APPLIED TEST SYSTEMS
THE MARK OF RELIABILITY

INSTRUCTION MANUAL

Series 540

Vertical Sealant Tester

This manual contains important operating and safety information. Carefully read and understand the contents of this manual prior to the operation of this equipment.

www.atspa.com

REVISED AUGUST 2020

Information in this document is subject to change without notice and does not represent a commitment on the part of:

Applied Test Systems (ATS)
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USA

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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.

Manual Contents

A. Introduction

A.1 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 (ATS) and the carrier immediately. If it is necessary to file a damage claim, retain the packing materials for inspection by the carrier.

A.2 Warranty Information

All new ATS systems are shipped with a warranty. Units have a warranty against defective parts and workmanship for one full year from the date of shipment. Please see APPENDIX A of this manual for complete details on the warranty.

A.3 After Sale Support

If there are any questions concerning the operation of the unit or software, contact the ATS Service Department at +1-724-283-1212.

Before calling, please obtain the software revision number from the View Screen and the serial number from the unit's data tag. A sample data tag is illustrated below, and can be completed with the unit's information for easy reference. Please be prepared to give a complete description of the problem to the ATS Service Department.

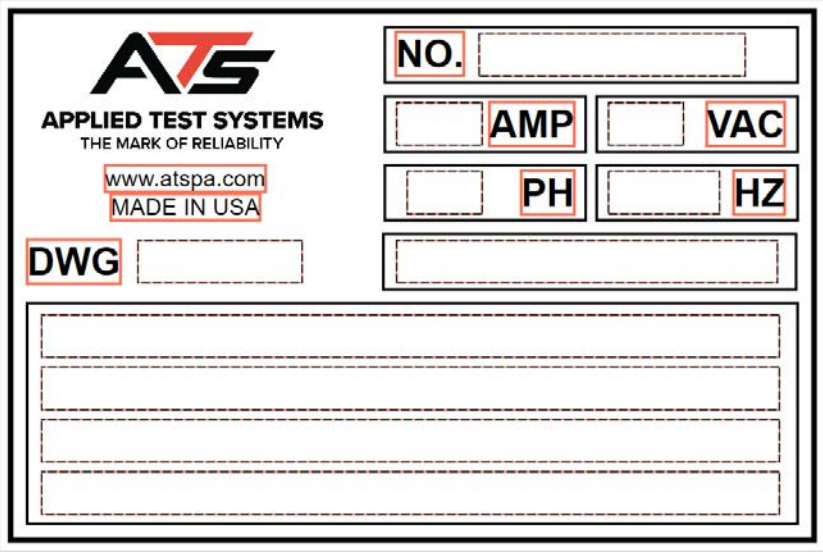

Figure A.1: ATS Sample Data Tag

B. Safety

B.1 For Owners, Operators, and Maintenance

All ATS equipment is designed to be operated with the highest level of safety. This manual uses note, caution, and warning symbols throughout to draw your attention to important operational and safety information.

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 at +1-724-283-1212.

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.

B.2 Safety Instructions

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 our Service Department.

Thoroughly understand the safety features and operation of the equipment. This manual will provide operators with safety concerns and general procedures. Be familiar with correct operating principals and use good judgment. Also refer to the appropriate manuals for system component safety instruction manuals.

Obey all national and local electric code requirements.

Dangerous high voltages present. Do not attempt to open the enclosure or gain access to areas where you are not instructed to do so. Refer servicing to qualified service personnel only.

B.3 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 push buttons. Personal injury may result when the loading crosshead begins moving.

WARNING: Always be certain the test area is clear of hands and heads and that the test is complete before pressing the return push button. The return button provides a rapid return.

WARNING: Before energizing the electrical power to the Series 540 Sealant Tester, set all controls and/or switches to the OFF position.

WARNING: Whenever a test is in progress, the operator MUST be at the controls.

WARNING: Keep hands clear of the specimen and load train when test is in progress.

WARNING: Always use the appropriate protective equipment when operating the Series 540 Sealant Tester and any accessory equipment.

B.4 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 to ensure safe operation of this equipment.

CAUTION: Set the adjustable limit switches prior to test operation. The limit switches prevent the moving crosshead from exceeding the pre-set range. Set the limit switches just above and below the range set for the moving crosshead.

CAUTION: If necessary, stop test operation in case of emergency. Use the emergency stop button on the Series 540 Sealant Tester to abort test operation.

CAUTION: Do not exceed the rated capacity of the adapter, grips, or load cell.

CAUTION: Lift the Series 540 Sealant Tester under the base, preferably or if necessary under the upper crosshead. If lifting by the crosshead, be careful not to damage any components with the lifting device. See Figure D.1 on p.8.

CAUTION: Be sure the correct load cell in use is selected in the load cell configuration menu.

CAUTION: Test capacity is determined by the smallest load cell in a load train regardless of which cell is connected. If higher capacity is needed, replace the smaller load cell with adapters.

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

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

CAUTION: Avoid ramming grips and fixtures together at high speeds. The load cell protection feature may not react fast enough to avoid damage to load cell.

