

SensorsX

SX-MTMSB Series

Single-Axis MEMS Inclinometer
Industrial Motion & Position Measurement



0.001° Resolution	±15° to ±120° Selectable Range	0.25% / 0.5% FS Total Accuracy
IP67 / IP68 Ingress Protection	-40 to +85 °C Operating Temperature	Analog / Fieldbus Output Options

Industrial Motion Measurement | Inclination | Tilt | Leveling

■ PRODUCT OVERVIEW

The SensorsX SX-MTMSB Series is a single-axis MEMS inclinometer designed for continuous tilt and attitude measurement in industrial applications. The series supports selectable measurement ranges up to $\pm 120^\circ$, 0.001° resolution, and multiple analog or digital output options, including 4–20 mA, voltage output, RS-485, CANopen, Modbus, and Profibus. With a 12–32 V DC supply range, aluminum-alloy housing, IP67/IP68 protection options, and direct cable, M12 × 1, or Binder 712 connection configurations, the series is suitable for aerospace, high-speed rail, engineering machinery, marine equipment, and related industrial tilt-measurement applications.



■ KEY FEATURES

◆ Selectable angular ranges from $\pm 15^\circ$ to $\pm 120^\circ$	◆ Total accuracy options: 0.25% FS or 0.5% FS
◆ Outputs: 4-20 mA, 0.5-4.5 V, 0-5 V, RS-485, CANopen, Modbus or Profibus	◆ Wide 12-32 V DC supply range and 50 V DC overvoltage protection
◆ 0.001° resolution with $\pm 0.005^\circ/\text{C}$ temperature drift	◆ 50 g shock resistance and 5 g vibration resistance
◆ IP67 with connector; IP68 with direct cable outlet	

■ TYPICAL APPLICATIONS

- Aerospace
- High-Speed Rail
- Industrial Machinery
- Marine / Ships

■ MEASUREMENT PERFORMANCE

Measurement principle	Single-axis inclination measurement
Angular range	$\pm 15^\circ$, $\pm 30^\circ$, $\pm 40^\circ$, $\pm 50^\circ$, $\pm 60^\circ$, $\pm 70^\circ$, $\pm 80^\circ$, $\pm 90^\circ$, $\pm 100^\circ$, $\pm 110^\circ$ or $\pm 120^\circ$
Resolution	0.001°
Total accuracy	0.25% FS or 0.5% FS
Temperature drift	$\pm 0.005^\circ/\text{C}$
Long-term stability	$\leq \pm 0.1\%$ FS/year (typical)

ELECTRICAL

Supply voltage	24 V DC nominal (12-32 V DC operating range)
Output signal	4-20 mA (3-wire); 0.5-4.5 V DC (3-wire); 0-5 V DC (3-wire); RS-485 (4-wire); CANopen (4-wire); Modbus (4-wire); Profibus (4-wire)
Current consumption	≤ 40 mA
Overvoltage protection	50 V DC
Insulation resistance	≥ 100 M Ω at 100 V DC
Protection	Power-supply reverse-polarity protection; 50 V DC overvoltage protection

ENVIRONMENTAL & MECHANICAL

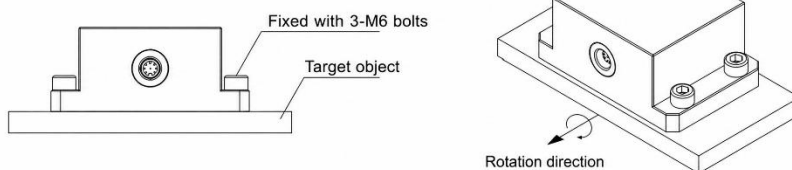
Operating temperature	-40 to +85 °C
Storage temperature	-40 to +120 °C
Shock resistance	IEC 60068-2-27, 50 g, 11 ms
Vibration resistance	IEC 60068-2-6, 49.1 m/s ² (5 g)
EMC / Surge Immunity	IEC 61000-6-2 / IEC 61000-6-3 / IEC 61000-6-4; surge immunity tested
Housing material	Aluminum alloy
Ingress protection	IP67: Binder 712 or M12 connector; IP68: direct cable outlet

