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CV-5502

Digital Image Sensor/Controller

CE

SPECIFICATIONS

Model			CV-5502
Type			Controller
No. of pixels			When CV-200C/S200C/H200C/200M/S200M/H200Mis connected• 2 megapixel mode: 1600 (H) × 1200 (V), Approx 1,920,000 pixels• 1 megapixel mode: 1024 (H) × 960 (V), Approx980,000 pixelsWhen CV-H100C/H100M is connected• 1 megapixel mode: 1000 (H) × 1000 (V), Approx1,000,000 pixelsWhen CV-035C/S035C/H035C/035M/S035M/H035Mis connected• 240,000 pixel mode: 512 (H) × 480 (V), Approx240,000 pixels• 310,000 pixel mode: 640 (H) × 480 (V), Approx310,000 pixels
Camera input			• Two color/monochromecameras (Compatiblewith CV-H200C/200C/S200C/H100C/035C/S035C/H035C/200M/S200M/H100M/035M/S035M/H035M, mixedconnection possible)• Two extra cameras canbe connected by usingexpansion unit CV-E500.Up to fourcameras can beconnected.
Main processor for image processing			DSP (High-speed)
No. of registered settings			SD cards 1 and 2 can each hold 1000 programs (depending on the size of the SDcard and the size of the programs), external switching possible
Number of screens that can be registered			Maximum 1000 screens for each program (depending on SD card size),Compressed saves possible
Internal memory capacity			SD card slot x2 (SDHC compatible)Compatible with OP-87133 (512 MB: standard in SD1 slot for CV-5502/5002),CA-SD1G (1GB: standard in SD1 slot for CV-5702), CA-SD4G (4GB: SDHC)
Window settings	Measurement area		128 locations per program
	Mask area		4 locations per area
Color extraction function (valid only when a color camera is connected)			Color binary, color shade, Gray, RGB average gray (Colors can be specifiednumerically via HSB values)Compatible with 1:n copy
Measurement tool	Area measurement		The shapes are rectangle, rotated rectangle, circle, oval, ring, arc or polygon (up to 12sides), edge detection rectangle area or edge detection circular area
	Position detection	Pattern search	• Multiple searches possible for both pattern area and search area. The shapes arerectangle, rotated rectangle, circle, oval, ring, arc, and polygon (up to 12 sides)• Pattern area can be masked (4 positions / area)
		V-search	• Up to 256 patterns can be searched simultaneously for both pattern area andsearch area. The shapes are rectangle, rotated rectangle, circle, oval, ring, arc,and polygon (up to 12 sides)• Pattern area can be masked (4 positions / area)
		Edge position	• Angles can be measured. The shapes are rectangle, rotated rectangle,circle, oval, ring, arc or polygon (up to 12 sides), edge detection rectanglearea or edge detection circular area
		Trend edgeposition	• Circle or straight line can be measured from the detection results• Shapes are rectangle, rotated rectangle, ring and arc
		Blob (Center ofgravity)	The shapes are rectangle, rotated rectangle, circle, oval, ring, arc or polygon (upto 12 sides), edge detection rectangle area or edge detection circular area
	Inspection mode	Edge position	
		Edge pitch	
		Edge No.	The shapes are rectangle, rotated rectangle, circle, oval, circumference, arc,polygon (up to 12 sides), auto-adjusting rectangle or auto-adjusting circular area
		Edge angle	Shape is rectangle.
		Pair edge	The shapes are rectangle, rotated rectangle, circle, oval, ring, arc, polygon (up to12 sides), auto-adjusting rectangle or auto-adjusting circular area
		Trend edge width	Shapes are rectangle, rotated rectangle, ring and arc
		Blob (characteristic quantities)	• Labels, center of gravity, main axis angle, area, feret diameter, perimeter,roundness• The shapes are rectangle, rotated rectangle, circle, oval, ring, arc or polygon (up to 12 sides), edge detection rectangle area or edge detection circular area
		Stain detection	• Subtract stain detection by using subtract filter• Stain grouping function supports multiple stain detection and positionmeasurement• The shapes are rectangle, rotated rectangle, circle, oval, ring, arc or polygon (up to 12 sides), edge detection rectangle area or edge detection circular area• Supports measurement of the color image using fine color
		Trend edge flaw	• The shapes are rectangle, circle, oval, ring, arc, and polygon.• Supports flaw detection using straight lines, circles, ovals, and free-formstraight lines as reference models.
		Intensity inspection	The shapes are rectangle, rotated rectangle, circle, oval, ring, arc, polygon (up to12 sides), auto-adjusting rectangle or auto-adjusting circular area
		Color (only when acolor camerais connected)	• RGB and HSB measurement supported• The shapes are rectangle, rotated rectangle, circle, oval, ring, arc or polygon (up to 12 sides)
		Geometry	• Calculation result can be reflected• Shapes are point, line, and circle
		OCR	• Character recognition for max. 2 lines of 20 characters per line• Shape is rectangle• Built-in date/time encryption support function
Interface	Control input	External trigger input	2 pointsEV compatible inputrating: 26.4 V or less, 3mA or more4-camera simultaneouscapture/individual capturecan be selected. (whenCV-E500 is not connected,images from up to twocameras can be capturedat the same time).Individual trigger delay (0 to 999 ms) can be selected for each trigger input
	Control input		18 inputsInput rating 26.4 V or less, 2 mA or more
	Control output	Universal output	27 outputs NPN (including two FLASH outputs linked to external trigger.)
		Total comparator output	1 output, NPN open collector, maximum 50 mA (30 V or less)Supports total status hold control and one shot output (1 to 9999 ms)
	Monitor output		SVGA 800x600 (24-bit color 60 Hz)
	Run indicator		Power, Error LED display

