INEA
INCLASS

Automated display assembly lines

Covering simple to complex shapes and rationalising resource usage with operator- and maintenance-friendly design.

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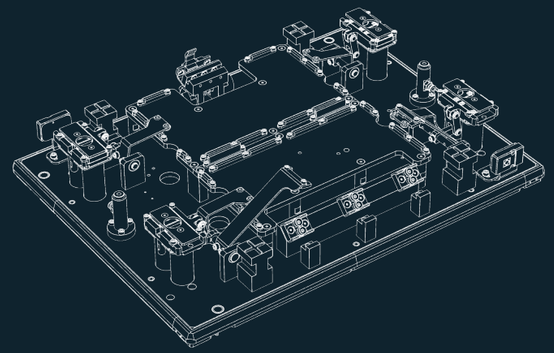
End-to-end display assembly

Fully automated display assembly, inspection and testing for simple or complex shapes. Designed for efficient resource use, easy maintenance and full traceability via MES and in-line quality control.



Optimal resource usage

Material waste, packaging, and energy costs are reduced through efficient line design and cleanroom emulation at the cell level. Automated loading via AGVs minimizes human access and enables fully interoperable, low-impact operation.

Continuous quality control

In-line inspection at every critical step ensures early defect detection and minimal scrap. Input and output are monitored with placement tolerances down to 5 µm. Fastening parameters—torque, rotation, and stroke—are continuously tracked for precise attachment.

Optical bonding

Dry optical bonding of touch displays using advanced adhesive application for a bubble- and defect-free process. Soft-to-hard and hard-to-hard lamination with optically clear adhesive ensures uniform coating and optical clarity. Integrated UV curing and autoclaves provide solid, visually flawless bonds.

Backlight assembly

Completely automated assembly line and process optimization with energy saving capabilities and automatic feeding mechanism for long line autonomy. Custom tooling ensures precise application and quick product changeover. Each station features in-house developed ISO 7 cleanroom emulation.

Final assembly

Modularly designed automatic and semiautomatic lines feature AI vision systems for component positioning and tolerance measurement. Where vision is impractical, digital contact sensors measure thickness, flatness, and parallelism with high accuracy. Servo-controlled presses handle delicate press operations, guided by force sensors for even distribution.

Strive for excellence

Our solutions are built to the highest industry standards and completely tailored to production needs. As production parameters change, the lines can be adapted modularly, swapping out components if necessary.

Precision

< 0.05 %

assembly tolerances

Performance

> 99 %

first pass yield

Sustainability

≥ 0.5 µm

particle filtering

Reliability

> 95 %

technical availability

Efficiency

< 0.05%

machine scrap rate

Safety

SIL 3

safe speed movement

360° traceability

All parameters and measurement values can be recorded and reported together with product identification to the manufacturing execution system (MES), which benefits from RFID tracking to accurately assess the location of each part within the assembly process. With machine status reports, any anomalies can be recognized immediately and mitigated accordingly.

End-to-end empowerment

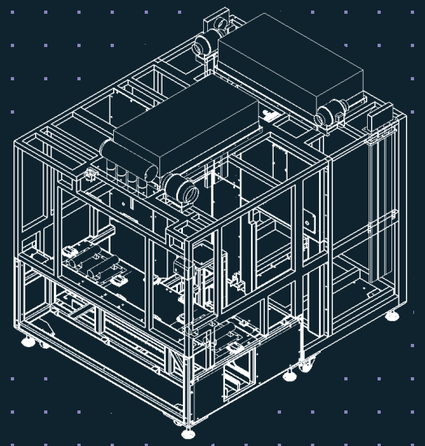
We strive to provide a well-rounded experience and stand by your side every step of the way: from concepts to design, through the definition of all assembly operations, their construction and automation, to deployment and ramp-up production support. We pride ourselves in helping our customers reach changing KPIs with continuous improvement throughout the production lifecycle.

Continuous quality assurance

Recognising ease of use as a key contributor to productivity, our lines are highly autonomous and operator friendly – from autonomous robot calibration to automatic product changeover due to tool changer grippers, adjustable production recipes, reverse input material feeding, and universal work piece carriers. Machine maintenance is eased by predictive maintenance and mobile UI panels with safe speed movement. Wherever human operators are necessary we ensure ergonomically adjustable workplace and operator friendly mechanical design.

