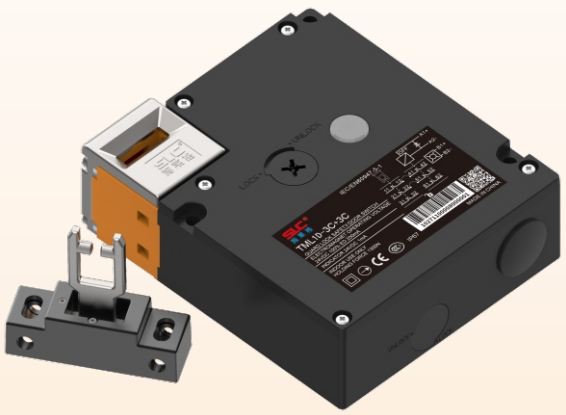
TML Series Safety Door Lock



Features

TML series security door locks are the most commonly used door interlocking technology. They use a key mounted at the opening of the switch body to detect the movement of the protective door. Due to their small and lightweight form factor, variety of contact configurations, and locking function, safety latches are often the lowest cost solution. Moreover, thanks to the use of flexible keys, their misalignment tolerances are increased, so they can be used in a wide range of applications.

TML series security door locks allow the switch head to press 90. The angle is rotated 4 times, the key can be inserted into the switch in different positions, and the electromagnet can choose to work on and off the power, which provides a variety of different options for the way the switch works and the installation method on the protective door. This increases the flexibility of the switch and makes it ideal for use on a wide range of doors.

Technical parameters

Security level		
Standard	EN60947-5-1、GB14048.5	
B10D	800000 times	
Authentication	CE、CCC(CQC)	
Mechanical life	More than a million times	
Electrical life	More than 500000 times	Resistive load 250VAC/3A

Environment	
Enclosure rating	Ip65
Operating temperature	-10~+55°C(Prevent icing, do not freeze)
Ambient humidity	Less than 95%RH

Electrical characteristics	
Rated insulation withstand voltage(Ui)	300V
Protection level against electric shock	Class II (Double insulation)
Pollution degree (use environment)	3 (EN60947-5-1)
Impulse withstand voltage(EN60947-5-1)	2.5KV
Contact contact resistance	Under 25mΩ
Insulation resistance	Above 100MΩ
Rated open heating current (LTH)	10A
Conditional short-circuit current	100A
Contact spacing	2.5mm

Usage type		
Load category	AC-15	DC-13
Rated operating voltage（Ue）	240V	24V
Rated operating current（Le）	3A	2A

Operating characteristics	
Perform the minimum anchoring force of the key	15N
Maximum clamping force	1300N
Maximum execution speed	0.05~0.5M/s
Maximum execution frequency	30 times/min
Minimum switching current at a specific voltage	10mA@5VDC

Material	
Weight	About 400g
Color	Dark yellow + black
Housing material	UL certified thermoplastics
Actuator material	SUS304

Other	
Solenoid rated operating voltage	0.2A@24VDC±10%
Solenoid power rating	4.6W
Solenoid DC resistance	125 Ω±10%
Rated operating voltage of the indicator	1mA@24VDC

Model description

TML [1] [D] — [3C] + [3C]

Product Series

1:Mechanical locking electromagnetic release
2:Electromagnetic locking mechanical release

D:The manual release switch is located under the product
F:The manual release switch is located on the front of the product(default)
N:No manual release

Mechanical side contact status
2C1O:2NC/1NO
3C:3NC
1C1O:1NC1NO
2C:2NC

Electromagnetic side contact status
2C1O:2NC/1NO
3C:3NC
1C1O:1NC1NO
2C:2NC

Selection guide

Release type	Manually release the position	Model	Operating characteristics	Order number
Mechanical locking electromagnetic release	Front manual release	TML1F-3C+3C	3C+3C	LOT9635871F33
		TML1F-3C+2C1O	3C+2C1O	LOT9635871F32
		TML1F-2C1O+3C	2C1O+3C	LOT9635871F23
		TML1F-2C1O+2C1O	2C1O+2C1O	LOT9635871F22
		TML1F-2C+2C	2C+2C	LOT9635871F2C
		TML1F-2C+1C1O	2C+1C1O	LOT9635871F21
		TML1F-1C1O+2C	1C1O+2C	LOT9635871F12
		TML1F-1C1O+1C1O	1C1O+1C1O	LOT9635871F11
		TML1F-3C+2C	3C+2C	LOT9635873F2C
		TML1F-3C+1C1O	3C+1C1O	LOT9635873F11
		TML1F-2C1O+2C	2C1O+2C	LOT9635872F22
		TML1F-2C1O+1C1O	2C1O+1C1O	LOT9635872F11
Electromagnetic locking mechanical release	Front manual release	TML2F-3C+3C	3C+3C	LOT9635872F33
		TML2F-3C+2C1O	3C+2C1O	LOT9635872F32
		TML2F-2C1O+3C	2C1O+3C	LOT9635872F23
		TML2F-2C1O+2C1O	2C1O+2C1O	LOT9635872F22
		TML2F-2C+2C	2C+2C	LOT9635872F2C
		TML2F-2C+1C1O	2C+1C1O	LOT9635872F21
		TML2F-1C1O+2C	1C1O+2C	LOT9635872F12
		TML2F-1C1O+1C1O	1C1O+1C1O	LOT9635872F11
		TML2F-3C+2C	3C+2C	LOT96352F3C2C
		TML2F-3C+1C1O	3C+1C1O	LOT96352F3C11
		TML2F-2C1O+2C	2C1O+2C	LOT96352F212C
		TML2F-2C1O+1C1O	2C1O+1C1O	LOT96352F2111

※Manual unlock knob position default product front (F), if you need to customize the bottom of the product unlock (D) or no manual unlock (N) please contact sales.
For more information on TSL safety gates, please refer to the Safety Latches section.

