Mini-G series

Ultra Compact for built-in Use
Embedded Amplifier Photo Sensors

- Ultra-compact size used for built-in use for over 25 years
- Various types such as head-on, wide diffuse reflective, high power or convergent reflective
- M3 threaded screw can be used for all models
- Water resistance complying with IP67
- Stability output is included standard
  - High-power light transmitting business cards: GT1SN, GT1N
  - Long detecting distance of 10 m: GT3RSN
  - High-performance detection at a short distance: GS5SN, GS5N
  - Less affected by background: limited reflection type
  - Easy light axis alignment: red LED type

Type

Detection method	Detecting distance	Model		Operation mode	Output mode
		Side-on type	Head-on type		
Through beam	1 m	**GT1SN**	—	Light-ON/ Dark-ON selectable (with switch)	NPN Open collector output
		GT1SPN	—		PNP Open collector output
		—	**GT1N**		NPN Open collector output
		—	**GT1PN**		PNP Open collector output
	7 m	—	**GT3N**		NPN Open collector output
		—	**GT3PN**		PNP Open collector output
	10 m	**GT3RSN**	—		NPN Open collector output
		GT3RSPN	—		PNP Open collector output
	7 m	**GT7SN**	—		NPN Open collector output
		GT7SPN	—		PNP Open collector output
Retroreflective	0.01 - 2 m	**GSM2RSN**	—		NPN Open collector output
		GSM2RSPN	—		PNP Open collector output
Diffuse reflective	70 mm	**GS5SN**	—		NPN Open collector output
		GS5SPN	—		PNP Open collector output
		—	**GS5N**		NPN Open collector output
		—	**GS5PN**		PNP Open collector output
	400 mm	**GS20RSN**	—		NPN Open collector output
		GS20RSPN	—		PNP Open collector output
	300 mm	—	**GS20RN**		NPN Open collector output
		—	**GS20RPN**		PNP Open collector output
	300 mm	**GS20SN**	—		NPN Open collector output
		GS20SPN	—		PNP Open collector output
	200 mm	—	**GS20N**		NPN Open collector output
		—	**GS20PN**		PNP Open collector output
Convergent reflective	1 - 40 mm	**GSZ3SN**	—		NPN Open collector output
		GSZ3SPN	—		PNP Open collector output
	3 - 30 mm	**GSZ3RSN**	—		NPN Open collector output
		GSZ3RSPN	—		PNP Open collector output

Optional Parts

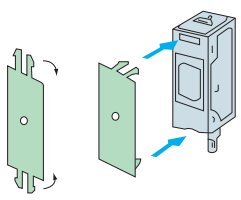
Type	Model	Pinhole diameter	Applicable model and detecting distance (attached to both transmitter and receiver)
Pinhole plate (SUS)	**GP1**	ϕ 1mm	**GT3RSN**·····400㎜ **GT7SN** ·····300㎜
	GP2	ϕ 2mm	**GT3RSN**·····1m **GT7SN** ·····1m
	GP3	ϕ 3mm	**GT3RSN**·····3m **GT7SN** ·····2.5m
	GP5-1	5 x 1mm	**GT3RSN**·····2m **GT7SN** ·····1.7m

(Models GT1N and GT1SN are provided with stick-on pinhole sheets.)

(Detecting distance when pinhole plates are mounted on both transmitter and receiver)

Type of pinhole plate (attached to GT1N or GT1SN)	ϕ 1mm	ϕ 2mm	ϕ 3mm	5×1 mm
Detecting distance	100 mm	300 mm	400 mm	300 mm

● Installation of pinhole plate

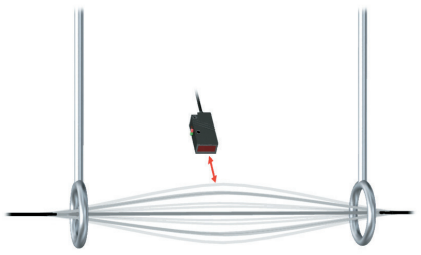


Bend the top and bottom parts at the base and insert the bent parts into the sensor slits.

