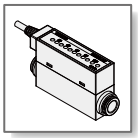

FC-D series - Seperateable numeric display flow switch

Order expression

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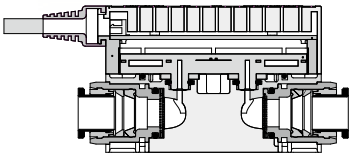
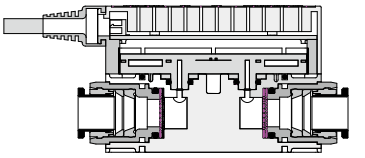
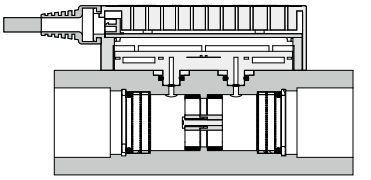


FCSD

Internal structure

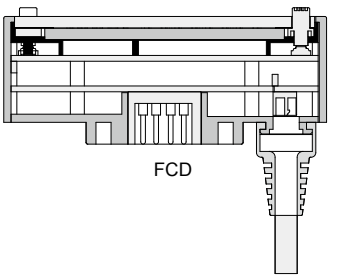


FCMD



FCHD

Internal structure

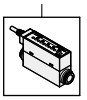


FCD

How to order

FC	SD	020	C04	B	3
Model	Model	Flow rate	Port size	Bracket	Cable length

FC series Flow switch with seperated monitor



Model	
SD	Small flow rate
MD	Medium Flow rate
HD	Large flow rate

Model	Code	Flow range
FCSD	005	500mL/min
	020	2L/min
	100	10L/min
	200	20L/min
FCMD	500	50L/min
	101	100L/min
	201	200L/min
FCHD	501	500L/min
	102	1000L/min

Code	Port size	FCSD				FCMD			FCHD	
		005	020	100	200	500	101	201	501	102
C04	Ø4	●	●	●	●	–	–	–	–	–
C06	Ø6	●	●	●	●	●	–	–	–	–
C08	Ø8	–	–	–	–	●	●	●	–	–
P04	Rc1/2	–	–	–	–	–	–	–	●	●

Code	Type	FCSD	FCMD	FCHD
None	—	No		
B	Flat	●	●	—
L	L type	●	●	●

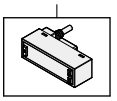
None	No
1	1m
3	3m

■1 Cable type: FC-1L
3 Cable type: FC-3L

How to order

FCD	V	N	F	3
Model	Monitor output	Switch output	Bracket	Cable length

FC series Flow switch with seperated monitor



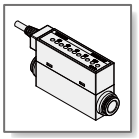
Monitor output	
V	Voltage type 0.5-4.5V

Switch output	
N	NPN output
P	PNP output

Code	Type
None	No
F	Monitor assembly accessory

None	No
1	1m
3	3m

■1 Cable type: FC-1L
3 Cable type: FC-3L



FC-D series - Seperateable numeric display flow switch

Operation specification

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Seperateable flow switch specification

Item		FCSD				FCMD			FCHD	
Flow rate		500mL/min	2L/min	10L/min	20L/min	50L/min	100L/min	200L/min	500L/min	1000L/min
Port size		Ø4, Ø6, Ø8				Ø6, Ø8	Ø8		Rc1/2	
Flow unit Note: 1	Display	2 COLOR								
	Displayable range	0~500 mL/min	0~2 L/min	0~10 L/min	0~20 L/min	0~50 L/min	0~100 L/min	0~200 L/min	0~500 L/min	0~1000 L/min
	Min. display unit	1mL/min	0.01L/min		0.1L/min					1L/min
Accumulated pulse flow function	Displayable range	9999999mL	99999.99L		999999.9L					9999999L
	Min. display unit	1mL	0.01L		0.1L					1L
Power	Voltage type	DC12~24V(10.8~26.4V)								
	Current type	DC24V(21.6~26.4V)								
Current consumption		50mA or less								
Response time		50mA or less								
Environment Note: 2	Min. operating pressure	– 0.9 kgf/cm^2								
	Max. operating pressure	7 kgf/cm^2								
	Proof pressure	10 kgf/cm^2								
	Temperature and humidity	0~50℃, 90%RH or less								
	Temperature	0~50℃								
Accuracy Note: 3	Operating range	3~100%F.S.								
	Linearity	±3%F.S. within (The secondary atmospheric release)								
	Pressure	±5%F.S. within								
	Temperature	±0.2%F.S/°C within (15~35°C, 25°C base)								
	Repeatability	±1%F.S. within								
Output type	Analog output	Output voltage: 1~5V, Min. load impedance: 50kΩ								
	Switch output	2NPN open collector output 2PNP open collector output (Max. loading current: 50mA, Max. supply voltage: DC 24V)								
Wiring		Ø3.5AWG26 X 5 Core								
Enclosure		IP40								
Circuit protection		Reverse power connection protection, Output reverse connection protection								
Weight	FCSD	56g								
	FCMD	56g								
	FCHD	141g								

Note : 1. Converted to volumetric flow at 20°C of 1 barometric pressure (101 kPa).

