

- The CS-R80 series sensors identify the color of the light emitted by light sources such as LEDs or color lamps.
- To register a standard color, teaching system is provided with the push buttons or external inputs.
- 2 output modes: single output/3 outputs are available.
- The standard color and tolerance of color composition can be separately set to each channel.

### 1 SPECIFICATION

Models	NPN output	<b>CS-R80</b>
	PNP output	<b>CS-R80PN</b>
Detection method	R.G.B color composition (RGB light receiving element)	
Detection distance	Depends on the intensity of received light ※4	
Detection object	Light sources emitting visible light ※5	
Power supply	12-24VDC ±10%, Ripple 10% Max.	
Current consumption	50mA (Max.)	
Standard color resisted	teaching 1 colors (Mode 1) teaching 3 colors (Mode 3) ※1	
Input / Output	Teaching by set button or external input : 1 output (Mode 1) Teaching by set button : 3 output (Mode 3) ※1	
External teaching	Non voltage input (contact, non contact)(valid for Mode 1)	
Output mode	NPN output	NPN open collector output Sink current 50mA (30VDC) Max. residual voltage : 2V
	PNP output	PNP open collector output Source current 50mA (30VDC) Max. residual voltage : 2V
Operating mode	Match On / Match Off, selectable	
Time delay	Selectable between On delay, Off delay and timer disabled	
	Delay time : 250ms fixed	
Response time	50ms or less ※2	
Indicators	Operation indicator "OP" When the output is activated	
	Level indicator "H": Excessive light intensity	
	Level indicator "L": Insufficient light intensity	
Display	1 Orange digit indicator +3 red digit indicators	
Switches	( + ), ( - ) Push button switch : select Mode/resister standard color/change setting value/select channel	
	Selectable switch : select RUN/SELECT/SET	
Circuit protection	Short circuit protection	
Materials	Polycarbonate	
Cable	Flying lead 2m (outer dia φ 3.7mm)	
Weight	Approx. 60 g	
Accessory	Bracket, Instruction manual	

- ※1 The factory setting is Mode 1.
- ※2 The sensor is activated 1 second after it is powered on.  
Response time may change depending on the amount of ambient lights.
- ※3 Recommended fiber : FT 105BC-CS, Detecting distance : 5 mm or less.
- ※4 Set the distance so that the received light intensity indicators H and L turn off. (See 7.3)
- ※5 Check detection for modulated light sources.

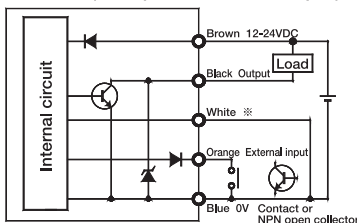
### 2 ENVIRONMENTAL SPECIFICATION

Ambient light	1,000 lx or less
Ambient temperature	Operating : -25 to +55°C, Storage : -40 to +70°C
Ambient humidity	35 to 85%RH
Protective structure	I P 40
Vibration	10 to 55Hz, 1.5mm double amplitude, 2 hr. in X, Y and Z directions
Shock	500m/s <sup>2</sup> 3 times in X, Y and Z directions

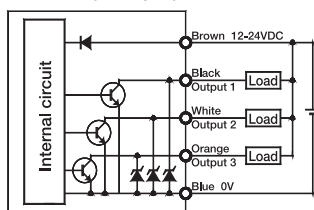
### 3 WIRING

#### ● CS-R80 (NPN output)

- Mode 1 (1 output / 1 External input) • Mode 3 (3 output)

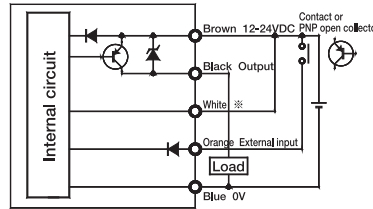


※ Connect white lead to 0V.

