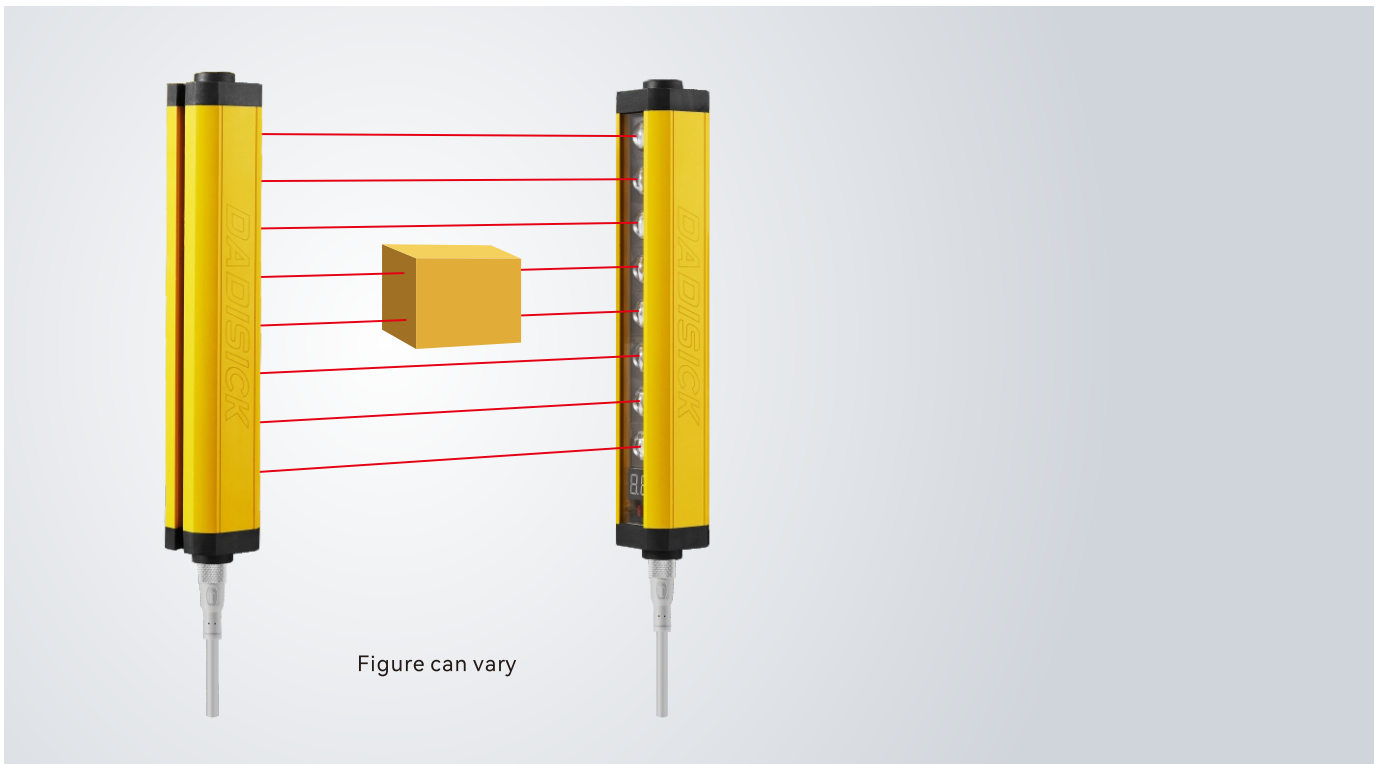


# USER'S MANUAL

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## MEASURING LIGHT CURTAINS SENSOR Emitter and Receiver DK-QL series



Thank you very much for purchasing DADISICK products!

**Please be familiar with the user manual and product manual before use.**

**For your safety, please be sure to follow the precautions in the safety precautions.**

**Please be sure to follow the instructions, product manual, DADISICK website, and other precautions.**

Please keep it properly for easy retrieval.

The specifications and external dimensions recorded in this manual are subject to change or discontinuation due to product improvements without prior notice.

Please confirm the latest information on the DADISICK website.

## SAFETY CONSIDERATIONS

- Observe all 'Safety Considerations' for safe and proper operation to avoid hazards.
-  Symbol indicates caution due to special circumstances in which hazards may occur.

 **Warning** Failure to follow instructions may result in serious injury or death.

01. Fail-safe device must be installed when using the unit with machinery that may cause serious injury or substantial economic loss. (e.g. nuclear power control, medical equipment, ships, vehicles, railways, aircraft, combustion apparatus, safety equipment, crime/disaster prevention devices, etc.)  
**Failure to follow this instruction may result in personal injury, economic loss or fire.**
02. Do not use the unit in the place where flammable/explosive/corrosive gas, high humidity, direct sunlight, radiant heat, vibration, impact, or salinity may be present.  
**Failure to follow this instruction may result in explosion or fire.**
03. Do not connect, repair, or inspect the unit while connected to a power source.  
**Failure to follow this instruction may result in fire.**
04. Check 'Connections' before wiring.  
**Failure to follow this instruction may result in fire.**
05. Do not disassemble or modify the unit.  
**Failure to follow this instruction may result in fire.**

