MESUR®gauge Plus Software

User's Guide

Thank you…

Thank you for purchasing MESURgauge Plus software, applications developed to:

- **Measure**
  Collect data from digital force gauges, torque gauges, test stands, travel displays, and other devices.
- **Control**
  Control the motion of certain Mark-10 motorized test stands via MESURgauge Plus.
- **Graph**
  View a real time graph of load vs. time or load vs. travel vs. time.
- **Analyze**
  View an analysis graph, calculate statistics, and zoom to selected locations on the graph.
- **Store**
  Save results to a file, generate reports, or export directly to Microsoft Excel. Save and recall previously saved test data, test setups and report templates.

MESURgauge Plus expand the functionality of a Mark-10 testing system, typically comprising a test stand, force gauge, grips, and accessories.

MESURgauge Plus may be evaluated for 90 days from date of installation before activation is required.

This User's Guide provides detailed operating instructions. For additional information or answers to your questions, please do not hesitate to contact us. Our technical support and engineering teams are eager to assist you.

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1 STARTUP

1.1 Hardware Requirements

MESURgauge Plus is compatible with PCs running Microsoft Windows XP or later operating system. Minimum monitor resolution is 1108 x 758. A USB or RS-232C serial port is required to communicate with an instrument. A second port is needed for certain equipment configurations. If USB communication is required, be sure to install the USB driver, included on the Resource CD provided with each instrument. It may also be downloaded from the Mark-10 website.

1.2 *Windows* Administrator Settings

You must enable full Administrator privileges on your PC for proper operation.

Failure to enable appropriate privileges will result in certain issues, such as not saving test setup files.

Procedure for *Windows 7 / 8 / 10*

1. Log on to *Windows* as an administrator or as a user with administrator privileges.
2. Right-click the MESURgauge Plus software icon on the Desktop, select *Properties*, and then click the *Compatibility* tab.
3. At the bottom of the screen, check the box *Run this program as an administrator*. Then click the button below it, labeled *Change settings for all users*. Then, click OK.

Procedure for *Windows XP*

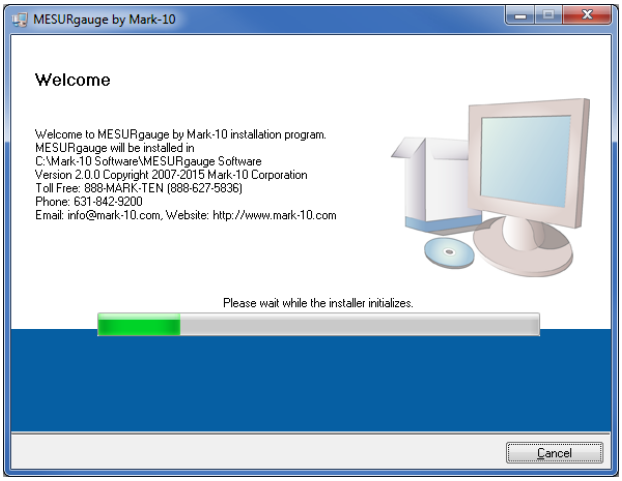
1. Log on to *Windows* as an administrator or as a user with administrator privileges.
2. Right-click the MESURgauge Plus software icon on the Desktop, select *Properties*, then click *Find Target*. Navigate to the folder in *Windows Explorer* where the software was installed (default location is C:\Mark-10 Software\MESURgauge Plus).
3. Right-click the *Mark-10 Software* folder and select *Properties*. In the *Security* tab click *Advanced,* then click on all of the users or groups desired and click *Edit*. Check the *Allow Full control* box. Then click OK three times to close the dialog boxes.

If further instructions are required, consult with your IT administrator.

1.3 Installation

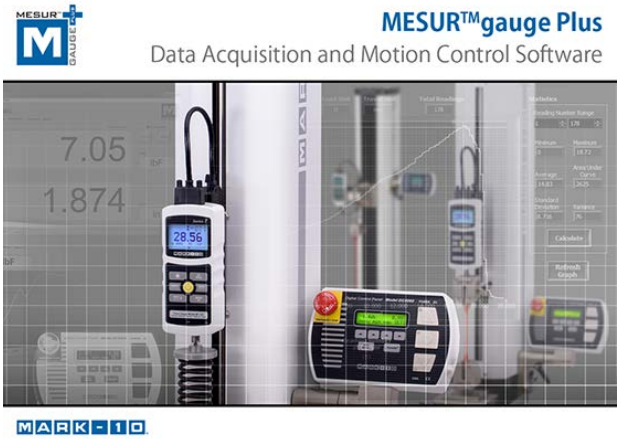
Insert the installation CD into the computer's CD-ROM drive. If *AutoRun* is enabled on the computer, the setup program will run automatically. If not, the setup program may be run manually. Locate and double-click the file "setup.exe" on the CD-ROM drive.

Follow the installation prompts, starting with:

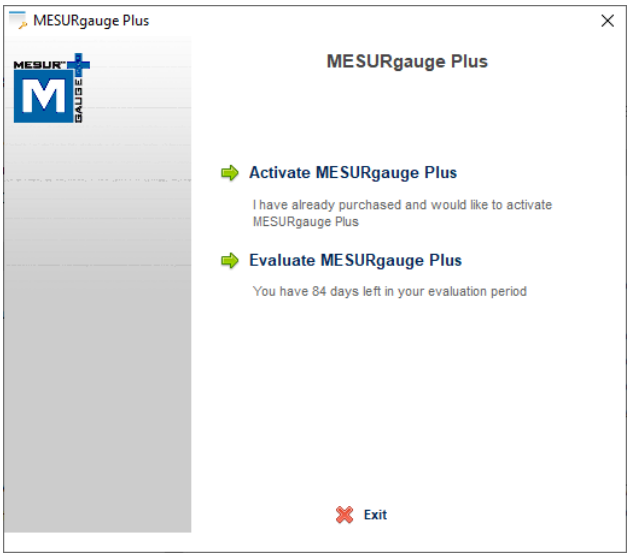


1.4 Launching the Software

1. Upon launching the software, a screen will briefly appear, displaying the name of the software and version number, as follows:



2. The start screen appears as follows:

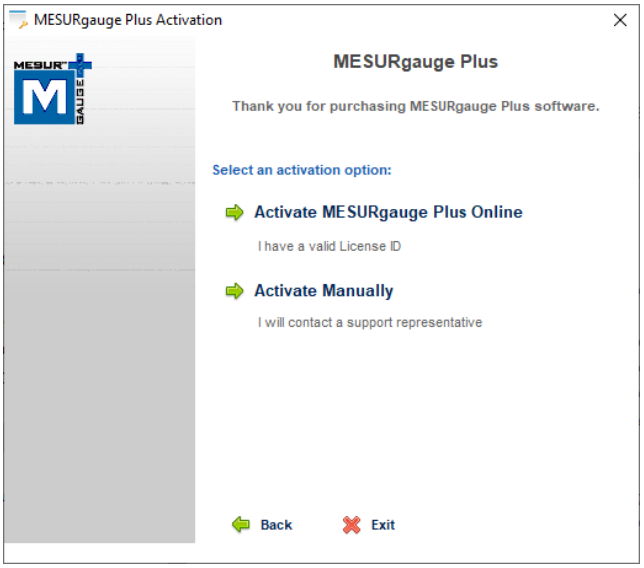


To evaluate the software at no charge, click the appropriate selection. The evaluation period is 90 days from the date of installation. The above screen appears every time the software is launched, until it is activated.

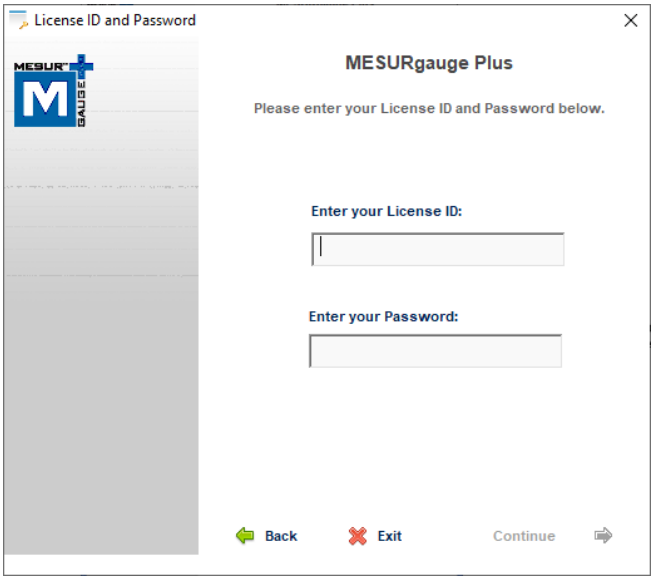
To activate the software, click the appropriate selection. Online activation is possible if internet access is available and appropriate *Windows* security settings are enabled. Alternatively, the software may be activated manually.

The software is a single-user license. The License ID and Password can be used on only one device at a time. The software must be deactivated before installing it on another device.
For instructions, refer to the **Installing On a Different PC** section (p. 35).

3. The next screen appears as follows:



If activating online, enter the License ID and Password in the appropriate fields, as shown below. The License ID and Password are provided by Mark-10 via emailed order acknowledgement, or printed on the CD case label.



Click “Continue” when complete.

4. If activating manually, enter the License ID and Password in the same manner. Clicking “Continue” will lead to another screen, as shown below:

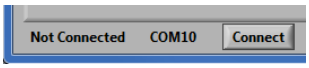
Contact Mark-10 to obtain the corresponding Activation Codes. Have the following information available:

- User Code 1
- User Code 2
- License ID*
- Password*

* Provided via emailed order acknowledgement or printed on the CD case label

5. Click “Continue” to complete the installation. When the installation is complete, locate the icon on the Desktop screen, in the *Windows* “Start” menu, or under “Programs”.

6. When the software is launched, *Auto Connect* will automatically attempt to connect a Mark-10 instrument to a COM port associated with a Mark-10 device. Note that the USB driver must be installed. The connection status may be seen in the lower left corner of the screen, as follows:



7. If an instrument cannot be identified or is not connected, the following message appears:

If the instrument is properly connected and configured but this message still appears, the COM port connection may be manually configured. Refer to the communication flowchart below and the following sections for details.

1.5 Overview

Plus is divided into tabs, each with its own set of functions:

Acquisition
Start and stop the test, view live table and graph. MESURgauge Plus also starts and stops motion for certain motorized test stands.

Analysis
View table, graph, and statistics, zoom in on graph, save and recall test data, export to Excel.

Digital Display
View live data in large format.

Test Setup
Configure test start and stop conditions, test units, default file locations, and communication parameters.

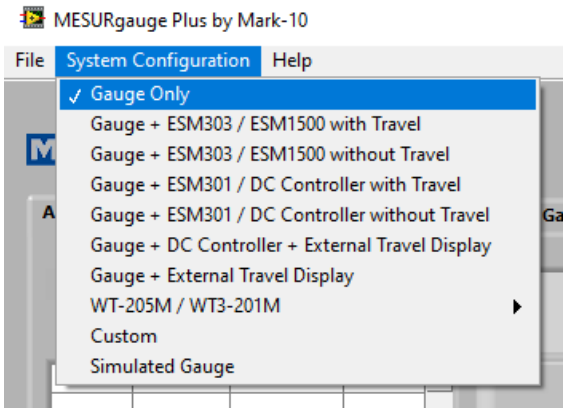
Port Setup *(displayed only for the Custom system configuration)*
Configure communication parameters.

