KEYENCE

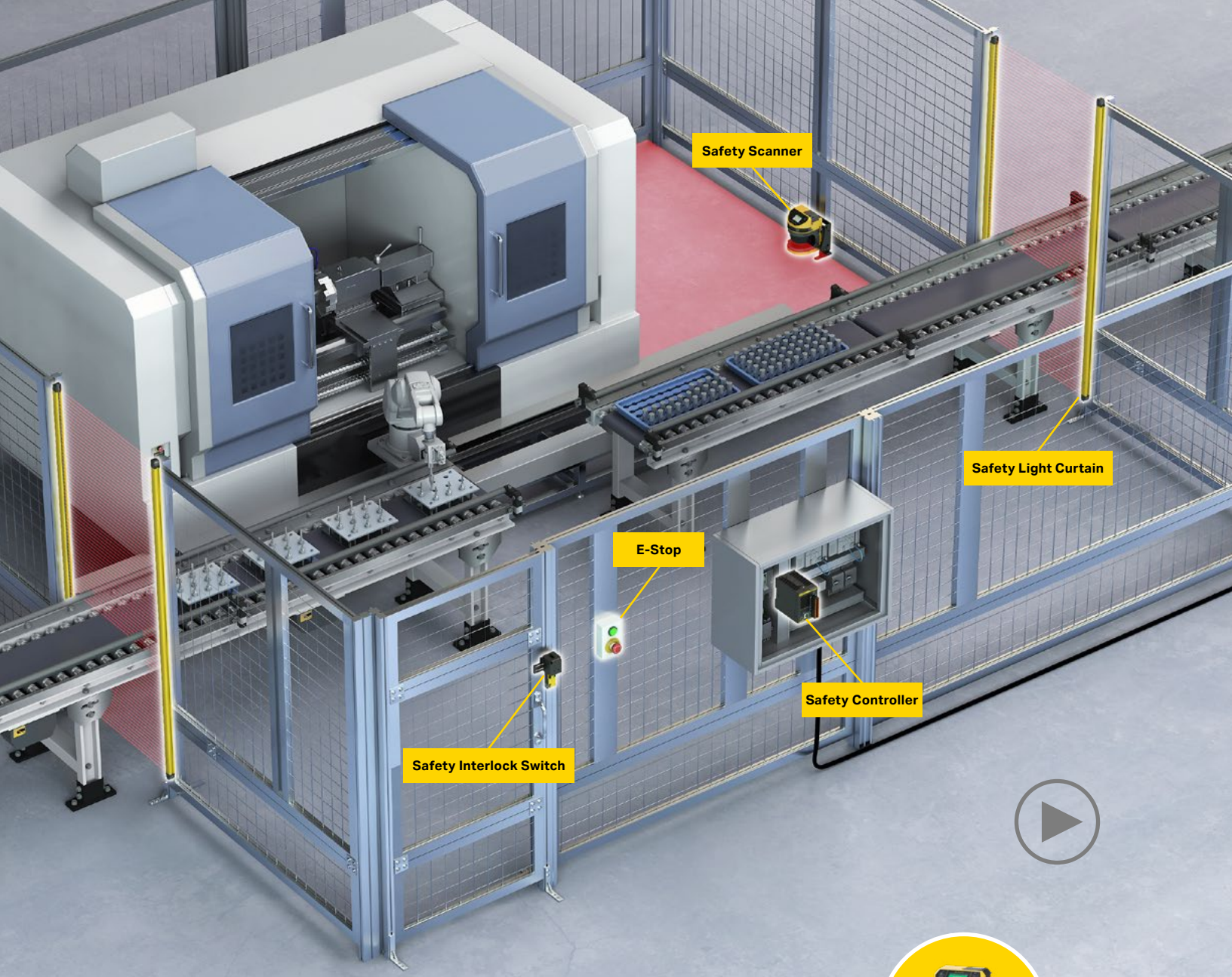
Safety Controller

GC Series

Simplified Safety Controls

Achieve the Top Safety Standards

PL e	Category 4	SIL3



All of Your Safety Controls in One Simple System

The GC Series provides a way to consolidate all of your safety devices into one compact and easy to use system. Whether utilizing only a few simple safety devices or dealing with complex safety setup needs, the GC Series offers an ideal solution for everyone.

Safety Controls Made Simple
GC Series

Easy & Flexible Integration

-Universal Connectivity
-Versatile Lineup
-Innovative GC-Link

→P.4

Intuitive Software

-Set Up in Minutes
-Drag & Drop Interface
-Simulate Setups with Ease

→P.8

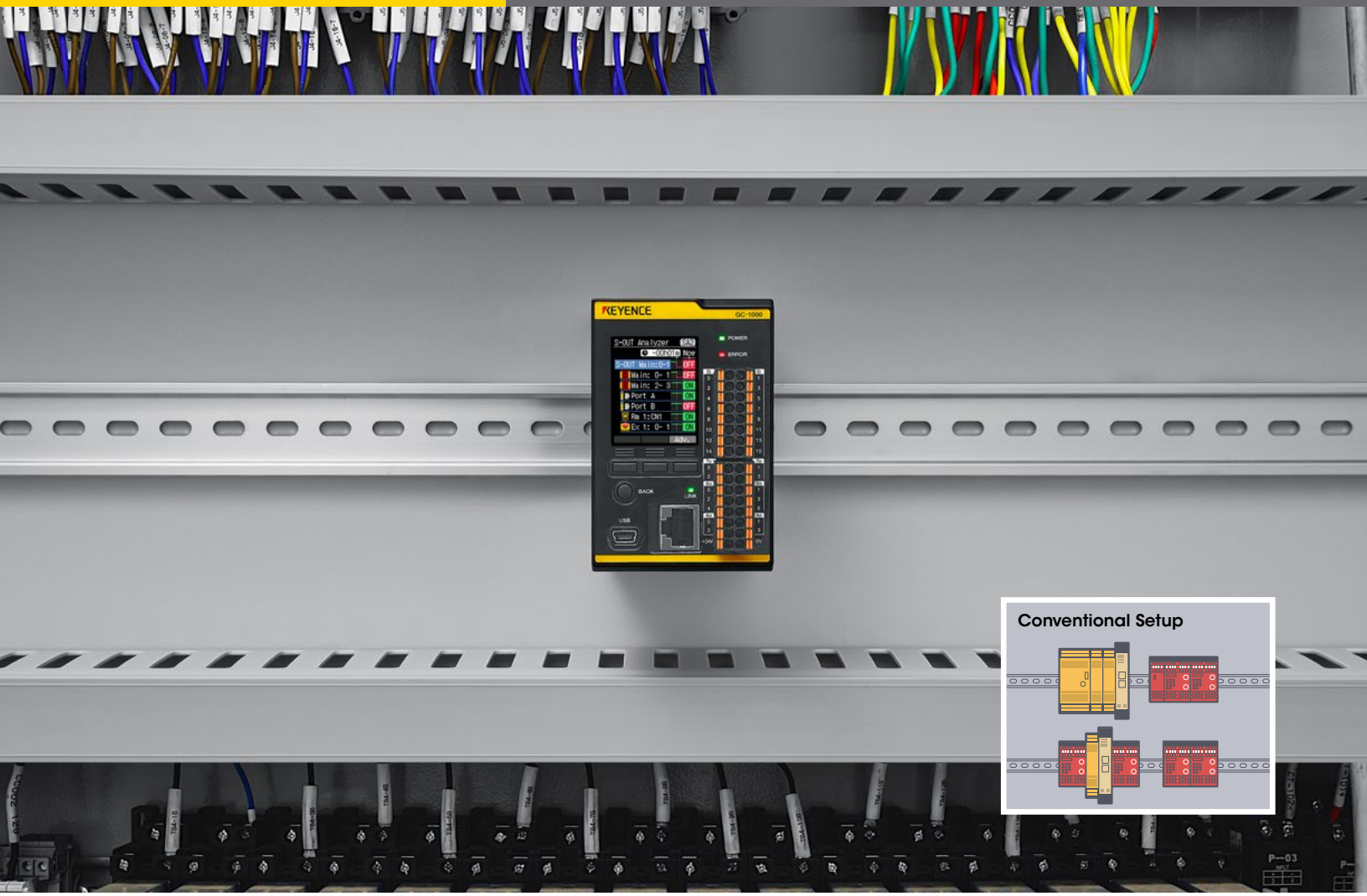
Unparalleled Monitoring

-Built-in Display
-Detailed Event History
-Remote Monitoring

→P.10

Easy & Flexible Integration

Connect to any and all safety devices with ease



Universal Connectivity

The GC Series is designed to integrate all of your safety devices into one easy to use system. From primary safety devices (light curtains, e-stops, etc.) to auxiliary devices (reset buttons, muting sensors, etc.), the GC Series provides flexible connection options with simple push terminals and even M12 QD ports.

Versatile Lineup

Flexible Controller Options

The GC Series offers two unique controllers, one for easy networking & expansion and another for simplified setups with a built-in safety relay.

GC-1000 with networking and expansion capabilities

GC-1000R with built-in safety relay.

Expansion Units to Fit Any Need

Expand up to 212 safety inputs and 46 safety outputs using a variety of expansion options, including safety relay output units and bus extension units for quicker and easier wiring.

Safety I/O Expansion Unit
GC-S84

Safety Input Expansion Unit
GC-S16

Bus Extension Unit
GC-B30

Safety Relay Output Unit
GC-S1R

AUX Output Expansion Unit
GC-A16

Durable Remote I/O Modules

Simplify wiring even further through the use of remote I/O modules, which offer standard 5-pin & 8-pin M12 QD ports and water/dust resistant IP65/67 enclosure ratings.

Remote I/O Module
GC-R45/48

Easy & Flexible Integration

Endless benefits when integrating with KEYENCE safety devices

GL-V/GL-R SERIES
Safety Light Curtains

SZ-V SERIES
Safety Laser Scanners

GS-M SERIES
Safety Interlock Switches

GS SERIES
Safety Interlock Switches

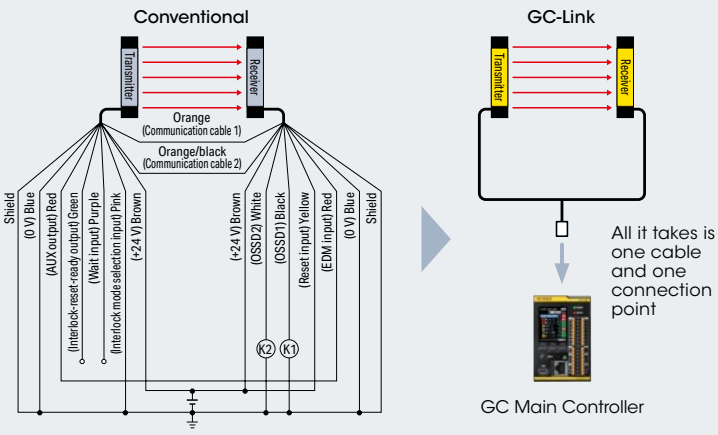
Locking Type

Non-Contact Type

KEYENCE Safety Lineup
One-Touch Connection with GC-Link

Eliminate Wiring Mistakes

Safety wiring has never been easier or more mistake-proof than with the innovative GC-Link feature. When utilizing the GC Series with one of many KEYENCE safety products, wiring can be reduced to a single cable that runs directly from the safety device to the safety controller and connects in a snap. NO WIRING NECESSARY!



Compatible KEYENCE Safety Devices

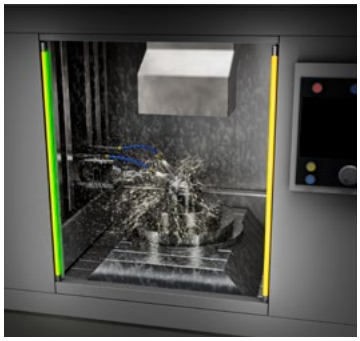
Safety Light Curtains

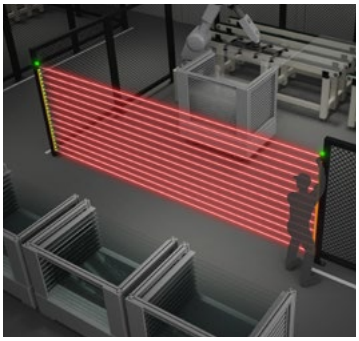
GL-V Series Advantage

- Full Length Indicator
- Easy Alignment
- Slim and Durable Housing

GC-Link Advantage

- Use GC-Link to see the strength of each individual beam axis without a computer for easy alignment/monitoring





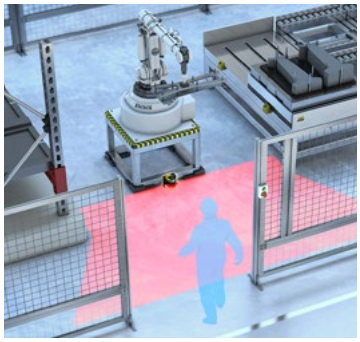
Safety Laser Scanners

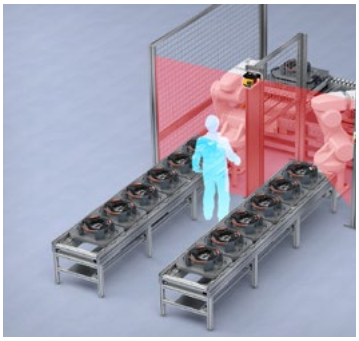
SZ-V Series Advantages

- Fully Customizable Setup
- Separate Display
- Built-in Camera

GC-Link Advantage

- Consolidate all wiring and bank switching into one device, with clear visibility of state & bank information





Safety Interlock Switches

GS/GS-M Series Advantages

- Robust & Compact Design
- Flexible Alignment
- Highly Visible Indicators

GC-Link Advantage

- Cascade multiple units and easily visualize door open, closed, and locked statuses on the GC display

Intuitive Software

Set up your entire safety controls system in mere minutes

GC Configurator

Programming has never been so simple or straightforward

No special skills or knowledge required

Easy

Fast

Free

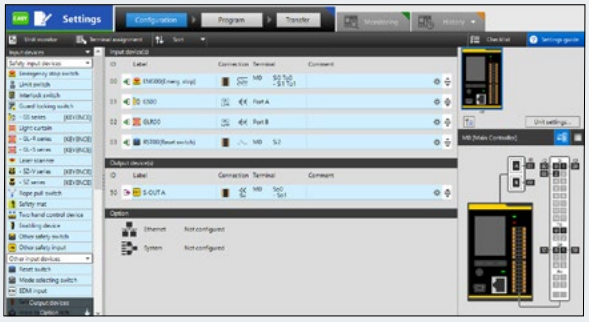
Unbeatable Ease of Use

Easy Mode

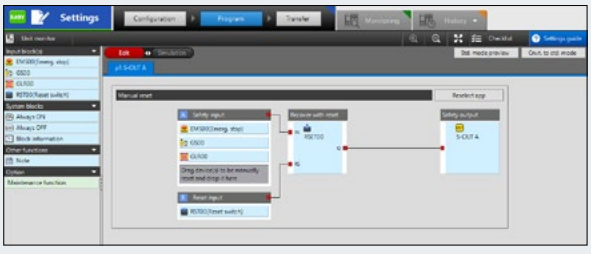
All it takes is 4 simple steps to set up complex safety systems

1. Select applicable devices
2. Automatically assign terminals
3. Select your application
4. Drag and drop devices to corresponding locations

DONE!



