OCR Sensor
(Optical Character Recognition)
Instruction Manual

CVS4 (White light source)

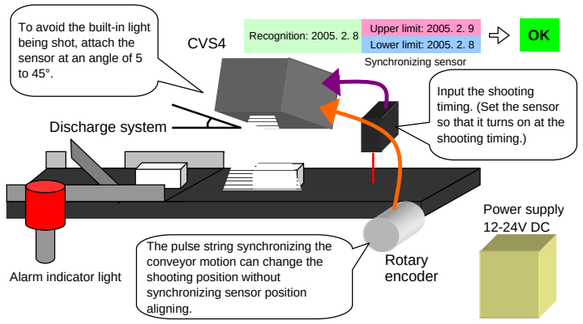
OPTEX FA

* Thank you for purchasing our OCR Sensor (Optical Character Recognition) character recognition sensor, CVS4 series.
* Carefully read this manual for proper operation before use.
* Keep this manual handy for future reference.
* This product is not designed as a safety device to protect human body.

1 Before use

What is CVS4 Series?

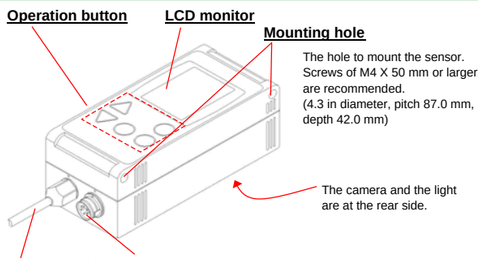
The CVS4 series converts the date and time such as an expiration date from the screen to the strings and output OK if they are within the upper and lower limit of setting date and time. The date and time are updated by the built-in calendar. In addition, the string of alphabetical and numerical characters can be identified.



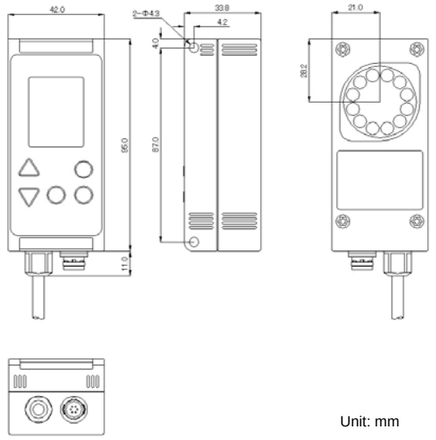
Specification

Model	CVS4-N20W / CVS4-P20W	CVS4-N21W / CVS4-P21W	CVS4-N23W / CVS4-P23W	CVS4-N23RW / CVS4-P23RW	CVS4-N40W / CVS4-P40W
Angle of view	20°				40°
Shooting distance, range	Refer to page 3.				
Light source	White LED (12 pcs)				
Brightness	Approx. 108 cd	Approx. 54 cd	Approx. 108 cd		Approx.54cd
Image sensor	330,000 pixels, CMOS black and white image sensor				
Supply voltage	12 to 24 V DC ± 10 %				
Power consumption	Max. 140 mA / 24 V DC				
Resolution	512 X 244		244 X 512		512 X 244
Lifetime of light source	Approx. 100,000 hours* (In normal temperature and humidity. Brightness level down by 1/2 of the initial level)				
Built-in clock accuracy	Monthly difference: -45 sec to + 1min 15 sec (Representative value)				
Built-in clock Backup	Primary battery: 5 years with the power OFF (Representative value) Supercapacitor: 7.8 years (Representative value with 3 days of backup time)				
Response time	20 characters of the date in 2 rows Approx. 23 to 48 ms (Rotation correction 0 to ±10°)				
Output signal	NPN/PNP Open collector output: 2, max.100 mA, Residual voltage 1.0 V or less, OK/NG output, External light control				
Input signal	Bank selection, String addition, External teaching, Synchronism, Pulse train				
Input filter time	12 ms (max): Bank selection, String addition, External teaching input, 48 µs (turn on, max), 450 µs (turn off): Synchronism, Pulse train input				
Operation temperature/humidity	0 to 40°C (No condensation), 35 to 85 %RH				
Storage temperature/humidity	-20 to 70°C, 25 to 95 %RH				
Vibration and impact durability	10 to 55 Hz Amplitude 1.5 mm, 5 G (10 times)				
Housing material	ABS / Acrylic / Polycarbonate				
Protection class	IP67				
Weight	Approx. 200 g				
Recognized number of characters, rows	60 characters (All rows) / 6 rows				
Recognized number of dates, times, and strings	4 in total: Each 2 for the date and the time, below 4 for the string (total 22 characters)				
User-defined dictionary	56 characters (Transferred from the PC)				
Date and time in letters	Month: 1 chr., Date: 2 chr., Hour: 1 chr., Minute: 1 chr. Converting to the above-mentioned alphabetical and numeric characters is available. (Transferred from the PC)				
Communication	RS232C (TTL Level) 4800 to 115200 bps				

Part Names and Functions

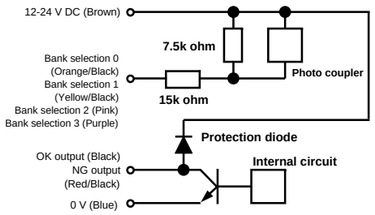


Dimension Drawing



Unit: mm

I/O Circuit



* Following two points are different in PNP:
- The polarities of transistor and diode are reverse.
- 12-24 V DC (Brown) and 0 V (Blue) are switched.

Bank Selection Table

Parameter (1.Parameter)				Line color				
Bank	Synchron	String +	SyncPuls	Orange/Black	Yellow/Black	Pink	Purple	Selectable range
BKIN	CONT	OFF	Others	Bank selection 0	Bank slctn1	Bank selection 2 ***1	Bank selection 3	0 to15
			ON					
		ON, SCLR	Others		String +			0, 1, 4, 5, 8, 9, 12, 13
			ON					
	UP, HIGH, DOWN, LOW	OFF	Others		Bank slctn1		Synchro-nizing input	0 to 7
			ON	Pulse train				0, 2, 4, 6
		ON, SCLR	Others	Bank slctn 0	String +			0, 1, 4, 5
			ON	Pulse train				0, 4
TCH	CONT	OFF	Others	Bank selection 0	Bank slctn1	External Teaching ***1	Bank selection 3	0 to 3, 8 to 11
			ON					
		ON, SCLR	Others		String +			0, 1, 8, 9
			ON					
	UP, HIGH, DOWN, LOW	OFF	Others		Bank slctn1		Synchro-nizing input	0 to 3
			ON	Pulse train				0, 2
		ON, SCLR	Others	Bank slctn 0	String +			0, 1
			ON	Pulse train				0
0 to 15, COMM	CONT	OFF	Others	Invalid	Invalid		Invalid	0 to 15 (Switches with the setting value) COMM: Sets with communica-tion
			ON					
		ON, SCLR	Others		String +			
			ON					
	UP, HIGH, DOWN, LOW	OFF	Others		Invalid		Synchro-nizing input	
			ON	Pulse train				
		ON, SCLR	Others	Invalid	String +			
			ON	Pulse train				

***1 In the case setting value of String+ is SET0, the rose wire has function that sets number symbols in B.String to "0". And selecting bank number 4 to 7 and 12 to 15 in unavailable.

Bank Number	Line Color			
	Orange/Black	Yellow/Black	Pink	Purple
0	OFF	OFF	OFF	OFF
1	ON			
2	OFF	ON		
3	ON			
4	OFF	OFF	ON	
5	ON			
6	OFF	ON		
7	ON			
8	OFF	OFF	OFF	ON
9	ON			
10	OFF	ON		
11	ON			
12	OFF	OFF	ON	
13	ON			
14	OFF	ON		
15	ON			

External teaching input
Performs 7.Semiauto at rising. (Possible to specify 6.AutoTeach)

String + input
The last digit of string registered at rising will be the character of the next ASCII code. However, the numerical characters repeat from 0 to 9 and the alphabetical characters repeat from A to Z. When 9 turns to 0, or Z to A, the next left character will be the next ASCII code. (Clears all character string when String+ is SCLR.)

