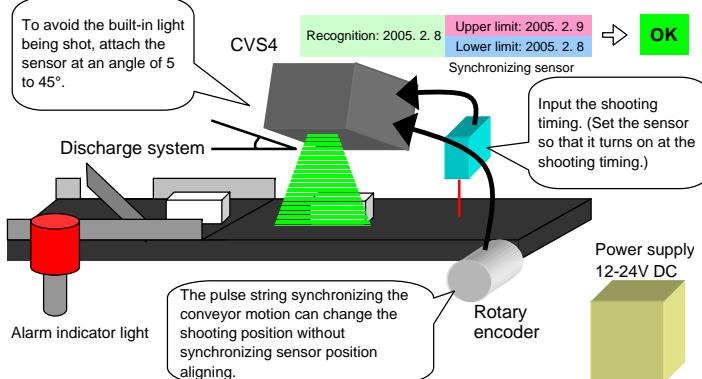


## 1 Before use

### What is CVS4 Series?

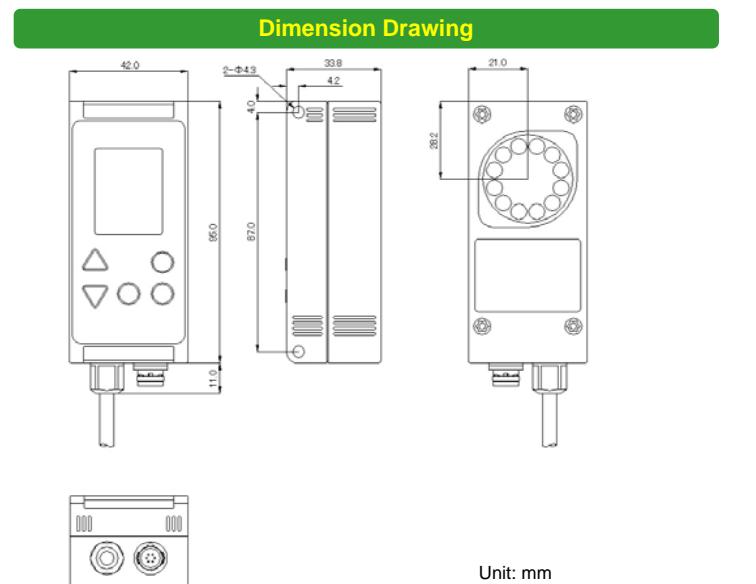
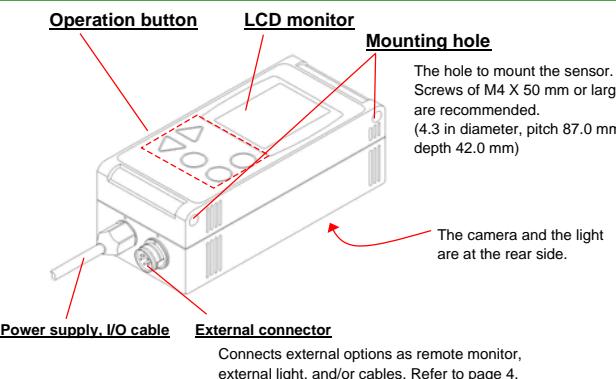
The CVS4 series converts the date and time such as an expiration date from the screen to the strings and output OK if they are within the upper and lower limit of setting date and time. The date and time are updated by the built-in calendar. In addition, the string of alphabetical and numerical characters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



### Specification

Model	CVS4-N20	CVS4-N21	CVS4-N23	CVS4-N23R	CVS4-P20	CVS4-P21	CVS4-P23	CVS4-P23R
Angle of view				20°				
Shooting distance, range			Refer to page 3.					
Light source			Green LED (12 pcs)					
Brightness	Approx. 70 cd	Approx. 35 cd		Approx. 70 cd				
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					
Lifetime of light source	Approx. 100,000 hours* (In normal temperature and humidity. Brightness level down by 1/3 of the initial level)							
Built-in clock accuracy	Monthly difference: -45 sec to +1 min 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)							
Response time	20 characters of the date in 2 rows Approx. 45 to 85 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							
Characters per row	30 characters							
Recognized number of dates, times, and strings	4 in total: Each 2 for the date and the time, 1 for 16 characters of the string							
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 57600 bps							

