

Controlar Presents CDIM – Curved Display Inspection Machine at Productronica 2025



At Productronica 2025, Controlar will showcase the **CDIM – Curved Display Inspection Machine**, a standalone, AI-powered vision system designed to inspect curved displays with precision and flexibility.

Combining advanced **linear camera technology** with **deep learning algorithms**, the CDIM transforms curved images into flat, analyzable representations, allowing for full-surface inspection with the same accuracy achieved on flat panels. This ensures every area of the display is thoroughly verified for defects, from dead pixels and display errors to curvature deviations or frame irregularities.

Curved-to-Flat Precision with Deep Learning

At the heart of the CDIM is a **linear camera system** with dedicated lighting that scans curved surfaces and translates them into a flattened image model. This enables uniform inspection coverage, eliminating blind spots and maintaining consistent accuracy across the entire display geometry.

The system's **deep-learning algorithms** continuously adapt to learn the expected image profile, distinguishing between normal variations and true defects. Depending on the test mode, the CDIM can inspect displays both when powered on, detecting defects such as **dead pixels** or **color inconsistencies**, or when powered off, identifying **curvature deviations**, **surface defects**, and **frame irregularities** with exceptional reliability.

Flexible Handling for Multiple Display Types

To accommodate diverse product types and geometries, the CDIM integrates an **overhead-mounted robot** equipped with an absolute encoder, enabling smooth, precise motion and easy reconfiguration.

By simply changing the **nest** and updating the robot program, operators can quickly adapt the station for new display formats, making the CDIM equally suitable for **production lines** or **R&D environments**.

This modular design significantly reduces setup time and investment costs, while maintaining inspection repeatability and high throughput.

Controlar Vision App – A Configurable Interface

Inspection setup and control are managed through the **Controlar Vision App**, a proprietary and configurable interface developed in-house by Controlar.

It allows users to **set up, monitor, and customize inspection tests** quickly and flexibly through features such as:

- Manual or automatic **trigger modes**
- **Configurable MSA mode** for quality verification
- Local image database with “**story mode**” for traceability
- **CSV data export** for external analysis
- **Live camera view** and station/line map visualization
- **Adjustable camera parameters** and **dynamic test models** for different inspection modes

This flexible software architecture ensures the system can evolve with production needs while maintaining full process transparency.

Designed for Production and R&D

Built as a **standalone, production-ready station**, the CDIM combines precise mechanical architecture, adaptive vision technology, and intelligent software for seamless integration in both **laboratory** and **factory-floor** settings.

Its key components include:

- Linear camera system with dedicated lighting
- Overhead robot with absolute encoder
- Customizable nests for different display types
- Deep-learning inspection software
- Proprietary Controlar Vision App
- Operator monitor with live image feed

Main Applications

The CDIM is a versatile inspection system ideal for:

- **Production quality control:** Fast and reliable detection of optical and mechanical curved display defects.
- **R&D testing:** Analysis of display geometry, frame alignment, and design validation.
- **Process optimization:** Real-time defect data for continuous improvement and traceability.

By translating curved surfaces into precise, AI-analyzed data, the CDIM enables **consistent, objective inspection results**, supporting manufacturers in achieving the highest display quality standards.

See It Live at Productronica 2025

Visitors can experience the **CDIM** in operation at **Controlar's stand A1.335/9**, where live demonstrations will highlight its deep-learning inspection capabilities and unique curved-to-flat imaging technology.

About Controlar

*Founded in 1995, **Controlar Innovating Industry** is a Portuguese company specializing in **Industrial Automation and Test Systems**, primarily serving the automotive sector.*

With over 400 employees and operations across Portugal, Spain, Mexico, Malaysia, India, Germany, the USA, France, Poland and Morocco, Controlar designs, develops, and integrates advanced solutions for the validation and verification of electronic components and systems, as well as for production line automation and quality control.