

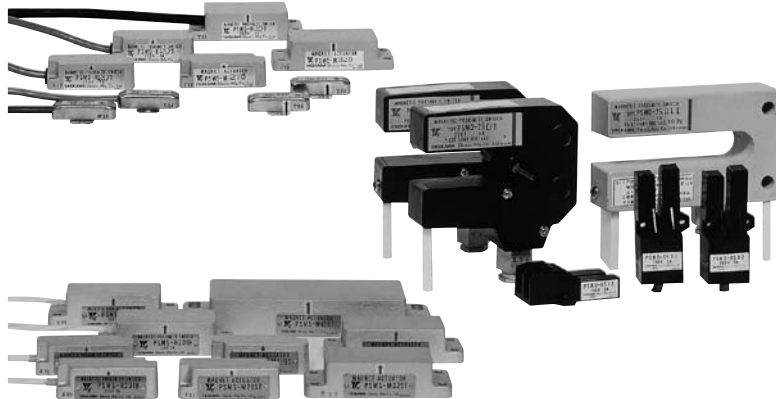
# Bestact MAGNETIC PROXIMITY SWITCHES

Vane Type PSMO  
Separate Type PSMS  
Memory Type PSMM  
Column Type PSMS\_RV  
Omnidirectional Sensor Type PSMT

**A Wide Variety of Types Available to Meet Applications/Specifications for General Purpose, High Temperature, etc.  
The Two-Wire System Provides a Wide Power Range.**

## FEATURES

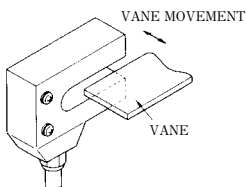
1. Completely sealed construction makes this switch best suited for adverse environments.
2. Direct control for loads of 100VDC or greater. No power supply or amplifying relay needed.
3. No protective circuit needed even for long cable wiring or inductive load.
4. No erroneous operation or breakdown due to noise and surge.
5. The contactless design assures a long service life and maintenance-free operation.
6. Economical proximity switches.



## TYPES AND HOW TO USE

Magnetic proximity switches are usually classified into two types: an integrated type such as vane type and a separate type. Switch operation principle is described below.

《Vane type》

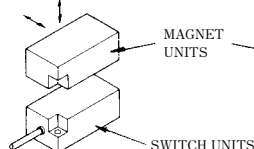


### Vane type

- Vane type switches detect materials without any physical contact. Materials enter into or pass by the groove of U-shaped structure. In general, the detected materials are made of flat shape and ferromagnetic materials such as iron plates.
- The switches provide high detecting accuracy even if the detected materials have play. They have only a few constrained conditions and very easy to use.

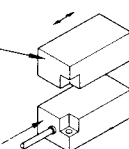
《Separate type》

MAGNET UNIT MOVEMENT



(Memory type)

MAGNET UNIT MOVEMENT



### Separate type

- The switch unit is fixed, and the magnet unit is mounted on the moving object to be detected. Approach or passage of the magnet unit will be detected without contact.
- Separate type doesn't need any separately-mounted detecting unit. Moreover, one magnet unit can energize several switch units. Various detecting methods are available to match your specifications.

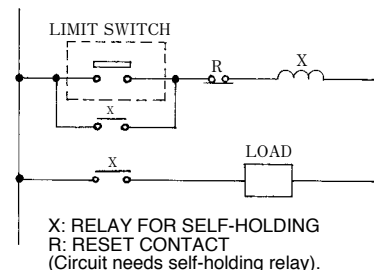
## Magnet characteristics for Bestact Operation

In various detecting devices incorporating Bestact, Yaskawa selected and designed carefully the materials that energize contacts to maintain long-term high operation accuracy.

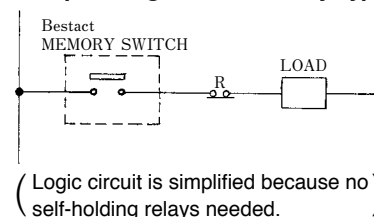
- Permanent magnets used for Yaskawa's detecting devices are rare earth magnets and anisotropic ferrite magnets which have high coercive force and large energy product. Yaskawa designed the optimum magnet shapes and the magnets are highly stable without demagnetization.
- Demagnetization due to aging is 2% or less for a 10 year period.

## APPLICATION EXAMPLES

### Circuit Example Using Conventional Limit Switch



### Circuit Example Using Bestact Memory Type Switch



# VANE TYPE MAGNETIC PROXIMITY SWITCHES

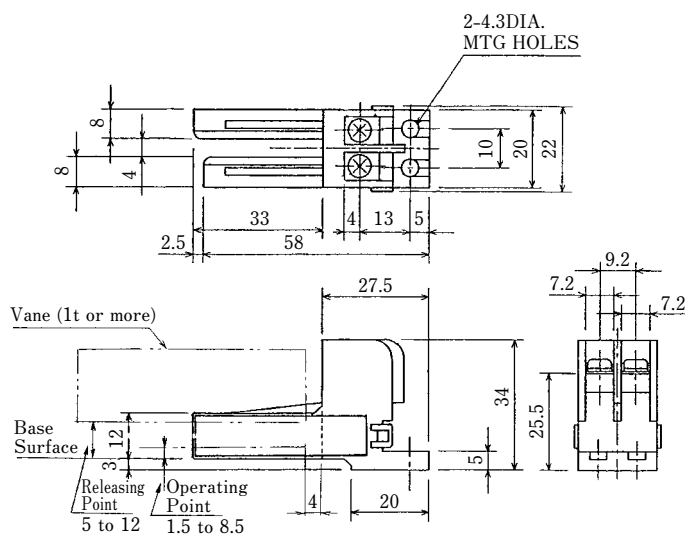
Type PSMO-04G2



## RATINGS AND SPECIFICATIONS

| Type                                | PSMO-04G2                                                                    |
|-------------------------------------|------------------------------------------------------------------------------|
| Contact Arrangement                 | 1NO                                                                          |
| Incorporated Bestact                | R25                                                                          |
| Rated Insulation Voltage            | 250VAC (Power Frequency)                                                     |
| Contact Performance                 | Refer to page 7.                                                             |
| Insulation Resistance               | 100MΩ or greater (with 500VDC Megger)                                        |
| Withstand Voltage (Power Frequency) | 1500VAC for 1 minute, Leakage Current: 5mA<br>(Across Open Contacts: 500VAC) |
| Vibration Resistance                | 9.8m/s <sup>2</sup> {1G}                                                     |
| Shock Resistance                    | Erroneous Operation                                                          |
|                                     | Breakdown                                                                    |
|                                     | 98m/s <sup>2</sup> {10G}                                                     |
|                                     | 980m/s <sup>2</sup> {100G}                                                   |
| Operating Temperature               | -10 to +50°C                                                                 |
| Connecting Terminal                 | Screw Size: 3.5×8(Screw With Plain/Spring Washer)                            |

## DIMENSIONS in mm



Note: When switch is used in a DC circuit, connect terminal 1 to ⊕ and number 2 to ⊖.

# VANE TYPE MAGNETIC PROXIMITY SWITCHES

Type PSMO-**G** (Medium-Capacity)  
Type PSMO-**E** (Large-Capacity)

## High Detecting Accuracy against Unstable Moving Materials and Easy to Use

- Can control circuits of 100VDC or greater without any power supply unit or amplifying relay
- No erroneous operation or circuit failure due to noise or surge
- Contactless design assures long service life and maintenance-free operation



## RATINGS AND SPECIFICATIONS

### • Medium-Capacity Type

| Type                              | PSMO-25G1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | PSMO-25G1T | PSMO-25G2 | PSMO-25G2T |
|-----------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------|-----------|------------|
| Groove Width mm                   | 24                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 24         | 24        | 24         |
| Groove Depth mm                   | 52                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 52         | 52        | 52         |
| Contact Arrangement               | 1NO                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 1NO        | 1NC       | 1NC        |
| Incorporated Bestact              | R25                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | R25        | R25       | R25        |
| Enclosure* <sup>1</sup>           | IP50                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | IP67       | IP50      | IP67       |
| Common Ratings and Specifications | <ul style="list-style-type: none"> <li>• Operating Temperature: -10 to +50°C</li> <li>• Storage Temperature: -25 to +70°C</li> <li>• Rated Insulation Voltage: 250VAC (Power Frequency)</li> <li>• Insulation Resistance: 5MΩ or greater (with 500VDC Megger)</li> <li>• Withstand Voltage (Power Frequency): 1500VAC for 1 minute*<sup>3</sup>, Leakage Current: 5mA (Across Open Contacts: 500VAC)</li> <li>• With Indicating Lamp, available on order. (For 100 or 200V only)*<sup>2</sup></li> <li>• Cable: 0.75mm<sup>2</sup> 2 conductors 1m long. (Dustproof type IP 50 without lamp: 2.5m long)</li> <li>• Standard Vane Detected mm: t1.6x60x100 (t1.2 or greater)</li> </ul> <p>Refer to page 7 for Contact Performance.</p> |            |           |            |

Note: \*1. Refer to page 59 for Degrees of Protection.

\*2. Models with indicating lamps have the following symbol.

PSMO-25G1T/L

4: For 100V

5: For 200V

\*3. Except for the model with an indicating lamp.

### • Large-Capacity Type

| Type                                    | PSMO-05E2* <sup>1</sup>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | PSMO-25E1* <sup>1</sup>      | PSMO-25E2* <sup>1</sup>      | PSMO-25E1T   | PSMO-25E2T   |
|-----------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------|------------------------------|--------------|--------------|
| Groove Width mm                         | 5                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 25                           | 25                           | 25           | 25           |
| Groove Depth mm                         | 36                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 90                           | 90                           | 120          | 120          |
| Contact Arrangement                     | 1NC                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 1NO                          | 1NC                          | 1NO          | 1NC          |
| Incorporated Bestact                    | R15                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | R15                          | R15                          | R15          | R15          |
| Connecting Method                       | Screw terminal or cable (1m)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Screw terminal or cable (1m) | Screw terminal or cable (1m) | Cable (2m)   | Cable (2m)   |
| Standard Vane Detected* <sup>2</sup> mm | t 1.6x15x45                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | t 2.3x50x100                 | t 2.3x50x100                 | t 2.3x50x135 | t 2.3x50x135 |
| Common Ratings and Specifications       | <ul style="list-style-type: none"> <li>• Enclosure: Waterproof type IP 67*<sup>3</sup></li> <li>• Operating Temperature: -10 to +80°C (with cable: -10 to +60°C)</li> <li>• Storage Temperature: -25 to +70°C</li> <li>• Switching Frequency: 3600 times/hour (7200 times/hour*<sup>4</sup>)</li> <li>• Rated Insulation Voltage: 250VAC (Power Frequency)</li> <li>• Insulation Resistance: 5MΩ or greater (with 500VDC Megger)</li> <li>• Withstand Voltage (Power Frequency): 1500VAC for 1 minute*<sup>5</sup>, Leakage Current: 5mA (Across Open Contacts: 800VAC)</li> <li>• With an Indicating Lamp, available on order. (For type PSMO-25, 100 or 200V only)*<sup>6</sup></li> <li>• Cable: 1.25mm<sup>2</sup> 2 conductors.</li> </ul> <p>Refer to page 7 for Contact Performance.</p> |                              |                              |              |              |

Note: \*1. Models with cables have suffix "P" in type names.

<Example> PSMO-05E2/P

\*2. Vane size of ferromagnetic structural iron plate.

\*3. Screw terminal of type PSMO-05E2 cannot be used as waterproof type since the screw terminal is exposed.

\*4. Only applicable for light loads such as power relays.

\*5. Except for the models with indicating lamps.

