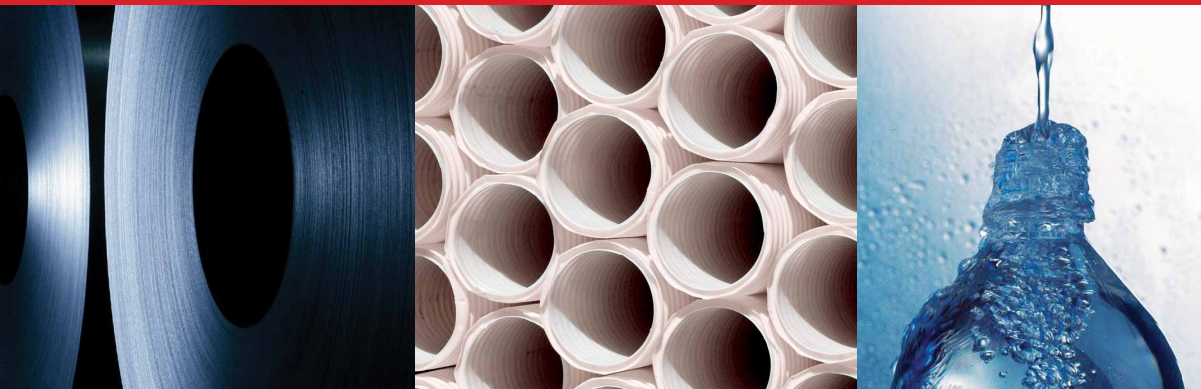


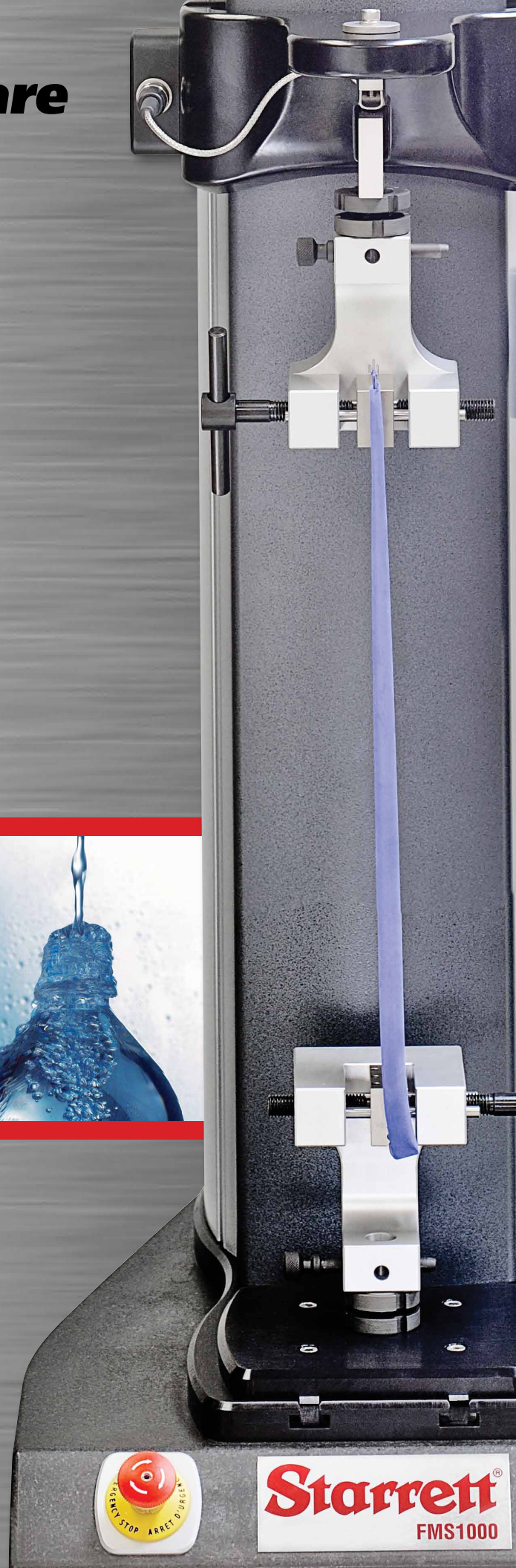
L2 Plus Series Software for Advanced Force Measurement

System Settings



Starrett®

The Better Solution



Starrett®
FMS1000



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Product Warranty

Starrett force measurement products carry a one-year (from date of purchase) warranty against defects in material and workmanship (parts and labor), subject to factory inspection.

The L.S. Starrett Company will repair or replace, at its option, any part or parts found to be defective in workmanship or material. Starrett warrants repaired or replaced parts for the balance of the original warranty period or 90 days, whichever is longer. Parts returned to the factory under warranty will be repaired at no charge. Freight charges to the factory will be paid by the customer. Return freight charges to the customer will be paid by Starrett.

This warranty does not cover damages from such causes as abuse, accident, neglect, fire or freight damage. It does not apply to defects resulting from modifications made by the customer or improper use of the system or its components.

Disclaimer of Liabilities

The L.S. Starrett Company shall have no liability or responsibility to the customer or any other person or entity with respect to any liability, loss or damage caused or alleged to be caused directly or indirectly by this documentation, or the hardware described in it. This includes but is not limited to any interruption of service, loss of business or anticipatory profits, or consequential damages resulting from the use or operation of hardware or equipment.

General Safety Precautions

Force measurement systems are potentially hazardous. Prior to operating your testing system, Starrett recommends that you read and understand the instruction manuals for your system and components and that you receive training on the proper use of this equipment from your authorized Starrett representative.

Observe all warnings and cautions identified in this manual for your equipment. A warning identifies a function that may lead to injury or death. A caution identifies a hazard that may lead to damage to equipment or loss of data.

Starrett products, to the best of our knowledge, comply with various national and international safety standards as they apply to material and force measurement testing. This Starrett product has been tested and found to comply with the following recognized standards:

- EN61010-1 Safety Requirements for Electrical Equipment
- EN61000-6-3 EMC Generic Emissions Standard
- EN61000-6-1 EMC Generic Immunity Standard

Starrett also certifies that this product complies with all relevant EU directives and carries the CE mark.

Warning Labels

Listed below are the warning labels used in this manual including their definitions. Please pay particular attention to these labels and sections within this manual denoted with a warning label.



HAZARD: This label identifies a potentially dangerous hazard that may lead to serious injury to personnel.



WARNING: This label alerts the user of a potentially serious hazard that may result in injury to personnel and damage to equipment.



CAUTION: This label advises the user to proceed using caution while performing this action. Failure to do so may harm equipment.



NOTE: This label is used to call-out important information including helpful operating instructions.

Electromagnetic Compatibility

Your MMD Series material test system is designed to comply with International Electromagnetic Compliance (IEC) standards.

To ensure reproduction of this EMC performance, connect this equipment to a low impedance ground connection. Typical suitable connections are a ground spike or the steel frame of a building.

Warnings

Emergency Stop

Press the emergency stop button whenever you feel there is an unsafe condition during a test. The emergency stop button removes power to the motor drive system causing the crosshead to stop.

Flying Debris

Eye protection, protective clothing and splinter/safety shields should be used whenever any possibility exists of a hazard from the failure of a sample, assembly or structure under test. Due to the wide range of materials that may be tested and that may result in a failure which may cause bodily injury, the precautions and preventative methods taken prior to testing is entirely the responsibility of the owner and the user of the equipment.

Crush Hazard

Always use caution when installing or removing apparatus and your sample material between the frame's crosshead and the base. A potential pinch/crush hazard exists. Keep clear of the testing fixture, and particularly the jaw faces at all times. Keep clear of the crosshead during movement. If available, always make sure the Pinch Load feature is enabled. This will stop inadvertent crosshead operation if in manual mode. Always ensure that other personnel cannot operate the system while you are working within the test fixture area.

Electrical Hazard

Disconnect equipment from the electrical power supply before removing any electrical safety covers. Disconnect power when replacing fuses. Never reconnect power while the covers are removed. Never operate the system with protective covers removed.

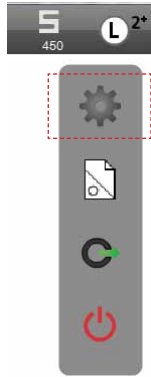
Rotating Machinery Hazard

Always disconnect power before removing covers that protect the user from the internal rotating mechanisms. If maintenance to the drive mechanism is required, and power is needed to perform maintenance to the drive system, maintenance should be performed by an authorized Starrett representative who has received factory training on performing such procedures.

8.0 L2 PLUS SYSTEM SETTINGS

The System Settings function is the central location where essential system functions can be setup for operation and user preferences.

The System Settings function can be accessed when you are not within an active test setup. Go to the Home view, and select the L2+ symbol to access the System Settings.



L2 Plus Systems Setting



NOTE

The System Settings may be accessed from the Home view only.

8.1 CONTACT INFORMATION Setting

The Contact Information setting can be used to enter information on your dealer or service provider. This allows users to know who and how to contact your provider about service and technical support and to arrange service schedules, including calibrations.

8.2 ABOUT Setting

The About settings displays critical information about the hardware and software that make up your L2 Plus system. This includes serial number information, firmware and software revision level information.

8.2.1 Read Setting

The Read setting is used by authorized Starrett personnel during system maintenance and configuration.

8.2.2 Write Setting

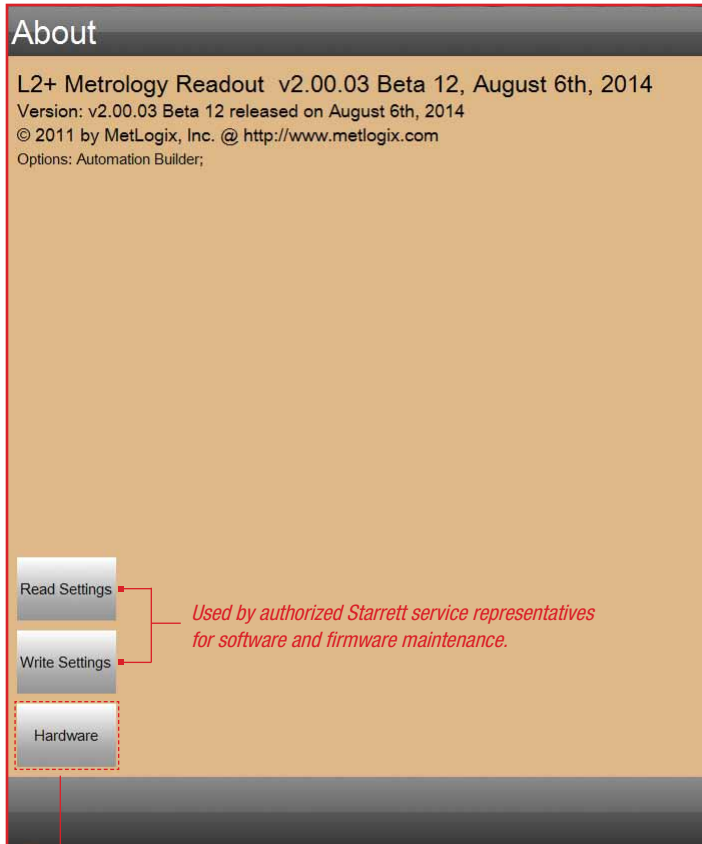
The Write setting is used by authorized Starrett personnel during system maintenance and configuration.



L2 Plus Systems Setting
Main Settings Menu

8.2.3 Hardware

The Hardware setting is used to display critical information about the hardware controller used by your L2 Plus system. The controller serial number is displayed, which is required for licensing of software options.



L2 Plus ABOUT Setting



L2 Plus ABOUT Setting
Hardware (Controller PCB) Information

8.3 LANGUAGE Setting

The Language setting is used to set the language that will be used to display textual information. The L2 Plus system can be used with a variety of different languages and information displays can be customized for local terminology and dialect.



