KEYENCE

Safety Light Curtain
GL-R Series

Maximum safety standard
Type4 **SIL3** **PLe**

Armoured Protection! Safety Light Curtain

STRONG × SIMPLE × SMART **3S**

Laser Alignment tool
GL-R1LP

GL-R Series

Armoured Protection

What makes a light curtain "robust"?
KEYENCE conducted in-depth research to determine how light curtains are damaged and learned that the most common cause is damage to the lens surface when it is scratched, cracked, or otherwise broken due to impact from parts or tools. In some cases, light curtains have been installed with user-fabricated protective covers or housing to prevent this damage.
As a result of this research, KEYENCE has designed a light curtain with a structure that prevents damage from parts or tools by narrowing the exposed lens area and recessing it in an impact resistant housing.*

* the narrowest lens surface aperture in the industry, according to KEYENCE research as of March, 2012

STRONG

Built-in guarding and the narrowest exposed lens surface in the industry.

With its narrow (9 mm wide) and recessed lens surface, the GL-R Series is protected against impact and resultant damage from parts, tools or operators without the need for any additional guards or covers. Additionally, the GL-R Series is protected from water and washdown environments due to its IP65/67 enclosure ratings.

Operating distance
0.2 to 10 m
Detection capability
ø14 mm
GL-RF Series

Operating distance
0.2 to 15 m
Detection capability
ø25 mm
GL-RH Series

Operating distance
0.2 to 15 m
Detection capability
ø45 mm
GL-RL Series

SMART

No Dead Zone
Because the first beam is emitted 10 mm* from each end, the light curtain can be mounted flush inside of equipment, eliminating the need for additional guarding or outside mounting.
*Except GL-RL Series

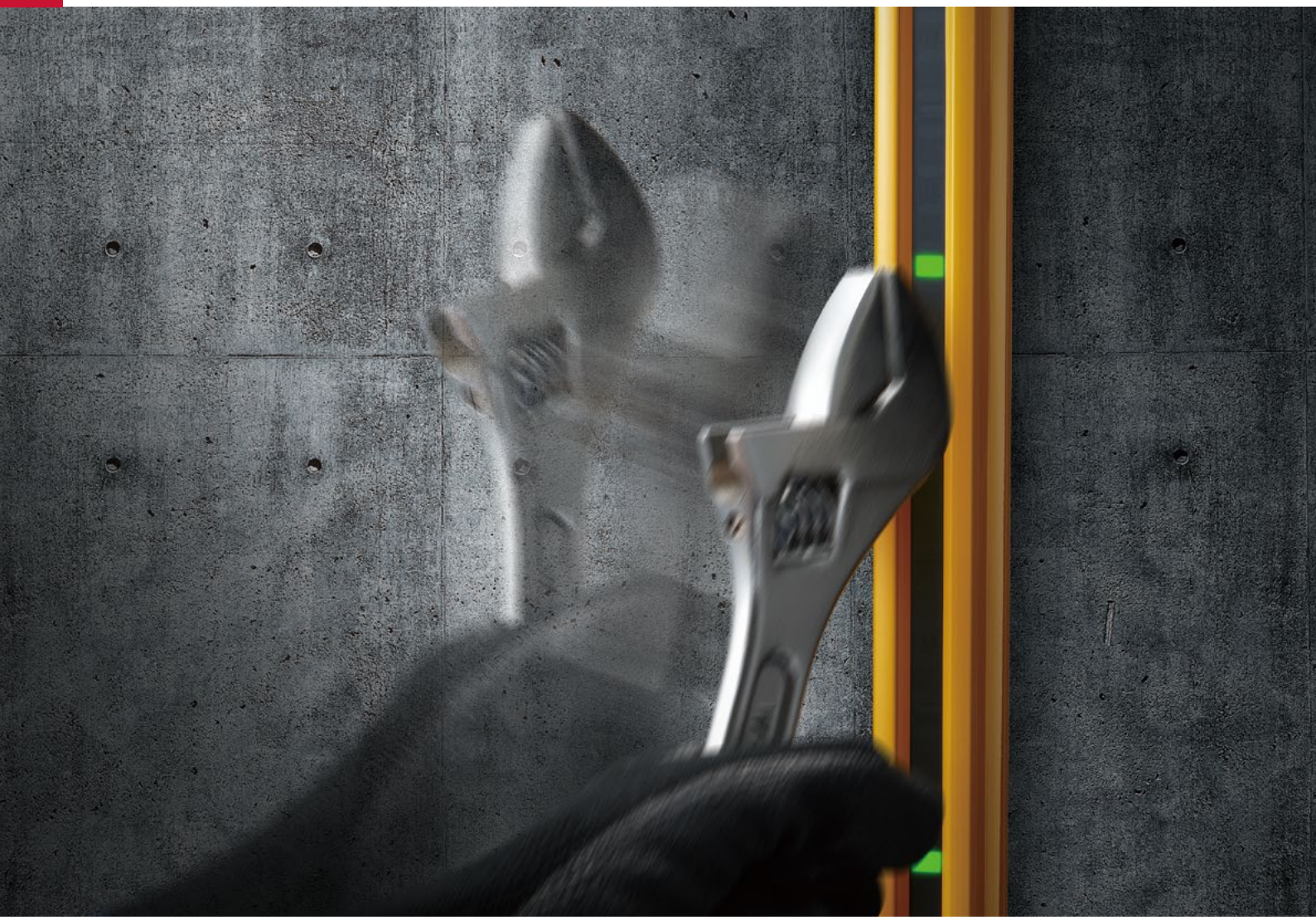
7-segment display
If an error is ever detected by the light curtain, the 7-segment display provides a code that indicates the cause, which greatly reduces the time required to take corrective action.

One-line system
Reduce connections to as few as 5 wires by using this system that eliminates transmitter wiring completely.

SIMPLE

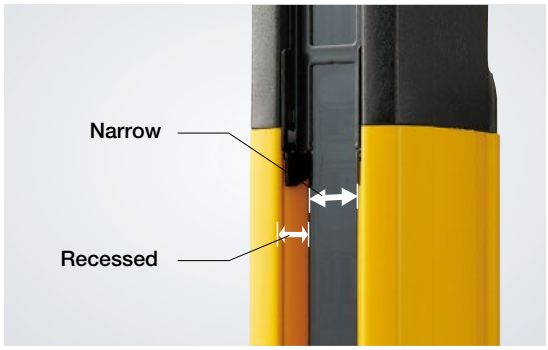
Reduce installation time with simple wiring and easy-to-use mounting brackets.
The introduction of the one-line system and optical synchronisation simplifies connections to as few as 5 wires.
Mounting brackets come pre-assembled to provide simple, one-step installation.

STRONG

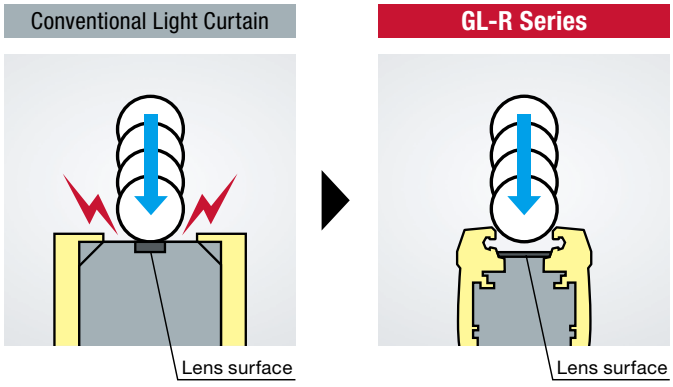


Securely protects the detection area

Built-in guarding will completely prevent impact to the lens surface by parts or tools of ø17 mm or more.*

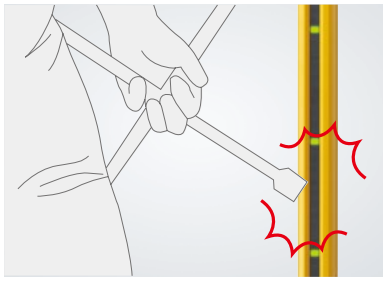


*See specifications for guaranteed values.

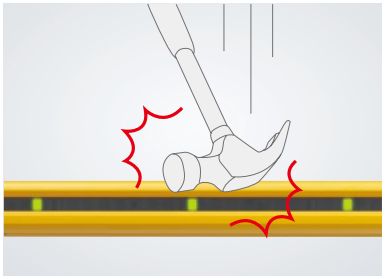


Thick and robust housing that resists impact

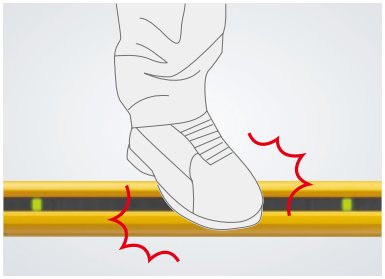
The GL-R Series is designed with a 3 mm thick housing that protects the light curtain body from various forms of impact, such as dropping equipment or hitting it with tools.*



Hitting



Dropping



Stepping, Kicking

*See specifications for guaranteed values.

No need for additional guarding

The GL-R Series can be installed and remain protected WITHOUT the use of additional U-channel type guarding, which simplifies installation and reduces cost.

Conventional Light Curtain

GL-R Series

IP65/IP67 enclosure rating

The GL-R Series housing meets IP65/IP67 enclosure ratings based on IEC standard, enabling its use in washdown environments without fear of damage to the light curtain.

IP65 **Water-jet (washdown) resistant**

IP67 **Watertight**

Robust, yet slim

(compared to conventional KEYENCE models)

The overall size of the GL-R Series has been reduced to save space on equipment whilst maintaining KEYENCE's high level of durability.

33% reduction in size compared to the conventional model

Conventional Light Curtain

GL-R Series

Long range

The range of the GL-RH and GL-RL Series models have been increased over past models for use in applications requiring protection up to 15 m.

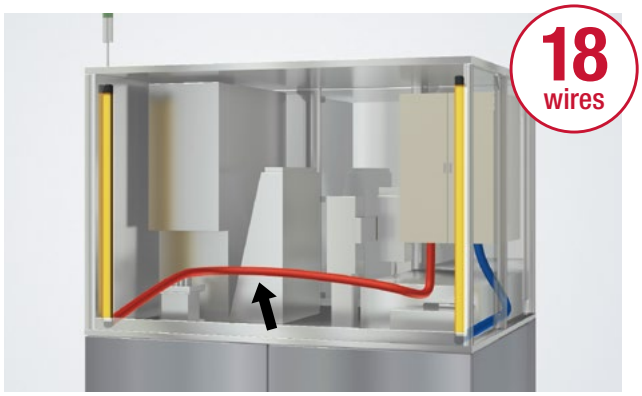
SIMPLE

One-line system [Recommended for smaller, single operation pieces of equipment]

- Reduce the number of wires from 18 to 5
- 1/3 of the wiring installation time compared to conventional light curtains

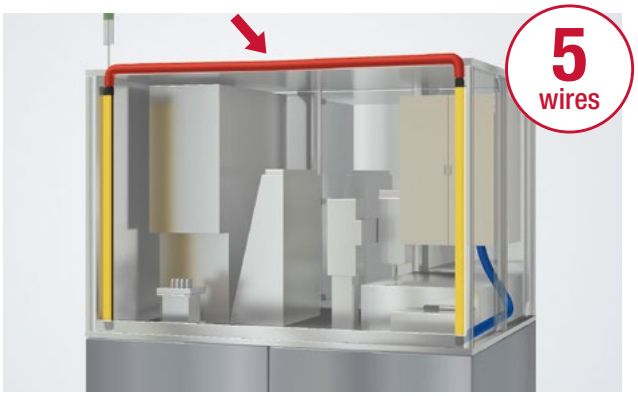
Simplified wiring

Conventional Light Curtain



The transmitter and receiver had to be routed through the machine and wired to the control panel.

One-line system



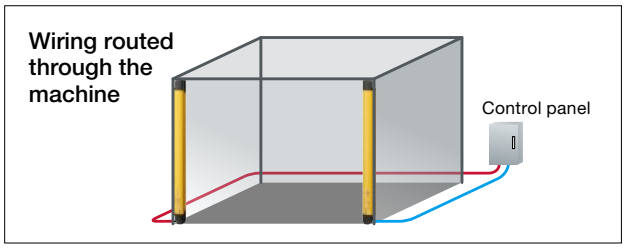
The transmitter receives power from the receiver, meaning that only the receiver has to be wired to the control panel.

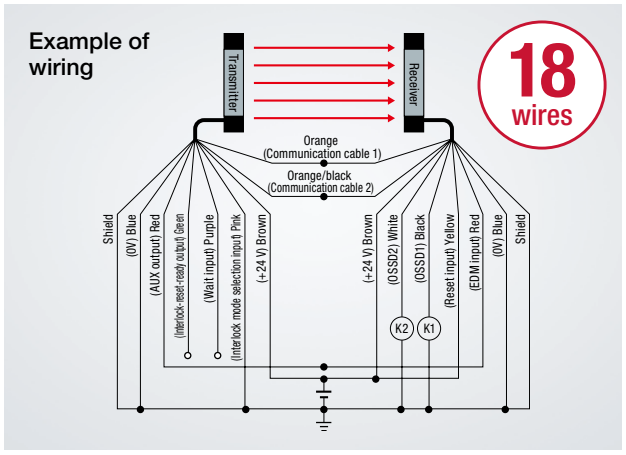
Advantages of the one-line system

1 Wiring is simplified by connecting the transmitter directly to the receiver, requiring that only the receiver be wired.

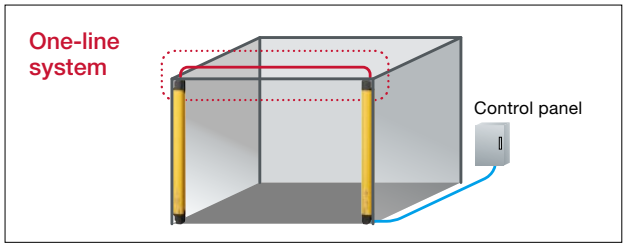
2 Reduced risk of mis-wiring due to the reduction in required connections.