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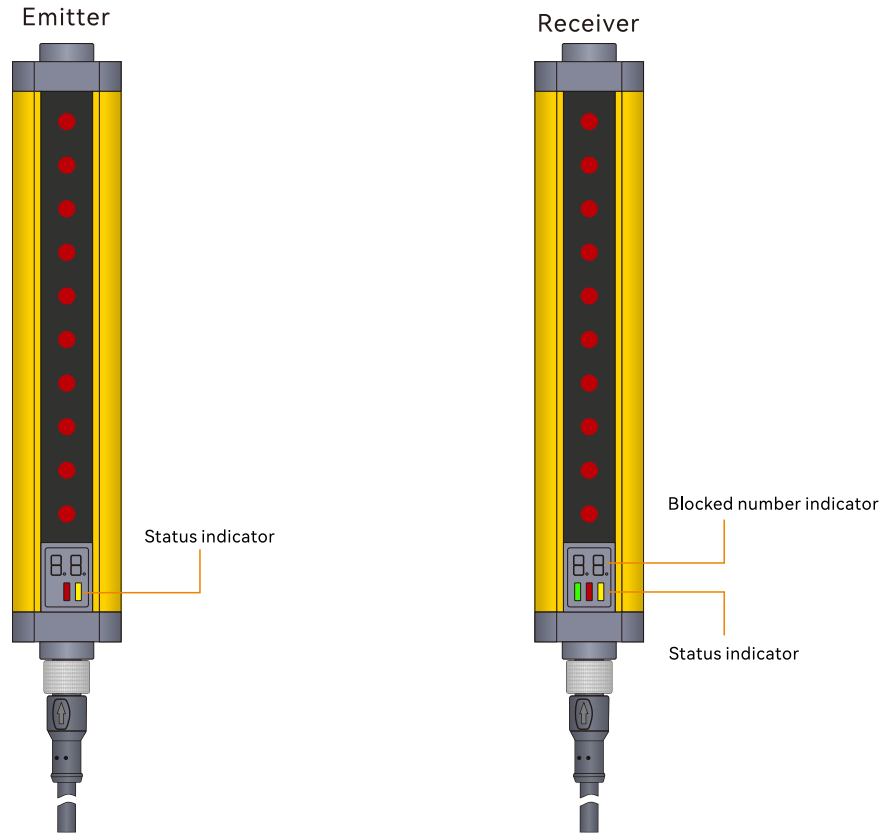
 **Caution** Failure to follow instructions may result in injury or product damage.

01. Use the unit within the rated specifications.  
**Failure to follow this instruction may result in fire or product damage.**
02. Use a dry cloth to clean the unit, and do not use water or organic solvent.  
**Failure to follow this instruction may result in fire.**
03. Do not use a load over the range of rated relay specification.  
**Failure to follow this instruction may result in fire, relay broken, contact melt, insulation failure or contact failure.**





## CAUTIONS DURING USE

- Follow instructions in 'Cautions during Use'. Otherwise, It may cause unexpected accidents.
- 12 – 24 VDC power supply should be insulated and limited voltage/current or Class 2, SELV power supply device.
- Use the product, 1 sec after supplying power. When using separate power supply for the sensor and load, supply power to sensor first.
- When using switching mode power supply to supply the power, ground FG. terminal and connect a condenser between 0 V and FG. terminal to remove noise.
- When connecting a DC relay or other inductive load, remove surge by using diodes or varistors.
- Wire as short as possible and keep away from high voltage lines or power lines, to prevent surge and inductive noise.
- This unit may be used in the following environments.
  - Indoors (in the environment condition rated in 'Specifications')
  - Altitude max. 2,000 m
  - Pollution degree 2
  - Installation category II

