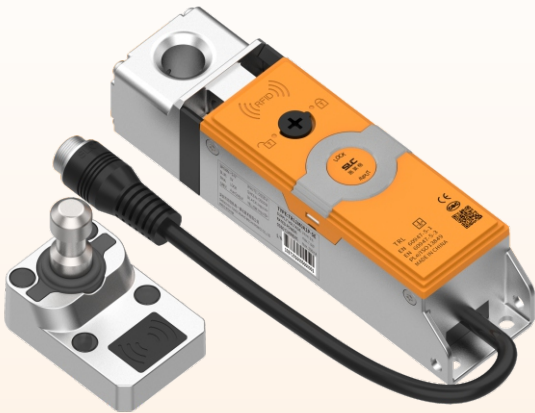




TRL1/TRL3

Series Safety

Door Lock



Features

The TRL1 and TRL3 series safety door locks are based on RFID radio frequency induction coding technology and use a monitored stainless steel lock bolt mechanism for a protective door device involving personal or machine safety. Safety Level SIL3 or PLe can be achieved with safe dual-channel output technology and can be used with safety latch.

Technical parameter

Security level

Standards	ISO 13849-1 IEC/EN60947-5-3
Safety classification	ISO 13849-1 compliant class 4 switch/SIL3 dual channel interlock for PLe/PLd
Certificate	CE CQC

Protection

- ◇ Safety short-circuit protection
- ◇ Current limit
- ◇ Overload protection
- ◇ Over Voltage Protection
- ◇ Overheat protection stops and restarts
- ◇ Reverse polarity protection
- ◇ Transient noise protection
- ◇ Failure pulse protection

Output

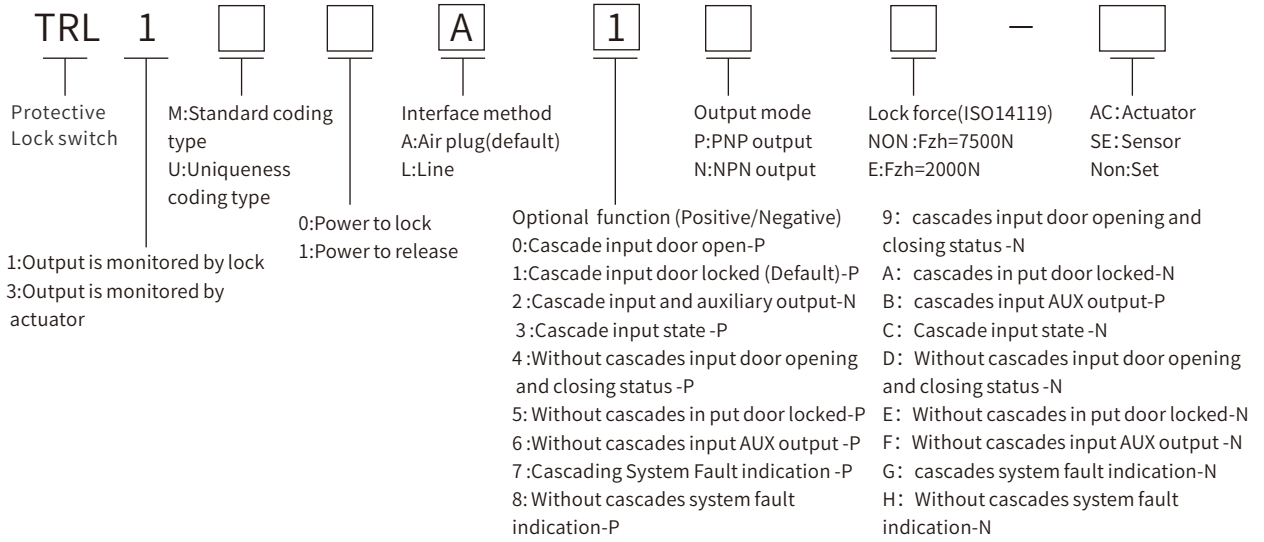
Security output	2 way Redundant PNP or NPN output (Self diagnostic test pulse)
AUX output	1 way PNP or NPN output (door close / door lock / auxiliary output fault indication)


Technical parameters


Deviation of bolt insertion	Max.: $\pm 2\text{mm}$
Lock hold force F_{max} (ISO14119)	9750N or 3000N
Lock hold force F_{zh} (ISO14119)	77500N or 2000N
Minimum operating radius of revolving door	$\geq 220\text{mm}$
Output current	DC $24\text{V} \pm 15\%$
Rated power	4.6W (no load) \ast
Output current	Max.: 200mA
Output conduction voltage drop	$< 2.5\text{V}$ @ 200mA
Leakage current	$< 100\mu\text{A}$
Operating Frequency	0.5Hz
Response time	100ms (Independent work)
Risk time	100ms
Start-up time	3.5s
Protection level	IP67
Operating temperature	$0\text{...}+55^{\circ}\text{C}$
Relative humidity	$5\text{...}95\%$
Materials	Nylon/Zinc alloy /Stainless steel
PFHd	$< 4.2 \times 10^{-8}$
MTTFd	288 years


\ast When locking and unlocking the action, the maximum power is 10W (no negative load) and the duration is 200ms


Model number description TRL1



BROWN: +24V BLUE: 0V PINK: LOCK GREY: Aux Output	WHITE: OSSD A GREEN: OSSD B BLACK: Input A+ YELLOW: Input B+	TYPE:TRL1M0A1P-SE SUPPLY VOLTAGE: 24V±15% RATED POWER: max.7.5W OSSD CURRENT: max. 200mA
深圳市同创机电一体化技术有限公司 SHENZHEN TONGCHUANG MECHATRONICS CO.,LTD MADE IN CHINA		S/N:  10372010005000001

BROWN: +24V BLUE: 0V PINK: LOCK GREY: Aux Output	WHITE: OSSD A GREEN: OSSD B BLACK: Input A+ YELLOW: Input B+	TYPE:TRL1M0A1PE-SE SUPPLY VOLTAGE: 24V±15% RATED POWER: max.7.5W OSSD CURRENT: max. 200mA
深圳市同创机电一体化技术有限公司 SHENZHEN TONGCHUANG MECHATRONICS CO.,LTD MADE IN CHINA		S/N:  10372010005000001

BROWN: +24V BLUE: 0V PINK: LOCK GREY: Aux Output	WHITE: OSSD A GREEN: OSSD B BLACK: Input A+ YELLOW: Input B+	TYPE:TRL3M0A1P-SE SUPPLY VOLTAGE: 24V±15% RATED POWER: max.7.5W OSSD CURRENT: max. 200mA
深圳市同创机电一体化技术有限公司 SHENZHEN TONGCHUANG MECHATRONICS CO.,LTD MADE IN CHINA		S/N:  10367010001000001

BROWN: +24V BLUE: 0V PINK: LOCK GREY: Aux Output	WHITE: OSSD A GREEN: OSSD B BLACK: Input A+ YELLOW: Input B+	TYPE:TRL3M0A1PE-SE SUPPLY VOLTAGE: 24V±15% RATED POWER: max.7.5W OSSD CURRENT: max. 200mA
深圳市同创机电一体化技术有限公司 SHENZHEN TONGCHUANG MECHATRONICS CO.,LTD MADE IN CHINA		S/N:  10367010149000001

TRL1 Selection table type

Lock force	Type	Lock type	PNP/NPN	Actuator	Sensor	Actuator+Sensor	Order numbe (AC+SE)
Fzh:7500N	Standard coding	Power to lock	PNP	TRL1M0P-AC	TRL1M0A1P-SE	TRL1M0A1*P	LOT136352299SCPE
			NPN	TRL1M0N-AC	TRL1M0A1N-SE	TRL1M0A1*N	LOT136352299SCNE
		Power to release	PNP	TRL1M1P-AC	TRL1M1A1P-SE	TRL1M1A1*P	LOT136352299SCPO
			NPN	TRL1M1N-AC	TRL1M1A1N-SE	TRL1M1A1*N	LOT136352299SCNO
	Uniqueness coding	Power to lock	PNP	TRL1U0P-AC	TRL1U0A1P-SE	TRL1U0A1*P	LOT136352299UCPE
			NPN	TRL1U0N-AC	TRL1U0A1N-SE	TRL1U0A1*N	LOT136352299UCNE
		Power to release	PNP	TRL1U1P-AC	TRL1U1A1P-SE	TRL1U1A1*P	LOT136352299UCPO
			NPN	TRL1U1N-AC	TRL1U1A1N-SE	TRL1U1A1*N	LOT136352299UCNO
Fzh:2000N	Standard coding	Power to lock	PNP	TRL1M0P-AC	TRL1M0A1PE-SE	TRL1M0A1*PE	LOT1E36352299SCPE
			NPN	TRL1M0N-AC	TRL1M0A1NE-SE	TRL1M0A1*NE	LOT1E36352299SCNE
		Power to release	PNP	TRL1M1P-AC	TRL1M1A1PE-SE	TRL1M1A1*PE	LOT1E36352299SCPO
			NPN	TRL1M1N-AC	TRL1M1A1NE-SE	TRL1M1A1*NE	LOT1E36352299SCNO
	Uniqueness coding	Power to lock	PNP	TRL1U0P-AC	TRL1U0A1PE-SE	TRL1U0A1*PE	LOT1E36352299UCPE
			NPN	TRL1U0N-AC	TRL1U0A1NE-SE	TRL1U0A1*NE	LOT1E36352299UCNE
		Power to release	PNP	TRL1U1P-AC	TRL1U1A1PE-SE	TRL1U1A1*PE	LOT1E36352299UCPO
			NPN	TRL1U1N-AC	TRL1U1A1NE-SE	TRL1U1A1*NE	LOT1E36352299UCNO

※Optional function: Replaceable

※The locking holding force Fzh complies with the ISO14119 test standard


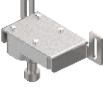







TRL3 Selection table type

Lock force	Type	Lock type	PNP/NPN	Actuator	Sensor	Actuator+Sensor	Order numbe (AC+SE)
F _{zh} :7500N	Standard coding	Power to lock	PNP	TRL1M0P-AC	TRL3M0A1P-SE	TRL3M0A1+P	LOT103672299SCPE
			NPN	TRL1M0N-AC	TRL3M0A1N-SE	TRL3M0A1+N	LOT103672299SCNE
		Power to release	PNP	TRL1M1P-AC	TRL3M1A1P-SE	TRL3M1A1+P	LOT103672299SCPO
			NPN	TRL1M1N-AC	TRL3M1A1N-SE	TRL3M1A1+N	LOT103672299SCNO
	Uniqueness coding	Power to lock	PNP	TRL1U0P-AC	TRL3U0A1P-SE	TRL3U0A1+P	LOT103672299UCPE
			NPN	TRL1U0N-AC	TRL3U0A1N-SE	TRL3U0A1+N	LOT103672299UCNE
		Power to release	PNP	TRL1U1P-AC	TRL3U1A1P-SE	TRL3U1A1+P	LOT103672299UCPO
			NPN	TRL1U1N-AC	TRL3U1A1N-SE	TRL3U1A1+N	LOT103672299UCNO
F _{zh} :2000N	Standard coding	Power to lock	PNP	TRL1M0P-AC	TRL3M0A1PE-SE	TRL3M0A1+PE	LOT1E10367299SCPE
			NPN	TRL1M0N-AC	TRL3M0A1NE-SE	TRL3M0A1+NE	LOT1E10367299SCNE
		Power to release	PNP	TRL1M1P-AC	TRL3M1A1PE-SE	TRL3M1A1+PE	LOT1E10367299SCPO
			NPN	TRL1M1N-AC	TRL3M1A1NE-SE	TRL3M1A1+NE	LOT1E10367299SCNO
	Uniqueness coding	Power to lock	PNP	TRL1U0P-AC	TRL3U0A1PE-SE	TRL3U0A1+PE	LOT1E10367299UCPE
			NPN	TRL1U0N-AC	TRL3U0A1NE-SE	TRL3U0A1+NE	LOT1E10367299UCNE
		Power to release	PNP	TRL1U1P-AC	TRL3U1A1PE-SE	TRL3U1A1+PE	LOT1E10367299UCPO
			NPN	TRL1U1N-AC	TRL3U1A1NE-SE	TRL3U1A1+NE	LOT1E10367299UCNO

