

Highly reliable sensor based on Karman vortex principle

# WFK Series

FLUEREX flow rate sensor for water



## Reliable

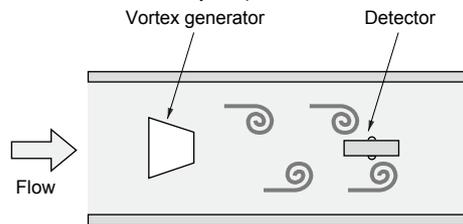
### ■ No more water impurities problems

Karman's vortex (\*) is applied

As the Karman's vortex has no moving parts that the impeller type normally has, problems such as debris and rust in piping will not occur, which allows for use of industrial water or such low-quality water.

### \* About Karman vortex

Around an object placed in the flow, the fluid is separated due to its viscosity characteristics, causing vortices swirling steadily and alternately from the sides of the object. The vortices (Karman vortices) appear unsymmetrically in the downstream of the object as shown in the figure, which will be detected by the piezoelectric element of the detector.



### ■ No more nervous piping work

Tough, stainless steel body and pipe adaptor will not deform, break or cause water leakage even when stress is applied to tighten steel pipes for piping.

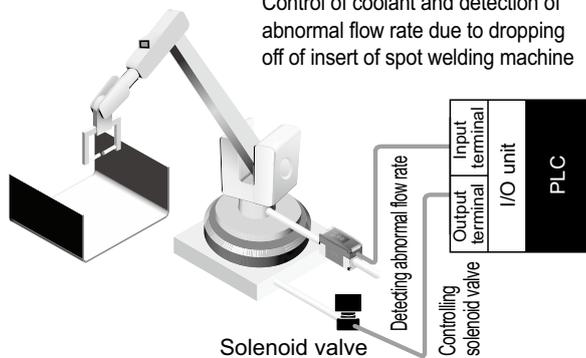
## Main applications

- Coolant control of laser oscillator
- Flow rate control of temperature controller
- Coolant control of dry vacuum pump
- Flow rate and temperature controls of coolant for mold

### Welding

#### Spot welding machine

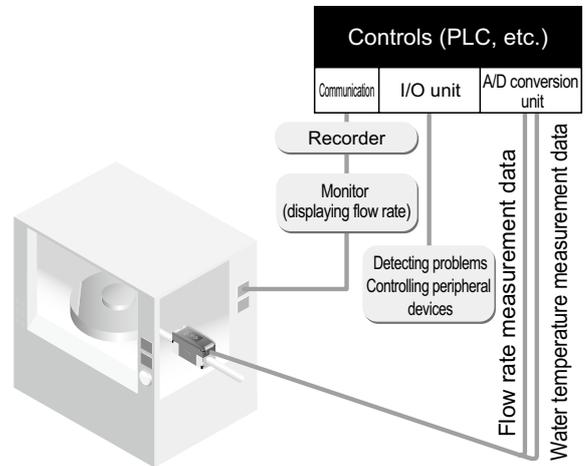
Control of coolant and detection of abnormal flow rate due to dropping off of insert of spot welding machine



### Semiconductor

#### Cooling and temperature control of semiconductor manufacturing equipment

Etching, grinder, dicer, CVD



## ● Model variations

WFK Series Flow rate variation	Model no.	Port size	Flow rate range (L/min)														
			1	2	3	4	5	10	20	30	40	50	100	150	200		
	WFK3004	Rc3/8 Rc1/2	0.5 to 4.0														
	WFK3012		1.5 to 12														
	WFK3032		4.0 to 32														
	WFK5008	Rc3/8 Rc1/2 Rc3/4	1.0 to 8.0														
	WFK6008		3.0 to 27.0														
	WFK5027 WFK6027		10 to 50														
	WFK7050	Rc3/4 Rc1					10 to 50										
	WFK7100	Rc1 Rc1 1/4					20 to 100										
	WFK7200	Rc1 1/4 Rc1 1/2					40 to 200										

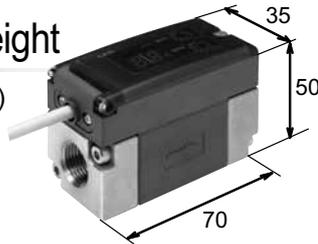
- F.R.L
- F (Filtr)
- R (Reg)
- L (Lub)
- PresSW
- Shutoff
- SlowStart
- FimResistFR
- Oil-Prohr
- MedPresFR
- No Cu/  
PTFE FRL
- Outdrs FR
- F.R.L  
(Related)
- CompFRL
- LgFRL
- PrecsR
- VacFR
- Clean FR
- ElecPneuR
- AirBoost
- SpdContr
- Silncr
- CheckV/  
other
- Jnt/tube
- AirUnt
- PrecsCompn
- Mech/  
ElecPresSw
- ContactSW
- AirSens
- PresSW  
Cool
- AirFloSens/  
Contr
- WaterRtSens
- TotAirSys  
(Total Air)
- TotAirSys  
(Gamma)
- RefrDry
- DesicDry
- HiPolymDry
- MainFiltr
- Dischrg  
etc
- Ending

## Easy to use

### WFK3000

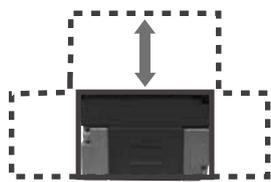
#### ● Compact/lightweight

Compact (L70 x W35 x H50) and lightweight (380 g). Perfect for integration into equipment.



#### ● Single size

A single body size can cover all three flow rate ranges. The size has been reduced to 1/3 of the previous equivalent model.



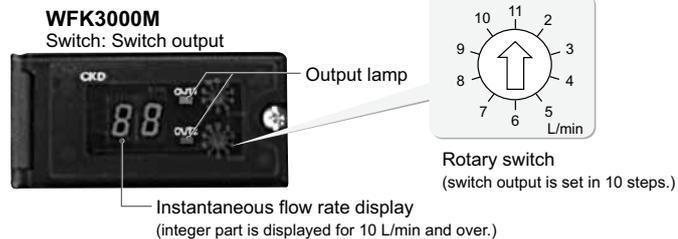
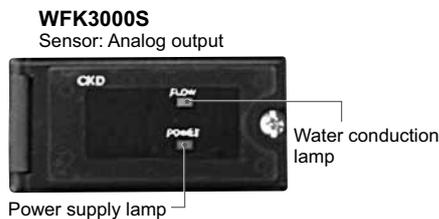
WFK3000

About 1/3 of our conventional models

(32 L/min)

#### ● Easy operation

Sensors will be ready for use as soon as wiring is completed. Setting of switch will be completed by simply turning the rotary switch.



#### ● Built-in water temperature measuring function

Sensors can incorporate the water temperature measuring function. Enabling water temperature measurement without additional work or space for installation. (Option)

#### ● Degree of protection IP65 or equivalent

Safe to use in food equipment or such other equipment that requires drip-proofing.

#### ● Reliable Karman vortex

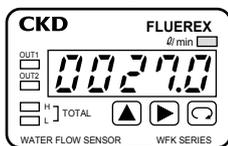
As the Karman vortex has no moving parts that the impeller type normally has, problems such as debris and rust in piping will not occur, which allows for use of industrial water or such low-quality water.

## WFK5000 to WFK7000

#### ■ Quick on-site flow rate check

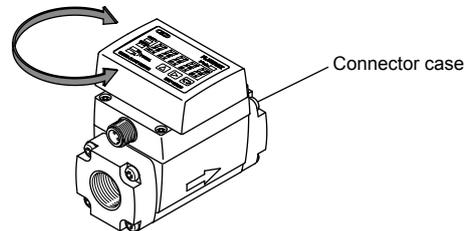
The display and sensor are housed in one compact body. The 5-digit digital display allows easy check of integrated value of the day. The integrated value for a longer period can also be displayed by switching the display.

Display of body



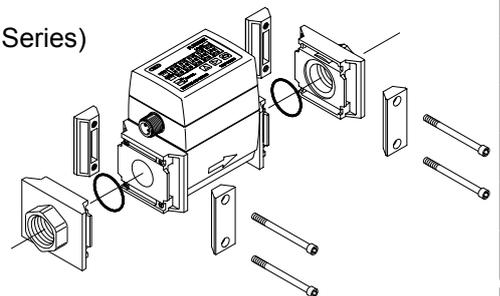
#### ■ Unrestricted installation

- The display can be rotated as desired within 270°. The mounting orientation will not affect checking of the flow rate.
- Connector wires can be drawn along the piping and organized well.



\* Be careful not to have the lead wires caught during the work.

#### ■ Modular design of pipe adaptors allows you to attach/detach the body without disconnecting the piping. (WFK6000 Series)



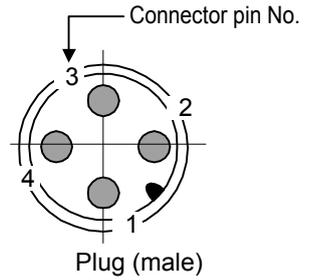
F.R.L
F (Filtr)
R (Reg)
L (Lub)
PresSW
Shutoff
SlowStart
FimResistFR
Oil-ProhR
MedPresFR
No Cu/PTFE FRL
Outdrs FR
F.R.L (Related)
CompFRL
LgFRL
PrecsR
VacF/R
Clean FR
ElecPneuR
AirBoost
SpdContr
Silncr
CheckV/other
Jnt/tube
AirUnt
PrecsCompn
Mech/ElecPresSw
ContactSW
AirSens
PresSW Cool
AirFloSens/Contr
WaterRtSens
TotAirSys (Total Air)
TotAirSys (Gamma)
RefrDry
DesicDry
HiPolymDry
MainFiltr
Dischrg etc
Ending

## WFK5000/6000/7000 Series

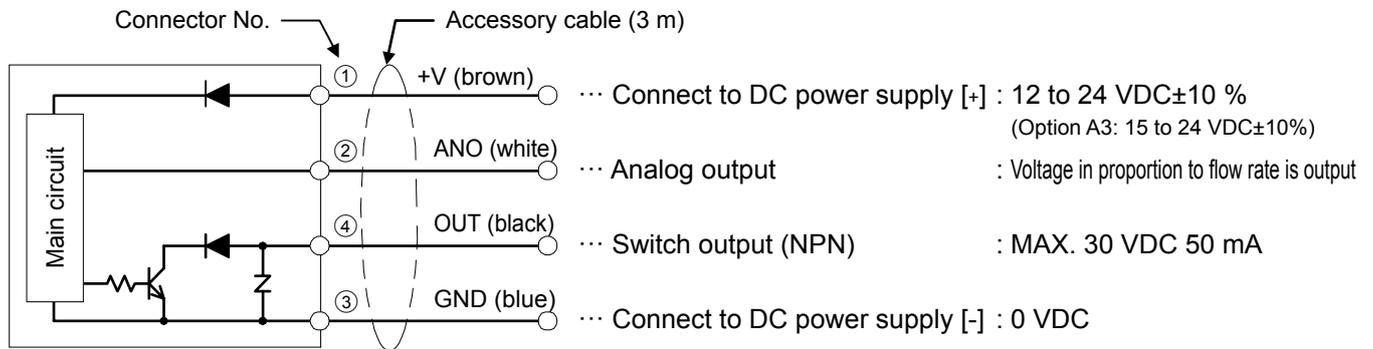
### Wiring method

F.R.L  
F (Filtr)  
R (Reg)  
L (Lub)  
PresSW  
Shutoff  
SlowStart  
FimResistFR  
Oil-ProhR  
MedPresFR  
No Cu/  
PTFE FRL  
Outdrs FR  
F.R.L  
(Related)  
CompFRL  
LgFRL  
PrecsR  
VacF/R  
Clean FR  
ElecPneuR  
AirBoost  
SpdContr  
Silncr  
CheckV/  
other  
Jnt/tube  
AirUnt  
PrecsCompn  
Mech/  
ElecPresSw  
ContactSW  
AirSens  
PresSW  
Cool  
AirFloSens/  
Contr  
WaterRtSens  
TotAirSys  
(Total Air)  
TotAirSys  
(Gamma)  
RefrDry  
DesicDry  
HiPolymDry  
MainFiltr  
Dischrg  
etc  
Ending

