

For Air

Digital Flow Switch/High Flow Rate Type

Series PF2A



Refer to www.smcworld.com for details of products compatible with overseas standards.

How to Order



Integrated Display Type

PF2A7 [] H [] [] [] [] M

Flow rate range

03	150 to 3000 ℓ/min
06	300 to 6000 ℓ/min
12	600 to 12000 ℓ/min

High flow rate type

Port specification

Nil	Rc
N	NPT
F	G

Port size

Symbol	Port size	Flow rate (ℓ/min)			Applicable model
		3000	6000	12000	
10	1	●			PF2A703H
14	1 1/2		●		PF2A706H
20	2			●	PF2A712H

Lead wire (Refer to page 35.)

Nil	M12 3 m lead wire with connector
N	Without lead wire

Unit specification

Nil	With unit switching function
M	Fixed SI unit ^{Note)}

Note) Fixed units:
Real-time flow rate: ℓ/min
Accumulated flow: ℓ, m³, m³ x 10³

Output specification

28	NPN open collector 1 output + Analog output (1 to 5 V)
29	NPN open collector 1 output + Analog output (4 to 20 mA)
68	PNP open collector 1 output + Analog output (1 to 5 V)
69	PNP open collector 1 output + Analog output (4 to 20 mA)

Switching of switch output and accumulated pulse output is possible with NPN or PNP open collector outputs.

Specifications

Model	PF2A703H	PF2A706H	PF2A712H
Measured fluid	Dry air, Nitrogen		
Detection type	Heater type		
Rated flow range ^{Note 1)}	150 to 3000 ℓ/min	300 to 6000 ℓ/min	600 to 12000 ℓ/min
Minimum set unit ^{Note 1)}	5 ℓ/min		10 ℓ/min
^{Note 2)} Display units	Real-time flow rate		
	Accumulated flow		
Operating pressure range	ℓ/min, CFM ℓ, m ³ , m ³ x 10 ³ , ft ³ , ft ³ x 10 ³ , ft ³ x 10 ⁶		
Proof pressure	0.1 to 1.5 MPa		
Pressure loss	2.25 MPa		
Accumulated flow range	20 kPa (at maximum flow rate)		
Linearity ^{Note 3)}	0 to 9,999,999,999 ℓ		
Repeatability	±1.5% F.S. or less (0.7 MPa, at 20°C)		
Pressure characteristics	±1.0% F.S. or less (0.7 MPa, at 20°C), ±3.0% of F.S. or less in case of analog output		
Temperature characteristics	±1.5% F.S. or less (0.1 to 1.5 MPa, based on 0.7 MPa)		
Output specifications	±2.0% F.S. or less (0 to 50°C, based on 25°C)		
	Switch output ^{Note 4)}	NPN open collector Max. load current: 80 mA; Max. applied voltage: 30 V; Internal voltage drop: 1 V or less (with load current of 80 mA) PNP open collector Max. load current: 80 mA; Internal voltage drop: 1.5 V or less (with load current of 80 mA)	
	Accumulated pulse output ^{Note 4)}	NPN or PNP open collector Flow rate per pulse: 100 ℓ/pulse, 10.0 ft ³ /pulse ON time per pulse width: 50 msec	
Response time	Analog output ^{Note 5)}		
	Output voltage: 1 to 5 V; Load impedance: 100 kΩ or more Output current: 4 to 20 mA; Load impedance: 250 Ω or less		
Hysteresis	1 sec. or less		
Power supply voltage	Hysteresis mode: Variable (can be set from 0); Window comparator mode: (can be set from 0 to 3% F.S.)		
Current consumption	24 VDC (ripple ±10% or less)		
Resistance	150 mA or less		
	Enclosure	IP65	
	Operating temperature range	0 to 50°C (with no freezing and condensation)	
	Withstand voltage	1000 VAC for 1 min. between external terminal and case	
	Insulation resistance	50M Ω (500 VDC Mega) between external terminal and case	
	Vibration resistance	10 to 500 Hz with a 1.5 mm amplitude or 98 m/s ² acceleration, in each X, Y, Z direction for 2 hrs, whichever is smaller.	
Impact resistance	490 m/s ² in X, Y, Z directions 3 times each		
Noise resistance	1000 Vp-p, Pulse width 1 μs, Rise time 1 ns		
Weight	1.1 kg (without lead wire)	1.3 kg (without lead wire)	2.0 kg (without lead wire)
Port size (Rc, NPT, G)	1	1 1/2	2

