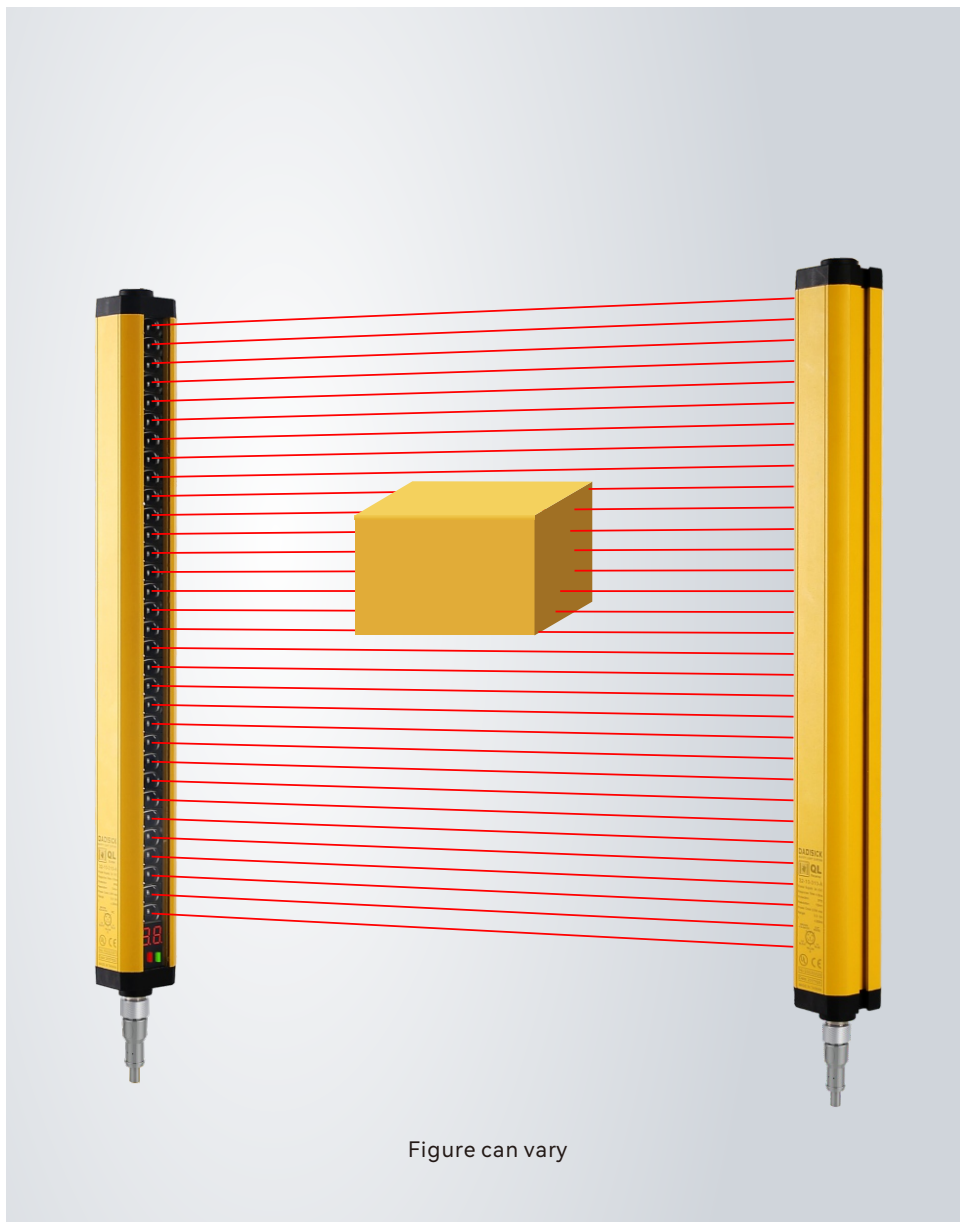


# TECHNICAL DATA SHEET

## MEASURING LIGHT CURTAINS SENSOR Emitter and Receiver QL series



### Contents

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



GB/T 19001-2016

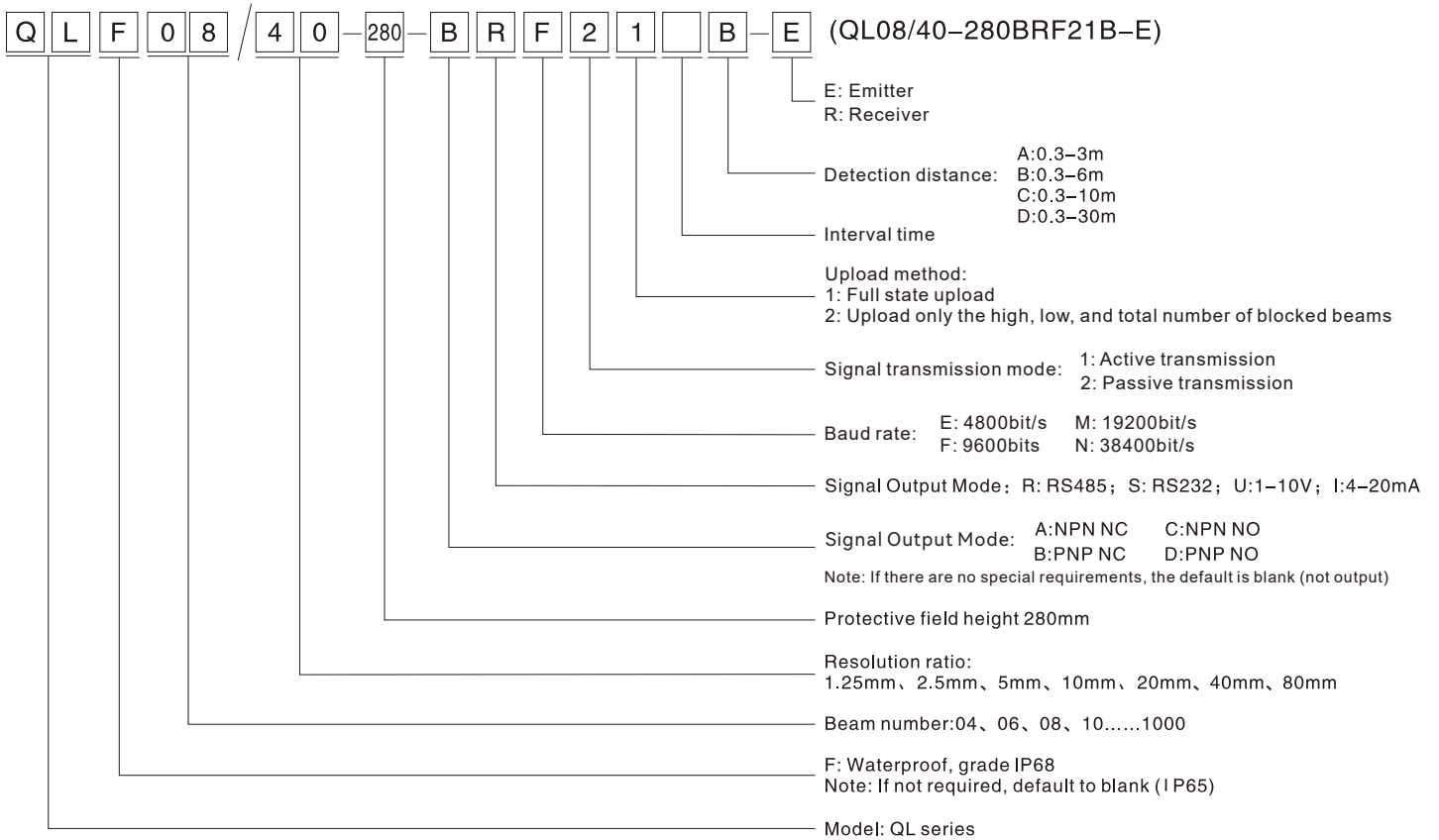
## Product application

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.