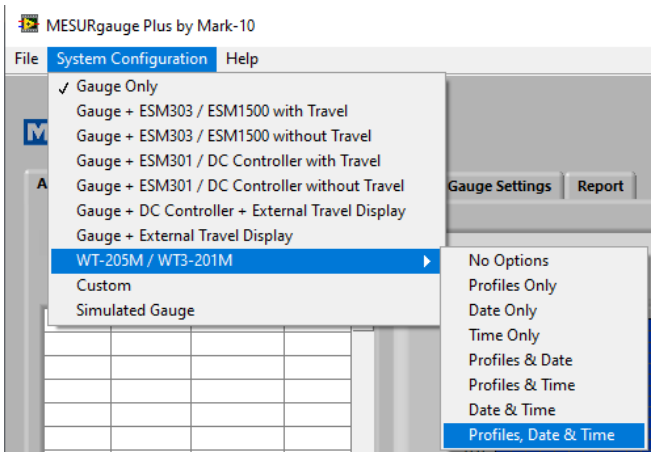
Gauge Settings *(displayed only for certain configurations)*
Convenient interface for configuring certain Mark-10 gauges.

Report
Generate a report for the test data.

1.6 System Configuration Menu

MESURgauge Plus interface with various test equipment. To select the desired configuration, click System Configuration, then choose the appropriate selection. A simulated data mode is also available for evaluation purposes, in the absence of any equipment. The selections are as follows:





1. **Gauge Only**
   For connecting a Mark-10 gauge directly to a PC, for plotting load vs. time. This configuration requires one available port on the computer, and a USB or RS-232 cable.

   Typical system:
   M5-20 force gauge.

   Equipment communication settings:
   Set gauge to USB output and 115,200 baud.

   Cable connections:
   Gauge <> AC1111 USB cable <> PC

2. **Gauge + ESM303 / ESM1500 with Travel** *(test stand motion control possible through this configuration)*
For connecting an ESM303, ESM303H, or ESM1500 test stand with integrated travel encoder to a PC, utilizing one channel. The gauge is connected to the test stand controller, and the controller is connected to a PC, for plotting load vs. travel distance. This configuration requires one available USB or serial port, and appropriate cables/adapters.

   Typical system:
   ESM303 test stand, AF009 integrated travel indication option, M7-200 force gauge, AC1114 interface cable, AC1107 USB cable.

   Equipment communication settings:
   Set gauge to RS-232 output and 115,200 baud. Set test stand to 115,200 baud.

   Cable connections:
   Gauge <> AC1114 cable <> Test stand <> AC1107 USB cable <> PC

3. **Gauge + ESM303 / ESM1500 without Travel** *(test stand motion control possible through this configuration)*
For connecting an ESM303, ESM303H, or ESM1500 test stand, without integrated travel encoder to a PC, utilizing one channel, for plotting load vs. time. The gauge is connected to the test stand controller, and the controller is connected to a PC. This configuration requires one available USB or serial port, and appropriate cables/adapters.

   Typical system:
   ESM1500FG test stand, M5-1000 force gauge, AC1114 interface cable, AC1107 USB cable.

   Equipment communication settings:
   Set gauge to RS-232 and 115,200 baud. Set test stand to 115,200 baud.

   Cable connections:
   Gauge <> AC1114 cable <> Test stand <> AC1107 USB cable <> PC

4. **Gauge + ESM301 / DC Controller with Travel**
For connecting an ESM301 or TSTM-DC test stand with integrated travel encoder to a PC, utilizing one channel, for plotting load vs. travel distance/angle. The gauge/indicator is connected to the test stand controller, and the controller is connected to a PC. This configuration requires one available USB or serial port, and appropriate cables/adapters.

   Typical system:
   TSTM-DC test stand, M5I indicator with torque sensor, AC1108 interface cable, AC1104 serial cable, RSU100 USB converter.

   Equipment communication settings:
   Set gauge to RS-232 and 9,600 baud. Set test stand controller to 115,200 baud.

   Cable connections:
   Gauge <> AC1108 cable <> Test stand controller <> AC1104 serial cable <> Optional RSU100 USB converter <> PC

5. **Gauge + ESM301 / DC Controller without Travel**
For connecting an ESM301 test stand or other test stand with DC controller without integrated travel encoder to a PC, utilizing one channel, plotting load vs. time. The gauge/indicator is connected to the test stand controller, and the controller is connected to a PC. This configuration requires one available USB or serial port, and appropriate cables/adapters.

   Typical system:
   TSTM-DC test stand, M5I indicator with torque sensor, AC1108 interface cable, AC1104 serial

cable, RSU100 USB converter.

Communication settings:
Set gauge to RS-232 and 9,600 baud. Set test stand controller to 115,200 baud.

Cable connections:
Gauge <> AC1108 cable <> Test stand controller <> AC1104 serial cable <> Optional RSU100 USB converter <> PC

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6. Gauge + DC Controller + External Travel Display

For connecting a Mark-10 gauge through a DC controller to a PC utilizing one channel, and a Mitutoyo travel display to a PC utilizing the other channel. Note that the maximum data acquisition rate is limited to 2 samples per second. This configuration requires two available USB or serial ports, and cables/adapters.

Typical system:
TSFM500-DC test stand, TSF001 travel display option, M5-100 force gauge, AC1105 Mitutoyo cable, MU100 Mitutoyo→USB converter

Communication settings:
Set gauge to 115,200, travel display baud rate is fixed at 9,600.

Cable connections:
- Gauge <> AC1108 cable <> Test stand controller <> AC1104 serial cable <> Optional RSU100 USB converter <> PC
- Travel display <> AC1105 Mitutoyo cable <> MU100 converter <> PC

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7. Gauge + External Travel Display

For connecting a Mark-10 gauge directly to a PC utilizing one channel and a Mitutoyo travel display to a PC utilizing the other channel. Note that the maximum data acquisition rate is limited to 2 samples per second. This configuration requires two available USB or serial ports, and cables/adapters.

Typical system:
ES30 test stand, ESM001 travel display option, M4-100 force gauge, AC1105 Mitutoyo cable, MU100 Mitutoyo→USB converter

Communication settings:
Set gauge to 115,200. Travel display baud rate is fixed at 1,200.

Cable connections:
- Gauge <> AC1104 USB cable <> PC
- Travel display <> AC1105 Mitutoyo cable <> MU100 converter <> PC

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8. WT-205M / WT3-201M

For connecting a WT-205M or WT3-201M wire crimp pull tester directly to a PC. This configuration requires one available USB or serial port. Note the sub-selections, corresponding to the tester's settings and installed optional functions:

a. No Options
No optional functions are installed. Optional functions applicable to MESURgauge Plus include *Date & Time Stamp* and *Profiles*.

b. Profiles Only
The profile name will appear in the **Acquisition** and **Analysis** tabs.

c. Date Only
The date stamp associated with the acquired data appears in the **Acquisition** and **Analysis** tabs. Note that if data points are saved over the course of more than one day, only the most recent date is used.

d. *Time Only*
The time stamp of each data point will appear in the tables in the **Acquisition** and **Analysis** tabs.

e. *Profiles & Date*
The profile name and date are displayed, as described above.

f. *Profiles & Time*
The profile name and time stamp for each reading is displayed, as described above.

g. *Date & Time*
The most recent date, as well as time stamp for each reading are displayed, as described above.

h. *Profiles, Date & Time*
The profile name, most recent date, and time stamp for each reading are displayed, as described above.

Communication settings:
Set tester to USB and 115,200 baud.

Cable connections:
Tester <> AC1104 USB cable <> PC

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9. Custom
For connecting up to two compatible instruments via two channels. Mark-10 or other brand instruments may be used, including force gauges, pressure gauges, linear scales, volt meters, or any other instrument with a compatible serial output. Refer to the following sections for more information.

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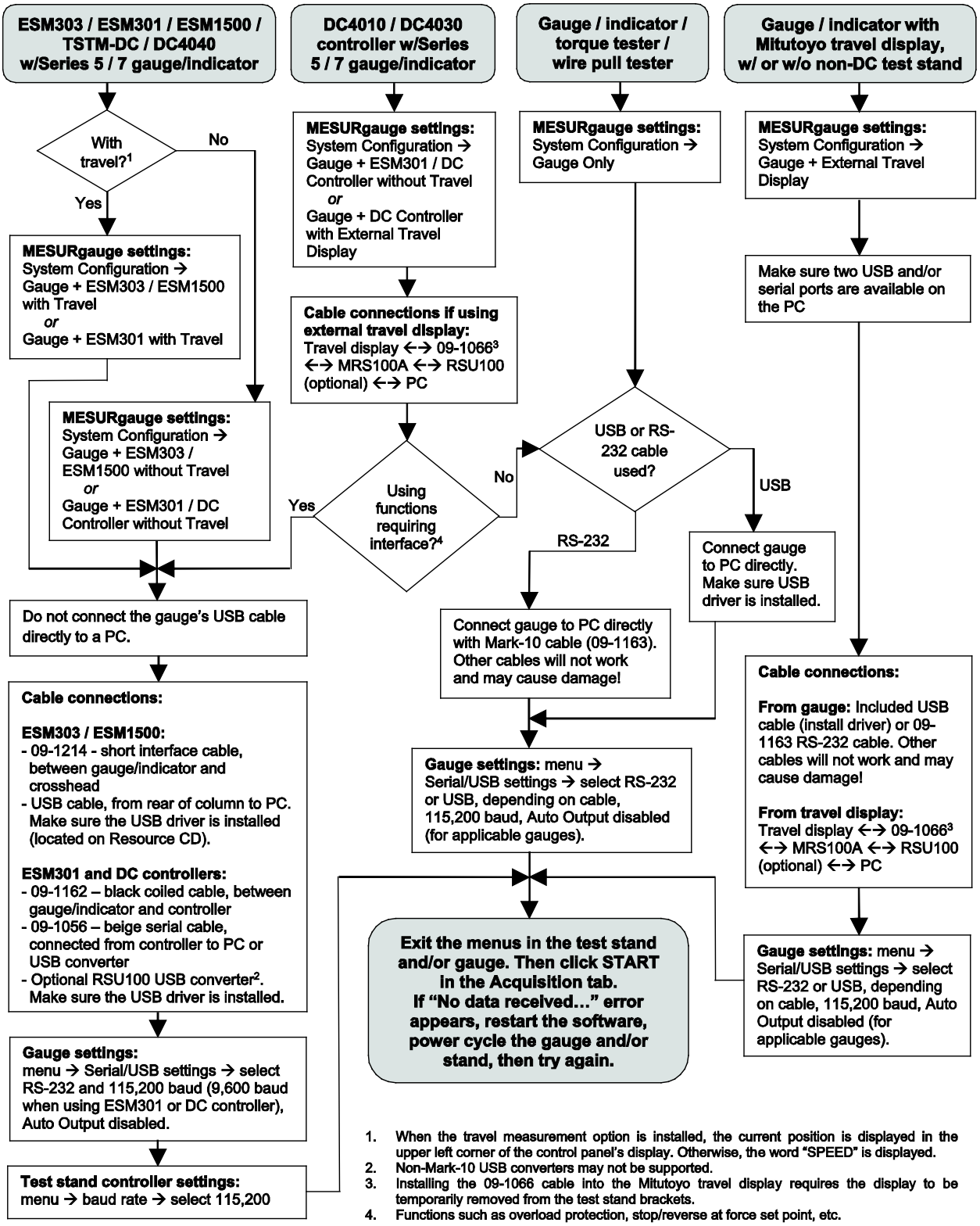
10. Simulated Gauge
For evaluating the functionality of the software without any instruments present. Simulated data is used to populate the graph and table.

