



INSTRUCTION SHEET

Original Instructions
Interlock Switch with Solenoid
HS6E Series



(Main circuit - Door monitor circuit)
* In order to verify if the product you are interested in is certified with the S mark, please check the following section on our website: "List of type numbers certified with the S mark"

Confirm that the delivered product is what you have ordered.
Read this instruction sheet to make sure of correct operation.

SAFETY PRECAUTIONS

In this operating instruction sheet, safety precautions are categorized to Warning and Caution:

WARNING

Warning notices are used to emphasize that improper operation may cause severe personal injury or death.

CAUTION

Caution notices are used where inattention might cause personal injury or damage to equipment.

1 Type

HS6E-L44B01-G

Circuit Code	Main Circuit	Door Monitor Circuit	Lock Monitor Circuit	Pilot Light Color G : Green
L : 1NC+1NC	2NC	1NO	Cable Length 01 : 1m 03 : 3m 05 : 5m	
M : 1NC+1NC	2NC	1NC	Housing Color B : Black	
N : 1NC+1NC	1NC, 1NO	1NO	Indicator Voltage 4 : 24V DC	
P : 1NC+1NC	1NC, 1NO	1NC		
VL :	3NC	1NC, 1NO		
VM :	3NC	2NC		
VN :	2NC, 1NO	1NC, 1NO		
VP :	2NC, 1NO	2NC		
Solenoid Voltage / Lock Mechanism				
4 : 24V DC / Spring Lock				
7Y : 24V DC / Solenoid Lock				

CAUTION

Solenoid lock type

- This interlock switch is designed to lock the actuator while the solenoid is energized and to release it when deenergized.
- When the power to the solenoid is interrupted by accident, such as disconnection, the lock is released before a machine stops completely. Then, the worker may be exposed to hazards.
- This interlock switch can be used only for limited applications which do not especially need to be locked for safety.

2 Specifications and Ratings

Applicable Standards	EN ISO / ISO 14119, GB/T14048.5 IEC 60947-5-1, EN 60947-5-1 GS-ET-19, UL508, CSA C22.2 No.14		
Standards for Use	IEC 60204-1, EN 60204-1		
Interlocking device Type /the level of coded	Type 2 Interlocking device / low level coded actuator (EN ISO / ISO 14119)		
Applicable Directives	Machinery Directive, Low Voltage Directive, RoHS Directive		
Condition	Operating Temperature	-25 to +50°C (no freezing)	
	Operating Humidity	45 to 85%RH(no condensation)	
	Pollution degree	3(Inside 2)	
	Altitude	2,000m maximum	
Impulse withstand voltage (Uimp)	1.5kV(Main,Lock monitor circuit) 2.5kV(Door monitor circuit) 0.5kV(Between ground and LED,solenoid circuit)		
Rated Insulation voltage (Ui)	150V(Main,Lock monitor circuit) 300V(Door monitor circuit) 30V(Between ground and LED,solenoid circuit)		
Thermal Current (Ith)	-25°C ≤ Operating temperature < 35°C		
	2.5A (≤ 2 circuits) 1.0A (≥ 3 circuits)		
Contact Ratings (Ue, Ie)	35°C ≤ Operating temperature ≤ 50°C		
	1.0A (1 circuit) 0.5A (≥ 2 circuits)		
Main Circuit, Lock monitor circuit	AC	Resistive load (AC-12)	30V 2A -
		Inductive load (AC-15)	125V 1A -

