

SensorsX SX-LMNB Series

Magnetostrictive Level Transmitter

Rigid-rod and flexible-rod configurations for one- or two-position measurement



WIDE MEASURING RANGE

Rigid probe: 50–5000 mm; flexible probe: 4000–20000 mm

MULTIPLE OUTPUT OPTIONS

4–20 mA, 0–5 V, 0–10 V, ± 5 V, ± 10 V, RS485, HART or Profibus

HIGH ACCURACY

Non-linearity < $\pm 0.05\%$ F.S.; repeatability < $\pm 0.002\%$ F.S.

■ PRODUCT OVERVIEW

The SX-LMNB Series is a magnetostrictive level transmitter designed for precise and reliable liquid-level measurement. A magnetic float follows the liquid surface, while the internal sensing element determines the float position from the transit time of a torsional pulse. Rigid, flexible and corrosion-resistant probe configurations are available, with support for single- or dual-position measurement and multiple industrial output signals.

■ KEY FEATURES

- Single- or dual-position level measurement.
- Rigid probe range of 50–5000 mm and flexible probe range of 4000–20000 mm.
- Multiple outputs including 4–20 mA, voltage, RS485/Modbus, HART and Profibus.
- Non-linearity < $\pm 0.05\%$ F.S. and repeatability < $\pm 0.002\%$ F.S.
- 16-bit D/A conversion with update time up to 20 ms.
- Operating-temperature versions up to 200 °C.
- Rigid, flexible and corrosion-resistant probe constructions.
- Probe materials include 304 stainless steel, 316L stainless steel, PP and PVDF.
- Flameproof Ex d IIB T5 version available.
- IP65 standard protection, with IP67 or IP68 available on request.
- Direct cable, circular connector or terminal electrical connections.

■ TYPICAL APPLICATIONS

Bulk Storage & Process Tanks

- Chemical storage tank level

Oil & Water Interface

- Oil-water separator interface (Float 7)

Hazardous & High-Temperature

- Flameproof-area installations

- Process vessel interface/level control
- Tank bottom-water detection
- High-temperature process vessels (up to 200 °C)
- Fuel and petroleum tank gauging
- Hydrocarbon/water interface monitoring
- Dual-level measurement applications

■ TECHNICAL SPECIFICATIONS

Parameter	Specification
Measured positions	1 to 2 positions
Supply	+24 VDC $\pm 10\%$ or ± 15 VDC $\pm 10\%$
Selectable forward/reverse outputs	0-5 VDC; 0-10 VDC; 4-20 mA; -5 to +5 VDC; -10 to +10 VDC; Modbus RS485; HART; Profibus
Effective range	Rigid structure: 50-5000 mm; flexible structure: 4000-20000 mm; special customer range available
Load - current output	Maximum load resistance 600 Ω
Load - voltage output	Maximum load current 2 mA
Operating current	<70 mA
Operating temperature	-40 to 85 °C; -40 to 120 °C; -40 to 200 °C
Storage temperature	-40 to 100 °C

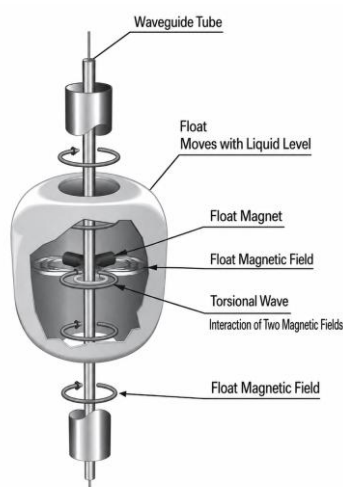
■ PERFORMANCE

Parameter	Specification
Non-linearity	< $\pm 0.05\%$ F.S.; maximum error 150 μm for range below 300 mm
Repeatability	< $\pm 0.002\%$ F.S.
Resolution	16-bit D/A conversion
Hysteresis	<0.002% F.S.
Temperature effect	<0.007% F.S./°C
Zero adjustment range	100% F.S.
Update time / sampling frequency	Range-dependent; not more than 20 ms

