Various models of rotor type Digital Flow Switches are newly launched.

- In addition to the conventional models, stainless body models for high flow rates are added.
- Power relay output models with increased contact capacity and open collector output models are added.
- Improved noise resistance

Note) The predictive function used in DFS2 is not provided for this DFS3 Series.

Specifications

Flow rate level	Low	Medium			Large	
Type	Plastic body	Plastic body (Standard type)	Metallic body	Stainless steel body	Metallic body	Stainless steel body
Detection method	Magnetic proximity/Iron proximity	Magnetic proximity/Iron proximity	Magnetic proximity			
Model	DFS3-1002/5002	DFS3-1000/5000	DFS3-1200	DFS3-1500	DFS3-2000	DFS3-2500
Material of body	Polyacetal (glass-filled)	Polyacetal (glass-filled)	BC6 (Nickel-plated)	SCS14	BC6 (Nickel-plated)	SCS14
Working fluid	Water					
Port size	Rc3/8				Rc3/4	
Pressure range	0 to 1.0 MPa					
Proof test pressure	1.5 MPa					
Ambient temperature	0 to +50℃ (No condensing)					
Fluid temperature	0 to +70℃ (No freezing)					
Flow rate range	0.2 to 2.5 ℓ /min	Flow rate range A: 0.5 to 5ℓ/min, Flow rate range B: 2.5 to 25ℓ/min			12 to 120ℓ/min	
Reading accuracy	±20%fs	±5%fs				
Hysteresis	5% or less				7% or less	
Alarm output response time	Approx. 500 ms					
Installing direction	Free					
Flowing direction	Both directions					
Number of output points	1c contact Relay output×1 point or open collector output×2 points (1 point for each of OUT-HIGH and OUT-LOW)					
Rated power supply	24 V DC or 100 V AC					

Notes) ● Use the flow switch within the flow rate range.
● The values shown in the table apply to cases of measurement of flow rate of tap water (20℃). The flow rate range varies depending on the viscosity of the fluid to be measured.

Electric Specifications (Common)

Supply voltage		24 V DC	100 V AC
Allowable voltage range		±10% (absolute max. rating 30 V DC)	±10%
Power consumption		700 m W or less	3 VA or less
Cable		VCTF 8-core, 0.3 mm², 1 m	Power supply: VCTF 3-core, 0.5 mm², 1 m Signal: VCTF 5-core, 0.5 mm², 1 m
Frequency output	Type	Photocoupler output	
	Max. allowable voltage	50 V DC	
	Load current	4 mA or less (output residual voltage 0.5 V or less)	

Output Specifications (Open collector output)

Type	Photocoupler×2 (OUT-HIGH/OUT-LOW) OUT-HIGH: On when flow rate is more than setting OUT-LOW: ON when flow rate is less than setting
Max. allowable voltage	50 V DC
Load current	10 mA (output residual voltage 0.8 V or less)

Output Specifications (Relay output)

Contact structure	1c×1 (Relay is driven when flow rate becomes lower than setting.)
Rated control capacity (at resistive load)	30 V DC 5A/250 V AC 5A
Max. allowable power (at resistive load)	150 W (DC)/1250 VA (AC)
Max. allowable voltage	125 V DC/300 V AC
Max. applicable current	5 A
Min. applicable load	5 V DC 10mA
Insulation resistance between contacts	1000 MΩ or more on 500-VDC insulation resistance tester
Withstand voltage between contacts	1000 V AC/for 1 min
Electrical life	100,000 times or more (at rated load, switching frequency of 30 times/min)

Configuration Table

Model	Type		Power supply		Cable length	
			100 V AC	24 V DC	1 m	3 m
DFS3-1000	Plastic body (medium flow rate)	Magnetic proximity type	○	○	○	△
DFS3-5000		Iron proximity type				
DFS3-1002	Plastic body (low flow rate)	Magnetic proximity type	△	△	△	△
DFS3-5002		Magnetic proximity type				
DFS3-1200	Metallic body (medium flow rate)	Magnetic proximity type	△	○	○	△
DFS3-1500	Stainless steel body (medium flow rate)	Magnetic proximity type	△	○	○	△
DFS3-2000	Metallic body (high flow rate)	Magnetic proximity type	△	○	○	△
DFS3-2500	Stainless steel body (high flow rate)	Magnetic proximity type	△	○	○	△

