

### SPECIFICATIONS



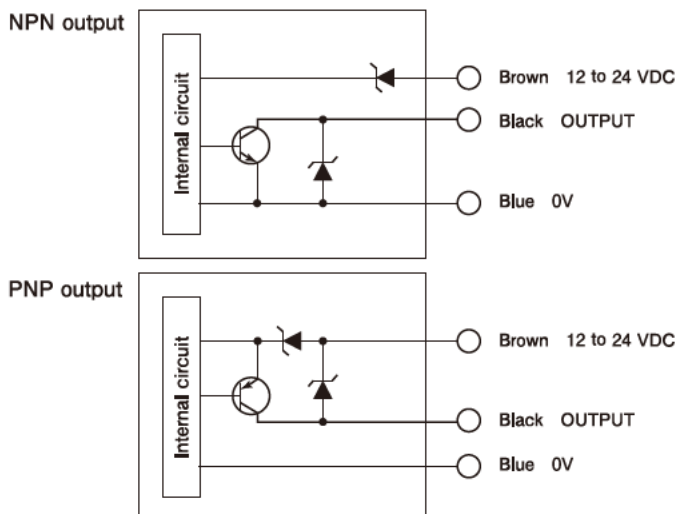
Models	NPN output type	GR12RN	GR12RSN	GR12GN	GR12GSN	GR12BSN	GR12WSN	GR40RN	GR60RN	GR12UVS	
	PNP output type	GR12RN-PN	GR12RSN-PN	GR12GN-PN	GR12GSN-PN	GR12BSN-PN	GR12WSN-PN	GR40RN-PN	GR60RN-PN	GR12UVSPN	
Detection method	Convergent beam										
Detection distance	12mm ±2mm						20 to 70mm		30 to 90mm		12mm ±2mm
Power supply	12 to 24 VDC ±10%, ripple 10% (Max.)										
Current consumption	35mA (Max.)			30mA (Max.)				38mA (Max.)		40mA (Max.)	26mA (Max.)
Output mode	NPN output type	NPN open collector output					Sink current 100mA (30VDC) or less				
	PNP output type	PNP open collector output					Source current 100mA (30VDC) or less				
Operating mode	Light-ON/Dark-ON selectable										
Interference protection	Built-in (2 sets only)										
Spot. dia.	φ 1mm						φ 1.5mm ※1		φ 4mm ※1		φ 0.5mm
Detecting mark size	0.5mm (Green mark on the white base)		0.5mm (Red mark on the white base)		0.5mm (Yellow mark on white)	1mm (Color mark on white)	1mm (Green mark on white)		2mm (Green mark on white)		—
	Response time										0.5 ms (Max.)
Light source	Red LED (680nm)		Green LED (525nm)		Blue LED (470nm)	White LED	Red LED (660nm)		Ultra violet LED (375nm)		
Sensitivity adjustment	Built-in										
Indicators	Operation indicator (Orange LED), Stability (Green LED)									Light indicator (Orange LED) Stability (Green LED)	
Circuit protection	Short circuit protection built-in										
Materials	Case : Polyarylate Lens : Polycarbonate (GR12UVS : Glass)										
Connection	Flying lead (Outer dia 4.2mm) 2m length									Flying lead (Outer dia 4.2mm) 3m length	
Weight	Approx. 80 g									Approx. 100 g	

※1 Detecting range at 40mm.

### ENVIRONMENTAL SPECIFICATION

Ambient light	3,000 lx or less
Ambient temperature	Operating : -25 to +55°C Storage : -30 to +70°C
Ambient humidity	35 to 85%RH
Protective structure	I P 67
Vibration	10 to 55Hz, 1.5mm double amplitude, 2 hr. in X, Y and Z directions
Shock	500 m/s <sup>2</sup> 3 times in X, Y and Z directions
Dielectric withstand voltage	1,000VAC for 1 minute
Insulation resistance	Min. 20MΩ (at 500VDC)

### OUTPUT CIRCUIT



### SHORT CIRCUIT PROTECTION

- Short circuit miswiring, or over load shuts off output transistor.
- Turn the power back on after checking the loaded condition or operating emission/interruption.
- Excessive current may flow in case of connected to condenser or coil.

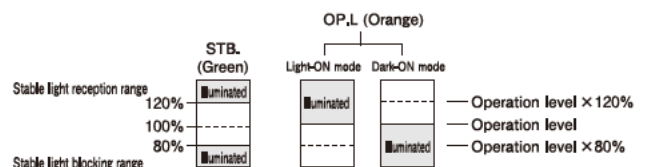
### LIGHT-ON/DARK-ON SELECTABLE

- It is available the Light-ON or Dark-ON by selectable switch.



### OPERATING INDICATOR AND STABILITY INDICATOR

- 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.

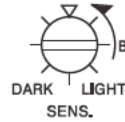
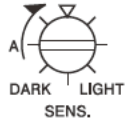


- The orange LED (OP.L) is the operation indicator. In the L.ON (Light ON) mode, the indicator is illuminated when a certain amount of light is detected. In the D.ON (Dark ON) mode, the indicator is illuminated when a certain amount of light is not detected.