### Part Names and Functions



	Shooting range	Focal distance	Minimum character height	Recommended character height
CVS4-N20	53 × 25 to 79 × 38 mm	90 to 150 mm	3.0 to 4.5mm	3.7 to 30mm
*1	53 × 50 to 79 × 76 mm		6.0 to 9.0mm	7.3 to 60mm
CVS4-N23	30 × 15 mm	50 ± 6 mm	1.5mm	2.2 to 10mm
*1	30 × 30 mm		3.0mm	4.4 to 20mm
CVS4-N21	21 × 10 mm	35 ± 4 mm	1.0mm	1.5 to 7.5mm
*1	21 × 20 mm		2.0mm	3 to 15mm

\*1 The condition when the parameter Wide (Vertical direction) is ON.

### Setup Flow

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

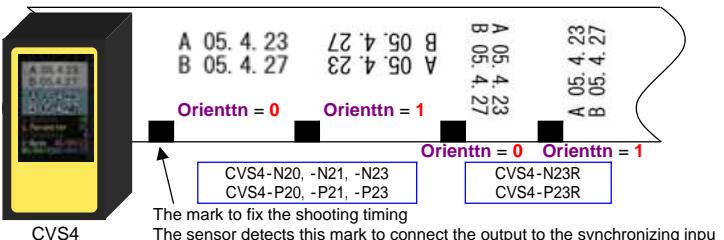
Line color	Name
Blown	Power supply 12-24 V DC
Blue	Power supply 0 V
Orange/Black	Bank selection 0 input / Pulse string input (at SyncPuls = ON)
Yellow/Black	Bank selection 1 input / String + input (at String+ = ON)
Pink	Bank selection 2 input / External teaching input (at other than Bank = BKIN)
Purple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

\*1 The condition when the parameter Wide (Vertical direction) is ON.

(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 string 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)
Red/Black	NG output / Light control output (at LightOut = NG)

The direction to recognize characters depends on the model.



Sets to Synchron (the setting value in 1.Parameter) = UP or DOWN. The shooting is given at rising or falling of synchronizing sensor.

To align the shooting position, adjust the synchronizing sensor position. For details, refer to page 4.

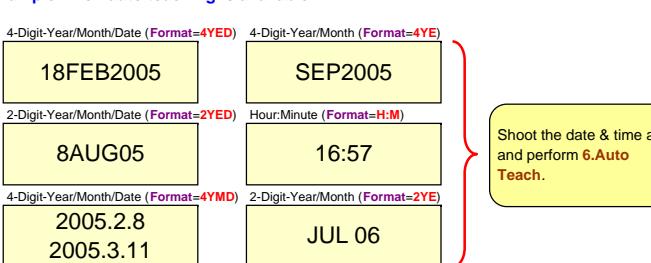
For the desktop test, set to Synchron = CONT to allow continuous shooting.

(3) Specify the date format.

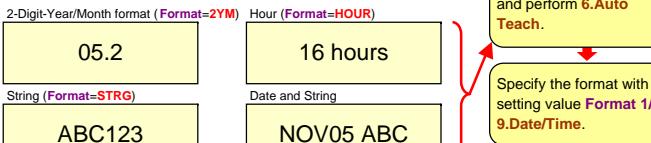
Specify the date among Year/Month/Date, Month/Date/Year, and Date/Month/Year. (The default is Year/Month/Date.)  
(Example) The date format such as 28.2.2005: Set to the setting value of DateFmt = DMY in 9.Date/Time.  
When displayed in other than the Western calendar, set the time gap from the year 2000 to YearOfst in 9.Date/Time.

(4) Perform teaching.