Note: If using the same configuration repeatedly, it is recommended to save it by clicking the **Save** or **Save as Default** button in the **Test Setup** tab. A setup may also be saved by clicking **File → Save Test Setup File**. Refer to the following sections for details.

1.7 Communication Flowchart

The following flowchart summarizes the required settings and cable connections for most system configurations:



1. When the travel measurement option is installed, the current position is displayed in the upper left corner of the control panel's display. Otherwise, the word "SPEED" is displayed.
2. Non-Mark-10 USB converters may not be supported.
3. Installing the 09-1066 cable into the Mitutoyo travel display requires the display to be temporarily removed from the test stand brackets.
4. Functions such as overload protection, stop/reverse at force set point, etc.

1.8 Other Menus

1. File

Open Test Setup File
Browse to open a previously saved test setup.

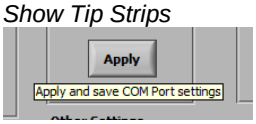
Save Test Setup File
Save current settings to a file.

Save Test Setup File as Default
Save current settings as default.

Factory Defaults
Restore factory default settings.

2. Help

Show Tip Strips



Check this selection to show “tip strips” - instructive text boxes which appear when the cursor hovers over an object or area of the screen.

MESURgauge Plus User’s Guide
Open the user’s guide as a PDF document (Adobe Reader is required).

Mark-10 Website
Link directly to the Mark-10 website.

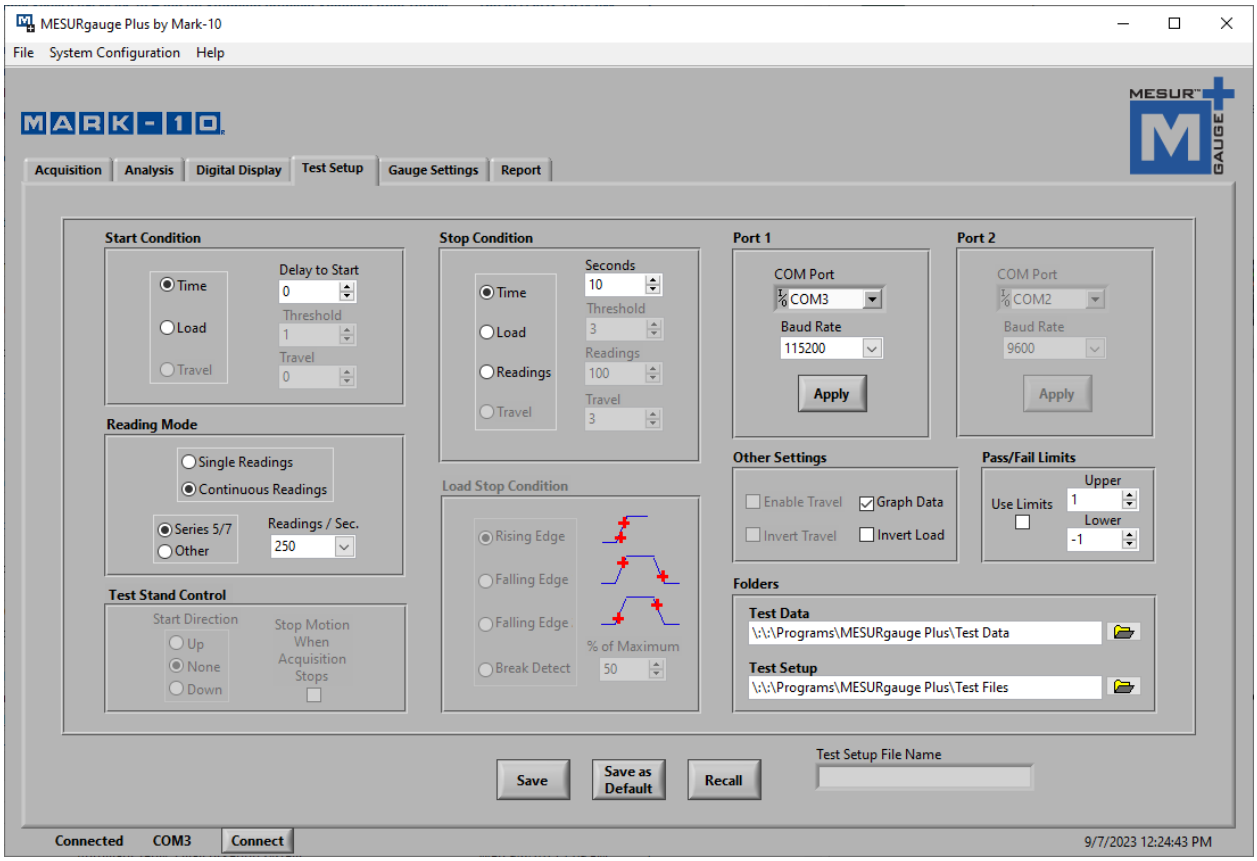
About
Click “About” or the logo in the upper right corner to display general software information.

1.9 Installing the USB Driver

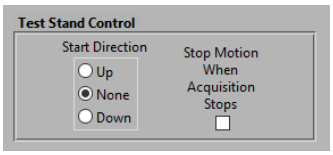
Prior to using the software with a Mark-10 instrument with USB output, install the Mark-10 USB Driver, available on the Resource CD or downloadable from our website (www.mark-10.com). Refer to the instrument and USB driver user’s guides for details.

2 TEST SETUP TAB

Use this tab to configure various data acquisition and communications parameters, including start and stop conditions, pass/fail limits, selection of continuous or single reading acquisition, data collection rate, default folders, and COM port selection.



2.1 Test Stand Control



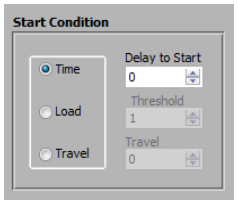
MESURgauge Plus controls the up and down motion of Models ESM303, ESM303H, and ESM1500 test stands. These stands do not require any optional functions for motion control via MESURgauge Plus, however, the *Travel Indication* option should be used if force vs. travel data is required. The test stand's control panel should be set to *CONSOLE* mode, not *PC* mode. Refer to the respective user's guides for details.

When appropriately configured, one click of the **START UP** or **START DOWN** button in the **Acquisition** or **Digital Display** tab emulates the UP or DOWN button on a compatible Mark-10 motorized test stand, in addition to starting data acquisition (data acquisition actually begins when the Start Condition has been met – see the following sub-section).

Start Direction
Select the desired crosshead direction to begin the test. Select "none" if motion start is not required.

Stop Motion When Acquisition Stops
Check this box to stop the motor when data acquisition ends. Uncheck to continue motion regardless of whether data acquisition ends. In this case, motion may be stopped manually by pressing the **STOP** button on the test stand control panel.

2.2 Start Condition



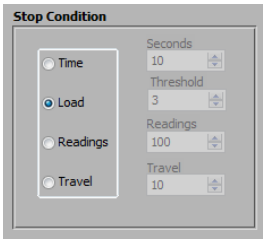
Pressing **START** in the **Acquisition** or **Digital Display** tab starts data acquisition when one of the following Start Conditions is met:

Time
Set a time threshold, in seconds.

Load
Set a load threshold. The software references the unit of measurement currently selected in the instrument.

Travel
Set a travel distance threshold. The software references the unit of measurement currently selected in the test stand or travel display.

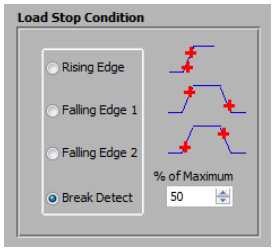
2.3 Stop Condition



Data acquisition stops when one of the following Stop Conditions is met:

Time
Set a time limit, in seconds.

Load
Stop at a load limit. Refer to the choice of load stop conditions below:



Four test stop options based on load threshold are available:

Rising Edge
Stop threshold is higher than the start threshold (increasing load).

Falling Edge 1
Stop threshold is lower than start threshold (decreasing load).

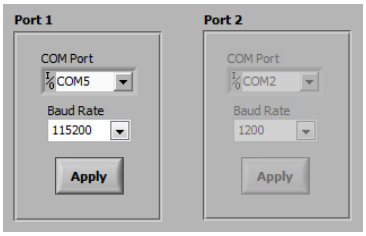
Falling Edge 2
Stop threshold is higher than Start threshold, but the load is decreasing.

Break Detect
Stop data acquisition when the load decreases to a specified percentage of the maximum (peak) load.

Readings
Set a number of acquired readings.

Travel
Set a travel limit.

2.4 Ports



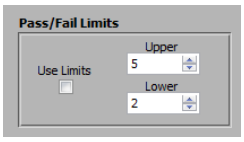
The software can accept two channels of communication via two COM ports. If a system configuration requiring only one COM port is selected, the secondary COM port settings window will be grayed out.

COM Port
The COM port is automatically selected via the *Auto Connect* function, however, it may be manually set if required. Clicking **REFRESH** in the drop-down list updates the list with all installed ports. The COM port associated with the instrument can be identified under the *Ports* sub-section of *Device Manager* in *Windows*.

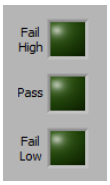
Baud Rate
The baud rate is automatically set by the *Auto Connect* function to match the connected instrument, however, it may be manually overridden.

Other communication parameters are fixed at 8 data bits, 1 stop bit, and no parity.

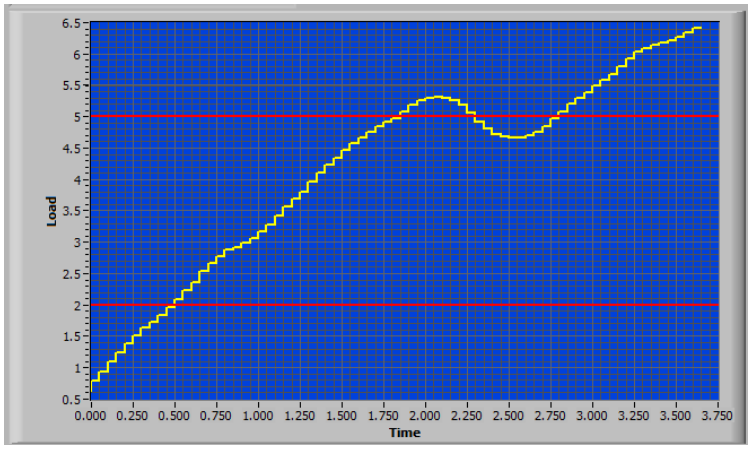
2.5 Pass / Fail Limits



Upper and lower pass/fail load limits may be configured. The resulting values are compared against these limits and go / no go indicators are shown in the lower right corner of the **Acquisition** tab, as follows:



Horizontal limit lines are displayed on the graphs in the **Acquisition** and **Analysis** tabs, as follows:



2.6 Reading Mode

Single Readings
Discrete readings are transmitted from the instrument each time **Read Gauge** is clicked in the **Acquisition** tab, or the **DATA** button on the instrument is pressed. An example application would be the collection of multiple peak torque readings from a batch of threaded closures.