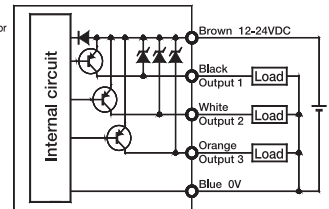


#### ● CS-R80PN (PNP output)

- Mode 1 (1 output / 1 External input) • Mode 3 (3 output)



※ Connect white lead to brown lead.



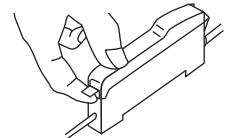
#### ● Precautions when wiring

- Insulate unused input and output lines.
- For the extension cord, use a cord with diameter of more than 0.3mm<sup>2</sup> and length less than 100m.
- Set the force to be applied to the cords according to the following standard : Tension : 70N or less Torque : 0.8N·m  
Pressing force : 20N or less Flexion : 3 kg or less
- When the load and the sensor have the own power supply separately, be sure to power on the sensor first.
- When powering off, output pulses may be generated. Be sure to power off the load or the load line first.
- Before attaching or removing the amplifier, be sure to power off.
- 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.

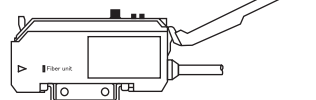
### 4 AMPLIFIER UNIT INSTALLATION

#### How to attach / detach case cover

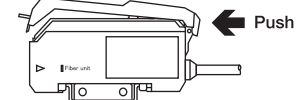
- 1) How to open case cover  
Pull up a case cover tab with holding the front part of the case cover.



- 2) How to detach case cover  
Push the cover end with full-opened condition, to remove the cover.

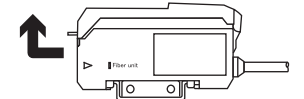
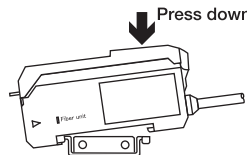


- 3) How to attach case cover  
Put the cover on the amplifier unit and push the hinge on shown the figure.

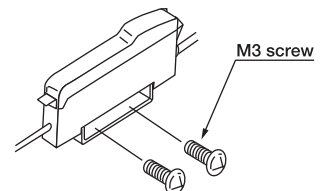


#### How to install DIN rail / mounting bracket

- 1) How to attach  
Engage a front hook of the amplifier unit onto a rail (or a mounting bracket) and press a rear part of the amplifier unit.
- 2) How to detach  
Lift up the front with pushing the amplifier unit forward, and the hook will be released.



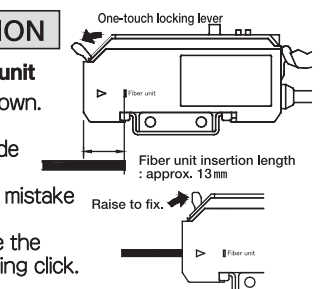
- 3) Side mounting of Amplifier unit  
Fasten with screws by making use of the attached mounting bracket. The tightening torque should be 0.8N·m Max.



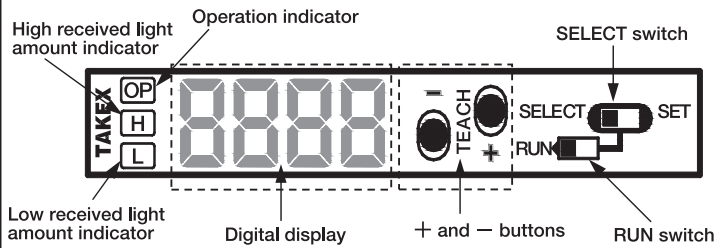
### 5 FIBER UNIT INSTALLATION

#### How to insert Fiber unit to Amplifier unit

- 1) Push the one-touch locking lever down.
- 2) Insert a fiber unit until the bottom.  
You can find a mark on the case side showing the insertion length.  
Please use it as a gauge to avoid a mistake when inserting the fiber unit
- 3) After the fiber unit is inserted, raise the locking lever until you hear the locking click.



