

ESP Series

Frequency-Sweep Level Sensor

Product Selection Guide



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Zhejiang ELEsenson Sensors Co., Ltd.

CONTENTS

▶ PRODUCT CATEGORY	P01
· B: Standard Version	
· H: High Temperature Resistant Version	
· C: Corrosion Resistant Version	
· E: Explosion-proof Version	
▶ APPLICATION SCENARIOS	P24
▶ COMPANY PROFILE	P25

ESP Series

Frequency-Sweep Level Sensor



Product Introduction

ELEsenson frequency-sweep level sensor is an advanced level-measuring sensor, an innovator in industrial inspection. Centered on intelligent algorithms, it breaks through traditional limitations, accurately identifying subtle differences within complex samples and achieving fast, precise analysis of material properties. It performs excellently in scenarios ranging from cell-property research in biomedical R&D, strict quality control in food inspection, to precise performance evaluation in electronic-material sectors.

Despite its compact form factor, it delivers powerful performance. Simple-to-install and compatible with diverse equipment. Choosing ELEsenson means choosing efficient and accurate detection solutions, unlocking unlimited possibilities for industrial upgrading.

Features



Wide Application Range

Frequency-sweep sensor performance is unaffected by tank-mounting position.



Excellent Stability

No moving mechanical parts; stable and accurate measurement.



High Measuring Accuracy

Detects liquids, powders, solids and other media; performance independent of material density.

Application Scenarios



Chili-sauce Workshop



Flour Workshop



Food-processing Plant

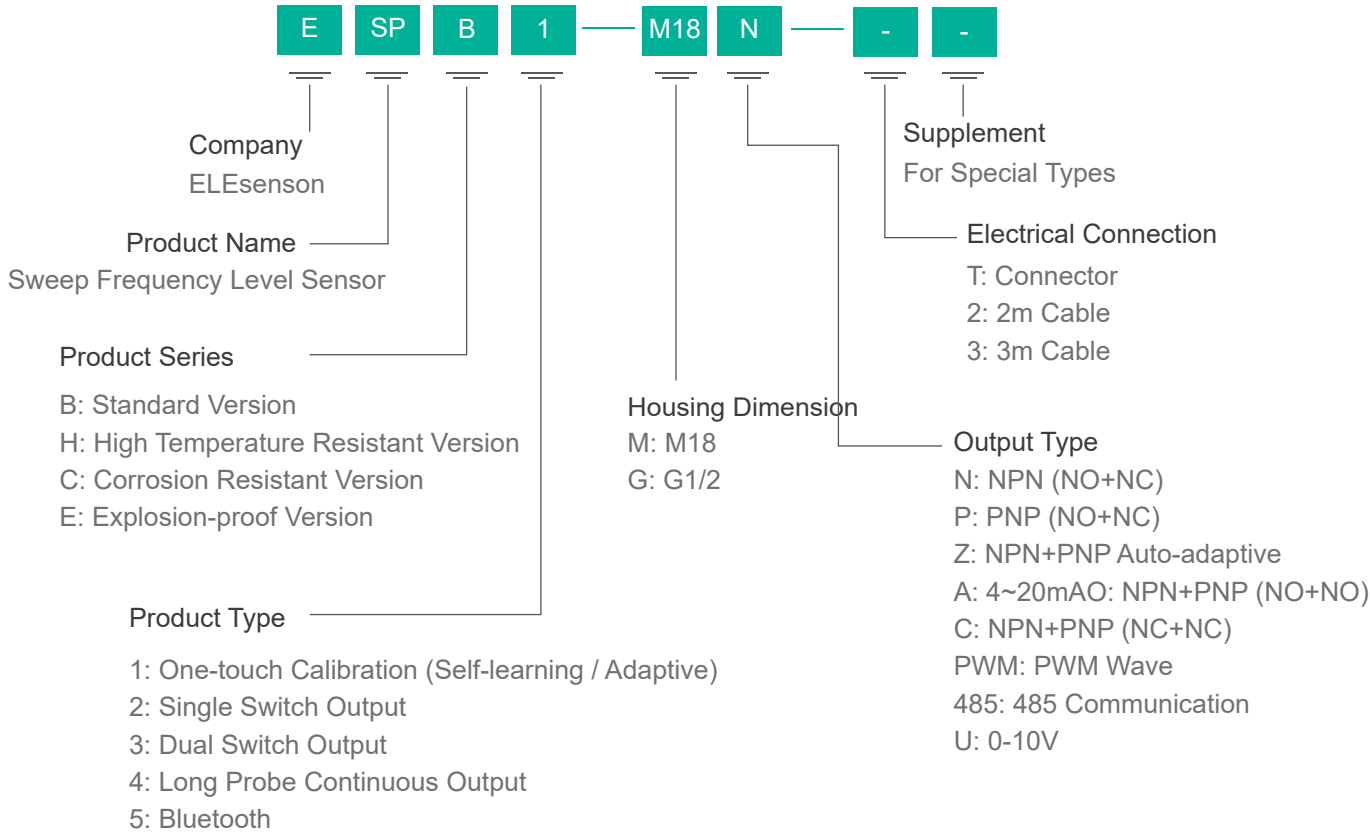


Beer Workshop

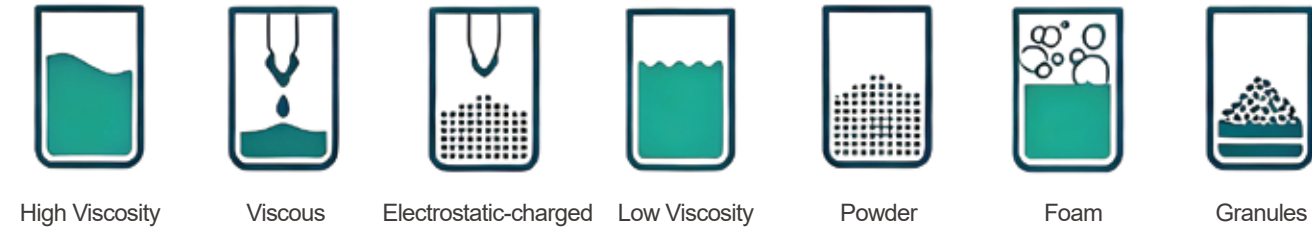


Iron-powder Workshop

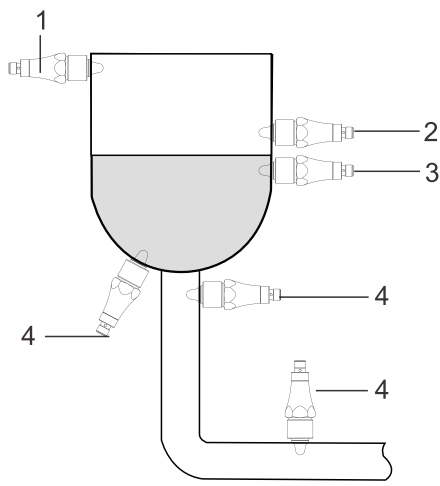
Model Code Definition



Suitable for a wide range of media, including liquids, pastes, viscous materials and solid media