※TRL3 series for process protection (safe shutdown, safe output start-up, lock-up determined by the customer's actual requirements)

※Optional function: Replaceable ※The locking holding force F_{zh} complies with the ISO14119 test standard

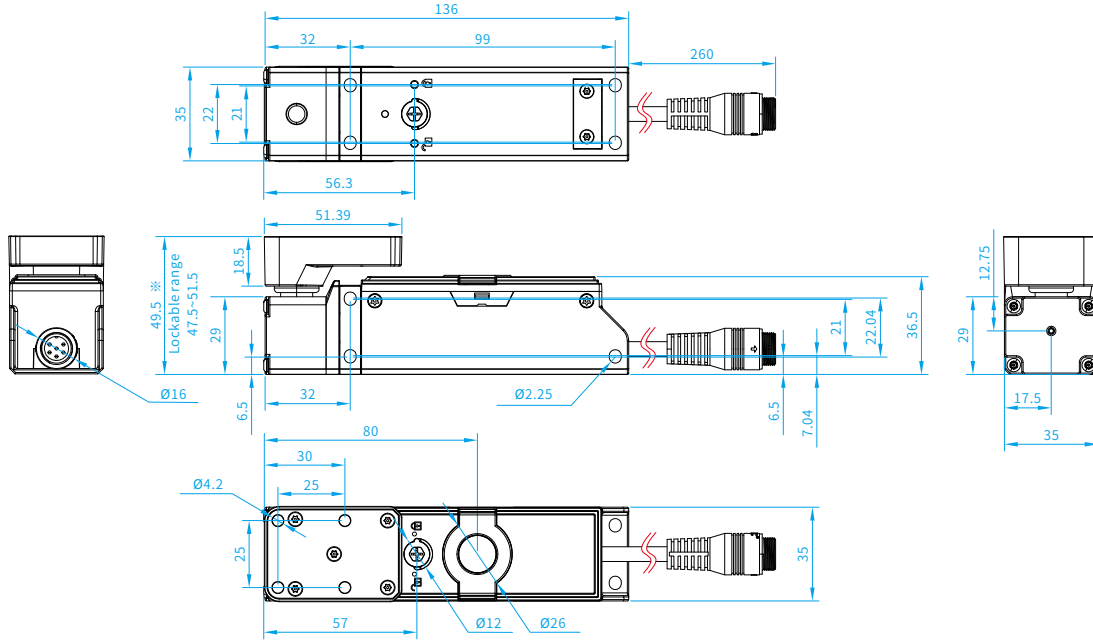
Accessories selection table

Type	Application Diagram	Name	Model number	Order number
Mounting bracket		TRL1 No. 1 right mounting bracket	TRL1-ZJ01	LOTTRL1-ZJ01
		TRL1 No. 2 right mounting bracket	TRL1-ZJ02R	LOTTRL1-ZJ02R
		TRL1 No. 2 left mounting bracket	TRL1-ZJ02L	LOTTRL1-ZJ02L
		TRL1 No. 3 mounting bracket	TRL1-ZJ03	LOTTRL1-ZJ03
		TRL1 No. 4 right mounting bracket※	TRL1-ZJ04R	LOTTRL1-ZJ04R
		TRL1 No. 4 left mounting bracket※	TRL1-ZJ04L	LOTTRL1-ZJ04L
Key fitting		Back release accessories	TRL1-H03	LOTTRL1H03
		Release the key manually	TRL1-F03	LOTTRL1F03
		Long release the key manually	TRL1-F04	LOTTRL1F04
Cable		Single end 3 meter cable	TRL1-LIN03	LOTTRL1-LIN03

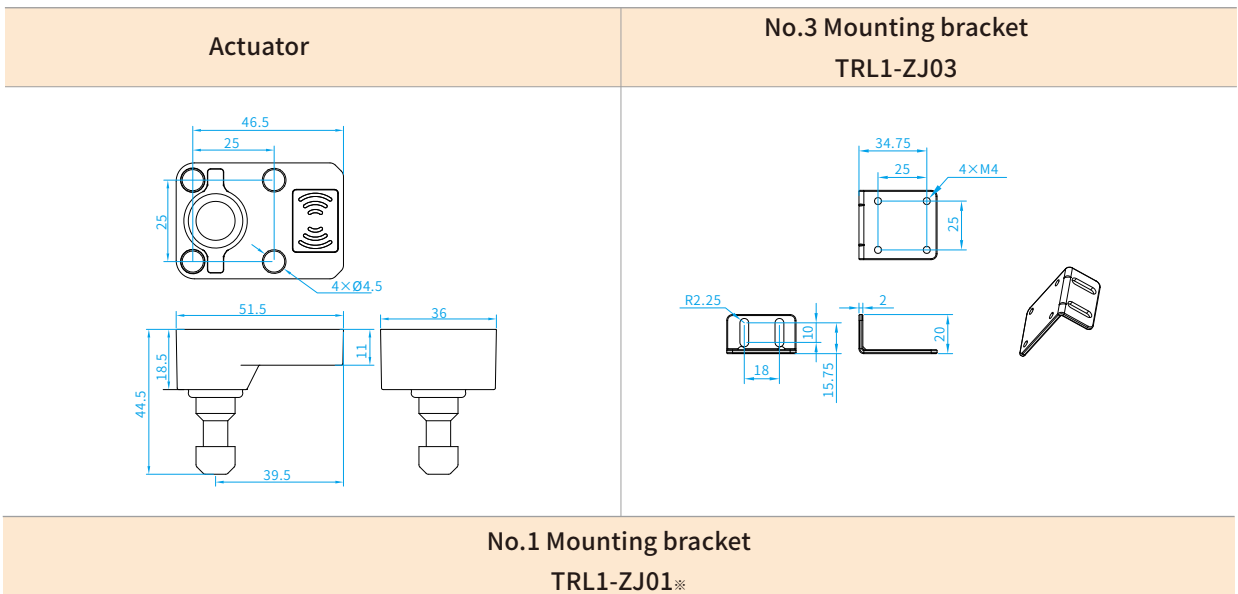
※ TRL1 No. 4 (left and right) mounting bracket: mainly used with rotary machine

※ TRL1 No. 1 mounting bracket: mainly suitable for use with TSL1/TSL2 safety bolt, detailed TSL1/TSL2 safety latch content

Mounting dimensions of sensors



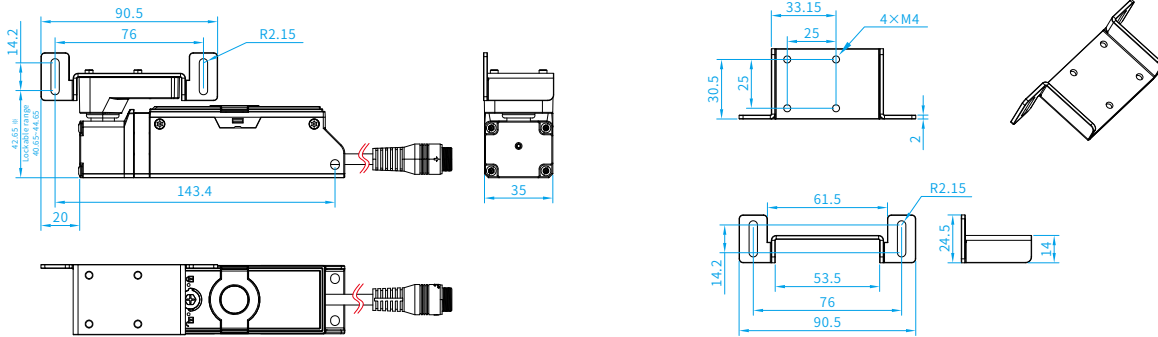
External dimensions of actuators and mounting brackets



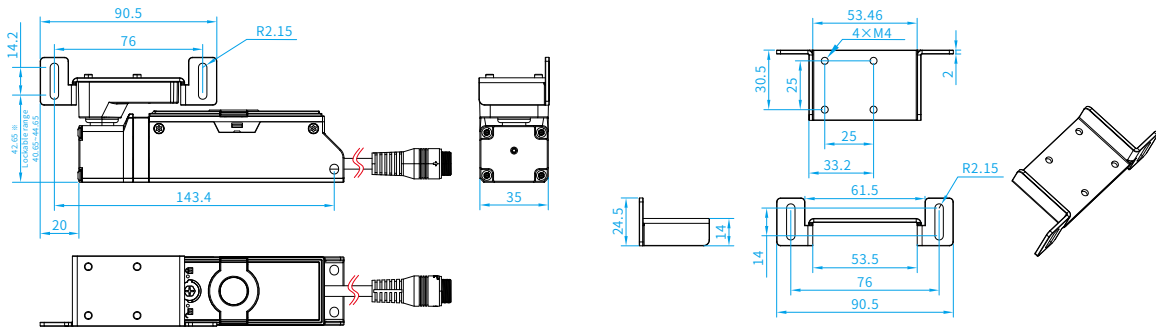
*Affected by product configuration and manufacturing process, the actual product size, weight may be different, please refer to the actual product

※ 49.5 ※ In this annotation method, the dimensions above the dimension line are the optimal installation dimensions, and the range dimensions below the dimension line are the ranges that can be locked after installation according to the dimensions above the dimension line.

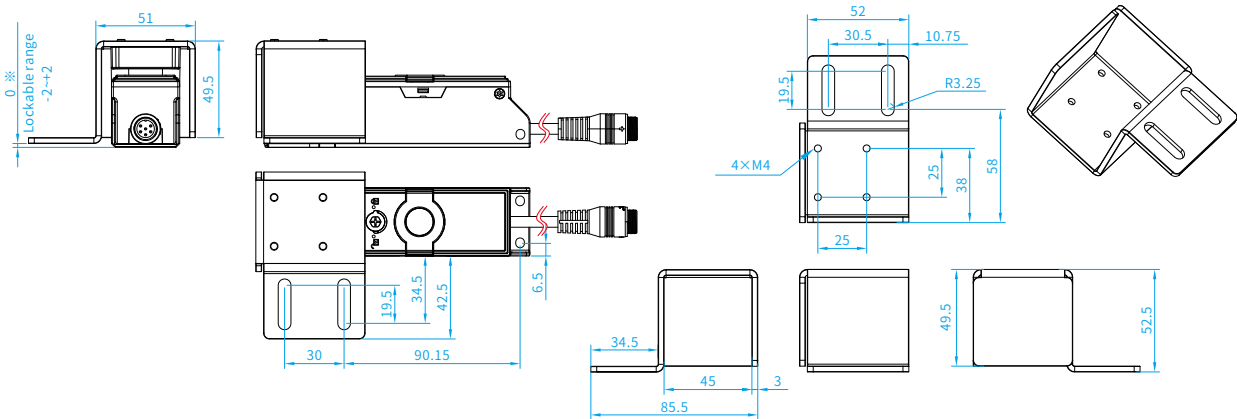
No.2 Mounting right bracket
TRL1-ZJ02R



No.2 Mounting left bracket
TRL1-ZJ02L



No.4 Mounting left bracket
TRL1-ZJ04L



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

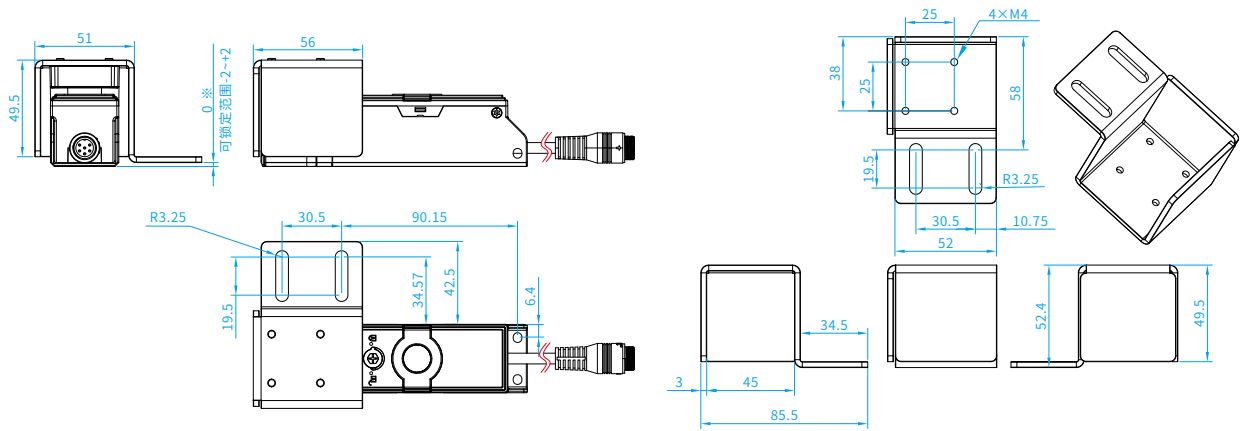
※TRL1 No.1 installation bracket: mainly suitable for use with TSL1/TSL2 safety door. Please refer to the content of TSL1/TSL2 safety door for details

※ 49.5 ※

In this annotation method, the dimensions above the dimension line are the optimal installation dimensions, and the range dimensions below the dimension line are the ranges that can be locked after installation according to the dimensions above the dimension line.