Continuous Readings
When selected, readings are requested from the instrument at a rate set in the *Readings per Second* field. An example application would be the analysis of force vs. time or force vs. distance in a peel test of packaging material.

Readings / Sec.
Set the data acquisition rate for *Continuous Readings* mode. For most system configurations, the available range is 0.001 to 50 readings per second (RPS).

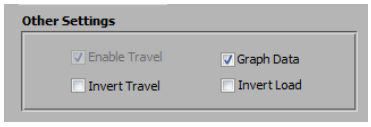
For the “Gauge Only” system configuration, select either “Series 5/7” (Series 5 and 7 force gauges and indicators) or “<Other>” (all other gauges and indicators).

Series 5 and 7 gauges and indicators may communicate at up to 500 RPS. For rates of 50 and higher, only the following values are available: 50, 125, 250, and 500. Make the appropriate selection in the drop-down list, or select <*Other*> to enter a value between 0.001 and 49.999.

Notes:

1. The rate of 500 RPS is only possible with Series 5 and 7 gauges with firmware versions 2.3.0 and higher, Model M7I indicator with firmware versions 2.3.2 and higher, and M5I indicator with firmware versions 2.3.3 and higher. For data acquisition rates of 500 RPS, the instrument's baud rate should be set to a minimum of 115,200.
2. When selecting an output rate of 50 or higher, the Start and Stop Conditions may be set to Time only. The other Start and Stop Conditions will be disabled.
3. After approximately 5 seconds of data collection at 500 Hz, the acquisition rate will gradually decrease. For longer duration tests, consider using a lower rate.
4. When using the system configuration "Gauge + External Travel Display", typically a Mitutoyo brand travel display is used. In such cases, it is recommended to limit the output rate to 2 readings per second to prevent communication errors.

2.7 Other Settings



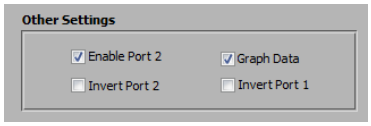
Enable Travel
When an appropriate system configuration is selected, this box is checked and grayed out.

Graph Data
When checked, data points populate the graph in the **Acquisition** tab. However, when collecting thousands of data points, the actual data acquisition rate will begin to slow. In applications requiring a large number of data points, it is recommended to uncheck this box for best performance. The graph will still be displayed in the **Analysis** tab upon completion of the test.

Invert Travel
Check this box to invert the polarity (sign) of the travel reading. Mark-10 test stand travel indicators display an increasing value as the crosshead moves upwards, and a decreasing value as the crosshead moves downward. In a compression test (downward motion), it may be desirable to flip the orientation of the plot in the **Acquisition** and **Analysis** tabs. This box is grayed out for a non-applicable configuration.

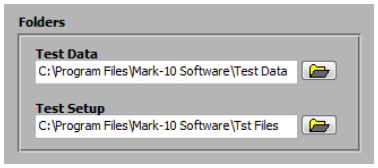
Invert Load
Check this box to invert the polarity (sign) of the load reading. Mark-10 instruments output tension readings as negative values, so inverting the load values will flip the orientation of the plot in the **Acquisition** and **Analysis** tabs. Note that some Mark-10 instruments may be configured to invert or omit load polarity.

When a custom system configuration is selected, the checkboxes appear as follows:



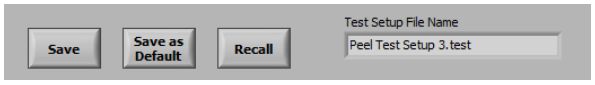
Up to two ports may be configured, and the data on each port may be inverted, as required. The graph data checkbox is still visible.

2.8 Folders



Enter full paths or browse for folders to use for test data (*.log) and test setup (*.tst) files. To browse for a folder, click the folder icon at the right of the text box and navigate to or create the desired folder, then click the "Current Folder" button in the dialog box.

2.9 Test Setup File Buttons



Save
Opens a file dialog box in which to save the current settings to a test setup file (.tst extension).

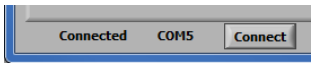
Note: If the “Custom” system configuration is selected, the **Port Setup** tab becomes accessible. Settings within this tab are also saved within the test setup file.

Save as Default
Saves the current settings in the **Test Setup** and **Port Setup** tabs to the default test setup file, “Default.tst”.

Recall
Opens a dialog box in which to browse for previously saved test setup files.

Test Setup File Name
Displays the name of the currently selected test setup file.

2.10 Auto Connect

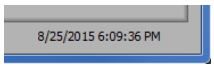


Upon opening the software, an appropriate COM port is automatically detected and configured. The status “Connected” or “Not Connected” is displayed, along with the COM port number.

If a connection is not automatically detected, ensure that all cable connections and instrument settings are correct, then click **Connect** to try again. The communication flowchart in the **Startup** section may also be helpful in ensuring all connections and settings are correct. If necessary, the COM ports may be manually configured in the **Test Setup** or **Port Setup** tabs.

Note: Port 2 is not automatically detected.

2.11 Date & Time

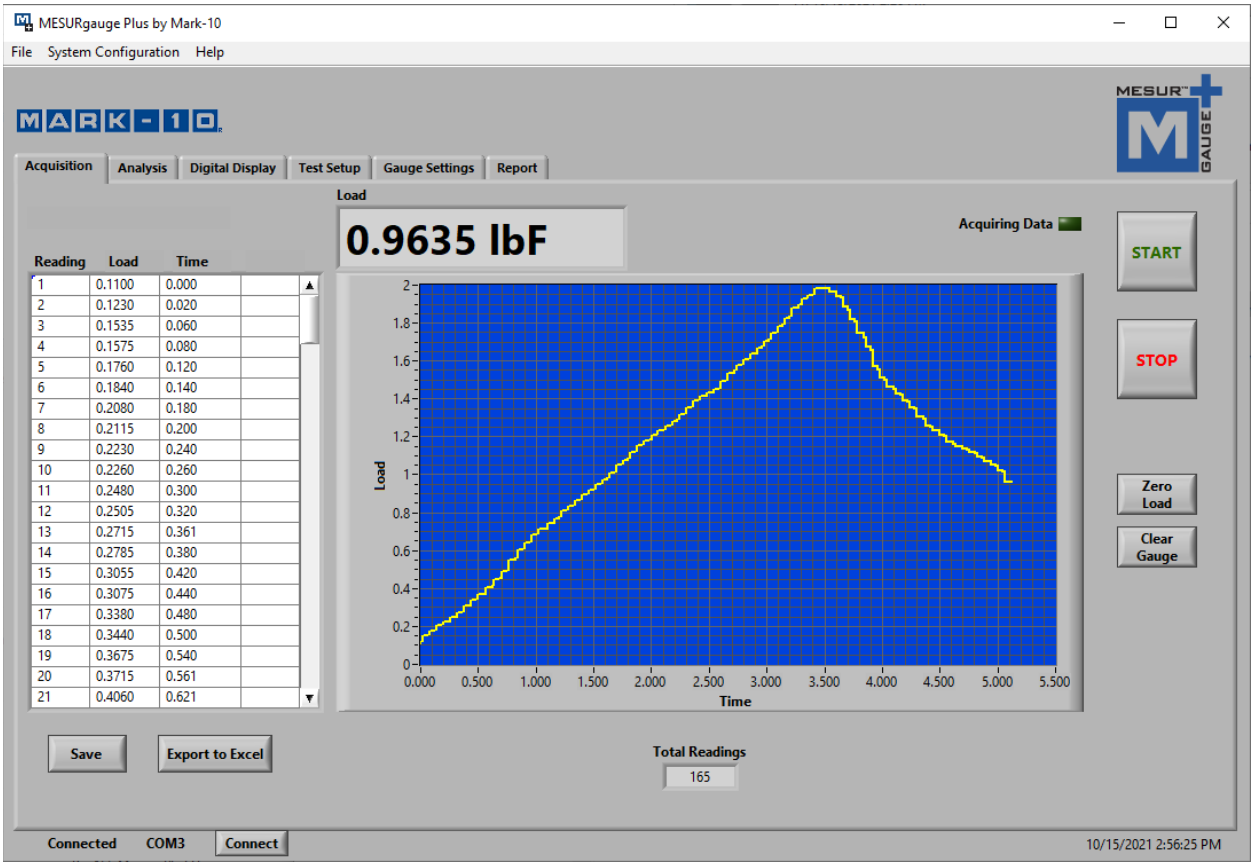


The current Windows date and time are displayed in the lower right corner of the screen.

3 ACQUISITION TAB

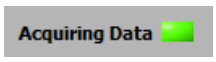
Use this tab to view tabular and graphical data from an instrument as it is being received. When the **START** button is clicked, data will be graphed and tabulated, commencing when the start condition in the **Test Setup** tab is met. Also, the **START UP** or **START DOWN** buttons initiate motion for a compatible motorized test stand. The test ends automatically when the stop condition in the **Test Setup** tab is met or when the **STOP** button is clicked.

The appearance of this tab depends on the system configuration selected, as well as the settings in the **Test Setup** tab. Below is an example of a “Gauge Only” configuration, set to continuous data acquisition with pass/fail limits enabled:



3.1 START

Starts a test. Data acquisition from the instrument commences when the start condition in the **Test Setup** tab is met. When data is being captured, the “Acquiring Data” indicator above the **START** button illuminates, as follows:



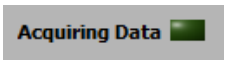
NOTE: The **START UP** or **START DOWN** button is shown instead of START, when appropriately configured, as follows:

or

Pressing **START UP** or **START DOWN** emulates the UP or DOWN button on a compatible Mark-10 motorized test stand, in addition to starting data acquisition (upon the Start Condition being met). Therefore, only one button click is required to initiate both motion control and data acquisition.

3.2 STOP

Stops data acquisition and stops the motion of a test stand. Data collection test will stop automatically when the selected stop condition in the **Test Setup** tab has been met. When the test is completed, the “Acquiring Data” indicator turns off, as follows:

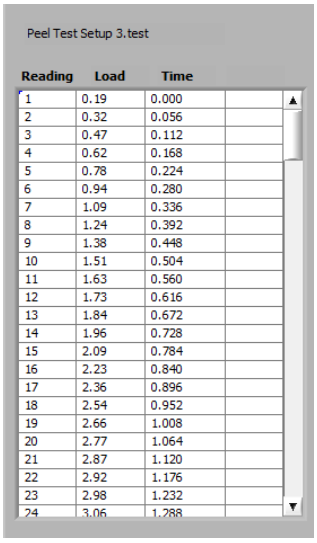


3.3 Current Readings

or

The current load and unit of measurement are displayed above the graph, as shown above left. If a system configuration including load and travel is selected, the current position and unit are also displayed, as shown above right.

