

# Model MDS-5T-F51 Proximity Sensor for Steel Pachinko Balls (Open collector output / 5 V DC)

**PATENTED**



Model List	Operation Status	Frequency
MDS-5T-F51	Normally closed	Standard
MDS-5T-F51B		Different

## Application

- Single or level detection of steel pachinko balls
- Detection of medals and coins or their level detection

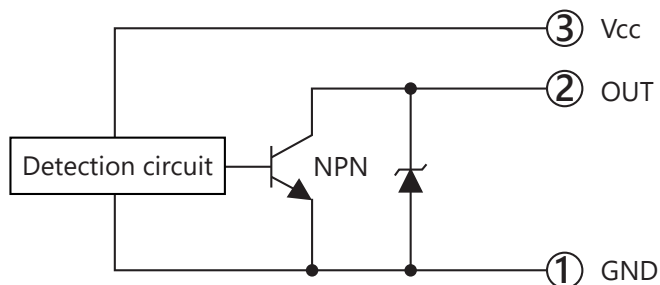
## Features

- A small flat proximity sensor (top surface detection type) with the power supply 5 V DC.
- The 2-wire sensor requires an external output residual voltage processing circuit and an open collector output conversion circuit (interface IC, etc.). Since this sensor has these circuits built-in, the cost of the external circuit of the sensor can be significantly reduced. In addition, since this sensor has an open collector output, High / Low logic processing is possible, and it can be directly connected as an input signal of DC30V or less.
- Features a keyway on the case side for an easy installation in one touch.
- Mounting is also possible using the accessory mounting bracket (sold separately).
- Since the operation mode is normally closed, disconnection detection processing can be easily performed.

## Rating/Performance

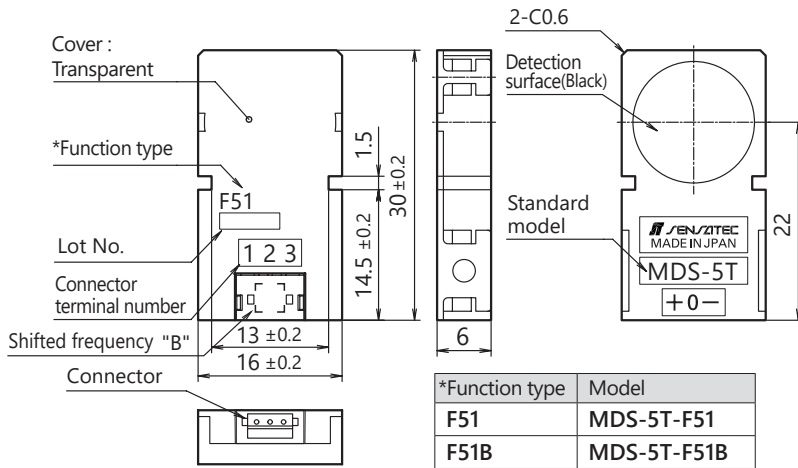
Model	MDS-5T-F51
Detection Surface	Upper side detection
Detection Distance	Steel Pachinko ball 5.0 ± 0.5 mm (4.5 to 5.5 mm)
Hysteresis	0.1 to 1.5 mm
Standard Detection Object	Steel Pachinko ball (ø 11 ± 0.05 mm)
Power Voltage	5 V DC (Operating voltage range : 4.5 V to 5.5 V DC)
Power Consumption	14 mA DC or less (At 5 V DC)
Output	NPN transistor open collector 30 V DC, 20 mA DC or less
Output Residual Voltage	1 V DC or less (Load current 20 mA DC)
Operation Status	Normally closed (Output ON without detection / Output OFF when target is detected)
Response Frequency	100 Hz or more
Temperature Range	-20 to 70 °C (-25 to 70 °C during storage) (Without dew condensation or freezing)
Humidity Range	35 to 85 % RH (35 to 85 % RH during storage) (Without dew condensation)
Breakdown Voltage	500 V AC, 50/60 Hz for 1 min (Between live parts and casing)
Insulation Resistance	50 MΩ or more, at 500 V DC megger (Between live parts and casing)
Vibration Resistance	Durability : 10 to 55 Hz, Double amplitude: 1.5 mm in X-, Y-, and Z-direction, each 2 hours (Device not powered)
Shock Resistance	Durability : 200 m/s <sup>2</sup> (Approx. 20 G) in X-, Y-, and Z-direction, each 3 times (Device not powered)
Anti-static Electricity	15kV Between the detection surface and the GND of the 1st terminal of the connector (C=150PF, Discharge resistance : 330 Ω)
Ingress Protection	IP50
Case Material	Case : ABS resin with glass (Black), Cover : PC (Transparent)
Connector	Connector: S3B-ZR (3-pin)(from J.S.T. Mfg. Co., Ltd.) [Connections] Housing: ZHR-3, Contact: SZH-002T-P0.5(from J.S.T. Mfg. Co., Ltd.)
Weight	Approx. 4.2 g
Options (Sold Separately)	Mounting bracket : PMS-5TS, Connector harness : SZH-3-300