Door monitor circuit	DC	Resistive load (DC-12)	2A	0.4A	-
		Inductive load (DC-13)	1A	0.22A	-
	AC	Resistive load (AC-12)	-	2.5A	1.5A
		Inductive load (AC-15)	-	1.5A	0.75A
DC	Resistive load (DC-12)	2.5A	1.1A	0.55A	
	Inductive load (DC-13)	2.3A	0.55A	0.27A	
Class of Protection		Class II (IEC 61140) *1			
Operating Frequency		900 operations/hour			
Operating Speed		0.05 to 1.0 m/s			
B10d		2,000,000 (EN ISO 13849-1 Annex C Table C.1)			
Mechanical Durability		1,000,000 operations minimum. (GS-ET-19)			
Electrical Durability		100,000 operations minimum. (900 operations / hour, AC-12 125V 2A, DC-12 125V 0.4A) 1,000,000 operations minimum. (900 operations / hour, 24V AC/DC 0.1A Resistive Load)			
Shock Resistance		Operating Extremes:100m/s ² , Damage Limits:1,000m/s ²			
Vibration Resistance		Operating Extremes:10 to 55 Hz, half amplitude 0.35mm Damage Limits: 30 Hz, half amplitude 1.5mm			
Actuator retention force		Fzh=500N minimum F1max.=650N minimum (GS-ET-19) *2, *3 (Fzh=100N minimum: HS9Z-A62 actuator)			
Direct Opening Travel		8 mm minimum			
Direct Opening Force		60 N minimum			
Contact Resistance		300 m Ω maximum (initial value, 1m cable)			
Degree of Protection		IP67 (IEC 60529) NEMA Type12 (operating temp. -25 to 45°C)			
Conditional short circuit current		50A (250V)			
Short-circuit Protective Device		Use 250V / 10A fast acting type fuse *4			
Solenoid	Rated Operating Voltage	DC24V 100% duty cycle			
	Rated Current	110 mA (solenoid 100mA, LED 10mA : initial value)			
	Turn ON Voltage	Rated voltage x 85% maximum (at 20°C)			
	Turn OFF Voltage	Rated voltage x 10% minimum (at 20°C)			
Indicator	Rated Operating Voltage	DC24V 100% duty cycle			
	Light Source	LED			
	Illumination Color	Green			
	Rated Power Consumption	Approx. 2.7W			

Ratings approved by safety agencies

- | | |
|---|---|
| (1) TÜV rating | (2) UL, c-UL rating |
| Main circuit, Lock monitor circuit
AC-15 125V/1A
DC-13 125V/0.22A
DC-13 30V/1A | Main circuit, Lock monitor circuit
1A, 125V ac, Pilot Duty
0.22A, 125V dc, Pilot Duty
1A, 30V dc, Pilot Duty |
| Door monitor circuit
AC-15 240V/0.75A
DC-13 250V/0.27A
DC-13 30V/2.3A | Door monitor circuit
C300 0.75A, 240V ac, Pilot Duty
Q300 0.27A, 250V dc, Pilot Duty |
| (3) CCC rating | (4) KOSHA rating |
| Main circuit, Lock monitor circuit
AC-15 125V/1A
DC-13 30V/1A | Main circuit, Lock monitor circuit
AC-15 125V/1A
DC-13 125V/0.22A |
| Door monitor circuit
AC-15 240V/0.75A
DC-13 30V/2.3A | Door monitor circuit
AC-15 240V/0.75A
DC-13 250V/0.27A |

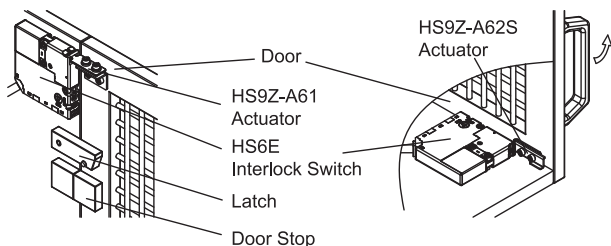
- *1 Basic insulation of 2.5kV, 1.5kV impulse withstand voltage is ensured between different contact circuits and between contact circuits and LED or solenoid in the enclosure. When both SELV (safety extra low voltage) or PELV (protective extra low voltage) circuits and other circuits (such as 230V AC circuits) are used for the solenoid power and contact circuits at the same time, the SELV or PELV requirements are not met any more.
- *2 The actuator locking strength is rated at 500N of static load. Do not apply a load higher than the rated value. When a higher load is expected to work on the actuator, provide an additional system consisting of another interlock switch without lock (such as the HS6B/HS7A interlock switch) or a sensor to detect door opening and stop the machine.
- *3 F1 max. is maximum force. The actuator's guard-locking force Fzh is calculated in accordance with GS-ET-19:

$$F_{zh} = \frac{\text{maximum force (F1max.)}}{\text{Safety coefficient (=1.3)}}$$
- *4 Make sure that a fast acting fuse for short-circuit protection trips before overheating of the wires.

