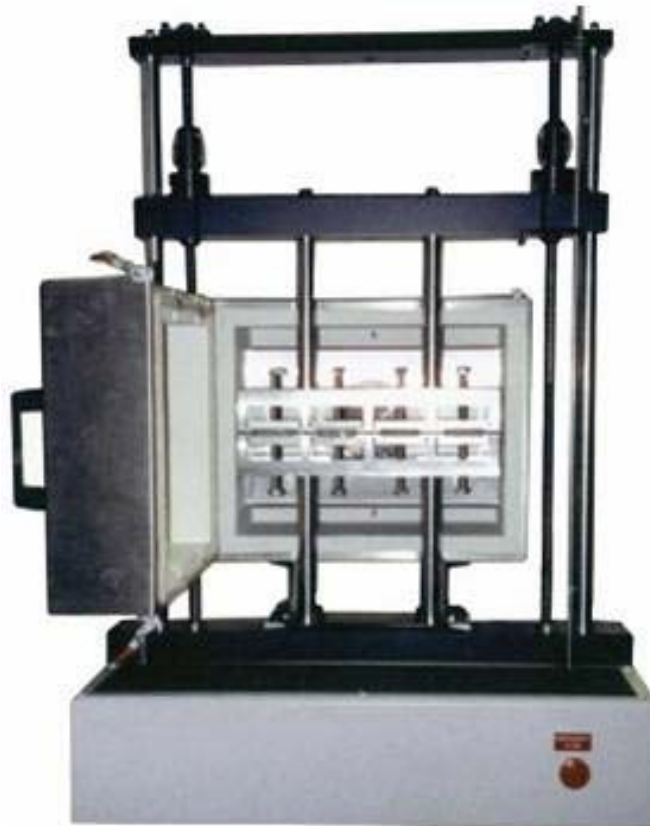


System Overview
Safety
Setup & Installation
Operation
Maintenance



SECOND EDITION, JANUARY 2009

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For assistance with set-up or operation, contact the ATS Service Department. Please have this manual and product serial number available when you call.

Telephone: (724) 283-1212 – FAX (724) 283-6570



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PREFACE

Unpacking

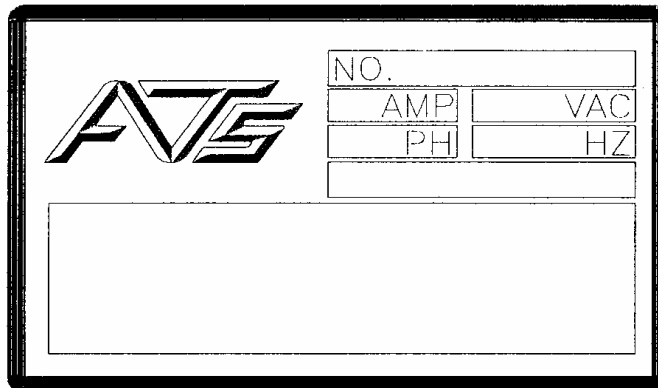
Retain all cartons and packing materials until the unit is operated and found to be in good condition. If damage has occurred during shipping, notify Applied Test Systems and the carrier immediately. If it is necessary to file a damage claim, retain the packing materials for inspection by the carrier.


Warranty

All new ATS, Inc. systems are shipped with a warranty. Units have a warranty against defective parts and workmanship for one full year from date of shipment.

After-Sale Support

If you have any questions concerning the operation of your unit, contact the ATS Service Department. Before calling, please obtain the serial number from the unit's data tag (shown below) and the software revision number. Also, please be prepared to give a complete description of your problem to our Service Engineer.



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SECTION 1. SYSTEM OVERVIEW

A. General Description

The ATS Series 540 Computerized Vertical Sealant Tester is a bench top system designed to test sealants, adhesives, or coatings by applying alternating tension and compression cycles to the selected specimen. By aligning components in a vertical direction, the area occupied by the machine is kept to a minimum, efficiently increasing the utilization space in small laboratory spaces.