No.4 Mounting right bracket

TRL1-ZJ04R

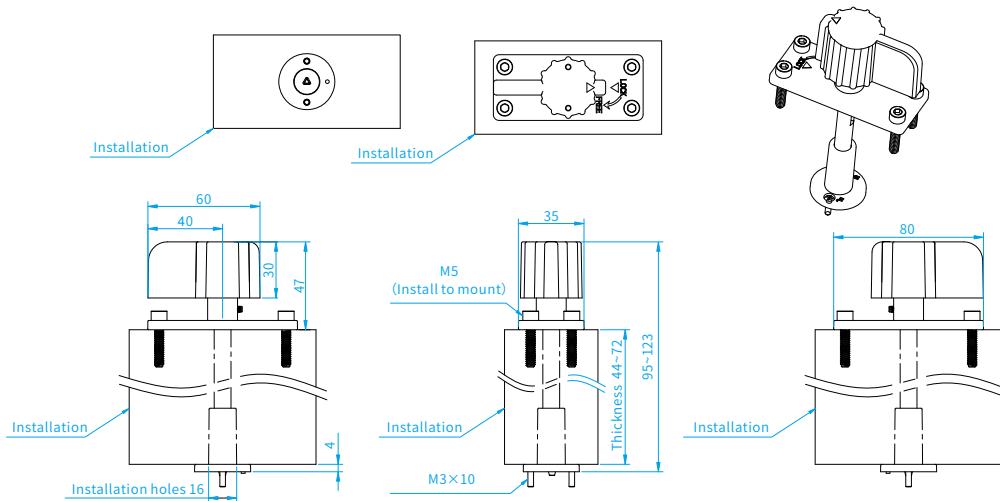


※Affected by product configuration and manufacturing process, the actual product size, weight may be different, please refer to the actual product

※ 49.5 ※ In this annotation method, the dimensions above the dimension line are the optimal installation dimensions, and the range dimensions below the dimension line are the ranges that can be locked after installation according to the dimensions above the dimension line.

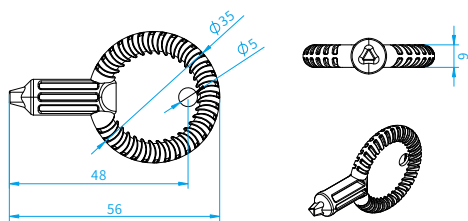
Back release accessories

TRL1-H03



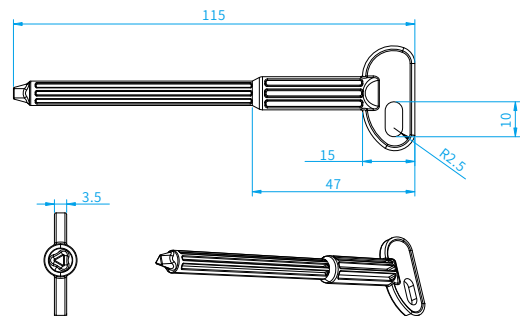
Release the key manually

TRL1-F03

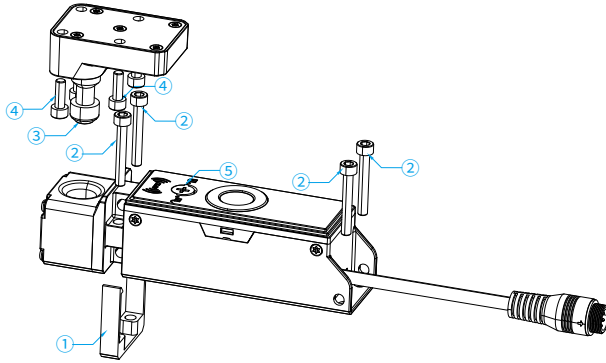


Long release the key manually

TRL1-F04




> Direct installation steps




① Turn the sensor screw slider to the opposite side of the screw head that needs to be fixed (4 mounting directions for every 90° rotation);

② Use 4 M4 screws to fix the actuator on the safety side, pay attention to the need to ensure that the back unlocking knob and the handle mounting hole are not blocked;

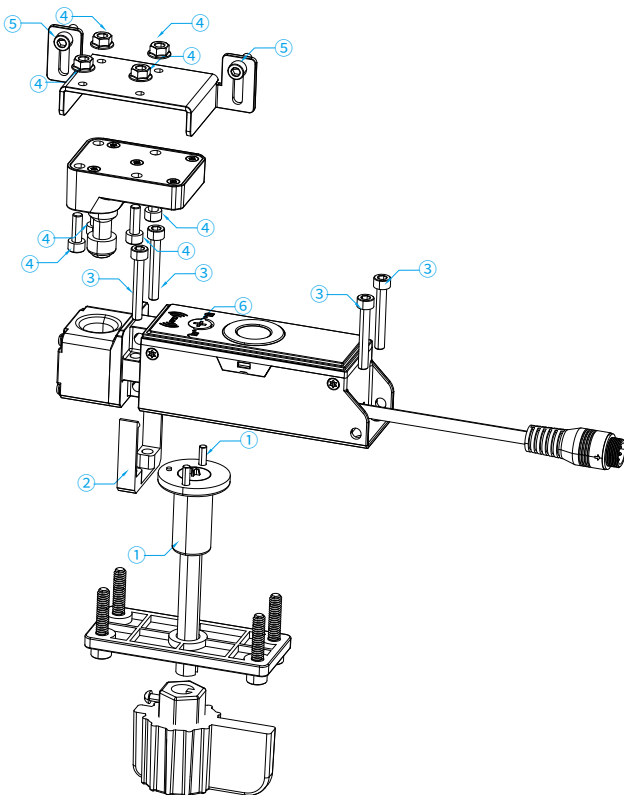
③ Insert the actuator into the sensor jack (the mechanical locking type needs to rotate the unlock knob to the  identified position first), and measure the position of the actuator mounting hole, and the actuator is close to the sensor, and the distance between the two shall not be greater than 3mm;

④ Use 4 screws to fix the sensor on the other side of the safety machine;

⑤ Turn the unlock knob to the marked position  to enable the TRL1 safety lock to work normally;

⑥ Load the 4 actuator mounting hole tamper plugs into the actuator mounting holes.


> With "mounting bracket" installation procedure




① Calculate and measure the position of the sensor mounting side, and punch holes in the position of the back unlock handle;

② Turn the sensor screw slider to the opposite side of the screw head that needs to be fixed (4 mounting directions for every 90° rotation);

③ Use 4 M4 screws to fix the actuator on the safety side, pay attention to the need to ensure that the back unlocking knob and the handle mounting hole are not blocked;

④ Insert the actuator into the sensor jack, (the mechanical locking type needs to rotate the unlock knob to  the marked position first) and adjust the installation direction of the "mounting bracket" (every 90° rotation of one installation direction, a total of 3 mounting directions), use 4 M4 screws to lock the "mounting bracket" and the actuator, close to the inductor, the distance between the two shall not be greater than 3mm;

⑤ Use 2 M4 screws to fix the "mounting bracket" and actuator combination on the other side of the safety machine;

⑥ Turn the unlock knob to  the marked position to enable the TRL1 safety lock to work normally;

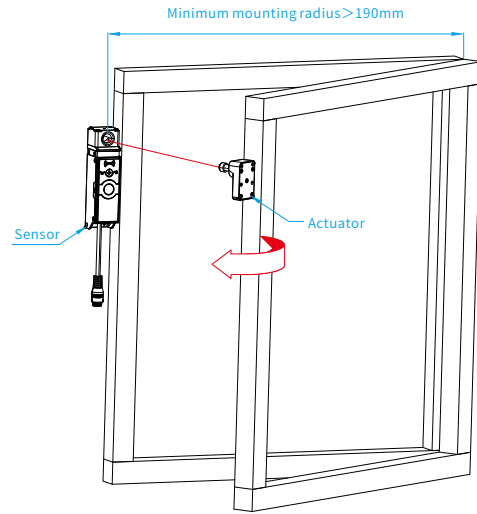
⑦ Load the 4 actuator mounting holes into the actuator mounting holes.

TRL1 series correct installation orientations



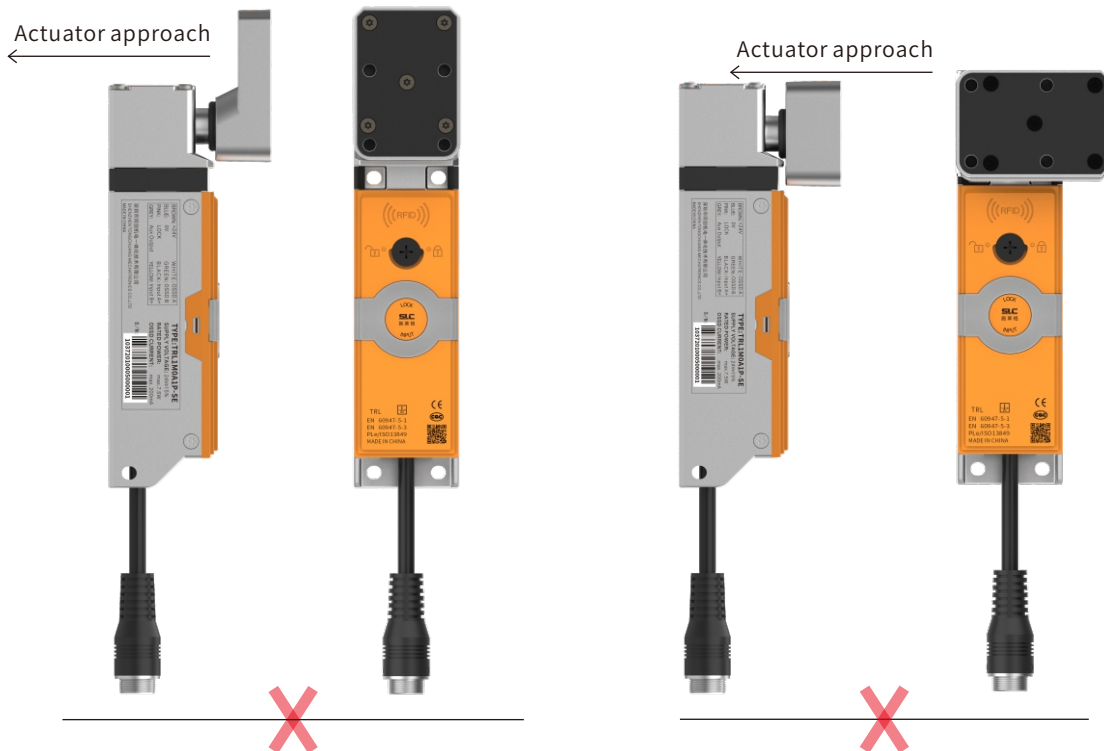
- ※The security lock must be installed as shown above.
- ※The actuator is only accessible from the front of the sensor.
- ※In special cases, it may be necessary to manually unlock the safety lock, after which a functional test must be performed.