Note 1) Flow rate display can be switched between the basic condition of 0°C, 101.3 kPa and the standard condition (ANR) of 20°C, 101.3 kPa, and 65% RH.

Note 2) For digital flow switch with unit switching function. (Fixed SI unit [(ℓ/min, or ℓ, m³ or m³ x 10³)] will be set for switch type without the unit switching function.)

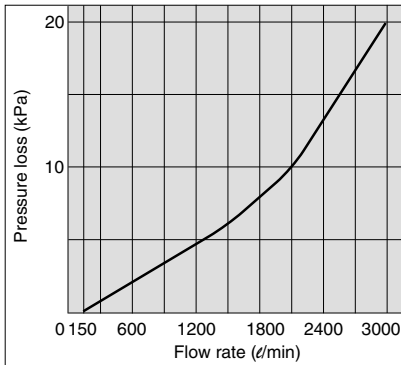
Note 3) The high flow rate type is CE marked; however, the linearity with applied noise is ±5% F.S. or less.

Note 4) Switch output and accumulated pulse output selections are made using the button controls.

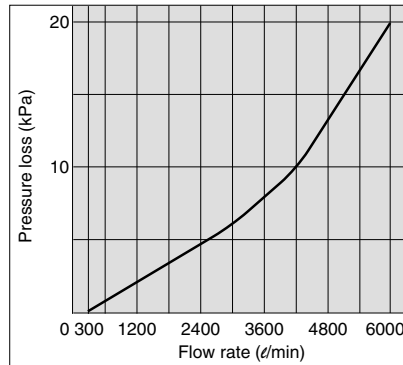
Note 5) The analog output operates only for real-time flow rate, and does not operate for accumulated flow.

Flow Characteristics (Pressure Loss)

