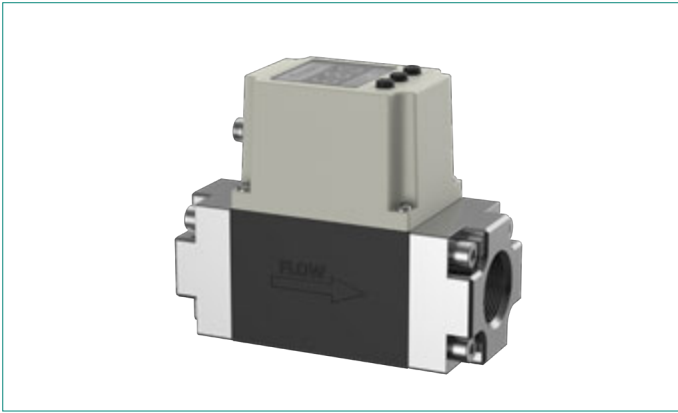


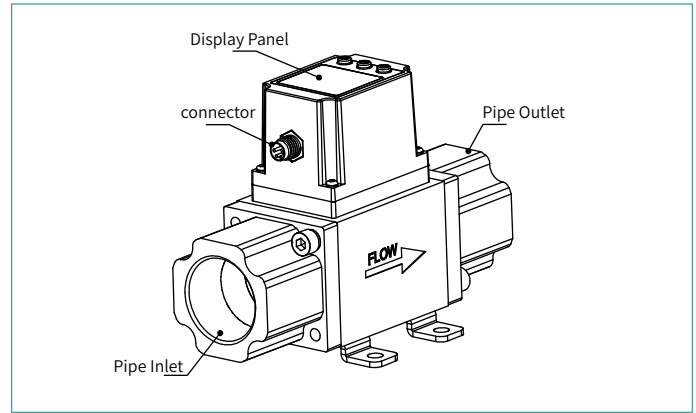
Digital Water Flow Sensor

FMS3 SERIES

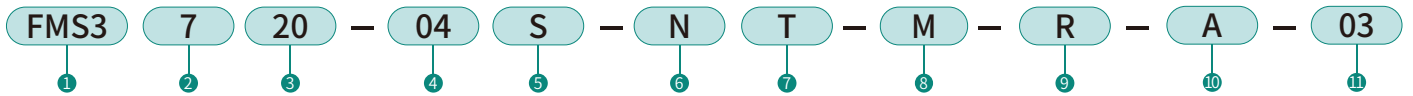
Product Drawing



Component Overview



Model Number Designation Method



① Series	② Category	③ Rated Flow	④ Pipe Size	⑤ Flow Regulation	⑥ Thread Type	⑦ Connection Type	⑧ Unit Specifications	⑨ Bracket	⑩ Output Mode		⑪ Cable Length
									OUT1	OUT2	
FMS3	7:Display Integrated	04:0.5-4L/min	03:3/8	S:With flow control Valve Blank:Without flow control Valve	Blank: Rc thread N: NPT thread G:G thread	Blank:Standard T:Rotatable	M: Instant flow: L/min cumulative flow: L Temp: °C	None:No bracket R:With bracket	A:NPN/NPN B:PNP/PNP C:NPN/Analog 1~5V D:NPN/Analog 4~20mA E:PNP/Analog 1~5V F:PNP/Analog 4~20mA I:IO-Link RS:Rs485	Blank:None 03:3m 05:5m 10:10m K03:3m K05:5m	
		20:2-16L/min									
		40:5-40L/min									
		11:10-100L/min	06:3/4	Blank:Without flow control Valve							
		21:50-250L/min	10:1/1								
			12:1 1/4								
			14: 1 1/2								

[Note] K03/K05 cables are M12-to-M8 adapters, while 03/05/10 cables have M8 connectors. Select the appropriate cable based on requirements

FMS3 Communication Cable Selection Rules



1 Series	2 Interface Type	3 Connector Style	4 Cable Type	5 Length Options	6 Cable Material
DZDL	M8/M12: M12-to-M8 Adapter Cable	A: Female	Blank: 4-wire to 5-wire	0.15M: 0.15Rice Length Options	PVC: PVC
	M8: M8 Plug Cable		S4: 4-wire	3M: 3Rice Length Options 5M: 5Rice Length Options	
				10M: 10Rice Length Options	

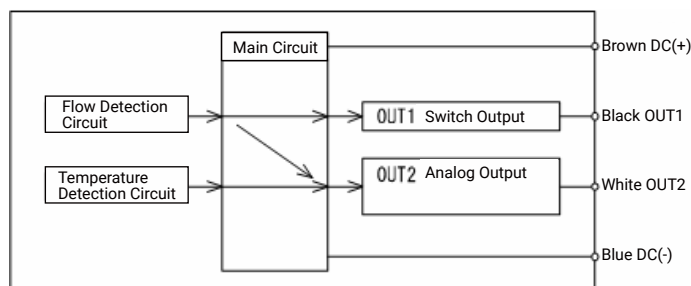
Digital Water Flow Sensor

FMS3 SERIES

Internal Circuitry & Wiring

► Temperature Sensor Output:「OUT2」Only

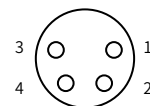
The output of OUT2 can be switched between temperature-correlated or flow-correlated output via button operation.



