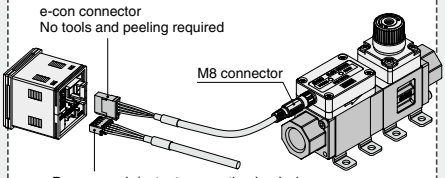
Indicator

Visually check status of sensor via indicator.

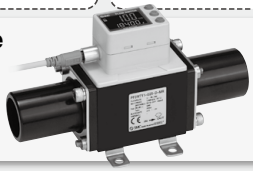


Flow rate: High	●	Blinking green/Fast
Flow rate: Low	●	Blinking green/Slow
Rated flow or less	●	OFF
Rated flow or more	●	Red ON

Reducing wiring labor by connector



PVC piping type



Wetted Parts

Pipe	CPVC (Heat resistant PVC)
Body	PPS
Seal	FKM

INDEX

3-color display

Digital Flow Switch for Water

PF3W Series

RoHS

How to Order

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

For how to order of remote monitor unit, refer to page 350.

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

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

Note) Analog output of 4 to 20 mA with temperature sensor is made to order. (Refer to page 342.)

Remote sensor unit/Unit printed on label

Symbol	Instantaneous flow rate	Temperature
Nil	L/min	°C
G∗	L/min (gal/min)	°C/°F

∗ Under the New Measurement Law, units other than SI (symbol "Nil") cannot be used in Japan.

Note) 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

Thread type

Nil	Rc
N	NPT
F	G∗

∗ ISO228 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	—	—	—	—	●

Flow adjustment valve

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

Note 1) 100 and 250 L/min types with flow adjustment valves are not available.

Note 2) The flow adjustment valve of this product is not suitable for applications which require constant adjustment of flow rate.

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

Note 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.

Made to Order

X109	Seal material EPDM
X128	Analog 4 to 20 mA 2 output type Note)
X143	Piping material brass

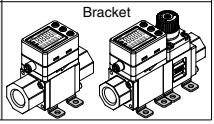
Note) Applicable only for remote type with temperature sensor (Refer to page 342.)

Calibration certificate (Only flow sensor)

Nil	None
A	With calibration certificate

∗ Written in both Japanese and English. The temperature sensor is not calibrated.

Bracket (Option)

Nil	None
R	Bracket 

Note) With bracket is not available for 250 L/min type.

Integrated display **Output specification/Temperature sensor**

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

Integrated display/Unit specification

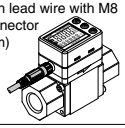
Symbol	Instantaneous flow rate	Accumulated flow	Temperature
M	L/min	L	°C
G	gal/min	gal	°C
F	gal/min	gal	°F
J	L/min	L	°F

∗ Under the New Measurement Law, units other than SI (symbol "M") cannot be used in Japan.

Note) 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

Lead wire

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

Options/Part No.

When optional parts are required separately, use the following part numbers to place an order.

Description	Part no.	Qty.	Note	
Bracket Note)	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)	

Note) For units with flow adjustment valve, 2 brackets are required.

Refer to pages 202 and 203 for Flow Switch Precautions. For details about the Specific Product Precautions, refer to the Operation Manual on the SMC website, http://www.smcworld.com

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) Note 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
Minimum setting unit			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 (with no freezing and condensation)				0 to 70°C (with no freezing and condensation)
Display unit			Instantaneous flow rate: L/min, Accumulated flow: L				
Accuracy			Display value: ±3% F.S. Analog output: ±3% F.S.				
Repeatability			±2% F.S. Note 2)				
Temperature characteristics			±5% F.S. (25°C reference)				
Operating pressure range Note 3)			0 to 1 MPa				
Proof pressure Note 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 Note 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				
	Maximum load current		80 mA				
	Maximum applied voltage		28 VDC				
	Internal voltage drop		NPN: 1 V or less (at 80 mA load current) PNP: 1.5 V or less (at 80 mA load current)				
	Response time Note 2), 5)		0.5 s/1 s/2 s				
	Output protection		Short circuit protection				
	Output mode	Flow rate	Select from hysteresis mode, window comparator mode, accumulated output mode, or accumulated pulse output mode.				
		Temperature	Select from hysteresis mode or window comparator mode.				
Analog output	Response time Note 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-color, 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 (with no freezing and condensation)				
	Operating humidity range		Operation, Storage: 35 to 85% R.H. (with no condensation)				
	Withstand voltage Note 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, UL (CSA), RoHS				
Wetted parts material Note 8)			PPS, Stainless steel 304, FKM, SCS13				
			Non-grease				
Piping port size Note 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				

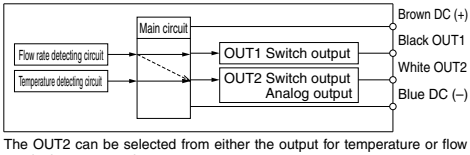
Note 1) Refer to "Measurable Range for Ethylene Glycol Aqueous Solution" on page 337. Measurement can be performed with a fluid that does not corrode wetted parts and has viscosity of 3 mPa·s [3 cP] or less. Be aware that water leakage may happen due to internal seal shrinkage or swelling depending on kinds of fluid.
Note 2) When 0.5 s is selected for the response time of the switch output, the repeatability becomes ±3% F.S.
Note 3) Operating pressure range and proof pressure change according to the fluid temperature. Refer to page 335.
Note 4) Cleared by turning off the power supply. It is possible to select the function to memorize it. (Every 2 or 5 minutes) When 5 minutes memorizing is selected, the lifetime of the memory element (electronic part) is 1 million times (5 minutes x 1 million times = 5 million minutes = Approx. 9.5 years for 24 hour energizing). Calculate the lifetime based on your operating conditions before using the memorizing function, and do not exceed it.
Note 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.)
Note 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 analog output by the temperature sensor.)
Note 7) When the temperature sensor is used, it will be 250 VAC.
Note 8) Refer to "Wetted Parts Construction" on page 337 for details.
Note 9) When the piping diameter or piping passage is restricted, the specifications may not be satisfied.
Note 10) Any products with tiny scratches, smears, or display color variation or brightness which does not affect the performance are verified as conforming products.

Temperature Sensor Specifications

Rated temperature range	0 to 100°C Note 1)
Setting/Display temperature range	−10 to 110°C
Minimum setting unit	1°C
Display unit	°C
Display accuracy	±2°C
Analog output accuracy	±3% F.S.
Response time	7 s Note 2)
Ambient temperature characteristics	±5% F.S.

Note 1) The rated temperature range is for the temperature sensor alone. The fluid temperature range specification of the flow switch as a whole is **0 to 90°C**.
Note 2) The response time is for the temperature sensor alone.

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.

Refer to pages 202 and 203 for Flow Switch Precautions. For details about the Specific Product Precautions, refer to the Operation Manual on the SMC website, http://www.smcworld.com

Specifications (Remote Sensor Unit)

Refer to page 350 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) Note 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 (with no freezing and condensation)				0 to 70°C (with no freezing and condensation)
Accuracy		±3% F.S.				
Repeatability		±2% F.S.				
Temperature characteristics		±5% F.S. (25°C reference)				
Operating pressure range Note 2)		0 to 1 MPa Note 2)				
Proof pressure Note 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
Analog output	Response time Note 3)	1s				
	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 (with no freezing and condensation)				
	Operating humidity range	Operation, Storage: 35 to 85% R.H. (with no condensation)				
	Withstand voltage Note 4)	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, UL (CSA), RoHS				
Wetted parts material Note 5)		PPS, Stainless steel 304, FKM, SCS13				
		Non-grease				
Piping port size Note 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
	With temperature sensor/Without flow adjustment valve	270 g	320 g	515 g	840 g	1060 g
	Without temperature sensor/With flow adjustment valve	295 g	345 g	595 g	—	—
	With temperature sensor/With flow adjustment valve	370 g	415 g	715 g	—	—
	With lead wire with connector	+85 g				

Note 1) Refer to "Measurable Range for Ethylene Glycol Aqueous Solution" on page 337. Measurement can be performed with a fluid that does not corrode wetted parts and has viscosity of 3 mPa·s [3 cP] or less. Be aware that water leakage may happen due to internal seal shrinkage or swelling depending on kinds of fluid.

