

# Fully Automatic Supercapacitor Electrode Separator Winding Machine

Item Number: CX04



## Introduction

Fully automatic supercapacitor winding machine for precise electrode and separator assembly, automatic tension control, length detection, alignment correction, short circuit testing, protective tape application, quality sorting, and high consistency production across demanding laboratory and industrial workflows with repeatable process performance.

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| Application                         | Description                                                                                                                                       | Key Benefit                                                                                          |
|-------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------|
| Supercapacitor Cell Development     | Produces wound positive electrode, negative electrode, and separator groups for laboratory-scale supercapacitor research and process development. | Provides repeatable winding conditions for comparing materials, designs, and process parameters.     |
| Energy Storage Pilot Production     | Supports pilot-line fabrication of supercapacitor electrode groups before higher-volume manufacturing.                                            | Integrates feeding, winding, inspection, testing, and classification into a controlled workflow.     |
| Electrode Process Validation        | Evaluates electrode lengths, widths, thicknesses, alignment, and winding behavior under defined product requirements.                             | Helps engineering teams verify process capability before production release.                         |
| Advanced Materials Research         | Handles electrode and separator materials used in energy storage research programs and advanced material evaluations.                             | Enables consistent sample preparation for reliable laboratory testing and analysis.                  |
| Manufacturing Quality Control       | Tests completed wound groups for short circuits and separates qualified products from nonconforming units.                                        | Detects electrical integrity issues before downstream assembly, reducing avoidable process losses.   |
| Product Design Verification         | Produces electrode groups for assessing new supercapacitor geometries, material combinations, and tape application methods.                       | Supports structured development work with controlled length and material positioning.                |
| Academic and Institutional Research | Provides an automated winding platform for universities, research institutes, and shared laboratory facilities.                                   | Combines practical process automation with a specification range suited to varied research programs. |

| Specification          | Details                                                                                                                                                                                                          |
|------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Product Item Number    | CX04                                                                                                                                                                                                             |
| Equipment function     | Manual loading of positive and negative electrode sheets, separator, termination tape, and protective tape; automatic winding of the electrode group according to predetermined product and process requirements |
| Length detection       | Included                                                                                                                                                                                                         |
| Tension control        | Automatic                                                                                                                                                                                                        |
| Alignment correction   | Automatic                                                                                                                                                                                                        |
| Short circuit testing  | Included                                                                                                                                                                                                         |
| Product classification | Good-product determination included                                                                                                                                                                              |

| Specification       | Details                                                  |
|---------------------|----------------------------------------------------------|
| Operating condition | Stable and reliable working state with process assurance |

| Step | Operation                                        |
|------|--------------------------------------------------|
| 1    | Separator feeding                                |
| 2    | Termination tape and protective tape feeding     |
| 3    | Positive and negative electrode feeding          |
| 4    | Electrode foil connection-tape inspection        |
| 5    | Electrode group winding                          |
| 6    | Length control                                   |
| 7    | Termination tape and protective tape application |
| 8    | Short circuit testing                            |
| 9    | Good-product classification                      |

| Material                 | Feeding Method | Material Single Piece Length (mm) | Material Width (mm) | Width Tolerance (mm) | Material Thickness (μm) | Thickness Tolerance (μm) | Maximum Outer Diameter (mm) | Inner Diameter (mm) |
|--------------------------|----------------|-----------------------------------|---------------------|----------------------|-------------------------|--------------------------|-----------------------------|---------------------|
| Positive electrode sheet | Roll material  | 600-6000                          | 80-160              | ±0.1                 | 100-320                 | ±10                      | 400                         | 75.8                |
| Negative electrode sheet | Roll material  | 600-6000                          | 80-160              | ±0.1                 | 100-320                 | ±10                      | 400                         | 75.8                |
| Separator                | Roll material  | Not specified                     | 80-160              | ±0.1                 | 16-50                   | ±4                       | 350                         | 75.8                |

| Parameter                   | Specification                                                             |
|-----------------------------|---------------------------------------------------------------------------|
| Power supply                | Single-phase AC220V, 10KW                                                 |
| Voltage fluctuation range   | ±10%                                                                      |
| Compressed air              | 0.45-0.6 MPa; 10 L/min                                                    |
| Ambient temperature         | 20-35°C                                                                   |
| Relative humidity           | 30-55% RH                                                                 |
| Overall dimensions          | 2500 L × 1700 W including dust cover × 2000 H                             |
| Weight                      | 3000 kg                                                                   |
| Site atmosphere requirement | No corrosive gases, corrosive liquids, or explosive gases present on site |