

## • SPECIFICATIONS

Type	Cable type	Connector type
Model NPN output	LX-111	LX-111-Z
Item PNP output	LX-111-P	LX-111-P-Z
Sensing range	10±3 mm	
Spot size	1×5 mm (at a setting distance of 10 mm)	
Supply voltage	12 to 24 V DC ± 10% / Ripple P-P 10% or less	
Power consumption	850 mW or less (Power voltage 24V, current consumption 35 mA or less)	
Mode switching input	<NPN output type> Mark mode Low...0 to +2 V (Source current 0.5mA or less) Input impedance: approx. 10 kΩ	<PNP output type> Color mode High...+5 V to +V (Sink current 3mA or less) Input impedance: approx. 10 kΩ
	Color mode High...+5 V to +V or open	Mark mode Low...0 to +0.6V or open
Output	<NPN output type> NPN open-collector transistor Maximum sink current: 50 mA Applied voltage: 30 V DC or less (between output and 0 V) Residual voltage: 1.5 V or less (at 50 mA sink current) (Note 1)	<PNP output type> PNP open-collector transistor Maximum source current: 50 mA Applied voltage: 30 V DC or less (between output and + V) Residual voltage: 1.5 V or less (at 50 mA source current) (Note 1)
	Output operation Short-circuit protection	Mark mode: Light ON during light receiving, Color mode: Light ON in consistency Incorporated (Auto reset type)
Response time	Mark mode: 45 μs or less, Color mode: 150 μs or less	
Operation indicator	Orange LED (light ON when output is ON)	
Protection	IP 67 (IEC)	
Ambient temperature	-10 to +55 °C (No condensation or icing), Storage: -20 to +70 °C	
Ambient humidity	35 to 85% RH, Storage: 35 to 85% RH	
Emitting element	Red / green / blue LED (Peak emitting wavelength: 640 nm / 525 nm / 470 nm)	
Material	Enclosure: PBT, Operation key: Silicone rubber, Operation panel, Lens: PC (Poly Carbonate)	
Cable	0.2 mm <sup>2</sup> 4-core cable (standard length: 2 m)	(Note 2)
Cable extension	Total length can be extended up to 100 m with cable of 0.3 mm <sup>2</sup> or more.	
Weight	Net weight: approx. 110 g Packing weight: approx. 120 g	Net weight: approx. 50g Packing weight: approx. 55g

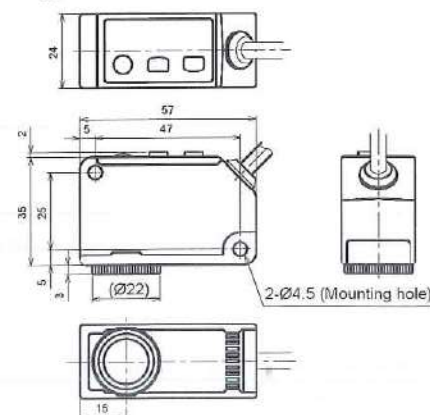
(Note 1) The ambient temperature is +23 °C where the detection conditions are not specified precisely.

(Note 2) Mating cable is not provided with the connector type. Please order it separately.

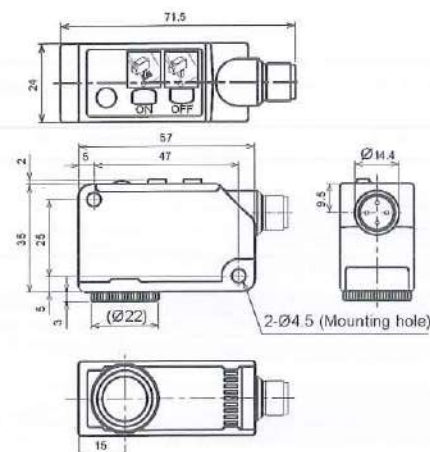
CN-24B-C2 (Straight type, 4-core, Cable length: 2 m), CN-24BL-C2 (Elbow type, 4-core, Cable length: 2 m)  
CN-24B-C5 (Straight type, 4-core, Cable length: 5 m), CN-24BL-C5 (Elbow type, 4-core, Cable length: 5 m)

