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SPECIFICATIONS

HS1T SERIES SOLENOID TYPE SAFETY SWITCH

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TYPE   HS1T –  __ 4 4 Z __ __ – __
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Contact configuration
Spring locking type
Pilot light rated voltag
Indicator color
Conduit Cover
Rear Unlock Button
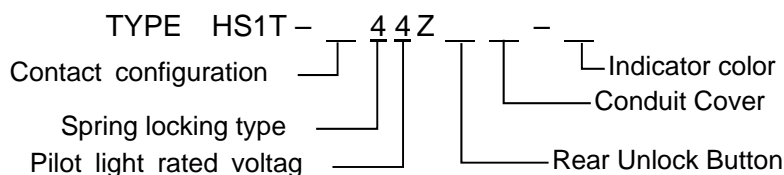
1. Applicable standards

Applicable Standards		ENISO/ISO14119
		IEC60947-5-1
		EN60947-5-1(TÜV approval)
		GS-ET-19(TÜV approval)
		UL508(UL Listing approval)
		CSA C22.2 No.14(c-UL Listing approval)
		GB/T14048.5(CCC pending)
	Standards for use	IEC60204-1/EN60204-1
Applicable directives		Low voltage directive, Machinery directive

2. Operating conditions

    (1) Operating Temperature   - 25 to + 55°C (no freezing)
    (2) Relative Humidity   20 to 95% RH (no condensation)
    (3) Storage temperature   - 40 to + 80°C (no freezing)
    (4) Pollution degree   3 (inside: 2)

3. Ratings

3.1   Contact

    (1) Rated insulation voltage   250V (IEC60947-5-1)
    (2) Thermal current   2.5A
    (3) Rated operating voltage and rated operating current

Rated operating voltage			30V	125V	250V
Rated Operating Current *1	AC	Resistive load (AC-12)	–	2.5A	1.5A
		Inductive load (AC-15)	–	1.5A	0.75A
	DC	Resistive load (DC-12)	2.0A	0.4A	0.2A
		Inductive load (DC-13)	1.0A	0.22A	0.1A

    UL, c-UL rating: Pilot Duty AC 0.75A/250V, Pilot Duty DC 1.0A/30V
    TUV rating: AC-15 0.75A/250V, DC-13 1.0A/30V
    CCC rating: AC-15 0.75A/250V, DC-13 1.0A/30V(Applying)

    (4) Minimum applicable load   3V AC/DC, 5mA (reference value)
    (5) Operating frequency   900 operations / hour

3.2   Solenoid

    (1) Rated insulation voltage   30V
    (2) Rated operating voltage   24V DC
    (3) Rated current (±10%)   200 mA
    (4) Coil resistance (±10%)   120Ω (at 20°C)
    (5) Turn on voltage   Rated voltage × 85% maximum (at 20°C)
    (6) Turn off voltage   Rated voltage × 10% minimum (at 20°C)
    (7) Continuous applicable voltage   Rated voltage × 110%
    (8) Continuous applicable duration   Continuous
    (9) Class of protection   Class F
    (10) Rated power consumption   Approx. 5W (initial value)

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3.3 Indicator

   (1) Rated insulation voltage   30V
   (2) Rated operating voltage   24V DC
   (3) Rated current   10mA
   (4) Light source   LED
   (5) Illumination color   ( )   Green (G)

4.   Construction

   (1) Outside view / Mounting hole layout   See the attached sheet.
   (2) Mounting screw   M5×3
   (3) Degree of protection   IP67 (IEC60529) Type 4X Indoor Use Only
   (4) Contact configuration   (□)   See the attached sheet
   (5) Actuator unlocking method   (a) Solenoid
                                       (b)Manual unlock tool
                                       (c)Rear Unlock Button   (When use rear unlock button)
   (6) Indicator light   With pilot light
   (7) Rear Unlock Button   ( )   Without(blank),With(L)
   (8) Safety switch housing color   Black
   (9) Operation head cover   Zinc alloy die-casting, Silver
   (10) Conduit type   Δ   Standard type(M20)(M),Cable side-routed type(M20)(SM)
   (11) Terminal number identification   See the operating characteristic chart
   (12)Applicable wire $0.3{\sim}1.5\text{mm}^2$ (AWG22~16)
   (13)Operation of contact elements   By a special actuator
   (14) Electric shock protection   Class   (IEC61140)
   (15)Weight   Approx. 450g