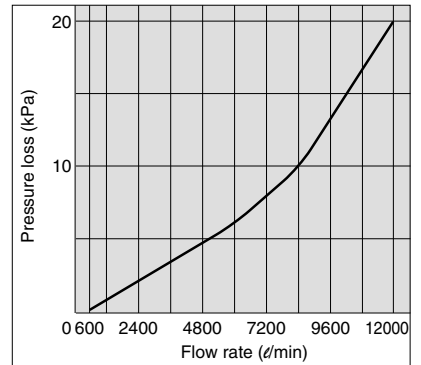
PF2A703H



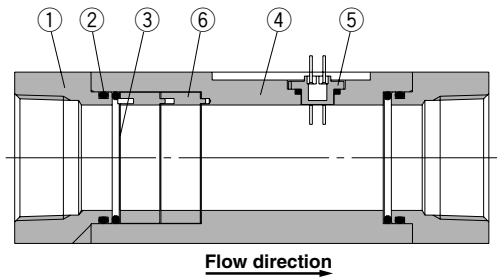
PF2A706H



PF2A712H



Construction



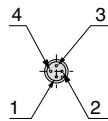
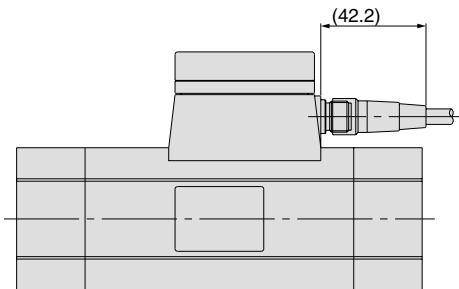
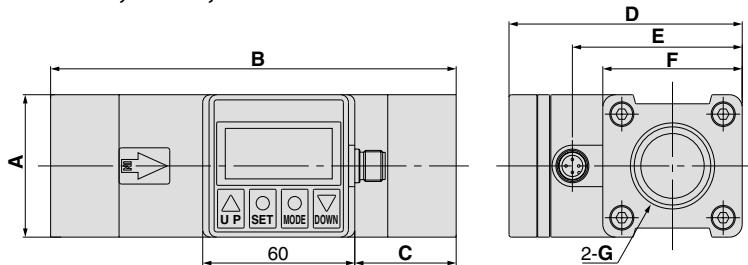
Parts list

No.	Description	Material	Note
1	Attachment	Aluminum alloy	Anodized
2	Seal	HNBR	—
3	Mesh	Stainless steel	—
4	Body	Aluminum alloy	Anodized
5	Sensor	PPS	—
6	Spacer	PBT	—

Series PF2A

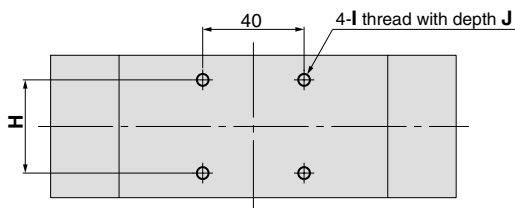
Dimensions

PFA703H, 706H, 712H



Connector pin numbers

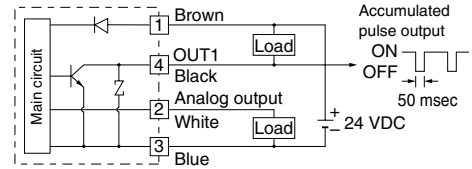
Pin no.	Pin description
1	DC(+)
2	Analog output
3	DC(-)
4	OUT1



Model	A	B	C	D	E	F	G	H	I	J
PF2A703H	55	160	40	92	67	55	Rc1, NPT1, G1	36	M5 x 0.8	8
PF2A706H	65	180	45	104	79	65	Rc1 ^{1/2} , NPT1 ^{1/2} , G1 ^{1/2}	46	M6 x 1	9
PF2A712H	75	220	55	114	89	75	Rc2, NPT2, G2	56	M6 x 1	9

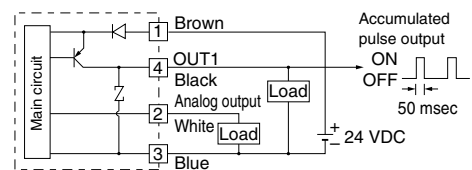
Internal circuits and wiring examples

① to ④ are the terminal numbers.



Load is an analog input equipment such as a voltmeter, ammeter.

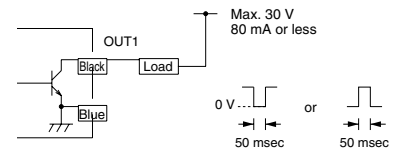
PF2A7□□H-□□²⁸/₂₉ (-M)



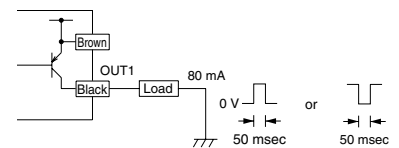
Load is an analog input equipment such as a voltmeter, ammeter.

PF2A7□□H-□□⁶⁸/₆₉ (-M)

Accumulated pulse output wiring examples

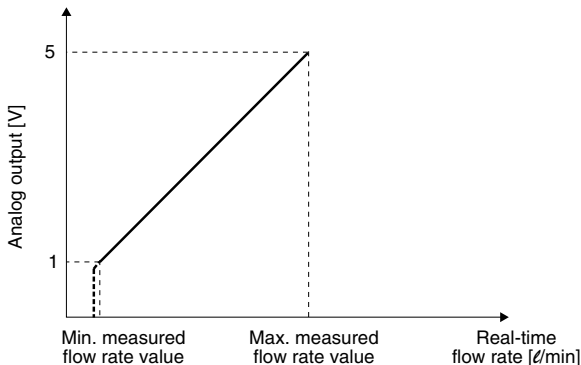


PF2A7□□H-□□²⁸/₂₉ (-M)



