Shock Dyno
V1.1C for Windows

User's Manual

Performance Trends, Inc.

Box 530164 Livonia, MI 48152
248-473-9230 Fax 248-442-7750
Website: www.performancetrends.com
Email: feedback@performancetrends.com

Performance Trends, Inc. PO Box 530164, Livonia, MI 48152
Tech Assistance for Registered Owners (248) 473-9230 Fax: 248-442-7750 Email: feedback@performancetrends.com

Website (tips, correspond with other users, download demos, update schedule, etc.) www.performancetrends.com

Continued on next page.

IN THE EVENT ANY REMEDY HEREUNDER FAILS Of ITS ESSENTIAL PURPOSE, OR IN ANY OTHER EVENT, PERFORMANCE TRENDS INC.'S LIABILITY HEREUNDER SHALL NOT EXCEED ANY AMOUNTS PAID BY USER TO PERFORMANCE TRENDS, INC. UNDER THIS AGREEMENT.

Some states do not allow the limitation or exclusion of liability for incidental or consequential damages and some states do not allow the exclusion of implied warranties, so the above limitations or exclusions may not apply to you.

No action, regardless of form, arising out of any claimed breach of this agreement or performance under this agreement may be brought by either party more than one year after the affected party learns of the cause of action.

Refer to diskette envelope for full license agreement.

********** W A R N I N G **********

The Shock Dyno makes calculations based on equations and data found in various published and heretofore reliable documents. The program is designed for use by skilled professionals experienced with engines and Tests. The following processes are hazardous, particularly if done by an unskilled or inexperienced user:

- Obtaining data to input to the program
- Interpreting the program's results

Before making measurements of or modifications to any Test, engine or driving situation, DO NOT FAIL TO:

- Regard the safety consequences
- Consult with a skilled and cautious professional
- Read the entire user's manual
- Obey all federal, state & local laws
- Respect the rights and safety of others

Table of Contents

Chapter 1 Introduction

1.1 Overview of Features

The Shock Dyno v1.1 program by Performance Trends, Inc is hardware, electronics and software to test shock absorbers, either on Performance Trends' Shock Dyno or on a user's existing shock dyno. The program offers options to record, calculate, save, graph, organize, retrieve, report and analyze shock velocity and force test data. The Shock Dyno v1.1 is a unique program which will save test time and improve the analysis of shock test data.

Features:

- Capability to tailor the program to work with Performance Trends' Shock Dyno or most any other shock dyno.
- User friendly, Windows interface, compatible with Windows 98, Me, XP, 2000 and NT, Vista, Win 7.
- Can print results using most any Windows compatible printer, many times in color.
- Save nearly unlimited number of tests for recall, comparison and analysis in the future.
- Allows several reporting and graphing options for analysis.
- Customize printed reports and graphs. You can include comments for each Shock graphed.
- Write ASCII files for importing data into other computer programs.
- Filter (find) past tests based on certain criteria, like Force at Seated or Open Heights, certain Customer name, etc like a data base program.
- "History Log", keeps a running log of tests you have recently started new, run, graphed or reported.

Please read Sections 1.2 "Before You Start" and 1.3 "A Word of Caution" before you turn on the computer. Then install the program following the guidelines in 1.4 "Getting Started" and try running it following section 1.5 "Example to Get You Going". When you feel a little familiar with the program, take time to read this entire manual. It will show you all the things you can do with this powerful tool.

IMPORTANT: Check Appendix 3, page 71, New Features in v1.1 C for the most recent changes.

1.2 Before You Start

What you will need:

- Most any Windows computer
- 32 Meg of RAM.
- Approximately 40 Megabyte of disk space. (More is required for storing large #s of tests.)
- Windows XP, Vista, Win 7, Win 8, Win 10.

Many terms used by the Shock Dyno and this user's manual are similar to terms used by other publications, i.e. Velocity, Force, etc. However, these terms may have different definitions. Therefore, read Chapter 2 to see what these terms mean to the Shock Dyno.

Occasionally it will be necessary to identify "typos" in the manual, known "bugs" and their "fixes", etc. which were not known at the time of publication. These will be identified in a file called README.DOC in the Shock Dyno directory or “V-Shock” folder. To read this file, click on Help at top of Main Screen and then click on Display Readme.doc file.

Unlocking Program:

The Shock Dyno has some minor copy protection. This ensures the legitimate users do not have to cover the costs for unauthorized distribution of the program. See Section 1.4 on unlocking the program.

1.3 A Word of Caution

First, before switching from your current method of recording Shock Data (either hand recording or via some other type of electronics) to the Performance Trends Shock Dyno, you should be very familiar with the Shock Dyno v1.1 program and your computer in general. See the precautions in Section 2.0 and Example 4.1.

Testing shocks requires you to mechanically compress and rebound a shock via a motor. Depending on your situation, the motor may start when you are not expecting it. Always keep hands and fingers clear of the dyno unless the motor power is OFF. Be sure to observe all safety warnings and use proper safety equipment like guards and safety goggles.

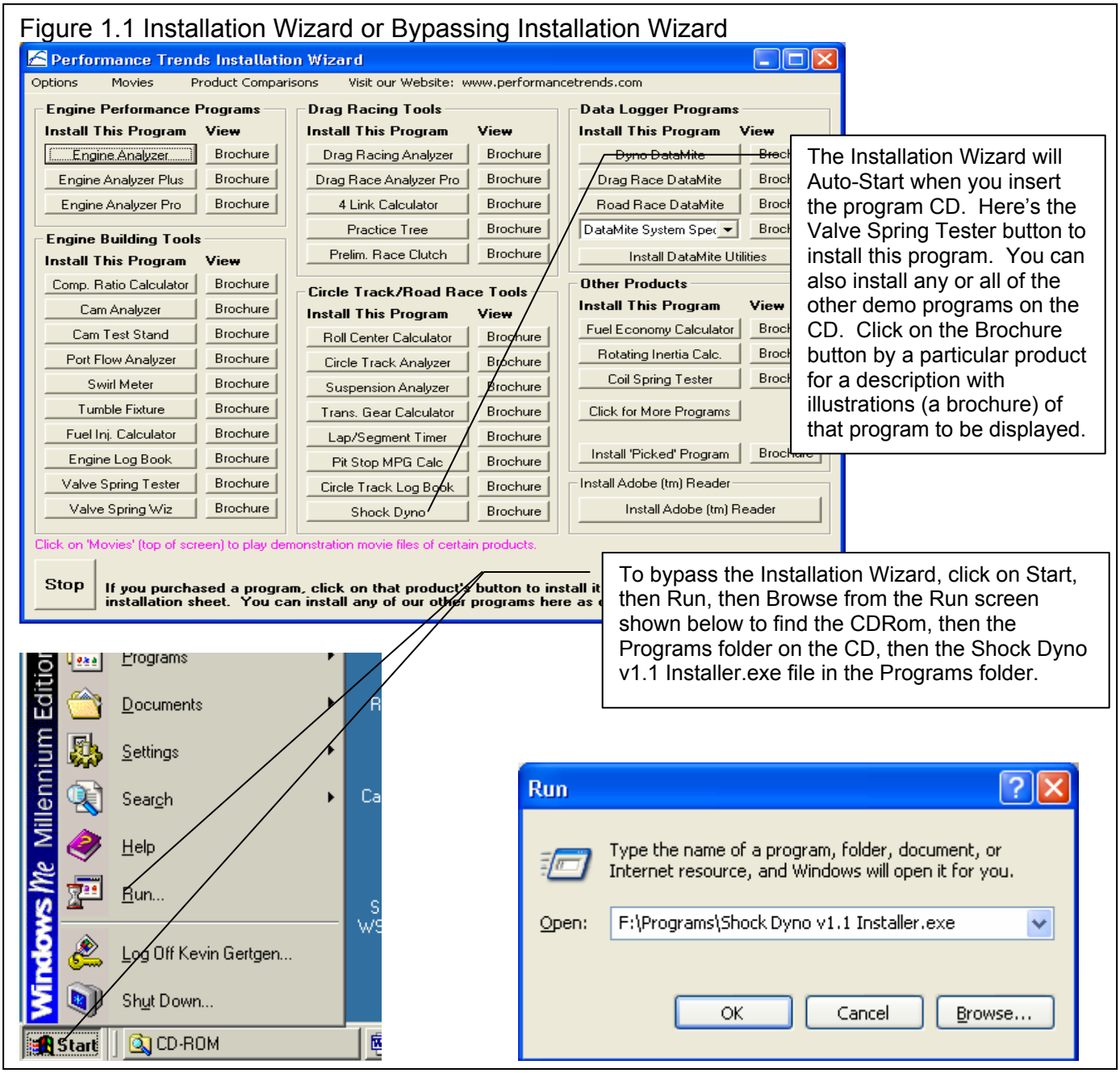
Please also read the Warranty and Warning at the beginning of this manual and on the diskette envelope.

1.4 Getting Started (Installation)

You must install the Shock Dyno from the distribution CD to a hard drive before it will run. To do this, simply install the CD in your CDRom drive and the Performance Trends Installation Wizard should automatically start, allowing you to install the Shock Dyno and demos of any of our other products.

If the CD does not auto-run, then click on Start, then Run, then Browse and find your CD drive. Then look for SETUP.EXE on the CD and run it to run the Installation Wizard. If you want to bypass the Wizard, go into the Programs folder on the CD and run the **Shock Dyno v1.1 Installer.exe** file.

Figure 1.1 Installation Wizard or Bypassing Installation Wizard



Entering Registered Owner's Name:

The first time you run the Shock Dyno, you will be asked to enter your name as the Registered Owner. During this first session, you can modify it until you are satisfied. Once you accept the name, the computer will generate a Registered Code # based on the name. (If you purchased the program directly from Performance Trends, you probably were sent a suggested Reg Name as described in the "Unlocking Program" section below.) To be eligible for Tech Help, you will need both your registered name and code #. The name you enter should be very similar to the name under which you purchased the program.

Click on "Reg To:" at the top of the Main Screen to review your name and code #.

Unlocking Program:

The Shock Dyno has some minor copy protection. This ensures the legitimate users do not have to cover the costs for unauthorized distribution of the program.

When you first receive the program, it is in demo mode. ***Most all features work in Demo mode except the ability to record data via the electronics.*** This demo mode is useful as a Shock Dyno file "viewer". Should your customers want to make reports or graphs of results you have created, they can just obtain a demo copy (from CD or website) and use it to do their own analysis of files you have created. They can do everything you can do except record new data.

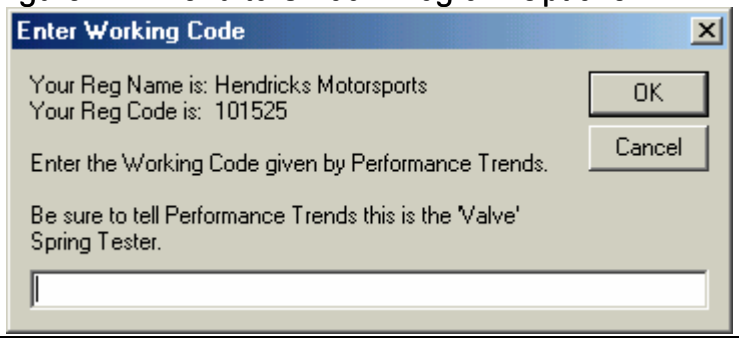
If you purchased the program directly from Performance Trends, you probably were sent a suggested Reg Name and the resulting Reg Code # you should get from that Reg Name. The Reg Name is case sensitive, which means it matters which letters you capitalize. You would have also been sent the unlock code that will unlock the program for that name.

If you purchased from the internet, or are having problems unlocking your program, you can call Performance Trends you're your unlock code. Before you call Performance Trends, you should get your Registered Name and Registered Code number. These are available by clicking on File in the upper left hand corner of the Main Screen, then clicking on Unlocking Program. A screen will appear as shown in Figure 1.2.

Performance Trends will provide you an unlocking code number. Type in the unlocking code number and click on OK. If you typed in the number correctly, you will be given a message that the program is permanently unlocked.

If you want to run the program on another computer, you must use the same Registered Name (it is case sensitive, which means it matters which letters you capitalize) and it will then generate the same Registered Code. Then the same Unlocking Code will unlock it.

Figure 1.2 Menu to Unlock Program Options

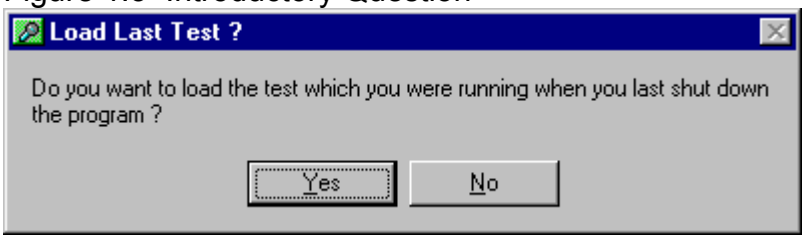


1.5 Example to Get You Going

To start the Shock Dyno, click on the Shock Dyno desktop icon. (An alternate method is to click on Start, then Programs, then Performance Trends, and then Shock Dyno.) During startup of the program, you will be given some introductory tips.

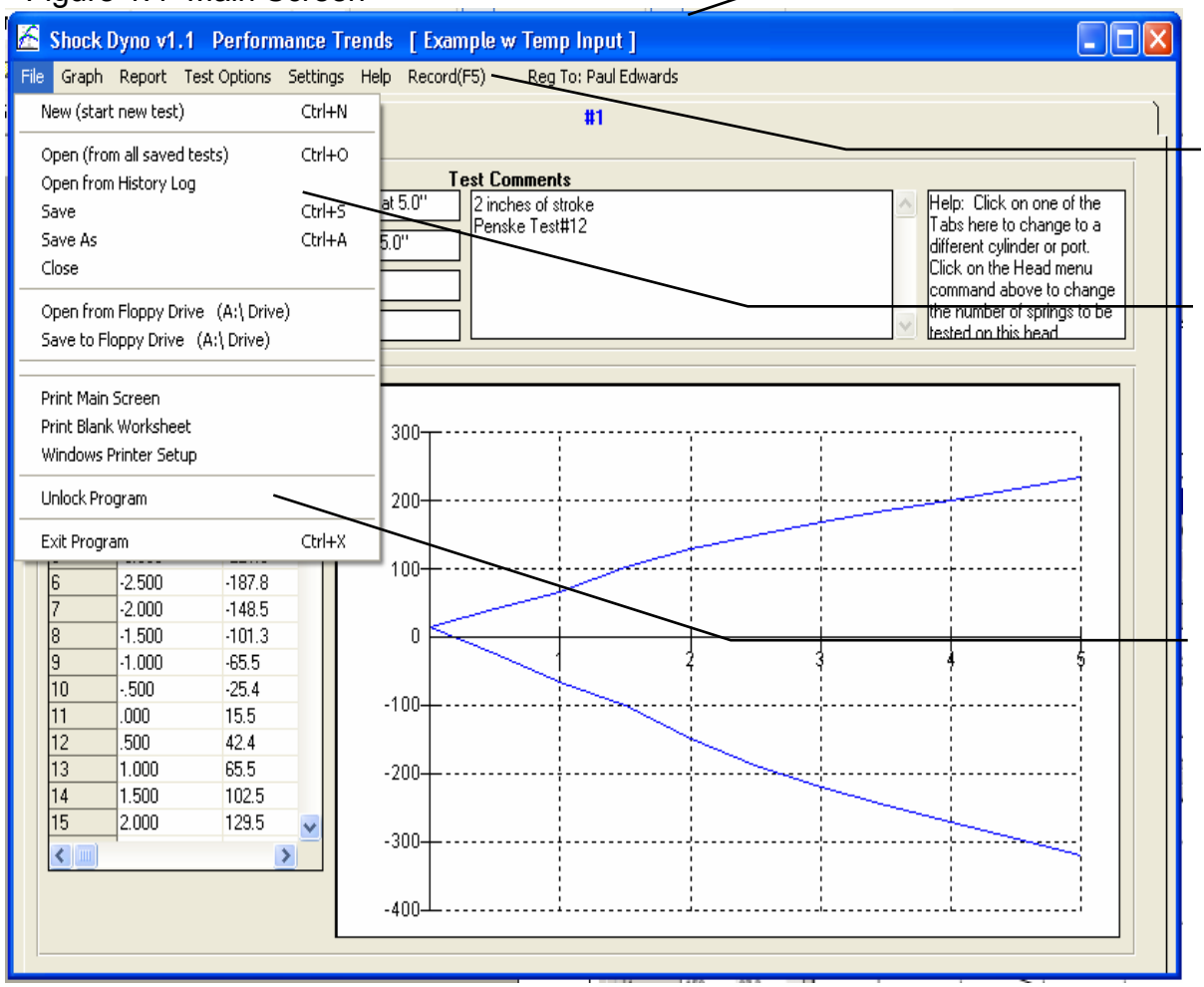
One of these "Tips" will ask if the "last test you were running should be loaded". If you have just received the program, this test will be an example test which was loaded at the factory. If you have run the Shock Dyno before, this will be the last test you were working with. If you are just learning the program, it is recommended you answer yes to this question so you have some example data to work with to understand how the program works.

Figure 1.3 Introductory Question



After these brief introduction screens and questions, you will be left at the Main Screen shown below:

Figure 1.4 Main Screen



Name of current test you are working with

Menu Commands

Click on File, then choose from different Save or Open options

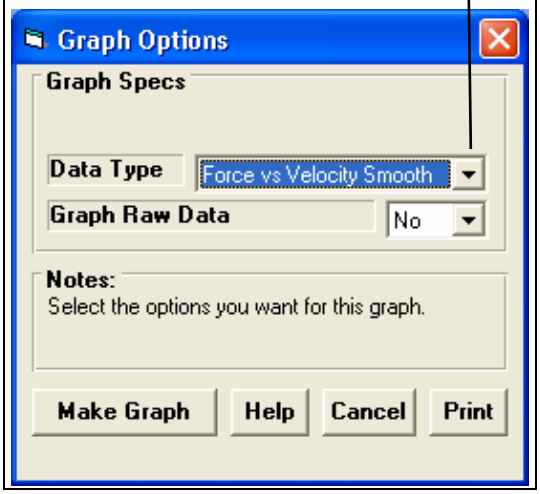
Click on File, then Unlock Program to allow the program to record data from the spring tester. See Section 1.4.

From this Main Screen, you can:

- Choose to review your options by clicking on the menu items at the top of the screen.
- Open or save a file of test results and specs by clicking on File in the upper left corner, and then the Open or Save commands.
- Add, edit or review test comments for the file you are currently working with.
- Graph or report the test for the file you are currently working with.
- Select if you want to analyze results at either various amounts of Shock height, or Shock compression from Seated Height (more like the Shock will be used in the engine).
- Change the Preferences options to somewhat customize the program for your needs.
- Get HELP to explain these options by clicking on Help.
- Quit the program by clicking on File, then Exit.

All these options are explained in detail in Chapters 2 and 3.

Figure 1.5 Graph Options Menu

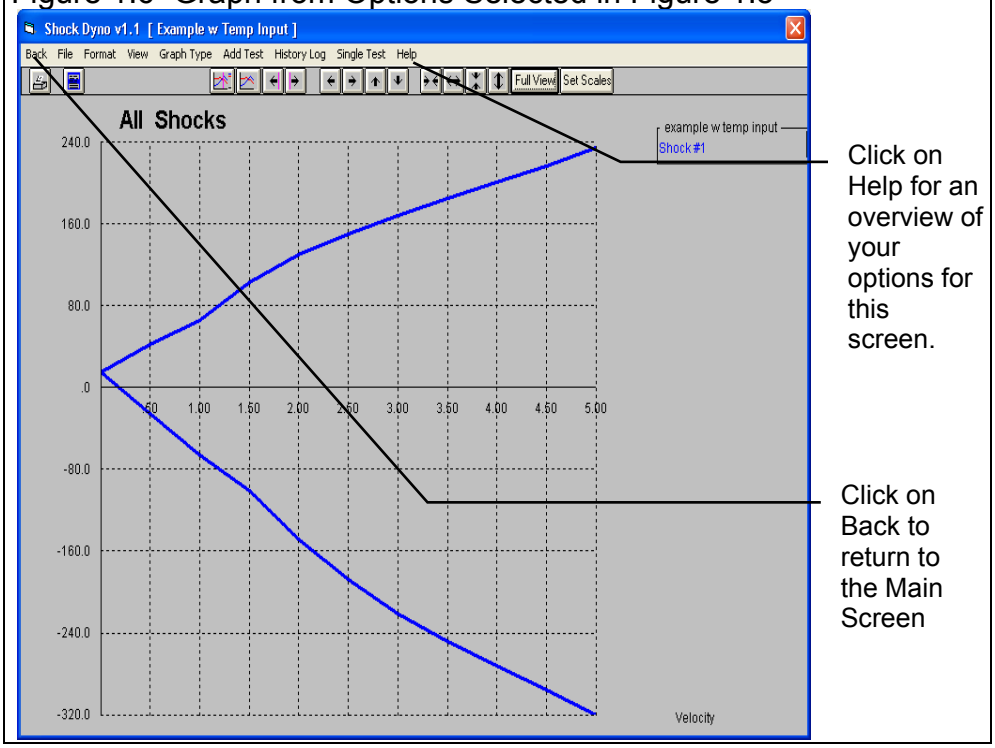


In the Main Screen's blue title bar you will notice the name of the current test is contained in square brackets [ ] (if you did load in an old Shock Test at program startup or opened a file by clicking on File, then Open). The program has some examples of tests saved in the Test Libraries' Example folder right from the factory.

To get started, let's try a couple of Menu commands. Click on the Graph menu command to open up the graph options menu shown in Figure 1.5. That Graph Type shown in Figure 1.5 is for Force vs Velocity Smooth. If this is not the graph type you see on your computer screen, click on the down arrow to select "Force vs Velocity Smooth".

Click on the Make Graph button to produce the graph shown in Figure 1.6. At the graph screen you have several other options available for changing the graph. These options are available by clicking on the commands in the menu bar or on the buttons at the top of the screen, including the Help command. The Help command at this screen (and most screens) provides a good background on what the various options are. For now, just click on Back at the upper left to return to the Main Screen.

Figure 1.6 Graph from Options Selected in Figure 1.5



A Test File is made up of the Shock Data (force recorded at various positions at particular times) and other data like Temperature, Comments, time and date, etc. This is explained in Section 3.6 "Data Libraries".

Many of the input specifications you see in the various menus may not be familiar to you. For a brief definition of the inputs, simply click on the specification name. The definition will appear in the Help frame with a page # in this manual for more info.

Once you feel comfortable changing specifications in the various menus and making various performance calculations, read Section 3.6 of this manual called Data Libraries to learn how to save a set of data or component specifications or recall information which has been previously saved. Then you will know all the basic commands to operate the program. For a more in-depth knowledge of using these commands and an explanation of the results, read this entire manual.

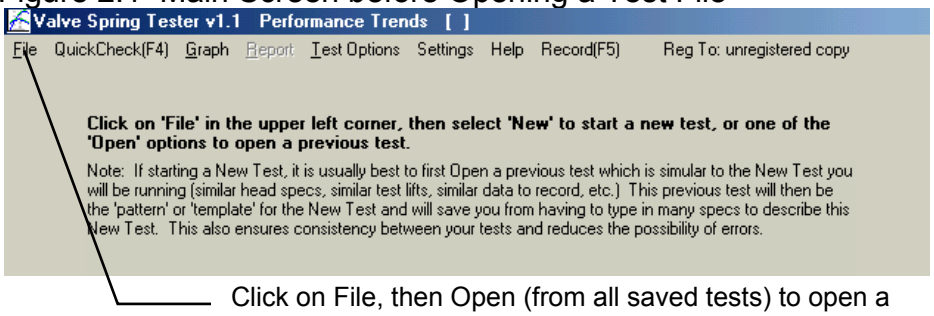
IMPORTANT: Check Appendix 3, page 71, New Features in v1.1 C for the most recent changes.

Chapter 2 Definitions

2.0 Basic Program Operation:

Whenever you start the Shock Dyno, you are brought to a Main Screen which will look like either Figure 2.1 or 2.3. If you have not yet selected a test to work with and have not started a new test, the Main Screen is mostly blank, like Figure 2.1.

Figure 2.1 Main Screen before Opening a Test File

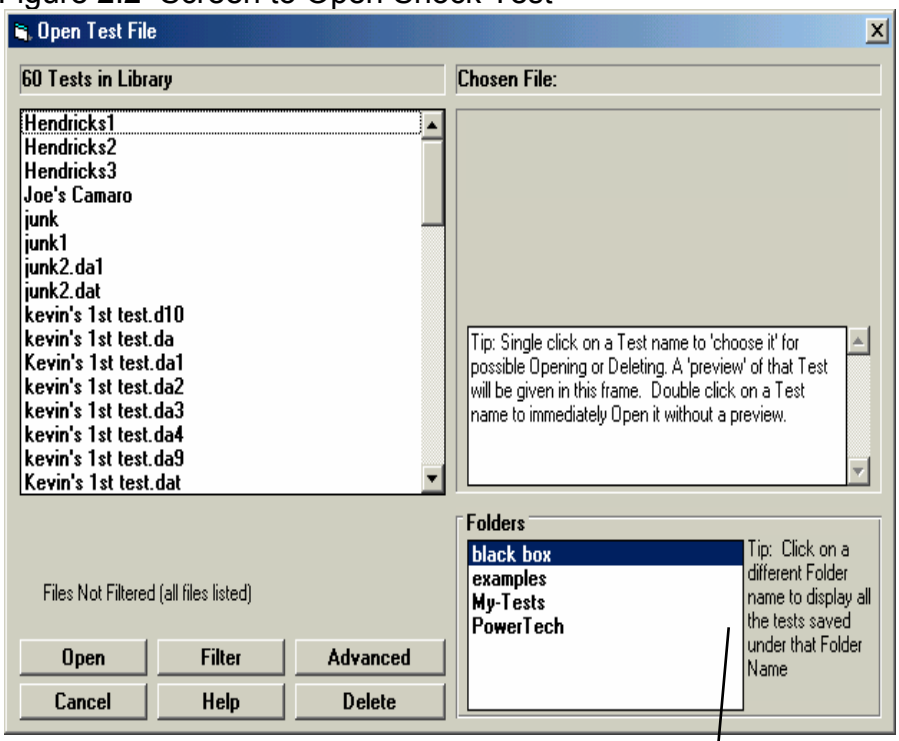


Click on File, then Open (from all saved tests) to open a previously saved test file. You can also open an Example Test file provided with the program. You will obtain a screen as shown in Figure 2.2.

If you want to Open a previously saved test, you can click on File in the upper left corner, then click on Open (from all saved tests). You will get a screen as shown in Figure 2.2 where you are presented with a list of saved tests in the Test Library. Some tests are examples provided by Performance Trends. As you run tests yourself and save the results, you will add many more tests to the library. These saved files are useful for making comparisons in the future, and can be used as test patterns (or templates) for new tests (saving you considerable time by not having to type in specs which match a past test).

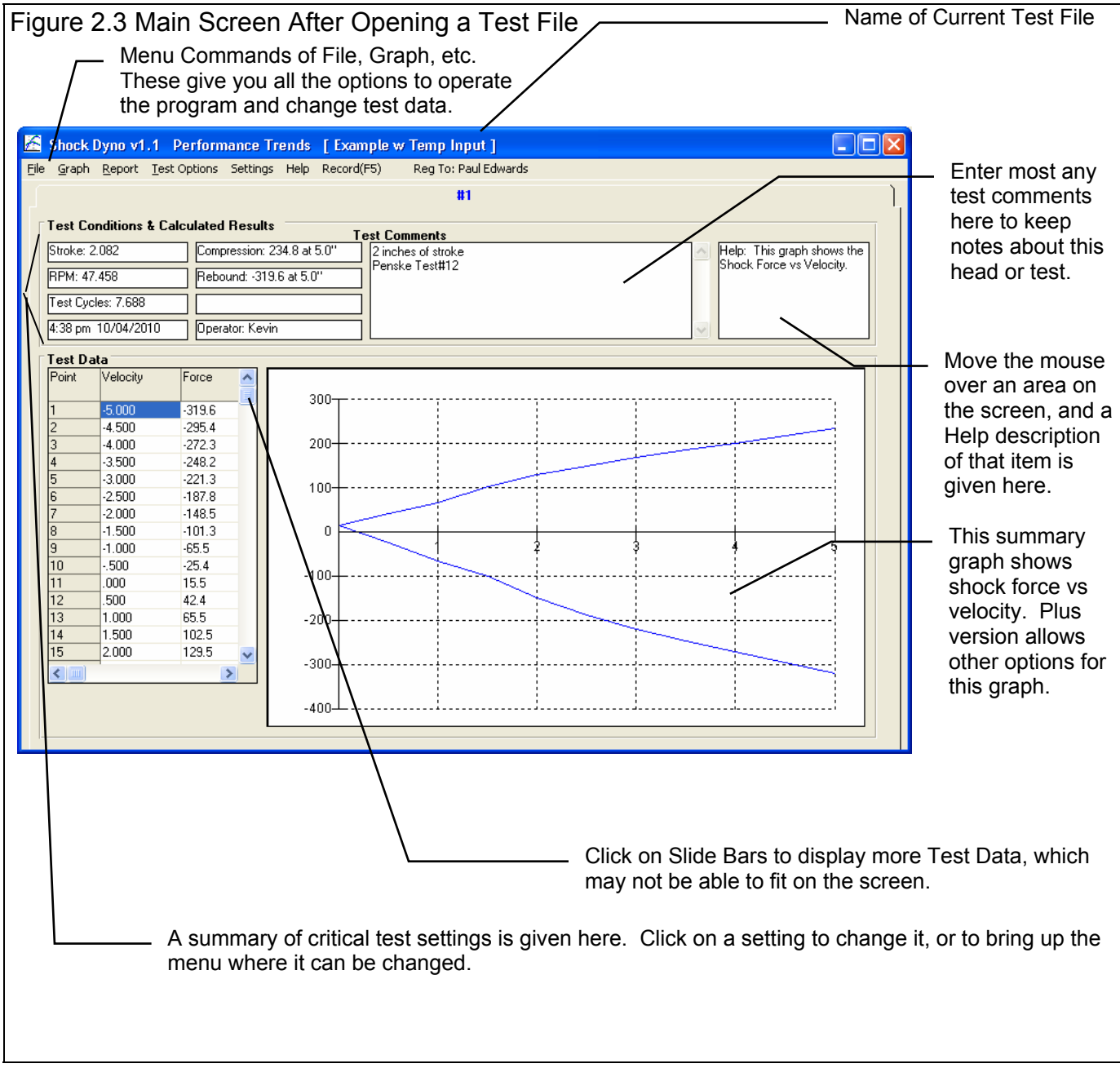
Figure 2.2 shows that the Test Library is divided into sections (called Folders in Figure 2.2) to help organize a large number of tests. For example, all Shock tests for the company ABC Engines could be saved under a section name of "ABC-Chassis". This will save considerable time and confusion when trying to locate a particular test in the future. To look in different sections, click on the Folder name from the list shown at the lower right of Figure 2.2. The list of tests will then be updated for that Folder. To pick a test, simply click on it from the list of tests, then click on the Open button. (For those familiar with computers, Folders are the folders in the ShockData folder. The Name "Folder" can be changed to something else, like "Customer" or "Shock Mfg".)