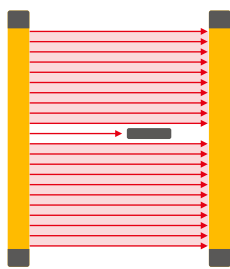
## The specifications of QL type measuring light curtain are as follows:



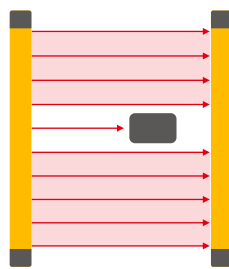
## Resolution ratio

Depending on the usage environment and requirements, it is important to choose the appropriate beam spacing

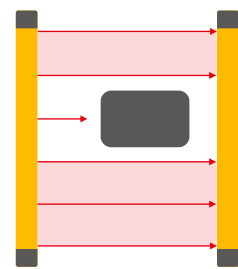
Opaque object detection:



Detection capability  
1.25/2.5/5/10/20mm  
diameter



Detection capability  
40mm  
diameter



Detection capability  
80mm  
diameter

## Technical data

### Basic data of Receiver and Emitter

Standard packaging	
Product model	<b>QL series</b>
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

Features	
Resolution ratio	1.25mm, 2.5mm, 5mm, 10mm, 20mm, 40mm, 80mm
Check the accuracy	2mm, 3.75mm, 6.5mm, 15mm, 25mm, 45mm, 85mm
Number of beams	04、06、08、10.....1000
Overall dimension	36mm*36mm*L, L is the length of emitter and receiver.
Detection distance	30-3000mm、30-6000mm、30-10000mm
Response time	≤15ms

Synchronization	
Line 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

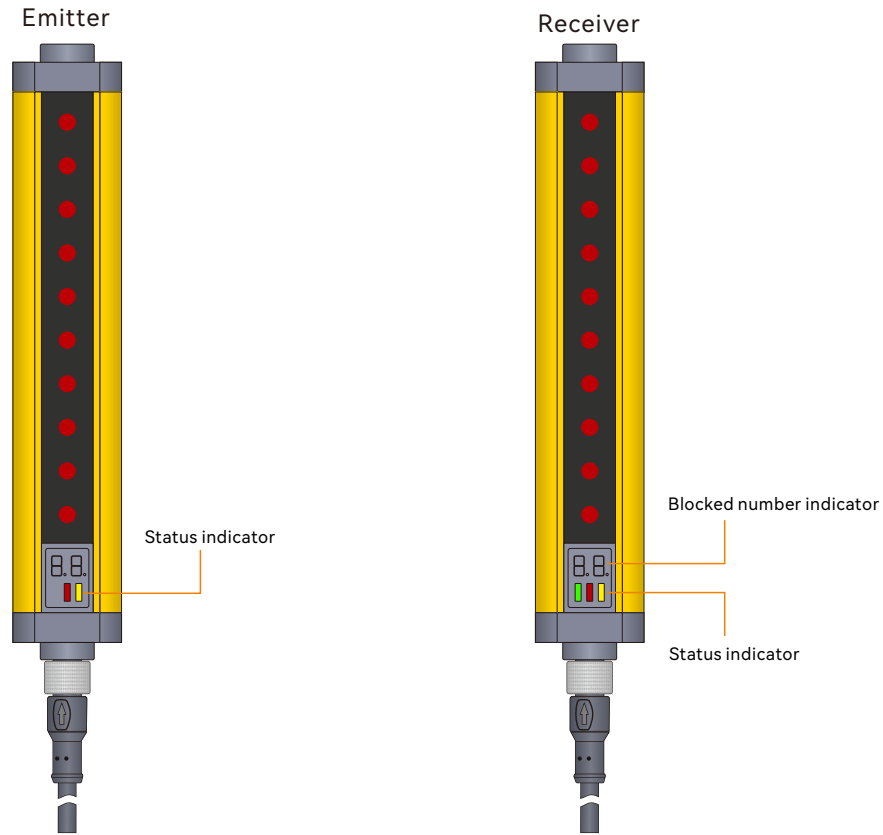
Mechanical data	
Housing material	Metal
Metal shell	Aluminium
Lens front screen material	Acrylic
Upper and lower cover materials	ABS reinforced nylon PA66+30% GF






Performance data	
Protection circuit	Short circuit protection Overvoltage protection
Supply voltage	24VDC, -20...20%
Maximum current consumption	150mA
Fuse	2A half time interval

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

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	
CETÜV	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

