- New type of amplifier built-in photo sensor
- Slim and compact side-on models
  - Lightweight and compact
    Thin, space-saving sensor allowing flexible mounting
  - Flat lens less affected by dust or dirt attached
    Superb stability with the high power (detecting distance of 10 m)
  - High-intensity indicators for increased visibility
    Easy checking of sensor operation from a distance

Type

Detection method	Detecting distance	Model		Operation mode	Output mode
		NPN type	PNP type		
Through-beam type	10m	**GN-T10RS**	**GN-T10RSPN**	Light-ON/Dark-ON selectable (with switch)	Open collector
Polarization reflector type	0.03～1.3m	**GN-M2RS**	**GN-M2RSPN**		
Diffuse-reflective type	400㎜	**GN-R40RS**	**GN-R40RSPN**		

- Infrared LED type
  For the through-beam and diffuse-reflective models, types that employ infrared LED as the light source are available.
  Fro details, see Rating/Performance/Specification.
- M8 connector type
  M8 connector connection types are available for all models.
  Fro details, see Rating/Performance/Specification.
  For connector specifications, see p. 180.


M8 connector type

Optional Parts

Type		Model	Pinhole diameter / Direction of polarization	Detecting distance with plate/filter attached: Red LED	Detecting distance with plate/filter attached: Infrared LED
For through-beam type only	Pinhole plate	**GNP1**	φ1mm	400mm	300mm
		GNP2	φ2mm	1m	1m
		GNP3	φ3mm	3m	2.5m
		GNP5-1	5×1mm	2m	1.7m
	Interference prevention filter	**GN-PFA**	Longitudinal	5m (Applicable to red LED type only)	
		GN-PFB	Horizontal		

Type	Model	Shape
Cord with M8 connector	**FBC-4R2S**	Straight (2 m)
	FBC-4R2L	Angled (2 m)

Rating/Performance/Specification

Rating/performance	Type	Permanently attached cord	NPN type	**GN-T10RS**	**GN-T7S**	**GN-M2RS**	**GN-R40RS**	**GN-R30S**	**GN-R7S**
			PNP type	**GN-T10RSPN**	**GN-T7SPN**	**GN-M2RSPN**	**GN-R40RSPN**	**GN-R30SPN**	**GN-R7SPN**
		Connector	NPN type	**GN-T10RS-J**	**GN-T7S-J**	**GN-M2RS-J**	**GN-R40RS-J**	**GN-R30S-J**	**GN-R7S-J**
			PNP type	**GN-T10RSPN-J**	**GN-T7SPN-J**	**GN-M2RSPN-J**	**GN-R40RSPN-J**	**GN-R30SPN-J**	**GN-R7SPN-J**
	Detection method			Through-beam type		Polarization reflector type	Diffuse-reflective type		
	Detecting distance			10m	7m	0.03~1.3m *1	400mm	300mm	70mm
	Detection object			ϕ 6mm (Min.) Opaque		Glossy objects including mirror-like materials and stainless-steel plates or Opaques	Standard detection object: 200 x 200 mm white drawing paper		Standard detection object: 100 x 100 mm white drawing paper
	Power supply			12-24V DC ±10% / Ripple 10% max.					
	Current consumption			Transmitter: 22mA max. Receiver: 15mA max.		25mA max.			
	Output mode	Control output	NPN type	Rating: sink current 100 mA (30 VDC max.) / Residual voltage: 1 V or less					
			PNP type	Rating: source current 100 mA (30 VDC max.) / Residual voltage: 2 V or less					
		Stability output	NPN type	Rating: sink current 50 mA (30 VDC max.) / Residual voltage: 1 V or less					
			PNP type	Rating: source current 50 mA (30 VDC max.) / Residual voltage: 2 V or less					
	Operation mode			Light-ON/Dark-ON selectable (with switch)					
	Anti Interference feature			———		Provided (operation may be affected depending on the setting)			
	Response time			0.5ms max.					
	Operating angle			10° (at receiver)		30° (at reflector)	———		
	Hysteresis			———			10% max.		
Specification	Light source (light wavelength)			Red LED (700nm)	Infrared LED (880nm)	Red LED (640nm)		Infrared LED (880nm)	
	Indicator			Transmitter: Power indicator (orange LED) Receiver: Operation indicator (orange LED) Stability indicator (green LED)		Operation indicator (orange LED) Stability indicator (green LED)			
	Volume (VR)			Sensitivity adjustment (on receiver for through-beam type)					
	Switch (SW)			Light-ON/Dark-ON selector switch					
	Short circuit protection			Provided for control output and stability output					
	Material	Case		Polybutylene terephthalate					
		Lens		Methacrylate					
	Connection	Permanently attached cord		Permanently attached cord (outer dimension: dia. 3.5) Transmitter 0.2sq. 2 core 2 m length (gray) Receiver 0.2 sq. 4 core 2 m length (black)		Permanently attached cord (outer dimension: dia. 3.5) 0.2sq. 4 core 2 m length (black)			
		Connector		M8 connector (cord with M8 connector separately available)					
	Mass	Permanently attached cord		Transmitter/receiver: approx. 60g		Approx. 60g			
		Connector		Transmitter/receiver: approx. 10g		Approx. 10g			
	Accessory					K-71 reflector			
				Screwdriver for sensitivity adjustment, operation manual, mounting bracket GN-B1 (provided for permanently attached cord type only)					