Note 2) Operating pressure range and proof pressure change according to the fluid temperature. Refer to the graphs below.

Note 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 analog output by the temperature sensor.)

Note 4) When the temperature sensor is used, it will be 250 VAC.

Note 5) Refer to "Wetted Parts Construction" on page 337 for details.

Note 6) When the piping diameter or piping passage is restricted, the specifications may not be satisfied.

Note 7) Any products with tiny scratches, smears, or display color variation or brightness which does not affect the performance are verified as conforming products.

Temperature Sensor Specifications

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

Note 1) The rated temperature range is for the temperature sensor alone. The fluid temperature range specification of the flow switch as a whole is **0 to 90°C**.

Note 2) The response time is for the temperature sensor alone.

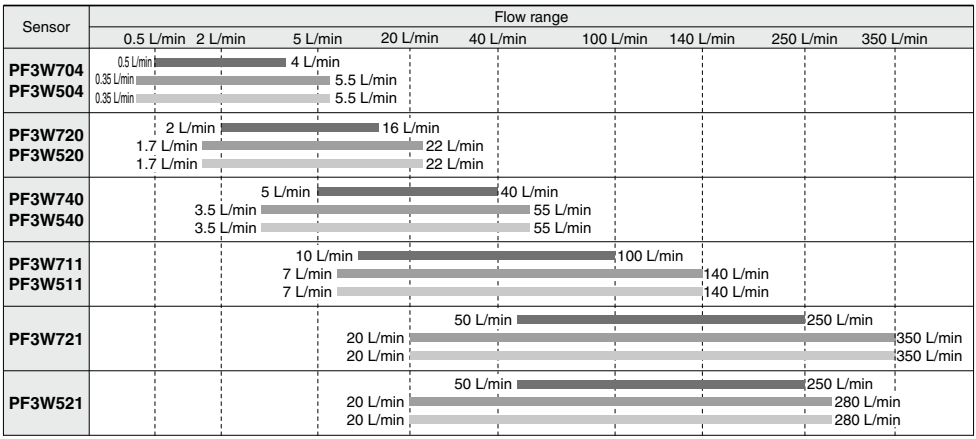
Set Flow Range and Rated Flow Range

⚠Caution **Set the flow within the rated flow range.**

The set flow range is the range of flow rate that is possible in setting.

The rated flow range is the range that satisfies the sensor's specifications (accuracy etc.).

Although it is possible to set a value outside the rated flow range, the specifications will not be guaranteed even if the value stays within the set flow range.



∗ In the case of the PF3W5 series, the displayable and settable ranges are the same as the PF3W3 series flow monitor.

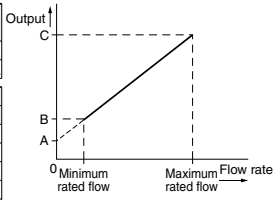
Rated flow range Display flow range Set flow range

Analog Output

Flow rate/Analog 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

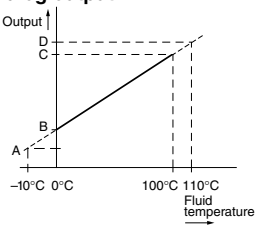


Fluid temperature/Analog output

PF3W7/5

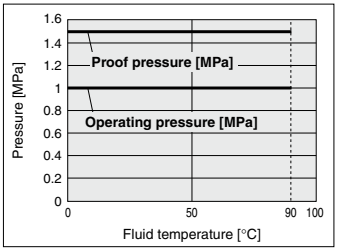
	A	B
Voltage output	0.6 V	1 V
Current output	2.4 mA	4 mA

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

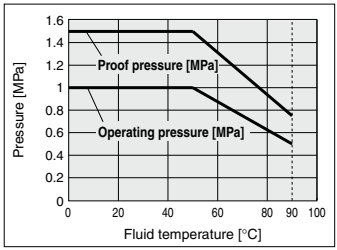


Operating Pressure and Proof Pressure

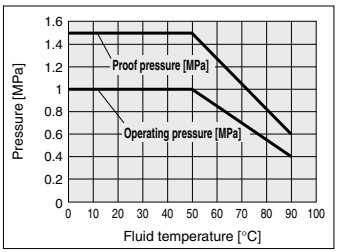
PF3W704/720/740/504/520/540



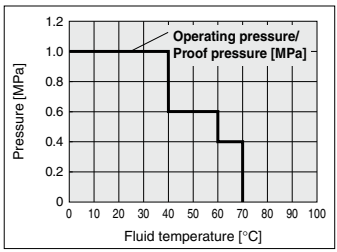
PF3W704S/720S/740S/504S/520S/540S



PF3W711/511

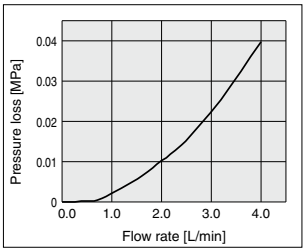


PF3W721/521

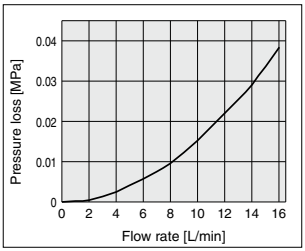


Flow Rate Characteristics (Pressure Loss: Without Flow Adjustment Valve)

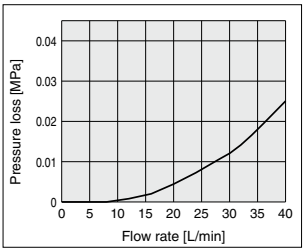
PF3W704/504



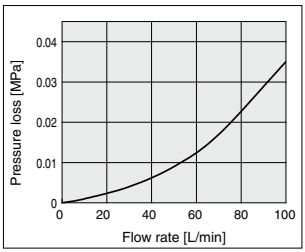
PF3W720/520



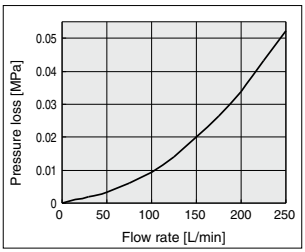
PF3W740/540



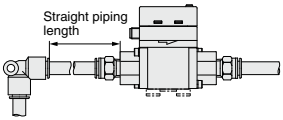
PF3W711/511



PF3W721/521



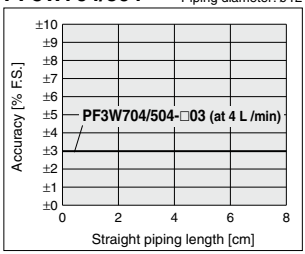
Straight Piping Length and Accuracy (Reference Value)



- 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)

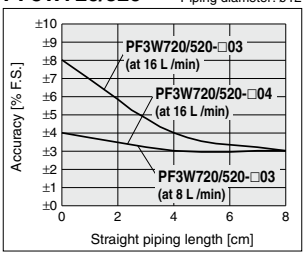
PF3W704/504

Pressure: 0.3 MPa
Piping diameter: ø12



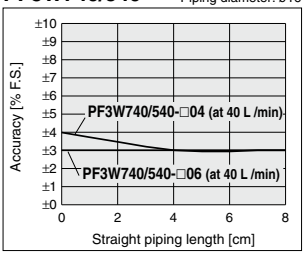
PF3W720/520

Pressure: 0.3 MPa
Piping diameter: ø12



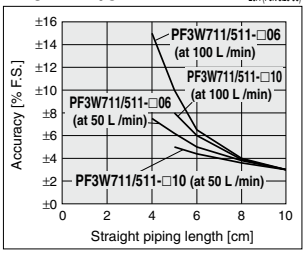
PF3W740/540

Pressure: 0.3 MPa
Piping diameter: ø16



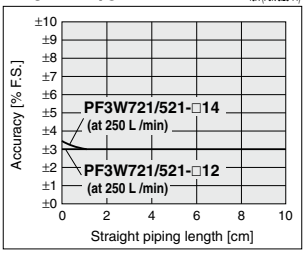
PF3W711/511

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



PF3W721/521

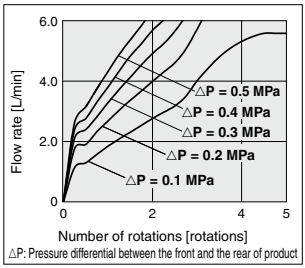
Pressure: 0.3 MPa Piping diameter: 32A (Port size 12)
40A (Port size 14)



