
 Reliability Creativity Service	Product Specifications		FZ01-353B2	1/6
	Capacitive Electromagnetic Flow Monitor		Model	CX□□A

1. Specifications

Model		CX10	CX15	CX20
Nominal diameter		10mm	15mm	20mm
Accuracy guaranteed flow-rate range		0.5 to 15L/min	2.0 to 60L/min	
Instantaneous flow-rate display *1		0.0 to 18L/min	0.0 to 72L/min	
Low flow cutoff flow-rate (3% of the upper limit value of the flow-rate range)		0.45L/min	1.8L/min	
Fluid to be measured		Water (tap water) or fluid which does not corrode wetted parts		
Detection method		Capacitive electromagnetic method		
Repeat accuracy		±2.0%F.S. *2 Even with direct piping of an elbow to the flow monitor, the above accuracy can be satisfied. However, it is in the case that the connection of the elbow is in the top, bottom, left, or right direction against the inlet side of the flow-path.		
Temperature characteristics	Ambient temperature	±5.0%F.S. *2 (Relative error of ambient temperatures 10°C and 50°C against the standard ambient temperature of 25°C)		
	Fluid temperature	±5.0%F.S. *2 (Relative error of a fluid temperatures 1°C or 85°C against the standard fluid temperature of 25°C)		
Piping characteristics		±5.0%F.S. *2 • In the case 90° elbow is connected in the top, bottom, left, or right direction against the inlet side of the flow-path. • In case of flow when a pipe size is reduced by one size (e.g., from 25A down to 20A) • In case of flow when a pipe size is enlarged by one size (e.g., from 8A down to 10A)		
Fluid temperature range		0 to +85°C (No freezing)		
Fluid conductivity range		5μS/cm to 3mS/cm		
Pressure range		0 to 1.0MPa (0 to 85°C) , 0 to 2.0MPa (0 to 50°C)		
Pressure resistance		3.0MPa		
Pressure drop (at the accuracy guaranteed maximum flow-rate)		20kPa or less		
Response-ability (dumping time)		63% response to step input Selectable from 0.25, 0.5, 1, 2.5 sec (Standard: 1 sec)		
Working ambient temperature/humidity range		0 to +50°C : 35 to 85%RH (No dew condensation)		
Storage ambient temperature range		-10 to +60°C		
LED display	Main display	Main display: 4 digits 7-segment (bicolor of green and red)		
	Sub display	Sub display: 6 digits 11-segment (white)		
Display	Instantaneous flow-rate unit	Display of instantaneous flow-rate or total accumulated flow volume		
	Accumulated flow volume display	Output mode/Input mode/Flow direction/Arbitrary text (selectable)		
	Accumulated flow volume unit	Standard setting: L/min, special setting: gal/min *4		
	Update frequency	4-digit display *3		
Signal cable (accessory)		Standard setting: L, kL, ML (selectable), special setting: gal, kgal, Mgal *4		
Power supply		5 times/sec		
Protection grade		Lead wire length: 3.0m (with the cable end coating peeled off) Outer diameter Φ6.7 Connector: M12 (Brown: Power supply+, Blue: GND, Black: Output 1, White: Output 2)		
		24V DC±10%, ripple P-P±10% or less		
		Indoor specification (equivalent to IP65)		
		Under the condition that the main body connection connector cable is attached to the product.		

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Current consumption	65mA DC or less		
Standard installation position	For horizontal piping, the installation position so that the display is horizontal against the ground. (No air shall be in the fluid)		
Flow direction	Flow direction can be changed.		
Pipe connection	Rc3/8	Rc1/2	Rc3/4
Weight	Approximately 460g	Approximately 490g	Approximately 520g
Wetted part materials * 5	Main body casing	PPS	
	Flow path	CAC804	
	Connection	FKM	
	O-ring		
Measuring tube gasket			
Others	UKCA Marking product, CE Marking product, RoHS directive compliant		
Option	Installation bracket		
Service life	5 years (under the following conditions) • Ambient temperature: 40°C, fluid temperature: 40°C, Ambient humidity: 63 to 67%RH • Accumulated failure rate in 5 years 10% or less (confidence level 60%)		

