

TOKYO SENSOR EDGE SWITCH

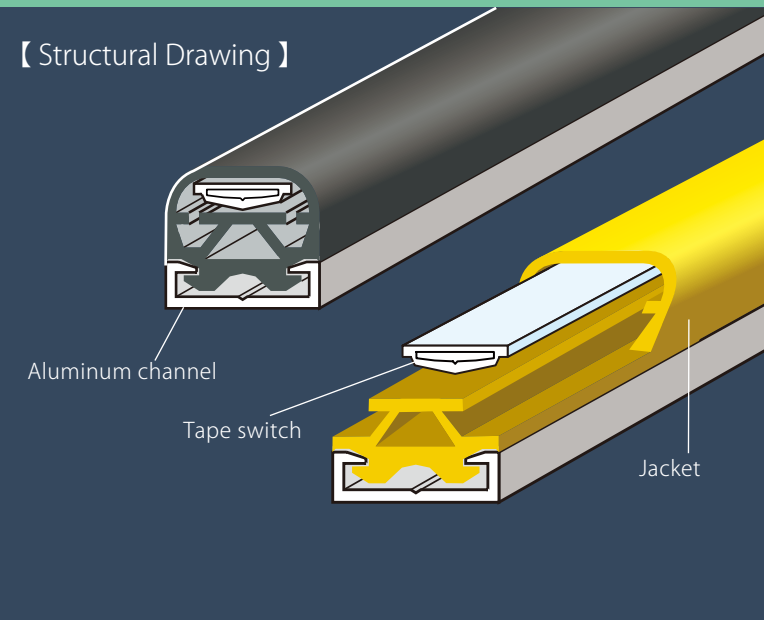
Contact detection type switches provided with cushioning characteristics which prevent damage to the contacted object.



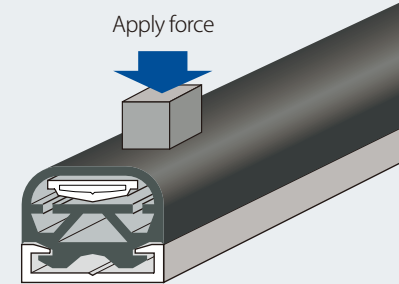
Provisions for protecting the sensing object are implemented by covering a tape switch with a dedicated jacket. This also minimizes the damage to the tape switch itself, so that the durability of the edge switch is greatly enhanced.

- Selectable from 8 types which differ in structure and size.
- Easy installation using an aluminum channel.
- 4-wire tape switches and terminating-resistor-integrated tape switches can be combined with an interface controller (page 21) to provide wire-breaking detection capability.

【 Structural Drawing 】



【 Actuating force measuring method*1】

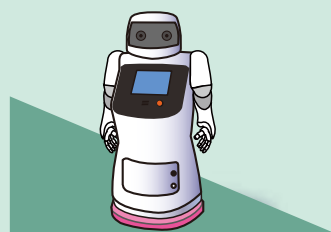


Using a 10 mm x 10 mm (planar) probe, apply force to the test switch, perpendicular to the top surface of the jacket and measure the load value at which the switch turns on.

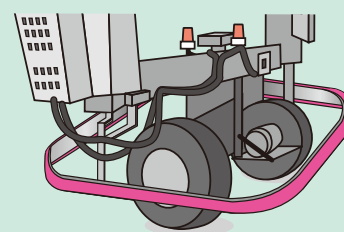
*1 See page 12 in the case of E21BK.

【 Applications 】 (See pages 3 and 4 for details.)

