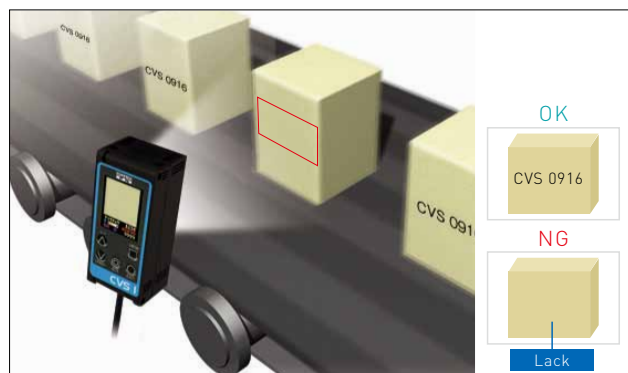


# CVS SERIES APPLICATION

## 1. Checking existence of printing on the box



### CVS1-R

Set the extracted color from the printing and check its area in the field of view

## 2. Checking the lid of instant foods



### CVS2-R

Check the color and shape by its pattern matching function

## 3. Checking existence of cutting tape on the film



### CVS1easy-R

Set the extracted color from the cutting tape and check its area in the field of view

## 4. Checking multiple colors on the box



### CVS2-R

Check existence of multiple color on the box registering multiple colors as reference

## 5. Checking existence of seasoning bag



### CVS1-R

Set the extracted color from the seasoning bag and check its area in the field of view

## 6. Checking shelf life on the packaging film



### CVS4-R

Check the date of shelf life on packaging film. It has calendar function so checking overnight is available

## 7. Checking existence of label on package



### CVS1-R

Set the major color on the label and check its area in the field of view

## 8. Checking existence of label on bottle



### CVS1-R + CVS-LU1

Check the color of fluorescent illuminated by UV light utilizing CVS-LU1

## 9. Checking shelf life on the milk package



### CVS4-R

Check the date of shelf life on milk package. It has calendar function so checking overnight is available

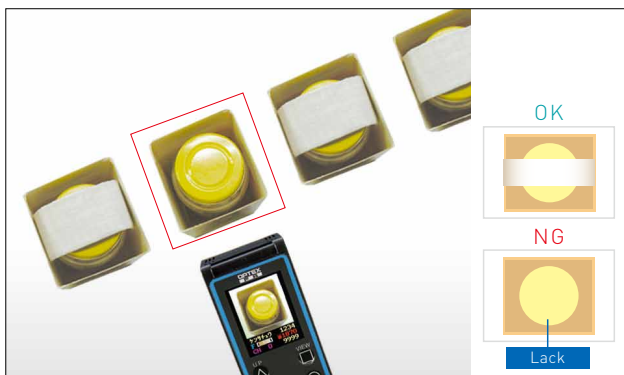
## 10. Checking expiration date on the package



### CVS4-R

Check the expiration date on the package. It can just check number of character as well

## 11. Checking existence of description of pills



### CVS1-R

Set the color area of description of pills in the field of view

## 12. Checking overlapping of the label



### CVS3-R

Check the overlapping label by its edge detection function

### 13. Checking marking on electric components



#### CVS1-R

Set the color of the marking and check its area in the field of view. Narrow angle view version can zoom up small area.

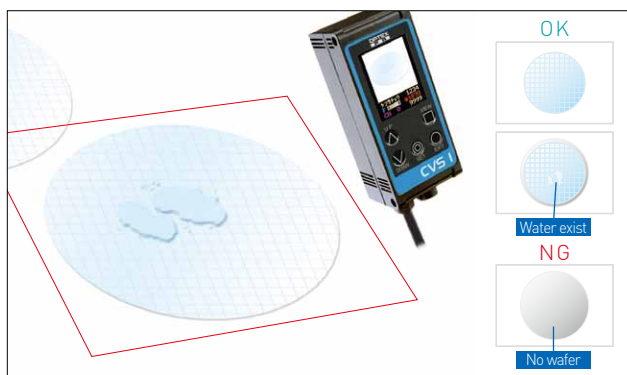
### 15. Checking order of the color of wires



#### CVS2-R

Check the color and position of wires by its color pattern matching function

### 17. Checking existence of wafer



#### CVS1-R

Set the color of the wafer as its reference and detect existence of the wafer even there are some water on it

### 14. Checking ON/OFF of LED on PWB



#### CVS2-R

Check the color and position of LED by its color pattern matching function

### 16. Checking existence of bad marking on parts



#### CVS2-R

Check color of the parts and color of bad marking on the parts to detect existence of bad parts

### 18. Checking direction of the parts



#### CVS3-R

Check the edge of the marking on the IC package and detect direction of it

### 19. Checking position of welded part



#### CVS2-R

Set the color of the pipe and welded part and detect welded part stably by its pattern matching function

### 20. Checking shape of assembled parts



#### CVS3-R

Check the shape of the assembled parts by edge detecting function utilizing back lighting

### 21. Checking direction of the parts on conveyor



#### CVS2-R

Check the color and position of the surface pattern by its color pattern matching function

### 22. Checking size of the nut



#### CVS3-R

Check size of the nut by edge detecting function

### 23. Checking characters on metal parts



#### CVS4-R

Check the characters engraved on the metal parts by its OCR function

### 24. Checking existence of lot number on the spark plugs



#### CVS1-R

Check the color area of the printed characters on the spark plugs





## Simple & Easy setup Color area sensor

- All in one color vision sensor
- Color resolution : 15,000 colors
- Stable color detection by calculating hue of each pixel



### Wide range line-up

CVS1easy-N20-R Standard type  
CVS1easy-N10-R Long range type  
CVS1easy-N40-R Macro view type  
CVS1easy-N21-R Narrow view type

### All in one

The sensor has a built-in Camera, LED Lighting, Display monitor and Controller. This structure enables water resistance IP67.

### Quick change over

8 Banks are available. You can remotely select the bank to use by PLC or other equipments.

### Three-Step-Teaching

Teaching is easily done by three steps even in 30 seconds just like a color sensor.

#### Step1 Get into teaching mode

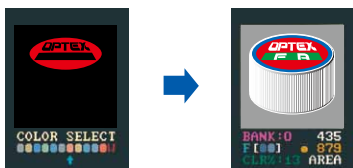


#### Step2 Set field of view

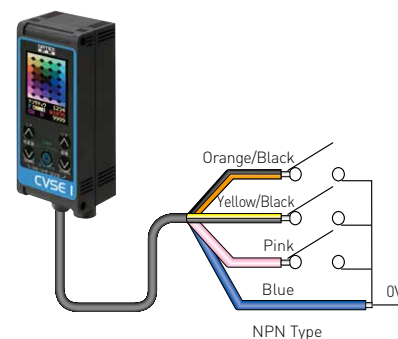
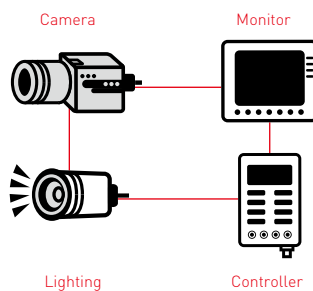


Chose the number to zoom in and zoom out

#### Step3 Set color



Chose the color from the list shown. You can also use teaching window on the view



### Easy Threshold adjustment

Changing sensitivity of color extraction and threshold of inspection is easily done by simple buttons.



### Color Resolution

Up to 15,000 colors are available to detect.

### Stable inspection

It calculates color hue of each pixel so stable inspection is available.

### Wide coverage line-up

You can chose from 4 inspection range/field of view according to inspection target condition.

High performance

Setup Adjustable while line is running

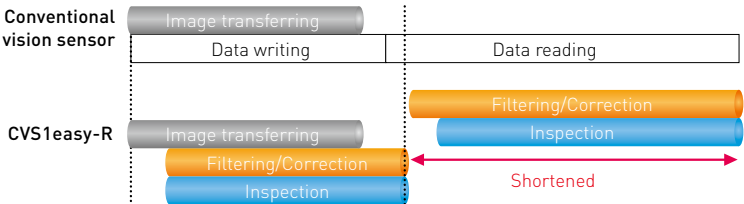
CVS1easy-R provides output with the setup parameters given even while you are adjusting setup. You don't have to stop the line.



CVS1easy-R has two processing unit individually so it can change parameters while vision processing is running without delay.

Secret of High speed

Transferring captured data and vision processing are parallelly done utilizing internal memory. It helps to shorten response time.



Stable inspection

It calculates color hue of each pixel that prevents miss-inspection affected by external light and brightness changes of lighting. Stable inspection is available and you can setup CVS1easy-R just like you do for photoelectric sensor.

When upper part is brighter than lower part

CVS1easy-R

Correct color to evenly

Conventional vision sensor

Inspection is done with hue and brightness

When a part is brighter than other part

CVS1easy-R

Correct color to evenly

Conventional vision sensor

It can't correct

When distance varies

CVS1easy-R

Correct color to evenly

Conventional vision sensor

The part must be set for correction

When the object is glossy

CVS1easy-R

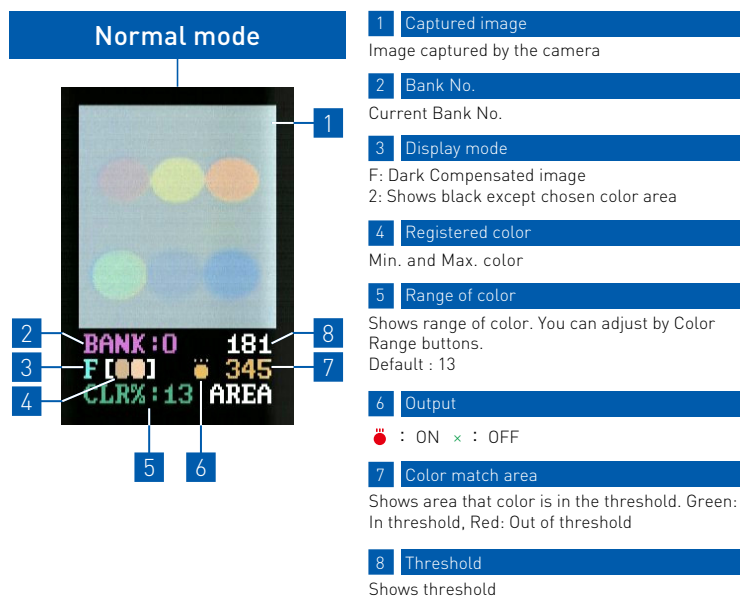
Correction is done except saturated part

