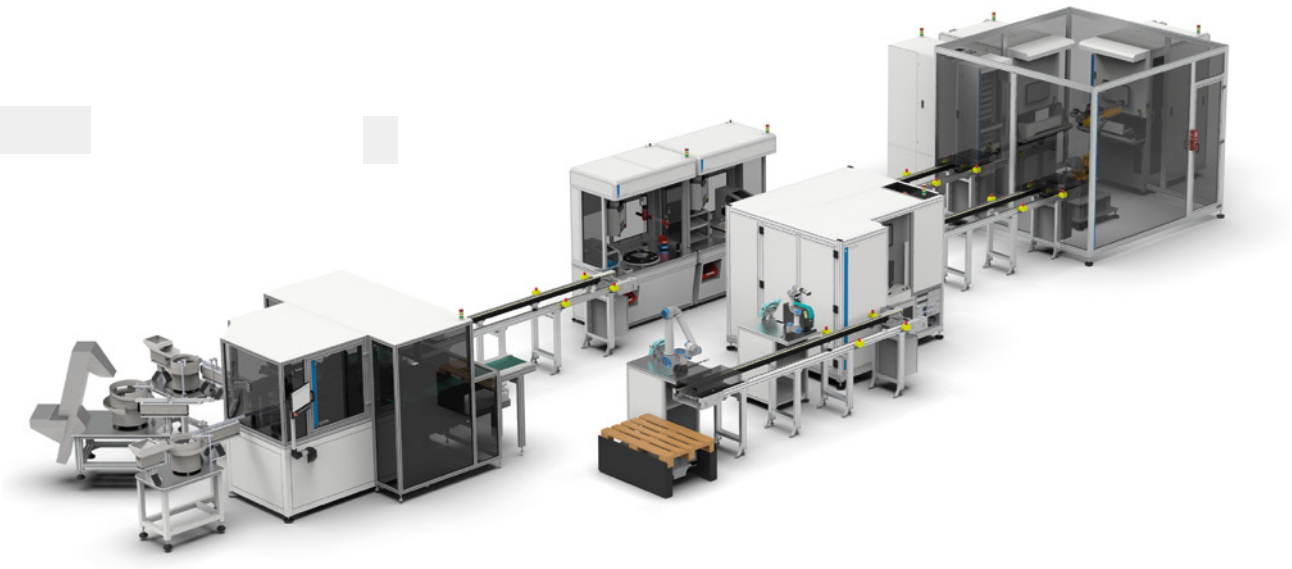
INDUSTRIAL AUTOMATION SOLUTIONS

FROM CONCEPT DESIGN, PLANNING AND EXECUTION, TO INSTALLATION AND ASSISTANCE



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innovating industry

Transversal solutions by Controlar

QiO2 Industrial IoT Platform

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The best technology and knowledge at the service of industry.

Controlar develops and integrates industrial automation solutions which include the use of advanced technology, project design and the development of mechanical and electrical projects, programming, among others.

From simple applications to integration with high levels of automation, our Automation Systems department is flexible and capable of responding to different types of projects according to the specific needs of each customer.

Taking advantage of the various interdisciplinary competencies within the Group, Controlar is able to provide the necessary services at all stages of project development, from concept design and planning to execution, installation and assistance:

- Development of machines and production lines
- Automation, remodeling and modernization of machines and processes
- HMI (Human Machine Interface) and PLC (Programmable Logic Controller) programming
- Traceability applications with RFID or based on customers' integrated database management
- Development of specific software for production control and efficiency monitoring – OEE (Overall Equipment Effectiveness) and MES (Manufacturing Execution System)
- Process monitoring solutions using SCADA (Supervisory Control and Data Acquisition), control of production lines and automation processes
- Robots design, installation and programming
- Artificial vision systems implementation

Equipment integration

- ABB
- Epson
- Siemens
- Kuka
- Universal Robots
- Stäubli
- Fanuc Robotics
- IAI
- Beckhoff
- Harting
- IGUS
- Rexroth
- Festo
- OMRON
- Rockwell Automation
- Weidmüller
- SMC
- Dai-Itchi-Dentsu
- CAB
- Phoenix Contact
- Rittal

Communications

- PROFINET
- EtherCat
- Ethernet/IP
- Modbus TCP/IP
- CANOpen
- DeviceNet
- Profibus
- AS-i

