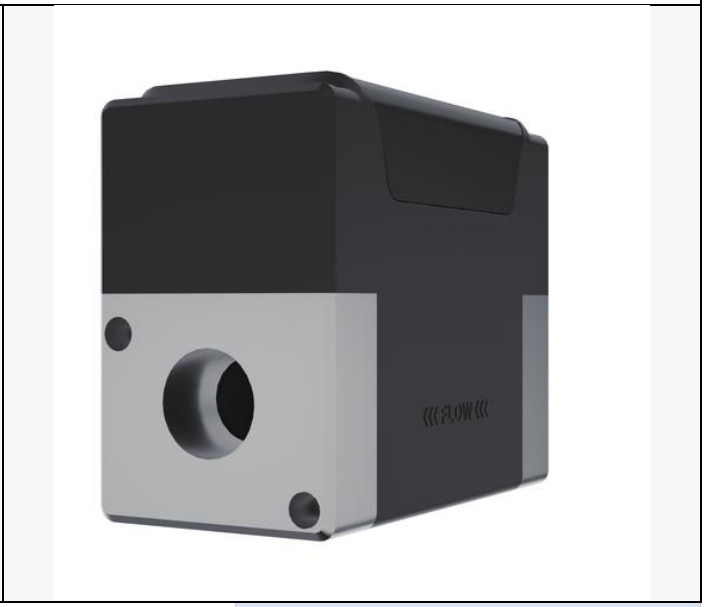
SensorsX

SX-FVMB Series

Compact Vortex Flow Sensor

Industrial Water-Based Liquid Flow Measurement



±2 % Accuracy (Water)	**DN8 – DN32** Pipe Size Range	**< 10 ms** Response Time
IP65 Ingress Protection	**LCD 90° Rotatable** Display	**24 V DC** Power Supply

Vortex Flow | Volume Flow + Temperature | RS485 Modbus RTU | 4–20 mA | IO-Link | NPN / PNP

■ PRODUCT OVERVIEW

The SX-FVMB series is a compact vortex flow sensor that monitors non-corrosive water-based fluid flow. It detects two process values: volume flow rate and medium temperature.

Standard outputs include RS485, 0–5 V, 4–20 mA, and IO-Link / NPN / PNP. The LCD display features English menus and supports 90° free rotation in any direction. Response time is less than 10 ms. The sensor also provides excellent vibration resistance and EMI immunity.

Typical Measurements

- Volume flow rate
- Medium temperature

Measurement medium: water-based fluids (non-corrosive)

PED NOTE: For sizes below DN50, mandatory PED conformity may not apply. Confirm project-specific compliance requirements before ordering.

■ KEY FEATURES

- ◆ **Water-Based Fluid Measurement**
  Monitors non-corrosive water-based liquids
- ◆ **Two Process Variables**
  Simultaneously detects volume flow rate and medium temperature
- ◆ **Multiple Output Options**
  Standard: RS485, 0–5 V, 4–20 mA, IO-Link / NPN / PNP
- ◆ **LCD Display**
  English-menu LCD with 90° free rotation
- ◆ **Fast Response**
  Response time less than 10 ms
- ◆ **Strong Vibration & EMI Resistance**
  Excellent anti-vibration and anti-EMI performance
- ◆ **Six Pipe Sizes**
- ◆ **Compact Integral Design**

DN8, DN10, DN15, DN20, DN25, DN32	Sensor and transmitter in one body

■ TYPICAL APPLICATIONS

Typical Applications

- Liquid Cooling Systems
- Factory Automation
- HVAC & Building Services
- Heat pump
- Semiconductor Manufacturing
- General Industrial Process

■ PERFORMANCE SPECIFICATIONS

Flow Range by Pipe Size

Pipe Size	Flow Range (m³/h)	Flow Range (L/min)
DN8	0.09 – 0.9	1.5 – 15
DN10	0.22 – 1.5	3.67 – 25
DN15	0.21 – 3	3.5 – 50
DN20	0.3 – 5.1	5.0 – 85
DN25	0.48 – 8.1	8.0 – 135
DN32	0.84 – 14.4	14 – 240

Note: Different pipe sizes correspond to different flow ranges. Select the pipe size based on the required measurement range.