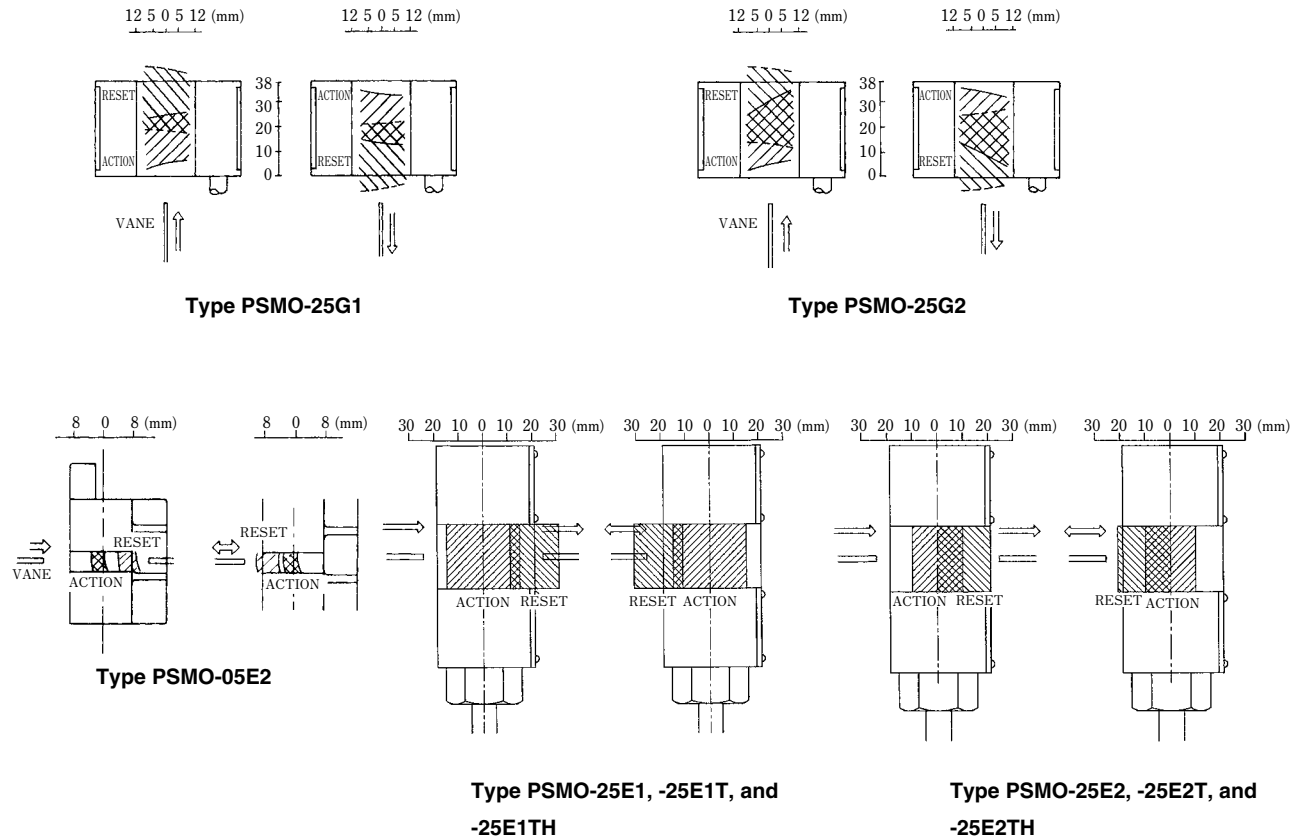
\*6. Models with indicating lamps has the following symbol.

PSMO-25E1/P/L

4: For 100V

5: For 200V

# OPERATING CHARACTERISTICS



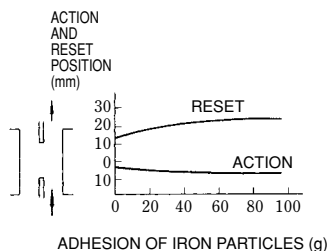
- Note:
1.  $\Rightarrow$  : Pass-through detection type  
 $\Leftarrow$  : Type that returns to the original position after operation.
  2. When a vane moves from the right, the operating characteristics are axisymmetric to the above characteristics.
  3. Action and reset range shown above indicates the difference of each switch. However, this is not the difference of each operation at repetitive detections. Repetitive detecting accuracy is  $\pm 0.2\text{mm}$ .

# INFLUENCE BY ENVIRONMENTAL CONDITIONS

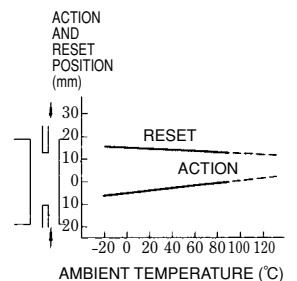
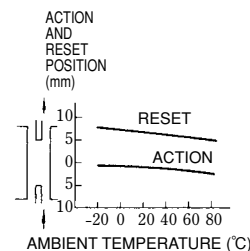
## • Operating characteristics when iron particles are adhered



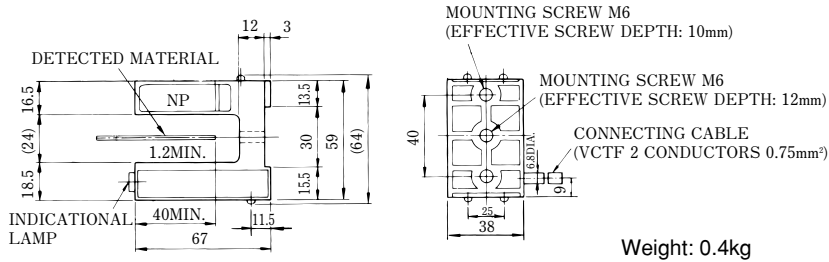
Adhesion of iron particles (60g)  
 (If iron particles are adhered as shown in this picture, influence is only a little bit.)



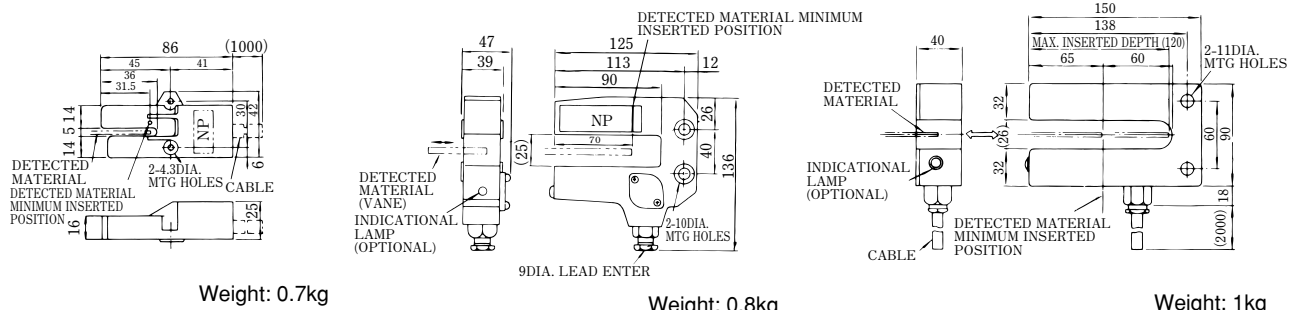
## • Ambient temperature and operating characteristics



## DIMENSIONS in mm



Type PSMO-25G



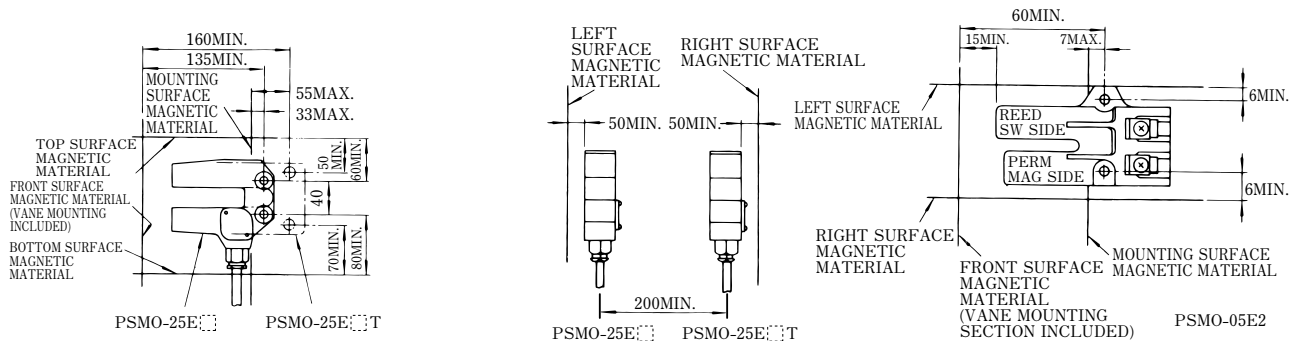
Type PSMO-05E2

Type PSMO-25E

Type PSMO-25E-T

## HOW TO USE

- (1) **Mounting on magnetic materials** Where the magnetic materials are outside of the range as illustrated below, normal switch operation should occur.



### (2) Vane configuration

Standard vane size should be bigger than shown in ratings and specifications on page 62. Insertion depth of the vane should be at least beyond the red line. The switch shouldn't contact the vane in the groove.

### (3) Operation speed of vane

The faster the vane passes, the quicker the switch will operate. To assure the operating speed of 30ms or greater with the standard vane, use it at the following speeds.

- Types PSMO-25D1, -25D1T 100m/min or less
- Types PSMO-25D2, -25D2T 150m/min or less

For higher speeds than these, the vane should be wider. Minimum speed is not particularly limited.

### (4) Mounting of more than one switch

When a mounting interval of type PSMO switches is larger than the above-mentioned allowable mounting dimension on magnetic materials, the normal operating function should not be affected.

### (5) Connections of leads

When the switch is used in a DC circuit, connect a black lead wire of connection cable or terminal code 1 to ⊕ and a white lead wire or terminal code 2 to ⊖.

### (6) Influence of external field

Use proper shielding when using in the vicinity of large external magnetic fields (near large power cables, magnet cranes, magnetic stirrers, etc. where leakage flux of 1 mT or greater exists) to avoid erroneous operation.

### (7) Indicating lamp

When an indicating lamp is provided, leakage current should be in consideration.

# VANE TYPE MAGNETIC PROXIMITY SWITCHES Type PSMO-06G11J

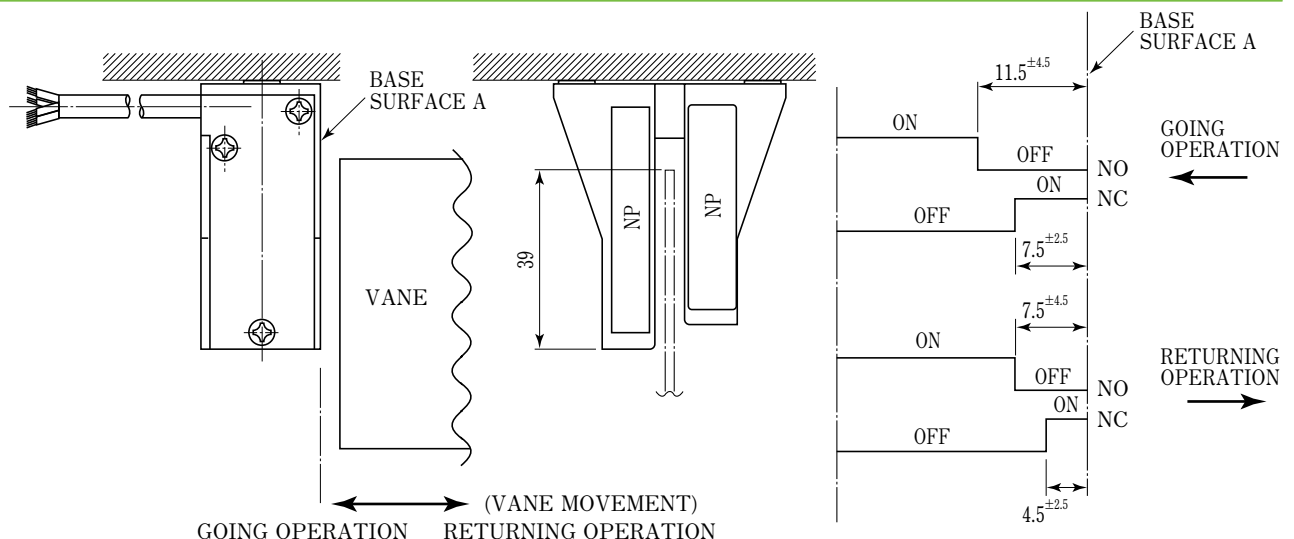
**2 outputs with 1NO1NC contact included while conventional vane type switches have only 1 output due to vane passage.**  
**Can save mounting space and allow 2 different kinds of voltage circuits.**  
**High contact reliability, best suited for use in an adverse environment.**



## FEATURES

- **Space saving**  
Incorporated 1NO1NC contact can save space. Optimum for rolling stock door interlock system.
- **Maintenance-free**  
Achieves high-frequency switching and long-term durability/ maintenance-free operation by employing a non-contact detection mechanism.
- **No protection circuit needed**  
No protection circuit needed unlike conventional reed switches.  
Free from sticking, achieves high durability for surge voltage and noise.
- **Total cost reduction**  
No power supply or amp needed unlike contact-less type.  
Makes the circuit simple and easy to use while providing significant cost reduction.

