DADISICK®

TECHNICAL DATA SHEET

SAFETY LIGHT CURTAIN SENSOR
Emitter and Receiver
DK-QRF series

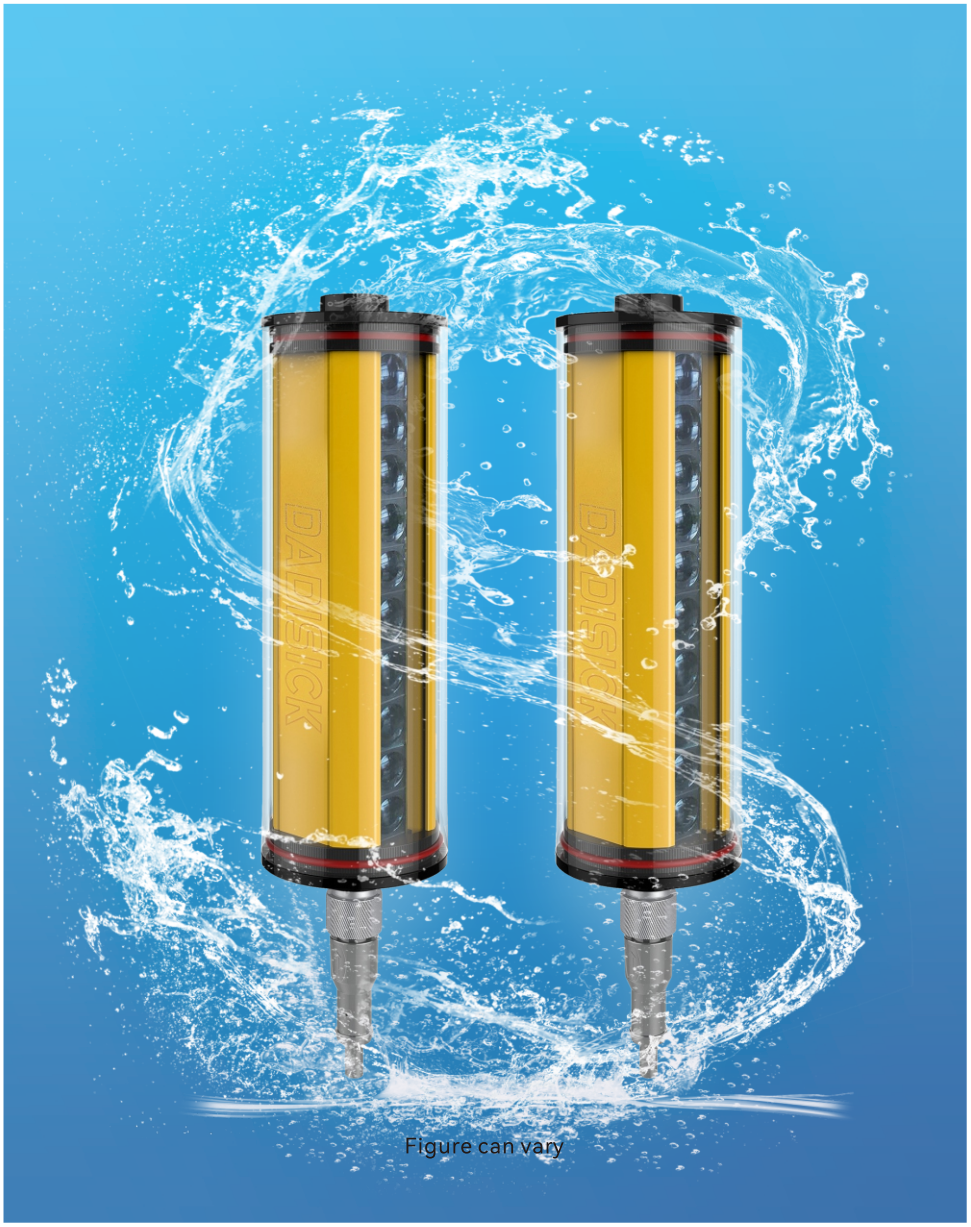

Figure can vary

Contents

GB/T 19001-2016

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Product application

A. Light curtain can achieve full protection for the slider can be stopped at any position on the press machine.

B. The light curtain can only achieve upper dead point protection if the slider can not be stopped at any position on the press machine.

C. Realize the regional protection for the industry manipulator, injection molding machines, packaging equipment, automation equipment, assembly wires and other dangerous work area.

D. Used to detect and alarm object.

The specifications of DK-QRF type safety light curtain are as follows:

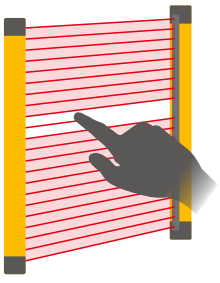
DK–QR F 12 / 10 – 110 – 2 – B B – E (DK–QRF12/10–110–2–BB–E)

- E: Emitter
  R: Receiver
- Detection distance: A:0.3–3m
  B:0.3–6m
  C:0.3–10m
- Signal Output Mode: A:NPN NC
  B:PNP NC
  C:NPN NO
  D:PNP NO
  Note: The default is figure A without special requirements.
- 2: 2-circuit of output
- Protective field height 110mm
- Resolution ratio: 10mm、20mm、30mm
  40mm、80mm、200mm
- Beam number:04、06、08、10.....150
- F: Add waterproof cover, grade IP68
  (IP68 grade is not required, default IP65)
- Model: DK-QR series safety light curtain

Resolution ratio

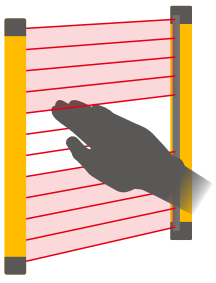
Depending on the usage environment and requirements, it is important to choose the appropriate beam spacing

Finger protection



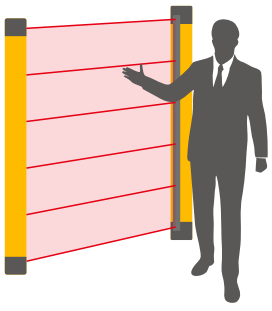
Detection capability
10/14/20mm
diameter

Hand protection



Detection capability
30/40mm
diameter

Arm/body protection



Detection capability
80/200mm
diameter

Technical data

Basic data of Receiver and Emitter

Standard packaging	
Product model	**DK-QRF series**
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	10mm，20mm，30mm，40mm，80mm
Check the accuracy	18mm，28mm，38mm，48mm，88mm
Number of beams	04、06、08、10.....150
Overall dimension	ϕ50mm*L，L is the length of emitter and receiver.
Detection distance	30-6000mm
Response time	≤15ms

Synchronization	Line synchronization
Consumption current	≤200mA
Output mode	2-circuit of PNP, with current of 500mA and voltage below 1.5V, polarity, short circuit and over-cutting protection
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

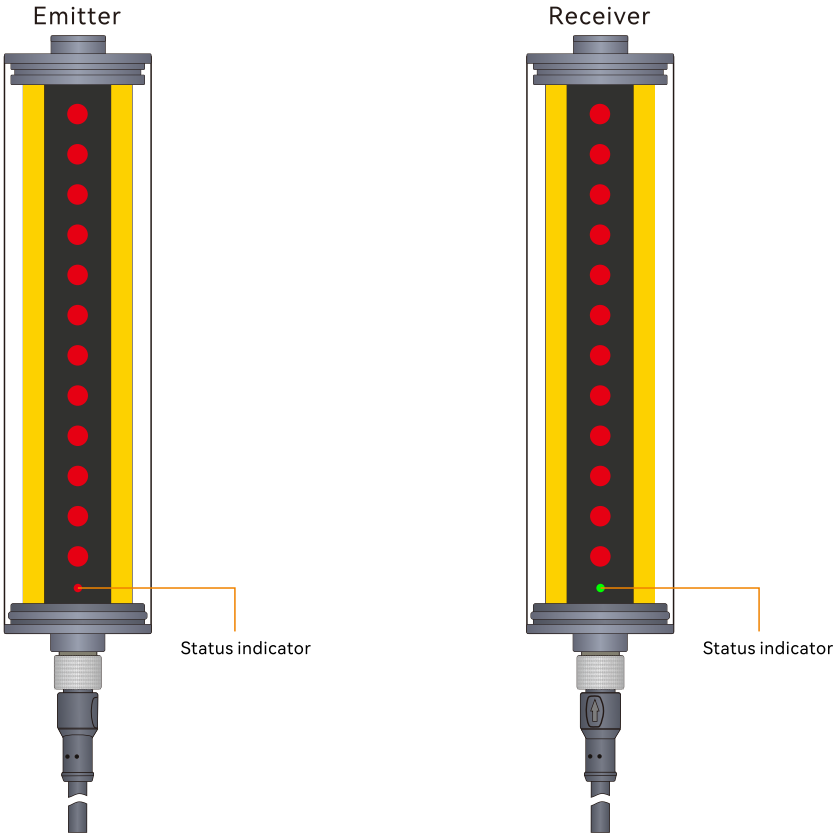
Performance data	
Protection circuit	Short circuit protection Overvoltage protection
Supply voltage	24VDC,-20...20%
Maximum current consumption	150mA
Fuse	2A half time interval

