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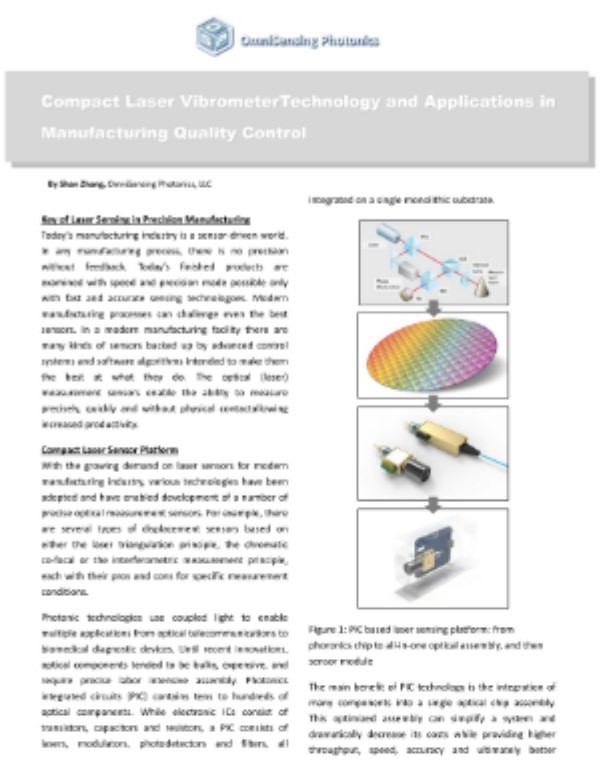
OmniSensing Photonics

Compact Laser VibrometerTechnology and Applications in Manufacturing Quality Control

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Key of Laser Sensing in Precision Manufacturing

Today's manufacturing industry is a sensor-driven world. In any manufacturing process, there is no precision without feedback. Today's finished products are examined with speed and precision made possible only with fast and accurate sensing technologies. Modern manufacturing processes can challenge even the best sensors. In a modern manufacturing facility there are many kinds of sensors backed up by advanced control systems and software algorithms intended to make them the best at what they do. The optical (laser) measurement sensors enable the ability to measure precisely, quickly and without physical contact allowing increased productivity.

Compact Laser Sensor Platform

With the growing demand on laser sensors for modern manufacturing industry, various technologies have been adopted and have enabled development of a number of precise optical measurement sensors. For example, there are several types of displacement sensors based on either the laser triangulation principle, the chromatic confocal or the interferometric measurement principle, each with their pros and cons for specific measurement conditions.

Photonic technologies use coupled light to enable multiple applications from optical telecommunications to biomedical diagnostic devices. Until recent innovations, optical components tended to be bulky, expensive, and require precise labor intensive assembly. Photonics integrated circuits (PIC) contains tens to hundreds of optical components. While electronic ICs consist of transistors, capacitors and resistors, a PIC consists of lasers, modulators, photodetectors and filters, all integrated on a single monolithic substrate.

Figure 1: PIC based laser sensing platform: from photonics chip to all-in-one optical assembly, and then sensor module

The main benefit of PIC technology is the integration of many components into a single optical chip assembly. This optimized assembly can simplify a system and dramatically decrease its costs while providing higher throughput, speed, accuracy and ultimately better

Compact Laser VibrometerTechnology and Applications in Manufacturing Quality Control

This paper introduces a series of compact laser vibrometer products developed by OmniSensing Photonics which are based on its integrated laser sensing platform. These laser vibrometers have wide applications in various industries, from automation production lines to medical/health field as ultrasound detectors. In this article, the compact laser vibrometer sensors as the key online quality control unit for manufacturing industry are highlighted, where two specific application cases are described with some details.

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