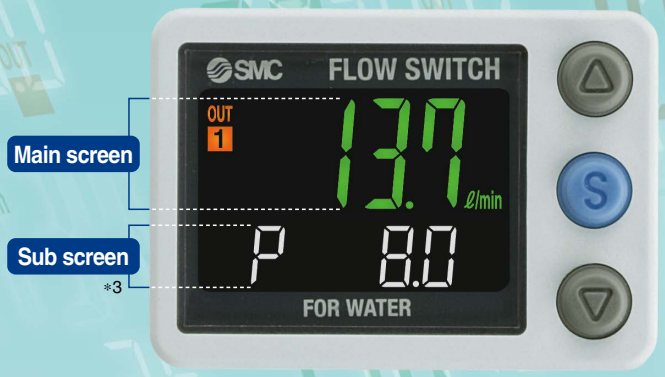
# 3-Color Display Digital Flow Switch for Water

## 3-color/2-screen display

*4 Excludes -X445
*4 Output specification: Excludes JT/KT

RoHS

IP65




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


**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** Output specification variations have been added.

| | |
|---|---|
| PF3W7 | Analog voltage 2-output type (flow rate + temperature)<br>Analog current 2-output type (flow rate + temperature) |

**New** 3-Screen Display

**4-Channel Flow Monitor**
***PFG200* Series** p. 3

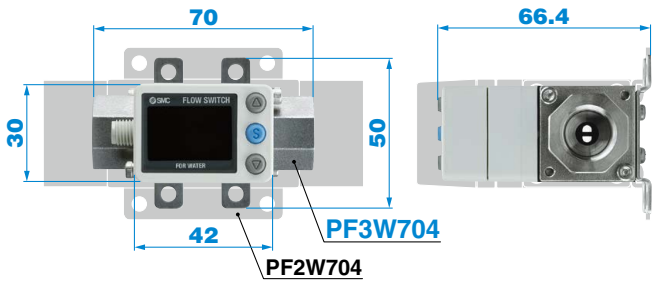
## Variations

| 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 |
|---|---|---|---|---|---|---|---|
| p. 11 Integrated<br>Remote Sensor<br>Monitor p. 31 | Water<br>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 | ● | — | ● | — | 1 1/4, 1 1/2 |
| PVC piping type Integrated p. 24<br>Remote Sensor<br>Monitor p. 31 | Deionized water | 10 to 100 | ● | — | — | — | 25A |
| | Chemical liquids | 30 to 250 | ● | — | — | — | 30A |

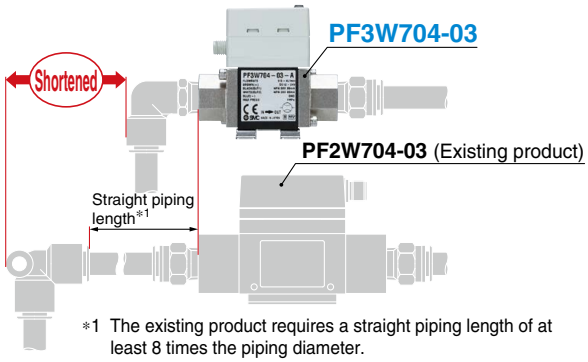
# *PF3W* Series

CAT.ES100-80D Ⓐ
CAT.ES100-80D 2024-01

## 40% smaller than the existing product




## Reduced required piping space



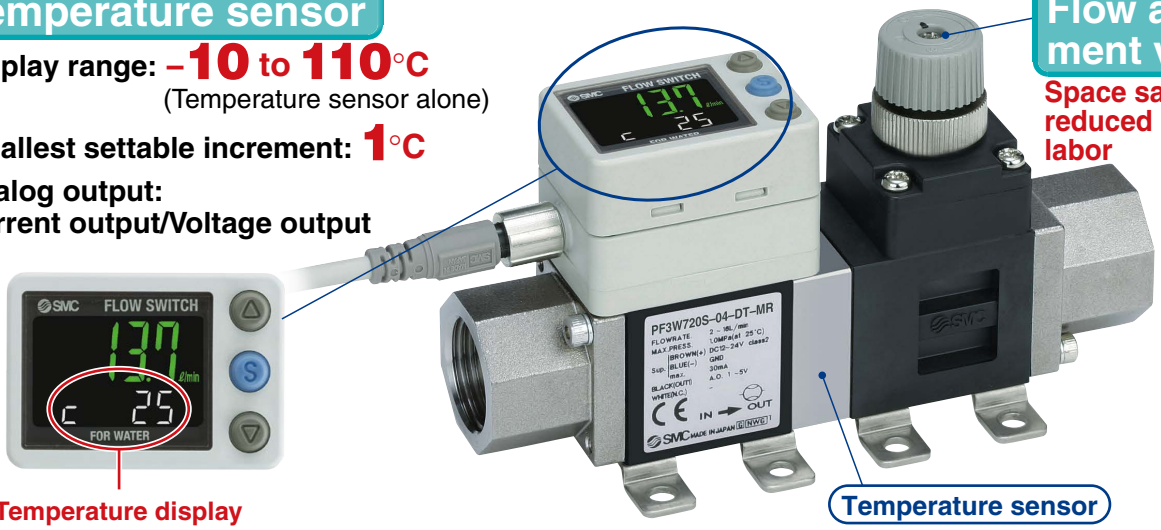

*1 The existing product requires a straight piping length of at least 8 times the piping diameter.
Refer to straight piping length and accuracy on pages 15 and 26.

## Temperature sensor

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

**Smallest settable increment: 1°C**

**Analog output:**
**Current output/Voltage output**



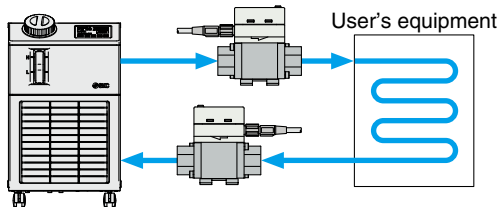

## Flow adjustment valve

**Space saving with reduced piping labor**

## Fluid temperature: 0 to 90°C

### Ethylene glycol aqueous solution can be used.

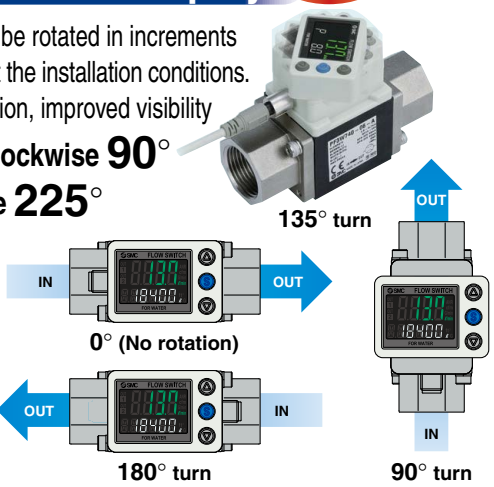
Example) Flow control of the circulating fluid in a chiller




## Rotatable display

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

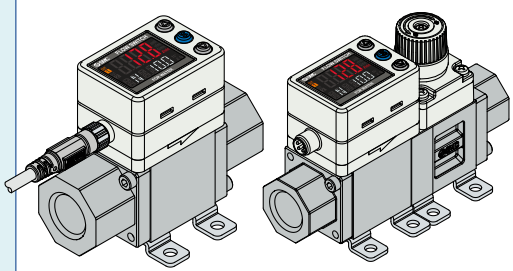
**Counterclockwise 90°**
**Clockwise 225°**



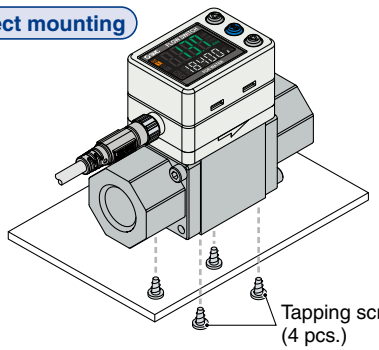

## Non-grease

## ◎Mounting

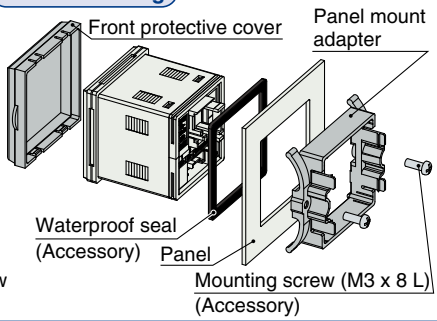
**Bracket mounting**



**Direct mounting**

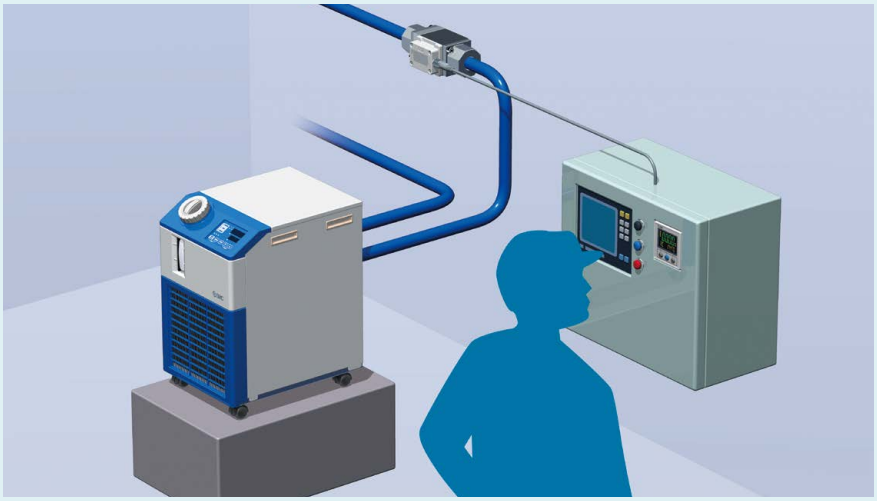



**Panel mounting**



## New Compatible with the analog 2-output type (flow rate + temperature)

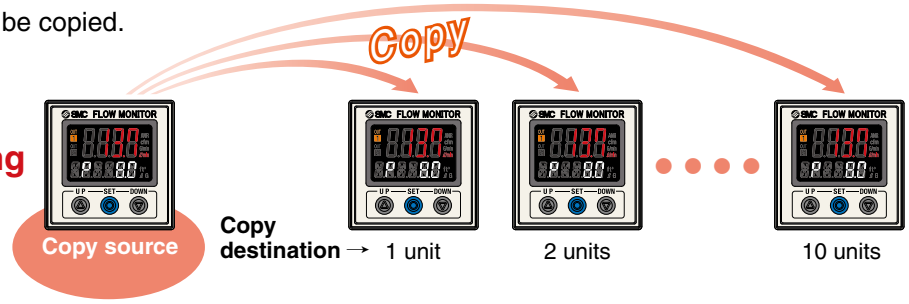
Enables the monitoring of flow rate and temperature conditions not only at the installation site but also remotely



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

The set values of the monitor can be copied.

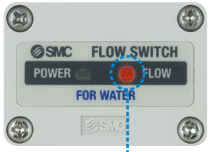
- **Reduced setting labor**
- **Minimized risk of setting mistakes**





## Indicator

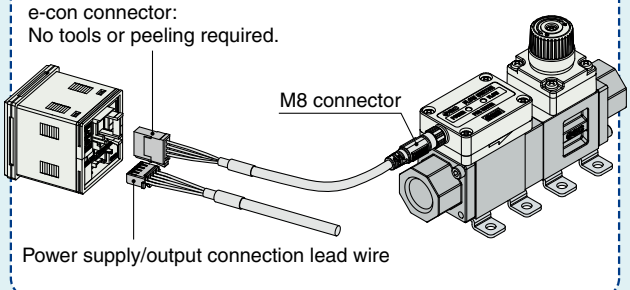
Visually check the status of the sensor via the indicator.




| | |
|---|---|
| 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 labor

e-con connector:
No tools or peeling required.




## PVC piping type

Wetted Parts

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

3-Screen Display

# 4-Channel Flow Monitor

## *PFG200 Series*

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



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

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

- Input Range Selection

### Visualization of Settings

| | | | | | |
|---|---|---|---|---|---|
| Set value (Threshold value) | P_1 | Hysteresis value | H_1 | Peak value | H_H₁ |
| Bottom value | H_Lo | Channel display | CH_1 | | |

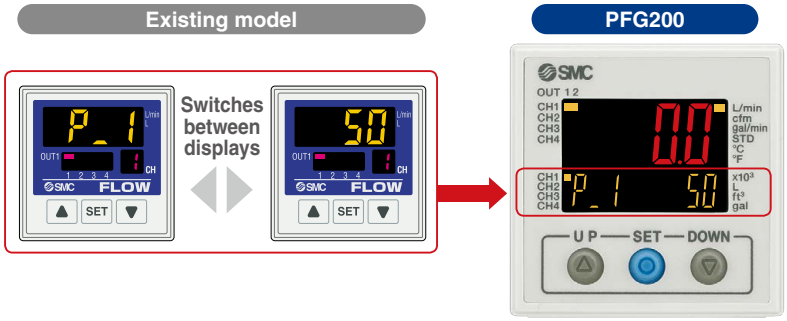




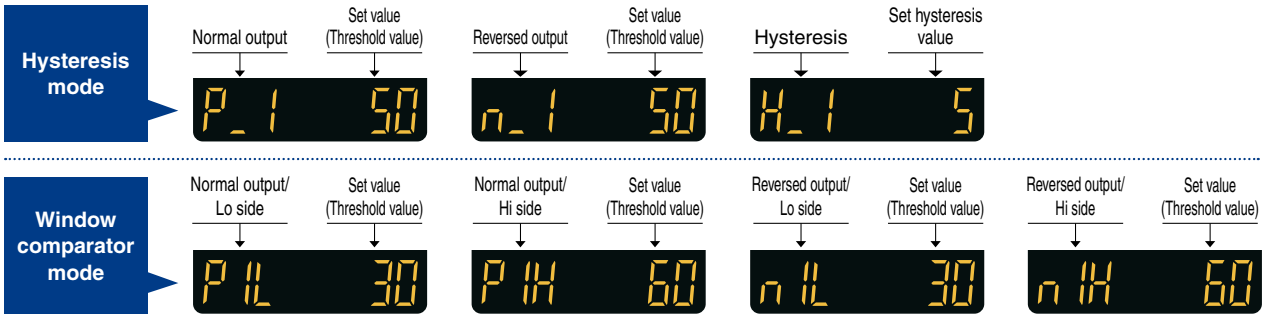
CAT.ES100-80D 2024-01

# Visualization of Settings

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

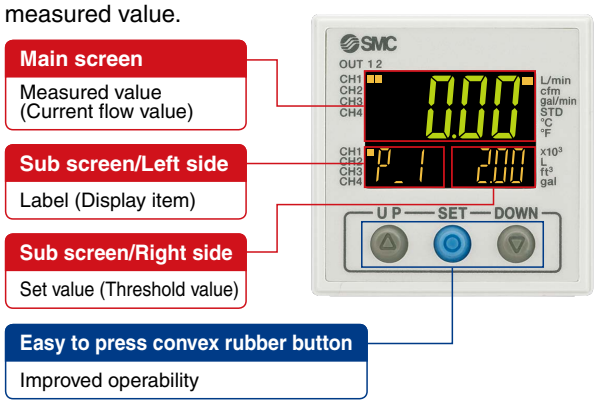



## Mode Examples

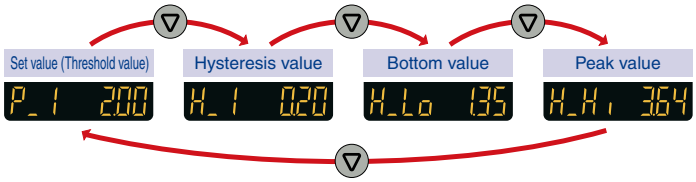



# Easy Screen Switching

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




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



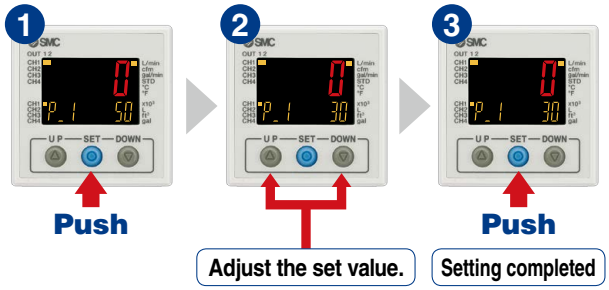

* One additional arbitrary display mode can be added via the function settings.

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

# Simple 3-Step Setting

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

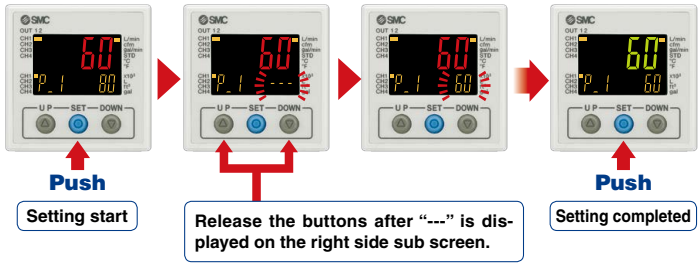
When the SET button is pressed and the hysteresis (H_1) is being displayed, the hysteresis value can be set.




## Now with a snap shot function for set value reading

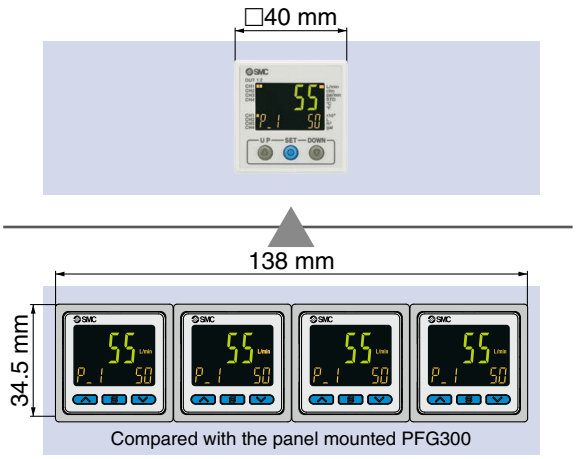
**Snap shot function**

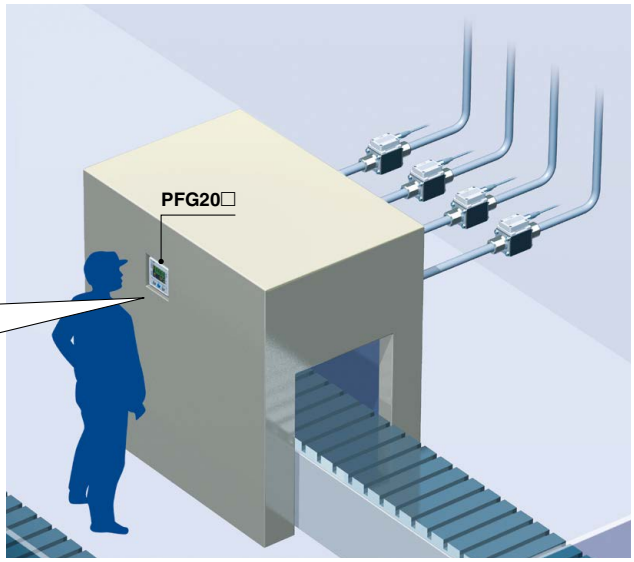
Pressing the △ and ▽ buttons simultaneously for a minimum of 1 second will make the set value (threshold value) the same as the current pressure value.