5.   Characteristics

   (1) Temperature rise   Contact: 50°C maximum
                                       Terminal: 50°C maximum
                                       Coil: 105°C maximum
                                       Lens: 30°C maximum
   (2) Insulation resistance   100 MΩ minimum (500V DC megger)
   (3) Impulse withstand voltage   2.5 kV (between LED/solenoid and ground: 0.5 kV)
   (4) Contact resistance   50 mΩ maximum (initial value)
   (5) Vibration resistance
      (a) Operating extremes   10 to 55 Hz, amplitude 0.35 mm minimum
      (b) Damage limits   30 Hz, Amplitude 1.5 mm minimum
   (6) Shock resistance
      (a) Operating extremes 100 m/s^2
      (b) Damage limits $1{,}000 \text{ m/s}^2$
   (7)Actuator Retention Force   Fzh = 5,000N min. (GS-ET-19)

                                      The actuator retention force of HS1T is 5000N at static load.
                                    Make sure that a force exceeding the above specification is not applied.
                                    In the event where the actuator retention force might exceed the
                                    expected load, add a system that can detect the opening of the door and
                                    stops the machine, such as adding another safety switch without lock
                                    (such as HS5D) or a sensor.
   (8)Operating force
      (a) Actuator insertion   Approx. 8.0+5.0 N
      (b) Actuator removal   Approx. 9.0+5.0 N

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(9)Travel (from mounting reference position)
    (a) Actuator total travel   28.5 mm (actuator : HS9Z-A11T)
    (b) Direct opening travel   12.0 mm minimum (actuator: HS9Z-A11T)
(10)Direct Opening Force   120 N minimum
(11) Operating speed   0.05~1.0 m/s
(12) Conditional short-circuit current   50A (250 V)
(13)Short-circuit protective device   250V AC, 10A, Fast blowing fuse

6. Life

(1) Mechanical life   2,000,000 operations minimum
    (Operating frequency: 900 operations/hour)
(2) Electrical life   100,000 operations minimum
    (AC-15 250A 0.75A)
    (Operating frequency: 900 operations/hour)
    2,000,000 operations minimum
    (AC/DC24V 100mA)
    (Operating frequency: 900 operations/hour)
(3) The Rear Unlock Button   3,000 operations minimum
    (Operating frequency: 900 operations/hour)

7. Attachment

(1) Manual unlock tool   Type: HS9Z-KEY5
(2) Rear Unlock Button   With Rear Unlock Button type
(3) Rear Unlock Button Screw   With Rear Unlock Button type

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8. Operation Cycle, Contact Configuration and Operation

· Contact operation is based on the condition that the actuator is inserted into the center of the safety switch slot

· Contact operation shows the HS9Z-A11T/A12T actuator.

· Use main circuit or monitor circuit with ☐ for the input to safety circuit.

· Indicator turns on when solenoid is energized.

●Contact Configuration and Operation

Type *10	Contact Configuration *11	Contact Operation (reference)

(Actuator Completely Inserted)   (Actuator Pulled Out)

■:Contact Closed   □:Contact Open

*1 This locking monitoring marking has been newly described in section 9.2.1 of EN ISO / ISO14119. It indicates that any devices with this marking meet the following EN ISO / ISO 14119 requirements:

- General (- General requirements for guard locking devices) (Section 5.7.1) *
- Locking monitoring (- Locking monitoring for guard locking devices) (Section5.7.2.2)

When a lock monitor circuit (contact) has the locking monitoring marking, it means that one circuit (contact) can monitor the position and the locking function of the protective door is closed and locked.

Both HS1T spring lock and solenoid lock models have marking for lock monitoring. Note that solenoid lock models can be used in applications where lock for safety purpose is found unnecessary after a risk assessment, e.g.locking is needed for purposes such as in production process.

*2   These are the image of locking position with actuator inserted.

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Operation Cycle

• Spring Lock Type (HS1T-□4)

Door States	Closed	Closed	Open	Closed
Solenoid Power A1-A2	OFF	ON	ON/OFF	OFF
Manual Unlock Key	Turn the key to lock position	Turn the key to lock position	Turn the key to lock position	Turn the key to unlock position
Rear Unlock Button	Returned status	Returned status	Returned status	When operating the Button
Main Circuit 11-42 21-52	Closed	Open	Open	Open
Monitor Circuit 11-12 21-22 31-32	Closed	Closed	Open	Closed
Monitor Circuit 13-14 23-24 33-34	Open	Open	Closed	Open
Monitor Circuit 41-42 51-52	Closed	Open	Open	Open
Monitor Circuit 53-54 63-64	Open	Closed	Closed	Closed
	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.

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