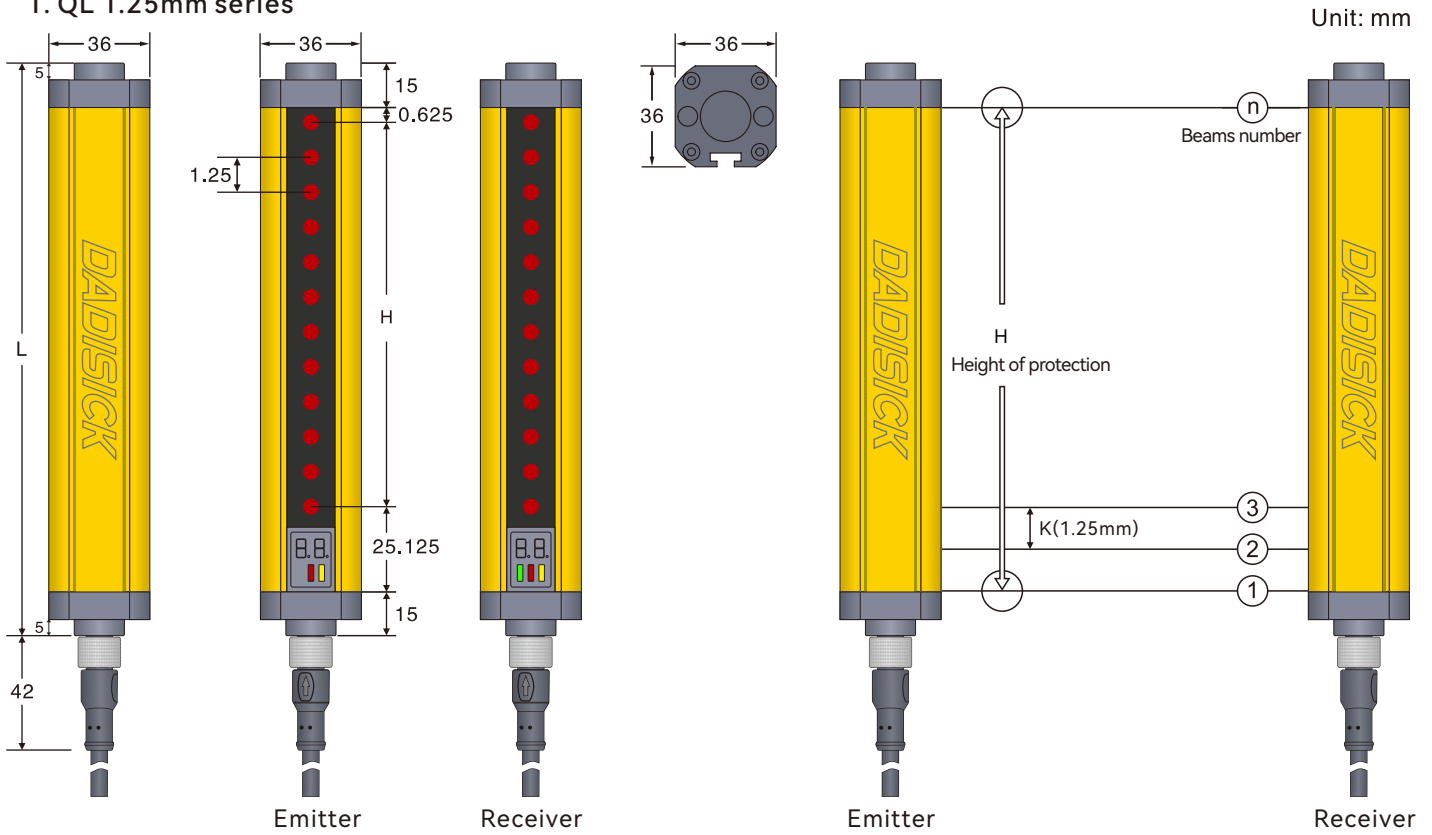
## Operation and display



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

### 1. QL 1.25mm series



#### Remarks

L: Total length of light screen  
 $L = 15 + 0.625 + H + 25.125 + 15$

H: Height of protected area  
 $H = (n - 1) * 1.25$

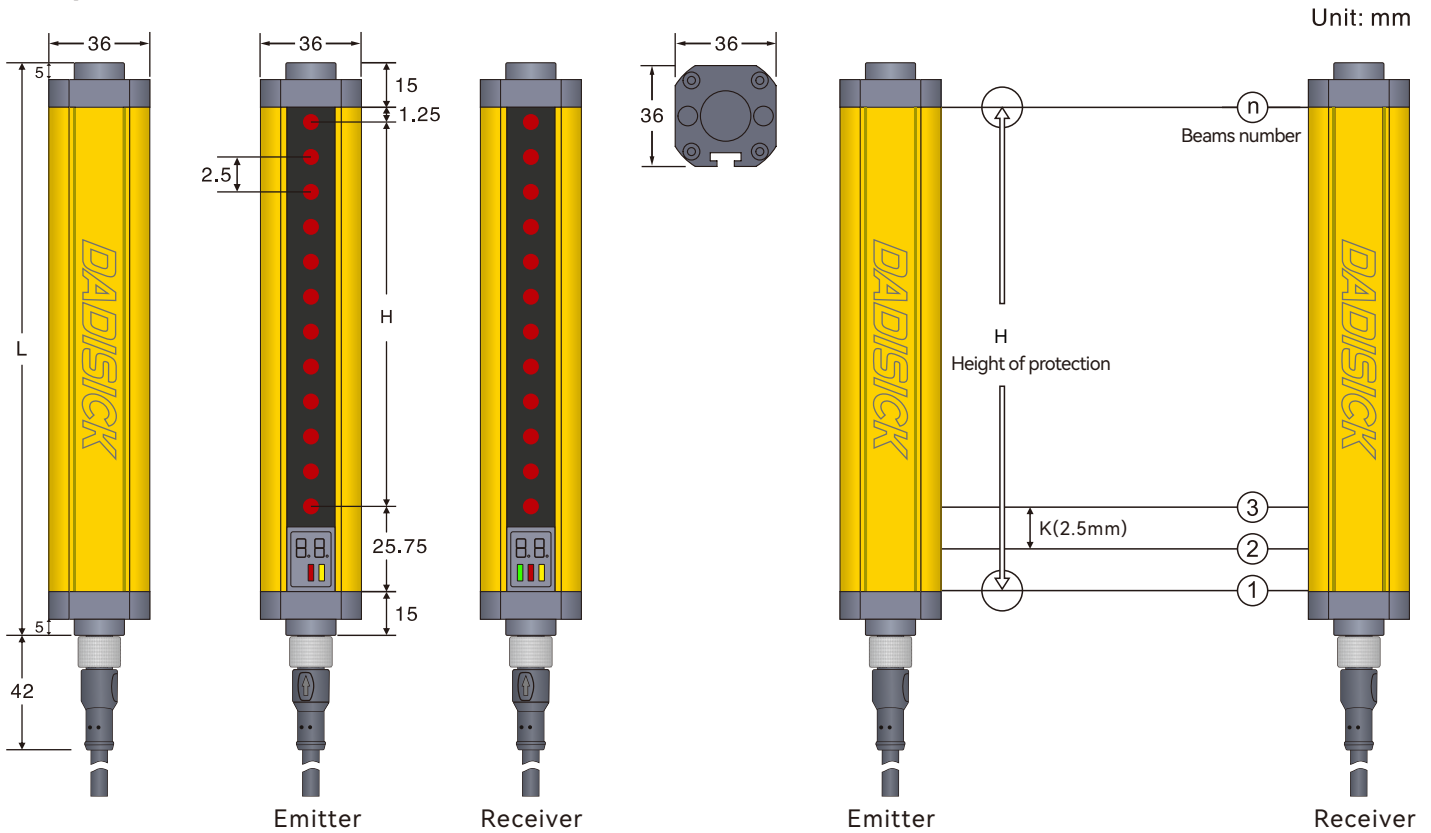
K: Resolution ratio

n: Beams number

### QL 1.25mm specification list

Resolution	Light beam	Protection height (H)	Total height (L)	Product model	Signal output mode			Detection range
					RS485	4-20mA	0-10V	
1.25mm (K)	64	78.75	132.5	QL64/1.25-78.75	R	I	U	0.2-1m
	128	158.75	212.5	QL128/1.25-158.75	R	I	U	0.2-1m
	192	238.75	292.5	QL192/1.25-238.75	R	I	U	0.2-1m
	256	318.75	372.5	QL256/1.25-318.75	R	I	U	0.2-1m
	320	398.75	452.5	QL320/1.25-398.75	R	I	U	0.2-1m
	384	478.75	532.5	QL384/1.25-478.75	R	I	U	0.2-1m
	448	558.75	612.5	QL448/1.25-558.75	R	I	U	0.2-1m

