

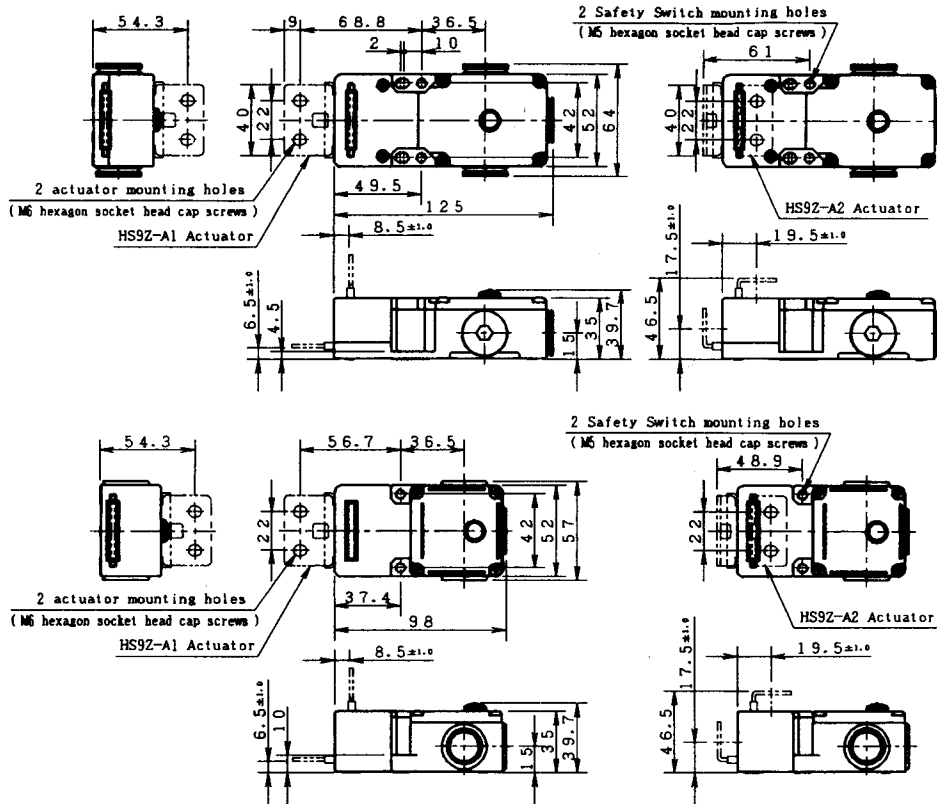
Type: HS1B-11R/-02R / HS2B-11*B
 HS1B-114R-*/-024-*/ HS2B-114*B-*

Use the safety switch according to the following instructions after confirming that the product is what you have ordered.

⚠ Precautions for Safety

- Read this instruction sheet to make sure of correct operation before starting installation, wiring, operation, maintenance, and inspection. Also, keep this instruction sheet at the end user.
- Turn power off to the safety switch before starting installation, removal, wiring, maintenance, and inspection on the safety switch. Failure to turn power off may cause electrical shocks or fire hazard.
- Use wires of a proper size to meet voltage and current requirements. Tighten the terminal to a recommended tightening torque of 1.0N·m. Loose terminal screws will cause unexpected heating and fire hazard during operation.

(1) External and Mounting Dimensions (mm)



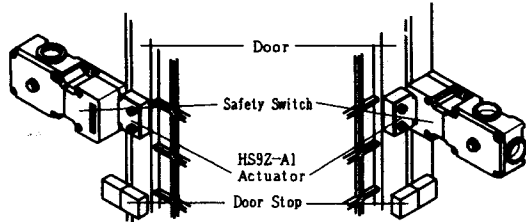
(2) Circuit Configuration and Operation Cycle

Door States	Closed	Open
Type HS1B-114R-*/ HS2B-114*B-*/ (Without Pilot Light) HS1B-11R HS2B-11*B		
Main Circuit	-3-4: Closed	-3-4: Open
Auxiliary Circuit	-1-2: Open	-1-2: Closed
	The machine can be operated.	The machine can not be operated.
Type HS1B-024R-*/ (Without Pilot Light) HS1B-02R		
Main Circuit	-3-4: Closed	-3-4: Open
Auxiliary Circuit	-1-2: Closed	-1-2: Open
	The machine can be operated.	The machine can not be operated.