Type	Model	Description	
Protective cover	**GN-PCB1**	For side-on type	Durable stainless steel cover to protect the sensor and reflector from impact. See page 195.
	GN-PCB2		
	G-K7B	For retroreflector (K-7 or K-71)	

Typical Application

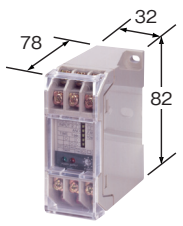
This sensor detects vibrations or reflections in the string.



● Applicable power supply unit

PS series

High capacity of 200 mA at 12 VDC



(General-purpose type) PS3N
PS3N-SR
(Multifunctional type) PS3F
PS3F-SR

Mini-G

Rating/Performance/Specification

Type	Side-on	NPN output	**GT1SN**	—	**GT3RSN**	**GT7SN**	**GSM2RSN**	**GS5SN**	**GS20RSN**	**GS20SN**	**GSZ3N**	**GSZ3RSN**
		PNP output	**GT1SPN**	—	**GT3RSPN**	**GT7SPN**	**GSM2RSPN**	**GS5SPN**	**GS20RSPN**	**GS20SPN**	**GSZ3SPN**	**GSZ3RSPN**
	Head-on	NPN output	**GT1N**	**GT3N**	—	—	—	**GS5N**	**GS20RN**	**GS20N**	—	—
		PNP output	**GT1PN**	**GT3PN**	—	—	—	**GS5PN**	**GS20RPN**	**GS20PN**	—	—
Detection method			Through beam				Retroreflective	Diffuse reflective			Convergent reflective	
Detecting distance			1m	7m	10m	7m	0.01～2 m (When used with K-71 reflector)	70 mm (50 x 50 mm white drawing paper)	400 mm (GS20RSN) 300 mm (GS20RN) (100 x 100 mm white drawing paper)	300 mm (GS20SN) 200 mm (GS20N) (100 x 100 mm white drawing paper)	1～40 mm (50 x 50 mm white drawing paper)	3～30 mm (50 x 50 mm white drawing paper)
Detection object			ϕ6mm (oe more) Opaque				ϕ40mm (or more) Opaque	Opaque, translucent, transparent				
Power supply			12-24V DC ±10% / Ripple 10% or less									
Current consumption		NPN output	Transmitter: 23mA or less Receiver: 18mA or less				20mA or less	25mA or less	20mA or less	22mA or less		20mA or less
		PNP output	Transmitter: 23mA or less Receiver: 21mA or less				25mA or less	28mA or less	25mA or less			
Output mode	Control output	NPN output	NPN open collector output Rating: sink current 100mA (30 VDC) or less									
		PNP output	PNP open collector output Rating: source current 100mA (30 VDC) or less									
	Stability output	NPN output	NPN open collector output Rating: sink current 50mA (30 VDC) or less									
		PNP output	PNP output type does not have stability output									
Operation mode			Light-ON/Dark-ON selectable (with switch)									
Response time			0.35ms or less									
Hysteresis			—					10% or less				
Operating angle			30° (at receiver)	10°(at receiver)			30° (at reflector)	—				
Light source (light wavelength)			Infrared LED (880nm)		Red LED (700nm)	Infrared LED (880nm)	Red LED (700nm)	Infrared LED (900nm)	Red LED (700nm)	Infrared LED (900nm)		Red LED (700nm)
Indicator			Transmitter: Power indicator (red LED) Receiver: Operation indicator (red LED) Stability indicator (green LED)				Operation indicator (red LED) Stability indicator (green LED)					
Volume			SENS: Sensitivity adjustment (on receiver for through-beam type)									
Switch			Light-ON/Dark-ON selector switch provided									
Short circuit protection			Provided (for control output only)									
Material		Case	Polyarylate									
		Lens	Polycarbonate	Polyarylate			Polycarbonate	Polyarylate			Polycarbonate	Acrylic
Connection		NPN output	Cable type (outer diameter: 3mm; length 2m) Transmitter: 0.15mm² x 2 cores (gray) Receiver: 0.15mm² x 3 cores (black)				Cable type (outer diameter: 3mm; length 2m) 0.15mm² x 4 cores (black)					
		PNP output	Cable type (outer diameter: 3mm; length 2m) Transmitter: 0.15mm² x 2 cores (gray) Receiver: 0.15mm² x 3 cores (black)				Cable type (outer diameter: 3mm; length 2m) 0.15mm² x 3 cores (black)					
Weight			Approx. 50 g (transmitter/receiver)				Approx. 50g					
Accessories			Pinhole sheets provided					K-71 reflector				
			Mounting bracket, operation manual provided									

