



# Color Identity Sensor CVS1 SERIES

CVS1-N10	View10°	NPN
P10	View10°	PNP
CVS1-N20	View20°	NPN
P20	View20°	PNP
CVS1-N40	View40°	NPN
P40	View40°	PNP

## Set Item List (patent applied)

Function name	LCD display	Setting range (Initial value)	Explanation
Area lower limit	AREA LO	0-9999 (5000)	Sets the lower limit of the detection area.
Area upper limit	AREA HI	0-9999 (0)	Sets the upper limit of the detection area.
Bank selection	BANK	0-17 (17)	Sets the method to switch the bank number.
Screen brightness	BRIGHT	0-255 (100)	Sets the brightness of the whole screen.
Color margin	COLOR	0-127 (20)	Sets the margin when the detection color is set as the representative value.
Color filter	COLRFIL	0-3 (0)	Sets the color filter. 0: Converts the color ratio per each pixel. 1: Acquire the maximum luminance 2: High sensitivity mode of "0". 3: High sensitivity mode of "1".
Area hysteresis	HYSTRSY	0-200 (10)	Sets the hysteresis (0.1% unit of all pixels) of the area upper and lower limits.
Input constant	IN FILT	0-4 (4)	Sets the time constants of the bank switching signal and the external teaching signal.
Darkness correction factor	KIL_BLK	0-31 (27)	Sets the ratio to correct the color darkness.
LCD Up/Down reverse	LCDVIEW	0, 1(0)	0: Normal LCD display 1 Display is up/down reversed.
Area display max. value	MAXAREA	0-9999 (9999)	Sets the area maximum value.
OFF delay time	OFF DLY	0-5000 (0)	Turns OFF the output signal when the condition is not met for over this set time (ms).
ON delay time	ON DLY	0-5000 (0)	Turns ON the output signal when the condition is met for over this set time (ms).
One-shot output	ONESHOT	0, 1(0)	When set to "1", output signal is output by one shot during the OFF delay time after the output signal turns ON.
Outside area range	OUTSIDE	0-3 (0)	0: Turns ON the output signal within the range between the area upper and lower limits. 1: Turns ON the output signal outside the range between the area upper and lower limits. 2: Same as "0". However, the bank switch 1 input becomes the output over the area lower limit value. 3: Same as "1". However, the bank switch 1 input becomes the output over the area lower limit value.
Resolution	RESOLUT	0, 1 (1)	Sets the fineness of the pixels taken out of the image sensor.
Synchronous input delay time	SYNCDLY	0-255 (0)	Sets the delay time of a synchronous input signal.
Synchronous input	SYNCHRO	0-4 (4)	Sets a synchronous input signal.
Teaching function enables	TEACHEN	0-3 (0)	0: Change and movement of window. 1: Prohibits change of image-taking range. 2: Fixes the teaching window and the image-taking range. 3: Prohibits teaching.
Teaching mode	TEACHMD	0-3 (0)	0: Performs normal teaching. 1: Performs the dirt and character detection teaching. 2: Similar to "0" under fixed brightness. 3: Similar to "1", under fixed brightness.
Teaching margin	TEACH%	0-30 (15)	Sets the color detection range at teaching.
Temperature compensation level	TEMPCMP	0-255 (30)	The temperature compensation level of the image sensor.