L2 Plus LANGUAGE Setting
Display Language options

Individual language files are saved in the TEXT directory within the Metlogix directory. A file for each supported language is supplied or is created by the user.



NOTE

Individual language files must be created or supplied and be resident in the TEXT sub directory within the Metlogix directory. Otherwise, without the appropriate file, textual information will not be translated.



NOTE

The user may be required to create their translation file in the appropriate language. This allows the user to apply special terminology or dialects for their operators.

8.3.1 Using Translation Utility

The L2 Plus system may display textual information in multiple languages. Translation into a language requires the system to have the associated language file in the Metlogix directory in the sub-directory called TEXT. Text files are created in an xml file format for each language. These language files may be supplied by Starrett or they may need to be created by the user using the Translation Utility.

Your L2 Plus system can display textual information in the following languages:

- English (default from factory)
- Deutsch
- Francais
- Italiano
- Espanol
- Portuguese
- Russian
- Chinese - Simplified
- Chinese - Mandarin
- Polish
- Czech
- Swedish

Translation May Not Be Supplied

The most common mistake associated with the display languages is that the L2 Plus software is supplied with these language sets already included. They are not.

The translations for your L2 Plus system are best done locally, by Starrett or the customer. Translating in this method provides the user or location with freedom to translate based on the local dialect or technical definitions that are commonly used in that region or for that application and industry.

An XML file is created for each language within your system that has been translated using the Translation Utility.

Within the Metlogix directory is a sub-directory called TEXT. Within the Text sub-directory are the XML files that carry your translation.



CAUTION

Use care to protect the translation XML file from accidental deletion or unauthorized access. If this file is deleted, removed, edited, etc. you will be required to re-translate the entire database of terms, phrases, numerics, symbols, etc.



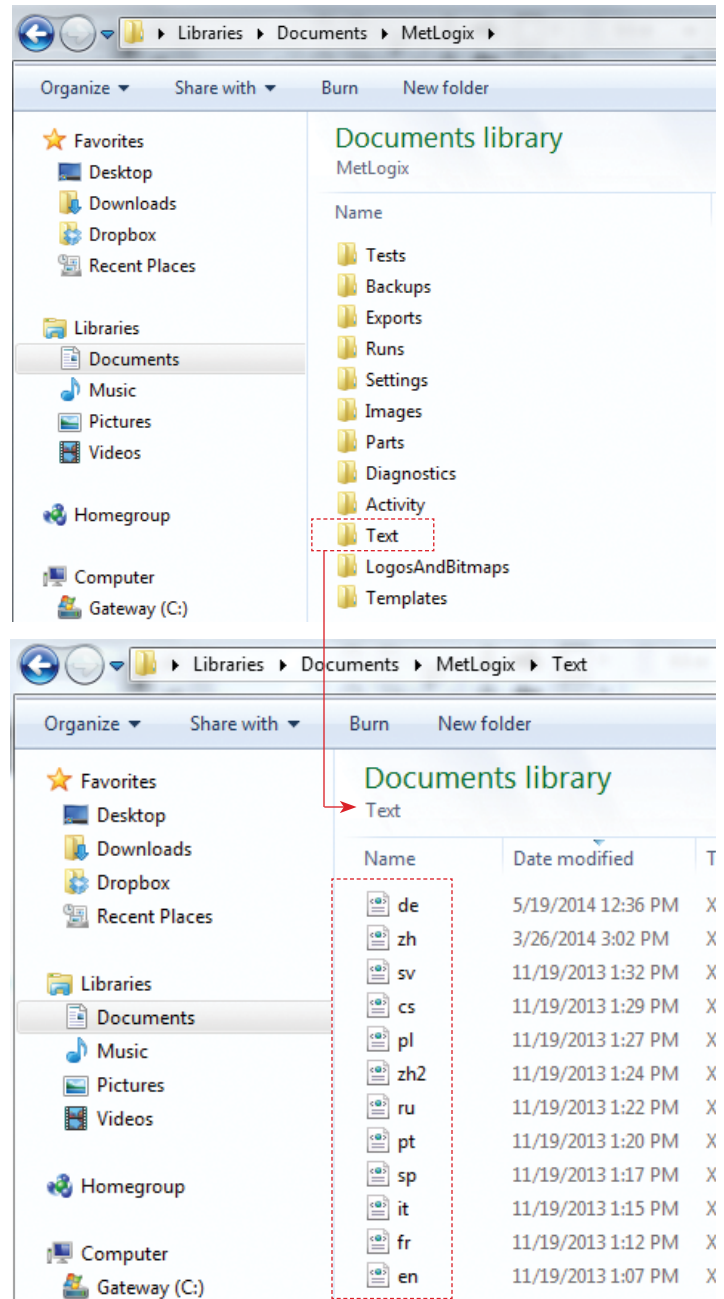
CAUTION

NEVER change the name of your xml file representing your language translation.

How Translations Work

Within the L2 Plus software, there is a translation utility. This utility is a software application that is open to a user to translate all text and terms used in the L2 Plus application.

The translation utility is accessed with the L2 Plus software launched. Using a keyboard, press and hold the Ctrl key plus the F4 key. This launches the translation utility. From this utility, the person translating the information enters the information into an open field in the utility view. Once a term is translated, the Lx system creates an xml file. This xml file contains the translated information. This xml file is automatically saved to the TEXT sub-directory within the Metlogix directory.



Each translation has an associated XML file with a system-assigned name. DO NOT CHANGE the file name.

Before You Begin

Before you launch the translation utility, you must first specify the language your are translating into, e.g. from English to [blank]. This is extremely important since you are setting up the translation utility and you are creating the xml file that saves your translation.

1. Go to the L2+ Main Menu
2. Select the Settings icon
3. Select the LANGUAGE option
4. Select the LANGUAGE type you are translating to
5. Select Done
6. Select Done

Launch the Translation Utility

You may launch the translation utility as follows:

Press and hold the Ctrl key and the F4 key simultaneously (Ctrl+F4).



NOTE

You can only launch the translation utility from an operating mode. The utility will not launch if you are within any Settings function.

Use the **APPLY FILTER** based on a text entry.

Enter the term or text and select **Apply Filter**. The information is displayed based on your text filter. For example, if you enter **Load**, all terms, phrases, etc. with **Load** are displayed. It restricts the current list to those items that match the text you've typed in the filter box. Handy for finding some text you see on the screen.

L2 Plus LANGUAGE Setting Using Deutsch Language for translation



Select the Language you want to display in using your Lx software.

The "active" language is denoted by the green dot.

English is the default language. English is also the reference language used in the Translator utility.

Use the **SAVE NOW** to save a completed text entry.

Use the **SAVE NOW** always before exiting the Translator utility. This ensures that your translations are saved to your XML file.

The Language type you selected in global **SETTINGS** displays as the header in the active translation column.

The example shown indicates that simplified **DEUTSCH** is the selected language.

English	Comment	Deutsch
Automatically run when part file is opened		Programmablauf sofort nach Öffnen des Teils
Automatically save UCS		AKS autom. speichern
Automation Builder		Automatik-Programmierool
Automation Builder		Automatik-Programmierool
Automation Steps		Automatische Schritte
Av		Av
Average		Durchschnitt
Average		Durchschnitt
Average		Durchschnitt
Average		Durchschnitt
Average		Durchschnitt
Average		Durchschnitt
Average		Durchschnitt
No Translation Is Needed		
Hide Translated Text Now		
Show All Text Now		
You are now ready to begin translating. Click on the phrase that you want to translate then this edit box will allow you to change it.		
2490 of 2523 translated		Kopieren Einfügen

The Record Count shows the current active item and the total number of items that can be translated.

L2 Plus LANGUAGE Setting
Translation Utility view

About the Translation View

When you launch the translation utility, the display will show the translation view. The translation view is where the entire language translation process is performed. You can get out of this view by selecting Ctrl+F4 at any time.



CAUTION

If you exit the translation utility BEFORE saving your work, your translation will NOT be saved. Use caution before exiting the utility and press the SAVE NOW prior to exiting.

This view has the following functions and labels:

- Filter Function
- Save Now
- English Column
- Comments Column
- Translated Language Column
- No Translated is Needed
- Hide Translated Text Now
- Show All Text Now
- Input Text Entry Block
- Copy
- Paste
- Record Count

APPLY FILTER

The APPLY FILTER function lets you “Filter by Text”. Using the filter and based on the term you enter, it restricts the current list to those items that match the text you’ve typed in the filter box. Handy for finding some text you see on the screen

All terms, phrases, numerics, symbols are displayed that can be translated in the ENGLISH column.

Once the translation is entered into the text input entry block, press SAVE NOW. This saves your translated item to the file named de.xml located in the Text sub-directory within the Metlogix directory.

English	Comment	Deutsch
Average		Durchschnitt
Average	<i>ENGLISH is the default language.</i>	Durchschnitt
Average	<i>ENGLISH is used to display all terms, phrases, numerics, symbols, etc. that can be translated.</i>	Durchschnitt
Average	<i>“Read-only” information provided to help define what the term, phrase, numeric or symbol represents. Helpful to ensure correct context interpretation and translation.</i>	Durchschnitt
Average		Durchschnitt
Average		Durchschnitt
Average		Durchschnitt
Average Circle		Durchschnitts Kreis
Average Load		Durchschnittliche Last
Average Peak Load		Durchschnittliche Spitzenlast
Average Peaks	<i>The Deutsch translation for the phrase in the active row is entered into the green text input entry block. The translated phrase appears in the Translate column (Deutsch).</i>	Durchschnittliche Spitzenwerte
Average Peaks / Valleys		Durchschnittliche Spitzenwerte/Tiefstwerte
Average Valley		Durchschnittliche Tiefstwerte

Buttons at the bottom: No Translation Is Needed, Hide Translated Text Now, Show All Text Now, Durchschnittliche Spitzenlast, Kopieren, Einfügen

Record Count: 2490 of 2523 translated

SAVE NOW

The SAVE NOW target should be used often. It secures your work and saves your work to its associated xml file. It is good practice to use the SAVE NOW target after each translation entry, including after the PASTE function.



NOTE

Always select the SAVE NOW target before you exit the translation utility.

ENGLISH COLUMN

Your L2 Plus software uses the English language as its default. All terms, phrases, numerics, symbols, etc. were created using the English language.

The ENGLISH column serves as the list of the available terms, phrases, numerics, symbols, etc. that may be translated.

The ENGLISH column displays all terms, phrases, numerics, symbols, etc. in a somewhat numerical-alphabetical order. Each item appears on a row and possible additional rows when used in multiple locations within the software.



NOTE

If a term, phrase, numeric or symbol appears on more than a single row, it is important to translate all rows with that information. The individual row corresponds to a particular location within the software and where and how it is displayed.



NOTE

The ENGLISH column lists some terms, phrases, numerics and symbols that may not pertain to your specific software. It is acceptable to only translate the terms you are familiar with for your force measurement or material testing application.

COMMENTS COLUMN

The COMMENTS column is “read-only” and serves to provide additional information that is intended to assist you to understand the definition or context of certain terms, phrases, etc.

TRANSLATED LANGUAGE COLUMN

The TRANSLATED LANGUAGE column is the result of your translation. The translated term, phrase, numeric, symbol, etc. that you translated in the Input Text Entry Block, is displayed in this column. Use this column to read your translated text and compare to the English column to ensure that your translation is correct.



NOTE

The header displayed for the TRANSLATED LANGUAGE column must represent the Language you selected in the Settings setup for the Language option. If the header does not display your language, you are incorrectly and improperly translating into another language.



NOTE

The terms, phrase, numeric, symbol, etc. displays in red to indicate that it has NOT BEEN TRANSLATED.