Conventional vision sensor

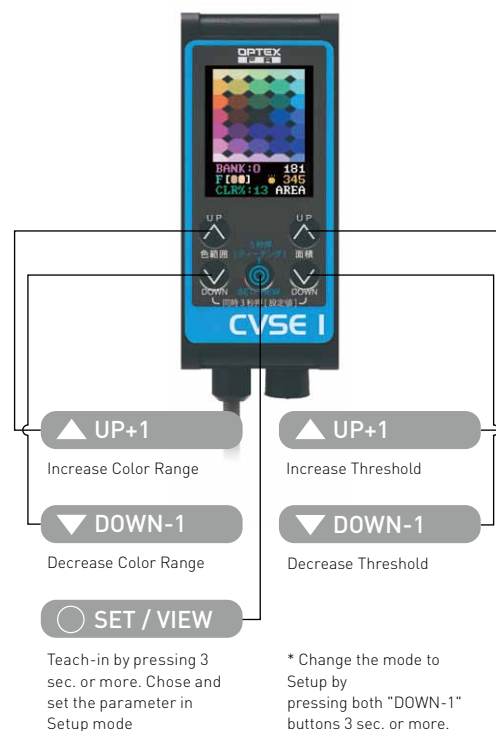
It can't correct

## Display

There are two mode: Normal / Setup



## Switches



## Specifications

Model	CVS1easy-N10-R CVS1easy-P10-R	CVS1easy-N20-R CVS1easy-P20-R	CVS1easy-N21-R CVS1easy-P21-R	CVS1easy-N40-R CVS1easy-P40-R
Detection angle	10°	20°		40°
Working distance	210 to 270mm	90 to 150mm	31 to 39mm	50 to 100mm
Field of view	40 x 50mm to 55 x 65mm	40 x 50mm to 65 x 75mm	17 x 20mm (±10%)	50 x 65mm to 100 x 115mm
Light source	White LED 12 pcs built-in			
Image sensor	330,000 Pixel CMOS color image sensor			
Supply Voltage	12 to 24V DC±10%			
Power consumption	Max. 120mA/24V DC			
Resolution	5 x 12 to 200 x 240			
LED light duration	Approx.50,000 hours (In normal temperature and humidity. Brightness level down by 1/2 of the initial level)			
Response time	11ms (Factory setting),5.0ms(min.),22ms(Max.)			
Output signal	NPN or PNP open collector output x 1 max.100mA Residual voltage 1.0V or less			
Input	3 x Bank selection,1 x Synchronous(Totally4)			
Operating temperature	0 to 40°C (No condensation)			
Operating humidity	35 to 85%RH			
Storage temperature/humidity	-20 to 70°C,35 to 95%RH (No condensation)			
Vibration/shock resistance	10 to 55Hz Amplitude 1.5mm/50G (500m/s <sup>2</sup> )			
Material	Case:ABS/Display and Lens:Acryl or Polycarbonate			
Protection structure	IP67			
Weight	Approx.180g (including cable)			

## Parameters

Function	Setting range (Default)	Description
<b>LCD Disp.</b>		
Brightness <b>BRIGHT</b>	0 to 255 (100)	Specifies the brightness of the screen (shutter time). The optimal value is set at teaching. The shutter time is calculated with "the setting value x 54.5 μs."
Initializing setting value <b>INITIAL</b>	NO, YES (NO)	Initializes all the set values by setting "YES."
Off delay <b>OFF DLY</b>	0 to 5000 (0)	Sets the Off delay time of output. When set to one shot ( <b>ONESHOT = ON</b> ), the value means period of oneshot output. (Unit: ms)
On delay <b>ON DLY</b>	0 to 5000 (0)	Sets the On delay time of output. (Unit: ms)
One shot <b>ONESHOT</b>	OFF, ON (OFF)	Switches to the oneshot output. The time is specified by the value of <b>OFF DLY</b> .
Output reverse <b>OUTSIDE</b>	LOW, HIGH (LOW)	Switches the relationship between the area and the output. <b>LOW</b> : The output turns on when the area is equal to area threshold or more than that. <b>HIGH</b> : The output turns on when the area is less than area threshold.
Resolution <b>RESOLUT</b>	LOW, HIGH (LOW)	Specifies the resolution of the image to be captured. <b>LOW</b> : Reduces the horizontal resolution and response time to half. Effective for fast moving object that doesn't need higher resolution. <b>HIGH</b> : Doesn't reduce the resolution.
Synchronous input <b>SYNCHRO</b>	OFF, ON (OFF)	<b>OFF</b> : Capture continuously. <b>ON</b> : Capture at the rising point of synchronous input (purple).

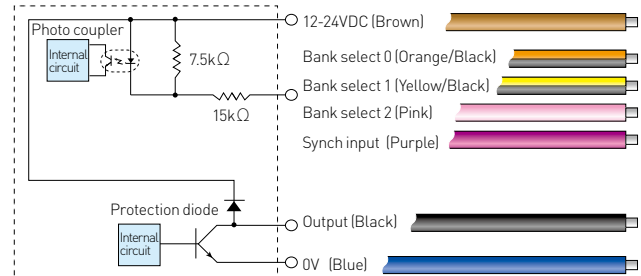
**LCD Disp** displayed in yellow: the setting item is common to all banks.  
**LCD Disp** displayed in purple: the setting item switches to the specific value of each bank.



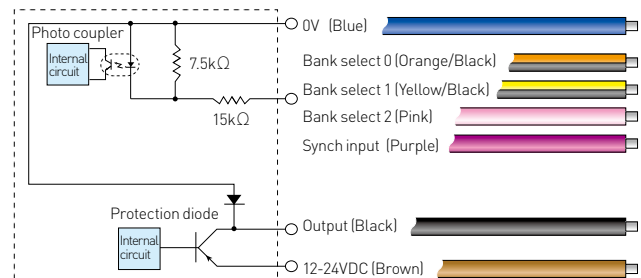
When switching banks changing resolution and zoom rate, the image sensor may take approx. 2 seconds to be stable. Set same resolution and zoom rate when change banks continuously.

## Connection diagram

(NPN)



(PNP)



## Bank table

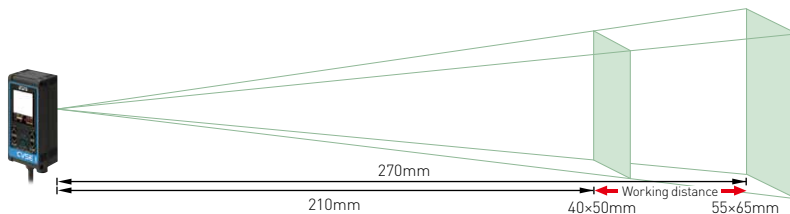
Cable Color	Signal	Bank No.							
		0	1	2	3	4	5	6	7
Orange/Black	Bank selection 0 input	OFF	ON	OFF	ON	OFF	ON	OFF	ON
Yellow/Black	Bank selection 1 input	OFF	OFF	ON	ON	OFF	OFF	ON	ON
Pink	Bank selection 2 input	OFF	OFF	OFF	OFF	ON	ON	ON	ON

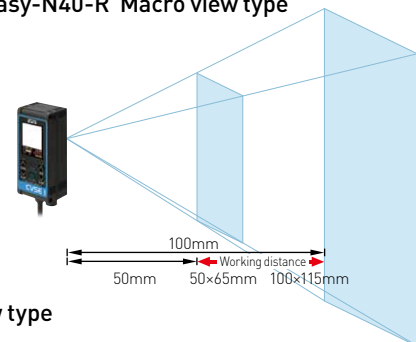
OFF	NPN: OPEN or connect with the brown line. PNP: OPEN or connect with the blue line.
ON	NPN: connect with the blue line. PNP: connect with the brown line.

## Field of View

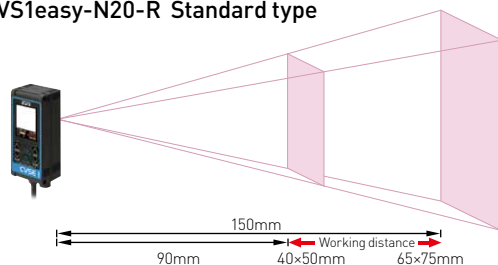
CVS1easy-N10-R Long range type



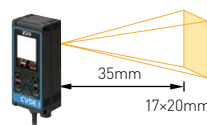
CVS1easy-N40-R Macro view type



CVS1easy-N20-R Standard type



CVS1easy-N21-R Narrow view type







## Easy setup Color sensor

- All in one color vision sensor
- High speed : 0.6 - 22ms
- Stable color detection by calculating hue of each pixel

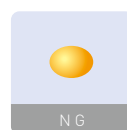
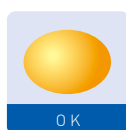


## Wide range line-up

CVS1-N20-R Standard type  
CVS1-N10-R Long range type  
CVS1-N40-R Macro view type  
CVS1-N21-R Narrow view type

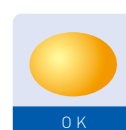
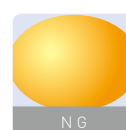
## One threshold mode

Determine OK when the area that the color matches exceeds the threshold.



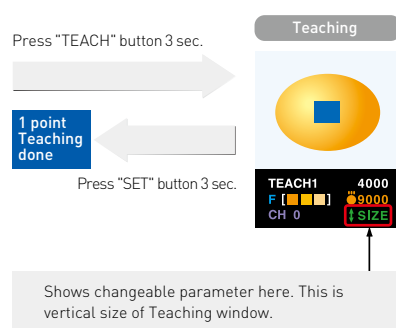
## Two threshold mode

Determine OK when the area that the color matches is in two thresholds.



## Easy Teaching

Teaching is easily done by moving the teaching cursor on the part that you want to teach the color and just set it.



## Setup per application

Set "INITIAL" proper number as following table shows. Parameters will be set automatically for the application.

	print	print on glossy surface	fine color difference	glossy surface	black and white	fine dark color difference	print on rough surface
<b>Application</b>	Shelf life 2005.8.25	2005.8.25					Shelf life 2005.8.25
<b>INITIAL</b>	1	2	3	4	5	6	8

## High Speed : 0.6 - 22ms

Newly developed vision processor enables high speed inspection.

## Up to 16 Bank

16 Banks are available in small all in one package.

## Zoom function

You can zoom in a part of the object.  
You can inspect 16 parts of the object changing Bank efficiently.

## Stable inspection

It calculates color hue of each pixel that prevent miss-inspection.

## Wide coverage line-up

You can chose from 4 inspection range/field of view according to inspection target condition.

High performance

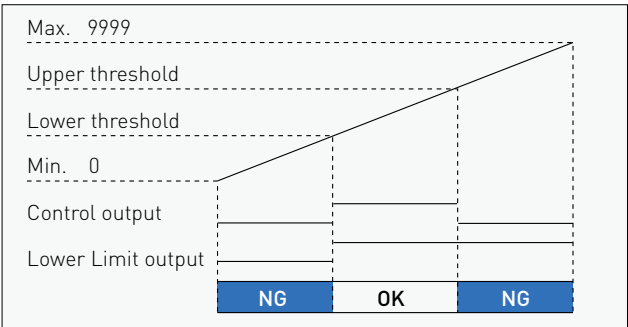
Setup Adjustable while line is running

CVS1-R provides output with the setup parameters given even while you are adjusting setup. You don't have to stop the line.



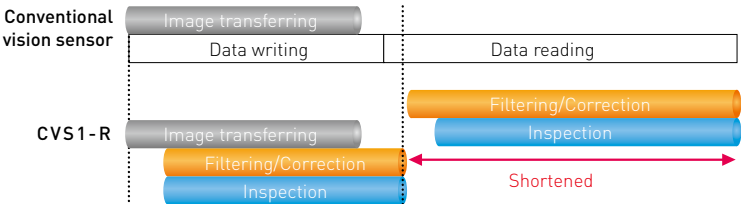
Lower Limit output

You can see which the NG output is lower than lower threshold or higher than upper threshold.



Secret of High speed

Transferring captured data and vision processing are parallelly done utilizing internal memory. It helps to shorten response time.



Stable inspection

It calculates color hue of each pixel that prevent miss-inspection affected by external light and brightness changes of lighting. Stable inspection is available and you can setup CVS1-R just like you do for photoelectric sensor.

