


1 Switching to the Color Area Sensor Mode
 Select "1" in CVS1 setting.
 (Procedure→CVS2 manual page 48)
 Turn the power off and on.

The
 Select "0" in CVS1 setting to return to the pattern matching sensor mode.



Color area sensor mode (CVS1 setting: 1) Pattern matching sensor mode (CVS1 setting: 0)

Function	Setting range (Initial value)	Description
Color 1 margin [COLOR1]	0 to 25 (1)	Adjusts Color 1 margin percentage. Larger value means wider detection area.
Color 2 margin [COLOR2]	0 to 25 (1)	Adjusts Color 2 margin percentage. Larger value means wider detection area.
Communication setting [COMMEN]	0 to 5 (0)	Select Communication setting. 0: Off 1 to 5: On. Baud rates are 4800, 9600, 19200, 38400, 57600bps in order. Data length=8bit, no parity, stop bit=1bit. When the communication function is activated, external lighting and remote monitoring are deactivated.
Mode selection [CVS1]	0, 1 (0)	Selects CVS2 sensor mode. 0: Pattern matching sensor 1: Color area sensor After selecting, turn off and on to activate the setting.
Darkness correction rate [DARK CDP]	0 to 31 (27)	Selects the correction rate of color darkness. 0: Off 1 to 31: Max. (Amplifies black color and converts to other colors.) Select a larger value to detect slight difference in dark color, and a smaller value to detect the difference between white, gray, and black.
Image sensor gain [IMG GAIN]	0 to 63 (0)	Controls the gain of image sensor. Selecting a larger value increases the screen brightness but also noise level. Select a larger value to shorten the

4 Reading Sort Number

Judgment Output and AUX output

Three(3) sort numbers are read out using two(2) types of output. The outputs appear as follows starting the current number.

Bank No.	Control output (Black)	AUX output (Red/Black)
Current	ON	OFF
+ 1	OFF	ON
+ 2	ON	ON

The above combinations are repeated in order (for the

Communication function

RS232C communication is available by connecting the optional cable (CVS-C02) to the external connector (=CVS manual page 7). This communication function allows reading up to fifteen(15) sort numbers. ("255" is returned when sorting is not activated).

Bank number readout protocol

Command	Data	Checksum	Received by CVS2
53H	49H	63H	

Transmitted by CVS2 → Response [Data (Lower)] [Data (Upper)] [Checksum] [SUM]

Response [Data (Lower)] [Data (Upper)] [Checksum] [SUM] → On's complement of (66H+Sort number/Upper+Lower)

Received data error or checksum error

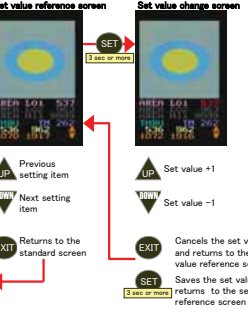
Response	Data (Lower)	Data (Upper)	Checksum	EAH
15H	00H	00H	00H	EAH

Note
 The response may delay by 3 seconds or more during external teaching.

Set Value Reference/Change Screen
 (See page 10 in this manual.)

Standard screen
 (See page 10 in this manual.)

Set value reference screen **Set value change screen**



UP: Previous setting item
 DOWN: Next setting item
 SET: Saves the set values and returns to the set value reference screen
 EXIT: Returns to the standard screen

UP: Set value +1
 DOWN: Set value -1
 SET: Saves the set values and returns to the set value reference screen
 EXIT: Cancels the set values and returns to the set value reference screen

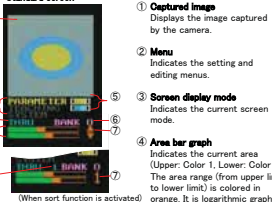
Masking
 (See page 14 in this manual.)

Teaching menu
 (See page 14 in this manual.)

Masking window
 SET: Saves the edited masking data and returns to the teaching menu.
 EXIT: Cancels the edited masking data and returns to the teaching menu.

UP: Performs the displayed option of the masking menu.
 SET: Selects the masking menu. (See page 16 in this manual.)
 EXIT: Returns to the standard screen.