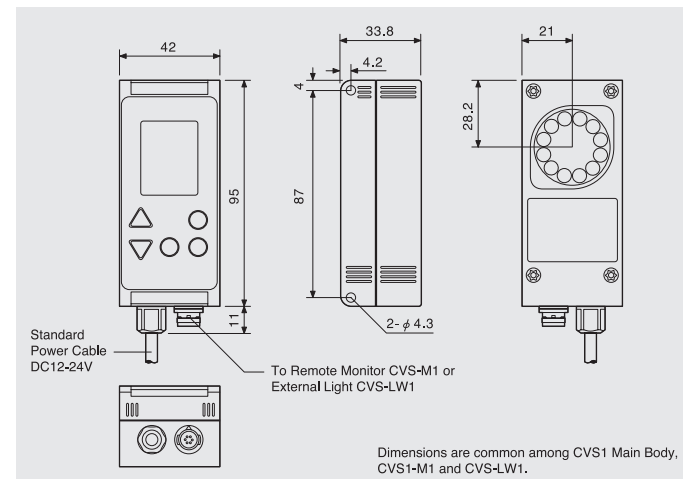
## Specification

MODEL	CVS1-N10(NPN), CVS1-P10(PNP)	CVS1-N20(NPN), CVS1-P20(PNP)	CVS1-N40(NPN), CVS1-P40(PNP)
View angle	10°	20°	40°
Object distance	210—270mm	210—270mm	210—270mm
Image-taking range ※1	40×50—55×65mm	40×50—55×65mm	40×50—55×65mm
Light source	White LED: 12 pcs		
Power voltage	Current Max. 220 mA / 12 V DC., 120 mA / 24 V DC.		
Resolution	8 × 16 × 3 (RGB) - 200 × 240 × 3 (RGB)		
Temperature drift	±2% of RGB each factor (0—40°C) ※2		
Lighting durability	Approx. 50000 hours ※3		
Lighting luminance tolerance	-70% — +100% ※4		
Response speed	0.6—22 ms		
Output ※5	NPN or PNP, Max. 100 mA, Residual voltage: 10V or less		
Input	Bank switch input: 4 points (1 point is switched to the upper and lower limit terminal.)		
Ambient working temperature	0—40°C		
Ambient humidity range	35—85%/RH		
Material	ABS / acrylic fiber / polycarbonate		
Protection degree	IP67		
Weight	Approx. 180g		

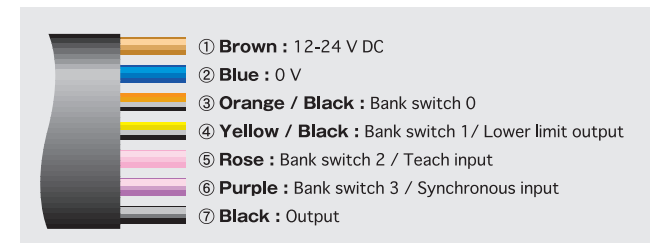
※1: Tolerance: ±10%  
 ※2: When the set value of KIL\_BLK is "10" or more

※3: When luminance has dropped to 50% under the normal temperature and humidity circumstance  
 ※4: Representative value when KIL\_BLK is set to "27"

## Dimensions



## Connection



## Options

MODEL	APPLICATION
CVS-M1 Remote Monitor (patent applied)	Remote controller with TFT display.
CVS-LW1 External Lighting (patent applied)	Use this lighting where this sensor is mounted at a dark place, or stable result is not obtained due to insufficient lighting.
CVS-C3S Extension Cable (3m)	Four cables can be connected at a time. MAX 15m in total.

- Specifications and technical information not mentioned here are written in Operation Manual. Or visit our website for getting details.
- All the warnings and cautions to know prior to use are given in Operation Manual.

World's First Palm Size Vision Sensor  
including Camera, Display, and Light under Teach-in system.