Figure 2.2 Screen to Open Shock Test



Click here to pick a different category or group of tests (Folder) from which to display a list of Test Files.

Figure 2.3 Main Screen After Opening a Test File

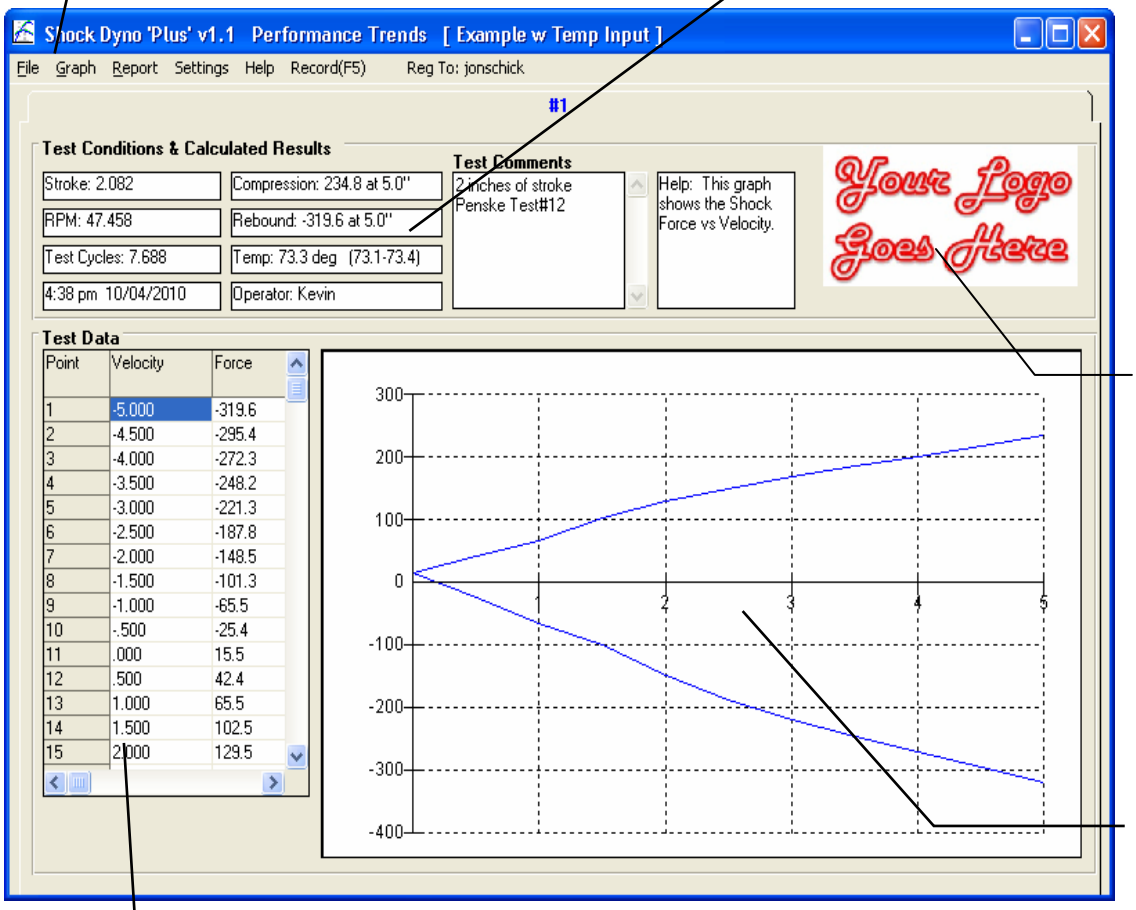


If you ***are*** working with particular test, the data will be presented as shown in Figure 2.3. Notice in Figure 2.3 that a current test name is listed at the top in square brackets [ ]. This is the file of Shock specs, Shock Data, etc which are currently saved in the Shock Data Library, and are the data and specs you are currently working with. If you change the Shock Data or specs, make a graph or report, it is for this test file.

2.1 Main Screen (Test Data)

The Main Screen is shown in Figure 2.6. The screen shows you a summary of the Shock force at various velocities, plus some summary data. The Main Screen is made up of 5 basic sections as shown in Figure 2.6. These are discussed in the next 5 sections. The rest of this section gives an overview of how a Shock Test is organized.

Figure 2.6 Main Screen After Opening a Test File



2.1.2 Test Results

Stroke

This is the stroke determined from the test cycles, based on the highest and lowest average length measured by the length sensor.

RPM

This is determined by the number of strokes measured during the test time.

Test Cycles

This is determined by the number of strokes measured during the test time.

Time/Date

This is time and date of the test. This can be changed by clicking on the Time/Date box.

Temp

This is the average temperature (and range shown as +/-) of the temp sensor if any. Plus Version only.

Compression

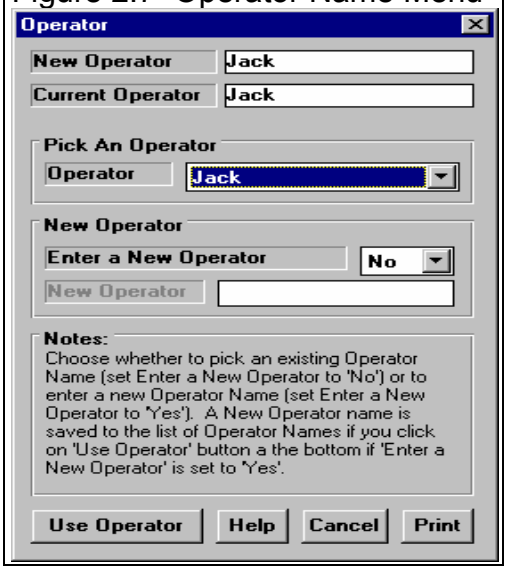
This is the force at the highest velocity in the Compression direction.

Rebound

This is the force at the highest velocity in the Rebound direction.

These calculated results are the same results that can be displayed in different Graph or Report types. They are shown here on the main screen as a summary of this Shock's calculated results.

Figure 2.7 Operator Name Menu



Test Operator

This is the name of the operator who ran the test. Click on this item for the menu of Figure 2.7 to be displayed, where you can type in a new operator name, or choose from one you have previously entered. It is always recommended you first check the list of existing operators, so you do not end up with several names for the same operator. For example, Bob, Bobby and Robert may all be for the same guy. When you go to look for tests run by Bobby in the future, the search (Filter option) will not show up the tests run by Bob or Robert.

To pick an existing operator name, pick No for Enter a New Operator, then pick from the Operator list. To enter an New Operator name, pick Yes for Enter a New Operator, then type in a New Operator name, which will be added to the list of operator names.

Test Comments

Test comments are for making most any notes about the test, unusual observations, customer requirements, etc. In the Plus version, you can search the Comments for various words. For example, you could search for all the tests which had the word "Bilstein" or "gas filled" in the Test Comments.

Help

The help frame will describe what ever portion of the screen the mouse has passed over or clicked on. For example, click on a location in the Test Data grid, and a description of what data can be entered in that particular column is given.

2.1.3 Summary Graph

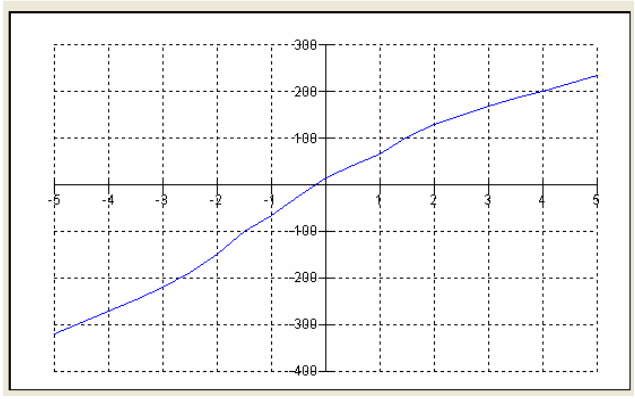
The summary graph shows Shock Force vs Velocity (Figure 2.6). This is an excellent way to show a "snap shot" of this shock's performance.

The Preference menu also lets you to select to either graph Graph as +/- Velocity = Yes or Graph as +/- Velocity = No. See Figure 2.8. Compression is shown as a positive force and Rebound is shown as a negative force. Depending on your Preference setting here, Rebound can be shown as a negative velocity or a positive velocity.

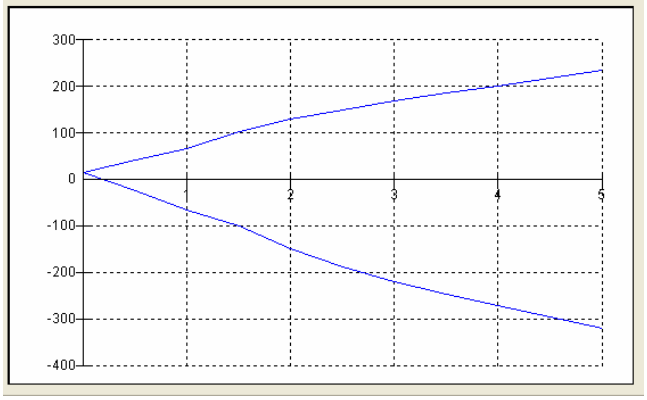
If you click on the Summary Graph, the Graph Options menu pops up to provide many more graphing options for the more detailed Graph screen.

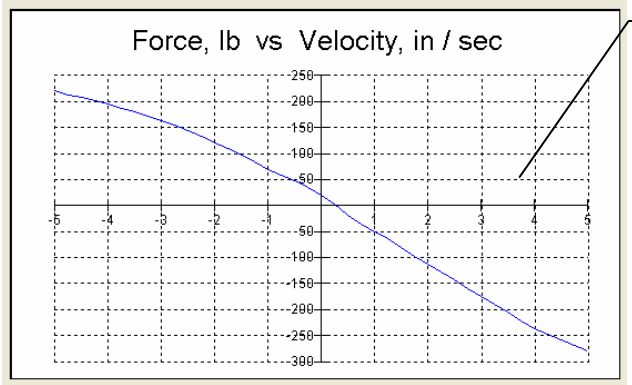
Figure 2.8 Comparing the Same Data with Different Preference Settings "Graph Raw Data"

Graph as +/- Velocity = Yes (rebound velocity negative)



Graph as +/- Velocity = No (rebound velocity positive)





Newer versions like 1.1B and 1.1C will do the "Yes" graphs like this. Positive velocity is when the length of the shock is increasing, rebound. This seems to be more universally accepted, and is what other Performance Trends programs are expecting, like Suspension Analyzer and Circle Track Analyzer. **This can be changed just by changing the sign for the load cell Factor calibration. Make it negative (-) and the graphs will look like this.**

2.1.4 Test Data Grid

These option buttons control a very important aspect as to how the program presents and analyzes data for calculated results, graphs and reports.

Velocity This is the Shock velocity as determined how the shock's length is changing during the cycle. Typically, compression velocity is positive and rebound velocity is negative. See Figure 2.8 to see how newer versions of the software has changed this definition.

Force This is the force measured at the corresponding velocity. Typically, compression force is positive and rebound force is negative.

Point The point column simply numbers the rows of data

2.1.5 Main Screen Commands

The next section discusses some of the commands available at the top of the Main Screen. Most will not be discussed here in detail, as they are discussed in other sections of this manual.

File (see Figure 2.12 for File Options)

New (start new test)

Click on File, then New to start a new test. This process will "walk you through" some critical steps to start with a blank Test Data grid, or to keep certain data from the previous test. Keeping data can save you considerable time since you don't have to type in information which may be the same as the current test. The New Test command is discussed in full detail in Section 2.6.

Open (from all saved tests)

This option presents the Open Test File menu discussed in Section 3.6, Data Libraries. From there you have several options to open a previously saved test file from any place in the Test Library, or from most any place on the computer, including the floppy disk drive.

Open (from History Log)

This option presents the History Log, a chronological list of test files you have been working with as discussed in Section 3.8. From there you can review a summary of the last 25 to 100 tests, and pick one to open. This method can make it easier to find a file you have just worked with lately, say in the last couple of weeks.

Save

Select Save if you want to save the current test and any recent changes ***to the same name*** as you are currently working with. This is the file name shown in square bracket [ ] at the top of the Main Screen.

Save As

Select Save As if you want to save the current test and any recent changes ***to a new name or new folder***. You will be presented with the menu discussed in Section 3.6 where you can change the test name, change the folder you are saving it to, or add a new folder name.

Open from CD/Zip Drive

This command provides a simple 1 click command to open a standard Windows "File Open" menu displaying the contents of the disk in an external drive (floppy, CD, zip drive, memory stick, etc.). This provides a convenient method for copying files from one computer to another.

Save to CD/Zip Drive

This command provides a simple 1 click command to save the current test file to the disk in an external drive (floppy, CD, zip drive, memory stick, etc.) to the same name as is currently being used. This provides a convenient method for copying files from one computer to another.

Print Main Screen
Print Blank Worksheet
Windows Printer Setup

The Print Main Screen and Print Blank Worksheet commands simply give you instructions how to do each. These commands were placed under File as many users will look under File to find these print options. The Windows Printer Setup lets you change your Windows default printer, paper orientation, etc for printing reports or graphs in other areas of the program.

Unlocking Program:

The Shock Dyno has some minor copy protection. This ensures the legitimate users do not have to cover the costs for unauthorized distribution of the program. See Section 1.4 for details.

Graph

The Graph command lets you graph several different types of data from the current test, either by itself or with data from other tests for comparisons. The Graph options are discussed in detail is Section 3.4, page 55.

Report

The Report command lets you create reports of several different types of data from the current test, either by itself or with data from other tests for comparisons. The Report options are discussed in detail is Section 3.1, page 49.

Test Options (not yet activated)

The Test Options command opens up the Test Options menu. There you tell the program critical Shock specs, like…. Test Options are discussed in detail in Section 2.3, page 23.

Settings

The Settings menu opens up 2 critical Menu commands, Tester Calibration and Preferences. These are described in the following paragraphs.

Tester Calibration

The Tester Calibration command opens up the Tester Calibration Specs menu, where you can describe the Shock tester you are using.

> ***The specs in the Tester Calibration menu are critical for accurate results. Be sure to read and understand the Tester Calibration Specs as discussed in detail in Section 2.4, page 41.***

Preferences

Preferences let you customize the program for your needs and for your computer and printer. See Section 2.2, page 21.

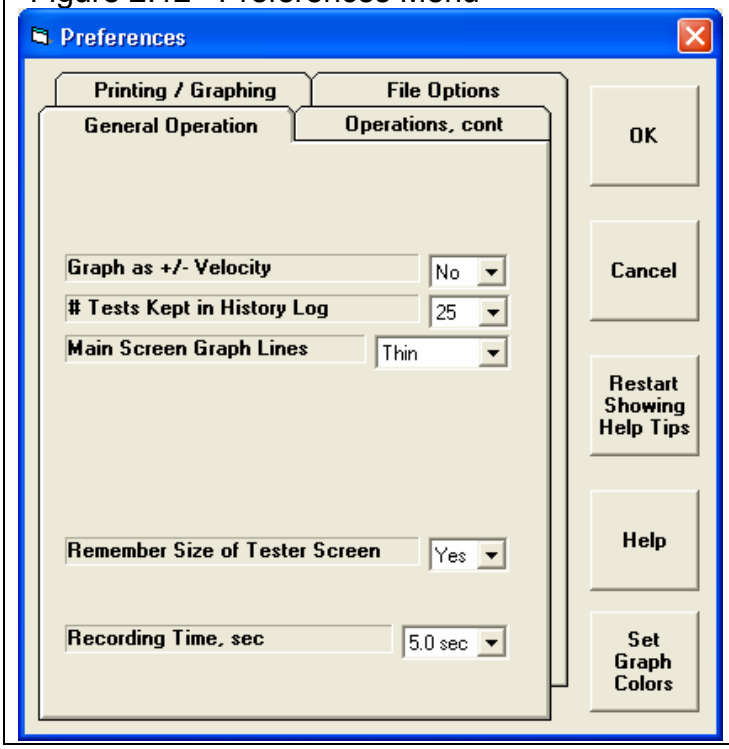
Help

Click on Help for several options to help describe your options at the Main Screen, and for other information to help you understand how this program works.

IMPORTANT: Check Appendix 3, page 71, New Features in v1.1 C for the most recent changes.

2.2 Preferences

Figure 2.12 Preferences Menu



Click on the Preferences item in the menu bar at the top of the Main Screen to bring up the Preferences menu shown in Figure 2.12. Here you can adjust some program items to personalize the program for your needs. Preferences may also save time by eliminating steps you don't require.

General Operation Tab

Graph as +/- Velocity

Set this to Yes to show both + and – velocity on the main screen (compression as + and rebound as -). Set to No to see both the compression and rebound force graphed vs just a positive velocity. This is more typical of shock dyno graphs. NOTE: In v1.1B and 1.1C software, compression is now – and rebound is now +.

Tests Kept in History Log

Pick the number of tests which you want the History Log to hold, from 25 to 100.

Main Screen Graph Lines

This option lets you choose the line thickness of the summary graph of force vs Shock height for all the Shocks on the Main Screen.

Remember Size of Tester Screen

Set this to Yes to allow you to enlarge the program's Electronics screen showing Tester Results when you test a Shock. Then when you close and return to this screen, it should be at the same size you previouisly adjusted it to. If the Electronics Recording screen becomes corrupted, you may need to set this to No to fix the problem.

Recording Time, sec

Set this to the approximate amount of time you want the shock dyno to run while recording data. The longer the time, typically the more accurate the data. You can also press the F2 key during a test to cut it short of this time.

If you have a retro fit kit, this setting only has an effect if you also have the Plus version with a motor control relay

Operations, cont Tab

Slow Down Data Readings

On newer, very fast computers, you may have to slow down the data readings for proper operation. The program may also warn you of this, to change this setting.

Warn About Slowing Down Readings

Sometimes your system may work fine with a faster Slow Down Data Readings setting than the program thinks is appropriate. Set this preference to No to avoid a nagging message.

Units

Choose either English or Metric Units.

Shock Dyno Controls Motor

For the Performance Trends Shock Dyno, and for retrofit kits with the Plus version of the software and a motor control relay option, set this to On/Off Only.

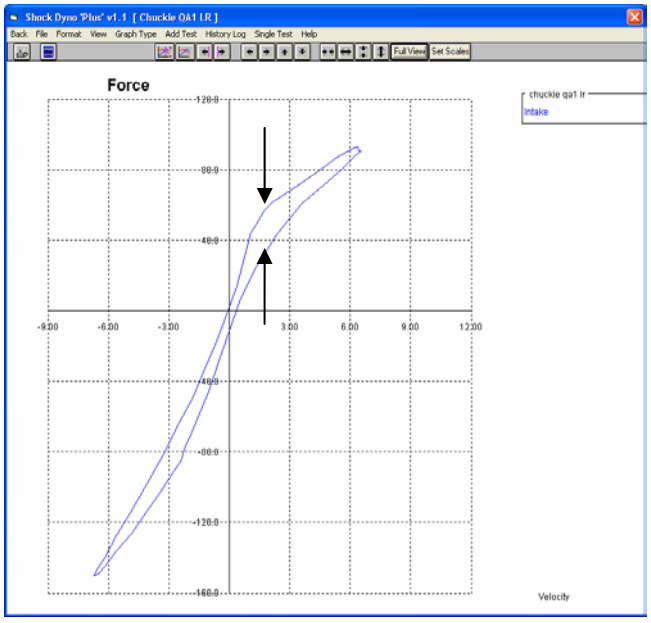
For retrofit kits without the Plus version of the software or a motor control relay option, set this to No.

Shock Dyno Agreement Warning Limit

As the shock goes through it's testing cycle, it is put through the same velocity in both an accelerating mode and decelerating mode. In a perfect world, the force recorded would be the same. However, in the real world it is not. See Figure 2.12A, showing the force going through the entire cycle. (Note: Only the Plus version allows for this graph.)

The arrows show a portion of the cycle where the agreement is not as good as other parts. Having very large disagreement can be an indication of a poor test or bad data. If you want messages about these differences to be told to you for each test, you will specify a low limit. If you know from your experience that the differences are normal, you may not want the "nagging" messages and you may increase this limit setting.

Fig 2.12A Agreement Limit



Files Options Tab

Program Title Comments

Enter most any text here for the First and Second lines. These 2 lines will appear at the top of printouts and printed graphs. This is a good place for your business name or your personal name. You can change these entries as often as you wish.

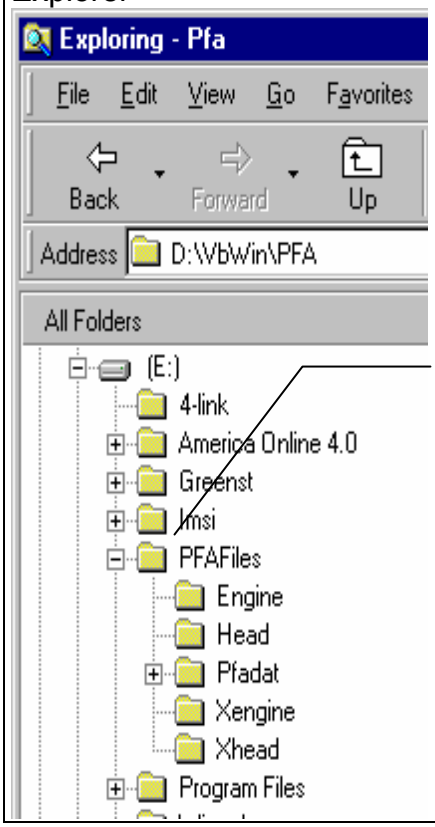
Use Alternate Location for Files

Some users (typically those on a network) may need to store their data files in a location other that in the Shock-V folder (the folder containing the actual Shock Dyno program). For example, you may want to put the files on the E drive so other computers can access them. If so, choose Yes and then the spec Path to Files will be enabled.

In most all situations (except for network users) it is STRONGLY recommended you keep this marked No.

It is also STRONGLY recommended that if you do choose Yes, that you do NOT keep changing this back and forth from No to Yes. This will produce possible errors when saving or opening files. This will be due mostly to saving them in one location and then looking for them in another location.

Figure 2.13 Alternate Path in Windows Explorer



Path to Files

If you set the previously described Use Alternate Location for Files spec to Yes, this spec becomes enabled. Enter the full path to the new location for the Shock Dyno data files. For example, if you want to store the files on the E drive, enter the path:

E:\Shock Data

Either before you make this change in the Preferences menu, or immediately after that change, you must copy all Shock Dyno data folders (directories) and data files to the new location. These folders include:

Shock Test Library (the ShockData folder and all subfolders)
Test Options Library (Test Options folder)

Assuming you used the path E:\Shock Data, you must copy the ShockData and Test Options folders (and their contents, the data files) to the Shock Data folder on the E drive. See Figure 2.13.

You must copy both folders listed above and their contents (files) to the new location to avoid errors.

It is also STRONGLY recommended that you do NOT keep changing the path. Once you set it, do NOT change it. Constantly changing it will produce possible errors when saving or opening files. This will be due mostly to saving them in one location and then looking for them in another location.

If this process seems complicated or you are not familiar with Windows copy commands or folders, DO NOT use this option. Keep the spec Use Alternate Location for Data Files set to No.

Default External Disk Drive

Choose the letter of the floppy disk drive on your computer, usually A for a floppy disk, but a letter of D or higher for a CD drive, memory stick, or zip drive. This is the disk drive which will be first opened when using the Save to CD/Zip Drive or Open from CD/Zip Drive File commands at the Main Screen.

Test Folder Name in Program

The Shock Dyno Analyzer saves tests under different folders (directories) under the main folder ShockData. Some users may prefer to have the 'Folder' be called 'EngFamily' or 'Customer', depending how they choose to organize their tests. Your entry here of most any text is what the program will use to call the different folders where test files are stored.

Printing/Graphing Tab

Printer Fonts

Choose which basic type of font to use for printouts. You may not get your choice if your printer does not support that particular font.

Printed Graph Width, % of Page

Due to the endless combinations of computers, Windows setups and printers, some printed graphs may not fill the page, some may extend off the page. This option lets you expand (% greater than 100) or shrink (% less than 100) the printed graph to better fit the page.

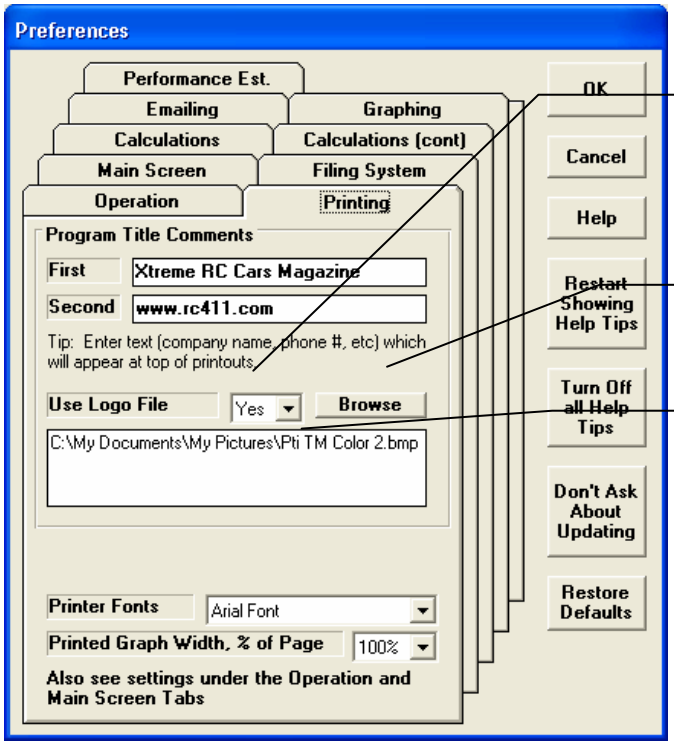
Graph Dot Matrix Printer Adjustment

Choose Yes if you are getting breaks in the border around printed graphs (usually happens with dot matrix printers).

Company Logo Graphics File for Printouts
Use Logo File

Choose Yes and you can browse your computer to pick a graphics file (.jpg file) to be included on your printouts. See Fig 2.13A.

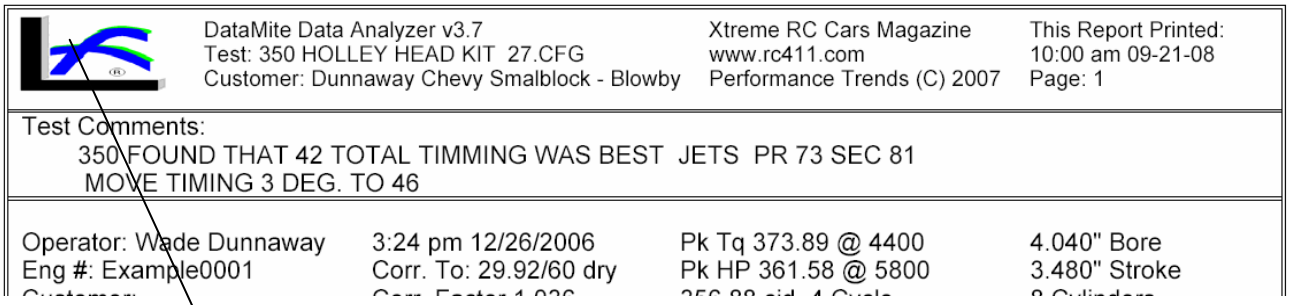
Figure s.13A Printing Company Logo (graphics file) on Graphs and Reports (Plus Version Only)



Set to Yes to include a graphics file (like one of your company logo) on printed graphs and reports.

Click on Browse button to find your graphics file on this computer.

The path to the graphics file is shown here.



Example of a Report Printout including a graphics file, in this case Performance Trends' company logo.

Command Buttons on Right Side of Screen

Click on OK to keep your changes.

Click on Cancel to abandon (not keep) your changes.

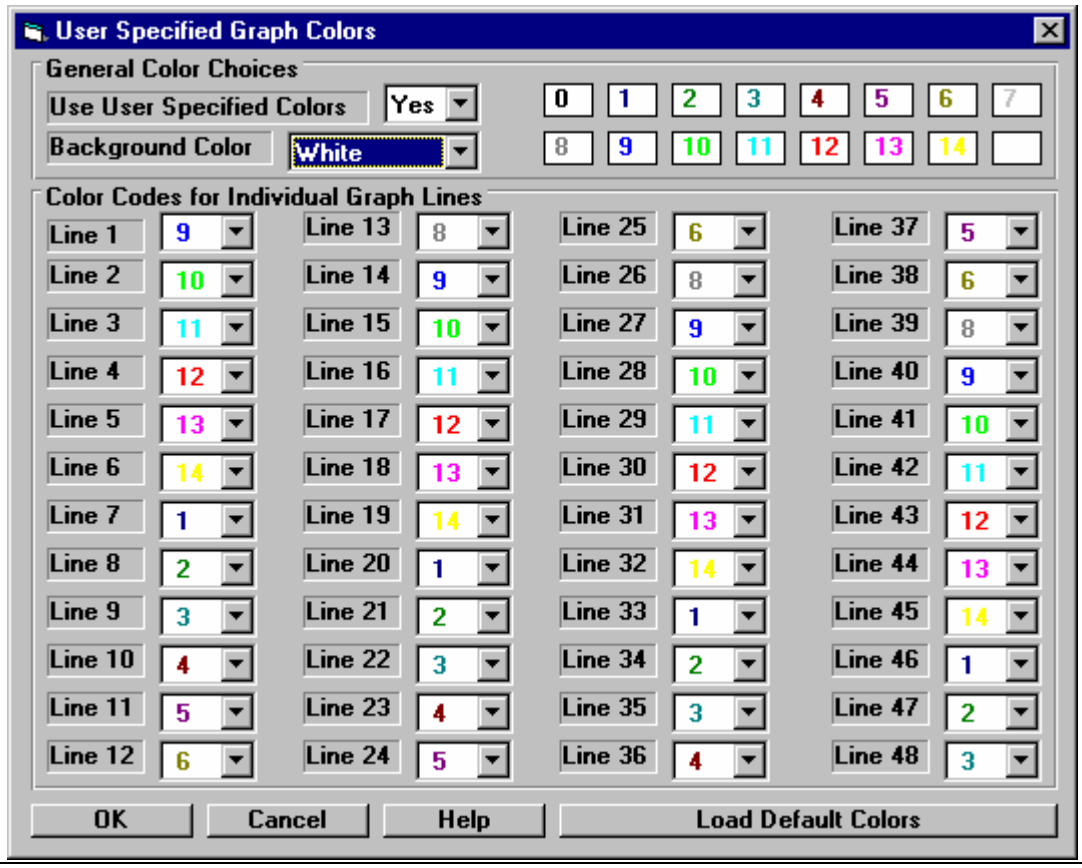
Click on Help to bring up help describing these Preferences.