2 Descriptions of LCD display
Standard screen



- 1 Captured image**
Displays the image captured by the camera.
- 2 Menu**
Indicates the setting and editing menus.
- 3 Screen display mode**
Indicates the current screen mode.
- 4 Area bar graph**
Indicates the current area (Upper: Color 1, Lower: Color 2). The area range (from upper limit to lower limit) is colored in orange. It is logarithmic graph.
- 5 Detection color**
Left: Darkest color, Right: Brightest color (Upper: Color 1, Lower: Color 2).
- 6 Bank number**
Indicates the selected bank number (0 to 14).
- 7 Output status and Sort number**
Orange: Output ON, Green: Output OFF
When sort function is activated, the sorted bank number is displayed.
- 8 Monitor bank number**
When sort function is activated, you can switch to another bank to monitor different color and area from the current bank (see page 12 in this manual).

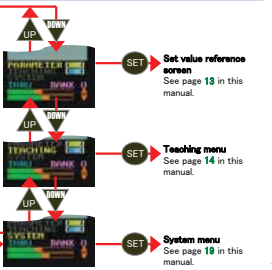
Function	Setting range (Initial value)	Description
Set value initialization [INITIAL]	0 to 15 (0)	You can initialize the set values, masking and brightness irregularity correction data. Select 0: High resolution (208×236) and 1: Low resolution (104×118). Press UP and DOWN to look all of the values.
LCD up/down [LCD VIEW]	0, 1 (0)	0: Normal display 1: Reverses the LCD display vertically. Select 1 when installing the unit upside-down.
Lighting ON/OFF [LIGHT ON]	0, 1 (1)	0: Internal lighting OFF. (External lighting remains on.) 1: Internal lighting ON.
OFF delay time [OFF DELAY]	0 to 5000 (0)	Stops output when the area judgment result is over the set time (unit: ms) and also out of the specified range.
ON delay time [ON DELAY]	0 to 5000 (0)	Starts output when the area judgment result is over the set time (unit: ms) and also within the specified range.
One-shot output [ONE SHOT]	0, 1 (0)	When set to 1, output starts by one-shot and remains on during OFF delay time. When OFF delay time is set at "0", output remains on continuously. Change the bank to stop output.
Area range [AREA RANG]	0 to 3 (0)	Select the condition to start output. 0: Color 1 and 2 are within the area range. 1: Color 1 and 2 are out of the area range. 2: Color 1 or 2 is within the area range. 3: Color 1 or 2 is out of the area range.

5 Operation and Display

The settings and procedures are basically common with CVS2 pattern matching sensor functions. Refer to CVS2 manual for operation examples.

- Changing set value → CVS2 manual page 48
- Color detection by teaching → CVS2 manual page 23
- Masking → CVS2 manual page 23
- Brightness irregularity correction → CVS2 manual page 46

Standard Screen Operation



UP: Set value reference screen (See page 13 in this manual.)
 DOWN: Teaching menu (See page 14 in this manual.)
 UP: System menu (See page 19 in this manual.)

Teaching Menu
 (See page 10 in this manual.)

Standard screen
 (See page 10 in this manual.)

Color 1 teaching
 (See page 18 in this manual.)

Delete the Color 1 setting.
 ("XX" appears. AREA LO1 and AREA HI1 turns to "0.")

Color 2 teaching
 (See page 18 in this manual.)

Delete the Color 2 setting.
 ("XX" appears. AREA LO2 and AREA HI2 turns to "0.")

Masking
 (See page 17 in this manual.)

Masking Menu

UP/DOWN: Masking window Up/Down
 Moves up/down the window.

UP/DOWN: Masking window Right/Left
 Moves the window to right/left.

UP/DOWN: Masking window vertical magnification/reduction
 Reduces the window vertically.

UP/DOWN: Masking window horizontal magnification/reduction
 Reduces the window horizontally.

UP/DOWN: Color margin percentage adjustment
 Increases color margin percentage.
 Reduces color margin percentage.

UP/DOWN: Mask/delete within color detection range
 Magnifies the window horizontally.
 Reduces the window horizontally.

