

**PATENTED**



▶ HPG-S3  
▶ HPG-S4  
▶ HPG-S5

Normally open  
Standard



▶ HPG-S3B  
▶ HPG-S4B  
▶ HPG-S5B

Normally open  
Shifted Frequency



▶ HPG-S31  
▶ HPG-S41  
▶ HPG-S51

Normally closed  
Standard



▶ HPG-S31B  
▶ HPG-S41B  
▶ HPG-S51B

Normally closed  
Shifted Frequency

Model List	Operation Sensitivity	Operation Configuration	Frequency
HPG-S3	30 pF	Normally open	Standard
HPG-S4	40 pF		
HPG-S5	50 pF		
HPG-S3B	30 pF		Different
HPG-S4B	40 pF		
HPG-S5B	50 pF		
HPG-S31	30 pF	Normally closed	Standard
HPG-S41	40 pF		
HPG-S51	50 pF		
HPG-S31B	30 pF		Different
HPG-S41B	40 pF		
HPG-S51B	50 pF		

### Application

- Touch switch for door knobs
- Elevator switch
- Touch switch for automatic doors
- Touch switch for security purpose
- Seat sensor
- Input switch for electric devices
- Input sensor of amusement equipment
- Handles of Pachinko machines
- Safety device for finger pinch avoidance from machine moving parts or door mechanisms

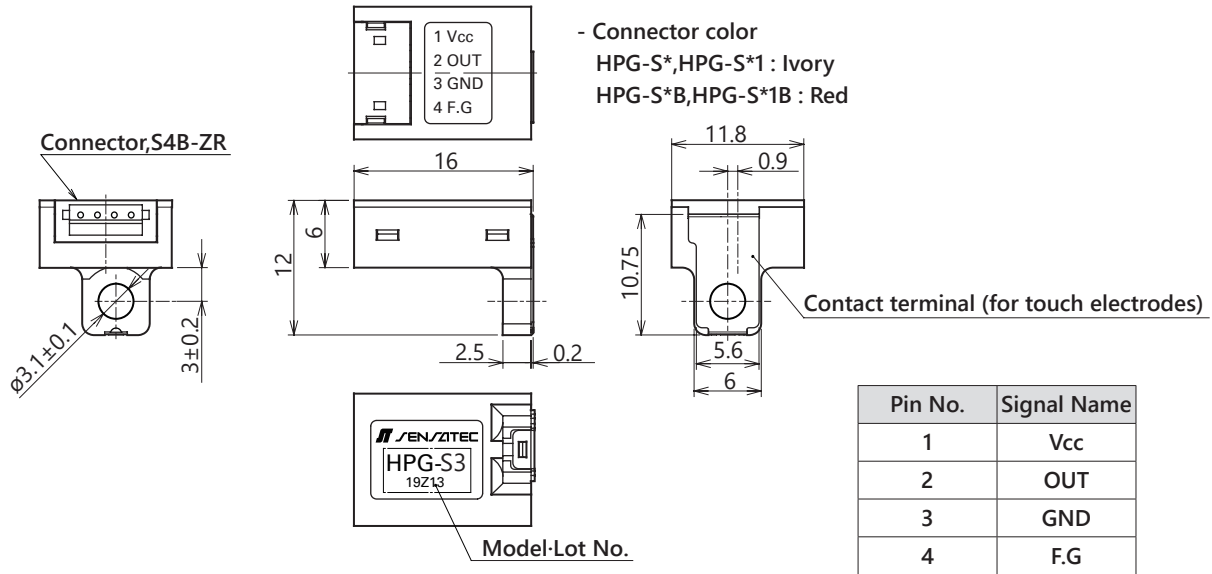
### Features

- In various situations that expose amusement arcade machines to static electricity, such as lengthy internal wiring and/or no grounding connection from the machine to the parlor, this sensor assures excellent anti-static performance. This has been realized by optimizing the design of noise eliminating circuit (see the next page) of the sensor, from which the static electricity enters.
- When used in a large-output transmission station or near a large-sized inverter device, the common mode noise from the DC power source can be diverted to the frame ground.
- Because this is an ultra-small sensor, it can be easily installed locations where space is very limited.
- Open collector output means direct connection to a microcomputer input is possible without any special interface circuit.
- The sensor does not react to objects of small capacitances such as plastic bags or small pieces of luggage. There is no need to adjust the sensitivity level.
- The static electricity generated by human activity is countered by built-in protection circuits. No additional countermeasure is required.
- The sensor features a contact terminal for the touch electrode. Connection is available by the simple connection of a touch electrode