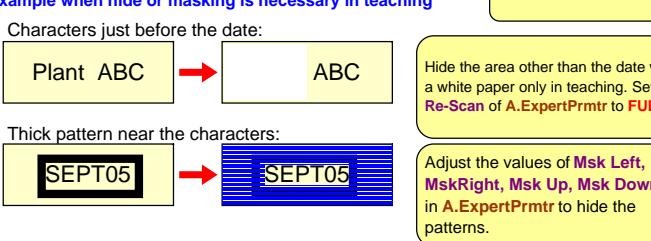
Example when auto teaching is available:



Example when teaching is started after format setting:



Example when hide or masking is necessary in teaching



(5) Check the operation.

Operation is normal if the recognized date is correct and judged as OK. In case of abnormal operation, refer to the troubleshooting (page 13).

### To Shoot Moving Object

#### Limitation of shutter time with object moving speed

High-speed moving of the object blurs the shot images. Set the shutter time upper limit calculated in the formula below to ShtrLimit (the setting value in 8.Adj Parameter) to limit the shutter time in teaching.

Shutter time upper limit = 10 × desired line width (mm) ÷ the object moving speed (m/s)

When the screen is dark due to short shutter time, set LightPwr (the setting value in 8.Adj Paramtr) to HIGH to double the built-in light brightness. Note that the brightness is strong: Do not look the light directly, or it may damage your eyes.

#### Rolling shutter interference

The character height becomes lower than the actual.

A 05. 4. 23 B 05. 4. 27 → A 05. 4. 23 B 05. 4. 27

The character height becomes higher than the actual.

A 05. 4. 23 B 05. 4. 27 → A 05. 4. 23 B 05. 4. 27

The characters slant down to the left.

A 05. 4. 23 B 05. 4. 27 → A 05. 4. 23 B 05. 4. 27

The characters slant down to the right.

A 05. 4. 23 B 05. 4. 27 → A 05. 4. 23 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 FixRtSt (in A.ExpertPrmtr).

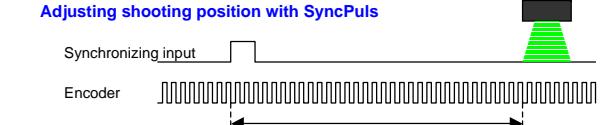
#### Expansion of shooting range

Turning ON Wide (the setting value in 1.Parameter) vertically doubles the shooting range of the screen.

A 05. 4. 23 B 05. 4. 27

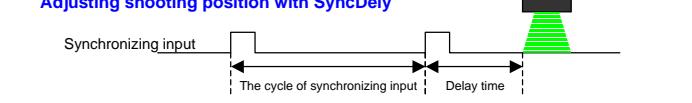
Wide = OFF  
Wide = ON

#### Adjusting shooting position with SyncPuls



Generally the conveyor in the printing process is equipped with a rotary encoder. The SyncPuls counts the pulse trains up to the shooting position and shoots as they reach the specified number of counts. Turn ON SyncPuls in 1.Parameter to set the number of counts in SyncDely. It is valid only when Synchron is set to UP or DOWN. Although it requires the encoder and occupies the bank selection 0 input, SyncPuls responses the object speed change.

#### Adjusting shooting position with SyncDely



\* The shooting position may be incorrectly set when the object speed changes in the process, and the intervals of synchronizing marks are shifted.

#### Optional Devices

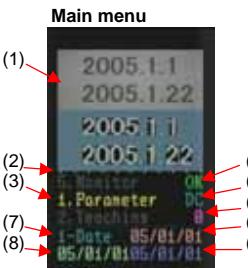
##### CVS-M1: Remote monitor

Convenient when performing operation of the monitor and the switch from a distance.

##### CVS-LW1, -LU1: External light

</

## 2 Details and Operation of LCD



- (1) Shot screen: Switches according to the monitor display mode of (5).  
 (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.)

### (7) Displayed date/time items:

- 1-Date : The 1st date  
 2-Date : The 2nd date  
 1-Time : The 1st time  
 2-Time : The 2nd time  
 Char= : Number of characters and character string

- (5) Screen display mode:  
 D: Live screen, 2: Differential screen, C : Cut-off screen  
 (6) Current bank number (0 to 15)  
 (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.

