



PFD Series

Digital Flow Switch for Deionized Water and Chemicals

All wetted parts made from New PFA for superior corrosion resistance.



High Corrosion Resistance

Body, Sensor:

New PFA

Tubing:

Super PFA

Digital Flow Switch with
Excellent Flow Through Characteristics

PFD Series

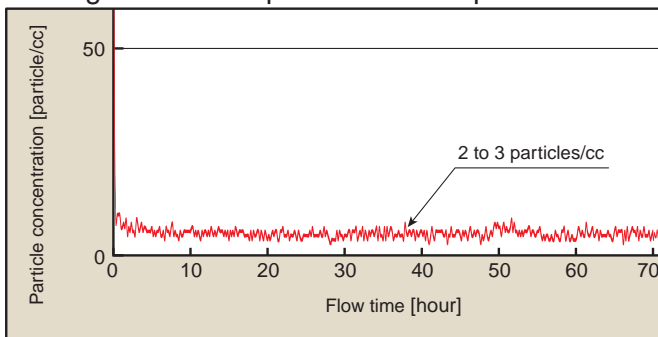
1.6 ℓ/min

Minimum measurable flow rate
is available from 1.6 ℓ/min.

Reduced particle generation

Karman vortex has no moving parts and therefore generates a minimum amount of dust particles.

Particulate generation data [Particle characteristics](Reference data)
Average number of particles: 2 to 3 particles/cc



This data was obtained by performing an actual 10-minute ultrasonic cleaning using an average 16MΩ•cm of deionized water at class 10000 clean room (1ℓ/min flow rate). The diameter of the measured particles ranges from 0.1 to 0.5μm.

The unit of measurement for flow rate used during measuring is 100cc/min.



Series Variations

Series	Remote type		ℓ/min Flow rate measurement range ℓ/min	Note1) Output specification*	Piping specification
	Sensor unit	Display unit			
PFD	PFD520	PFD30⁰	Note2) 1.6 to 20	Switch output Accumulated pulse output	1/2 inch tubing O.D.

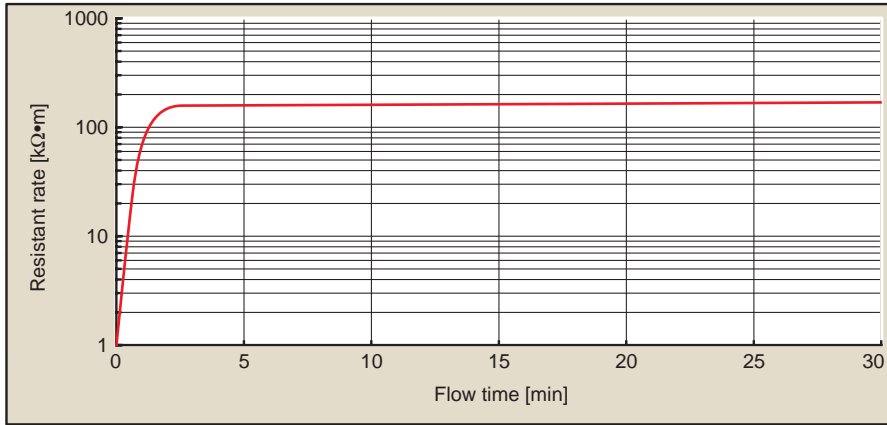
Note1) Output selection can be made at the touch of a button.

Note2) The valve for viscosity 1mPa•s (1cP) or less. (The viscosity is almost same as that of 25°C water.)

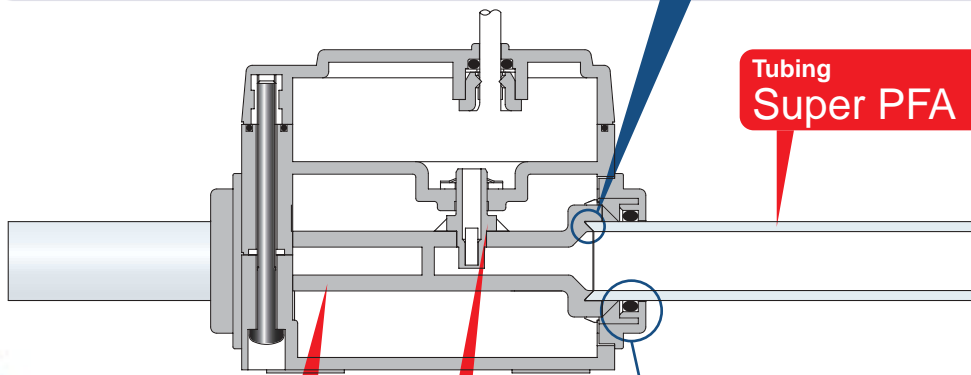
Tapered side seal construction

Tapered tube seal minimizes internal dead volume to reduce accumulation of fluid deposits.