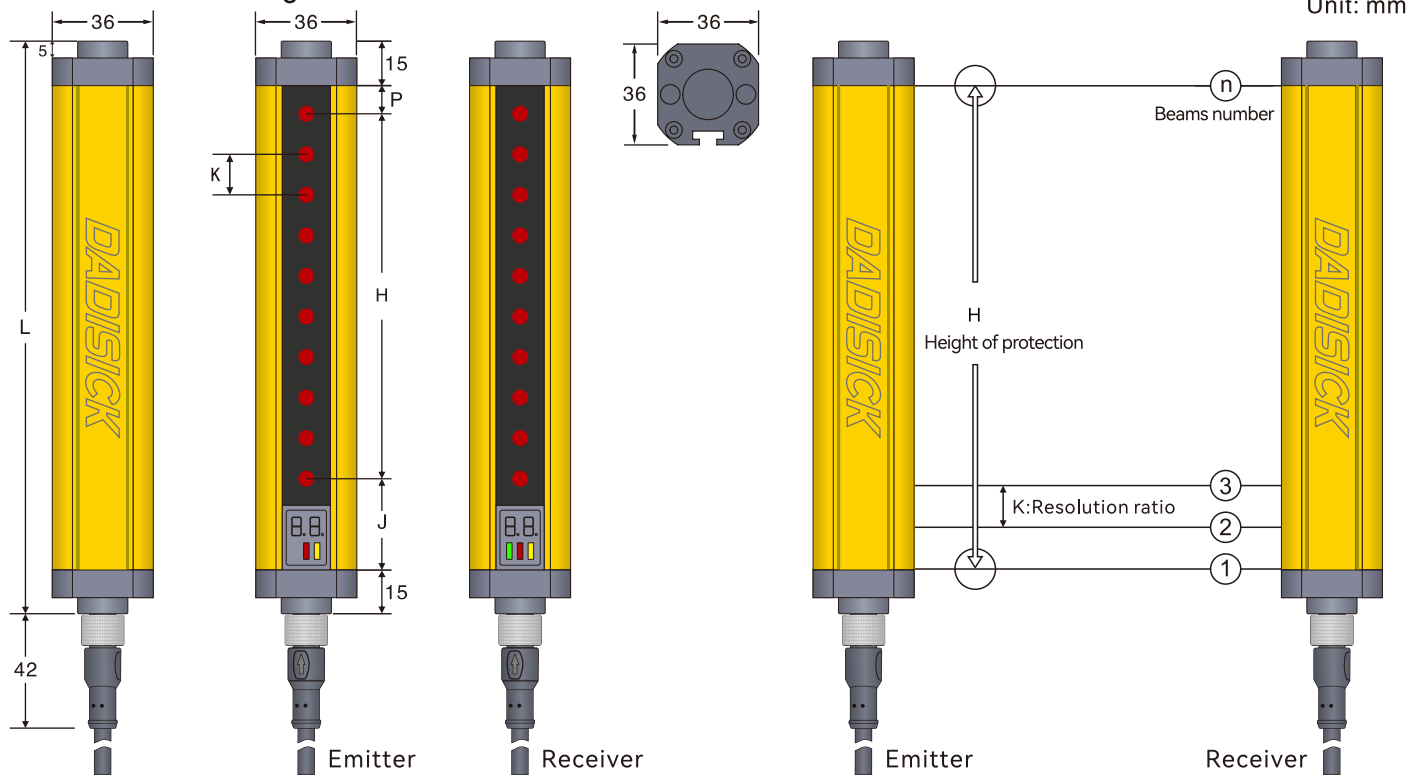
## Operation and display



| Status indicator | LED status Indicator  | Explain            |
|------------------|---|--------------------|
| Emitter          |  Red and Yellow, always on | Turns on the power |

| Status indicator | LED status Indicator  | Explain                                  |
|------------------|---|--|
| Receiver         |  Red, always on  | Turns on the power                       |
|                  |  Green and Red   | All light paths are connected            |
|                  |  Red and Yellow  | The light is blocked or misaligned       |
|                  |  Lights flashing | Interference or overstep detection range |

**Dimensioned drawings**



**Remarks** L: Total length of light screen  
 n: Beams number  
 H: Height of protected area  
 $L = P + H + J + 15 + 15$   
 K: Resolution ratio  
 $H = (n - 1) * K$

|          |        |       |     |      |    |    |    |
|----------|--------|-------|-----|------|----|----|----|
| K ( mm ) | 1.25   | 2.5   | 5   | 10   | 20 | 40 | 80 |
| P ( mm ) | 0.625  | 1.25  | 2.5 | 5    | 10 | 10 | 10 |
| J ( mm ) | 25.125 | 25.75 | 27  | 29.5 | 34 | 34 | 34 |

**1. Frame format**

- Reference to Modbus RTU protocol customization, using RS485 communication;
- Baud rate 4800 bit / s, 9600 bit / s, 19200 BOT / s, 38400 bit / s, default 9600 bit / s;
- Data 8 bit; no parity check; 1 bit stop bit; 16 bit CRC check.

**2. Active transmission mode of RS485/232 signal**

Active access: By default, data is automatically uploaded to the host computer every 100 ms (speed and time can be set).

**3. Passive transmission mode of RS485/232 signal**

Passive access mode: multiple sets of light curtains are connected in parallel at the same time, and the upper computer sends instructions before uploading data. The address code can be modified arbitrarily.

**4. RS485/232 Communication Protocol (Mode 1)**

The communication mode uploads the status of all light points directly to the upper computer, which processes data directly according to the requirements of use.

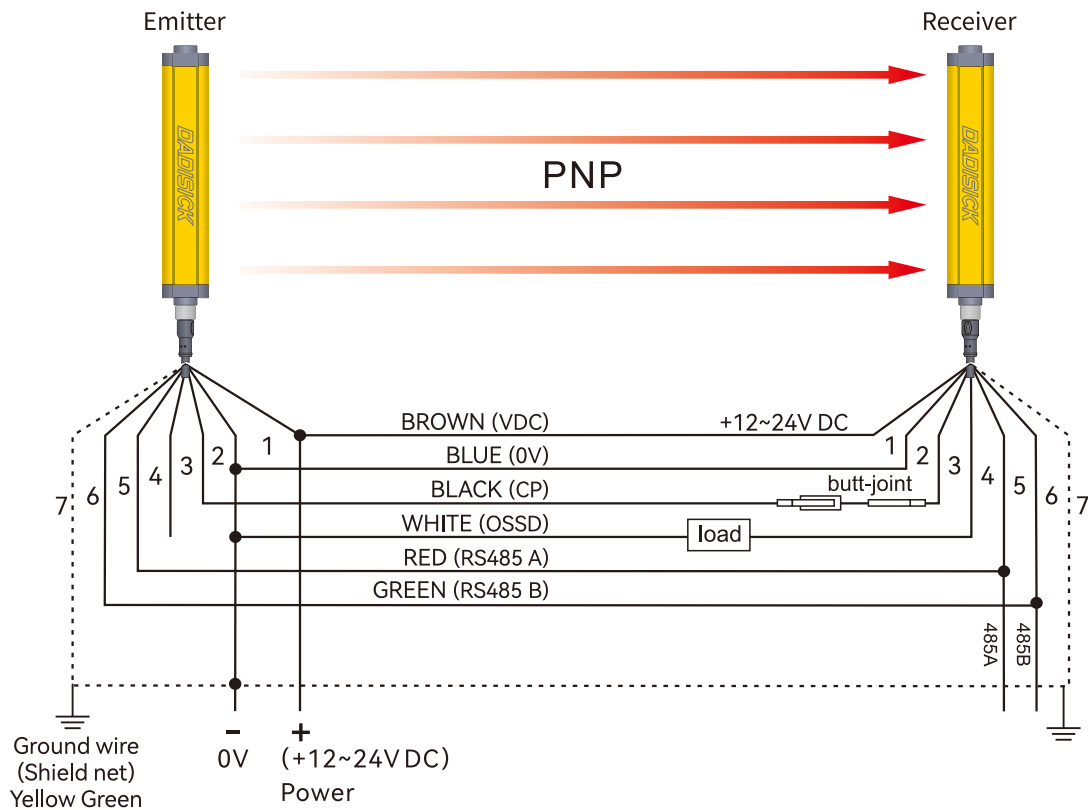
|                            |                            |                          |                             |        |     |        |                         |                        |                   |
|----------------------------|----------------------------|--------------------------|-----------------------------|--------|-----|--------|-------------------------|------------------------|-------------------|
| Free                       | 0                          | 1                        | 2                           | 3      | --- | N      | N+1                     | N+2                    | Free              |
| Starting position<br>≥10ms | Starting position<br>0x03H | Total number<br>of spots | Single frame<br>data volume | Data 1 | --- | Data N | CRC Check<br>High Bytes | CRC Check<br>Low Bytes | Stop bit<br>≥10ms |

