LANBAO

SPN-BC50 Long-distance Color Mark Sensor

Instruction Manual

White light source, wide wavelength range, stably detect differences of colors.
Background suppression function.
Long-distance detection, 500mm sensing distance.
IO-LINK communication.

Precautions

- The maximum allowable voltage of the sensor is 10% of the rated voltage, Please confirm that the supply voltage is less than the maximum allowable value before powering on
- The time from powering-on to normal detection of the sensor is 100ms, please ensure that the sensor is used after 100ms of powering-on
- When using different power sources for the sensor and load, be sure to turn on the power of the sensor first
- When the sensor is not used, it is recommended to cut off the power of the load first and then turn off the power of the sensor
- When installing the sensor, do not subject the sensor to severe external force (such as hammering, etc.), which may damage the sensor performance
- Avoid using thinner, alcohol or other organic solvents when cleaning
- CAUTION Use of controls or adjustments or performance of procedures other than those specified herein may result in hazardous radiation exposure

Safety Warning

- Do not use in an environment with flammable, explosive or corrosive gases
- Do not use in oil or chemical environments
- Do not use in a high humidity environment
- Do not use in direct sunlight
- Do not use in other environmental conditions that exceed the rated value
- Do not disassemble, repair or modify this product without authorization

Scrap Treatment

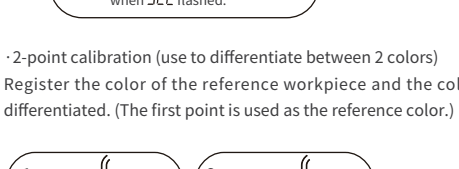
- When the product is scrapped, please dispose of it as industrial waste

■ Model specification

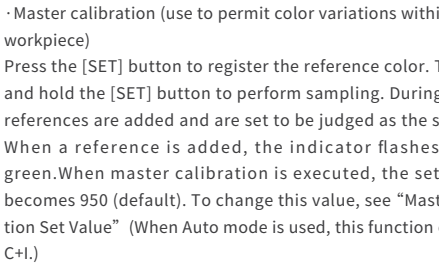
P/N	NPN/PNP	SPN-BC5 0 DEB-W
Detection distance		50-500mm
Minimum spot diameter		Approx. 3.5 mm at 100 mm Approx. 9 mm at 250 mm Approx. 20mm at 500 mm
Response time		200μs/1ms/10ms/100ms/500ms
Light source		White LED
Reduce mutual interference function		Up to 2 units with alternate frequencies set
Supply power	Supply voltage	10-30VDC, including 10% ripple (P-P), Class 2 or LPS
	Consumption current	24VDC: ＜50mA 12VDC: ＜100mA
Timer		OFF/ON delay/OFF delay/One-shot
I/O	Control output	NPN NO/NC or NPN/PNP NO/NC Depends on specific P/N
	External input	Tuning /Transmission OFF selectable
Protection circuit		Reverse polarity, surge and overcurrent protection
Ambient light		Incandescent lamp: <10000lux, sunlight: <20000lux
Ambient temperature		-20...+50℃ ((non-freezing))
Ambient humidity		35...85%RH ((non-condensing))
Shock resistance		1000m/s² X, Y, Z axis directions respectively 6 times
Vibration resistance		10 to 55 Hz Double amplitude 1.5 mm in the X, Y, Z axis directions respectively, 2 hours
Protection degree		IP65
Material		Case: zinc casting chrome, indicator cover: PPSU, button: stainless steel
Weight		128g

