## HS1L Interlock Switches with Solenoid

## 3000N locking strength (largest in class)! *

Suitable for large and heavy doors.
Same actuators as HS1E (locking strength 3000N) can be used.
*As of October 2009, according to IDEC research of plastic interlock switches with solenoid.

## Six contacts in a compact housing (same size as HS1E)!

## Same dimensions and mounting hole layouts as HS1E.

Size: $35 \times 104 \times 129 \mathrm{~mm}$
Door open, closed, and locked statuses can be monitored for various applications.


## New energy saving design!

## Energy efficient new solenoid unit.

Solenoid Current Consumption


## Improved safety and usability!

- Manual unlock key and LED indicator are standard.
- Manual unlock key allows for manual unlocking in the event of power failure or maintenance.
- Indicator has an independent circuit, and can be used for various purposes.
- Two locking mechanisms to choose from-spring lock (unlocked with energized solenoid) or solenoid lock (locked with energized solenoid).
- M3 terminal screws for wiring.
- Wide operating temperature range $\left(-20\right.$ to $\left.+55^{\circ} \mathrm{C}\right)$.


## Specifications

| Applicable Standard | ISO14119 <br> IEC60947-5-1 <br> EN60947-5-1 (TÜV approval) <br> GS-ET-19 (TÜV approval) <br> UL508 (UL listed) <br> CSA C22.2 No. 14 (c-UL listed) |
| :---: | :---: |
|  | $\begin{aligned} & \text { IEC60204-1/EN60204-1 } \\ & \text { (applicable standards for use) } \end{aligned}$ |
| Operating Temperature | -20 to $+55^{\circ} \mathrm{C}$ (no freezing) |
| Relative Humidity | 45 to 85\% (no condensation) |
| Storage Temperature | -40 to $+80^{\circ} \mathrm{C}$ (no freezing) |
| Pollution Degree | 3 |
| Overvoltage Category | III |
| Impulse Withstand Voltage | 4.0 kV (between LED, solenoid and ground: 1.5 kV ) |
| Contact Resistance | $50 \mathrm{~m} \Omega$ maximum (initial value) |
| Insulation Resistance | Between live and dead metal parts: $100 \mathrm{M} \Omega$ minimum (500V DC megger) Between terminals of different poles: $100 \mathrm{M} \Omega$ minimum (500V DC megger) |
| Electric Shock Protection | Class II (IEC 61140) |
| Degree of Protection | IP67 (IEC 60529) |
| Shock Resistance | Damage limits: $1000 \mathrm{~m} / \mathrm{s}^{2}$ |
| Vibration Resistance | Operating extremes: <br> 10 to 55 Hz , amplitude 0.35 mm <br> Damage limits: 30 Hz , amplitude 1.5 mm |
| Actuator Operating Speed | 0.05 to $1.0 \mathrm{~m} / \mathrm{s}$ |
| Direct Opening Travel | 11 mm minimum |
| Direct Opening Force | 50 N minimum |
| Actuator Retention Force when Locked | 3000N minimum (GS-ET-19) |
| Operating Frequency | 900 operations per hour |
| Mechanical Durability | 1,000,000 operations minimum (GS-ET-19) |
| Electrical Durability | 100,000 operations minimum <br> (AC-15 3A/250V) <br> 1,000,000 operations minimum <br> (24V AC/DC, 100mA) <br> (operating frequency 900 operations per hour) |
| Conditional Short-circuit Current | 100A (250V) (Use 250V/10A fast acting type fuse for short-circuit protection.) |
| Weight (approx.) | 450g (HS1L-DQ44) |

## Type No. Development



## - Actuator

| Description | Ordering Type No. |
| :--- | :---: |
| Straight Actuator | HS9Z-A1S |
| L-shaped Actuator | HS9Z-A2S |
| Angle Adjustable (vertical) Actuator (for hinged door) | HS9Z-A3S |

