


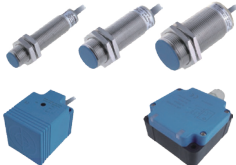



Position detection

Magnetic proximity switch		P.3 ▢
Bistable position switch		P.11 ▢
Tool setting gauge position switch		P.13 ▢
Inductive proximity switch		P.15 ▢
Capacitive proximity switch		P.23 ▢

Magnetic proximity switch



Magnetic proximity switch is the general term of sensors, which replaces limit switch and other contact detection methods and aims at conducting detection without contact with the detection object. It can detect the move and existence information of the object and transform them into electrical signals. The sensor products which can also detect the presence and proximity of objects without any physical contact are called “proximity switch”. There are different types of proximity switch, such as magnetic induction, electrostatic capacity, ultrasonic, photoelectric, Hall and so on. It is widely used in the position alarm of automobile, intelligent home, safety protection and industrial control area.

Inquiry Soway

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High stability, high reliability and high consistency.

Multiple magnetic field sensitivity range, capable of mat with magnet trigger.

Excellent gas tightness and long service life.

User can customize the hosing color, wire direction, wire rod, terminal, etc.

Application area



Intelligent home appliance



Auto industry



Safety alarm



Industrial position control alarm

Standard Performance Parameters of Magnetic Reed Proximity Switch

Product series	SP11 series	SP12 series	SP13 series	PX113	SP119	SP11G	SP140
External Structure Dimensions	Table 1	Table 2	Table 3	Figure 9	Figure 4	Figure 5	Figure 7
Structure type	Independent, Back magnetic type						Slot type
Trigger	Magnet or ferromagnetic metal						
Output contact form	Magnetic reed normally open type, Magnetic reed single-pole double-throw						
Maximum switching power	10W		70W		5W		100W
Maximum switching voltage (DC)	200V		200V		175V		500V
Maximum switching voltage (AC)	100V		250V		125V		
Maximum switching current (DC)	500mA		1000mA		400mA		DC3A (24V)
Maximum switching current (AC)	500mA		1000mA		280mA		
Minimum breakdown voltage	200V DC		400V DC		200V DC		1000V DC
Maximum load current	1.0A		1.75A		0.5A		4.0A
Maximum contact impedance	300mΩ		300mΩ		300mΩ		1Ω
Minimum insulation impedance	10 ⁶ MΩ		10 ⁶ MΩ		10 ⁶ MΩ		10 ⁶ MΩ
Operating temperature range	-40 ~ 125℃		-40 ~ 125℃		-40 ~ 125℃		-40 ~ 125℃
Service life	10 ⁶ times		10 ⁶ times		10 ⁶ times		10 ⁶ times

Note 1: The above are the standard electrical parameters of the commonly used models. Products can also be customized according to the customer's requirements.

Note 2: For the need of high-power switch, only some of the models are suitable. Please consult with business personnel for the selection of models.

Basic performance parameters of Hall switch

Product series	SPH1 series	SPH3 series	SPH19	SPH1G	SPH40
External structure dimensions	Table 1	Figure 8	Figure 4	Figure 5	Figure 7
Structure type	Independent (All-pole type, unipolar type, latched type), back magnetic type				Slot type
Trigger	Magnet or ferromagnetic metal				
Effective measurement range	Determined by the material and characteristics of the Trigger				
Operating voltage	3V ~ 26V				
Output signal	OC output				
Output signal	Two-wire current output or three-wire OC output (specify if voltage output is needed)				
Output current (max)	20mA				
Output breakdown voltage	30V				
Protection ^{Note3}	Reverse Voltage Protection, short circuit protection, overload protection				

Position detection

Angle measurement

Speed measurement

Displacement measurement

Liquid level measurement

Flow measurement

Pressure measurement

Temperature and humidity measurement

Current measurement

Special sensor

Magnetic proximity switch

Bistable position switch

Tool setting gauge position switch

Inductive proximity switch

Capacitive proximity switch

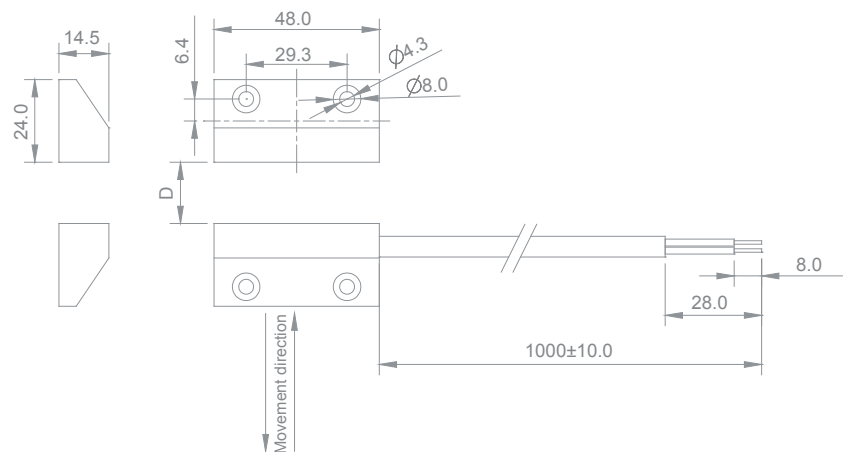


Position detection
Angle measurement
Speed measurement
Displacement measurement
Liquid level measurement
Flow measurement
Pressure measurement
Temperature and humidity measurement
Current measurement
Special sensor

Magnetic proximity switch
Bistable position switch
Tool setting gauge position switch
Inductive proximity switch
Capacitive proximity switch



Figure 5



Product selection list

SP	□	□	□ □	—	□ □	□	—	□ □	—	□ □	□	□ □
	Type	Structural form	Structure code		Operating distance	Trigger mode		Signal output		Installation information	Electrical connection	Wiring length
	1: Dry reed type H: Hall, magneto resistiv I: Inductive C: Capacitive type R:RFID	1: Rect Angle 2: Cylinder 3: With thread Cylinder	Rect Angle structure code Diameter of cylinder type Unit mm		Unit mm	Applicable to H Series U: Unipolar type B: Bipolar A: All-pole type F: Ferromagnetic type		See Table 1		See Table 2	Direct outgoing cable P: PVC sheath T: Teflon sheath U: PU series sheath S: Silicon rubber sheath D: Connector output	Unit: 100mm

Schedule 1(Signal Output Information)

Output system		Output mode	Power	Output group
□		□	□	□
Switching output	K: Mechanical switch	1: Normally open	L: Low power signal H: High power signal	1: Single group 2-9: Represents 2 to 9 groups
		2: Normally close		
	N:NPN	3: Single-pole double-throw		
	P:PNP	4: Double-pole double-throw		
	T: Silicon Controlled Rectifier	5: Open-collector output (OC output)		
Analog output	A: Current	1:4mA ~ 20mA N: NAMUR		
	V: Voltage			
Digital output	O: Single bus			
	C: CAN	P:PWM		

Selection example: SP1310-XX-K1L1-M8P01

It is a cylindrical magnetic reed type proximity switch position sensor with thread. The output type is switch output, normally open type, power is 10W, installed thread is M8, and direct-out common cable is 100mm long.