■ Input/ Output wiring diagram

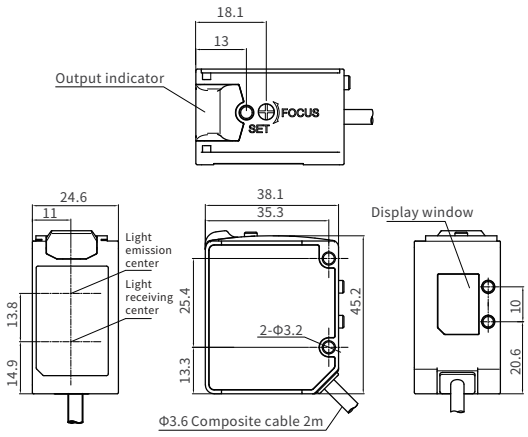
NPN output



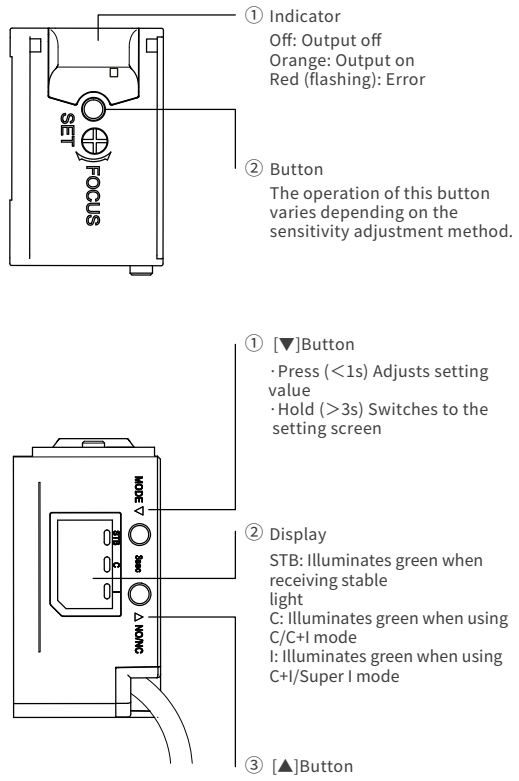
PNP output



■ Dimensions



■ Button instruction



① Indicator
Off: Output off
Orange: Output on
Red (flashing): Error

② Button
The operation of this button varies depending on the sensitivity adjustment method.

① [▼]Button
·Press (＜1s) Adjusts setting value
·Hold (＞3s) Switches to the setting screen

② Display
STB: Illuminates green when receiving stable light
C: Illuminates green when using C/C+I mode
I: Illuminates green when using C+I/Super I mode

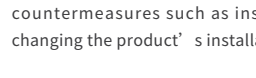
③ [▲]Button
·Press (＜1s) Adjusts setting value
·Hold (＞3s) Switches between N.O./N.C.

■ Detection Mode

Detection Mode	Explanation
Auto(default)	When adjusting the sensitivity, the optimal mode is automatically selected between C+I or C.
C+I mode	Detection is performed according to the color components (R, G, B) and illumination (the received light intensity).
C mode	Detection is performed according to the color components (R, G, B) only.
Super I mode	Detection is performed according to the illumination (the received light intensity) only.

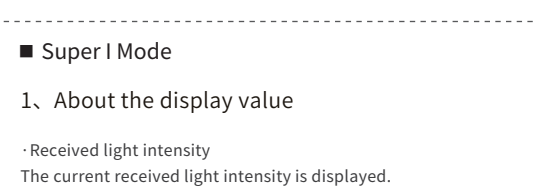
■ Adjusting the Spot Diameter

·Use the dial on the side of the sensor to adjust the spot diameter.



Note	Dial turning torque: 0.2 N · m or less

·Turn the dial to the right to decrease the focal distance.

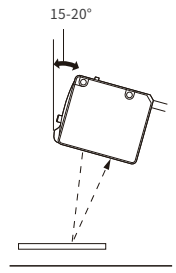


·Turn the dial to the left to increase the focal distance.

■ Operating guide

Installation

.Tightening torque for the mounting holes: 0.63 N·m (M3 screw)
. If the workpiece contains a glossy surface that could interfere with stable detection, tilt the sensor approx. 15 ° to 20 ° . If tilting the sensor does not improve detection, please attach the reflection canceling attachment.



Ambient light

High-frequency light, such as that from an inverter fluorescent lamp, entering the receiver directly or after reflecting from the workpiece may lead to malfunctions. In this situation, implement countermeasures such as installing a light shielding plate or changing the product’ s installation position.

■ Basic Settings

Set the output logic to N.O. or N.C.

- n_o（Lon） Turns the output on when the registered condition is met (turns the output on when light is received)
- n_C（don） Turns the output on when a condition other than the registered condition is met (turns the output on when light is not received)

■ Background Removal

When the detection object has a similar color to the background, long press SET+△ 3s against the background at the same time to eliminate the current detection background. After the screen flashes, release the button to display the reset sensitivity, and the function will be automatically cancelled.

■ Sensitivity Adjustment（Auto/C+I/C Mode）

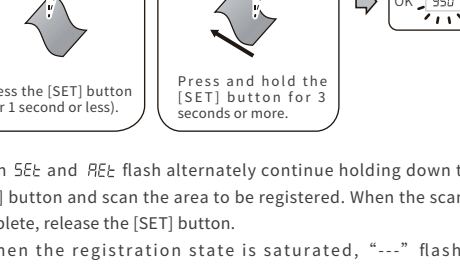
1、About the display value

·Conformity
The level of conformity of the current detected workpiece to the registered reference workpiece.
Display range: 0 to 999 (The more the workpiece conform to reference workpiece, the higher the value.)

