# JX-101A Juxin Double-column Servo Computerized Tensile Testing---Machine Product Operation Manual


This manual is intended to guide operators in the correct installation, operation, and maintenance of the JX-101A Juxin Dual-column Servo Computerized Tensile Testing Machine (hereinafter referred to as the "testing machine"), ensuring safe, stable, and precise operation of the equipment, as well as protecting the personal safety of operators and extending the service life of the machine. Operators must carefully read this manual before using the equipment and strictly follow the operating procedures. The operator shall bear full responsibility for any equipment damage or personal injury caused by non-compliant operation.

# Product Overview

## 1.1 Product Name

JX-101A Juxin Dual-column Servo Computerized Tensile Testing Machine

## 1.2 Product Application

This testing machine is a high-precision, intelligent testing device for mechanical properties of materials. Adopting a dual-column structure and servo computer control, it can accurately perform various mechanical property tests such as tension, compression, bending, shearing, peeling, and tearing on metals, non-metals, and composite materials (e.g., shoe materials, rubber and plastics, textiles, hardware, leather, etc.). It is widely used in shoe factories, research institutions, quality inspection departments, manufacturing enterprises, and other scenarios for material research and development, production quality inspection, process optimization, and other processes, meeting relevant domestic and international standards such as ISO, ASTM, and GB.

## 1.3 Core Features

1. **Dual-column high-rigidity structure**: Welded with high-strength steel, the machine body is stable and vibration-free during operation, capable of withstanding heavy loads, ensuring stable testing processes and accurate test data, and adapting to the testing needs of large-sized specimens;
2. **Precise servo control**: Equipped with an imported AC servo motor and high-precision ball screw drive system, paired with a high-sensitivity S-type force sensor, it delivers high force measurement accuracy, precise displacement and speed control, stepless speed regulation, and smooth, quiet operation;
3. **Intelligent computer control**: Matched with special measurement and control software compatible with Windows systems, it can display real-time test curves (force-displacement, stress-strain, etc.), automatically collect, store, and analyze test data, support batch export of test reports, and enable convenient and efficient operation;
4. **Multi-scenario adaptability**: Can be equipped with a variety of special fixtures (tension, compression, bending, etc.), adapting to the testing of specimens of different materials and types, and meeting the testing needs of multiple industries such as shoe materials, rubber and plastics, and hardware;
5. **Multiple safety protections**: Built-in safety devices including overload protection, upper and lower travel limit protection, and emergency stop switch, together with a double-door protective cover, effectively avoiding safety risks during testing and protecting operators and equipment;
6. **Easy maintenance design**: Core components are wear-resistant and durable, wearing parts are easy to replace, daily maintenance is simple, enabling long-term stable operation and adapting to 24-hour continuous operation in factories and laboratories.

# 2. Technical Parameters

1. Maximum test force: 5kN/10kN (optional as required);
2. Force accuracy: ±0.5% FS (better than Class 1 accuracy), load resolution up to 1/100,000, force measurement range 0.2%～99% FS;
3. Displacement resolution: 0.001mm, travel accuracy ≤1%, effective test travel: 800～1200mm (excluding fixtures, customizable);
4. Test speed range: 0.001～500mm/min (stepless adjustable), speed accuracy ±0.5%;

5. Unit conversion: Supports free switching among various internationally common units such as kgf, lbf, N, kN;
6. Servo motor power: 1.5kW (optional as required);
7. Operating voltage: AC 220V/380V 50/60Hz (overseas 110V version customizable), peak voltage fluctuation of power supply not exceeding 3V;
8. Host dimensions (L×W×H): Approx. 750×450×1600mm (customizable), effective test width 410mm;
9. Net weight of equipment: Approx. 250～300kg;
10. Applicable standards: GB/T 228.1, GB/T 1040, GB/T 9341, ASTM D412, ISO 527, ISO 9073-3, and other relevant domestic and international standards;
11. Software configuration: Supports single-step/multi-step testing, automatic repeated testing, displays comprehensive test data and charts, and supports report export in Word and Excel formats;
12. Environmental requirements: Operating temperature 21±2℃, relative humidity 65±2%RH, environment free of strong electromagnetic interference, vibration, and with dry and good ventilation.