C. System Overview

C.1 Equipment Parts

Front of Unit

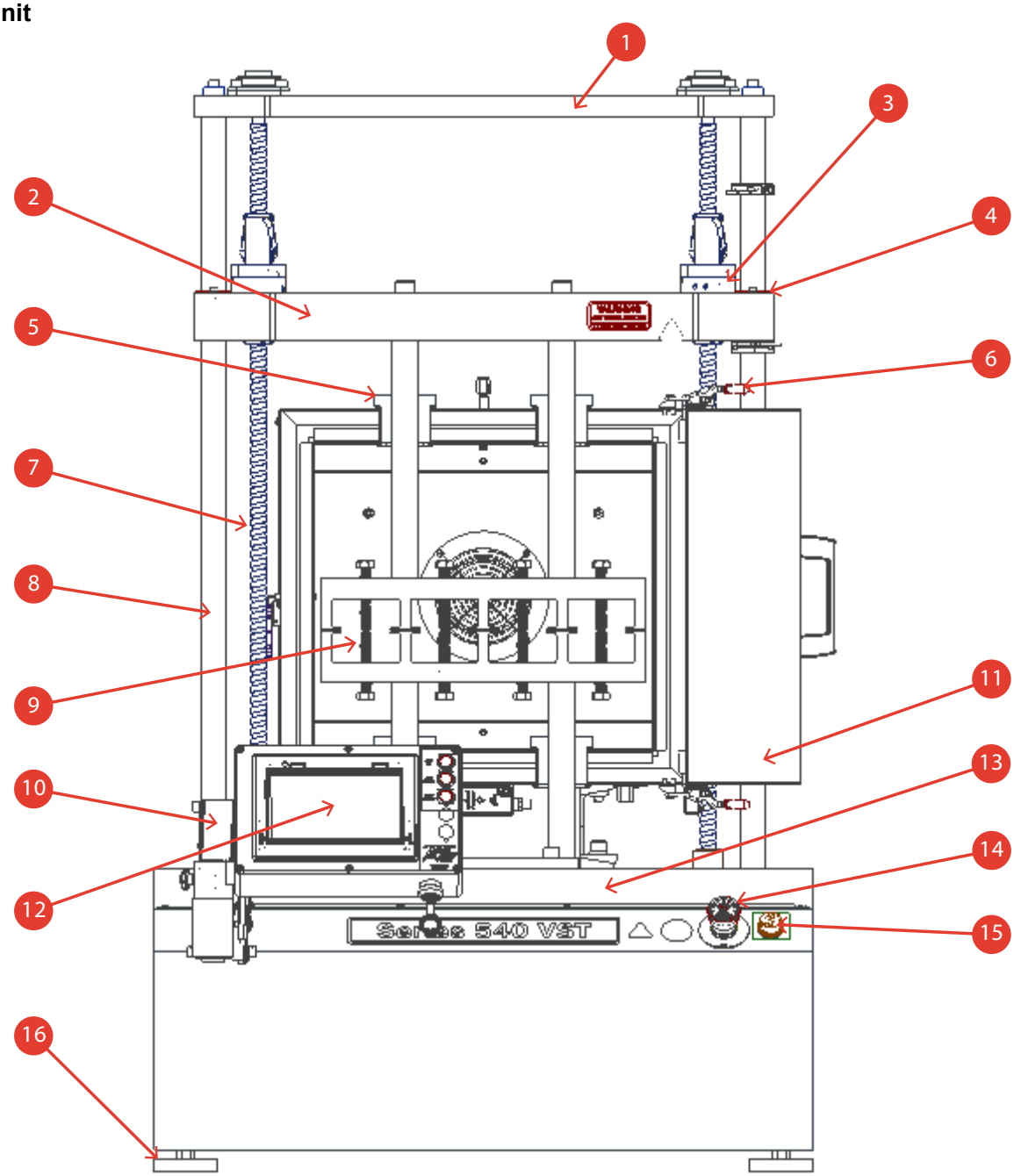

Figure C.1.: Series 540 Sealant Tester (Front View)

1. Upper Crosshead
2. Lower Moving Crosshead
3. Upper Fixed Limit
4. Lower Adjustable Limit
5. Insulators
6. Door Latch
7. Ball Screw
8. Guide Rod
9. Specimen Fixture
10. Adjustable HMI Arm
11. Hot/Cold Chamber
12. HMI
13. Fixed Lower Crosshead
14. E-Stop
15. Power Indicator Light
16. Adjustable Leveling Feet