► Connector Connection Guidelines

1. Perform connector installation/removal only after power shutdown.
2. Use dedicated wiring paths – shared routes with power/high-voltage lines may cause interference-induced malfunctions.
3. Switch-mode power supplies must include grounding – ungrounded units accumulate switching noise.

Connector Pinout



Pin	Color	Switch/Analog Output	Rs485 Output	IO-Link output
1	Brown	DC+	DC+	DC+
2	White	OUT2	B	-
3	Blue	DC-	DC-	DC-
4	Black	OUT1	A	DI/DO

Standard Specifications

Model			FMS3704	FMS3720	FMS3740	FMS3711	FMS3721
Compatible Fluids			Water and ethylene glycol aqueous solutions (viscosity ≤3mPa·s (3cP))				
Detection Method			Kármán vortex street type				
Rated Flow Range			0.5~4L/min	2~16L/min	5~40L/min	10~100 L/min	50~250 L/min
Display Flow Range			0.35~5.50L/min (<0.35 shows 0.00)	1.70~22.00 L/min (<1.7 shows 0.0)	3.5~55.0 L/min (<3.5 shows 0.0)	7~140 L/min (<7 shows 0)	20~350 L/min (<20 shows 0)
Setting Flow Range			0.35~5.50L/min	1.70~22.00L/min	3.5~55.0 L/min	7~140 L/min	20~350 L/min
Minimum Setting Unit			0.01L/min	0.01L/min	0.1L/min	1L/min	1 L/min
Fluid Temperature			0~90℃ (non-freezing/non-condensing)				
Display Units			Instant flow: L/min,cumulative flow: L				
Accuracy			Display: ±3%F.S., Analog output: ±3%F.S.				
Repeatability			±2%f.S.				
Temperature Characteristic			±5%f.S.(reference at 25℃)				
Operating Pressure Range			0~1MPa				
Operating Pressure			1.5MPa				
Pressure Loss(without flow control valve)			≤45kPa at max flow				
Cumulative Flow Range			99999999.9L		999999999L		
Switch Output			NPN or PNP open collector output				
	Max Load Current		80mA				
	Max Applied Voltage		DC28V				
	Voltage Drop		NPN : 1V (at 80mA), PNP: ≤1.5V (at 80mA)				
	Response Time		0.5s/1s/2s				
	Output Protection		Short-circuit protection				
	Output Modes	Flow	Simple/Hysteresis/Window comparator selectable				
		Temperature	Simple/Hysteresis/Window comparator selectable				
Output Modes	Voltage output		1~5V, Output impedance: 1kΩ				
	Current output		4~20mA, Max load impedance: 600Ω				
	RS485 output		MODBUS RTU				
	IO-Link output		COM2(38.4kBaud)				
Hysteresis			Adjustable				
Power Supply voltage			DC12~24V±10%				
Current Consumption			≤50mA				
Environmental Resistance	Protection class		IP65				
	Operating Temperature Range		0~50℃ (non-freezing/non-condensing)				
	Humidity range		35~85% R.H. (operating/storage, non-condensing)				
	Withstand voltage		AC1000V 1min (between charging parts and housing)				
	Insulation resistance		≥50MΩ (DC500V megger, between charging parts and housing)				
Certifications			CE, UL certification				
Wetted Parts Materials			SUS304, FKM, PBT+30%GF/PPS+40%GF, AL/POM/PVDF/PPS				