NO TRANSLATED IS NEEDED

When you select a row for translation, you have the option to not translate the term, phrase, numeric, symbol, etc. In other words, you are accepting that particular item as your translation.

Select the NO TRANSLATION IS NEEDED to accept the items displayed in your language column as the “correct” term, phrase, numeric, symbol, etc.



NOTE

If you press the NO TRANSLATION IS NEEDED function, the term, phrase, numeric, symbol, etc. changes color from red to black. Black text indicates the item has been translated. A red item shows that the item has not be translated.

HIDE TRANSLATED TEXT NOW

Select the HIDE TRANSLATION TEXT NOW to hide all terms, phrases, numerics, symbols, etc. that have been translated or where they have been identified as “No Translated is Needed”.



NOTE

Items that have been translated or that are considered translated, display in black text. When the HIDE TRANSLATED TEXT NOW is pressed, these items are not displayed. Only the remaining items, displayed in red, are displayed.

SHOW ALL TEXT NOW

The SHOW ALL TEXT NOW lets you display all terms, phrases, numerics, symbols, etc. If you used the Hide Translated Text Now function to hide translated items, selecting the SHOW ALL TEXT NOW will re-display any hidden item.



NOTE

You can check to ensure that all terms, phrases, numerics and symbols are translated by using the SHOW ALL TEXT NOW function and looking for any items in your language column that displays in red text. Red text means the item has not be translated.

INPUT TEXT ENTRY BLOCK

The INPUT TEXT ENTRY BLOCK is where you type in your translation. When you select a row, this block highlights in green with the English term, phrase, numeric, symbol, etc. Use your delete key to remove the English version and then use your keyboard to enter your preferred translation- term, phrase, numeric, symbol, etc.



NOTE

Always use the shortest term, phrase, numeric or symbol. Remember, your translation must fit the space it has been allocated within the software.



NOTE

After you have entered your translation, press the SAVE NOW target.



NOTE

Ensure that your translation took effect by verifying that your new translation is displayed in the Translated Language column and that it is displayed in black text.

COPY

You will encounter items requiring translation that appear on multiple rows in your translation view. You only need to translate the first incident where the term, phrase, numeric, symbol, etc. appears. Then use the COPY function to copy your translation to the next field using the Paste function.



NOTE

The COPY function operates as it does in Microsoft WORD, EXCEL or other applications. When you Copy, the item that you copied is treated as a “clip board” item. You may make repetitive “pastes” by copying one item and using the Paste function in multiple locations.

PASTE

The PASTE function operates in conjunction with the Copy function. The PASTE function is only operable when you Copy a term, phrase, numeric, symbol, etc.



NOTE

The COPY function operates as it does in Microsoft WORD, EXCEL or other applications. When you Copy, the item that you copied is treated as a “clip board” item. You may make repetitive “pastes” by copying one item and using the PASTE function in multiple locations.



NOTE

When you PASTE, you paste into the INPUT TEXT ENTRY BLOCK.

RECORD COUNT

The RECORD COUNT is a “ready-only” that shows the item (row) based on the total number of items in the database for translation.

Proof Your Translation

Once you have completed the entire translation for all items, you should “proof the translation” by exiting the translation utility.

Next, go into “run-time mode” with your software and go through the various setup and operating functions. Look for how your translated information appears- is it fitting the allocated space or is it over-writing the allocated space. Look for any terms that may not have been translated, etc.



NOTE

If you find that a translated term, phrase, numeric or symbol is too large for the allocated space, you have two options in this order:

1. Shorten your translation
2. Contact your Starrett representative for assistance- it may be something we can do to reduce the translated item size; or maybe we can increase the allocated space.

8.4 SECURITY Setting

An entire User Guide is devoted to the Security Setting and the various security provisions within your software. For more information, please refer to **User Guide 7- Security**.

*L2 Plus SECURITY Setting
Account Information*

8.5 FILE LOCATIONS Setting

The File Locations setting is used to specify where exported data and other files used within your L2 Plus system are saved to.

The File Location setting lets you map where files are transmitted to, archived or saved when your L2 Plus system is networked.



CAUTION

Please ensure that files from your system are protected from unauthorized access. Files distributed via a network are not protected by the L2 Plus system. These files must be protected by your company’s network security

Category	Location
Archives	Archives
Backups	Backups
Diagnostics	Diagnostics
Exports	Exports
Runs	Runs
Templates	Templates
Tests	Tests

*L2 Plus FILE LOCATIONS Setting
Map where critical files are saved to on your network*

8.5.1 Archive Setting

The Archive file location is used to house historical Runs files.

Once the Runs Limit for a test setup has been reached, the oldest run file for that test is removed from the Runs List. The oldest run file is saved to the Archive file location where it may be imported into the active Runs List so that it's results can be compared to active runs.

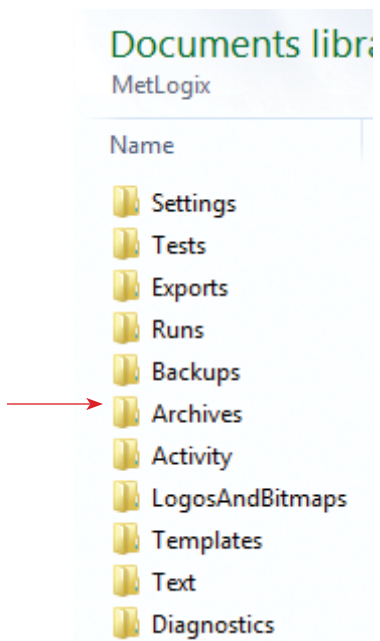
There is no limit to the number of files that can be saved in the Archive sub-directory.

The default location for Archive files is the Metlogix directory on your L2 Plus workstation and the Archive sub-directory.



NOTE

Historical runs that are no longer included in an active test's Runs List are automatically saved to the Archive sub-directory. Archived runs may be used for benchmarking or comparing historical runs and results to current runs and results.

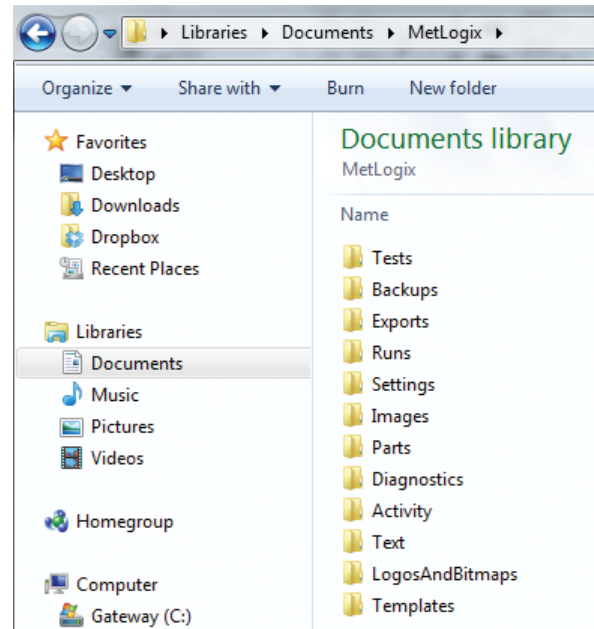


*L2 Plus Metlogix Directory
Historical runs saved to Archives sub-directory*

8.5.2 Backups File Location

The Backup file location is used by authorized Starrett personnel only. Included in this location are copies of system settings files and software license authentication functions.

The default location for Backup files is the Metlogix directory on your L2 Plus workstation and the Backups sub-directory.



*L2 Plus METLOGIX Directory
File Storage Location*

8.5.3 Diagnostics File Location

The Diagnostics file location is used to house diagnostic files that can be created should the user experience an issue with their L2 Plus software. Selecting the L2+ symbol (upper right) and holding when a problem is experienced creates a file that is saved to the Diagnostic directory. This file can then be emailed to your Starrett representative for evaluation and recommendations.

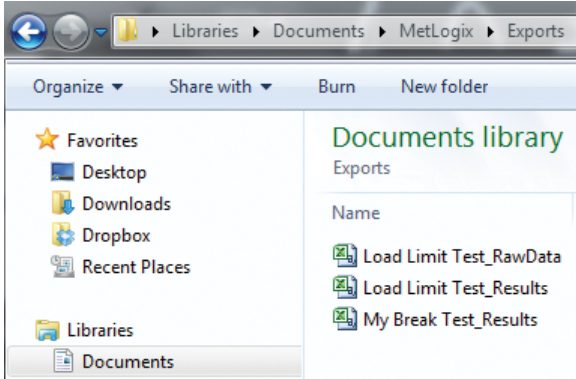
The default location for Diagnostics files is the Metlogix directory on your L2 Plus workstation and the Diagnostics sub-directory.

8.5.4 Exports File Location

Using the Post Test step, you have the ability to export data and results. The File Location setting is used to map where the exported files are sent and saved. Files are .csv types.

Data and result files can be exported automatically at the completion of a test run using the Post Test output options. Or, you can export data and results on-demand using the Share function.

The default location for Export files is the Metlogix directory on your L2 Plus workstation and the Exports sub-directory.



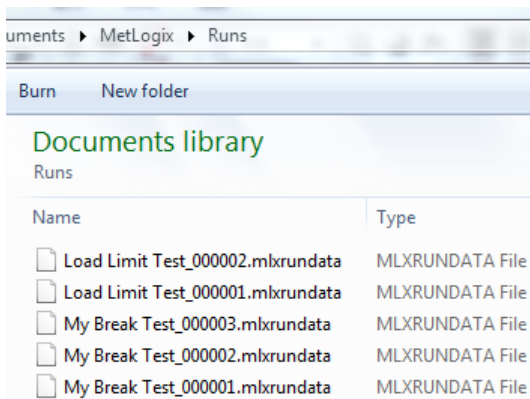
*L2 Plus EXPORTS Directory
.csv export files of data and results*

8.5.5 Runs File Location

Individual tests are called “runs”. Each run has a unique file that contains the individual data points that were acquired during the test based on the Sampling Rate that your have specified in the Pre Test step.

Runs files may only be opened using the L2 Plus software application.

The default location for Runs files is the Metlogix directory on your L2 Plus workstation and the Runs sub-directory.



*L2 Plus RUNS Directory
Individual test run files are saved as MLXRUNDATA files*

8.5.6 Templates File Location

The Template location may be used to save test setups that you do not want to have accessible on your L2 Plus system. As a “template” these files may serve as a test that can be copied and used for other materials or components. A “template” can be created that has a common sequence as another test setup, but which has different step attributes. Templates can help speed up the creation of new test methods.



NOTE

A test setup that is saved to the Template location will not appear on the Home view. This test cannot be used on the system until it has been copied or moved to the Tests directory.

The default location for Template files is the Metlogix directory on your L2 Plus workstation and the Templates sub-directory.

8.5.7 Tests File Location

The Tests directory contains the “active” test setups for your L2 Plus system. These tests appear in the Home directory.

The default location for Test files is the Metlogix directory on your L2 Plus workstation and the Tests sub-directory.



CAUTION

The Test files are the source file for a test. If this file is removed from the Tests directory it will not appear on the main Home directory. If a Test file is deleted, the test and all associated Runs are deleted.

8.6 LOAD CELL CORRECTIONS Setting



WARNING

The Load Cell Correction functions should be restricted to personnel who are authorized to calibrate a Starrett load cell sensor. Use by inexperienced and untrained personnel can result in permanent damage to the load cell sensor and your testing system.

The Load Cell Corrections setting is used for calibrating a load cell that is connected to your testing frame. This section will describe some of the functions available.

The procedures for calibrating a Starrett load cell sensor may be obtained through your Starrett representative.