2. QL 2.5mm series



Unit: mm

Remarks

L: Total length of light screen  
 $L = 15 + 1.25 + H + 25.75 + 15$

H: Height of protected area  
 $H = (n - 1) * 2.5$

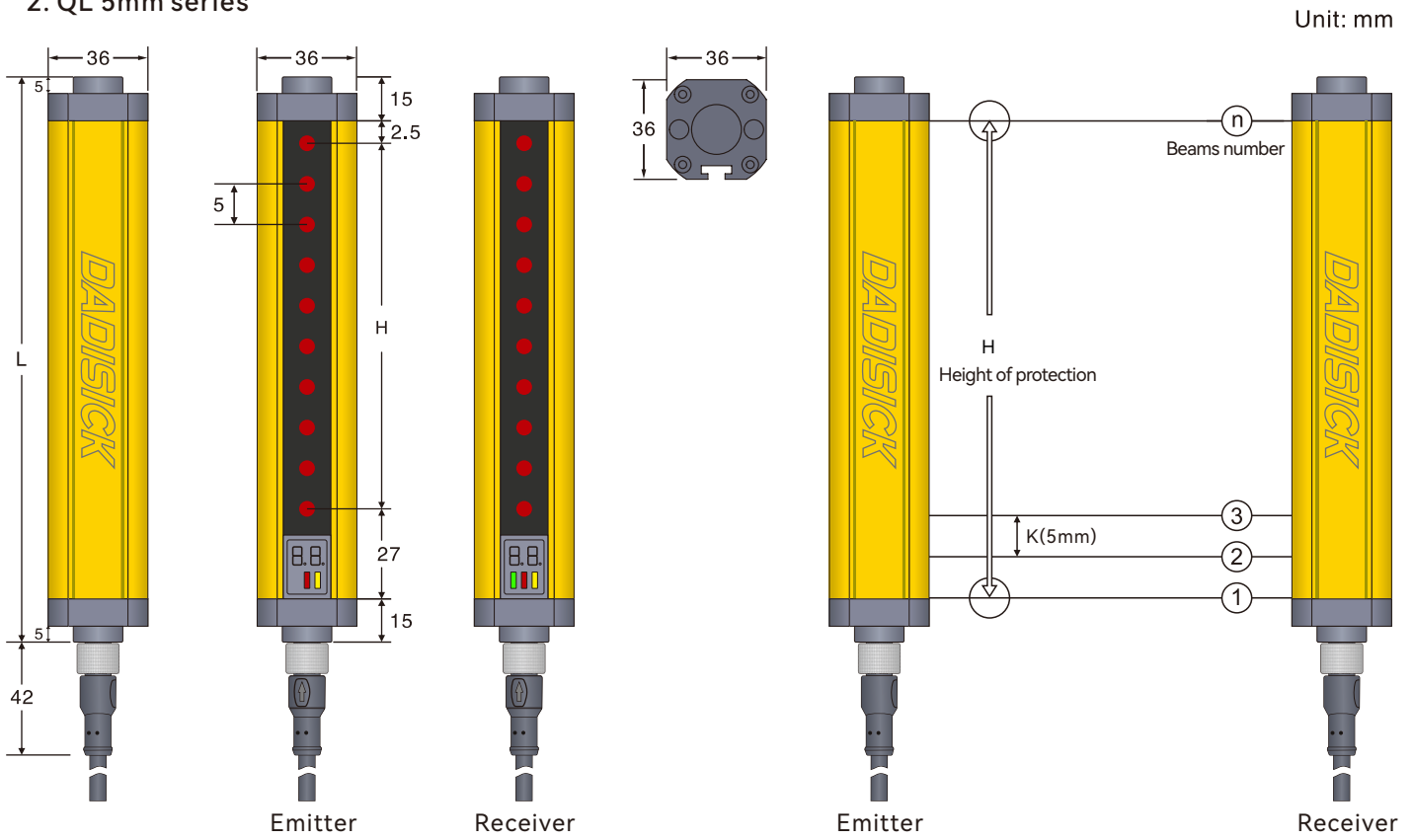
K: Resolution ratio

n: Beams number

QL 2.5mm specification list

Resolution	Light beam	Protection height (H)	Total height (L)	Product model	Signal output mode			Detection range
					RS485	4-20mA	0-10V	
2.5mm (K)	32	77.5	134.5	QL32/2.5-77.5	R	I	U	0.3-3m
	40	97.5	154.5	QL40/2.5-97.5	R	I	U	0.3-3m
	48	117.5	174.5	QL48/2.5-117.5	R	I	U	0.3-3m
	56	137.5	194.5	QL56/2.5-137.5	R	I	U	0.3-3m
	64	157.5	214.5	QL64/2.5-157.5	R	I	U	0.3-3m
	72	177.5	234.5	QL72/2.5-177.5	R	I	U	0.3-3m
	80	197.5	254.5	QL80/2.5-197.5	R	I	U	0.3-3m
	88	217.5	274.5	QL88/2.5-217.5	R	I	U	0.3-3m
	96	237.5	294.5	QL96/2.5-237.5	R	I	U	0.3-3m
	104	257.5	314.5	QL104/2.5-257.5	R	I	U	0.3-3m
	112	277.5	334.5	QL112/2.5-277.5	R	I	U	0.3-3m
	120	297.5	354.5	QL120/2.5-297.5	R	I	U	0.3-3m
	128	317.5	374.5	QL128/2.5-317.5	R	I	U	0.3-3m
	136	337.5	394.5	QL136/2.5-337.5	R	I	U	0.3-2m
	144	357.5	414.5	QL144/2.5-357.5	R	I	U	0.3-2m
	152	377.5	434.5	QL152/2.5-377.5	R	I	U	0.3-2m
	160	397.5	454.5	QL160/2.5-397.5	R	I	U	0.3-2m
	168	417.5	474.5	QL168/2.5-417.5	R	I	U	0.3-2m
	176	437.5	494.5	QL176/2.5-437.5	R	I	U	0.3-2m
	184	457.5	514.5	QL184/2.5-457.5	R	I	U	0.3-2m
	192	477.5	534.5	QL192/2.5-477.5	R	I	U	0.3-2m
	200	497.5	554.5	QL200/2.5-497.5	R	I	U	0.3-2m
	208	517.5	574.5	QL208/2.5-517.5	R	I	U	0.3-2m
	216	537.5	594.5	QL216/2.5-537.5	R	I	U	0.3-2m
	224	557.5	614.5	QL224/2.5-557.5	R	I	U	0.3-2m
	232	577.5	634.5	QL232/2.5-577.5	R	I	U	0.3-2m
	240	597.5	654.5	QL240/2.5-597.5	R	I	U	0.3-2m
	248	617.5	674.5	QL248/2.5-617.5	R	I	U	0.3-2m
...	...	...	...	...	R	I	U	0.3-2m
464	1157.5	1214.5	1214.5	QL464/2.5-1157.5	R	I	U	0.3-2m
472	1177.5	1234.5	1234.5	QL472/2.5-1177.5	R	I	U	0.3-2m
480	1197.5	1254.5	1254.5	QL480/2.5-1197.5	R	I	U	0.3-2m

2. QL 5mm series



Remarks

L: Total length of light screen  
 $L = 15 + 2.5 + H + 27 + 15$

H: Height of protected area  
 $H = (n - 1) * 5$

K: Resolution ratio

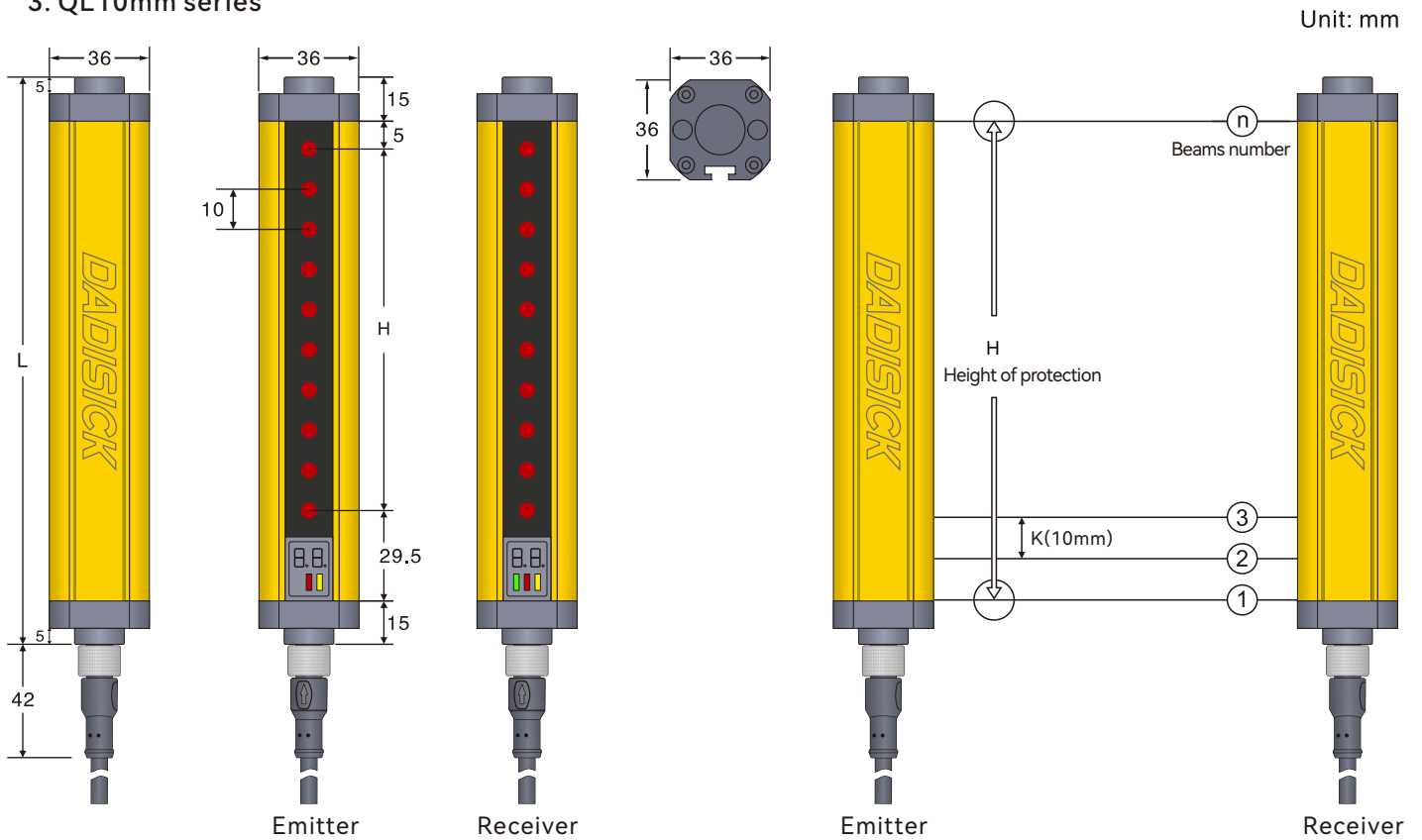
n: Beams number

QL 5mm specification list

Resolution	Light beam	Protection height (H)	Total height (L)	Product model	Signal output mode			Detection range
					RS485	4-20mA	0-10V	
5mm (K)	16	75	134.5	QL16/5-75	R	I	U	0.3-3m
	24	115	174.5	QL24/5-115	R	I	U	0.3-3m
	32	155	214.5	QL32/5-155	R	I	U	0.3-3m
	40	195	254.5	QL40/5-195	R	I	U	0.3-3m
	48	235	294.5	QL48/5-235	R	I	U	0.3-3m
	56	275	334.5	QL56/5-275	R	I	U	0.3-3m
	64	315	374.5	QL64/5-315	R	I	U	0.3-3m
	72	355	414.5	QL72/5-355	R	I	U	0.3-3m
	80	395	454.5	QL80/5-395	R	I	U	0.3-3m
	88	435	494.5	QL88/5-435	R	I	U	0.3-3m
	96	475	534.5	QL96/5-475	R	I	U	0.3-3m
	104	515	574.5	QL104/5-515	R	I	U	0.3-2m
	112	555	614.5	QL112/5-555	R	I	U	0.3-2m
	120	595	654.5	QL120/5-595	R	I	U	0.3-2m
	128	635	694.5	QL128/5-635	R	I	U	0.3-2m
	136	675	734.5	QL136/5-675	R	I	U	0.3-2m
	144	715	774.5	QL144/5-715	R	I	U	0.3-2m
	152	755	814.5	QL152/5-755	R	I	U	0.3-2m
	160	795	854.5	QL160/5-795	R	I	U	0.3-2m
	168	835	894.5	QL168/5-835	R	I	U	0.3-2m
	176	875	934.5	QL176/5-875	R	I	U	0.3-2m
	184	915	974.5	QL184/5-915	R	I	U	0.3-2m
	192	955	1014.5	QL192/5-955	R	I	U	0.3-2m
	200	995	1054.5	QL200/5-995	R	I	U	0.3-2m
	208	1035	1094.5	QL208/5-1035	R	I	U	0.3-2m
	216	1075	1134.5	QL216/5-1075	R	I	U	0.3-2m
224	1115	1174.5	QL224/5-1115	R	I	U	0.3-2m	
232	1155	1214.5	QL232/5-1155	R	I	U	0.3-2m	
...	...	...	...	...	R	I	U	0.3-2m
480	2395	2454.5	2454.5	QL480/5-2395	R	I	U	0.3-2m
488	2435	2494.5	2494.5	QL488/5-2435	R	I	U	0.3-2m
496	2475	2534.5	2534.5	QL496/5-2475	R	I	U	0.3-2m