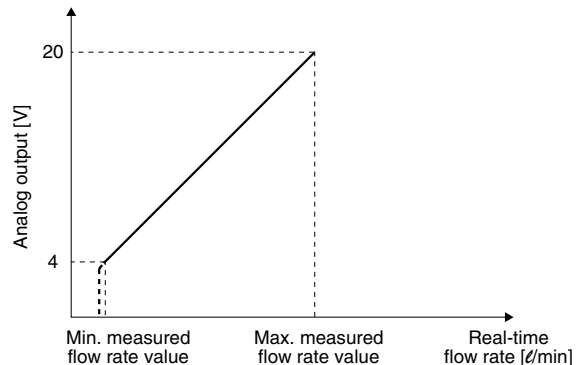
PF2A7□□H-□□⁶⁸/₆₉ (-M)

Analog output 1 to 5 VDC



Part no.	Min. measured flow rate value [ℓ/min]	Max. measured flow rate value [ℓ/min]
PF2A703H-□-28 PF2A703H-□-68	150	3000
PF2A706H-□-28 PF2A706H-□-68	300	6000
PF2A712H-□-28 PF2A712H-□-68	600	12000

4 to 20 mADC

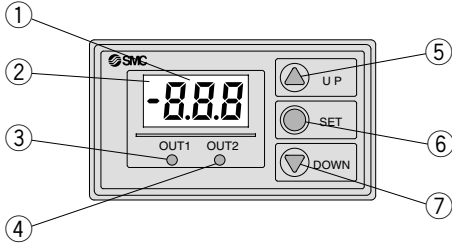


Part no.	Min. measured flow rate value [ℓ/min]	Max. measured flow rate value [ℓ/min]
PF2A703H-□-29 PF2A703H-□-69	150	3000
PF2A706H-□-29 PF2A706H-□-69	300	6000
PF2A712H-□-29 PF2A712H-□-69	600	12000

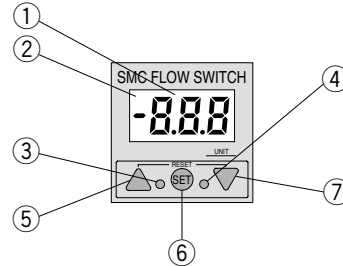
For Air/Water Digital Flow Switch *Series PF2A/PF2W*

Description

Integrated Display Type PF2A710, 750, 711, 721, 751 PF2W704(T), 720(T), 740(T), 11



Remote Type/Display Unit PF2A300, 301, 310, 311 PF2W300, 301, 330, 331

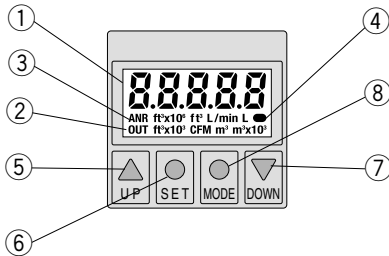


RESET button (▲ + ▼ button)

If the UP and DOWN buttons are pressed simultaneously, the RESET function will activate. In case of an emergency, please clear the display. The display of the accumulated flow will be reset to zero.

① LED display/Red	Displays the measured flow rate, each setting condition, and error code.
② Indicator (PF2A7□□, PF2A3□□ for air only)	Illuminates when the normal condition (nor) is selected.
③ Output (OUT1) display/Green	Displays the output condition of OUT1. Illuminates when turned ON.
④ Output (OUT2) display/Red	Displays the output condition of OUT2. Illuminates when turned ON.
⑤ UP button (▲ button)	Use to change the mode or to increase the set value.
⑥ SET button (● button)	Use this button to set the valve or the set mode.
⑦ DOWN button (▼ button)	Use to change the mode or decrease the set value.