3 Mounting Examples

- Install the interlock switch on the immovable machine or guard, and install the actuator on the movable door. Do not install both interlock switch and actuator on the movable door, otherwise the angle of insertion of the actuator to the interlock switch may become inappropriate, and failure will occur.

(Examples of Mounting on Sliding Doors) (Examples of Mounting on Hinged Doors)

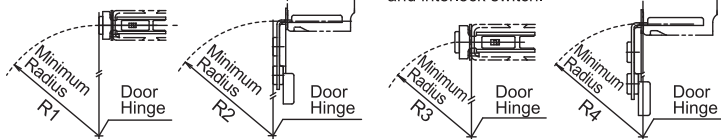


Minimum Radius of Hinged Door

- When using the interlock switch for a hinged door, the minimum radius of the applicable door is shown in the following figures.

When the center of the hinged door is on the extension line of the actuator mounting surface.

When the center of the hinged door is on the extension line of the contact surface of actuator and interlock switch.



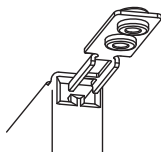
	Minimum Radius			
	R1	R2	R3	R4
HS9Z-A62/-A62S	230mm	230mm	160mm	160mm
HS9Z-A65/-A66	70mm (Horizontal Swing)	70mm (Vertical Swing)	50mm (Horizontal Swing)	50mm (Vertical Swing)

CAUTION

The values shown above are based on the condition that the actuator enters and exits the actuator entry slot smoothly when the door is closed or opened.

Since there may be deviation or misalignment of the hinged door, make sure of correct operation in the actual application before installation.

When inserting an actuator into the slot, make sure to arrange the □ shapes in the same direction, as shown on the right.



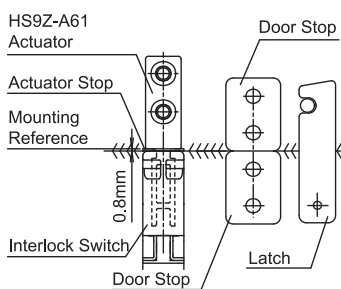
The Adjustable (vertical/horizontal) Actuator

- Using the angle adjustment screw (M3 hexagon socket set screw), the actuator angle can be adjusted up to 20° (refer to dimensions).
- The larger the actuator angle, the smaller the applicable radius of the door swing. After installing the actuator, open the door. Then adjust the actuator angle so that the actuator enters the entry slot of the interlock switch properly.
- After adjusting the actuator angle, apply loctite or the like on the adjustment screw to prevent loosening. Use screw locking agent that is compatible with the base material.

Base : PA66 (66 nylon) of glass reinforced grade
Angle adjustment screws : stainless steel

Installing the Interlock Switch and Actuator

- When installing the actuator, position the actuator using the actuator stop (for positioning the entry slot center and mounting reference position).
- As shown on the right, the mounting reference position of the actuator when inserted in the interlock switch is where the actuator stop touches the actuator.
- Install a door stop as shown on the right to protect the interlock switch and actuator against excessive force. Do not use the interlock switch as a door stop, otherwise the interlock switch will be damaged.



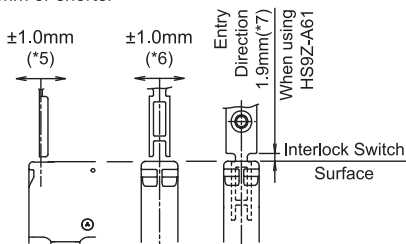
- After removing the actuator stop, ensure that the actuator is installed within the tolerances shown below.

From the entry slot center of the interlock switch (*5, 6) : ±1.0mm

The gap between the actuator shoulder and the interlock switch surface (*7)

HS9Z-A61/-A62/-A65/-A66 : 1.9mm or shorter

HS9Z-A62S : 1.3mm or shorter



- To ensure correct operation, it is recommended to fasten the door using a latch to achieve the above tolerance values.
- Make sure the actuator can be inserted into the entry slot without any issue.
- Perform operation test before starting operation in order to confirm the open/close operation of contacts and locking/unlocking operation.
- When the actuator is pulled while locked in the interlock switch, the actuator moves within the range shown below.

