

Maximum safety standard

Type4

SIL3

PLe

CE



Armoured Protection! Safety Light Curtain

STRONG X SIMPLE X SMART 3S

NEW

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

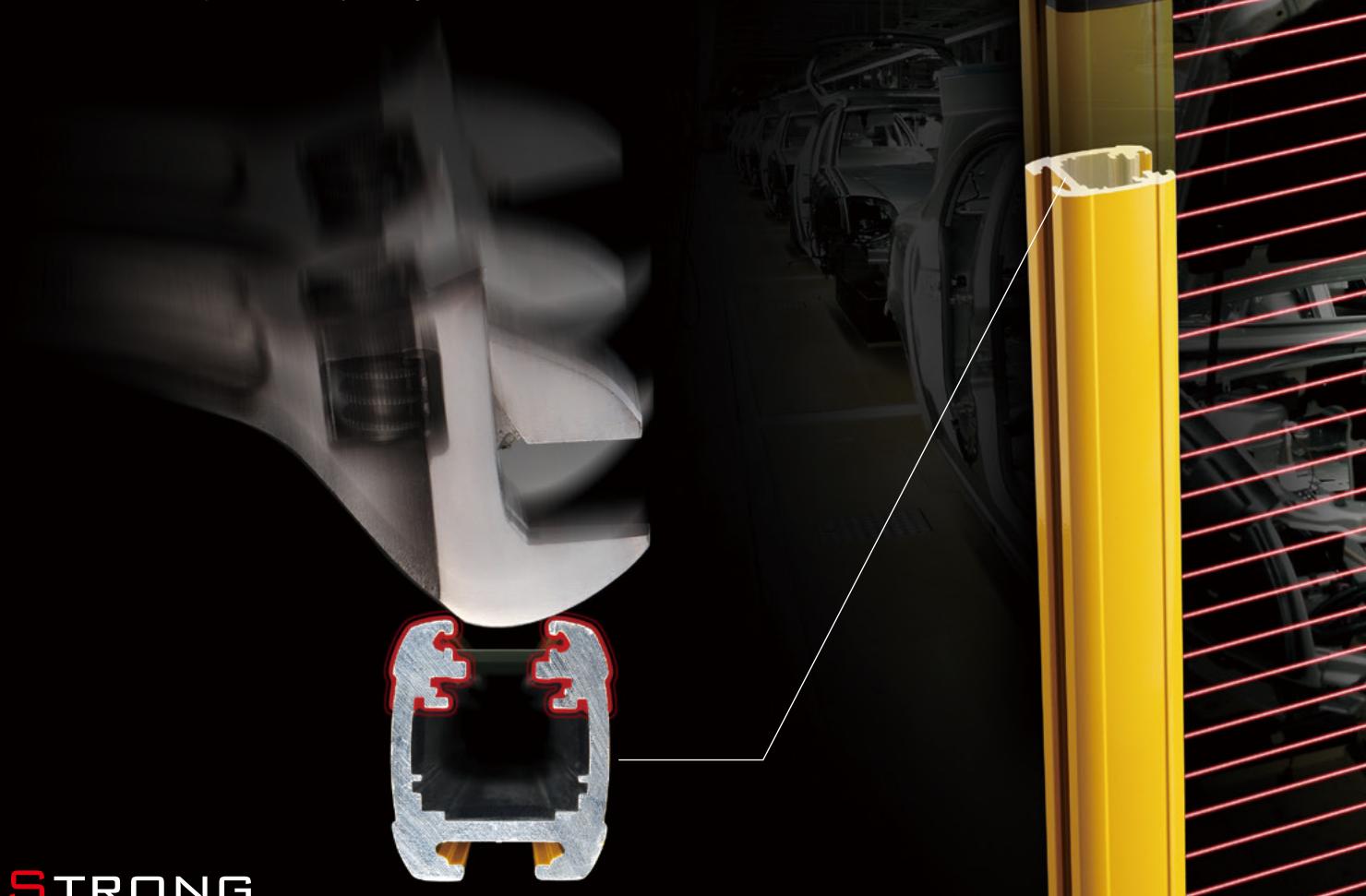
Armoured Protection

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.*

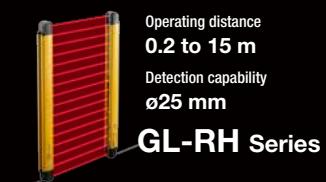
* the narrowest lens surface aperture in the industry, according to KEYENCE research as of March, 2012

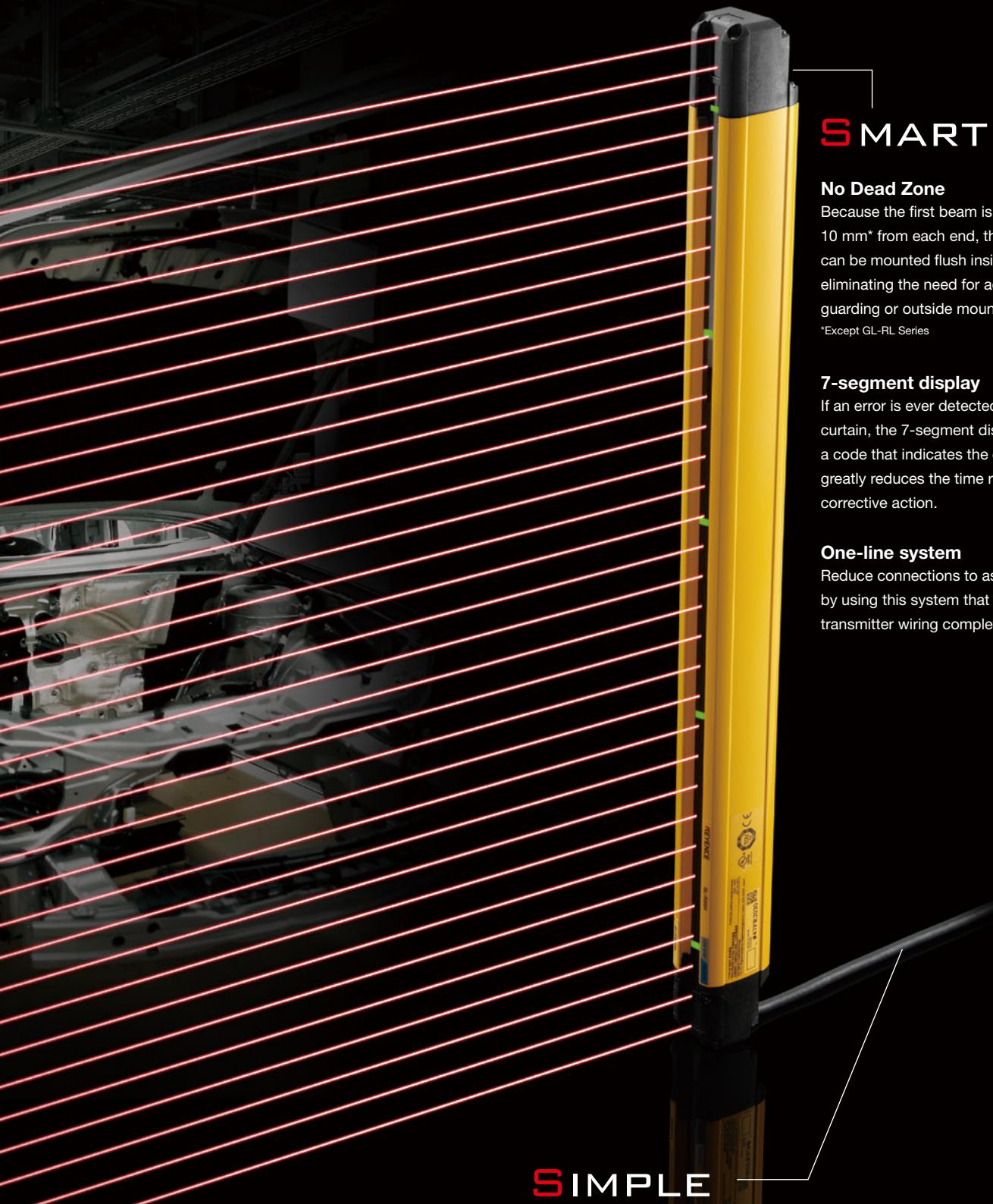


STRONG

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.





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.

