

Middle-G Series

Compact for built-in use
Embedded Amplifier Photo Sensors

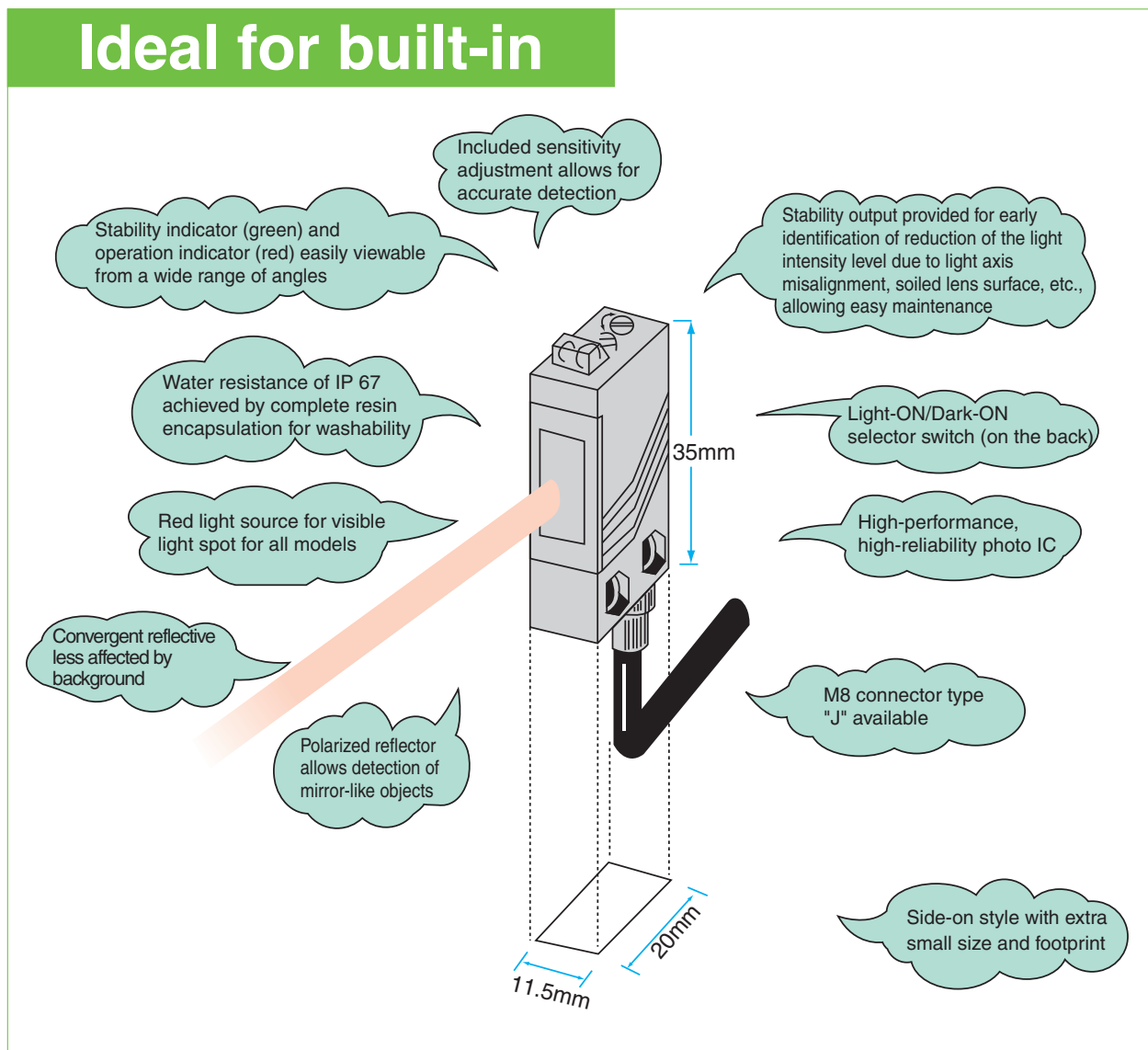
Embedded Amplifier Photo Sensors






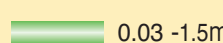

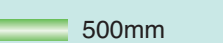

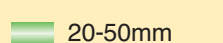
- Completely filled with resin to be IP67 compliant
- Improved water resistance and intensity suitable for conveyor lines

- The operation mode can be selected by a switch
- Sensitivity adjustment for fine detection
- Globally compatible PNP types also conveniently provided with stability output
- Optional rigid protective cover (mounting bracket) available

