

ACCUTEST/501

OWNERS MANUAL



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Physical Testing Equipment Services, 15 Morgan Mill Road, Johnston, RI 02919 (401) 944-4760



TO PLACE AN ORDER OR SCHEDULE SERVICE CALL (401) 944-4760

Or contact us online at ptes_rcs@email.msn.com or www.physicaltestingequipmentsv.com



THE ACCUTEST/501 TESTING SYSTEM

The AccuTest/501 is a basic electronic tensile tester designed for ease of use, reliability, durability and a broad range of test applications. Straightforward controls and test settings require no special training. Force measurement, test stand control and pneumatic clamp controls are all contained on this table top unit. The compact and simple design makes the 501 user-friendly and easy to service.



NOTE: THE ACCUTEST/501 OWNERS MANUAL IS AVAILABLE AS A .PDF DOCUMENT. IF YOU PREFER AN ELECTRONIC COPY OF THIS DOCUMENT PLEASE CONTACT OUR SYSTEM ADMINISTRATOR AT PTES.BARRY.BLANCHETTE@GMAIL.COM.

Standard Features:

- Auto-Zero
- Auto-Check
- Tracking /Peak/Hold Signal Selection
- Pounds/Kilograms/Newtons
- PSI Factor Measure Selection (based on .25" wide dumbbell samples)
- Load Cell
- Load Cell Over Range Limit
- Clamp Compression Limit
- Proximity Sensing Stroke Control
- Variable Test Speed Selection
- Automatic Crosshead Return
- Cycling Mode

Optional Features:

- Elongation Digital Measurement with Break Detector
- Strip Chart Recorder
- Pneumatic Clamp Controls



BEFORE ATTEMPTING TO INSTALL, OPERATE OR ADJUST THE ACCUTEST/501 IT IS ESSENTIAL TO READ THESE INSTRUCTIONS COMPLETELY. IF YOU ARE UNSURE OF ANY OF THE INSTRUCTIONS OR PROCEDURES CONTAINED IN THIS MANUAL CONTACT PTES FOR FURTHER EXPLANATION AT (401) 944-4760 OR PTES_RCS@EMAIL.MSN.COM.



INTRODUCTION

The AccuTest/501 (constant rate of extension) can measure tensile strengths and other physical characteristics of almost any material within the range of the load cell in use, up to a maximum of 500 pounds.

The "Components" section will outline and describe the major operating parts of the tester. Approximate weight of the AccuTest/501 is 100 pounds.

The pulling force imposed on the specimen is measured electronically, eliminating the errors due to mechanical friction, inertia, etc.

The mechanical pull on the specimen is transmitted from the upper clamp to the load cell. The maximum electrical output is obtained with a load cell deflection of not more than 0.005 inches.

The deflection of the load cell is converted to a proportional electrical signal and transmitted to the force measurement system. This signal is displayed according to the pre-selected test requirement settings.

The crosshead of the AccuTest/501 drives upward to apply tensile stress to the material under testing. This allows the operator to remain seated while having full visibility of the specimen and the controls.

- The AccuTest/501 will perform to settings that must be selected and completed:
- Upper Stroke Limit (according to clamp style and desired separation)
- Lower Stroke Limit (according to clamp style and desired separation)
- Crosshead Speed
- Force Measurement Settings



ACCUTEST/501 COMPONENTS



Figure 1 : The AccuTest Control Console

Control Switches. <POWER>, <UP>, <STOP>, <DOWN>, <CYCLE> and <AIR> buttons are centralized on one control panel located on the front of the tester's main cabinet (Figure 1 above). The AccuTest/501 operates in an automatic mode once the <UP> button is actuated. The crosshead will travel to the pre-set upper stroke limit, reverse direction and stop at the pre-set lower stroke limit. At any time during the crosshead movement the <UP>, <STOP> or <DOWN> buttons can be used to manually control the crosshead.

With the <CYCLE> button off, pressing the <UP> button will initiate crosshead travel to the pre-set upper stroke limit and then return to the position set by the lower stroke limit and stop. Speed of travel is determined by the pre-set position of the <SPEED> indicator dial.