# Centralized Control Saves Installation Space.

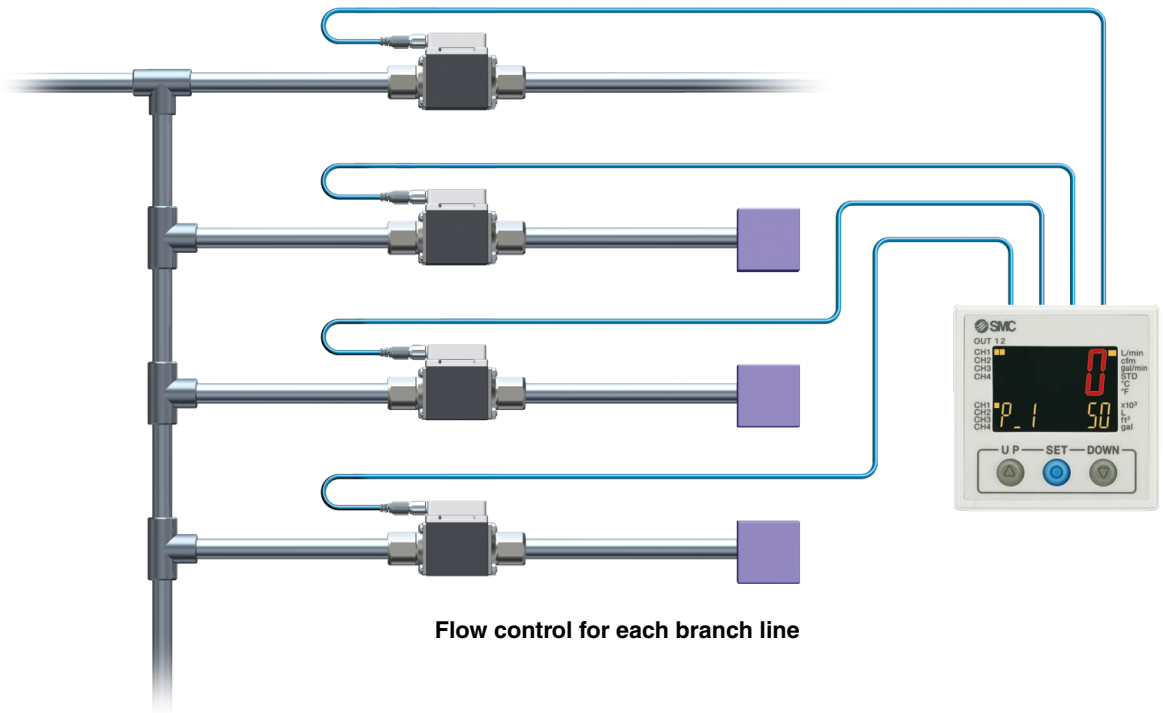
**66 % reduction in installation space** (Compared with the panel mounted PFG20□)



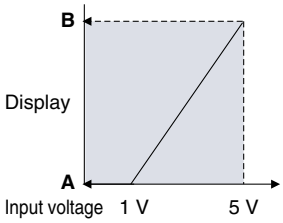

# Accumulated Flow Measurement

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




**Flow control for each branch line**

# Input Range Selection (for Pressure/Flow rate)




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

**A is displayed for 1 V. B is displayed for 5 V.**
The range can be set as required.
Refer to page 36 for the specification of the sensors which can be connected.
For the individual specifications of each connectable sensor, refer to the **Web Catalog**.

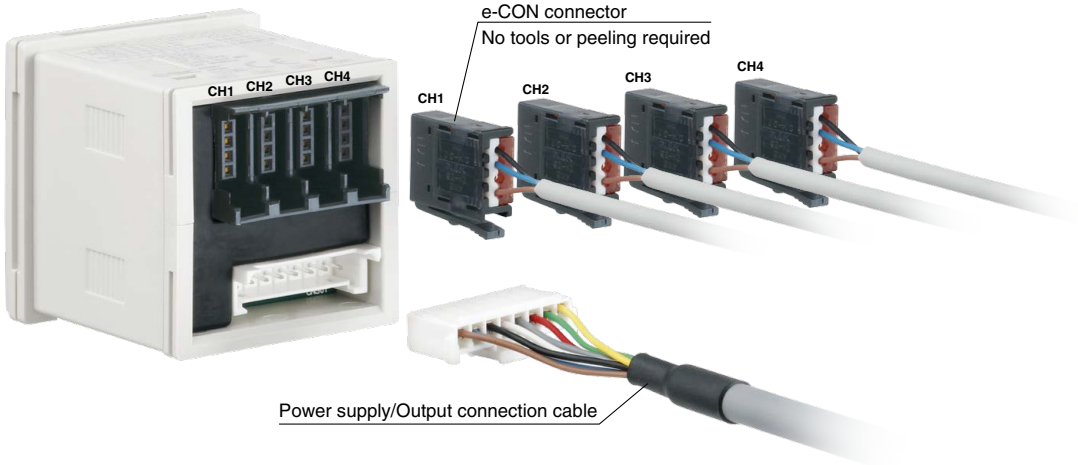
### ■ For Pressure Sensor for General Fluids / PSE56□

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

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

# Connectors

Connection and removal of wiring is easy.




# Functions

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

**■ Key-lock function**
This function prevents operation errors such as accidentally changing setting values.

**■ External input function**
The accumulated value, peak value, and bottom value can be reset remotely.

**■ Error display function**
This function displays error location and content when a problem or error has occurred.

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

**■ Zero-cut setting**
When the flow display value is close to zero, this function forces the display to zero.

**■ Selection of power-saving mode**
Power-saving mode can be selected.
It shifts to power-saving mode automatically when there is no button operation for 30 seconds.

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

**■ Accumulated value hold**
The accumulated value is not cleared even when the power supply is turned OFF.

**■ Snap shot function**
The current flow rate value can be stored to the switch output ON/OFF set point.

**■ Output check function**
It is possible to check the switch output operation and process data value.

**■ Channel to channel copy function**
The set values can be copied to other channel.

**■ Channel select function**
Flow value for the selected channel is displayed.

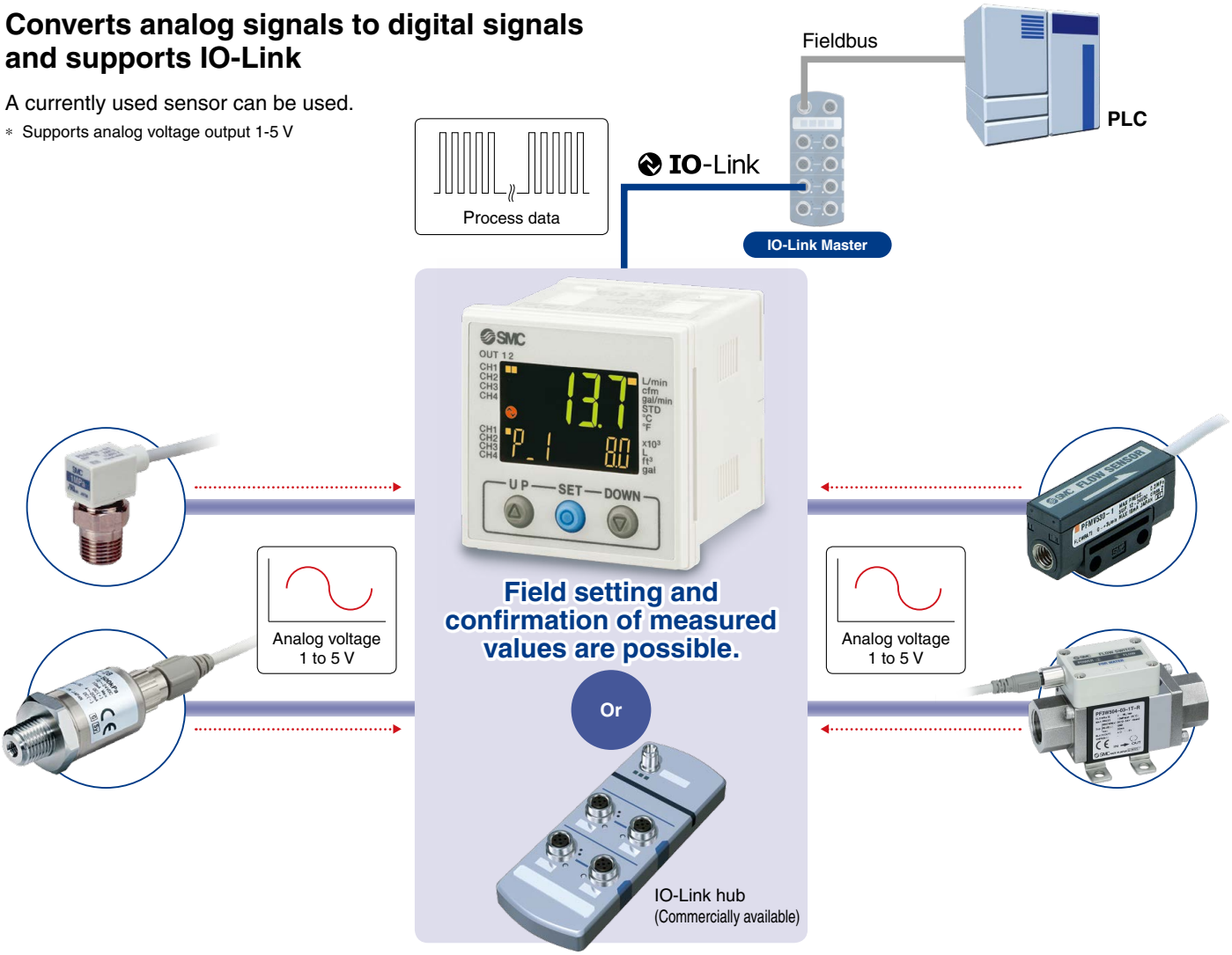
**■ Channel scan function**
Flow values for each channel are displayed in turn every 2 seconds.

# Hub Function

## Converts analog signals to digital signals and supports IO-Link

A currently used sensor can be used.

∗ Supports analog voltage output 1-5 V




### Process Data

| Bit offset | 79 | 78 | 77 | 76 | 75 | 74 | 73 | 72 | 71 | 70 | 69 | 68 | 67 | 66 | 65 | 64 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Item | CH1 measured value: 16-bit signed integer | | | | | | | | | | | | | | | |
| Bit offset | 63 | 62 | 61 | 60 | 59 | 58 | 57 | 56 | 55 | 54 | 53 | 52 | 51 | 50 | 49 | 48 |
| Item | CH2 measured value: 16-bit signed integer | | | | | | | | | | | | | | | |
| Bit offset | 47 | 46 | 45 | 44 | 43 | 42 | 41 | 40 | 39 | 38 | 37 | 36 | 35 | 34 | 33 | 32 |
| Item | CH3 measured value: 16-bit signed integer | | | | | | | | | | | | | | | |
| Bit offset | 31 | 30 | 29 | 28 | 27 | 26 | 25 | 24 | 23 | 22 | 21 | 20 | 19 | 18 | 17 | 16 |
| Item | CH4 measured value: 16-bit signed integer | | | | | | | | | | | | | | | |

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

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

Each channel has 2 outputs∗1.

| Diagnosis item | · Internal product malfunction<br>· Outside of zero-clear range |
|---|---|

| Diagnosis item | · Output overcurrent |
|---|---|

| Diagnosis item | · Display upper and lower limits are exceeded.<br>· The accumulated flow upper and lower limits are exceeded |
|---|---|

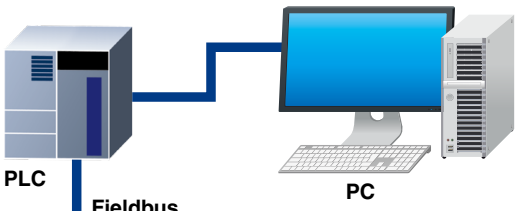
Implement diagnostic bits in the process data.

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

# IO-Link Compatible PF3W7□-X445

p. 23

## 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.

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

**Read the device data.**
• Switch ON/OFF signal and analog 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**

**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.

## 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 |

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

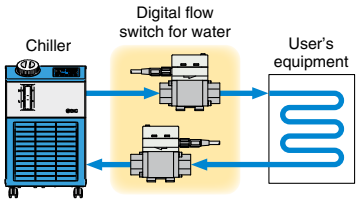
| Bit offset | 31 | 30 | 29 | 28 | 27 | 26 | 25 | 24 | 23 | 22 | 21 | 20 | 19 | 18 | 17 | 16 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Item | Measured temperature value (PD) | | | | | | | | | | | | | | | |

| 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 | |

### Application Examples

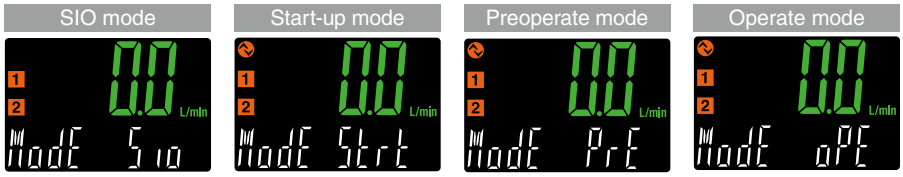
**For the predictive maintenance of cooling water problems**

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




## Display function

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




**Operation and Display**

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

*1 In IO-Link mode, the IO-Link indicator will be ON or flashing.

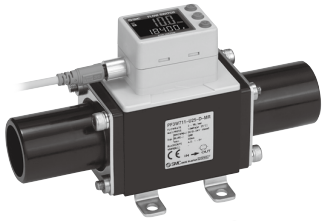
# CONTENTS

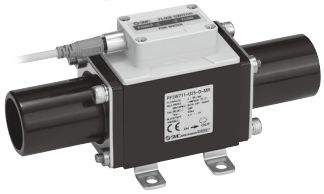
**3-Color Display** Digital Flow Switch for Water *PF3W Series*

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

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

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





# 3-Color Display
# Digital Flow Switch for Water
# *PF3W* Series

## How to Order

For how to order the remote monitor unit, refer to page 31.

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

| Symbol | OUT1 | OUT2 | Temperature sensor |
|---|---|---|---|
| | Flow rate | Temperature | |
| **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 the remote monitor (PFG200/PF3W3 series), select 1 to 5 V for the flow rate analog output (output symbol "-1" or "-1T").
∗ The 4 to 20 mA analog output type with a temperature sensor is only available as a made to order. (Refer to page 22.)

**Remote sensor unit/Unit printed on label**

| Symbol | Instantaneous flow | Temperature |
|---|---|---|
| **Nil** | L/min | °C |
| **G**∗1 | L/min (gal/min) | °C/°F |

∗1 Under the New Measurement Act, units other than SI (symbol "Nil") cannot be used in Japan.
∗ 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** □ □ – □

❶ ❷ ❸ ❹ ❺ ❻ ❼ ❽ ❾ ❿ ⓫

### ❶ Type

| | |
|---|---|
| **5** | Remote sensor unit |
| **7** | Integrated display |

### ❷ Rated flow range (Flow range)

| Symbol | Rated flow range |
|---|---|
| **04** | 0.5 to 4 L/min |
| **20** | 2 to 16 L/min |
| **40** | 5 to 40 L/min |
| **11** | 10 to 100 L/min |
| **21** | 50 to 250 L/min |

### ❸ Flow adjustment valve

| Symbol | With/without flow adjustment valve | Rated flow range | | | | |
|---|---|---|---|---|---|---|
| | | **04** | **20** | **40** | **11** | **21** |
| **Nil** | Without | ● | ● | ● | ● | ● |
| **S** | With | ● | ● | ● | — | — |

∗ 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 the constant adjustment of the flow rate.

### ❹ Thread type

| | |
|---|---|
| **Nil** | Rc |
| **N** | NPT |
| **F** | G∗1 |

∗1 ISO 228 equivalent

### ❺ Port size

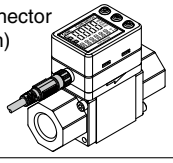
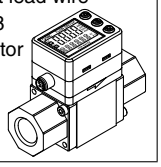
| Symbol | Port size | Rated flow range | | | | |
|---|---|---|---|---|---|---|
| | | **04** | **20** | **40** | **11** | **21** |
| **03** | 3/8 | ● | ● | — | — | — |
| **04** | 1/2 | — | ● | ● | — | — |
| **06** | 3/4 | — | — | ● | ● | — |
| **10** | 1/1 | — | — | — | ● | — |
| **12** | 1 1/4 | — |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

### ❻ 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 | 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∗1 | — | |
| **H** | PNP | External input∗1 | — | |
| **AT** | NPN | (NPN) ⇄∗2 NPN | | With temperature sensor |
| **BT** | PNP | (PNP) ⇄∗2 PNP | | |
| **CT** | NPN | (Analog 1 to 5 V) ⇄∗2 Analog 1 to 5 V | | |
| **DT** | NPN | (Analog 4 to 20 mA) ⇄∗2 Analog 4 to 20 mA | | |
| **ET** | PNP | (Analog 1 to 5 V) ⇄∗2 Analog 1 to 5 V | | |
| **FT** | PNP | (Analog 4 to 20 mA) ⇄∗2 Analog 4 to 20 mA | | |
| **JT**∗4 | Analog 1 to 5 V∗3 | — | Analog 1 to 5 V∗3 | |
| **KT**∗4 | Analog 4 to 20 mA∗3 | — | Analog 4 to 20 mA∗3 | |

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

### ❼ Lead wire (Option)

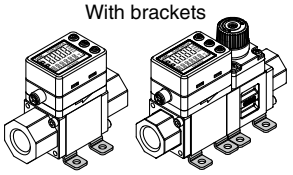
| **Nil** | **N** |
|---|---|
| With lead wire with M8 connector (3 m)  | Without lead wire with M8 connector  |

### ❽ Integrated display/Unit specification

| Symbol | Instantaneous flow | Accumulated flow | Temperature |
|---|---|---|---|
| **M** | L/min | L | °C |
| **G** | gal/min | gal | °C |
| **F** | gal/min | gal | °F |
| **J** | L/min | L | °F |

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

### ❾ Brackets (Option)

| | |
|---|---|
| **Nil** | None |
| **R** | With brackets  |

∗ Brackets are not available for the 250 L/min type.

### ❿ Calibration certificate (Only for flow rate)

| | |
|---|---|
| **Nil** | None |
| **A** | With calibration certificate |

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

### ⓫ Made to order

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

∗1 Applicable only for the remote type with a temperature sensor (Refer to page 22.)
∗2 Integrated display type only

## Options/Part Nos.

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

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

∗1 For units with a flow adjustment valve, 2 brackets are required.