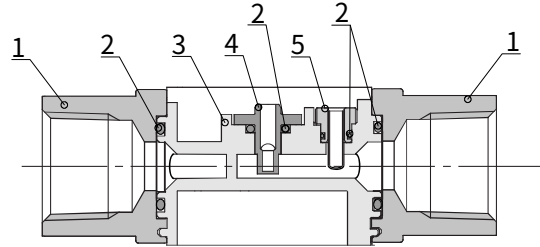
Digital Water Flow Sensor

FMS3 SERIES

Product Structure

► Structure of Flow Meter Without Control Valve

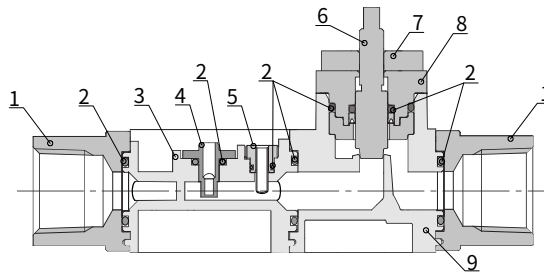
No.	Component	Material
1	End Fitting	SUS304
2	Sealing Ring	FKM
3	Meter Body	PBT+30%GF/PPS+40%GF
4	Sensor	AL/POM/PVDF/PPS
5	Temperature Sensor	SUS304



Product Structure

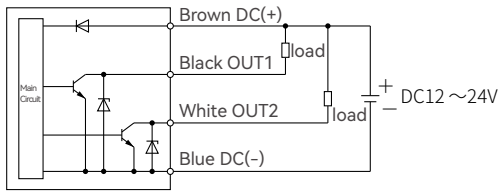
► Structure of Flow Meter With Control Valve

No.	Component	Material
1	End Fitting	SUS304
2	Sealing Ring	FKM
3	Meter Body	PBT+30%GF/PPS+40%GF
4	Sensor	AL/POM/PVDF/PPS
5	Temperature Sensor	SUS304
6	Adjustment Valve Lifting Screw	SUS304
7	Control Valve Cover	PBT+30% Glass Fiber
8	Control Valve Locking Mechanism	PBT+30% Glass Fiber
9	Control Valve Body	PBT+30% Glass Fiber

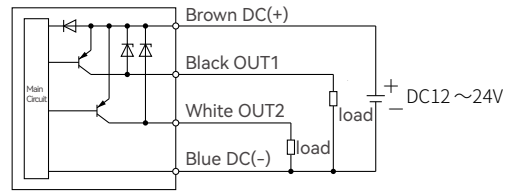


Internal Circuitry & Wiring

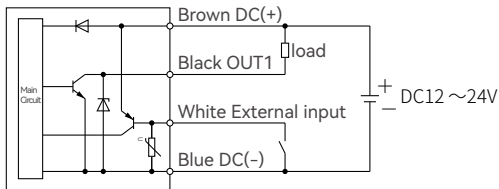
► NPN2 Output Type



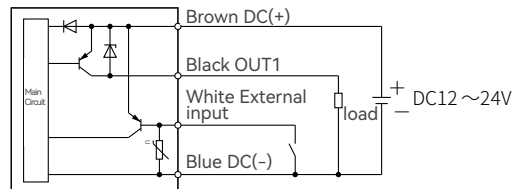
► PNP2 Output Type



► NPN + Analog Output Type

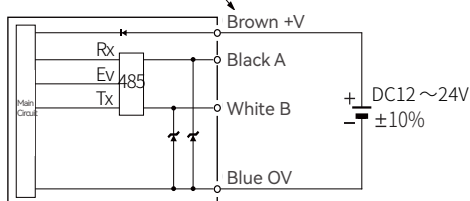


► PNP + Analog Output Type



► RS485 Output Type

Wire Color Coding for Connectorized Cables



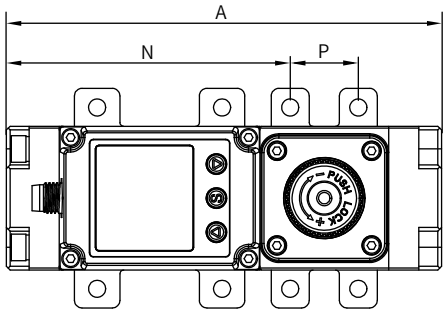
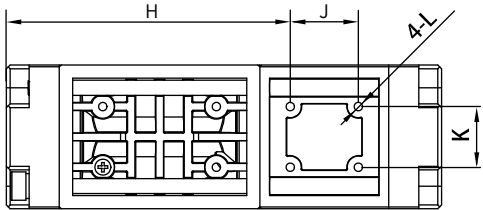
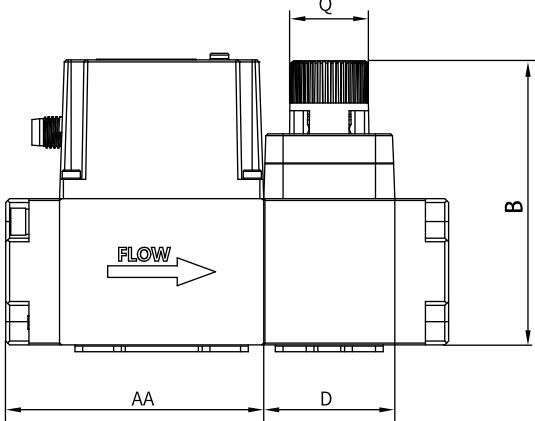
Digital Water Flow Sensor

