Vision Sensor

Cost Effective Vision Sensors and LED lighting for machine vision

Multi Camera Vision Sensor MVS Series

MVS-PM-R Color pattern matching camera unit

It can detect color and shape of target object.

Application examples :
- Inspection of electronic parts
- Inspection of position of parts for automobile
- Checking existence of some material by its color

Direction of electronic parts

MVS-EM-R Measurement camera unit

It can measure distance between edges on the objects.

Application examples :
- Measuring diameter of parts for automobile
- Counting edges on the surface of parts
- Measuring pitch of lead frame for electronic parts

Positioning of printed circuit board

MVS-OCR2 Color OCR camera unit

It can inspect Date, Time and Text.

Application examples :
- Inspection of shelf life on the label
- Inspection of lot number on the label
- Inspection of Part number labeled on the parts for automobile

Shelf life of confection

MVS-DN-E Controller

Controller has Touchscreen for easy operation.

The controller supports up to 3 cameras

You can connect 3 different cameras to one controller

All in one Vision Sensor CVS Series

Lens, Image sensor, LED lighting, LCD display and vision processor are in one body.

All in one structures

*Actual shape of the parts might be different from the picture above.

CVSE1-RA, CVS1-RA

Color area Detection

Checking existence of label on package

CVS2-RA

Shape/Color area Detection

Checking multiple colors on the box

CVS3-RA

Edge detection

Checking overlapping of the label

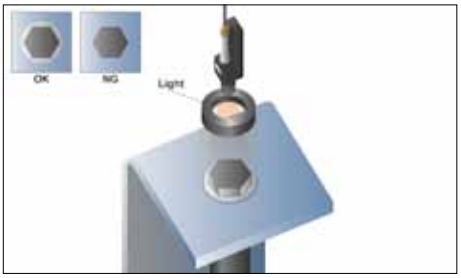
CVS4-R

OCR

Checking shelf life on the packaging film

MVS SERIES APPLICATION

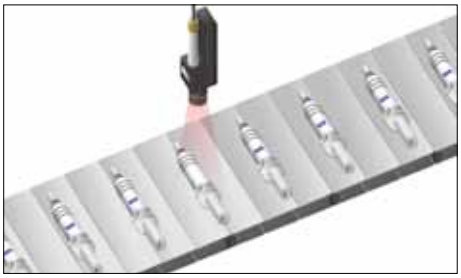
1. Detecting presence of metal washer



MVS-PM-R
-Detect its area by color

MVS-EM-R
-Measure the diameter of the washer

2. Checking engine spark plugs

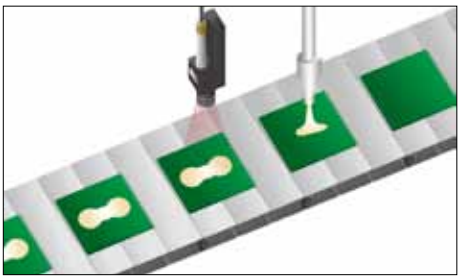


MVS-PM-R
-Contour matching

MVS-EM-R
-Measure its character

MVS-OCR2
-Check the part number

3. Checking amount of paint or glue applied



MVS-PM-R
-Check its area by color

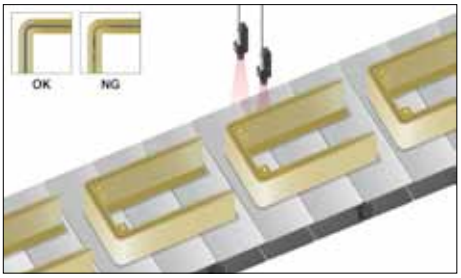
MVS-EM-R
-Measure its size in X/Y

4. Checking engine position

MVS-PM-R
-Check position by pattern matching

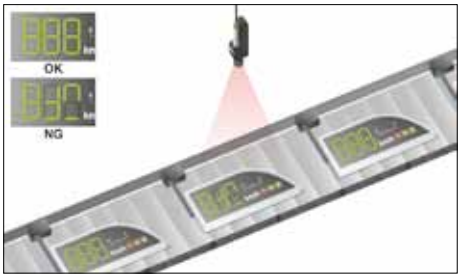
MVS-EM-R
-Measure the distance of body - engine

5. Check bead of sealing rubber for continuity



MVS-PM-R
-Check color area of the rubber

6. Checking display of vehicle speed panel



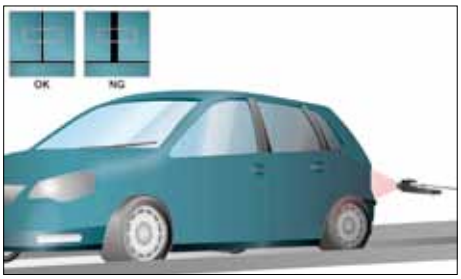
MVS-PM-R
-Check color area in each part
-It can check up to 16 parts utilizing 16 inspection windows

7. Checking shape of O ring

MVS-PM-R
-Check shape by contour

MVS-EM-R
-Measure the diameter

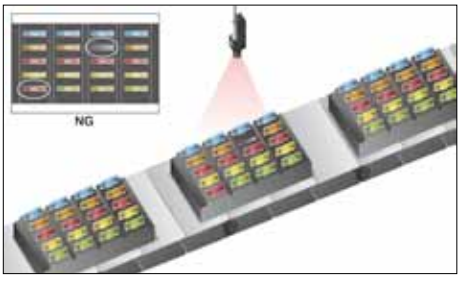
8. Checking gap between doors



MVS-PM-R
-Check area of the gap

MVS-EM-R
-Measure the gap

9. Verifying fuse position and type in fuse panel



MVS-PM-R
-Check color of fuse and position
-Lighting to be mounted from side to reduce surface reflection

10. Checking shape of piston valve

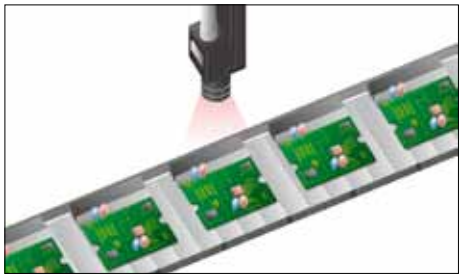
MVS-PM-R
-Check the shape by pattern matching

MVS-EM-R
-Measure the dimensions

11. Check flame to ensure the presence of material

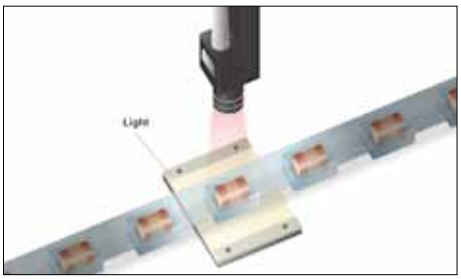
MVS-PM-R
-Check color area of flame

12. Check LED color and parts position



MVS-PM-R
-Check parts position and area by color

13. Check direction of parts in emboss taping

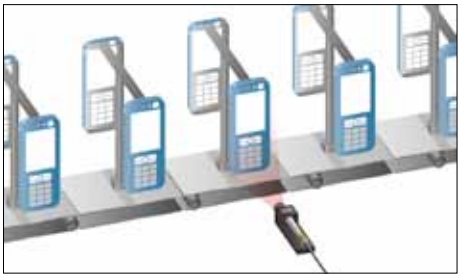


MVS-PM-R
-Check the direction by color pattern matching

14. Measuring pitch of lead frame

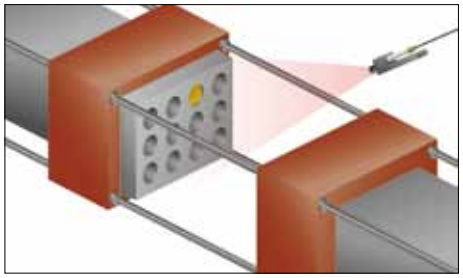
MVS-EM-R
-Measure the pitch in Max., Min. and Mean

15. Checking the color of paint on parts



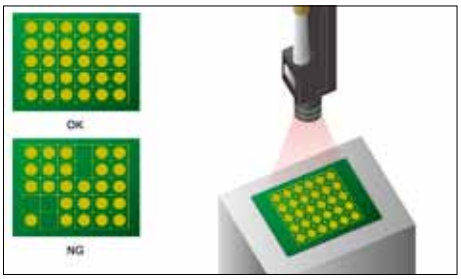
MVS-PM-R
-Check for correct color accuracy and application

16. Check presence of parts in tooling machine



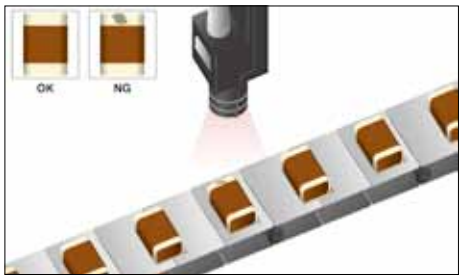
MVS-PM-R
-Check the presence of parts by color pattern matching

17. Checking existence of paste on PWB



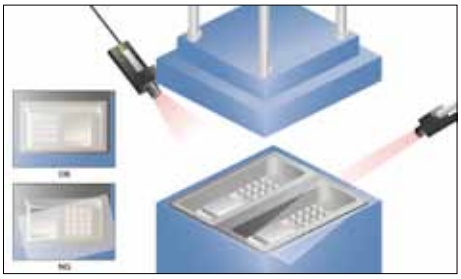
MVS-PM-R
-Check existence of the paste by pattern matching

18. Checking surface condition of chip parts



MVS-PM-R
-Check stain area on the surface of the chip parts

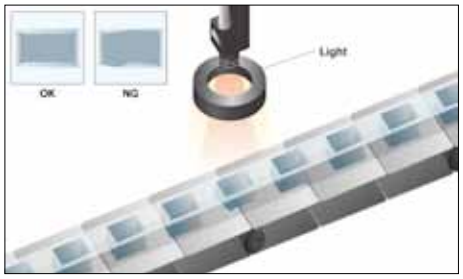
19. Detecting misalignment of material in tooling machine



MVS-PM-R
-Check material contour

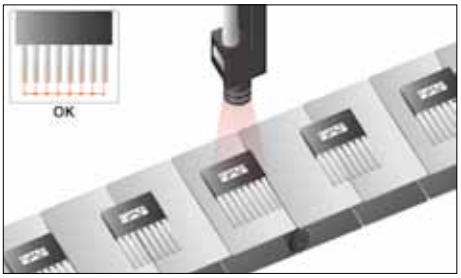
MVS-EM-R
-Measure object position from edge

20. Checking shape of emboss taping



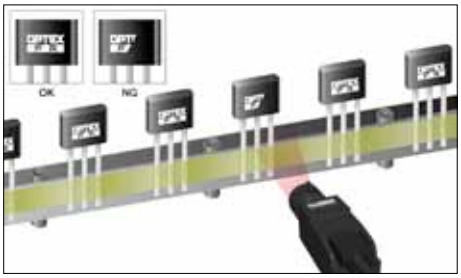
MVS-PM-R
-Check its shape by contour or full color

21. Checking lead pitch of parts



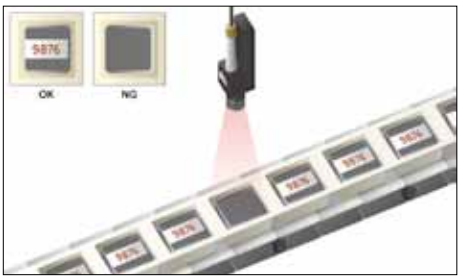
MVS-EM-R
-Measure pitch of multiple leads in max., min. and mean.

22. Check printing on transistors



MVS-OCR2
-Check the characters printed on transistors

23. Check the marking on chip parts



MVS-PM-R
-Check existence of mark

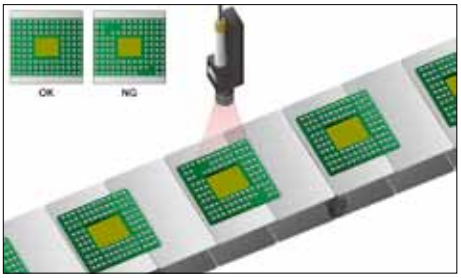
MVS-OCR2
-Check the characters printed on the chip

24. Checking position of orientation flat

MVS-PM-R
-Check the area

MVS-EM-R
-Check the distance between edges

25. Checking existence of solder balls



MVS-PM-R
-Check color area of the solder balls by utilizing multiple inspection windows (max. 16)

26. Checking position of wafer on handling machine

MVS-PM-R
-Check its position in the inspection window

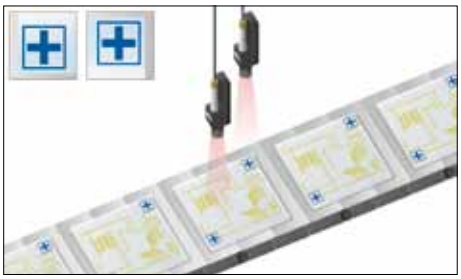
MVS-EM-R
-Check the distance between edges

27. Checking wafer position in FOUP

MVS-PM-R
-Check wafer position by color area utilizing multiple inspection windows (max.16)

MVS-EM-R
-Check distance between wafers

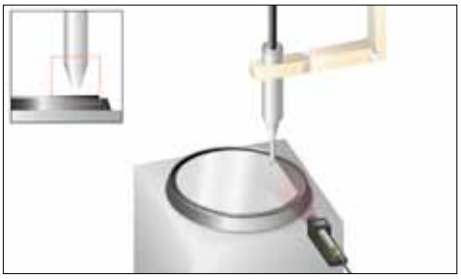
28. Checking position of reference mark on PWB glass



MVS-PM-R
-Check its position by pattern matching

MVS-EM-R
-Measure distance between edges

29. Checking condition of vacuum collet tip



MVS-PM-R
-Check the shape by pattern matching

30. Checking segments of LCD display

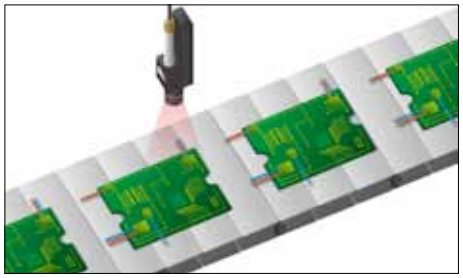
MVS-PM-R
-Check its condition by contour matching

31. Checking shape of rubber ring

MVS-PM-R
-Check its shape by pattern matching

MVS-EM-R
-Measure distance between two outermost and innermost edges

32. Check for the presence of parts and correct order on PWB

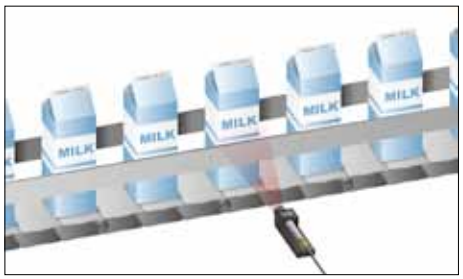


MVS-PM-R
-Check color area utilizing multiple inspection windows (max. 16)

33. Checking lid alignment

MVS-PM-R
-Multiple points on the lid are checked to determine alignment

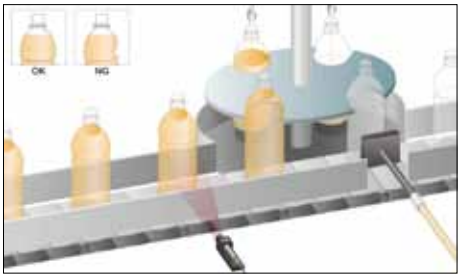
34. Checking shape and printing on milk package



MVS-PM-R
-Check the shape by its contour or other pattern matching

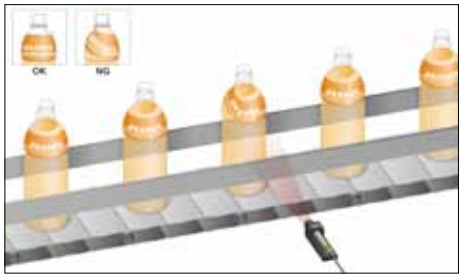
MVS-OCR2
-Check for printing on the package

35. Checking shape of plastic bottles



MVS-PM-R
-Check the shape by contour

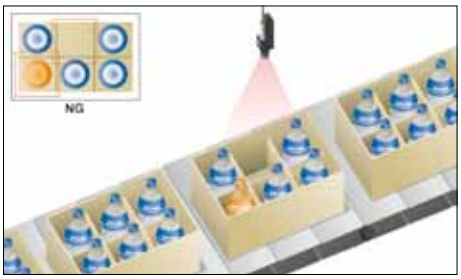
36. Checking for label on plastic bottle



MVS-PM-R
-Check its position and type by color pattern matching

MVS-OCR2
-Check characters printed on label

37. Checking number and type of bottles

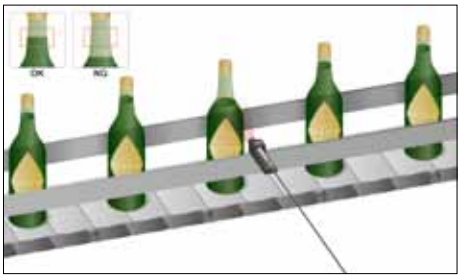


MVS-PM-R
-Check for presence of each bottle by color pattern matching

38. Checking position and type of pills in dispenser

MVS-PM-R
-Check position and type by color pattern matching

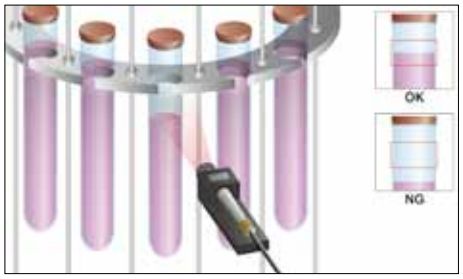
39. Checking level of liquid in bottle



MVS-PM-R
-Check color area of the liquid in the bottle

MVS-EM-R
-Measure position of liquid surface in the bottle

40. Checking level of liquid in tube



MVS-PM-R
-Check color area of the liquid in the tube

MVS-EM-R
-Measure position of liquid surface in the tube

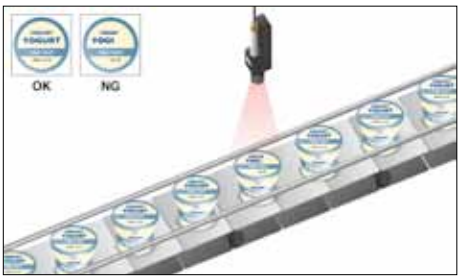
41. Checking characters printed on pouch

MVS-OCR2
-Check characters on the pouch

42. Detecting condiments in instant food package

MVS-PM-R
-Check color area of each condiment

43. Checking characters printed on yogurt lid



MVS-PM-R
-Check characters on the lid by color pattern matching

MVS-OCR2
-Check characters on the lid

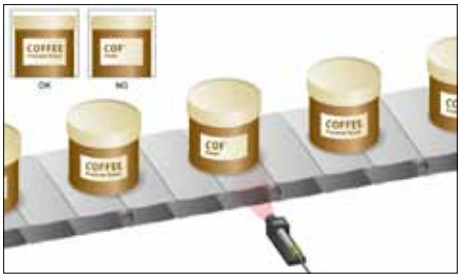
44. Checking existence of blob or stain on a bottle cap

MVS-PM-R
-Check surface condition by stain area and color area

45. Checking presence of label attached for ad campaign

MVS-PM-R
-Check its position by color pattern matching

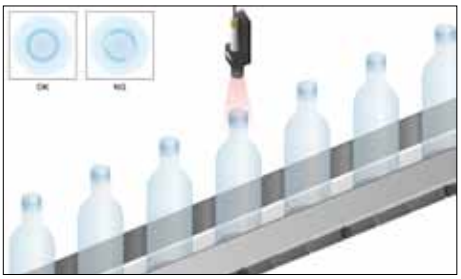
46. Checking for characters printed on package



MVS-PM-R
-Check character by color pattern matching

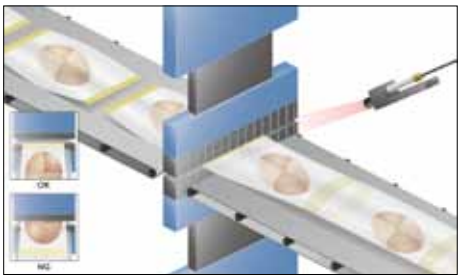
MVS-OCR2
-Check character on the package

47. Detecting defects on bottle



MVS-PM-R
-Detect defects by checking the contour

48. Checking position of heat sealing on pillow packaging



MVS-PM-R
-Check the position of heat sealing area by color pattern matching

49. Detecting lid position on the bottle

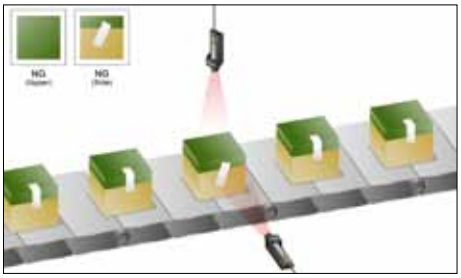
MVS-PM-R
-Check its position by color pattern matching

50. Checking for correct order in Calendar sorting

MVS-PM-R
-Check pattern by unique characteristics of each sheet

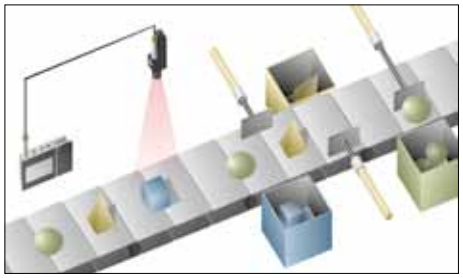
MVS-OCR2
- Check printed characters

51. Checking presence and position of packing tape



MVS-PM-R
-Check the position by color pattern matching

52. Sorting objects by shape



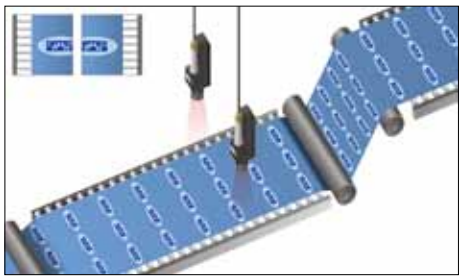
MVS-PM-R
-Check and sort objects by shape

53. Checking position of printing material

MVS-PM-R
-Check deviation of the mark from original position

MVS-EM-R
-Measure position of the mark

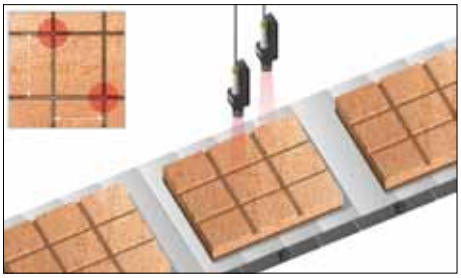
54. Measure width of sheet material



MVS-PM-R
-Check deviation of the edge from original position

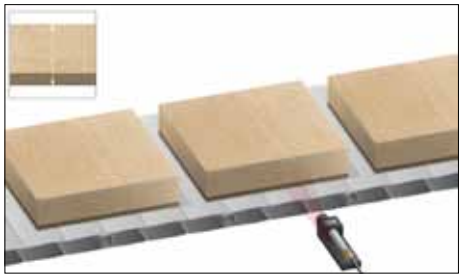
MVS-EM-R
-Measure position of the edge

55. Measuring dimension of object



MVS-PM-R
-Measure distance between two edges

56. Measuring thickness of object



MVS-EM-R
-Measure distance between two edges

57. Checking size of rubber bank

MVS-PM-R
-Check area of the rubber

MVS-EM-R
-Measure distance between two edges of rubber

58. Checking shape and surface condition of plastic parts

MVS-PM-R
-Check the shape by contour and check the surface condition by stain area and color area

PM MVS-PM-R

Color pattern matching camera unit

Using advanced technology, it is possible to inspect objects fast and reliably.
Objects can be inspected for Color, Color and Shape, Blob/Stain, Contour, Differentiation of picture, etc.