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

PF3W7

## Specifications (Integrated Display)

| Model | | | PF3W704 | PF3W720 | PF3W740 | PF3W711 | PF3W721 |
|---|---|---|---|---|---|---|---|
| **Applicable fluid** | | | Water and ethylene glycol aqueous solution (with a viscosity of 3 mPa·s [3 cP] or less)*1 | | | | |
| **Detection method** | | | Karman vortex | | | | |
| **Rated flow range** | | | 0.5 to 4 L/min | 2 to 16 L/min | 5 to 40 L/min | 10 to 100 L/min | 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. Analog output: ±3% F.S. | | | | |
| **Repeatability** | | | ±2% F.S.*2 | | | | |
| **Temperature characteristics** | | | ±5% F.S. (25°C standard) | | | | |
| **Operating pressure range***3 | | | 0 to 1 MPa | | | | |
| **Proof pressure***3 | | | 1.5 MPa | | | | |
| **Pressure loss (without flow adjustment valve)** | | | 45 kPa or less at the max. flow | | | | 60 kPa or less at the max. flow |
| **Accumulated flow range***4 | | | 99999999.9 L | | 999999999 L | | |
| | | | By 0.1 L | By 0.5 L | By 1 L | | |
| **Switch output** | | | NPN or PNP open collector output | | | | |
| | **Max. load current** | | 80 mA | | | | |
| | **Max. applied voltage** | | 28 VDC | | | | |
| | **Internal voltage drop** | | NPN: 1 V or less (at load current of 80 mA) PNP: 1.5 V or less (at load current of 80 mA) | | | | |
| | **Response time***2, 5 | | 0.5 s/1 s/2 s | | | | |
| | **Output protection** | | Short-circuit protection | | | | |
| | **Output mode** | **Flow rate** | Select from Hysteresis, Window comparator, Accumulated output, or Accumulated pulse output modes. | | | | |
| | | **Temperature** | Select from Hysteresis mode or Window comparator mode. | | | | |
| **Analog 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-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 (No freezing or condensation) | | | | |
| | **Operating humidity range** | | Operation, Storage: 35 to 85% R.H. (No condensation) | | | | |
| | **Withstand voltage***7 | | 1000 VAC for 1 min between terminals and housing | | | | |
| | **Insulation resistance** | | 50 MΩ or more (500 VDC measured via megohmmeter) between terminals and housing | | | | |
| **Standards and regulations** | | | CE/UKCA marking, UL (CSA) | | | | |
| **Wetted parts material***8 | | | PPS, Stainless steel 304, FKM, SCS13 | | | | |
| | | | Non-grease | | | | |
| **Piping port size***9 | | | 3/8 | 3/8, 1/2 | 1/2, 3/4 | 3/4, 1 | 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 | | | | |

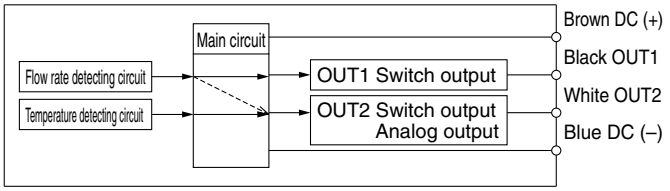
∗1 Refer to the "Measurable Range for Ethylene Glycol Aqueous Solution" graph on page 16. Measurement is possible as long as the fluid does not corrode the wetted parts and the viscosity is 3 mPa·s (3 cP) or less. Be aware that water leakage may occur due to internal seal shrinkage or swelling depending on the type of fluid.
∗2 If 0.5 s is selected for the response time of the switch output, the repeatability will be ±3% F.S.
∗3 The operating pressure range, proof pressure, and available flow range vary depending on the fluid temperature. Refer to the graphs on page 14.
∗4 It is cleared when the power supply is turned OFF. The hold function can be selected. (Intervals of 2 or 5 mins can be selected.)
If the 5-min interval is selected, the life of the memory element (electronic part) is limited to 1 million times. (If energized for 24 hours, life is calculated as 5 mins x 1 million = 5 million mins = about 9.5 years.) Therefore, if using the hold function, calculate the memory life for your operating conditions, and use within this life.
∗5 The response time when the set value is 90% in relation to the step input (The response time is 7 s when it is output by the temperature sensor.)
∗6 The response time until the set value reaches 90% in relation to the step input (The response time is 7 s when it is analog output by the temperature sensor.)
∗7 When the temperature sensor is used, it will be 250 VAC.
∗8 For details, refer to the "Wetted Parts Construction" on page 16.
∗9 When the piping diameter or piping passage is restricted, the specifications may not be satisfied.
∗ Products with tiny scratches, marks, or display color or brightness variations which do not affect the performance of the product are verified as conforming products.

## 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 |
| **Analog 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.




OUT2 can output either the temperature or flow rate by button operation.

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

PF3W5

## Specifications (Remote Sensor Unit)

Refer to page 32 for monitor unit specifications.

| Model | | PF3W504 | PF3W520 | PF3W540 | PF3W511 | PF3W521 |
|---|---|---|---|---|---|---|
| Applicable fluid | | Water and ethylene glycol aqueous solution (with a viscosity of 3 mPa·s [3 cP] or less)*1 | | | | |
| Detection method | | Karman vortex | | | | |
| Rated flow range | | 0.5 to 4 L/min | 2 to 16 L/min | 5 to 40 L/min | 10 to 100 L/min | 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 max. flow | | | | 60 kPa or less at the max. flow |
| Analog 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*4 | 1000 VAC for 1 min between terminals and housing | | | | |
| | Insulation resistance | 50 MΩ or more (500 VDC measured via megohmmeter) between terminals and housing | | | | |
| Standards and regulations | | CE/UKCA marking, UL (CSA) | | | | |
| Wetted parts material*5 | | PPS, Stainless steel 304, FKM, SCS13 | | | | |
| | | Non-grease | | | | |
| Piping port size*6 | | 3/8 | 3/8, 1/2 | 1/2, 3/4 | 3/4, 1 | 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 | | | | |

*1 Refer to the "Measurable Range for Ethylene Glycol Aqueous Solution" graph on page 16. Measurement is possible as long as the fluid does not corrode the wetted parts and the viscosity is 3 mPa·s (3 cP) or less. Be aware that water leakage may occur due to internal seal shrinkage or swelling depending on the type of fluid.
*2 The operating pressure range and proof pressure may change according to the fluid temperature. Refer to the graphs on page 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 analog output by the temperature sensor.)
*4 When the temperature sensor is used, it will be 250 VAC.
*5 For details, refer to the "Wetted Parts Construction" on page 16.
*6 When the piping diameter or piping passage is restricted, the specifications may not be satisfied.
* Products with tiny scratches, marks, or display color or brightness variations which do not affect the performance of the product are verified as conforming products.

## Temperature Sensor Specifications

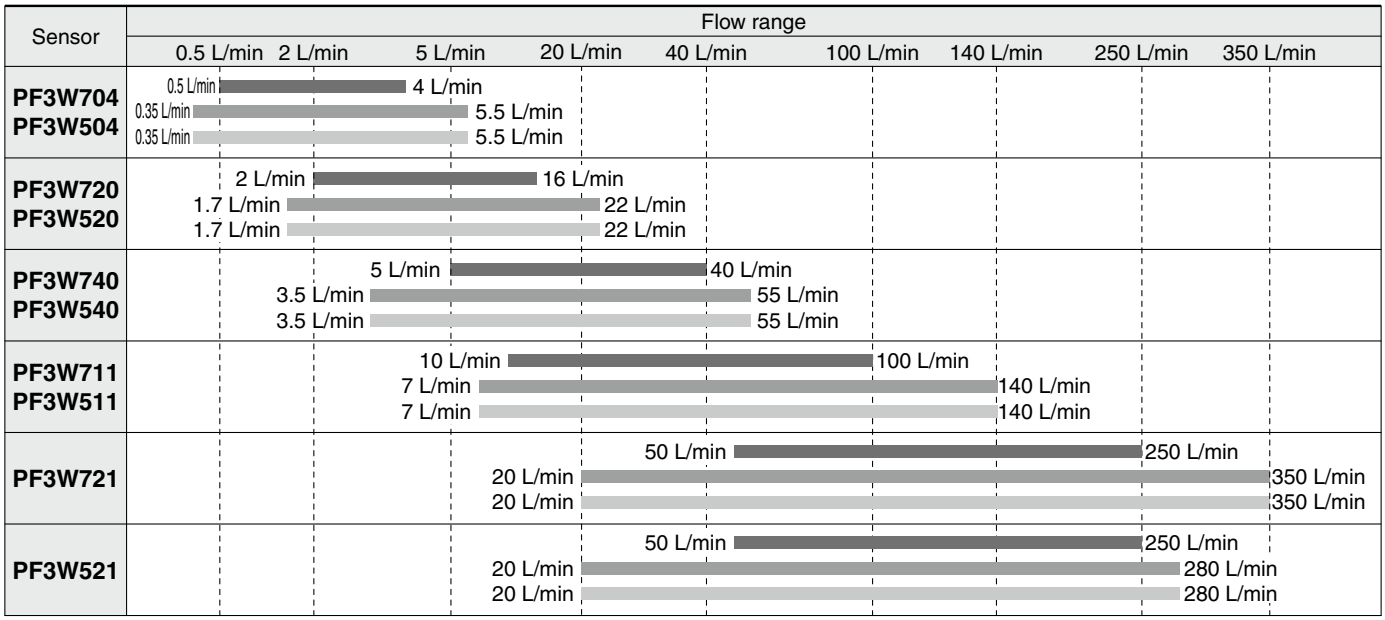
| | |
|---|---|
| Rated temperature range | 0 to 100°C*1 |
| Analog output accuracy | ±3% F.S. |
| Response time | 7 s*2 |
| Ambient temperature characteristics | ±5% F.S. |

*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.




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

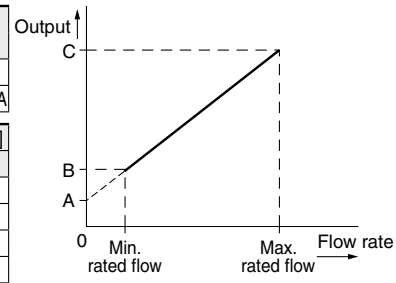
Rated flow range  Display flow range  Set flow range

## 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] | |
|---|---|---|
| | Min. | Max. |
| **PF3W704/504** | 0.5 | 4 |
| **PF3W720/520** | 2 | 16 |
| **PF3W740/540** | 5 | 40 |
| **PF3W711/511** | 10 | 100 |
| **PF3W721/521** | 50 | 250 |

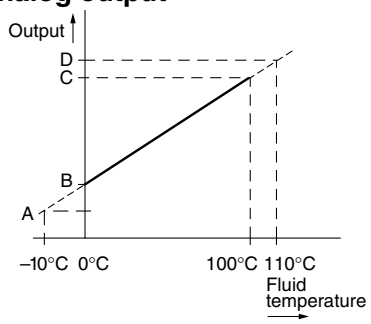



### Fluid temperature/Analog output

**PF3W7/5**

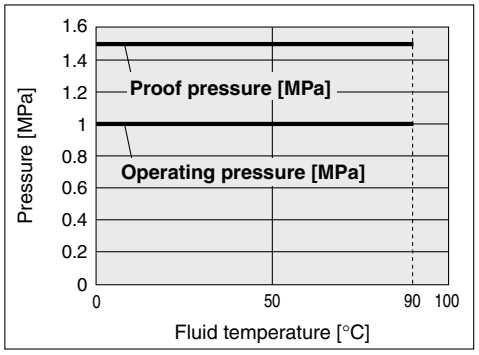
| | A | B |
|---|---|---|
| Voltage output | 0.6 V | 1 V |
| Current output | 2.4 mA | 4 mA |

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

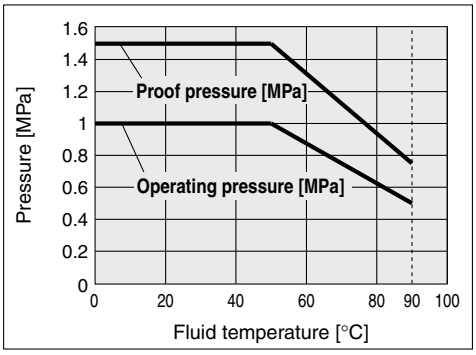



## Operating Pressure and Proof Pressure

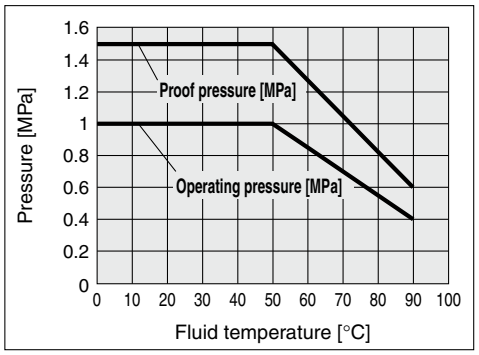
### PF3W704/720/740/504/520/540



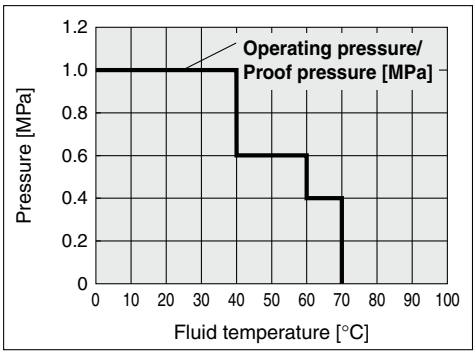

### PF3W704S/720S/740S/504S/520S/540S




### PF3W711/511



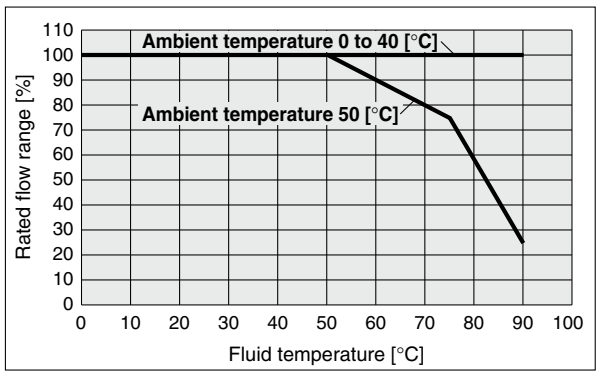

### PF3W721/521




## Available Flow Range

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

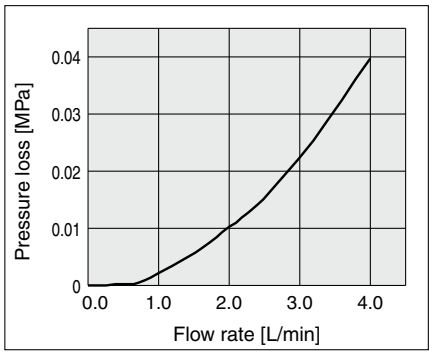
### PF3W704/720/740/711/721



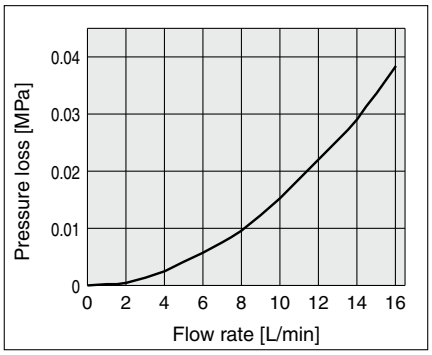

* For the PF3W721, up to 70 [°C] of the operating fluid
* If the analog current 2-output type is installed in an environment with high temperatures, the temperature of the product may rise. In such a case, be sure to cool the product.

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

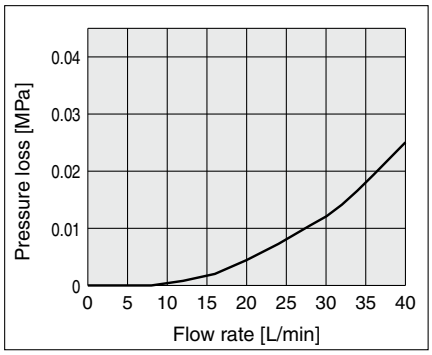
### PF3W704/504



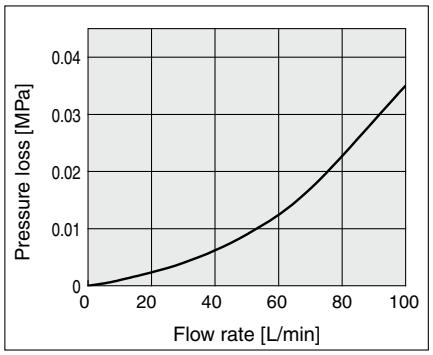

### PF3W720/520



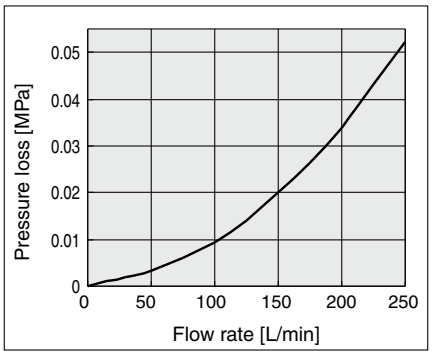

### PF3W740/540



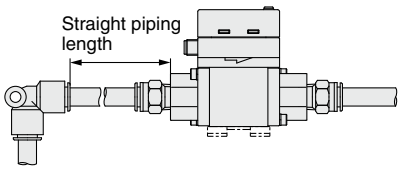

### PF3W711/511




### PF3W721/521



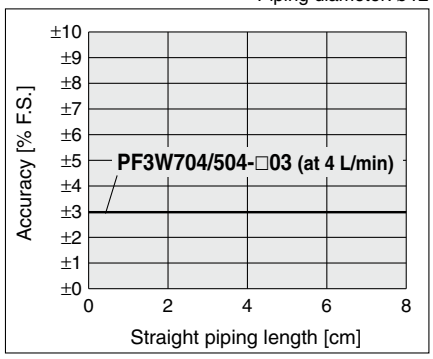

## Straight Piping Length and Accuracy (Reference Value)




- 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)

