

Larson Systems Inc.



060-1000-0094-00H

FLASH 25, 36 & 48

Automatic Testers

With Optional Automatic Spring Loader

Current for Software Version 2.84

DAQ Board Firmware Version 2.77



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About This Manual

This manual could contain technical inaccuracies or typographical errors. Periodic changes are made to the information contained herein. These changes will be incorporated in new editions of the manual.

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1 INTRODUCTION

Larson Systems' FLASH Series of Automatic Testers are highly intuitive automated force and length testing systems. With a variety of load and range capacities, this family of testers can test a wide assortment of parts. Although designed for and commonly used in spring testing, the FLASH can be used for most any type of material testing application that requires the measurement of a combination of force or length data using compression or tension.

Automated testing at its best, the FLASH Series tester features a versatile full-color touch screen interface. Touch the computer screen to run dynamic force and length tests, display results in an easy-to-read graphical or statistical format, store programs and results, or share the data via printed report or network connection. This is truly a full-featured tester. From basic test sequence functionality to the most complex, programs may be customized and used for numerous applications. Features vary by model and the level of software purchased.

While this manual includes basic step-by-step procedures, the FLASH tester can be used for very complex testing applications depending on the features included with the software package purchased. Larson Systems also offers onsite training. For additional product information that may not appear in this manual, such as force and length specifications, pricing on other products and upgrades available, see the LSI website at www.larsonsystems.com, or call 763-780-2131.

1.1 Standard Features

The following features are standard on all FLASH Series testers:

- Compression and extension testing of force and length
- Touch screen controls
- Windows 7 operating system
- FLASH Basic software package – see Section 2 for details
- 20-bit internal force resolution
- Automated or manual testing
- Full enclosure safety shield
- Mechanical force overload stops
- Software length and force limits
- Emergency stop button
- English or metric unit selection
- Digital calibration
- NIST traceable calibration

1.2 The FLASH Family of Testers

LSI makes several testers that use FLASH software. This manual covers the FLASH 25, FLASH 36 and FLASH 48.

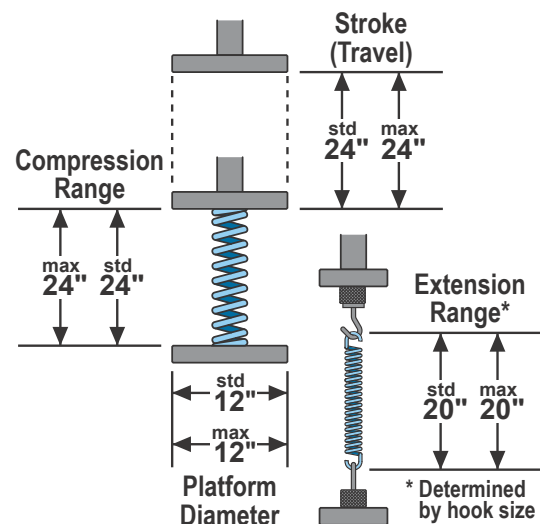
1.2.1 FLASH 25

The FLASH 25 was redesigned from the ground up in 2013 alongside its big brother, the FLASH 48. An ideal motorized tester for Disc Bellevilles or Belleville Washers, it can test parts with very high spring rates. It is designed with four ball screws for stability and three load cells to prevent off-center loading problems associated with large plate diameters.



FLASH 25
(Pictured with optional Light Curtain Guard)

- Test up to 13,200 lb
- Optional Center-Length Transducer to test Belleville Washers or wave springs – small parts with high rates
- Accommodates an Adjustable Spring Thru-Rod Assembly up to 6-inches in diameter to support parts with a tendency to buckle under load
- Optional Light Curtain Guard for safe, fast, repeated testing of Belleville Washers, wave springs or other parts that have no risk of being ejected from the tester when under load



1.2.2 Force and Length Specifications—FLASH 25

Force Specifications

Load Cell Capacity	Standard Resolution	
	0-20% Full Scale	20-100% Full Scale
2 lb	0.0001 lb	0.001 lb (Quick Change Load Cell)
907 g	0.02 g	0.2 g
8.9 N	0.0002 N	0.002 N
11 lb	0.0002 lb	0.002 lb (Quick Change Load Cell)
5 kg	0.1 kg	1 g
49 N	0.001 N	0.01 N
22 lb	0.0005 lb	0.005 lb (Quick Change Load Cell)
10 kg	0.2 kg	2 g
98 N	0.002 N	0.02 N
66 lb	0.001 lb	0.01 lb (Quick Change Load Cell)
30 kg	0.5 kg	5 g
294 N	0.005 N	0.05 N
110 lb	0.002 lb	0.02 lb (Quick Change Load Cell)
50 kg	0.001 kg	0.01 kg
489 N	0.01 N	0.1 N
200 lb	0.005 lb	0.05 lb (Quick Change Load Cell)
91 kg	0.002 kg	0.02 kg
890 N	0.02 N	0.2 N
500 lb	0.01 lb	0.1 lb (Quick Change Load Cell)
249 kg	0.005 kg	0.05 kg
2,447 N	0.05 N	0.5 N
750 lb	0.02 lb	0.2 lb (Quick Change Load Cell)
340 kg	0.01 kg	0.1 kg
3,336 N	0.1 N	1 N
1,000 lb	0.02 lb	0.2 lb (Quick Change Load Cell)
454 kg	0.01 kg	0.1 kg
4,448 N	0.1 N	1 N
1,000 lb	0.02 lb	0.2 lb (Twist Under Load Optional)
454 kg	0.01 kg	0.1 kg
4,448 N	0.1 N	1 N
1,500 lb	0.1 lb	1 lb (Quick Change Load Cell)
680 kg	0.05 kg	0.5 kg
6,672 N	0.5 N	5 N
2,000 lb	0.1 lb	1 lb (Quick Change Load Cell)
907 kg	0.05 kg	0.5 kg
8,896 N	0.5 N	5 N
2,000 lb	0.05 lb	0.5 lb (Twist Under Load Optional)
907 kg	0.02 kg	0.2 kg
8,896 N	0.2 N	2 N
3,000 lb	0.1 lb	1 lb (Twist Under Load Optional)

1,361 kg	0.05 kg	0.5 kg	
13,345 N	0.5 N	5 N	
6,000 lb	0.2 lb	2 lb	(Twist Under Load Optional)
2,722 kg	0.1 kg	1 kg	
26,690 N	1 N	10 N	
10,000 lb	0.2 lb	2 lb	(Twist Under Load Optional)
4,536 kg	0.1 kg	1 kg	
44,482 N	1 N	10 N	
13,200 lb	0.5 lb	5 lb	(Twist Under Load Optional)
5,987 kg	0.2 kg	2 kg	
58,717 N	2 N	20 N	

Accuracy = \pm Resolution x 2

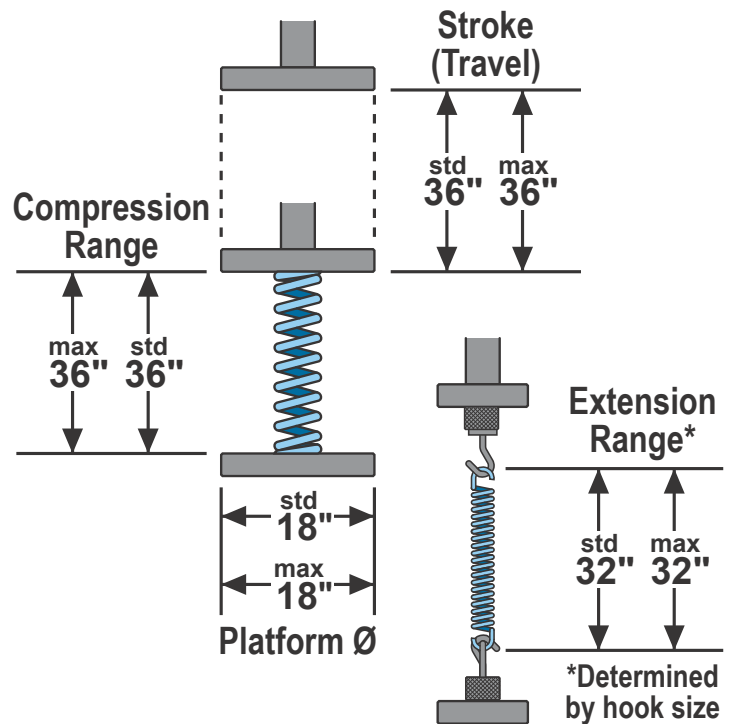
Length Specifications

Standard Resolution	High Resolution*
0.0005 in (\pm 0.001 in)	0.0001 in (\pm 0.0005 in)
0.01 mm (\pm 0.02 mm)	0.001 mm (\pm 0.01 mm)

*Requires High Resolution Length option 025-1000-0234-02

1.2.3 FLASH 36

The FLASH 36 is the largest tester manufactured by LSI. It was designed to accommodate large parts with heavy loads and is capable of testing up to 50,000 lbs. Like the FLASH 25, this tester has four ball screws for stability and three load cells to prevent off-center loading problems associated with large plate diameters. Designed with a fully enclosed assembly, this tester is also capable of testing with a platform up to 18" in diameter, or 16" if equipped with the optional Auto-Loader. The FLASH 36 also accommodates a large pneumatically powered thru-rod assembly used for testing parts that tend to buckle under load.



- Test Materials up to 50,000 lb on a Platform 18 Inches in Diameter!
- Accommodates a Thru-Rod Assembly up to 6-inches in diameter to support parts with a tendency to buckle under load
- Optional Auto-Loader shuttles parts weighing up to 500 lb into the enclosure for testing – the FLASH 36 does the heavy lifting

FLASH 36

1.2.4 Force and Length Specifications—FLASH 36

Force Specifications

Load Cell Capacity	Standard Resolution	
	0-20% Full Scale	20-100% Full Scale
2,000 lb	0.05 lb	0.5 lb
907 kg	0.02 kg	0.2 kg
8,896 N	0.2 N	2 N
5,000 lb	0.1 lb	1 lb
2,268 kg	0.05 kg	0.5 kg
22,241 N	0.5 N	5 N
10,000 lb	0.2 lb	2 lb
4,536 kg	0.1 kg	1 kg
44,482 N	1 N	10 N
20,000 lb	0.5 lb	5 lb
9,072 kg	0.2 kg	2 kg
88,964 N	2 N	20 N
35,000 lb	1 lb	10 lb
15,875 kg	0.5 kg	5 kg
155,687 N	5 N	50 N
50,000 lb	2 lb	20 lb
22,679 kg	1 kg	10 kg
222,411 N	10 N	100 N
Accuracy = \pm Resolution x 2		

Length Specifications

Standard Resolution
0.0005 in (\pm 0.001 in)
0.01 mm (\pm 0.02 mm)

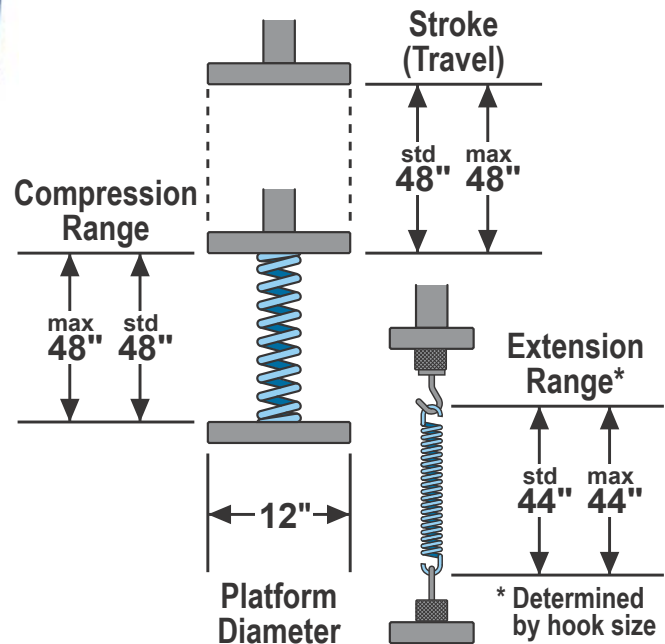
1.2.5 FLASH 48

A fully featured update of our FLASH 25 tester with a 48-inch stroke, the FLASH 48 is designed to accommodate large parts with heavy loads and features our four ball screw design for stability with three load cells to prevent off-center loading problems. With a fully enclosed assembly for maximum safety, this tester has a standard platform diameter of 12" and is even capable of being outfitted with any of our Quick Change Load Cells. This gives the FLASH 48 an extremely versatile load capacity range from 2 lb to 13,200 lb. The FLASH 48 accommodates a large thru-rod assembly for testing parts that tend to buckle under load and was designed from the ground up to be compatible with a wide variety of other optional features, like a light curtain for additional safety or a center-length transducer for very accurate testing of small deflection, high-rate springs, like Belleville Washers or wave springs.



FLASH 48

- Test loads from 2 lb. to 13,200 lb.
- Available Center-Length Transducer to test Belleville Washers and other high-rate parts with small deflection
- Accommodates a Thru-Rod Assembly up to 6-inches in diameter to support parts with a tendency to buckle under load



1.2.6 Force and Length Specifications—FLASH 48

Force Specifications

Load Cell Capacity	Standard Resolution	
	0-20% Full Scale	20-100% Full Scale
2 lb	0.0001 lb	0.001 lb (Quick Change Load Cell)
907 g	0.02 g	0.2 g
8.9 N	0.0002 N	0.002 N
11 lb	0.0002 lb	0.002 lb (Quick Change Load Cell)
5 kg	0.1 kg	1 g
49 N	0.001 N	0.01 N
22 lb	0.0005 lb	0.005 lb (Quick Change Load Cell)
10 kg	0.2 kg	2 g
98 N	0.002 N	0.02 N
66 lb	0.001 lb	0.01 lb (Quick Change Load Cell)
30 kg	0.5 kg	5 g
294 N	0.005 N	0.05 N
110 lb	0.002 lb	0.02 lb (Quick Change Load Cell)
50 kg	0.001 kg	0.01 kg
489 N	0.01 N	0.1 N
200 lb	0.005 lb	0.05 lb (Quick Change Load Cell)
91 kg	0.002 kg	0.02 kg
890 N	0.02 N	0.2 N
500 lb	0.01 lb	0.1 lb (Quick Change Load Cell)
249 kg	0.005 kg	0.05 kg
2,447 N	0.05 N	0.5 N
750 lb	0.02 lb	0.2 lb (Quick Change Load Cell)
340 kg	0.01 kg	0.1 kg
3,336 N	0.1 N	1 N
1,000 lb	0.02 lb	0.2 lb (Quick Change Load Cell)
454 kg	0.01 kg	0.1 kg
4,448 N	0.1 N	1 N
1,000 lb	0.02 lb	0.2 lb (Twist Under Load Optional)
454 kg	0.01 kg	0.1 kg
4,448 N	0.1 N	1 N
1,500 lb	0.1 lb	1 lb (Quick Change Load Cell)
680 kg	0.05 kg	0.5 kg
6,672 N	0.5 N	5 N
2,000 lb	0.1 lb	1 lb (Quick Change Load Cell)
907 kg	0.05 kg	0.5 kg
8,896 N	0.5 N	5 N
2,000 lb	0.05 lb	0.5 lb (Twist Under Load Optional)
907 kg	0.02 kg	0.2 kg
8,896 N	0.2 N	2 N
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1,361 kg	0.05 kg	0.5 kg

13,345 N	0.5 N	5 N	
6,000 lb	0.2 lb	2 lb	(Twist Under Load Optional)
2,722 kg	0.1 kg	1 kg	
26,690 N	1 N	10 N	
10,000 lb	0.2 lb	2 lb	(Twist Under Load Optional)
4,536 kg	0.1 kg	1 kg	
44,482 N	1 N	10 N	
13,200 lb	0.5 lb	5 lb	(Twist Under Load Optional)
5,987 kg	0.2 kg	2 kg	
58,717 N	2 N	20 N	

Accuracy = \pm Resolution x 2

Length Specifications

Standard Resolution	High Resolution*
0.0005 in (\pm 0.001 in)	0.0001 in (\pm 0.0005 in)
0.01 mm (\pm 0.02 mm)	0.001 mm (\pm 0.01 mm)

*Requires High Resolution Length option 025-1000-0234-02

2 FLASH SOFTWARE PACKAGES

The Basic software package is standard on a FLASH tester. The Extra, Pro Spring, Pro Material, and Pro Ultimate are optional software packages. A FLASH tester is programmed with one of these software packages as specified at purchase. The Fatigue Testing software package is also optional, but may be purchased in addition to the first four software packages listed and is included with the Pro Ultimate software package. The features of each software package are described in this section.

2.1.1 *Basic*

- Single Load Cell Operation Limited to 1 or 2-point Testing
- Absolute Programming Only
- Two Test Point Commands: Length @Force, Force @Length
- On-screen Production Monitoring Feature
- Option to Password Protect Individual Menus
- No Graphic or Statistical Displays, No Printing Functionality
- No Program Saving or Retrieving

2.1.2 *Extra*

- FLASH Basic Software Features
- Dual Interchangeable Load Cell Operation
- Absolute and Incremental Programming
- Up to 10-point Testing
- Additional Test Point Commands: Preset, Free Length, Initial Tension, and Rate
- Report Printing Capability
- Save Program and Retrieval Feature
- No Graphic or Statistical Results Displays

2.1.3 *Pro Spring*

- FLASH Extra Software Features
- Full Range Interchangeable Load Cell Operation
- Up to 99-point Testing
- Graphic and Statistical Results Displays
- Length and Force Offsets
- Quick Test Menu Application
- Quick Launch Menu Application

2.1.4 *Pro Material*

- FLASH Pro Spring Software Features
- Additional Test Point Commands: Peak Force, Pause, Delay, Dynamic to Force, Dynamic to Length, and Dynamic to Time

2.1.5 **Fatigue Testing**

This feature tests the endurance of a part and monitors force performance for the entire test. Other features of the Fatigue testing option include:

- Preset Cycles up to 10,000,000
- Archive Data During Cycling at Preset Intervals to a File Viewable via Intranet
- Program Testing to Stop at Fatigue or Breakage Point

2.1.6 **Pro Ultimate**

This FLASH software package is the highest end, full feature package available from LSI for automated parts testing.

- FLASH Pro Spring Software Features
- FLASH Pro Material Software Features
- Additional Test Point Command: Fatigue
- Fatigue Testing Software Package
- Dynamic Testing option—real-time test by force/length
- Test Preference—to absolute length or deflection from a point

2.1.7 **Password Protection**

Various levels of password protection are embedded in the FLASH software. Some are factory settings and can be changed only by LSI. Others, however, allow you to set access levels at your facility. *See Section 14.7 for FLASH Setup.*

3 **SMART LOAD CELLS / TWIST UNDER LOAD**

All FLASH models can be purchased with interchangeable load cell capacity. This requires a minimum of the FLASH Extra software package which supports dual load cells or any of the FLASH Pro software packages that allow up to the maximum number of load cell capacities offered for a particular model. Standard on the FLASH 25, 36, and 48, Twist Under Load (TUL) measures the amount of twist in any given spring as load is applied.

4 **WHISPER SERVO DRIVE**

There is a range of standard servo drives for each tester based on the force capacity needed for your application. The FLASH 25 offers 6,000 lb and 13,200 lb drives. The FLASH 36 is available with 10,000 lb, 20,000 lb, 35,000 lb and 50,000 lb drives. The FLASH 48 is available with either a 6,000 lb or 13,200 lb drive. The **Whisper Servo Drive** is a closed-loop servo drive for rapid travel speed. With this feature, rapid speed can be maintained to full load. Expect test cycle time reductions, especially when testing at greater loads. As a bonus, tester noise is also reduced.

5 **POWER REQUIREMENTS**

FLASH 25 – 6,000 lb.	208/240 VAC, 1-phase
FLASH 25 – 13,200 lb.	208/240 VAC, 3-phase
FLASH 36 – All Models	240 VAC, 3-phase
FLASH 48 – 6,000 lb.	208/240 VAC, 1-phase
FLASH 48 – 13,200 lb.	208/240 VAC, 3-phase

6 WEB SERVICE, NETWORK, & PRINTER CONNECTION

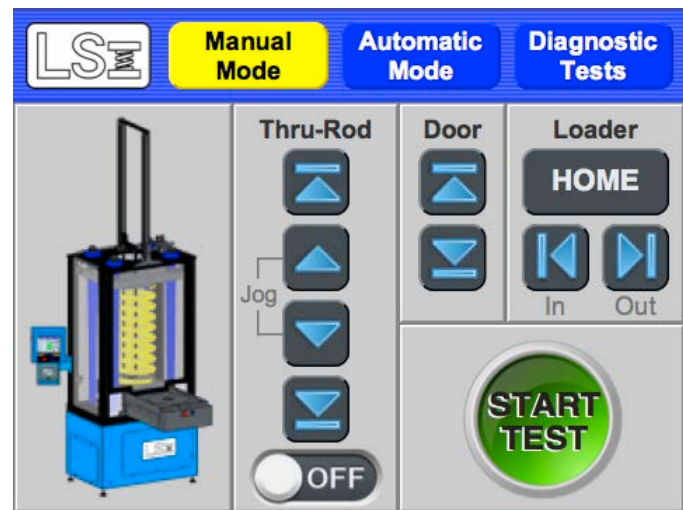
These features are set up through the Access Operation System option located under FLASH Setup. The Operating System is password protected. See Section 14.7.6 about gaining access. The web and network service will need to be set up by an IT technician at the tester location and coordinated with LSI to establish. Contact LSI for details at 763-780-2131.

7 AUTO-LOADER

The Auto-Loader is an option for the FLASH 36 that relieves the operator of the burden of lifting a heavy spring into the tester. Simply place the spring on the Auto-Loader platform, press a button, and it glides into the tester - like putting a disk into a computer or CD player!



NOTE: The Auto-Loader has a 500-lb. capacity, but it should not be used as a step to reach the upper parts of the tester. The tambour cover is designed as a safety guard only, and will collapse.

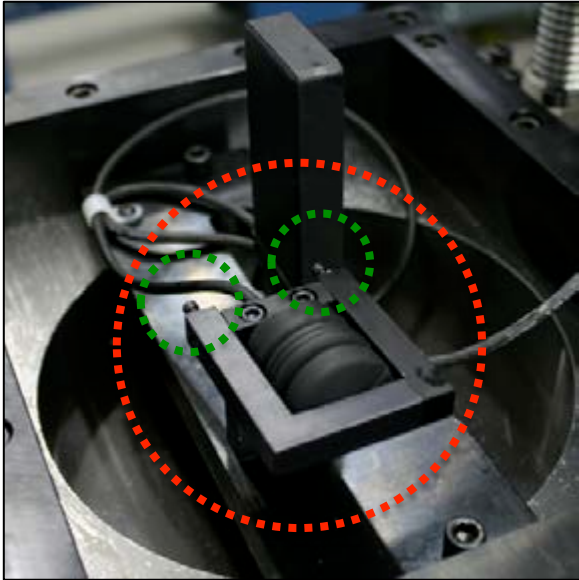


The Auto-Loader touch screen mounted under the FLASH touch screen shows you at a glance at the picture on the left if the spring is inside or outside the tester, if the thru-rod is on or off, or inserted through the spring, or if the safety door is open or closed. You can also specify Manual or Automatic Modes from this screen, or run Diagnostic tests.