- Package quantity: 1


## Ratings

- Contact Ratings

| Rated Insulation Voltage (Ui) |  |  | 300 V |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: |
| Rated Operating Current (Ith) |  |  | 10A |  |  |
| Rated Operating Voltage (Ue) |  |  | 30V | 125 V | 250 V |
| Rated Operating Current (le) | AC | Resistive Load (AC-12) | 10A | 10A | 6A |
|  | AC | Inductive Load (AC-15) | 10A | 5A | 3A |
|  | DC | Resistive Load (DC-12) | 8A | 2.2A | 1.1A |
|  | DC | Inductive Load (DC-13) | 4A | 1.1A | 0.6A |

- Minimum applicable load (reference value): 3V AC/DC, 5mA
(Applicable range may vary with operating conditions and load types.)
- TÜV rating: AC-15 3A/250V, DC-13 4A/30V

UL, c-UL rating: A300

$$
\begin{aligned}
& \text { Pilot duty: AC 3A/250V } \\
& \text { Pilot duty: DC 4A/30V }
\end{aligned}
$$

- Solenoid Unit and LED Indicator

| Lock Mechanism |  | Spring Lock | Solenoid Lock |
| :---: | :---: | :---: | :---: |
| Solenoid | Rated Operating Voltage | 24V DC (100\% duty cycle) |  |
|  | Rated Current | 200 mA (initial value) |  |
|  | Coil Resistance | $120 \Omega$ (at $20^{\circ} \mathrm{C}$ ) |  |
|  | Pickup Voltage | Rated voltage $\times 85 \%$ max. (at $20^{\circ} \mathrm{C}$ ) |  |
|  | Dropout Voltage | Rated voltage $\times 10 \%$ max. (at $20^{\circ} \mathrm{C}$ ) |  |
|  | Maximum Continuous Applicable Voltage | Rated voltage $\times 110 \%$ |  |
|  | Maximum Continuous Applicable Time | Continuous |  |
|  | Insulation Class | Class F |  |
| LED | Rated Operating Voltage | 24V DC |  |
|  | Rated Current | 10 mA |  |
|  | Light Source | LED |  |
|  | Illumination Color | Green (G), Red (R) |  |

## Parts and Functions



- Accessories

| Description | Ordering Type No. |
| :--- | :---: |
| Key Wrench for TORX Screw (L-shaped) | HS9Z-T1 |
| Conduit Port Plug (Size: G1/2 only) | HS9Z-P1 |

[^0]Types

| Lock Mechanism | Circuit Code | Contact Configuration | Conduit <br> Port Size | LED <br> Indicator | Manual Unlocking Key | Ordering Type No. |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Spring Lock | R |  | G1/2 | With | With | HS1L-R44KMSR-(2) |
|  |  |  | PG13.5 |  |  | HS1L-R44KMSRP-(2) |
|  |  |  | M20 |  |  | HS1L-R44KMSRM-(2) |
|  | DQ | Main: $1 \mathrm{NC}+1 \mathrm{NC}$ Door monitor: 1NO <br> 1NC+1NC Lock monitor: 1NO | G1/2 |  |  | HS1L-DQ44KMSR-(2) |
|  |  | Main circuit: $\Theta 11$ 12 41 42 <br> Main circuit: $\Theta 21$ 22 51 52 | PG13.5 |  |  | HS1L-DQ44KMSRP-(2) |
|  |  | Monitor circuit: $63 \quad 64$ | M20 |  |  | HS1L-DQ44KMSRM-② |
|  | DT | Main: $1 \mathrm{NC}+1 \mathrm{NC}$ Door monitor: 1NC <br> 1NC+1NC Lock monitor: 1NC | G1/2 |  |  | HS1L-DT44KMSR-② |
|  |  | Main circuit: $\Theta$ 11 12 41 <br> Main circuit: $\Theta 21$ 22 51 52 | PG13.5 |  |  | HS1L-DT44KMSRP-(2) |
|  |  | Monitor circuit: $\quad 61$ | M20 |  |  | HS1L-DT44KMSRM-(2) |
| Solenoid Lock | R |  | G1/2 | With | With | HS1L-R7Y4KMSR-2 |
|  |  |  | PG13.5 |  |  | HS1L-R7Y4KMSRP-(2) |
|  |  |  | M20 |  |  | HS1L-R7Y4KMSRM-(2) |
|  | DQ | Main: $1 \mathrm{NC}+1 \mathrm{NC}$ Door monitor: 1NO <br> 1NC+1NC Lock monitor: 1NO | G1/2 |  |  | HS1L-DQ7Y4KMSR-(2) |
|  |  | Main circuit: $\Theta$ 11 12 41 42 <br> Main circuit: $\Theta$ 21 22 51 52 | PG13.5 |  |  | HS1L-DQ7Y4KMSRP-(2) |
|  |  | Monitor circuit: $63 \quad 64$ | M20 |  |  | HS1L-DQ7Y4KMSRM-(2) |
|  | DT | Main: $1 \mathrm{NC}+1 \mathrm{NC}$ Door monitor: 1NC <br> $1 \mathrm{NC}+1 \mathrm{NC}$ Lock monitor: 1NC | G1/2 |  |  | HS1L-DT7Y4KMSR-(2) |
|  |  | Main circuit: $\Theta$ 11 12 41 <br> Main circuit: $\Theta 2$    <br>  21 22 51 52 | PG13.5 |  |  | HS1L-DT7Y4KMSRP-(2) |
|  |  | Monitor circuit: 6 | M20 |  |  | HS1L-DT7Y4KMSRM-2 |