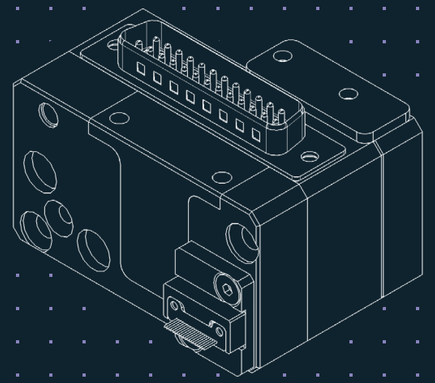
Optimal resource usage

To make sure that every technical requirement is met and scrap is kept to a minimum, our in-line quality assurance inspects the input materials as well as product output after every critical operation, so that any defects are detected early and mitigated promptly. With high robot precision and nest tolerances as low as 5 microns, every part is placed exactly where it belongs. To ensure exact attachment, the system monitors fastening parameters such as torque, rotation, and stroke.



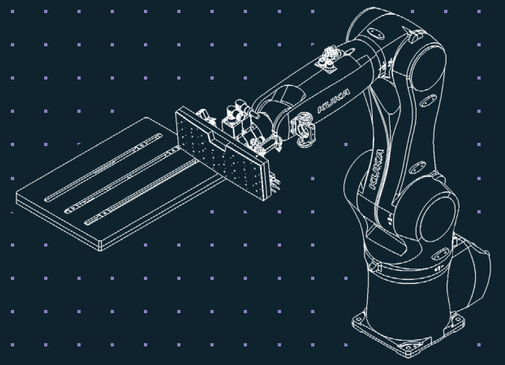
Clean room emulation

The assembly chamber is maintained at constant overpressure and the laminar flow above the assembly area is considered. The quantity and size of air particles are monitored in real time and can be reported to the information system if necessary. Every material input includes a pre-cleaning chamber to enable constant production output, assembly component loading, and maintained cleanliness.



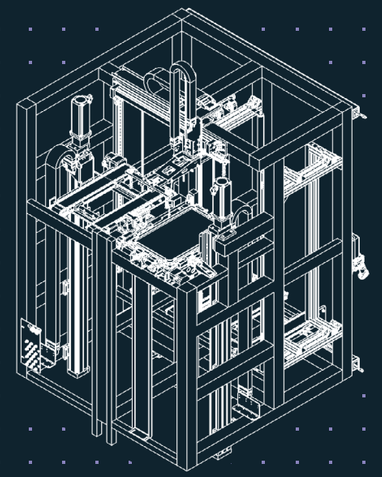
Product contacting

Functional tests require power and communication connections, which we can accommodate with a wide variety of connectors, such as flexible PCB, FPC, MQS, or HSD. Wherever possible, we use a floating contact head with mechanical guides to achieve a precise connection. Where that is not feasible, a highresolution vision system detects the position of the connection pins and the contacting head. It is mounted on high precision servo driven actuators, which can achieve contacting pitch as low as 0,5 mm using contacting probes with a tip diameter of only 0,27 mm.



Robot manipulation

With the help of advanced vision systems, robots can pick components from a wide range of packaging options such as trays, bins, and rolls. To be able to automatically assemble complex parts, gripper compensation technology is implemented. The camera system can detect the precise part position in the gripper to help the robot compensate for any differences and make sure that every product is assembled correctly.



Feeding system

The use of an advanced vision system enables dynamic component pick by precisely detecting their position. This reduces the packaging and labour costs, as the machines can process unevenly packaged input materials without operator intervention, allowing for longer autonomy. A feeding system is chosen depending on the component packaging, which could be a stack feeder, roll feeder, vibrating feeder, or tray feeder, using AGV loading and unloading wherever practical.

I’d like to highlight the impressive support and response time from the INEA team throughout and after the project, so we had a smooth ramp-up and kept the standard high the whole time.

— New Product Launch Manager, Automotive Technologies

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