



LOOP TACK TESTER
MODEL LT-2000
OPERATING INSTRUCTIONS

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CONTENTS

PRODUCT DESCRIPTION	3
SPECIFICATIONS.....	3
UNPACKING.....	4
ASSEMBLY.....	5
KEY COMPONENTS	6
TOUCH SCREEN FORMAT.....	8
THEORY OF OPERATION	11
POWER UP.....	11
MACHINE SETUP	12
RUNNING A TEST	17
EZ DATA SOFTWARE SYSTEM	19
MAINTENANCE	21
TROUBLESHOOTING	21
MAINTENANCE PROCEDURES	21
CLEANING THE TOUCH SCREEN	22
LOAD CELL REMOVAL	23

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.
- Collected test data can be exported via USB port.
- Selectable units of measure: Kilograms, Grams, Newtons, Pounds, and Ounces.
- Compatible with EZ-Data System software. See www.cheminstruments.com for details.

SPECIFICATIONS

Electrical	120/240 VAC, 50/60 Hz, 2 amps
Operating Temperature	32 – 122 degrees Fahrenheit (0 – 50 degrees Celsius)
Humidity	0 – 55% relative humidity
Speed	6 - 30 inches/minute, 1 IPM increments 150 - 762 millimeters/minute, 1 mm/min increments
Dwell Time	0 – 30 seconds, 1 second increments
Loop Length	5 inch or 7 inch
Physical Dimensions	Width: 13 inches (33 centimeters) Depth: 16 inches (41 centimeters) Height: 18 inches (46 centimeters) Weight: 25 pounds (12 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

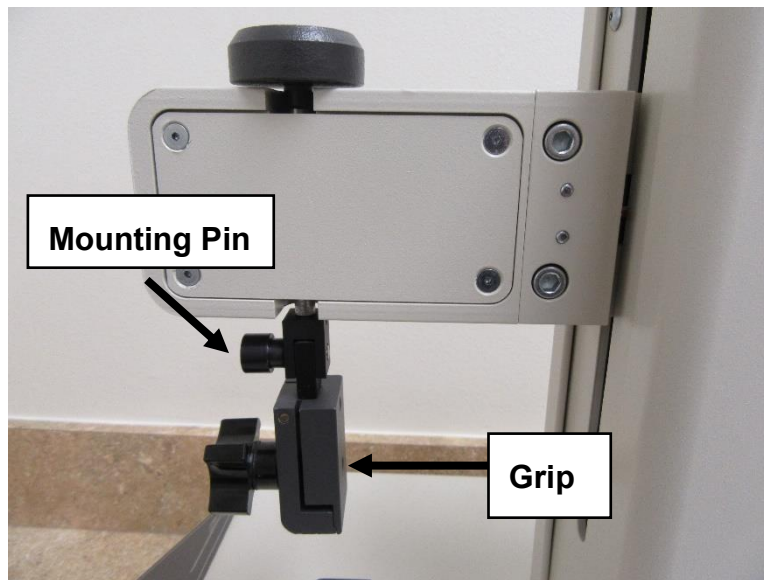
Carefully remove the test frame/data acquisition assembly from the packaging and set it on a sturdy bench top. Check the physical dimensions listed previously for the space required for the instrument. As with any precision piece of laboratory equipment, it is preferable to locate the Loop Tack Tester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



WARNING: Damage will occur if this unit is plugged into the incorrect power supply. This is a dual voltage machine. Connect either 120 or 240 VAC.