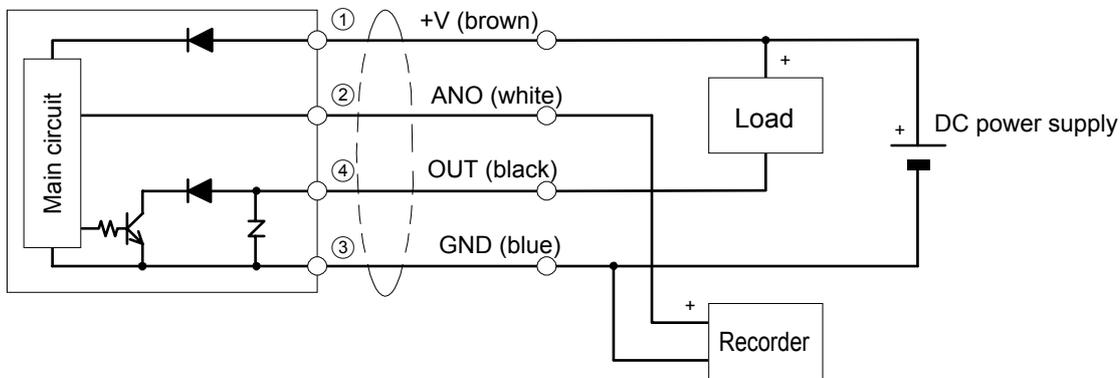
- Always read the safety precautions before wiring.
  - Connectors used are VA connectors (model No.: TM-4DSX3HG4) made by Correns Corporation. Specifications: For DC, 4-conductor 0.5 mm<sup>2</sup>
  - Option (analog output, switch output)
- |                                   |                                    |
|-----------------------------------|------------------------------------|
| Blank; (0 to 5 [V], NPN)          | -P ; (0 to 5 [V], PNP)             |
| -A1; (4 to 20 [mA])               | -PA2; (1 to 5 [V], PNP)            |
| -A2; (1 to 5 [V], NPN)            | -PA3; (0 to 10 [V], PNP)           |
| -A3; (0 to 10 [V], NPN)           | -PA4; (without analog output, PNP) |
| -A4; (without analog output, NPN) | -PA5; (2-point switch output, PNP) |
| -A5; (2-point switch output, NPN) |                                    |



#### 1) Blank, -A2, -A3, -A4 (switch output: NPN)

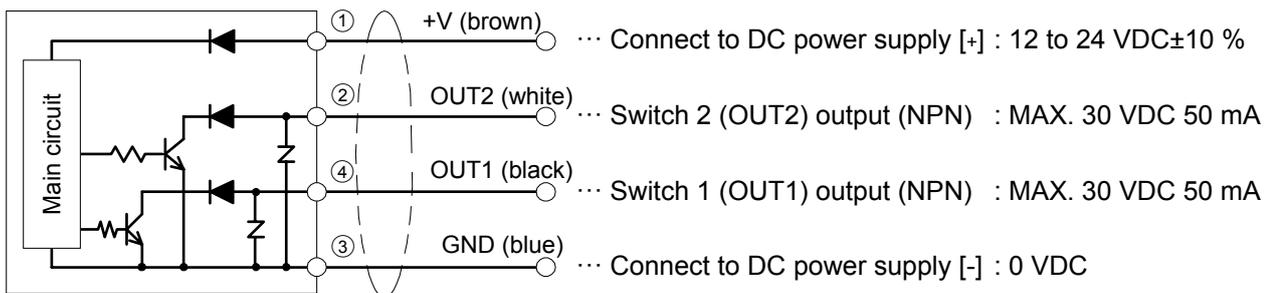


#### Example of connection to relay/resistance load/recorder

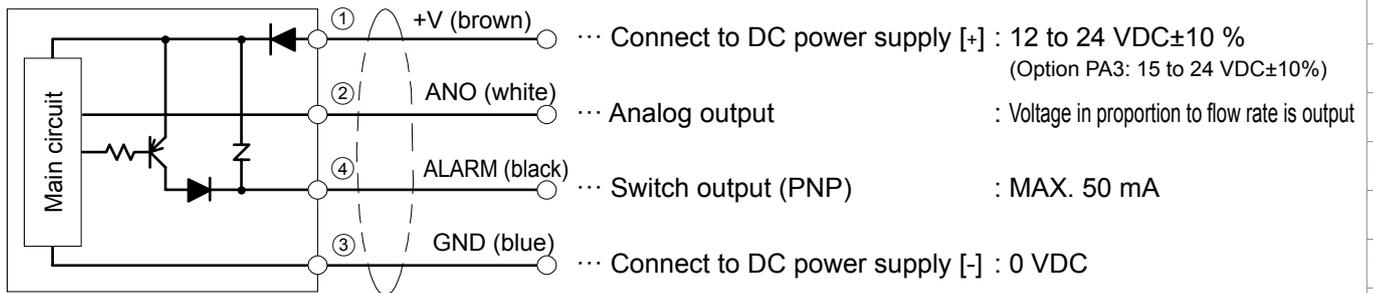


#### 2) -A5 (2-point switch output, NPN)

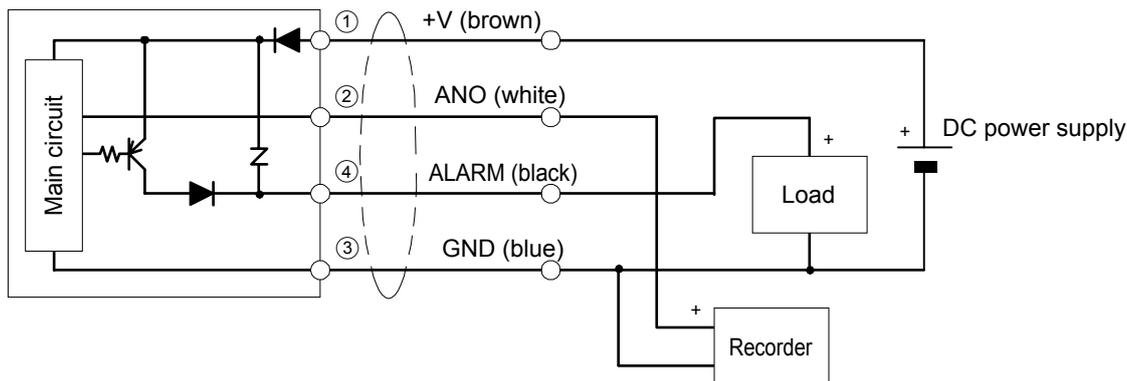
· Analog output is not available if 2-point switch output is selected.



#### 3) -P, -PA2, -PA3, -PA4 (Switch output: PNP)

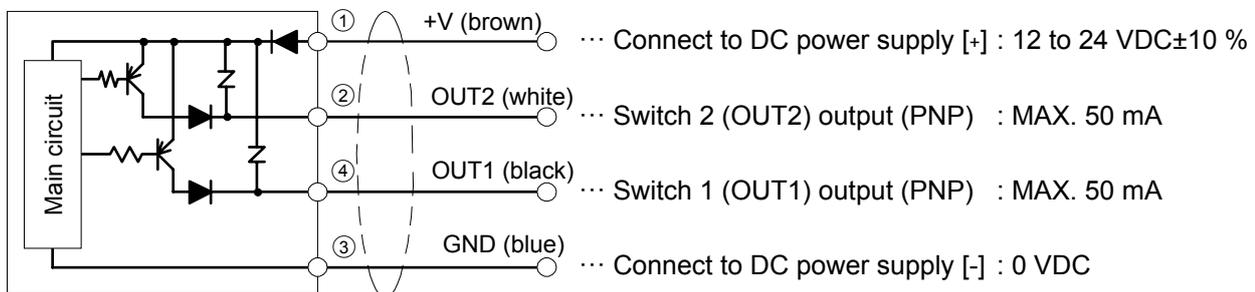


#### Example of connection to relay/resistance load/recorder



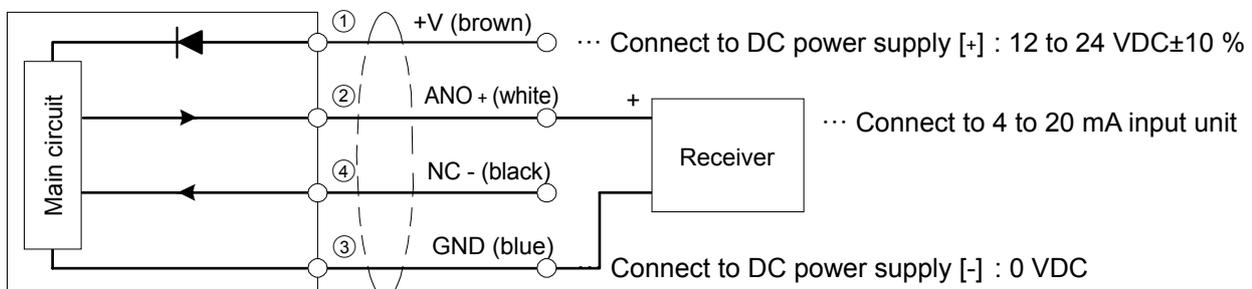
#### 4) -PA5 (2-point switch output, PNP)

· Analog output is not available if 2-point switch output is selected.



#### 5) -A1 (4 to 20 mA)

· Switch output is not available if 4 to 20 mA output is selected.



**\*Note**  
 When connecting two or more flow rate sensors to the upper-level input circuit (receiver), carefully prevent signal interference. (Refer to "3. Analog output AI (4 to 20 mA) connection" on page 1453.)

F.R.L
F (Filtr)
R (Reg)
L (Lub)
PresSW
Shutoff
SlowStart
FmResistFR
Oil-ProhR
MedPresFR
No Cu/ PTFE FRL
Outdrs FR
F.R.L (Related)
CompFRL
LgFRL
PrescR
VacF/R
Clean FR
ElecPneuR
AirBoost
SpdContr
Silncr
CheckV/ other
Jnt/tube
AirUnt
PresCompn
Mech/ ElecPresSw
ContactSW
AirSens
PresSW Cool
AirFloSens/ Contr
WaterRtSens
TotAirSys (Total Air)
TotAirSys (Gamma)
RefrDry
DesicDry
HiPolymDry
MainFiltr
Dischrg etc
Ending

## WFK5000/6000/7000 Series

- F.R.L
- F (Filtr)
- R (Reg)
- L (Lub)
- PresSW
- Shutoff
- SlowStart
- FimResistFR
- Oil-ProhR
- MedPresFR
- No Cu/  
PTFE FRL
- Outdrs FR
- F.R.L  
(Related)
- CompFRL
- LgFRL
- PrecsR
- VacF/R
- Clean FR
- ElecPneuR
- AirBoost
- SpdContr
- Silncr
- CheckV/  
other
- Jnt/tube
- AirUnt
- PrecsCompn
- Mech/  
ElecPresSw
- ContactSW
- AirSens
- PresSW  
Cool
- AirFloSens/  
Contr
- WaterRtSens
- TotAirSys  
(Total Air)
- TotAirSys  
(Gamma)
- RefrDry
- DesicDry
- HiPolymDry
- MainFiltr
- Dischrg  
etc
- Ending

### Functions

#### ● Output lamp

Indicates the switch output status.  
\* For OUT2, only when option A5 is selected

#### ● Unit lamp Integrating flow

[L]  
· Displays the lower digits of integrating flow. (Unit: L liter)  
[H]  
· Displays the higher digits of integrating flow. (Unit: L liter)

Max. 9 digits of integrating flow  
[H] Higher digits...09999 [L] Lower digits...99999

#### ● Unit lamp Instantaneous flow rate

· When the lamp is ON, the 5-digit digital display displays the instantaneous flow rate.