TRL1 security door lock revolving door installation dimensions



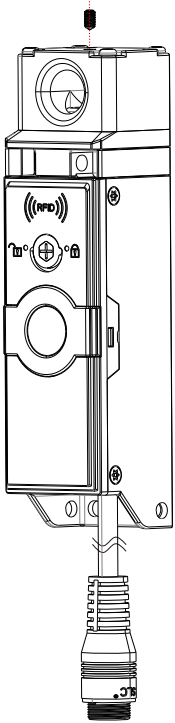
Minimum installation radius measurement position is the safety switch (safety interlock) actuator (execution key) insert port center to the revolving door rotating shaft center size.

Wrong approach direction



※The safety lock cannot be installed in the manne 「 shown above.

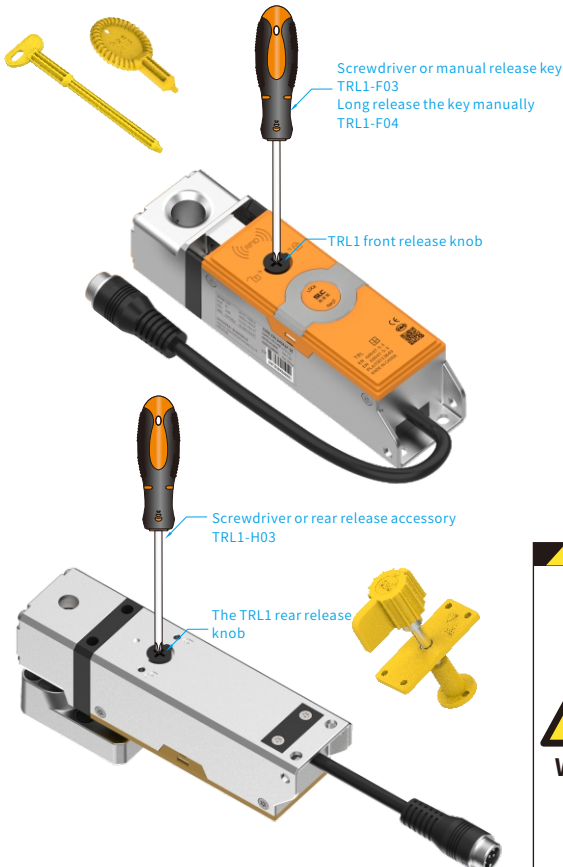
Adjust the smoothness of opening and closing



If the opening and closing are not smooth after installation, you can also remove the locking machine screw (1.5mm on the opposite side) in the left picture and then use it. Since the suction product is very easy to open in this case, please prepare the suction product according to the requirements.

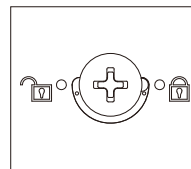
 Danger	<ul style="list-style-type: none"> ◆ To reduce the probability of invalidation, install the TRL1 safety lock in a location that is not easily accessible (such as, out of reach, physical shields or railings, concealed locations). Or secure it in a manner that cannot be removed to prevent the TRL1 safety lock from being removed or moved. ◆ For more information on minimizing the probability of invalidation, please refer to ISO14119. ◆ Actuators, inductors and other mounting brackets should be fixed according to the installation size requirements. ◆ During installation, please apply medium strength thread glue to the fixing screw to prevent the screws of the TRL1 safety lock sensor and actuator mounting bracket from loosening. ◆ If the special mounting bracket is not suitable for installation, please consult our product sales staff.
 Caution	<ul style="list-style-type: none"> ◆ When installing the rotating machine, please make sure that the rotation radius is greater than 220mm. ◆ When replacing actuators or sensors, please follow the same steps to replace them. ◆ Please prepare screws (M4) for fixing actuators, sensors, and mounting brackets to the device.

Instructions for unlocking

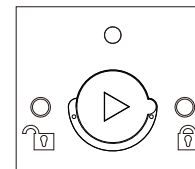


1. When manual release is required, please use a screwdriver or manual knob accessory, screw the front release knob of the TRL1 sensor from the position to the position , at this time the TRL1 sensor will not be able to lock the TRL1 actuator, to restore the locking function, you need to screw the front release knob of the TRL1 sensor from the position counterclockwise to the position .

2. TRL1 safety lock, only works properly when the front release knob and back release knob are in the position at the same time.



Cross release knob

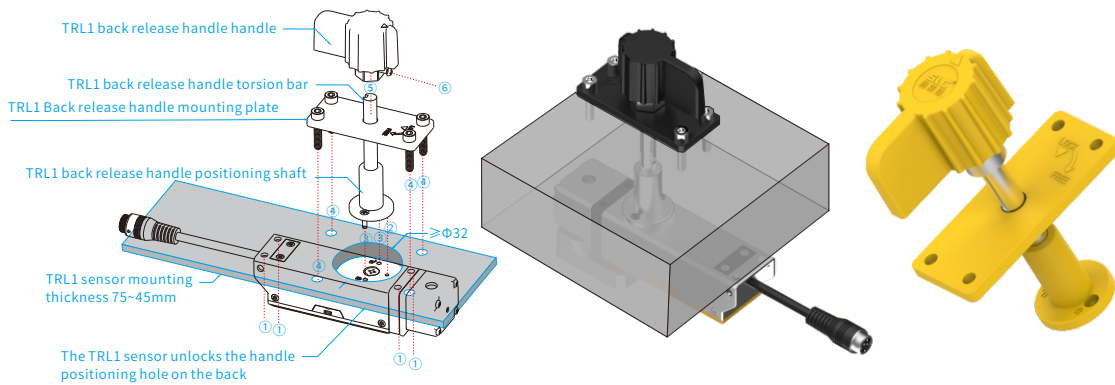


Triangle release knob

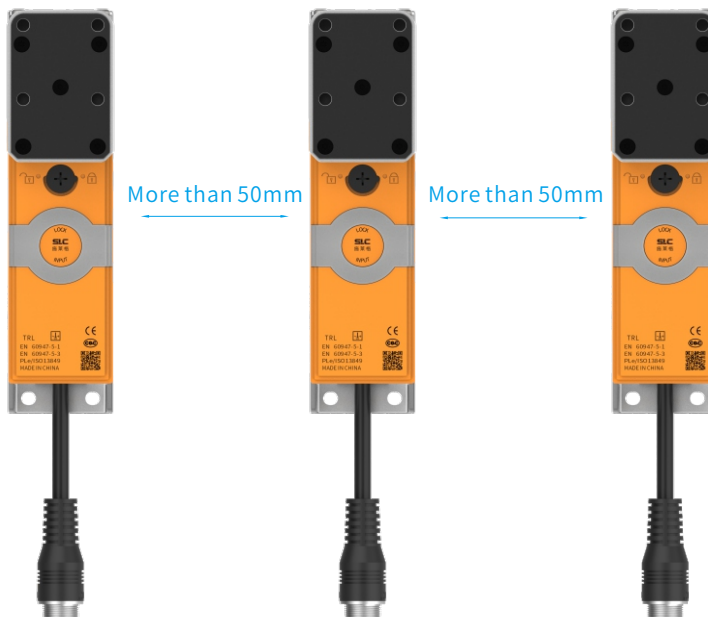
 Warn	<ul style="list-style-type: none"> ◆ Electromagnetic locking model, it is forbidden to turn the manual release knob from to position in the product locked state, otherwise it will cause irreparable damage to TRL products; ◆ Electromagnetic locking model, in the open state, after turning the manual release knob from to position, and then giving the lock signal, it will not be able to provide locking force for the safety machine. To get the product working properly again, you need to turn the manual release knob to the position.
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➤ Rear release accessories TRL1-H03 installation and use instructions

- ① Locate and punch holes in the TRL1 sensor mounting (thickness 75~45mm), diameter ≥ 32 mm, for installing the rear release accessory TRL1-H03, and install and fix the TRL1 sensor with 4 M4 screws;
- ② Put the rear release accessory TRL1-H03 torsion bar into the rear release accessory positioning shaft as shown in the figure, and align the positioning shaft bump and screw mounting hole with the TRL1 sensor positioning hole and screw hole respectively to ensure that the back release torsion bar cross position is inserted into the TRL1 sensor cross groove, and rotating the back release torsion bar can unlock the TRL1 sensor;
- ③ Use 2 M4 screws to fix the back unlock handle positioning shaft in the TRL1 actuator installation position;
- ④ Use 4 M4 screws to fix the rear release fitting mounting plate on the TRL1 sensor mounting plate (note that the marking direction of the mounting plate needs to be consistent with the actual unlocking direction; The screw degree needs to be determined according to the thickness of the mounting part, and the TRL1 sensor cannot be touched);
- ⑤ Load the TRL1 back release handle handle into the TRL1 back release handle torque bar and secure both with accessory screws as shown in (6). TRL1 back release handle handle.

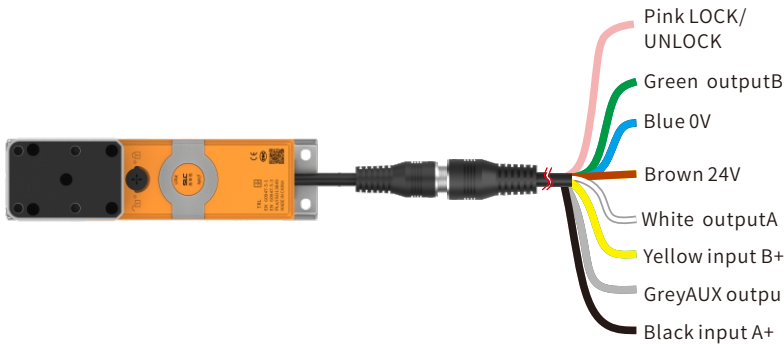


➤ Avoid mutual interference



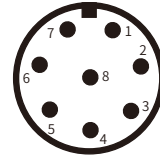
When multiple TRL1 safety locks are used, mutual interference may occur and TRL1 safety locks may malfunction. To prevent mutual interference, install the TRL1 safety lock as follows.