When upper part is brighter than lower part

CVS1-R	Conventional vision sensor
<p>Correct color to evenly</p>	<p>Inspection is done with hue and brightness</p>

When a part is brighter than other part

CVS1-R	Conventional vision sensor
<p>Correct color to evenly</p>	<p>It can't correct</p>

When distance varies

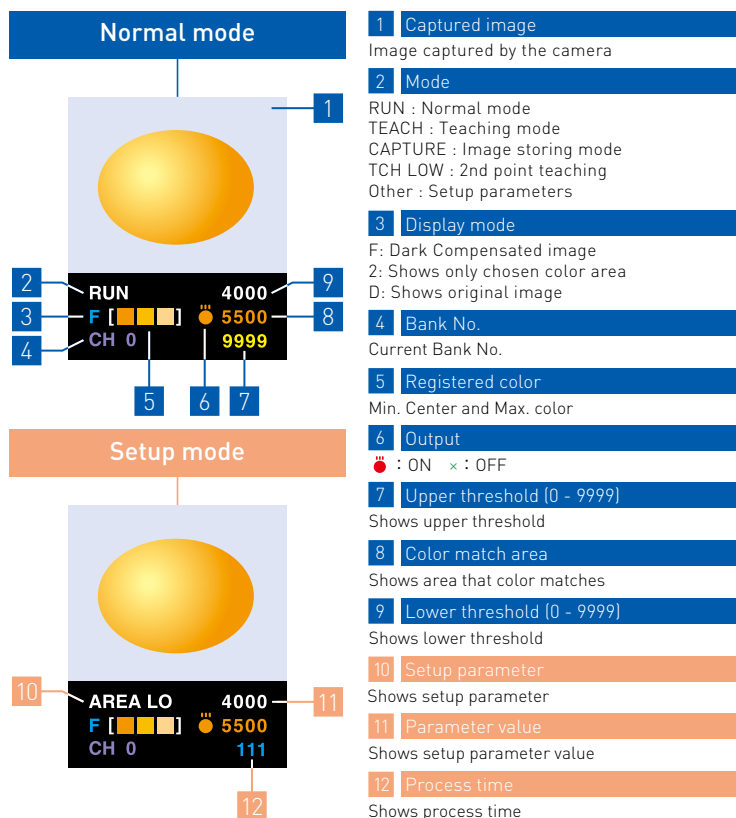
CVS1-R	Conventional vision sensor
<p>Correct color to evenly</p>	<p>The part must be set for correction</p>

When the object is glossy

CVS1-R	Conventional vision sensor
<p>Correction is done except saturated part</p>	<p>It can't correct</p>

## Display

There are two mode: Normal / Setup



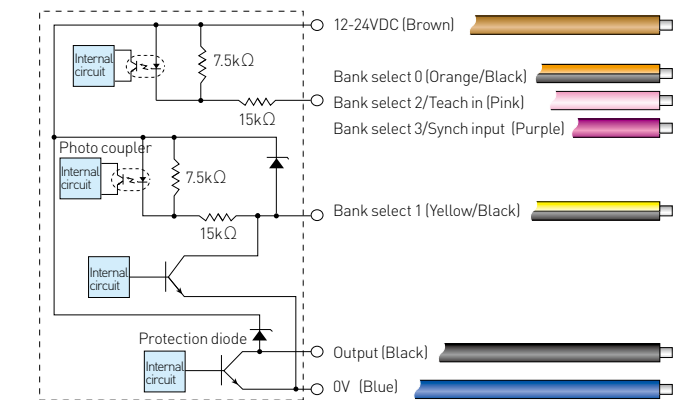
## Switches



## Specifications

Model	CVS1-N10-R CVS1-P10-R	CVS1-N20-R CVS1-P20-R	CVS1-N21-R CVS1-P21-R	CVS1-N40-R CVS1-P40-R
Detection angle	10°	20°		40°
Working distance	210 to 270mm	90 to 150mm	31 to 39mm	50 to 100mm
Field of view	40 x 50mm to 55 x 65mm	40 x 50mm to 65 x 75mm	17 x 20mm (±10%)	50 x 65mm to 100 x 115mm
Light source	White LED 12 pcs built-in			
Image sensor	330,000 Pixel CMOS color image sensor			
Supply Voltage	12 to 24V DC±10%			
Power consumption	Max. 120mA / 24V DC			
Resolution	8 x16 to 200 x 240			
LED light duration	Approx.50,000 hours (In normal temperature and humidity. Brightness level down by 1/2 of the initial level)			
Response time	0.6ms to 22ms			
Output signal	NPN or PNP open collector output x 2 (one of them is "Lower limit output"selectable with bank input #1) max.100mA Residual voltage 1.0V or less			
Input	4 x Bank selection / 1 x Synchronous / 1 x External teaching / 1 x Lower limit output (Totally 4)			
Operating temperature	0 to 40°C (No condensation)			
Operating humidity	35 to 85%RH			
Storage temperature/humidity	-20 to 70°C,35 to 95%RH (No condensation)			
Vibration/shock resistance	10 to 55Hz Amplitude 1.5mm / 50G (500m/s <sup>2</sup> )			
Material	Case:ABS / Display and Lens:Acryl or Polycarbonate			
Protection structure	IP67			
Weight	Approx.180g (including cable)			

# Connection diagram (NPN)

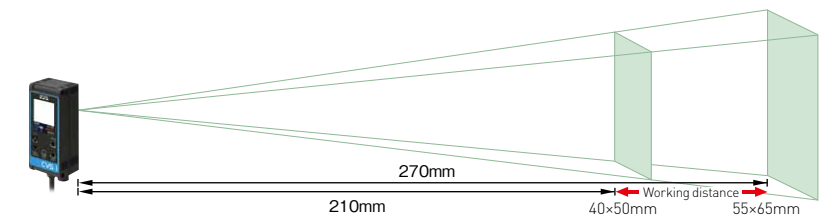


# Bank table

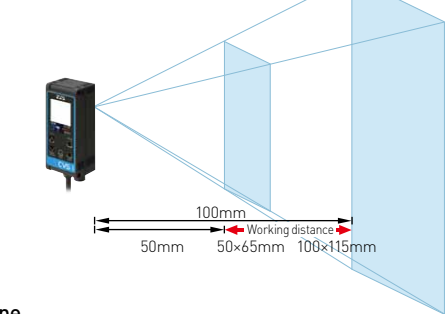
Bank No.	Bank select input			
	3(Purple)	2(Pink)	1(Yellow/Black)	0(Orange/Black)
0	OFF	OFF	OFF	OFF
1	OFF	OFF	OFF	ON
2	OFF	OFF	ON	OFF
3	OFF	OFF	ON	ON
4	OFF	ON	OFF	OFF
5	OFF	ON	OFF	ON
6	OFF	ON	ON	OFF
7	OFF	ON	ON	ON

# Field of View

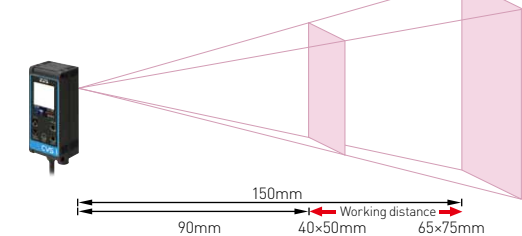
CVS1-N10-R Long range type



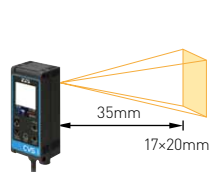
CVS1-N40-R Macro view type



CVS1-N20-R Standard type



CVS1-N21-R Narrow view type





## Detect Color and Shape for various inspection

- All in one color vision sensor
- For Pattern matching and Color inspection
- Better sensitivity by Masking function

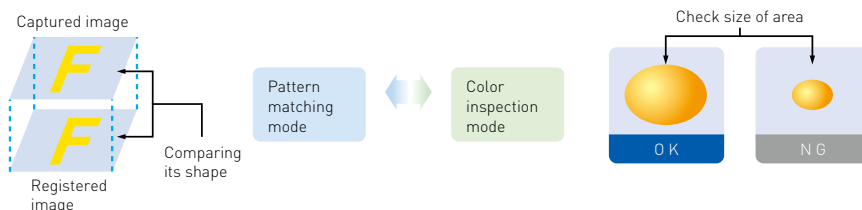


### Wide range line-up

CVS2-N20-R Standard type  
CVS2-N10-R Long range type  
CVS2-N40-R Macro view type  
CVS2-N21-R Narrow view type

### Pattern matching mode and Color inspection mode are available

Inspection of shape and direction of the object is available by pattern matching mode. You can use CVS2-R as simple Color inspection sensor as well. Sorting by color is also available.



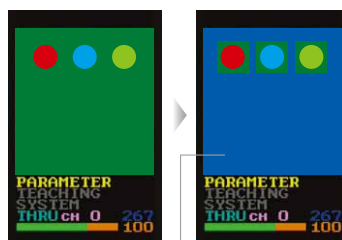
### Correct background brightness

CVS2-R has a function that corrects evenness of background brightness. You register just the background for reference.



### Masking function

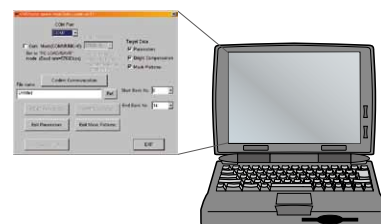
You can mask the area that doesn't have to be checked so that you can get better sensitivity of color inspection.



Masking area

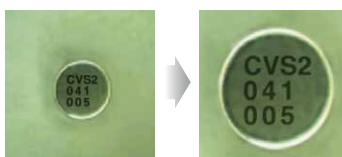
### Downloading setup parameters to PC

You can download setup data and image data into PC. You can use the image data on PC and can copy setup to other CVS2-R. Please use I/F cable CVS-C2C.



### Zoom function

CVS2-R has Zoom function so you can zoom in up to twice size.



x2

### Up to 15 Bank

15 Banks are available in small all in one package.

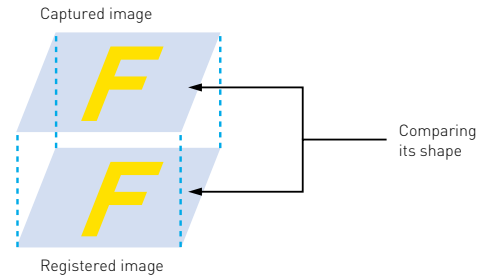
### Wide coverage line-up

You can chose from 4 inspection range/field of view according to inspection target condition.



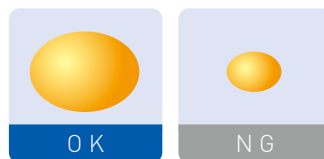
## Pattern Matching mode

CVS2-R detects up to 65,536 colors and checks its shape to compare with registered image.

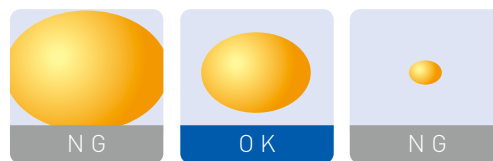


## Color Inspection mode

Determine OK when the area that the color matches exceeds the threshold.



Determine OK when the area that the color matches is in two thresholds.



## Two Color Inspection at a time

CVS2-R can inspect two colors for one application at a time.

### Checking Two Color

You can set Upper and Lower threshold for two colors to inspect. You can chose a logic from 4 combination.

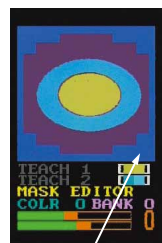


Two bar graphs for two colors

Two threshold for two colors each

### Masking function

You can mask the area you don't want to detect the color freely in position.