- *1. 0.0L/min to not more than 110% of the accuracy guaranteed flow-rate range...Characters lights
More than 110% of the accuracy guaranteed flow-rate range to not more than 120% ...Characters blinks
More than 120% of the accuracy guaranteed flow-rate range ...Excessive flow error (E007) is indicated
- *2. Conditions: Piping condition (Upstream side straight pipe length: 5D, downstream side: 0), Water temperature: 25±5°C,
Conductivity: 200µS/cm, Response time: 1sec, Average value of measurement for 240 sec
- *3. When the accumulated flow volume exceeds the maximum accumulated flow volume, accumulation stops and the upper limit value is held until it is reset.
- *4. gal (Indication in US liquid amount gallon): 1gal = approx. 3.785L
- *5. Material symbols
PPS Polyphenylene Sulfide resin
CAC804 Bronze casting
FKM Fluoro Rubber

2. Output specifications

2-1. Output 1 (contact output)


1) Output format

Item	NPN output	PNP output
Format	NPN transistor output	PNP transistor output
Rating	30V DC, 50mA or less	30V DC, 50mA or less
ON-time residual voltage	2.0V or less	2.4V or less
Short-circuit protection (overcurrent protection)	Yes	
Output format	N.O. (initial value)/N.C.	
Update interval	100ms	

2) Output mode

① Level judgment mode

In this mode, the switch output is triggered by judging if the instantaneous flow-rate is larger or smaller than the set level judgment value.

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② Window judgment mode

In this mode, the switch output is triggered by judging if the instantaneous flow-rate is within or outside the range defined by the set two values.

③ Trip accumulated flow volume output mode (Increment)

In this mode, the trip accumulated flow volume is counted up from "0" and the switch output is triggered when the value reaches the set value.

Resetting the trip accumulated flow volume value cancels the switch output and restores the value to "0".

④ Trip accumulated flow volume output mode (Decrement)

In this mode, the trip accumulated flow volume is counted down from the set value and the switch output is triggered when the value reaches "0."

Resetting the trip accumulated flow volume value cancels the switch output and restores the value to the set value.

⑤ Trip accumulated flow volume pulse output mode

In this mode, a pulse is output each time the fluid flows for a certain volume.

The pulse unit for each nominal diameter is as follows:

Pulse unit [L/P], [gal/P]	Pulse width [ms]	Nominal diameter		
		10A	15A	20A
0.01	10±5	◎	—	—
0.1	50±5	○	◎	◎
0.2		—	○	○
1		○	○	○
10		—	○	○

◎: Initial setting, ○: Selectable setting to change the setting

⑥ Alarm output


Alarm is output when an error in "3. Alarm judgment items", except "Reverse flow detection", has been detected.

Alarm Judgment Items" has been detected. Alarm output is automatically canceled when the error has been resolved.

2-2. Output 2 (Select analog output or switch input)

■Output format Analog output

Item	Voltage output	Current output
Format	1 to 5V DC	4 to 20mA DC
Load impedance	50kΩ or more	500Ω or less
Free scale function	Yes Selectable within the range of 10 to 100% of the maximum value of the accuracy guaranteed flow-rate range to change the setting	
Short-circuit protection	Yes	No
Update interval	100ms	

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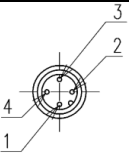
■Input format Switch input

When the input has turned on, the following actions are triggered depending on the setting.

- ① Remote zero adjustment, ② Resetting of trip accumulated flow volume value

Item	NPN
Input time	20ms or more
Short-circuit current	Approx. 2mA DC

2-3. Pin assignment on the main body side

Connector	Pin assignment	Description
1		Power supply 24V DC
2		Output 2: Analog output (voltage/current) or switch input
3		Power supply GND
4		Output 1: Switch output (NPN/PNP)