HS9Z-A61/-A62/-A65/-A66 : 4.1mm maximum from the interlock switch surface

HS9Z-A62S : 3.5mm maximum from the interlock switch surface

The open/close status of the contacts are maintained within the range. When a gap is caused because of actuator relocation, make sure that the gap does not lead to new risks.

HS9Z-A61, HS9Z-A62, HS9Z-A62S ACTUATOR

- When there is a displacement of interlock switch and actuator, the actuator may hit the entry slot of interlock switch too hard, thus damaging the entry slot and actuator. The rubber cushions on the HS9Z actuator prevent the actuator from damaging the entry slot by absorbing the shock with movement flexibility. Do not, however, exert excessive shocks, otherwise the failure of interlock switch may be caused.
- The rubber cushions may deteriorate depending on the operating environment and conditions. Immediately replace the deformed or cracked rubber cushions with new ones.

Recommended Screw Tightening Torque

Name or Use	Screw Tightening Torque
For mounting the interlock switch (M4 screw) *8	1.0 to 1.5 N·m
For mounting the actuator (M4 screw) *8	1.0 to 1.5 N·m

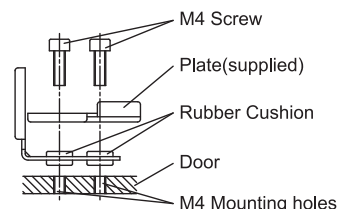
CAUTION

*8 When the torque is not enough to recommended screw tightening torque, make sure that the screw do not become loose by using adhesive sealants etc. to keep right operation and mounting positioning.

Mounting HS9Z-A62S actuator

Using two M4 screws and plate, fasten the actuator securely on the door.

Plate has directionality. Do not lose the plate. The actuator may fall off from the door if there is no plate, and the actuator does not properly.



The tensile strength of the HS9Z-A62 actuator is 100N. If an excessive tensile force is applied, the actuator may fall off the door. When a tensile force exceeding 100N is expected, use the HS9S-A62S actuator with a plate.

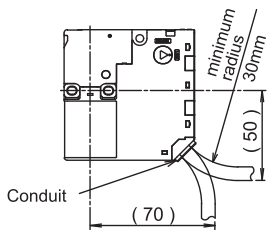
4 Instruction

For Mounting

- Do not apply an excessive shock to the interlock switch when opening or closing the door. A shock to the interlock switch exceeding 1,000m/s² may cause failure.
- Provide a door guide, and ensure that force is applied on the interlock switch only in the actuator insertion direction.
- Do not pull the actuator while it is locked. Also, regardless of door types, do not use the interlock switch as a door lock. Install a separate lock as shown in section 3.
- Entry of foreign objects in the actuator entry slot may affect the mechanism of the switch and cause a breakdown. If the operating atmosphere is contaminated, use the protective cover provided the entry of foreign objects into the switch through the actuator entry slots.
- Make sure to install the product in a safe place out of reach. Make sure to conduct a proper risk assessment evaluation before using the product, and use a shield or a cover to protect the product if need be.
- Continue for a long time energizing the solenoid, the switch temperature rises approximately 35°C above the ambient temperature (to approximately 85°C while the ambient temperature is 50°C). Keep hands off to prevent burns. If cables come into contact with the switch, use heat-resistant cables.



- When the actuator is locked or unlocked, the NC lock monitor contacts and NO unlock monitor contacts cause bouncing. When designing a control circuit, take the bouncing into consideration (reference values: 20ms).
- Solenoid has polarity. Be sure to wire correctly and do not apply reverse voltage otherwise the solenoid will be damaged. Do not apply voltage that exceed the rated voltage, otherwise the solenoid will be burnt out.
- Do not fasten or loosen the conduit at the bottom of the interlock switch.
- When wiring, make sure that liquid such as water and oil does not intrude from the end of the cable.
- When bending the cable during wiring, secure the cable radius of 30mm at the minimum. Do not apply an excessive shock, such as tensile and compressing force, to the connection part of the cable and switch.
- Use the proprietary actuators only. Other actuators will cause damage to the switch.
- Ensure that the interlock switch is installed on a flat mounting surface, and provide sufficient strength to the mounting surface so that it will not be distorted during operation. Uneven surface, distorted surface, or foreign objects may result in the malfunction of interlock switch.



