

## HS7A-DMC Magnetic Safety Switches

### Key features:

- Compact size and easy positioning.
- Combination with proprietary relay modules achieves safety category 4 (EN954-1).
- Compact size (7 × 16 × 51mm)
- Positioning for installation is easy.
- Up to 36 sets can be connected.  
(safety relay module: HR1S-DME)
- Degree of protection: IP67



### Part Numbers

#### HS7A Non-contact Magnetic Interlock Switches

| Contact Configuration | Cable Length | LED     | Part Number   | Applicable Safety Relay Module |
|-----------------------|--------------|---------|---------------|--------------------------------|
| 1NO + 1NC             | 2m           | Without | HS7A-DMC5902  | HR1S-D□                        |
|                       |              | With    | HS7A-DMC5912  |                                |
|                       | 5m           | Without | HS7A-DMC5905  |                                |
|                       |              | With    | HS7A-DMC5915  |                                |
|                       | 10m          | Without | HS7A-DMC59010 |                                |
|                       |              | With    | HS7A-DMC59110 |                                |
| 2NO                   | 2m           | Without | HS7A-DMC7902  | HR1S-AF□                       |
|                       |              | With    | HS7A-DMC7912  |                                |
|                       | 5m           | Without | HS7A-DMC7905  |                                |
|                       |              | With    | HS7A-DMC7915  |                                |
|                       | 10m          | Without | HS7A-DMC79010 |                                |
|                       |              | With    | HS7A-DMC79110 |                                |

### Accessory

| Name     | Part Number |
|----------|-------------|
| Actuator | HS9Z-ZC1    |



One HS9Z-ZC1 is supplied with each HS7A-DMC non-contact interlock switch.

### Maximum Number of Connectable Non-contact Interlock Switches per Input of Safety Relay Module

| Non-contact Interlock Switch | HS7A-DMC59□□ |          | HS7A-DMC79□□ |          |
|------------------------------|--------------|----------|--------------|----------|
|                              | Without LED  | With LED | Without LED  | With LED |
| HR1S-D□                      | 6            | 3        | —            | —        |
| HR1S-AF□                     | —            | —        | 6            | 1        |



The HS7A-DMC non-contact interlock switch is supplied with an HS9Z-ZC1 actuator.  
The contact configuration in the table above shows the contact status when the non-contact interlock switch is not activated.

### HR1S Safety Relay Modules for Non-contact Interlock Switches

| Safety Relay Module | Voltage                                           | Number of Inputs | Max. Number of Connectable Non-contact Interlock Switches |
|---------------------|---------------------------------------------------|------------------|-----------------------------------------------------------|
| HR1S-DMB□32         | 24V DC –20 to +20%                                | 2                | 12                                                        |
| HR1S-DME□32         |                                                   | 6                | 36                                                        |
| HR1S-AF□30B         | 24V AC –15 to +10% 50/60 Hz<br>24V DC –15 to +10% | 1                | 6                                                         |



Safety category 3 can be achieved when connecting two or more non-contact interlock switches per one input.  
When connecting multiple non-contact interlock switches (HS7A-DMC790□), use HR1S-AF51□.  
(HS7A-DMC791□ cannot be connected in multiple numbers.)

