



LOOP TACK TESTER
MODEL LT-1000
OPERATING INSTRUCTIONS

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PRODUCT DESCRIPTION

Congratulations on the purchase of your new ChemInstruments Loop Tack Tester. This versatile, user-friendly, carefully designed instrument allows you to determine loop tack values of adhesive laminates.



WARNING: This equipment can cause injury if not used properly. It is the operator's responsibility to observe all safety rules and warnings.

The unit has the following features:

- Automated test sequence.
- Stores up to 20 tests in memory.
- Stored test data is available for review.
- Collected test data can be exported via RS232 port.
- Selectable units of measure: Kilograms, Grams, Newtons, Pounds, and Ounces.
- Compatible with EZ-Lab System software. See www.cheminstruments.com for details.

SPECIFICATIONS

Electrical	Model specific 120V model: 120 VAC, 60 Hz, 2 amps 240V model: 240 VAC, 50 Hz, 2 amps
Operating Temperature	32 – 150 degrees Fahrenheit (0 – 70 degrees Celsius)
Humidity	0 – 55% relative humidity
Speed	Fixed speed of 12 inches per minute
Physical Dimensions	Width: 12 inches (30 centimeters) Depth: 15 inches (38 centimeters) Height: 16 inches (40 centimeters) Weight: 37 pounds (17 kilograms)

UNPACKING

ChemInstruments has made every effort to ensure that the Loop Tack Tester arrives at your location without damage. Carefully unpack the instrument and check for any damage that may have occurred during shipment. If any damage did occur during transit, notify the **carrier** immediately.

The ChemInstruments Loop Tack Tester consists of the following parts:

- The test frame, which includes the motor/drive mechanism and the data acquisition system.
- An envelope with this manual.
- Grip and fastening pin.
- Power cord.

Make sure all of these components are present before discarding packaging material.

ASSEMBLY

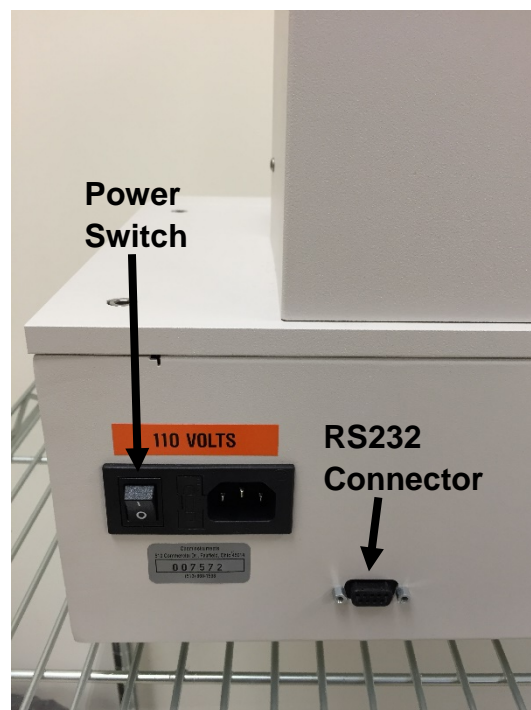
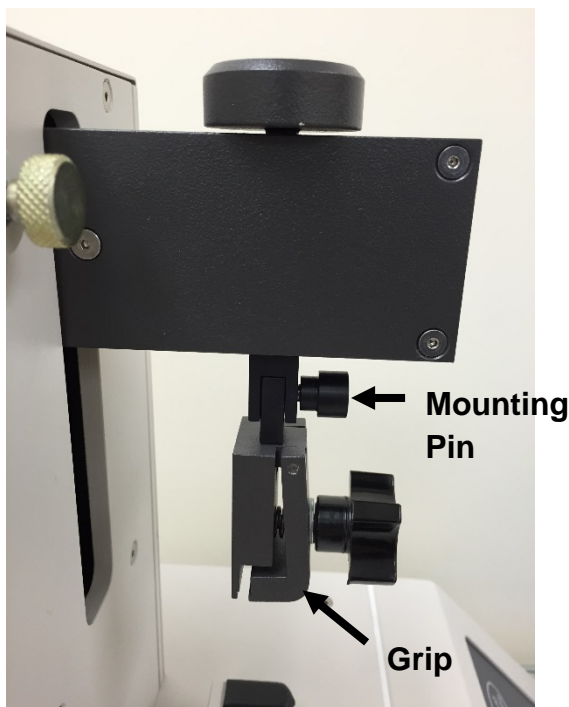
Carefully remove the test frame/data acquisition assembly from the packaging and set it on a sturdy bench top. Check the physical dimensions listed previously for the space required for the instrument. As with any precision piece of laboratory equipment, it is preferable to locate the Loop Tack Tester in an area where temperature and humidity are controlled to standard conditions of 72 ± 2 degrees Fahrenheit and $50 \pm 5\%$ relative humidity.