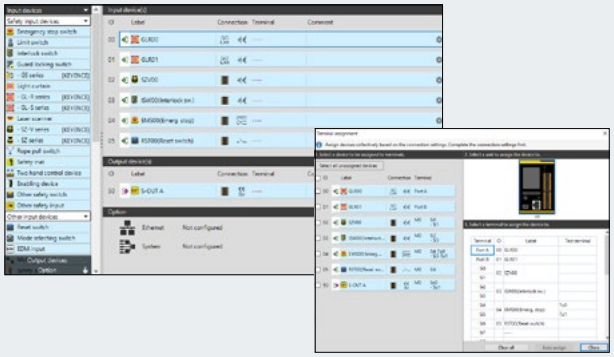
Select an application then input your devices



Easily Customize Any Setup

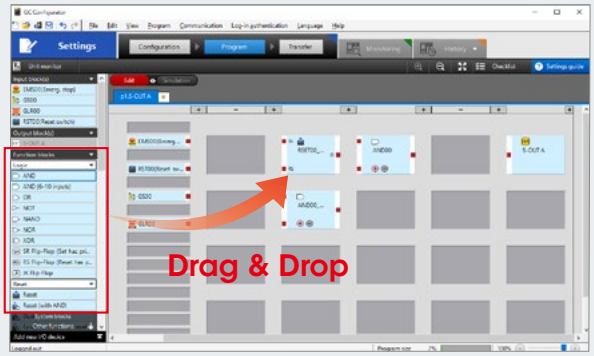
Countless Devices & Automatic Terminal Assignment

Choose all the input & output devices you need for your unique safety setup and then let the GC automatically assign all the terminals to make wiring a breeze.



Drag & Drop Interface

Once devices and terminals are selected, simply create your program using our visual and easy to use programming screen, allowing full customization and easy drag & drop setup.



Confirm Your Program Works in Seconds

Simulation Mode

Quickly and easily check your program before wiring any devices using simulation mode. This helps to ensure correct operation and decrease installation time.

Simply click on devices to simulate turning them ON or OFF and test your safety logic.

Unparalleled Monitoring

Monitoring and troubleshooting have never been easier

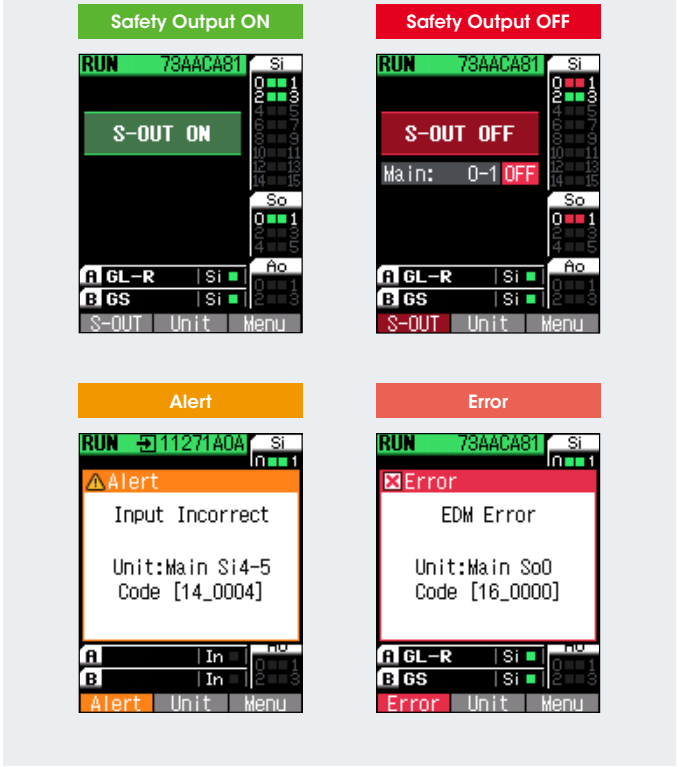
All the Information You Need in One Display

GS Interlock Statuses | Event History Display | GL-R/V Beam Monitoring

Easy Monitoring Without a Computer

Built-in Display

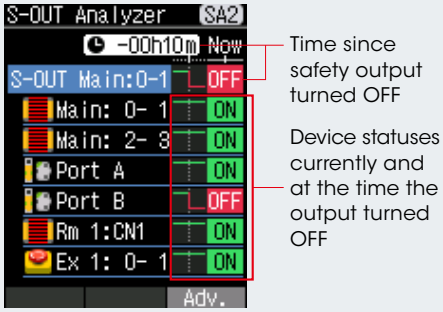
Monitoring the safety status of your setup has never been easier. The full color, detailed display provides status updates, information, and clear error/alert details. Utilizing GC-Link increases the benefits of this display by showing individual beam strengths for the GL-R/GL-V Series and door statuses for the GS Series.



Event/Detection History

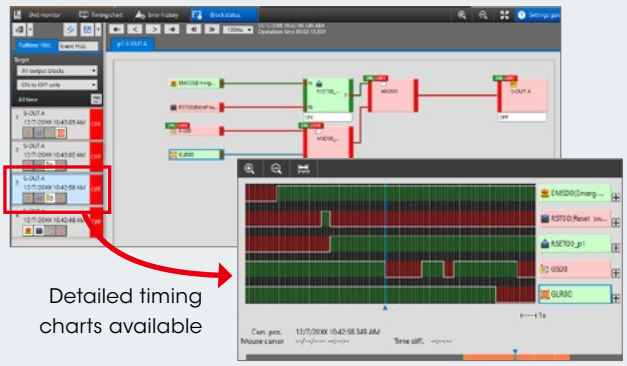
Event History on the Display

Wonder why your machine stopped? Simply look at the event history on the display to quickly realize which device stopped your machine.



Event History with a Computer

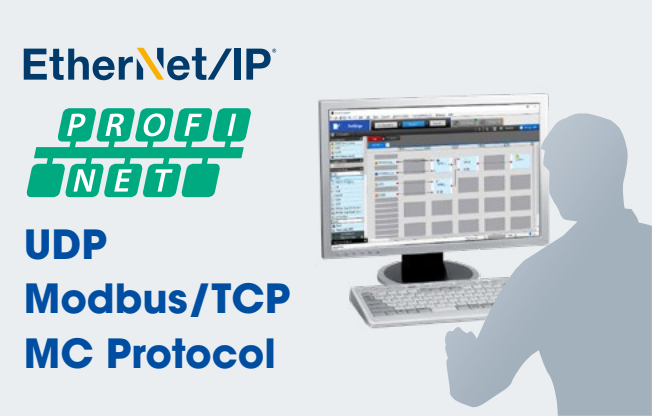
For more detailed troubleshooting, grab your computer and find the event information along with detailed timing charts to better understand the situation.



Monitor/Program From Anywhere

Network Compatible

Along with communicating with PLCs, the networking capabilities of the GC Series make it possible to remotely monitor/program the unit from anywhere to avoid costly onsite maintenance/troubleshooting.



Additional Features

High Speed Response Times

Safety distances can remain minimized, with the high speed processing power of the GC Series. The response time remains incredibly small even when expanding the setup.

	Main controller only	With expansion units
		
Inputs (max.)*	20	212
Response time	5.5 ms	9.6 ms

* Number of inputs includes the GC-Link ports.

Compact Size

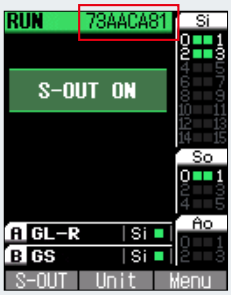
Minimize the amount of cabinet space utilized by your safety controls system with the compact size of the GC Series Main and Expansion units.

Replaceable System Memory

When damage occurs to the main controller, downtime can be minimized by utilizing the removable system memory, which stores the program and other essential information.

CRC Code

Ensure that no unauthorized changes are made to your setup by monitoring the unique CRC code that is provided directly on the display of the main controller.



Selecting a Safety Controller

Use the following steps to select the optimal GC Series components for your setup

STEP 1 Main controller [Required]

Standard type
GC-1000

Relay output type
GC-1000R

STEP 2 Expansion units [Optional]

Safety input / output unit
GC-S84

Safety input unit
GC-S16

Safety relay output unit
GC-S1R

Auxiliary output unit
GC-A16

Bus extension unit
GC-B30

STEP 3 Remote I/O modules [Optional]

Standard (5-pin)
GC-R45

Interlock switches type (8-pin)
GC-R48

STEP 4 GC-Link cables* [Optional]

Choose cables based on connected devices

Main controller connection cable

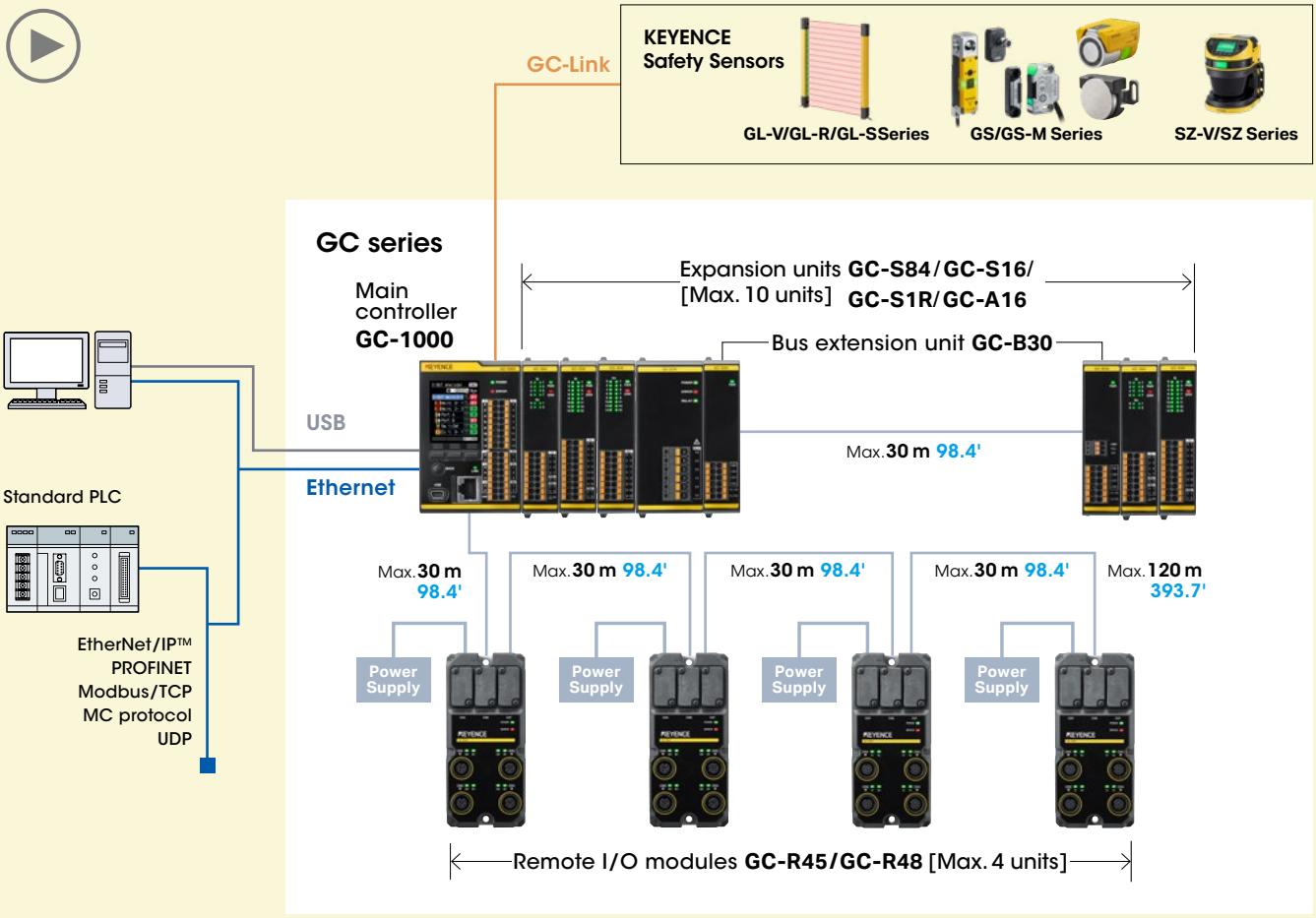
Sensor main unit connection cable

Extension cable

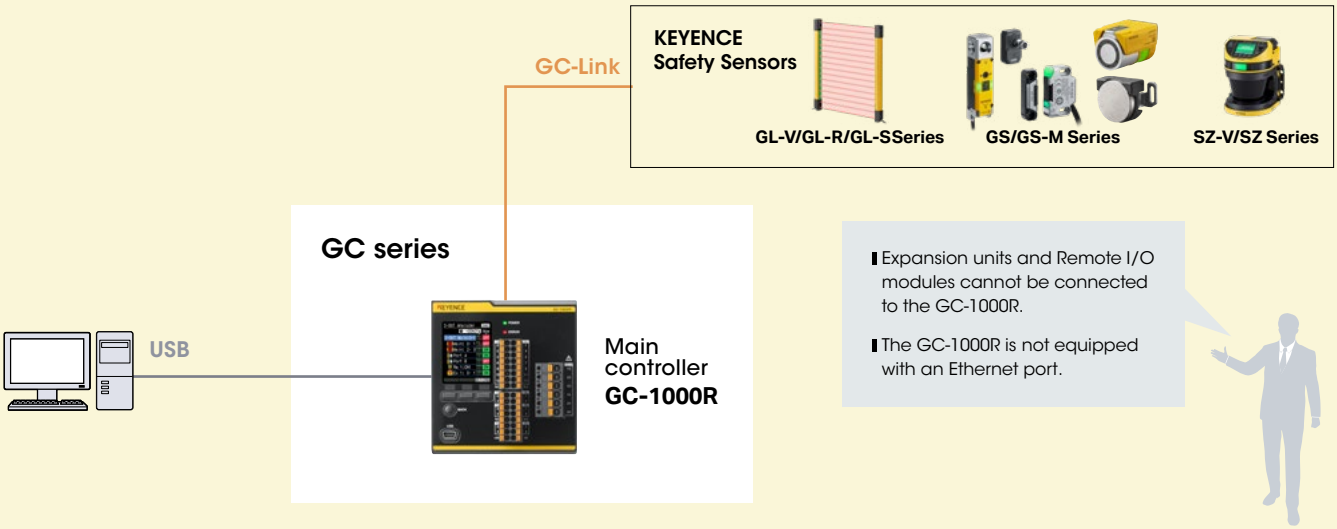
* Enables connection to KEYENCE safety sensors with reduced wiring, and also provide additional functionality.

System configuration

Standard type: GC-1000



Relay output type: GC-1000R



- Expansion units and Remote I/O modules cannot be connected to the GC-1000R.
- The GC-1000R is not equipped with an Ethernet port.