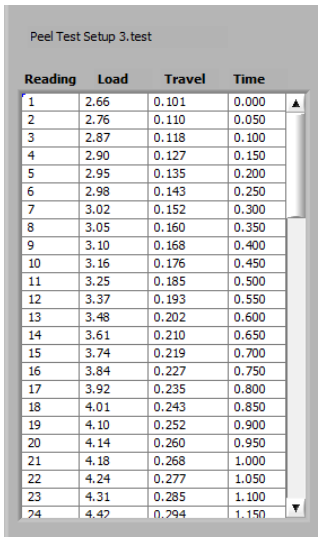
3.4 Table



Peel Test Setup 3.test

Reading	Load	Time
1	0.19	0.000
2	0.32	0.056
3	0.47	0.112
4	0.62	0.168
5	0.78	0.224
6	0.94	0.280
7	1.09	0.336
8	1.24	0.392
9	1.38	0.448
10	1.51	0.504
11	1.63	0.560
12	1.73	0.616
13	1.84	0.672
14	1.96	0.728
15	2.09	0.784
16	2.23	0.840
17	2.36	0.896
18	2.54	0.952
19	2.66	1.008
20	2.77	1.064
21	2.87	1.120
22	2.92	1.176
23	2.98	1.232
24	3.06	1.288

or



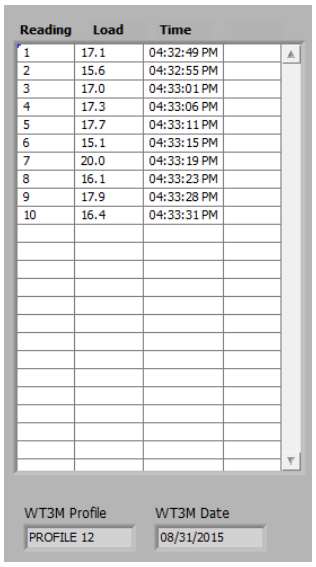
Peel Test Setup 3.test

Reading	Load	Travel	Time
1	2.66	0.101	0.000
2	2.76	0.110	0.050
3	2.87	0.118	0.100
4	2.90	0.127	0.150
5	2.95	0.135	0.200
6	2.98	0.143	0.250
7	3.02	0.152	0.300
8	3.05	0.160	0.350
9	3.10	0.168	0.400
10	3.16	0.176	0.450
11	3.25	0.185	0.500
12	3.37	0.193	0.550
13	3.48	0.202	0.600
14	3.61	0.210	0.650
15	3.74	0.219	0.700
16	3.84	0.227	0.750
17	3.92	0.235	0.800
18	4.01	0.243	0.850
19	4.10	0.252	0.900
20	4.14	0.260	0.950
21	4.18	0.268	1.000
22	4.24	0.277	1.050
23	4.31	0.285	1.100
24	4.42	0.294	1.150

Data points are displayed in tabular format, including the reading number, load reading, and relative time stamp (in seconds), as shown above left. If a system configuration including load and travel is selected, a column for travel is also displayed, as shown above right.

The currently selected test setup file is displayed above the table.

The table appears as follows for a WT-205M or WT3-201M:



Reading	Load	Time
1	17.1	04:32:49 PM
2	15.6	04:32:55 PM
3	17.0	04:33:01 PM
4	17.3	04:33:06 PM
5	17.7	04:33:11 PM
6	15.1	04:33:15 PM
7	20.0	04:33:19 PM
8	16.1	04:33:23 PM
9	17.9	04:33:28 PM
10	16.4	04:33:31 PM

WT3M Profile: PROFILE 12
WT3M Date: 08/31/2015

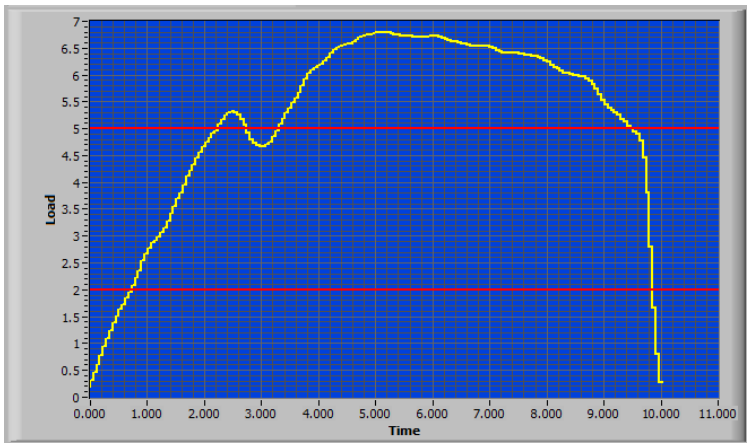
The time stamp, date stamp, and profile name appear when an appropriate configuration is selected, and when the instrument is appropriately configured. If data is collected over a period of more than one day, the most recent date will populate this field.

Note:
Date & time stamp, and the ability to save multiple profiles, are optional functions on WT-205M & WT3-201M testers.

3.5 Total Readings

The total number of data points collected during the test.

3.6 Graph



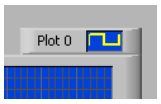
MESURgauge Plus plots load versus time or load versus travel, depending on the system configuration. X-axis and Y-axis minimum and maximum values can be changed by double-clicking on the numerals along the axes. When the numeral is highlighted, type the desired value, then press **ENTER** or click away from the area.

3.7 Additional Graph Functions

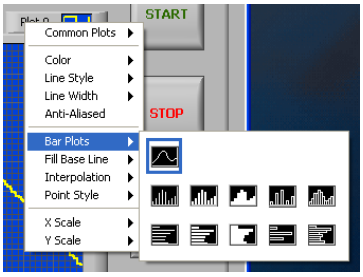
Several additional graph functions and settings are hidden by default, but may be viewed by right-clicking anywhere within the graph. A pop-up menu appears as follows:

The menu items are provided for quick access and convenience to some common functions. The *AutoScale X* and *Autoscale Y* items are equivalent to the “padlock” icons in the *Scale Legend*, as described below.

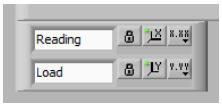
3.8 Plot Legend



Several settings, such as plot style, graph colors, and other settings are available by clicking on the *Plot Legend* icon. A menu of options will appear as follows:



3.9 Scale Legend



Auto-scale lock (“padlock”)

When in the locked position, the scale is in auto-scale mode (default).

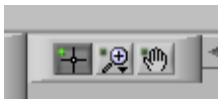
Auto-scale

Click to auto-scale the axis.

Scale & grid properties

Click to adjust various scale and grid properties. A pop-up context menu provides access to these properties.

3.10 Graph Palette



Standard View

Zoom

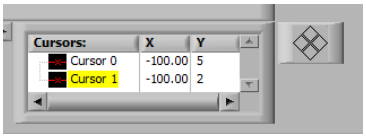
Click this icon to expand the selection of zooming tools, as follows:

	Set a zoom window with adjustable x- and y-dimensions for a specific part of the graph.
	Set a zoom window with adjustable x-dimension for a specific part of the graph.
	Set a zoom window with adjustable y-dimension for a specific part of the graph.
	View entire graph.
	Zoom out.
	Zoom in.

Pan

Reposition the graph by clicking the mouse and dragging, as desired.

3.11 Cursor Legend



Cursor Control

Click on the quadrants of this icon to move the cursor in the corresponding direction.

Cursor Table
Displays the cursor position's X and Y values.

3.12 X Scrollbar

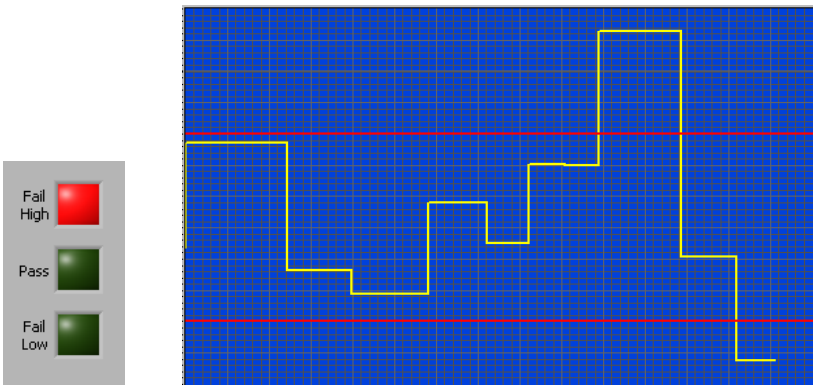
Click to enable or disable a scroll bar for the graph's x-axis.

3.13 X Scale and Y Scale

Click to enable or disable titles and increments for the x- and y-axes.

3.14 Pass/Fail Indicators

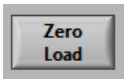
When the *Use Limits* check box in the **Test Setup** tab is checked, pass/fail indicators and limit lines are displayed, as follows:



3.15 Read Gauge

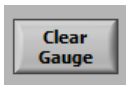
Request the currently displayed value on a compatible Mark-10 instrument. This button is visible only for *Single Readings* reading mode, and enabled only during data acquisition.

3.16 Zero Load



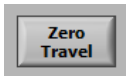
Zeroes a compatible Mark-10 instrument. It is enabled only when data acquisition is inactive.

3.17 Clear Gauge



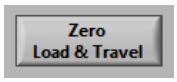
Clears a compatible instrument's peak values and starts a new averaging or external trigger test (for applicable instruments). It is enabled only when not acquiring data.

3.18 Zero Travel



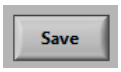
Zeroes the travel display on a compatible Mark-10 test stand control panel. This button is active only for applicable system configurations with travel measurement.

3.19 Zero Load & Travel



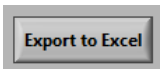
Zeroes the load on a compatible instrument and zeroes travel on a compatible Mark-10 test stand control panel, simultaneously. This button is active only for applicable system configurations with travel measurement.

3.20 Save Data



Saves data as a .csv or .log file. May be opened by MESURgauge or a third-party application.

3.21 Export to Excel



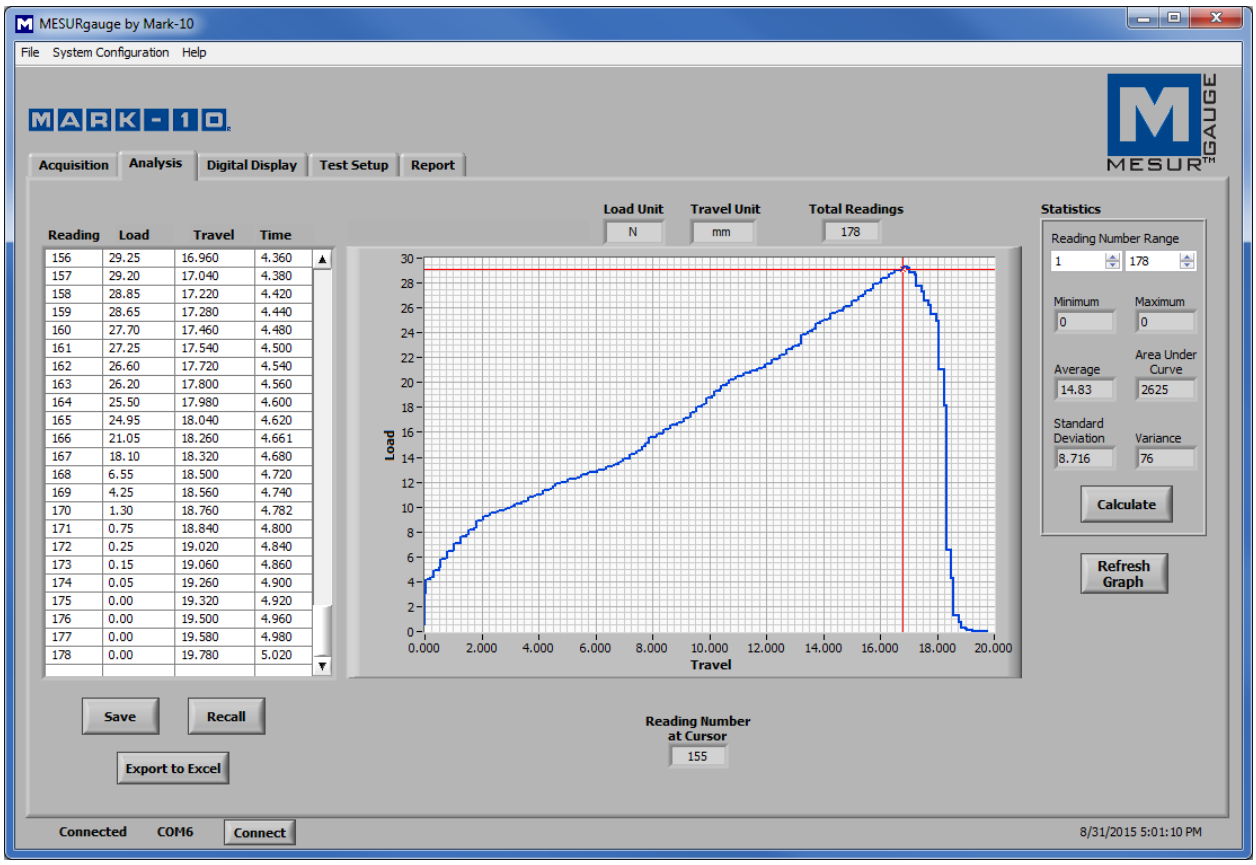
Clicking this button launches Microsoft Excel (if installed, sold separately), and opens and populates a new worksheet.