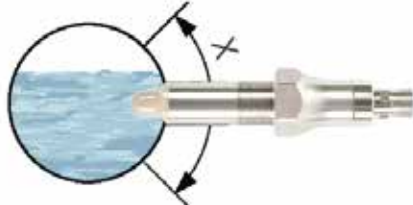


Mounting Position

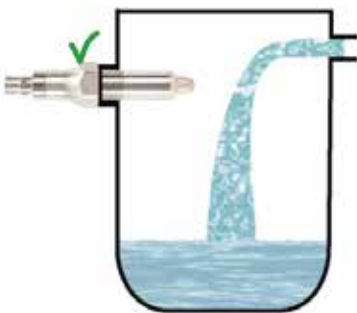


- 1 Overflow Alarm
- 2 High-level Alarm
- 3 Low-level Alarm
- 4 Dry-run Protection

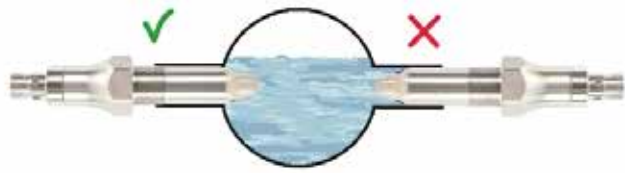
The sensor can be mounted at any position on the vessel. The sensor installed at the upper part of the vessel (1) prevents overflow. Sensors mounted at lower positions detect maximum (2) or minimum (3) material level. Sensors installed at the vessel bottom or discharge pipe (4) protect the pump from dry running.



X – Recommended orientation when installing the sensor in a pipeline

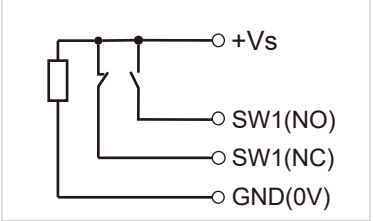


Correct orientation for sensor installation in tank

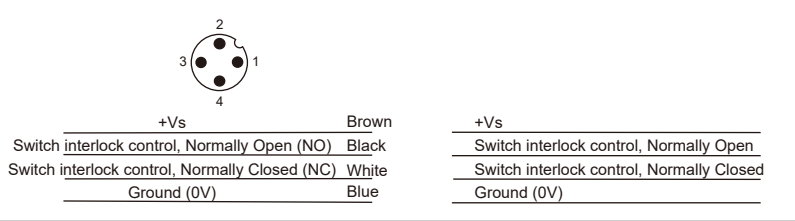


Correct and incorrect installation methods of sensor in pipeline fittings

Wiring Diagram

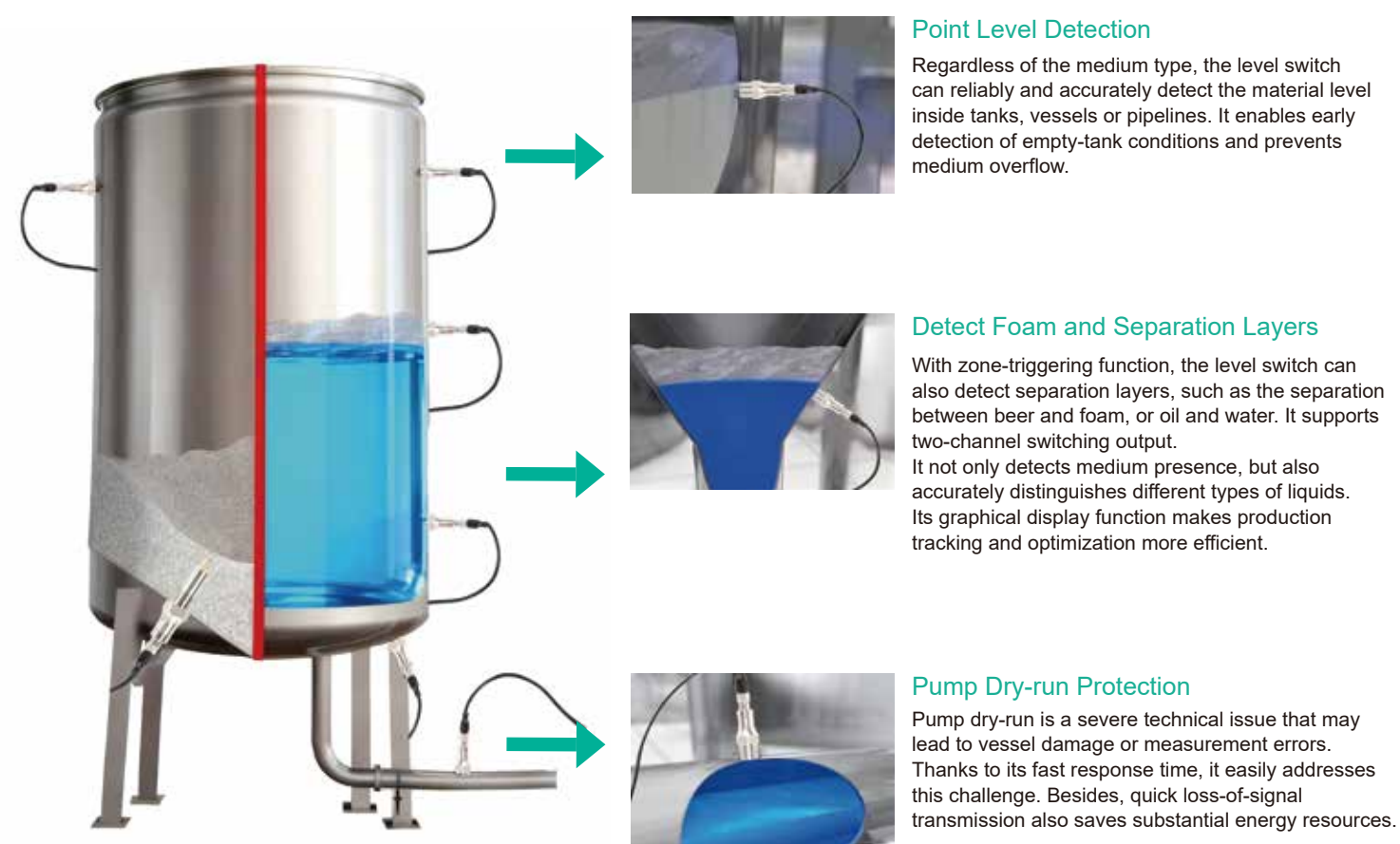


Connector





Level Detection: Suitable for All Media



Three Major Advantages of Intelligent Point Level Detection

Quick & Easy Integration

1

1. Equipped with various process connectors and adapters to shorten overall installation and commissioning time.
Compatible with IO-Link digital interface, while supporting traditional switching signals and analog signals, enabling easy integration with control systems.
2. The probe features deep insertion depth and requires no extra adjustments unlike tuning-fork products.
It greatly reduces interference to production processes and simplifies overall equipment structure.
3. Certified by multiple industry standards, it guarantees stable equipment operation and enhances safety during process operations.

