

Image Processing Device Lineup

MICRO-IMAGECHECKER PV300

Ultra high-speed, gray scale image processing
Full set of interfaces with CompactFlash card and Ethernet



MICRO-IMAGECHECKER A230

Character recognition & character checker type



MICRO-IMAGECHECKER A110

Multi-checker V2 series
Compact-size, gray scale image processing (1 camera type)



MICRO-IMAGECHECKER AX40

Color and gray scale image processing
Full set of interfaces with CompactFlash card and Ethernet



MICRO-IMAGECHECKER A210

Multi-checker V2 series
Compact-size, gray scale image processing (2 camera type)



LightPix AE20

Visual sensor with lights, camera and CPU integrated into one unit
Color area/color discrimination/color and pattern matching/
edge detection/apex detection/size measurement



These materials are printed on ECF pulp.

These materials are printed with earth-friendly vegetable-based (soybean oil) ink.



Panasonic

ideas for life

Image Processing Device
MICRO-IMAGECHECKER

PV300

For One-Step-Ahead Image Processing
The New Ultra High-Speed Imagechecker

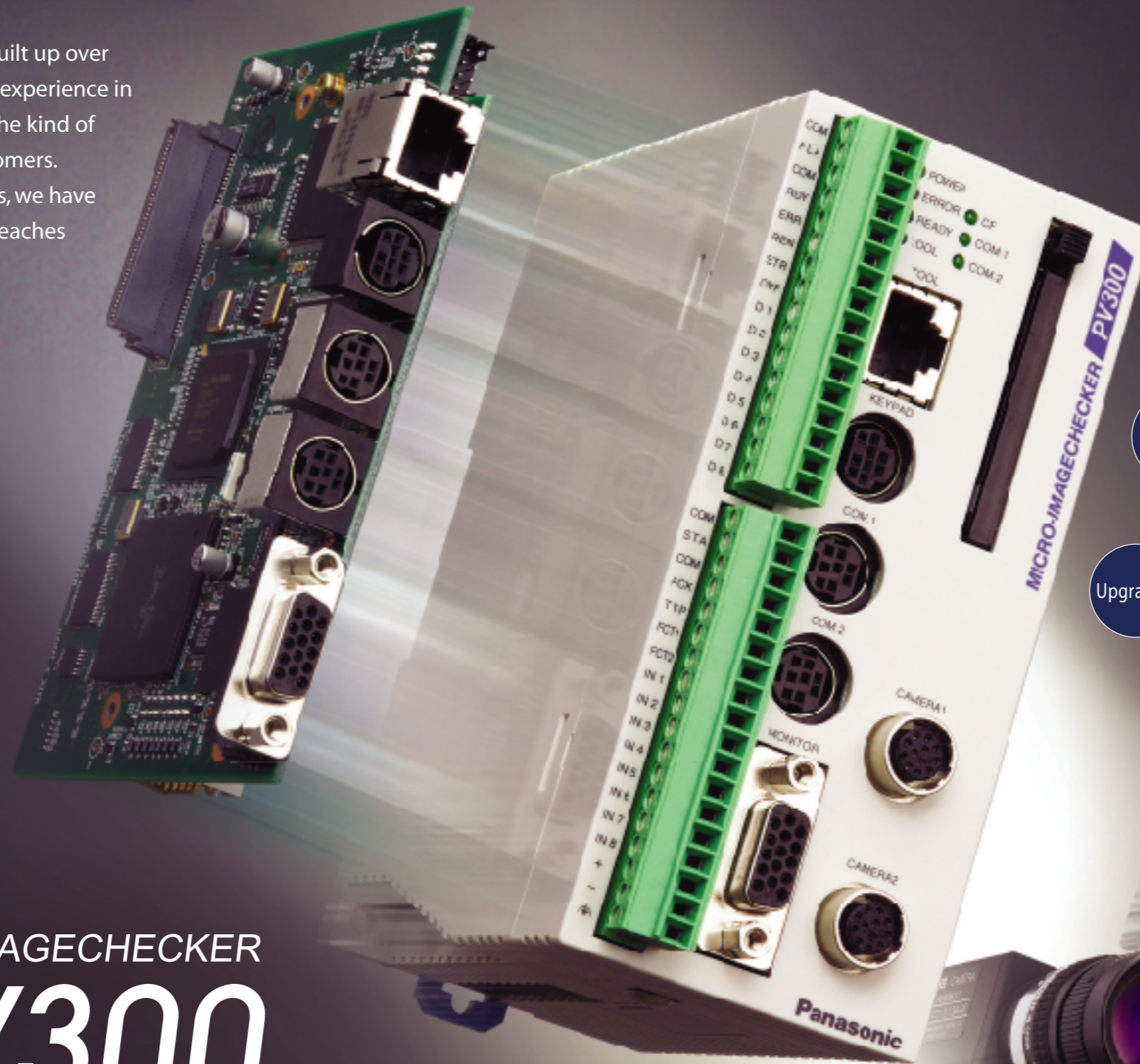


IMAGE CHECKER 20th

New

High performance exceeding even large-scale devices.
 Gray scale type image processing device for the next generation.

The PV300 inherits image processing technology built up over many years and know-how derived from hands-on experience in the field. Even more importantly, it is designed for the kind of performance requirements demanded by our customers. Combining ease of use with sophisticated functions, we have created a gray scale image processing device that reaches an even higher level of perfection.