General Specifications

Measurement	
Measurement Principle	Vortex
Measurement Medium	Water-based fluids (non-corrosive)
Measured Variables	Volume flow rate; medium temperature
Pipe Size Range	DN8 to DN32
Accuracy (Water)	±2 %
Response Time	< 10 ms
Process Conditions	
Medium Temperature	−10 to +95 °C (+14 to +203 °F)
Maximum Working Pressure	1.0 MPa (145 psi) — PN10
Display	
Display Type	LCD (English menu)
Display Orientation	90° free rotation in any direction
Flow Units	
Available Units	m³/h | t/h | L/h | L/min | mL/min

■ DISPLAY & KEYPAD DEFINITION

① ② LED indicators	① and ② power-on status LEDs (lit continuously from power-on until measurement screen). ① Power status indicator (lit continuously after power-on). ② Working status indicator (lit when flow present; off when no flow)
③ Button ■ (Select)	1. Change from run mode to main menu. 2. Change to set mode. 3. Confirm a set parameter value.
④ Buttons ▲ ▼	1. Select a parameter. 2. Change a parameter value (hold button). 3. In normal run mode: view totalizer; press again to return to run mode.

■ ELECTRICAL SPECIFICATIONS

Power Supply	
Supply Voltage	24 V DC (10.8–30 V DC range)
Output Signal (Flow)	
Standard Outputs	RS485 Modbus RTU, 0–5 V, 4–20 mA, IO-Link / NPN / PNP
All Flow Outputs Include	Pulse output
4–20 mA	4-wire + pulse
RS485	Modbus RTU + pulse
PNP / NPN	Discrete + pulse
IO-Link	IO-Link + pulse
0–5 V	0–5 V + pulse
Output Signal (Temperature)	
Options	4–20 mA (Available only when the selected flow output is 4–20 mA) or 0–5 V (Available only when the selected flow output is 0–5 V) or Without
Electrical Connection	
M12 × 1	M12 × 1 connector (cable 2 m)
Direct wire	Direct cable exit 2 m [DN8 only]

■ ENVIRONMENTAL SPECIFICATIONS

Temperature	
Ambient Temperature (operation)	0 to +60 °C (32 to +140 °F)
Storage Ambient Temperature	0 to +60 °C (32 to +140 °F)
Humidity	
Relative Humidity (operation & storage)	5–95 %
Atmospheric Pressure	
Storage Atmospheric Pressure	86–106 kPa (12.5–15.4 psi)
Mechanical	
Ingress Protection	IP65
Vibration Resistance	Excellent anti-vibration performance
EMI Immunity	Excellent electromagnetic interference immunity
Housing	
Junction Box Material	PPS
Junction Box Ambient Range	−20 to +70 °C (−4 to +158 °F)

■ PROCESS CONNECTIONS & WETTED MATERIALS

Process Connection	
Flange Standard	EN 1092-1 / ASME B16.5, Raised Face (RF) available on request
Thread Types	G, NPT, RC, PT (male and female external / internal)
Special	Union (pipe union); Sanitary clamp (tri-clamp)
Pressure Rating	PN6 (0.6 MPa / 87 psi) or PN10 (1.0 MPa / 145 psi)
Materials in Contact with Medium	
Probe Material	ETFE

Wetted Material	PPS
Connection Material	304 stainless steel | 316 stainless steel | 316L stainless steel | PPH
Seal Material	
Without seal	Code X
NBR	Code K
PTFE (flange connections only)	Code 2
FKM / Viton (thread connections only)	Code F
Housing	
Junction Box Material	PPS
Ingress Protection	IP65
Junction Box Ambient Range	−20 to +70 °C (−4 to +158 °F)