Back of Unit

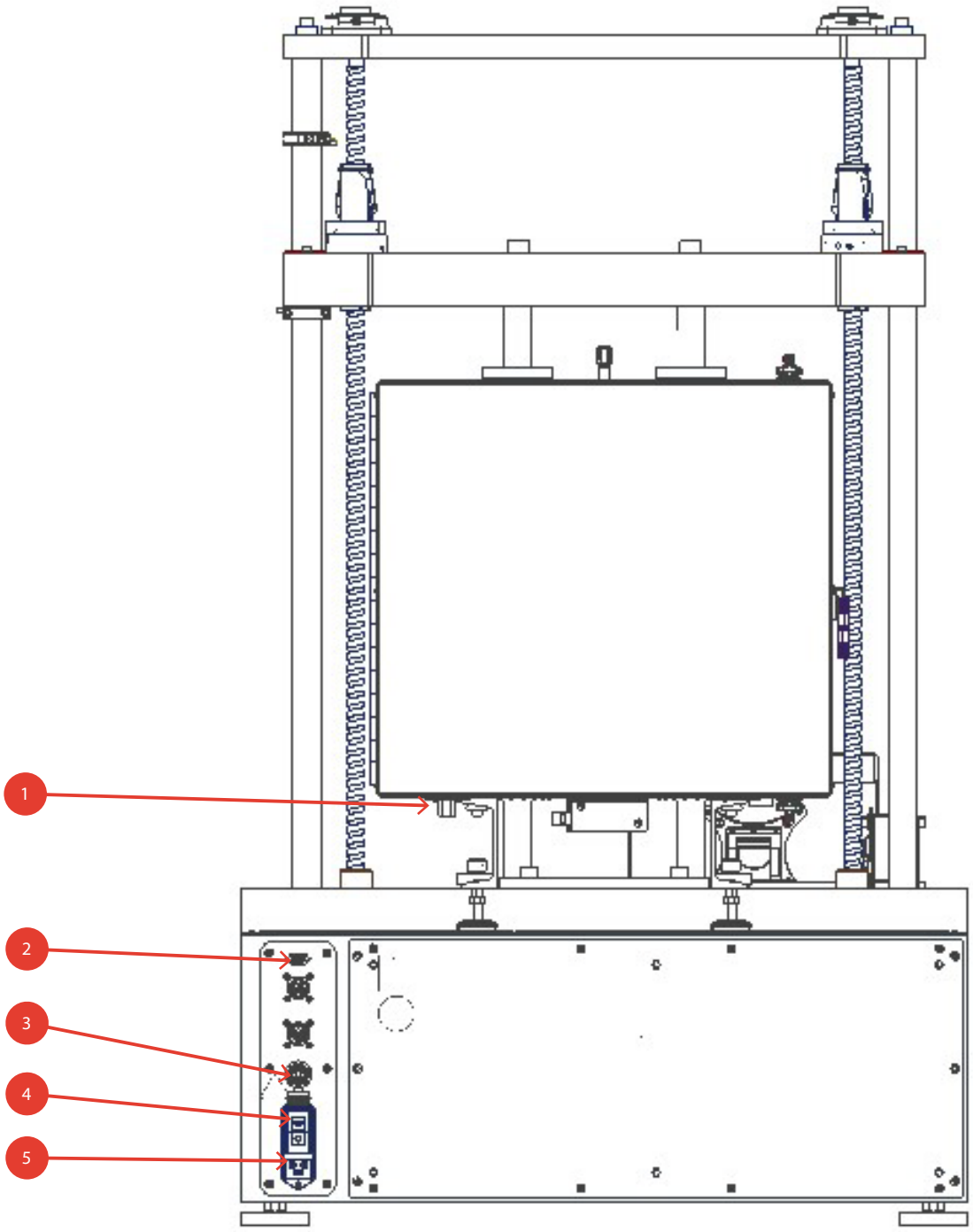

Figure C.2.: Series 540 Sealant Tester (Rear View)

1. LN2/Co2 Fitting
2. db 9 Connector - for communivations with temperature control
3. Ethernet
4. Power Switch
5. Power Connector

C.2 General Product Description

The ATS Series 540 Sealant Tester is the most versatile test frame in our line of sealant testing equipment. The system is designed to test samples such as sealants, adhesives, and coatings by applying tension and compression cycles. The compact benchtop design and vertical specimen alignment direction means the 540 only requires a minimum amount of lab space. Operation of the Series 540 is controlled by an adjustable touch screen HMI display, where all system functions are accessed. An optional hot/cold chamber with digital temperature control is available to allow testing to be performed at a wide range of temperature. For additional information on the Series 540 Sealant Tester please contact your ATS sales representative by calling +1-724-283-1212.

C.3 Product Specifications

Capacity	5,000 lbf (22.24 kN)
Frame Type	Bench top, vertical
Fixture Alignment	Precision columns
Drive Type	Dual-screw, single-motor, computer-controlled
Constant-or Variable Speed Testing	.0002 - 20 in./min (0.0005 - 500.0 mm/min)
Maximum Travel	1.0” (50.8mm) (extension)
Specimen Capacity	12 (standard)
Power Requirements	230VAC 60 Hz

D. Installation

D.1 Unpacking

Carefully unpack the equipment and inspect it for damage during shipment. 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 the carrier and ATS immediately. If it is necessary to file a damage claim, retain the packaging materials for inspection by the carrier.