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

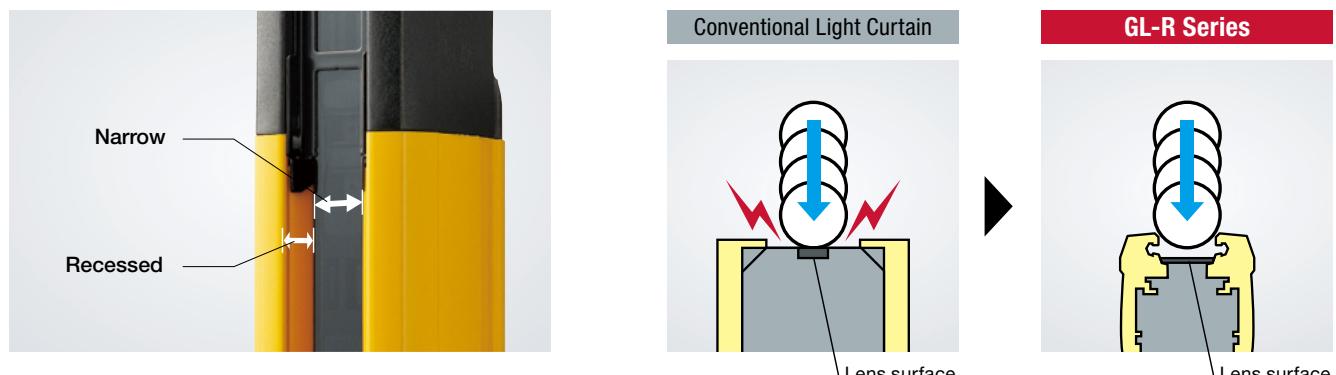
Reduce connections to as few as 5 wires by using this system that eliminates transmitter wiring completely.

STRONG



Securely protects the detection area

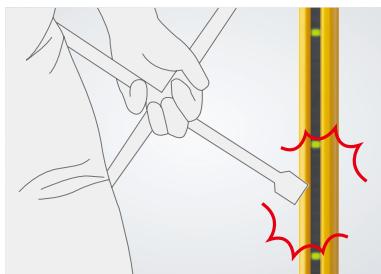
Built-in guarding will completely prevent impact to the lens surface by parts or tools of ø17 mm or more.*



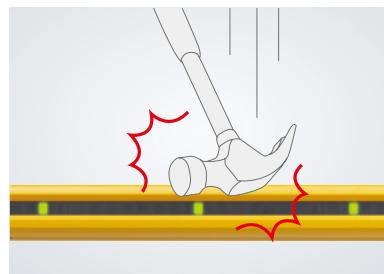
*See specifications for guaranteed values.

Thick and robust housing that resists impact

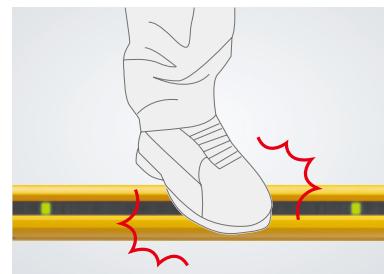
The GL-R Series is designed with a 3 mm thick housing that protects the light curtain body from various forms of impact, such as dropping equipment or hitting it with tools.*



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



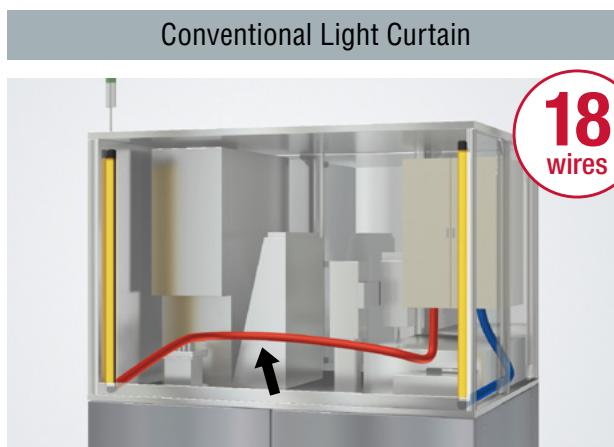
Long range

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



Simplified wiring



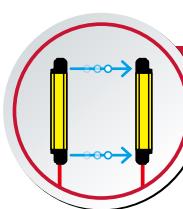
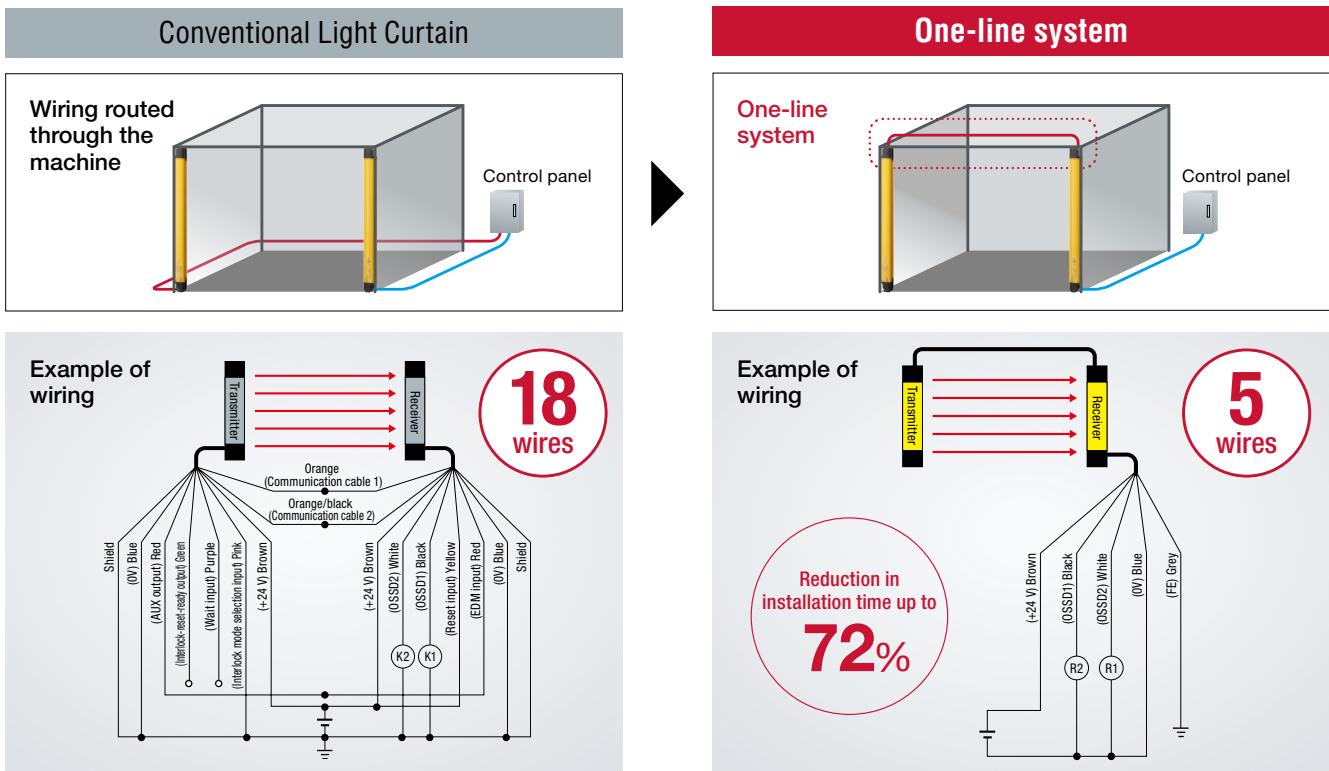
The transmitter and receiver had to be routed through the machine and wired to the control panel.



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

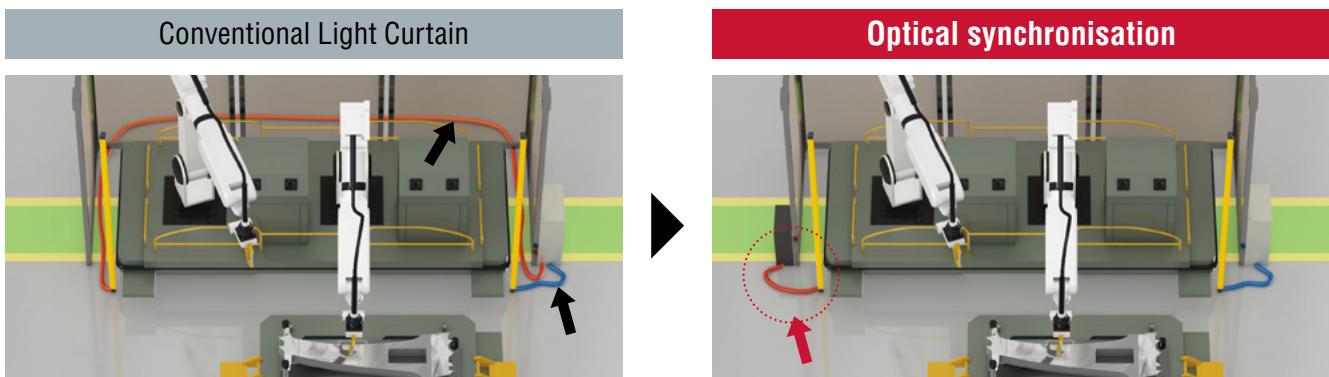
- 1 Wiring is simplified by connecting the transmitter directly to the receiver, requiring that only the receiver be wired.
- 2 Reduced risk of mis-wiring due to the reduction in required connections.