WARNING

- Turn off the power to the interlock switch before starting installation, removal, wiring, maintenance, and inspection on the interlock switch. Failure to turn power off may cause electrical shocks or fire hazard.
- Do not disassemble or modify the switch. Also do not attempt to disable the interlock switch function, otherwise a breakdown or an accident will result.

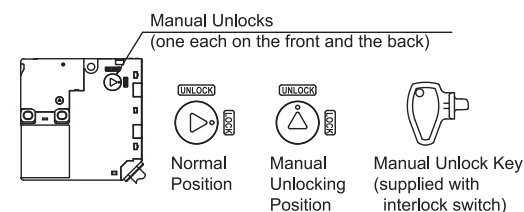
CAUTION

HS6E Series Interlock Switches are Type 2 low-level coded interlocking devices (EN ISO / ISO 14119). The following system installation & mounting instructions are EN ISO / ISO 14119 requirements to prevent function failure from the interlock switch.

- Using permanent fixing methods (e.g. welding, rivets, special screws...etc) to prevent dismantling or de-positioning of the interlock device. However, permanent fixing methods are not an adequate solution if you expect the interlock device to fail during the machinery lifetime, or if you need to replace the product in quick manner. In these situations, other measures (see 2.) should be put in place to reduce the risks of function failure.
 - At least one of the following measures should be applied to prevent function failure.
 - Mounting the interlock device in a place out of reach from workers
 - Using shielding protection to prevent physical obstruction of the device
 - Mounting the interlock device in a hidden position
 - Integrate status monitoring & cycling testing of the device to the control system to prevent product failure.
- Regardless of door types, do not use the interlock switch as a door stop. Install a mechanical door stop to the end of the door to protect the interlock switch against excessive force. When a higher load works on the lock portion of the interlock switch, the actuator may not unlock.
 - Mount the actuator so that it will not hit the operator when the door is open, otherwise injury may be caused.
 - Pay attention to the safe management of spare actuator. Safety function of door interlock switch will be lost in case the spare actuator is inserted into the interlock switch.
 - Do not cut or remodel the actuator, otherwise failure will occur.
 - If multiple safety components are wired in series, the Performance Level to EN ISO 13849-1 will be reduced due to the restricted error detection under certain circumstance.
 - The entire concept of the control system, in which the safety component is integrated, must be validated to EN ISO 13849-2.

For Manual Unlocking

- Spring lock type : The HS6E allows manual unlocking of the actuator to precheck proper door operation before wiring or turning power on, as well as for emergency use such as a power failure.
- Solenoid lock type : If the actuator is not unlocked although the solenoid is deenergized, the actuator can be unlocked manually.



Manual Unlocking Method

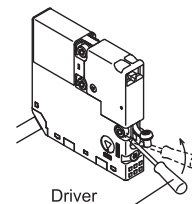
- When using the manual unlock key :

To change the normal position to the manual unlocking position as shown above, turn the key fully (90 degrees) using the proprietary key supplied with the switch. Using the switch with the key being not fully turned (less than 90 degrees) may cause damage to the switch or errors.

Note: When manually unlocked, the switch will keep the main circuit disconnected and the door unlocked.

- When unlocking by pushing the plate inside the interlock switch :

Remove the screw at the side of the interlock switch and insert a small screwdriver. Push the plate inside the interlock switch toward the LED pilot light using a small screwdriver until the actuator is unlocked. See the figure on the right.



CAUTION

- Before manually unlocking the interlock switch, make sure the machine has come to a complete stop. Manual unlocking during operation may unlock the switch before the machine stops, and the function of interlock switch with solenoid is lost.
- Continue for a long time energizing the solenoid, do not unlock the actuator manually (solenoid lock type).
- Do not apply excessive force (0.45 N·m or more) to the manual unlock key. Otherwise the manual unlock switch will be damaged.
- Do not leave the manual unlock key attached to the switch during operation. This is dangerous because the switch can always be unlocked while the machine is in operation. Do not attach the key to the switch intentionally (the key is designed to fall off when the operator's hand is off the key).
- Unlocking by pushing the plate inside the interlock switch must be performed in emergency only. After unlocking, make sure to tighten the M4 screw to the tightening torque of 0.3 to 0.5 N·m. Do not apply excessive force to the M4 screw. Otherwise the interlock switch is damaged. Make sure that all screws are installed, otherwise the waterproof capability is lost.