STEP 1 Main controller [Required]

		Standard type (Expansion possible)	Safety relay output type (Expansion not possible)
		GC-1000	GC-1000R
			
Number of inputs and outputs	GC-Link ports	2 ports	2 ports
	Safety inputs	16	14
	Safety outputs (PNP)	6	4
	Safety relay output	—	1 (3a)
	AUX outputs	4	4
	Test outputs	4	4
Interface	USB	✓	✓
	Ethernet	✓	—
Expansion	Expansion units	Max. 10 units *	—
	Remote I/O modules	Max. 4 units	—

*Bus extension unit "GC-B30" is not counted as one of the connected units. Only one set of "GC-B30" can be used per setup.

The number of safety inputs necessary is based on the type and number of input devices.

· For example, a device such as a safety light curtain (PNP output × 2) or an E-STOP (NC contact × 2) uses two safety inputs per device.
· On the other hand a reset switch (NO contact × 1) or an EDM input (NC contact x 1) uses only one safety input.
· The GC-Link ports are used to connect KEYENCE safety sensors with reduced wiring.

Please review the configuration example on p.24.

STEP 2 Expansion units [Optional]

		Add more safety inputs & outputs	Add more safety inputs only	Add a safety relay output	Add more AUX outputs	When cabinet space is limited
		Safety input / output unit GC-S84	Safety input unit GC-S16	Safety relay output unit GC-S1R	Auxiliary output unit GC-A16	Bus extension unit GC-B30
						
Number of inputs and outputs	Safety inputs	8	16	—	—	—
	Safety outputs (PNP)	4	—	—	—	—
	Safety relay output	—	—	1 (3a)	—	—
	AUX outputs	—	—	—	16	—
	Test outputs	2	4	—	—	—

STEP 3

Remote I/O modules [Optional]

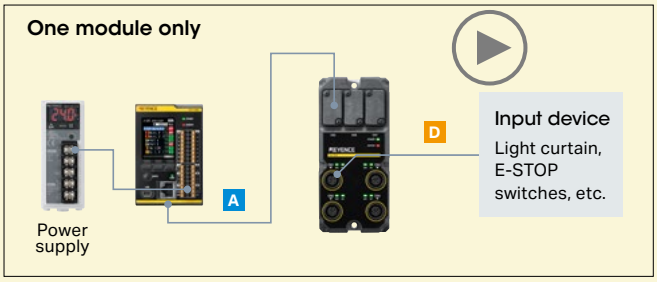
		Connect light curtains, E-STOP switches, and more	Connect locking type safety interlock switches, and more
		Standard (5-pin) **GC-R45**	Interlock switches type (8-pin) **GC-R48**
			
Number of inputs and outputs	M12 ports	5-pin × 4	8-pin × 4
	Safety inputs	8	8
	Lock control outputs (PNP)	—	4
	Safety relay output	—	—
	AUX outputs	4	—
	Test outputs	8	8

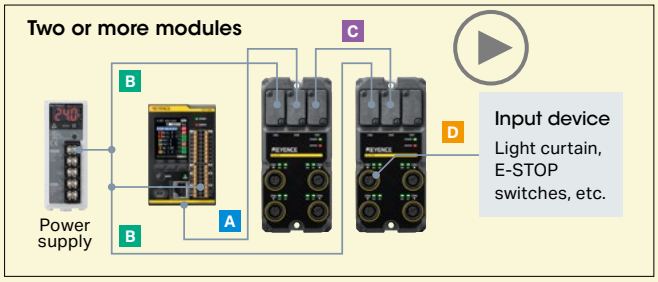
Connect one input device per M12 port.

It is not possible to connect two or more devices to one M12 port.

* Depending on the configuration assigned to each port, there are restrictions on the number of inputs and outputs used simultaneously. For the details, please see "Terminal arrangements" on p.22.

Remote I/O module cable selection





A Remote I/O module power cable

GC-RP10	10 m 32.8' *	Approx.700 g 24.69 oz
GC-RP30	30 m 98.4' *	Approx.1950 g 68.78 oz

B Remote I/O module external power cable

GC-RE10	10 m 32.8' *	Approx.550 g 19.40 oz

C Remote I/O module extension cable

GC-RS10	10 m 32.8'	Approx.700 g 24.69 oz
GC-RS30	30 m 98.4'	Approx.1950 g 68.78 oz

* A: Power cable and B: External power cable are both free-cut. It is possible to cut the cable to a preferred length.

Use the following cables when connecting KEYENCE safety sensors to the remote I/O module.

D Sensor cables

		Sensor connection cables			Extension cables			
GC-R45	GL-V series*	Direct connection possible			**GL-VCC05**	0.5 m 1.6'	Approx.70 g	2.46 oz
					GL-VCC1	1 m 3.3'	Approx.100 g	3.53 oz
					GL-VCC3	3 m 9.8'	Approx.200 g	7.06 oz
					GL-VCC5	5 m 16.4'	Approx.300 g	10.59 oz
					GL-VCC10	10 m 32.8'	Approx.560 g	19.76 oz
	GL-R series	**OP-88300**	0.3 m 1.0'	Approx.35 g 1.23 oz	**GS-P5CC1**	1 m 3.3'	Approx.95 g	3.35 oz
					GS-P5CC3	3 m 9.8'	Approx.210 g	7.40 oz
					GS-P5CC5	5 m 16.4'	Approx.310 g	10.93 oz
					GS-P5CC10	10 m 32.8'	Approx.580 g	20.45 oz
	GL-S series	**GL-SPC03P**	0.3 m 1.0'	Approx.30 g 1.05 oz	**OP-85503**	2 m 6.6'	Approx.70 g	2.46 oz
					OP-85504	5 m 16.4'	Approx.130 g	4.58 oz
	GS-10PC	Direct connection possible			**GS-P5CC1**	1 m 3.3'	Approx.95 g	3.35 oz
					GS-P5CC3	3 m 9.8'	Approx.210 g	7.40 oz
					GS-P5CC5	5 m 16.4'	Approx.310 g	10.93 oz
					GS-P5CC10	10 m 32.8'	Approx.580 g	20.45 oz
	SZ-V series	**SZ-VPC03S**	0.3 m 1.0'	Approx.70 g 2.46 oz	**SZ-VCC7**	7 m 23.0'	Approx.600 g	21.16 oz
	SZ-01S	**SZ-PC03PS**	0.3 m 1.0'	Approx.60 g 2.11 oz	**SZ-CC7PS**	7 m 23.0'	Approx.450 g	15.87 oz
GC-R48	GS-11PC/ GS-51PC/ GS-71PC/ GS-M51P/ GS-M91P/ GS-ML51P	Direct connection possible			**GS-P8LC1**	1 m 3.3'	Approx.80 g	2.82 oz
					GS-P8CC1	1 m 3.3'	Approx.70 g	2.46 oz
					GS-P8CC3	3 m 9.8'	Approx.170 g	5.99 oz
					GS-P8CC5	5 m 16.4'	Approx.240 g	8.46 oz
					GS-P8CC10	10 m 32.8'	Approx.450 g	15.87 oz

*The Y-shaped connector (GL-VY01) can also be used.

Remote I/O modules can be cascaded up to 4 modules.

Max. cascaded modules: 4
Max. cable distance: 120 m 393.7'

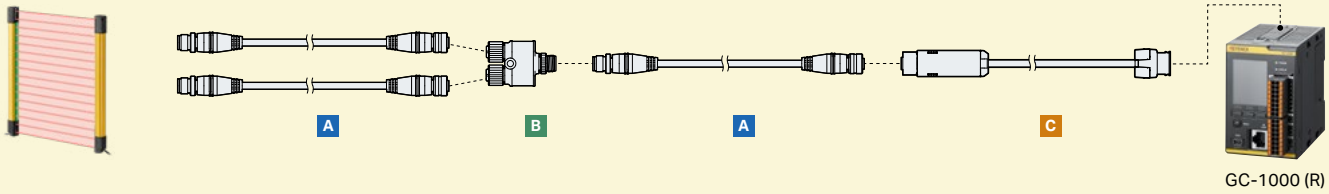
[Breakdown]
A: Power cable 30 m 98.4'
C: Extension cable 30 m 98.4' × 3

STEP 4 GC-Link cables [Optional]

Connecting a safety light curtain

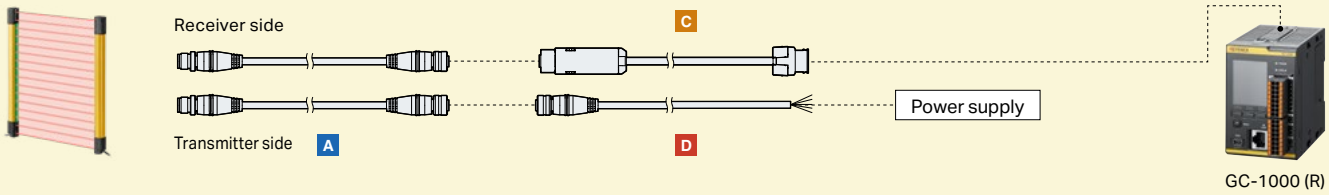
GL-V Series

When integrating the power wiring of the transmitter and receiver



	A Extension cable (quantity: 1)		B Y-shaped connector	C GC-Link cable	
	Use to increase the length of the cable.		1 required per set.	1 included.	
GL-V Series	GL-VCC05	0.5 m 1.6'	GL-VY01	GL-VCG03	0.32 m 1.0'
	GL-VCC1	1 m 3.3'			
	GL-VCC3	3 m 9.8'			
	GL-VCC5	5 m 16.4'			
	GL-VCC10	10 m 32.8'			

When wiring the power of the transmitter and receiver separately

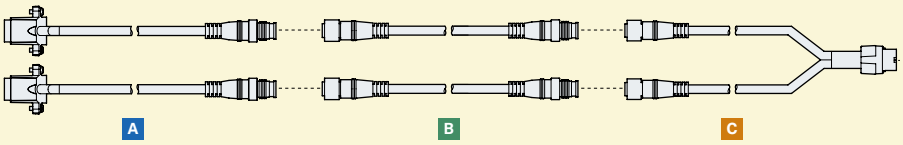


	A Extension cable (quantity: 1)		C GC-Link cable		D Main unit connection cable	
	Use to increase the length of the cable.		1 included.		1 required for the transmitter.	
GL-V Series	GL-VCC05	0.5 m 1.6'	GL-VCG03	0.32 m 1.0'	GL-VP2	2 m 6.6'
	GL-VCC1	1 m 3.3'			GL-VP5	5 m 16.4'
	GL-VCC3	3 m 9.8'			GL-VP10	10 m 32.8'
	GL-VCC5	5 m 16.4'				
	GL-VCC10	10 m 32.8'				

Cable extension:
Scan the QR code to the right of the GC Series user's manual.

GL-R/GL-S Series

Safety light curtain



GC-1000(R)

	A Sensor main unit connection cable Required for transmitter and receiver		B Extension cable Used for extension. Needed for both transmitter and receiver.		C Main controller connection cable One set connects to both transmitter and receiver.	
GL-R series ▶	GL-RPC03PS (incl. 1 cable)	0.3 m 1.0'	GL-RCC7S (incl. 1 cable)	7 m 23.0'	GL-RCG03S (incl. 1 set)	0.3 m 1.0'
GL-S series	GL-SPC03PS (incl. 2 cables)	0.3 m 1.0'			GL-SCG03S (incl. 1 set)	0.3 m 1.0'

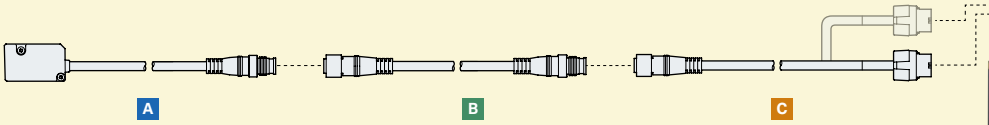
Cable extension:
Please have the total length of the cables for the GL-R Series be no more than 30 m 98.4' in length for the transmitter and for the receiver.
Please have the total length of the cables for the GL-S Series be no more than 20 m 65.6' in length for the transmitter and for the receiver.
Scan the QR code to the right of the GC Series user's manual for details.

See here for the GL-R Series

See here for the GL-S Series

Connecting a safety laser scanner

Safety laser scanner



GC-1000(R)

			A Sensor main unit connection cable		B Extension cable Used for extension		C Main controller connection cable One SZ-VCG03M uses two GC-Link ports.	
SZ-V series *1 ▶	Simple connection *1	SZ-V04	SZ-VPC03S	0.3 m 1.0'	SZ-VCC7	7 m 23.0'	SZ-VCG03	0.3 m 1.0'
	Advanced function connection	SZ-V04	SZ-VPC03M	0.3 m 1.0'	SZ-VCC7M	7 m 23.0'	SZ-VCG03M Uses two ports	0.3 m 1.0'
		SZ-V32(N)	SZ-VPC03B	0.3 m 1.0'				
SZ series		SZ-01S *2	SZ-PC03PS	0.3 m 1.0'	SZ-CC7PS	7 m 23.0'	SZ-VCG03	0.3 m 1.0'

*1 Depending on the functions used, different cables are required. See p.28 "KEYENCE safety sensor connection SZ-V series [SZ-V04(X)]" and the GC series User's Manual for more details *2 SZ-04M/16V cannot be connected

Cable extension:
• Ensure that the maximum total cable length for both SZ-V and SZ series is 30 m 98.4'.
Scan the QR code to the right of the GC Series user's manual for details.

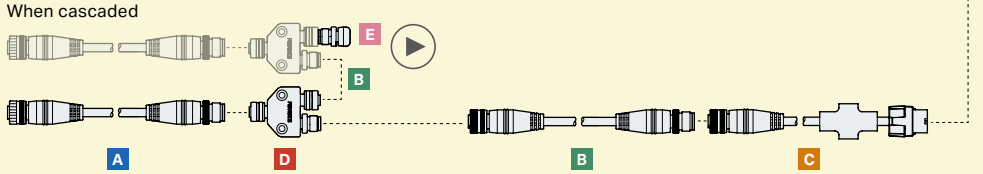
See here for the SZ-V Series

See here for the SZ Series

Connecting safety interlock switches

Safety interlock switches

When cascaded



GC-1000(R)

	A 8-pin extension cable Used for extension		D Y-shaped connector Same number of pieces required as number of interlock switches.	E End connector 1 piece required at the end	B 5-pin extension cable Used for extension. When cascading, use this cable between Y-shaped connectors.		C Main controller connection cable	
GS/GS-M series Cascade up to 16 units (including 4 locking type units)	GS-P8LC1	1 m 3.3'	GS-Y11	GS-Y12	GS-P5CC1	1 m 3.3'	GS-P5CG03	0.3 m 1.0'
	GS-P8CC1	1 m 3.3'			GS-P5CC3	3 m 9.8'		
	GS-P8CC3	3 m 9.8'			GS-P5CC5	5 m 16.4'		
	GS-P8CC5	5 m 16.4'			GS-P5CC10	10 m 32.8'		

* GS-11PC, GS-51PC, GS-71PC, GS-M51P, GS-M91P and GS-ML51P are the models compatible with GC-Link connection. All the models except for GS-11PC are locking type.