Flow through characteristics (Reference data)



Fill the passage with sulphuric acid and leave as is for 30 minutes. After expelling the sulphuric acid, flush the flow passage out with deionized water and measure the resistance rate of the fluid that is ejected from the downstream side. A quick recovery time indicates less deposit.



Body
New PFA

Sensor
New PFA

Vibration reducing seals.

Improved shock and vibration resistance. Malfunctions (output errors) that would otherwise be caused by vibration are prevented.

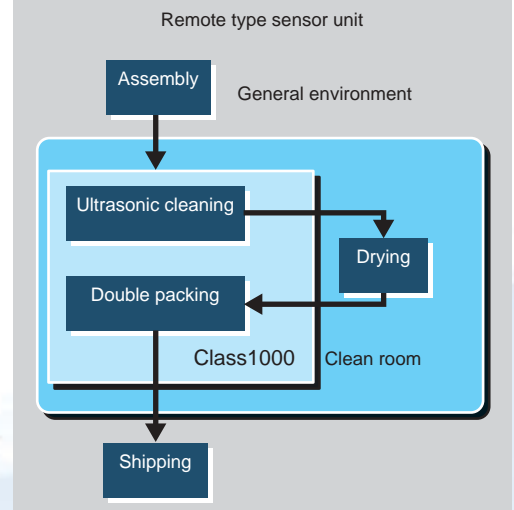


Programmable outputs

4 combinations of outputs are possible.

	①	②	③	④
Output 1	Switch output	Switch output	Accumulated pulse output	Accumulated pulse output
Output 2	Switch output	Accumulated pulse output	Switch output	Accumulated pulse output

Series PFD Production Process Chart



How to Order

Remote Type Sensor Unit

PFD5 20-13-1

Flow rate range

20 1.6-20ℓ/min

Applicable Tube O.D. size: in inches

13 1/2

Output specifications

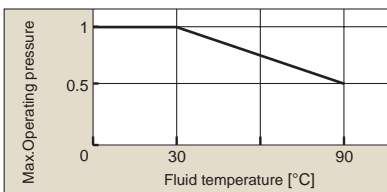
1	Pulse output + Analogue output (1 to 5V)
2	Pulse output + Analogue output (4 to 20mA)



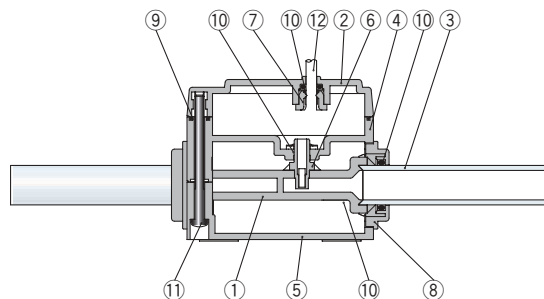
Sensor Specifications

Model	PFD520-13-1	PFD520-13-2
Measurable fluid	Deionized water and chemicals (Fluids that does not corrode or osmose Teflon®) with viscosity 3mPa·s (3cP) or less	
Detection type	Karman vortex	
Flow rate measurement range	1.8 to 20ℓ/min (1.6 to 20ℓ/min at 0.1MPa with viscosity 1mPa·s (1cP) or less)	
Operating pressure range ^{Note 1)}	0~1MPa	
Proof pressure ^{Note 1)}	1.5MPa	
Fluid temperature	0~90°C	
Operating ambient temperature range	0~50°C	
Linearity	±2% F.S. or less (water at 25°C)	
Repeatability	±1% F.S. or less (water at 25°C)	
Temperature characteristics	±5% F.S. or less (0° to 50°C, based on 25°C)	
Output specifications	Pulse output	Open drain 30V, 10mA, Duty ratio: approx. 50%
	Analog output	1 to 5V (Allowable load resistance: 100kΩ or more) 4 to 20mA (Allowable load resistance: 250Ω or less)
Power supply voltage	12 to 24VDC (ripple ±10%)	
Current consumption	20mA or less	
Withstand voltage	1000VAC for 1 min. between external terminal block and case	
Insulation resistance	50MΩ between external terminal block and case	
Noise resistance	1000Vp-p, Pulse width 1μs, Rise time 1ns	
Vibration resistance	4.9m/s ²	
Impact resistance	490m/s ² , X, Y, Z directions, 3 times each	
Weight	200g	
Enclosure	IP65	
Piping specifications	1/2 inch tube	

Note1) Varies depending on the fluid temperature. Proof pressure ≤ 1.5 times max. operating pressure.