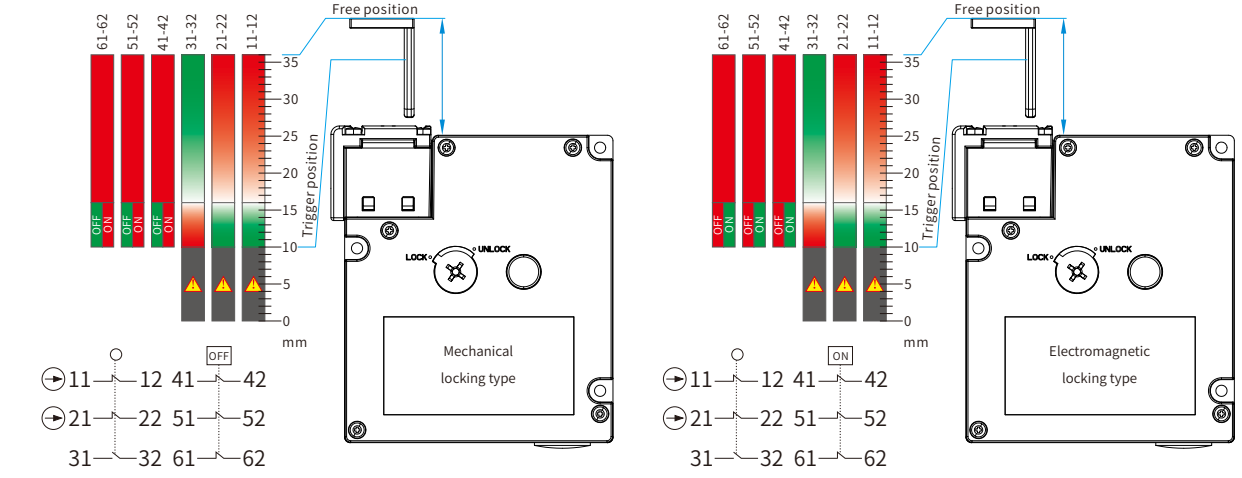
TML SERIES SAFETY DOOR LOCK

Type of accessory	Accessory name	Model	Operating characteristics	Order number
Accessory	Bend the key	TTS1K1	Installed perpendicular to the insertion orientation	LOTTTS1-L1
	Straight key	TTS1K2	Install parallel to the insertion direction	LOTTTS1-B1
	Flexible key	TMLK1	Supports horizontal rotation 20°, rotate 15° vertically	LOT50551842K1
	Director	TMLG1	Metal guides , M3×37 Screw	LOT36303425G1
	TSL1 Right opening door kit	TML+TSL1R	TSL1A1、TSL1A2 Right mounting fitting	LOT232064R
	TSL1 Left opening door kit	TML+TSL1L	TSL1A1、TSL1A2 Left mounting fitting	LOT232064L
	TSL2 Right opening door kit	TML+TSL2R	TSL2A1、TSL2A2 Right mounting fitting	LOT232065R
	TSL2 Left opening door kit	TML+TSL2L	TSL2A1、TSL2A2 Left mounting fitting	LOT232065L
	TSL1 Escape handle	TSL1AD3		LOT20010
	TSL2 Escape handle	TSL2AD3		LOT200M8

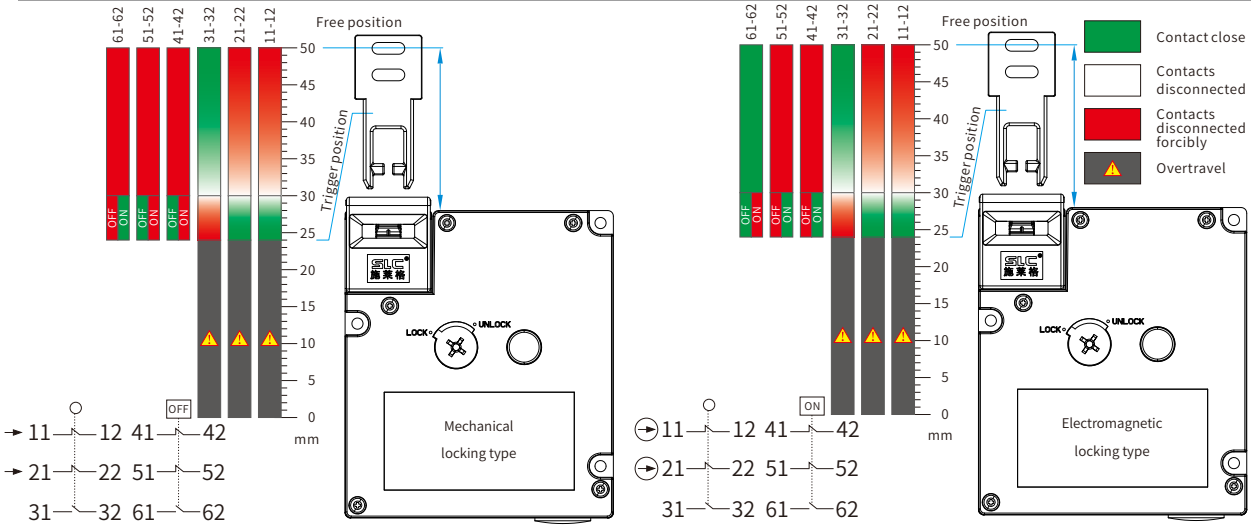
※TSL Security Gate (sold separately)

Contact state switching stroke diagram

TTS1K1 Trigger contact travel diagram

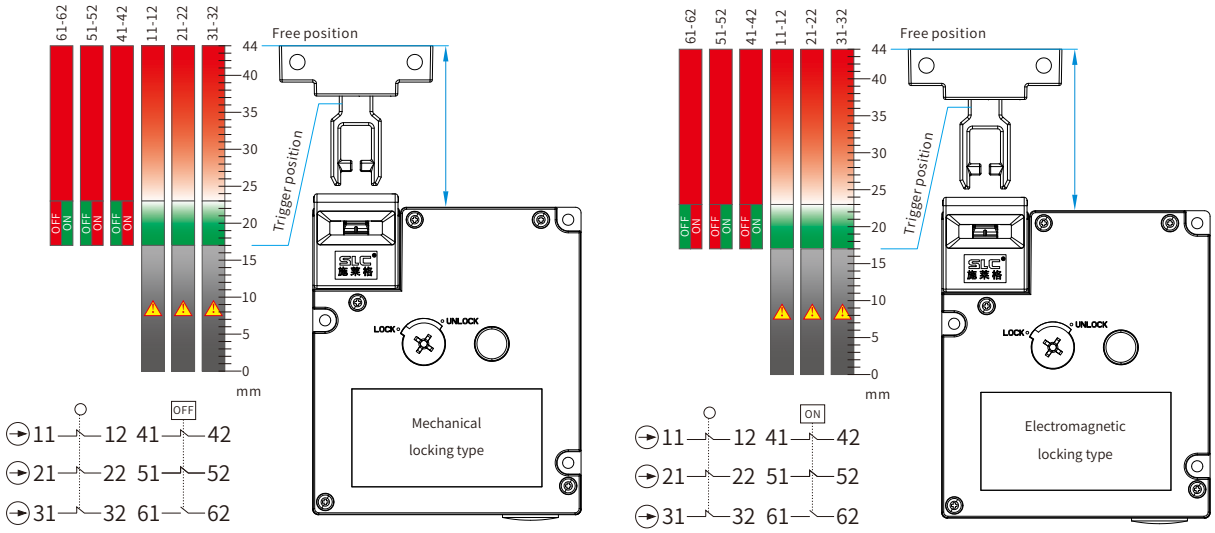


TTS1K2 Trigger contact travel diagram



※Mechanical locking electromagnetic release (electromagnet needs to be powered off during operation), electromagnetic locking mechanical release (electromagnet needs to be energized during operation)

TMLK1 Trigger contact travel diagram



Contact state closure and disconnection relationship

Force disconnect, Force the contact to be disconnected

Forced disconnection refers to the separation of contacts by the forced movement of the actuating element (trigger element).

