Through-the-Lens (TTL) Laser Marking Enables Simple and Exact Alignment

Challenge

Manufacturers of components for automotive, semiconductor and electronics applications often have a similar need to place small permanent marks on their products with increased spatial accuracy and consistency. For example, it may be required to place a miniature 2D code into a small recess. This can sometimes be achieved with precise fixturing, but this slows the marking process and increases its overall cost. Plus this type of alignment can be temperature sensitive.

Solution

A new option that is now available on the PowerLine family of laser markers completely solves this problem. This option is called Through-the-Lens (TTL) marking. Here a vision system (camera, etc.) is integrated into the marking optics in the form of an optics cube located between the laser and the scanner. A beam splitter in this cube intercepts the laser path and enables a camera to see the target object along an identical path as the marking laser, i.e., with no offset and no parallax effects. The object is illuminated with a ring of LEDs operating in a different wavelength range than the laser, so that the dichroic beamsplitter efficiently rejects any scattered laser light from reaching the camera, which sees only the target. This TTL option can be integrated in any PowerLine markers, including those using USP lasers for black marking and ultraviolet models for marking plastics. The targeting image can be viewed for manual operation or used for automated alignment and marking.

Benefit

Because the camera view and marking laser path are identical, the positioning of the product is no longer critical. With automated alignment, the system can exactly correct for both rotational and lateral positioning errors. Moreover, any small thermal drifts in the system or fixturing will have no impact since they will affect the viewing path and laser path identically. This enables faster marking, consistent mark placement, and eliminates the cost for fixturing and the time for careful physical alignment.

Figure 1. The TTL option for PowerLine uses an optics cube to combine the viewing and marking paths before the scan optics.
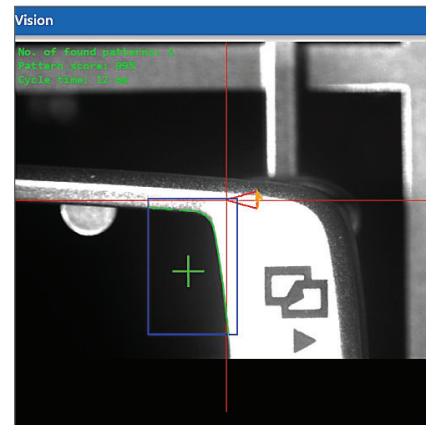

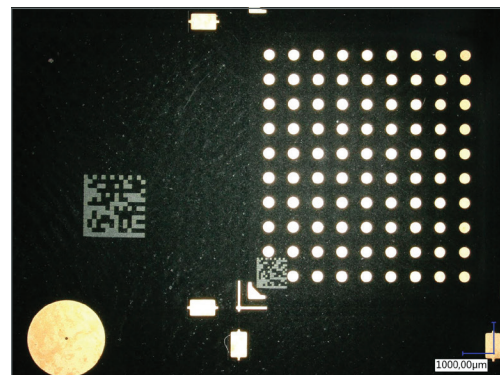Figure 2. TTL can be used for manual viewing or automated mark placement.

Figure 3. TTL is perfect for placing small 2D marks in constricted spaces.

Application Field

Accurately positioning small laser marks on products for the automotive, semiconductor, electronics, and other industries.

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