Integrated Display Type PF2A703H, 706H, 712H

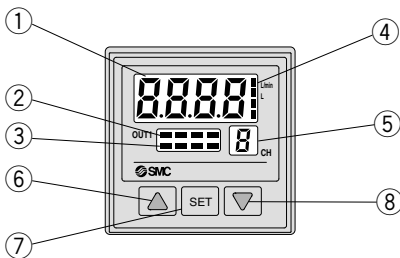


RESET button (▲ + ▼ button)

If the UP and DOWN buttons are pressed simultaneously, the RESET function will activate. In case of an emergency, please clear the display. The display of the accumulated flow will be reset to zero.

① LCD display/Orange	Displays the measured flow rate, each setting condition, and error code.
② Output (OUT1) display/Orange	Displays the output condition of OUT1. Illuminates when turned ON.
③ Unit display/Orange	Displays the selected unit. Type without unit switching function is fixed SI units (ℓ/min, or ℓ, m ³ , m ³ x 10 ³).
④ Flow rate confirmation display/Orange	The blinking intervals change depending on the flow rate value.
⑤ UP button (▲ button)	Use to change the mode or to increase the set value.
⑥ SET button (● button)	Use to select the function.
⑦ DOWN button (▼ button)	Use to change the mode or decrease the set value.
⑧ MODE button (● button)	Use for changing the function.

4-channel Flow Monitor (Remote type/Display unit) PF2A200, 201 PF2W200, 201



① LCD display/Orange	Displays the measured flow rate, each setting condition, and error code.
② Switch output display/Red	Displays the output condition of OUT1 (CH1 to 4). Illuminates when turned ON.
③ Unit display of flow rate for air/Red (PF2A200, 201 for air only)	CH1 to 4 will illuminate when the normal condition (nor) is selected.
④ Unit display/Orange	Illuminates the selected unit. Use after putting the unit label other than ℓ/min, ℓ.
⑤ Channel display/Red	Displays the selected channel.
⑥ UP button (▲ button)	Use to change the mode or to increase the set value.
⑦ SET button	Use this button to set the value or the set mode.
⑧ DOWN button (▼ button)	Use to change the mode or decrease the set value.

Series PF2A/PF2W

Functions

Refer to the "Instruction Manual" for information on setting and operating.

Flow rate measurement selection

Real-time flow rate and accumulated flow rate can be selected. A flow rate of up to 999999 can be accumulated. The accumulated flow rate is reset when the power supply turns OFF. (PF2A7□H maintains the values.)

Unit switching

For Air

Display	Real-time flow rate	Accumulated flow
U_1	ℓ/min	ℓ
U_2	CFM x 10 ⁻² x CFM x 10 ⁻¹	ft ³ x 10 ⁻¹

CFM = ft³/min

High Flow Rate Type (For Air)

Display	Real-time flow rate	Accumulated flow
U_1	ℓ/min	ℓ, m ³ , m ³ x 10 ³
U_2	CFM	ft ³ , ft ³ x 10 ³ , ft ³ x 10 ⁶

For Water / High Temperature Fluid Type (For Water)

Display	Real-time flow rate	Accumulated flow
U_1	ℓ/min	ℓ
U_2	GPM	gal (US)

GPM = gal (US)/min

Note) Fixed SI unit (ℓ/min, or ℓ, m³, m³ x 10³) will be set for the type without the unit switching function.

Flow rate conversion

Normal condition: 0°C, 101.3 kPa, dry air
Standard condition: 20°C, 101.3 kPa, 65%RH (ANR)
Switchable between these conditions.

Flow rate measuring unit confirmation

This function allows for the confirmation of the accumulated flow rate when real-time flow rate is selected and to confirm the real-time flow rate when accumulated flow rate is selected.

Key lock

This function prevents accidental operations such as changing the set value.

Accumulation clearance

This function clears the accumulated value.