- Specify an LED indicator color code in place of (2) in the Ordering Type No. G: green, R: red
- The contact configuration shows the status when the actuator is inserted and the switch is locked.
- Actuators are not supplied with the interlock switch and must be ordered separately.


## Terminal Numbers



| 11-42: | Main circuit |
| :--- | :--- |
| 21: | Main circuit or monitor circuit (door monitor) |
| 22: | Monitor circuit (door monitor) |
| 31/33: | Monitor circuit (door monitor) |
| 32/34: | Monitor circuit (door monitor) |
| 51: | Monitor circuit (lock monitor) |
| 52: | Main circuit or monitor circuit (lock monitor) |
| $61 / 63:$ | Monitor circuit (lock monitor) |
| $62 / 64:$ | Monitor circuit (lock monitor) |
| A1: | Solenoid $(-)$ |
| A2: | Solenoid $(+)$ |
| X1: | LED $(-)$ |
| X2: | LED $(+)$ |

* There is no wiring between 22-51 with circuit code $R$.


## Dimensions and Mounting Hole Layouts

- Interlock switch when using straight actuator (HS9Z-A1S)
- Interlock switch when using L-shaped actuator (HS9Z-A2S)


Note: Plug the unused actuator entry slot using the slot plug supplied with the interlock switch.

* Install the interlock switch using four mounting screws when using the actuator entry slot vertical to the mounting panel, and three mounting screws when using the actuator entry slot horizontal to the mounting panel.


## - Straight Actuator (HS9Z-A1S)



- Angle Adjustable (vertical) Actuator (HS9Z-A3S)


M3 hexagon sockethead bolt


## - Actuator Mounting Reference Position

As shown in the figure on the right, the mounting reference position of the actuator when inserted in the interlock switch is where the actuator stop placed on the actuator lightly touches the interlock switch.
Note: After mounting the actuator, remove the actuator cover and the actuator stop film.

- L-shaped Actuator (HS9Z-A2S)


Note: The actuator cover and the actuator stop film are supplied with the actuator and used when adjusting the actuator position. Remove them after the actuator position is determined.

All dimensions in mm.


