

**The SIMATIC VS 710 vision sensor.**  
With its unique integrated  
PROFIBUS interface.



# simatic

## MACHINE VISION

**SIEMENS**

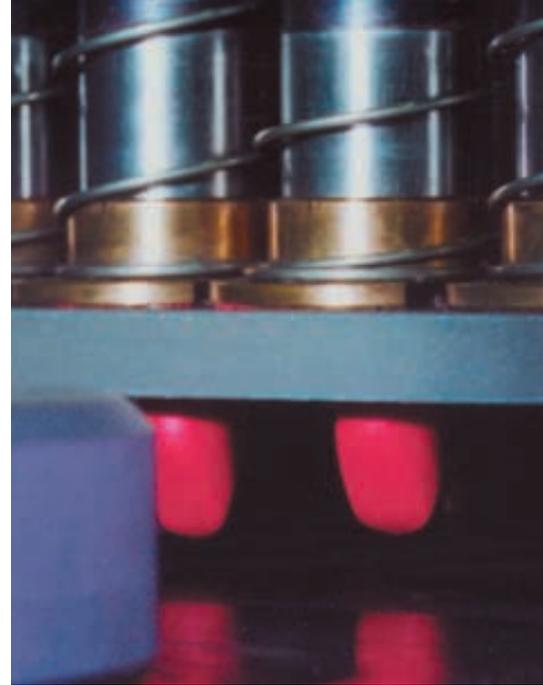
# SIMATIC Machine Vision gives new perspectives on production

Suppose you have chosen to make use of a machine vision system. And must now make a choice, and find exactly the right one for your individual production activities. What would you be looking for?

Perhaps for a system which

- makes frequent production changeovers without great effort and shortens resetting times
- is equally at home in quality control/assurance as in production automation, where machine idle times and customer complaints are to be avoided
- has proven itself in material flow control, for optimizing production activities
- prevents consequential faults by early detection of initial faults
- works to maximize machine utilization
- achieves critical increases in productivity
- and offers all this at an economical price, and is quickly available.

In short: you surely want a machine vision system which can do all of this and has all these features – and of course, sees everything with the finest of detail.