MICRO-IMAGECHECKER
PV300



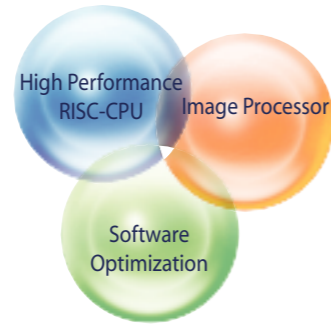
SPEEDY Highest processing speed in its class
 Great reductions in processing speed using a dual processor configuration combining the most robust image processor in its class with the high-performance RISC-CPU.

EASY User-friendly interface
 Easy-to-use operation menus with a wealth of processing functions, easy-to-read color message display, setting help, etc.

Upgraded Supports 4 cameras simultaneously
 Support for 2 camera types: standard cameras and high-speed random cameras.
 Supports a maximum of 4 camera connections using a camera switching unit.
 (standard cameras only)

High Speed

Equipped with a dual processor (image processor + high-performance RISC-CPU), the PV300 utilizes software optimization to achieve a unique high-speed image processing algorithm.



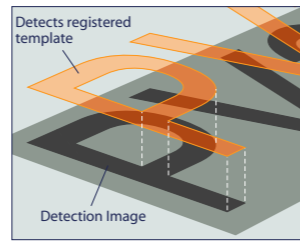
[High Speed 1]

Smart Matching

Detects the presence (or absence) of a pattern (object) in the search area that matches the template registered. Detection of sub-pixel position possible with gray scale matching. In addition, using the gray scale differential processing function, shape inspection e.g. to detect chips or other flaws in an object, can also be carried out simultaneously.

[Processing Time]
Previous Model: 36.0 ms
PV300: **3.8 ms**
Condition: Without orientation correction
Template: 128 x 128
Search Area: 512 x 480

10
times faster than previous model



[High Speed 2]

Feature Extraction

Features, such as the number of objects, the area, central coordinates, angle of the main axis, projection width or perimeter length can be extracted using a binary image.

[Processing Time]
Previous Model: 61.0 ms
PV300: **3.9 ms**
Condition: With orientation correction
Template: 486 x 452
Object color: Black

16
times faster than previous model



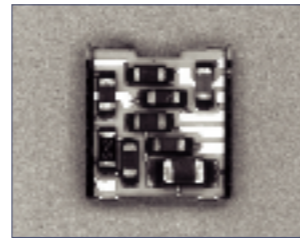
[High Speed 3]

Gray Scale Window

An area can be created in a 256 gray scale image, with a rectangular, circular or polygonal shape over the area where object detection is to take place. An average value for the brightness data (gray scale value) for all pixels in that area can be calculated.

[Processing Time]
Previous Model: 69.0 ms
PV300: **1.7 ms**
Condition: With orientation correction
Inspection Area: 486 x 452

40
times faster than previous model



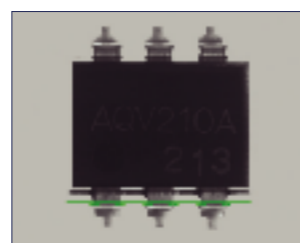
[High Speed 4]

Gray Scale Edge

The size, distance between lead pins or pitch can be measured for an inspection object. Parameters allow settings to be made in great detail. Using the extreme accuracy of sub-pixel processing, the edge in question can be reliably extracted for a wide variety of object states.

[Processing Time]
Previous Model: 28.0 ms
PV300: **2.7 ms**
Condition: With orientation correction
Inspection Area: 200 x 160

10
times faster than previous model



Binary Window

[Processing Time] PV300: **2.1 ms** Previous Model: 49.1 ms
Conditions: With orientation correction, inspection area: 486 x 452

Judges whether a certain amount of area for an object is present using a binary image. High-speed processing faster than 23 times previous models is possible, even when multiple inspection areas are specified.

Binary Edge

[Processing Time] PV300: **0.9 ms** Previous Model: 1.8 ms
Conditions: With orientation correction, inspection area: 200 x 160

Determination of position and simple size measurement can be carried out at approximately twice the speed of previous models. There is no effect on inspection speed even if the inspection area is increased for purposes of stability in inspections.

User-Friendly Interface

The user interface has been designed with the user in mind. The color message display facilitates quick recognition. The dedicated keypad fits comfortably in the palm and makes configuring the PV300 as simple as child's play.

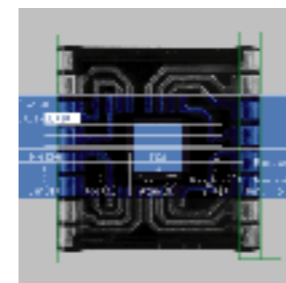
Rich Information Display

The PV300 makes it easy to distinguish between guidelines and character information by displaying information in various colors. In addition, parallel judgment output results can also be monitored in color.

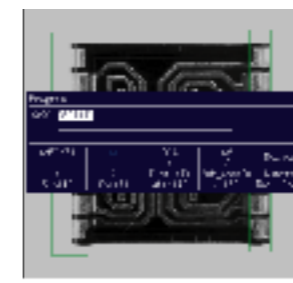
- Status Display Area**
 - Currently selected model number, model title and shutter speed
 - Currently displayed image type
 - Message Area: Displays various messages, sub-windows for checker settings and checker test results.
 - Overall Judgment Result: Displays OK (in green) when the output judgment meets the judgment requirements set in "Overall Judgment"
 - Signal Output Status: When the following signals are output, the box below each signal is illuminated. (RUN mode only)
 - R: READY signal
 - E: ERROR signal
 - 1~8: D1 to D8 signals
 - Execution Time
- Menu Bar**: Displays menus for setting inspection conditions and the inspection environment.
- Screen Display Area**
 - <RUN mode>: Displays images, checker areas, inspection results, etc. depending on the settings in Settings Mode.
 - <Settings Mode>: Displays images, checker areas, etc. Settings windows called from the menu bar are also displayed in this area.