Setting	Value	Unit
Enable LEC	No	
Distance Nominal	0.00	in
Distance Observed	0.00	in
Enable deflection compensation	No	
Deflection Distance	0.12	in
Deflection Force	0.00	lbf
Enable cell calibrations	No	

*L2 Plus LOAD CELL CORRECTIONS Setting
Used for calibrating load cell sensors and test frame*

8.6.1 Enable LEC (Linear Error Correction)

Linear Error Correction (LEC) is normally set to Yes. This algorithm continuously evaluates test frame displacement and applies correction to ensure that displacement measurements are maintained to within published specifications.

8.6.2 Distance Nominal

When a full system calibration is performed and displacement is calibrated per ASTM E2309/2309M (or equivalent), the nominal value used during calibration is entered into this field. This value is taken from the artifact used to calibrate or verify displacement.

8.6.3 Distance Observed

When a full system calibration is performed and displacement is calibrated per ASTM E2309/2309M (or equivalent), the observed value used during calibration is entered into this field. The Observed value is the value displayed by the L2 Plus Workstation connected to the test frame.

8.6.4 Enable Deflection Compensation

Deflection compensation is a feature within your L2 Plus system that corrects and compensates for the total deflection effects due to frame deflection, load cell sensor deflection and test fixture deflection.

Deflection compensation may be used in either tensile or compressive testing.

Spring compression testing can benefit from deflection compensation since even very minor deflection effects can result in erroneous readings and calculations of spring rate.

Compensating for deflection can be done by allowing the entire “grip string”, comprised of the load cell sensors attached to the frame and platens affixed to the load cell to be compressed against a hard stop. For example, allowing the top compression platen to compress against the lower compression platen at a very low speed and to a specified load capacity that is well within the load cell capacity.



WARNING

Deflection compensation, performed incorrectly, can result in permanent damage to the load cell sensor. Deflection compensation should be performed by your Starrett representative or personnel who have been trained, or who are experienced in performing deflection compensation on Starrett systems.

If you expect your load measurement during your test to be 10lbf, you will want to compensate for deflection up to 10lbf.

To determine your deflection compensation values, you would bring your compression platens together so they are barely touching one another, or just touching one another without a significant load (below 1% of the target load of 10lbf.

Zero the Distance.

With the jog speed set at Slow Speed, press the jog key downward causing the crosshead to move downward until you reach the target load value of 10lbf.

Record the Distance value that the crosshead traveled to get to the target load of 10lbf. This Distance value is the Deflection Distance.

The Deflection Force is the target load value, e.g. load at the Deflection Distance value.

8.6.4.1 Deflection Distance

The Deflection Distance is the distance the crosshead traveled from a zero position to the target load value.

8.6.4.2 Deflection Force

The Deflection Force is the target load value, e.g. load at the Deflection Distance value.

8.6.5 Enable Cell Calibrations

When the Enable Cell Calibrations option is YES, the system is in calibration mode and should not be used for testing.

Enable Cell Calibrations must be set to NO when the system is being used for testing.



WARNING

Calibration should be performed by personnel experienced in calibrating a Starrett load cell sensor and test frame.

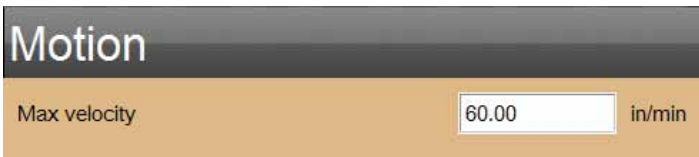
Improper calibration will result in erroneous measurements and may cause permanent damage to the load cell sensor and test frame.

8.7 MOTION Setting

The Motion setting is used to establish the highest test speed/velocity that the test system crosshead may travel. This value limits the crosshead velocity for test step setup and for the maximum speed velocity that is controlled by the jog switch.

The default Motion setting is factory set at the maximum allowed speed for that Starrett test frame.

Adjusting the Motion setting downward reduces the maximum allowed crosshead speed to this value.



*L2 Plus MOTION Setting
Sets the maximum allowable crosshead speed/velocity*

8.8 LOADS Setting

The Load Setting is used to specify options and characteristics concerning load measurement.



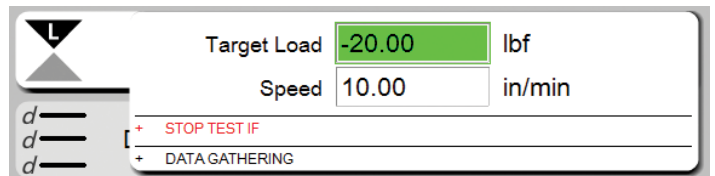
*L2 Plus LOAD Setting
Used to establish load measurement functions*

8.8.1 Load Sign Assignment

The “Export with minus sign” function lets you specify how to designate a compression load using a negative sign. Tensile loads will have a positive sign (no sign actually shown), while compression loads will display a negative sign. Or, you may choose to reverse the sign so that tensile loads have a negative sign to distinguish them from a compression load (no sign).

When the selection = Compression, compression results will be displayed with a negative sign. Tensile results will display without a sign.

When the selection = Tension, tensile results will be displayed with a negative sign. Compressive results will display without a sign.



*L2 Plus LOAD Setting
Shows a compression value entered as a negative value*

8.8.2 Grip Load

The Grip Load is a value that you enter to protect your test fixture (grip) from damage due to overloading or exceeding the load capacity of the test fixture.

All test fixtures have a load capacity. This load capacity is the maximum load that the test fixture is rated to. Loads exceeding this capacity can permanent damage the test fixture.

Often, the maximum capacity of the test fixture is below the maximum load capacity of the load cell sensor, therefore, the maximum load for a test setup should be the lowest rated capacity of the test fixture, load cell or test frame.

The Grip Load setting allows you to enter a load capacity limit based on the testing fixture used. For example, you may have a 1000N load cell, but you are using a test fixture with a maximum testing capacity of 50N. In order to protect the test fixture, you can set the Grip Load to 50N. When 50N is reached, the test run will terminate and protect the test fixture.



WARNING

Excessive crosshead speed may make it impossible to stop in sufficient time to prevent an overload. Do not use high speeds, particularly in compression directions.



NOTE

If Grip Load is set, a test run will abort if the measured load exceeds the Grip Load value you have entered.



NOTE

The Grip Load value is sign dependent. If your compression sign is negative, you must enter the Grip Load value as a negative value if you intend to protect your test fixture with a load capacity limit in the compressive direction.

8.8.3 Frame Capacity

The Frame Capacity value is automatically displayed and represents the maximum allowed load capacity for the test frame your L2 Plus system is configured with.

This is a “read-only” value and is not adjusted.



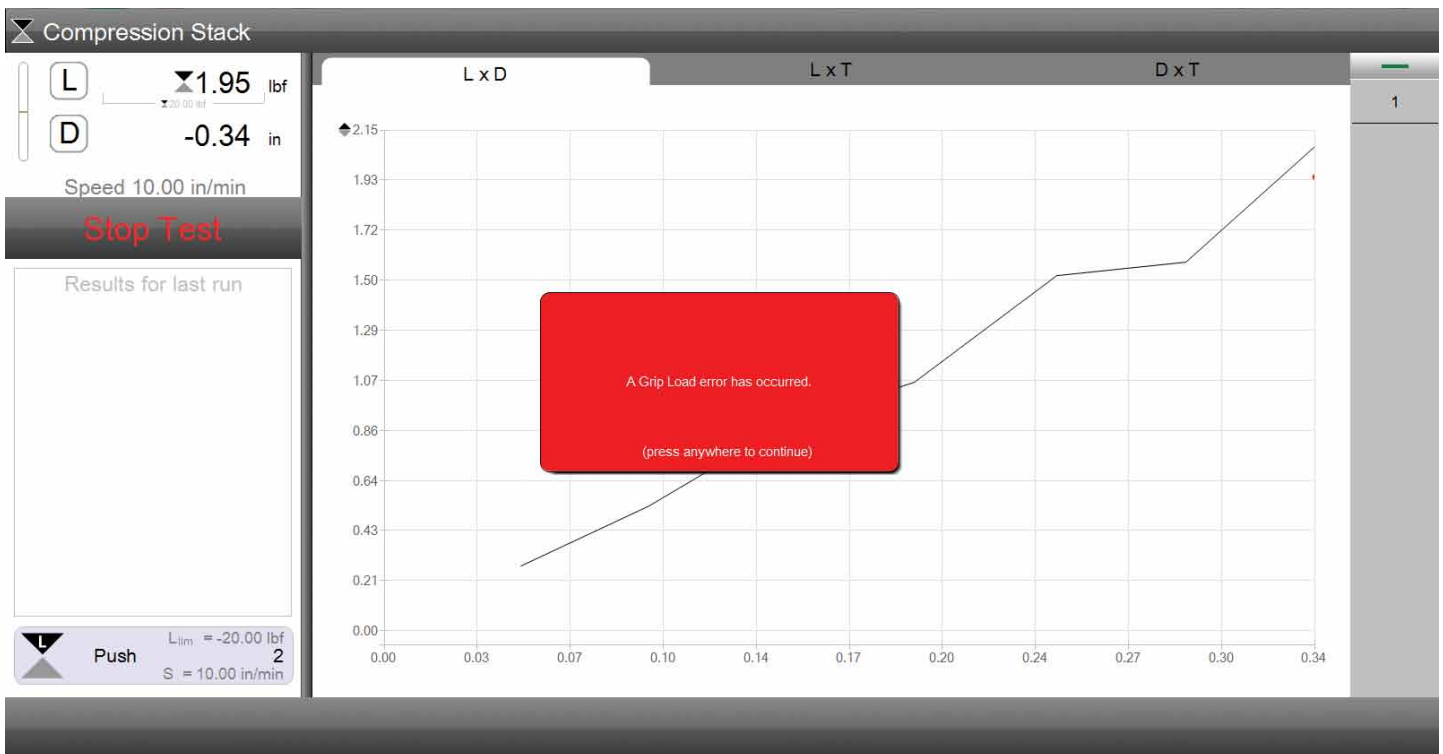
NOTE

No tests may be performed beyond the Frame capacity.



L2 Plus LOAD Setting

Shows the frame capacity for this L2 System at 112lbf (500N)



L2 Plus LOAD Setting

An exception stops aborts the test run when the Grip Load is exceeded

8.8.4 Current Load Cell

The L2 Plus software identifies the load cell sensor model that is connected to the test frame and that is communicating and controlled by the L2 Plus workstation.

You may use the drop down list to select a load cell model if you choose to have a specific load cell associated with this system or a particular test setup.

8.8.5 Maximum Load Allowed

The “Maximum load allowed” feature lets you limit the capacity of a connected load cell sensor by specifying the maximum load allowed. Using this limit can help prevent accidental overloads. If you are using a 100N load cell, and you specify the Max load allowed at 75%, the 100N load cell will measure between 0 and 75N. A test run will terminate if this load limit is exceeded.



WARNING

Excessive crosshead speed may make it impossible to stop in sufficient time to prevent an overload. Do not use high speeds, particularly in compression directions.