Ideal for built-in



Type

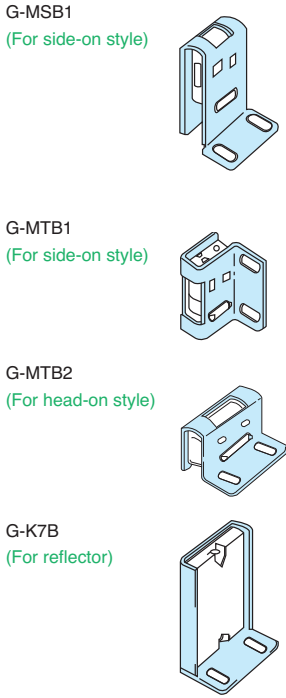
Detection method	Detecting distance	Model		Operation mode	Output mode
		NPN output	PNP output		
 Through beam	 7m	GT5RSN	GT5RSPN-N	Light-ON/ Dark-ON selectable [with switch]	Open collector output
		GT5RSN-J	GT5RSPNN-J		
		GT5RN	GT5RPN-N		
		GT5RN-J	GT5RPNN-J		
 Polarized retroreflective	 0.03 -1.5m	GMR2RSN	GMR2RSPN-N		
		GMR2RSN-J	—		
		GMR2RN	GMR2RPN-N		
		GMR2RN-J	GMR2RPNN-J		
 Diffuse reflective	 500mm	GSR05RSN	GSR05RSPN-N		
		GSR05RSN-J	GSR05RSPNN-J		
		GSR05RN	GSR05RPN-N		
		GSR05RN-J	GSR05RPNN-J		
 Convergent reflective	 20-50mm	GSZ5RS	—		
		GSZ5R	GSZ5RPN		

Optional Parts

Type	Model	Applicable model	Description
Reflector	K-7	All polarized retroreflective type models	Detecting distance With K-7: 0.03-2.5 m With S-25: 70-400 mm
	S-25 *		
Protective cover	G-MSB1	Side-on type models	Rigid SUS covers for protecting sensors and reflectors from impact, etc.
	G-MTB1		
	G-MTB2	Head-on type models	
	G-K7B	K-7 and K-71 reflectors	
Cord with M8 connector	FBC-4R2S	M8 connector type sensor models with "-J"	Straight (2 m)
	FBC-4R2L		Angled (2 m)

* One sheet contains 25.

Protective cover



For dimensions, see "Dimensions (protective cover)."

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Rating/Performance/Specification

Model	Cable type		GT5RN	GT5RSN	GMR2RN	GMR2RSN	GSR05RN	GSR05RSN	GSZ5R	GSZ5RS	
	NPN output										
	PNP output		GT5RPN-N	GT5RSPN-N	GMR2RPN-N	GMR2RSPN-N	GSR05RPN-N	GSR05RSPN-N	GSZ5RPN	—	
	Connector type	NPN output		GT5RN-J	GT5RSN-J	GMR2RN-J	GMR2RSN-J	GSR05RN-J	GSR05RSN-J	GSZ5R-J	GSZ5RS-J
PNP output		GT5RPNN-J	GT5RSPNN-J	GMR2RPNN-J	GMR2RSPNN-J	GSR05RPNN-J	GSR05RSPNN-J	GSZ5RPN-J	—		
Detection method		Through beam			Polarized retroreflective		Diffuse reflective type		Convergent reflective		
Detecting distance		7 m			0.03 - 1.5 m		500mm (100 x 100mm white drawing paper)		20 - 50mm (100 x 100mm white drawing paper)		
Detection object		φ20mm (or more) Opaque			Glossy objects including mirror-like materials and stainless-steel plates or opaque objects		Opaque, translucent, and transparent				
Power supply		12 - 24V DC ±10% / Ripple 10% or less (* 5VDC model)									
Current consumption		NPN output		Transmitter: 20mA or less Receiver: 20mA or less			30mA or less		25mA or less		
		PNP output		Transmitter: 20mA or less Receiver: 25mA or less			35mA or less		30mA or less		
Output mode		Control output		NPN open collector output Rating: sink current 100mA (30 VDC) or less / Residual voltage: 1 V or less							
		PNP output		PNP open collector output Rating: source current 100mA (30 VDC) or less / Residual voltage: 2 V or less							
		Stability output		NPN output		NPN open collector output Rating: sink current 50mA (30 VDC) or less / Residual voltage: 1 V or less					
				PNP output		NPN open collector output Rating: sink current 50mA (30 VDC) or less / Residual voltage: 1 V or less					
Operation mode		Light-ON/Dark-ON selectable (with switch)									
Response time		0.5ms or less									
Hysteresis		10% or less									
Operating angle		10° (at receiver)			30° (at reflector)						
Light source (light wavelength)		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 (VR)		SENS: sensitivity adjustment (on receiver for through-beam type)									
Switch (SW)		Light-ON/Dark-ON selector switch provided									
Short circuit protection		Provided (for control output only)							Provided		
Material		Case		Polyarylate							
		Lens		Acrylic							
Connection		Attached cable (outer diameter 4.2) Transmitter of through-beam type: 0.3 mm ² 2 core 2 m length (gray) Receiver of through-beam type, reflective type : 0.2 mm ² 4 core 2 m (black)									
Mass		Approx. 80 g (transmitter/receiver)			Approx. 80g						
Accessories		K-71 reflector provided Mounting bracket, screwdriver for adjustment and operation manual									
Notes		*A model using power supply of 5VDC is also available among head-on types. Please contact TAKEX for details. ● All models are provided with a mounting bracket. Polarization reflector types are provided with a bracket for reflector and adhesive sheet for mounting the reflector.									