Hall proximity switch



Figure 6

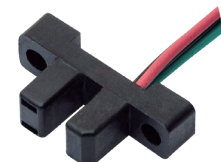
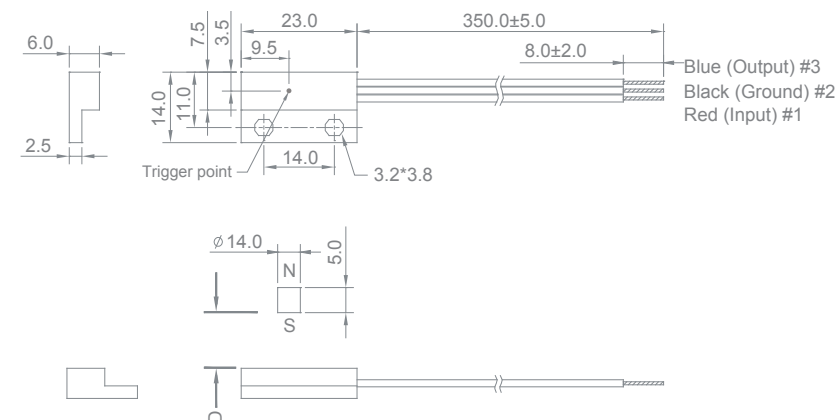


Figure 7

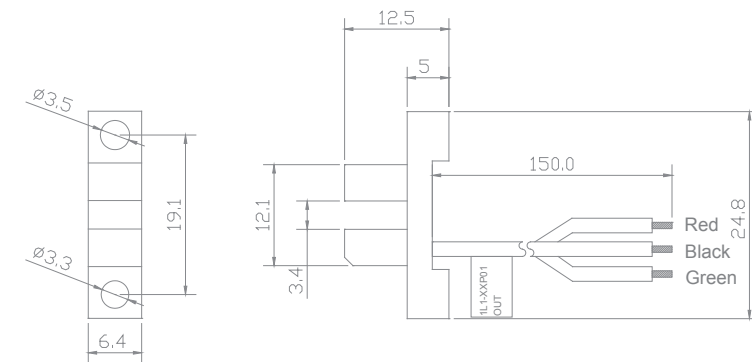
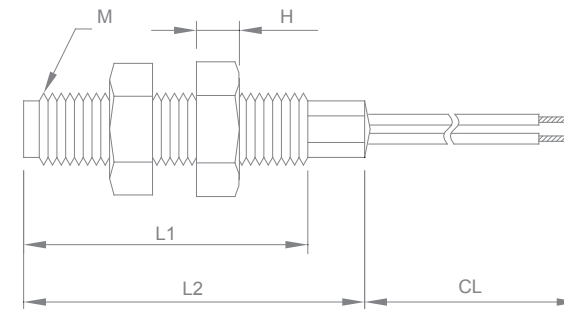


Figure 8



Model	External dimension (screw thread)				
	L1	M	d	CL	D
SPH308	45	M8×1.0	Φ6.3	According to customer's demand	According to customer's demand
SPH312	50	M20×1.0	Φ5.0	According to customer's demand	According to customer's demand
SPH320	50	M20×1.0	Φ5.0	According to customer's demand	According to customer's demand

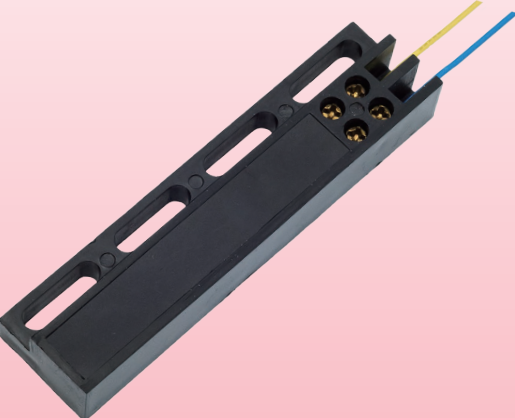
Position detection
Angle measurement
Speed measurement
Displacement measurement
Liquid level measurement
Flow measurement
Pressure measurement
Temperature and humidity measurement
Current measurement
Special sensor

Magnetic proximity switch
Bistable position switch
Tool setting gauge position switch
Inductive proximity switch
Capacitive proximity switch



Magnetic proximity switch
Bistable position switch
Tool setting gauge position switch
Inductive proximity switch
Capacitive proximity switch

Bistable position switch



Bistable position switch is mainly used for flat floor and well of elevator. It is used for limit control of elevator lift. As a result of the adoption of reed switch technology, which has the advantages of high reliability, long life, quick response, no power consumption and easy installation and wiring, and the defect that the mechanical switch is easy to damage is overcome.

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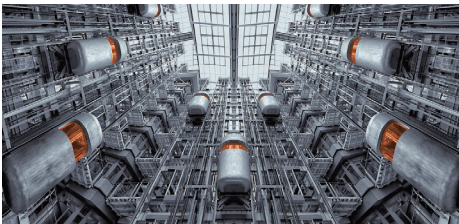


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- High reliability and long life
- Quick response, no power consumption
- Easy installation and wiring

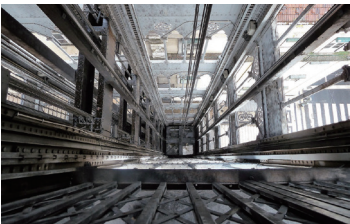
Application area



Lift elevator limitation control



Lift elevator limitation control



Lift elevator limitation control

Product Exterior

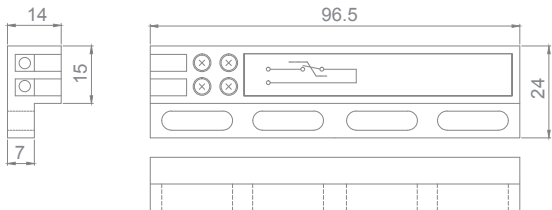


Standard performance parameter

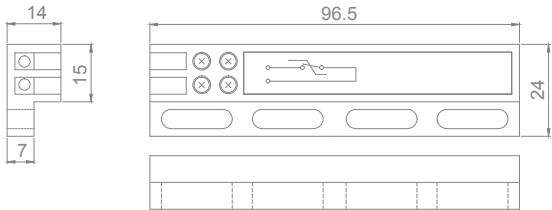
Model	BS-01A	BS-01B
Contact form	A(NO)	
Maximum contact capacity	80W/VA	
Maximum switching voltage	250VAC/DC	
Maximum switching current	1.3A	
Maximum load current	2.0A	
Maximum contact resistance	80mΩ	
Minimum insulation resistance	10 ¹¹ Ω	
Service temperature range	-25 ~70℃	
Thermal shock resistance	-20 ~70℃	
Operating distance	Min 3mm、Max 15mm	