Bank selection input
The duration from input to the actual switch is approx. 30 ms, but it takes approx. 100 ms to accept the next shooting.

Pulse train input
Counts at rising of input and starts shooting when the value reaches SyncDely value or more. The count is reset at rising of synchronizing input (at falling when Synchron=DOWN).

Setup Flow

(1) Select the model according to the shooting range and the character size.

	Parameter Wide	Field of View (mm× mm)	Focal distance (mm)	Available character width (mm)	Available character height (mm)
CVS4-N40W	OFF	53×25 to 115×53	40 to 100	2.8 to 44	2.8 to 43
	FAST/FST2				5.6 to 43
CVS4-N20W	OFF	53×25 to 79×38	90 to 150	2.8 to 30	2.8 to 31
	FAST/FST2				5.6 to 31
	ON	53×50 to 79×76			5.6 to 62
CVS4-N23W	OFF	30×15	50 ± 6	1.0 to 11	1.1 to 12
	FAST/FST2				2.2 to 12
	ON	30×30			2.2 to 24
CVS4-N21W	OFF	21×10	35 ± 4	0.75 to 8.2	0.75 to 8.2
	FAST/FST2				1.5 to 8.2
	ON	21×20			1.5 to 16

(2) Connect the power supply and I/O.

Line color	Name
Blown	Power supply 12-24 V DC
Blue	Power supply 0 V
Orange/Black	Bank selection 0 input / Pulse train input (at SyncPuls = ON)
Yellow/Black	Bank selection 1 input / String +input (at String+ = ON)
Pink	Bank selection 2 input / External teaching input (at other than Bank = BKIN)
Purple	Bank selection 3 input / Synchronizing input (at other than Synchron = CONT)
Black	OK output / Light control output (at LightOut = OK or OK-P)
Red/Black	NG output / Light control output (at LightOut = NG or NG-P)

(3) Enter 0.Setup Flow in main menu.

Settings and functions are listed in the order of first setup, therefore anyone can setup easily. At first please initialize all settings. (See page 9)

Item	How to setup / Explanation	Page
Orienttn	Specify the shooting orientation to indicate correct orientation of characters on CVS4 display. NORM REVS MIRR RVMR CVS4-N20, -N21, -N23, -N40 CVS4-P20, -P21, -P23, -P40 NORM REVS MIRR RVMR CVS4-N23R CVS4-P23R Taken image	9
Wide	Specify the shooting range double height to ON, reduces vertical resolution to decrease response time to FAST, and absorbs dispersion of object position to FST2.	10
Shading	Corrects the threshold of characters and background on the left and right side of taken image.	10
Surface	Specify the surface condition of the object. If white characters on the dark background, set to BLAK.	10
Trapezid	Specify the angle difference between the CVS4 main unit and the object. (Unit : degree) Setting value : 0 to +45 Setting value : 0 to -45	10
ShtrLimt	Specify the upper limit of fixing shutter time at teaching. The formula is below. (Unit : 0.1ms) **Shutter time upper limit = 10 × desired line width (mm) ÷ the object moving speed (m/s)**	10
Synchron	Specify the synchronizing input. Set the setting value to UP to shoot when the input turns on from OFF. Set to CONT for desktop test.	10
DateFrmt	Specify the order of date. For example, if the date format such as 28.2.2005: Set to the setting value to DMY.	11
Auto Tch	Performs 6.Auto Teach for automatic teaching.	8
Format 1 to Format 4	Please make sure the format of date and time.	11
- OK? -	If OK, and you're done. If not, specify above settings Format to desired value and adjust following parameters to take an image of characters clearly.	

Specify the format, adjust taking an image, and perform semi auto teaching.

LightPwr	When the screen is dark due to short shutter time, set to HIGH to double the built-in light source brightness	10
Shutter	When the object blurs the shot images, decrease shutter time setting value.	10
Luster	Increase the setting value to avoid the luster effect.	10
ThreshId	If stain or luster is detected, increase the setting value. If the slight change of brightness as the character, decrease the setting value	10
DotCheck	Set to OFF when recognized date does not include dots between year, month, and date.	12
Semiauto	Performs 7.Semiauto for semi auto teaching.	8
String	Performs B.String menu for confirming/editing character string.	7
- OK? -	If OK, and you're done. If not, adjust another parameters.	

(Continued on the page 4)

(From the page 3)

Adjust character thickness and size to setup manually.

Bold	Increase for dot and thin characters. Decrease for bold characters.	10
Rotate	Specify the range of search for the object rotation. (Unit : 0.94 degree)	10
SlantOfs	Specify the center of character slant angle. (Unit : degree)	10
Slant	Adjust the range of search for the character slant correction. (Unit : 0.85 degree)	10
CharWdth	Specify the typical character width such as "0" and "2". (Unit : Pixel) Set the character size references from the scale on screen	12
CharNarw	Specify the minimum character width to detect characters such as "." and "1". (Unit : Pixel)	12
Date Tch	Saves the number of days/minutes subtracting the current date from the recognized date/time. When STRG is set in any of Format 1 to 4, saves the existing characters.	11
- END -	If OK, and you're done.	

Scale per approx. 50 pixels.
In this case, character width will be approx. 30 pixels.

To Shoot Moving Object

Rolling shutter interference

CVS4-N20, -N21, -N23, -N40
CVS4-P20, -P21, -P23, -P40

CVS4-N23R, -P23R

Moving direction of the object

The character height becomes lower than the actual.
A 05. 4. 23 → A 05. 4. 23
B 05. 4. 27 → B 05. 4. 27

The character height becomes higher than the actual.
A 05. 4. 23 → A 05. 4. 23
B 05. 4. 27 → B 05. 4. 27

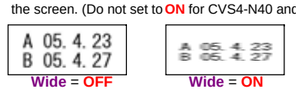
The characters slant down to the left.
A 05. 4. 23 → A 05. 4. 23
B 05. 4. 27 → B 05. 4. 27

The characters slant down to the right.
A 05. 4. 23 → A 05. 4. 23
B 05. 4. 27 → B 05. 4. 27

Keep the characters within the shooting range when their forms are modified. Increase the Slant value (the setting value in 8. Adj Paramtr) when the characters slant. The optimal value is automatically saved just by performing the teaching. To use the fixed value, turn ON or C+RS FixRtSlt (in A.ExpertPrmtr).

Expansion of shooting range

Turning ON Wide (the setting value in 1.Parameter) vertically doubles the shooting range of the screen. (Do not set to ON for CVS4-N40 and -P40.)



Decrease the influence of rolling shutter

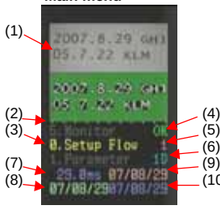
Turning FAST Wide (the setting value in 1.Parameter) vertically reduces the resolution to half. The image transferring time and the slant down angle will be reduced to half.

Absorbs dispersion of the object position

Turning FST2 Wide (the setting value in 1.Parameter) vertically reduces the resolution to half and takes images 2 times in one trigger input. The shooting interval is approx. 13.3 ms. Outputs OK signal if any one of the judgments of 2 images.
Also turning REPT SyncPuls (the setting value in 1.Parameter) takes images repeatedly until judgment is OK. Outputs NG signal if takes the timeout time that is specified SyncDely setting. (unit : 0.1ms)

2 Details and Operation of LCD

Main menu



(1) Shot screen: Pressing VIEW button to switch the monitor display mode. On "C" screen mode, background green color means OK judgment, red means NG, and yellow means while teaching.

