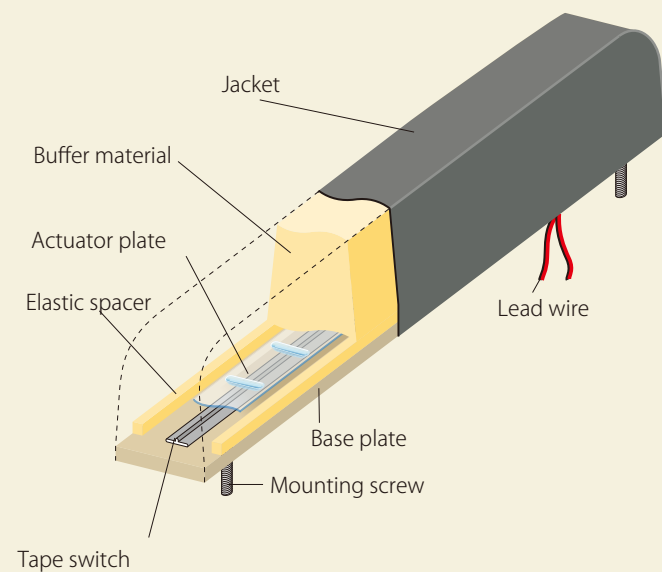


BUMPER SWITCH®

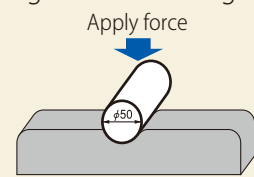
Contact detection capability and high shock cushioning characteristics



【 Structural Drawing 】



【 Actuating force measuring method 】



A contact/collision detecting switch with excellent cushioning characteristics. Customer requirements such as size and mounting shape can be accommodated with flexibility.

- Custom manufacturing is possible according to the mounting shape and use environment requirements.
- Buffer material with excellent cushioning characteristics
- Can be combined with an interface controller (page 21) for wire-breaking detection.

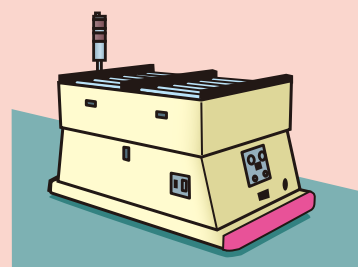
■ Rating

Rated voltage *1	:AC/DC, 5 to 24V
Rated current *1	:0.01 to 0.3A (resistive load)
Interelectrode insulating resistance*1	:10MΩ or higher (DC250V)
Interelectrode withstand voltage*1	:DC250V, 1 minute
Recommended temperature range	:0 to 50°C

* 1 Terminating-register-integrated tape switches (2 wires) are excluded. For terminating-register-integrated tape switches (2 wires) contact our sales representative serving your locality.

【 Application 】 (See page 3 and 4 for details.)

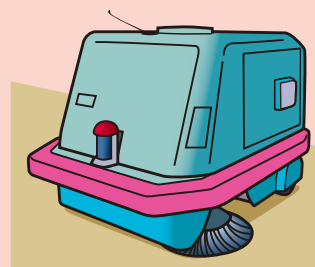
Automatic guided vehicles
(Contact/collision detection)



Stage set
(Suck-in detection)

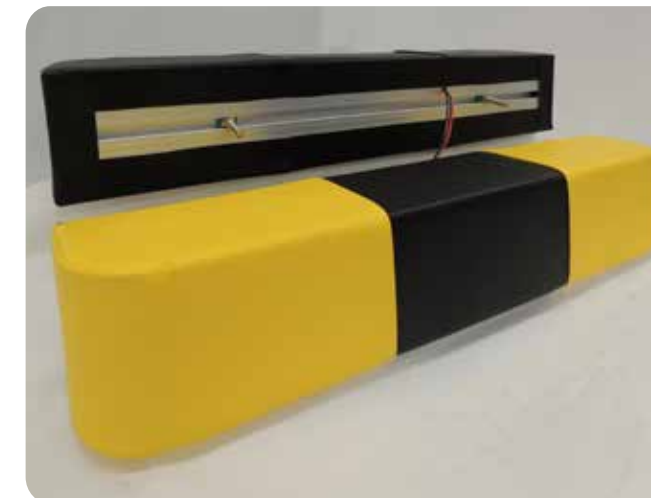


Cleaning robot
(Contact/collision detection)



See page 23 for wiring examples and equivalent circuit.

