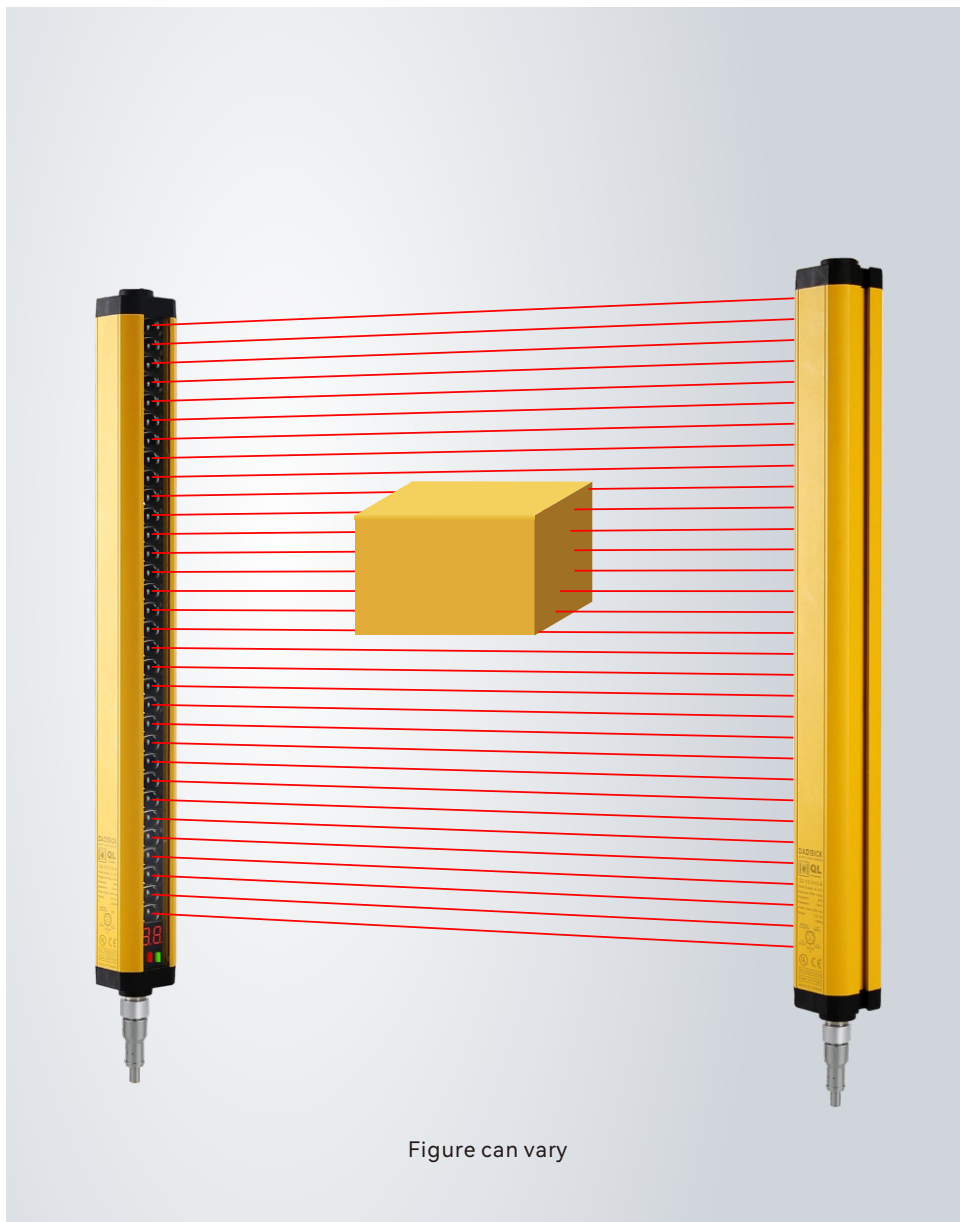


TECHNICAL DATA SHEET

MEASURING LIGHT CURTAINS SENSOR

Emitter: QL04/20-60BRF21B-E

Receiver: QL04/20-60BRF21B-R



Contents

- Product application
- Technical data
- Operation and display
- Dimensioned drawings
- Electrical connection
- Wiring diagram
- Accessories



GB/T 19001-2016

Product application

A. Conveyor Systems: Light curtains are utilized in conveyor systems to monitor the movement of objects or materials. They can detect jams, misalignments, or blockages on the conveyor belt and trigger corrective actions to maintain smooth operation.