Machine size

BS-01A



BS-01B



Position detection

Angle measurement

Speed measurement

Displacement measurement

Liquid level measurement

Flow measurement

Pressure measurement

Temperature and humidity measurement

Current measurement

Special sensor

Magnetic proximity switch

Bistable position switch

Tool setting gauge position switch

Inductive proximity switch

Capacitive proximity switch

Special position switch for tool setting gauge



SDVH8 position switch is used to measure the external dimension of the product. It can be used separately and output the switch signal. It can also be used with a transmitter. The transmitter can be equipped with more than one displacement sensors. The transmitter can analyze and process the acquired displacement sensor signal to obtain the external dimension data of the tested product and gives the result of whether the structure size is qualified. If needed, the relevant information can be further corrected.

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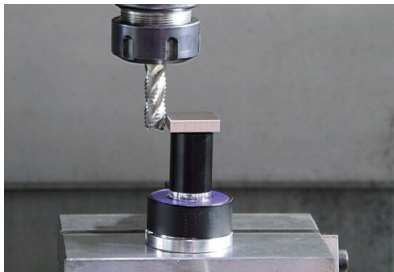
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Measurement Repetition Accuracy: 1μm

External Diameter φ8, Thread M8 x 0.75

The circle measuring head and flat measuring head are optional

Application area



Machining center tool detection

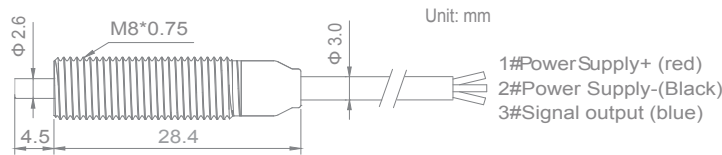


Machining center tool detection



Machining center tool detection

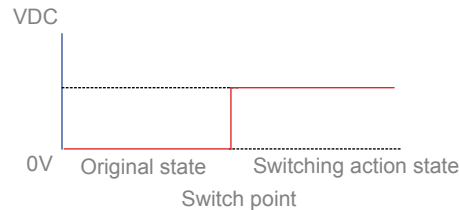
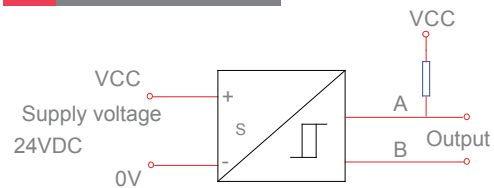
External structure dimensions



Standard performance parameter

Product dimensions	The dimension screw thread part is $\varnothing 8$, the total length is 33 mm
Waterproof grade	IP67, resistance to cutting fluid corrosion
Supply voltage	5-18 VDC ($\pm 10\%$)
Displacement stroke	2.5 mm
Operating distance	0.5mm (movement 0.5mm trigger)
Repeated accuracy	1μm
Contact force stronger than	0.7 N
Output mode	On-off output, static state output high power frequency, after trigger, output low power frequency
Outgoing mode	Terminal outgoing
Service life	One million times
Working temperature	-25 ~ +85 ℃
Storage temperature	-40 ~ +105 ℃
Temperature and humidity	0 - 95%
Shell material	SUS304

Wiring diagram



Instructions for use

- 1.Install the displacement sensor at the proper position of the tooling and fixture.
- 2.Connect the sensor with power supply, output to PLC, focus on correct connection of lead wires.
- 3.Wenn output value exceeds the preset allowable value, a low leve signal will be outputed and uploaded to a PLC or computer for subsequent processing.

Position detection

Angle measurement

Speed measurement

Displacement measurement

Liquid level measurement

Flow measurement

Pressure measurement

Temperature and humidity measurement

Current measurement

Special sensor

Magnetic proximity switch

Bistable position switch

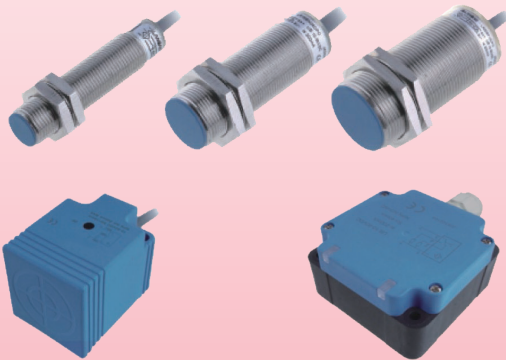
Tool setting gauge position switch

Inductive proximity switch

Capacitive proximity switch



Inductive proximity switch



Inductive proximity switch utilizes the principle of mutual inductance of metal conductor and alternating magnetic field. The detection coil located at the front end of the sensor produces high frequency magnetic field. When the metal object approaches the magnetic field, eddy current is generated inside the metal object, which results in the energy attenuation of the magnetic field. When the metal object is constantly close to the sensor's inductive surface, the energy is absorbed and the attenuation is caused. When the attenuation reaches a certain degree, the sensor switch is triggered to output signal, thereby achieving the purpose of non-contact detection.

Inquiry action

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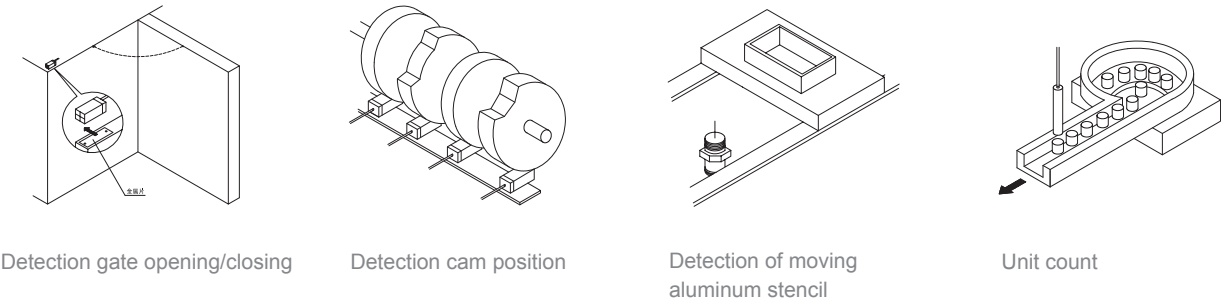