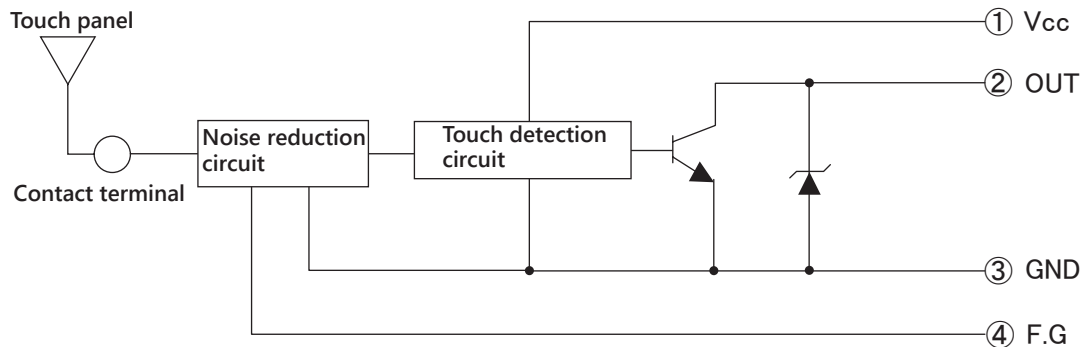
### Rating/Performance

Model	HPG-S3	HPG-S4	HPG-S5	HPG-S31	HPG-S41	HPG-S51
Operation Sensitivity	30 pF±6 pF	40 pF±8 pF	50 pF±10 pF	30 pF±6 pF	40 pF±8 pF	50 pF±10 pF
Power Voltage	5 V to 12 V DC (Operating voltage range: 4.75 V to 13.8 V DC)					
Power Consumption	At 5 V DC : 4 mA DC or less, At 12 V DC : 18 mA DC or less					
Output	NPN transistor open collector 14.4 V DC, 50 mA DC or less					
Maximum Output Saturation Voltage	1 V DC MAX (Load current 50 mA DC)					
Operation Status	Normally open (On output with detection target)			Normally closed (Off output with detection target)		
Temperature Range	-20 to 60 °C (-25 to 65 °C during storage) (Without dew condensation or freezing)					
Humidity Range	35 to 85 % RH (25 to 85 % RH during storage) (Without dew condensation or freezing)					
Anti-static Electricity	With/without F.G. terminal (Frame Ground) Contact discharge or discharge in air between the contact terminal and the ground terminal : ± 25 kV (150 pF, 330 Ω, 100 times at 1 second interval)					
Breakdown Voltage	500 V AC, 50/60 Hz for 1 min (Between live parts and the case)					
Insulation Resistance	20 MΩ or more, at 500 V DC megger (Between live parts and the case)					
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 : 500 m/s <sup>2</sup> (Approx. 50 G) in X-, Y-, and Z-direction, each 3 times (Device not powered)					
Ingress Protection	IP50					
Case Material	PBT reinforced with glass-fiber (Black)			PBT reinforced with glass-fiber (Gray)		
Connector	Connector : S4B-ZR-SM4A-TF (4-pin), Housing : ZHR-4, Contact : SZH-002T-P0.5 (from J.S.T. Mfg. Co., Ltd.)					
Weight	Approx. 1.5 g					
Options (Sold Separately)	Connector harness: SZH-4-300					

## Dimensions



## Output Circuit



## Precautions During Use

- Do not apply any voltage greater than 100 V peak, between GND and F.G.
- The contact terminal (touch electrode) of the touch sensor is connected to the detection circuit. Accordingly, for safety, between the touch sensor power and AC power, ensure the insulation is sufficient for the breakdown voltage.
- The static electricity discharged to the touch electrode is released from the GND line. The F.G. line smoothens the voltage in the GND line, enabling to control the voltage fluctuation in the GND line. The GND line and the F.G. line need to be as short as possible, or the impedance should be as small as possible.
- The touch sensor uses a high-frequency oscillator circuit. If multiple touch sensors are approached or the same person touches the touch electrodes of multiple touch sensors, mutual interference may occur which could reduce detection accuracy.
- To prevent mutual interference, models using oscillators of differing frequencies are used. The influence of mutual interference depends on the arrangement of the touch sensor and touch electrode as well as the wiring status; consult us for the details. For the Shifted Frequency types, the letter B is included after the model name. If the F.G. terminal is not to be used, open status is required. In this case, the sensor can still be used as a normal touch sensor.
- When using the normally open output type, be sure to use the sensor with the wiring capacity of the output line under 1,000 pF. Otherwise, the charge of the output line may exceed the maximum output current at output drive, resulting in output malfunction. When a longer output wiring is needed for larger output wiring capacity over 1,000 pF, either add a 100 Ω resistor in series besides the output terminal of the sensor side, or use the normally close output type.
- For normally open output type sensors, the output line wiring length should be 5 m or less in order to eliminate the influence of the output drive current capability of the IC used in this sensor and the anti-static performance due to wiring inductance.
- The tightening torque for the case should be 0.5 N·m or less.
- For other precautions, refer to "General Precautions" for touch sensors.