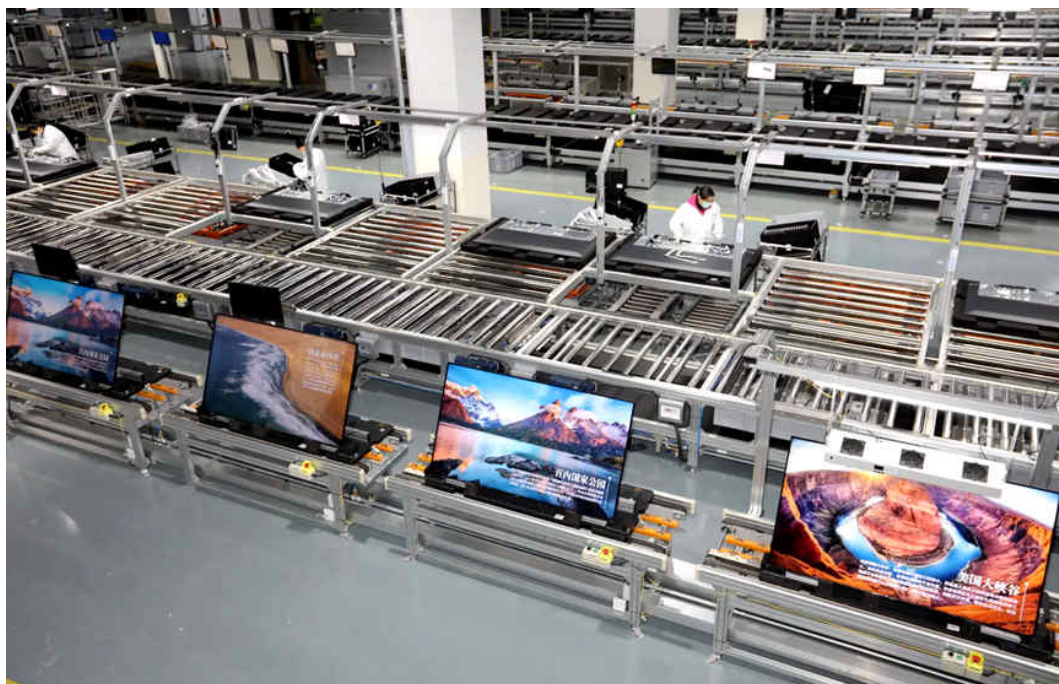


LCD TV Assembly Line

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I. Overview

This equipment is an automated assembly line designed for the final assembly of LCD televisions. It is suitable for the sub-assembly, final assembly,

debugging, aging, and offline packaging of 32"-65" LCD/LED TVs. The complete line consists of a module section, final assembly section, aging section, testing section, packaging section, and a control system. With a line length of 50-100 meters and 10-20 workstations, it utilizes a plate-chain or belt conveyor system. Coordinated by a PLC control system, it achieves fully automated production from components to finished products.

The equipment supports mixed-model production. By changing fixtures and calling corresponding programs, the same line can process TV products ranging from 32" to 85". The entire line can be integrated with the factory's MES (Manufacturing Execution System) to enable production data collection and process monitoring.

II. Details

1. Line Structure

The line adopts a double-speed chain or plate-chain conveyor format with an aluminum alloy frame. Pallets (fixture plates) move along with the chain. Each workstation is equipped with pneumatic stoppers and positioning devices to ensure products stop precisely for assembly operations. Depending on the factory layout, the line can be designed as a single-level planar layout or a multi-level vertical loop (e.g., Module section on the 3rd floor, Assembly/Aging section on the 2nd floor, and Packaging section on the 1st floor, connected via inter-floor elevators).

2. Workstation Configuration

The typical process sequence is: LCM/Backplane Loading → Automatic Reflector Assembly → LB Code Scanning → Diffuser Plate Cleaning → Manual SP/LGP/Bezel Assembly → Automatic Dispensing/Screw Locking → Automatic OC Assembly → Automatic Flipping → AOI Inspection → Lighting Test → Aging → FT Functional Test → Visual Inspection → Bagging / Boxing / Sealing / Palletizing.

3. Key Process Modules

- **Screw Locking:** Electric screwdrivers equipped with torque sensors; 6-axis collaborative robots with a repeatability of $\pm 0.05\text{mm}$.

- **Bonding/Lamination:** Vision positioning system (CCD) ensures screen bonding accuracy, with errors controlled within $\pm 0.5\text{mm}$.
- **Inspection:** Online AOI (Automated Optical Inspection) stations perform quality control via vision systems.
- **Aging:** Online aging time is 45-60 minutes. The aging line is equipped with isolated transformer power supplies (110V/220V, two groups switchable).
- **Anti-static:** The entire line features anti-static design with surface resistance controlled between $10^6\text{-}10^9\Omega$ to prevent damage to precision electronic components.

4. Control System

Adopts PLC + HMI (touch screen) centralized control. Each section has independent power supply and overload protection. The line is equipped with equipment grounding, ESD grounding, lighting, SOP racks, tool racks, and power sockets for each process. It can communicate with the upper-level MES to achieve product traceability, cycle time monitoring, and fault alarming.

III. Technical Parameters (General Reference Values, Customizable)

Item	Parameters
Applicable Product Size	32"-65" LCD TV (extendable to 85")
Total Line Length	50-100 m (depends on number of stations and factory layout)
Number of Stations	10-20 stations
Tact Time	20-60 seconds/unit (Design tact time can reach 9-15 sec/unit)
Design Capacity	180-240 units/hour; Daily capacity over 1,000 units
Conveying Speed	0.5-2 m/s (adjustable)
Pallet Size	42"-51": 1000×1200×32 mm; 55"-65": 1000×1600×35 mm
Max. Unit Weight	Below 42": 25 kg; 51" model: 35 kg; 65" model: 45 kg

Item	Parameters
Bonding Accuracy	±0.5 mm
Robot Repeatability	±0.05 mm
Online Aging Time	45-60 minutes
Operating Voltage	110V/220V switchable, 50Hz/60Hz
Main Power Input	3-phase 5-wire 380V; Total line power approx. 270 kW
Compressed Air	0.5-0.7 MPa
ESD Protection	Surface resistance 10^6 - $10^9 \Omega$
Line Height	Work surface 750 ± 30 mm; Overall net height approx. 2600 mm

□ The above parameters are general industry reference ranges. The actual delivery plan must be specifically designed according to the customer's product size, capacity requirements, factory floor height, and budget. Line length, station configuration, and automation level (semi-automatic/fully automatic) can all be adjusted.

IV. Selection Guide

- **Semi-automatic Line:** Suitable for small to medium-scale production. Investment ranges from 500k to 1.2M RMB. Still requires some manual labor.
- **Fully Automatic Line:** Equipped with MES and robotic arms. Base price starts at 2M RMB+. Enables unmanned operation at key stations.
- **High-Speed Line:** When tact time is compressed to under 20 seconds/unit, transmission mechanisms and robot configurations are upgraded accordingly, increasing investment by 60%-80% compared to a standard line.