**Automatic Color Inspection for Colored Wires in Electric Cables**

**ABSTRACT**

In this paper, an automatic optical inspection system for checking the sequence of colored wires in electric cable is presented. The system is able to inspect cables with flat connectors differing in the type and number of wires. This variability is managed in an automatic way by means of a self-learning subsystem and does not require manual input from the operator or loading new datatothemachine.Thesystemis coupledto aconnectorcrimping machine and once the model of a correct cable is learned, it can automatically inspect each cable assembled by the machine. The main contributions of this paper are: (i) the self-learning system; (ii) a robust segmentation algorithm for extracting wires from images even if they are strongly bent and partially overlapped; and (iii) a color recognition algorithm able to cope with highlights and differentfinishingofthewireinsulation.Wereportthesystemevaluation over a period of several months during the actual production of large batches of different cables; tests demonstrated a high level of accuracy and the absence of false negatives, which is a key point in order to guarantee defect-free productions.

***Index Terms—***Cable crimping, wire color measurement, wire color sequence, wire detection, visual inspection.