·Setting value
The extent to which it is consistent with the "color" of the detection target set as a benchmark is determined to be the same "color", and this degree is displayed as a threshold. When confirming or manually fine-tuning setpoints, refer to the confirming and adjusting setpoints tutorial.
※The blinking numeric value that appears after calibration is the setting value.

2、Setting the sensitivity (apply one of the following three methods)

.1-point calibration (use to detect 1 specific color)
When Auto mode is used, this function operates in C+I.



·2-point calibration (use to differentiate between 2 colors)
Register the color of the reference workpiece and the color to be differentiated. (The first point is used as the reference color.)

·Master calibration (use to permit color variations within the same workpiece)
Press the [SET] button to register the reference color. Then, press and hold the [SET] button to perform sampling. During sampling, references are added and are set to be judged as the same color. When a reference is added, the indicator flashes (once) in green.When master calibration is executed, the setting value becomes 950 (default). To change this value, see “Master Calibration Set Value” (When Auto mode is used, this function operates in C+I.)

When SEt and REt flash alternately continue holding down the [SET] button and scan the area to be registered. When the scan is complete, release the [SET] button.
※When the registration state is saturated, “---” flashes alternately.

3、Permitting color variations between different workpieces

·Master addition calibration (when adding workpieces to be permitted)
Position a workpiece which is to be judged the same as the current registered color. Then press and hold the [SET] button and the [▼] button. When the added registration is successful, the “setting value” flashes three times, and the sensor returns to the normal screen (the setting value is not changed at this point in time).
In this case, references are added to permit colors between "the current registered color" and "the additional registered color".

< Precautions for master addition calibration>
·To clear the master addition calibration, perform another calibration.
·If the setting fails or the registration state is saturated, “---” is displayed. To add an allowable range, lower the setting value, and perform the master addition calibration again.

4、Checking and adjusting the setting value

When a larger setting value is in place, the detection tolerance is tight.
In contrast, when the setting value is reduced, a wider detection tolerance is enabled.

■ Super I Mode

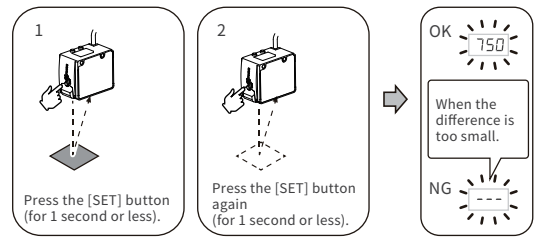
1、About the display value

·Received light intensity
The current received light intensity is displayed.
Display range: 0 to 999 (The greater the received light intensity, the higher the value.)

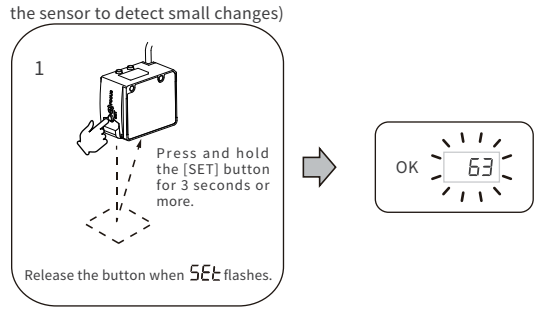
·Setting value
The threshold at which the received light intensity is judged to indicate that a workpiece is present.To check or manually make fine adjustments to the value, see “Checking and adjusting the setting value".
※The blinking numeric value that appears after calibration is the setting value.

2、Setting the sensitivity (apply one of the following three methods)

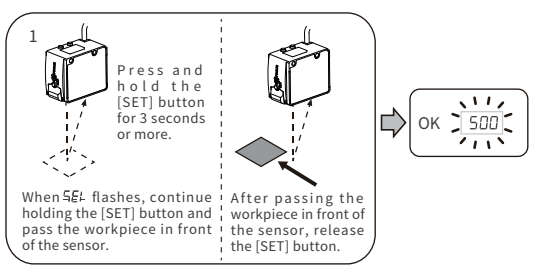
·2-point calibration (basic intensity differentiation)



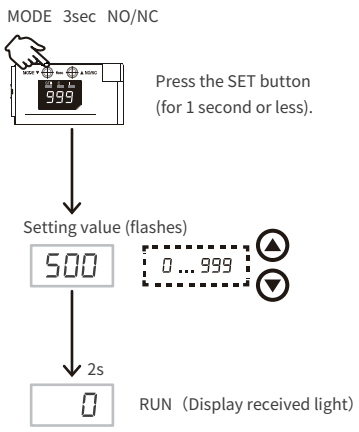
·Maximum sensitivity calibration (use to increase the sensitivity of the sensor to detect small changes)