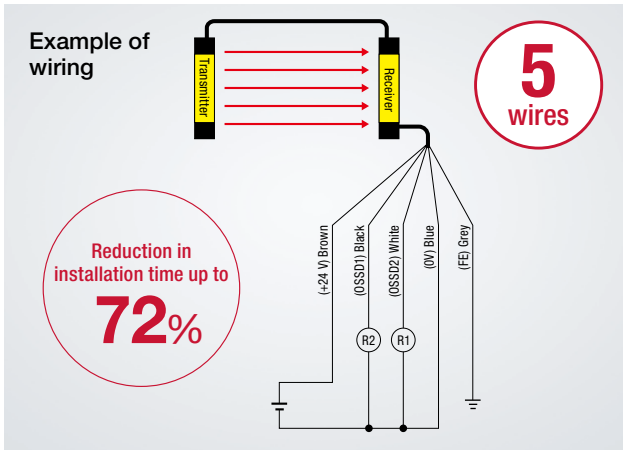
Conventional Light Curtain

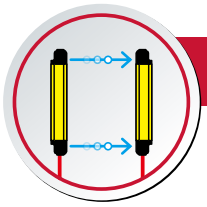




One-line system





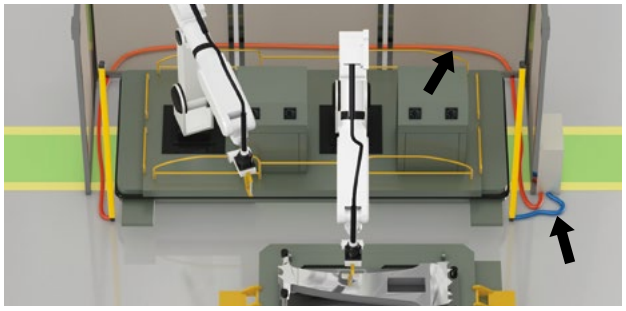


Optical synchronisation [Recommended for larger pieces of equipment or work cells]

•Reduced wiring

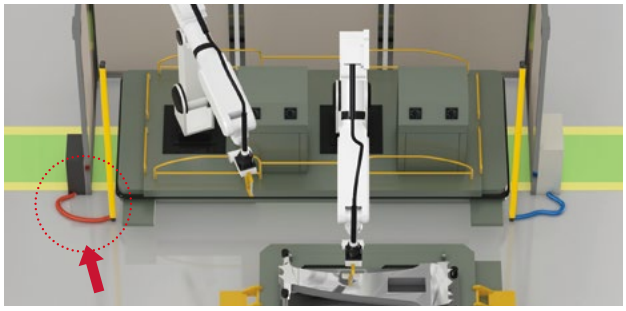
Separate transmitter and receiver wiring simplifies installation

Conventional Light Curtain



Synchronisation wiring is required.

Optical synchronisation



The transmitter and receiver can be wired separately, which greatly simplifies wiring and installation time. Long lengths of cable are no longer required to be routed through the machine.

SIMPLE

Quick fit brackets

Adjustable angle mounting bracket

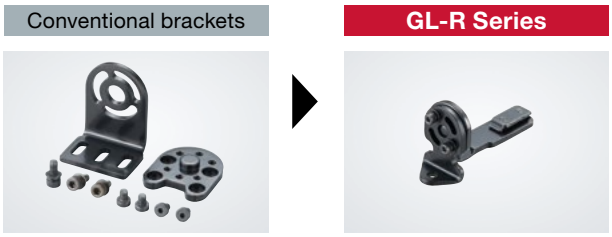
Straight / L-shaped mounting bracket

No dead zone mounting bracket

[Easy installation]

1. No assembly required

Traditionally, mounting brackets have required assembly before installation. However, the GL-R Series brackets come pre-assembled, so installation is as simple as sliding them into the mounting track and securing them to the machine.

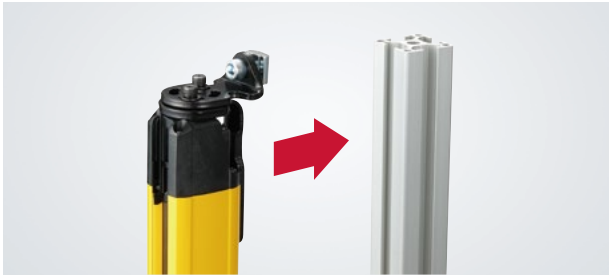


2. Insert the bracket into the mounting track

The GL-R Series is designed to simplify mounting by inserting the brackets into the mounting track and locking them in place.

3. Mount directly to standard extruded aluminium framework

The GL-R Series mounting brackets have been designed to attach directly to standard extruded aluminium framework without the need for any additional hardware.



GL-T11R Type4 Quick Disconnect Safety Relay

The GL-T11R combines all of the features necessary to build a Category 4 compatible safety circuit in a single unit.
This makes it possible to dramatically reduce the amount of time and labour required by complex circuit design processes.
It also boasts quick disconnects that simplify the wiring process involved in connecting the light curtain to the relay.
The GL-T11R reduces the need for specialised knowledge about safety circuits.

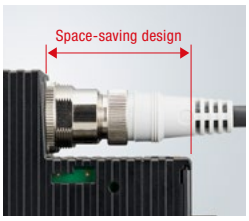
GL-T11R

Quick Disconnect

The safety light curtain is connected via a quick disconnect, eliminating the danger of wiring mistakes and reducing the amount of time and labour required for wiring.

Spring type terminal block

Easy and reliable wiring with no screw terminals to tighten.



Space-saving

The GL-T11R design ensures that the connectors do not extend beyond the unit's footprint, helping to save space inside the control panel.

Replaceable Relay

The relay board (OP-87682) can be replaced without removing any wiring, which eliminates time loss and potential connection mistakes during rewiring.

* The terminal unit can also be removed separately.

SL-U2 AC Power Supply

SL-U2

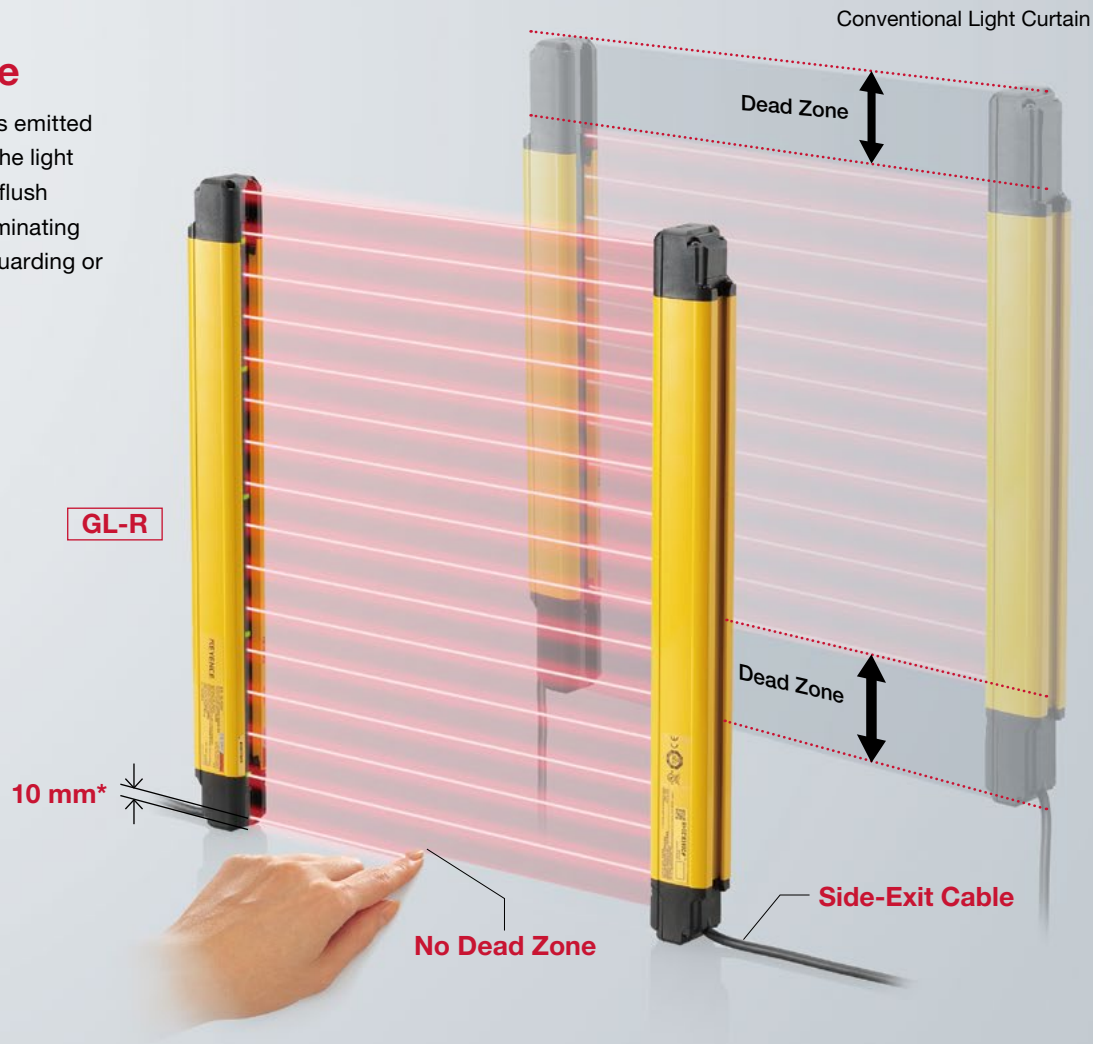
The SL-U2 dedicated power supply directly connects to the side of the GL-T11R, providing power to the entire light curtain setup without the need for additional wiring.

SMART

No Dead Zone

Because the first beam is emitted 10 mm* from each end, the light curtain can be mounted flush inside of equipment, eliminating the need for additional guarding or outside mounting.

*Except GL-RL Series



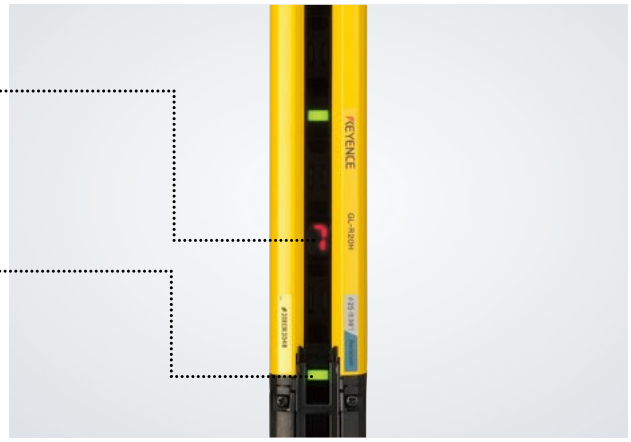
7-segment & centre indicators

7-segment display

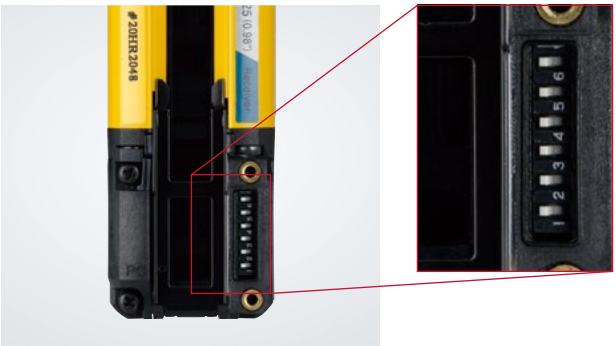
Errors are displayed as numeric codes, which reduces the amount of time spent identifying and correcting the problem that was detected by the GL-R Series.

Centre indicator

These indicators highlight the operational status of the GL-R Series to the user. The indicators change colour to identify if the light curtain is clear, interrupted, or in a lockout condition.



Built-in functionality



1 Mutual interference prevention

Mutual interference between 2 units can be prevented.

2 Reduced resolution function*

This function expands the size of the detection capability.
Up to 2 axes can be disabled.

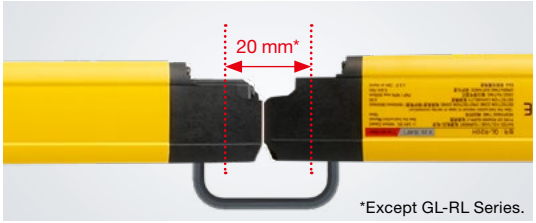
* In the single zone mode.
For details, refer to GL-R User's Manual.

3 Centre indicator function control

The centre indicators can be turned off to reduce current consumption.

Built-in series connection ability

The coverage of the GL-R Series can be easily expanded by connecting additional units in series. All models include this feature as standard.



QD connector

The GL-R Series can easily be connected to a general-purpose, M12 quick disconnect port or cable.

Corner mirror

Corner mirrors are available to allow 1 set of curtains to cover up to 4 sides of a machine and reduce the amount of wiring required.

Advanced Option

Battery-powered laser alignment tool

Easily align the light curtains before power is even turned ON.

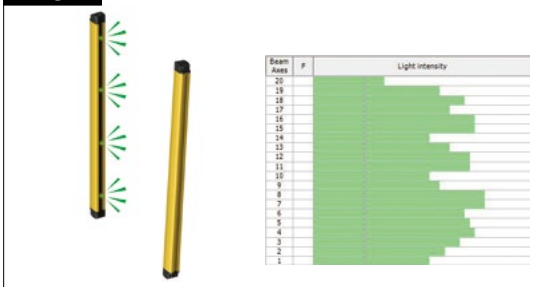
- Attaches to the GL-R in seconds with no tools necessary
- Battery power removes the need for a nearby power source
- Quickly check alignment at any point on the curtain

PC configuration software **Safety device configurator**

ADVANCED ALIGNMENT METHOD

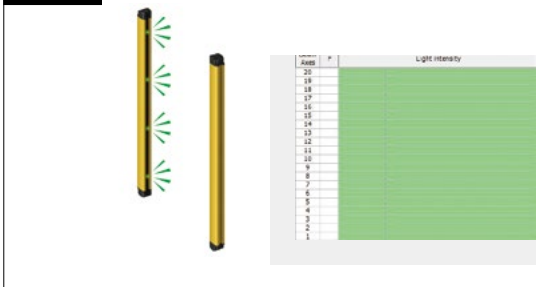
The GL-R Series makes nuisance trips and alignment problems a thing of the past. By using KEYENCE's optional Alignment Tool, users can quickly and easily ensure full alignment of each individual beam.

BEFORE



While the light curtain appears to be aligned; the software indicates that the potential for nuisance trips still exists and that superior alignment can be achieved.