Click on Turn On Restart Showing Help Tips to start showing the pop up tips for critical parts of the program operation like when the program was first installed. These Tips usually appear only once each time you run the program, unless you click on the "Don't Show This Again" box in the lower left corner of the tip. See Figure 2.8a.

Click on Stop Showing Help Tips to stop showing the pop up tips for critical parts of the program operation like when the program was first installed. This is not recommended unless you are very familiar with the program.

Click on Set Graph Colors to bring up the screen below, Figure 2.8b, where you can customize graph colors.

Figure 2.8b Screen for Customizing Graph Line Colors



IMPORTANT: Check Appendix 3, page 71, New Features in v1.1 C for the most recent changes.

2.3 Test Options (see Appendix 3)

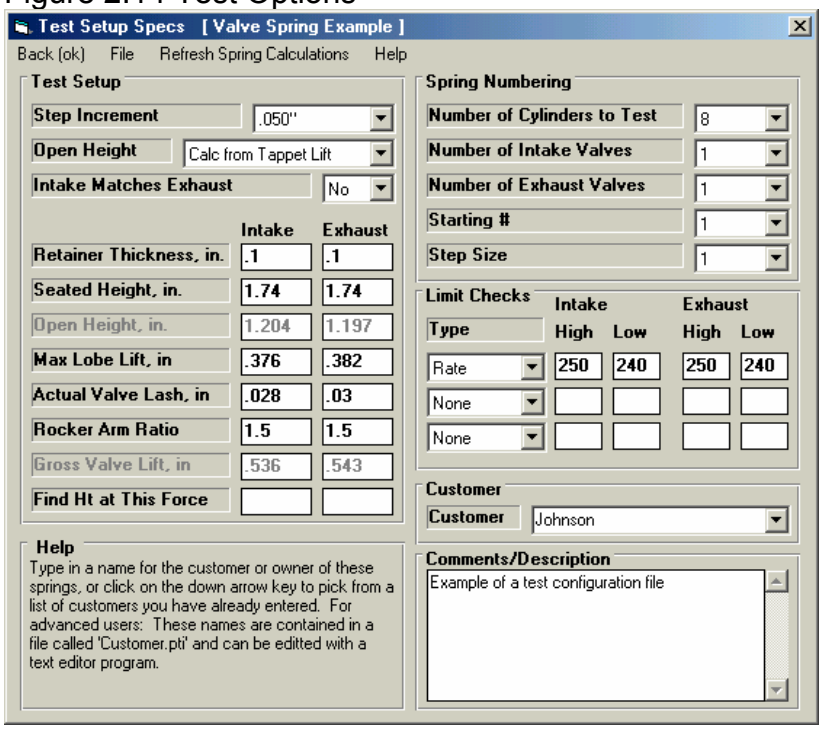
This menu is only available in the Plus version 1.1 C, and contains several critical specs which determine:

1. How the Shock is analyzed
2. How many Shocks are to be measured and how they are numbered.
3. General info like customer name and comments describing these test setup specs.

As you click on each input spec or input name, a brief description is given in the "Help" box in the lower left corner. These help descriptions give very useful information to understanding how these inputs work.

See Appendix 3 for full details on this feature.

Figure 2.14 Test Options



2.4 Shock Tester Calibration Specs

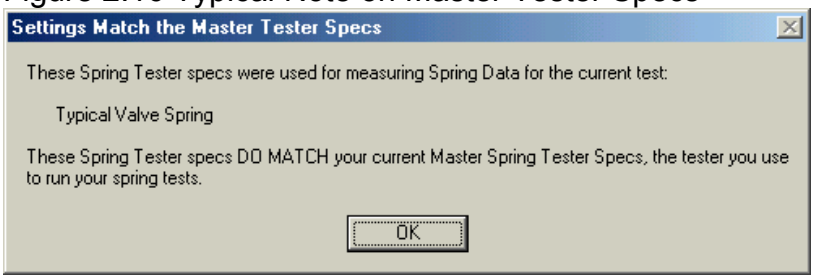
The Shock Tester Calibration Specs describe the tester you are using and calibration specs for converting electrical signals into Shock force and height. These specs are critical for accurate data, therefore be sure these specs are correct for each test.

Master Tester Specs

A critical concept for Tester Calibration Specs is the idea of the Master Tester Calibration Specs. When you run a test, you are using a particular tester, with certain Tester Calibration Specs. When you save the test, the program saves a copy of the Tester Calibration Specs with the test. Let's call this test "April 12" and assume it was run on April 12th.

Let's say several months later that you recalibrate your tester. Your current tester specs do not match the specs for "April 12". If you open "April 12", the program installs the tester specs which you used on April 12th when you ran the test.

Figure 2.16 Typical Note on Master Tester Specs



If you go into the Tester Calibration Specs menu, you will likely get a message shown in Figure 2.16, saying that the Tester Calibration Specs for April 12 do not match your ***Master Tester Calibration***, the specs for your current tester. You may ask "What are ***Master Tester Calibration Specs?"***

The program keeps track of any changes to Tester Calibration Specs, asking you if these changes should only apply to the Tester Calibration Specs for a particular test, or if these changes represent your actual tester ***right now***, the Master Tester Calibration specs. Whenever, you start a ***new*** test, either based on a previous test or starting completely blank, the Master Tester Calibration Specs are used. Whenever you open an old test file, the tester calibration specs used for that particular test are used.

Since each complete test you run keeps a set of Tester Calibration Specs, you can easily see what calibration specs were being used at most any time in the past. Simply open an older test, click on Settings, then Tester Calibration to view these specs. If you want to return your tester's calibration to these previous specs, simply click on File, than Save as Master Tester Calibration specs. Now all new tests you run will use these calibration specs.

Changing calibration specs will not affect data which has already been recorded, just new data.

Sensor Specs

If you purchased a complete Shock Dyno system from Performance Trends, you probably got a calibration sheet with it. Then you can type in these numbers on this screen for an accurate calibration.

Length Sensor Offset

This is the offset in the calibration curve for the Shock Length Sensor. In a calibration curve of 'Compression=A*Volts+B', the Offset is the 'B'. Click on the 'Calibrate' button to calibrate sensor through the electronics. See Figure 2.17

Factor

The factor in the calibration curve for the Shock Length Sensor. In a calibration curve of 'Pres=A*Volts+B', the Factor is the 'A'. Click on the 'Calibrate' button to calibrate sensor through the electronics. See Figure 2.17

Comment

Some comment to describe the calibration of the Shock Length Sensor. Click on the 'Load Date' button to load the current Time and Date as the comment.

Force Sensor Offset

The offset in the calibration curve for the Force Sensor. In a calibration curve of 'Pres=A*Volts+B', the Offset is the 'B'. Click on the 'Calibrate' button to calibrate sensor through the electronics. See Figure 2.17

Figure 2.17 Definition of Factor and Offset

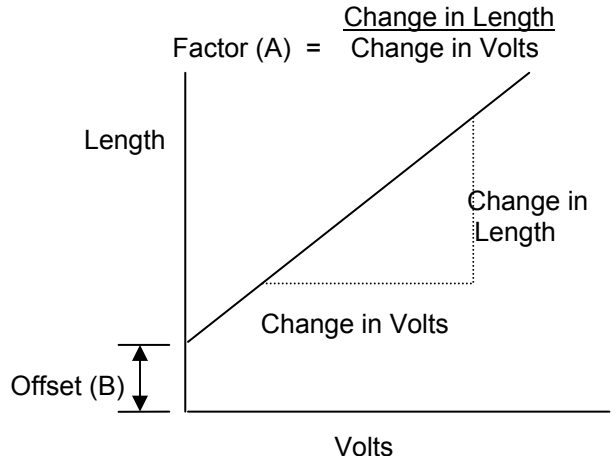
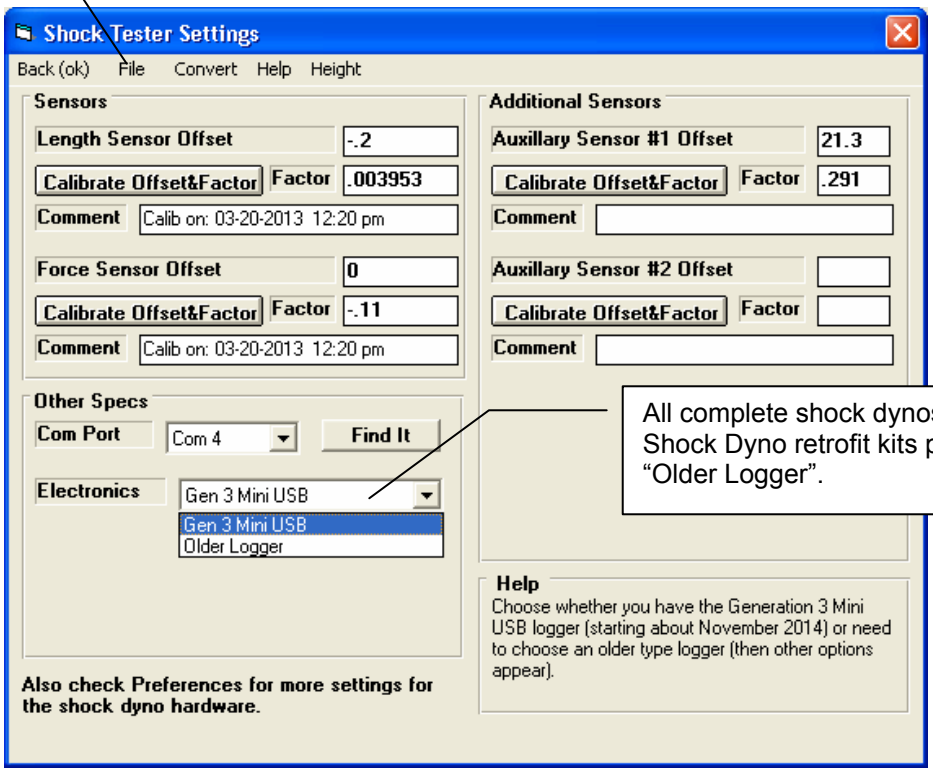


Figure 2.21 Shock Tester Specs Menu (check "Quick Start" paperwork for more details)

Click on File, then:

- Save as My Tester Specs
- Open Master Tester Specs
- Recalculate (lets you recalculate the results if you have made some changes). Note: If you update the calibration numbers, the results will NOT update to match these new numbers.
- Print or Windows Printer Setup to print this screen.



All complete shock dynos will use "Gen 3 Mini USB". Shock Dyno retrofit kits produced before 2015 would use "Older Logger".

Factor

The factor in the calibration curve for the Force Sensor. In a calibration curve of 'Pres=A*Volts+B', the Factor is the 'A'. Click on the 'Calibrate' button to calibrate sensor through the electronics. See Figure 2.17

Comment

Some comment to describe the calibration of the Force Sensor. Click on the 'Load Date' button to load the current Time and Date as the comment. p 161

Auxillary Sensor #1 Offset

This is the offset in the calibration curve for the Auxillary Sensor #1, typically a temperature sensor. In a calibration curve of 'Compression=A*Volts+B', the Offset is the 'B'. Click on the 'Calibrate' button to calibrate sensor through the electronics. See Figure 2.17

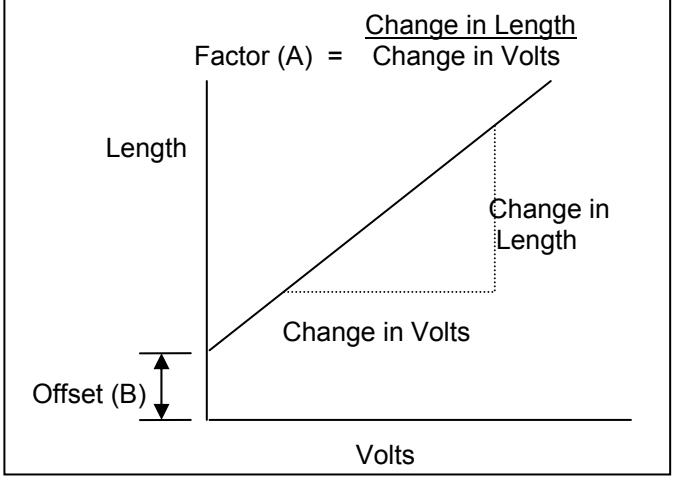
Factor

The factor in the calibration curve for the Auxillary Sensor #1, typically a temperature sensor. In a calibration curve of 'Pres=A*Volts+B', the Factor is the 'A'. Click on the 'Calibrate' button to calibrate sensor through the electronics. See Figure 2.17

Comment

Some comment to describe the calibration of the Auxillary Sensor #1, typically a temperature sensor. Click on the 'Load Date' button to load the current Time and Date as the comment.

Figure 2.17 Definition of Factor and Offset



Other Specs

Com Port

Click on the down arrow button to select computer's COM (serial) port # you are using to 'talk' to the electronics. It is recommended you select 'Let program find it'.

Electronics

Click on the down arrow button to select the type of electronics you are using to read the Shock Tester. For most all cases, you will select **Perf Trends' Gen 2 USB Logger** .

Calibrate Factor & Offset

Click on either of these 2 buttons to perform a calibration. A calibration is required when you first get the tester if it has not been done at Performance Trends. You may also want to check the current calibration if you suspect a problem.

It is strongly recommended that you do NOT recalibrate often. This will often cause more problems than improve data accuracy. If the force sensor does not read 0 (or very close to it) with no Shock on the tester, than use the "Re-Zero Force" option described previously in this section.

Figure 2.19 Calibration Procedure for Length Sensor (spring height sensor)

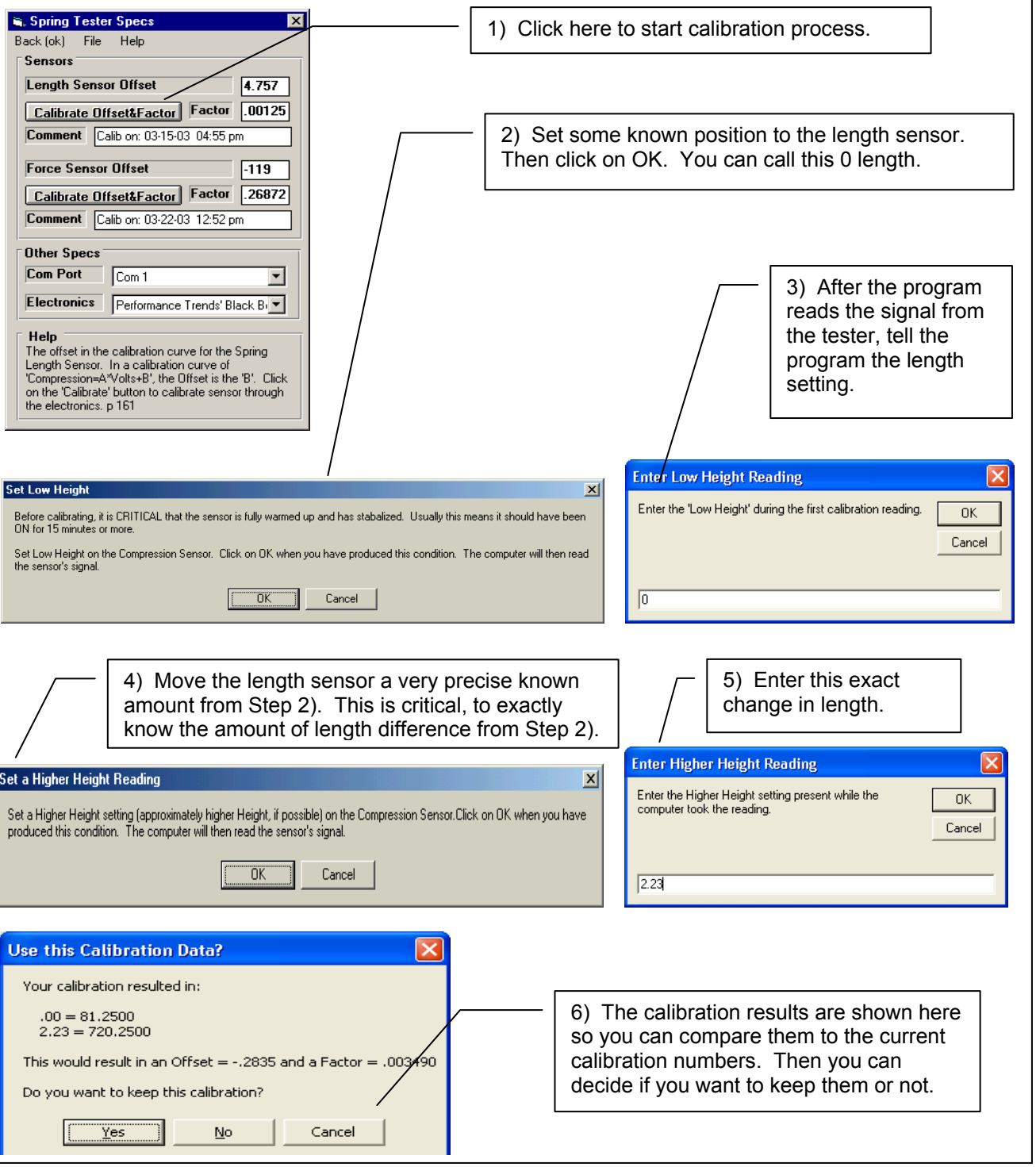


Figure 2.20 Force Calibration Procedure Using a Weight or Measured Force

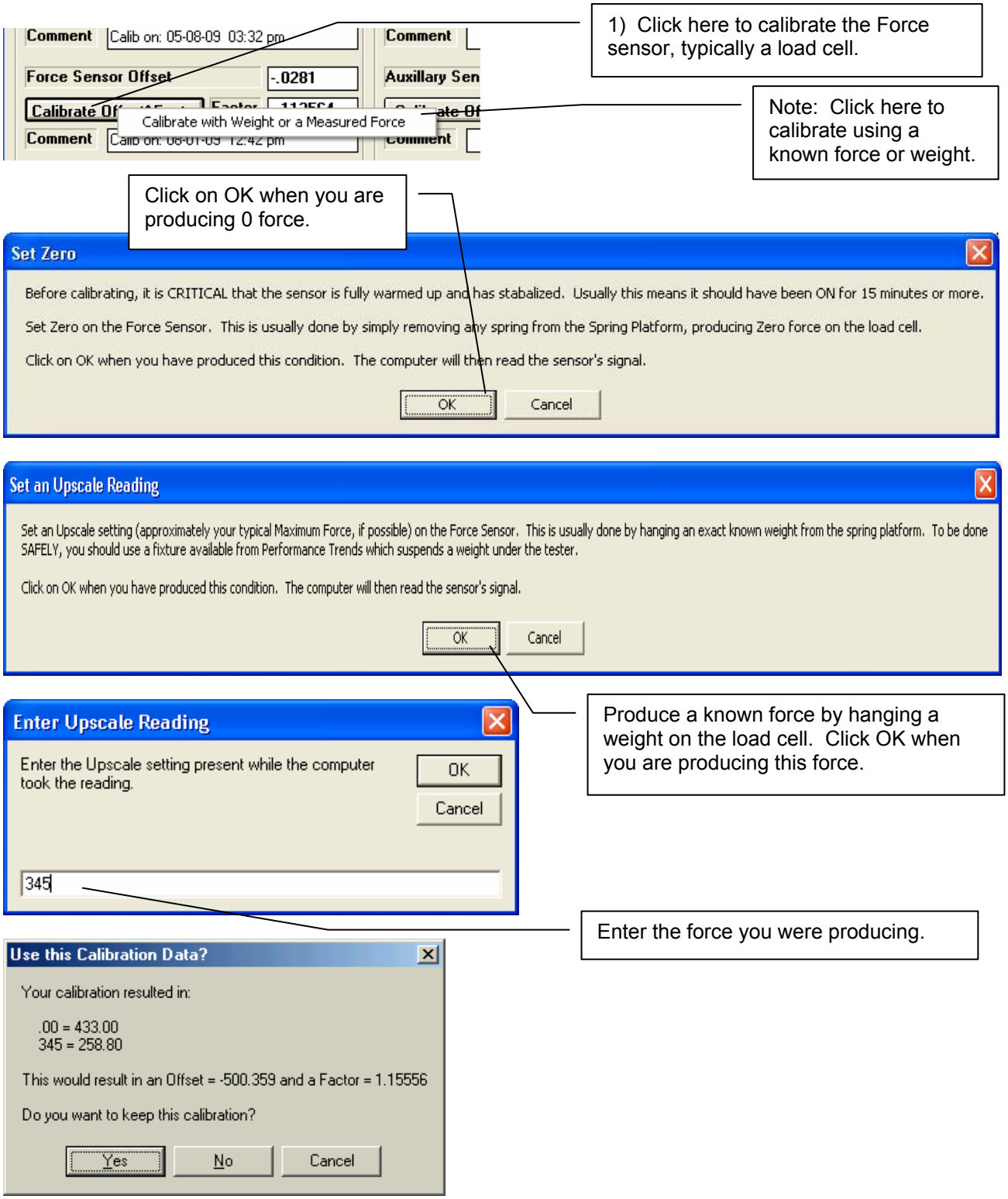
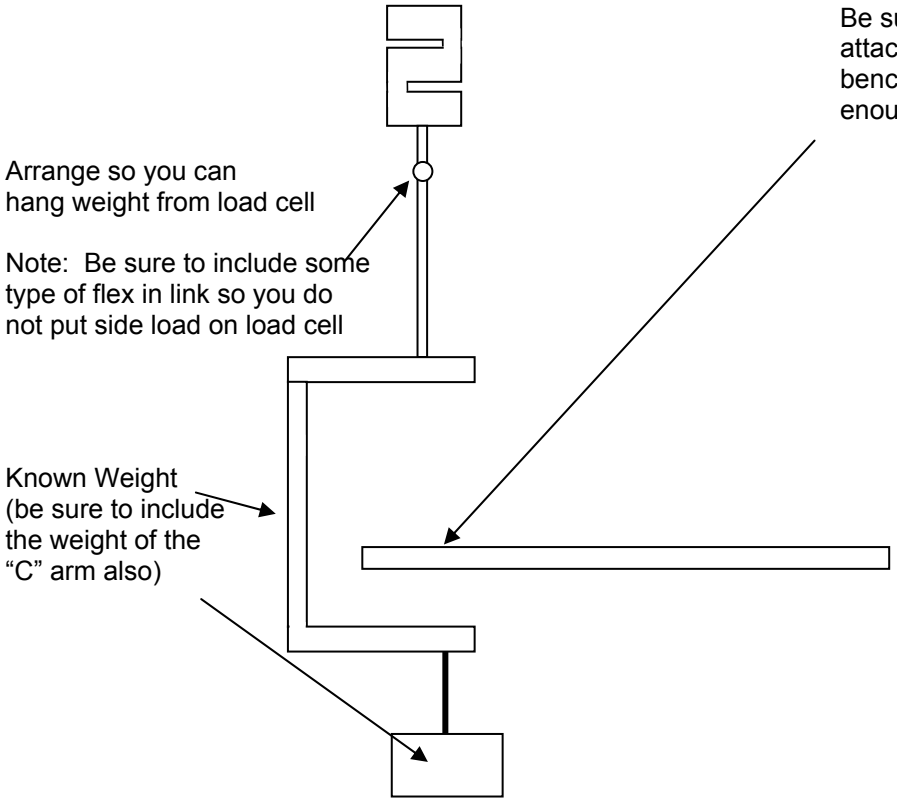


Figure 2.21 Calibrating Force with a Known Weight

This is done much like calibrating the Height sensor. You will need to hang a known weight from the load cell and arrange some method to avoid hitting the dyno itself. Shown here is a "C" arm. You can also do this by moving the load cell off the shock dyno.



IMPORTANT: Check Appendix 3, page 71, New Features in v1.1 C for the most recent changes.

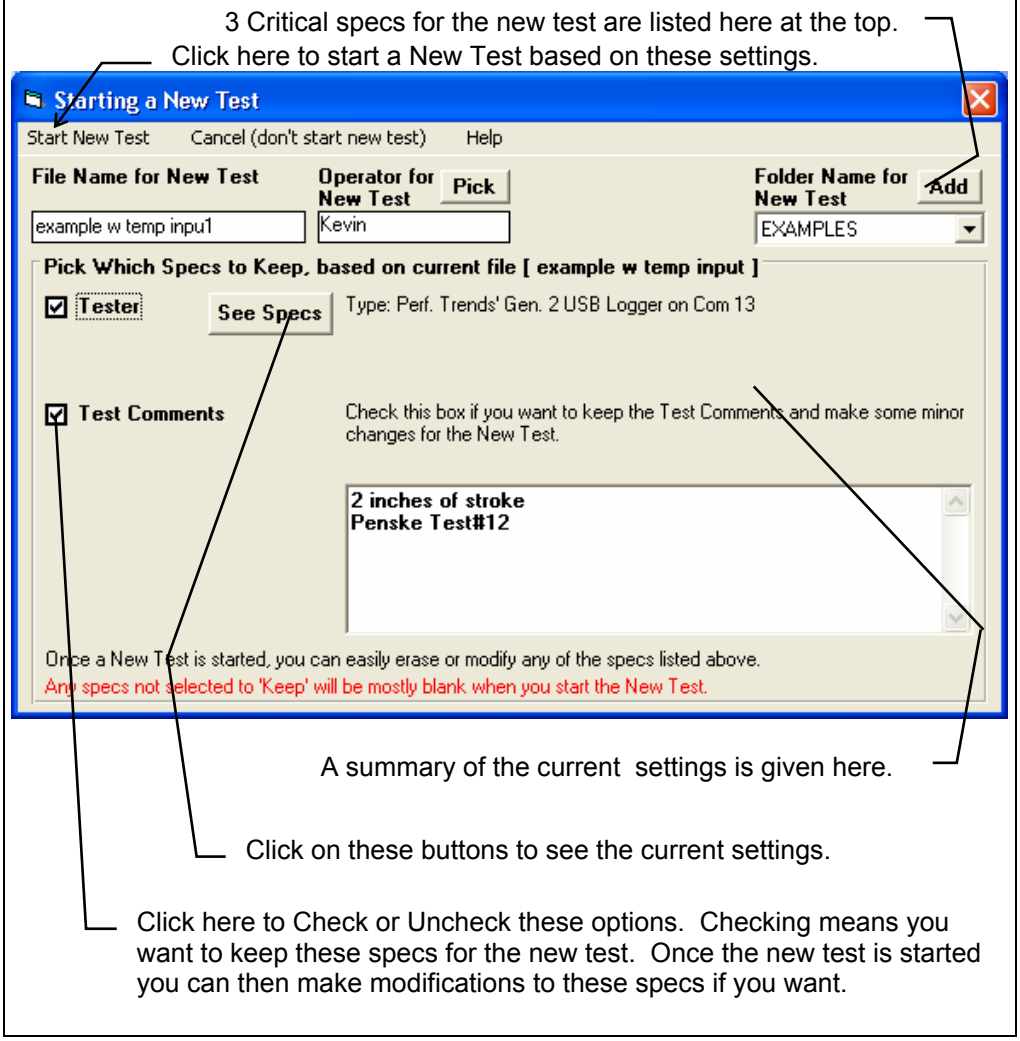
2.6 New Test Menu (starting a new complete test)

The New Test command is available by clicking on File at the top, left of the Main Screen, then selecting New Test. You will then be presented with the screen shown in Figure 2.26. Getting a new test started right is probably the ***most important step in running a Shock test***.

When starting a New Test, it is usually best to first Open a previous test which is similar to the New Test you will be running (similar Shock specs, similar numbering specs, similar limit checks, etc.) This previous test will then be the 'pattern' or 'template' for the New Test and will save you from having to type in many specs to describe this New Test. This also ensures consistency between your tests and reduces the possibility of errors.

If the current test is not a good 'pattern' for this new test (or if there currently is no test displayed), you can abort starting this new test by clicking on 'Cancel (don't start new test)' at the top of the New Test screen. Then click on 'File' at the top, left of the Main Screen and select one of the 'Open' options to open a past test to serve as a pattern.

Figure 2.26 New Test Menu



If you must start with a blank test (which may be the case when you first get this program), or want to modify some specs from the previous test, click on the 'See Specs' buttons for each category of specs. Click on Help at these menus for more info on how to enter these specs.

When you close out these menus, you are brought back to the New Test screen. Be sure to check the check box at the left for all specs you want to use for your new test. ***All*** Categories not checked will be blanked out. Blank specs may cause problems with more detailed analysis, and won't allow you to keep track of important details about the head you are testing.

Most specs in these categories can be changed once the test has started with no problems. This includes specs which simply describe the test and Shocks which do not affect height and force measurements, like Test Options, Test Comments, etc.

However, specs which DO affect height and force measurements like the Shock Tester Calibration specs, are critical to have correct for even the first data point.