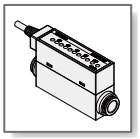
2. When applying compressed air, please use clean air that complies to JIS B 8392-1:2003 Class 1.1.1 to 1.6.2. Compressed air from the compressor contains drainage (water, oxidized oil, foreign matter, etc.). Install an air dryer (minimum pressure dew point: 10°C or colder), and oil mist filter (maximum oil concentration: 0.1 mg/m3) on the primary side of this product to maintain product functions.

3. Please collabrate the product within specification requested. The environment condition: 25+/- 3 °C, voltage output DC 24V +/- 0.1V. F.S. indicates the actual portion of flow rate.

4. Analog output is with load impendance 1kΩ. When the connection to load impedance is low, the output value differenciation will increase. Please do make sure the connection of load impendance difference before use.

5. Current for 24 VDC connection with no load connected. Consumed current varies with the load connection.

6. This product's protection circuit is effective only for specific misconnections and load short-circuits. It does not provide protection for all misconnections.



FC-D series - Seperateable numeric display flow switch

Display datasheet

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Display datasheet

Item			Seperated display
Setting flow range Note: 1		mℓ	5, 10, 50, 100, 500
		ℓ	1, 2, 4, 5, 10, 12, 20, 25, 32, 50, 100, 200, 500, 1000, 1500
Ambient of fluid temperature and humidity Note: 5			0~50℃
Display type			4 digit + 4 digit; 2 color LCD display
Input voltage			1~5V
Output	Switch output		2 NPN open collector output, 50mA or below, voltage dropping
			2 NPN open collector output, 50mA or below, voltage dropping
	Analog output		0.5 ~ 4.5 V voltage output 1 point (load impedance 50k Ω above) Note:4
Current voltage			DC12~24V (10.8~26.4V)
Consumption current Note: 2			Below 40mA (when reach to DC24V, load impedance)
Wiring			Ø 3.7 is AWG 26 x 5 core (connector), insulator outter dia. Ø 1.0
Function			Flow display, flow display to peak holding, on-off output, analog output
Enclosure			IEC standard equal to IP 40
Circuit protection Note: 3, 6			Reverse power connect protection
Accessory			1 sensing connector with 1 meter cable
Weight (body only)			16g approx

Note : 1. When connecting FC monitor, it detects flow range automatically (The setting will be down before delivery).

2. Current for 24 VDC connection with no load connected. Consumed current varies with the load connection.

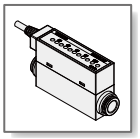
3. This product's protection circuit is effective only for specific misconnections and load short-circuits. It does not provide protection for all misconnections.

4. Analog output is with load impendance 1kΩ. When the connection to load impedance is low, the output value differenciation will increase. Please do make sure the connection of load impendance difference before use.

5. When using compressed air, use clean air that complies to JIS B 8392-1:2003 Class 1.1.1 to 1.6.2. Compressed air from the compressor contains drainage (water, oxidized oil, foreign matter, etc.). Install an air dryer (minimum pressure dew point: 10°C or colder), and oil mist filter (maximum oil concentration: 0.1 mg/m3) on the primary side of this product to maintain product functions.

6. Please collabrate the product within specification requested. The environment condition: 25+/- 3 °C, voltage output DC 24V +/- 0.1V. F.S. indicates the actual portion of flow rate.

7. Converted to volumetric flow at 20°C of 1 barometric pressure (101 kPa).



FC-D series - Seperateable numeric display flow switch

Working principle / Internal circuit and load wiring diagram

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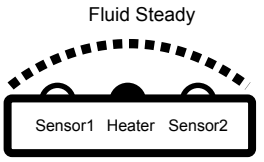
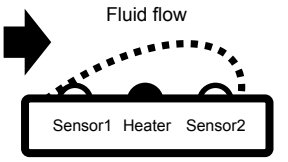
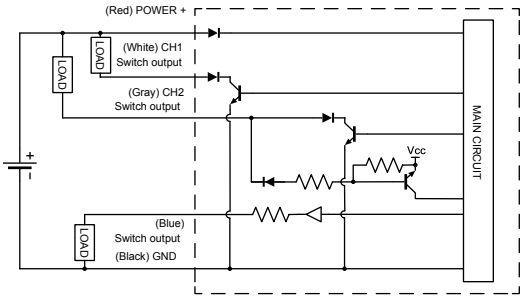
Working principle