## MOUNTING AND OPERATING CHARACTERISTICS



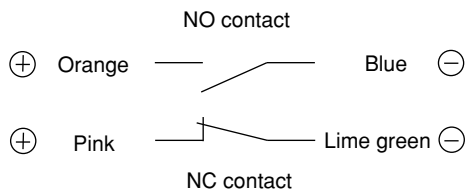
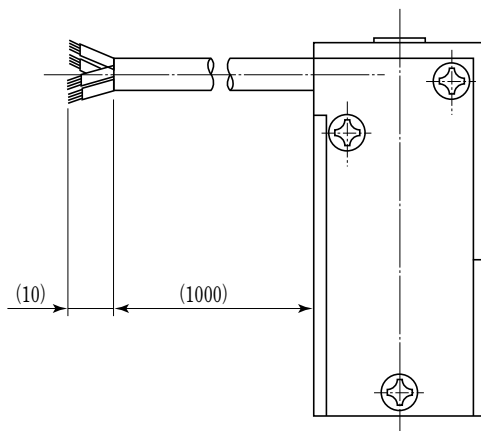
**Recommended vane material: SPCC&SPHC (Magnetic material), Thickness: 1.2mm, width 50mm or greater**  
**Recommended vane inserted depth: 39mm or greater**

## CONTACT RATINGS AND SPECIFICATIONS

| Type                          |                                     | PSMO-06G11J                                                                  |
|-------------------------------|-------------------------------------|------------------------------------------------------------------------------|
| Contact Arrangement           |                                     | 1NO1NC                                                                       |
| Incorporated Bestact          |                                     | R25                                                                          |
| Rated Insulation Voltage      |                                     | 250VAC (Power Frequency)                                                     |
| Contact Performance           |                                     | Refer to page 7.                                                             |
| Insulation Characteristics    | Insulation Resistance               | 100M $\Omega$ or greater (with 500VDC Megger)                                |
|                               | Withstand Voltage (Power Frequency) | 1500VAC for 1 minute, Leakage Current: 5mA<br>(Across Open Contacts: 500VAC) |
| Vibration Malfunction         |                                     | 10 to 240Hz, 19.6m/s <sup>2</sup> {2G} (Double Amplitude) 3 directions       |
| Withstand Vibration           |                                     | Refer to JIS E 4031 Annex JA Category 2 Class B                              |
| Shock Malfunction             |                                     | 59m/s <sup>2</sup> {6G} 3 directions                                         |
| Dropping Shock                |                                     | Refer to JIS E 4031 Annex JA Category 2 Class B                              |
| Operating Ambient temperature |                                     | -10 to +50°C                                                                 |
| Cable                         |                                     | UL 2464 4 conductors cable (A WG 20) 1m                                      |

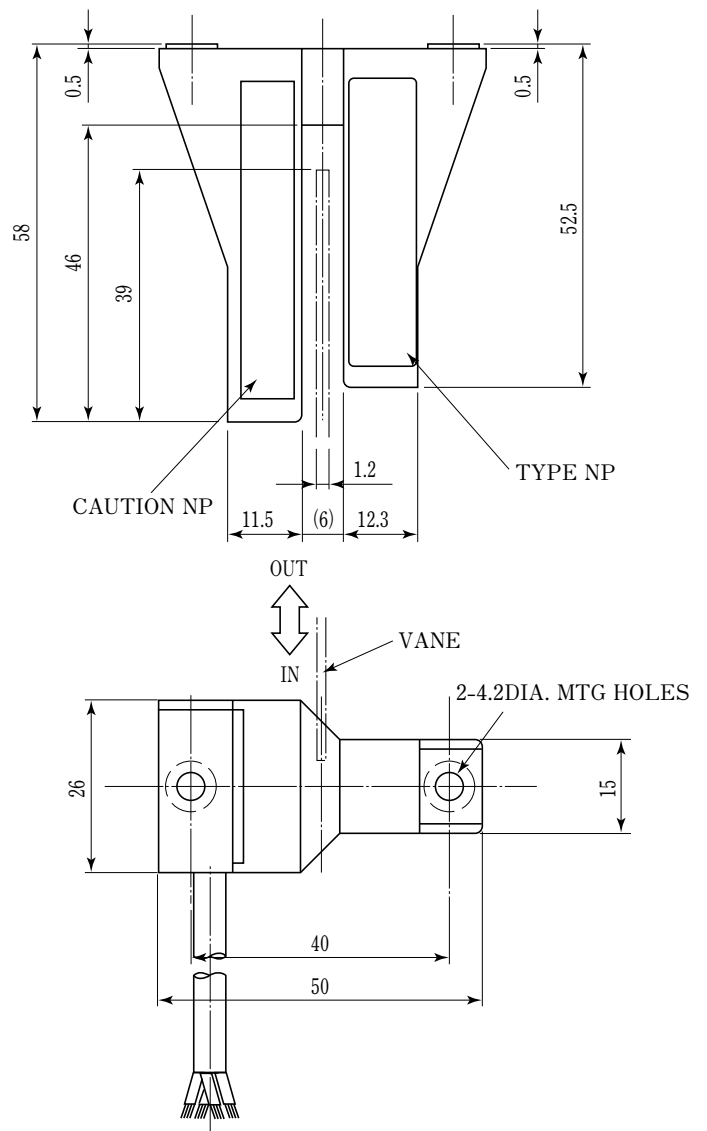
Note: 1. Degrees of protection is dust-proof type (standard). Contact Yaskawa for waterproof type (IP67).

# DIMENSIONS in mm



| Contact | Cable color | Connecting Wires in DC circuit |
|---------|-------------|--------------------------------|
| NO      | Orange      | ⊕                              |
|         | Blue        | ⊖                              |
| NC      | Pink        | ⊕                              |
|         | Lime green  | ⊖                              |

· Recommended Insertion Depth: 39mm or greater





# HIGH-PRECISION VANE TYPE MAGNETIC PROXIMITY SWITCHES

Type PSMO-15G□  
(Medium-capacity)

**Easy Adjustment for Stop Levelling of Hydraulic Low-Speed Elevators.**  
**This High-Precision Products provide Adjustment-Free Operation.**



## RATINGS AND SPECIFICATIONS

| Type                                 |             | PSMO-15G1                                                                                                                                                                                                                                                                                                                                                                                | PSMO-15G2  | PSMO-15G2S | PSMO-15G1T           | PSMO-15G2T                               |
|--------------------------------------|-------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------|------------|----------------------|------------------------------------------|
| Contact Arrangement                  |             | 1NO                                                                                                                                                                                                                                                                                                                                                                                      | 1NC        | 1NC        | 1NO                  | 1NC                                      |
| Incorporated Bestact                 |             | R25                                                                                                                                                                                                                                                                                                                                                                                      | R25        | R25        | R25                  | R25                                      |
| Operating Characteristics (mm)<br>*1 | UP-ON       | 9 to 20                                                                                                                                                                                                                                                                                                                                                                                  | 20 to 29   | 20 to 29   | 9 to 20              | 20 to 29                                 |
|                                      | UP-OFF      | 26 to 35                                                                                                                                                                                                                                                                                                                                                                                 | 14 to 24   | —          | 26 to 35             | 14 to 24                                 |
|                                      | DOWN-ON     | 18 to 29                                                                                                                                                                                                                                                                                                                                                                                 | 9 to 18    | 9 to 18    | 18 to 29             | 9 to 18                                  |
|                                      | DOWN-OFF    | 3 to 12                                                                                                                                                                                                                                                                                                                                                                                  | 14 to 24   | —          | 3 to 12              | 14 to 24                                 |
|                                      | Response *2 | 12 or less                                                                                                                                                                                                                                                                                                                                                                               | 12 or less | 6 or less  | 12 or less           | 12 or less                               |
| Enclosure *3                         |             | Dust-proof type IP50                                                                                                                                                                                                                                                                                                                                                                     |            |            | Waterproof type IP67 |                                          |
| Common Ratings and Specifications    |             | <div>• Operating temperature: -10 to +50℃<br/>• Storage temperature: -25 to +70℃<br/>• Rated Insulation Voltage: 250VAC (Power Frequency)<br/>• Insulation Resistance: 5MΩ or greater (with 500VDC Megger)<br/>• Withstand Voltage (Power Frequency):<br/>1500VAC for 1 minute, Leakage Current: 5mA<br/>(Across Open Contacts: 500VAC)<br/>• Cable: 0.75mm² 2 conductors 1m long.</div> |            |            |                      | Refer to page 7 for Contact Performance. |

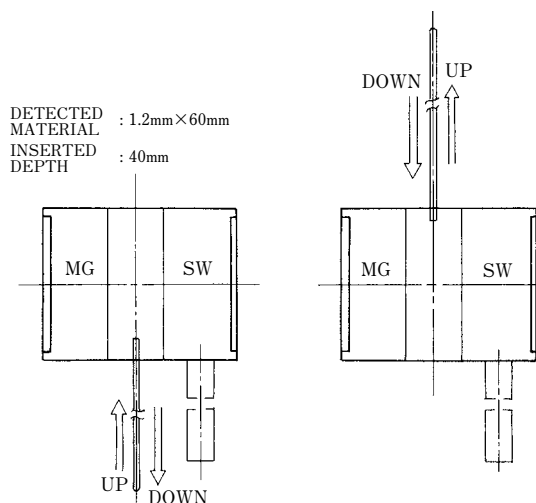
Note: \*1. Operating characteristics are nearly symmetric to vane passage direction (vertical).

Values tabulated are the ones at insertion depth of 40mm.

\*2. Response shows the difference between the operating point and releasing point (absolute value) as shown in figure below.

(1) After the switch is operated in UP direction, it is released in DOWN direction.

(2) After the switch is operated in DOWN direction, it is released in UP direction.



## TYPICAL APPLICATIONS

Stop level detecting switches and door-open command switches for passenger and freight elevators, stop level detecting switches for vertical parking garages, passage point detecting switches for transport machineries and passage detector switches for general industrial machineries.

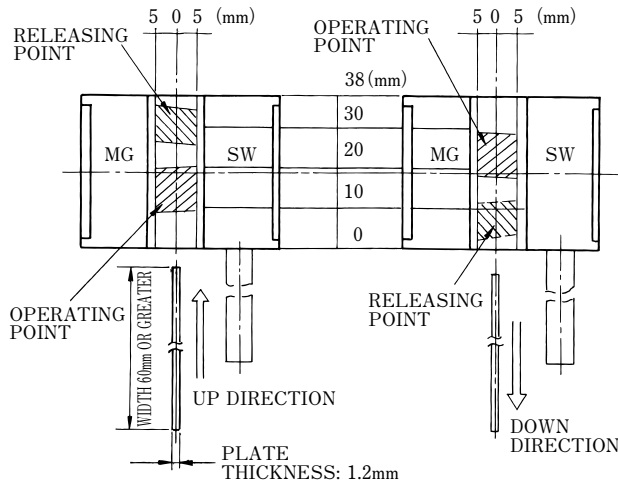
\*3. Refer to page 59 for degrees of protection.