Environmental data	
Protection grade	IP68
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 ℃ (but not frozen), storage temperature: - 25 -+55 ℃
Ambient humidity	Working time: 35~85% RH, saving time: 35~95% RH

Output	
Number of safe output circuits (OSSD)	2-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 switch output 1	Connection pin 4, WHITE OSSD1
Switching element	Transistor PNP
Safety switch output 2	Connection pin 5, GREEN OSSD2
Switching element	Transistor PNP

Certificate	
CE TÜV	No.E8A 104143 0001 Rev.00
ROHS certification	No.BSTDG180811032001CC
CE TYPE 4	No.ICR Polska/VC/HS221222
UL	No. 4790783741.1-S
ISO	No. HIC180327 GB/T 19001-2016 / ISO 9001:2015

Operation and display

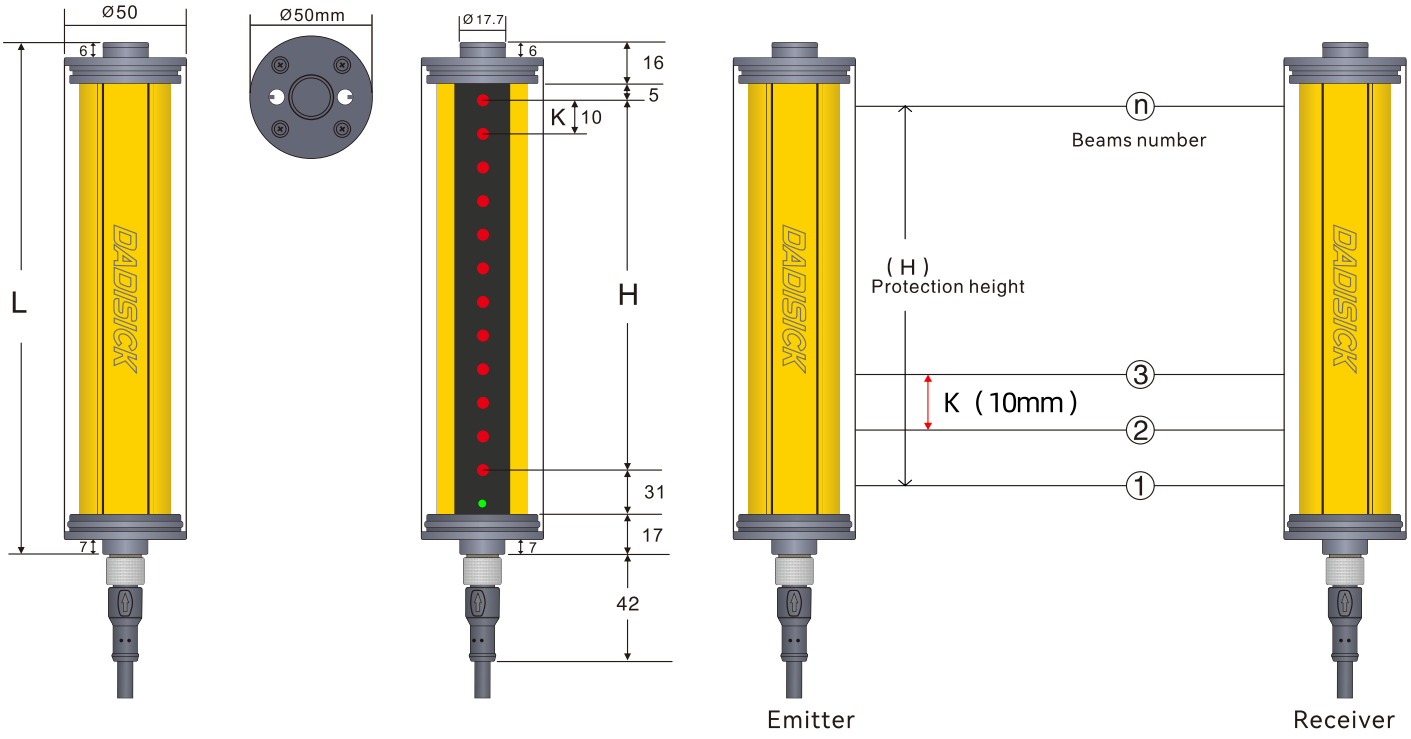


Normal operation of light curtain	LED Indicator status	Explain
Emitter	Red, always on	Turns on the power
	Receiver and emitter are red	Receiver and Emitter are not aligned
Receiver	Green	All light paths are connected
	Red	Light path shading
	Lights flashing	Interference or overstep detection range