Semi-custom bumper switch (SC series)



A tape switch integrated contact/collision detection switch with outstanding reliability and cushioning characteristics. Quick delivery is also possible.

- Employment of a bolt rail system permits on-site setup of the screw position (dispensing with the need to set up the screw position at the time of order).
- An aluminum extrusion material employed as the base material for increased strength and precision.
- Black and/or yellow single or two-color jacket.
- The available sizes
SC-50(H·D: 50 mm each): Length 350 to 3,600mm
SC-100(H·D: 100 mm each): Length 600 to 3,600mm

■ Shape and structure

SC-50
Height×depth×length (mm) 50×50×Designated length (350~3,600)
Weight Approx. 1,100g/m
Mounting screw (length selectable) M6 SUS (Effective sensing length=21, 26, 31 mm)
Pretravel (φ 50 cylinder)*3 Approx. 9mm
Overtravel*3 Approx. 14mm (250N)
Approx. 16mm (400N)

SC-100
Height×depth×length (mm) 100×100×Designated length (600~3,600)
Weight Approx. 2,000g/m
Mounting screw (length selectable) M8 SUS (Effective sensing length=26, 31, 36 mm)
Pretravel (φ 50 cylinder)*3 Approx. 15mm
Overtravel*3 Approx. 55mm (250N)
Approx. 60mm (400N)

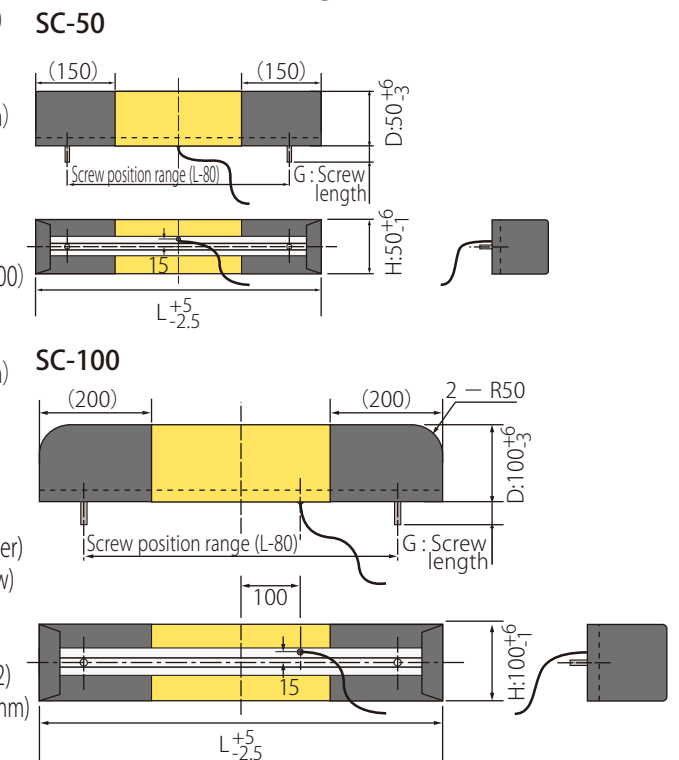
■ Specification and Rating *4

Jacket (sewn) Artificial leather (3 sheets stitched together)
Jacket color 2-color combination selectable (black/yellow)
Buffer material Urethane foam
Base plate Aluminum extrusion material
Lead wires 4-wire system (VFF 0.3 mm² red/black×2)
Length: Customer specified (standard: 500 mm)
Actuating force*3 Approx. 40N

* 3 Characteristic Value in normal temperature

* 4 Not applicable special support such as Drip-proof, Outdoor and Clean room

【 Reference Drawing 】



Semi-custom bumper switch estimates and ordering information (Dimensions in mm)