#### ● 5-digit digital display

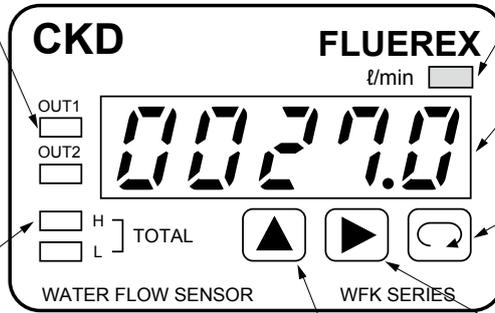
· Displays the instantaneous flow rate/integrating flow.  
[In write mode]  
· Displays the output setting value, etc.

#### ● Change key

[Measurement mode]  
· Switches the display between the instantaneous flow rate and integrating flow.  
[In write mode]  
· Use to confirm the setting.

#### ● Shift key

[Measurement mode]  
· Switches the display to the write mode when held down for 2 seconds.  
[In write mode]  
· Moves the blinking digit to the right.

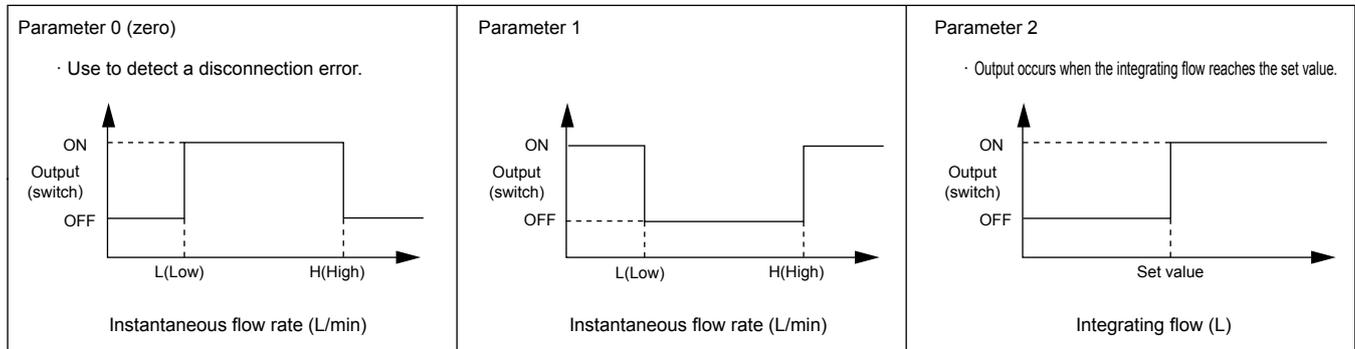


#### ● Up key

[Measurement mode]  
· Switches H and L of the integrating flow display.  
[In write mode]  
· Increases the blinking digits.

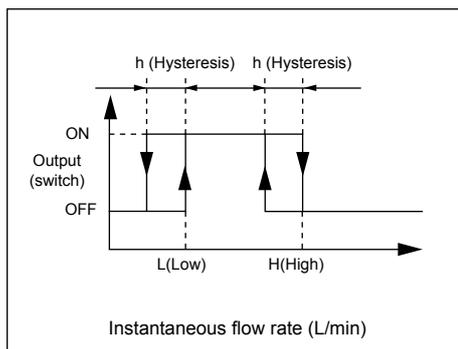
#### ● Switch parameter

· Three types of setting are available according to the application.



#### ● Hysteresis

· Set when the flow rate pulsates, causing the switch output to chatter.



#### ● To clear the integrating flow

- 1) In the write mode described on the right, clear with key operation.
- 2) Clear by turning the power OFF.

#### Note

- 1) When output (switch) is ON, the transistor is in conduction state.
- 2) For safety, set the output only when the upper level equipment is in stop state.
- 3) The settings of parameters 0 and 1 should satisfy the following conditions.

Otherwise operation cannot be guaranteed.

- $0 < L < H$
- $0 < (L-h) \leq L < (H-h)$

Note that the output is always OFF if  $L=H=h=0$  (factory default).

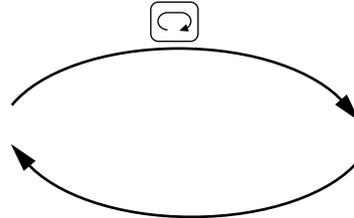
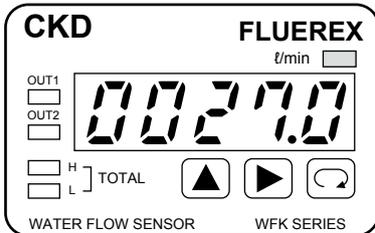
F.R.L
F (Filtr)
R (Reg)
L (Lub)
PresSW
Shutoff
SlowStart
FimResistFR
Oil-ProhR
MedPresFR
No Cu/ PTFE FRL
Outdrs FR
F.R.L (Related)
CompFRL
LgFRL
PrecsR
VacF/R
Clean FR
ElecPneuR
AirBoost
SpdContr
Silncr
CheckV/ other
Jnt/tube
AirUnt
PrecsCompn
Mech/ ElecPresSw
ContactSW
AirSens
PresSW Cool
AirFloSens/ Contr
WaterRtSens
TotAirSys (Total Air)
TotAirSys (Gamma)
RefrDry
DesicDry
HiPolymDry
MainFiltr
Dischrg etc
Ending

### Measurement mode

- Measures the instantaneous flow rate/integrating flow. (when powered on)

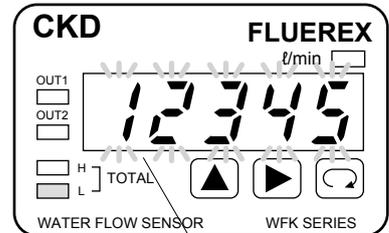
Holding down for 2 seconds confirms the setting: the blinking light will change to a steady light and the display will constantly show an integrated value. As the setting is retained even if the power is turned OFF, resetting is not necessary. To return to the instantaneous flow rate display, hold down for 2 seconds again.

Instantaneous flow rate display



In 10 seconds, the light goes from blinking to steady and the display automatically returns to the instantaneous flow rate display.

Temporary integrating flow display



Note) Integrating flow is displayed in integers.



Hold down for 2 seconds

### Write mode

- Set the switch output.

Note) In the example below, P (parameter) is set to 0, L (Low) to 10, H (High) to 20, and h (hysteresis) to 1 L/min.



Parameter setting

- Set the parameter with the Up key.

Note) L, H and h are not displayed if parameter 2 is selected. Refer to the instruction manual for details.



L (Low) setting

- Set the L (LOW) value with the Shift/Up keys.



H (High) setting

- Set the H (High) value with the Shift/Up keys.

Note) The OUT2 setting will appear for option A5 only. Refer to the instruction manual for details.



Hysteresis setting

- Set the h (hysteresis) value with the Shift/Up keys.



Clearing integrating value

- Hold down the Shift/Up keys together for 10 seconds to clear the integrating value.

To measurement mode

# Discontinue

FLUEREX flow sensor

## WFK5000 Series

(Standard)

● Flow rate range: 1.0 to 8.0/3.0 to 27.0 L/min



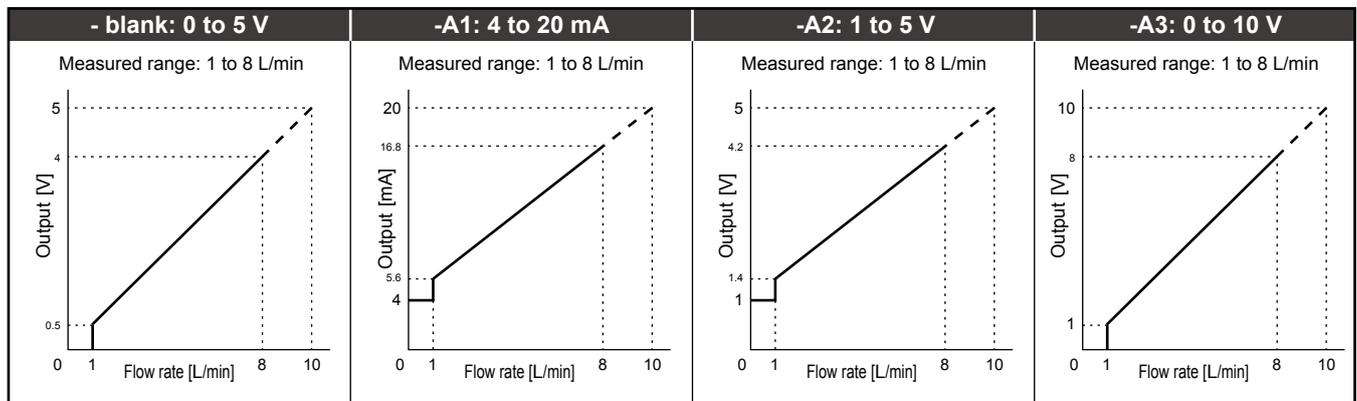
### Specifications

Descriptions		WFK5008-10	WFK5008-15	WFK5008-20	WFK5027-10	WFK5027-15	WFK5027-20
Specifications	Flow rate measured range L/min	1.0 to 8.0			3.0 to 27.0		
	Port size Rc	3/8	1/2	3/4	3/8	1/2	3/4
Specifications	Port material	Stainless steel: SCS13					
	Pressure loss MPa	0.050 (≈7.3 psi, 0.5 bar) or less (at 8.0 L/min)			0.045 (≈6.5 psi, 0.45 bar) or less (at 27.0 L/min)		
Working conditions	Applicable fluid	Clear water, industrial water					
	Max. working pressure MPa	1.0 (≈150 psi, 10 bar)					
	Proof pressure MPa	1.5 (≈220 psi, 15 bar)					
	Fluid temperature °C	1 (33.8°F) to 70 (158°F)					
	Ambient temperature °C	0 (32°F) to 50 (122°F) (85% RH or less)					
Display	5-digit LED display						
Integrating flow	Max. 9 digits;						
	however, H and L are split displayed Reset when powered off						
Output	Switch output	Number of points	1 point (NPN/PNP transistor open collector)				
		Rating	MAX 50 mA				
	Analog output	Internal voltage drop	(NPN) 2.0 V or less (PNP) 2.5 V or less				
		Accuracy	0 to 5 VDC (linear output) standard ±2.5% F.S. ±1 digit				
Switch output response time sec	Approx. 1.0 (Note)						
Power supply voltage	12 to 24 VDC ± 10% (max. 100 mA) For option A3: 15 to 24 VDC						
Cable	Accessory (3 m, 4-conductor, final diameter φ6, cable conductor 0.5 mm <sup>2</sup> , insulator O.D. φ1.9 mm, with connector)						
Mounting orientation	Unrestricted in vertical/horizontal direction						
Degree of protection	IP64 or equivalent						
Weight g	630	600	650	630	600	650	
Bracket weight g	60 (including screws)						

Note: When the switch is set to 70% of the normal flow rate (used), the time until the switch output occurs after the flow rate drops instantly to 0

### Analog output

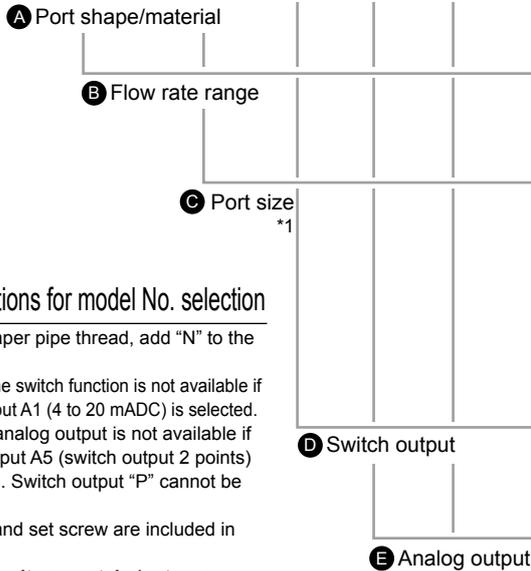
● WFK5008-\*\*



### Connecting load conditions

Descriptions	Blank [0 to 5 V]	-A1 [4 to 20 mA]	-A2 [1 to 5 V]	-A3 [0 to 10V]
Allowable load weight	50 kΩ or more	500 Ω or less	50 kΩ or more	50 kΩ or more