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

- Reduced wiring

Separate transmitter and receiver wiring simplifies installation



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.

Conventional brackets



GL-R Series



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.



NEW

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.



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.



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



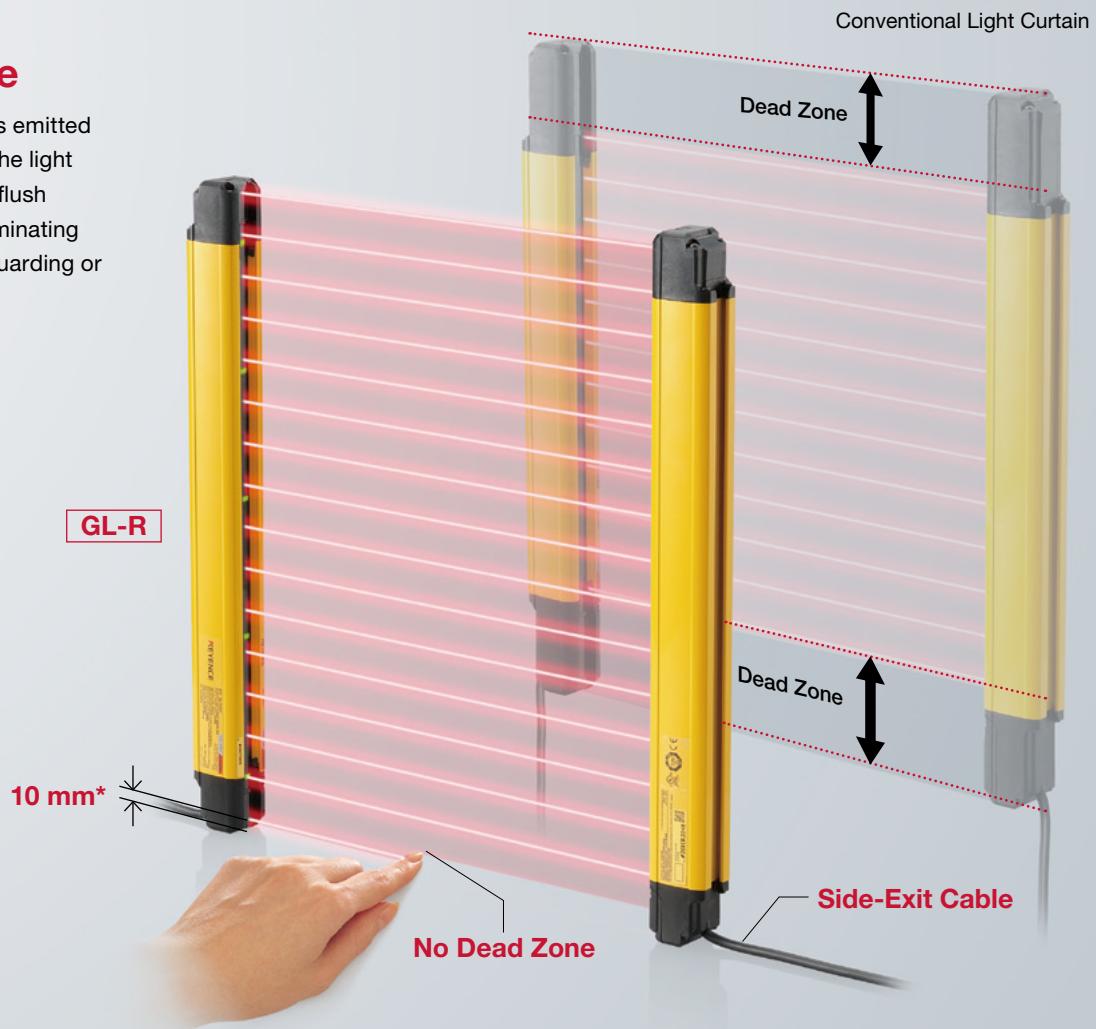
SL-U2, dedicated power source with class 2 output

In order to use the GL-R Series as a Type 4 light curtain, it is necessary to have a power supply that meets IEC/EN/UL61496-1 requirements. The SL-U2 dedicated power supply unit meets all of these requirements. Additionally, the SL-U2 uses a direct connection, eliminating the need for external wiring.

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



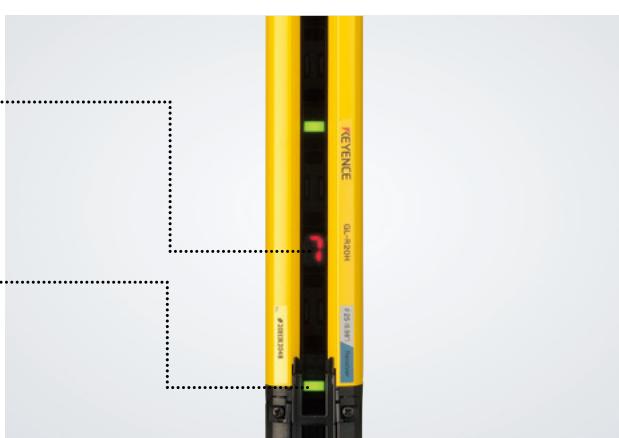
7-segment & centre indicators

7-segment display

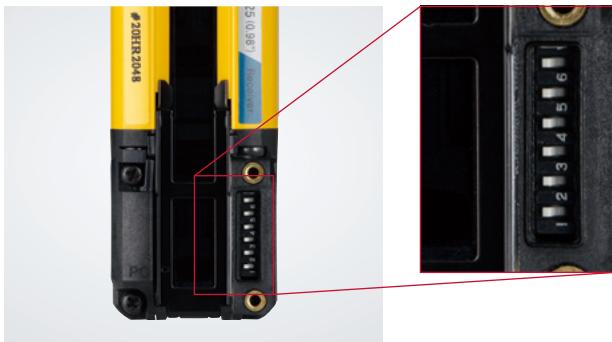
Errors are displayed as numeric codes, which reduces the amount of time spent identifying and correcting the problem that was detected by the GL-R Series.

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.

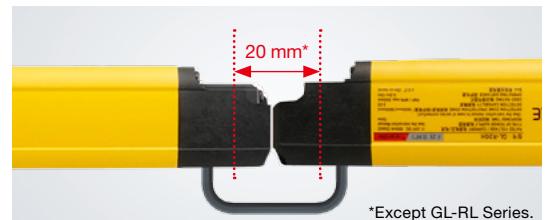
* In the single zone mode.
For details, refer to GL-R User's Manual.

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.



*Except GL-RL Series.

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

Download site www.keyence.co.uk/glr_soft

PC configuration software
Safety device configurator (free download)

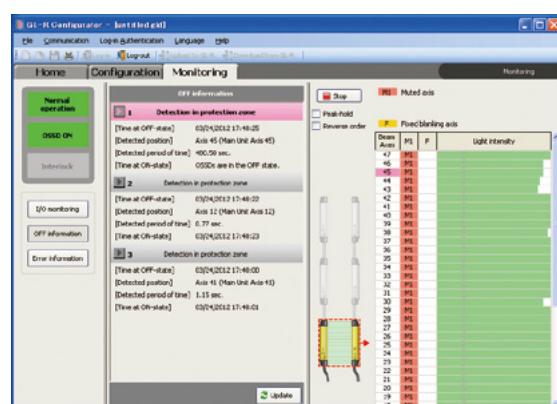
[MONITORING FUNCTION]

The operation of the GL-R Series can be monitored with a PC. The status of I/O signals including OSSD outputs, override inputs, and error conditions can be checked as well as light intensity. In addition, monitoring the mute condition will help to easily identify causes of abnormal operation during the muting setup or operation.