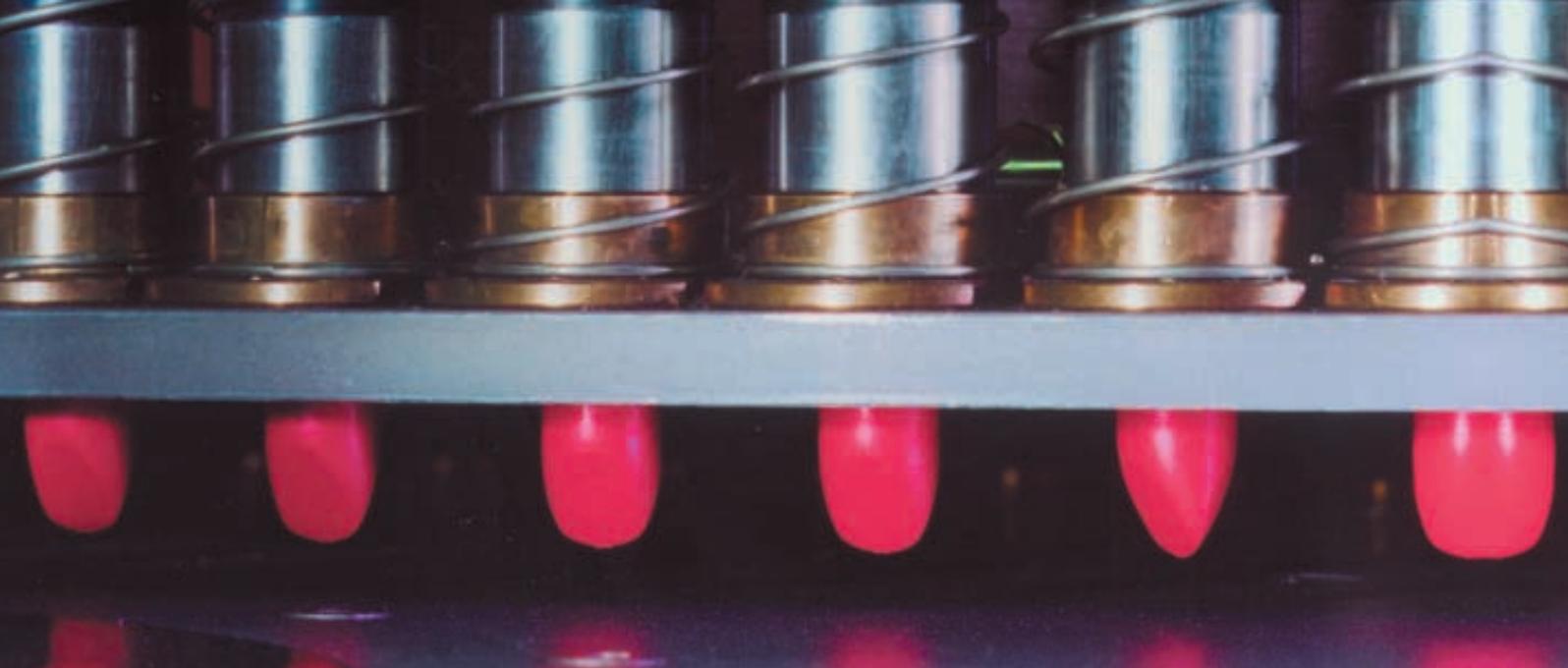


Here is the answer:

SIMATIC® VS 710 is the ideal image processing system for flexible production systems, and will keep a reliable eye on production and a firm grip on production processes, around the clock.

SIMATIC VS 710 will assist the profitability of your business in numerous ways, not least by its so-far unique integration of a PROFIBUS interface into a vision sensor.





## A winner in every respect for image processing

With every new investment, the price/performance ratio is always a primary consideration. Increasing cost pressures in production oblige one to look at costs more critically than ever. Whether the costs are for the purchase and implementation of new plant components, or to assist with production profitability, SIMATIC VS 710 offers the quickest amortization.

### The PROFIBUS has it

The unerring high-tech eye offers major benefits, particularly to PROFIBUS users:

for example, by a significant reduction in engineering costs, short changeover times with no costly plant idle times, and major savings on service costs through local fault analysis. In addition, it is also possible to transmit images and programs via the PROFIBUS over long distances, both rapidly and reliably. Apart from all the cost advantages, no compromises have to be made in technological terms.

### Flexible configuration

With SIMATIC VS 710, system configuration is rapid and uncomplicated. Because the rule here is: simple configuration work replaces costly programming. This saves not only a great deal of valuable working time, but also expensive staff training sessions.

### High-tech inside

Behind this cost-effective and powerful image processing offering from Siemens there is a system which gives maximum reliability at high clock rates. This reliability is made possible by the use of the latest sensor technology in the SIMATIC VS 710. As a result, the overall balance sheet for the SIMATIC VS 710 will please any user.

### Exemplary price/performance ratio

SIMATIC VS 710 offers top technology from the finest, without detracting from this by its price. On the contrary: the price/performance ratio is so impressive that the description "value for money" is more than adequate.



## For every industry – for every case

### Pharmaceuticals, medicine, cosmetics and consumer goods, packaging industry

- Checking the integrity of packing
- Checking labels for fault-free attachment
- Checking the printing of expiry dates
- Checking containers for correct and complete filling

### Electrical and electronic industries

- Identification of modules
- Completeness checks on component insertion in modules
- Dimensional checks on contacts
- Checking plastic injection moldings for fault-free shape