WARNING: Make sure the power source matches the requirements of the Loop Tack Tester. Input voltage requirement will be labeled in orange above power receptacle. Damage will occur if this unit is plugged into the incorrect power supply.

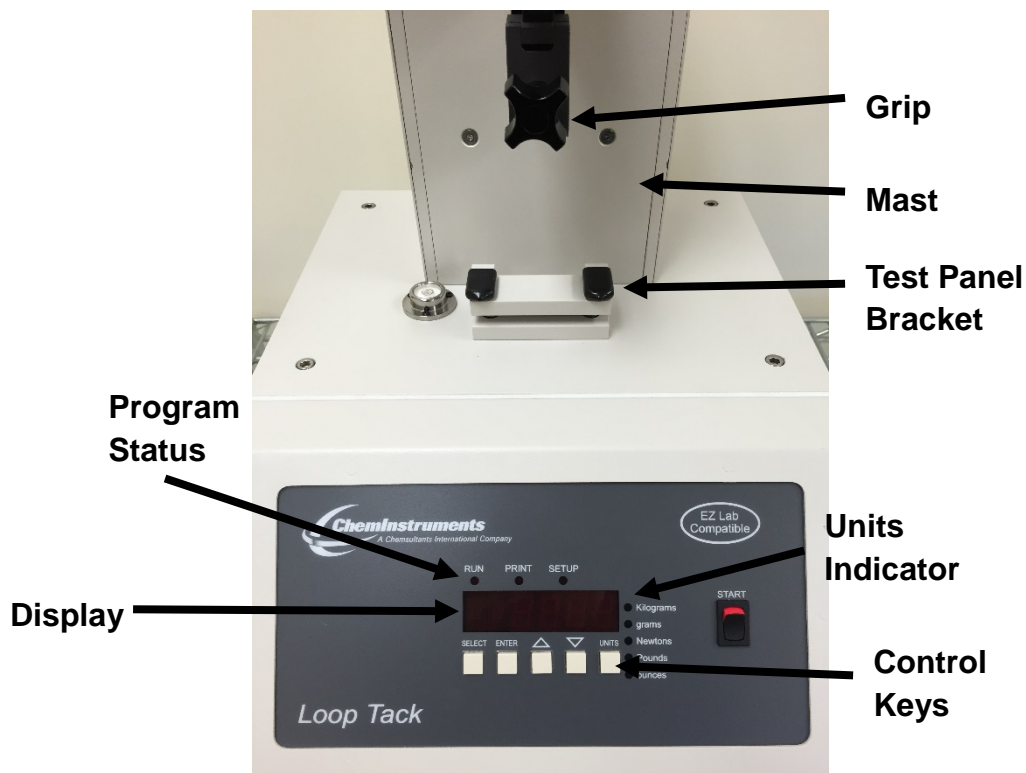
Attach the grip to the load cell assembly using the small mounting pin to hold it in place. Make sure the sample grip is mounted with the knob toward the front.

Connect the power cord to its receptacle on the backside of the control cabinet. Complete the connection by inserting the male end of the power cord into an appropriate AC outlet. Notice that the on/off power switch is located directly beside the power cord receptacle on the backside of the test frame.



KEY COMPONENTS

- **POWER SWITCH** is located on the back panel of the control cabinet directly beside the power cord connection.
- **TEST PANEL BRACKET** provides a holder for a standard 1 inch wide test panel.
- **LOAD CELL ASSEMBLY** consists of the mounting bracket for the load cell with grip.
- **GRIP** secures the test sample loop to the load cell.
- **MAST** the track that the load cell assembly travels during the testing cycle.
- **DIGITAL DATA DISPLAY** provides test data results and system status information.
- **PROGRAM STATUS INDICATOR** these three LED lights identify the operating status. Run, Print, or Setup Menus are active when the LED light is on.
- **UNITS INDICATOR** there are five LED lights indicating the units of measure for the data collected. They are Kilograms, Grams, Newtons, Pounds, and Ounces.
- **CONTROL KEYS** control the various features of the data acquisition and operating system. There are 5 keys consisting of Select, Enter, Up \uparrow , Down \downarrow , and Units.
- **RS232 CONNECTION** data output port for downloading test data.