Blue part is masked area

### Sorting function

Sorting is available by utilizing two outputs up to 3. You can also increase the sorting number up to 15 by utilizing RS-232C controlling or external unit TMC-N11-CVS.

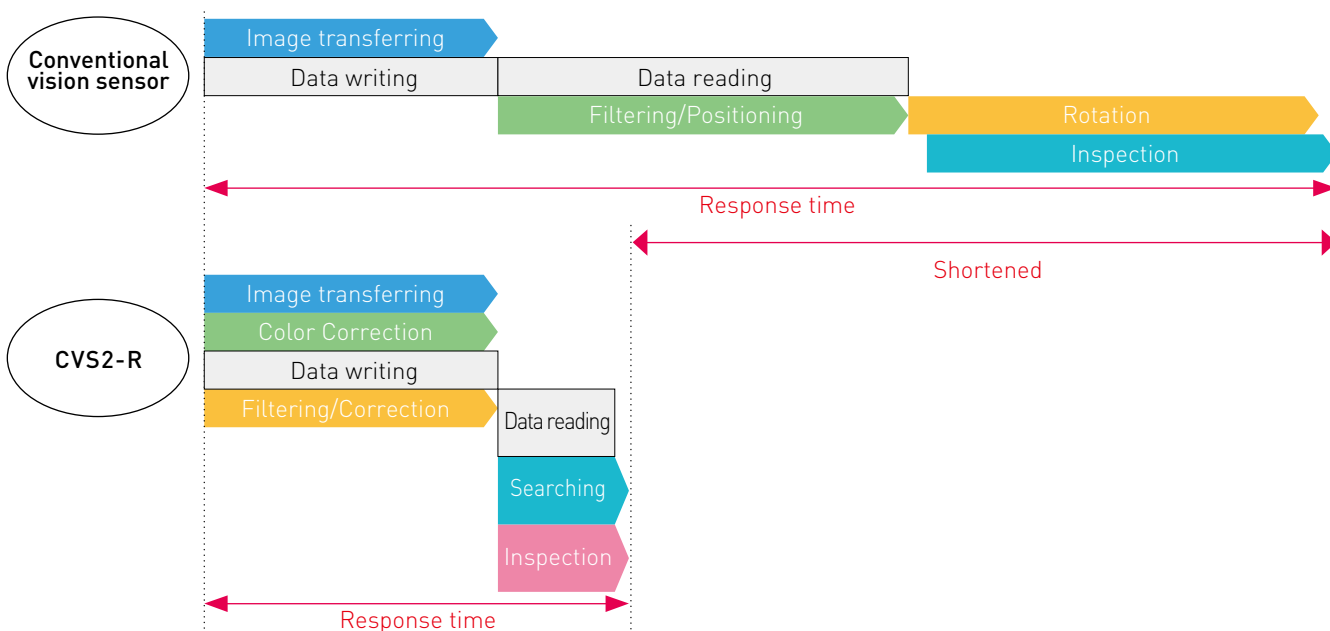


When this parameter is 1, you can sort in two criteria.

## Features

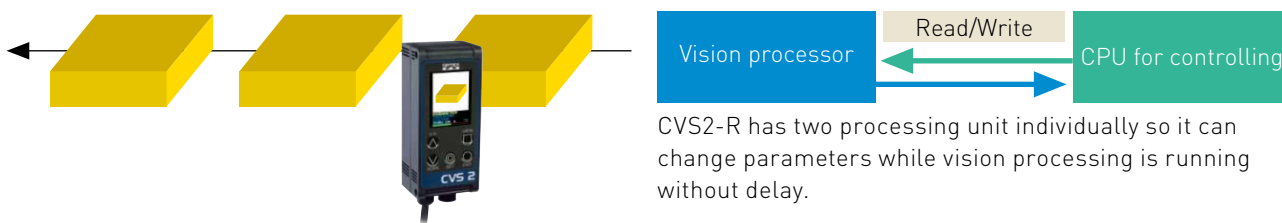
### Secret of High speed

Transferring captured data and vision processing are parallelly done utilizing internal memory. It helps to shorten response time.



### Setup Adjustable while line is running

CVS2-R provides output with the setup parameters given even while you are adjusting setup. You don't have to stop the line.



### Correct background brightness

CVS2-R has a function that corrects evenness of background brightness. You register just the background for reference.

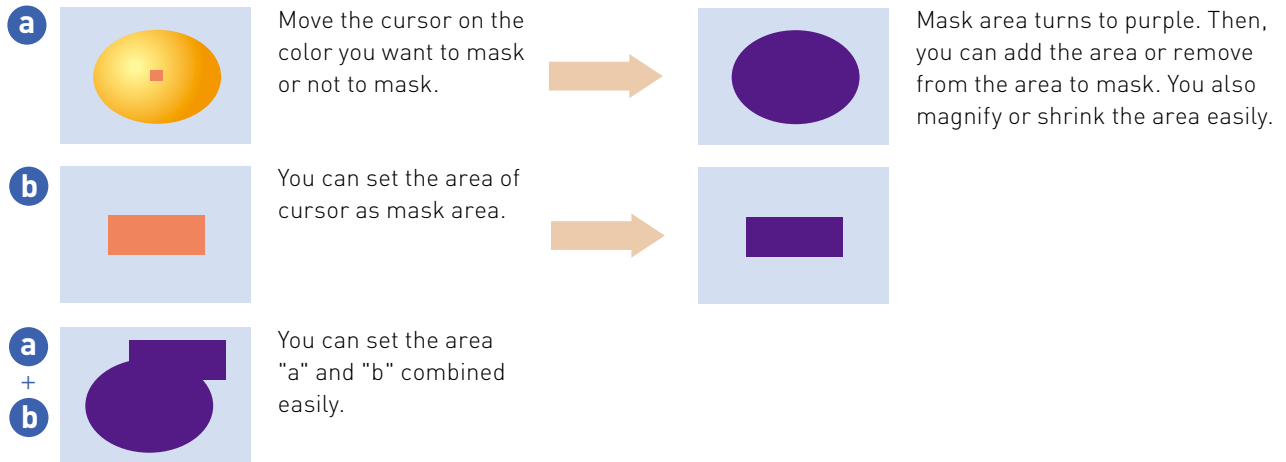


## Masking

You can mask the area that doesn't have to be checked so that you can get better sensitivity of color inspection.

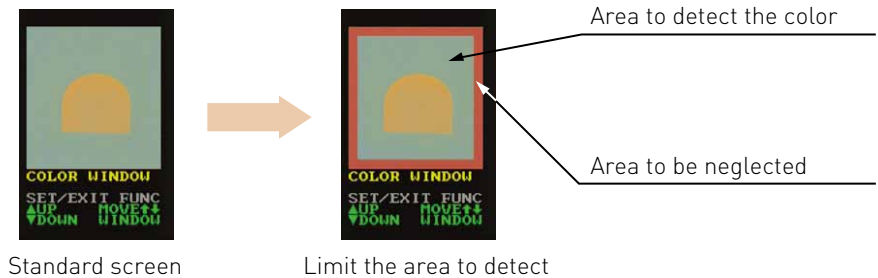
### Setup

You can setup the area to mask as follows.

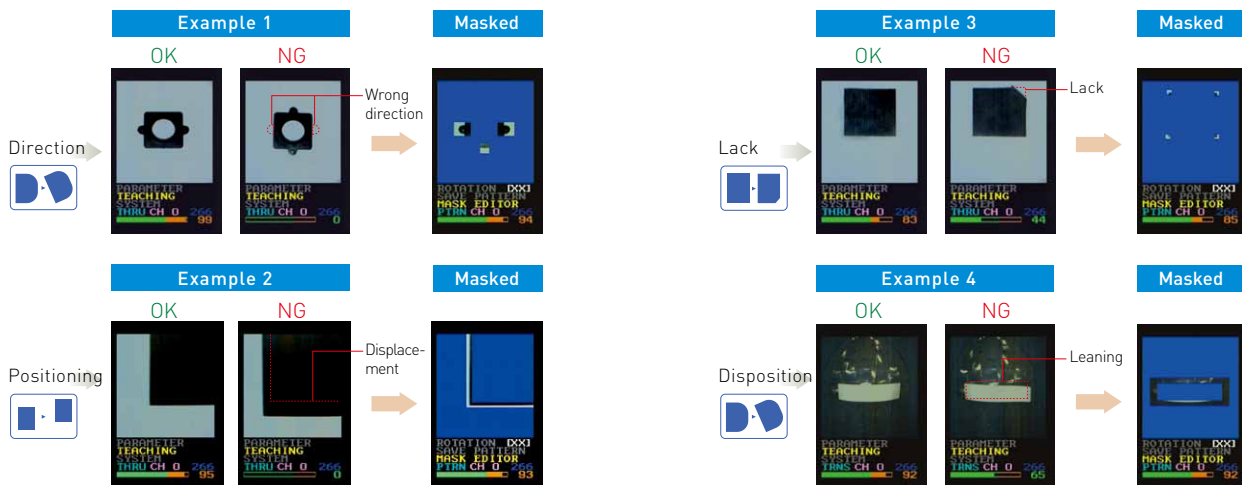


### Color inspect area

You can limit the area to inspect color from. This prevents miss-detection of color at the edge of the FOV.



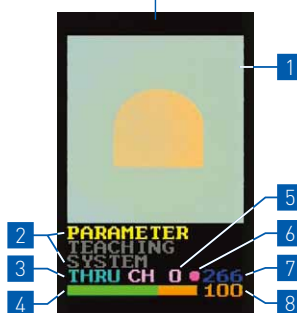
### Example of masking



You can get better result by masking the area that doesn't show characteristics of the target object.

## Display

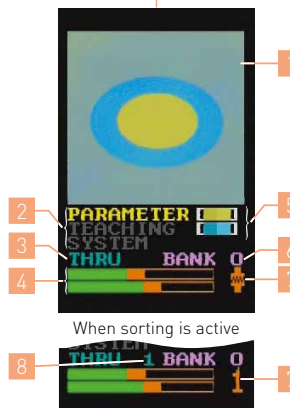
### Pattern matching mode



- 1 Captured image  
Image captured by the camera
- 2 Parameters  
Shows parameters
- 3 Display mode  
You can change display mode by VIEW button
- 4 Bar graph  
Shows how big the area that the color matches. Threshold is at the border of green and orange.
- 5 Bank No.  
Shows current Bank.
- 6 Auxiliary output  
Status of auxiliary output.  
● : means ON
- 8 Color match area  
Shows area that color matches.  
Orange : ON, Green : OFF

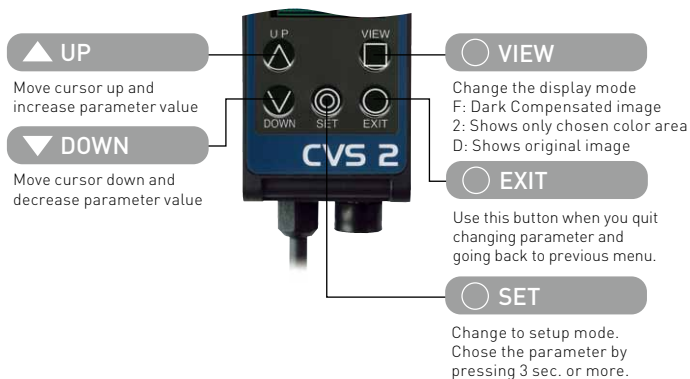
7 Response time  
Shows response time. Unit : 0.1ms.  
Example : 266 = 26.6ms

### CVS1 compatible mode



- 1 Captured image  
Image captured by the camera
- 2 Parameters  
Shows parameters
- 3 Display mode  
Shows display mode
- 4 Display mode  
Shows how big the area that the color matches.
- 5 Registered color  
Min. Center and Max. color
- 6 Bank No.  
Shows current Bank.
- 7 Output/Sorting status  
Orange: ON, Green: OFF  
Shows sorting No. when it's active.
- 8 Monitoring Bank No.  
Shows Bank No. for sorting.

