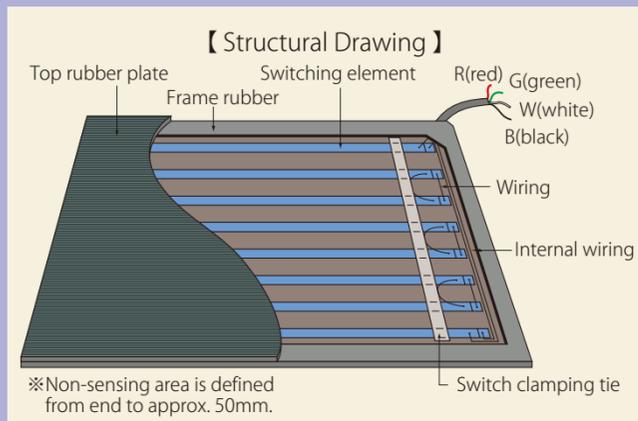
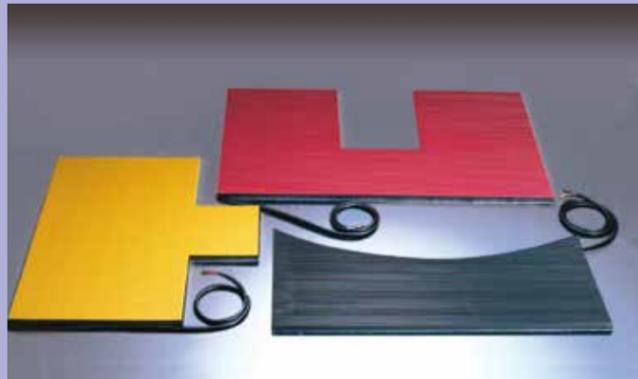
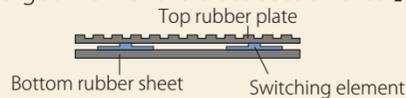


MAT SWITCH®

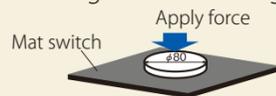
Mat switches with excellent reliability and durability covering a wide range of models from standard to custom products



【Enlarged view of the cross section area】



【Actuating force measuring method】



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

Around robots
(Personnel sensing)

Periphery of a rotary press
(Personnel sensing)



Protects human life from hazards and demonstrates its power in promoting factory automation and security.

Provides a remarkable service in a wide variety of locations such as a plant where machines and robots are actively operated.

The customer can select the most appropriate type of mat switch from a variety of products from standard to custom according to the intended application.

- Employment of a simple structure tape switch further enhances product quality, performance, and stability.
- Can be combined with an interface controller (page 21) for wire-breaking detection.
- Excellent shock resistance and durability
- High-quality oil resistant or non-oil resistant rubber selectable.
- Can accommodate with precision to orders that specify custom dimensions or shape.

■Ratings

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	:−10 to 50°C
Storage temperature	:−10 to 60°C
Storage humidity	:90%RH or less

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

■Specifications

Actuating force	:Approx. 80N (φ80 mm)
Withstand load	:2kN (φ80mm, 1 minute)
Durability	:1 million operations
Lead wire	:SVCTF (black), 4 conductors, 0.75mm ²
Lead wire length	:1,500mm
Lead wire outlet	:Upper right (R type) (standard) Upper left (L type) Lead wires from both sides (W type) coupling mat

See page 24 for wiring examples and equivalent circuit.

Mat switch (standard product)



A standard mat switch that can be used in plants where press machine, industrial robots, and automated machines are in use.

- Adopts a wire-breaking detection compatible 4-wire output system and uses oil resistant rubber.
- A block pattern is used on the surface of the MS-754R and MS-1074R and a ribbed rubber on the surface of the MS-1054R.
- The edge section are tapered for stumble prevention. (Applicable products: MS-754R, MS-1074R)
- Meets the waterproof specifications (optional), JIS C 0920:2003 protection class 7
※Avoid using the mat in a puddle or any location where it is always exposed to water.
- Use the ramp frame AE-25 (optional) to secure the mat.

