EPSON VISION SYSTEMS

WITH A KEEN EYE FOR QUALITY AND COST

ENGINEERED
FOR BUSINESS

EPSON®
EXCEED YOUR VISION

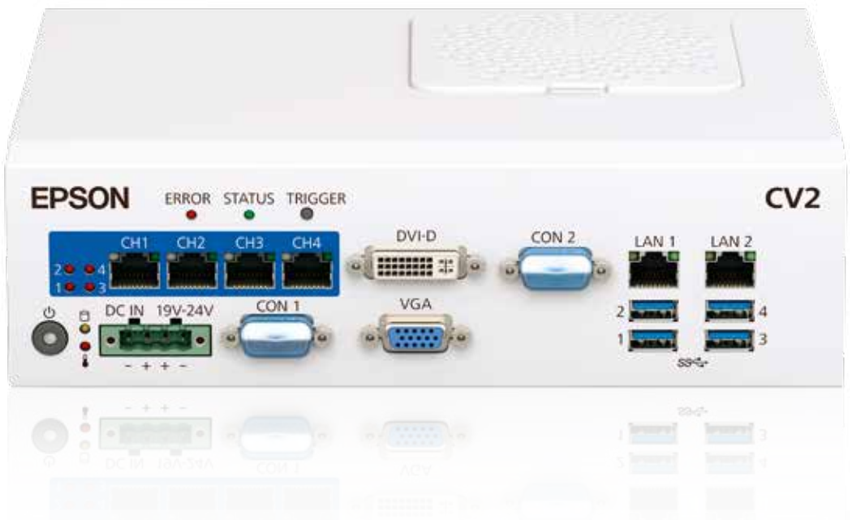
OUR ROBOTS
ALWAYS IN THE PICTURE

Product quality requirements are high – in all areas of industry. Retrospective quality assurance is however costly, as it occupies both manpower and valuable time.

Quality controls during the production process not only achieve transparency in the production chain, it also ensures defective parts are already extracted within the process and at their point of origin.

Epson robots with the powerful Epson Vision System focus on quality. This means that even **micro-defects,** for example on visible, sealing, and functional surfaces, as well as component contours, can be detected – even with high clock rates, poor accessibility, and small batch sizes. This means that narrow component tolerances are no longer a problem.

In addition to quality assurance, the advantages of Epson's integrated image processing can be exploited in many other applications, in particular for **dynamic, flexible parts handling,** for example in **conveyor tracking**, as well as component orientation with their pick and place positions.



Epson Compact Vision CV2

YOU CAN SEE IT:

- Reliable quality control even with very narrow tolerances
- Improved production process transparency
- Cost reduction, as subsequent controls are eliminated
- End-to-end automation, even with complex parts handling
- Improved product tracking

FOR EXAMPLE:
SOLUTIONS WITH EPSON VISION SYSTEMS

Whether during test, measurement, and inspection, or in dynamic handling of moving parts – the image processing has increasing importance within the robotics.

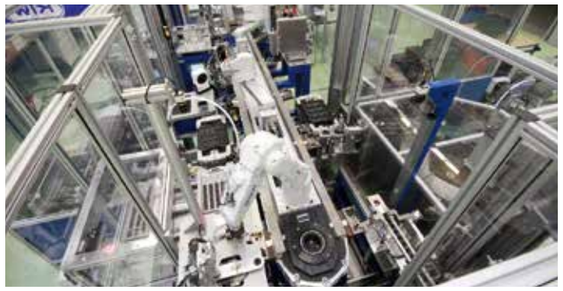
The Epson image processing system, made up of software tools and hardware with compact cameras, can be precisely tailored to your application.

MEDICAL/PHARMACEUTICAL APPLICATION EXAMPLE: AUTOMATED PIPETTING OF SUBSTANCES

The Epson SCARA clean room robot has an on-board camera, which can inspect different areas and allows position corrections. Even if the target part is not in the exact same place, the camera guidance enables precise approach to dosage or grip positions.

A second camera carries out quality inspections. It checks whether the dispensed droplets are in the correct position, and the correct size.

ELECTRONICS INDUSTRY APPLICATION EXAMPLE: HEADLAMP DRIVES ASSEMBLY



Ideal for flexible movement and gripping: Epson 6 axis robot with image processing. During the work process, it detects the part location and carries out an inside contour check. Both robot and image processing system are easily controlled via a software platform.