## • DIMENSIONS (Unit: mm)

### Cable type / LX-111□

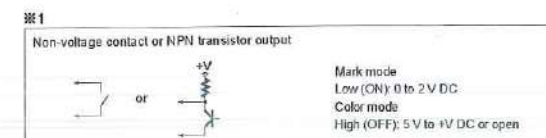
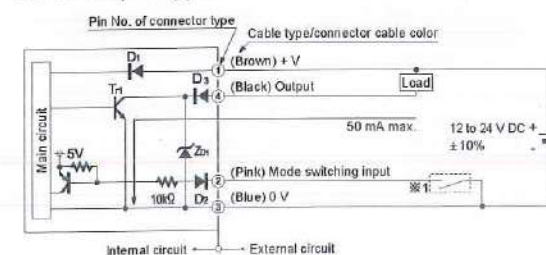


### Connector type / LX-111□-Z



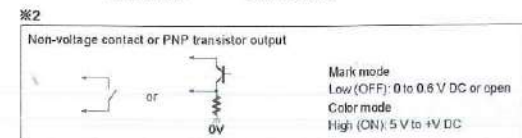
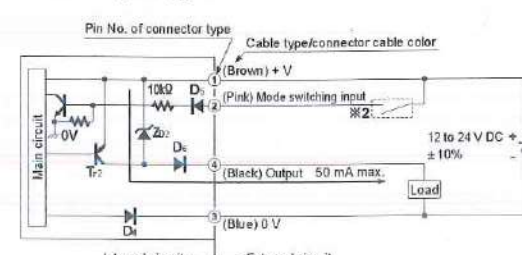
## • I/O CIRCUIT DIAGRAMS

### NPN output type



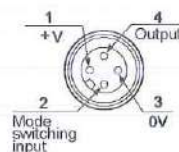
Symbols: D1, D2, D3, D4, D5, D6: Reverse supply polarity protection diode  
Zet, Zs: Surge absorption zener diode

### PNP output type



Tn: NPN output transistor  
Tp: PNP output transistor

### Layout of connector pin for connector type LX-111□-Z



# Panasonic

NEW

Simple 3 LED Mark Sensor

LX-111



*Mark Sensor for Sensing the Rainbow*

# Panasonic

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No.CE-LX111 May, 2013

Specifications are subject to change without notice.

2013.05 | panasonic.net/id/pidsz/global



# High - Speed and Ultra - Simple Mark Detection with Two Modes

## High Precision

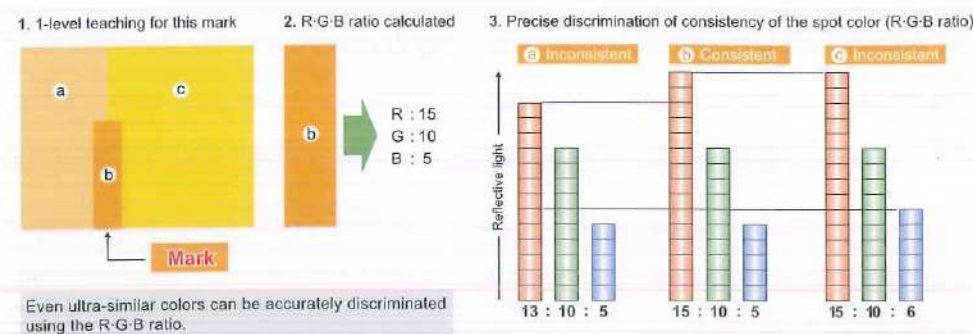
### Color mode **High precision discrimination**

Utilizing 3-color (R-G-B) LEDs simultaneously, this mode realizes high precision mark color discrimination by the R-G-B reflective light ratio. This mode also enables effective detection of films with patterns around the mark.



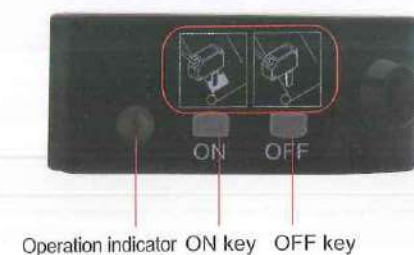
### High precision mark color discrimination

The color mode on the LX-111 series utilizes all 3-color (R-G-B) LEDs to discriminate the mark color by the R-G-B ratio, which enables high precision judgments. The graphic figure below shows the above-mentioned process.