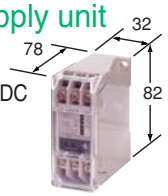
*1 The distance with use of K-7 (separately available) is 0.01 - 2 m.

Environmental Specification

Environment	Ambient light	5,000 lx max.
	Ambient temperature	–25 - +55 –C (non-freezing)
	Ambient humidity	35 - 85%RH (non-condensing)
	Protective structure	IP67
	Vibration	10 - 55 Hz / 1.5 mm amplitude / 2 hours each in 3 direction
	Dielectric strength	AC1000V 1 min.
	Insulation resistance	500 VDC, 20 MΩ or higher
	Shock	500 m/s² / 3 times each in 3 directions

● Applicable power supply unit

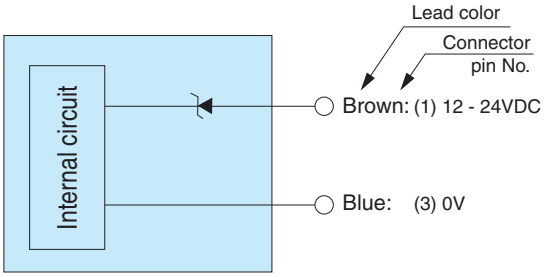
PS series
High capacity of 200 mA at 12 VDC



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

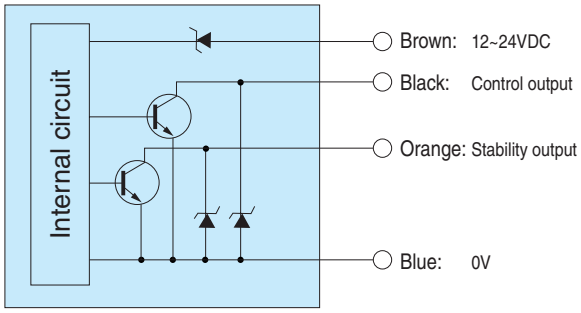
Input/Output Circuit and Connection

Transmitter of through-beam type

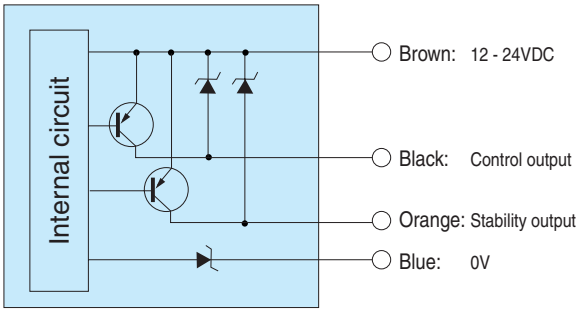


Receiver of through-beam type/polarization reflector type/diffuse-reflective type

NPN output type



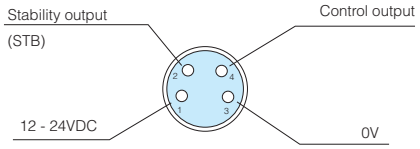
PNP output type



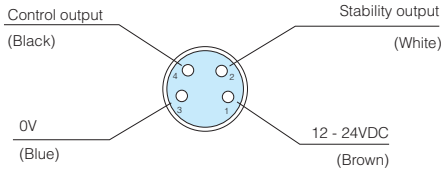
- The output transistor turns off when load short circuit or overload occurs. Check the load and turn the power back on. To extend the cord, use thick wires (at least 0.3 mm²).