D.2 Installation

1. Remove the shipping crate and packing material from the Series 540 Sealant Tester, leaving the Series 540 on its pallet. Inspect the machine for any signs of damage incurred during shipment.
2. Lift the Series 540 Sealant Tester from the shipping pallet, preferably by lifting under the base. If using a fork lift, make sure the forks are fully supporting the front and back of the base otherwise damage may occur to components under the base or the unit might tip. If necessary, the Series 540 may be lifted by the upper crosshead, but suitable care should be taken. Use padding or soft wood blocking as necessary to prevent damage.

Figure D.1: Lifting Series 540 Sealant Tester

3. Position the Series 540 Sealant Tester with a fork lift or crane. Lift the Series 540 under the housing or by the upper crosshead.
4. Install the interconnecting cable between the load cell and the load cell connector on the back of the unit (see Figure C.2 for location). The unit will not function without the load cell connected.
5. Connect the Series 540 Sealant Tester to the appropriate grounded source of power, as listed on the data tag.
6. Connect the line cord to the line cord connector provided on the rear of the Series 540 Sealant Tester (see Figure C.2 for location). Make sure all controls are set to the OFF position. Check the main power switch/ circuit breaker beside the connector to make sure it is in the OFF position.
7. Connect the line cord to the connector profided on the rear of the temperature control unit. Make sure all controls are set to the OFF position. Check the main power switch/circuit breaker beside the connector to make sure it is in the OFF position.
8. Connect the db9 cable from the temperature controller to the back of the series 540 (see figure C.2 pg 6)

Figure D.2: Temperature Control System Front & Back

E. Software Overview

E.1 Software Map

Figure E.1 illustrates the proper navigation of the Series 540 Sealant Tester's software screens.

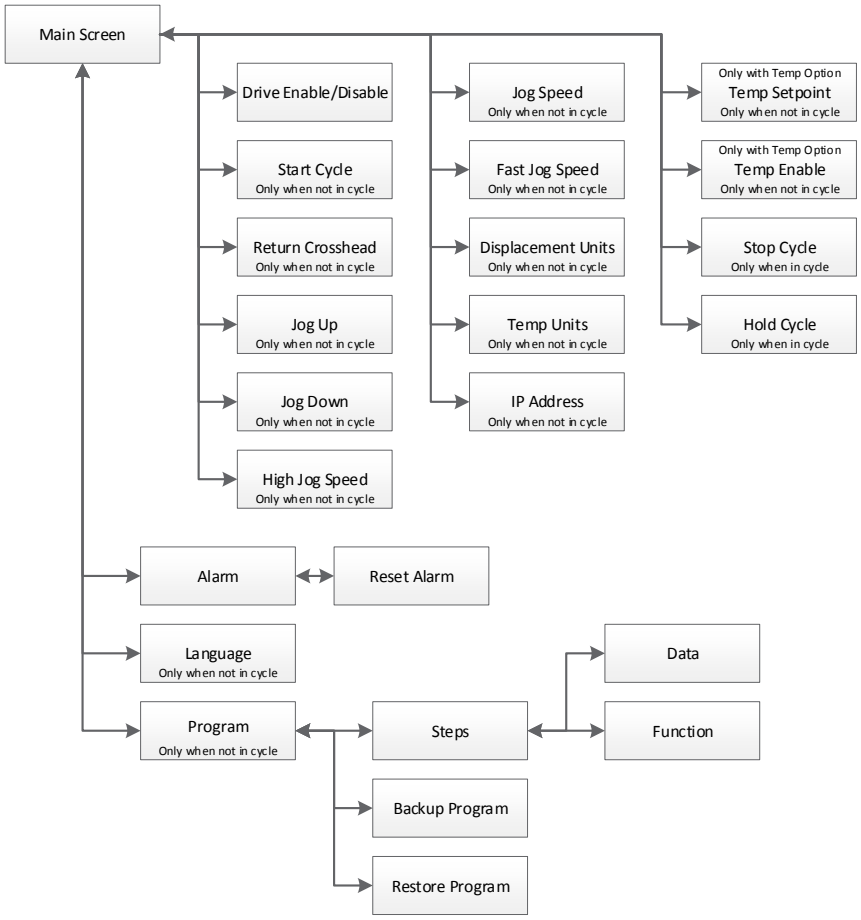

Figure E.1: Series 540 Sealant Tester Software Map

E.2 Main Screen

Figure E.2 illustrates the Main Screen that is shown when the machine is started. It allows you to setup, and run, tests. The screen will show machine Displacement. It also has several controls to set-up and run the machine.