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

**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.

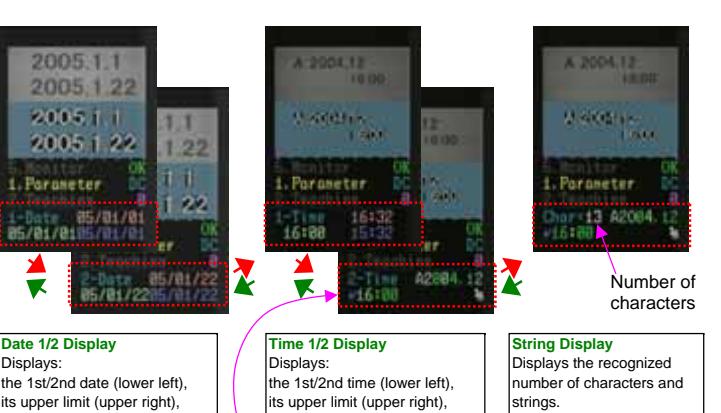
**DOWN + SET**  
 Press >3sec. simultaneously  
 Locks editing all parameters and disables teach-in, editing character string and calendar. (Locked) Press these button on main menu or teaching menu.

**UP + SET**  
 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.



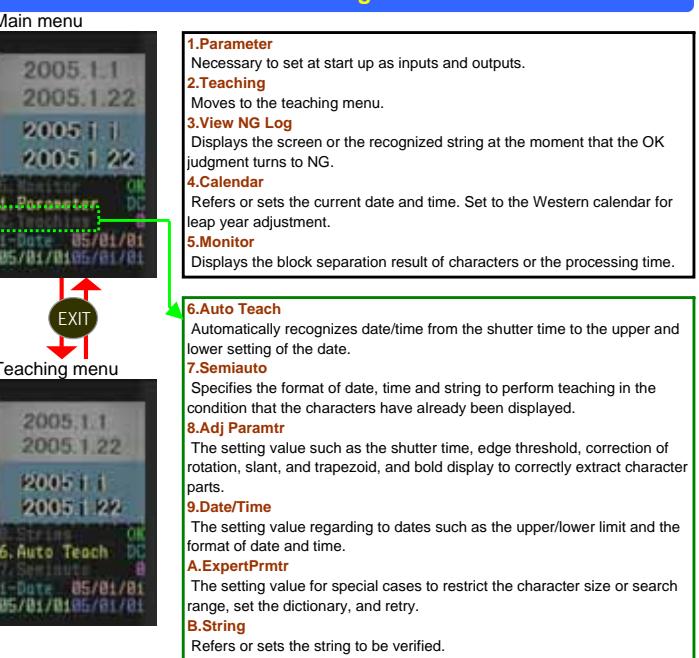
Pressing **UP** or **DOWN** with **VIEW** switches the recognized string display.



\* 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.

Identical rate High	Green	Pale green	Cream	Yellow	Yellow-Orange	Orange	Red	Brown	Dark Brown	Low
Conversion value of <b>CharMrgn</b>	0	4	8	12	16	20	24	28	32	