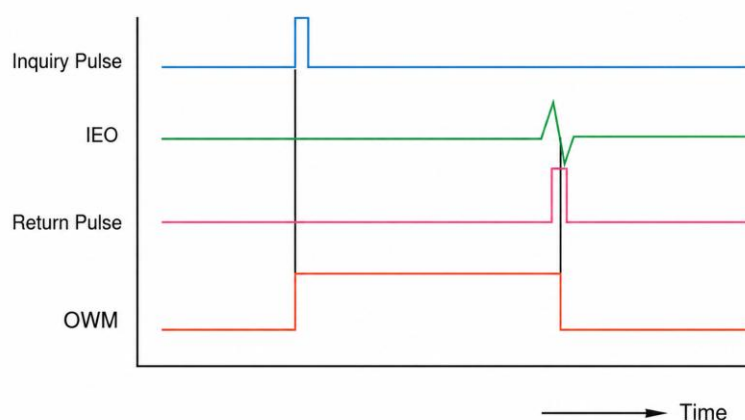
■ CONSTRUCTION AND MATERIALS

Item	Specification
Probe construction	Rigid probe, flexible probe, or corrosion-resistant probe
Probe material	304 stainless steel, 316L stainless steel, PP, or PVDF
Pressure rating	Determined by the selected float
Electronics housing material	Stainless steel or aluminium
Electronics enclosure	Type A stainless steel; Type B aluminium alloy; Type C PP; Type D PVDF
Installation interface	Threaded connection
Lead-out method	Direct cable, circular connector, or terminal
Explosion marking	Ex d IIB T5 (flameproof)
Ingress protection	IP65; IP67 or IP68 available on request

■ MEASURING PRINCIPLE



Structural Schematic



Operating Waveform Diagram

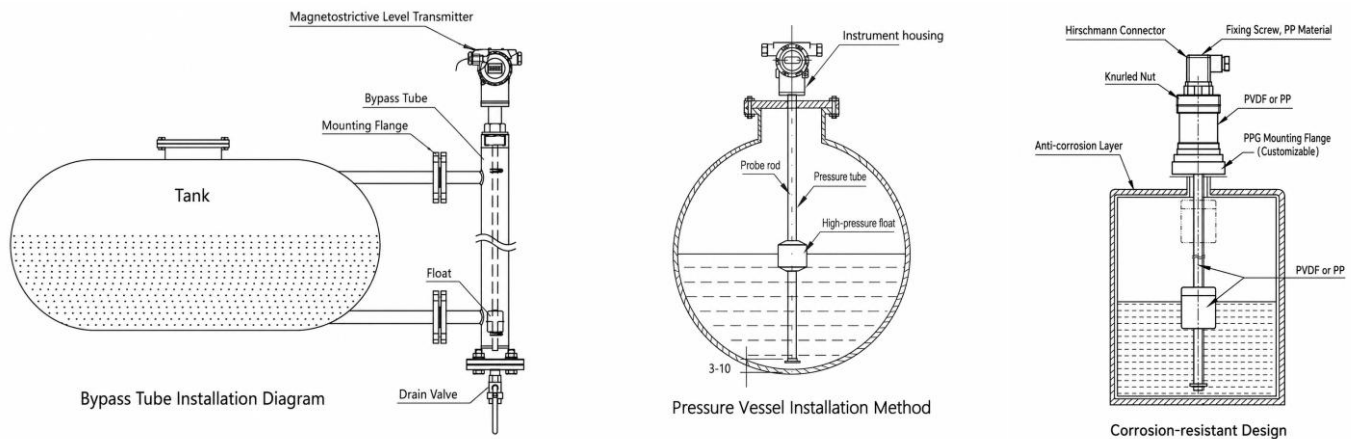
The magnetostrictive level transmitter measures liquid level by detecting the position of a magnetic float. A current pulse is sent through the magnetostrictive sensing rod, generating a magnetic field. When this field interacts with the permanent magnetic field of the float, a torsional return pulse is produced. The electronics calculate the float position from the time difference between the transmitted and return pulses, providing an accurate liquid level measurement.