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

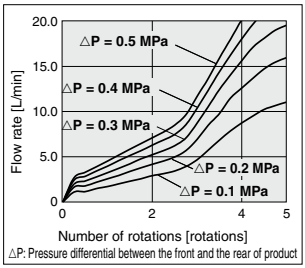
Flow Rate Characteristics of Flow Adjustment Valve

PF3W704S/504S



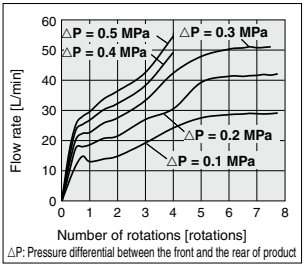
△P: Pressure differential between the front and the rear of product

PF3W720S/520S



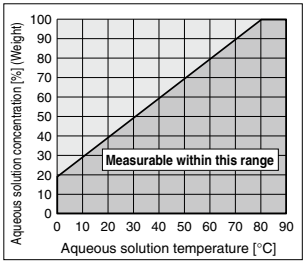
△P: Pressure differential between the front and the rear of product

PF3W740S/540S

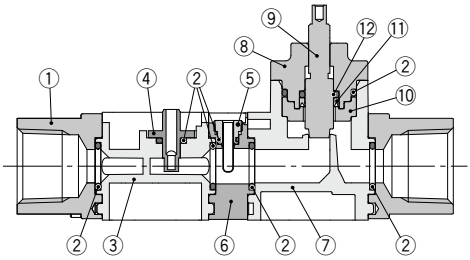


△P: Pressure differential between the front and the rear of product

Measurable Range for Ethylene Glycol Aqueous Solution (Reference Value)



Wetted Parts Construction



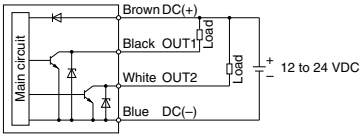
Component Parts

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	

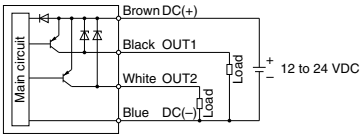
Internal Circuits and Wiring Examples

PF3W7□□

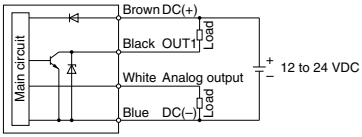
-A(T)
NPN (2 outputs)



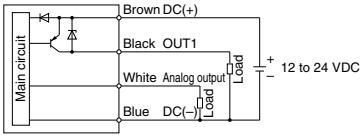
-B(T)
PNP (2 outputs)



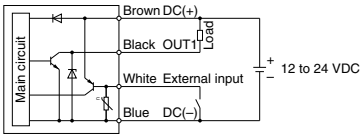
-C(T)/D(T)
C(T): NPN + Analog voltage output
D(T): NPN + Analog current output



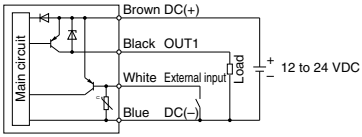
-E(T)/F(T)
E(T): PNP + Analog voltage output
F(T): PNP + Analog current output



-G
NPN + External input

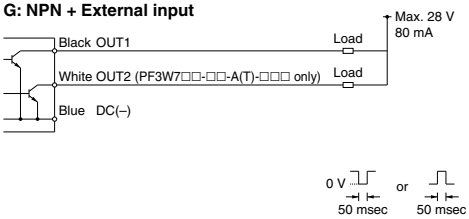


-H
PNP + External input

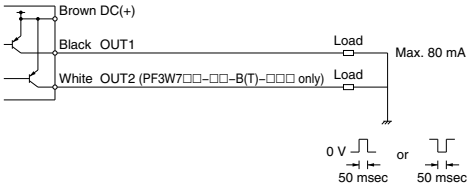


Accumulated pulse output wiring examples

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

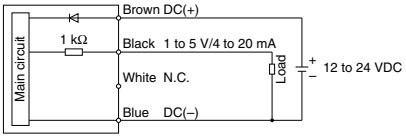


-B(T)/E(T)/F(T)/H
B(T): PNP (2 outputs)
E(T), F(T): PNP + Analog output
G: PNP + External input

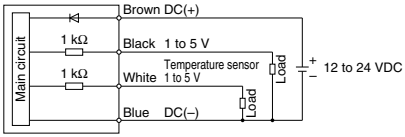


PF3W5□□

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



-1T
Analog voltage output
(With temperature sensor output)

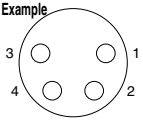


Dimensions

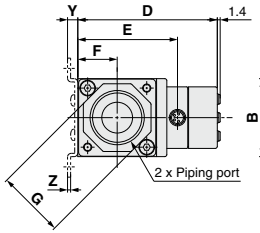
PF3W704/720/740/711/721
Integrated display

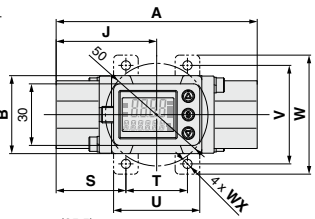
Connector pin number

Example

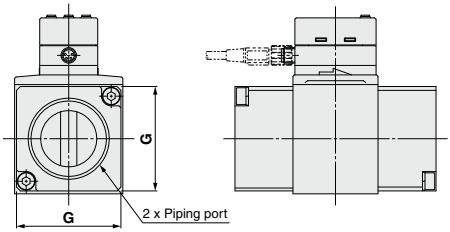


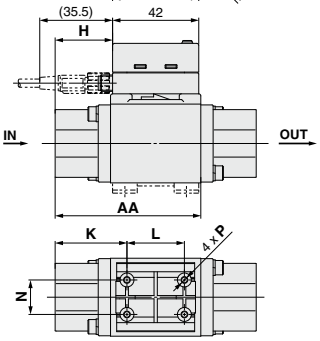
Pin no.	Pin name
1	DC (+)
2	OUT2
3	DC (–)
4	OUT1



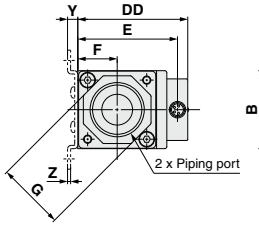


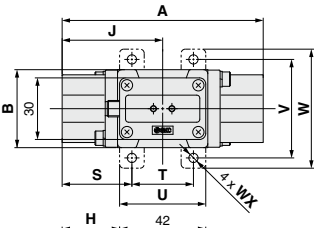
For PF3W721



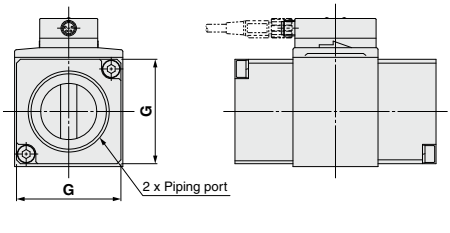


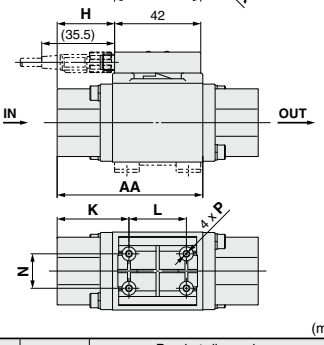
PF3W504/520/540/511/521
Remote sensor unit