■ COMMUNICATION PROTOCOLS

RS485 / Modbus RTU

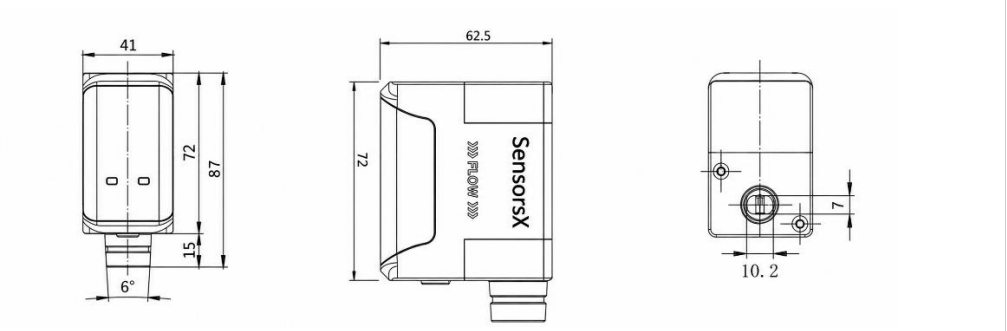
Interface	RS-485 (2-wire bus)
Protocol	Modbus RTU
Default Node ID	10
Baud Rate	9600 bps
Data Bits	8
Stop Bits	1
Parity	None

Modbus Register Map

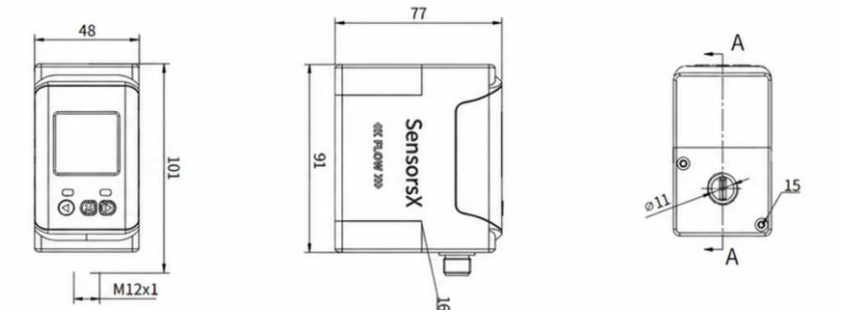
Modbus Address	Access	Data Type	Definition
40001	Read only	16-bit low word	Instantaneous flow rate — low 16 bits
40002	Read only	16-bit high word	Instantaneous flow rate — high 16 bits
40003	Read only	16-bit low word	Temperature — low 16 bits
40004	Read only	16-bit high word	Temperature — high 16 bits
40005	Read only	16-bit low word	Total flow — low 16 bits
40006	Read only	16-bit high word	Total flow — high 16 bits