The following buttons are located on the Main Screen:

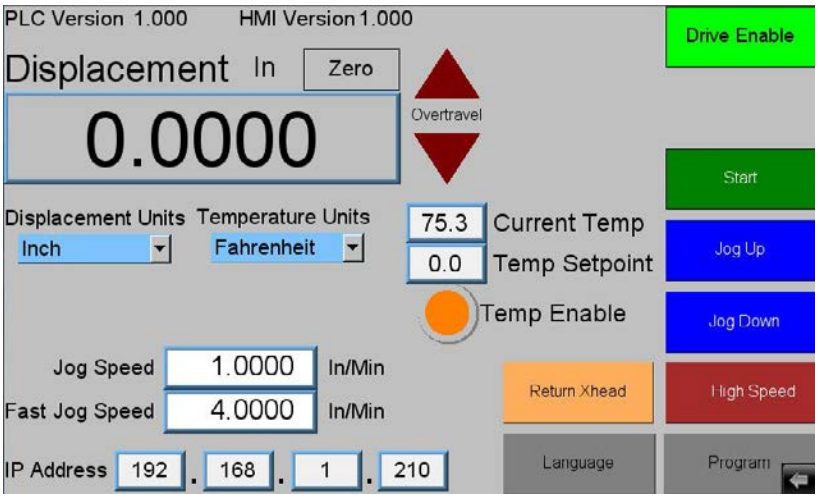

Figure E.2: Main Screen

Zero Button

Located to the right of the Displacement name and used to zero out the value. This button will be hidden when a test is running.

Overtravel Indicators

Will turn on if the system goes into over travel going up or down.

Drive Enable Button

Used to enable (Green) and disable (Red) the drive system. The drive must be enabled to jog or run a test. As a safety you should **ALWAYS** disable the drive when you are loading or unloading samples.

Alarm Button

Only shows up if there is an alarm or warning. If displayed, press to go to the alarm screen and see what has triggered the alarm.

Start Button

Starts a test if the drive system is enabled.

Jog Up and Down Buttons

Will jog the machine in the desired direction at the currently selected jog speed.

Return Xhead Button

Send the crosshead back to the zero displacement position at the current jog speed if the drive system is enabled. Please note that if you press the “Return Xhead” button and the system is moving to the zero

position, pressing it again will stop it.

High Speed Button

Turns fast jogging speed on and off.

Program Button

Takes you to the program edit screen. When the system is running a test this button is hidden so that changes cannot be made.

Language Button

Used to access the Language Screen where you can change the text language for the system. When the system is running a test this button is hidden and changes cannot be made.

Displacement Units

Allow the system displacement to show and be programed in English (In) or Metric (mm) units. This is hidden if the system is running a test.

Jog Speed Field

Shows the speed that the system will travel for normal jog, when the jog buttons or the “Return Xhead” are pressed. This is hidden if the system is running a test.

Fast Jog Speed Field

Shows the speed that the system will travel for fast jog, when the jog buttons or the “Return Xhead” button are pressed. This is hidden if the system is running a test.

NOTE: Fast jog speed is used instead of the normal speed if the “High Speed” button has been pressed. If the system is in fast jog the “High Speed” button will light up. You can turn off fast jog by pressing the button again, or fast jog will time out and return to the normal jog speed after 15 seconds if the system is not moving. If the system is moving (Jog or Return Xhead), the speed will return to normal 15 seconds after the movement stops.

IP Address Field

Used to allow someone at a remote location to monitor the system using a VNC viewer program. It is also used for data logging using other programs. This is hidden if the system is running a test.

Temperature Units

Allow the system temperature to show and be programed in English (°F) or Metric (°C) units. This will only be displayed if the system has a temperature control option and is not running a test.

Current Temp

Displays the current chamber temperature. This will only be displayed if the system has a temperature control option.

Temp Setpoint

Manual set point for the chamber temperature. This will only be displayed if the system has a temperature control option and no test is running.

Temp Enable

Allows the operator to manually turn the chamber temperature control on and off. This will only be displayed if the system has a temperature control option and no test is running.

Figure E.3 illustrates what the Main Screen looks like when the system is running a test. Several buttons and fields disappear while other buttons and fields appear.

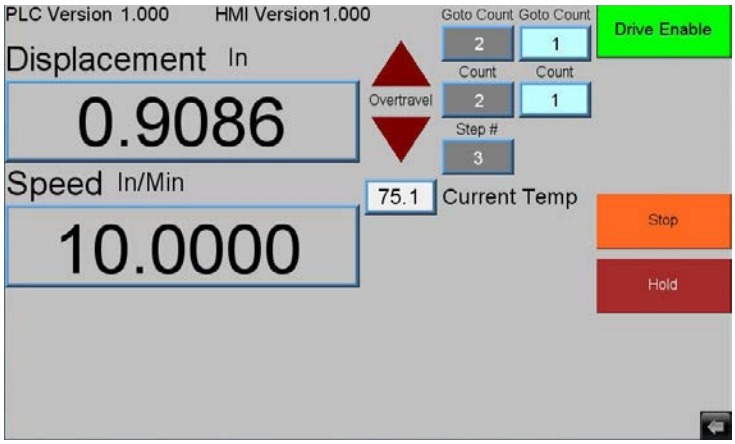

Figure E.3 - Main Screen, Test Running

Stop Button

Stops a running test at any time.

Hold Button

Puts program execution on hold until pressed again. The hold will only take effect once the current program step finishes.