Cable extension:
• Please have the total length of cable from the main controller to the first GS Series unit be no more than 30.6 m 100.4' in length, and no more than 31.3 m 102.7' in length for the cable going to the GS-M Series.
• Please have the total length of cable from the main controller to the final GS Series unit be no more than 60.6 m 198.8' in length, and no more than 61.3 m 201.1' in length for the cable going to the GS-M Series.
Scan the QR code to the right of the GC Series user's manual for details.

Main controllers

Item		GC-1000	GC-1000R
Input/output points	Safety inputs	16	14
	Safety outputs	6	4
	Safety relay output	—	1 (3a)
	AUX outputs	4	4
	Test outputs	4	4
Maximum number of connectable expansion units		10*1	—
Maximum number of connectable remote I/O modules		4	—
GC-Link ports		2 ports	2 ports
Safety input specifications	Input device	Contact output device or PNP output device	
	Input type	Type3	
	ON level (voltage/current)	Min. 11 V/2 mA	
	OFF level (voltage/current)	Max. 5 V/1.5 mA	
	Short-circuit current	Si 0 to 3: Approx. 5 mA Si 4 to 15: Approx. 3 mA	Si 0 to 3: Approx. 5 mA Si 4 to 13: Approx. 3 mA
	Protection circuit	Surge protection circuit, wrong wiring protection circuit	
	Maximum cable length	Max. 100 m 328.1'	
Safety output specifications	Output type	PNP transistor output (DC-13, Type 0.5, Protected outputs)*2	
	Maximum load current	500 mA	
	Residual voltage (during ON)	Max. 2.0 V	
	Leakage current (during OFF)	Max. 0.5 mA	
	Maximum capacitive load	0.5 µF	
	Load wiring resistance	Max. 2.5 Ω	
	Protection circuit	Overcurrent protection circuit, reverse connection protection circuit	
	Maximum cable length	Max. 30 m 98.4'	
Safety relay output specifications	Output type	—	Relay (3a) (Externally-protected outputs)*3
	Rated load (resistance load)	—	250 VAC 6A / 30 VDC 6A*4
	Rated load (inductive load)	—	240 VAC 2A (AC-15) / 24 VDC 1A (DC-13)
	Relay output mechanical life	—	Resistance load (250 VAC 6A/30 VDC 6A): Min. 100,000 times Resistance load (250 VAC 1A/30 VDC 1 A): Min. 500,000 times Inductive load (AC-15: 240 VAC 2 A): Min. 100,000 times (cosø = 0.3) Inductive load (DC-13: 24 VDC 1 A): Min. 100,000 times (L/R = 48 ms)
	Maximum cable length	—	Max. 100 m 328.1'
	B10d	—	With rated load: 400,000 times With low load: 2,000,000 times
Test output specifications	Output type	PNP transistor output *5	
	Maximum load current	100 mA	
	Protection circuit	Overcurrent protection circuit, reverse connection protection circuit	
	Maximum cable length	Max. 100 m 328.1' *6	
AUX output specifications	Output type	Transistor output (PNP/NPN selectable by wiring) PNP output (DC-13, Type 0.1, Protected outputs)*2 *5	
	Maximum load current	PNP: 100 mA, NPN: 20 mA	
	Residual voltage (during ON)	Max. 2.0 V	
	Leakage current (during OFF)	Max. 0.5 mA	
	Protection circuit	Overcurrent protection circuit, reverse connection protection circuit	
	Maximum cable length	Max. 30 m 98.4'	
Communication interface	USB	USB2.0	
	Ethernet	100BASE-TX STP (shielded twisted pair) cable of Category 5 or higher	—
Network functionality		EtherNet/IP™, PROFINET, Modbus/TCP, MC protocol, UDP	—
Others	LCD display	1.77-inch color LCD	
	Display buttons	4 points (3 operation keys + 1 BACK key)	
Usage environment	Operating ambient temperature	−10 to +55 °C 14 to 131 °F (No freezing)	
	Relative humidity	5 to 85% (No condensation)	
	Storage temperature	−25 to +70 °C -13 to 158 °F (No freezing)	
	Vibration resistance	Frequency: 5 to 9 Hz, Half amplitude: 3.5 mm 0.14" Frequency: 9 to 150 Hz, Acceleration: 10 m/s² 10 times each in X, Y, Z directions	
	Shock resistance	Acceleration: 150 m/s², Operating time: 11 ms, 3 times each in X, Y, Z directions	
	Overvoltage category	II III (relay output part of GC-1000R and GC-S1R)	
	Pollution degree	2	
	Operating altitude	Max. 2000 m 6561.7'	
Applicable standards	EMC	EMS: IEC 61131-2/-6, EN61131-2/-6 EMI: IEC 61131-2, FCC Part15B Class A, ICES-003, Class A	
	Safety	IEC 61508,EN61508 SIL3 IEC 62061 SIL CL3 ISO/EN13849-1:2015 Cat. 4, PL e, UL1998	
Power supply	Power voltage	24 VDC (-30 to +20%) Class 2	24 VDC (-20 to +20%) Class 2
	Current consumption	Max. 200 mA	
Dimensions (W×D×H)		60×95×90 mm 2.36"× 3.74"×3.54"	85×95×90 mm 3.35"×3.74"×3.54"
Materials		Polycarbonate	
Weight		Approx. 260 g 9.17 oz	Approx. 360 g 12.69 oz

*1 The bus extension unit "GC-B30" is not included in this number, and only one set of "GC-B30" can be used per setup.
*2 Paragraph 6.4.6 Temporary overload of IEC 61131-2 supports up to 1.2 times the maximum load current.
*3 To comply with the requirements of IEC61131-2, connect 10 A fast blow fuse (IEC 60217) in series to each contact.
*4 Check the derating characteristics described later.
*5 AUX outputs (NPN output) and test outputs do not comply with paragraph 6.4.6 of IEC 61131-2.
*6 When the test output is branched and connected to multiple safety input devices, the total branched cable length must not exceed 400 m 1312.3'.
*7 EtherNet/IP™ is a trademark of ODVA. inc.

Expansion units

Item		GC-S84	GC-S16	GC-S1R	GC-A16
Input/output points	Safety inputs	8	16	—	—
	Safety outputs (PNP)	4	—	—	—
	Safety relay output	—	—	1 (3a)	—
	Test outputs	2	4	—	—
	AUX outputs	—	—	—	16
Safety input specifications	Input device	Contact output device or PNP output device	Contact output device or PNP output device	—	—
	Input type	Type3	Type3		
	ON level (voltage/current)	Min. 11 V/2 mA	Min. 11 V/2 mA		
	OFF level (voltage/current)	Max. 5 V/1.5 mA	Max. 5 V/1.5 mA		
	Short-circuit current	Approx. 3 mA	Approx. 5 mA		
	Protection circuit	Surge protection circuit, wrong wiring protection circuit	Surge protection circuit, wrong wiring protection circuit		
	Maximum cable length	Max. 100 m 328.1'	Max. 100 m 328.1'		
Safety output specifications	Output type	PNP transistor output (DC-13, Type 0.5, Protected outputs)*1	—	—	—
	Maximum load current	500 mA			
	Residual voltage (during ON)	Max. 2.0 V			
	Leakage current (during OFF)	Max. 0.5 mA			
	Maximum capacitive load	0.5 µF			
	Load wiring resistance	Max. 2.5 Ω			
	Maximum cable length	Max. 30 m 98.4'			
	Protection circuit	Overcurrent protection circuit, reverse connection protection circuit			
Safety relay output specifications	Output type	—	—	Relay (3a) (Externally-protected outputs)*2	—
	Rated load (resistance load)			250 VAC 6A / 30 VDC 6A*3	
	Rated load (inductive load)			240 VAC 2A (AC-15) / 24 VDC 1A (DC-13)	
	Relay output mechanical life			Resistance load (250 VAC 6A/30 VDC 6A): Min. 100,000 times Resistance load (250 VAC 1A/30 VDC 1 A): Min. 500,000 times Inductive load (AC-15: 240 VAC 2 A): Min. 100,000 times (cosø = 0.3) Inductive load (DC-13: 24 VDC 1 A): Min. 100,000 times (L/R = 48 ms)	
	Maximum cable length			Max. 100 m 328.1'	
	B10d			With rated load: 400,000 With low load: 2,000,000	
Test output specifications *4	Output type	PNP transistor output	PNP transistor output	—	—
	Maximum load current	100 mA	100 mA		
	Protection circuit	Overcurrent protection circuit, reverse connection protection circuit	Overcurrent protection circuit, reverse connection protection circuit		
	Maximum cable length	Max. 100 m 328.1' *5	Max. 100 m 328.1' *5		
AUX output specifications	Output type	—	—	—	PNP transistor output (DC-13, Type 0.1, Protected outputs)*1
	Maximum load current				100 mA
	Residual voltage (during ON)				Max. 2.0 V
	Leakage current (during OFF)				Max. 0.5 mA
	Protection circuit				Overcurrent protection circuit, reverse connection protection circuit
	Maximum cable length				Max. 30 m 98.4'
Usage environment	Operating ambient temperature	−10 to +55 °C 14 to 131 °F (No freezing)			
	Relative humidity	5 to 85% (No condensation)			
	Storage temperature	-25 to +70 °C -13 to 158 °F (No freezing)			
	Vibration resistance	Frequency: 5 to 9 Hz, Half amplitude: 3.5 mm 0.14" Frequency: 9 to 150 Hz, Acceleration: 10 m/s² 10 times each in X, Y, Z directions			
	Shock resistance	Acceleration: 150 m/s², Operating time: 11 ms, 3 times each in X, Y, Z directions			
	Overvoltage category	II	II	II (III for relay output part)	II
	Pollution degree	2			
	Operating altitude	Max. 2000 m 6561.7'			
Applicable standards	EMC	EMS: IEC 61131-2/-6, EN61131-2/-6,EMI: IEC 61131-2, FCC Part15B Class A, ICES-003, Class A			
	Safety	IEC 61508, EN 61508 SIL3, IEC 62061 SIL CL3, ISO/EN 13849-1:2015 Cat. 4, PL e, UL1998			
Power supply	Power voltage	24 VDC (-20 to +20%) Class 2	—	—	—
	Current consumption	Max. 60 mA	Max. 50 mA	Max. 80 mA	Max. 70 mA
Dimensions (W×D×H)		22.2×95×90 mm 0.87"×3.74"×3.54"	22.2×95×90 mm 0.87"×3.74"×3.54"	39.6×95×90 mm 1.56"×3.74"×3.54"	22.2×95×90 mm 0.87"×3.74"×3.54"
Materials		Polycarbonate			
Weight		Approx. 130 g 4.58 oz	Approx. 130 g 4.58 oz	Approx. 180 g 6.34 oz	Approx. 130 g 4.58 oz

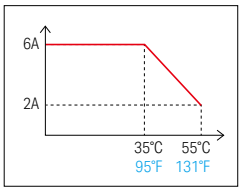
*1 Paragraph 6.4.6 Temporary overload of IEC 61131-2 supports up to 1.2 times the maximum load current.
*2 To comply with the requirements of IEC61131-2, connect 10 A fast blow fuse (IEC 60217) in series to each contact.
*3 Check the derating characteristics described later.
*4 Test outputs do not comply with paragraph 6.4 of IEC 61131-2.
*5 When the test output is branched and connected to multiple safety input devices, the total branched cable length must not exceed 400 m 1312.3'.

Bus extension unit

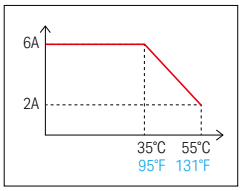
Item		GC-B30	
		GC-B30A	GC-B30B
Cable length between GC-B30A and GC-B30B		Max. 30 m 98.4'	
Usage environment	Operating ambient temperature	-10 to +55 °C 14 to 131 °F (No freezing)	
	Relative humidity	5 to 85% (No condensation)	
	Storage temperature	-25 to +70 °C -13 to 158 °F (No freezing)	
	Vibration resistance	Frequency: 5 to 9 Hz, Half amplitude: 3.5 mm 0.14" Frequency: 9 to 150 Hz, Acceleration: 10 m/s² 10 times each in X, Y, Z directions	
	Shock resistance	Acceleration: 150 m/s², Operating time: 11 ms, 3 times each in X, Y, Z directions	
	Overvoltage category	II	
	Pollution degree	2	
	Operating altitude	Max. 2000 m 6561.7'	
Applicable standards	EMC	EMS: IEC 61131-2/-6, EN61131-2/-6, EMI: IEC 61131-2, FCC Part15B Class A, ICES-003, Class A	
	Safety	IEC 61508, EN61508 SIL3, IEC 62061 SIL CL3, ISO/EN13849-1:2015 Cat. 4, PL e, UL1998	
Power supply	Power voltage	—	24 VDC (-20 to +20%) Class 2
	Current consumption	Max. 35 mA	Max. 35 mA
Dimensions (W×D×H)		22.2×95×90 mm 0.87"×3.74"×3.54"	22.2×95×90 mm 0.87"×3.74"×3.54"
Materials		Polycarbonate	
Weight		Approx. 110 g 3.88 oz	Approx. 110 g 3.88 oz

Derating characteristics

GC-1000R



GC-S1R



Remote I/O modules

Item		GC-R45	GC-R48
Maximum number of connected units*1		4 (GC-R45 and GC-R48 can be connected together)	4(GC-R45 and GC-R48 can be connected together)
Safety input specifications	Input device	Contact output device or PNP output device	
	Input type	Type3	
	ON level (voltage/current)	Min. 11 V/2 mA	
	OFF level (voltage/current)	Max. 5 V/1.5 mA	
	Short-circuit current	Approx. 3 mA	
	Protection circuit	Surge protection circuit, wrong wiring protection circuit	
	Maximum cable length	Max. 100 m 328.1'	
Safety output specifications (GC-R48 Pin 3: Lock control output)	Output type	—	PNP transistor output (DC-13, Type 0.5, Protected outputs)*2
	Maximum load current	—	500 mA
	Residual voltage (during ON)	—	Max. 2.0 V
	Leakage current (during OFF)	—	Max. 0.5 mA
	Maximum capacitive load	—	0.5 µF
	Protection circuit	—	Overcurrent protection circuit
	Maximum cable length	—	Max. 30 m 98.4'
Test output specifications*3	Output type	PNP transistor output (DC-13, Type 0.5, Protected outputs)	
	Maximum load current	100 mA	
	Protection circuit	Overcurrent protection circuit	
	Maximum cable length	Max. 100 m 328.1'*4	
AUX output specifications	Output type	PNP transistor output (DC-13, Type 0.1, protected outputs)*2	—
	Maximum load current	100 mA	—
	Residual voltage (during ON)	Max. 2.0 V	—
	Leakage current (during OFF)	Max. 0.5 mA	—
	Protection circuit	Overcurrent protection circuit	—
	Maximum cable length	Max. 30 m 98.4'	—
Power supply output*3	Supported pin	Pin 1	Pin 2
	Power supply capability	Max. 0.5 A	Max. 0.5 A
	Protection circuit	Overcurrent protection circuit	
Usage environment	Operating ambient temperature	−10 to +55 °C 14 to 131 °F (No freezing)	
	Relative humidity	5 to 85 % (No condensation)	
	Storage temperature	−25 to +70 °C -13 to 158 °F (No freezing)	
	Vibration resistance	Frequency: 5 to 9 Hz, Half amplitude: 3.5 mm 0.14" Frequency: 9 to 150 Hz, Acceleration: 10 m/s² 10 times each in X, Y, Z directions	
	Shock resistance	Acceleration: 150 m/s², Operating time: 11 ms, 3 times each in X, Y, Z directions	
	Overvoltage category	II	
	Pollution degree	2	
	Operating altitude	Max. 2000 m 6561.7'	
Applicable standards	EMC	EMS: IEC 61131-2/-6, EN61131-2/-6, EMI: IEC 61131-2, FCC Part15B Class A, ICES-003, Class A	
	Safety	IEC 61508, EN61508 SIL3, IEC 62061 SIL CL3, ISO/EN13849-1:2015 Cat. 4, PL e, UL1998	
Power supply	Power voltage	24 VDC (-20 to +20 %) Class 2	
	Current consumption	Max. 90 mA	Max. 90 mA
Enclosure ratings		IP65/67 (IEC 60529) (TÜV SÜD certified)	
Dimensions (W×D×H)		64.8×141.5×34.5 mm 2.55"×5.57"×1.36"	64.8×141.5×34.5 mm 2.55"×5.57"×1.36"
Materials		PBT (GF 30 %), SUS304	
Weight		Approx. 420 g 14.81 oz	Approx. 420 g 14.81 oz

*1 When connecting multiple remote I/O modules, power needs to be supplied to each remote I/O module.
*2 Paragraph 6.4.6 Temporary overload of IEC 61131-2 supports up to 1.2 times the maximum load current.
*3 Power supply outputs and test outputs do not comply with paragraph 6.4.6 of IEC 61131-2.
*4 When the test output is branched and connected to multiple safety input devices, the total branched cable length must not exceed 400 m 1312.3'.