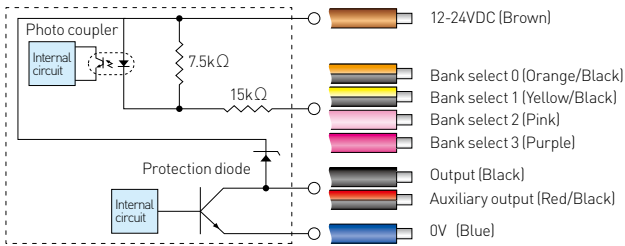
## Switches



## Specifications

Model	CVS2-N10-R CVS2-P10-R	CVS2-N20-R CVS2-P20-R	CVS2-N21-R CVS2-P21-R	CVS2-N40-R CVS2-P40-R
Detection angle	10°	20°		40°
Working distance	210 to 270mm	90 to 150mm	31 to 39mm	50 to 100mm
Field of view	40 x 50mm to 55 x 65mm	40 x 50mm to 65 x 75mm	17 x 20mm (±10%)	50 x 65mm to 100 x 115mm
Light source	White LED 12 pcs built-in			
Image sensor	330,000 Pixel CMOS color image sensor			
Supply Voltage	12 to 24V DC±10%			
Power consumption	Max. 140mA/24V DC			
Resolution	8 x 16 to 200 x 240			
LED light duration	Approx. 50,000 hours (In normal temperature and humidity. Brightness level down by 1/3 of the initial level)			
Response time	4ms to 22ms			
Output signal	NPN or PNP open collector output x 2 max. 100mA Residual voltage 1.0V or less			
Input	4 x Bank selection / 1 x Synchronous / 1 x External teaching (Totally 4)			
Operating temperature	0 to 40°C (No condensation)			
Operating humidity	35 to 85%RH			
Storage temperature/humidity	-20 to 70°C, 35 to 95%RH (No condensation)			
Vibration/shock resistance	10 to 55Hz Amplitude 1.5mm / 50G(500m/s <sup>2</sup> )			
Material	Case: ABS / Display and Lens : Acryl or Polycarbonate			
Protection structure	IP67			
Weight	Approx. 180g (including cable)			

## Connection diagram



## Auxiliary output

**AUX OUT=0: Ready** - Turns OFF after switching Bank.

Turns ON when Output is ready

**AUX OUT=1: Judge timing** - Turns ON when Judge timing

**AUX OUT=2: Light timing** - Turns ON when Lighting

**AUX OUT=3: Searching result** - Turns ON when each search result is in its criteria, MAGNIFY%, POSIT% X, POSIT% Y, ROTATE%.

## Bank table

Set up	BANK	0-14		15		16	
	SYNCHRON	4	0-3	4	0-3	4	0-3
External Input	Bank select 0	NA		Active		Active	
	Bank select 1	NA		Active		Active	
	Bank select 2	External Teach-in		Active		Active	
	Bank select 3	NA	Synch.In	Active	Synch.In	Active	Synch.In

### Sorting output

You can get sorting output from following table that shows which bank matches by combination of Output (Black) and Auxiliary output (Red/Black) signals.

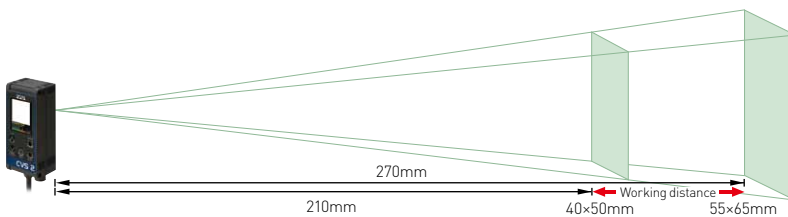
Bank No.	Output(Black)	Auxiliary output(Red/Black)
Current Bank	ON	OFF
+1	OFF	ON
+2	ON	ON

Bank No.	Bank select input			
	3(Purple)	2(Pink)	1(Yellow/Black)	0(Orange/Black)
0	OFF	OFF	OFF	OFF
1	OFF	OFF	OFF	ON
2	OFF	OFF	ON	OFF
3	OFF	OFF	ON	ON
4	OFF	ON	OFF	OFF
5	OFF	ON	OFF	ON
6	OFF	ON	ON	OFF
7	OFF	ON	ON	ON
8	ON	OFF	OFF	OFF
9	ON	OFF	OFF	ON
10	ON	OFF	ON	OFF
11	ON	OFF	ON	ON
12	ON	ON	OFF	OFF
13	ON	ON	OFF	ON
14	ON	ON	ON	OFF
0	ON	ON	ON	ON

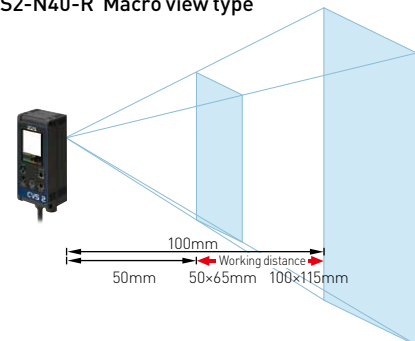
OFF	NPN: OPEN or connect with the brown line. PNP: OPEN or connect with the blue line.
ON	NPN: connect with the blue line. PNP: connect with the brown line.

## Field of View

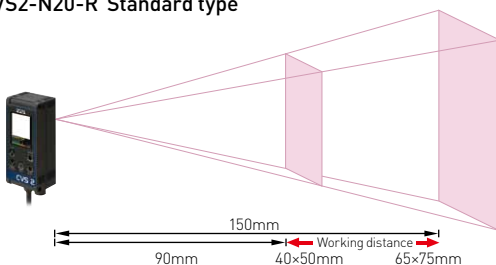
### CVS2-N10-R Long range type



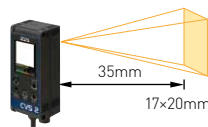
### CVS2-N40-R Macro view type



### CVS2-N20-R Standard type



### CVS2-N21-R Narrow view type







## Edge sensor for various applications

- All in one color vision sensor
- Easy setup and High performance
- Useful Zoom-in function

### Wide range line-up

CVS3-N20-R Standard type  
CVS3-N10-R Long range type  
CVS3-N21-R Narrow view type

### New inspection mode: Contour mode, Differential mode

New inspection mode, Contour mode and Differential mode have been added up on conventional CVS3-R compatible mode. It has improved search function and improved color/contrast correct function.

### Masking function

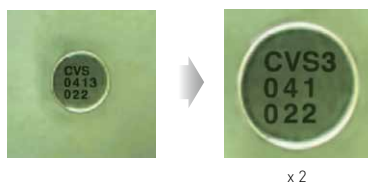
You can mask the area that doesn't have to be checked so that you can get better sensitivity of inspection.



Mode	Compatible mode	Contour mode	Differential mode
Application	<p>Metal parts</p>	<p>Metal parts Contour mode+Monochrome mode</p> <p>For flaw with slight color difference Contour mode+Color inspection</p> <p>For slight color difference and shape Contour mode+inspection of entire area</p>	<p>Checking picture Differential mode</p> <p>For low contrast object Differential mode+Color inspection</p>

### Zoom function

CVS3-R has Zoom function so you can zoom in up to twice size.



### Downloading setup parameters to PC

You can download setup data and reference image data into PC.  
You can copy the reference image data and the setup data to other CVS3-R.  
Please use I/F cable CVS-C2C.

### Up to 15 Bank

15 Banks are available in small all in one package.

### Other FOV type is available

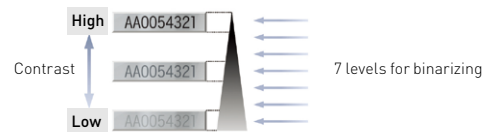
In case you need other FOV type like CVS1-R or CVS2-R, please contact our distributor.

## Features

### 7 binarize level

When it compares binarized image between registered image and captured image, it chooses best binarize level to get best image automatically. This is effective when the lighting is not stable.

**Existence of graved mark on metal or glass**



### Scaling up/down

Correcting size function correct captured image size. This function is effective for inspection of the object on conveyor.

**Detecting direction of object**



Size of image captured is changed in case the conveyor waves or its speed changes. In this case, this function automatically changes image size when it searches target image.



### Rotate correction

Correction of rotation is available up to  $\pm 6.2$  degree.

**Inspection of chocolate shape**



Find out best angle rotating the captured image step by step



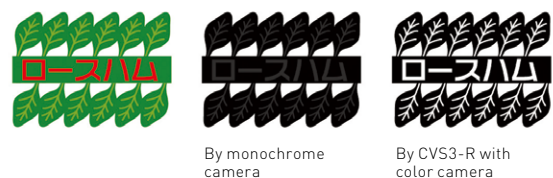
### Detecting Color edge

Detect edge between different colors and get clear image to inspect.

**Inspection of colored label direction**



You can detect even red color on green background easily that monochrome camera can't.



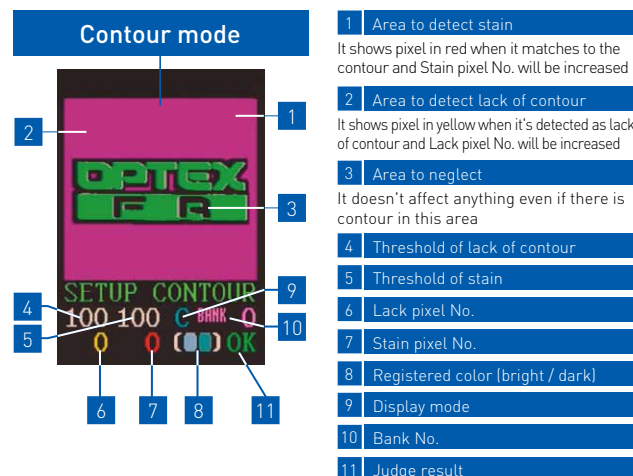
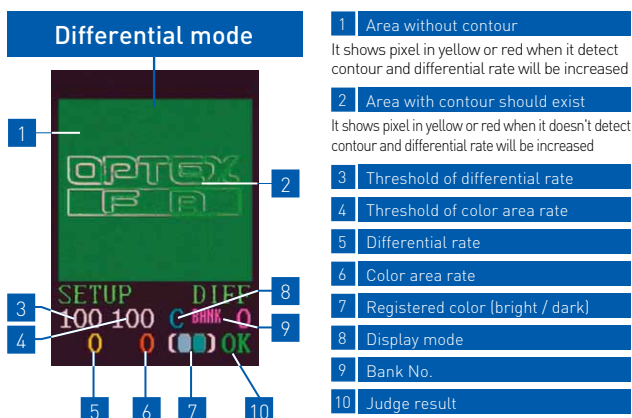
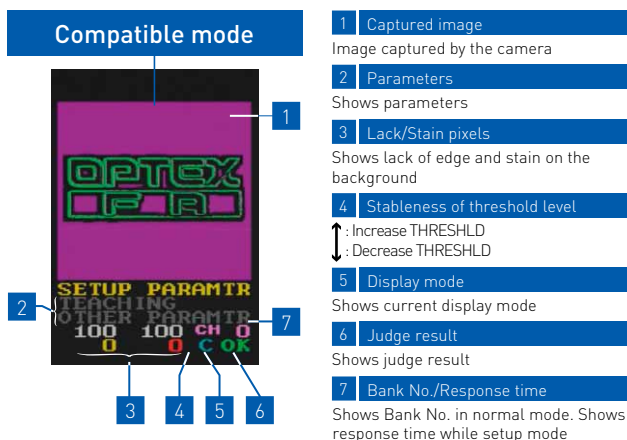
### Easy Teaching

You can externally teach CVS3-R just by inputting single Teaching signal. Then, CVS3-R updates its image for reference automatically.