## Menu Configuration



## 4 Settings

### 1.Parameter

Function <b>LCD display</b>	Setting range (Default)	Description
Bank Specification <b>Bank</b>	0 to 15, TCH, BKIN, COMM (BKIN)	Specifies how to select the bank number selection. <b>0 to 15:</b> Selects the set bank. <b>TCH:</b> Selects the bank with the bank selection 0, 1, 3 inputs. <b>BKIN:</b> Selects the bank with the bank selection 0 to 3 input. <b>COMM:</b> 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 <b>BKIN</b> .)
Bank Copy <b>BankCopy</b>	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 <b>Communic</b>	OFF, 4.8k, 9.6k, 19k2, 38k4, 57k6 (57k6)	Sets the communication function. <b>OFF:</b> Disables communication function. Set when using the external light (CVS-LW1,-LU1). <b>4.8k to 57k6:</b> Uses the communication function. The baud rate order is 4800, 9600, 19200, 38400, 57600 bps. Data length without parity 8 bit and 1 stop bit. The external light or the remote monitor cannot be used.
Initialization <b>Initialz</b>	----, EXEC (---)	Saving the setting value as <b>EXEC</b> initializes all setting values and strings.
Built-in light ON/OFF <b>Light</b>	OFF, ON (ON)	Controls the built-in light. Turn it <b>OFF</b> and use the external light when shooting transparent bottles as it is difficult to shoot with the built-in light. <b>OFF:</b> Built-in light=OFF <b>ON:</b> Built-in light=ON
External light control signal <b>LightOut</b>	--, NG, OK, NG-P, OK-P (--)	--: Uses the red and black lines as NG output. <b>NG:</b> 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. <b>OK:</b> OK output (black line) turns OFF in synchronization with shooting. NG output (red/black line) turns ON as usual when it is NG. <b>NG-P:</b> NG output (red/black line) turns ON in synchronization with shooting. <b>OK-P:</b> OK output (black line) turns ON in synchronization with shooting.
NG Delay <b>NG Delay</b>	0 -255 (0)	Outputs NG only when NG judgment continuously exceeds the specified counts. Even with no NG output, NG is displayed on the screen and the NG screen is saved. (i.e.) When the setting value is 1, outputs OK for only a single NG judgment.
Off Delay <b>OffDelay</b>	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.
On Delay <b>OnDelay</b>	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 <b>One-shot</b>	0, 1 (0)	When setting to 1, 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 <b>Synchron=CONT</b>
Shooting orientation <b>Orientin</b>	NORM, REVS (NORM)	Switches the shooting orientation. <b>NORM:</b> Takes out the characters without rotating the shooting screen. (CVS4-XX R rotates to the left by 90°.) <b>REVS:</b> Takes out the characters by rotating the shooting screen by 180°. (CVS4-XX R rotates to the right by 90°.)
Output synchronous delay count <b>OutSynDI</b>	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 <b>Save NG</b>	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 <b>String +</b>	OFF, ON (OFF)	<b>OFF:</b> Uses the yellow and black lines as a bank selection 1 input. <b>ON:</b> Uses the yellow and black lines as a string additional input. The characters registered in <b>B.String</b> 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>B.String:</b> AB0123 It turns to AB0124, AB0125, ..., AB0129, AB0130, AB0131, --- at rising of the yellow/black lines.
Synchronizing input delay coefficient <b>SyncDely</b>	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 = $8192 \times \text{delay time} \div \text{cycle width of the synchronizing input}$ * Delay time will be the number of pulse count when the setting value of <b>SyncPuls</b> is ON, calculated the setting value of <b>SyncDely</b> $\times 64\mu\text{s}$ when the setting value of <b>SyncPuls</b> is TIME.

### 8.Adj Paramtr

Function <b>LCD display</b>	Setting range (Default)	Description
<b>Bold/Thin Bold</b>	-2 to +6 (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.
<b>Built-in light power LightPwr</b>	LOW, HIGH (LOW)	<b>LOW:</b> Sets the built-in light power to half. Continuously lights when not using the synchronizing input ( <b>Synchron=CONT</b> ). <b>HIGH:</b> 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.
<b>Luster cancel Luster</b>	0 to 63 (16)	Strengthens the screen brightness to avoid the luster effect. In <b>6.Auto Teach</b> , the optimal value is set according to the lustrous strength of object surface.
<b>Rotation search angle Rotate</b>	0 to 20 (1)	Specifies the maximum angle of rotation search. Searches the correct character orientation by rotating every $\pm 0.94^\circ$ per setting value. (Maximum $\pm 19^\circ$ ).
<b>Shutter time upper limit ShtrLimit</b>	0 to 132 (132)	Sets the upper limit of fixing shutter time at teaching ( <b>6. Auto Teach</b> ). Sets the value according to the moving object speed. Setting value = $10 \times \text{desired line width (mm)} \div \text{object moving speed (m/s)}$
<b>Shutter time Shutter</b>	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.
<b>Range of character slant correction Slant</b>	0 to 20 (1)	Specifies the maximum range of the character slant correction. Searches the correct character orientation centering around the setting value of <b>SlantOfs</b> by rotating every $\pm 0.85^\circ$ per setting value.
<b>Offset angle of character slant correction SlantOfs</b>	0 to +26 to -26 (0)	Specifies the offset angle of the character slant correction. Refer to above setting <b>Slant</b> .
<b>Object surface Surface</b>	WHIT, BLAK (WHIT)	Specifies the surface condition of the object. In <b>6.Auto Teach</b> , rewrites to <b>WHIT</b> only when the surface is obviously white. <b>WHIT:</b> Black characters on the white background <b>BLAK:</b> White characters on the black background
<b>Character/Background threshold Threshld</b>	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.
<b>Trapezoid correction Trapezid</b>	-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.