### How to order



### ⚠ Precautions for model No. selection

- \*1: For U.S. taper pipe thread, add "N" to the port size.
- \*2: Note that the switch function is not available if analog output A1 (4 to 20 mADC) is selected.
- \*3: Note that analog output is not available if analog output A5 (switch output 2 points) is selected. Switch output "P" cannot be selected.
- \*4: A bracket and set screw are included in option B.  
**If you order it separately (not as an option), specify the product name: bracket assembly and model No.: WF-FL-249969.**

### [Example of model No.]

#### WFK5027-15-PA3B

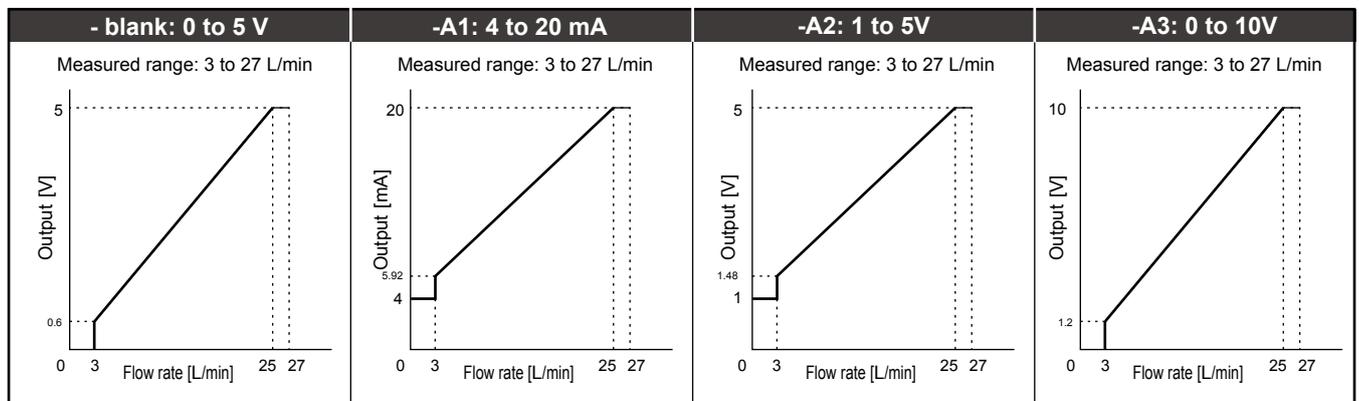
Model: FLUEREX flow sensor standard

- Ⓐ Port shape/material : Shape: female thread, material: stainless steel
- Ⓑ Flow rate range : 3 to 27 L/min
- Ⓒ Port size : Rc1/2
- Ⓓ Switch output : PNP transistor open collector
- Ⓔ Analog output : 0 to 10 VDC
- Ⓕ Bracket : Attached

Code	Content
<b>Ⓐ Port shape/material</b>	
5	Shape: female thread, material: stainless steel (SCS13)
<b>Ⓑ Flow rate range</b>	
008	1 to 8 L/min
027	3 to 27 L/min
<b>Ⓒ Port size</b>	
10	Rc3/8
15	Rc1/2
20	Rc3/4
10N	3/8NPT
15N	1/2NPT
20N	3/4NPT
<b>Ⓓ Switch output</b>	
Blank	NPN transistor open collector
P	PNP transistor open collector
<b>Ⓔ Analog output</b>	
Blank	0 to 5 VDC
A1	4 to 20 mADC *2
A2	1 to 5 VDC
A3	0 to 10 VDC
A4	Without analog output
A5	Switch output 2 points *3
<b>Ⓕ Bracket</b>	
Blank	None
B	Bracket attached (including mounting screws)

### Analog output

#### ● WFK5027-\*\*-\*\*



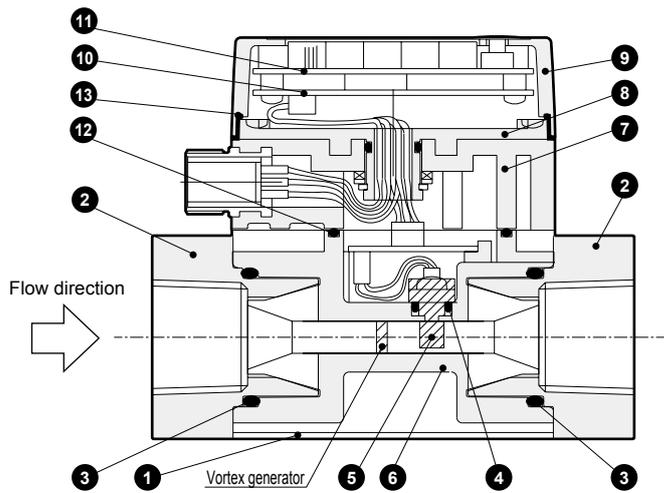
### Connecting load conditions

Descriptions	Blank [0 to 5 V]	- A1 [4 to 20 mA]	- A2 [1 to 5 V]	- A3 [0 to 10 V]
Allowable load weight	50 kΩ or more	500 Ω or less	50 kΩ or more	50 kΩ or more

F.R.L
F (Filtr)
R (Reg)
L (Lub)
PresSW
Shutoff
SlowStart
FimResistFR
Oil-ProhR
MedPresFR
No Cu/ PTFE FRL
Outdrs FR
F.R.L (Related)
CompFRL
LgFRL
PrescR
VacF/R
Clean FR
ElecPneuR
AirBoost
SpdContr
Silncr
CheckV/ other
Jnt/tube
AirUnt
PresCompn
Mech/ ElecPresSw
ContactSW
AirSens
PresSW Cool
AirFloSens/ Contr
WaterRtSens
TotAirSys (Total Air)
TotAirSys (Gamma)
RefrDry
DesicDry
HiPolymDry
MainFiltr
Dischrg etc
Ending

## WFK5000 Series

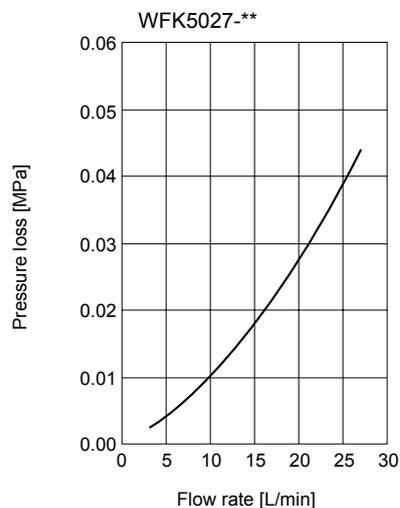
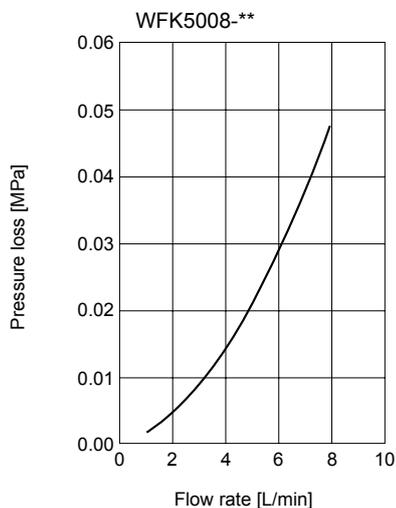
### F.R.L Internal structure and parts list



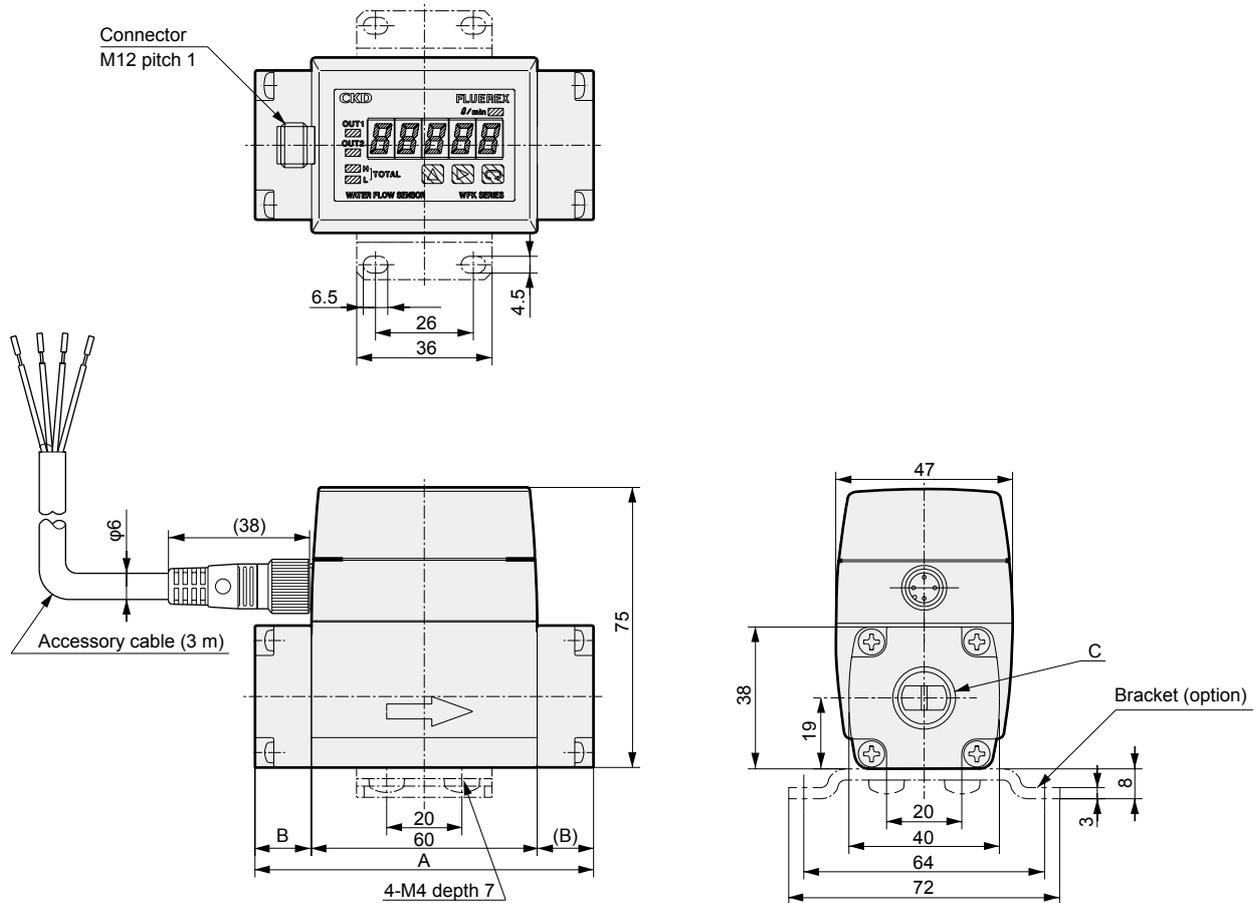
Cannot be disassembled

No.	Part name	Material		Quantity
1	Body	SCS13	Stainless steel casting	1
2	Attachment	SCS13	Stainless steel casting	2
3	O-ring	NBR	Nitrile rubber	2
4	O-ring	NBR	Nitrile rubber	1
5	Vortex detector	PPS resin (interior: piezo ceramic)		1
6	Sleeve	PPS resin		1
7	Connector case	ABS resin		1
8	Case B	PC/ABS alloy resin		1
9	Case A	ABS resin		1
10	CPU board	-		1
11	Display board	-		1
12	Sleeve packing	NBR	Nitrile rubber	1
13	Case packing	NBR	Nitrile rubber	1