The sensing chips on FC series are made by silicon semiconductor process. Thermal isolation technology used on sensor chip and sensor substrate, contained into a tiny space, can speed up the reaction and agility, due to heat distribution equally. The internal sensing design is that 2 sensing chips clipping a heater. When heater has been started, the heat area is evenly distributed around the heater (at which no fluid flows). When fluid flows through the sensor and the fluid steady, the temperature becomes asymmetry. Lower temperature can be measured at the upper part of the heater; meanwhile higher at bottom. The temperature forms the resistance difference on the temperature sensor. The variation of flow rate is proportional to the resistance difference. FC series flow switch measures fluid flow rate by this working principle.

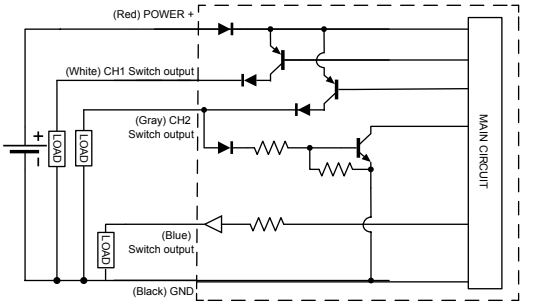




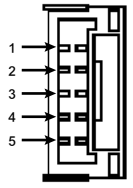
FC Series - NPN Output



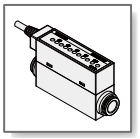
FC Series - PNP Outpue



FC Series-Wire connector



PIN	Wire colo	Content
01	RED	Power + (Voltage output: 12 ~ 24V, current output: 24V)
02	WHITE	CH1(switch output 1: max50mA)
03	GRAY	CH2(switch output 2: max50mA or external input)
04	BLUE	Voltage output: 1.5V Load impedance: 50kΩ above Current output: 4-20mA Load impedance: below 300 Ω
05	BLACK	Power - (GND)



FC-D series - Seperateable numeric display flow switch

Component parts / Material List

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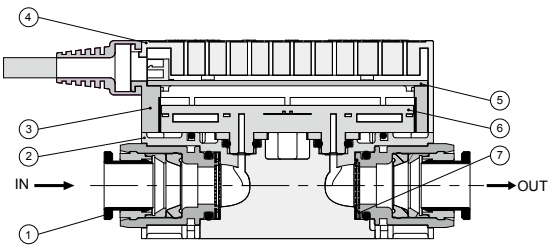
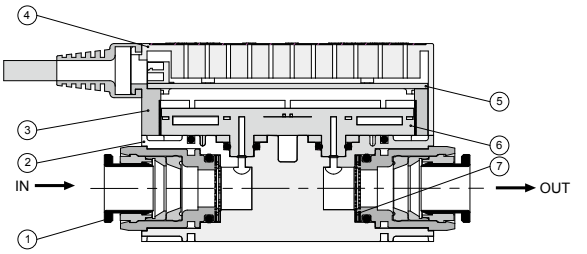
Component parts

▸ FCSD



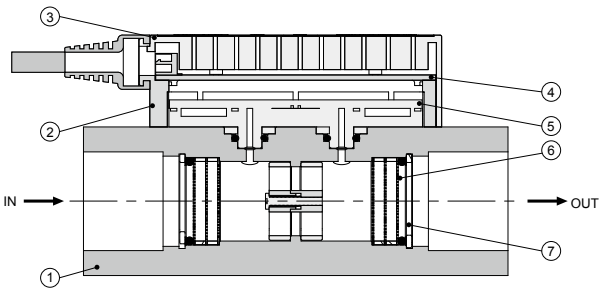
No.	Description	Material
01	Fitting assembly	Aluminum alloy, Plastic
02	Main body	Plastic
03	Cover of sensor module	Plastic
04	Cover	Plastic
05	PCB	–
06	Flow sensor module	–
07	Fairing board	Stanless steel

▸ FCMD



No.	Description	Material
01	Fitting assembly	Aluminum alloy, Plastic
02	Main body	Plastic
03	Cover of sensor module	Plastic
04	Cover	Plastic
05	PCB	–
06	Flow sensor module	–
07	Fairing board	Stanless steel