Software

- Siemens TIA Portal
- Bosch Nexeed Automation (certified)
- Omron Sysmac
- Rockwell Automation FactoryTalk
- Beckhoff Twincat
- Bosch IndraWorks
- Beijer iX Developer
- IAI Robocylinder
- EPSON RC+
- ABB RobotStudio

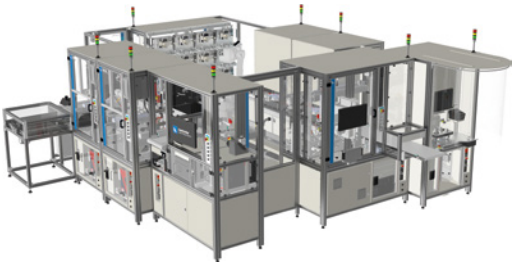
Automated Assembly Line for Infotainment Displays

Product Description

The automated assembly line for CID (Central Information Display) and DD (Driver Display) units is designed to precisely bring together the display housing, frame, and display screen. It is divided into two distinct sections dedicated to a specific stage of the assembly process: one to gluing and the other focused on screwing. Each section comprises four dedicated stations, such as a loading station, a rotation and placement station, and an assembly & curing station.

Key Features

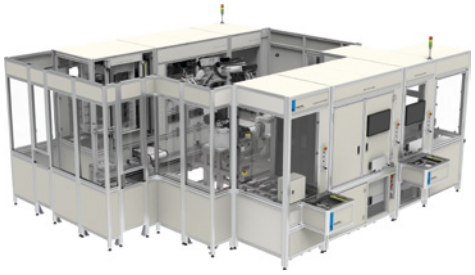
- Incorporating various automated setups with diverse functionalities
- Equipped with robotic alignment technology that ensures displays are assembled consistently and accurately
- Assembly process enhanced by a vision system to continuously measure deviations and provide offset values for precise robotic repositioning
- Two conveyor systems, comprising linear tracks, lifts, indexing units, and customized components designed specifically for transferring carriers with parts



Automated Screwing and Test Line for Instrument Clusters

Engineered to streamline the final stages of the production process, this assembly and testing line comprises two screwing stations, a flash programming station, two white point calibration and End-of-Line (EoL) test stations, a labeling & certification station, and a final control station for subjective testing and end-item labeling.

- Fully automated line: components flow in through a conveyor and exit the line ready for packaging
- Robotic handling: efficient feeding of components, ensuring short production cycles
- Machine vision testing and calibrations with exceptional accuracy
- Including display color analyzers for precise calibration
- Modular design ensuring adaptability and versatility, with interchangeable modules to meet evolving production needs



Automated Assembly Line for EV Cell Management Control of Batteries

Product Description

This fully automated testing line featuring a swift 13-second cycle time comprises a high voltage test station, a curing station, a leak test station, an End-of-Line (EoL) test station and an automatic labeling and inspection system.
At the high voltage station, we've introduced a rotating gripper to handle two parts simultaneously, thereby reducing cycle times and enhancing productivity.
Most of the stations feature modular designs, enabling the line to adapt swiftly for testing similar products by simply changing the nests. Both the leak and EoL stations house six lightweight and easily removable modules, simplifying maintenance tasks.

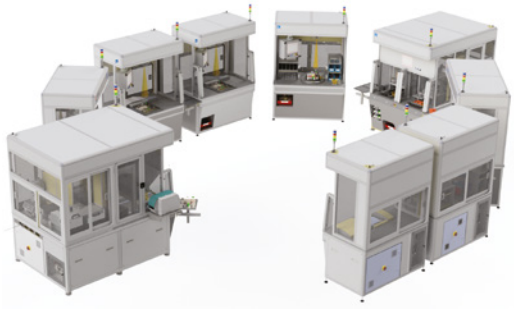
Key Features

- Robotic precision and speed, delivering flawlessly tested units in just 13 seconds
- Modular design allowing for adaptability and configuration changes to accommodate different products or versions, reducing downtime during transitions
- Cutting-edge software, enabling seamless connectivity and integration with various systems and configurations
- Stringent quality control to ensure every CMC unit leaving this production line meets the highest industry benchmarks
- Easily performed adjustments and calibrations, enhancing operational flexibility

Automatic Test Line for BMS (Battery Management Systems)

Our Automated BMS Testing Line is meticulously designed to conduct a comprehensive battery of quality validation tests on Battery Management Systems (BMS). These critical tests encompass hipot testing, resistance assessments, functional evaluations, RF power level checks, OMF flashing, provisioning, network connectivity testing, conformal coating application, certification, and the application of end-item labeling.
A BMS is an embedded module that manages critical battery functions. It is engineered to measure individual cell voltage, module voltage, and temperature levels within HV batteries.