4. Ultra-high precision products with even narrower operational range are also available.  
For details, contact Yaskawa.

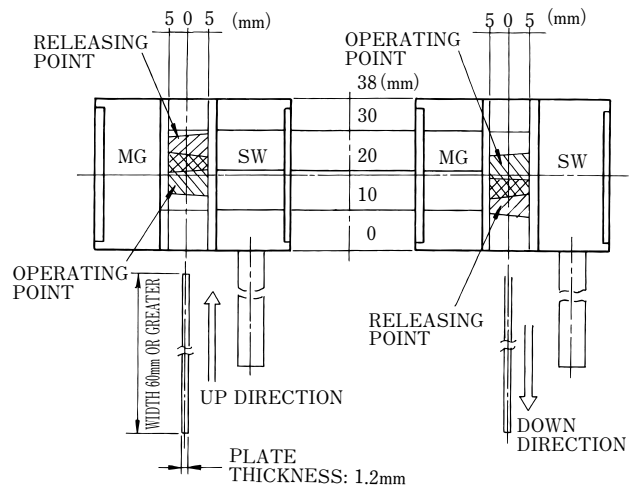
# OPERATING CHARACTERISTICS

(Actuating range when the vane passes through in a horizontal direction at insertion depth of 40mm.)

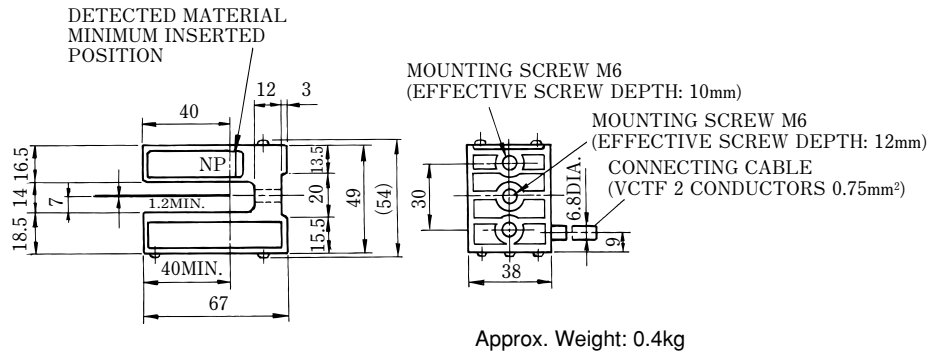
## • Type PSMO-15G1



## • Type PSMO-15G2



# DIMENSIONS in mm

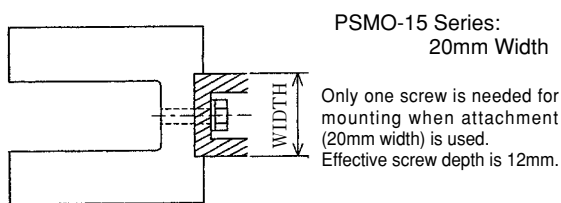
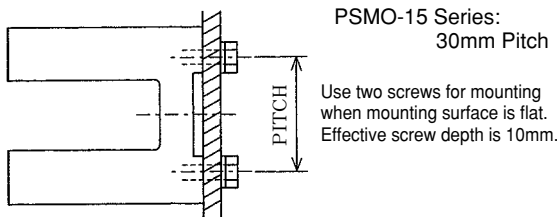


- Note:
1. This switch operates by passage of magnetic materials. Provide insertion depth of 40mm or greater.
  2. When the switch is used in a DC circuit, connect the black lead to  $\oplus$  and the white lead to  $\ominus$ .

# NOTE FOR INSTALLATION

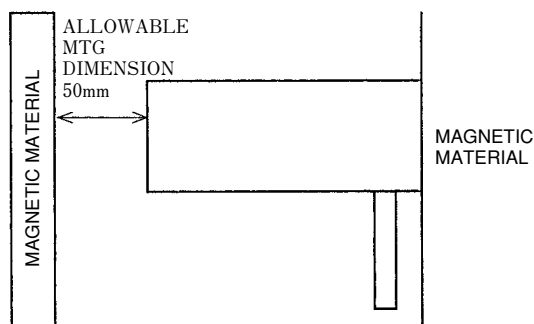
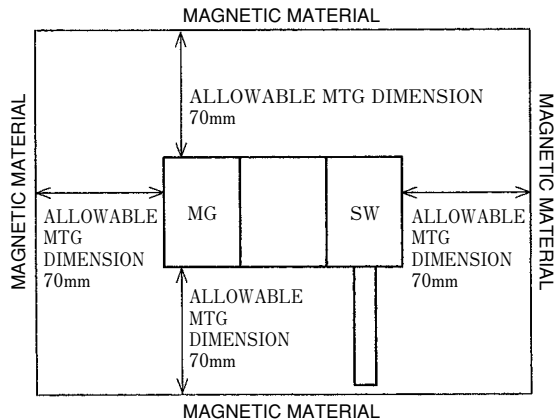
## ⚠ CAUTION

- MTG screw torque for M6 must be 3.2 to 3.9 (N · m)  
{33 to 40 (kgf · cm)}



## ⚠ CAUTION

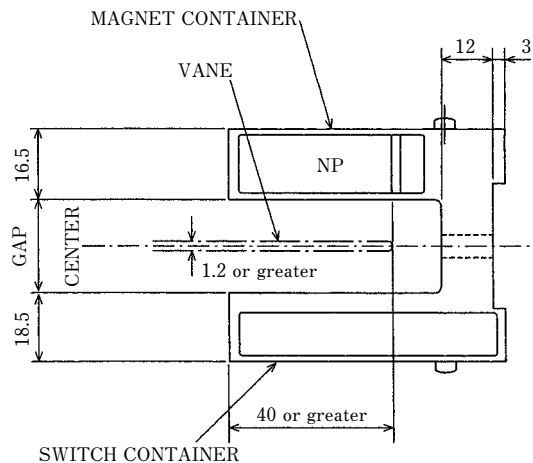
- Allowable mounting dimension for magnetic material  
Operational characteristic can be changed when magnetic material is too close to these switches. Magnetic material should be outside of the range as illustrated below.



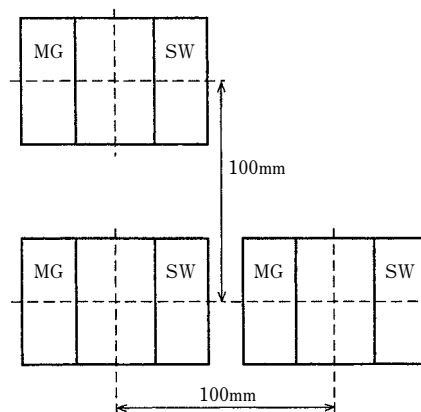
- Vane mounting  
Vaness must be mounted securely so they will not contact the switches or be bent by permanent magnets incorporated in the switches.

## ❗ OBLIGATION

- Vane mounting position  
Contacts incorporated in these switches operate and release by passage of vanes (Iron plates). Use magnetic materials (Plate thickness: 1.2 to 2.3mm, Width: 60mm or greater) such as ferromagnetic structure iron plate. The insertion depth in the detecting groove must be set further than the red line indicated on NP.



- Allowable mounting pitch  
Allowable mounting pitch is 100mm or greater when more than one switch is mounted in parallel or multistage. (Operating characteristics can be changed. Confirm them after mounting.)



# SEPARATE TYPE MAGNETIC PROXIMITY SWITCHES

Type PSMS (Medium-capacity)  
(Large-capacity)

## A Great Number of Combinations of Switch Units and Magnet Units Available to Set up an Best-Suited Detecting System

- Directly controls 100VDC or greater without any power supply unit or amplifying relay
- No erroneous operations or circuit failure due to noise and surge
- Contactless detection assures maintenance-free operation and long life



### RATINGS AND SPECIFICATIONS

#### • Medium-Capacity Type

| Type                                | Switch Unit           | PSMS-R1G1                                                                 |
|-------------------------------------|-----------------------|---------------------------------------------------------------------------|
|                                     | Magnet Unit           | PSMS-MP10                                                                 |
| Rated Sensitive Distance mm         |                       | 10                                                                        |
| Maximum Sensitive Distance mm       |                       | 10 to 12                                                                  |
| Contact Arrangement                 |                       | 1NO                                                                       |
| Incorporated Bestact                |                       | R25                                                                       |
| Enclosure*1                         |                       | Dustproof type IP50                                                       |
| Switching Frequency                 |                       | 3600 times/hour                                                           |
| Rated Insulation Voltage            |                       | 250VAC (Power Frequency)                                                  |
| Contact Performance                 |                       | Refer to page 7.                                                          |
| Insulation Resistance               |                       | 5MΩ or greater (with 500VDC Megger)                                       |
| Withstand Voltage (Power Frequency) |                       | 1500VAC for 1 minute, Leakage Current: 5mA (Across Open Contacts: 500VAC) |
| Ambient Temperature                 | Operating Temperature | -10 to +60°C                                                              |
|                                     | Storage               | -25 to +80°C                                                              |

Note: \*1. Refer to page 59.

#### • Large-Capacity Type

| Type                                | Switch Unit (Incorporated Bestact)*1 | PSMS-R1E1                                                                                                                                                                                                                                                                                                                                                                                                                     | PSMS-R2E1 | PSMS-R3E1 | PSMS-R4E1 |            |
|-------------------------------------|--------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|-----------|-----------|------------|
|                                     | Magnet Unit                          | PSMS-M105                                                                                                                                                                                                                                                                                                                                                                                                                     | PSMS-M215 | PSMS-M325 | PSMS-M450 | PSMS-MX70  |
| Rated Sensitive Distance*2 mm       |                                      | 5                                                                                                                                                                                                                                                                                                                                                                                                                             | 15        | 25        | 50        | 70         |
| Maximum Sensitive Distance*3 mm     |                                      | 8 to 11                                                                                                                                                                                                                                                                                                                                                                                                                       | 16 to 24  | 30 to 40  | 65 to 85  | 100 to 110 |
| Common Ratings and Specifications*3 |                                      | <ul style="list-style-type: none"> <li>• Contact Arrangement: 1NO</li> <li>• Enclosure: Waterproof type IP67*5</li> <li>• Operating Ambient Temperature: -10 to +60°C</li> <li>• Storage Ambient Temperature: -25 to +80°C</li> <li>• Rated Insulation Voltage: 250VAC (Power Frequency)</li> <li>• Withstand Voltage (Power Frequency): 1500VAC for 1 minute, Leakage Current: 5mA (Across Open Contacts: 800VAC)</li> </ul> |           |           |           |            |

Refer to page 7 for Contact Performance.

Note: \*1. Incorporated Bestact type is R15

\*2. Detectable distance when both switches and magnet units are mounted on iron plates at ambient temperature of 20°C.

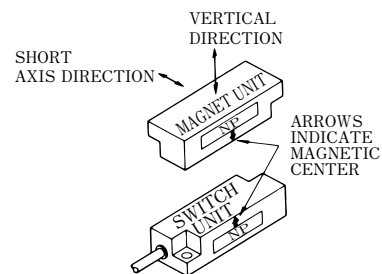
\*3. This shows the maximum interval between units when the switches are mounted on non-magnetic materials at 20°C. (Value range shows performance variation of each product but not the variation due to repetitive operations.)

4. Only switch units are equipped with a cable of 1 meter long.

\*5. Refer to page 59.

### OPERATING METHOD

Two actuation directions of the magnet available to operate the switch.