5 Contact Operation

Contact Configuration and Operation

Type	Contact Configuration *9	Contact Operation (reference) (Travel: mm)
	<p>Door Monitor (+) A2, Lock Monitor (-) A1</p>	<p>0(Actuator Mounting Reference Position)</p> <p>Approx. 1.1 (Lock)</p> <p>Approx. 4.7</p> <p>Approx. 5.0</p> <p>Approx. 27.4</p>
HS6E-L□	Main Circuit : 11-12 41-42 Monitor Circuit : 21-22 Monitor Circuit : 31-32 Monitor Circuit : 53-54	11-42 21-22 31-32 53-54
HS6E-M□	Main Circuit : 11-12 41-42 Monitor Circuit : 21-22 Monitor Circuit : 31-32 Monitor Circuit : 51-52	11-42 21-22 31-32 51-52
HS6E-N□	Main Circuit : 11-12 41-42 Monitor Circuit : 21-22 Monitor Circuit : 33-34 Monitor Circuit : 53-54	11-42 21-22 33-34 53-54
HS6E-P□	Main Circuit : 11-12 41-42 Monitor Circuit : 21-22 Monitor Circuit : 33-34 Monitor Circuit : 51-52	11-42 21-22 33-34 51-52
HS6E-VL□	Monitor Circuit : 11-12 41-42 Monitor Circuit : 21-22 Monitor Circuit : 31-32 Monitor Circuit : 53-54	11-12 21-22 31-32 41-42 53-54
HS6E-VM□	Monitor Circuit : 11-12 41-42 Monitor Circuit : 21-22 Monitor Circuit : 31-32 Monitor Circuit : 51-52	11-12 21-22 31-32 41-42 51-52
HS6E-VN□	Monitor Circuit : 11-12 41-42 Monitor Circuit : 21-22 Monitor Circuit : 33-34 Monitor Circuit : 53-54	11-12 21-22 33-34 41-42 53-54
HS6E-VP□	Monitor Circuit : 11-12 41-42 Monitor Circuit : 21-22 Monitor Circuit : 33-34 Monitor Circuit : 51-52	11-12 21-22 33-34 41-42 51-52

(Actuator Completely Inserted) (Actuator Pulled Out)

■ Contact closed
□ Contact open

⚠ CAUTION

*9 The Actuator is inserted, and HS6E is locked.

- Contact operation is based on the condition that the actuator is inserted into the center of the interlock switch slot.
- Contact operation shows the HS9Z-A61, A62, A65, A66 actuators. (For HS9Z-A62S actuator, decreases 0.6mm to contact operations)
- Terminals 12-41 are connected together internally. Use terminals 11-42 for safety circuit inputs. (without HS6E-V□)
- Indicator turns on when solenoid is energized.

⚠ CAUTION

When using the outputs from the HS6E-V interlock switch as inputs to safety circuits, connect the door monitor circuits (11-12, 21-22, 31-32) ⊖ and lock monitor circuits (41-42, 51-52) in series. (GS-ET-19)

Then, the contact rating for the lock monitor circuit is applied. (HS6E-V□)

Operation Cycle

- Spring Lock Type (HS6E-□4)

Door States	Closed	Closed	Open	Closed
Door Manual Unlock Key	-	-	-	Turn the key to unlock position.
Main Circuit 11-42	Closed	Open	Open	Open
Door Monitor Circuit 21-22 31-32	Closed	Closed	Open	Closed
Door Monitor Circuit 33-34	Open	Open	Closed	Open
Lock Monitor Circuit 51-52	Closed	Open	Open	Open
Lock Monitor Circuit 53-54	Open	Closed	Closed	Closed
Solenoid Power A1-A2	Off	On	Off/On	Off
	Door is locked. The machine can be operated.	Door is unlocked. The machine can not be operated.	The machine can not be operated.	Door is unlocked. The machine can not be operated.