## 6 OPERATION PANEL



### Panel Parts Descriptions

#### ● Indicators

**Operation indicator (OP)** : Lights when output turns ON.

**High received light amount indicator (H)**

: Lights when the received light amount becomes saturated.

**Low received light amount indicator (L)**

: Lights when the received light amount becomes insufficient.

※ When the high received light amount indicator (H) or low received light amount indicator (L) is lit, the light amount is beyond the measurable range. Adjust the light amount and distance so that the light amount stays within the measurable range.

● **Digital display** : 1 digit in orange + 3 digits in red, which indicates various statuses of operations.

During RUN : 1 digit in orange : Indicates the channel selected.

3 digits in red : Indicates a numeric value.

※ The value appears slowly to improve the visibility.

● **RUN switch** : Changes between the RUN mode and the SET mode.

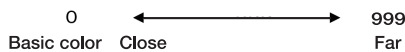
● **SELECT switch** : Changes between the SELECT mode and the SET mode.

● **+ and - buttons** : Changes the tolerances and setting items.

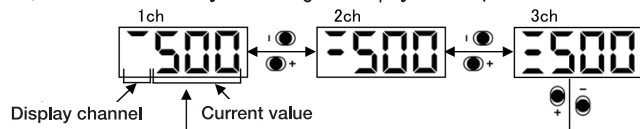
## 7 INDICATIONS DURING RUN

### 7.1 Digital display during RUN

The digital display shows the difference from the basic color at each channel within the range from 0 to 999. As the value is closer to the basic color, the displayed numeric value becomes smaller.



The + and - buttons allow you to change the display channel (when Mode 3 is set.)



### 7.2 Operation indicator during RUN

Output OFF	Output ON
Unlit	Lit

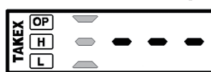
※ The indicator lights when any output turns ON if Mode 3 (3 outputs) is set.

### 7.3 Received light amount indicators



These indicators show whether the received light amount is within the measurable range. If H or L is lit, the light amount is beyond the measurable range. You must adjust the amount.

### 7.4 If the numeric value is displayed as "----"



When the light amount from the work is smaller or greater than the one registered at teaching, the sensor judges that the received light is different from the basic color and outputs it to OFF even if it receives the light having the same color hue within the allowable range. If this happens, the display shows "----". Under this condition, the output becomes unstable because the sensor distinguishes the color hue and the brightness at the same time. You must adjust the settings, for example, by lowering the tolerance, so as to eliminate the display "----".

## 8 BASIC OPERATIONS

- When using the sensor is Mode 1 (1 output, 1 external input) → See 8.1.
- When using the sensor is Mode 3 (3 outputs) → See 8.2.

### 8.1 Operations in Mode 1 (factory-set mode)

- To change the mode, see "10. Changing and Initializing the Sensor Mode".
- To set the tolerances and other items, see "9. Detail Settings".

### 1) Registering the basic colors through the key operation on the sensor unit (Teaching)

Status	Operation	Switch	Display	Work
RUN mode				
			"999" lights. Note 1	
SET mode	Change the RUN switch to the SET mode.			
		Change	The indicator in orange blinks.	When a work is placed
Teaching	Hold down the + or - button (until "End" appears)			
		Hold down.	"t---" blinks.	
Teaching Completed				
			"End" lights.	
SET mode	Release the button.			
			The indicator in orange blinks.	
RUN mode	Change the RUN switch to the RUN mode.			
		Change	The current value appears.	When a work is placed
			The operation indicator (OP) lights. Output ON	

Note 1 : After being factory-set or initialized, the display shows "999".