### 3. QL10mm series



#### Remarks

L: Total length of light screen  
 $L = 15 + 5 + H + 29.5 + 15$

H: Height of protected area  
 $H = (n - 1) * 10$

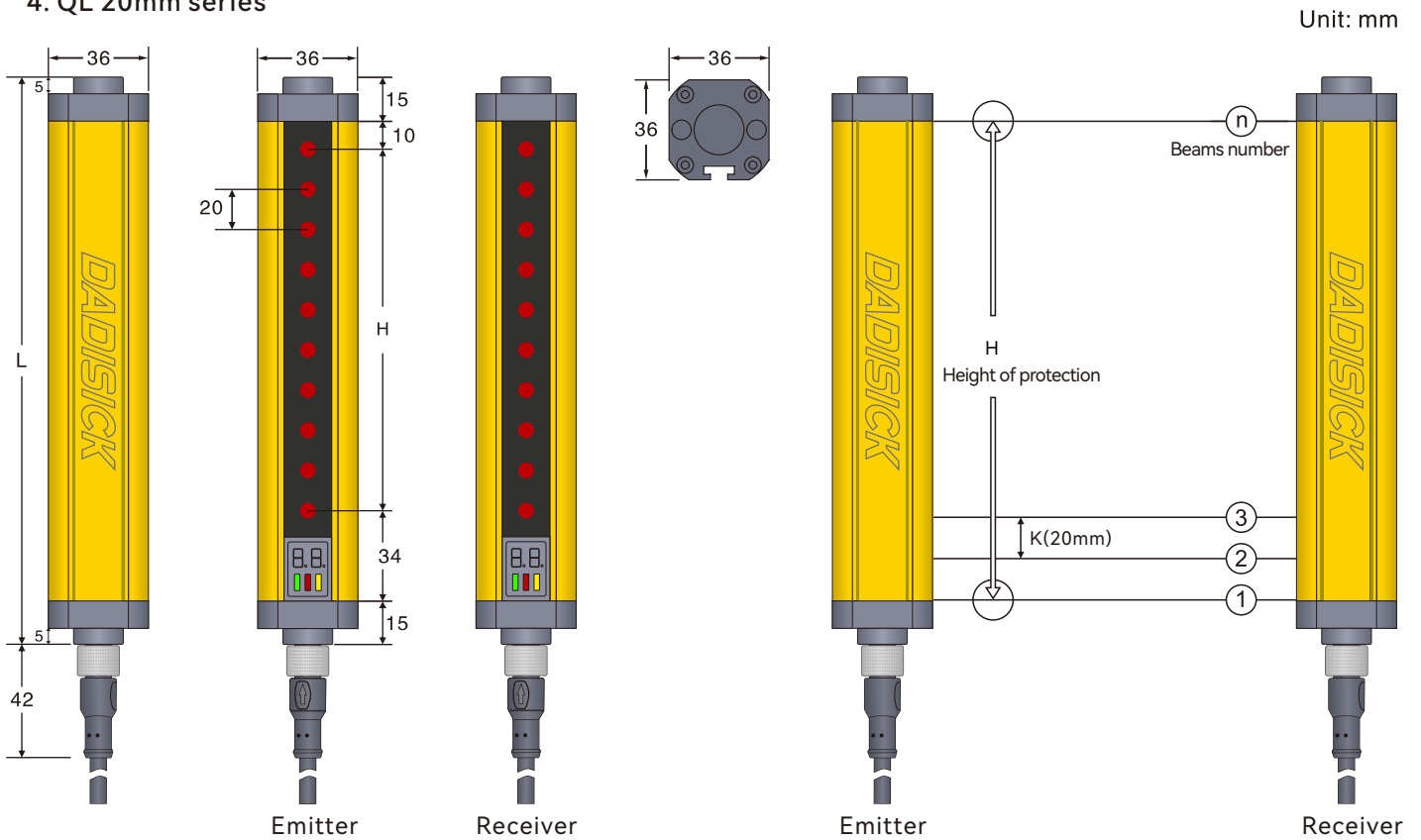
K: Resolution ratio

n: Beams number

#### QL 10mm specification list

Resolution	Light beam	Protection height (H)	Total height (L)	Product model	Signal output mode			Detection range
					RS485	4-20mA	0-10V	
10mm (K)	8	70	134.5	QL08/10-70	R	I	U	0.3-6m
	10	90	154.5	QL10/10-90	R	I	U	0.3-6m
	12	110	174.5	QL12/10-110	R	I	U	0.3-6m
	14	130	194.5	QL14/10-130	R	I	U	0.3-6m
	16	150	214.5	QL16/10-150	R	I	U	0.3-6m
	18	170	234.5	QL18/10-170	R	I	U	0.3-6m
	20	190	254.5	QL20/10-190	R	I	U	0.3-6m
	22	210	274.5	QL22/10-210	R	I	U	0.3-6m
	24	230	294.5	QL24/10-230	R	I	U	0.3-6m
	26	250	314.5	QL26/10-250	R	I	U	0.3-6m
	28	270	334.5	QL28/10-270	R	I	U	0.3-6m
	30	290	354.5	QL30/10-290	R	I	U	0.3-6m
	32	310	374.5	QL32/10-310	R	I	U	0.3-6m
	34	330	394.5	QL34/10-330	R	I	U	0.3-6m