■ MECHANICAL DIMENSIONS

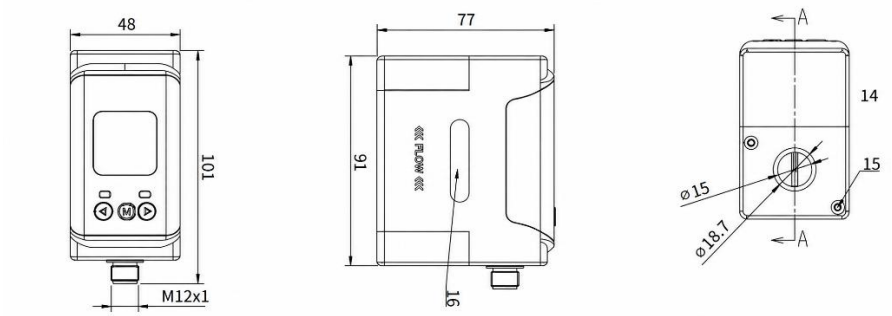
DN8



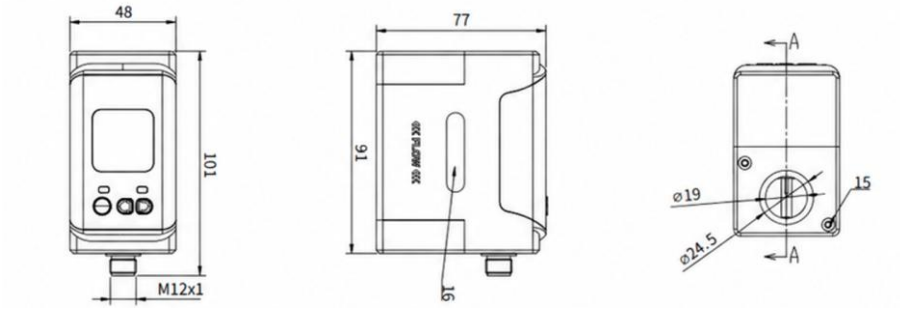
DN10



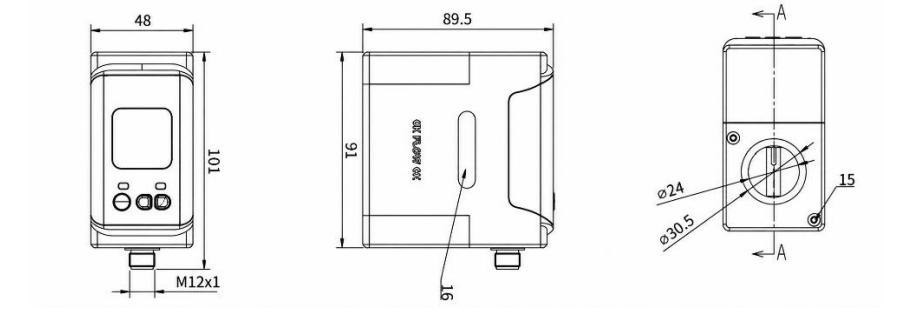
DN15



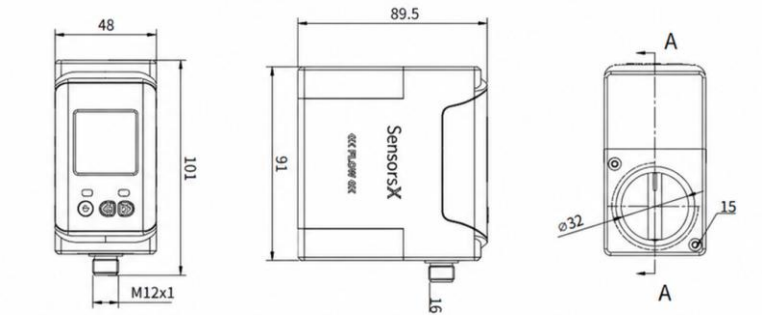
DN20



DN25



DN32



Note: All dimensions in mm.

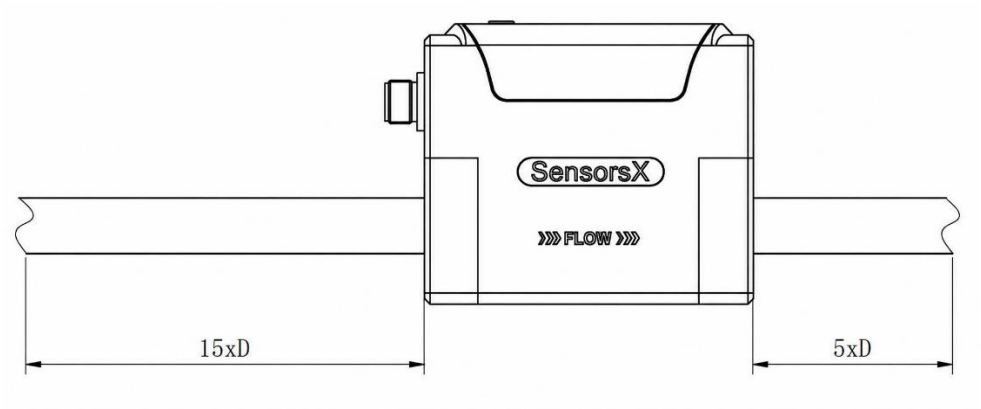
■ INSTALLATION

Straight-Pipe Requirements (D = nominal pipe diameter)