·Full auto calibration (use when workpiece movement cannot be stopped for calibration)

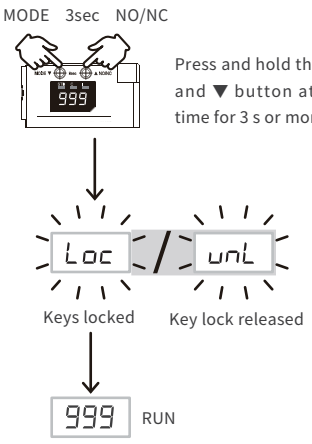


3、Checking and adjusting the setting value

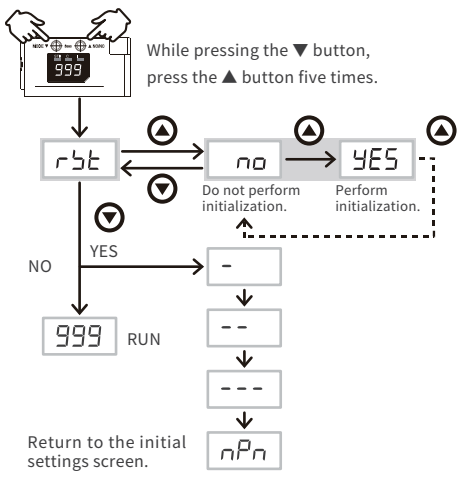


■ Useful Functions

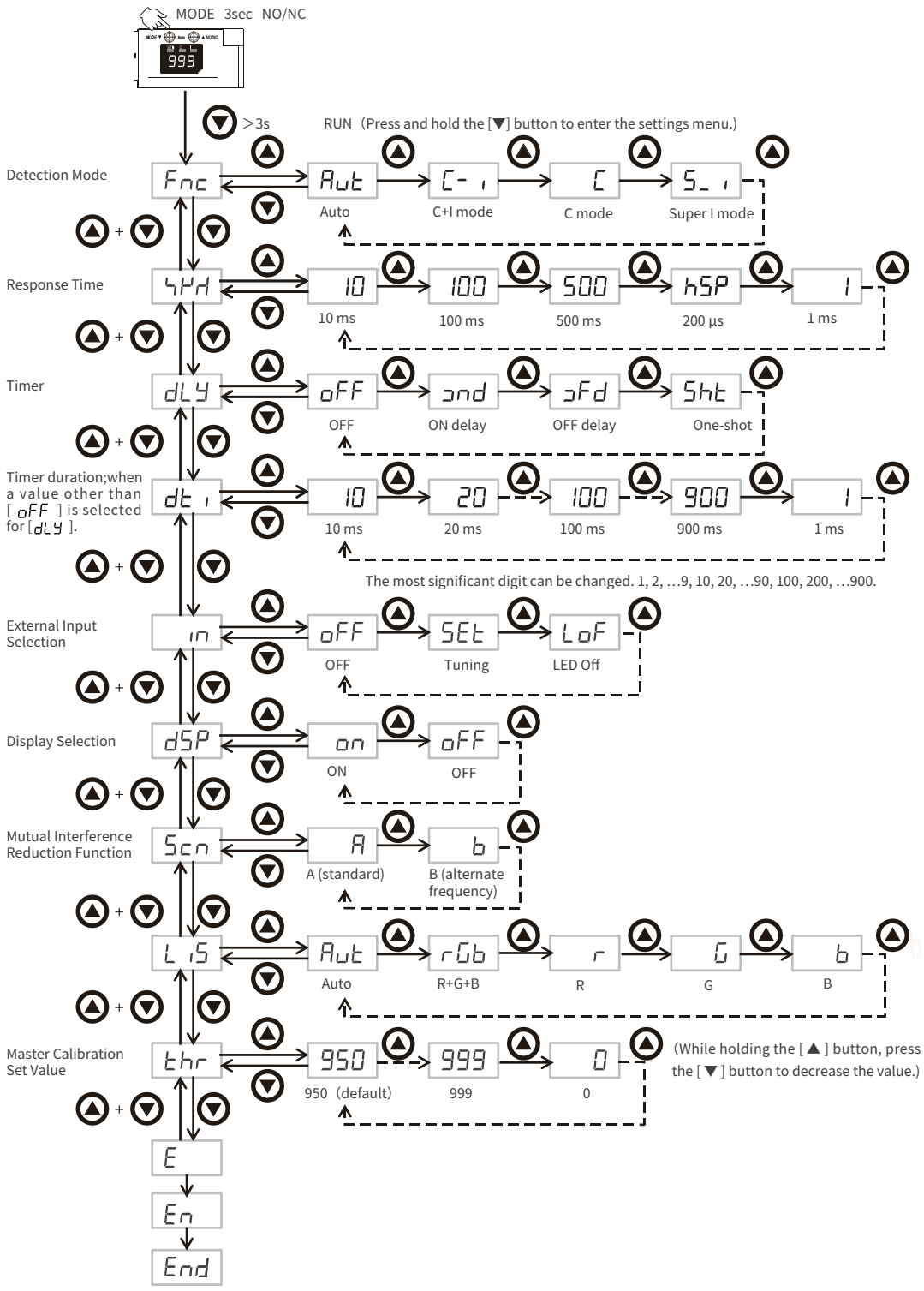
Key Lock



Initialization.



■ Settings



Detection Mode

Select the desired detection mode.

Response Time

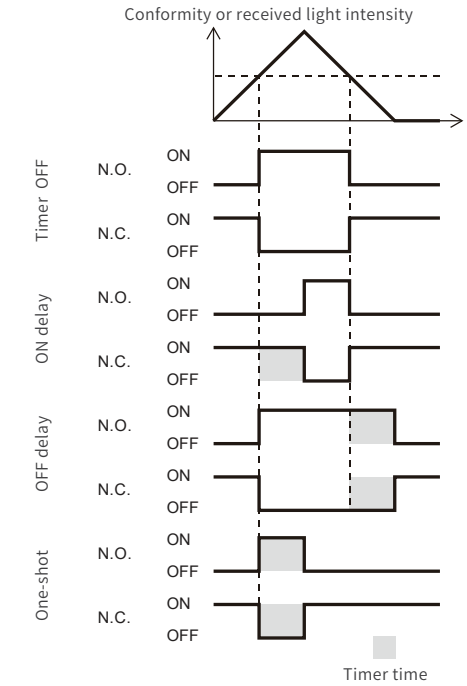
The longer the response time, the more reliable and stable the detection.

When detection is unstable due to the workpieces moving at a high speed, set the response time to a smaller value.

Timer

This function can be used to delay the timing of the sensor output switching.

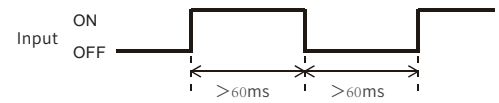
- ON delay[ond]
- OFF delay [oFd]
- One-shot[SEt]



External Input Selection

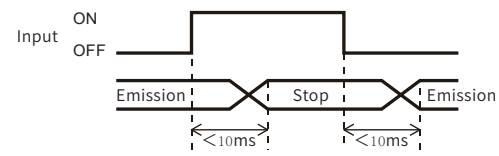
Calibration[SEt]

This external input performs the same function as pressing the [SET] button.



Transmission OFF[LoF]

This external input stops the emission of the LED.



Display selection

Press the [oFF] button to turn off the display.

Anti-interference function:

This product can reduce the impact of interference by changing the light emission cycle. When using multiple units in close distance, please set different light emission cycles for each.

Light source selection for judgment:

When selecting Super I mode, the RGB light source used for judgment is automatically chosen by the sensor to be the most suitable one at the set sensitivity if [Auto] is selected.