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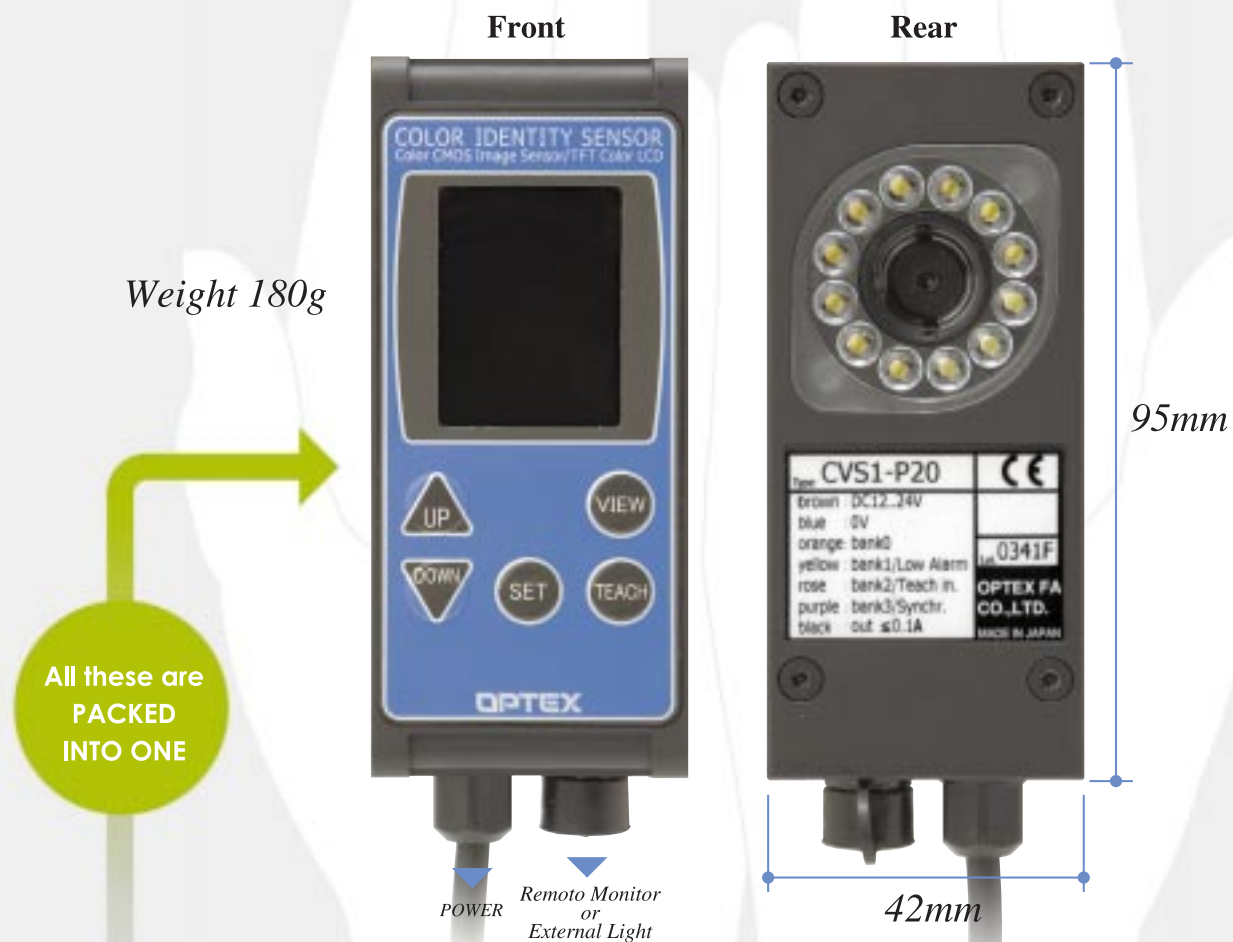
74534-01-0401



**Easy to set up and operate.**  
**Vision Sensing System is now simplified this way.**

World's first Color Vision Sensor under stand-alone mechanics consisting of Camera, Color monitor, Light and Controller.

Fine and accurate sensing is available by identifying and measuring area of specified colors with special CPU.



**It's innovation ,**  
**but what is "Color Identity Sensor, CVS1"?**

CVS1 memorizes area of colors of objects, and sort out the object that may have more (or less) pixels than the memorized level. Unlike conventional color sensors and scanners, therefore, CVS1 is accurate, tough and flexible to fluctuation of conveyor that the object is on.

**What CVS1 Color Identity Sensor is useful for?**

Any of colored material can be sorted out by colors itself. By identifying difference of those colors accurately by Optex FA's custom CPU it's possible to sort out materials between similar colors. This philosophy is useful to know, for instance, liquid level in the bottle that has been sweating job in setting up color sensors accurately. CVS1 Color Identity Sensor computes area of the specified color within its vision, by simply a teach-in way, and sorts out the bottle that may contain higher or lower level of liquid in the bottle. Conventional vision system fits to this application. But requires you to pay a lot of attention to setting, while CVS1 operates in a teach-in way.



**Simple Wiring**

Stand-alone system does not require confusing wiring. Just connect Power Cable to the main unit of CVS1.

It's what we call "installation". If you need external light to bright up objects for better vision, simply connect External Light CVS-LW1.

If you need to set up or monitor the object in remote, simply connect CVS-M1, a Remote Monitor unit that has remote control functions as well as vision.