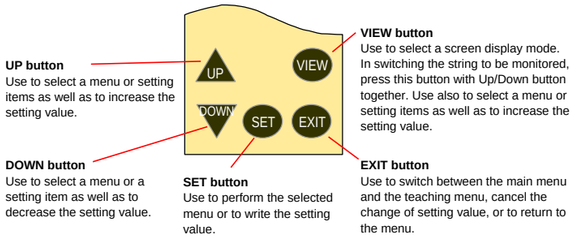
(2) Scale per approx. each 50 pixels: Use as a guide to adjust the character width.

(3) Menu display: The selected item is displayed in yellow.

(4) Judgment result:
OK: Date and time are within the upper and lower limits. The strings are identified.
NG: Date and time are out of the upper and lower limits, or the strings are not identified.
ER: Backup error of the calendar timer. (It disappears by resetting SECOND in 4.Calendar in the menu.)

(5) Current bank number (0 to 15)
(6) Displayed date/time items:
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 synchronizing input to judgment output)
(8) Recognized date/time
(9) Upper limit of date/time
(10) Lower limit of date/time



UP button
Use to select a menu or setting items as well as to increase the setting value.

VIEW button
Use to select a screen display mode. In switching the string to be monitored, press this button with Up/Down button together. Use also to select a menu or setting items as well as to increase the setting value.

DOWN button
Use to select a menu or a setting item as well as to decrease the setting value.

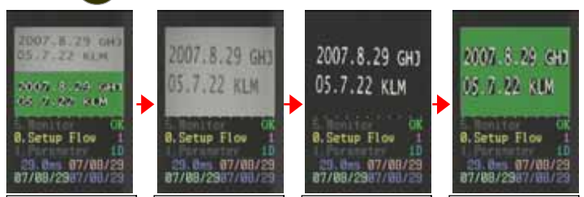
SET button
Use to perform the selected menu or to write the setting value.

EXIT button
Use to switch between the main menu and the teaching menu, cancel the change of setting value, or to return to the menu.

DOWN + SET — Press >3sec. simultaneously
Locks editing all parameters and disables teach-in, editing character string and calendar. (Locked) Press these button on main menu or teaching menu.

UP + SET — Press >3sec. simultaneously
Cancels the lock. Press on 9.Date/Time, releases lock only parameter of 1-Date+ and 2-Date+.

Pressing VIEW to select the monitor display.



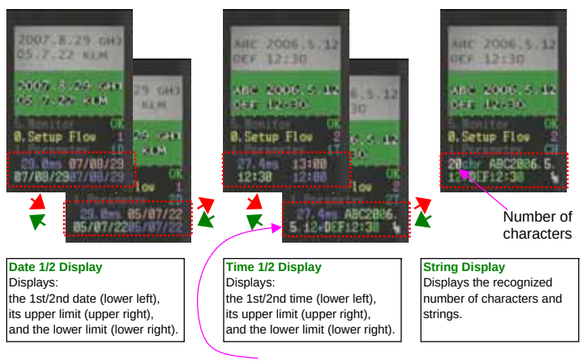
DC screen
Displays both of the live screen and the Cut-out screen.

D screen
Displays the live screen.

2 screen
Displays the differential screen.

C screen
Displays the Cut-out screen.

Pressing UP or DOWN with VIEW switches the recognized string display.



Date 1/2 Display
Displays:
the 1st/2nd date (lower left),
its upper limit (upper right),
and the lower limit (lower right).

Time 1/2 Display
Displays:
the 1st/2nd time (lower left),
its upper limit (upper right),
and the lower limit (lower right).

String Display
Displays the recognized number of characters and strings.

* When no date or time is specified, the string is displayed. The character color shows the identical rate with the dictionary. The character turns to ? when the difference exceeds the CharMrgn setting value.

Menu Configuration

Main menu

0.Setup Flow
Indicates settings / functions in order for installation.
1.Parameter
The setting value for inputs and outputs.
2.Teaching
Moves to the teaching menu.
3.View NG Log
Displays the screen or the recognized string at the moment that the OK judgment turns to NG.
4.Calendar
Refers or sets the current date and time. Set to the Western calendar for leap year adjustment.
5.Monitor
Displays the block separation result of characters or the processing time.

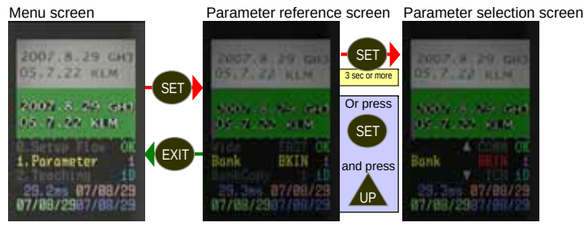
EXIT

Teaching menu

2.Teaching

6.Auto Teach
Automatically recognizes date/time from the shutter time to the upper and lower setting of the date.
7.Semiauto
Specifies the format of date, time and string to perform teaching in the condition that the characters have already been displayed.
8.Adj Paramtr
The setting value such as the shutter time, edge threshold, correction of rotation, slant, and trapezoid, and bold display to correctly extract character parts.
9.Date/Time
The setting value regarding to dates such as the upper/lower limit and the format of date and time.
A.ExpertPrmtr
The setting value for special cases to restrict the character size or search range, set the dictionary, and retry.
B.String
Refers or sets the string to be verified.

Operation of Menu, Parameter Reference, Selection Screen



UP — To the previous menu
DOWN — To the next menu
SET — To the selected menu
EXIT — Selection between the main menu and the teaching

UP — To the previous setting value
DOWN — To the next setting value

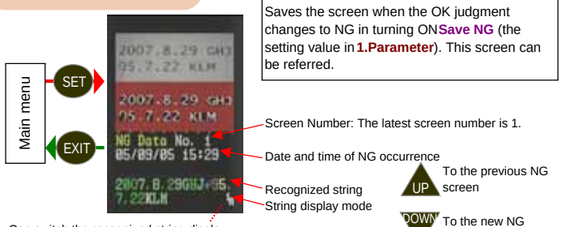
UP — The setting value +1
DOWN — The setting value -1

EXIT — Cancels and returns to the setting value reference screen.
SET (3 sec. or more) — Saves and returns to the setting value reference screen.
Or press SET and press UP

Function Detail of Each Menu

3.View NG Log

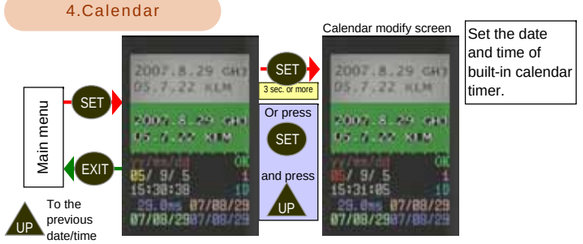
Saves the screen when the OK judgment changes to NG in turning ON Save NG (the setting value in 1.Parameter). This screen can be referred.



The character with smaller difference with the dictionary in the numerical and alphabetical characters. → SET → The result compared only with the numerical and symbol dictionary. → SET → The result compared only with the alphabetical dictionary.

- Up to 30 pages can be saved. When exceeding 30 pages, the oldest data is overwritten.
- During NG screen reference, the NG screen is not saved even judged as NG. Automatically returns to the main menu when there is no switch operation for approx. 1 minute.

4.Calendar



Set the date and time of built-in calendar timer.

UP — To the previous date/time
DOWN — To the next date/time

EXIT — Cancels and returns to the reference screen.
SET (3 sec. or more) — Saves and returns to the reference screen.
Or press SET and press UP

UP — The date/time +1
DOWN — The date/time -1

Select the Western calendar for leap year adjustment.

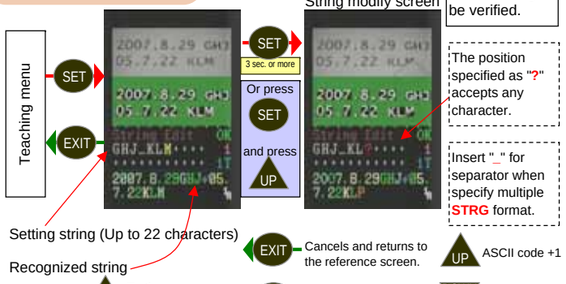
5.Monitor

Block separation of cut-off characters by 7 x 7

The character with smaller difference with the dictionary in the numerical and alphabetical characters → SET → The result compared only with the numerical and symbol dictionary → SET → The result compared only with the alphabetical dictionary

Check the recognition result for correct block separation.