## Output Circuit



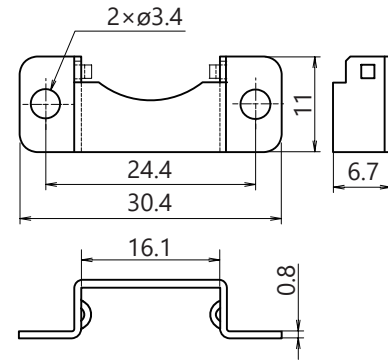
\*Because there is no reverse connection protection diode built-in, pay careful attention to the polarity of the power supply.

## Dimensions



## Installation Brackets

### PMS-5TS



Material: Brass

Surface treatment: Nickel plating

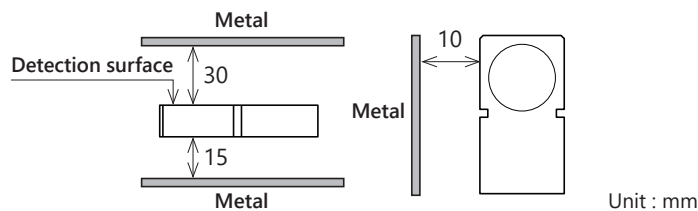
\* When installing, make sure that it does not overlap the detection surface.

## Precautions During Use

### Influence by surrounding metals

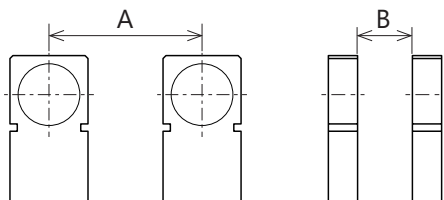
Do not place metal around the sensor body (Within 30 mm from the detection surface and within 15 mm from the back of the detection surface, or within 10 mm for the side surface from one direction and within 15 mm for the side surface from two directions.)

Otherwise, the detection distance may increase or other malfunctions may occur.



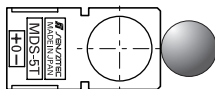
### Mutual interference

When two or more identical sensors are used, observe the minimum values shown in the figure on the below to prevent mutual interference. (The different frequency model type has "B" at the end of its model designation.)



	Same frequency	Different frequency
A	80 mm	30 mm
B	150 mm	75 mm

### Precautions when installing



Do not use when metal is in close contact.

### Others

- Please note that this proximity sensor can detect steel pachinko balls, but not SUS pachinko balls. Use "Model: MDS-5T-S51" to detect SUS pachinko balls.
- When detecting pachinko balls one by one, keep them at least 30 mm apart. In addition, the range of output operation time varies depending on the passing position, passing distance, passing speed, ball material, and parallelism of the medal surface with respect to the sensor detection surface.
- Do not drop a detector such as a pachinko ball or medal directly on the detection surface. The internal ferrite core may be damaged by impact, and the sensor may deteriorate or fail. Also, do not directly hit or pass a detector such as a pachinko ball or medal against the detection surface of the sensor. Be sure to install indirect materials (plastic, etc.) between the detector and the detection surface of the sensor for detection.
- Please use with a margin in the detection distance at about 70% or less of the measured detection distance.
- \* For other precautions, refer to "General Precautions" for proximity sensors.