Three other critical specs are listed separately at the top:

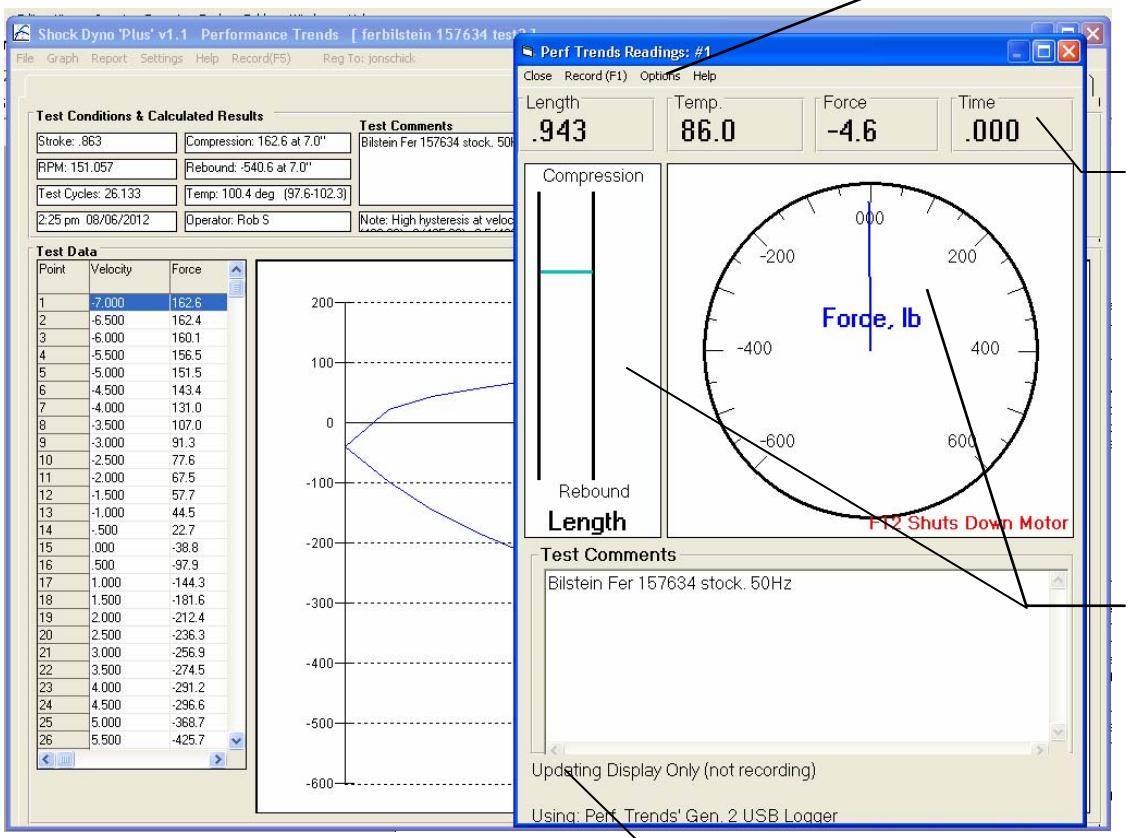
1. File Name for New Test is the file name the program will create for saving the Shock Data for the new test you are starting. The program fills in a default name of the current test name, but incrementing the last digit in the name by 1. You can change this name to most anything you like. The program will warn you if the name entered is not valid and show you what is wrong.
2. Operator for New Test is the name of the operator for this test. Click on Pick to pick an operator name already used or to enter a new name. The program defaults to the operator of the current test.
3. Folder Name for New Test is the folder in the ShockData folder where the test will be saved. The program may not be using the name 'folder' for this spec, but whatever word you have assigned in the Preferences menu at the Main Screen. The folder name 'Examples' is reserved for Performance Trends example tests supplied with the program, and can ***NOT*** be used for your tests.

When you are ready to start the new test, click on 'Start New Test' at the top of the screen. If some critical specs have not been entered, the program will warn you and ask you for it at that time. The program will fill in the Test Time and Date based on the computer's time and date. This can be changed later by clicking on the Test Time/Date at the Main Screen.

2.7 Recording Electronic Data from Shock Tester (testing a Shock)

This screen shows you the current Shock Tester readings, and lets you automatically record these readings and load them in the Test Data grid. Each time data is recorded, critical Shock Data like Compression Force, Rebound Force are recalculated and displayed on the Main Screen (behind this screen).

Figure 2.27 Screen for Reading Electronics



The gauges show the Shock Length and Force readings. The scales for these gauges can be changed by clicking on 'Options', and then 'Force Gauge Scale' or 'Maximum/Minimum Shock Heights'.

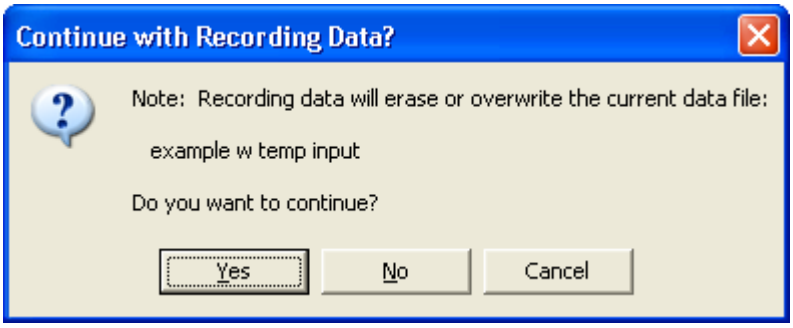
Shock Force should read very close to zero with no Shock in the tester. If this is not the case, you can 'Re-Zero' the force sensor without doing a full calibration by clicking on Options, then Rezero Force.

You can resize this screen by placing the mouse pointer over an edge of this screen to get the 'double arrow' pointer, then holding the mouse arrow down and dragging the edge to a new location. You can also reposition this screen by clicking (and

holding the mouse button down) on the title bar at the top of this screen (typically blue) and dragging this screen to a new location, then releasing the mouse button. The new screen size and position are used each time this screen is re-opened.

Test Procedure

When you first enter the Recording screen, you are warned that the current tests data will be overwritten by any new data you record. If you have not saved the data for the current test, you should save it choose No to return to the Main Screen and then save this data.



When in the Recording screen, you can watch all the current readings to check that they are reading correctly.

Turn on the motor for the shock dyno to get readings as the shock is cycling.

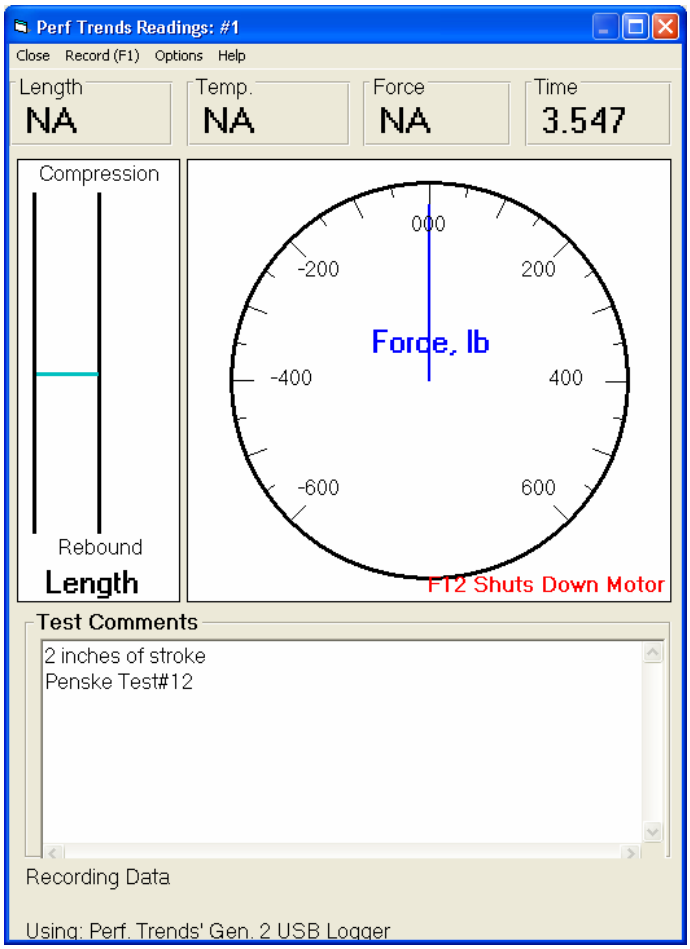
If you have a Retrofit kit ***without*** a motor relay, you will start manually, with some switch on your motor.

If you have Performance Trend's shock dyno, or you have a Retrofit kit ***with*** a motor relay, you will start the motor with the computer command Shift-F7 (press and release the F7 key while holding down the Shift key). We purposely picked these 2 keys to ensure both of your hands are on the computer keyboard. That is to ensure your hands are away from the motor, dyno and shock, to reduce risk of injury.

Once you do the Shift-F7 command, the confirmation message below appears to further confirm it is safe to start the motor. Click Yes to start the motor.

Important: When working with the Shock Dyno, as with most any motorized machinery, you must use proper safety precautions. This includes wearing safety goggles, keeping gaurds in place, keeping hands and fingers out of moving parts, and following all safety precautions and warning labels. Because the software may control the starting of the motor, **ALWAYS assume the motor could start unexpectedly**. Make sure the motor has no power when working on the shock absorber and dyno.

Once the dyno starts cycling the shock, you can press the <F1> key to start the recording of data. In the Plus version, if you are using a temperature sensor, you can select a particular temperature to start recording data. (This is discussed later in this section.) If that is the case, the program will wait until the shock reaches that temperature before starting it's recording cycle.



Once recording starts, you will see the timer start in the upper right corner. The testing cycle will stop when the timer reaches the Cycle Time set in the Preferences screen. You can stop it earlier than that by pressing the <F2> key.

When the test cycle stops and recording stops, the motor will turn off if you have a motor control relay. The recording screen will close and you will return to the Main Screen with the results.

As the recording screen shows, you can press the <F12> key to stop the motor at any time. NOTE: It is best to tap the <F12> key several times, because the computer is VERY busy when data is being recorded. The program may not "see" the first press of the <F12> key.

Menu Commands

Close

Click this option to close this menu and return to the Main Screen.

Record (F1)

Click this option or press the <F1> key to start recording data. Once you press this, compress the Shock and then release the Shock. Recording will automatically stop when you return the Shock tester handle to approximately its starting location. If recording does not automatically start, press <F2>. See Stop Recording below.

Stop Recording (F2)

Click this option or press the <F2> key to stop recording data. Normally, recording stops when you return the Shock tester to its starting position. If this does not happen for some reason, use this option.

Options

Print

Click on this to print the current screen.

Print Setup

Click on this to bring up the Windows Printer Setup screen to choose various printer options.

Manually Save Screen Dimensions

If you adjust the size and location of this screen, and the program is not "remembering" the size and location, click on this option to force the program to save these specs.

Readings for Debugging

Use this option only if directed to do so by a Performance Trends technician.

Re-Zero Force Readings

Electronics are prone to minor changes (or drift) over time or through temperature changes, etc. This is most obvious when you have no Shock on the tester, but the updating force reading is not reading ***exactly*** 0.0. Rather than doing a complete calibration of the system, you can simply re-zero the force reading by clicking on this option. The program will tell you to remove the Shock and wait for the force sensor to stabilize. Then click a button and the program will reset the zero force reading.

Note: Because the force sensor is so sensitive, the updating display will never read a constant 0 when there is no Shock. However, when force is correctly zeroed, you should see about the same amount of negative readings as positive readings.

Before re-zeroing, you should try to press lightly on the tester platform to see if there is any "stiction" causing hang up in the testers force sensor. If pressing and releasing always brings up a completely different reading, there would be appear to be some type of "hang-up" in the force sensor.

Eliminate Re-Zero Correction

Click on this option if you want to eliminate any Re-Zeroing effect on the Force sensor. The program will now convert voltage from the electronics exactly as you originally calibrated it.

Display ...

These "Display" commands are of little value to the user. There are used primarily by Performance Trends technicians to troubleshoot communications problems.

Force Gauge Scale

Click on this to select the range for the force gauge, from 0-300 up to 0-1800.

Maximum Shock Height

Click on this to enter the highest Shock height that will be displayed on the Height Bar Graph.

Minimum Shock Height

Click on this to enter the lowest Shock height that will be displayed on the Height Bar Graph.

Shock Dyno

Motor Control Options

Motor On Safe

Click on this to turn on the motor.

Motor Off <F12>

Click on this to turn off the motor, the same as pressing the <F12> key.

Start Recording Options

Start Recording Immediately

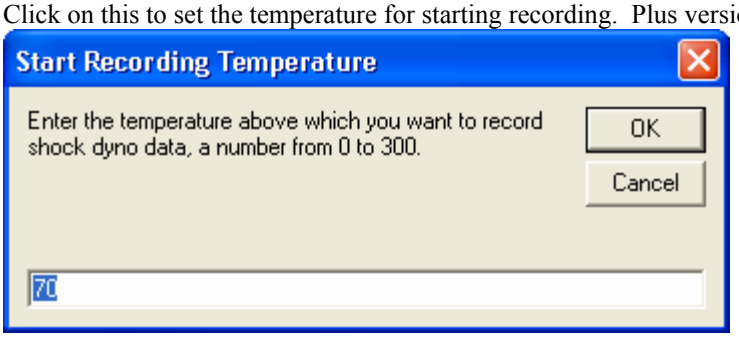
Click on this to set the mode where the recording starts immediately after pressing the <F1> key.

Start When up to Temperature

Click on this to set the mode where the recording starts only when the shock gets up to a predetermined temperature. Plus version only.

Set Start Temperature

Click on this to set the temperature for starting recording. Plus version only.



Graphing

Show Graph

Click on this to turn on "real time" graphing, so you can see immediately how this current test is comparing to the previous test. This lets you spot problems before running the entire test. Plus version only.

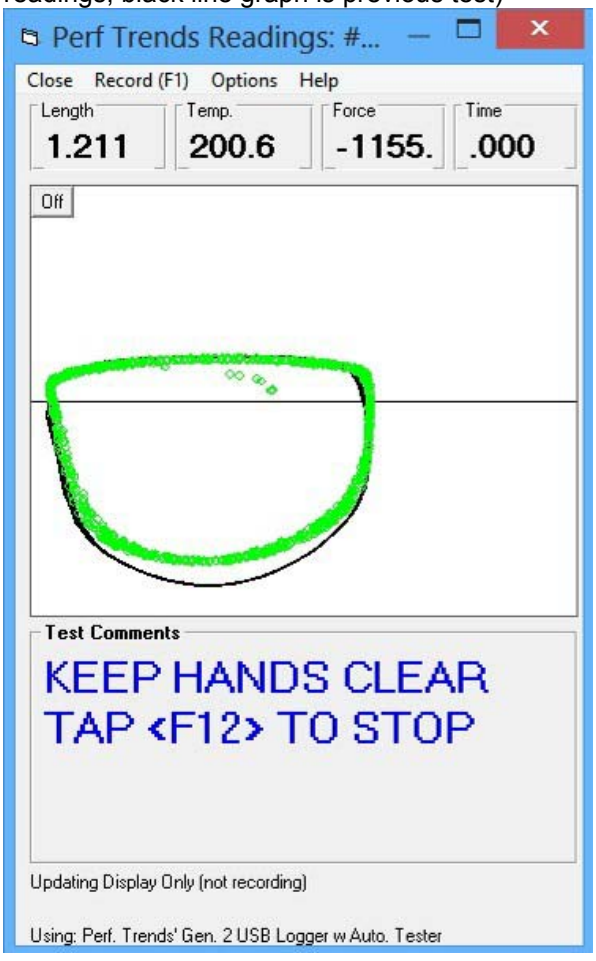
Hide Graph

Click on this to turn off the Graph. Plus version only.

Help

Brings up "on screen" help.

Real Time Graph (green dots show current readings, black line graph is previous test)



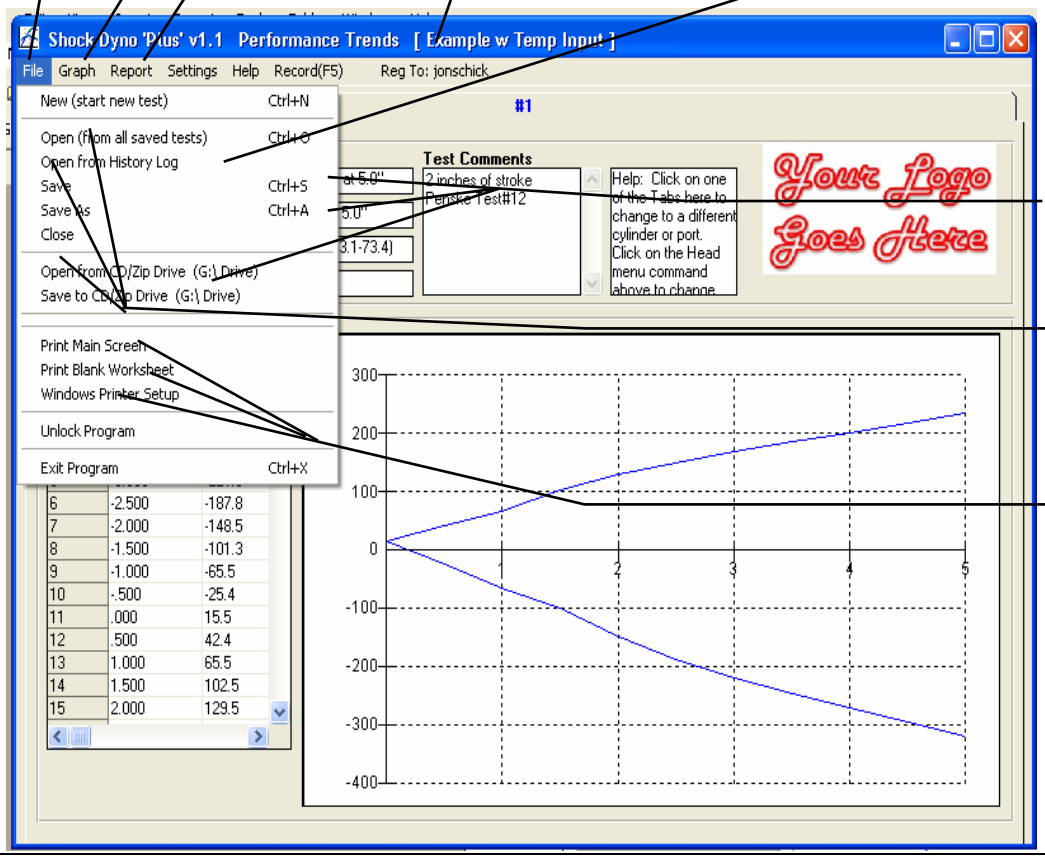
Chapter 3 Output

The Shock Dyno provides several ways to view and output the test results for a complete test, including:

- Reports of tabular data displayed on the screen
- ASCII files for importing results to other software packages
- High resolution graphs
- Printer output of reports or graphs
- History Log (chronological list of test most currently worked with)
- Data Libraries for recording flow test data (or sets of Test Options) for later use.

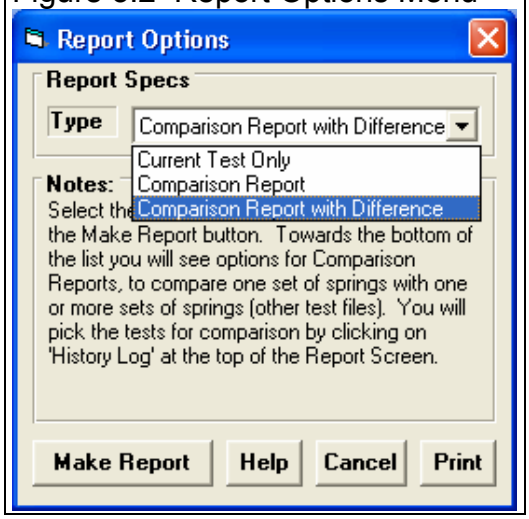
All these topics will be covered in this chapter. Figure 3.1 shows how to reach all these various features.

Figure 3.1 Various Output Options from the Test Results Screen



3.1 Reports

Figure 3.2 Report Options Menu



Click on the Report menu command at the Main Screen to be presented with the Report Options Menu shown in Figure 3.2. The inputs in this menu are described below.

Type

Several types of reports can be picked by clicking on the down arrow key of this combo box. Reports can be for Intake and Exhaust Shocks, just Intake Shocks, or just Exhaust Shocks. Report Types basically fall into 4 categories:

1. Std (standard) report, which includes the Data Types of: Shock Rate, Open Force, Open Height, Seated Force, Seated Height, Non Linear %, Bind Height, Clearance and Ht for Force for each Shock.
2. Time report, which includes the Data Types of: Shock Rate, Open Force, Seated Force, Bind Height, Clearance, Open Vel, Close Vel, Cycle Time for each Shock.
3. Comparison Std (standard) Reports showing side by side comparisons of data included in a Std Report for 2 or more tests. You can also choose Comparison Std + Difference which will include the difference between the 'Baseline' test (the current test) and those you included in the comparison. You choose which tests to include in the comparison by clicking on History Log at the top of the screen and putting a 'Yes in the 'Report?' column.
4. Force vs Height Details showing the Shock Force at various Shock heights for all Shocks side by side.

If you have selected that the intake and exhaust Shocks are to use the same specs in Test Options, then intake and exhaust Shocks are listed together. Otherwise, the intake Shocks are listed first and the exhaust Shocks are listed second.

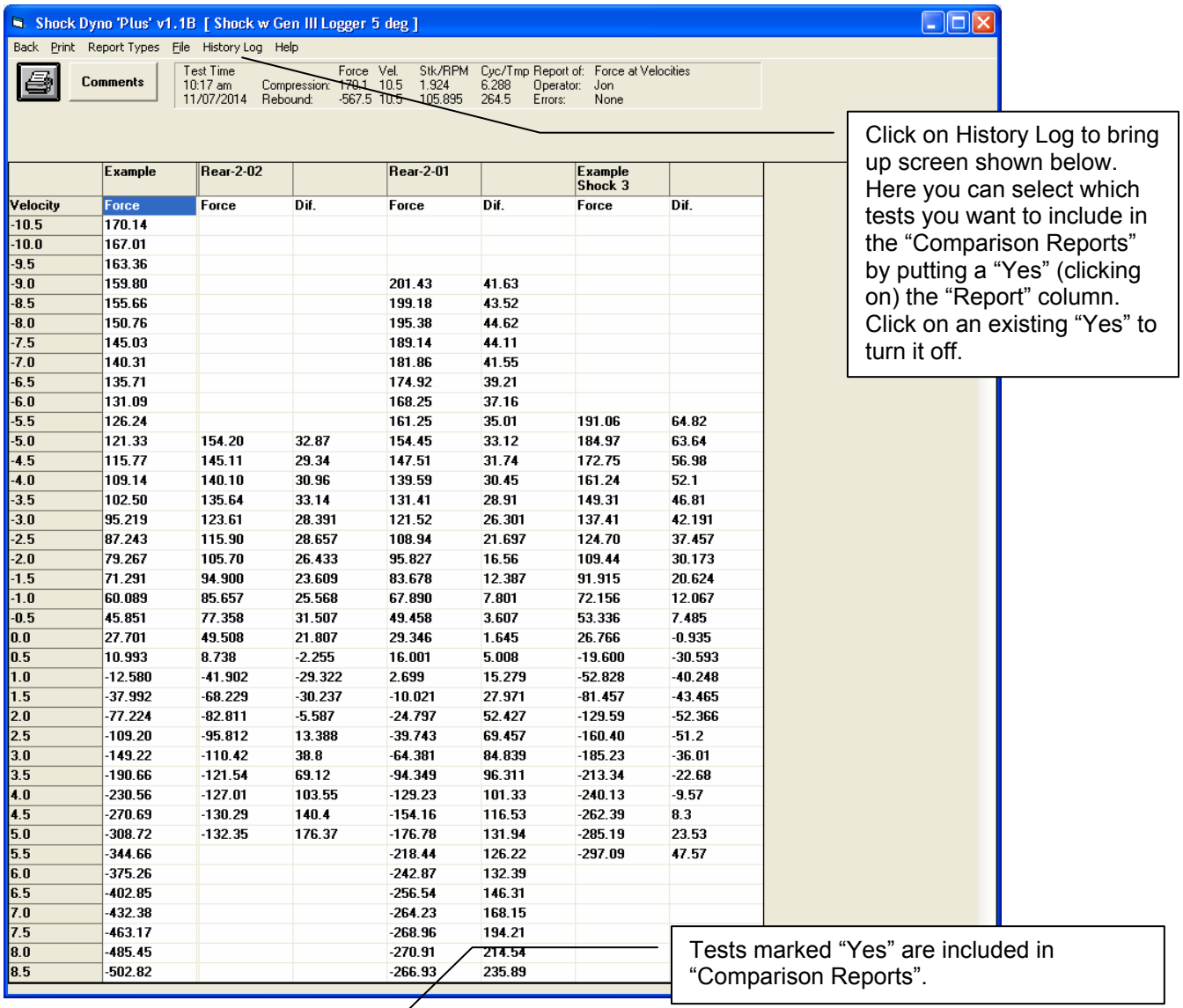
Definitions of Data Types:

Velocity is the shock velocity, typically in inches/second for English units..

Force is the force at each particular velocity .

IMPORTANT: Check Appendix 3, page 71, New Features in v1.1 C for the most recent changes.

Figure 3.5 Report showing 3 shocks and the amount of difference in force at the same velocities. (Note that the program aligns the data to compare at equal velocities, even though the shocks were not tested at the same velocities.)



	Example	Rear-2-02		Rear-2-01		Example Shock 3	
Velocity	Force	Force	Dif.	Force	Dif.	Force	Dif.
-10.5	170.14						
-10.0	167.01						
-9.5	163.36						
-9.0	159.80			201.43	41.63		
-8.5	155.66			199.18	43.52		
-8.0	150.76			195.38	44.62		
-7.5	145.03			189.14	44.11		
-7.0	140.31			181.86	41.55		
-6.5	135.71			174.92	39.21		
-6.0	131.09			168.25	37.16		
-5.5	126.24			161.25	35.01	191.06	64.82
-5.0	121.33	154.20	32.87	154.45	33.12	184.97	63.64
-4.5	115.77	145.11	29.34	147.51	31.74	172.75	56.98
-4.0	109.14	140.10	30.96	139.59	30.45	161.24	52.1
-3.5	102.50	135.64	33.14	131.41	28.91	149.31	46.81
-3.0	95.219	123.61	28.391	121.52	26.301	137.41	42.191
-2.5	87.243	115.90	28.657	108.94	21.697	124.70	37.457
-2.0	79.267	105.70	26.433	95.827	16.56	109.44	30.173
-1.5	71.291	94.900	23.609	83.678	12.387	91.915	20.624
-1.0	60.089	85.657	25.568	67.890	7.801	72.156	12.067
-0.5	45.851	77.358	31.507	49.458	3.607	53.336	7.485
0.0	27.701	49.508	21.807	29.346	1.645	26.766	-0.935
0.5	10.993	8.738	-2.255	16.001	5.008	-19.600	-30.593
1.0	-12.580	-41.902	-29.322	2.699	15.279	-52.828	-40.248
1.5	-37.992	-68.229	-30.237	-10.021	27.971	-81.457	-43.465
2.0	-77.224	-82.811	-5.587	-24.797	52.427	-129.59	-52.366
2.5	-109.20	-95.812	13.388	-39.743	69.457	-160.40	-51.2
3.0	-149.22	-110.42	38.8	-64.381	84.839	-185.23	-36.01
3.5	-190.66	-121.54	69.12	-94.349	96.311	-213.34	-22.68
4.0	-230.56	-127.01	103.55	-129.23	101.33	-240.13	-9.57
4.5	-270.69	-130.29	140.4	-154.16	116.53	-262.39	8.3
5.0	-308.72	-132.35	176.37	-176.78	131.94	-285.19	23.53
5.5	-344.66			-218.44	126.22	-297.09	47.57
6.0	-375.26			-242.87	132.39		
6.5	-402.85			-256.54	146.31		
7.0	-432.38			-264.23	168.15		
7.5	-463.17			-268.96	194.21		
8.0	-485.45			-270.91	214.54		
8.5	-502.82			-266.93	235.89		

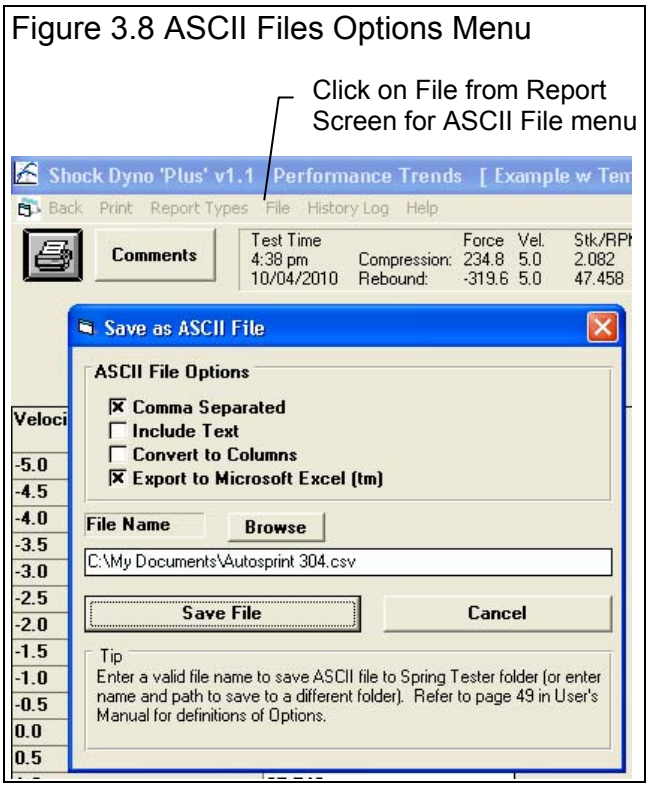
Test File and Path	Report?	Std Report Title	Save?	Stroke	Compression	Test Date	RPM	Rebound	Cycles	Temp
...o\shock w gen iii logger 5 deg	Yes	Example		1.924	170.1 @ 10.5	11/07/2014	105.895	-567.5 @ 10.5	6.288	264.5
...hock data\rob\lancia-rear-2-02	Yes	Rear-2-02		.855	154.2 @ 5.0	01/23/2014	106.472	-132.3 @ 5.0	18.047	55.4
...hock data\rob\lancia-rear-2-04		Lancia-rear-2-04		.891	115.3 @ 2.5	01/23/2014	54.484	-54.2 @ 2.5	8.844	55.6
...hock data\rob\lancia-rear-2-01	Yes	Rear-2-01		.880	201.4 @ 9.0	01/23/2014	191.489	-270.9 @ 9.0	31.117	55.3
...ds shock dyno\j kent 4 pro 8in		J KENT 4 PRO		1.835	115.6 @ 5.5	06/11/2011	58.568	-110.5 @ 5.5	9.488	0.0
...ta\shock dyno\graham green cal		Graham Green cal		2.082	234.8 @ 5.0	10/04/2010	47.458	-319.6 @ 5.0	7.688	73.3
...ta\shock dyno\usb shock dyno 1		USB Shock Dyno			.0 @	05/30/2005		.0 @		

3.2 ASCII Data Files

You may want to use the results from the Shock Tester in other software packages. This could be for additional graph capabilities, statistical analysis, data basing, etc. Once you have created a report (as shown in Section 3.1), click on File to write the results to an ASCII file with a name of your choosing. The ASCII File command is possible any time a report is displayed on the screen.