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- Non-contact detection method is adopted, which is safe and reliable, no wear and tear
- Special IC design and manufacture are adopted, so that performance is stable.
- Anti-mechanical collision and anti-corrosion

Application area



Basic performance parameter

						
Product series		SPI 312	SPI 318	SPI 330	SPI 140	SPI 180
External structure diagram		Figure 1	Figure 2	Figure 3	Figure 4	Figure 5
Specifications(mm)		M12*1*51, M12*1*61	M18*1*52, M18*1*62	M30*1.5*52, M30*1.5*62	40*40*53	80*80*40
Installation		● Flush, ○ Non-flush	● Flush, ○ Non-flush	● Flush, ○ Non-flush	● Flush, ○ Non-flush	● Flush, ○ Non-flush
Effective detection distance		2mm, 4mm	5mm, 8mm	10mm, 15mm	15mm, 20mm	40mm, 50mm
Output	DC 3 Wires	NPN NO; NPN NC PNP NO; PNP NC	NPN NO; NPN NC PNP NO; PNP NC	NPN NO; NPN NC PNP NO; PNP NC	NPN NO; NPN NC PNP NO; PNP NC	NPN NO; NPN NC PNP NO; PNP NC
	DC 4 Wires	NPN NO+NC PNP NO+NC	NPN NO+NC PNP NO+NC	NPN NO+NC PNP NO+NC	NPN NO+NC PNP NO+NC	NPN NO+NC PNP NO+NC
	DC 2 Wires	NO NC	NO NC	NO NC	NO NC	NO NC
	AC 2 Wires	NO NC	NO NC	NO NC	NO NC	NO NC
	AC/DC 2 Wires	/	NO NC	NO NC	NO NC	NO NC
Supply voltage		10...30 VDC 20...250 VAC	10...30 VDC 20...250 VAC 20...250 VAC/DC	10...30 VDC 20...250 VAC 20...250 VAC/DC	10...30 VDC 20...250 VAC 20...250 VAC/DC	10...30 VDC 20...250 VAC 20...250 VAC/DC
Switch frequency		DC3/4: 1500Hz, 1000Hz DC2: 800Hz, 500Hz AC2: 20Hz	DC3/4: 1000Hz, 800Hz DC2: 500Hz, 300Hz AC2: 20Hz	DC3/4: 500Hz, 300Hz DC2: 200Hz AC2: 20Hz	DC3/4: 400Hz, 200Hz DC2: 400Hz, 200Hz AC2: 20Hz	DC3/4: 100Hz, 50Hz DC2: 100Hz, 50Hz AC2: 10Hz
Ambient temperature		-25...+70℃	-25...+70℃	-25...+70℃	-25...+70℃	-25...+70℃
Level of protection		IP67	IP67	IP67	IP67	IP67
Housing material		Nickel-copper Alloy	Nickel-copper Alloy	Nickel-copper Alloy	PBT	PBT
Connection		Cable	Cable	Cable	Cable	M12Connector, Terminal connection
Certification		CE U	CE U	CE U	CE	CE

Position detection
Angle measurement
Speed measurement
Displacement measurement
Liquid level measurement
Flow measurement
Pressure measurement
Temperature and humidity measurement
Current measurement
Special sensor
Magnetic proximity switch
Bistable position switch
Tool setting gauge position switch
Inductive proximity switch
Capacitive proximity switch



Position detection
Angle measurement
Speed measurement
Displacement measurement
Liquid level measurement
Flow measurement
Pressure measurement
Temperature and humidity measurement
Current measurement
Special sensor

Machine size

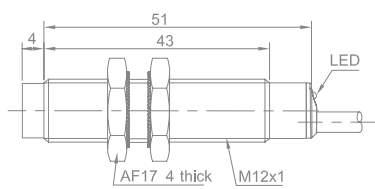


Figure 1-SPI 312

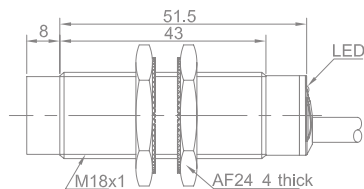


Figure 2-SPI 318

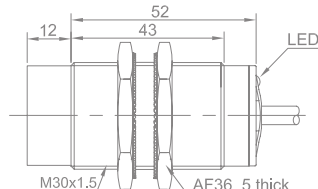


Figure 3-SPI 330

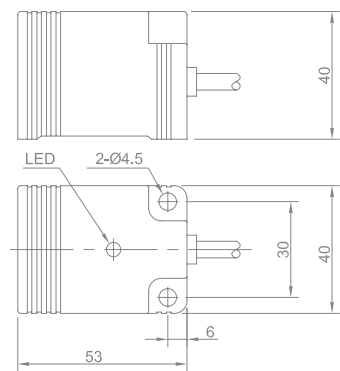


Figure 4-SPI 140

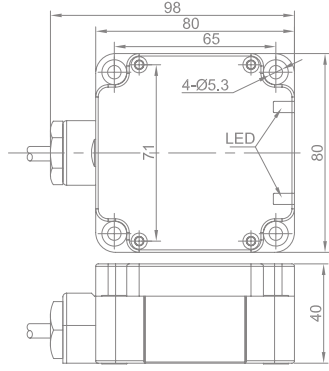


Figure 5-SPI 180

Magnetic proximity switch
Bistable position switch
Tool setting gauge position switch
Inductive proximity switch
Capacitive proximity switch



Wiring method

DC 2 -wire	Lead type	M8 connector	M12 connector	Terminal connection
NO				
NC				

DC 3 -wire	Lead type	M8 connector	M12 connector	Terminal connection
NPN NO				
NPN NC				
PNP NO				
PNP NC				

DC4 -wire	Lead type	M12 connector	Terminal connection
NPN NO+NC			
PNP NO+NC			

AC/DC 2 -wire	Lead type	M12 connector	Terminal connection
NO			
NC			
NO/NC			

Intrinsically safe type	Lead type	M8 connector	M12 connector	Terminal connection

Analog output type	Lead type	M12 connector	Terminal connection
Three-wire type Voltage output			
Three-wire type Voltage output			
Four-wire type Voltage/current output			

Remarks

Connector	M8 connector	M12 connector

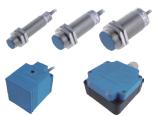
Position detection
Angle measurement
Speed measurement
Displacement measurement
Liquid level measurement
Flow measurement
Pressure measurement
Temperature and humidity measurement
Current measurement
Special sensor

Magnetic proximity switch
Bistable position switch
Tool setting gauge position switch
Inductive proximity switch
Capacitive proximity switch



Position detection
Angle measurement
Speed measurement
Displacement measurement
Liquid level measurement
Flow measurement
Pressure measurement
Temperature and humidity measurement
Current measurement
Special sensor

Magnetic proximity switch
Bistable position switch
Tool setting gauge position switch
Inductive proximity switch
Capacitive proximity switch



Caution for sensor connection

Two-wire type

Connection

Incorrect wiring or unreliable wiring can damage sensors and peripheral devices. Please refer to the right chart for wiring method



Cable connection

When the connecting the sensor cable, the cable shall be wired separately with the power line and the high-voltage line. Please absolutely avoid using the same slot, and the same conduit wiring, otherwise it will lead to malfunction.