Perfect shape? Correct dimensions? Epson robots keep an eye on quality – even at high workpiece numbers and short cycle times.

AUTOMOTIVE APPLICATION EXAMPLE: CAMERA-GUIDED 3D ASSEMBLY AND TEST OF AN MID MODULE

The three-dimensional MID (Moulded Interconnect Devices) technology mechatronic assembly can be fitted, tested, and assembled using Epson image processing robots.

Production data are acquired via the master computer with data matrix codes.

A mobile camera enables high-frequency 3D dispensing of soldering pastes on horizontal and inclined surfaces. The dispensing points are optically checked.

Following final assembly of the combination switch and cable assembly, a haptic, optic, and electrical functional test is carried out.

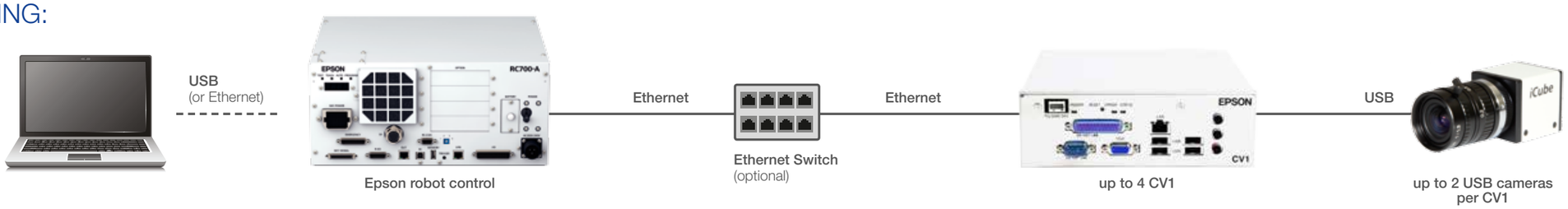
THE RIGHT IMAGE PROCESSING
FOR YOUR APPLICATION

At Epson, everything fit easily together and is seamlessly integrated – kinematics, control, and image processing. This lets you enjoy a number of advantages: Smooth integration with no interface problems, as well as millisecond-fast communication between robot and image processing.

In Support, you have a contact who provides you with competent, prompt support.
Our image processing systems can be adapted to your individual requirements, and furthermore, flexibly extended.

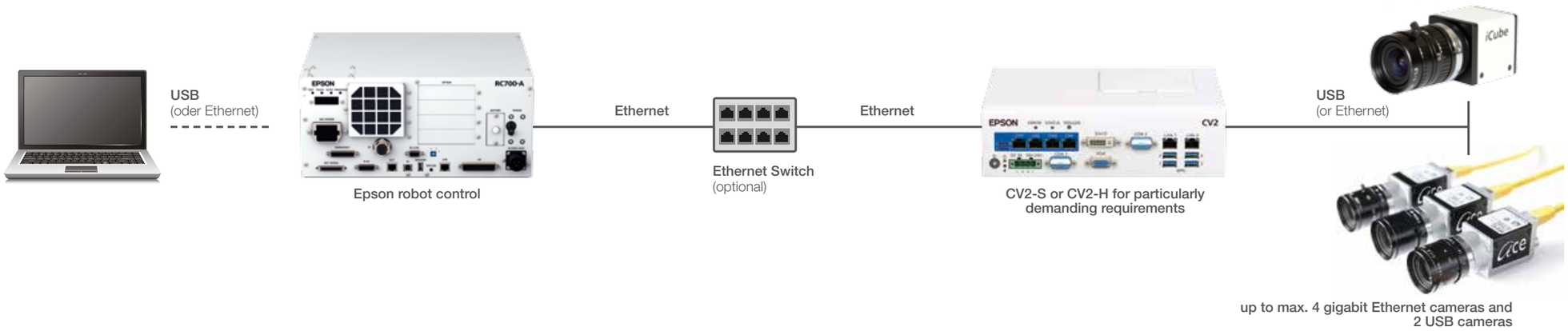
EPSON COMPACT VISION CV1
YOUR ENTRY TO IMAGE PROCESSING:

- Without PC: Ideal where a computer is not always used for image processing.
- Combine with up to 8 standard or high-resolution USB cameras, permanent or mobile installation.
- Objects in various focal lengths, integrated or with offset lens.