Construction



Component Parts

No.	Description	Material
1	Body	New PFA
2	Sensor	New PFA
3	Tube	Super PFA
4	Housing A	PPS
5	Housing B	PPS
6	Housing C	PPS
7	Bushing	POM
8	Cap	PPS
9	Gasket	FKM
10	O-ring	FKM
11	Thread	SUS304
12	Lead Wire	PVC



How to Order

Remote Type Display Unit

PFD3 0 0 - A - M

Flow rate range

0	1.6 to 20ℓ/min
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Output specifications

0	NPN 2 output
1	PNP 2 output

Unit

Nil	Selectable units ^{Note 1)}
M	Fixed SI unit ^{Note 2)}

Note 1) Not available in Japan

Note 2) Fixed units: Real-time flow rate: ℓ/min
Accumulated flow: ℓ

Panel mount

Sensor Specifications

Model	PFD300-A(-M)		PFD301-A(-M)	
Flow rate display range	1.3 to 21.0ℓ/min			
Set range	1.3 to 21.0ℓ/min			
Display digits	3 1/2 digit 7-segment LED			
Minimum setting unit	0.1ℓ/min			
Selectable display units ^{Note 2)}	Real-time flow rate	ℓ/min, Gal/min		
	Accumulated flow	ℓ, Gal		
Accumulated flow range	0-999999ℓ			
Operating temperature range	0-50°C			
Linearity	±0.5% F.S. or less			
Repeatability	±0.5% F.S. or less			
Temperature characteristics	±1% or less (15° to 35°C, based on 25°C)			
	±2% or less (0° to 50°C, based on 25°C)			
Output specifications ^{Note 1)}	Switch output	2 outputs NPN open collector 30V, 80mA	2 outputs PNP open collector 80mA	
	Accumulated pulse output	0.1ℓ/pulse (ON time: 50msec/pulse, Reversible polarity)		
Indicator lights	Lights up when ON: OUT1: Green; OUT2: Red			
Response time	1sec			
Hysteresis	Hysteresis mode: Variable (can be set from 0), Window comparator mode: Fixed 3 digits			
Power supply voltage	12 to 24VDC (ripple ±10%)			
Current consumption	60mA or less			
Withstand voltage	1000VAC for 1 min. between external terminal block and case			
Insulation resistance	50MΩ between external terminal block and case			
Noise resistance	1000Vp-p; Pulse width: 1μs; Rise time: 1ns			
Vibration resistance	10 to 50Hz at 1.5mm amplitude or 98m/s ² acceleration (whichever is smaller) in X, Y, Z directions, 2 hours each			
Impact resistance	490m/s ² , X, Y, Z direction, 3 times each			
Enclosure	IP40			
Weight	45g			