**5. RS485/232 Communication Protocol (Mode 2)**

The communication mode only uploads the data of the highest point, the lowest point and the total number of photovoltaic shielded to the upper computer directly, and the upper computer processes the data directly according to the use requirements.

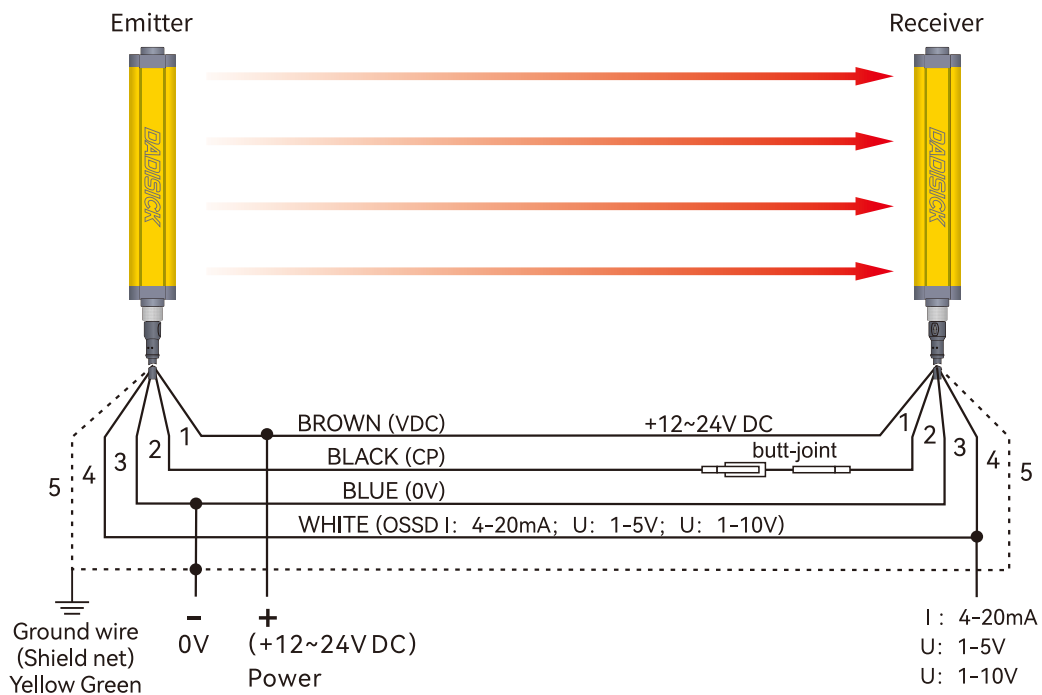
|                            |                            |                          |                                     |   |  |                                     |               |                   |
|----------------------------|----------------------------|--------------------------|-------------------------------------|---|--|-------------------------------------|---------------|-------------------|
| Free                       | First place                | Second place             | Third place                         | Fourth place                                      | Fifth place                                      | Sixth place                         | Seventh place | Free              |
| Starting position<br>≥10ms | Starting position<br>0x03H | Total number<br>of spots | Single frame<br>data volume<br>0x07 | The highest point<br>of light screen<br>occlusion | The lowest point<br>of light screen<br>occlusion | Total number<br>of<br>light screens | Check code    | Stop bit<br>≥10ms |

### 6. DK-QL series RS485/RS232 wiring diagram

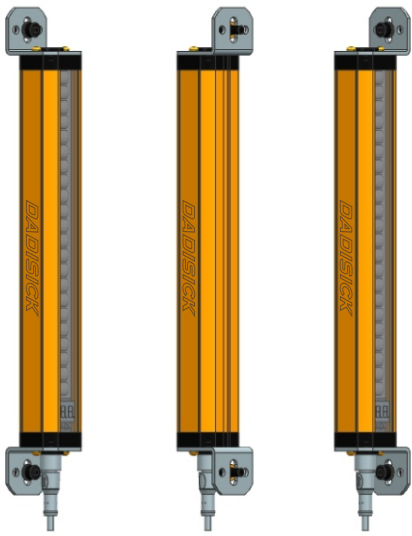


This figure is an example of PNP double output 7-pin wiring.