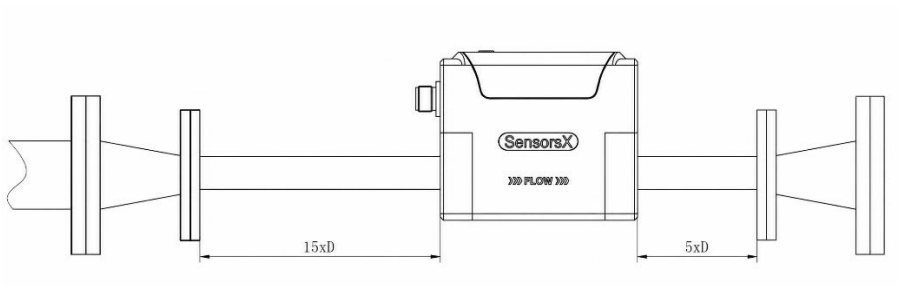
Configuration	Upstream	Downstream	Note
Straight pipe	≥ 15D	≥ 5D	D = nominal pipe diameter
Reducer	≥ 15D	≥ 5D	
Expander	≥ 15D	≥ 5D	
Single elbow	≥ 25D	≥ 5D	Downstream of elbow
Double elbow	≥ 50D	≥ 5D	
Valve — downstream	≥ 5D (downstream of valve)	—	Regulating or partially-open valve
Valve — upstream	≥ 25D (after valve)	≥ 5D	Regulating or partially-open valve

Installation Diagrams

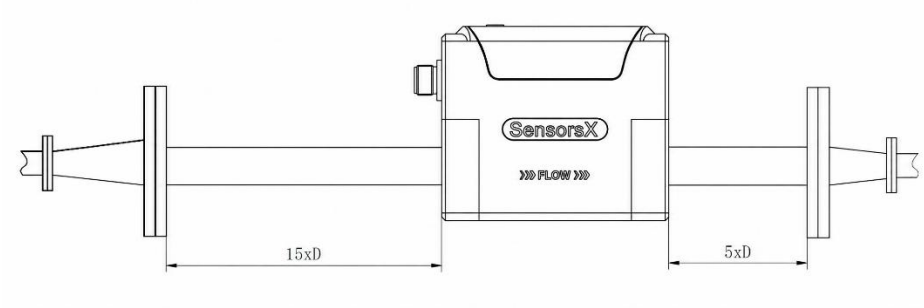
1. Straight Pipe Upstream ≥ 15D | Downstream ≥ 5D



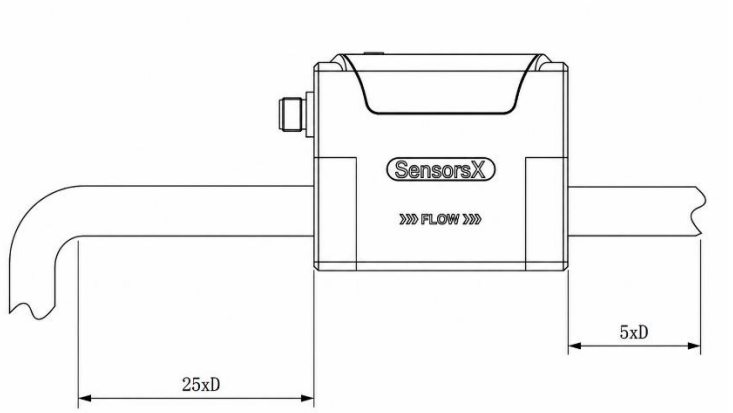
2. Reducer (Contraction) Upstream ≥ 15D | Downstream ≥ 5D