### Automobile industry and suppliers

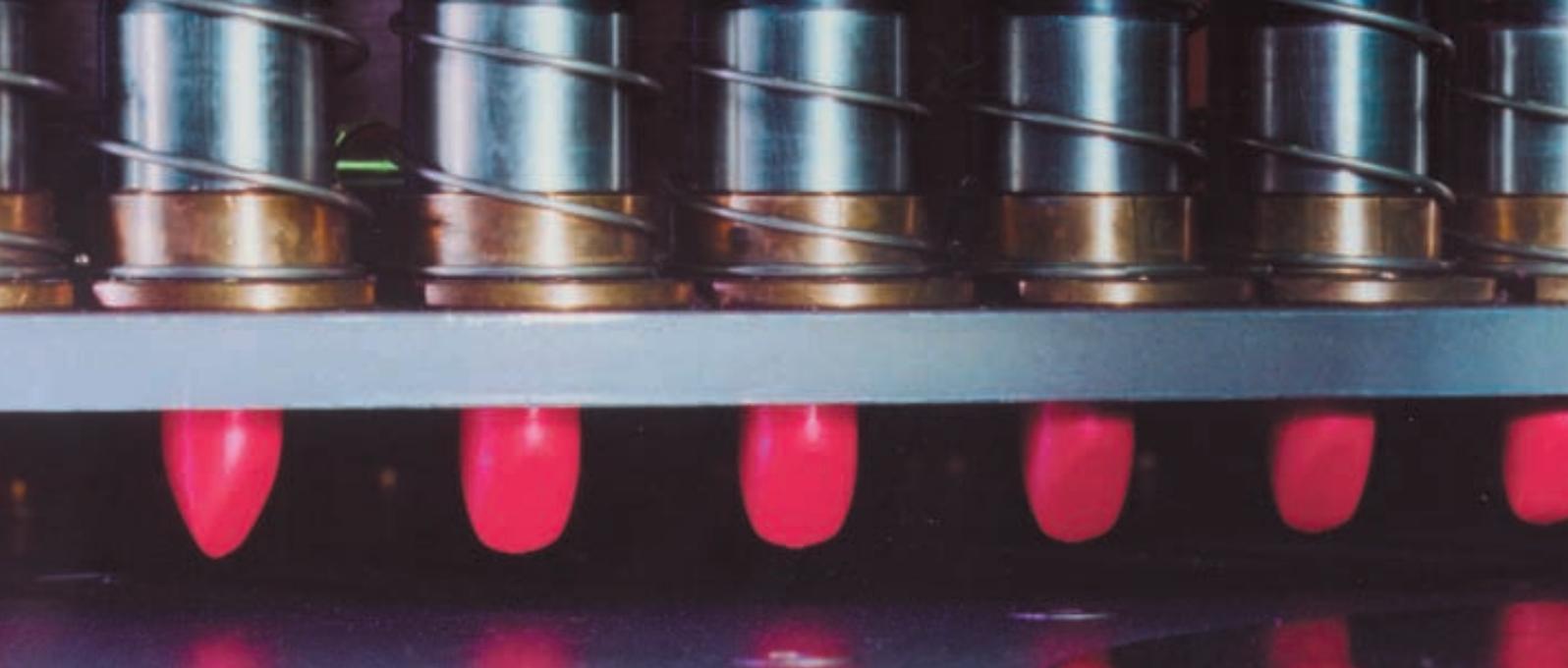
- Recognition of individual parts for automated assembly
- Checking assembly work for fault-free completion
- Checking the crimped connections, e.g. on airbag plugs

### Metal processing

- Dimensional checks on stamped, pressed, and turned parts, etc.
- Recognition of parts on joining elements, assemblies, etc.

### Logistics, handling

- Position recognition for robotics, AGV systems, cranes, high-bay warehouses



## Unique: PROFIBUS included

SIMATIC VS 710 is the only intelligent camera in the world with an integral PROFIBUS interface! Using the PROFIBUS, the camera can not only exchange data with other automation devices, but can also be configured. Images and programs can be transmitted, even over long distances, via the PROFIBUS.

### Configuring via the PROFIBUS

By configuring each SIMATIC VS 710 via the PROFIBUS, substantial time can be saved. Every vision sensor connected to the system can be configured on-line from a central programming device (PG) or PC, using the user-friendly configuration software, ProVision! This does not require a single cable to be reconnected. No special knowledge of the network configuration is necessary.

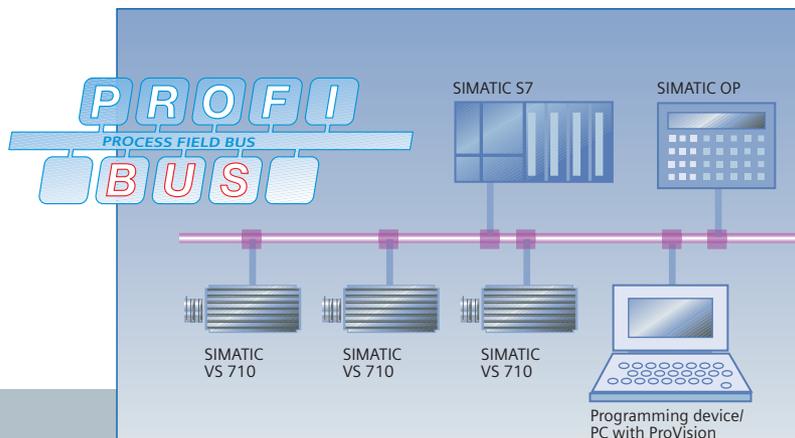
### Record times for modifications – thanks to PROFIBUS