#### 4. QL 20mm series



#### 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

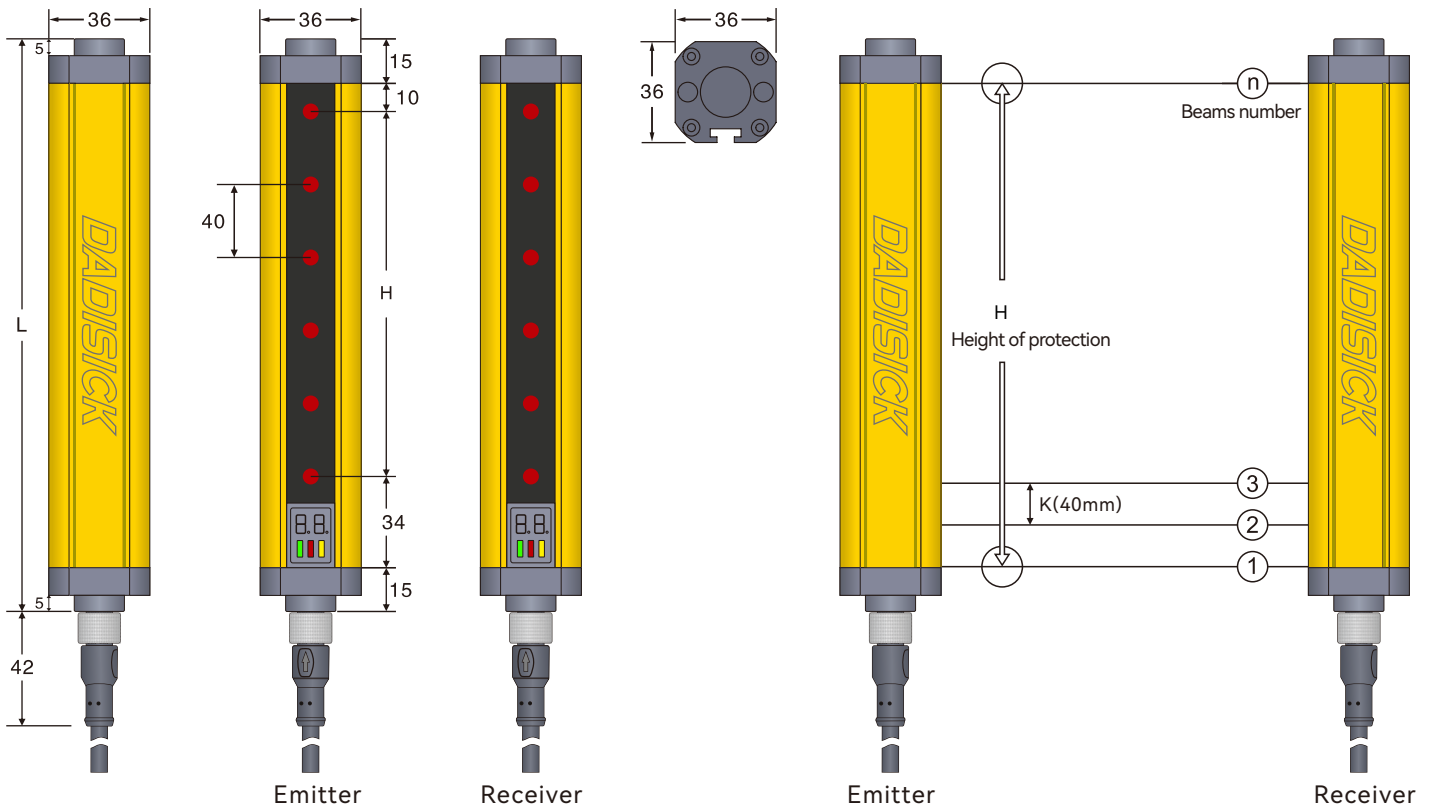
#### QL 20mm specification list

Resolution	Light beam	Protection height (H)	Total height (L)	Product model	Signal output mode			Detection range
					RS485	4-20mA	0-10V	
20mm (K)	4	60	134	QL04/20-60	R	I	U	0.3-6m
	6	100	174	QL06/20-100	R	I	U	0.3-6m
	8	140	214	QL08/20-140	R	I	U	0.3-6m
	10	180	254	QL10/20-180	R	I	U	0.3-6m
	12	220	294	QL12/20-220	R	I	U	0.3-6m
	14	260	334	QL14/20-260	R	I	U	0.3-6m
	16	300	374	QL16/20-300	R	I	U	0.3-6m
	18	340	414	QL18/20-340	R	I	U	0.3-6m
	20	380	454	QL20/20-380	R	I	U	0.3-6m
	22	420	494	QL22/20-420	R	I	U	0.3-6m
	24	460	534	QL24/20-460	R	I	U	0.3-6m
	26	500	574	QL26/20-500	R	I	U	0.3-6m
	28	540	614	QL28/20-540	R	I	U	0.3-6m
	30	580	654	QL30/20-580	R	I	U	0.3-6m
32	620	694	QL32/20-620	R	I	U	0.3-6m	

Note: The sensing distance can reach up to 30m. For more information, please contact customer service

5. QL 40mm series

Unit: mm



Remarks

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

H: Height of protected area  
 $H = (n - 1) * 40$

K: Resolution ratio

n: Beams number

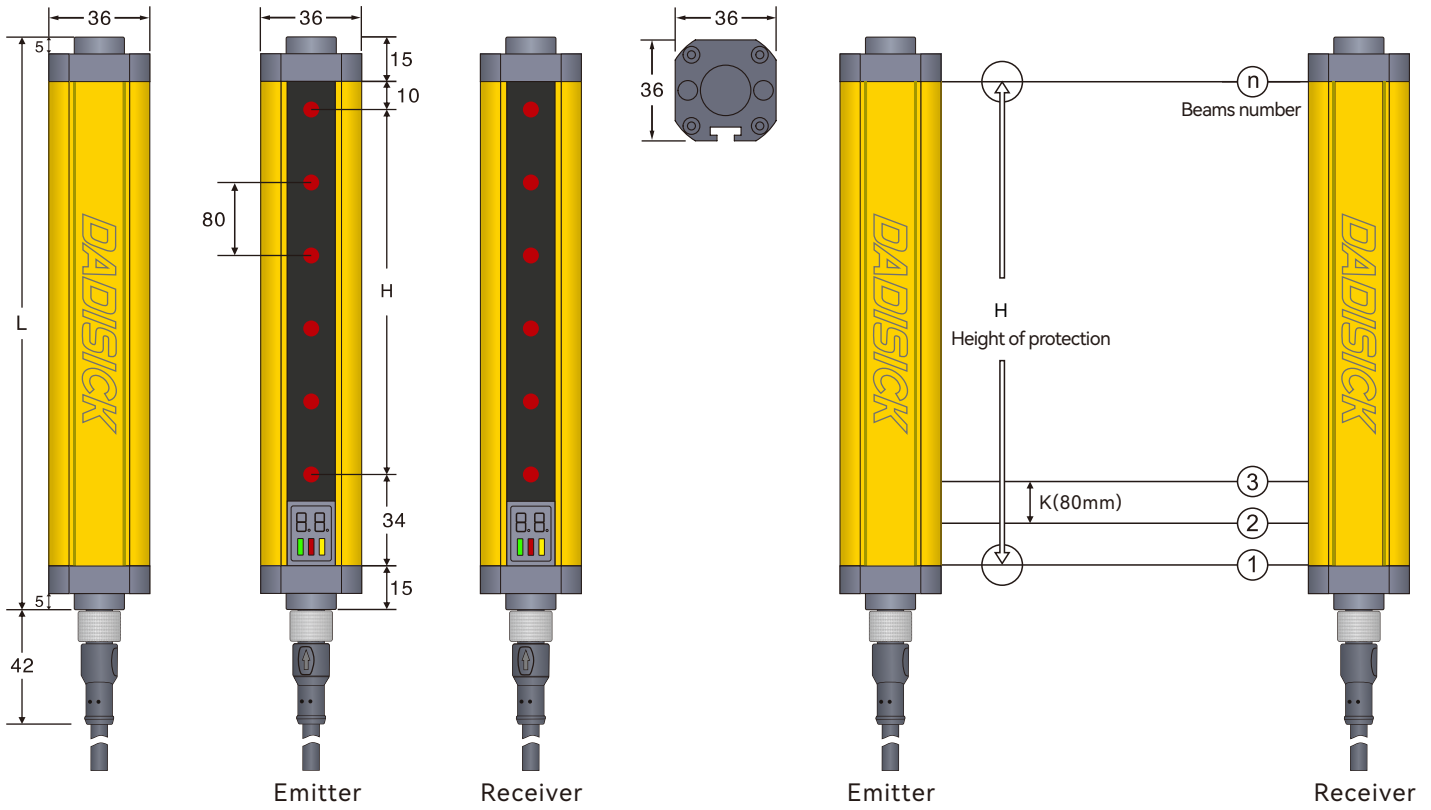
QL 40mm specification list

Resolution	Light beam	Protection height (H)	Total height (L)	Product model	Signal output mode			Detection range
					RS485	4-20mA	0-10V	
40mm (K)	4	120	194	QL04/40-120	R	I	U	0.3-6m
	6	200	274	QL06/40-200	R	I	U	0.3-6m
	8	280	354	QL08/40-280	R	I	U	0.3-6m
	10	360	434	QL10/40-360	R	I	U	0.3-6m
	12	440	514	QL12/40-440	R	I	U	0.3-6m
	14	520	594	QL14/40-520	R	I	U	0.3-6m
	16	600	674	QL16/40-600	R	I	U	0.3-6m
	18	680	754	QL18/40-680	R	I	U	0.3-6m
	20	760	834	QL20/40-760	R	I	U	0.3-6m
	22	840	914	QL22/40-840	R	I	U	0.3-6m
	24	920	994	QL24/40-920	R	I	U	0.3-6m
	26	1000	1074	QL26/40-1000	R	I	U	0.3-6m
	28	1080	1154	QL28/40-1080	R	I	U	0.3-6m
	30	1160	1234	QL30/40-1160	R	I	U	0.3-6m
	32	1240	1314	QL32/40-1240	R	I	U	0.3-6m
	34	1320	1394	QL34/40-1320	R	I	U	0.3-6m
	36	1400	1474	QL36/40-1400	R	I	U	0.3-6m
	38	1480	1554	QL38/40-1480	R	I	U	0.3-6m
	40	1560	1634	QL40/40-1560	R	I	U	0.3-6m
	42	1640	1714	QL42/40-1640	R	I	U	0.3-6m
	44	1720	1794	QL44/40-1720	R	I	U	0.3-6m
	46	1800	1874	QL46/40-1800	R	I	U	0.3-6m
	48	1880	1954	QL48/40-1880	R	I	U	0.3-6m
	50	1960	2034	QL50/40-1960	R	I	U	0.3-6m
	52	2040	2114	QL52/40-2040	R	I	U	0.3-6m
	54	2120	2194	QL54/40-2120	R	I	U	0.3-6m
	56	2200	2274	QL56/40-2200	R	I	U	0.3-6m
	58	2280	2354	QL58/40-2280	R	I	U	0.3-6m
60	2360	2434	QL60/40-2360	R	I	U	0.3-6m	
62	2440	2514	QL62/40-2440	R	I	U	0.3-6m	
64	2520	2594	QL64/40-2520	R	I	U	0.3-6m	
66	2600	2674	QL66/40-2600	R	I	U	0.3-6m	
68	2680	2754	QL68/40-2680	R	I	U	0.3-6m	
70	2760	2834	QL70/40-2760	R	I	U	0.3-6m	
72	2840	2914	QL72/40-2840	R	I	U	0.3-6m	