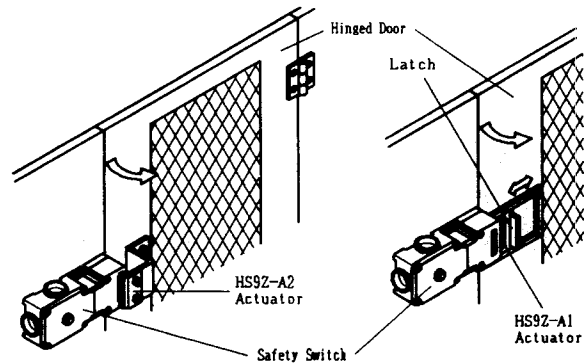
(3) Mounting Examples

- Mount the HS2B safety switch on the equipment body.
- Mount the actuator on the moving door.
- See the figure below.

Examples of Mounting on Sliding Doors

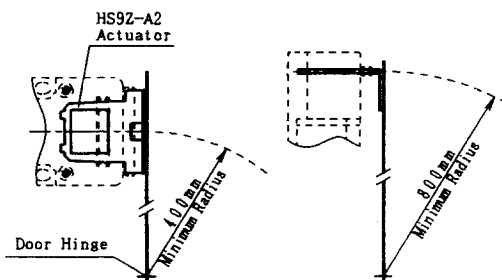


Examples of Mounting on Hinged Doors



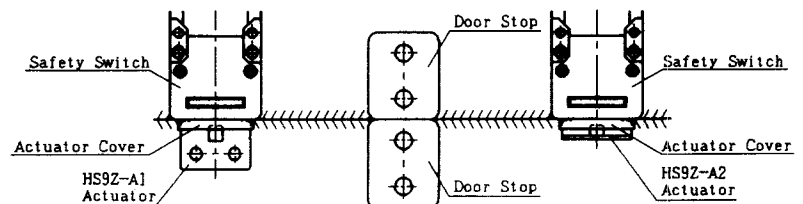
(4) Minimum Radius of Hinged Door

- See the figure below.



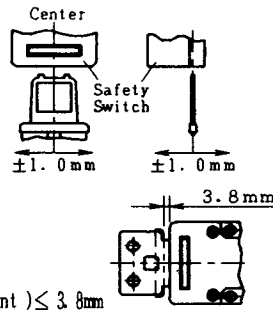
(5) Actuator Mounting Reference Position

- As shown below, the mounting reference position of the actuator inserted into the safety switch. The actuator cover touches the safety switch lightly. (After mounting the actuator, remove the actuator stop from the safety switch.)



(6) Actuator Mounting Tolerance

- Mounting tolerance of the actuator is 1.0mm in the four lateral directions.



- Contact operation is not affected when the actuator is moved 3.8mm at the maximum from the reference position.

$$(\text{Actuator deviation}) + (\text{Door movement}) \leq 3.8\text{mm}$$

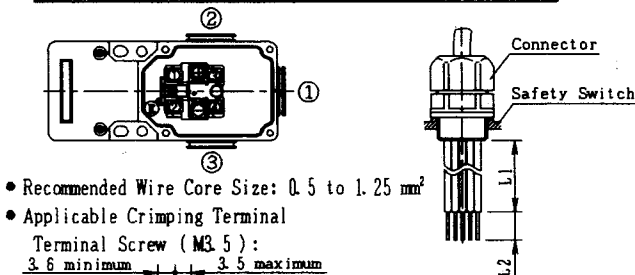
(7) Specifications and Ratings

Applicable Standards	IEC60947-5-1, EN60947-5-1 GS-ET-15, 73/23/EEC		
Thermal Current <Ith>	10 A		
Contact Ratings (Reference Values) <Ue, Ie>	AC	Resistive load (AC12)	30V 10A 125V 10A 250V 6A
		Inductive load (AC15)	10A 5A 3A
	DC	Resistive load (DC12)	8A 2.2A 1.1A
		Inductive load (DC13)	4A 1.1A 0.6A
Operating Frequency	900 operations/hour		
Operating Speed	1000 mm/sec maximum		
Positive Opening Travel	11 mm minimum		
Positive Opening Force	HS1B, HS2B (Without Actuator retaining mechanism): 20 N minimum HS2B (With Actuator retaining mechanism): 36 N minimum		
Contact Resistance	50 mΩ maximum (Initial value)		
Degree of Protection	IP67 (IEC60529)		
Short-Circuit Protective Device	250V AC 10A Fuse (Type D01 based on IEC60269-1, 60269-2)		
Illuminated Part Rated Operating Voltage	24VDC		
Illuminated Part Rated Current	10mA		
Illuminated Part Light Source	LED lamp		
Lens Color	R (Red), G (Green) (φ12 Lens)		