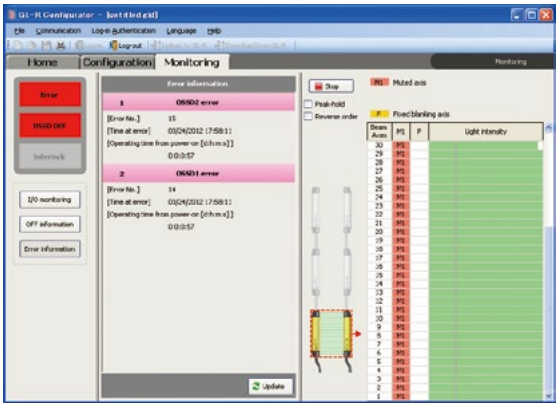
AFTER



By utilising the software, ideal alignment can be quickly and easily achieved to maintain consistently stable operation.

VARIOUS INFORMATION

OSSD output OFF time, location, and duration can be easily checked by accessing the OFF information. The Error code, time of occurrence, and conditions can be checked by accessing the Error Information. All Error codes and order of occurrence are saved as Error history records, allowing the past history to be checked. This allows for easier troubleshooting and analysis.



Error information

Selecting a Safety Light Curtain

Use the following steps to select the optimum GL-R Series components for your application

step 1 Select the light curtain type → step 2 Select the light curtain length → step 3 Select the mounting bracket → step 4 Select the cables → step 5 Select the optional accessories*

*Optional accessories are not required for normal operation.

step 1
step 2

CURTAINS

GL-RF Series
Detection capability
ø14 mm

GL-RH Series
Detection capability
ø25 mm

GL-RL Series
Detection capability
ø45 mm

step 3

BRACKETS

Adjustable angle mounting bracket
GL-RB01

Adjustable angle mounting bracket
GL-RB02

Straight mounting bracket
GL-RB11

L-shaped mounting bracket
GL-RB12

L-shaped mounting bracket
GL-RB21

step 4

CABLES

step 5

OPTIONAL ACCESSORIES

Dedicated safety relay for the GL-R Series
GL-T11R

Laser Alignment tool
GL-R1LP

Front protection cover

Interface unit

Corner mirror
SL-M Series

step 1

Select the light curtain type

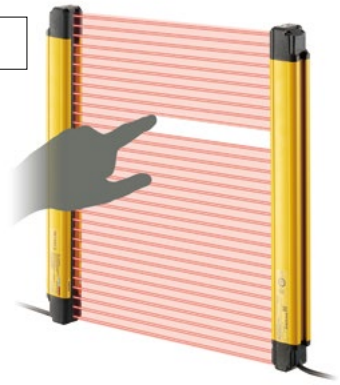
Select a model according to the distance to the equipment hazard.

Detection capability: ø14 mm

Beam axis pitch of 10 mm.

Entry detection

To step 2 **GL-RF** P.15

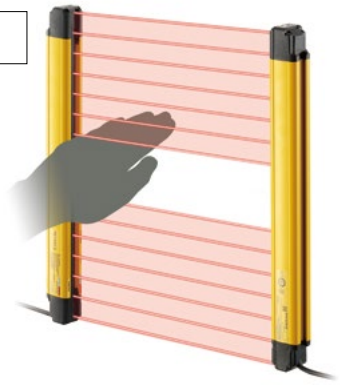


Detection capability: ø25 mm

Beam axis pitch of 20 mm.

Entry detection

To step 2 **GL-RH** P.15

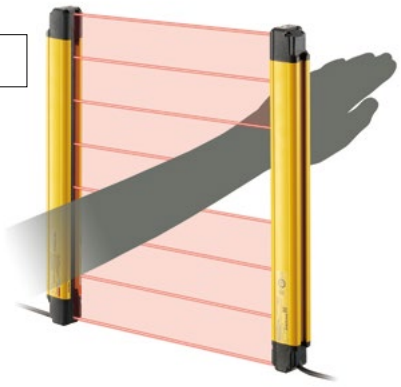


Detection capability: ø45 mm

Beam axis pitch of 40 mm.

Entry/presence detection

To step 2 **GL-RL** P.15



The required mounting distance from the hazard is determined by the response time and detection capability for the light curtain that has been selected. Though the ø25 mm model is used most frequently, if the distance to the hazard is short, select the ø14 mm model. If the distance to the hazard is long, you can use the ø45 mm model.

step 2

Select the light curtain length

If [Detection capability: ø14 mm] was selected in Step 1

GL-RF Series

Model	No. of beam axes	Total length (mm)	Detection height (mm)	Protection height (mm)	Operating distance (m)
GL-R23F	23	240	220	244	0.2 to 10
GL-R31F	31	320	300	324	
GL-R39F	39	400	380	404	
GL-R47F	47	480	460	484	
GL-R55F	55	560	540	564	
GL-R63F	63	640	620	644	
GL-R71F	71	720	700	724	
GL-R79F	79	800	780	804	
GL-R87F	87	880	860	884	
GL-R95F	95	960	940	964	
GL-R103F	103	1040	1020	1044	
GL-R111F	111	1120	1100	1124	
GL-R119F	119	1200	1180	1204	
GL-R127F	127	1280	1260	1284	

To step 3 P.16

If [Detection capability: ø25 mm] was selected in Step 1

GL-RH Series

Model	No. of beam axes	Total length (mm)	Detection height (mm)	Protection height (mm)	Operating distance (m)
GL-R08H	8	160	140	185	0.2 to 15
GL-R12H	12	240	220	265	
GL-R16H	16	320	300	345	
GL-R20H	20	400	380	425	
GL-R24H	24	480	460	505	
GL-R28H	28	560	540	585	
GL-R32H	32	640	620	665	
GL-R36H	36	720	700	745	
GL-R40H	40	800	780	825	
GL-R44H	44	880	860	905	
GL-R48H	48	960	940	985	
GL-R52H	52	1040	1020	1065	
GL-R56H	56	1120	1100	1145	
GL-R60H	60	1200	1180	1225	
GL-R64H	64	1280	1260	1305	
GL-R72H	72	1440	1420	1465	
GL-R80H	80	1600	1580	1625	
GL-R88H	88	1760	1740	1785	
GL-R96H	96	1920	1900	1945	

To step 3 P.16

If [Detection capability: ø45 mm] was selected in Step 1

GL-RL Series

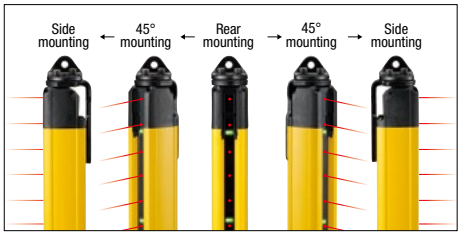
Model	No. of beam axes	Total length (mm)	Detection height (mm)	Protection height (mm)	Operating distance (m)
GL-R04L	4	160	120	205	0.2 to 15
GL-R06L	6	240	200	285	
GL-R08L	8	320	280	365	
GL-R10L	10	400	360	445	
GL-R12L	12	480	440	525	
GL-R14L	14	560	520	605	
GL-R16L	16	640	600	685	
GL-R18L	18	720	680	765	
GL-R20L	20	800	760	845	
GL-R22L	22	880	840	925	
GL-R24L	24	960	920	1005	
GL-R26L	26	1040	1000	1085	
GL-R28L	28	1120	1080	1165	
GL-R30L	30	1200	1160	1245	
GL-R32L	32	1280	1240	1325	

To step 3 P.16

step 3

Select the mounting bracket

Adjustable angle mounting bracket GL-RB01 (incl. 2 pieces)



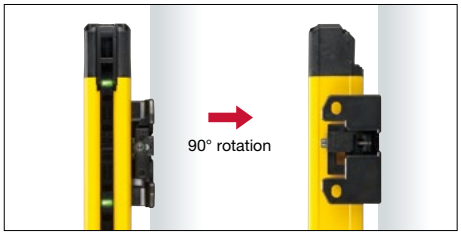
- **By changing the screw positions, it is possible to adjust the angle of the light curtain by 180°.**

If the total length of the GL-R main unit is 1280 mm or longer, and if mounting it using the Adjustable angle mounting bracket, also use the antivibration bracket [GL-RB32 (2 pieces/pack)] to prevent vibration.

To step 4 P.17

No dead zone mounting bracket GL-RB21 (incl. 2 pieces)

Useful when mounting brackets cannot be used on the top or bottom of the light curtain

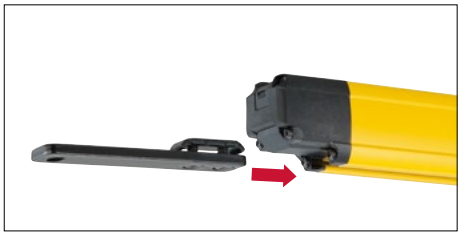


- **Allows you to rotate the light curtain 90° by changing the mounting hole. It is also possible to perform fine-tuning of ±15° from this position.**

If the total length of the GL-R main unit is 1280 mm or longer and if mounting it using the no dead zone mounting bracket, also use the antivibration bracket [GL-RB32 (2 pieces/pack)] to prevent vibration.

To step 4 P.17

Straight mounting bracket GL-RB11 (incl. 2 pieces)

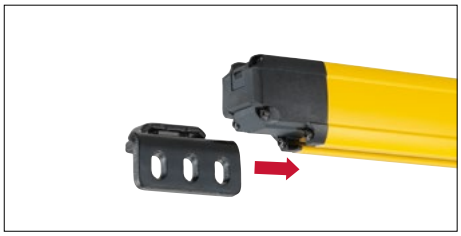


- **Simple attachment to standard machine framework.**

If the total length of the GL-R main unit is 1280 mm or longer, and if mounting it using the straight mounting bracket, also use the antivibration bracket [GL-RB31 (2 pieces/pack)] to prevent vibration.

To step 4 P.17

L-shaped mounting bracket GL-RB12 (incl. 2 pieces)



- **Simple attachment to standard machine framework.**

If the total length of the GL-R main unit is 1280 mm or longer, and if mounting it using the L-shaped mounting bracket, also use the L-shaped mounting bracket [GL-RB12 (2 pieces/pack)] to prevent vibration.

To step 4 P.17

step 4

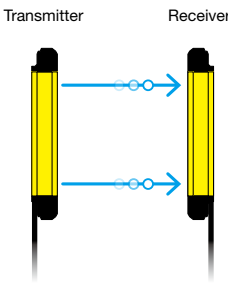
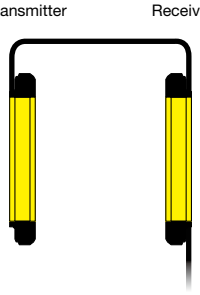
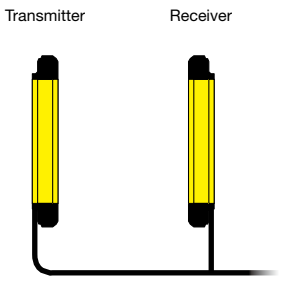
Select the cables

It is possible to select from the following 3 types of wiring systems according to the application.
Select an applicable cable according to the wiring systems listed below.

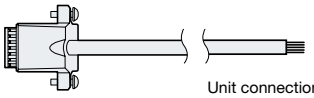
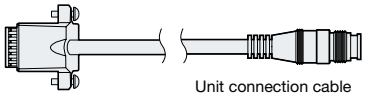
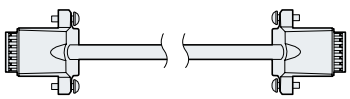
Cables

- Each model is connected to one cable. Therefore, at least two cables are needed as a system, one for the transmitter and another for the receiver.
- All cables can be used for both the transmitter and receiver.
- The combination of the wiring system and cable determines the functions that can be used. Different types of cables can be used for the transmitter and receiver.
- Make sure that the length of the main unit connection cable and extension cable will be 30 m or less regarding the transmitter and receiver, respectively, when using the optical/wire synchronisation system.
- Make sure that the total length for all cables, which includes the unit connection cable, extension cable, and series connection cable, is 30 m or less when using the one-line system.

Select 1 cable for each transmitter/receiver according to the optimal wiring system. If multiple functions are necessary, select an 11-core cable.

Wiring system		Optical synchronisation system	One-line system	Wire synchronisation system
Wiring diagram				
Applicable Cables	Transmitter	5-core cable	Series connection cable	7-core cable 11-core cable
	Receiver	5-core cable 11-core cable	5-core cable 11-core cable	7-core cable 11-core cable

Select a unit connection cable or one-line system series connection cable. If extending the cable, select a connector type.

Shape	No. of conductors	PNP/NPN	Connector	Length (m)	Model
 Unit connection cable	5-core	PNP	—	5	**GL-RP5P**
			—	10	**GL-RP10P**
		NPN	—	5	**GL-RP5N**
			—	10	**GL-RP10N**
	7-core	PNP	—	5	**GL-RP5PS**
			—	10	**GL-RP10PS**
		NPN	—	5	**GL-RP5NS**
			—	10	**GL-RP10NS**
	11-core	PNP	—	5	**GL-RP5PM**
			—	10	**GL-RP10PM**
		NPN	—	5	**GL-RP5NM**
			—	10	**GL-RP10NM**
 Unit connection cable (for extension use)	5-core	PNP	M12 (5-pin male)	0.3	**GL-RPC03P**
		NPN			**GL-RPC03N**
	7-core	PNP	M12 (8-pin male)		**GL-RPC03PS**
		NPN			**GL-RPC03NS**
	11-core	PNP	M14 (12-pin male)		**GL-RPC03PM**
		NPN			**GL-RPC03NM**
 The connector shape for both sides is the same.	Series connection cable	PNP/NPN shared	—	0.08	**GL-RS008**
				0.15	**GL-RS015**
				0.5	**GL-RS05**
				1	**GL-RS1**
				3	**GL-RS3**
				5	**GL-RS5**
				10	**GL-RS10**

step 4

Select the cables

For extension

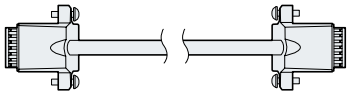
• If using a combination of the unit connection cable (for extension use) and the extension cable, make sure that they share the same amount of conductors.