A switch contact with this switching characteristic is called a forced opening contact.

The forced opening contact is a normally closed contact and is marked with the symbol ⊖ . In addition, switches with a forced disconnect function must meet the requirements of Annex K of the standard EN 60947-5-1.

For detailed switching status of the product, please refer to the status switching related content.

When the drive element (trigger element) is in a free position, the safety contact ⊖ is disconnected;

When the drive element (trigger element) is in the trigger position, the safety contact ⊖ is closed;

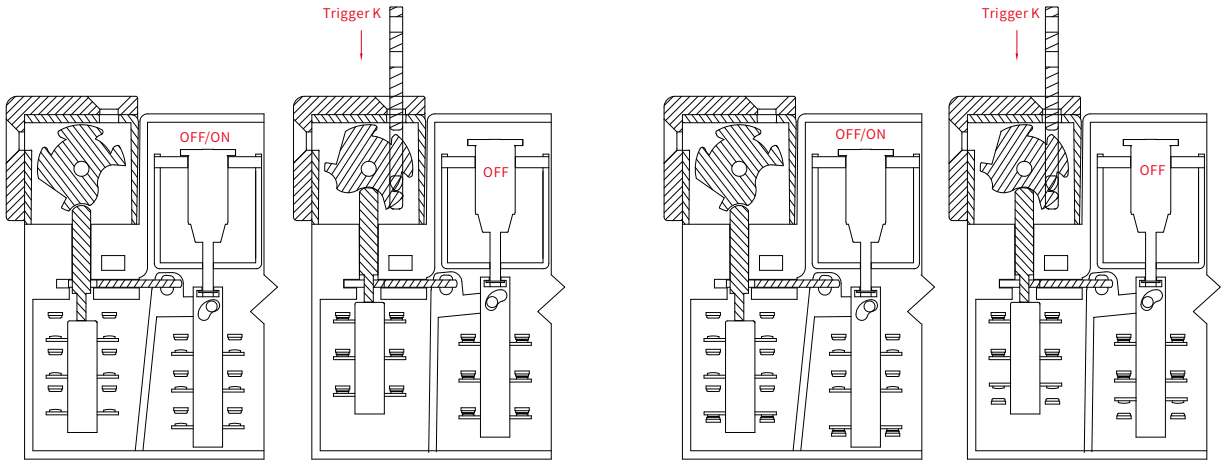
Feature description

The safety lock monitors the position of the removable safety guard.

When the drive element moves from the actuating position to the free position, the safety contact ⊖ is triggered.

During this process, the safety contact has been completely disconnected.

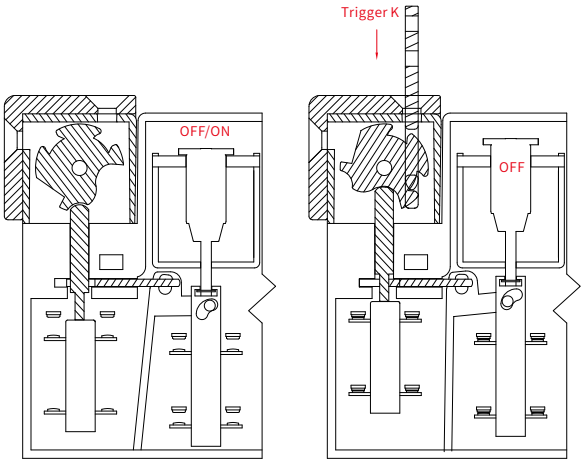
Mechanically locked electromagnetic release type



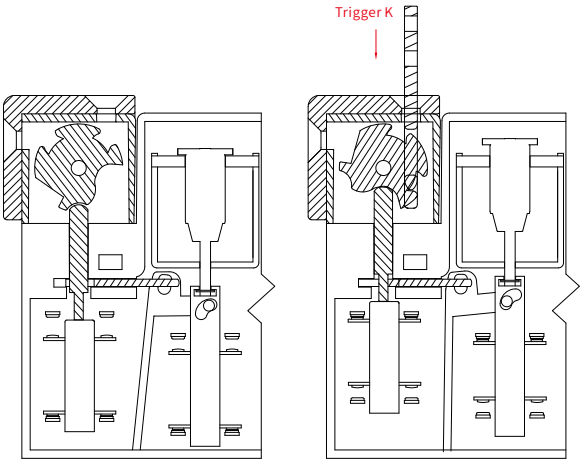
3N.C+3N.C　　2N.C/1N.O+2N.C/1N.O

※Mechanical locking electromagnetic release (electromagnet needs to be powered off during operation), electromagnetic locking mechanical release (electromagnet needs to be energized during operation)

TML SERIES SAFETY DOOR LOCK

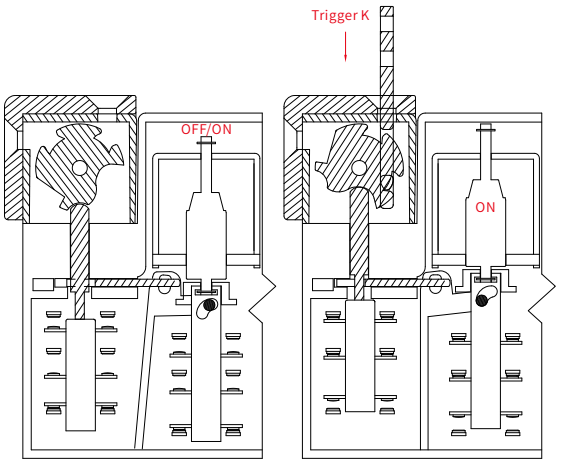


2N.C+2N.C

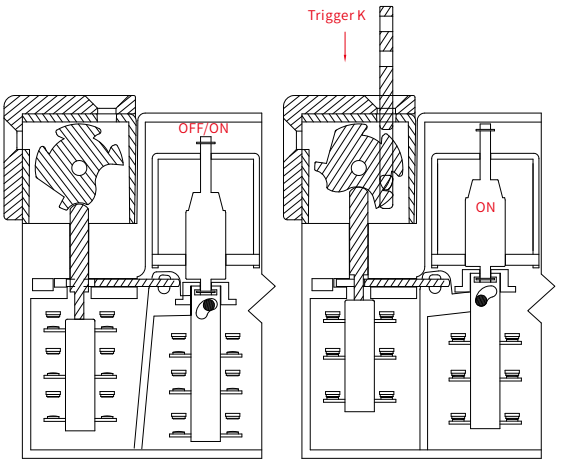


1N.C/1N.O+1N.C/1N.O

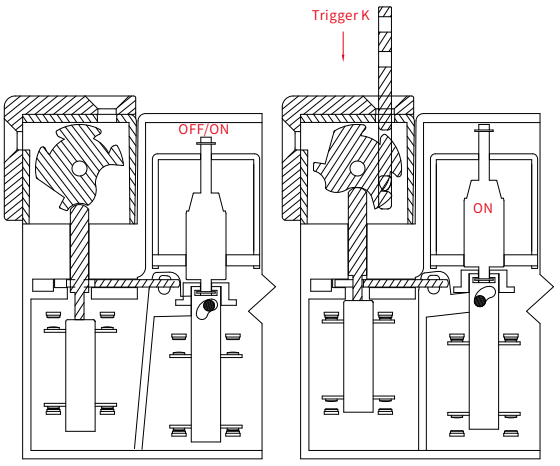
Electromagnetic locking locking mechanical release type