Direction of electronic parts

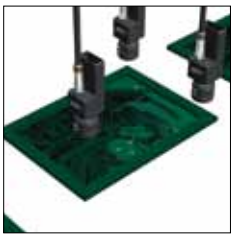

Quality of labeling


Page order of print

EM MVS-EM-R

Measurement camera unit

Reliable measurement of length and/or edge count.
Measure the distance between edges, measure the pitch of pins, count edges, etc.


Positioning of printed circuit board


Shape of condenser

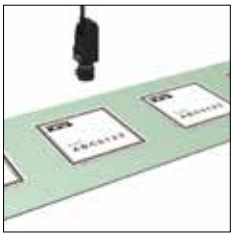

Shape of parts for automobile

OCR MVS-OCR2

Color OCR camera unit

Inspection of Date, Time and Text.
Verification of Expiration date,Time stamp, Lot number or Text.


Shelf life of confection


Lot number of labels


Type mark of parts for automobile

MVS-DN-E

Controller

Connect up to three cameras.
Touchscreen operation.
USB, RS232 and Ethernet interface.
10 key data entry.
Onboard Lighting control.
∗PNP output type is MVS-DP-E


Backlit buttons show which are active to assist in Setup and Adjustment.
Help functions can be accessed at any time by pressing the "?" button

Advanced Technology
High speed vision processing and cost savings

PM EM OCR

Original LSI with CPU integrated

ECO-Engine: OPTimum CPU Ver.5

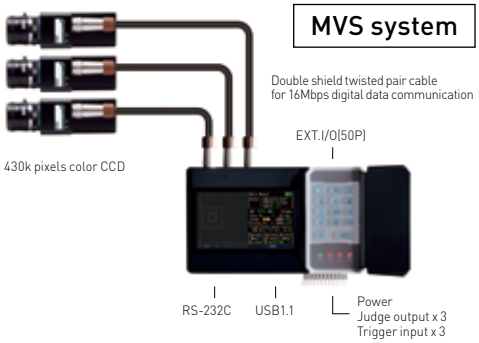
The MVS features an Optex original design LSI with CPU integrated, we were able to integrate the vision process engine into the camera unit. This solution provides high speed image processing and accurate inspection for a variety of applications. Each camera processes the image internally and transmits the result to the controller.

PM EM OCR

No change in response speed when operating multiple cameras

Three Cameras inspect independently

We utilized a new technology in the MVS that features low heat generation and low power dissipation. This concept was originally developed for the CVS series as an all-in-one design, the same technique was carried over to the MVS.
There is no change in the response time when multiple cameras are used. The all-in-one design allows the camera to operate independent from the controller.



PM EM OCR

Integrated system technology

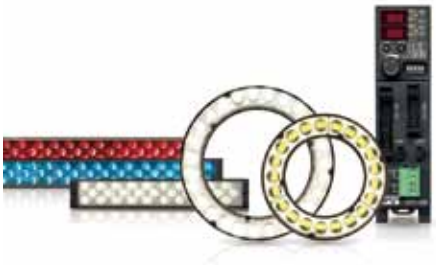
High Performance, Easy Installation and Low Cost

The controller has a built-in touchscreen interface, full color display and ten-key input panel. A power supply for control of the external lighting is also integrated into the controller. Simply connect the cameras and lights to the controller. There is no need for a console, external monitor or a separate power supply for lighting.

PM EM OCR

Support is available from LED lighting to training

Lighting is the single most important factor to capturing a good quality image for inspection. Optex FA offers a complete selection of lighting options. We can provide customer support for the selection of lighting, lenses, and training.

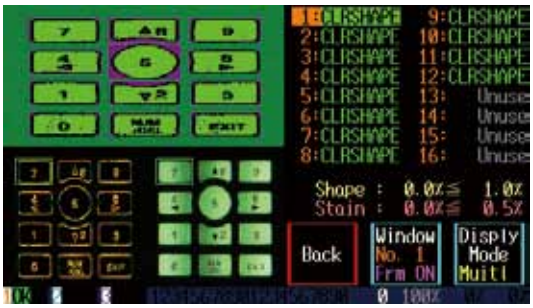


PM EM

Up to 16 inspections can be done at the same time with one Camera

16 Inspection windows are available for each Camera

Each Camera can have a maximum of 16 inspection windows in one Bank of memory. Each inspection window can be set to inspect a different feature based on 6 inspection functions. The inspection judgment output for each inspection window can be output through the 50 pin I/O connector.



OCR

Up to 4 inspection windows

The parameters for each inspection window can be individually set.
Up to 2 Forms of each Date and Time are available for one window and up to 4 Forms of strings are available(max. total of 4 Forms).

PM EM OCR

Quick change over

32 Banks are available for one Camera

You can remotely select the bank to use by using a controller, PLC or the RS-232C I/F. The setup parameters for each bank are stored in memory and can be recalled when the product is run again.

PM EM OCR

Lighting control without the need of a separate power supply

Controller has LED lighting control built in

Support for a total of three LED lights(12VDC, 24W total)is available.
The output connector for the power source is a quick connect/disconnect type.
The intensity level for each light can be adjusted separately.

For stable inspection and better process yield
7 functions are available

PM EM OCR Continuous capture

When the camera checks the image it will automatically check up to 5(EM-R) or 6 images(PM-R) or 8 images(OCR2), looking for a good reading. This insures stable operation if the trigger is not stable or the position of the object changes slightly. If the result is found to be OK the inspection will stop prior to reaching the maximum number of inspections.

PM EM OCR Variable shutter speed

When the camera is checking image using the Continuous Capture feature the shutter speed will automatically be adjusted up to +36% ~ -24%(PM-R/EM-R) or +/-12% (OCR2). This compensates for changes in the lighting.

PM EM OCR Search function

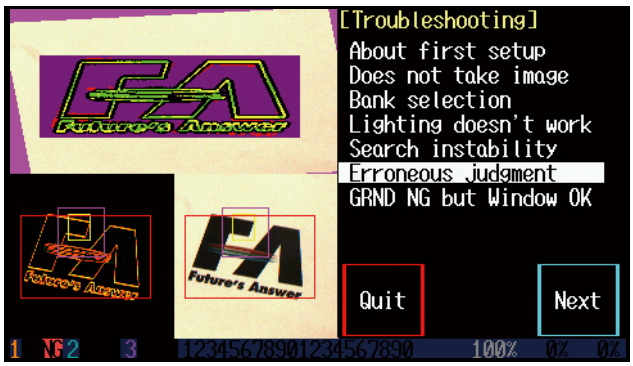
The images is searched not only in the X and Y direction but it also can be rotated up to +/- 180 degrees (PM-R/OCR2) or +/- 45 degrees(EM-R). This is useful when the position or orientation of the object changes.

PM Scaling up/down

When the camera is checking the image using the Continuous Capture feature the image will automatically be scaled Up/Down by up to +/-6%. This compensates for changes in the distance between the camera and object.

PM EM Trouble Shoot

button leads you to the Trouble Shooting menu. From this menu, you are able to view what corrections need to be done.



PM EM OCR Help function

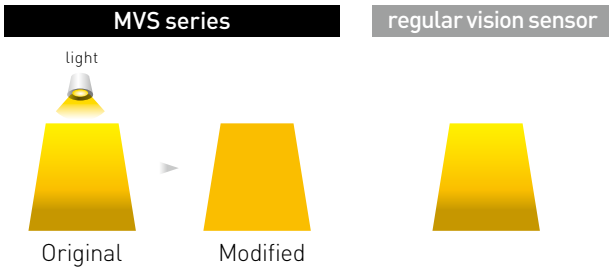
button on the ten-key panel shows what the parameter means and what adjustments can be done.

PM OCR Dark Compensation (OCR2 : Illuminance Correction)

For reliable inspection of color, the hue of each pixel is calculated. This function insures that captured images are stable even with variations in lighting or when the distance to the target changes.

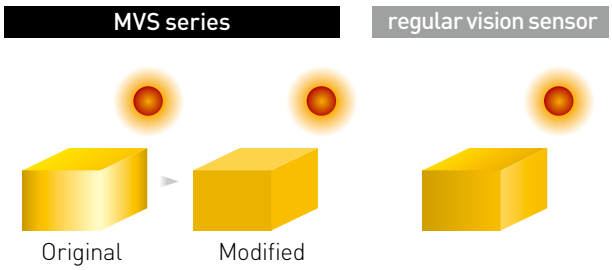
When the light is from the top

The MVS calculates the hue of each pixel so it can get a homogenous color for each pixel. Regular vision sensors simply adjust the brightness so the upper part is brighter than the lower part.



When a bright ambient light is present

The MVS can get a homogenous color for each pixel even if the object has an area which is brighter due to external ambient light.

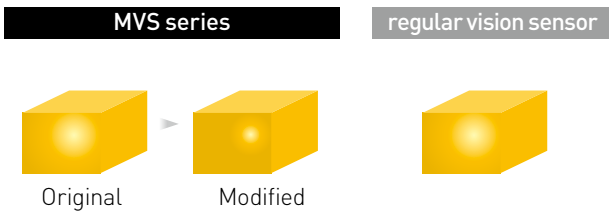


When the distance varies

The Dark Compensation function is effective when the object distance varies and its brightness changes.

When the object is glossy

The Dark Compensation function helps to reduce bright spots on glossy surfaces.



PM EM Simply follow the explanation on the display

Fast and easy "SETUP Menu"

Concept : No operating manual required

Setup button leads you to the SETUP menu where each step is clearly described.

Backlit buttons show which are active to assist in Setup and adjustment. Help functions can be accessed at any time by pressing the "?" button.

Following is example of MVS-PM SETUP Menu

1. Touch[Setup]button

2. Select"Bank"and"Trigger mode"

3. Adjust shutter speed

4. Adjust brightness and direction of the image

5. Storing captured image

6. Select Color mode or Black and White mode

7. Determine search area and its function

8. Setup inspection windows

9. Setup inspection function

Select function from Stain/Color Area/Full Color/Differential/ Contour/Color Shape

10. Touch[Finish]to exit setup menu

OCR Easy Setting and Processing

3 - Step - setup

What you have to do is just proceed setting parameters as shown on the display one by one. This helps you not to forget setting some parameters and reduce setting wrongly. It's just 3 steps you have to go through settings that is much more simple than conventional MVS-OCR. You can reduce time for installation as well.

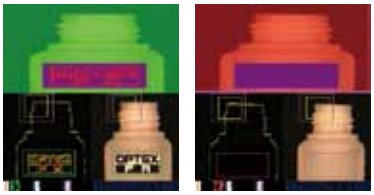
STEP 1	STEP 2	STEP 3	
Camera setting	Store master image	Teaching	Setup complete

Inspection for Color, Flaw, Blob, Shape, etc.
6 inspection modes are available

Stain

The camera compares the differential ratio of the stored master image with the differential result of the target image to determine the Stain value. When this value exceeds the upper limit or is less than the lower limit, it is defined as NG. This is used to detect the presence of stain (flaws) on the surface of metal objects or defects in plastic materials.

OK(label present) processed | NG(no label) processed

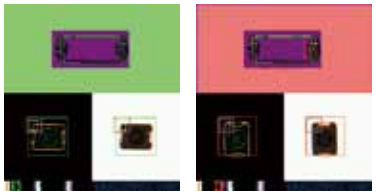


Differential Original Differential Original

Contour

The camera compares the contour of the stored differential master image with the contour of the target object. It counts the number of pixels that do not match the Target contour to determine the Contour value (Lack of pixels). It counts the number of pixels outside of the Target contour area (background) which have the selected color to determine the Stain value.

OK(correct direction) processed | NG(rotated) processed

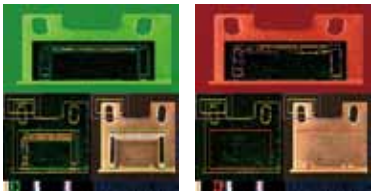


Differential Original Differential Original

Differential

The camera compares the stored differential master image with the target object. If the difference exceeds the threshold it is defined as NG.This function is used to inspect metal parts with uneven lighting. It is not good for detecting color or its depth.

OK(part present) processed | NG(no parts) processed

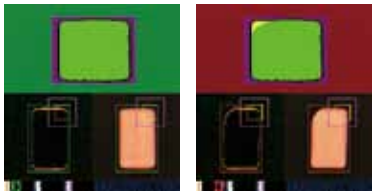


Differential Original Differential Original

Color Shape

The camera inspects the shape of the area that contains the selected color.
It counts the number of pixels that have a different color in this area to determine the Contour value (Lack of pixels). It counts the number of pixels outside of the area (background) which have the selected color to determine the Stain value.

OK(matches) processed | NG(corner missing) processed



Differential Original Differential Original

Color Area

The camera calculates the ratio of the number of pixels that have the selected color to all the pixels in the inspection window. When it exceeds the upper limit or is less than the lower limit, it is defined as NG.
This is used to detect color differences, especially when the color is not stable and that there is no need to detect object shape.

OK(all lights on) processed | NG(light missing) processed

Differential Original Differential Original

Full Color

The camera will compare the difference between the full color image of the target and the stored image.
If the sum of the difference exceeds the threshold value it is defined as NG.
This is used to inspect color and depth of pictures and prints under stable lighting.

OK(correct direction) processed | NG(rotated) processed

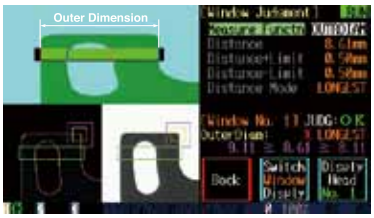
Differential Original Differential Original

Measurement of Inner / Outer Dimension, Edge position, Counting edges, etc.
6 inspection modes are available

Outer Dimension

The camera measures the distance between the two outermost edges. Choose between the longest, shortest or the mean value in the selected inspection window.

processed

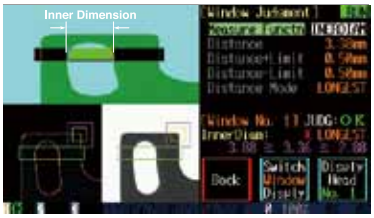


Differential Original

Inner Dimension

The camera measures the distance between the two innermost edges. Choose between the longest, shortest or the mean value in the selected inspection window.

processed



Differential Original

Position

Measures the distance between two edges in two different inspection windows. This function is useful for detecting the displacement of edges. Choose between the longest, shortest or the mean value in the selected inspection window.

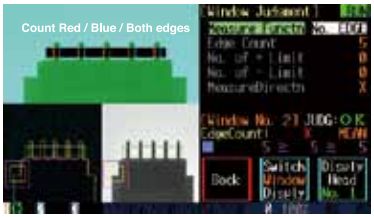
processed

Differential Original

Number of Edges

The camera counts the number of edges in the inspection window. Choose the edges to count based on the transition of light to dark, dark to light or all of the edges. In the processed image, a red line means a light to dark transition and a blue line means dark to light.

processed

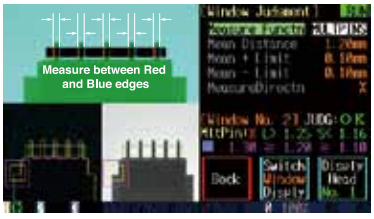


Differential Original

Multiple Edges

The camera measures the distance between edges in the inspection window. Choose the edges of a light part (blue line to red line) or a dark part (red line to blue line). It judges by longest limit, shortest limit or the mean value.

processed



Differential Original

Center Pitch

The camera measures the pitch between the centers of the edges in the selected inspection window. It judges by longest limit, shortest limit or the mean value.

processed

Differential Original

Achieved 8 times better resolution NEW

High resolution system enables accurate print inspection

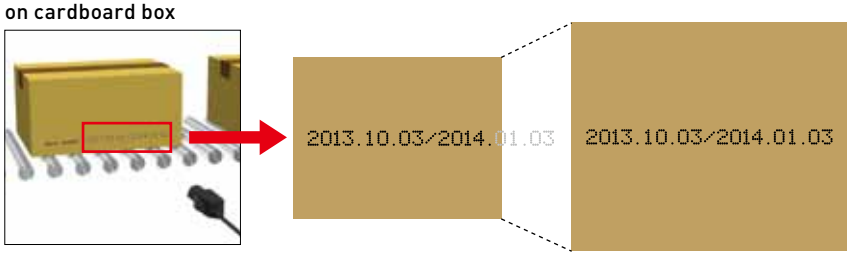
With mega pixel C-MOS image sensor, it achieved accurate print inspection by better character recognition.

Conventional MVS-OCR | MVS-OCR2

You can get bigger FOV (Field Of View)

With better resolution, you can set around 2 times bigger FOV.
Print inspection of long printing in wide area is available

Example of print inspection on cardboard box

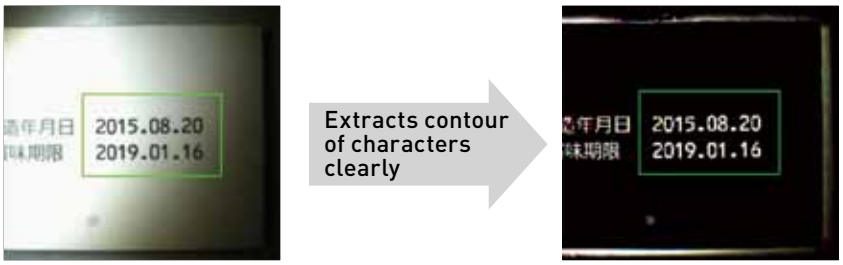


MVS-OCR
Long print can't be in the FOV

MVS-OCR2
Long print can be in the FOV thanks to better resolution.

Clear clipping out of the characters by new algorithm
It clips out of the characters clearly even if the lighting is uneven NEW

New algorithm achieved clipping out of the characters under uneven or unstable lighting.



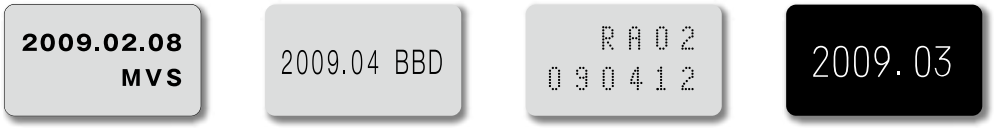
Original | Processed

Character recognition feature of MVS-OCR2

MVS-OCR2 compares captured image with internal dictionary and choose most alike character.
Then, it compares the recognized characters with expected characters. When all characters are correct, it outputs "OK". Otherwise, "NG" (No Good).

All correct:OK	Wrong character:NG	Lack partly:NG	Lack:NG
2014.07	2014.08	2014.07	2014.0

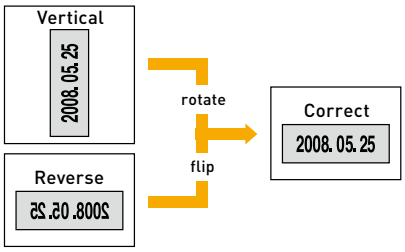
Recognizes various printer fonts



Thermal printer | Hot printer | Ink jet printer | Laser marker

Change the image direction

The image direction for each bank can be set. This makes it possible to read reverse printed characters such as printing on the opposite side of a transparent sheet.

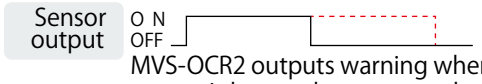


Functions to prevent miss recognition for stable inspection

We installed useful functions that are created based on our long experience in print inspection industry.

Warning (multiple objects run sticked) NEW

When the objects run sticked side by side, the photo sensor outputs only once and the conventional OCR sensor won't check second one. MVS-OCR2 has warning function by checking trigger signal length to detect this problem.



MVS-OCR2 outputs warning when the sensor output is longer than expected period.

