

# Door Operation Sensors

## Switch Built-in Magnet Door Latch PCSW Series

TDK SW Catch (Sensing Door Latch) holds the doors, panels, and lids on all types of equipment. This latch also contains a reed switch which can be used to sense if a door is open or closed. The switch is activated by a unique TDK-designed magnetic circuit.

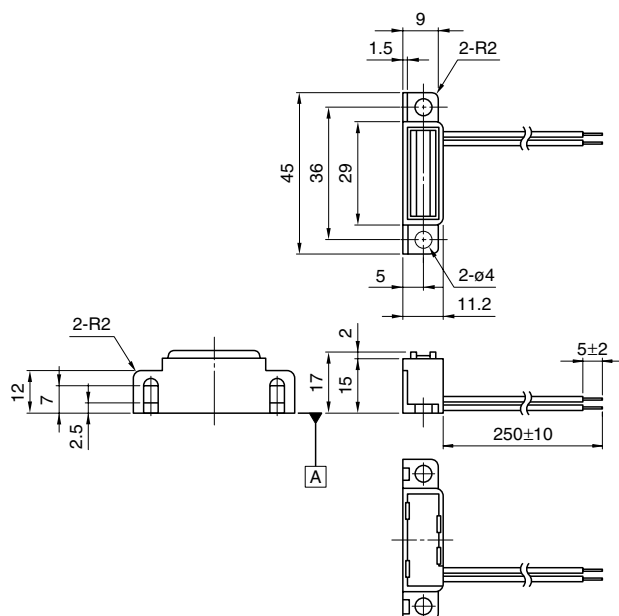
### FEATURES

- SW catch can hold the doors and lids on all types of equipment. When the door is opened or closed, the confirmation signal can be easily received.
- Provides stable mechanical latching with reliable interlocked electronic switching.
- Highly reliable electronic operation due to reed switch contacts.
- Highly reliable mechanical operation (over 100000 open/close cycles) due to special resin casings.
- Compact dimensions and easy to mount.
- Two types are available.
  - A type: Switch contacts open (OFF) when door is closed.
  - B type: Switch contacts closed (ON) when door is closed.

Type	A	B
At attraction of a magnetic material	OFF	ON
At non attraction of a magnetic material	ON	OFF

Part No.	Type	Magnetic pull force
PCSW303B3A000	A	$\geq 29.4\text{N}$
PCSW303B1B000	B	$\geq 9.8\text{N}$
PCSW303B3B000	B	$\geq 29.4\text{N}$

### SHAPES AND DIMENSIONS



- A ferromagnetic material such as iron with minimum dimensions of 45×12×1mm must be installed on mounting face A.

Dimensions in mm

### APPLICATIONS

For the latching and sensing of doors, panels, and lids on copiers, printers, office automation equipment, and factory automation equipment, and machineries.

### SWITCH

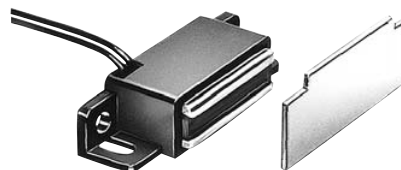
Maximum contact rating	10W
Maximum contact voltage E <sub>dc</sub>	100V
Maximum contact current I <sub>dc</sub>	0.5A
Maximum initial contact resistance	0.15Ω [excluding lead wires]

### TEMPERATURE RANGES

Operating	0 to +60°C
Storage	-25 to +80°C

### RATINGS

Magnetic pull force	$\geq 29.4\text{N}$ or $\geq 9.8\text{N}$ , when measured with a TDK standard deadweight
Attraction plate	29×16×1.6mm min. Material should be SPCC or equivalent. Make sure that heads of mounting screw do not touch the yoke surface of the housing when door is closed.
Electrical leads	UL1007, AWG#26 black insulation
Maximum lead tension	within 9.8N
Electrical connector	Not provided



- All specifications are subject to change without notice.