FMS3 SERIES

Dimension drawing

FMS3704、3720、3740 With Control Valve

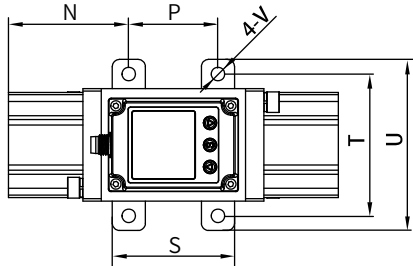
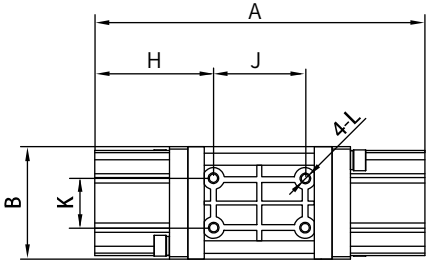
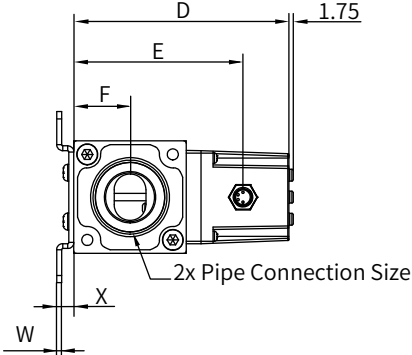
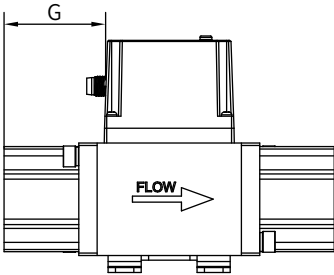
Model	A	AA	B	D	H	J	K	L	Q	Bracket Dimensions	
										N	P
FMS3704 (S)	115	67	73.8	34	75	18	16	2.2	20.5	75	18
FMS3720 (S)	123	71	73.8	34	79	18	16	2.2	20.5	79	18
FMS3740 (S)	153	85	76	44	98	18	16	2.2	25.8	98	18



Dimension drawing

FMS3704、3720、3740、3711、3721 Flow Sensor

Model	Pipe Connect ion Size (NPT、RC)	A	B	D	E	F	G	H	J	K	L	Bracket Dimensions							
												N	P	S	T	U	V	W	X
FMS3704	3/8	81	38	74	55.2	19	13.8	25.5	30	16	2.2	24	33	45	47.9	58	4.5	1.5	1.8
FMS3720	3/8,1/2	89	38	74	55.2	19	17.8	29.5	30	16	2.2	28	33	45	47.9	58	4.5	1.5	1.8
FMS3740	1/2,3/4	109	38	74	55.2	19	27.8	39.5	30	16	2.2	38	33	45	47.9	58	4.5	1.5	1.8
FMS3711	3/4 1	135	46	88	69.2	23	40.8	48.5	38	20	3.5	49.3	36.5	50	58	70	5.5	2	7
FMS3721	1-1/4	119	58	94	75.2	29	32.1	39.5	40	26	2.1	38	43	55	70	80	5.2	1.5	6.5
	1-1/2	123	58	94	75.2	29	34.1	41.5	40	26	2.1	40	43	55	70	80	5.2	1.5	6.5



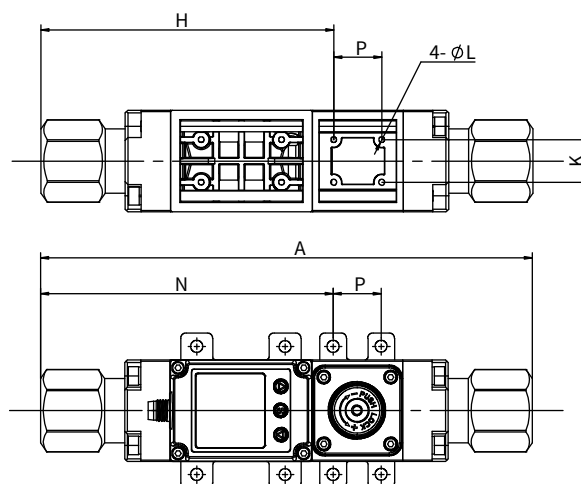
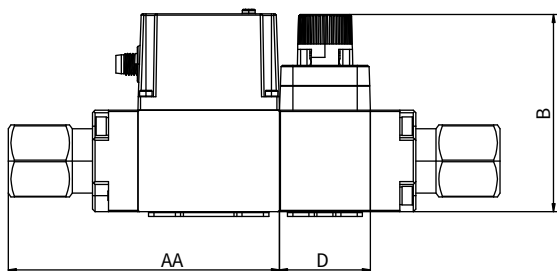
Digital Water Flow Sensor