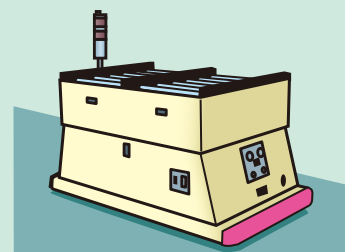
Mobile Service Robot
(Contact/impact detection)



Tire guard for an air bridge
(Contact/impact detection)



Automatic guided vehicle
(Contact/impact detection)



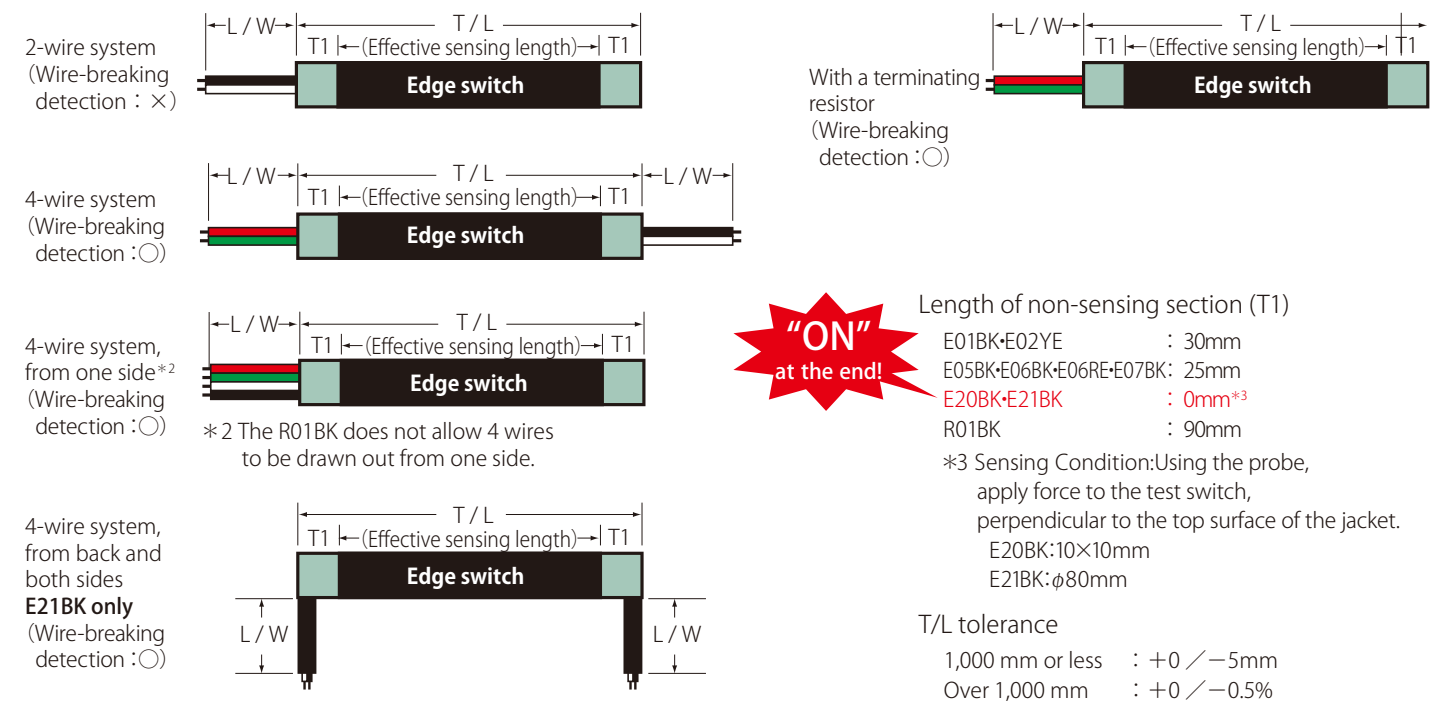
Appropriate and Effective Terminal Treatment for Utilizing the Full Potential of Edge Switch

See page 23 for wiring examples and equivalent circuit and page 26 for a detailed description of the lead wire types.

We changed some specific material in compliance with the updated RoHS2 directive, so we also changed the type number. Please see "Type number Chart" in page 11.