SC-100 L900 L/W500 BYB 26
① ② ③ ④ ⑤

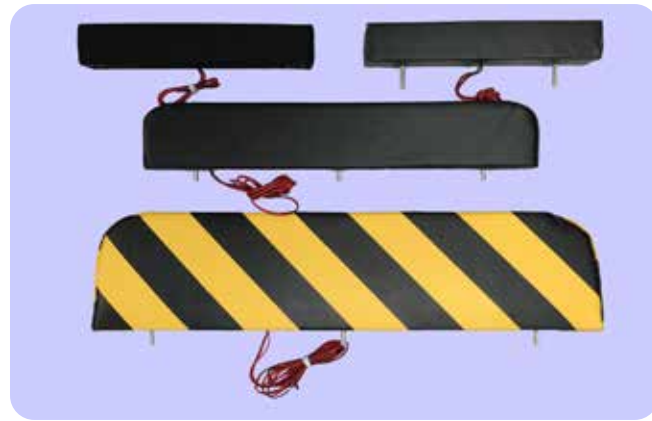
- ① Type ② Total length (L)
- ③ Lead wire length: 500 mm standard (customer specifiable)
- ④ Color: BBB, BYB, YBY, YYY(see the table on the right)
- ⑤ Effective mounting screw length (G)
SC-50: Selectable from 21, 26, and 31 mm (M6).
SC-100: Selectable from 26, 31, and 36 mm (M8).

Color combination	Symbol
Black-Black-Black	BBB
Black-Yellow-Black	BYB
Yellow-Black-Yellow	YBY
Yellow-Yellow-Yellow	YYY

Length	SC-50	SC-100
350~450	2	-
451~599	3	-
600~800	3	2
801~1,200	4	3
1,201~1,600	5	4
1,601~2,000	6	5
2,001~2,400	7	6
2,401~2,800	8	7
2,801~3,200	9	8
3,201~3,600	10	9

TOKYO SENSOR
BUMPER SWITCH®

Bumper switch (custom product)



A tape switch integrated contact/collision detection switch with outstanding reliability and cushioning characteristics.

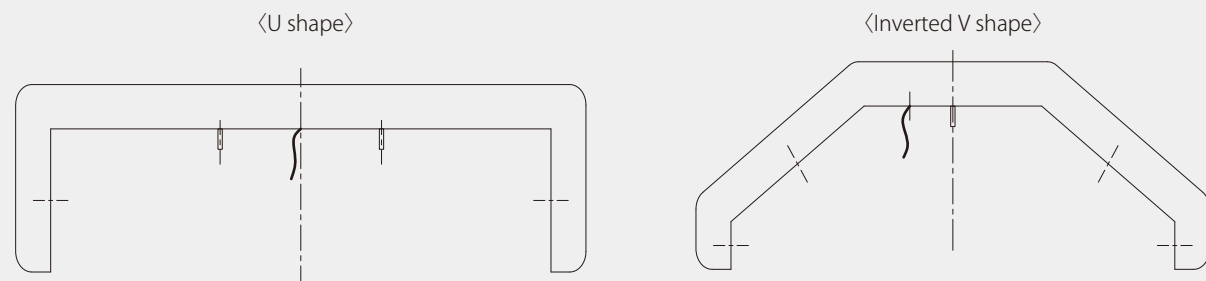
- Size and shape are customizable according to the customers application.
- Buffer material with excellent cushioning characteristics
- Finds uses in clean room and outdoor applications.

All bumper switches are available as custom products. Refer to the following with respect to their specifications:

Specifications	Standard	Option			
Jacket	Artificial leather	Artificial leather	Splash	Lastan (heat resistant)	Aluminum leather
Jacket color	Black	Selectable	Black	Gray	Metallic luster
Buffer material	Urethane foam	Urethane foam, formed rubber (select according to application)			
Base plate	Iron plate, Polywood 12 mm thick Maximum length 2,400 mm	aluminum plate, stainless steel plate			
Mounting screw	M8 l = 30mm	Customer designated			
Actuating force	Approx. 40N*1	Up to size and specification			
Wiring system	4-wire system	2-wire system*2/4-wire system/terminating resistor integrated (2 wires)*3			
Lead wire	VFF (vinyl sheathed flat type cable) 2 conductors, 0.3mm ² red/black×2	Customer designated			
Lead wire length	500mm	Customer designated			