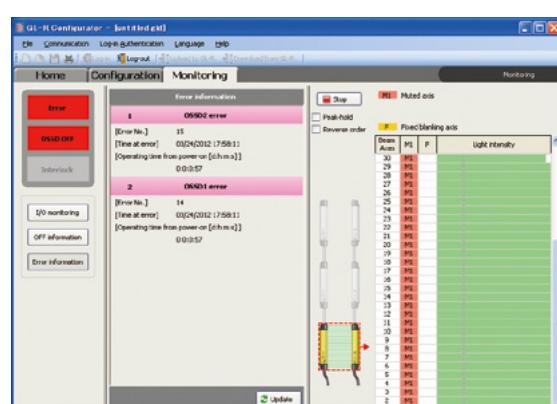


[OFF INFORMATION, ERROR INFORMATION, ERROR HISTORY]

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.



OFF information



Error information

Selecting a Safety Light Curtain

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



*Optional accessories are not required for normal operation.

step 1	Curtains
step 2	 GL-RF Series Detection capability ø14 mm
step 3	 GL-RH Series Detection capability ø25 mm
step 4	 GL-RL Series Detection capability ø45 mm
step 5	Optional Accessories
	 Front protection cover
	 Interface unit
	 Corner mirror SL-M Series
	 NEW Dedicated safety relay for the GL-R Series GL-T11R

step
1

Select the light curtain type

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

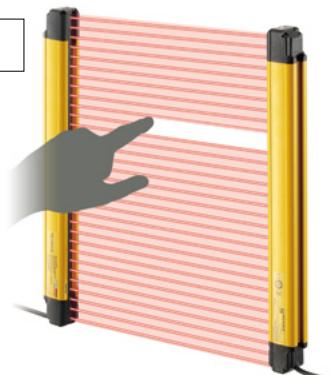
► Detection capability: ø14 mm

Beam axis pitch of ø10 mm.

Entry detection

To step 2 **GL-RF**

P.15



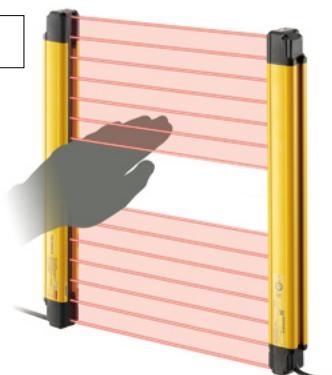
► Detection capability: ø25 mm

Beam axis pitch of ø20 mm.

Entry detection

To step 2 **GL-RH**

P.15



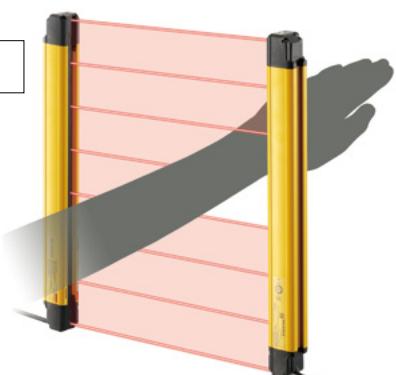
► Detection capability: ø45 mm

Beam axis pitch of ø40 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	
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	

0.2 to 10

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	
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	

0.2 to 15

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	
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	

0.2 to 15

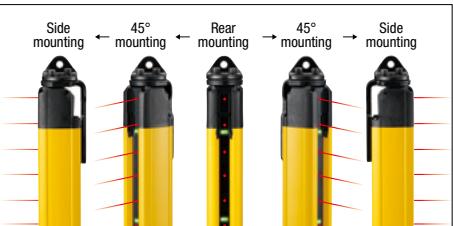
To step 3 P.16



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°.

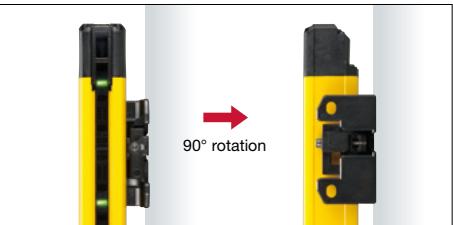
If the total length of the GL-R main unit is 1280 mm or longer, and if mounting it using the Adjustable angle mounting bracket, also use the antivibration bracket [GL-RB32 (2 pieces/pack)] to prevent vibration.



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.

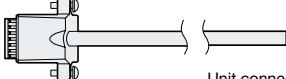
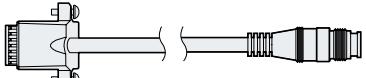
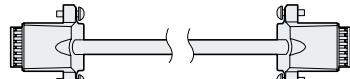
Select 1 cable for each transmitter/receiver according to the optimal wiring system.

If multiple functions are necessary, select an 11-core cable.

Wiring system		Optical synchronisation system		One-line system		Wire synchronisation system	
Wiring diagram		Transmitter	Receiver	Transmitter	Receiver	Transmitter	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	

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
		—	—		
 Series connection cable	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

The connector shape for both sides is the same.

**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		10	GL-RC10
	20		20	GL-RC20
	5		5	GL-RC5S
	10		10	GL-RC10S
	20		20	GL-RC20S
	5		5	GL-RC5M
	10		10	GL-RC10M
	20		20	GL-RC20M

For series connection

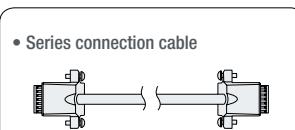
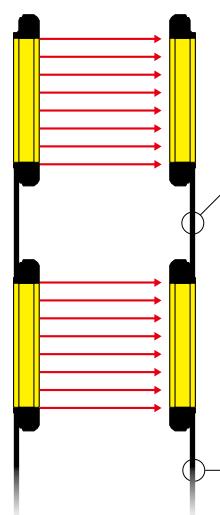
By connecting up to 3 GL-R units in a series, they can function as a single set of light curtains.

- Use a series connection cable to perform series connection.

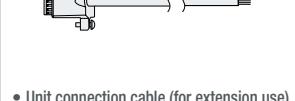
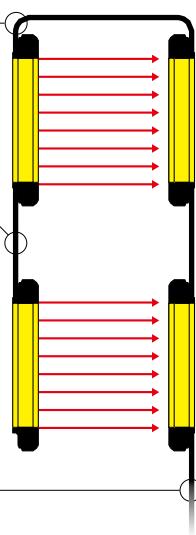
Shape	PNP/NPN	Length (m)	Model
Series connection cable	PNP/NPN shared	0.08	GL-RS008
		0.15	GL-RS015
		0.5	GL-RS05
		1	GL-RS1
		3	GL-RS3
		5	GL-RS5
		10	GL-RS10

Installation schematic

Optical synchronisation/ Wire synchronisation system



One-line system



*The unit connection cable cannot be installed on top of the GL-R.

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.

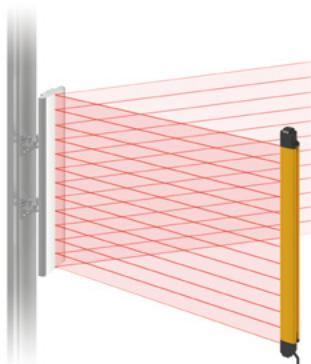


Model	Name
GL-R1UB	Interface unit
OP-51580	USB cable 2 m
OP-86941	USB cable 5 m

▶ 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

► GL-T11R Series dedicated relay 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.

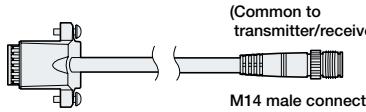
► SL-U2 dedicated power supply for KEYENCE light curtains (Class 2 output)

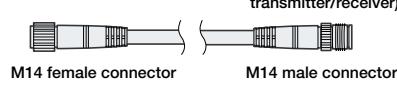
Dedicated power supply for KEYENCE light curtains

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
(Common to transmitter/receiver) 	0.3	GL-RPT03PM
	3	GL-RPT3PM
	5	GL-RPT5PM