Focus Monitor NEW

It is difficult to adjust focus of the camera if you are not get use to it. MVS-OCR2 has "Focus Monitor" function a kind of level gauge that shows how much the camera focuses at the point to be adjusted. It will be very easy to adjust by checking visualized level bar.

Focus Monitor display

Auto Calendar

MVS-OCR2 compares the date and hour with internal calendar which automatically runs so you don't have to re-setup the characters to check every time.

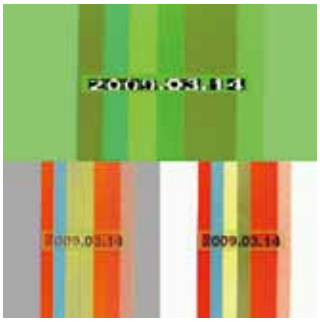
Date to compare | Passing 0:00 | Date to compare added one day automatically

Matching tolerance per character

The matching tolerance for each character can be set (ex. the numbers "6" an "8" are very close in shape and need to be checked closely).

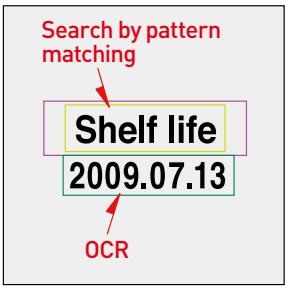
OCR regardless of color

The MVS-OCR2 is able to detect characters regardless of the color of the background.



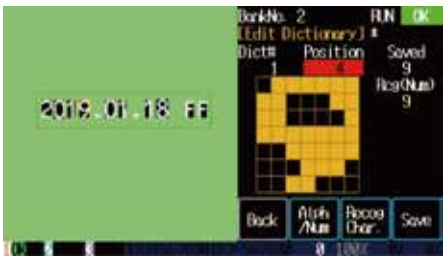
Search function

The MVS-OCR2 is able to search in both the X and Y directions, it also can do a rotational search of +/- 0~180 degrees by pattern maching.



User defined characters

The MVS-OCR2 can recognize lower case letters and special symbols defined by the user dictionary.
For example it can be used to distinguish between "H" and "M" when the font that is used makes these letters hard to distinguish.



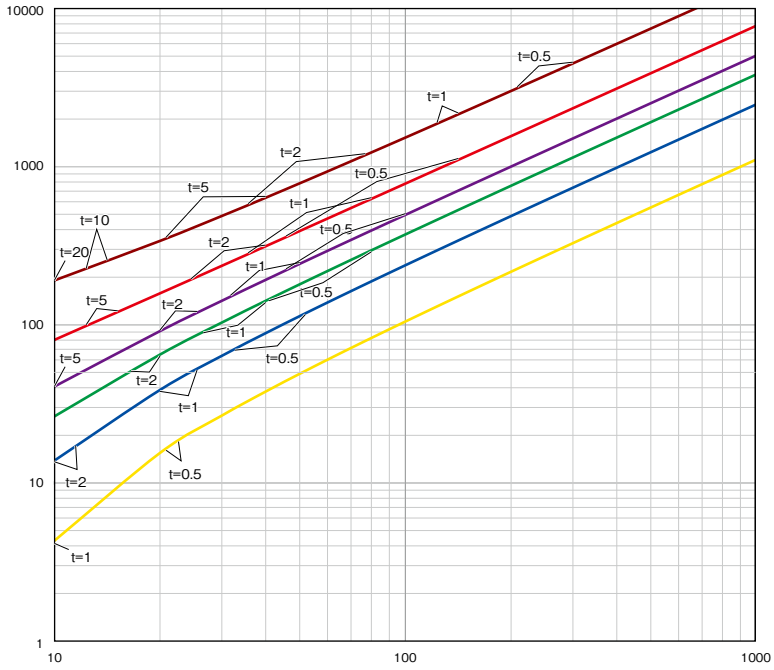
Code recognition

It can recognize Code of Month/Date/Hour/Minute.
Example: "CAO H" → "March 15th, 7 O'clock"

Conversion list example You can modify on the controller.

*This table is just for showing an example.

Camera Working Distance L (mm) **CCTV Lens**



Field of View A (mm)

"t=" indicates thickness of Extension ring to use (mm)

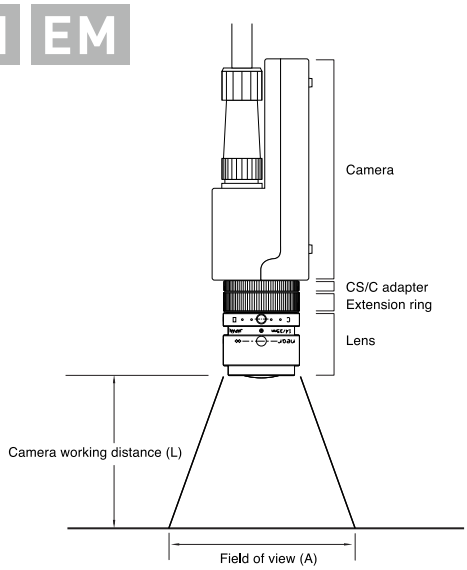
Lens

FASV-03514V FASV-1214V FASV-2514V
FASV-0813V FASV-1614V FASV-5018V

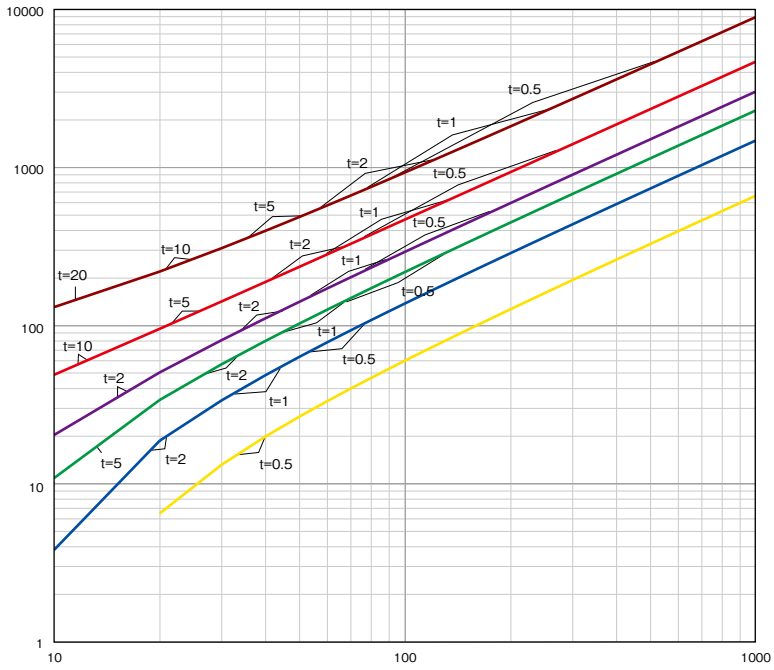
How to utilize the graph

1. Determine Working distance (L) and Field of view (A).
2. Choose the appropriate lens and extension ring according to the graph.

PM **EM**



Camera Working Distance L (mm) **CCTV Lens**



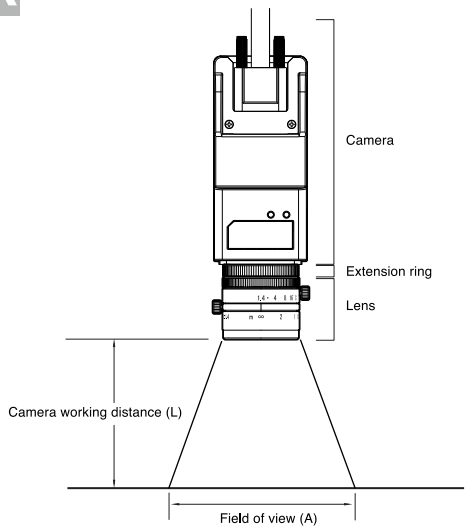
Field of View A (mm)

"t=" indicates thickness of Extension ring to use (mm)

Lens

FASV-03514V FASV-1214V FASV-2514V
FASV-0813V FASV-1614V FASV-5018V

OCR



SYSTEM PART NUMBERS

Camera unit

Model No. : **MVS-PM-R /MVS-EM-R**
Image sensor : CCD(color)
Capture mode : Color/Monochrome

Model No. : **MVS-OCR2**
Image sensor : CCD(color)
Capture mode : Color/Monochrome

*lens is not included. Please order separately

Camera cable

MVS-C2S : 2M Cable
MVS-C5S : 5M Cable
MVS-C5E : 5M Extension Cable
MVS-C5SR : 5M Robotic Cable
MVS-C5ER : 5M Extension Robotic Cable
MVS-C5W : 5M Cable with wiring for light (need MVS-LC05)
MVS-C2S-OCR2 : 2M Cable
MVS-C5S-OCR2 : 5M Cable

Controller

Model No. : **MVS-DN-E**
Camera No : Max 3
I / F : Touch panel display,
Ten-key
Ethernet

*PNP output type is MVS-DP-E

CCTV Lens (C mount)

Model No. : **FASV-03514V**
Focal Length : 3.5mm
F No. : F1.4
Filter size : -

Model No. : **FASV-0813V**
Focal Length : 8mm
F No. : F1.3
Filter size : M27 P0.5

Model No. : **FASV-1214V**
Focal Length : 12mm
F No. : F1.4
Filter size : M27 P0.5

Model No. : **FASV-1614V**
Focal Length : 16mm
F No. : F1.4
Filter size : M27 P0.5

Model No. : **FASV-2514V**
Focal Length : 25mm
F No. : F1.4
Filter size : M27 P0.5

Model No. : **FASV-5018V**
Focal Length : 50mm
F No. : F1.8
Filter size : M30.5 P0.5

Macro Lens for Mega-pixel (C mount)

Model No. : **FASV-LD4**
Focal Length : 4mm
F No. : F4.16
Filter size : M27 P0.5

Model No. : **FASV-LD6.5**
Focal Length : 6.5mm
F No. : F6.51
Filter size : M30.5 P0.5

Model No. : **FASV-LD10**
Focal Length : 10mm
F No. : F10.27
Filter size : M27 P0.5

Model No. : **FASV-LD20**
Focal Length : 20mm
F No. : F20.74
Filter size : M27 P0.5

Model No. : **FASV-LD30**
Focal Length : 30mm
F No. : F30.01
Filter size : M27 P0.5

Model No. : **FASV-LD50**
Focal Length : 50mm
F No. : F48.46
Filter size : M30.5 P0.5

Polarizing filter

Model No. : **FASV-PL255-RS**
size : M25.5 P0.5

Model No. : **FASV-PL270-RS**
size : M27 P0.5

Model No. : **FASV-PL305-RS**
size : M30.5 P0.5

IR cut filters

Model No. : FASV-IR270
size : M27 P0.5

Model No. : FASV-IR305
size : M30.5 P0.5

Extension ring set

Model No. : FASV-EXR-LT2
5 piece set

I/O Connector cable

MVS-C3I0 : 3m IEEE1284 half pitch 50p

Touch panel protective sheet

MVS-TP

External light

Model No. : OPR-S55-28W
Method : Direct ring
Spec : White LED/ DC12V, 5.1W
Cable : 500mm

Model No. : OPB-5015W2-B/ OPB-10015W2-B/ OPB-15015W2-B
Method : Direct bar
Spec : White LED/ bracket installed DC12V, 5.1W
Cable : 500mm

Filters for light

PL-OPR-S55-28 : Polarizing filter for OPR-S55-28
DF80-OPR-S55-28 : Diffuse filter (80%) for OPR-S55-28

PL-OPB-5015 : Polarizing filter for OPB-5015W2-B
DF80-OPB-5015 : Diffuse filter (80%) for OPB-5015W2-B
DF-OPB-5015 : Diffuse filter (60%) for OPB-5015W2-B

PL-OPB-10015 : Polarizing filter for OPB-10015W2-B
DF80-OPB-10015 : Diffuse filter (80%) for OPB-10015W2-B
DF-OPB-10015 : Diffuse filter (60%) for OPB-10015W2-B

PL-OPB-15015 : Polarizing filter for 15015W2-B
DF80-OPB-15015 : Diffuse filter (80%) for 15015W2-B
DF-OPB-15015 : Diffuse filter (60%) for 15015W2-B

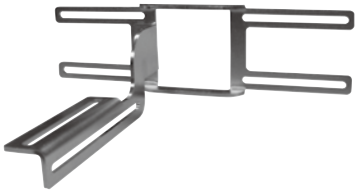
Light holder

OPAU-150A : Mounting bracket accessory for use with OPR-S55-28W

Mounting bracket for light

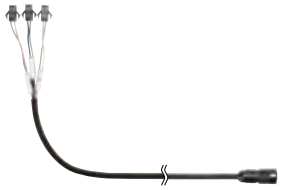
BKT-MVS-OPR : Mounting bracket for OPR-S55-28W

BKT-MVS-OPDB-01/BKT-MVS-OPDB-01-20
BKT-MVS-OPDB-02
Mounting bracket for OPB-5015W2-B/ OPB-10015W2-B/OPB-15015W2-B



Cable for light

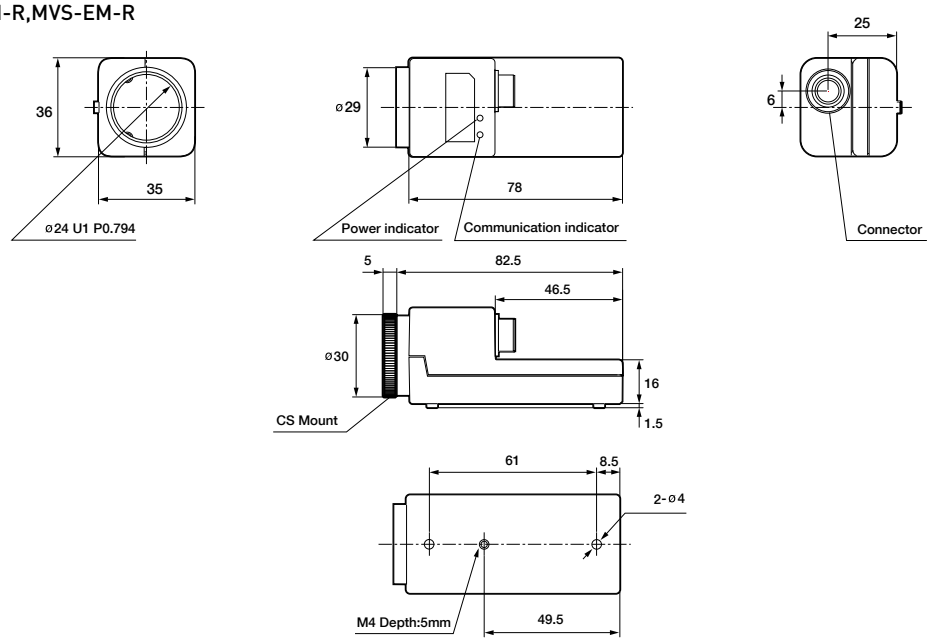
MVS-LC05 : Controller to lighting connection cable, 500mm length



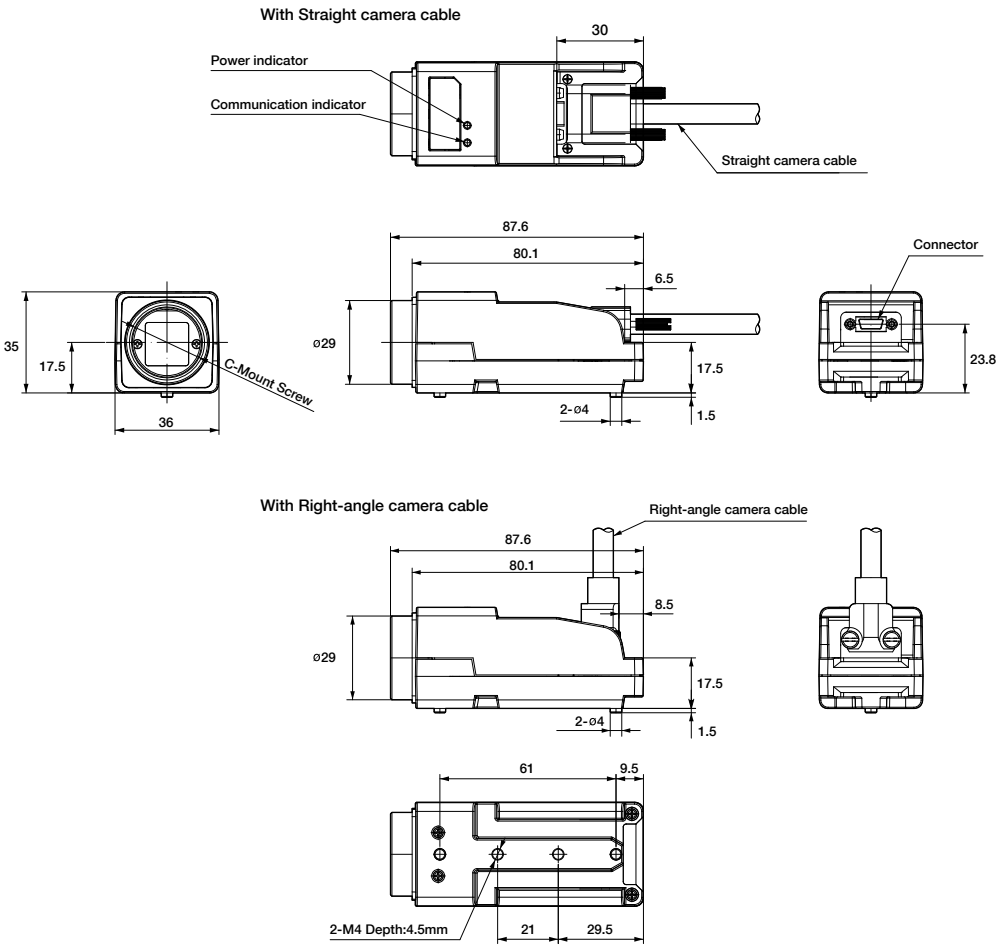
OP-CB1-2 : 2m Extension cable for light
OP-CB1-3 : 3m Extension cable for light
OP-CB1-5 : 5m Extension cable for light

Camera unit

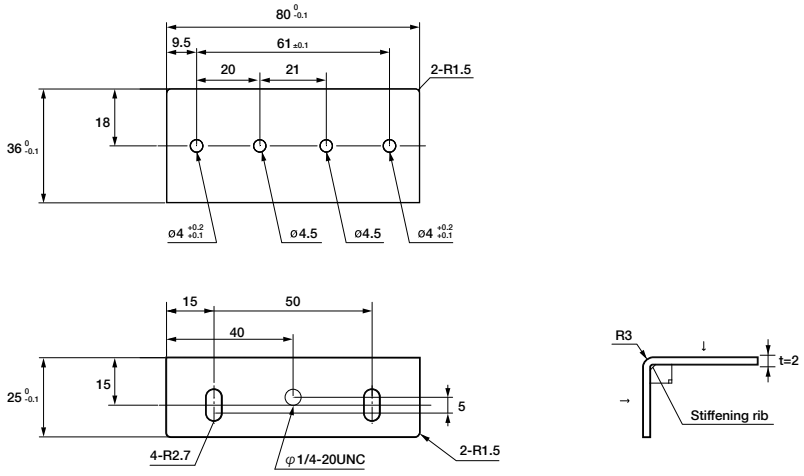
Model No. : MVS-PM-R,MVS-EM-R



Model No. : MVS-OCR2

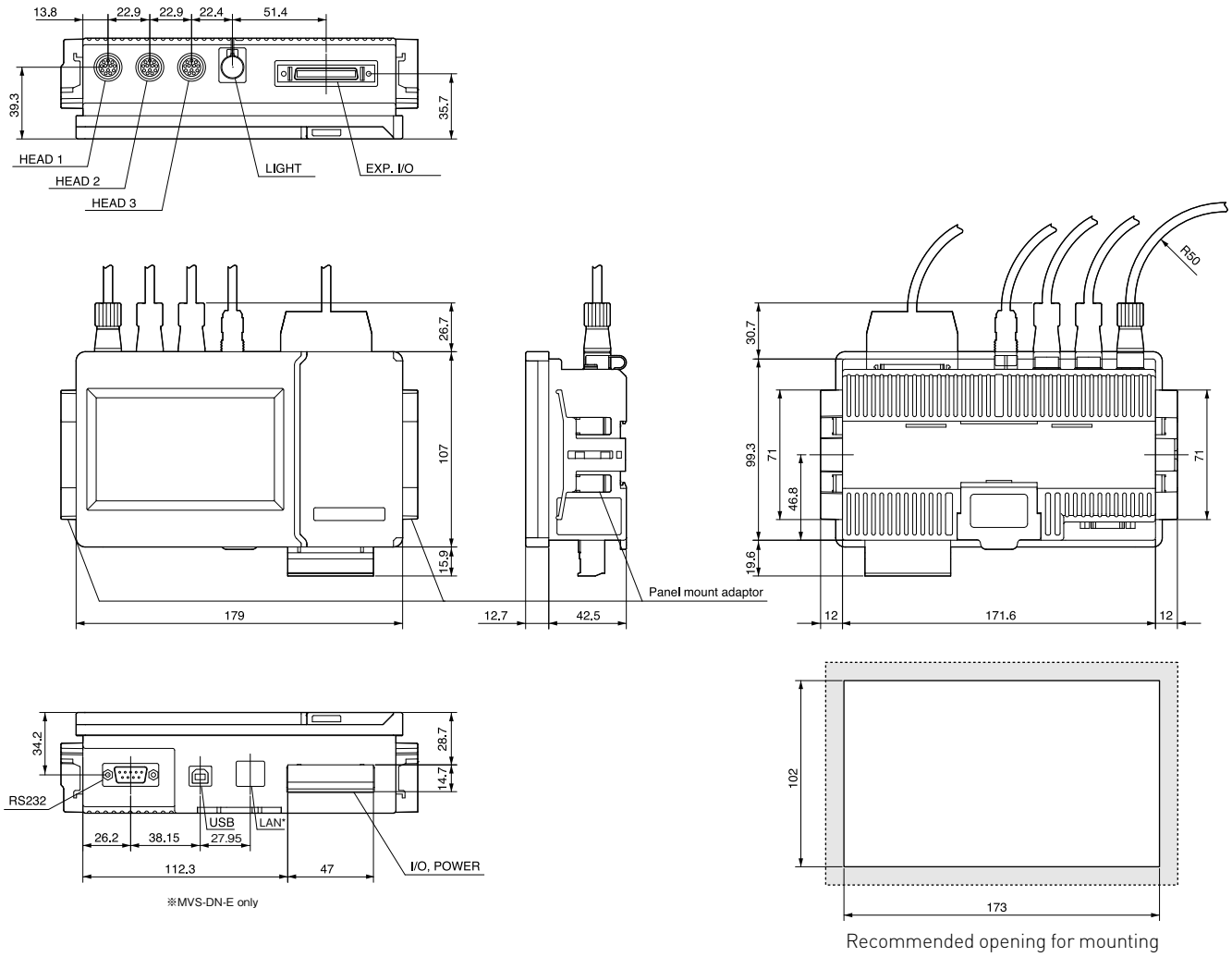


Mounting bracket



Controller

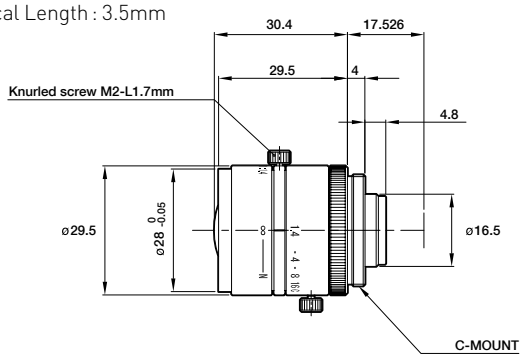
Model No. : MVS-DN-E



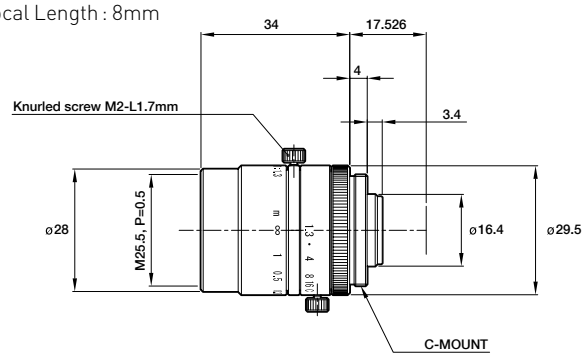
Recommended opening for mounting

CCTV Lens (C mount)