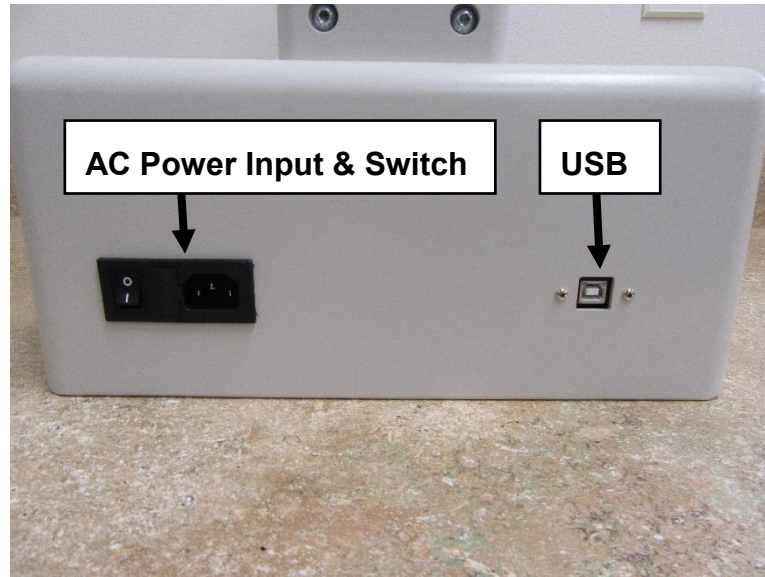
Attach the grip to the load cell assembly using the small mounting pin to hold it in place. Make sure the sample grip is mounted with the knob toward the front.

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.

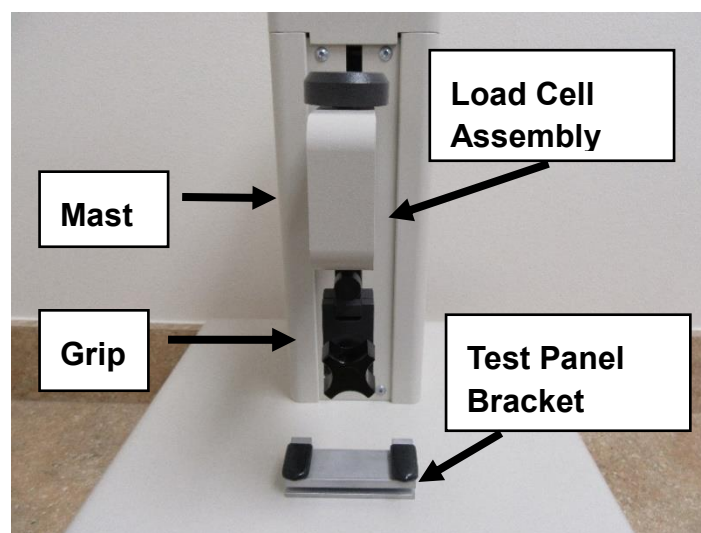


KEY COMPONENTS

- **POWER SWITCH** is located on the back panel of the control cabinet directly beside the power cord connection.
- **USB CONNECTION** data output port for downloading test/setup data.



- **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.



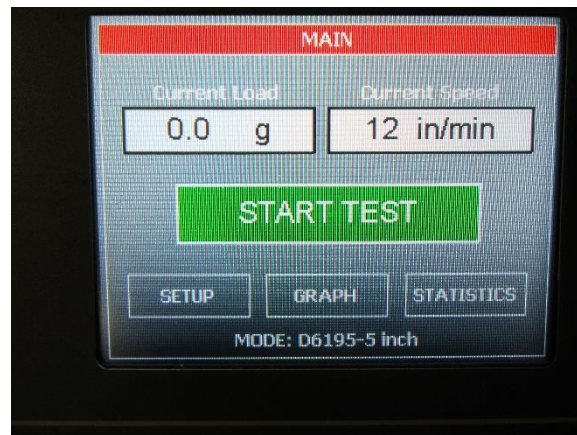
- **TOUCH SCREEN DISPLAY** is the control center for the LT-2000.



TOUCH SCREEN FORMAT

MAIN SCREEN

- **Current Load** – displays the force currently measured by the load cell.
- **Current Speed** – displays the set speed of the test.
- **Start Test** – will start a test.
- **Setup** – will display all setup options.
- **Graph** – will display the graph, minimum, maximum, and average values of the last test.
- **Statistics** – will display the minimum, maximum, average, variance, standard deviation, and work of the last test.