### 2) Registering the basic colors using the external output (Teaching)

Status	Operation	Switch	Display	Work
RUN mode				
			"999" lights. Note 1	When a work is placed
Teaching	Enter external input signals for more than 7 seconds.			
			"t---" blinks.	
Teaching Completed	After 7 seconds has passed			
			"End" lights.	
RUN mode	Release external input signals.			
			The current value appears.	When a work is placed
			The operation indicator (OP) lights. Output ON	

Note 1 : After being factory-set or initialized, the display shows "999".

#### ※ Teaching errors

If the following value appears in the digital display after teaching, an error has occurred.

If this happens, the basic colors do not change but hold the previous values.

During the error display, no output is performed. Press the + or - button to reset the error.

	<b>Teaching error</b>
"Err" blinks.	The input value of received light amount is beyond the range. Check the high (H) and low (L) received light amount indicators. Adjust the settings so that both indicators will go off.

Note: Light sources changing in brightness like blinking or pulsed LED may not be detected stably. Light sources to be detected should illumine with a fixed brightness.

## 8.2 Operations in Mode 3

- First, set the sensor mode to Mode 3.
  - To change the mode, see "10. Changing and Initializing the Sensor Mode".
  - To set the tolerances and other items, see "9. Detail Settings".

### Registering the basic colors to desired channels (Teaching)

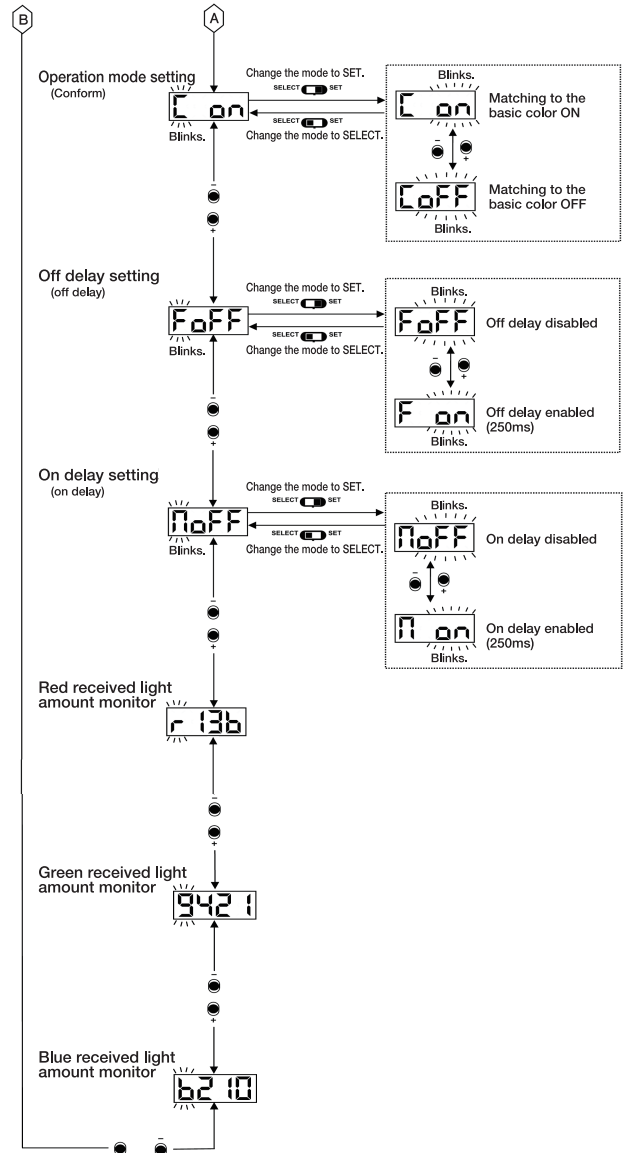
Mode	Operation	Switch	Display	Work
RUN mode		SELECT SET RUN	0 The current value appears.	
SET mode	Change the RUN switch to the SET mode.	SELECT SET RUN	1ch The indicator in orange blinks.	
SET mode	Change the SELECT switch to the SET mode.	Change SELECT SET RUN	1ch The "ch" indication blinks.	
SET mode	Press the + or - button to select the channel to be registered.	TEACH + TEACH -	-2ch 3ch The indicator in orange blinks.	
SELECT mode	Change the SELECT switch to the SELECT mode.	Change SELECT SET RUN	-2ch The indicator in orange blinks. (This example selects 2 ch.)	
Teaching	Hold down the + or - button (until "End" appears.)	TEACH + TEACH - Hold down	t--- "t---" blinks.	Work When a work is placed
Teaching Completed		TEACH + TEACH -	End "End" lights.	
SET mode	Release the button.	TEACH + TEACH -	-2ch The indicator in orange blinks.	
RUN mode	Change the RUN switch to the RUN mode.	SELECT SET RUN	0 The current value appears. The operation indicator (OP) lights. Output2 ON	Work When a work is placed