Note: The sensing distance can reach up to 30m. For more information, please contact customer service

6. QL 80mm series

Unit: mm



Remarks

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

H: Height of protected area  
 $H = (n - 1) * 80$

K: Resolution ratio

n: Beams number

QL 80mm specification list

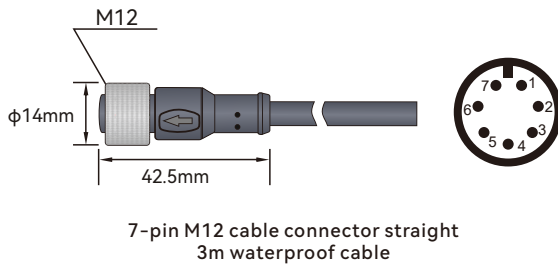
Resolution	Light beam	Protection height (H)	Total height (L)	Product model	Signal output mode			Detection range
					RS485	4-20mA	0-10V	
80mm (K)	4	240	314	QL04/80-240	R	I	U	0.3-6m
	6	400	474	QL06/80-400	R	I	U	0.3-6m
	8	560	634	QL08/80-560	R	I	U	0.3-6m
	10	720	794	QL10/80-720	R	I	U	0.3-6m
	12	880	954	QL12/80-880	R	I	U	0.3-6m
	14	1040	1114	QL14/80-1040	R	I	U	0.3-6m
	16	1200	1274	QL16/80-1200	R	I	U	0.3-6m
	18	1360	1434	QL18/80-1360	R	I	U	0.3-6m
	20	1520	1594	QL20/80-1520	R	I	U	0.3-6m
	22	1680	1754	QL22/80-1680	R	I	U	0.3-6m
	24	1840	1914	QL24/80-1840	R	I	U	0.3-6m
	26	2000	2074	QL26/80-2000	R	I	U	0.3-6m
	28	2160	2234	QL28/80-2160	R	I	U	0.3-6m
	30	2320	2394	QL30/80-2320	R	I	U	0.3-6m
	32	2480	2554	QL32/80-2480	R	I	U	0.3-6m
	34	2640	2714	QL34/80-2640	R	I	U	0.3-6m
36	2800	2874	QL36/80-2800	R	I	U	0.3-6m	
38	2960	3034	QL38/80-2960	R	I	U	0.3-6m	
40	3120	3194	QL40/80-3120	R	I	U	0.3-6m	

Note: The sensing distance can reach up to 30m. For more information, please contact customer service

## 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 <sup>2</sup>
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.

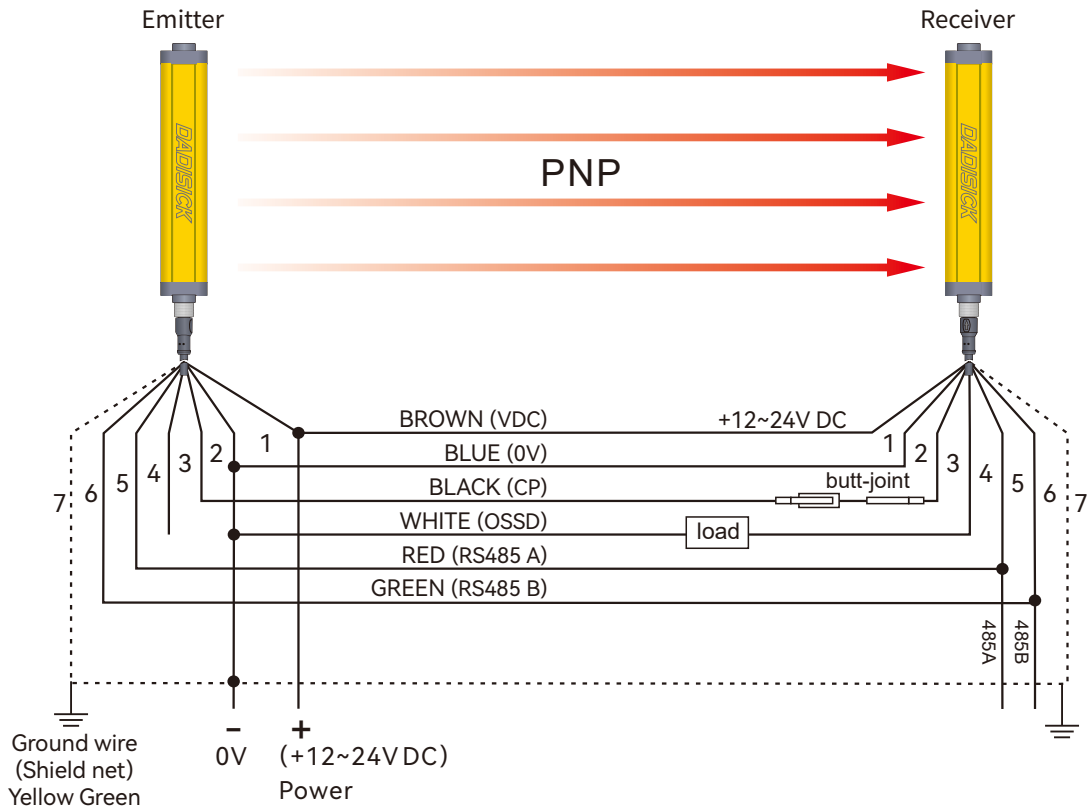
Free	0	1	2	3	---	N	N+1	N+2	Free
Starting position ≥10ms	Starting position 0x03H	Total number of spots	Single frame data volume	Data 1	---	Data N	CRC Check High Bytes	CRC Check Low Bytes	Stop bit ≥10ms

### 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.

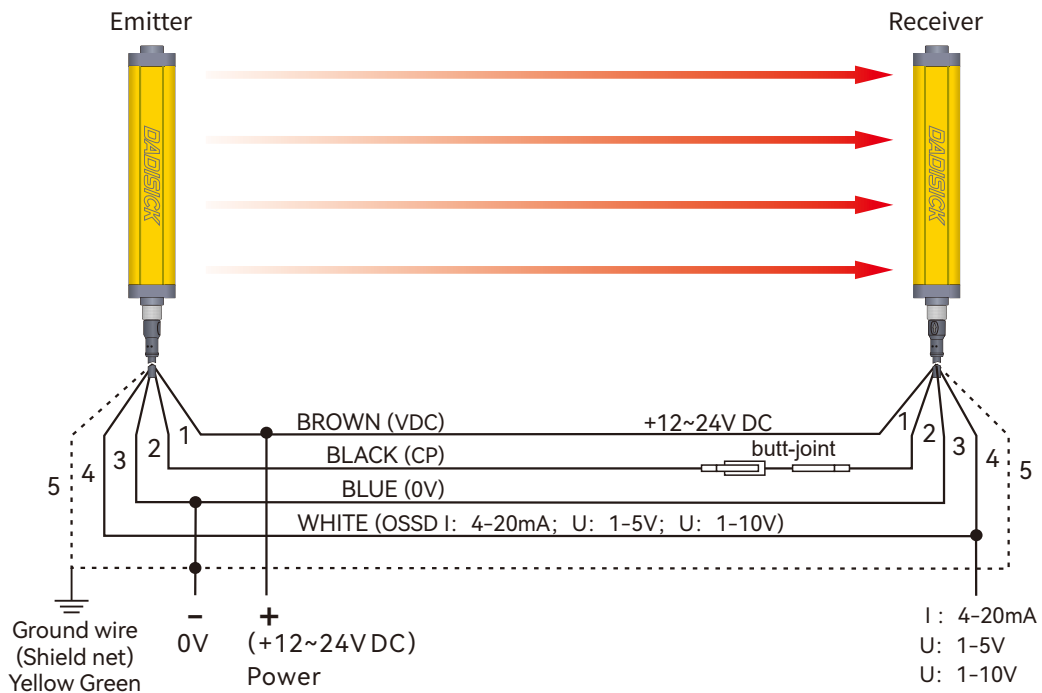
Free	First place	Second place	Third place	Fourth place	Fifth place	Sixth place	Seventh place	Free
Starting position ≥10ms	Starting position 0x03H	Total number of spots	Single frame data volume 0x07	The highest point of light screen occlusion	The lowest point of light screen occlusion	Total number of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