Pressing the <CYCLE> button will initiate up and down cycling of the cross head between the upper stroke limit and lower stroke limit at the speed set by the <SPEED> indicator dial. Pressing the <CYCLE> button again will stop the cycling. The crosshead will return and stop at the lower stroke limit (the "HOME" position) and is ready for normal operation.



THE STROKE CONTROL FIXTURES MUST BE PROPERLY POSITIONED AND SET TO ESTABLISH THE CORRECT DISTANCE FROM LOWER STROKE LIMIT ACCORDING TO CLAMP STYLE AND REQUIRED CLAMP SEPERATION. IF THE CLAMP SYSTEM IS CHANGED THE STROKE CONTROL FIXTURES MUST BE PROPERLY POSITIONED FOR THE NEW CLAMP STYLE AND REQUIRED SEPERATION. FAILURE TO CORRECTLY SET THE STROKE CONTROL FIXTURES CAN RESULT IN DAMAGE TO THE ACCUTEST/501 SYSTEM, THE CLAMPS IN USE AND MAY RESULT IN OPERATOR INJURY.

Lower Stroke Control Fixture. Mounted on the rear support bar of the drive screw column (Figure 2), the lower stroke control is attached to an adjustable knob that protrudes out from behind the column. Loosening the knob allows the fixture to slide up and down in the column. Move the knob to desired height and tighten. The switch is now in place. Note the knob will only tighten enough to hold the stroke control in place. It is not necessary to over-tighten or used tools to set in place. In the unlikely event of a lower proximity switch failure, the fixture will slide with the crosshead until the clamp compression limit is activated, stopping the crosshead.

Upper Stroke Control Fixture. Mounted on the rear support bar of the drive screw column (Figure 2), the upper stroke control is attached to an adjustable knob that protrudes out from behind the column. The upper switch is identical in function to the lower switch. Loosening the knob allows the fixture to slide up and down in the column. Move the knob to desired height and tighten. The switch is now in place. In the unlikely event of an upper proximity switch failure during a test with a load applied, the load cell overrange limit programmed into the microprocessor will stop the unit if the factory set maximum is exceeded.



Figure 2: The Stroke Control Fixture Knob Behind Tester

Load Cell Assembly. The load cell assembly includes the load cell, universal coupling for anti-rotation, plate and upper clamp mounting stud (Figure 3). The complete assembly can be removed (See “Removing The Load Cell” section below).



Figure 3: The Load Cell Assembly On Crosshead

Crosshead. Major component that houses the load cell assembly, proximity switches, ball screw bearings and support bar silicone bushings. Driven by a single ball screw, the upward travel of the crosshead provides the force for testing materials.

Lower Clamp Stud. Located on the base surface of the tester cabinet, the male stud inserts into the female connection of the lower clamp system in use. Once the clamp is in place, tighten the locknut or insert quick-connect pin into clamping system to maintain a stationary position (Figure 4).

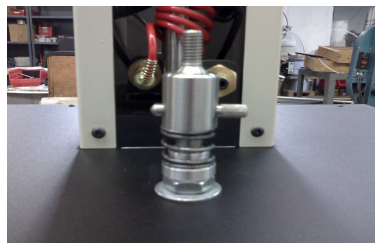


Figure 4 (Left): Lower Clamp Stud

Upper Clamp Stud. Part of the load cell assembly located beneath the load cell, the male stud inserts into the female connection of the upper clamp, secured in place by a coupling pin (Figure 5)



Figure 5 (Right): Upper Clamp Stud



Clamp Compression Limit. The clamp compression limit is a factory setting in the microprocessor unit. Should the clamps come together or an obstruction come between the clamps, creating compression or “negative” load, the clamp compression limit will actuate and stop the downward crosshead movement. Press the <UP> button to relieve the setting and then remove the obstruction or re-set the distance between clamps.