### ※ Teaching errors

If the following value appears in the digital display after teaching, an error has occurred. If this happens, the basic colors do not change but hold the previous values. During the error display, no output is performed. Press the + or - button to reset the error.

**Teaching error**

The input value of received light amount is beyond the range. Check the high(H) and low(L) received light amount indicators. Adjust the settings so that both indicators will go off.



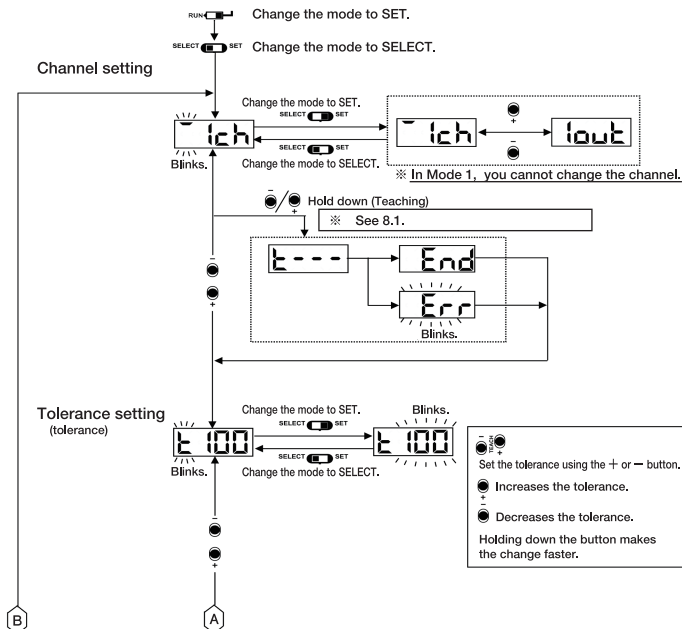
## 9 DETAIL SETTINGS

In the SET mode, you can do the following functional settings.

※ The indicated numeric values of tolerances and received light amounts are samples. They are different from the actual indications.