- The detecting distance of diffuse reflective type varies, depending on transmittance of the detection object. Please be sure to check the detection beforehand.
- The detecting distance and detection object of the reflective type vary, depending on a reflector combined with the sensor.
- The detecting distance is the range which you can set for the reflector. The sensor can detect an object even in extremely short range.

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/s ² / 3 times each in 3 directions
Dielectric withstanding	1,000 VAC for 1 minute
Insulation resistance	500 VDC, 20 MΩ or higher

*Detecting distances for different reflectors

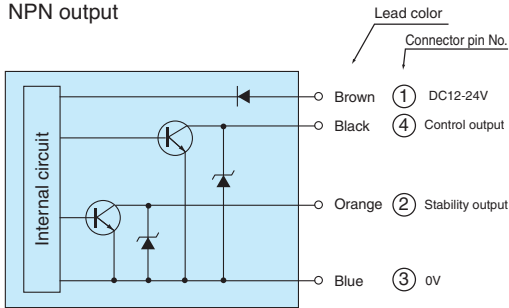
- The detecting distance depends on the reflector used.

Reflector model	K-71	K-7	S-25
Detecting distance	0.03 - 1.5m	0.03 - 2.5m	70 - 400mm

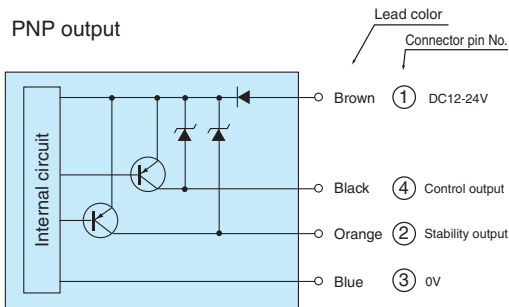
The detecting distance is the range which you can set for the reflector. The sensor can detect an object even in extremely short range.

Input/Output Circuit and Connection

NPN output

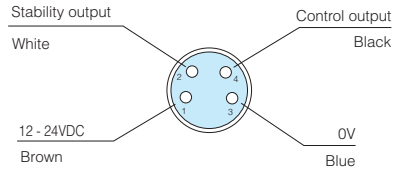


PNP output



- 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.

M8 connector type (-J) pin assignment and connection (Receiver/reflective type sensor)



The colors show lead colors for use in combination with the optional cord with M8 connector.

(Transmitter)

Lines other than Lines 1 (brown) and 3 (blue) are unused.

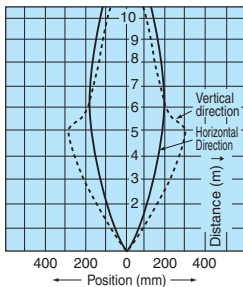


Performance Curves (Typical)

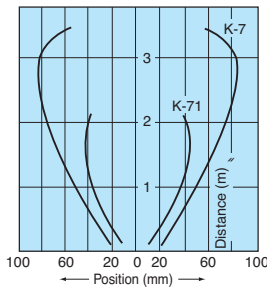
The various performance curves are the same as the NPN output / PNP output except for the output mode.

Response Curves: Beam Pattern

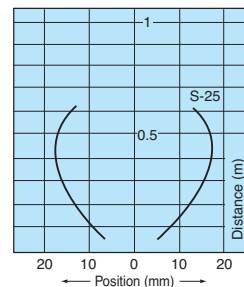
GT5RSN · GT5RN



GMR2RSN (K-7) / GMR2RN (K-71)

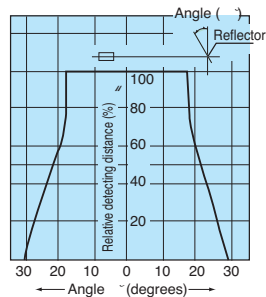


GMR2RSN (S-25) / GMR2RN (S-25)