- ① CVS-LW1 is possible to connect up to 3 sets to a main sensor.
- ② Remote monitor CVS-M1 is available up to 15 meter away using extension cable CVS-C3S, an extension cable of 3 meter that is connectable up to 4 pcs.
- ③ Remote monitor CVS-M1 itself has 3 meter cable.

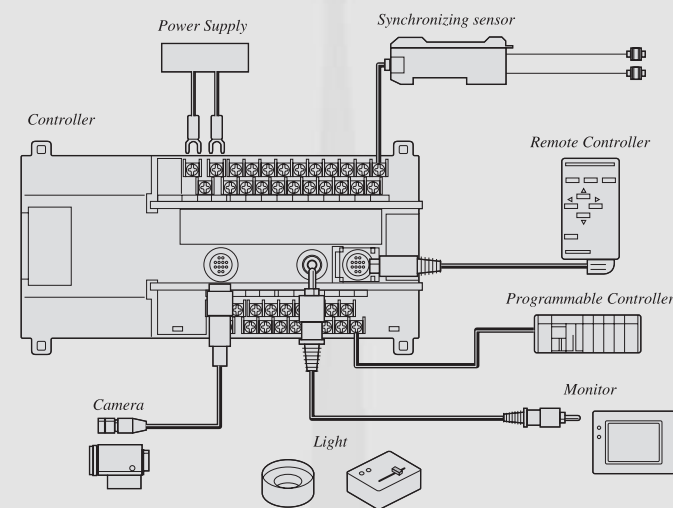


**Conventional system was...**

So called Vision sensing System consists of main camera, controller, monitor, power supply, synchronizing sensor and external lighting system to bright up the object. You used to pay a lot to this kind of high tech's but difficult system to handle.

Optex FA is now giving ultimate and easy solution useful for cost & time saving.

World's first stand-alone mechanics of CVS1 series is helpful, not only for cost saving but also for space saving and easy wiring.





**PACKED INTO ONE**

**Leading edge of CVS1 is meant in its lighting system implemented in main body.**

White LED brights up the object. Special CPU controls internal heat not to generate so much in itself, and protect the body from overheat. Full color CMOS with 330,000 pixels assures clear image given in the TFT color display of 1.5 inch QVGA logically capable of identifying 16,770,000 colors.

24 bit color processor gives color compensation against change of ambient illuminance. Conventional vision sensor system is accurate enough, but is easily influenced by fluctuation of conveyor and ambient light because of illuminance. Instead, CVS1 Color Identity Sensor computes color ratio of each pixel, to be strong to changing brightness of vision. Given same way, hardly influenced by shadows that is caused by lighting angle. (PATENT pending)

**Description in the medicine box**

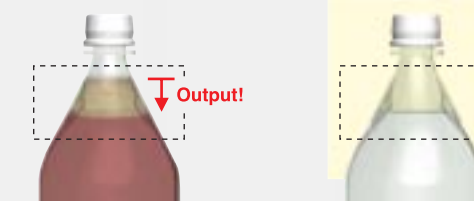


With conventional photosensors it has been impossible. Accurately defect and sort out the box without description. It does not matter between box and paper even in similarly white, as far as letters are printed on the description.

**Liquid level in the bottle**



CVS1 gives output as fast as 0.6 ~ 22 msec that is applicable to bottle liquid inspection. Regardless of colors of bottles and liquid, even such as white bubbled liquid like beer, CVS1 detects liquid level sensing color difference between bubble and liquid. Bottle material does not matter.



Set Teach-in area as given above. The liquid gives, for instance, 30% of total vision for memory. If the liquid level was lower or higher than that threshold, output comes.

Even clear water is possible to detect as far as a bright colored background is set behind the bottle. The bright background gives lens-effect and enables CVS1 to detect clear water.



Remark : This application may require an external light in adequate angle.

**Typical Applications**

**Labels (consumption limit date, etc) on box.**



To detect labels on box. Labels indicate consumption limit and production numbers for identification. Letters on the label sometimes fades, or the label itself may incline. CVS1 detects those problems accurately.

**To detect labels**



Teach-in the area tightly.

For example, white label with blue background. Set teach-in area as shown above. CVS1 memorizes, for instance, 47% for blue, 43% for white, and 10% for black (letters). If letters lack, CVS1 gives output sensing lack of that 10% of black object.