2

Robust & Durable, High Process Safety

1. The sensor housing adopts sturdy stainless steel material, suitable for harsh production environments with frequent temperature fluctuations.
2. The sensor probe is made of PEEK with hygienic design for easier cleaning.
3. It effectively resists interference from viscous media to avoid false alarms and minimize equipment downtime.
4. Universal medium compatibility; works with liquids, pastes, viscous substances, granules and other media.

Intelligent Design & Functions

3

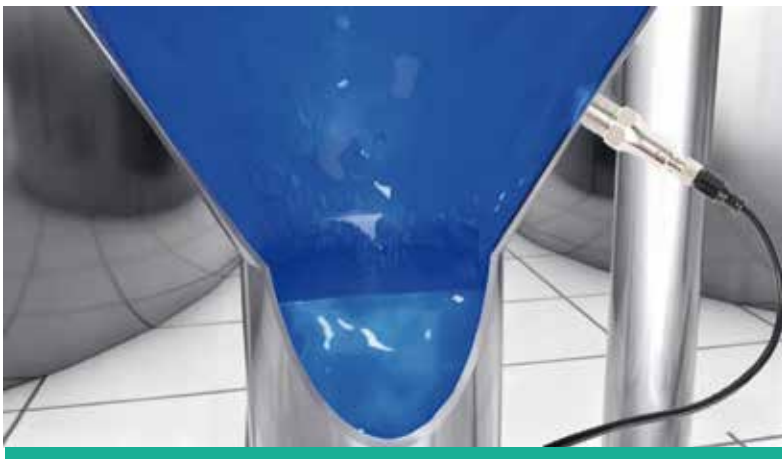
1. Multi-color LED status indicator with 360° full viewing angle for unrestricted visual observation.
2. Graphical display of switch status effectively improves production safety and operation transparency.
3. Supports multiple switching outputs plus additional analog output, fully maximizing flexibility for switch applications.
4. Simple and convenient commissioning; no manual adjustment required for different medium types.

Automatic Adjustment According to Medium Type

In food processing industries with constantly changing formulas or small-batch production, the self-adaptive switching threshold delivers real added value. This level switch automatically adjusts its switching point and performs reliable detection according to the medium type, eliminating the need for manual parameter setup. It ensures great flexibility within minimal configuration time.



Immunity to Material Build-up



Optimized Design for Cleaning Processes

During cleaning cycles such as CIP, conventional level switches often produce false signals because they cannot distinguish between process media and cleaning liquids. The ELEsenson level switch can be configured to ignore cleaning fluids like alkaline and acid solutions during cleaning cycles, easily overcoming this challenge.



Generate Added Value via Additional Analog Output

Beyond switch signals, the level switch can output a 4...20mA analog signal. Therefore, in addition to point-level information, the level switch can supply various auxiliary process data via other measured values.

Medium Differentiation



• Water	18.46 mA
• Oil	14.90 mA
• Air	8.27 mA

Based on the 4...20mA analog signal, it can distinguish oil, water, various powders and other media. During system configuration, the readings can be displayed intuitively via a handheld programmer. In addition, the analog output signal can be inverted.

Cleaning Process Analysis

The 4...20mA analog signal can also be used to analyze whether the sensor probe is clean and if residual medium adheres to it. In addition, it can detect whether the cleaning procedure has been completed.



Moisture Content Measurement

The analog signal can be used to measure the moisture or dryness of the medium, especially for solid and granular materials.



Adaptive Solutions to Meet Your Application Requirements

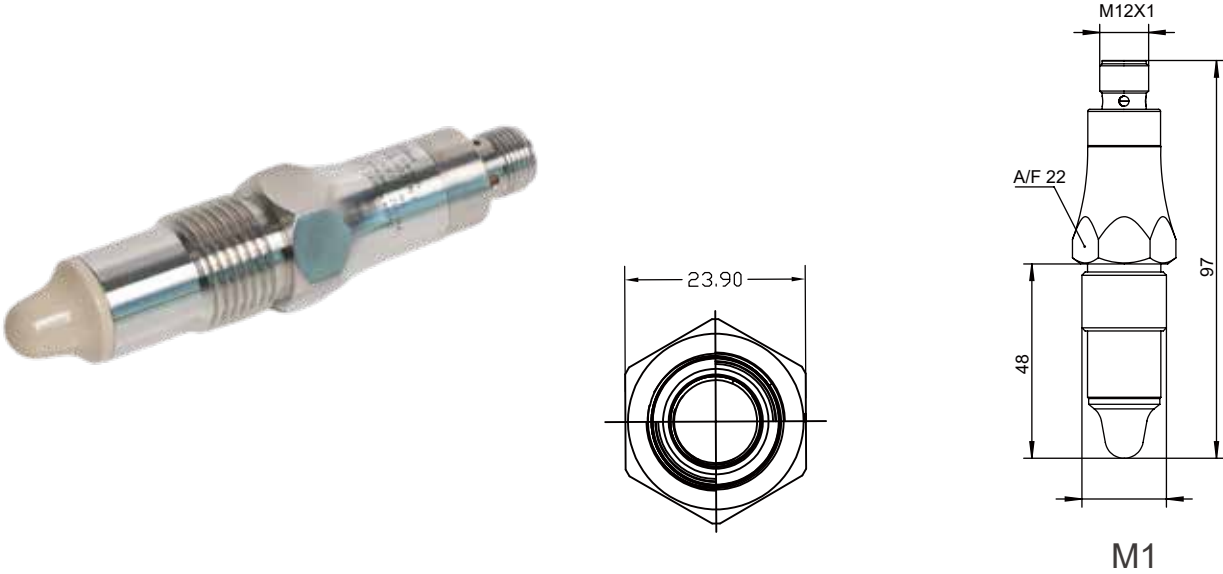
Requirements for sensors vary with different media types. It covers a wide range of applications, including pump dry-run protection, reliable overflow protection, leakage detection, as well as selective detection and suppression of foam or separation layers. Yiluyi achieves all the above application requirements with a single sensor technology — this capability is pioneering within the industry. Whether bulk solids, powders, liquids or foam, regardless of medium viscosity, this product handles them with ease.

Simplify Complex Processes & Improve Overall Efficiency

Using one single sensor to reduce the total variety of sensors brings multiple benefits: cutting procurement, spare parts logistics and maintenance costs; accelerating R&D efficiency for new machinery and equipment. Multi-function in one sensor reduces the quantity of documents required. It supports a variety of process connections and adapters for simple integration with existing systems.