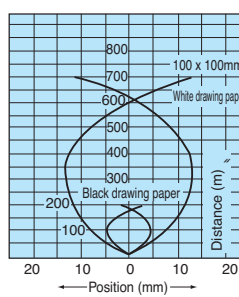
Response Curves: Tilt Angle

GMR2RSN · GMR2RN



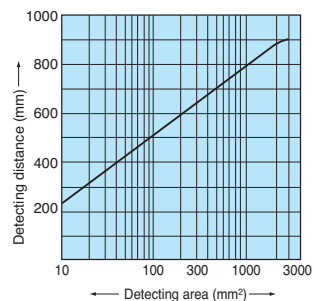
Response Curves: Detecting Position

GSR05RSN · GSR05RN



Response Curves: Target Size

GSR05RSN · GSR05RN



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

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<p>GT5RN GMR2RN GSR05RN GSZ5R CAD</p> <p>(Head-on) typical example</p> <p>With mounting bracket attached. <ul style="list-style-type: none"> Accessories Screw: 2 Nut: 2 Materials SUS </p> <p>*1 The operating side depends on the model.</p>	<p>GT5RSN GMR2RSN GSR05RSN GSZ5RS CAD</p> <p>(Side-on) Typical example</p> <p>With mounting bracket attached. <ul style="list-style-type: none"> Accessories Screw: 2 Nut: 2 Materials SUS </p>
<p>K-71 Reflector (attached to polarized retroreflective type) CAD</p> <p>With mounting bracket attached. <ul style="list-style-type: none"> Accessories Screw: 2 Nut: 2 Materials Mirror: acryl Base: heat-resistant ABS </p> <p>May be pasted on with adhesive sheet provided</p> <p>(Applicable to polarized retroreflective type) Effective reflecting surface: 30 x 18 mm Mounting: secured with M3 screws attached to mounting bracket (alternatively adhesive may be used)</p>	<p>(Mounting bracket in different orientation)</p> <p>With mounting bracket attached. <ul style="list-style-type: none"> Accessories Screw: 2 Nut: 2 Materials SUS </p>
<p>"-J" (M8 connector type) head-on model CAD</p> <p>With mounting bracket attached. <ul style="list-style-type: none"> Accessories Screw: 2 Nut: 2 Materials SUS </p>	<p>"-J" (M8 connector type) side-on model CAD</p>
<p>FBC-4R2S (Straight) CAD</p> <p>Outer diameter φ4 cable: 0.2 mm² x 4 cores 2m (black)</p>	<p>FBC-4R2L (Angled) CAD</p> <p>Outer diameter φ4 cable: 0.2 mm² x 4 cores 2m (black)</p>

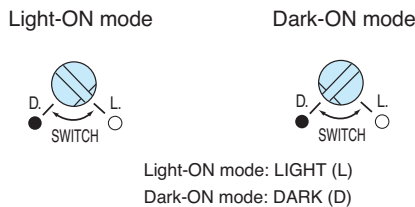
Dimensions (protective cover) (in mm)

The tightening torque between brackets and sensors or between brackets and screws has to be up to 0.6 N · m.

<p>G-MSB1 (side-on)</p> <p>CAD</p> <p>• Accessories Screw: 2 Flat nut: 1 • Materials SUS</p>	<p>G-MTB2 (head-on)</p> <p>CAD</p> <p>• Accessories Screw: 2 Flat nut: 1 • Materials SUS</p>
<p>G-MTB1 (side-on)</p> <p>CAD</p> <p>• Accessories Screw: 2 Flat nut: 1 • Materials SUS</p>	<p>G-K7B (reflector)</p> <p>CAD</p> <p>A for K-7 B for K-10 C for K-71 C' for reverse mouting of K-71</p> <p>• Accessories Screw: 2</p>

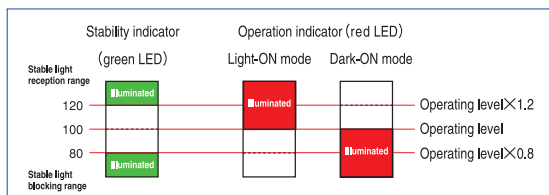
Operation Mode Switching

- Operation mode selector switch is provided for all models.



Indicators

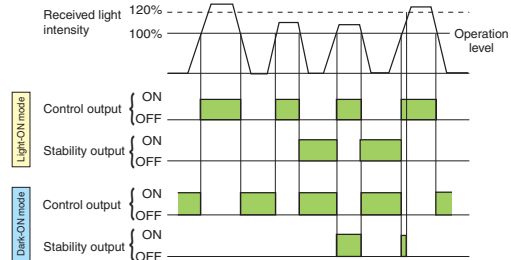
- The operation indicator (red LED) and stability indicator (green LED) each show different received light intensity levels as described in the figure.
- After aligning the optical axis and adjusting the sensitivity, make sure the light received and the light blocked is within the stable ranges by blocking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



- The red 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.

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.



Sensitivity adjustment (for diffuse-reflective type)

(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 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.