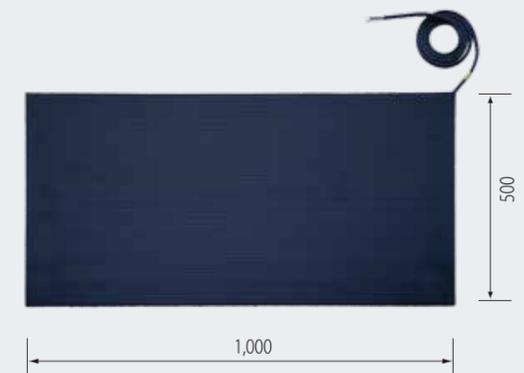
【Mat switch dimensions】

MS-754R、MS-1074R

Top rubber plate: block pattern
MS-754R size: 500×700×13mm weight: 5kg
MS-1074R size: 700×1,000×12mm weight: 8kg

MS-1054R

Top rubber plate: ribbed rubber
size: 500×1,000×10mm weight: 5.8kg



Precaution: Install and use the product on a flat, smooth surface. Use of the product in an uneven surface may cause switch malfunctions or failures.

Standard mat switch estimates and ordering information

MS-1074 R
① ②

①Product name ②Lead wire outlet
(R: Standard, lead wires drawn from top right, L: Lead wires drawn from top left, W: Lead wires from both sides)
If a mat securing ramp frame (AE-25: optional) is desired, specify it when placing an order.

Mat switch (custom product)



Custom unique finishing made possible through a flexible combination of size, sensitivity, and material quality, selected according to the customer's intended use.

- Oil resistant (JIS class 1 and class 3 are not liquid immersible), non-oil resistant, thin, and thick types available for use in suitable applications
- For customer-desired dimensions and shape
- The available options are listed below.
 - Waterproofing
(Except types of mat whose lead wires are drawn out of the back side. Use of the mat in a puddle or any location where it is always exposed to water is not allowed.)
 - Lead wire: 2-wire system or terminating-resistor integrated mat
 - Lead wire length, direction in which lead wires are drawn
 - Stumble prevention treatment

Type	Standard		Optional						
Oil resistant	Oil resistant /non-oil resistant	Non-oil resistant	Oil resistant /non-oil resistant	Oil resistant	Non-oil resistant				
Top rubber sample									
Color	Black	Gray	Black	Orange	Black	Black	Green	Yellow	Red
Design	Ribbed		Striped pattern	Floral pattern	Flat	Flat	Ribbed		
size (minimum)*1-2-3	300×300		300×300	300×300	300×300	300×300	300×300		
size (maximum)*1-2	1,200×3,000		1,000×3,000	1,000×2,000	1,200×3,000	1,000×3,000	1,200×3,000		
Thickness*1	10・14		11・15	11・15	9・15	9・15	10・14		

*1 All units in mm *2 The size tolerances are +0 mm to -5 mm for all sides.
*3 Contact the sales representative serving your locality for products of 300 mm or less.

Custom mat switch estimates and ordering information (Dimensions in mm)

800 × 1200 × t 10 Oil resistant Black Ribbed L/W1500 Top right Waterproof Person

- | | |
|-----------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------|
| ① Vertical dimension | : Short side regarded as vertical side. |
| ② Horizontal dimension | : Long side regarded as horizontal size. |
| ③ Thickness | : See above. 10 mm and 14 mm are basic thicknesses. |
| ④ Material quality | : Either oil resistant (JIS class 1, class 3) or non-oil resistant |
| ⑤ Upper rubber (color, design) | : See above. |
| ⑥ Lead wire length | : Standard 1,500 mm is assumed unless otherwise specified. |
| ⑦ Lead wire outlet | : Specify based on ① and ②.
(Top right, when long side is regarded as horizontal side, is assumed unless otherwise specified.) |
| ⑧ Presence or absence of waterproof treatment | : Specify the presence or absence of waterproof treatment according to your installation environment. |
| ⑨ Detection target | : Personnel sensing is standard.
Be sure to consult us if there is possible passing of vehicles (carrier vehicles, dollies, forklifts). |

The 4-wire system is standard for the lead wires (may be combined with a CG1 series interface controller (page 21) for wire-breaking detection). Terminating-resistor-integrated mats or 2-wire system may be selected as an option (see page 26 for details on the lead wire types). Contact the sales representative serving your locality for the other optional specifications (stumble prevention, heavy object support).