The ATS Series 540 can test up to 12 specimens simultaneously in capacities up to 5,000 lbs. (17.7kN) The samples are cycled a preset number of times at a selected distance and speed to simulate environmental conditions.

The ATS Series 540 test control function and data acquisition is operated by a Windows®-based personal computer. During testing, the software, ATS Cyclic Software, controls displacement, speed, and count and all of which are fully adjustable. In addition, the screen displays provide continuous information about test variables.

Standard test methods covered by the ATS 500 Series sealant testing machines include ASTM C719, C836, C910, and C920; JIS (Japanese Institute of Standards) 9010; U.S. Federal SS-S200, TT-S227, and TT-S230. **The ATS Series 540's design does not allow for it to perform any additional functions other than the intended functions specified in this manual.**

The ATS Series 540 Load Frame is constructed of a base, columns, an upper crosshead, and a moving crosshead. Other essential parts include the crosshead limit system and personal computer with Ethernet/network port that contains the ATS Cyclic software that controls the ATS Series 540 during a test.

The base houses an electronically controlled, variable speed motor and low inertia drive system capable of a wide speed of bandwidth. A zero backlash ball screw drive system operates the moving crosshead which can be equipped with various testing accessories.

A crosshead limit system is provided with both fixed and user – adjustable stops. The fixed stops are factory preset to prevent damaging the crosshead over travel conditions. The crosshead limit system provides a means for the user to set custom travel limits on the crosshead based on specific tests.