VGA Monitor Display

High performance color monitor which recreates inspection objects on the screen with high fidelity. Operations and settings can be carried out easily with a combination of pull-down menus and the keypad. In addition, semi-transparent mode, allowing operations to be carried out while viewing captured images, and fill mode, which blocks out background colors, are both supported. Readability has been improved using a large (18-dot) Chinese character font.



Semi-Translucent Mode



Fill Mode

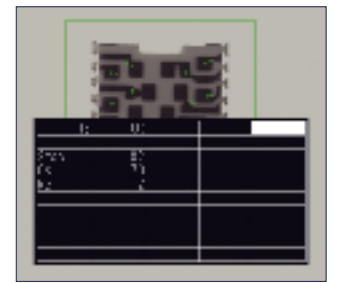


Keypad

Just position the cursor on a menu and press the <Enter> key.

Data Monitor

Up to 50 inspection results can be displayed in a list on the monitor, allowing the operator to check the results on the monitor. Threshold adjustment (upper and lower limit values) can also be changed on the data monitor without having to enter them in the settings menu.



Applications

The PV300 can be used for a wide selection of applications where high-speed processing is required, such as determination of presence/absence and orientation, measurement of area and size, etc.

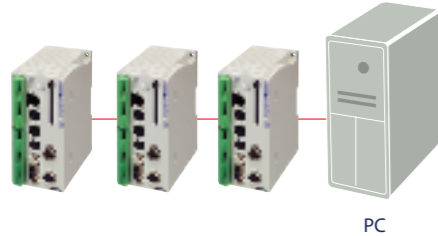
- Inspection of presence/absence of parts
- Inspection of part size
- Inspection of part orientation
- Inspection of presence/absence of date or serial no.
- Inspection of product nameplate label
- Inspection of remote control switch printing
- Inspection of cap tightness
- Inspection of logo mark printing
- Inspection of flat cable width
- Inspection of label position
- Inspection for debris/dirt on part
- Inspection for 7-segment illumination
- Inspection of substrate positioning
- Inspection for metal part picking, etc.

Full Selection of Interfaces

External interfaces are essential for image processing devices of the future. The PV300 is equipped with a full selection of interfaces that rival even large-scale devices.

Ethernet Connection

The PV300 can be connected to a LAN using high-speed Ethernet (100BASE-TX) to meet various application requirements. Measurement data can be transmitted to a PC at high speed during operation. In addition, the inspection status of multiple PV300 devices can be monitored from a single PC. With the high-speed connection to a PC, backing up image data is easy.



Keypad Operation

The amazingly easy-to-operate keypad, which resembles the feel of playing a game and was popular in the A series is also used by the PV300.



PLC Link Function

The PV300 can communicate easily with external devices, such as PLCs, using the RS232C port. No programming is necessary to connect the PV300 to our PLCs or to selected PLCs of other makers.

Supported Models: Matsushita Electric Works PLCs
OMRON Corporation - C, CV and CS1 series
Mitsubishi Electric Corporation - A, Q and FX series
Allen-Bradley - SLC500 series

VGA Monitor

Judgment results and settings programs are displayed in color for outstanding visibility. (Camera-captured images are in black and white.)



Note: Commercially-available VGA monitors may also be connected. (devices supporting horizontal synchronous frequency: 31.466KHz and vertical synchronous frequency: 59.94KHz only)

Operation cannot be guaranteed with devices from other manufacturers.

External Memory (CF Card) Support



Up to 512MB of data can be saved on CompactFlash memory cards, e.g. to store images, back up data or settings, etc. Data analysis and trend tracking can be taken to another level by using a spreadsheet program such as Excel.

Note: Backup image data can be used as regular bitmap files on a PC.

DIN Rail Installation

Connect up to 4 (monochrome) cameras

- Support is standard for the 2 types of standard cameras and high-speed random cameras.
- Up to 4 cameras can be connected using a camera switching unit. (standard cameras only)
Note: 2 cameras are normally connected without a camera switching unit, i.e. each camera has its own cable.



Functions

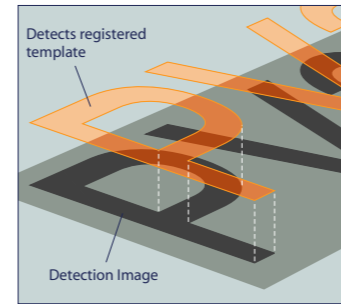
The number of inspection program settings has been increased from 16 types in previous models*1 to 64 types.

Top in Class *2

Smart Matching

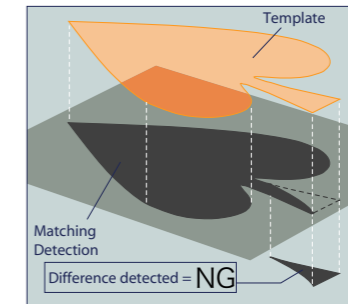
Upgraded

Detection of sub-pixel position possible with gray scale matching. In addition, using the gray scale differential processing function, shape inspection, etc. can also be carried out simultaneously. Memory capacity has been increased 4 times over previous models, allowing support for an even wider range of applications.