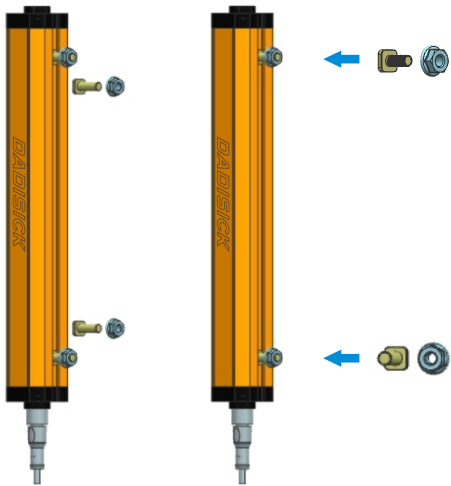
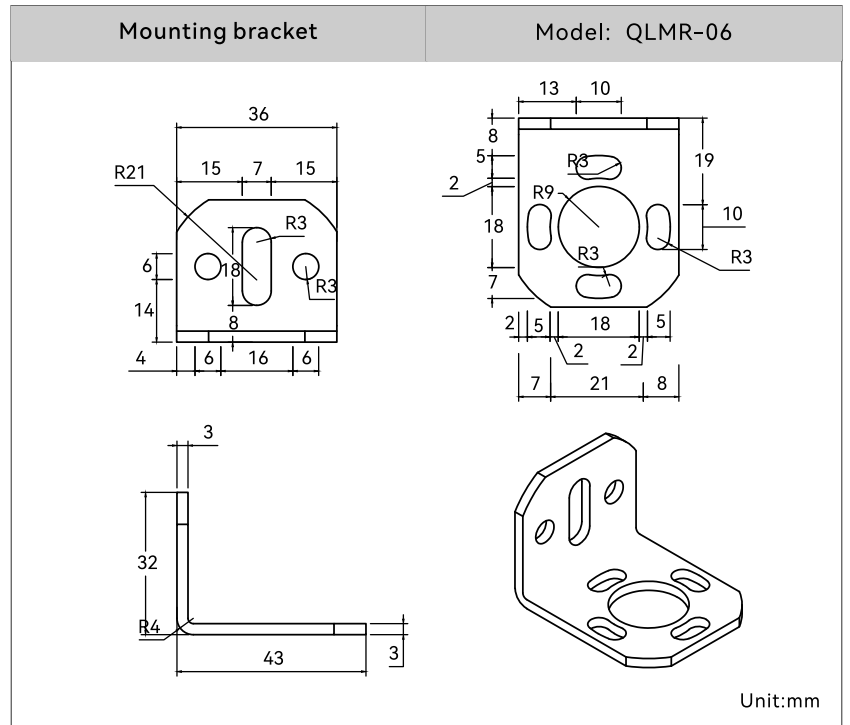
### 7. DK-QL series 5-pin analog U/I wiring diagram



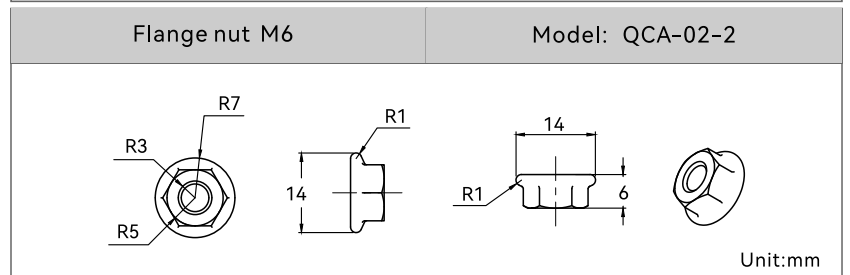
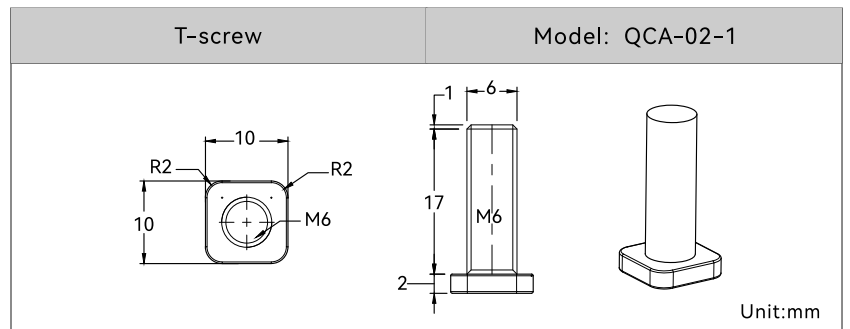
## Accessories

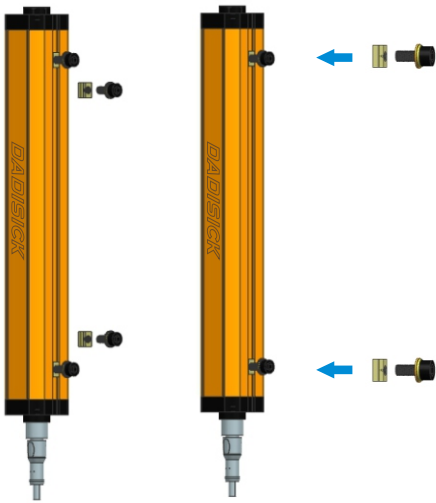


1. Installation of right angle brackets at both ends  
(Original accessories)



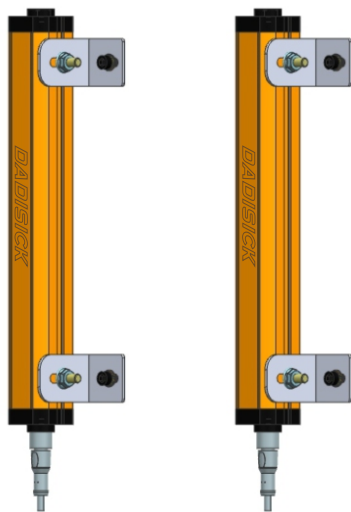
2. Installation method of T-shaped screws on the back  
(Original accessories)





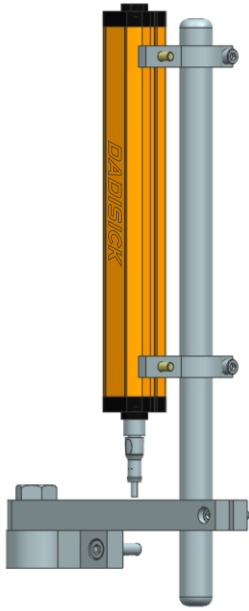
3. Installation method of convex nut  
(Optional accessories)

| Raised nut | Model: QCA-03-1                           |
|------------|---|
|            | <p style="text-align: right;">Unit:mm</p> |
| M5 screw   | Model: QCA-03-2                           |
|            | <p style="text-align: right;">Unit:mm</p> |