# 3. Structural Composition and Function Description
This testing machine mainly consists of a frame, servo drive system, measurement system, electrical control system, fixtures, and safety protection devices. The functions of each component are as follows:

## 3.1 Frame
Adopting a dual-column gantry structure welded with high-strength steel, it includes three parts: columns, crossbeam, and worktable. It bears the weight of the whole machine and test loads, ensuring the frame is stable, deformation-free, and vibration-free during testing, providing a stable foundation for high-precision testing. The crossbeam height is adjustable to adapt to specimens of different sizes, and the worktable is used to fix fixtures and specimens with a smooth surface, whose position can be adjusted according to test requirements.

## 3.2 Servo Drive System
Composed of an imported servo motor, ball screw, and servo controller, it is the power core of the testing machine. The servo motor provides precise power, driving the crossbeam to move vertically and smoothly via the ball screw to apply tension or pressure to the specimen; the servo controller receives computer commands to precisely adjust motor speed, operating speed, and displacement, ensuring the stability and accuracy of the testing process, with more precise and reliable operation compared to traditional motors.

## 3.3 Measurement System
Including force sensor, displacement sensor, and data acquisition module:
1. **Force sensor**: Adopts a high-sensitivity S-type strain gauge sensor, which can measure real-time force changes during testing, convert force signals into electrical signals and transmit them to the computer, featuring high measurement accuracy and fast response speed; the measuring range of 5 to 10kN can be customized as required;

2. **Displacement sensor**: Used to measure crossbeam displacement and specimen deformation, with high displacement resolution to accurately capture subtle displacement changes during testing;
3. **Data acquisition module**: Collects real-time test data such as force, displacement, and speed, and quickly transmits them to the computer software for analysis and processing, ensuring accurate and timely data acquisition.

## 3.4 Electrical Control System
Composed of a computer host, measurement and control software, control panel, and emergency stop switch:
1. **Computer host**: Installed with special measurement and control software for parameter setting, test operation, data display, curve drawing, and report export. Recommended configuration: Intel Celeron CPU above 2GHz, memory above 1GB, hard disk space above 2GB, display resolution above 1024 × 768, compatible with Windows XP, Windows 7, Windows 8, Windows 10 systems; Microsoft Office 2003 or above should be installed for convenient report export;
2. **Control panel**: Located on the side of the frame, equipped with power switch, start/stop button, speed adjustment knob, etc., enabling manual control of equipment start/stop and speed adjustment with intuitive and convenient operation;
3. **Emergency stop switch**: Located on the control panel and front of the frame; pressing it in an emergency immediately cuts off the equipment power and stops all operating actions to avoid safety risks.

## 3.5 Fixtures and Accessories
1. **Standard fixtures**: Equipped with tension fixtures, compression fixtures, and bending fixtures, replaceable according to test types. Made of wear-resistant materials, the fixtures hold firmly to prevent specimen sliding and ensure test accuracy;
2. **Optional fixtures**: Leather tearing fixtures, bursting fixtures, yarn fixtures, etc., can be selected as required to adapt to specimens of different materials;
3. **Standard accessories**: Including pins, power cord, communication cable, fuse, operation manual; optional accessory includes sampling plate.

## 3.6 Safety Protection Devices
1. **Overload protection**: The equipment automatically stops when the test force exceeds the set maximum value, preventing overload damage to the motor, sensor, and frame;
2. **Travel limit protection**: Limit switches are set at the extreme positions of the crossbeam's up-and-down movement, and the equipment automatically stops when reaching the limit positions to prevent the crossbeam from hitting the frame;
3. **Protective cover**: Double-door protective cover; closing it during testing prevents injury from flying debris of broken specimens and protects internal components of the equipment;
4. **Leakage protection**: The power system is equipped with a leakage protection device to prevent electric shock to operators caused by equipment leakage.

# 4. Installation and Commissioning

## 4.1 Installation Preparation

1. **Site requirements**: Select a flat, dry, well-ventilated site free of vibration and corrosive gases, with a ground bearing capacity of no less than 400kg/㎡. The site space shall be larger than the equipment dimensions for convenient operation, maintenance, and specimen placement, away from flammable, explosive materials, and strong electromagnetic interference sources;
2. **Power requirements**: Confirm that the power voltage is consistent with the equipment's rated voltage (AC 220V/380V). The power circuit must be securely grounded with a grounding resistance of no more than 4Ω to avoid leakage risks and ensure stable power supply without obvious voltage fluctuations;
3. **Tool preparation**: Prepare installation tools such as wrenches, screwdrivers, spirit levels, and tape measures to ensure smooth installation.