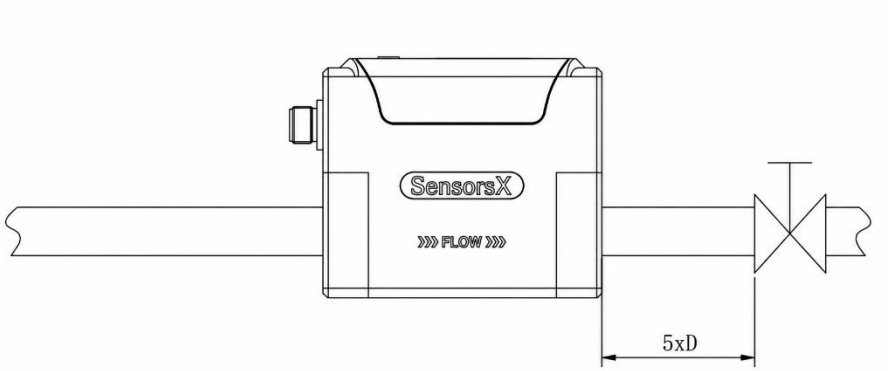
3. Expander (Expansion) Upstream ≥ 15D | Downstream ≥ 5D



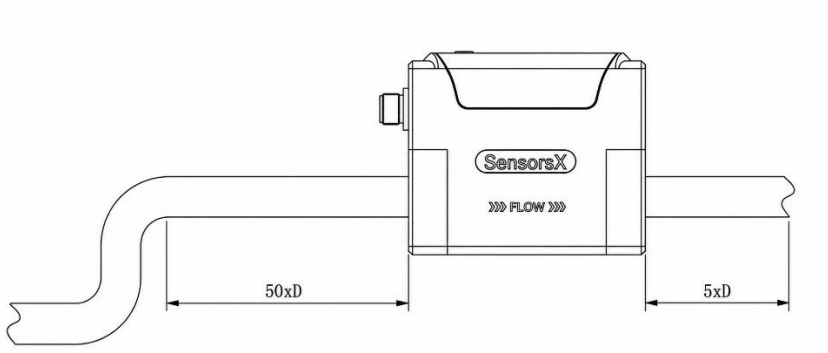
4. Single Elbow
Upstream ≥ 25D |
Downstream ≥ 5D



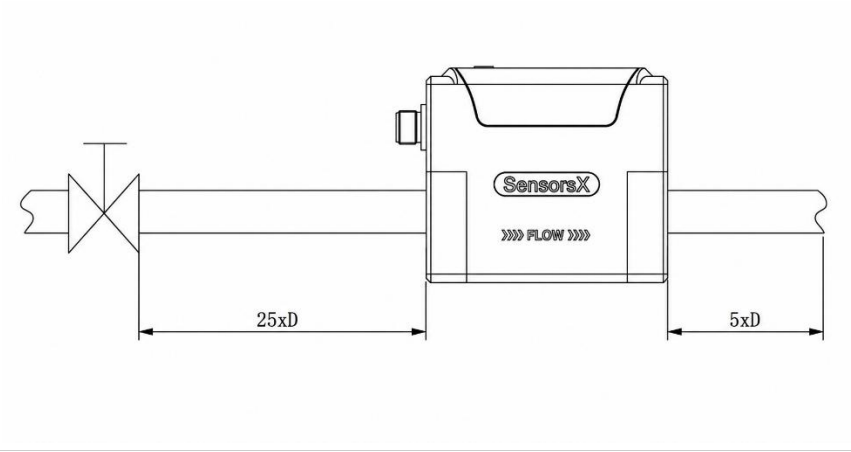
5. Valve (Downstream)
Valve ≥ 5D downstream of meter