## OPERATION PRINCIPLES

### A TYPE SWITCH CONTACTS OPEN (OFF)

#### 1. Door closed

Closing the door brings its ferromagnetic attraction plate into contact with the door latch housing. This causes the magnetic flux generated from the magnet in the housing to flow across both yokes, through the attraction plate on the door. This holds the door closed. Since the magnetic flux now flows through the attraction plate, the flux available to the reed switch drops below the release point of the switch, and the contacts open (OFF).

#### 2. Door open

When the door is open, its ferromagnetic attraction plate is separated from the door latch housing. This causes the magnet's flux to leak through both yokes of the magnetic circuit. Leakage occurs from an actuating projection at the reed switch side of the yoke to a diagonally-positioned actuating projection. This makes the flux through the reed switch rise beyond the closing point of the switch, causing it to close (ON).

### B TYPE SWITCH CONTACTS CLOSED (ON)

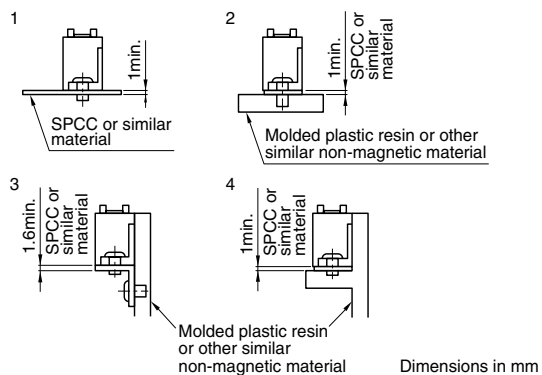
#### 1. Door closed

Closing the door brings its ferromagnetic attraction plate into contact with the door latch housing. This causes the magnetic flux generated from the magnet in the housing to flow across both yokes, through the attraction plate on the door. This holds the door closed. Since the magnetic flux from the magnet now flows through the attraction plate, only leakage flux is available to the reed switch. However, a submagnet provided in the upper part of the reed switch is unaffected, and its magnetic flux causes the reed switch to close (ON).

#### 2. Door open

When the door is open, its ferromagnetic attraction plate is separated from the door latch housing. This causes the magnet's flux to leak through both yokes of the magnetic circuit. Leakage occurs from an actuating projection at the reed switch side of the yoke to a diagonally-positioned actuating projection. The flux from the main magnet through the reed switch rises. However, the magnetic flux from the submagnet interferes with this rising flux leakage from the main magnet, counteracting it. The result is that the overall magnetic flux through the reed switch now drops below the releasing point of the switch, causing the contacts to open (OFF).

## INSTALLATION EXAMPLES



## GUIDELINES FOR RELIABLE OPERATION

- Do not drop or strike these products. They contain glass-housed reed switches. Excessive impact may result in breakage. Even if the glass envelope is not broken, impact may cause the switching characteristics to change.
- Do not apply excessive force to leads during soldering.
- Do not store or use these products under conditions of intense static magnetic fields, alternating magnetic fields, or pulsed magnetic fields.
- Do not overload the holding ability of the latch. Forces in excess of 49N may deform the housing.
- Do not allow foreign magnetic materials, substances or fillings to stick to the magnetized attracting surface of the housing. This will cause a gap between the housing and the attracting plate when the door or panel is closed, resulting in unreliable operation. Use with caution in locations where such foreign material may be a factor. Removal of any attracted foreign material restores normal operation.
- The housings of these products do not incorporate magnetic shielding. Mounting face A is designed to be in contact with ferromagnetic material. However, placing the housing's other faces in contact with or in close proximity to magnetic materials may cause characteristics to change. Contact TDK Engineering if your application requires placement near magnetic materials.

## RECOMMENDED ATTRACTING PLATES

TDK SW Catches (Sensing Door Latches) utilize changes in magnetic flux for switching operation. Therefore, the shape of the attracting plate can influence operation. The recommended attracting plate shape is shown below.

The magnetic pull force of these products was determined using a TDK standard deadweight which is a cylindrically-shaped piece of iron. Therefore, when iron attracting plates of 1 to 2mm thickness are used, the magnetic pull will be less than the values given above.