Differential Function

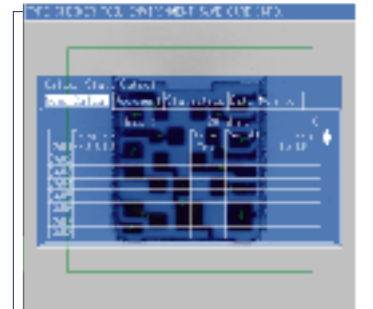
Based on the position information obtained by the matching function, the registered object and detected object are overlapped and compared on a pixel-by-pixel basis. Any pixels with a difference in brightness over a certain level are detected. The area value of such pixels can then be used to make pass/fail judgments.



Numerical Calculation/Judgment Output

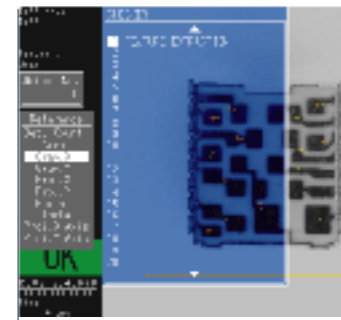
Top in Class *2

The numerical output function has been greatly simplified so that even a novice can set it easily. Operation has also become even easier as both numerical calculations and judgment output can now be set on the same screen (up to 96 formulas).



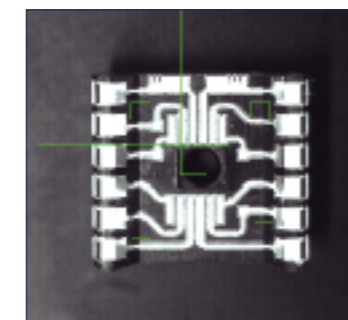
Feature Extraction

Features, such as the number of objects, workpieces, the area, central coordinates, angle of the main axis, projection width or perimeter length can be extracted.



Gray Scale Window

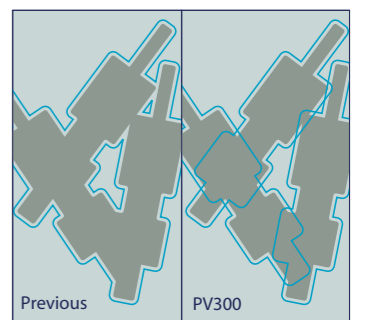
An inspection area can be created in a 256 gray scale image, with a rectangular, circular or polygonal shape, over the area where object detection is to take place. An average value for the brightness data (gray scale value) for all pixels in that area can be calculated.



360° Contour Matching

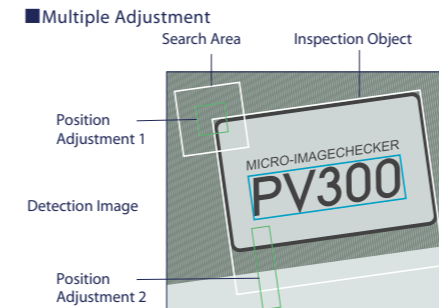
Upgraded

Stable position detection is possible even for difficult-to-detect objects which are hidden due to overlapping by predicting contours lines before carrying out judgment. The range of settings has been doubled and support has been added for 4 cameras.



Rotation/Position Adjustment

Highly accurate and reliable inspection is realized by automatically adjusting object orientation and stop position deviation. Since adjustment is carried out using gray scale data, the PV300 is especially resistant to variations in brightness. Complicated adjustments are also possible using the priority adjustment function.

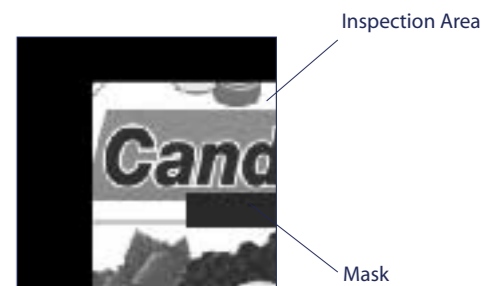


- Position Adjustment
- Rotation Adjustment
- Multiple Adjustment
- Priority Adjustment

Reliable position adjustment by filter processing
In order to boost the accuracy of rotation and position adjustment, filter processing is used to realize stable image processing, even for images with large amounts of noise.

Mask

The shape of the inspection area can be set to match particular targets. Mask area settings can also be combined to allow efficient inspections to be carried out only on the necessary parts.

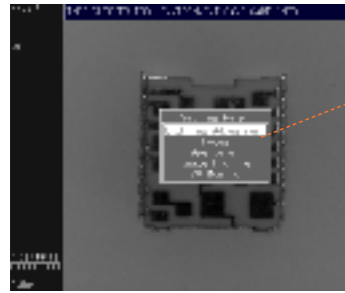


Settings

A full range of inspection modes to meet customers' needs. Support functions for optimal settings.

Setting Help

This function helps the user make settings that in the past relied heavily on human judgment, e.g. setting the focus, adjusting the aperture, finding the optimal settings for the parallel monitor, lighting adjustment, density profile display, etc.



Density Profile

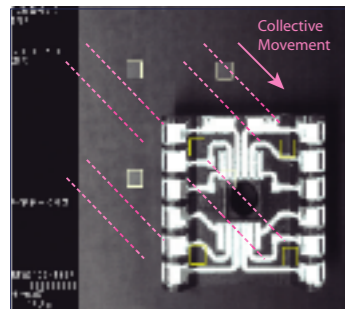
Gray scale values for the image are displayed in an easily understandable table.

Parallel Monitor

The "Parallel Monitor" function is also useful during actual operation for monitoring parallel input and output signals to and from the PV300.

