Panasonic
ideas for life

Short Form
Imagecheckers

Industrial Machine Vision

08/2008

Panasonic Machine Vision systems

Efficient, 100% quality assurance and process automation

Panasonic Machine Vision systems

Product selection chart

Contents

The appropriate system for your individual application

Thanks to our wide product range, from the easy vision sensor LightPix AE20 to the high-end system Imagechecker P400, we can offer you the optimal solution for your particular Machine Vision application. The table below provides you with an initial overview of which system to consider for which inspection task. We would be pleased to assist you in selecting the right product – please call us, the addresses and telephone numbers are listed on the last page of this brochure.

Imagechecker system	Category	Complexity of the task			Application											Page
		Easy	Medium	Demanding	Presence checking / sorting	Size measurement	Position detection	Object identification	Pick and place	Surface inspection	Optical Character Verification (OCV)	Optical Character Recognition (OCR)	Code reading	Color (C) Gray value (G)	Max. number of cameras	
PD60/65	2D Code Reader												++	G	1	8
LightPix AE20	Vision sensor				+	+	+	+						C+G	1	10
A100 Multichecker	Compact				+ +	+ +	+ +	+ +	+	+				G	1/2*	12
A200 Multichecker	Compact				+ +	+ +	+ +	+ +	+ +	+				G	2/4*	12
A200 OCR	Compact				+	+ +	+	+		+	+ +	+ +		G	2/4*	13
AX40	Compact				+ +	+ +	+ +	+ +	+ +	+				C+G	2/4	14
PV310	Compact				+ +	+ +	+ +	+ +	+ +	+ +				G	2/4*	16
PV500	Compact				+ +	+ +	+ +	+ +	+ +	+ +	+			G	4	18
P400MA	PC-based				+ +	+ +	+ +	+ +	+ +	+ +	+ +	+ +	+ +	G	4	20
P400	PC-based				+ +	+ +	+ +	+ +	+ +	+	+ +	+ +	+ +	G	12	22

* with video switch

Panasonic Machine Vision systems

Efficient, 100% quality assurance and process automation

Imagecheckers save money by

- Reducing scrap
- Detecting errors early in the production process
- Improving output
- Reducing warranty claims
- Increasing customer satisfaction

Sleep is natural, but not for an Imagechecker

Imagecheckers never sleep. They are never unobservant, not even for an instant, 24 hours a day, 7 days a week.

You have 15ms to detect an error

Products are inspected within milliseconds without influencing the overall production speed. Rapid 100% quality inspection at almost any place in the production line is assured.

You need a precise result?

Imagecheckers are very precise measuring devices. They can detect errors down to 1/1000mm. They see errors the human eye cannot.

Need a change?

Vision systems can be flexibly taught new inspection tasks when manufacturing processes are modified. Rather than performing costly hardware changes, simply adapt parameters in the inspection program.

Good or bad?

Imagecheckers judge based on fixed tolerances. Once quality limits have been set, the system detects product failures precisely, reproducibly and objectively.

Panasonic Machine Vision systems

Why choose Panasonic?

25 years of experience and more than 100,000 systems installed

The first Panasonic Vision system “Imagechecker 10” was developed in 1980 – originally for our own manufacturing plants. In 1983 we started to sell these systems to other companies. One of the most famous products of that time is the “Imagechecker 30”, which is still checking quality at numerous production lines. With the introduction of the M series, Panasonic initiated compact size systems, which still mark the trend. So far we have installed more than 100,000 Imagecheckers world-wide.

We mold smart solutions for you

Machine Vision applications must often be tailor-made. Rather than offer only a product, we strive to provide you with the most reliable and efficient solution for your visual inspection task.

From industry for industry

Panasonic vision systems are used extensively in our own manufacturing plants. Hence the systems are developed and based on real industrial requirements and applications. Our customers can rest assured that our products have thoroughly proved their quality and performance on the factory floor.

Quality matters

In order to guarantee superior quality, we have our own quality technology center, which employs the world’s most advanced equipment. Here electrical and mechanical tests are performed. Along with environmental chambers, EMC testing and chip analysis devices, our products are subjected to quality tests that often exceed national sandards!

One-stop shopping for the range of automation

We offer a complete factory automation product range: sensors, laser sensors, PLCs, Human Machine Interfaces, inverters, laser marking systems, ACD components and much more.

Global network of support and services

The PEW group has 123 operation sites and more than 70 sales companies and offices spread throughout the world. Our European headquarters has its own development center for Machine Vision products. Each European branch has its own laboratory with experienced application engineers.

A powerful and durable partner

Panasonic is one of the largest electrical engineering companies in the world. In more than 80 years we have developed some 220,000 products, ranging from high-quality lighting and information systems to consumer electronics, household appliances and factory automation systems.

The products are marketed under diverse brands such as Panasonic, National, Technics, JVC and SUNX.

Panasonic Machine Vision systems

Industrial inspection solutions across the entire range

Panasonic is one of the few manufacturers that offers a complete Machine Vision systems range, from the small vision sensor to high-end devices, which ensures the most efficient and economical solution for your needs.

PD series

2D code reader

LightPix AE20

Vision sensor

A series

Compact gray-scale systems

Reliable 2D code reading

2D codes allow large amounts of data to be stored in a small area. Panasonic 2D code readers are available as handheld or stationary types. Both types are distinguished by highly accurate reading even under severe conditions.

Machine Vision – as easy as a photoelectric sensor

Machine Vision performance at sensor size and price. LightPix closes the gap between a conventional photoelectric sensor and a Machine Vision system. It is ideal for applications a sensor can't cope with but for which a vision system is too advanced. It is fast, easy to use and cost efficient.

Small, fast, smart …

A series Imagecheckers are compact systems for the majority of common gray-scale inspection tasks. They are being used in several thousand industrial installations, proving just how robust and reliable they are. Two firmware packages are available: the Multichecker type solves a wide range of applications while the OCR Package is dedicated to print and character inspection applications.

AX40

Compact color system

More information through colors

Using color attributes, a more precise inspection of objects is possible in many cases. In this respect, our AX40 drastically expands the range of applications that can be solved using Machine Vision. AX40 incorporates several gray-processing functions from the A series, offering the best of both worlds. Furthermore, AX40 offers an ethernet interface and a CF card slot for data storage.

PV series

Compact high-speed

If speed matters

Thanks to their multi processor architectures, PV series Image-checkers are especially suited to high-speed inspection applications. They offer various inspection routines from A- and AX series plus new checkers – for example, for flaw detection. Up to 4 digital cameras can be connected to PV500.

P400 series

PC-based Machine Vision

High-performance, all-round systems

P400 systems are based on durable and field-tested industrial PC technology. The smart combination of selected high-performance hardware components and specially developed driver software allow powerful Machine Vision algorithms to be used. Thus even demanding inspection tasks can be managed easily and reliably. Two types are available: the expandable 19" version P400 and the compact size P400MA.

Stationary 2D code reader PD60

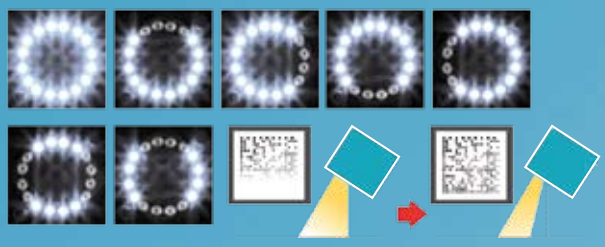
Stationary 2D code reader PD60

2D codes are becoming increasingly widespread in industry. They store a large amount of data in a small area and offer excellent reading accuracy. The PD60 is a high performance, stationary 2D code reader for Data Matrix (ECC200) and QR codes.
The advantages are many:

- Complete system with integrated lighting, optics, processing functions and interfaces
- Highly accurate code reading even under severe conditions
- Easy installation and configuration
- Especially suited for reading markings directly on metal
- Fast processing time of down to 30ms
- Robust, oil-resistant IP67G protective metal housing
- Excellent connectivity
- Quality validation even surpassing ISO/IEC 15415

Easy installation

The PD60 can be installed as easily as a photoelectric sensor. Lighting, lens and processor are integrated in the compact, oil-resistant IP67G housing. During installation, two LED guide lights indicate the correct distance to the code. When the two beams intersect to form one point, the distance is correct.