Connector type pin assignment and connection

(Sensor)



(Cord with M8 connector)



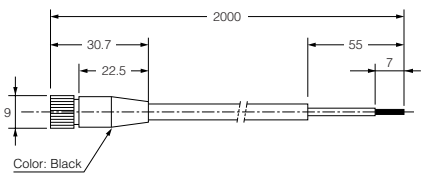
Lead color	Pin No.	Function
Brown	1	12 - 24 VDC
White	2	STB output
Blue	3	0V
Black	4	Control output

Cord with M8 connector (optional)

(in mm)

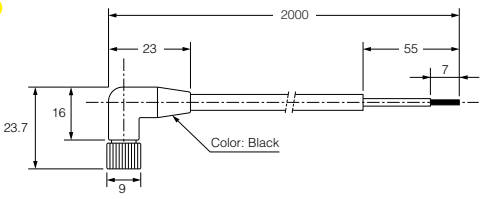
FBC-4R2S (straight)

CAD



FBC-4R2L (angled)

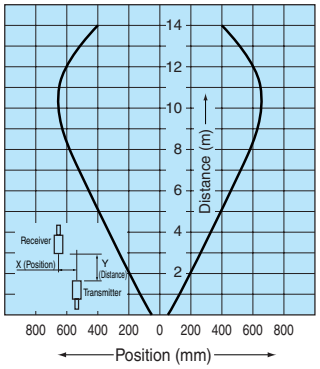
CAD



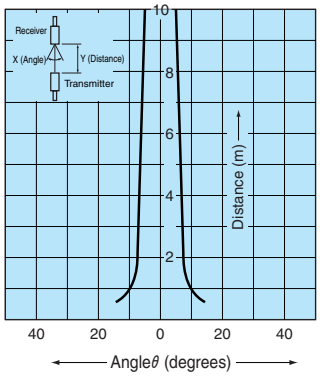
Characteristics (Typical Example)

Through-beam type GN-T10RS (PN) (-J)

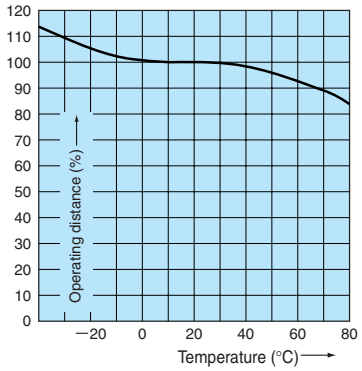
● Directional characteristics



● Operating angle characteristics

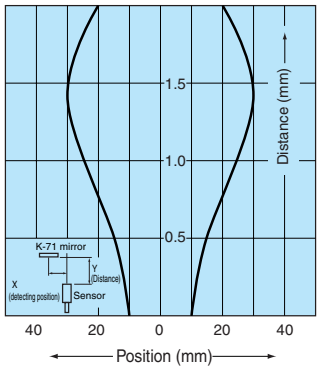


● Temperature characteristics

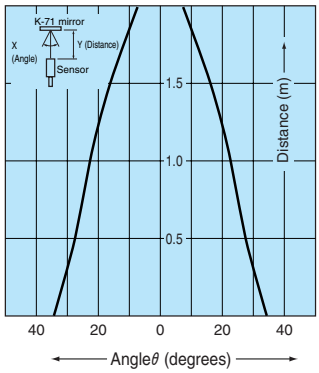


Polarization reflector type GN-M2RS (PN) (-J)

● Directional characteristics

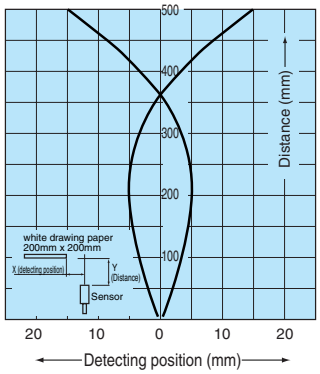


● Operating angle characteristics

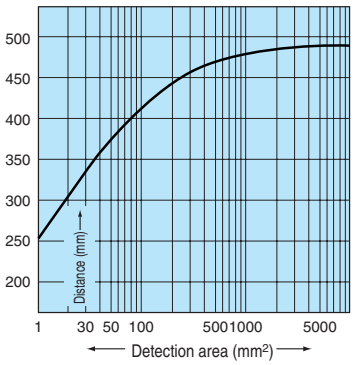


Diffuse-reflective type GN-R40RS (PN) (-J)

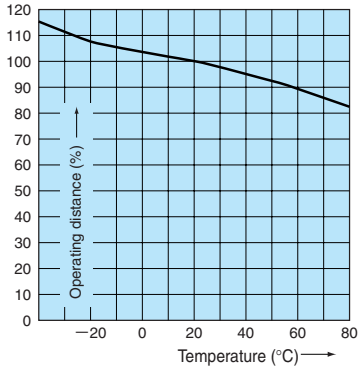
● Activation area characteristics



● Distance-area characteristics



● Temperature characteristics



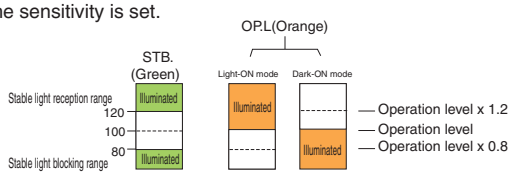
For Correct Use

Be sure to follow the instructions in the operation manual provided for correct use of the product.