## Circuit Diagrams and Operating Characteristics

- Spring Lock Type

| Interlock Switch Status |  |  | Status 1 | Status 2 | Status 3 | Status 4 | Manual Unlock |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  |  | - Door Closed <br> - Machine ready to operate <br> - Solenoid de-energized | - Door Closed <br> - Machine cannot be operated <br> - Solenoid energized | - Door Open <br> - Machine cannot be operated <br> - Solenoid energized | - Door Open <br> - Machine cannot be operated <br> - Solenoid de-energized | - Door Closed <br> - Machine cannot be operated <br> - Solenoid de-energized |
| Door Status |  |  |  |  |  |  |  |
| Circuit Diagram (HS1L-DQ4) |  |  |  |  |  |  |  |
| Door |  |  | Closed (locked) | Closed (unlocked) | Open | Open | Closed (unlocked) |
|  | HS1L-DQ4 | Main Circuit 11-42 | ON (closed) | OFF (open) | OFF (open) | OFF (open) | OFF (open) |
|  |  | $\begin{gathered} \text { Main Circuit } \\ 21-52 \end{gathered}$ | ON (closed) | OFF (open) | OFF (open) | OFF (open) | OFF (open) |
|  |  | $\begin{gathered} \hline \text { Door Monitor } \\ \text { Circuit } \\ \text { (Door Open) } \\ 33-34 \\ \hline \end{gathered}$ | OFF (open) | OFF (open) | ON (closed) | ON (closed) | OFF (open) |
|  |  | $\left.\begin{array}{\|c\|} \text { Lock Monitor } \\ \text { Circuit } \\ \text { (unlocked) } 63-64 \end{array} \right\rvert\,$ | OFF (open) | ON (closed) | ON (closed) | ON (closed) | ON (closed) |
| Solenoid Power A1-A2 |  |  | OFF (de-energized) | ON (energized) | ON (energized) | OFF (de-energized) | OFF (de-energized) |

## - Solenoid Lock Type

| Interlock Switch Status |  |  | Status 1 | Status 2 | Status 3 | Status 4 | Manual Unlock |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  |  | - Door Closed <br> - Machine ready to operate <br> - Solenoid energized | - Door Closed <br> - Machine cannot be operated <br> - Solenoid de-energized | - Door Open <br> - Machine cannot be operated <br> - Solenoid de-energized | - Door Open <br> - Machine cannot be operated <br> - Solenoid energized | - Door Closed <br> - Machine cannot be operated <br> - Solenoid de-energized to energized |
| Door Status |  |  |  |  |  |  |  |
| Circuit Diagram (HS1L-DQ4) |  |  |  |  |  |  |  |
| Door |  |  | Closed (locked) | Closed (unlocked) | Open | Open | Closed (unlocked) |
|  | HS1L-DQ7Y | Main Circuit 11-42 | ON (closed) | OFF (open) | OFF (open) | OFF (open) | OFF (open) |
|  |  | $\begin{aligned} & \text { Main Circuit } \\ & 21-52 \end{aligned}$ | ON (closed) | OFF (open) | OFF (open) | OFF (open) | OFF (open) |
|  |  | $\begin{gathered} \hline \text { Door Monitor } \\ \text { Circuit } \\ \text { (Door Open) } \\ 33-34 \\ \hline \end{gathered}$ | OFF (open) | OFF (open) | ON (closed) | ON (closed) | OFF (open) |
|  |  | Lock Monitor Circuit (unlocked) $63-64$ | OFF (open) | ON (closed) | ON (closed) | ON (closed) | ON (closed) |
| Solenoid Power A1-A2 |  |  | ON (energized) | OFF (de-energized) | OFF (de-energized) | ON (energized) (Note 2) | OFF to ON <br> (Note 1) (Note 2) |

Note 1: Do not attempt manual unlocking while the solenoid is energized.
Note 2: Do not energize the solenoid for a long period of time while the door is open or while the door is unlocked manually.

- Operation Characteristics (reference)

- The operation characteristics show the contact status when the actuator enters into the center of the entry slot.
- The circuit No. 12-41 and 22-51 are interconnected. Use circuits 11-42 and 21-52 for safety circuits (In HS1L-R type, circuit 12-41 is interconnected.)