Dimensioned drawings

1. DK-QRF 10mm series

Unit: mm



Remarks

L:Total length of light screen

L=16+5+H+31+17

H:Height of protected area

H= (n–1) * 10

K:Resolution ratio

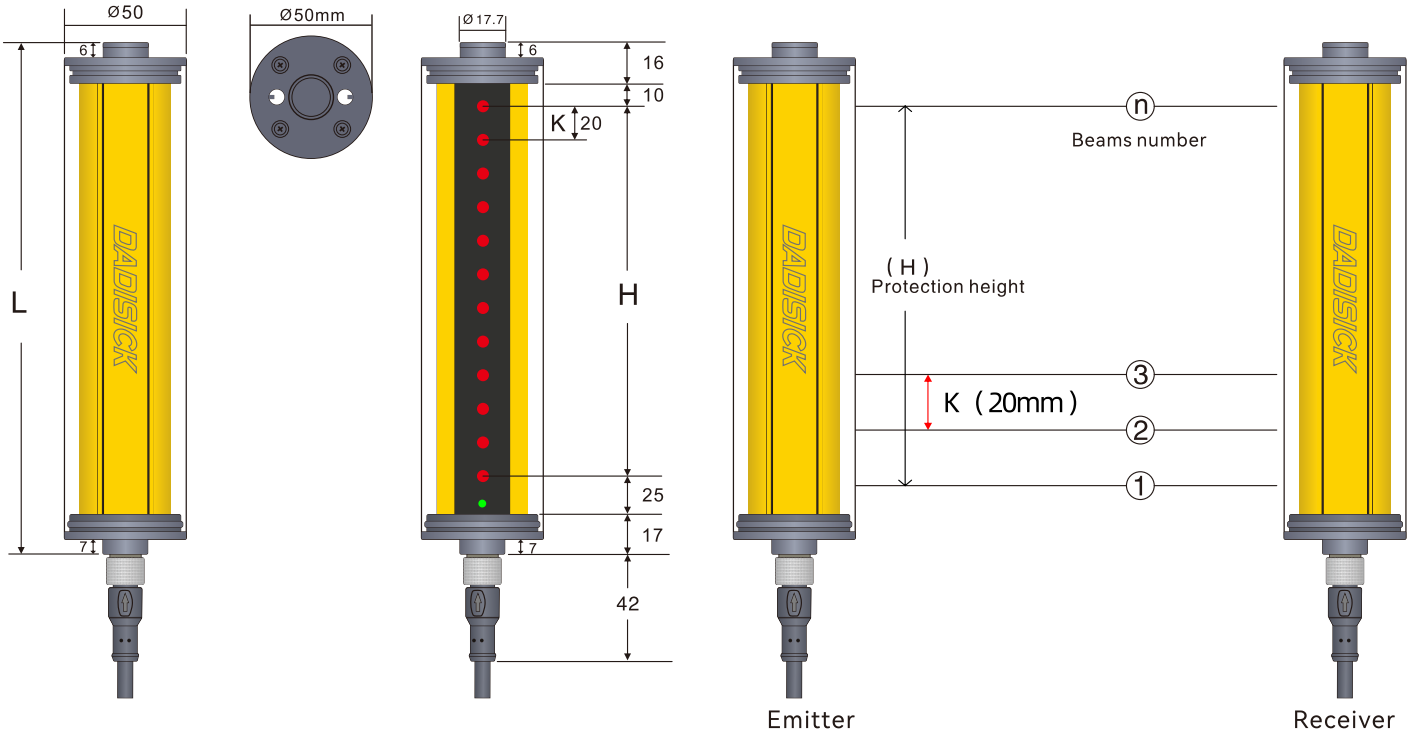
n:Beams number

DK-QRF 10mm specification list

Resolution	Light beam	Protection height (H)	Total height (L)	Product model	Signal output mode		Detection range
					Two outputs	PNP output	
10mm (K)	6	50	119	DK–QRF06/10–50	2	PNP	0.3-6m
	8	70	139	DK–QRF08/10–70	2	PNP	0.3-6m
	10	90	159	DK–QRF10/10–90	2	PNP	0.3-6m
	12	110	179	DK–QRF12/10–110	2	PNP	0.3-6m
	14	130	199	DK–QRF14/10–130	2	PNP	0.3-6m
	16	150	219	DK–QRF16/10–150	2	PNP	0.3-6m
	18	170	239	DK–QRF18/10–170	2	PNP	0.3-6m
	20	190	259	DK–QRF20/10–190	2	PNP	0.3-6m
	22	210	279	DK–QRF22/10–210	2	PNP	0.3-6m
	24	230	299	DK–QRF24/10–230	2	PNP	0.3-6m
	26	250	319	DK–QRF26/10–250	2	PNP	0.3-6m
	28	270	339	DK–QRF28/10–270	2	PNP	0.3-6m
	30	290	359	DK–QRF30/10–290	2	PNP	0.3-6m
	32	310	379	DK–QRF32/10–310	2	PNP	0.3-6m
	34	330	399	DK–QRF34/10–330	2	PNP	0.3-6m
	36	350	419	DK–QRF36/10–350	2	PNP	0.3-6m
	38	370	439	DK–QRF38/10–370	2	PNP	0.3-6m
	40	390	459	DK–QRF40/10–390	2	PNP	0.3-6m
	42	410	479	DK–QRF42/10–410	2	PNP	0.3-6m
	44	430	499	DK–QRF44/10–430	2	PNP	0.3-6m
	46	450	519	DK–QRF46/10–450	2	PNP	0.3-6m
	48	470	539	DK–QRF48/10–470	2	PNP	0.3-6m
	50	490	559	DK–QRF50/10–490	2	PNP	0.3-6m
	52	510	579	DK–QRF52/10–510	2	PNP	0.3-6m
	...	...	...	...	2	PNP	0.3-6m
	146	1450	1519	DK–QRF56/10–1450	2	PNP	0.3-6m
	148	1470	1539	DK–QRF58/10–1470	2	PNP	0.3-6m
	150	1490	1559	DK–QRF60/10–1490	2	PNP	0.3-6m

2.DK-QRF 20mm series

Unit: mm



Remarks

L:Total length of light screen
L=16+10+H+25+17

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

K:Resolution ratio

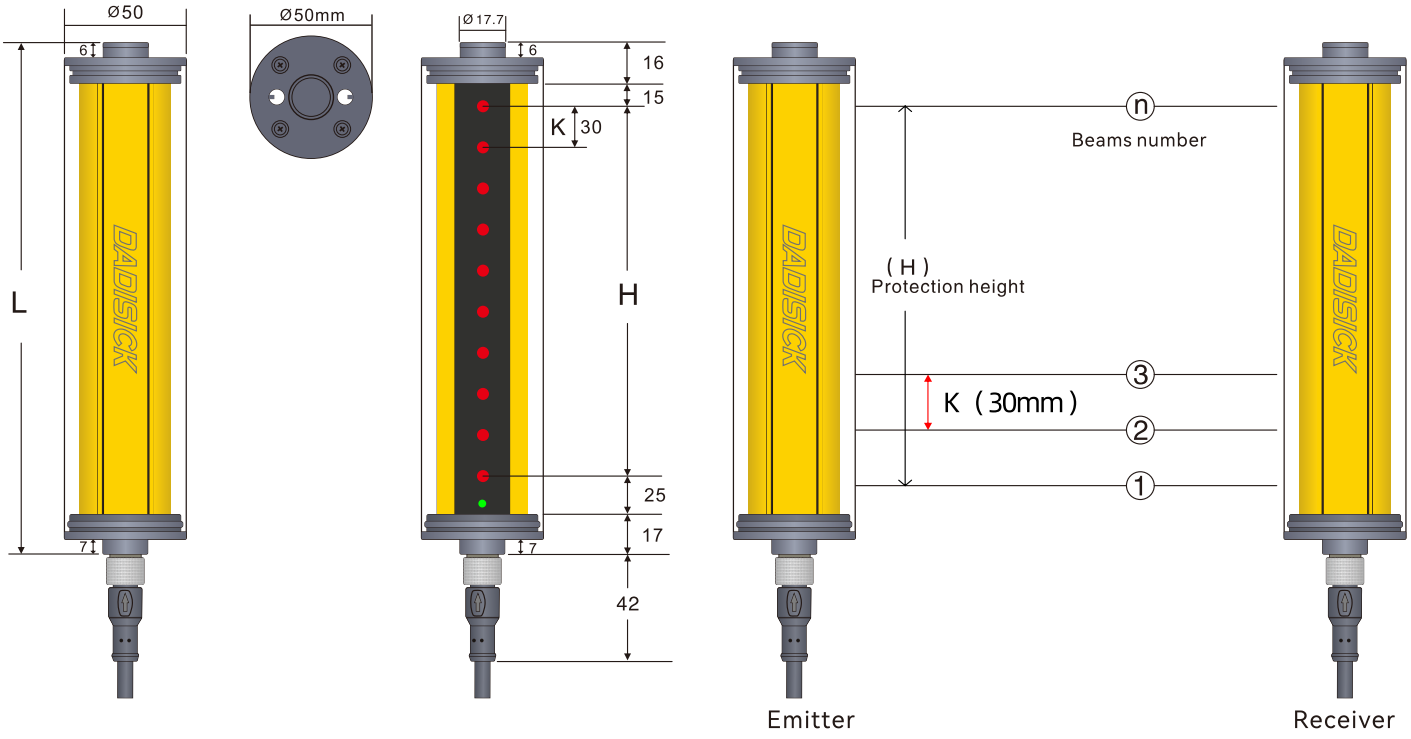
n:Beams number

DK-QRF 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	128	DK–QRF04/20–60	2	PNP	0.3-6m
	6	100	168	DK–QRF06/20–100	2	PNP	0.3-6m
	8	140	208	DK–QRF08/20–140	2	PNP	0.3-6m
	10	180	248	DK–QRF10/20–180	2	PNP	0.3-6m
	12	220	288	DK–QRF12/20–220	2	PNP	0.3-6m
	14	260	328	DK–QRF14/20–260	2	PNP	0.3-6m
	16	300	368	DK–QRF16/20–300	2	PNP	0.3-6m
	18	340	408	DK–QRF18/20–340	2	PNP	0.3-6m
	20	380	448	DK–QRF20/20–380	2	PNP	0.3-6m
	22	420	488	DK–QRF22/20–420	2	PNP	0.3-6m
	24	460	528	DK–QRF24/20–460	2	PNP	0.3-6m
	26	500	568	DK–QRF26/20–500	2	PNP	0.3-6m
	28	540	608	DK–QRF28/20–540	2	PNP	0.3-6m
	30	580	648	DK–QRF30/20–580	2	PNP	0.3-6m
	32	620	688	DK–QRF32/20–620	2	PNP	0.3-6m
	34	660	728	DK–QRF34/20–660	2	PNP	0.3-6m
	36	700	768	DK–QRF36/20–700	2	PNP	0.3-6m
	38	740	808	DK–QRF38/20–740	2	PNP	0.3-6m
	40	780	848	DK–QRF40/20–780	2	PNP	0.3-6m
	42	820	888	DK–QRF42/20–820	2	PNP	0.3-6m
	44	860	928	DK–QRF44/20–860	2	PNP	0.3-6m
	46	900	968	DK–QRF46/20–900	2	PNP	0.3-6m
	48	940	1008	DK–QRF48/20–940	2	PNP	0.3-6m
	50	980	1048	DK–QRF50/20–980	2	PNP	0.3-6m
	...	...	...	...	2	PNP	0.3-6m
	68	1340	1408	DK–QRF68/20–1340	2	PNP	0.3-6m
	70	1380	1448	DK–QRF70/20–1380	2	PNP	0.3-6m
	72	1420	1488	QR72/20–1420	2	PNP	0.3-6m

3. DK-QRF 30mm series

Unit: mm



Remarks

L:Total length of light screen　　H:Height of protected area　　K:Resolution ratio　　n:Beams number