## 4.2 Installation Steps

1. **Unpacking inspection**: Open the equipment packaging and check whether the equipment host, fixtures, accessories, manual, etc., are complete, undamaged, and not missing. Contact the manufacturer immediately if any damage or missing items are found;
2. **Equipment placement**: Place the equipment stably at the designated site and adjust the frame with a spirit level to ensure it is horizontal (the bubble of the spirit level is centered), avoiding frame inclination that affects test accuracy;
3. **Component installation**: Install fixtures on the crossbeam and worktable, tighten fixture screws to ensure firm and aligned installation; connect the communication cable and power cord between the computer host and the equipment, ensuring secure and loose-free connections;
4. **Software installation**: Install the special measurement and control software on the computer host following the installation wizard, restart the computer after installation to ensure normal software operation, connect the equipment to the computer, and test communication functionality.

## 4.3 Commissioning Process

1. **No-load commissioning**: Turn on the equipment and computer power, launch the measurement and control software, and check normal communication between the software and the equipment; click "No-load Operation" in the software, adjust the test speed, and observe whether the crossbeam moves up and down smoothly without jamming or abnormal noise;
2. **Force calibration**: Hang standard weights on the force sensor and calibrate the force value via the software to ensure force measurement accuracy meets the requirement (±0.5% FS). Contact the manufacturer's technicians for adjustment if the deviation is excessive;
3. **Fixture commissioning**: Install the corresponding fixtures, clamp standard specimens in the fixtures, start the equipment for a simple tensile test, and check whether the fixtures hold firmly, whether the specimen slides, and whether the test curve is normal;
4. **Safety device commissioning**: Test the functions of the emergency stop switch, overload protection, and limit protection. The equipment shall stop immediately when the emergency stop switch is pressed; set an overload value, and the equipment shall stop automatically when the test force exceeds it; move the crossbeam to the limit position, and the equipment shall stop automatically to ensure all safety devices function properly.

The equipment can be put into normal use only after commissioning is completed.

# 5. Operating Steps

## 5.1 Pre-start Preparation

1. **Equipment inspection**: Check whether the equipment power and communication cables are securely connected, whether fixtures are properly installed and free of looseness, whether there are no foreign objects on the frame, and whether the protective cover is intact;
2. **Environment inspection**: Confirm that the operating environment meets the requirements, with temperature and humidity within specified ranges, free of vibration and interference;
3. **Equipment startup**: Turn on the equipment power switch, then the computer power, launch the measurement and control software, and check normal communication between the software and the equipment without error prompts;
4. **Specimen preparation**: Prepare standard specimens according to test requirements, ensuring specimen dimensions and specifications comply with testing standards, with smooth, defect-free surfaces to avoid affecting test results;
5. **Parameter setting**: Set test parameters in the measurement and control software, including test type (tension/compression/bending, etc.), test speed, maximum test force, specimen dimensions, test standards, etc., and save the settings.

## 5.2 Specimen Clamping

1. Select the corresponding fixture according to the test type, ensuring firm installation and cleanliness of the fixture;
2. Manually adjust the crossbeam height to match the distance between upper and lower fixtures with the specimen length;
3. Clamp one end of the specimen in the upper fixture, adjust the specimen position to ensure it is centered and not skewed, then tighten the fixture; clamp the other end of the specimen in the lower fixture, adjust the position similarly and tighten the fixture to ensure firm clamping without looseness or sliding (avoid damaging the specimen during clamping);
4. Close the protective cover to ensure operator safety.

## 5.3 Test Operation

1. Recheck parameter settings and specimen clamping; click the "Start" button in the software upon confirmation, and the equipment will start operating with the crossbeam moving at the set speed to apply test force;
2. During testing, observe real-time test curves, force values, displacement data displayed on the software, and the equipment’s operating status. Press the emergency stop switch immediately to halt the test if any abnormality occurs (e.g., specimen fracture, equipment abnormal noise, error prompts);
3. Upon completion of the test, the equipment stops automatically, and the software saves test data and curves automatically, generating a preliminary test report;
4. Open the protective cover, loosen the fixtures, take out the tested specimen, and clean up debris on the fixtures and worktable.

## 5.4 Shutdown Procedure

1. After all tests are completed, close the measurement and control software and exit the program;
2. Turn off the computer power, then the equipment power switch, and cut off the main power supply;
3. Clean the equipment frame, fixtures, and worktable, remove residual debris, and organize test data and specimens;
4. Close the protective cover and take dustproof and moisture-proof measures for the equipment.