## SENSITIVITY ADJUSTMENT

The sensitivity adjustment is a 4-turn pot. without stopper. Turning four revolutions clockwise (to LIGHT) enables the maximum sensitivity and turning four revolutions counterclockwise (to DARK) enables the minimum sensitivity. There is no stop on the pot. and it can be turned more than four revolutions. Turning the pot the other way immediately makes the adjustment effective and there is no play in the adjustment.

- Place the detection object at the given position and direct the spot on a region with high reflectance. Turn up the sensitivity adjustment gradually from MIN and find the point at which the light reception indicator (LIGHT) is illuminated (Point A).
- Direct the spot on a region with low reflectance, further turn up the sensitivity adjustment gradually from Point A until the light reception indicator is illuminated. Turn down the adjustment gradually from that point and find the point at which the light reception indicator goes out (Point B). If the light reception indicator is not illuminated even after turning four revolutions, the point reached after turning four revolutions is regarded as Point B.
- Set the adjustment at midway between Point A and B.



## DETECTION CAPABILITY

- Reference for selection of mark sensor for detecting register marks (correlation between mark colors, background colors and light source colors)

Sensor light source :

R : red light G : green light B : blue light

Mark color Background color	Black	Blue	Green	Red	Orange	Yellow	White
White	RGB	RGB	RGB	GB	B	B	
Yellow	RGB	RGB	RGB	G	G		B
Orange	RGB	RGB	RGB	GB		G	B
Red	RB	RB	R		GB	G	GB
Green	B	B		R	RGB	RGB	RGB
Blue	B		B	RB	RGB	RGB	RGB
Black		B	B	RB	RGB	RGB	RGB

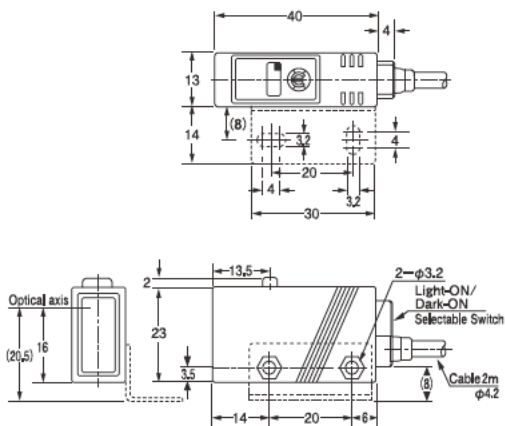
(\*) Detection may not succeed depending on the shading, etc.  
Be sure to check the operation with samples.

## NOTES

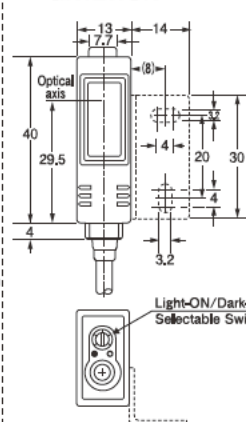
- Do not use the sensor where direct water spray continuously occurs, or under water.
- Avoid such a usage as continuously switching on and off the power supply.
- When using a switching regulator, be sure to ground the frame ground (FG) terminal or ground (G) terminal.
- Be sure to route the sensor lines separately from any power transmission or high-voltage line. Using the same conduit or duct for wiring may cause electric induction, which leads to faulty operation or damage.
- Use power supply which is limited the current (3A) in accordance with the lead wire size of the sensor.
- Avoid installation so that the sensor is directly faced toward inverter type fluorescent lamp.
- To extend the cord, use wires at least 0.3mm<sup>2</sup>.
- In cleaning the lens and the case, be sure to use a dry cloth and gently wipe off dusts from them. Do not use thinner or alcohol.
- The tightening torque for the mounting screw should be within 0.6N·m.

## DIMENSIONS (in mm)

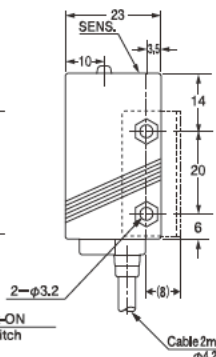
Basic Type  
GR12RN  
GR12GN



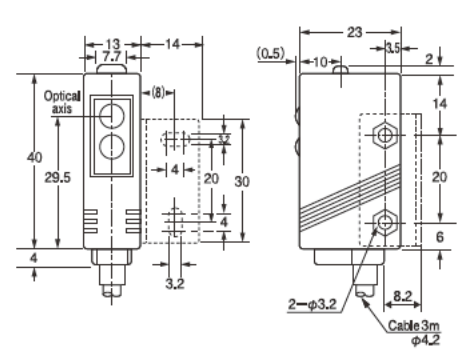
Side-on Type  
GR12RSN  
GR12GSN  
GR12BSN  
GR12WSN



GR40RN  
GR60RN



GR12UVS



- The guarantee period of this product is one year after the delivery.
- If any defect is found during the guarantee period, Takenaka will repair or replace the defective product.
- This product is an industrial sensor which issues an output upon detecting an object. It does not have any function to prevent accidents, death or injuries.
- Takenaka will not be held responsible for any damage or loss incurred due to accidents, faulty installation, abuse, misuse, improper maintenance or acts of God including lightning surge.