### Pressure loss



### Dimensions



Model No.	A	B	C
WFK50**-10	90	15	Rc3/8
WFK50**-15	90	15	Rc1/2
WFK50**-20	105	22.5	Rc3/4
WFK50**-10N	90	15	3/8NPT
WFK50**-15N	90	15	1/2NPT
WFK50**-20N	105	22.5	3/4NPT

F.R.L
F (Filtr)
R (Reg)
L (Lub)
PresSW
Shutoff
SlowStart
FmResistFR
Oil-ProhR
MedPresFR
No Cu/ PTFE FRL
Outdrs FR
F.R.L (Related)
CompFRL
LgFRL
PrecsR
VacF/R
Clean FR
ElecPneuR
AirBoost
SpdContr
Silncr
CheckV/ other
Jnt/tube
AirUnt
PrecsCompn
Mech/ ElecPresSw
ContactSW
AirSens
PresSW Cool
AirFloSens/ Contr
WaterRtSens
TotAirSys (Total Air)
TotAirSys (Gamma)
RefrDry
DesicDry
HiPolymDry
MainFiltr
Dischrg etc
Ending

# Discontinue

FLUEREX flow sensor

## WFK6000 Series

(Modular connection)

● Flow rate range: 1.0 to 8.0/3.0 to 27.0 L/min



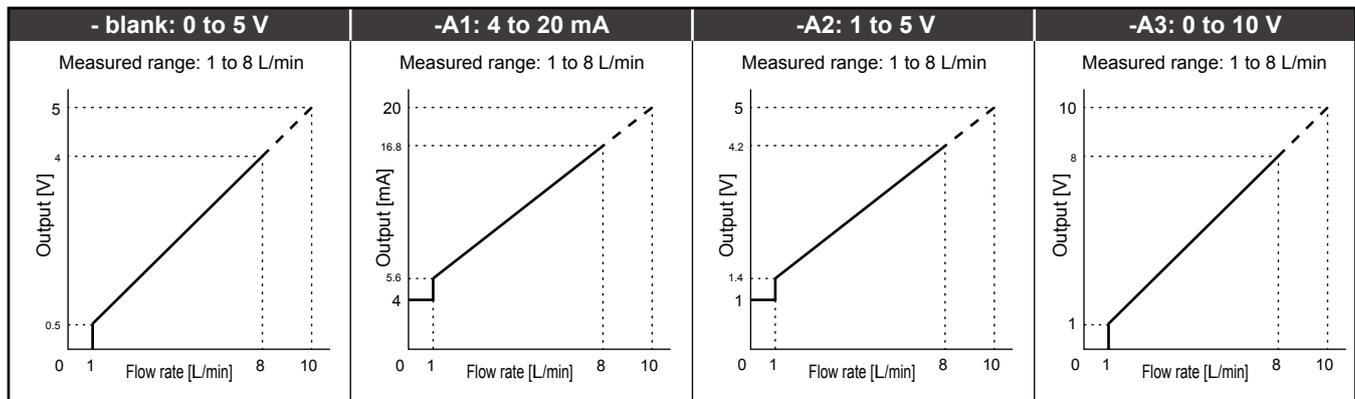
### Specifications

Descriptions		WFK6008-10	WFK6008-15	WFK6008-20	WFK6027-10	WFK6027-15	WFK6027-20
Specifications	Flow rate measured range L/min	1.0 to 8.0			3.0 to 27.0		
	Port size Rc	3/8	1/2	3/4	3/8	1/2	3/4
	Port material	Stainless steel: SCS13					
	Pressure loss MPa	0.050 (≈7.3 psi, 0.5 bar) or less (at 8.0 L/min)			0.045 (≈6.5 psi, 0.45 bar) or less (at 27.0 L/min)		
Specification conditions	Applicable fluid	Clear water, industrial water					
	Max. working pressure MPa	1.0 (≈150 psi, 10 bar)					
	Proof pressure MPa	1.5 (≈220 psi, 15 bar)					
	Fluid temperature °C	1 (33.8°F) to 70 (158°F)					
	Ambient temperature °C	0 (32°F) to 50 (122°F) (85% RH or less)					
Display		5-digit LED display					
Integrating flow		Max. 9 digits; however, H and L are split displayed Reset when powered off					
Output	Switch output	Number of points	1 point (NPN/PNP transistor open collector)				
		Rating	MAX 50 mA				
	Analog output	Internal voltage drop	(NPN) 2.0 V or less (PNP) 2.5 V or less				
		Accuracy	±2.5% F.S. ±1 digit				
Switch output response time sec		Approx. 1.0 (Note)					
Power supply voltage		12 to 24 VDC ± 10% (max. 100 mA) For option A3: 15 to 24 VDC					
Cable		Accessory (3 m, 4-conductor, final diameter φ6, cable conductor 0.5 mm <sup>2</sup> , insulator O.D. φ1.9 mm, with connector)					
Mounting orientation		Unrestricted in vertical/horizontal direction					
Degree of protection		IP64 or equivalent					
Weight	g	830	810	850	830	810	850
Bracket weight	g	60 (including screws)					

Note: When the switch is set to 70% of the normal flow rate (used), the time until the switch output occurs after the flow rate drops instantly to 0

### Analog output

● WFK6008-\*\*



### Connecting load conditions

Descriptions	Blank [0 to 5 V]	- A1 [4 to 20 mA]	- A2 [1 to 5 V]	- A3 [0 to 10 V]
Allowable load weight	50 kΩ or more	500 Ω or less	50 kΩ or more	50 kΩ or more

### How to order



**A** Port shape/material

**B** Flow rate range

**C** Port size  
\*1

**D** Switch output

**E** Analog output

**F** Bracket  
\*4

### ⚠ Precautions for model No. selection

\*1: For U.S. taper pipe thread, add "N" to the port size.

\*2: Note that the switch function is not available if analog output A1 (4 to 20 mADC) is selected.

\*3: Note that analog output is not available if analog output A5 (switch output 2 points) is selected. Switch output "P" cannot be selected.

\*4: A bracket and set screw are included in option B. **If you order it separately (not as an option), specify the product name: bracket assembly and model No.: WF-FL-249969.**

### [Example of model No.]

#### WFK6027-15-PA3B

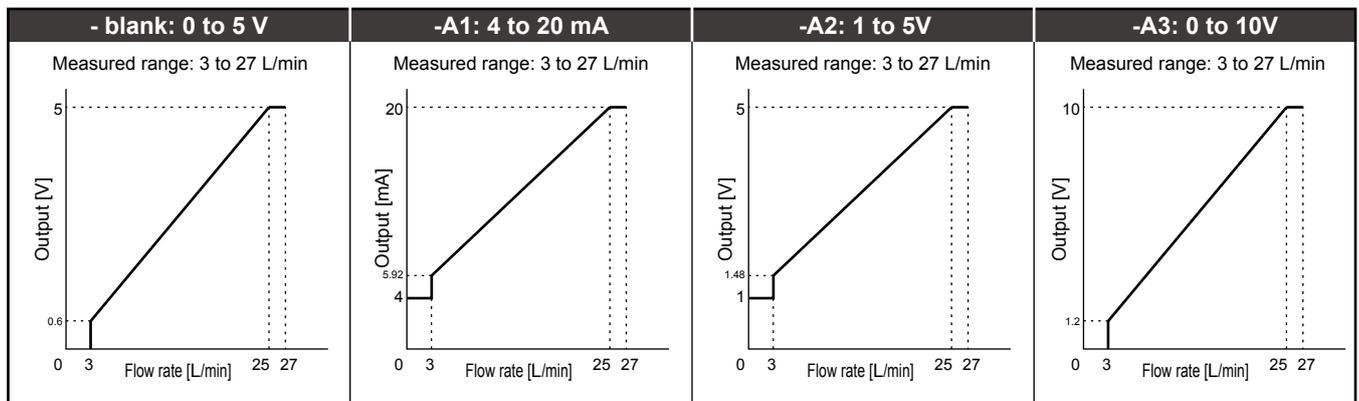
Model: FLUEREX flow sensor module

- A** Port shape/material : Shape: female thread, material: stainless steel
- B** Flow rate range : 3 to 27 L/min
- C** Port size : Rc1/2
- D** Switch output : PNP transistor open collector
- E** Analog output : 0 to 10 VDC
- F** Bracket : Attached

Code	Content
<b>A Port shape/material</b>	
6	Shape: female thread, material: stainless steel (SCS13)
<b>B Flow rate range</b>	
008	1 to 8 L/min
027	3 to 27 L/min
<b>C Port size</b>	
10	Rc3/8
15	Rc1/2
20	Rc3/4
10N	3/8NPT
15N	1/2NPT
20N	3/4NPT
<b>D Switch output</b>	
Blank	NPN transistor open collector
P	PNP transistor open collector
<b>E Analog output</b>	
Blank	0 to 5 VDC
A1	4 to 20 mADC *2
A2	1 to 5 VDC
A3	0 to 10 VDC
A4	Without analog output
A5	Switch output 2 points *3
<b>F Bracket</b>	
Blank	None
B	Bracket attached (including mounting screws)

### Analog output

● WFK6027-\*\*



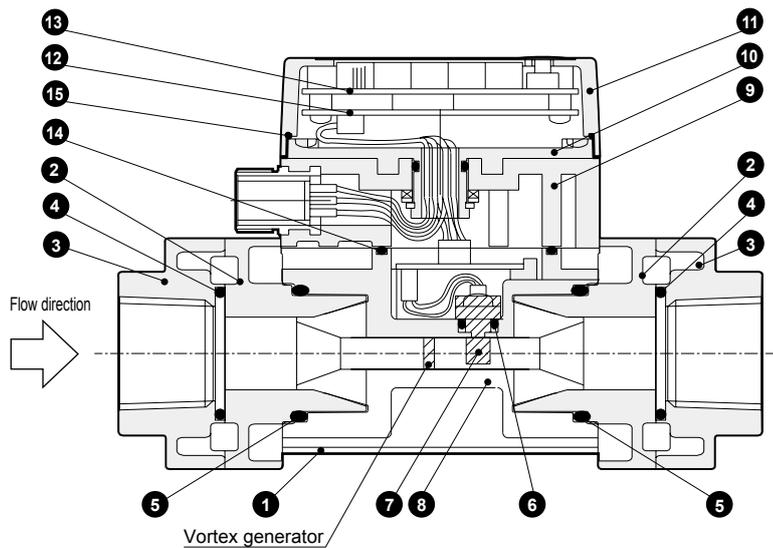
### Connecting load conditions

Descriptions	Blank [0 to 5 V]	- A1 [4 to 20 mA]	- A2 [1 to 5 V]	- A3 [0 to 10 V]
Allowable load weight	50 kΩ or more	500 Ω or less	50 kΩ or more	50 kΩ or more

F.R.L
F (Filtr)
R (Reg)
L (Lub)
PresSW
Shutoff
SlowStart
FimResistFR
Oil-ProhR
MedPresFR
No Cu/ PTFE FRL
Outdrs FR
F.R.L (Related)
CompFRL
LgFRL
PrescR
VacF/R
Clean FR
ElecPneuR
AirBoost
SpdContr
Silncr
CheckV/ other
Jnt/tube
AirUnt
PrescCompn
Mech/ ElecPresSw
ContactSW
AirSens
PresSW Cool
AirFloSens/ Contr
WaterRtSens
TotAirSys (Total Air)
TotAirSys (Gamma)
RefrDry
DesicDry
HiPolymDry
MainFiltr
Dischrg etc
Ending