6. Double Elbow
Upstream ≥ 50D |
Downstream ≥ 5D

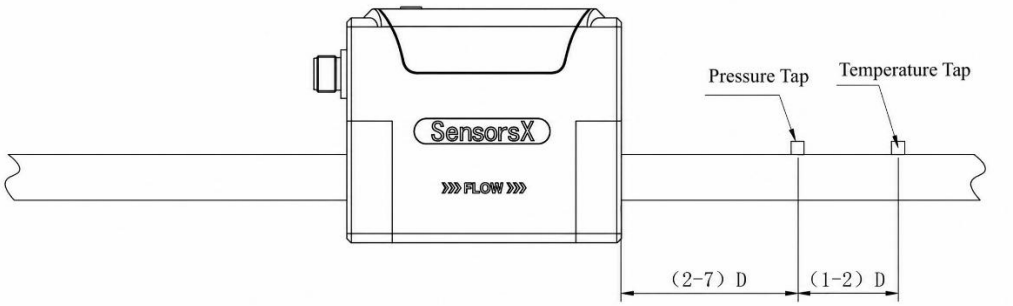


7. Valve (Upstream) ≥ 25D after valve | Downstream ≥ 5D



8. Pressure Tap and Temperature Tap Positions

Pressure tap: 2–7D downstream of flowmeter.
Temperature tap: 1–2D downstream of pressure tap.



Additional Installation Notes

• Avoid locations with large temperature variation. If strong thermal radiation is present, provide heat shielding and ventilation.
• Avoid installation in environments containing corrosive gases. If unavoidable, provide adequate ventilation.
• Although the flowmeter is robustly built, install in locations with minimal vibration or mechanical shock. Add pipe supports if installed on a high-vibration line.
• Ensure no leaks at pipe connections. Applied pressure must not exceed the rated maximum. When measuring hazardous liquids, prevent splashing on eyes or skin.

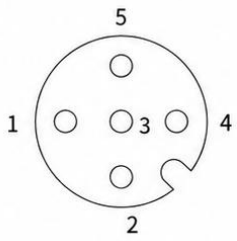
■ WIRING DIAGRAM

5-Pin Aviation Connector — Pin Assignment by Output Variant

RS485 Output Variant	
Pin 1 Brown	Power +
Pin 2 White	RS485 Signal B
Pin 3 Blue	Power −
Pin 4 Black	Pulse output
Pin 5 Grey	RS485 Signal A
0–5 V / 4–20 mA Output Variant (temperature output version)	
Pin 1 Brown	Power +
Pin 2 White	Flow: 0–5 V or 4–20 mA
Pin 3 Blue	Power −
Pin 4 Black	Pulse output
Pin 5 Grey	Temperature: 4–20 mA output
0–5 V / 4–20 mA Output Variant	

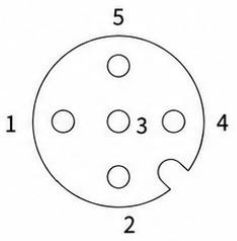
Pin 1 Brown	Power +
Pin 2 White	Flow: 0–5 V or 4–20 mA
Pin 3 Blue	Power −
Pin 4 Black	Pulse output
Pin 5 Grey	Reserve
IO-Link / NPN / PNP Output Variant	
Pin 1 Brown	Flow: IO-Link / NPN / PNP
Pin 2 White	Reserved
Pin 3 Blue	Power +
Pin 4 Black	Pulse output
Pin 5 Grey	Power −
0–5 V / 4–20 mA Output Variant (Direct wire, 3-wire) [DN8 only]	
Pin 1 Red	Power +
Pin 2 White	Flow: 0–5 V or 4–20 mA
Pin 3 Black	Power −

RS485 Wiring Instructions



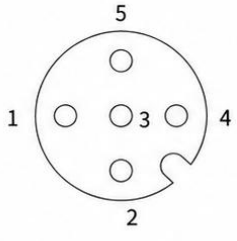
1 (Brown): Power+
2 (White): Signal B
3 (Blue): Power-
4 (Black): Pulse Output
5 (Gray): Signal A
(Factory set)
Note: Wire color shall prevail in kind