CHECK THE POSITION OF THE LOWER STROKE CONTROL FIXTURE AND ADJUST IF NECESSARY. IF THE CLAMP COMPRESSION LIMIT ACTUATED DUE TO LOWER PROXIMITY SWITCH FAILURE CONTACT PTES IMMEDIATELY AT (401) 944-4760 OR [PTES_RCS@EMAIL.MSN.COM](mailto:ptes_rcs@email.msn.com).

Rear Support Bar / Front Support Bar. The support bars are major components of the drive screw assembly which provides structural integrity and crosshead guidance. On models with pneumatic controls the bar also acts as a guide for clamping the coiled air hose.

Load Cell Overrange Limit. The load cell overrange limit is a factory setting in the microprocessor unit. If the force applied to the load cell exceeds this limit setting (usually the full scale value of the load cell) the crosshead will stop. Press the <DOWN> button switch to clear this condition.



THE BREAKING STRENGTH OF TEST MATERIALS MUST NOT EXCEED THE LOAD CELL AND TEST FRAME CAPACITIES. IF THIS LIMIT FAILS TO ACTUATE CONTACT PTES IMMEDIATELY AT (401) 944-4760 OR [PTES_RCS@EMAIL.MSN.COM](mailto:ptes_rcs@email.msn.com).

Variable Speed Control. <SPEED> knob used to control the speed of crosshead travel (Figure 6). The speed can be set from 1 inch per minute up to 20 inches per minute. Turning the knob clockwise will increase the speed. Turning the knob counter-clockwise will decrease the speed. Graduations on the dial are provided to identify speed. Once the desired speed is set, the crosshead will travel both up and down at this selected speed.



Figure 6: Variable Speed Control Knob

Upper And Lower Proximity Switches. Mounted on the upper and lower rear surfaces of the crosshead (inside the drive screw covers) these switches sense the ground metal surfaces (“targets”) of the respective stroke control fixtures. The upward crosshead travel will be reversed when the upper sensor and upper target align. The crosshead will return to its starting position (“home”) at the pre-set speed and stop when the lower sensor and lower target align. In the <CYCLE> mode the crosshead will



continuously cycle at the pre-set speed, between the upper and lower stroke control limit settings until taken out of the <CYCLE> mode.

Upper And Lower Stroke Control Limit Targets. The targets are a metal “wedge” with an angled, ground surface that aligns with the proximity switch to stop or re-direct crosshead travel. (This piece is inside the metal column cover attached to the knob that protrudes out the back of the tester).

110 VAC Outlet. Located on the rear of the unit, this outlet provides an external power outlet supported by the machine.

1 AMP / 15 AMP Fuses. 1 AMP fuse for DC power supply protection; 15 AMP fuse for main power protection.

Power Cord. AccuTest/501 power source (110VAC, 60Hz, 1 Phase).

Recorder Connector. Located on the rear of the tester cabinet, this connector allows for connection and synchronization of optional recording equipment.



Figure 7: Connector For Recorder

Main Power Switch. <POWER> button that controls electrical power to the entire unit (Figure 8).



Figure 8: Main Power Switch On Front Console



INSTALLATION – SETTING UP THE TESTER



THE TESTING EQUIPMENT WAS CAREFULLY INSPECTED AND TESTED TO CONFIRM IT IS IN PERFECT CONDITION AT THE TIME OF SHIPMENT. UPON RECEIPT IF THERE ARE ANY SIGNS OF DAMAGE NOTIFY THE TRANSPORTATION CARRIER IMMEDIATELY.



THE ACCUTEST/501 MUST BE MOVED BY SUPPORTING AND LIFTING AT THE BASE OF THE TESTER. DO NOT ATTEMPT TO MOVE THE TESTER BY HOLDING THE DRIVE COLUMN OR CROSSHEAD. THIS MAY CAUSE DAMAGE TO THE COLUMN WHICH COULD LEAD TO BINDING OF THE CROSSHEAD, BENT CLAMP ASSEMBLIES, ETC WHICH RESULT IN ERRONEOUS TEST READINGS OR FAILURE TO OPERATE.

