

High Speed Vision Inspection

CASE STUDY



A major medical component manufacturer needed inspection on the fly for quality inspection.

Challenge

Our client needed inspection and verification of various key features of a part while running at high rates of speed, 130-250 parts per minute (ppm) continuously (on-the-fly). The parts are generally clear but can come in multiple colors such as red and blue. The requirements included toleration of color differences while inspecting at the same rate even if parts were mixed. One of the biggest issues was trying to reliably inspect a clear part. During inspection, parts that had molding defects or that were damaged by upstream processing needed to be identified. Specific defects could affect the part integrity or part operation and therefore could make the part unsafe for use. Features to inspect included finger position, finger straightness, finger integrity (presence/absence) and ensuring the body is level.

Solution

Two cameras were mounted over a cam-driven dial to inspect the front and rear sides of the part. The dial drive is continuous, and the cameras are discretely triggered when the cam goes into dwell directly by the PLC for speed. To obtain the quality image, it was necessary to place the light at a distance for the light to become collinear. This enhanced the edges along the part and made them appear darker and thicker. To lessen the effect of ambient light a red backlight was used with a matching red band pass filter on the lens. The key to the success of this system is speed, therefore fast hardware and fast processing was essential. This application used well over 25+ vision tools (edge detection tools mostly with blob tools and light meters, not to mention other logic and script tools) and was required to run at speeds of up to 255ppm (235msec. per part max.). With an image acquisition of ~80msec and a dwell of ~180msec for processing and communications, we used some key features of ATS SmartVision™ software, such as tool base and offset referencing for automatic positioning based on other key fiducial points. This removed the time-consuming task of manually moving tools from the application and freed up valuable time for other processing. Also, ATS SmartVision software's ability to leverage and support OEM hardware was crucial to the implementation.

Results

The customer was pleased with the results and subsequently ordered three large-scale systems.