NAiS

Image Processing Device
MICRO-IMAGECHECKER ®

A230

OCR (Optical Character Recognition)

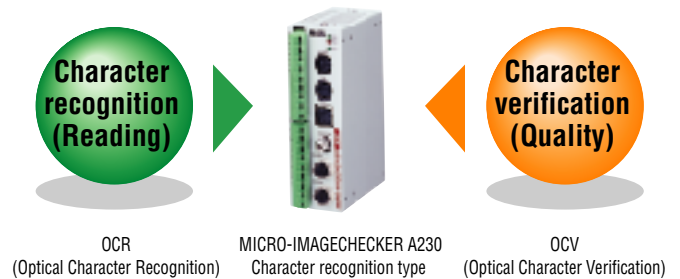# Optical Character Inspection the Easy Way

Featuring advanced character recognition and verification functions combined in a powerful, easy-to-implement system.

Bringing you innovation through perfect product date and lettering inspection

Supports various character inspections through OCR and OCV.

The A230 says goodbye to an era of high-priced, difficult-to-implement, dedicated machine vision systems for character inspections. After reading the characters printed on a product, the A230 character recognition function distinguishes the product type and the character verification function checks the printing quality. While combining these two powerful features, the A230 is also easier to implement than any dedicated character verification system before it. Matsushita Electric Works continually innovates to make image processing better and easier with features can handle a wide range of character inspection needs.

Character recognition (Reading)

Character verification (Quality)

OCR
(Optical Character Recognition)

MICRO-IMAGECHECKER A230
Character recognition type

OCV
(Optical Character Verification)

Extract characters easily and accurately!

Uses advanced algorithms to extract the characters only, with no background interference.

Grayscale processing is used so only characters are extracted even if there is competing noise in the background. Extract character strings by simply drawing around the target area to be designated.
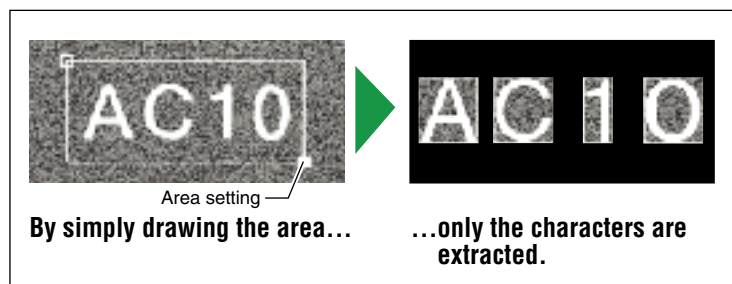
Even when there's a background pattern…

Even if there's a line in the background…

Operation is this simple!

Area setting

By simply drawing the area…   **…only the characters are extracted.**
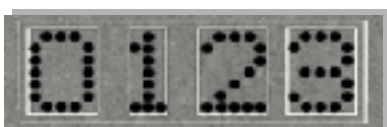
Even recognizes dot matrix, joined, chipped and blurred characters!

Recognition

The characters printed on products vary widely and can range from dotted inkjet characters, joined characters that were stamped, to blurred or partially omitted characters. The A230, boasting many powerful features, takes on the inspection of such characters, a feat that has been so difficult up to now.

Dot matrix characters   **Joined characters**   **Chipped or blurred characters**
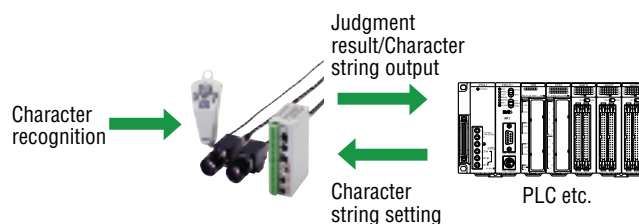
"Neural Network" learning function allows reading of different sized characters!

A character learning function based on Neural Network technology allows you to register a variety of characters for recognition. Once learned, the characters can be read even if their size changes.

AAAAAAA

Equipped with two OCR fonts

The A230 comes preinstalled with two OCR fonts, OCR-A and OCR-B. Inspection of characters in these fonts omits the need to conduct learning.