Shape	No. of conductors	PNP/NPN	Length (m)	Model
 Extension cable	5-core M12 connector (5-pin female)	PNP/NPN shared	5	**GL-RC5**
			10	**GL-RC10**
			20	**GL-RC20**
	7-core M12 connector (8-pin female)		5	**GL-RC5S**
			10	**GL-RC10S**
			20	**GL-RC20S**
	11-core M14 connector (12-pin female)		5	**GL-RC5M**
			10	**GL-RC10M**
			20	**GL-RC20M**

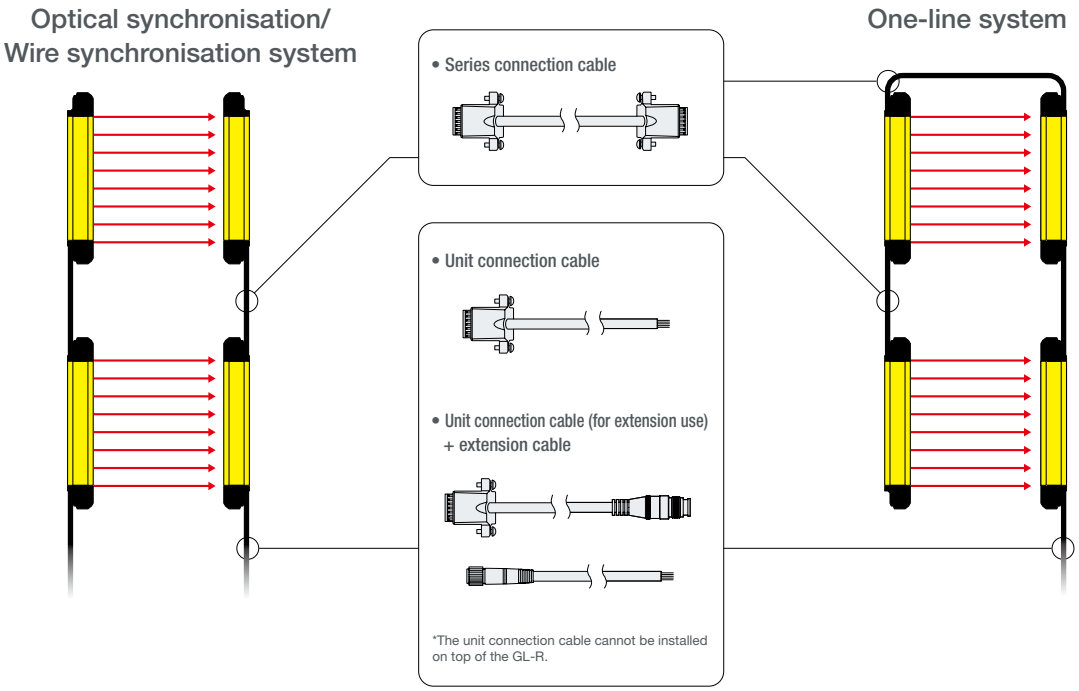
For series connection

By connecting up to 3 GL-R units in a series, they can function as a single set of light curtains.

• Use a series connection cable to perform series connection.

Shape	PNP/NPN	Length (m)	Model
 *The connector shape for both sides is the same. There are no regulations for the direction in which connection is performed.	PNP/NPN shared	0.08	**GL-RS008**
		0.15	**GL-RS015**
		0.5	**GL-RS05**
		1	**GL-RS1**
		3	**GL-RS3**
		5	**GL-RS5**
		10	**GL-RS10**

Installation schematic



step 5

Select the optional accessories

Front protection cover

Select a front protection cover to protect the detection surface as necessary.

Two sets are required to install protection on both the transmitter and receiver. Refer to the detection distances in the chart when using the front protection cover.

Front protection cover	Operating distance		
	GL-RF	GL-RH	GL-RL
Single side (Transmitter or receiver only)	9.5 m	14.5 m	
Both sides (Transmitter and receiver)	9 m	14 m	

Model	Applicable GL-R model		
GL-RA160	—	GL-R08H	GL-R04L
GL-RA240	GL-R23F	GL-R12H	GL-R06L
GL-RA320	GL-R31F	GL-R16H	GL-R08L
GL-RA400	GL-R39F	GL-R20H	GL-R10L
GL-RA480	GL-R47F	GL-R24H	GL-R12L
GL-RA560	GL-R55F	GL-R28H	GL-R14L
GL-RA640	GL-R63F	GL-R32H	GL-R16L
GL-RA720	GL-R71F	GL-R36H	GL-R18L
GL-RA800	GL-R79F	GL-R40H	GL-R20L
GL-RA880	GL-R87F	GL-R44H	GL-R22L
GL-RA960	GL-R95F	GL-R48H	GL-R24L
GL-RA1040	GL-R103F	GL-R52H	GL-R26L
GL-RA1120	GL-R111F	GL-R56H	GL-R28L
GL-RA1200	GL-R119F	GL-R60H	GL-R30L
GL-RA1280	GL-R127F	GL-R64H	GL-R32L
GL-RA1440	—	GL-R72H	—
GL-RA1600	—	GL-R80H	—
GL-RA1760	—	GL-R88H	—
GL-RA1920	—	GL-R96H	—

Interface unit

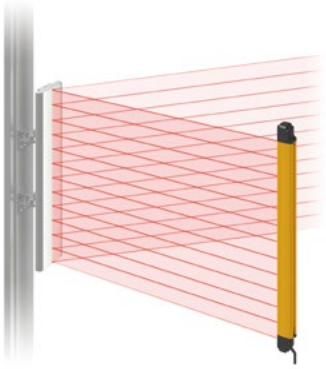
Optional accessory required to perform configuration and monitoring of the GL-R on a PC.

Model	Name
GL-R1UB	Interface unit
OP-51580	USB cable 2 m
OP-86941	USB cable 5 m

Corner mirror SL-M Series

By using a corner mirror, it is possible to reduce costs and save time on wiring.

- This is a mirror that reflects light from the transmitter within a range of 45° to 95°. Up to 4 mirrors can be used. For details, see the “SL-M Series instruction manual”.



For each single corner mirror, the detection distance will decrease by approximately 10%.

Model	Applicable GL-R model		
SL-M12H	GL-R23F	GL-R08H/GL-R12H	GL-R04L/GL-R06L
SL-M16H	GL-R31F	GL-R16H	GL-R08L
SL-M20H	GL-R39F	GL-R20H	GL-R10L
SL-M24H	GL-R47F	GL-R24H	GL-R12L
SL-M28H	GL-R55F	GL-R28H	GL-R14L
SL-M32H	GL-R63F	GL-R32H	GL-R16L
SL-M36H	GL-R71F	GL-R36H	GL-R18L
SL-M40H	GL-R79F	GL-R40H	GL-R20L
SL-M44H	GL-R87F	GL-R44H	GL-R22L
SL-M48H	GL-R95F	GL-R48H	GL-R24L
SL-M52H	GL-R103F	GL-R52H	GL-R26L
SL-M56H	GL-R111F	GL-R56H	GL-R28L
SL-M60H	GL-R119F	GL-R60H	GL-R30L
SL-M64H	GL-R127F	GL-R64H	GL-R32L
SL-M80H*	—	GL-R72H/GL-R80H	—
SL-M96H*	—	GL-R88H/GL-R96H	—

* Newly added to the lineup

step 5

Select the optional accessories

DEDICATED Safety relay and power supply for the gl-r series

Dedicated relay for the GL-R Series

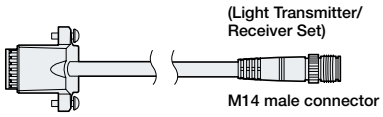
Type	Model	Safety input Light curtain	Safety output	Other I/O
Safety relay	**GL-T11R**	1 ch (2 inputs) (Dedicated for GL-R)	1 channel (2 outputs)	EDM input, Muting input, AUX output, Muting lamp output, etc.

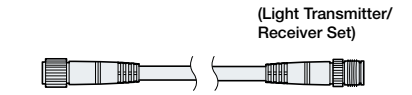
Dedicated power supply for KEYENCE light curtains

Type	Model	Input power supply voltage	Output voltage	Output capacity	Power consumption
Switching type power supply	**SL-U2**	100 to 240 VAC ±10% (50/60 Hz)	24 VDC ±10% Class 2	1.8 A	135 VA

GL-T11R Connection cable

- The following cable must be used for connection between the GL-R and GL-T11R.
  The system will not operate if other GL-R cables are used to connect the GL-R and GL-T11R.

Shape	Length (m)	Model
	0.3	**GL-RPT03PM**
	3	**GL-RPT3PM**
	5	**GL-RPT5PM**
	10	**GL-RPT10PM**

Shape	Length (m)	Model
	10	**GL-RCT10PM**

Battery-operated laser alignment tool

Type	Model	Power source	Laser class
Laser Alignment Tool	**GL-R1LP**	AAA battery x 2	Class 2 laser product

Test piece for detection test

Model	Detail
OP-88865	Diameter of 14 mm, Length of 200 mm
OP-88866	Diameter of 25 mm, Length of 200 mm

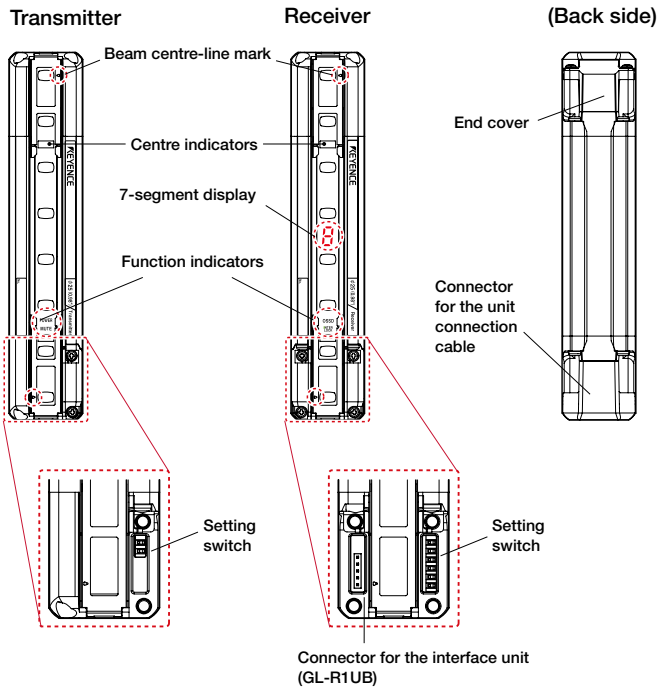
When you need a test piece larger than 25 mm in diameter, please acquire on your own.

SPECIFICATIONS

Model			GL-RF	GL-RH	GL-RL
Beam axis spacing/Lens diameter			10 mm / ø4	20 mm / ø5	40 mm / ø5
Detection capability			ø14 mm	ø25 mm	ø45 mm
Operating distance			0.2 to 10 m*1	0.2 to 15 m*1	
Effective aperture angle			Max. ±2.5° (When operating distance is 3 m or more)		
Light source			Infrared LED (870 nm)		
Response time			Optical synchronisation (Channel 0) or Wire synchronisation: 6.6 to 18.1 ms Optical synchronisation (Channel A or B): 6.9 to 27.4 ms		
OSSD operation			Turns on when no interruptions are present in the detection zone		
Synchronisation between the transmitter and receiver			Optical synchronisation or Wire synchronisation (Determined by wiring)		
Light interference prevention function			Prevents mutual interference in up to two GL-R systems. Optical synchronisation: prevented by Channel A and B with setting switch Wire synchronisation: prevented automatically		
Control output (OSSD output)	Output		2 transistor outputs. (PNP or NPN is determined by the cable type)		
	Max. load current		500 mA*2		
	Residual voltage (during ON)		Max. 2.5 V (with a cable length of 5 m)		
	OFF state voltage		Max. 2.0 V (with a cable length of 5 m)		
	Leakage current		Max. 200 µA		
	Max. capacitive load		2.2 µF		
	Load wiring resistance		Max. 2.5 Ω		
Supplemental output (Non-safety-related output)	AUX		Transistor outputs (Compatible with both PNP and NPN) Load current: Max. 50 mA, Residual voltage: Max. 2.5 V (with a cable length of 5 m)		
	Error output				
	Muting lamp output		Incandescent lamp (24 VDC, 1 to 5.5 W) LED lamp (load current: 10 to 230 mA) can be connected		
External input	EDM input		[When using a PNP output cable] ON voltage: 10 to 30 V OFF voltage: Open or 0 to 3 V Short circuit current: Approx. 2.5 mA (Approx. 10 mA with EDM input only)	[When using an NPN output cable] ON voltage: 0 to 3 V OFF voltage: Open or 10 V or more Up to the power voltage Short circuit current: Approx. 2.5 mA (Approx. 10 mA with EDM input only)	
	Wait input				
	Reset input				
	Muting input 1, 2				
	Override input				
Power supply	Voltage		24 VDC ±20%, ripple (P-P) 10% or less, Class 2		
	Current consumption		Transmitter : 37 to 81mA, Receiver : 66 to 91 mA		
Protection circuit			Reverse current protection, short-circuit protection for each output, surge protection for each output		
Environmental resistance	Enclosure rating		IP65/IP67 (IEC60529)		
	Overvoltage category		II		
	Ambient temperature		-10 to +55°C (No freezing)		
	Storage ambient temperature		-25 to +60°C (No freezing)		
	Relative humidity		15 to 85% RH (No condensation)		
	Storage relative humidity		15 to 95% RH		
	Ambient light		Incandescent lamp: 3,000 lx or less. Sunlight: 20,000 lx or less		
	Vibration		10 to 55 Hz, 0.7 mm compound amplitude, 20 sweeps each in the X, Y and Z directions		
	Shock		100m/s² (approx. 10 G), 16 ms pulse in X, Y and Z directions, 1,000 times each axis		
Material	Main unit case		Aluminium		
	Upper case/lower case		Nylon (GF 30%)		
	Front cover		Polycarbonate, SUS304		
Weight			See p.23		
Approved standards	EMC	EMS	IEC61496-1, EN61496-1, UL61496-1		
		EMI	EN55011 ClassA, FCC Part15B ClassA, ICES-003 ClassA		
	Safety		IEC61496-1, EN61496-1, UL61496-1 (Type 4 ESPE)		
			IEC61496-2, EN61496-2, UL61496-2 (Type 4 AOPD)		
			IEC61508, EN61508 (SIL3)		
			EN ISO13849-1:2015 (Category 4, PLe)		
			UL508		
			UL1998		

*1 When the option front protection cover is installed on the one of transmitter or receiver, the Operating distance is shorten by 0.5 m. When the front covers are installed on both of the transmitter and receiver, the Operating distance is shorten by 1.0 m.
*2 When the GL-R is used under surrounding air temperatures between 50 to 55°C, the Maximum load current should not exceed 350 mA.