Response time

Base response time	4.8 ms

				ON → OFF	OFF → ON
Added time for input devices	Added time for input device connection point	When connecting to the main controller (GC-Link*1, terminal block)		+0 ms	
		When connecting to an expansion unit or remote I/O module		+1.7 ms	
	Added time for input blocks	Filtering time setting	0.5 ms	+0.7 ms	+1.2 ms
			1 ms or more	+ Filtering time	+ Filtering time + 0.5 ms
		When using the test output		+4.5 ms	+34 ms

			ON → OFF	OFF → ON
Added time for output devices	Added time for output device connection point	Main controller	+0 ms	
		Expansion unit or remote I/O module	+2.4 ms	
	Added time for output blocks*2	S-OUT (PNP output)	+0 ms	
		S-OUT (relay output)	+10 ms	+32 ms*3

*1 Add the response time of input device itself, if any. *2 For AUX outputs, add 0.5 ms *3 The minimum OFF time of the relay output is 300 ms.

When using the following functions in the program, add additional time based on the function.
· When using the timer function, add delay time per timer.
· When arranging multiple registers in series, add 2 ms per register pair (store and load). For example, when two register pairs are arranged in series, add 4 ms.

Terminal arrangements

GC-1000

0	Si0	Si1	1	Safety inputs Si
2	Si2	Si3	3	
4	Si4	Si5	5	
6	Si6	Si7	7	
8	Si8	Si9	9	
10	Si10	Si11	11	
12	Si12	Si13	13	
14	Si14	Si15	15	

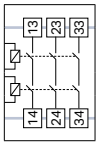
0	To0	To1	1	Test outputs To
2	To2	To3	3	
0	So0	So1	1	Safety outputs So
2	So2	So3	3	
4	So4	So5	5	
0	Ao0	Ao1	1	AUX outputs Ao
2	Ao2	Ao3	3	
	+24 V	0 V		

GC-1000R

0	Si0	Si1	1	Safety inputs Si
2	Si2	Si3	3	
4	Si4	Si5	5	
6	Si6	Si7	7	
8	Si8	Si9	9	
10	Si10	Si11	11	
12	Si12	Si13	13	
14	N.C.	N.C.	15	

0	To0	To1	1	Test outputs To
2	To2	To3	3	
0	So0	So1	1	Safety outputs So
2	So2	So3	3	
4	N.C.	N.C.	5	
0	Ao0	Ao1	1	AUX outputs Ao
2	Ao2	Ao3	3	
	+24 V	0 V		

13	SRo		Safety relay output SRo
23	SRo		
33	SRo		
14	SRo		
24	SRo		
34	SRo		



GC-S84

0	Si0	Si1	1	Safety inputs Si
2	Si2	Si3	3	
4	Si4	Si5	5	
6	Si6	Si7	7	
0	To0	To1	1	Test outputs To
0	So0	So1	1	Safety outputs So
2	So2	So3	3	
	+24 V	0 V		

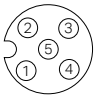
GC-S16

0	Si0	Si1	1	Safety inputs Si
2	Si2	Si3	3	
4	Si4	Si5	5	
6	Si6	Si7	7	
8	Si8	Si9	9	
10	Si10	Si11	11	
12	Si12	Si13	13	
14	Si14	Si15	15	
0	To0	To1	1	Test outputs To
2	To2	To3	3	

GC-A16

0	Ao0	Ao1	1	AUX outputs Ao
2	Ao2	Ao3	3	
4	Ao4	Ao5	5	
6	Ao6	Ao7	7	
8	Ao8	Ao9	9	
10	Ao10	Ao11	11	
12	Ao12	Ao13	13	
14	Ao14	Ao15	15	

GC-R45

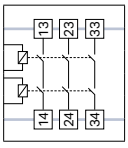


Connection type / Pin number	1 PNP input	2 PNP inputs	1 input *2	1 input+ 1 test output*2	2 inputs	2 inputs+ 2 test outputs	AUX outputs*3	Power supply only*4
Pin 1	+24 V	+24 V	+24 V	+24V	+24 V	To1	(+24 V)	+24 V
Pin 2	(IN1)*1	Si1	(IN)*1	(IN)*1	Si1	Si1	Ao0	
Pin 3	0 V	0 V	0 V	0 V	0 V	0 V	0 V	0 V
Pin 4	Si0	Si0	Si0	Si0	Si0	Si0		
Pin 5	(IN2)*1	(IN)*1	+24 V	To0	+24 V	To0		

*1 This input can be enabled in the "Advanced Input Settings" for the device. *2 When selecting "reset switch" or "other switch" for an input device, Pin 2 can be used for the AUX output.
*3 When selecting "AUX output" for an output device, Pin 2 becomes "Ao0". *4 When selecting "power supply" for an input device, Pins 1 and 3 can be used as an external power supply.

GC-S1R

13	SRo		Safety relay output SRo
23	SRo		
33	SRo		
14	SRo		
24	SRo		
34	SRo		



GC-R48

Connection type / Pin number	1 PNP input	2 PNP inputs	1 input	1 input + 1 test output	2 inputs	2 inputs + 2 test outputs
Pin 1	(IN2)*1	(IN)*1	(IN2)*1	(IN2)*1	(IN)*1	(IN)*1
Pin 2	+24 V	+24 V	+24 V	+24 V	+24 V	+24 V
Pin 3 *2	So (lock control output)	So (lock control output)	So (lock control output)	So (lock control output)	So (lock control output)	So (lock control output)
Pin 4	+24 V	+24 V	+24 V	To0	+24 V	To0
Pin 5	Si0	Si0	Si0	Si0	Si0	Si0
Pin 6	(IN1)*1	Si1	(IN1)*1	(IN1)*1	Si1	Si1
Pin 7	0 V	0 V	0 V	0 V	0 V	0 V
Pin 8	+24 V	+24 V	+24 V	+24 V	+24 V	To1

*1 This input can be enabled in the "Advanced Input Settings" for the device.
*2 When selecting "other safety switch", "other safety input", "other switch", or "other input" for an input device, Pin 3 can be used as a non-safety output.

Input device types

KEYENCE safety sensors*

Safety light curtains	GL-V Series
	GL-R Series
	GL-S Series
Safety interlock switches	GS/GS-M Series
Safety laser scanners	SZ-V Series
	SZ Series

* When connecting KEYENCE safety sensors not listed above, please choose the appropriate device type from the "Safety input devices".

Safety input devices

Emergency stop switch
Limit switch
Interlock switch
Guard locking switch
Light curtain
Laser scanner
Rope pull switch
Safety mat
Two hand control device
Enabling device
Other safety switches
Other safety inputs

Other input devices

Reset switch
Mode selecting switch
EDM input
Muting input*
Safety plug
Hold-to-run switch
Other switches
Other inputs
Power supply port

* This cannot be used in EASY mode

Output devices that can be connected

It is possible to connect devices which meet the requirements of the "Safety output specifications" on p.19-20 Specifications. Depending on the device specifications, select the appropriate output type from the following options.

Safety output

PNP output × 2
PNP output × 1
Relay output × 1 (3a)

Non-safety output

PNP output × 1

List of function blocks

Function blocks

Logic	
AND	NOR
AND(6-10 inputs)	XOR
OR	SR Flip-Flop (Set has priority)
NOT	RS Flip-Flop (Reset has priority)
NAND	JK Flip-Flop

Reset	
Reset	Dual reset
Reset (with AND)	Existence detection reset

Muting	
Sequential muting	Muting for exit
Parallel muting	Position detection muting
Cross-muting	

Applications	
Master ON	Control guard
Unlock control	PSDI control
Bypass	

Manual mode	
Manual mode control (MMC)	MMC output enable
MMC input bypass	

Timers / counters	
OFF-delay	Up-down counter
ON-delay	Up-down counter (with binary output)
Pulse generator	

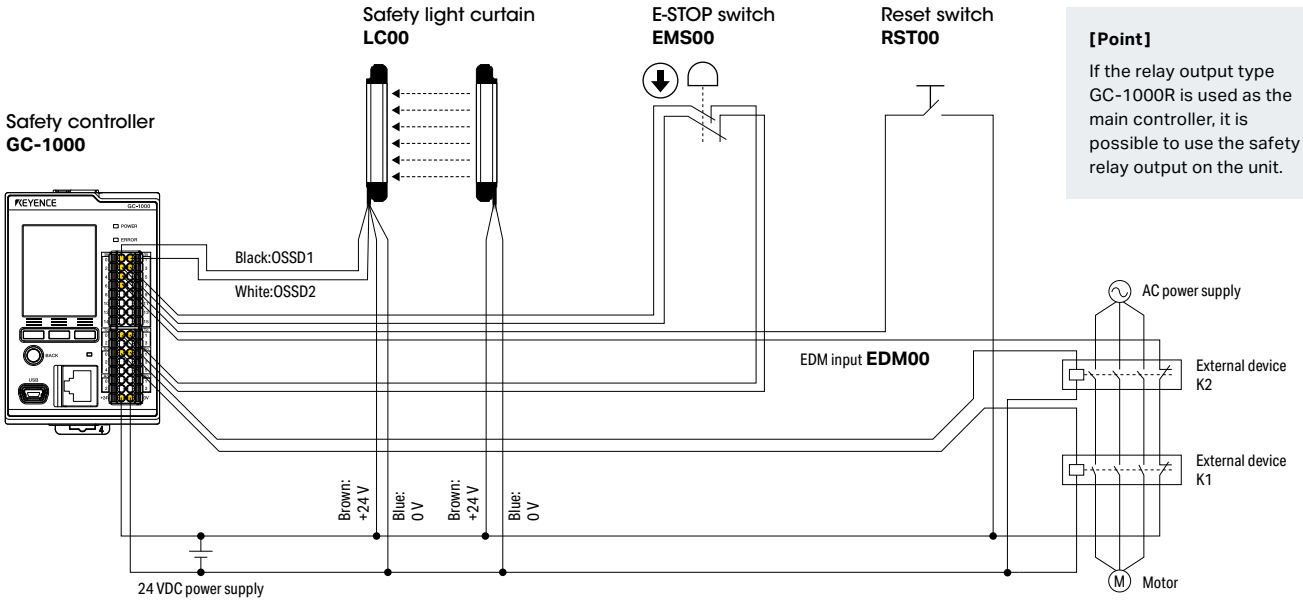
Others	
Edge detection	Selector (2 inputs)
Binary decoder	Selector (4 inputs)
Binary encoder	Register (load)
Mode changing control	Register (store)

System blocks

System blocks	
Always ON	1 scan ON upon start-up
Always OFF	Jump (load)
Block information	Jump (store)
System information	Event history trigger

Configuration example

Wiring diagram



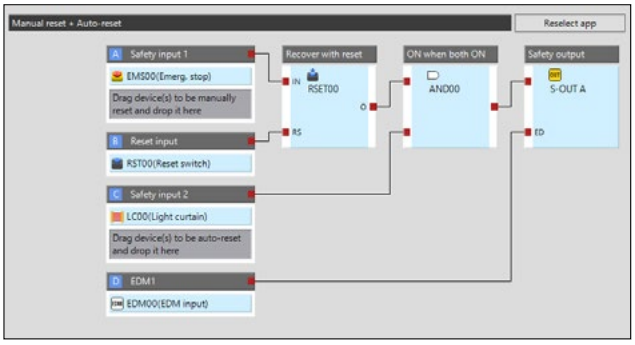
[Point]

If the relay output type GC-1000R is used as the main controller, it is possible to use the safety relay output on the unit.

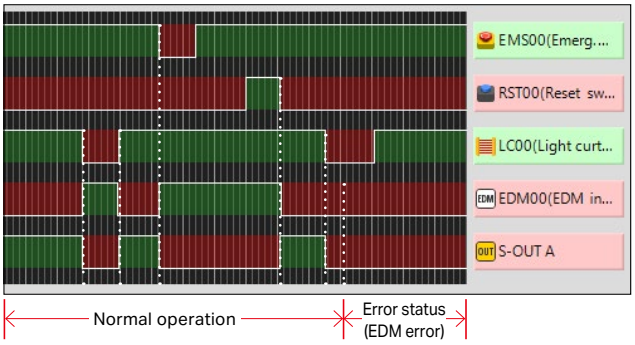
- The safety light curtain (LC00) is connected to two safety input terminals.
- The E-STOP switch (EMS00) is connected to two safety input terminals and two test output terminals.
- The reset switch (RST00) is connected to one safety input terminal.
- The EDM input* (EDM00) is connected to one safety input terminal.

* EDM function: This function checks for faults in devices such as force-guided relays or contactors

Program example



Timing chart



1 When the safety light curtain is blocked, the safety output S-OUT A turns OFF. When the safety output S-OUT A turns OFF, the external devices K1 and K2 turn OFF, and the motor M is stopped. When the safety light curtain is cleared, the safety output S-OUT A turns ON, and the motor M will start to move.

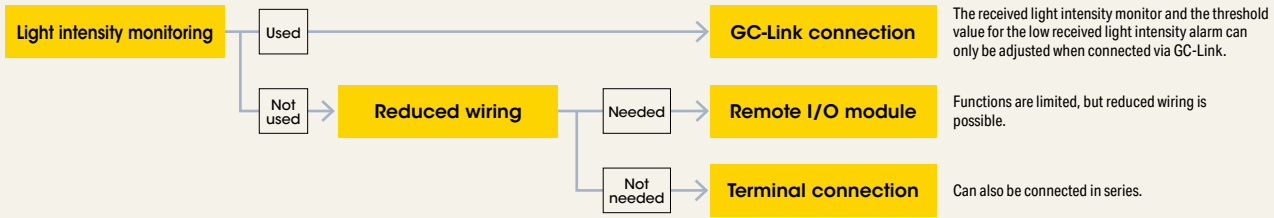
2 When the E-STOP switch is pushed, the safety output S-OUT A turns OFF the external devices K1 and K2, and stops the motor M. Even after the E-STOP switch is returned, the safety output S-OUT A remains OFF, and the motor M remains stopped. When the reset switch is pushed, the safety output S-OUT A turns ON, and the external devices K1 and K2 turn ON, and the motor M starts to move.