8 CENTER LENGTH TRANSDUCER

IMPORTANT NOTE (Software Versions 2.79 and Older):

The secondary encoder (center length transducer) needs to be disabled in FLASH Setup > User, before manually retracting the center length transducer probe and testing parts with it disabled.

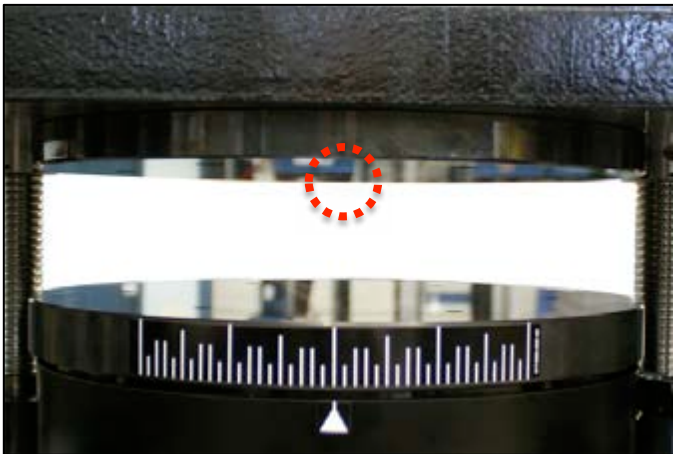


Clamp shown in the retracted position.

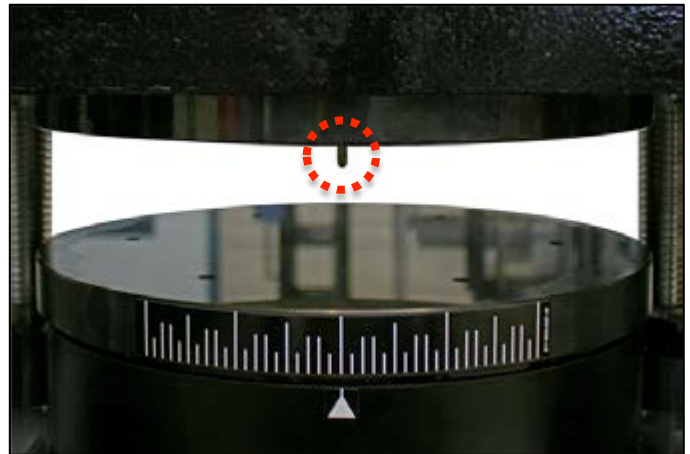


Clamp shown in the extended position.

Use the adjustment screws if the probe does not fully retract with the clamp in the retracted position.



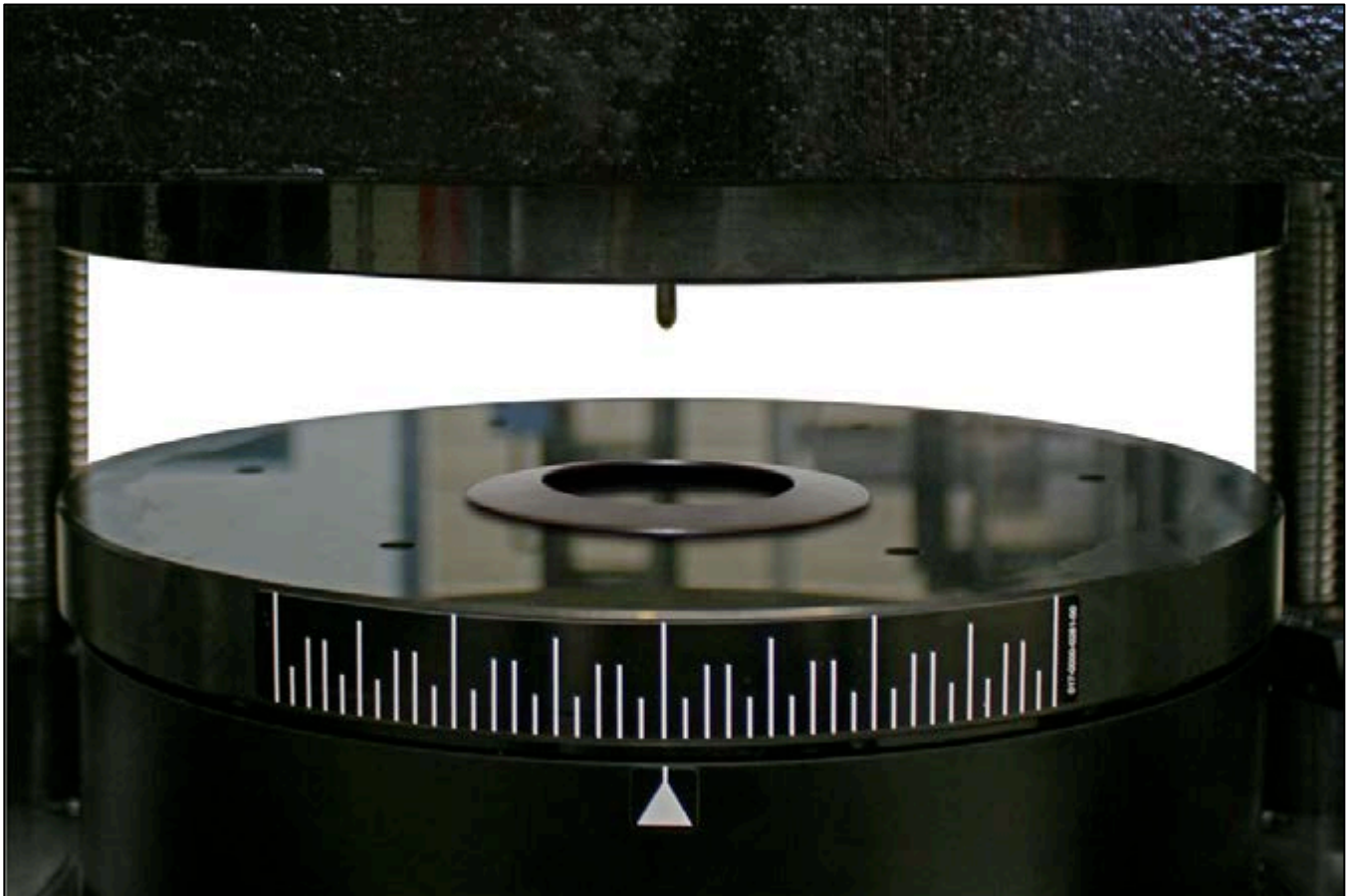
Center length probe tip shown in the retracted position, flush with the upper platform.



Center length probe tip shown in the extended position, ready for testing.



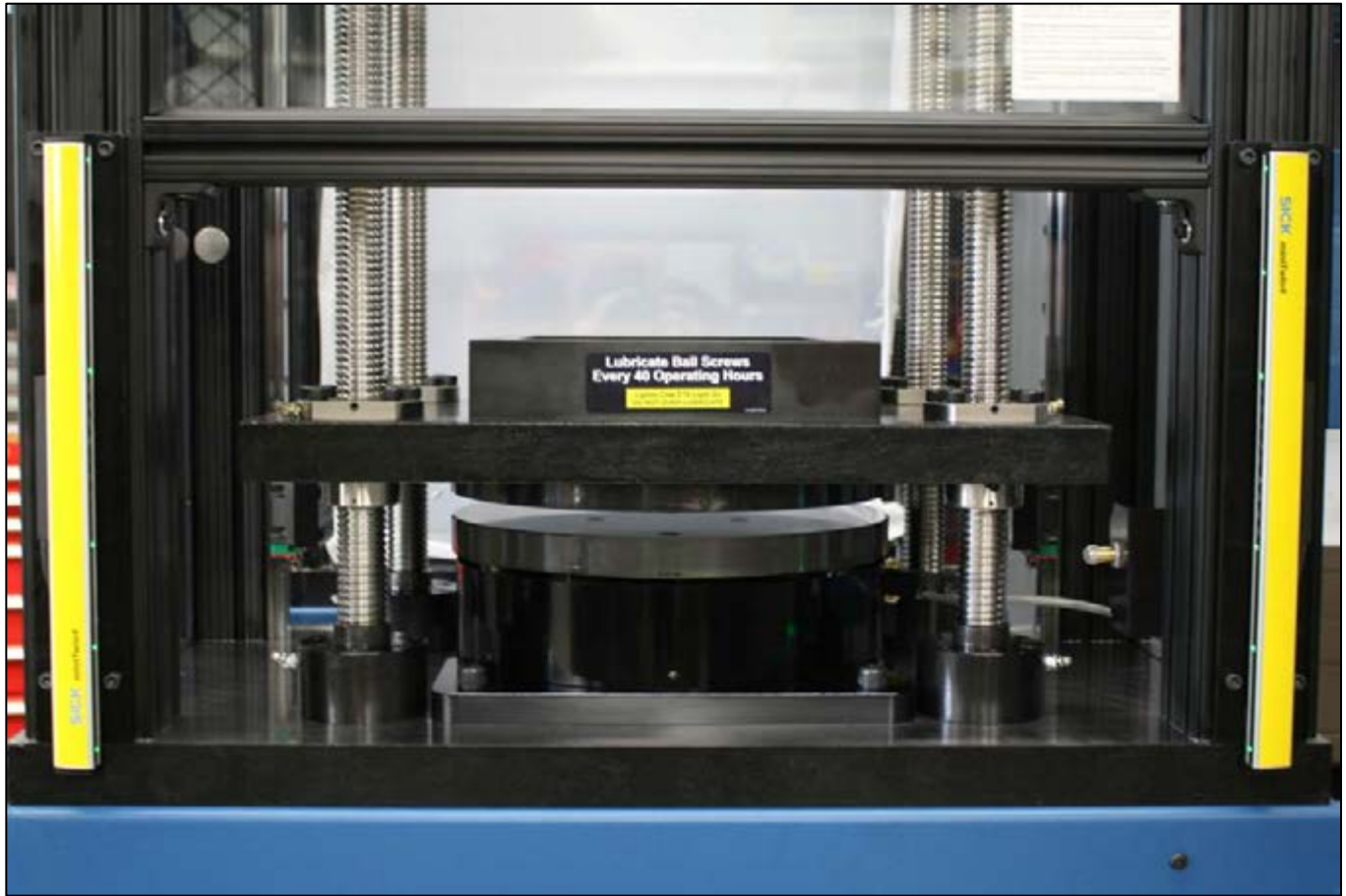
When the Center Length Transducer is active you will see a green “CLT Active” indicator in the “Length” box. This indicator will turn red and read “CLT Disabled” when the Center Length Transducer is not in use. These screenshots show a beta version of the center length transducer indicator on the Manual Mode (above left) and Automatic Mode (above right) screens.



Testing a Belleville Washer using the center length transducer.

9 LIGHT CURTAIN GUARD

The Light Curtain Guard is an optional safety feature for the FLASH 25 that replaces the standard swinging polycarbonate door. Because small non-buckling parts like Belleville Washers or wave springs are not a risk to be ejected from the tester when under load, the Light Curtain Guard allows the operator to maintain quick access to load and unload parts while keeping his or her hands safe from pinch points. Whether the tester's platform is moving up or down, tripping the Light Curtain Guard stops platform travel in milliseconds, illuminates red LED's on the sensor bars and requires the user to reset from error on the FLASH touch screen, then restart the current test.



The Light Curtain Guard is active when the green LED's are illuminated on the sensor bars.

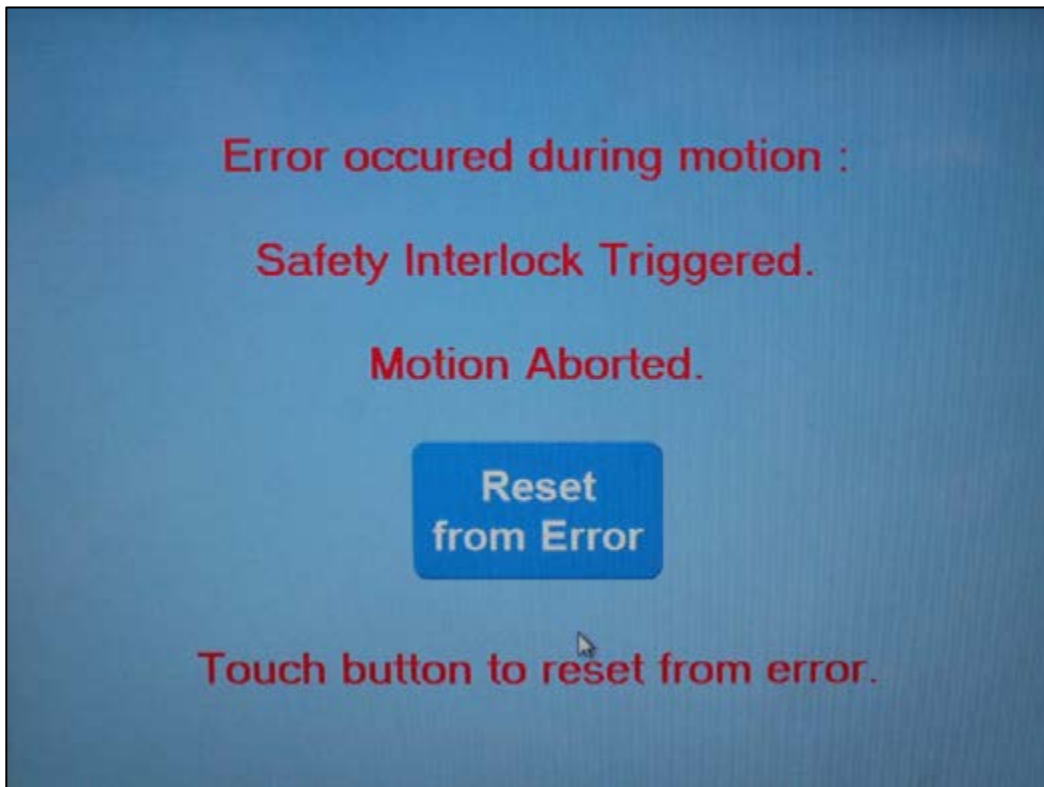
Important Note! The Light Curtain Guard is disabled when manually jogging the tester's platform up or down in Manual Mode. Please keep the enclosure clear of anything that may be caught in pinch points.

The photo on the right shows the FLASH's Manual Mode screen's warning: "Safety Interlock Not Functional During Jog"





The above photos show the Light Curtain Guard active (left) and tripped (right).



Error screen that appears on the FLASH interface when the Light Curtain is tripped.

10 ADDITIONAL OPTIONS AND EQUIPMENT

- **Inkjet Printer:** Connects to tester for printing reports, includes USB cable
- **Thru-Rod Accessory Package:** Order as an additional safety feature, or use it to test springs that tend to buckle during compression. Thru-rods are pneumatically inserted and retracted. Package includes thru-rods for the following spring diameters: 1", 1.25, 1.5-3", 3-6.5". See Section 13.2.
- **Platforms and Fixtures:** Larger platforms and various types of extension hooks are available to suit a variety of testing needs

See www.larsonsystems.com for details about these and other options.

11 USING THIS MANUAL

- Have the FLASH tester accessible and follow along with this manual.
- *Be sure to read the Safety and Use Guidelines in Section 12 before starting.*
- Instruction for basic operation begins at Section 13 – Machine Setup. Familiarity with this section will instill proper use of the interactive touch screen and make the more complex screens that follow easy to learn.
- Any instruction in brackets and bold type refers to a button on the screen.
- Main menu applications are described in section 14 starting with the easiest.
- Section 16 – Examples of Test Programs, leads you through programming, saving a program, running a test, and viewing results. Items taught in separate sections are put together in a usable sequence for practical application.
- Know the specifics about the configuration of the FLASH software purchased with your tester, as some sections of this manual may not apply. Note the model of tester and level of software you purchased to determine the type of configuration you have.

12 SAFETY AND USE GUIDELINES

12.1 Important Considerations



- **Compressed springs have stored potential energy proportional to the spring constant.** Use care and release this energy in a controlled manner to avoid injury.
- Do not apply a force greater than the tester can handle.
- Be sure the operating area is clean and dry.
- All parts to be tested should be free of oil and contaminants.
- Keep the tester from contact with liquid.
- Keep this User Manual available for quick reference.
- The protective enclosure should be kept closed during testing.
- Use of protective eyewear is recommended for safety.
- Follow all instructions and warnings associated with the use of the FLASH tester.

12.2 Auto-Loader

The Auto-Loader has a 500-lb. capacity, but it should not be used as a step to reach the upper parts of the tester. The tambour cover is designed as a safety guard only and will collapse if stepped on.



12.3 The Safety Shield Enclosure



Each FLASH Tester is equipped with a fully enclosed testing area with safety interlock. This safety shield may be designed as a door or cover on the tester to protect the operator from injury if parts should fly out from the testing area as load is applied.

DO NOT TAMPER WITH, REMOVE, OR MODIFY THE SAFETY SHIELD or the tester's warranty shall be void.

12.4 Normal Shutdown Procedure

1. To power down under normal operating conditions, you must exit Windows properly.
2. Touch the red **[Shut Down]** button in the upper right of the FLASH display screen. A prompt will appear to verify shutdown.
3. Touch **[Yes]** to continue. You will see a message, "Windows is shutting down."

12.5 Abort Test and Emergency Stop

The red **[Abort Test]** button located in the lower right of the FLASH screen display is the first means of stopping platform movement in an emergency situation. It is the preferred way to halt a test. If a faulty program has been entered, hit the **[Abort]** button to stop the test. This also stops the motor on the Auto-Loader. Switch the operation to **Manual** and use the **Jog bar** to move the platform out of the way. Remove the spring and re-check the program. Re-program if necessary.

The red **Emergency Stop** (E-stop) on the front of the FLASH tester is designed for emergency use, but not for normal shutdown procedure. The E-stops on the FLASH 36 with Auto-Loader are connected. Hitting the E-stop on the FLASH screen or on the Auto-Loader screen interrupts power to both motors.

When you use the E-stop, abort the test (using the **Abort** button), switch the program to **Manual**, release the E-stop and use the **Jog bar** to raise the platform and remove the spring. You can re-start the tester by rotating the E-stop button clockwise until it pops out from the tester. Power is once again supplied to the motor controller. The tester will need to be re-initialized or rebooted.

See Section 13.4 for proper **On and Off Procedure**, and Section 13.6.9 for more information on [**Abort Test**], and Section 13.5 for **Auto-Loader** system operation.

12.6 Windows 7 Automatic Logon

By default, the FLASH Series of testers are programmed to bypass the MS Windows 7 logon prompt at startup to automatically login anyone to operate the tester. This is a more convenient setting for its use. Depending on your network administrator policy, the automatic login may be considered a security risk if the tester has been connected to your company's network. The Windows logon bypass could allow anyone using the tester to also have access to that network, authorized or not.

The user account on the FLASH tester *does not* have the necessary write privileges. The Windows login was originally bypassed at the LSI factory using an **Administrator** account. Once this feature is turned off, a Windows login prompt will appear when the tester is turned on. Contact Larson Systems if you need help with this feature.

How the Windows 7 Login is used when automatic login is turned off: The prompt will say "**FLASH User**" in the first dialog box and ask for a password in the next box. Touch the dialog box to access the on-screen keyboard, touch the letters on the keyboard to type password, touch [**Enter**] when finished, then touch [**OK**].

When you start the tester, you will see two windows. One is Windows 7; the other is the FLASH software. These two programs communicate with each other and you will see the windows light up and turn off as they exchange information. Normal boot-up time is about 2.5 minutes.

13 MACHINE SETUP

Place the tester on a level and stable work area where you can test parts in a comfortable manner. The FLASH tester should be positioned so you can load, test and remove parts from the testing area. You should also be able to easily view and access the display. Touch the screen with a finger to use the touch-screen interface.

13.1 Basic Installation

The power input needs to be three-phase 240-Volt, 30 amp AC. The tester is cabled with four-blade NEMA style, L14-30 plug or L IS-20 for three-phase models.

The top plate of the tester has threaded holes near the corners for eye bolts that can be used to lift the unit. This works well for removing it from the skid and installing the feet.

Once the unit is unbolted from the skid, set it in place and adjust the threaded feet to level the unit.

13.2 Installing the Optional Thru-rod Assembly



Optional thru-rod assemblies are 1", 1.25", 1.5"- 3" variable, or 3" - 6" variable. To make installation easier, the largest plate has been pre-attached to the bottom of the moveable upper platform to act as a guide for the rod or assembly. When using the smaller adjustable 1.25" and 1" rods, a smaller 6" platform mounts to the larger plate, making changing thru-rod assemblies more manageable. All assemblies retract via a pneumatic actuator mounted atop the tester.



The picture at left shows the linear actuator in the upper lift position. This unit is mounted to the top of the tester. Sensors on the side of the actuator adjust travel length. You will see a bolt pattern on the top plate (to the right side of the center hole as you face the front of the tester). The bolts in the bottom of the actuator fit the threaded holes.

Depending upon the size of the thru-rod you need to use, attach the rod or assembly to the threaded hole on the bottom of the black L- bracket on the linear actuator. For ease of assembly, we suggest you start with the 1" rod. The corresponding thru-rod load plate is attached to the bottom of the moveable upper platform to act as a guide for the rod or assembly.



A threaded spud (about 7/8" diameter) is at the bottom of each thru-rod. This spud screws into threaded hole in the bottom of each thru-rod assembly and acts as a bottom guide for the rod assembly.

With the guide plate attached to the upper plate, you need to enter an offset length to compensate for the added thickness of the upper plate when initializing the tester:

1" thru rod plate thickness	.500"
1.25" thru rod plate thickness	.500"
1.5-3" variable rod plate	.500"

The variable assemblies are adjusted by loosening the three cap screws at the top and bottom of the assembly, to give the desired outside diameter. Make sure the assembly will travel through the round upper platform guide before tightening the screws.



13.3 Air Line Connection



The thru-rod actuator operates with standard shop air, 40-120 PSI. The regulator on the tester allows you to adjust it to your plant conditions. Connect your shop air to the quick connect on the side or back of the tester. The air regulator is mounted on the side of the base of the FLASH 25 tester or on the top of the FLASH 36. The inlet port is 1/4" NPT thread. It has a male end quick connect on the unit, but you can remove it if you wish and plumb with hose or tubing.

A pneumatic linear device is mounted vertically on the top plate to actuate the thru-rod assemblies. The push-to-fit tubing connectors attach easily to the pneumatic tubing.