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

Automatically set items in Teaching (**6.Auto Teach**)

**LCD display** The yellow setting items are common to all banks.

**LCD display** The purple setting items depend on each bank.

<b>Synchronizing pulse input SyncPuls</b>	OFF, ON, TIME (OFF)	<b>OFF:</b> Shoots when after waiting the time calculated by <b>SyncDely</b> formula. <b>ON:</b> Shoots when the rising count of bank selection 0 input reaches the <b>SyncDely</b> setting value from the synchronizing input rising (at <b>Synchron=UP</b> ). Inputs the pulse string of encoder. <b>TIME:</b> Shoots when after waiting for the setting value of <b>SyncDely</b> $\times 64\mu\text{s}$
<b>Synchronizing input Synchron</b>	LOW, DOWN, HIGH, UP, CONT (CONT)	Sets the synchronizing input. When setting other than <b>CONT</b> , the bank selection 3 input becomes the synchronizing input. The followings are the shooting conditions: <b>LOW:</b> Shoots when the synchronizing input is OFF. <b>DOWN:</b> Shoots when the synchronizing input turns off from ON. <b>HIGH:</b> Shoots while the synchronizing input is ON. <b>UP:</b> Shoots when the synchronizing input turns on from OFF. <b>CONT:</b> Continuously imports the images.
<b>Spread of shooting range (vertically) Wide</b>	OFF, ON (OFF)	<b>OFF:</b> Sets the shooting range to the normal resolution. <b>ON:</b> Doubles the shooting range height from the normal. Double roughness is applied with the same vertical resolution. Re-teaching is required when switching from <b>Wide</b> .

