

Electrode Production Standards

Explanation of Electrode Production Location and Length for Smart Film

1. Overview

This document defines the standard electrode configuration guidelines for CX SMART FILM PDLC/PNLC smart film products. Proper electrode placement is critical for ensuring uniform switching performance, optimal power distribution, and long-term product reliability. All downstream processing partners should follow these specifications during the busbar soldering and lamination process.

2. Electrode System Classification

Type	Configuration	Description
Type A	Single-sided Pair of Electrodes	Two busbars placed on the same edge of the film, suitable for smaller panels.
Type B	Double-sided Cut-through Electrode	Busbars running through both sides of the film edge, providing better current distribution.
Type C	Two Pairs on Each Side	One pair of electrodes on each opposite side, ideal for medium to large format panels.

3. Electrode Selection by Film Length

The following table provides the recommended electrode configurations based on the film panel length. These specifications ensure optimal voltage distribution and uniform switching across the entire film surface.

Film Length Range	Recommended Electrode Types	Notes
≤ 2,500 mm	Type A (Single-sided) Type B (Double-sided cut-through) Type C (One pair each side)	All three configurations are fully supported. Previous 2,700mm specification is updated based on verified testing data.
2,500 – 3,300 mm	Type B (Double-sided cut-through) Long-side electrode Type C (One pair each side)	Single-sided electrode is not recommended for lengths exceeding 2,500mm.
3,300 – 5,000 mm	Type C (One pair each side) Long-side electrode only	Double-sided cut-through configuration is not recommended in this range.
> 5,000 mm	Long-side electrode only	Maximum length configurations require long-side busbar placement for uniform power delivery.

4. Electrode Spacing Guidelines

4.1 Edge Length < 800mm

When the electrode edge length is less than 800mm, it is recommended to maintain a 20% gap between the two electrodes. The remaining length should be divided equally between the two electrode segments.

4.2 Edge Length > 800mm (Single-sided)

For single-sided electrode configurations with an edge length exceeding 800mm, the two electrodes should be separated by 250–300mm. The remaining distance should be divided equally between the two electrode segments on each side.

5. Special Case: Conductive Glass Substrates

When the smart glass is fabricated using conductive glass substrates (including laminated glass, insulating glass, and multi-layer smart glass structures), special electrode configuration is required. This applies even to partially coated glass with any level of conductivity.

Film Length	Electrode Configuration
≤ 2,000 mm	Single-sided electrode (Type A) is acceptable
2,000 – 4,000 mm	Long-side electrode OR one pair on both short sides
> 4,000 mm	Long-side electrode only — no other configurations recommended

6. Important Notes

- All specifications above are based on standard CX SMART FILM products with Japanese-imported ITO substrates and liquid crystal materials.
- Deviations from these guidelines may result in uneven switching, increased power consumption, or reduced product lifespan.
- For custom sizes or special applications, please contact our technical support team for personalized recommendations.
- Specifications are subject to update as product testing and optimization continue. Always refer to the latest version of this document.