FMS3 SERIES

Dimension drawing

► Rotary Joint with Control Valve S-T

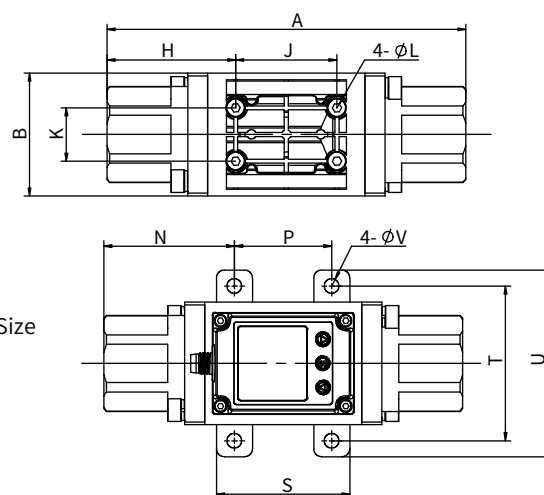
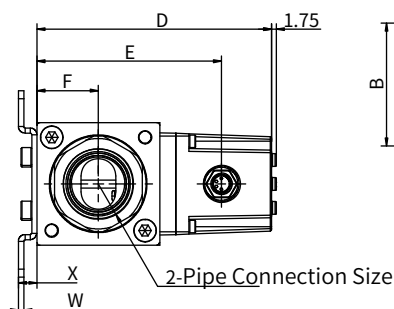
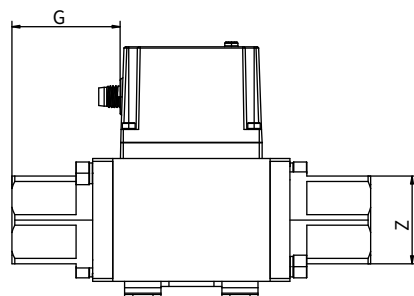
Model	Pipe Connection Size (NPT, RC)	A	AA	B	D	H	J	K	L	Q	Bracket Dimensions		
											N	P	U
FMS3704(S-T)	3/8	184	101.5	73.8	34	109.5	18	16	2.2	20.5	109.5	18	58
FMS3720(S-T)	3/8, 1/2	184	101.5	73.8	34	109.5	18	16	2.2	20.5	109.5	18	58
FMS3740(S-T)	1/2	202	109.5	76	44	122.5	18	16	2.2	25.8	122.5	18	58
	3/4	208	112.5			125.5					125.5		70



Dimension drawing

► Rotary Joint-T

Model	Pipe Connection Size (NPT, RC)	A	B	D	E	F	G	H	J	K	L	Z	Bracket Dimensions							
													N	P	S	T	U	V	W	X
FMS3704(T)	3/8	150	38	74	55.2	19	48.3	60	30	16	2.2	27	58.5	33	45	47.9	58	4.5	1.5	1.8
FMS3720(T)	3/8, 1/2	150	38	74	55.2	19	48.3	60	30	16	2.2	27	58.5	33	45	47.9	58	4.5	1.5	1.8
FMS3740(T)	1/2	158	38	74	55.2	19	55.3	64	30	16	2.2	27	62.5	33	45	47.9	58	4.5	1.5	1.8
	3/4	164						67				30	65.5							
FMS3711(T)	3/4	134.6	46	88	69.2	23	40.6	48.3	38	20	3.5	33	49.1	36.5	50	58	70	5.5	2	7