Connect the air lines to the linear actuator. The toggle switch on the arm just below the FLASH control screen or the loader control screen actuates the thru-rod assembly. It is a three-position switch: up, stationary, and down. The unit is designed to allow the thru-rod assembly to move smoothly in and out of your spring while a new spring is being readied for testing. When not needed, the thru-rod assembly can simply be parked in the up position, out of the way.

13.4 On and Off Procedure

13.4.1 Turning on the Tester

1. Turn the red **Emergency Stop** button on the outside of the tester clockwise. The knob pops out to allow the tester to receive power.
2. Next, push the blue **Power On** button and hold it for 5 seconds. The Windows 7 Operating System will load first, followed by the FLASH software, if the **Windows 7 automatic logon** feature is turned on. The FLASH head will display alternating windows as the two software programs communicate with each other. See Section 12.6 regarding this feature. Normal startup time is approximately 2 minutes, 30 seconds.
3. When the automatic logon feature is turned off, a dialog box appears with “**FLASH User**” in the first box and a blank box for password entry below. Touch the dialog box to access the on-screen keyboard. To type the password, press the letters on the keyboard, touch **[Enter]** when finished, and then touch **[OK]**. The password is managed by Supervisor access.
4. The FLASH testing software will load. The screen shown below appears next. The display defaults to the **Manual Mode** (highlighted in yellow) in compression testing (indicated in the force display).

13.4.2 Proper Procedure for Tester Shutdown (Extremely Important)

1. Touch the red **[Shut Down]** button located in the upper right of the display when you're ready to turn off the machine. A pop-up window will ask you to verify shutdown. Select Yes.
2. Windows will close and a prompt will appear when it is safe to turn off your computer. Push the red **Emergency Stop** button to turn power completely off.

Both steps must be followed for normal operating shut down.

13.5 Tester Startup with Auto-Loader Operation



Operating the Auto-Loader is as easy as pushing a few buttons on the loader touch screen interface.

13.5.1 Power Up the Tester

Twist the E-stop button clockwise to release it if it is engaged. Push and hold the blue **Power Button** on the FLASH Control head for 5 seconds. The touch screen on the FLASH head and on the Loader operations control screen will light up and go to the **Manual** mode of operation. Startup time for the FLASH control sequence is approximately 2 minutes, 30 seconds.

The loader door and the thru-rod assembly will rise to their uppermost positions.

13.5.2 HOME (Initialize) the Auto-Loader

Remove any parts that may be sitting on the loader platform

and make sure the tester's upper platform is high enough to allow the loader platform to move into the tester. Use the jog switch on the FLASH control screen to manually move the tester platform to a higher location, if necessary.

To home (initialize) the loader, push the dark gray **Home** button on the loader control touch screen. The Loader touch screen control is mounted just below the Flash Control touch screen.

The loader will move into the tester and lower the platform onto the load cell.

13.5.3 HOME (Initialize) the Tester

The right-hand window on the FLASH control screen will say "**Home Tester**". If the tester platforms are more than 2 inches apart, use the jog button to move the upper platform down to about 2 inches. (This will save time, as the move will be a slow one) Touch the **HOME** button.

The platforms will slowly come together. This establishes the **Zero point** for length measurement. The upper platform will return to its default height. The height of the return location of the upper platform can be set in the FLASH Setup **User Setup** screen.

The load platform stays in the tester, the upper platform moves to its up position, and the control screen is in manual mode. The tester is ready to use.

13.5.4 Getting Ready to Test

Use the FLASH control screen to load the test program. There are three ways to do this, using the navigation tool bar on top of the FLASH control screen.

- 1. Use the Quick Launch Screen.** Touch Quick Launch. Select the program you want by touching the saved test file from those on the screen.
- 2. Use the File screen.** Touch **File**. Find your test specification file and double-tap it or touch the Open button to load the program. (This is similar to all File Open screens on any PC.)
- 3. Go to Program Mode.** Create a new program to use.

Your program is now loaded and ready to run.

13.5.4.1 First Test: Go to Automatic Mode on the FLASH screen

1. Move the load platform out of the tester. The loader control touch screen has three sections. Under the loader control, touch the arrow button pointing out of the tester.
2. Load your part into the center of the load platform.
3. Touch the arrow to move the platform back into the tester.
4. Change the **loader control screen** to Automatic Mode.
5. On the Flash control screen, **zero the force** to remove the weight of the spring.
6. Press the "Start Cycle" button on the Loader Control Touch Screen or the Blue button on right end of the extended loader platform frame.

The door will close and the thru-rod assembly will come down into the spring center, if it has been turned on. The test will be performed. When complete, the thru rod will retract, the door will open and the part will move out to the loader platform.

13.5.4.2 Successive Tests

Remove the tested spring from the platform and load the next spring onto the loader. Touch the **Start Cycle** button and the test cycle will repeat. Remove the spring.

13.5.4.3 Saving Your Data

When you are finished testing, go to the **File** screen. Touch the **Save** button. This will save the test specification and the results file. The file will have the same file number as the spec file and a numerical extension such as .001. The files are in comma-separated value format, which can be easily imported to a spreadsheet.

13.6 The Main Display (Manual Mode)

The FLASH screen pictured in 11.5.1 is the first display that appears after starting the tester. The tester is in **Manual Mode** for compression testing, but not yet ready to perform basic force and length testing.

At startup, the dialog box in the Length display reads “**Home Tester.**” A button below it is labeled the same. Initializing the tester or setting it to its “home” or zero point is the first thing you should do to clear the “Home Tester” prompt from the display. This section explains the home tester procedure for both compression and extension. The features of the **Manual Mode** screen are also described.

13.6.1 Home Tester (Initialize)

The screenshot displays the Manual Mode interface. At the top, a navigation bar contains buttons for File, Quick Test, Program Mode, Manual Mode (highlighted in yellow), Automatic Mode, FLASH Setup, Quick Launch, and Shut Down. Below this is a Re-Initialize button. The main area features a vertical JOG control with Up and Down buttons. The central part is a graph with Length (in) on the y-axis (0 to 12) and Force (lb) on the x-axis (-200 to 800). To the right of the graph are two control panels: the Length panel with a 100% slider, a 'Home Tester' button, and 'Reset' and 'Offset' buttons; and the Force panel with a 'Comp.' dropdown, a 'Go To...' button, a display showing 0.00 lb, and 'Zero', 'Reset', and 'Offset' buttons. At the bottom left is an 'Instructions' box with text: "Compression Homing: Clear parts or fixtures from platforms. Press Home Tester to set Length Home Point. Upper platform moves down to lower platform, applies a nominal force, and releases. Length display will zero and platform will move to Return Height." At the bottom right is a large red 'Abort Test' button.

1. Use Force Display in Manual Mode

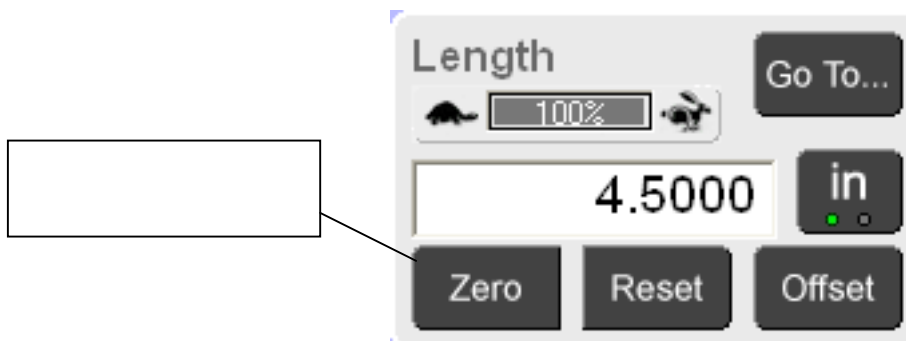
13.6.1.1 Set Length Home Point For Compression

Make sure the Home Tester between the upper and lower platform is clear of any parts, materials or fixtures. Zero the safety shield.

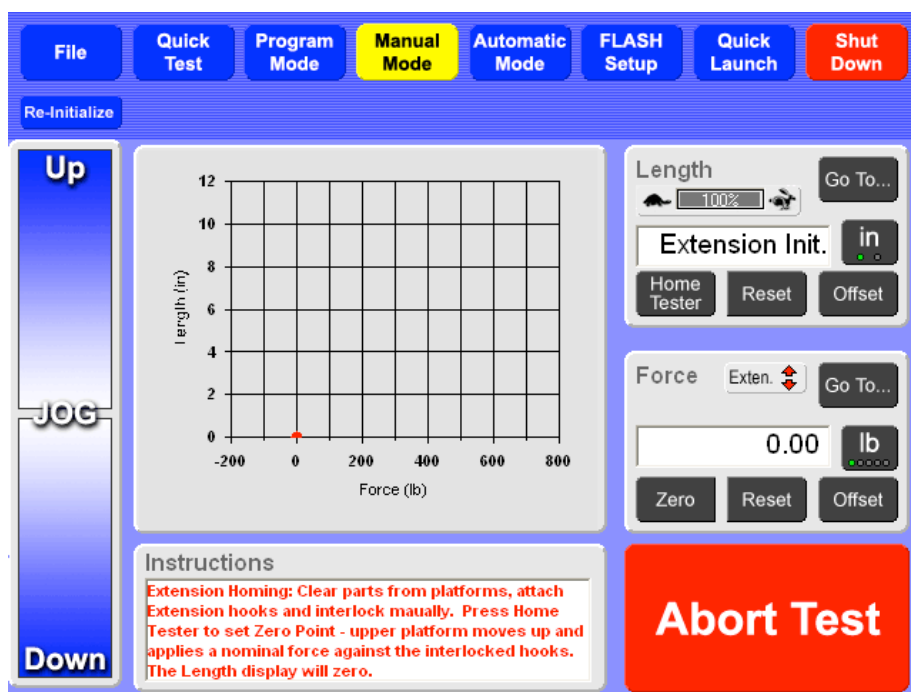
Touch **[Home Tester]** on the left below the dialog box in the **Length** display. This begins the automatic and slow downward movement of the upper platform to meet the lower platform. The **Instructions** box reads “**Tester Initializing.**”

When the platforms meet, the upper platform applies a proportional amount of force to the lower platform and finally the **Length** display is zeroed.

Once the display is zeroed, the upper platform raises itself and stops at a height you specified during User setup. The Return Height is set in the user settings of the Flash Setup. Reposition the platform as needed using the Jog Bar. The **Length** display now looks as shown below.



If the tester is going to be used for compression testing only, it is not necessary to set the length home point for extension – proceed to section 11.5.1.3. However, if the tester will be used only for extension testing, the Length Home Point for Compression testing must be set before testing can be done.



13.6.1.2 Set Length Home Point for Extension

When you set the **Length Home Point** for extension, change the compression setting to extension. Touch the **[Comp.]** indicator in the **Force** display. (See Section 13.6.2 about changing Compression and Extension testing.) The dialog box in the Length display will read “**Extension Init.**” as shown above.

Make sure the testing area is clear of any parts or objects and install extension hooks* certified to the capacity of the tester.

Use the **Jog Bar** to adjust the upper platform so the extension hooks interlock. Touch **[Home Tester]** to initialize for extension testing.

13.6.1.3 If Other Fixtures Will be Used (Compensation)

If other fixtures will be used, such as button-type platforms in compression or additional hooks in extension, or a thru-rod assembly, their lengths must be accounted for. There are two ways to do this:

1. Manually measure the fixtures, i.e., with calipers, and enter the length as an offset, using a negative number.
2. Use the tester to find the offset. Install the fixture, and move the platform until the fixtures touch. Apply 10 percent of the load cell force. The platforms can be moved using the jog buttons or the **Go To Force** button. If the **Go To Force** button is used, we suggest that you slow the platform speed to near minimum. Use the **Speed Adjust Bar** in the length display. Once 10 percent force is applied, the **Zero** button can be pressed or the **Length** in the display can be entered into an offset as a negative number.

*Contact Larson Systems Inc., if you do not have the appropriate hooks. 763-780-2131.

When other fixtures are used, the automatic extension initialization feature can be disabled to manually set a zero point. This is controlled under FLASH Setup in the User settings.

13.6.1.4 During Automated Extension Initialization

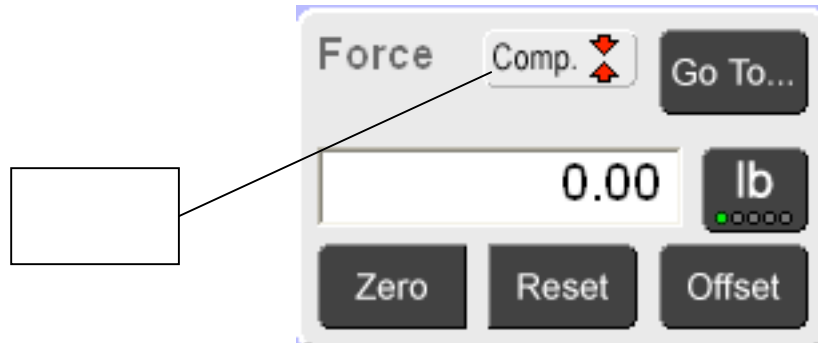
The upper platform moves up and applies a force of about 10% full scale. The upper platform stays at the force applied and the **Length** display is zeroed. As in the compression procedure, the **[Home Tester]** button is now **[Zero]**. Release the hooks by moving the upper platform downward, using the Jog Bar in Manual Mode.

Once the **Length Home Point** has been set, it does not need to be set again until the next startup. If **[Zero]** is touched in the **Length** display as an adjustment for a particular situation or unintentionally with the platforms apart, touch **[Reset]** to return to the original initialization zero point.

The **[Re-Initialize]** button located just below the **[File]** menu button may be used to initialize the tester without turning off the machine and starting over.

13.6.2 Compression and Extension

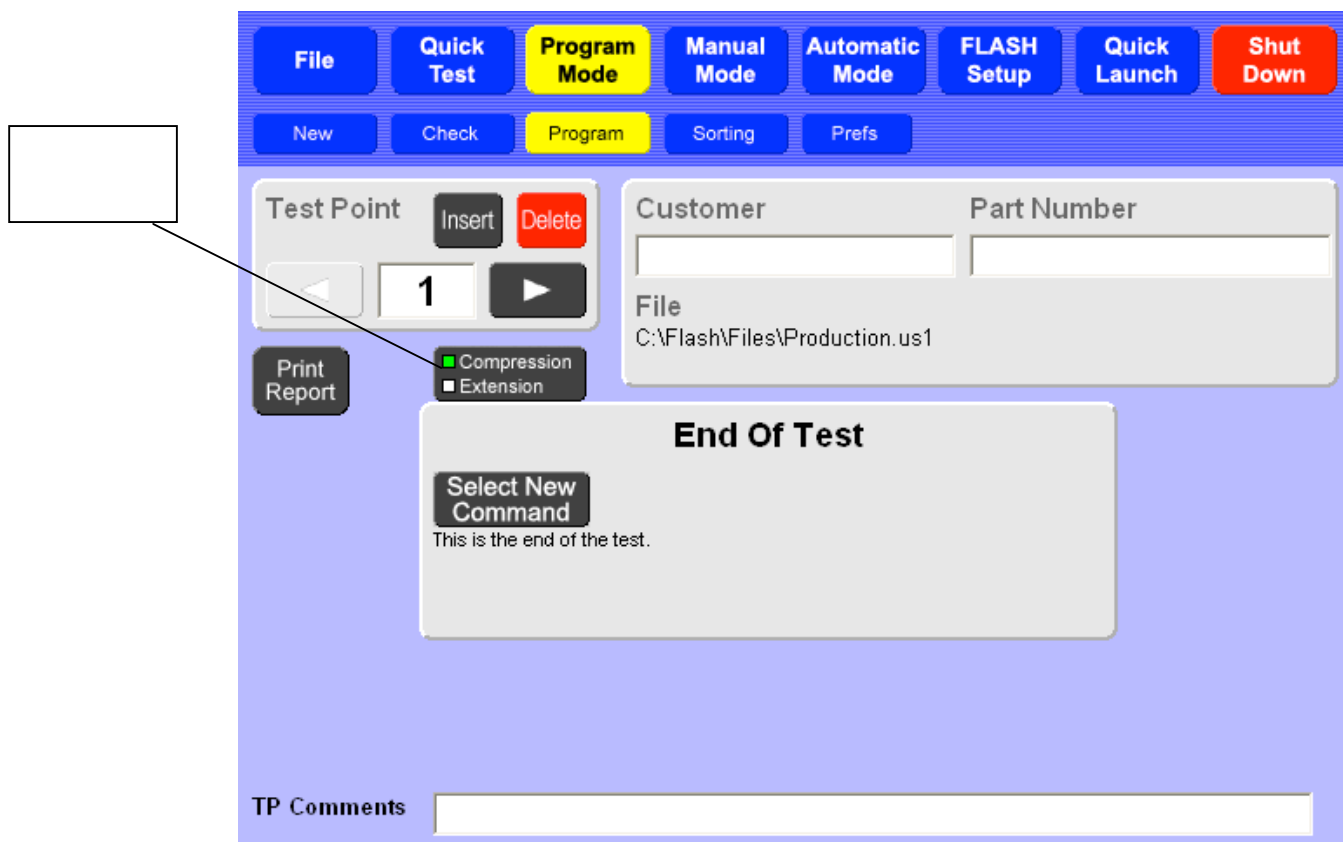
Make sure the tester is set for compression or extension. There are three ways to change the testing convention. The most common way is from the Force display in **Manual Mode** by touching the small box to the left of the **[Go To]** button.



NOTE: This indicator is also present on **Quick Test** and **Automatic Mode** screens but does not allow convention change; its function is only as an indicator.

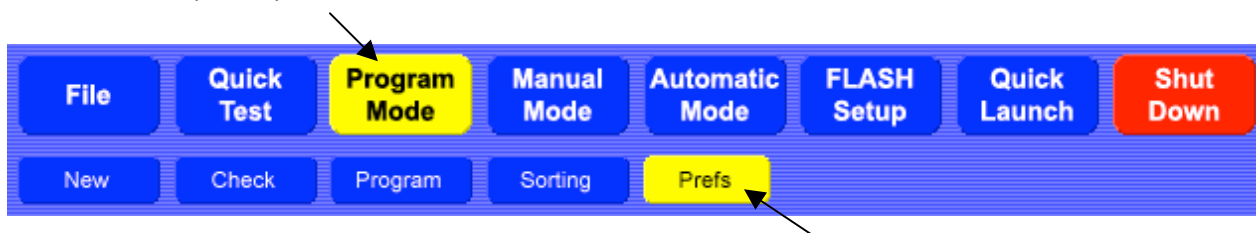
When the convention is changed, the background of the screen will change color from light blue for compression (default setting) to dark blue for extension. Touch this button to toggle between the two screens and the machine recognizes the difference. This difference is a visual reminder if you are using compression *and* extension testing or when more than one person uses the tester.

The convention can also be changed in the **Program Mode** as shown in the screen on the next page. In addition, you can change the setting in **[Prefs]** with a button under the **Program Mode**.

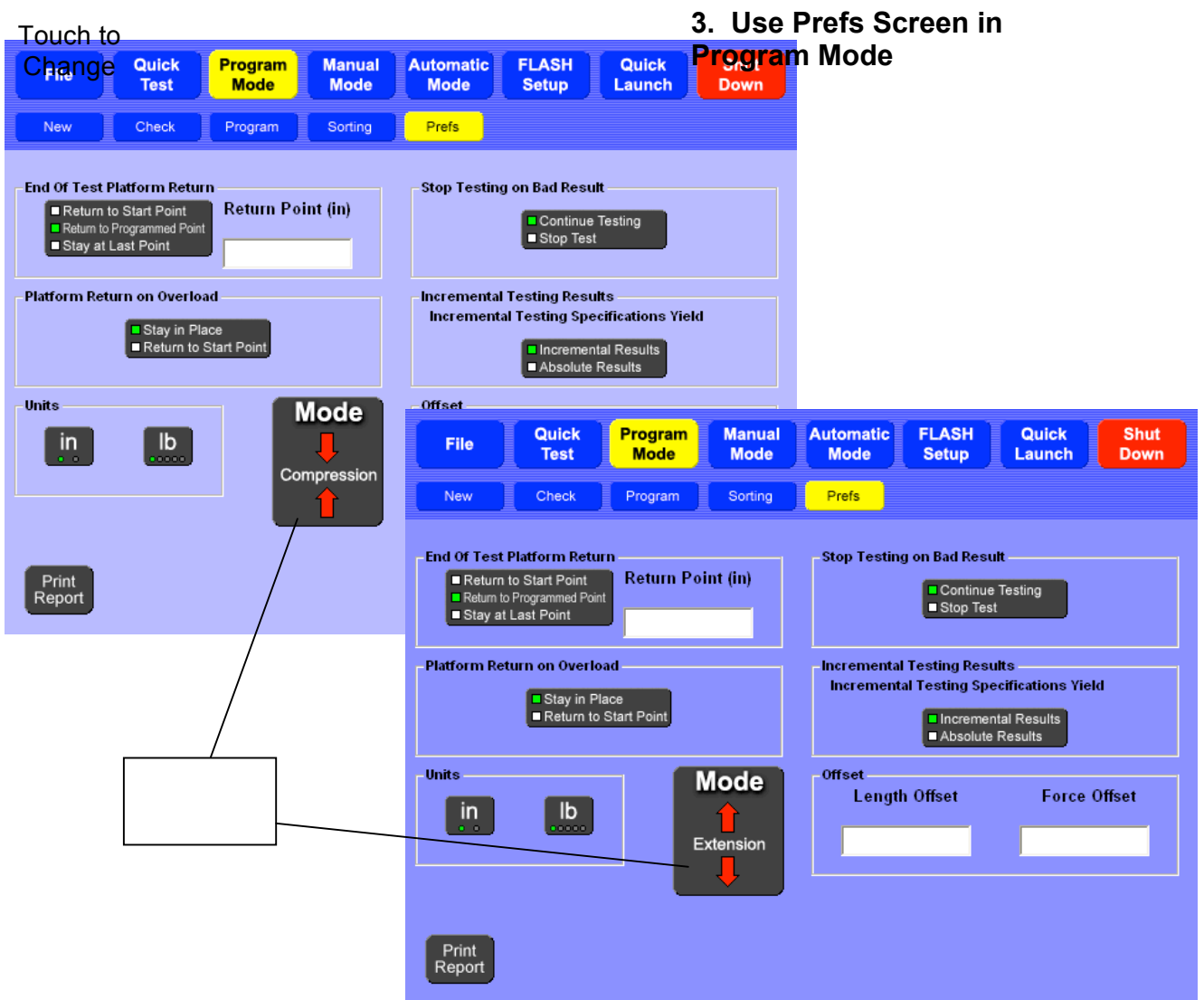


In the black box listing Compression and Extension, touch the box to change test modes. The tiny box in front of Compression and Extension will become green, indicating the active convention. The background screen color will also change.

