

Fraunhofer IPM

HoloTop Motion

3D sensors for high-throughput production lines

Continuous inline measurement with micrometer precision

HoloTop motion sensors use digital multi-wavelength holography to quickly and accurately measure the surface topography of components at feed velocities of up to 1 m/s.

The digital holographic sensors in the HoloTop Motion series capture the 3D surface of moving components with micrometer accuracy during production. Depending on the objective lens, the sensors can achieve a lateral resolution of less than two micrometers. Often, they are the only solution for precise, full-surface 3D measurements while still maintaining high throughput. Thus, they enable reliable quality control in the production of wafers, microbump arrays, metal surfaces, and gear components.

3D surface measurement without stopping production

In many production processes, components must be temporarily stopped or even completely diverted from the production line for precise 3D inspection. This results in the loss of valuable cycle time and makes it difficult to perform comprehensive quality control on large surfaces or continuously moving components. HoloTop Motion sensors measure surfaces in motion, providing the foundation for 3D surface testing without interrupting production.

The digital holographic sensors illuminate a narrow section of the surface and capture its topography across the entire area with a high point density. The surface is scanned section by section in the direction of travel. The acquired 3D measurement data is then stitched together to produce a continuous surface topography.

Thus, HoloTop Motion sensors can capture virtually any length of surface in three dimensions. The only limitations are those resulting from specific system integration. The width of the measurement section depends on the required lateral resolution and can be individually adjusted by selecting the appropriate lens.

Advantages

- 3D measurement at speeds of up to 1 m/s
- 5,120 × 512 measurement points per section
- Section width adjustable via lens
- Axial reproducibility < 1 µm (1σ)
- Virtually any scan length
- Can be integrated for specific applications