THEORY OF OPERATION

A pressure-sensitive adhesive laminate sample is formed into a standard loop. This loop, with the adhesive on the outside, is brought into contact with a standard test panel and retracted at a set speed. An electronic load cell measures the tack force, then feeds the information to a data acquisition unit. The data acquisition unit collects the data from the load cell and stores these data points in memory for use in calculating the maximum, minimum and average values. The data acquisition unit assigns a file number and saves the results in memory. This data can be downloaded through the RS232 connection port to an appropriate receiving program on your PC.

POWER UP

Turn on the master power switch located on the back panel of the control cabinet next to the power line receptacle. The internal control board will go through a self-test and then display the average force for the last test.



WARNING: Operating temperature for this equipment is 32 to 150 degrees Fahrenheit (0 to 70 degrees Celsius). The equipment needs to be completely free of condensation, inside and out, before applying power.

MENU FORMAT

There are three distinct Menus for the Loop Tack Tester. They are the Run menu, Print menu, and Setup menu. Each menu has an indicator light that will be on when that menu is active. Within each menu there are a series of modes that display the data collected, calibration sequence, and data storage/transfer.

Each of the three menus uses the Up ↑ and Down ↓ arrow keys to access the modes within the menu. When the desired mode is displayed the Enter key is used to access the parameter settings for that mode. Once a parameter selection is made the Enter key is used to record the setting and return to the Run menu.

The following is an outline of the three menus and the modes contained within each menu. Use this chart to quickly identify the location and proper path to access any of the settings.

RUN MENU

- **I** – displays the force currently measured by the load cell.
- **A** – displays the average force measured from a test.
- **H** – displays the maximum force measured from a test.
- **L** – displays the minimum force measured from a test.

PRINT MENU

- **P** – transfers the selected test's data to the connected PC through the RS232 port.
- **St** – turns data storage on or off.
- **dL** – deletes all stored test data.

SETUP MENU

- **F** – calibrates the load cell.
 - **LC** – records the low calibration point.
 - **HC** – records the high calibration point.
- **bE** – turns the beeper on or off.

There is also a Units key that allows you to change the unit of measure to any of the five choices: Kilograms, Grams, Newtons, Pounds, and Ounces. The green LED lights to the right of the display indicate the current active unit of measure.

MACHINE SETUP

LOAD CELL CALIBRATION

It is important to calibrate the load cell to ensure that reliable data will be gathered. A calibration procedure is built into the software of the Loop Tack Tester. This procedure should be followed upon first use of the Loop Tack Tester and whenever necessary thereafter. The following is the step-by-step procedure for calibrating the load cell.



Make sure that the Loop Tack Tester has been powered on for 30 minutes before proceeding with calibration.