- Spring Lock Type (HS6E-V□4)

Door States	Closed	Closed	Open	Closed
Door Manual Unlock Key	-	-	-	Turn the key to unlock position.
Door Monitor Circuit 11-12 21-22 31-32	Closed	Closed	Open	Closed
Door Monitor Circuit 33-34	Open	Open	Closed	Open
Lock Monitor Circuit 41-42 51-52	Closed	Open	Open	Open
Lock Monitor Circuit 53-54	Open	Closed	Closed	Closed
Solenoid Power A1-A2	Off	On	Off/On	Off
	Door is locked. The machine can be operated.	Door is unlocked. The machine can not be operated.	The machine can not be operated.	Door is unlocked. The machine can not be operated.

- Solenoid Lock Type (HS6E-□7Y)

Door States	Closed	Closed	Open	Closed
Door Manual Unlock Key	-	-	-	Turn the key to unlock position.
Main Circuit 11-42	Closed	Open	Open	Open
Door Monitor Circuit 21-22 31-32	Closed	Closed	Open	Closed
Door Monitor Circuit 33-34	Open	Open	Closed	Open
Lock Monitor Circuit 51-52	Closed	Open	Open	Open
Lock Monitor Circuit 53-54	Open	Closed	Closed	Closed
Solenoid Power A1-A2	On	Off	Off/On *11	Off *10, *11
	Door is locked. The machine can be operated.	Door is unlocked. The machine can not be operated.	The machine can not be operated.	Door is unlocked. The machine can not be operated.

- Solenoid Lock Type (HS6E-V□7Y)

Door States	Closed	Closed	Open	Closed
Door Manual Unlock Key	-	-	-	Turn the key to unlock position.
Door Monitor Circuit 11-12 21-22 31-32	Closed	Closed	Open	Closed
Door Monitor Circuit 33-34	Open	Open	Closed	Open
Lock Monitor Circuit 41-42 51-52	Closed	Open	Open	Open
Lock Monitor Circuit 53-54	Open	Closed	Closed	Closed
Solenoid Power A1-A2	On	Off	Off/On *11	Off *10, 11
	Door is locked. The machine can be operated.	Door is unlocked. The machine can not be operated.	The machine can not be operated.	Door is unlocked. The machine can not be operated.

⚠ CAUTION

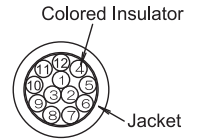
*10 Do not attempt manual unlocking when the solenoid is energized.

*11 Do not energize the solenoid for a long time while the door is open or when the door is unlocked manually.

6 Wiring

Wiring

- Cable specifications
UL style 2464, 12c×No.22AWG, (80°C 300V)
- Wire identification
Wires are identified by the color and white line printed on the wire.



Do not use wire which is Gray, Gray / White. (without HS6E-V□)

No.	Insulator Color	No.	Insulator Color	No.	Insulator Color
1	Blue / White	5	Orange / White	9	Pink / White
2	Gray	6	Gray / White	10	Brown / White
3	Pink	7	White	11	Brown
4	Orange	8	Black	12	Blue

Terminal number identification

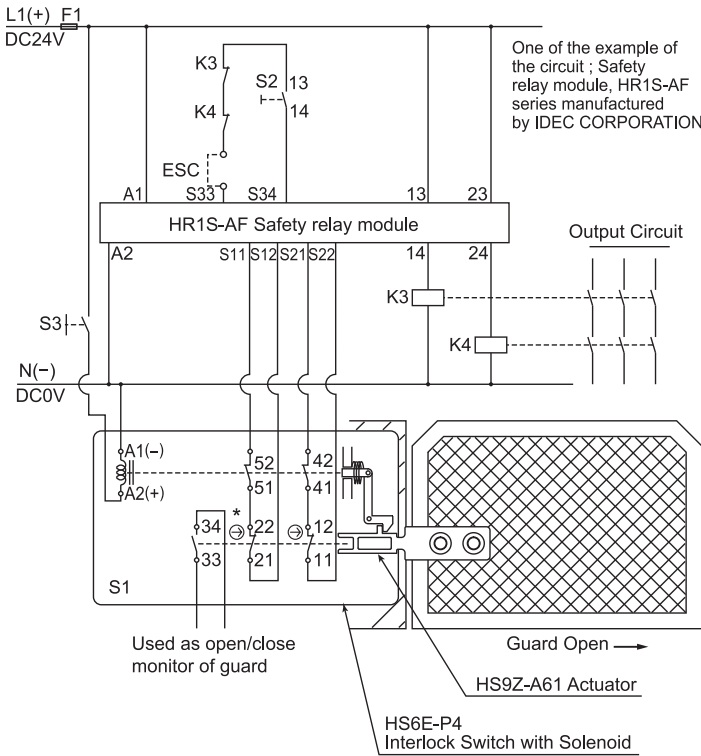
- When wiring, the terminal number on each contact is identified by wire color. The following table shows the identification of terminal numbers.
- When wiring, cut unnecessary wires such as unused wires to avoid incorrect wiring.