You can only save the results currently displayed on the Report screen. If you want to write an ASCII file of a test file you have previously run, you must open that test file first, then create a report for that test file (unless you create a comparison report of the current file with this previously run file).

Figure 3.8 ASCII Files Options Menu



ASCII File Options

Comma Separated

Select this option to insert commas between data points. Leave this unchecked for data to be arranged in evenly spaced columns.

Include Text

Select this option to strip out all titles and letters, leaving only numbers.

Convert to Columns

If you do not select this option, data will be written to the file much like it is displayed in the report on the screen. Select this option to have the report turned on its side, that is, the rows will become columns and the columns will become rows.

Export to Microsoft Excel (tm)

Check this if you want the ASCII file you write to open more easily in Microsoft Excel. If you check this, the program will check that you have checked Comma Separated, and have included a ".csv" extension to the end of the file name, which stands for "comma separate variables". Excel automatically recognizes this extension and opens the file more automatically.

You may also want to check Include Text. Though this is not required, it will make the data easier to understand in Excel.

File Name

Enter a file name for saving this ASCII file. Checks are made to ensure what you enter is a valid file name and that you are not overwriting an existing file. The file is written to the Shock Dyno v1.1 folder (directory), the folder which contains the Shock_Dyno.exe program file.

There are certain limitations for file names, including:

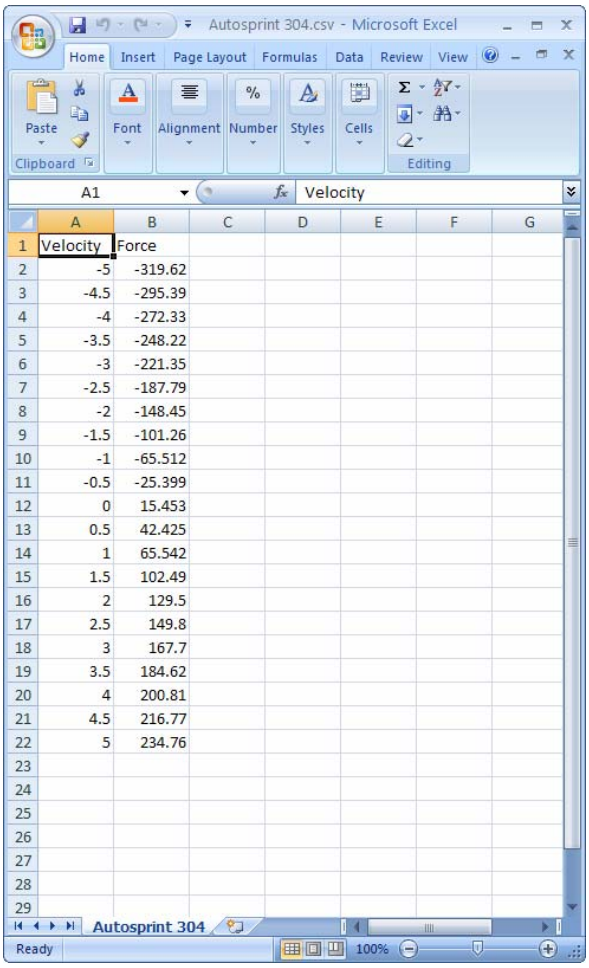
- Names can only be 40 characters long.
- Names can not contain certain characters, like question mark (?), slash (/), etc. The program will warn you if you use an illegal character.

See Section 3.6 for more details on file names

Browse

Click on the Browse button to open a Windows screen to browse your computer to find an existing file. Then you can select to delete it, rename it, choose it for the name of the new file you will save and then edit that name if you want.

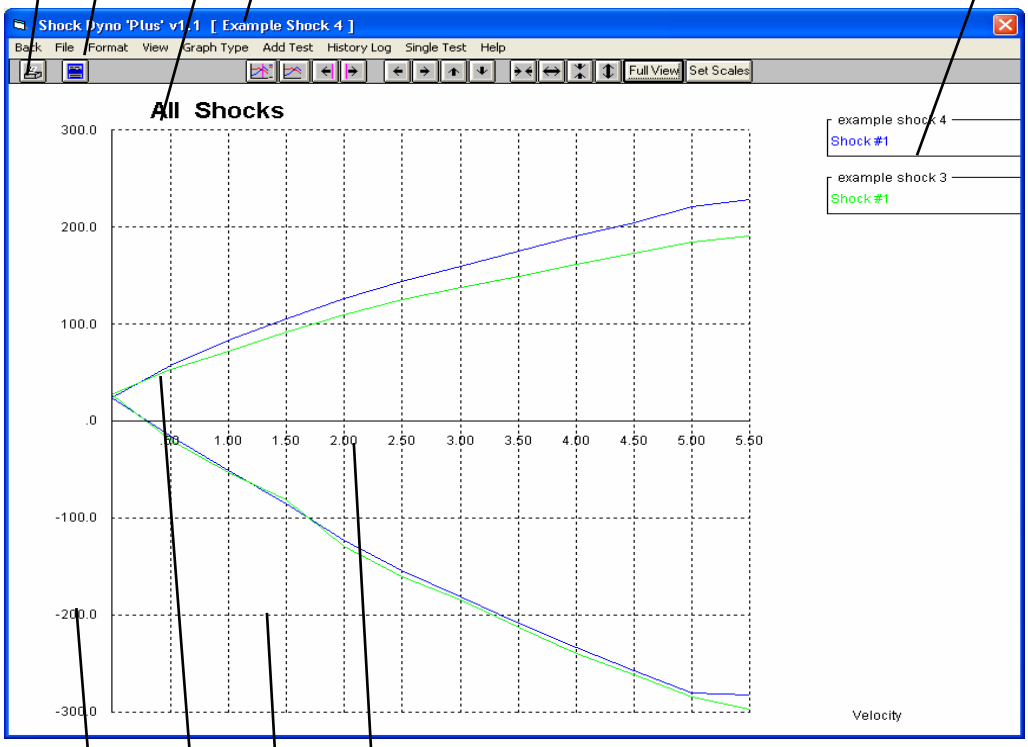
Figure 3.8B Excel File for Comma Separated and Include Text



3.4 Graphs

Graphs are obtained by clicking on the Graph menu command at the top of the Main Screen or clicking on the Summary Graph at the Main Screen. Figure 3.18 shows a typical graph and descriptions of some of the basic graph screen items.

Figure 3.9 Primary Graph Screen Items



Command buttons. Some commands can only be done through these buttons, some of these buttons just provide a graphical button for performing action of some menu items.

Menu bar provides for several graph commands and options.

Graph Title, which can be changed by clicking on Format, then Edit Titles/Legend

Name of current Test File containing all spring data and specs

Graph Legend, which describes the data graphed. This includes Name of the Test Results file, Type of Data, which data goes with which file, if any multiplier is applied to the data. You can also click on Data Type names and the corresponding data line will flash. This is useful to find a particular line when several are graphed. The names in the Legend can be changed by clicking on Format, then Edit Titles/Legend.

Horizontal X axis. The scaling of this axis can be easily changed as described in this section.

Grid lines. The style or elimination of grid lines can be changed by clicking on Format, then Grid Style.

Data graph lines. The style and thickness of these lines can be changed by clicking on Format, then Line Style. Bar Graphs also possible for certain graph types.

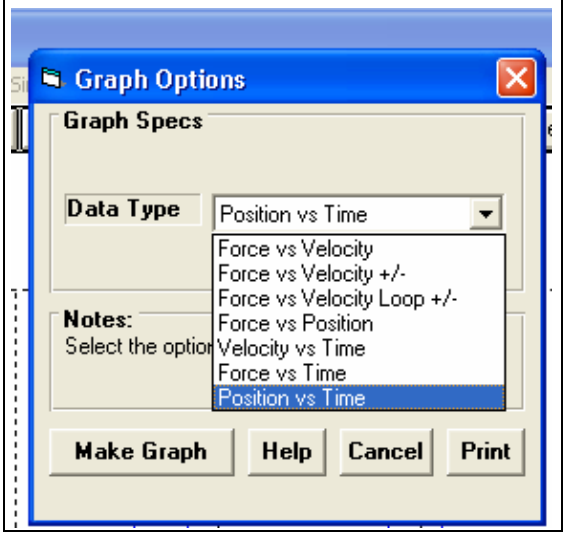
Vertical Y axis. The scaling of this axis can be easily changed as described in this section.

There are 3 basic types of graphs which can be made:

- Force vs Velocity
- Force vs Position (Plus version only)
- Data vs Time (Plus version only)

You determine which type of data you graph by the Graph Type in the Graph Options menu. See Figure 3.10.

Figure 3.10 Graph Options Menu



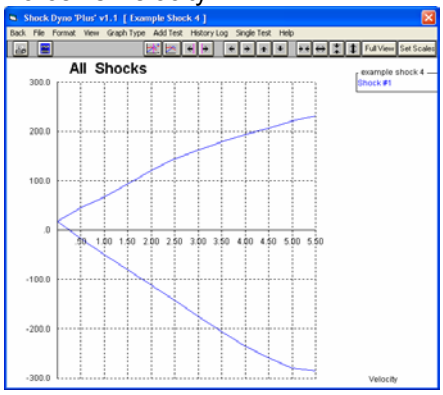
Data Type

You can choose from the following Data Types to graph:

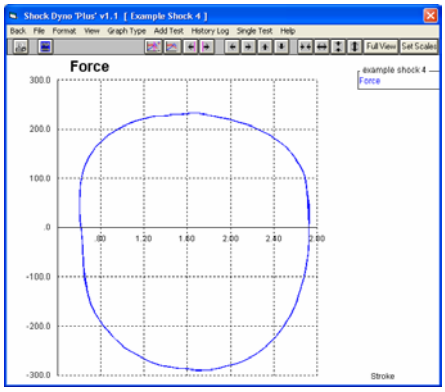
- Force vs Velocity (standard graph for shock data)
- Force vs Velocity +/- (another standard graph, but makes it easier to spot data with graph cursor)
- Force vs Velocity Loop +/- (Plus version only, and shows hysteresis, an advanced term for detailed shock data)
- Force vs Position (Plus version only, and is typically called a "football" or "potato" graph. This graph can also let experienced shock tuners clearly spot problems.)
- Velocity vs Time (Plus version only, typically used for troubleshooting sensors and data quality)
- Force vs Time (Plus version only, typically used for troubleshooting sensors and data quality)
- Position vs Time (Plus version only, typically used for troubleshooting sensors and data quality)

Figure 3.11 Comparison of 3 Categories of Data Type Graphs

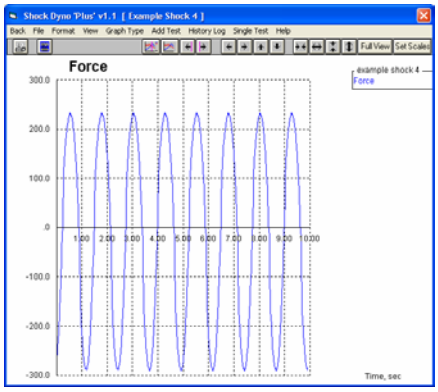
Force vs Velocity



Force vs Position



Data vs Time



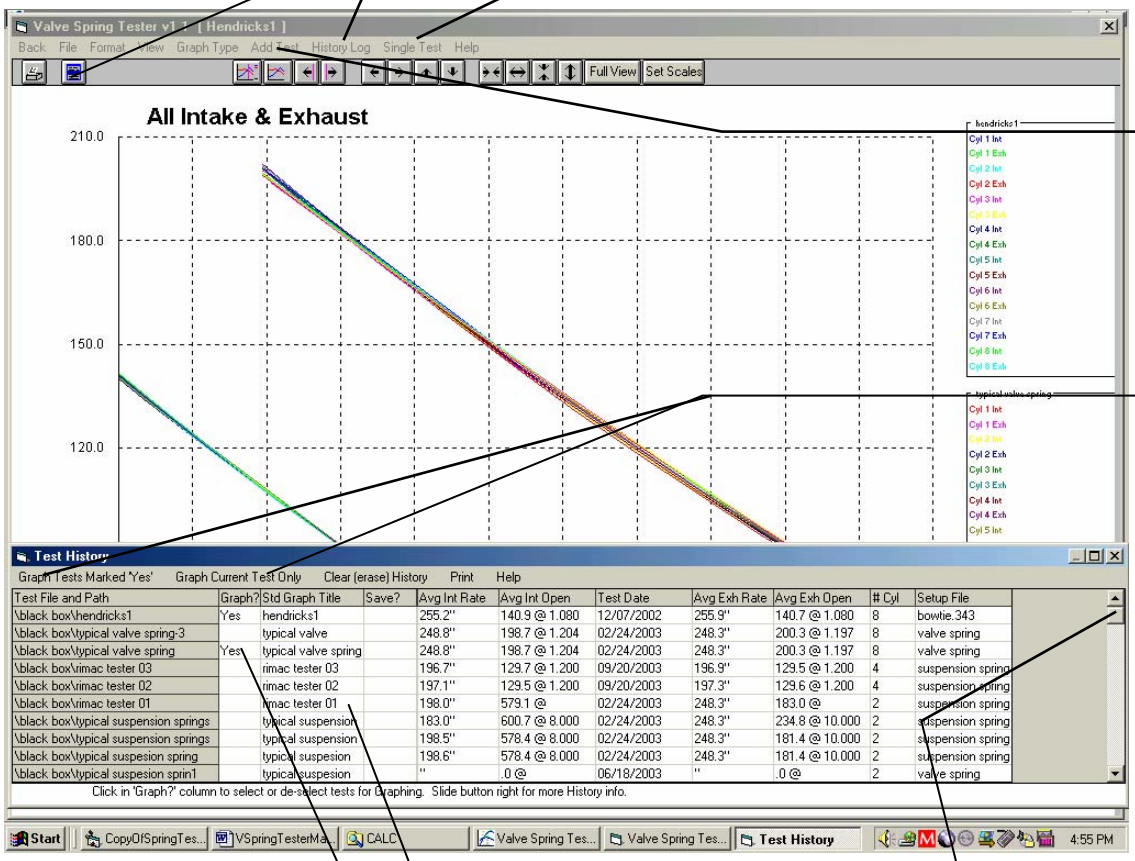
Graphs Comparing More Than 1 Test

There are 3 ways to pick which tests are graphed:

- ***Current test results***. These are the test results of the test file which you are working with on the Main Screen.
- ***Tests marked in the History Log***. These are the test results which you previously graphed, started new, opened, etc. which you have marked "Yes" to graph in the History Log (see Section 3.8).
- ***Add Test*** lets you pick any test from the Test Library to add to the top of the History Log, and mark as a test you want to graph. Since it is at the top of the History Log, it should definitely be included in the next graph.

You can compare data from up to 6 tests, as long as there is room for the Legends (labels) for each graph on the right side of the graph. Usually this ends up being about 48 graph lines, which could be 6 tests with 4 graph lines (for example, Int only for 4 cylinders), or 3 tests with 8 graph lines (for example, Int & Exh for 4 cylinders), etc.

Figure 3.12 History Log (See Section 3.8 for more details.)



Test File and Path	Graph?	Std Graph Title	Save?	Avg Int Rate	Avg Int Open	Test Date	Avg Exh Rate	Avg Exh Open	# Cyl	Setup File
\black box\hendricks1	Yes	hendricks1		255.2"	140.9 @ 1.080	12/07/2002	255.9"	140.7 @ 1.080	8	bowtie.343
\black box\typical valve spring-3		typical valve		248.8"	198.7 @ 1.204	02/24/2003	248.3"	200.3 @ 1.197	8	valve spring
\black box\typical valve spring	Yes	typical valve spring		248.8"	198.7 @ 1.204	02/24/2003	248.3"	200.3 @ 1.197	8	valve spring
\black box\rimac tester 03		rimac tester 03		196.7"	129.7 @ 1.200	09/20/2003	196.9"	129.5 @ 1.200	4	suspension spring
\black box\rimac tester 02		rimac tester 02		197.1"	129.5 @ 1.200	09/20/2003	197.3"	129.6 @ 1.200	4	suspension spring
\black box\rimac tester 01		rimac tester 01		198.0"	579.1 @	02/24/2003	248.3"	183.0 @	2	suspension spring
\black box\typical suspension springs		typical suspension		183.0"	600.7 @ 8.000	02/24/2003	248.3"	234.8 @ 10.000	2	suspension spring
\black box\typical suspension springs		typical suspension		198.5"	578.4 @ 8.000	02/24/2003	248.3"	181.4 @ 10.000	2	suspension spring
\black box\typical suspesion spring		typical suspesion		198.6"	578.4 @ 8.000	02/24/2003	248.3"	181.4 @ 10.000	2	suspension spring
\black box\typical suspesion sprin1		typical suspesion		"	.0 @	06/18/2003	"	.0 @	2	valve spring

Other Graphing Features

The graph screen has several other features, including:

- Printing
- Cursor to pinpoint the value of a particular point on the graph
- Changing titles and legend names
- Changing the scales
- Line Type (format)

These are discussed in this next section.

Printing

Figure 3.13 shows the options for printing graphs and how to access these options. Figure 3.14 shows the screen for changing the Windows Printer Setup. Figure 3.15 shows how you can add information to a graph printout by clicking on Format, then Edit Printed Comments and Data Output.

Figure 3.13 Printing Graphs

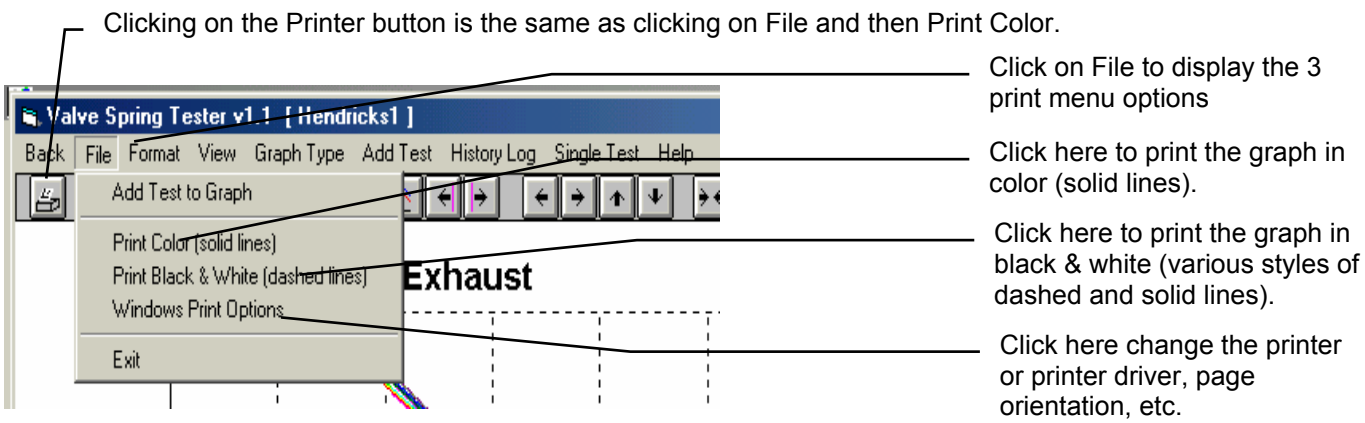


Figure 3.14 Standard Windows Printer Options

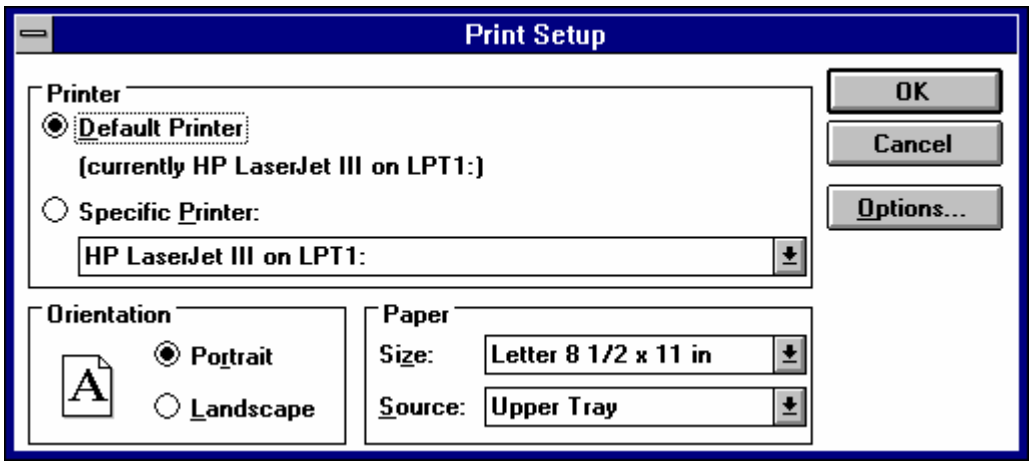
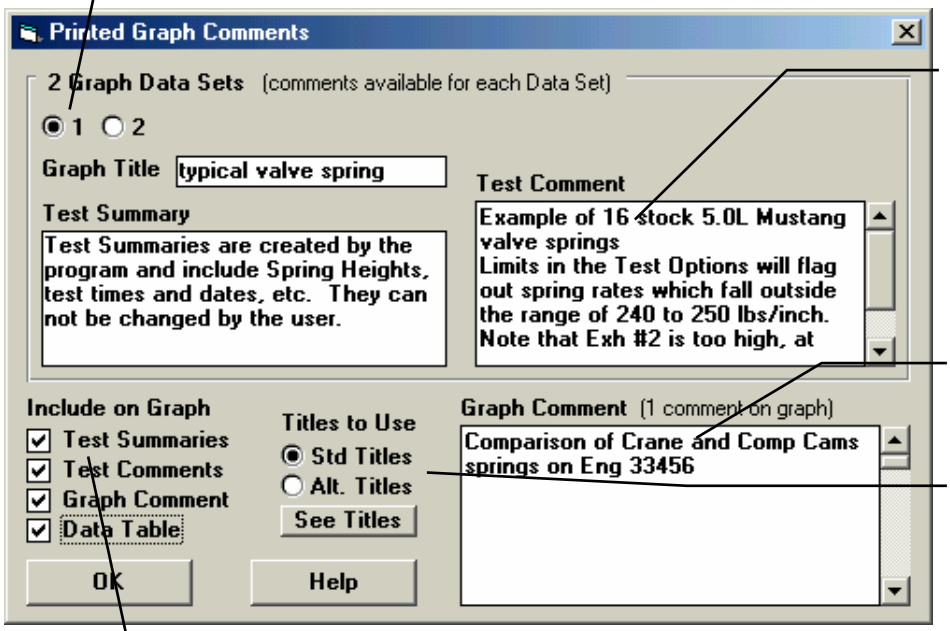
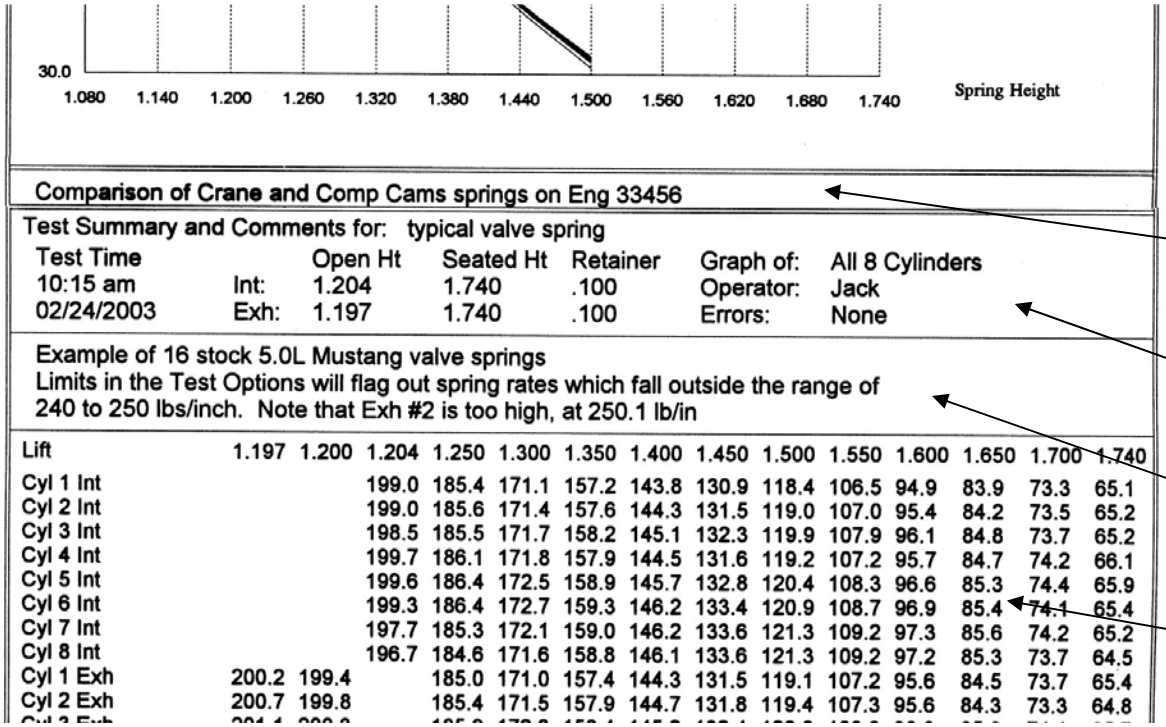


Figure 3.15 Adding Information to a Graph Printout (Most of these options have no effect on the graph on the screen, only the graph that is printed.)

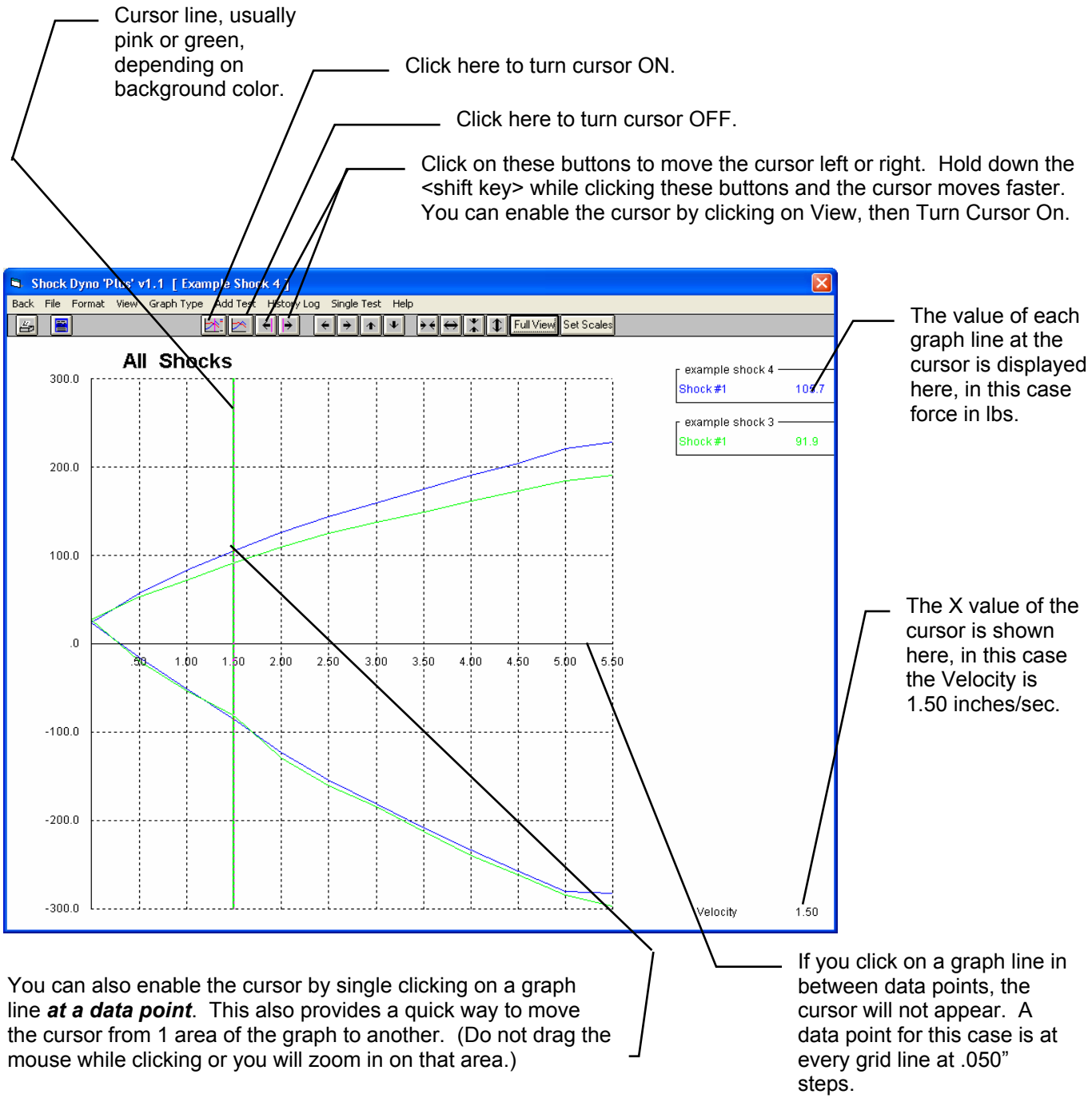




Cursor

The cursor feature is very useful for determining or comparing the value of the graph lines at various places. See Figure 3.25 for explaining the use of the cursor.

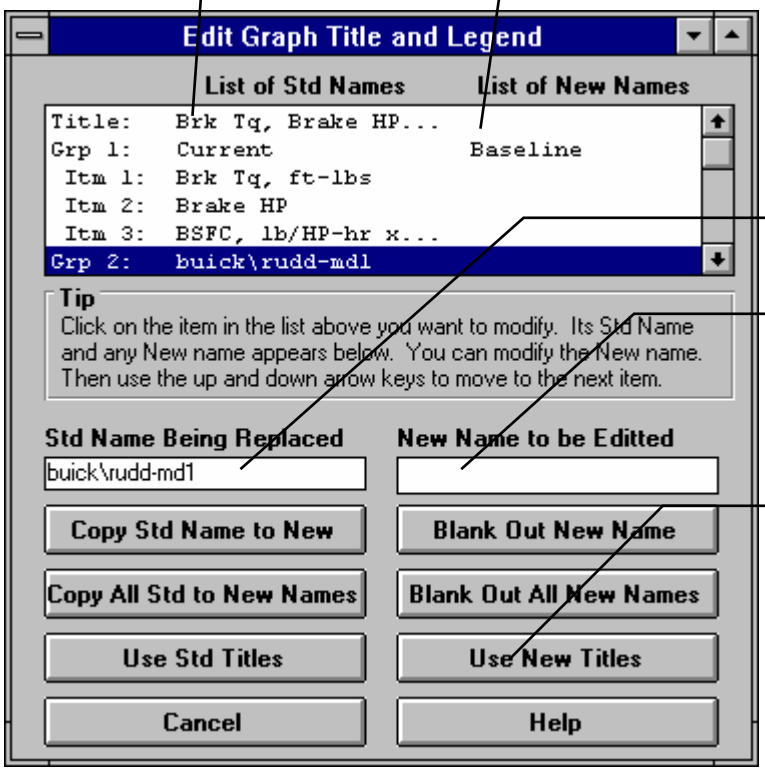
Figure 3.16 Cursor Features and Commands



Changing titles and legend names

Many times you may want to customize a graph by displaying and printing labels of your choice. Click on Format and then Edit Titles/Legend to bring up the menu shown in Figure 3.17 which will allow you to do this.