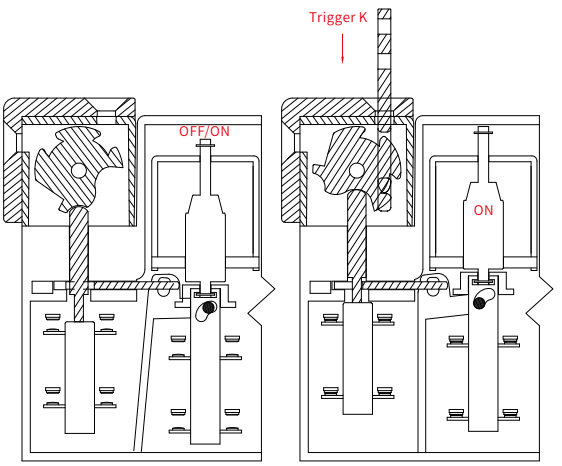
2N.C/1N.C+2N.C/1N.C



3N.C+3N.C



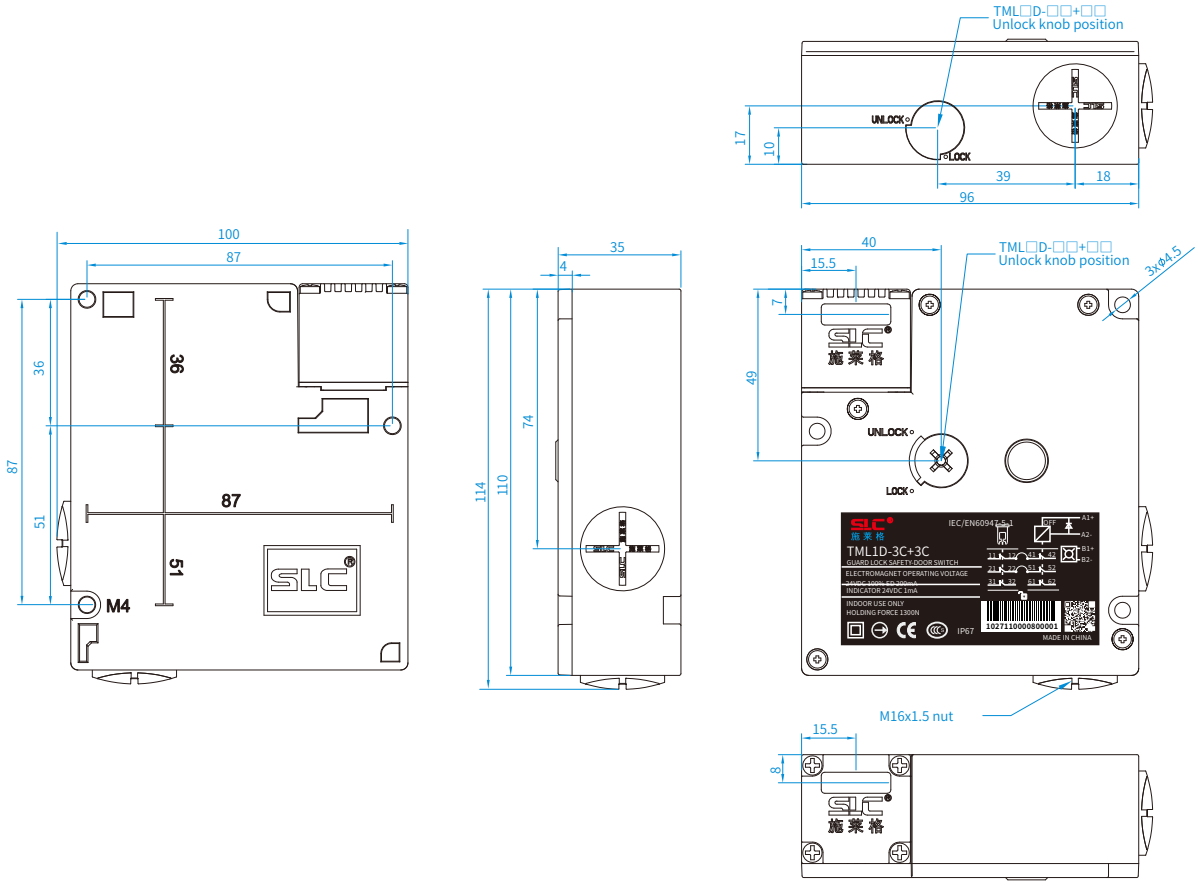
1N.C/1N.O+1N.C/1N.O



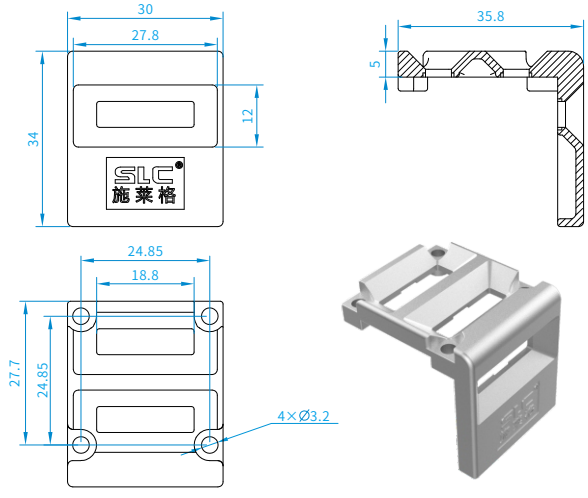
2N.C+2N.C

※Mechanical locking electromagnetic release (electromagnet needs to be powered off during operation), electromagnetic locking mechanical release (electromagnet needs to be energized during operation)

Body shape and installation size (mm)



Director size（TMLG1）

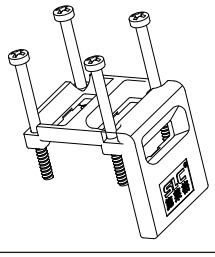


※Affected by product configuration and manufacturing process, the actual product size, weight may be different, please refer to the actual product

Warn

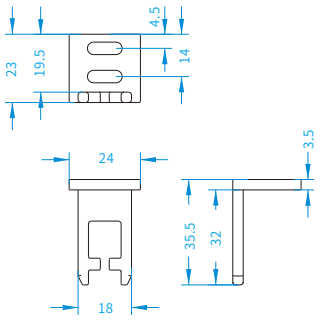
When installing a metal guide, it is necessary to remove the four fixing screws on the head of the TML product, and install the guide and head back to the TML product with the M3×37 screws equipped with the guide.