## Safety Precautions

- In order to avoid electric shock or fire, turn power off before installation, removal, wire connection, maintenance, or inspection of the interlock switch.
- If relays are used in the circuit between the interlock switch and the load, consider the danger and use safety relays, since welded or sticking contacts of standard relays may invalidate the functions of the interlock switch. Perform a risk assessment and establish a safety circuit which satisfies the requirement of the safety category.
- Do not place a PLC in the circuit between the interlock switch and the load. Safety security can be endangered in the event of a malfunction of the PLC.
- Do not disassemble or modify the interlock switch, otherwise a breakdown or an accident may occur
- Do not install the actuator in a location where the human body may come in contact. Otherwise injury may occur.
- Install the actuator where it does not touch human body when the door is opened/closed. Otherwise injury may occur.
- Solenoid lock type is locked when energized, and unlocked when de-energized. When energization is interrupted due to wire disconnection or other failures, the interlock switch may be unlocked causing possible danger to the operators. Solenoid lock type must not be used in applications where locking is strictly required for safety. Perform a risk assessment and determine whether solenoid lock type is appropriate.
- In order to prevent the interlock switch and actuator from being removed without authorization, it is recommended to install an one-way screw or a screw that needs a special tool for removal. Welding or rivet is also recommended.


## Instructions

- Regardless of door types, do not use the interlock switch as a door stop. Install a mechanical door stop at the end of the door to protect the interlock switch against excessive force.
- Make sure that no force is applied on the actuator, otherwise the actuator may not be unlocked properly.
- Do not apply excessive shock to the interlock switch when opening or closing the door. A shock to the interlock switch exceeding $1,000 \mathrm{~m} / \mathrm{s}^{2}$ may cause damage to the interlock switch.
- If the operating atmosphere is contaminated, use a protective cover to prevent the entry of foreign objects into the interlock switch through the actuator entry slots. Entry of foreign objects into the interlock switch may affect the mechanism of the interlock switch and cause a breakdown
- Plug the unused actuator entry slot using the slot plug supplied with the interlock switch.
- Do not store the interlock switches in a dusty, humid, or or-ganic-gas atmosphere, or the switches are subject to direct sunlight.
- Use proprietary actuators only. When other actuators are used, the interlock switch may be damaged.
- The actuator retention force is 3000 . Do not apply a load higher than the rated value. When a higher load is expected, provide an additional system consisting of other interlock switch without lock (such as the HS5D interlock switch) or a sensor to detect door opening and stop the machine.
- Regardless of door types, do not use the interlock switch as a door lock. Install a separate lock using a latch or other measures
- While the solenoid is energized, the interlock switch temperature rises approximately $40^{\circ} \mathrm{C}$ above the ambient temperature (to approximately $95^{\circ} \mathrm{C}$ while the ambient temperature is $55^{\circ} \mathrm{C}$ ). To prevent burns, do not touch. If cables come into contact with the interlock switch, use heat-resistant cables.
- Solenoid has polarity. Be sure of the correct polarity when wiring.


## Minimum Radius of Hinged Door

When using the interlock switch for a hinged door, refer to the minimum radius of doors shown below. For the doors with small minimum radius, use angle adjustable actuators (HS9Z-A3S).
Note: The following values apply when the actuator does not interfere with the interlock switch when opening and closing the door. Because deviation or dislocation of hinged door may occur in actual applications, make sure of the correct operation before installation.

## When using HS9Z-A2S Actuator

- When the door hinge is on the extension line of the interlock switch surface

- When the door hinge is on the extension line of the actuator mounting surface:



## When using HS9Z-A3S Actuator

- When the door hinge is on the extension line of the interlock switch surface: 50 mm
- When the door hinge is on the extension line of the actuator mounting surface: 80 mm



## Actuator Angle Adjustment

- Using the angle adjustment screw, the actuator angle can be adjusted (refer to the dimensional drawing on page 4). Adjustable angle: 0 to $20^{\circ}$
- The larger the adjusted angle of the actuator, the smaller the applicable radius of the door opening. After installing the actuator, open the door. Then adjust the actuator so that its edge can be inserted properly into the actuator entry slot of the interlock switch.
- After adjusting the actuator angle, apply Loctite to the adjustment screw so that the screw will not move.