B.String



Set the string to be verified.

The position specified as "?" accepts any character.

Insert "_" for separator when specify multiple STRG format.

Setting string (Up to 22 characters)
Recognized string

UP — To the previous character
DOWN — To the next character

EXIT — Cancels and returns to the reference screen.
SET (3 sec. or more) — Saves and returns to the reference screen.
Or press SET and press UP

UP — ASCII code +1
DOWN — ASCII code -1

Hold down VIEW and press UP — Switches the strings to be recognized: Character with high identical rate → Numeric only → Alphabet only

Hold down VIEW and press DOWN — Switches the strings to be recognized: Alphabet only → Numeric only → Character with high identical rate

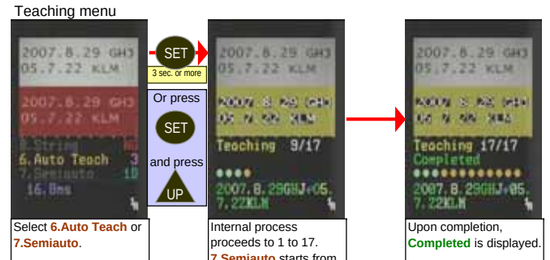
3 Teaching

Teaching type

6.Auto Teach
Performs teaching including shutter time, thresholds of characters and backgrounds, and the surface condition of object. Four (4) shootings are given before teaching completes. Automatically recognizes the format of date and time (Except for some formats).

7.Semiauto
Imports necessary information such as character size, fixing shutter time for recognition. Teaching completes without additional shooting in the condition that the characters have already been shot on the screen. When the date and time formats have already been set with the setting value Format 1 to 4 in 8.Adj Paramtr, these formats are used in priority.

Teaching menu



Select 6.Auto Teach or 7.Semiauto.

Internal process proceeds to 1 to 17. 7.Semiauto starts from 4.

Upon completion, Completed is displayed.

Ending messages

Completed	Successfully completed.
String not found	No character was detected. The setting value returns to the original one. For correct display, adjust the setting values of 8.Adj Paramtr (Shutter, ShtrLimt, Surface, ThreshId) before performing 7.Semiauto.
Format not found	The format of date and time was not found. The settings for the shutter time or the character size are saved. Specify Format 1 to 4 in 9.Date/TIme before performing 7.Semiauto.
Date overflow	The recognized date exceeds 5000 days from today. The wrong date might have been recognized. The setting such as the shutter time or the character size are saved. Specify Format1 to 4. DateFrmt, and YearOfst in 9.Date/Time before performing 7.Semiauto.
Date underflow	The recognized date exceeds 999 days before today. The wrong date might have been recognized. The setting such as the shutter time or the character size are savec

Setting value available only in 6.Auto Teach

Format 1 to 4	**String format** Searches the format of date and time among the recognized strings. Does not search H:M, 2YM, STRG, etc. The setting value is overwritten.
LightPwr	**Built-in light power** Select HIGH when Synchron is other than CONT, and the required shutter time exceeds the upper limit (ShtrLimt).
Luster	**Luster cancel** Saturates the object surface with much luster by lighting to control the luster interference.
Shutter	**Shutter time** Calculates and sets the optimal shutter time.
Surface	**Object surface** Rewrites the setting to WHIT only when the surface is obviously white.
ThreshId	**Characters/Background threshold** Calculates and sets the optimal threshold.
DotCheck	**Dot Check** Rewrites the setting to ON. If any format was not found, rewrites the setting to OFF and searches again.

Setting value set in 7.Semiauto and 6.Auto Teach

Bold	**Bold display** Displays the size -2 to +8 in order in bold and sets the value with minimum difference from the dictionary.
Format 1 to 4	**String format** Checks for the format with preset value. Finds optimal formats from the start to rewrite when the setting value of Format 1 is ---.
Rotate	**Rotation search angle** Rewrites the setting value added 1 to the rotating angle in teaching. Perform teaching when it rotates most. **1
Slant	**Range of character slant correction** Rewrites the setting value to half of the slant angle in teaching. Perform teaching when it slants most. **1
SlantOfs	**Offset angle of character slant correction** Rewrites the setting value to the slant angle in teaching. Perform teaching when it slants most. **1
1-Date+, 2-Date+	**Date additional value** Saves the number of days subtracting the current date from the recognized date.
1-Date±, 2-Date±	**Date tolerance** Rewrites the date tolerance to 3 when the day unsaved with 4YM (only the original tolerance is 0 when 7.Semiauto). However, overwrites the date tolerance to 0 when the recognized date is today (without 7.Semiauto). Rewrites the date tolerance to 0 when the day saved with 4YMD and the original tolerance is 3 in 6.AutoTeach.
1-Time+, 2-Time+	**Time additional value** Saves the number of minutes subtracting the current time from the recognized time.
CharHght	**Character height** Saves the 72 % value of typical character height. Does not cut-out characters whose height is equal to this height or less. The low characters such as "-" or "." are separated into blocks with the height maintained. **2
CharNarw	**Minimum character narrowness** Saves the eighth value of typical character width. Does not cut-out characters whose width is less than the above-mentioned width. **2
CharWdth	**Character width** Saves the 90 % value of typical character width. Separates narrow width characters such as "1" or "." into blocks, maintaining the width. As for characters with double width or more, separates them into two. **2
String to be compared	When STRG is set in any of Format 1 to 4, saves the existing characters. Maximum characters to save can be modified with the setting value Max Strg, and the maximum rows to save can be modified with the setting value StrgLine.

**1 Does not rewrite setting value when performaing 7.Semiauto when the setting value of FixRtSlt is ON or C+RS.
**2 Same as **1, when the setting value of FixRtSlt is CHAR or C+RS.

4 Settings

Automatically set Items in Teaching (**6.Auto Teach**, **7.Semiauto**)
Automatically set items in Teaching (**6.Auto Teach**)

LCD display
LCD display
The yellow setting items are common to all banks.
The purple setting items depend on each bank.