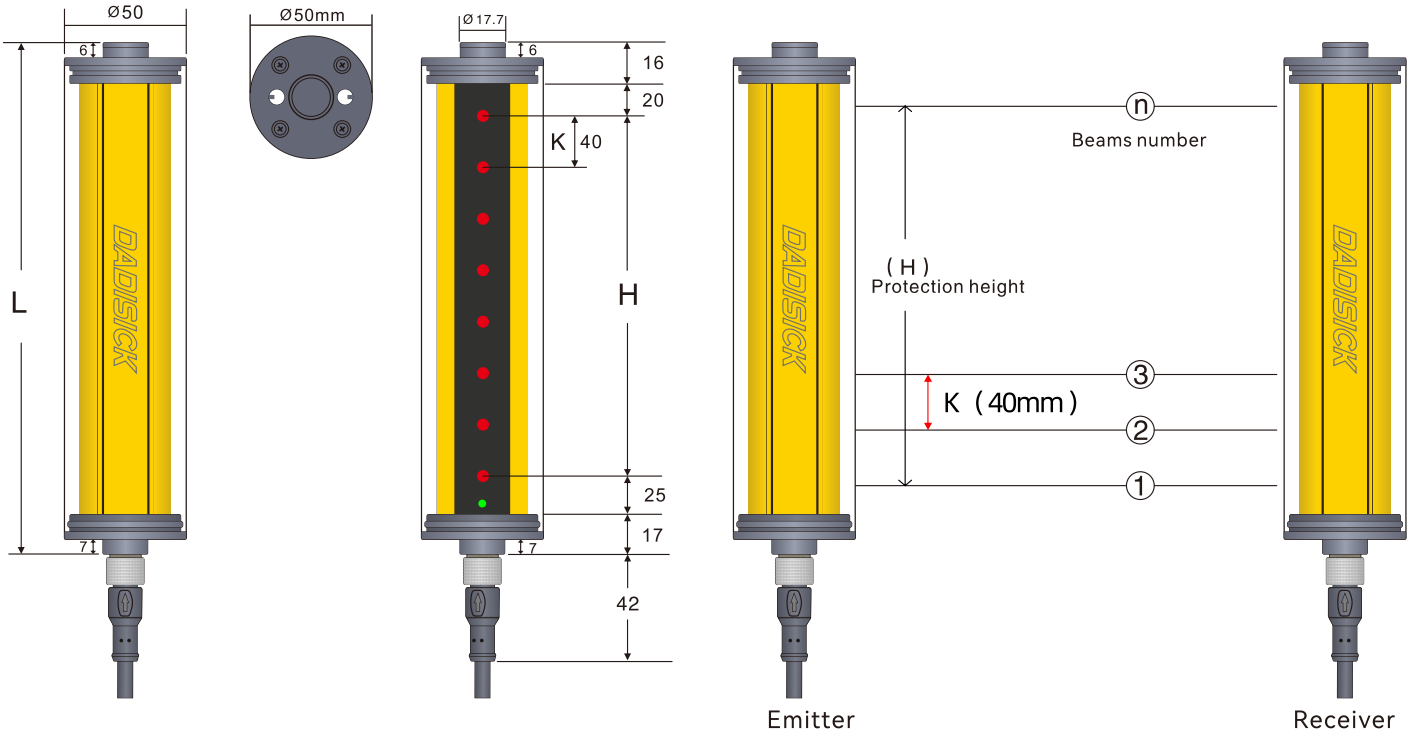
L=16+15+H+25+17　　H= (n–1) * 30

DK-QRF 30mm specification list

Resolution	Light beam	Protection height (H)	Total height (L)	Product model	Signal output mode		Detection range
					Two outputs	PNP output	
30mm (K)	4	90	163	DK–QRF04/30–90	2	PNP	0.3-6m
	6	150	223	DK–QRF06/30–150	2	PNP	0.3-6m
	8	210	283	DK–QRF08/30–210	2	PNP	0.3-6m
	10	270	343	DK–QRF10/30–270	2	PNP	0.3-6m
	12	330	403	DK–QRF12/30–330	2	PNP	0.3-6m
	14	390	463	DK–QRF14/30–390	2	PNP	0.3-6m
	16	450	523	DK–QRF16/30–450	2	PNP	0.3-6m
	18	510	583	DK–QRF18/30–510	2	PNP	0.3-6m
	20	570	643	DK–QRF20/30–570	2	PNP	0.3-6m
	22	630	703	DK–QRF22/30–630	2	PNP	0.3-6m
	24	690	763	DK–QRF24/30–690	2	PNP	0.3-6m
	26	750	823	DK–QRF26/30–750	2	PNP	0.3-6m
	28	810	883	DK–QRF28/30–810	2	PNP	0.3-6m
	30	870	943	DK–QRF30/30–870	2	PNP	0.3-6m
	32	930	1003	DK–QRF32/30–930	2	PNP	0.3-6m