# 6. Safety Precautions

1. Operators must receive professional training and be familiar with the equipment operating procedures and safety precautions before operating the equipment; non-professionals are strictly prohibited from operating the equipment;
2. Wear labor protection supplies (protective gloves, safety shoes, safety goggles) before operation to avoid personal injury from flying debris of broken specimens or equipment operation;
3. Do not open the protective cover during testing, and strictly prohibit placing hands, tools, etc., inside the equipment (especially between upper and lower fixtures) to prevent pinching or crushing injuries;
4. Do not operate the equipment under overload or over-travel conditions; strictly follow the set parameters to avoid damage to the equipment, sensors, and motor;
5. If abnormal noise, vibration, jamming, error prompts, etc., occur during equipment operation, immediately press the emergency stop switch, cut off the power, troubleshoot faults, and prohibit operating the equipment with faults. Contact the manufacturer’s technicians if the fault cannot be resolved;
6. Equipment repair and maintenance must be performed by professional technicians. Cut off the main power before maintenance and hang a "Under Maintenance, Do Not Switch On" sign to avoid electric shock or accidental equipment startup;
7. The power circuit must be securely grounded; regularly check for aging or loose circuits and replace damaged circuits in a timely manner to avoid leakage risks;
8. Flammable, explosive, and corrosive materials are strictly prohibited from being piled up at the test site. Keep the site ventilated and tidy, and equipped with necessary fire-fighting equipment;
9. Flying debris may be generated when specimens break; operators shall stay away from the front of the equipment to avoid injury;
10. Do not arbitrarily modify equipment parameters or disassemble equipment components. Contact the manufacturer’s technicians for guidance if parameter adjustment or component disassembly is required.

# 7. Maintenance and Servicing

## 7.1 Daily Maintenance (After Daily Operation)

1. **Cleaning**: Wipe the equipment frame, crossbeam, worktable, and fixtures with a clean cloth to remove residual specimen debris, dust, and other foreign objects, ensuring the equipment is clean and preventing foreign objects from entering the equipment and affecting

operation;
2. **Inspection**: Check for loose or worn fixtures; tighten loose parts in time and replace severely worn ones; check whether communication and power cables are securely connected without looseness or damage;
3. **Lubrication**: Apply an appropriate amount of lubricating oil (or grease) to moving parts such as crossbeam guides, ball screws, and fixture connections to reduce component wear and ensure smooth operation;
4. **Organization**: Organize test data and specimens, turn off the equipment power, cover the protective cover, and take dustproof and moisture-proof measures.

## 7.2 Regular Maintenance (Weekly/Monthly)
1. **Weekly maintenance**: Check the operating status of the servo motor for abnormal noise or overheating; check whether limit switches and emergency stop switches are sensitive and effective; check the force sensor connections for looseness and clean dust on the sensor surface;
2. **Monthly maintenance**: Calibrate the force sensor and displacement sensor to ensure measurement accuracy meets requirements; check the welded joints of the frame for cracks or deformation; check fixture wear and replace severely worn fixtures or parts; inspect the electrical control system, clean dust from the computer host, and back up test data; check the lubricating oil level and replenish lubricating oil in time; tighten all loose screws and connectors of the equipment.

## 7.3 Long-term Storage (Not in Use for More Than 1 Month)
1. Cut off the main power of the equipment, turn off the computer power, unplug the power and communication cables, and organize the wires;
2. Thoroughly clean the equipment frame, fixtures, and internal components to remove all debris and dust;
3. Apply anti-rust oil to all moving parts (guides, ball screws, fixtures, etc.) to prevent rust;
4. Dismantle the fixtures, clean them, and store them properly;
5. Cover the entire equipment with a dust cover and place it in a dry, well-ventilated environment free of corrosive gases and vibration to avoid moisture, rust, or damage to the equipment.

## 7.4 Maintenance Notes
1. Use special lubricating oil for lubrication; avoid using non-compliant lubricating oil to prevent component damage;
2. Do not directly rinse the internal and electrical components of the equipment with water during cleaning to prevent short circuits or electric leakage;
3. Replace damaged or aged components in a timely manner during maintenance to avoid affecting equipment operation;
4. Keep maintenance records detailing maintenance time, content, replaced components, etc., for future traceability.

# 8. Troubleshooting
If a fault occurs during equipment operation, the operator shall immediately stop the machine and cut off the power, conduct preliminary troubleshooting using the following methods. Contact

the manufacturer’ s technicians if the fault cannot be resolved; do not disassemble the equipment for repair without authorization.