○: Standard product △: Semi-standard product

● How to order

The item enclosed by broken line needs not to be entered, if unnecessary. Semi-standard product

DFS3 – 10 0 0 – 24 V DC T A L – 25

(1) Model (2) Type (3) Flow rate (4) Supply voltage (5) Output spec (6) Piping adapter (7) Cable length (8) Flow rate specified for order for combination

Symbol	Flow rate	Material of body	Detection
10	Medium	Plastic	Magnet
12	Medium	Metal	Magnet
15	Medium	Stainless steel	Magnet
20	Large	Metal	Magnet
25	Large	Stainless steel	Magnet
50	Medium	Plastic	Iron

0 Medium or high flow rate
2 Low flow rate (with low-flow piping adapter)
Note) 2 low flow rate" can be specified only for the plastic bodies.

24 V DC
100 V AC

Relay output
T Open collector output

Piping adapters unnecessary
A With piping adapters
Note) Only plastic bodies are provided with piping adapters.

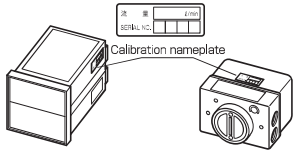
1 m (standard)
L 3 m (semi-standard)

5 ℓ(0.5 to 5 ℓ)
25 25 ℓ(2.5 to 25 ℓ)
120 120 ℓ(12 to 120 ℓ)
Note) Enter only when placing an order for a combination of flow switch and DFM2.

How to order a combination of flow switch and Digital Flow Meter DFM2

DFM2–1000– 25

5 ℓ(0.5 to 5 ℓ)
25 25 ℓ(2.5 to 25 ℓ)
120 120 ℓ(12 to 120 ℓ)
Note) Enter only when placing an order for a combination of flow switch and DFM2.



Accessories (parts for plastic body type DFS3-1000 and 5000)

- Piping adapter set
  (For prevention of breakage of ports of DFS3-1000 and 5000)
  Part number: DF-AP
  Contents: Piping adapter (material: copper alloy/C3604B): 2 pcs
  Sealing O-ring (P-10A): 2 pcs

- Low flow piping adapter set
  (Set for converting medium-flow type DFS3-1000 or 5000 to low-flow type)
  Part number: DF-FW2
  Contents: Piping adapter (material: copper alloy): 1 pc
  Low flow piping adapter (material: copper alloy/C3504B): 1 pc
  Low flow nozzle (material: copper alloy/BC6): 1 pc
  Sealing O-ring (P-10A): 2 pcs
  O-ring for nozzle (1AS-6): 1 pc
  Note) For DFS3-1200 and 1500, contact us.

Flow setting procedures

■When setting with a flow meter

①Reduce the flow rate in the piping to the set flow rate.

②Then, turn the flow rate setting trimmer on the front panel of the flow switch with a slotted screwdriver to switch the LED from green to red.

■When setting without a flow meter

Use the following graphs when determining an approximate flow rate without using a flow meter.

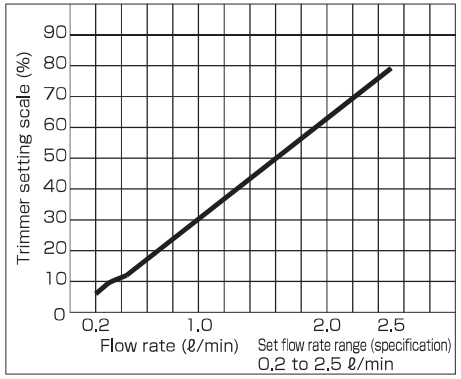
Example: To output an alarm using DFS3-1000 when the flow rate is about 10 ℓ/min or less

The intersection of the line of the set flow rate of 10 ℓ/min and the line of flow rate range B is A. Read the percentage specified for the point A, 35%.