## WFK6000 Series

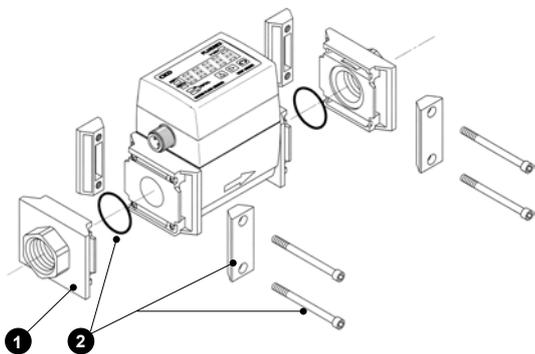
### F.R.L Internal structure and parts list



Cannot be disassembled

No.	Part name	Material	Quantity	No.	Part name	Material	Quantity
1	Body	SCS13 Stainless steel casting	1	9	Connector case	ABS resin	1
2	Attachment K	SCS13 Stainless steel casting	2	10	Case B	PC/ABS alloy resin	1
3	Attachment	SCS13 Stainless steel casting	2	11	Case A	ABS resin	1
4	O-ring	NBR Nitrile rubber	2	12	CPU board	-	1
5	O-ring	NBR Nitrile rubber	2	13	Display board	-	1
6	O-ring	NBR Nitrile rubber	1	14	Sleeve packing	NBR Nitrile rubber	1
7	Vortex detector	PPS resin (interior: piezo ceramic)	1	15	Case packing	NBR Nitrile rubber	1
8	Sleeve	PPS resin	1				

### Modular assembly



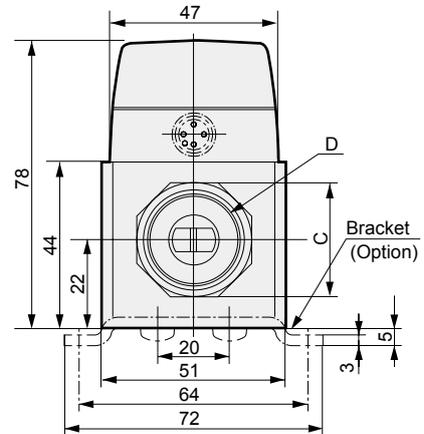
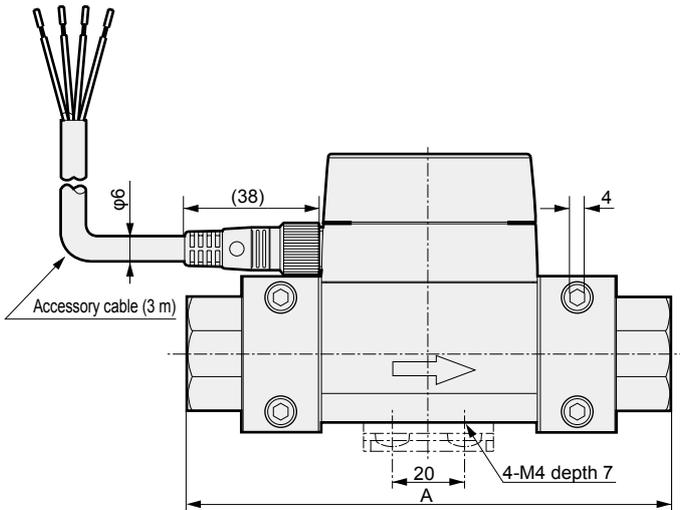
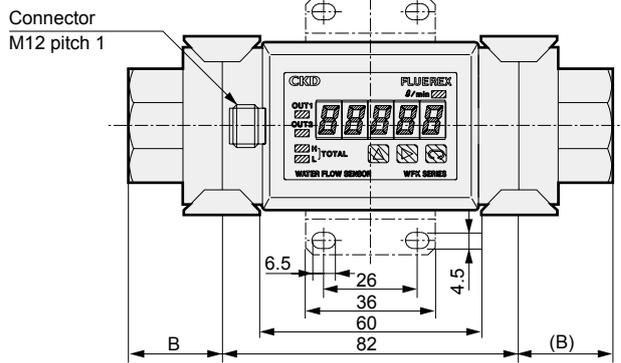
Model No.	Port size	(1) Attachment	(2) Joiner set
WFK60**-10	Rc3/8	WF-FL-290810	WF-FL-298234 (common)
WFK60**-15	Rc1/2	WF-FL-290811	
WFK60**-20	Rc3/4	WF-FL-290812	
WFK60**-10N	3/8NPT	WF-FL-290813	
WFK60**-15N	1/2NPT	WF-FL-290814	
WFK60**-20N	3/4NPT	WF-FL-290815	

\* The model numbers of attachment and joiner set are for one side only. If replacing pieces of both sides, specify 2 as the quantity.

### Dimensions

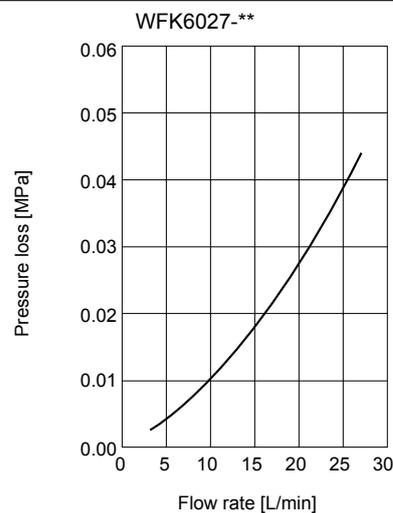
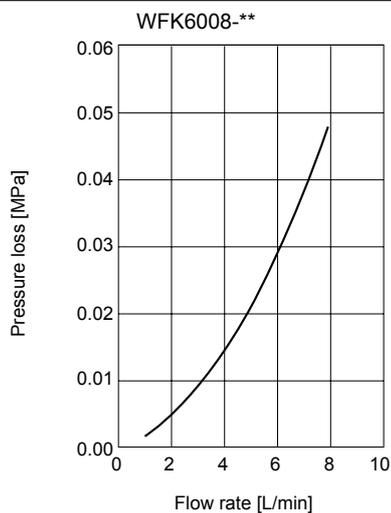


- F.R.L
- F (Filtr)
- R (Reg)
- L (Lub)
- PresSW
- Shutoff
- SlowStart
- FimResistFR
- Oil-ProhR
- MedPresFR
- No Cu/PTFE FRL
- Outdrs FR
- F.R.L (Related)
- CompFRL
- LgFRL
- PrecsR
- VacF/R
- Clean FR
- ElecPneuR
- AirBoost
- SpdContr
- Silncr
- CheckV/other
- Jnt/tube
- AirUnt
- PrecsCompn
- Mech/ElecPresSw
- ContactSW
- AirSens
- PresSW Cool
- AirFloSens/Contr
- WaterRtSens
- TotAirSys (Total Air)
- TotAirSys (Gamma)
- RefrDry
- DesicDry
- HiPolymDry
- MainFiltr
- Dischrg etc
- Ending



Model No.	A	B	C	D
WFK60**-10	122	20	24 (hexagon)	Rc3/8
WFK60**-15	122	20	27 (hexagon)	Rc1/2
WFK60**-20	134	26	32 (octagon)	Rc3/4
WFK60**-10N	122	20	24 (hexagon)	3/8NPT
WFK60**-15N	122	20	27 (hexagon)	1/2NPT
WFK60**-20N	134	26	32 (octagon)	3/4NPT

### Pressure loss



# Discontinue

FLUEREX flow sensor

## WFK7000 Series

(Large flow rate)

● Flow rate range: 10 to 50 / 20 to 100 / 40 to 200 L/min



### Specifications

1 MPa = 10 bar

Descriptions		WFK7050-20	WFK7050-25	WFK7100-25	WFK7100-32	WFK7200-32	WFK7200-40
Specifications	Flow rate measured range L/min	10 to 50		20 to 100		40 to 200	
	Port size Rc	3/4	1	1	1 1/4	1 1/4	1 1/2
Working conditions	Port material	Stainless steel: SCS13					
	Pressure loss MPa	0.050 (≈7.3 psi) or less (at 50 L/min)		0.050 (≈7.3 psi) or less (at 100 L/min)		0.050 (≈7.3 psi) or less (at 200 L/min)	
	Applicable fluid	Clear water, industrial water					
	Max. working pressure MPa	1.0 (≈150 psi, 10 bar)					
	Proof pressure MPa	1.5 (≈220 psi, 15 bar)					
	Fluid temperature °C	1 (33.8°F) to 70 (158°F)					
Display	Ambient temperature °C	0 (32°F) to 50 (122°F) (85% RH or less)					
	Display	5-digit LED display					
Integrating flow		Max. 9 digits; however, H and L are split displayed Reset when powered off					
Output	Switch output	Number of points	1 point (NPN/PNP transistor open collector)				
		Rating	MAX 50 mA				
		Internal voltage drop	(NPN) 2.0 V or less (PNP) 2.5 V or less				
	Analog output	0 to 5 VDC (linear output) standard					
Accuracy		±2.5% F.S. ±1 digit					
Alarm output responsiveness sec		Approx. 1.0 (Note)					
Power supply voltage		12 to 24 VDC ± 10% (max. 100 mA) For option A3: 15 to 24 VDC					
Cable		Accessory (3 m, 4-conductor, final diameter φ6, cable conductor 0.5 mm <sup>2</sup> , insulator O.D. φ1.9 mm, with connector)					
Mounting orientation		Unrestricted in vertical/horizontal direction					
Degree of protection		IP64 or equivalent					
Weight g		4400	4200	4000	4000	3800	
Bracket weight g		94 g (including screws)					

Note: When the switch is set to 70% of the normal flow rate (used), the time until the switch output occurs after the flow rate drops instantly to 0

- F.R.L
- F (Filtr)
- R (Reg)
- L (Lub)
- PresSW
- Shutoff
- SlowStart
- FimResistFR
- Oil-Prohr
- MedPresFR
- No Cu/ PTFE FRL
- Outdrs FR
- F.R.L (Related)
- CompFRL
- LgFRL
- PrecsR
- VacFR
- Clean FR
- ElecPneur
- AirBoost
- SpdContr
- Silncr
- CheckV/ other
- Jnt/tube
- AirUnt
- PrecsCompn
- Mech/ ElecPresSw
- ContactSW
- AirSens
- PresSW Cool
- AirFloSens/ Contr
- WaterRtSens
- TotAirSys (Total Air)
- TotAirSys (Gamma)
- RefrDry
- DesicDry
- HiPolymDry
- MainFiltr
- Dischrg etc
- Ending

### How to order

**WFK 7 050 - 20 - P A3 B**

**A** Port shape/material

**B** Flow rate range

**C** Port size  
\*1

**D** Switch output

**E** Analog output

**F** Bracket  
\*4

### ⚠ Precautions for model No. selection

\*1: For U.S. taper pipe thread, add "N" to the port size.

\*2: Note that the switch function is not available if analog output A1 (4 to 20 mADC) is selected.

\*3: Note that analog output is not available if analog output A5 (switch output 2 points) is selected. Switch output "P" cannot be selected.

\*4: A bracket and set screw are included in option B.