4. Installation method of side right angle bracket  
(Optional accessories)

| Side mounting bracket | Model: QCA-05                             |
|-----------------------|---|
|                       | <p style="text-align: right;">Unit:mm</p> |



5. Stainless steel bracket installation  
(Order separately)

| Stainless steel bracket installation  | Model: QCA-01 |
|---|---------------|
| <p>Clip:</p>  |               |
| <p>Aluminum round:</p>  |               |
| <p>Aluminum arm:</p>  |               |
| <p>Steel pipe:</p> <p>Length: 400/500/600/700/800/1000 optional</p> <p style="text-align: right;">Unit:mm</p> |               |

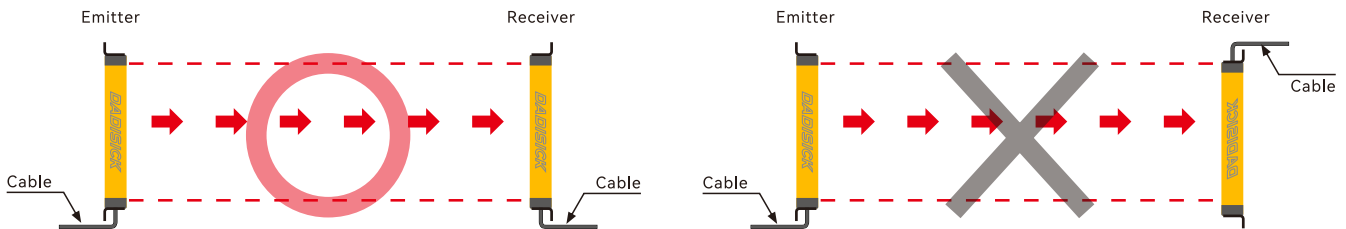
# INSTALL

## ⚠ WARNING

Before installation, please open the packing box first, check the packed components according to the packing list, and turn off the power supply of the machine tool at the beginning of installation to avoid danger.

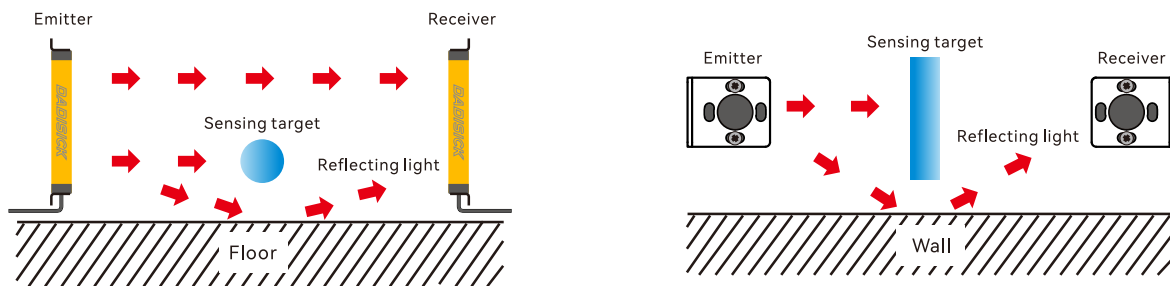
### 1、 Installation direction

The installation direction of the light emitting device and the light receiving device should be consistent.



### 2、 Reflection from the ground and walls

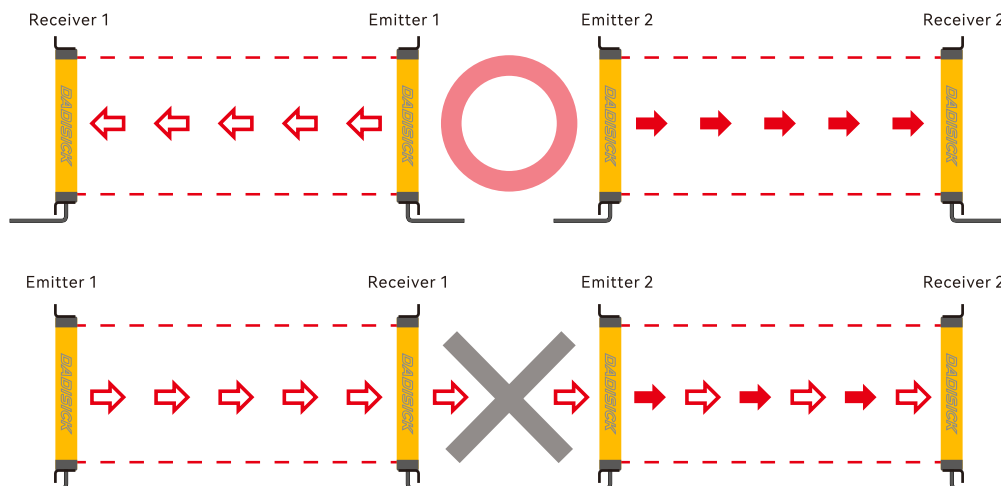
When installing it as below, the light reflected from the surface of wall and flat is not shaded. Please check whether it operates normally or not with a sensing target before using. (interval distance:  $\geq 0.5$  m)