B. Robotics: They help robots detect the presence of humans or obstacles within their work area, allowing them to stop or adjust their movements to prevent collisions.

C. Assembly Lines: Light curtains are used to optimize assembly line operations. They can accurately detect the position and movement of parts, ensuring precise alignment and preventing errors during the manufacturing process.

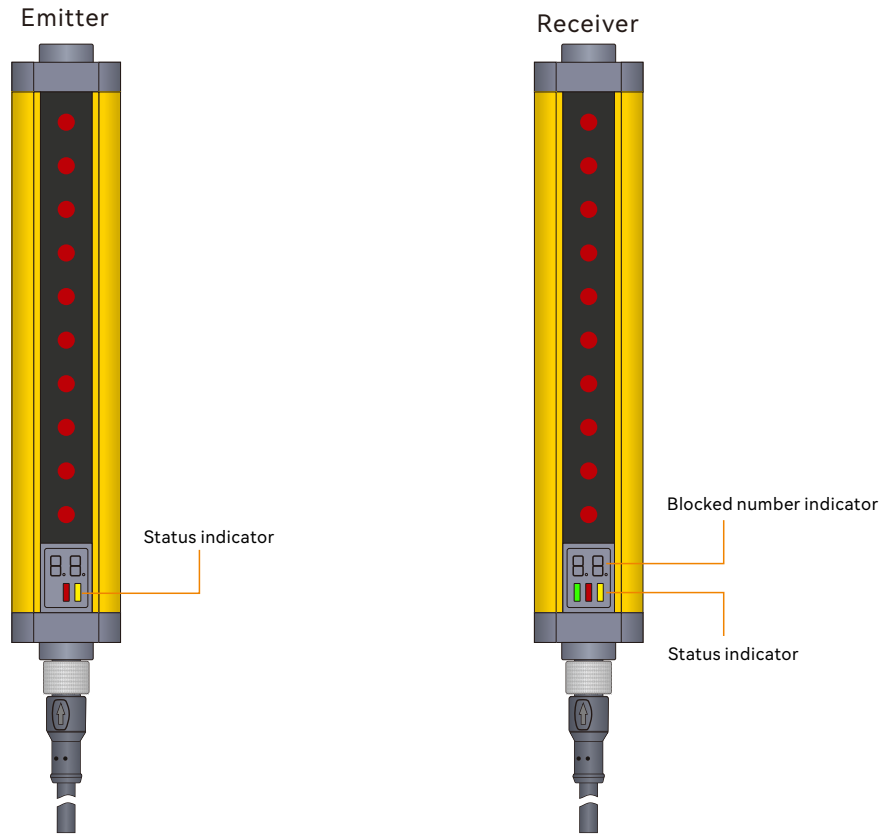
Technical data






Basic data of Receiver and Emitter

Standard packaging	
Product model	QL04/20-60BRF21B-E and QL04/20-60BRF21B-R
Standard configuration	One receiver, one transmitter, two data lines, one right-angle rack, and one t-shaped screw
Light curtain form	Infrared radiation type
Application	Standard industrial environment - finger protection
Features	
Resolution ratio	20mm
Check the accuracy	25mm
Number of beams	4
Protection height	60mm
Total height	134mm
Detection distance	30-6000mm (Default 30-6000mm, customer service can be contacted to customize 30-30000mm.)
Response time	≤15ms
Synchronization	
Synchronization	Line synchronization
Consumption current	≤200mA
Output mode	RS485/RS232 output or analog voltage U: 1-10V/analog current I: 4-20mA output, with 1 circuit of PNP output
Output status	ON (receiving indicator green light)
Indicator light	Transmitter: power indicator light (red); receiver: output indicator light on (green), blackout (red)
Wavelength	850nm
Type of light	Infrared light (NIR), invisible
Function	Automatic reset
Mechanical data	
Overall dimension	36*36*134mm
Housing material	Metal
Metal shell	Aluminium
Lens front screen material	Acrylic
Upper and lower cover materials	ABS reinforced nylon PA66+30% GF
Environmental data	
Protection grade	IP65
Resistance to ambient light	Incandescent light: illumination of light-receiving surface 3000Lx; Sunlight: illumination of light-receiving surface 10000Lx
Ambient temperature	Working temperature: - 10~+40 °C (but not frozen), storage temperature: - 25 ~+55 °C
Ambient humidity	Working time: 35~85% RH, saving time: 35~95% RH

Performance data	
Protection circuit	Short circuit protection Overvoltage protection
Supply voltage	24VDC, -20...20%
Maximum current consumption	150mA
Fuse	2A half time interval
Output	
Number of safe output circuits (OSSD)	1-circuit
Type	Safety circuit output circuit OSSD
Minimum switch voltage high	18V
Minimum switch voltage low	2.5V
Typical switching voltage	22.5V
Voltage type	DC
Maximum current load	380mA
Load inductance	two thousand
Load capacity	zero point three
Maximum residual current	0.2mA
Typical residual current	0.002MA
Voltage drop	1.5V
Safety output	Connection pin 4, WHITE OSSD NPN/PNP
Communication protocol	Connection pin 5, RED RS485A; Connection pin 6, GREEN RS485B
Certificate	
CE TÜV	No.E8A 104143 0001 Rev.00
ROHS certification	No.BSTDG180811032001CC
CE TYPE 4	No.ICR Polska/VC/HS221214
UL	No. 4790783741.1-S
GB/T	No. HIC180327 GB/T 19001-2016 idt ISO 9001:2015