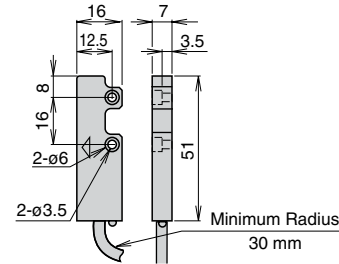
## Specifications

|                             |                                                            |                                      |
|-----------------------------|------------------------------------------------------------|--------------------------------------|
| Applicable Standards        | IEC/EN 60947-5-1<br>UL508 (UL listed)<br>CSA C22.2, No. 14 |                                      |
| Operating Temperature       | -25 to 85°C (no freezing)                                  |                                      |
| Relative Humidity           | 30 to 85% RH (no condensation)                             |                                      |
| Storage Temperature         | -40 to +85°C (no freezing)                                 |                                      |
| Pollution Degree            | 3                                                          |                                      |
| Electric Shock Protection   | Class II (IEC 60536)                                       |                                      |
| Degree of Protection        | IP67 (IEC 60529)                                           |                                      |
| Shock Resistance            | 300 m/s <sup>2</sup> (11 ms) (IEC 60068-2-7)               |                                      |
| Vibration Resistance        | 100 m/s <sup>2</sup> (10 to 150 Hz) (IEC 60068-2-6)        |                                      |
| Rated Voltage (Ue)          | 24V DC                                                     |                                      |
| Rated Current (Ie)          | 100 mA                                                     |                                      |
| Repeat Accuracy             | 10% maximum                                                |                                      |
| Maximum Operating Frequency | 150 Hz                                                     |                                      |
| Voltage Drop                | I = 10 mA                                                  | 0.1V (without LED) / 2.4V (with LED) |
|                             | I = 100 mA                                                 | 1V (without LED) / 4.2V (with LED)   |
| Housing Material            | PBT                                                        |                                      |
| Housing Color               | Red                                                        |                                      |
| Cable                       | AWG23 × 4<br>Cable length: 2m, 5m, 10m                     |                                      |
| Weight (approx.)            | HS7A-DMC: 100g (cable length: 2m)<br>HS9Z-ZC1: 9g          |                                      |

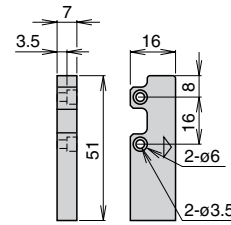
## Dimensions (mm)