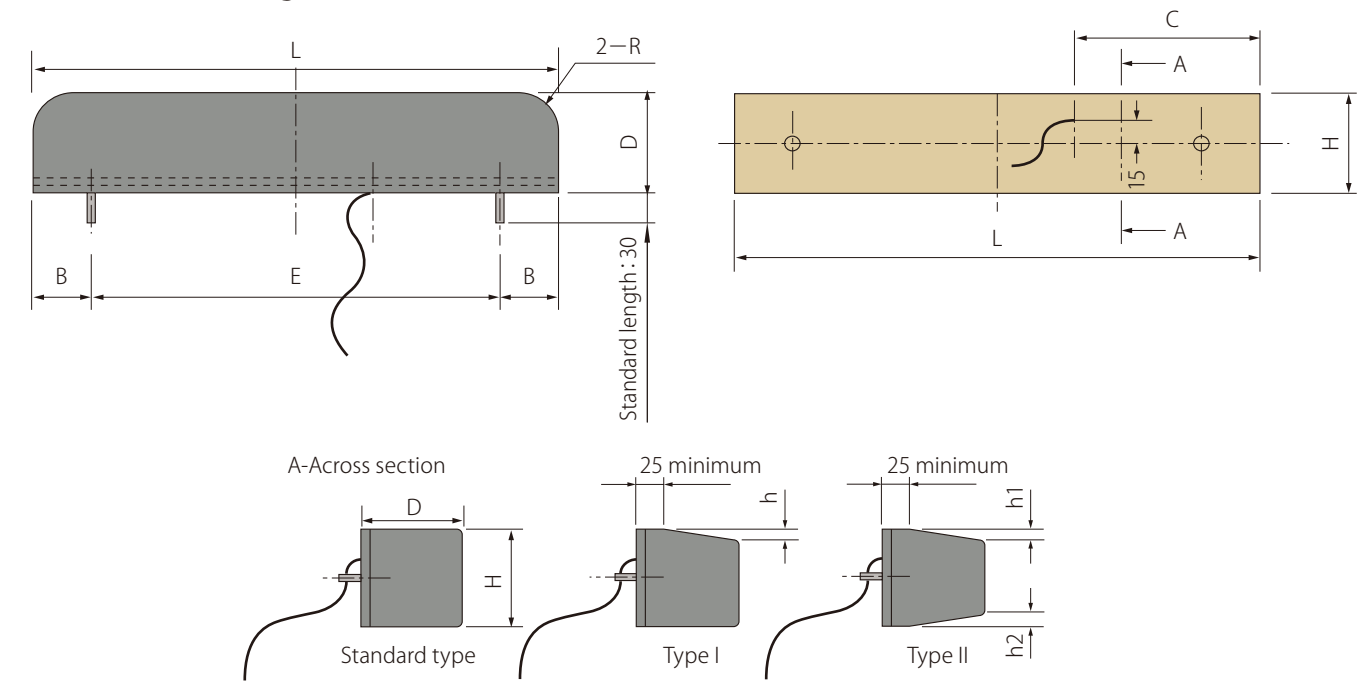
*1 Characteristic Value in normal temperature (In the case of D:100mm H:100mm).
*2 Wire-breaking detection is impossible.
*3 Contact the sales representative serving your locality for terminating-register-integrated switches (2 wires).

Examples of irregular shapes (optional)



(Contact the sales representative serving your locality for details.)

Reference drawing (dimensions need be specified by customer)



※Types I and II switches are optional.
Contact the sales representative serving your locality.

Bumper switch estimates and ordering information (dimensions in mm)

Main body dimensions and shape Enter dimensions and other values in 【 】.
*Items with an asterisk are required. Specify any irregular shape in the drawing.