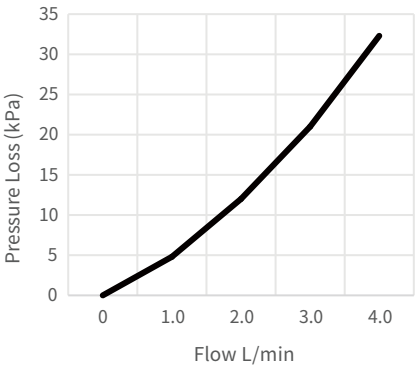


Digital Water Flow Sensor

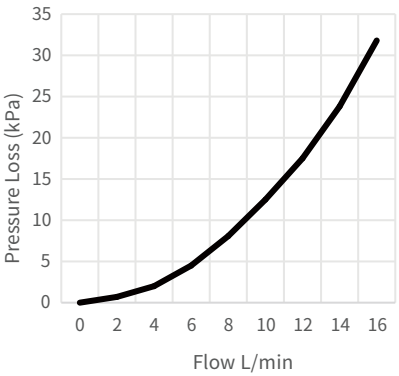
FMS3 SERIES

Flow Characteristic Curve

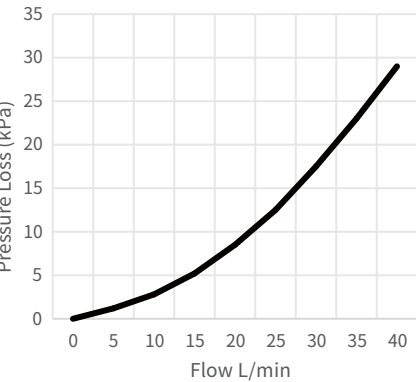
FMS3 series 3704



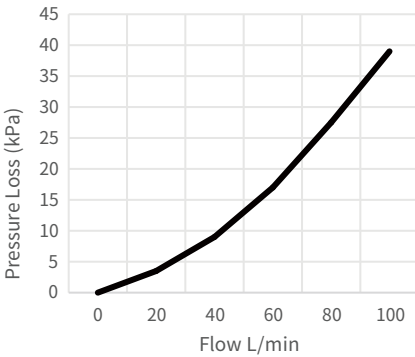
FMS3 series 3720



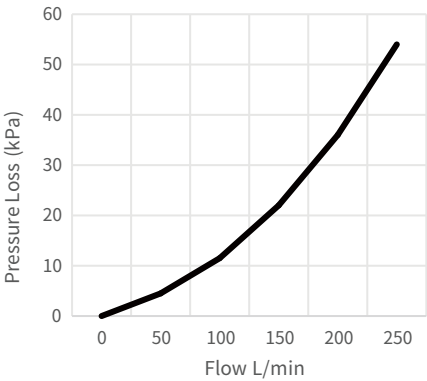
FMS3 series 3740



FMS3 series 3711

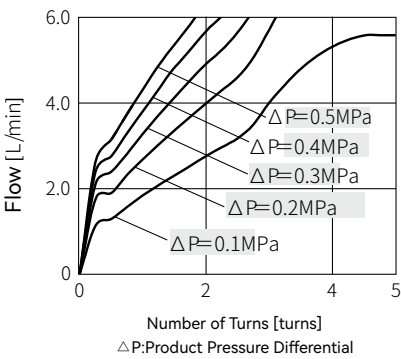


FMS3 series 3721

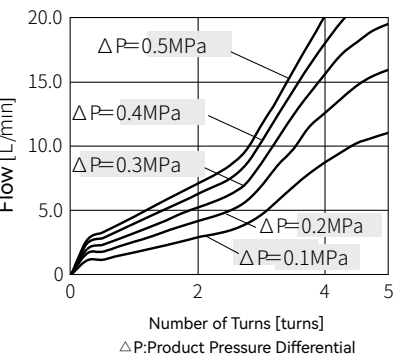


Flow Control Valve Characteristics

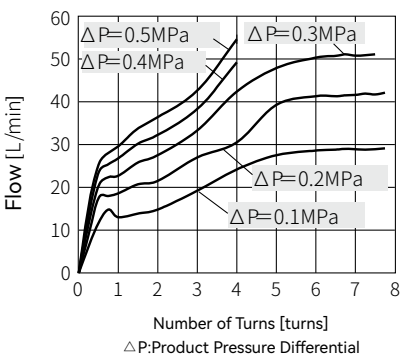
FMS3 series 3704-S



FMS3 series 3720-S



FMS3 series 3740-S



Digital Water Flow Sensor

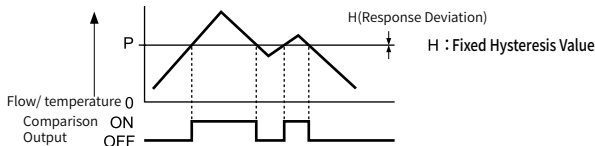
FMS3 SERIES

Output Modes & Actions

- For Compare Output 1 & 2, select output modes from Simple, Hysteresis, or Window Comparator modes.