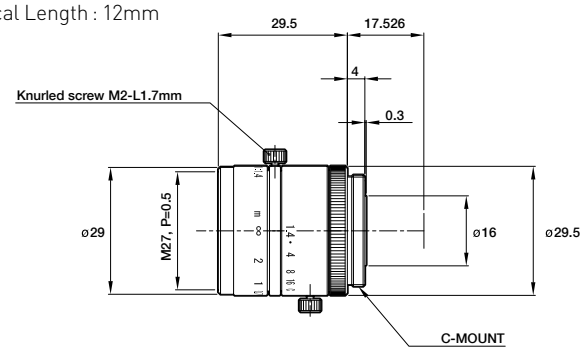
Model No. : FASV-03514V
Focal Length : 3.5mm



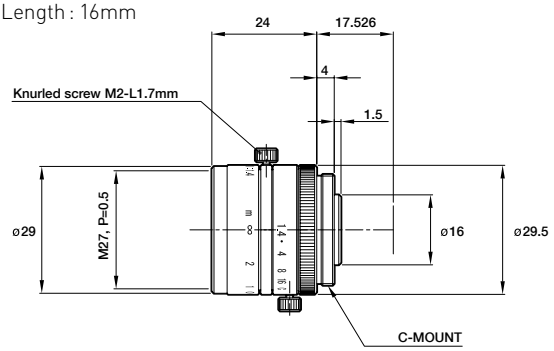
Model No. : FASV-0813V
Focal Length : 8mm



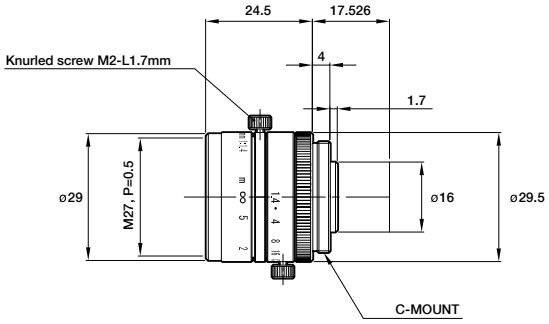
Model No. : FASV-1214V
Focal Length : 12mm



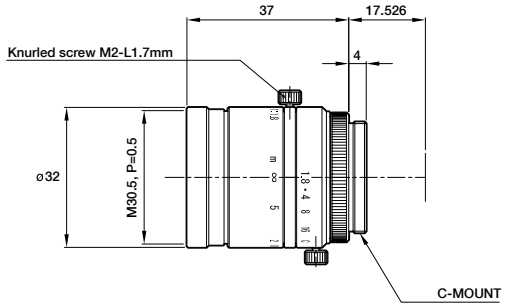
Model No. : FASV-1614V
Focal Length : 16mm



Model No. : FASV-2514V
Focal Length : 25mm

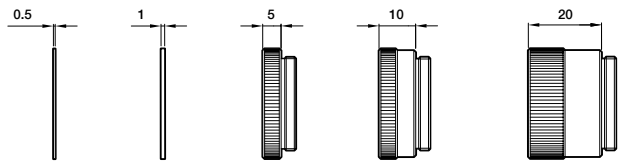


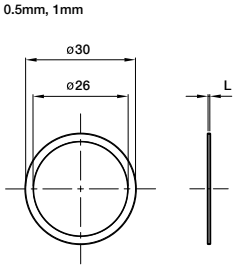
Model No. : FASV-5018V
Focal Length : 50mm

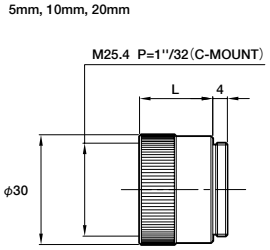


Extension ring set

Model No. : FASV-EXR-LT2

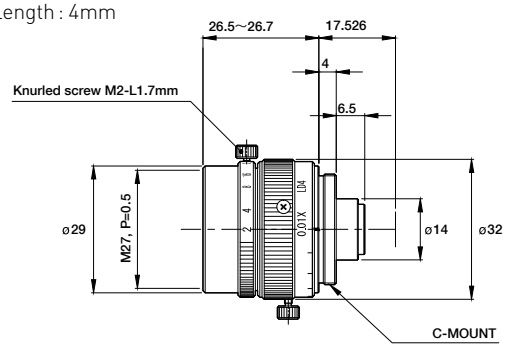




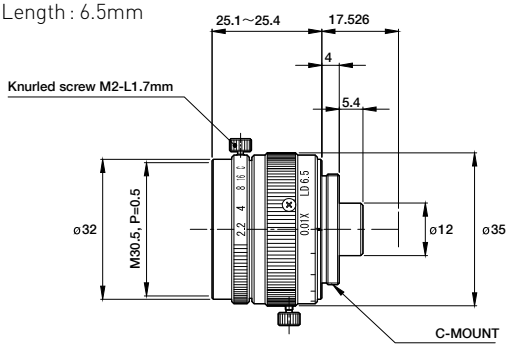


Macro Lens for Mega-pixel (C mount)

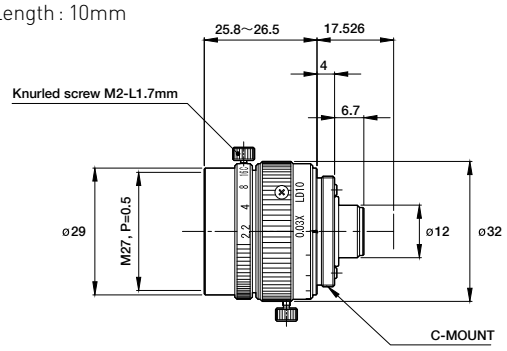
Model No. : FASV-LD4
Focal Length : 4mm



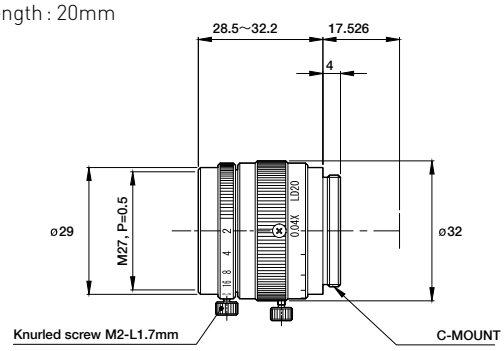
Model No. : FASV-LD6.5
Focal Length : 6.5mm



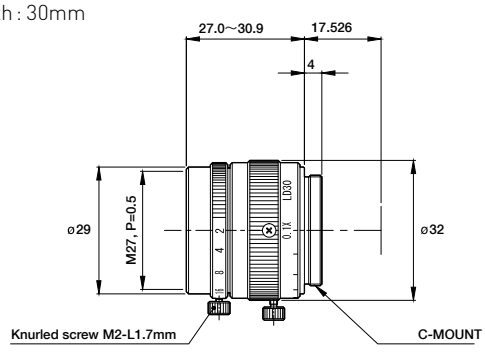
Model No. : FASV-LD10
Focal Length : 10mm



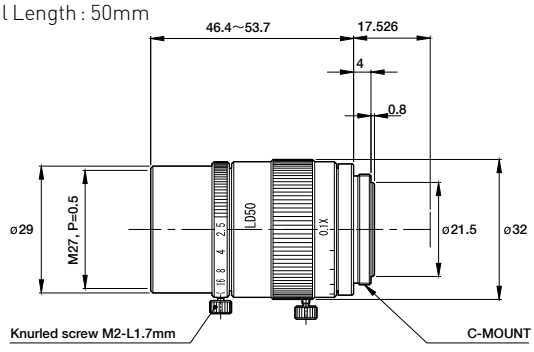
Model No. : FASV-LD20
Focal Length : 20mm



Model No. : FASV-LD30
Focal Length : 30mm



Model No. : FASV-LD50
Focal Length : 50mm

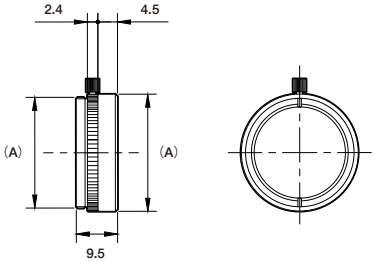


Polarizing filter

Model No. : FASV-PL255-RS
(A) size : M25.5 P0.5

Model No. : FASV-PL270-RS
(A) size : M27 P0.5

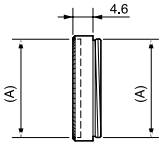
Model No. : FASV-PL305-RS
(A) size : M30.5 P0.5



IR cut filters

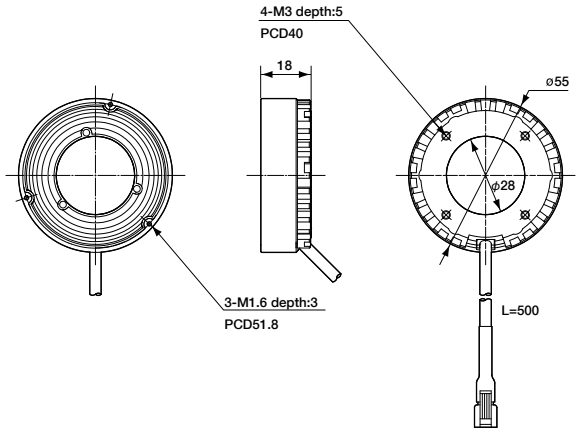
Model No. : FASV-IR270
(A) size : M27 P0.5

Model No. : FASV-IR305
(A) size : M30.5 P0.5

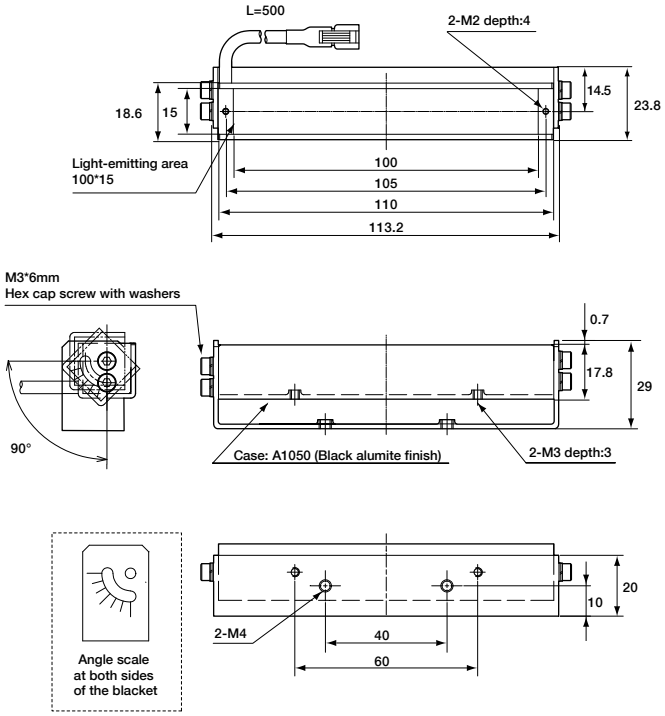


External light

Model No. : OPR-S55-28W



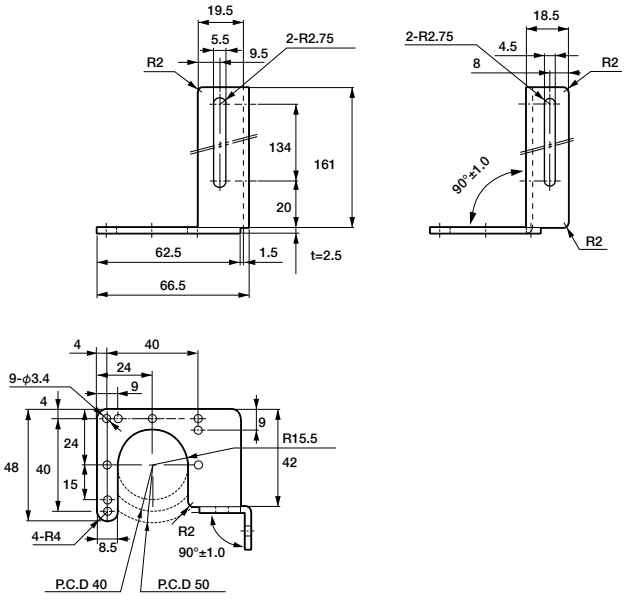
Model No. : OPB-10015W2-B (with bracket installed)



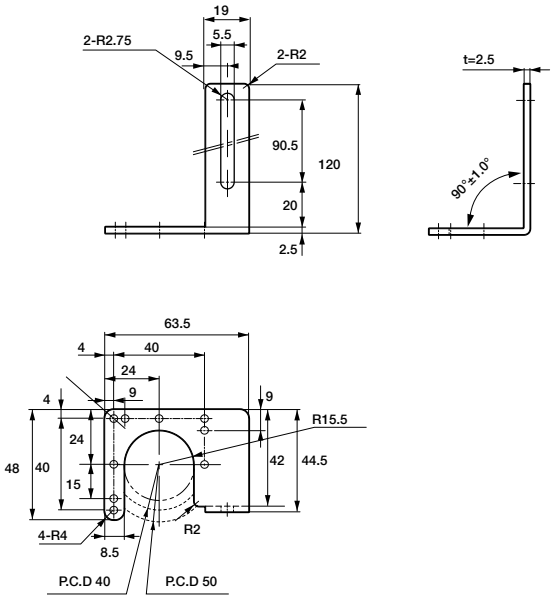
Mounting bracket for light

Mounting bracket for OPR-S55-28W

Model No. : BKT-MVS-OPR

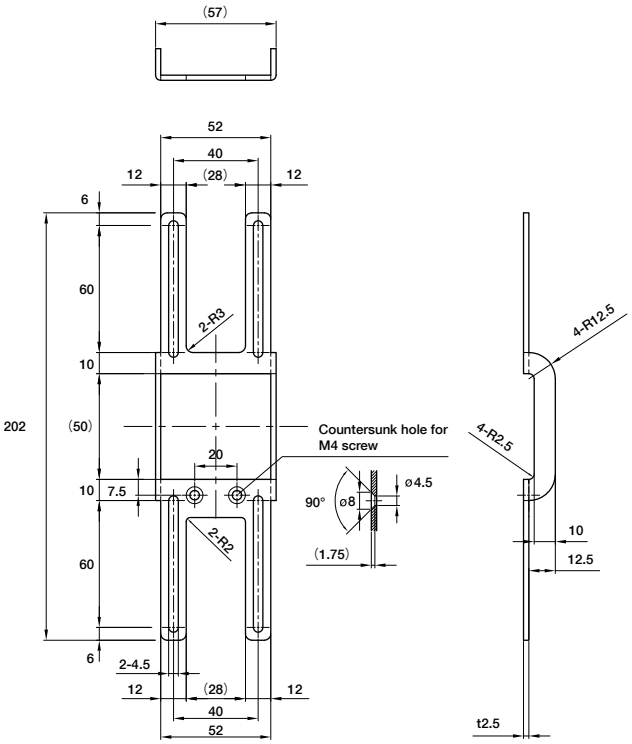


Model No. : BKTS-MVS-OPR

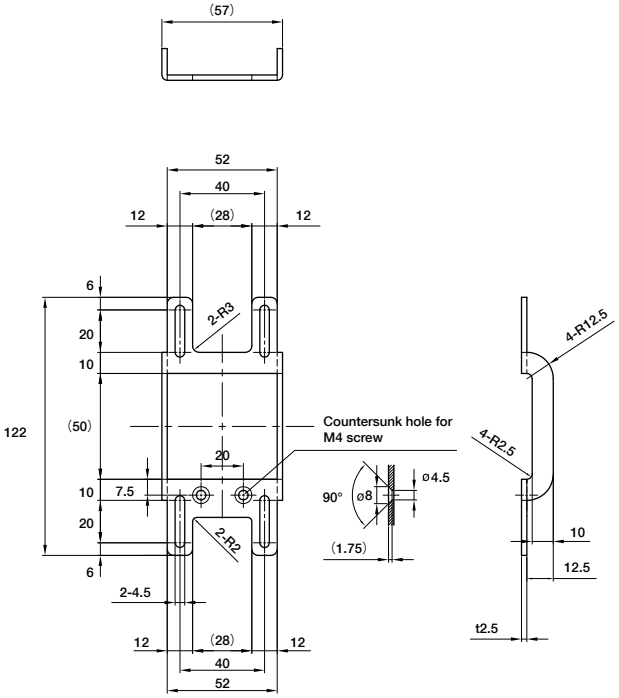


Mounting bracket for OPB-5015W2-B/OPB-10015W2-B/OPB-15015W2-B

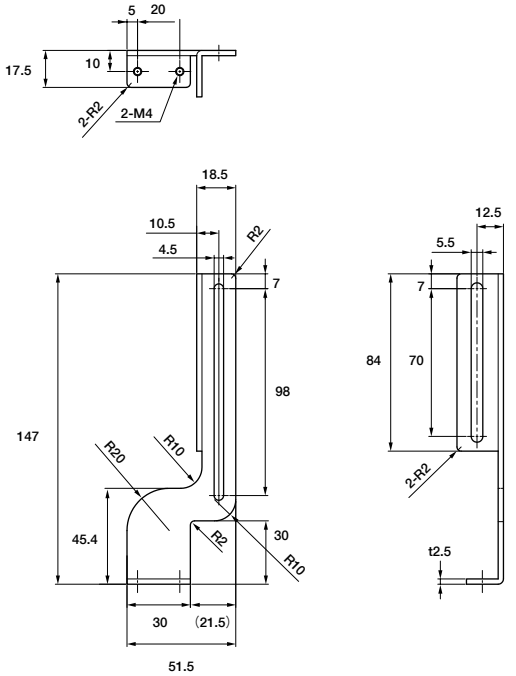
Model No. : BKT-MVS-OPDB-01



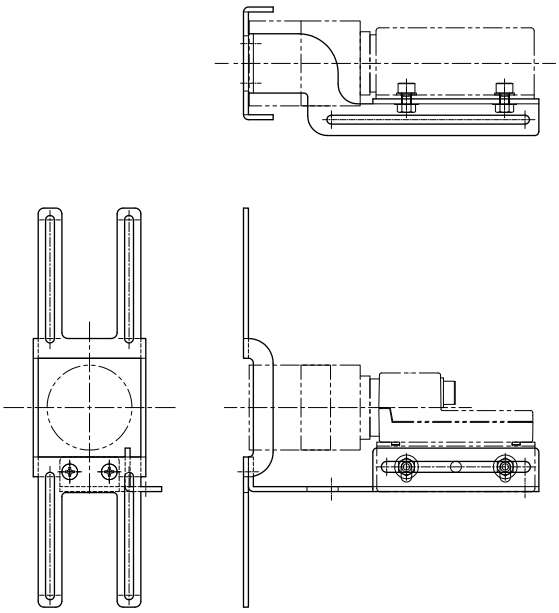
Model No. : BKT-MVS-OPDB-01-20



Model No. : BKT-MVS-OPDB-02



BKT-MVS-OPDB-01 and BKT-MVS-OPDB-02 (Example)