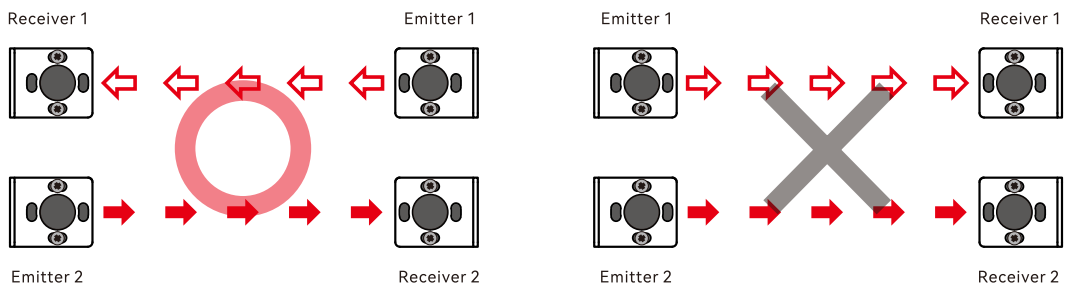
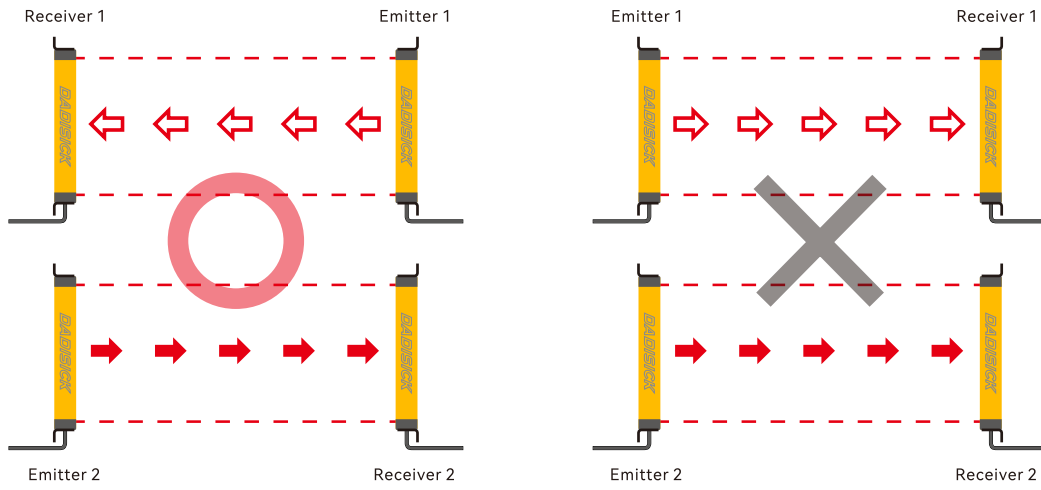


### 3、 For protection of interference

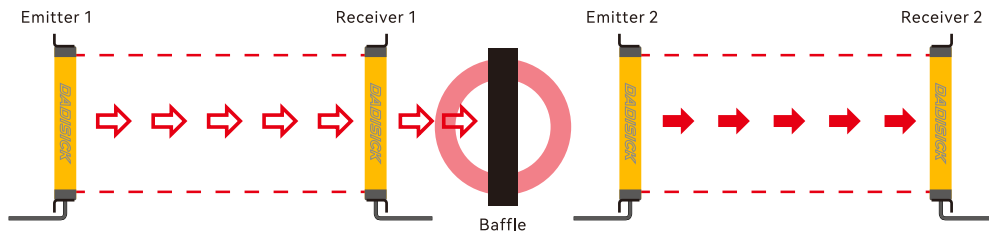
It may cause interference when installing more than 2 sets of the sensor. In order to avoid the interference of the sensor, please install as following figures and use the transmitted light frequency changing function.

- Transmission direction should be opposite between 2 sets.



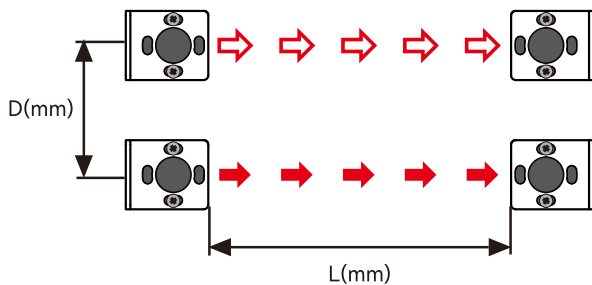


- Baffle should be installed between 2 sets.



- Interval distance adjustment:

- ① Depending on the environment, it may vary;
- ② Do not use it directly under high-speed and high-frequency fluorescent lamps.



| L (sensing distance) | L (installation allowable distance) |
|----------------------|-------------------------------------|
| 0.1~1m               | ≥0.1m                               |
| ≥1m                  | ≥0.2m                               |