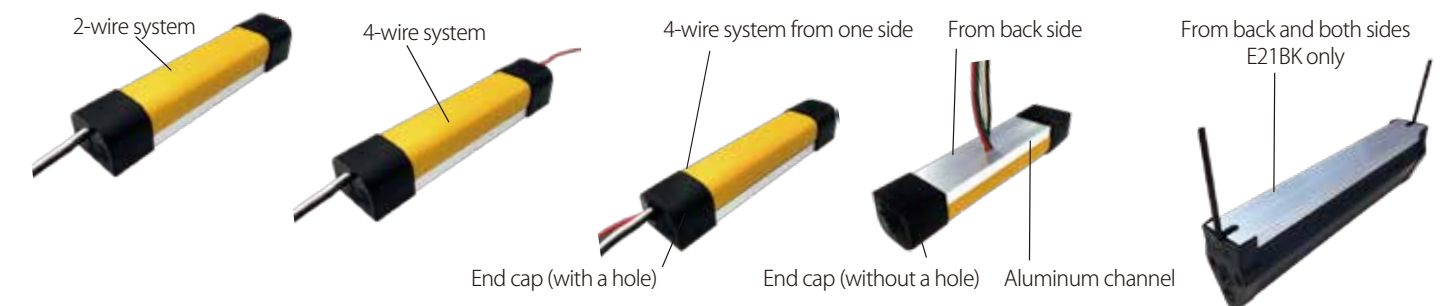
■ Termination non-sensing section

All edge switches are manufactured to the customer-designated dimensions. Notice the length of the non-sensing section of the terminations.



"ON" at the end!

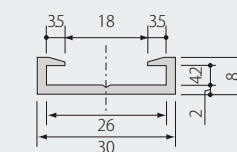
■ Methods of drawing out the lead wires of an edge switch



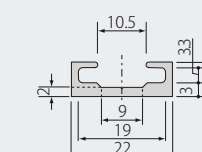
Dedicated aluminum channel (attached to the main body)

Coefficient of thermal expansion of the aluminum channel : $23.8 \times 10^{-6} / K$

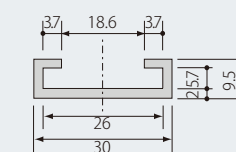
For E01BK • E02YE • E05BK : AC-300



For E06BK • E06RE • E07BK : AC-220

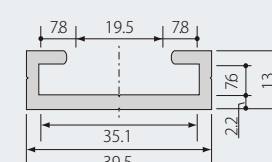


For E20BK : AC-302

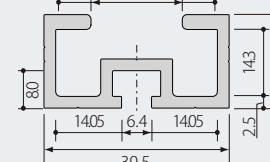


For E21BK : AC-395 or AC-400 (with Mounting screw)

AC-395



AC-400



Total AC-400 length and number of screws (Dimensions in mm)

Total length (L dimension)	Number of screws	Mounting screw for AC-400
200 ~ 400	2	M6 SUS Effective sensing length $t=17, 22, 27\text{mm}$
401 ~ 800	3	
801 ~ 1,200	4	
1,201 ~ 1,600	5	
1,601 ~ 2,000	6	

Type number	E01BK1	E02YE1	E05BK1	E06BK1・E06RE1	E07BK1	E20BK1	E21BK1	R01BK1
Applications	● "Stuck in" detection of a door ● Vehicle collision detection ● Contact detection of an automated guided vehicle				● "Stuck in" detection ● Collision detection ● Contact detection		● Contact detection ● Collision detection	● Vehicle passing detection
Appearance								
Actuating force*1 Cross sectional view, shape*2 (Dimensions in mm)	10N 	10N 	12N 	15N 	10N 	20N 	See below.*4 	30N
Maximum length	7,000mm	7,000mm	3,000mm	10,000mm	2,400mm	7,000mm	2,000mm	10,000mm
Weight	Approx. 600g/m	Approx. 600g/m	Approx. 690g/m	Approx. 500g/m	Approx. 600g/m	Approx. 600g/m	AC395:Approx. 2,000g/m AC-400:Approx. 2,100g/m	Approx. 320g/m
Jacket material	EPDM	PVC	EPDM	PVC	NBR	EPDM	EPDM	EPDM
Operating temperature range*3		0 to 50°C		0 to 50°C	0 to 50°C	-20 to 50°C	-10 to 50°C	0 to 50°C
Storage temperature range		0 to 60°C		0 to 60°C	0 to 60°C	-20 to 60°C	-10 to 60°C	0 to 60°C
Storage humidity range		90%RH or lower		90%RH or lower	90%RH or lower	90%RH or lower	90%RH or lower	90%RH or lower
Applicable alu. channel		AC-300		AC-220	AC-220	AC-302	AC-395 or AC-400	See below.
Maximum alu. channel length		3,000mm		3,000mm	3,000mm	3,000mm	2,000mm	See below.