PART DESCRIPTION



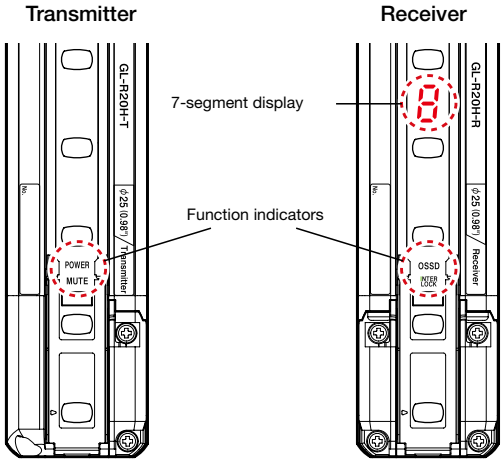
SETTING SWITCH

Transmitter

Number	Details	Settings	
2	Channel	Channel 0 (Not applied) (default)	Use Channel for light interference prevention when optical synchronisation system is applied. For details, refer to the "GL-R User's Manual".
		Channel A	
1		Channel B	

Receiver

Number	Details	Settings	
6	Centre indicator	ON (Green) when all beam axes are clear (Default)	
		OFF when all beam axes are clear	
5	Reduced resolution function (safety function)	Reduced resolution is not applied (Default).	
4		Reduced resolution (one optical beam) is applied.	
3		Reduced resolution (two optical beams) is applied.	
2	Channel	Channel 0 (Not applied) (default)	Use Channel for light interference prevention when optical synchronisation system is applied. For details, refer to the "GL-R User's Manual".
		Channel A	
1		Channel B	



FUNCTION INDICATORS

Transmitter		
Name	Status	Details
POWER (orange)	Light ON	Power ON (Transmitter)
	Light OFF	Power OFF (Transmitter)
MUTE (orange)	Light ON	Muted condition or Override condition
	Blinking slowly	Muting input 1 ON
	Blinking	Muting input 2 ON, or muting input 1 and 2 ON
	Light OFF	Muting input 1 and 2 OFF

Receiver		
Name	State	Details
OSSD (red/green)	Light in red	OSSD OFF
	Light in green	OSSD ON
	Blinking in green	Amount of received light is unstable. (Alert output OFF)
	Light OFF	Power OFF (Receiver)
INTERLOCK (Yellow)	Light ON	Interlock condition
	Blinking	Interlock reset ready condition (Interlock reset ready output ON)
	Light OFF	No interlock or error condition

• When optical synchronisation system is applied, only the “POWER” indicator turns ON on the transmitter.

7-SEGMENT DISPLAY

Upon power-up

Wire synchronisation system or one-line system	Optical synchronisation system		
	Channel 0	Channel A	Channel B
11	3	A	b

During normal operation

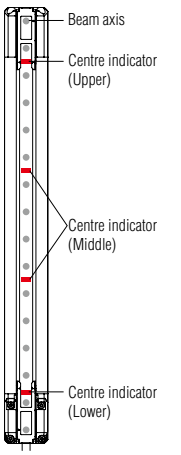
Condition		7-segment display
Applying the reduced resolution function or fixed blanking function.		F
Wait input is activated.		U
Applying the muting function or override function	Muting input 1 ON	8
	Muting input 2 ON	8
	Muting input 1 and 2 ON*1	- -
	Muted Condition	8 ⇨ 8 ⇨ 8 ⇨ 8 ⇨ 8 ⇨ 8
	Override input ON*2	o
	Override condition.	8 ⇨ 8 ⇨ - ⇨ 8
Other than those above.		Turn OFF

*1 When not in the muted condition because conditions for initiation of muting are not met.
*2 When not in the override condition because conditions for initiation of override are not met.

Error condition

When an error occurs, the OSSD goes to the OFF-state and the GL-R goes to the error condition. For the 7-segment display in the error condition, refer to the “instruction manual”.

CENTRE INDICATORS



Centre indicator (Upper)

indicates whether interruption is present in the top beam axis or not. (clear or blocked)

Centre indicator (Middle)

indicates whether the middle axis beams are interrupted or not.

Centre indicator (Lower)

indicates whether interruption is present in the bottom beam axis or not. (clear or blocked)

Centre indicator	Light OFF	Light in red	Light in green	Blinking in red
Upper	Top beam axis is blocked	Although the top beam axis is unblocked, the others are blocked	No interruption is present in detection zone of the GL-R. (clear)	Error condition
Middle	Top beam axis or Bottom beam axis is blocked	Although the top and bottom beam axis are unblocked, the middle beams are blocked		
Lower	Bottom beam axis is blocked	Although the bottom beam axis is unblocked, the others are blocked		

* The centre indicator on the transmitter is OFF when optical synchronisation system is applied.

RESPONSE TIME (OSSD)

GL-RF

Unit: ms

Model	Response time (OSSD)					
	Wire synchronisation, One-line or Optical synchronisation system (Channel 0)			Optical synchronisation system (Channel A or B)		
	ON → OFF	OFF → ON*1	All blocked → ON*2	ON → OFF	OFF → ON*1	All blocked → ON*2
GL-R23F	6.9	49.2	64.4	9.3	52.7	74.0
GL-R31F	7.8	50.5	67.9	10.7	54.8	79.5
GL-R39F	8.6	51.8	71.3	12.1	56.9	85.1
GL-R47F	9.5	53.1	74.8	13.5	59.0	90.7
GL-R55F	10.4	54.3	78.3	14.9	61.1	96.3
GL-R63F	11.2	55.6	81.7	16.3	63.2	101.8
GL-R71F	12.1	56.9	85.2	17.6	65.3	107.4
GL-R79F	13.0	58.2	88.6	19.0	67.4	113.0
GL-R87F	13.8	59.5	92.1	20.4	69.4	118.5
GL-R95F	14.7	60.8	95.5	21.8	71.5	124.1
GL-R103F	15.5	62.1	99.0	23.2	73.6	129.7
GL-R111F	16.4	63.4	102.4	24.6	75.7	135.2
GL-R119F	17.3	64.7	105.9	26.0	77.8	140.8
GL-R127F	18.1	66.0	109.4	27.4	79.9	146.4

GL-RH

Unit: ms

Model	Response time (OSSD)					
	Wire synchronisation, One-line or Optical synchronisation system (Channel 0)			Optical synchronisation system (Channel A or B)		
	ON → OFF	OFF → ON*1	All blocked → ON*2	ON → OFF	OFF → ON*1	All blocked → ON*2
GL-R08H	6.6	48.7	63.1	6.9	49.1	64.2
GL-R12H	6.6	48.7	63.1	7.4	49.9	66.3
GL-R16H	6.6	48.7	63.1	8.1	50.9	69.1
GL-R20H	6.6	48.7	63.1	8.8	52.0	71.9
GL-R24H	7.0	49.3	64.9	9.5	53.0	74.7
GL-R28H	7.4	50.0	66.6	10.2	54.0	77.5
GL-R32H	7.9	50.6	68.3	10.9	55.1	80.2
GL-R36H	8.3	51.3	70.0	11.6	56.1	83.0
GL-R40H	8.7	51.9	71.8	12.3	57.2	85.8
GL-R44H	9.2	52.6	73.5	12.9	58.2	88.6
GL-R48H	9.6	53.2	75.2	13.6	59.3	91.4
GL-R52H	10.0	53.9	77.0	14.3	60.3	94.2
GL-R56H	10.5	54.5	78.7	15.0	61.4	96.9
GL-R60H	10.9	55.2	80.4	15.7	62.4	99.7
GL-R64H	11.3	55.8	82.1	16.4	63.4	102.5
GL-R72H	12.2	57.1	85.6	17.8	65.5	108.1
GL-R80H	13.1	58.4	89.1	19.2	67.6	113.7
GL-R88H	13.9	59.7	92.5	20.6	69.7	119.2
GL-R96H	14.8	61.0	96.0	22.0	71.8	124.8

GL-RL

Unit: ms

Model	Response time (OSSD)					
	Wire synchronisation, One-line or Optical synchronisation system (Channel 0)			Optical synchronisation system (Channel A or B)		
	ON → OFF	OFF → ON*1	All blocked → ON*2	ON → OFF	OFF → ON*1	All blocked → ON*2
GL-R04L	6.6	48.7	63.1	6.9	49.1	64.2
GL-R06L	6.6	48.7	63.1	6.9	49.1	64.2
GL-R08L	6.6	48.7	63.1	6.9	49.1	64.2
GL-R10L	6.6	48.7	63.1	7.0	49.3	64.9
GL-R12L	6.6	48.7	63.1	7.4	49.9	66.3
GL-R14L	6.6	48.7	63.1	7.7	50.4	67.7
GL-R16L	6.6	48.7	63.1	8.1	50.9	69.1
GL-R18L	6.6	48.7	63.1	8.4	51.4	70.5
GL-R20L	6.6	48.7	63.1	8.8	52.0	71.9
GL-R22L	6.8	49.0	64.0	9.1	52.5	73.3
GL-R24L	7.0	49.3	64.9	9.5	53.0	74.7
GL-R26L	7.2	49.6	65.7	9.8	53.5	76.1
GL-R28L	7.4	50.0	66.6	10.2	54.0	77.5
GL-R30L	7.7	50.3	67.5	10.5	54.6	78.9
GL-R32L	7.9	50.6	68.3	10.9	55.1	80.2

*1 If the interruption is present in the detection zone for less than 80 ms, the response time (OFF to ON) will be 80 ms or more to ensure that the OSSD maintains the OFF state for more than 80 ms.

*2 "All blocked" means the situation where the GL-R operates in optical synchronisation system and the transmitter and receiver is not synchronised (top and bottom beam axes are both blocked). In this situation, the response time is longer because the GL-R synchronises the transmitter and receiver first and then determines the clear or blocked.

Point

- When the GL-R units are connected in series, the response time is calculated according to the following steps;

1. Sum up the response time of all unit.
2. Subtract the following time from the result of previous step.

ON to OFF

One sub unit : 2 ms

Two sub unit : 4.2 ms

(When Optical synchronisation system and Channel A or B)

One sub unit : 2.7 ms

Two sub unit : 5.7 ms

OFF to ON

One sub unit : 42 ms

Two sub unit : 84 ms

When connecting the GL-R32H (32 beam axes), GL-R24H (24 beam axes), and GLR12L (12 beam axes) in series for one-line system, the response time of each unit is 7.9 ms, 7.0 ms, and 6.6 ms respectively, and the response time (ON to OFF) is 7.9 ms + 7.0 ms + 6.6 ms - 4.2 ms = 17.3 ms.
The response time (OFF to ON) is 50.6 ms + 49.3 ms + 48.7 ms - 84 ms = 64.6 ms.

- 2.0 m/s is the maximum object detection speed of the GL-R series.

CURRENT CONSUMPTION

Unit: mA

Model	Current consumption (Max.)	
	Transmitter	Receiver
GL-R23F	50	70
GL-R31F	54	71
GL-R39F	57	72
GL-R47F	60	74
GL-R55F	62	75
GL-R63F	64	77
GL-R71F	66	78
GL-R79F	67	80
GL-R87F	69	81
GL-R95F	71	83
GL-R103F	72	84
GL-R111F	74	85
GL-R119F	76	87
GL-R127F	78	89

Unit: mA

Model	Current consumption (Max.)	
	Transmitter	Receiver
GL-R08H	43	66
GL-R12H	46	68
GL-R16H	50	69
GL-R20H	53	71
GL-R24H	57	72
GL-R28H	59	73
GL-R32H	61	74
GL-R36H	63	75
GL-R40H	65	76
GL-R44H	66	77
GL-R48H	68	79
GL-R52H	69	80
GL-R56H	71	81
GL-R60H	72	82
GL-R64H	73	83
GL-R72H	75	85
GL-R80H	77	87
GL-R88H	79	89
GL-R96H	81	91

Unit: mA

Model	Current consumption (Max.)	
	Transmitter	Receiver
GL-R04L	37	66
GL-R06L	39	67
GL-R08L	41	68
GL-R10L	43	69
GL-R12L	46	70
GL-R14L	48	71
GL-R16L	50	72
GL-R18L	52	73
GL-R20L	54	75
GL-R22L	56	75
GL-R24L	57	76
GL-R26L	59	77
GL-R28L	60	78
GL-R30L	61	79
GL-R32L	62	80

* When each input, excluding the EDM input, is turned ON, the current consumption per input increases by 2.5 mA.