Environmental Specification

Ambient light	5,000 lx or less
Ambient temperature	–25 - +55°C (non-freezing)
Ambient humidity	35-85%RH (non-condensing)
Protective structure	IP67
Vibration	10-55 Hz / 1.5 mm double amplitude / 2 hours each in 3 direction
Shock	500 m/s² / 3 times each in 3 directions
Dielectric strength	1,000 VAC for 1 minute
Insulation resistance	500 VDC, 20 MΩ or higher

* Detecting distances for different reflectors

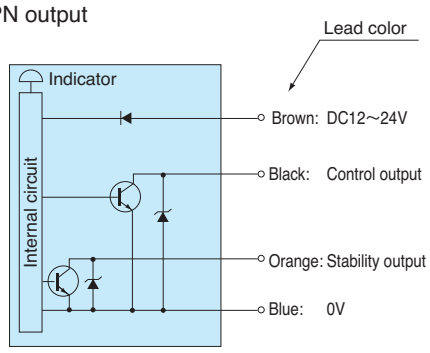
The detecting distance depends on the reflector used.

Reflector model	K-71	K-7	S-25
Detecting distance	0.01 - 2m	0.01 - 3m	70 - 400mm

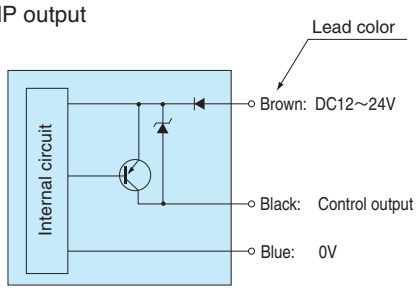
The detecting distance is the range which you can set for the reflector. The sensor can detect an object even in extremely short range.

Input/Output Circuit and Connection

● NPN output



● PNP output

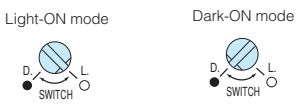


(PNP output models are not equipped with stability output.)

- The transmitter is provided with power supply lines (brown: 12 - 24 VDC; blue: 0 V) only.
- The output transistor turns off when load short circuit or overload occurs. Check the load and turn the power back on.

Switching the operation mode

- All models have the operation mode selector.

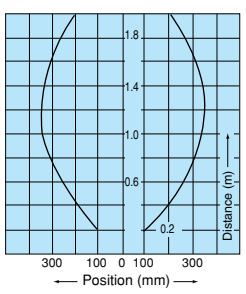


For the Light-ON mode, turn to L.
For the Dark-ON mode, turn to D.

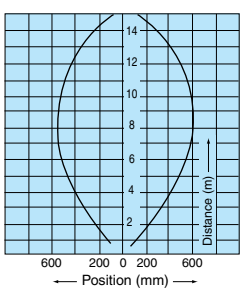
Performance Curves (Typical)

● Response Curves : Beam Pattern

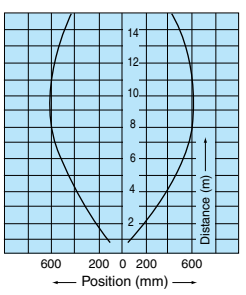
GT1SN·GT1N



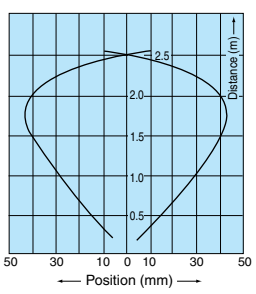
GT3N·GT7SN



GT3RSN

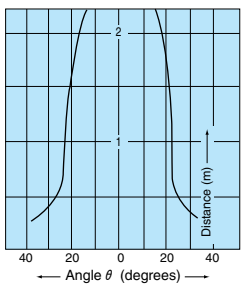


GSM2RSN (K-71)