SETUP SCREEN

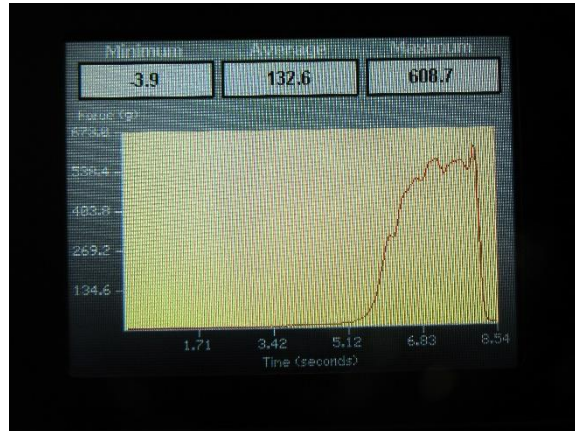
- **Calibrate Load Cell** – allows the user to calibrate the load cell.
- **Units** – change the force units and/or the speed units.
- **Speed** – set the test platform's test speed. If the mode is set to D 6195 then speed is set to 12 in/min (or 300 mm/min) and cannot be changed.
- **Dwell** – is used to select the dwell time. If the mode is set to D 6195 then dwell time is set to 0 seconds and cannot be changed.
- **Mode** – sets the mode of test operation. Selecting a specific test method will set the speed and dwell time specified in the test specification and will not allow the user to change these two settings.
- **Qualify Operation** – is used to verify some of the hardware functions with the LT-2000.
- **About** – retrieve the machine's software version and control board's hardware revision.
- **Exit** – go back to the main screen.

If there are 30 seconds of no screen activity when in any of the setup screens except the qualify operation screen, then the machine will exit the setup screen and return to the main screen.



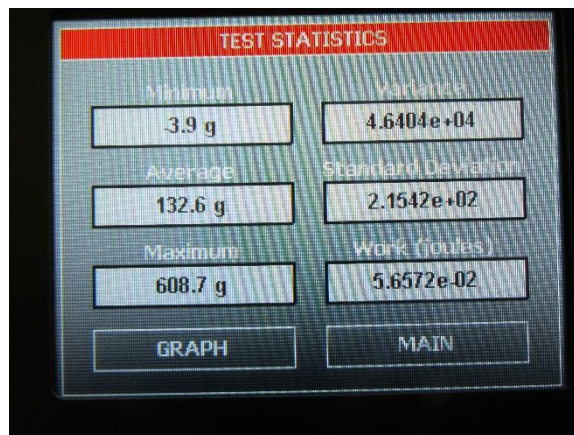
GRAPH SCREEN

The graph screen will display the graph, minimum, maximum, and average values of the last test. Touch anywhere on the screen to exit the graph screen and return to the main screen.



STATISTICS SCREEN

The statistics screen will display the minimum, maximum, average, variance, standard deviation, and work of the last test.



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. This data can be downloaded through the USB connection port to an appropriate receiving program on your PC.

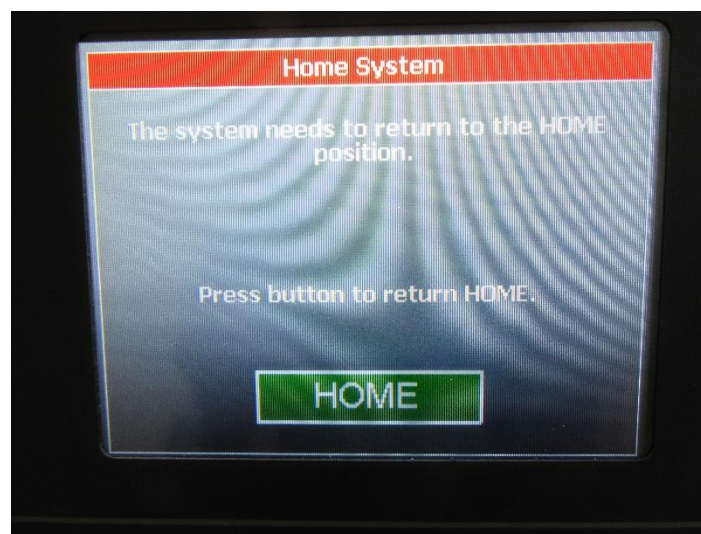
POWER UP

Turn on the master power switch located on the back panel of the control cabinet next to the power line receptacle.