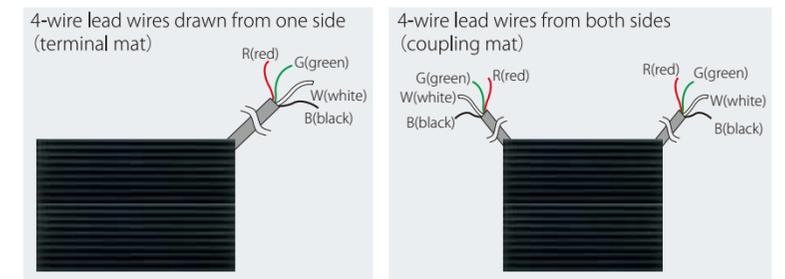
Lead wires (See page 24 for wiring examples.)

Lead wires are available in 4-wire and 2-wire (optional) versions, each of which is further divided into those which are drawn from one side for terminating switches and those which are drawn from both sides for interconnecting switches. Some types of 2-wire system lead wires are provided with a terminating resistor.

Wiring system	Wire type	Thickness	Number of wires
4-wire	Lead wires drawn from one side	0.75mm ²	1
	Lead wires drawn from both sides		2
2-wire	Lead wires drawn from one side		1
	Lead wires drawn from both sides		2
	Terminating resistor integrated	1	

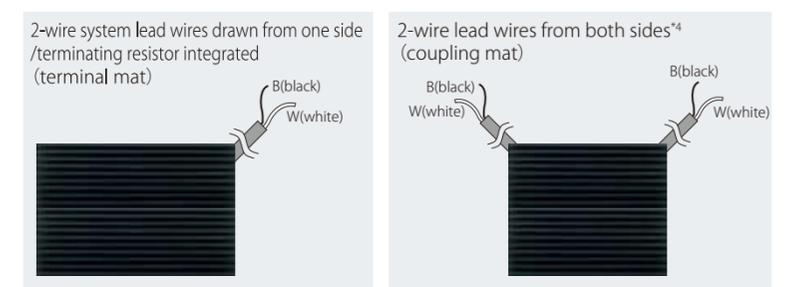
● 4-wire system (standard)

Each lead wire is a round shaped 4-conductor (red/green/white/black) cord and allows for wire-breaking detection when the mats and interface controller (page 21) are interconnected with wires of the same colors.



● 2-wire system/terminating resistor integrated (optional)

Each lead wire is a round shaped 2-conductor (black/white) cord. In the 2-wire system only configuration, wire-breaking detection is not possible even when an interface controller is used. Wire-breaking detection is made possible, however, by using a terminating-resistor integrated mat on the terminal side.



*4 Internal wire system is 4-wire lead wires.

Ramp frame AE-35 / AE-25 (optional)

2 types of aluminum ramp frames are available for use according to the thickness of the mat to be used.

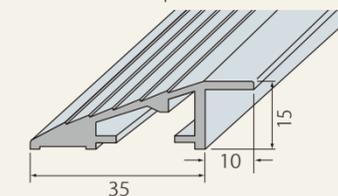
Applications: For securing the mat or for stumble prevention

*The sides processed for stumble prevention (taped) cannot be used as their height does not match the height of the mat.