## HS7A-DMC

## (Non-contact Interlock Switch)



## HS9Z-ZC1 (Actuator)

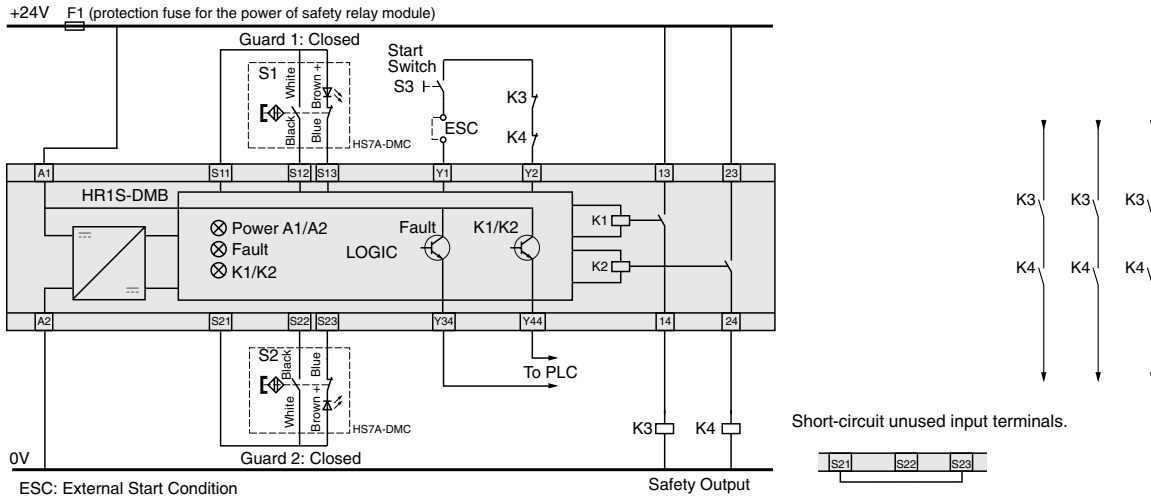


## Example Wiring Diagram

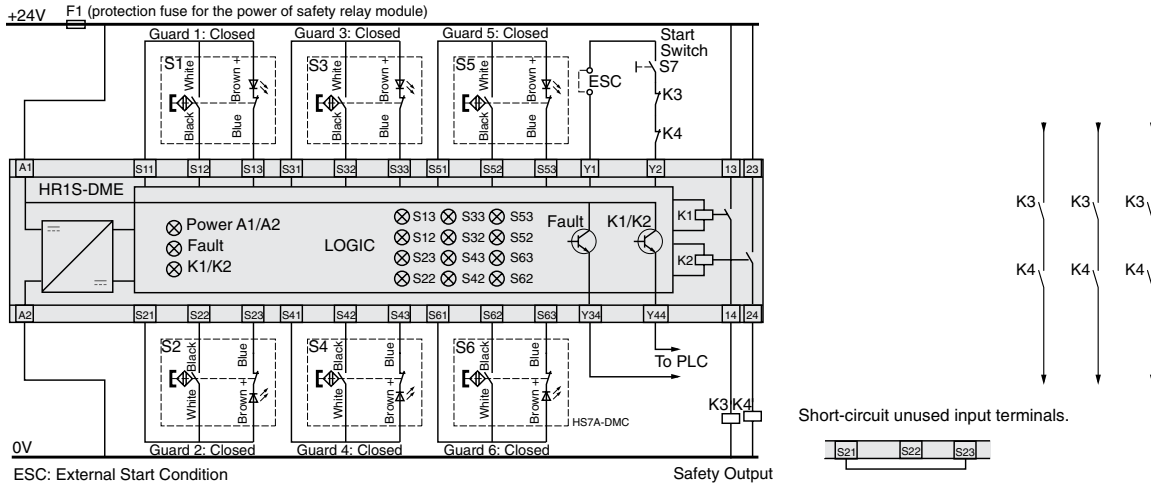


The following diagrams show the contact statuses when the non-contact interlock switches are activated by the actuators.

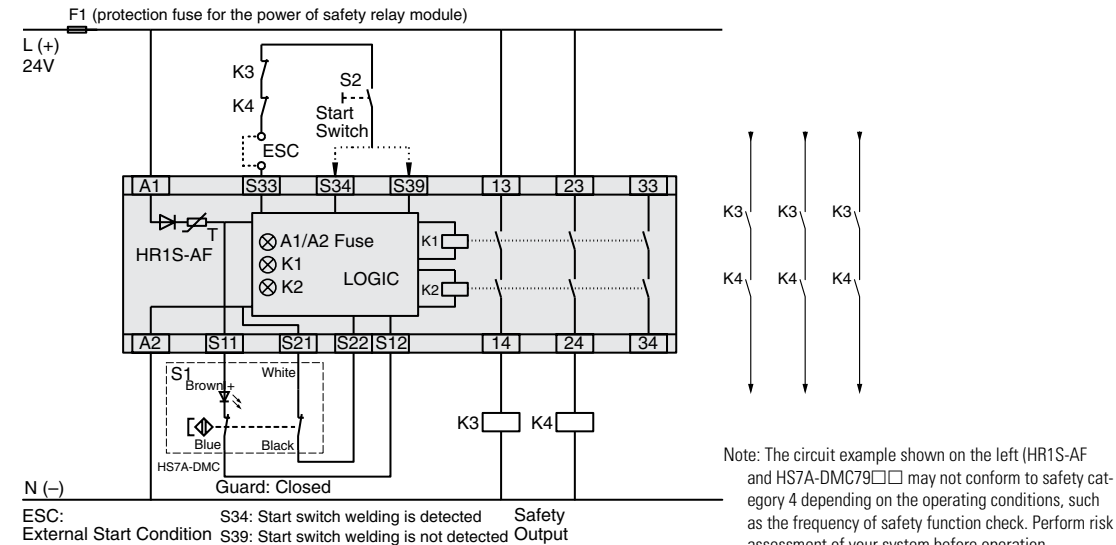
### Example: Safety Category 4 (ISO 13849-1) Circuit, HR1S-DMB + HS7A-DMC591 (1NO+1NC) + HS9Z-ZC1