- Jacket : 【 】 ※Standard artificial leather is assumed if left blank.
- *Total length L : 【 】 mm $150 \leq L \leq 2400$
- *depth D : 【 】 mm $50 \leq D \leq 200$ ※Twice the H dimension maximum
- *Height H : 【 】 mm $50 \leq H \leq 200$
- *Corner radius R : 【 】 mm $25 \leq R \leq D-25$ ※in 5 mm units (Enter "0" if round corner is not required.)
- Mounting screw : 【 】 mm ※Length: 15 mm to 65 mm in 5 mm increments
(Standard screw length:30 mm M8 nut Plain washer Spring washer)
- *Screw position dimension B : 【 】 mm $40 \leq B \leq 150$
- *Screw pitch dimension E : 【 】 mm $E \leq 700$
- *Number of mounting screws : 【 】
- Lead wire length : 【 】 mm ※500 mm standard length is assumed if left blank.
- Wiring system : 4-wire (standard)
※Contact the sales representative serving your locality for terminating-register-integrated switches (2 wires).

•For a 4-wire switch, select the number of lead wire outlets.

*Number of lead wire outlets : Select from 1 and 2.

Spacing between 2 lead wire outlets : 【 】 mm ※Must be 50 mm or longer away from both sides

*Lead wire position dimension C : 【 】 mm ※Must be 50 mm or longer away from both sides

Special support (optional): Irregular shape (U-/inverted V shape) Type I Type II
Drip-proof supported Outdoor use supported

Please note: Contact the sales representative serving your locality for using in the clean room.

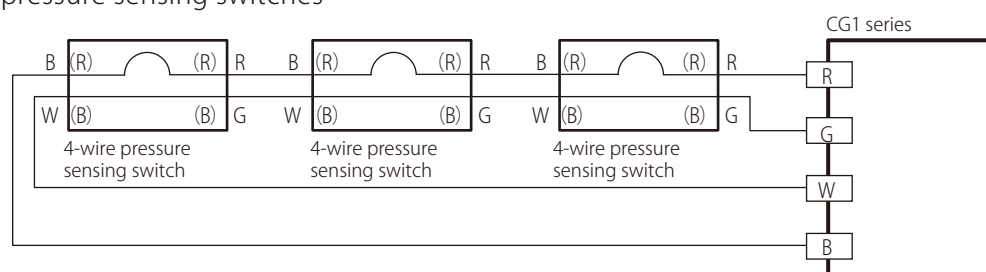
Use and Wiring Examples of the Tokyo Sensor's Pressure Sensing Switching Products

■ Examples of connecting the lead wires of switch products to a CG1 interface controller and equivalent circuits

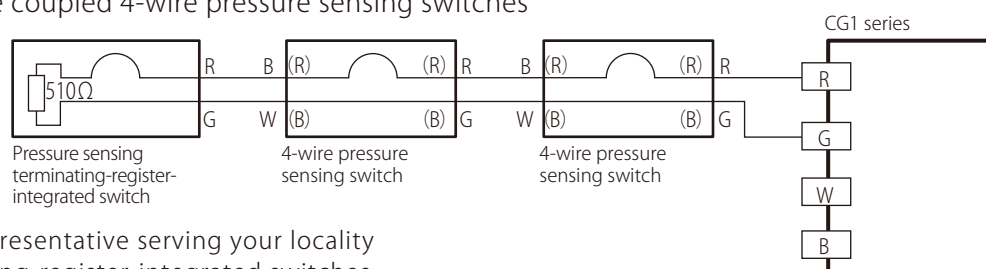
Switch type	4-wire system			Terminating-resistor-integrated switch		
	Lead wire		CG1 terminal	Lead wire		CG1 terminal
	Wire type	Wire color		Wire type	Wire color	
Tape switch (page 5)	VFF	Red (R) Green (G)	R G	VFF	Red (R) Green (G)	R G
	VFF	Black (B) White (W)	B W			
Edge switch (page 9)	VFF	Red (R) Green (G)	R G	VFF	Red (R) Green (G)	R G
	VFF	Black (B) White (W)	B W			
Bumper switch (page 13)	VFF	Red (R) Black (B)	R G	VFF	Red (R) Green (G)	R G
	VFF	Red (R) Black (B)	B W	※Contact the sales representative serving your locality for bumper terminating-resistor-integrated switches.		
Switch equivalent circuit						
Wiring diagram						