8.8.6 Disable Overload

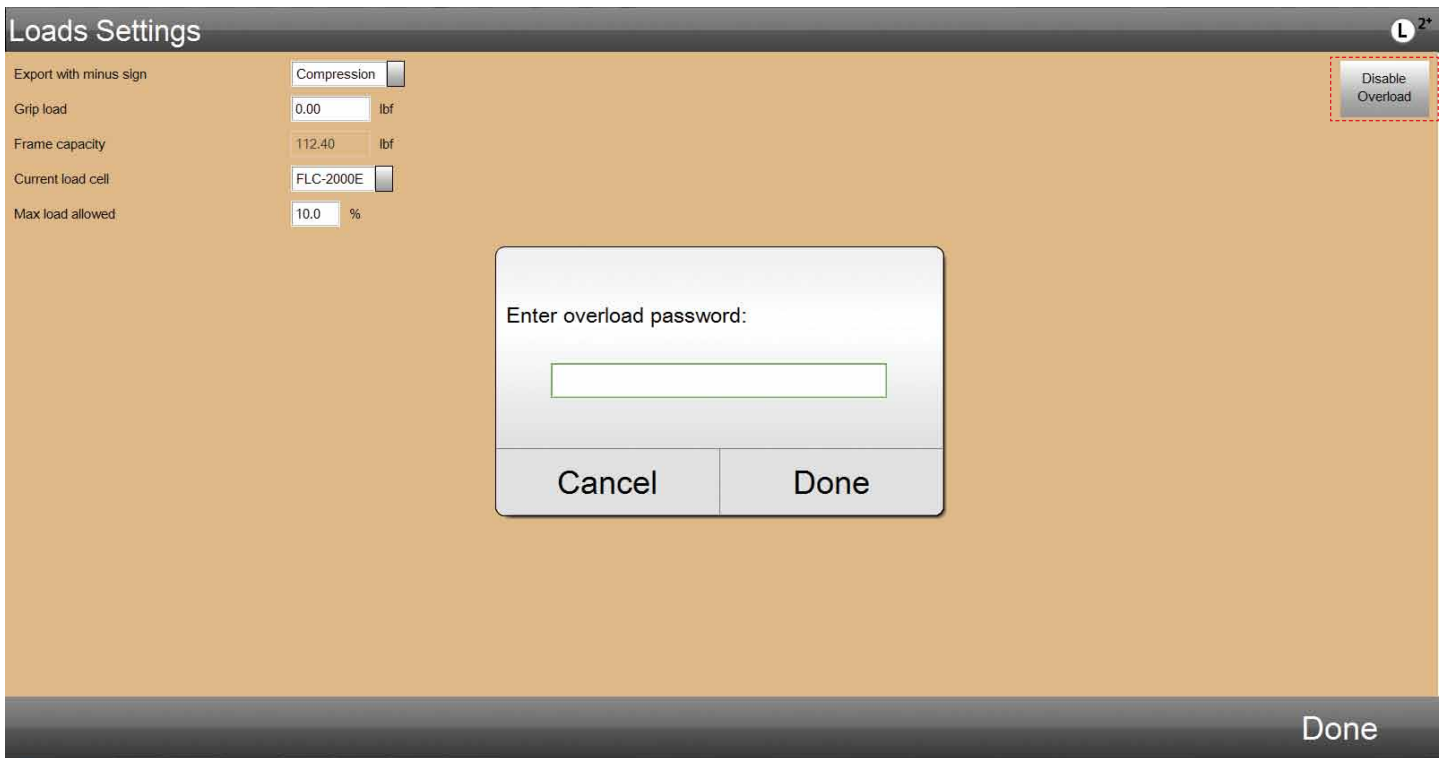
The Disable Overload function is intended for use during load cell calibration, where you need to disable overload protection.

The Disable Overload function is password protected and may be accessed by authorized Starrett personnel. Contact your Starrett representative if you need to access the Disable Overload function.



WARNING

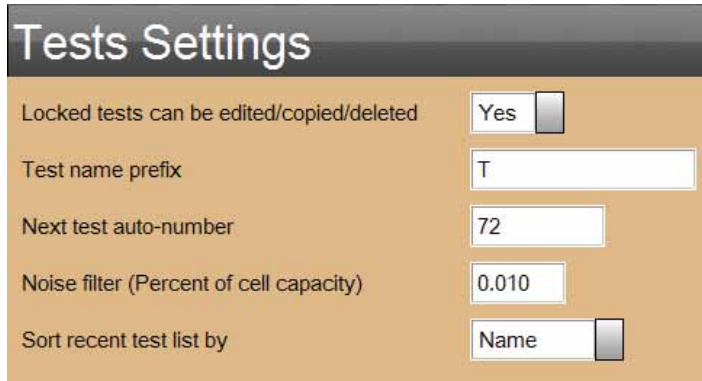
The Disable Overload function removes all load cell sensor protection. The Disable Overload function is used during load cell sensor calibration. Disable Overload should NEVER be disabled during normal system use, e.g. all use except for load cell sensor calibration. Disabling overload protection may lead to permanent damage to a connected load cell sensor and potential permanent damage to your test frame.



L2 Plus LOAD Setting
Shows required Password entry dialog to Disable Overload protection

8.9 TESTS Setting

The Tests setting is used to specify how certain Test functions perform. These settings include the ability of the user to edit a locked test; the use of prefixes in the test name; test numbering, and how tests appear on the main Home Menu.

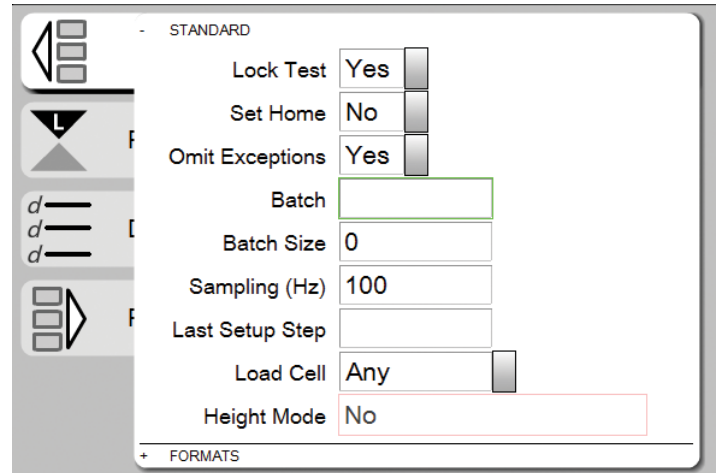


Locked tests can be edited/copied/deleted	Yes
Test name prefix	T
Next test auto-number	72
Noise filter (Percent of cell capacity)	0.010
Sort recent test list by	Name

*L2 Plus TESTS Setting
Shows options associated with test setups*

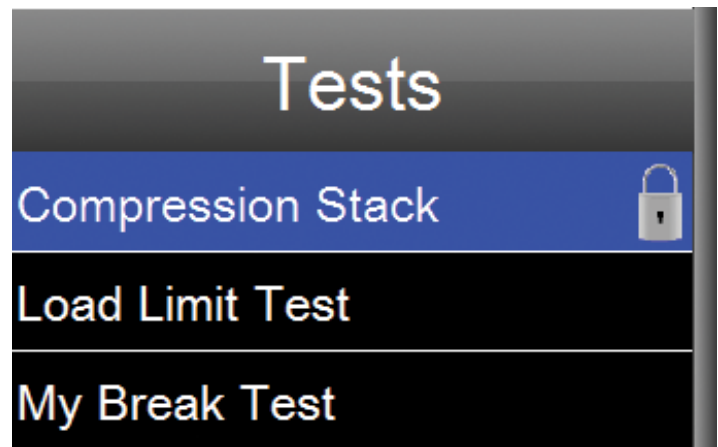
8.9.1 Locked Test

Test setups may be locked by the creator. If the user has Test Authoring rights, and this setting = YES, the user can edit, copy or delete a test setup. If the setting = NO the user cannot edit, copy or delete a test setup.



Lock Test	Yes
Set Home	No
Omit Exceptions	Yes
Batch	
Batch Size	0
Sampling (Hz)	100
Last Setup Step	
Load Cell	Any
Height Mode	No

*L2 Plus TESTS Setting
Shows a test setup where the test is Locked by the creator*



Tests
Compression Stack
Load Limit Test
My Break Test

*L2 Plus TESTS Setting
A locked test setup shown in Home menu*

8.9.2 Test Prefix Name

The Test Prefix Name option is useful if you want to have a common naming convention for the tests you create.

For example, you may want to use the initials of the person who created the test in the naming convention for tests. Or, you may want to use the location/facility/lab that is associated with the test setup.

When a Test Prefix Name is used, all test setups created will have this prefix name, followed by a number.

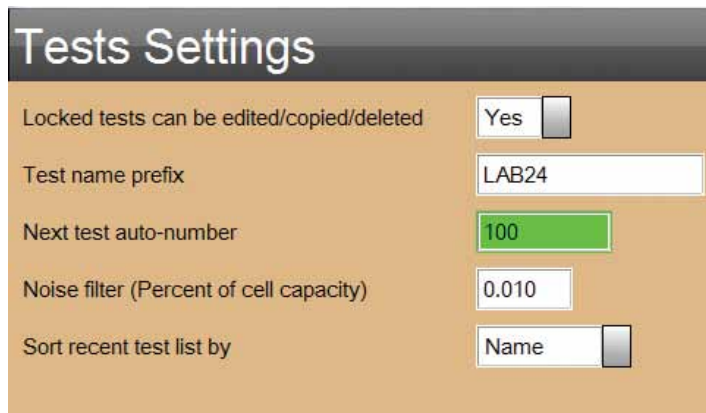
8.9.3 Next Test Auto Number

The Test Auto Number option applies a sequential number beginning with this number specified to all newly created test setup.

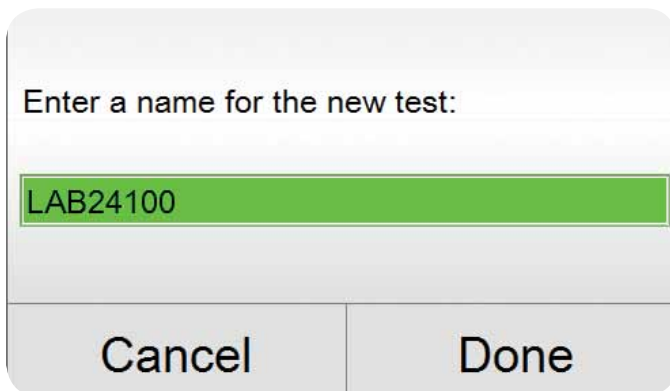
The default number is 1. A new test with a Prefix Name=T will have test name with auto number of 1, e.g. T1. Succeeding test setups will have a number T2, T3, etc. until you rename the test.

A naming convention may include the lab facility number and then a sequential number that corresponds to a sample, batch, material, etc.

Renaming the test overwrites the Prefix Name and Test Number.



*L2 Plus TESTS Setting
Shows Prefix and Auto Number setup for a new test*

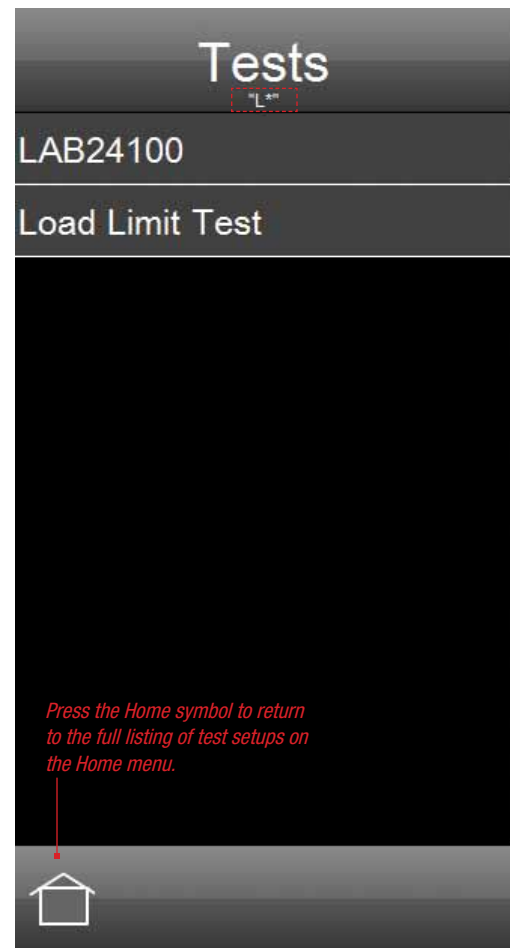


*L2 Plus TESTS Setting
Shows automatic naming of new test setup*

8.9.4 Noise Filter

The Noise filter is used to set the sensitivity of the load cell sensor and its noise dampening capability. The Noise Filter default is 0.01% of the connected load cell sensor. In most applications this value should NOT be changed.