4. DK-QRF 40mm series

Unit: mm



Remarks

L:Total length of light screen

L=16+20+H+25+17

H:Height of protected area

H= (n–1) * 40

K:Resolution ratio

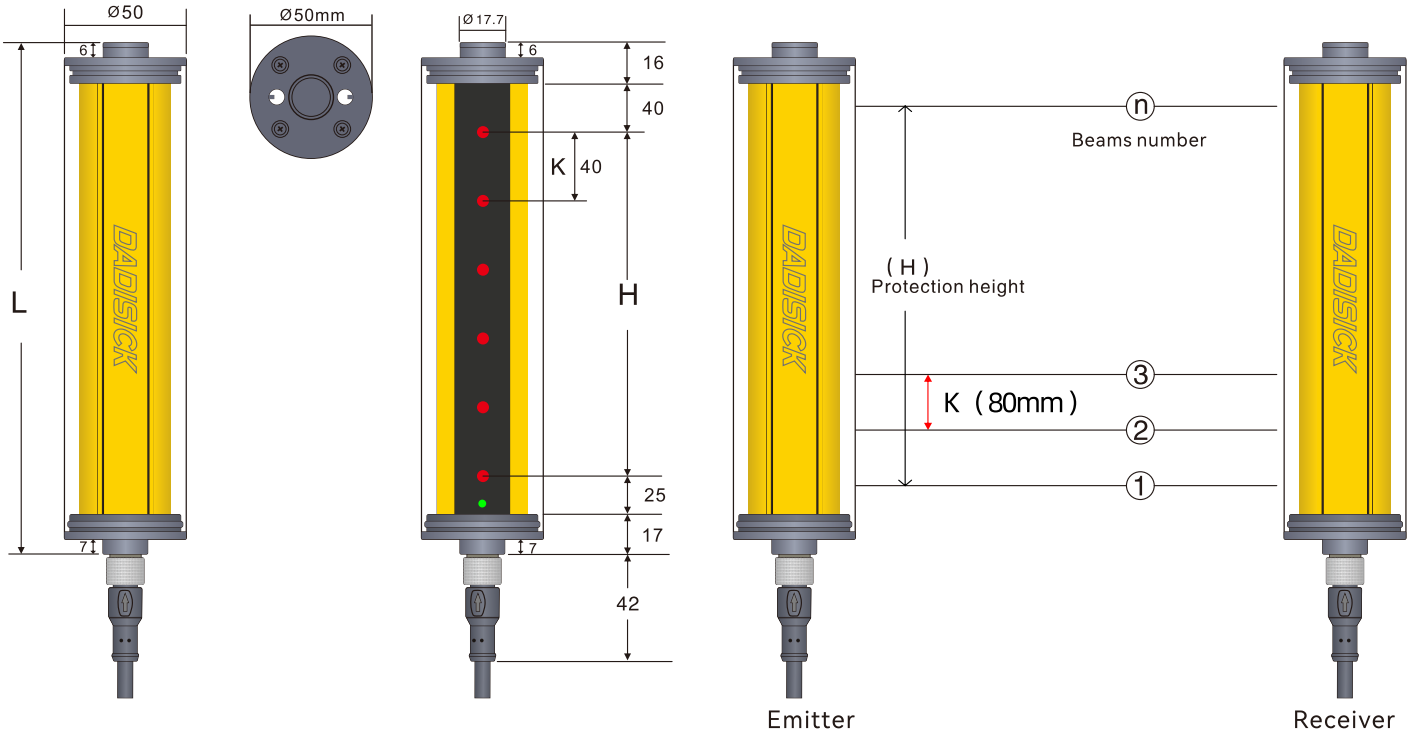
n:Beams number

DK-QRF 40mm specification list

Resolution	Light beam	Protection height (H)	Total height (L)	Product model	Signal output mode		Detection range
					Two outputs	PNP output	
40mm (K)	4	120	198	DK–QRF04/40–120	2	PNP	0.3-6m
	6	200	278	DK–QRF06/40–200	2	PNP	0.3-6m
	8	280	358	DK–QRF08/40–280	2	PNP	0.3-6m
	10	360	438	DK–QRF10/40–360	2	PNP	0.3-6m
	12	440	518	DK–QRF12/40–440	2	PNP	0.3-6m
	14	520	598	DK–QRF14/40–520	2	PNP	0.3-6m
	16	600	678	DK–QRF16/40–600	2	PNP	0.3-6m
	18	680	758	DK–QRF18/40–680	2	PNP	0.3-6m
	20	760	838	DK–QRF20/40–760	2	PNP	0.3-6m
	22	840	918	DK–QRF22/40–840	2	PNP	0.3-6m
	24	920	998	DK–QRF24/40–920	2	PNP	0.3-6m
	26	1000	1078	DK–QRF26/40–1000	2	PNP	0.3-6m
	28	1080	1158	DK–QRF28/40–1080	2	PNP	0.3-6m
	30	1160	1238	DK–QRF30/40–1160	2	PNP	0.3-6m
	32	1240	1318	DK–QRF32/40–1240	2	PNP	0.3-6m
	34	1320	1398	DK–QRF34/40–1320	2	PNP	0.3-6m
	36	1400	1478	DK–QRF36/40–1400	2	PNP	0.3-6m
	38	1480	1558	DK–QRF38/40–1480	2	PNP	0.3-6m
	40	1560	1638	DK–QRF40/40–1560	2	PNP	0.3-6m
	42	1640	1718	DK–QRF42/40–1640	2	PNP	0.3-6m
	44	1720	1798	DK–QRF44/40–1720	2	PNP	0.3-6m
	46	1800	1878	DK–QRF46/40–1800	2	PNP	0.3-6m
	48	1880	1958	DK–QRF48/40–1880	2	PNP	0.3-6m
	50	1960	2038	DK–QRF50/40–1960	2	PNP	0.3-6m
	...	...	...	...	2	PNP	0.3-6m
	68	2680	2758	DK–QRF28/40–2680	2	PNP	0.3-6m
	70	2760	2838	DK–QRF30/40–2760	2	PNP	0.3-6m
	72	2840	2918	DK–QRF32/40–2840	2	PNP	0.3-6m

5. DK-QRF 80mm series

Unit: mm



Remarks

L:Total length of light screen　　H:Height of protected area　　K:Resolution ratio　　n:Beams number

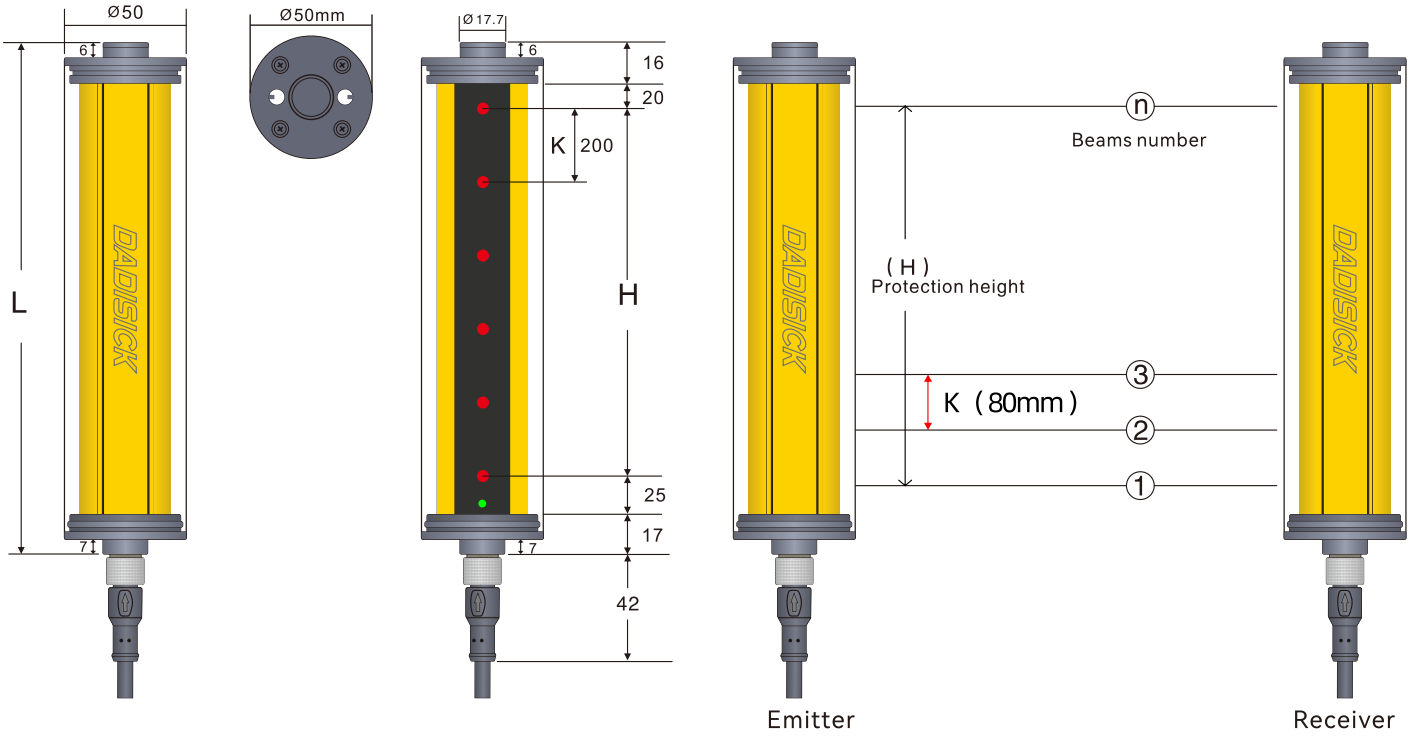
L=16+40+H+25+17　　H= (n–1) * 80

DK-QRF 80mm specification list

Resolution	Light beam	Protection height (H)	Total height (L)	Product model	Signal output mode		Detection range
					Two outputs	PNP output	
80mm (K)	4	240	338	DK–QRF04/80–240	2	PNP	0.3-6m
	6	400	498	DK–QRF06/80–400	2	PNP	0.3-6m
	8	560	658	DK–QRF08/80–560	2	PNP	0.3-6m
	10	720	818	DK–QRF10/80–720	2	PNP	0.3-6m
	12	880	978	DK–QRF12/80–880	2	PNP	0.3-6m
	14	1040	1138	DK–QRF14/80–1040	2	PNP	0.3-6m
	16	1200	1298	DK–QRF16/80–1200	2	PNP	0.3-6m
	18	1360	1458	DK–QRF18/80–1360	2	PNP	0.3-6m
	20	1520	1618	DK–QRF20/80–1520	2	PNP	0.3-6m
	22	1680	1778	DK–QRF22/80–1680	2	PNP	0.3-6m
	24	1840	1938	DK–QRF24/80–1840	2	PNP	0.3-6m
	26	2000	2098	DK–QRF26/80–2000	2	PNP	0.3-6m
	28	2160	2258	DK–QRF28/80–2160	2	PNP	0.3-6m
	30	2320	2418	DK–QRF30/80–2320	2	PNP	0.3-6m
	32	2480	2578	DK–QRF32/80–2480	2	PNP	0.3-6m

6. DK-QRF 200mm series

Unit: mm



Remarks

L:Total length of light screen　　H:Height of protected area　　K:Resolution ratio　　n:Beams number

L=16+20+H+25+17　　H= (n−1) * 80

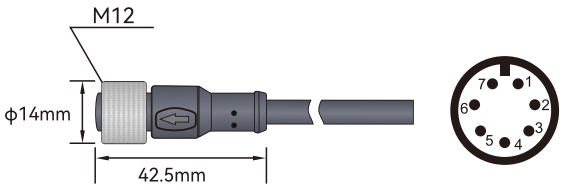
DK-QRF 200mm specification list

Resolution	Light beam	Protection height (H)	Total height (L)	Product model	Signal output mode		Detection range
					Two outputs	PNP output	
200mm (K)	4	600	678	DK-QRF04/200-600	2	PNP	0.3-6m
	6	1000	1078	DK-QRF06/200-1000	2	PNP	0.3-6m
	8	1400	1478	DK-QRF08/200-1400	2	PNP	0.3-6m
	10	1800	1878	DK-QRF10/200-1800	2	PNP	0.3-6m
	12	2200	2278	DK-QRF12/200-2200	2	PNP	0.3-6m
	14	2600	2678	DK-QRF14/200-2600	2	PNP	0.3-6m
	16	3000	3078	DK-QRF16/200-3000	2	PNP	0.3-6m
	18	3400	3478	DK-QRF18/200-3400	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:



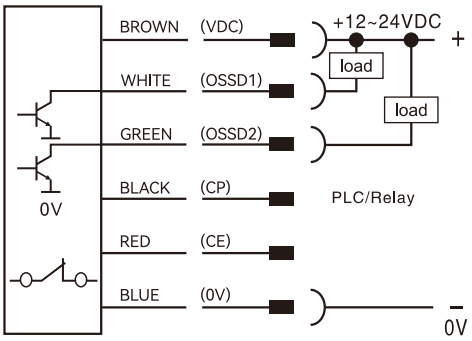
7-pin M12 cable connector straight
3m waterproof cable

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

Receiver Wiring diagram		
Pin number	Line color	Name
1	BROWN	24V DC
2	BLUE	0V
3	BLACK	CP
4	WHITE	OSSD1
5	GREEN	OSSD2
6	RED	CE
7	YELLOW	Ground wire

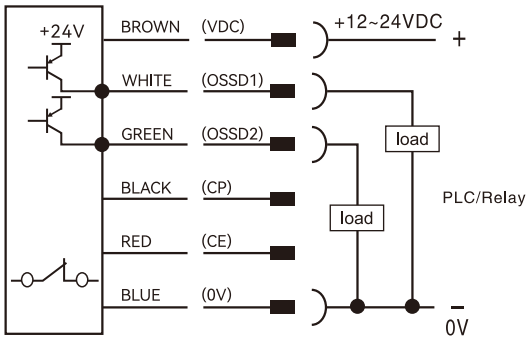
1. DK-QRF signal output selection (actual output of transistor working normally)