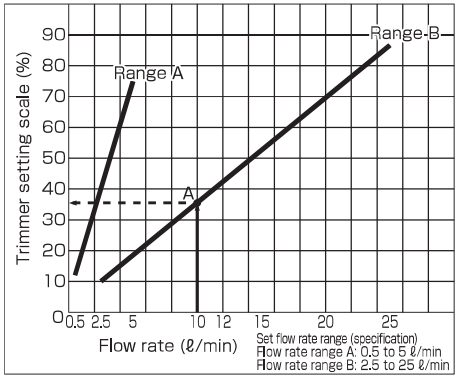
Set the flow switch trimmer to 35%, and an alarm will be output when the flow rate is approx. 10 ℓ/min or less.

Trimmer Setting Scale-Flow Characteristic Graphs (fluid: tap water at 20℃)

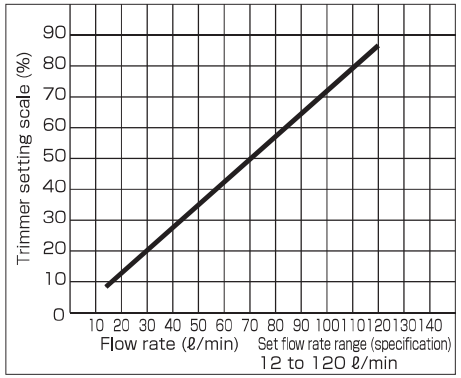
DFS3-1002, 5002(low flow rate type)



DFS3-1000, 1200, 1500, 5000(medium flow rate type)

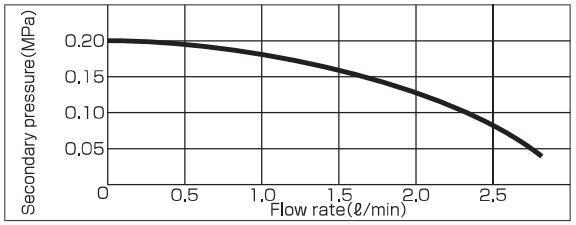


DFS3-2000, 2500(large flow rate type)

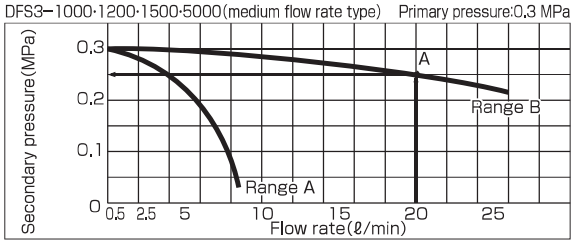


Flow Rate-Pressure Loss Characteristic Curves (fluid: tap water at 20℃)

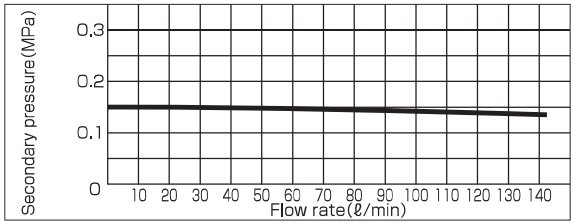
DFS3-1002·5002(low flow rate type) Primary pressure:0.2 MPa



DFS3-1000·1200·1500·5000(medium flow rate type) Primary pressure:0.3 MPa



DFS3-2000·2500(large flow rate type) Primary pressure:0.15 MPa



How to read the graph

The flow rate-pressure loss characteristic curves shown left are used to determine the pressure loss of DFS3 Series Digital Flow Switches.

Example: Determine the pressure loss caused when water is fed at 20 ℓ/min using the flow rate range B of DFS3-1000, 1200, 1500 or 5000.

Answer: The intersection of the line of the flow rate of 20 ℓ/min and the flow curve is A.

Read the value of the secondary pressure at the point A.