Shape	Length (m)	Model
(Common to transmitter/receiver) 	10	GL-RCT10PM

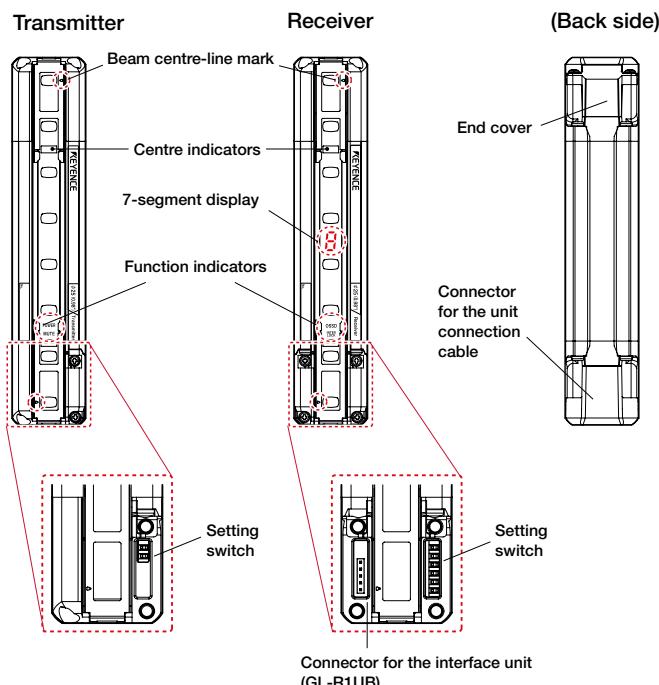
SPECIFICATIONS

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) Prevents mutual interference in up to two GL-R systems.	
Light interference prevention function		Optical synchronisation: prevented by Channel A and B with setting switch Wire synchronisation: prevented automatically	
Control output (OSSD output)	Output Max. load current Residual voltage (during ON) OFF state voltage Leakage current Max. capacitive load Load wiring resistance	2 transistor outputs, (PNP or NPN is determined by the cable type) 500 mA ² Max. 2.5 V (with a cable length of 5 m) Max. 2.0 V (with a cable length of 5 m) Max. 200 µA 2.2 µF Max. 2.5 Ω	
Supplemental output (Non-safety-related output)	AUX Error output Muting lamp output	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) Incandescent lamp (24 VDC, 1 to 5.5 W) LED lamp (load current: 10 to 230 mA) can be connected	
External input	EDM input Wait input Reset input Muting input 1, 2 Override 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 0 V or more Up to the power voltage Short circuit current: Approx. 2.5 mA (Approx. 10 mA with EDM input only)
Power supply	Voltage Current consumption	24 VDC ±20%, ripple (P-P) 10% or less, Class 2 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 Overvoltage category Ambient temperature Storage ambient temperature Relative humidity Storage relative humidity Ambient light Vibration Shock	IP65/IP67 (IEC60529) II -10 to +55°C (No freezing) -25 to +60°C (No freezing) 15 to 85% RH (No condensation) 15 to 95% RH Incandescent lamp: 3,000 lx or less, Sunlight: 20,000 lx or less 10 to 55 Hz, 0.7 mm compound amplitude, 20 sweeps each in the X, Y and Z directions 100m/s ² (approx. 10 G), 16 ms pulse in X, Y and Z directions, 1,000 times each axis	
Material	Main unit case Upper case/lower case Front cover	Aluminum Nylon (GF 30%) Polycarbonate, SUS304	See p.23
Weight			
Approved standards	EMC EMI Safety	IEC61496-1, EN61496-1, UL61496-1 EN55011 ClassA, FCC Part15B ClassA, ICES-003 ClassA IEC61496-1, EN61496-1, UL61496-1 (Type 4 ESPE) IEC61496-2, EN61496-2, UL61496-2 (Type 4 AOPD) IEC61508, EN61508 (SIL3), IEC62061, EN62061 (SIL CL3) EN ISO13849-1:2008 (Category 4, PLd) 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	<input checked="" type="checkbox"/> Channel 0 <input type="checkbox"/> (Not applied) (default)
1		<input checked="" type="checkbox"/> Channel A <input type="checkbox"/> Channel B

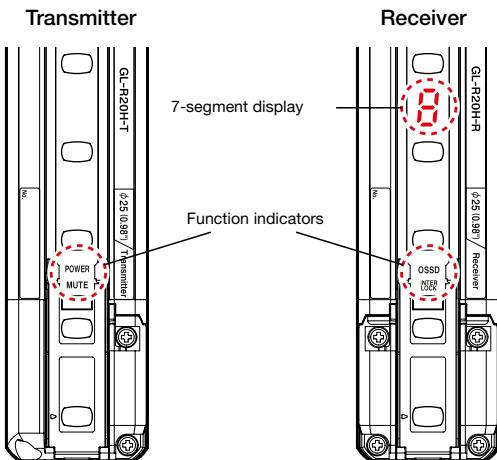
Use Channel for light interference prevention when optical synchronisation system is applied. For details, refer to the "GL-R User's Manual".

Receiver

Number	Details	Settings
6	Centre indicator	<input checked="" type="checkbox"/> ON (Green) when all beam axes are clear (Default) <input type="checkbox"/> OFF when all beam axes are clear
5		<input checked="" type="checkbox"/> Reduced resolution is not applied (Default).
4	Reduced resolution function (safety function)	<input checked="" type="checkbox"/> Reduced resolution (one optical beam) is applied.
3		<input checked="" type="checkbox"/> Reduced resolution (two optical beams) is applied.
2	Channel	<input checked="" type="checkbox"/> Channel 0 (Not applied) (default)
1		<input checked="" type="checkbox"/> Channel A <input type="checkbox"/> Channel B

Use Channel for light interference prevention when optical synchronisation system is applied. For details, refer to the "GL-R User's Manual".

INDICATORS



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
II	—	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
	—
	Muting input 2 ON
	—
	Muting input 1 and 2 ON ¹
	—
Muted Condition	8 8 8 8 8 8 8
Override input ON ²	□
Override condition.	8 8 8 8 □ 8 8
Other than those above.	Turn OFF

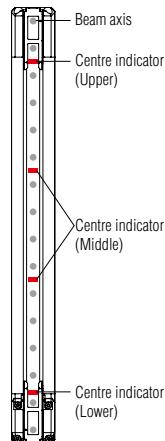
¹ When not in the muted condition because conditions for initiation of muting are not met.

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)

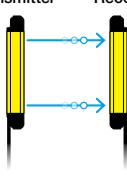
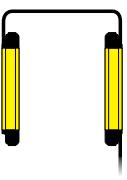
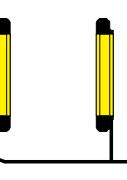
indicates whether interruption is present in the bottom beam axis or not. (clear or blocked)

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

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

FUNCTIONS AND FEATURES

WIRING SYSTEM

Wiring system	Optical synchronisation system	One-line system	Wire synchronisation system
Wiring diagram			
Advantage	<ul style="list-style-type: none"> Wiring is not needed between the transmitter and receiver. The Transmitter and the receiver can operate on different power supplies. 	<ul style="list-style-type: none"> Simplified wiring. The unit connection cable is not needed for the transmitter. 	<ul style="list-style-type: none"> All functions of the GL-R are available.
Limitation	<ul style="list-style-type: none"> The input and output functions on the transmitter are not available. All indicators other than "Power" are not available on the transmitter. 	<ul style="list-style-type: none"> The input and output functions on the transmitter are not available. There is a maximum limit for the total length of cables. 	<ul style="list-style-type: none"> 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	Receiver cable	5-core	11-core	5-core	11-core	7-core	11-core
	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.

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

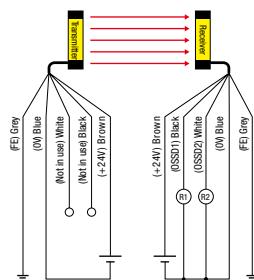
- L1** Muting lamp (Incandescent lamp or LED lamp)
P1, P2 Muting device (Self-contained photoelectric sensors, etc.)
M 3-phase motor
PLC For NON SAFETY-RELATED system control use^{*1}

^{*1} These are NON SAFETY-RELATED components.

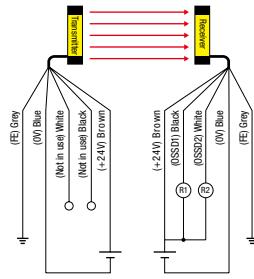
OPTICAL SYNCHRONISATION SYSTEM

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

(1) PNP output cable



(2) NPN output cable

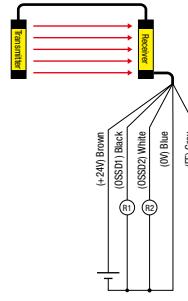


ONE-LINE SYSTEM

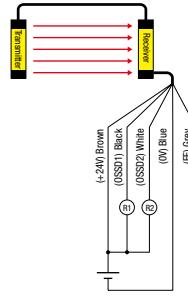
- The series connection cable must be used to connect the transmitter and receiver.
- The unit connection cable is not needed for the transmitter.
- The wiring when using an 11-core cable with the receiver is the same as the optical synchronisation system wiring.