Figure 3.17 Menu to Edit Title and Legend



This is the list of Standard names the program uses unless you click on the Use New Titles button below. Select (click on) a Standard name you want to change. The Standard Name appears in the edit box, along with the current New name if there is one. ***Once you have selected a name from this list (that row will be highlighted) it is easier to use the up and down arrow keys to select the next item to edit than clicking the item with the mouse.***

This is the list of New names the program will use if you click on Use New Titles. If a title in the List of New Names is blank, the program will use the Standard name.

Standard name from row selected.

New name for you to edit. Other options include clicking on the Copy Std Name to New or Blank Out New Name buttons.

Click here to close this menu and use the New names you have entered. Where New names have been left blank, the Standard name will be used.

Changing the scales

Many times you may want to change the scale of the X or Y axis. This may be to show an area in more detail or to match the scales of a previous graph. The Pro has several ways to change the scales as shown in Figures 3.18 and 3.19.

Figure 3.18 Changing Scales for the X or Y Axis

Clicking on these buttons shifts the graph left, right, up or down. Hold down the shift key while clicking on them and the graph moves farther each step.

Clicking on these buttons zooms in or zooms out on the graph, either vertically or horizontally Hold down the shift key while clicking on them and the graph moves farther each step.

Click here to restore "auto-scaling". That is where the computer picks the scale to show all the graph in good detail.

You can use the mouse to outline an area to be zoomed in on. Simply click on the mouse key in the upper left corner of the area, then hold the key down and drag the mouse to the lower right corner of the desired area. A box will be drawn as shown. When you release the mouse key, this area will fill the whole graph. This feature is disabled if the cursor is turned on. Also, start the upper left corner well away from a graph line or the program may turn on the cursor instead.

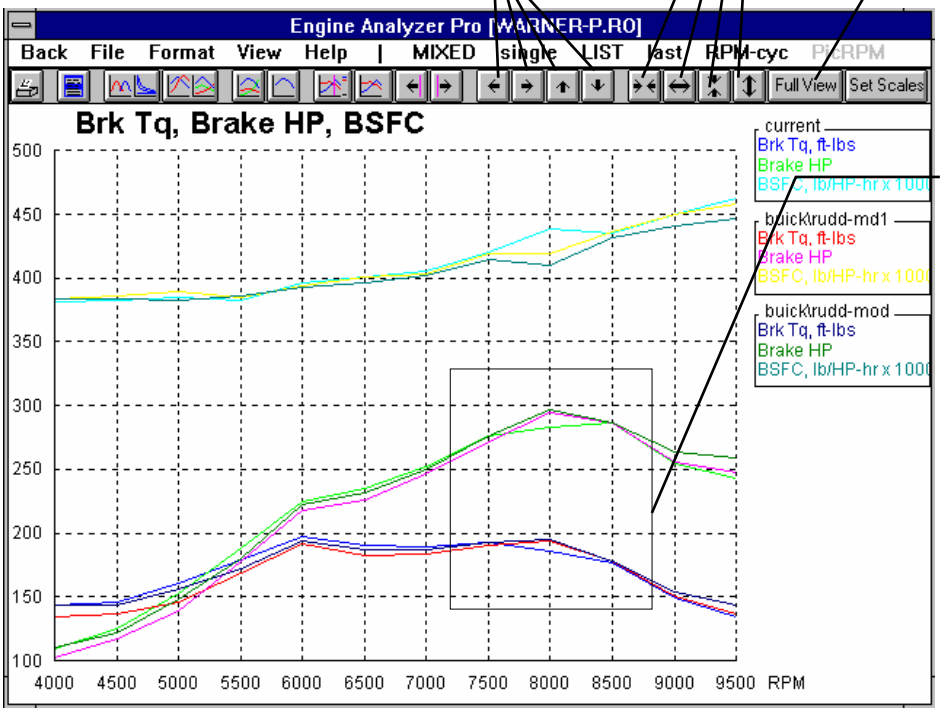


Figure 3.19 Menu to Specify Graph Axes Scales

This menu can be obtained 2 ways. You can click on View in the menu bar then Specify Scales (axes), or click on the Set Scales button, the right most button on the graph screen.

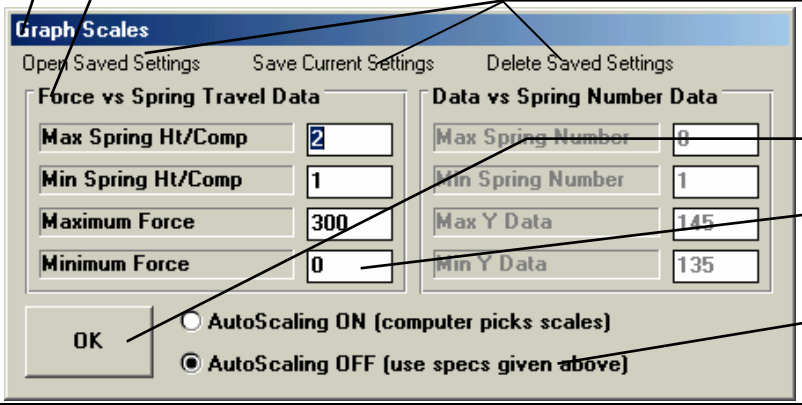
Depending on the type of graph data you currently working with, one of these 2 sections will be enabled.

You can Save these settings for easy recall later, using the Open Saved Settings, or Delete them from Saved settings with Delete.

Click on OK to have the graph redrawn to these new scale

The current scale limits are loaded when this menu opens. Change any or all these to most any value you want.

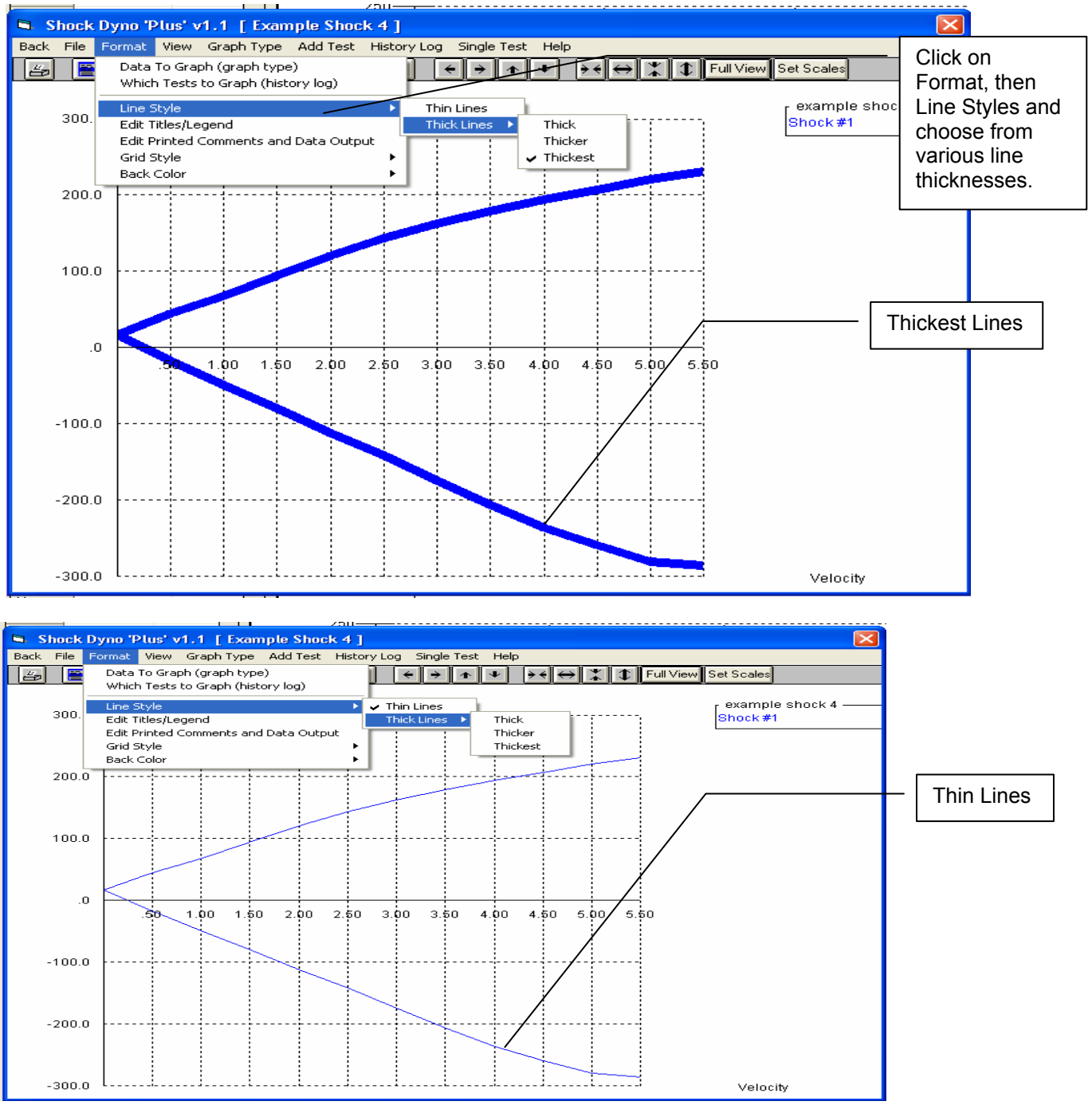
Click the Turn Autoscaling Off button to turn Autoscaling Off to enable changing specs in this menu.



Line Type (format)

For Shock Force vs Height, only Line Graphs are possible, but with different line thicknesses. For graphing results for individual Shocks, line graphs are possible and 2D or 3D bar graphs. See Figure 3.20 below.

Figure 3.20 Alternate Line Types for Graphing Results for Individual Shocks

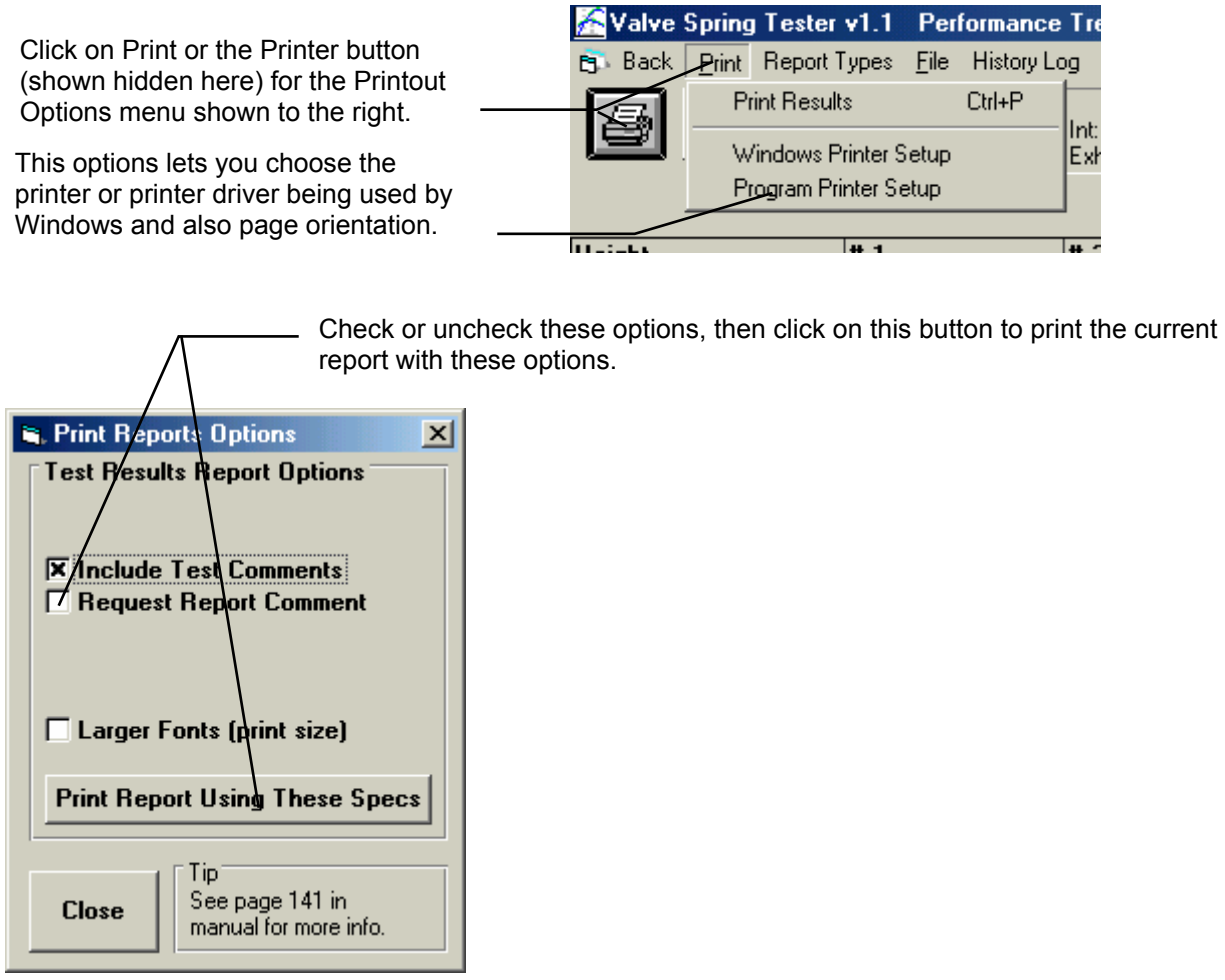


IMPORTANT: Check Appendix 3, page 71, New Features in v1.1 C for the most recent changes.

3.5 Printer Output

The Shock Dyno can print the tabular test results of a report for a permanent hardcopy by clicking on Print in the menu bar or the Printer icon. The menu of options shown in Figure 3.31 will appear. Check the options you want to use for the printout by clicking on any or all of the Option boxes. All options and buttons are discussed in this section.

Figure 3.31 Printer Button and Print Menu Command Options - Report Screen



Test Results Report Options

Include Test Comments

Select this option if you want all the comments for the Test File printed with the results.

Request Report Comment

Select this option if you want to be asked for a comment for each particular report you send to the printer. These "report comments" are useful to identify important points for future reference, like modifications, engine results, etc.

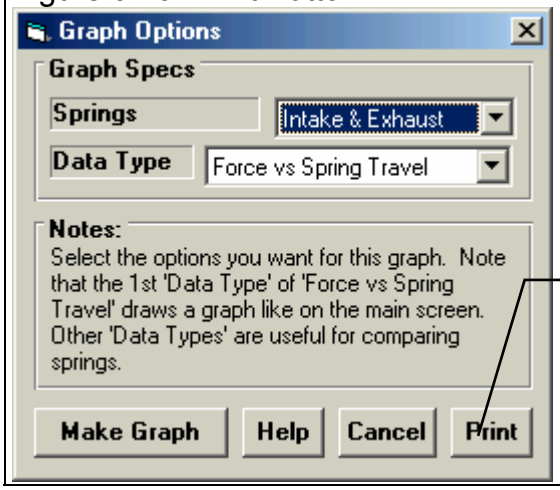
Larger Font (Print Size)

Check this option if your particular printer is printing the results with a small print font. This option will increase the font size for some parts of some reports. Also see Preferences for Selecting Printer Fonts, page 26.

Other Print Options

Other menus have print menu commands or print buttons as shown in Figures 3.22 and 3.23.

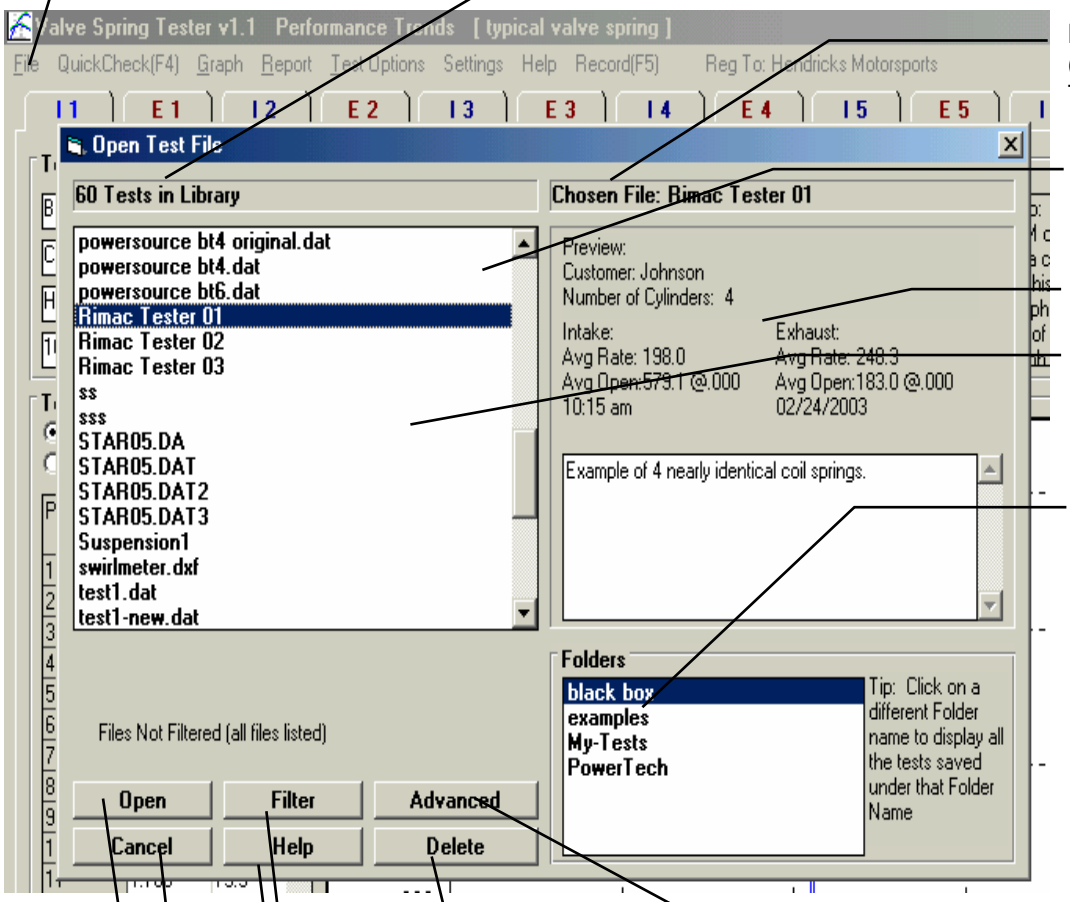
Figure 3.23 Print Button



3.6 Data Libraries

The Shock Dyno allows you to save a set of Shock Data and related specs (Test Options, etc) to the Test File Library under a name of your choosing. You can then open these test files out of the Test File Library in the future for comparison or modification. The Open window is below with explanations.

Figure 3.24 Test Library Options



Open a Test File

To open a test file saved in the Test Library, click on File at the upper left corner of the Main Screen, then on the Open (from all saved tests). You also have an additional option of "Open (from History Log)" which will be discussed in Section 3.8.

You will obtain the window shown on the previous page. Single click on one of the tests in the list, or click and drag the slide button on the right side of the list to display more tests. Once you single click on a test, it is now the Chosen Test File and a preview of the test is given in the Preview section. If the file you chose was not a valid Shock Dyno file, the program will tell you and you can not choose it.

Once a test has been chosen, you can delete it by clicking on the Delete button, or Open it by clicking on the Open button in this window. You can also click on a different test to Preview it or close this window and return to the Main Screen without choosing a new test file.

If you are sure of the test you want to open, you can simply double click on it from the Test List. This opens the test without a preview and closes this menu.

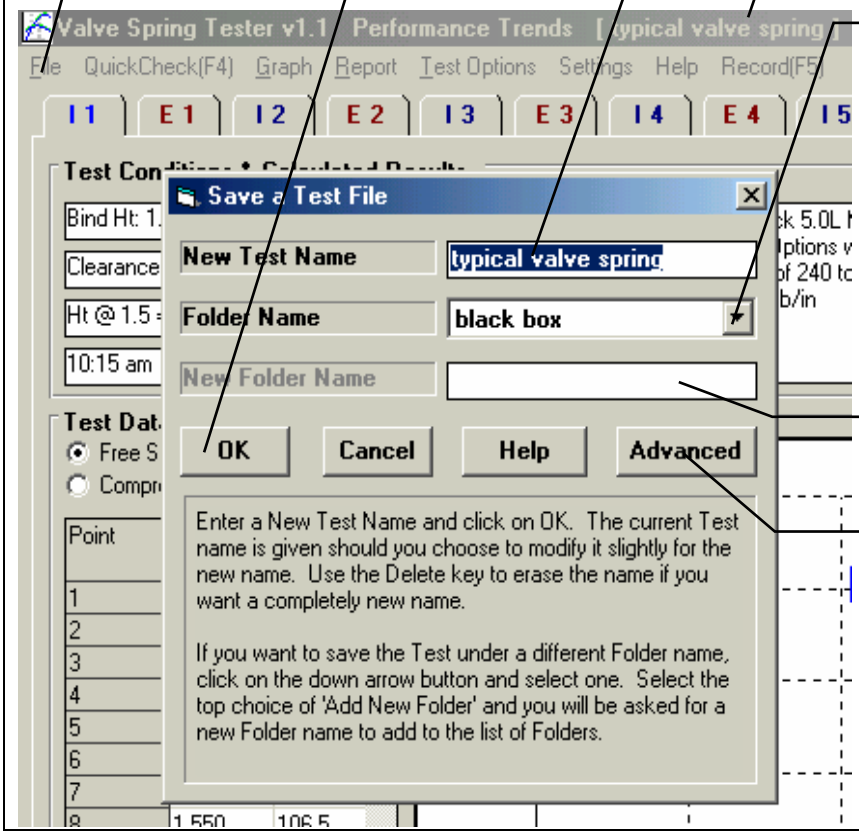
Note: You can also save sets of Test Options to its own separate libraries. This is done very similarly as with the Test Files, except you click on File, then Open from the Test Options menu. See Figure 3.25.

Save a Test File

Before you discuss saving a test file, it is important for you to understand how the program opens and uses test files. When you open a test from the Test Library, you are only using a *copy* of the test. The original test file is kept in the library.

As you make changes to the test, they are only made to this copy. The original file is not changed. If you want to delete your changes, you can simply open a fresh, unchanged copy of the original test file from the Library. If you want to keep your changes, *you must save them*. This can be done by clicking on File, then Save. You are also asked if you want to save your changes whenever you open a new test, and the program has detected you have made changes to the current file.

Figure 3.26 Saving Test File Options



To save a Test File, you will be presented with the Save Window as shown above. The program suggests a new test name which is the same as the current test name shown at the top of the Main Screen. If you want to save your changes to the same name, simply click on OK. This will update the current test file with your latest changes.

If you want to save the current set of test specs with your changes to a new name (and leave the current test file in the Library unchanged), then click on the suggested file name and modify it as you want. For example, in the window shown above, you may want to add -2 to the current name "typical valve Shock" to create "typical valve Shock-2" to indicate this is the 2nd revision of "typical valve Shock". This is the safest way to make changes, because you can always return to an earlier version and see what you had done.

Because the Suspension Analyzer is a 32 bit program (not compatible with the older Windows 3.1), it can use most any type of file name. The names can be up to 50 characters long and can include spaces, and upper case and lower case letters. However, there are certain limitations for file names, as they can ***not*** contain certain characters, like / \ : | > < * ? " . The program will warn you if you use an illegal character.

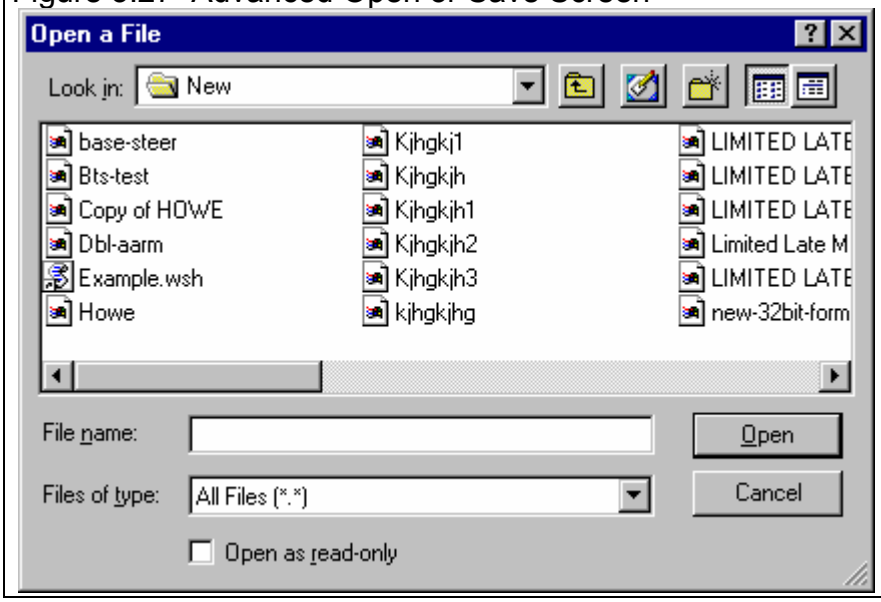
Test files are saved to folders (directories) you have created in the Shock Data folder (directory) in the Shock-V folder (directory) under PERFTRNS.PTI folder (directory). You ***can*** copy Shock Dyno files from programs on other computers to this folder (directory) and they will be found by the program. The Save to Floppy and Open From Floppy commands discussed on page 18 are an alternate, perhaps easier way to copy files from one computer to another.

The method of saving Test Options files is exactly the same as complete Test Files, except that you access the Save menu by clicking on File at the top of these individual menus, as shown in Figure 3.25. These files are saved to the Test Options folders (subdirectories).

Advance Open or Save Screen

If you click on the Advanced button in either the Open or Save As screen, you will obtain the screen shown in Figure 3.27. From here you can access most and file on the computer on most any disk drive.

Figure 3.27 Advanced Open or Save Screen



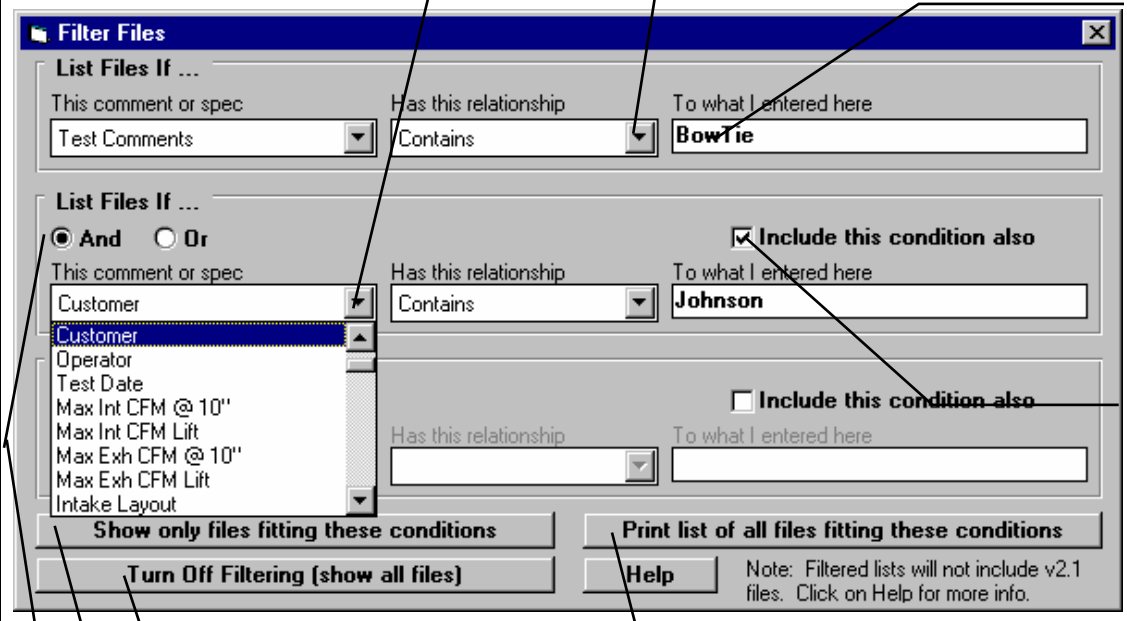
Tips to Advanced Users:

If you have a file from another computer, from another disk (like a floppy) or folder, you can simply copy it into any folder in the Shock Data folder and it will be found by the Shock Tester program. This can be done with a program like Windows Explorer. You can also create new folders (directories) in the Shock Data folder and these will also be used by the Shock Tester program.

3.7 Filter (find) Test Files

The Shock Dyno has a powerful way to search for tests in the Test Library called the Filter Option. Click on the Filter button in the Open Test File menu (Figure 3.24, page 67) to be presented with the screen shown in Figure 3.28 below.

Figure 3.28 Filter Files Menu



Click on the down arrow button to pick the spec or comment to check for a certain condition "Has this relationship".

Click on the down arrow button to pick the condition to look for. These change depending on the spec or comment you have chosen.

Type in (or pick from a list for some specs) the condition to look for. The program treats UPPER and lower case letters the same (bowtie = BOWTIE = BowTie).

Check here to include a 2nd condition. This enables specs in this section.

Click here to produce a report of all files meeting the Filter conditions IN ALL FOLDERS in the SpringData folder (the entire Test Library). This way you can avoid looking in each folder separately and can save time.

Click on this button to return to the File Open menu which will now show ***all test files***.

Click on this button to return to the File Open menu which will now ***only show files which fit the Filter Conditions***.

Select And and the Test Files displayed must fit ***both*** conditions specified. Select Or and the Test Files displayed can fit ***either*** of the conditions specified.