Another way to change the testing convention is also in the Program Mode, but from the Preferences (Prefs) menu.



The **Prefs** screens that follow show the Compression and Extension settings. This is the least likely path to use, but if you set Preferences in programming, this is a good place to verify the selection.



The tester will stay in the mode (convention) you select until changed back or the machine is turned off. This means you can navigate anywhere in the program and still be in the selected test mode as indicated on each screen.

13.6.3 Navigation Toolbar

The FLASH software has up to seven Main Menu Applications accessible from the **Navigation Toolbar** at the top of every screen: **File**, **Quick Test**, **Program Mode**, **Manual Mode**, **Automatic Mode**, **FLASH Setup** and **Quick Launch**. Not all software packages include all application features. For example, the Basic software package does not include the **Quick Test**, **Quick Launch**, Program Saving and Retrieving (part of **File**), and Sorting feature (part of **Program Mode**). See Section 2 for details about the features of each software package.



Touch the desired button to navigate. The highlighted button identifies the active selection.



13.6.4 The Jog Bar

The **Jog Bar**, located on the left side of the display in Manual Mode, manually controls the movement of the upper platform. Touch and hold anywhere on the Jog Bar to engage. The platform moves faster when the darker portion of the Jog Bar is touched and slower when the lighter portion is touched. It stops when the Jog Bar is released.

13.6.5 Force vs. Length Graph

This time-sensitive graph indicates the current force and length and real-time test results. A single point identified by a red dot represents the position of the upper platform and the force applied to the part being tested.

13.6.6 Length

The **Length** display is located on the right just below the **Navigation Toolbar**. Its main function is to show real-time length. The **Go To** button moves the platform to a specific length for a basic test that gives the resulting force in real time. *Adjust test speed percentages by touching the*

turtle [🐢] or the *rabbit* [🐰] icon.

13.6.7 Force

The **Force** display is located on the right just below the **Length** display. Its main function is to show real-time force. The **Go To** button moves the platform to a target force that gives a resulting length value. It also includes an indicator that shows if compression or extension testing has been selected and a button for unit selection.

13.6.8 Instructions

The **Instructions** at the bottom of the display give helpful directions on how to proceed or reflect the status of the tester.

13.6.9 Abort Test

When the upper platform is in automatic movement initiated by running a test or a **Go To** command, the red, on-screen **[Abort Test]** button may be touched to halt the platform.

13.6.10 Shut Down

The red **[Shut Down]** button located at the upper right corner of the screen is used for the proper shutdown of the Windows 7 program each time the machine is turned off. This procedure is described in Section 10.4.

13.6.11 Re-Initialize

The **[Re-Initialize]** button located below the **[File]** menu button is used to re-set the tester to its **Home Length Point** without turning off the machine and starting it again. See the end of Section 11.2.1 about this function.

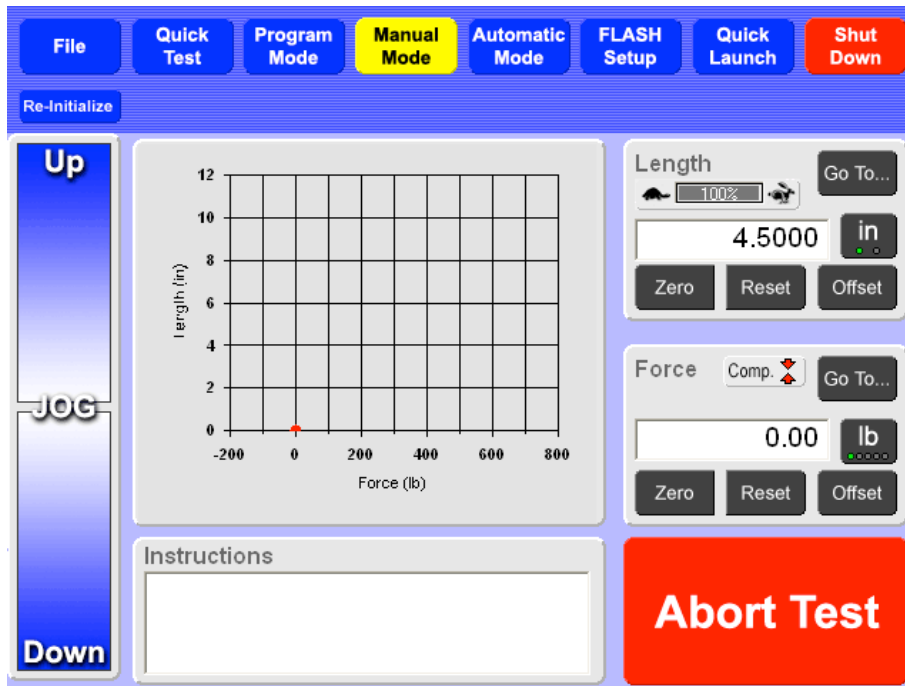
14 MAIN MENU APPLICATIONS

Seven **Main Menu Applications** may be accessed from the **Navigation Toolbar** at the top of the display:

- **File** – Clear all current specifications and result data, open a file from storage to run a test or view results, save a programmed test, or rename a file.
- **Quick Test** – Run a generic test on an unknown part and create a test to run on similar parts based on the characteristics found during the quick test.
- **Program Mode** – Create and customize a variety of test applications that may be saved and used as needed. No need to create a test each time the FLASH tester is used for a different application.
- **Manual Mode** – Control the platform movement manually, use a “go to” function for force and length testing and view results.
- **Automatic Mode** – Run test applications repetitively and generate results in various formats to be shared or printed in hard copy.
- **FLASH Setup** – Enter basic fixed information and preferences. The **User** and **Print Setup** submenus contain default specifications set at the factory. Review these before testing and make changes if needed. Especially important if running a unique test application.
- **Quick Launch** – Select and run a pre-defined test application.

The use of each menu item listed is described in this section. Note that the menu items do not appear in the order listed above or on the **Navigation Toolbar**. The menu features are usually used in conjunction with each other. For example, after creating a test sequence in the **Program Mode**, you may go to **Automatic Mode** to run the test, and then save the information gathered using **File**.

This is the Manual Mode screen after the Length Home Point has been set in compression:



The tester is now ready to perform basic force and length tests.

14.1 Manual Mode

The **Manual Mode** screen appears by default when the tester is turned on. From this screen you can manually control the upper platform and perform basic force and length tests using the “go to” feature. The tester displays real-time force and length data, both in numerical and graphical form.

14.1.1 Using the Length Display

The **Length** display is located on the right just below the **Navigation Bar**. Its main function is to show real time length. “**Home Tester**” appears in the dialog box at every startup. To clear this message, the **Length Home Point** must be set prior to testing as described earlier in Section 13.6.1.

The [Go To] Function:

Touch **[Go To]** to test a part by moving the upper platform to a target length in a quick, automatic movement without programming a test. A numeric keypad appears on the screen. Touch the buttons on the keypad to enter the desired height of the upper platform in the dialog box and touch the green **[Go To]** button. The platform moves to the height specified and the Force vs. Length graph adjusts accordingly. Use the Jog Bar to fine-tune measurements.



Unit of Measurement Selection:

The button just below **[Go To]** may read **[in]** or **[mm]**. Touch this button to select inches or millimeters as the unit of measurement for length. The current program or results displayed will automatically convert to the unit of measurement you choose.

The [Zero], [Reset], and [Offset] Buttons:

Zero – sets the current length reading to zero without setting a length offset point.

Reset – restores the zero point set when the Length Home Point was performed.

Offset – program a length-offset point to compensate for fixtures installed after the **Length Home Point** has been set. A numeric keypad appears with a dialog box. Touch the buttons on the keypad to enter the desired length offset value in the dialog box and touch **[Enter]** to set. This shifts the zero length point.

Change Test Speed:

Above the dialog box in the **Length** display is a turtle icon before a percentage bar, followed by a rabbit icon. This speed percentage bar controls the platform speed. Changing the percentage displayed adjusts the test speed. Touch turtle **[🐢]** to decrease the platform speed or rabbit **[🐰]** to increase speed. The speed set follows through to the **Automatic Mode** and vice versa until changed.

Set the Percentage of the Speed Change Increment:

The tester’s speed percentage can be set to change to a user setting for the first test of a part, i.e., when the Automatic Mode is entered and there are no results shown. This initial testing speed percentage is controlled from the User menu under the FLASH

Setup screen. A corresponding setting controls how much the percentage changes when [▲] or [▼] is touched.

14.1.2 Using the Force Display

The **Force** display is located on the right of the screen, just below the **Length** display. Real-time force is shown here.



14.1.2.1 The [Go To] Function:

Touch **[Go To]** for smooth automatic movement of the upper platform to a specified force without programming a test. Touch the buttons on the on-screen keypad to enter the target force and touch the green **[Go To]** button. The upper platform automatically applies force to the test part until it reaches the target value. The Force vs. Length graph adjusts accordingly.

14.1.2.2 Unit of Measurement Selection:

The button just below **[Go To]** may read **[lb]**, **[N]**, **[g]**, **[kg]**, or **[oz]**. Touch this button to select the unit of measurement for force. The current program and results displayed will automatically convert to the unit of measurement you selected.

14.1.2.3 The [Zero], [Reset], and [Offset] Buttons:

[Zero] – Set the current force reading to zero without specifying a force offset.

[Reset] – Clear out the zero value if **[Zero]** was touched and not intended.

[Offset] – Enter a force-offset value to compensate for the weight of fixtures installed prior to testing. A numeric keypad appears with a dialog box when the **[Offset]** button is touched. Touch the buttons on the keypad to enter the desired force offset value and touch **[Enter]** to set. This adjusts the zero force starting point.

14.1.3 Run A Basic Test

The **Length Home Point** should have been set at startup as described in Section 12.

Tester Setup:

1. Press the **Jog Bar** to raise the upper platform to a height greater than the part to be tested, but stay within the tester's maximum range.
2. Open the enclosure and place the test part on the platform. Make sure the item is centered – on the lower platform. Close and secure the enclosure.

Perform **Force @ Length** or **Length @ Force** tests described next.

Force @ Length:

1. Touch **[Zero]** in the Force display to eliminate the part's weight from the force reading.
2. Touch **[Go To]** in the Length display. Enter the length on the keypad that the upper platform should go to for force measurement and touch the green **[Go To]** button.

The platform immediately moves to the specified length and takes a measurement that appears in the Force display. This **Force @ Length** measurement is also reflected on the graph by the position of the red dot. The platform will remain at this height until a new command is given or is moved manually with the **Jog Bar**.

Length @ Force:

1. Touch **[Zero]** in the Force display to eliminate the part's weight from the force reading.
2. Touch **[Go To]** in the Force display. Enter the force on the keypad that the upper platform should apply and touch the green **[Go To]** button.

The platform slowly applies force to the part and reduces speed as it reaches its destination force. The length appears in the dialog box of the Length display and the position of the red dot on the graph adjusts accordingly. Again, the platform will remain at this height until a new command is given or is moved manually with the **Jog Bar**.

In either scenario, the **[Go To]** command may be changed to a new specified force or length as many times as you want. Adjustments to length can be made with the **Jog Bar** to fine-tune a measurement. In addition, the units of measurement or speed of testing may be changed.

14.2 Program Mode

Password Protection Optional

Touch **[Program Mode]** on the **Navigation Toolbar** to start. Use the **Program Mode** to create a variety of customized testing sequences, and set test preferences. There are four sub-screens in the Program Mode: **New**, **Check**, **Program**, and **Preferences (Prefs)**.

14.2.1 New

Touch **[New]** to clear all specifications and results. A message will appear to verify the action. Touch **[Yes]** to clear and continue or **[No]** to cancel the action. Any test points and preferences that have been entered will be cleared if **[Yes]** is selected. This includes any results that were obtained.

14.2.2 Check

Touch **[Check]** to check for any errors when creating a test point sequence. If the sequence contains any errors, a message box will appear and identify the problem. Touch **[OK]** to exit the message box. The Test Point screen moves to the test point that contains the error. Make the correction and check the sequence again. The message box will indicate when the sequence is good and contains no errors. Touch **[OK]** to clear the message box and continue.

14.2.3 Program

When **[Program Mode]** is selected, the display defaults to the **[Program]** sub-screen shown below. The selections are highlighted in yellow. This is where a test application sequence can be defined and programmed.



14.2.3.1 Using the Test Point Box

This screen always displays a gray box in its center that may be titled “End of Test” (shown), “Command:” or show available command buttons. Above this gray box and to the left is a smaller gray box titled “**Test Point.**” Scroll through the available test points by touching the arrow keys, [**◀**] or [**▶**]. The number of test points available for a sequence varies by the software package purchased (see Section 2 for more information). To go to a specific test point, touch the value dialog box and use the displayed keypad to enter the desired test point number. As the arrow [**▶**] is touched from test point 1, if each test point displays the “**End Of Test**” box, no commands have been entered for a test sequence yet. To create a new Test Point sequence begin at Test Point 1. The Test Point box is inactive when the larger gray box displays the test point command buttons.

From the **Test Point** box, test points may be inserted or deleted as a test point application sequence is created. Instructions for using [**Insert**] and [**Delete**] are found in section 14.2.3.10 – Creating a Test Point Application Sequence.

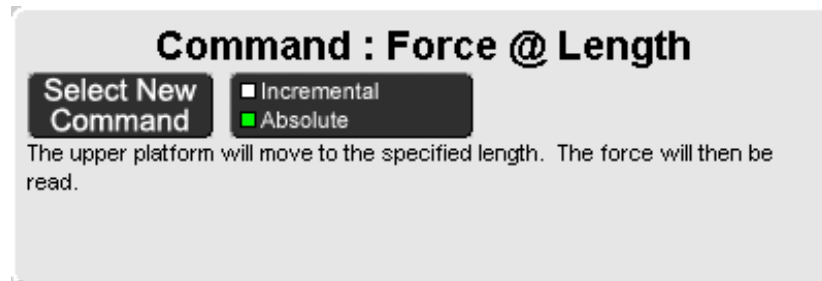
14.2.3.2 Select New Commands

Each time **[Select New Command]** is touched in a **Command** or **End Of Test** box, a gray bar or box with up to 14 black command buttons appears in the center of the display. When this selection bar is displayed, the buttons in the **Test Point** box are inactive. This means the test point number displayed is in process of being created.



Choose test commands from this bar when you create a test sequence application. As a command is touched, a new gray box appears with the name of the command at the top. In each command box select absolute or incremental testing and enter the required test point data in any highlighted value dialog box. When finished, touch the right arrow key in the **Test Point** box to move to the next test point in the sequence.

Touch **[Select New Command]** to add the next test point command to the test sequence. Repeat this process until the test sequence desired is complete. For the last test point, choose **[End Test]**.



14.2.3.3 Absolute or Incremental Testing

Certain commands can be performed in **Absolute** or **Incremental** mode. In Absolute mode, the forces and lengths (both specifications and results) reference a fixed zero point. In Incremental mode, the forces, lengths, and results are given as deflection amounts. An option that specifies that the results of incremental testing be given as absolute measurements is available, and is covered in section 14.2.4.4.

14.2.3.4 Test Commands

The subsections that follow describe each possible command for the FLASH. Numerical data must be entered for many of the commands before moving to the next test point. However, some commands may not require any values, but will allow you to enter optional data if desired.

Text boxes that require data are labeled and highlighted. Optional text boxes for data are labeled, but not highlighted. Enter data by touching a text box to activate an on-screen

keypad. Results from entering a nominal value calculate a percentage representing the distance of the measurement taken from that nominal value.

Some tests allow you to enter an optional tolerance value. Tolerance is entered as a percentage from 0.01% to 99.99% or as a specific upper or lower limit (USL or LSL). However the tolerance is entered, the other method is automatically calculated and filled when results are displayed. For example, if a tolerance percentage is entered, the USL and LSL are automatically calculated. The test point is “conditional” when you use a tolerance value to obtain test data.

A command may allow you to enter a value to specify the test point to be performed at a different speed than other test points. The value entered represents the maximum speed the upper platform is allowed to reach during the test. All platform motion starts at a slow speed and gradually increases to its maximum speed. Depending on the distance from the platform to the test point target, the maximum speed allowed (by default or as specified) may not always be reached. If this option is left blank, the default speed that allows a maximum movement of 180 inches per minute will be used.

14.2.3.4.1 Force @ Length

The upper platform moves to a specified length and the force will be the result. **Force at Length** tests can be performed in Absolute or Incremental mode and require a length value. Test speed, nominal force and tolerance values are optional.

14.2.3.4.2 Length @ Force

The upper platform moves to a specified force and the length will be the result. **Length at Force** tests can be performed in Absolute or Incremental mode and require a force value. Test speed, nominal length and tolerance values are optional.

14.2.3.4.3 Preset

The upper platform moves to a stated position a specific number of times. There are no results for a **Preset** test. Choose Absolute or Incremental mode and enter a force or a length value, but not in addition to a preset count. Specifying a different test speed is optional.

14.2.3.4.4 Free Length or Initial Tension

Free Length: The upper platform moves downward so force is applied very slightly to measure the free length of the part. This command is available only for compression testing. There are no required specifications to be entered. Test speed, nominal force and tolerance values are optional.

Initial Tension: The platform moves upward until a very slight force is applied and deflects twice to measure the initial tension of the part. The initial tension is calculated from the two deflections a total distance of twice the specified deflection length. This test is available only for extension testing. A length specification is required that refers to the deflection distance. Because the platform will move by twice the specified deflection length, use caution when determining the amount of deflection.

14.2.3.4.5 Peak Force

The upper platform moves to a specified length and the maximum force encountered is the result. A target length is required. Nominal force and tolerance values are optional. The test speed defaults to 15 inches per minute when measuring **Peak Force** and can be changed.

14.2.3.4.6 Rate

The rate is calculated between two test points. Rate is defined as the difference between two test points divided by the distance between. Two test points are required in the sequence before Rate is selected. These two test points are required data; the Rate is calculated based on the correct test points. Nominal rate and tolerance values are optional.

14.2.3.4.7 Cancel

Cancel reverses the screen displayed to its previous setting.

14.2.3.4.8 Pause

The test sequence stops until manually resumed by the operator. To use this command, touch **[Pause]**, then touch the right arrow to move to the next test point, then touch **[Select New Command]** to choose the next command that will be performed when the test is resumed. When a **Pause** test point is reached during a test sequence, testing stops. The **[Resume]** button is now active. Touch **[Resume]** when ready to continue testing.

14.2.3.4.9 Delay

The test sequence stops for a specified amount of time and then resumes testing automatically when the specified time expires. To use this command, touch **[Delay]** and enter the amount of time delay desired. Be sure this command is placed correctly in the test command sequence. Touch the right arrow to move to the next test point, then touch **[Select New Command]** to choose the next command at which testing will resume.

14.2.3.4.10 End Test

This command specifies the end of the test. When a test is in progress, the first instance of this command will end the test, even if there are valid commands after the **End Of Test** command.

14.2.3.5 Fatigue (Optional Feature)

This feature is a separately purchased item. If not purchased, **[Fatigue]** is not an available Test Command selection.

Fatigue testing requires a nominal force or length value entered as the target position. When this command is selected, choose Incremental or Absolute testing, then specify Fatigue to Length or Fatigue to Force for the test. Enter the nominal force or length value as applicable and the number of cycle counts desired – the maximum number of cycles allowed is 10 million.



The fatigue test can be programmed to stop in the event of part fatigue or breakage. By entering a nominal force or length and a tolerance value, the part is checked when the platform stops at the target position. If the part does not test within the specified tolerance, the Fatigue test will stop.

When the platform reaches its target position, the resulting value may be archived and analyzed further at another time. If archiving data is selected an archive interval can be set to control how much data is archived and how often. The frequency may be set to every cycle, every tenth cycle, every fiftieth cycle, etc. The data is stored in a file (.csv) that spreadsheet programs can read. The FLASH stores the data to a file and does not analyze or report the test data in any way.

A Fatigue Plate Assembly is available for purchase for testing up to eight springs or parts at the same time. Parts stay in place with special knobs and can be diameters of 3/4", 1/2", or 1/4". Details about this product and using fatigue testing can be found on the LSI website at www.larsonsystems.com.

14.2.3.6 Dynamic Testing

Dynamic Testing is available with Pro Material or Pro Ultimate software. It allows you to test and record real-time results, change the increments, and automatically re-graph the results.

14.2.3.6.1 Dynamic To Length, Dynamic To Force

The upper platform moves to a length or force that you enter in the Motion Specifications window. Move speed may also be selected. Raw data will be recorded over this entire range.

For reporting and graphing purposes, the data will be displayed as selected in the Measurement Specifications window. This can be all or a part of the Motion Specifications range. After capturing the raw data, you can come back and change this specification to see/report an alternative view of your data. You must specify the measurement and the measurement interval. Results are graphed and displayed based on interval type (length, force, or time) and interval amount.

The screenshot displays the software interface for Dynamic Testing. At the top, there is a menu bar with buttons for File, Quick Test, Program Mode (highlighted), Manual Mode, Automatic Mode, FLASH Setup, Quick Launch, and Shut Down. Below this is a secondary menu with New, Check, Program (highlighted), Sorting, and Prefs.

The main interface is divided into several sections:

- Test Point:** Includes an 'Insert' button, a 'Delete' button, and a numeric input field showing '1' with left and right arrow buttons.
- File Name:** A text input field for the file name.
- Print Setup:** A dropdown menu for print settings.
- Customer:** A text input field for customer information.
- Part Number:** A text input field for part number.
- Print Report:** A button with a dropdown menu showing 'Compression' and 'Extension'.
- Archive Data:** A dropdown menu with 'Archive Data' and 'Do Not Archive' options.
- Command: Dynamic To Length:** A central panel with a 'Select New Command' button and a descriptive text: 'The upper platform will move to the Motion End point. Measurements will be taken as the platform moves based on the Measurement Type and Measurement Interval.'
- Motion Specifications:** A panel with a dropdown menu showing 'Absolute' and 'Incremental' (selected), and a numeric input field for 'Motion End (mm)' with the value '0.000'.
- Measurement Specifications:** A panel with a dropdown menu showing 'By Force', 'By Length' (selected), and 'By Time', and three numeric input fields for 'Measurement Interval (mm)' (0.100), 'Measurement Start (mm)', and 'Measurement End (mm)'.
- Motion Speed (mm/min):** A numeric input field.
- TP Comments:** A text input field at the bottom.



14.2.3.6.2 Dynamic To Time

The upper platform remains in position for a specified amount of time. Readings are taken at specified time intervals until the target time specified has expired. This type of testing is most commonly used in material testing or when determining if length or force is maintained over a nominal time.

