Identifying Registration Marks in Laminate Films

Many manufacturing processes rely on registration marks to line up sheet materials for cutting or printing. Some packaging companies use multi-laminate films for their packaging applications, and can require elaborate printed graphics that include several colors. If even one of the colors is offset, the resulting print can appear blurred. In order to maintain a high level of quality with these complex printing systems, printers use registration marks on the base film to act as an orientation point for multi-color printing so that all of the color passes are aligned. By using a registration mark, not only is the final print of higher quality, but less scrap is created by print passes that do not line up.

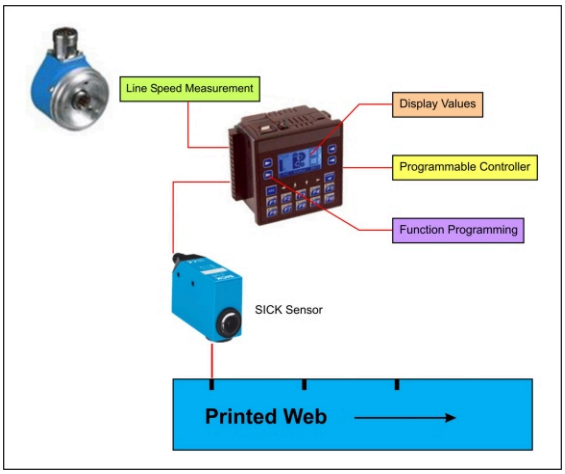
The registration mark is only one part of the alignment process. The printing system has to be able to identify the registration mark and align either the base material or the printing apparatus accordingly. Traditionally, registration marks were aligned visually by the operator, and relied on the judgment of the operator to achieve accuracy. Other types of registration marks, such as perforations in the base material allowed the material to be aligned on pins to maintain the correct orientation. However, the human eye can only provide so much accuracy, and alignment pins are not always appropriate, depending on the type of material and its final use.

Using Digital Imaging to Improve Printing Quality

Today, the advancement of digital imaging allows for this type of imaging to be applied to the printing process to greatly improve the overall quality of the printing process. Digital imaging can also be used to measure the distance between printed registration marks to minimize the amount of scrap that is generated.

Cimtec's Solution for Printing

Cimtec has developed a custom solution for this application specifically for the printing industry. A digital imaging system for this application consists of an optical sensor, such as a SICK high switching frequency (10 KHz) sensor, that will read the printed eyespot that is located along the edge of the material web, an optical encoder to calculate the line speed based on the drive roller, and a display system. The impression distance is then calculated by the PLC controller based on the time differential between eyespots multiplied



by the line speed. The system will have the capability to display multiple values. These values are called up individually by function keys on the controller front control panel:

Single impression distance measurement (F1)
Average impression dimension (F2-over X number of impressions as input by the operator F3)
Impression length tolerance value (F4-high and F5-low)
Impression count set point (F6)
Linear compensation factors (F7)

Output signals are provided when the dimensional tolerances values F4 and F5 are exceeded or to stop the line upon reaching the predetermined impression count (F6).

The alerts provided by this specific Cimtec solution will allow manufacturers to have a better handle on their printing operations and to maintain higher quality of the printing process. Through higher quality, manufacturers will reduce the amount of excess material as well as mis-printed material, which will in turn reduce overall production costs.