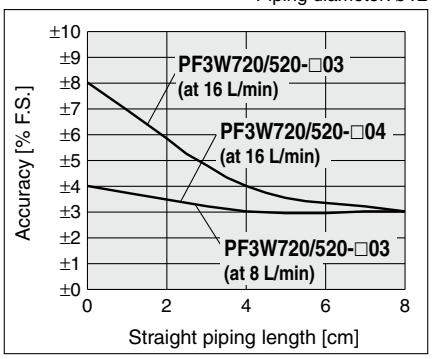
### PF3W704/504

Pressure: 0.3 MPa
Piping diameter: ø12



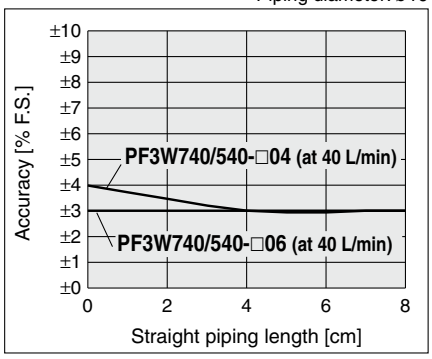

### PF3W720/520

Pressure: 0.3 MPa
Piping diameter: ø12



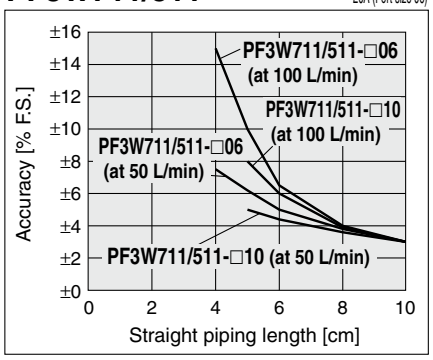

### PF3W740/540

Pressure: 0.3 MPa
Piping diameter: ø16



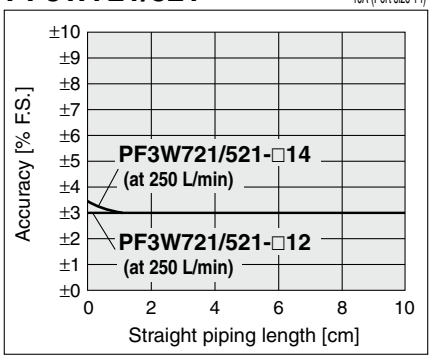

### PF3W711/511

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




### PF3W721/521

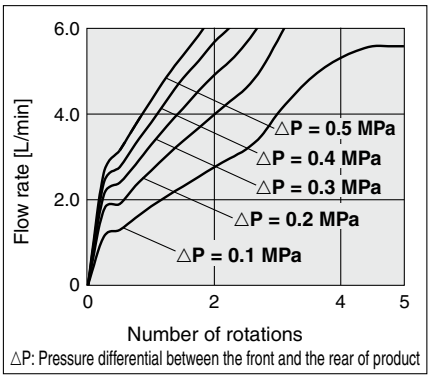
Pressure: 0.3 MPa Piping diameter: 32A (Port size 12)
40A (Port size 14)




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

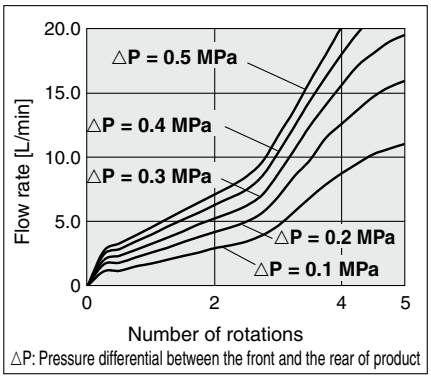
## Flow Rate Characteristics of Flow Adjustment Valve

### PF3W704S/504S



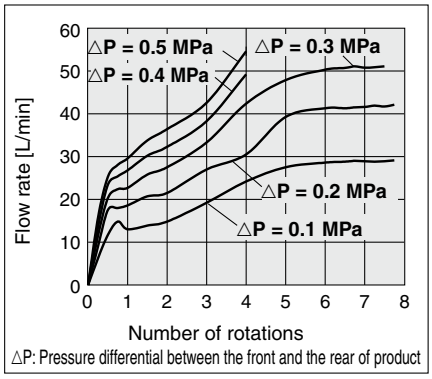

△P: Pressure differential between the front and the rear of product

### PF3W720S/520S



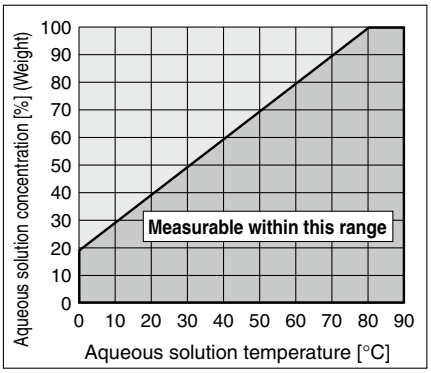

△P: Pressure differential between the front and the rear of product

### PF3W740S/540S

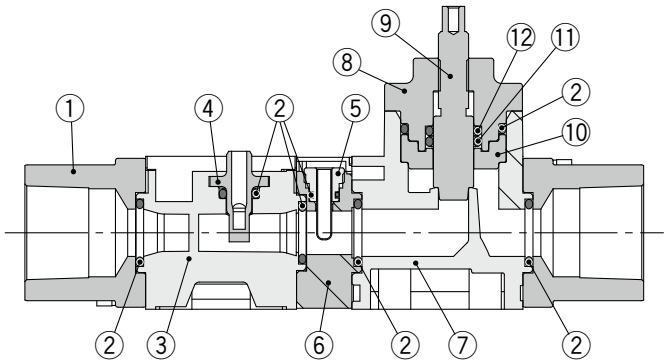



△P: Pressure differential between the front and the rear of product

### Measurable Range for Ethylene Glycol Aqueous Solution (Reference Value)




## Wetted Parts Construction



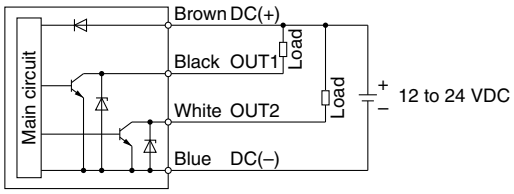

### Component Parts

| 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 | |
| 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 | **Seal** | FKM | |
| 12 | **Seal** | FKM | |

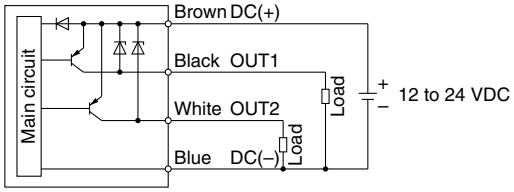
## Internal Circuits and Wiring Examples

### PF3W7□□

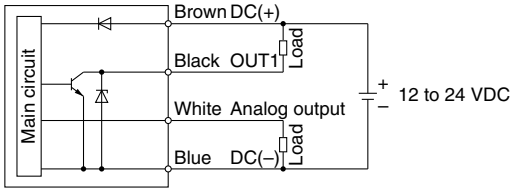
**-A(T)**
**NPN (2 outputs)**



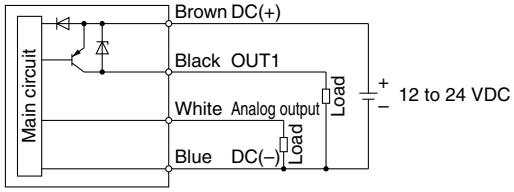

**-B(T)**
**PNP (2 outputs)**



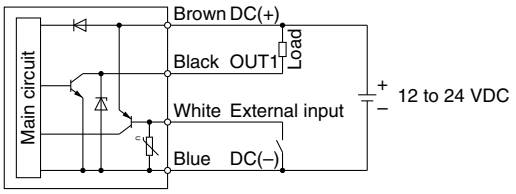

**-C(T)/D(T)**
**C(T): NPN + Analog voltage output**
**D(T): NPN + Analog current output**



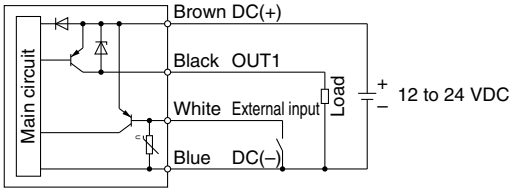

**-E(T)/F(T)**
**E(T): PNP + Analog voltage output**
**F(T): PNP + Analog current output**



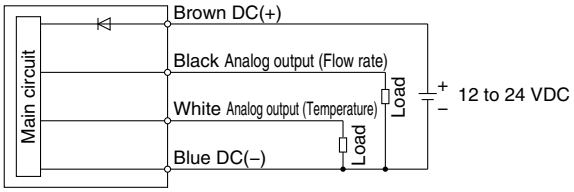

**-G**
**NPN + External input**




**-H**
**PNP + External input**



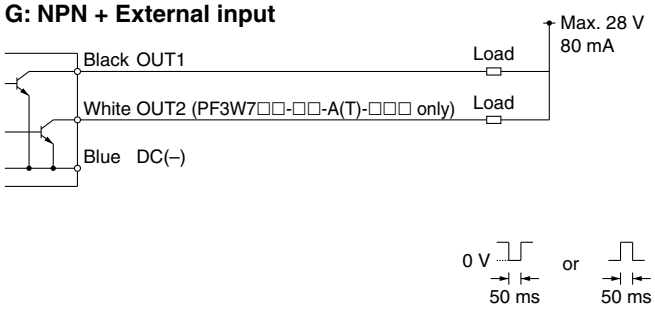

**-JT/KT**
**JT: Analog voltage output + Analog voltage output**
**KT: Analog current output + Analog current output**



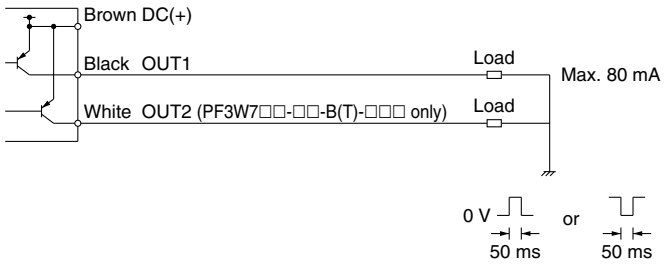
## Internal Circuits and Wiring Examples

### 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**

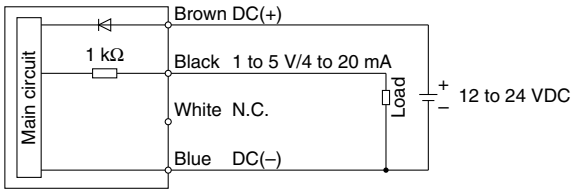



**-B(T)/E(T)/F(T)/H**
**B(T): PNP (2 outputs)**
**E(T), F(T): PNP + Analog output**
**G: PNP + External input**

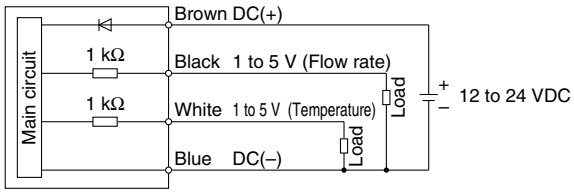



### PF3W5□□

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




**-1T**
**1T: Analog voltage output + Analog voltage output**

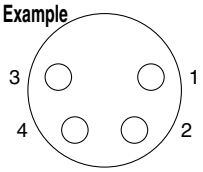


## Dimensions

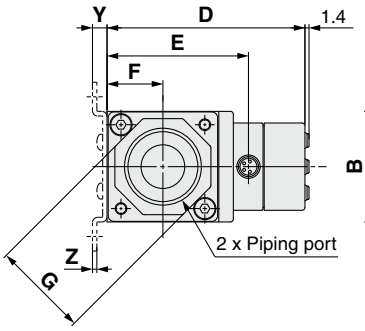
### PF3W704/720/740/711/721
**Integrated display**

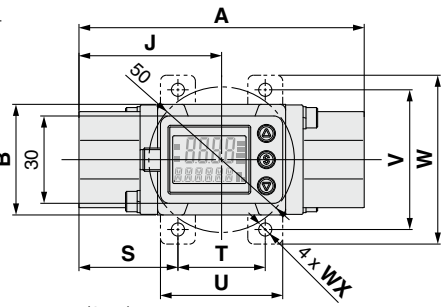
**Connector pin number**

Example

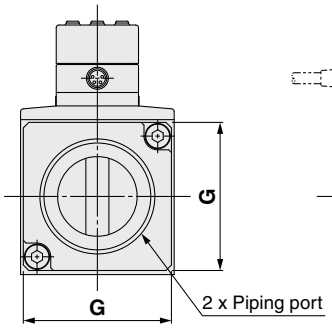


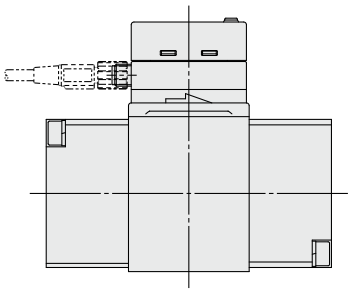

| Pin no. | Pin name |
|---|---|
| **1** | DC (+) |
| **2** | OUT2 |
| **3** | DC (–) |
| **4** | OUT1 |

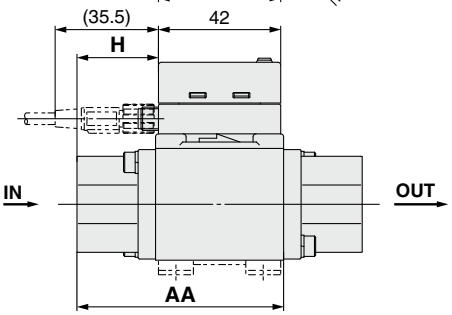


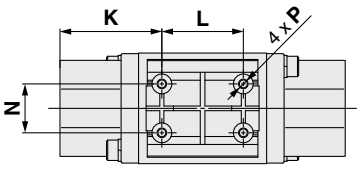




**For PF3W721**

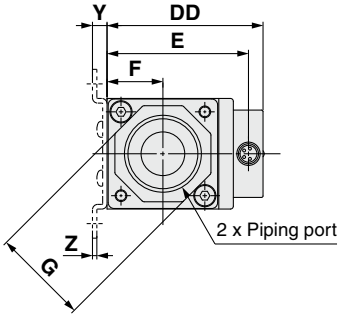


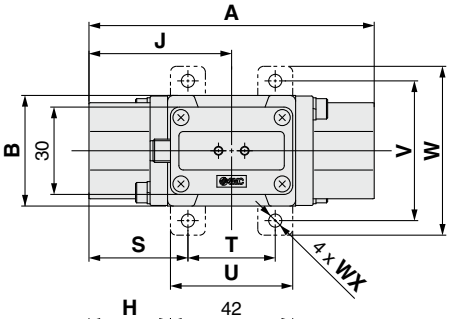





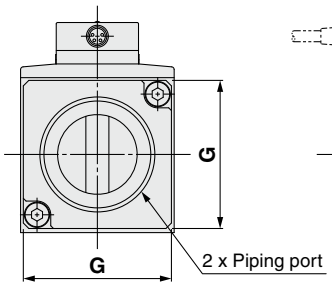



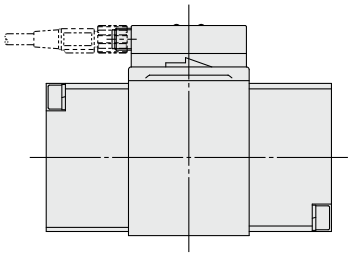

### PF3W504/520/540/511/521
**Remote sensor unit**

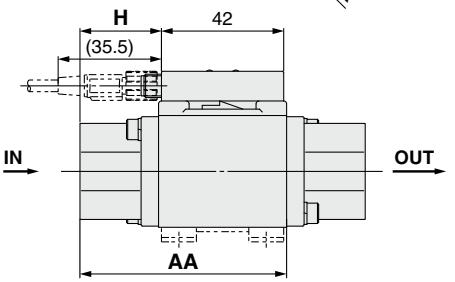


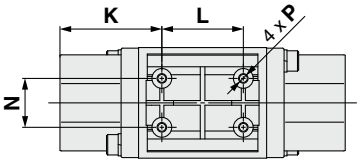




**For PF3W521**





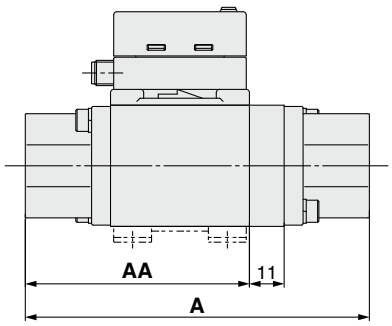




[mm]

| 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

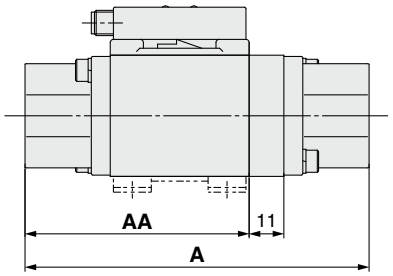
### PF3W704/720/740/711/721-□-□T
**Integrated display: With temperature sensor**



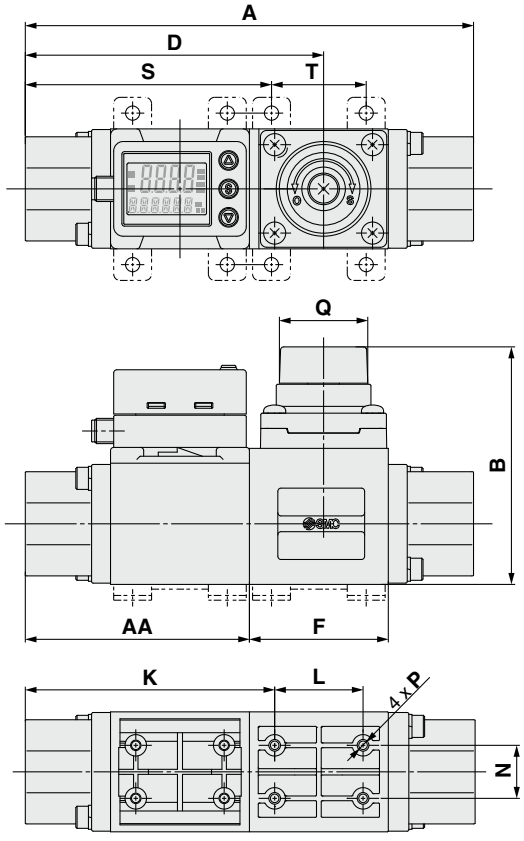

[mm]

| 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 |

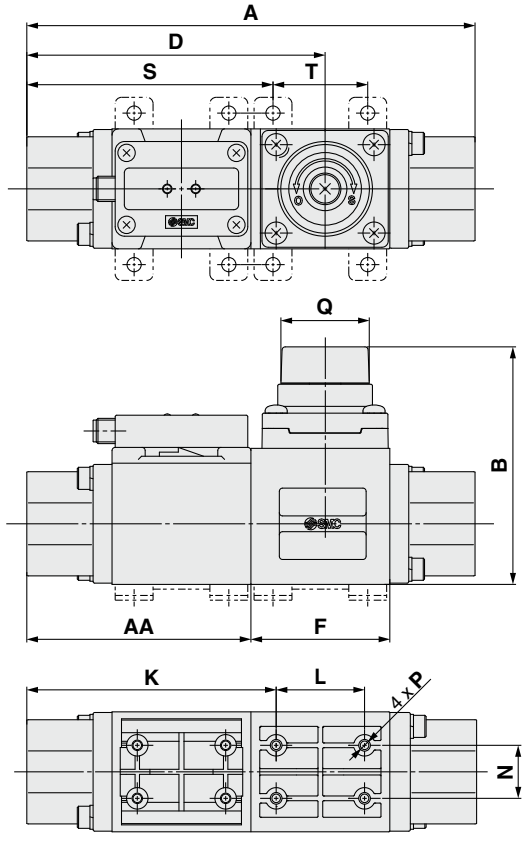
### PF3W504/520/540/511/521-□-□T
**Remote sensor unit: With temperature sensor**