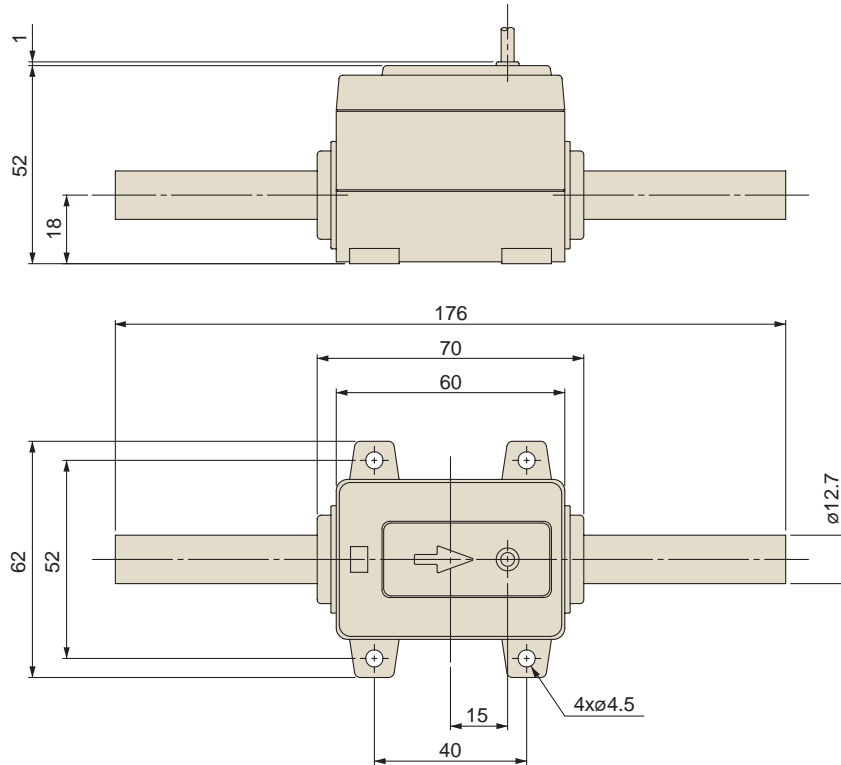
Note 1) Switch output and accumulated pulse output selections can be made at the push of a button.

Note 2) For PFD30□-A only.

	①	②	③	④
Output 1	Switch output	Switch output	Accumulated pulse output	Accumulated pulse output
Output 2	Switch output	Accumulated pulse output	Switch output	Accumulated pulse output

Dimensions: Remote Type Sensor Unit

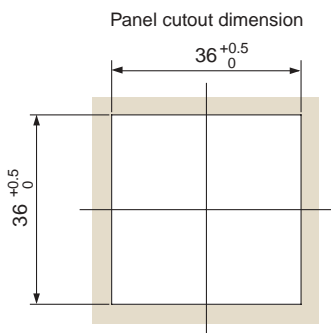
PFD520-13



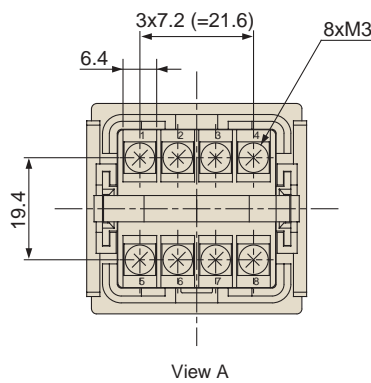
Dimensions: Remote Type Display Unit

PFD30⁰-A

Panel Mount Type

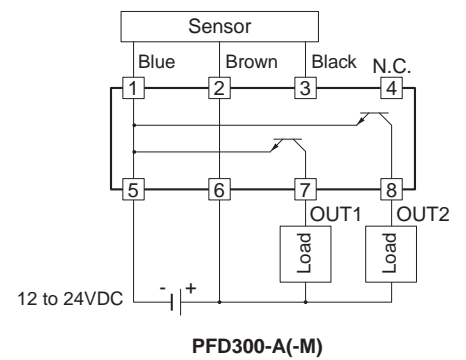


*Applicable panel thickness is 1 to 3.2mm.

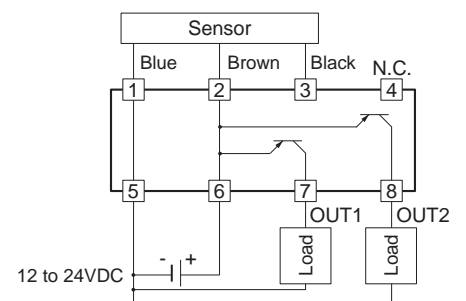
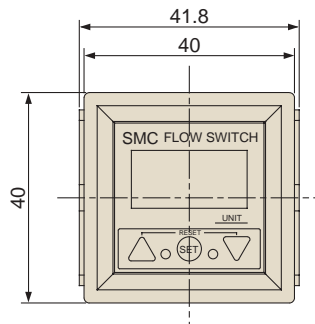
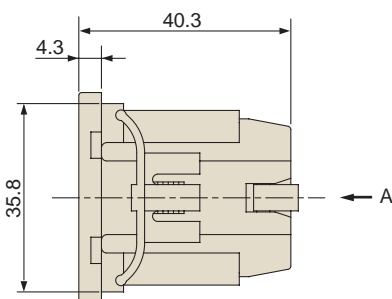


View A

Internal circuit and wiring



PFD300-A(-M)