### Example: Safety Category 4 (EN 13849-1) Circuit, HR1S-DME + HS7A-DMC591 (1NO+1NC) + HS9Z-ZC1

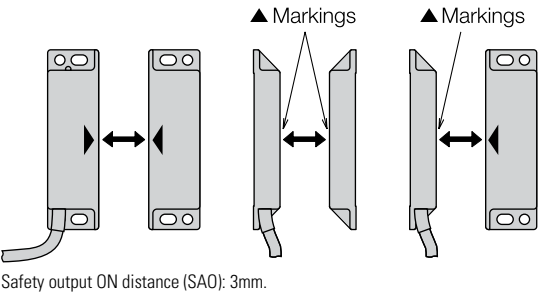


### Example: Safety Category 4 (EN 13849-1) Circuit, HR1S-DME + HS7A-DMC591 (1NO+1NC) + HS9Z-ZC1



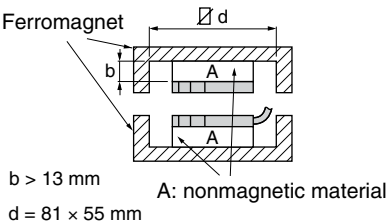
Operating Instructions

Operating Direction

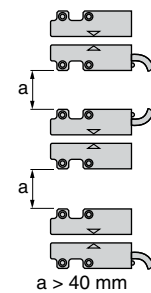


Precautions for Installation

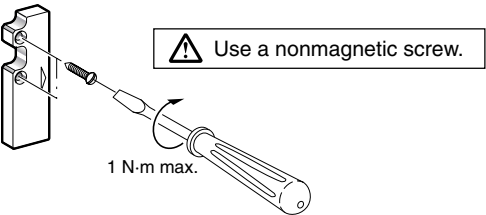
When installing on a ferromagnet



Close mounting



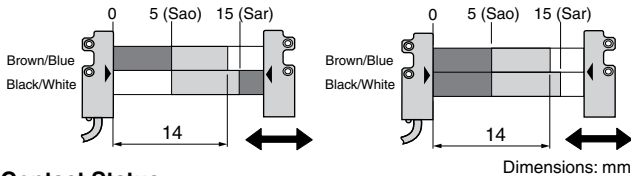
Tightening Torque



Operation Chart

HS7A-DMC59□□(1NO+1NC)

HS7A-DMC79□□(2NO)



Contact Status

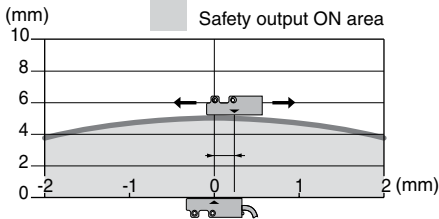
|    |                    |
|----|--------------------|
| ■  | Contact Closed (1) |
| □  | Contact Open (0)   |
| ■□ | Transient State    |

Sao: Assured operating distance where the safety output is sure to turn on.

Sar: Assured release distance where the safety output is sure to turn off.

Note: When the transfer time between the actuator's Sao-Sar is 500 ms or longer, the time lag is detected as an error.

Operation Area



## HS7A-DMP Magnetic Safety Switches

### Key features:

- Three-contact models.  
Auxiliary contacts enable PLCs to monitor the door status.
- Operation signals from auxiliary contacts can be read directly by controllers such as PLCs, allowing for monitoring HS7A-DMP non-contact interlock switches.
- Ideal for installation on guard doors where positioning is difficult.
- Conformable up to safety category 4 (EN ISO 13849-1)  
(Combining with proprietary safety relay module achieves safety category 4.)
- A maximum of 36 sets can be connected (safety relay module: HR1S-DME)
- Degree of protection: IP67



The HS7A-DMP non-contact interlock switches can be used as interlock switches when used in combination with safety relay modules specified by IDEC.

### Part Numbers

#### HS7A Non-contact Interlock Switches

| Contact Configuration | Cable Length | LED     | Ordering Type No. | Applicable Safety Relay Module |
|-----------------------|--------------|---------|-------------------|--------------------------------|
| 1NO+2NC               | 2m           | Without | HS7A-DMP5002      | HR1S-D□                        |
|                       |              | With    | HS7A-DMP5012      |                                |
|                       | 5m           | Without | HS7A-DMP5005      |                                |
|                       |              | With    | HS7A-DMP5015      |                                |
| 2NO+1NC               | 2m           | Without | HS7A-DMP7002      | HR1S-AF□                       |
|                       |              | With    | HS7A-DMP7012      |                                |
|                       | 5m           | Without | HS7A-DMP7005      |                                |
|                       |              | With    | HS7A-DMP7015      |                                |



The HS7A-DMP non-contact interlock switch is supplied with an HS9Z-ZP1 actuator.  
The contact configuration in the table above shows the contact status when the non-contact interlock switch is not activated.