SPECIFICATIONS

Model	MVS-PM-R MVS-EM-R Common Specifications
Supply Voltage	DC 6VDC ±10% (From Controller)
Power consumption	Max. 100mA / 24V DC (in Controller)
Image sensor	430000 Pixel 1/3" CCD Color Image Sensor
Resolution	512 X 512 (512 X 256 by interlace processing)
Pixel size	H: 6.5 X V: 6.3μm (512 X 512 =→ 3.33 X 3.23 mm)
Lens type	CS mount (C mount adapter is included)
Communication I/F	LVDS (100Mbps) dedicated to Controller (Max. 10m)
Indicator	LED (Power, Status)
Operating Temp., Humid.	0~50℃, 35~85%/RH (Non Condensing)
Storage Temp., Humid	-20~70℃, 25~95%/RH (Non Condensing)
Vibration, Shock	Vibration : 10~ 55Hz /1.5mm, Shock : 15G
Regulatory compliance	CE (EMC: 2004/108/EC) / RoHS: 2011/65/EU) EMC standards (EN 61000-6-2, EN 61000-6-4)
Material	Aluminum
Protection Category	IP50 (IEC 60529)
Weight	Approx. 90g
Accessories	C mount adapter, mounting bracket

Model	MVS-PM-R Specifications
Image processing function	- Rotation Search up to +/- 180 degree - 16 Inspection Window - Judgment of Contour and Background, Color Normalized Correlation, Differential Normalized Correlation, Color Shape, Color Area, Stain - Variable shutter speed with continuous capture (up to 6 times) - Automatic Color/Black&White changeover - External Teaching (Auto-Shutter/Threshold/Color Extracting)

Model	MVS-EM-R Specifications
Measurement function	- Rotation Search up to +/- 45 degree - 16 Inspection Window - Measuring Outer/Inner size, Counting number of Edges, Measuring position of Edge, Measuring Edge to Edge, Measuring pitch of Edges - Variable shutter speed with continuous capture (up to 5 times) - Black&White capturing - External Teaching (Auto-Shutter/Threshold/Auto function selection)

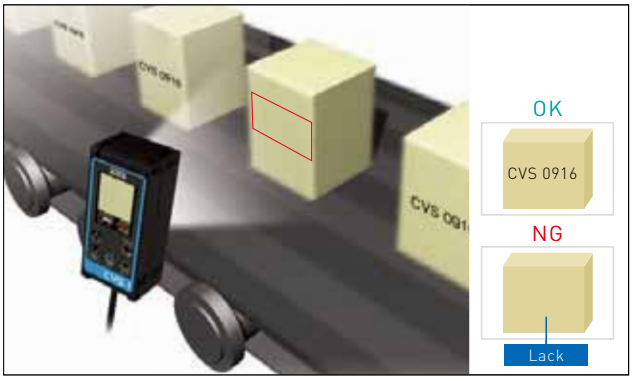
Model	MVS-OCR2 Specifications
Supply Voltage	DC 6VDC ±10% (From Controller)
Power consumption	Max. 200mA / 24V DC (in Controller)
Image sensor	1000,000 Pixel 1/1.8" CMOS Color Image Sensor
Resolution	1024 X 1024 progressive
Pixel size	5.42 X 5.42 mm (1024 X 1024)
Lens type	C Mount
Communication I/F	LVDS (100Mbps) dedicated to Controller (Max. 10m)
Indicator	LED (Power, Status)
Response time	Approx. 48ms (2 lines, 20 characters, No search) Varies by shutter speed, inspection window size, etc.
Operating Temp., Humid.	0~50℃, 35~85%/RH (Non Condensing)
Storage Temp., Humid.	-20~70℃, 25~95%/RH (Non Condensing)
Vibration resistance	Vibration : 10~ 55Hz /1.5mm, X,Y,Z for 2 hours
Shock resistance	Approx. 15G, X,Y,Z 3 times each
Regulatory compliance	CE (EMC: 2004/108/EC) / RoHS: 2011/65/EU) EMC standards (EN 61000-6-2, EN 61000-6-4)
Material	Aluminum
Protection Category	IP50 (IEC 60529)
Weight	Approx. 140g
Accessories	Mounting bracket
Image processing function	- Rotation Search up to +/- 180 degree - 4 Inspection Window - Up to 6 lines and up to 60 characters per one inspection window. Up to 120 characters are recognizable totally. - Up to 2 DATE and 2 TIME and 4 strings (total 4) - User-defined dictionary : 1500 characters managed in 3 groups of 500 each - Available Date/Time code recognition: Month: 1 character, Date: 2 char., Hour: 1 char., Minutes: 1 char. - Variable shutter speed with continuous capturing (up to 6 times) - Automatic Color/Black&White changeover - External Teaching (Auto-Shutter/Threshold/Color Extracting)

SPECIFICATIONS

Model	MVS-DN/DP/DN-E/DP-E
Supply Voltage	DC 24V ±10% (DC 12V is possible without external Light)
Power consumption	Controller : Max. 80mA / 24V DC, With external light : max 1.5A (150% of Light power consumption)+ Power consumption of all camera heads
Number of camera	Max. 3 heads
Output	NPN/PNP open collector Residual voltage is less 1.0V, OK, NG : 1 each for every camera head (Total: 6) max. 100mA, Auxiliary output : Total 20, max. 50mA
Input	Synchronous: 3, Auxiliary: 10
I/O connector	Power/OK/NG/Synchronous : Terminal block 12P, Expansive I/O : IEEE1284 half pitch connector 50P
External Light out	12V PWM control (87kHz, 256steps) Out: 3, Total 24W
Communication I/F	USB1.1 (max 12Mbps) : USB standard connector, RS232 (max 500kbps) : D-Sub 9P, RJ45 (8P8C) : Ethernet (10BaseT/100BaseTX) MVS-DN-E / DP-E only
Display, Control device	4.3" wide TFT LCD, Touchscreen, Panel SW, Indicator : Power, Camera No.LED
Timer accuracy	-45sec. ~ +1min. 15sec. Per Month (Typical)
Timer backup battery	primary cell : 5 year with power off (Typical), secondary super capacitor : 7.8 year (Typical with 3 days backup)
Operating Temp., Humid.	0~50℃, 35~85%/RH (Non Condensing)
Storage Temp., Humid	-20~70℃, 25~95%/RH (Non Condensing)
Vibration, Shock	Vibration : 10~ 55Hz /1.5mm, Shock : 10G
Regulatory compliance	CE (EMC: 2004/108/EC) / RoHS: 2011/65/EU) EMC standards (EN 61000-6-2, EN 61000-6-4)
Material	polycarbonate
Protection	IP20 (IEC 60529)
Weight	Approx. 570g
Attachment	Panel mount bracket

CVS SERIES APPLICATION

1. Checking existence of printing on the box

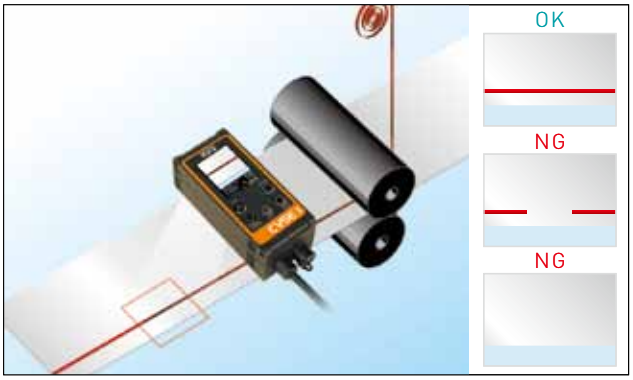


CVS1-RA
Set the extracted color from the printing and check its area in the field of view

2. Checking the lid of instant foods

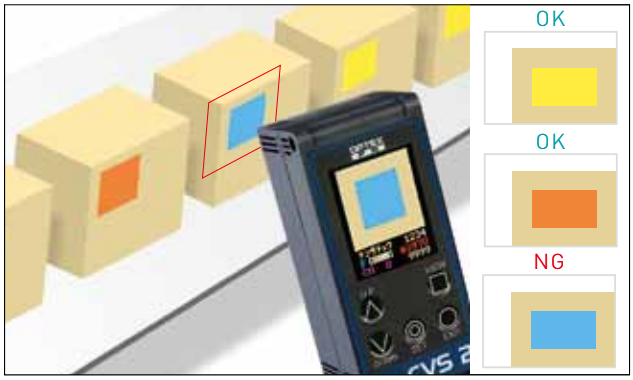
CVS2-RA
Check the color and shape by its pattern matching function

3. Checking existence of cutting tape on the film



CVSE1-RA
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-RA
Check existence of multiple color on the box registering multiple colors as reference

5. Checking existence of seasoning bag

CVSE1-RA
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

CVSE1-RA
Set the major color on the label and check its area in the field of view

8. Checking existence of needle cap

CVS1-RA
Existence of needle cap can be detected easily by color area inspection even in a big FOV

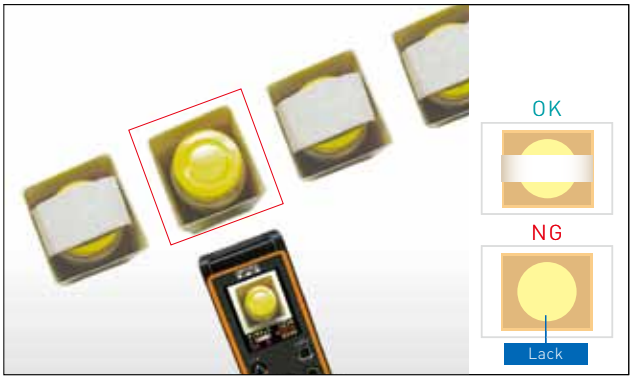
9. Checking shelf life on the milk package

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



CVSE1-RA
Set the color area of description of pills in the field of view

12. Checking overlapping of the label

CVS3-RA
Check the overlapping label by its edge detection function

13. Checking marking on electric components

CVSE1-RA
Set the color of the marking and check its area in the field of view. Narrow angle view version can zoom up small area.

14. Checking ON/OFF of LED on PWB

CVS2-RA
Check the color and position of LED by its color pattern matching function

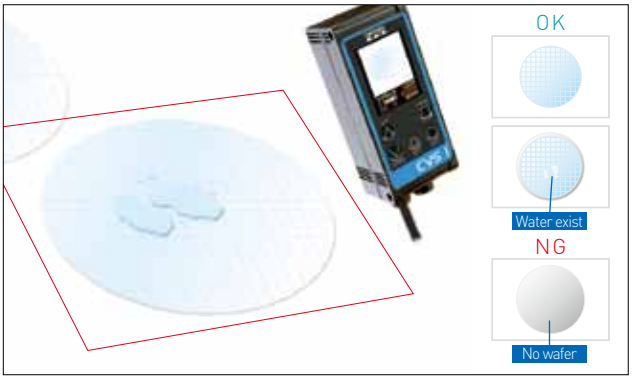
15. Checking order of the color of wires

CVS2-RA
Check the color and position of wires by its color pattern matching function

16. Checking existence of bad marking on parts

CVS2-RA
Check color of the parts and color of bad marking on the parts to detect existence of bad parts

17. Checking existence of wafer



CVS1-RA
Set the color of the wafer as its reference and detect existence of the wafer even there are some water on it

18. Checking direction of the parts

CVS3-RA
Check the edge of the marking on the IC package and detect direction of it

19. Checking position of welded part

CVS2-RA
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-RA
Check the shape of the assembled parts by edge detecting function utilizing back lighting

21. Checking direction of the parts on conveyor

CVS2-RA
Check the color and position of the surface pattern by its color pattern matching function

22. Checking size of the nut

CVS3-RA
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-RA
Check the color area of the printed characters on the spark plugs

Simple & Easy setup Color area sensor

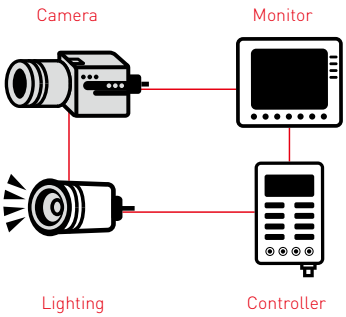
- All in one color vision sensor
- Color resolution : 15,000 colors
- Stable color detection by calculating hue of each pixel

Wide range line-up

CVSE1-N20-RA Standard type
CVSE1-N10-RA Long range type
CVSE1-N40-RA Macro view type
CVSE1-N21-RA 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.



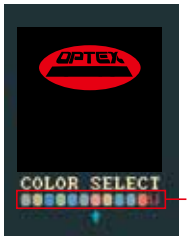
CVS series

Three-Step-Teaching

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

Step1 Set field of view

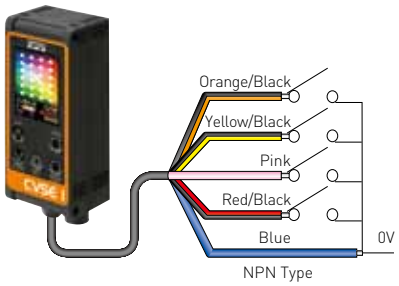
Step2 Set color



Step3 Completed with the final adjustment

Quick change over

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



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 choose from 4 inspection range/field of view according to inspection target condition.

High performance

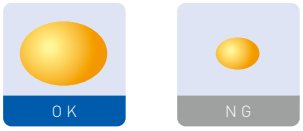
Setup Adjustable while line is running

CVSE1-RA provides output with the setup parameters given even while you are adjusting setup. You don't have to stop the line.

CVSE1-RA has two processing unit individually so it can change parameters while vision processing is running without delay.

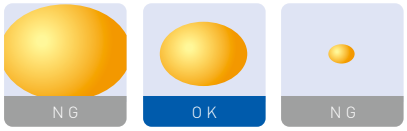
One threshold mode

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



Two threshold mode

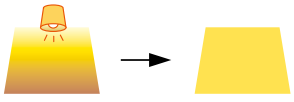
Determine OK when the area that the color matches is in two thresholds.



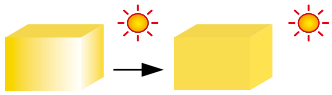
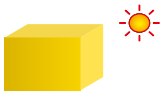
Stable inspection

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 CVSE1-RA just like you do for photoelectric sensor.

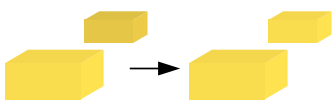
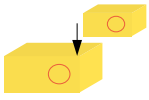
When upper part is brighter than lower part

CVSE1-RA	Conventional vision sensor
 Correct color to evenly	 Inspection is done with hue and brightness

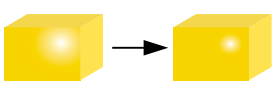
When a part is brighter than other part

CVSE1-RA	Conventional vision sensor
 Correct color to evenly	 It can't correct

When distance varies

CVSE1-RA	Conventional vision sensor
 Correct color to evenly	 The part must be set for correction

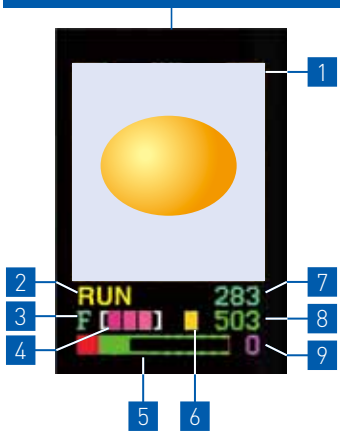
When the object is glossy

CVSE1-RA	Conventional vision sensor
 Correction is done except saturated part	It can't correct

Display

There are two modes : Normal / Setup

Normal mode



1 View
Captured image.

2 Mode
RUN: Sensor running.
Others: Teaching or setting parameter

3 Screen mode
Screen display mode.
D: displays the captured image.
F: displays the image after correction process.
2: displays the detected image.

4 Target colors
To detect colors at image. Left is darkest color and middle is middle tone, right is brightest color.

5 Area bar graph
Displays the Area in the bar graph.
Red: Out of range, Green: Within range.

6 Output
Output status ■ : ON ■ : OFF

7 Response time
Time from snapshot to output. per 0.1ms

8 Area
Area of detected colors.
Red: Out of range, Green: Within range.

9 Bank No.
Current bank number.

Switches

UP
Move cursor up and increase parameter value

DOWN
Move cursor down and decrease parameter value

SET
Change to setup mode.
Choose the parameter by pressing 3 sec. or more.

VIEW
Change the display mode
F: Dark Compensated image
2: Shows only chosen color area
D: Shows original image

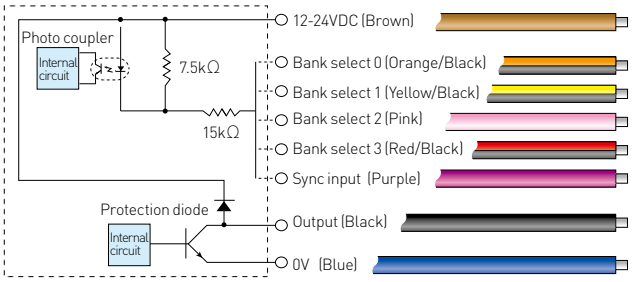
TEACH / EXIT
Change to Teaching mode by pressing 3 sec. or more.

Specifications

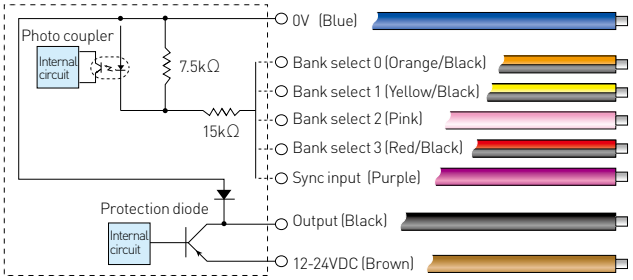
Model	CVSE1-N10-RA CVSE1-P10-RA	CVSE1-N20-RA CVSE1-P20-RA	CVSE1-N21-RA CVSE1-P21-RA	CVSE1-N40-RA CVSE1-P40-RA
Detection angle	10°	20°		40°
Working distance	210 to 270mm	90 to 150mm	31 to 39mm	50 to 100mm
Field of view	40 x 50mm to 55 x 65mm	40 x 50mm to 65 x 75mm	17 x 20mm (±10%)	50 x 65mm to 100 x 115mm
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 x12 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	2.9 to 27.7ms(Factory setting : 16.7ms) SYNCRO=ON, BRIGHT=100			
Output	NPN or PNP open collector output x 1 max.100mA Residual voltage 1.0V or less			
Input	Bank select 0 to 3, Sync input			
Operating temperature	0 to 40℃ (No condensation)			
Operating humidity	35 to 85%RH			
Storage temperature/humidity	-20 to 70℃,35 to 95%RH (No condensation)			
Vibration/shock resistance	10 to 55Hz Amplitude 1.5mm/50G (500m/s^2)			
Material	Case:ABS/Display and Lens : Acryl or Polycarbonate			
Protection structure	IP67			
Weight	Approx.200g (including cable)			

Connection diagram

(NPN)



(PNP)



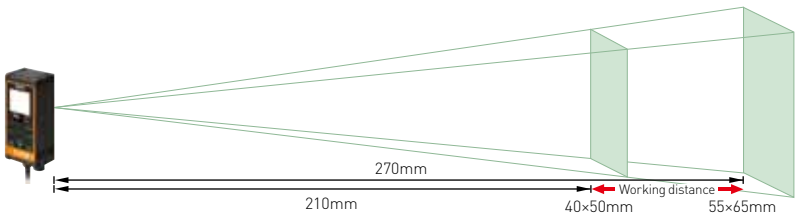
Bank table

Bank No.	Cable Color Signal			
	Orange/Black	Yellow/Black	Pink	Red/Black
	Bank selection 0 input	Bank selection 1 input	Bank selection 2 input	Bank selection 3 input
0	OFF	OFF	OFF	OFF
1	ON	OFF	OFF	OFF
2	OFF	ON	OFF	OFF
3	ON	ON	OFF	OFF
4	OFF	OFF	ON	OFF
5	ON	OFF	ON	OFF
6	OFF	ON	ON	OFF
7	ON	ON	ON	OFF
8	OFF	OFF	OFF	ON
9	ON	OFF	OFF	ON
10	OFF	ON	OFF	ON
11	ON	ON	OFF	ON
12	OFF	OFF	ON	ON
13	ON	OFF	ON	ON
14	OFF	ON	ON	ON
15	ON	ON	ON	ON

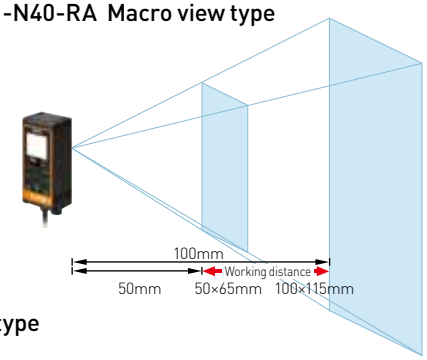
OFF	OPEN or connect with the brown line.
ON	Connect with the blue line.