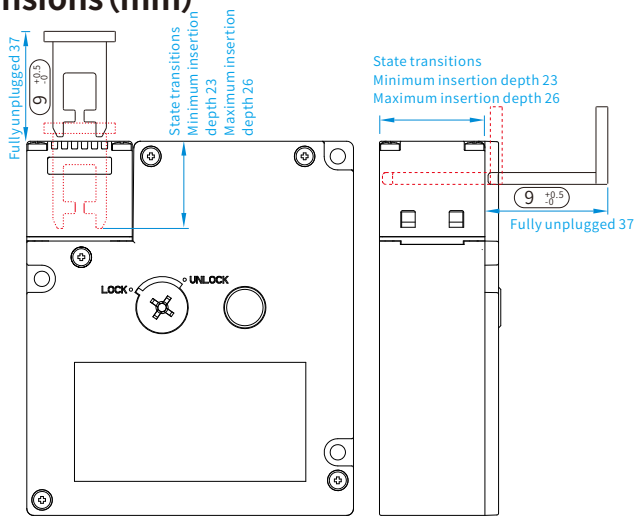
TML factory header mounting screws (M3×32) should not be mixed with metal guide screws, otherwise it will cause irreparable damage to the product.



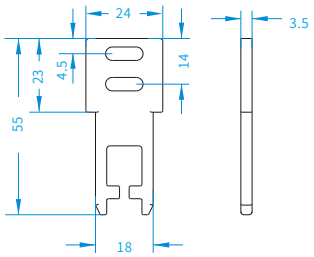
Execute key and mounting dimensions (mm)