WARNING: Operating temperature for this equipment is 32 to 122 degrees Fahrenheit (0 to 50 degrees Celsius). The equipment needs to be completely free of condensation, inside and out, before applying power.

If the load cell assembly is not at the home switch on power up, the following message will appear. The system must establish the location of the home switch on power up.



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.

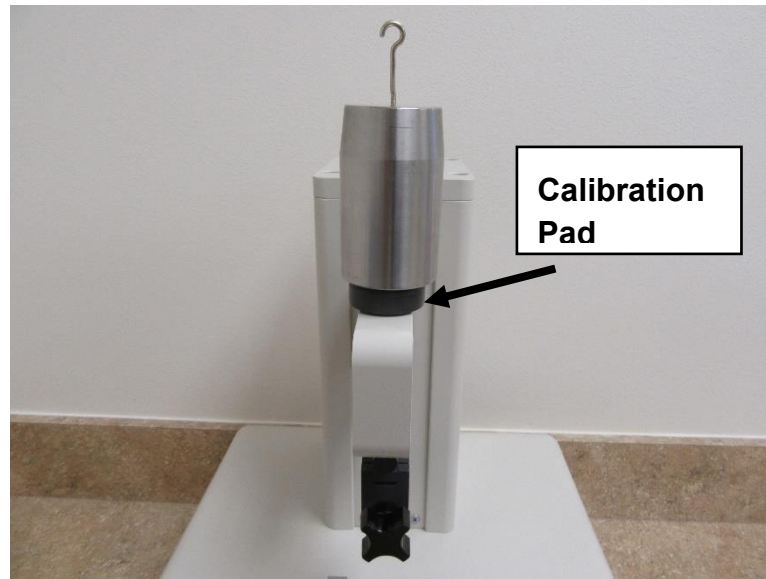


The calibration sequence defaults to grams as the unit of measure. Make sure that your calibration weights and entries are in grams.

LOAD CELL CALIBRATION PROCEDURE

1. Confirm that the grip is properly attached to the Load Cell Assembly and secured by the mounting pin.
2. Select SETUP from the main screen.
3. Select CALIBRATE LOAD CELL from the setup screen.
4. The first screen in the calibration process describes the 2 point calibration process. Select OK to continue.
5. The next screen measures the low calibration value (typically 0). Make sure that you do not have a weight setting on the calibration pad and select OK.
6. The next screen measures the high calibration value. This weight should be close to the maximum rated load cell value. Set the weight on the calibration pad. See photo below.
7. Set the high calibration value by selecting CHANGE and entering the value of the weight in grams and select ENTER. Select OK to continue.

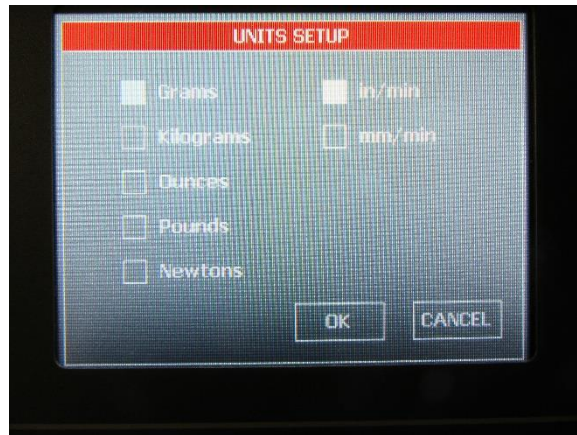
8. The display will show the main screen and the current reading of force will be displayed under CURRENT LOAD.
9. Verify the calibration by setting a different calibration weight on the calibration pad.
10. Repeat the calibration procedure if necessary.



FORCE AND SPEED UNITS

Force and speed units can be changed with the following procedure.

1. Select SETUP from the main screen.
2. Select UNITS from the setup screen.
3. Select the desired units. Select OK to confirm the entered units.



SPEED

To perform a test correctly, it is necessary to set the test speed in accordance with the selected test method. The following is a step-by-step procedure for setting the speed.