Collective Movement

Checkers that have been set can be moved collectively all at once. This is useful for fine adjustment when re-setting cameras. It is also convenient when transferring product type data to a different device.



Security

Passwords can be set in "environment" - "initial settings". Vital settings data can be protected from careless operating errors.



Inspection Mode

The PV300 is equipped with a variety of inspection modes, such as position adjustment, rotation adjustment, gray scale and binarization, to support a wide range of inspection needs.

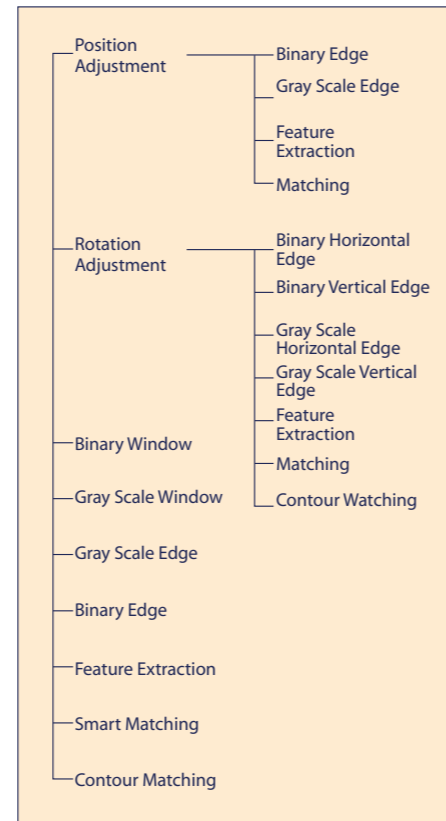
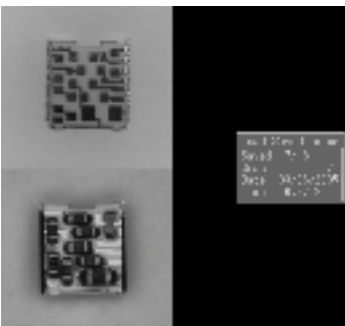


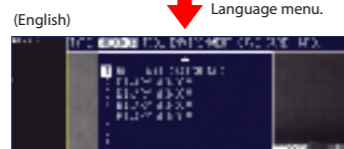
Image Storage

Using a calendar function, the date a defect was discovered and the number of inspections can be added to saved color images. This is useful for later verification (checking a defective product against a saved image) and for analyzing defect tendencies.



Global Support (English/Japanese display & CE compliance)

Considering that the device may be shipped overseas, the display can be switched between English and Japanese. The controller and dedicated cameras are standardized items and CE compliant.



Selection is easy using the Environment Settings - Language menu.

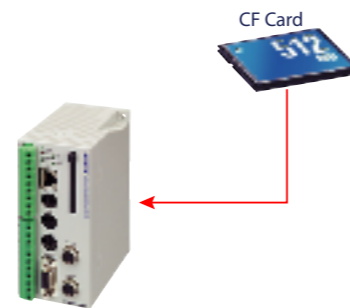
Support

Our popular menus and support software greatly improve workability during inspections.

Download from CF card

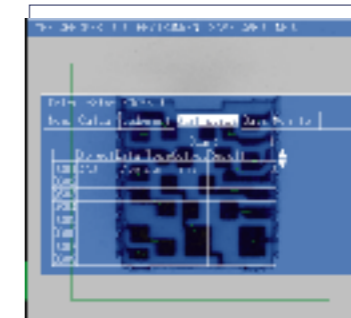


It is now possible to download a program stored on a Compact Flash card to the main unit using a parallel external signal.



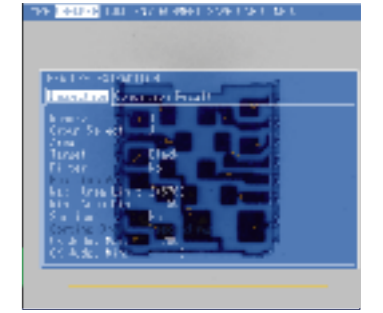
Statistical Support

Statistical data such as the maximum, minimum and average data values, number of failed results, etc. can be displayed. Maximum, minimum and average values in pass judgments can be checked, allowing them to be used as a guide for subsequent upper and lower limit settings.



Print Screen

Display and settings screens can be saved to a memory card as bitmap files. This is convenient for creating documents or for checking previous images.



Parallel Handshake Support



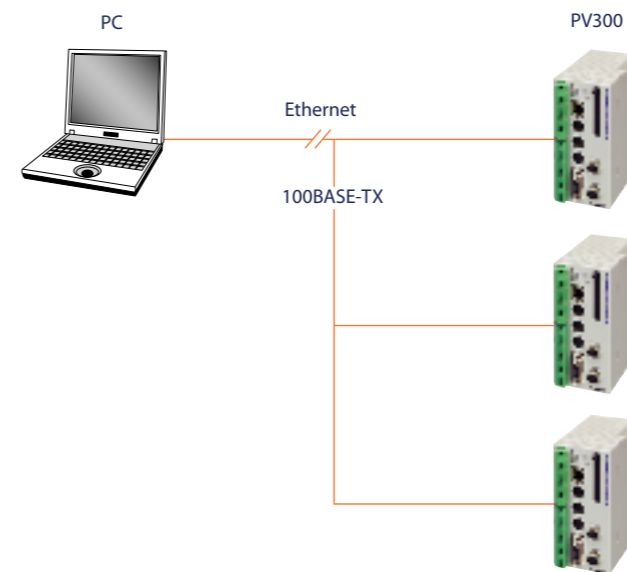
The judgment and numerical calculation results available for parallel external output have been drastically increased from 8 to 96.