*1 Standard value at normal temperature *2 Typical value for the shape *3 Noncondensation

Electrical characteristics*5

Rated voltage : AC/DC 5 to 24V
 Rated current : 0.01 to 0.3A (Resistive load)
 Interelectrode withstand voltage : DC250V, 1 minute
 Interelectrode insulating resistance : 100MΩ or higher (DC250V)
 Resistance at normal temperature : 0.6Ω/m

*5 Terminating-register-integrated tape switches are excluded.
 For terminating-register-integrated tape switches, contact the sales representative serving your locality.

Ambient environment and environmental performance

Oil resistant : Excellent (E07BK)
 (JIS class 1, class 3) Poor (The others)
 Organic solvent resistance : Poor
 Waterproof specifications : JIS C 0920:2003 protection class 7
 *6 Waterproofness is guaranteed by the tape switch incorporated in the edge switch.

Edge switch estimates and ordering information (Dimensions in mm)

E01BK1 T/L1200 L/W500 4-wire system wires from one side

E21BK1 T/L1200 L/W500 4-wire system wires from back and both sides AC-400 22mm

- ① Type (color) ② T/L (total switch length) ③ L/W (lead wire length: 500 standard)
 ④ 2-wire (standard)/4-wire (standard of E21BK)/terminating resistor integrated
 ⑤ lead wire drawing method (E21BK: wires from back and both sides standard)

● When placing an order for E21BK, specify ⑥ and ⑦.

⑥ Applicable aluminium channel (AC-395 or AC-400)

⑦ Effective mounting screw length for AC-400 : Selectable from 17, 22, and 27mm (M6)

Contact the sales representative serving your locality for lead wire type, waterproof specifications, additional aluminium channel treatment, and other options.

When placing an order for a R01BK channel (optional), specify its type, length, and the use of end protectors.

Type number Chart

Current	Former
E01BK1	EDB-10 (black)
E02YE1	EDB-10 (yellow)
E05BK1	EHR
E06BK1	ESU (black)
E06RE1	ESU (red)
E07BK1	EH-02
E20BK1	E20BK0
E21BK1	E21BK0
R01BK1	RSN

*4 Actuating force measuring method (E21BK)



Actuating force: Less than 150N

【Reference】
 Actuating force measuring method for Bumper Switch (P.13)



Characteristic Value in normal temperature : Approx. 60N

R01BK lead wire

Wiring system : 2-wire system
 Wire type : VCTFK (oval vinyl cabtyre cord) 0.75mm²
 Standard length : 1,000mm
 Standard color : Sheath, gray (black/white core wire)

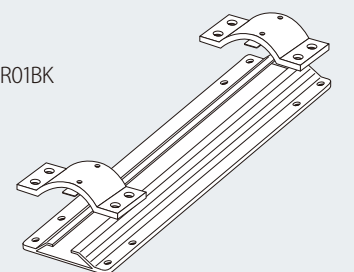
Aluminum channel for R01BK (optional)

(May be fixed to the road surface with anchor bolts. Call us for detailed dimensions.)
 Type : RSN-AC5, RSN-AC10, RSN-AC15
 Length*9 : 500mm (RSN-AC5), 1,000mm (RSN-AC10), 1,500mm (RSN-AC15)
 Width : 115mm
 Height : 13mm (RSN-EP mount section: 27mm)
 Weight : 0.7kg (RSN-AC5), 1.5kg (RSN-AC10), 22.3kg (RSN-AC15)
 *9 Can be cut to customer requirements, in addition to regular lengths, prior to shipment.