SECTION 1. SYSTEM OVERVIEW

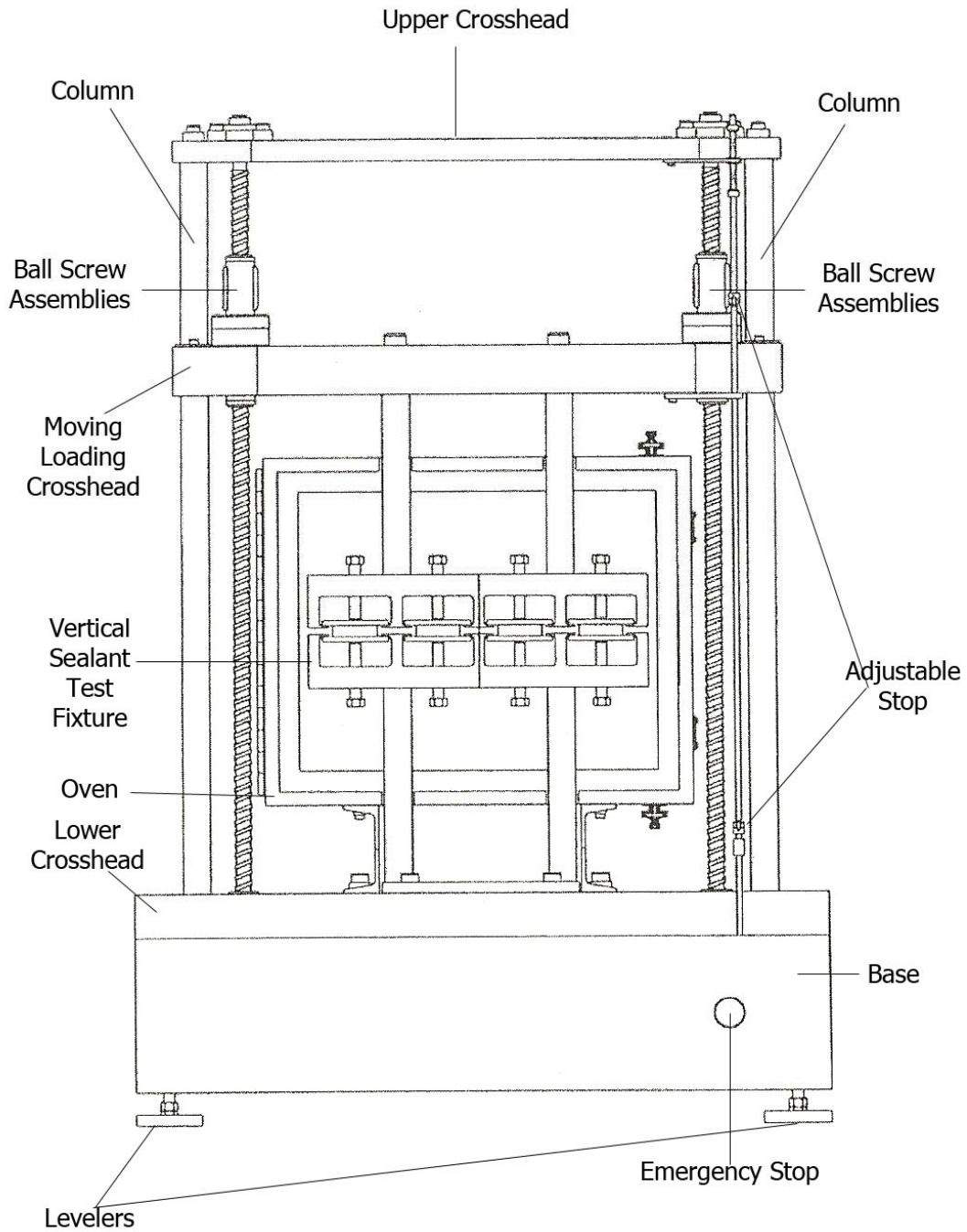


Figure 1. ATS Series 540 with oven door removed.



B. Specifications

1. Load Frame

Capacity	5,000 lb.(22.24kN)
Clearance	Horizontal: 20 ¾ in. (527 mm) between screws
Crosshead Speed Accuracy	0.05% of indicated speed
Crosshead Travel	4 in. (101 mm) without chamber; 2 in. (50.8 mm) with chamber
Speed Range	0.0001-2.0 in. / min. (.025-50 mm / min.)

2. Specimen Fixtures

Specimen Capacity	12 specimens 3 in. (76.2 mm) long by 2 in. (50.8 mm) wide by 1 in. (25.4 mm)tall
Fixture Capacity	5,000 lb. (22.24kN)

3. General

Height	46 ¼ in. (1174 mm)
Width	31 ½ in. (800 mm)
Depth	26 in. (660 mm) 30 in. (762 mm) with chamber
Shipping Weight	700 lb. (3.114kN) approximate
Power Requirements	230 VAC, 1 Phase, 60 Hz.

4. Computer System

The computer system must meet the following minimum specifications:

Operating System	Windows® 95, 98, ME, NT 4.0, 2000, XP
Memory (RAM)	64 Megabytes for Windows® 95, 98, ME 128 Megabytes for Windows® NT 4.0, 2000, XP
Hard Disk	15 Megabytes free space
Processor	Intel Celeron® 500 MHz or better
Display	Video Graphics Array (VGA)
CD-ROM Drive	Required for software installation

NOTE: Specifications subject to change without notice



SECTION 1. SYSTEM OVERVIEW

C. Environmental Conditions

The ATS Series 540 is designed for use in an industry/laboratory setting. It is designed for an indoor and dry environment. The unit should be placed on a clean, stable work surface.

D. Computer Control System Software









The computer control system software provides user control of the ATS Series 540 system in a Windows® environment with keyboard and/or mouse access to the functions. The software provides pull-down menus, button selections, and data entry text boxes for easy update and access to information.

During operation, the software collects and records the data from the various sensors within the ATS Series 540. The software is organized so all the information required to conduct a particular test is stored in the computer

Procedures in this manual assume the operator has experience working in a Windows environment.