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




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

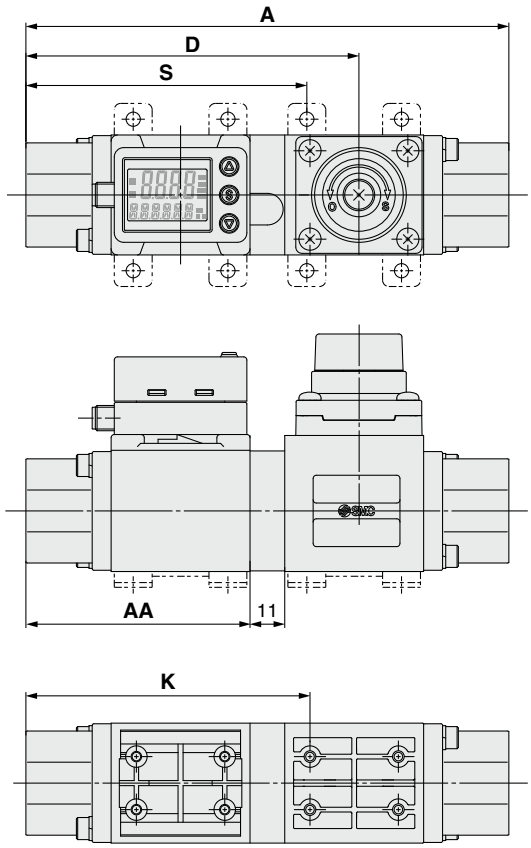



[mm]

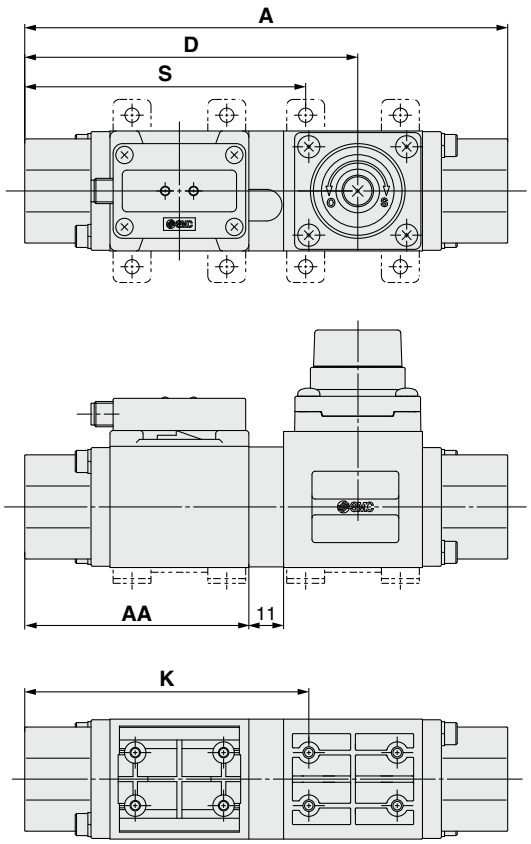
| Model | A | AA | B | D | F | K | L | N | P | Q | Q number of rotations | Bracket dimensions S | Bracket dimensions T |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **PF3W704S/504S** | 104 | 50 | 63.6 (Max. 68.6) | 70.2 | 34 | 58.5 | 18 | 13.6 | ø2.7 depth 10 | ø19 | 6 | 56.5 | 22 |
| **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**



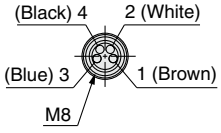

### PF3W504S/520S/540S-□-□T
**Remote sensor unit: With temperature sensor and flow adjustment valve**

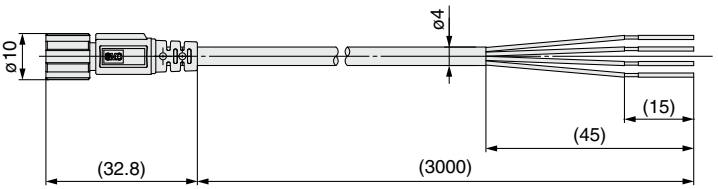



[mm]

| 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 |

* 4-wire type lead wire with M8 connector used for the PF3W series
* For wiring, refer to the “Operation Manual” on the SMC website (https://www.smcworld.com).

# *PF3W Series*
# Made to Order

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

Made to Order

## 1 EPDM seal material

Symbol **-X109**

**Seal material for wetted parts changed to EPDM**

**PF3W5** □□-□□-□□-□□□-**X109**
**PF3W7** □□-□□-□□-□□□-**X109**

**EPDM seal material**

Refer to page 11 for details of How to Order.

## 2 Analog 4 to 20 mA 2-output type

Symbol **-X128**

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

**PF3W5** □□-□□-**2T**□-□□□-**X128**

**Analog 4 to 20 mA 2-output type**

Refer to page 11 for details of How to Order.

* Cannot be ordered in combination with the standard remote monitor unit
  Please special-order separately.

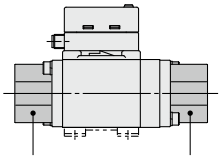
## 3 Brass piping material specification

Symbol **-X143**

**Piping (attachment) material changed to brass**

**PF3W5** □-□□-□□-□□□-**X143**
**PF3W7** □-□□-□□-□□□-**X143**

**Brass piping (attachment) material specification**



**Piping (attachment)**

Refer to page 11 for details of How to Order.

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

Symbol
## 4 IO-Link compatible -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**

| | |
|---|---|
| **Nil** | 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)**

| | |
|---|---|
| **Nil** | 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 M12 connector is also available separately.
For details, refer to the **Web Catalog**.

**❻ Unit specification**

| Symbol | Instantaneous flow | Accumulated flow | Temperature |
|---|---|---|---|
| **Nil** | gal/min | gal | °C |
| **M** | L/min | L | °C |

* Under the New Measurement Act, units other than SI (symbol "M") cannot be used in Japan.
* Reference: 1 [L/min] = 0.2642 [gal/min]
1 [gal/min] = 3.785 [L/min]

**❼ Bracket (Option)**

| | |
|---|---|
| **Nil** | None |
| **R** | With bracket |

**❽ Calibration certificate (Only for flow rate)**

| | |
|---|---|
| **Nil** | None |
| **A** | Yes |

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

### 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<br>Variable from 0 to 60 s/0.01 s increments | | | | |
| | **Output mode** | **Flow rate** | Select from Hysteresis, Window comparator, Accumulated output, Accumulated pulse output, Error output, or Switch output OFF modes. | | | | |
| Power supply voltage | **When used as a switch output device** | | 12 to 24 VDC, including ripple (p-p) 10% | | | | |
| | **When used as an IO-Link device** | | 18 to 30 VDC, including ripple (p-p) 10% | | | | |
| **Digital filter***3 | | | Select from 0.5 s, 1.0 s, 2.0 s, 5.0 s, 10.0 s, 15.0 s, 20.0 s, or 30.0 s. | | | | |
| Environment | **Withstand voltage** | | 250 VAC for 1 min between external terminals and case | | | | |
| **Standards and regulations** | | | CE/UKCA marking, UL (CSA) | | | | |

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

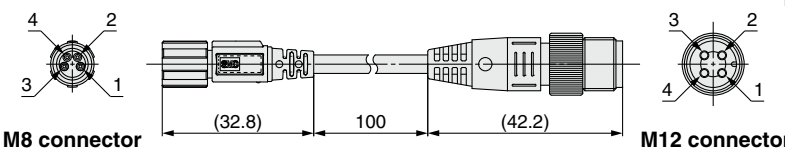
### Communication Specifications (IO-Link mode)

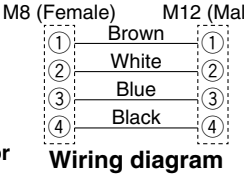
| | |
|---|---|
| **IO-Link type** | Device |
| **IO-Link version** | V1.1 |
| **Communication speed** | COM2 (38.4 kbps) |
| **Configuration file** | IODD file*1 |
| **Minimum cycle time** | 3.5 ms |
| **Process data length** | Input data: 6 bytes, Output data: 0 byte |
| **On request data communication** | Yes |
| **Data storage function** | Yes |
| **Event function** | Yes |
| **Vendor ID** | 131 (0x0083) |
| **Device ID***2 | PF3W704-❑-LT❑-M-X445: 330 (0x014A)<br>PF3W720-❑-LT❑-M-X445: 310 (0x0136)<br>PF3W740-❑-LT❑-M-X445: 317 (0x013D)<br>PF3W711-❑-LT❑-M-X445: 331 (0x014B)<br>PF3W721-❑-LT❑-M-X445: 332 (0x014C) |

*1 The configuration file can be downloaded from the SMC website, https://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 12 and later.

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




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

# 3-Color Display

# Digital Flow Switch for PVC Piping

# *PF3W* Series

RoHS

## How to Order

For how to order the remote monitor unit, refer to page 31.

**Remote sensor unit**

**Output specification**

| Symbol | OUT1 |
|---|---|
| **1** | Analog 1 to 5 V |
| **2** | Analog 4 to 20 mA |

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

**Remote sensor unit/Unit printed on label**

| Symbol | Instantaneous flow |
|---|---|
| **Nil** | L/min |
| **G**∗1 | L/min (gal/min) |

∗1 Under the New Measurement Act, units other than SI (symbol "Nil") cannot be used in Japan.
* 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)**

| | |
|---|---|
| **Nil** | None |
| **A** | With calibration certificate |

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

**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.∗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 | 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 |

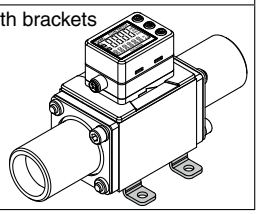
External input: The accumulated value, peak value, and bottom value can be reset.

**Made to order**

| | |
|---|---|
| **X109** | EPDM seal material |

(Refer to page 30.)

**Brackets (Option)**

| | |
|---|---|
| **Nil** | None |
| **R** | With brackets  |

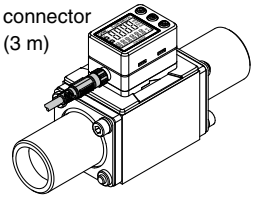
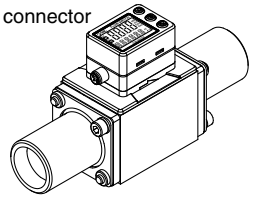
* Brackets are not available for the 250 L/min type.

**Integrated display/Unit specification**

| Symbol | Instantaneous flow | Accumulated flow |
|---|---|---|
| **M** | L/min | L |
| **G** | gal/min | gal |

* Under the New Measurement Act, units other than SI (symbol "M") cannot be used in Japan.
* G: Made to order
Reference: 1 [L/min] ↔ 0.2642 [gal/min]
1 [gal/min] ↔ 3.785 [L/min]

**Lead wire (Option)**

| Nil | 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 | |

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

PF3W7

## Specifications (Integrated Display)

| Model | | | PF3W711 | PF3W721 |
|---|---|---|---|---|
| **Applicable fluid** | | | Water and ethylene glycol aqueous solution (with a viscosity of 3 mPa·s [3 cP] or less)*1 | |
| **Detection method** | | | Karman vortex | |
| **Rated flow range** | | | 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. Analog 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 max. 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. | |
| **Analog 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-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 (No freezing or condensation) | |
| | **Operating humidity range** | | Operation, Storage: 35 to 85% R.H. (No condensation) | |
| | **Withstand voltage** | | 1000 VAC for 1 min between terminals and housing | |
| | **Insulation resistance** | | 50 MΩ or more (500 VDC measured via megohmmeter) between terminals and housing | |
| **Standards and regulations** | | | CE/UKCA marking, UL (CSA) | |
| **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 |

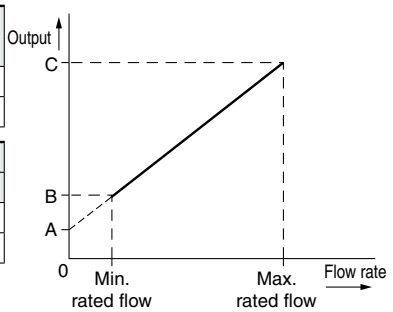
*1 Refer to the "Measurable Range for Ethylene Glycol Aqueous Solution" graph on page 16. Measurement is possible as long as the fluid does not corrode the wetted parts and the viscosity is 3 mPa·s (3 cP) or less. Refer to the list of applicable fluids on page 44. Be aware that water leakage may occur 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 It is cleared when the power supply is turned OFF. The hold function can be selected. (Intervals of 2 or 5 mins can be selected.)
If the 5-min interval is selected, the life of the memory element (electronic part) is limited to 1 million times. (If energized for 24 hours, life is calculated as 5 mins x 1 million = 5 million mins = about 9.5 years.) Therefore, if using the hold function, calculate the memory life for your operating conditions, and use within this life.
*5 The response time when the set value is 90% in relation to the step input
*6 The response time until the set value reaches 90% in relation to the step input
*7 For details, refer to the "Wetted Parts Construction" on page 27.
*8 When the piping diameter or piping passage is restricted, the specifications may not be satisfied.
* Products with tiny scratches, marks, or display color or brightness variations which do not affect the performance of the product are verified as conforming products.

## Analog Output

### Flow rate/Analog output

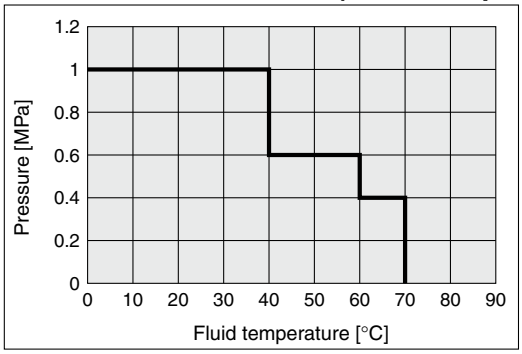
| | A | B | | C |
|---|---|---|---|---|
| | | 11 | 21 | |
| Voltage output | 1 V | 1.4 V | 1.5 V | 5 V |
| Current output | 4 mA | 5.6 mA | 5.9 mA | 20 mA |

| Model | Rated flow [L/min] | |
|---|---|---|
| | Min. | Max. |
| **PF3W711/511** | 10 | 100 |
| **PF3W721/521** | 30 | 250 |




## Operating Pressure and Proof Pressure

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



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

PF3W5

## Specifications (Remote Sensor Unit)

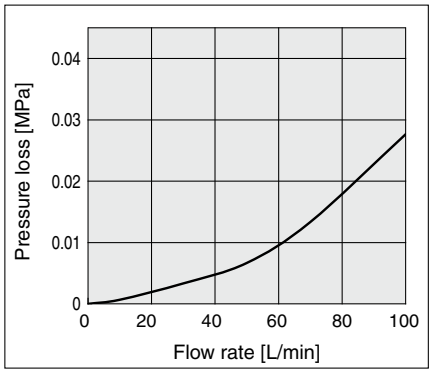
Refer to page 32 for monitor unit specifications.

| Model | | PF3W511 | PF3W521 |
|---|---|---|---|
| **Applicable fluid** | | Water and ethylene glycol aqueous solution (with a viscosity of 3 mPa·s [3 cP] or less)*1 | |
| **Detection method** | | Karman vortex | |
| **Rated flow range** | | 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 max. flow | |
| **Analog 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 min between terminals and housing | |
| | **Insulation resistance** | 50 MΩ or more (500 VDC measured via megohmmeter) between terminals and housing | |
| **Standards and regulations** | | CE/UKCA marking, UL (CSA) | |
| **Wetted parts material***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 |

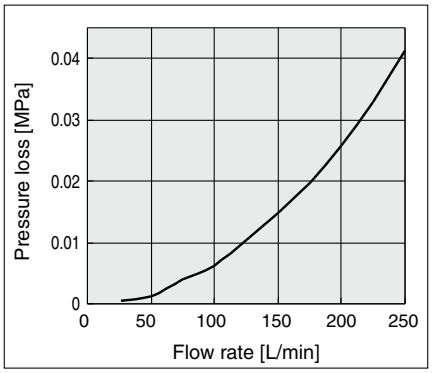
*1 Refer to the "Measurable Range for Ethylene Glycol Aqueous Solution" graph on page 16. Measurement is possible as long as the fluid does not corrode the wetted parts and the viscosity is 3 mPa·s (3 cP) or less. Refer to the list of applicable fluids on page 44.
*2 The operating pressure range and 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 the "Wetted Parts Construction" on page 27.
*5 When the piping diameter or piping passage is restricted, the specifications may not be satisfied.
* Products with tiny scratches, marks, or display color or brightness variations which do not affect the performance of the product are verified as conforming products.

## Flow Rate Characteristics (Pressure Loss)

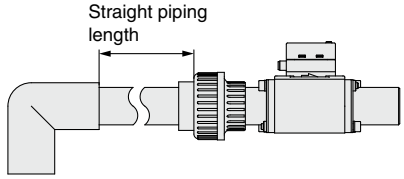
### PF3W711/511




### PF3W721/521



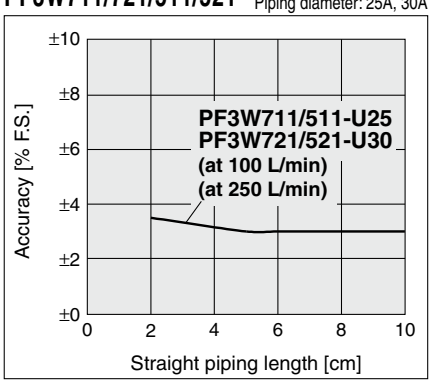

## Straight Piping Length and Accuracy (Reference Value)




- 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.

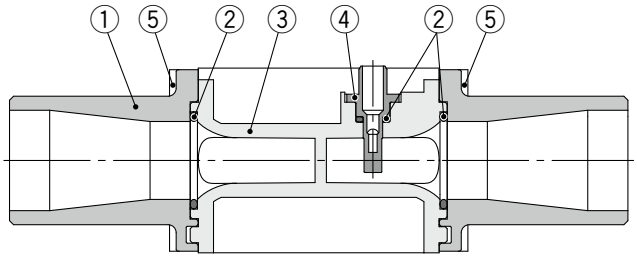
### PF3W711/721/511/521

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




For measurable range for ethylene glycol aqueous solution (reference values), refer to page 16.

## 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 |

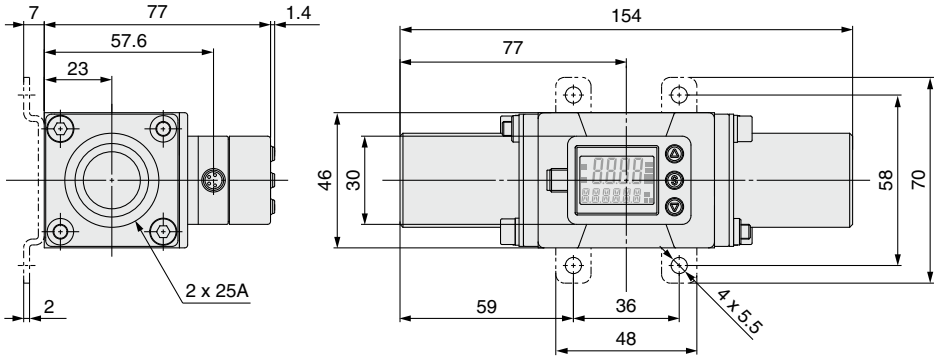
∗ Replacing the PVC pipe may cause accuracy to fluctuate by 1 to 2%.