■ TECHNICAL CHARACTERISTICS

Characteristic	Specification
Reliability	Non-contact sensing with no wear-prone mechanical transmission components.
Accuracy	Better than 0.01% F.S.
Safety	Flameproof construction available for hazardous-area applications.

Installation	Supports threaded top or side mounting.
System integration	Multiple analog and digital outputs support integration with control and monitoring systems.

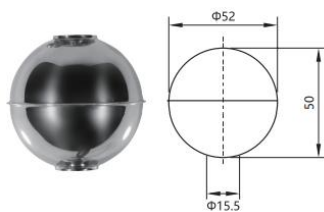
■ INSTALLATION INFORMATION



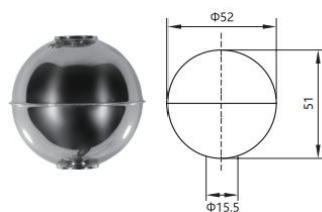
Before installation, read the complete instructions and keep ambient temperature, shock, vibration and pressure within the permitted range. Do not bend the probe. Protect the electronic housing and probe end from impact. Do not use the sensor in media that chemically attack or corrode it, and do not immerse the electronic housing or subject it to liquid-column pressure. Protect the probe after installation.

For bracket mounting, clamp the sensor in the bracket and secure the bracket to the sensor thread with the locking nut. Open the magnet ring by removing the two No. 6 retaining rings and two M3 × 12 screws, install the ring around the measuring rod, and refit the fasteners. Slight eccentricity of the magnet ring does not affect measurement performance. Fit the retaining plate at the lower end of the measuring rod with two M3 × 8 screws and two M3 nuts.