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

(1) PNP output cable

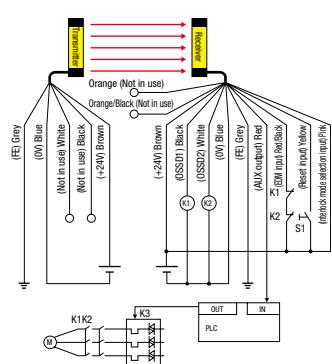


(2) NPN output cable

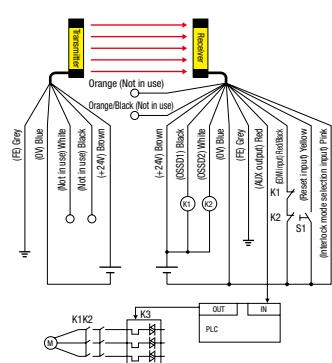


Transmitter : 5-core cable, Receiver: 11-core cable Uses EDM input and the interlock function

(1) PNP output cable



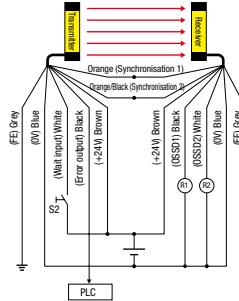
(2) NPN output cable



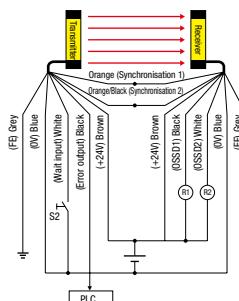
WIRE SYNCHRONISATION SYSTEM

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

(1) PNP output cable



(2) NPN output cable



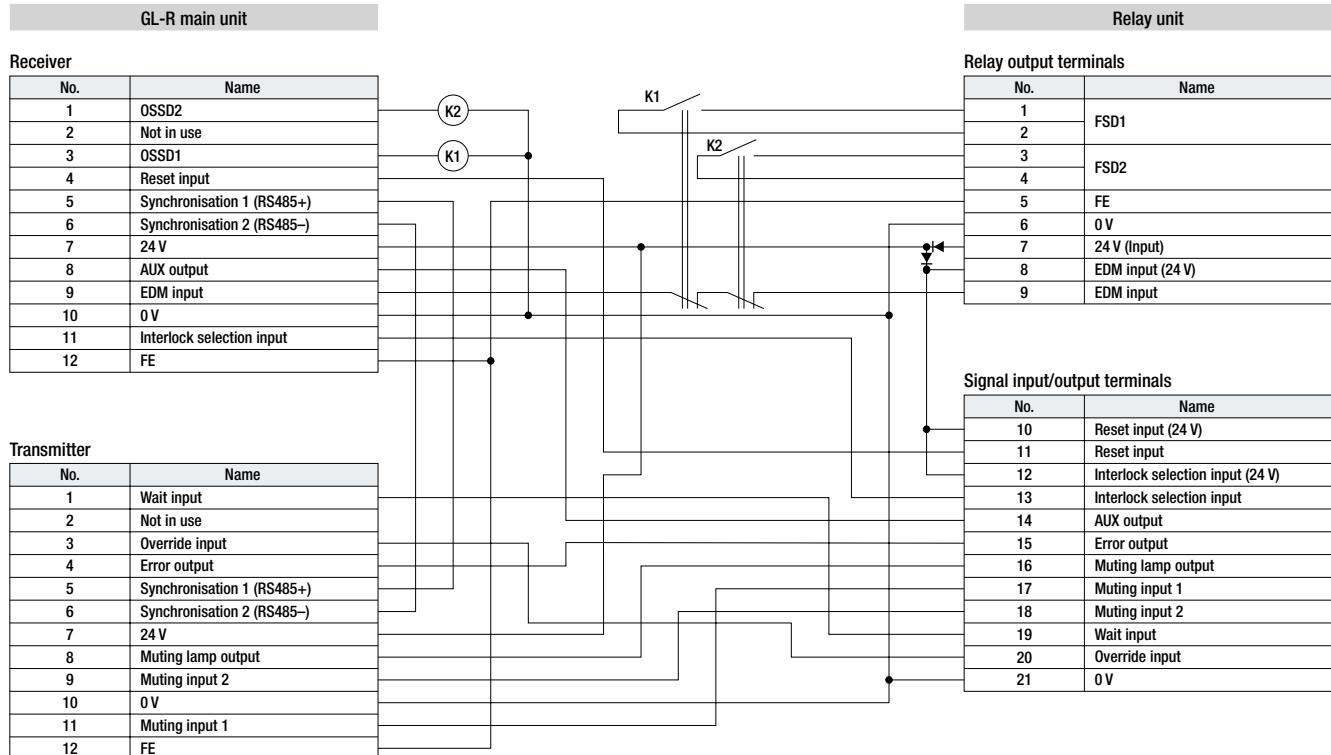
SPECIFICATIONS [GL-T11R]

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 (COS ϕ =0.3) (Inductive load)	
		24 VDC 1 A (COS ϕ =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, cos ϕ = 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	
	Error output	50 mA max., residual voltage 2.5 V max. (When the connection between the GL-R and GL-T11R is 5 m)	
	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	
	Wait input	Short circuit current: Approx. 2.5 mA (Approx. 10 mA with EDM input only)	
	Reset input		
	Muting input 1, 2		
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	EN61496-1, UL61496-1, IEC61496-1	
		EN55011 ClassA, FCC Part15B ClassA, ICES-003 ClassA	
	Safety	EN61496-1, UL61496-1, IEC61496-1 (Type4 ESPE)	
		EN ISO13849-1: 2008 (Category4, PLe) UL508, EN50178	

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

WIRING [GL-T11R]

Internal circuit diagram



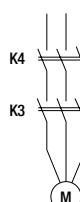
Wiring example

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
	6
0 V *1	
24 V (Input) *1	7
EDM input (24 V) *2	8
EDM input *2	9



- 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.

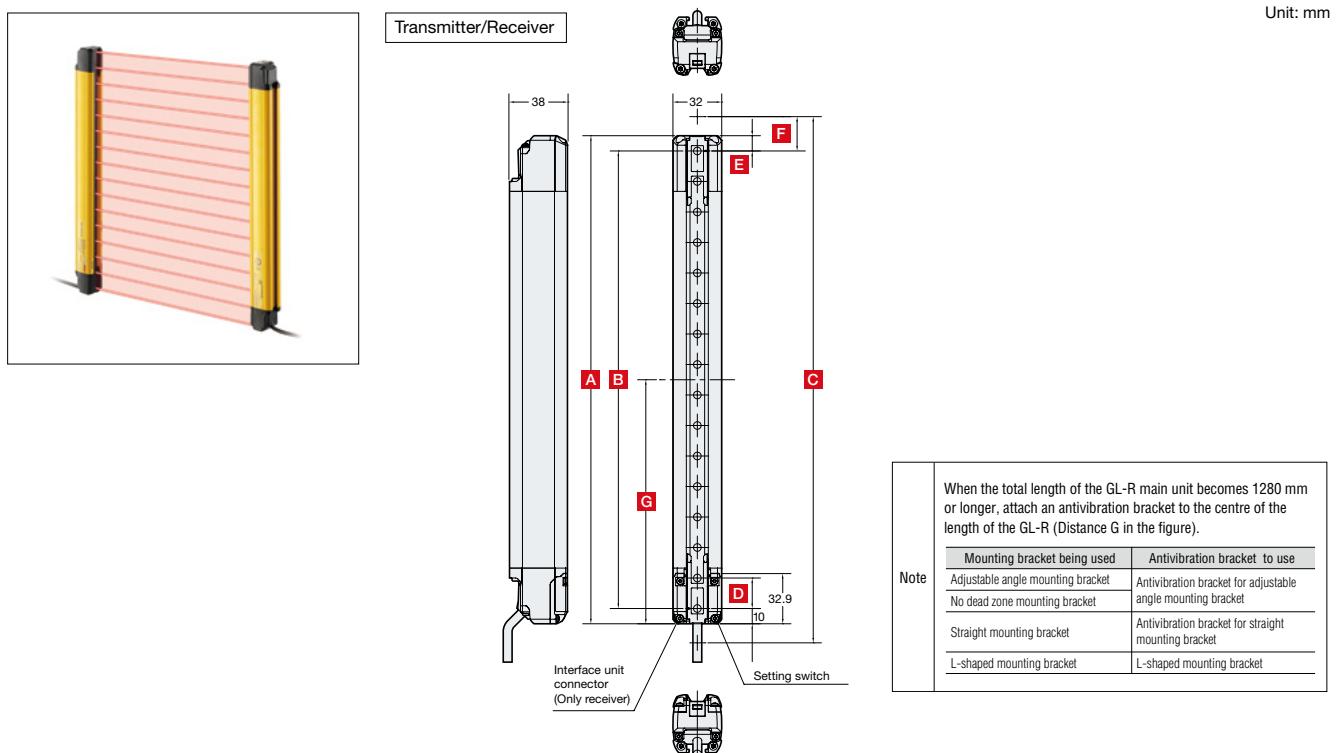
Signal input/output terminals

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

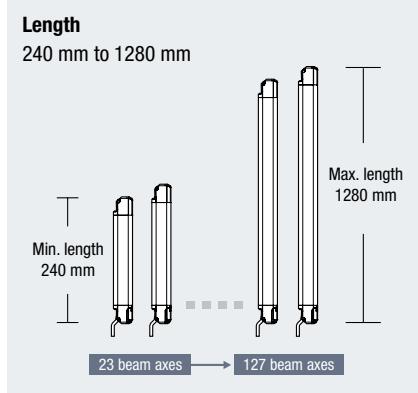
- Points**
- Depending on the settings of the "Safety Device Configurator" PC setting software, each function is switched to a different function. When the settings are changed, check the wiring referring to the internal circuit diagram in the previous section.
 - The total electric current supplied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