Standard Version

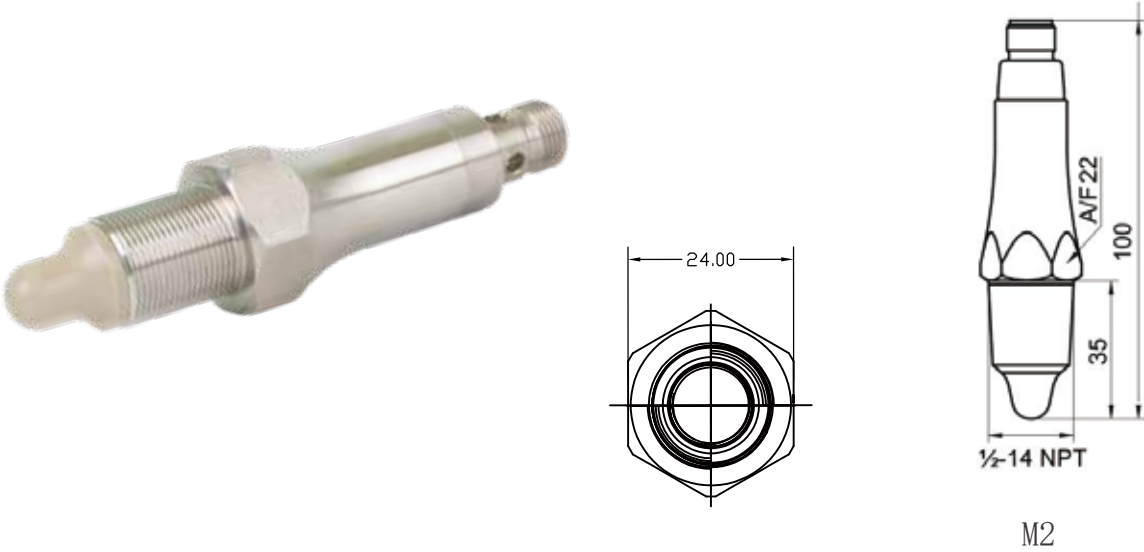
One-touch Teach-in / Auto-learn



Specifications		
Current Load	NPN(NO+NC)	ESP-B1-M1N
	PNP(NO+NC)	ESP-B1-M1P
	NPN+PNP Auto-adaptive	ESP-B1-M1Z
	4~20mA	ESP-B1-M1A
Operating Voltage	12V...30VDC	
Reverse Polarity Protection	Yes	
Current Consumption	Typical 25mA, Max 50mA	
Start-up Time	<2 s	
Short-circuit Protection	Yes	
Voltage Drop	PNP: (+Vs-1.5V)±0.5V, Rload=10KΩ	
	NPN: (+1.5V)±0.5V, Rload=10KΩ	
Leakage Current	±100 μA MAX.	
Switch State	Normally Open + Normally Closed (NO+NC)	
Repeat Accuracy	±1mm	
Hysteresis	±1mm	
Response Time	0.1s	
Delay	0.0...10.0 s (adjustable)	
Ambient Temperature	-40...+85℃	
Thread	M18	
Storage Temperature	-40...+85℃	
Protection Rating	IP67, IP69K (with suitable cable)	
Vibration (Sinusoidal)	1.6 mm P-P (2...25Hz), 4g (25...100Hz), 1 octave/min	

Standard Version

One-touch Teach-in / Auto-learn



Specifications		
Current Load	NPN(NO+NC)	ESP-B1-M2N
	PNP(NO+NC)	ESP-B1-M2P
	NPN+PNP Auto-adaptive	ESP-B1-M2Z
	4~20mA	ESP-B1-M2A
Operating Voltage	12V...30VDC	
Reverse Polarity Protection	Yes	
Current Consumption	Typical 25mA, Max 50mA	
Start-up Time	<2 s	
Short-circuit Protection	Yes	
Voltage Drop	PNP: (+Vs-1.5V)±0.5V, Rload=10KΩ	
	NPN: (+1.5V)±0.5V, Rload=10KΩ	
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Standard Version

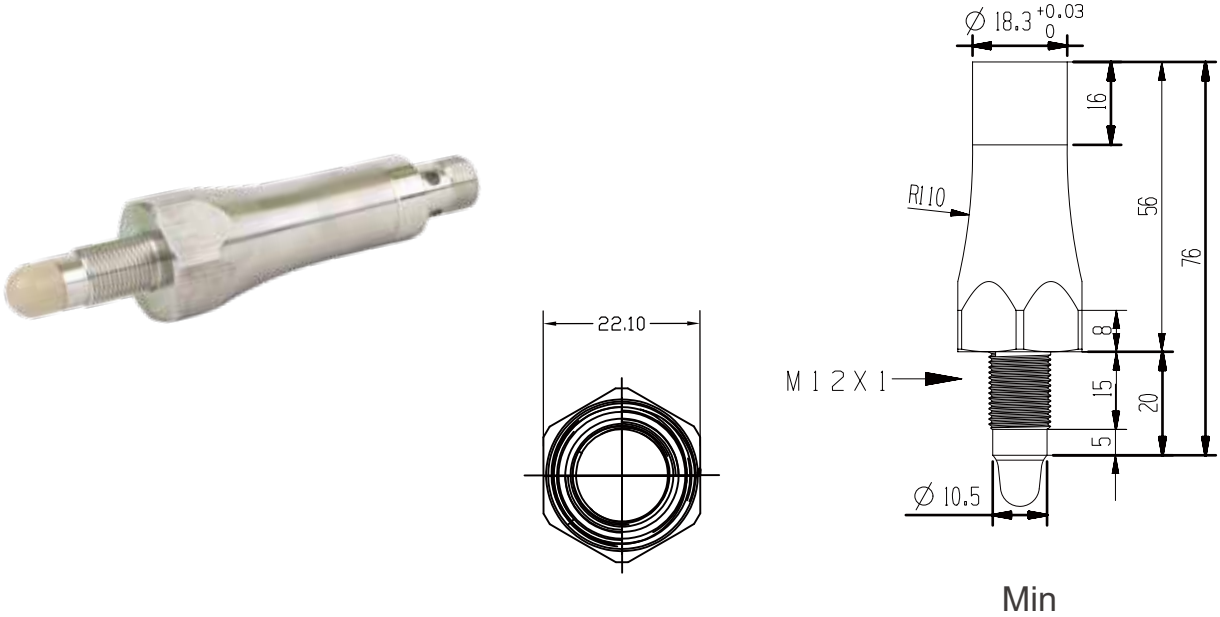
One-touch Teach-in / Auto-learn



Specifications		
Current Load	NPN(NO+NC)	ESPB1-M3N
	PNP(NO+NC)	ESPB1-M3P
	NPN+PNP Auto-adaptive	ESPB1-M3Z
	4~20mA	ESPB1-M3A
Operating Voltage	12V...30VDC	
Reverse Polarity Protection	Yes	
Current Consumption	Typical 25mA, Max 50mA	
Start-up Time	<2 s	
Short-circuit Protection	Yes	
Voltage Drop	PNP: (+Vs-1.5V)±0.5V, Rload=10KΩ	
	NPN: (+1.5V)±0.5V, Rload=10KΩ	
Leakage Current	±100 µA MAX.	
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Ambient Temperature	-40...+85°C	
Thread	M18	
Storage Temperature	-40...+85°C	
Protection Rating	IP67、IP69K (with suitable cable)	
Vibration (Sinusoidal)	1.6 mm P-P (2...25Hz)、4g (25...100Hz), 1 octave/min	