3.22 Saving Changes

The visibility of the above legends and palettes, as well as their settings, are linked to the test setup file, which may be saved from the *File* menu or the **Test Setup** tab.

4 ANALYSIS TAB

This tab is used to analyze the data obtained following a test. Saved data in an instrument may also be downloaded into this tab. Statistics are calculated and displayed automatically upon completion of the test or download of saved data. The graph cursor tools can be used to zoom to a specific area of the graph. Statistics may then be calculated for that region of the graph. Graph and table data from the **Acquisition** tab is automatically transferred to this graph and table when the test has been completed.

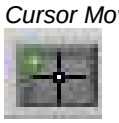


4.1 Graph

Graph tools are hidden by default, but may be viewed by right-clicking anywhere in the graph, as described in the **Acquisition** tab.

The following additional graph tools is present:

Cursor Movement Tool

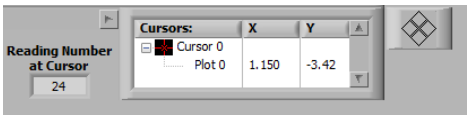


Clicking this button allows the X-Y cursor to be dragged to the desired position along the curve.

4.2 Refresh Graph

Redraws the graph based on the data collected during the test.

4.3 Cursor Palette



Cursor Table

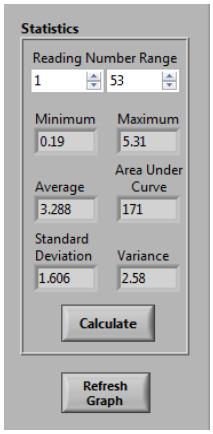
Displays the cursor position's X and Y values.

Reading Number at Cursor
Reading number corresponding to the current position of the cursor.

Cursor Control

Click on the quadrants of this icon to move the cursor in the corresponding direction.

4.4 Statistics



This frame displays statistical data for the test.

Reading Number Range
Set the minimum and maximum values of the data range, which is based on reading numbers. Defaults to the full range at completion of the test.

To redraw the graph and recalculate statistics for a specified range, change the minimum and maximum values, then click **Calculate** and/or **Refresh Graph**.

Maximum
The maximum load reading measured during the test. For most instruments and test stand-based configurations, MESURgauge requests the maximum (peak) value from the instrument, not from the collected data. Since instruments' internal sampling rates are significantly faster than the data output rate to MESURgauge, this peak value is more accurate. For non-applicable instruments and test stand-based systems, the maximum value is obtained from the collected data.

Note that in any configuration, when **Calculate** or **Refresh Graph** are clicked, the maximum value is recalculated from the collected data, not from the instrument.

Minimum
The minimum load reading measured during the test.

Average
The average (mean) of the readings. Note that in situations where load fluctuates between positive and negative values, this function considers polarity, not absolute values. For example, the average of +5 and -5

is calculated as 0.

Area Under Curve
The average of the absolute values of the load readings multiplied by the selected time interval.

Standard Deviation
The standard deviation of the acquired data.

Variance
The variance of the acquired data.

4.5 Table

The table functionality is the same as described in the **Acquisition** tab.

4.6 Save

Opens a file dialog box, where the file name and location may be specified. The default file folder location for the test data files is set in the “Test Data Folder” field in the **Test Setup** tab. After saving, the file can then be opened by common Windows programs such as Excel.

4.7 Recall

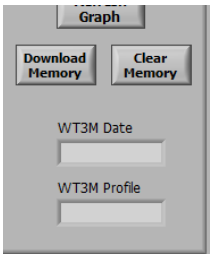
Recall a previously saved test data file. The table and graph will be populated with the previously saved data, and the statistics will be automatically calculated for these data.

4.8 Export to Excel

Clicking this button launches Microsoft Excel (if installed, sold separately), and opens and populates a new worksheet.

4.9 Other Functions

When certain system configurations are selected, the following additional buttons and fields appear in the lower right corner:



Download Memory and Clear Memory
Downloads saved data from a compatible Mark-10 instrument. The instrument must be in the main operating mode (i.e. not in a menu or configuration area).

Before clicking **Download Memory**, ensure that the Reading Mode in the **Test Setup** tab is set to “Single Readings”. Also ensure that the **START** button is not clicked before downloading or clearing memory. The “Acquiring Data” light should be off during this time.

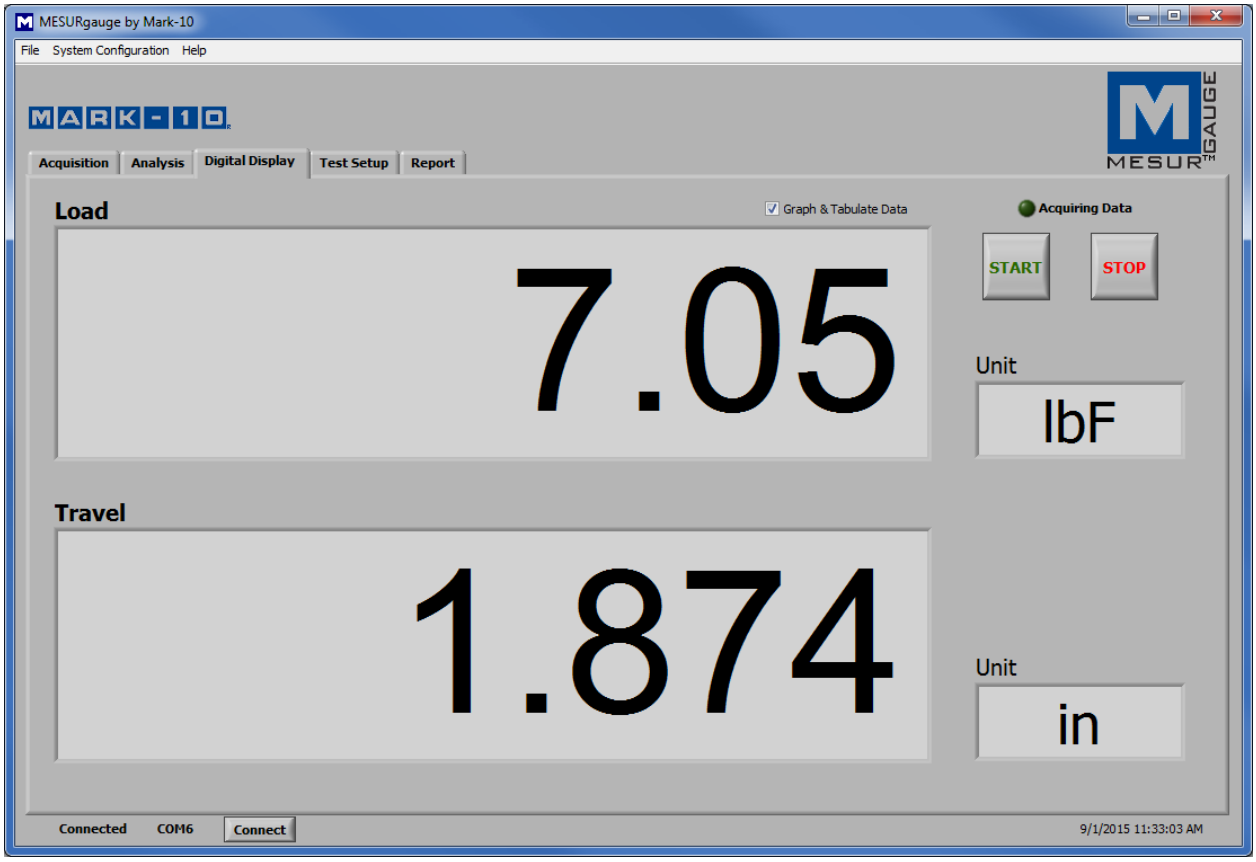
Click **Clear Memory** to delete the stored data from the instrument’s memory.

A communication error message will appear if an incompatible instrument is used or if it is not in the main operating mode.

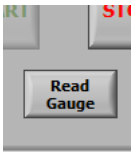
WT3M Date and WT3M Profile
When using an appropriately configured WT-205M or WT3-201M tester, the date of data storage (which may be different from the software’s data acquisition date), and profile name appear in these fields.

5 DIGITAL DISPLAY TAB

This tab is provided to display real time, enlarged load readings or load and travel readings when an appropriate system configuration is used. If the “Graph and Tabulate Data” check box is checked, the graph and table in the **Acquisition** tab are populated. Data acquisition and motion control may be started and stopped from this tab, as with the **Acquisition** tab. See image below:



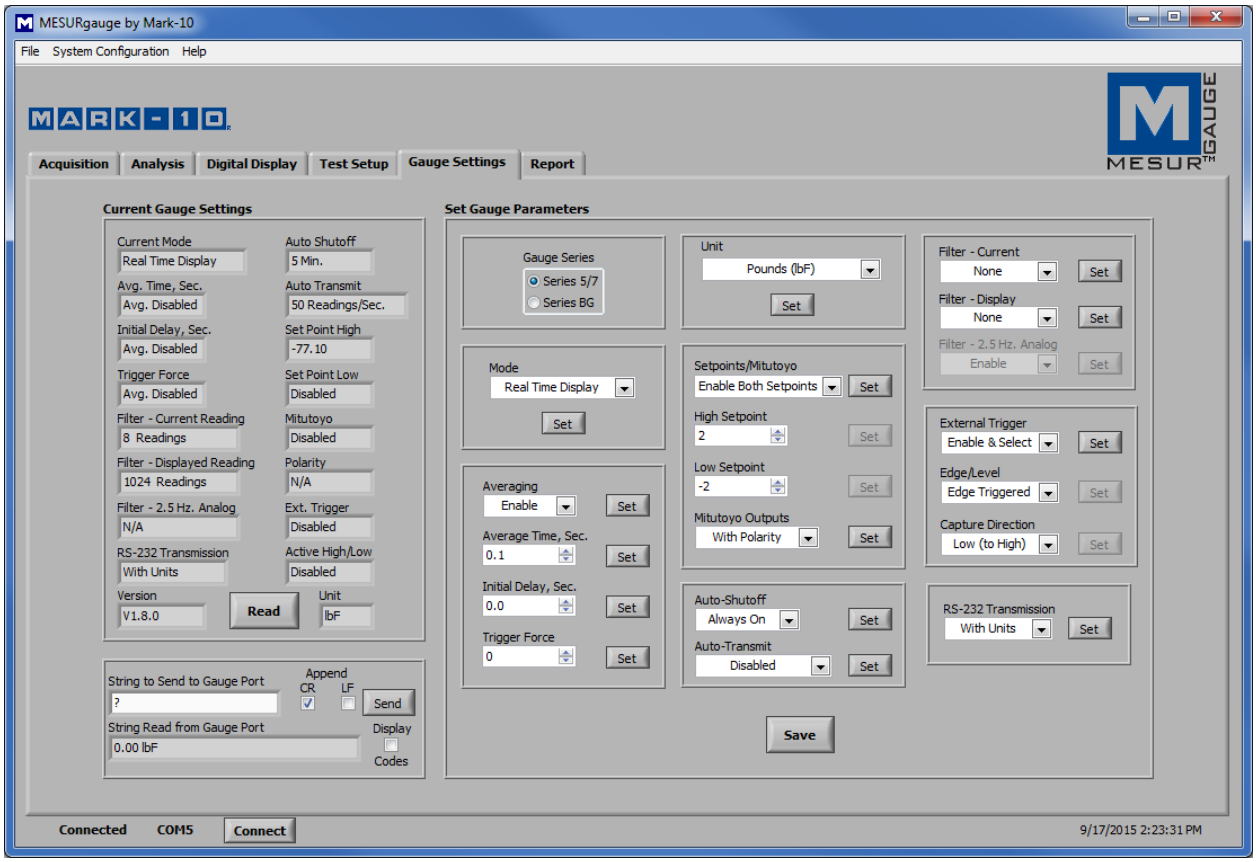
If “Single Readings” is selected in the **Test Setup** tab, the **Read Gauge** button appears for appropriate system configurations, as shown below. Readings may be manually requested, as with the **Acquisition** tab.



6 GAUGE SETTINGS TAB

This tab provides a utility with which to read and set gauge configuration parameters. Settings are applicable only for Mark-10 Series 7, 5, and BG instruments. Changes may be made only while the instrument is connected directly to a PC.

In the lower left section of the screen, it is possible to enter commands to send to any instrument via the primary serial port.



6.1 Read

Populates the fields above with current settings from a Mark-10 instrument.

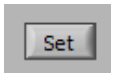
6.2 Save

Saves the current gauge settings to the instrument's non-volatile memory. These will be the default settings when the instrument powers on.

Note: The desired settings must be individually written to the gauge (by clicking the **Set** button adjacent to the parameter menu) before clicking **Save**. It is recommended to click the **Read** button to confirm the current settings

before clicking **Save**.

6.3 Set Buttons



Sets the adjacent parameter.

6.4 String to Send to Gauge

Enter a command to send to the gauge via RS-232 or USB. This facility allows the user to communicate with and send commands to a variety of Mark-10 and non-Mark-10 instruments. Click **Send** to send the command.

6.5 String Read from Gauge

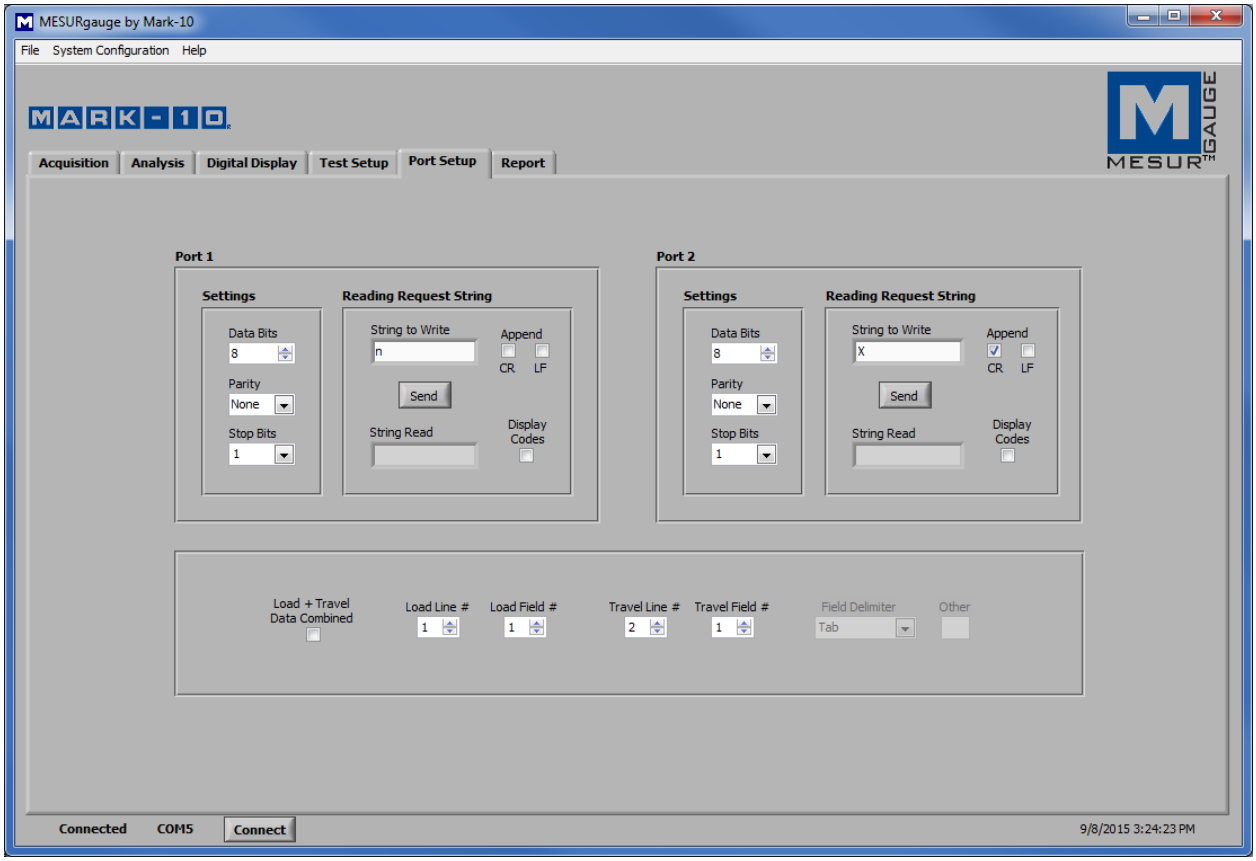
This text box shows the response string, if any, that is received in response to the above command.

6.6 Display Codes

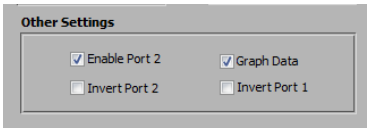
Display control character '\' codes (\r = carriage return, \n = line feed, \s = space).

7 PORT SETUP TAB

This tab is only visible when the *Custom* system configuration is selected, thereby allowing the user maximum control over test setup and communication parameters.

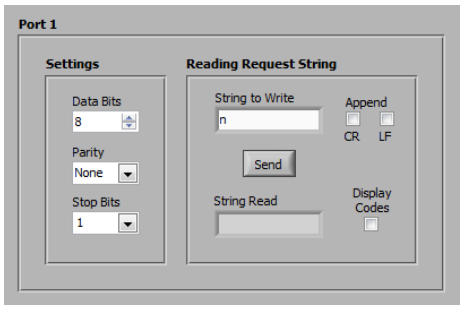


If two ports are required, check the *Enable Port 2* box in the Test Setup tab:



The ability to set up communication parameters allows MESURgauge Plus to be used with non-Mark-10 instruments. For whichever type of instrument is used, note the appropriate baud rates, reading request strings, and other settings. The COM port numbers and baud rates are configured in the **Test Setup** tab, while all other parameters may be set in the **Port Setup** tab.

7.1 Port 1 & Port 2 Settings



Data Bits
Select the number of data bits for the serial port. The default setting is 8 data bits.

Parity
Select the parity setting of the serial port. The default setting is “None” (no parity).

Stop Bits
Select the number of stop bits for the serial port. The default setting is 1 stop bit.

7.2 Reading Request String

String to Write
Enter the command string to request a reading from the instrument. For Mark-10 instruments, the string “?” (no quotes) requests the currently displayed reading. Select the CR (carriage return) and/or LF (line feed) check boxes to append the string as required.

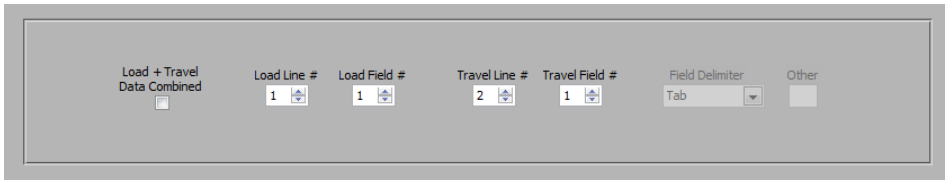
Other commands besides data collection may be transmitted, such as requesting peak or average readings from a compatible Mark-10 instrument.

String Read
This is the raw character string read from the instrument.

Display Codes
Display control character '\' codes, as follows:

\r = carriage return
\n = line feed
\s = space

7.3 Load + Travel Data Combined



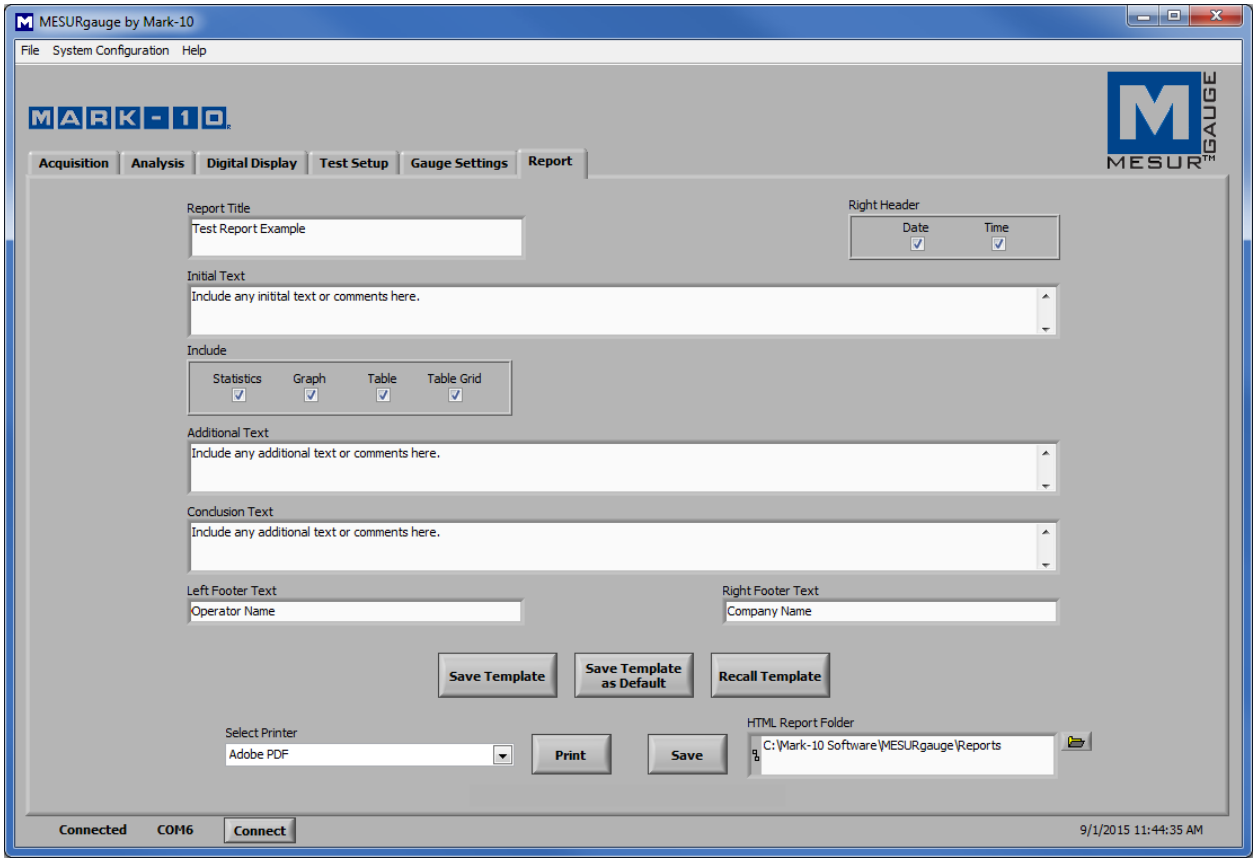
Check this box for the software to accept two strings of data on one COM port. Configure the data string as required by selecting the appropriate line numbers, field numbers, and field delimiter. The default settings apply to Mark-10 test stands such as the ESM303, where force gauge data output is combined with the test stand’s travel encoder output via a single ASCII command.