Operation and display

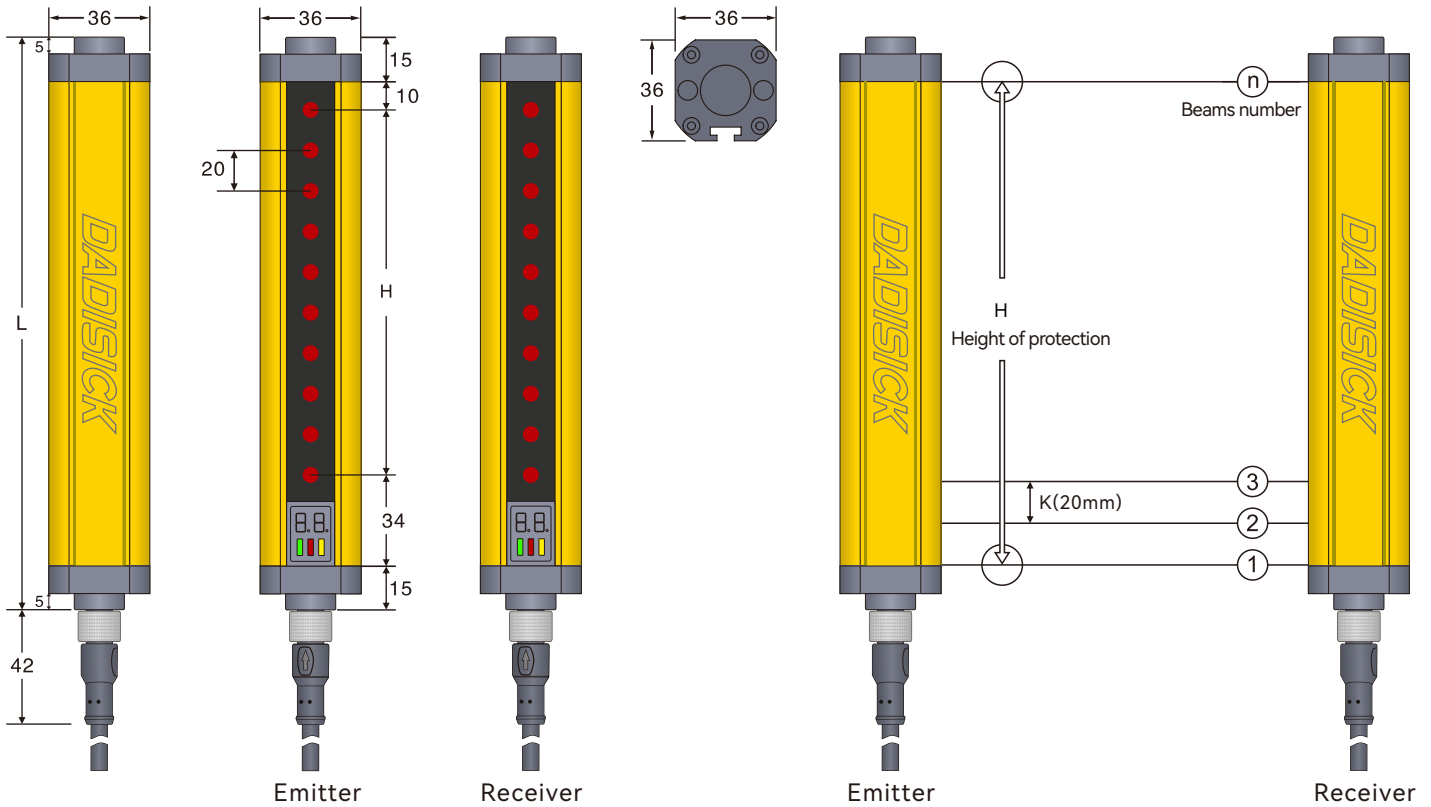


Status indicator	LED status Indicator	Explain
Emitter	 Red and Yellow, always on	Turns on the power
Receiver	 Red, always on	Turns on the power
	 Green and Red	All light paths are connected
	 Red and Yellow	The light is blocked or misaligned
	 Lights flashing	Interference or overstep detection range