DIMENSIONS

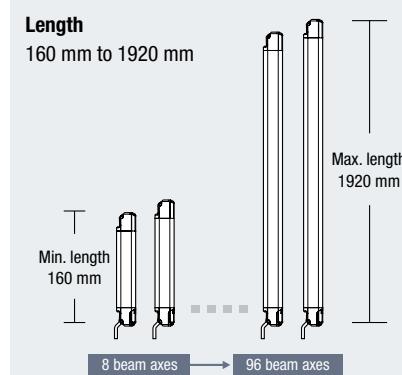
GL-R (GL-RF/RH/RL) MAIN UNIT



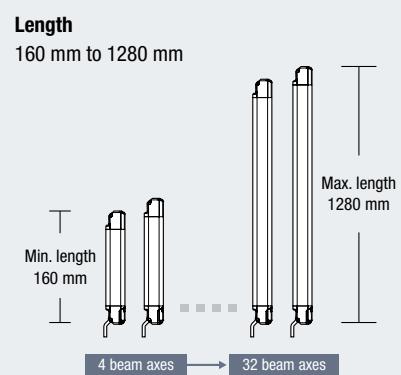
GL-RF UNIT VARIATION



GL-RH UNIT VARIATION



GL-RL UNIT VARIATION



Understanding the model name

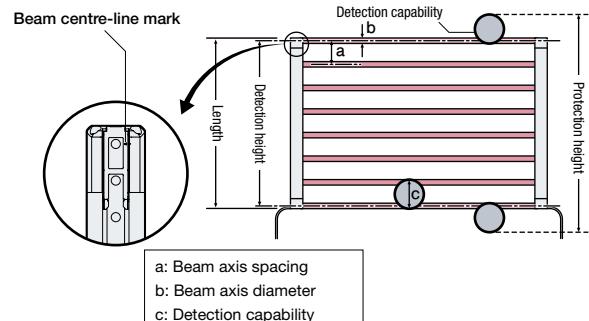
GL-R 12 H

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



DIMENSIONS

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				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				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				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