### Accessory

| Name     | Part Number |
|----------|-------------|
| Actuator | HS9Z-ZP1    |



One HS9Z-ZP1 is supplied with each HS7A-DMP non-contact interlock switch.

### Maximum Number of Connectable Non-contact Interlock Switches per Input of Safety Relay Module

| Non-contact Interlock Switch | HS7A-DMP50□□ |          | HS7A-DMP70□□ |          |
|------------------------------|--------------|----------|--------------|----------|
|                              | Without LED  | With LED | Without LED  | With LED |
| HR1S-DM□                     | 6            | 3        | —            | —        |
| HR1S-AF□                     | —            | —        | 6            | 1        |

### HR1S Safety Relay Modules for Non-contact Interlock Switches

| Safety Relay Module | Number of Inputs | Max. Number of Connectable Non-contact Interlock Switches |
|---------------------|------------------|-----------------------------------------------------------|
| HR1S-DMB□           | 2                | 12                                                        |
| HR1S-DME□           | 6                | 36                                                        |
| HR1S-AF□            | 1                | 6                                                         |

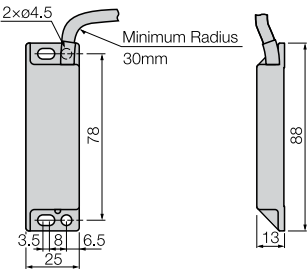


When connecting multiple non-contact interlock switches (HS7A-DMP700□), use HR1S-AF□.  
(HS7A-DMP701□ cannot be connected in multiple numbers.)

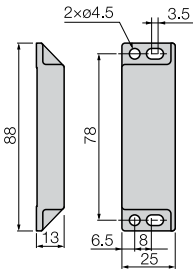
Specifications

|                             |                                                            |                                      |
|-----------------------------|------------------------------------------------------------|--------------------------------------|
| Applicable Standards        | IEC/EN 60947-5-1<br>UL508 (UL listed)<br>CSA C22.2, No. 14 |                                      |
| Operating Temperature       | -25 to 85°C (no freezing)                                  |                                      |
| Relative Humidity           | 35 to 85% RH (no condensation)                             |                                      |
| Storage Temperature         | -40 to +85°C (no freezing)                                 |                                      |
| Pollution Degree            | 3                                                          |                                      |
| Electric Shock Protection   | Class II (IEC 60536)                                       |                                      |
| Degree of Protection        | IP67 (IEC 60529)                                           |                                      |
| Shock Resistance            | 300 m/s <sup>2</sup> (11 ms) (IEC 60068-2-7)               |                                      |
| Vibration Resistance        | 100 m/s <sup>2</sup> (10 to 150 Hz) (IEC 60068-2-6)        |                                      |
| Rated Voltage (Ue)          | 24V DC                                                     |                                      |
| Rated Current (Ie)          | 100 mA                                                     |                                      |
| Repeat Accuracy             | 10% maximum                                                |                                      |
| Maximum Operating Frequency | 150 Hz                                                     |                                      |
| Voltage Drop                | I = 10 mA                                                  | 0.1V (without LED) / 2.4V (with LED) |
|                             | I = 100 mA                                                 | 1V (without LED) / 4.2V (with LED)   |
| Electrical Durability       | 1,200,000 operations minimum                               |                                      |
| Housing Material            | PBT                                                        |                                      |
| Housing Color               | Red                                                        |                                      |
| Cable                       | AWG23 × 6<br>Cable length: 2m, 5m                          |                                      |
| Weight (approx.)            | HS7A-DMP: 180g (cable length: 2 m)<br>HS9Z-ZP1: 50g        |                                      |

Dimensions (mm)  
HS7A-DMP□□□□  
(Non-contact  
Interlock Switch)



