

# TFT DISPLAYS

- Flexible loading systems (manual, handling, robot, transfer) for scalable expansion stages
- Optimal interaction with our Industry 4.0 solutions
- Subpixel accurate input and output inspection of the display
- Development, production, support and expertise from a single source (one-stop shopping)

Modular assembly and testing system for TFT displays  
Assembly | Bonding | End-of-line testing





# MODULAR ASSEMBLY AND TEST SYSTEMS FOR TFT SCREENS

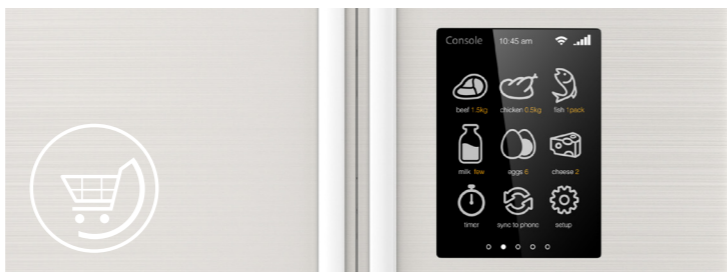
You can find them on refrigerators, washing machines and infotainment components. TFT screens have long become a part of our everyday life. PIA is a leading manufacturer of production systems for the assembly and bonding of such displays in the automotive infotainment sector. Reliable technology is important when it comes to TFT screens, for instance to maximize the screen's dust and humidity resistance, response speed and the user-friendliness of its touch functions. One example for the successful implementation of these aspects is the operating screen for electric vehicles.

The most significant production know-how lies in optical bonding (LOCA) which PIA masters with its system. This process takes place in 4 modules. From the automatic screen feed control including color sensor, to component cleaning with ionized air to atmospheric plasma treatment. The bonding agent is applied in accordance with customer specifications.

The bonding process takes place with an input of an active position correction system. The TFT and cover glass pane are bonded in a freely parameterizable capping process. A UV lamp finally cures the bonding agent. Downstream, the unit is once again plasma cleaned. Followed by an automatic quality control. The EOL tests check all significant mechanical, electrical and optical properties of the display units - no product should leave the factory without this testing.

## APPLICATION EXAMPLE

Our systems produce bonded display assemblies in different variants and perform a fully automatic test. The production takes place in clean room class 6 under ESD requirements.



## BENEFITS

- Modular structure of automation, bonding and EOL testing
- Flexible loading systems (manual, handling, robot, transfer) for scalable expansion stages
- Optimal interaction with our industry 4.0 solutions
- Monitoring of humidity and temperature (environmental monitoring) Reduction/avoidance of rejects
- Development, production, support and know-how from one source
- Subpixel accurate input and output inspection of the display Reduction of rejects/improvement of product quality
- Automation at the highest level
- Recipe management means flexible setting of parameters without the use of a programmer
- No standard machine, flexible joining processes and flexible and customer-specific display sizes

# CORE TECHNOLOGY CASE STUDIES

## BONDING LINE FOR TFT SCREENS

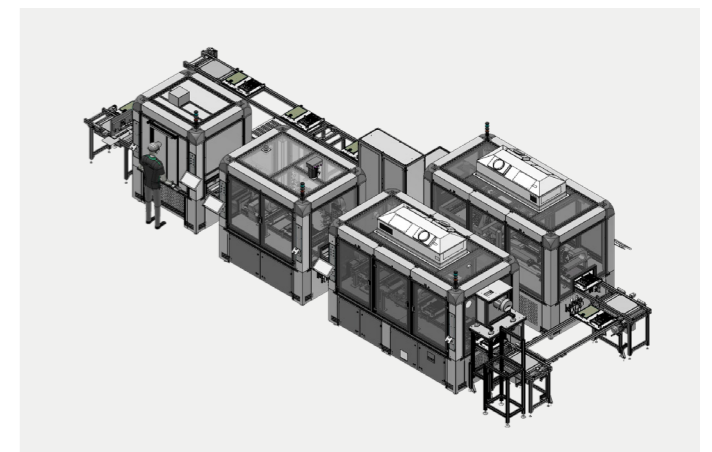
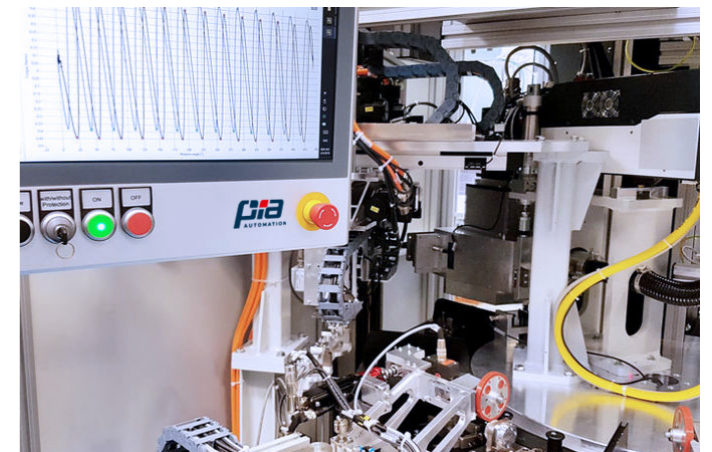
- Bonding of TFT screens e.g. size A3
- Plasma Cleaning
- Dam dosage
- Dosing of two-component adhesive
- UV curing

## EOL TESTING AUTO-HMI PRODUCTS

- Vehicle communication (CAN/LIN) including vehicle simulation
- Equivalent load tests
- Current measurements <10 uA
- Torque tests in the range of 10 Ncm
- Force-displacement tests in the range from 5 Ncm to 50 Ncm
- Automatic Optical Inspection (AOI) of the display properties (pixel defects, sub-pixel defects, homogeneity, etc.) using a high-resolution camera 29 MP
- Current calibrations
- Touchpad Tests

## VIBRATION MEASUREMENT OF TFT-TOUCHSCREENS

- Non-contact measurement of the vibration behaviour / laser triangulation sensor
- Curve analysis and recalibration
- Sampling frequency 50kHz



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