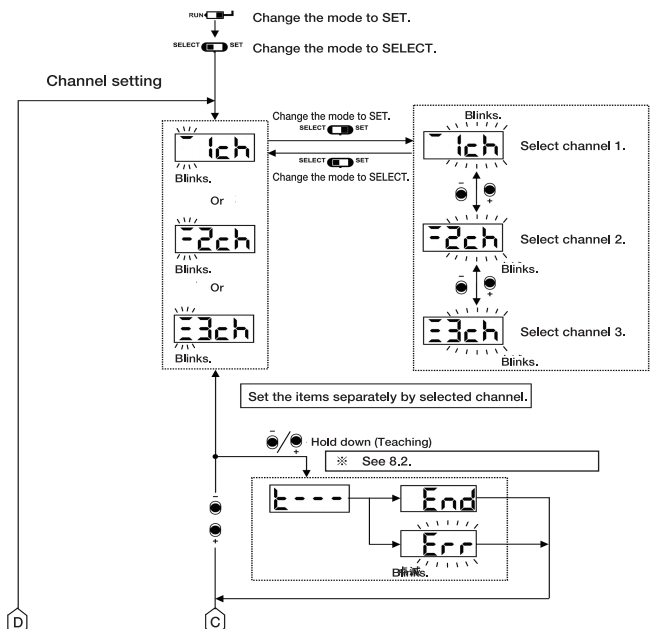
### ● When Mode 1 is set

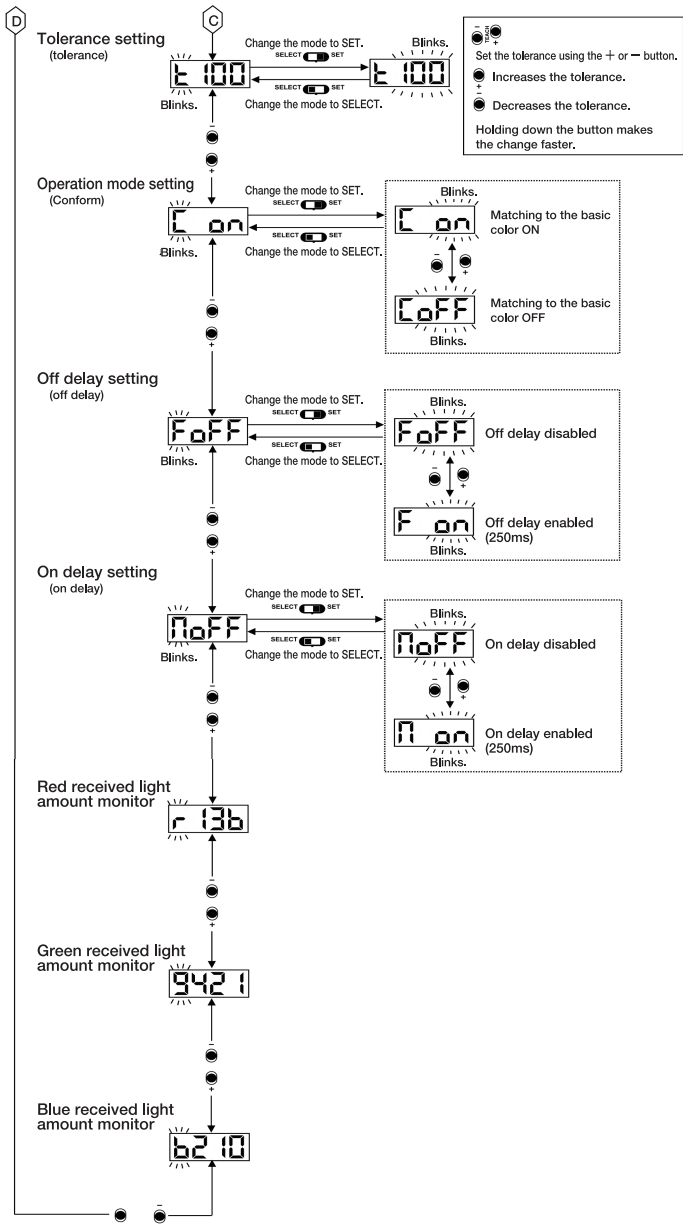
Can be set to channel 1 (1ch) only.



### ● When Mode 3 is set

You can set the items separately by channel.





## 10.2 Initializing the mode

By changing the sensor mode (between Mode 1 and Mode 3), the setting values and basic color information are initialized. To perform initialization only, change the sensor mode to other mode once and then reset it to the original mode. Initialized settings (factory-set values)  
 Tolerance : 100  
 Operation mode (Conform) : ON when matching to the basic color  
 Off delay : Disabled  
 On delay : Disabled