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	RS-232C		Numerical value output, image data (compressible) and control input/outputenabled. Can be used simultaneously with other communication ports.Maximum baud rate of 115200 bps is supported.Do not use to connect to PLC link, CC-Link, or EtherNet/IP™
	Ethernet		Numerical value output, image data (compressible) and control input/output enabled.Can be used simultaneously with other communication ports.100BASE-TX/10BASE-T
	USB		Numerical value output, image data (compressible) and control input/outputenabled. Can be used simultaneously with other communication portsUSB2.0 HI-SPEED compatible
	PLC link		Numerical value output and control input/output using the RS-232C port orEthernet port enabled.Following PLCs are supported via link unit*1:• KEYKENCE CORP.: KV-700 series, KV-1000 series, KV-3000 series, KV-5000 series,KV-5500 series• Mitsubishi Electric: A series (RS-232C only), Q series, L series• OMRON: SYSMAC C series (RS-232C only), CJ/CJ1 series• Yaskawa Electric: MP900 series (RS-232C only)/MP2000 seriesDo not use to connect to CC-Link, RS-232C, or EtherNet/IP™
	CC-Link		By connecting the optional CC-Link unit CA-NCL10E, numerical value input/output and control input/output are enabled.• Supports remote device station, Ver. 2.00/1.10• Do not use to connect to PLC link, RS-232C, or EtherNet/IP™
	EtherNet/IP™		Numerical value input/output and control input/output enabled while using anEthernet port• Supports periodic communication (Max. 1436 bytes), supports messagecommunication• Up to 128 units can be connected• Compliant with compliance test Version.A5• Do not use to connect to PLC link, RS-232C, or CC-Link
Illumination control			By connecting the optional illumination expansion unit, LED illumination (12 V, 24V) and intensity control are enabled.• 2 channels per unit, connect up to 4 units• Supports multi-pattern illumination function
Continuous capture function			• 1 to 32-time multi-measurement (maximum, minimum and average values)• Error values can be excluded from the measurement result
Execution condition setting function			Can set whether to execute the results (OK/NG) for other measurement andcalculation windows in each measurement window.
Image capturing setting function	Processing area setting function		• The applicable 980,000 pixels (1024 (H) x 960 (V)) canbe captured from 1,980,000 pixels (1 megapixel mode).• The applicable 240,000 pixels (512 (H) x 480 (V))can be captured from 320,000 pixels (normalmode)However, when CV-H035C/H035M is connected, support is only providedfor 240,000 pixels of the 310,000 pixels used for the process area.
	Scan mode (valid only when a monochrome camera is connected)		Progressive/interlace selectable
	Capturing start/end line setting function		Desired capture start/end line can be set within the image capture range.CV-H200C/H200M cannot capture fewer than 100 lines.
Correction functions	Position adjustment		Batch, individual (maximum 128 settings), X, Y, ±180° rotation.
	Camera gain adjustment		Sensitivity adjustment, offset, and span adjustment (RGB batch/individual and span can be set for each of 16 brightness levels. RGBindividual setting can be supported when color camera is connected.)
	White balance adjustment (valid only when a color camera is connected)		Manual setting using white paper
	Image inversion function		Can generate mirror images
	Scaling		X and Y calibration setting for each camera. Conversion from measurementvalues and calculation values is supported.
	Filter function	Count	The same type of filter can be used up to 9 times. 13 steps. (For binarization and subtract only: 1 step/window)
		Type	Expand, shrink, average, median, edge sharpening, edge extract X, edge extractY, Sobel, Prewitt, Roberts, Laplacian, binary, subtract, illumination adjustment,contrast conversion, image extraction, image shade correction, Blur
Display language			Japanese/English/German/Italian/French/Traditional Chinese/Simplified Chineseselectable
Calculation function	Numerical operation	Number of settings	128 calculations/1 program
		Arithmetic operation	+, -, x, ÷
		Arithmetic function	Square, exponential, counting fractions as one, round-off fractions, maximum, minimum, average, average within range,square root, absolute value, remainder, distance, angle, sin, cos, tan, asin, acos, atan, π
		Comparative operator	<, ==, Not
		Geometric calculation	Distance between 2 points, angle of line segment, circle radius, circle center,average angle, straight line, cross point, distance between a point and a straightline, straight line angle, angle between the two crossed lines, perpendicular linebetween a point to a line, perpendicular bisector , midpoint
		Coordinate conversion function.	Coordinate system conversion, rotating matrix
		Type conversion function	Coordinate constant conversion, constant coordinate conversion,angle unit conversion
		Logical operator	AND, OR, NOT, XOR
		Sort function	Maximum value index output, minimum value index output
		System function	Number of measurement times, measurement time, year, month, day, time, minute, second
		Time axis operation function	Previous measurement result acquisition operator
	Command memory		1000 command memories that can be rewritten from external devicesor the remote control console during operation are installed.
Support functions	Statistics analysis	No. of data	Max. 20000 data (can be saved into an SD card in a batch)
		Statistical items	Maximum, minimum, average value, deviation (3σ), total status OK/NG times
	Screen save (valid when monochrome and color cameras are connected)		The following number ofimages can be saved inthe system's memory:• Maximum 511 images (monochrome camerain 240,000 pixel mode)• Maximum 255 images (monochrome camerain 310,000 pixel mode)• Maximum 127 images (monochrome camerain 1 megapixel mode)• Maximum 63 images (monochrome camerain 2 megapixel mode)• Maximum 508 images (color camera in240,000 pixel mode)• Maximum 253 images (color camera in 31pixel mode)• Maximum 124 images (color camera in 1megapixel mode)• Maximum 60 images (color camera in 2megapixel mode) (These are the maximumvalues with only onecamera connected, and[Condition] set to [AllImages].)
	Programming aid functions	Screen Magnification	Between 4% and 1600% during setting or operation (6% and 2500% during fullscreen display) (Size can be set for each screen while displaying multiplescreens.)
		Edge Waveform Display	Edge waveform can be graphically displayed during setting or operation, andedge intensity and measurement values (some are not supported) can bedisplayed during setting.
		Profile Display	Trend edge position and gap can be graphically displayed during setting oroperation.
		Stability display	Stain detection (stain level) is displayed during setting or operation.
		Character Extraction Display	OCR automatic cutout waveform graphics can be displayed during setting oroperation
		Shift all windows	Selected windows from an identical camera or an identical registered image canbe shifted in the desired XY direction in a group.
		Defect Waveform Display	The flaw level waveform of the trend edge tool can be displayed as a graphic inProgram or Run mode.
	Display template setting function	No. of display templates	10 templates/1 program (within which 4 templates are specified values),externally selectable
		No. of screens that can be displayed simultaneously	Max. 5 screens can be displayed at the same time (when 5 scr. (HORIZONTAL)/5 scr. (VERTICAL) is selected).
		Hold image	Up to the past three images (NG images) can be displayed as hold images.Measurement results and measurement time can be viewed. (The number ofdisplayable times varies between 0 and 3 depending on camera's connectionstate