The crated tester should be moved as close as possible to its final location and placed on a level, flat surface in a clean and dry area. Before uncrating remove all blocking and fastening materials. Carefully remove the tester from the crate and install the four (4) leveling pads ("feet") in the bottom of the unit.

All accessories (clamps, recorder, charts, spare parts, etc) are packed separately and may be shipped separately. Consult the packing list to confirm what is included in this shipment.

DRIVE MECHANISMS

The drive mechanism of the tester was fully lubricated before shipment and requires no further lubrication before use.

Periodically, check the ball screw for dryness and dirt. The right hand screw guard assembly must be removed to expose the ball screw and guide bar assembly. Wipe the ball screw and bars with a clean, lint-free cloth. Apply light oil (3-In-1 Oil) sparingly to the screw above and below the crosshead. Replace the screw guard and tightly secure all fastening screws.



DO NOT OVER-LUBRICATE THE BALL SCREW. EXCESSIVE OIL CAN REDUCE TENSION AND CAUSE SLIPPING WHICH WILL AFFECT SPEED OF CROSSHEAD AND DISTORT TEST READINGS. EXCESSIVE OIL ALSO ATTRACTS DUST AND DEBRIS, ESPECIALLY IN DIRTY ENVIRONMENTS, AND CAN LEAD TO BINDING AND OTHER ISSUES WITH THE CROSSHEAD, WHICH WILL ALSO AFFECT TEST RESULTS.

ELECTRICAL CONNECTIONS

The AccuTest/501 has only one external power connection.

Make sure the power cord is connected to an electrical supply with the same characteristics (i.e. 110VAC)

The power supply to the tester MUST BE GROUNDED to a cold water ground or its equivalent.

A stable, safe and clean line voltage is critical to the proper operation of the AccuTest/501. Dedicate a separate electrical line to the tester, install a line filter/surge suppressor and maintain voltage within 105-125 volts for the 110VAC unit (or other applicable values for units specified to operate on other voltages, such as applications outside the United States.

CLAMP INSTALLATION

To install the clamps, position the crosshead to allow substantial clearance between the upper and lower clamps. Attach the clamps to the upper and lower studs (using the quick connect pins and/or locking nut assembly). With the clamps installed, move the crosshead at a SLOW speed and stop (by pushing the <STOP> button on the console) at the desired separation.



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Once the clamps are at desired separation, adjust the upper and lower proximity fixtures by sliding in the rail until the contact at the end of the proximity switch is approximately half-covered by the angled surface of the respective proximity fixture (SEE PHOTO). A small red light can be seen on the proximity switch will illuminate upon actuation. Use this red light to determine proper position of the proximity fixture.

Once both proximity fixtures have been properly set, press the <UP> button and allow the crosshead to travel to the upper limit switch, reverse direction and return to the lower switch and stop. Confirm the clamp separation distance and make any necessary adjustments.



THE LOWER STROKE CONTROL FIXTURE MUST BE RE-POSITIONED EACH TIME THE CLAMP STYLE OR SEPARATION REQUIRED IS CHANGED. FAILURE TO RESET THE POSITION OF THE LOWER CLAMP FIXTURE MAY RESULT IN DAMAGE OR INJURY. THE CLAMP COMPRESSION LIMIT FEATURE OF THE MICROPROCESSOR PROVIDES BACK UP PROTECTION SHOULD THE LOWER PROXIMITY SWITCH FAIL. RELYING ON THIS FEATURE AS THE "NORMAL" METHOD OF STOPPING THE CLAMPS SHOULD NOT BE DONE.

If the lower proximity fixture was not properly positioned and the clamp compression limit feature disables the crosshead, simply press the <UP> button. Set up the clamp separation again and re-test as outlined above.



OPERATION

Crosshead Motion Control. The crosshead is raised and lowered by a single ball screw driven by a variable speed DC motor and amplifier. Motion control buttons and speed settings:

- <POWER> turns on power to the testing system
- <UP> moves the crosshead assembly up toward the upper proximity fixture
- <STOP> ends movement of the crosshead
- <DOWN> moves the crosshead assembly down toward the lower proximity fixture
- <CYCLE> engages a cycle of crosshead movement where the crosshead assembly moves up toward the upper proximity fixture, then down toward the lower proximity fixture in a continuous cycle.