**If you order it separately (not as an option), specify the product name: bracket assembly 2 and model No.: WF-FL-251256.**

### [Example of model No.]

## WFK7050-20-PA3B

Model: FLUEREX flow sensor large flow rate

**A** Port shape/material: Shape: female thread, material: stainless steel

**B** Flow rate range : 10 to 50 L/min

**C** Port size : Rc3/4

**D** Switch output : PNP transistor/open collector

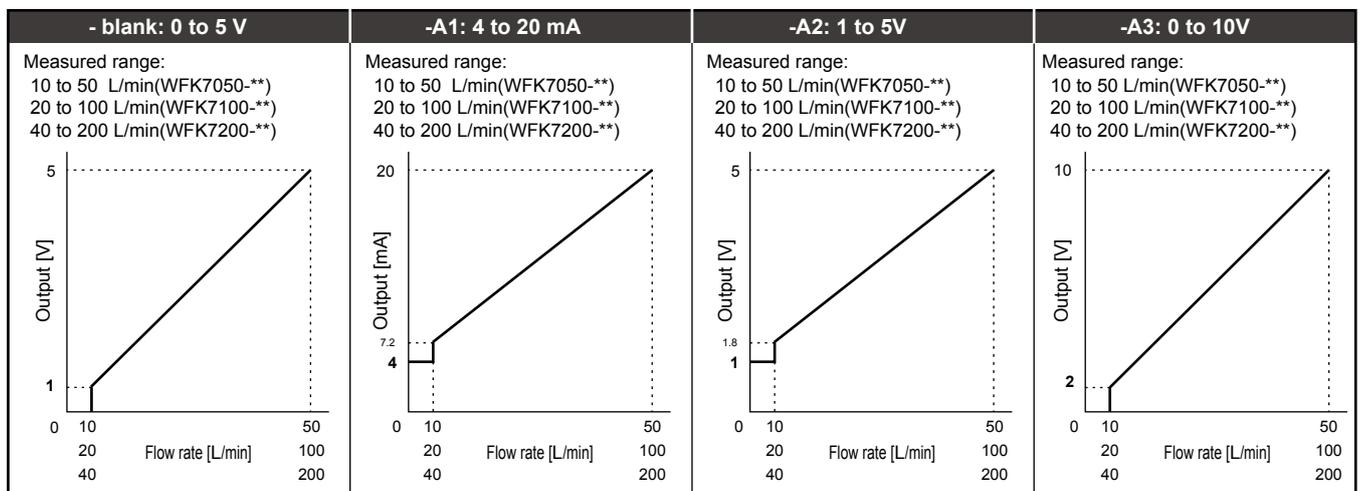
**E** Analog output : 0 to 10 VDC

**F** Bracket : Attached

Code	Content			
<b>A Port shape/material</b>				
7	Shape: female thread, material: stainless steel (SCS13)			
<b>B Flow rate range</b>				
050	10 to 50 L/min			
100	20 to 100 L/min			
200	40 to 200 L/min			
<b>C Port size</b>				
	Flow rate range	050	100	200
20	Rc3/4	●	-	-
25	Rc1	●	●	-
32	Rc1 1/4	-	●	●
40	Rc1 1/2	-	-	●
20N	3/4NPT	●	-	-
25N	1NPT	●	●	-
32N	1 1/4NPT	-	●	●
40N	1 1/2NPT	-	-	●
<b>D Switch output</b>				
Blank	NPN transistor open collector			
P	PNP transistor open collector			
<b>E Analog output</b>				
Blank	0 to 5 VDC			
A1	4 to 20 mADC	*2		
A2	1 to 5 VDC			
A3	0 to 10 VDC			
A4	Without analog output			
A5	Switch output 2 points	*3		
<b>F Bracket</b>				
Blank	None			
B	Bracket attached (including mounting screws)			

### Analog output

#### ● WFK7050-\*/WFK7100-\*/WFK7200-\*



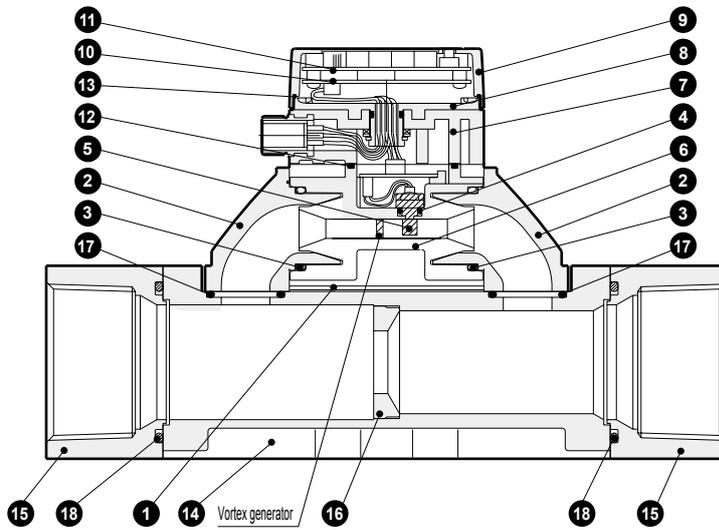
### Connecting load conditions

Descriptions	Blank [0 to 5 V]	- A1 [4 to 20 mA]	- A2 [1 to 5 V]	- A3 [0 to 10 V]
Allowable load weight	50 kΩ or more	500 Ω or less	50 kΩ or more	50 kΩ or more

F.R.L
F (Filtr)
R (Reg)
L (Lub)
PresSW
Shutoff
SlowStart
FmResistFR
Oil-ProhR
MedPresFR
No Cu/ PTFE FRL
Outdrs FR
F.R.L (Related)
CompFRL
LgFRL
PrecsR
VacF/R
Clean FR
ElecPneuR
AirBoost
SpdContr
Silncr
CheckV/ other
Jnt/tube
AirUnt
PrecsCompn
Mech/ ElecPresSw
ContactSW
AirSens
PresSW Cool
AirFloSens/ Contr
WaterRtSens
TotAirSys (Total Air)
TotAirSys (Gamma)
RefrDry
DesicDry
HiPolymDry
MainFiltr
Dischrg etc
Ending

## WFK7000 Series

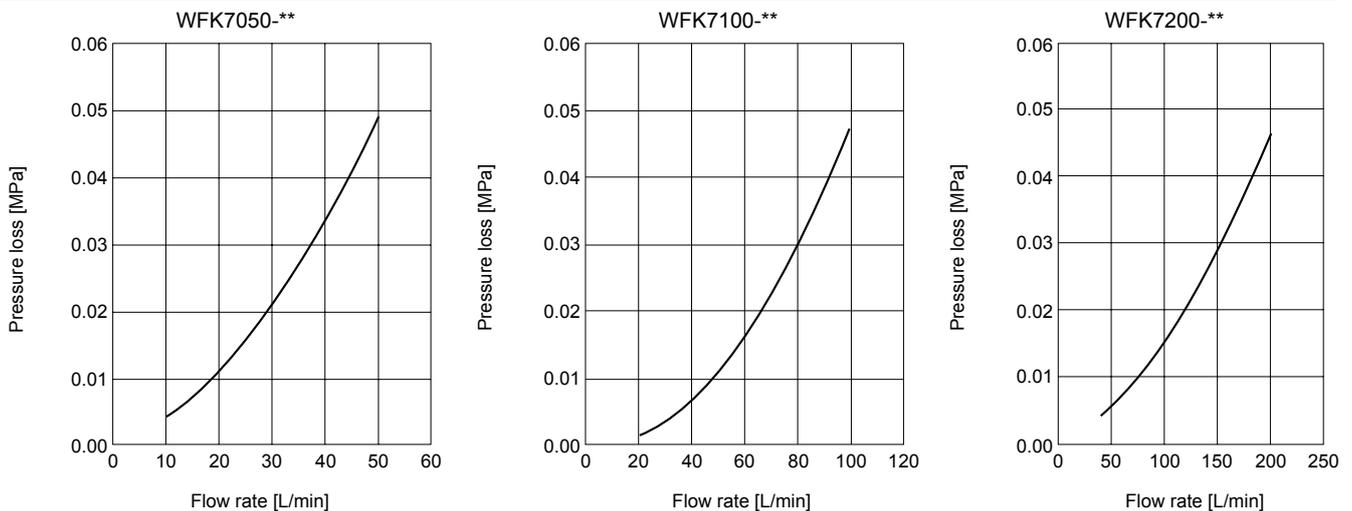
### F.R.L Internal structure and parts list



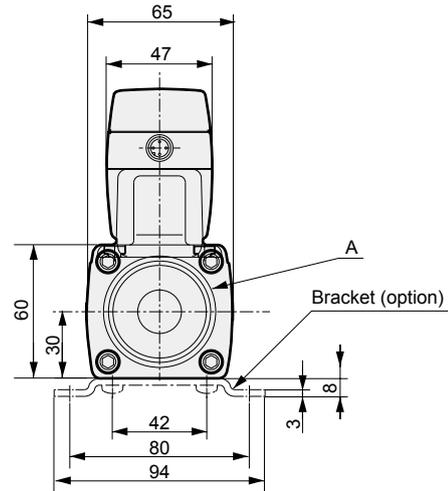
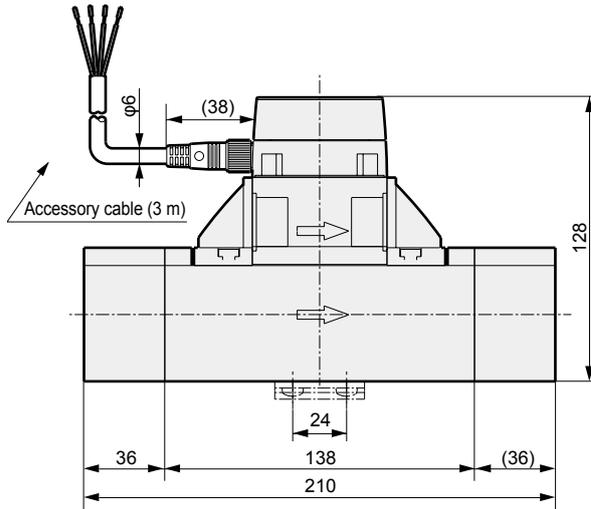
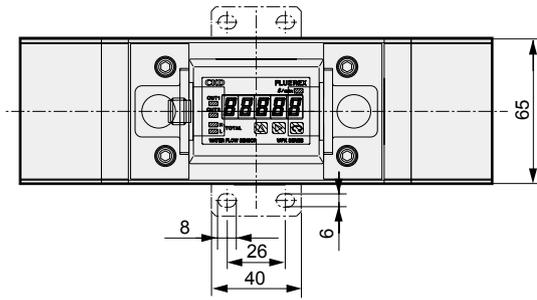
Cannot be disassembled

No.	Part name	Material	Quantity	No.	Part name	Material	Quantity
1	Body	SCS13 Stainless steel casting	1	10	CPU board	-	1
2	Sub-attachment	SCS13 Stainless steel casting	2	11	Display board	-	1
3	O-ring	NBR Nitrile rubber	2	12	Sleeve packing	NBR Nitrile rubber	1
4	O-ring	NBR Nitrile rubber	1	13	Case packing	NBR Nitrile rubber	1
5	Vortex detector	PPS resin (interior: piezo ceramic)	1	14	Main body	SCS13 Stainless steel casting	1
6	Sleeve	PPS resin	1	15	Main attachment	SCS13 Stainless steel casting	2
7	Connector case	ABS resin	1	16	Orifice	SUS304 Stainless steel	1
8	Case B	PC/ABS resin	1	17	O-ring	NBR Nitrile rubber	2
9	Case A	ABS resin	1	18	O-ring	NBR Nitrile rubber	2

### Pressure loss



Dimensions



Model No.	A
WFK7050-20	Rc3/4
WFK7050-25	Rc1
WFK7100-25	Rc1
WFK7100-32	Rc1 1/4
WFK7200-32	Rc1 1/4
WFK7200-40	Rc1 1/2
WFK7050-20N	3/4NPT
WFK7050-25N	1NPT
WFK7100-25N	1NPT
WFK7100-32N	1 1/4NPT
WFK7200-32N	1 1/4NPT
WFK7200-40N	1 1/2NPT

F.R.L
F (Filtr)
R (Reg)
L (Lub)
PresSW
Shutoff
SlowStart
FimResistFR
Oil-ProhR
MedPresFR
No Cu/ PTFE FRL
Outdrs FR
F.R.L (Related)
CompFRL
LgFRL
PrecsR
VacF/R
Clean FR
ElecPneuR
AirBoost
SpdContr
Silncr
CheckV/ other
Jnt/tube
AirUnt
PrecsCompn
Mech/ ElecPresSw
ContactSW
AirSens
PresSW Cool
AirFloSens/ Contr
WaterRtSens
TotAirSys (Total Air)
TotAirSys (Gamma)
RefrDry
DesicDry
HiPolymDry
MainFiltr
Dischrg etc
Ending

### Mounting, installation and adjustment

- F.R.L
- F (Filtr)
- R (Reg)
- L (Lub)
- PresSW
- Shutoff
- SlowStart
- FimResistFR
- Oil-ProhR
- MedPresFR
- No Cu/ PTFE FRL
- Outdrs FR
- F.R.L (Related)
- CompFRL
- LgFRL
- PrecsR
- VacF/R
- Clean FR
- ElecPneur
- AirBoost
- SpdContr
- SiIncr
- CheckV/ other
- Jnt/tube
- AirUnt
- PresCompn
- Mech/ ElecPresSw
- ContactSW
- AirSens
- PresSW Cool
- AirFloSens/ Contr
- WaterRtSens
- TotAirSys (Total Air)
- TotAirSys (Gamma)
- RefrDry
- DesicDry
- HiPolymDry
- MainFiltr
- Dischrg etc
- Ending

#### 1. Wiring

##### **⚠ DANGER**

- Use with power supply voltage and output in the specified range.  
Applying a voltage that is outside of the specified range may cause malfunction, damage to the sensor, electrical shock, and/or fire. Do not use any load that exceeds the rated output. Using such a load may result in damage to the output part or fire.