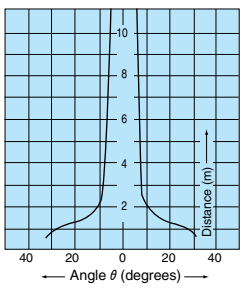


● Response Curves : Tilt Angle

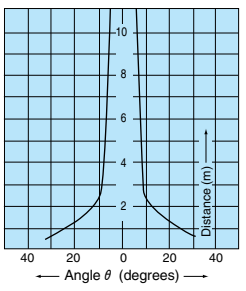
GT1SN·GT1N



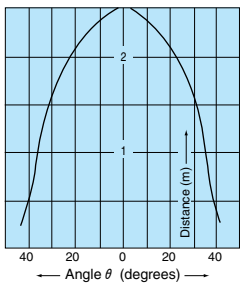
GT3N·GT7SN



GT3RSN



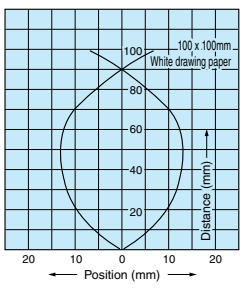
GSM2RSN (K-71)



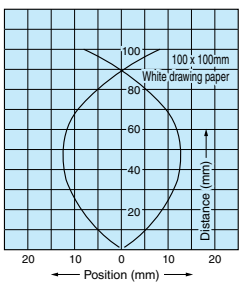
Mini-G

● Response Curves : Detecting Position

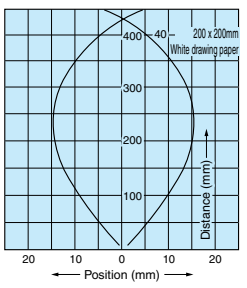
GS5SN



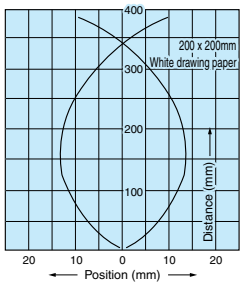
GS5N



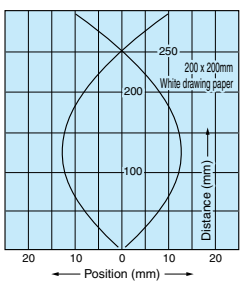
GS20RSN



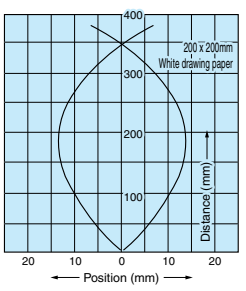
GS20RN



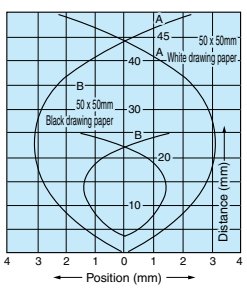
GS20N



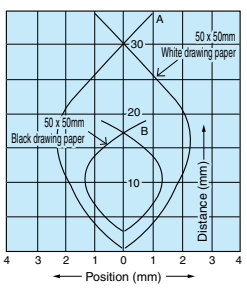
GS20SN



GSZ3SN

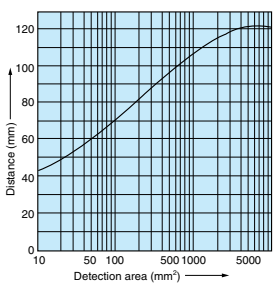


GSZ3RSN

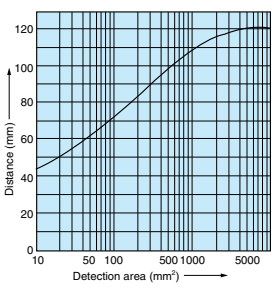