You can fix the light source by choosing [R+G+B], [R], [G], or [B].

Standard tuning setting value:

When using the [Auto/C+I/C mode], the value set during standard tuning becomes a fixed value. This value can be changed in the detailed settings.

The larger the value, the stricter the detection. However, when setting the standard tuning, it is easier to display “------” . If “------” is displayed, please reduce this value and perform the standard tuning again.

■ Display instruction

Output When an Error Occurs

Display	Content	Solution
ErE	1) The Settings have been rewritten more than 1 million times 2) Storage is abnomal	1) The storage has reached its end of life. 2) When the power is switched on and there's no reset, a fault has occurred.
uuu	Displayed when excessive light is received by the sensor (Auto/C+I/C modes)	Adjust the sensor's installation angle so that specular reflections do not enter the receiver.
nnn	Displayed when excessive light is received by the sensor (Auto/C+I/C modes)	Check whether the detection distance is within specified range.
Loc	The key lock function is enabled.	Release the key lock.
The bar pulses across the display	The display selection is set to OFF.	Set the display selection to ON.

Output When an Error Occurs

Display	ON/OFF Output		Indicator	
	N.O.	N.C.	N.O.	N.C.
ErC	Normal operation		Flashing in red	
uuu	OFF	ON	OFF	Orange
nnn	OFF	ON	OFF	Orange
Loc	Normal operation		Normal operation	
The bar pulses across the display	Normal operation		Normal operation	

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