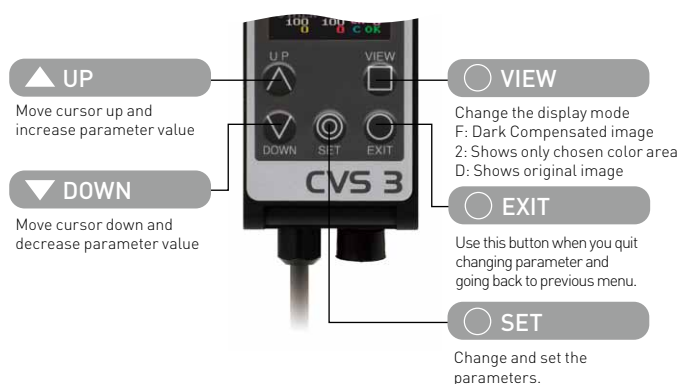
**Verifying shelf life that changes everyday**



## Display



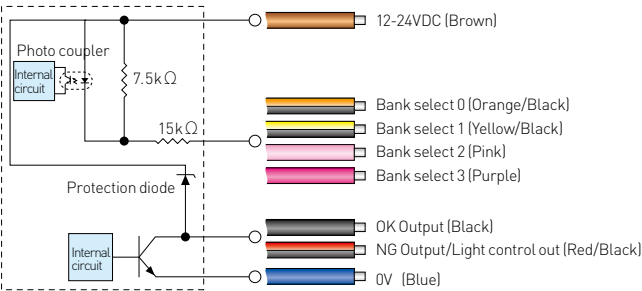
## Switches



## Specifications

Model	CVS3-N10-R CVS3-P10-R	CVS3-N20-R CVS3-P20-R	CVS3-N21-R CVS3-P21-R
Detection angle	10°	20°	
Working distance	210 to 270mm	90 to 150mm	31 to 39mm
Field of view	40 x 50mm to 55 x 65mm	40 x 50mm to 65 x 75mm	17 x 20mm (±10%)
Light source	White LED 12 pcs built-in		
Image sensor	330,000 Pixel CMOS color image sensor		
Supply Voltage	12 to 24V DC±10%		
Power consumption	Max. 140mA/24V DC		
Resolution	16 x 16 to 208 x 236		
LED light duration	Approx. 50,000 hours (In normal temperature and humidity. Brightness level down by 1/3 of the initial level)		
Response time	48ms (Factory setting). 2.5ms (Min). 518ms (Max)		
Output signal	NPN or PNP open collector output x 2 max. 100mA Residual voltage 1.0V or less		
Input	4 x Bank selection / 1 x Synchronous / 1 x External teaching (Totally 4)		
Operating temperature	0 to 40°C (No condensation)		
Operating humidity	35 to 85%RH		
Storage temperature/humidity	-20 to 70°C, 35 to 95%RH (No condensation)		
Vibration/shock resistance	10 to 55Hz Amplitude 1.5mm / 50G (500m/s <sup>2</sup> )		
Material	Case: ABS / Display and Lens : Acryl or Polycarbonate		
Protection structure	IP67		
Weight	Approx. 180g (including cable)		

Connection diagram



Bank table

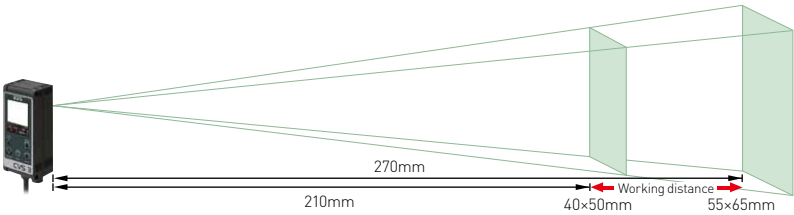
Set up	BANK	0~14		15		16	
	SYNCHRON	4	0~3	4	0~3	4	0~3
External Input	Bank select 0	NA		Active			
	Bank select 1	NA		Active			
	Bank select 2	External Teach-in		Active			
	Bank select 3	NA	Synch.In	Active	Synch.In	Active	Synch.In

Bank No.	Bank select input			
	3(Purple)	2(Pink)	1(Yellow/Black)	0(Orange/Black)
0	OFF	OFF	OFF	OFF
1	OFF	OFF	OFF	ON
2	OFF	OFF	ON	OFF
3	OFF	OFF	ON	ON
4	OFF	ON	OFF	OFF
5	OFF	ON	OFF	ON
6	OFF	ON	ON	OFF
7	OFF	ON	ON	ON
8	ON	OFF	OFF	OFF
9	ON	OFF	OFF	ON
10	ON	OFF	ON	OFF
11	ON	OFF	ON	ON
12	ON	ON	OFF	OFF
13	ON	ON	OFF	ON
14	ON	ON	ON	OFF
0	ON	ON	ON	ON

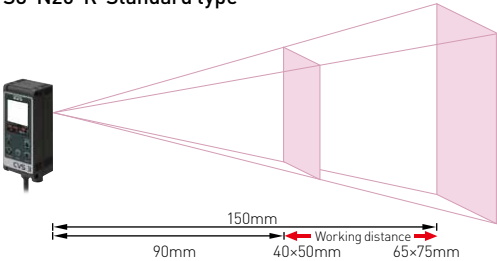
OFF	NPN: OPEN or connect with the brown line. PNP: OPEN or connect with the blue line.
ON	NPN: connect with the blue line. PNP: connect with the brown line.

Field of View

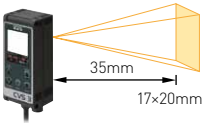
CVS3-N10-R Long range type



CVS3-N20-R Standard type



CVS3-N21-R Narrow view type





## Compact OCR sensor

- All in one OCR sensor
- Easy setup and High performance
- Built-in Calendar



## Wide range line-up

CVS4-N23-R Standard type  
CVS4-N21-R Small character type  
CVS4-N20-R Long range type  
CVS4-N40-R Macro view type  
CVS4-N23R-R Standard vertical type

## Easy setup

You can setup easily just following the instruction on the screen.

## User dictionary

You can make characters utilizing the images captured and transferred to PC.

## Up to 16 Bank

16 Banks are available in small all in one package.

## Built-in Calendar

It can check the date continuously overnight referring built-in calendar without error because of its tolerance of time.

## All in one OCR sensor

Recognizes Alphabetic, Numeric and Special characters. It can check shelf life, date of manufacture and lot number. It recognizes characters of Thermal printer, Hot printer, Ink-jet printer and Laser marker.

2009.02.08  
CVS4

Thermal printer

2009.04 BBD

Hot printer

R A 0 2  
0 9 0 4 1 2

Ink-jet printer

2009.03

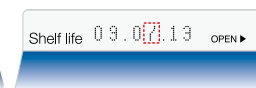
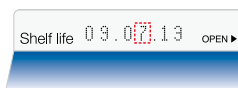
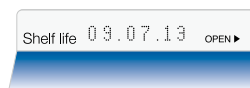
Laser marker

It compares the characters with internal Dictionary. You can setup as it determines NG when single character is wrong. You can also setup as it determines OK when the character has only small lack.

Correct

Small lack

Big lack



## Storing NG image

When judge result changed from OK to NG, it stores NG image into internal memory up to 30 images. You can download the image data from CVS4-R through optional cable CVS-C2C.

## Wide range of line-up

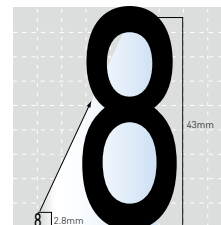
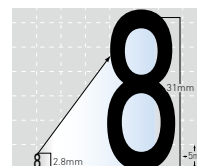
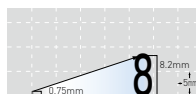
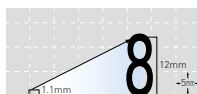
You can chose a range from 4 ranges of line-up.

CVS4-N23W-R/  
-N23RW-R

CVS4-N21W-R

CVS4-N20W-R

CVS4-N40W-R



## Character direction

CVS4-N23W-R/-N21W-R/  
-N20W-R/-N40W-R

CVS4-N23RW-R



A 05 10 17  
B 05 10 22



A 05 10 17  
B 05 10 22

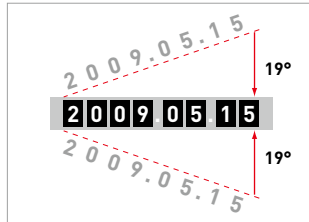


## Features

### Rotation search



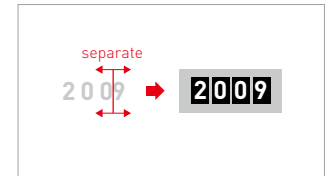
It can search the characters rotating up to  $\pm 19$  degree.



### Recognize connected characters



Connected characters can be separated by adjusting the character width.



### Double shutter



It captures twice by single trigger. If first image or 2nd image is OK, judge result is OK. This function is effective when the trigger timing is not stable and object position is not stable.

### Continuous capture



It will automatically capture and check the image continuously from single trigger until it gets OK image. If it gets Time-out before getting OK, it outputs NG.

### Expandable FOV



You can expand vertical FOV when the character lines can't be in standard FOV



FOV can be vertically doubled by this function and it can detect the character lines in a FOV.

### Mirror capture

It can capture mirror reversed image

### Fast capture mode

It has Fast capture mode reducing vertical resolution down to half. This is effective for the objects that move fast.

### Delayed Output function

It has timer to delay activating output for the period. This function can be utilized for controlling sorting stage located after the inspection stage.

### Check character number

It can just check number of characters to see existence of the printing for example.

### Delayed NG mode

It can turn output to NG only when it detect NG certain times continuously. This is effective for detecting ink runs out and some special error that happens rarely.

### Wild card for verifying characters

You can use "?" as a wild card to determine a character as OK whatever the character is. This function is effective when the character can be any characters.