However, in certain extreme conditions, there may be too much noise on the load signal that you need to dampen the signal in order to obtain a more precise load point on your graph. To do this, you can experiment by increasing this noise setting from 0.01% to 0.02%. This effectively increases the measurement band around a point, making it more precise in identifying a specific load scope point.



Press the Home symbol to return to the full listing of test setups on the Home menu.

*L2 Plus Home menu
Shows test names filtered after entering character "L"*

8.9.5 Sort Recent Test List By

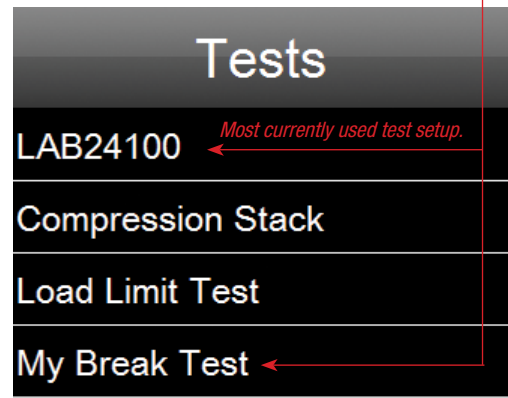
You may specify how test setups appear on your Home menu. Tests may be listed by their Name alpha-numerically, or they may be listed based on "last used". A test that was used most recently will appear at the top of the list of test setups.

If you have a large number of test setups, you may also use your keyboard to filter the test names. Type the first few characters of your test using your QWERTY keyboard and the list of test names will be filtered showing only the test names with the characters you typed.

*L2 Plus TESTS Setting
Shows tests to be sorted by Last Used in the Home menu*

The screenshot shows the 'Tests Settings' menu with the following options:

- Locked tests can be edited/copied/deleted: Yes (checkbox checked)
- Test name prefix: LAB24
- Next test auto-number: 101
- Noise filter (Percent of cell capacity): 0.010
- Sort recent test list by: Last Used

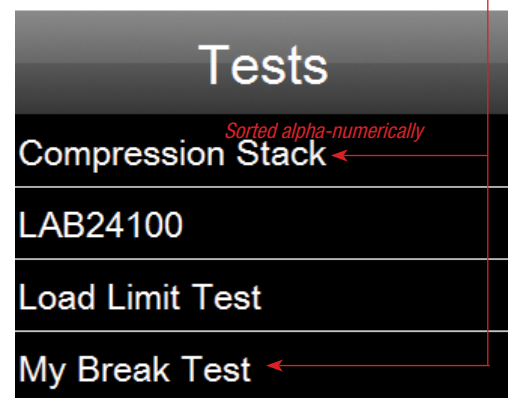


Test setup that represents the "oldest", the test that hasn't been used recently.

*L2 Plus TESTS Setting
Shows tests to be sorted by Name (alpha-numerically) in the Home menu*

The screenshot shows the 'Tests Settings' menu with the following options:

- Locked tests can be edited/copied/deleted: Yes (checkbox checked)
- Test name prefix: LAB24
- Next test auto-number: 101
- Noise filter (Percent of cell capacity): 0.010
- Sort recent test list by: Name



8.10 IO LINES Setting

Starrett test frames are equipped with a digital I/O termination panel on the back of the test frame. FMS and FMD test frames have the digital I/O panel. MMS and MMD material test frames, which may be used with your L2 Plus software when very high precision is required, feature the digital I/O panel plus an analog I/O panel.

The I/O capability available to users REQUIRES that the system is equipped with the optional Automation Builder software application.



NOTE

The I/O capabilities on any Starrett test frame cannot be used unless the system being used is equipped with a licensed version of the optional Automation Builder software.

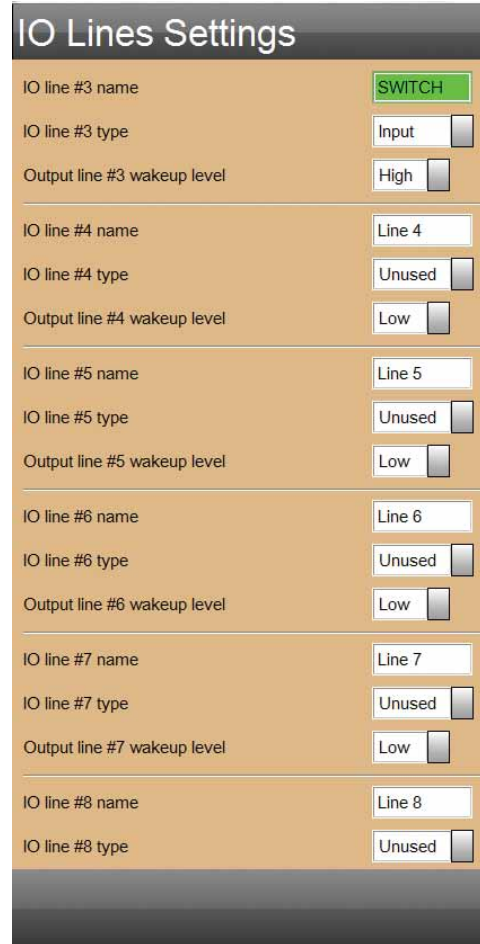
8.10.1 Optional Automation Builder Application

The L2 Plus Automation Builder is an optional software package that is used with the L2 Plus Test Builder application. The Automation Builder software enhances the functionality provided by the Test Builder. Combined with the Test Builder application, the Automation Builder adds these functions to your L2 Plus system:

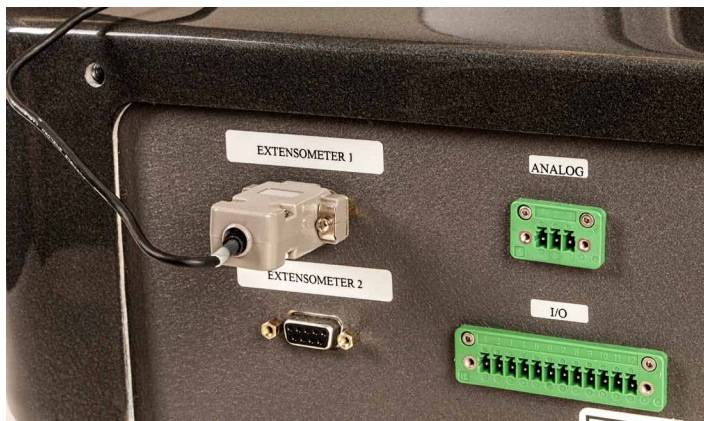
- Create formulas and expressions using arithmetic, trigonometric and logarithmic functions
- Utilize the digital input/outputs on your MMx or FMx test stand
- Incorporate conditional branching within your test setups for advanced test method control and integration with ancillary equipment

You can create formulas that use your basic results to determine more advanced force measurement and material testing results including coefficient of friction using an inclined test fixture.

The Automation Builder are discussed in a separate User Guide. For details on the Automation Builder and its use, please refer to **User Guide 8- Using the Optional Automation Builder Software**.



L2 Plus IO LINES Setting
Shows setup options for digital I/O lines



Analog and Digital I/O Termination Panel
Shown on MMS and MMD Material Test Frames (MMD-50K)



Digital I/O Termination Panel
Shown on FMS and FMD Force Test Frames (FMS5000)

8.11 PRINTOUTS Setting

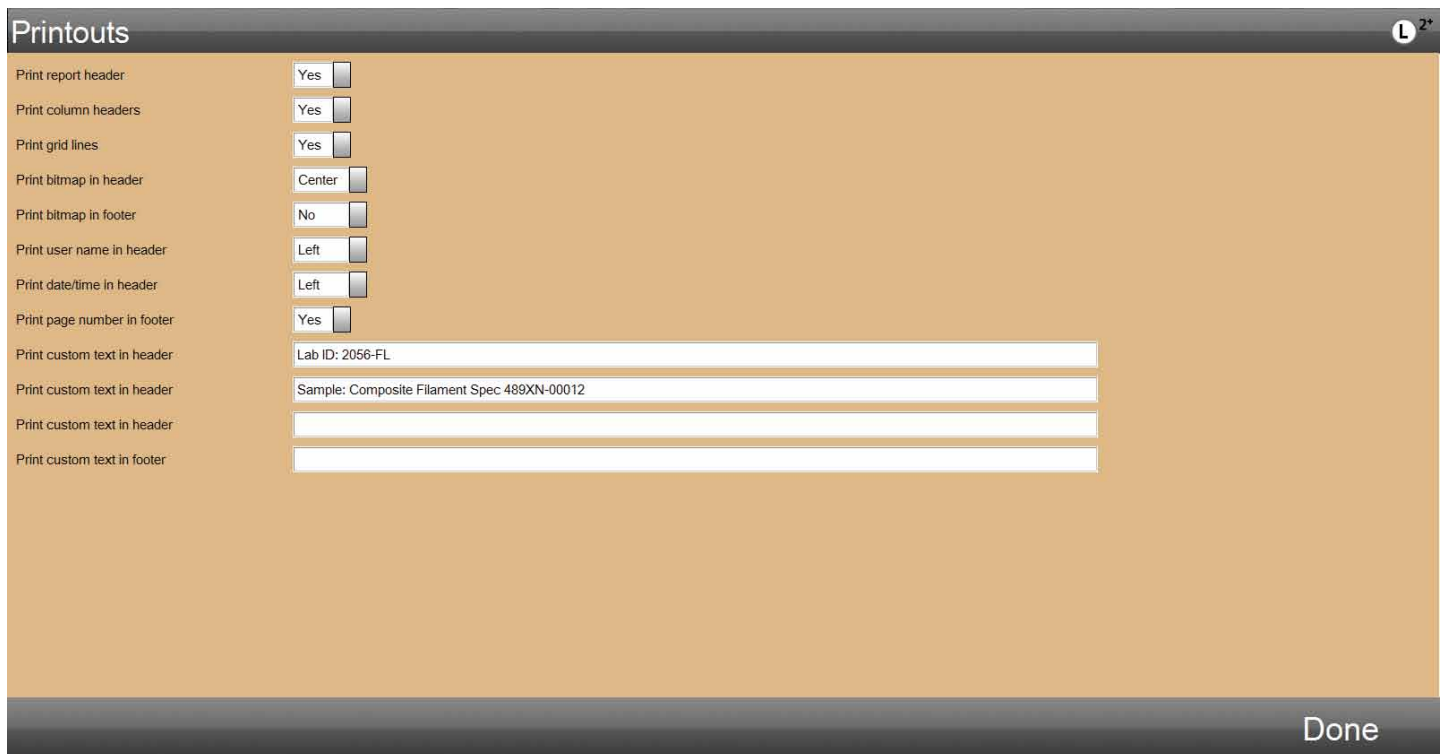
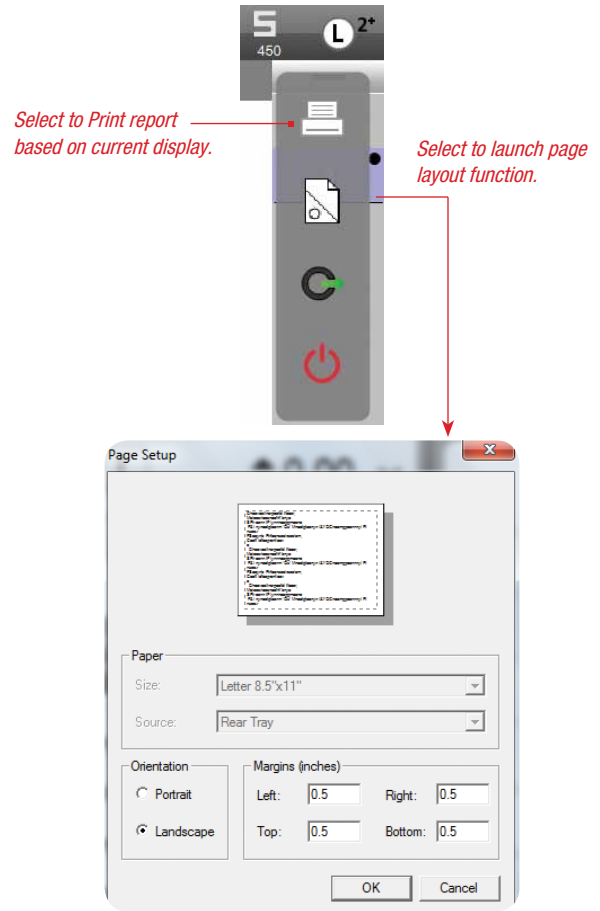
The L2 Plus system features a set of standard reports that may be used to print out graphs, results, statistics and more. The report printouts are accessed using the L2+ symbol. Reports are associated with the type of page view being displayed. For example, if you are displaying a full graph view, if you select the Printer symbol in the L2+ main menu, the full graph report is printed. This is a full-page report of the graph and its result markers.