**To detect incline/decline of label**



Teach-in the left edge only.

Set teach-in area as shown above. For instance CVS1 memorizes 77% for blue, 23% for white. If the label inclines, memorized colors come unbalanced, and CVS1 gives output.

**To detect black letters on transparent sticker.**



Teach-in as transparent label is positioned.

For example, black letters on the label that is colored same as background. CVS1 memorizes 97% for blue and 3% for black letters. Once the letters come blurred the memory comes unbalanced and output signal is given.

**Ingredients placed on short cake**




If several ingredients are assorted on the cake that you must detect and count every stuff on the cake, that is actually impossible with conventional photosensor. Without annoying presetting of system, CVS1 gives you easy solution and detection even in high speed conveyor line.



Assorted fruits give color functions for memory. If the fruits is dispositioned, CVS1 detects sharply.

**Color LCD same as handy phone size.  
Only 5 buttons mean everything for operation.**

**Details of LCD Screen**



**Normal screen**

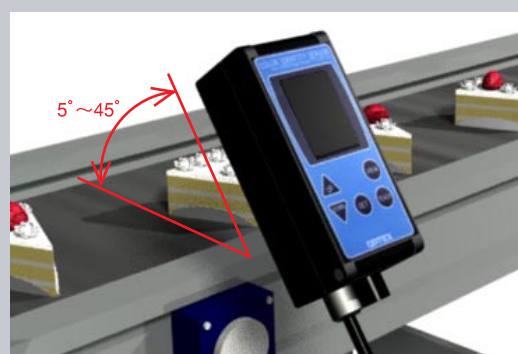
- Image screen
- Mode display
- Screen display status
- Bank number
- Detection color
- Area lower limit
- Detection color area
- Area upper limit
- Output condition
- Set item
- Set value
- Response time (Unit: 0.1 ms)

**Set Value Reference screen**

- UP button
- DOWN button
- SET button
- TEACH button
- VIEW button

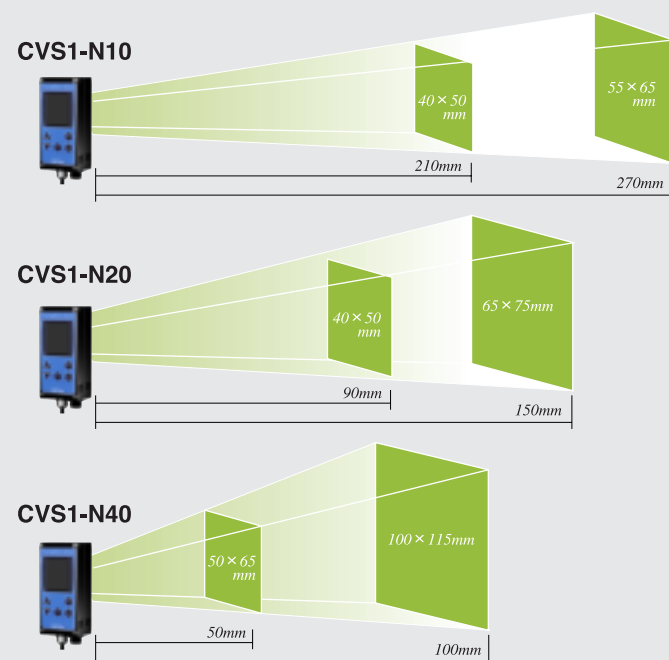
**When mount the sensor**

Mount the sensor leaned by 5°~45° so that lighting should not be reflected by a work. Detection may become successful by changing the angle to finds the best. Tilt the sensor by 10°~40° to avoid the mirror reflection when a work is shiny. Take caution so that external lighting (light from fluorescent light, etc.) is not reflected.