For PF3W521



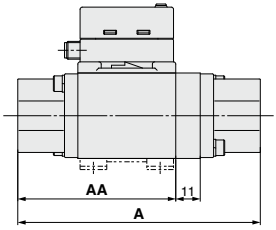


(mm)

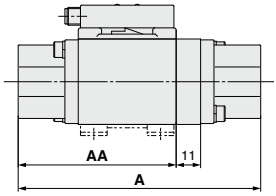
Model	Port size (Rc, NPT, G)	A	AA	B	D	DD	E	F	G	H	J	K	L	N	P	Bracket dimensions							
																S	T	U	V	W	WX	Y	Z
PF3W704/504	3/8	70	50	30	60	45.6	40.6	15.2	24	14	35	26	18	13.6	ø2.7 depth 14	24	22	32	40	50	4.5	5	1.5
PF3W720/520	3/8, 1/2	78	54	30	60	45.6	40.6	15.2	27	18	39	30	18	13.6	ø2.7 depth 12	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	ø2.7 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	ø3.5 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	ø3.5 depth 14	—	—	—	—	—	—	—	—
	G1 1/4	108	76							33	54	41.5											
	G1 1/2	112	78							35	56	43.5											

Dimensions

PF3W704/720/740/711/721-□-□T
Integrated display: With temperature sensor



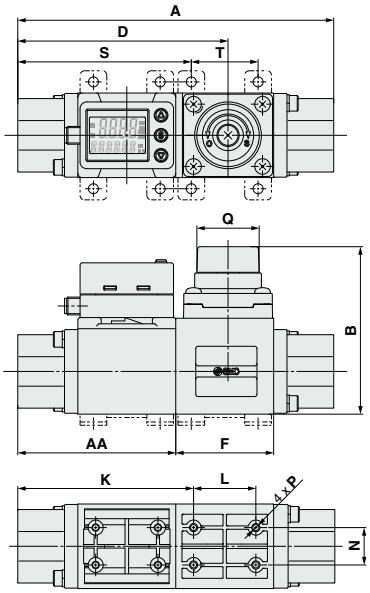
PF3W504/520/540/511/521-□-□T
Remote sensor unit: With temperature sensor



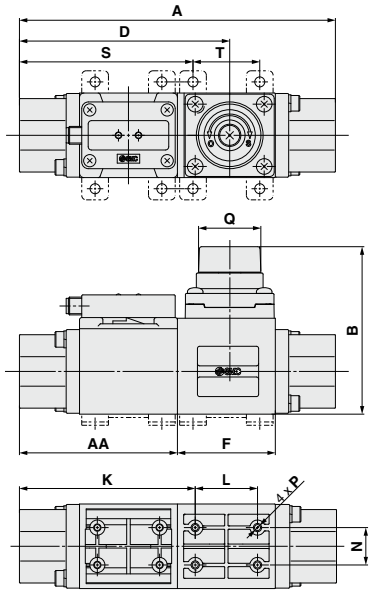
(mm)

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

PF3W704S/720S/740S
Integrated display: With flow adjustment valve



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

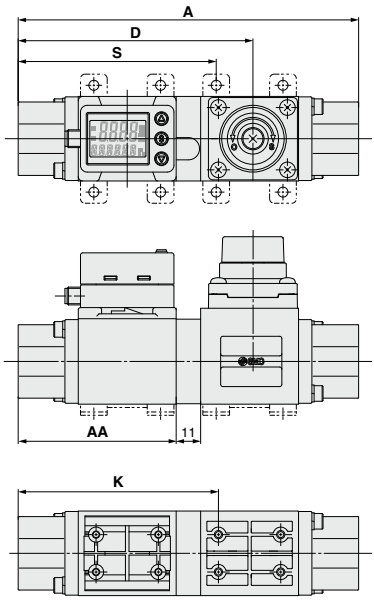


(mm)

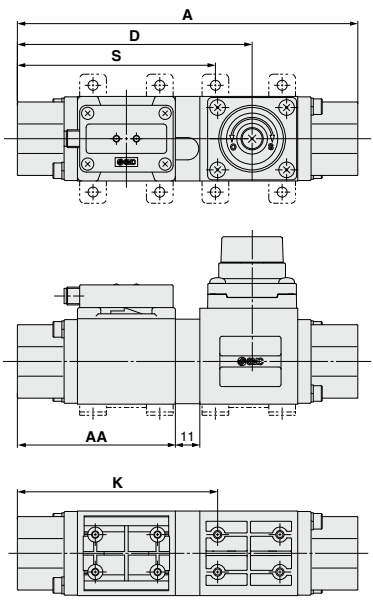
Model	A	AA	B	D	F	K	L	N	P	Q	Q number of rotations	Bracket dimensions S	Bracket dimensions T
PF3W704S/504S	104	50	63.6 (Max. 68.6)	70.2	34	58.5	18	13.6	ø2.7 depth 10	ø19	6	56.5	22
PF3W720S/520S	112	54	63.6 (Max. 68.6)	74.2	34	62.5	18	13.6	ø2.7 depth 10	ø19	6	60.5	22
PF3W740S/540S	142	71	75.25 (Max. 81)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

Dimensions

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



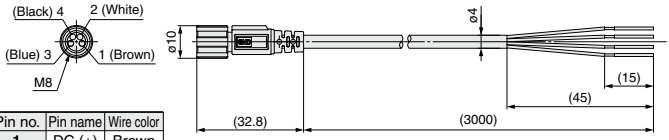
PF3W504S/520S/540S-□-□T
Remote sensor unit: With temperature sensor and flow adjustment valve



(mm)

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

ZS-40-A
Lead wire with M8 connector



Pin no.	Pin name	Wire color
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
	Color	Brown, White, Black, Blue
Sheath	**Material**	Heat and oil resistant PVC
Finished O.D.		ø4

Note 1) 4-wire type lead wire with M8 connector used for the PF3W series.
Note 2) Refer to the Operation Manual in our website (http://www.smcworld.com) for wiring.

Made to Order

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

Made to Order

Symbol **-X109**

1 Seal material EPDM

Seal material for wetted parts changed to EPDM

PF3W5 □ – □□ – □□ – □□□ – **X109**
PF3W7 □ – □□ – □□ – □□□ – **X109**

Seal material EPDM

Refer to "How to Order," page 332 for details.

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

Symbol **-X128**

2 Analog 4 to 20 mA 2 output

Output specification of remote type with a temperature sensor: Analog 4 to 20 mA 2 output

PF3W5 □□ – □□ – **2T** □ – □□□ – **X128**

Analog 4 to 20 mA 2 output

Refer to "How to Order," page 332 for details.

Note) Remote monitor unit is eguipped as standard.

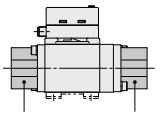
Symbol **-X143**

3 Piping material brass

Piping (attachment) material changed to brass

PF3W5 □ – □□ – □□ – □□□ – **X143**
PF3W7 □ – □□ – □□ – □□□ – **X143**

Piping (attachment) material brass



Piping (attachment)

Refer to "How to Order," page 332 for details.

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

3-color display

Digital Flow Switch for PVC Piping

PF3W Series

RoHS

How to Order

For how to order of remote monitor unit, refer to page 350.

Remote sensor unit

Output specification

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

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

Remote sensor unit/Unit printed on label

Symbol	Instantaneous flow rate
Nil	L/min
G∗	L/min (gal/min)

∗ Under the New Measurement Law, units other than SI (symbol "Nil") cannot be used in Japan.

Note) G: Made to Order
Reference: 1 [L/min] ↔0.2642 [gal/min]
1 [gal/min] ↔3.785 [L/min]

Calibration certificate (Only flow sensor)

Nil	None
A	With calibration certificate

∗ Written in both English and Japanese. The temperature sensor is not calibrated.