#### • Short axis direction

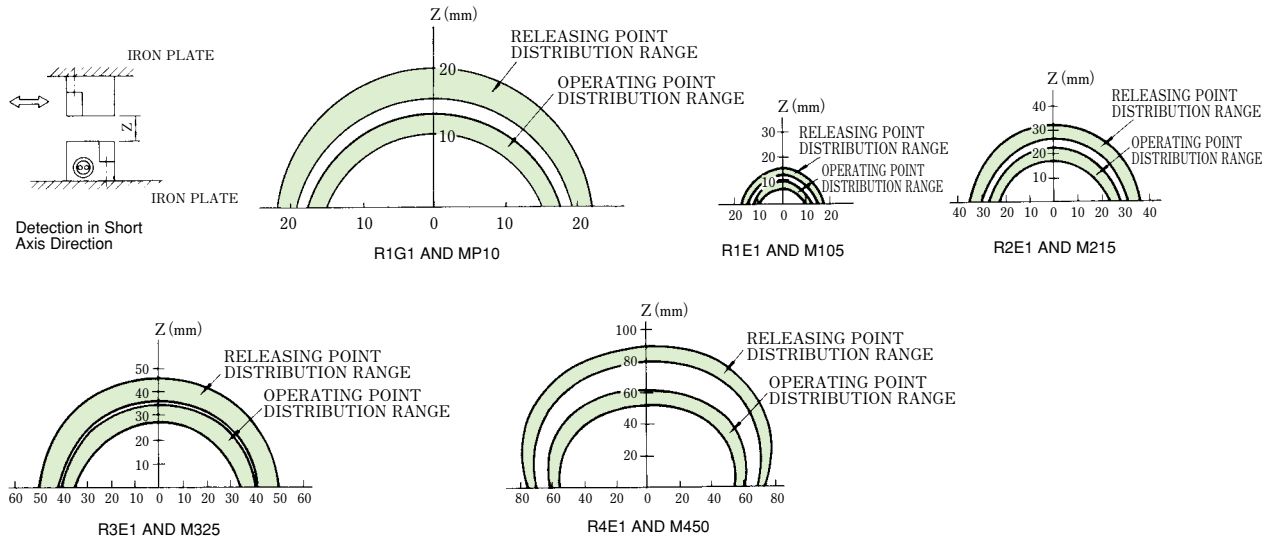
Easy to mount and the most stable operating characteristics are assured.

#### • Vertical direction

Operating characteristics are stable. However, a special mounting method should be taken depending on the stop condition.

# OPERATING CHARACTERISTICS

## <Short axis direction, vertical stroke range>

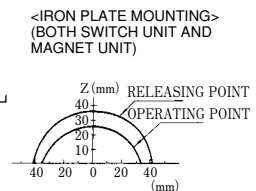
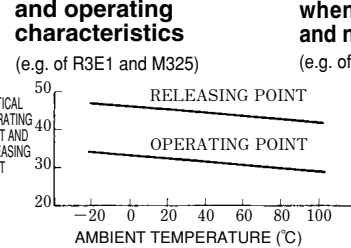
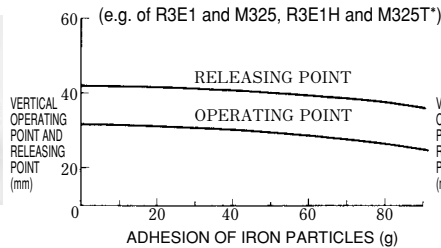


# INFLUENCE BY ENVIRONMENTAL AND OPERATING CONDITIONS

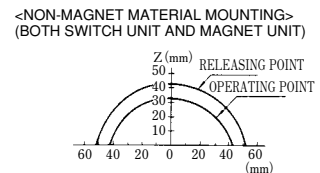
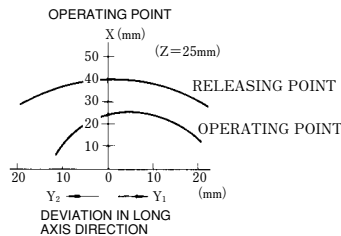
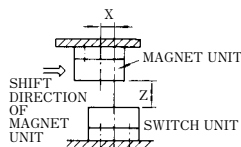
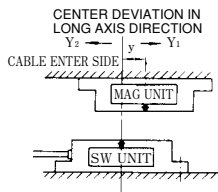
- Operating characteristics when iron particles are adhered (e.g. of R3E1 and M325, R3E1H and M325T\*)
- Ambient temperature and operating characteristics (e.g. of R3E1 and M325)
- Comparison of performance when mounting on magnetic and non-magnetic materials (e.g. of R3E1 and M325)



Adhesion of iron particles (30g)  
(If iron particles are adhered as shown in this picture, influence is only a little bit.)

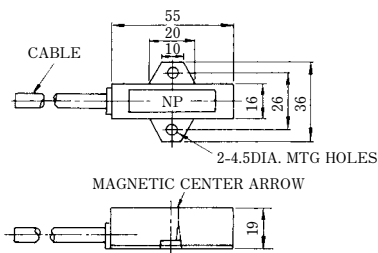


- Influence by deviance in long axis direction during short axis movement (e.g. of R3E1 and M325, R3E1H and M325T\*)



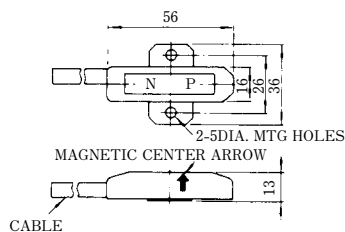
\* Refer to page 77.

# DIMENSIONS in mm



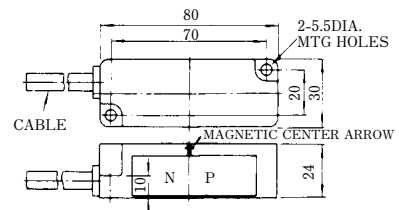
Weight: 0.08kg

Type PSMS-R1G1



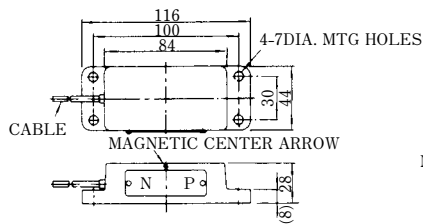
Weight: 0.13kg

Type PSMS-R1E1



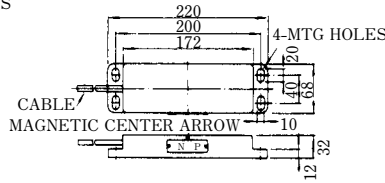
Weight: 0.22kg

Type PSMS-R2E1



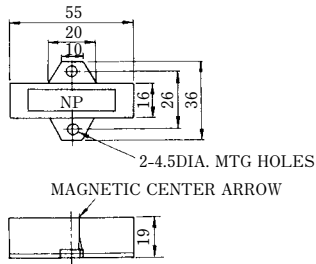
Weight: 0.35kg

Type PSMS-R3E1



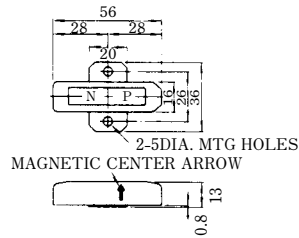
Weight: 0.9kg

Type PSMS-R4E1



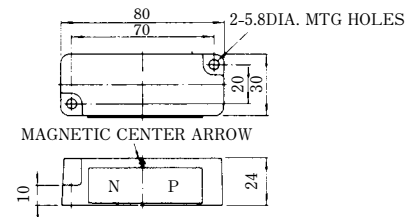
Weight: 0.04kg

Type PSMS-MP10



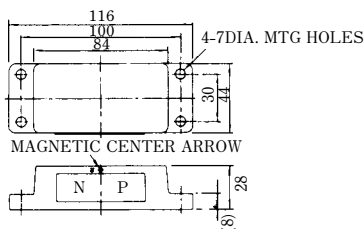
Weight: 0.03kg

Type PSMS-M105



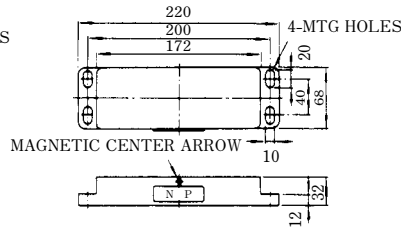
Weight: 0.16kg

Type PSMS-M215



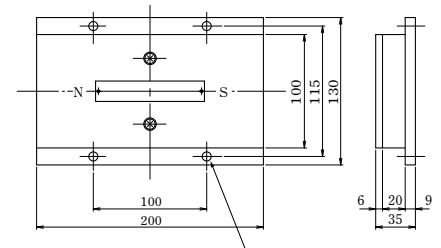
Weight: 0.45kg

Type PSMS-M325



Weight: 1.4kg

Type PSMS-M450



Weight: 3kg

Type PSMS-MX70

## HOW TO USE

### • Repetitive detection accuracy

If detecting distance does not vary after mounting the product, repetitive operation accuracy is within  $\pm 1\text{mm}$  at temperature change of  $\pm 20^\circ\text{C}$ . When the detecting distance varies repetitively, the accuracy will also change.

### • Allowable magnet unit speed of detected materials (at $20^\circ\text{C}$ )

| Operating Conditions |                         | Allowable Magnet Unit Speed<br>in Short Axis Direction<br>(mm/s) |
|----------------------|-------------------------|------------------------------------------------------------------|
| Type of Magnet Unit  | Detecting Distance (mm) |                                                                  |
| PSMS-M105            | 5                       | 320 or less                                                      |
| PSMS-M215            | 15                      | 625 or less                                                      |
| PSMS-M325            | 25                      | 770 or less                                                      |

Note: 1. Values tabulated above are based on the switch unit ON time: 50ms.

2. When the speed is faster than above, mount the magnet units in parallel.

### • Connection

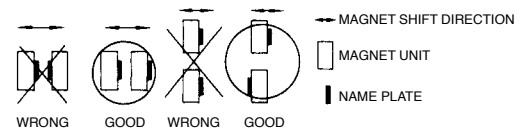
When the switch is used in a DC circuit, connect the black lead wire to  $\oplus$  terminal.

### • Mounting

- (1) Unit can even be mounted to flat magnetic materials such as iron plates. However, do not mount the units so that they are surrounded by magnetic materials.
- (2) When mounting the units, align the magnetic center arrows each other to adjust the misalignment in long axis direction.

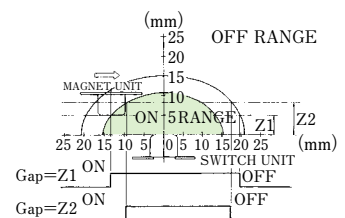
- (3) There is no interference with each other if two or more switch units are mounted in parallel. Thus, it is possible to determine the required mounting pitch in combination for individual actuation range.

- (4) When mounting two or more magnet units in parallel, follow the instruction illustrated below for the direction of magnet polarity (N or S). The nameplate are good indications for the direction.



### • How to adjust the gap

The contact operates when the center of the magnet unit passes ON and OFF area.



# MEMORY TYPE MAGNETIC PROXIMITY SWITCHES

Type PSMM

## Self-Holding Type Magnetic Proximity Switches Make Sequencing Simple

### RATINGS AND SPECIFICATIONS

| Type                                 | Switch Unit           | PSMM-RPE1U                                                                |
|--------------------------------------|-----------------------|---------------------------------------------------------------------------|
|                                      | Magnet Unit           | PSMM-MP15U                                                                |
| Incorporated Bestact                 |                       | R15                                                                       |
| Rated Sensitive Distance*1mm         |                       | 15 (when mounted on non-magnetic materials)                               |
| Operational Gap Range*1mm            |                       | 8~16 (when mounted on non-magnetic materials)                             |
| Enclosure*2                          |                       | Drip-proof type IP52 (NEMA 2)                                             |
| Shock Resistance*3 (malfunction)     |                       | 98m/s <sup>2</sup> {10G}                                                  |
| Vibration Resistance*3 (malfunction) |                       | 49m/s <sup>2</sup> {5G} (10 to 55Hz)                                      |
| Maximum Response Speed               |                       | 200m/min                                                                  |
| Rated Insulation Voltage             |                       | 250VAC (Power Frequency)                                                  |
| Contact Performance                  |                       | Refer to page 7.                                                          |
| Insulation Resistance                |                       | 100MΩ or greater (with 500VDC Megger)                                     |
| Withstand Voltage (Power Frequency)  |                       | 1500VAC for 1 minute, Leakage Current: 5mA (Across Open Contacts: 800VAC) |
| Ambient Temperature                  | Operating Temperature | -10 to +60°C                                                              |
|                                      | Storage               | -25 to +80°C                                                              |

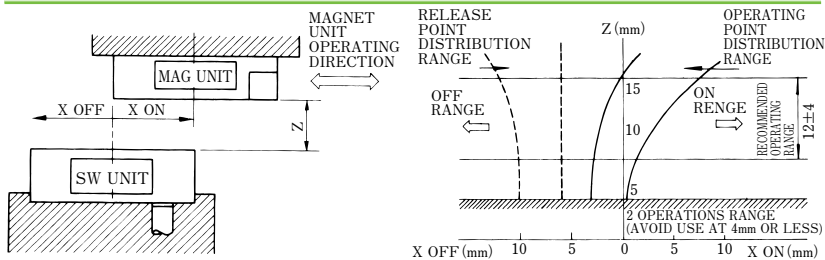
Note: \*1. At ambient temperature of 20°C. Sensitive distance where ambient temperature T (°C) can be calculated by the following equation.

$$\text{Sensitive distance (mm)} = \text{Rated sensitive distance} \times \{1 - 0.0018 (T - 20)\}$$

\*2. Refer to page 59.