0~5V/4~20mA, 4-20mA (Dual Output)



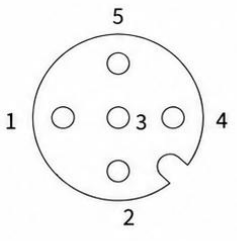
1 (Brown): Power+
2 (White): Flow 0~5V/4~20mA
3 (Blue): Power-
4 (Black): Pulse Output
5 (Gray): Temperature 4-20mA Output
(Factory set)
Note: Wire color shall prevail in kind

0~5V/4~20mA Wiring Instructions



1 (Brown): Power+
2 (White): Signal 0~5V/4~20mA
3 (Blue): Power-
4 (Black): Pulse Output
5 (Gray): Reserved
(Factory set)
Note: Wire color shall prevail in kind

IO-Link/NPN/PNP Output



1 (Brown): IO-Link/NPN/PNP Output
2 (White): Reserved
3 (Blue): Power+
4 (Black): Pulse Output
5 (Gray): Power-
(Factory set)
Note: Wire color shall prevail in kind

■ ORDERING INFORMATION

Complete model number example: SX-FVMB-2028AK0XH244K48XF15

Accuracy	
20	**±2 %**
Probe Material	
2	**ETFE**

Wetted Material	
8	PPS
Explosion Protection	
A	Without (non-hazardous areas)
Display / Junction Box	
K	PPS housing, IP65, ambient −20 to +70 °C (−4 to +158 °F), LCD display
L	PPS housing, IP65, ambient −20 to +70 °C (−4 to +158 °F), without LCD [DN8 only]
Structure Type	
0	Standard temperature / pressure type — fluid −10 to +95 °C (+14 to +203 °F), pressure 0–1 MPa (145 psi)
Seal Material	
X	Without seal
K	NBR (Nitrile Butadiene Rubber) *[Requires Connection Type = Flange (code H)]*
2	PTFE *[Requires Connection Type = Thread]*
F	FKM (Viton)
Process Connection Type	
H	Flanged connection; flange standard to be specified when ordering
R	G-type male external thread
P	NPT-type male external thread
S	RC-type male external thread
Q	PT-type male external thread
N	G-type female internal thread
L	NPT-type female internal thread
K	RC-type female internal thread
M	PT-type female internal thread
Y	Union (pipe union)
T	Sanitary clamp (tri-clamp)
Process Pressure Rating	
1	PN6 (0.6 MPa / 87 psi)
2	PN10 (1.0 MPa / 145 psi)
Connection Size (Flange , Thread , Clamp)	
3	DN10, 3/8", 34
4	DN15, 1/2", 50.5
5	DN20, 3/4", 64
6	DN25, 1", 77.5
7	DN32, 1-1/4", 91
Connection Material	
4	304 stainless steel
6	316 stainless steel
7	316L stainless steel
8	PPH
Electrical Connection	
A	Direct cable exit (2 m) [DN8 only]
K	M12 × 1 (cable 2 m)

Power Supply	
4	24 V DC
Output Signal (Flow)	
4	4–20 mA (4-wire) + Pulse
8	RS485 Modbus RTU + Pulse
P	PNP + Pulse
N	NPN + Pulse
K	IO-Link + Pulse
E	0–5 V + Pulse
Output Signal (Temperature)	
X	Without temperature output
4	4–20 mA (4-wire) [Available only when the selected flow output is 4–20 mA.]
E	0–5 V DC [Available only when the selected flow output is 0–5 V.]
Flow Unit	
F	m^3/h
U	t/h
H	L/h
J	L/min
E	mL/min
Flow Range (Pipe Size)	
8	DN8
10	DN10
15	DN15
20	DN20
25	DN25
32	DN32
K38	NPS ⅜"
K12	NPS ½"
K34	NPS ¾"
N1	NPS 1"
K114	NPS 1¼"
Customized	
D	Custom configuration — specify requirements when ordering