The connection of logical AND and logical OR of sensor.

In principle, the AND or OR of the 2-wire DC switch output sensor cannot be connected. In addition, contact concatenation is not allowed.

It can connect to programmable controller

The DC input module of the programmable controller can be connected with the DC switch output type 2-wire sensor, but it is necessary to confirm the connectivity with the DC input module at ON and OFF time before using.

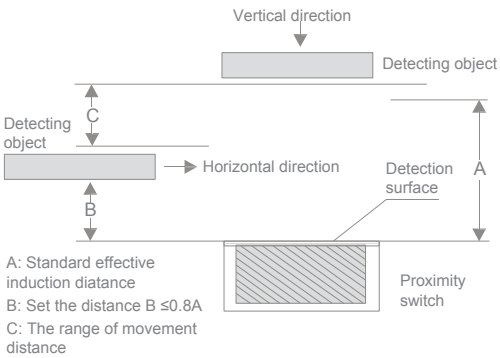
Three-wire type

<p>Connection</p> <p>The AND and OR of three-wire DC switch output sensor can be connected. Its output forms are NPN-type and PNP-type. Can be connected to switch power relay, electromagnet, counter and other DC drive load.</p>	<p>NPN output connection</p>	<p>PNP output connection</p>
<p>OR connection</p> <p>When the sensor OR is connected, any sensor action can drive the load. The number of sensors depends on the sum of the current, so long as it does not affect the sensor's supply voltage, multiple connections can be made. NPN and PNP types cannot be mixed use.</p>	<p>OR connection of NPN output</p>	<p>PNP output connection</p>
<p>AND connection</p> <p>When the sensor AND is connected, the load can be driven when all the sensors are moving. The number of sensors depends on the sum of their saturation voltage, so long as it does not affect the sensor's supply voltage and load drive voltage, multiple connections can be made. The response speed of the sensor is the sum of the initial reset of each sensor.</p>	<p>AND connection of NPN output</p>	<p>AND connection of PNP output</p>
<p>Sensor 1: PNP output Sensor 2: PNP output</p> <p>Advantages: The saturation voltage of the sensor does not affect the voltage of the sensor when it is operating. The motion of the sensor depends on its response speed.</p>	<p>Mixed use of AND by NPN and PNP</p>	
<p>It can connect with programmable controller</p> <p>The DC input module of the programmable controller can be connected directly with the DC switch 3-wire NPN or PNP type output. The power supply of the sensor is DC+24V DC stabilized power supply.</p>	<p>NPN output</p>	<p>NPN output</p>
Cable connection (same as 2-wire cable connection)		

Method of installation

Position setting of detecting object

The effective induction distance of the sensor may vary slightly due to the changes about ambient temperature, voltage, and other ambient conditions. Therefore, the maximal opposition approach of the detecting object should be less than the induction distance. In standard tests, the actual induction distanc should be set to less than 80% of the standard effective induction distance to make the sensor working stably. In addition, if the shape of the detecting object is smaller than that of the standard testing object, or the detection object other als from iron, the actual induction distance must be shortened due to the standard effective induction distance. Please refer to the specifications for details.



Installation method of embedded, quasi-embedded and non-embedded type

The proximity sensor can be divided into the embedded type and the non-embedded type according to the installation method. Embedded type can be embedded inside metal. Non-embedded type cannot be embedded in the metal for use, but compared with embedded type with regards to action distance, the detection distance is longer.

<p>Embedded mounted proximity switch</p> <p>When the sensor is installed, the induction surface can be level with the metal surface. The distance from the surface of the switch to the opposite metal object should be $\geq 3S_n$, and the distance between the two adjacent switches must be $\geq D$.</p>	
<p>Quasi-embedded mounted proximity switch</p> <p>There should be a distance from the sensing surface to the mounting surface which is non-magnetic. When this condition is met, the switch distance is valid and unrestricted. Dimension "X"(see right chart) refers to the minimum distance between the induced surface and the conductive material below it.</p>	
<p>Non-embedded mounted proximity switch</p> <p>They can be identified by their heads, and the area around the non-flush-type inductive surface has no metal housing. The distance from the inductive surface to the metal mounting medium must be $\geq 2S_n$. The distance from the sensing surface to the opposite metal object must be $\geq 3S_n$, and the distance from the other two adjacent proximity switches must be $\geq 2d$.</p>	

※The advantages of embedded-mounted inductance sensors and capacitance sensors are that they have better mechanical protection performance, and are less sensitive to electrical errors than those non-embedded mounted sensors.

Position detection
Angle measurement
Speed measurement
Displacement measurement
Liquid level measurement
Flow measurement
Pressure measurement
Temperature and humidity measurement
Current measurement
Special sensor

Magnetic proximity switch
Bistable position switch
Tool setting gauge position switch
Inductive proximity switch
Capacitive proximity switch



Position detection
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Precautions

Notice when switching on or off the power supply

When the power is turned on or off, the output state of the sensor should be OFF whether it is detected or not. Especially when the power is switched on, the action in which the output state is OFF at a certain time is called the initial reset. But in the following cases, the output will have an instantaneous ON (OFF) state, which is proportional to the length of the sensor's operating distance, about 10...100ms. When the sensor is connected with the counter and programmable controller, there will be no problem because the counter and programmable controller have an initial reset circuit inside. In other cases, please be careful to avoid the following situations.

- 1 The detection object is located near the detection distance of the sensor.
2. For the DC voltage type and DC switch type sensors, the time constant increases (decreases) significantly when the power supply is switched on (off).
- 3 For AC switch-type sensor, there is self-excitation and noise when its power is on (off).

Load of capacitance and lamp

For DC switch-type and AC switch-type sensors, capacitors, incandescent lamps and other loads should not be used as loads directly connected to them. Please connect or in series with a current limiting resistor through a relay.