In any of the “Dynamic To” Test Point Commands, you may change the Interval type in the box titled Measurement Specifications by touching the selection. You may enter a starting and an ending point for interval measurement or specify a different test speed, if desired.



14.2.3.6.3 *Dynamic to Deflection*

Dynamic to deflection allows you to test deflection on suspension springs, Belleville washers and switches and buttons that require downward pressure to operate. This test procedure allows you to create a zero point for the test part. This point can be a test return point or a point determined by a program command. The upper platform then moves to a specified length or force. Readings are taken at specified intervals as the platform moves to the target point. Results are then displayed as force to deflection or rate to deflection.

14.2.3.6.4 *Dynamic Rate Averaging*

When the Test Graph Force vs. Rate or Length vs. Rate is shown, the rate values can be averaged to show a smoother curve. A value of 1 represents no averaging, showing a rate between two adjunct digital points. A value of 100 is maximum averaging.

Dynamic to Deflection and Dynamic Rate Averaging can be selected when you set your test preferences in the Automatic Mode (Section 12.5).

14.2.3.7 **Customer / Part Number**

For each test created, a **Customer** name and **Part Number** can be entered to appear on the printed report. Touch the text box to enter. In addition, when a stored program is retrieved, the retrieved file name would be on the printed report and also appear on the display just below **File**. If the test program has not yet been saved and a Part Number is entered, the Part Number defaults as the filename unless manually changed.

14.2.3.8 **TP Comments**

Each individual test point can contain comments that appear on the printed report. Enter test point comments by touching the text box at the bottom of the display. If you create creating attest point sequence by selecting the test point commands, each test point will already be labeled as the test point command on the printed report under test specifications. Any comment entered will appear below the labeled test point. To view how this looks in a printed report, see **Preview** in Section 12.2.3.9.

14.2.3.9 **Print Report**

This button will generate a hard copy of the program and any results gathered. When **[Print Report]** is touched, a message box to confirm appears. The options are to **Print**, **Preview**, or **Cancel**.

The **Preview** function can be used even if a printer is not connected to the tester. Viewing what the printed report would look like may be helpful to determine relevance of results, or the best viewing format, if the printout needs to be modified. Results can be saved and printed or viewed in the format desired at a later time. Report printout specifications may also be modified in **FLASH Setup > Print Setup**. When viewing a report in **Preview**:

- Scroll through the pages using arrows along the side or bottom of page
- Use **[Zoom]** to zoom in or out to view by page or enlarge
- Touch **[Close Preview]** to exit Preview

14.2.3.10 **Creating a Test Point Application Sequence**

Before creating a test point application sequence go to **[Prefs]** to view the default settings and make any necessary changes. (See Section 12.2.4). Touch **[Program]** to return.

The **End Of Test** box should be displayed and the **Test Point** value box should be at 1.

1. Touch **[Select New Command]** in the **End Of Test** box. The Test Command selection bar appears.
2. Touch the desired Test Command. A box appears titled with the command selected. **(Ex/ Command : Force @ Length)**

3. In the command box, choose **Incremental** or **Absolute** measurement. Choice is identified by a small green square. The box includes a description of what the machine does with this command. There may also be value boxes on the screen waiting for data to be entered.
4. To enter required data, touch the value box and a keypad will appear. Touch the desired numbers. When finished, touch **[Enter]**.
5. **TP Comments** may be entered that will appear on the printed report. Touch the TP Comment dialog box at the bottom of the screen and an alphanumeric keypad appears. Type in a comment by touching the letters on the keypad.
6. When finished or if no data is required, touch the right arrow button in the Test Point box to move to the next Test Point. The **End Of Test** box appears.
7. To add more Test Point commands, repeat from step 1.
8. When the last Test Point command has been entered and the **End Of Test** box is displayed the test application sequence is complete.
9. Touch **[Check]** to check for test point errors.

During the course of programming, the test points may be modified or changed using **[Insert]** or **[Delete]** as shown in the Test Point box.

14.2.3.10.1 Insert a Test Point

First, a command box must be displayed to use the **Test Point** box. Use the right or left arrow to view the test point in a sequence where a new test point will be inserted. The test point being viewed will move ahead one point to follow the inserted test point.

1. Touch **[Insert]** when viewing the test point.
2. Any test points already set at and above this point will shift up one.
3. The current test point is left blank and ready for a new test command.
4. Touch **[Select New Command]** to continue.
5. Choose the desired command from the Test Command selection bar to insert.
6. Enter any required or optional data, including TP Comments.
7. Navigate as needed to make changes to the test application sequence or go to the End of Test. Check and continue.

14.2.3.10.2 Delete a Test Point

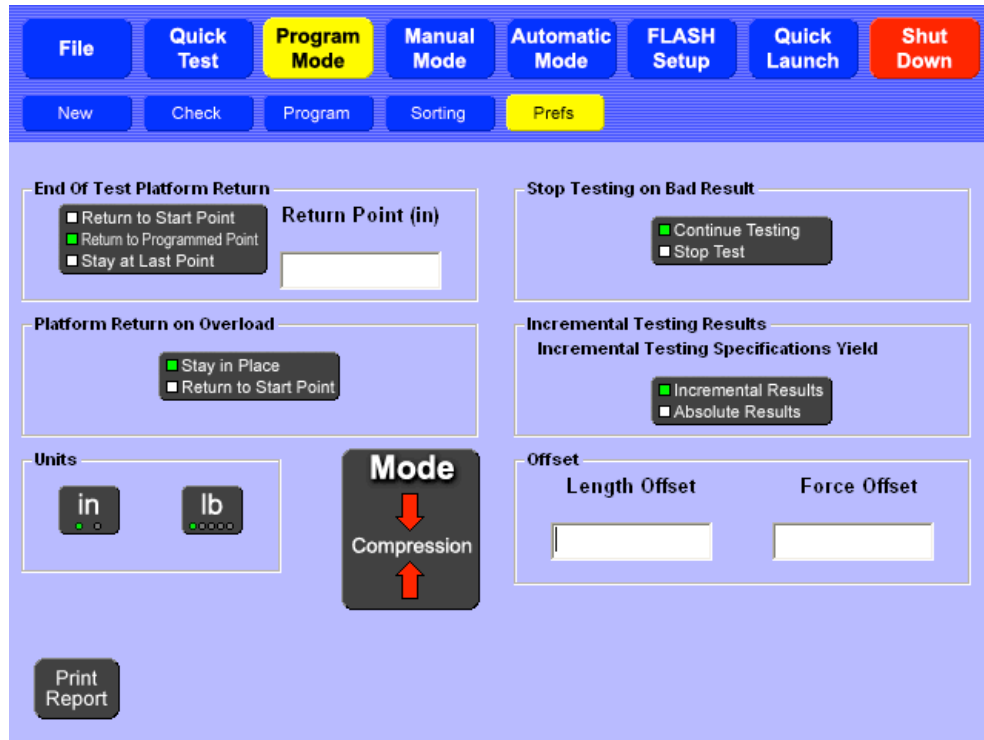
Touch **[Delete]** to delete the test point being viewed. Any test points above, the one deleted will shift down by one in the sequence.

The Test Application created can now be run in **[Automatic Mode]**, saved under **[File]**, modified or cleared. The test sequence continues from mode to mode as the screens are navigated. A new test cannot be created or retrieved until the current test is cleared. To clear a test and results, touch **[New]** in Program Mode. A message to verify this action appears. (This does not delete saved programs.)

These features allow easy customization of the data measured during a test sequence and position the order of the commands as needed.

14.2.4 Program Mode Preferences (Prefs)

The **Preferences** sub-screen initially displays the default settings for all testing applications. These preferences may be changed as needed or set for a user's standard testing parameters and left alone.



14.2.4.1 Post Test Platform Return

After a test is finished, the upper platform may be set to **Return to Start Point**, **Return to Programmed Point**, or set to **Stay at Last Point**. By default the platform will return to its starting point. If **Return to Programmed Point** is selected, touch the dialog box to enter a length value.

14.2.4.2 Platform Return on Overload

If an overload occurs during testing, the upper platform may be set to **Stay in Place** at the point of overload or **Return to Start Point**.

By default, the upper platform will **Stay in Place** at the point of overload. Staying in place may be helpful to determine why the overload occurred. Depending on the application run, setting to **Return to Start Point** may be preferred. Remember, in an overload emergency, the **Emergency Stop** button can be used to release the force and shut off the machine.

14.2.4.3 Stop Testing on Bad Result

When a conditional test results in either a **Bad Low** or a **Bad High** condition, the FLASH tester may be set to **Continue Testing** or to **Stop Test** immediately. By default, the tester will continue testing and all test points will be run. It may save time to set to **Stop Test** if only good parts are desired and the test sequence has multiple test points.

14.2.4.4 Incremental Testing Results

Certain test commands can be performed in either **Absolute** or **Incremental** mode (see Section 14.2.3.3). When a test command is performed in **Incremental** mode, the result can be returned in either incremental or absolute results. Incremental testing returns only incremental results.

In **Absolute** mode, the forces and lengths (both specifications and results) reference a fixed zero point. In **Incremental** mode, the forces, lengths, and results are given as deflection

amounts. There is an option available that specifies that the results of incremental test be given as Absolute measurements.

14.2.4.5 Units of Measurement

Two buttons control the units used during testing for length and force. When the unit of measurement is changed, all test points and results are converted to reflect the new unit selection.

14.2.4.5.1 Length

Choose between inches (in) and millimeters (mm). By default, the unit of measurement is inches.

14.2.4.5.2 Force

Choose between pound (lb), Newton (N), gram (g), kilogram (kg), or ounce (oz). By default, the unit of measurement is pounds.

14.2.4.6 Mode

This option selects the testing convention of either Compression or Extension.

14.2.4.6.1 Compression

For compression tests, the upper platform will move toward the lower platform to increase force.

14.2.4.6.2 Extension

For extension tests on current FLASH testers, the upper platform moves away from the lower platform to increase force. An extension length initialization must be performed to use extension mode the first time. Test fixtures, usually some type of hook, are attached to both platforms.

14.2.4.7 Offset

The **Length Offset** moves the length zero point and the **Force Offset** moves the force zero point. Offsets are generally used to compensate for the installation of test fixtures or the weight of the part being tested. When an offset is used, the force and / or length readings account for the value entered as the offset.

14.2.4.8 Show Length Results as Displacement from Test Point 1

This is an option under the Automatic mode that allows the tester to display length data as deflection amounts based on the tests performed in test points 1 and 2

a) If test point 1 and test point 2 are not dynamic tests, the starting position for deflection measurements is the ending position of Test Point 1. The direction for positive measurements will be the direction from test point 1 to test point 2. For Example, if Test Point 1 is Force at Length to 2" and Test Point 2 is Force at Length to 1" then deflection measurements will be measured from 2" and will be positive, with the upper platform moving down.

b) If test point 1 is not a Dynamic test and test point 2 is a dynamic test, the starting position for deflection measurements is the ending position of test point 1. The direction for positive measurements is the direction of travel for the dynamic test in test point 2. For example, if Test Point 1 is Length at Force to 450 lb and Test Point 2 is Dynamic to Force to 1000 lb, deflection measurements will start where 450 lb is found and the positive direction is the direction to get to 1000 lb. If testing a compression spring, positive direction is downward.

c) If test point 1 is a Dynamic Test, the starting position for deflection measurements will be the position of the platform before the test starts or the specified Measurement Start. The direction for positive measurements is the direction of travel for the Dynamic test.

14.2.4.9 Print Report

Touch **[Print Report]** to generate a hard copy of the program run and print the resulting test data. See Section 14.2.3.9 for more information. Check availability of this option.

14.3 Quick Test

Password Protection Optional

Use **Quick Test** to obtain test data for a part without knowing any of its characteristics. A generic predefined test performs two compression passes to solid height on the part. The first pass determines the test points and the second determines the nominal value for the test points. Testing is based on the presets under **[Prefs]**. See Section 14.2.4.

NOTE: The **Quick Test** application is designed for compression springs. Consult with LSI if you have any questions.

If the part has coils that shift during compression, the **Quick Test** will not work. Shifting coils will not produce an accurate solid height. If the coils shift, the preset force or length should be changed. Depending on the part or the capacity of the tester, the speed of the test can be adjusted to enhance the accuracy and minimize deflection.

The **Quick Test** feature calculates the free length, the force required to reach solid height, the two points between free length and solid height (default is at 20% and 80% deflection from free length), and the rate between the two points during the first pass. During the second pass, the tester determines nominal test result values. The final result of the **Quick Test** is a 5-point test sequence that can be used to repetitively test like parts in the **Automatic Mode**. The 5-point sequence of test commands is as follows:

1. Free Length
2. Force @ Length (for first deflection)
3. Force @ Length (for second deflection)
4. Length @ Force (for solid height)
5. Rate (between test point 2 and 3)

This test can now be:

1. Viewed and fine tuned in the **Program Mode**
2. Run repetitively and data viewed in the **Automatic Mode**
3. Saved for future use, along with any test result data using **File**

Under **Quick Test** there are three sub-screen menus: **Program**, **Actual Data**, and **Prefs**.

14.3.1 Program

	Length (in)	Force (lb)	Tolerance
Free Length	<input type="text"/>	<input type="text"/>	<input type="text"/>
20% Deflection	<input type="text"/>	<input type="text"/>	<input type="text"/>
80% Deflection	<input type="text"/>	<input type="text"/>	<input type="text"/>
Solid Height	<input type="text"/>	<input type="text"/>	<input type="text"/>

Rate

Tolerance

Comp.

Abort Test

The **Program** screen allows you to run the generic **Quick Test** or manually enter data for the 5 test points and then run a test.

To start a **Quick Test**, touch the green **[Learn Test]** button in the lower right of the display. During the first pass, as each test point is reached, its value is displayed in the corresponding value box. Once the first compression is complete, the upper platform returns to its starting point to begin the second pass. When the second pass is complete, the nominal test results are displayed and the platform returns to its start position. You may fill in the **Tolerances** if desired by touching the corresponding value dialog box.

If part specifications are known, using **[Learn Test]** may be bypassed and the test data entered manually by touching the corresponding value dialog box. After the test data has been entered via **[Learn Test]** or manual data entry, parts may be tested using the **Actual Data** sub-screen.

14.3.2 Actual Data

	Length (in)	Force (lb)	Tolerance
Free Length	<input type="text"/>		8.00
20% Deflection	2.4965	<input type="text"/>	7.00
80% Deflection	2.0310	<input type="text"/>	6.00
Solid Height	<input type="text"/>	198.5	5.00

Rate

Tolerance

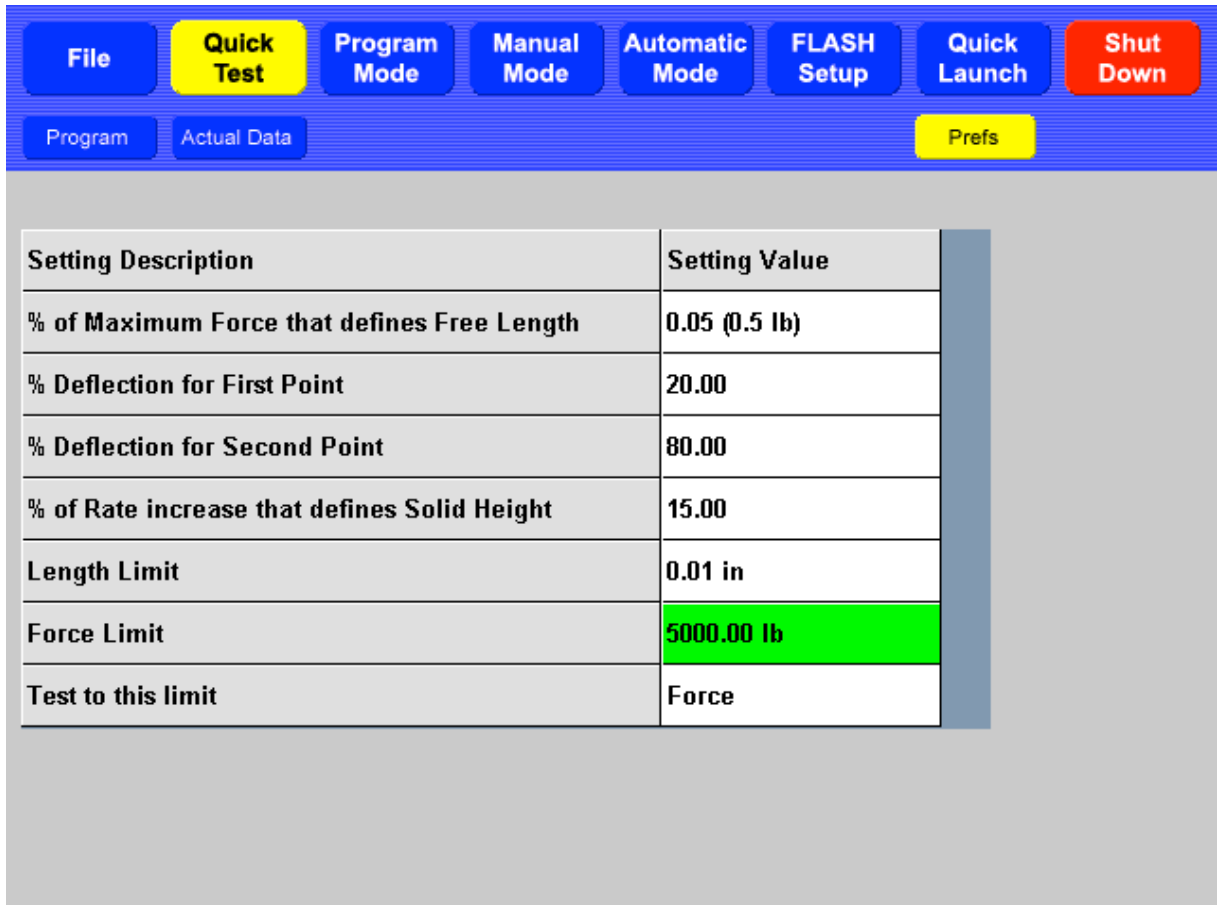
Comp.

Abort Test Repeat Test

Touch the green **[Repeat Test]** button to run a test again. When the test is finished the results will be displayed. If tolerance values were entered then the results will be displayed in green for a satisfactory result or in red for a bad high or bad low result. Only the most recent test data will display. The **Automatic Mode** may be used if you prefer to view multiple test results. The **[Repeat Test]** button operates the same as the **[Start Test]** button in **Automatic Mode**.

14.3.3 Quick Test Preferences (Prefs)

The Preferences set are used when [Quick Test] is run.



Setting Description	Setting Value
% of Maximum Force that defines Free Length	0.05 (0.5 lb)
% Deflection for First Point	20.00
% Deflection for Second Point	80.00
% of Rate increase that defines Solid Height	15.00
Length Limit	0.01 in
Force Limit	5000.00 lb
Test to this limit	Force

14.3.3.1 Percent of Maximum Force that defines Free Length

This determines the free length used to find the deflection lengths for the first and second deflection from Free Length (test points 2 and 3 in final test point 5).

14.3.3.2 Percent Deflection for First Point

Determines the first deflection length between free length and solid height. This is the longest length that is closest to free length.

14.3.3.3 Percent Deflection for Second Point

Determines the second deflection length between free length and solid height. This is the shorter length that is closest to solid height.

14.3.3.4 Percent of Rate Increase that defines Solid Height

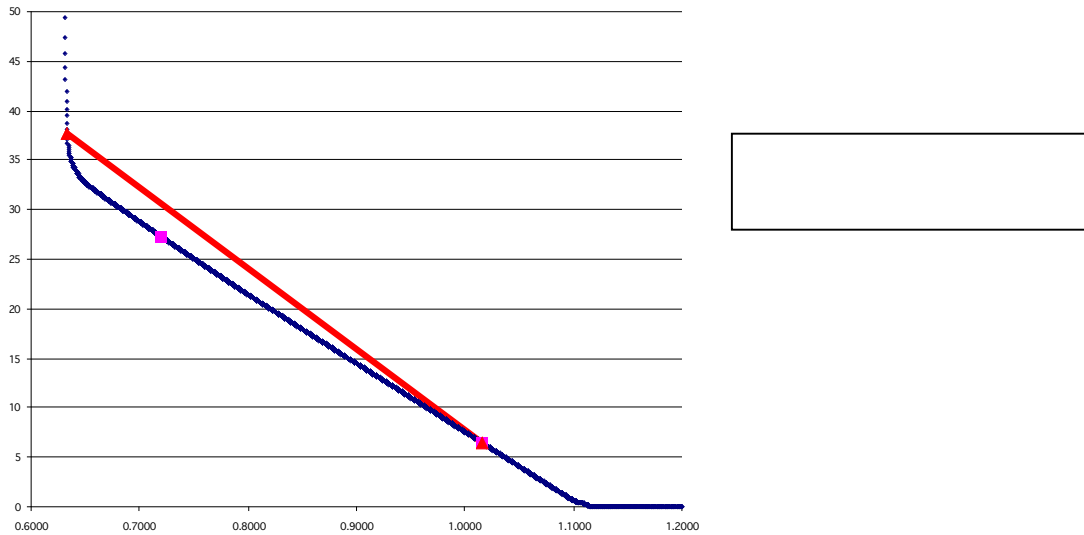
Determine the amount of force needed to compress the part to solid.

While a part is compressed, the rate is constant as seen in the picture below. Once the part is compressed solid, the force increases exponentially.

During the processing of the data from the first pass, an approximation is made of the two testing points in order to determine the rate of the part. To find the force needed for solid

height, the rate is examined between the first point and the rest of the curve. When this rate increased by a set amount, the solid height is determined.

This setting determines how much of an increase in rate is needed to calculate solid height.



14.3.3.5 Length Limit

During the Quick Test, the part is compressed to a specific force or a specific length. When the test compresses to a force, this setting is used to determine the force limit.

If testing to a length, this length must be set to a point just above the damage point for the part. If the part is not compressed to solid, this length is used as the Solid Height.

14.3.3.6 Force Limit

During the Quick Test the part is compressed to either a specific force or a specific length. When the test compresses to a force then this setting is used to determine what force to compress to.

If you test to a force, this force must be set large enough to compress the part to solid, but low enough to not damage the part being tested.