1. Select SETUP from the main screen.
2. Select SPEED from the setup screen.
3. Select CHANGE and enter the desired sled speed in the selected units and press ENTER. Select OK to confirm the entered speed.



DWELL

The dwell time is the amount of time that the material will stay in contact with the test panel before it is pulled away and test data is captured. The following is a step-by-step procedure for setting the dwell time.

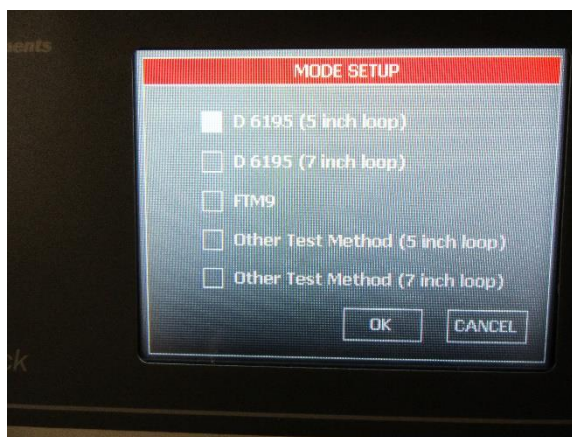
1. Select SETUP from the main screen.
2. Select DWELL from the setup screen.
3. Select CHANGE and using the arrow buttons, select the desired dwell time and select OK. Select OK again to confirm the entered dwell time.



MODE

Selecting a specific test method will set the speed and dwell time specified in the test specification and will not allow the user to change these two settings.

1. Select SETUP from the main screen.
2. Select MODE from the setup screen.
3. Select the appropriate mode and select OK to confirm.



QUALIFY OPERATION

Some of the hardware functions of the LT-2000 can be verified with the qualify operation screen.

- **Current Load** – displays the force currently measured by the load cell. It will be displayed in the selected units.
- **Current Speed** – displays the set speed of the test platform.
- **AD Reading** – displays the hardware counts measured on the control board from the load cell interface. Pulling on the load cell grip will display values greater than 32000. Pushing on the load cell grip will display values less than 32000.
- **Test Speed** – is a method of verifying the speed of the test platform. The test platform will move 4 inches at the set speed and measure the amount of time that it takes to travel 4 inches.
- **Verify Load Cell** – will sample the load cell data for 10 seconds. A test can be simulated with a weight sitting on the calibration pad to verify the load cell calibration if necessary. The test platform will not move, the system will simply measure the load cell and display a graph along with the statistics when the 10 seconds is complete.



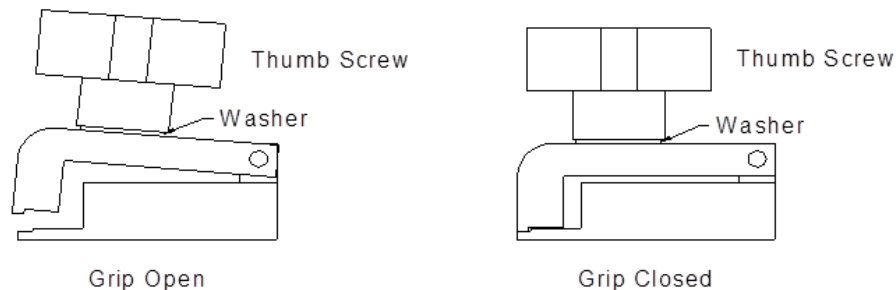
RUNNING A TEST

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-2000 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. 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 ½ 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. Press START TEST. The machine will complete one full test cycle and automatically stop when finished.