HS7A-ZP1 (Actuator)

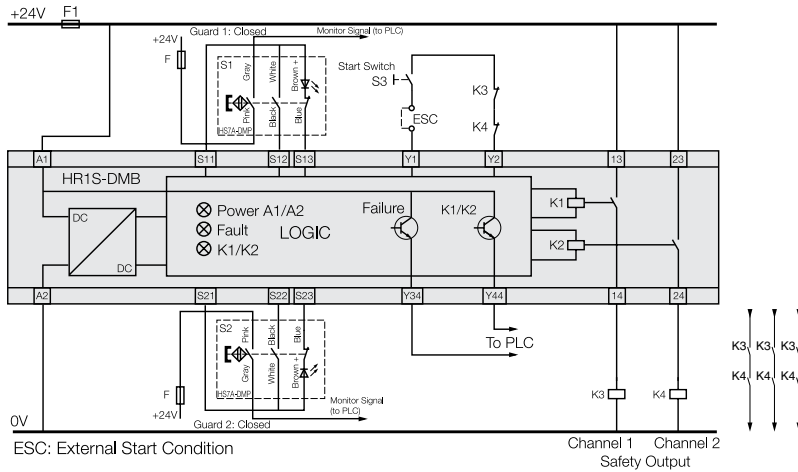


## Example Wiring Diagram

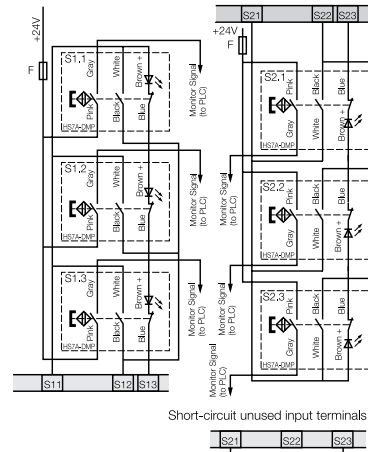


The following diagrams show the contact statuses when the non-contact interlock switches are activated by the actuators.

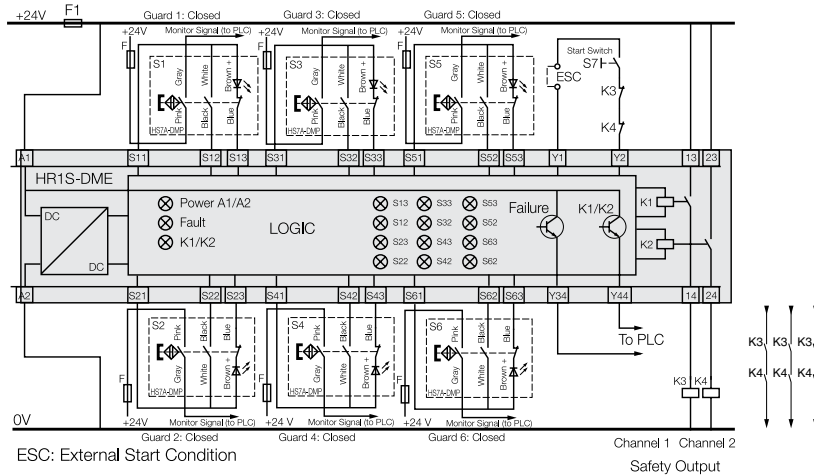
### Example: Safety Category 4 (ISO 13849-1) Circuit HR1S-DMB + HS7A-DMP50 (1N0+2NC) + HS9Z-ZP1



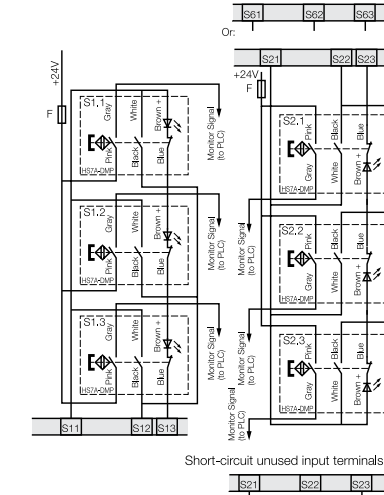
### Example: Safety Category 3 (EN ISO 13849-1) Circuit HR1S-DMB