SECTION 2. SAFETY

All Applied Test Systems Inc. equipment is designed to be operated with the highest level of safety. To maintain the safe operation of this tester, ATS endeavours to educate the operator about safety issues surrounding certain parts of the tester. These safety issues are addressed through the use of labeling on the equipment. The following labels may appear on your test unit:

	<p>Burn Hazard Hot Surface</p>
	<p>Electrical Shock/ Electrocution</p>
	<p>Hand Crush Force From Above</p>
	<p>Protective Earth (Ground)</p>
	<p>European Directive CE Mark</p>
	<p>General Danger</p>
	<p>No Access For Unauthorized Persons</p>
	<p>Read Operator's Manual</p>



SERIES 540 COPMUTERIZED VERTICAL SEALANT TESTER

**SAFETY
INSTRUCTIONS**

1. Only a trained person is to be permitted to operate this equipment. Training should include instruction in operation under normal conditions and emergency situations.
2. Where safety is dependent upon stopping devices or starting devices or both, they are to be kept free of obstructions that could endanger personnel.
3. The areas around loading and unloading points are to be kept clear of obstructions that could endanger personnel.
4. Personnel working on or near this equipment shall be instructed as to the location and operation of pertinent stopping devices.
5. This equipment is to be used only for the purpose for which it is constructed. See operator's manual for the proper use of this equipment.
6. Under no circumstances are the safety characteristics of this equipment to be altered.
7. Routine inspections and corrective/preventative maintenance measures are to be conducted to ensure that all guards and safety features are retained and function properly.
8. All personnel are to be alerted to the potential hazards indicated by the safety labels on this equipment.
9. As a general rule this equipment is not to be cleaned while in operation. Where proper cleaning requires the equipment to be in motion and a hazard exists, personnel should be made aware of the associated hazard.

Safety Instructions

SECTION 2. SAFETY CONT.

A. For Owners, Operators, and Maintenance Personnel

Read and understand all instructions and safety precautions listed in this manual before installing or operating your unit. If you have any questions regarding operation of the unit or instructions in this manual, contact the ATS Service Department.

In addition to the safety warnings listed below, warnings are posted throughout the manual. Read and follow these important instructions. Failure to observe these instructions can result in permanent damage to the unit, significant property damage, personal injury, or death.

1. Warnings

The following statements are warning statements. Unlike caution statements, warning statements alert the operator to conditions that may injure personnel. Operators must be aware of these conditions in order to prevent injuries that may occur while operating this equipment.



WARNING: Keep hands and heads clear of the crossheads and load train when pressing the “UP” or “DOWN” controls.



WARNING: Disconnect power prior to performing maintenance. Turn off the unit and disconnect the line cord from the power source before performing any maintenance procedures.



WARNING: Keep hands away from the specimen and load train when test is in progress.



WARNING: When a test is in progress, the operator must be at the controls.



SECTION 2. SAFETY CONT.

2. Cautions

The following statements are caution statements. These statements alert the operator to conditions that may damage equipment. Operators must be aware of these conditions in order to ensure safe operation of this equipment.



CAUTION: Installation of electrical devices must be accomplished by competent personnel and done in accordance with any current local and national codes. Equipment grounding is a MUST



CAUTION: Before energizing the electrical power to the ATS Series 540, turn off all power switches and place all controls in an OFF or neutral position. Check that your power source is of the appropriate voltage and is surge-protected. Use appropriate power adapters based upon your region.



CAUTION: Do not exceed the rate capacity of the adapters, grips, or load cell. Damage to your equipment may result.



CAUTION: Do not lift the ATS Series 540 by the loading crosshead. Damage to your equipment may result. Lift it only under the housing, or by the adjustable crosshead.



CAUTION: The load cell capacity of the load train component is reduced at elevated temperatures.



CAUTION: Observe maximum temperature ratings of test components (extensometer, grips, fixtures, couplings, etc.)

SECTION 3. SOFTWARE

The control screen contains all elements necessary for setup and running tests. The functions of each item are described below and on the following pages.