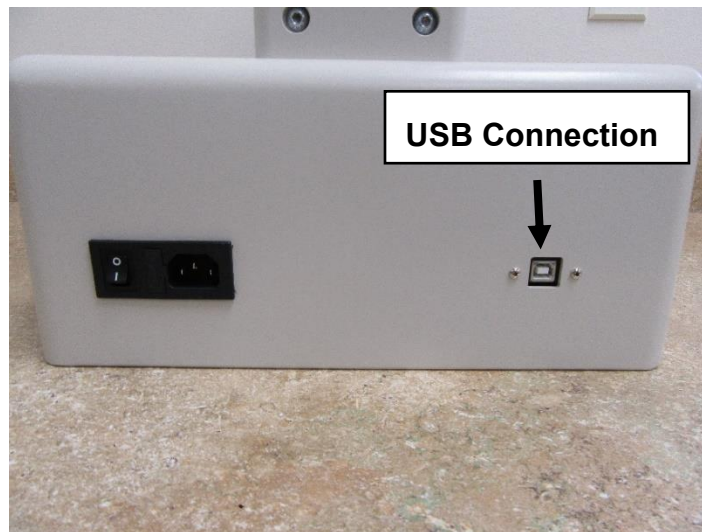
NOTE: Since the testing area is one square inch, a test panel may be used several times. After completing a test, slide the test panel to one side in order to expose a clean spot on the panel. Ensure that the footprint of rubber fingers from previous test do not interfere with current test.

EZ DATA SOFTWARE SYSTEM

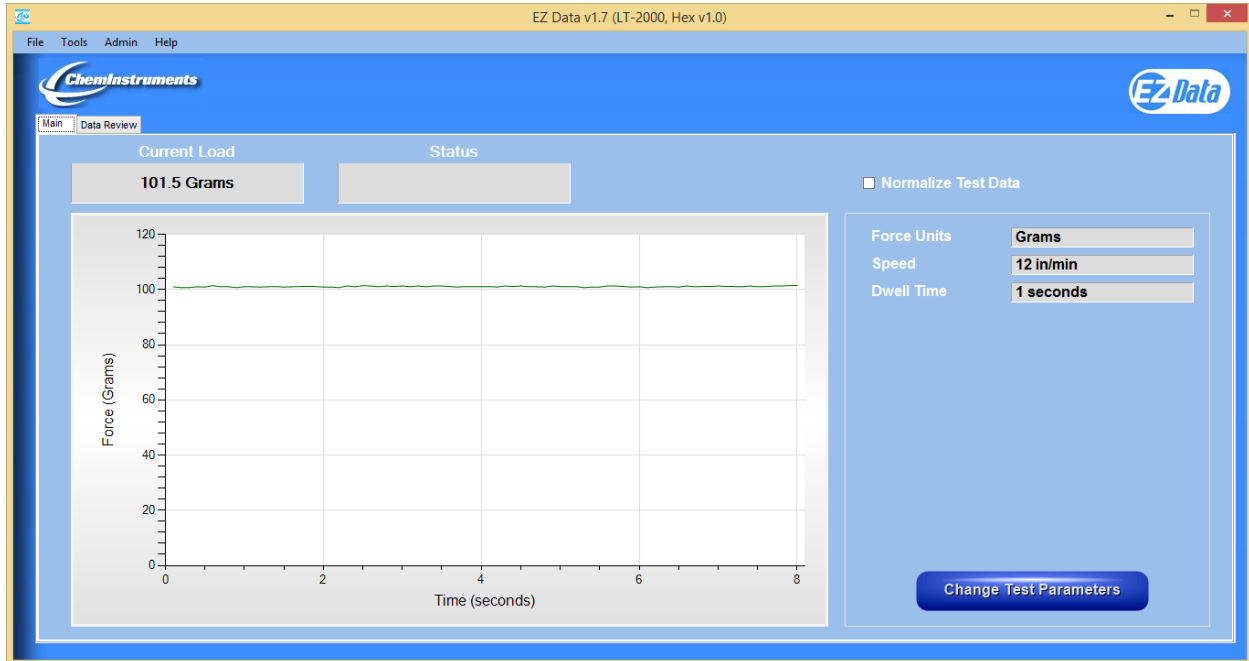
EZ Data is a ChemInstruments program that runs on your computer and will allow you to interface to your ChemInstruments machine in order to save test data files, save raw test data to excel, graph and crop test data, tabulate test data files, and overlay test data files. Please refer to the EZ Data manual for specific information on how to use the EZ Data software system.