Excellent reading reliability

In particular, needled codes and codes on metallic surfaces are not easy to process. Thanks to its automatic lighting adjustment and numerous filter functions, the PD60 itself can read these difficult markings. This makes the device especially well suited for reading codes marked directly on the product.

Configuration software free-of-charge

You can easily configure the PD60 and PD65 with PDTOOL, our free configuration software. In just three steps, you define the inspection area, “teach-in” the code and begin processing.

Of course you can adapt all other parameters to your individual needs using the software. Moreover, PDTOOL enables the readout of measurements and pictures which the PD60/65 can store internally in real time.

* A ccording to JEMA

Handheld 2D code reader PD65

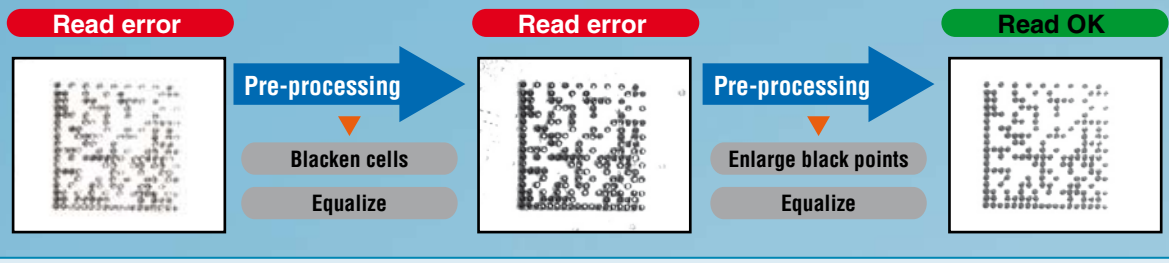
Position – Trigger – Finished

The PD65 is the mobile version of the PD60. To read the 2D code, simply place the handheld PD65 on the part and pull the read trigger. Within a few milliseconds, the code is read. In addition to data output, the color of the front ring changes to green to confirm the reading. If a read error occurs, the ring not only turns red but a signal tone alerts the user to the error. The handheld PD65 has the same performance capabilities as the PD60.

The PD65 is oil-resistant (IP67G) and built for severe industrial applications. Its ergonomic design lets you operate it easily even when wearing gloves.

Reliable, fast reading

PD60/65 read Data Matrix (ECC200) and QR codes. It does not matter whether the codes are tilted, flipped or inverted. Various automatic functions, e.g. automatic lighting adjustment, ease setup substantially. To guarantee reliable reading even under severe conditions, e.g. needled codes on metal, powerful filter functions and automatic side/diffuse lighting are available, for example. Typical total processing time lies between 30 and 100ms.



The new firmware version of PD60/65 is able to verify 2D codes according to ISO/IEC 15415.
Many different quality characteristics can be verified:

- Decoding
- Symbol contrast
- Modulation
- Fixed-pattern damage
- Grid non-uniformity
- Axial non-uniformity
- Unused error correction
- Print growth
- Noise evaluation

Machine Vision as easy as a photoelectric sensor

All-in-one design

All components for lighting, optics, image acquisition (camera) and signal processing (CPU) are combined in one unit and mutually configured for optimal performance. Hence, reliable inspection is guaranteed and installation is both fast and easy.

Bridging the gap between photoelectric sensors and vision systems

Due to their punctiform working principle, conventional photoelectric sensors are not always suitable for certain inspection applications. Also, object surfaces that change or reflect poorly can cause unstable detection. On the other hand, a Machine Vision system is often oversized or uneconomical. The solution for such “intermediate” cases is the vision sensor LightPix AE20. It offers basic two-dimensional inspection yet is as easy to operate as a sensor.

Excellent connectivity

LightPix AE20 features several interfaces. During setup, it communicates via its USB port with the PC. Alternatively, you can use the operation and finder units to make settings. These units can also monitor images and results during inspection, which can be transferred to a PLC via the LightPix AE20’s parallel I/Os or serial RS232 interface. Last but not least, AE20 can be connected to our GT11 touch terminals, which allows you to create individual user interfaces.

PC
Setup, result handling, project management, image storage, …

USB

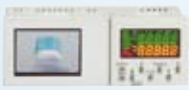
Digital I/Os
RS232

PLC
Result output, process automation

RS232

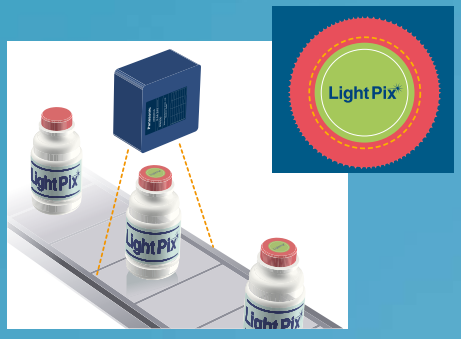
Touch-Panel
Adjustment parameters, result display

LVDS

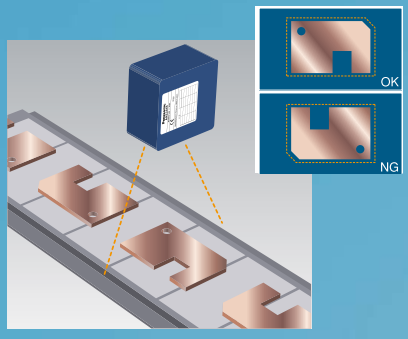


Operation and finder unit
Setup, parameter adjustment, image display

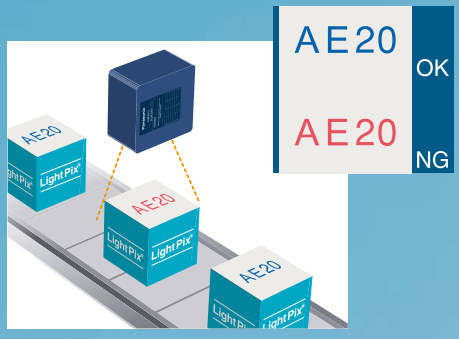
Available inspection functions



Color area measurement



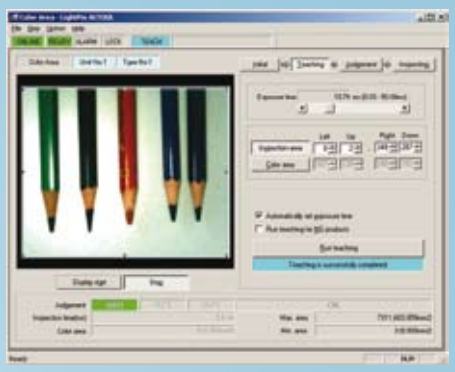
Pattern matching



Color detection

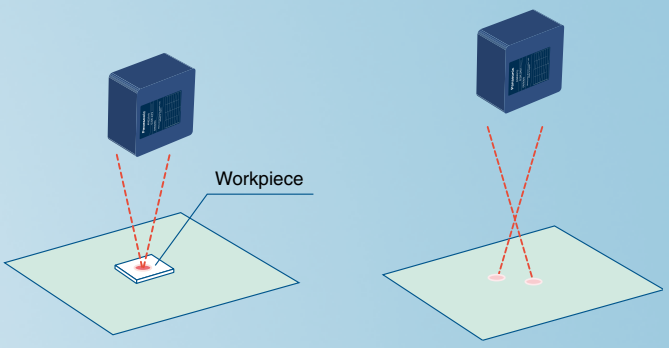
Setup made easy

With our Windows-compatible PC software AETOOL, setting up your inspection tasks is easy. Thanks to step-by-step procedures and several automatic adjustment functions, AETOOL allows you to configure your LightPix AE20 in record time. Additional tools allow you to change firmware and view images which can be stored in the AE20's ring buffer. Of course, AETOOL can also be used to copy applications from one LightPix AE20 to another.