Each SIMATIC VS 710 Vision Sensor can store up to 150 different checking programs. These programs can be started on-line, via the PROFIBUS – for example manually from an operating panel or automatically by a controller. This allows the user to adjust the checking tasks flexibly and as necessary when numerous different products are to be made in rotation.

If checking criteria are to be applied to new products, it is only necessary to create the new checking program, and download it from the central programming device via the PROFIBUS into the VS 710 devices – done!

When doing this, the machine does not have to be switched off, so production can continue uninterrupted. This saves valuable time and raises the plant availability – and with it productivity.

Maintenance and servicing are also satisfyingly economical: fault analysis is carried out locally via the PROFIBUS. So if there is an incident, service staff do not need to be on the spot immediately.





**The SIMATIC VS 710 high-tech system that keeps a sharp eye on machinery is ideally suited for ...**

- precise, non-contact 2-D measurements on products and parts,
- checking for completeness during assembly,
- identifying codes and plain text,
- orientation and position recognition,
- reliable identification of workpieces,
- checking the surfaces and contours of parts,
- print format control.



## The user-friendly ProVision software: simple configuration work instead of costly programming

### For beginners. And for professionals

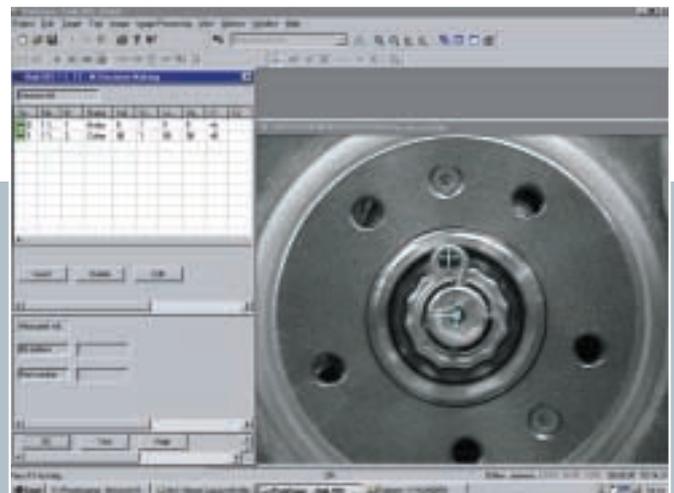
When it comes to image processing and programming, ProVision is the ideal tool – whether for beginners or professionals. Because its simple operation and parameterization, with integral test and recognition functions (inspection elements), make tasks as simple as possible, particularly for the less experienced user. A mouse click parameterizes the positions of parts, checks for their presence, position, shape, pattern, spacing, angle, and surface finish in an instant.

### Using your own inspection elements

ProVision now supports an open interface for the integration of plug-in inspection elements generated by the user. They can be used in the same way as standard elements. This feature enables convenient configuring of the test program for (almost) any task, irrespective of the standard functional scope. The individual inspection elements are easy to write in the C++ programming language for use in ProVision. The user can benefit both from convenient configuring with ProVision and flexible programming in a high-level language.



Example: completeness checking in the assembly of a motor; selecting the elements to check when creating a new project



Example: checking that a wheel part is correctly assembled and has the correct number of holes, and that the wheel nut is locked