The peak current set by the current limiting resistor R is within the load current of the sensor:	Allowable loss of capacitor R (W)
$\frac{\text{Supply voltage V}}{\text{Maximum load current mA of the proximity switch}} \leq R \text{ (K}\Omega \text{)}$	$\frac{\text{Supply voltage V2}}{R \text{ (}\Omega \text{)}} \times 2 \text{ times above}$

Load in parallel with capacitor and lamp

$\frac{\text{Supply voltage V}}{\text{Maximum load current of the proximity switch mA-load current mA}} \leq R \text{ (K}\Omega \text{)}$	$\frac{\text{Allowable loss of capacitor R (W)}}{\text{Supply voltage V2}} \times 2 \text{ times above}$
	$R \text{ (}\Omega \text{)}$

Load circuit protection circuit

The load short circuit protection circuit will cut off the load current and protect the sensor's output when the current exceeds more than 2 times of the sensor's maximum load current due to the sensor's misoperation, load damage, etc.

Points for attention to check wiring

The use of buzzer, lamp and other experiments to check the wiring of the sensor, may produce high voltage, high current. Therefore, please do not use this kind of inspection method.

Product selection list

SP										
	Type	Structural form	Structure code	Installation method	Operating distance	Working power supply	Signal output	Body installation information	Connection mode	Wiring length
	I: Inductive	1: Rect Angle 2: Cylinder 3: Cylinder with thread	Rect Angle structure code Cylindrical structure: Diameter, Unit mm	B: flush-type N: Non-flush-type	Unit mm	Default:10~30VDC E:10~60VDC A:20~250VAC	See Table 1	See Table 2	P: Cable D: connector	Unit: 100mm

Schedule 1(Signal Output Information)

Output type	Output mode
K: Mechanical switch	O:NO C:NC D:NO+NC
N:NPN	
P:PNP	
A:AC	

Schedule 2-Installation method of body and table of parameters

Method and parameter list of body installation							
Installation mode	Parameters						
C: Cylinder	Code	Thread/outside diameter	DN	British system	Code	Thread/outside diameter	British system
M: Standard thread	1			1/8”	D	16	
T: Fine thread	2			1/4”	E	18	
S: Extreme fine thread	3	3	10	3/8”	F	20	
F: Flange DN	4	4	15	1/2”	G	22	2”
G: British thread	5	5	20		H	24	
N: NPT thread	6	6	25	3/4”	I	27	
	7	7	30		J	30	
	8	8	32	1”	M	50	
	9				N	60	
	A	10	40				
	B	12	50				
	C	14	60				

Position detection
Angle measurement
Speed measurement
Displacement measurement
Liquid level measurement
Flow measurement
Pressure measurement
Temperature and humidity measurement
Current measurement
Special sensor

Magnetic proximity switch
Bistable position switch
Tool setting gauge position switch
Inductive proximity switch
Capacitive proximity switch



Capacitive proximity switch



The inductive surface of the capacitive proximity switch is composed of two coaxial metal electrodes, which form a capacitance and are connected in RC oscillation circuit. When the power is switched on, the RC oscillator does not oscillate. When a target is close to the sensor's inductive surface, the capacitance increases and the oscillator begins to oscillate. Through the processing by the post circuit, it is converted into the switching signal, thereby achieving the purpose of detecting the existence of objects. The capacitive sensor can detect metal objects, and also can detect non-metal objects. For metal objects, the maximum movement distance can be obtained. For non-metal objects the movement distance depends on the material's permittivity, the bigger the material's permittivity, the larger the movement distance can be obtained.

Inquiry Soway _____

86-0755-88367005
soway@sowaysensor.com



Data download _____

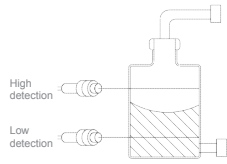
www.sowaysensor.com/product/

It can detect different materials such as metal, plastic, liquid and so on.

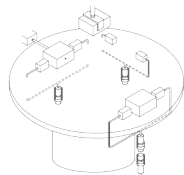
Different materials in vessel can be detected through non-metal tube wall

Equipped with potentiometer to conduct sensitivity adjustment function

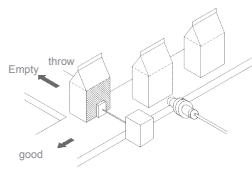
Application area



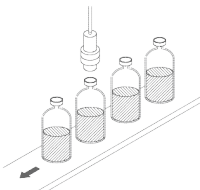
Detect the liquid level from the sideways of the bottle



Check whether the worktable is rotated in place



Detection of objects in package



Detection of bottle cap

Basic performance parameter

							
Product series	SPC 312	SPC 318	SPC 330	SPC 130	SPC 150	SPC 306	SPC 313
External structure diagram	Figure 1	Figure 2	Figure 3	Figure 4	Figure 5	Figure 6	Figure 7
Specifications(mm)	M12*1*52, M12*1*65	M18*1*70, M18*1*83.5	M30*1.5*62 M30*1.5*79	30*7*50	50*7*20	43*24*20	34*33*20
Installation	● Flush, ◑ Non-flush	● Flush, ◑ Non-flush	● Flush, ◑ Non-flush	● Flush, ◑ Non-flush	◑ Non-flush	◑ Non-flush	◑ Non-flush
Effektive detection dialance	2mm, 4mm	5mm, 8mm	10mm, 15mm	5mm, 8mm	10mm	13mm	26mm
Output	DC 3 Wires	NPN NO; NPN NC PNP NO; PNP NC	NPN NO; NPN NC PNP NO; PNP NC	NPN NO; NPN NC PNP NO; PNP NC	NPN NO; NPN NC PNP NO; PNP NC	NPN NO; NPN NC PNP NO; PNP NC	NPN NO; NPN NC PNP NO; PNP NC
	DC 4 Wires	/	NPN NO+NC PNP NO+NC	NPN NO+NC PNP NO+NC	/	/	/
	DC 2 Wires	/	/	/	/	/	/
	AC 2 Wires	/	NO NC	NO NC	/	/	/
	AC/DC 2 Wires	/	/	NO NC	/	/	/
Supply voltage	10...30 VDC	10...30 VDC 20...250 VAC	10...30 VDC 20...250 VAC 20...250 VAC/DC	10...30 VDC	10...30 VDC	10...30 VDC	10...30 VDC
Switch frequency	50Hz	50Hz, 15Hz	50Hz, 15Hz	60Hz	30Hz	60Hz	60Hz
Ambient temperature	-25...+70°C	-25...+70°C	-25...+70°C	-10...+55°C	-10...+55°C	-10...+55°C	-10...+55°C
Level of protection	IP67	IP67	IP67	IP67	IP67	IP67	IP67
Housing material	Nickel-copper Alloy, PA66	Nickel-copper Alloy, PBT	Nickel-copper Alloy, PBT	PBT	PBT	PBT	PBT
Connection	Cable, M12 Connector	Cable, M12 Connector	Cable, M12 Connector	Cable	Cable	Cable	Cable
Certification	CE	CE RoHS	CE RoHS	CE	CE	CE	CE