3 The EDM input is used to detect welded contacts in the external devices. When a welded contact occurs, the GC series goes into an error state, and the safety output S-OUT A turns OFF. When the safety output S-OUT A turns OFF, the external devices K1 and K2 turn OFF, and the motor M is stopped.

Depending on the connection type, functions that can be used may be different.

GL-V series

Recommended connection type



Function details by connection type

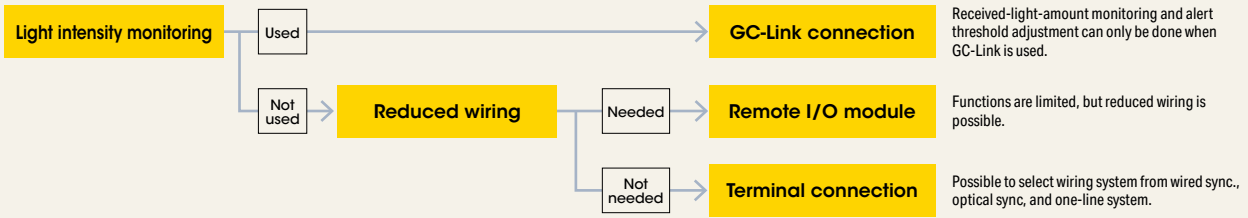
	Connection type		
	GC-Link	Terminal blocks	Remote I/O modules M12 5-pins
OSSD output	✓	✓	✓
Large line indicator control	✓	✓	-
Channel setting (interference prevention)*1	✓	✓	✓
GL-V received light intensity monitor with GC main unit display	✓	-	-
GL-V received light intensity monitor with <GC Configurator>	✓	-	-
Acquire low received light intensity alarm (adjustable threshold value)	✓	-	-
Acquire GL-V OSSD OFF history	✓	-	-
GL-V error history	✓	-	-

*1 Can be set using the GL-V main unit settings switch.

Depending on the connection type, functions that can be used may be different.

GL-R series

Recommended connection type



Function details by connection type

		Connection type		
		GC-Link	Terminal blocks	Remote I/O modules M12 5-pins
GC Series functions	GL-R received-light-amount monitoring with the GC main controller display	✓	×	×
	GL-R received-light-amount monitoring with the GC Configurator	✓	×	×
	Received-light-amount decrease alert (threshold setting available)	✓	×	×
	GL-R OSSD OFF history	✓	×	×
	GL-R error history	✓	×	×
GL-R Series functions	GL-R wiring system	Wire synchronization	Optical synchronization/One-line/Wire synchronization	Optical synchronization/One-line
	OSSD output	✓	Available functions vary by wiring system. Refer to <GL-R function details by wiring system>(page 6-50) of GC Series User's Manual	✓
	AUX outputs	✓*1		✓*1
	Error output	×*2		×
	Muting	✓*1		✓*1
	Partial muting function*3	×		×
	Muting bank function*3	×		×
	Muted condition output*3	✓*1		✓*1
	Muting lamp output	×		×
	Override function	✓*1		✓*1
	Interlock function*3	✓*1		✓*1
	Interlock-reset-ready output*3	✓*1		✓*1
	EDM function	✓*1	✓*1	✓*1
	Wait input	×	Usable functions vary by wiring system. Refer to <GL-R function details by wiring system>(page 6-50) of GC Series User's Manual	×
	Alert output*3	✓*4		×
	Clear/Block output*3	×		×
	Reset input (error clear)	×		×
	Reduced resolution function*3	PC		PC
	Fixed blanking function*3	PC		PC
	Channel configuration (light interference prevention function)	✓		✓
	Center indicator configuration	×		×
	Monitoring function	✓	PC	PC

"PC" indicates that the function can be configured with the GL-R configuration software; "Safety Device Configurator".

*1 These functions can be supported with the GC Series program using function blocks. *2 An error number can be reviewed via an industrial network.

*3 These functions cannot be used on the GL-RHG/GL-RFG. Additionally, you cannot change the settings using the configuration software on the GL-RHG/GL-RFG.

*4 A threshold for received-light-amount can be set on the GC Series main controller to utilize the alert output.

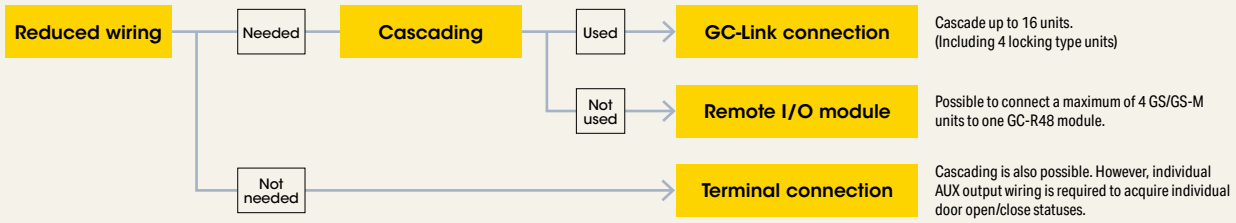
Reference The available functions for the GL-R Series vary by the wiring system and cables used. When connecting the GL-R Series to the "terminal block", refer to the following <GL-R function details by wiring system>(page 6-50) of the GC Series User's Manual.

For connection types and functions of GL-S series, refer to the "GC series User's Manual".

Depending on the connection type, functions that can be used may be different.

GS/GS-M series

Recommended connection type



Function details by connection type

Locking Type (GS-51PC/ GS-71PC/ GS-M51P/ GS-M91P/ GS-ML51P)

		GC-Link	Terminal blocks	Remote I/O modules
				M12 8-pins
Cascade connection	Using Y-shaped connector	✓ (4 units*1*2)	×	×
	Not using Y-shaped connector	—	*3	×
GC Series functions	Indicator mode setting	✓	×	×
	OSSD operation switching (set via the GC Configurator)	✓	×	×
	Coding level high operation check	✓	×	×
	Open/close state check in cascade connection	✓	×	×
	Lock state check in cascade connection	✓	×	×
	Indicator control	✓	×	×
GS/GS-M Series functions	OSSD output	✓	✓	✓
	OSSD operation switching	✓	*3	×
	AUX outputs	✓		✓
	Interlock	✓*4		✓*4
	EDM	✓*4	✓*4	✓*4
	Coding level switching	✓*5		✓*5
	Lock control input	✓*6		✓
GS Series functions	Auxiliary release	✓	*3	✓
	Escape release*7	✓*9		✓*9
	Dedicated handle*8	✓		✓

*1 When establishing a cascade connection with the GC-Link, use the GS-Y11 (Y-shaped connector) and the GS-Y12 (end connector).
*2 Up to 16 units can be cascade-connected with a combination of non-contact and locking types (Max. four units for the locking type).
*3 Depends on the GS/GS-M Series type/model. Refer to <Function details by type>(clause 6) of the GC Series User's Manual.
*4 These functions can be supported with the GC Series program using function blocks.
*5 For the GS series, coding level switching cannot be executed while the GC Series is connected. Execute coding level switching on the GS alone and then connect to the GC Series.
*6 Only the power-to-release type supports Category 4 / PL e.
*7 When using the optional escape release attachment (GS-H02)
*8 When using the optional dedicated handle (GS-H01)
*9 The M12 connector type (GS-51PC/71PC) only.

Non-Contact Type (GS-11PC)

		GC-Link	Terminal blocks	Remote I/O modules	
				M12 5-pins	M12 8-pins
Cascade connection	Using Y-shaped connector*1	✓ (16 units*2)	*3	×	×
	Not using Y-shaped connector*1	—		×	×
GC Series functions	GS indicator mode setting	✓	×	×	×
	Coding level high operation check	✓	×	×	×
	Open/close state check in cascade connection	✓	×	×	×
	GS indicator control	✓	×	×	×
GS Series functions	OSSD output	✓	✓	✓	✓
	AUX outputs	✓	*3	✓	✓
	Interlock	✓*4		✓*4	✓*4
	EDM	✓*4	✓	✓*4	✓*4
	Coding level switching	✓*5	✓	✓*5	✓*5

*1 The available Y-shaped connector and end connector vary by the connection method.

Connection destination	Compatible model	Y-shaped connector	End connector
GC-Link	GS-11PC	GS-Y11	GS-Y12
Terminal blocks	GS-11PC	GS-Y01	GS-Y02

*2 Up to 16 units can be cascade-connected with a combination of non-contact and locking types (Max. four units for the locking type).
*3 Depends on the GS Series type/model. Refer to <Function details by type>(clause 6) of the GC Series User's Manual.
*4 These functions can be supported with the GC Series program using function blocks.
*5 Coding level switching cannot be executed while the GC Series is connected. Execute coding level switching on the GS alone and then connect to the GC Series.

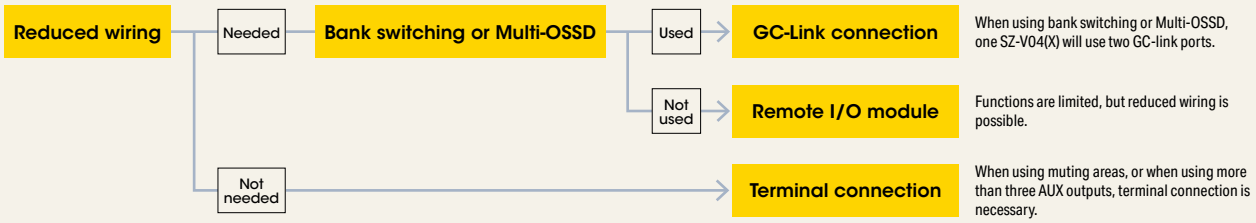
Reference The available functions of the GS Series vary by the type used. When connecting the GS Series to the "terminal block", refer to the following <Function details by type>(page 6-53) of the GC Series User's Manual.

Connection to KEYENCE safety sensors

Depending on the connection type, functions that can be used may be different.

SZ-V series [SZ-V04(X)]

Recommended connection type



Function details by connection type

			GC-Link		Terminal blocks	Remote I/O module M12 5-pins
			Using 1 port (simple connection)	Using 2 ports (advanced connection)		
SZ-V04 functions	Protection zones		1	2	2	1
	Warning zones		1*1	2	2	1*1
	Minimum detectable object size setting		ø20 to 150 mm ø0.79" to 5.91"			
	Camera		✓*2			
	Interlock function		✓*3	✓*3	✓	✓*3
	EDM function		✓*3	✓*3	✓*3	✓*3
	Bank switching function	Maximum number of banks	1	4*4*5	4	1
		Switching through wiring input	×	✓	✓	×
		Switching through encoder input	×	×	×	×
	Multi-OSSD		×	✓	✓	×
	Muting	Muting for all zones	✓*3	✓*3	✓	✓*3
		Muting for specified zone	×	×	✓	×
	Reference points monitoring		✓			
	AUX outputs		1	2	6	1
	State information output		×	✓	✓	×
	Detection history		✓			
	Ethernet communications		×			
	Scanner head series connection		Up to 3 units			×

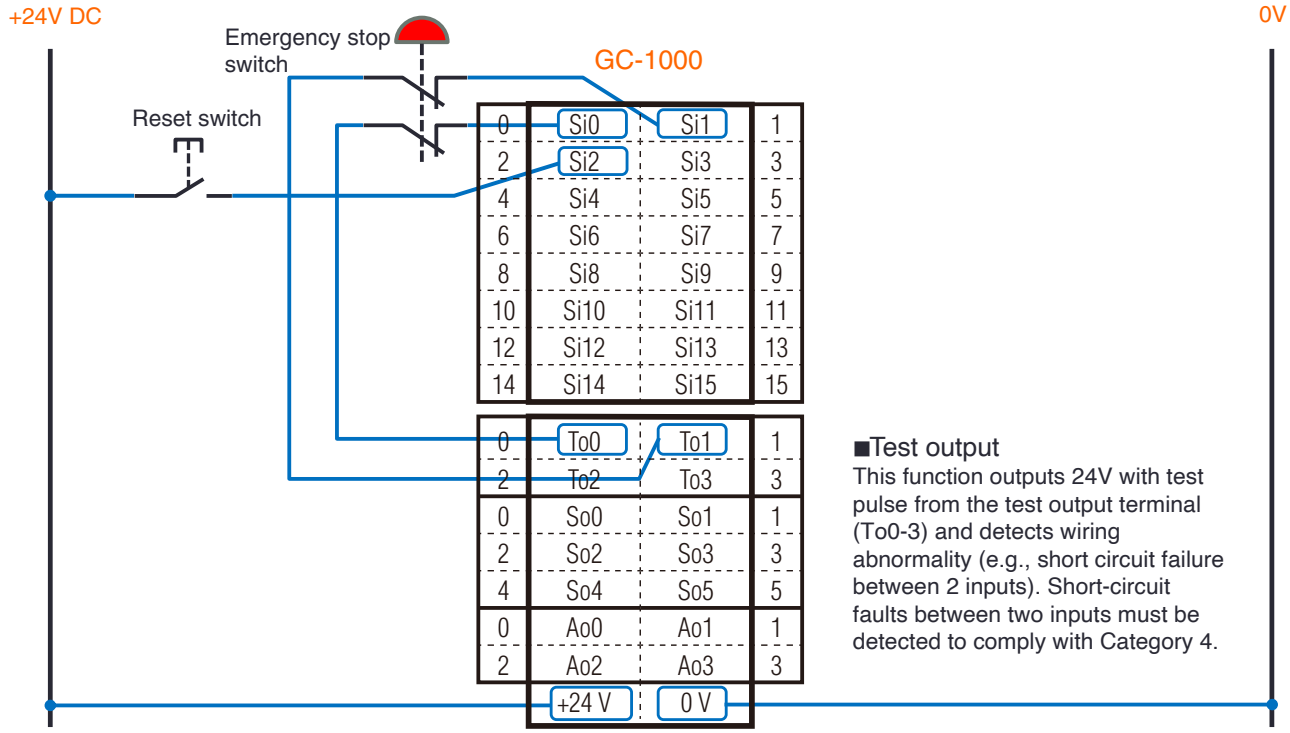
*1 Imported to the GC Series using the AUX output of the SZ-V. Two warning zones can be set with the SZ-V, however, the GC Series can only utilize either the warning zone (A) or warning zone (B) detection output.
*2 Only when using the camera type head
*3 These functions can be supported with the GC Series program using function blocks.
*4 The maximum number of banks is two when the multi-OSSD function is not used.
*5 The bank switching method for the SZ-V is set to "Binary" (excluding the case of using the "independent bank switching" function).

For the connection type and function of models not listed above (e.g. SZ-V32(X)), refer to the "GC series User's Manual".