7.4 Saving Changes

The above settings may be saved, or saved as default, as part of the test setup file.

8 REPORT TAB

Use this tab to set up a report for the saved data. The report may be printed or saved as an HTML file. A report template may be saved and recalled.



8.1 Report Title

Enter a title or text here.

8.2 Right Header Check Boxes

Check the “Date” and/or “Time” boxes to include the current date and/or time in the right header of the report.

8.3 Initial Text

Enter any initial text here.

8.4 Include Statistics

Include statistics in the report.

8.5 Include Graph

Include a graph in the report.

8.6 Include Table

Include the data in the report.

8.7 Include Table Grid

Include a table grid around the individual data points.

8.8 Additional Text

Enter any additional text here.

8.9 Conclusion Text

Enter any concluding text here.

8.10 Left Footer Text

Enter text to appear in the lower left corner of the report.

8.11 Right Footer Text

Enter text to appear in the lower left corner of the report.

8.12 Save Template

Saves a template of all the above fields and selections.

8.13 Save Template as Default

Saves the current template as default.

8.14 Recall Template

Recalls a previously saved template.

8.15 Select Printer

Select the printer to which the report will print. The Windows default printer is initially selected.

8.16 Print

Sends the report to the selected printer.

8.17 HTML Report Folder

Enter or browse for a folder in which to save the report files.

8.18 Save

Opens a file dialog box prompting the user to save the report. Enter a file name and optionally browse to any desired folder location. The default file folder location for report files is set in **HTML Report Folder**, as described above.

8.19 Sample Report

A sample report is shown below:

Tuesday, September 01, 2015
12:49:53 PM

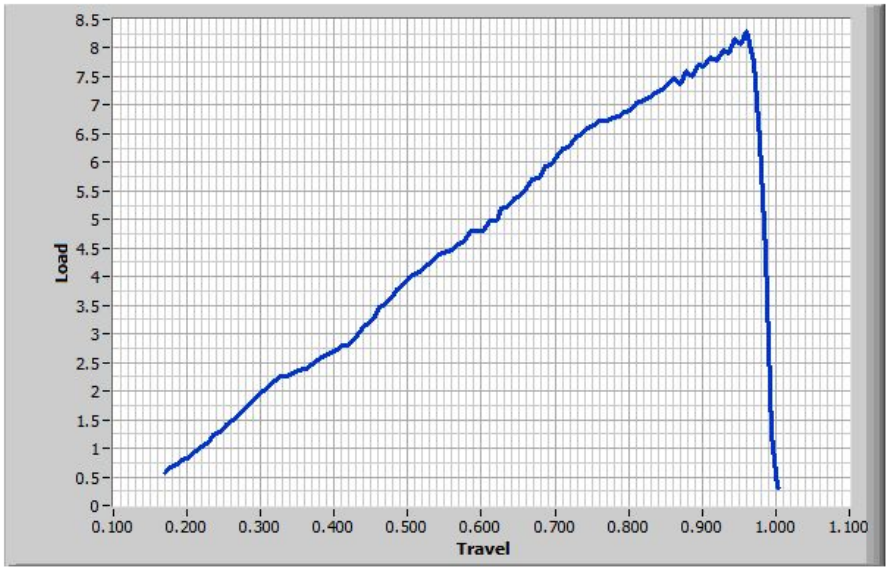
Wire Crimp Pull Test

Pull test performed at 4 in/min, utilizing an ESM303 test stand with M5-50 force gauge, G1001 upper grip, and G1002 lower grip.

Load Unit: lbF

X-Axis: Travel
Travel Unit: in

Statistics
Reading Number, Low: 1
Reading Number, High: 101
Maximum: 8.2900
Minimum: 0.3100
Average: 4.4940
Area Under Curve: 449.3960
Standard Deviation: 2.3503
Variance: 5.5237



Reading Number	Load [lbF]	Travel [in]	Time [sec.]
1	0.56	0.169	0
2	0.67	0.177	0.05
3	0.73	0.186	0.1
4	0.79	0.194	0.15
5	0.86	0.203	0.2
6	0.95	0.211	0.25

Continued…

98	0.38	0.978	4.85
99	4.38	0.987	4.9
100	1.26	0.995	4.95
101	0.31	1.003	5

The sample behavior was as expected.

The sample passed.

John Doe

ABC Company
MESURgauge by Mark-10 Corp.

9 INSTALLING ON A DIFFERENT PC

MESURgauge Plus installations are single-user licenses, however, they may be installed on a different PC if the original installation is deactivated.

If the original PC is not operational, contact Mark-10 for further instructions.

If the original PC is still operational, follow the instructions below:

1. Hold down the **Shift** key and double click the software icon.
2. The following window appears:
3. Click “Yes”. The next screen appears as follows:

4. Click “Activate MESURgauge Plus”. The next screen appears as follows:

5. Click “Activate Manually”. The next screen appears as follows:

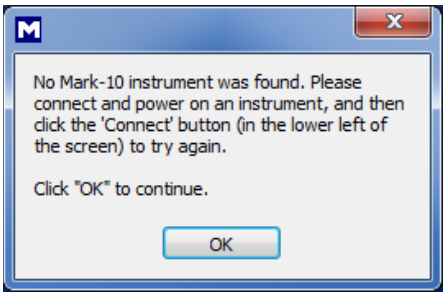
6. Click “Continue”. The next screen appears as follows:

7. Provide the **License ID** and two **User Codes** to Mark-10. Mark-10 will then provide a corresponding **Activation Code 1**. It is not necessary to enter **Activation Code 2**. Then click “Continue”. If successful, the following screen appears:

8. Use the originally supplied License ID and Password to install the software on a new PC, using the same procedure described in the **Startup** section.

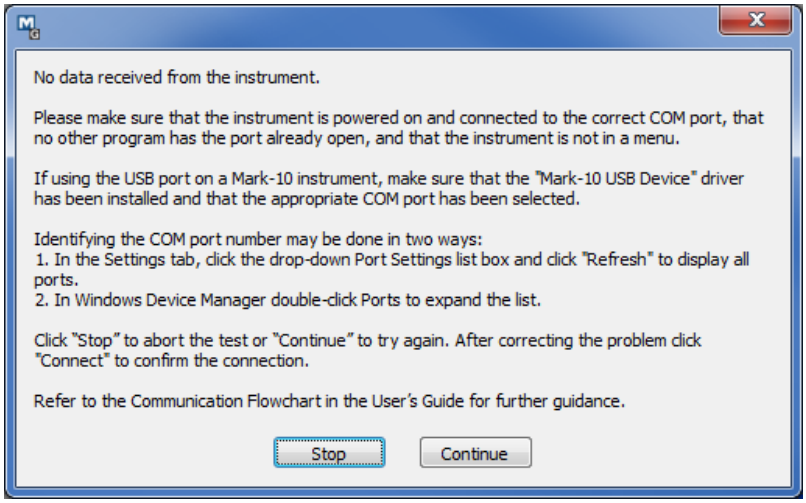
10 TROUBLESHOOTING

1. Error message: "No Mark-10 instrument was found…"



This message appears after opening the software if no instrument is detected. Confirm that the instrument is connected, powered on, and configured appropriately.

2. Error message: "No data received from the instrument..."



This message appears after clicking **START** if communication has not been achieved between the instrument and the software, due to a number of possible causes. Refer to the communication flowchart in the **Startup** section. If following these instructions does not resolve the issue, consult with an IT administrator.

3. Sometimes the graph and table have random or inconsistent data, such as data spikes or zero values.

Disable the auto-output function in the instrument (refer to its respective user's guide for details), and/or reduce the frequency of data collection in the **Test Setup** tab.

4. Test Setup files are not saved when closing and reopening the software.

In *Windows*, enable full Administrator privileges for the MESURgauge Plus program folder. Refer to the **Startup** section for details.

5. The graphed data is inverted ("upside down").

The Load (y-axis) and Time / Travel (x-axis) values can be inverted to achieve the desired graph appearance. Checkboxes are provided in the **Test Setup** tab. Some Mark-10 instruments can also be configured to output data with reversed polarity or without polarity (compression readings are normally positive, tension values are negative).

6. **The data acquisition rate (number of readings per second) decreases as more data points are collected.**
   Live graphing in the **Acquisition** tab can slow down the data acquisition rate over the course of thousands of collected data points. To partially mitigate this reduction, uncheck the “Graph Data” box in the **Test Setup** tab. Although the graph will not be updated in real time in the **Acquisition** tab, it may be viewed in its entirety in the **Analysis** tab, after the test is complete.

7. ***Auto Connect* does not establish a connection to the instrument.**
   Under most circumstances, the *Auto Connect* feature automatically detects the instrument and selects the appropriate COM port and baud rate in the **Test Setup** tab. However, if an automatic connection cannot be established, cable connections and settings should be checked. Refer to the communication flowchart in the **Startup** section for further information.

8. **The PC running the software has crashed, and/or the software needs to be installed on another PC.**
   It is possible to install the software on a different PC following deactivation of the original installation. Refer to the **Installing On a Different PC** section for details.

9. **When using the Export to Excel function, there are gaps in the data in the Excel spreadsheet. Not all data is transferred.**
   This is caused by mouse-clicking anywhere within the Excel application before all the data has been transferred. Do not click the mouse button until the data transfer is complete.

NOTES:

Mark-10 Corporation has been an innovator in the force and torque measurement fields since 1979. We strive to achieve 100% customer satisfaction through excellence in product design, manufacturing and customer support. In addition to our standard line of products we can provide modifications and custom designs for OEM applications. Our engineering team is eager to satisfy any special requirements. Please contact us for further information or suggestions for improvement.

Force and torque measurement engineered better

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