### 9.Date/Time

Function <b>LCD display</b>	Setting range (Default)	Description
<b>Date additional value 1-Date + 2-Date +</b>	-999 to 5000 (0)	Compares the date added with the set days with the recognized date against today. <b>1-Date +</b> corresponds to the 1st date, <b>2-Date +</b> to the 2nd date. When the value larger than 0 is set in <b>1-Time(2-Time)</b> and the additional value of the current time and <b>1-Time(2-Time)</b> exceeds 23.59, the date turns to the next day. (The unit: day) When <b>Format1</b> is set to <b>---</b> , sets the number of characters to compare.
<b>Date tolerance 1-Date ± 2-Date ±</b>	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 <b>Format1</b> is set to <b>---</b> , sets the margin of the number of characters to compare. (i.e.) When <b>1-Date +</b> is 10, and <b>1-Date ±</b> is 1, the acceptable range for the number of characters is 9-11.
<b>Time additional value 1-Time + 2-Time +</b>	0 to 1439 (0)	Compares the time added with the set minutes with the recognized time. <b>1-Time +</b> corresponds to the 1st time, <b>2-Time +</b> to the 2nd time. (The unit: minute)
<b>Time tolerance 1-Time ± 2-Time ±</b>	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)
<b>Date Format Datefrm</b>	YMD, MDY, DMY (YMD)	Specifies the order of date. <b>YMD:</b> Year/Month/Date <b>MDY:</b> Month/Date/Year <b>DMY:</b> Date/Month/Year
	---	Specifies the format of the date, time, and the string. Simultaneously judges four types of formats from <b>Format1</b> to 4. Remember that the only two dates, two times and one string can be specified. <b>4YMD</b> to <b>H-M</b> and <b>4YED</b> to <b>2YE</b> are automatically recognized in teaching. For other formats, specify them before performing <b>7.Semiauto</b> . --: Does not specify the format. <b>4YMD:</b> 4-Digit-Year/Month/Date (2005.10.26 or 26.10.2005) <b>4YM:</b> 4-Digit-Year/Month (2005.10 or 10.2005) <b>2YM:</b> 2-Digit-Year/Month/Date (05.10.26 or 26.10.05) <b>H-M:</b> Hour and minute divided with ":" (13:57) <b>2YM:</b> 2-Digit-Year/Month (05.10 or 10.05) <b>HOUR:</b> Hour only (13) <b>STRG:</b> String up to 16 characters (AB13009) <b>A-MD:</b> Month/Date in alphabetical/numerical characters *1 <b>A-M:</b> Month in alphabetical/numerical characters *1,*3 <b>A-HM:</b> Hour and minute in alphabetical/numerical characters <b>A-H:</b> Hour in alphabetical/numerical characters *4 <b>A-D:</b> Date written in alphabetical/numerical characters. *1,*2 <b>MD:</b> Month/Date (10.26 or 26.10) *1 <b>4YED:</b> 4-Digit-Year/Month in English/Date (2005OCT26) <b>4YE:</b> 4-Digit-Year/Month in English (2005OCT) *3 <b>2YE:</b> 2-Digit-Year/Month in English/Date (05OCT26) <b>2YE:</b> 2-Digit-Year/Month in English (05OCT) *3 <b>PY:</b> Year only (5) If equal to current year, possible to read 1-digit year. *2, *3
<b>String format</b>	---	Setting <b>Format1</b> to <b>---</b> enables the characters judgment function, that accepts the result when the total number of recognized characters are within setting range. Set the characters with <b>1-Date +</b> , and set the margin with <b>1-Date ±</b> .
<b>Format 1</b>	0 to 16 (0)	Specifies the maximum characters to register when <b>STRG</b> is specified in <b>Format1</b> to 4. The setting 0 means the same with that of 16. Even the characters are less than the setting value, the rows exceeding the setting value in <b>StrgLine</b> 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.)
<b>Format 2</b>	3 to 9 (3)	Specifies the number of character for month notation in English. ( <b>Format1</b> to 4=YED, 4YE, 2YE, 2YE) The setting 3 means "JAN" is January. The setting 7 and above means "JANUARY" is January.
<b>Format 3</b>	1 to 10 (1)	Specifies the number of string lines at the time of specifying the <b>STRG</b> in <b>Format1</b> 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.
<b>Format 4</b>	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 <b>MD</b> , <b>A-MD</b> , etc, that of saved in the previous <b>Format</b> 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 2005.12.31 and <b>1-Date +</b> is 1, the upper and lower limit is 2006.1.1. Next the printed character is 1.1, the current value of year is 2005 then the recognized date is 2005.1.1 and the judgment is NG. But set the next value of year 2006 and re-judge then the recognized date is 2006.1.1 and the judgment is OK.
*2
For the month unsaved with <b>A-D</b> , that of saved in the previous <b>Format</b> is set. When nothing is saved, the current value of month is set.
*3
For the day unsaved with <b>4YM</b> , <b>2YM</b> , etc, that of saved in the previous <b>Format</b> 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 2005.10.31 and <b>1-Date +</b> is 1, the upper and lower limit is 2005.11.1. Next the printed character is 2005.11.1, the current value of day is 31 then the recognized date is 2005.11.1 and the judgment is NG. But set 1 (because today is 31st) and re-judge then the recognized date is 2005.11.1 and the judgment is OK. (Please set the value of <b>1-Date ±</b> to 3 and above.)
*4
In the case of the hour format ( <b>HOUR</b> , <b>A-H</b> ), the current minute is placed on the recognized hour. (Please set the value of <b>1-Time ±</b> to 60 and above.)

### A.ExpertPrmr

Function <b>LCD display</b>	Setting range (Default)	Description
<b>Character height CharHght</b>	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 ":".
<b>Character recognition margin CharMrgn</b>	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.
<b>Minimum character CharNarw</b>		