Simple Mode

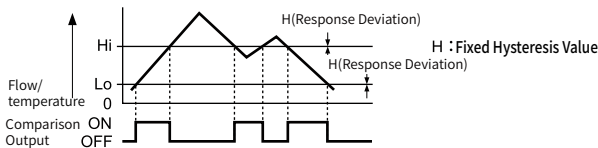
- Comparison Output ON/OFF Control Modes



[Note 1] P represents the "Hi" for Compare Output 1 and "H2" for Compare Output 2.
[Note 2] With fixed hysteresis (H) set, the output signal changes when rising above H_1+H or H_2+H .
[Note 3] Default hysteresis value $H=0$ (no deadband unless configured).

Window compare mode

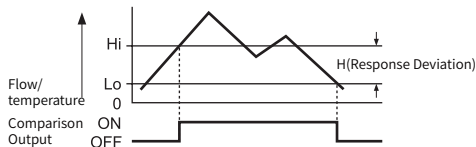
- Pressure ON/OFF Control Mode (within set range)



[Note 1] For Compare Output 1, Hi/Lo are denoted as H_1/L_1 ; for Compare Output 2, Hi/Lo are H_2/L_2 .
[Note 2] With fixed hysteresis (H) set, the output signal changes when rising above L_1+H & H_1+H (or L_2+H & H_2+H).
[Note 3] Default hysteresis value $H=0$.

Hysteresis Mode

- ON/OFF Control Mode with Response Deviation Setting for Comparative Outputs



[Note 1] For Compare Output 1, Hi/Lo thresholds are labeled H_1/L_1 ; for Output 2, H_2/L_2 .
[Note 2] With hysteresis H set, output triggers when value exceeds H_1+H (Output 1) or H_2+H (Output 2) during rise.
[Note 3] Default hysteresis: $H=0$

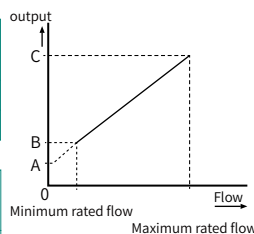
Mode	Condition (Flow L)	Level Switching NO/NC Switching	Output Level	Display	Alarm LED
Simple Mode	$>H_1+H$ or (H_2+H)	NO	high	out1 or out2	on
		NC	low		on
	$<H_1-H$ or (H_2-H)	NO	low		off
Hysteresis Mode	$>H_1+H$ or (H_2+H)	NO	high	out1 or (out2)	on
		NC	low		on
	$<L_1-H$ or (L_2-H)	NO	low		off
Window compare mode	Within Window	$L_1+H < L < H_1+H$ or $(L_2+H < L < H_2+H)$	NO	high	out1 or (out2)
			NC	low	off
	Outside window	$<L_1-H$ or (L_2-H)	NO	low	on
			NC	high	out1 or (out2)
		$>H_1+H$ or (H_2+H)	NO	low	on
			NC	high	out1 or (out2)

Analog Output

Flow / Analog Output

	A	B			C
		04/20/40	11	21	
Voltage output	1V	1.5V	1.4V	1.8V	5V
Current Output	4mA	6mA	5.6mA	7.2mA	20mA

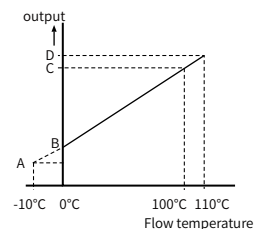
Mode	Rated Flow L/min		Instantaneous Flow Alarm Threshold (L)
	Min	Max	
FMS3704	0.5	4	5.5
FMS3720	2	16	22
FMS3740	5	40	55
FMS3711	10	100	140
FMS3721	50	250	350



Flow / Analog Output

	A	B
Voltage output	0.6V	1V
Current Output	2.4mA	4mA

	C	D
Voltage output	5V	5.4V
Current Output	20mA	21.6mA



Digital Water Flow Sensor

FMS3 SERIES

Alarm function

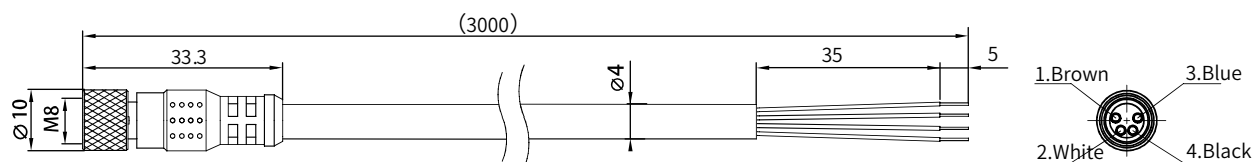
Display	Error Name	Content
Over-instantaneous range	Instantaneous flow out of range	The flow exceeds the display flow range
Over-cumulative range	Cumulative flow out of range	The cumulative value exceeds the cumulative flow range
Over upper temperature limit	Temperature exceeds upper limit	The fluid temperature exceeds 110°C
Exceed the lower temperature limit	Temperature drops below the lower limit	The fluid temperature is below -10°C