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

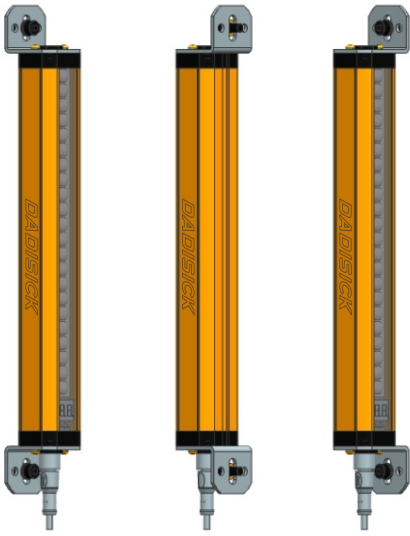


This figure is an example of PNP double output 7-pin wiring.

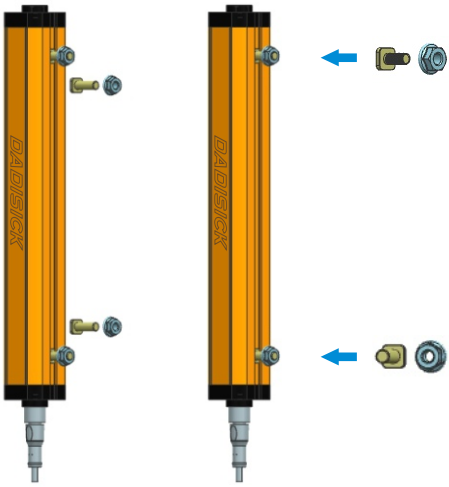
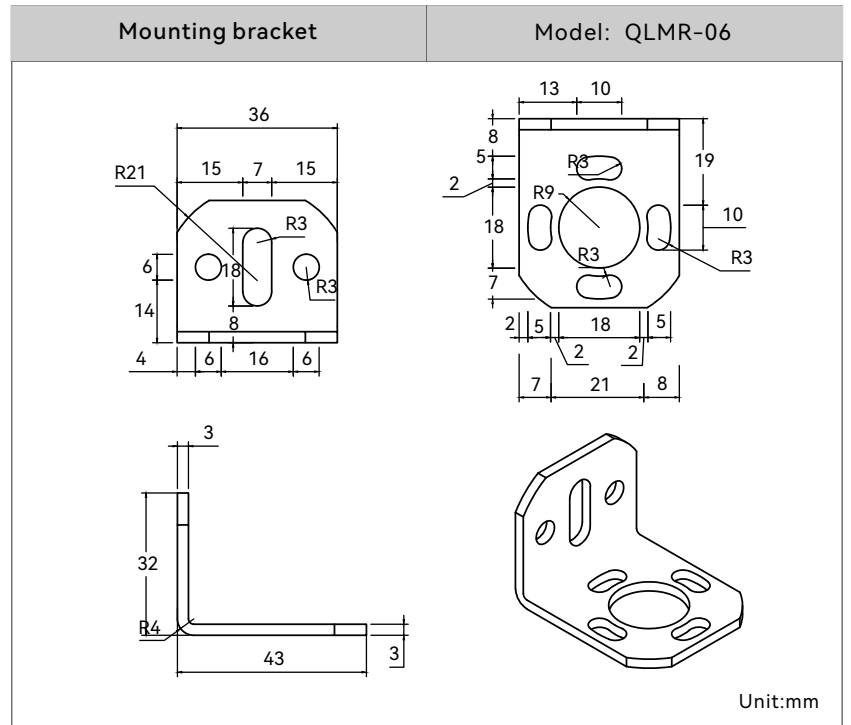
### 7. QL series 5-pin analog U/I wiring diagram



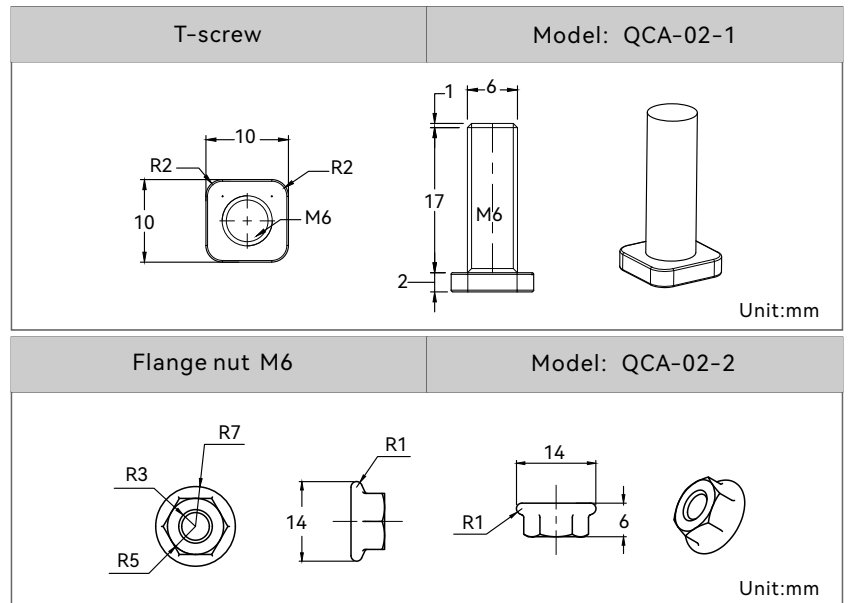
## Accessories

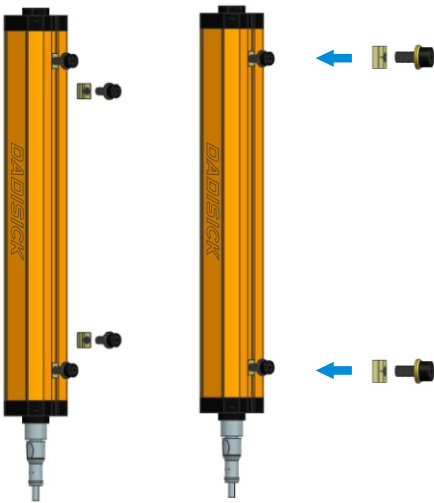


1. Installation of right angle brackets at both ends  
(Original accessories)



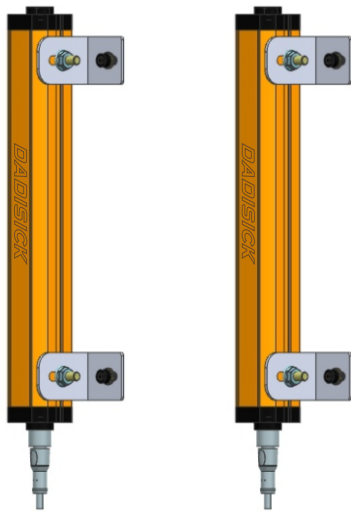
2. Installation method of T-shaped screws on the back  
(Original accessories)





3. Installation method of convex nut  
(Optional accessories)

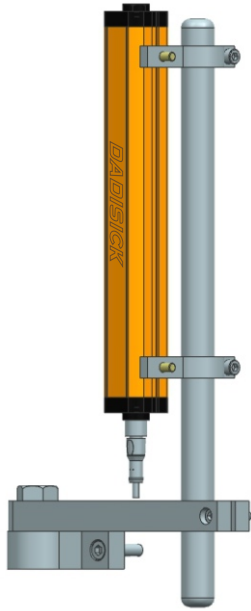
Raised nut	Model: QCA-03-1
	<p style="text-align: right;">Unit:mm</p>
M5 screw	Model: QCA-03-2
	<p style="text-align: right;">Unit:mm</p>



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>	