Field of View

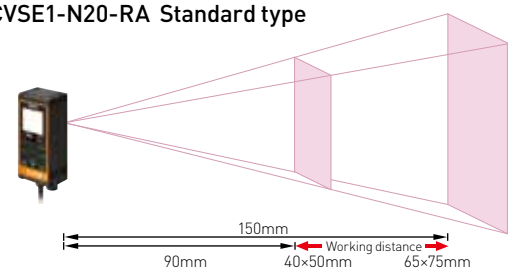
CVSE1-N10-RA Long range type



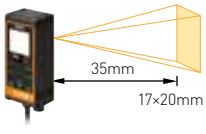
CVSE1-N40-RA Macro view type



CVSE1-N20-RA Standard type



CVSE1-N21-RA Narrow view type



Easy setup Color sensor

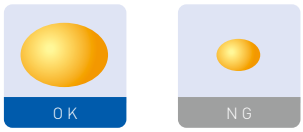
- All in one color vision sensor
- High speed : 0.6 - 22ms
- Stable color detection by calculating hue of each pixel

Wide range line-up

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

One threshold mode

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

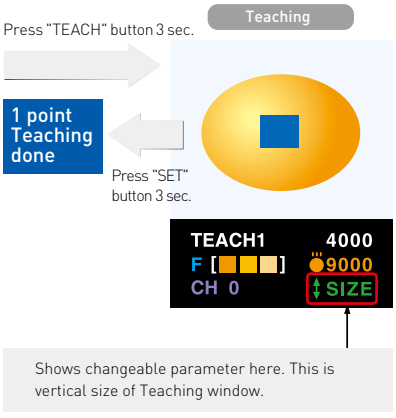


Two threshold mode

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

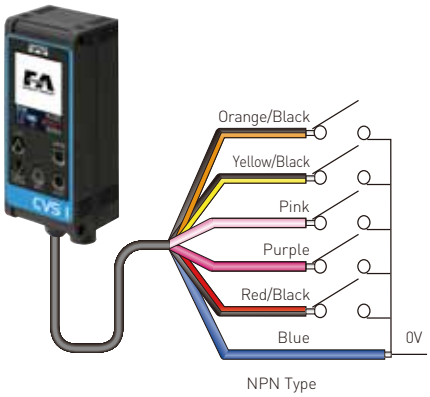
Easy Teaching

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



Up to 16 Bank

16 Banks are available in small all in one package.



High Speed

Newly developed vision processor enables high speed inspection.

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 choose from 4 inspection range/field of view according to inspection target condition.

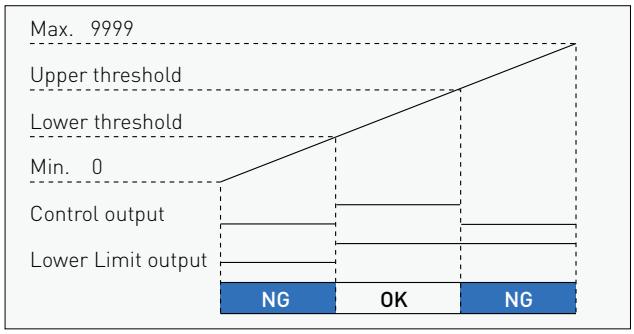
High performance

Setup Adjustable while line is running

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

Lower Limit output

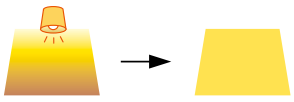
You can see which the NG output is lower than lower threshold or higher than upper threshold.



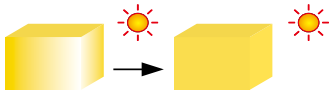
Stable inspection

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-RA just like you do for photoelectric sensor.

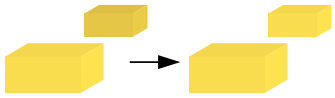
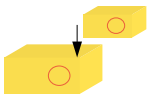
When upper part is brighter than lower part

CVS1-RA	Conventional vision sensor
 Correct color to evenly	 Inspection is done with hue and brightness

When a part is brighter than other part

CVS1-RA	Conventional vision sensor
 Correct color to evenly	 It can't correct

When distance varies

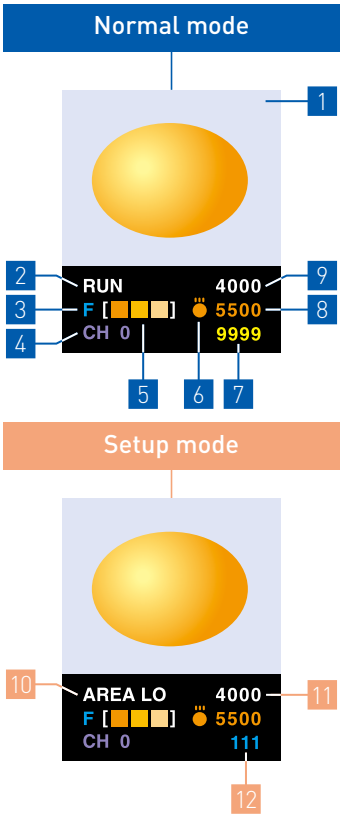
CVS1-RA	Conventional vision sensor
 Correct color to evenly	 The part must be set for correction

When the object is glossy

CVS1-RA	Conventional vision sensor
 Correction is done except saturated part	It can't correct

Display

There are two modes : Normal / Setup



1 Captured image
Image captured by the camera

2 Mode
RUN : Normal mode
TEACH : Teaching mode
CAPTURE : Image storing mode
TCH LOW : 2nd point teaching
Other : Setup parameters

3 Display mode
F: Dark Compensated image
2: Shows only chosen color area
D: Shows original image

4 Bank No.
Current Bank No.

5 Registered color
Min. Center and Max. color

6 Output
● : ON × : OFF

7 Upper threshold (0 - 9999)
Shows upper threshold

8 Color match area
Shows area that color matches

9 Lower threshold (0 - 9999)
Shows lower threshold

10 Setup parameter
Shows setup parameter

11 Parameter value
Shows setup parameter value

12 Process time
Shows process time

Switches

UP
Move cursor up and increase parameter value

DOWN
Move cursor down and decrease parameter value

VIEW
Change the display mode
F: Dark Compensated image
2: Shows only chosen color area
D: Shows original image

SET
Change to setup mode. Choose the parameter by pressing 3 sec. or more.

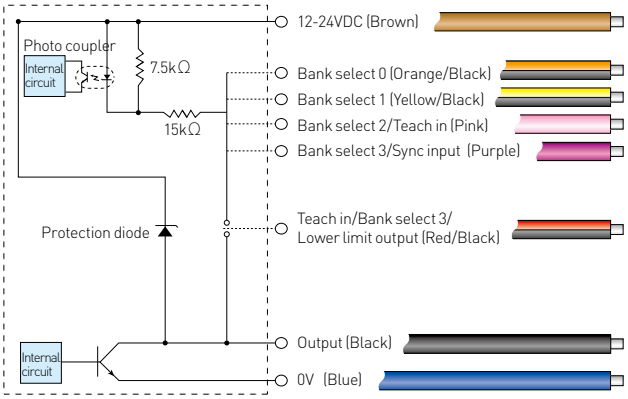
TEACH
Change to Teaching mode by pressing 3 sec. or more.

Specifications

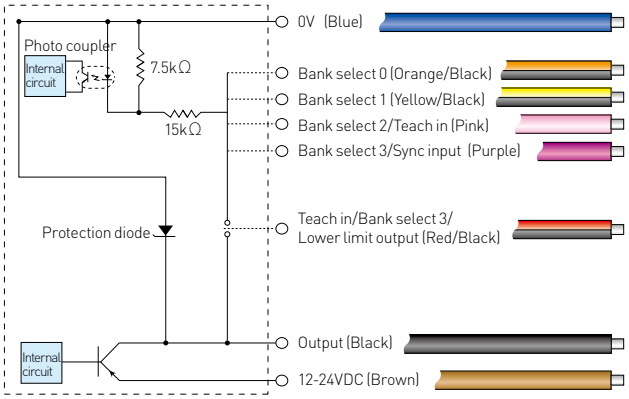
Model	CVS1-N10-RA CVS1-P10-RA	CVS1-N20-RA CVS1-P20-RA	CVS1-N21-RA CVS1-P21-RA	CVS1-N40-RA CVS1-P40-RA
Detection angle	10°	20°		40°
Working distance	210 to 270mm	90 to 150mm	31 to 39mm	50 to 100mm
Field of view	40 x 50mm to 55 x 65mm	40 x 50mm to 65 x 75mm	17 x 20mm (±10%)	50 x 65mm to 100 x 115mm
Light 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 208 x 236			
LED light duration	Approx.50,000 hours (In normal temperature and humidity. Brightness level down by 1/2 of the initial level)			
Response time	15ms to 36.3ms (Factory setting : 18.8ms)			
Output	NPN or PNP open collector output x 2 (one of them is "Lower limit output"selectable by bank input #1) max.100mA Residual voltage 1.0V or less			
Input	Totally 4: Bank select 0-2, Bank select 3 (switchable to Sync input), Teach in (switchable to Bank select 3 or Lower limit output)			
Operating temperature	0 to 40℃ (No condensation)			
Operating humidity	35 to 85%RH			
Storage temperature/humidity	-20 to 70℃,35 to 95%RH (No condensation)			
Vibration/shock resistance	10 to 55Hz Amplitude 1.5mm / 50G (500m/s^2)			
Material	Case:ABS / Display and Lens : Acryl or Polycarbonate			
Protection structure	IP67			
Weight	Approx.200g (including cable)			

Connection diagram

(NPN)



(PNP)

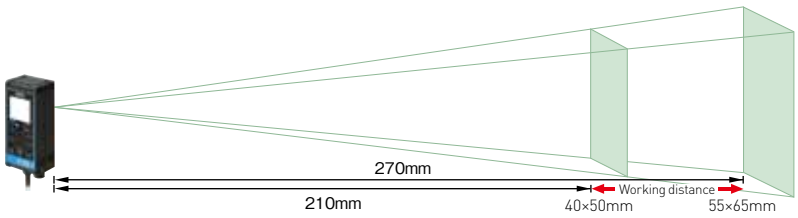


Bank table

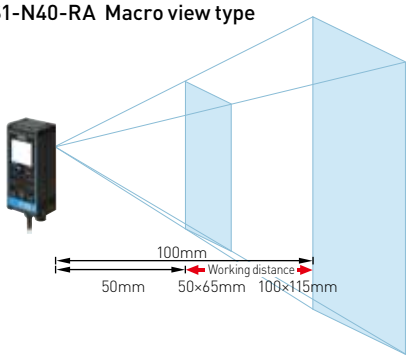
Bank No.	Bank select input			
	3(Purple)	2(Pink)	1(Yellow/Black)	0(Orange/Black)
0	OFF	OFF	OFF	OFF
1	OFF	OFF	OFF	ON
2	OFF	OFF	ON	OFF
3	OFF	OFF	ON	ON
4	OFF	ON	OFF	OFF
5	OFF	ON	OFF	ON
6	OFF	ON	ON	OFF
7	OFF	ON	ON	ON
8	ON	OFF	OFF	OFF
9	ON	OFF	OFF	ON
10	ON	OFF	ON	OFF
11	ON	OFF	ON	ON
12	ON	ON	OFF	OFF
13	ON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

Field of View

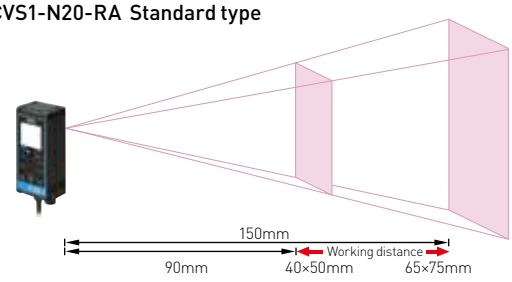
CVS1-N10-RA Long range type



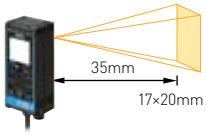
CVS1-N40-RA Macro view type



CVS1-N20-RA Standard type



CVS1-N21-RA Narrow view type



Detect Color and Shape for various inspection

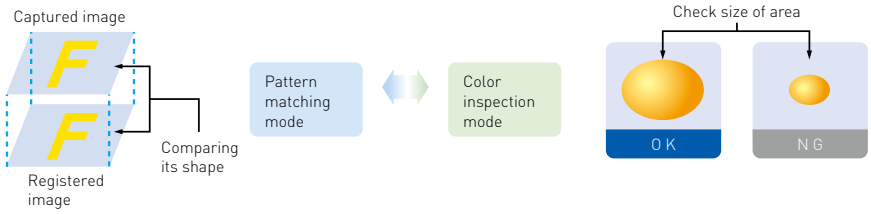
- All in one color vision sensor
- For Pattern matching and Color inspection
- Better sensitivity by Masking function

Wide range line-up

CVS2-N20-RA Standard type
CVS2-N10-RA Long range type
CVS2-N40-RA Macro view type
CVS2-N21-RA 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-RA as simple Color inspection sensor as well. Sorting by color is also available.



Correct background brightness

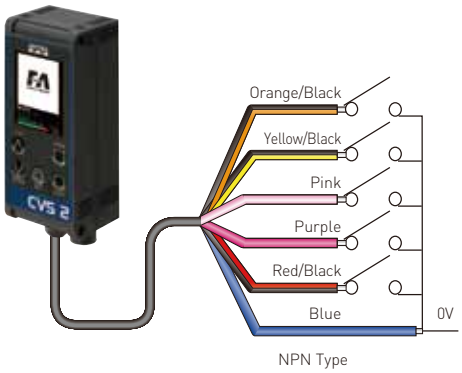
CVS2-RA has a function that corrects evenness of background brightness. You register just the background for reference.

All in one

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

Up to 15 Bank

15 Banks are available in small all in one package.

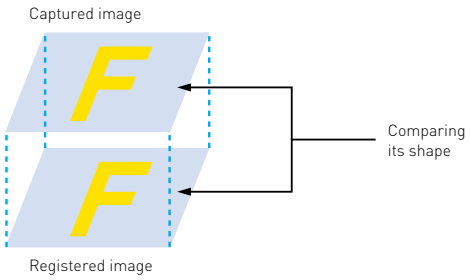


Wide coverage line-up

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

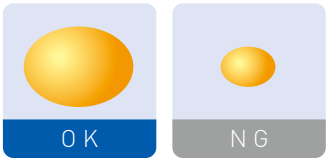
Pattern Matching mode

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

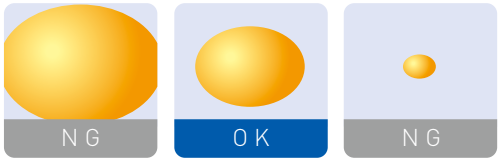


Color Inspection mode

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-RA 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 choose 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.

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

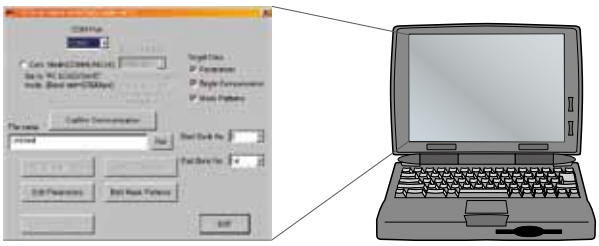
Features

Masking function

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

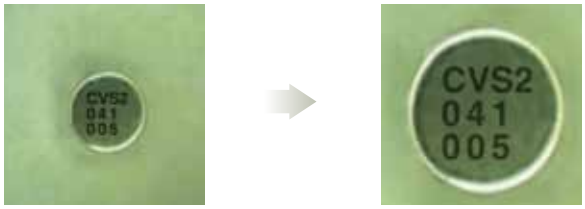
Downloading setup parameters to PC

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-RA. Please use I/F cable CVS-C2C.



Zoom function

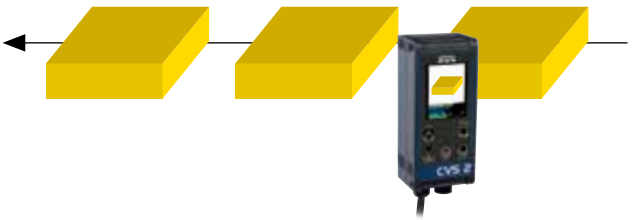
CVS2-RA has Zoom function so you can zoom in up to twice size.

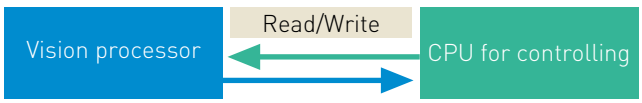


x 2

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.

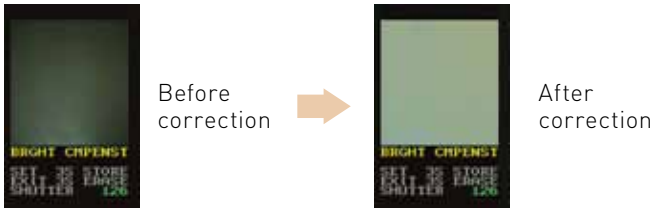




CVS2-RA has two processing unit individually so it can change parameters while vision processing is running without delay.

Correct background brightness

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



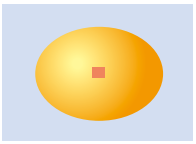
Masking

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

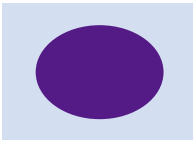
Setup

You can setup the area to mask as follows.

a

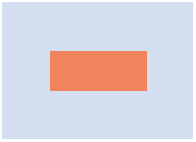


Move the cursor on the color you want to mask or not to mask.

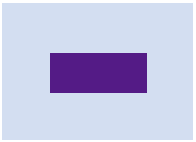


Mask area turns to purple. Then, you can add the area or remove from the area to mask. You also magnify or shrink the area easily.

b



You can set the area of cursor as mask area.



a + b

You can set the area "a" and "b" combined easily.

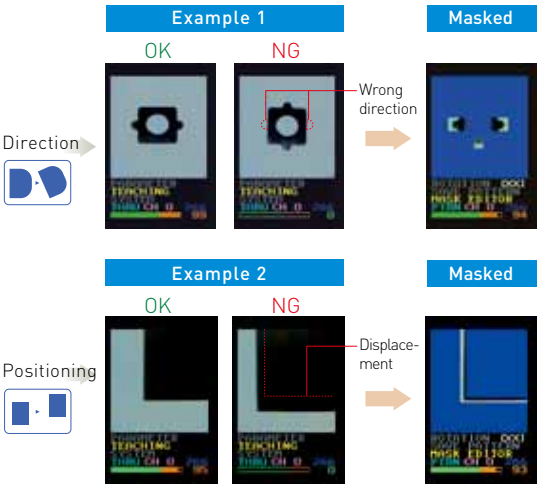
Color inspect area

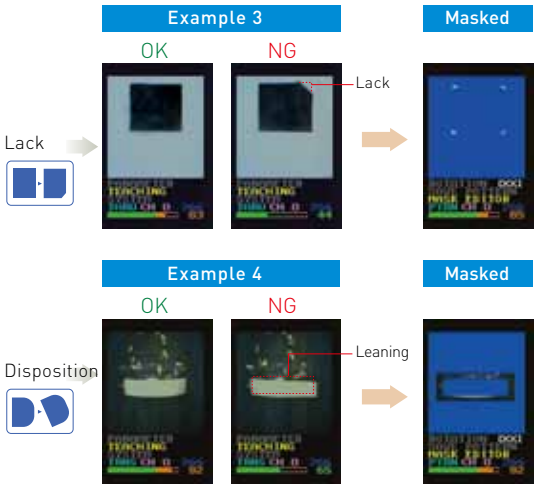
You can limit the area to inspect color from. This prevents miss-detection of color at the edge of the FOV.

Standard screen

Limit the area to detect

Example of masking

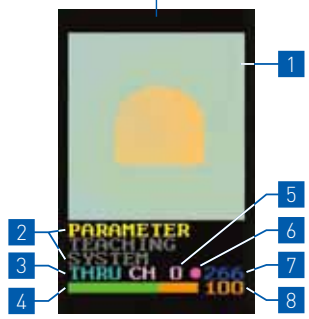




You can get better result by masking the area that doesn't show characteristics of the target object.

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.

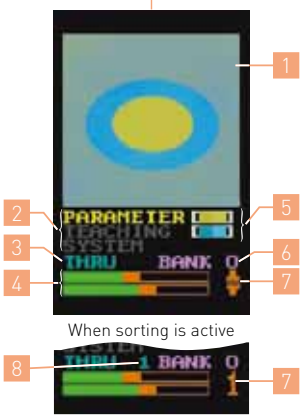
5 Bank No.
Shows current Bank.

6 Auxiliary output
Status of auxiliary output.
● : means ON

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

8 Color match area
Shows area that color matches.
Orange : ON, Green : OFF

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

UP
Move cursor up and increase parameter value

DOWN
Move cursor down and decrease parameter value

VIEW
Change the display mode
F: Dark Compensated image
2: Shows only chosen color area
D: Shows original image

EXIT
Use this button when you quit changing parameter and going back to previous menu.

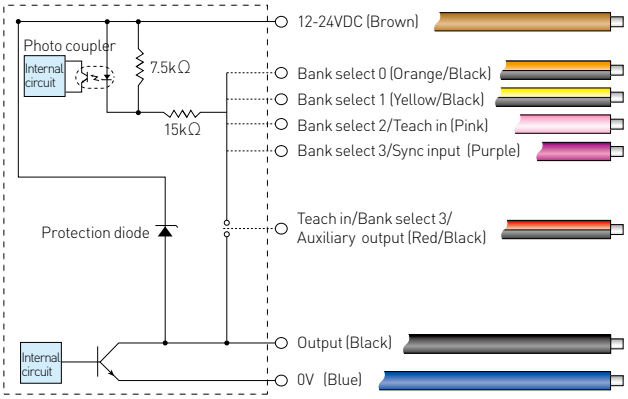
SET
Change to setup mode. Choose the parameter by pressing 3 sec. or more.