Dimensioned drawings

QL 20mm series

Unit: mm



Remarks

L: Total length of light screen
 $L = 15 + 10 + H + 34 + 15$

H: Height of protected area
 $H = (n - 1) * 20$

K: Resolution ratio

n: Beams number

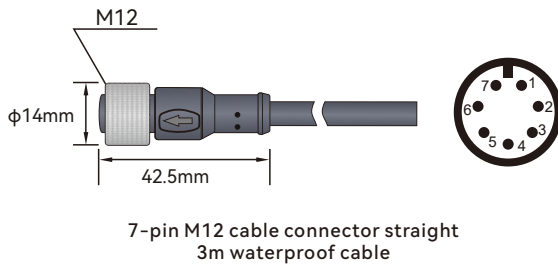
QL 20mm specification list

Resolution	Light beam	Protection height (H)	Total height (L)	Product model	Signal output mode		Detection range
					Two outputs	PNP output	
20mm (K)	4	60	134	QL04/20-60	2	PNP	0.3-6m
	6	100	174	QL06/20-100	2	PNP	0.3-6m
	8	140	214	QL08/20-140	2	PNP	0.3-6m
	10	180	254	QL10/20-180	2	PNP	0.3-6m
	12	220	294	QL12/20-220	2	PNP	0.3-6m
	14	260	334	QL14/20-260	2	PNP	0.3-6m
	16	300	374	QL16/20-300	2	PNP	0.3-6m
	18	340	414	QL18/20-340	2	PNP	0.3-6m
	20	380	454	QL20/20-380	2	PNP	0.3-6m
	22	420	494	QL22/20-420	2	PNP	0.3-6m
	24	460	534	QL24/20-460	2	PNP	0.3-6m
	26	500	574	QL26/20-500	2	PNP	0.3-6m
	28	540	614	QL28/20-540	2	PNP	0.3-6m
	30	580	654	QL30/20-580	2	PNP	0.3-6m
	32	620	694	QL32/20-620	2	PNP	0.3-6m
	34	660	734	QL34/20-660	2	PNP	0.3-6m
	36	700	774	QL36/20-700	2	PNP	0.3-6m
	38	740	814	QL38/20-740	2	PNP	0.3-6m
	40	780	854	QL40/20-780	2	PNP	0.3-6m
	42	820	894	QL42/20-820	2	PNP	0.3-6m
	44	860	934	QL44/20-860	2	PNP	0.3-6m
	46	900	974	QL46/20-900	2	PNP	0.3-6m
	48	940	1014	QL48/20-940	2	PNP	0.3-6m
	50	980	1054	QL50/20-980	2	PNP	0.3-6m
	52	1020	1094	QL52/20-1020	2	PNP	0.3-6m
	54	1060	1134	QL54/20-1060	2	PNP	0.3-6m
	56	1100	1174	QL56/20-1100	2	PNP	0.3-6m
	58	1140	1214	QL58/20-1140	2	PNP	0.3-6m
60	1180	1254	QL60/20-1180	2	PNP	0.3-6m	
62	1220	1294	QL62/20-1220	2	PNP	0.3-6m	
64	1260	1334	QL64/20-1260	2	PNP	0.3-6m	
66	1300	1374	QL66/20-1300	2	PNP	0.3-6m	
68	1340	1414	QL68/20-1340	2	PNP	0.3-6m	
70	1380	1454	QL70/20-1380	2	PNP	0.3-6m	
72	1420	1494	QL72/20-1420	2	PNP	0.3-6m	

Electrical connection

Electrical interface	
Number of interfaces	2 (receiver and transmitter)
Type	M12 connector, 7-pin
Interface metal	Copper nickel plating
Plug material	GY384 gray 30P
Allowable typical conductor section	0.25mm ²
Maximum link cable	100m
Maximum allowable cable load	4.9A
Cable material	PVC

Cable description:



Emitter Wiring diagram		
Pin number	Line color	Name
1	BROWN	24V DC
2	BLUE	0V
3	BLACK	CP
4	WHITE	-
5	RED	RS485A
6	GREEN	RS485B
7	YELLOW	Ground wire

Receiver Wiring diagram		
Pin number	Line color	Name
1	BROWN	24V DC
2	BLUE	0V
3	BLACK	CP
4	WHITE	OSSD
5	RED	RS485A
6	GREEN	RS485B
7	YELLOW	Ground wire

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.