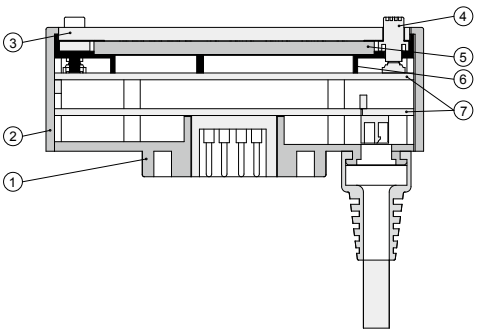
▸ FCHD



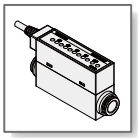
No.	Description	Material
01	Main body	Aluminum alloy
02	Cover of sensor module	Plastic
03	Cover	Plastic
04	PCB	–
05	Flow sensor module	–
06	Fairing board	Stanless steel
07	O-ring	Stanless steel

Display component list

▸ FCD



No.	Description	Material
01	Flow sensor module	–
02	Cover of sensor module	Plastic
03	Acrylic display panel	Acrylic
04	Bottom	Rubber
05	LCD	–
06	LCD Support frame	Plastic
07	PCB	–



FC-D series - Seperateable numeric display flow switch

Precautions

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CAUTION

For your safe use of this product, be sure to read before using the product Precautions.

- When designing and assembling equipment using our products, it is necessary to ensure the safety of the equipment, such as mechanical structure, air pressure, control circuits and electrical systems, and fulfill the obligation of safe use of the equipment.
- To use our products safely, please be aware of that the product's selection, usage, operation and regulation are important. In order to ensure the safety of the device, strictly observe the warnings and cautions.
- In order to ensure the safety of the device, please strictly comply with the warnings and cautions.
- Furthermore, please check the device safety before assembly and operation.

WARNING

This product is designed and manufactured as a device and component for general industrial machinery, Therefore, the operator must have the appropriate expertise and experience.

- Please use this product within the specifications of the product.
- This product can not be used outside the original specifications. In addition, this product must not be modified and reprocessed.
- Meanwhile, the scope of the present product is used as a device and a general industrial components. Therefore, it is not suitable for outdoor use and under the following conditions and in the environment :
  1. When using this product, it will directly contact with atomic energy, railway, aviation, ships, vehicles, medical equipment, food and beverage, entertainment equipment, emergency circuit breaking circuit. Stamping machinery, brake circuits, safety devices, etc., need to consider and ensure its safety purposes.
  2. Used in the impact on people and property, especially in the use of safety requirements.
     (If the use of special circumstances, please consult the company. However, please develop a safety precaution to avoid danger in the event of a malfunction)
- Please confirm the safety of all the systems related to this product before mechanical assembly, inspection and maintenance of the equipment, etc.
- Even if the machine stops, there will still be high pressure, high temperature and charged situation, be sure to take note.
- When inspecting or refurbishing the machine, be sure to cut off the energy sources such as the air source, the water source and the power of the corresponding equipment, and eliminate the compressed air in the system. Pay attention to water leakage or power leakage.
- When using air compressor machinery and equipment for start-up or restart, take precautions such as preventing flight and ensure the safety of the system before proceeding.
- In the use of this product, the product failure may lead to major accidents in the use, be sure to set the self-protection components.

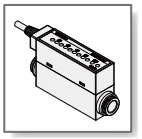
Be sure to follow the warnings and cautions noted in the datasheet to prevent accidents.

⚠ **DANGER**	Indicates a dangerous situation that could result in death or serious injury if performed incorrectly.
⚠ **WARNING**	ndicates a dangerous situation that could result in death or serious injury if performed incorrectly.
⚠ **CAUTION**	Indicates that, in the event of an incorrect operation, there is a risk of minor injuries or property damage.

＊Even matters in the Caution can have significant consequences depending on the circumstances. Are an important part of the above, be sure to follow the implementation.

Disclaimers

1. The Company is not responsible for any loss of production, loss of profits, personal injury, delay in costs and any incidental, consequential damages, costs and damages arising out of the use or failure of the product.
2. The Company does not take all responsibility for the following matters.
3. Due to natural disasters, non-the product caused by fire, the third party or the customer caused by fault or negligence caused by the loss.
4. When using this product on your company's machines, your company's machines may have avoided the loss of functionality and construc tion that is generally expected in the industry.
5. Losses caused by actions other than those specified in our catalog or the instruction manual, as well as installation, installation, adjustment, maintenance, etc.
6. Product's malfunction losses caused by disapproved remodel, software or inappropriate assembly.