1.Parameter

Function LCD display	Setting range (Default)	Description
Bank Specification **Bank**	0 to 15, TCH, BKIN, COMM (BKIN)	Specifies how to select the bank number selection. **0** to **15**: Selects the set bank. **TCH**: Selects the bank with the bank selection 0, 1, and 3 inputs. **BKIN**: Selects the bank with the bank selection 0 to 3 input. **COMM**: Selects the bank with communication. The bank number set with communication returns 0 by turning off the power supply. (*The bank selection 2 input turns to the external teaching input other than with BKIN.)
Bank Copy **BankCopy**	0 to 15 (0)	Copies the current bank setting value and the string to the bank of set copy source bank number. The setting value becomes **0** when the power source is turned off.
Communication setting **Communic**	OFF, 4.8k, 9.6k, 19k2, 38k4, 57k6, 115k (57k6)	Sets the communication function. **OFF**: Disables communication function. Set when using the external light (CVS-LW1,-LU1). **4.8k** to **115k**: Uses the communication function. The baud rate order is 4800, 9600, 19200, 38400, 57600, 115200 bps. Data length without parity 8 bit and 1 stop bit. The external light or the remote monitor cannot be used.
Initialization **Initialz**	----, EXEC (----)	Saving the setting value as **EXEC** initializes all setting values and strings.
Built-in light ON/OFF **Light**	OFF, ON (ON)	Controls the built-in light. Turn it OFF and use the external light when shooting transparent bottles as it is difficult to shoot with the built-in light. **OFF** : Built-in light=OFF **ON** : Built-in light=ON
External light control signal **LightOut**	--, NG, OK, NG-P, OK-P (--)	**--**: Uses the red and black lines as NG output. **NG**: NG output (red/black line) turns OFF in synchronization with shooting. Use this when controlling commercial lights. OK output (black line) turns ON as usual when it is OK. **OK**: OK output (black line) turns OFF in synchronization with shooting. NG output (red/black line) turns ON as usual when it is NG. **NG-P** : NG output (red/black line) turns ON in synchronization with shooting. **OK-P** : OK output (black line) turns ON in synchronization with shooting.
NG Delay **NG Delay**	0 -255 (0)	Outputs NG only when NG judgment continuously exceeds the specified counts. However, if there is no characters of specified formats, outputs NG immediately. Even with no NG output, NG is displayed on the screen and the NG screen is saved.
Off Delay **OffDelay**	0 to 5000 (0)	Delays OK/NG output turning OFF. Turns OFF when the judgment result continuously maintains the off condition for the setting time (ms) or longer. (OK and NG outputs timer work separately.)
On Delay **On Delay**	0 to 5000 (0)	Delays OK/NG output turning ON. Turns ON when the judgment result continuously maintains the on condition for the setting time (ms) or longer.
One shot /Output holding **One-shot**	OFF, ON (OFF)	When setting to **ON**, keeps the output ON by the off delay time since the output turns ON. When the off delay time is 0, holds the output ON. To turn OFF the output, switch the bank. This is valid in the condition other than **Synchron**=CONT.
Shooting orientation **Orienttn**	NORM, REVS, MIRR, RVMR (NORM)	Switches the shooting orientation. **NORM**: Takes images without rotating and mirroring. (CVS4-XX RW rotates to the left by 90°.) **REVS**: Takes images with rotating 180°. **MIRR** : Takes images with mirroring right and left. **RVMR** : Takes images with mirroring up and down.
Output synchronous delay count **OutSynDl**	0 to 15 (0)	Delays OK/NG output timing by counting synchronizing input. Available on the parameter **One-shot** is 1 and **Synchron** is UP or DOWN. In the case of reject process is after measuring process, be able to use the NG output for rejecting signal.
Save NG screen **Save NG**	OFF, ON (OFF)	Saves the screen in which OK judgment turns to NG up to 30 screens in the built-in memory. The saved items are the contents of D and C screens, date and time of occurrence, and recognized strings. The screen is not saved when the power is cut while saving.
String additional input **String +**	OFF, ON, SET0, SCLR (OFF)	**OFF**: Uses the yellow and black lines as a bank selection 1 input. **ON**: Uses the yellow and black lines as a string additional input. The characters registered in **B.String** is counted up. At rising, changes the rightmost digit to the next character. The numerical part turns to **0** from **9** and the alphabetical character turns to **A** from **Z** accordingly. By turning off the power supply or switching the bank returns to the previous strings. (Example) The registered characters of **B.String**: **AB0123** It turns to **AB0124**, **AB0125**, ---, **AB0129**, **AB0130**, **AB0131**, --- at rising of the yellow/black lines. **SET0** : Uses the yellow and black lines as same as value is ON. The rising edge of the rose wire sets "**0**" to number symbols in **B.String**. Character string will be save to memory. **SCLR** : Uses the yellow and black lines as a string clear input. Character string will be save to memory.

Synchronizing input delay coefficient **SyncDely**	0 to 8000 (0)	Calculates the time from the synchronizing input to the actual shooting based on the cycle (Max. 4.19 sec) of synchronizing input. The shooting position remains stable even with the object speed changed, the stability deteriorates with the speed increased or decreased. The maximum delay time is 0.52 sec. Setting value = 8192 × delay time ÷ cycle width of the synchronizing input * Delay time will be the number of pulse count when the setting value of **SyncPuls** is ON, and calculated the setting value of **SyncDely** × 64µs when the setting value of **SyncPuls** is TIME and **SyncDely** × 256µs when it is TIM4.
Synchronizing pulse input **SyncPuls**	OFF, ON, TIME, TIM4, REPT (OFF)	**OFF**: Shoots when after waiting the time calculated by **SyncDely** formula. **ON**: Shoots when the rising count of bank selection 0 input reaches the **SyncDely** setting value from the synchronizing input rising (at **Synchron**=UP). Inputs the pulse string of encoder. **TIME**: Shoots when after waiting for the setting value of **SyncDely** × 64(µs) **TIM4** : Works same as TIME, but unit is **SyncDely** × 256(µs) . **REPT** : Takes images repeatedly until judgment is OK. Outputs NG signal if takes the timeout time that is specified **SyncDely** setting. (unit : 0.1ms)
Synchronizing input **Synchron**	LOW, DOWN, HIGH, UP, CONT (CONT)	Sets the synchronizing input. When setting other than CONT, the bank selection 3 input becomes the synchronizing input. The followings are the shooting conditions: **LOW**: Shoots while the synchronizing input is OFF. **DOWN**: Shoots when the synchronizing input turns off from ON. **HIGH**: Shoots while the synchronizing input is ON. **UP**: Shoots when the synchronizing input turns on from OFF. **CONT**: Continuously imports the images.
Spread of shooting range (vertically) **Wide**	OFF, ON, FAST, FST2 (OFF)	**OFF**: Sets the shooting range to the normal resolution. **ON**: Doubles the shooting range height from the normal. Double roughness is applied with the same vertical resolution. Re-teaching is required when switching from **Wide**. Built-in light source might be appeared in four corners of CVS4-N40W and -P40W, so please do not set to ON. **FAST** : Reduces vertical resolution of the image sensor, to make the half of the image transferring time. **FST2** : Reduces vertical resolution as same as FAST, and takes images 2 times in one trigger input. The shooting interval is approx. 13.3 ms. Outputs OK signal if any one of the judgments of 2 images.

8.Adj Paramtr

Function LCD display	Setting range (Default)	Description
Bold/Thin **Bold**	-2 to +8 (0)	Displays the characters in bold or thin style. Makes clear the feature of characters by displaying the dot characters in bold or the laser marked characters in narrow, or thinning the line seize of bold characters.
Built-in light power **LightPwr**	LOW, HIGH (LOW)	**LOW**: Sets the built-in light power to half. Continuously lights when not using the synchronizing input (**Synchron**=CONT). **HIGH**: Sets the built-in light power to maximum. Protect your eyes with the sunglasses in operating as the light flashes even when the synchronizing input is not used.
Luster cancel **Luster**	0 to 63 (16)	Strengthens the screen brightness to avoid the luster effect. In **6.Auto Teach**, the optimal value is set according to the lustrous strength of object surface.
Rotation search angle **Rotate**	0 to 20 (1)	Specifies the maximum angle of rotation search. Searches the correct character orientation by rotating every ± 0.94° per setting value. (Maximum ± 19°).
Shading correction **Shading**	0 to 4 (0)	Corrects the threshold of characters and background on the left and right side of taken image. The brightness of taken image on the left and right side is darker than the center, especially CVS4-N40W/-P40W built-in light source. Adjust setting value to detect characters on the left and right side.
Shutter time upper limit **ShtrLimt**	0 to 132 (132)	Sets the upper limit of fixing shutter time at teaching (**6. Auto Teach**). Sets the value according to the moving object speed. Setting value = 10 × desired line width (mm) ÷ object moving speed (m/s)
Shutter time **Shutter**	0 to 132 (70)	Sets the shutter time (0.1ms). When the object moves, Keep the value within that obtained from the formula above to prevent the image blurring.
Range of character slant correction **Slant**	0 to 20 (1)	Specifies the maximum range of the character slant correction. Searches the correct character orientation centering around the setting value of **SlantOfs** by rotating every ± 0.85° per setting value.
Offset angle of character slant correction **SlantOfs**	-26 to +26 (0)	Specifies the offset angle of the character slant correction. Refer to above setting **Slant**.
Object surface **Surface**	WHIT, BLAK, WH-C, BK-C (WHIT)	Specifies the surface condition of the object. In **6.Auto Teach**, rewrites to WHIT only when the surface is obviously white. **WHIT**: Black characters on the white background **BLAK**: White characters on the black background **WH-C**, **BK-C**: Same as WHIT and BLAK. Does not perform emphasis horizontal line function.
Character/Background threshold **ThreshId**	0 to 255 (35)	Sets the differential threshold of characters and background. Decreasing the setting value allows to detect even the slight change of brightness as the character, however increase it when stain or luster is detected.
Trapezoid correction **Trapezid**	-45 to +45 (0)	Sets the angle difference between the CVS4 main unit and the object. Attaching them at an angle to avoid specular reflection and correct that the front side is displayed wider. The unit is angle.