Position detection

Angle measurement

Speed measurement

Displacement measurement

Liquid level measurement

Flow measurement

Pressure measurement

Temperature and humidity measurement

Current measurement

Special sensor

Magnetic proximity switch

Bistable position switch

Tool setting gauge position switch

Inductive proximity switch

Capacitive proximity switch



Position detection
Angle measurement
Speed measurement
Displacement measurement
Liquid level measurement
Flow measurement
Pressure measurement
Temperature and humidity measurement
Current measurement
Special sensor

Magnetic proximity switch
Bistable position switch
Tool setting gauge position switch
Inductive proximity switch
Capacitive proximity switch



Machine size

SPC312 Molded cable dimension diagram

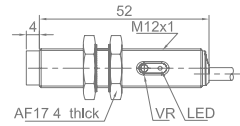
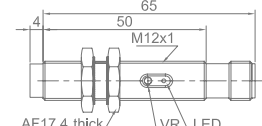


Figure 1

SPC312 Connector dimension diagram



SPC306 Dimension diagram

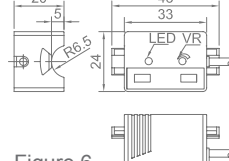


Figure 6

SPC318 Molded cable dimension diagram

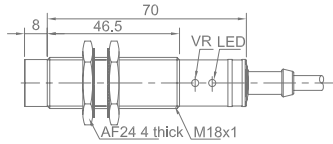
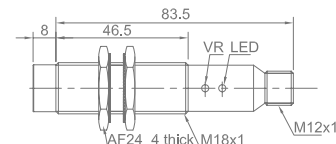


Figure 2

SPC318 M12 Connector dimension diagram



SPC313 Dimension diagram

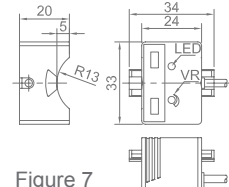


Figure 7

SPC330 Molded cable dimension diagram

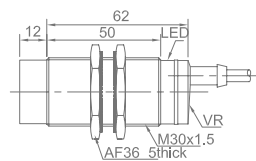
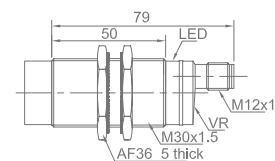


Figure 3

SPC330 M12 Connector dimension diagram



SPC130 Dimension diagram

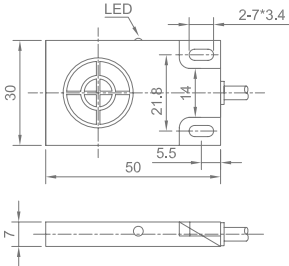


Figure 4

SPC150 Dimension diagram

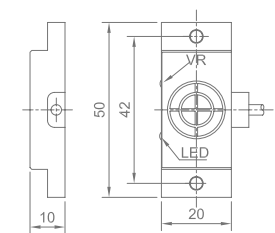


Figure 5

Wiring method

DC 2 Wires	Lead type	M8 connector	M12 connector	Terminal connection
NO				
NC				

Unit: mm

DC 3 Wires	Lead type	M8 connector	M12 connector	Terminal connection
NPN NO				
NPN NC				
PNP NO				
PNP NC				

DC4 Wires	Lead type	M12 connector	Terminal connection
NPN NO+NC			
PNP NO+NC			

AC/DC 2 Wires	Lead type	M12 connector	Terminal connection
SCR NO			
SCR NC			

AC/DC 2 Wires	Lead type	M12 connector	Terminal connection
NO			
NC			
NO/NC			

Intrinsically safe type	Lead type	M8 connector	M12 connector	Terminal connection

Position detection
Angle measurement
Speed measurement
Displacement measurement
Liquid level measurement
Flow measurement
Pressure measurement
Temperature and humidity measurement
Current measurement
Special sensor

Magnetic proximity switch
Bistable position switch
Tool setting gauge position switch
Inductive proximity switch
Capacitive proximity switch



Position detection
Angle measurement
Speed measurement
Displacement measurement
Liquid level measurement
Flow measurement
Pressure measurement
Temperature and humidity measurement
Current measurement
Special sensor

Magnetic proximity switch
Bistable position switch
Tool setting gauge position switch
Inductive proximity switch
Capacitive proximity switch



Analog output type	Lead type	M12 connector	Terminal connection
3-wire Voltage output			
3-wire Voltage output			
4-wire Voltage/current output			

Remarks

Connector	M8 connector	M12 connector

Caution for sensor connection

Two-wire type

Connection

Incorrect wiring or unreliable wiring can damage sensors and peripheral devices. Please refer to the right chart for wiring method



Cable connection

When the connecting the sensor cable, the cable shall be wired separately with the power line and the high-voltage line. Please absolutely avoid using the same slot, and the same conduit wiring, otherwise it will lead to malfunction. If the cable needs to be lengthened, please choose the cable with cross-section of more than 0.3mm when it is less than 30m, please choose the cable with conductor impedance of less than 100Ω/km when it is more than 30m, in addition, if the cable is too long in high-speed response, the output waveform will be distorted due to the capacitance between the wires and other factors, please pay special attention.

The connection of logical AND and logical OR of sensor.

In principle, the AND or OR of the 2-wire DC switch output sensor cannot be connected. In addition, contact concatenation is not allowed.

It can connect to programmable controller

The DC input module of the programmable controller can be connected with the DC switch output type 2-wire sensor, but it is necessary to confirm the connectivity with the DC input module at ON and OFF time before using.

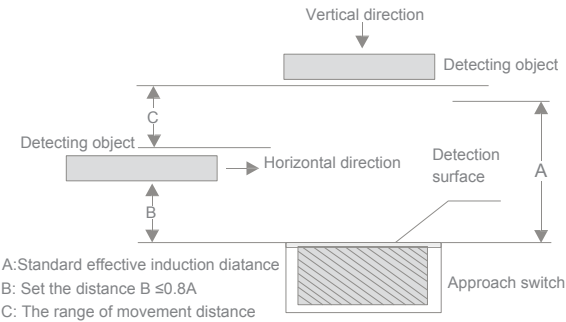
Three-wire type

Connection The AND and OR of three-wire DC switch output sensor can be connected. Its output forms are NPN-type and PNP-type. Connectable Switch power relay, electromagnet, counter and other DC drive load.	NPN output connection 	PNP output connection
OR connection When the sensor OR is connected, any sensor action can drive the load. The number of sensors depends on the sum of the current, so long as it does not affect the load action, multiple connections can be made. NPN and PNP types cannot be mixed use.	OR connection of NPN output 	OR connection of PNP output
AND connection When the sensor AND is connected, the load can be driven when all the sensors are moving. The number of sensors depends on the sum of their saturation voltage, so long as it does not affect the sensor's supply voltage and load drive voltage, multiple connections can be made. The response speed of the sensor is the sum of the initial reset of each sensor. Sensor 1: PNP output Sensor 2: PNP output Advantages: The saturation voltage of the sensor does not affect the voltage of the sensor when it is operating. The motion of the sensor depends on its response speed.	AND connection of NPN output 	AND connection of PNP output
It can connect with programmable controller The DC input module of the programmable controller can be connected directly with the DC switch 3-wire NPN or PNP type output. The power supply of the sensor is DC+24V DC stabilized power supply.	NPN output 	NPN output
Cable connection (same as 2-wire cable connection)		