WEIGHT

Unit: g

Model	Weight	
	Transmitter	Receiver
GL-R23F	320	330
GL-R31F	430	440
GL-R39F	550	550
GL-R47F	660	670
GL-R55F	780	780
GL-R63F	890	900
GL-R71F	1000	1010
GL-R79F	1200	1200
GL-R87F	1300	1300
GL-R95F	1400	1400
GL-R103F	1500	1500
GL-R111F	1600	1600
GL-R119F	1700	1700
GL-R127F	1800	1900

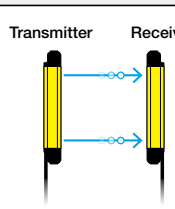
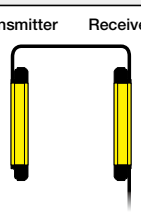
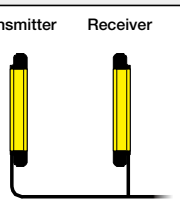
Unit: g

Model	Weight	
	Transmitter	Receiver
GL-R08H	210	210
GL-R12H	320	330
GL-R16H	430	440
GL-R20H	550	550
GL-R24H	660	660
GL-R28H	770	770
GL-R32H	880	890
GL-R36H	1000	1000
GL-R40H	1110	1110
GL-R44H	1220	1220
GL-R48H	1330	1340
GL-R52H	1440	1450
GL-R56H	1560	1560
GL-R60H	1670	1680
GL-R64H	1780	1790
GL-R72H	2010	2010
GL-R80H	2230	2240
GL-R88H	2450	2460
GL-R96H	2680	2690

Unit: g

Model	Weight	
	Transmitter	Receiver
GL-R04L	210	210
GL-R06L	320	330
GL-R08L	430	440
GL-R10L	550	550
GL-R12L	660	660
GL-R14L	770	770
GL-R16L	880	890
GL-R18L	1000	1000
GL-R20L	1110	1110
GL-R22L	1220	1220
GL-R24L	1330	1340
GL-R26L	1440	1450
GL-R28L	1560	1560
GL-R30L	1670	1680
GL-R32L	1780	1790

WIRING SYSTEM

Wiring system		Optical synchronisation system	One-line system	Wire synchronisation system
Wiring diagram				
Advantage		• Wiring is not needed between the transmitter and receiver. • The Transmitter and the receiver can operate on different power supplies.	• Simplified wiring. • The unit connection cable is not needed for the transmitter.	• All functions of the GL-R are available.
Limitation		• The input and output functions on the transmitter are not available. • All indicators other than “Power” are not available on the transmitter.	• The input and output functions on the transmitter are not available. • There is a maximum limit for the total length of cables.	• Wiring is needed between the transmitter and the receiver.
Applicable cables	Transmitter	5-core cable	Series connection cable	7-core cable 11-core cable
	Receiver	5-core cable 11-core cable	5-core cable 11-core cable	7-core cable 11-core cable

Wiring system		Optical synchronisation system		One-line system		Wire synchronisation system			
Cable combination	Transmitter cable	5-core		Series connection		7-core		11-core	
	Receiver cable	5-core	11-core	5-core	11-core	7-core	11-core	7-core	11-core
Usable functions	OSSD output	✓	✓	✓	✓	✓	✓	✓	✓
	AUX (auxiliary) output		✓		✓	💻	✓	💻	✓
	Error output		💻		💻	✓	✓	✓	✓
	Muting		💻		💻		💻	✓	✓
	Partial muting function		💻		💻		💻	💻	💻
	Muting bank function								💻
	Muted condition output		💻		💻		💻	💻	💻
	Muting lamp output							✓(💻)	✓(💻)
	Override function							✓(💻)	✓(💻)
	Interlock function		✓(💻)		✓(💻)		✓(💻)		✓(💻)
	Interlock-reset-ready output		💻		💻		💻		💻
	EDM function		✓(💻)		✓(💻)		✓(💻)		✓(💻)
	Wait input					✓	✓	✓	✓
	Alert output		💻		💻	💻	💻	💻	💻
	Clear/Block output		💻		💻	💻	💻	💻	💻
	Reset input (for error)		✓		✓		✓		✓
	Reduced resolution function	✓(💻)	✓(💻)	✓(💻)	✓(💻)	✓(💻)	✓(💻)	✓(💻)	✓(💻)
	Fixed blanking function	💻	💻	💻	💻	💻	💻	💻	💻
	Channel configuration (Light interference prevention function)	✓	✓	✓	✓	✓	✓	✓	✓
	Centre indicator configuration	✓(💻)	✓(💻)	✓(💻)	✓(💻)	✓(💻)	✓(💻)	✓(💻)	✓(💻)
	Monitoring function	💻	💻	💻	💻	💻	💻	💻	💻

✓ Available without the configuration software 💻 Available with the configuration software ✓(💻) Available without the configuration software. Functionality can be expanded when using the configuration software.

SERIES CONNECTION

Up to three GL-R units can be serially connected and used as a single light curtain.

OSSD

The OSSD is a safety-related control output. It connects to an external device (load), such as an FSD or MPCE. The GL-R generates self-diagnosis signals on its internal control circuit to perform diagnostics on the output circuit (OSSD). These signals periodically force the OSSD into a temporary OFF state when no interruption exists in the detection zone.

INTERLOCK FUNCTION

Interlock is a function that prevents the OSSD from automatically going to the ON state from an OFF state. You can prevent the unintended start-up and/or the unintended restart of the machine if an interlock is applied to the GL-R.

EXTERNAL DEVICE BREAKDOWN DETECTION (EDM FUNCTION)

EDM (External Device Monitoring) is a function of the GL-R that monitors the state of the control devices which are externally connected to the GL-R. The GL-R can detect a fault, such as welded contacts on external devices, as long as the EDM function is activated. This function is available only when connecting the 11-core cable to the receiver.

Point

- Each model is connected to one cable. Therefore, at least two cables are needed as a system, one for the transmitter and another for the receiver.
- All cables can be used for both the transmitter and receiver.
- The combination of the wiring system and cable determines the functions that can be used. Different types of cables can be used for the transmitter and receiver.
- Be sure to match the numbers of conductors (core wires) when using the unit connection cable for extension use and the extension cable.

CABLE SPECIFICATION

1 Cable length

1. Optical synchronisation system, wire synchronisation system

The sum of the length for the unit connection cable and extension cable must be 30 m or less. This limitation applies separately to the entire transmitter cable setup and the entire receiver cable setup.

2. One-line system

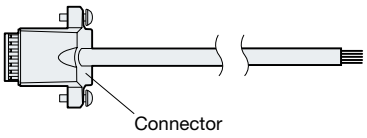
The sum of the length for all of the unit connection cables, extension cables and series cables must be 30 m or less.

DANGER

- Cables must be within the lengths specified. Failure to follow this specification may cause improper operation of safety functions, and may create a dangerous situation.
- The series connection cable cannot be cut or extended. If the cable is cut or extended, safety features may not operate properly. Do not allow this to happen as it is extremely dangerous.

2 Minimum cable bending radius: 5 mm

3 Identification of connector cables



Connector colour

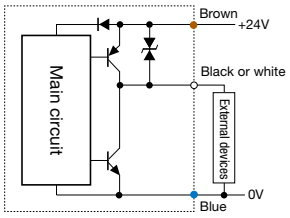
PNP output type cables or series connection cables : Black connectors
NPN output type cables : Grey connectors

Point

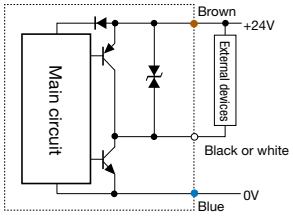
- PNP output type cables and NPN output type cables cannot be used at the same time (mixed wiring is not possible). One type of cable must be chosen based on the application.

DIAGRAMS OF THE I/O CIRCUITS

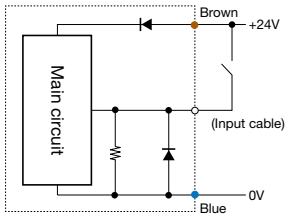
Output circuit (PNP cable)



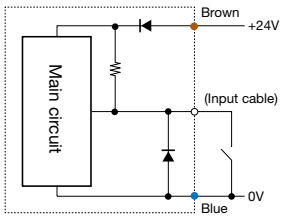
Output circuit (NPN cable)



Input circuit (PNP cable)



Input circuit (NPN cable)



CABLE COLOURS AND PIN POSITIONS

Reference

- When the synchronisation wire 1 or 2 is not connected, the GL-R operates in optical synchronisation system.
- When optical synchronisation system or one-line system is applied, the input and output functions on the transmitter are not available.
- The functions assigned to the input and output may differ according to the configuration when setting through the configuration software.
- "Wiring systems" (page 24)

5-core cable

Pin number	Cable colour	Name	
		When the transmitter is connected	When the receiver is connected
1	Brown	+24V	+24V
2	White	(Not in use)	OSSD2
3	Blue	0V	0V
4	Black	(Not in use)	OSSD1
5	Grey	FE	FE

Reference

M12 connector male pin assignment

M12 connector female pin assignment

7-core cable

Pin number	Cable colour	Name	
		When the transmitter is connected	When the receiver is connected
1	White	Wait input	OSSD2
2	—	(Not in use)	(Not in use)
3	Black	Error output	OSSD1
4	Brown	+24V	+24V
5	Orange	Synchronisation 1 (RS-485 +)	Synchronisation 1 (RS-485 +)
6	Orange/black	Synchronisation 2 (RS-485 -)	Synchronisation 2 (RS-485 -)
7	Blue	0V	0V
8	Grey	FE	FE

Reference

M12 connector male pin assignment

M12 connector female pin assignment

11-core cable

Pin number	Cable colour	Name	
		When the transmitter is connected	When the receiver is connected
1	White	Wait input	OSSD2
2	—	(Not in use)	(Not in use)
3	Black	Error output	OSSD1
4	Yellow	Override input	RESET input
5	Orange	Synchronisation 1 (RS-485 +)	Synchronisation 1 (RS-485 +)
6	Orange/black	Synchronisation 2 (RS-485 -)	Synchronisation 2 (RS-485 -)
7	Blue	0V	0V
8	Red	Muting lamp output	AUX output
9	Red/black	Muting input 2	EDM input
10	Brown	+24V	+24V
11	Pink	Muting input 1	Interlock selection input
12	Grey	FE	FE

Reference

M14 connector male pin assignment

M14 connector female pin assignment

EXAMPLES OF WIRING

NOTICE

- Unused I/O cables should be individually insulated.
- The functions assigned to the input and output may differ according to the configuration when configuring through the configuration software. For more information, see the "GL-R Series user's Manual".
- The Grey cable (FE) is electrically connected to the main unit case.
- The main unit case and a power-supply line are connected by a capacitors 3kV 100pF.

SIGNAL MEANING

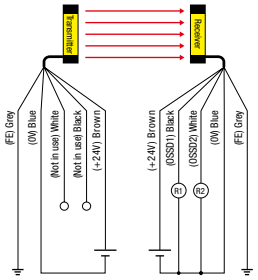
R1, R2 ····· External device (safety PLC, safety relay unit, etc.)
K1, K2 ····· External device (Force guided relay, magnet connector, etc.)
K3 ····· Solid state connector*1
S1 ····· Switch used for reset input
S2 ····· Switch used for wait input*1
S3 ····· Switch used for override input
S4 to 6 ····· Switch used for muting bank inputs
L1 ····· Muting lamp (Incandescent lamp or LED lamp)
P1, P2 ····· Muting device (Self-contained photoelectric sensors, etc.)
M ····· 3-phase motor
PLC ····· For NON SAFETY-RELATED system control use*1

*1 These are NON SAFETY-RELATED components.

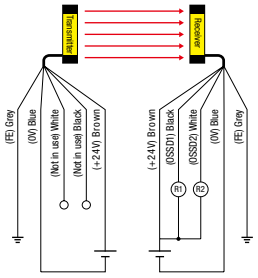
OPTICAL SYNCHRONISATION SYSTEM

Transmitter : 5-core cable, Receiver: 5-core cable

(1) PNP output cable

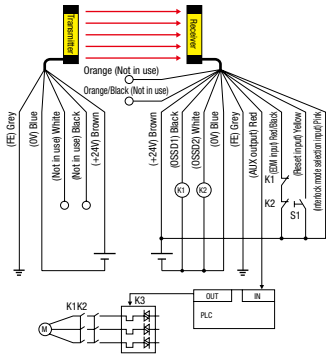


(2) NPN output cable

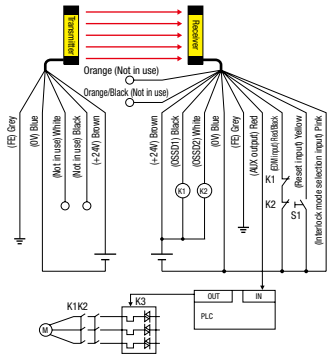


Transmitter : 5-core cable, Receiver: 11-core cable Uses EDM input and the interlock function

(1) PNP output cable



(2) NPN output cable

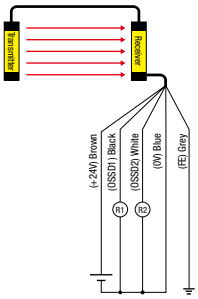


ONE-LINE SYSTEM

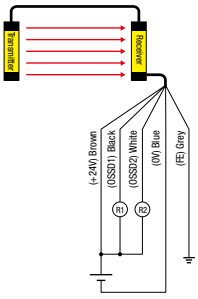
- The series connection cable must be used to connect the transmitter and receiver.
- The unit connection cable is not needed for the transmitter.
- The wiring when using an 11-core cable with the receiver is the same as the optical synchronisation system wiring.

Transmitter : Series connection cable, Receiver: 5-core cable

(1) PNP output cable



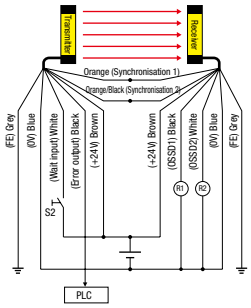
(2) NPN output cable



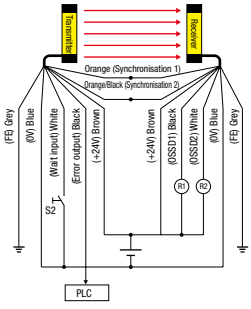
WIRE SYNCHRONISATION SYSTEM

Transmitter : 7-core cable, Receiver: 7-core cable

(1) PNP output cable



(2) NPN output cable



SPECIFICATIONS

Model			GL-T11R
Applicable model			GL-R Series
Relay output	FSD1,2		250 VAC 6 A 30 VDC 6 A (Resistance load)
			240 VAC 2 A (COSø=0.3) (Inductive load)
			24 VDC 1 A (COSø=0.3) (Inductive load)
Response time	ON→OFF		GL-R +10 ms
	OFF→ON		GL-R +32 ms
Life-span	Electrical life-span		100,000 cycles or more with 250 VAC 6 A resistance load (open/close frequency: 20 times/minute)
			100,000 cycles or more with 30 VDC 6 A resistance load (open/close frequency: 20 times/minute)
			500,000 cycles or more with 250 VAC 1 A resistance load (open/close frequency: 30 times/minute)
			500,000 cycles or more with 30 VDC 1 A resistance load (open/close frequency: 30 times/minute)
			AC15: 100,000 cycles or more with 240 VAC 2 A inductive load (open/close frequency: 20 times/minute, cosø = 0.3)
			DC13: 100,000 cycles or more with 24 VDC 1 A inductive load (open/close frequency: 20 times/minute, L/R = 48 ms)
Non-safety output	AUX output		Transistor output (PNP/NPN input device can be connected.) *1 50 mA max., residual voltage 2.5 V max. (When the cable between the GL-R and GL-T11R is 5 m)
	Error output		
	Muting lamp output		Incandescent lamp (24 VDC, 1 to 5.5 W) LED lamp (load current: 10 to 230 mA) can be connected.
External input	EDM input		ON voltage: [Power supply voltage - 5 V] to [Power supply voltage] OFF voltage: Open or 0 to 3 V Short circuit current: Approx. 2.5 mA (Approx. 10 mA with EDM input only)
	Wait input		
	Reset input		
	Muting input 1, 2		
	Override input		
Power supply	Power supply voltage		24 VDC ±10%, ripple (P-P) 10% or less, Class 2
	Current consumption		100 mA max. (24 VDC, GL-T11R only)
Environmental resistance	Enclosure rating		IP20 (IEC60529) Must be installed within a control panel rated at IP54 or higher.
	Pollution degree		2
	Overvoltage category		III
	Ambient temperature		-10 to +55°C (No freezing)
	Storage ambient temperature		-25 to +60°C (No freezing)
	Relative humidity		15 to 85% RH (No condensation)
	Storage relative humidity		15 to 95% RH
	Altitude		2,000 m or less
	Vibration		10 to 55 Hz 0.7 mm compound amplitude 20 sweeps each in the X, Y and Z directions
	Shock		100m/s^2 (approx. 10 G), 16 ms pulse in X, Y and Z directions, 1,000 times each axis
Material	Main unit case		Polycarbonate
Weight			Approx. 310 g
Approved standards	EMC	EMS	EN61496-1, UL61496-1, IEC61496-1
		EMI	EN55011 ClassA, FCC Part15B ClassA, ICES-003 ClassA
	Safety		EN61496-1, UL61496-1, IEC61496-1 (Type4 ESPE)
			EN ISO13849-1 : 2015 (Category4, PLe)
			UL508, EN50178

*1 The output operation is the same as that when the PNP output type cable is used.