Wiring Example

① Emergency stop switch and reset switch **Category: Up to 4**

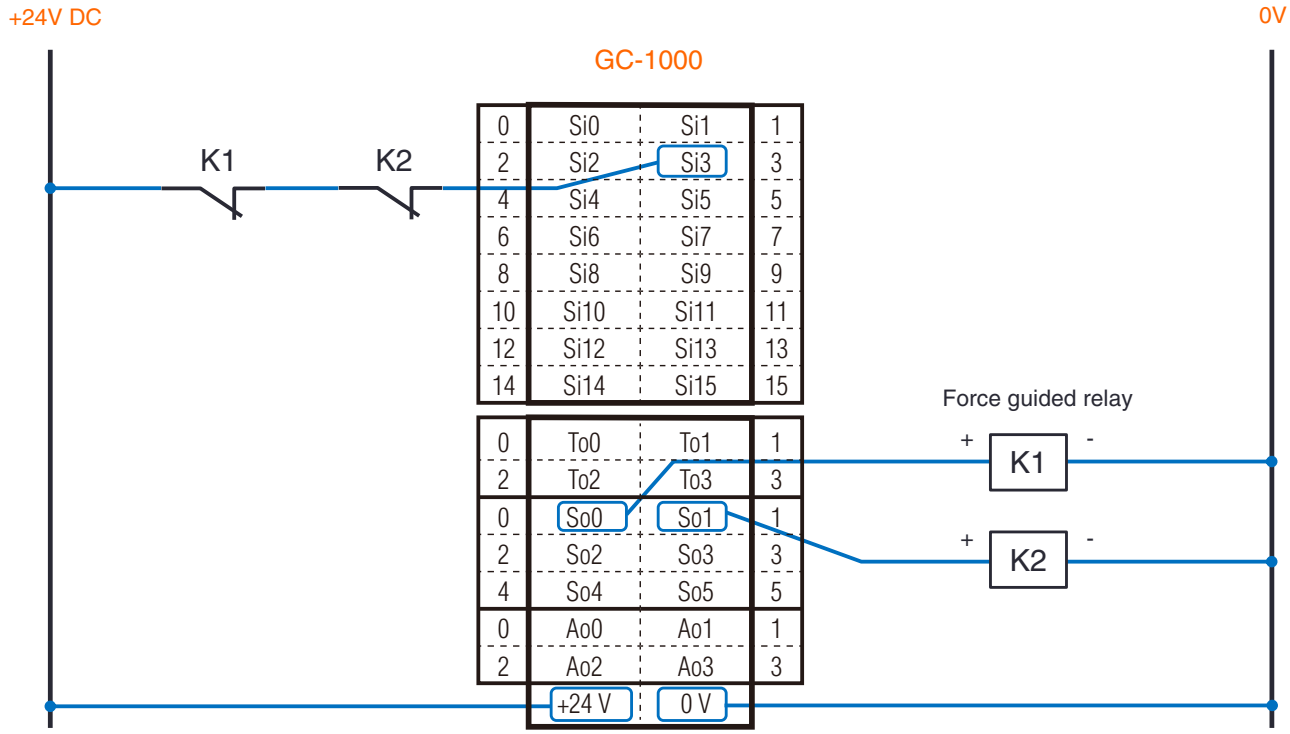
Emergency stop switch setting: 2 inputs 2 test outputs
Reset switch setting: 1 input



■Test output
This function outputs 24V with test pulse from the test output terminal (To0-3) and detects wiring abnormality (e.g., short circuit failure between 2 inputs). Short-circuit faults between two inputs must be detected to comply with Category 4.

② Force guided relay and EDM input **Category: Up to 4**

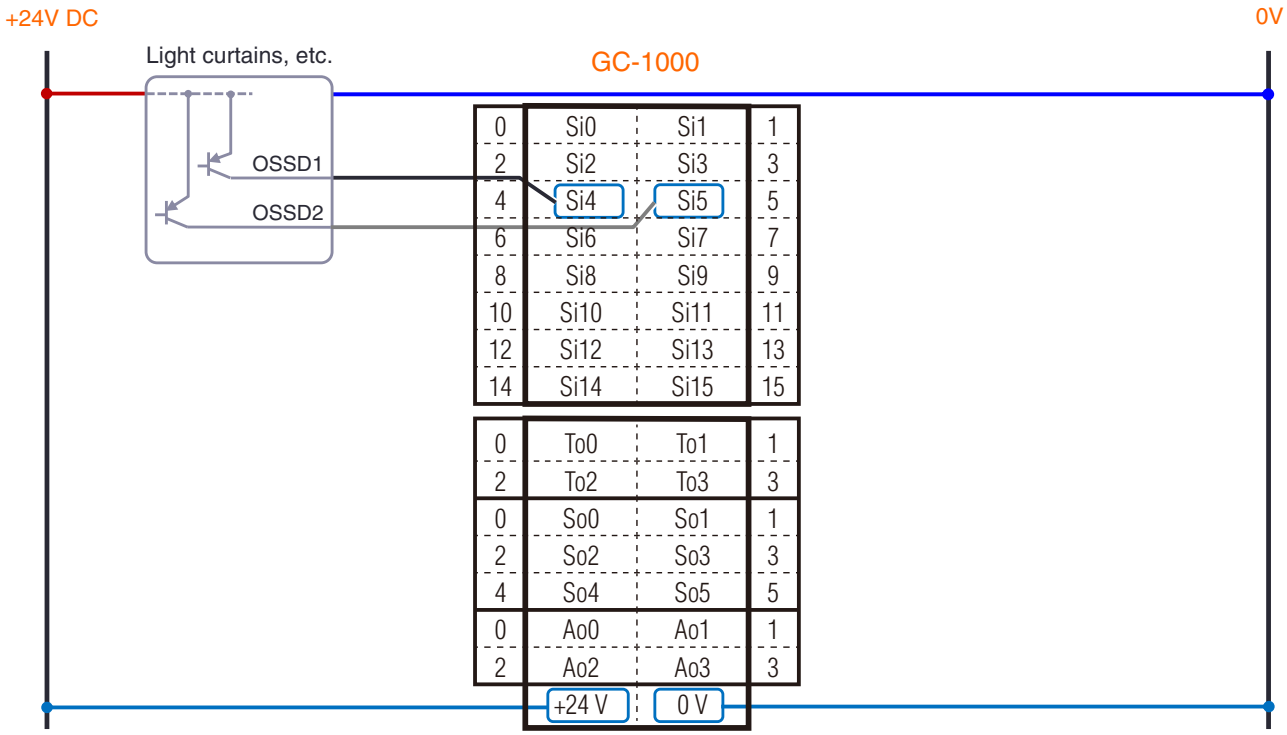
S-OUT setting: Safety output x 2
EDM input setting: 1 input



③ OSSD (PNP-output)

Category: Depends on the input device

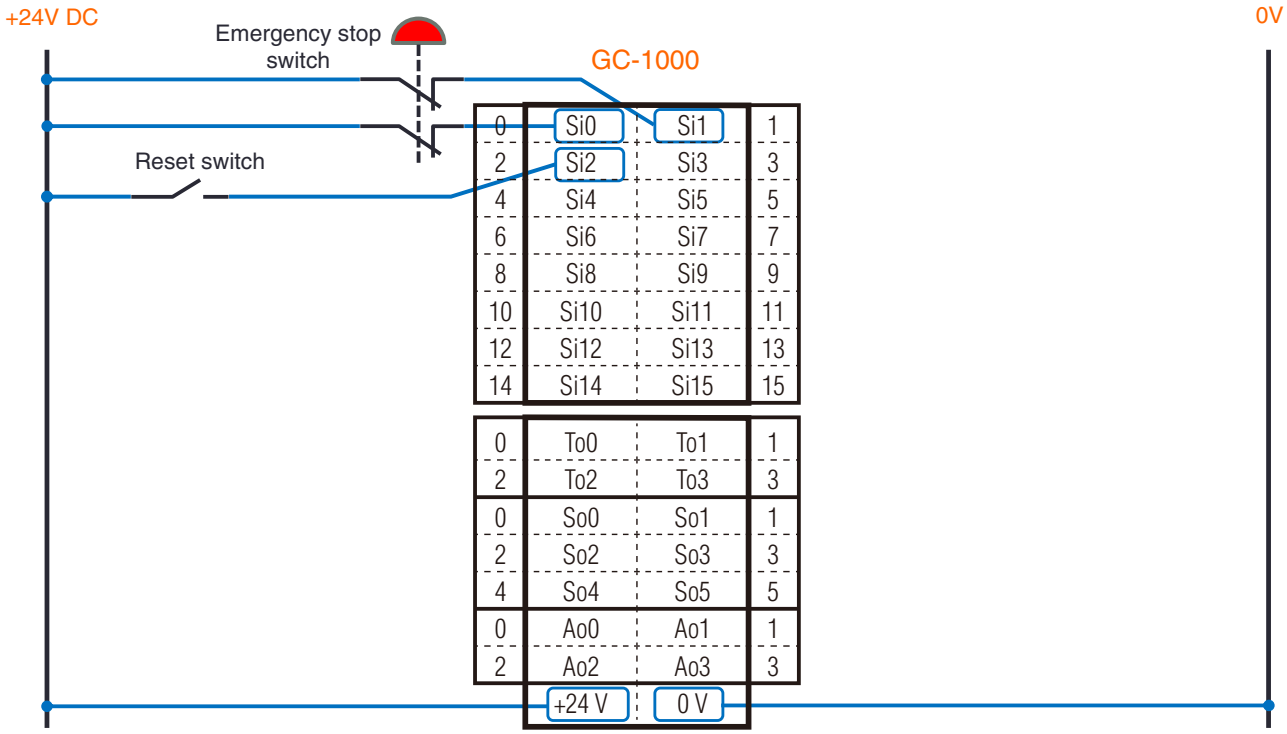
Setting of light curtain, laser scanner, etc. :PNP 2 input



④ Emergency stop switch and reset switch

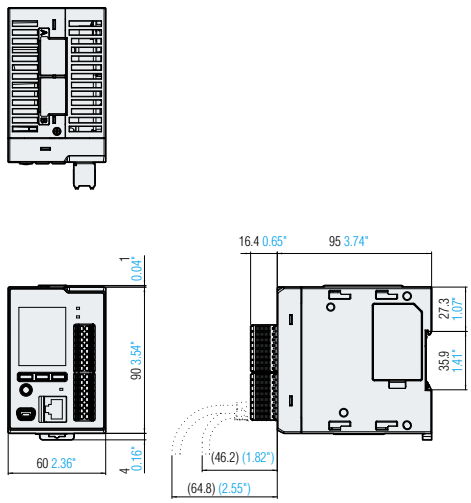
Category: Up to 3

Emergency stop switch setting: 2 inputs
Reset switch setting: 1 input

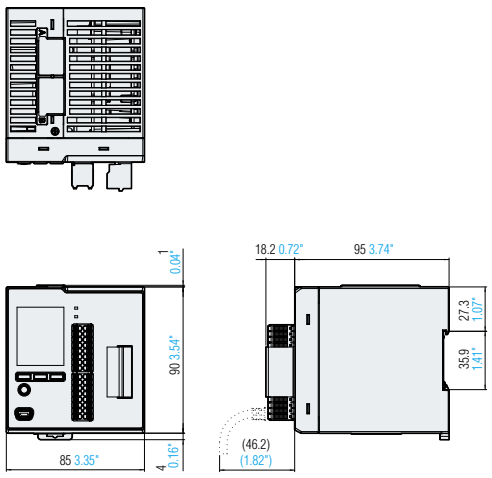


Dimensions Unit: mm inch

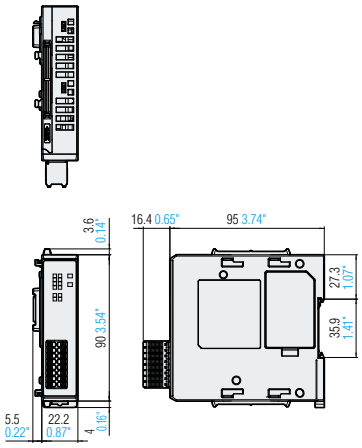
GC-1000



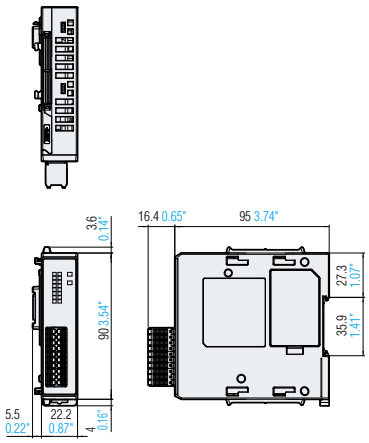
GC-1000R



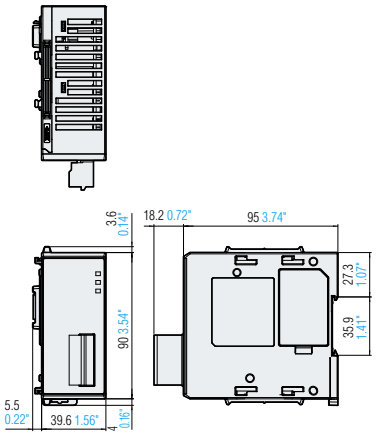
GC-S84



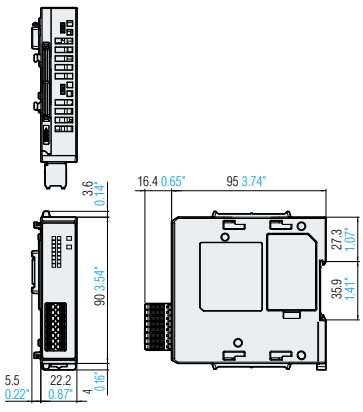
GC-S16



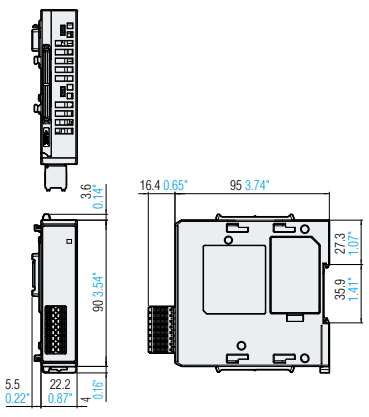
GC-S1R



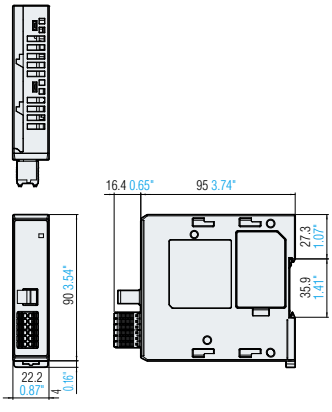
GC-A16



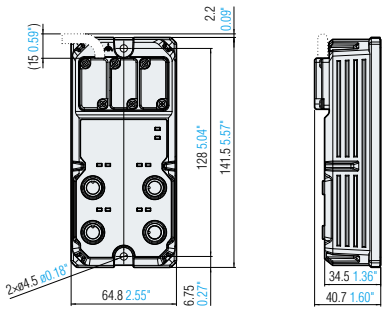
GC-B30A



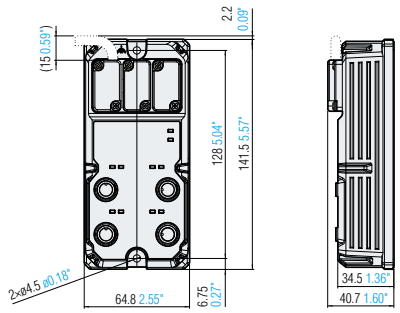
GC-B30B



GC-R45

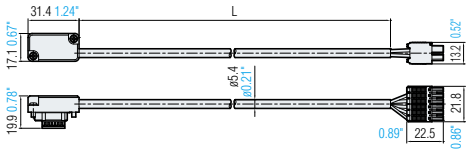


GC-R48



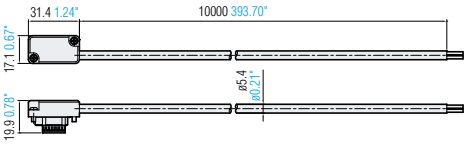
Remote I/O module connection cables

GC-RP10/30

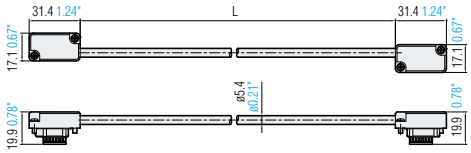


Models	L(mm inch)
GC-RP10	10000 393.70"
GC-RP30	30000 1181.10"