Speed Button

Displays the last commanded speed of the system.

Step # Field

Displays the step number of the program that is currently being executed.

Count Fields

Only show up if the current program step is a “Cycle Position” move. The gray field is the total number of cycles programed. The light blue field shows how many cycles have been executed so far.

Time Fields

If the current program step is a “Hold” the “Count Fields” will be replaced with “Time Fields”. The gray field is the total amount of time in minutes programed. The light blue field is how much time has been executed so far in minutes.

Goto Count Fields

Only show up if the program is in a Goto loop. The gray field is the total number of returns programed. The light blue field is how many have been executed so far.

E.3 Alarm Screen

Figure E.4 illustrates the Alarm Screen. It is shown anytime the “Alarm” button is pressed on the Configure or Main Screen, and displays the current alarm(s) or warning(s) that triggered the button’s appearance.

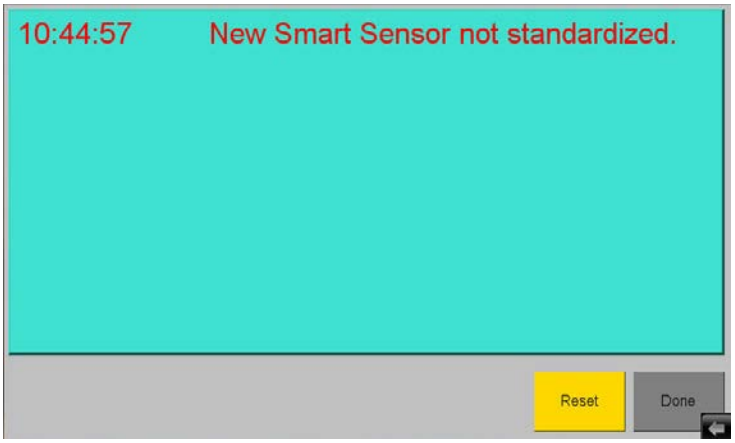

Figure E.4: Alarm Screen

The Alarm Screen shows all current alarms (in Red) and warnings (in Yellow). Users can attempt to reset these with the “Reset” button. Some alarms will go away automatically when the alarm condition goes away. However, some will not go away until a power cycle. The “Done” button will return you to the previous screen.

E.4 Language Screen

Figure E.6 illustrates the Language Screen. It is shown anytime the “Language” button is pressed on the Configure Screen.

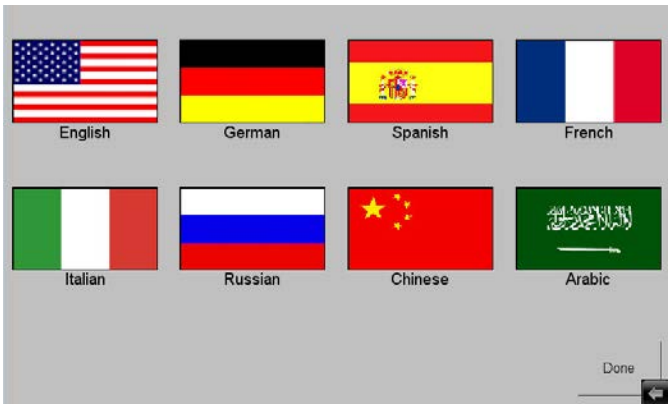

Figure E.5: Language Screen

To change the language the system is using, simply press the flag of the language you wish to use.

Pressing the “Done” button will return you to the Configure Screen.

E.5 Miscellaneous Screen

Figure E.6 illustrates the Miscellaneous Screen. It is shown anytime the “Miscellaneous” button is pressed on the Configure Screen.

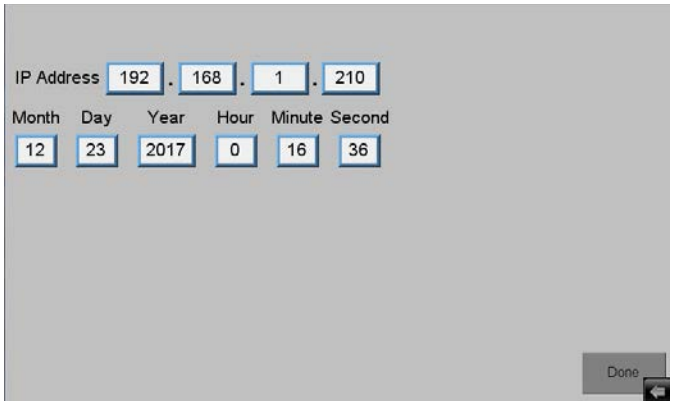

Figure E.6: Miscellaneous Screen

The IP Address field is programmed by the ATS Service department before your system is shipped out, and is only used when connecting to additional software.

The remaining fields are used to set the current date and time of the machine. This is used to notify the operators that it is time to verify and or standardize the load cell that is attached. If the calibration time is up, the system will not stop tests from running but will give a warning and if the load cell is out of specification the test will not be valid.

The “Done” button will return you to the Configure Screen.