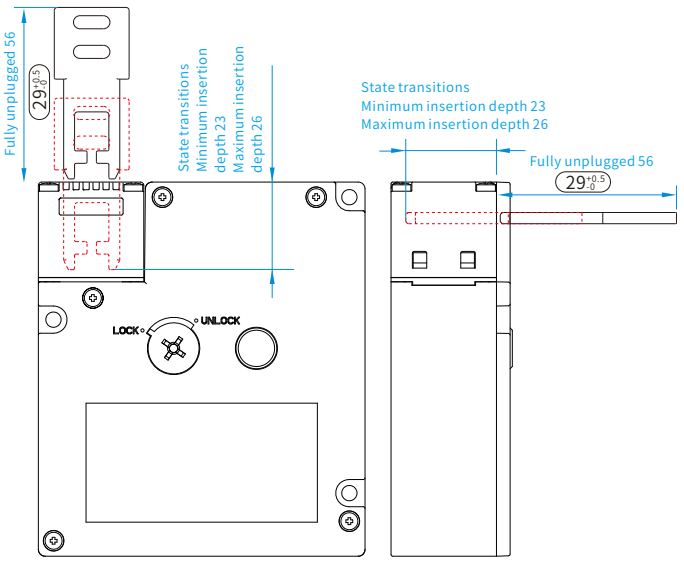
TTS1K1 Bend the key



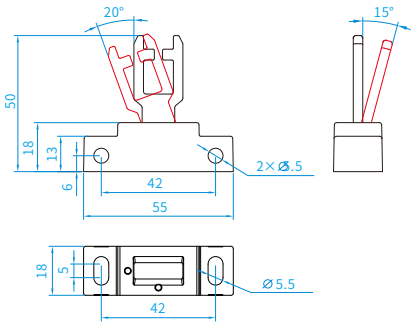


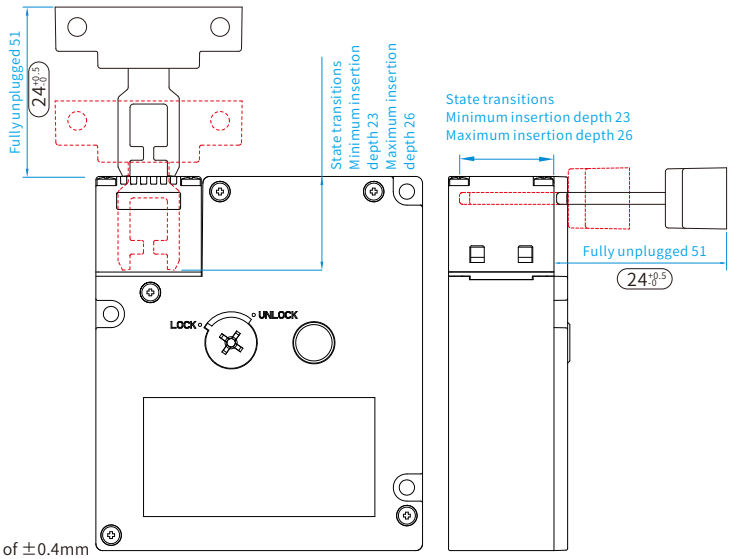
TTS1K2 Straight key





TMLK1 Flexible key



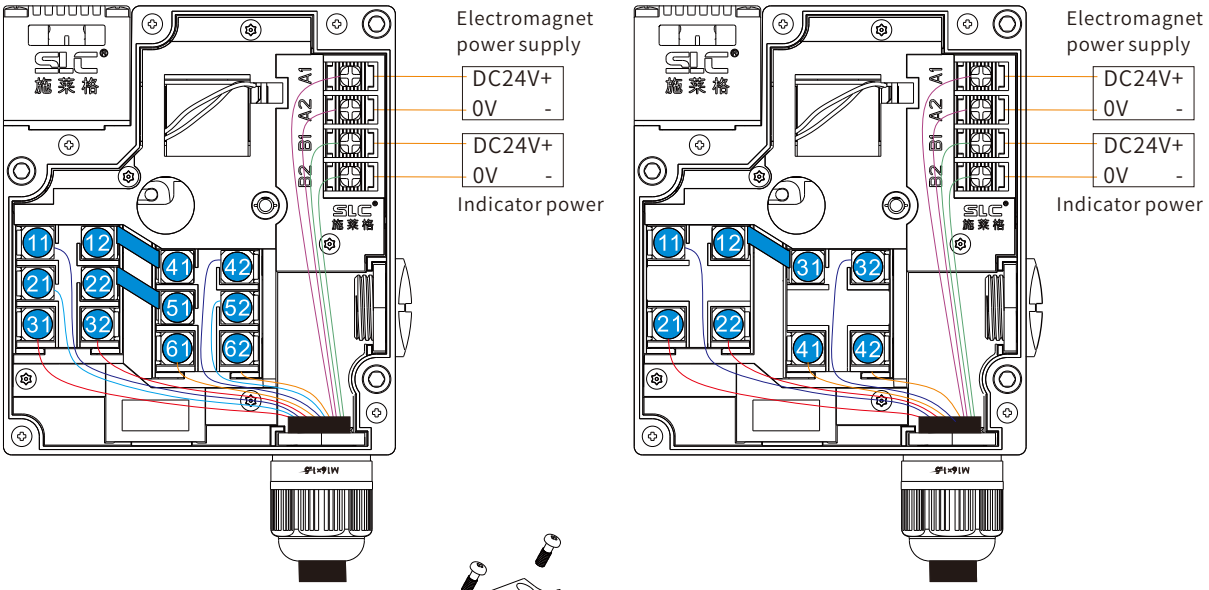


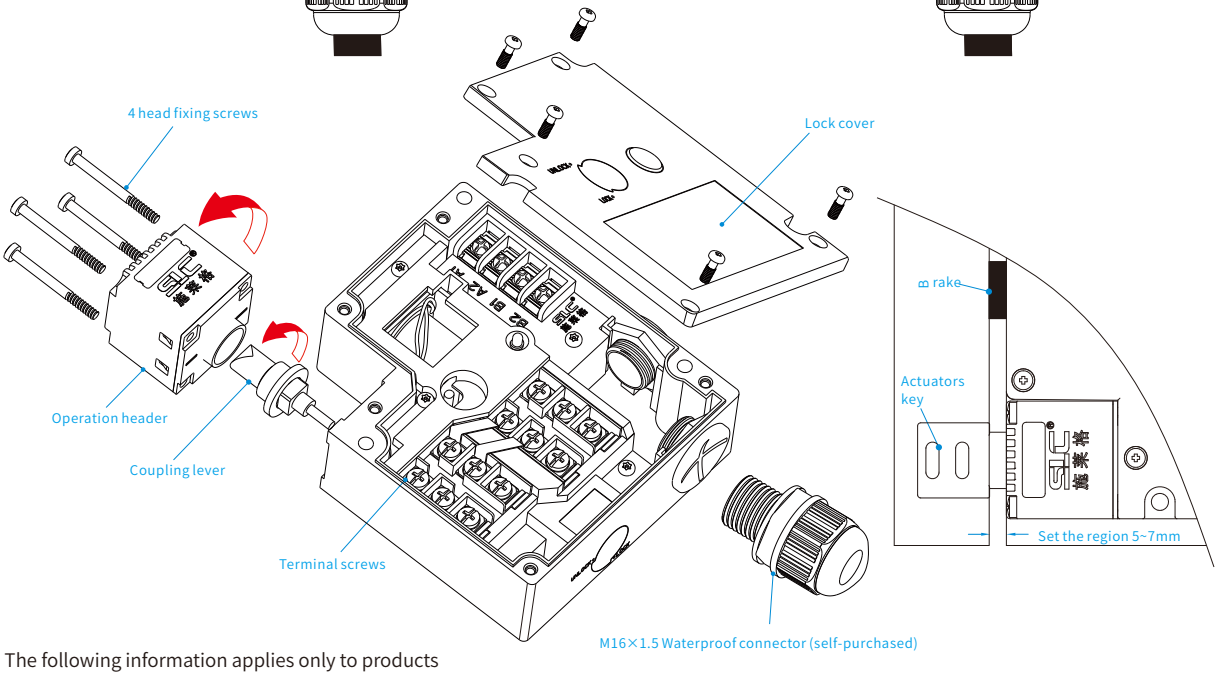
※Unless otherwise noted, all dimensions have a specified tolerance of ±0.4mm

※Affected by product configuration and manufacturing process, the actual product size, weight may be different, please refer to the actual product

※Protects the operating head from damage. The stop (end stop) must be installed according to size (24 +0.5 -0).

Electrical connection





The following information applies only to products with cable entry:

1. Remove the screw from the operating head and adjust the direction of operation;
2. Set the rotating operation head to the desired direction;
3.Tighten the screw with a torque of 0.6Nm;
4.Open the safety lock shell;
5. When using the safety lock as the interlock device for personnel protection, at least one control (⊖) must be used, please refer to the contact description for the safety terminal distribution;
6.Use 0. 5Nm torque connects and tightens terminal screws;
7.Check whether the cable inlet is sealed;
8.Close the lock cover and tighten the screws in place (tightening torque 0. 6Nm).

Warn

- Make sure the switch is securely installed to prevent it from actually dropping. Failure to do so may result in personal injury.
- Do not use the switch as a brake.
- In order to ensure that the base of the operation key does not touch the switch head, be sure to install the brake as shown in the picture above, and adjust the brake so that the operation key is really located in the setting area of the base (5~7mm).
- Do not subject the toilet switch to the impact of exceeding its impact resistance value(1000m/s^2)bucket.
- Incorrect connection will cause loss of security functions.
- Only the safety contact (⊖) provides a secure connection function.

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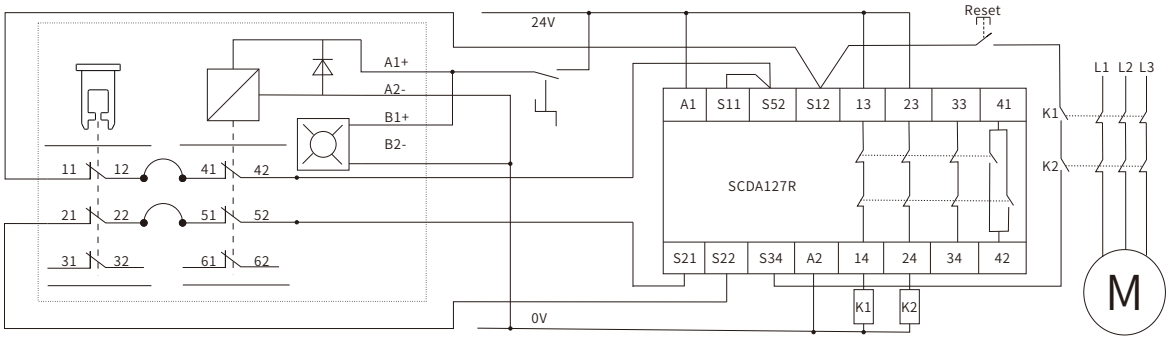
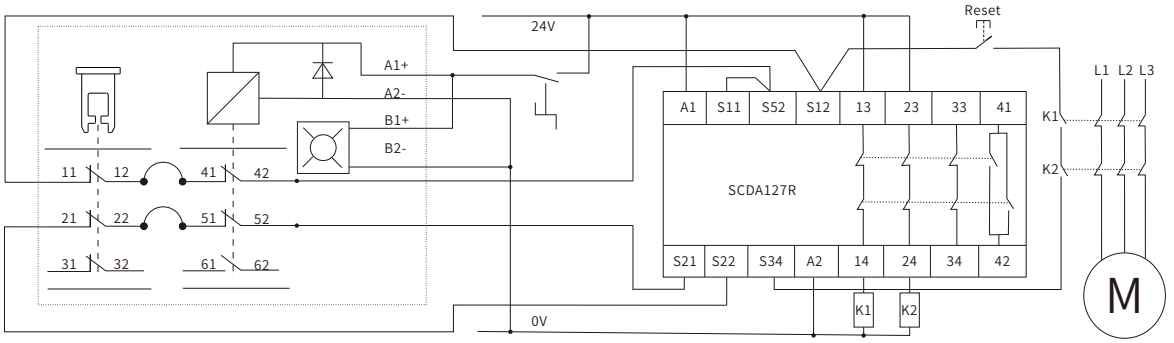
Application examples

