**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.

---

**Up to 15 Bank**

15 Banks are available in small all in one package.

---

**All in one**

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

---

**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.

- Masking function
  You can mask the area you don’t want to detect the color freely in position.

- 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.
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.

Setup Adjustable while line is running
CVS2-R provides output with the setup parameters given even while you are adjusting setup. You don’t have to stop the line.

Correct background brightness
CVS2-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.

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

   - **a**

   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.

2. **You can set the area of cursor as mask area.**

   - **b**

3. **You can set the area “a” and “b” combined easily.**

   - **a + b**

**Color inspect area**

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

**Example of masking**

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

### Pattern matching mode
1. Captured image: Image captured by the camera
2. Parameters: Shows parameters
3. Display mode: You can change display mode by VIEW button
4. Bar graph: Shows how big the area that the color matches. Threshold is at the border of green and orange.
5. Bank No.: Shows current Bank.
6. Auxiliary output: Status of auxiliary output. $\bullet$: 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
7. Monitoring Bank No.: 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
- **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

<table>
<thead>
<tr>
<th>Model</th>
<th>CVS2-N10-RA</th>
<th>CVS2-N20-RA</th>
<th>CVS2-N21-RA</th>
<th>CVS2-N40-RA</th>
<th>CVS2-N40-RA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Detection angle</td>
<td>10°</td>
<td>20°</td>
<td></td>
<td></td>
<td>40°</td>
</tr>
<tr>
<td>Working distance</td>
<td>210 to 270mm</td>
<td>90 to 150mm</td>
<td>31 to 39mm</td>
<td>50 to 100mm</td>
<td></td>
</tr>
<tr>
<td>Field of view</td>
<td>40 x 50mm to 55 x 65mm</td>
<td>40 x 50mm to 65 x 75mm</td>
<td>17 x 20mm (±10%)</td>
<td>50 x 65mm to 100 x 115mm</td>
<td></td>
</tr>
<tr>
<td>Light source</td>
<td>White LED 12 pcs built-in</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Image sensor</td>
<td>330,000 Pixel CMOS color image sensor</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Supply Voltage</td>
<td>12 to 24V DC±10%</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Power consumption</td>
<td>Max. 140mA/24V DC</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Resolution</td>
<td>8 x 16 to 200 x 240</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>LED light duration</td>
<td>Approx. 50,000 hours(In normal temperature and humidity. Brightness level down by 1/3 of the initial level)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Output</td>
<td>NPN or PNP open collector output x 2 max. 100mA Residual voltage 1.0V or less</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Input</td>
<td>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)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Operating temperature</td>
<td>0 to 40°C [No condensation]</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Operating humidity</td>
<td>35 to 85%RH</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Storage temperature/humidity</td>
<td>-20 to 70°C, 35 to 95%RH [No condensation]</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vibration/shock resistance</td>
<td>10 to 55Hz Amplitude 1.5mm / 50G(500m/s²)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Material</td>
<td>Case:ABS / Display and Lens: Acryl or Polycarbonate</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Protection structure</td>
<td>IP67</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Weight</td>
<td>Approx. 200g (including cable)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### Connection diagram

- **Output (Black)**
- **Auxiliary output (Red/Black)**
- **0V (Blue)**
- **12-24VDC (Brown)**

#### AUX OUT=0: Ready
- Turns OFF after switching Bank. Turns ON when Output is ready

#### AUX OUT=1: Judge timing
- Turns ON when Output is ready

#### 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

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>OFF</td>
<td>OFF</td>
<td>OFF</td>
</tr>
<tr>
<td>1</td>
<td>OFF</td>
<td>OFF</td>
<td>OFF</td>
</tr>
<tr>
<td>2</td>
<td>OFF</td>
<td>OFF</td>
<td>OFF</td>
</tr>
<tr>
<td>3</td>
<td>OFF</td>
<td>OFF</td>
<td>OFF</td>
</tr>
<tr>
<td>4</td>
<td>OFF</td>
<td>OFF</td>
<td>OFF</td>
</tr>
<tr>
<td>5</td>
<td>OFF</td>
<td>OFF</td>
<td>OFF</td>
</tr>
<tr>
<td>6</td>
<td>OFF</td>
<td>ON</td>
<td>OFF</td>
</tr>
<tr>
<td>7</td>
<td>OFF</td>
<td>OFF</td>
<td>ON</td>
</tr>
<tr>
<td>8</td>
<td>ON</td>
<td>OFF</td>
<td>OFF</td>
</tr>
<tr>
<td>9</td>
<td>OFF</td>
<td>OFF</td>
<td>ON</td>
</tr>
<tr>
<td>10</td>
<td>OFF</td>
<td>OFF</td>
<td>ON</td>
</tr>
<tr>
<td>11</td>
<td>OFF</td>
<td>OFF</td>
<td>ON</td>
</tr>
<tr>
<td>12</td>
<td>OFF</td>
<td>OFF</td>
<td>ON</td>
</tr>
<tr>
<td>13</td>
<td>OFF</td>
<td>OFF</td>
<td>ON</td>
</tr>
<tr>
<td>14</td>
<td>OFF</td>
<td>OFF</td>
<td>ON</td>
</tr>
</tbody>
</table>

#### 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.

<table>
<thead>
<tr>
<th>Bank No.</th>
<th>Bank select input</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>BANK 0</td>
</tr>
<tr>
<td>1</td>
<td>BANK 1</td>
</tr>
<tr>
<td>2</td>
<td>BANK 2</td>
</tr>
<tr>
<td>3</td>
<td>BANK 3</td>
</tr>
<tr>
<td>4</td>
<td>Bank select 0</td>
</tr>
<tr>
<td>5</td>
<td>Bank select 1</td>
</tr>
<tr>
<td>6</td>
<td>Bank select 2</td>
</tr>
<tr>
<td>7</td>
<td>Bank select 3</td>
</tr>
</tbody>
</table>

#### Field of View

**CVS2-N10-RA** Long range type

**CVS2-N20-RA** Standard type

**CVS2-N40-RA** Macro view type

**CVS2-N21-RA** Narrow view type

* Input/Output selectable by setup
**Dimensions**

**CVS Series**

- **Cable for I/F and Power supply**

- **I/F connector**

- Fastening torque: 0.8N*m Max.

**Remote monitor CVS-M1-R**

- **Cable for I/F and Power supply**

- **I/F connector**

- Fastening torque: 0.8N*m Max.

**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.