UP/DOWN: Mask/delete outside color detection range
 Magnifies the window vertically.
 Reduces the window vertically.

UP/DOWN: Mask/delete outside masking window
 Magnifies the window horizontally.
 Reduces the window horizontally.

UP/DOWN: Mask/delete inside masking window
 Magnifies the window vertically.
 Reduces the window vertically.

UP/DOWN: Mask/delete result saving
 Saves the result and exits.
 CANCEL: Cancels the result and exits.

3 Color 1 area
 Upper: Lower area limit
 Lower: Current area
 Orange indicates that the current area is within the specified range, and Green indicates that the current area is out of the specified range.

Color 2 area
 Same as 3.

Response time
 Displays the response time from starting image capture to outputting by the unit of 0.1ms.

Communication status
 Indicates the transmitting/receiving status.
 0: Readout command is correctly received and response is transmitted.
 1: Set value access command is correctly received and response is transmitted.
 2: Data or checksum error in readout command.
 3: Data or checksum error in set value access command.
 4: Error command is received.

Function	Setting range (Initial value)	Description
Resolution & Capture area [RESOLUT]	0 to 2 (0)	Select the number of pixels and capture area taken out from the image sensor. 0: High resolution (208×236) 1: High speed (104×118) 2: Narrow area (208×236, x2 zoom)
Screen size [SCREEN]	0 to 3 (0)	Select the screen size taken out from the image sensor. 0: 208×236 1: 180×236 2: 112×236 3: 64×236
Shutter time [SHUTTER]	0 to 742 (100)	Select the shutter time (unit: ms). You cannot select the value larger than the image transfer time of the image sensor.
Sort bank number [SORTING]	0 to 14 (0)	Select the sort bank number. 0: Sorting Off 1 to 14: Sorts the bank numbers of set value.1. (Example) Current bank=5, Set value=2 Checks the colors and areas of the bank number 5, 6, and 7, and outputs the bank number that satisfies the output condition. DARK CDP, IMG GAIN, OUTSIDE SHUTTER, TEMPCOMP are processed using the current bank values. Set the same values in all the sort banks before teaching. Output reference chart→Page 9 in this manual

Changing the Screen Display Mode

Color 1
 Displays Color 1 only. All the other colors are displayed in purple.

Color 2
 Displays Color 2 only. All the other colors are displayed in purple.

Color 1+2
 Displays Color 1 and 2. All the other colors are displayed in purple.

Through
 Displays the captured image after color correction.

Live
 Displays the actual image before color correction.

Color 1/Color2 Teaching
 (See page 14 in this manual.)

SET: Saves the teaching results (color, area, color margin percentage, darkness correction factor, shutter speed, captured image) and returns to the teaching menu.
 EXIT: Cancels the teaching results and returns to the teaching menu.

Color detection window

The detected color in the color detection window
 *When a bright color and black color are in the detection window, the sensor detects black color. This allows detection of printing letters.

UP: Performs the displayed option of the color selection menu. (See page 16 in this manual.)
 VIE: Selects continuous capture or still image capture.

In Color 2 teaching, "TEACH 2" is displayed instead of "TEACH 1".
 The other displays/settings are common with Color 1 teaching.

System Menu
 (See page 10 in this manual.)

Brightness irregularity correction
 (See page 20 in this manual.)

PC communication
 Data saving and loading with PC

Holding captured image
 Holds the image captured at the moment the output changes.

UP/DOWN: Output changes
 SET: Returns to the standard screen.

3 Setting Options

Function	Setting range (Initial value)	Description
Color 1 area lower limit [AREA LO1]	0 to 9999 (1)	Selects the lower limit of Color 1 detection area.
Color 2 area lower limit [AREA LO2]	0 to 9999 (0)	Selects the lower limit of Color 2 detection area.
Color 1 area upper limit [AREA HI1]	0 to 9999 (0)	Selects the upper limit of Color 1 detection area. The set value "0" corresponds to "9999."
Color 2 area upper limit [AREA HI2]	0 to 9999 (0)	Selects the upper limit of Color 2 detection area. The set value "0" corresponds to "9999."
Bank selection [BANK]	0 to 16 (16)	Selects the bank selecting option. 0: Selects the set bank. (Bank selection 2 input is the external teaching input.) 1: Selects a bank by external input. (Bank selection 2 input is the external teaching input.) 2: Selects a bank by external input. (Bank selection 2 input is the external teaching input.)
Copy of bank settings [BANK COPY]	0 to 14 (0)	Copies the set values and masking display of the current bank to the destination bank. During copying, capture and judgment is interrupted. When the power is turned off, the setting returns to "0."