Remote sensor unit PF3W 5 □ – U □ – 1 □ – □ □ □ – □

Integrated display PF3W 7 11 – U 25 – A □ – M □ □ – □

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

PVC pipe O.D.

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

∗ JIS K6742 equivalent

Integrated display

Output specification

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

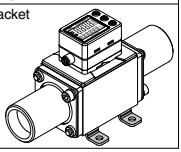
External input: The accumulated value, peak value, and bottom value can be reset.

Made to Order

X109	Seal material EPDM

(Refer to page 349.)

Bracket (Option)

Nil	None
R	Bracket 

Note) With bracket is not available for 250 L/min type.

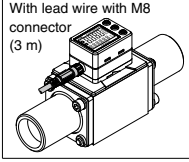
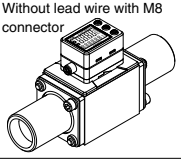
Integrated display/Unit specification

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

∗ Under the New Measurement Law, units other than SI (symbol "M") cannot be used in Japan.

Note) G: Made to Order
Reference: 1 [L/min] ↔0.2642 [gal/min]
1 [gal/min] ↔3.785 [L/min]

Lead wire

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

Options/Part No.

When optional parts are required separately, use the following part numbers to place an order.

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)	

Refer to pages 202 and 203 for Flow Switch Precautions. For details about the Specific Product Precautions, refer to the Operation Manual on the SMC website, http://www.smcworld.com

Specifications (Integrated Display)

Model			PF3W711	PF3W721
Applicable fluid			Water and ethylene glycol aqueous solution (with viscosity of 3 mPa·s [3 cP] or less) Note 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
Minimum setting unit			1 L/min	2 L/min
Conversion of accumulated pulse			1 L/pulse	2 L/pulse
Fluid temperature			0 to 70°C (with no freezing and condensation)	
Display unit			Instantaneous flow rate: L/min, Accumulated flow: L, Display values updated 5 times per second	
Accuracy			Display value: ±3% F.S. Analog output: ±3% F.S.	
Repeatability			±2% F.S. Note 2)	
Temperature characteristics			±5% F.S. (25°C reference)	
Operating pressure range Note 3)			0 to 1 MPa	
Proof pressure Note 3)			1 MPa	
Pressure loss			45 kPa or less at the maximum flow	
Accumulated flow range Note 4)			999999999 L	
			By 1 L	
Switch output			NPN or PNP open collector output	
	Maximum load current		80 mA	
	Maximum applied voltage		28 VDC	
	Internal voltage drop		NPN: 1 V or less (at 80 mA load current) PNP: 1.5 V or less (at 80 mA load current)	
	Response time Note 2), 5)		0.5 s/1 s/2 s	
	Output protection		Short circuit protection	
	Output mode	Flow rate	Select from hysteresis mode, window comparator mode, accumulated output mode, or accumulated pulse output mode.	
Analog output	**Response time** Note 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-color, 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 (with no freezing and condensation)	
	Operating humidity range		Operation, Storage: 35 to 85% R.H. (with 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, UL (CSA), RoHS	
Wetted parts material Note 7)			PPS, FKM, CPVC	
			Non-grease	
Piping port size Note 8)			25A	30A
Weight	**Without lead wire with connector**		285 g	340 g
	With lead wire with connector		370 g	425 g

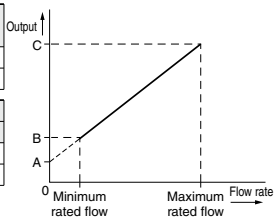
Note 1) Refer to "Measurable Range for Ethylene Glycol Aqueous Solution" on page 337. Measurement can be performed with a fluid that does not corrode wetted parts and has viscosity of 3 mPa·s [3 cP] or less. Refer to the list of applicable fluids on page 357. Be aware that water leakage may happen due to internal seal shrinkage or swelling depending on kinds of fluid.
Note 2) When 0.5 s is selected for the response time of the switch output, the repeatability becomes ±3% F.S.
Note 3) Operating pressure range and proof pressure change according to the fluid temperature. Refer to the graph below.
Note 4) Cleared by turning off the power supply. It is possible to select the function to memorize it. (Every 2 or 5 minutes) When 5 minutes memorizing is selected, the lifetime of the memory element (electronic part) is 1 million times (5 minutes x 1 million times = 5 million minutes = Approx. 9.5 years for 24 hour energizing). Calculate the lifetime based on your operating conditions before using the memorizing function, and do not exceed it.
Note 5) The response time when the set value is 90% in relation to the step input.
Note 6) The response time until the set value reaches 90% in relation to the step input.
Note 7) Refer to "Wetted Parts Construction" on page 346 for details.
Note 8) When the piping diameter or piping passage is restricted, the specifications may not be satisfied.
Note 9) Any products with tiny scratches, smears, or display color variation or brightness which does not affect the performance are verified as conforming products.

Analog Output

Flow rate/Analog output

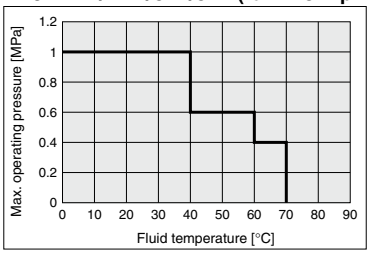
	A	B		C
		11	21	
Voltage output	1 V	1.4 V	1.5 V	5 V
Current output	4 mA	5.6 mA	5.9 mA	20 mA

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



Operating Pressure/Proof Pressure

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



Refer to pages 202 and 203 for Flow Switch Precautions. For details about the Specific Product Precautions, refer to the Operation Manual on the SMC website, http://www.smcworld.com

Specifications (Remote Sensor Unit)

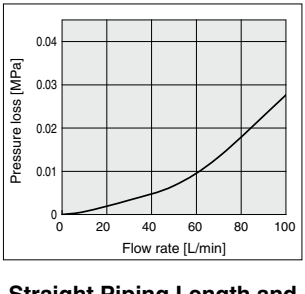
Refer to page 351 for monitor unit specifications.

Model		PF3W511	PF3W521
Applicable fluid		Water and ethylene glycol aqueous solution (with viscosity of 3 mPa·s [3 cP] or less) Note 1)	
Detection method		Karman vortex	
Rated flow range		10 to 100 L/min	30 to 250 L/min
Fluid temperature		0 to 70°C (with no freezing and condensation)	
Accuracy		±3% F.S.	
Repeatability		±2% F.S.	
Temperature characteristics		±5% F.S. (25°C reference)	
Operating pressure range Note 2)		0 to 1 MPa Note 2)	
Proof pressure Note 2)		1 MPa	
Pressure loss		45 kPa or less at the maximum flow	
Analog output	Response time Note 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 (with no freezing and condensation)	
	Operating humidity range	Operation, Storage: 35 to 85% R.H. (with 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, UL (CSA), RoHS	
Wetted parts material Note 4)		PPS, FKM, CPVC	
		Non-grease	
Piping port size Note 5)		25A	30A
Weight	Without lead wire with connector	270 g	325 g
	With lead wire with connector	355 g	410 g

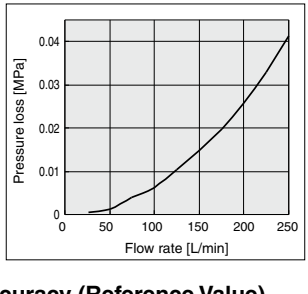
Note 1) Refer to "Measurable Range for Ethylene Glycol Aqueous Solution" on page 337. Measurement can be performed with a fluid that does not corrode wetted parts and has viscosity of 3 mPa·s [3 cP] or less. Refer to the list of applicable fluids on page 357.
Note 2) Operating pressure range and proof pressure change according to the fluid temperature. Refer to the graphs below.
Note 3) The response time until the set value reaches 90% in relation to the step input.
Note 4) Refer to "Wetted Parts Construction" on page 346 for details.
Note 5) When the piping diameter or piping passage is restricted, the specifications may not be satisfied.
Note 6) Any products with tiny scratches, smears, or display color variation or brightness which does not affect the performance are verified as conforming products.