E.6 Program Screen

Figure E. 7 shows the “Program” screen. It is appears anytime the “Program” button is pressed on the main screen. Its main purpose is to display, edit, save, and load the program in the machine.

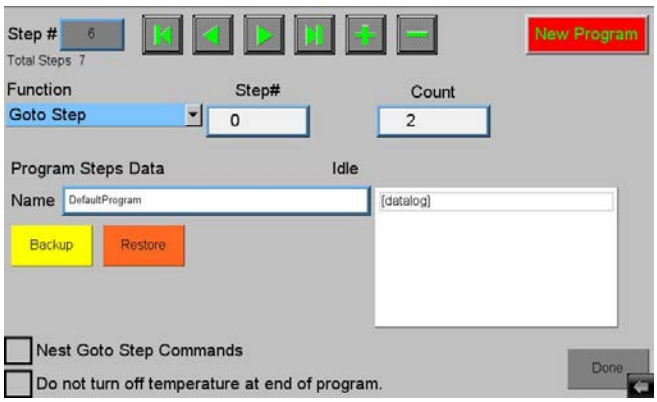

Figure E.7: Program Screen

NOTE: There are 10,000 steps possible for each program. Most programs will have less than 20.

The “Step#” displays the current step of the program. Note, programs always start at step 0.

Total Steps shows the total number of steps in the current program.

The following buttons are used to navigate through the program steps, and to add or delete steps:


Go to first step


Go to last step


Previous step


Insert a step


Next step


Delete a step

New Program Button

Erases the entire program and starts a new one. Caution should be used as there is no undelete and once pressed the program is gone unless it had been previously backed up.

Function Drop-down

Will display the current step function and allow it to be changed. The data entry fields will change depending on the function selected. Current functions are:

No Operation

Has no data and is simply a place holder with no action.

Move to position

Has a position and speed entry. The system will start to move to the position entered. Note, the program will not wait for anything, but go to the next step in the program as soon as the move is started.

Wait for Position

Has a position entry. The program will wait at this step until the system has reached the entered position.

Cycle Position

Has a position, speed, and count entry. This is a cyclic move, the system will move back and forth between its current position and the position entered. It will do this for count times.

Goto Setp

Has a step number and count entry. The step number must be a previous step. This is a loop control. The program will jump back to the entered step and execute the program from there to the goto for count times. Then it will move on to the next step of the program. Note, if the step number entered is not a previous step the program will jump over a section of program not executing them and the count will not be used. Also, remember that the code has executed once before it gets to the goto command so if you wish to execute a block of code a certain number of times, enter one less in the count.

Hold

Has a time entry. The program will wait at this step until the entered time has expired.

Set Temperature

Has a temperature and rate entry. This command will set the temperature control to the entered temperature at the ramp rate entered and move on to the next step. Note, the program will not wait for anything, but go to the next step in the program as soon as the temperature is set. This command will only be displayed if the system has the temperature control option.

Wait for Temperature

Has a temperature entry. The program will wait at this step until the system has reached the entered temperature. This command will only be displayed if the system has the temperature control option.

Program Steps Data Section

Allows you to backup and restore the program to a USB flash drive. This may be useful in the event of a hardware failure, or if you wish to have multiple programs to run on this machine. The “Idle” to the right of the section name will change to “Busy” when the system is accessing the flash drive.

Name Field

Used to name the file that is to be backed up to or restored from the USB flash. The name may include a path if desired.

Backup Button

Used to save the program data from the machine to the flash drive. Note, this button will only be displayed if a flash drive is plugged in.

Restore Button

Used to restore the program data from the flash drive to the machine. Note, this button will only be displayed if a flash drive is plugged in. The white box to the right of the name field will display the file names of the programs already stored on the flash. This is where you select a file to be restored.

Nest Goto Step Commands

Can be checked if you wish to nest goto commands. They may be nested as deep as you like but the “Goto Count” on the main screen will not be displayed when a test is running.

Do Not Turn off Temperature at End of Program

May be checked if you have many samples to run and wish the chamber to stay at temperature. Otherwise the control system will shut down at the end of a test.

Done Button

Will return you to the Main Screen.

Anytime you insert a flash drive you will see the screen in Figure E.8.

If you are just inserting a flash drive with machine programs on it just press “Cancel”. You would only need the other buttons if you are updating the HMI software.

Figure E.8.: Flash Drive Pop-Up

E.7 New HMI Software

From time to time a new software version may come out for the HMI. Below are instructions for downloading the new software. The new version of software must be on the root of a flash drive.

1. Power up the machine.

2. Unscrew USB port cover and install flash drive containing the new version of software into the USB port.

3. In a few seconds the menu in Figure E.9 will pop-up. Choose Download.

4. Another pop-up menu (Figure E.10) will appear prompting for a password. Using the keyboard displayed on the screen, enter 111111. Check the box that indicates Download Project files and uncheck the boxes that indicate Clear History files and Download History files. Select OK.