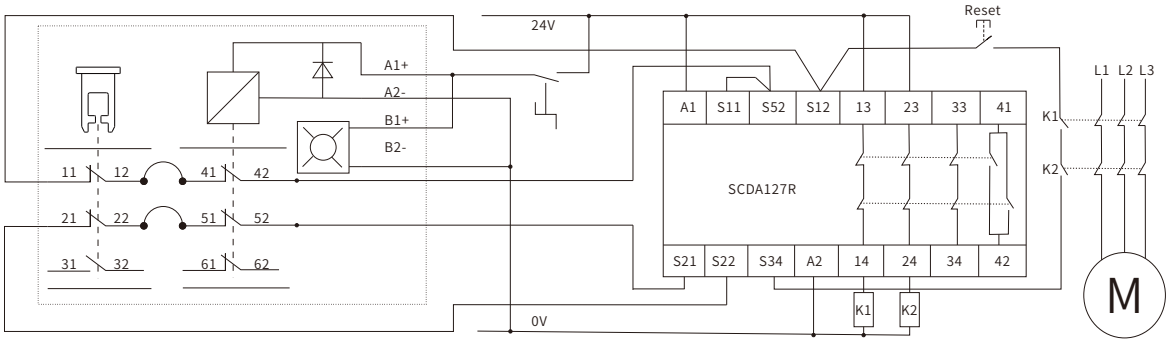
TML□□-3C+3C(Applications with 127)



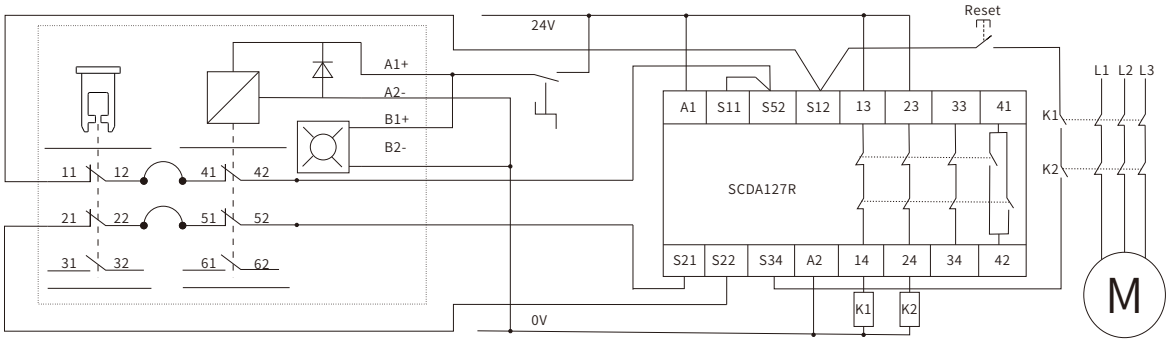
TML□□-3C+2C1O(Applications with 127)



TML□□-2C1O+3C(Applications with 127)

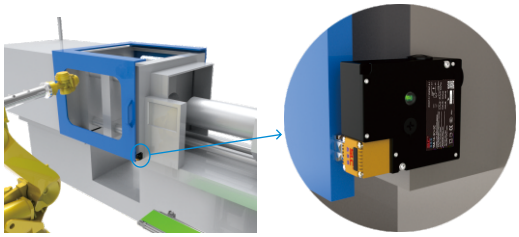


TML□□-2C1O+2C1O(Applications with 127)

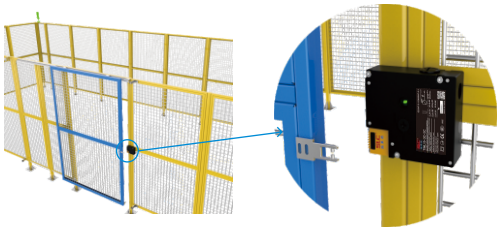


Applied to sliding door equipment

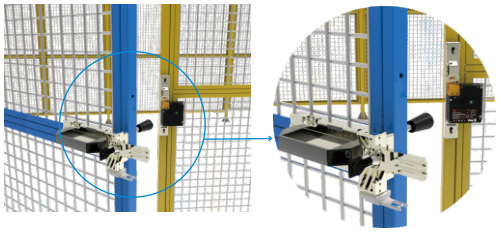
Applied to left and right sliding door equipment



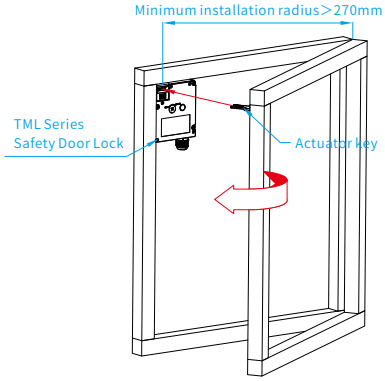
Apply to the left and right sliding door area



Fitted with TSL safety doors for revolving doors



Revolving door installation dimensions



The minimum installation radius is measured from the center of the actuator (actuation key) insert of the safety switch (safety interlock) to the center of the revolving door rotary axis.

Use safety notes

◆ Installation environment

Do not immerse the switch in oil or water, or use the switch in a location that is continuously exposed to oil or water splashes. Failure to do so may result in oil or water entering the inside of the switch. (The IP67 protection level of the switch specifies the water inlet after the switch is immersed in water for a certain period of time).

◆ Electromagnetic locking type

The electromagnetic locking type can only be locked when the solenoid is energized. Therefore, in the event of a sudden power failure, etc., the lock will be released as soon as the power supply to the solenoid part is stopped. Therefore, the dangerous state inside the door after the device is stopped will continue to exist, and the device application does not use the electromagnetic locking type.