## Internal Circuits and Wiring Examples

Refer to pages 17 and 18.

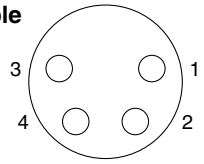
## Dimensions

### PF3W711-U25
**Integrated display**

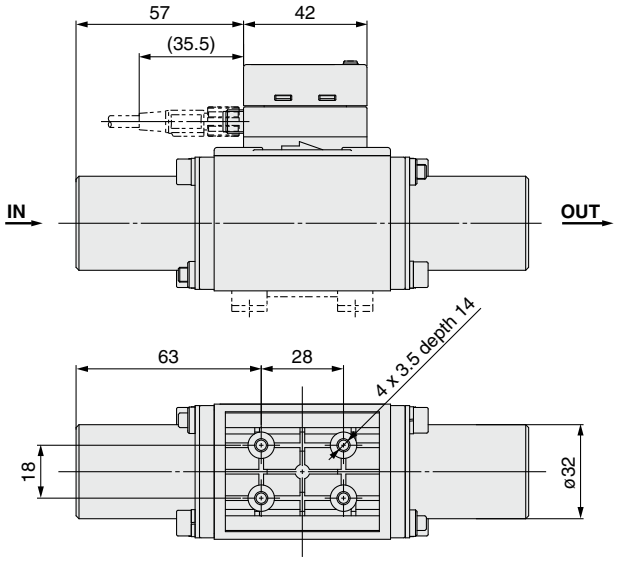



**Connector pin number**

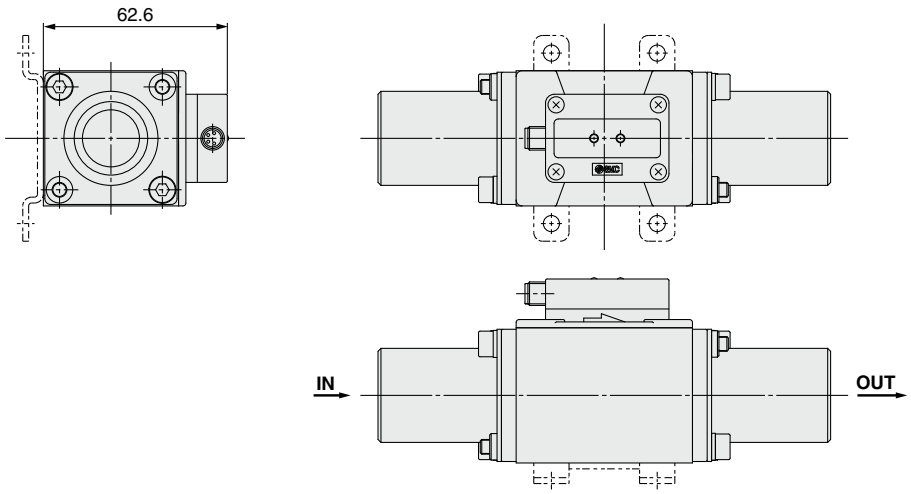
**Example**



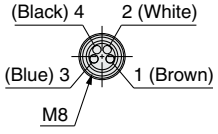

| Pin no. | Pin name |
|---|---|
| **1** | DC (+) |
| **2** | OUT2 |
| **3** | DC (–) |
| **4** | OUT1 |



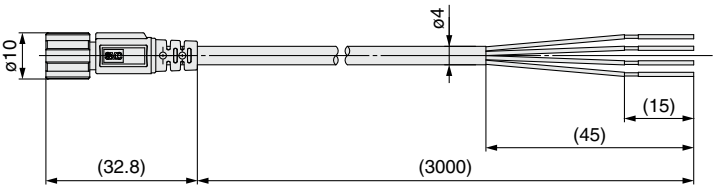

### PF3W511-U25
**Remote sensor unit**




### 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 |



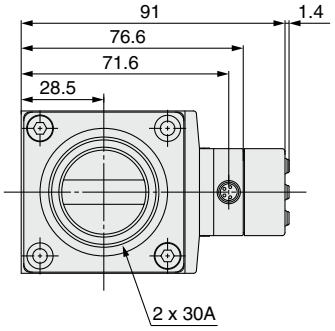

**Lead Wire Specifications**

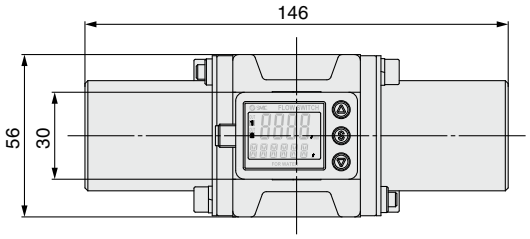
| | | |
|---|---|---|
| **Conductor** | **Nominal cross section** | AWG23 |
| | **O.D.** | Approx. 0.7 mm |
| **Insulator** | **Material** | Heat-resistant PVC |
| | **O.D.** | Approx. 1.1 mm |
| | **Color** | Brown, White, Black, Blue |
| **Sheath** | **Material** | Heat- and oil-resistant PVC |
| **Finished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

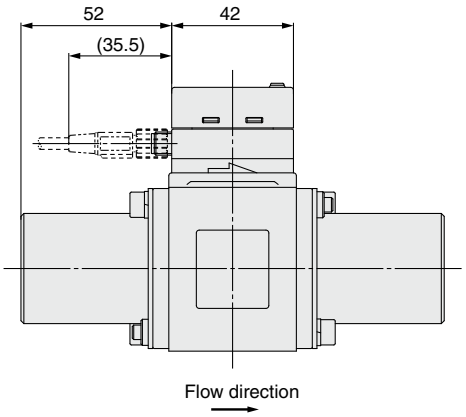
∗ 4-wire type lead wire with M8 connector used for the PF3W series
∗ For wiring, refer to the “Operation Manual” on the SMC website (https://www.smcworld.com).

## Dimensions

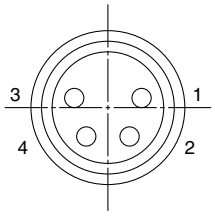
### PF3W721-U30
**Integrated display**



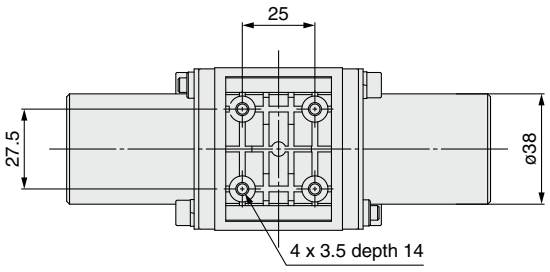



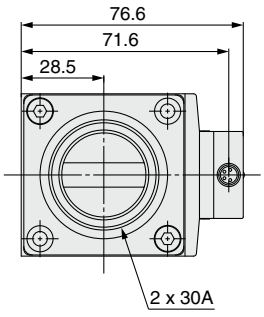

**Body side**
**Connector pin number**

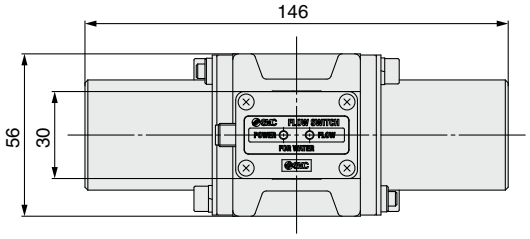


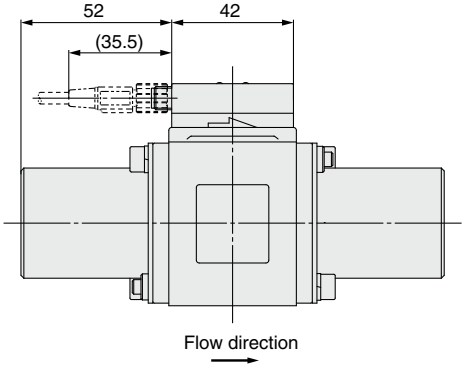

| Pin no. | Pin name |
|---|---|
| **1** | DC (+) |
| **2** | OUT2 |
| **3** | DC (–) |
| **4** | OUT1 |



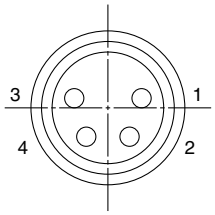

### PF3W521-U30
**Remote sensor unit**




**Body side**
**Connector pin number**




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

# *PF3W Series*
# Made to Order

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

Made to Order

## 1 EPDM seal material

Symbol **-X109**

**Seal material for wetted parts changed to EPDM**

**PF3W5□-U□-□□-□□□-X109**

**PF3W7□-U□-□□-□□□-X109**

**EPDM seal material**

Refer to page 24 for details of How to Order.

3-Color Display

# Digital Flow Monitor for Water

# PF3W3 Series


## How to Order

**PF3W 30 A □ – M V C □**

### Type

| | |
|---|---|
| **3** | Remote monitor unit |

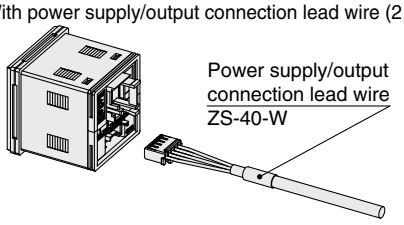
For remote sensor units, select the analog output 1 to 5 V type.
Applicable sensors: PF3W5□□-□□-1(T)

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

### Lead wire

| | |
|---|---|
| **Nil** | With power supply/output connection lead wire (2 m)<br>  |
| **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 |

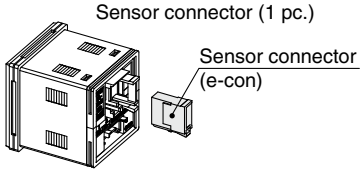
∗ Under the New Measurement Act, units other than SI (symbol "M") cannot be used in Japan.
∗ G, F, J: Made to order
Reference: 1 [L/min]↔0.2642 [gal/min]
1 [gal/min]↔3.785 [L/min]
°F = 9/5°C + 32

### Calibration certificate (Only flow monitor)

| | |
|---|---|
| **Nil** | None |
| **A** | With calibration certificate |

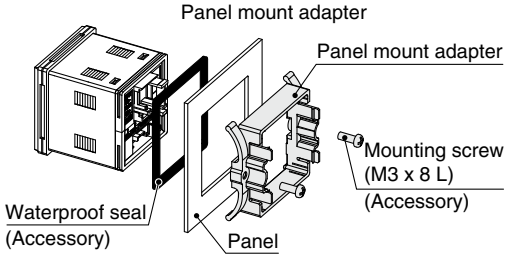
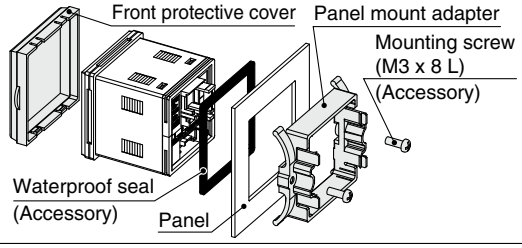
∗ The certificate is written in both Japanese and English.

### Option 2

| | |
|---|---|
| **Nil** | None |
| **C** | Sensor connector (1 pc.)<br>  |

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

### Option 1

| | |
|---|---|
| **Nil** | None |
| **T** | Panel mount adapter<br>  |
| **V** | Front protective cover + Panel mount adapter<br>  |

## 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 copy destination units |

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

PF3W3

## 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. Analog 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. | | | | |
| **Analog 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-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 (No freezing or condensation) | | | | |
| | **Operating humidity range** | | Operation, Storage: 35 to 85% R.H. (No condensation) | | | | |
| | **Withstand voltage** | | 1000 VAC for 1 min between terminals and housing | | | | |
| | **Insulation resistance** | | 50 MΩ or more (500 VDC measured via megohmmeter) between terminals and housing | | | | |
| **Standards and regulations** | | | CE/UKCA marking, UL (CSA) | | | | |
| **Weight** | **Without power supply/output connection lead wire** | | 50 g | | | | |
| | **With power supply/output connection lead wire** | | 100 g | | | | |

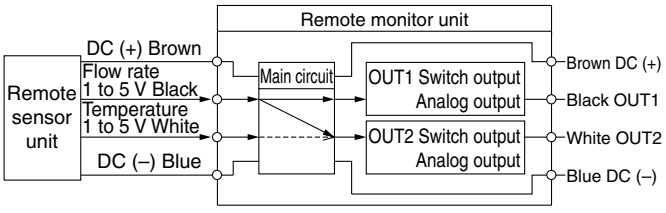
∗1 It is cleared when the power supply is turned OFF. The hold function can be selected. (Intervals of 2 or 5 mins can be selected.)
If the 5-min interval is selected, the life of the memory element (electronic part) is limited to 1 million times. (If energized for 24 hours, life is calculated as 5 mins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

## 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 |
| **Analog 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.




OUT2 can output either the temperature or flow rate by button operation.

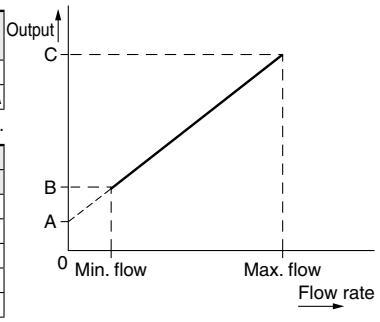
## Analog Output

### 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] | |
|---|---|---|
| | Min. | Max. |
| **PF3W504** | 0.5 | 4 |
| **PF3W520** | 2 | 16 |
| **PF3W540** | 5 | 40 |
| **PF3W511** | 10 | 100 |
| **PF3W521** | 30 | 250 |

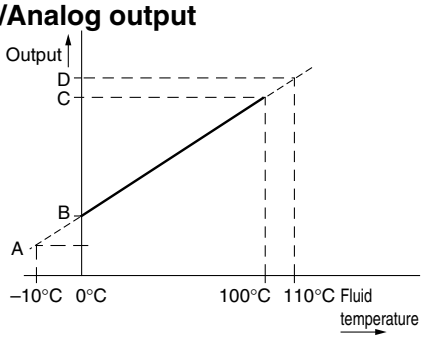



### Fluid temperature/Analog output

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

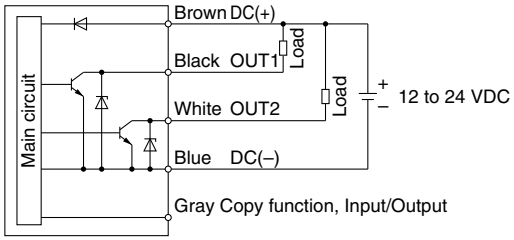
| | C | D |
|---|---|---|
| Voltage output | 5 V | 5.4 V |
| Current output | 20 mA | 21.6 mA |

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

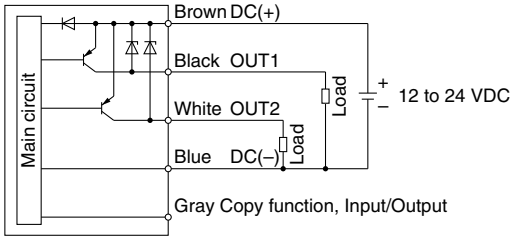


## Internal Circuits and Wiring Examples

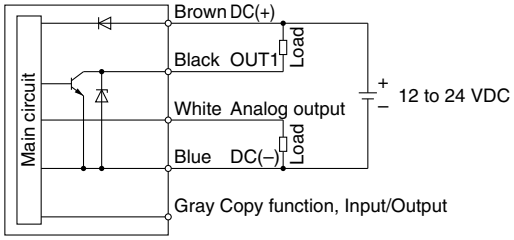
**-A**
**NPN (2 outputs)**



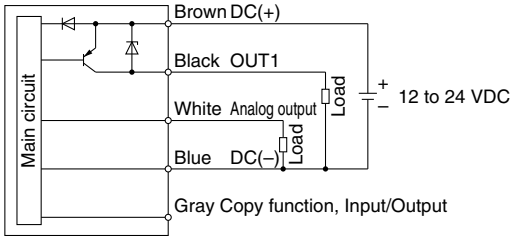

**-B**
**PNP (2 outputs)**



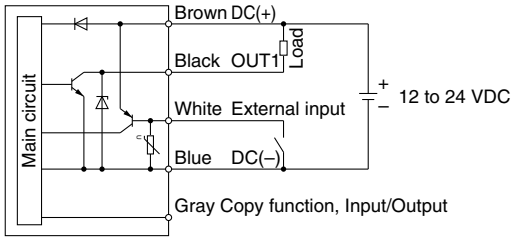

**-C/D**
**C: NPN + Analog voltage output**
**D: NPN + Analog current output**



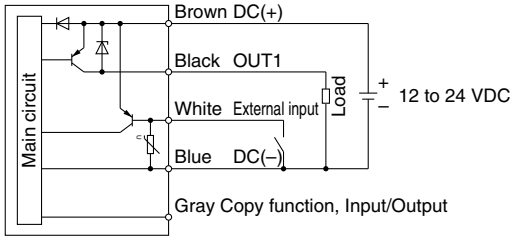

**-E/F**
**E: PNP + Analog voltage output**
**F: PNP + Analog current output**



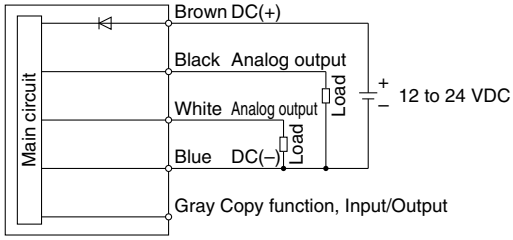

**-G**
**NPN + External input**




**-H**
**PNP + External input**

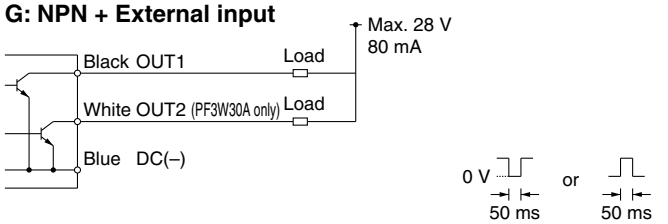



**-J/K**
**J: Analog voltage output**
**K: Analog current output**

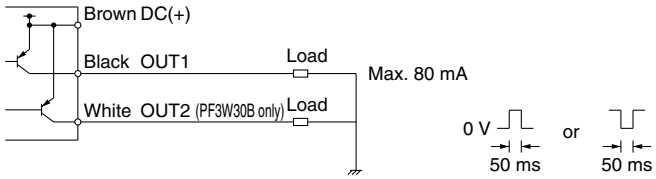



### Accumulated pulse output wiring examples

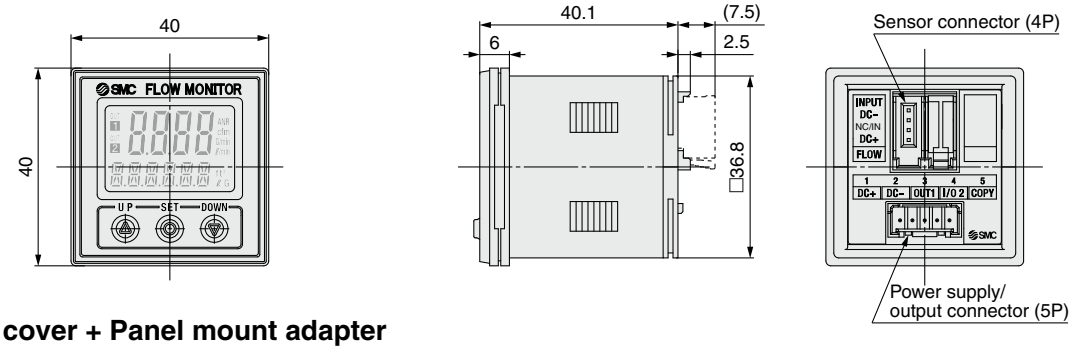
**-A/C/D/G**
**A: NPN (2 outputs)**
**C, D: NPN + Analog output**
**G: NPN + External input**