Where,

(Pressure loss)=(primary pressure)−(secondary pressure)

Therefore, =0.3 MPa−0.25 MPa

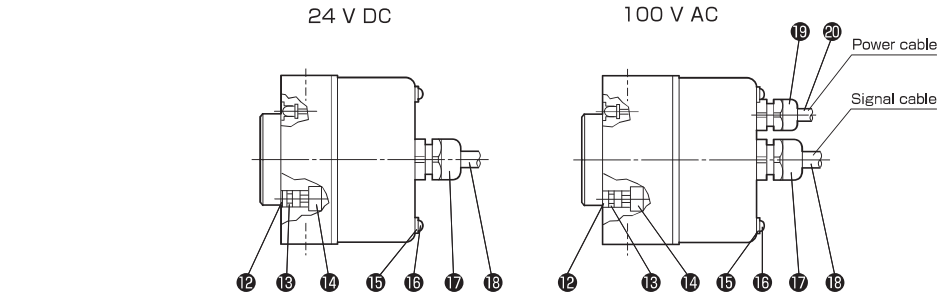
=0.05 MPa

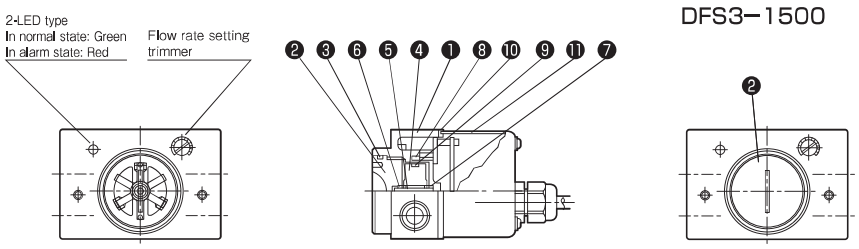
Accordingly, to feed water at a flow rate of 20 ℓ/min, the pressure difference between the upstream and downstream sides of the flow switch is 0.05 MPa.

This indicates that the primary pressure (pump discharge pressure) must be 0.05 MPa or more. However, actually, determine the pump discharge pressure based on the pressure loss on the whole piping.

Note) The characteristics vary depending on the viscosity and temperature of the fluid used.