- Comprehensive testing: capable of conducting a wide range of tests
- Early-stage validation indispensable for validating BMS performance in both the early stages of development and during manufacturing, ensuring reliability and functionality
- Employing robotics and automation for precise handling of BMS units to minimize human error and increase testing efficiency
- Ability to adapt to testing multiple BMS types, accommodating different product specifications
- Certification to ensure the BMS meets relevant industry standards and regulation



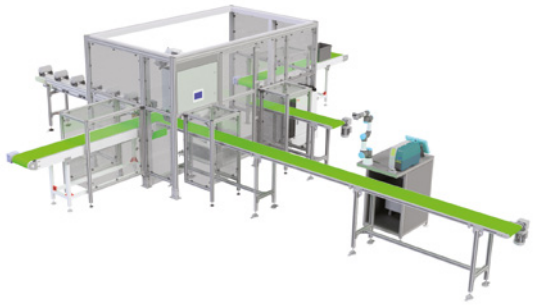
Semi-Automatic Assembly Line

Product Description

This Automatic Assembly Line was developed to perform semi-automatic assembly and inspection of electronic and plastic components, with the minimum of human intervention.
Hand labor is only required for the supply of the devices to be tested on the different setups. In this particular case it was possible to automate an assembly process with high repeatability and inspection in order to maximize production and error detection, reducing variability, bottlenecks and providing a consistent quality output.

Key Features

- Precision and reliability (each component is assembled with the same specifications and process every time)
- Quick and safe storage, sorting, orientation, positioning and insertion without damaging the product
- Ability to handle multiple tasks and to perform highly detailed assembly tasks
- Consistent quality and yield output
- Traceability Control on each DUT (Device Under Test) during each stage of the production



Sorting and Packing Station

Product Description

The Sorting and Packing Station is composed of different robotic cells and conveyors that ensure the transport of materials to be sorted and packed, being also able to perform AOI (Automatic Optic Inspection) for quality control.
This automatic station is equipped with a vision system and a robot with a 2600 mm range of working area. In order to ensure the safety of workers, the robot is inside a cell and visible through a polycarbonate security door.

Key Features

- Packing, sorting and visual inspection of different types of material, all in one
- Quality control and validation; product selection
- Developed for the automotive industry, but suitable for other industries that require automatic packing, sorting and inspection of products
- Possibility of being customized in other configurations for various types of products

Lifetime Test Rigs for Heat Pumps

Product Description

When it comes to air conditioning, heating and water supply, plastic components are subject to the aging process due to the temperature they are exposed to or to the amount of oxygen in the fluids.
The Lifetime Test Rigs for Heat Pumps developed by Controlar allows the prediction, in an accelerated test, of the wear levels throughout the plastic components' life in order to prevent eventual failures during the life cycle of the DUT.

Key Features

- Plastic components ageing acceleration
- Oxygen % and temperature control
- Arrhenius shift factors principle of Materials linearity
- Up to 208 weeks of test endurance
- Up to 54 DUTs simultaneously
- 3 main independent temperature water circuits