Standard Version

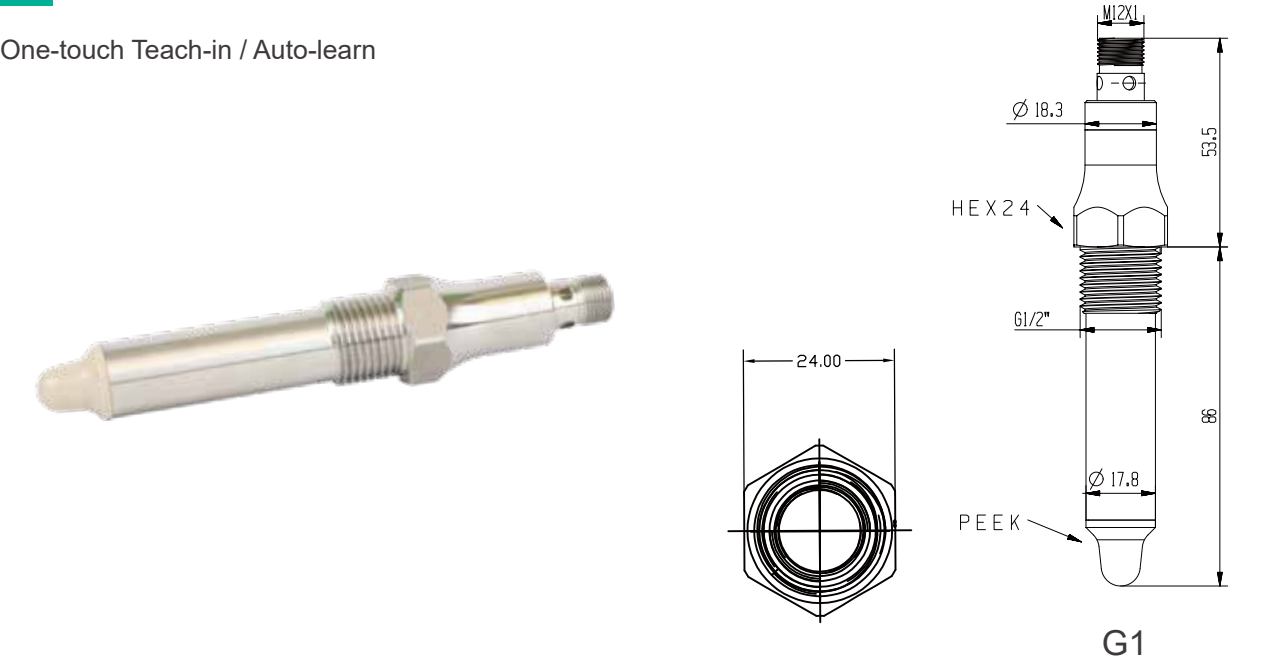
One-touch Teach-in / Auto-learn



Specifications		
Current Load	NPN(NO+NC)	ESPB1-MinN
	PNP(NO+NC)	ESPB1-MinP
	NPN+PNP Auto-adaptive	ESPB1-MinZ
	4~20mA	ESPB1-MinA
Operating Voltage	12V...30VDC	
Reverse Polarity Protection	Yes	
Current Consumption	Typical 25mA, Max 50mA	
Start-up Time	<2 s	
Short-circuit Protection	Yes	
Voltage Drop	PNP: (+Vs-1.5V)±0.5V, Rload=10KΩ	
	NPN: (+1.5V)±0.5V, Rload=10KΩ	
Leakage Current	±100 µA MAX.	
Switch State	Normally Open + Normally Closed (NO+NC)	
Repeat Accuracy	±1mm	
Hysteresis	±1mm	
Response Time	0.1s	
Delay	0.0...10.0 s (adjustable)	
Ambient Temperature	-40...+85°C	
Thread	M18	
Storage Temperature	-40...+85°C	
Protection Rating	IP67、IP69K (with suitable cable)	
Vibration (Sinusoidal)	1.6 mm P-P (2...25Hz)、4g (25...100Hz), 1 octave/min	

Standard Version

One-touch Teach-in / Auto-learn



Specifications		
Current Load	NPN(NO+NC)	ESPB1-G1N
	PNP(NO+NC)	ESPB1-G1P
	NPN+PNP Auto-adaptive	ESPB1-G1Z
	4~20mA	ESPB1-G1A
Operating Voltage	12V...30VDC	
Reverse Polarity Protection	Yes	
Current Consumption	Typical 25mA, Max 50mA	
Start-up Time	<2 s	
Short-circuit Protection	Yes	
Voltage Drop	PNP: (+Vs-1.5V)±0.5V, Rload=10KΩ	
	NPN: (+1.5V)±0.5V, Rload=10KΩ	
Leakage Current	±100 μA MAX.	
Switch State	Normally Open + Normally Closed (NO+NC)	
Repeat Accuracy	±1mm	
Hysteresis	±1mm	
Response Time	0.1s	
Delay	0.0...10.0 s (adjustable)	
Ambient Temperature	-40...+85℃	
Thread	G1/2	
Storage Temperature	-40...+85℃	
Protection Rating	IP67、IP69K (with suitable cable)	
Vibration (Sinusoidal)	1.6 mm P-P (2...25Hz)、4g (25...100Hz), 1 octave/min	

Standard Version

One-touch Teach-in / Auto-learn



Specifications		
Current Load	NPN(NO+NC)	ESPB1-G2N
	PNP(NO+NC)	ESPB1-G2P
	NPN+PNP Auto-adaptive	ESPB1-G2Z
	4~20mA	ESPB1-G2A
Operating Voltage	12V...30VDC	
Reverse Polarity Protection	Yes	
Current Consumption	Typical 25mA, Max 50mA	
Start-up Time	<2 s	
Short-circuit Protection	Yes	
Voltage Drop	PNP: (+Vs-1.5V)±0.5V, Rload=10KΩ	
	NPN: (+1.5V)±0.5V, Rload=10KΩ	
Leakage Current	±100 μA MAX.	
Switch State	Normally Open + Normally Closed (NO+NC)	
Repeat Accuracy	±1mm	
Hysteresis	±1mm	
Response Time	0.1s	
Delay	0.0...10.0 s (adjustable)	
Ambient Temperature	-40...+85℃	
Thread	G1/2	
Storage Temperature	-40...+85℃	
Protection Rating	IP67、IP69K (with suitable cable)	
Vibration (Sinusoidal)	1.6 mm P-P (2...25Hz)、4g (25...100Hz), 1 octave/min	