Interface signal definition

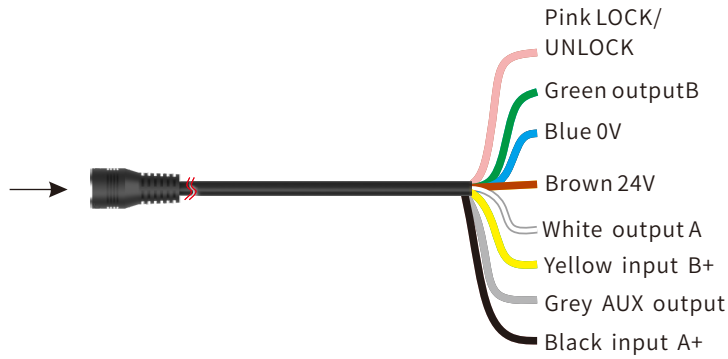
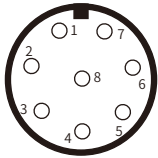


No.	Signal	Color	Definition
1	LOCK/UNLOCK	Pink	LOCK/UNLOCK
2	Security output B	Green	Safety Output
3	0V	Blue	Power negative
4	24V	Brown	Power positive
5	Security output A	White	Safety Output
6	Security Input B+	Yellow	Cascaded inputs (monitored)
7	AUX output	Grey	Status/Locked/Output Status
8	Input A+	Black	Cascaded inputs (monitored)

Bus

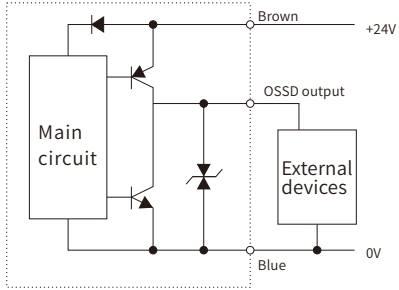


Bus bar

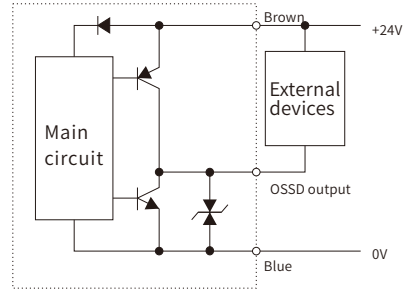


Input and output circuit diagrams

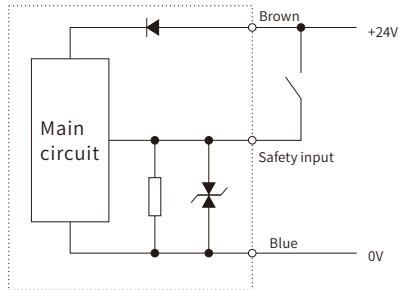
OSSO output circuit (PNP type)



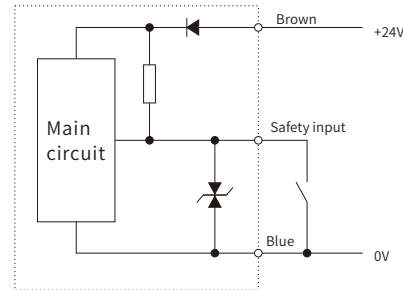
OSSO output circuit (NPN type)



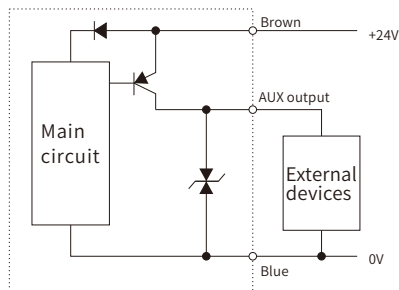
Safety input circuit (PNP type)



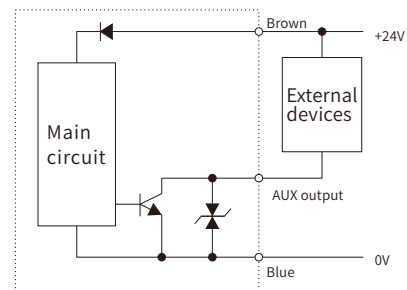
Safety input circuit (NPN type)



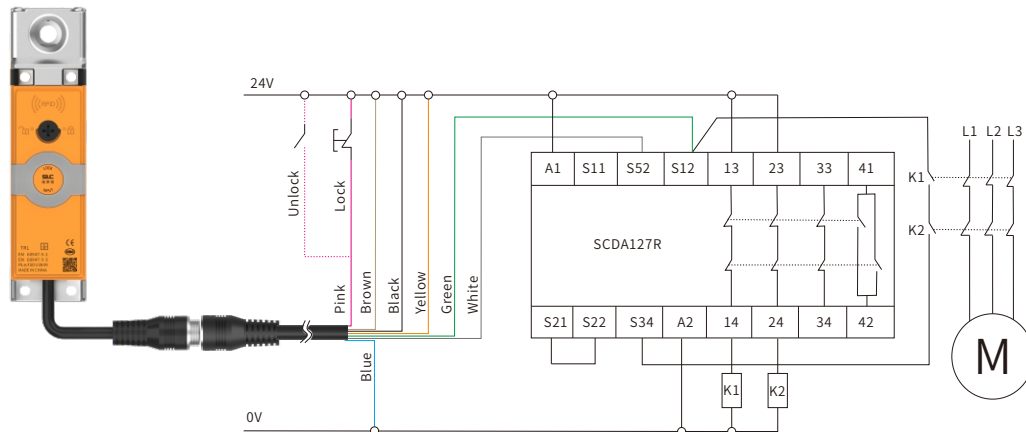
AUX输出电路图 (PNP型)



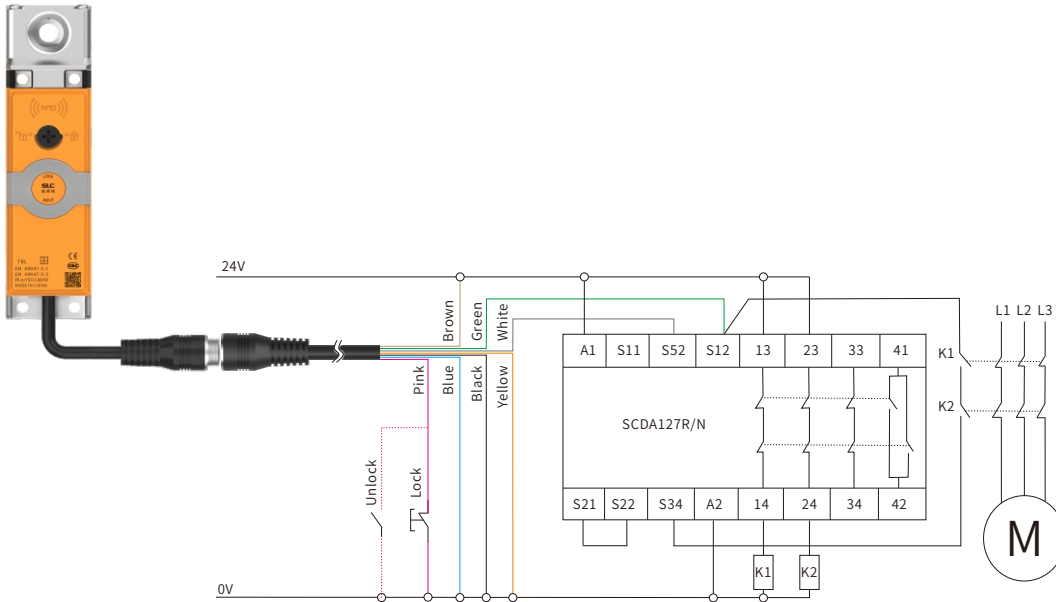
AUX输出电路图 (NPN型)



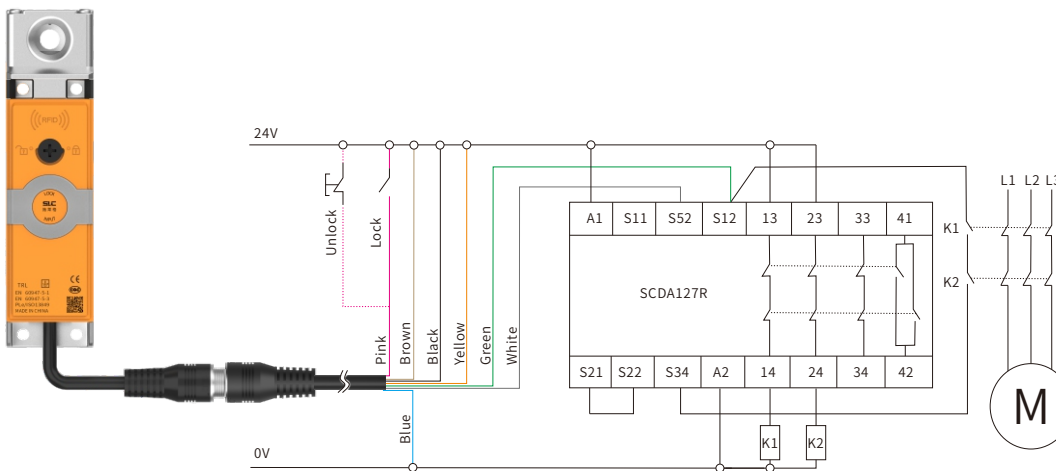
Example of electromagnetic locking PNP type safety lock with SCDA127R application wiring



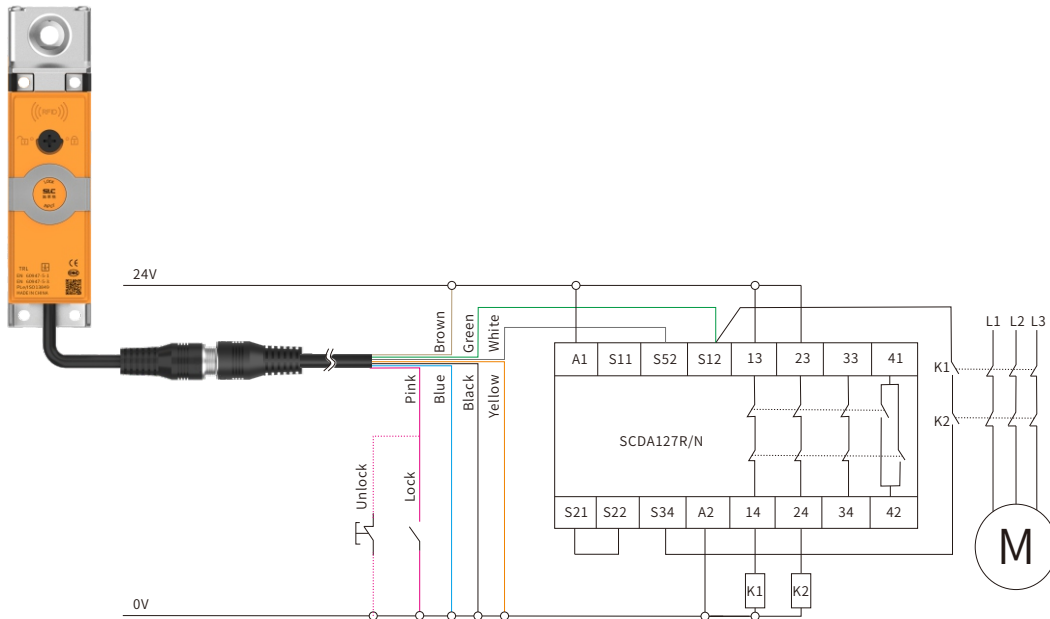
Example of electromagnetic locking NPN type safety lock with SCDA127R application wiring



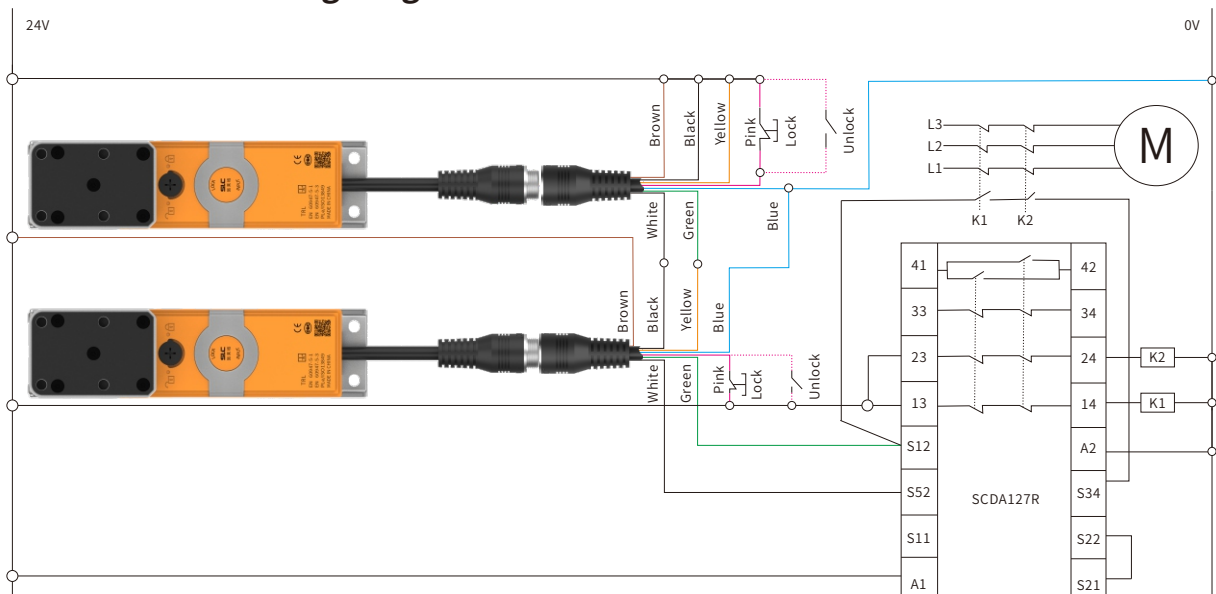
Example of mechanical locking PNP type safety lock with SCDA127R application wiring