Set up the inspection height easily with our new pilot spot system

This function is very helpful when installing AE20 at the inspection site. Two LEDs project red spots onto an object. You know when the correct mounting distance is reached when the spots overlap and appear as one. This also allows you to easily determine the center of the inspection area. Of course, the guide light turns off automatically during inspection.

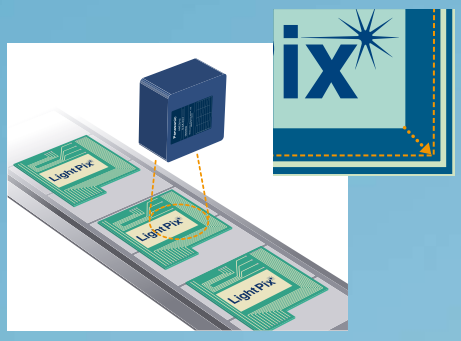


Suitable distance

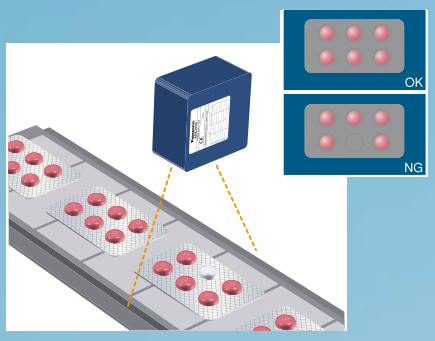
Too far (blurred)

Industrial grade metal case

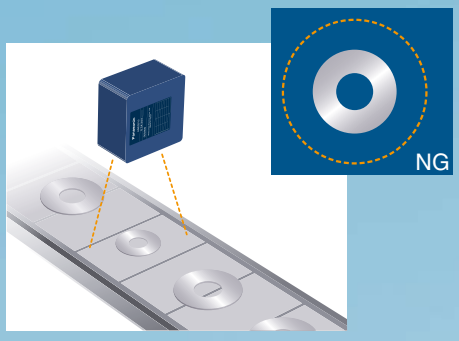
Like a sensor, AE20 can be used in harsh industrial environments. Its compact aluminium housing and protected connectors conform to protection class IP67.



Edge/corner detection



Feature extraction



Size measurement

Multi-purpose compact systems

Micro-Imagechecker A100 (Multichecker) – the cost-effective one camera system

For many inspection tasks, one CCD camera is enough. If the required inspection speed is also within the usual range, A100 is the perfect, economical choice.

It's small

With dimensions of just 120 x 40 x 70mm, the A series Imagechecker is one of the smallest of its kind, allowing you to downsize your equipment. The controller is made for a factory floor environment: it has a robust metal housing which can be easily placed in a switching cabinet. Also, it does not contain parts subject to wear, such as fans or hard-disk drives. All ports are located on the front side and the terminal blocks can be removed, making installation even easier.

It's easy

Micro-Imagechecker A series has a menu-based user interface which makes it easy to set the inspection parameters for your individual inspection task - even without programming skills. With just four buttons, all adjustments can be made in a short time.

Inspection functions

Presence checking, sorting, counting

These inspection functions enable products or minute product details to be recognised, even under delicate ambient light conditions. It is possible to detect, sort or count objects based on their geometrical characteristics - for example to check whether all parts were included during assembly.

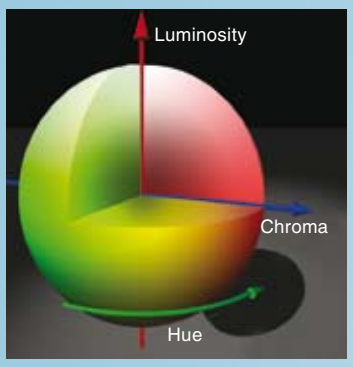
Measurement

Several advanced algorithms enable fast and precise measurement of product dimensions, e.g. spacing, angle, radii, etc. Within just a few milliseconds, measurements are performed with a resolution of up to 1/10 of a pixel.

Color image-processing opens a new world of possibilities

Micro-Imagechecker AX40

Besides a wealth of proven gray-scale inspection functions, AX40 additionally offers color image processing features. Colors like, e.g. green, cyan, or yellow can sometimes hardly be distinguished in a gray-value image. However, with AX40's color inspection routines, even slightest nuances in color can be differentiated, thus the range of solvable inspection applications is significantly expanded.



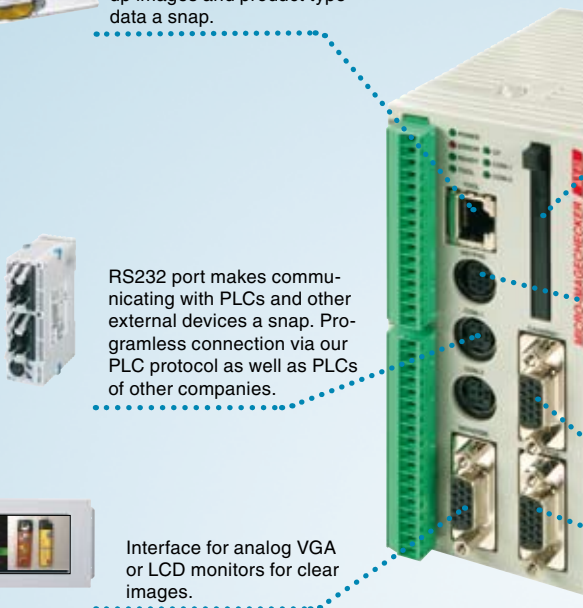
Human eye-like sensitivity

The color recognition/extraction algorithms of AX40 are based on the LCH (luminosity, chroma and hue) mode, which covers all colors a human eye can recognize. This mode allows for color recognition more similar to that of the human eye than conventional RGB-mode color extraction.

Fast and easy setup

Our newly designed user interface allows you to set up your inspection routine quickly. The clearly structured screen with its pull-down menus, semi-transparent spreadsheets and indicators makes it easy to configure the AX40 to each individual application, even for non-experts.

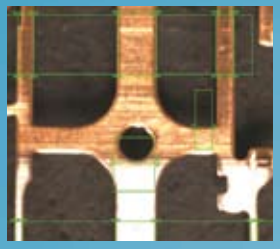
Standard internal ethernet interface. High-speed interface with AXTOOL makes backing up images and product type data a snap.

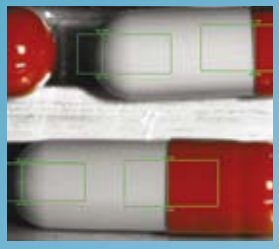


RS232 port makes communicating with PLCs and other external devices a snap. Programless connection via our PLC protocol as well as PLCs of other companies.

Interface for analog VGA or LCD monitors for clear images.