5. Next will appear 2 subdirectories - pccard and usbdisk. Click usbdisk then click disk_a_1 then click OK.

The necessary files will now be downloaded.

When done, remove the flash drive and replace the USB port cap.

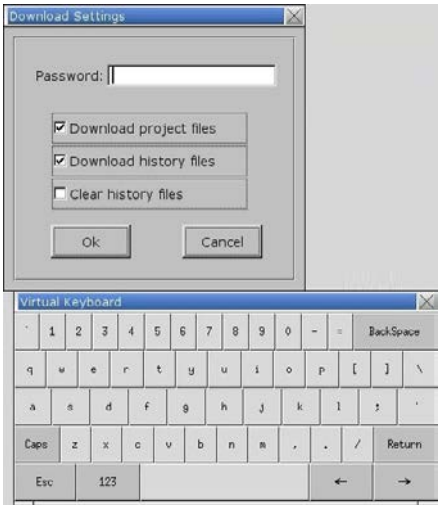

Figure E.9: Keypad Pop-Up

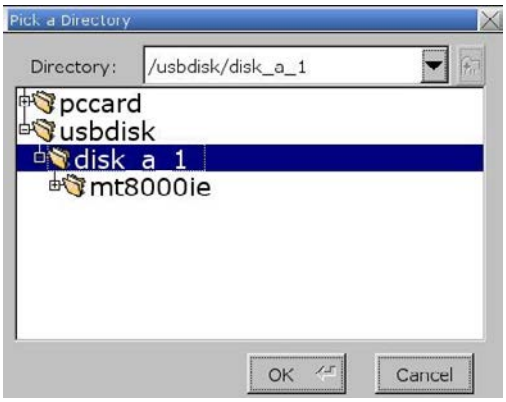

Figure E.10: Subdirectories

F. Operation

F.1 Test Frame

The test frame is constructed with twin ball screws driven by an electronically controlled servo motor driving the loading crosshead. Fixed stops on the limit switch actuator rod are set at the factory to protect the test frame by limiting crosshead movement. Do not readjust these stops. Adjustable limit stops provided with thumbscrews allow the user to limit crosshead movement during testing.

WARNING: Stops are factory set and should not be readjusted.

F.2 Test Setup

1. Turn the main power on. Allow twenty minutes for warm-up and stabilization before you run a test. You can do the rest of the pre-test set-up while the system is warming up.
2. Use the jog buttons to position and load samples into the test fixture.
3. Zero displacement
4. Press the program button to go to the program edit screen
5. Create a new program or verify that the program steps are correct.

F.3 Running a Test

1. Ensure insulators are in place around the specimen holder rods at the top and bottom of the hot/cold chamber
2. Verify that samples are properly loaded and zero displacement
3. Close the hot/cold chamber door and latch both the top and bottom
4. Verify that no alarms are showing, enable the drive and press the START button. If you wish to stop the test before it completes the program press the STOP button.

I. Maintenance

I.1 General Maintenance

The Series 540 Sealant Tester 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 of the Series 540 , such as the gear reducer, drive assembly, and the servo motor system.

To facilitate smooth movement of the crosshead, the ball screw assembles are factory lubricated and protected by screw covers. Under normal use there is no need to relubricate.

Appendix A: Warranty

Your Applied Test Systems product has been manufactured and inspected by experienced craftsmen. Applied Test Systems warrants, for the original purchaser, each product to be free from defects in material and workmanship for a period of thirteen (13) months from date of shipment or twelve (12) months from date of installation - whichever comes first. This warranty does not apply to failures caused by normal usage, misuse, or repair or service by unauthorized personnel, nor does it cover limited life electrical components which deteriorate with age such as tubes, lamps, fuses, and heaters. Load cells are covered for manufactured defects only - incidents of over load or other customer misuse are not covered under warranty. The warranty does not extend to products not manufactured or assembled by Applied Test Systems.

This warranty is expressly limited to the repair, replacement, or adjustment of the product at Applied Test Systems' option. The product must be returned to the Applied Test Systems factory or an authorized repair center. Applied Test Systems shall not be liable for any labor, transportation, or installation costs that may arise in connection with the product or return.

To obtain warranty service:

1. Applied Test Systems must be promptly notified in writing of the defect.

2. Upon receipt of written authorization, said defective equipment is returned as directed, with transportation charges prepaid by the buyer and –

3. Applied Test Systems examination of such equipment discloses to its satisfaction that the defect exists and was not caused by negligence, misuse, improper installation, accident, or unauthorized repair or alteration.

This warranty is in lieu of all other warranties, expressed or implied, including the implied warranty of merchantability or fitness for particular purpose. In no event shall Applied Test Systems be liable for direct, indirect, special, incidental, collateral, or consequential damages.

The aforementioned provisions do not extend the original warranty period of any article that has been either repaired or replaced by Applied Test Systems.

Applied Test Systems reserves the right to change published specifications.

Appendix B: Image Glossary

154 Eastbrook Lane, Butler, PA 16002 USA | **www.atspa.com** | +1-724-283-1212