Model		SL-U2
Type		Switching type
Input power supply voltage		100 to 240 VAC ±10% (50/60 Hz)
Overvoltage category		II
Output voltage		24 VDC ±10%, Class 2
Ripple/noise		240 mVp-p max.
Output capacity		1.8 A
Environmental resistance	Ambient temperature	-10 to +55°C (No freezing)
	Relative humidity	35 to 85% RH (No condensation)
Pollution degree		2
Withstand voltage		1500 VAC 1 minute (across all external terminals and case)
Vibration		10 to 55 Hz 0.7 mm compound amplitude 20 sweeps each in the X, Y and Z directions
Shock		100m/s^2 (approx. 10 G), 16 ms pulse in X, Y and Z directions, 1,000 times each axis
Insulation resistance		50 MΩ or more (With 500 VDC megohmmeter across all external terminals and case)
Power consumption		135 VA
Momentary interruption		10 ms max.
Weight		Approx. 240 g
Approved standards	EMC	EN61000-6-2, EN55011 Class A, FCC Part15 Class A, ICES-003 Class A
	Safety	EN60950-1, EN50178, UL60950-1, UL508

Model		GL-R1LP
Type		Laser Alignment Tool
Wavelength		635nm
Power source		AAA battery x 2 (sold separately)
FDA(CDRH) Part 1040.10	Laser class	Class 2 laser product
	Output	1.0mW
IEC 60825-1/ JIS C 6802	Laser class	Class 2 laser product
	Output	1.0mW
Weight		260g

*The laser classification for FDA (CDRH) is implemented based on IEC60825-1 in accordance with the requirements of Laser Notice No.50.

Internal circuit diagram

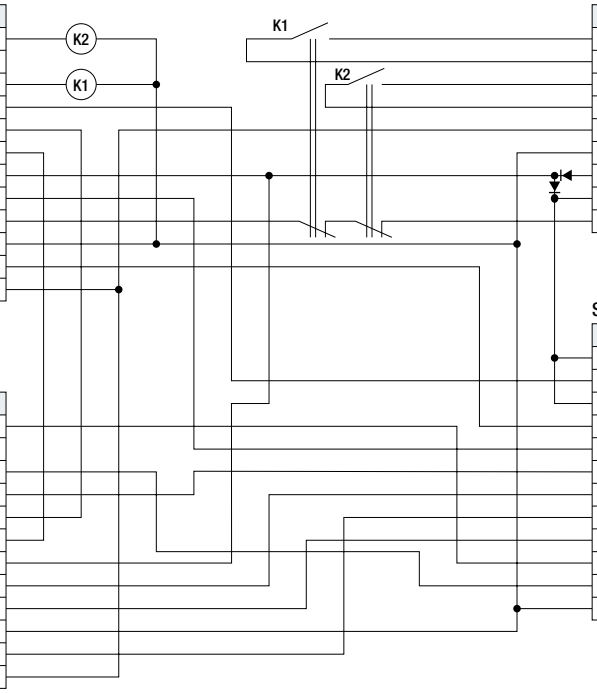
GL-R main unit

Receiver

No.	Name
1	OSSD2
2	Not in use
3	OSSD1
4	Reset input
5	Synchronisation 1 (RS485+)
6	Synchronisation 2 (RS485–)
7	24 V
8	AUX output
9	EDM input
10	0 V
11	Interlock selection input
12	FE

Transmitter

No.	Name
1	Wait input
2	Not in use
3	Override input
4	Error output
5	Synchronisation 1 (RS485+)
6	Synchronisation 2 (RS485–)
7	24 V
8	Muting lamp output
9	Muting input 2
10	0 V
11	Muting input 1
12	FE



Relay unit

Relay output terminals

No.	Name
1	FSD1
2	
3	FSD2
4	
5	FE
6	0 V
7	24 V (Input)
8	EDM input (24 V)
9	EDM input

Signal input/output terminals

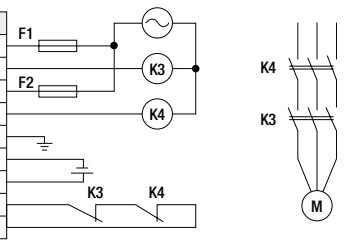
No.	Name
10	Reset input (24 V)
11	Reset input
12	Interlock selection input (24 V)
13	Interlock selection input
14	AUX output
15	Error output
16	Muting lamp output
17	Muting input 1
18	Muting input 2
19	Wait input
20	Override input
21	0 V

Wiring example

The wiring example shown here assumes the case of the following settings:
- Interlock function: Enabled (Manual reset mode)
- EDM function: Enabled
- Muting function: Enabled

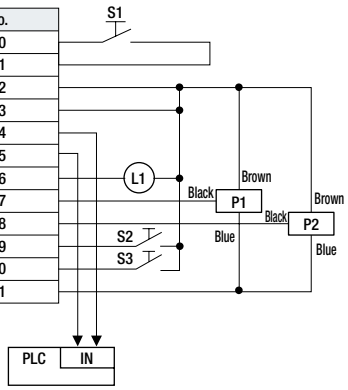
Relay output terminals

Name	No.
FSD1	1
	2
FSD2	3
	4
FE	5
0 V *1	6
24 V (Input) *1	7
EDM input (24 V) *2	8
EDM input *2	9



Signal input/output terminals

Name	No.
Reset input (24 V) *3	10
Reset input *3	11
Interlock selection input (24 V)	12
Interlock selection input	13
AUX output	14
Error output	15
Muting lamp output	16
Muting input 1	17
Muting input 2	18
Wait input	19
Override input	20
0 V	21



F1, F2	Fuse
K3, K4	External device (Magnet contactor, etc.)
S1	Switch for reset (N.O.)
S2	Switch for wait input (N.O.)
S3	Switch for override (N.O.)
L1	Muting lamp (Incandescent lamp or LED lamp)
P1, P2	Muting device (PZ Series self-contained photoelectric sensor <PNP output>, etc.)
M	3-phase motor
PLC	For monitoring use. This is a NON-SAFETY RELATED system.

S2 and PLC are NON-SAFETY RELATED systems.

*1 No. 6 and No. 7 do not need to be wired when the SL-U2 is connected.
*2 If it is not necessary to perform error detection for K3 and K4 (when EDM input is not used), use the shorting bar between No. 8 and No.9.
*3 In the auto reset mode, use the shorting bar between No. 10 and No.11. To release the error condition of a GL-R through the reset input, connect a N.C. switch.

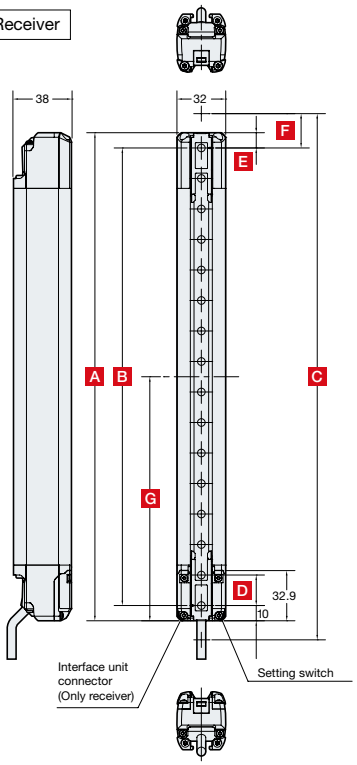
Points

- Depending on the settings of the “Safety Device Configurator” PC setting software, each function is switched to a different function. When the settings are changed, check the wiring referring to the internal circuit diagram in the previous section.
- The total electric current supplied from each 24 V terminal of the GL-T11R must be 95 mA or less.

GL-R (GL-RF/RH/RL) MAIN UNIT

Transmitter/Receiver

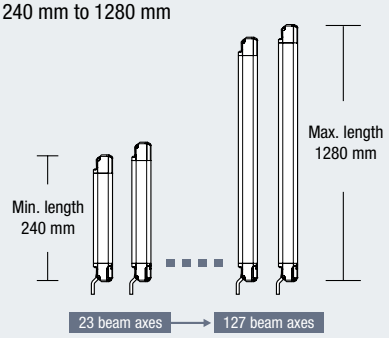
Unit: mm



Note	When the total length of the GL-R main unit becomes 1280 mm or longer, attach an antivibration bracket to the centre of the length of the GL-R (Distance G in the figure).	
	Mounting bracket being used	Antivibration bracket to use
	Adjustable angle mounting bracket	Antivibration bracket for adjustable angle mounting bracket
	No dead zone mounting bracket	
	Straight mounting bracket	Antivibration bracket for straight mounting bracket
	L-shaped mounting bracket	L-shaped mounting bracket

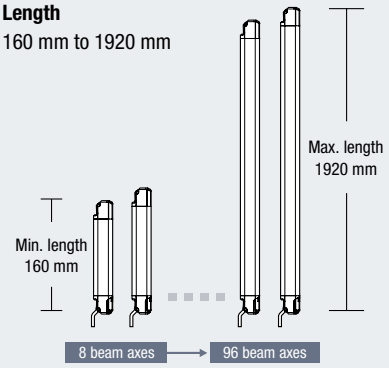
GL-RF UNIT VARIATION

Length
240 mm to 1280 mm



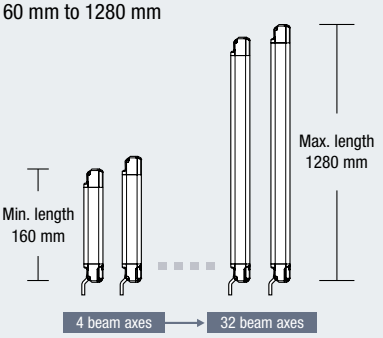
GL-RH UNIT VARIATION

Length
160 mm to 1920 mm



GL-RL UNIT VARIATION

Length
160 mm to 1280 mm



Understanding the model name

GL-R 12 H
1 2 3

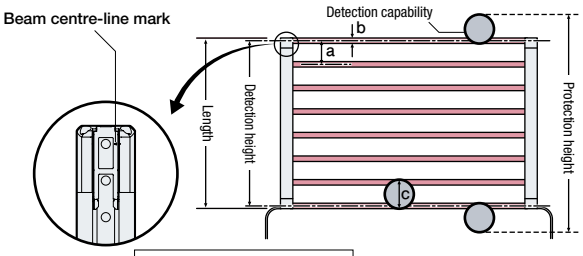
1 Series name

2 Number of beam axes: 2 or 3 digit number.
Ex.: 08 = 8 axes, 64 = 64 axes

3 Detection capability: F: ø14 mm detection type,
H: ø25 mm detection type,
L: ø45 mm detection type

The main unit includes both transmitter and receiver as one set.