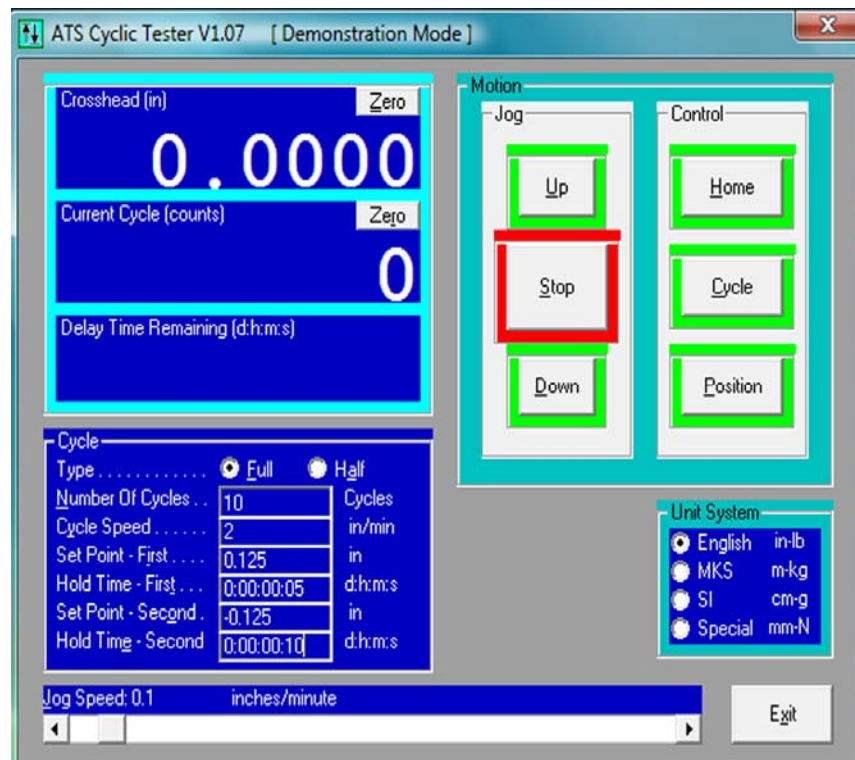


Figure 2. ATS Cyclic Tester Menu

1. **Crosshead (in)** – Indicates the displacement in inches that the crosshead has moved from home. To zero the displacement count, click on the “Zero” button that is located in the upper right corner of the Crosshead section.
2. **Current Cycle (counts)** – Provides a running total of the number of cycles completed since it was zeroed. To return the counter to zero, click the “Zero” button that is located in the upper right corner of the Current Cycle section.
3. **Delay Time Remaining (d, h, m, s)** – This section gives the user a countdown that states the time before the next movement of the crosshead. The time used in this section is determined by the user input in the Hold Time from the Cycles section below.
4. **Cycle**
 - a. **Type** – Select your choice of counting in either full or half cycles.



- b. **Number of Cycles** – Enter the number of cycles you would like to run. The test will automatically stop when this number of cycles dictated has been reached.
 - c. **Cyclic Speed** – Enter the speed of the crosshead in inches per minute.
 - d. **Set Point-First** - (First motion position from Zero) selects the displacement and direction to which the crosshead will travel before reversing the cycle. With respect to zero, a positive value will cause the crosshead to move in an upward direction (compression), and a negative value will cause the crosshead to move down (tension). Enter desired Set Point-First value here.
 - e. **Set Point-Second** – (Second motion position from zero) is used to place a specimen under both tension and compression. Enter desired value, selecting the displacement and direction to which the crosshead will travel after completing the first cycle set.
 - f. **Jog Speed** – Increase or decrease the Jog Speed by selecting the box below the display, clicking and dragging the box to increase and / or decrease the jog speed.
5. **Motion**
- a. **Jog**
 - 1) Up - Click on the Up button to move the crosshead in a positive direction.
 - 2) Down – Click on the Down button to move the crosshead in a negative direction.
 - 3) Stop– Click on the Stop button to stop movement of the crosshead.

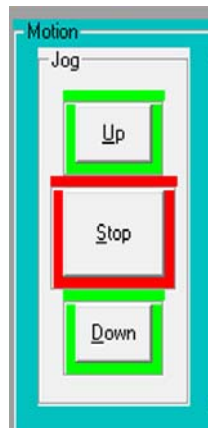


Figure 3. Jog Controls

b. Control

- 1) Home – Click on the Home button to return the crosshead to the zero position.
- 2) Cycle – Click the Cycle button to start the cyclic operation. A confirmation window that looks like the image below will pop up. Click on OK to continue the operation, or click on the Cancel button to cancel the operation.