Inspection functions



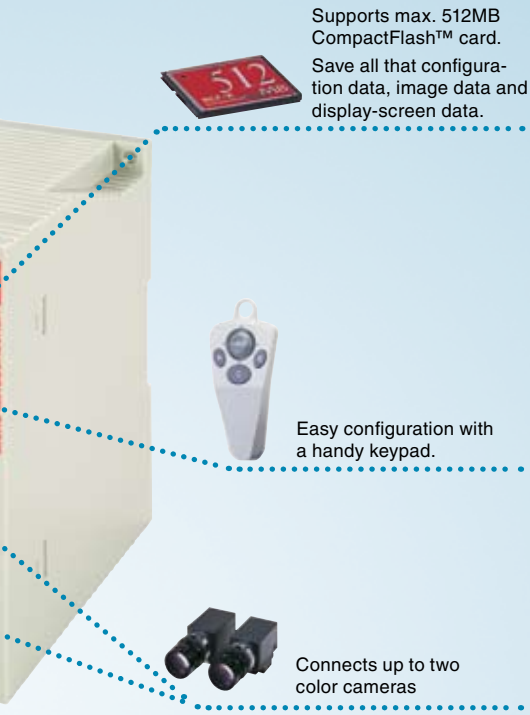


Size measurement

Gray-scale based inspection functions such as edge finders allow the system to measure dimensions, angles, diameters, radii, etc. with sub-pixel resolution.

Color detection, presence checking

Measures the area of the specified region or predefined colors to detect foreign objects, perform presence checking, sort or count objects.



1 System – 4 inspection modes

AX40 commands four different inspection modes: color, binary, gray-scale and differential image processing. Combined with a large pool of ready-made and easy-to-configure inspection functions such as 360° contour-matching and smart matching, AX40 can handle nearly any inspection task.

Full color

LCH mode for human eye-like color inspection.

Suitable for various inspection tasks such as sorting, counting, parts recognition, etc.

Gray-scale

256 gray tones for precise measurement, positioning, etc.

Differential

Extracts edges/changes in the image data.

Ideal method e.g. for surface inspection.

Binary

A reduction of the image data to black and white pixels allows fastest inspection.

Powerful

The dedicated RISC CPU of AX40 guarantees a short response time and enables powerful algorithms such as those used for the contour matching function. Hence objects can be detected precisely and reliably, even if they partially overlap or if the ambient light changes.

Shape/surface inspection

A gray-scale differential processing function allows edges and contours to be inspected so that chips or scratches can be detected, for example. Additionally, our smart matching can perform accurate image substraction down to the sub-pixel level, allowing you to detect minute differences in objects.

360° position detection

By analyzing the direction of contour lines, stable position detection is performed, even for objects hidden or overlapped. This function is highly impervious to changes in illumination and detects orthogonal misalignment or any object rotated within 360°.

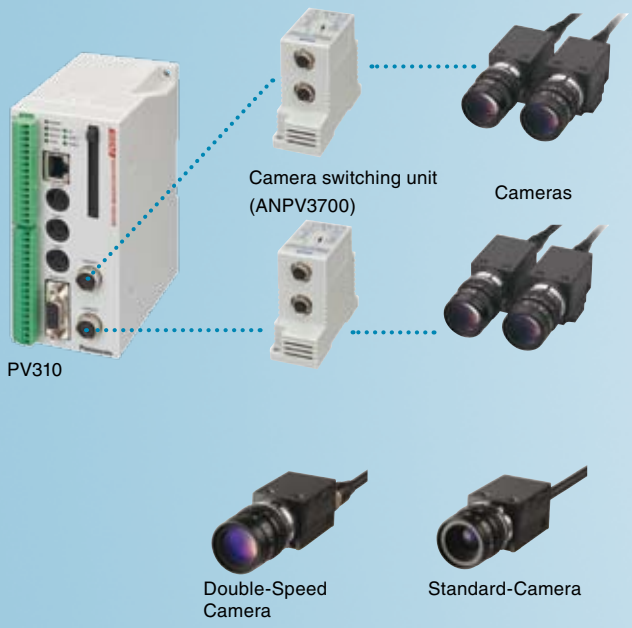
Compact high-speed system

High-speed Machine Vision

The PV310 is a compact gray-scale vision system, designed for ultra high-speed image processing. Thanks to its dual-processors architecture and its speed-optimized image processing algorithms, PV310 allows processing times of less than 2ms.

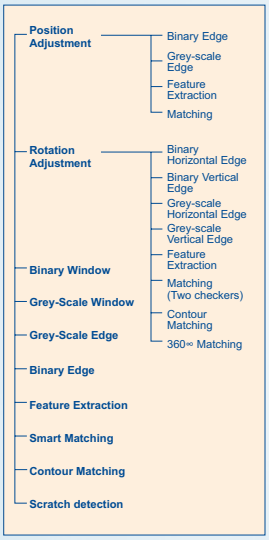
Large variety of inspection functions

The PV310 is equipped with a large pool of highly accurate inspection functions which makes the system suitable for almost any inspection applications. Furthermore, a selection of 13 pre-processing filters, allow reliable inspection even if the image conditions are difficult.



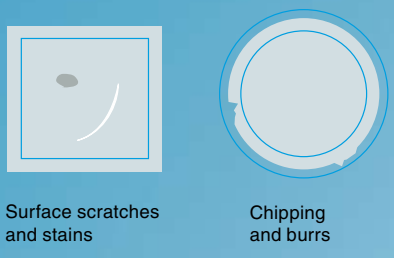
Supports 4 cameras simultaneously

Up to four standard or high-speed random shutter cameras can be connected using the optional camera switching unit. This allows the inspection of objects from different angles or the inspection of large objects with high resolution.



Flaw detection

Scratches, stains, chipped edges, burrs, and other defects can be detected reliably..

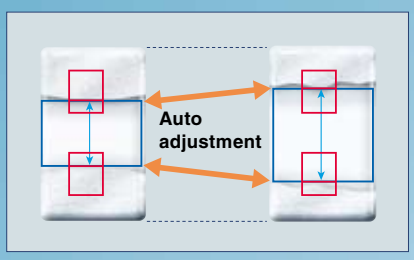


Surface scratches and stains

Chipping and burrs

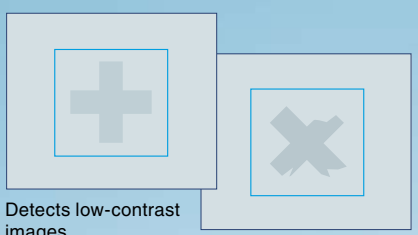
Auto area adjustment

The inspection area can be automatically adjusted to the workpiece size to cover slight variations.



Low contrast matching

The workpiece can be detected even if the contrast to the background is low or if the workpiece itself is damaged.



Detects low-contrast images

*) available as of fall 2007

Image data transfer and storage

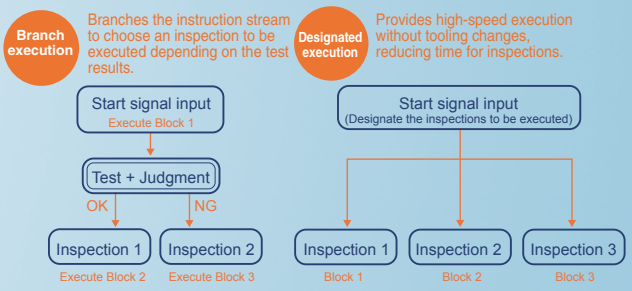
Image data can be saved on a CF card even during inspection, allowing you to examine the data in your office at your convenience or transfer configuration settings to another Imagechecker. You can also transfer image data via Ethernet. You can set the file name to be transferred, the image output method, etc. Our free software AXTOOL can be used to receive and handle the data.

Fast and easy configuration

The configuration of PV310 is done with a keypad, directly at the device without the need to connect a PC. Thanks to the clearly structured and intuitive graphical user interface, the system can be flexibly configured in a short time. Several help functions guide the user to optimum settings with respect to basic parameters such as focus, aperture and lighting. During inspection, up to 50 user-defined values (e.g. statistics) can be displayed on the screen to grasp the current status at a glance.