FC-D series - Seperateable numeric display flow switch

Pressure loss characteristic

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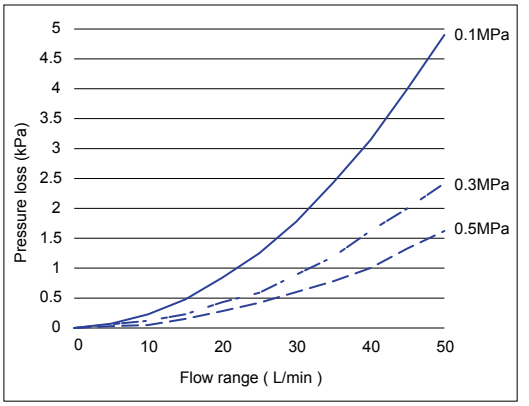
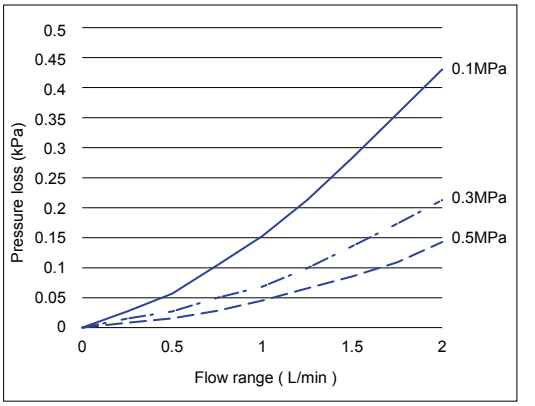
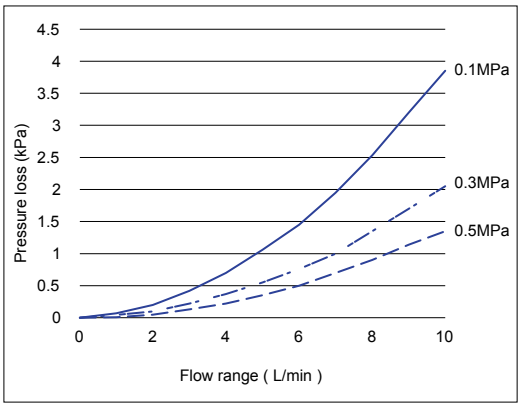
FCSD-005