## Instructions

## Mounting Examples

Install the interlock switch and actuator referring to the figures below.


Application on Hinged Doors


## For Manual Unlocking

## Spring lock type

The HS1L allows manual unlocking of the actuator to pre-check proper door movement before wiring or turning power on, as well as for emergency use such as a power failure.

## Solenoid lock type

The solenoid lock type interlock switch normally does not need the manual unlock. However, only when the interlock switch would not release the actuator even though the solenoid is de-energized, the interlock switch can be unlocked manually. Unlock the interlock switch manually only when the solenoid is de-energized. Do not unlock the interlock switch manually when the solenoid is energized.

## Using manual unlock key

- When locking or unlocking the interlock switch manually, turn the key fully using the manual unlock key supplied with the interlock switch.
- Using the interlock switch with the key not fully turned (less than $90^{\circ}$ ) may cause damage to the interlock switch or operation failures. When manually unlocked, the interlock switch will keep the main circuit disconnected and the door unlocked. Main circuit and lock monitor circuit remain open.
- Do not leave the manual unlock key attached to the interlock switch during operation. This is dangerous and does not satisfy the requirement by safety standards, because the interlock switch can always be unlocked while the machine is in operation.



## - Unlocking from the back of interlock switch

Insert the tip of a small screwdriver into the oblong hole on the back of the interlock switch, and tilt toward the center of the switch until the actuator is unlocked.
Note: Provide a hole on the mounting panel for unlocking from the back. When making a hole in the panel, take waterproof characteristics into consideration.


## Safety Precautions

Before manually unlocking the interlock switch, make sure that the machine has come to a complete stop. Manual unlocking during operation may unlock the interlock switch before the machine stops, and the function of interlock switch with solenoid is lost.
On the solenoid lock type, manual unlocking is provided for the situation where the switch cannot be unlocked even though the solenoid has turned off. Do not attempt manual unlocking while the solenoid is energized.

## Precautions for Opening and Closing the Lid

- When opening the lid before wiring, make sure to open only the lid shown the following figure. Removing unnecessary screws may cause a failure of the interlock switch.
- Use HS9Z-T1 key wrench for TORX screw when removing and installing the lid.
- Make sure that no foreign objects such as dust, water, or oil enter the interlock switch when wiring



## Applicable Crimping Terminal



- Use an insulation tube on the crimping terminal.
- When using stranded wires, make sure that loose wires do not cause short circuit. Also, do not solder the terminal to prevent loose wires.

| Applicable Crimping Terminal | Applicable Wire |
| :---: | :---: |
| N0.5-3 / FN0.5 (JST) | 0.2 to $0.5 \mathrm{~mm}^{2}$ |
| N1.25-MS3 (JST) | 0.25 to $1.65 \mathrm{~mm}^{2}$ |
| V1.25-YS3A (JST) | 0.25 to $1.65 \mathrm{~mm}^{2}$ |

## Applicable Wire Size

- 0.5 to $1.5 \mathrm{~mm}^{2}$


## Instructions

## Applicable Cable Glands

Use IP67 cable glands.


When Using Flexible Conduit (Example)
Flexible conduit example: VF-03 (Nihon Flex)

| Conduit Port Size | Plastic Cable Gland | Metal Cable Gland |
| :---: | :---: | :--- |
| G1/2 | - | RLC-103 (Nihon Flex) |
| PG13.5 | - | RBC-103PG13.5 (Nihon Flex) |
| M20 | - | RLC-103EC20 (Nihon Flex) |

When Using Multi-core Cables (Example)
Flexible conduit example: VF-03 (Nihon Flex)

| Conduit Port Size | Plastic Cable Gland | Metal Cable Gland |
| :---: | :---: | :---: |
| G1/2 | SCS-10 <br> (Seiwa Electric) | ALS-16 <br> (Nihon Flex) |
| PG13.5 | ST13.5 <br> (K-MECS) | ABS-PG13.5 <br> (Nihon Flex) |
| M20 | ST-M20X1.5 <br> (K-MECS) (Note) | ALS-EC20 <br> (Nihon Flex) |

- Different cable glands are used depending on the cable sheath outside diameter. When purchasing a cable gland, confirm that the cable gland is applicable to the cable sheath outside diameter.
Note: When using the ST-M20X1.5 cable gland, use together with a gasket (Type No.: GPM20, K-MECS).