Fault Handling Procedures Table

Phenomenon	Speculated Cause	Cause Investigation Method	Countermeasure
No display	Poor connection	Confirm the connection status of the connector	Please connect the connector
Large fluctuation in flow display	Reverse connection of piping	Confirm whether the installation direction of the product is consistent with the flow direction	Please ensure that the installation direction meets the flow direction requirements
	Foreign matter mixing in or adhesion in the flow path of the sensor part	①Confirm whether there is a possibility of foreign matter ②Confirm whether it is adhered by foreign matter	It is recommended to set a filter of about 40 mesh. Please remove the foreign matter
	Insufficient water flow	Confirm whether the flow path is filled with water	Please keep the flow path in a water-filled state
	Flow pulsation	Confirm whether there is a change in supply pressure and whether the compressor or pump as the pressure source has characteristic pulsation	Please replace it with a pump with less pulsation. Please set an air tank, etc. to reduce pressure changes. Please replace it with an elastic piping such as a rubber hose
Buttons no response	In the button lock state	Confirm each button	Confirm whether the button is locked

Wire Specification

► FMS3series uses a 4-wire cable with M8 connector, available in 3m, 5m, and 10m lengths



Pinout Definition

No.	Name	color
1	DC(+)	Brown
2	OUT2	White
3	DC(-)	Blue
4	OUT1	Black

Wire Specification

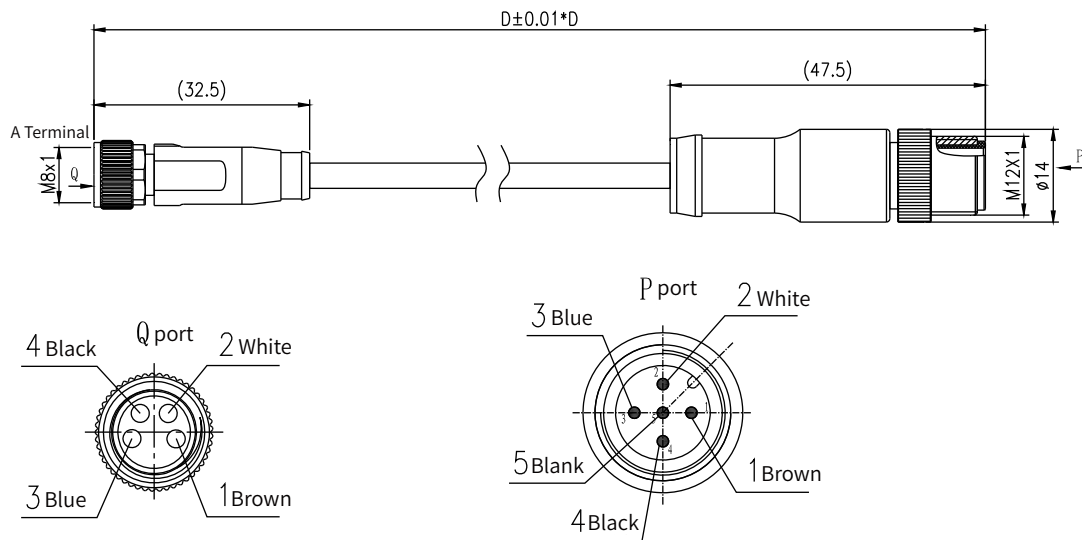
Conductor	Outer Diameter	AWG23
	Material	Approximately 0.7mm
Insulator	Material	Heat-resistant PVC
	Outer Diameter	Approximately 1.1mm
Sheath	Color	Brown, White, Black, Blue
	Material	Oil-resistant PVC
Finished Product Outer Diameter		Φ4

Digital Water Flow Sensor

FMS3 SERIES

Dimensions

► M8-4P female straight connector to M12-5P male straight connector (Unspecified tolerances per GB/T 1804-m; Unit: mm):



Wiring Table

A Terminal	Core Wire Color	B Terminal	Cable Specification
M8-4P Female Straight Head Hole Position No		M12-5P Male Straight Head Hole Position No	
1	Brown	1	UL2464 4*24AWG (E497459) PVC Sheath
2	White	2	
3	Blue	3	
4	Black	4	

Connection Precautions

- Smaller pipe sizes are more susceptible to straight-run length effects.
- Virtually unaffected by fluid pressure variations
- Low flow rates are less affected by straight-pipe length requirements.
- To maintain accuracy within $\pm 3\%$ FS, ensure straight-pipe length $\geq 8\text{cm}$ ($\geq 11\text{cm}$ for 100L/min & 250L/min models).