Meaning of each item



a: Beam axis spacing
b: Beam axis diameter
c: Detection capability

Dimensions for units A-G

Unit: mm

Model	No. of axes	A Length	B Detection height	C Protection height	D Beam axis pitch	E	F	G
GL-R23F	23	240	220	244	10	10	12	120
GL-R31F	31	320	300	324				160
GL-R39F	39	400	380	404				200
GL-R47F	47	480	460	484				240
GL-R55F	55	560	540	564				280
GL-R63F	63	640	620	644				320
GL-R71F	71	720	700	724				360
GL-R79F	79	800	780	804				400
GL-R87F	87	880	860	884				440
GL-R95F	95	960	940	964				480
GL-R103F	103	1040	1020	1044				520
GL-R111F	111	1120	1100	1124				560
GL-R119F	119	1200	1180	1204				600
GL-R127F	127	1280	1260	1284				640

Unit: mm

Model	No. of axes	A Length	B Detection height	C Protection height	D Beam axis pitch	E	F	G
GL-R08H	8	160	140	185	20	10	22.5	80
GL-R12H	12	240	220	265				120
GL-R16H	16	320	300	345				160
GL-R20H	20	400	380	425				200
GL-R24H	24	480	460	505				240
GL-R28H	28	560	540	585				280
GL-R32H	32	640	620	665				320
GL-R36H	36	720	700	745				360
GL-R40H	40	800	780	825				400
GL-R44H	44	880	860	905				440
GL-R48H	48	960	940	985				480
GL-R52H	52	1040	1020	1065				520
GL-R56H	56	1120	1100	1145				560
GL-R60H	60	1200	1180	1225				600
GL-R64H	64	1280	1260	1305				640
GL-R72H	72	1440	1420	1465				720
GL-R80H	80	1600	1580	1625				800
GL-R88H	88	1760	1740	1785				880
GL-R96H	96	1920	1900	1945				960

Unit: mm

Model	No. of axes	A Length	B Detection height	C Protection height	D Beam axis pitch	E	F	G
GL-R04L	4	160	120	205	40	30	42.5	80
GL-R06L	6	240	200	285				120
GL-R08L	8	320	280	365				160
GL-R10L	10	400	360	445				200
GL-R12L	12	480	440	525				240
GL-R14L	14	560	520	605				280
GL-R16L	16	640	600	685				320
GL-R18L	18	720	680	765				360
GL-R20L	20	800	760	845				400
GL-R22L	22	880	840	925				440
GL-R24L	24	960	920	1005				480
GL-R26L	26	1040	1000	1085				520
GL-R28L	28	1120	1080	1165				560
GL-R30L	30	1200	1160	1245				600
GL-R32L	32	1280	1240	1325				640

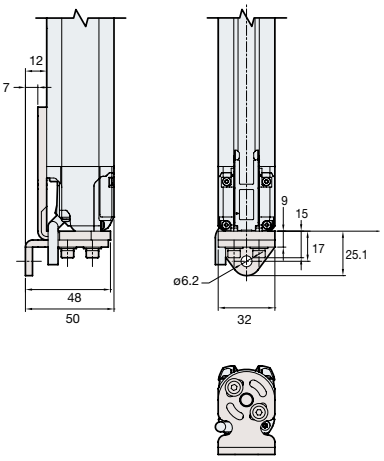
Unit: mm

Mounting bracket

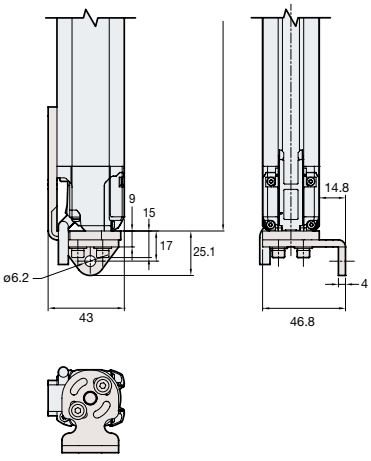
Adjustable angle mounting bracket
GL-RB01

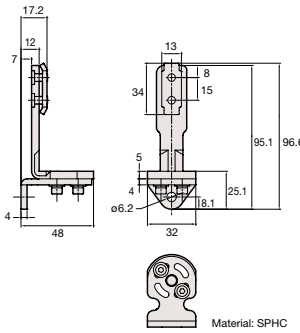
When mounted on GL-R

Back mounted state



Side mounted state



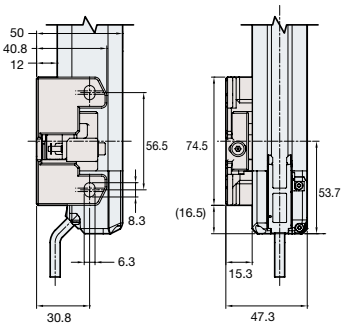


Material: SPHC

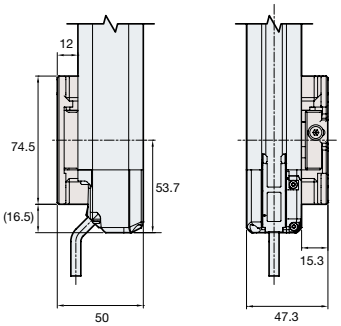
No dead zone mounting bracket
GL-RB21

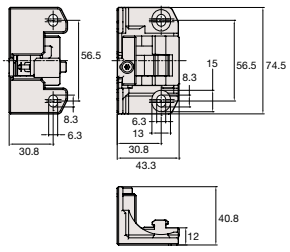
When mounted on GL-R

Back mounted state



Side mounted state



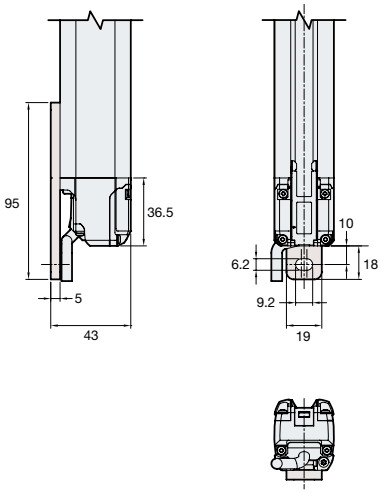


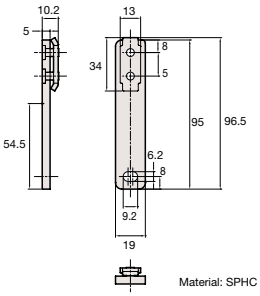
Material: Zinc die-cast

Straight mounting bracket
GL-RB11

When mounted on GL-R

Mounted state





Material: SPHC

DIMENSIONS

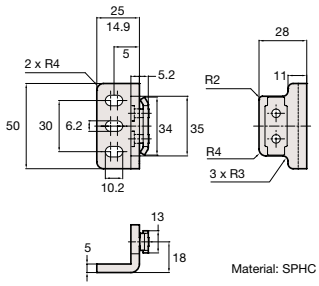
Unit: mm

Mounting bracket

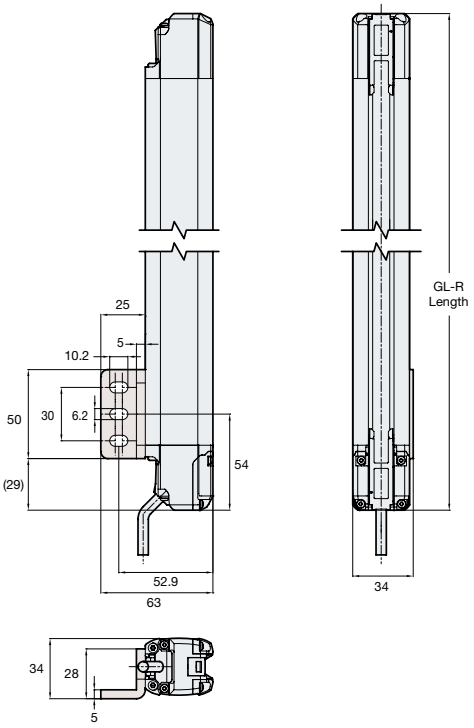
L-shaped mounting bracket
GL-RB12

When mounted on GL-R

Mounted state



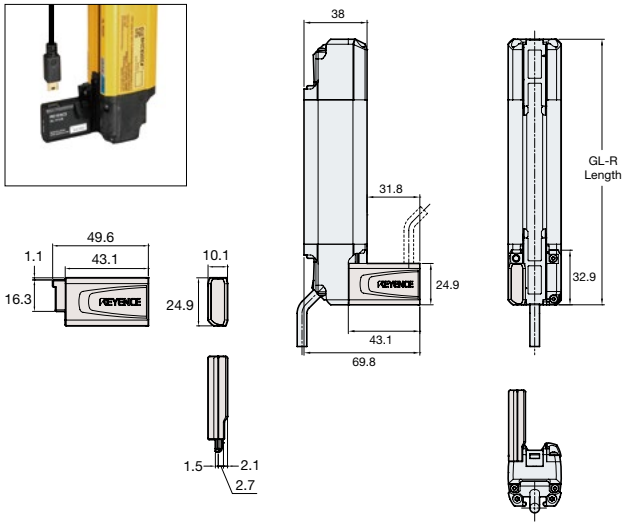
Material: SPHC



Interface unit

GL-R1UB

Mounted state

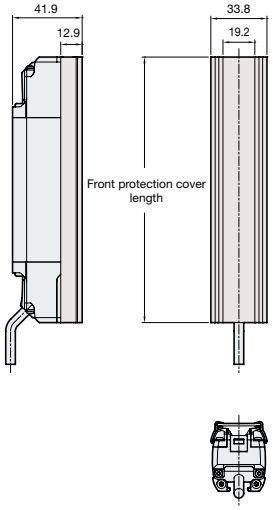


Front protection cover

GL-RA

See p.19 for the details

Mounted state

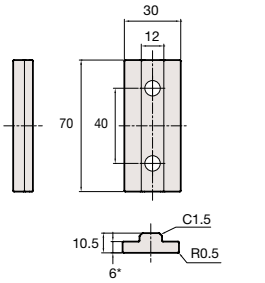


Unit: mm

Antivibration bracket

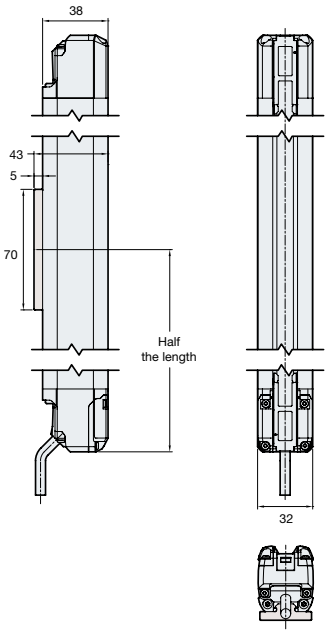
Antivibration bracket for the straight mounting bracket

GL-RB31



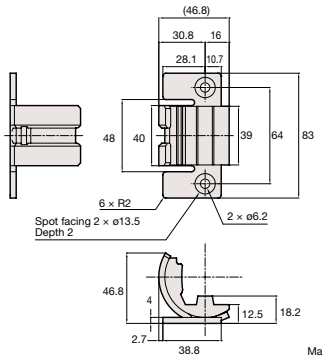
Material: EPDM *5 mm: when mounting

Mounted state



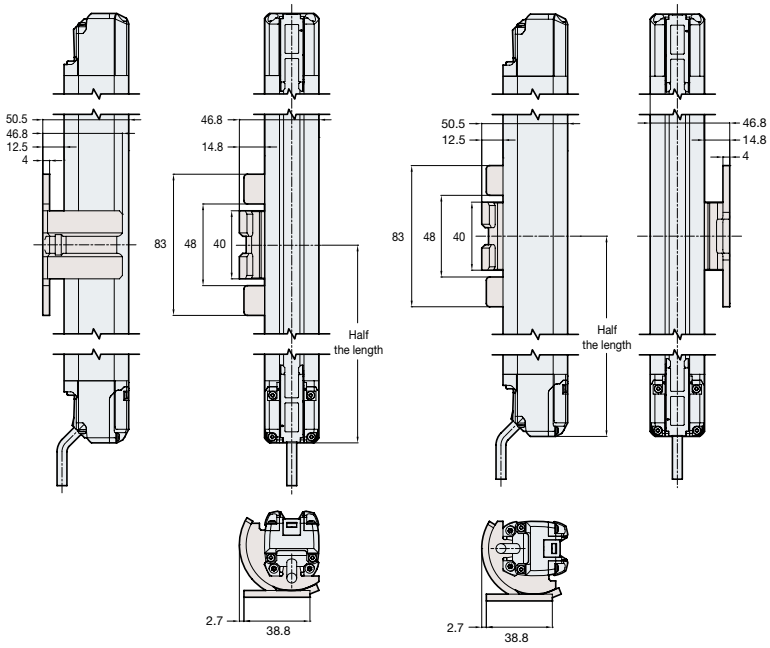
Antivibration bracket for the adjustable angle mounting bracket

GL-RB32



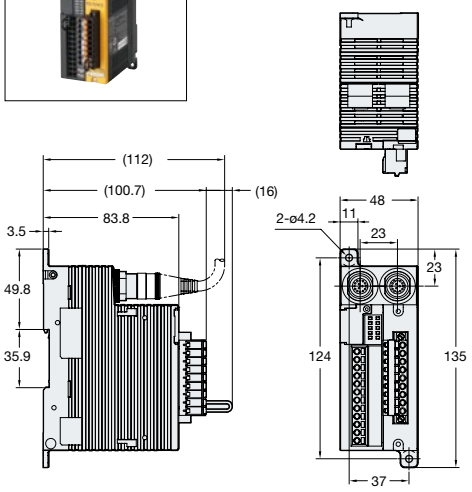
Material: SPHC, EPDM

Mounted state



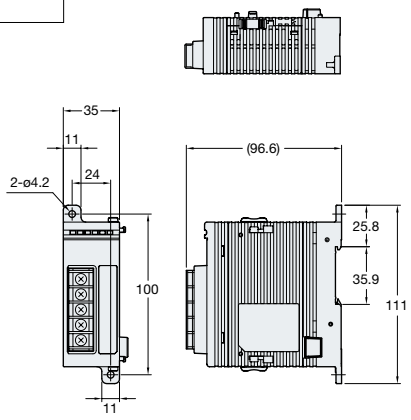
GL-T11R Series dedicated relay for the GL-R

GL-T11R



SL-U2 dedicated power supply for KEYENCE light curtains (Class 2 output)

SL-U2



Type 3 Safety Laser Scanner

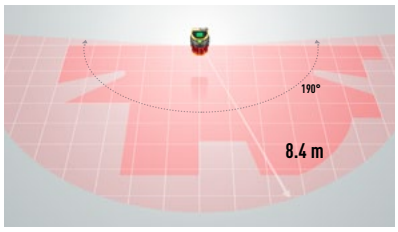
SZ-V Series

INDUSTRY LEADING SAFETY LASER SCANNER

Versatile, Easy to Use, and Truly Superior

Impressively Stable Detection Over 8.4m Range

With an industry leading range of 8.4m over a 190° field of view, the SZ-V boasts the longest and most stable detection around.

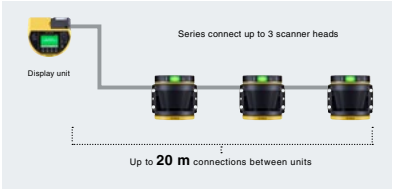


Separate systems

Separate systems are available to utilise the detachable display and cascading functionality of the SZ-V Series.

Connect up to 3 Units in Series

Seamlessly and simply guard multiple sides of a machine by cascading up to 3 units together.



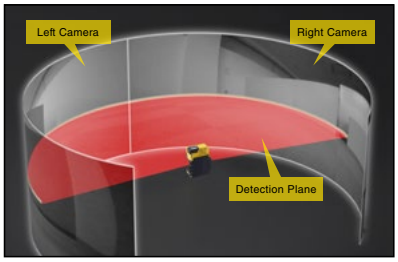
Models

Integrated models

Function			Model
	Standard type	Camera	SZ-V32X
		Standard	SZ-V32
	Multi-function and Network type	Camera	SZ-V32NX
		Standard	SZ-V32N

Industry's First Built-in Camera

This industry first, ensures proper zone configuration and allows users to pinpoint the cause of any trip. Monitoring has never been easier.



MEMO

KEYENCE CORPORATION

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