➤ Example of mechanical locking NPN type safety lock with SCDA127R/N application wiring



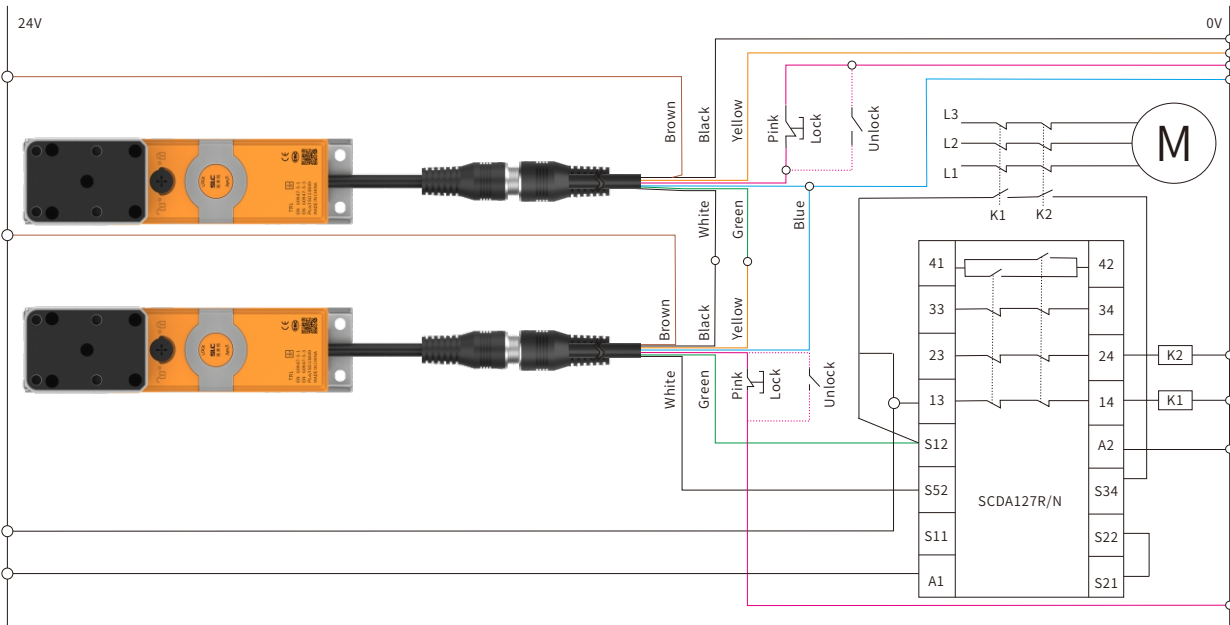
➤ Electromagnetic locking PNP type safety lock multi-lock cascade with SCDA127R wiring diagram



Caution

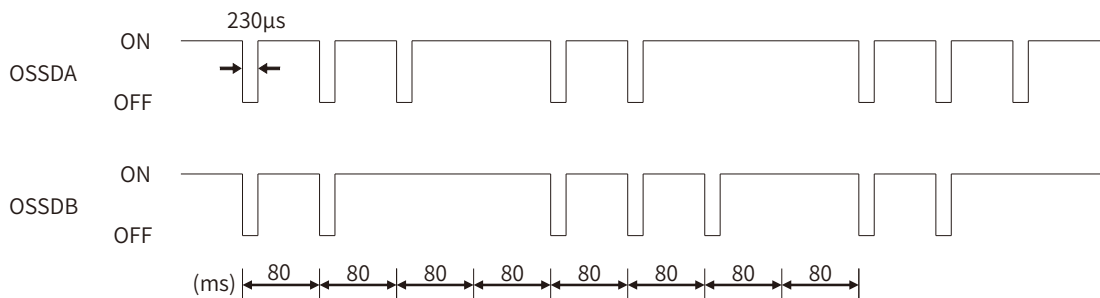
◆ When multiple sets of products are cascaded or used with a shared power supply, it is recommended to avoid collinear the LOCK signal of multiple sets of products to avoid product or system abnormalities caused by excessive instantaneous power.

Electromagnetic locking NPN type safety lock multi-lock cascade with SCDA127R/N wiring diagram



OSSD outputs self-diagnostic timing

The TRL1 safety lock has an output self-diagnostic function. During the TRL1 safety lock output conduction period, the TRL1 safety lock internal control timing control unit periodically and actively turns off the OSSDA and OSSDB outputs sequentially. During the short shutdown of OSSDA or OSSDB, the TRL1 safety lock internal timing control unit detects whether OSSDA or OSSDB is indeed closed, if it is indeed closed, the corresponding OSSD switch is in a normal working state, if OSSD is not detected to shut down, the corresponding OSSD fails, the system will immediately shut down the two OSSDs, at this time TRL1 safety lock red indicator flashes to ensure functional safety. Therefore, when the safety lock connection load is PLC or a fast smart device with MCU control, the self-test pulse needs to be filtered out in the program, and the following figure is the TRL1 safety lock self-diagnosis output waveform timing diagram.



*Devices connected to OSSD, such as safety relays or contactors, should not react to these temporary, self-diagnostic shutdown signals.

TRL1 functional status indication

Electromagnetic locking (PNP) type													LED indicator status									
Actuator alignment status	Lock door control signal (pink)	OSSD input (black/yellow)	Lock status	OSSD output (white/green)	Auxiliary indication, 0-H optional function (gray line)																	
					0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F	G	H
Misaligned	Low level	Low level	Unlock	0V	0V	24V	0V	0V	24V	0V	24V	0V	24V	0V	24V	0V	24V	0V	24V	0V	24V	0V
	High level	Low level	Unlock	0V	0V	24V	0V	0V	24V	0V	24V	0V	24V	0V	24V	0V	24V	0V	24V	0V	24V	0V
	High level	High level	Unlock	0V	0V	24V	0V	0V	24V	0V	24V	0V	24V	0V	24V	0V	24V	0V	24V	0V	24V	0V
Aligned	Low level	Low level	Unlock	0V	24V	0V	24V	0V	24V	0V	24V	0V	24V	0V	24V	0V	24V	0V	24V	0V	24V	0V
	Low level	High level	Unlock	0V	24V	0V	24V	0V	24V	0V	24V	0V	24V	0V	24V	0V	24V	0V	24V	0V	24V	0V
	High level	Low level	lock	0V	24V	24V	0V	24V	24V	0V	24V	24V	0V	24V	24V	0V	24V	24V	0V	24V	24V	0V
Aligned	High level	High level	lock	24V	24V	0V	24V	24V	0V	24V	24V	0V	24V	24V	0V	24V	24V	0V	24V	24V	0V	24V
	High level	Low level	lock	24V	24V	0V	24V	24V	0V	24V	24V	0V	24V	24V	0V	24V	24V	0V	24V	24V	0V	24V
	Low level	High level	lock	24V	24V	0V	24V	24V	0V	24V	24V	0V	24V	24V	0V	24V	24V	0V	24V	24V	0V	24V

Electromagnetic locking (NPN) type													LED indicator status									
Actuator alignment status	Lock door control signal (pink)	OSSD input (black/yellow)	Lock status	OSSD output (white/green)	Auxiliary indication, 0-H optional function (gray line)																	
					0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F	G	H
Misaligned	High level	Low level	Unlock	24V	24V	0V	24V	24V	0V	24V	24V	0V	24V	24V	0V	24V	24V	0V	24V	24V	0V	24V
	High level	High level	Unlock	24V	24V	0V	24V	24V	0V	24V	24V	0V	24V	24V	0V	24V	24V	0V	24V	24V	0V	24V
	Low level	Low level	Unlock	24V	24V	0V	24V	24V	0V	24V	24V	0V	24V	24V	0V	24V	24V	0V	24V	24V	0V	24V
Aligned	High level	Low level	Unlock	24V	24V	0V	24V	24V	0V	24V	24V	0V	24V	24V	0V	24V	24V	0V	24V	24V	0V	24V
	High level	High level	Unlock	24V	24V	0V	24V	24V	0V	24V	24V	0V	24V	24V	0V	24V	24V	0V	24V	24V	0V	24V
	Low level	High level	lock	24V	24V	0V	24V	24V	0V	24V	24V	0V	24V	24V	0V	24V	24V	0V	24V	24V	0V	24V
Aligned	Low level	Low level	lock	24V	24V	0V	24V	24V	0V	24V	24V	0V	24V	24V	0V	24V	24V	0V	24V	24V	0V	24V
	Low level	High level	lock	24V	24V	0V	24V	24V	0V	24V	24V	0V	24V	24V	0V	24V	24V	0V	24V	24V	0V	24V
	High level	Low level	lock	24V	24V	0V	24V	24V	0V	24V	24V	0V	24V	24V	0V	24V	24V	0V	24V	24V	0V	24V

Mechanical Locking (PNP) type													LED indicator status									
Actuator alignment status	Lock door control signal (pink)	OSSD input (black/yellow)	Lock status	OSSD output (white/green)	Auxiliary indication, 0-H optional function (gray line)																	
					0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F	G	H
Misaligned	Low level	Low level	Unlock	0V	0V	24V	0V	0V	24V	0V	24V	0V	24V	0V	24V	0V	24V	0V	24V	0V	24V	0V
	Low level	High level	Unlock	0V	0V	24V	0V	0V	24V	0V	24V	0V	24V	0V	24V	0V	24V	0V	24V	0V	24V	0V
	High level	Low level	Unlock	0V	0V	24V	0V	0V	24V	0V	24V	0V	24V	0V	24V	0V	24V	0V	24V	0V	24V	0V
Aligned	High level	Low level	Unlock	0V	24V	0V	24V	0V	24V	0V	24V	0V	24V	0V	24V	0V	24V	0V	24V	0V	24V	0V
	High level	High level	Unlock	0V	24V	0V	24V	0V	24V	0V	24V	0V	24V	0V	24V	0V	24V	0V	24V	0V	24V	0V
	Low level	Low level	lock	0V	24V	24V	0V	24V	24V	0V	24V	24V	0V	24V	24V	0V	24V	24V	0V	24V	24V	0V
Aligned	Low level	High level	lock	0V	24V	24V	0V	24V	24V	0V	24V	24V	0V	24V	24V	0V	24V	24V	0V	24V	24V	0V
	High level	Low level	lock	0V	24V	24V	0V	24V	24V	0V	24V	24V	0V	24V	24V	0V	24V	24V	0V	24V	24V	0V
	High level	High level	lock	0V	24V	24V	0V	24V	24V	0V	24V	24V	0V	24V	24V	0V	24V	24V	0V	24V	24V	0V