Full Peripheral Support with Vision Support Tool

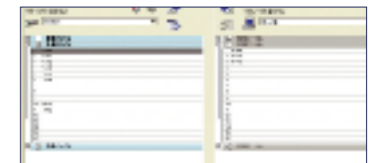
The Vision Support Tool provides even more convenient functions. Connects to PV300s using a high-speed interface (100BASE-TX) to meet various application requirements.



(Optional)



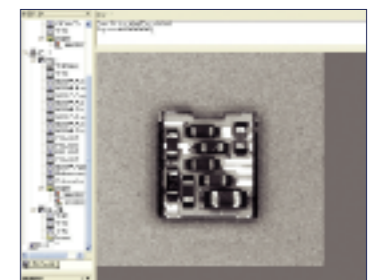
Product type data backup screen



Document display screen



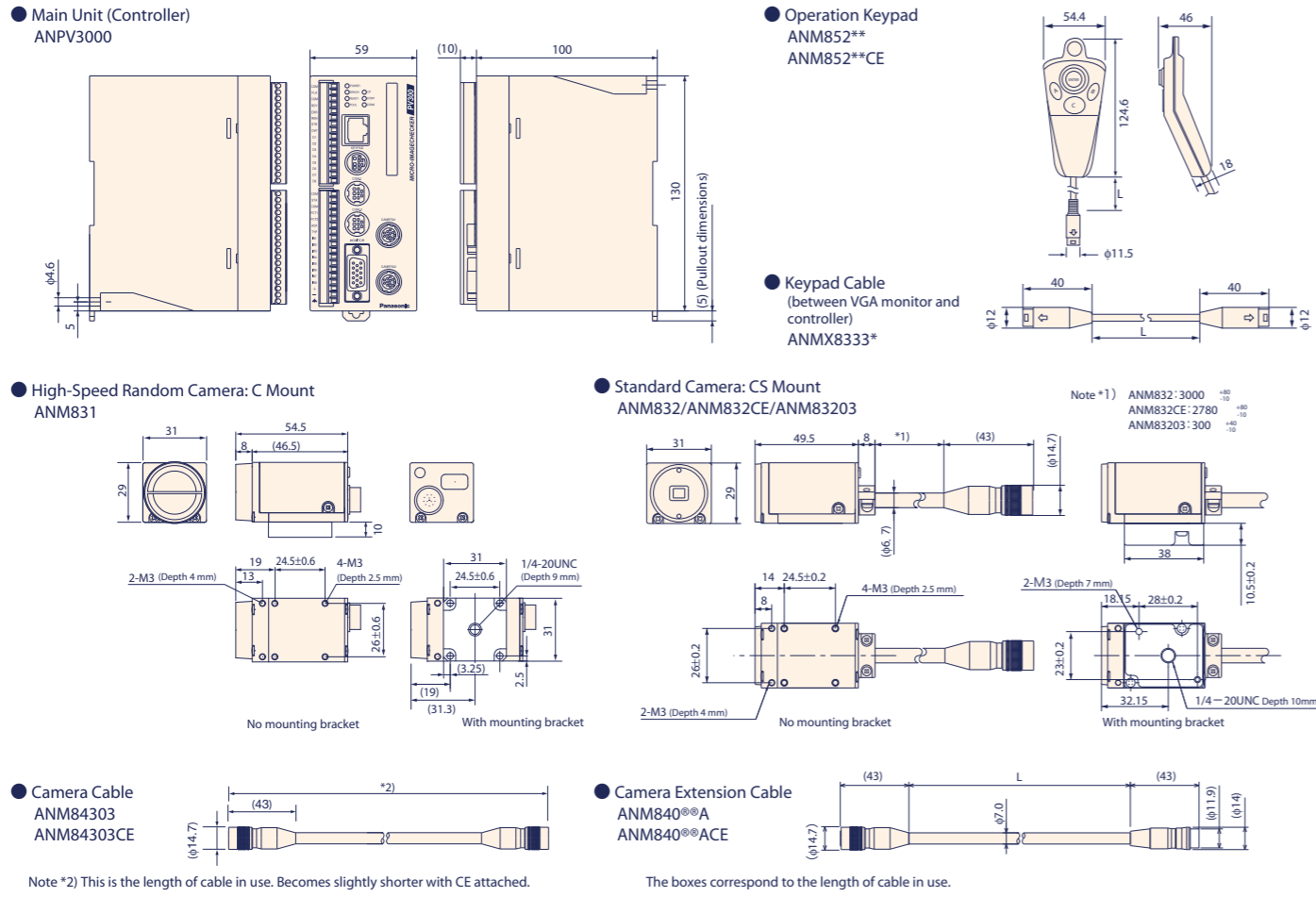
Image data display screen



1. Backup/recovery of image and settings data
2. Copy/move/deletion of image and settings data
3. Checking of saved images on PC
4. Conversion of settings data to CSV document: Editing possible with Excel