* The functions indicated in purple contain the set values for each bank.

Function	Setting range (Initial value)	Description
Synchronization input [SYNCINP]	0 to 4 (4)	Selects the synchronization input setting. When set to 0-3, the bank selection 3 input is assigned to the synchronization input. The capturing conditions are as follows. 0: While the synchronization input is Off 1: When the synchronization input is switched from On to Off 2: While the synchronization input is On 3: When the synchronization input is switched from Off to On 4: Captures images continuously
Teaching enable [TEACHEN]	0 to 2 (0)	Enables/disables teaching, masking, brightness irregularity correction, and PC communication. 0: Enables all of the functions. 1: Enables teaching (TEACH1, TEACH2) only. 2: Disables all of the functions.
Temperature compensation level [TEMPCOM]	0 to 50 (15)	Selects the temperature compensation level of the image sensor. Since the color set by teaching at low temperature may change at high temperature, this function compensates the color difference. The function is off when set at "0."
Color detection window [WINDOW]	0, 1 (0)	Specifies the position to display the color to teach when the external teaching is used. 0: Displays the color detection window in TEACH screen (excluding the system menu).

Note
 The value settings and their lock information are shared in both of pattern matching and color area sensor modes. When the sensor mode is switched, the lower/upper area limit values, position axis, and rotation correction axis may become incorrect, or the locked items may be shifted. When this happens, perform the setting or teaching again (for each

Changing the Monitor Bank Number

When sort function is activated, you can select another bank within the sorted banks and monitor its color and area.

Monitoring Bank 0
 Displays the color 1 and 2, and the area bar graph of Bank 0.

Monitoring Bank 1
 Displays the color 1 and 2, and the area bar graph of Bank 1.

Monitoring the next bank

Monitoring the further next bank

Changing the screen from the standard screen to another one will return the monitor bank number to the current bank number.

Color Selection Menu

SET: Color detection window Up/Down
 DOWN: Moves up the window.
 UP: Moves down the window.

SET: Color detection window Right/Left
 RIGHT: Moves the window to right.
 LEFT: Moves the window to left.

SET: Color detection window vertical magnification/reduction
 UP: Magnifies the window vertically.
 DOWN: Reduces the window vertically.

SET: Color detection window horizontal magnification/reduction
 UP: Magnifies the window horizontally.
 DOWN: Reduces the window horizontally.

SET: Color margin percentage adjustment
 UP: Increases color margin percentage.
 DOWN: Reduces color margin percentage.

SET: Darkness correction rate adjustment
 UP: Increases darkness correction rate.
 DOWN: Reduces darkness correction rate.

SET: Shutter time adjustment
 UP: Increases shutter time.
 DOWN: Shortens shutter time.

SET: Area upper/Lower limit
 UP: Sets the current area to the upper limit.
 DOWN: Sets the current area to the lower limit. (Press again to return to the initial value.)

SET: Teaching result saving
 UP: Saves the result and exits.
 DOWN: Cancels the result and exits.

Brightness Irregularity Correction
 (See page 10 in this manual.)

SET: Saves the brightness irregularity correction data and returns to the system menu.
 EXIT: Cancels the data and returns to the system menu.

UP/DOWN: Displays the optimum shutter time (unit: 0.1ms).
 Green: The optimum value is being calculated, or the shutter time has reached the upper limit value.
 Red: The optimum value is being calculated, or the shutter time has reached the upper limit value.

When using this function, capture the even, bright color (such as matte white paper). The shutter time of all the banks are overwritten at data saving.

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