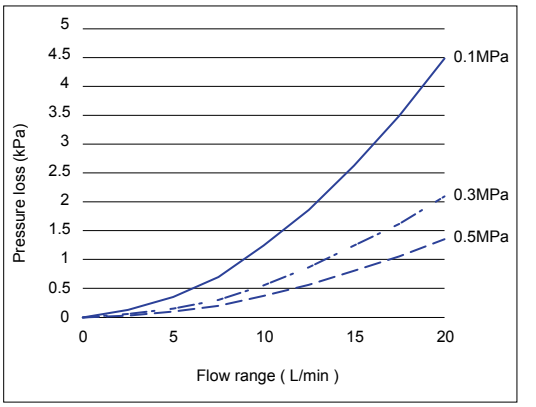
FCSD-020



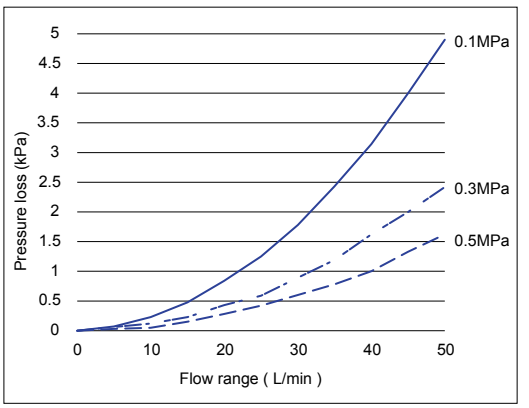
FCSD-100



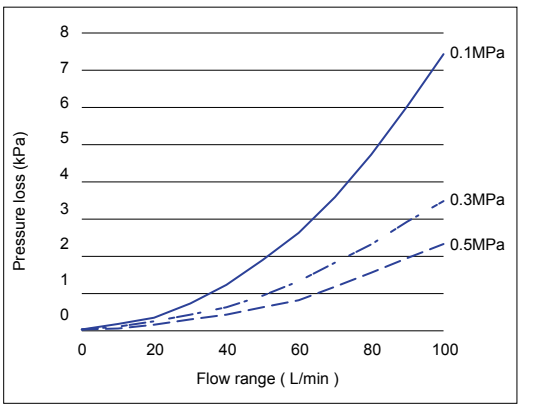
FCSD-200

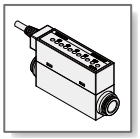


FCMD-500



FCMD-101





FC-D series - Seperateable numeric display flow switch

Pressure loss characteristic

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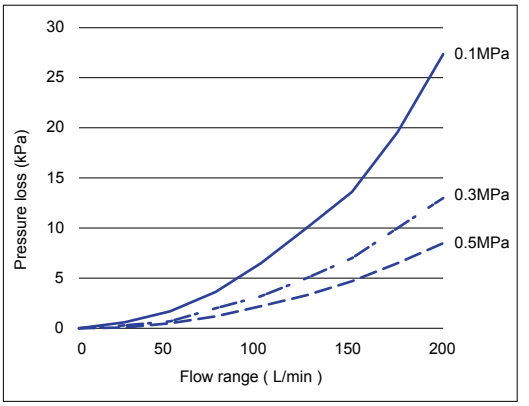
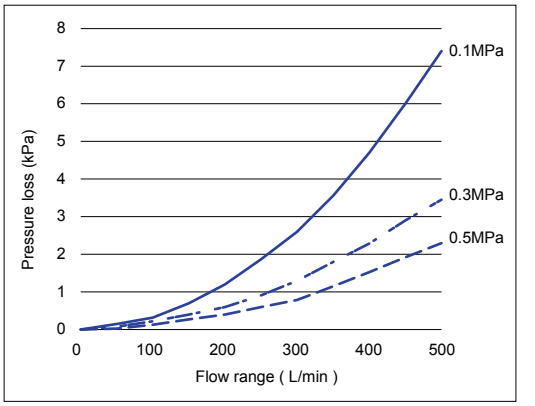
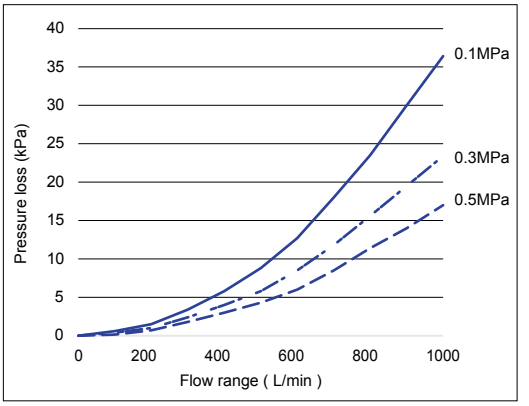
FCMD-201

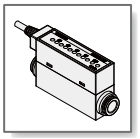


FCHD-501



FCHD-102





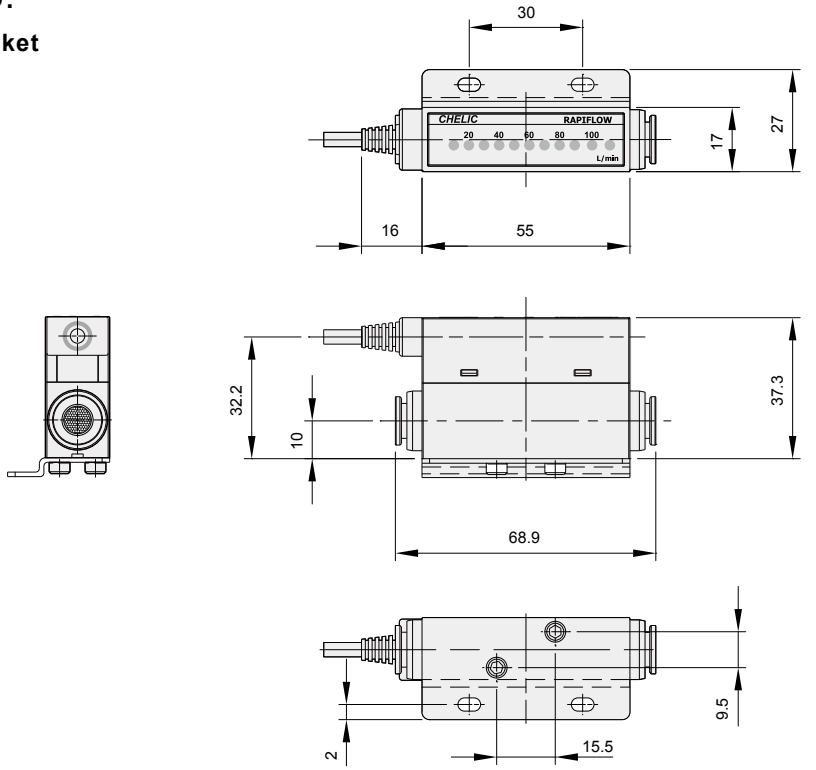
FC-D series - Seperateable numeric display flow switch