GC-RE10



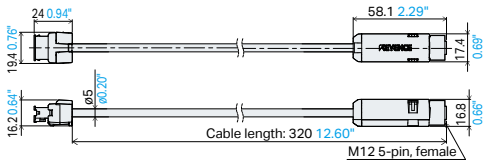
GC-RS10/30



Models	L(mm inch)
GC-RS10	10000 393.70"
GC-RS30	30000 1181.10"

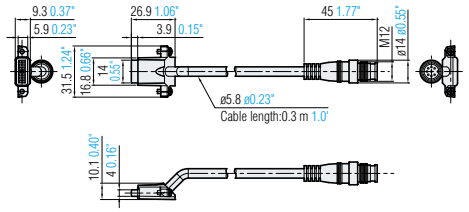
GL-V series connection cables

GL-VCG03

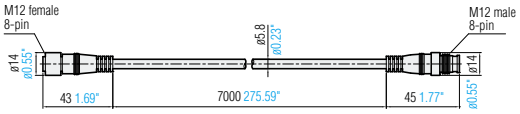


GL-R series connection cables

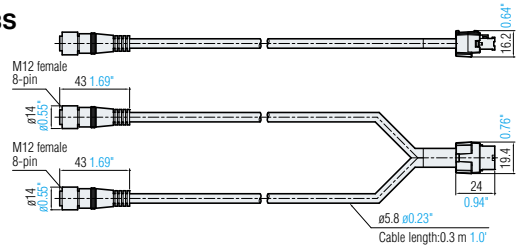
GL-RPC03PS



GL-RCC7S

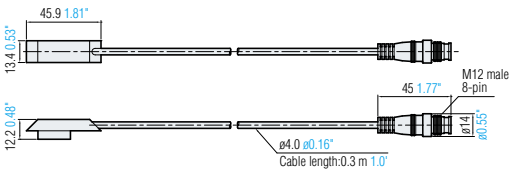


GL-RCG03S

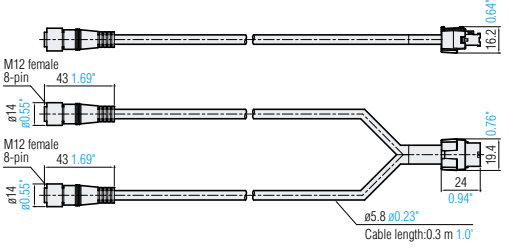


GL-S series connection cables

GL-SPC03PS

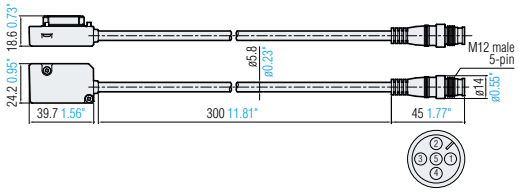


GL-SCG03S

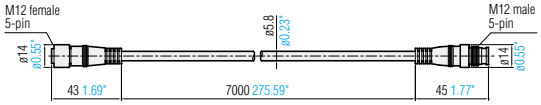


SZ-V series connection cables

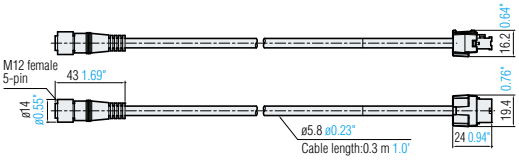
SZ-VPC03S



SZ-VCC7



SZ-VCG03



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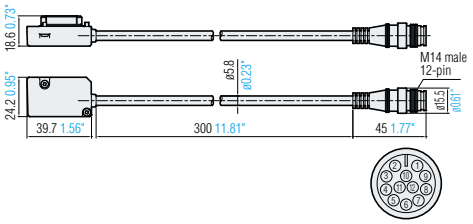

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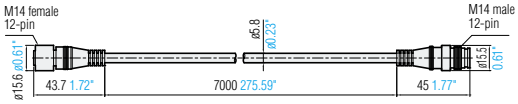

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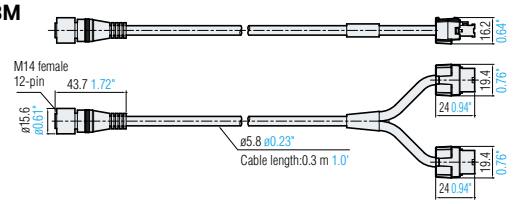
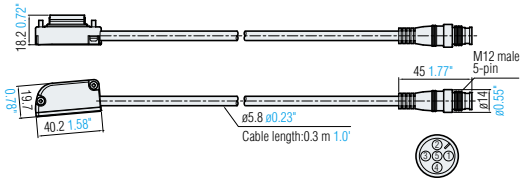


SZ series connection cables

SZ-PC03PS



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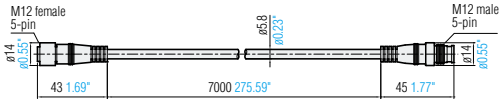
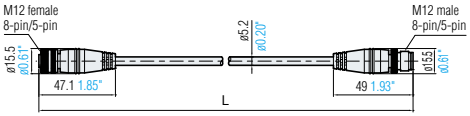


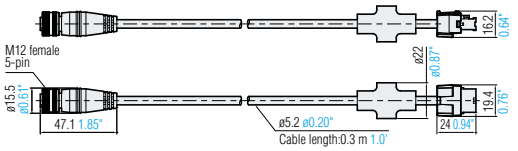
GS/GS-M series connection cables / Y-shaped connector

GS-P5CC1/3/5/10, GS-P8CC1/3/5/10

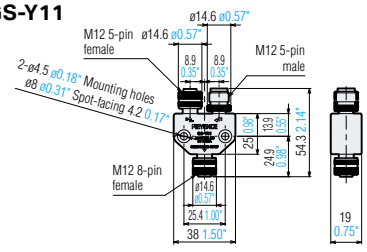


Models	L(mm inch)
GS-P5CC1	1000 39.37"
GS-P5CC3	3000 118.11"
GS-P5CC5	5000 196.85"
GS-P5CC10	10000 393.70"
GS-P8CC1	1000 39.37"
GS-P8CC3	3000 118.11"
GS-P8CC5	5000 196.85"
GS-P8CC10	10000 393.70"

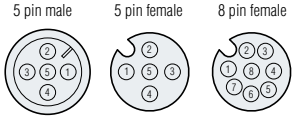
GS-P5CG03



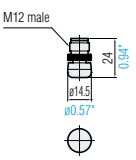
GS-Y11



Pin assignment



GS-Y12



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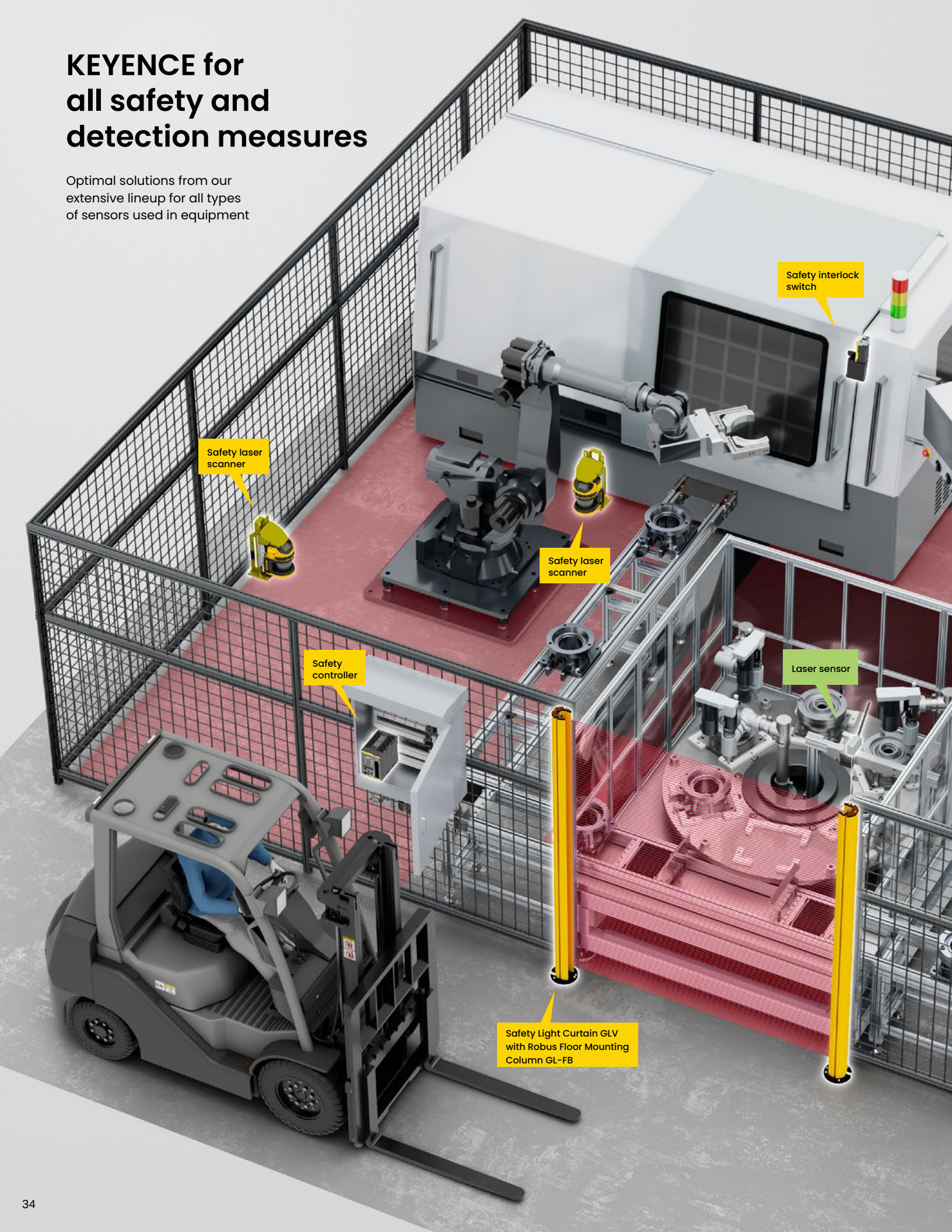
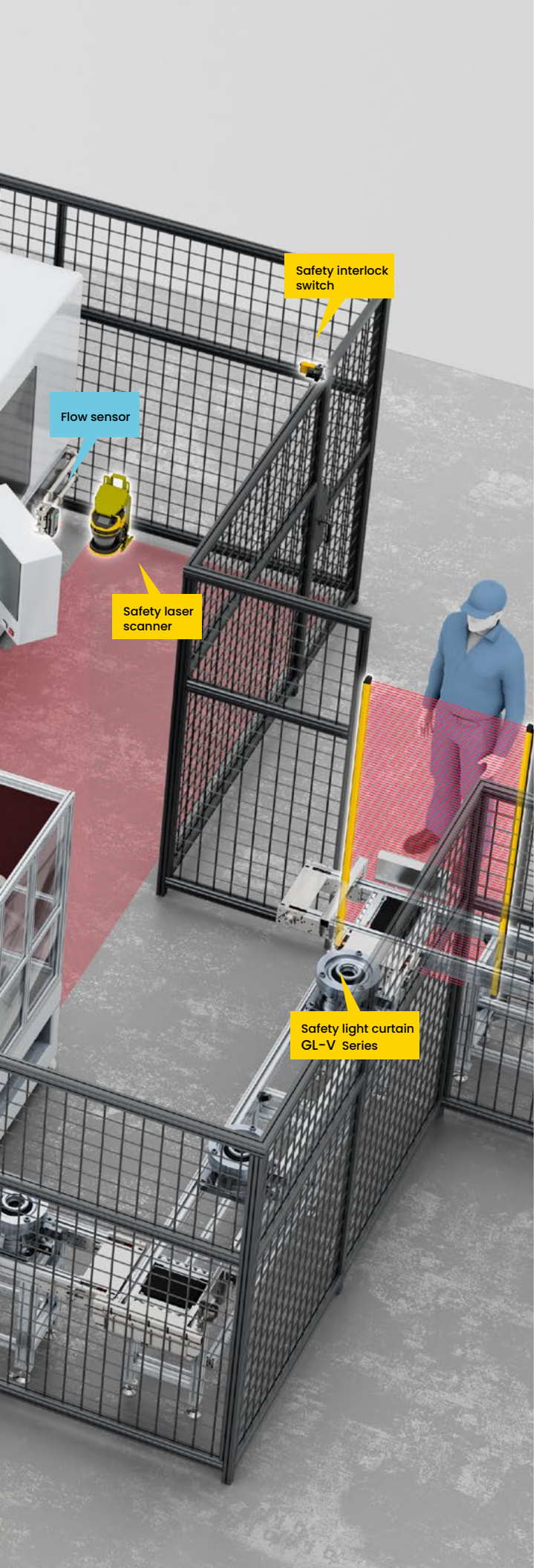




Safety interlock switches

Equipment door safety measures

Compact safety interlock switch
GS-M Series

Safety interlock switch
GS Series

Safety light curtains

Intrusion into dangerous areas and area protection

Type 4 safety light curtain
GL-V Series

Type 4 safety light curtain
GL-R Series

Safety laser scanners

Freely set protection zones

Type 3 safety laser scanner
SZ-V Series

Type 3 safety laser scanner
SZ Series

Safety controller

Advanced functionality and easy to use

Safety controller
GC Series

Flow sensor

Measures flow rate without cutting pipes

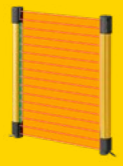
Clamp-On Flow Sensor
FD-H Series

Laser sensor

Reflective type with stable detection

CMOS laser sensor
LR-X Series

KEYENCE for Safety Measures



GL-V Series
Small & Robust Light Curtain

GL-R Series
Safety light curtain

GS-M Series
Safety Interlock Switches

SZ-V Series
Safety laser scanner

GS Series
Safety Interlock Switches
[Locking Type]

GC Series
Safety controller

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