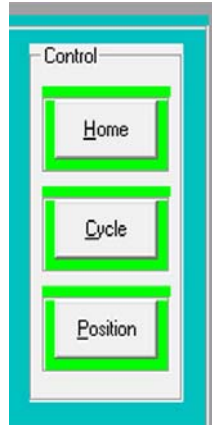


Figure 4. Motion Control

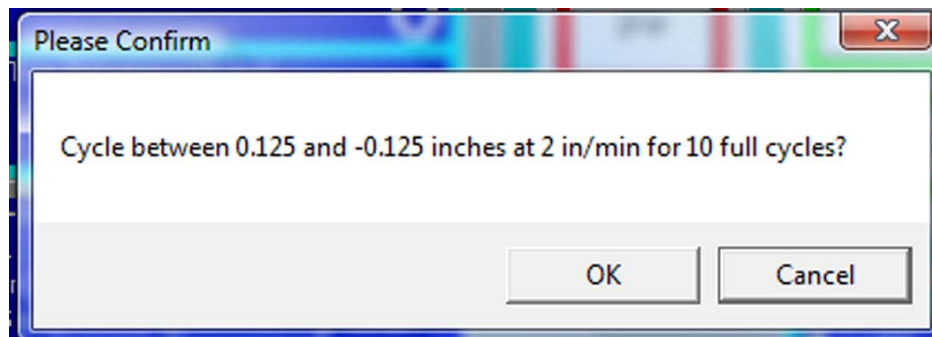


Figure 5. Cycle Confirmation Window

- 3) Position – Click the Position button to enter the value that the crosshead readout should show after the movement.

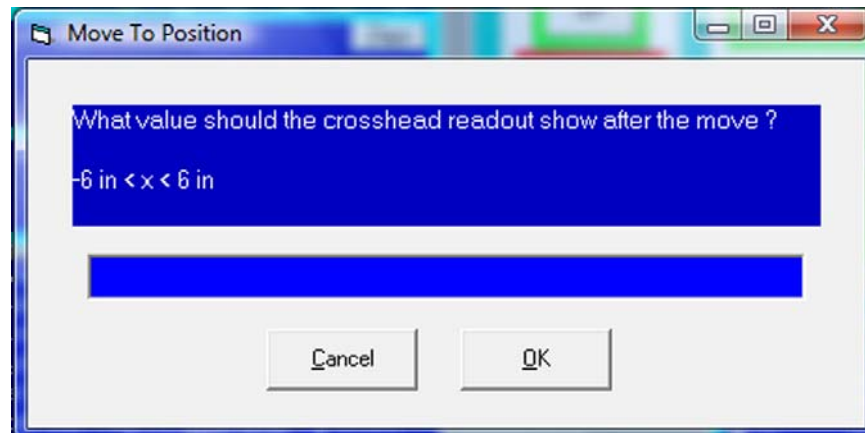


Figure 4. Position Menu

6. **Exit** – Click the Exit button to exit the program.



SECTION 4. INSTALLATION

A. Unpacking the Equipment

1. Remove the ATS 540 Vertical Sealant Tester load frame and computer from the crate.
2. Place the load frame on a sturdy work surface
3. Place the computer system on the work surface near the load frame.
4. Inspect the equipment and computer system to be sure there wasn't any damage during shipment. If damage is found, notify the shipping company and the ATS Service Department.

B. Connecting the Equipment

1. Please use the following connection cables that were shipped with the ATS Series 540.
 - a. Main Power Cable
 - b. Communication Cable
2. Connect the main power cable from the bottom right back of the base to the power supply.
3. Connect the communication cable in the bottom left of the tester base and the computer.
4. When connecting additional equipment to the computer, refer to the manufacturer's literature for details.

C. Software Installation

NOTE: Systems that were shipped from the factory have the software already installed on the computer that is set up to work with the ATS Series 540. The following instructions only apply to those whom purchased a computer separately.