3. Alarm judgment items

Error item	Error code	Description
Low power supply voltage detection	No	Detects that the power supply voltage has dropped low. Measurement stops when the error occurs. LCD turns off.
Memory Error detection	E002	Detects a memory data error. Measurement stops when the error occurs.
Excitation Error detection	E003	Detect that electric current does not flow through the excitation coil correctly. Measurement stops when the error occurs.
Overcurrent detection	E004	Detects that the overcurrent protection function of the switch output has been triggered. Measurement stops when the error occurs.
Excessive Fluid Noise detection	E005	Detect that correct fluid measurement is not possible because abnormal electric current is flowing through the fluid to be measured, air is contained in the fluid, etc.
Reverse Flow detection	E006	Detect that reverse flow, which is over the low flow cutoff flow-rate, is flowing.
Excessive Flow Rate detection	E007	Detect that excessive flow (120% of the maximum flow-rate of the accuracy guaranteed flow-rate range) is flowing.

4. Other Functions

1) Parallel mode


When multiple units are installed in parallel, be sure to separate two adjacent units by 1mm or more. Ensure that units set to the Standard frequency mode and Parallel mode are installed alternately. Choose the Standard frequency mode or Parallel mode in the Function mode.

2) Auto zero adjustment

The flow rate at the timing when the configuration button is pressed is set as the zero point. Or, the flow rate at the timing of external switch input is pressed is set as the zero point.

3) Memory backup

When the setting values are changed, the latest values are saved in the memory. Accumulated values are updated to the latest values in every two minutes.

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5. Items of your designation


Model		<input type="checkbox"/> CX10 <input type="checkbox"/> CX15 <input type="checkbox"/> CX20	
Output specifications	Output 1	Output format	<input type="checkbox"/> NPN output <input type="checkbox"/> PNP output
	Output 2	Output format	Analog output <input type="checkbox"/> Voltage output <input type="checkbox"/> Current output

6. Precautions for handling

Before handling the product, be sure to read the handling manual carefully. And, use the product correctly.

6-1. Working environment, fluid to be measured

- (1) Ensure that the wetted parts' materials have corrosion resistance against fluid to be measured.
- (2) The product cannot be used for non-conducting fluid such as purified water, oil, etc.
- (3) Flowing of electric current in the fluid to be measured may leads to incorrect operation.
- (4) Keep the product away from a strong magnetic field or a source of electric noise.
- (5) The product is not explosion-proof specification. Do not use the product in an explosive atmosphere such as flammable gas, etc.
- (6) Avoid installation at a place exposed to direct sunlight and/or rain (Indoor specification).
- (7) Do not use the product where condensation can form inside the product. Note that if a fluid with a lower temperature than the ambient temperature flows through the product, condensation may form inside the product, which may adversely affect its performance.

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6-2. Precautions for piping

- (1) No air shall be in the fluid to be measured. The measurement accuracy is to be affected.
Do not install the product at a place where air accumulation can easily occur (e.g. upstream side of a falling pipe).
Also, before start measurement, remove air sufficiently.
- (2) The product can be installed in any orientation, however, for horizontal piping, it is recommended to install it so that the display surface is parallel to the ground in order to minimize influence by air bubbles.
- (3) Devices such as a flow-rate adjusting valve, etc., which disturb flow shall be installed in the downstream of the flowsensor.
- (4) Avoid installing the product where it is exposed to excessive pressure, such as water hummer, etc.
- (5) In case foreign substances, oil, etc., exist in the piping,
install the flowsensor after cleaning inside of the pipe.
- (6) Make sure to align the flow direction of the fluid with the flow direction indicated by the arrow on the main body.
- (7) Around the place of installation, provide enough space for maintenance.
- (8) In a fluid sealed circuit, pressure is increased due to temperature change and the product may be damaged. Provide the system with a relieve valve to prevent the system to become such fluid sealed circuit.
- (9) In case of arranging the products in parallel, if their display indications and/or analog outputs are not stable, they can be stabilized by setting longer response time and/or setting the parallel mode.
- (10) In case of consideration to arrange plural pieces of the products for a Flow Rate Type Filling Apparatus, please judge such usage after checking the Patent Number JP3916032B2.

6-3. Wiring

- (1) For a power supply and a remote counter, it is recommended to electrically isolate them from others.