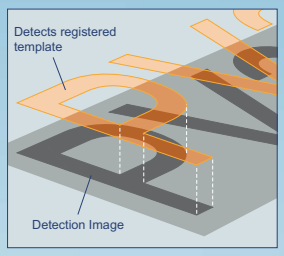
Branch execution/designated execution

The system offers two possibilities for high-speed inspection program changes:



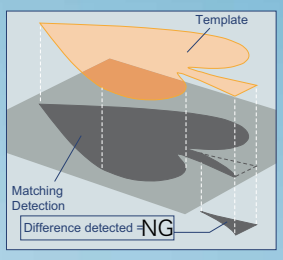
360° smart matching

Sub-pixel accurate 360° position detection with gray-scale matching.



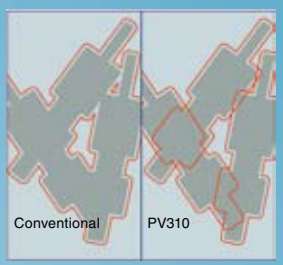
Differential function

The registered object and the detected object are overlapped and compared on a pixel-by-pixel basis. This allows e.g. a shape inspection to be performed.



360° contour matching

Stable position detection is possible even for objects that overlap because their contours can be extricated.



High-performance Machine Vision in compact class

Speed – precision – flexibility

The PV500 is Panasonic's most powerful stand-alone Machine Vision system. Its innovative hardware and software helps to increase the efficiency of your automation and quality control tasks. The all-round system is suitable for most of the typical industrial applications.

Increasing a manufacturer's productivity was the major aim for developing this product. Thanks to its very fast processing, its high precision and its flexibility, the PV500 solves inspection tasks easily, cost-efficiently and extremely fast.

The PV500 is also prepared for your future applications: its robust design, a wide selection of inspection tools and regular software updates ensure that the investment in a PV500 gives you long-lasting benefits.

Speed

The PV500 is designed for fast processing of complex inspection tasks. Its impressive speed is a result of:

- ***5 processors*** which evaluate images simultaneously
- ***Quad-speed CCD*** cameras which transfer images with quadruple speed
- The asynchronous image trigger and the ***pipelining*** process
- ***Partial imaging*** with up to 30,000 images/min.

Precision

These days, the tolerances regarding product features are steadily getting narrower. Consequently, there is an increasing need for precise inspection tools to ensure product quality. The PV500 meets this trend in several ways:

- ***High-resolution cameras*** with up to 2 megapixels
- ***Digital CameraLink*** cameras for high contrast and low-noise images
- ***Precise inspection algorithms*** with an internal calculation resolution of 1/1000 pixel
- ***Smart pre-processing algorithms*** for effective optimization of an image
- Data conversion from pixel to mm

Flexibility

The requirements of modern production lines are such that equipment and devices for quality control need to be highly flexible. The PV500 meets this requirement in several ways:

- A wide range of ready-made but configurable ***inspection "tools"***
- The possibility of ***online parameterization during live inspection***
- The possibility of ***connecting 3 different camera types*** – also a mix of them
- An ***individual trigger*** for each camera connected
- Several ways of ***documenting inspection results***

Equipped with a wide range of interfaces esential for image processing devices of the future

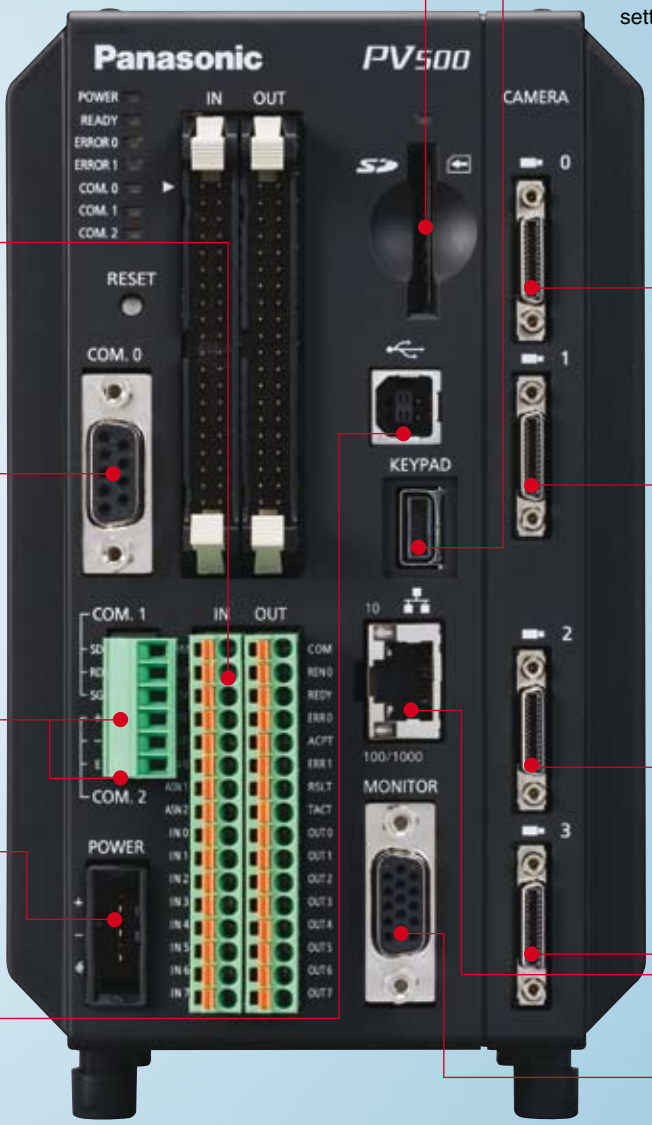
The entire operation of PV500 is made for working fast and effectively. Modifications or optimizations can take place even during checking operations. Thus the production process does not have to be stopped. The VGA monitor shows all relevant checking results at a glance. Numerous statistic functions allow a detailed analysis of the production process. On the SD memory card images, projects or results can be saved for documentation. This can also be carried out via Ethernet connector.

SD memory card (SDHC) compatible

Can save setting programs, captured images and inspection results.

Keypad

The dedicated keypad with an ergonomic design provides excellent operability for setting.



Parallel I/O

Equipped with both MIL connectors and terminal sockets.
MIL connectors:
32 inputs and 32 outputs
Terminal sockets:
16 inputs and 16 outputs

RS232C port

For communications with external devices, including other makers' PLCs as well as PLCs using our own protocol.
Terminal sockets:
16 inputs and 16 outputs

RS232C/RS485 port

(Coming soon)

Power port

24V DC power port separately provided for safety design.

USB connector

For connection to a PC to use the setting tool (coming soon).

Cameras (digital cameras)

Up to four cameras of three different types can be connected. (Available with the four-camera type)

- Quad-speed cameras
- 2-megapixel camera
- Ultra-compact camera

Ethernet interface

Gigabit Ethernet compatible. High-speed transfer of captured images is possible.

XGA monitor output

High-end Machine Vision – small and compact

High-end Machine Vision of the most reliable kind

The P400MA is a compact, PC-based Machine Vision system that sets a new standard with respect to flexibility and reliability. It supports up to four cameras and uses exactly the same software and powerful inspection routines as the full-sized system P400.

The system's hardware and software are delivered fully configured saving you time when setting up your system.

Latest vision technology

A careful combination of the latest computing technology and selected image processing hardware yields robust, fast and precise industrial Machine Vision. The system comes equipped with our Vision P400 software, which is based on one of the most advanced image processing libraries in the world. Expert knowledge is only one mouse-click away.