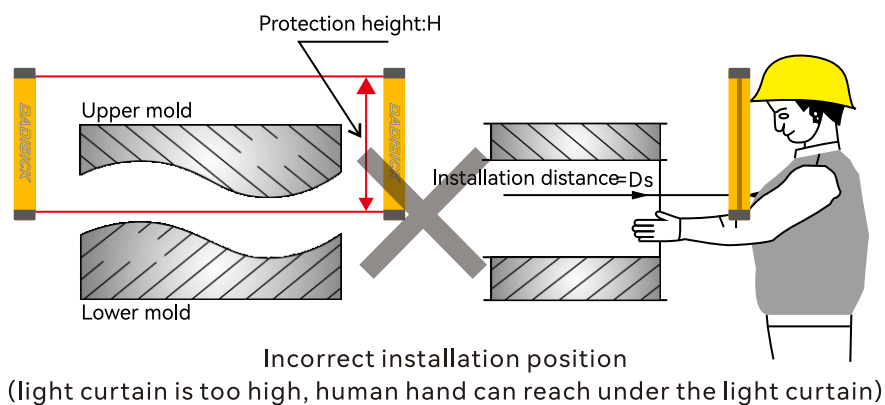
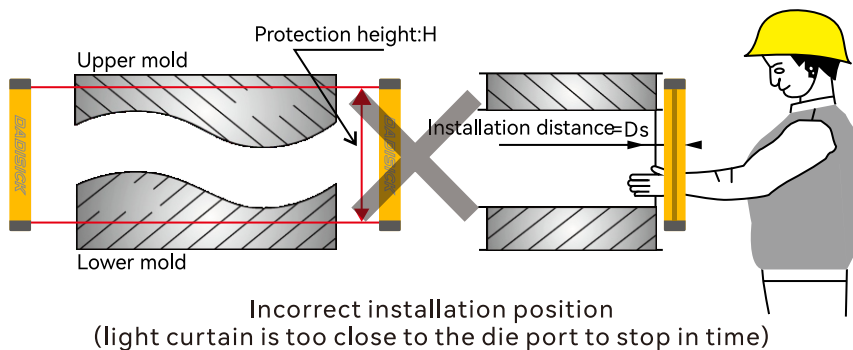
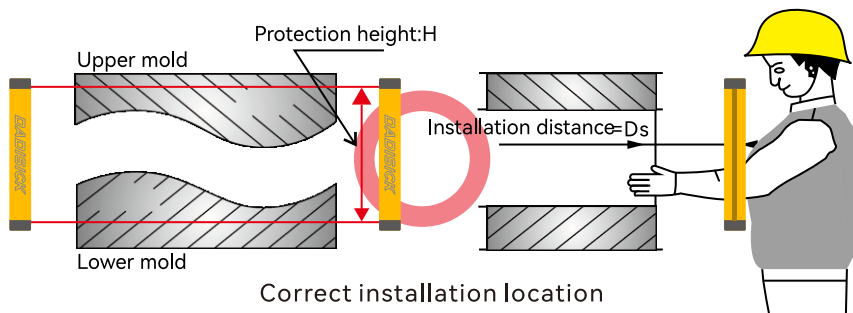
## ! WARNING

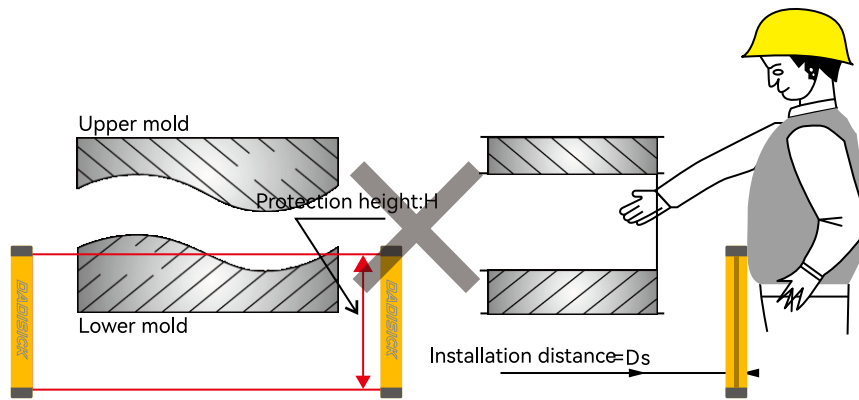
Safety distance is one of the necessary conditions to ensure that the photoelectric protection device realizes the protection function, the safety distance must be calculated correctly, and the safety distance must be ensured during installation!

### 1、 the determination of height position

The height position refers to the position of the light curtain of the photoelectric protection device relative to the upper and lower die ports of the machine tool, that is, under the premise of ensuring a safe distance, the lowest beam of light of the photoelectric protection device shall not be higher than the lower edge of the lower die mouth, and the top beam of light shall not be lower than the upper edge of the upper die port.

This involves the selection of the protection height of the photoelectric protection device  
 Protection height  $\geq$  machine slide stroke + adjustment amount





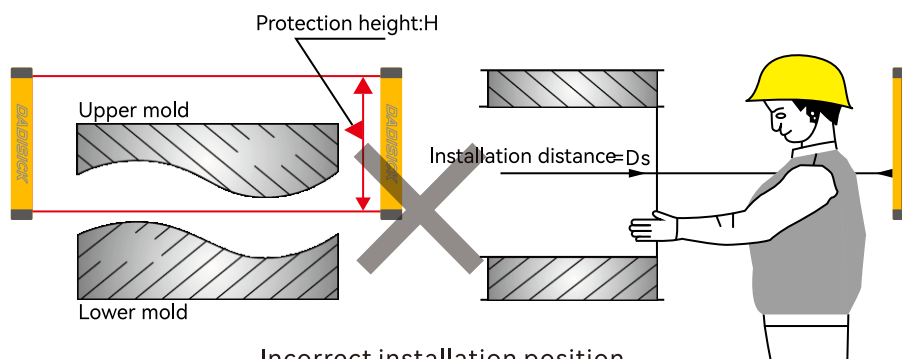
Incorrect installation position  
(light curtain is low, human hand can reach out from the top of the light curtain)

 **WARNING**

- A. The height position is one of the necessary conditions to ensure that the photoelectric protection device realizes the protection function, and the height position must be ensured correctly during installation.
- B. If the mold is replaced during use, the safety distance and height position must be readjusted according to the above two requirements.

## 2. Setting of auxiliary protective measures

When the horizontal distance between the light curtain plane of the photoelectric protection device and the front end of the mold base exceeds 400mm, auxiliary photoelectric or protective fences should be installed to prevent the operator's body from entering the inside of the light curtain plane. When it is less than 400mm, safety measures such as auxiliary photoelectric or protective fence can also be taken.



Incorrect installation position  
(too far from the die port for people to enter the danger zone)