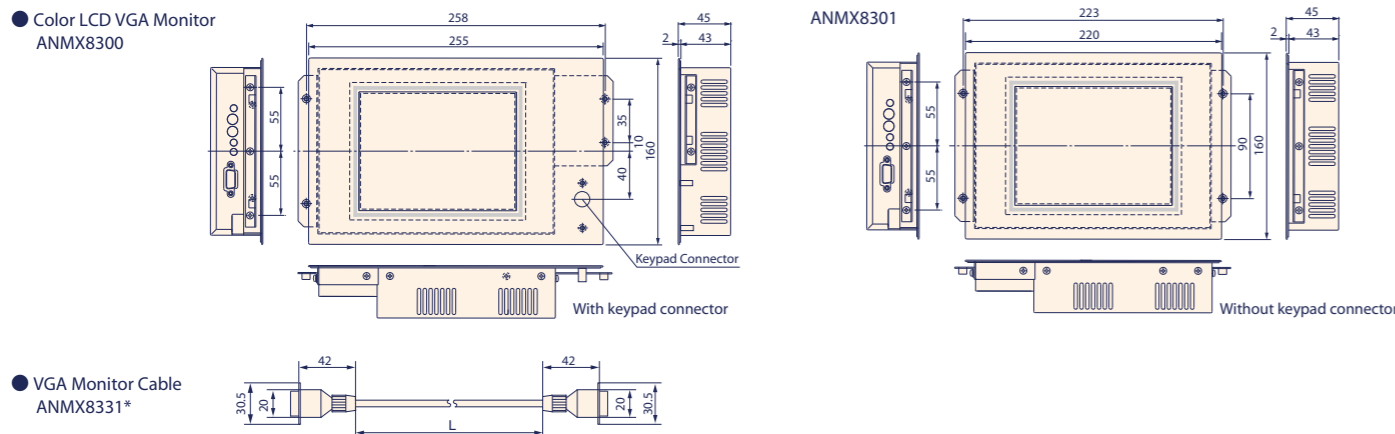
Note: The screen design may differ from that shown.

Dimensions (Unit: mm)



C Mount Lens		A		B	
ANB842L	f=6.5	φ48	42		
ANB843L	f=8.5	φ42	40		
ANB845NL	f=1.6	φ30	33		
ANB846NL	f=2.5	φ30	37.3		
ANB847L	f=5.0	φ48	48		
ANM88161	f=1.6	φ30.5	25		
ANM88251	f=2.5	φ30.5	25.5		
ANM8850	f=5.0	φ27.5	38.5		
ANM88501	f=5.0	φ30.5	38.5		

CS Mount Lens		A		B	
ANM8808	f=8	φ=34	35		
ANM88081	f=8	φ=31	35		
ANM8804	f=4	φ=34	41		
ANM88041	f=4	φ=31	40		
ANM8828	f=2.8	φ=34	38		
ANM88281	f=2.8	φ=31	37.5		



Product Numbers and Specifications

Table of Product

Product Name	Specification	Part No.
PV300 Controller		ANPV3000
High-Speed Random Camera (C Mount)	progressive support (CE version)	ANM831
Standard Camera	with 3 m cable	ANM832
	with 3 m cable: CE version	ANM832CE
	with 30 m cable	ANM83203
High-speed Random Camera Cable	3 m	ANM84303
	3 m(CE version)	ANM84303CE
Camera Extension Cable	2 m extension: Total 5 m (CE version)	ANM84002A
	7 m extension: Total 10 m	ANM84007A
	12 m extension: Total 15 m	ANM84012A
	17 m extension: Total 20 m	ANM84017A
	2 m extension: Total 5 m (CE version)	ANM84002ACE
	7 m extension: Total 10 m (CE version)	ANM84007ACE
VGA Monitor	With keypad connector	ANM8300
	Without keypad connector	ANMX8301
Kit for installation on main unit	With keypad connector. Mounting brackets (ANMX835)/Monitor cable: 0.5 m/Keypad cable: 0.5 m	ANMX8302
	Without keypad connector. Mounting brackets (ANMX835)/Monitor cable: 0.5 m	ANMX8303
Controller Mounting Brackets	Brackets for mounting VGA monitor on the controller	ANMX835
Cables	Monitor cable length: 0.5 m (for single-unit mounting)	ANMX83310
	Monitor cable length: 1 m	ANMX83311
	Monitor cable length: 2 m	ANMX83312
(with keypad controller) Keypad cable for connection to main unit	Cable length: 1 m	ANMX83330
	Cable length: 1 m	ANMX83331
	Cable length: 2 m	ANMX83332
CS mount Lens	f2.8 CS mount compact lens	ANM8828
	f2.8 CS mount compact lens with lock	ANM88281
	f4 CS mount compact lens	ANM8804
	f4 CS mount compact lens with lock	ANM88041
	f8 CS mount compact lens	ANM8808
	f8 CS mount compact lens with lock	ANM88081
C mount Lens	f6.5 C mount lens with lock	ANB842L
	f8.5 C mount lens with lock	ANB843L
	f16 C mount super-compact lens with lock	ANM88161
	f25 C mount compact lens with lock	ANB846NL
	f25 C mount super-compact lens with lock	ANM88251
	f50 C mount lens with lock	ANB847L
Adapter Ring	5 mm	ANB84805
	0.5/1.5/10/20/40 mm	ANB848
Operation Keypad	with 2 m cable	ANM85202
	with 3 m cable	ANM85203
	with 2 m cable: CE version	ANM85202CE
	with 3 m cable: CE version	ANM85203CE
COM Port Cable	for connection to PC (D-SUB 9 pins): 3 m	ANM81103
	for connection to PLC (discrete-wire cable): 3 m	ANM81303