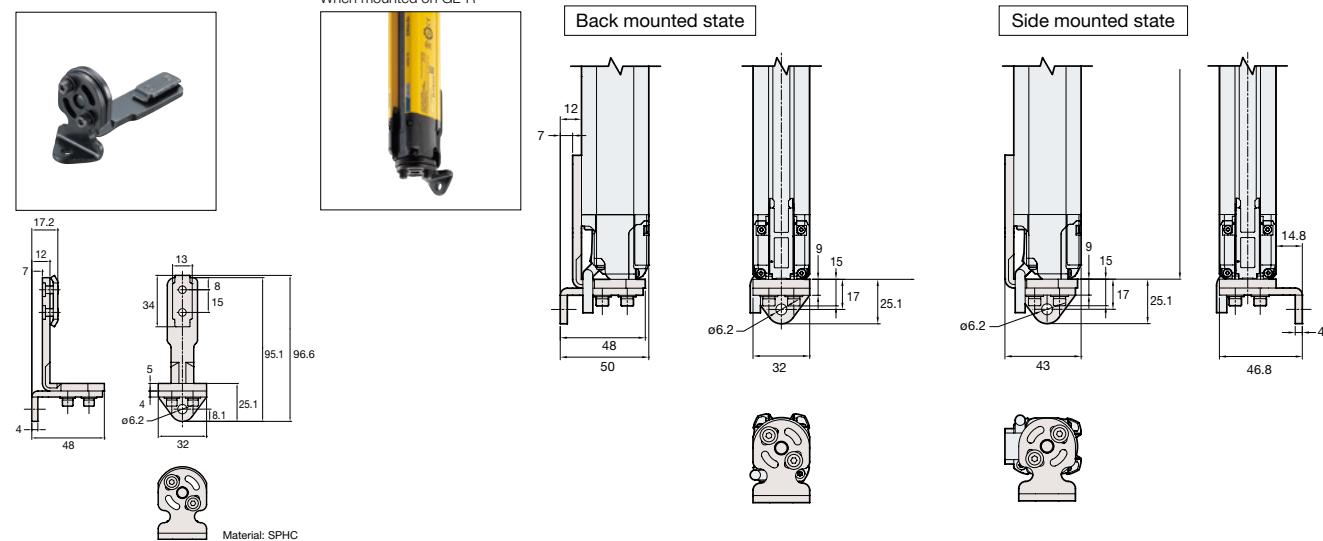
DIMENSIONS

Unit: mm

Mounting bracket

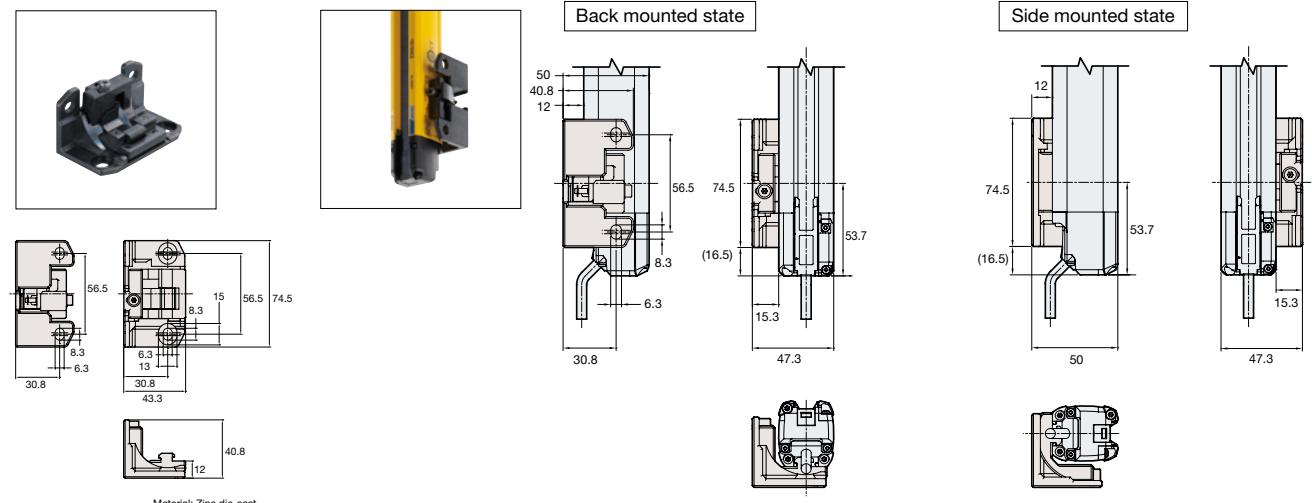
Adjustable angle mounting bracket

GL-RB01



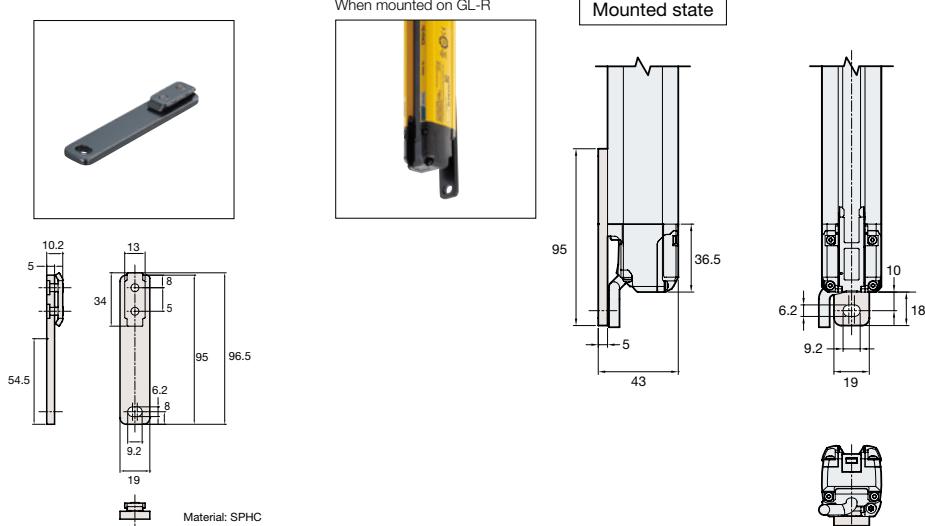
No dead zone mounting bracket

GL-RB21



Straight mounting bracket

GL-RB11



DIMENSIONS

Unit: mm

Antivibration bracket

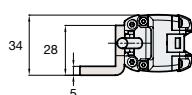
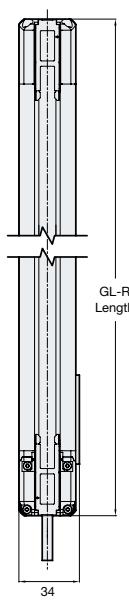
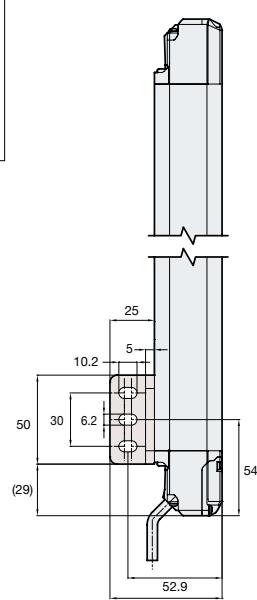
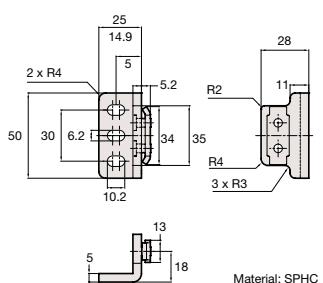
L-shaped mounting bracket

GL-RB12



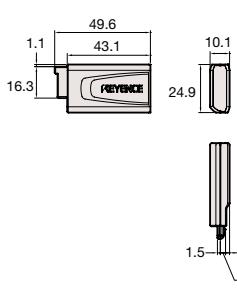
When mounted on GL-R

Mounted state

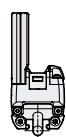
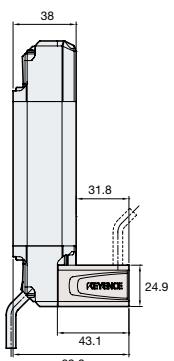


Interface unit

GL-R1UB



Mounted state



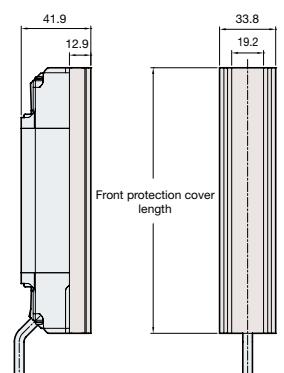
Front protection cover

GL-RA



See p.19 for the details

Mounted state



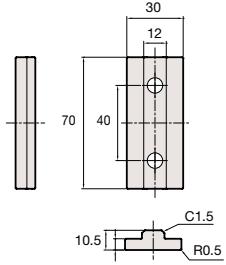
DIMENSIONS

Unit: mm

Antivibration bracket

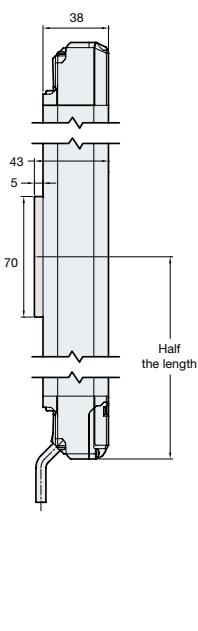
Antivibration bracket for the straight mounting bracket

GL-RB31



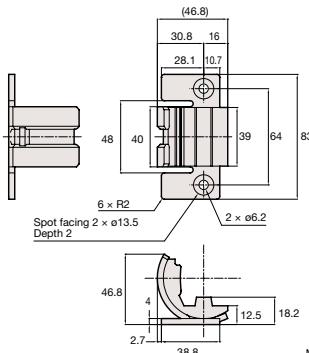
Material: EPDM *5 mm: when mounting

Mounted state



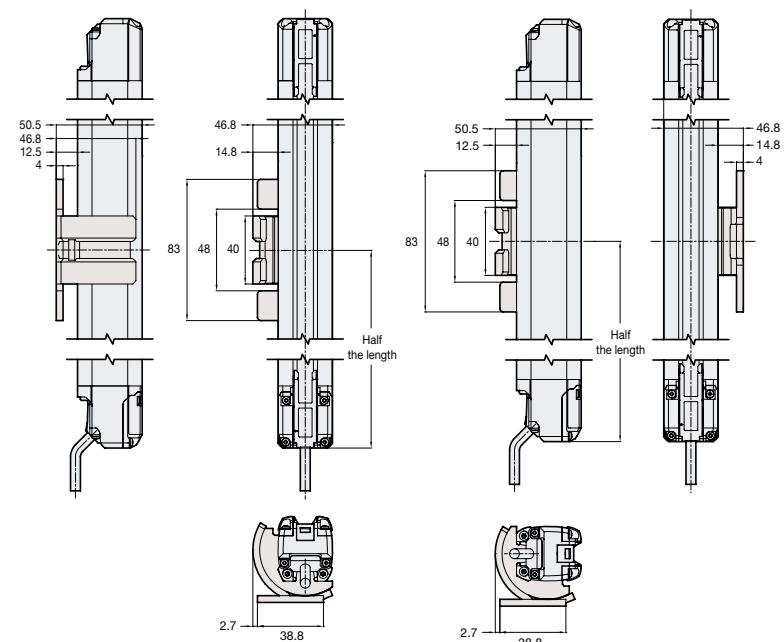
Antivibration bracket for the adjustable angle mounting bracket

GL-RB32



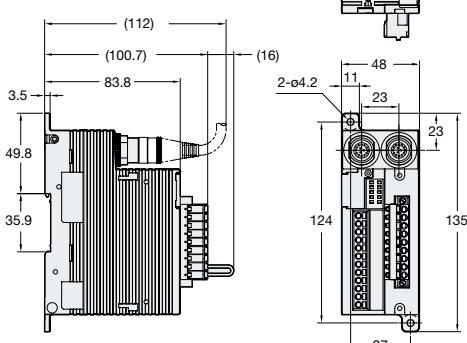
Material: SPHC, EPDM

Mounted state



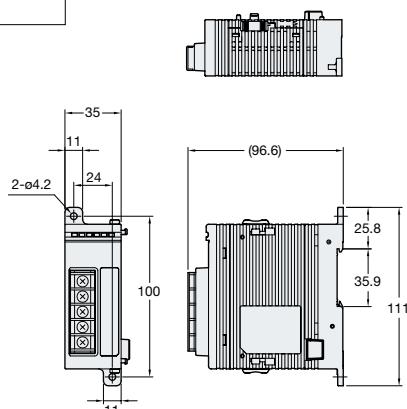
GL-T11R Series dedicated relay for the GL-R

GL-T11R



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

SL-U2

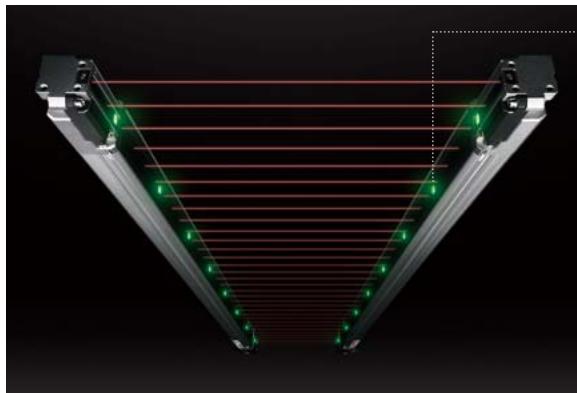


Related product

Highly-Visible Safety Light Curtain SL-V Series

Type4

SIL3



World's first

Highly-Visible Indicator

"Highly-Visible Indicator" will make the presence of a light curtain seen easily, which will prevent accidental light shielding. In addition, lighting and blinking of the indicator will help understand the state of the light curtain easily.

Various lineup

Super Heavy Duty



Please visit: www.keyence.com

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SAFETY INFORMATION



Please read the instruction manual carefully in order to safely operate any KEYENCE product.

