



Instruction Manual Automated SurePeel Tester



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Introduction

The SurePeel Automated Seal Strength Tester is a test instrument intended to be incorporated into a quality control program of packagers. The SurePeel is a motorized test stand with a force transducer used to measure the strength of a seal based on the ASTM standard for measuring Seal Strength of Flexible and Rigid Barrier Materials (ASTM F88). The SurePeel can be used for the following purposes;

Seal integrity: The force required to separate the seal can indicate the seal strength of the package. Using this test method within a quality control program will ensure that your packaged products are consistently and reliably sealed.

Package Development: Seal strength testing can be utilized for package development. New materials can be evaluated by comparing the test results and the strength required to peel a seal is at times limited in order to facilitate the opening of a package (Easy-Peel)

Validation: The test results from the SurePeel tester can be used to validate a packaging process and set the limits used in the packaging process.

Packaging Machinery Troubleshooting: The peel testing results can aid in troubleshooting a packaging machine setup or operation.

1. Specifications

Power supply: 120VAC, 3 Amps
Force Range: 0 – 50 lbs
Speed Range: 0.5 in/min – 50 in/min
Stroke Length: 8 inches
Accuracy: +/- 0.01 lbs static
Resolution: +/- 0.01 lbs
Dimensions: 19.5” H x 7.5” W x 17.25” D
Weight: 22 lbs.

2. Installation

1. Locate unit on a table top.
2. Plug unit into standard 115VAC outlet.

3. Description

The SurePeel Seal Strength Tester is an instrument that utilizes a motorized test stand and force gauge to measure the peel strength of a test strip that includes part of the seal. The test method is based on the ASTM F88 standard for measuring the seal strength of flexible and rigid materials. MDC recommends that you obtain a copy of the ASTM F88 standard for your reference. Information included in the standard, but not limited to, are;

- Test method

- Test Procedure
- Speed of testing
- Size of the test strip
- Test strip tail holding method
- Failure modes
- Interpretation of test results

The SurePeel tester is controlled by a PLC with an Operator Interface. The system allows for automatic and manual operation of the system as well as calibration.

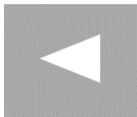
4. Basic Operation

The SurePeel allows the user to test a pre-cut test strip that includes part of the seal. The operator inserts each end of the test strip into the clamping fixtures. Once the sample is in place the test can be performed in automatic or manual and the peak force is captured.

4.1 Function Keys



Esc – Press to abort any test in process or use to navigate back when entering data.



Decrease – Press to scroll through the Main Menu and the Datalog.



Increase – Press to scroll through the Main Menu and the Datalog.



Symbol – Press this key when entering a numeric value that requires a decimal point or negative sign.



Enter – Press this key to store a new value in a data entry field, or enter to the next screen.



START – Press to Start a test cycle in Automatic Mode, or move the clamp up in Manual Mode. When changing a setpoint, press to enter the digit 1.



STOP – Press to Stop a test cycle, or move the clamp down in Automatic and Manual Mode. When changing a setpoint, press to enter the digit 6.



SPEED INCREASE – Press to increase the speed of the actuator for the current mode. When changing a setpoint, press to enter the digit 2.



SPEED DECREASE – Press to decrease the speed of the actuator for the current mode. When changing a setpoint, press to enter the digit 7.



ZERO/CAL – Press to zero the peak force and the position values in Manual and Automatic Mode. When changing a setpoint, press to enter the digit 0.



GRAPH – Press to draw the force vs. position graph of the last cycle. The graphing function is only enabled on the RESULT screen. When changing a setpoint, press to enter the digit 4.

5. Operation

5.1 Power Up

Power up the unit by turning on the switch located on the back panel. The PLC screen shortly lits up, and the manufacturer and software version information (as shown in Figure 1.) is shown on the first “splash” screen during the boot-up procedure. Then the PLC automatically goes in the Automatic Test mode.