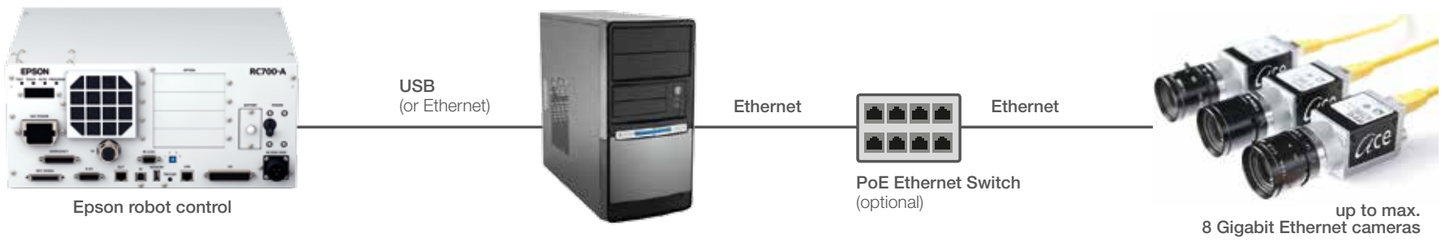
EPSON COMPACT VISION CV2
IMAGE PROCESSING WITH HIGH PROCESSOR SPEED:

- No computer is required to process images.
- For requirements such as short cycle times and high camera resolutions (more than 1.3 MP), colour or monochrome.
- Combine with up to 4 GigE cameras and 2 USB cameras, mobile or stationary.
- High-speed communication via GigaEthernet.
- Two variants: CV2-S and CV2-H for even more demanding requirements.



EPSON COMPACT VISION PV1
IMAGE PROCESSING SYSTEM VIA PC:

- Requires computer provision for image processing.
- For requirements such as short cycle times and high camera resolutions (more than 1.3 MP), colour or monochrome.
- Combine with up to 8 GigE cameras, mobile or stationary.
- High-speed communication via GigaEthernet.



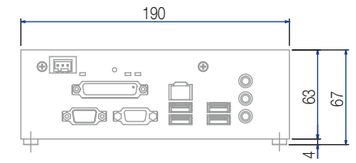
IMAGEPROCESSING SYSTEMS

EPSON **COMPACT VISION**	**CV1**	**CV2-S**	**CV2-H**
Processor		Intel Pentium G2120	Intel Core-i7 3770
Ports	Ethernet, USB, monitor, mouse, keyboard	Ethernet, USB 2.0, monitor, mouse, keyboard	
Camera connections	Max. 2 USB cameras	Up to 4 GigE cameras and 2 USB cameras (6 cameras max.)	
Dimensions	190 x 63 x 197 mm	232 x 70 x 175 mm	
Power consumption	DC 24V ±5%/2A	DC 24V ±5%/12A	
Ambient temperature	5 – 40°C	5 – 40°C	
Weight	1.5 kg	2.1 kg	

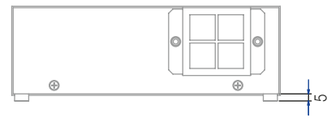
	B/W IMAGE PROCESSING	B/W AND COLOUR IMAGE PROCESSING	
EPSON **USB CAMERAS** FOR COMPACT VISION (CV1 AND CV2)	**USB VGA** mono camera	**USB 1.3 M** mono / colour camera	**USB 5.0 M** mono / colour camera
Resolution	640 x 480 pixels	1,280 x 1,024 pixels	2,560 x 1,920 pixels
Sensor types	CMOS – 1/3" Progressive Scan	CMOS – 1/2" Progressive Scan	CMOS – 1/2.5" Progressive Scan
Lens attachment	C/CS mount		
Camera use	**Stationary camera** 5 m USB cable, **Mobile camera** 5 m USB high flex cable		
Accessories (optional)	1x set of **mounting brackets, lenses,** individual 8, 12, 16, 25, 50 mm, or as a set, 1x set of **intermediate rings**		
Dimensions without lens	33 x 30.5 x 30 mm		
Weight	50 g		