● Response Curves : Target Size

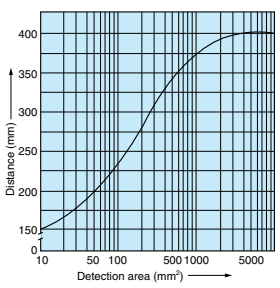
GS5SN



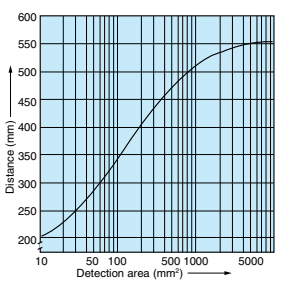
GS5N



GS20RN

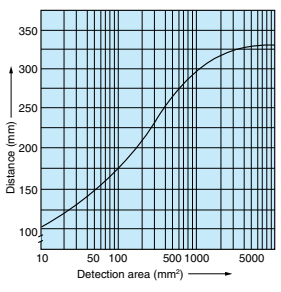


GS20RSN

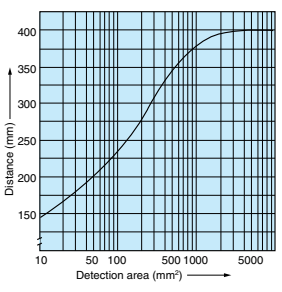


● Response Curves : Ambient Temperature

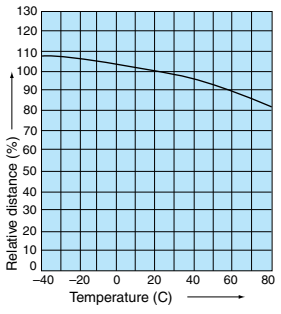
GS20N



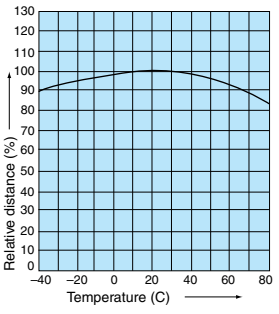
GS20SN



Reflective type



Through beam type

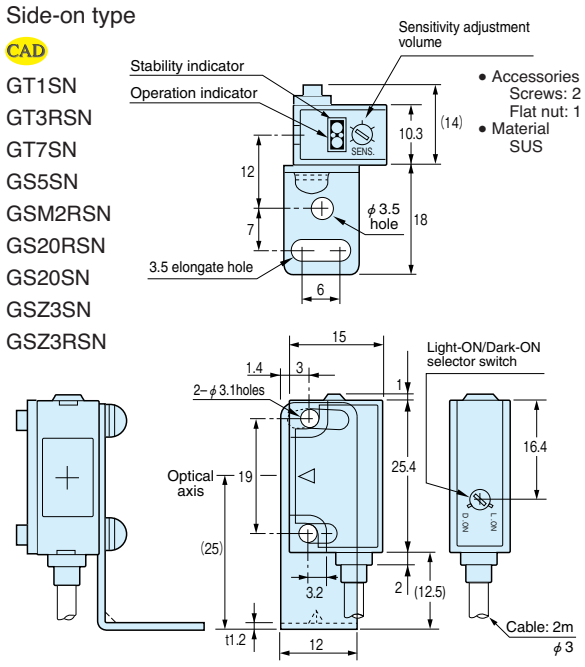


Dimensions (in mm; tightening torque for mounting screws: 0.6 N·m max.)

Side-on type

CAD

GT1SN
GT3RSN
GT7SN
GS5SN
GSM2RSN
GS20RSN
GS20SN
GSZ3SN
GSZ3RSN

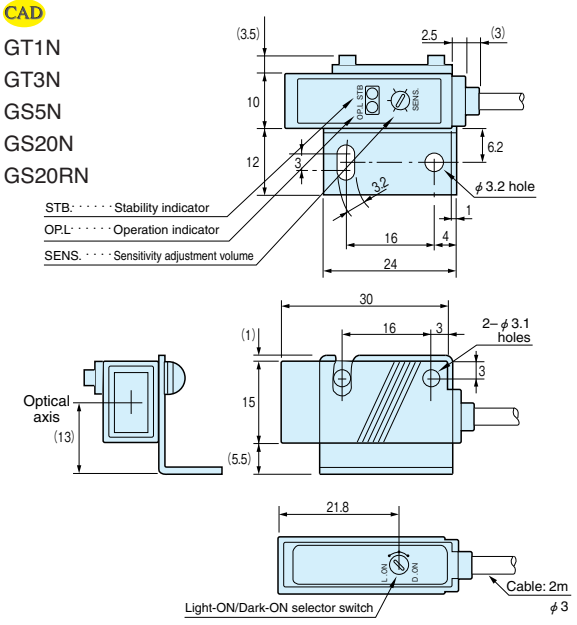


*Figures above show receivers. Transmitters have different panels.