Circuit No.	Insulator Color
11	Blue
12 / 42 (without HS6E-V□)	Blue / White
21	Brown
22	Brown / White
31, 33	Orange
32, 34	Orange / White
41 (HS6E-V□)	Gray
42 (HS6E-V□)	Gray / White
51, 53	Pink
52, 54	Pink / White
A1(-)	Black
A2(+)	White

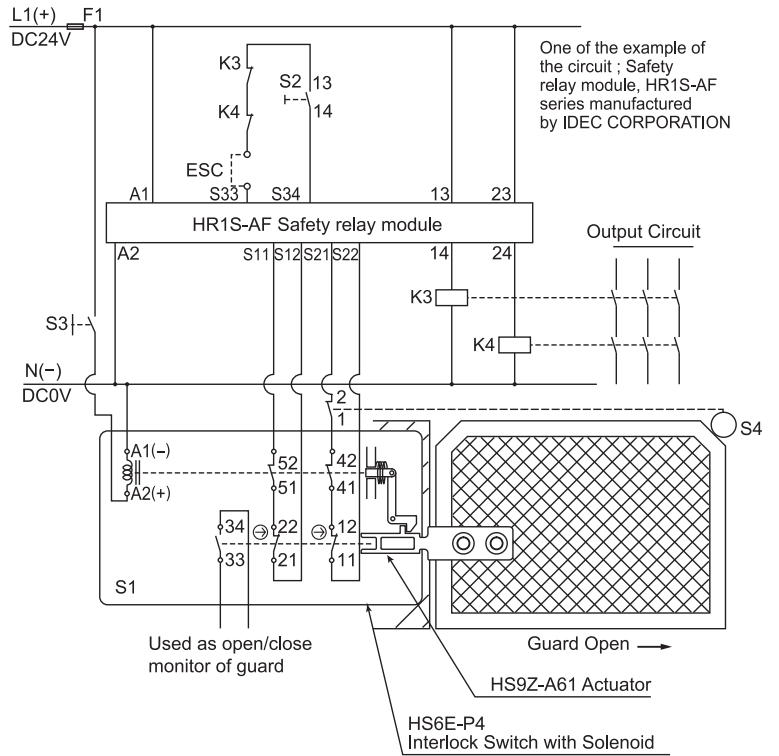
7 Example of wiring Diagram realizing Safety Category

Example of a circuit diagram for Safety Category 3 (attainable PL = d)

(Condition 1: To apply the fault exclusion of mechanical structural parts including the actuator → Make sure to use the product within the product specification range described in this manual and the version of the manual provided with the product.)
(Condition 2: Documentation of the reason for the machine/equipment manufacturer to have applied the fault exclusion based on ISO 13849-1, ISO 13849-2 or IEC 62061.)



Example of a circuit diagram for Safety Category 4 (attainable PL = e)



Note: Use the monitoring device(Safety relay module) provided the capability to detect a cross short circuit. The insulation of the cable has to withstand environmental influences. If a control device other than the one shown in the draft is used, the used control device has to be equipped with a cross short circuit monitor.

- S1: HS6E-P4 Interlock Switch with Solenoid
- S2: Start Switch (HW Series Momentary)
- S3: Unlocking Enabling Switch
- S4: Safety limit Switch
- ESC: Outside start condition
- K3, 4: Safety Contactor
- F1: Outside fuse of safety relay module at power supply line

*Connect 21-22 and 51-52 in series.