PFD301-A(-M)

Related Fittings

High Purity Fluoropolymer Fittings

LQ1•LQ2 Series

- Quadruple seal construction
- Applicable for a variety of fluids
- Expansion of the range to include compact fittings-Series LQ1



LQ1 Series



LQ2 Series

CAT.ES-70

Variations

New release of female thread and flange type fittings offer flexibility of mounting

Connector LQ1H LQ2H	Male	
	Female	
Elbow LQ1L LQ2L	Male	
	Female	
Run tee LQ1R LQ2R	Male	
	Female	
Branch tee LQ1B LQ2B	Male	
	Female	
Union elbow LQ1E LQ2E		
Union tee LQ1T LQ2T		
Panel mount union LQ1P LQ2P		
Union LQ1U LQ2U		
Union Flange LQ1F		

Specifications

LQ1 Series

Model	LQ1□10	LQ1□20	LQ1□30	LQ1□40	LQ1□50	LQ1□60
Maximum operating pressure (at 20° C)	0.7MPa					
Operating temperature	0~150°C					

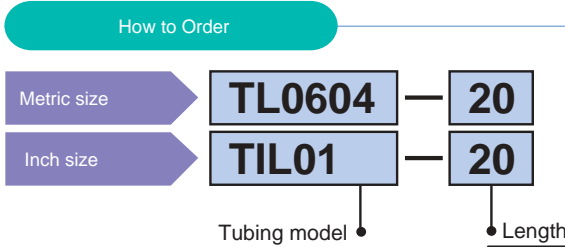
LQ2 Series

Model	LQ2□20	LQ2□30	LQ2□40	LQ2□50
Maximum operating pressure (at 20° C)	1.0MPa			
Operating temperature	0~200°C			

Related Tubes

High Purity Fluoropolymer Tubing

TL/TIL Series



Metric size

TL0604

Inch size

TIL01

20

20

● Tubing model ● Length

Symbol	How sold	Length
10	In rolls	10m
20		20m
50		50m
100		100m
2S	In straight lengths	2m

Refer to the Series specification below and the related catalogue ES-70.

Series

Series		TL Series (Metric sizes)						TIL Series (Inch sizes)						
		TL0403	TL0604	TL0806	TL1008	TL1210	TL1916	TIL01	TIL05	TIL07	TIL11	TIL13	TIL19	TIL25
Nominal size		—	—	—	—	—	—	1/8"	3/16"	1/4"	3/8"	1/2"	3/4"	1"
O.D. x I.D. mm		ø4x ø3	ø6x ø4	ø8x ø6	ø10x ø8	ø12x ø10	ø19x ø16	ø3.18x ø2.18	ø4.75x ø3.15	ø6.35x ø3.95	ø9.53x ø6.33	ø12.7x ø9.50	ø19.05x ø15.85	ø25.4x ø22.2
O.D. mm	Standard size	4	6	8	10	12	19	3.18	4.75	6.35	9.53	12.7	19.05	25.4
	Tolerance	±0.1			+0.2 -0.1			±0.1			+0.2 -0.1			
Thickness mm	Standard size	0.5	1.0			1.5		0.5	0.8	1.2	1.6			
	Tolerance	±0.05	±0.1			±0.15		±0.05	±0.08	±0.12	±0.15			
Rolls	10m	—	—	—	●	●	●	—	—	—	●	●	—	—
	20m	●	●	●	●	●	●	●	●	●	●	●	●	●
	50m	●	●	●	●	●	●	●	●	●	●	●	●	●
	100m	●	●	●	●	●	●	●	●	●	●	●	●	—
Straight lengths	2m	●	●	●	●	●	●	●	●	●	●	●	●	●
Color		Colour of material: Translucent												

Specifications

Fluid Maximum operating pressure (at 20°C)	1.0MPa		0.9MPa		0.7MPa	0.6MPa	1.0MPa		0.7MPa		0.5MPa		
Burst pressure (at 20°C)	4.9MPa	6.9MPa	4.7MPa	3.6MPa	2.9MPa	2.6MPa	6.4MPa	6.7MPa	7.9MPa	6.7MPa	4.6MPa	2.8MPa	2.0MPa
Minimum bending radius mm	20		40	65	110	160	12	20		30	60	160	290
Maximum operating temperature (Fixed operation)	260°C												
Material	Super PFA High purity PFA												

SMC UK Contact Numbers

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