Standard Version

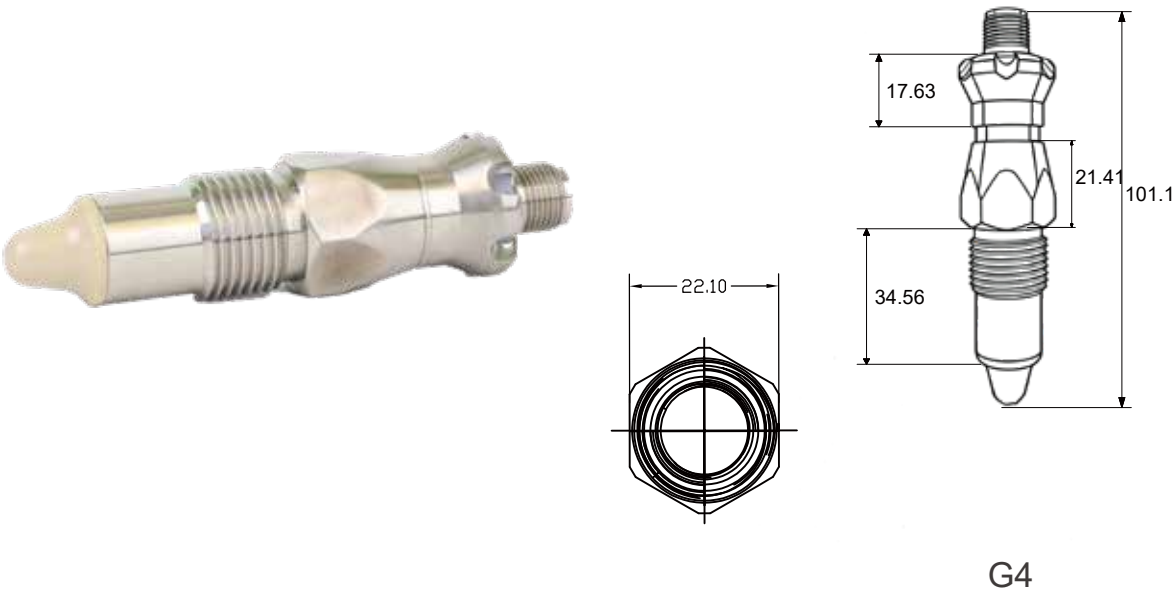
One-touch Teach-in / Auto-learn



Specifications		
Current Load	NPN(NO+NC)	ESPB1-G3N
	PNP(NO+NC)	ESPB1-G3P
	NPN+PNP Auto-adaptive	ESPB1-G3Z
	4~20mA	ESPB1-G3A
Operating Voltage	12V...30VDC	
Reverse Polarity Protection	Yes	
Current Consumption	Typical 25mA, Max 50mA	
Start-up Time	<2 s	
Short-circuit Protection	Yes	
Voltage Drop	PNP: (+Vs-1.5V)±0.5V, Rload=10KΩ	
	NPN: (+1.5V)±0.5V, Rload=10KΩ	
Leakage Current	±100 μA MAX.	
Switch State	Normally Open + Normally Closed (NO+NC)	
Repeat Accuracy	±1mm	
Hysteresis	±1mm	
Response Time	0.1s	
Delay	0.0...10.0 s (adjustable)	
Ambient Temperature	-40...+85℃	
Thread	G1/2	
Storage Temperature	-40...+85℃	
Protection Rating	IP67、IP69K (with suitable cable)	
Vibration (Sinusoidal)	1.6 mm P-P (2...25Hz)、4g (25...100Hz), 1 octave/min	

Standard Version

One-touch Teach-in / Auto-learn



Specifications		
Current Load	NPN(NO+NC)	ESPB1-G4N
	PNP(NO+NC)	ESPB1-G4P
	NPN+PNP Auto-adaptive	ESPB1-G4Z
	4~20mA	ESPB1-G4A
Operating Voltage	12V...30VDC	
Reverse Polarity Protection	Yes	
Current Consumption	Typical 25mA, Max 50mA	
Start-up Time	<2 s	
Short-circuit Protection	Yes	
Voltage Drop	PNP: (+Vs-1.5V)±0.5V, Rload=10KΩ	
	NPN: (+1.5V)±0.5V, Rload=10KΩ	
Leakage Current	±100 μA MAX.	
Switch State	Normally Open + Normally Closed (NO+NC)	
Repeat Accuracy	±1mm	
Hysteresis	±1mm	
Response Time	0.1s	
Delay	0.0...10.0 s (adjustable)	
Ambient Temperature	-40...+85℃	
Thread	G1/2	
Storage Temperature	-40...+85℃	
Protection Rating	IP67、IP69K (with suitable cable)	
Vibration (Sinusoidal)	1.6 mm P-P (2...25Hz)、4g (25...100Hz), 1 octave/min	