##### **⚠ WARNING**

- Check the line color and terminal number when connecting wires.  
While an overcurrent protection circuit for the output transistor, a protection circuit for erroneous wiring and diodes for preventing reverse connection are implemented, these do not protect against all incorrect wiring. Incorrect wiring can result in malfunction, failure, or damage to the sensor. Check the instruction manual for line colors and terminal numbers in order to ensure correct wiring.

- Ensure that wires are properly insulated.  
Check that wires do not come into contact with other circuits, that no ground faults occur, and that the insulator between terminals is not defective. Otherwise, overcurrent may flow into the sensor, causing damage.

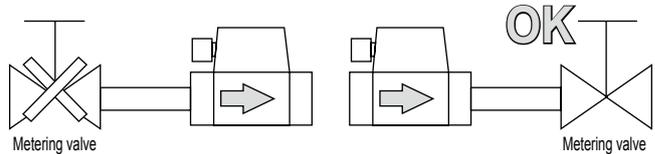
##### **⚠ CAUTION**

- Keep the cable away from all noise sources, including power distribution wires. Noise can cause malfunctions.
- Keep unused wires from coming into contact with other wires.
- Do not short-circuit the output transistor.  
When a load is short-circuited, overcurrent protection circuit is triggered to prevent damage to the output transistor; however, if this state persists, the output transistor could be damaged.  
**Overcurrent protection: Approx.70 mA**
- Do not use a load that can produce surge voltage.  
While an element that protects against surge is inserted, repeated exposure to surges can lead to damage. Use relays and solenoid valves that are equipped with surge absorption elements. If there is a surge source on the same power supply line, similarly implement surge protection.
- Make sure that the lead wire is free of repeated bends and tension. This may lead to disconnection.

#### 2. Piping

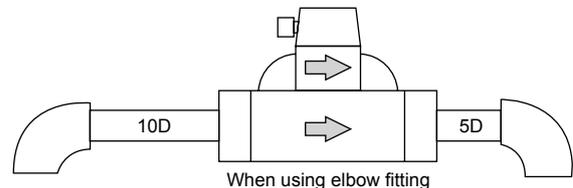
##### **⚠ CAUTION**

- Pipes can be installed in any orientation, vertical, horizontal, etc. Note that pipes should be installed so that the fluid constantly fills the piping while it flows through the pipes. When installing a pipe vertically, making the fluid flow upward can reduce the influence of air bubbles inside.
- If a pipe is narrowed just before the flow rate sensor, or if there is a valve or other restricting component on the primary side, cavitation occurs inside the pipe, preventing accurate measurement. For this reason, such piping should be installed on the secondary side of the sensor. Cavitation...(Vapor cavities that form due to the static pressure at end points, such as a ship propeller, dropping below the vapor pressure of the water. Otherwise, reduced efficiency or screw damage may result.)

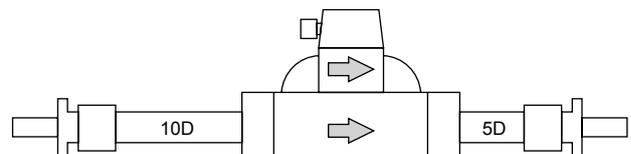


However, operating the pump with the secondary-side valve closed may cause the flow rate sensor to detect pressure waves from the pump, resulting in incorrect indication. If this occurs, install the valve on the primary side. When doing so, ensure that a straight pipe with a diameter of 10 times and over the bore size is installed between the valve and the flow rate sensor.

- When using an elbow or bush in the piping, provide straight piping sections of at least 10D on the IN side and 5D on the OUT side when using a WFK7000 Series model. Note that bore size change by bush should be within one size. Note that without a straight pipe, measurement accuracy can be compromised due to disturbances in the flow rate and/or pressure distribution. (Straight pipes are not necessary for the WFK3000, 5000 and 6000 Series. However, it is recommended that a straight pipe is installed to ensure stable measurements.)



When using elbow fitting



When using bush fitting

\* "D" here indicates the inner diameter of the piping material. Refer to the table below for specific values.

Bore size	Rc3/4 (20A)	Rc1 (25A)	Rc1 1/4 (32A)	Rc1 1/2 (40A)
5D	100 mm	125 mm	160 mm	200 mm
10D	200 mm	250 mm	320 mm	400 mm

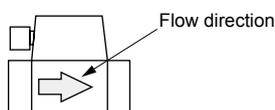
- Use appropriate torque to tighten the pipes when connecting them.
  - The purpose is to prevent water leakage and screw damage.
  - First tighten the bolts by hand to ensure that the threads are not damaged, then use a tool.

#### [Recommended values]

Port thread	Tightening torque N·m
Rc3/8	31 to 33
Rc1/2	41 to 43
Rc3/4	62 to 65
Rc1	83 to 86
Rc1 1/4	97 to 100
Rc1 1/2	104 to 108

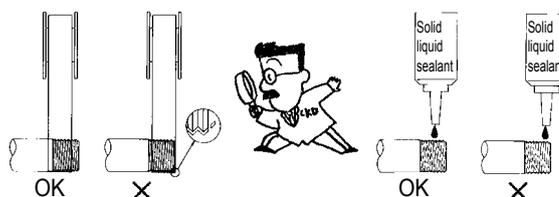


- When installing piping, align the fluid flow direction to the direction of the arrow marked on the body. Connecting the pipe in the wrong direction causes the flow rate to be indicated as less than the actual flow rate or zero.



- Before installing piping, clean the pipes to remove foreign matter, cutting chips, residual testing water, etc.

- Make sure that no force is applied to the resin parts when piping.
- Make sure that no sealing tape or adhesive enters the pipes when connecting the piping.
- If there is significant difference between the ambient temperature and the fluid temperature, condensation occurs, which can enter wired parts, causing operation failure. If condensation should occur, ensure that the mounting orientation of the flow rate sensor is horizontal and the display is facing upward.
- When connecting pipes, wrap sealing tape in the opposite direction from the threading, from the inside position to within 2 mm from the pipe end.
  - If sealing tape protrudes from the pipe threads, it could be cut when screwing the bolts in. This could cause the tape to enter the solenoid valve, causing failures.



- When using a liquid sealant, make sure it does not adhere to resin parts. Otherwise resin parts could be damaged, which is dangerous.

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Outdrs FR
F.R.L (Related)
CompFRL
LgFRL
PrescR
VacF/R
Clean FR
ElecPneuR
AirBoost
SpdContr
Silncr
CheckV/ other
Jnt/tube
AirUnt
PresCompn
Mech/ ElecPresSw
ContactSW
AirSens
PresSW Cool
AirFloSens/ Contr
WaterRtSens
TotAirSys (Total Air)
TotAirSys (Gamma)
RefrDry
DesicDry
HiPolymDry
MainFiltr
Dischrg etc
Ending

### Use/maintenance

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- F (Filtr)
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- MedPresFR
- No Cu/ PTFE FRL
- Outdrs FR
- F.R.L (Related)
- CompFRL
- LgFRL
- PrecsR
- VacFR
- Clean FR
- ElecPneuR
- AirBoost
- SpdContr
- Silncr
- CheckV/ other
- Jnt/tube
- AirUnt
- PresCompn
- Mech/ ElecPresSw
- ContactSW
- AirSens
- PresSW Cool
- AirFloSens/ Contr
- WaterRtSens
- TotAirSys (Total Air)
- TotAirSys (Gamma)
- RefrDry
- DesicDry
- HiPolymDry
- MainFiltr
- Dischrg etc
- Ending

#### 1. Common

#### CAUTION

■ If a problem occurs during operation, immediately turn the power OFF, stop use, and contact your dealer. The display may become warm (approximately 40°C), but this is not an abnormality.

■ Hardware check and other internal settings are performed during the first two seconds or so after turning ON the power. Display and output do not function normally during this period. Particularly, if a transistor output is used in the control of an interlock circuit, an abnormal stop may occur. Mask the output during this period.

■ When changing the output set value, turn OFF the equipment first in order to prevent unexpected operation in the control system equipment.

■ Do not apply excessive rotational force to the display. The display rotates 270 degrees; turn it to your most convenient position. However, forcing the display to turn by using excessive force can cause the stopper to break.  
(Excluding WFK3000 Series)

■ Ensure proper operation through periodic inspections.

■ When removing the equipment, shut OFF power, make sure that no water pressure is applied, and take other safety precautions before the removal.

■ Do not disassemble or modify, as this may cause malfunction.

■ For cleaning, use mild detergent or any other non-polluting cleaning agent.

#### 2. Applicable fluid

#### CAUTION

■ Follow the precautions below for the applicable fluids to be measured. If the following water quality standards are not met, performance may be compromised.

■ The water quality of the applicable fluid should be as per the “Guideline of Water Quality for Refrigeration and Air Conditioning Equipment” (Water quality standard: Cooling system - Circulating type - Circulating water) provided by the Japan Refrigeration and Air Conditioning Industry Association.

Descriptions	Chem form	Unit	Water quality standard
pH	-	pH(25°C)	6.5 to 8.2
Electrical conductivity	-	mS/m(25°C)	0.2 to 80 *1
Chloride ion	Cl <sup>-</sup>	mg/L(ppm)	200 or less
Sulfate ion	SO <sub>4</sub> <sup>2-</sup>	mg/L(ppm)	200 or less
Acid consumption (pH 4.8)	CaCO <sub>3</sub>	mg/L(ppm)	100 or less
Total hardness	CaCO <sub>3</sub>	mg/L(ppm)	200 or less
Calcium hardness	CaCO <sub>3</sub>	mg/L(ppm)	150 or less
Ionized silica	SiO <sub>2</sub>	mg/L(ppm)	50 or less
Iron	Fe	mg/L(ppm)	1.0 or less
Copper	Cu	mg/L(ppm)	0.3 or less
Sulfide ion	S <sup>2-</sup>	mg/L(ppm)	Not detected
Ammonium ion	NH <sub>4</sub> <sup>+</sup>	mg/L(ppm)	1.0 or less
Residue chlorine	Cl	mg/L(ppm)	0.3 or less
Free carbonic acid	CO <sub>2</sub>	mg/L(ppm)	4.0 or less
Stability index	-	-	6.0 to 7.0

\*1 Electrical conductivity should be 0.2 [mS/m] and over.  
For use in the range of 0.05 to 0.2 [mS/m], consult with CKD.  
Do not use for ultrapure water, i.e. water with electrical conductivity below 0.05 [mS/m].