Method of installation

Position setting of detecting object

The effective induction distance of the sensor may vary slightly due to the changes about ambient temperature, voltage, and other ambient conditions. Therefore, the maximal opposition approach of the detecting object should be less than the induction distance. In standard tests, the actual induction distanc should be set to less than 80% of the standard effective induction distance to make the sensor working stably. In addition, if the shape of the detecting object is smaller than that of the standard testing object, or the detection object other als from iron, the actual induction distance must be shortened due to the standard effective induction distance. Please refer to the specifications for details.



Position detection
Angle measurement
Speed measurement
Displacement measurement
Liquid level measurement
Flow measurement
Pressure measurement
Temperature and humidity measurement
Current measurement
Special sensor

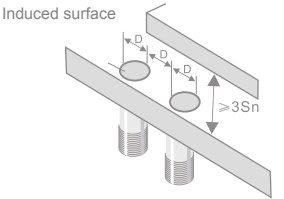
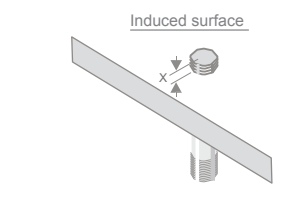
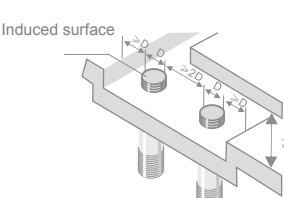
Magnetic proximity switch
Bistable position switch
Tool setting gauge position switch
Inductive proximity switch
Capacitive proximity switch



Position detection
Angle measurement
Speed measurement
Displacement measurement
Liquid level measurement
Flow measurement
Pressure measurement
Temperature and humidity measurement
Current measurement
Special sensor

Installation method of embedded, quasi-embedded and non-embedded type

The proximity sensor can be divided into the embedded type and the non-embedded type according to the installation method. Embedded type can be embedded inside metal. The non-embedded type cannot be embedded in the metal for use, but compared with the embedded type with regards to action distance, the detection distance is longer.

Embedded mounted proximity switch	
Quasi-embedded mounted proximity switch	
Non-embedded mounted proximity switch	

✖ The advantages of embedded-mounted inductance sensors and capacitance sensors are that they have better mechanical protection performance, and are less sensitive to electrical errors than those non-embedded mounted sensors.

Notes

Notice when switching on or off the power supply

When the power is turned on or off, the output state of the sensor should be OFF whether it is detected or not. Especially when the power is switched on, the action in which the output state is OFF at a certain time is called the initial reset. But in the following cases, the output will have an instantaneous ON (OFF) state, which is proportional to the length of the sensor's operating distance, about 10...100ms. When the sensor is connected with the counter and programmable controller, there will be no problem because the counter and programmable controller have an initial reset circuit inside. In other cases, please be careful to avoid the following situations.

- 1 The detection object is located near the detection distance of the sensor.
2. For the DC voltage type and DC switch type sensors, the time constant increases (decreases) significantly when the power supply is switched on (off).
- 3 For AC switch-type sensor, there is self-excitation and noise when its power is on (off).

Load of capacitance and lamp

For DC switch-type and AC switch-type sensors, capacitors, incandescent lamps and other loads should not be used as loads directly connected to them. Please connect or in series with a current limiting resistor through a relay.

The peak current set by the current limiting resistor R is within the load current of the sensor:

$$\frac{\text{Supply voltage V}}{\text{Maximum load current of the proximity switch}} \leq R \text{ (K}\Omega \text{)} \quad \text{mA}$$

Allowable loss of capacitor R (W)

$$\frac{\text{Supply voltage V}^2}{R \text{ (}\Omega \text{)}} \times 2 \text{ times above}$$

Load in parallel with capacitor and lamp

$$\frac{\text{Supply voltage V}}{\text{Maximum load current of the proximity switch mA-load current mA}} \leq R \text{ (K}\Omega \text{)}$$

Allowable loss of capacitor R (W)

$$\frac{\text{Supply voltage V}^2}{R \text{ (}\Omega \text{)}} \times 2 \text{ times above}$$

Load circuit protection circuit

The load short circuit protection circuit will cut off the load current and protect the sensor's output when the current exceeds more than 2 times of the sensor's maximum load current due to the sensor's misoperation, load damage, etc.

Points for attention to check wiring

The use of buzzer, lamp and other experiments to check the wiring of the sensor, may produce high voltage, high current. Therefore, please do not use this kind of inspection method.

Product selection list

SP	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>	—	<input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>	—	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	—	<input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>
	Type	Structural form	Structure code	Installation method		Operating distance	Working power supply		Signal output		Body installation information	Connection mode	Wiring length
	I: Capacitive	1: Rect Angle 2: Cylinder 3: Cylinder with thread	Rect Angle structure code Cylindrical structure: Diameter, Unit mm	B: flush-type N: Non-flush-type		Unit mm	Default:10~30VDC E:10~60VDC A:20~250VAC		See Table 1		See Table 2	P: Cable D: connector	Unit: 100mm

Schedule 1(Signal Output Information)

<input type="checkbox"/>	<input type="checkbox"/>
Output type	Output mode
K: Mechanical switch	O:NO C:NC D:NO+NC
N:NPN	
P:PNP	
A:AC	

Schedule 2-Installation method of body and table of parameters

Method and parameter list of body installation							
Installation mode	Parameters						
<input type="checkbox"/>	<input type="checkbox"/>						
C: Cylinder	Code	Thread/outside diameter	DN	British system	Code	Thread/outside diameter	British system
M: Standard thread	1			1/8"	D	16	
T: Fine thread	2			1/4"	E	18	
S: Extreme fine thread	3	3	10	3/8"	F	20	
F: Flange DN	4	4	15	1/2"	G	22	2"
G: British thread	5	5	20		H	24	
N: NPT thread	6	6	25	3/4"	I	27	
	7	7	30		J	30	
	8	8	32	1"	M	50	
	9				N	60	
	A	10	40				
	B	12	50				
	C	14	60				