If a split graph-data view display is being shown and you select the L2+ print function, a report is printed showing the graph of all selected test runs (rows) and their data table.

Customization of the reports may be done using the Printouts setting.

If more sophisticated reporting is preferred, you may use the export files (.csv files) to merge with Microsoft® Excel®. This lets you create very comprehensive reports using Excel features such as macros or pivot tables.

L2 Plus Main menu
Shows Print and Page Layout functions



L2 Plus PRINTOUTS menu
Shows options for setting up how standard reports will appear

8.11.1 Print Report Header

When the Print report header option = Yes, the attributes associated with the report header are printed. These attributes are:

- Print Bitmap in Header
- Print User Name in Header
- Print Date/Time in Header
- Print Custom Text in Header

If any of these attributes are enabled, they will appear in the printout in the header section of the report.

8.11.2 Print Column Headers

Column Headers are present in all Data Table views. Column headers typically represent the name of the result type (coefficient). Beneath the column header are the actual result values.

If Print column header = Yes, the header labels in all data table views is included in the report and will print when output.

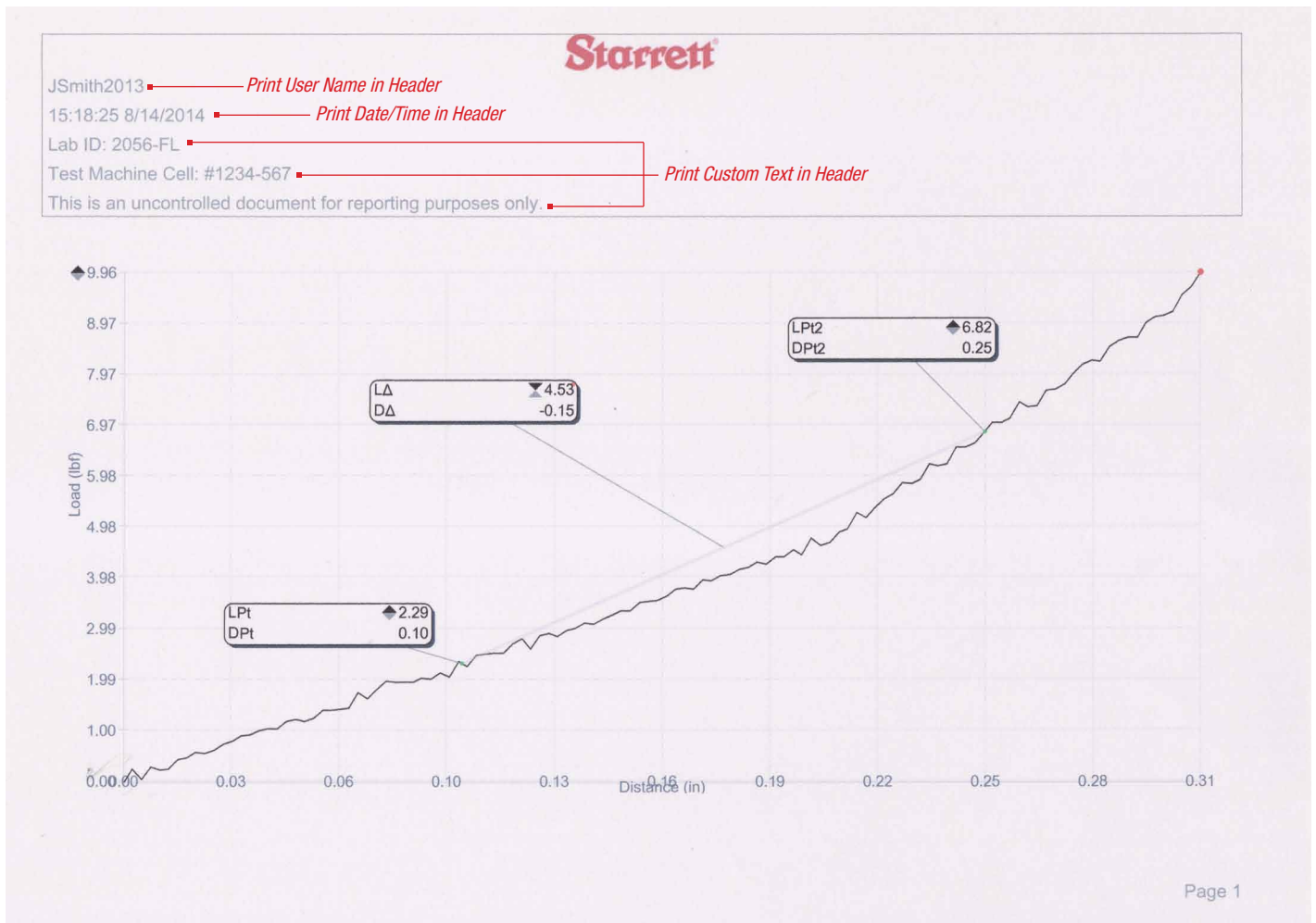
If Print column header = No, the header labels are not included in the report and will not print. Only the result values are printed within the column.

8.11.3 Print Grid Lines

Graph views display with grid lines. However, for printouts, you have the option to output a report for a graph with or without grid lines.

If Print grid lines = Yes, grid lines will be printed on your report printout.

If Print grid lines = No, grid lines will not be printed on your report.



8.11.4 Print Bitmap in Header

The "Print bitmap in header" option is intended to allow users to include a logotype of their company in the header of their printout.

If a bitmap is to be used in the header, the bitmap must first be saved in the Metlogix directory, in the sub-directory called "LogosAndBitmaps".

The image saved must be a bitmap (.bmp) file.

The bitmap image to be used must be renamed to "Headerlogo". If the bitmap is not saved with this name it will not appear in the printout.

The bitmap optimum size is 30 pixels high, with length set to proportional.

When the Print bitmap in header = Right, the bitmap named "Headerlogo" is printed justified right on the printout.

When the Print bitmap in header = Left, the bitmap named "Headerlogo" is printed justified left on the printout.

When the Print bitmap in header = Center, the bitmap named "Headerlogo" is printed at the center of the report printout.

When the Print bitmap in header = No, no bitmap is printed in the header.

8.11.5 Print Bitmap in Footer

The "Print bitmap in footer" option is intended to allow users to include a logotype of their company in the footer of their printout.

If a bitmap is to be used in the footer, the bitmap must first be saved in the Metlogix directory, in the sub-directory called "LogosAndBitmaps".

The image saved must be a bitmap (.bmp) file.

The bitmap image to be used must be renamed to "Footerlogo". If the bitmap is not saved with this name it will not appear in the printout.

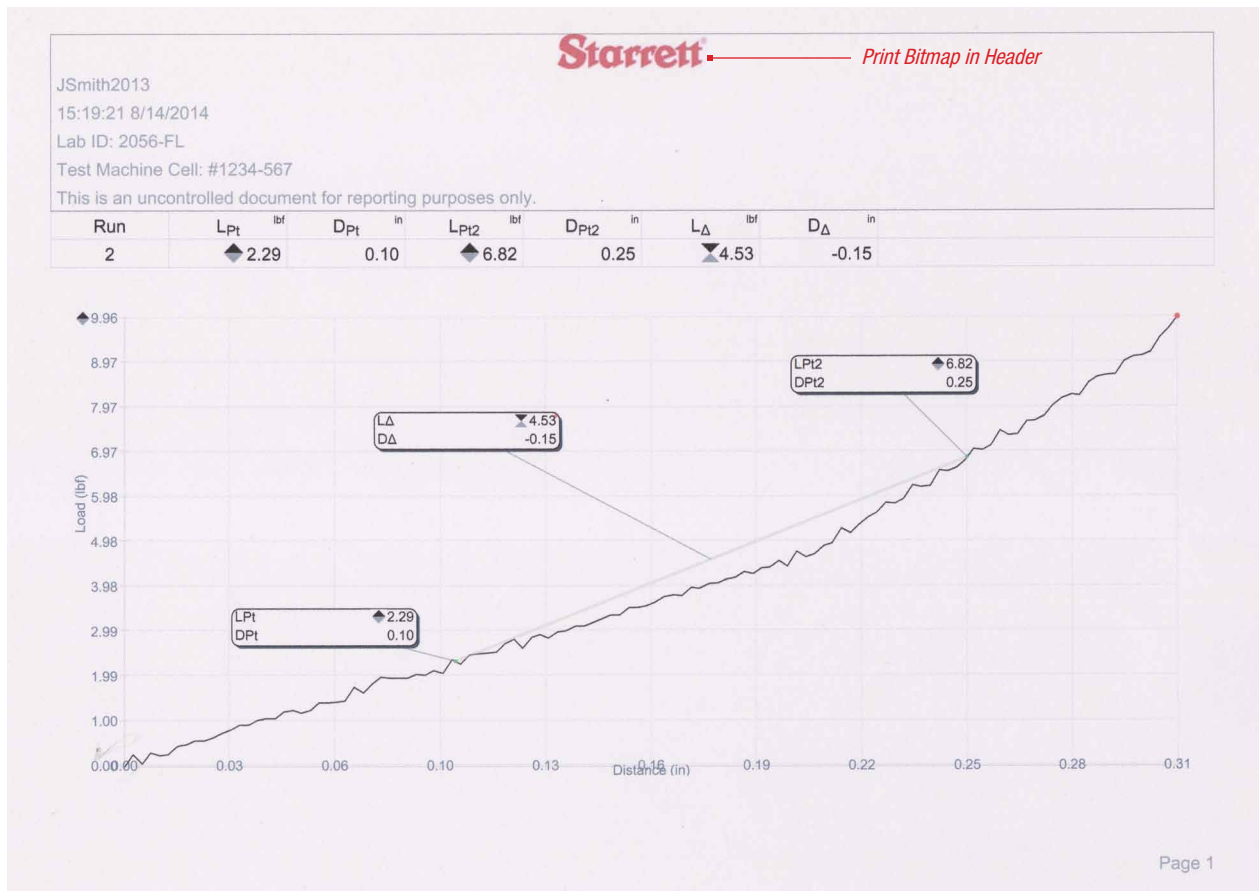
The bitmap optimum size is 15 pixels high, with length set to proportional.

When the Print bitmap in footer = Right, the bitmap named "Footerlogo" is printed justified right on the printout.

When the Print bitmap in footer = Left, the bitmap named "Footerlogo" is printed justified left on the printout.

When the Print bitmap in footer = Center, the bitmap named "Footerlogo" is printed at the center of the report printout.