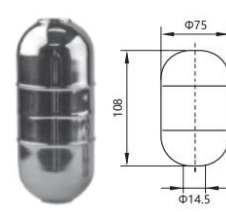
■ FLOAT SELECTION



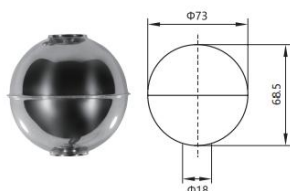
Float 01



Float 02



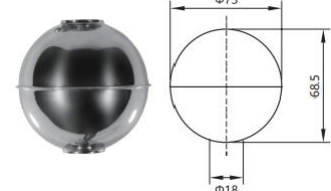
Float 03



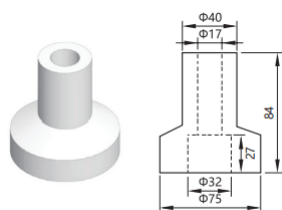
Float 04



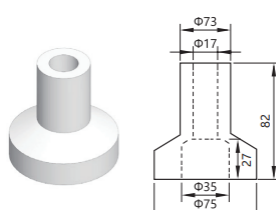
Float 05



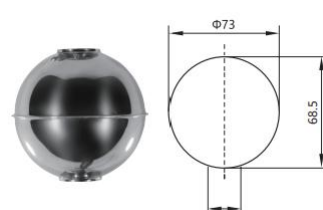
Float 06



Float 07



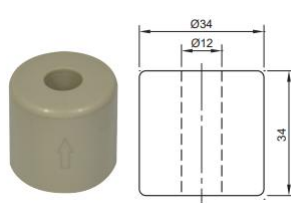
Float 08



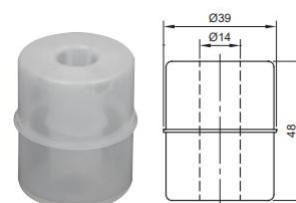
Float 09



Float 10



Float 11

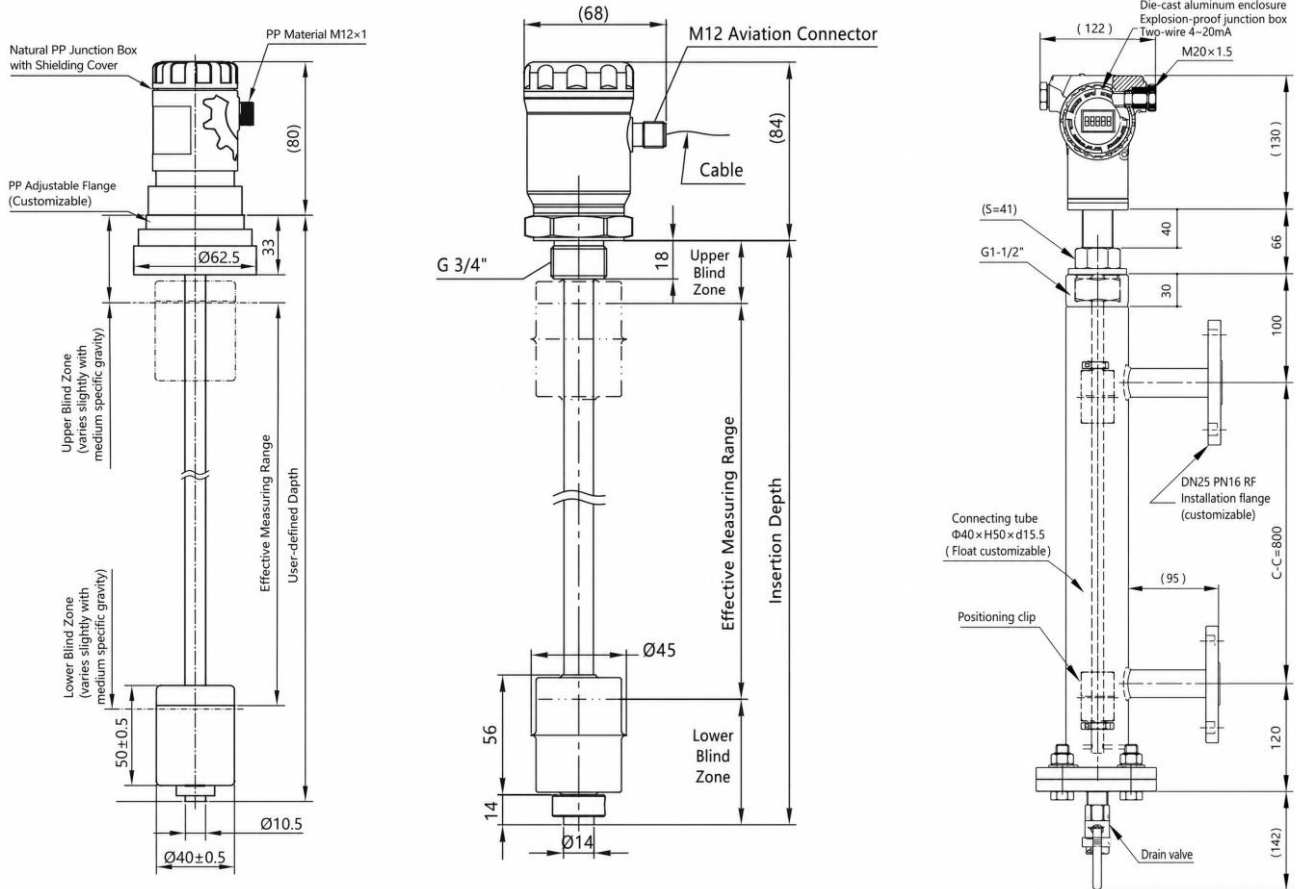


Float 12

Code	Geometry	Material	Density	Pressure
01	Sphere Ø52 × H50 × d15.5	316 stainless steel	0.55 g/cm ³	2.5 MPa
02	Sphere Ø52 × H51 × d15.5	316 stainless steel	0.80 g/cm ³	2.5 MPa
03	Slender cylinder Ø75 × H108 × d14.5	304 stainless steel	0.40 g/cm ³	2.5 MPa
04	Sphere Ø73 × H68.5 × d18	316 stainless steel	0.66 g/cm ³	2.5 MPa
05	Cylinder Ø45 × H56 × d15	316 stainless steel	0.50 g/cm ³	1.0 MPa
06	Sphere Ø73 × H68.5 × d18	316 stainless steel	0.90 g/cm ³	2.5 MPa
07	Cap Ø75 × Ø40 × H84 × d17	PP	0.77 g/cm ³	2.0 MPa
08	Cap Ø75 × Ø73 × H82 × d17	PP	0.93 g/cm ³	Suitable for high pressure
09	Sphere Ø73 × H68.5 × d18	316 stainless steel	1.10 g/cm ³	2.5 MPa
10	Cylinder Ø40 × H50 × d12	PVDF	0.85 g/cm ³	1.0 MPa
11	Cylinder Ø34 × H34 × d12	PP	0.85 g/cm ³	1.0 MPa
12	Cylinder Ø39 × H48 × d14	PFA	0.85 g/cm ³	1.0 MPa

Notes: float 07 is suitable for oil-water interface measurement; float 08 is suitable for high-pressure service and oil-water interface measurement; floats 10, 11 and 12 are suitable for liquid-level measurement. Special float customization is available.

■ SX-LMNB SERIES DIMENSIONAL DRAWING (REFERENCE)



Unit: mm

■ ORDERING INFORMATION

Complete model number example: **SX-LMNB-ZF1Y2A01000AT101**