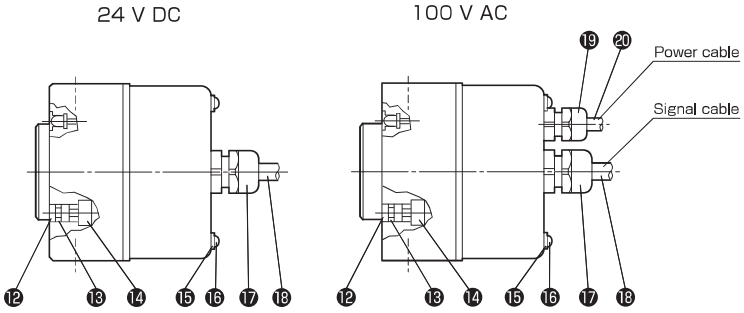
DFS3−1000·1200·1500·5000

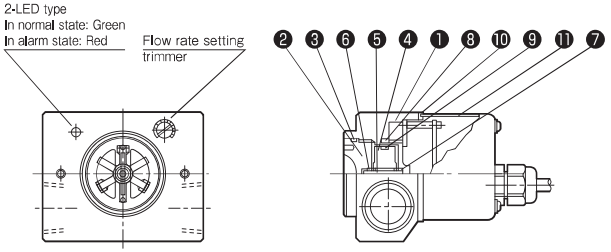




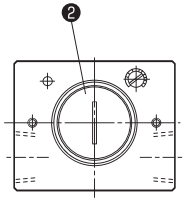
DFS3−1500

DFS3−2000·2500





DFS3−2500



List of Parts in Contact with Liquid

No	Name	Name				
		DFS3-1000·5000	DFS3-1200	DFS3-1500	DFS3-2000	DFS3-2500
❶	Body	Polyacetal (glass-filled)	Bronze casting (nickel-plated)	Stainless steel:SCS14	Bronze casting (nickel-plated)	Stainless steel:SCS14
❷	Rotor cap	Polyether sulfone		Stainless steel:SUS316	Polyether sulfone	Stainless steel:SUS316
❸	Rotor cap gasket	Nitrile rubber		ETFE	Nitrile rubber	ETFE
❹	Rotor	Polyacetal		ETFE	Polyacetal	ETFE
❺	Rotor pin	Alumina ceramic				
❻	Rotor cap bearing	Alumina ceramic				
❼	Rotor bearing	Alumina ceramic				

Parts List

No	Name	Material
❽	Hall IC (magnetic proximity type)	—
	High-frequency oscillating switch (iron proximity type)	—
❾	Magnet (magnetic proximity type)	—
	Iron (iron proximity type)	—
❿	Cover gasket	Nitrile rubber
⓫	Cover	Cold rolled steel
⓬	Trimmer cap	Synthetic resin
⓭	Trimmer cap gasket	Nitrile rubber

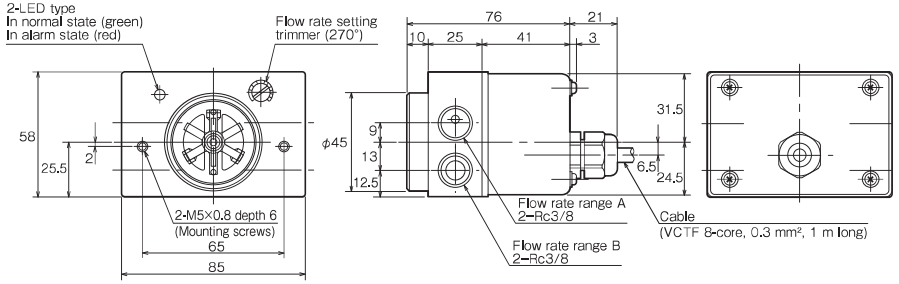
No	Name	Material
⓮	Trimmer	—
⓯	Screw gasket	—
⓰	Screw	—
⓱	Cable gland	—
⓲	Cabtyre cable	VCTF 1 m
⓳	Cable gland	—
⓴	Cabtyre cable	VCTF 1 m

Weight Table

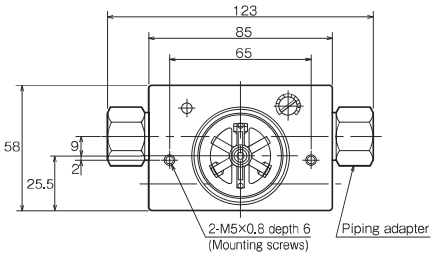
Unit: g

Model	Type		Power supply				Weight to be added when piping adapters are fitted
			24 V DC		100 V AC		
			Cable, standard (1 m)	Cable length (3 m)	Cable, standard (1 m)	Cable length (3 m)	
DFS3-1000	Plastic body (medium flow rate)	Magnetic proximity type	Approx. 410	Approx. 550	Approx. 500	Approx. 800	+Approx. 120
DFS3-1200	Metallic body (medium flow rate)	Magnetic proximity type	Approx. 1100	Approx. 1250	Approx. 1200	Approx. 1500	—
DFS3-1500	Stainless steel body (medium flow rate)	Magnetic proximity type	Approx. 1100	Approx. 1250	Approx. 1200	Approx. 1500	—
DFS3-2000	Metallic body (high flow rate)	Magnetic proximity type	Approx. 1400	Approx. 1550	Approx. 1500	Approx. 1800	—
DFS3-2500	Stainless steel body (high flow rate)	Magnetic proximity type	Approx. 1300	Approx. 1450	Approx. 1400	Approx. 1700	—
DFS3-5000	Plastic body (medium flow rate)	Iron proximity type	Approx. 410	Approx. 550	Approx. 500	Approx. 800	+Approx. 120
DFS3-1002	Plastic body (low flow rate)	Magnetic proximity type	Approx. 540	Approx. 700	Approx. 650	Approx. 950	—
DFS3-5002	Plastic body (low flow rate)	Iron proximity type	Approx. 540	Approx. 700	Approx. 650	Approx. 950	—

