

New Capabilities Take the Fright Out of Integrating Vision Inspection Into Existing Control Schemes

Implementing automated vision inspections at each stage of production on existing machinery to improve quality and reduce waste can be intimidating. Many vision system manufacturers unwittingly frighten off broader adoption by making their systems complicated to integrate into existing control and data collection systems. The latest crop of vision inspection systems offers more internal capabilities to reduce the complexity of programming and communications for engineering, and minimize the impact on the control system.



What's the Problem?

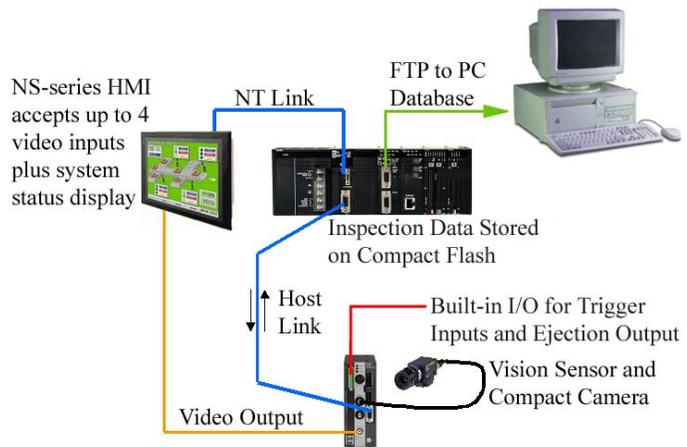
There are many applications in automotive, electronics assembly, and food and beverage packaging that can benefit from a machine vision system's accurate inspection. Here's a basic date code inspection/verification problem solved three ways to show the scalability of new solutions and where to find savings in hardware, engineering and maintenance. The problem: How do we collect date code information from the vision system, process the actions through the control system, then record results into a database, and monitor the action in real-time? A concise comparison table is at the end.

The Low-Impact Turnkey Solution

A turnkey system using the newest vision and control technology for date code verification is **completely isolated** from the existing PLC system. One advantage of the low-impact turnkey solution is local data storage.

Why Local Data Storage is Desirable

- Data are automatically stored to a Compact Flash card in CSV format; middleware on the PC reads the CSV into the database.
- Minimizes programming of middleware.
- Reduces the amount of communications traffic to once-per-shift uploads to a PC instead of continuous read/write of vision data.



Elements of the Turnkey System

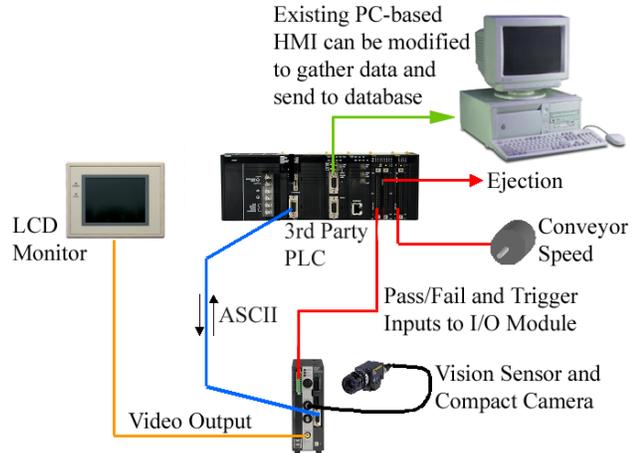
- Compact vision sensor inspects for date code quality and uses built-in I/O to handle synchronization and pass/fail control for ejection tasks.
- Built-in serial communications transmits vision results for data collection to the PLC.
- Live video output combined with an Omron NS-series HMI provides a local monitor and interface for vision system setup and diagnostics.
- Small controller reports I/O and vision status to HMI; stores production data for shift or run on compact flash.

- Operates autonomously, so none or a few program changes must be made to the existing control system.
- Data from Compact Flash memory cards can be called manually or over a network using FTP.

Smart Vision and Existing Controllers Solution

If the benefits of making the vision inspection a part of the control system outweigh the simplicity of a turnkey system, a hybrid solution of smart vision with existing controls can provide flexibility and reduced costs in hardware, software and engineering compared to traditional integrated solutions.