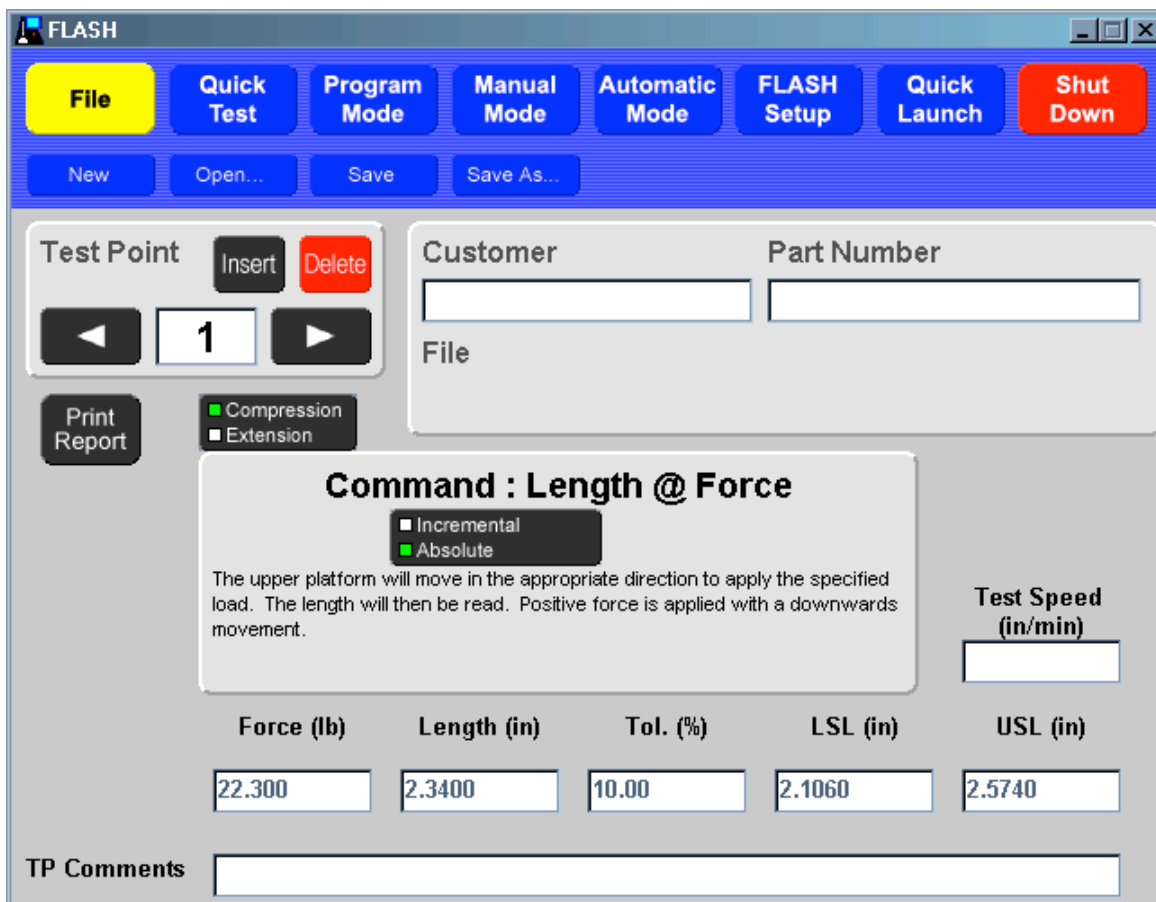
14.3.3.7 Test to this limit

This setting specifies whether force or length limits are used when performing the first pass of the Quick Test.

14.4 File

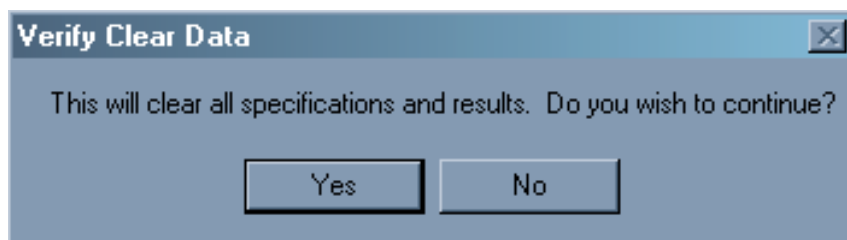
Password Protection Optional

Touch **[File]** to save tests and results, retrieve tests and results, or clear the current test and results. This screen is similar to the **Program Mode > Program** screen. However, no specifications may be changed. Touch **[◀]** or **[▶]** to review a test sequence. The submenus for the **File** menu are **New**, **Open**, **Save** and **Save As**.



14.4.1 New

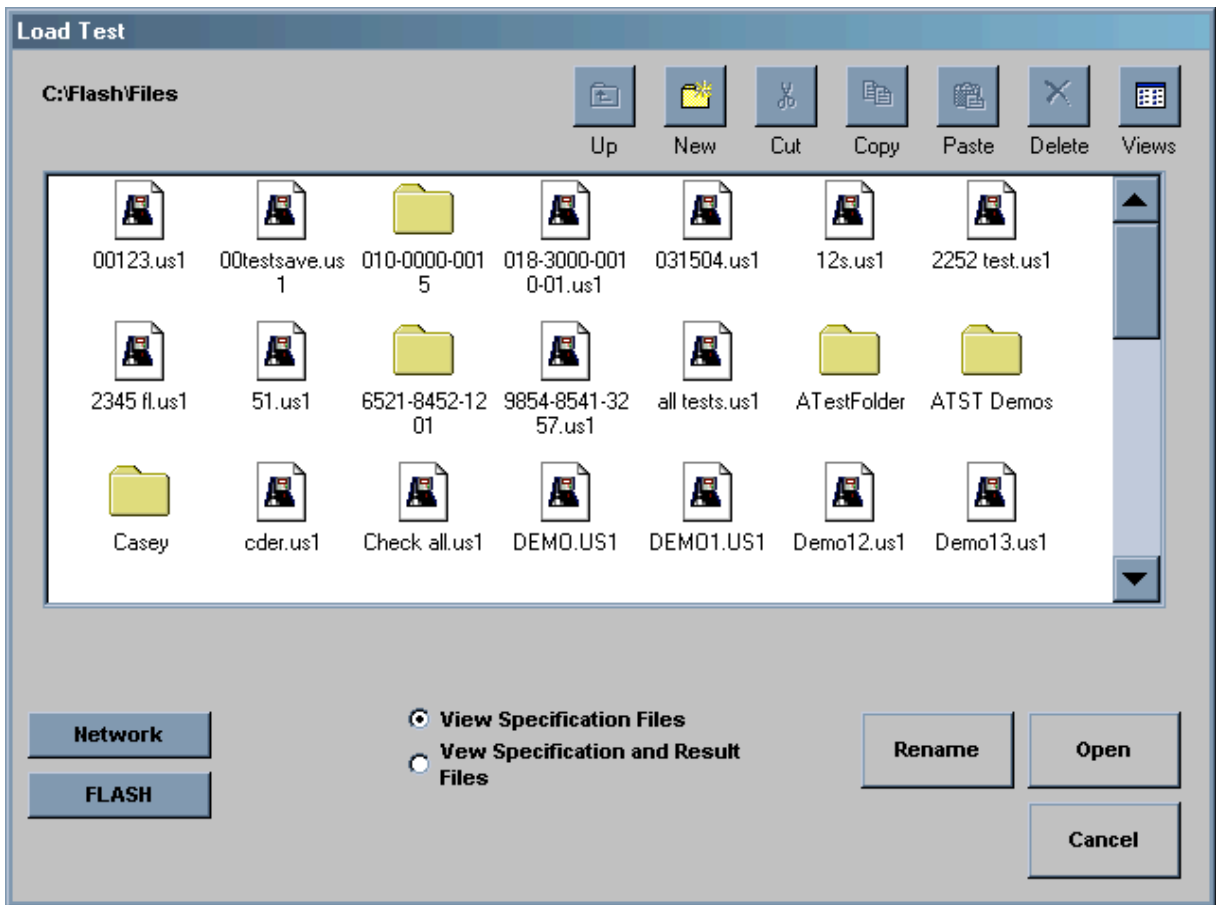
Touch **[New]** to clear a test and all results. **The current test is not saved.** A message to verify the action appears. Touch **[Yes]** to clear or **[No]** to make a different selection.



14.4.2 Open

Touch the **[Open]** submenu to view files that have been stored. The **Load Test** screen appears as shown below. Touch a filename or folder to select a test or result file.

View Specification Files only or **View Specification and Result Files** by touching the desired selection in the bottom center of the screen.



After a file or folder has been selected, its name appears in a dialog box at the bottom of the screen. The following actions may be selected from the row of icons at the top right of the display:

- Touch **[Up]** to move up a directory. This icon is active when a folder is selected and allows movement between other folder directories.
- Touch **[New]** to create and name a new folder in the displayed directory.
- Touch **[Cut]** or **[Copy]** to Cut or Copy a folder or file.
- Touch **[Paste]** to move or copy a file or folder to the current directory.
- Touch **[Delete]** to delete a file or folder. When a file or folder is deleted, it is moved to the Recycling Bin. The Recycling Bin can be accessed through the Operating System. See Section 11.7.6.
- Touch **[Views]** to toggle between: Large Icons, Small Icons, List, or Details.

To open a file and run a test:

1. Touch the desired test filename from the **C:\Flash\Files** screen to select.
2. Touch **[Open]** in the lower right of the display. This brings up the test in the original **[File]** screen that displays the test point and command along with the main **Navigation Toolbar**.

3. If the test program requires modification, select **[Program]** from the **Navigation Toolbar**. Use the arrow keys in the **Test Point** box to view or make changes. Add information like **Customer** or **Part Number** if you wish.
4. Changes may be saved to the same filename by touching **[File]>[Save]** or to a new filename by touching **[File]>[Save As]**.
5. To use the test program for running a test select **[Automatic Mode]** from the **Navigation Toolbar**.
6. Touch the green **[Start Test]** button to run. See Section 14.5 for information on using **Automatic Mode** and selecting result views.
7. Multiple parts may be tested in this mode, generating a condition for sorting, and results saved, printed, or viewed.

Other Available Selections:

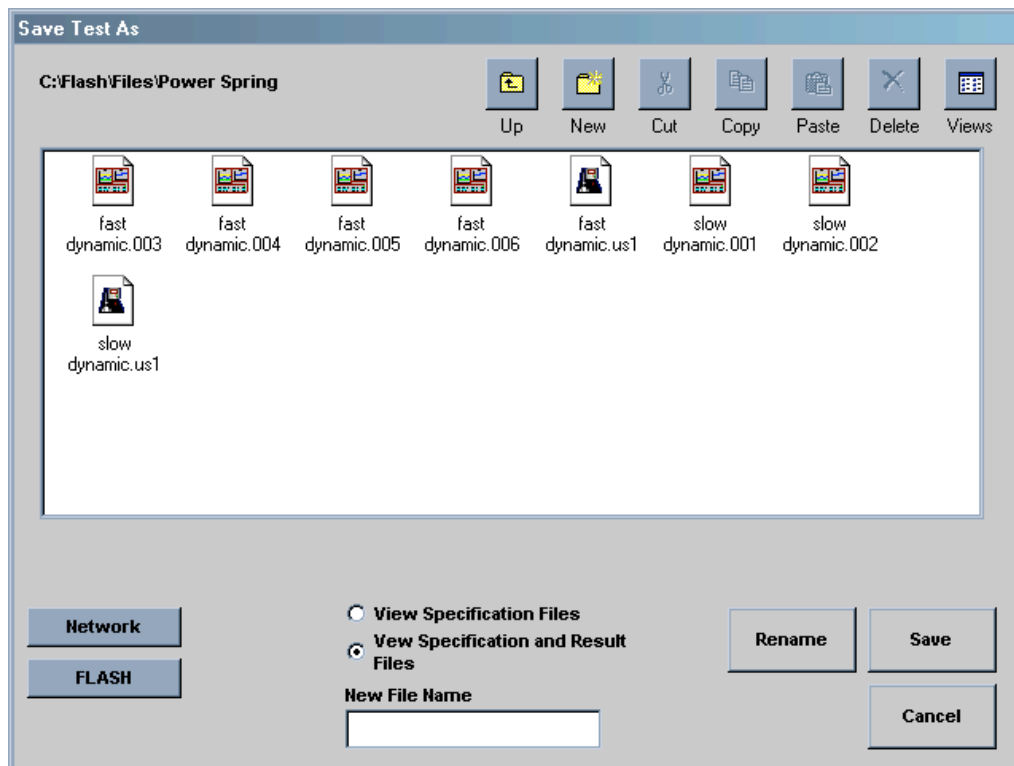
- **[Rename]** – rename an existing file
- **[Network]** – access the customer network allowing files to be shared via intranet.
- **[FLASH]** – return to the “C:\Flash\Files directory screen
- **[Cancel]** – go back to the previous screen

14.4.3 Save

If the test already has a filename, the test specifications and results are saved under that file name again by touching [Save]. If the test specifications do not have a filename yet, the **Save Test As** screen opens and asks you to save the file.

14.4.4 Save As...

Touch **[Save As...]** to give test sequence specifications and results a filename when saving to storage for the first time. Navigate this screen with the same commands in section 14.4.3. Touch the **New File Name** dialog box to bring up the on-screen keyboard. Type a filename and touch **[Enter]**.



14.5 Automatic Mode

In **Automatic Mode**, you may test several parts or springs in sequence using a predefined program, select how the results are compiled, view the results by data or graph, set view preferences, and print a report. Available features vary by software package.

Test	Result (in)	Tolerance (%)	Run Line		
			L	M	U
1	1.5555	-0.92		•	
2	1.5709	0.06		•	
3	1.5894	1.24		•	
4	1.5437	-1.68		•	
5	1.5823	0.78		•	
6	1.5732	0.20		•	
7	1.5720	0.13		•	
8	1.5709	0.06		•	
9	1.5732	0.20		•	
10	1.5441	-1.65		•	
11	1.5890	1.21		•	
12	1.5709	0.06		•	
13	1.5886	1.18		•	
14	1.5717	0.11		•	

14.5.1 Using a Predefined Program

There are two basic ways to put a (predefined) test sequence in place to run from the **Automatic Mode**.

1. Create a test point sequence in the **Program Mode** or capture a test point sequence using **Quick Test**. Then, enter the **Automatic Mode**. The program created is now in place to run.
2. Go to **File>Open** and select the desired stored program from the directory. Enter the **Automatic Mode**. The program selected is now in place to be run. The filename of the program selected appears in the top of the gray part of the display.

14.5.2 Select How Results Are Compiled

Select **By Test** or **By Lot** from the sub-menu bar to choose how the results calculate.

- **By Test** calculates the results for each individual test
- **By Lot** calculates the average result for a group of parts tested

The default selection is **By Test**.

14.5.3 Viewing Results

This section describes the content of the various views available for the method of calculation. Preferences may be set for each individual view format. In section 14.5.4, the Preferences relevant to each view are described.

14.5.3.1 By Test or By Lot

14.5.3.1.1 Actual Data

This view consists of a table / grid that lists each test point of a sequence and may show columns for actual numerical results, tolerances, and conditional results when applicable. Results are an average when Actual Data is calculated By Lot.

The Actual Data grid can be viewed in either of two ways:

1. By **Test Point (Tp)** showing all of the test results for a single point, or
2. By **Test** showing all of the test point results for a specific test.

The desired view can be set in Preferences (**Prefs**) or switched by tapping the title at the top of the left column labeled “Tp” or “Test”.

The conditional results can also be viewed two ways:

1. By **Condition** showing “Bad High”, “Satisfactory”, or “Bad Low” statements, or
2. By a **Run Line** reflecting where the results fall in relation to the specified limits.

The desired view can be set in Preferences (**Prefs**) or switched by tapping the title at the top of the right column labeled “Condition” or “Run Line”.

14.5.3.1.2 Statistics

This view shows the test results as statistical data that can be viewed as an average of all tests when **By Test** is selected. View the data as an average of a certain number of tests when **By Lot** is selected and lot size has been defined in Preferences.

14.5.3.2 By Test Only

14.5.3.2.1 F vs. L (Force vs. Length)

A point is plotted on a chart for each test point that has both force and length data. By testing multiple points, a representative curve is displayed. If the test sequence included a test point for both the compression and release strokes, the chart would be able to display hysteresis.

Chart limits for each point may be set in Preferences (**Prefs**) or by tapping on the axis labels. Clear the zoom to change the chart limits to the load cell maximum and length maximum.

14.5.3.2.2 Individual

In graphical format, this view shows all of the results for a single test point for all of the parts tested. Shift the chart over the test points using the right and left arrows. Touch chart labels along either axis to zoom in. Touch **[Clear Zoom]** or **[Undo Zoom]** to reset or manipulate graph.

Chart limits may be set in Preferences (**Prefs**) or by tapping on the chart labels to zoom. Clear the zoom to change the chart limits to the load cell maximum and the length maximum.

14.5.3.3 By Lot Only

14.5.3.3.1 X-Bar / R-Chart

The **X-Bar** graph is similar to the Individual graph except that each point represents the mean of the group data. The **R-Chart** represents the range of results within the group data. The two may be viewed individually or on the same chart. If viewing individually use **[Show Range]** and **[Show X-Bar]** to switch views. Touch **[Prefs]** when viewing this chart to change settings.

14.5.3.3.2 Histograms

This graph shows how the data groups together and how the normal line would appear. For a symmetrical group of data, the normal line would look like a bell curve. The histogram limits will be the specification limits, the +/- sigma limits, or actual results. The histogram is divided into 10 sections over the limits.

14.5.4 Automatic Mode Preferences (Prefs)

When using the Automatic Mode and By Test or By Lot has been selected (highlighted in yellow), a results view may be selected as described in the previous section. At any of the combinations of By Test / By Lot with a result view, a different preference screen can be accessed that is specific to the view that is highlighted by touching [Prefs]. This section describes the variables that may be set for each.

14.5.4.1 Actual Data

- View by Tp or by Test
- View conditional results by Condition or Run Line
- Set the Lot Size (if applicable)

14.5.4.2 Statistics

- Set the Lot Size (if applicable)

14.5.4.3 F vs. L

- Set axis limits manually
- Show specification limits
- X and Y axis max / min force and length

14.5.4.4 Individual

- Set axis limits manually
- Show specification limits
- Show the mean line
- Show the +/- 4 Sigma control lines
- Minimum / maximum test points (Tp) displayed on X axis

14.5.4.5 X-Bar / R-Chart

There are a number of preferences that may be set for this chart including:

- X-Bar and Range on same chart
- Set axis limits manually
- Show X-Double Bar line
- Show Range Mean line
- Show X-Bar specification limit line
- Show +/- 4 Sigma control lines for both X-Bar and R-Chart
- Set the Lot Size
- X and Y axis max / min for both X-Bar and R-Chart

14.5.4.6 Histogram

- Specification limits
- +/- Sigma limits
- Actual results
- Set the Lot Size

14.5.4.7 Start Test

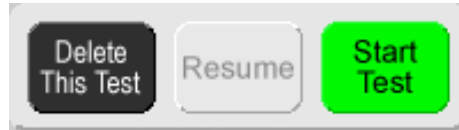
After the first part to be tested has been placed on the platform, be sure to zero the force and close the safety shield or door. Touch the green **[Start Test]** button located in the lower right of the display to begin a test. Results will appear immediately. If a test ends in an error, such as door left open or overload, it will be deleted automatically when **[Start Test]** is touched to begin the next test. Parts can continue to be tested by touching **[Start Test]**. The **Test Point** number will increase each time another test is run.

14.5.4.8 Abort Test

Touch the red **[Abort Test]** button to stop the movement of the platform during a test. The platform will immediately stop. The platform may have to be moved or reset to a starting position using the Jog Bar in Manual Mode so you can remove the part and continue testing. The Abort Test button switches to Delete This Test after a test is run. (Note: If the abort button on the touch screen is pushed, no re-initialization is required. If the E-stop button below the touch screen is used, you must re-initialize the tester.)

14.5.4.9 Resume

When a test point sequence contains **Pause** as a test point command, the tester will automatically pause when that test point is reached. Touch **[Resume]** to continue the test. The **Resume** button is only available for use when a **Pause** command is run.



14.5.4.10 Delete This Test

Once a test has been run, the **Abort Test** button will change to "**Delete This Test.**" You may touch **[Delete This Test]** to delete or touch **[Start Test]** to continue testing. Once the next test is started, the previous test run is fixed and reported. Only the last test run may be deleted.

14.5.4.11 Show Length Results as Displacement from Tp 1

This is a preference when you use a dynamic test command under the Automatic mode that allows the tester to display length data as deflection amounts based on the tests performed in test points 1 and 2.

a) If test point 1 and test point 2 are not dynamic tests, the starting position for deflection measurements is the ending position of Test Point 1. The direction for positive measurements will be the direction from test point 1 to test point 2. For Example, if Test Point 1 is Force at Length to 2" and Test Point 2 is Force at Length to 1" then deflection measurements will be measured from 2" and will be positive, with the upper platform moving down.

b) If test point 1 is not a Dynamic test and test point 2 is a dynamic test, the starting position for deflection measurements is the ending position of test point 1. The direction for positive measurements is the direction of travel for the dynamic test in test point 2. For example, if Test Point 1 is Length at Force to 450 lb and Test Point 2 is Dynamic to Force to 1000 lb, deflection measurements will start where 450 lb is found and the positive direction is the direction to get to 1000 lb. If testing a compression spring, positive direction is downward.

c) If test point 1 is a Dynamic Test, the starting position for deflection measurements will be the position of the platform before the test starts or the specified Measurement Start. The direction for positive measurements is the direction of travel for the Dynamic test.

Result Preferences

View Results by Test (view all results for one test)

View Results by Test Point (view all results for one test point)

Show Length Results as Displacement from Tp 1

View Condition Description

View Condition Run Line

Dynamic Rate Averaging (1 - 100)

Part Counting

By Test Number

By Serial Number

Starting SN

Automatically Save Result Data

Auto Clear Results After This Many Results

14.5.4.12 Print Report

Touch **[Print Report]** to generate a printed report if your tester has this feature. However, the Preview function may be used even if a printer is not connected. See Section 12.2.3.9.

14.5.4.13 Tested By

Touch the dialog box below **Tested By** to enter the name of the person performing the tests using the on-screen keyboard. The name entered appears on the printed report and stored with the results file.

14.5.4.14 Length Display

The **Length Display** functions the same as in **Manual Mode** except that there is no **[Go To]** feature.

14.5.4.15 Force Display

The **Force Display** functions the same as in **Manual Mode** except that there is no **[Go To]** feature.

14.5.4.16 Test Number

By using the right or left arrows, each individual test point and test result can be viewed unless viewing all test results, statistics or individual chart.

Touch **[Clear Results]** to clear test results and leave the test specifications intact. A message will appear to verify this action.

For detailed instructions on creating a test program and running it in Automatic Mode, see Section 14 – Examples of Test Programs.

14.6 Quick Launch

Password Protection Optional

The **Quick Launch** feature is designed to give you quick access to a specific test. This is handy when a test needs to be run on a part while you're testing other parts. Quickly access Quick Launch: select a test, run the test, view results and go back to testing. No need to set up or program a test.