Mechanical Locking (NPN) type													LED indicator status									
Actuator alignment status	Lock door control signal (pink)	OSSD input (black/yellow)	Lock status	OSSD output (white/green)	Auxiliary indication, 0-H optional function (gray line)																	
					0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F	G	H
Misaligned	High level	Low level	Unlock	24V	24V	0V	24V	24V	0V	24V	24V	0V	24V	24V	0V	24V	24V	0V	24V	24V	0V	24V
	High level	High level	Unlock	24V	24V	0V	24V	24V	0V	24V	24V	0V	24V	24V	0V	24V	24V	0V	24V	24V	0V	24V
	Low level	Low level	Unlock	24V	24V	0V	24V	24V	0V	24V	24V	0V	24V	24V	0V	24V	24V	0V	24V	24V	0V	24V
Aligned	Low level	Low level	Unlock	24V	24V	0V	24V	24V	0V	24V	24V	0V	24V	24V	0V	24V	24V	0V	24V	24V	0V	24V
	Low level	High level	Unlock	24V	24V	0V	24V	24V	0V	24V	24V	0V	24V	24V	0V	24V	24V	0V	24V	24V	0V	24V
	High level	High level	lock	24V	24V	0V	24V	24V	0V	24V	24V	0V	24V	24V	0V	24V	24V	0V	24V	24V	0V	24V
Aligned	High level	Low level	lock	24V	24V	0V	24V	24V	0V	24V	24V	0V	24V	24V	0V	24V	24V	0V	24V	24V	0V	24V
	High level	High level	lock	24V	24V	0V	24V	24V	0V	24V	24V	0V	24V	24V	0V	24V	24V	0V	24V	24V	0V	24V
	Low level	Low level	lock	24V	24V	0V	24V	24V	0V	24V	24V	0V	24V	24V	0V	24V	24V	0V	24V	24V	0V	24V

TRL3 functional status indication






















Electromagnetic locking (PNP) type																							
Actuator alignment status	Lock door control signal (sprink)	OSSD input (black/yellow)	Lock status	OSSD output (white/green)	Auxiliary indication, 0~H optional function (gray line)										LED indicator status								
					0	1	2	3	4	5	6	7	8	9		A	B	C	D	E	F	G	H
Misaligned	Low level	Low level	Unlock	0V	0V	24V	0V	0V	24V	0V	0V	24V	0V	24V	0V	24V	0V	0V	24V	0V	24V	0V	0V
	High level	Low level	Unlock	0V	0V	24V	0V	0V	24V	0V	0V	24V	0V	24V	0V	24V	0V	0V	24V	0V	24V	0V	0V
	High level	High level	Unlock	0V	0V	24V	0V	0V	24V	0V	0V	24V	0V	24V	0V	24V	0V	0V	24V	0V	24V	0V	0V
Aligned	Low level	Low level	Unlock	24V	0V	0V	24V	0V	0V	24V	0V	0V	24V	0V	0V	24V	0V	0V	24V	0V	24V	0V	0V
	High level	Low level	lock	0V	24V	24V	0V	0V	24V	24V	0V	0V	24V	24V	0V	0V	24V	0V	0V	24V	24V	0V	0V
	High level	High level	lock	24V	24V	0V	24V	0V	0V	24V	24V	0V	0V	24V	24V	0V	0V	24V	24V	0V	0V	24V	24V





































Electromagnetic locking (NPN) type																							
Actuator alignment status	Lock door control signal (sprink)	OSSD input (black)	Lock status	OSSD output (white/green)	Auxiliary indication, 0~H optional function (gray line)										LED indicator status								
					0	1	2	3	4	5	6	7	8	9		A	B	C	D	E	F	G	H
Misaligned	High level	High level	Unlock	24V	24V	0V	0V	24V	0V	0V	24V	0V	0V	24V	0V	0V	24V	0V	0V	24V	0V	0V	24V
	High level	Low level	Unlock	24V	24V	0V	0V	24V	0V	0V	24V	0V	0V	24V	0V	0V	24V	0V	0V	24V	0V	0V	24V
	Low level	Low level	Unlock	24V	24V	0V	0V	24V	0V	0V	24V	0V	0V	24V	0V	0V	24V	0V	0V	24V	0V	0V	24V
Aligned	High level	High level	Unlock	0V	0V	24V	0V	0V	24V	0V	0V	24V	0V	0V	24V	0V	0V	24V	0V	0V	24V	0V	0V
	High level	Low level	lock	0V	0V	24V	0V	0V	24V	0V	0V	24V	0V	0V	24V	0V	0V	24V	0V	0V	24V	0V	0V
	Low level	Low level	lock	0V	0V	24V	0V	0V	24V	0V	0V	24V	0V	0V	24V	0V	0V	24V	0V	0V	24V	0V	0V

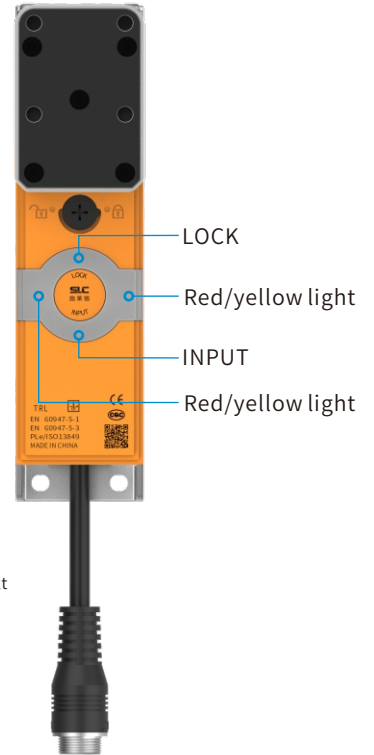
Mechanical Locking (PNP) type																							
Actuator alignment status	Lock door control signal (sprink)	OSSD input (black)	Lock status	OSSD output (white/green)	Auxiliary indication, 0~H optional function (gray line)										LED indicator status								
					0	1	2	3	4	5	6	7	8	9		A	B	C	D	E	F	G	H
Misaligned	Low level	Low level	Unlock	0V	0V	24V	0V	0V	24V	0V	0V	24V	0V	0V	24V	0V	0V	24V	0V	0V	24V	0V	0V
	Low level	High level	Unlock	0V	0V	24V	0V	0V	24V	0V	0V	24V	0V	0V	24V	0V	0V	24V	0V	0V	24V	0V	0V
	High level	Low level	Unlock	0V	0V	24V	0V	0V	24V	0V	0V	24V	0V	0V	24V	0V	0V	24V	0V	0V	24V	0V	0V
Aligned	High level	Low level	Unlock	0V	24V	0V	0V	24V	0V	0V	24V	0V	0V	24V	0V	0V	24V	0V	0V	24V	0V	0V	24V
	High level	High level	lock	0V	24V	0V	0V	24V	0V	0V	24V	0V	0V	24V	0V	0V	24V	0V	0V	24V	0V	0V	24V
	Low level	Low level	lock	0V	24V	24V	0V	0V	24V	24V	0V	0V	24V	24V	0V	0V	24V	24V	0V	0V	24V	24V	0V

Mechanical Locking (NPN) type																							
Actuator alignment status	Lock door control signal (sprink)	OSSD input (black)	Lock status	OSSD output (white/green)	Auxiliary indication, 0~H optional function (gray line)										LED indicator status								
					0	1	2	3	4	5	6	7	8	9		A	B	C	D	E	F	G	H
Misaligned	High level	Low level	Unlock	24V	24V	0V	0V	24V	0V	0V	24V	0V	0V	24V	0V	0V	24V	0V	0V	24V	0V	0V	24V
	High level	High level	Unlock	24V	24V	0V	0V	24V	0V	0V	24V	0V	0V	24V	0V	0V	24V	0V	0V	24V	0V	0V	24V
	Low level	Low level	Unlock	24V	24V	0V	0V	24V	0V	0V	24V	0V	0V	24V	0V	0V	24V	0V	0V	24V	0V	0V	24V
Aligned	Low level	Low level	Unlock	0V	0V	24V	0V	0V	24V	0V	0V	24V	0V	0V	24V	0V	0V	24V	0V	0V	24V	0V	0V
	High level	High level	lock	0V	0V	24V	0V	0V	24V	0V	0V	24V	0V	0V	24V	0V	0V	24V	0V	0V	24V	0V	0V
	High level	Low level	lock	0V	0V	24V	0V	0V	24V	0V	0V	24V	0V	0V	24V	0V	0V	24V	0V	0V	24V	0V	0V


















TRL1 Series Safety Lock LED Status





















LED status during normal operation					
Red light	Green light	INPUT yellow	LOCK yellow	Product status	
On 	Off 	Off 	Off 	No RFID tag (universal code)	
Double flash  	Off 	Off 	Off 	No RFID tag (unique code)	
On 	Off 	Off 	1Hz flash 	With RFID tag, no LOCK signal	
Off 	1Hz flash 	1Hz flash 	On 	With RFID tag, Locked, no input signal	
Off 	On 	On 	On 	With RFID tag, Locked, input signal	

LED status during fault					
Red light	Green light	INPUT yellow	LOCK yellow	Product status	
1Hz flash 	Off 	Off 	Off 	OSSD output overload/AUX output overload / OSSD output self-diagnostic fault/OSSD terminal voltage detection fault	
1Hz flash 	Off 	1Hz flash 	Off 	Supply voltage is out of operating range	
4Hz flash 	Off 	4Hz flash 	Off 	Enter Self-diagnostics	
4Hz flash 	Off 	Off 	Off 	Electromagnet fault/optocoupler self-diagnosis fault	
3 red 1 green Loop flash  	Off 	Off 	1Hz flash 	Opening timeout	
3 green 1 red Loop flash  	Off 	Off 	On 	Lock timeout	
Red and green alternate 1Hz flash  	Off 	Off 	Off 	Main and secondary MCU communication failures	
Red and green alternate 4Hz flash  	Off 	Off 	Off 	Unique encoding label and lock code do not match	



TRL3 Series Safety Lock LED Status

LED status during normal operation				LOCKLED status	
Red light	Green light	INPUT yellow	Product status	LOCK yellow	LOCK status
On 	Off 	Off 	No RFID tag (universal code)	Off 	No LOCK signal, unlocked
Double flash  	Off 	Off 	No RFID tag (unique code)	On 	LOCK signal, locked
Off 	1Hz flash 	1Hz flash 	With RFID tag, no input signal	1Hz flash 	No LOCK signal, unlock abnormal
Off 	On 	On 	With RFID tag, input signal	4Hz flash 	LOCK signal, lock abnormal

LED status during fault			
Red light	Green light	INPUT yellow	Product status
1Hz flash 	Off 	Off 	OSSD output overload/AUX output overload / OSSD output self-diagnostic fault/OSSD terminal voltage detection fault
1Hz flash 	Off 	1Hz flash 	Supply voltage is out of operating range
4Hz flash 	Off 	4Hz flash 	Enter Self-diagnostics
4Hz flash 	Off 	Off 	Electromagnet fault/optocoupler self-diagnosis fault
Red and green alternate 1Hz flash  	Off 	Off 	The main and secondary MCU communication failures
Red and green alternate 4Hz flash  	Off 	Off 	Unique encoding label and lock code do not match

※Start initialization, green light 2Hz flashes 3 times, and then enter normal working mode; If the green light does not flash 3 times at 2Hz when starting, you need to contact after-sales processing.

Unique encoding actuators use matching

TRL1 and TRL3 security locks are divided into universal code types and unique code types.※


The unique coding type TRL1 and TRL3 safety locks do not have a corresponding unique code when they leave the factory, and only need to match the encoding operation with TRL1 and TRL3 actuators (keys) when they are used for the first time.