End protector for R01BK (optional)

(The cable outlet and termination sections of the R01BK are protected from the tire.)

Type : RSN-EP
 Length : 60mm
 Width : 115mm
 Height : 22.5mm
 Weight : 250g
 Material : SS400 flat steel, trivalent chromium plating



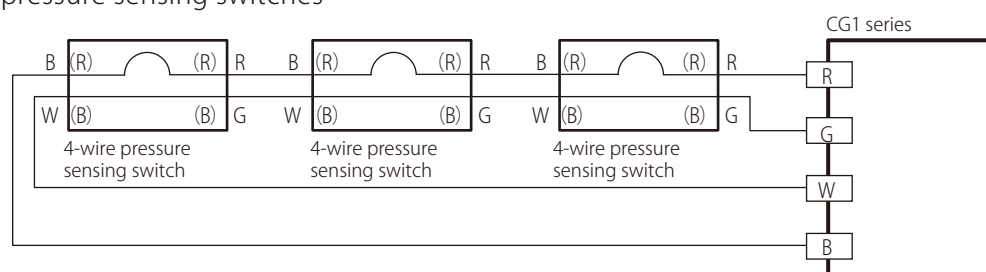
Use and Wiring Examples of the Tokyo Sensor's Pressure Sensing Switching Products

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

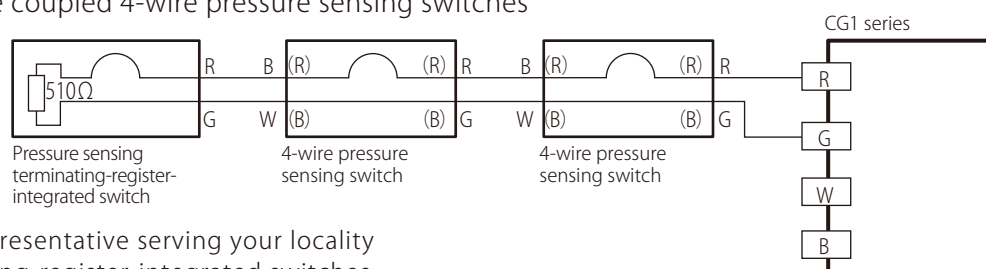
Switch type	4-wire system			Terminating-resistor-integrated switch		
	Lead wire		CG1 terminal	Lead wire		CG1 terminal
	Wire type	Wire color		Wire type	Wire color	
Tape switch (page 5)	VFF	Red (R) Green (G)	R G	VFF	Red (R) Green (G)	R G
	VFF	Black (B) White (W)	B W			
Edge switch (page 9)	VFF	Red (R) 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



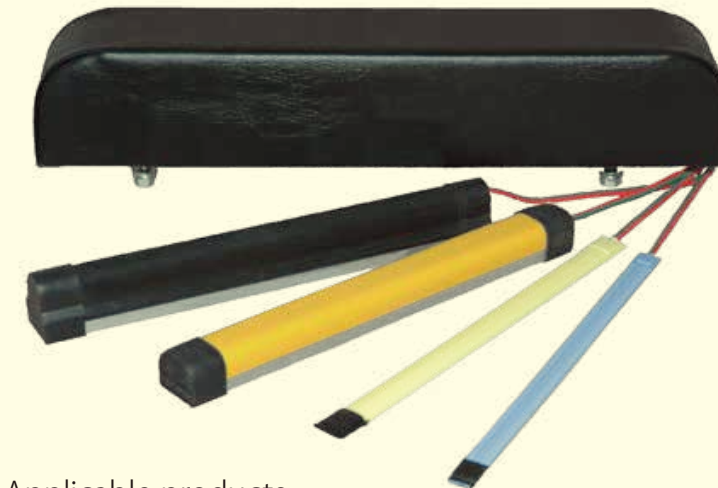
(2) Using a pressure sensing terminating-resistor-integrated switch at the end of the coupled 4-wire pressure sensing switches



※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.