## Conduit Port Opening

- Make an opening for wire connection by breaking one of the conduit-port knockouts on the interlock switch housing using a screwdriver.
- Before opening the conduit port, remove the locking ring for cable gland inside the interlock switch.
- When breaking the conduit port, take care not to damage the contact block or other parts inside the interlock switch.
- Cracks or burrs on the conduit entry may deteriorate protection against water.
- When changing to another conduit port, close the unused opening with an optional plug (Type No.: HS9Z-P1)


Plug (HS9Z-P1)


G1/2

## Recommended Tightening Torque

- HS1L interlock switch: 3.2 to $3.8 \mathrm{~N} \cdot \mathrm{~m}$ (four M5 screws) (Note)
- Lid: $\quad 0.9$ to $1.1 \mathrm{~N} \cdot \mathrm{~m}$ (M4 screws)
- Terminal: $\quad 0.6$ to $0.8 \mathrm{~N} \cdot \mathrm{~m}$ (M3 screws)
- Cable gland: $\quad 2.7$ to $3.3 \mathrm{~N} \cdot \mathrm{~m}$
- Actuators

HS9Z-A1S/A2S: 2.7 to $3.3 \mathrm{~N} \cdot \mathrm{~m}$ (two M5 screws) (Note) HS9Z-A3S: $\quad 4.5$ to $5.5 \mathrm{~N} \cdot \mathrm{~m}$ (two M6 screws) (Note)
Note: The above recommended tightening torque of the mounting screws are the values with hex socket head bolts. When other screws are used and tightened to a smaller torque, make sure that the screws do not become loose after mounting.

- Wire Length Inside the Interlock Switch

|  | Screw Terminal No. | Through Conduit Port |  |  |
| :--- | :---: | :---: | :---: | :---: |
|  |  | (2) |  |  |
|  | 11 | $95 \pm 2$ | $45 \pm 2$ |  |
|  | 21 | $85 \pm 2$ | $35 \pm 2$ |  |
|  | 22 | $60 \pm 2$ | $70 \pm 2$ |  |
|  | $31 / 33$ | $75 \pm 2$ | $35 \pm 2$ |  |
|  | $32 / 34$ | $50 \pm 2$ | $60 \pm 2$ |  |
|  | 42 | $65 \pm 2$ | $95 \pm 2$ |  |
|  | 51 | $45 \pm 2$ | $70 \pm 2$ |  |
|  | 52 | $55 \pm 2$ | $85 \pm 2$ |  |
|  | $62 / 64$ | $35 \pm 2$ | $60 \pm 2$ |  |
|  | A 1 | $45 \pm 2$ | $75 \pm 2$ |  |
|  | A 2 | $60 \pm 2$ | $45 \pm 2$ |  |
|  | X 1 | $70 \pm 2$ | $30 \pm 2$ |  |
|  | X 2 | $80 \pm 2$ | $35 \pm 2$ |  |
| $7 \pm \pm 1$ |  |  |  |  |



Note:
HS1L-R
Do not remove the wire between terminals 12-41, because these terminals are interconnected for safety circuit input. Use terminals 11-42 for safety circuit inputs. (GS-ET-19)

## HS1L-DQ and HS1L-DT

Do not remove the wires between terminals 12-41 and 22-51, because these terminals are interconnected for safety circuit inputs. Use terminals 11-42 and 21-52 for safety circuit inputs. (GS-ET-19)

Specifications and other descriptions in this catalog are subject to change without notice.


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[^0]:    - Package quantity: 1
    - Key Wrench for TORX Screw is supplied with the interlock switch.