Specifications

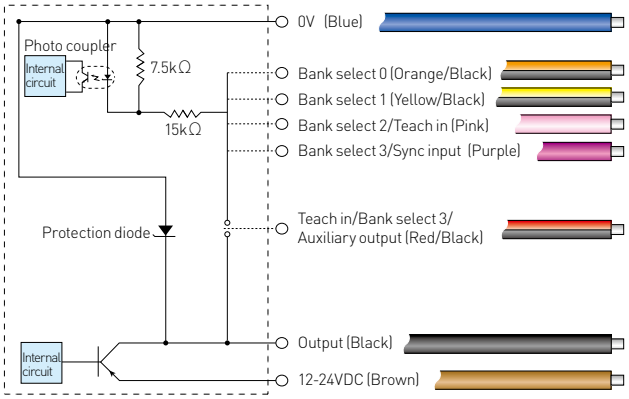
Model		CVS2-N10-RA CVS2-P10-RA	CVS2-N20-RA CVS2-P20-RA	CVS2-N21-RA CVS2-P21-RA	CVS2-N40-RA CVS2-P40-RA
Detection angle		10°	20°		40°
Working distance		210 to 270mm	90 to 150mm	31 to 39mm	50 to 100mm
Field of view		40 x 50mm to 55 x 65mm	40 x 50mm to 65 x 75mm	17 x 20mm (±10%)	50 x 65mm to 100 x 115mm
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 x16 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	Pattern matching mode	9.2/15.2/21.2/27.3ms (Standerd mode) 6.7/10.9/15.2/19.5ms (Double speed mode)			
	CVS1 compatible mode	8.7/14.8/20.8/26.8ms (Standerd mode) 5.7/9.7/13.5/17.3ms (Double speed mode)			
Output		NPN or PNP open collector output x 2 max. 100mA Residual voltage 1.0V or less			
Input		Bank select 0 to 1, Bank select 2 (switchable to Teach input), Bank select 3 (switchable to Sync input), Teach in (switchable to Bank select 3 or Auxiliary output)			
Operating temperature		0 to 40℃ (No condensation)			
Operating humidity		35 to 85%RH			
Storage temperature/humidity		-20 to 70℃, 35 to 95%RH(No condensation)			
Vibration/shock resistance		10 to 55Hz Amplitude 1.5mm / 50G(500m/s^2)			
Material		Case:ABS / Display and Lens : Acryl or Polycarbonate			
Protection structure		IP67			
Weight		Approx.200g (including cable)			

Connection diagram

(NPN)



(PNP)



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			
	Bank select 1	NA		Active			
	Bank select 2	External Teach-in				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.

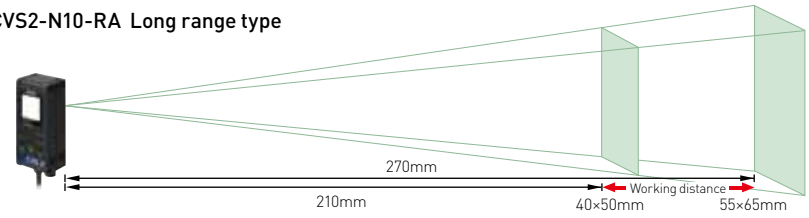
Bank No.	Output(Black)	Auxiliary output(Red/Black)
Current Bank	ON	OFF
+1	OFF	ON
+2	ON	ON

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

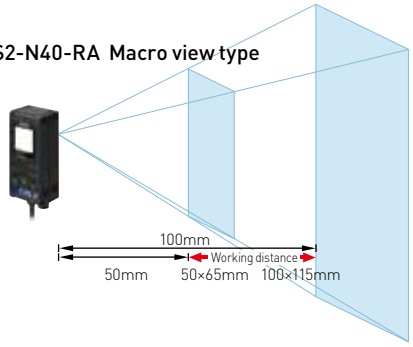
OFF	NPN: OPEN or connect with the brown line. PNP: OPEN or connect with the blue line.
ON	NPN: connect with the blue line. PNP: connect with the brown line.

Field of View

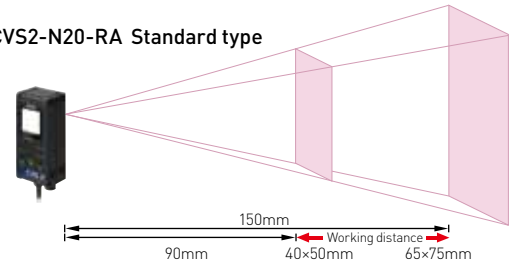
CVS2-N10-RA Long range type



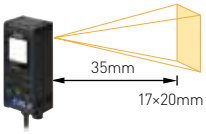
CVS2-N40-RA Macro view type



CVS2-N20-RA Standard type



CVS2-N21-RA Narrow view type



* Input/Output selectable by setup

Edge sensor for various application

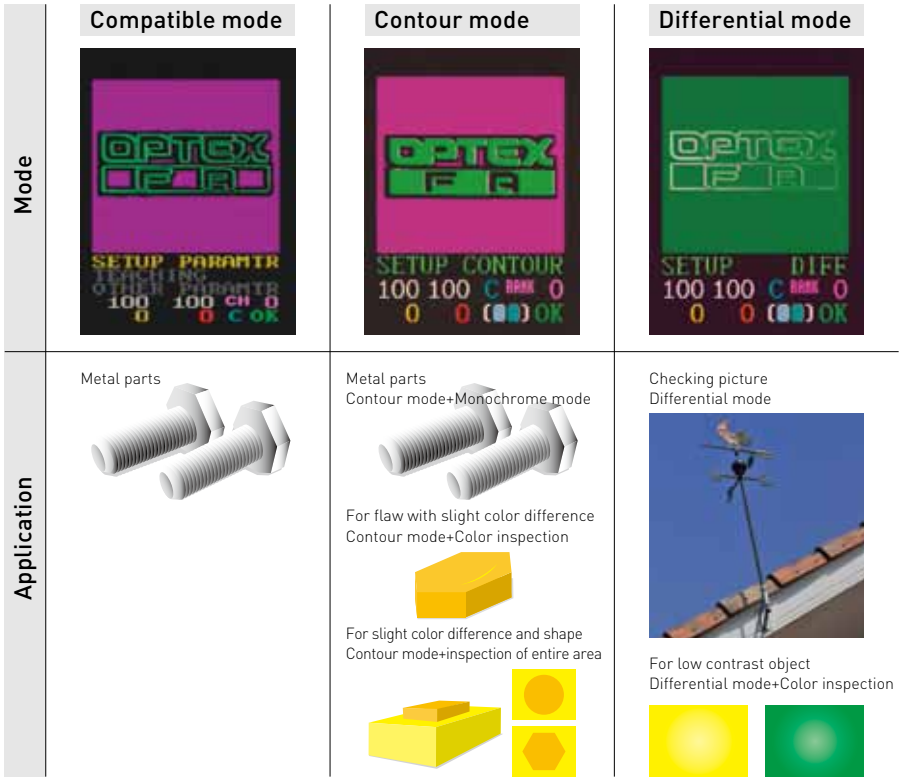
- All in one color vision sensor
- Easy setup and High performance
- Useful Zoom-in function

Wide range line-up

CVS3-N20-RA Standard type
CVS3-N21-RA Narrow view type

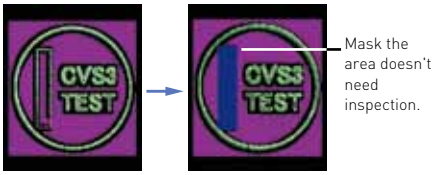
New inspection mode: Contour mode, Differential mode

New inspection mode, Contour mode and Differential mode have been added up on conventional CVS3-RA 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.



Zoom function

CVS3-RA 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-RA.
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-RA or CVS2-RA, 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

Rotate correction

Correction of rotation is available up to +/- 6.2 degree.

Inspection of chocolate shape

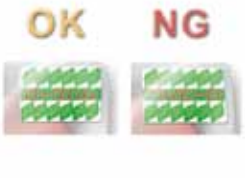
Find out best angle rotating the captured image step by step

Registered image | Captured image | Corrected image

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.

By monochrome camera | By CVS3-R with color camera

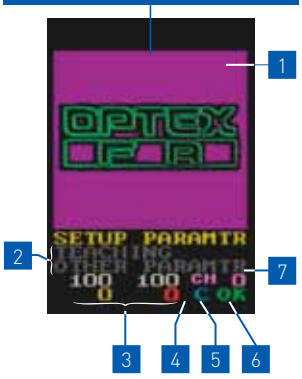
Easy Teaching

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

Verifying shelf life that changes everyday

Display

Compatible mode



1 Captured image
Image captured by the camera

2 Parameters
Shows parameters

3 Lack/Stain pixels
Shows lack of edge and stain on the background

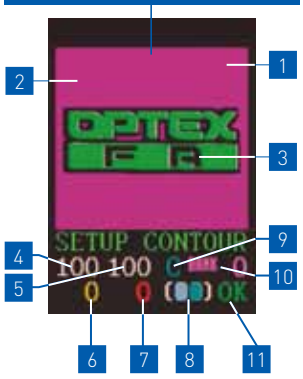
4 Stableness of threshold level
↕ : Increase THRESHLD
↕ : Decrease THRESHLD

5 Display mode
Shows current display mode

6 Judge result
Shows judge result

7 Bank No./Response time
Shows Bank No. in normal mode. Shows response time while setup mode

Contour mode



1 Area to detect stain
It shows pixel in red when it matches to the contour and Stain pixel No. will be increased

2 Area to detect lack of contour
It shows pixel in yellow when it's detected as lack of contour and Lack pixel No. will be increased

3 Area to neglect
It doesn't affect anything even if there is contour in this area

4 Threshold of lack of contour

5 Threshold of stain

6 Lack pixel No.

7 Stain pixel No.

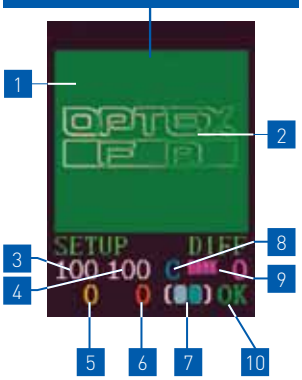
8 Registered color (bright / dark)

9 Display mode

10 Bank No.

11 Judge result

Differential mode



1 Area without contour
It shows pixel in yellow or red when it detect contour and differential rate will be increased

2 Area with contour should exist
It shows pixel in yellow or red when it doesn't detect contour and differential rate will be increased

3 Threshold of differential rate

4 Threshold of color area rate

5 Differential rate

6 Color area rate

7 Registered color (bright / dark)

8 Display mode

9 Bank No.

10 Judge result

Switches

UP
Move cursor up and increase parameter value

DOWN
Move cursor down and decrease parameter value

VIEW
Change the display mode
F: Dark Compensated image
2: Shows only chosen color area
D: Shows original image

EXIT
Use this button when you quit changing parameter and going back to previous menu.

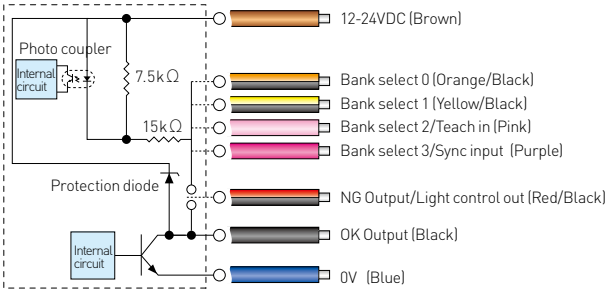
SET
Change and set the parameters.

Specifications

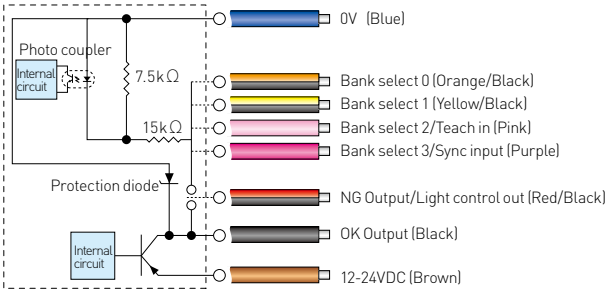
Model	CVS3-N20-RA CVS3-P20-RA	CVS3-N21-RA CVS3-P21-RA
Detection angle	20°	
Working distance	90 to 150mm	31 to 39mm
Field of view	40 x 50mm to 65 x 75mm	17 x 20mm (±10%)
Light source	White LED 12 pcs built-in	
Image sensor	330,000 Pixel CMOS color image sensor	
Supply Voltage	12 to 24V DC±10%	
Power consumption	Max. 140mA/24V DC	
Resolution	16 x16 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	Contour mode : 148ms (Factory Settings)	
Output	NPN or PNP open collector output x 2 max. 100mA Residual voltage 1.0V or less	
Input	Totally 4: Bank select 0-3, Bank select 2 (switchable to Bank select 3 or NG output)	
Operating temperature	0 to 40℃ (No condensation)	
Operating humidity	35 to 85%RH	
Storage temperature/humidity	-20 to 70℃, 35 to 95%RH (No condensation)	
Vibration/shock resistance	10 to 55Hz Amplitude 1.5mm / 50G (500m/s^2)	
Material	Case:ABS / Display and Lens : Acryl or Polycarbonate	
Protection structure	IP67	
Weight	Approx.200g (including cable)	

Connection diagram

(NPN)



(PNP)



Bank table

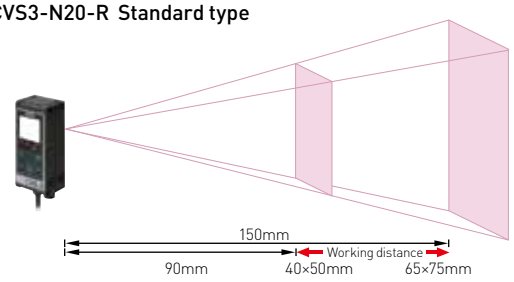
Set up	BANK	0~14		15		16	
	SYNCHRON	4	0~3	4	0~3	4	0~3
External Input	Bank select 0	NA		Active			
	Bank select 1	NA		Active			
	Bank select 2	External Teach-in				Active	
	Bank select 3	NA	Synch.In	Active	Synch.In	Active	Synch.In

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

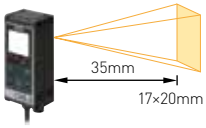
OFF	NPN: OPEN or connect with the brown line. PNP: OPEN or connect with the blue line.
ON	NPN: connect with the blue line. PNP: connect with the brown line.

Field of View

CVS3-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-N23W-R Standard type
CVS4-N21W-R Small character type
CVS4-N20W-R Long range type
CVS4-N40W-R Macro view type
CVS4-N23RW-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.

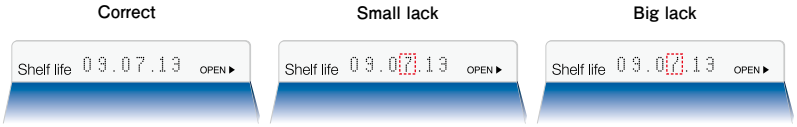
Built-in Calendar

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.

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.



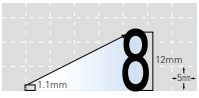
Storing NG image

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.

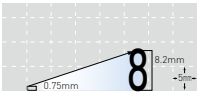
Wide range of line-up

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

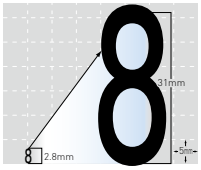
CVS4-N23W-R/ -N23RW-R



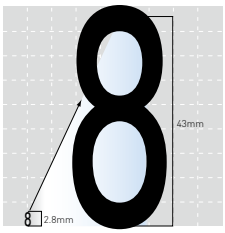
CVS4-N21W-R



CVS4-N20W-R



CVS4-N40W-R



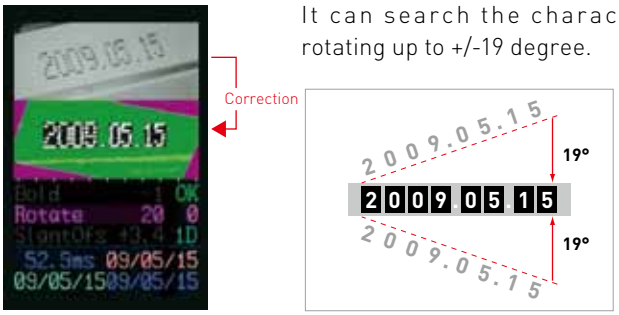
Character direction

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

CVS4-N23RW-R

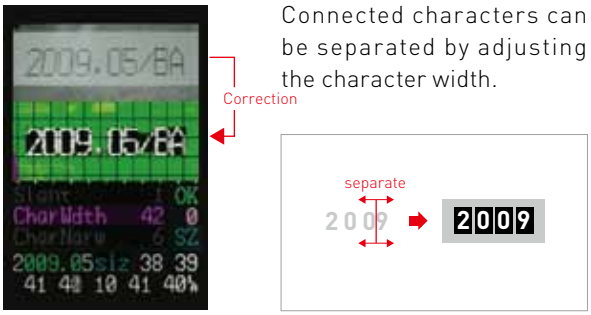
Features

Rotation search



It can search the characters rotating up to +/-19 degree.

Recognize connected characters

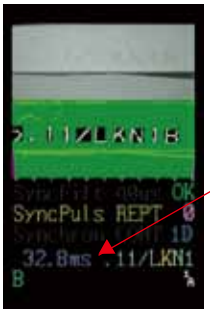


Connected characters can be separated by adjusting the character width.

Double shutter

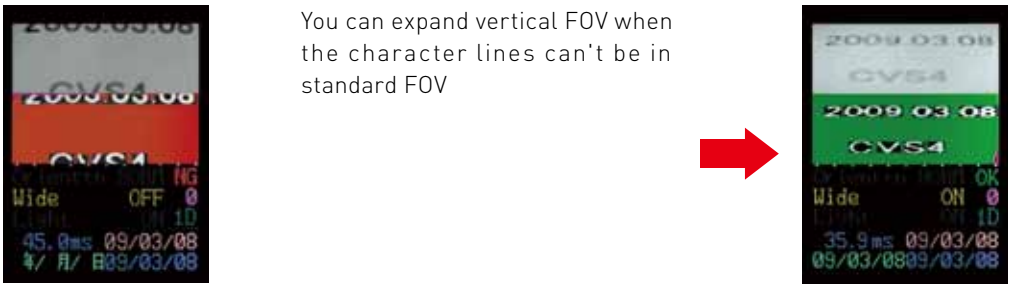
It captures twice by single trigger. If first image or 2nd image is OK, judge result is OK. This function is effective when the trigger timing is not stable and object position is not stable.

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.

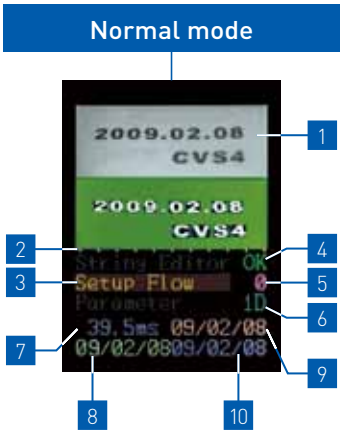
Delayed NG mode

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



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

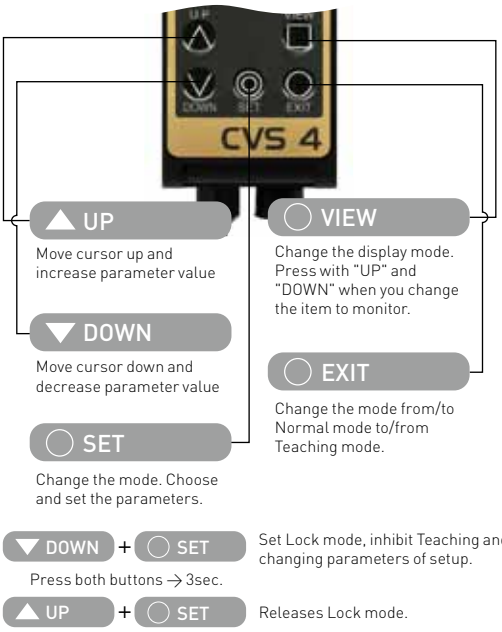
7 Response time from Sync. input to Judge output

8 Recognized Date/Time

9 Upper limit of Date/Time

10 Lower limit of Date/Time

Switches

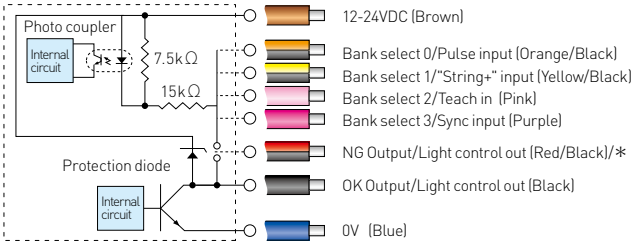


Specifications

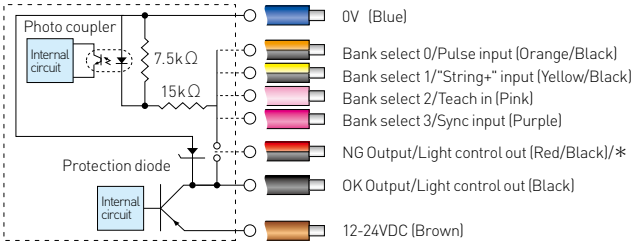
Model	CVS4-N20W-R CVS4-P20W-R	CVS4-N21W-R CVS4-P21W-R	CVS4-N40W-R CVS4-P40W-R	CVS4-N23W-R CVS4-P23W-R	CVS4-N23RW-R CVS4-P23RW-R
Detection angle	20°		40°	20°	
Working distance	90 to 150mm	31 to 39mm	50 to 100mm	44 to 56mm	44 to 56mm
Field of view	53x25mm to 79x38mm	21x10mm (±10%)	53x25mm to115x53mm	30x15mm (±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	NPN or PNP open collector output x 2 (OK/NGoutput,External light control output) max. 100mA Residual voltage 1.0V or less				
Input	Bank select 0 (Pulse input), Bank select 1 ("String +" input), Bank select 2 (Teach in), Bank select 3 (Sync input)				
Operating temperature	0 to 40℃ (No condensation)				
Operating humidity	35 to 85%RH				
Storage temperature/humidity	-20 to 70℃, 35 to 95%RH(No condensation)				
Vibration/shock resistance	10 to 55Hz Amplitude 1.5mm / 50G(500m/s^2)				
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

(NPN)



(PNP)