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	Screen customization function	No. of customized screens	10 screens/1 program
		Custom item	Character string: Measurement value (decimal point can be specified), result,custom character, graphics, active text
		Measurement result interlink	• Display color can be changed according to the result for figures and customcharacters.• Can set a message in the allocation table that relates to the measurementvalue (active text)
	Operation rewrite function		• Upper/lower tolerance or command memory can be rewritten during operation.• Supports illumination adjustment during operation (when CA-DC21E isconnected)
	Emulation function		Built-in emulation function that can create new program data and save data onCV-5002SE in the FE format for the CV-3002 Series SE, SEII, and SEIII, and theCV-5002 Series.
	Program file update function		The program data used on the CV-3002 Series or CV-5002FE can be converted into the program data format for the CV-5002 Series second edition.
	Custom menu function		Shortcut menu to a desired program screen can be created (20 menus/program).
	Memory card save function (SD2 slot only)		• Measurement value, judgment result, NG count, measurement image (compressible), stored image (compressible), captured image, statisticsanalysis data, RS-232C communication log, program data (only setting contentcan be saved to both SD1 slot and SD2 slot)• Can save data during test run (except for program data)
	Others		Screen capture function, password function, re-test function, file managementfunction, I/O monitoring, RS-232C monitoring (with log save function)
Rating	Power voltage		24 VDC ±10 %
	Current consumption		2.4 A (2 cameras at maximum load)/3.2 A (4 cameras at maximum load)
Environmental resistance	Ambient temperature		When 2 cameras are connected: 0 to +50 °C 32 to 122 °F (0 to +45 °C 32 to 113 °F when a camera with 1,000,000 pixels or more is connected) When 4 cameras are connected: 0 to +45 °C 32 to 113 °F
	Relative humidity		35 to 85 % RH (No condensation)
Weight			Approx. 1,250 g

*1 Some models also are compatible with the RS-232C, Ethernet ports in the system.

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