9.Date/Time

Function LCD display	Setting range (Default)	Description
Date additional value **1-Date +** **2-Date +**	-999 to 5000 (0)	Compares the date added with the set days with the recognized date against today. **1-Date+** corresponds to the 1st date, **2-Date+** to the 2nd date. When the value larger than 0 is set in **1-Time**(**2-Time**) and the additional value of the current time and **1-Time**(**2-Time**) exceeds 23.59, the date turns to the next day. (The unit: day) When **Format1** is set to **---**, sets the number of characters to compare.
Date tolerance **1-Date ±** **2-Date ±**	0 to 1000 (0)	Sets the margin level of date to compare. If the range is within before and after the setting value, it is acceptable. (The unit: day) When **Format1** is set to **---**, sets the margin of the number of characters to compare. (i.e.) When **1-Date+** is 10, and **1-Date±** is 1, the acceptable range for the number of characters is 9 to 11.
Time additional value **1-Time +** **2-Time +**	0 to 1439 (0)	Compares the time added with the set minutes with the recognized time. **1-Time+** corresponds to the 1st time, **2-Time+** to the 2nd time. (The unit: minute)
Time tolerance **1-Time ±** **2-Time ±**	0 to 720 (30)	Sets the margin level of time to compare. If the range is within before and after the setting minute, it is acceptable. The margin level also works to the date. When crossing dates, the dates before and after are acceptable. (The unit: minute)
Date Format **DateFrmt**	YMD, MDY, DMY (YMD)	Specifies the order of date. **YMD**: Year/Month/Date **MDY**: Month/Date/Year **DMY**: Date/Month/Year
String format **Format 1** **Format 2** **Format 3** **Format 4**	---, 4YMD, 4YM, 2YMD, H:M, 2YM, HOUR, STRG, A-MD, A-M, A-HM, A-H, A-D, MD, 4YED, 4YE, 2YED, 2YE, PY, SSAD (---)	Specifies the format of the date, time, and the string. Simultaneously judges four types of formats from **Format1 to 4**. Remember that the only two dates, two times and four strings can be specified. 4YMD to 2YMD and 4YED to 2YE are automatically recognized in teaching. For other formats, specify them before performing **7.Semiauto**. **---**: Does not specify the format. **4YMD**: 4-Digit-Year/Month /Date (2005.10.26 or 26.10.2005) **4YM**: 4-Digit-Year/Month (2005.10 or 10.2005) ***3*** **2YMD**: 2-Digit-Year/Month /Date (05.10.26 or 26.10.05) **H:M**:Hour and minute divided with ":" (13:57) **2YM**: 2-Digit-Year/Month (05.10 or 10.05) ***3*** **HOUR**: Hour only (13) ***4*** **STRG**: String up to 22 characters (AB13009) If specify multiple STRG, set the character "_" for delimiter in **B.String** menu. **A-MD**: Month /Date in alphabetical/numerical characters ***1*** **A-M**: Month in alphabetical/numerical characters ***1***,***3*** **A-HM**: Hour and minute in alphabetical/numerical characters **A-H**: Hour in alphabetical/numerical characters ***4*** **A-D**: Date written in alphabetical/numerical characters. ***1***,***2*** **MD** : Month /Date (10.26 or 26.10) ***1*** **4YED** : 4-Digit-Year/Month in English/Date (2005OCT26) **4YE** : 4-Digit-Year/Month in English (2005OCT) ***3*** **2YED** : 2-Digit-Year/Month in English/Date (05OCT26) **2YE** : 2-Digit-Year/Month in English (05OCT) ***3*** **PY** : Year only (5) If equal to current year, possible to read 1-digit year. ***2***, ***3*** **SSAD** : Analyzes specified commands in **B.String** and stores result to date. For more details, please contact our distributor. Setting **Format1** to **---** enables the characters judgment function, that accepts the result when the total number of recognized characters are within setting range. Set the characters with **1-Date+**, and set the margin with **1-Date±**.
Max string characters **Max Strg**	0 to 22 (0)	Specifies the maximum characters to register when performing **7.Semiauto** and STRG is specified in **Format1** to **4**. The setting **0** means the same with that of **22**. Even the characters are less than the setting value, the rows exceeding the setting value in **StrgLine** are not registered. Set the top number of characters for the case including the string and dates in a row, such as "ABC 05.3.25." (Set 3 for this case.)
Number of character for month notation **MonthChr**	3 to 9 (3)	Specifies the number of character for month notation in English. (**Format1** to **4**=4YED, 4YE, 2YED, 2YE) The setting **3** means "JAN" is January. The setting **7** and above means "JANUARY" is January.
String lines **StrgLine**	1 to 10 (1)	Specifies the number of string lines at the time of specifying the STRG in **Format 1** to **4**. The line feed is inserted even in the large interval between characters. Therefore, the part with large interval is counted as a line.
Year Offset **YearOfst**	0 to 99 (0)	Subtracts the setting value from the recognized year to compare the current date. The built-in calendar corresponds only to the Western calendar. The Japanese calendar is converted to the Western one by subtraction.

***1**
For the year unsaved with **MD**, **A-MD**, etc, that of saved in the previous **Format** is set. When nothing is saved, the current value of year is set. If the judgment was NG, the next value of year is set and re-judge.
For example, when today is Dec.31.2005 and **1-Date+** is **1**, the upper and lower limit is Jan.1.2006. Next the printed character is 1.1, the current value of year is 2005 then the recognized date is Jan.1.2005 and the judgment is NG. But set the next value of year 2006 and re-judge then the recognized date is Jan.1.2006 and the judgment is OK.
***2**
For the month unsaved with **A-D**, that of saved in the previous **Format** is set. When nothing is saved, the current value of month is set.
***3**
For the day unsaved with **4YM**, **2YM**, etc, that of saved in the previous Format is set. When nothing is saved, the current value of day is set. If the judgment was NG and today is 1st to 15th, 30 is set. If today is 16th to 31st, 1 is set.
For example, when today is Oct.31.2005 and **1-Date+** is **1**, the upper and lower limit is Nov.1.2005. Next the printed character is 11.2005, the current value of day is 31 then the recognized date is Nov.31.2005 and the judgment is NG. But set 1 (because today is 31st) and re-judge then the recognized date is Nov.1.2005 and the judgment is OK. (Please set the value of **1-Date±** to **3** and above.)
***4**
In the case of the hour format (**HOUR**, **A-H**), the current minute is placed on the recognized hour. (Please set the value of **1-Time±** to **60** and above.)