OCR-A
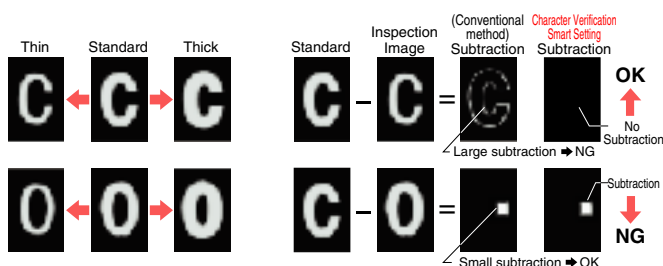1234567
890ABCD

OCR-B
12345678
90ABCDEF

Output the inspection results

A recognized character string can be compared with a string pre-specified by a PLC or PC and the result can be output as a judgment result. Also, recognized strings can be output as string data.
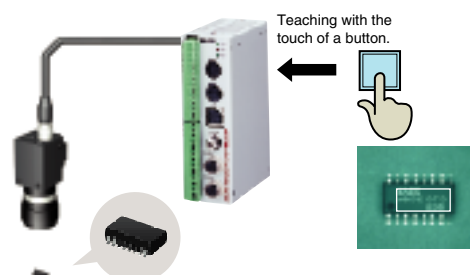
Character recognition →

Judgment result/Character string output →

Character string setting ←

PLC etc.

Inherits the functions of the A220 (OCV type) as is.

Smart Processing Function for OCV

Thin Standard Thick
C ← C → C

0 ← 0 → 0

Standard Inspection Image (Conventional method) Subtraction Character Verification Smart Setting Subtraction

C − C = G (No Subtraction) **OK**
Large subtraction ➡ NG

C − O = (Subtraction) **NG**
Small subtraction ➡ OK

Based on a registered grayscale template, thin and thick characters are automatically generated and grayscale subtractionl processing is conducted with the inspected characters. This allows you to make pass judgments for products that would problematically fail due to a slight thinness or thickness in the characters.
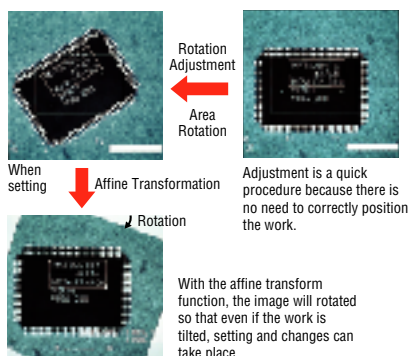
Teaching Function
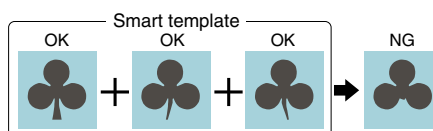
Teaching with the touch of a button.

Templates for referencing the product/lot number and expiry date can be re-registered using external control. On-site control is possible by easy push button operation and the A230 even supports position adjustment.

Extensive grayscale inspection function

Rotation Adjustment

Rotation Adjustment
Area Rotation

When setting → Affine Transformation

Rotation

Adjustment is a quick procedure because there is no need to correctly position the work.

With the affine transform function, the image will rotated so that even if the work is tilted, setting and changes can take place.

The grayscale function quickly and accurately detects and compensates for work rotation or shift.

Smart Matching

Smart template
OK + OK + OK ➡ NG

The pattern-matching algorithm used is the fastest in its class for machine vision. Also, the smart template procedure can even create and adjust template models based on the image from good products.

Lead Inspection of Connector or IC

Just specify the area, and the A230 will accurately measure the lead pitch and lead width in sub-pixel units and count the number of pins.

3

Specifications

Item		Specifications
Frame memory		512 480 (pixels) 256 gradations
Operator interface		Menu selection using special-purpose keypad (English/Japanese switchable)
Monitor display		Can be switched between Gray Scale Memory, Gray Scale Thru and Gray Scale NG
Processing	Gray scale	8-bit 256 gradations
Number of product types		32
Inspection functions	Position and Rotation position adjustment function	8 per type Sequence setting by matching/gray scale edge Priority adjustment function, Multi-stage adjustment function
	Character recognition	Max. 8 per type Area: Rectangle Inspection method: Outputs character label with highest match with specified dictionary. Processing: Character reading using Neural Network Inspection object: Black/white specification possible Inspection direction: Right to left, left to right, up to down, and down to up Character segment: Gray scale, automatic binarization, fixed binarization, with dilation/erosion function Adjustment: Position and rotation adjustment group Output value: Read character string (16 characters max.) Other: Read function for joined characters and ability to specify character strings for judgment
	Dictionary for character recognition	5 max. (equipped with OCR-A and OCR-B fonts) 40 characters max. (36 alphanumeric characters and 4 symbols) per dictionary 3 patterns max. per character
	Character verification	16 per type Character quality inspection using matching, subtraction, and labeling. (Supports up to ± 30 degrees rotation for each character.) Character: Possible to inspect up to a maximum of 30 characters. Auto pattern registration function that uses an original character segmentation function. It is possible to set so that only character edges are masked during pattern registration. Pattern: Patterns can be registered without character segmentation. Output: Number of detections, Detection position, Maximum subtraction, Number of subtraction, and Correlation value for each character. Judgment: OK/NG for whole characters and individual characters.
	Smart matching (sub-pixel processing)	4 per type Includes a subtraction processing function that operates after detection matching Sub-pixel accuracy multiple detection matching by gray scale correlation processing Rotation by raster detection and raster detection position (±30 degrees) Output: number of detected items, correlation values, detection position and angle, teaching registration changes possible from external source Judgment learning function via smart template
	Lead inspection (sub-pixel processing)	32 per type Detection at gray sub-pixel unit Area specification: Line or rectangle Scan method: single, gray filter/width Detection position: Dual edge detection Output: Number of leads Judgment: Number of leads, pitch, width, and overall judgment