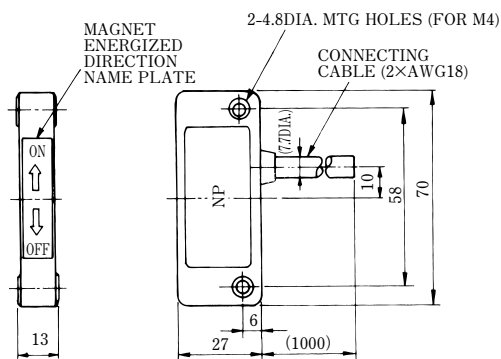
\*3. Values when the switch unit is mounted correctly on a non-magnetic material. These values can decline depending on a magnetic material and mounting direction.

### OPERATING CHARACTERISTICS



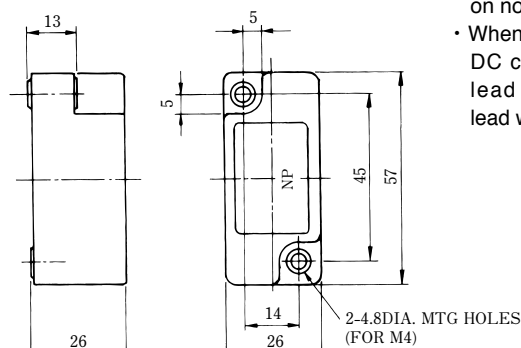
### DIMENSIONS in mm

#### Type PSMM-RPE1U (Switch Unit)



Weight: 0.12kg

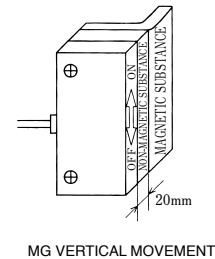
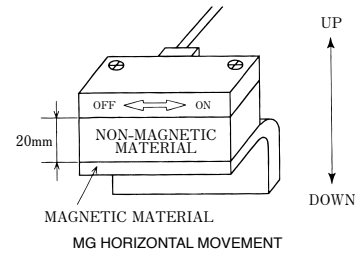
#### Type PSMM-MP15U (Magnet Unit)



Weight: 0.1kg



### MOUNTING



### OPERATING METHOD

The magnet unit that switches the contact moves in long axis direction. When the magnet moves to ON side, the contact is turned on and maintained.

- This unit should be mounted on non-magnetic materials.
- When the switch is used in a DC circuit, connect brown lead wire to ⊕, and blue lead wire to ⊖.

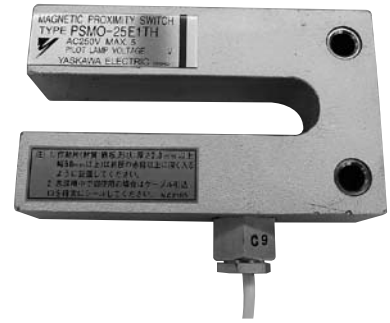


# VANE TYPE HIGH-TEMPERATURE-USE MAGNETIC PROXIMITY SWITCHES

Type PSMO-H

**Unsurpassed Performance at High Temperature, Humidity Atmosphere; Exceeding any Non-Contact Types. 130°C Continuous or 180°C for Short Time (10 Minutes or Less)**

- Direct control of 100VDC or greater, no power supply unit or amplifying relay needed
- No erroneous operation or breakdown in circuit due to noise and surge
- Contactless design assures long service life and maintenance-free operation



## RATINGS AND SPECIFICATIONS

| Type                       |                                     | PSMO-25E1TH                                                               | PSMO-25E2TH |
|----------------------------|-------------------------------------|---------------------------------------------------------------------------|-------------|
| Contact Arrangement        |                                     | 1NO                                                                       | 1NC         |
| Incorporated Bestact       |                                     | R15                                                                       |             |
| Groove Width               |                                     | 25mm                                                                      |             |
| Groove Depth               |                                     | 120mm                                                                     |             |
| Enclosure*2                |                                     | Flood tight type IP67*2                                                   |             |
| Standard Vane Size         |                                     | Structural iron plate (SPCC, etc.) t 2.3×50×135mm                         |             |
| Ambient Temperature        | Operating Temperature               | -25 to +130°C                                                             |             |
|                            | Storage                             | -40 to +150°C                                                             |             |
| Rated Insulation Voltage   |                                     | 250VAC (Power Frequency)                                                  |             |
| Contact Performance        |                                     | Refer to page 7.                                                          |             |
| Insulation Characteristics | Insulation Resistance               | 5MΩ or greater (with 500VDC Megger)                                       |             |
|                            | Withstand Voltage (Power Frequency) | 1500VAC for 1 minute, Leakage Current: 5mA (Across Open Contacts: 800VAC) |             |
| Cable                      |                                     | Heatproof cable (4.6DIA. 0.75mm <sup>2</sup> 2 conductors) 3m long        |             |

Note: 1. As for ratings and specifications other than tabulated above, refer to those of standard types on page 62.

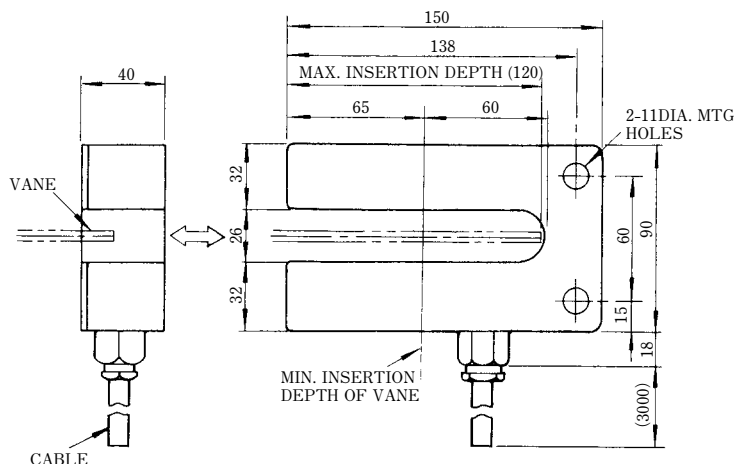
\*2. Refer to page 59.

## TYPICAL APPLICATIONS

Continuous casting machines, coke ovens, converters, rolling mills, cement curing ovens, equipment in refrigerators.

## DIMENSIONS in mm

### • Type PSMO-25E1TH



Weight: 1.0kg

### Influence of ambient temperature and compensation

Where temperature varies widely from the beginning and during operation, the actuating point and return point may change a little due to the thermal characteristics of the magnetic unit. Therefore, for applications requiring higher accuracy, compensate for the change before mounting.

### Connection

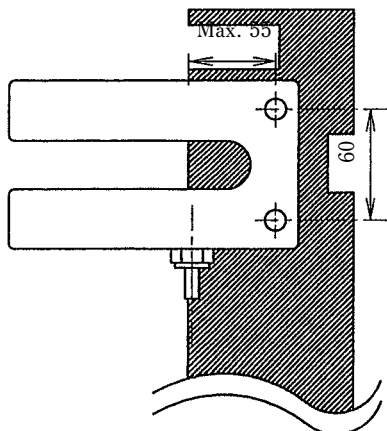
- When the switch is used in a DC circuit, connect black lead wire to ⊕, and white lead wire to ⊖.



# NOTE FOR INSTALLATION

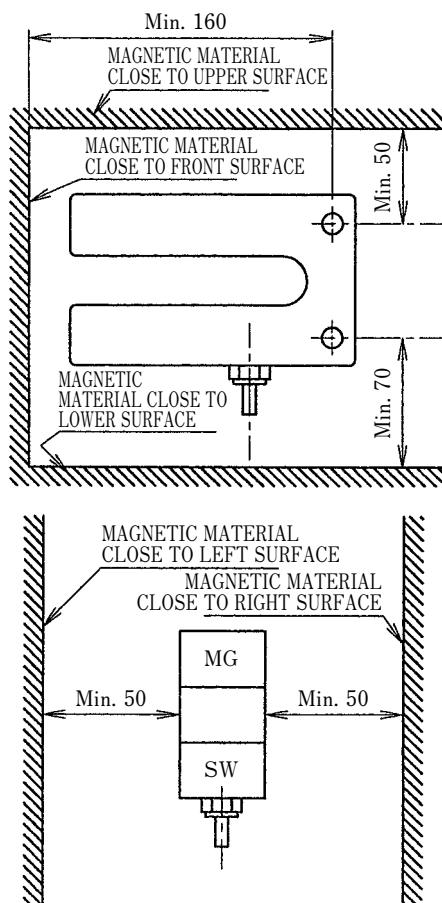
## ⚠ CAUTION

● Allowable mounting dimension for these switches.  
These switches must be mounted with the center of the mounting holes less than 55mm from the edge of the mounting surface.



## ⚠ CAUTION

● Allowable mounting dimension for magnetic material  
Operating characteristics can be changed when magnetic material is approaching to these switches. Magnetic material should be outside of the range as illustrated below.



### ● Vane mounting

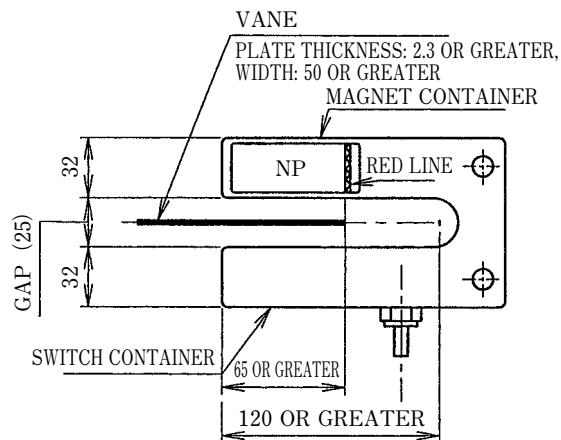
Vanes must be mounted securely so they will not contact the switches or be bent by permanent magnets incorporated in the switches.

## ⓘ OBLIGATION

### ● Vane mounting position

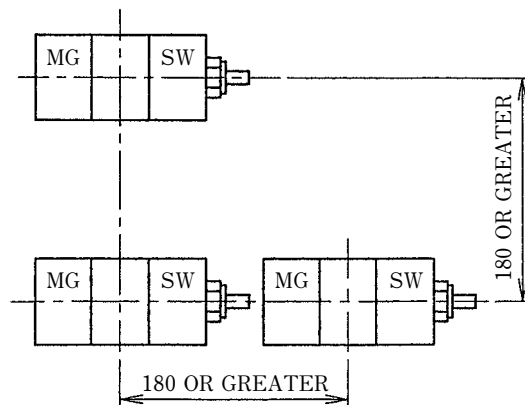
Contacts incorporated in these switches operate and release by passage of vanes (Iron plates).  
Use magnetic materials (Plate thickness: 2.3mm or greater, Width: 50mm or greater) such as ferromagnetic structure iron plate.