Explosion Protection	
Z	Without
E	Flameproof
Connection	
F1	EN 1092 DN50 PN10 flange
M1	M20 × 1.5
N1	3/4 NPT
Probe Type	
R	Flexible rod (non-metal)
Y	Rigid rod
Probe Material	
1	304 stainless steel
2	316 stainless steel
3	PP
4	PVDF
5	316L stainless steel
6	PFA
Output / Supply	
A	4-20 mA / 24 VDC
B	0-5 V / 24 VDC
C	0-10 V / 24 VDC
D	-5 to 5 V / 15 VDC
E	-10 to 10 V / 15 VDC
F	RS485-Modbus / 24 VDC
G	HART 4-20 mA / 24 VDC
Electrical Connection	
0	Direct cable
1	Circular connector (not flameproof)
2	304 stainless steel junction box / electronics housing
3	316L stainless steel junction box / electronics housing
4	PP junction box / electronics housing
5	PVDF junction box / electronics housing
6	Type 300 junction box
Level Range	
50mm	50 mm
100mm	100 mm
200mm	200 mm
300mm	300 mm

500mm	500 mm
800mm	800 mm
1000mm	1000 mm
1200mm	1200 mm
1500mm	1500 mm
2000mm	2000 mm
2500mm	2500 mm
3000mm	3000 mm
4000mm	4000 mm
5000mm	5000 mm
6000mm	6000 mm
10000mm	10000 mm
20000mm	20000 mm
30000mm	30000 mm
Measurement Type	
A	Single level
B	Dual level
C	Level and temperature
Working Temperature	
T1	-40 to 85 °C
T2	-40 to 120 °C
T3	-40 to 200 °C
Float	
01	Spherical Float Ø52 × H50 × d15.5
02	Spherical Float Ø52 × H51 × d15.5
03	Slender Cylindrical Float Ø75 × H108 × d14.5
04	Spherical Float Ø73 × H68.5 × d18, Density: 0.66 g/cm³
05	Cylindrical Float Ø45 × H56 × d15
06	Spherical Float Ø73 × H68.5 × d18, Density: 0.90 g/cm³
07	Cap-Shaped Float Ø75 × Ø40 × H84 × d17
08	Cap-Shaped Float Ø75 × Ø73 × H82 × d17
09	Spherical Float Ø73 × H68.5 × d18, Density: 1.10 g/cm³
10	Cylindrical Float Ø40 × H50 × d12
11	Cylindrical Float Ø34 × H34 × d12
12	Cylindrical Float Ø39 × H48 × d14
Optional	
D	Customized information; specify in order remarks