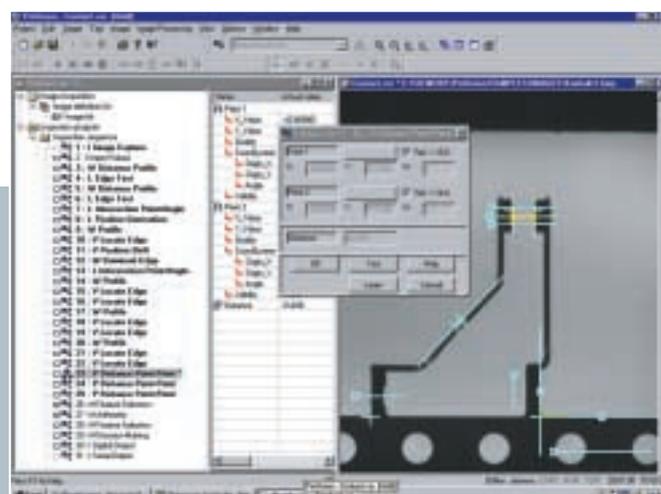


### Using C programs

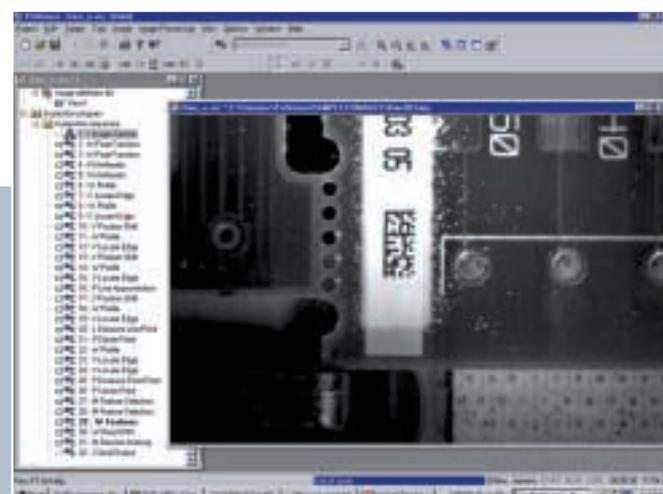
The experienced programmer of image processing algorithms can develop his own checking and recognition functions in the C/C++ programming language. Existing algorithms can very simply be ported to SIMATIC VS 710.

### Software package for OCR/OCV character recognition

As an alternative to ProVision, the software package for OCR/OCV character recognition can be used. This contains all the functions for defining and teaching the system the characters which are to be read or verified, and only requires to be parameterized by the user.



Example: measuring relay contacts, with an inspection element which measures the distance between two points



Example: localizing and deciphering the 2-D data matrix code on a circuit board

# Pin sharp: the latest sensor technology

## **Best image quality and resolution. Even with moving images**

The innovative SIMATIC VS 710 image analysis system is based on contrasts, and is supreme in gray-scale image processing, with a high image quality and resolution.

As you would expect, there is nothing but the best technology in this vision sensor. So the digital camera has the latest generation of high-resolution sensor technology. Square pixels are just as much a part of this as the restart/reset function, full-frame shutter technology, interlaced and non-interlaced modes, and an integral flash trigger.

## **Strength: robust image analysis**

Whether for large lots or small parts: SIMATIC VS 710 offers high functional reliability from its robust image analysis. Even with poor contrast, the checking and recognition results will always be dependable. And this with a measurement accuracy which is better by a factor of 2 than analog systems!

## **Undistorted images**

Pixel-identical sampling guarantees distortion-free images. In addition to which the interrupt-controlled image capture and the restart/reset mode permit reliable analyses at the highest product transport rates. Another highlight: using a directly-connectable standard VGA monitor, all the images – live or stored – can be displayed, including with graphical overlays.

## **Rapid processing, high cycle rates**

With the fast CPU, image analysis is a rapid process: the image is analyzed in accordance with the specified program in the shortest possible time. Here, the analysis is initiated via either the digital, the serial, or the PROFIBUS interface. In addition, image analysis can be performed in alternating buffer mode – in which the latest image is stored before the processing of the preceding one is complete. This ensures that even at high cycle rates or when parts are presented at irregular intervals, each part is checked exactly. This makes cycle rates of up to 25 pieces/sec achievable. Naturally, we have made the SIMATIC VS 710 capable of being booted. With up to 150 programs resident in memory. And with the guarantee that image analysis is activated immediately after switch-on.