	B/W IMAGE PROCESSING	B/W AND COLOUR IMAGE PROCESSING	
EPSON **GigE CAMERAS** FOR PC VISION (PV1) AND COMPACT VISION (CV2)	**GigE VGA** mono camera	**GigE 2.0 M** mono / colour camera	**GigE 5.0 M** mono / colour camera
Resolution	640 x 480 pixels	1,600 x 1,200 pixels	2,560 x 1,920 pixels
Sensor types	CCD – 1/4" Progressive Scan Global shutter	CCD – 1/1.8" Progressive Scan Global shutter	CMOS – 1/2,5" Progressive Scan Rolling shutter
Lens attachment	C/CS mount		
Camera use	**Stationary camera** 5 m Gigabit Ethernet cable **Mobile camera** 5 m Gigabit Ethernet high flex cable		
Accessories (optional)	1x et **mounting brackets**, **lenses,** individual 8, 12, 16, 25, 50 mm or as a set, 1x set **intermediate rings**, 10 m Gigabit **Ethernet cable**, 10 m Gigabit **Ethernet high-flex cable**		
Dimensions without lens	42 x 29 x 29 mm		
Weight	90 g		

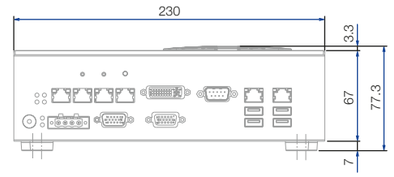
Front view (CV1)



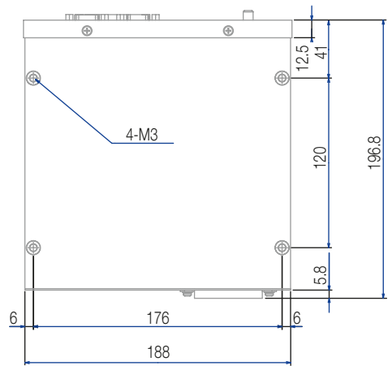
Rear view (CV1)



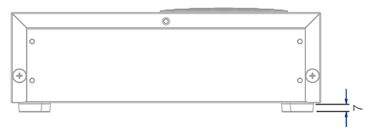
Front view (CV2)



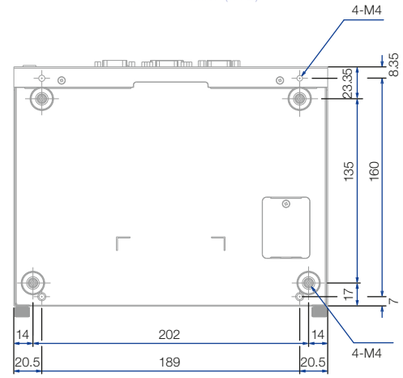
View from below (CV1)



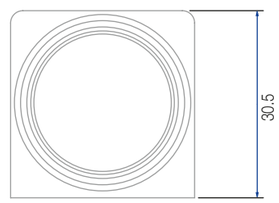
Rear view (CV2)



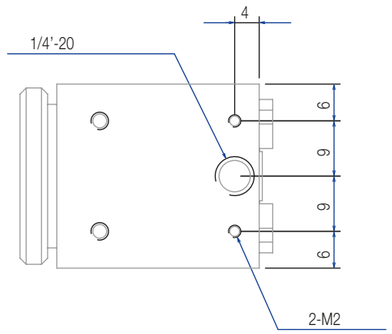
View from below (CV2)