NPN NC



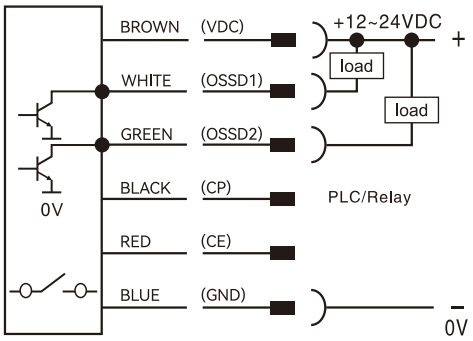
A

PNP NC



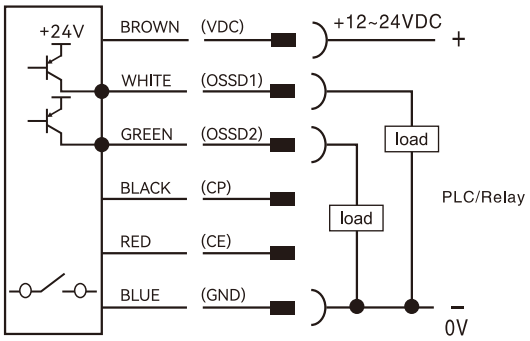
B

NPN NO



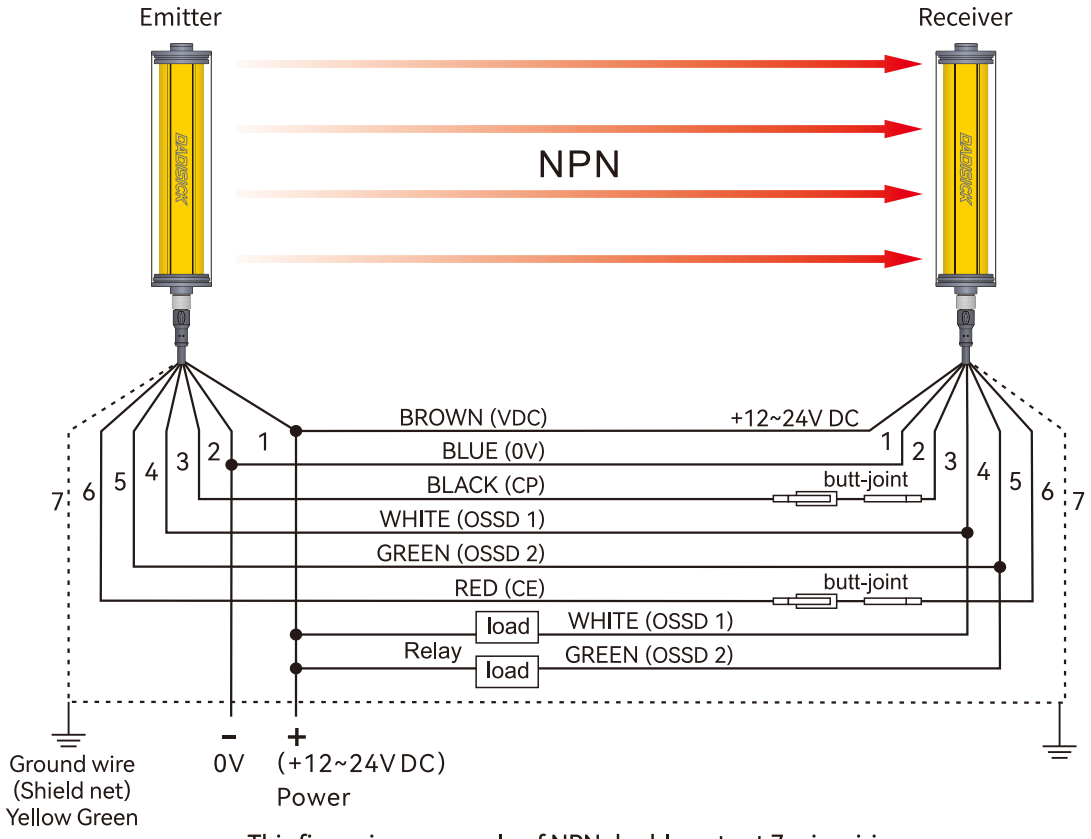
C

PNP NO



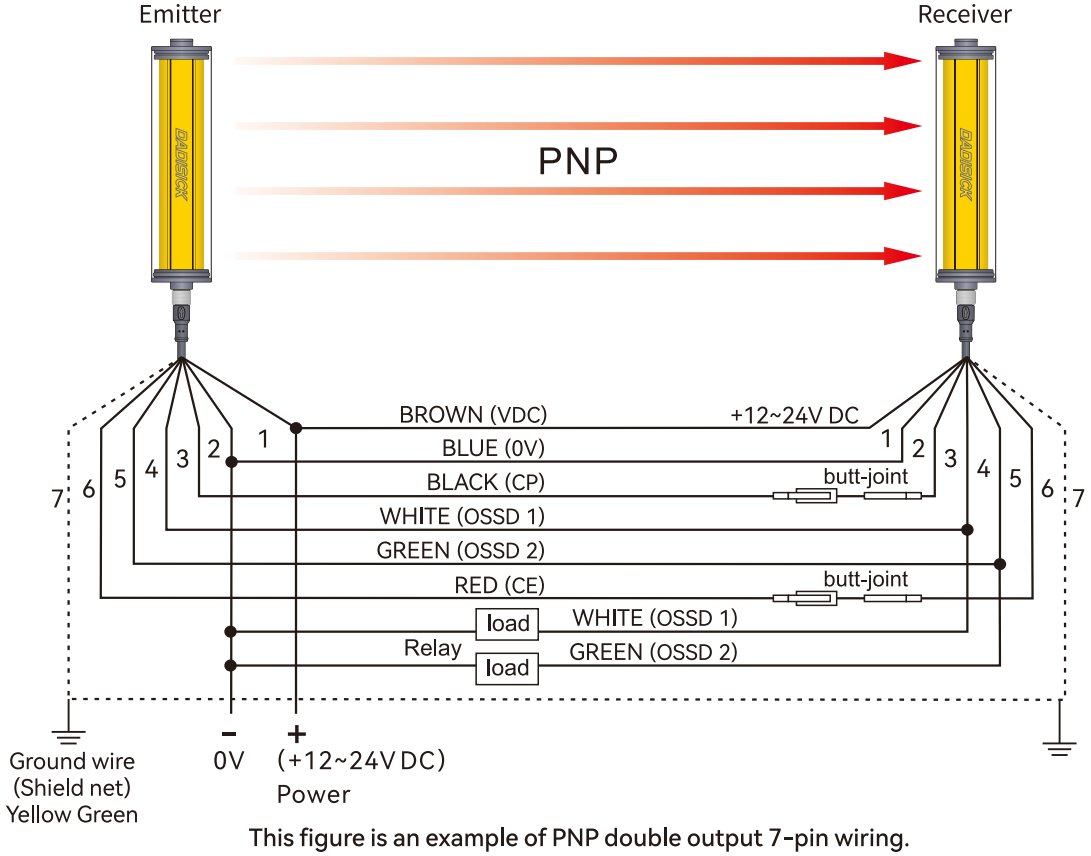
D

2. NPN output wiring diagram



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

3. PNP output wiring diagram

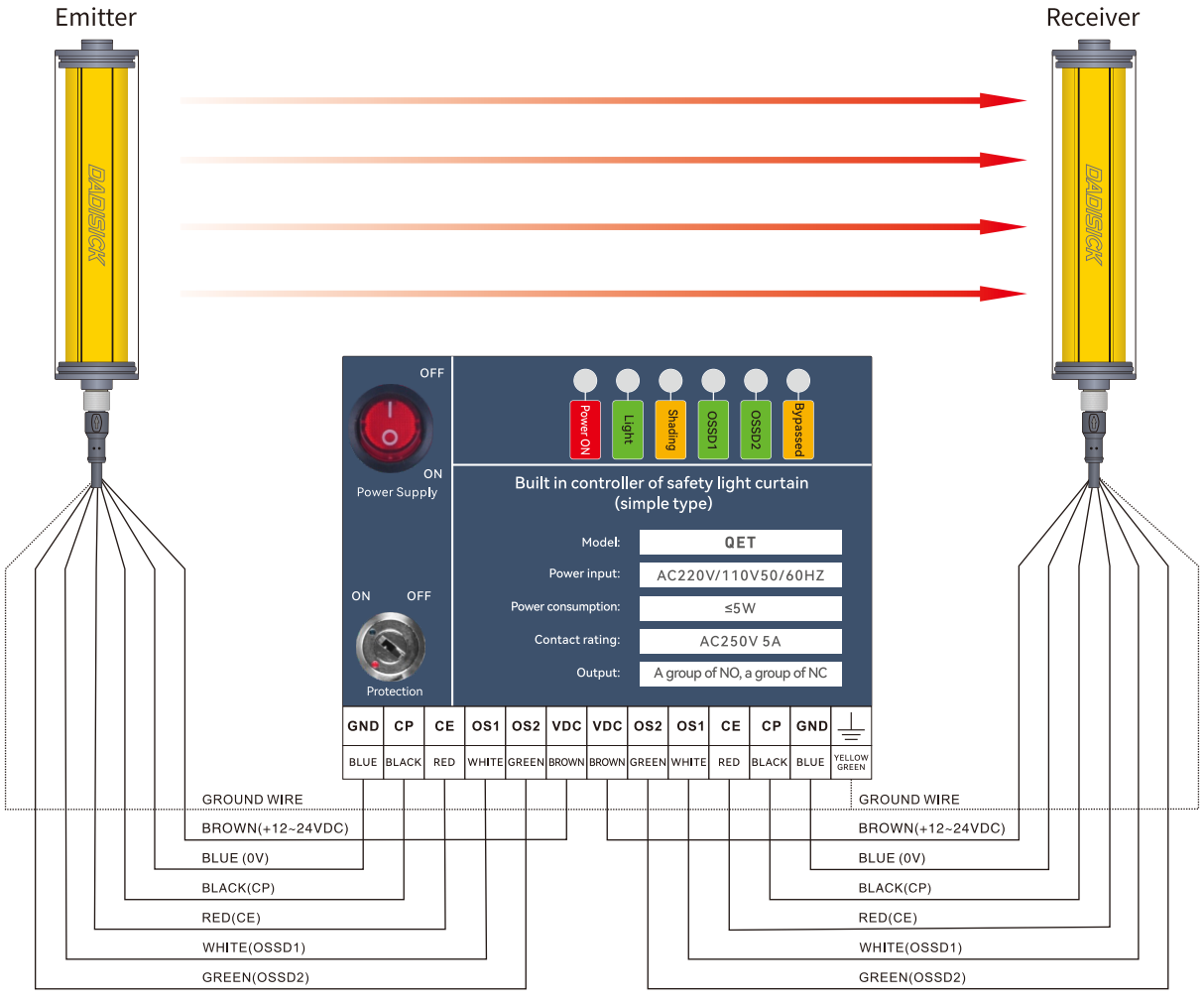


This figure is an example of PNP double output 7-pin wiring.

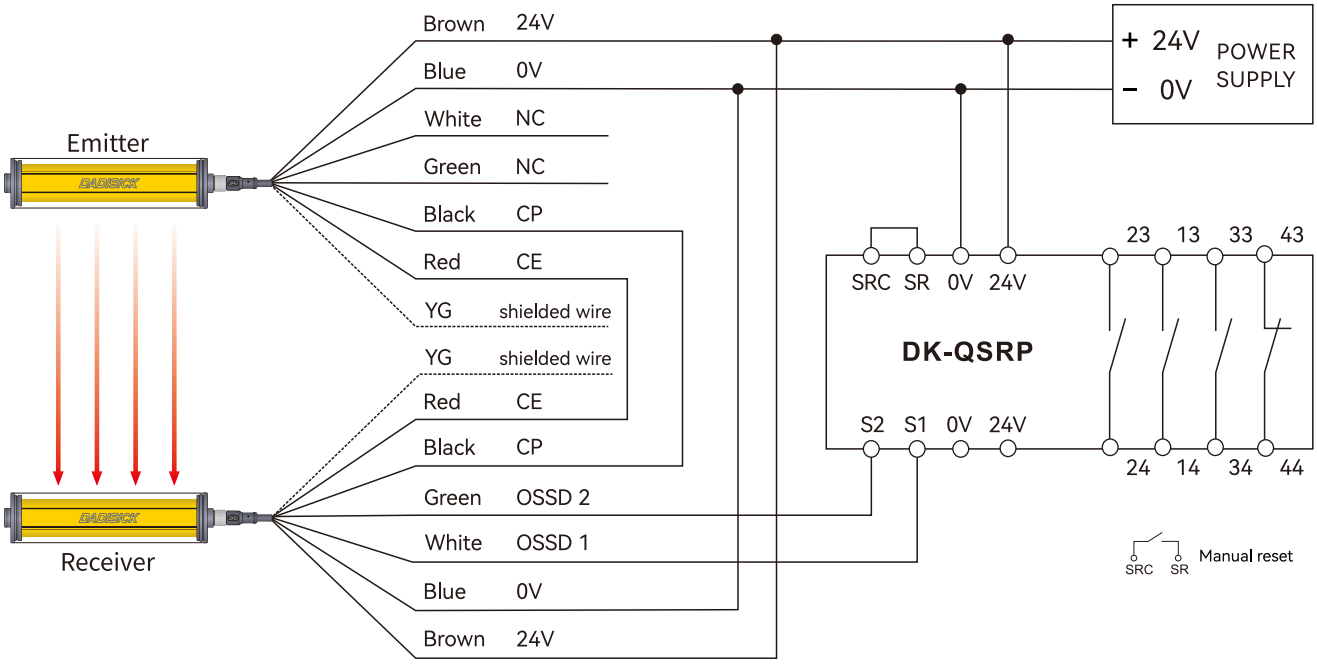
4. Selection of safety light curtain controller

Name	Order separately	Model	Descriptions
Built-in controller		QET	Used to monitor the signal processing of DK-QRF series light curtain, and output one group of NO and one group of NC.
Safety relay		DK-QSRP	DK-QSRP safety relays have three groups of NO and one group of NC, with strong control capabilities. They are suitable for various signal monitoring in industrial places with high safety requirements, including emergency stop signals, safety door opening and closing signals, safety light curtain signals, and two-handed button signals.
Safety relay	  Multifunctional switching switch	DK-Ter-AP	Equipped with a mode switch, it can be used for most safety components, such as light curtains, safety switches, carpet contacts, two handed switches, etc.Automatic/manual reset paddles for quick configuration.Dual channel monitoring circuit, safe and reliable.
Light curtain relay		QET-1	Output conversion between NC and NO for DK-QRF series light curtain.