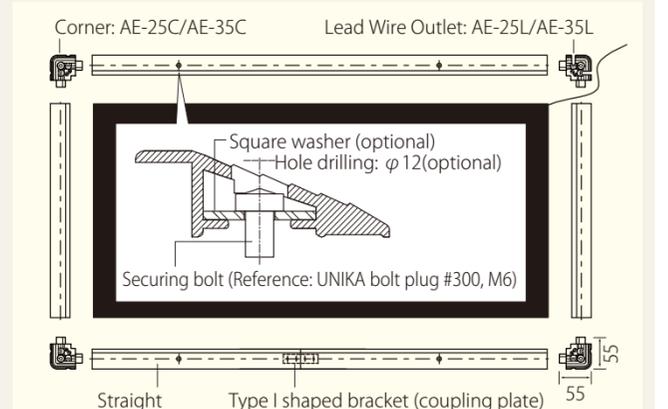
AE-35: (Compatible with the mats of 14 mm or 15 mm thick)

AE-25: (Compatible with mats having a thickness of 9 mm to 11 mm and standard products (page 18))

Dimensions of ramp frame cross section (mm)



*The AE-25 is available in versions with a height of 12 mm only.



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

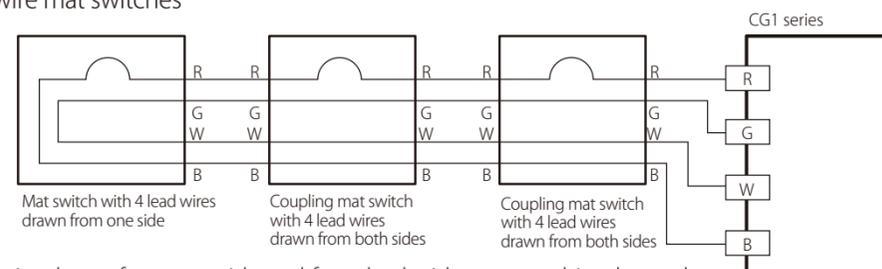
Terminal mat product

Switch type	4-wire system with lead wires drawn from one side			Terminating-resistor-integrated switch		
	Lead wire Wire type	Wire color	CG1 terminal	Lead wire Wire type	Wire color	CG1 terminal
Mat Switch (page 17)	SVCTF (Black, 4 conductors)	Red (R) Green (G) Black (B) White (W)	R G B W	SVCTF (Black, 2 conductors)	Black (B) White (W)	R G
Switch equivalent circuit						
Wiring diagram						

Coupling mat products

Switch type	4-wire system with lead wires drawn from both sides				2-wire system with lead wires drawn from both sides			
	Lead wire Wire type	Wire color	Lead wire Wire type	Wire color	Lead wire Wire type	Wire color	Lead wire Wire type	Wire color
Mat Switch	SVCTF (Black, 4 conductors)	Red (R) Green (G) Black (B) White (W)	SVCTF (Black, 4 conductors)	Red (R) Green (G) Black (B) White (W)	SVCTF (Black, 2 conductors)	Black (B) White (W)	SVCTF (Black, 2 conductors)	Black (B) White (W)
Switch equivalent circuit								
Wiring diagram								

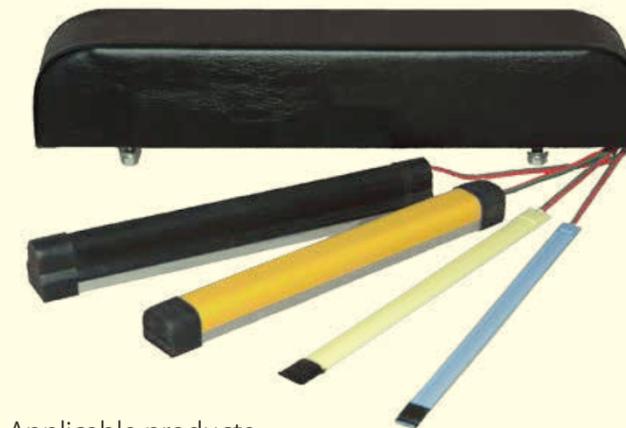
■ Example of coupling 4-wire mat switches



• Mat switches with 4 lead wire drawn from one side and from both sides are combined together.

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

* 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.