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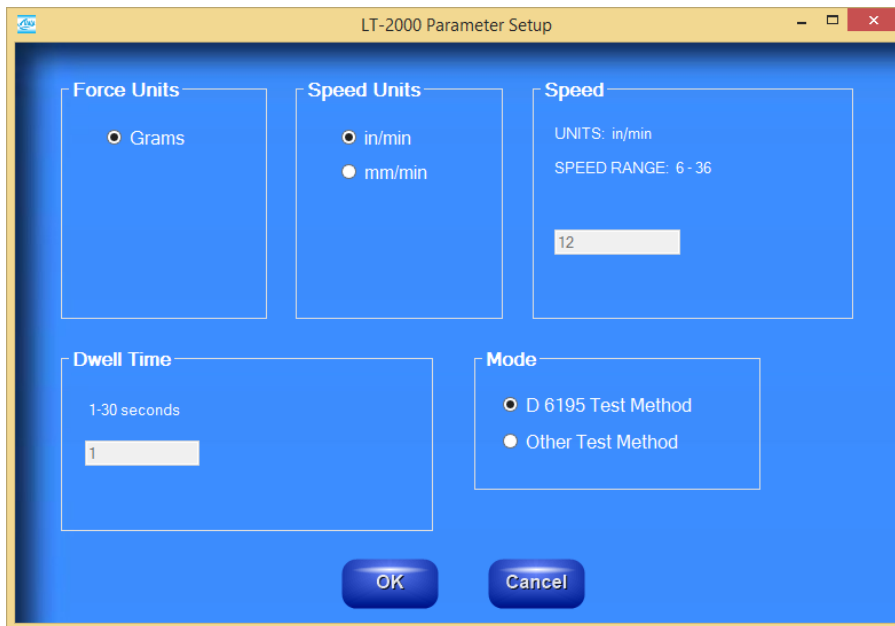
LT-2000 can be connected to your computer with a Type A-B, Revision 2.0 Compliant, USB cable.



The following picture is the main screen of EZ Data with a LT-2000 connected. This screen will show the current load as a value and a real time graph as data is collected from the load cell. It shows the test setup parameters. It will also allow you to change the test parameters.



The following picture shows the LT-2000 parameter setup.



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	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

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.

CLEANING THE TOUCH SCREEN

It's important to realize the touch panel is sensitive to chemicals.

Specific Cleaning Information: Use a soft, lint-free cloth. The 3M Microfiber Lens Cleaning Cloth is especially recommended for cleaning touch panels without requiring liquid cleaner. The cloth may be used dry or lightly dampened with a mild cleaner or Ethanol. Be sure the cloth is only lightly dampened, not wet. Never apply cleaner directly to the touch panel surface; if cleaner is spilled onto touch panel, soak it up immediately with absorbent cloth. Cleaner must be neither acid nor alkali (neutral pH). When using cleaner, avoid contact with the edges of the film or glass, and with the flex tail. Wipe the surface gently; if there is a directional surface texture, wipe in the same direction as the texture. Never use acidic or alkaline cleaners, or organic chemicals such as: paint thinner, acetone, toluene, xylene, propyl or isopropyl alcohol, or kerosene. Suitable cleaning products are commercially available pre-packaged for use; one example of such a product is **Klear Screen™** or commercially available off-the shelf retail brands such as **Glass Plus® Glass and Surface Cleaner** made by Reckitt-Benckiser. Use of incorrect cleaners can result in optical impairment of touch panel and/or damage to functionality.

Note: Most products contain 1-3% Isopropyl Alcohol by volume, which is within acceptable limits for Resistive Touch Panel cleaning use.

Caution: Many products contain Ammonia, Phosphates, and/or Ethylene Glycol, which are NOT ACCEPTABLE; check product content label carefully.

LOAD CELL REMOVAL

The load cell assembly can be removed to send back for recertification. Carefully remove the two large screws. Make sure that you support the load cell assembly with one hand while removing the screws so that the load cell does not fall. After the two screws are removed, gently pull the assembly back, exposing the connector. Disconnect the connector. Be careful not to tug on the wires.