General Specifications

Product Name	Specification
Rated Operating Voltage	24 V DC
Operating Voltage Range	21.6 to 26.4 V DC (including ripples)
Rated Current Consumption	0.7 A max. (1 camera) 0.9 A max. (2 cameras)
Ambient Temperature (in use)	0 to 50°C (no freezing or condensation)
Storage Ambient Temperature	-20 to +60°C (no freezing or condensation)
Ambient Humidity (in use and storage)	35 to 75% (at 25°C with no freezing or condensation)

Product Name	Specification
Noise Immunity	1000 V pulse width 50 ns/1 μs (using noise simulator method)
Vibration Resistance	10 to 55 Hz, 1 cycle/1 min. Double amplitude of 0.75 mm. 30 min. each in X, Y and Z directions
Shock Resistance	196 m/s ² , 5 times each in X, Y and Z directions
Weight	Approx. 450g

Functional Specifications

Product Name	Specification	
Settings Data Storage Capacity	approx. 4 MB	
Frame Memory	512 x 480 (pixels)	
Operation Environment	Menu selection by dedicated keypad (selection of Japanese/English) Key Emulation Menu selection by serial command	
Input/Output	Cameras	2 Standard cameras or progressive high-speed random cameras (standard camera: max. 4 cameras when using camera switching unit)
	Monitor Output	Color VGA output
	Memory Card	Compact Flash: 1 slot
	Serial	RS-232C x 1 channel - Input: start/product type switch/camera display switch/template re-registration/CompactFlash settings restore/reference to and alteration of upper and lower values for numerical computation/reference to and alteration of binary level/reference to and alteration of gray scale edge thresholds/data storage/length input for input commands for statistics initialization (for PLC) - Output: output (no. of inspections/judgment output/numerical computations/statistics) synchronous or asynchronous to inspection start trigger
	Parallel	Input: 13 points; output: 14 points; removable screw-down terminal block
	Keypad Input	1 Connector for dedicated keypad (ANM8520*)
Tools	Ethernet: 1 channel	
Image Processing Functional Specifications	Product Name	Specification
	Monitor Display	Full color VGA/gray scale image/binary image Two-screen compressed display: side-by-side display (when gray scale image selected) through/memory, data monitor, marker, + information display region (128x480)
	Number of Connected Cameras	max. 2 cameras (max. 4 cameras with a camera switching unit)
	Processing Method	Gray scale processing - Binary processing
	No. of Product Types	Max. 64 types (depends on settings data capacity)
	Inspection Functions	Max. 99 checkers/product type 2Position adjustment, rotation adjustment, binary window 3Gray scale window, binary edge, gray scale edge 3Feature extraction, smart matching, contour matching
Numerical Computation	Max. 96 functions/product type Substitution for and calculations involving output values of inspection functions operators: 4-operation calculation, √, arc tangent, distance between 2 points, parenthesis, Sin, Cos, absolute value of difference	
	Max. 96 functions/product type Substitution for and logical calculation of judgment results from checkers and numerical computations operators: NOT/AND/OR/XOR/parenthesis	
Judgment Output	Max. 96 functions/product type Substitution for and logical calculation of judgment results from checkers and numerical computations operators: NOT/AND/OR/XOR/parenthesis	
Statistics	Max. 96/product type Allows substitution for results of numerical computation and judgment output results Calculation of no. of passes/no. of fails/pass average/pass distribution/pass max. value/pass min. value/pass range (for judgment output no. of passes/no. of fails only)	
Data Monitor	Max. 50/product type Displayed on screen in table form during RUN Title input and substitution of numerical computation results, judgment output results, statistical results and product numbers possible	
External Input/Output	Product Name	Specification
	Operation Data	Max. 4/environment Substitution in numerical computation possible
	Marker	Max. 8/product type Graphic display on screen during RUN
	Serial	RS-232C=1ch (max. speed 115200 bps)
		- Input: start/product type switch/camera display switch/template re-registration/CompactFlash settings restore/reference to and alteration of upper and lower values for numerical computation/reference to and alteration of binary level/reference to and alteration of gray scale edge thresholds/data storage/length input for input commands for statistics initialization (for PLC) - Output: output (no. of inspections/judgment output/numerical computations/statistics) synchronous or asynchronous to inspection start trigger - Computer link support: Supported models: Matsushita Electric Works PLC OMRON Corporation - C, CV and CS1 series Mitsubishi Electric Corporation - A, Q and FX series Allen-Bradley - SLC500 series
	Parallel	Input: 13 points; output: 14 points - Input: start/product type switch/camera display switch/template re-registration/data restore from CompactFlash - Output: ready/error/flush/image acquired/strobe/judgment output data/synchronous output (no. of inspections/judgment output/numerical computation/statistics) possible by handshake output
Ethernet	Ethernet: 1 channel - Output: output (no. of inspections/judgment output/numerical computations/statistics) asynchronous to overall execution/settings data/image backup and restore/conversion to documentation for settings data	
CF Card	Compact Flash: 1 slot - Output: output (no. of inspections/judgment output/numerical computations/statistics) asynchronous to overall execution/settings data/image backup and restore/screen dumps	
Other	Display Functions	Transparent menu/parallel output status monitor/reference coordinate display/checkers with fail results highlighted in different color
	Collective Movement	Collective movement of set checkers in units of position/rotation adjustment groups.
	Image Storage	Max. 16 images/camera Each time/storage possible according to judgment result Test runs available on stored images Display of date and time saved Function to maintain display of last image saved
Setting Help	Focusing/aperture adjustment/parallel monitor/lighting adjustment/gray scale profile display	
Calendar	Calendar information added to stored images File time stamp	
Password	Password function for when moving between settings modes	