Automatic Air-Vent Haptic Tester with Robot

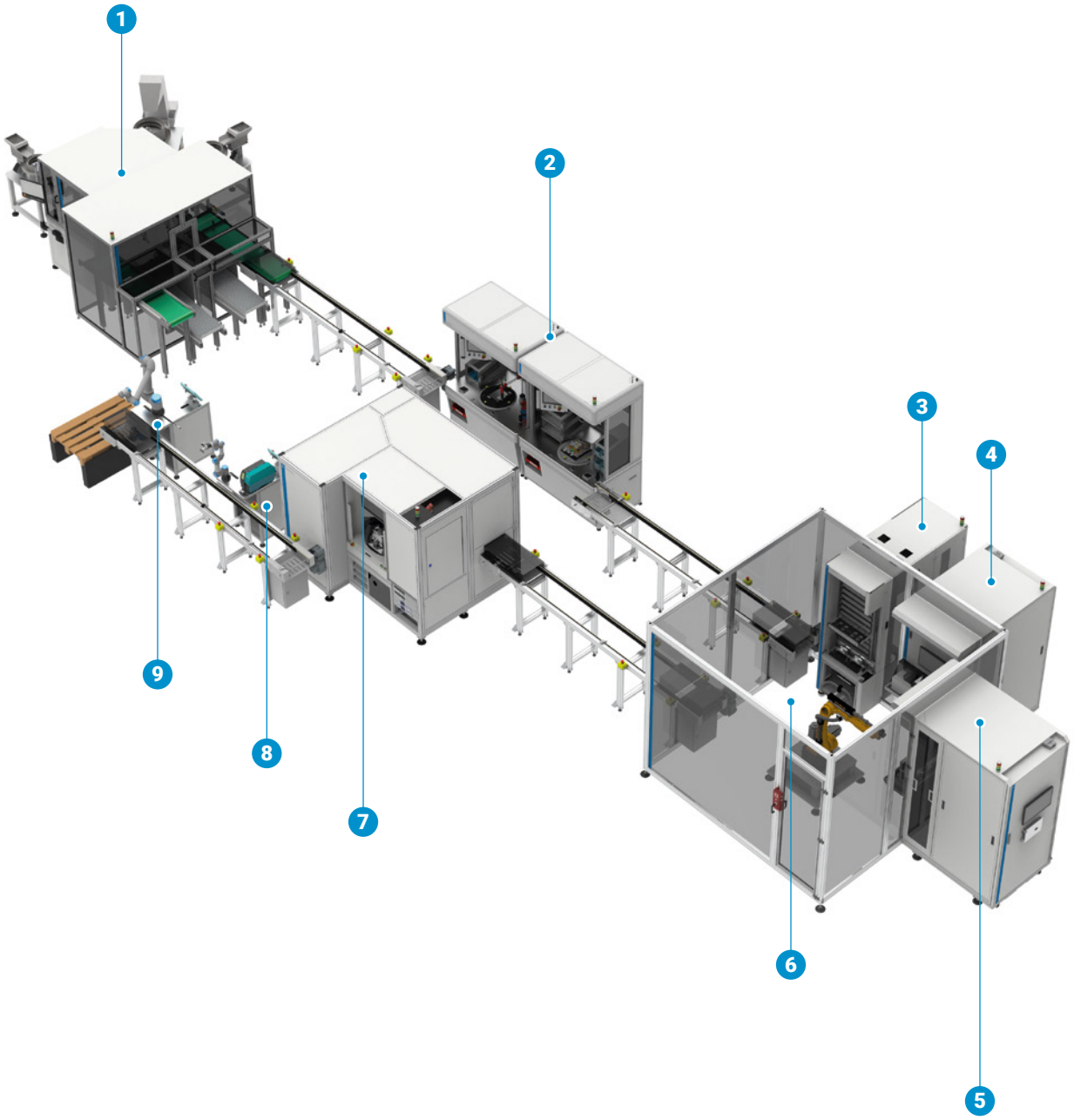
Product Description

The Automatic Air-Vent Haptic Tester performs automatic functional test on variants of air vent parts to measure the force required to perform movements on the different components' parts.
The movements are performed by a six axis robot that forces the components to follow desired paths while gathering data on the expended force. This particular machine tests sliders and knurl wheels performing four test movements in each slider and two test movements in each knurl wheel.

Key Features

- Functional testing of air-vent parts in different phases of product development
- Measurement of applied forces to evaluate impact and strength
- Intuitive analysis software acquisition
- Fast and accurate identification of errors
- Possibility of testing different products

Automatic Assembly, Test and Quality Control Line



1. Full automatic assembly machine

Full automatic assembly machine with bowl feeders, robots and vision systems for lower cycle time operations.

2. Semi-automatic assembly machines

Manual stations for assembly, screwing and greasing of electronic components.

3. Run-in with flashing and temperature test station

Automatic station for flashing and run-in tests with controlled temperature. Concept with 16 test drawers for parallel operations.

4. RF test station

Station for RF tests with interchangeable fixtures for quick product changeover.

5. AOI test station

Vision test station for black MURA, white point calibration, flicker, and luminance tests.

6. Automatic test cell

Robot cell for test parts manipulation all over the test stations.

7. Final quality control

Quality tests for product validation at the End-of-Line (EoL).

8. Labeling station

Automatic print and placement of barcode labels on products or pallets.

9. Automatic packing station

Automatic packing station with collaborative robotic arm.

Innovation, Quality and **Passion for Engineering.**

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