Head-on type

CAD

GT1N
GT3N
GS5N
GS20N
GS20RN

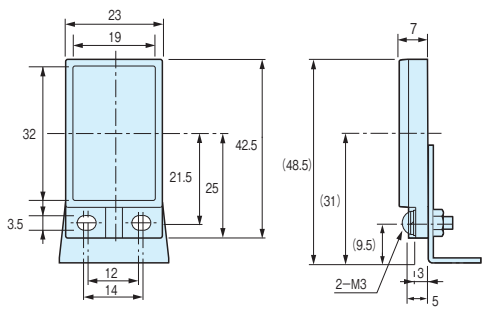


*Figures above show receivers. Transmitters have different panels.

Reflector

CAD

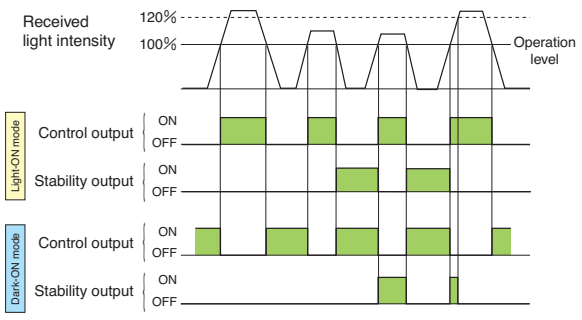
K71



(Applicable to polarized retroreflective type
Effective reflecting surface: 30 x 18 mm
Mounting: mounting bracket provided, secured with M3 screws (alternatively adhesive may be used))

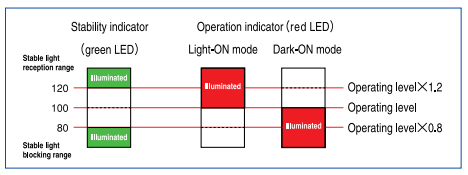
Stability output

The stability output can be used to check for reduction of the light intensity level along with any change in the operating environment or operation over time or to perform initial check of the operation. When two consecutive detections have occurred with the intensity of light detected exceeding the operation level but not reaching 120 % of the level (range allowing stable operation), the stability signal is output when the control output is deactivated. (This output is not available with the PNP output types of the Mini-G Series.)



Indicators

- The operation indicator (red LED) and stability indicator (green LED) each show different received light intensity levels as described in the figure.
- After aligning the optical axis and adjusting the sensitivity, make sure the light received and the light blocked is within the stable ranges by blocking and unblocking the lights with a detection object repeatedly.
  Setting within the stable range increases reliability against differences in the environment after installation.



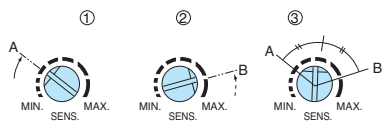
- The orange LED is the operation indicator.
  For the light ON mode, the indicator is illuminated when the light is detected.
  For the dark ON mode, the indicator is illuminated when the light is blocked.

Sensitivity adjustment (for Light-ON mode)

(Adjustment for Light-ON mode)

- When any light-reflecting object is in the background

(1) Place the object to be detected in a given position, turn up the sensitivity adjustment volume (SENS.) gradually and find the point at which the operation indicator (red LED) is illuminated (Point A).
(2) Remove the object, turn down the sensitivity adjustment volume gradually from MAX. and find the point at which the operation indicator (red LED) goes out (Point B). (If the operation indicator is not illuminated even at Max., MAX. is regarded as Point B.)
(3) Set the volume at midway between Points A and B.



CAD To download CAD data including dimensions, please visit www.takex-elec.co.jp/index_e.html.