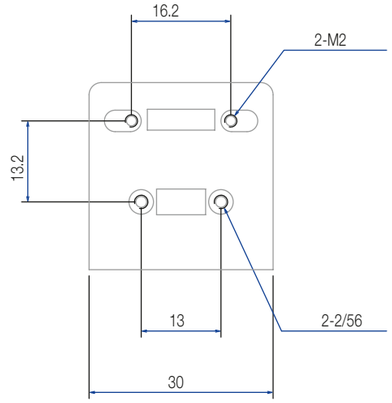
Front view



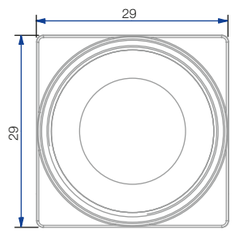
View from below



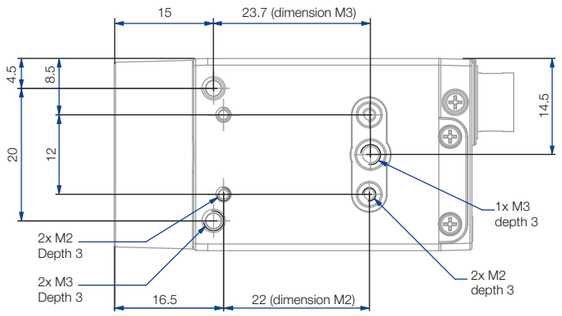
Rear view



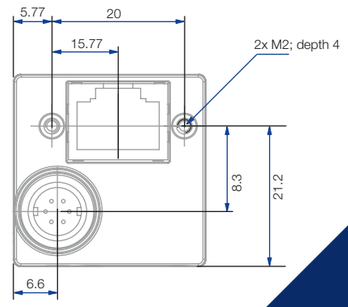
Front view



View from below



Rear view



SOFTWARE TOOLS
MADE TO ORDER

Simple programming

The image processing software – Epson Vision Guide 7.0 – is integrated within the Epson RC+ development environment. This can significantly reduce setup times and allows image processing sequences to be created in just a few mouse clicks. Programming uses drag&drop without the need for additional editors.

The software runs on Windows® (XP, Vista as well as 7 and 8.1) and communicates with the control via USB or Ethernet.

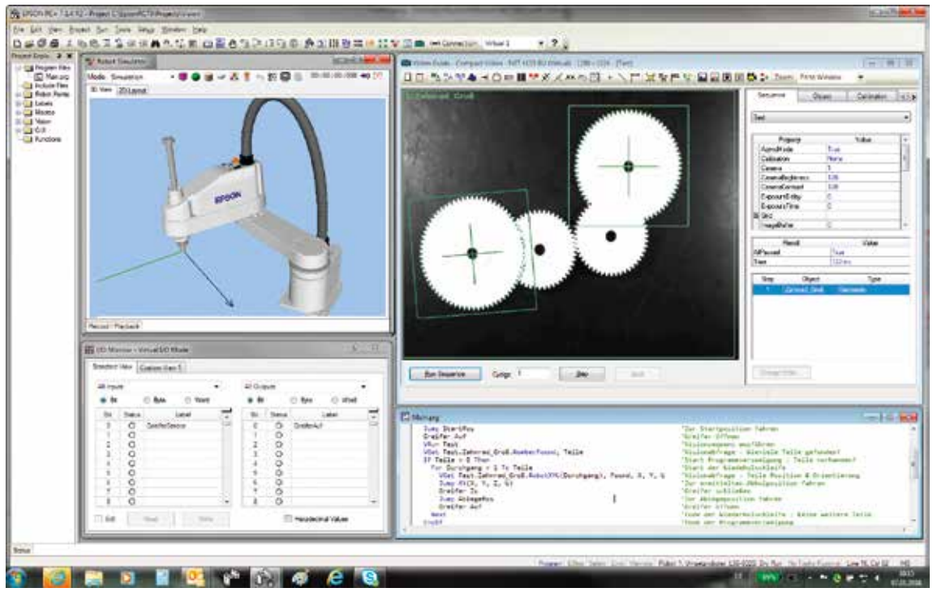
Fast help

To make setting up and working with the image processing system even easier, there are wizards to help.

FOR EXAMPLE: FUNCTIONS OF THE EPSON VISION GUIDE 7.0

IMAGE PROCESSING SIMULATION

Simulate image processing sequences prior to robot system configuration, and gain valuable experience with the operating environment.

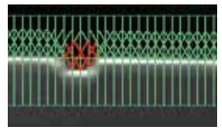


CATCH-ON-FLY: RECORDING AND EVALUATION IN HIGH-SPEED ROBOT MOVEMENTS

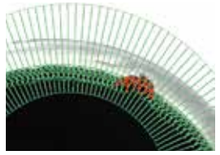
The robot control takes a picture and evaluates it – without stopping the robot via the camera. This enables for example workpiece offset data to be determined in a time-saving manner.

DEFECT INSPECTION FOR CHECKING AGAINST SPECIFICATIONS AND TEMPLATES

The error detection function allows differences resulting from comparison with the template image to be detected instantly, not only on straight sections, but also on complex shapes.



Line inspector



Curve inspector

COLOUR CAMERA SUPPORT

This facilitates selection of various coloured or transparent workpieces and assessment of the front and rear.

HIGH-RESOLUTION CAMERA SUPPORT (2 MP / 5 MP)

These cameras have now resulted in an increased search area for the same precision. Alternatively details can be shown in higher resolution within the same size search area.