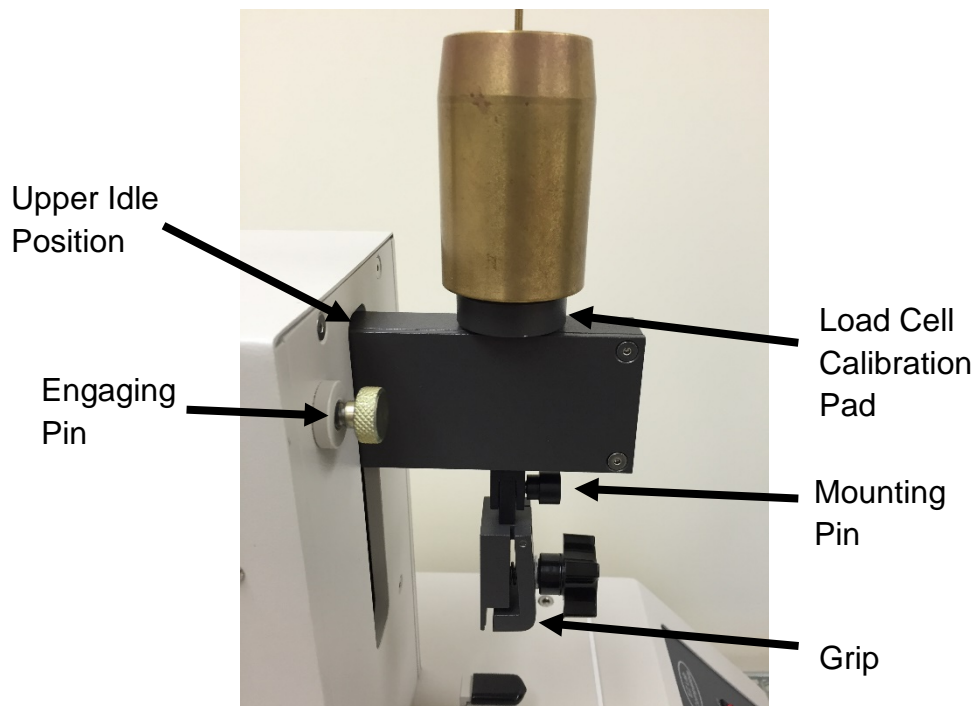


The calibration sequence defaults to grams as the unit of measure. Make sure that your calibration weights and entries are in grams.

LOAD CELL CALIBRATION PROCEDURE

1. Move the Load Cell Assembly containing the load cell to the upper idle position. Make sure the engaging pin is activated to lock the assembly in this position.
2. Confirm that the grip is properly attached to the Load Cell Assembly and secured by the mounting pin.
3. Simultaneously press the Select and Enter keys for 3 seconds to access the Setup menu.
4. Use the Up↑ and Down↓ keys until the “F” is visible on the Display, press the Enter key to access the calibration sequence.
5. At the “LC” display, determine the Low Offset Value desired (typically 0.00). Make sure that you **do not** have a weight on top of the load cell calibration pad, and press the Enter key. The display will change to “HC” for high calibration value.
6. At the “HC” display select a calibration weight close to the maximum expected test value. Set that weight on top of the load cell calibration pad.

7. Set the High Offset Value on the Display to correspond with the selected calibration weight. You can change the displayed value by pressing the Up↑ and Down↓ keys.
8. Press the Enter key to complete calibration. The display will change to the “I” mode showing the current reading of force.
9. Verify the calibration by setting a **different calibration weight** on top of the load cell calibration pad. Confirm that the instantaneous force reading is the same as the selected weight sitting on the load cell calibration pad.
10. Repeat the calibration procedure if necessary.



CURRENT FORCE READING

A current force reading is available by accessing the “I” mode in the Run menu. To access this mode, simply press the Up↑ key until the display shows “I #####” where the # will be the current force being measured. This reading should be used only as a quick reference.

NOTE: It is important to remember that the load cell is measuring forces at a rate of 400 times per second. The rate of display on the display screen cannot cycle at this speed. Therefore, the value in the “I” reading is an average of the data points that the load cell is measuring. Fluctuations in the reading could be caused by vibration of the load cell.

AUDIBLE BEEP

The Loop Tack Tester has an audible beep feature that sounds each time a Control key is pressed. This provides confirmation that electrical contact has been made by the key. This audible beep feature may be turned off by following this procedure.

1. Simultaneously press the Select and Enter keys for 3 seconds to access the Setup menu.
2. From the Setup menu, press the Up ↑ key to select the Beep mode.
3. When the display shows “bE”, press the Enter key to access the settings.
4. Press the Up ↑ or Down ↓ keys to turn the beep feature off or on.
5. After selecting the appropriate setting press the Enter key to activate your choice and return to the Run menu.

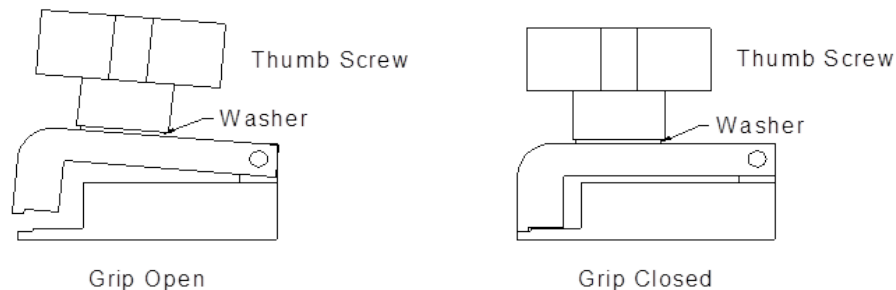
RUNNING A TEST

Loop tack tests are conducted according to written test methods, such as ASTM, PSTC, TLMI and others. These tests are performed to determine the tack adhesive values of the selected PSA material as it is removed from a stainless steel test panel. The LT-1000 will accommodate test panels with dimensions of 1 inch wide by any length and thickness up to ¼ inch.