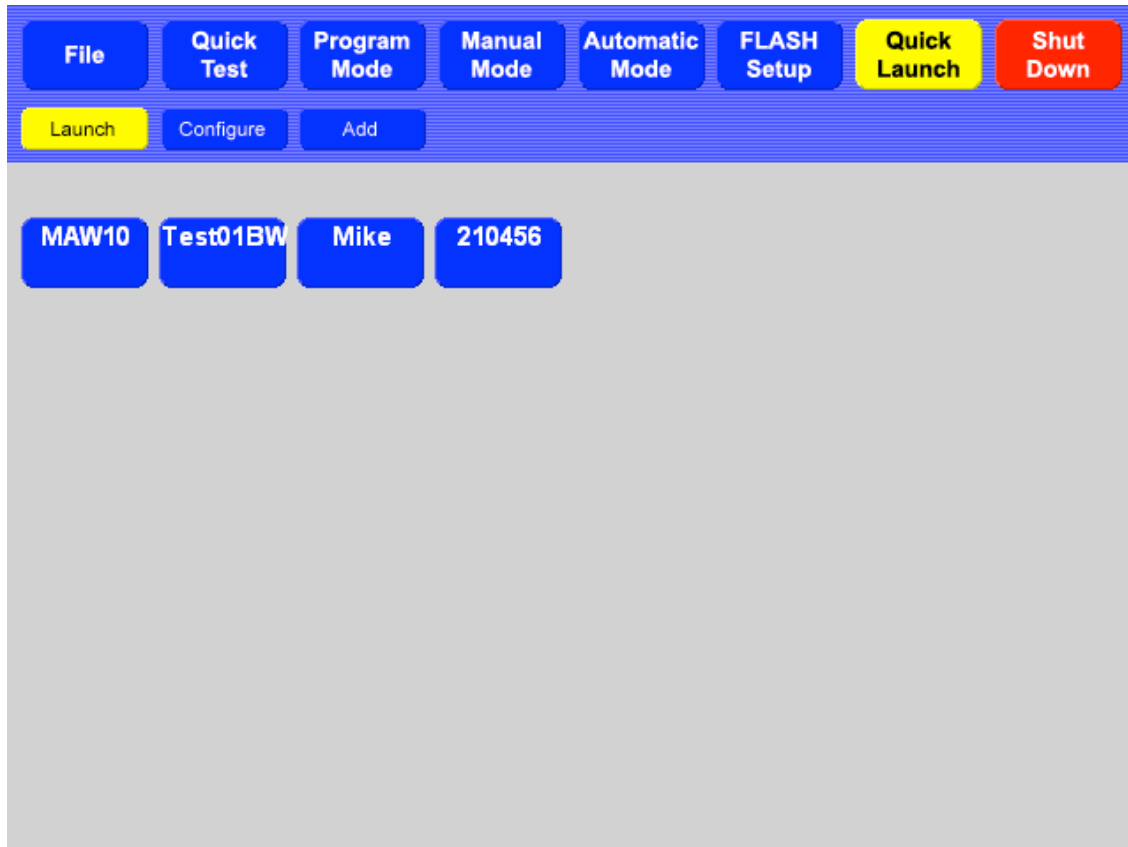
There are three sub-screens under **Quick Launch**:

- **Launch** – select and run a customized test sequence from here
- **Configure** – edit or delete a launch button
- **Add** – define and add a new program button to the launch screen

14.6.1 Launch

Select any blue Quick Launch button from the gray area of this screen. See [14.6.3 – Add](#) for instructions to set up Quick Launch buttons. The **Quick Launch** screen shown below has four buttons set up labeled by name, part number or other description. The screen can accommodate about 50 buttons.

When a blue Quick Launch button is selected, the tester will go to the specified screen to open when the button was created and added to the display. You will be able to run the test immediately.



14.6.2 Configure

Touch **[Configure]** to edit or delete an existing button. Select the Quick Launch button from the directory. The following screen appears:

The screenshot shows the 'FLASH' software interface. At the top, there is a menu bar with buttons for 'File', 'Quick Test', 'Program Mode', 'Manual Mode', 'Automatic Mode', 'FLASH Setup', 'Quick Launch', and 'Shut Down'. Below the menu bar, there are three buttons: 'Launch', 'Configure', and 'Add'. The main area of the dialog box contains four text input fields, each with a 'Clear' button to its right. The fields are: 'Name' (containing 'Mike'), 'Specification File' (containing 'C:\UTM\DEMO.US1'), 'Print Setup(Optional)', and 'Screen To Open' (containing 'Actual Data'). Below the fields is a 'Display Screens' section with a grid of buttons: 'Actual Data', 'Statistics', 'Individual Chart', 'F vs L Chart', 'Actual Data', 'Statistics', 'X-Bar Chart', and 'Histogram'. At the bottom of the dialog box are three buttons: 'Accept Changes', 'Remove', and 'Cancel'.

You may edit the **Name**, choose a different **Specification File**, change the **Screen To Open** information, or add **Print Setup** specifications. Touch a dialog box to make changes.

When changes have been entered, touch **[Accept Changes]** to save.

Touch **[Remove]** to instantly delete a quick launch button.

Touch **[Cancel]** to go back to the previous screen.

The **[Clear]** buttons next to the dialog boxes will erase the data from the corresponding box.

14.6.3 Add

Add a new button to the **Launch** view using this function. Each button should include a **Name**, **Specification File**, and the **Screen To Open** when selected. A **Print Setup** preference may be attached if desired. Tap on a text box to enter data.

The screenshot shows the 'FLASH' application window. The top bar is blue and contains several buttons: 'File', 'Quick Test', 'Program Mode', 'Manual Mode', 'Automatic Mode', 'FLASH Setup', 'Quick Launch' (highlighted in yellow), and 'Shut Down' (red). Below this bar are three more buttons: 'Launch', 'Configure', and 'Add' (highlighted in yellow). The main area is light gray and contains four text input fields, each with a 'Clear' button to its right:

- Name:** The text box contains the word 'Blank'.
- Specification File:** An empty text box.
- Print Setup(Optional):** An empty text box.
- Screen To Open:** An empty text box.

At the bottom of the dialog are two buttons: 'Add' and 'Cancel'.

14.6.3.1 Name

The **Name** appears on the blue file button under **Quick Launch**.

14.6.3.2 Specification File

The Specification File must already exist in the saved files. Touch this text box and the **File Load** screen appears, listing all saved files. Select a filename icon from this directory to attach to a new Quick Launch button and continue.

14.6.3.3 Print Setup (Optional)

Attach a printing specification to the button being created. If a printer has been configured to the Windows Operating System, it will appear as a selection when this text box is selected.

14.6.3.4 Screen To Open

Screens to open may encompass any screen. If the **Automatic Mode** screen is selected then a specific result screen can also be selected, result screens include Actual Data, Statistics, and any chart. Selections available will be shown.

[Clear] – to delete information from text box

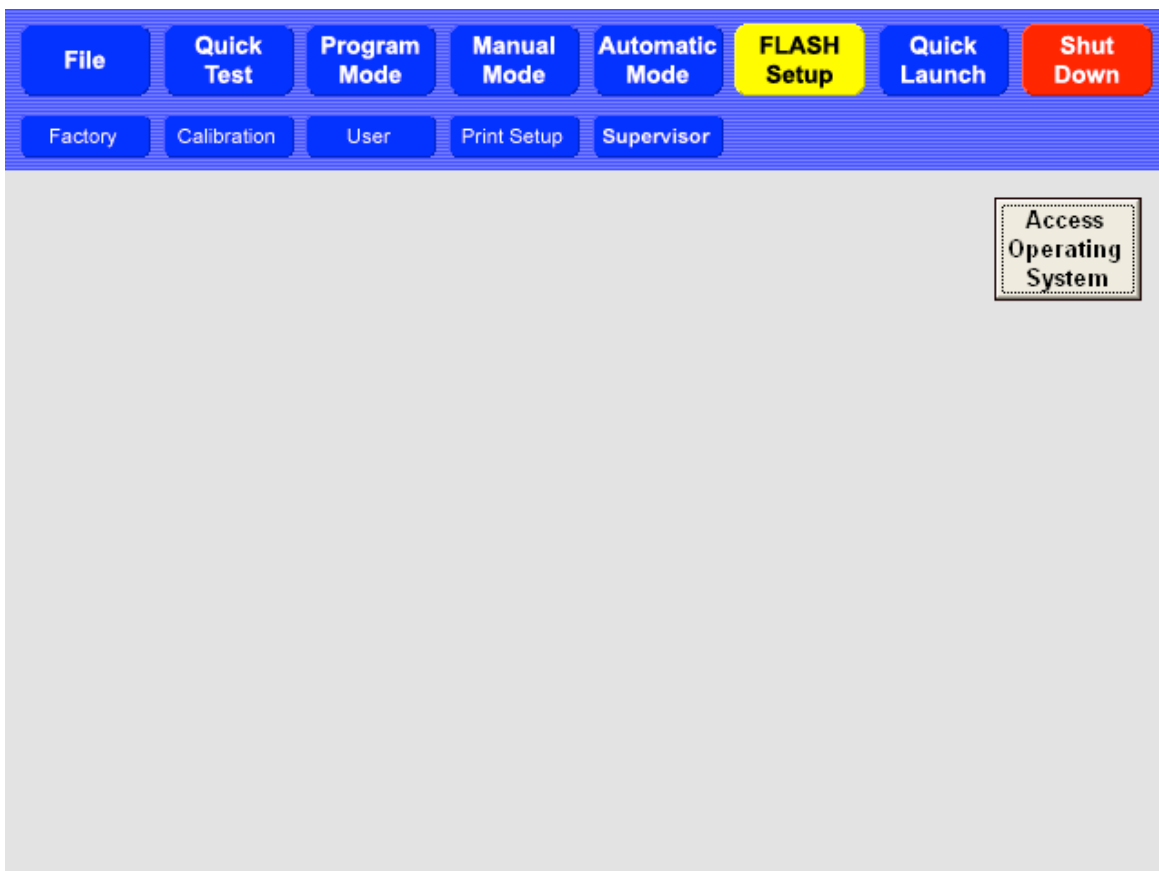
[Add] – touch this button when all information has been entered to create a new button

[Cancel] – to cancel creating a new button

14.7 FLASH Setup

There are five selections within the FLASH Setup menu: **Factory**, **Calibration**, **User**, **Print Setup**, and **Supervisor**. They are password-protected or accessible as noted in their descriptions below.

There is also a button configured separately from the main selection menu identified as **[Access Operating System]**. Certain tester configurations may require you to access this password-protected menu.



14.7.1 Factory

Password Protected

Factory setup is done at Larson Systems for each new tester and should never be accessed by the end user. Changes to factory settings could degrade performance of

the FLASH tester or disrupt the FLASH program entirely. ***Intentional changes to the Factory settings by the end user may void the warranty.***

14.7.2 Calibration

Password Protected

Calibration is used to adjust settings affecting the measurement accuracy of the FLASH tester. This feature should be accessed and used only by LSI trained calibration technicians.

14.7.3 User

Password Protection Optional

User setup displays tester settings you can access. Default settings have been preset at the factory and may not need any adjustment. Some of the items are general information about the FLASH tester, such as the software version and serial number. Other settings control test speed, standard deviation, input and output signal diagnostics, to name a few. This is a good place to view and modify settings that may affect test specifications.

14.7.4 Print Setup

Password Protection Optional

Print Setup displays the settings for report printout and shows an example of the standard printout. Different report printouts can be configured and saved for use with appropriate test applications using this menu.

When [**Print Setup**] is selected from the **FLASH Setup** menu, a menu bar of black action buttons appears with an example report below it. The action buttons are **Save Info**, **Load Info**, and **Preview**, followed by four selection buttons. This section describes how to use this screen and what each item and action button does.

When using the **Print Setup** screen, start with the Example Report. There are three columns titled **Setting Description**, **Order**, and **Setting Value**. Navigate this report by touching the scroll bar on the right side of the screen. Touch the title of a setting description to see the details and options for that section.

The screenshot shows the **Print Setup** interface. At the top is a menu bar with buttons for File, Quick Test, Program Mode, Manual Mode, Automatic Mode, **FLASH Setup** (highlighted), Quick Launch, and Shut Down. Below this is a secondary menu bar with Factory, Calibration, User, **Print Setup** (highlighted), and Supervisor. A row of action buttons includes Save Info, Load Info, Preview, and four selection buttons: By Test, Regular, All Results, Margins, By Lot, Quick Test, Single TP, and Print Setup.

The main area displays a report preview with the following structure:

Setting Description	Order	Setting Value																																																																																																																												
Print Company Name (+) Show Details	1	Your Company Name Your City, Your State, Zip Code																																																																																																																												
Print Heading (+) Show Details	2	<table border="1"> <tr> <td colspan="2">General Information</td> <td colspan="2">Test Equipment</td> </tr> <tr> <td>Tester By:</td> <td></td> <td rowspan="6"> Laser Systems Inc. Minnesota, MN, USA Tester Model: FLASH 11 Software Version: 1.6 Load Cell: 110,000 lb Calibration Date: 01-02-0004 Recalibration Date: 01-02-0005 </td> </tr> <tr> <td>Customer:</td> <td></td> </tr> <tr> <td>Cust Part#:</td> <td></td> </tr> <tr> <td>File Name:</td> <td>C:\FlashFiles\Demo001</td> </tr> <tr> <td>Test Date:</td> <td>08-18-1995</td> </tr> <tr> <td>Spring Type:</td> <td>Compression</td> </tr> <tr> <td>Length Offset:</td> <td>0.0000 in</td> <td></td> </tr> <tr> <td>Force Offset:</td> <td>0.000 lb</td> <td></td> </tr> </table>	General Information		Test Equipment		Tester By:		 Laser Systems Inc. Minnesota, MN, USA Tester Model: FLASH 11 Software Version: 1.6 Load Cell: 110,000 lb Calibration Date: 01-02-0004 Recalibration Date: 01-02-0005	Customer:		Cust Part#:		File Name:	C:\FlashFiles\Demo001	Test Date:	08-18-1995	Spring Type:	Compression	Length Offset:	0.0000 in		Force Offset:	0.000 lb																																																																																																						
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Print Specs	3	<table border="1"> <tr> <th colspan="8">Test Specifications</th> </tr> <tr> <th>In.</th> <th>Measurement</th> <th>Target</th> <th>Nominal</th> <th>Tolerance</th> <th>Speed</th> <th colspan="2">Miscellaneous</th> </tr> <tr> <td>1</td> <td>F&L</td> <td>1.2500 in</td> <td>25,451 lb</td> <td>± 5%</td> <td></td> <td colspan="2"></td> </tr> <tr> <td>2</td> <td>F&L</td> <td>0.9800 in</td> <td>32,539 lb</td> <td>5.00 %</td> <td></td> <td colspan="2"></td> </tr> <tr> <td>3</td> <td>Rate</td> <td></td> <td>26,2900 lb/in</td> <td>5.00 %</td> <td></td> <td colspan="2">TPs 1, 2</td> </tr> </table>	Test Specifications								In.	Measurement	Target	Nominal	Tolerance	Speed	Miscellaneous		1	F&L	1.2500 in	25,451 lb	± 5%				2	F&L	0.9800 in	32,539 lb	5.00 %				3	Rate		26,2900 lb/in	5.00 %		TPs 1, 2																																																																																					
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14.7.4.1 Setting Description

Seven categories identify sections of the example report on the left side:

1. **Print Company Name** – When details are shown, if the **Company Name** has not been entered, touch this item to open the on-screen keyboard, type in company name and touch enter. Do the same for **City Name**.
2. **Print Heading** – The only option in this section is printing the tester's LSI calibration date on the report. Touch to toggle between **Yes** or **No**.
3. **Print specs** – There are no option selections for printing test specifications here. Use the black selection button above the report example to select **Regular** or **Quick Test**. This changes the specifications printed within this section.
4. **Print Results** – The options are Print Tp Results, Point 1 (Yes or No) and Print Tp Run Line (Yes or No). Use the black selection button above the report example to select results printed in this section as Actual Data or Lot Data (By Test or By Lot).
5. **Print Statistical Summary** – There are a number of options listed by statistic. Some of the statistics may not be relevant for a particular test and may be omitted here. Just touch the **Setting Value** to change.
6. **Print Text Histogram** – There are no options for printing a text histogram.
7. **Print Individual Chart** – The only option is printing an individual chart by point. If Yes is selected, a chart will print on the report for each point of the test.

Next, make sure the black Selection buttons above the chart have been set as desired.

14.7.4.2 Selection Buttons

- **By Test** or **By Lot** – this selection defaults to By Test. Change to By Lot if an average representation of a group of results is needed.
- **Regular** or **Quick Test** – this selection defaults to Regular. Change to Quick Test if using results from a Quick Test program. This will define the Test Specifications section of the report.
- **All Results** or **Single TP** – this selection defaults to All Results. Change to Single TP if only looking at one test point's results.
- **Margins** or **Print Setup** – this selection defaults to Print Setup. If the margin settings of the report need to be changed, switch selection to Margins and make changes. Touch again to return to Print Setup.

Once **Print Setup** selections have been made, the action buttons may be used.

14.7.4.3 Save Info

Select [**Save Info**] to open the "**Save Print Out Setup Info As**" screen. Save any particular print setup configuration with its own filename and use when needed. This feature allows you to save multiple report printout schemes to be used with certain test applications. This screen operates the same as in **File > Save As** described in section 14.4.4.

14.7.4.4 Load Info

Once Print Setup files have been saved, select [**Load Info**] to access these files. Choose the report print out format desired for a particular test application. Once a report has been printed, you may decide to change the printout format for the same data. Return to this screen and load a different file.

14.7.4.5 Preview

Select [**Preview**] to view how actual test results appear in the format selected.

Using **Print Setup**, you may set the options desired and print as needed after any testing application is completed. However, the **Print Setup** feature can also be used to customize individual printed reports and save time.

If, after a test is complete, you would like to change the print settings, go to the **Print Setup** screen and go through the report as described in this section. Toggle between **Preview** and the main screen to view actual changes. Return to the menu where the test results were obtained and print the customized report.

Or, save a variety of tests for particular needs. Once testing is complete, go to the **Print Setup** screen and touch **[Load Info]** to retrieve the desired printout and return to the testing menu and print.

14.7.5 Supervisor

Password Protected

Password protection is intended for use by a supervisor or authorized person at the end user location. An authorized person should receive the password for accessing these settings with the shipment of the tester from the factory. Contact LSI if password access is needed.

Using the Supervisor menu, an authorized person can control access to individual menus by setting passwords as desired. For example, this feature could be used to distinguish between someone who is authorized to change, create, and manage test programs and someone who would be authorized only to run the tests. It can be set up for complex hierarchy levels or just a simple password to prevent use of one menu by an unauthorized person.

Password Setup

Under the Setting Description column on the left are the Password setting descriptions. Each Setting Value field to the right of each item is normally blank meaning no passwords have been set to restrict access. To set a password, just touch the Setting Value blank next to the item. An on-screen keypad will appear for numeric or alpha and numeric characters.

14.7.6 Access Operating System

Password Protected

Access to the operating system is password protected. The FLASH tester runs on a Microsoft Windows operating system. Windows is set up to work with LSI's FLASH software program. Changes made to the Windows operating system that interfere with the FLASH software may void the warranty.

This button is accessible from any of the FLASH Setup menus except **Print Setup**. An end user authorized person may access the operating system using the password shipped with the tester. (Only certain settings should be accessed and changed by the end user. They are: Add a Printer, Workgroup Name for Network Settings, and File Sharing.) Certain operating system settings require test or numerical input. This requires a USB keyboard connected to the tester in order to enter this type of data. Access to the operating system allows the user to add a printer, change the Workgroup for Network access, or change folder permission for the C:\Flash\Files saved to that drive without voiding the warranty.

Touch **[Access Operating System]** and a message appears titled **Restricted Access** that includes warranty information and a verification that the user would like to access the operating system. Touch **[Yes]** to access and enter the password. Contact LSI for password if you have not received one.

15 EXTERNAL CONNECTOR INTERFACES

This section details all of the external connectors on a FLASH Tester. The external connectors may be USB, Ethernet, RS-232, Remote Start, or VGA.

15.1 USB

This connector is a USB-A connector and is a standard PC type connector. It can be used to connect devices such a keyboard and mouse, a printer, or a USB flash drive.

15.2 Ethernet

This connector is a standard RJ-45 connector and is used to connect to a company's Ethernet computer network.

15.3 VGA (optional)



This is a female DB-15 connector and can be used to attach a remote monitor.

15.4 Remote ON (optional)

This is a 2 pin female Bendix connector. Use a momentary switch and hold it for 5 seconds to turn on the tester.

15.5 Automation Port

This is a male DB-25 connector used to connect the tester to an automated system. This connector can be configured to use either internal 12 VDC and ground or an externally supplied voltage and ground. Refer to cable 025-1000-0619-00 purchased from LSI for full details.

Here is a brief description of the pins. Signals are relative to the configured voltages unless otherwise specified.

Pin	Description	Pin	Description
1	+ 12 VDC Internal supply	14	End Of Test, Active High
2	Error Output	15	Flap 1, Output
3	Remote Start Input, Active Low to Internal Ground	16	Flap 2, Output
4	Internal Ground	17	Flap 4, Output
5	Production Monitor, Yellow Light Output	18	Flap 8, Output
6	Production Monitor, Green Light Output	19	Flap 16 / Output 1
7	Remote Abort, Active High to User Ground	20	Flap 32 / Output 2
8	Not Connected	21	Flap 64 / Output 3
9	Door Interlock, Input or Output, Active Low to User Ground	22	Flap 128 / Output 4
10	Upper Travel Interlock, Input or Output, Active Low to User Ground	23	User Supplied Voltage
11	I/O Input 1, Active High to User Ground	24	User Supplied Ground
12	I/O Input 2, Active High to User Ground	25	Remote Shutdown, Active High to User Ground
13	I/O Input 3, Active High to User Ground		

15.6 RS-232

This is female DB-9 connector. It is pinned as a DCE. This means it can be connected to a computer using a standard DB-9 straight through cable.

The RS-232 port can be used in one of two ways. The first is strictly as a data source to a data collector. The second uses the following bi-directional communication protocol. This protocol allows an end user to program a test, run the test, and receive data using only the RS-232- port. This section will describe how to use both methods.

The communication protocol used is 9600-baud, 8 data bits, 2 stop bits, no parity, and hardware flow control.

15.6.1 As a Data Source

When the tester is connected to a computer and after a test is completed, the tester will test the RS-232 port to see if it is connected to a computer. If a connection is sensed, the tester will check to see if the connected device uses the bi-directional communication protocol. If the connected device does not use the protocol, the tester will send out the result data.

Result data is sent out as a single ASCII data string. Multiple pieces of data (individual test point results) will be comma delineated. The line will terminate with a carriage return.

15.6.2 Bi-Directional Communication Protocol

Data packets to and from the tester are ASCII data strings consisting typically of two or three capital letters followed by a number and terminating with a carriage return.