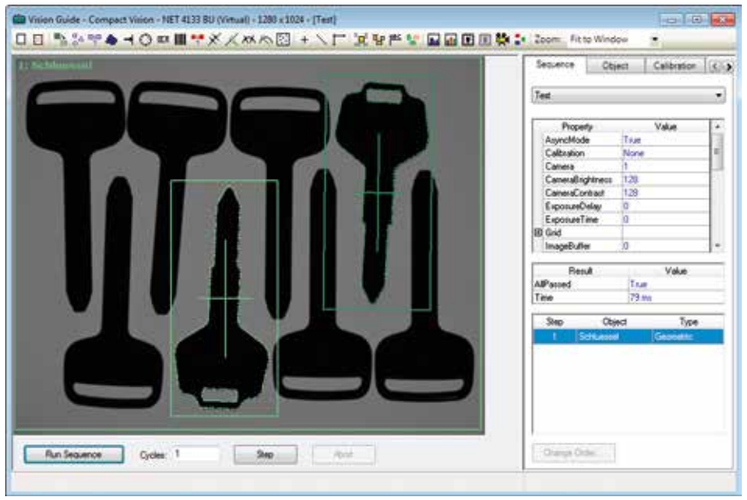
0,3 MP

5 MP

FURTHER HIGHLIGHTS
FROM OUR LIBRARY

GEOMETRIC OBJECT

Using the “Geometric Object” software tool, objects can be detected much faster and more reliably than with conventional template or edge detection. Commands are simply selected from a library overview, which further processes the robot position. The complex, lengthy, and error-prone linking of multiple command sequences is no longer required.



CODE READING

Whether barcodes, data matrix codes, or QR codes, the Code Reading function allows better and faster product tracking.

SOFTWARE TOOLS AT A GLANCE

- **Integrated calibration routines,** which support various camera alignments and calibrations
- **Point-and-click interface** for fast prototyping
- **Blob analysis tools** which measure the size, form and position of objects with changes
- **Search function** for geometric figures based on geometric part elements
- **Normalised correlation search** which detects objects using a sophisticated template matching technique in varying light conditions
- **Edge search function** which detects a certain edge precisely at sub-pixel level
- **Polar search,** an angle search function which measures the rotation of complex objects fast
- **Line and point tools** to draw and measure lines between points
- **Object reference mechanism,** to align a vision tool at the result of another vision tool
- **Histograms** for looking more closely at pixel data and to define limit values for tools
- **Statistical calculations and evaluations** for every vision tool
- **Automatic compensation** of small defects on the camera lenses and the camera itself for object angle deviations
- **Catch-on-fly** motion control via I/O function without stopping the robot
- **Vision simulation** for simulating complete motions including image processing
- **Defect inspection** for comparison with template images
- **Code reading** for the identification of barcodes or two-dimensional data matrix codes without them having to be explicitly learned
- **Support** for colour cameras and high resolution cameras

ABOUT EPSON

Epson Robotic Solutions is one of the leading suppliers of high-tech robot systems, renowned worldwide for their reliability. The product range includes, in addition to the Epson 6 axis robots, SCARA robots, the Epson-developed Spider, the entry-level SCARA robots Epson LS, as well as image processing and controls.

Technological pioneer

- In-house research and development department for automation processes
- One of the most comprehensive model ranges of high precision industrial robots in the world
- **1982**
  Epson SCARA robots freely available in Japan for the first time
- **1986**
  First class 1 clean room robot
- **1997**
  First PC-based control
- **2008**
  Inventor of the right or left arm-optimised G3 SCARA robot
- **2009**
  Inventor of the spider - a unique SCARA robot with no dead zones
- **2013**
  First application of Epson QMEMS® sensors in robotics, thus reducing 6 axis kinematics vibrations
- **2014**
  Epson Compact Vision CV2: Epson's own ultra-fast image processing computer

Pre and after-sales support

- Feasibility studies for maximum planning and project security
- Support for planning and implementation
- Introductory seminars, programming/maintenance courses, operator training
- Inspection and individual maintenance concepts
- Hotline service, on site repair service
- Central spare part stocking

EPSON INDUSTRY SOLUTIONS CENTER – **WE‘LL FIND YOUR SOLUTION!**

Epson
Industry
Solutions
Center

Experience all our Epson robots in action. In a workshop cell you can build, simulate and improve your automation application with help from our experts. The cell can be controlled and networked using all conventional fieldbus systems. In addition we can supply you with modern peripherals such as a vision and conveyor tracking system.

WOULD YOU LIKE TO ARRANGE AN APPOINTMENT?

CALL US ON
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OR SEND AN EMAIL TO
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