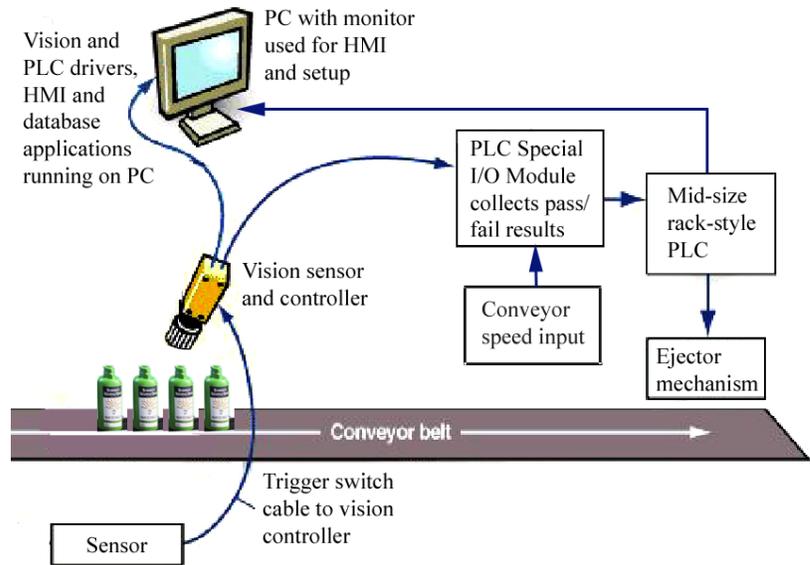
- Compact vision sensor with built-in I/O sends pass/fail and inspection trigger inputs to the PLC as regular I/O.
- Operates in conjunction with existing PLC or PC control system; however, there is minimal impact on I/O points to be integrated into operations.
- Built-in serial communications for status and data collection to existing control systems.
- Live video output supports a local LCD monitor. A hand-held console is used for configuration.



Traditional Vision and Controller Integrated Solution

Integrators with years of vision system experience have proven results from this combination of equipment, software and programming, even though less elaborate solutions provide comparably reliable results.

- Vision system continuously reads/writes to PC with acquired data, keeping the network busy with transaction data.
- Middleware programming is complex and time-consuming as it involves integrating multiple drivers: one from vision supplier, one from PLC supplier, and HMI application to display setup and operations.
- Standard setup for ejector involves connecting vision sensor to a special I/O module to collect pass/fail results before passing them to the PLC.
- Local I/O to handle pass/fail ejection tasks is an available option, and adds cost to most vision controls.
- A video output is available as an option with some vision sensors.
- Settings are downloaded from central controller, slowing down responsiveness to changeovers.



Summary of Vision System Capabilities and Impact on Existing Controls

System type	Newest vision and control technology, almost invisible to existing controls	Newest vision technology integrated with existing controls	Traditional vision and control integration solution
Camera	Single camera vision sensor inspects for text quality		
Accept/reject action	Vision system has built-in I/O used to eject bad product. Also sends rejection signal to CJ PLC memory via I/O	Sends rejection signal to PLC via standard I/O; PLC ejects bad product	Vision sensor output goes into a special I/O module (A-B Flex I/O); PLC ejects bad product
Setup monitor	HMI using video output or LCD monitor Built-in live video output is helpful for setup	LCD monitor Built-in live video output is helpful for setup	Laptop or industrial panel PC monitor using vision system driver from manufacturer
Operation monitor	HMI using live video output plus serial connection for vision and PLC data exchange	HMI or industrial panel PC for process using host link	Industrial panel PC for HMI; runs vision system driver, PLC operation viewing driver and host link software
Data storage/communication to database	PLC stores collected data as CSV on compact flash card for local database; upload data via PLC Ethernet module; middleware on PC reads CSV into database	Use serial port on PLC to send collected data via Digi Serial-to-Ethernet converter PC interface for data tracking	Vision data goes directly to the PC running vision and PLC drivers, HMI and database applications
Middleware programming	Light	Moderate	Heavy
Vision Sensor Features			
On-board I/O	Built in, standard	Built in, standard	Optional
Video output	Built in, standard	Built in, standard	Optional or not available
Communication port	Serial; Ethernet solution available	Serial; Ethernet solution available	Serial or Ethernet
HMI Features	Omron NS-Series HMI presents live video and system information for local monitoring and can be used for system setup	Omron HMI or other brand.	Omron HMI or other brand.
Video display	Displays up to 4 live video images	Displays up to 4 live video images	Use PC monitor

For more information:

Contact Omron vision system specialist. Call 866-88-OMRON to find the one nearest you.