# A complete package: camera, computer, I/O, and PROFIBUS

## Everything in it, everything on it, and easy-to-use

With the compact SIMATIC VS 710 we have integrated everything into a single device: camera, computer, I/O, and PROFIBUS interface. What you require in addition is merely a 24-volt power supply, a standard objective, and a lighting set up. You see: after all the superlatives which have just been used, you would not expect a complicated system. Rather, a very compact device which is attractive for its user-friendliness. This applies also to its mounting. With just three screw connections or one adjustable fixing bracket, the SIMATIC VS 710 is mounted in the required arrangement in an instant!

## Perfect links to the process included

The interfaces for linking to the process and to automation devices are already built into the VS 710:

- PROFIBUS-DP with transmission at up to 12 Mbit
- Fast RS 232 serial interface, with a transfer rate of up to 115 kbit
- Digital inputs and outputs, with integral flash control for particularly simple flash usage

Software modules are available to permit simple linkage to the SIMATIC S5, S7 and C7 programmable controllers. PROFIBUS communications for the SIMATIC VS 710 can be conveniently parameterized using STEP®7.

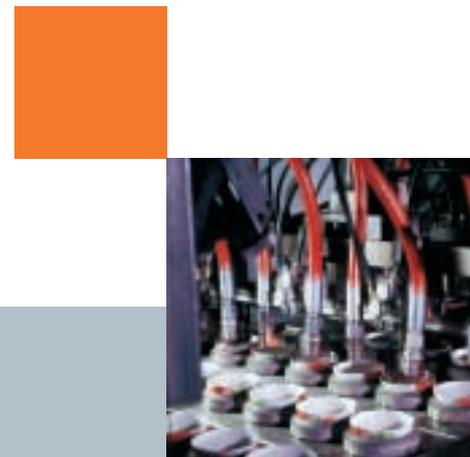
## Plain sailing: code and OCR/OCV character recognition

This can be used for the rapid and reliable identification of products and parts:

- Recognition of the ECC200 data matrix code – a well-liked method for industrial applications, because bright/dark codes can be up to 30 % distorted. Up to 10 codes/sec can be read.
- OOCR/OCV character recognition and verification: up to 30 characters/sec and 2 character strings can be read simultaneously, with up to 20 characters/string.

## Large choice of accessories

Standard accessories can be used for the SIMATIC VS 710, for example industrial 24 V DC power supplies (no 9 V or 12 V supply required!) and standard C-mount objectives. Also available for the SIMATIC VS 710 are a wide selection of lighting rigs, IP 64 housings to protect against dirt, damage, and mispositioning, PROFIBUS components, VGA monitors, and connecting cables.



# SIMATIC VS 710 – Technical Data

- Compact anthracite-black metal casing with alternative mounting options and all connections by plug-connector on the back plate
- C-mount standard objective connection with simple adjustment of the back focal distance
- Restart/reset, full-frame shutter with 1/50–1/10,000 sec exposure time, field/frame operation with pixel-identical sampling
- Image formats from 768 x 512 square pixels to 380 x 280, freely programmable
- Integral flash control
- CPU with direct access frame memory
- 16 MB DRAM main memory, 16 MB flashdisk, 256 Kbyte EPROM for the BIOS
- 2 MB frame or display memory, with graphical overlay
- Runtime operating system: MS-DOS with 32-bit DOS Extender
- Configuring software for PC/programming device with Windows 95/98/ME/2000/NT 4.0, in 5 languages (German, English, French, Spanish, Italian)
- Approvals: CE, UL, CSA, FM
- Operating temperature: 5 to 50 °C with no fan
- 24 V, 500 mA power supply, range 20–30 V
- Dimensions: 65 x 80 x 130 mm (W x H x D)
- Weight: approx. 0.250 kg

## Interfaces

- 12-pin circular connector with 24 V 2-bit digital interrupt logic inputs, and 24 V 4-bit digital optocoupler outputs, with one of the outputs for flash control
- 9-pin sub D pin contact strip as the RS 232 interface, with 115 Kbaud transfer rate
- 9-pin sub D socket, PROFIBUS-DP interface with 12 Mbaud transfer rate, DP protocol as slave
- 15-pin 3-row sub D socket as SVGA monitor connector, output format 800 x 600 in automatic mode
- 4-pin circular connector to the external power supply

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For further information on SIMATIC VS 710, such as technical specifications, application examples, downloads, news, ordering data, and ordering via e-business in the Siemens Mall, please see our Internet site:

[www.siemens.com/machine-vision](http://www.siemens.com/machine-vision)

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