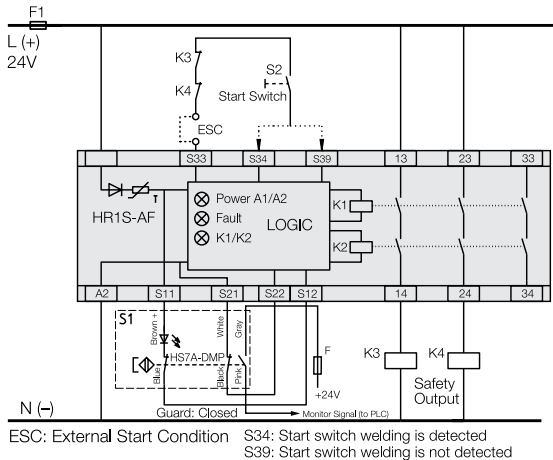
### Example: Safety Category 4 (ISO 13849-1) Circuit HR1S-DME + HS7A-DMP50 (1N0+2NC) + HS9Z-ZP1



### Example: Safety Category 3 (ISO 13849-1) Circuit HR1S-DME



### Example: Safety Category 4 (ISO 13849-1) Circuit HR1S-AF + HS7A-DMP70 (2N0+1NC) + HS9Z-ZP1



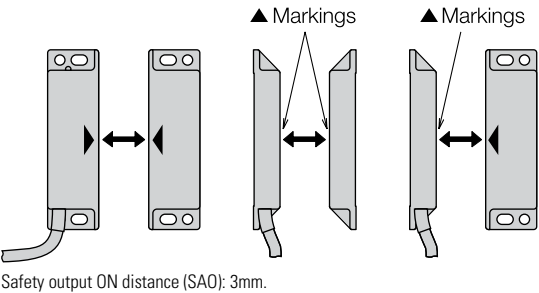
F1: Protection fuse for the power of safety relay module

F: Protection fuse for monitor signal contacts (max. 500mA gG (gL))

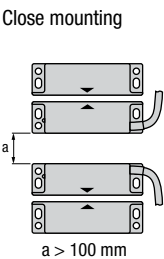
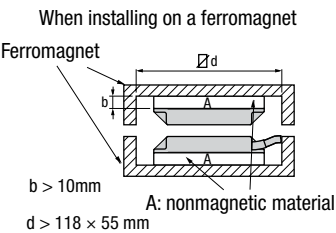
Note: The circuit example shown on the left (HR1S-AF and HS7A-DMP70) may not conform to safety category 4 depending on the operating conditions, such as the frequency of safety function check. Perform risk assessment of your system before operation.

Operating Instructions

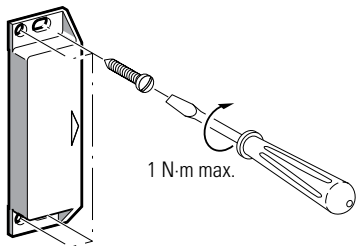
Operating Direction



Precautions for Installation

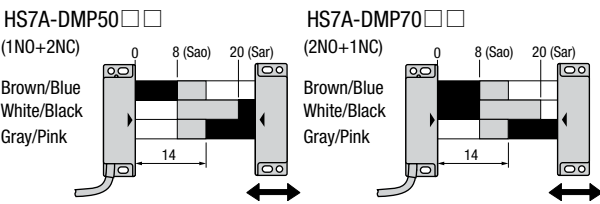


Tightening Torque



⚠ Use a nonmagnetic screw.

Operation Chart



Contact Status

|     |                    |
|-----|--------------------|
| ■   | Contact closed (1) |
| □   | Contact open (0)   |
| ■ □ | Transient area     |

Sao: Assured operating distance where the safety output is sure to turn on.  
Sar: Assured release distance when the safety output is sure to turn off.

Note: When the transfer time between the actuator's Sao-Sar is 500 ms or longer, the time lag is detected as an error.

Operation Area

