High Speed Vision Inspection System

Opportunity

A Fortune 500 manufacturer was designing a new product. The new product required extensive vision inspection on 100% of all parts. This included inspection for cosmetic appearance of the label, electrical functionality, and completion of assembly operation.

Marketing and distribution requirements for the new product roll-out resulted in a timetable for installation that was very aggressive.

Design Solution

Each system includes one to seven vision inspection sensors. Up to nine parameters are inspected with each vision sensor.

Product inspection rate was specified to be 30 frames per second, the design rate of the camera equipment. Specification and design of the data interface between vision sensors and data collection computer required special attention since the selected vision sensor manufacturer did not have experience in operating the sensor at this data rate.

AEC specified and designed lensing, lighting, and material handling for each system. Light fixturing and material handling required special attention because of the high transport rate Mechanical design permitted manual coarse and fine adjustment of all cameras, registration of product position within the field of view, front lights, and backlights.

Vision sensors communicated via a high speed backplane to a VME based PC running a custom C language application. Operator Interface was developed using WonderWare InTouch. Sequence of Operation is controlled by a GE 90-30 PLC.

Other non-vision based inspection sensors are installed at different locations on the machines. Since the various sensors are located at different points along the transport path of the product, it was necessary to maintain a shift register in the PLC controller to maintain synchronization with product motion. The high speed shift register permits marking of the correct defective products using a single high speed ink jet printer.

Final version of the system supports four product sizes. Changeover time was minimized by presenting mechanical setup information on Operator Interface screens, and by storing recipes and vision algorithms for all products in the PC for download to the vision sensors.

Results

AEC received Notification to Proceed in mid-November. First system was installed and placed in operation, on schedule, during the first week in February. A total of eleven systems were placed in operation on time and on budget.

Scope of Supply included specification, electrical design, mechanical design, purchasing, programming, installation, and startup of all systems.