High-capacity software

The Vision P400 software is extremely user-friendly. It is mostly self-explanatory and runs under the well-known Windows operating system. Therefore many users will already be familiar with basic procedures. With the aid of icons, toolbars and status displays, even sophisticated applications can be configured quickly, securely and efficiently. No previous programming knowledge is required.

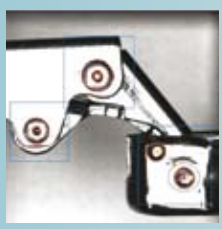
Inspection functions P400MA/P400

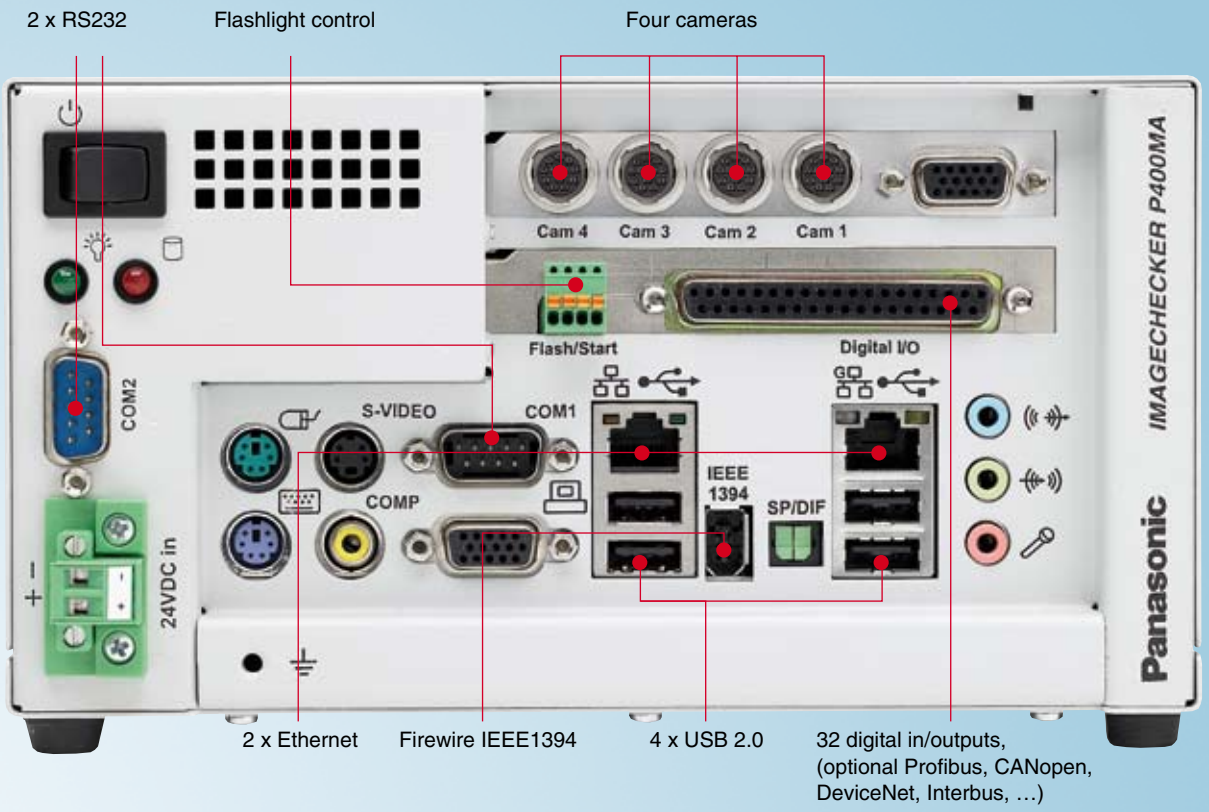
2D measurement

No matter which kind of measuring has to be performed, Vision P400 offers the right tools: distances, radii, areas, perimeters, roundness and much more. Depending on the field of view and the camera connected, µm-resolution can be achieved.

Assembly inspection

Five different ready-to-use algorithms are availabe to check whether the right part is at the right position, from simple presence checking applications of single parts to inspection of complex component assemblies.





A reliable and compact system

P400MA's operating system is Windows XP embedded, which offers superior reliability. In the event of an uncontrolled power breakdown, all important system files will be protected by a special filter system so that the device will reboot properly. Standardized hardware and several protective features ensure safe and reliable operation for many years – even in a harsh industrial environment.

2D code reading

This newly developed checker reads 2D codes such as Data Matrix ECC200 and QR codes. Regardless of whether the codes are randomly twisted or significant changes in brightness occur, this powerful checker will read them reliably. Setting the checker is as easy as drawing a rectangle.

Barcode

Almost any barcode can be read with this tool. 2/5 Industrial, Code 39/93/128, EAN 13, EAN 8, UPC-A/E and Pr Pharma Code are just a few examples.

Expandable high-performance Machine Vision

Imagechecker P400, a PC-based, multi-purpose Machine Vision system made for complex and demanding inspection applications.

Like its “little brother”, P400 is a complete and ready-to-use system. It employs only high-quality hardware components optimized for maximum performance. In combination with its specially developed dedicated driver software plus our Vision P400 software, the system ensures extremely high performance and reliability for a wide range of industrial inspection applications. Furthermore it offers multi-camera processing with up to 12 cameras and supports expandability from the hardware and software points of view.

Inspection functions P400MA/P400

Sorting, counting, parts recognition

Even objects which look quite similar can be distinguished reliably and quickly. For example, our Feature Extraction checker evaluates up to 20 object criteria (such as perimeter, area, center of gravity, etc.) in only a few milliseconds.

Further inspection functions on pages 20 and 21.

Print inspection

Often blurred or incomplete imprints have to be detected. P400 is able to localize quality deviations which can barely be seen by the human eye.

Expandability

The system can be upgraded with up to two additional camera boards, which allows inspections to be carried out with up to 6 cameras parallel or 12 cameras serial. P400 comes equipped with standard interfaces such as RS232, USB, Ethernet and even a parallel interface card with 32 digital I/Os . Furthermore, thanks to its open design, several unoccupied PCI slots allow additional plug-in cards to be used, e.g. a Profibus interface.

Made for the factory floor

During the development of the PC-Imagechecker P400, we attached great importance to designing a durable system, suitable for industrial use. P400 has been thoroughly tested in regard to vibration and shock. Furthermore, each single P400 component has to pass an extended quality test before being used for the production of a system. Each single P400 system has to withstand a 48-hour test run. Due to its backplane architecture, servicing a P400 system is easy.

Fast

The combination of carefully selected, fast hardware components and a specially developed driver software gives P400 real high-speed inspection capabilities. For example, extracting more than 1000 object features takes less than 50ms. Even if inspecting with several cameras, P400 will not slow down your production line.

Designed with the customer in mind

The PC-Imagechecker P400 is based on a powerful IBM-compatible industrial computer and offers several important and convenient features:

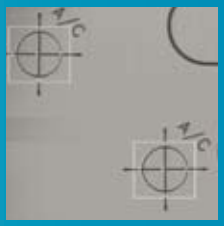
- Rugged 19" metal housing
- Lockable front door
- Changeable hard-disk drive for easy maintenance
- DVD writer
- High-quality fans with removable dust filter
- 3-point fixing for all slot-cards
- Keyboard, mouse and USB connectors on the front

OCR/OCV

A powerful tool to read and verify characters, strings and symbols. We have expanded the functionality of this checker. Now, also rotated or even curved strings can be read.

Positioning

Using special algorithms, P400 systems reach a resolution of up to 1/2000 pixel for positioning applications. The teach-in procedure merely requires that you show the system a reference image.