Item		Specifications
Inspection functions	Gray edge (sub-pixel processing)	32 per type Detection at gray sub-pixel units Area specification: Line or rectangle Scan method: Single/projection, gray filter/width Detection position: Edge, front edge and rear edge, maximum differential value, or multiple edge (256 max.) Output: Detected edge coordinates, number of detections Judgment: Number of detections
	Gray window	32 per type Area: Rectangle, polygon (3to 16 points), circle, or oval Mask area: None, rectangle, polygon (3 to 16 points), circle or oval Output value: Gray scale mean value
Conversion data		4 registers, Can quote to numerical calculation. Can convert numerical calculation result to actual distance. Standard distance, Number of pixels, Coefficient
Numerical calculation		32 per type Arithmetic, arctan, square root, distance between two points, specific substitution, referencing of previous data, and output control
Judgment output		External output (D) registers: 32 per type Internal judgment (R) registers: 32 per type
External I/O	Serial	RS232C: 2 channels (max. 115200bps) Compatible with Matsushita Electric Works "FP Series" PLCs, Mitsubishi "MELSEC A Series/FX Series" PLCs, and Omron "C Series" PLCs.
	Parallel	Input: 11 points, Output: 14 points, Removable screw-down terminal block
Display functions		Display image brightness modification Image suppress function when setting checkers Image rotation function when setting checkers Bright display of reject locations, Data monitor, Checker list
Setup support tools	Image save function	8 screens Save/load function for inspection image (all screens/problem screens) Store images for re-inspection/resetting Windows-PC image save/load function using the Vision Backup- Tool Ver.2
	Debug function	Trap function, Spreadsheet
	Setup help	Focus setup, Aperture setup, Lighting adjustment, Gray scale profile monitor, Input monitor function, Forced output function
Moving work compatibility		Double-speed random camera (progressive), Flash, Electronic shutter
Camera		Double-speed random camera (progressive): ANM831, Standard camera: ANM832 Composite video (NTSC) input compatible (however the connection requires one port)
Number of cameras		2
Operating voltage		24V DC, 0.9A max.
Setup data backup		Image data and settings can be saved to a Windows PC using the Vision Backup- Tool Ver. 2
Dimensions (mm)		40 (W) 120 (H) 84 (D)

Product Numbers

Controller

Specifications		Part No.
MICRO-IMAGE-CHECKER A230 OCR type	NPN output	ANMA232
	Photo-MOS output	ANMA238

Camera

Specifications	Part No.
C mount camera, Progressive Double-speed Random: CE	ANM831
CS mount camera support electric-shutter with 3 m cable	ANM832
CS mount camera support electric-shutter with 3 m cable: CE	ANM832CE

Double-speed random camera cable

Specifications	Part No.
3m	ANM84303
3m: CE	ANM84303CE

Camera extension cable

Specifications	Part No.
2 m extension: total 5 m	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	ANM84002ACE
7 m extension: total 10 m: CE	ANM84007ACE
12 m extension: total 15 m: CE	ANM84012ACE
17 m extension: total 20 m: CE	ANM84017ACE

Keypad

Specifications	Part No.
with 2 m cable	ANM85202
with 3 m cable	ANM85203
with 2 m cable: CE	ANM85202CE
with 3 m cable: CE	ANM85203CE

Monitor

Specifications		Part No.
Panasonic GPBM910	100V AC/12 VDC	AUGPBM910

Data backup software

Specifications	Part No.
Vision Backup-Tool Ver.2 English version	ANM70131V2

Microsoft windows NT4.0/95/98 compatible.
An operating system is not included with this software.

Accessories

Specifications	Part No.
I/O terminal block for input: 1 piece, for output, 1 piece	ANMA8001
BNC connector Monitor BNC jack to PIN jack adapter	ANM8606

In addition, a full lineup of accessories including lenses and illumination equipment is available.

Unless otherwise specified, estimate and delivery prices do not include technician dispatching and other related services. Therefore, for the situations given below, additional charges may be added.
• Installation and trial operation guidance
• Inspections, adjustments, and repairs
• Technical support and instruction

To USA Customer
• Products sold by seller are covered by the warranty and patent indemnification provisions in its Terms and Conditions of Sale only.

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

PRINTED WITH SOY INK™