Flow Rate Characteristics (Pressure Loss)

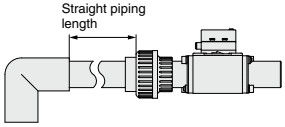
PF3W711/511



PF3W721/521



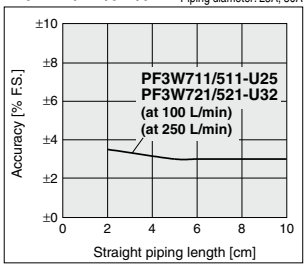
Straight Piping Length and Accuracy (Reference Value)



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

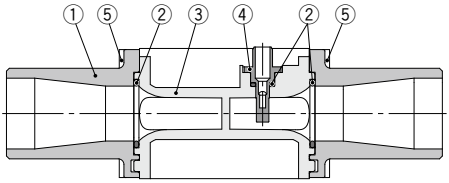
PF3W711/721/511/521

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



For measurable range for ethylene glycol aqueous solution (reference values), refer to page 337.

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 (M5 x 80 with two hexagonal socket head cap screws)**	ZS-40-U25-A	1
	30A retaining plate (M5 x 65 with two hexagonal socket head cap screws)	ZS-40-U30-A	1

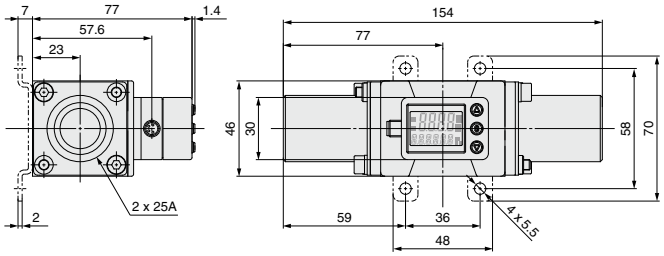
∗ Replacing the PVC pipe may cause accuracy to fluctuate by 1 to 2%.

Internal Circuits and Wiring Examples

Refer to page 338.

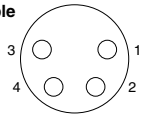
Dimensions

PF3W711-U25
Integrated display

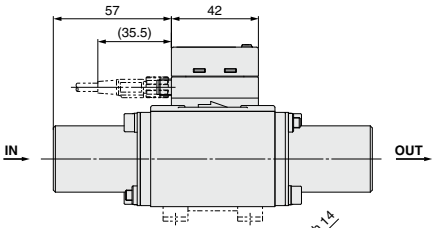


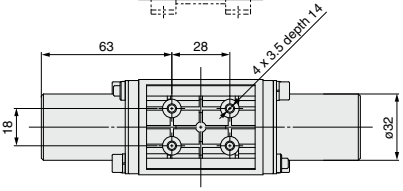
Connector pin number

Example

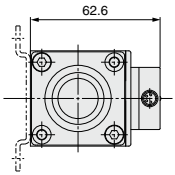


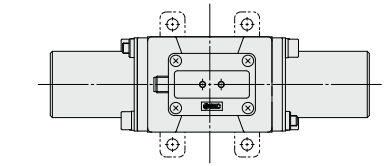
Pin no.	Pin name
1	DC (+)
2	OUT2
3	DC (–)
4	OUT1

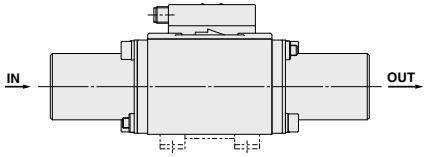




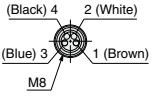
PF3W511-U25
Remote sensor unit



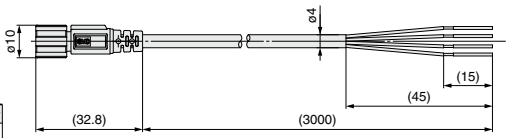




ZS-40-A
Lead wire with M8 connector



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



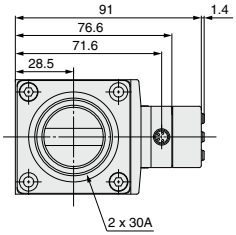
Lead Wire Specifications

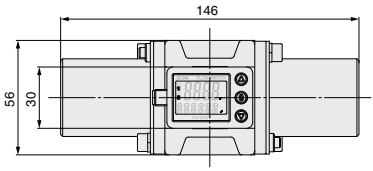
Conductor	Nominal cross section	AWG23
	O.D.	Approx. 0.7 mm
Insulator	Material	Heat resistant PVC
	O.D.	Approx. 1.1 mm
	Color	Brown, White, Black, Blue
Sheath	Material	Heat and oil resistant PVC
Finished O.D.		ø4

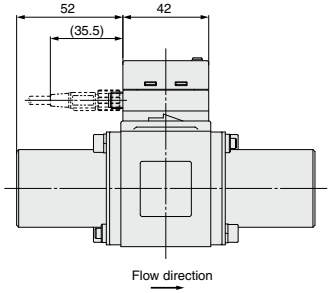
Note 1) 4-wire type lead wire with M8 connector used for the PF3W series.
Note 2) Refer to the Operation Manual in our website (http://www.smcworld.com) for wiring.

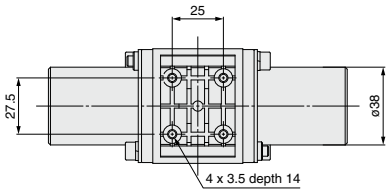
Dimensions

PF3W721-U30
Integrated display

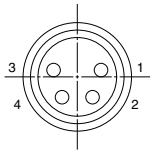






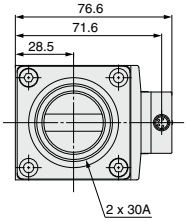


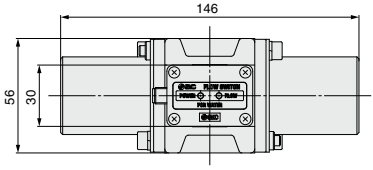
Body side
Connector pin number

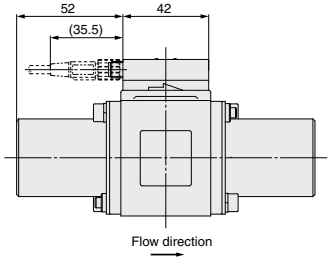


Pin no.	Pin name
1	DC (+)
2	OUT2
3	DC (–)
4	OUT1

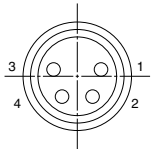
PF3W521-U30
Remote sensor unit







Body side
Connector pin number



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

Made to Order

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

Made to Order

Symbol

1 Seal material EPDM — -X109

Seal material for wetted parts changed to EPDM

PF3W5 □ – U □ – □□ – □□□ – X109

PF3W7 □ – U □ – □□ – □□□ – X109

Seal material EPDM

Refer to “How to Order,” page 343 for details.

3-color display

Digital Flow Monitor for Water

PF3W3 Series

How to Order

PF3W 3 0 A □ – M V C □

Type

3	Remote monitor unit

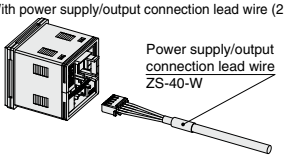
For remote sensor units, select the analog output 1 to 5 V type.
Applicable sensors: PF3W5□□-□□-1(T)

Output specification

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

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

Lead wire

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

Lead wire is not connected, but shipped together.

