Lens adjustment and lens fixing for advanced driver assistance systems

The assembly system enables highly precise production of optical components for modern driver assistance systems.

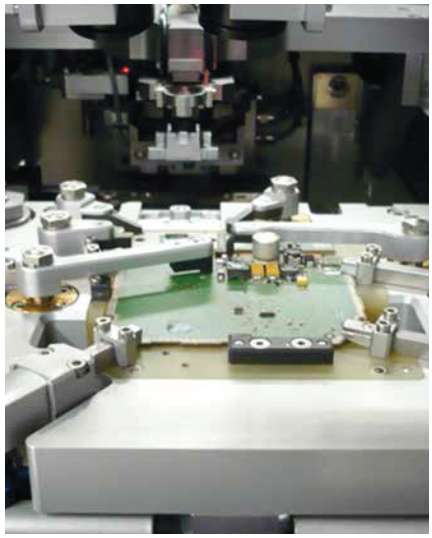
The machine is loaded with printed circuit boards (PCB), lens carriers and optical lenses. An imager (image data processing chip) is already fixed on the PCB. As a result, the imager on the PCB should be stuck together with the lens carrier and the focused lens. For that purpose, the PCB with the imager is attached in a fixture und contacted, in order to read the imager data. The PCB with the imager is moved and cleaned below the lens carrier and the lens. After positioning the imager on the X-Y-plane, the PCB with the imager is positioned in Z-direction towards the lens carrier and the lens. If the lens carrier is vertically positioned above the lens carrier, the gripper releases the lens carrier, while the optical lens is still fixed. In order to focus the lens, the PCB with imager and lens carrier is moved in Z-direction. In the focus position the components are automatically glued. Within 20 s ultraviolet light is drying the adhesive and the assembling is completed.

Due to the establishing of linear measuring scales and a high precision lifting table the adjustment system of IMAK is in the position to reproduce an accuracy of the lens carriers position by less than 2 µm.

Objektive adjustment and fixing

Basic setup

The system for the lens adjustment and fixing consists of 2 units. The main frame, which is fully made of steel, consists of the supply unit, linear measuring scales, lifting table, industrial PC, telecentrical illuminating, engine controls and the bonding unit. In the upper section of the machine a specially designed target guarantees the exact adjustment of the parts to be assembled. To avoid any dirt on the lenses as a result of air pollution, the whole system is based on an air circulation concept.



PCB in a movable fixture

Dimensions in mm (WxHxD)

1657 x 3440 x 1235

Voltage

400 V AC

Weight

1200 kg

Safety technology

Light curtain SL-V63F

Diverse safety switches

Emergency-stop-switch

Characteristics

High precision lift table

3 linear measuring scales (absolute encoder, accuracy class ± 3 µm)

4 Festo-valve-clusters

24 biconvex and biconcave lenses

9 high precision linear guides

4 absorbers KSD

Diverse proximity switches and sensors

Glue unit

Application of advanced driver assistance system

Advanced driver assistance systems are supporting the driver by handling one's car and realizing different traffic situations on the basis of completely or partially autonomous working systems. Beside an improved night view, a projector of danger- and speed indicators at the inner surface of the front pane, modern advanced driver assistance systems support the driver acoustically or by vibration to hold the track or the distance to the vehicle in front.