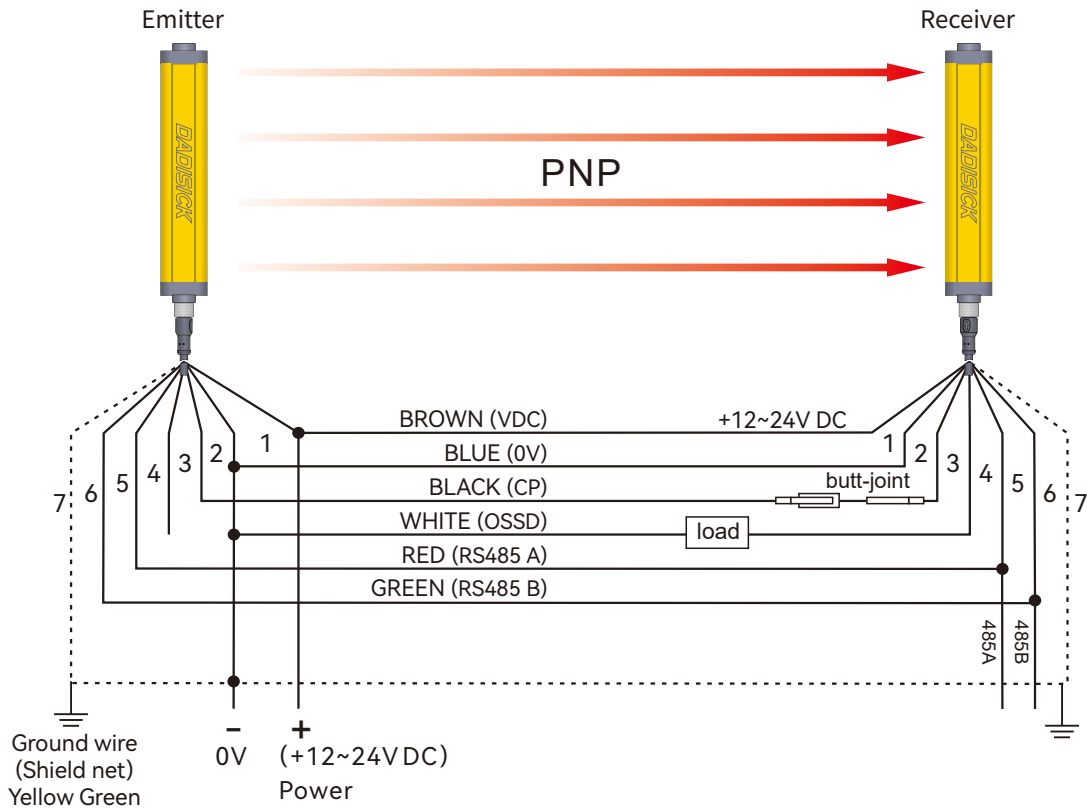
Free	0	1	2	3	---	N	N+1	N+2	Free
Starting position ≥10ms	Starting position 0x03H	Total number of spots	Single frame data volume	Data 1	---	Data N	CRC Check High Bytes	CRC Check Low Bytes	Stop bit ≥10ms

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.

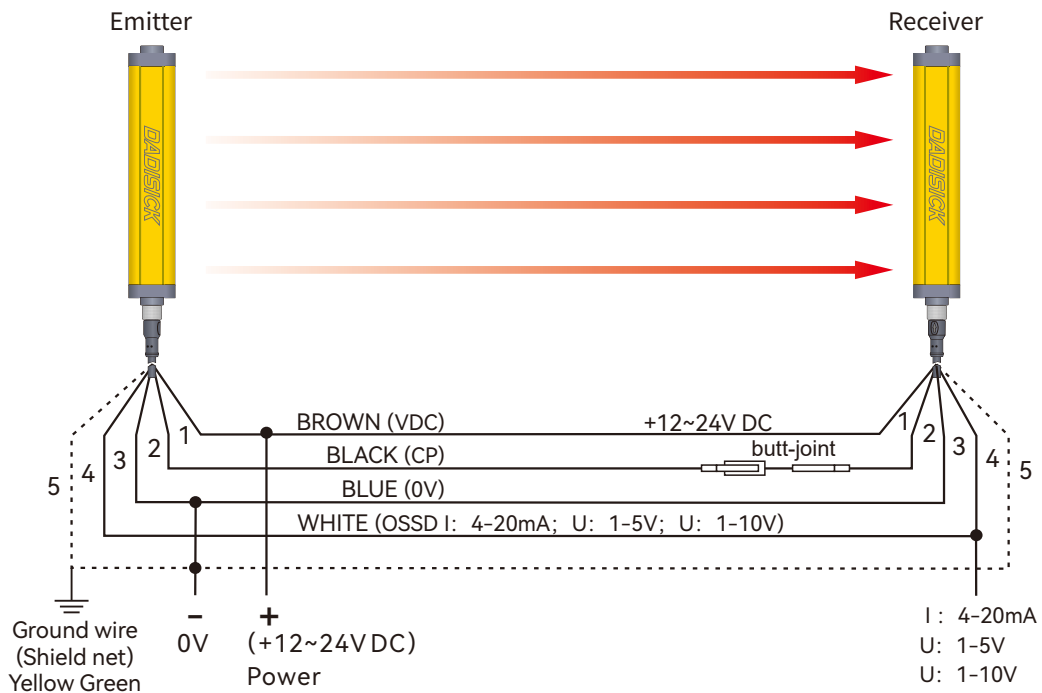
Free	First place	Second place	Third place	Fourth place	Fifth place	Sixth place	Seventh place	Free
Starting position ≥10ms	Starting position 0x03H	Total number of spots	Single frame data volume 0x07	The highest point of light screen occlusion	The lowest point of light screen occlusion	Total number of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