The types of commands can be broken down into three types: Specifications, Results, and Miscellaneous.

All commands will be terminated with a carriage return when received and need to be terminated with a carriage return when sent.

15.6.3 Specification commands

SR : Request the current specifications from the tester

MR0 : Set or receive the request to clear all current specifications and results.
The third character is the number zero.

MR01 : Set or receive the request to clear the current results.
The third and fourth characters are zero and one.

GL : Set or receive the current Length Offset
This command will be followed by number that represents the current Length Offset.

GF : Set or receive the current Force Offset

This command will be followed by a number that represents the current Force Offset.

GE: Set or receive the current testing method.

This command is three characters long. GEC for compression or GEE for extension.

MU : Set or receive the current measuring units.

This command is four characters long. The third character is for Length or Angle and are as follows:

“I” for inches or degrees,

“M” for millimeters or Revolutions.

The fourth character is for the Force or Torque and includes:

“L” for pound force or inch-pound torque

“N” for Newtons force or Newton-millimeters torque

“G” grams force or grams-millimeters

“K” kilograms force or kilograms-millimeters

“O” ounces force or inch-ounces

“F” foot-pounds torque

“M” Newton-meters torque

“B” kilogram-meters torque

“C” kilogram-centimeters torque

OR : Set or receive the Platform Return After Test option.

This command is composed of three characters and a number. The third character is the option's value. “0” (zero) represents Return To Start Position. “1” represents Stay At Last Point, “2” represents Return to Specified Position. The number following the third character represents the Return to Specified Position. A value of “-100000000” represents Undefined, or none specified. Any another value represents a specific position. A number should always be send, even if it is the Undefined number.

OE : Set or receive the option Return on Overload option.

This is a three-character command. The third character should be “0” (zero) for false (which means the platform remains at the position that caused the overload), or “1” for true (which means the platform returns to the starting point when an overload occurs).

OB : set or receive the Stop on First Bad option.

This is a three-character command. The third character should be a “0” (zero) for false (which means the entire test sequence is completed), or “1” for true (which means the test will end prematurely if a test point tests bad).

OD : Set or receive the Flap Open time.

This command should be followed by a number that represents the amount of time the sorting flaps are opened, if the Flaps Open option is set to Timed. The number should be expressed in seconds.

OF : Set or receive the Default Sorting Flap

This command is followed by a number that represents the default flap open if no sorting conditions are met when a sorting table has been defined.

OW : Set or receive the End Of Test Signal Width

A number following these characters represents the amount of time the End Of Test signal is given. It should be given in seconds.

OI : Set or receive the Incremental Test Result Type option

This command will be 3 characters long. The third character will be "0" (zero) for incremental results, or "1" for absolute results.

OS : Set or receive the Sorting Table

By itself, this command signals the beginning of the sorting table. When this command is given with a number following it, it represents an entry in the sorting table.

Full condition statement is: If (condition), Then (Flap). Each half of the statement is defined by using sets of two commands.

Condition statements are given as two commands: OSx followed by OSy where x is a number that represents a test point to check and y is a number that represents the condition to apply. The conditions are:

"1" = Satisfactory

"2" = Bad Low

"3" = Bad High

"4" = Not Satisfactory

"5" = Not Bad Low

"6" = Not Bad High.

For example: an OS1 followed by OS2 represents "If Test Point 1 is Bad Low." Multiple conditions can be ANDed together by giving multiple sets of OSx and OSy commands.

The Then (Flap) is stored in the table as two commands, an OS0 (zero) followed by an OSx where x is a number that represents a Flap. Individual flaps are given as 1, 2, 4, 8, 16, or 32. If a situation arises, multiple flaps can be given at one time by adding together the numbers. For example, a 21 represents flaps 1, 4, and 16 together.

The command "CC" should be given at the end of the table.

TP : Set or receive the current test point.

This command should be followed by a number between 1 and 100.

SC : Set or receive the current test point command.

The following are the current test point commands:

L for Length @ Force

F for Force @ Length

P for Preset

E for Free length

K for Peak Force
R for Rate
A for Pause
D for Delay
I for Initial Tension
B for Keypad Entry
J for End
Z for Fatigue
2 for Dynamic To Length
3 for Dynamic To Force
4 for Dynamic To Time
5 for Signal I/O
6 for Position

SL : Set or receive the Specified Length

This command will have a number following it. Typically, it will be a number that represents a position. For the Keypad entry, there will be a "C" followed by a number that represents the nominal value. For Signal I/O, it represents the amount of time the signal is on. For Rate, it is the first test point used to calculate the rate.

SF : Set or receives the Specified Length.

This command will have a number following it. Typically it will be a number that represents a force. For Keypad entry, there will be an "O" (letter ohh) followed by a string that represents the units of the measurements; blank if none. For Dynamic to Length and Dynamic to Time the number will represent the measurement Interval Type: "0" (zero) for Force, "1" for Length, and "2" for type. For I/O signal the number will represent the I/O signal pair to use "1", "2", or "3".

ST : Set or receive the Specified Tolerance

This command will be followed by a number. The number represents the tolerance around the Nominal result value to be a satisfactory part. This value is expressed as a percentage.

SS : Set or receive the Specified Speed

This command will have a number following it. Typically it will be a number that represents a speed in in/min or mm/min.

SI : Set or receive the measuring method: absolute or incremental.

This command will have one character following it: "A" for absolute, or "I" for incremental.

S2 : Set or receive the Fatigue type.

This command will have one character following it: "A" for fatigue to Length, or "I" for fatigue to Force.

SM : Set or receive the miscellaneous data.

This command is used for certain tests and will have a number following it. The Preset command uses it for the number of cycles. The Rate command uses it as the nominal rate. The Keyboard command uses it for the prompt. The prompt shown on the screen must be programmed with an "N" in front of it, i.e., "NThis is

the Prompt". The Delay uses this as the delay time in seconds. The Fatigue command uses it as the cycle count. The Dynamic commands use this to list the Start and Stop interval condition.

SE : Set or receive user specified data.

The user can specify up to 10 extra specifications, such as Part Number and Customer Name. They are transferred using the commands "SE:002xx" through "SE:011" where "xx" is the specified text. These command require the colon character after the "SE" characters.

"SE:020x" sets or receives the Part Counting option. If "x" is a "0" (zero) the tester counts normally. If "x" is "1", then the tester counts Serial Numbers and uses the Initial Serial Number option as the first test count.

"SE:021x" specifies the Initial Serial Number value.

Fx : Set or receive the Archiving option.

If this command is present, Archiving will be turned on (for Fatigue or Dynamic test only) and the x will be a number specifying the Archiving interval. If this command is not received or sent, archiving is turned off.

SO : Set or receive the Test Point Comment.

Any text following these characters will be displayed in the Comment section of the Program screen.

ER : Receive an Error code.

This command will be followed by a number that represents an error code.

15.6.4 Result commands

RN : Receive the Result Test Number

This command will be followed by a number that represents the current test number.

RP : Receive the current Result Test Point

This command will be followed by a number that represents the current Test Point.

AF : Receive the Absolute Force

This command will be followed by a number that represents the Absolute Force read when the test point finished.

AL : Receive the Absolute Length

This command will be followed by a number that represents the Absolute Length read when the test point finished.

RR : Receive the Test Point Result

This command will be followed by a number that represents the result of the test point.

RS : Receive the result of the Sorting Table

This command will be followed by a number that represents the result the sort table at the end of the test.

RE : Receive the Error value

This command will be followed by a number that represents the error condition if the test ended in an error.

RC : Receive the Test Point Condition

This command would be followed by a character the represents the condition of the test point: "L" for low, "H" for high, or "S" for good.

RG : Receive the Global Condition

This command would be followed by a character the represents the overall condition of the test: "G" for good or "B" for bad.

15.6.5 Miscellaneous commands

RL : The tester will send out the current Force

RF : The tester will send out the current Length

US : The tester will start a test.

16 EXAMPLES OF TEST PROGRAMS

The examples are meant to help you navigate through an actual test point sequence. The numbers here may not apply to all springs or parts – adjust values as needed.

16.1 Single Point Test Sequence

This example uses a **Force @ Length** test point command programmed with a Nominal value and a Tolerance. Make sure the **Length Home Point** has been set before starting. The numbers given in the examples assume that length is in inches and force is in pounds.

Set Up the Test Point Sequence:

1. Touch **[Program Mode]** on the Navigation Toolbar to start.
2. Touch **[New]** to clear out all specifications and results. Touch **[Yes]** to verify the action. The Test Point resets to 1.
3. Touch **[Select New Command]**.
4. From the test command selection bar that appears touch **[Force @ Length]**.
5. Tap the text box below **Length** and enter a target length of 2.58.
6. Tap the text box below **Force** and enter 15.6.
7. Tap the text box below **Tolerance** and type in "10" for a 10 percent tolerance.
8. View the text box below **LSL**. The **LSL** display should read 14.04 and the **USL** display should read 17.16. These values were automatically calculated from the Nominal and Tolerance values entered. Test point 2 (last test point) should read **End Of Test**.
9. A **Customer** and / or a **Part Number** may be entered with this program, if desired, by tapping the respective text boxes. It will show on the printed report. Entering this information is not required.

Save the Test Point Sequence:

1. Touch **[File]** on the Navigation Toolbar.
2. Touch **[Save]** on the sub-menu just below the **Navigation Toolbar**. The “**Save Test As**” screen opens if a particular test sequence has not been saved before. If a **Part Number** was entered in the **Program Mode**, it defaults as the program’s filename; otherwise, the **New File Name** text box will be empty.
3. To enter a **New File Name** tap the corresponding text box and an on-screen keyboard appears. Type in the desired filename for the program and touch **[Enter]**.
4. Touch **[Save]** located in the lower right area of the display to save the test specifications under the filename entered.

Run the Test Point Sequence:

1. Touch **[Automatic Mode]** on the **Navigation Toolbar**. (Retrieve the program under **File>Open** and select if running the test at a later time.)
2. Choose to calculate results **By Test** or **By Lot**. The results will display as **Actual Data** by default unless otherwise specified using another selection from the sub-menu.
3. Place the part to be tested in the center of the lower platform. The upper platform may need to be moved to accommodate by touching **[Manual Mode]** and touching the Jog Bar to raise the platform. Touch **[Automatic Mode]** to return and place the part on the lower platform. Close the safety shield before starting the test.
4. Touch **[Zero]** on the Force display if not at zero before starting a test.
5. Touch the green **[Start Test]** button located in the lower right of the display to begin the test. The results will display in real time as the test is performed.
6. Because of the tolerance value, results will also show the condition of the part. To see how repetitive testing works run more tests on a few of the same part by repeating from step 3 – the Test Point number advances as each test is run.

After a few more tests have been run, switch views in the submenu to see the different ways the results can be seen. Refer to Section 13.5.3.1 for viewing details.

Making Changes to the Test Point Sequence:

1. If the displayed results are not as expected and specifications need adjustment, touch **[Program Mode]**. (You may have to **Clear Results** in **Automatic Mode** first.)
2. Use the arrows in the **Test Point** box to move to the test point being changed. In this case, the **Length**, **Force** or **Tolerance** specifications may be adjusted for **Test Point 1**.
3. Once satisfied with the changes, touch **[File]>[Save]**.
4. To continue testing, touch **[Automatic Mode]**.
5. In the **Test Number** box touch **[Clear Results]** to clear out any displayed results from the previous test if not already done.
6. Begin testing again from step 3 - **Run the Test Point Sequence** instructions above.

Saving Test Results:

To save the results touch **[File]>[Save]**. A file will be saved with the same program name followed by .001. As more results are saved the extension will increase to .002, .003, etc.

16.2 Multi-Point Test Sequence

This example shows a three-point test using two **Length @ Force** test points and a **Rate** test point. The numbers given in this example are based on a load cell capacity of at least 110 lbs. Adjust the forces appropriately if you use a tester of a lower capacity. Again, make sure the Length Home Point has been set before starting.

Set Up the Test Point Sequence:

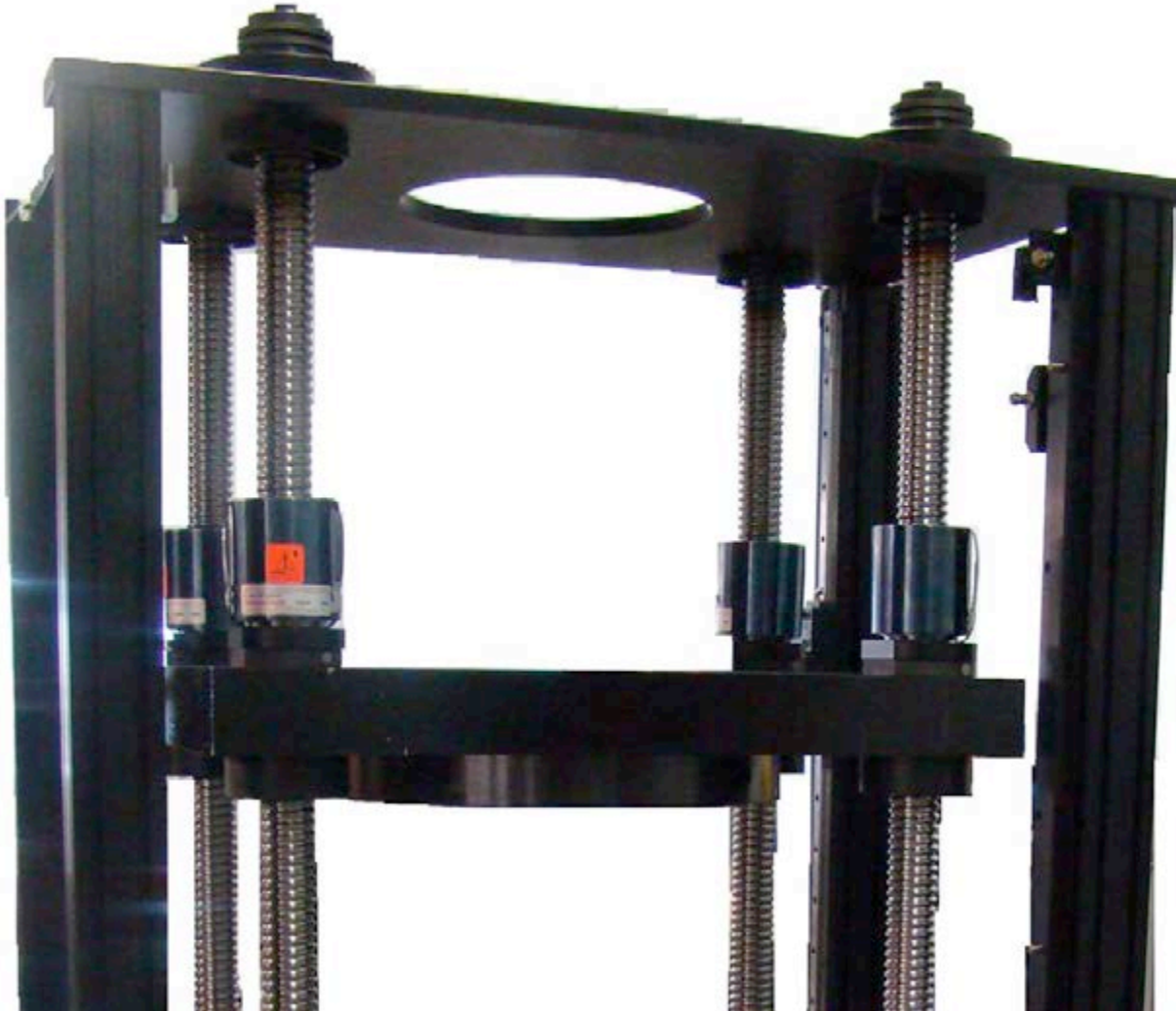
1. Touch **[Program Mode]** on the **Navigation Toolbar** to start.
2. Touch **[New]** to clear out all specifications and results. Touch **[Yes]** to verify the action. The Test Point resets to 1.
3. Touch **[Select New Command]**.
4. From the test command selection bar that appears, touch **[Length @ Force]**.
5. Tap the text box below **Force** and type 22.3 using the pop-up keypad to enter the target force.
6. Tap the text box below **Length** and type in 2.34 to enter the nominal length.
7. Tap the text box below **Tolerance** and type in "10" for the percent tolerance value.
8. Touch the right arrow in the **Test Point** display to move to test point 2.
9. Touch **[Select New Command]**.
10. From the test command selection bar that appears, touch **[Length @ Force]**.
11. Tap the **Force** text box and type in 75.3 to enter the target force for test point 2.
12. Tap the text box below **LSL** and type in 1.8.
13. Tap the text box below **USL** and type in 1.9.
14. View the **Tolerance** display. This value should read 2.7. The **Length** display should read 1.85. Tolerance and Length are automatically calculated based on LSL and USL.
15. Touch the right arrow in the **Test Point** display to move to test point 3.
16. Touch **[Select New Command]**.
17. From the test command selection bar touch **[Rate]**.
18. The first and second test point values should fill with 1 and 2, respectively, or enter these values manually. The Rate value should read 107.5510. Test point 4 should read **End Of Test**.

This completes programming a three-point test with nominal and tolerance values.

After a test point sequence has been programmed, touch **[Check]** to verify there are no errors. At this point, you may save or run the test point sequence as described in section 16.1 under the Single Point Test Sequence. When testing is complete, the results may also be saved if desired.

17 CARE AND MAINTENANCE

17.1 Ball Screw Maintenance



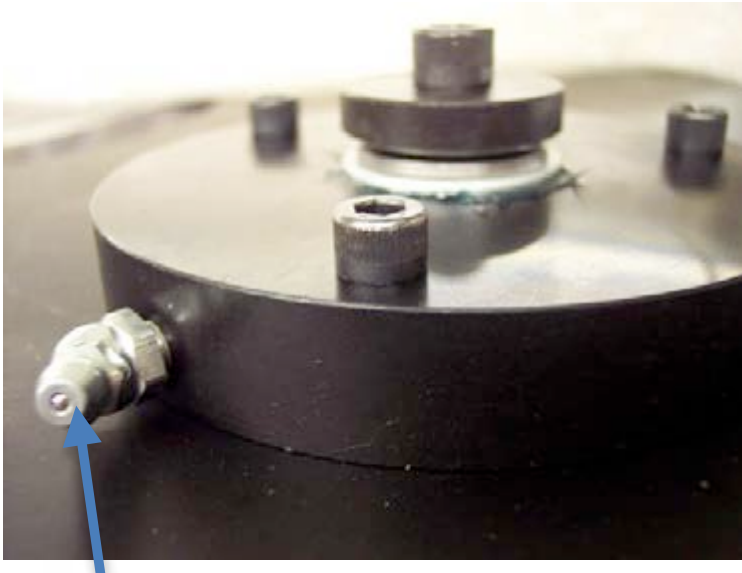
Ball screws

The FLASH 25, 36 & 48 all have four ball screws, one in each corner of the machine. Their primary purpose is to keep the testing platforms parallel and rigid when you're applying a load to a spring.

1. At the top of the tester, there are four zerks on the ball screws. Give these parts one pump of Premium Lubricating Grease every three months.
2. For the FLASH 36: Remove the bottom access panel of the tester. There are four zerks at the bottom of the of the ball screws. Apply one pump of Premium Lubricating Grease to each once every three months.
3. For the FLASH 25 & 48: The four grease zerks at the bottom of the ball screws are accessible from the inside of the machine. You do not need to remove an access panel

to perform this maintenance. Apply one pump of Premium Lubricating Grease to each once every three months.

4. Just above the upper load platform four zerks are located on the ball nuts. Give each of them a shot of Premium Lubricating Grease once every three months.
5. Apply some DTE Light Oil on a clean rag. Wipe the linear rail bearings with this oiled rag. The rail bay also has a zerk. Give it some Premium Lubricating Grease once every three months.
6. Apply some DTE Light Oil on a clean rag. Wipe the ball screws with this oiled rag. Keep the ball screws clean and free of debris.
7. If your tester is equipped with a loader mechanism, it includes six zerks. (a) Run the loader into the tester. Open the access door to the left of the control panel. You can now access two zerks. (b) Remove the two cap screws on each side of the platform end of the roll-top guard. Roll the guard back to access four zerks. Add grease—one shot every three months. Run a clean, oiled rag along the track inside the loader mechanism.



Zerk

17.2 Touch-Screen Interface



The display screens may become soiled with dirt or fingerprints and need to be cleaned. Use a soft cloth slightly damp with water and mild soap to gently wipe away any smudges. Do not spray any liquid on the display that could seep inside the FLASH tester. ALWAYS USE MILD SOAP. Any type of harsh cleansing agent may cause irreparable damage to the screen.

17.3 Annual Calibration

LSI recommends annual calibration of the load cells on your tester. If you prefer, we offer on-site calibration service by a trained calibration technician. Call 763-780-2131 to schedule service at your facility.

17.4 Service and Repair

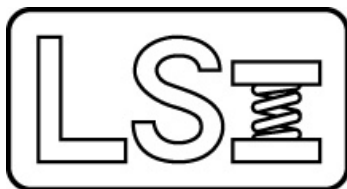
Contact LSI, 763-780-2131, when calibration or repair service is needed for the tester. The tester may be shipped back to LSI in its original packaging for calibration or repair. If original packaging is not available, Larson Systems can replace the container and ship it to the tester's location.

Title

Title to the described equipment shall remain in the seller until full, actual payment therefore shall have been made. In the event of a default, the seller shall have the right to repossess the said equipment and whatever monies shall have been paid on account shall be deemed to have been rental for the use thereof to the date of such repossession. The seller shall also have the right to hold the purchaser liable for a sum equivalent to the unpaid balance of the purchase price together with all expenses and damages that the seller may have sustained, the purchaser to receive credit however, for the net monies realized on the sale of the equipment. At the election of the seller, the seller may deem title to have passed to the purchaser, in which event the seller need not repossess the equipment, but may sue at law for the balance unpaid thereon.

Warranty

FLASH 25 and FLASH 36 parts and labor are warranted against defects in material and workmanship to the consumer for a period of twelve months from the date of purchase. This warranty covers all parts, except consumable items. It applies only to machines and accessories that have been installed and operated in accordance with instructions in our reference manuals, have not been tampered with in any way, misused, suffered damage through accident, neglect or conditions beyond our control and have been serviced only by authorized personnel. Larson Systems Incorporated is not responsible for loss in operating performance due to environmental conditions, such as humidity, dust, corrosive chemicals, deposition of oil or other foreign matter, spillage or other conditions beyond our control. There are no other warranties expressed or implied, and Larson Systems Incorporated shall not be liable under any circumstances for incidental or consequential damage. Warranty service is conducted at LSI's facilities in Minneapolis, MN. Return the tester freight prepaid during the warranty period, and Larson Systems Incorporated will make a warranty determination, repair and return the tester freight collect. Shipments sent collect will be rejected.



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