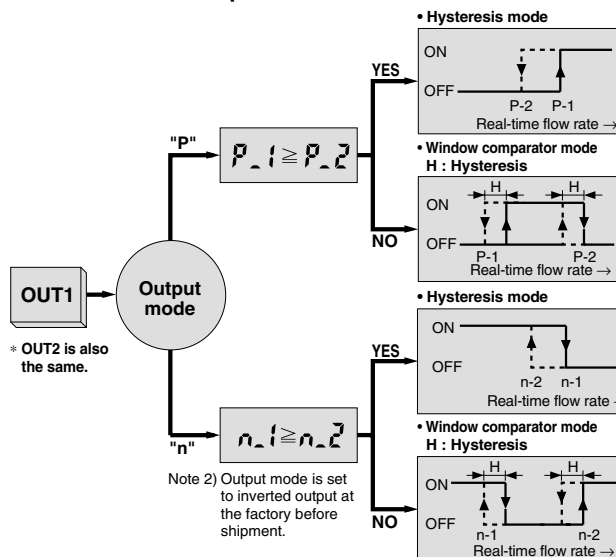
Initialization of setting (only for Series PF2A7□□H)

This function restores the setting to the original state, just as it had been shipped from the factory.

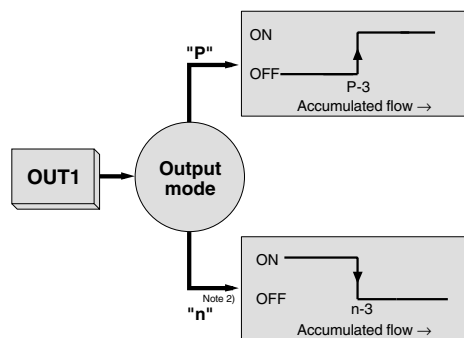
Output types

Real-time switch output, accumulated switch output, or accumulated pulse output can be selected as an output type.

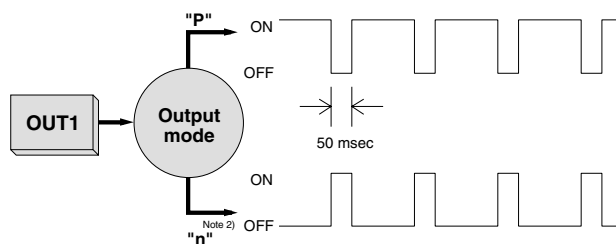
Real-time switch output



Accumulated switch output



Accumulated pulse output



Note 1) For a digital flow switch with an unit switching function. (Fixed SI unit [ℓ/min, or ℓ, m³ or m³ x 10³] will be set for switch types without an unit switching function.) Refer to the specifications of the display unit for the flow rate value per pulse.

Functions

Copy function (PF2□200, 201 only)

Information to be copied is:

- ① Flow rate range
- ② Display mode
- ③ Display unit (Only available when the unit specification is nil.)
- ④ Output method
- ⑤ Output mode
- ⑥ Flow rate display unit (available with PF2A20□ only)
- ⑦ Flow rate value

Peak hold, Bottom hold display function

(PF2□200, 201 only)

The maximum or minimum value can be held in the case where the real-time flow rate display mode is selected during the initial setting.

Error correction

LED display	Contents	Solution
Er1 Err-1	Note 1) A current of more than 80 mA is flowing to OUT1. Note 2)	Check the load and the wiring for OUT1.
Er2	Note 1) A current of more than 80 mA is flowing to OUT2.	Check the load and the wiring for OUT2.
Err-3 Er4	Note 2) The set data has changed for some reason. Note 1)	Perform the RESET operation, and reset all the data again.
---	Note 1) The flow rate is over the flow rate measurement range. Note 2)	Use an adjustment valve, etc. to reduce the flow rate until it is within the flow rate range.

Note 1) Applicable to display integrated type and remote type except PF2A7□□H series.

Note 2) Applicable to PF2A7□□H series only.