## Display

**Normal mode**

- 1 Captured image  
You can change by VIEW button. When it's detached mode, background is Green for OK and Red for NG.
- 2 Scale  
Scale for adjust character size in FOV
- 3 Display mode  
Shows display mode in yellow
- 4 Judge result  
OK : Data/Time is in threshold and string matches  
NG : Any lines doesn't match  
ER : Backup error of calendar timer
- 5 Current Bank No.
- 6 Inspection item on screen  
1D : The 1st date 2D : The 2nd date  
1T : The 1st time 2T : The 2nd time  
CH : Number of characters and character string
- 7 Response time from Synch. input to Judge output
- 8 Recognized Date/Time
- 9 Upper limit of Date/Time
- 10 Lower limit of Date/Time

## Switches

**UP**  
Move cursor up and increase parameter value

**DOWN**  
Move cursor down and decrease parameter value

**VIEW**  
Change the display mode. Press with "UP" and "DOWN" when you change the item to monitor.

**EXIT**  
Change the mode from/to Normal mode to/from Teaching mode.

**SET**  
Change the mode. Chose and set the parameters.

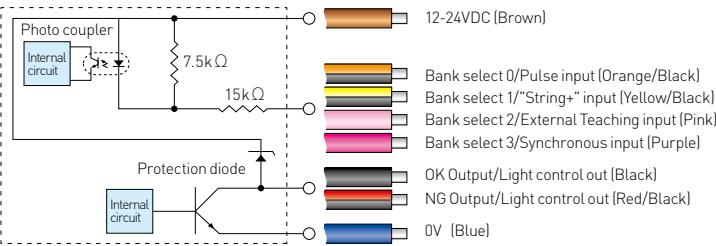
**DOWN + SET**  
Set Lock mode, inhibit Teaching and changing parameters of setup.  
Press both buttons → 3sec.

**UP + SET**  
Releases Lock mode.

## Specifications

Model	CVS4-N20W-R CVS4-P20W-R	CVS4-N21W-R CVS4-P21W-R	CVS4-N40W-R CVS4-P40W-R	CVS4-N23W-R CVS4-P23W-R	CVS4-N23RW-R CVS4-P23RW-R
Detection angle	20°		40°	20°	
Working distance	90 to 150mm	31 to 39mm	50 to 100mm	44 to 56mm	44 to 56mm
Field of view	53x25mm to 79x38mm	21x10mm (±10%)	53x25mm to 115x53mm	30x15mm (±10%)	30x15mm (±10%)
Light source	White LED 12 pcs built-in				
Image sensor	330,000 Pixel CMOS monochrome image sensor				
Supply Voltage	12 to 24V DC±10%				
Power consumption	Max. 140mA / 24V DC				
Resolution	512 x 244				244 x 512
LED light duration	Approx.100,000 hours(In normal temperature and humidity. Brightness level down by 1/2 of the initial level)				
Response time	23ms to 48ms (20 characters in 2 lines,Rotation search up to ±10°)				
Output signal	NPN or PNP open collector output x 2 (OK/NGoutput,External light control output) max. 100mA Residual voltage 1.0V or less				
Input	4 x Bank selection / 1 x Synchronous / 1 x External teaching (Totally 4)				
Operating temperature	0 to 40°C (No condensation)				
Operating humidity	35 to 85%RH				
Storage temperature/humidity	-20 to 70°C, 35 to 95%RH(No condensation)				
Vibration/shock resistance	10 to 55Hz Amplitude 1.5mm / 50G(500m/s <sup>2</sup> )				
Material	Case:ABS / Display and Lens : Acryl or Polycarbonate				
Protection structure	IP67				
Weight	Approx.200g (including cable)				
Recognizable character number	60 characters / 6 lines				
Character number per line	30 characters				
Number of date/time/string	Up to 2 x Date / 2 x Time / 4 x Strings with 22 characters (up to 4 items)				
User Dictionary	56 characters				
Built-in Timer accuracy	-45 sec. to 75 sec. per month				
Back up period of built-in timer	5 years by built-in non-rechargeable battery / Life of super capacitor : 7.8 years ( when its capacity gets down to the level that keep timer 3 days )				

Connection diagram



Bank table

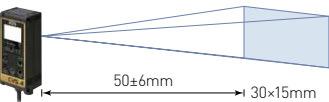
Bank No.	Bank select input			
	3(Purple)	2(Pink)	1(Yellow/Black)	0(Orange/Black)
0	OFF	OFF	OFF	OFF
1	OFF	OFF	OFF	ON
2	OFF	OFF	ON	OFF
3	OFF	OFF	ON	ON
4	OFF	ON	OFF	OFF
5	OFF	ON	OFF	ON
6	OFF	ON	ON	OFF
7	OFF	ON	ON	ON
8	ON	OFF	OFF	OFF
9	ON	OFF	OFF	ON
10	ON	OFF	ON	OFF
11	ON	OFF	ON	ON
12	ON	ON	OFF	OFF
13	ON	ON	OFF	ON
14	ON	ON	ON	OFF
15	ON	ON	ON	ON

OFF	NPN: OPEN or connect with the brown line. PNP: OPEN or connect with the blue line.
ON	NPN: connect with the blue line. PNP: connect with the brown line.

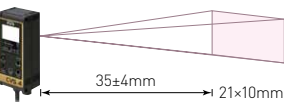
Parameter				Function of Bank selection input				Selectable range	
Bank	Synchron	String+	SyncPlus	Orange / Black	Yellow/Black	Pink	Purple		
BKIN	CONT	OFF	Others	Bank selection0	Bank slctn 1	Bank slctn 2	Bank slctn 3	0-15	
			ON		String+			0,1,4,5,8,9,12,13	
		ON,SCLR	Others		Bank slctn 1		Synchrono- us input	0-7	
			ON					Pulse que	0,2,4,6
	UP,HIGH DOWN, LOW	OFF	Others	Bank slctn0	String+	0,1,4,5			
			ON		Pulse que	0,4			
TCH	CONT	OFF	Others	Bank selection0	Bank slctn 1	Bank slctn 3	0-3, 8-11		
			ON		String+		0,1,8,9		
		ON,SCLR	Others		Bank slctn 1		Synchrono- us input	0-3	
			ON					Pulse que	0,2
	UP,HIGH DOWN, LOW	OFF	Others	Bank slctn0	String+	0,1			
			ON		Pulse que	0			
0-15, COMM	CONT	OFF	Others	NA	NA	External Teaching	NA	0-15 (Bank is set by parameter and through RS232/F)	
			ON		String+				
		ON,SCLR	Others		Pulse que		NA		Synchrono- us input
			ON				String+		
	UP,HIGH DOWN, LOW	OFF	Others	NA	String+				
			ON			Pulse que			

Field of View

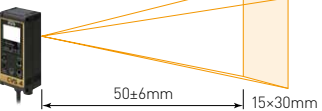
CVS4-N23W-R



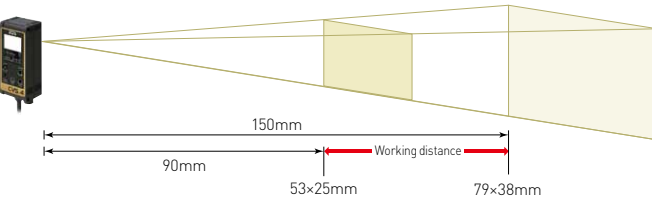
CVS4-N21W-R



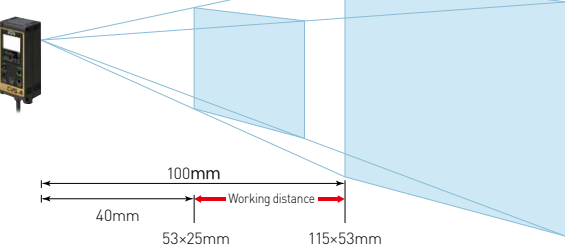
CVS4N23RW-R



CVS4-N20W-R



CVS4-N40W-R



# RS232 Communication

## Available functions

### 1.Setup

You can download/modify/upload setup from/to CVS4-R.

### 2.User DIC

You can make unique character referring the image from CVS4-R.

### 3.Downloading NG image

You can refer NG image and check what happened.

### 4.Remote control

You can control CVS4-R through RS232 I/F.

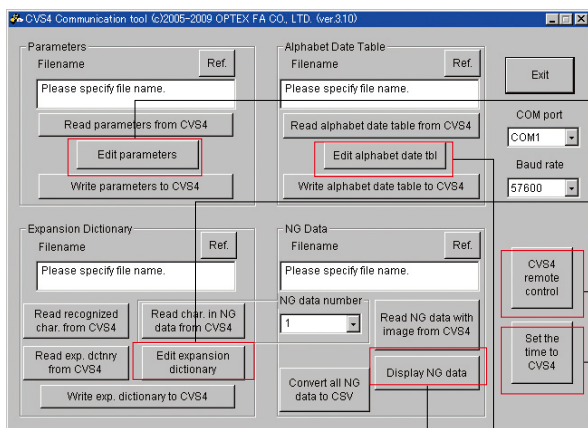
### 5.Timer setup

You can set the timer of CVS4-R copying from PC.

### 6.Code recognition

You can modify code table that shows simple codes mean Date/Time.

## Main menu



Required PC spec.

- Microsoft Windows XP, 2000
- RS232 I/F
- Cable CVS-C2C

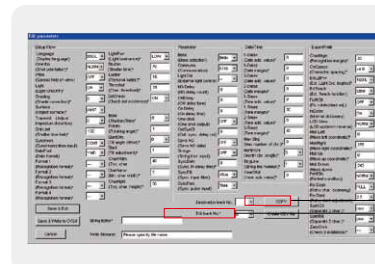
Downloadable from  
<http://www.optex-fa.com>



I/F cable  
CVS-C2C



## 1. Setup Modification

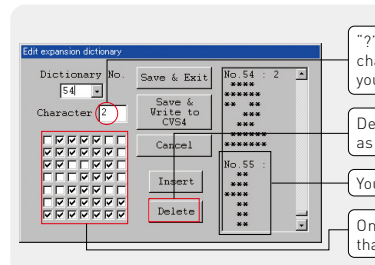


Parameter with "\*" means that each Bank has individual setup.

Set destination Bank No. and click Execute to copy.

Bank No. to modify

## 2. User Dictionary



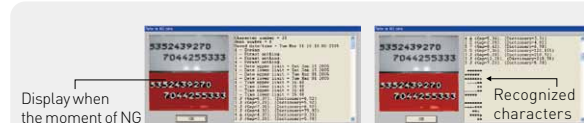
"?" means that couldn't recognize the character. Please input the character you want to register.

Delete redundant one when it's same as another.

You can view the list

One character consists of 7 \* 7 dots that you can modify.

## 3. Downloading NG image



Display when the moment of NG

Recognized characters

## 4. Remote control



You can control through RS232 I/F

## 5. Timer setup



You can copy the timer setup of PC to CVS4-R

## 6. Code recognition



CVS4-R can recognize Code of Month/Date/Hour/Minute. Example: "CAO H" -> "March 15th, 7 o'clock"

## Accessories for CVS series

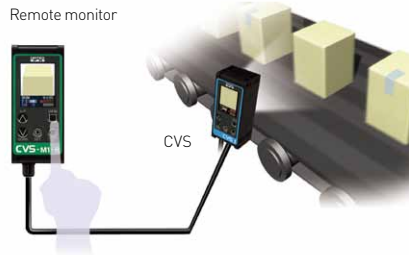
### Remote monitor (with 3m cable)



**CVS-M1-R**  
You can use for  
CVS1-R, 2-R, 3-R, 4-R



**CVSE-M1-R**  
Only for CVS1easy-R



You can control from Remote monitor that has LCD and buttons to control remotely. The buttons work same as CVS series itself.