- Do not use the product for detection for the protection of human body.
- When using the product for safety purposes, ensure safety with the control system as a whole as well as the detection.
- This product is not explosion proof.

About indicators

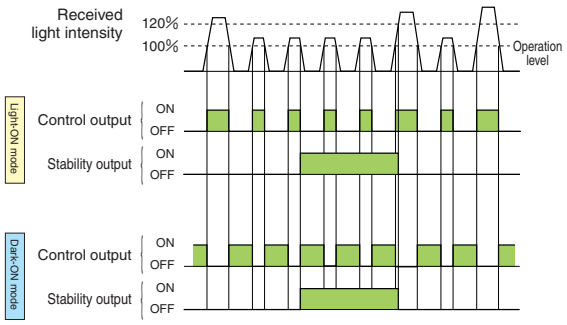
- The operation indicator (orange LED) and stability indicator (green LED) show the levels of light intensity as described in the figure below.
- After aligning the optical axis and adjusting the sensitivity, use a detection object to block and unblock the light beam several times to make sure that the sensitivity level is in a range that allows stable activation and deactivation. Setting the sensitivity in a range allowing stable operation achieves higher reliability against changes in the operating environment generated after the sensitivity is set.



- The orange LED (OP.L) is the operation indicator.
  In the L.ON (light ON) mode, the indicator is illuminated when a certain amount of light is detected.
  In the D.ON (dark ON) mode, the indicator is illuminated when a certain amount of light is not detected.

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.



Reflector of polarization reflector type

The detection distance varies depending on the reflector model used.

Reflector model	K-71	K-7	S-25
Detecting distance	0.03 - 1.3m	0.01 - 2m	50 - 600mm
Remarks	Accessory	Optional	Optional

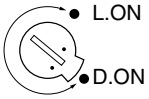
Mounting of sensor

The tightening torque for mounting screws should not exceed 0.6 N·m.

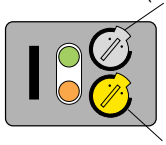
Switching between light ON and dark ON and setting sensitivity

(For the light ON mode)
Turn the switch to L.ON.

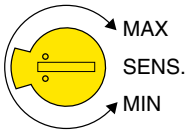
(For the dark ON mode)
Turn the switch to D.ON.



Light-ON/Dark-ON selector (white)



Sensitivity adjustment volume (yellow)



Sensitivity can be adjusted for detection with a transmission-type model in which blocking of the light beam is inadequate due to a translucent or small object or for detection with a reflection-type model in which any influence of the background should be avoided or the sensor must detect low intensity of reflected light. Turning the volume counterclockwise reduces the sensitivity.

For setting the light ON/dark ON switch (white) and adjusting the sensitivity volume (yellow), use the adjustment screwdriver supplied and turn carefully. Turning the volumes with excessive force may damage the volumes.

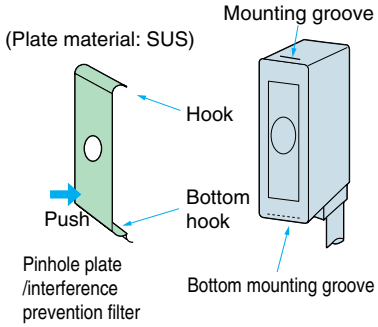
About pinhole plate

Pinhole plates allow the reduction of the size of a detection object or the margin of movement. Using the sensitivity adjustment volume in combination allows detection of even smaller or near-transparent objects.

Interference prevention filters

When two sensors are mounted close to or in contact with each other, interference prevention filters can be used to avoid faulty operation caused by mutual-interference.
Interference prevention filters can be used only for transmission-type sensors emitting red light.