1. **Fault phenomenon**: Equipment fails to start

Possible causes: Power not connected, emergency stop switch not reset, power cord damaged, abnormal power voltage, electrical control system fault;

Solution: Check power connection to ensure power is on; reset the emergency stop switch; inspect the power cord for damage and replace it if broken; measure the power voltage to ensure it meets requirements; contact the manufacturer’ s technicians for electrical control system faults.

2. **Fault phenomenon**: Communication failure between software and equipment

Possible causes: Loose or damaged communication cable, incorrect software settings, computer interface fault;

Solution: Reconnect the communication cable to ensure a firm connection; check the communication cable for damage and replace it if broken; verify software communication settings and restore default settings; inspect the computer interface and replace the computer or interface if faulty.

3. **Fault phenomenon**: Inaccurate test force measurement

Possible causes: Uncalibrated force sensor, loose sensor connection, insecure fixture clamping, skewed specimen placement, damaged sensor;

Solution: Calibrate the force sensor; tighten sensor connections; re-clamp the specimen to ensure firm clamping and centering; contact the manufacturer for sensor replacement if the sensor is damaged.

4. **Fault phenomenon**: Jamming or abnormal noise during crossbeam movement

Possible causes: Lack of lubrication on moving parts, foreign objects on guides, worn ball screw, servo motor fault;

Solution: Add lubricating oil to moving parts; clean foreign objects from guides; inspect ball screw wear and replace it if severely worn; contact the manufacturer’ s technicians for servo motor faults.

5. **Fault phenomenon**: Automatic shutdown during testing

Possible causes: Reached set maximum test force, reached crossbeam limit position, overload protection activated, specimen fracture, emergency stop switch pressed;

Solution: Check test parameter settings and adjust maximum test force and travel parameters; check for specimen fracture and replace the specimen; check for accidental pressing of the emergency stop switch and reset it; troubleshoot overload if overload protection is activated and adjust test parameters.

6. **Fault phenomenon**: Insecure fixture clamping and specimen sliding

Possible causes: Worn fixtures, unsecured fixtures, smooth specimen surface, inappropriate fixture selection;

Solution: Replace worn fixtures; retighten fixtures; roughen the specimen clamping area; replace

with suitable fixtures.

7. **Fault phenomenon**: Software error and failure to generate test report
Possible causes: Abnormal software installation, missing test data, computer system fault, incorrect report settings;
Solution: Reinstall the measurement and control software; check test data and supplement missing data; restart the computer and troubleshoot system faults; verify report settings and restore default settings.

# 9. Packaging and Transportation
1. **Packaging**: Core components of the equipment are wrapped with bubble film and pearl cotton, and the outer layer is reinforced with wooden boxes to prevent collision and damage during transportation; supporting materials such as product manual, certificate, warranty card, fixtures, and accessories are properly placed inside the wooden box;
2. **Transportation**: Supports land and sea transportation. Avoid severe impact, rain, exposure, and moisture during transportation; keep the frame horizontal during placement, and strictly prohibit inversion or tilting;
3. **Handling**: Use a forklift or crane when handling the equipment, select stress-bearing parts of the frame as handling points to avoid damaging equipment components during handling, move at a slow speed, and place stably.

# 10. After-sales Service
1. **Warranty period**: The equipment is provided with a 12-month free warranty service from the date of delivery (excluding damage caused by human factors, force majeure, or unauthorized disassembly of the equipment);
2. **Installation and commissioning**: Provide free on-site installation and commissioning services, assist in pre-job training for operators to ensure proficient operation of the equipment;
3. **Technical support**: 7×24-hour technical support; operators can contact the manufacturer's technicians at any time for equipment operation and troubleshooting issues, with remote guidance for resolution;
4. **Parts supply**: Long-term supply of equipment parts at reasonable prices to ensure long-term stable operation of the equipment;
5. **Repair service**: Upon receiving fault notifications, the manufacturer's technicians respond promptly. Professional personnel are arranged for on-site repair if required (reasonable repair and parts fees are charged for repairs beyond the warranty period).

# 11. Supplementary Provisions
1. The parameters in this manual are for the general configuration of the JX-101A Juxin Dual-column Servo Computerized Tensile Testing Machine. Specific specifications can be customized according to customer requirements, subject to the actual signed contract and equipment 实物;
2. For matters not covered in this manual, consult the manufacturer's technical department for supplementary instructions;
3. The manufacturer reserves the right to modify the content of this manual due to product

upgrades and will notify customers in a timely manner after modification without separate notice;

4. Reproduction, distribution, or alteration of this manual without the manufacturer’ s written permission is strictly prohibited;

5. The manufacturer reserves the final right of interpretation for this manual.