6. QL series RS485/RS232 wiring diagram

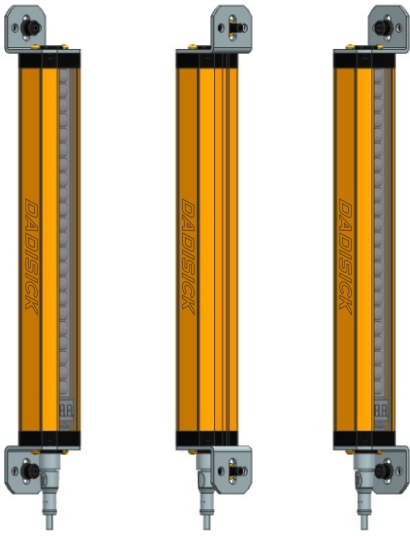


This figure is an example of PNP double output 7-pin wiring.

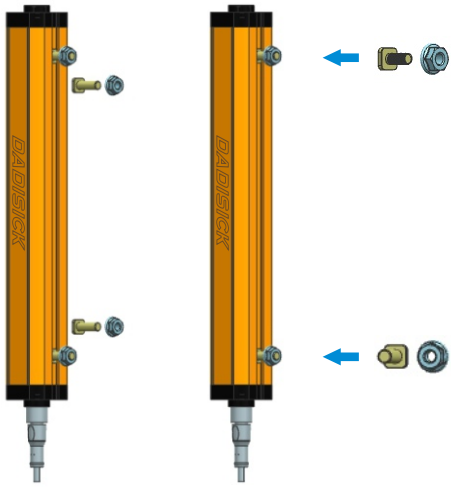
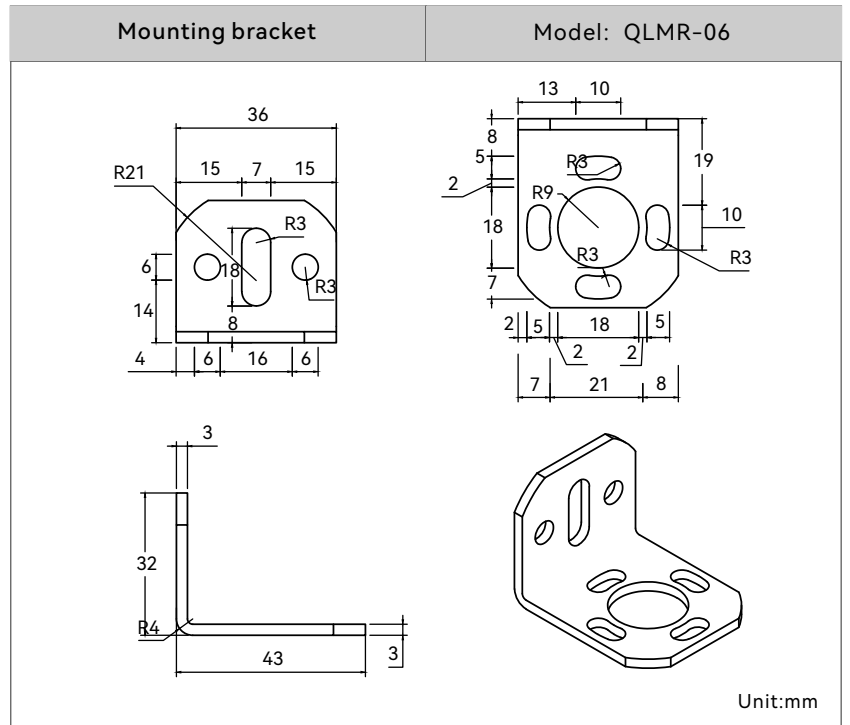
7. QL series 5-pin analog U/I wiring diagram