## Easy Setting

The setting can be completed easily just by pressing the ON key with the light source aligned to the color to be detected.



- Press the ON key with the light source aligned to the mark to be detected
- Press the OFF key with the light source moved away from the set color

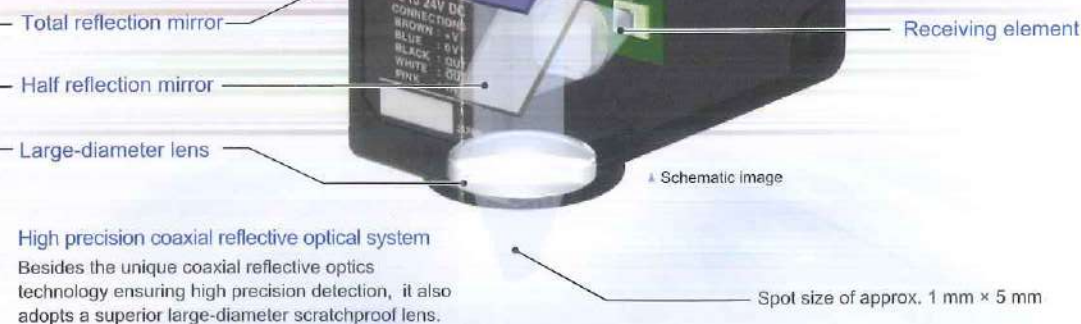


### Meeting various requirements of mark detection

Coaxial reflective optical system combined with ultra-slim spot of approximately. 1 mm × 5 mm enables high precision detection.



R-G-B light emitting elements all in one  
To detect any marking, this unit is equipped with red, green and blue LED light emitting elements all in one.



## Environment-resistant IP67 Protection Construction

The sensor will not be affected by the water during washing the machines and production line.



## High Speed

### Mark mode **Ultra high-speed response**

This sensing mode enables an ultra high-speed response time of 45 μs by automatically selecting a single color from the 3-color (R-G-B) LEDs, and automatically selects the optimal LED that is most suitable for the sensing by its automatic optimal LED selection function, which is perfect for ultra quick sensing.

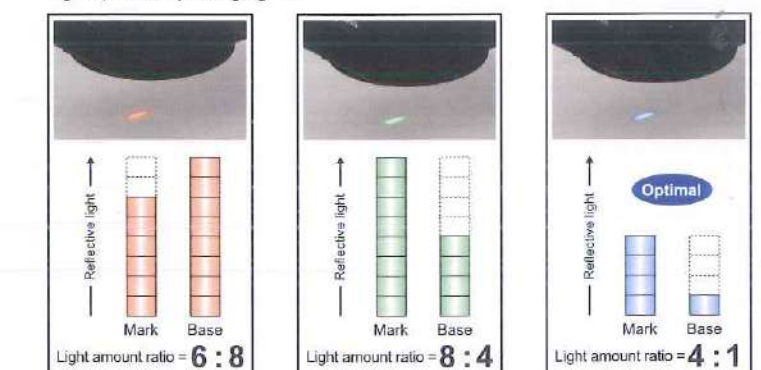


### Automatic optimal LED selection function

This function selects the optimal color from the 3-color (R-G-B) LEDs. Incorporating the "Automatic optimal LED selection function", the mark mode on LX-111 series enables optimal sensing by automatically selecting the LED coming with the largest contrast between the mark and the base (S/N ratio). As this mode automatically selects the LED according to the contrast of reflection of the mark and base instead of the difference between their reflected light amounts, a more stable sensing is ensured.

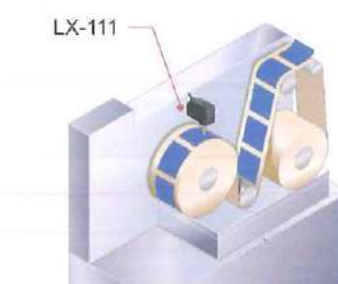
For the packaging film below, the blue LED will be used to detect the mark for its optimal light amount ratio to ensure a more stable sensing.

Eg. A piece of packaging film



## Application

Detection of mark on packaging machine tapes



Detection of tapes stuck on copper foils