(8) Wire Lengths

- Wire Length inside the Safety Switch

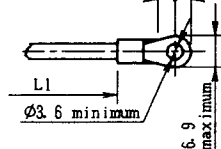
Wire Length: L1 (mm)	Screw Terminal No.	Through Conduit Hole			
		HS1B ①	HS2B ②	HS1B, HS2B ③	HS1B, HS2B ④
1	1	60±2	45±2	30±2	80±2
2	2	60±2	45±2	80±2	30±2
3	3	30±2	20±2	30±2	50±2
4	4	30±2	20±2	50±2	30±2
+	4	45±2	35±2	25±2	70±2
-	4	45±2	35±2	70±2	25±2
E	7	70±2	-	95±2	40±2
Wire Stripping Length: L2 (mm)		7±1			



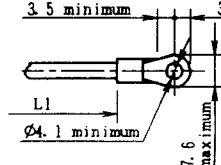
- Recommended Wire Core Size: 0.5 to 1.25 mm²

- Applicable Crimping Terminal

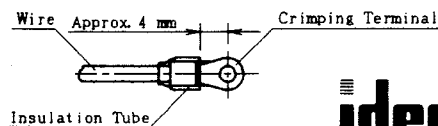
Terminal Screw (M3.5):
3.6 minimum 3.5 maximum



Ground Terminal Screw (M4):
3.5 minimum 3.8 maximum



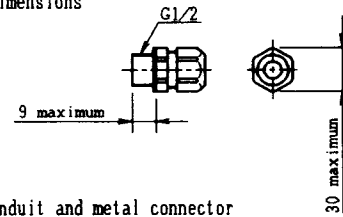
Note: Make sure to use an insulation tube on the crimping terminal.



(9) Combinations of Applicable Connector

Use a connector with a degree of protection IP67.

- Applicable connector dimensions



- When using flexible conduit and metal connector
Applicable Flexible Conduit Example: Type VF-03 (made by Nihon Flex)
Applicable Metal Connector Example: (G1/2) Type RLC-103 (made by Nihon Flex)
- When using plastic connector, metal connector and multi-core cable (G1/2)

Applicable Plastic Connector Example: Type SCS-10□ (made by Seiwa Electric)
Applicable Metal Connector Example: Type ALS-16□□ (made by Nihon Flex)

Note: Make sure the outside diameter of multi-core cable because connector type is decided depending on the outside diameter of multi-core cable.

(10) Recommended Screw Tightening Torque

Name or Use	Screw Tightening Torque
For mounting the safety switch (M5 hexagon socket head cap screw)	5.0 ± 0.2 N·m
For mounting the actuator (M6 hexagon socket head cap screw)	5.0 ± 0.2 N·m
For mounting the lid (M4)	HS1B 1.2 ± 0.1 N·m
	HS2B 0.9 ± 0.1 N·m
Connector (G1/2)	3.0 ± 0.2 N·m
Plug for Unused Conduit Hole (G1/2)	2.0 ± 0.2 N·m
Terminal screw (M3.5)	1.0 ± 0.1 N·m
Ground Terminal screw (M4)	1.0 ± 0.1 N·m

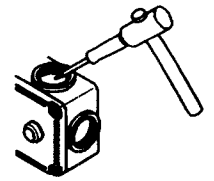
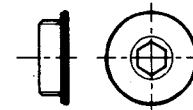
(11) Opening the connector hole

The HS2B safety switch has 3 conduits hole knockouts formed on the switch housing.

Break a desired knockout to mount a connector using a hammer and a screwdriver.

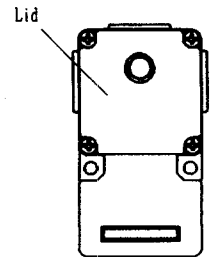
- When breaking the knockout to open a connector hole, be careful not to damage the contact block inside.
- Use an optional connector hole plug to close an unused connector hole.

Plug
Type: HS9Z-P1



(12) Precautions for Operation

- Do not use the safety switch as a door stop on any type of doors. Install mechanical door stops on the door ends to protect the safety switch from excessive force.
- When the door is opened and closed, make sure that excessive shocks are not applied to the safety switch. If a shock of 1000 m/sec² (100G) or more is applied to the safety switch, the contacts may bounce, causing contact malfunction.
- When opening the safety switch lid to wire, open the lid only. (See the figure on the right.) Never remove other screws, otherwise the safety switch may be damaged.
- The safety switch lid can be only removed with the L wrench with the safety switch or with the optional screwdriver (applicable to HS1B only).
- When wiring or installing a conduit, make sure that no foreign objects, dust, and water enter into the safety switch.
- Use a slot-plug attached to the safety switch to close the unused actuator entry slot.



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