Attachment of pinhole plate
/interference prevention filter



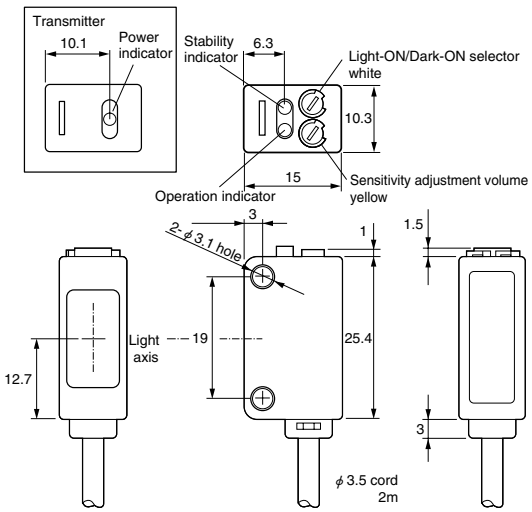
Put a hook of the plate on the mounting groove at the top of the sensor and press the bottom of the plate in until it clicks.

Dust, drops of water, etc. in the pinhole or the filter may cause faulty operation.

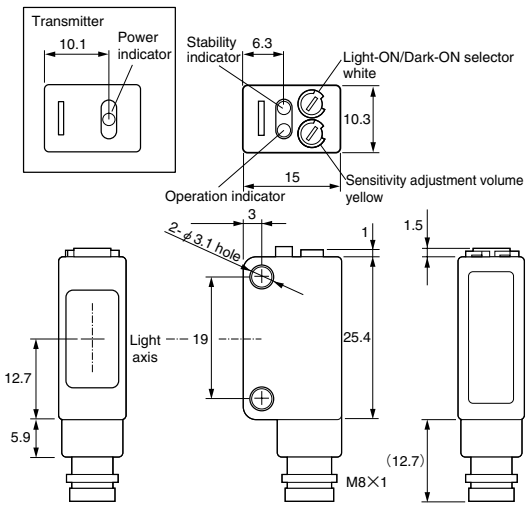
Dimensions (in mm)

All permanently attached cord model

CAD

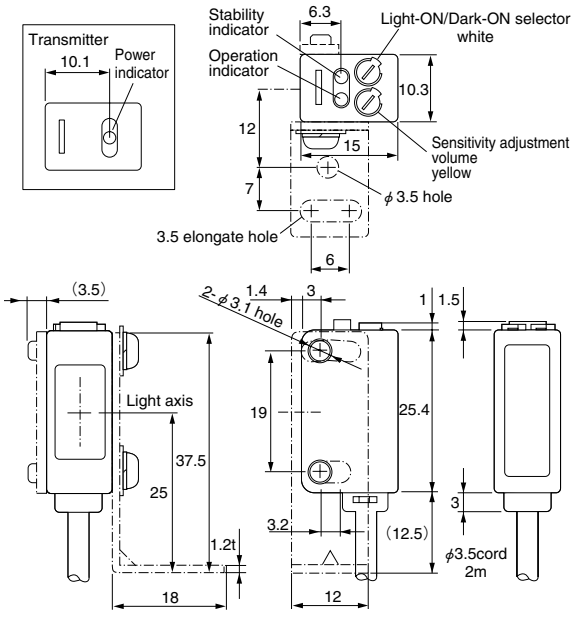


All connector connection (-J) models



(Mounting brackets do not come with connector types.)

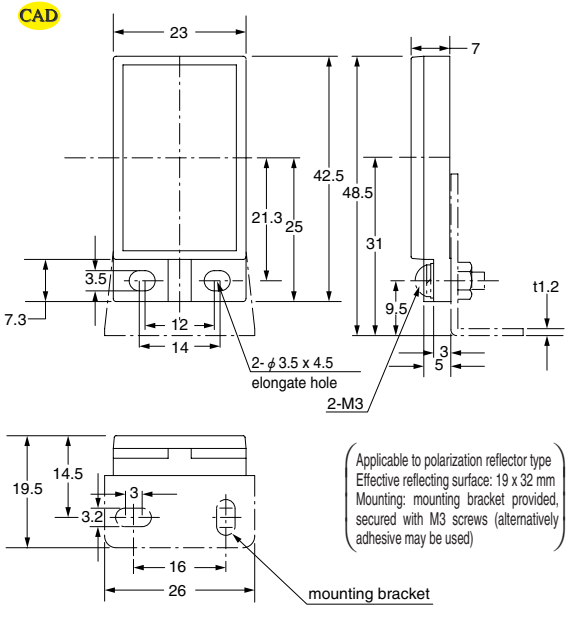
All permanently attached cord models



(With GN-B1 mounting bracket attached)

Reflector K-71

CAD



Applicable to polarization reflector type
Effective reflecting surface: 19 x 32 mm
Mounting: mounting bracket provided, secured with M3 screws (alternatively adhesive may be used)