The insertion depth in the detecting groove must be set further than the red line indicated on NP.



### ● Allowable mounting pitch

Allowable mounting pitch is 180mm or greater when more than one switch is mounted in parallel or multistage.  
(Operating characteristics can be changed. Confirm them after mounting.)



# SEPARATE TYPE HIGH-TEMPERATURE-USE MAGNETIC PROXIMITY SWITCHES

Type PSMS-H, T

**Designed for High Temperature, High Humidity Atmosphere; Exceeding any Non-Contact Types. Resistant to 130°C for Continuous Duty or 180°C for Short Time (10 Minutes or Less)**



- Direct control of 100VDC or greater, no power supply unit or amplifying relay needed
- No erroneous operation or breakdown in circuit due to noise and surge
- Contactless design assures long service life and maintenance-free operation

## RATINGS AND SPECIFICATIONS

| Type                            | Switch Unit                         | PSMS-R2E1H                                                                       | PSMS-R3E1H |            |            |
|---------------------------------|-------------------------------------|----------------------------------------------------------------------------------|------------|------------|------------|
|                                 | Magnet Unit                         | PSMS-M215T                                                                       | PSMS-M325T | PSMS-M450T | PSMS-MX70T |
| Rated Sensitive Distance*1 mm   |                                     | 15                                                                               | 25         | 50         | 70         |
| Maximum Sensitive Distance*2 mm |                                     | 16 to 24                                                                         | 30 to 40   | 65 to 80   | 100 to 110 |
| Contact Arrangement             |                                     | 1NO                                                                              |            |            |            |
| Incorporated Bestact            |                                     | R15                                                                              |            |            |            |
| Rated Insulation Voltage        |                                     | 250VAC (Power Frequency)                                                         |            |            |            |
| Enclosure*4                     |                                     | Waterproof type IP67                                                             |            |            |            |
| Insulation Characteristics      | Insulation Resistance               | 5MΩ or greater (with 500VDC Megger)                                              |            |            |            |
|                                 | Withstand Voltage (Power Frequency) | 1500VAC for 1 minute, Leakage Current: 5mA<br>(Across Open Contacts: 800VAC)     |            |            |            |
| Ambient Temperature             | Operating Temperature               | -25 to +130°C                                                                    |            |            |            |
|                                 | Storage                             | -40 to +150°C                                                                    |            |            |            |
| Cable                           |                                     | 3m long heat-resistant cable (4.6mm outer dia, 0.75mm <sup>2</sup> 2 conductors) |            |            |            |

Note: \*1. Detectable distance at ambient temperature of 20°C when both the switches and the magnet units are mounted on iron plates. Setting gap where ambient temperature T (°C) can be calculated by the following equation.

Setting gap (mm) = Rated sensitive distance × {1 - 0.0018 (T - 20)}

\*2. Maximum detectable distance when the switch is mounted on a non-magnetic material. (Value range shows performance variation of each product but not the variation due to repetitive operations.)

\*3. As for ratings and specifications other than tabulated above, refer to those of standard types on page 71.

\*4. Refer to page 59.

## TYPICAL APPLICATIONS

Continuous casting machines, coke ovens, converters, rolling mills, cement curing ovens, equipment in refrigerators.

### Influence of ambient temperature and compensation

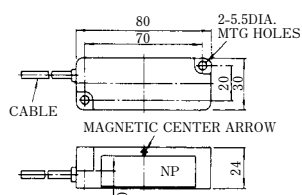
Where temperature varies widely from the beginning and during operation, the actuating point and return point may change a little due to the thermal characteristics of the magnetic unit.

For applications requiring higher accuracy, compensate for the change before mounting.

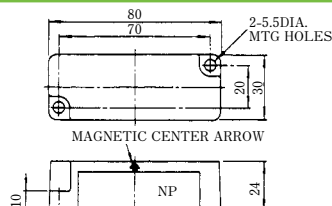
### Connection

- When the switch is used in a DC circuit, connect black lead wire to ⊕, and white wire to ⊖.

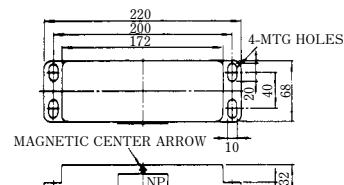
## DIMENSIONS in mm



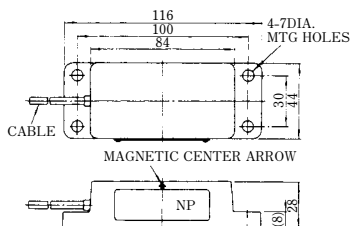
Weight: 0.2kg  
Type PSMS-R2E1H



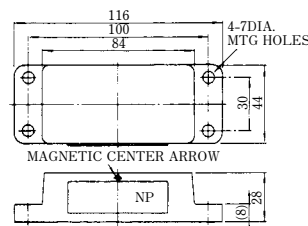
Weight: 0.16kg  
Type PSMS-M215T



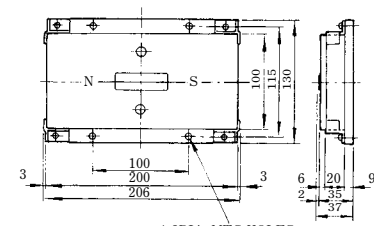
Weight: 1.4kg  
Type PSMS-M450T



Weight: 0.4kg  
Type PSMS-R3E1H



Weight: 0.45kg  
Type PSMS-M325T



Weight: 3kg  
Type PSMS-MX70T

# MEMORY TYPE HIGH-TEMPERATURE-USE MAGNETIC PROXIMITY SWITCHES

Type PSMM-H, T

## Stable Self-Holding Performance at High Temperature and Humid Atmosphere

- Resistant to continuous duty at 130°C
- Simplified sequence circuit with no external self-holding circuit needed.



## RATINGS AND SPECIFICATIONS

| Type                                             | Switch Unit           | PSMM-R3E1H                                                                       |            |            |
|--------------------------------------------------|-----------------------|----------------------------------------------------------------------------------|------------|------------|
|                                                  | Magnet Unit           | PSMM-M325T                                                                       | PSMM-M450T | PSMM-MX70T |
| Rated Sensitive Distance <sup>*1</sup> mm        |                       | 25                                                                               | 50         | 70         |
| Operational Gap Range <sup>*1</sup> mm           |                       | 10 to 35                                                                         | 10 to 60   | 10 to 85   |
| Incorporated Bestact                             |                       | R15                                                                              |            |            |
| Rated Insulation Voltage                         |                       | 250VAC (Power Frequency)                                                         |            |            |
| Ambient Temperature                              | Operating Temperature | -25 to +130°C                                                                    |            |            |
|                                                  | Storage               | -40 to +150°C                                                                    |            |            |
| Enclosure <sup>*3</sup>                          |                       | Waterproof type IP67                                                             |            |            |
| Shock Resistance (Malfunction) <sup>*4</sup>     |                       | 98m/s <sup>2</sup> {10G}                                                         |            |            |
| Vibration Resistance (Malfunction) <sup>*4</sup> |                       | 48m/s <sup>2</sup> {5G} (10 to 55Hz)                                             |            |            |
| Maximum Response Speed                           |                       | 200m/min                                                                         |            |            |
| Insulation Resistance                            |                       | 5MΩ or greater (with 500VDC Megger)                                              |            |            |
| Withstand Voltage (Power Frequency)              |                       | 1500VAC for 1 minute, Leakage Current: 5mA<br>(Across Open Contacts: 800VAC)     |            |            |
| Cable                                            |                       | 3m long heat-resistant cable (4.6mm outer dia, 0.75mm <sup>2</sup> 2 conductors) |            |            |

Note: \*1. Detectable distance at ambient temperature of 20°C when both the switches and the magnet units are mounted on iron plates. Setting gap where ambient temperature T (°C) can be calculated by the following equation.

Setting gap (mm) = Rated sensitive distance × {1-0.0018 (T-20)}

2. As for ratings and specifications other than tabulated above, refer to standard types on page 74.

\*3. Refer to page 59.

\*4. Values when the switch unit is mounted correctly on a non-magnetic material.

These values can decline depending on mounting of a magnetic material and mounting direction.

## TYPICAL APPLICATIONS

Continuous casting machines, coke ovens, converters, rolling mills, cement cure ovens, equipment in refrigerators.

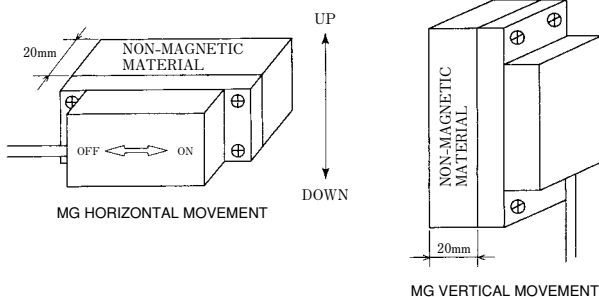
### Influence of ambient temperature and compensation

Where temperature varies widely from the beginning and during operation, the actuating point and return point may change a little due to the thermal characteristics of the magnetic unit.

For applications requiring higher accuracy, compensate for the change before mounting.

### Connection and Mounting

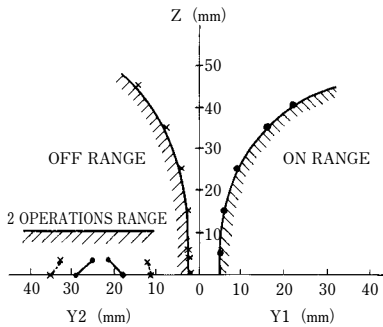
- When the switch is used in a DC circuit, connect black lead wire to ⊕, and white wire to ⊖.



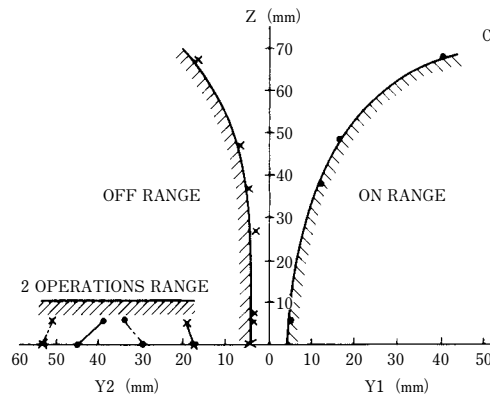
# OPERATING CHARACTERISTICS

(The switch unit is mounted on a non-magnetic material, and the magnet unit is on a ferromagnetic material.)

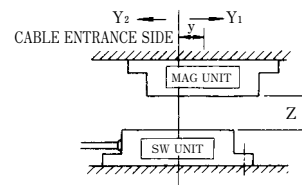
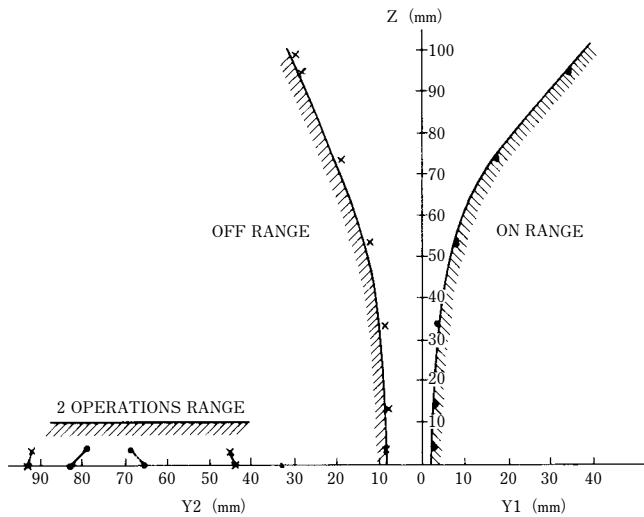
## (1) Type PSMM-M325T



## (2) Type PSMM-M450T



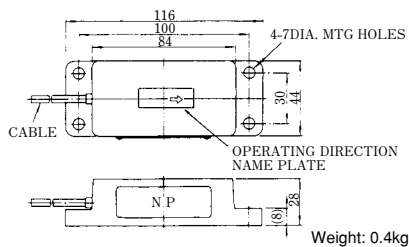
## (3) Type PSMM-MX70T



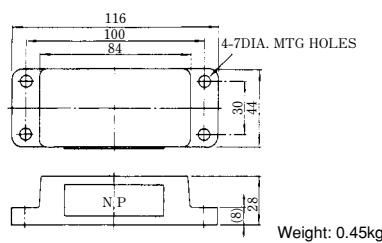
Note:

Shown here are typical examples. ON and OFF points vary depending on each product and mounting condition. Where the switch unit is mounted on a ferromagnetic material, the operating characteristics may change.