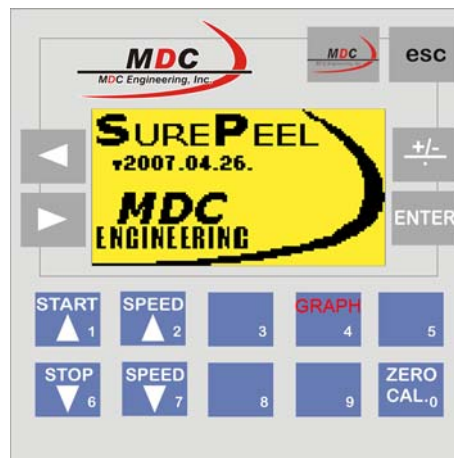


Figure 1: Support Information

5.2 Main Menu

The main menu allows the user to navigate to the main areas of the control system. Use the left and right arrow keys to scroll through the main menu. When the desired function is highlighted, press Enter to navigate to the selected screen.

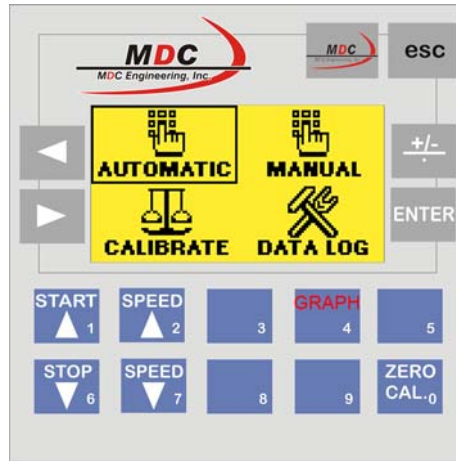


Figure 2: Main Menu

AUTOMATIC: Navigate to the Automatic Mode screen.

MANUAL: Navigate to the Manual Mode screen.

CALIBRATE: Navigate to the Calibration function screen.

DATALOG: Navigate to the Log screen.

5.3 Automatic Mode

Automatic mode testing is used to perform an automatic peel test. The peak force will be captured for the sample.

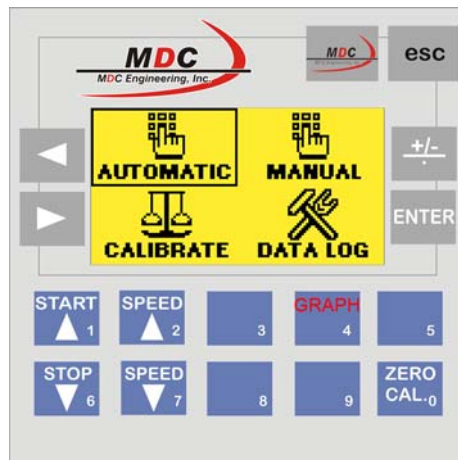


Figure 3: Automatic Mode Selection

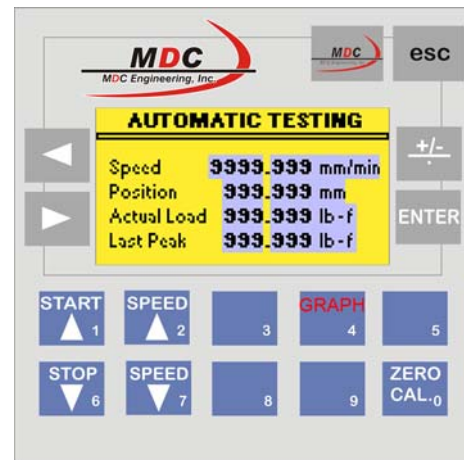


Figure 4: Automatic Mode Control Screen

5.3.1 Automatic Test Procedure

1. Cut a test sample.
2. Secure each end of the test sample in the clamps. If required the upper clamp may be positioned with the Up/Down keys.



Figure 5: Inserting a Test Sample



Figure 6: Actual Peel Test

3. Use the Speed Up/Down keys to select the speed, then press the Start key.
4. The upper clamp will move up, separating the sample at the seal.
5. The actual force load is displayed during the test.
6. When the seal breaks, the test will automatically stop.
7. The peak force captured and the tester will automatically go into manual mode.
8. Record the peak force and the position if required. (This data is also stored in the PLC's memory).
9. Remove the sample.
10. Cut a new sample.
11. Adjust the upper clamp position for the new sample with the Up/Down keys, secure the sample, then hit ZERO. At this point, the peak force and position will be zeroed out, and the machine will go back into Automatic Mode ready for a new test.
12. Repeat.