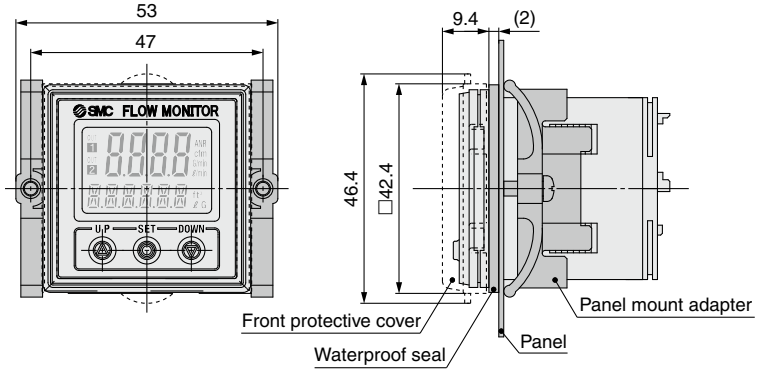

**-B/E/F/H**
**B: PNP (2 outputs)**
**E, F: PNP + Analog output**
**G: PNP + External input**



## Dimensions

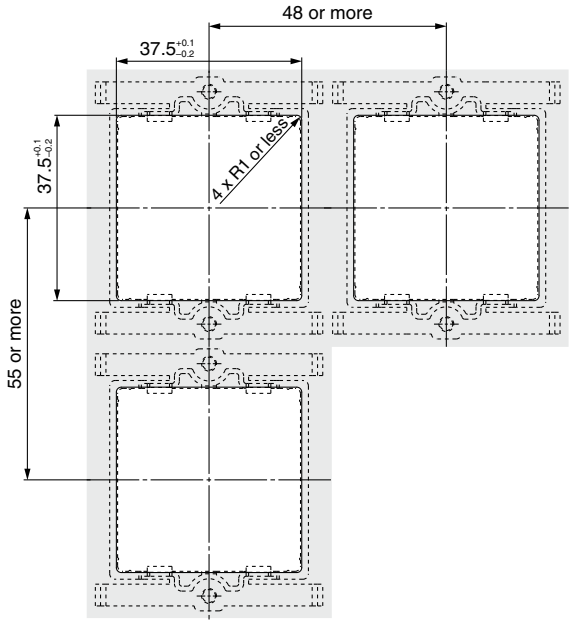



### Front protective cover + Panel mount adapter

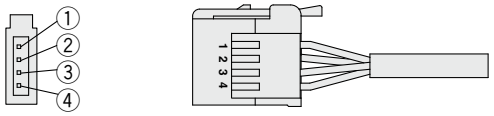



### Panel fitting dimensions

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



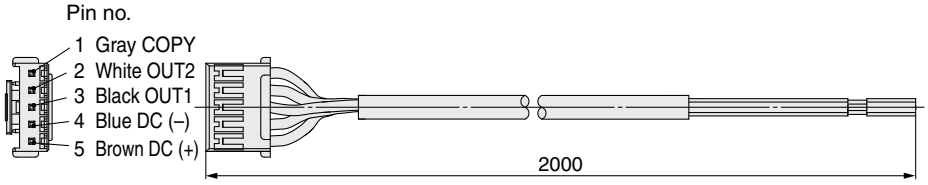

### Sensor connector




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

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

### Power supply/output connection lead wire




### Lead Wire Specifications

| | | |
|---|---|---|
| Conductor | Nominal cross section | 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 |

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

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

## How to Order

**PFG20 0 – M □ □ □**

### Input/Output specification

| Symbol | Description |
|---|---|
| **0** | NPN 5 outputs + External input |
| **1** | PNP 5 outputs + External input |
| **2**∗1 | IO-Link + NPN 4 outputs or NPN 5 outputs (SIO mode) |
| **3**∗1 | IO-Link + PNP 4 outputs or PNP 5 outputs (SIO mode) |

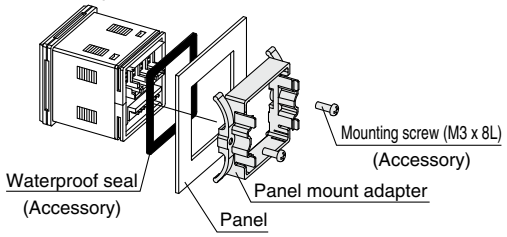
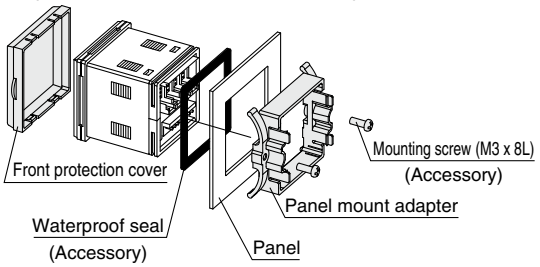
∗1 When the flow monitor is used as an IO-Link device, the total power supply current of the connected sensors should be 200 mA or less.

### Unit specification

| | |
|---|---|
| **Nil** | With unit selection function∗2 |
| **M** | SI units only∗3 |

∗2 Under the New Measurement Act, switches with the unit selection function are no longer allowed for use in Japan.
∗3 Fixed unit: Instantaneous flow: L/min
Accumulated flow : L

### Option 1

| | |
|---|---|
| **Nil** | None |
| **A** | Panel mount adapter<br>  |
| **B** | Front protection cover + Panel mount adapter<br>  |

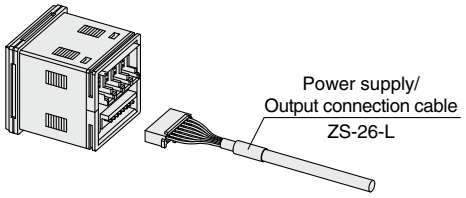
∗ Options are not assembled, but shipped together.

### Option 2

| | |
|---|---|
| **Nil** | None |
| **4C** | Sensor connector (4 pcs.)<br>∗ For PF2/3W5□ |

∗ Connector is not connected, but shipped together.

### Option 3

| | |
|---|---|
| **Nil** | Power supply/Output connection cable (2 m)<br>  |
| **N** | None |

∗ Cable is shipped together, but not connected.

## Options/Part Nos.

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

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

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

## Specifications

| Series | | | PFG20□ Series | | | | |
|---|---|---|---|---|---|---|---|
| **Applicable SMC flow sensor** | | | **PF2(3)W504** | **PF2(3)W520** | **PF2(3)W540** | **PF2(3)W511** | **PF3W521** |
| **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 |
| **Instantaneous flow rate display/Set flow rate range** | | | 0.35 to 4.50 L/min (Flow under 0.35 L/min is displayed as "0.00.") | 1.7 to 17.0 L/min (Flow under 1.7 L/min is displayed as "0.0.") | 3.5 to 45.0 L/min (Flow under 3.5 L/min is displayed as "0.0.") | 7 to 110 L/min (Flow under 7 L/min is displayed as "0.") | 20 to 280 L/min (Flow under 20 L/min is displayed as "0.") |
| Instantaneous flow rate display/Min. setting unit | | | 0.05 L/min | 0.1 L/min | 0.5 L/min | 1 L/min | 2 L/min |
| Accumulated flow display/Set flow rate range | | | 0 to 99,999,999.9 L | 0 to 999,999,999 L | 0 to 999,999,999 L | | |
| Accumulated flow display/Min. setting unit | | | 0.1 L | 1 L | 1 L | | |
| Accumulated pulse flow rate exchange value | | | 0.05 L | 0.1 L | 0.5 L | 1 L | 2 L |
| **Unit** | | | L/min, gal/min (depends on selected range) | | | | |
| **Electrical** | Power supply voltage | **When used as a switch output device** | 12 to 24 VDC ±10% with 10% ripple (p-p) or less | | | | |
| | | **When used as an IO-Link device** | 18 to 30 VDC, including ripple (p-p) 10%*1 | | | | |
| | **Current consumption** | | 55 mA or less | | | | |
| | **Protection** | | Polarity protection | | | | |
| | Power supply voltage for sensor*1 | | [Power supply voltage] −1.5 V | | | | |
| | Power supply current for sensor*2 | | Max. 110 mA (However, the total power supply current for the four inputs is 440 mA or less, and the total power supply current when used as an IO-Link device is 200 mA or less). | | | | |
| **Accuracy** | **Display accuracy (Linearity)** | | ±5.0% F.S. Max.*4 | | | | |
| | **Repeatability** | | ±3.0% F.S. Max.*4 | | | | |
| | **Temperature characteristics** | | ±0.5% F.S. Max. (Reference: 25°C) | | | | |
| **Switch output (SIO mode)** | **Output type** | | NPN or PNP open collector output: 5 outputs | | | | |
| | **Output mode** | | Hysteresis mode, Window comparator mode, Accumulated output, Accumulated pulse output, Error output, Output OFF | | | | |
| | **Switch operation** | | Normal output, Reversed output | | | | |
| | **Max. load current** | | 80 mA | | | | |
| | **Max. applied voltage (NPN only)** | | 30 VDC | | | | |
| | Internal voltage drop (Residual voltage) | | 1.5 V or less (at load current of 80 mA) | | | | |
| | **Delay time***3 | | 5 ms or less, variable from 0 to 60 s/0.01 s increments | | | | |
| | **Hysteresis** | | Variable from 0*5 | | | | |
| | **Protection** | | Over current protection | | | | |
| **Analog input** | **Input type** | | Voltage input: 1 to 5 VDC (Input impedance: 1 MΩ) | | | | |
| | **Number of inputs** | | 4 inputs (Check the "Internal Circuits and Wiring Examples" on pages 37 to 39.) | | | | |
| | **Connection method** | | e-CON | | | | |
| | **Protection** | | Over voltage protection (up to a voltage of 26.4 VDC) | | | | |
| **External input***8 | | | Voltage free input: 0.4 V or less (reed or solid state) for 30 ms or longer | | | | |
| **Display** | **Display type** | | LCD | | | | |
| | **Number of screens** | | 3-screen display (Main screen, Sub screen x 2) | | | | |
| | **Display color** | | Main screen: Red/Green, Sub screen: Orange | | | | |
| | **Number of display digits** | | Main screen: 4 digits (7 segments), Sub screen (Left): 4 digits (some digits are 11-segments, 7 segments for other), Sub screen (Right): 5 digits (some digits are 11-segments, 7 segments for other) | | | | |
| | **Indicator light** | | Lights up when switch output is turned ON. OUT1, OUT2: Orange | | | | |
| **Digital filter***6 | | | Variable from 0 to 30 s/0.01 s increments | | | | |
| **Environment** | **Enclosure** | | Front face: IP65 (when panel-mounted), Others: IP40 | | | | |
| | **Withstand voltage** | | 1000 VAC for 1 min between terminals and housing | | | | |
| | **Insulation resistance** | | 50 MΩ or more (500 VDC measured via megohmmeter) between terminals and housing | | | | |
| | **Operating temperature range** | | Operating: 0 to 50°C, Stored: −10 to 60°C (No condensation) | | | | |
| | **Operating humidity range** | | Operating/Stored: 35 to 85% RH (No condensation) | | | | |
| **Standards** | | | CE/UKCA marking | | | | |
| **Weight** | **Body** | | 51 g (Excludes power supply and output cable) | | | | |
| | **Power supply/Output cable** | | 60 g | | | | |
| | **e-CON (1 pc.)** | | 2 g | | | | |
| **Communication (IO-Link mode)** | **IO-Link type** | | Device | | | | |
| | **IO-Link version** | | V1.1 | | | | |
| | **Communication speed** | | COM2 (38.4 kbps) | | | | |
| | **Configuration file** | | IODD file*7 | | | | |
| | **Minimum cycle time** | | 4.8 ms | | | | |
| | **Process data length** | | Input data: 10 bytes, Output data: 0 bytes | | | | |
| | On request data communication | | Yes | | | | |
| | **Data storage function** | | Yes | | | | |
| | **Event function** | | Yes | | | | |
| | **Vendor ID** | | 131 (0 x 0083) | | | | |

*1 Check the power supply voltage range of the connected sensor.
*2 Over current on DC (+) side and DC (−) side of the sensor input connector results in breakage of the product.
*3 Value without digital filter (at 0 ms)
*4 The system accuracy when combined with an applicable flow sensor.
*5 If the applied pressure fluctuates around the set value, the hysteresis must be set to a value more than the amount of fluctuation, or chattering will occur.
*6 The response time indicates when the set value is 90% in relation to the step input.
*7 The configuration file can be downloaded from the SMC website, https://www.smcworld.com
*8 This setting is only possible for the PFG200/PFG201.
* Products with tiny scratches, marks, or display color or brightness variations which do not affect the performance of the product are verified as conforming products.

## Applicable Flow Sensors

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

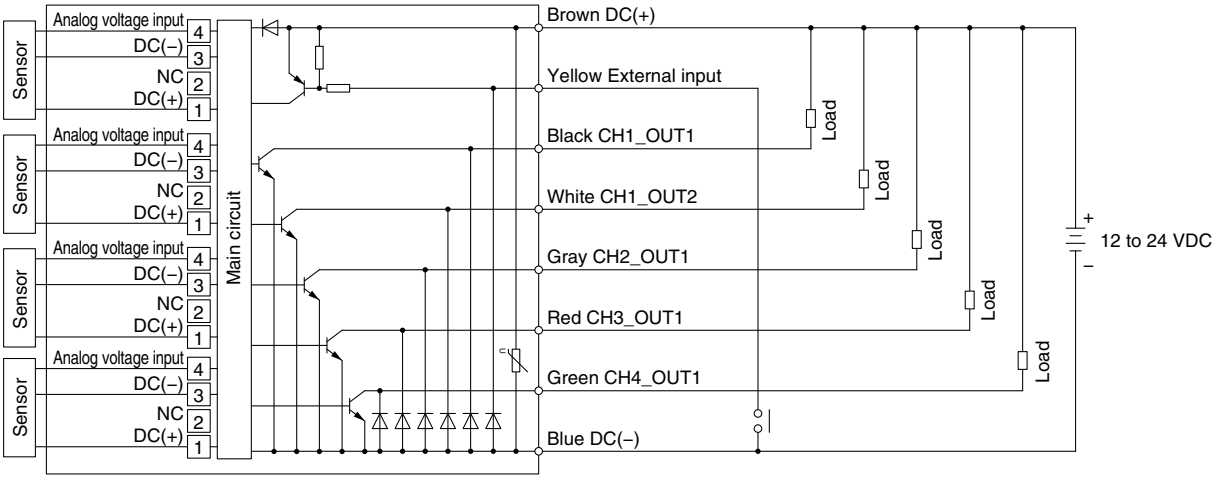
## Internal Circuits and Wiring Examples