◆ Correct tightening torque

Be sure to tighten the screws of the switch correctly. Loose screws may cause malfunction. When using an electric screwdriver or similar tool to attach the screw head and loosen the screw, do not screw the screw to the position where the thread is untripped. Otherwise, the end of the thread may be damaged.

Type	Correct tightening torque
Terminal screws	0.78N.m
Lock cap screws	0.69N.m
Operating head screw	0.59N.m
Perform the key installation screws	2.75N.m
Body mounting screws	0.69N.m
Connector	2.16N.m

◆ Installation of switch and operation keys

1.Please use M4 screws and washers to install the switch and operation key, and tighten with appropriate torque.

2.For safety, use screws that will not be easily removed or take similar measures to prevent switches and operating keys from being easily removed.

3.If the switch is installed on the back, the release key can only be operated from the bottom, and the indicator light cannot be used.

4.Ensure that the alignment deviation between the operating key and the keyhole is within the millimeter of the keyhole. If the operating key deviates from this position or is angled, it may cause accelerated wear or damage to the switch.

Please observe the installation method of inserting the operation key vertically into the keyhole.

5.Do not exert excessive force on the operating key when the key is inserted into the switch, or drop the switch with the operating key inserted.
6.Failure to do so may cause the key to deform or break the switch.

◆ About the change of head orientation

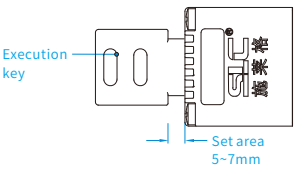
1.Remove the screws at the corners of the head to change the direction of the head to the prisoner. Switch heads can be installed in four directions. However, be careful not to mix with exotic objects, and you need to dial out the white actuator to rotate synchronously.

2.Do not change the switch head orientation when removing the cover.

3.Do not insert or remove the operation key when the switch head is removed. Otherwise, the operation key may not be inserted.

◆ About the fixing of the door

When the door is closed (when the operating key is inserted), the operating key may be pushed back outside the setting area due to the weight of the door, the vibration of the equipment, or the rubber used for cushioning the door. Attempting to open the door at this time may result in damage or malfunction of the door. In addition, when unlocking, the lock may not be released if a load is applied to the operation key. Do not use this switch as a replacement crystal for door locking devices. Please secure the door with a positioning piece to ensure that the operating key remains in the setting area.



◆ About the release knob

1.It is used to unlock in case of power failure or emergency.

2.After using the tool to switch from the LOCK position to the UNLOCK position, the lock is released, and the safety door can be opened (mechanical locking type only).

3.When the electromagnetic locking type is in the locking state (solenoid ON state), it is necessary to directly power off the solenoid or add a solenoid switch to the outside to unlock it.

4.When leaving the factory, the release knob of TML1□-□□□□+□□□□ is set in the LOCK position, once the execution key is inserted, it is necessary to power the solenoid or rotate the unlock knob to the UNLOCK position to dial out the execution key.

5.Do not use this release knob when the device stops starting.

6.Only the person in charge can perform the auxiliary lock release.

7.Do not apply more force than 1N.m to the screw part of the release knob. Otherwise, the release knob may break and become inoperable.

8.In order to prevent the release knob from being used by an unspecified person, please put the release knob in the LOCK state and seal it with sealing wax (wax seal), etc.

Warn

◆Electromagnetic locking model, it is forbidden to transfer the manual unlocking knob from the LOCK position to the UNLOCK position when the electromagnet is energized, otherwise it will cause irreparable damage to the TML product;
◆Electromagnetic locking model, in the case of electromagnet power failure, the manual unlocking knob will be transferred from the LOCK position to the UNLOCK position, the electromagnet is energized, the contact will not operate, and the locking force cannot be provided to the safety gate. To get the product working properly again, you need to turn the manual unlock knob to the LOCK position.

◆ Install the outer cover

• When installing the cover, confirm the condition of the sealing rubber and confirm that there are no foreign objects. If the sealing rubber attached to the cover is misaligned or adheres to foreign objects, the sealing performance will be affected.
• Do not use on products other than the intended screws when installing the cover. Otherwise, the sealing characteristics will be affected.

◆ Solenoids

• The solenoid will become hot when it is live, do not touch it.

• The DC solenoid has a polarity, please confirm the polarity of the terminal before wiring.

◆ Wiring considerations

1.Do not wire the switch while it is powered on. Failure to do so may result in electric shock.

2.When wiring, do not allow particulate matter such as small wires to enter the switch body.

3.When connecting the terminals through the insulation sales and M4 crimping terminals, make sure that they are not pressed on the housing and cover.

4.The applicable wire size is: AWG20 ~ AWG18 (0.5~0.75mm), please use the appropriate length of the wire to wire. Failure to do so may result in the cover arching or not being properly secured.

5.Do not stuff the crimp terminal into the gap of the shell, otherwise it may cause the shell to be damaged and deformed.

6.To avoid contact between the terminal and the inside of the switch housing, use a terminal with a thickness of 0.5mm or less.

◆ Handle the catheter opening

1. It is recommended to use Ml6×1.5 fast waterproof cable connector to connect to the lead window, screw in the product shell thread length is not less than 5.5mm, and tighten with appropriate torque. If over-tightened, the case may be damaged.

2. Make sure the outer diameter of the cable connected to the connector is correct.

3. When wiring, install a catheter cap on an unused catheter port and fasten it with appropriate torque, and the switch is supplied with a catheter cap.

Danger	◆ Personal injury may occur. Before using this device, be sure to check that the safety functions are working properly. Safety functions may not function properly due to incorrect wiring, incorrect settings or faulty switches, resulting in some devices remaining operational when they should have stopped. ◆ There is a possibility of personal injury. If the device is used when the release key is in the UNLOCK position, the electromagnetic lock may not work, causing some devices to remain operational when they should stop. Before using the device, be sure to put the release key in the LOCK position. Also, check the status of the locking and safety circuits. ◆ There is a possibility of personal injury. Before changing the orientation of the head, be sure to set the release key to the "UNLOCK" position, or install the operating key. Failure to do so can damage the switch, causing some devices to remain operational when they should be stopped. See "About releasing knobs" on page 7. ◆ Personal injury may occur. When the electromagnetic locking function or switch function is damaged, some devices may remain operational when they should stop. Do not use the electromagnetic locking function of the switch instead of the door lock, be sure to prepare a lock that is independent of the switch, and put a warning label on the door to prevent others from forcefully opening it while the door is locked, or you can also prepare an indicator light to show the locked/unlocked status of the door. ◆ During installation, please apply medium strength thread glue to the fixing screw to prevent the TML safety door lock body and the screw that executes the key from moving. ◆ Please prepare the screws (M4) for fixing the actuator, inductor, and mounting bracket to the device.
Warn	◆ Electric shock is possible. ◆ Do not use metal connectors or metal conduits.