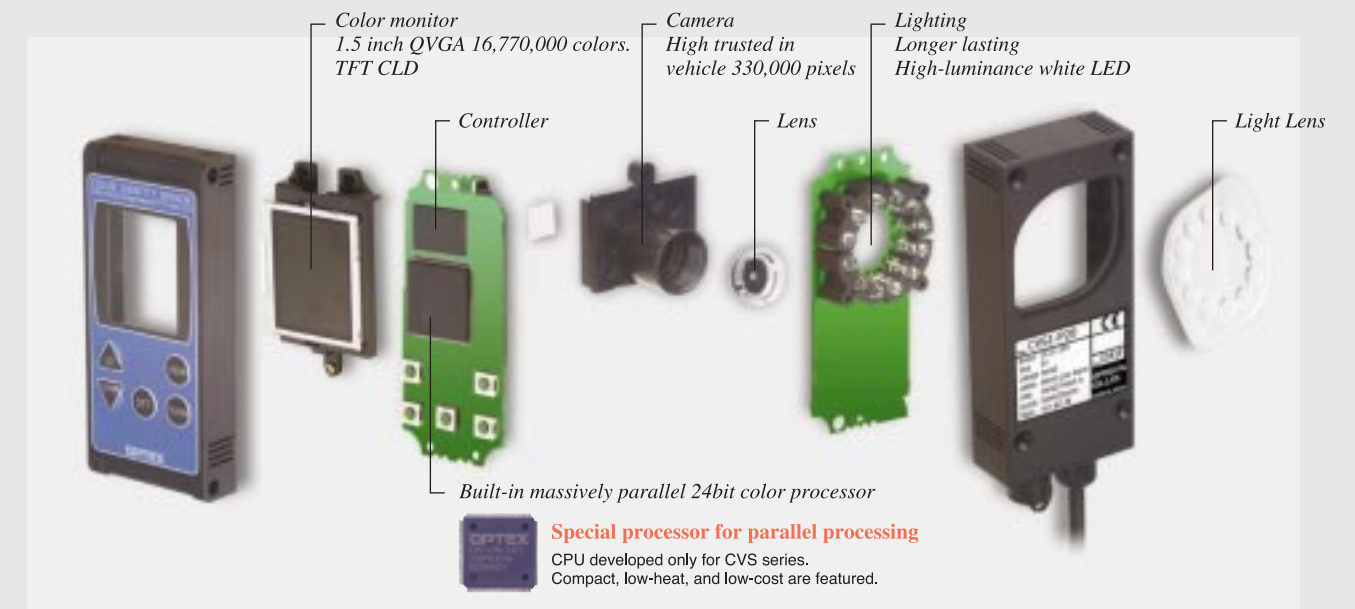
**Field of view**

The number implemented in the product type means angle to view. (f.i. CVS1-N20 views in 20 degree)

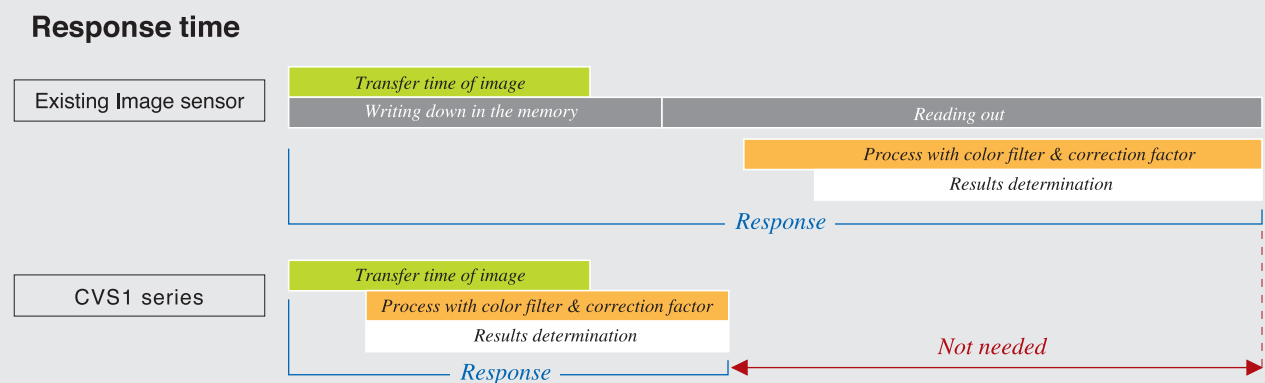


**CVS 1 gives its technical advantages in fast response and easy setting even under rough conditions of the surroundings.**

**CVS1, all-in-one shape**



**ASIC Principle of high-speed**



**ASIC Principle of In-operation adjustment**

Each process is independent and work parallel. Delay of output will not be triggered even though in-operation.