NOTE: Make sure the load cell has been calibrated before conducting a test.

GRIP OPERATION

The grip opens by turning the thumb screw counter-clockwise. Insert the free end of the sample into the open grip and close the grip by turning the thumb screw clockwise.



NOTE: The grip is attached to the load cell through the yoke by the mounting pin. Remove the grip from the Load Cell Assembly to load samples into the grip.

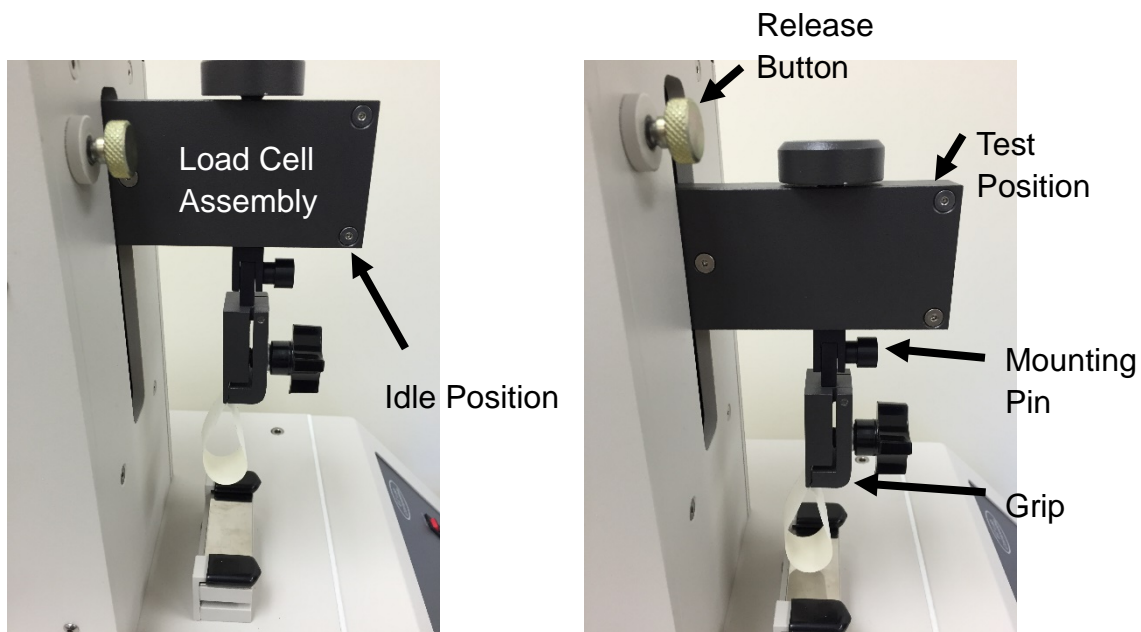


WARNING: Rotating the yoke on the threaded mounting rod, causing the yoke to come in contact with the wall of the load cell housing will damage the load cell. There must be a physical gap maintained between the yoke and the load cell housing for the load cell to function correctly.

TEST PROCEDURE

The ChemInstruments Loop Tack Tester is very simple to use. The following is the correct procedure for running a Loop Tack Test. See pictures that follow this procedure for clarification of terms.

1. Thoroughly clean a test panel with a strong solvent such as Methyl Alcohol or Methyl Ethyl Ketone. The test panel should be made of 304 Bright Annealed Stainless Steel with a surface height roughness of 2 micro inches \pm 1 micro inch.
2. Insert a test panel into the panel holder. Suitable test panels are available from ChemInstruments.
3. Put the Load Cell Assembly in the idle position. Remove the grip by removing the mounting pin. Carefully slide the grip straight down until it is clear of the mounting yoke.
4. Cut a test specimen 1 inch x 5 inch with the long dimension in the machine direction.
5. Completely remove the release liner from the specimen.
6. Bend the specimen back onto itself, being careful not to crease it, forming a teardrop shaped loop with the adhesive surface towards the outside.
7. Fasten the ends together using a strip of $\frac{1}{2}$ inch wide masking tape.
8. Insert the tape loop into the grip until it touches the spring block near the center of the grip to ensure squareness of the sample.
9. Replace the grip using the mounting pin to secure it in the mounting yoke.
10. Support the Load Cell Assembly to prevent the assembly from falling while pulling on the Release Button to lower the Load Cell Assembly to the test position.
11. Press the Start Switch and hold it until the Load Cell Assembly starts to move. The machine will complete one full test cycle and automatically stop when finished.