CERTIFICATIONS & APPROVALS

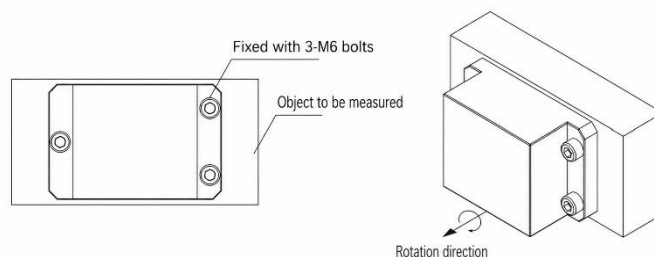
Compliance	RoHS / CE
------------	-----------

INSTALLATION ORIENTATION

Top-Mount Installation



Side-Mount Installation

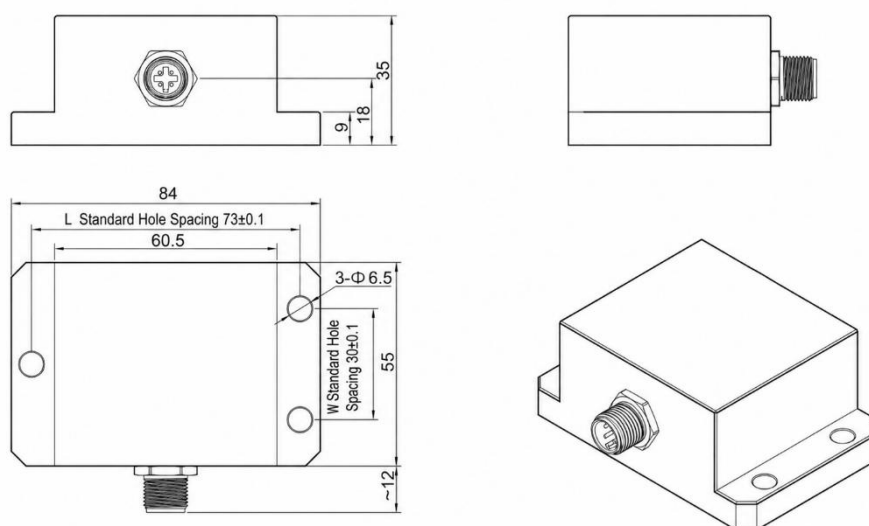


Install the sensing axis in the required orientation. Top-surface and side-surface mounting configurations are available. Confirm the required mounting orientation when ordering.

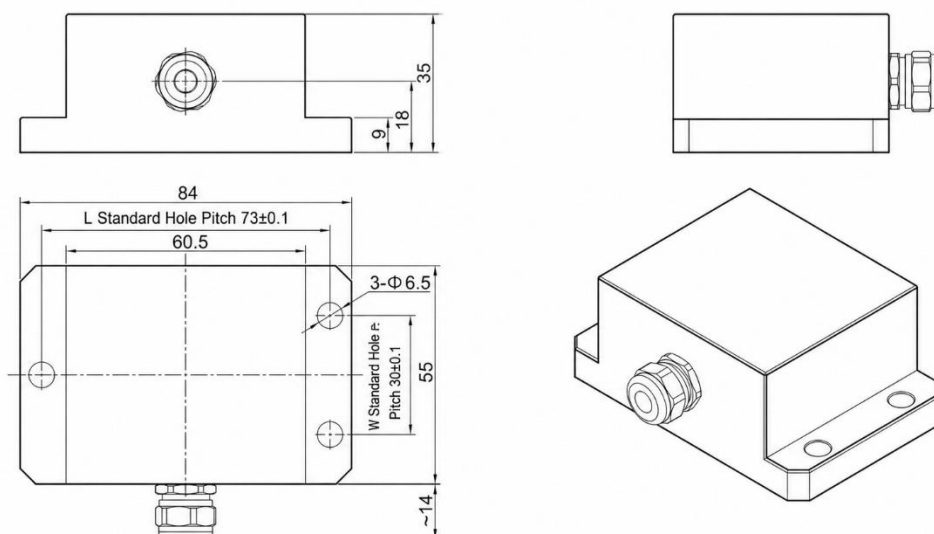
- ◆ Secure the unit using three M6 fasteners through the three $\varnothing 6.5$ mm mounting holes.
- ◆ Avoid mounting stress and ensure the reference surface is flat and rigid.
- ◆ The direction of rotation and zero reference must be verified during system commissioning.