DFS3−1000·1200·1500·5000−24 V DC∗

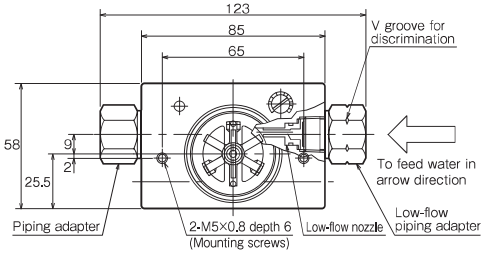


Dimensions when piping adapter set (DF-AP) is attached DFS3−1000·5000−24 V DC∗A∗



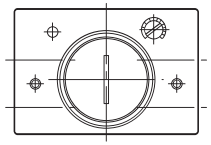
Note) The appearance is different, but the outer dimensions are the same as shown above.

Dimensions when low flow piping adapter set (DF-FW2) is attached DFS3−1002·5002−24 V DC



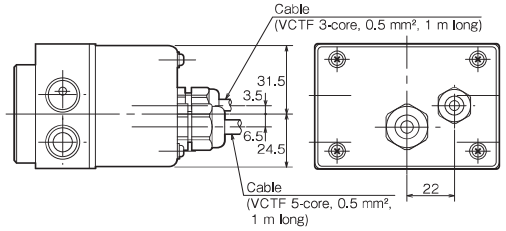
Note) For the low flow type, use the flow rate range A.

DFS3−1500−24 V DC

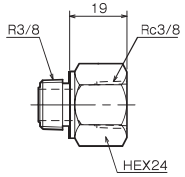


Note) The appearance is different, but the outer dimensions are the same as shown above.

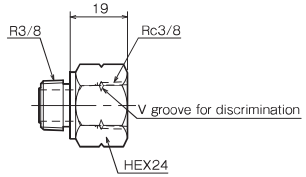
DFS3−1000·1200·1500·5000−100 V AC



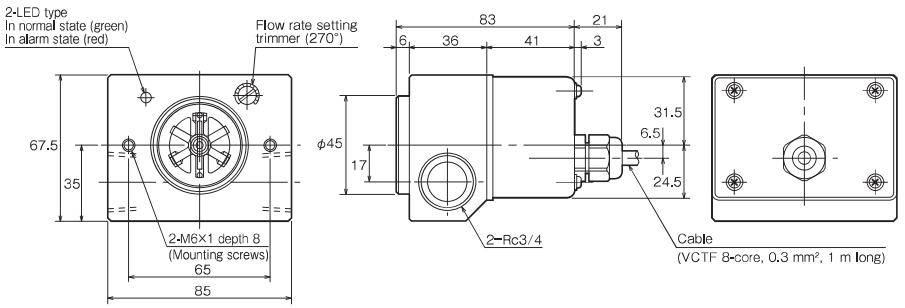
Piping adapter(accessory)



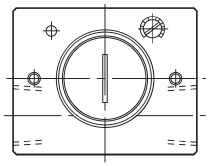
Low flow piping adapter (accessory)



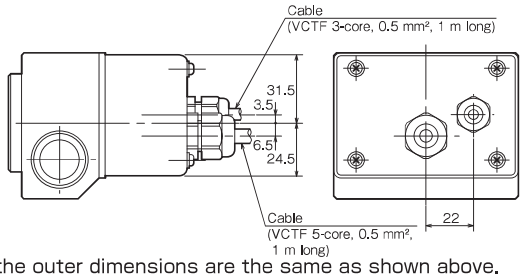
DFS3−2000·2500−24 V DC∗



DFS3−2500−24 V DC∗



DFS3−2000·2500−100 V AC∗



Note) The appearance is different, but the outer dimensions are the same as shown above.