- The settings in this screen will display all test files with the word BowTie (or bowtie or BOWTIE) somewhere in the test comments and with the word Johnson (or johnson or JOHNSON) somewhere in the Customer description (a spec in the Test Options menu).

The Filter Feature is very useful for finding a specific test or to find all the tests which meet a certain set of conditions. For example, say you want to find a test that Operator "Jack" ran for Customer "Smith" on "Big Block Chevy" Shocks. Or, say you are having problems with a certain brand of valve Shocks, where the part # you record in the comments starts with "NAP". Or perhaps you want to find all Small Block Chevy Shocks that measured over 400 lbs at Open Height on the exhaust. In all these cases, the filtering specs would allow you to find the test files.

First you must select the condition you want to look for by clicking on the down arrow button on the 'This comment or spec' box. Your choice of this spec will determine what the 'Has this relationship' options are, and what specs can be entered in the 'To what I enter here' spec.

You can select up to 3 conditions to look for. For the Operator "Jack", Customer "Johnson", "Big Block Chevy" example above, you would need to search for 3 conditions. For the valve seal example, you could just search for 1 condition (look for "NAP" in the test comments). You add conditions by checking the 'Include this condition also' box. This enables the other specs for each condition.

If more than 1 condition is being used for the search, you must determine if you want the search to include tests which fit ANY of the conditions (Or) or must match ALL conditions (And). For example, if you are looking for tests run by either Operator Jack or Operator Joe, you would select "Or". If you want Tests which measured more than 400 lbs at the Open Height on Exhaust ***and*** were done since Jan 1999 (the tests must match both conditions), you would select "And".

The 3 command buttons will do the following:

Show Files Only Fitting These Conditions will return you to the Open Test File screen. Only files fitting these conditions will be displayed (which may be no files in some situations). You can click on various folders (or whatever name you have given to folders in the Preferences menu at the Main Screen) to see if there are any matches in other folders.

Turn Off Filtering (show all files) will return you to the Open Test File screen and now all files will be displayed.

Print List of All Files Fitting These Conditions will search through the entire Test Library (all folders in the ShockData folder) for files matching these conditions and display them in a new screen. From this screen, you can also print the list. This is the quickest way to see which folders may contain test files matching your conditions.

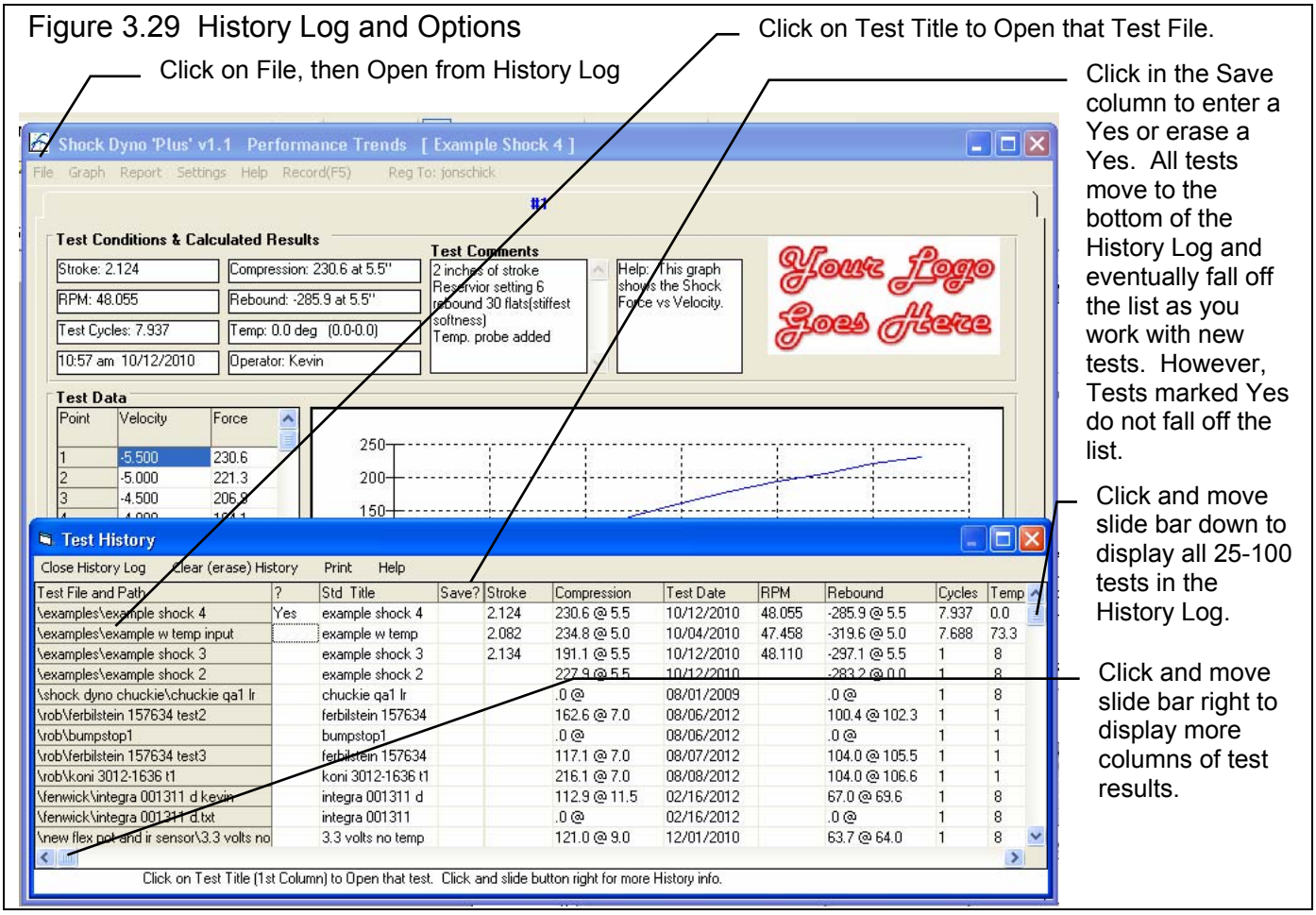
> Tip: When looking for a word, the program doesn't care if it is in CAPITAL (upper case) or small (lower case) letters. In Figure 3.37 above you are looking for the word BowTie in the test comments. The program will display all files which have the word "BowTie" or the word "BOWTIE" or the word "bowtie" or the word "BowTIE" anywhere in the comments. The program will ***not*** find files with the words "Bow Tie" (with a space between Bow and Tie) . Therefore, it may be smarter to just look for the word "bow" to avoid this problem. Note, however, that if you do this, the program will also find tests with the word "elbow" or "crossbow" , for example, in the test comments.

IMPORTANT: Check Appendix 3, page 71, New Features in v1.1 C for the most recent changes.

3.8 History Log

Click on File, then Open form History Log at the Main Screen to obtain the History Log shown below in Figure 3.29. This screen shows a summary of the results for the last 25-100 tests you have worked with (started new, opened, graphed, etc.) The number of tests in the log (25-100) is selectable in the 'Preferences' menu at the Main Screen. When you work with a new test, it is added to the top of the History Log, and (if the Log is full) the last run drops off the bottom of the list. In the Pro Version, the History Log is an alternate way to open tests which have been saved to the Test Library. The advantage of the History Log is it lists the tests you most recently worked with at the top.

Figure 3.29 History Log and Options



From this screen you can open a test file by clicking on the 'Test File and Path' column (first column on the left). If the test file was saved to a standard folder (directory, or whatever you have chosen to call folders in the Preferences menu), the folder name is given first, followed by the test file name.

If a test file has been Opened from or Saved to a non-standard folder (a folder not in the ShockData folder) using the 'Advanced' function, the entire path is given. If the 'Path and File Name' won't fit, it is shortened and preceded by '...'.

You can choose to Save certain results you believe are special and you may want to recall or graph in the future by clicking on the Save column to insert a Yes there. Tests marked Yes to Save eventually move to the bottom of the History Log, but are never dropped off the list or erased until you again click on the Yes to make it blank.

Note that just the Test File Name stays in the History Log. Should you delete the file using the Open (from all saved tests) command, the test file will be deleted. When you try to open it or graph if from the History Log, you will get note saying the file can not be found.

You can print the History Log on a printer by clicking on the 'Print' menu command. Note that the History Log will be most readable when the Page Orientation is in Landscape setting.

History Log at Graph Screen

At the Graph Screen, several options are available to graph selected tests from the History Log, and change the Graph Titles. You can obtain the History Log by clicking on the menu command History Log at the top of the Graph Screen. The History Log is how you graph different tests together for comparison. From this screen you can:

- Choose to Graph certain Test Results by clicking on the Graph column to insert a Yes there. Tests marked Yes to Graph will be graphed when you click on the 'Graph Tests Marked 'Yes' '. The first test (usually the current Flow Test you are working with) is always graphed even with no Yes marked. The number of tests actually graphed is limited by available space, usually a limit of about 48 graph lines total.
- Graph only the current test results (the test file at the top of the Log) by clicking on 'Graph Current Test Only'.
- Click on 'Graph Title' to change the Standard Title for this test. The program defaults to putting in the Head # unless it is blank, when it then puts in the test file name. (You can also specify 'Alternate' titles and legend names by clicking on 'Format' at the top of the Graph Screen, then 'Edit Titles/Legends'.)
- Choose to Save certain results you believe are special and you may want to recall or graph in the future. See the Save explanation of the previous page

IMPORTANT: Check Appendix 3, page 71, New Features in v1.1 C for the most recent changes.

Appendix 1 Accuracy and Repeatability

Accuracy

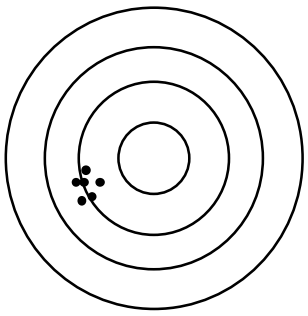
The difference between ***repeatability*** and ***accuracy*** is a concept few people understand. Graphically, accuracy and repeatability is shown in Figure A.1. Think of the Shock tester as an "archer" which is trying to hit the "bull's eye" or the true Shock measurements. Let's say the true Shock Force at 5"/sec was 245.5 lbs, but one shock dyno always comes up with values between 230 to 231 lbs. This dyno is not very accurate, but is very repeatable (only a 1 lb spread in data). Another dyno comes up with measurements which vary from 241 to 250 lbs, which average out to the true 245.5 lb. This tester with the 9 lb/inch spread in data is not nearly as repeatable as the first, but is more accurate.

Ideally, you want both a repeatable and accurate Shock dyno, but this is not always possible. When are accurate measurements and repeatable measurements most desirable?

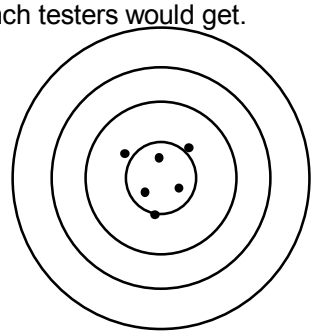
- If you very accurately want to determine if a Shock is different than another Shock, or has changed from when it was first installed in the engine, the ***repeatable*** dyno is the one to use.
- If you want Shock data to prove to a chassis tuner that these Shocks will work with their suspension, for other people to compare their Shocks with, you are better off with the ***accurate*** tester.
- If you must prove the Shocks you are selling are within your customer's specs, you need the ***accurate*** dyno.
- If you want Shocks specs to use in a suspension simulation computer program, you are better off with the ***accurate*** dyno.

Figure A1

Repeatable Measurements
produce the same readings, test after test, but the reading may not be the true CFM.



Accurate Measurements
produce a reading which is close to the ***true*** reading, which is a reading other accurate flow bench testers would get.



The ***accuracy*** of your dyno will depend on many things:

- How you calibrate it and how well it holds calibration. See Section 2.4. The length measurement calibration is fairly easy to keep accurate as blocks of a specific height (thickness) are easy to obtain or make. The force measurement is more difficult. It is best to hang a known weight as shown in Section 2.4, Figure 2.2.
- Mechanical "soundness". This includes keeping clearances to a minimum, so the shock is not being jerked around. You want smooth cycles with continuous up and down motion, no sticking, not "slop" in clearances, and no motor speed control which can be cycling power to the motor.

Repeatability

Performance Trends has developed sophisticated math to analyze the raw data recorded from the Shock dyno to make it the most repeatable software in this price range. This is done by averaging several cycles together. The more recording time you specify in the Preferences section, the more repeatable the measurements. The statistical analysis of the Shock Dyno can take this data and obtain true Shock rates which can repeat within 1 lb or better.

Appendix 2 Backing Up Data

Backing up data means to make more than one copy of the data which can be used or referred to at a later date. This may be needed in the event one copy becomes lost or erased, or you need room in the Flow Test Library. Backing up data can take 2 basic forms:

Paper Reports
Copying files with Windows copy commands

Other than making Paper Reports, backing up data requires knowledge of Windows Explorer commands. Unless you are experienced with Windows commands, have someone experienced with Windows assist you to prevent losing data.

Paper Reports:

If you already keep written copies of all Shock tests you perform, you already understand this form of backing up data. When you finish a test, print out the various types of reports for this test. Simply store this paper report in a safe place.

Disadvantage of Paper Back Ups:

For example, say you have accidentally erased a Shock test file but have a paper report of that data. From these paper reports, there is no way to do a comparison graph to other Shock test, or recalculate the Seated Force from a new Seated Shock Height, etc. What you printed out is all these test results will ever be.

Copying data to disk with Windows commands:

Obviously copying the data to disks is the preferred method of backing up because you can do all sorts of analysis or modifications from computer data that is just not possible from paper back ups. If you are not familiar with Windows commands, have someone help you the first couple of times. However, ***this is the most reliable and most efficient way to back up your data.***

Note: Unless stated otherwise, all mouse clicks are with the normal, left button on the mouse.

To copy Entire ShockData Folder using Windows Explorer, which contains all folders and test files in the Test Library:

Click on Start, then Programs, then Windows Explorer (usually at the bottom of the list of programs). You will obtain the Windows Explorer screen shown in Figure A5.

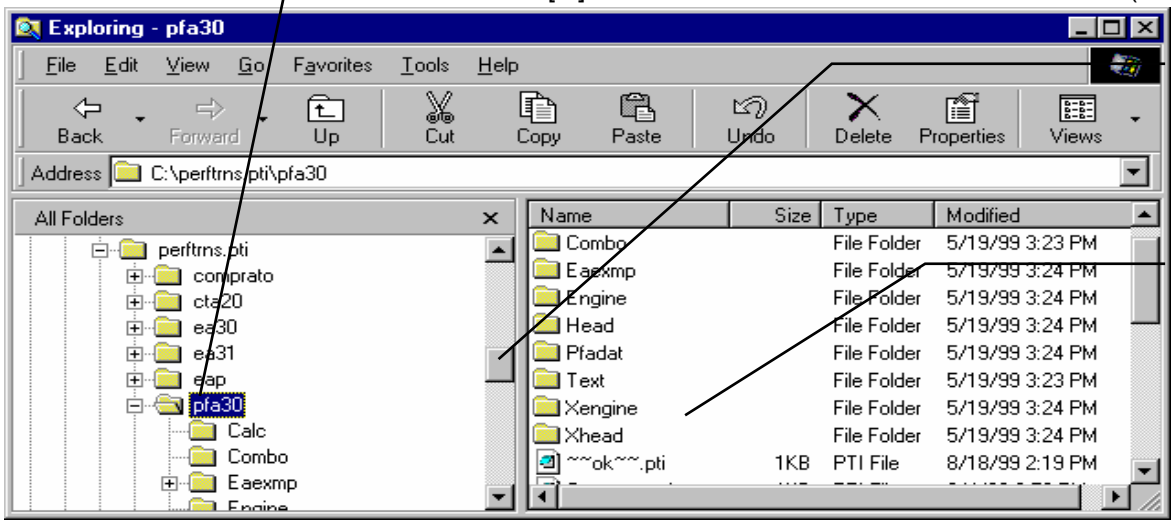
Locate the PERFTRNS.PTI folder (may not be printed in capital letters) on the left side of the Windows Explorer screen, usually on the C drive. Click on the [+] sign to the left of it to display the contents of the PERFTRNS.PTI folder.

You should now see the Shock-V folder. Click on the [+] sign to the left of it to display the contents of the Shock-V folder.

You should now see the ShockData folder. Right click on the yellow ShockData folder icon to display the menu of options. Click on the Copy command to copy this entire folder (all test files in the standard Test File Library).

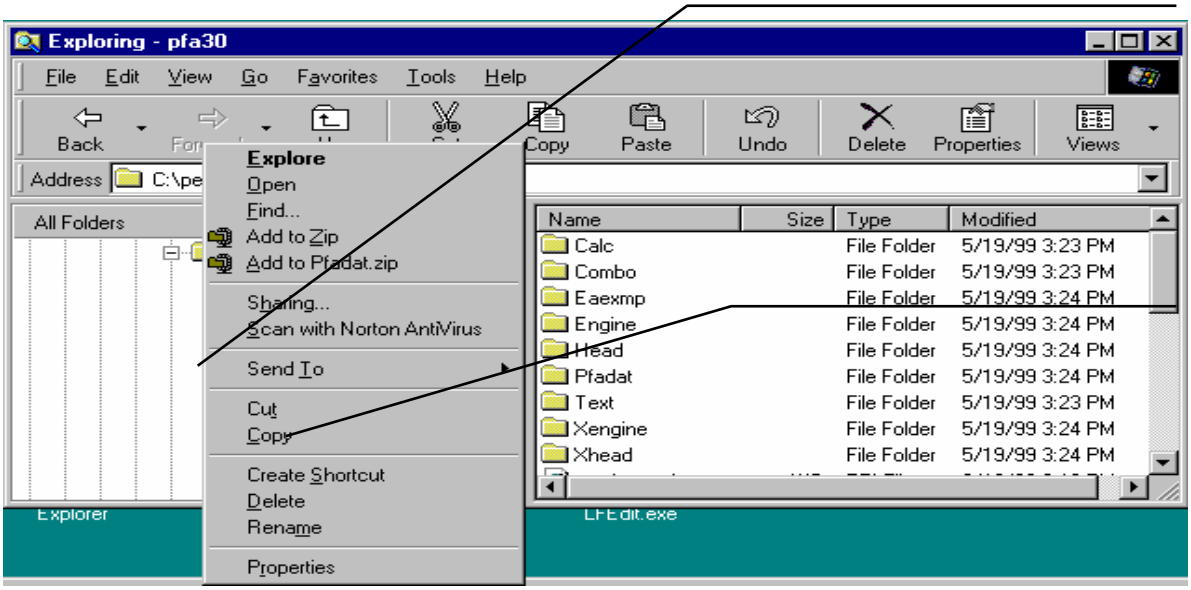
Figure A5 Copying Files with Windows 95, 98 or NT Windows Explorer

Find the PFA30 folder under the PERFTRNS.PTI folder, usually on the C drive. Click on the [+] box to the left of a folder to show its contents (folders).



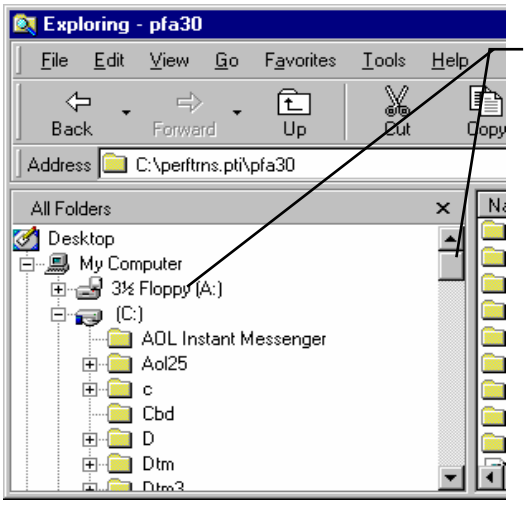
Click and drag the slide bar button to move up and down the list of folders.

The contents of the open (clicked on) folder on the left is shown here, including both folders and files.

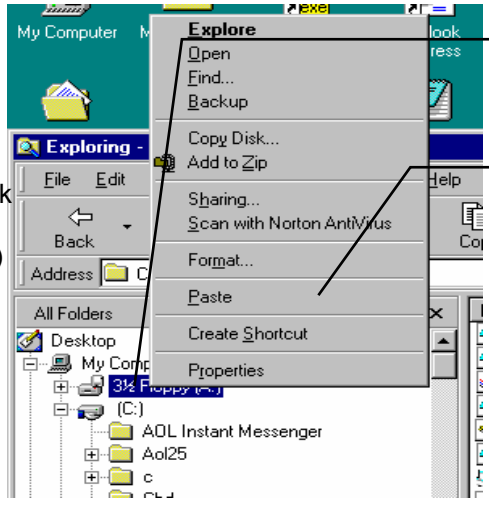


Right click (with the right mouse button) on the PFADAT folder (not seen here) to open a menu of options.

Click on Copy to copy the entire contents of the PFADAT folder (the entire test file library). DO NOT click on Cut.



Drag slide bar to the top of the list to find your Floppy disk drive (usually A)



Right click on the Floppy drive icon.

Then click on Paste to paste whatever you copied (in this example, the entire PFADAT folder) to the disk in the Floppy drive.

Now you must tell the computer where you want to copy the files to. Click and drag the slide bar for the left section of the Windows Explorer screen to the top. (You can also click on the up or down arrow buttons on the slide bar.) Look for the Floppy Drive icon, usually the "A" drive. Put a new, formatted disk in the floppy drive. Then right click on the Floppy Drive icon, and select Paste from the list of options. You will see the floppy drive light come on as the entire ShockData folder and all its contents are copied to the floppy disk. Label this disk with something like "ShockData folder, xx/xx/xx" with a name and date.

Notes:

If you have so many tests in the Test Library, they may not all fit onto 1 floppy disk. Windows Explorer will tell you this and ask you to insert another new, formatted disk. If this happens, be sure to label all disks with a name, date and sequential #s, and keep the entire disk set together. A suggestion for novice computer users is to make each folder under ShockData a separate floppy disk. This may require more floppy disks, but will make it easier to understand restoring just certain folders in the future.

You may just want to back up one particular folder in the test library (in the ShockData folder) or just 1 particular test. You would do this the same as with copying the entire ShockData folder, just click on the [+] by the ShockData folder to display the folders under ShockData. Then right click on the folder you want to Copy. To find individual test files, click on the yellow folder icon containing the test file and the contents of the folder will be shown on the right side of the Windows Explorer screen. Then right click on the test file name and select Copy.

You can also copy individual test files to the floppy drive inside the Shock Dyno Analyzer program. Open the file you want to copy so it is the current test file. Then click on File at the top of the Main Screen, then select Copy to Floppy Disk.

More experienced computer users may want to use the "Backup" features built into Windows 95 and 98 (click on Start, Programs, Accessories, System Tools, Backup). This compresses test files so it takes fewer floppy disks. However you need to use the Backup program to restore test files, which can be more confusing to novice computer users.

Restoring Data

Be very careful when restoring data, as you may overwrite Test Files with old, erroneous information. Read all the information below before restoring data. If you are not familiar with Windows Explorer, have someone more experienced help you.

The ONLY reason to restore data is if you have lost test files. This could be because you mistakenly erased it, you had a major computer failure, or you are moving the program to another computer. Do NOT restore data unless you have one of these problems, as you could possible create many more problems than you are trying to fix.

When restoring test files and folders, you pretty much reverse the procedure for backing up. First you put your backed up floppy disk in the floppy drive. Then open Windows Explorer, find the Floppy drive icon and click on it to display its contents. Right click on the folder you want to restore and select Copy.

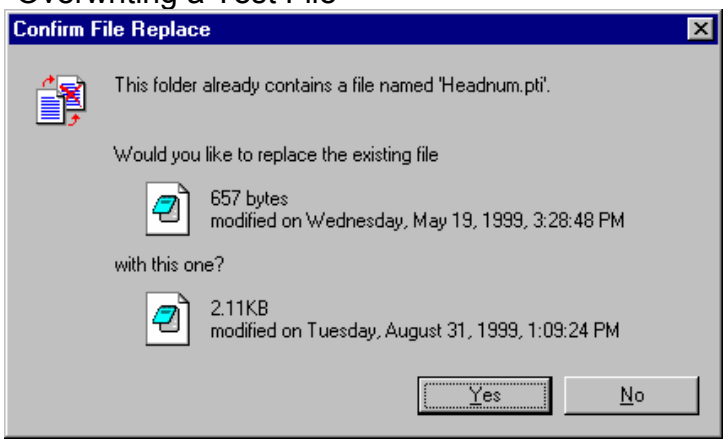
Now find the ShockData folder under Shock-V under PERFTRNS.PTI, usually on the C: drive. Right click on the folder ***1 level up*** from the folder you are restoring. For example, if you are restoring the test file folder CHEV which was in the ShockData folder, you must click on the ShockData folder. If you are restoring the entire Test Library folder ShockData, you must click on the Shock-V folder. If you are restoring the test file 194-150 which was in the CHEV folder under the ShockData folder, you must click on the CHEV folder.

During the restoring (copying) process, Windows Explorer checks to see if it is overwriting an existing file (Figure A6). If it is, it will ask you if the existing file or folder should be overwritten. Be very careful when overwriting files, as you may overwrite a new test file with data from an old test file of the same name.

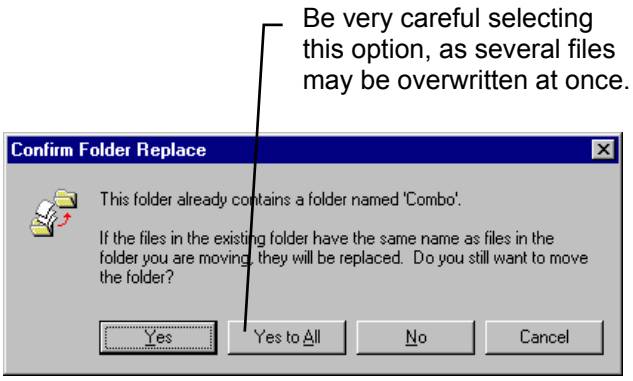
Before restoring test files, it is good practice to back up all test files first. Then if you make a mistake, and overwrite test files you didn't mean to, you have your backup copies to restore the test files from.

Figure A6 Windows Explorer Warnings when Overwriting Test Files

Overwriting a Test File



Overwriting an Entire Folder (several files)



Appendix 3 New Features in v1.1 C

The v1.1C of the Shock Dyno program adds several new features, which are described in this Appendix. Many of these new features are only available in the Plus version.

Calculation and Accuracy Improvements:

A new 12 bit "Gen 3" USB logger has been released, which records the stroke or lift data with more precision than the previous "Gen 3" logger. The software can tell if the logger is the older 10 bit or new 12 bit, so you do not have to tell the software which type of board you have. (The v1.1B could read this logger also.)

The program now allows you to measure Gas Force and Seal Drag on the Performance Trends Shock Dyno. This is discussed in more detail under "New Features".

The program now allows for 2 methods of data analysis for Standard and Non-Standard shocks for the best accuracy. This is discussed in more detail under "New Features".

The program now allows for analyzing a shock with a spring called "Shock w Spring", like coilovers, or motorcycle forks. This is discussed in more detail under "New Features", and is in the Plus Version only.

The program now has a better way to check the length sensor calibration on Performance Trends' Shock Dynos. This is discussed in more detail under "Other Improvements".

Program has a new Preference setting for "Shock Dyno Controls Motor" of "Variable". At this time, this setting only allows the program to expect very low RPMs, for example, under 50 RPM. With this set to Variable, and the Preference "Recording Time, sec" set to 10 seconds, the program can record data for motor RPMs well under 50 RPM. This is mostly for retro-fit dynos with variable speed control. Figure A27.

If you tell program you have a Performance Trends Shock Dyno in the Tester Calibration screen, the program now better explains what it will do when the measured stroke does not match one of the strokes built into the Performance Trends Shock Dyno. It will ask you if the length sensor calibration should should be adjusted to match the stroke, and what stroke you are running. The prior version would do this automatically, which made the process more complex and sometimes not as reliable.

New Features:

The Plus version now has a new screen called Test Options. Under Test Options you can specify:

- How many shocks you want to group into one test file, from 1 to 10.
- How you want each shock to be labeled
- A description of the particular shock so the program can do the best analysis of the data Click on the "Info on Test Type" button for more explanation. Note: In the Basic Version, this entry is contained in the Tester Calibration screen.
- How the Gas Force should be measured or accounted for. You can select to have some graphs and reports done with eliminating the Gas Force.
    - Assume zero means the program assumes there is no gas force.
    - Estimate assumes the force is whatever is the average force at zero velocity.
    - Measure means the program will ask you to run a quick manual test after the actual dyno test with the shock ***not*** moving. This test will consist of putting some compression movement and then some expansion movement on the shock and having the dyno measure the force from both. Figure A15.
    - Manually Enter means you can enter any number you want, based on your experience or some other method of measuring it. If you choose this, a "Clc" button appears by Gas Force on the main screen so you can calculate the force from gas pressure. Figure A16.

- A Customer name, which could also be a car name or number or some other designation for the settings in this screen.
- Comments, which can be any words you want to describe the settings in this screen.

This Test Options screen also allows you to open or save these settings under the File dropdown menu. This makes it easy to be consistent the next time you test the 4 shocks from, say, “Peterson’s Late Model 77”. Click on File, then “Open Test Setup File” and pick from other Test Setup Files you have saved in the past.

If you change the Force Sensor calibration, the program now asks if you want the force data for the current test to be updated to reflect this new change in the calibration. This change is reflected in all shocks in the test file. See Figure A12. Plus Version only. NOTE: This change is reflected in just this test file and future tests. To change the force data in other test files, you have to open them individually and make this change again. Or, you could click on File in Tester Calibration screen, then Open my Saved Tester Calibration Specs.

There is a new Length Sensor calibration option to let you adjust the current calibration to produce a certain stroke. Say the current test you ran shows a stroke of 1.87 inches, but you know it should 1.75 inches. Click on Settings, then Tester Calibration, then Calibrate Length button and an option of “Calibrate by knowing Stroke of Current Test” appears. Click on it and follow the steps as outlined in Figure A11.

The Plus version can now read several versions of Roehig ™ .CVP files. If you read them into a test which has multiple shocks specified in Test Conds, the program asks for which shock you want this Roehrig data assigned. Figure A13.

The program has 3 new data fields for Plus version of shock dyno, Gas Force, Seal Drag, and Adjustment. Adjustment would be like the number of clicks or flats adjusted into the shock for a particular test. The Adjustment will show up in labels on the graph and in reports. Figure A14.