■ Examples of coupling pressure sensing switches
(Applicable products: tape switch, edge switch, and bumper switch)

(1) Coupling 4-wire pressure sensing switches



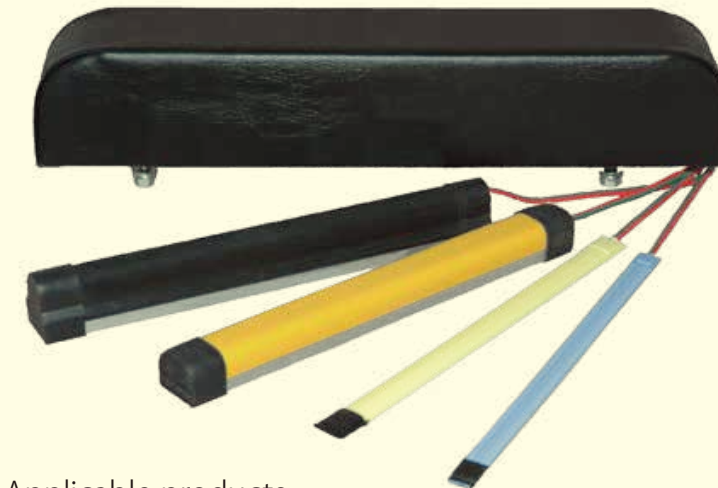
(2) Using a pressure sensing terminating-resistor-integrated switch at the end of the coupled 4-wire pressure sensing switches



※Contact the sales representative serving your locality for bumper terminating-resistor-integrated switches.

Wire-breaking detectable 2-wire system dispensing with return wiring

Terminating-resistor-integrated pressure sensing switch products



Applicable products

Tape switch (page 5), edge switch (page 9), Bumper switch (page 13), Mat switch (page 17)

Features

- Wire-breaking detection is possible in 2-wire configuration.
(Can be combined with a CG1 series interface controller (page 21).)
- Use of the terminating-resistor-integrated pressure sensing switch at the terminal of coupled pressure sensing switch products dispenses with long return wiring.
- No changes need be made to the external shape and detectable range of a pressure sensing switch by implementing the terminating-resistor-integrated pressure sensing switch at the terminal of that pressure sensing switch product. Replacement of existing products is also possible.
- Waterproof type is optional.

■ Differences among the 2-wire, 4-wire, and terminating-resistor-integrated switches

2-wire type : Generally, only the switching function is used (wire-breaking detection is impossible).

4-wire type : Used in applications where two or more switches are to be put together.
Can be combined with a CG1 series device for wire-breaking detection.

Terminating resistor integrated type : Wire-breaking detection is possible by combining the switch with a CG1 series device in 2-wire configuration.

Lead wires Other lead wire types are also available. Contact the sales representative serving your locality.

Product type	Wiring system	Wire type	Standard length	Standard color	Wire-breaking detection
Tape switch Edge switch	2-wire system	VFF (vinyl sheathed flat type cable) 0.5mm ²	500mm	Same color as switch jacket	×
	4-wire system			Red-green/Black-white	○
	Terminating resistor integrated			Red-green	○
Bumper switch	4-wire system	VFF (vinyl sheathed flat type cable) 0.3mm ²	500mm	Red-black×2	○
Mat switch	4-wire system	SVCTF (Soft vinyl cabtyre round cord) 0.75mm ²	1,500mm	Red-green/Black-white	○

* 1 The Lead Wires of EH-02 is VFF 0.3mm², and The Lead Wires of E21BK0 is SVCTF 0.3mm² 2 cores × 2.

* 2 The standard color of the lead wires in the 2-wire T20RE0, T20WH0, EH-02 and E20BK is black-white, and 2-wire edge switches is the same as that of the built-in switch jacket

* 3 The Lead Wires color of E21BK0 is black-white.