The sensor that has completed the coding matching, when starting at power on (no actuator): ❶ After the green light flashes 3 times, the ❷ red light flashes 1s and then 2Hz flashes 2 times, repeat ❷, all other lights go off (unique code)

For sensors that have not completed coding matching, coding matching is required, and the process is as follows:

- ❶ Use the TRL1 and TRL3 actuators (keys) provided by our company to insert TRL1 and TRL3 safety locks that do not match the code;
- ❷ Power up TRL1 and TRL3 safety locks, and after the unmatched TRL1 and TRL3 safety locks are successfully initialized (green light flashes three times), they will enter the matching mode, at which time the traffic lights flash rapidly alternately;
- ❸ TRL1 and TRL3 safety locks will read the codes of TRL1 and TRL3 actuators (keys);
- ❹ After 5 seconds, TRL1 and TRL3 safety locks are successfully matched, and the traffic lights stop flashing alternately;
- ❺ Please power off and restart TRL1 and TRL3 safety locks.

※Once the unique encoding type TRL1 safety lock is successfully matched with a TRL1 actuator (key) code, thereafter, the TRL1 safety lock can only identify the TRL1 actuator (key) that has been matched, and cannot identify other TRL1 actuators (keys).

 Caution	<ul style="list-style-type: none"> ◆ When used for the first time, the actuator must be matched. ◆ During the actuator matching process, the actuator cannot be powered off and moved, otherwise the matching will be unsuccessful. ◆ After the actuator and the sensor are matched, they can only be used in pairing, and the sensor can no longer recognize other actuators.
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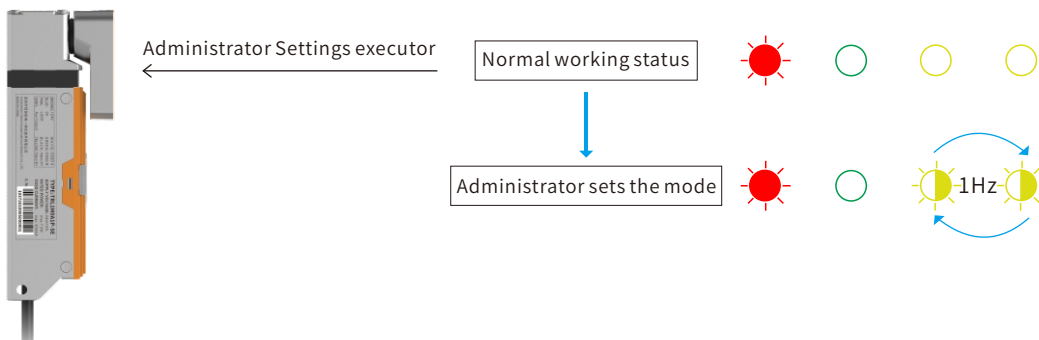
Description of TRL1 "Service Mode"

When the equipment needs to be repaired between the equipment, the maintenance personnel need to be authorized by the administrator of the equipment to enter the equipment, and the administrator uses the "administrator key" to set the authorization of the TRL1 lock, the TRL1 lock will enter the "maintenance mode" from the "normal working state" (at this time, it does not respond to the lock operation of the lock signal, and the OSSD output is always in the off state), and the maintenance inspector needs to use the "maintenance key" for TRL1. The lock verifies registration before entering the device. When the maintenance personnel leave the equipment after the maintenance work, they need to verify the TRL1 lock again to cancel the registration record, and the administrator of the equipment confirms that there is no one in the equipment, and then deauthorize the TRL1 lock to enter the "normal working state" from the "maintenance mode".

TRL1 Administrator Key and Repairman Key Instructions

1. Add an Administrator Key description

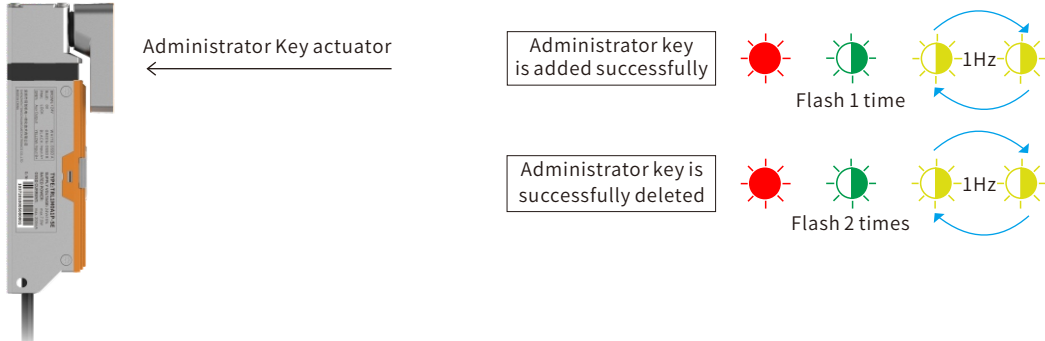
(1) Use the "administrator settings" actuator provided by our company to align with the TRL1 lock, about 5s later, TRL1 lock enters the "administrator setting mode", at this time the TRL1 lock two lights alternate slow flashing, the red light is always on, and the green light is off;



TRL1/TRL3 SERIES SAFETY DOOR LOCK

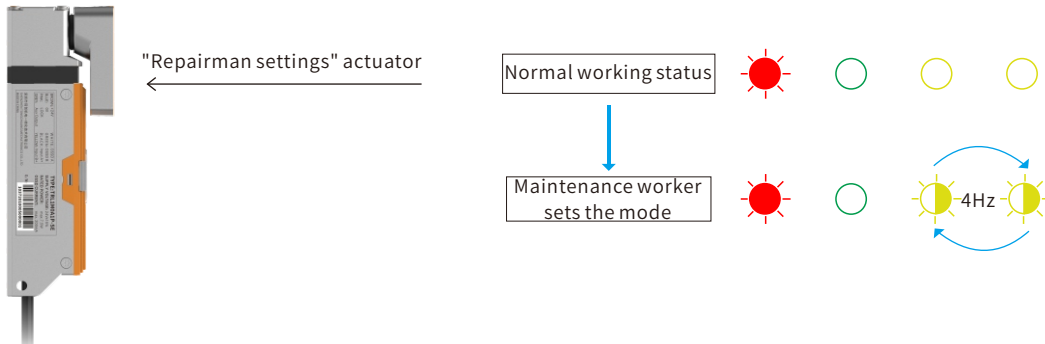
(2) Use the "administrator key" actuator provided by our company to align with the TRL1 lock, about 3s later, if the TRL1 lock green light flashes 1 time, it means that the "administrator key" is increased successfully, if the TRL1 lock green light flashes 2 times, it means that the "administrator key" is deleted successfully;

※ TRL1 lock can store up to 8 "administrator keys"



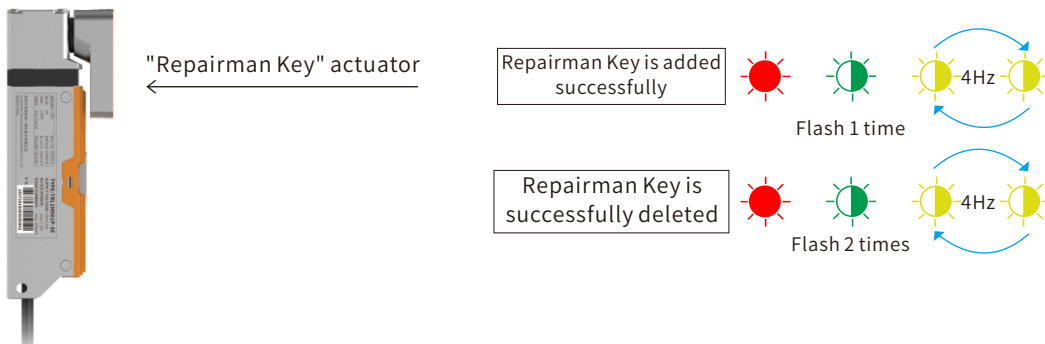
2.Add a "Repairman Key" description

(1) Use the "maintenance staff setting" actuator provided by our company to align with the TRL1 lock, about 5s later, TRL1 lock enters the "maintenance staff setting mode", at this time TRL1 lock two lights flash alternately, the red light is always on, and the green light is off;



(2) Use the "maintenance key" actuator provided by our company to align with the TRL1 lock, about 3s later, if the TRL1 lock green light flashes 1 time, it means that the "maintenance key" is successfully increased, if the TRL1 lock green light flashes 2 times, it means that the "maintenance key" is deleted successfully;

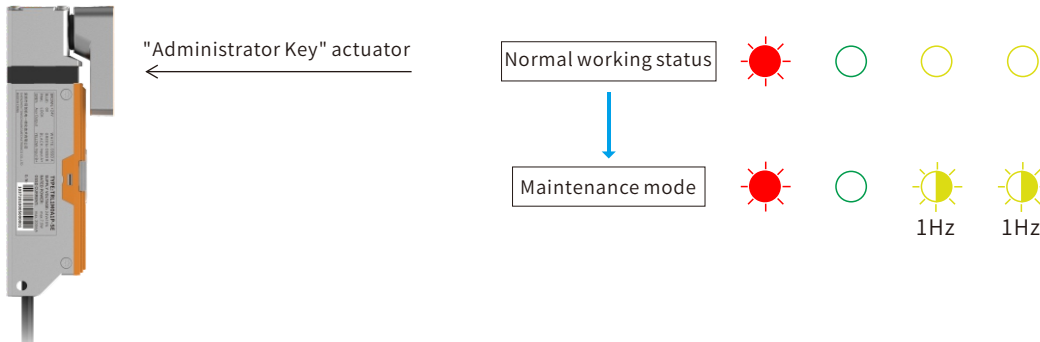
※ TRL1 lock stores up to 8 "Repairman Keys"



3.Steps to use the Administrator Key and Repairman Key

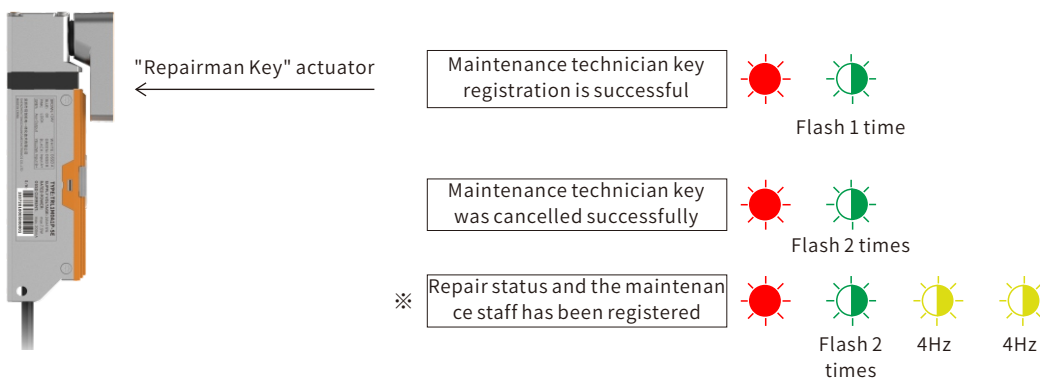
(1)Enter the "Service Mode" instructions

When the TRL1 lock is in the "normal working state", use the "administrator key" actuator to align the TRL1 lock, about 5s later, if the two lights flash slowly at the same time, the red light is always on, and the green light is off, indicating that the TRL1 lock has entered the "maintenance mode" at this time;



(2)Instructions for registering or canceling the "Repairman Key"

When the TRL1 lock is in "maintenance mode", use the "maintenance key" actuator to align the TRL1 lock with about 3s, if the green light flashes 1 time, it means that the "maintenance key" registration is successful, if the green light flashes 2 times, it means that the "maintenance key" cancels the registration successfully;



※When the TRL1 lock is in "maintenance mode" and there is a "maintenance key" registration record, both lights will flash at the same time.

(3)Instructions for exiting "Maintenance Mode"

When the TRL1 lock is in "maintenance mode" and there is no "maintenance key" registration record, use the "administrator key" actuator to align the TRL1 lock, about 5s later, if the red light is always on (for the universal code TRL1 lock), the green light and the lamp are off, indicating that the TRL1 lock has exited the "maintenance mode" and entered the "normal working state".