NOTE: Since the testing area is one square inch, a test panel may be used several times. After completing a test, slide the test panel to one side in order to expose a clean spot on the panel. Ensure that the footprint of rubber fingers from previous test do not interfere with current test.

FILE MANAGEMENT

There are four file management functions available in the Loop Tack Tester. They are Review, Download, Store, and Delete. The following sections describe each of these modes and the procedure for enacting each.

REVIEWING TEST DATA

When the Data Storage is turned on, test data is maintained in the memory of the LT-1000. This data is accessible for reviewing, downloading and deleting. The following procedures will describe how to review data contained within each test file.

1. Press the Select key to access the Print menu. The Display will show the letter “P” indicating Print mode.
2. Press the Enter key to access the Print mode.
3. The Display will show “P #####” where # represents the number of tests currently stored in memory.
4. Pressing the Down ↓ and Up ↑ key will allow you to select any of the individually stored test files, each one indicated by a different number.
5. After selecting the file number to be reviewed, press the Select key two (2) times to access that particular file’s data. The Display will change to the “I” or current force reading.
6. Pressing the Up ↑ key will change the display from “I” to “Average, High, and then Low.” The numerical values displayed are the test results stored for the selected test file in the Print mode.

DOWNLOADING TEST DATA

When the Data Storage is turned on, test data can be downloaded to an accepting program like HyperTerminal through the LT-1000’s RS232 port. The LT-1000 must be connected to a computer with a RS232 cable. The following procedures will describe how to download data contained within each test file.

1. Press the Select key to access the Print menu. The Display will show the letter “P” indicating Print mode.
2. Press the Enter key to access the Print mode.
3. The Display will show “P #####” where # represents the number of tests currently stored in memory.
4. Pressing the Down ↓ and Up ↑ key will allow you to select any of the individually stored test files, each one indicated by a different number.
5. After selecting the file number to be reviewed, press the Enter key to download that particular file’s data. The Display will show the number of data points that being downloaded.

NOTE: This will only download to a program that can accept RS232 data. The accepting program must be set to 9600 baud, 8 data bits, 1 stop bit, and no parity.

DATA STORAGE

The LT-1000 can store test files in the memory or operate without storing test files. The following procedure describes how to turn the memory storage function on and off.

1. Press the Select key to select the Print menu. The Display will initially show the "P" mode.
2. Press the Up ↑ to select the "St" storage mode.
3. Press the Enter key to access the Storage mode. The Display will show either, "St On" or "St OFF".
4. Pressing the Up ↑ or Down ↓ key will toggle the Display between "St On" and "St OFF". When the St On is selected the LT-1000 will store up to 20 individual tests in files.

DELETING TEST DATA

The storage limit of the LT-1000 memory is 20 tests. When this limit is reached, an error message, "St FULL" is displayed. It is then necessary to delete test data from the memory in order to allow additional test data to be stored. Deleting test files before the memory is full is also accomplished with this procedure.

1. Press the Select key to access the Print menu. The Display will show the letter "P" indicating Print mode.
2. Press the Up ↑ key until "dL" is displayed. Then press the Enter key to access the Delete mode. The Display will show "dl 00##" where the ## indicates the number of test files stored in memory.
3. Pressing the Select and Enter keys together for 3 seconds will delete the stored test files and return the Display to the Run Menu and "I" mode.

MAINTENANCE

TROUBLESHOOTING

The troubleshooting chart describes some problems that may occur over time. After determining the problem, follow one of the following maintenance procedures.

Table 1 – Troubleshooting Chart

Problem	Possible Cause	Procedure
No data collected	Not in Run Menu	Refer to running a test
Load Cell Assembly does not move during a test	Load cell assembly is in the upper idle position	Move the load cell assembly to the test position. Refer to test procedure
	Motor is not allowing the assembly to move	Replace motor
Data measurement consistently low/high	Improper calibration	Check calibration
	Bad calibration	Refer to load cell calibration
Calibration drifts	Bad or damaged load cell	Replace load cell
“St FULL” message	Max number of tests have been collected	Refer to deleting test data

MAINTENANCE PROCEDURES

As with any precision equipment it is important to provide care and maintenance to ensure proper performance and long life. General cleaning and care will ensure accurate test and trouble free performance.