Standard Version

One-touch Teach-in / Auto-learn

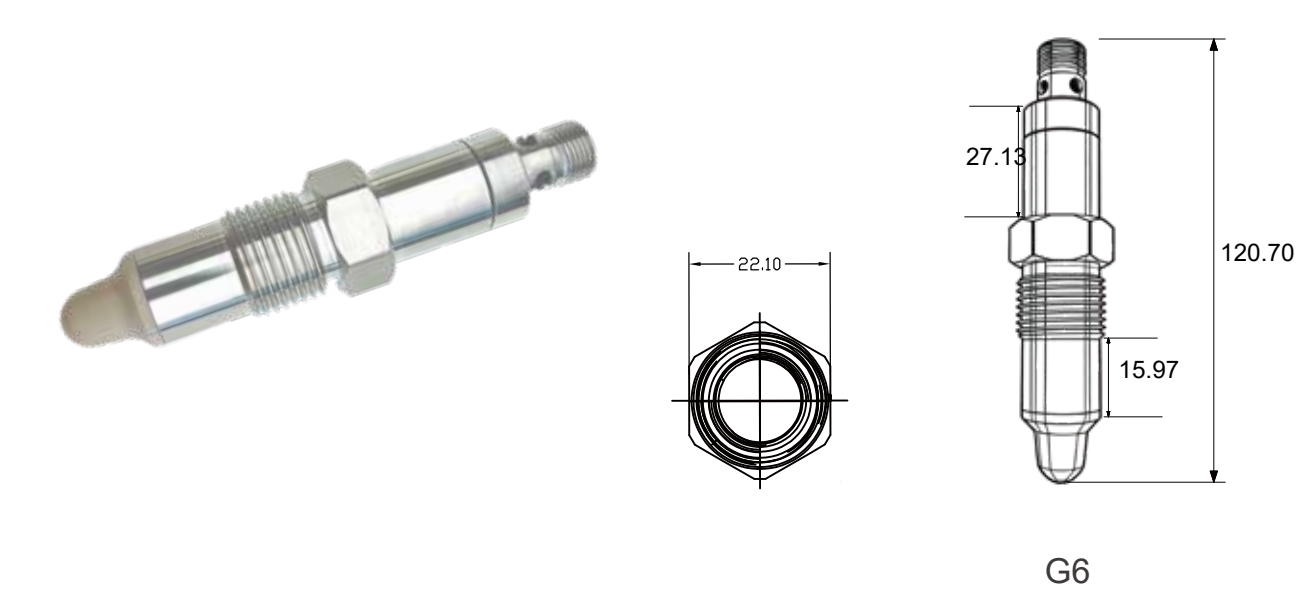


G5

Specifications		
Current Load	NPN(NO+NC)	ESPB1-G5N
	PNP(NO+NC)	ESPB1-G5P
	NPN+PNP Auto-adaptive	ESPB1-G5Z
	4~20mA	ESPB1-G5A
Operating Voltage	12V...30VDC	
Reverse Polarity Protection	Yes	
Current Consumption	Typical 25mA, Max 50mA	
Start-up Time	<2 s	
Short-circuit Protection	Yes	
Voltage Drop	PNP: (+Vs-1.5V)±0.5V, Rload=10KΩ	
	NPN: (+1.5V)±0.5V, Rload=10KΩ	
Leakage Current	±100 µA MAX.	
Switch State	Normally Open + Normally Closed (NO+NC)	
Repeat Accuracy	±1mm	
Hysteresis	±1mm	
Response Time	0.1s	
Delay	0.0...10.0 s (adjustable)	
Ambient Temperature	-40...+85℃	
Thread	G1/2	
Storage Temperature	-40...+85℃	
Protection Rating	IP67、IP69K (with suitable cable)	
Vibration (Sinusoidal)	1.6 mm P-P (2...25Hz)、4g (25...100Hz), 1 octave/min	

Standard Version

One-touch Teach-in / Auto-learn

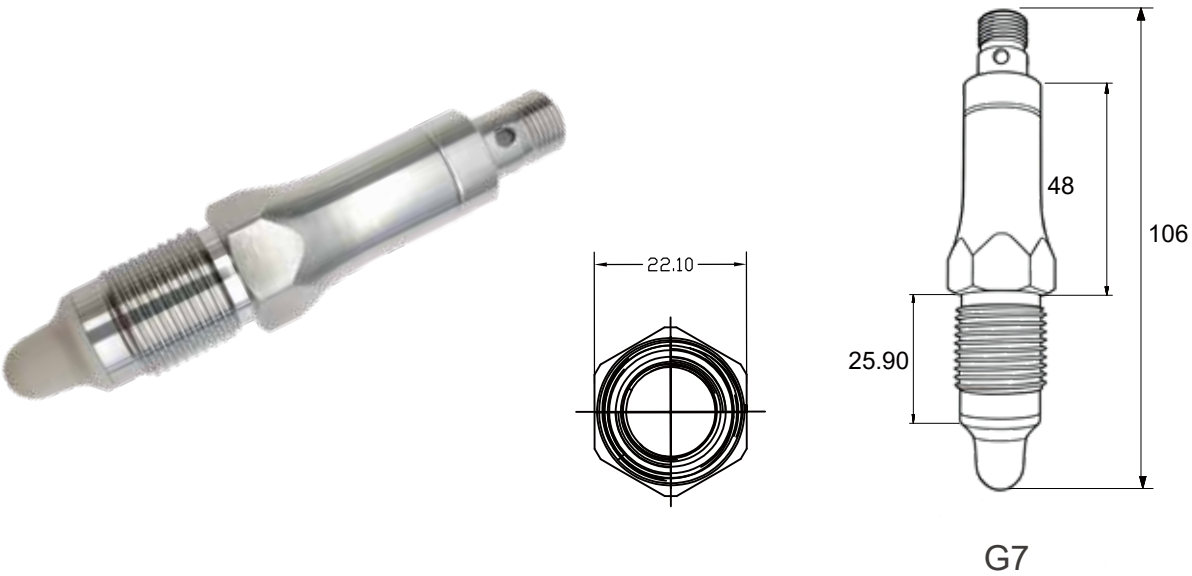


G6

Specifications		
Current Load	NPN(NO+NC)	ESPB1-G6N
	PNP(NO+NC)	ESPB1-G6P
	NPN+PNP Auto-adaptive	ESPB1-G6Z
	4~20mA	ESPB1-G6A
Operating Voltage	12V...30VDC	
Reverse Polarity Protection	Yes	
Current Consumption	Typical 25mA, Max 50mA	
Start-up Time	<2 s	
Short-circuit Protection	Yes	
Voltage Drop	PNP: (+Vs-1.5V)±0.5V, Rload=10KΩ	
	NPN: (+1.5V)±0.5V, Rload=10KΩ	
Leakage Current	±100 µA MAX.	
Switch State	Normally Open + Normally Closed (NO+NC)	
Repeat Accuracy	±1mm	
Hysteresis	±1mm	
Response Time	0.1s	
Delay	0.0...10.0 s (adjustable)	
Ambient Temperature	-40...+85℃	
Thread	G1/2	
Storage Temperature	-40...+85℃	
Protection Rating	IP67、IP69K (with suitable cable)	
Vibration (Sinusoidal)	1.6 mm P-P (2...25Hz)、4g (25...100Hz), 1 octave/min	