A.ExpertPrmtr

Function LCD display	Setting range (Default)	Description
Character height **CharHght**	0 to 200 (50)	Specifies the character height (pixel). Does not cut-out characters whose width is under the setting value. Used for correct recognition of small characters such as "."
Character recognition margin **CharMrgn**	0 to 255 (30)	Specifies the range to allow the difference between cut-out characters and the data in the dictionary. When the difference exceeds the setting value, the character is displayed as "?" During teaching, the setting value is processed to 1/2.
Minimum character **CharNarw**	0 to 100 (5)	Specifies the width of the narrowest character to be cut-out (pixel). Does not cut-out characters whose width is under the setting value.
Character width **CharWdth**	0 to 200 (40)	Specifies the character width (pixel). Used to separate two characters in link for correct recognition of narrow characters such as "1" or ":"
Character space **ChrSpace**	x1.5 to x7.0 (x4.0)	Inserts the space (Line feed) when the interval between characters becomes the set magnification of character width (**CharWdth**).
Dot Check **DotCheck**	OFF, ON (ON)	Checks if there is a dot between the date. **OFF**: Accepts when recognized as the date, regardless of dot presence. **ON**: Judges as NG if there is no dot. (05 3.10 is judged as NG.)
Extension dictionary **ExpDctnr**	0 to 56 (0)	The number of characters registered in the extension dictionary. Automatically written in registering with PC.
External light source brightness **ExtLgtPw**	6%〜100% (100%)	Adjusts CVS-LW1 (external light source) brightness. The parameter **Communic** should be set to OFF and disconnect communication cable and CVS-M1 monitor. **2
External teach-in function **ExtTeach**	SEMI, AUTO (SEMI)	**SEMI** : Perform **7.Semiauto** when the external teach-in input is turned on. **AUTO** : Perform **6.Auto Teach** when the external teach-in input is turned on.
Rotation/Slant correction and characters size fixing **FixRtSlt**	OFF, ON, CHAR, C+RS (OFF)	**OFF**: Automatically sets the rotation correction range (**Rotate**) and the slant correction range (**Slant**) during teaching. **ON**: Does not rewrite the value of **Rotate**, **Slant**. When the object moves faster than in teaching, preset the larger value in **Rotate**, **Slant**. **CHAR**: Does not rewrite the character size (**CharHght**, **CharNarw**, **CharWdth**) during teaching. When there are bold and narrow characters, adjust the above-mentioned setting value to be recognized before performing teaching. **C+RS**: Does not rewrite the rotation/slant correction nor the character size. * When performing **6.Auto Teach**, these settings are ignored.
Internal dictionary **IntDctnr**	OFF, ON (ON)	The function to separate the internal dictionary. Turn it **OFF** when comparing the character only by the extension dictionary.
LCD Up Down reverse **LCD View**	NORM, REVS (NORM)	**NORM**: The normal LCD display. **REVS**: Displays the LCD by reversing upside-down. Uses when attaching the sensor with facing the upside-down.
Mask Left / Right / Up / Down Coordinate **Msk Left** **MskRight** **Msk Up** **Msk Down**	0 to 255 (0 / 255 / 0 / 243)	Specifies the left / right / top / bottom edge coordinate which does not perform the character cut-out search.
Character Re-scan **Re-Scan**	OFF, ON, FULL, SEQN (FULL)	Searches again the date and time from the next character at NG judgment. Ignores unnecessary characters on the screen. In ON, FULL, ignores "." (dot) in the recognized strings when comparing the strings. (**Format1 to 4**=STRG). **OFF**: Does not re-scan. **ON**: Starts re-scan from the character of the next line feed including the large interval between characters. **FULL**: Starts from the next character. Scans even without interval between characters. However, note that 10:00 is regarded as OK even when 0:0 is OK. When recognizing the time, set to ON. **SEQN** : If judged OK in a format when slant retry (**Re-Slant**) and shooting repeatedly (**SyncPuls** = REPT or **Wide** = FST2), judges next format in next shooting.
Slant Re-try **Re-Slant**	OFF, 0.9, 2.5, 4.3, 6.0 (2.5)	Performs re-recognition operation by slanting the characters to the left and right at NG judgment. The more increase setting value, It prolongs the processing time at NG. Setting value means correction angle.
Character separation ON (1 - 3 lines) **Sprt 123** (4 - 6 lines) **Sprt 456**	xxx to ooo (ooo)	Enables the process to separate two, three, and four characters in link. Enables by changing to **O** in the first lines from the left. (Examples) When **Sprt123** is **oxx**, enables to separate only the first line. When **Sprt456** is **xoo**, disables to separate the 4th line.
Zero Check **ZeroChck**	--- to 123 (---)	Judges as NG when the value for the month/date/minute is 1 digit. Judges as NG when the year is not 2 or 4 digits. (Without **Format**=PY) **---**: Accepts either 1 digit or 2digits. (05 and 5 are recognized as the same.) **1--**: Checks if the first numerical values are 2 digits. If the time is 1 digit in **Format**=H:M, judged as NG. **-2-**: Checks if the second numerical values are 2 digits. When **Format**=2YMD, and the month is 1 digit, judges as NG. **12-**: Checks if the first and second numerical values are 2 digits. - - - **123**: Checks if the 3 numerical values are 2 digits.

5 Troubleshooting

(1) Character is linked with the next character

The situation that the character is linked with the next character occurs in unsuccessful cut-out of the interval between characters. This may occur in the case of shooting bold characters.

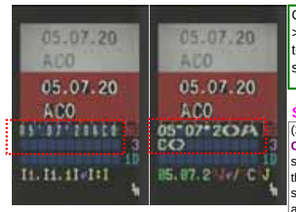
Solution

(1-1) Decrease the setting value **Bold** in **8.Adj Paramtr**.
>> Decrease the bold level and widen the interval between characters. Adjust the lightness of characters by decreasing the **ThreshId** value.

(1-2) Decrease the setting value **CharWdth** in **A.ExpertPrmtr**.
>> The separation function for up to 2, 3 and 4 characters operates against the characters with double to quadruple width of the **CharWdth** setting value. The interval between white dots under the shooting screen is approx. 50 pixels. Adjust the setting value referring to the character size.

(1-3) Adjust the value of the setting value **Trapezid** in **8.Adj Paramtr**.
>> The screen changes to a trapezoid shape when CVS4 is set to the object. When changed, the characters slant at the both edges on the screen. Adjust the setting value to correct this situation. Set the setting value to the mounting angle of CVS4.

(2) Characters are incorrectly compared with dictionary or wrongly read



Check the cut-out character in **5.Monitor**.
>> When the character becomes narrow due to block separation or the one character is separated into two to four.

Solution

(2-1) The character is thinned when the value of **CharWdth** in **A.ExpertPrmtr** is too large or separated into two when it is too small. Normally the 90 % of value of typical character width is saved in **6.Auto Teach** or **7.Semiauto**. However, adjust it if saved imperfectly.

>> Block separation is successful but the characters are too small to be recognized stably.

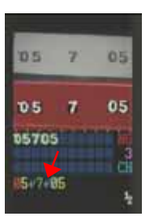
Solution

(2-2) Set the characters so that they are displayed as wide as possible. Increase the setting value of **Re-Slant** in **A.ExpertPrmtr** to improve. Adjust the **Bold** value in **8.Adj Paramtr** so that the character obtains the adequate width.
Set **Slant**, **SlantOfs** and **Rotate** in **8.Adj Paramtr** to **0** when the object rotation or the character slant is hardly found.
Set to **OFF** when **Wide** in **1.Parameter** is set to **ON** or **FAST**.

>> Patterns exist around the characters and the characters are not cut-out.

Solution

(2-3) Exclude the pattern being displayed or apply masking by adjusting **Msk Left**, **MskRight**, **Msk Up**, and **Msk Down** in **A.ExpertPrmtr**.



>> Line feed mark exists between date of time.

Solution

(2-4) The line feed mark is inserted in a wide interval between characters. Increase **ChrSpace** value in **A.ExpertPrmtr** to exclude the line feed mark inserted.

>> Block separation is successful but the recognized characters are not correct.

Solution

(2-5) Chinese and Korean characters are not recognized correctly. Register expansion dictionary before teach-in to recognize special font and characters. Increase **CharMrgn** in **A.ExpertPrmtr** to recognize most similar character in built-in dictionary instead of "?".

>> Images are unstable due to the lustrous characters or backgrounds.