Remote monitor unit/Unit specification

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

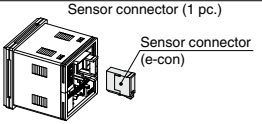
∗ Under the New Measurement Law, units other than SI (symbol "M") cannot be used in Japan.
Note) G, F, J: Made to Order
Reference: 1 [L/min]↔0.2642 [gal/min]
1 [gal/min]↔3.785 [L/min]
°F = 9/5°C + 32

Calibration certificate (Only flow monitor)

Nil	None
A	With calibration certificate

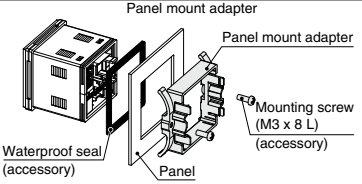
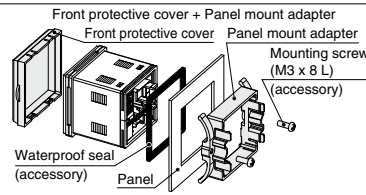
∗ Written in both English and Japanese.

Option 2

Nil	None
C	Sensor connector (1 pc.) 

Connector is not connected, but shipped together.

Option 1

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

Options/Part No.

When optional parts are required separately, use the following part numbers to place an order.

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

Refer to pages 202 and 203 for Flow Switch Precautions. For details about the Specific Product Precautions, refer to the Operation Manual on the SMC website, http://www.smcworld.com

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
Minimum setting unit			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 rate: L/min, Accumulated flow: L				
Accuracy			Display value: ±0.5% F.S. Analog output: ±0.5% F.S.				
Repeatability			±0.5% F.S.				
Temperature characteristics			±0.5% F.S. (25°C reference)				
Accumulated flow range Note 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				
	Maximum load current		80 mA				
	Maximum applied voltage		28 VDC				
	Internal voltage drop		NPN: 1 V or less (at 80 mA load current) PNP: 1.5 V or less (at 80 mA load current)				
	Response time Note 2)		1 s/2 s				
	Output protection		Short circuit protection				
	Output mode	**Flow rate**	Select from hysteresis mode, window comparator mode, accumulated output mode, or accumulated pulse output mode.				
		Temperature	Select from hysteresis mode or window comparator mode.				
Analog output	**Response time** Note 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-color, 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 (with no freezing and condensation)				
	Operating humidity range		Operation, Storage: 35 to 85% R.H. (with 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, UL (CSA), RoHS				
Weight	**Without power supply/output connection lead wire**		50 g				
	With power supply/output connection lead wire		100 g				

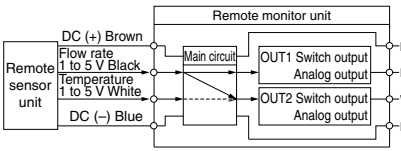
Note 1) Cleared by turning off the power supply. It is possible to select the function to memorize it. (Every 2 or 5 minutes) When 5 minutes memorizing is selected, the lifetime of the memory element (electronic part) is 1 million times (5 minutes x 1 million times = 5 million minutes = Approx. 9.5 years for 24 hour energizing). Calculate the lifetime based on your operating conditions before using the memorizing function, and do not exceed it.
Note 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.)
Note 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 analog output by the temperature sensor.)
Note 4) Any products with tiny scratches, smears, or display color variation or brightness which does not affect the performance are verified as conforming products.

Temperature Sensor Specifications

Rated temperature range	0 to 100°C Note 1)
Setting/Display temperature range	–10 to 110°C
Minimum setting unit	1°C
Display unit	°C
Analog output accuracy	±3% F.S.
Response time	7 s Note 2)
Ambient temperature characteristics	±5% F.S.

Note 1) The rated temperature range is for the temperature sensor alone. The fluid temperature range specification of the flow switch as a whole is **0 to 90°C**.
Note 2) The response time is for the temperature sensor alone.

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.

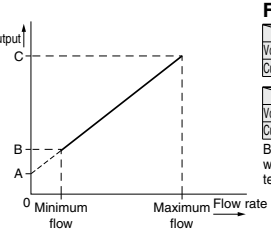
Analog Output

Flow rate/Analog 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

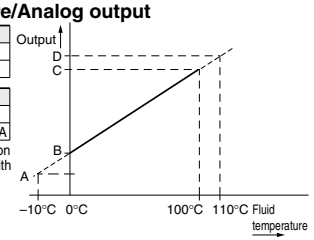


Fluid temperature/Analog output

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

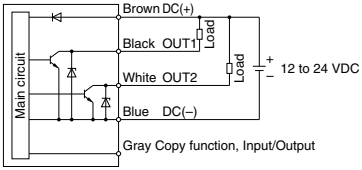
	C	D
Voltage output	5 V	5.4 V
Current output	20 mA	21.6 mA

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

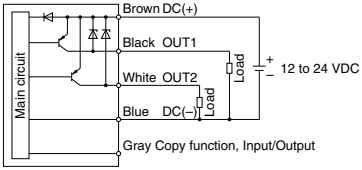


Internal Circuits and Wiring Examples

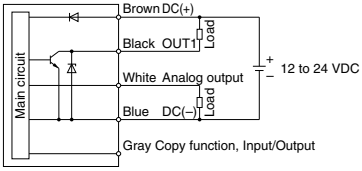
-A
NPN (2 outputs)



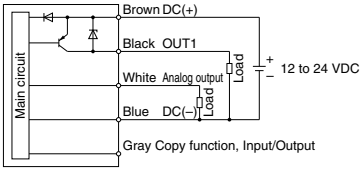
-B
PNP (2 outputs)



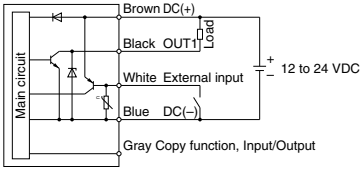
-C/D
C: NPN + Analog voltage output
D: NPN + Analog current output



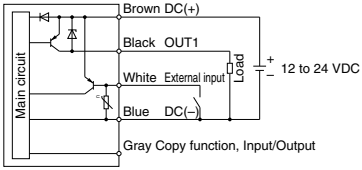
-E/F
E: PNP + Analog voltage output
F: PNP + Analog current output



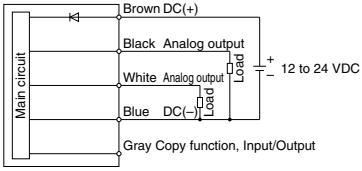
-G
NPN + External input



-H
PNP + External input

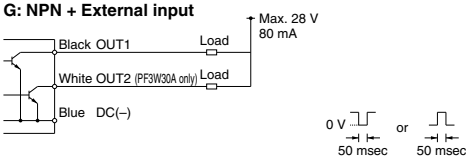


-J/K
J: Analog voltage output
K: Analog current output

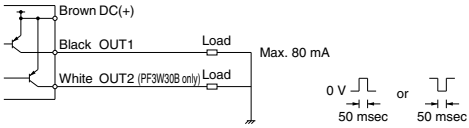


Accumulated pulse output wiring examples

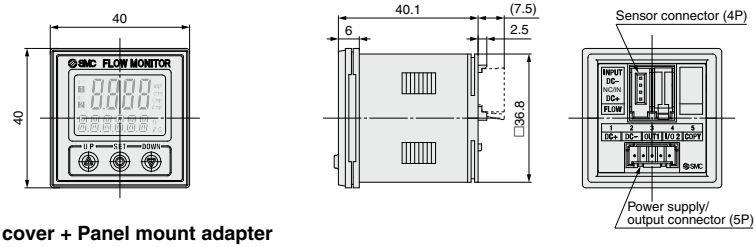
-A/C/D/G
A: NPN (2 outputs)
C, D: NPN + Analog output
G: NPN + External input



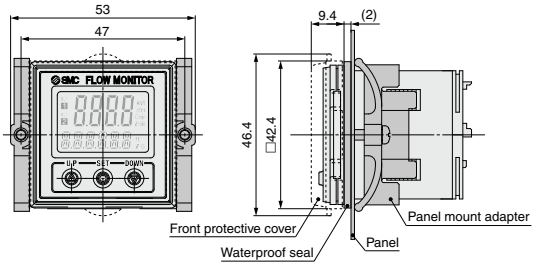
-B/E/F/H
B: PNP (2 outputs)
E, F: PNP + Analog output
G: PNP + External input