During the test cycle, the user should observe the test sample for indication of delamination or other anomalies. Record this information.

During test, the user may also press the Esc and Stop buttons to stop the automatic operation when any of the following events occur:

- The unit is not able to measure the seal break force.
- Adjustments are required.
- In an emergency situation.

At any time during the operation the Zero (0) key may be pressed to zero the position or weight offset.

5.3.2 Operation principles, definition of variables

The break force is automatically determined based on the fact, that the force required to pull apart materials will drop after the break point is reached.

The SurePeel tester automatically determines the break force with the help of the Fallback and Residual force parameters.

The Fallback is the amount of force drop that has to be measured after a force peak to qualify that peak as the break point. The fallback may be also considered as the sensitivity of the automatic force test.

When testing devices or materials with multiple “break” points, increasing the Fallback value will eliminate the possibility of measuring a local force drop as the absolute break point. On the other hand, when the fallback is increased too much, the tester will not be able to measure the break point.

The unit stops the automatic force test after the break point is measured and the amount of residual force is below the preset value.

Please note that the Fallback and Residual Force variables are factory configured.

5.4 Manual Mode Operation

A manual mode function is provided for direct control of the actuator and speed. Testing can be performed in manual mode.

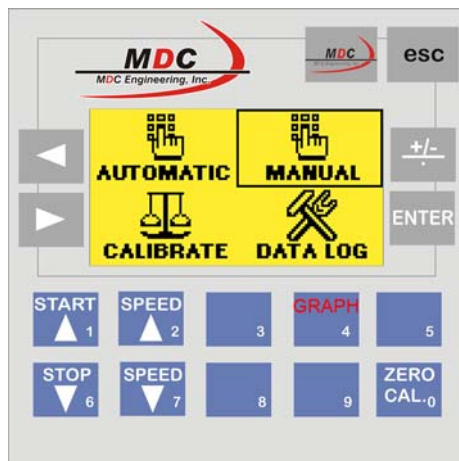


Figure 7: Manual Mode Selection

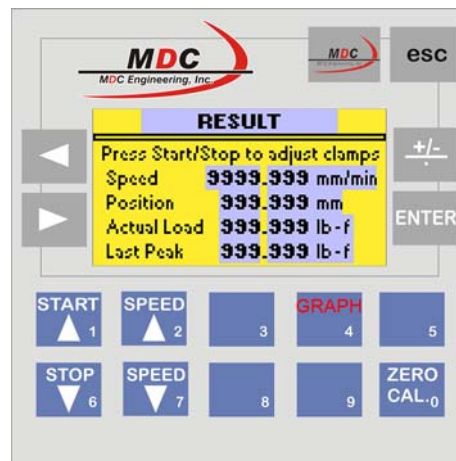


Figure 8: Manual Mode Control Screen

5.4.1 Manual Test Procedure

1. Cut a test sample.
2. Position the upper clamp with the Up/Down keys according to the sample size.
3. Secure each end of the test sample in the clamps.
4. Use the Speed Up/Down keys to select the speed, then press Zero/Cal. To offset the position and force.
5. Press and hold the Start/Up or Stop/Down key to manually move the upper clamp.

WARNING

PAY SPECIAL ATTENTION WHEN OPERATING THE CLAMP CLOSE (<1”) EITHER ONE OF THE ENDS. STOP THE MOVEMENT IMMEDIATELY WHEN THE CLAMP HITS EITHER ONE OF THE ENDS AND MOVE IT MANUALLY TO THE OPPOSITE WAY TO PREVENT POSSIBLE DAMAGE TO THE EQUIPMENT.

6. The actual and peak force load is displayed during the test.
7. Record the peak force and the position.
8. Remove the sample.
9. Repeat.

Hit Esc to go back to the Main Menu.

5.5 Calibration

The SurePeel tester is a precision force measurement device. The force is transformed to an electrical signal with a strain gage based force transducer. Like in case of any other strain gage based measurement device, it is recommended to check the calibration and/or re-calibrate the device as often as possible. Usually the recalibration timeframe is not more than 6 months, but proper determination depends on many factors, like the duty cycle and the average load on the transducer, also the possibility of overloading the strain gage. Certified weights are optionally available.