## 11 PRECAUTIONS

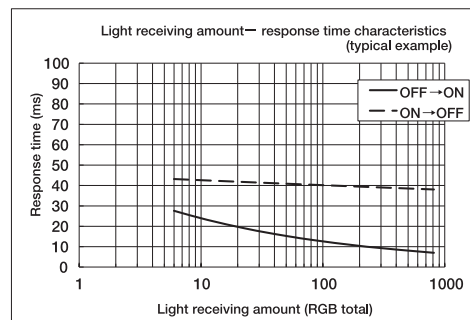
- The CS-R80 series is subject to the ambient light. Do not use the sensor in environments subject to fluctuation of brightness such as the vicinity of windows.
- If the ambient light is brighter than the light source of the work to be detected, the detecting ability may become unstable. Maximize the brightness of the light source of the work to be detected and place the fiber unit as close as possible to the light source.
- For high brightness light sources, use CS-ND light attenuation unit.
- Use the fiber unit having a large core diameter.  
 Recommended fiber : FT105BC-CS (core diameter 1.5mm)
- If the fiber unit cannot be placed near the light source of the work to be detected, attach the lens unit FA515 or equivalent to the fiber unit to limit the field of view.
- Since the light of fluorescent lamps blink at high rate, the sensor detects the light unstably in environments where the light source of the work to be detected is illuminated with the fluorescent light. Keep the fluorescent light as far away as possible from the light source of the work. The conventional fluorescent lamps are more likely to be affected than the inverter fluorescent lamps.
- The sensor operation may become unstable and generate chattering depending on the installation environments and conditions. By enabling the on-delay timer or off-delay timer, you can reduce generation of chattering.
- The hysteresis level is response to the tolerance. The greater the tolerance becomes, the higher hysteresis level becomes to suppress generation of chattering.
- Increase or decrease the tolerance as required using the reference 100.
- Do not use the sensor at rooftop or at a site where its light receiving surface is directly exposed to ambient light.

## 10 CHANGING AND INITIALIZING THE SENSOR MODE

### 10.1 Changing the sensor mode

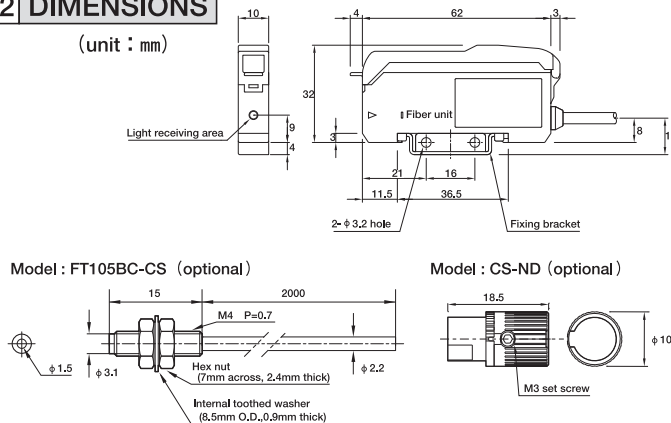
Status	Operation	Switch	Display
RUN mode		SELECT  SET	999 "999" lights. Note 1
Mode selection	Change the RUN switch to SET mode while holding down the - button.	TEACH +  SET	1 out "1 out" blinks.
Mode selection	Holding down the + or - button for more than 3 seconds sets Mode 3.	TEACH +	3 out "3 out" blinks.
Mode selection	Holding down the + or - button for more than 3 seconds again returns to Mode 1.	TEACH -	1 out "1 out" blinks.
RUN status	Change the RUN switch to RUN.	SELECT  SET	999 "999" lights. Note 1

Note 1 : After being factory-set or initialized, the indicator shows "999"



## 12 DIMENSIONS

(unit : mm)



- This sensor is designed to detect a specific object. It is not provided with control functions for prevention of injuries or accidents in itself.
- Takex will not held responsible for any damage or loss incurred due to accidents, faulty installation, abuse, misuse, improper maintenance or acts of God including lightning surge.
- Specifications and dimensions may be subject to change without notice.