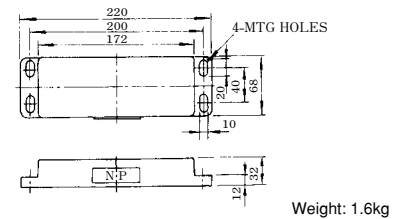
# DIMENSIONS in mm



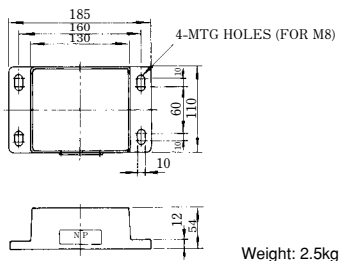
Type PSMM-R3E1H



Type PSMM-M325T



Type PSMM-M450T



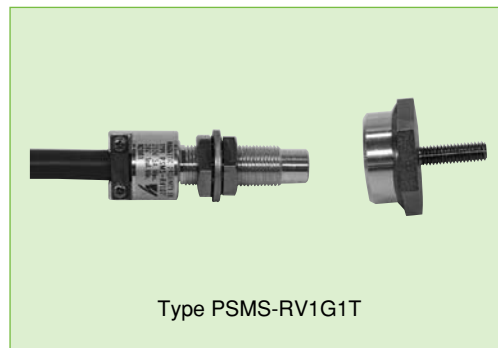
Type PSMM-MX70T

# COLUMN TYPE MAGNETIC PROXIMITY SWITCHES

Type PSMS-RV ☐

**Superior Space/Cost Saving Performance Especially in High Temperature when Compared with Conventional Column Type Inductive Proximity Switches.**

- Type PSMS-RV incorporating Bestact is best suited for position detectors in an adverse environment such as high temperature, high humidity or direct sunlight.
- Misalignment is allowed in all directions within the operating curve. The end user can adjust the mounting of the parts within the operating curve as needed.
- No power supply unit or amplifying relay needed.



## RATINGS AND SPECIFICATIONS

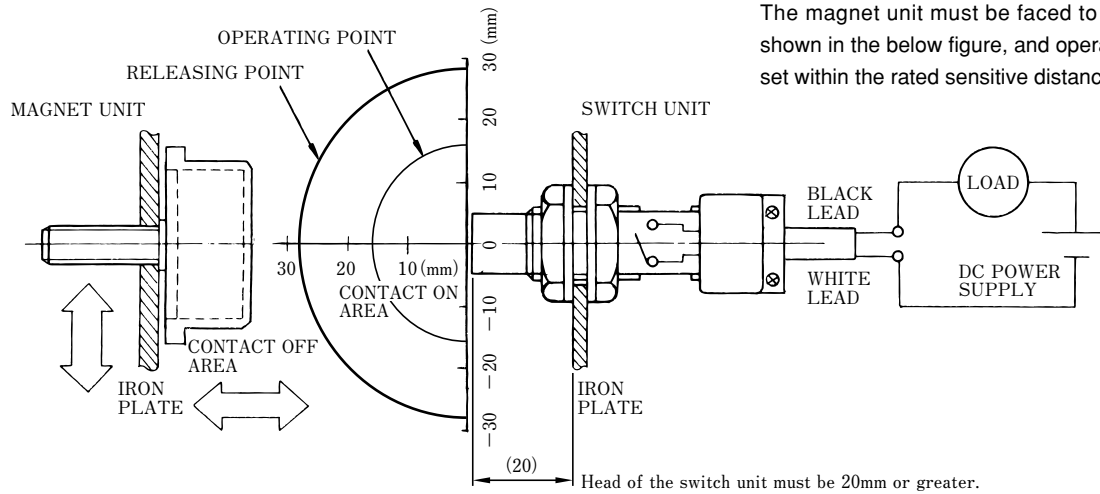
| Purpose                       |                                     |                                                 | General Purpose                                                              | High Temperature        |               |               |
|-------------------------------|-------------------------------------|-------------------------------------------------|------------------------------------------------------------------------------|-------------------------|---------------|---------------|
| Type                          | Switch Unit                         | PSMS-RV1G1T                                     | PSMS-RV1G1TH                                                                 | PSMS-RV3G1TH            | PSMS-RV3G1THL | PSMS-RV4G1THL |
|                               | Magnet Unit                         | PSMS-MV10TH (M6 STUD) · PSMS-MV10THA (M8 SCREW) |                                                                              |                         |               |               |
| Rated Sensitive Distance (mm) |                                     |                                                 | 10                                                                           |                         |               |               |
| Contact Arrangement           |                                     |                                                 | 1NO                                                                          |                         |               |               |
| Rated Insulation Voltage      |                                     |                                                 | 250VAC (Power Frequency)                                                     |                         |               |               |
| Incorporated Bestact          |                                     |                                                 | R25                                                                          |                         |               |               |
| Contact Performance           |                                     |                                                 | Refer to page 7.                                                             |                         |               |               |
| Characteristics               | Vibration Resistance                |                                                 | 49m/s <sup>2</sup> {5G} (16.7 to 1000Hz)                                     |                         |               |               |
|                               | Shock Resistance                    | Erroneous Operation                             | 98m/s <sup>2</sup> {10G}                                                     |                         |               |               |
|                               |                                     | Breakdown                                       | 980m/s <sup>2</sup> {100G}                                                   |                         |               |               |
|                               | Withstand Voltage (Power Frequency) |                                                 | 1500VAC for 1 minute, Leakage Current: 5mA<br>(Across Open Contacts: 500VAC) |                         |               |               |
|                               | Insulation Resistance               |                                                 | 5MΩ or greater (with 500VDC Megger)                                          |                         |               |               |
| Ambient Temperature           | Operating Temperature               | -10 to +60°C                                    | -25 to +130°C                                                                |                         |               |               |
|                               | Storage                             | -20 to +80°C                                    | -30 to +130°C                                                                |                         |               |               |
| Enclosure*                    |                                     |                                                 | Waterproof type IP67                                                         |                         |               |               |
| Unit Case Material            |                                     |                                                 | Aluminum                                                                     |                         |               |               |
| Switch Unit Cable             |                                     |                                                 | General Cable 1m long                                                        | Heatproof Cable 1m long |               |               |

Note: \* Refer to page 59.

## TYPICAL APPLICATIONS

- Position detectors for an adverse atmosphere in steel plant/cement producing equipment
- Door-zone detectors for elevators
- Position detectors for escalators
- Position detectors for general industrial machinery like vertical parking garages
- Auxiliary contacts for heavy machinery like disconnectors

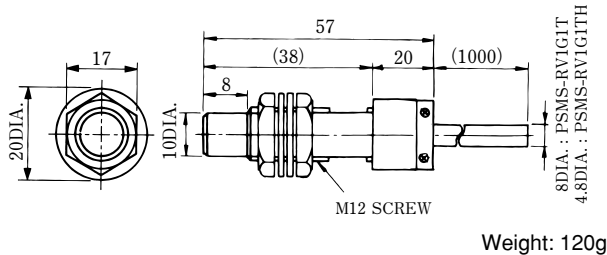
# DRIVING METHOD AND SENSITIVE DISTANCE



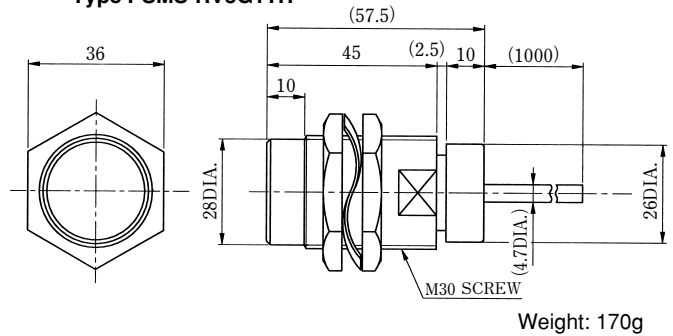
## DIMENSIONS in mm

### SWITCH UNIT

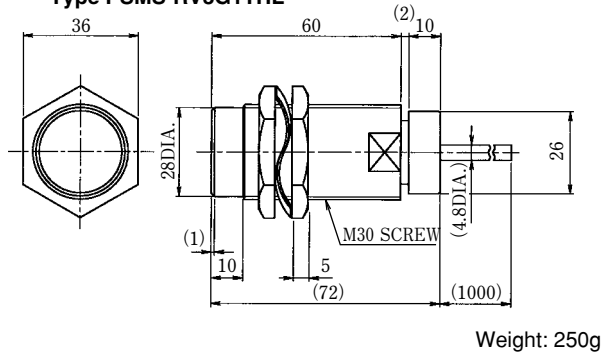
- Type PSMS-RV1G1T: with General Cable
- Type PSMS-RV1G1TH: with Heatproof Cable



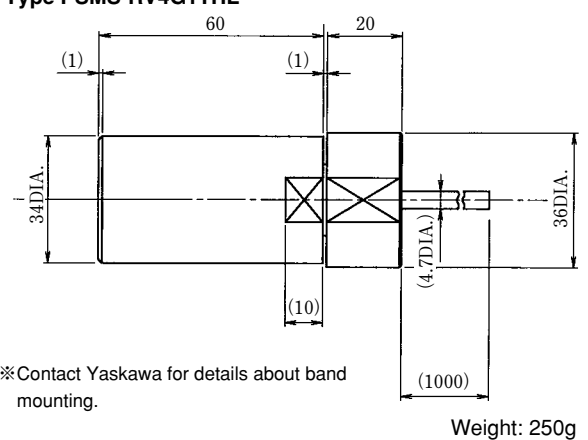
### • Type PSMS-RV3G1TH



### • Type PSMS-RV3G1THL



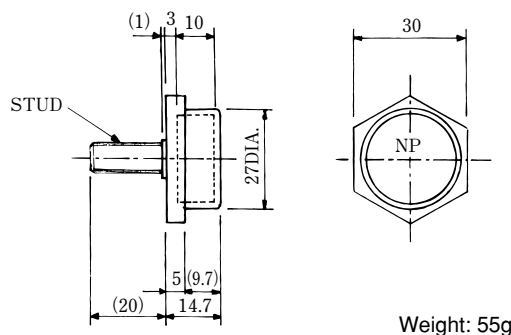
### • Type PSMS-RV4G1THL



※Contact Yaskawa for details about band mounting.

### MAGNET UNIT

- Type PSMS-MV10TH: M6 STUD
- Type PSMS-MV10THA: M8 STUD



Note: where the switch is used in a DC circuit, connect the black lead wire to ⊕ and white lead wire to ⊖.

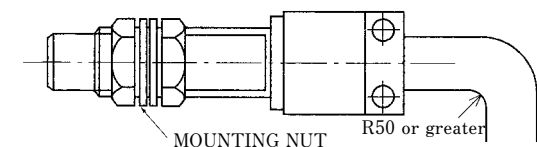
### NOTE FOR INSTALLATION

#### CAUTION

#### ●Tightening torque of the mounting nut

PSMS-RV1G1T (H) ...16.6 to 23.5 (N · m) {170 to 240 (kgf · cm)}

PSMS-RV3G1TH (L) ...49 to 78 (N · m) {500 to 800 (kgf · cm)}



- Do not twist the cable less than R50.