Dimensions

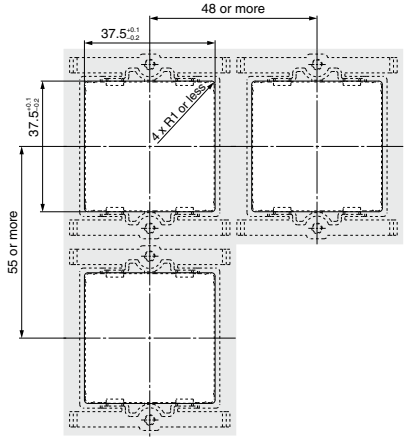


Front protective cover + Panel mount adapter

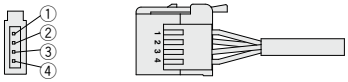


Panel fitting dimmensions

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



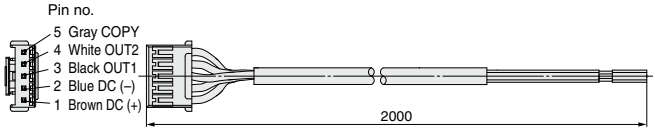
Sensor connector



Pin no.	Terminal	Connector no.	Lead wire color*
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)

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

Power supply/output connection lead wire



Lead Wire Specifications

Conductor	Nominal cross section	AWG26
	O.D.	Approx. 0.5 mm
Insulator	Material	Cross-linked vinyl
	O.D.	Approx. 1.0 mm
	Color	Brown, Blue, Black, White, Gray
Sheath	Material	Oil and heat resistant vinyl
Finished O.D.		ø3.5

Note) Refer to the Operation Manual in our website (http://www.smcworld.com) for wiring.

Function Details 1

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) corresponding to instantaneous flow rate,
Output corresponding to accumulated flow,
Accumulated pulse output
Note) 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 temperature sensor is selectable only for OUT2.
(Refer to "How to Order" for details.)

■ Indication color

The indication color can be selected for each output condition. The selection of the indication color provides visual identification of abnormal values. (The indication color depends on OUT1 setting.)

ON: Green, OFF: Red
ON: Red, OFF: Green
Always: Red
Always: Green

■ Response time

The response time can be selected depending on 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.
Note) 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 when external input is available. The accumulated value, peak value, and bottom value can be reset by remote control.
Accumulated flow external reset:
This function resets the accumulated value to "0" when an input signal is applied.
In accumulated increment mode, the value will be zero when reset, and the accumulated value will increase from zero.
In accumulated decrement mode, the value will be the set value when reset, and the accumulated value will decrease from the set value.
∗ When the accumulated value is memorized, every time the accumulated value external reset is activated, the memory element (EEPROM) will be accessed. Take into consideration the maximum number of times the memory element can be accessed, 1 million times. The total of external input times and accumulated value memorizing time interval should not exceed 1 million times.
Peak and bottom reset: Peak and bottom values are reset.

■ Forced output function

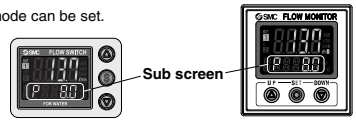
Output is turned ON/OFF compulsorily when starting the system or during maintenance. This enables confirmation of the wiring and prevents system errors due to unexpected output.
For the analog output type, the output will be 5 V or 20 mA for ON and 1 V or 4 mA for OFF.
∗ Also, the increase or decrease 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 function

Accumulated value can be saved on the unit even when the power supply is turned off.
The accumulated value is memorized every 2 or 5 minutes during measurement, and continues from the last memorized value when the power supply is turned on again.
The lifetime of the memory element is 1 million access cycles. 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

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.	

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

■ Power saving mode

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

■ Setting of secret code

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

■ Peak/Bottom value indication

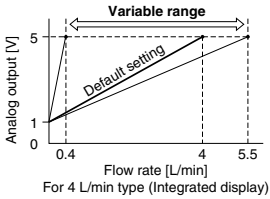
The maximum (minimum) flow is detected and updated from when the power supply is turned on. In peak (bottom) value indication mode, this maximum (minimum) flow is displayed.

■ Keylock function

Prevents operation errors such as accidentally changing setting values.

■ Analog output free range function

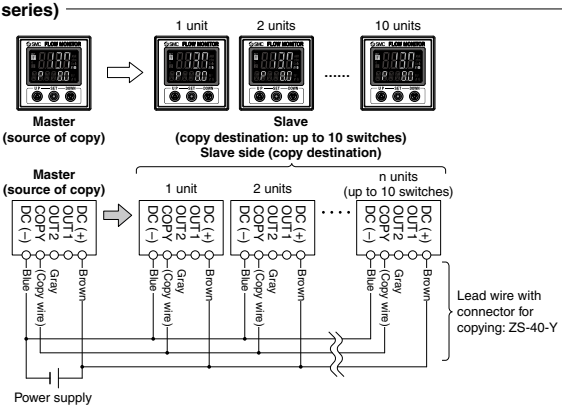
Flow rate value that generates an output of 5 V or 20 mA can be changed. (This function is not available for the analog output to the temperature.) This function is available if the analog output type is used. The value can be changed within 10% of the maximum rated flow to the maximum display flow range.



■ Copy function (Remote monitor unit/PF3W3 series)

The settings of the master sensor (source of copy) can be copied to the slave sensors, reducing setting labor and minimizing risk of mistakes in setting.

Can copy to up to 10 switches simultaneously. (Maximum transmission distance 4 m)



■ Error indication function

When a failure or error arises, the location and contents are displayed.

Indication	Description	Contents	Action	Applicable model: Integrated display PF3W7 series	Applicable model: Remote monitor unit PF3W3 series
Er 1	OUT1 over current error	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 turn on it again.	●	●
Er2	OUT2 over current error	Load current of 80 mA or more is applied to the switch output (OUT2).		●	●
HHH	Excessive instantaneous flow rate	Flow exceeds the upper limit of indicated flow rate range (rated flow x approx. 1.4).	Decrease the flow.	●	●
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]	Excessive accumulated flow	Flow exceeds the accumulated flow range. (Decimal points start blinking due to the flow range.)	Reset the accumulated flow value. (This error does not matter when the accumulated flow is not 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.	●	●
	Unconnected temperature sensor error	Temperature sensor output wire is not connected.	Connect the temperature output wire.	—	●
		Temperature sensor is not connected to the remote sensor unit.	Check if or not the remote sensor unit is connected to a temperature sensor.		
	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	System error	Internal data error	Turn off the power supply and then turn on it again. If the failure cannot be solved, please contact SMC for investigation.	●	●
Er4					
Er6					
Er8					
Er12	Temperature sensor failure	Temperature sensor may be damaged.		●	—

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

PF3W Series
Function Details 2

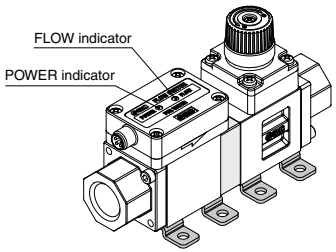
Remote Sensor Unit (PF3W5 series)

■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.



■Error indication function

When a failure or error 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.
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 off the power supply and then turn on it again. If the failure cannot be solved, 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 failure cannot be solved after the above actions are performed, please contact SMC for investigation.

Applicable Fluids

Material and Fluid Compatibility Check List (Guide)

Chemical		Compatibility
Ammonium hydroxide		×
Isobutyl alcohol		× Note 3)
Isopropyl alcohol		○ Note 1), 2)
Hydrochloric acid	Concentration 30% or less	○ Note 2)
Hydrogen peroxide	Concentration 5% or less	○
Nitric acid (except fuming nitric acid)	Concentration 10% or less	○ Note 2)
Deionized water		○
Sodium hydroxide (caustic soda)	Concentration 50% or less	× Note 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.

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

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

Note 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