**PFG20□–□□□□**

**•Input/Output specifications**

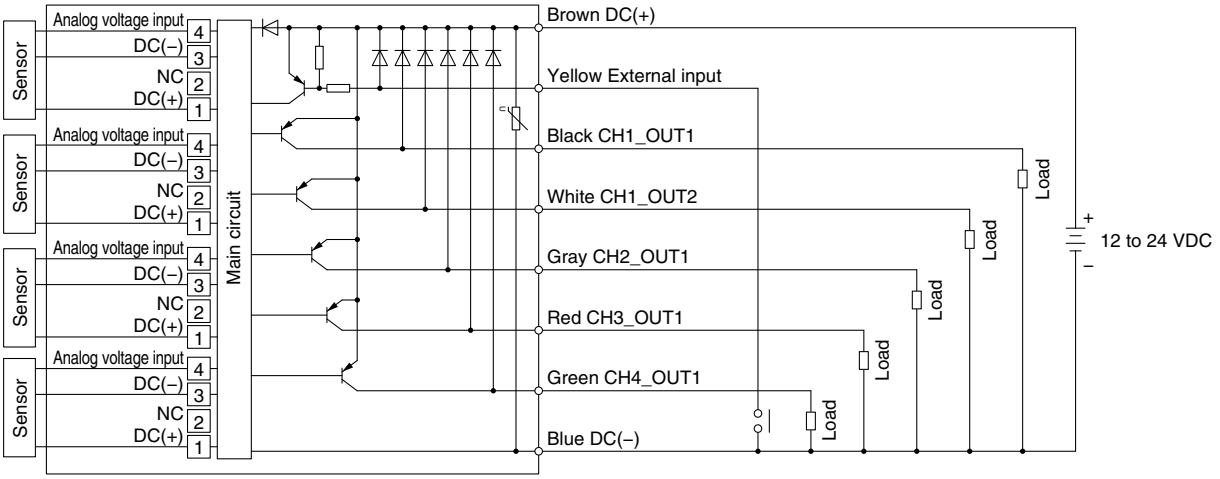
**0**

**· NPN open collector 5 outputs + External input**




**1**

**· PNP open collector 5 outputs + External input**



## Internal Circuits and Wiring Examples

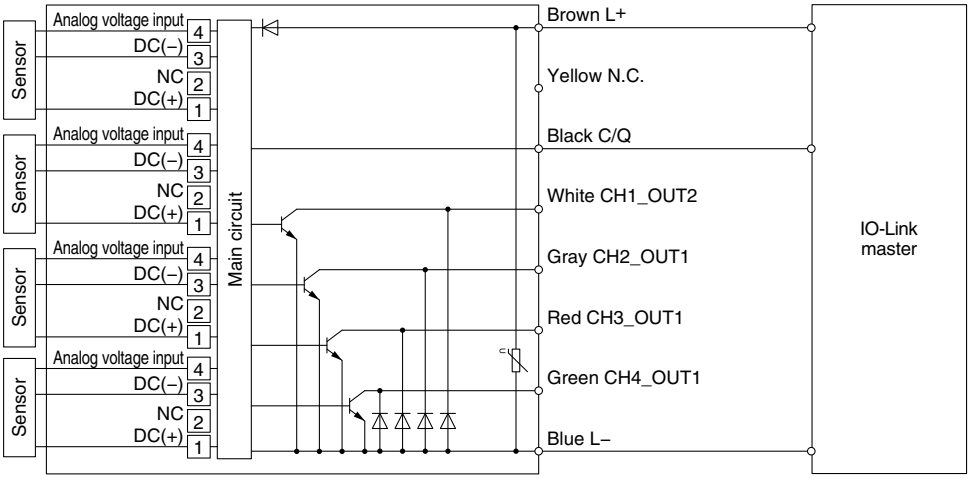
**PFG20□–□□□□**

**•Input/Output specifications**

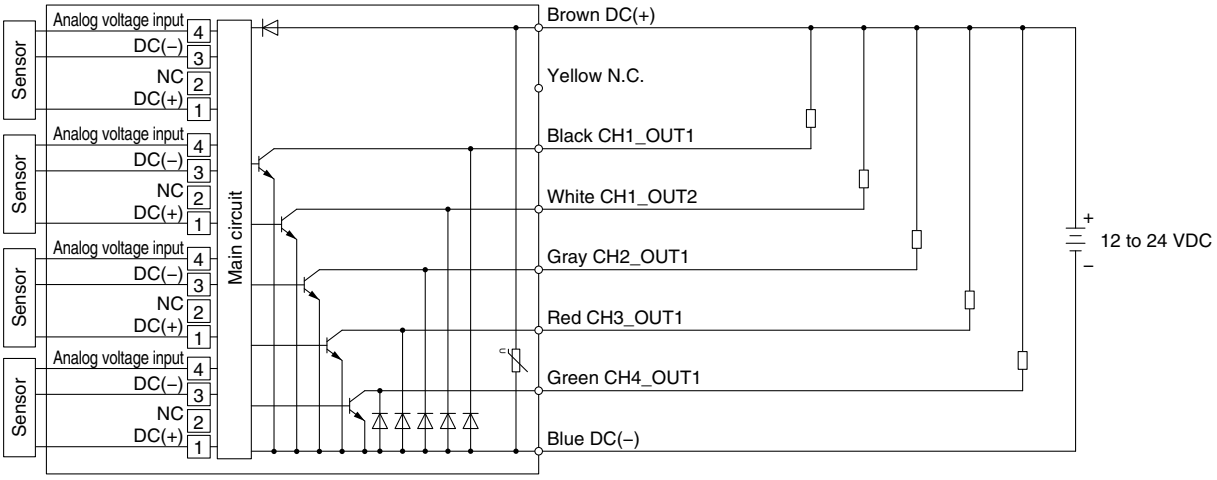
**2**

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

**When used as an IO-Link device**




**When used as a switch output device**



## Internal Circuits and Wiring Examples

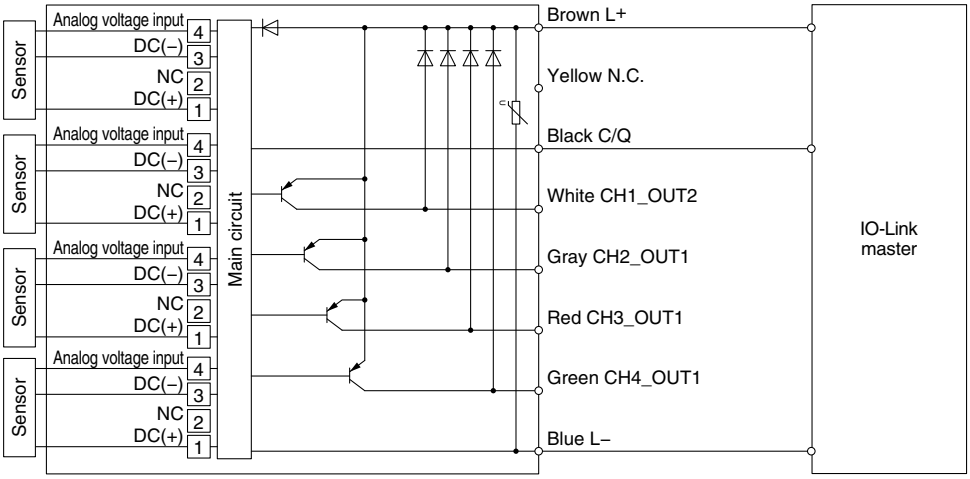
**PFG20□–□□□□**

**•Input/Output specifications**

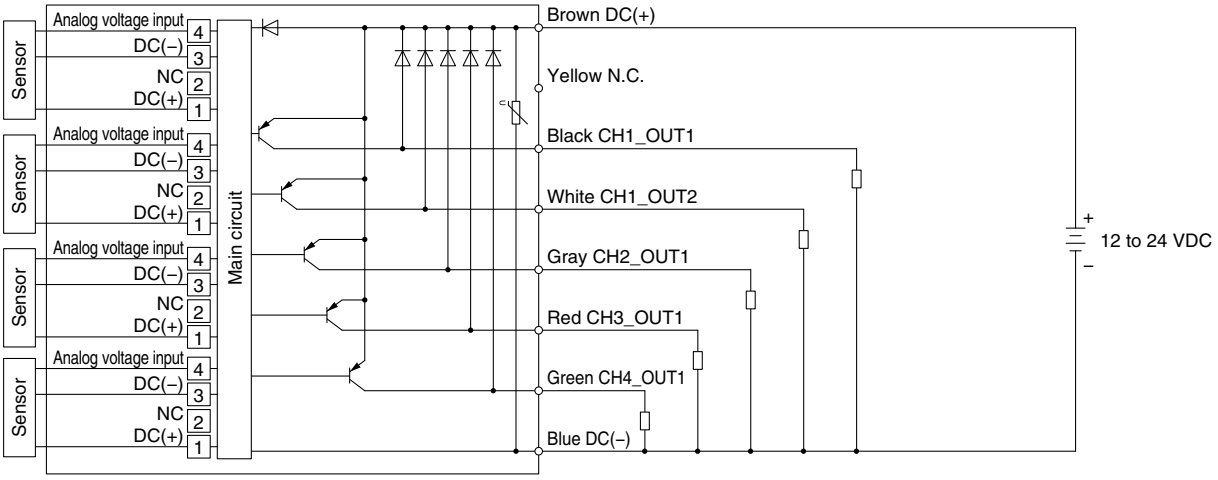
**3**

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

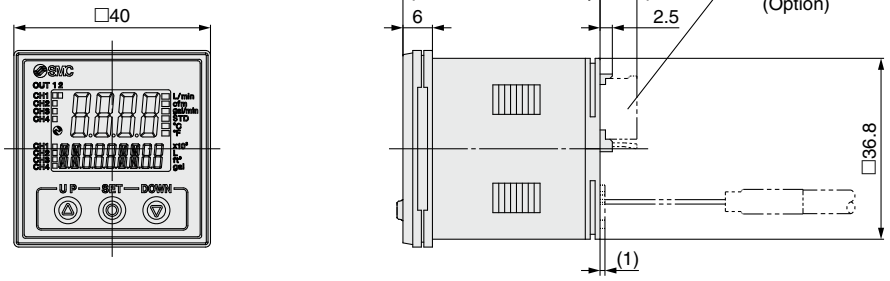
**When used as an IO-Link device**

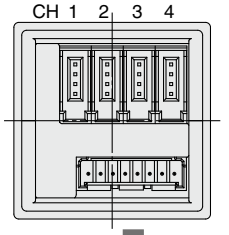



**When used as a switch output device**

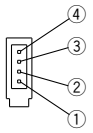


## Dimensions



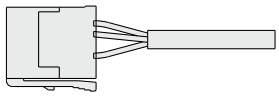




**Sensor connector (4P x 4)**

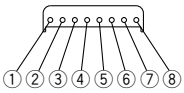



| Pin no. | Terminal |
|---|---|
| ① | DC (+) |
| ② | N.C |
| ③ | DC (–) |
| ④ | IN (1 to 5 V) |

**Connector (Option)**

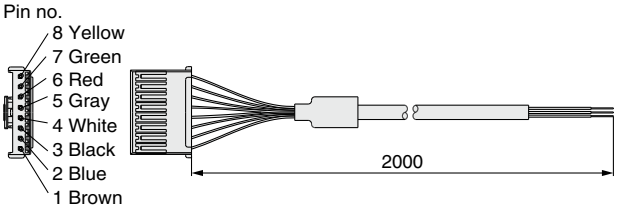


**Power supply/Output connector (8P)**



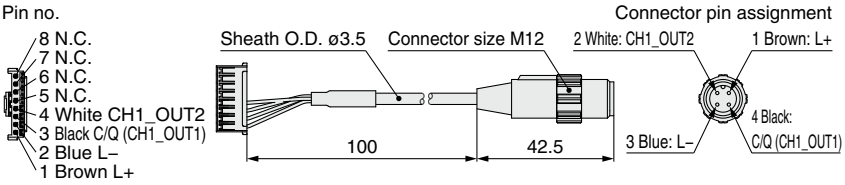

| Pin no. | Terminal | |
|---|---|---|
| | PFG200/PFG201 | PFG202/PFG203 |
| ① | DC (+) | L+ |
| ② | DC (–) | L– |
| ③ | CH1_OUT1 | C/Q (CH1_OUT1) |
| ④ | CH1_OUT2 | |
| ⑤ | CH2_OUT1 | |
| ⑥ | CH3_OUT1 | |
| ⑦ | CH4_OUT1 | |
| ⑧ | Auto-shift input | N.C. |

**Power supply/Output connection cable (Accessory)**

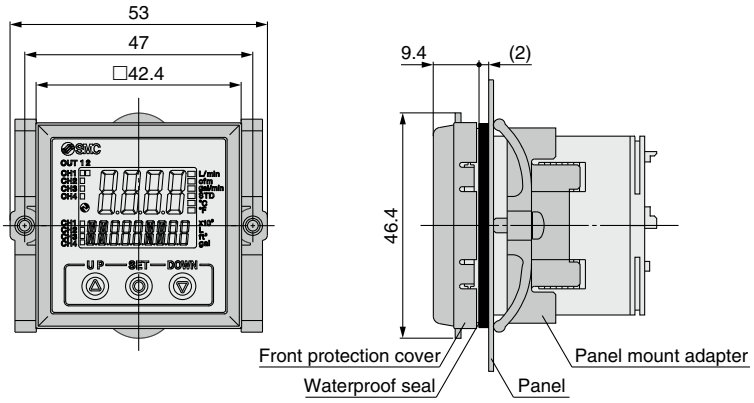


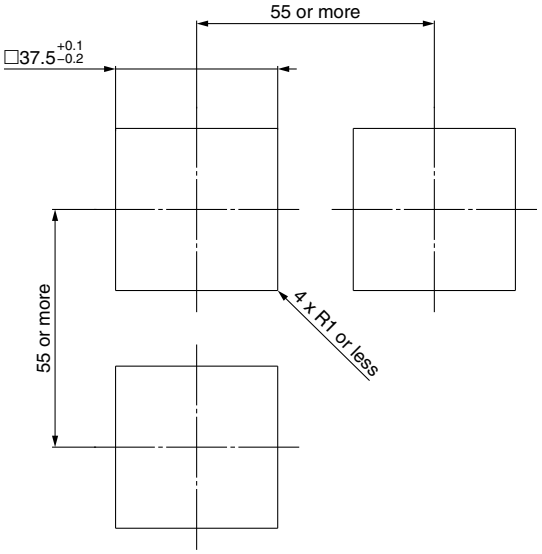

**Power supply with M12 connector/Output cable (Made to Order)**

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




### Front protection cover + Panel mount adapter




**Panel fitting dimensions**
**Applicable panel thickness:**
**0.5 to 8 mm**

# *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) corresponding to instantaneous flow rate, output corresponding to accumulated flow, or accumulated pulse output.
* At the time of shipment from the factory, it is set to hysteresis mode and normal output.

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

### ■ Display color
The display color can be selected for each output condition. The selection of the display color provides visual identification of abnormal values. (The display color depends 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 | ● | ● |

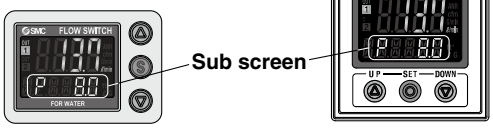
### ■ External input function
This function can be used only when the optional external input is present. The accumulated flow, peak value, and bottom value can be reset remotely.
**Accumulated value external reset:** A function to reset the accumulated flow value when an external input signal is applied.
In accumulated increment mode, the accumulated value will reset to and increase from zero.
In accumulated decrement mode, the accumulated value will reset to and decrease from the set value.
* When the accumulated value is stored to memory, every time the accumulated value external reset is activated, the memory (EEPROM) will be accessed. Take 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 memorizing 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 analog 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 memorized every 2 or 5 minutes during measurement and continues from the last memorized value when the power supply is turned on again.
The life time of the memory device is 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**

| 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 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.

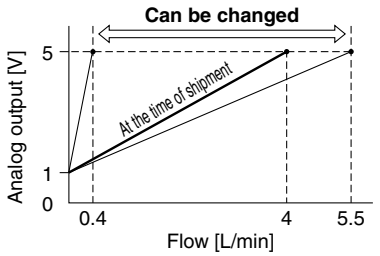
### ■ Peak/Bottom value display
The maximum (minimum) flow rate is detected and updated from when the power supply is turned on. In peak (bottom) value display mode, this maximum (minimum) flow rate is displayed.

### ■ Keylock function
Prevents operation errors such as accidentally changing setting values

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

### ■ Analog 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 analog output to the temperature.) This function is available if the analog 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.

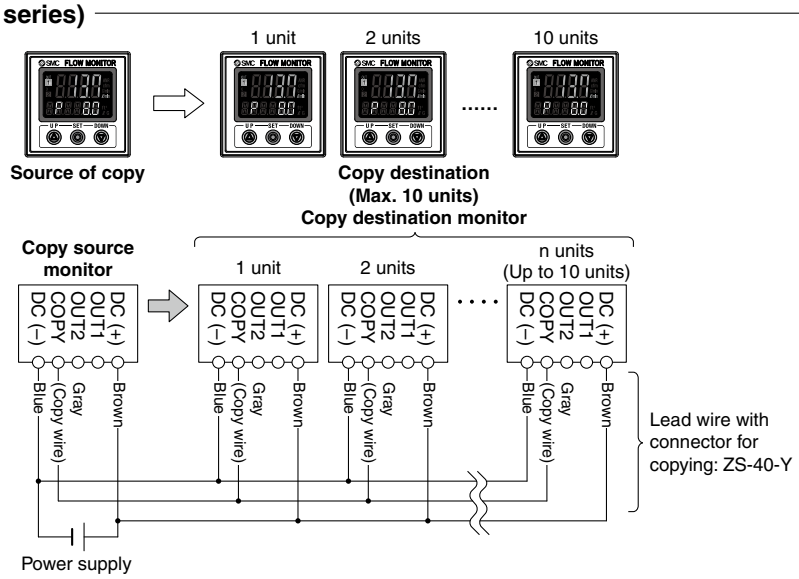


For 4 L/min type (Integrated display)

### ■ Copy function (Remote monitor unit/PF3W3 series)

The set values of the monitor can be copied.
This can reduce setting labor and minimize 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 | Remote monitor unit PF3W3 series |
| Er 1 | 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. | ● | ● |
| | 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 the power off and then on again. If the error cannot be rectified, please contact SMC for investigation. | ● | ● |
| Er4 | | | | | |
| Er6 | | | | | |
| Er8 | | | | | |
| 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.

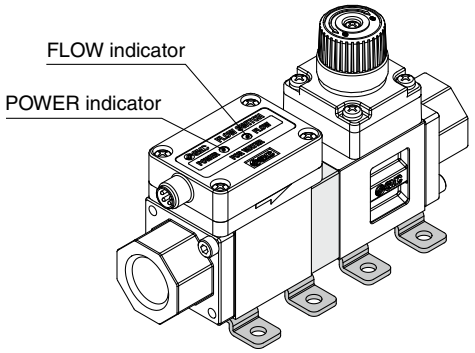
## Remote Sensor Unit (PF3W5 series)

### ■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 display function

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

| LED display | Description | Contents | Action |
|---|---|---|---|
| POWER Green Red FLOW<br>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<br>POWER indicator: Blinking red | Temperature measurement range error | Fluid temperature is either under –10°C or over 110°C. | Adjust the fluid temperature within the measurable temperature range. |
| POWER Red Red FLOW<br>POWER indicator: Blinking red<br>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<br>POWER indicator: Red ON<br>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<br>POWER indicator: Red ON<br>FLOW indicator: Blinking red | | | |
| POWER Red FLOW<br>POWER indicator: Red ON<br>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.

# 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 |
| **Deionized 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

# ⚠ Safety Instructions

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

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

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

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

*1) ISO 4414: Pneumatic fluid power - General rules and safety requirements for systems and their components
ISO 4413: Hydraulic fluid power - General rules and safety requirements for systems and their components
IEC 60204-1: Safety of machinery - Electrical equipment of machines - Part 1: General requirements
ISO 10218-1: Robots and robotic devices - Safety requirements for industrial robots - Part 1:Robots
etc.

## ⚠ Warning

**1. The compatibility of the product is the responsibility of the person who designs the equipment or decides its specifications.**

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

**2. Only personnel with appropriate training should operate machinery and equipment.**

The product specified here may become unsafe if handled incorrectly. The assembly, operation and maintenance of machines or equipment including our products must be performed by an operator who is appropriately trained and experienced.

**3. Do not service or attempt to remove product and machinery/ equipment until safety is confirmed.**

1. The inspection and maintenance of machinery/equipment should only be performed after measures to prevent falling or runaway of the driven objects have been confirmed.
2. When the product is to be removed, confirm that the safety measures as mentioned above are implemented and the power from any appropriate source is cut, and read and understand the specific product precautions of all relevant products carefully.
3. Before machinery/equipment is restarted, take measures to prevent unexpected operation and malfunction.

**4. Our products cannot be used beyond their specifications. Our products are not developed, designed, and manufactured to be used under the following conditions or environments. Use under such conditions or environments is not covered.**

1. Conditions and environments outside of the given specifications, or use outdoors or in a place exposed to direct sunlight.
2. Use for nuclear power, railways, aviation, space equipment, ships, vehicles, military application, equipment affecting human life, body, and property, fuel equipment, entertainment equipment, emergency shut-off circuits, press clutches, brake circuits, safety equipment, etc., and use for applications that do not conform to standard specifications such as catalogs and operation manuals.
3. Use for interlock circuits, except for use with double interlock such as installing a mechanical protection function in case of failure. Please periodically inspect the product to confirm that the product is operating properly.

## ⚠ Caution

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

## Limited warranty and Disclaimer/ Compliance Requirements

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

### Limited warranty and Disclaimer

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

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

### Compliance Requirements

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

**Revision History**

**Edition B**
* The remote type has been added.
* Units with a flow adjustment valve have been added.
* The 100 L/min type has been added.
* The PVC piping type has been added.
* Number of pages has been increased from 16 to 32. PR

**Edition C**
* The 250 L/min type has been added.
* The analog 4 to 20 mA 2-output type (-X128) has been added to made to order options.
* The brass piping material specification (-X143) has been added to made to order options.
* Number of pages has been decreased from 32 to 28. QW

**Edition D**
* The PF3W7□-X445 has been added.
* Number of pages has been increased from 28 to 36. WU

**⚠ Safety Instructions** Be sure to read the "Handling Precautions for SMC Products" (M-E03-3) and "Operation Manual" before use.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CAT.ES100-80D 2024-01