External dimensions

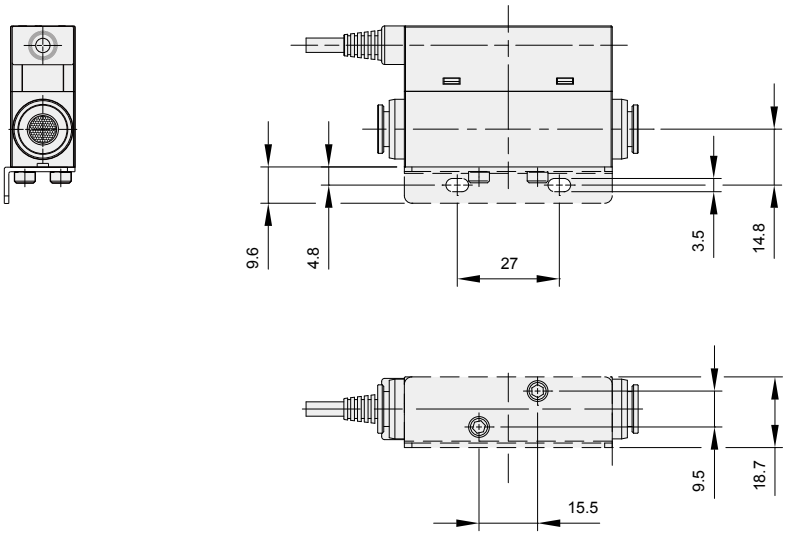
CHELIC

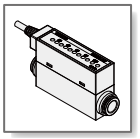
FCSD/FCMD:

L type bracket



Flat bracket





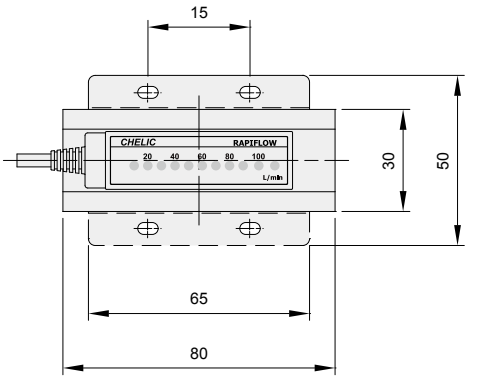
FC-D series - Seperateable numeric display flow switch

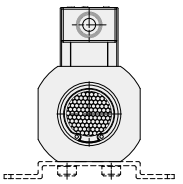
External dimensions

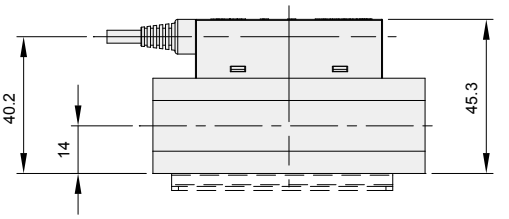
CHELIC

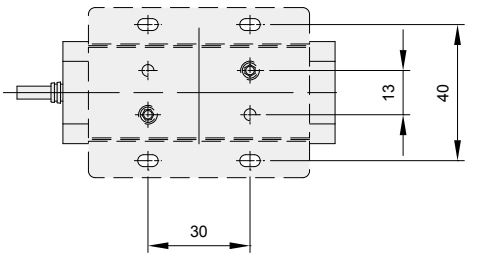
FCHD:

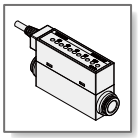
L type bracket











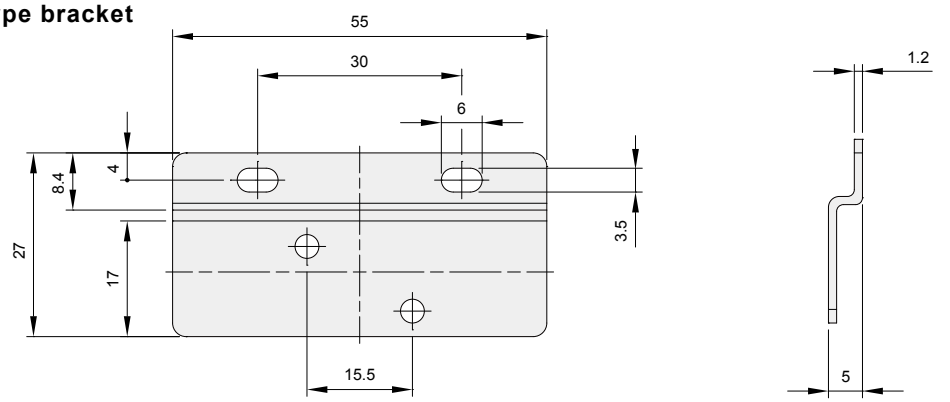
FC-D series - Seperateable numeric display flow switch

External dimensions

CHELIC

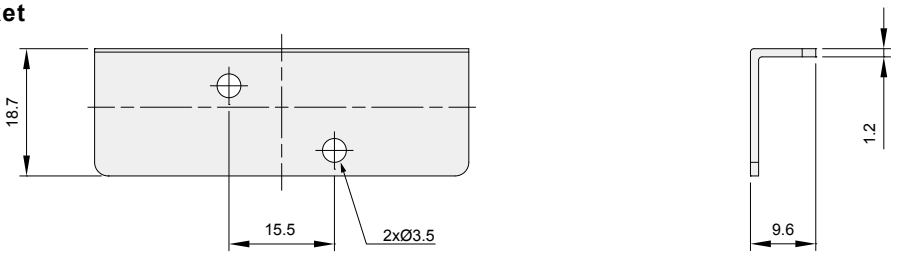
FCSD/FCMD:

L type bracket



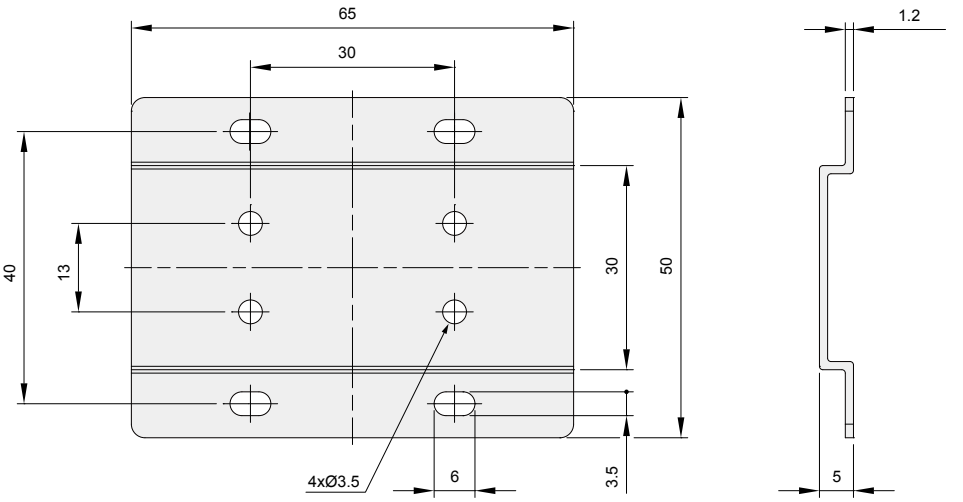
FCSD/FCMD:

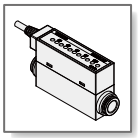
Flat bracket



FCHD:

L type bracket





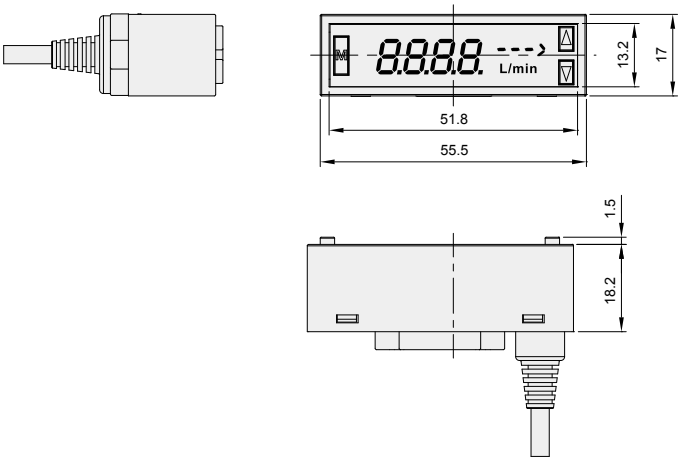
FC-D series - Seperateable numeric display flow switch

External dimensions

CHELIC

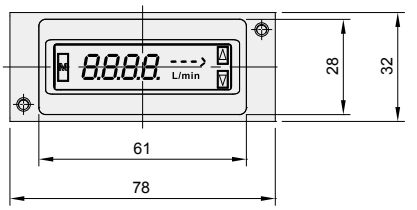
FCD:

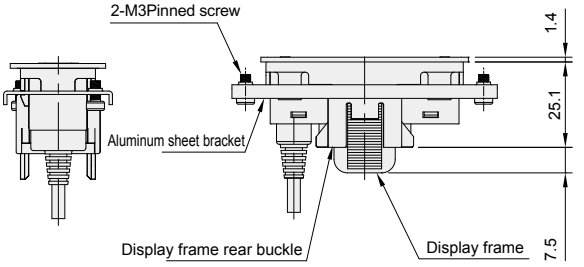
L type bracket

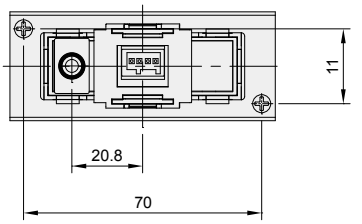


FCD:

Display bracket

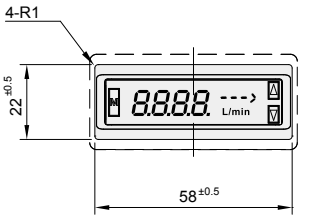






Display dimension

When FCD single unit assembled



When FCD assembled in grouping