Solution

(2-6) Increase the **Luster** value in **8.Adj Paramtr** and saturate the screen with the light to cancel the lustrous part. Adjust the **ThreshId** value to allow the characters pop-up. If the problem still persists, adjust the CVS4 setting angle or use the external light to avoid the direct reflected light.

>> Images are blurred.

Solution

(2-7) When not focused correctly, the feature of character becomes blurred. Adjust the distance between CVS4 and the object to focus.

(2-8) When the object moving speed is fast, please refer solution (5-3).

>> Fine noises on the screen are recognized as dots.

Solution

(2-9) Increase the value in **CharNarw A.ExpertPrmtr** to ignore the characters with narrower width than this setting values.

(2-10) Increase the **ThreshId** value in **8.Adj Paramtr** to avoid fine noises displayed on the screen.

>> Character cut-out is not successful due to the shooting of the cylinder-shape object shot at an angle.

Solution

(2-11) Shoot from the front side. To avoid reflection of the built-in light, set **Light** in **1.Parameter** to **OFF** and use the external light.

>> Horizontal line of "2" or "7" gets thinner and be misrecognized. But increasing **Bold** effects misrecognition between "6" and "8".

Solution

(2-12) Thickens up the blocks of 2 to 6 column in 1st and 7th row. If it might trigger another misrecognition, set **Surface** in **8.AdjParamtr** to **WH-C** or **BK-C**.

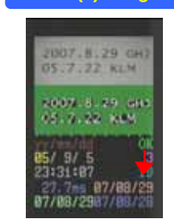
(3) String is not recognized as the specified date or time

The date and time may not be correctly displayed even though the strings show the correct date and time order. This problem occurs when **Re-Scan** in **A.ExpertPrmtr** is set to **FULL** or **ON**. The string within the upper and lower limit of date and time is searched from the top. Therefore, if no string of OK judgment exists, the date and time recognized in the last part of string are displayed.

Solution

(3-1) Select **OFF** for the **Re-Scan** setting or correctly set the upper and the lower setting of date and time in **9.Date/Time**.

(4) Judged as NG at the point at the date change



This trouble occurs when the difference exists between the printer for the date and the CVS 4 calendar.

Solution

(4-1) Increase the **1-Time±** value in **9.Date/Time**. Set the duration of specified time (minutes) as the upper and lower limit of the date before the date change. Also set the current date and the previous date as the upper and lower limit on the current date, the next date and the after the date change. Set with **2-Time±** for the second date (**2-Date**).

(4-2) Increase the **1-Date±** value in **9.Date/Time**. In the format of Y/M, the difference of months occurs at the month change with the different days. Normally, setting to **3** avoids any trouble in any month.

(5) Wrong recognition in high speed of object

The slant correction is insufficient as the object moves in higher speed than in teaching.

Solution

(5-1) Set **FixRtSlt** in **A.ExpertPrmtr** to **ON** in advance and increase the **Slant** value in **8.Adj Patamtr** by the value of required slant correction. Doing this avoids rewriting of the **Slant** and **SlantOfs** value in teaching.

(5-2) Setting **Wide** in **1.Parameter** to **FAST** makes reducing imgae transferring time and slant down angle.

High speed of the object blurs the shot images.

Solution

(5-3) Refer to the page for to set the ShtrLimt value in **8.Adj Patamtr** before performing teaching. Add the external light if the screen is not enough light in teaching (the case the **ShtrLimt** value becomes **5** or less).

Changing the speed of the object shifts the shooting position and the characters run out of the screen.

Solution

(5-4) To absorb the dispersion of the object position, set **Wide** (in **1.Parameter**) to **FST2**, or set **SyncPuls** (in **1.Parameter**) to **REPT**. And decrease the setting value of **Rotate** and **Slant** (in **8.Adj Paramtr**) and set **Re-Slant** (in **A.Expert Prmtr**) to **OFF**, to reduce processing time.

When the object moves in high speed, the character height changes to disable cutting them out.

Solution

(5-5) Perform teaching in the condition that the object moves in high speed. Or decrease the **CharHght** value in **A.ExpertPrmtr** to cut-out. (In this picture, the work moving at 0.7m/s is shot.)

Moving direction of the work

(6) Unsuccessful String registration in 7.Semiauto

In the string registration (specifies **STRG** in **Format 1 to 4**), assign the numerical character to the numerical part and alphabetical character to the alphabetical part if the strings have already been registered.

Solution

(6-1) Clear the string with **B.String** before performing **7.Semiauto**. Clearing the top character (change to **" "**) also clears the remaining characters. Characters before "**A**" of the ASCII code are judged as numerical ones, and as alphabetical ones if after "**A**."

(7) Misrecognizes date when date is 1-digit.

Recognizes date characters that be linked the original 1-digit date and the next character.

Solution

(7-1) Print the next characters apart from date character, and decrease the setting value of **ChrSpace** in **A.ExpertPrmtr** to insert line-feed character. (Ex. "**2005.11. 1 SA**")
(7-2) Be sure to print 2-digit date. (EX. **2005.11.01 SA**")
(7-3) Register the next character to the expansion dictionary as character ".".
(7-4) Decrease the setting value of **CharMrgn** in **A.ExpertPrmtr** to recognize the next character as "?". (Be careful not to change "." date characters that you want to recognize.)

(8) NG judgment when verifying multiple lines string

Specify correct character string in **B.String**, but the judgment is still NG.

Solution

(8-1) Set the parameter of **StrgLine** in **9.Date/Time** to necessary lines (This example is **2**).
(8-2) Set the parameters of **Format** in **9.Date/time** to **STRG** the number of times of necessary lines, and specify "_" character in **B.String** as the separator. (This example requires **Format 1** to **2YMD**, **Format 2** to **STRG**, **Format 3** to **STRG**, and **B.String** to "**S_A5**".)

(9) String is too long to fit shooting all characters.

Printing width is too long to fit all characters in the screen. Selecting wider FOV type is not enough for minimum character size.

Solution

(9-1) Set the parameters as below. Specify the parameter of **Format 1,2,3, and 4** starting from left in the print characters when the object moves from right to left. Starting from right when the object moves from left to right.

Parameters
Synchron in **1.Parameter** = **UP** or **DOWN**
SyncDely in **1.Parameter** = Repeat shooting time (Unit : 0.1ms)
SyncPuls in **1.Parameter** = **REPT**
Re-Scan in **A.ExpertPrmtr** = **SEQN**
Re-Slant in **A.ExpertPrmtr** = **OFF** (to reduce response time)
Format 1 in **9.Date/Time** = **4YMD** (in this example)
Format 2 in **9.Date/Time** = **STRG** (in this example)
*Exchange **Format 1 and 2** when the object moves from left to right.

Optional Devices

CVS-M1: Remote monitor
Convenient when performing operation of the monitor and the switch from a distance.

CVS-LW1, -LU1: External light
Convenient in shortage of the light intensity or in detecting highlighted characters. "-LW1" means white and "-LU1" means ultraviolet rays. For use, set **Communic** to **OFF**. Other types of external lights are also available. For details, contact our Customer Service Department.

CVS-C3S: Extension cable for remote monitor (3m)
The extension cable for CVS-M1. Connectable up to 4 cables.

CVS-C2C: RS-232C communication cable (2m)
The cable is to transfer the setting values, register the dictionary, read and set strings, absorb NG screens, and select banks. For extension, use the level converter to avoid communication error.

ASCII characters list that CVS4 is able to indicate on LCD screen.
! # $ % & ( ) * + - . / 0 to 9 : ; < = > ? @ A to Z [\ ] ^ _ ` a to z ~
Characters list in the internal dictionary
. / 0 to 9 : A to Z

The exclusive software describes the following information: The extension dictionary registration, the date registration in alphabetical characters, save and transfer of setting value, the string reading by communication, and bank selection. Contact our Customer Service Department to obtain the software.

This instruction manual corresponds to the software version 2.09 or greater (Screen display at startup is 209 or greater).

Indicates hardware version.

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