1. Turn the computer on, and wait until the computer initializes. Place the CD in the CD ROM and follow the computer's instructions.



SECTION 5. SETUP AND OPERATION

- A. Before energizing the electrical power to the ATS Series 540, set the power control to the “off” position.



CAUTION: Before energizing the electrical power to the ATS Series 540, turn off all power switches and place all controls in an OFF or neutral position. Check that your power source is of the appropriate voltage and is surge-protected. Use appropriate power adapters based upon your region.

- B. Turn the main power breaker to the frame to the “on” position and turn on the computer.
- C. Determine and /or review test requirements for all components of the system. Run the software, and program accessory equipment to the test requirements (for example - programming a temperature controller or measuring device).
- D. Position the upper crosshead per required specifications. Movement or positioning of load crosshead can be accomplished by the following procedure:
1. Set the Jog Speed to a rate that will permit easy control of the crosshead.
 2. Click on the “Up” or “Down” Jog button to move the crosshead.

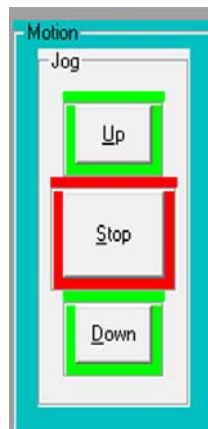


Figure 5. Jog Controls



WARNING: Keep hands and heads clear of the crossheads and load train when pressing the “UP” or “DOWN” controls.

- E. Make sure that the ATS 540 and it's fixture have been properly positioned to allow efficient installation of the specimen.
- F. Load the specimen, and tighten fixtures bolts to check positioning of fixtures and accessories, if so desired, to assist in selecting test procedures to match testing requirements.
- G. Select and install accessories required for the test.
- H. Position the adjustable stops to prevent accidental damage to the testing accessories. The upper stop is used to prevent ramming of the load train components together. The upper or lower halves of the fixture should never come closer then .020 in. (0.5 mm) If a furnace or oven is used, the lower stop should be used to prevent damage to the "inner top" of the oven / furnace from over travel of the test fixture.
- I. Make sure the specimen(s) is properly mounted. Check the fixture, accessories, and lower stops.
- J. Set your test parameters in your software.
- K. If any accessory equipment (chart recorder, temperature conditioning equipment, etc.) is being used, start it at this time.
- L. To start the test, click on the Cycle button.

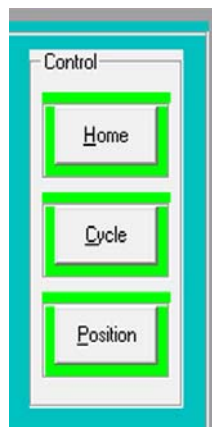


Figure 6. Cycle Button

- M. The machine will stop automatically at the point of zero displacement. If you wish to stop before normal completion, click the Stop button.
- N. Repeat the above procedure for additional tests.



SECTION 6. MAINTENANCE

- A. The ATS Series 540 is relatively maintenance free. However, some basic procedures should be followed to keep your system running trouble free. Information for specific components of the system is contained within the manufacturers' literature included with this manual. This includes information concerning the mechanical elements such as gear reducer, drive assembly, and the servo motor system.
- B. Inspect the ATS Series 540 test fixture periodically, and always check the fasteners are tight and the mating surfaces of the fixture are parallel within .005 in. (0.127 mm). If the fixture is out of parallel or visibly damaged, discontinue use and contact the ATS Service Department
- C. To facilitate smooth movement of the crosshead, lubricate the ball screws of the ATS 540 when needed. We recommend using Dow Corning 321 Dry Film Lubricant. Follow the manufacturer's instructions.
 - 1. Move the crosshead to a position that will expose the maximum vertical length of the ball screws. If the test area is below the crosshead, this position will be at the uppermost point of travel and vice versa. The adjustable limit stops will likely need to be moved. Do not change the position of the factory set fixed stops.
 - 2. When the ball screws are sufficiently coated, return the crosshead and the adjustable stops to the appropriate positions to resume testing.