Standard Version

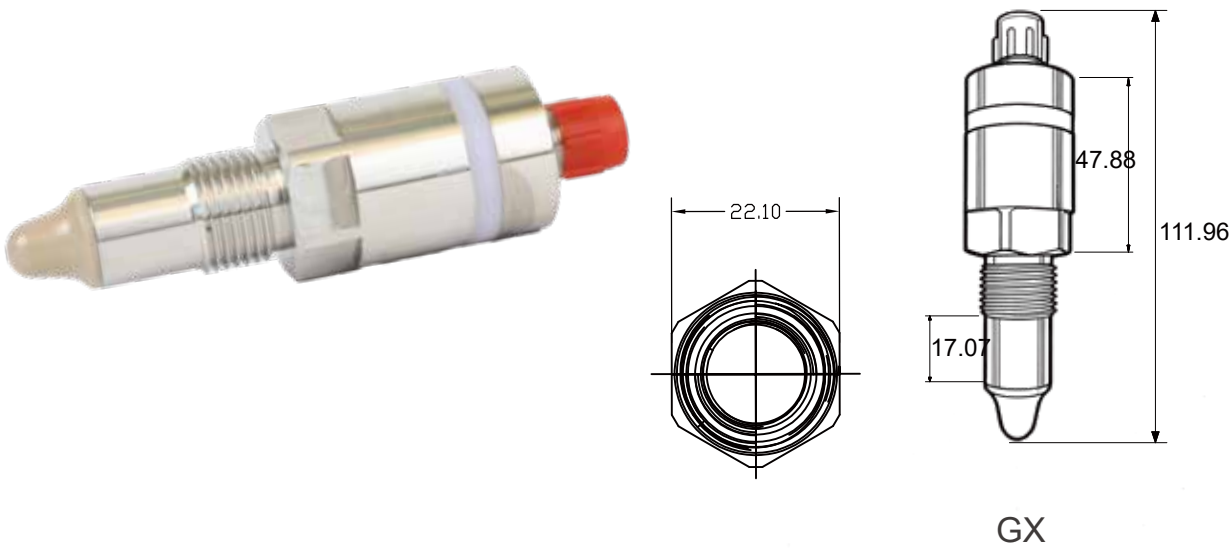
One-touch Teach-in / Auto-learn



Specifications		
Current Load	NPN(NO+NC)	ESPB1-G7N
	PNP(NO+NC)	ESPB1-G7P
	NPN+PNP Auto-adaptive	ESPB1-G7Z
	4~20mA	ESPB1-G7A
Operating Voltage	12V...30VDC	
Reverse Polarity Protection	Yes	
Current Consumption	Typical 25mA, Max 50mA	
Start-up Time	<2 s	
Short-circuit Protection	Yes	
Voltage Drop	PNP: (+Vs-1.5V)±0.5V, Rload=10KΩ	
	NPN: (+1.5V)±0.5V, Rload=10KΩ	
Leakage Current	±100 μA MAX.	
Switch State	Normally Open + Normally Closed (NO+NC)	
Repeat Accuracy	±1mm	
Hysteresis	±1mm	
Response Time	0.1s	
Delay	0.0...10.0 s (adjustable)	
Ambient Temperature	-40...+85℃	
Thread	G1/2	
Storage Temperature	-40...+85℃	
Protection Rating	IP67、IP69K (with suitable cable)	
Vibration (Sinusoidal)	1.6 mm P-P (2...25Hz)、4g (25...100Hz), 1 octave/min	

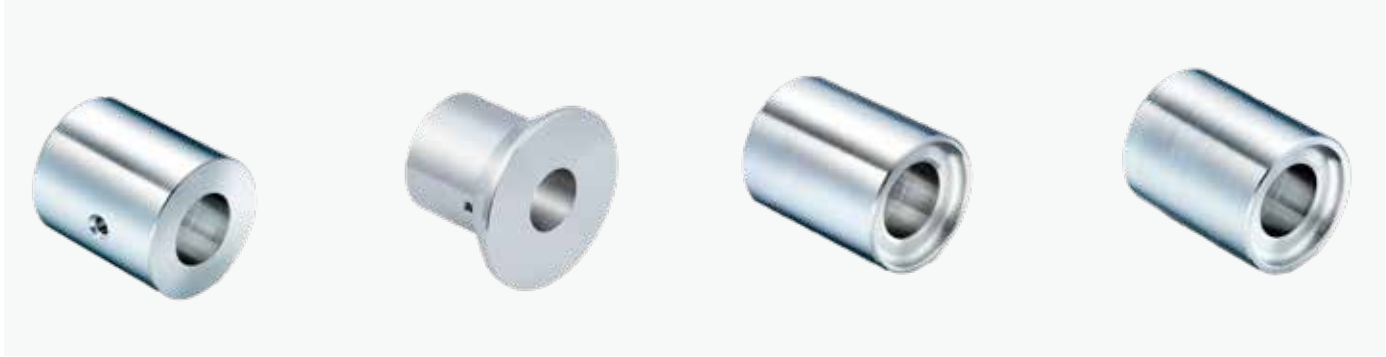
Standard Version

One-touch Teach-in / Auto-learn



Specifications		
Current Load	NPN(NO+NC)	ESPB1-GXN
	PNP(NO+NC)	ESPB1-GXP
	NPN+PNP Auto-adaptive	ESPB1-GXZ
	4~20mA	ESPB1-GXA
Operating Voltage	12V...30VDC	
Reverse Polarity Protection	Yes	
Current Consumption	Typical 25mA, Max 50mA	
Start-up Time	<2 s	
Short-circuit Protection	Yes	
Voltage Drop	PNP: (+Vs-1.5V)±0.5V, Rload=10KΩ	
	NPN: (+1.5V)±0.5V, Rload=10KΩ	
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Protection Rating	IP67、IP69K (with suitable cable)	
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Accessories: Adapter Sleeves



More customized accessories available

APPLICATION SCENARIOS



Peanut Butter



Beer



Ice Cream



Tomato Sauce



Wheat



Strawberry Jam



Butter



Mayonnaise



Chocolate Sauce

COMPANY PROFILE

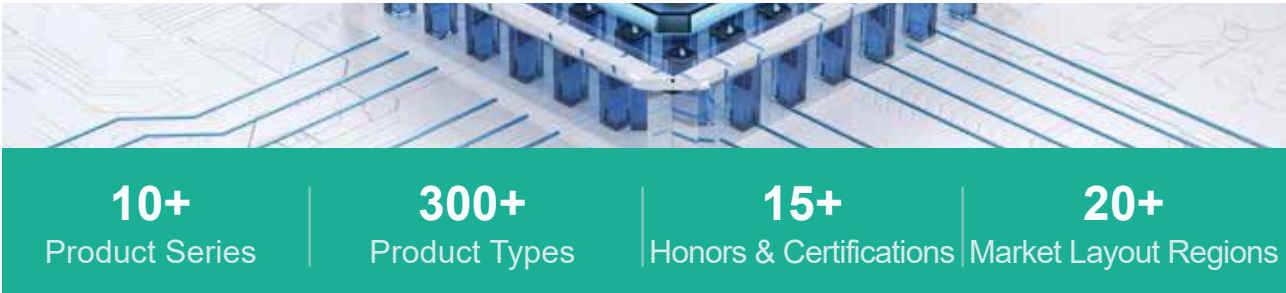


ELEsenson focuses on R&D, manufacturing and sales of sensors. We have a high-caliber, innovative technical team. Pursuing continuous technical improvement, we deliver high-performance, reliable sensor products for customers.

Our broad product portfolio covers multiple industries including industrial automation, smart home and automotive electronics. Our products are well-received for precise measurement, stable performance and outstanding durability.

During production, strict quality-control procedures guarantee premium quality for every unit leaving our factory. We maintain close cooperation with customers, deeply understanding requirements and delivering customized solutions for special-scenario demands.

ELEsenson regards innovation as core driving force. Continuous investment in R&D and product upgrades. With professional teams, premium products and thoughtful service, Zhejiang ELEsenson Sensors has built solid reputation in the industry, contributing technical strength to the advancement of multiple sectors.



Corporate Culture

Vision

Uphold conviction, reach new heights of sensor-technology development.
Build a globally-leading sensor enterprise and lead industry progress through technological innovation.

Mission

Drive development through innovation, win trust by quality.
Supply precise,stable,durable and reliable sensor products plus customized solutions for industrial automation, rail transit, automotive electronics and other industries.

Core Values

Customer-Oriented, Integrity-Based, Innovation-Driven, Quality-First.
We are customer-demand oriented, operate with integrity, pursue innovation and strive for superior product & service quality.

CORE ADVANTAGES

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Professional & Efficient Team

Experienced and skilled personnel providing high-quality service & technical support.
- 

Strong R&D Capability

Advanced R&D equipment & specialist team to develop innovative, competitive products.
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Complete After-Sales Support System

Timely response to customer requests, comprehensive technical support & solutions to maximize customer satisfaction.



HONORS AND QUALIFICATIONS



Brief Product Catalog | English Version | Issue 1, 2025

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