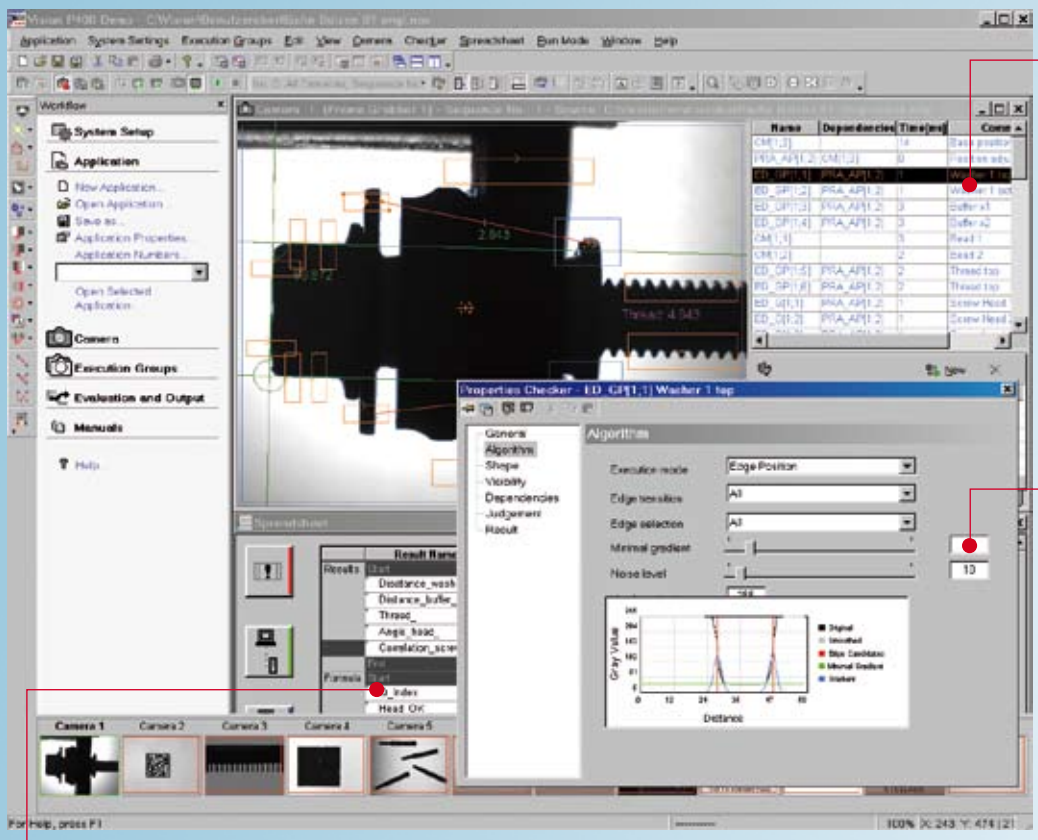


PD60/65 | LightPix AE20 | A100/A200 | AX40

Fast and easy setup software for P400MA/P400

A new standard in user-friendliness

The Vision P400 software is mostly self-explanatory and runs under the well-known Windows operating system. Therefore many users will allready be familiar with basic procedures. With the aid of icons, toolbars and status displays, even sophisticated applications can be configured quickly, securely and efficiently. No previous programming knowledge is required.



The sequence scroll bar

Provides an overview of the checkers set. This is also where the order in which the checkers run can be specified, and where the user can jump to the corresponding dialog box of the checker by simply clicking on the bar.

Checker dialog box

This is where limit values are defined, results retrieved, or even filter settings made. Each checker has its own dialog box and thus can be adjusted individually to the application.

Spreadsheet

The spreadsheet is a special dialog box for displaying, setting and optimizing individual parameters, judgement limits and results. Furthermore, statistics can be prepared and checking results assigned to the interfaces.

Wealth of ready-to-use inspection tools

Window checker

- Presence check
- Sorting
- Area measurement
- Surface inspection
- Parts recognition

Gray value edge detection

- High accuracy measurement of length and distances
- High accuracy angle measurement
- Coplanarity check
- Surface inspection

Binary edge detection

- Fast measurement of length and distance
- Fast angle measurement
- Presence checking

Difference checker

- Print checking
- Punch checking
- Quality check of injection moulded parts
- Surface inspection

Two systems – one software

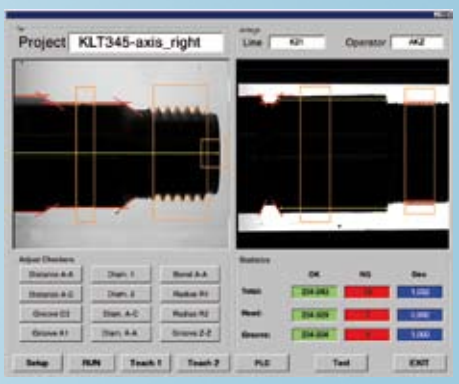
Although P400MA and P400 are different with respect to hardware features, their “intelligence” – the Vision P400 software – is the same. Thus users benefit from a uniform GUI with the same range of inspection tools in both systems and scalable hardware power. Vision P400 inspection programs are rendered interchangeable between both devices.

Offline parameterization

In order to create a Vision P400 inspection program, it is not mandatory to have a real P400MA/P400 system on hand. Using our free simulation software, any PC or notebook with MS Windows can be used to set up, test or to optimize a Vision P400 inspection routine. This simulation software offers all major functions of the real version.

Tailor-made user interface via ActiveX®

ActiveX controls use Microsoft’s COM technologies to communicate with other MS Windows applications such as MS Excel or custom programmed software clients. The implementation of P400’s ActiveX control is well supported by almost every open-standard programming language, e.g. Visual Basic or Visual C++. All major Vision P400 parameters and results can be accessed via this software interface. Thus, creating a specific and individual user interface for Vision P400 can be easily realized.



Feature extraction

- Counting objects
- Presence check
- Position detection
- Roundness check
- Parts recogniton

Code reader

- Read codes:
  - Barcodes: 2/5 Industrial, Code 39/93/128, EAN 8, EAN 13, UPC-A, UPC-E, PR Pharma Code
  - 2D codes: Data Matrix ECC200, QR Code

Optical Character Recognition (OCR)

- Read, identify and verify:
  - Plain writing
  - Laser prints/thermal prints
  - Logos
- Object recognition

Contour matching

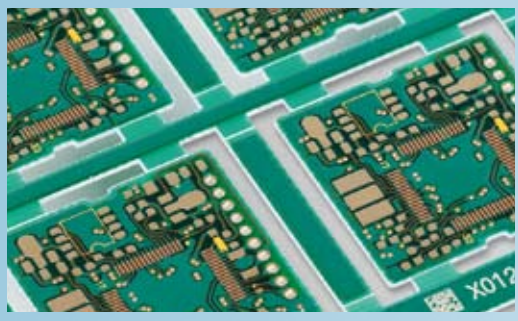
- Position detection (0–360°)
- Object identification
- Presence check

Panasonic Machine Vision systems

Application examples

Automotive

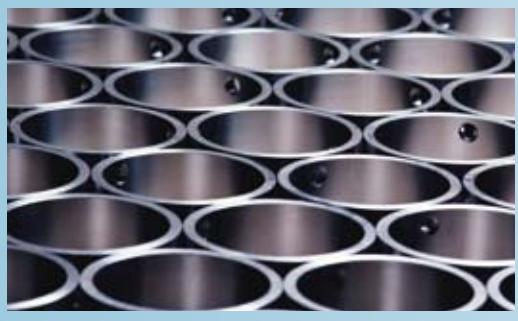
Zero defects are taken for granted in the automobile industry and related sectors. Product defects would not only lead to expensive recalls but could also endanger human lives. Just think of an airbag which wouldn't open correctly. Other typical automotive parts inspected by our systems include antennas, car horns, connectors, valves, rims, windshields, motor blocks, sunroofs, car keys, filters, etc.