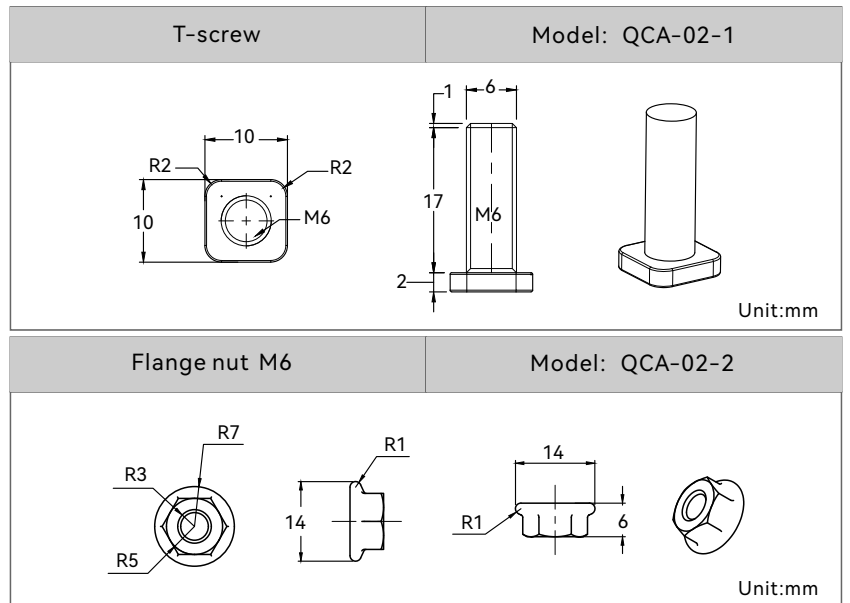
Accessories

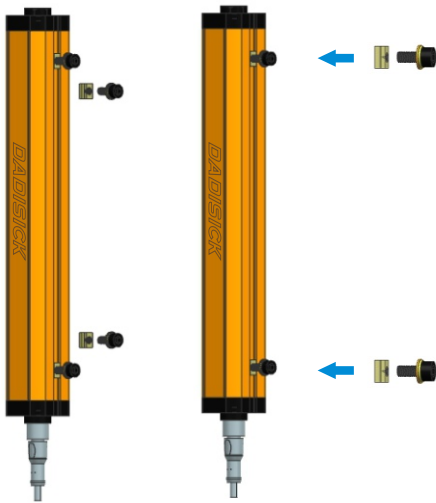


1. Installation of right angle brackets at both ends
(Original accessories)



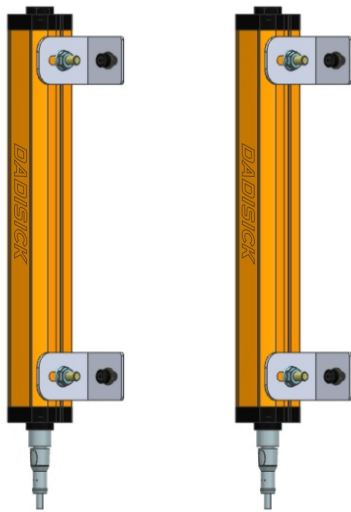
2. Installation method of T-shaped screws on the back
(Original accessories)





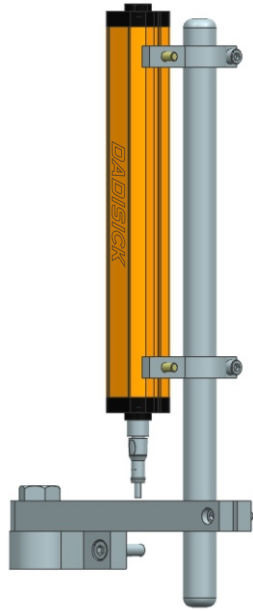
3. Installation method of convex nut
(Optional accessories)

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>	