When actuated, the respective function buttons will be illuminated.

Speed Control. The <SPEED> knob on the front console controls a potentiometer that determines crosshead speed. To increase speed turn the <SPEED> knob clockwise. To decrease speed, turn the <SPEED> knob counter-clockwise. Graduation marks on the dial can be utilized to identify desired speed settings for various tests.

Crosshead Travel ("Stroke"). The starting and reversing positions of the crosshead are set according to the clamp style and separation, as well as the physical properties of the materials being tested. Automatic movement of the crosshead is achieved through positioning of the upper and lower proximity fixtures as detailed in prior sections. If a sample breaks prior to reaching the upper proximity switch, the <DOWN> button can be pushed to bring crosshead back to the "home" position (the point the lower proximity switch is engaged).

The lower proximity limit is set to establish a "home" position for lower clamp and establish desired separation to hold samples as outlined by testing procedures being followed. The upper proximity limit should be set just beyond the breaking point of the samples being tested. This may take several tests to establish the correct position.

Removing The Load Cell.



THE LOAD CELL IS A MAJOR COMPONENT OF THE ACCUTEST/501 TESTING SYSTEM AND SHOULD BE HANDLED CAREFULLY. DAMAGE TO THE LOAD CELL WILL HAVE A MATERIAL EFFECT ON ACCURACY OF THE TEST RESULTS.

To remove the load cell, turn the <POWER> button off and remove the upper clamp. Next, remove the four (4) screws fastening the front cover plate in place (SEE PHOTO). Next, remove the four screws fastening the anti-rotation plate to the bottom of the crosshead.

The load cell is direct wired to a terminal strip located on the LEFT side of the crosshead. Disconnect each wire documenting the number the terminal strip connection carefully. Next, remove the four (4) allen head screws fastening the load cell mounting plate and carefully remove the complete load cell assembly. DO NOT REMOVE the acorn nut located on top of the load cell assembly.

Reassemble by reversing the above procedures. Make sure all fastening screws are securely tightened.

Reinstall the upper clamp and turn the <POWER> button back on.

PHYSICAL TESTING EQUIPMENT SERVICES

AccuTest/501

15 Morgan Mill Road, Johnston, RI 02919
Phone: (401) 944-4760; Fax (401) 944-4960

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PNEUMATIC CLAMPS

The procedures for pneumatic clamps are the same for manual clamps with the added step of ensuring the air lines attached to each clamp are connected/disconnected (Figure 9). This connection may be a threaded fitting or push-connect fitting depending on the type of clamps in use and when they were made.

A 100PSI air supply must be available to connect to the filter/lubricator located at the rear of the tester cabinet. Set the pressure gauge on the filter/lubricator to the recommended operating pressure for the style of air clamps being used. Press the <AIR> button on the front control panel to energize the internal air controls.

Clamps are controlled by a double-actuating foot pedal direct wired to the tester.

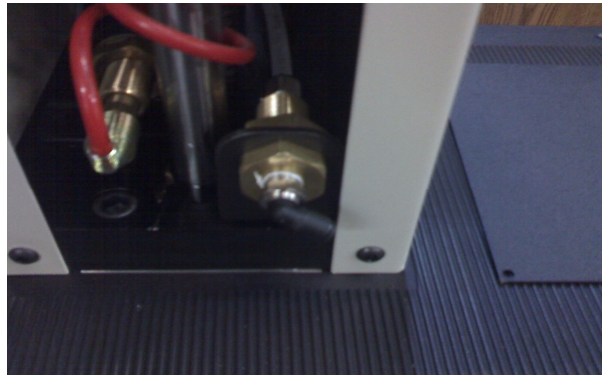


Figure 9: Pneumatic Connection For Clamps On Column

MICROPROCESSOR

If your AccuTest/501 is equipped with a microprocessor and/or software package the instructions are provided under a separate manual. Contact PTES if you did not receive this document.