When the Print bitmap in footer = No, no bitmap is printed in the footer.



8.11.6 Print User Name in Header

When the L2 Plus system utilizes the Security function and the use of User Names and passwords, the “Print user name in header” option will include the logged in user’s name at the time the printout is printed.

The L2 Plus system’s Security function lets you establish User Accounts. Each account has a unique User Name and associated password.

When the user logs into the L2 Plus system, their User Name can be included in the printouts that occur during that user’s session.

If Print user name in header = Right, the user who is logged into the L2 Plus system when the printout was performed will have their User Name printed right justified in the header.

If Print user name in header = Left, the user who is logged into the L2 Plus system when the printout was performed will have their User Name printed left justified in the header.

If Print user name in header = Center, the user who is logged into the L2 Plus system when the printout was performed will have their User Name printed in the center of the header.

If the Print user name in header = No, there is no User Name printed in the header.

8.11.7 Print Date/Time in Header

A time stamp may be used and printed in the report header.

If Print date/time in header = Right, the date with time is printed right justified in the header.

If Print date/time in header= Left, the date with time is printed left justified in the header.

If Print date/time in header = the date with time is printed in the center of the header.

If Print date/time in header = No, there is no date or time printed in the header.

8.11.8 Print Page Number in Footer

Page numbers may be included in your printout.

If Print page number in footer = Right, the page number is printed right justified in the footer.

If Print page number in footer = Left, the page number is printed left justified in the footer.

If Print page number in footer = Center, the page number is printed in the center of the footer.

If Print page number in footer = No, no page number is printed.

Starrett

JSmith2013
 16:38:27 8/14/2014
 Lab ID: 2056-FL
 Test Machine Cell: #1234-567
 This is an uncontrolled document for reporting purposes only.

Run	L _{Pt} ^{lbf}	D _{Pt} ⁱⁿ	L _{Pt2} ^{lbf}	D _{Pt2} ⁱⁿ	L _Δ ^{lbf}	D _Δ ⁱⁿ
2	◆ 2.29	0.10	◆ 6.82	0.25	◆ 4.53	-0.15
Max	◆ 2.29	0.10	◆ 6.82	0.25	◆ 4.97	-0.15
Min	◆ 0.58	0.10	◆ 1.54	0.25	◆ 4.53	-0.15
Range	◆ 1.71	0.00	◆ 5.28	0.00	◆ 3.56	0.00
Average	◆ 1.43	0.10	◆ 4.18	0.25	◆ 2.75	-0.15
Std Dev	◆ 1.21	0.00	◆ 3.73	0.00	◆ 2.52	0.00
6 Sigma	◆ 7.25	0.00	◆ 22.40	0.00	◆ 15.10	0.00

Print Custom Text in Footer

COMPANY CONFIDENTIAL

Print page number in Header

Page 1

8.11.9 Print Custom Text in Header

Three lines of custom text may be included in your header. Each text line is restricted to no more than 80 characters and spaces.

8.11.10 Print Custom Text in Footer

One line of custom text may be included in your footer. The text line is restricted to no more than 80 characters and spaces.



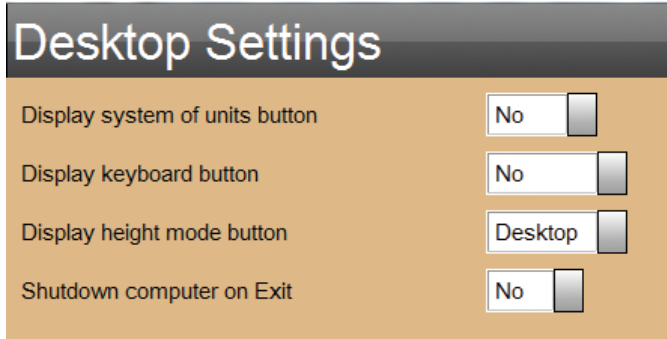
JSmith2013
 16:48:33 8/14/2014
 Lab ID: 2056-FL
 Test Machine Cell: #1234-567
 This is an uncontrolled document for reporting purposes only.

Run	Coef	Units	Actual	Limit 1	Limit 2	Deviation	P/F	Comment
1	LPt	lbf	◆ 0.58					
1	DPt	in	0.10					
1	LPt2	lbf	◆ 1.54	◆ 6.50	◆ 7.00		Fail	
1	DPt2	in	0.25					
1	LΔ	lbf	▲ 0.97					
1	DΔ	in	-0.15					
2	LPt	lbf	◆ 2.29					
2	DPt	in	0.10					
2	LPt2	lbf	◆ 6.82	◆ 6.50	◆ 7.00		Pass	
2	DPt2	in	0.25					
2	LΔ	lbf	▲ 4.53					
2	DΔ	in	-0.15					

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8.12 DESKTOP Setting

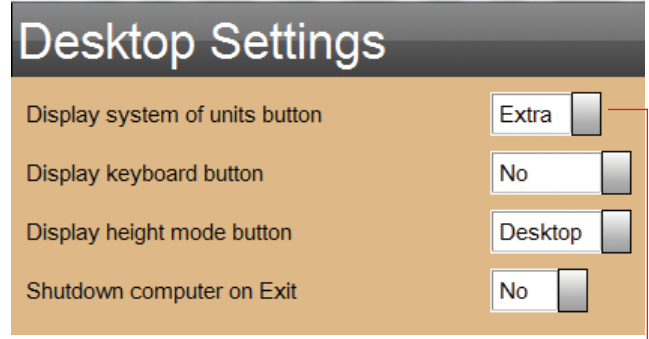
The Desktop Setting is used to specify and include specialized targets on your L2 Plus workstation that aide in changing units and testing mode. There is also an option that causes the L2 Plus workstation to shutdown when exiting the L2 Plus software application.



L2 Plus DESKTOP Settings

8.12.1 Display System of Units Button

The Units button provides a target that allows the user to toggle between Metric (SI) and English (Imperial) units of measure.



*L2 Plus DESKTOP Settings
Display units button is set to Extra*



*L2 Plus DESKTOP Settings
Shows Units button for English (Imperial) units of measure*



*L2 Plus DESKTOP Settings
Shows Units button for Metric (S.I.) units of measure*

8.12.2 Display Keyboard Button

The Keyboard button, when pressed or selected, launches a virtual keyboard on your display.

When the Keyboard button is set to Extra, it appears in the “Extra” drop down menu.

When the Keyboard button is set to Desktop, an icon of a keyboard appears on the header tool bar. Press the icon to launch the virtual keyboard.



L2 Plus DESKTOP Settings

Shows Keyboard button with English (Imperial) units of measure using Extra option



L2 Plus DESKTOP Settings

Shows Keyboard button with Metric (S.I.) units of measure using Extra option



L2 Plus DESKTOP Settings

Shows Keyboard button using Desktop option

8.12.3 Display Height Mode Button

The Height mode button lets you change your operating mode between Normal and Height modes. Normal mode uses a D to display distance. Height mode uses an H to display height.

When the Height button is set to Extra, it appears in the “Extra” drop down menu.

When the Height button is set to Desktop, an icon of a keyboard appears on the header tool bar. Press the icon to toggle between Normal and Height mode.



L2 Plus DESKTOP Settings

Shows Height button with English (Imperial) units of measure using Extra option



L2 Plus DESKTOP Settings

Shows Height button with Metric (S.I.) units of measure using Extra option



L2 Plus DESKTOP Settings

Shows Desktop option with Height mode = No

8.12.4 Shutdown Computer on Exit

The “Shutdown computer on Exit” function, when set to Yes, will automatically close the L2 Plus application and shut down the workstation when the user logs out.

If the Shutdown computer on Exit = No, the computer will remain powered up after logging out of the L2 Plus application.

8.13 DISPLAY FORMATS Setting

Units of measure are setup using the Display Formats setting. The L2 Plus system lets you use S.I. or Imperial units. However, you cannot use mixed units of measure- combination S.I. and Imperial.



NOTE

System units of measurement may use either S.I. or Imperial units but not both. Mixed units are not permitted.

8.13.1 Current Flags

The “flags” or “units of measurement” used within the L2 Plus application may be changed by the user.

Units of measurement may use either the S.I. (metric) units or the imperial units. The user must select either S.I. or Imperial.



NOTE

L2 Plus system units of measurement may be either S.I. or imperial.



NOTE

You may not have mixed units of measurement within your operating system. For example, you cannot have mm (millimeters) for distance measurement and lbf (pound-force) for load measurement.

The default flags are listed in the table.

Flag Description	Factory Default
Height	D (normal mode for Distance)
Distance	mm
Load	N
Work	Joules
Rate-Time	Minutes

Units of Measurement

Display Formats L 2*

Current height mode flag	D <input type="text"/>	Imperial <input type="checkbox"/>
Current distance flag	in <input type="text"/>	
Current load flag	lbf <input type="text"/>	
Current work flag	in-lbf/in ³ <input type="text"/>	
Current rate time flag	Minutes <input type="text"/>	
Display resolution for distance	<input type="text" value="0.01"/>	
Display resolution for load	<input type="text" value="0.01"/>	
Display resolution for work	<input type="text" value="0.01"/>	
Display resolution for time	<input type="text" value="0.001"/>	
Display resolution for scalars	<input type="text" value="0.001"/>	
Display resolution for percent	<input type="text" value="0.1"/>	
Use comma for radix	No <input type="checkbox"/>	
Date format	MM/DD/YY <input type="text"/>	
Notation	None <input type="text"/>	
Minimum notation threshold	<input type="text" value="0.001"/>	
Maximum notation threshold	<input type="text" value="1000.000"/>	

Select the mode of units: S.I. (Metric) or Imperial (English)

Done

8.13.1.1 Height Flag

The Height flag is used to represent the operating mode of the system. The Height mode measures height based on a user-set datum. The letter “D” is used to designate the “normal” operating mode.

8.13.1.2 Distance Flag

The units of measure for Distance are:

S.I. Units	Imperial Units
mm	in
cm	

Distance Units of Measurement

8.13.1.3 Load Flag

The units of measure for Load (force) are:

S.I. Units	Imperial Units
N	lbf
kgf	

Load (Force) Units of Measurement

8.13.1.4 Work Flag

Work or energy are used to measure resilience. Work is determined by the area beneath the graph.

The units of measure for Work (energy) are:

S.I. Units	Imperial Units
Joule (J)	in-lbf
Kilojoule (kJ)	in-lbf/in ³
Millijoule (mJ)	
J/mm ³	
kJ/mm ³	
mJ/mm ³	

Work Units of Measurement

8.13.1.5 Rate-Time Flag

The units of measure for Rate-Time are:

S.I. Units	Imperial Units
Seconds	Seconds
Minutes	Minutes

Rate-Time Units of Measurement

8.13.2 Display Resolution Settings

The resolution settings are used to establish the significant digits displayed for a variable. When resolutions are adjusted, they should be done so in accordance with the specifications of the test frame and load cell sensor.

When very high resolution is used, it is recommended that Notation be used. The L2 Plus system may use Engineering Notation.

8.13.3 Use Comma for Radix

The radix may be either a period or comma.

8.13.4 Date Format

The date format may be either MM/DD/YY or DD/MM/YY.

8.13.5 Notation

Notation may be used when high resolutions are being used. Notation use requires that you establish minimum and maximum thresholds for the numeric value.

8.13.5.1 Minimum Notation Threshold

The Minimum threshold is the smallest decimal number that defines when to use Engineering Notation.

8.13.5.2 Maximum Notation Threshold

The Maximum threshold is the largest decimal number that defines when to use Engineering Notation.

8.14 SOUND Setting

The Sound Setting is used to specify audible annunciation for various L2 Plus actions. These actions are for the following:

- Button activation
- Test run completion
- Test failure



Note
Sound files cannot be changed.



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