WARNING:

Do not overload the loadcell, it may damage the loadcell or move the unit out of calibration. Please find specifications in Chapter 2.

5.5.1 Calibration Procedure

WARNING:

DO NOT ATTEMPT TO RECALIBRATE THE UNIT WITHOUT HAVING CERTIFIED WEIGHT(S).

Initiate the calibration process may from the Main Menu, by selecting the Calibration with the Arrow keys then pressing the Enter button (Figure 9.). Before starting the calibration, move up the top clamp allowing enough room between the clamps so the weight may be placed on the bottom clamp without touching the top clamp.

On the next screen (Figure 10.) the operator has to enter the theoretical value of the known load. If there is no need to change these variables simply press the Enter button until the flashing cursor disappears.

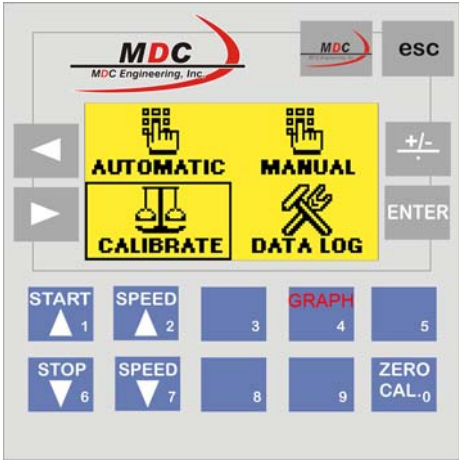


Figure 9: Calibration Mode Selection



Figure 10: Calibration Control Screen

Once the cursor is disappeared, follow the instructions on the bottom part of the screen.

1. First, remove any load from the lower clamp, then press the Cal. button.
2. Place the known (certified) weight on the lower clamp, then press the Cal. button twice.
3. The loadcell is now calibrated for compression. Check the value on the screen for errors and make sure the variation is within your specs.
4. At this point the linearity of the measurements may be tested by placing different known weights on the lower clamp, and comparing the theoretical values to the readout on the screen (Figure 11., Figure 12.).

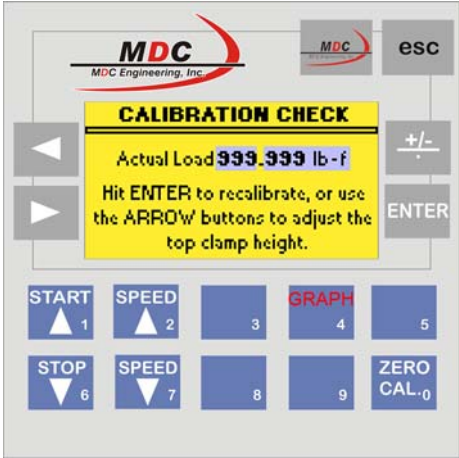


Figure 11: Calibration Check Screen

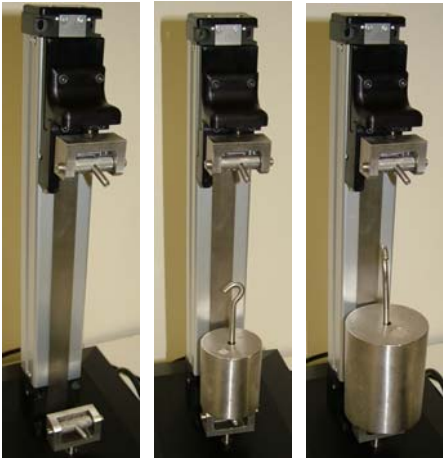


Figure 12: Checking the Calibration (Linearity check at 0lb, 2lb, 5lb)

Because the loadcell is highly linear for both tension and compression loads, there is no need to calibrate the unit for tension loads. If there is a strict calibration policy that

requires calibration for both tension and compression loads, the firmware may be easily changed to support the 2 way calibration method and a calibration kit may be purchased.

If you need calibration for both compression and tension loads, contact us for more information.

6. Contact Information

For technical support please use the following contact information.

MDC Engineering, Inc.
1465 Tallevast Rd.
Sarasota, FL 34243
mail@mdcengineering.com
Phone: (941) 358-0610
Fax: (941) 358-0638