For PF2A/W200, 201

LED display	Contents	Solution
Er1	Over current is flowing to the load of a switch output.	Shut off the power supply. After eliminating the output factor that caused the excess current, turn the power supply back on.
Er0	Internal data error.	Contact SMC.
Er7	Internal data error.	
Er10	Internal data error.	
Er5	Internal data error.	Shut off the power supply and then reset the switch.
Er6	Internal data error.	
---	The flow rate is over the flow rate measurement range.	Use an adjustment valve, etc. to reduce the flow rate until it is within the flow rate range.

Channel select function (PF2□200, 201 only)

Every pushing the Δ button, channel selection "1→2→3→4→1..." is available. The flow rate measurement of each selected channel is shown in the display unit.

Channel scan function (PF2□200, 201 only)

Changes displaying the channel shown every about 2 seconds and its detected flow rate.

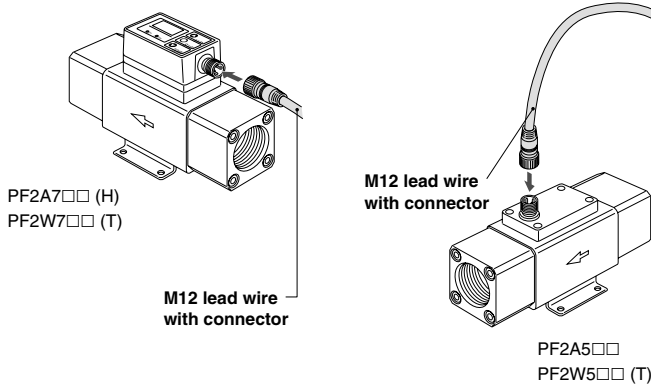
Series PF2A/PF2W

Option

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

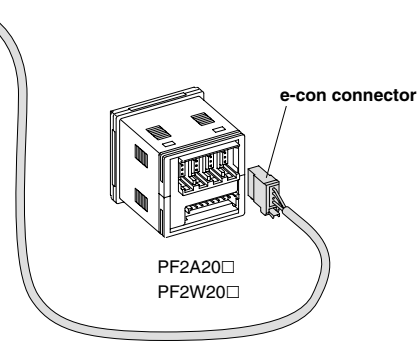
M12 lead wire with connector

Part no.	Qty.	Lead wire length
ZS-29-A	1	3 m



e-con connector

Part no.	Qty.
ZS-28-CA-4	1



In addition to the lead wire assembly shown above, those listed below (female contact) can be connected. However, they cannot be connected with an e-con connector because the diameter of the core wire and its coverage diameter are different. For details, contact each manufacturer.

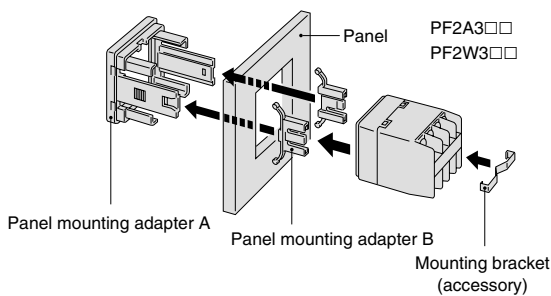
Connector size	Pin no.	Manufacturer	Applicable series
M12	4	Correns Corp.	VA-4D
		OMRON Corp.	XS2
		Yamatake Co.,Ltd.	PA5-4I
		Hirose Electric Co., Ltd.	HR24
		DKK Ltd.	CM01-8DP4S

In addition to the connectors shown above, those listed below (e-con) can be connected.

Manufacturer	Model
Sumitomo 3M Limited	37104-3122-000FL
Tyco Electronics AMP K.K.	2-1473562-4
OMRON Corp.	XN2A-1430

Panel mounting

Pin no.	Description	Note
ZS-22-E	Panel mounting adapter A, B	With mounting bracket



Part no.	Description	Note
ZS-26-B	Panel mounting adapter	With waterproof seal, mounting screw
ZS-26-C	Front protective cover + Panel mounting adapter	With waterproof seal, mounting screw