Electronics

Especially in the electronics industry, Machine Vision is an excellent tool for detecting potential failures, e.g. loose wires, bad soldering points, etc. in the early stages of the production process.

Imagecheckers are also used to detect components, their orientation or imprints. Our systems can be integrated "inline" at almost any place in your production line, thus eliminating costly rework of the final product.



Metal and plastics inspection

In the plastics industry, parts must often be checked for chipped edges, injection moulding faults, blemishes on the surface and webs – tasks for which our Imagecheckers are optimally suited. The same applies to precise measurements in the metal industry. In this case, precision of 1µm and processing times below 20ms are required.

Pharmaceuticals / medicine / cosmetics

In these areas, quality control is of utmost importance. Products must be able to be traced via lot numbers at any time and the expiration date must be clearly legible. For cosmetics packaging, even the smallest errors lead to sales difficulties. The Imagechecker is self-monitoring and absolutely dependable; these aspects combined with comprehensive documentation features make the Imagechecker an essential facet of the overall application.

References

Food

In this market segment we have solved typical inspection tasks such as completeness/shape inspection of sweets, size and volume classification of fruits, fish and vegetables. Also, controlling the correct packaging of instant meals or packaged food as well as validating best-before dates are common applications. Because Imagecheckers do not need to touch products to inspect them, they are especially suited for food related quality assurance matters.

Packaging industry

A product's packaging plays a major role when the customer is deciding which product to buy. Even at high speeds, the Imagechecker can detect faulty printing, smudged typeface, displaced labels, overlapping packaging material and incorrect expiry imprints. Easy operation permits a multitude of design variations.

References

2R Kunststofftechnik, ABB, Abus, AISA Automation Industrielle, AIT, Alcoa Deutschland, Alphasem, Arcotronics Bauelemente, Ascom Telcom, ASIC Robotics, B. BRAUN Medical, BMW, Borbet, Bosch-Siemens-Hausgeräte, Bovi Aisa, Branscheid, Braun, Bridgestone, Bruna, Buna Sow Leuna, Chocolat Frey, Claas Fertigungstechnik, Continental Automotive GmbH, Covance Pharmaceutical, Daimler, Delphi Automotive Systems, DFT, Disetronic Medical Systems, Diotec Semiconductor, Dorst Technologies, Domino, Eberle Federnfabrik, Ebm-Papst, Eta, Fauretia, FCI Automotive, Fisher Clinical, Feldschlößchen, Friwo, GE Lighting, Goodyear, Harman/Becker Automotive Systems, Hasseröder Brauerei, Heineken, Herlan, Huba Control, Hoppe, IMA, Infineon Technologies, Intel, Isabellenhuette Heusler, ITW Automotive Products, Johnson Control, Keg Safety, Keiper, Komax, Kodak, Koito, Komax Systems, Kräuterhaus Wild, Küster ACS, L'Oreal, Landis & Gyr, Laser Automation Gekatronic, Lear Corporation, Lego, Leonische Drahtwerke, Loctite, Magneti Marelli, Matsushita Bosch Video, Maxon Motor, Mercedes Benz, Mibelle Cosmetic, Michelin, Metzeler Reifen, Milford Tea, Molex, Mobis Hyundai, Möhling, Mühlbauer, MTA-Automation, Nedschroef Altena, Oerlikon Assembly, Osram, Otis, Papierfabrik Louisenthal, Panasonic, Paro, Philips, Philip Morris Products, Phoenix Contact, Platzgummer, Porsche Leipzig, Preh, Rasco, Renata, Richard Martin Medizintechnik, Robert Bosch, Robomat, Roche Diagnostics, Rodotec, Rolex, Ronal, Ronda, Saint-Gobain Calmar, Schering, Schneider Electric Industries, Schott, SEGU Sytemelektronik, Siemens, Sigma, Sodeka, Sofic, Sony, STMicroelectronics, Storck, Stoneridge Automotive, Styner+Bienz, Südzucker, Swatch, Tampoprint, TATA, Teca, TechnoSYS, Telegärtner, THE Thomas Machine, Thyssen Krupp Presta, Trevira, Trisa, TRW Automotive, Tyco Electronics AMP, UHU, Unaxis, VG Semicon, VHF Technologies, Volkswagen, Wago Kontakttechnik, Webasto, Weidmann Plastics Technology, West Pharmaceutical Service, Winkhaus Automation, Witte Automotive, Ypsomed Medical Systems, ZF Sachs …

Panasonic Machine Vision systems

Optics & illumination

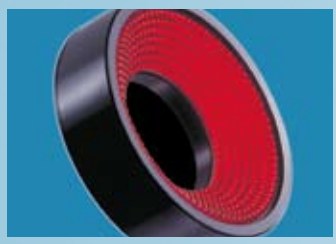
Optics and illumination – prerequisites for effective Imagechecking

Machine Vision begins by choosing the appropriate lighting and optics. This is just as important as powerful software when it comes to guaranteeing setup effort and judgement.

Hence, Panasonic analyzes each of your requests individually and selects the best combination of optics and lighting. We have a huge range of light sources and lenses at our disposal.

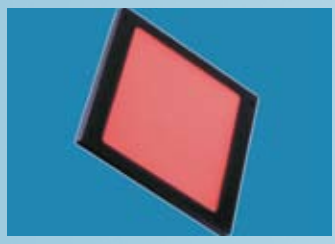
Lenses and optics

- Quality lenses with manual iris and focus
- Special lenses for megapixel cameras
- Telecentric lenses
- Extension tubes and other accessories



LED ring lights

- Long lifetime
- Available in different diameters and colors
- For strobe or constant light
- Fast response time
- Miniaturized construction with mounting threads
- Optional diffuser, polarizer



LED back lights

- Long lifetime
- Available in different sizes and colors
- For strobe or constant light
- Fast response time
- Miniaturized construction with mounting threads
- Diffuser included

LED coaxial lights

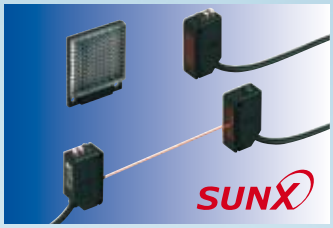
- Shadow free and diffuse illumination
- Available in different sizes and colors
- Long lifetime
- Robust aluminium housings

Other LED lights

- Dome lights
- Flat-dome lights
- Bar lights
- Line lights
- Spotlights

Panasonic Machine Vision systems

Related products



Photoelectric sensors

SUNX is the brand name for our sensor products. Whatever type of sensor is required, our wide product range offers you the right solution.

Measurement sensors

Our laser and eddy current analog sensors provide precise measurements, even for the most demanding applications. Measurement sensors complement Machine Vision, especially when it comes to measuring distance, displacement and thickness.

Programmable controllers

Programmable controllers from Panasonic represent “control advantages” that pay for themselves right from the start.

Human Machine Interfaces

Our compact size, bright and easy-to-read Human Machine Interfaces can be used to visualize inspection results. Touch panels can even replace the standard keypad if you so desire.

Laser Marking systems

Accurate and distinct non-removable marking of almost any product can be achieved with our Laser Markers. We offer various CO_2 and FAYb models ranging from 12 to 30 Watts.

ACD components

Components such as Timers/Counters and Limit Switches round off our wide Factory Automation product range.

Transparency via Traceability

Traceability in industry means that for any product at any time, you can determine when, where and from/by whom it was purchased, manufactured, processed, stored, transported, used and disposed of.

Panasonic is one of the few manufacturers in the world that offers completely automated solutions for tracing products.

Marking

Positioning

Sensing

Checking

Operating

Controlling

Panasonic
ideas for life

Notes

Global Network

North America | Europe | Asia Pacific | China | Japan

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