MECHANICAL DIMENSIONS

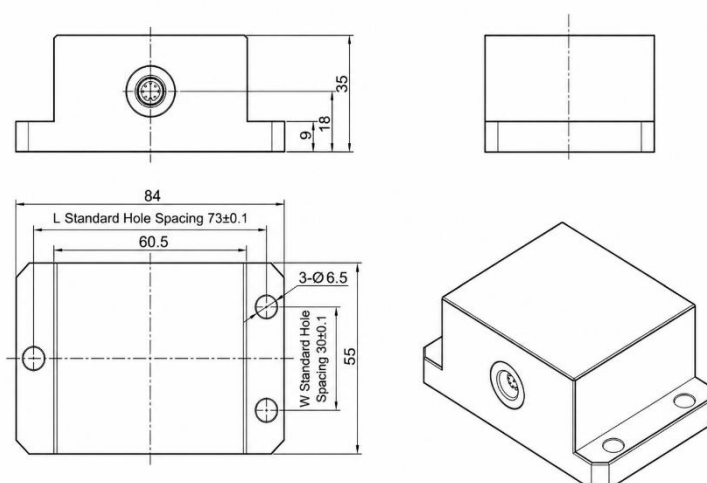
M12×1 Connector



Direct Cable Outlet



Binder Connector



Note: Mounting hole spacing L and W can be customized.

■ WIRING DIAGRAM

Direct Cable Outlet

Wire color	Analog variants (4 / 1 / 2)	Digital variants (K / M / P / Q)
Red	+24 V DC	+24 V DC
Yellow	Signal +	Signal +
Green	0 V	0 V
White	Not connected	Signal -
Shield	Shield	Shield

Connector Pin Assignment

Connector	Pin	Analog variants	Digital variants
Binder 712	1	+24 V DC	+24 V DC
Binder 712	2	Signal	Not connected
Binder 712	3	0 V	0 V
Binder 712	4-5	Not connected	Not connected
Binder 712	6	Not connected	Signal -
Binder 712	7	Not connected	Signal +
M12 × 1, 5-pin	1	+24 V DC	+24 V DC
M12 × 1, 5-pin	2	Signal +	Signal +
M12 × 1, 5-pin	3	0 V	0 V
M12 × 1, 5-pin	4	Not connected	Signal -
M12 × 1, 5-pin	5	Not connected	Not connected

※ **Binder 712 Assignment:** Viewed from the mating side with the keyway facing down, PIN1 is the leftmost pin. The pins are numbered clockwise from PIN1 to PIN7.

※ **M12×1 Assignment:** Viewed from the mating side with the keyway facing down, PIN1 is the lower-left pin. The pins are numbered counterclockwise from PIN1 to PIN5.

■ ORDERING INFORMATION

Complete model number example: **SX-MTMSB-40S±30°25D**

Output	
4	4-20 mA
1	0.5-4.5 V DC
2	0-5 V DC
K	CANopen
M	Modbus
P	Profibus
Q	RS-485
Electrical Connection	
0	Direct cable outlet
6	M12 × 1 male, 5-pin
9	Binder, 7-pin
Mounting	
S	Side-surface mounting
T	Top-surface mounting
Measurement Range	
±15°	±15° full scale
±30°	±30° full scale
±40°	±40° full scale
±50°	±50° full scale
±60°	±60° full scale
±70°	±70° full scale
±80°	±80° full scale
±90°	±90° full scale

±100°	±100° full scale
±110°	±110° full scale
±120°	±120° full scale
Total Accuracy	
25	0.25% FS
50	0.5% FS
Optional / Customized	
D	Customized requirements; specify in order remarks

※ Example interpretation: 4-20 mA output, direct cable outlet, side-surface mounting, ±30° measurement range, 0.25% FS total accuracy, with customized requirements specified in the order remarks.

※ For direct cable versions, specify the required cable length; confirm the exact interface protocol and pin assignment for digital-output variants; confirm customized mounting-hole distances L and W when required; use option D only when customized requirements are stated in the order remarks.