4.1 Wiring diagram of QET built-in controller

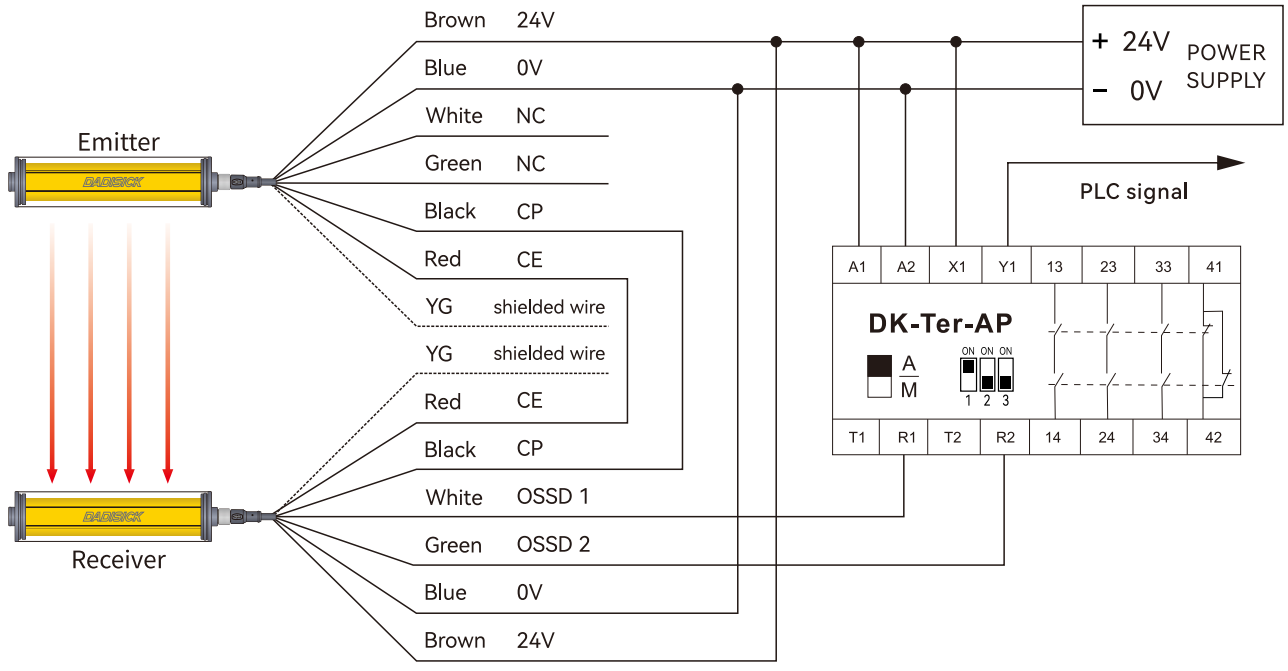


4.2 Wiring diagram of DK-QSRP safety relay

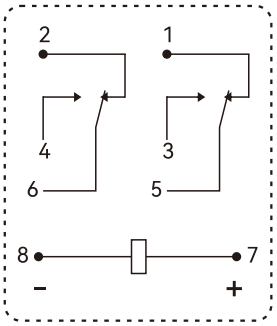


4.3 Wiring diagram of DK-Ter-AP safety relay

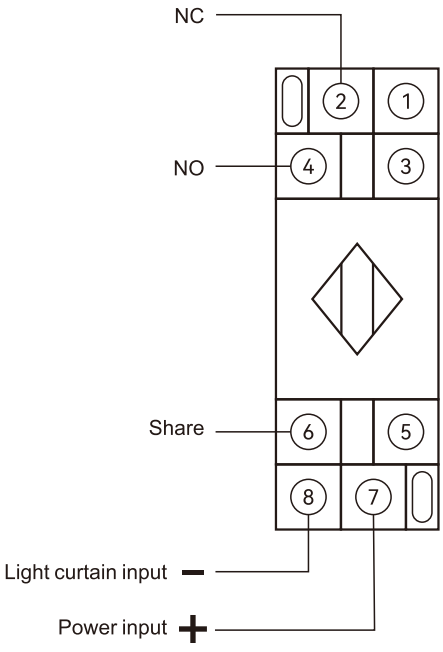
Dual channel light curtain PNP switch safety input, with automatic reset and PLC signal output.



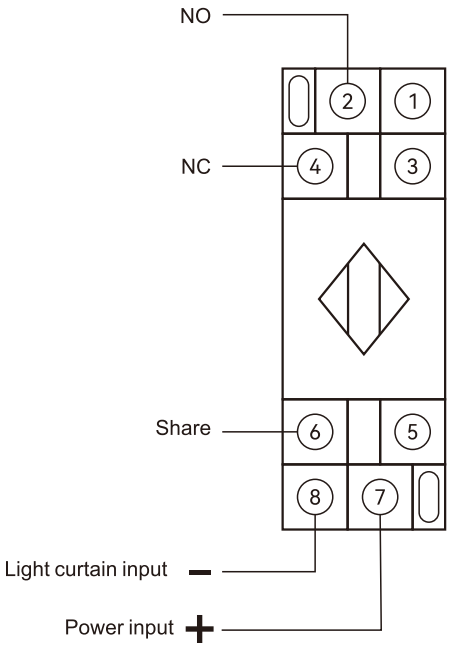
4.4 Wiring diagram of QET-1 light curtain relay



Circuit diagram



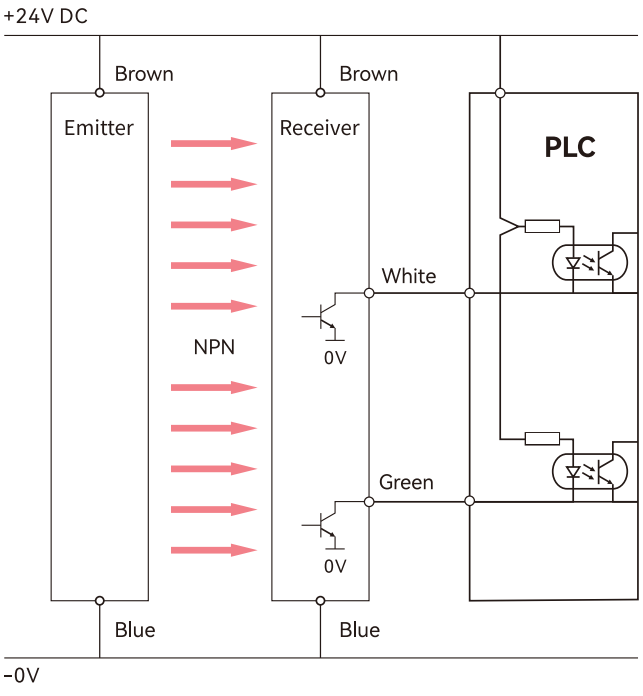
When not powered on



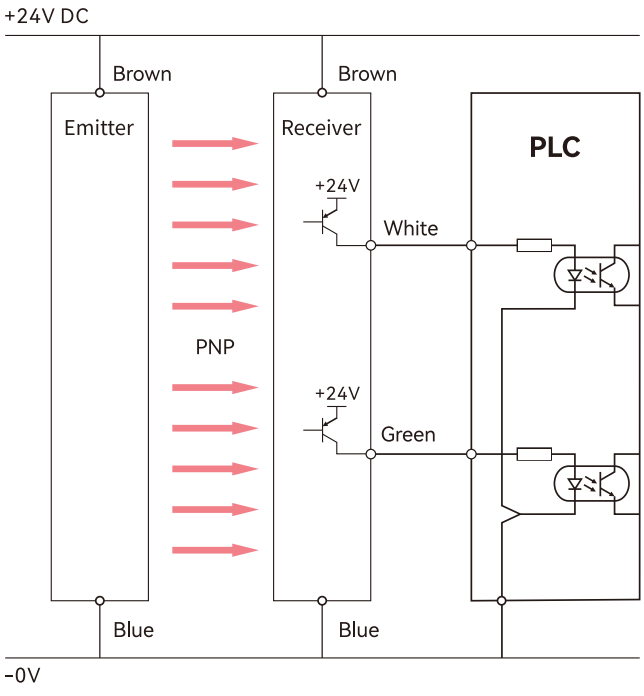
When powered on

4.5 Wiring between light curtain and PLC and one-chip computer system

NPN wiring:

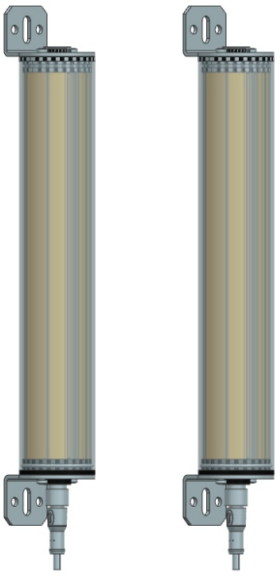


PNP wiring:



Accessories

Metal angled fixing bracket installation method
(Original accessories)



DK-QRF series mounting bracket	Model: QF-07