* Bank select 0 to 3/"String+"/Teach in

Bank table

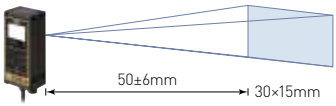
Bank No.	Bank select input			
	3(Purple)	2(Pink)	1(Yellow/Black)	0(Orange/Black)
0	OFF	OFF	OFF	OFF
1	OFF	OFF	OFF	ON
2	OFF	OFF	ON	OFF
3	OFF	OFF	ON	ON
4	OFF	ON	OFF	OFF
5	OFF	ON	OFF	ON
6	OFF	ON	ON	OFF
7	OFF	ON	ON	ON
8	ON	OFF	OFF	OFF
9	ON	OFF	OFF	ON
10	ON	OFF	ON	OFF
11	ON	OFF	ON	ON
12	ON	ON	OFF	OFF
13	ON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

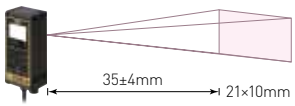
Parameter				Function of Bank selection input				Selectable range
Bank	Synchron	String+	SyncPlus	Orange / Black	Yellow/ Black	Pink	Purple	
BKIN	CONT	OFF	Others	Bank selection0	Bank slctn 1	Bank slctn 2	Bank slctn 3	0~15
			ON					
		ON,SCLR	Others		String+			0,1,4,5,8, 9,12,13
			ON					
	UP,HIGH DOWN, LOW	OFF	Others		Bank slctn 1		Synchro-nous input	0~7
			ON	Pulse que				0,2,4,6
		ON,SCLR	Others	Bank slctn0	String+			0,1,4,5
			ON	Pulse que				0,4
TCH	CONT	OFF	Others	Bank selection0	Bank slctn 1	External Teaching	Bank slctn 3	0~3, 8~11
			ON					
		ON,SCLR	Others		String+			0,1,8,9
			ON					
	UP,HIGH DOWN, LOW	OFF	Others		Bank slctn 1		Synchro-nous input	0~3
			ON	Pulse que				0,2
		ON,SCLR	Others	Bank slctn0	String+			0,1
			ON	Pulse que				0
0~15, COMM	CONT	OFF	Others	NA	NA		NA	0~15 (Bank is set by parameter and through RS232I/F)
			ON					
		ON,SCLR	Others		String+			
			ON					
	UP,HIGH DOWN, LOW	OFF	Others		NA		Synchro-nous input	
			ON	Pulse que				
		ON,SCLR	Others	NA	String+			
			ON	Pulse que				

Field of View

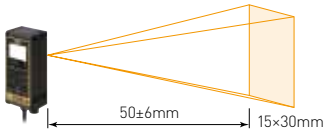
CVS4-N23W-R



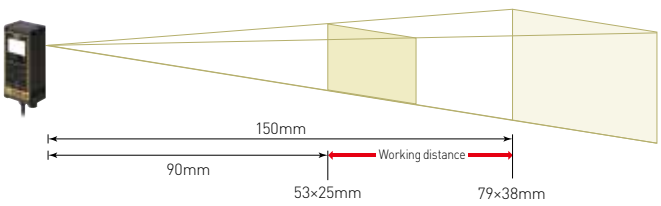
CVS4-N21W-R



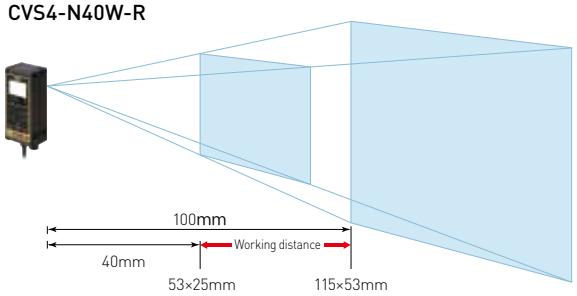
CVS4N23RW-R



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.

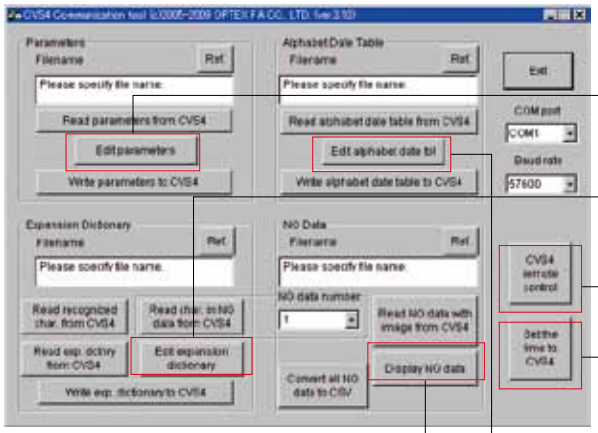
3.Downloading NG image
You can refer NG image and check what happened.

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

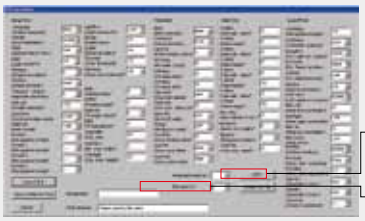


Required PC spec.
- Microsoft Windows 7
- RS232 I/F
- Cable CVS-C2C

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

I/F cable
CVS-C2C

1. Setup Modification

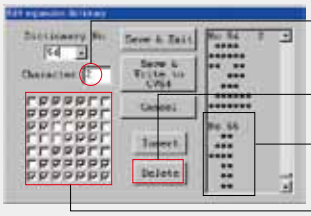


Parameter with "*" means that each Bank has individual setup.

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

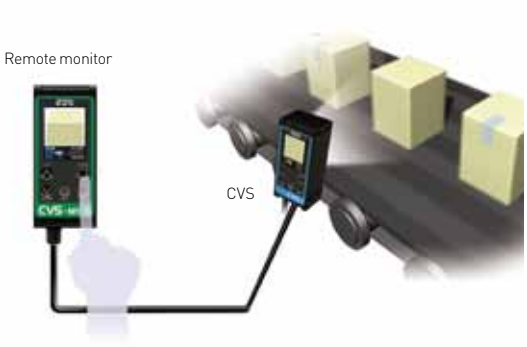
6. Code recognition

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

Accessories for CVS series

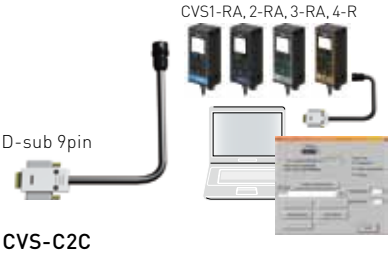
Remote monitor (with 3m cable)

CVS-M1-R
For CVS series



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

PC I/F cable (2m)



CVS-C2C
For CVS1-RA, 2-RA, 3-RA, 4-R

You can download the I/F software from our homepage. You can setup CVS1-RA, CVS2-RA, CVS3-RA 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 7
- 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-RA,2-RA,3-RA,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

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-RA,2-RA,3-RA,4-R

You can connect PC and get video signal at a time.

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.

High brightness Bar LED lighting with bracket

OPB-5015W2-B
50x15mm

OPB-10015W2-B
100x15mm

OPDB-50x15WS

Power supply LED controller

OPPD-15

Bracket for Lighting

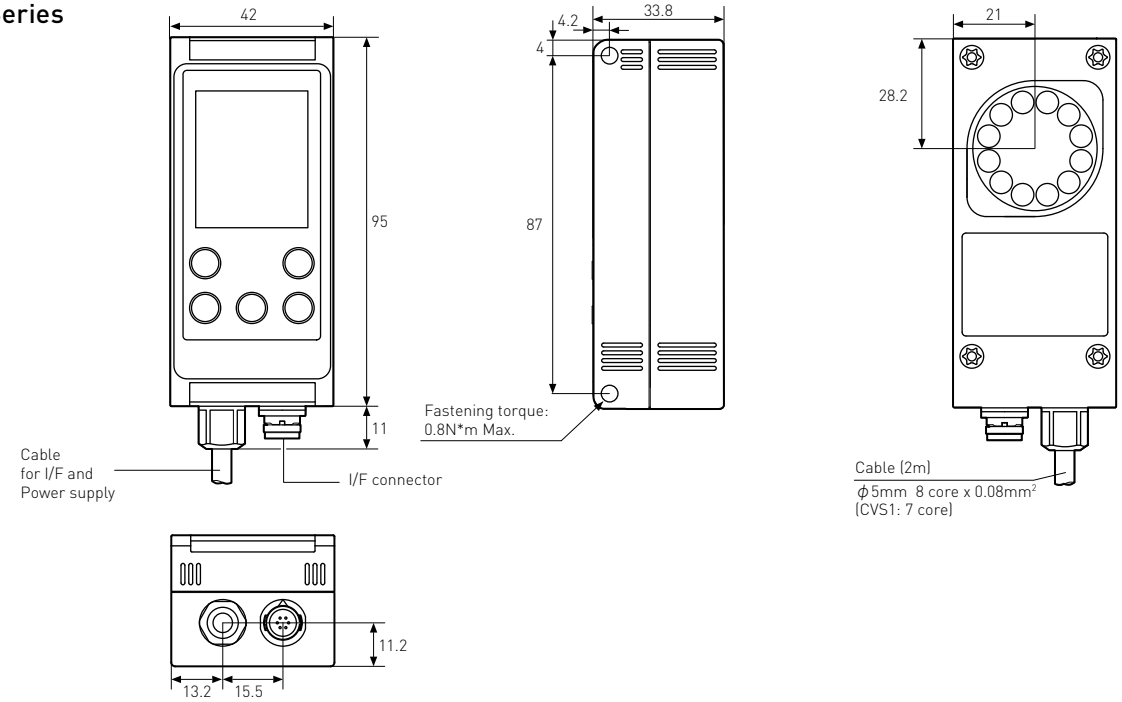
CVS-OPDB-2000
CVS-OPDB-3040
CVS-OPDB-6080

2 OPDB-50x15WS and CVS-OPDB-2000

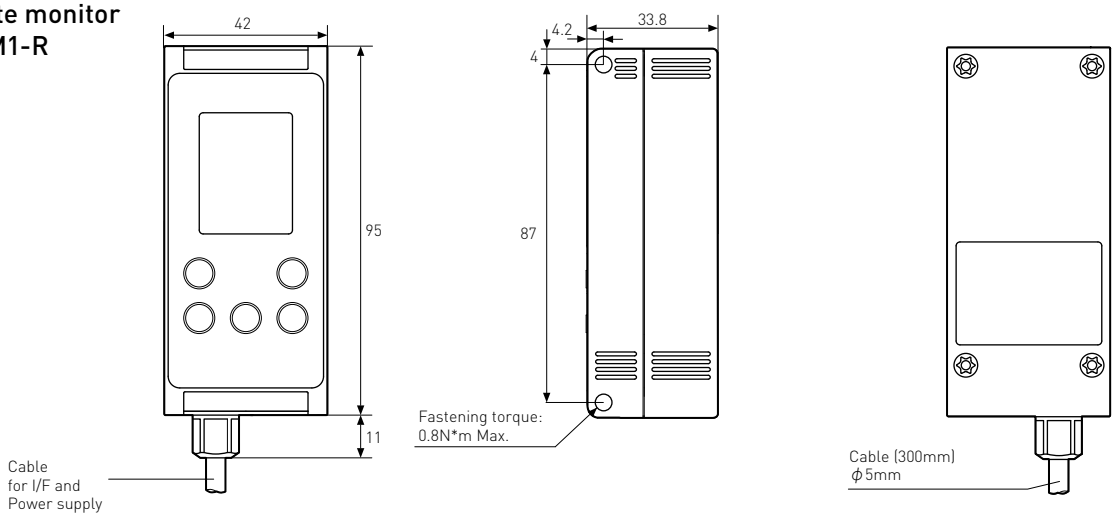
CVS-OP1000L
This is for mounting CVS series and external LED lighting.

Dimensions

CVS Series



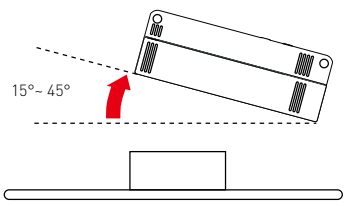
Remote monitor CVS-M1-R



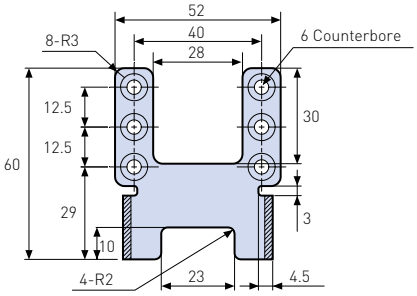
(unit: mm)

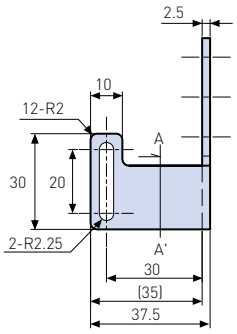
Tips for mounting CVS series

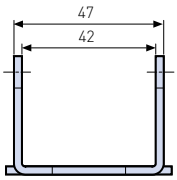
- Please determine Working distance and Field of View so that you choose correct model number of CVS series.
- Please use M4 * 50mm screws to mount CVS series
- Please take care about distance between CVS and target object to get stable size of Field of View.
- Please mount CVS at 15 to 45 degree to 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.



Bracket for Lighting
CVS-OPDB-2000

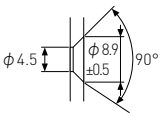




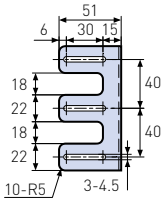


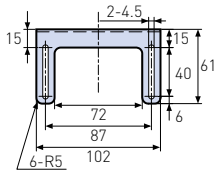
Section A-A'

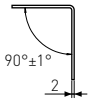
Section of Counterbore



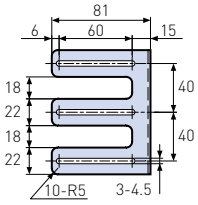
CVS-OPDB-3040

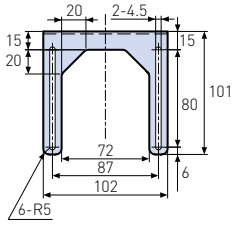


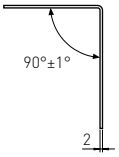




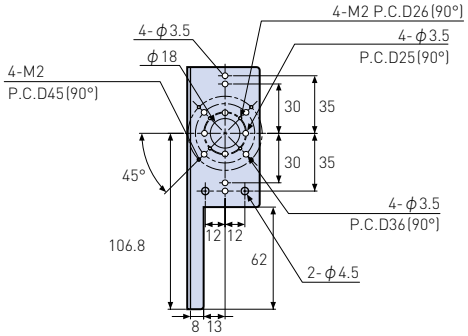
CVS-OPDB-6080

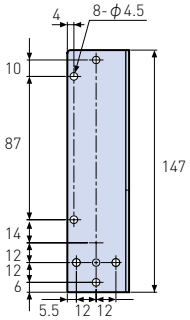


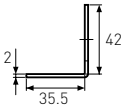




CVS-OP-1000L







(unit: mm)

Ring

OPR
Sensing LED ring lighting

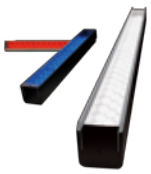
OPDR
Direct ring lighting

OPDR-F
Flat direct ring lighting

OPDR-LA
Low-angle direct ring lighting

OPDR-H
Horizontal direct ring lighting

Bar



OPB
High brightness bar lighting

OPB-S
Sensing LED bar lighting

Bar

OPDB-LE
Long range bar lighting

OPDB
Direct bar lighting

Line

OPLS
Line lighting (collimated/back light)

OPLT
Line lighting (back light)

HMB
Half mirror unit for OPLS/OPLT series

Diffuse

OPMR
Multiple-angle ring lighting

OPHR
Powerful ring lighting

Diffuse

OPIR / OPIR-S
Diffuse ring lighting

OPLR
Diffuse low-angle ring lighting

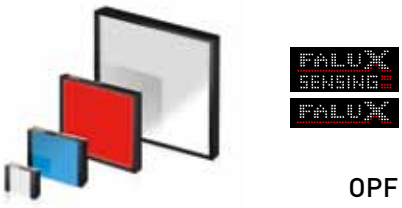
OPLQ2
Diffuse low-angle square lighting

Dome

OPHD
Powerful dome lighting

OPID
Diffuse dome lighting

Back light

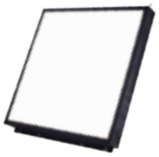


OPF
Sensing back light LED lighting

OPSM-H
Back light lighting

Back light

OPSM
Surface mounted LED back light lighting



OPSM-E
Big-size back light lighting

OPEM-H /OPEM
Edge type back light lighting

Coaxial

OPCX
Coaxial lighting

Spot

OPS-S
Sensing LED spot lighting

OPS2 / OPHS
Spot lighting

Full-color

RGB
Full-color lighting

Infrared

IR
Infrared lighting

Ultraviolet

UV
Ultraviolet lighting

Controller

OPPD
LED Controller

OPPF
Controller Advanced

Power supply

OPPCW
Power Supply (Dual output)

OPPE
Digital Power Supply with Ethernet Supported

OPPV
Voltage-control Power Supply for Line lighting

Options

DF
Diffuse Plate

PL
Polarizing Plate

OP
Cable

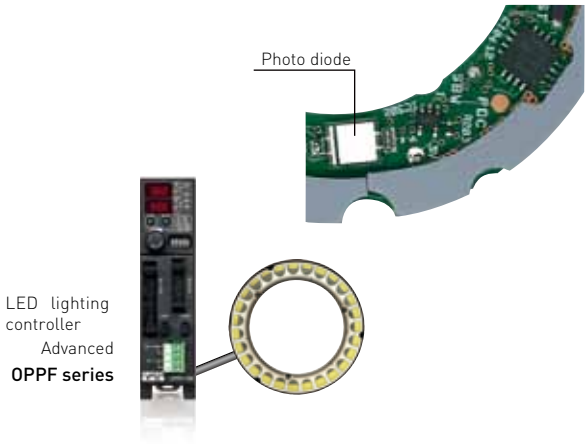
OPAU
Arm Unit

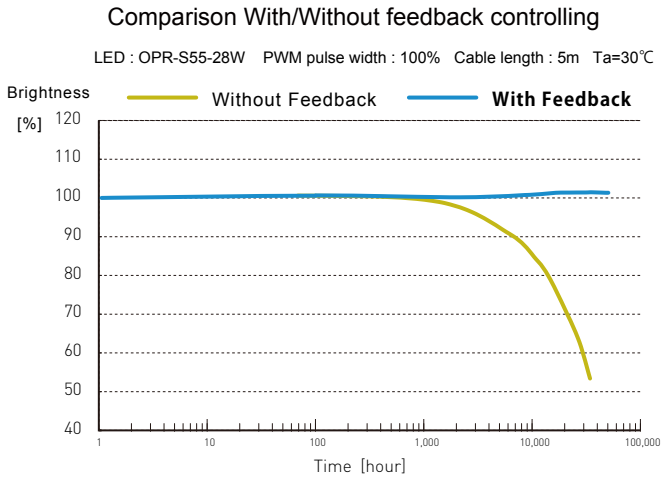
Sensing and feedback controlling technology "FALUX sensing"

Patent registered

* except OPR-32-10□

Multiple photo diodes detect LED brightness regardless its flashing pulse width. It provides brightness and temperature data through power line.
LED lighting controller OPPF series can control its LED brightness utilizing this data.
This technology enables long life around 40k hours.





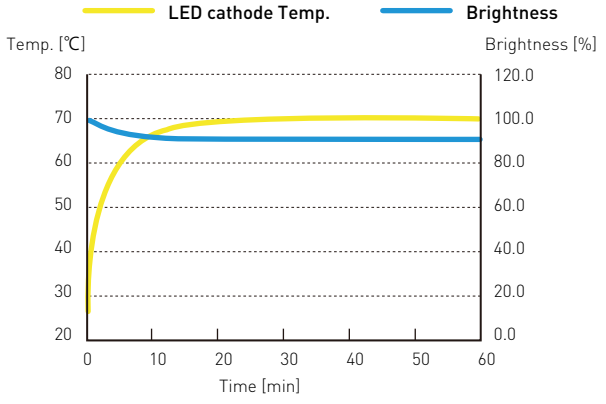
"FALUX" keeps brightness stable tracking temperature.

Patent registered

Constant current regurator adjusts brightness of each LED and temperature tracking circuitry keeps brightness stable especially at the start up moment.

Without FALUX

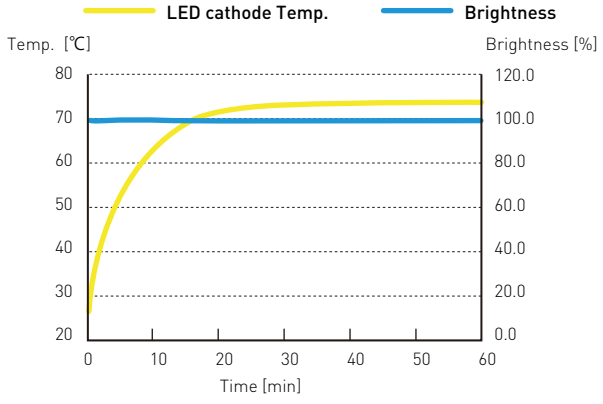
Brightness changes depends on LED temperature. You have to screen LED precisely but it doesn't help to keep its brightness stable very much.



Conventional OPDR-50-28W

With FALUX

FALUX keeps brightness of each LED even the temperature changes.



New product OPR-S55-28W

www.optex-fa.com

FASTUS is a product brand of Optex-FA

Attention: Not to be Used for Personnel Protection.

Never use these products as sensing devices for personnel protection. Doing so could lead to serious injury or death.
These sensors do not include the self-checking redundant circuitry necessary to allow their use in personnel safety applications.
A sensor failure or malfunction can cause either an energized or de-energized sensor output condition.
Please consult our distributors about safety products which meet OSHA, ANSI and IEC standards for personnel protection.

- Specifications are subject to change without prior notice.
- Specifications and technical information not mentioned here are written in Instruction Manual. Or visit our website for details.
- All the warnings and cautions to know prior to use are given in Instruction Manual.

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