### I/O Expansion unit



#### TMC-N11-CVS

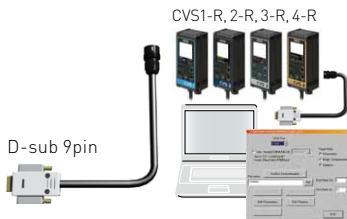
With CVS2-R (only for color area mode) :

You can get sorting output up to 15 utilizing 4 output from CVS2-R

With CVS3-R and CVS4-R : You can use all Banks even using synchronous input and external teaching input

\*You can't use for CVS1-R and CVS1easy-R

### PC I/F cable (2m)



#### CVS-C2C

For CVS1-R, 2-R, 3-R, 4-R  
You can download the I/F software from our homepage. You can setup CVS1-R, CVS2-R, CVS3-R and CVS4-R through each software and can get registered image. You can also modify mask area easily on the PC display.

#### Required PC spec.

- Microsoft Windows XP, 2000
- RS232 I/F

Software is downloadable from <http://www.optex-fa.com>

### Video cable (3m)



#### CVS-CN

For CVS series  
You can see the display image connecting standard TV monitor (NTSC).

### PC I/F cable + I/F cable for Video Out (2m)



#### CVS-C2Y

For CVS1-R, 2-R, 3-R, 4-R  
You can connect PC and CVS-M1-R. You can see the screen image on the CVS-M1-R.  
\* You can't control through CVS-M1-R.

### Extension cable for Remote monitor (3m)



#### CVS-C3S

For CVS-M1-R, CVSE-M1-R  
You can connect Remote monitor through this cable up to 15m (4 CVS-C3S = 12m + 3m cable of Remote monitor)

### PC I/F cable + Video cable (2m)



#### CVS-C2P(2m)

For CVS1-R, 2-R, 3-R, 4-R  
You can connect PC and get video signal at a time.

When you use TV monitor, please use it vertically



### External light in CVS series shape



#### CVS-LW1(white color LED)

You can connect to CVS series up to 3 serially.

#### CVS-LU1(UV LED)

This lighting is effective for object with fluorescent printing to detect.

### External LED lighting

When you need brighter lighting and/or lighting from other direction to get better image, you can utilize external LED lighting. Please refer Page 54 for other lighting and power supply.

#### Bar Light



OPDB-50x15WS

OPB-5015W-B  
50x15mm

OPB-10015W-B  
100x15mm

#### Power supply

For external LED lighting.



OPP-10-H(10W)

OPP-10-H(10W)  
OPP-30-H(30W)  
OPPD-15

#### Bracket for Lighting



2 OPDB-50x15WS and CVS-OPDB-2000

CVS-OPDB-2000  
CVS-OPDB-3040  
CVS-OPDB-6080

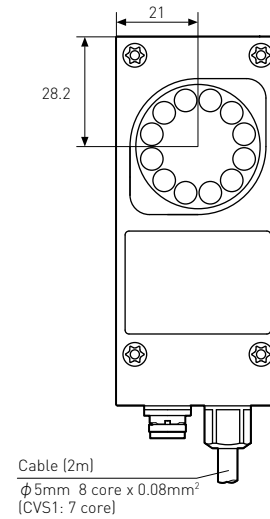
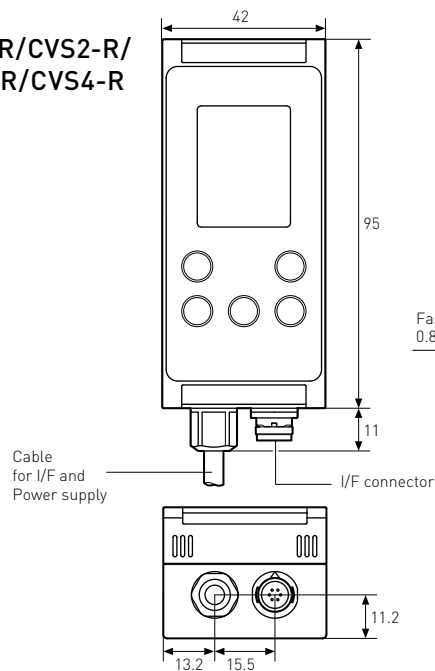


CVS-OP1000L  
This is for mounting CVS series and external LED lighting.

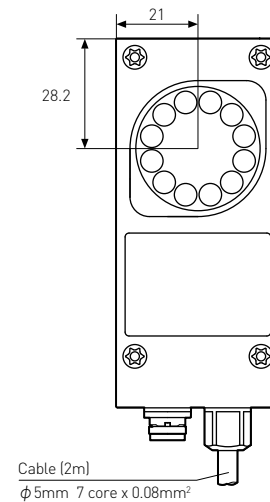
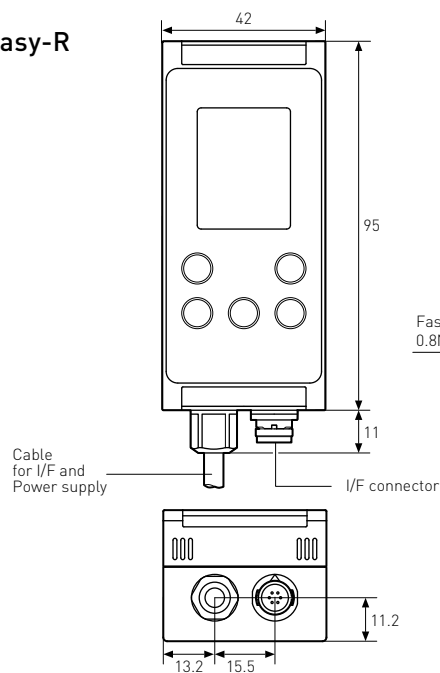


## Dimensions

### CVS1-R/CVS2-R/ CVS3-R/CVS4-R



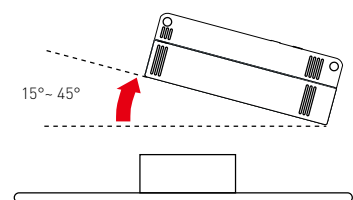
### CVS1easy-R



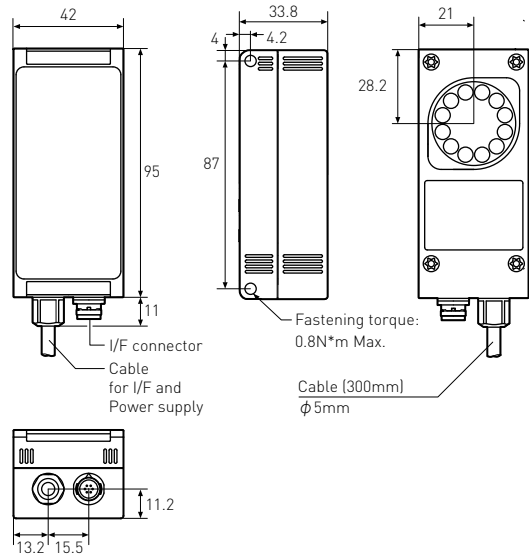
(unit: mm)

### Tips for mounting CVS series

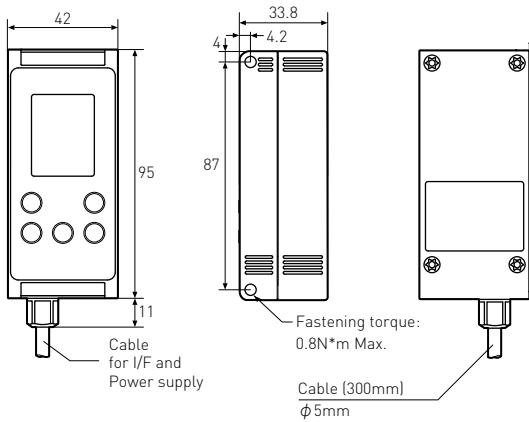
- Please determine Working distance and Field of View so that you chose correct model number of CVS series.
- Please use M4 \* 50mm screws to mount CVS series
- Please take care about distance between CVS and target object to get stable size of Field of View.
- Please mount CVS at 15 to 45 degree to prevent specular reflection from the object especially from glossy object.
- When the object moves fast, you have to set shutter speed shorter. Then, you will need brighter lighting to get better image. Please try external lighting in this case.



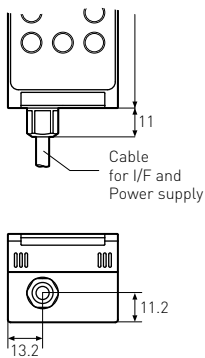
External light in CVS series shape  
CVS-LW1(white color LED), CVS-LU1(UV LED)



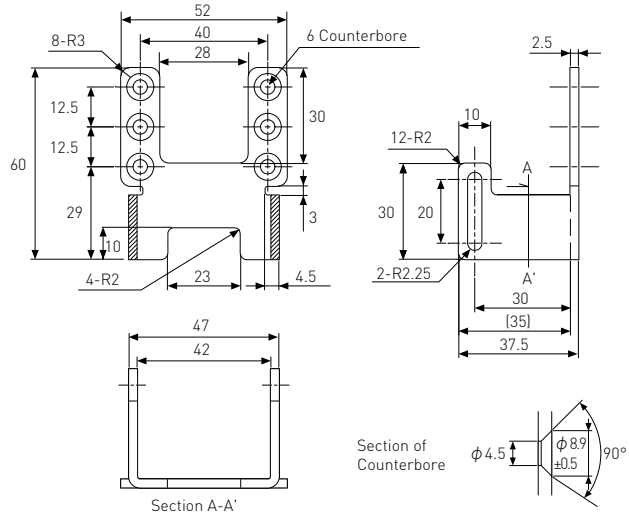
Remote monitor  
CVS-M1-R



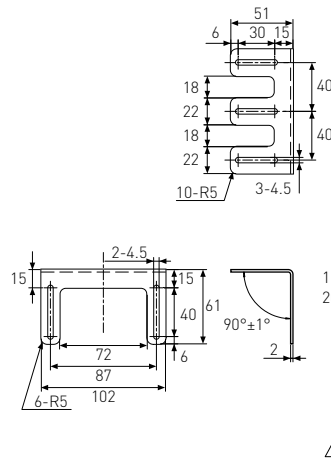
## CVSE-M1-R



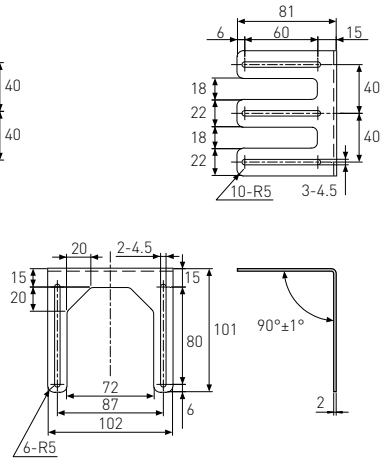
## Bracket for Lighting CVS-OPDB-2000



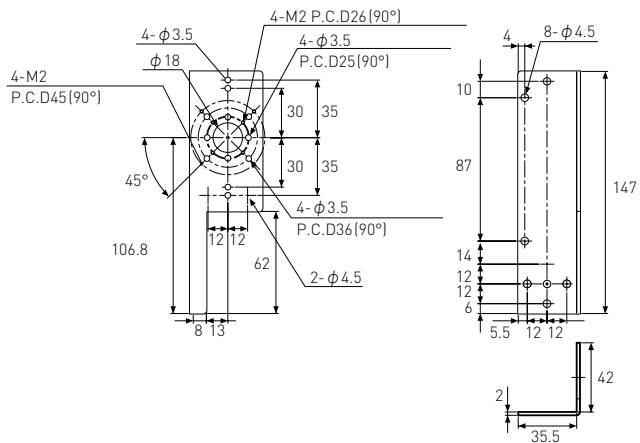
CVS-OPDB-3040



CVS-OPDB-6080



CVS-OP-1000L



(unit: mm)