The Test Options now allows you to manually measure Gas Force and Seal Drag after recording data. Figure A15.

The Plus version can now better analyze shocks with springs. You can select that Test Type in the Test Conds screen. If selected the program will expect a different type of data and separate out the spring effect from the shock effect. The spring data like Spring Rate, Min. Spring Force, and Spring Free Length will be reported.

> Typically when you test a shock, it is not important to know the exact shock length. If you cycle the shock between 18-20 inches, or from 15-17 inches, the results should be the same. However, with a spring on the shock, the results from cycling the shock between 18-20 inches or from 15-17 inches will produce VERY different results. That is because the spring forces will be very different because the spring will be compressed different amounts.
>
> To test a "Shock w Spring", you must enter the length of the shock when it is installed in the Shock Dyno. You may measure the length to be 18.45 inches at the dyno's current position, which could be .76" from the lowest part in the dyno's stroke. Enter 18.45 and the program now knows the longest length measured will be 18.45 + .76 = 19.21 inches. This is required for accurate, repeatable data for Shocks w Springs. Figure A28-A31.

File Handling:

When Starting a New Test, the fields for entering the Test and Folder names are now larger to allow for easily making longer names. The same is true shen Saving a file, and for most fields in the program for the test file name and folder name. If you cancel out of starting a new test, the program now explains any changes you have made will not be saved. Fig A17.

You can now display the Tests listed by Date Last Accessed (or changed), option called ‘List by Access Date’. Figure A19.

The program is using new routines for better naming of file names by adding numbers to the end of the names. If you want a file name to be, say, 'Joe Smith', the program used to suggest adding a number to the end to create 'Joe Smith1'. If you would do more than 9 tests, these tests would not be listed alphabetically in order. Now the program suggests this name to be 'Joe Smith001', so tests will be listed alphabetically, at least for the first 1000 tests you run with this name. Fig A17.

You can now Filter (search for) tests by File Name. Fig A20.

Now Filtered Files (searched for and found) are displayed in Notepad with better spacing to allow for very long file and folder names. Fig A20.

In the Open a Test screen, you now have several options to Add, Delete, Copy, Rename and Merge folders. Fig A18.

Files and folders you now delete from inside the program are sent to the computer's Recycle Bin, so they can be recovered if need be. Fig A18.

When saving a file, fields for file name and folder are longer to accommodate longer names.

The program now saves tests to My-Tests folder if it's original folder was the Examples folder. Overwritting a file from the Examples folder is also checked and not allowed. This can avoid some "nagging" messages when you shut down the program.

Program now asks if any changes to the current file should be saved if it senses you have made changes to it.

Graphing:

There are new columns in the History Log, one called "# Shocks" which shows the number of shocks for a particular data file, and "Graph Shocks" where you can choose which shocks you want to include in a graph. By clicking in the "Graph Shocks" column, you can request which shocks should be included in the graph. Figure A21.

The cursor on the graph screen now shows the values of all lines which lie on the vertical cursor line. Because shock dyno graphs can go back and forth across the screen several times, there may be more than just 1 value for each line. Each Cursor Value may now have several values separated by commas. Figure A21.

If you choose to include a Data Table with your printed graphs, the Table now include a more complete set of data. The table may also remove less important points to allow for using larger fonts for easier reading of the printout. Figure A22 and A23.

Because several Cursor Values can now be displayed, the graph legend area is wider to accomodate this. Also tried to make the box which outlines the 'legend for each test file more accomodating for different screen resolutions.

Fixed a bug where, for some Shock Dyno graphs, especially if you have requested 'Zero Force at zero velocity', the zero velocity point could be not included in the graph. Now it is included for most all cases.

Program is now better at finding appropriate graph scales when Auto Scaling graphs.

The graph can now better handle data (drawing cursors and grids) if the minimum and maximum X data were both negative.

The Graph on the main screen now has a title to show whether the data is graphed 'gas force removed', and the units being used (inches " or mm, KG, etc). Figure A14.

If the stroke readings for the graph in the Electronics Recording screen does not allow data to be shown on the graph, the program will automatically adjust the settings to show the graph. Plus Version only. Figure A26.

Reports:

There is a new Report Type of "Shock Summary" which displays the summary data on the main screen for each shock. Plus Version only. Figure A25.

Program has several enhancements to Comparison Reports to accomodate the feature that now test files can have multiple shocks.

When making report for several shocks in 1 test, the report lines up the force data for equal velocities on the same rows. Figure A14.

Other Improvements:

On Main Screen, there is a new option for either displaying data as “Total Force Recorded” or “Eliminate Gas Force”. Plus Version only. Figure A16.

The Preferences help file now displayed in Notepad for easier reading and printing.

Several options under ‘Help’ have been added on main screen to get help from Performancetrends.com and other websites.

Now the browser should be the default on your computer. Previously it only looked for Internet Explorer.

To fix a bug in the calibrating procedure, the program now saves the Tester Specs as the Master Tester Specs before doing a calibration.

Program now keeps track of variation in consecutive readings when doing a calibration and warns user if there was a lot of variation, over 2%. It also rejects repeat readings which are more than 5 bits different than the previous reading. The program now better warns you that there are no communications with the logger when you are calibrating. This is all to provide more accurate calibrations.

If you change the printer within the program to something other than the computer's default printer, the program now restores the default printer (and printer orientation) when it shuts down.

If you run tests at very low speed, the program now displays data at 0.25 in/sec increments. Figure A27.

Program is now more reliable at saving the configuration file when shutting down, and not letting it get corrupted.

There is a new Preference setting under 'Operation, cont' called 'Load Cell Overload Allowed'. The program tries to prevent you from overloading the load cell. This is to prevent damage, and this setting should be kept at 0 for all Performance Trends shock dynos. However, for some retro-fits, the other brand's load cells could have been undersized. For this condition, you may have to allow a certain percentage of overload to the the same operation you had with the previous software. Fig A27.

There are now several “how to” videos on the Performance Trends website on operating the software and calibrating the tester. We also have the movies on our youtube channel, which may display the movies better depending on your browser and computer: To find it, google the key words: youtube performance trends . Fig A30.

There is a Preference setting to better allow the software to run with Asian operating systems.

Figure A10 Plus Version's Test Options Screen

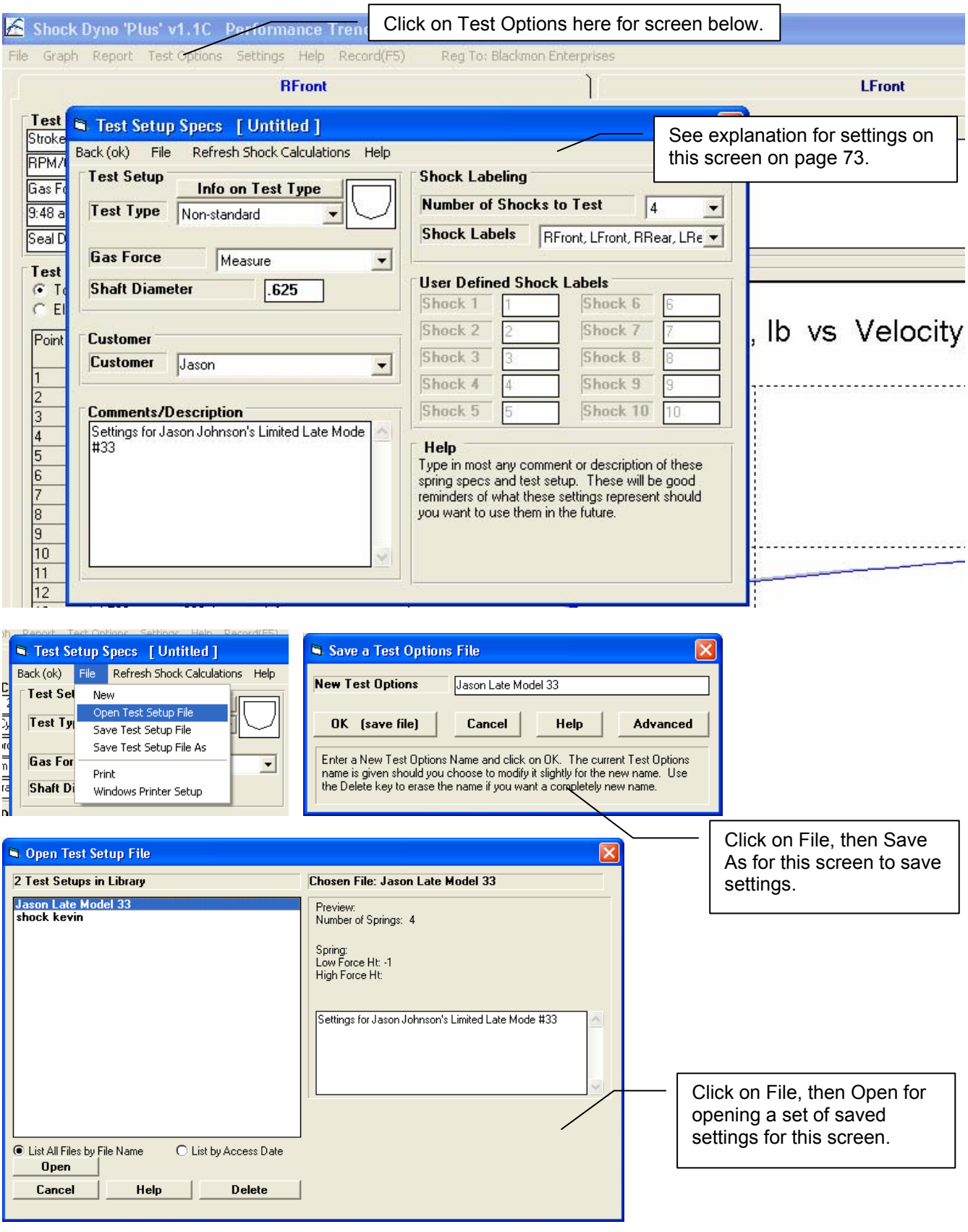


Figure A11 New Method of Calibrating Length Sensor, based on Knowing the Stroke

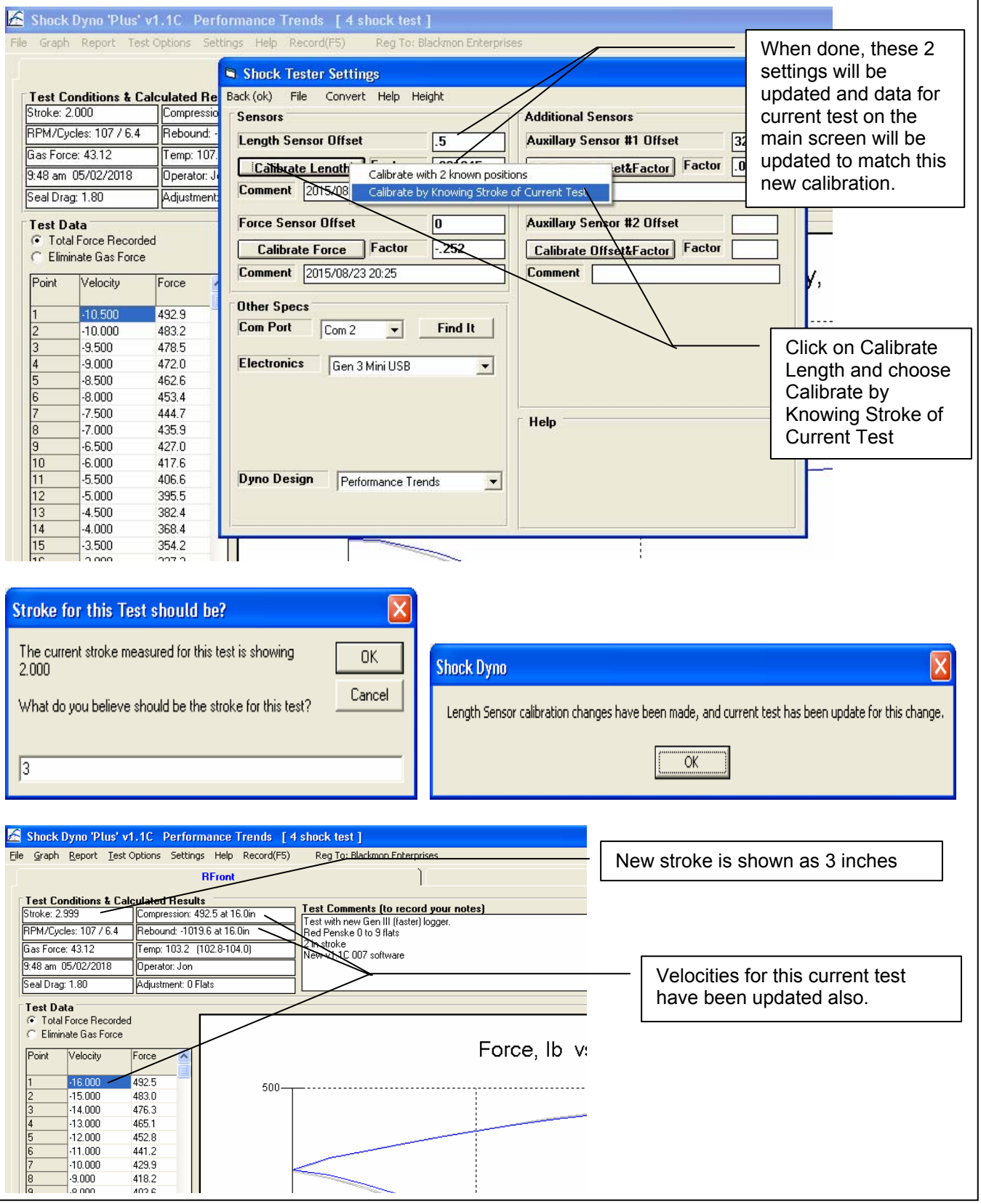


Figure A12 Recalculating Results if you change the Force Sensor Calibration

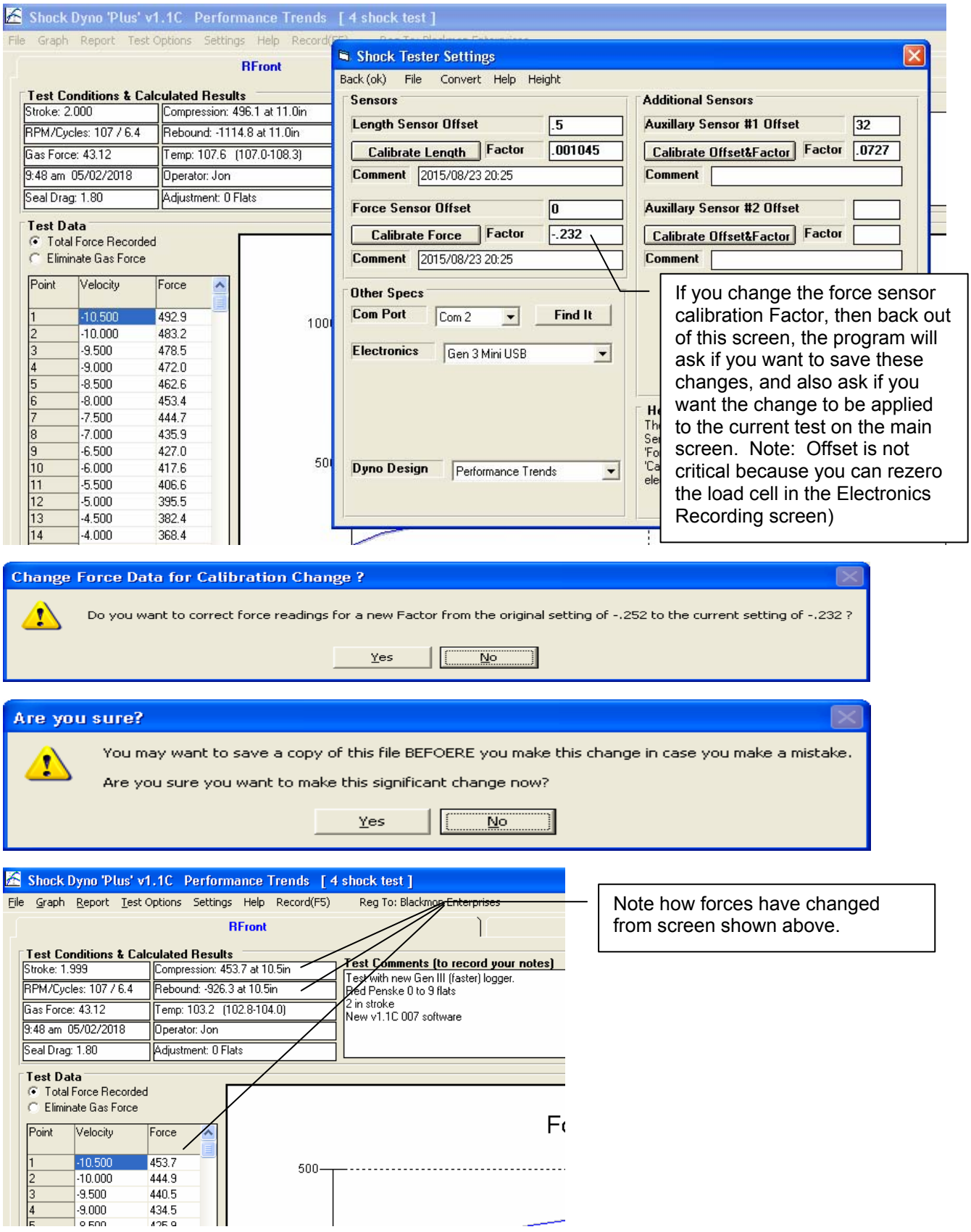


Figure A13 Importing Roehrig ™ Files in Plus Version

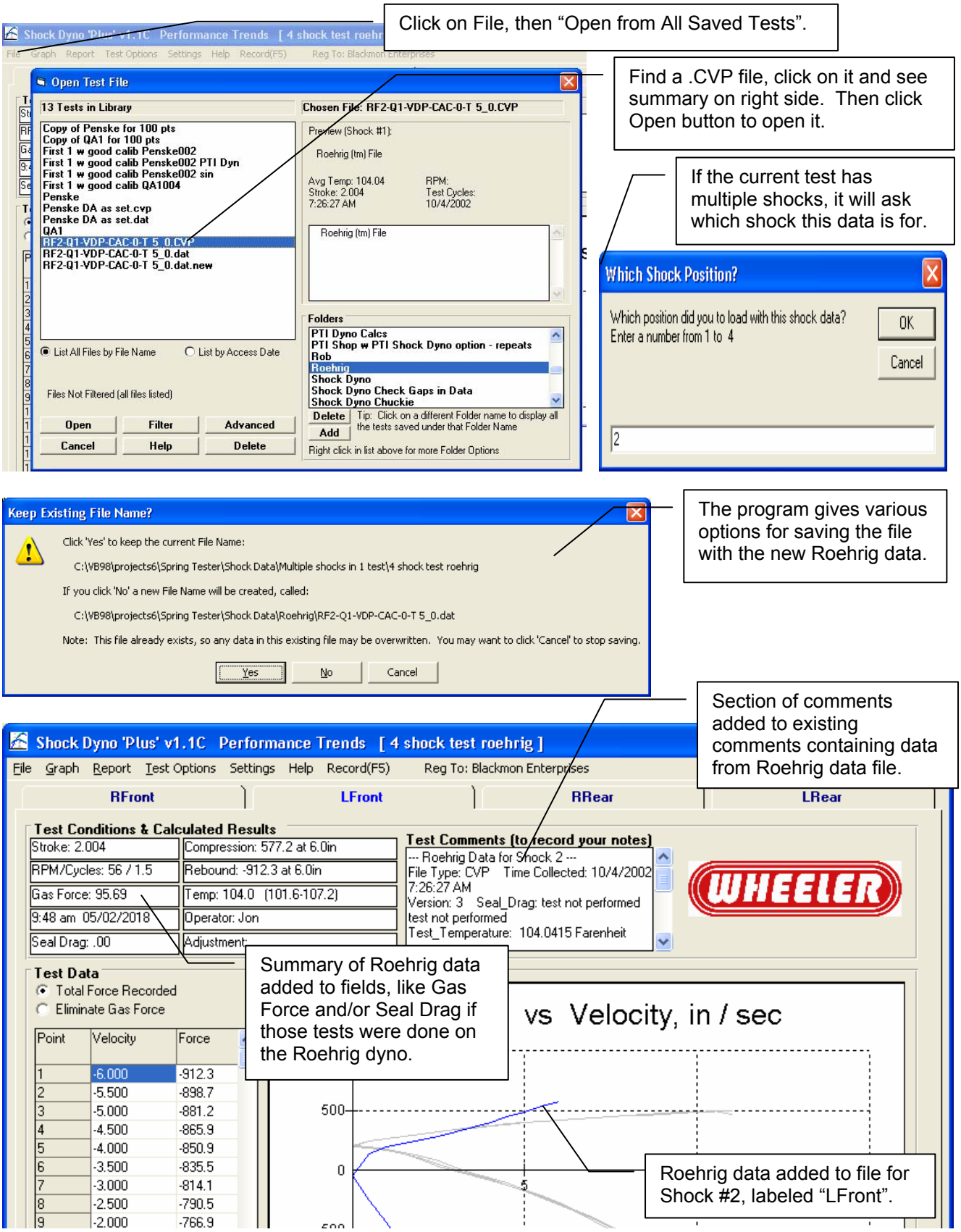
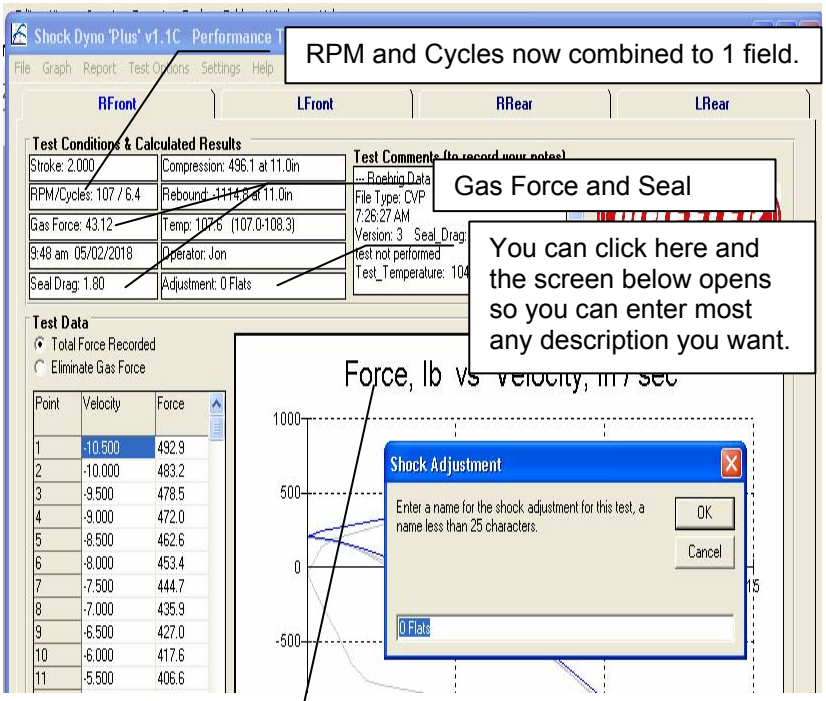


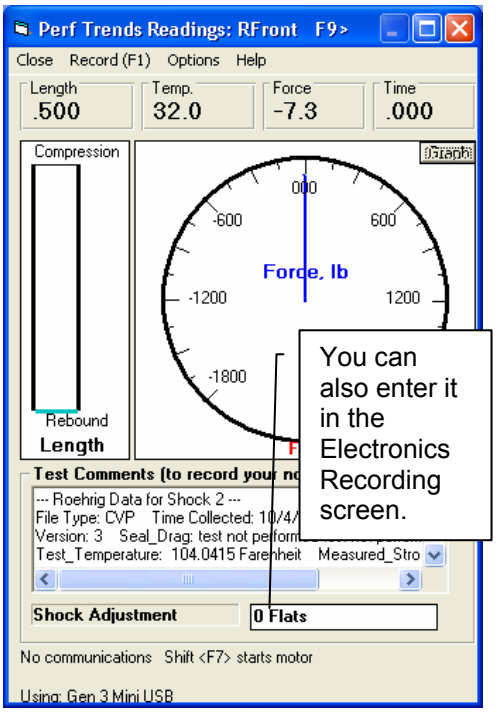
Figure A14 3 New Summary Data Fields in Plus Version



RPM and Cycles now combined to 1 field.

Gas Force and Seal

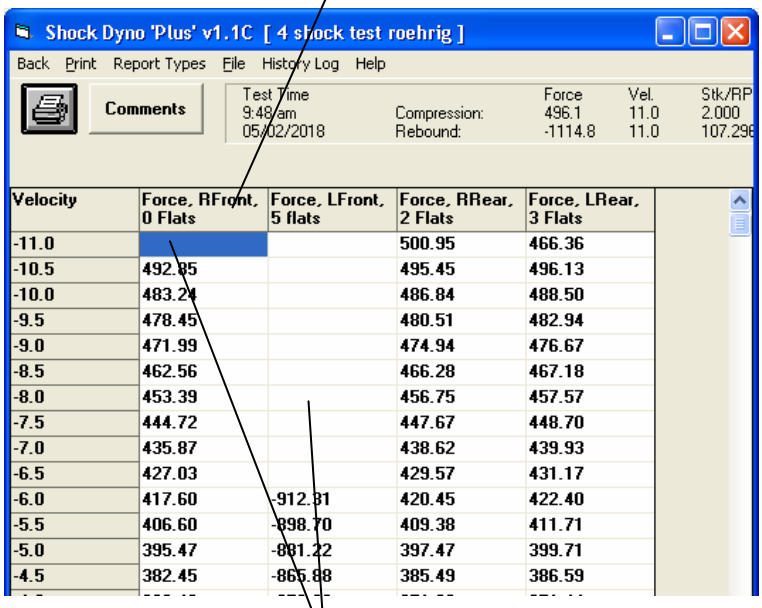
You can click here and the screen below opens so you can enter most any description you want.



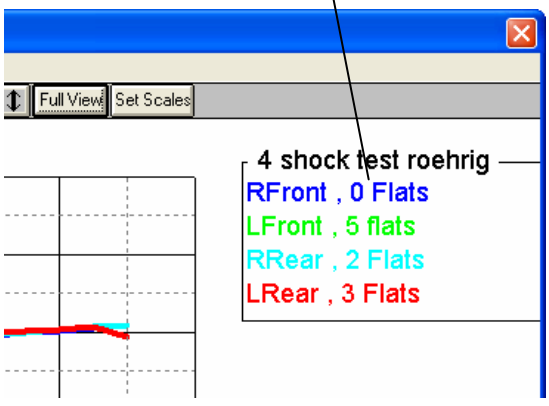
You can also enter it in the Electronics Recording screen.

New Graph Title shows units and if corrected for Gas Force.

The Adjustment descriptions show here in the Reports.



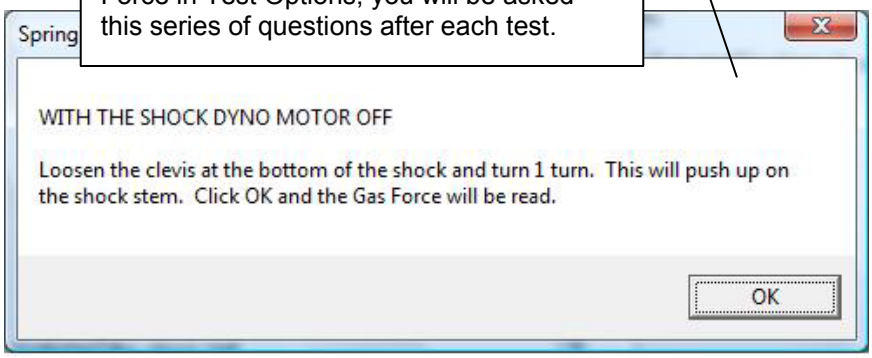
The Adjustment descriptions show here in the Graphs.

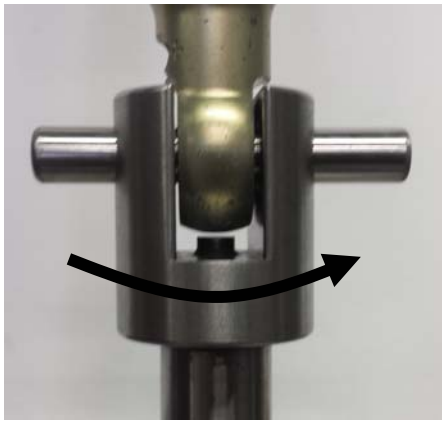


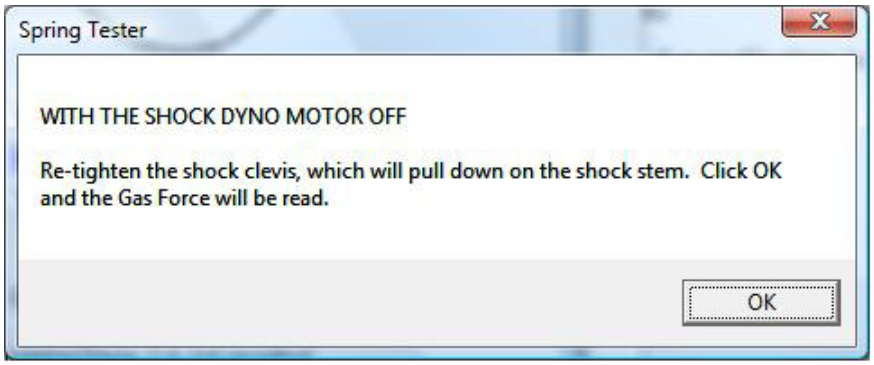
Note how the report leaves blanks when a particular shock does not have data for that particular velocity in the left column.

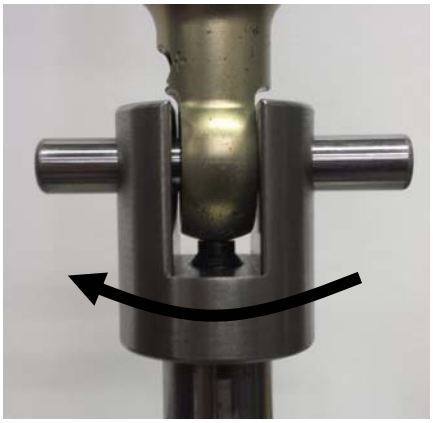
Figure A15 Manually Measuring Gas Force and Seal Drag, Plus Version

If you have selected to “Measure” the Gas Force in Test Options, you will be asked this series of questions after each test.









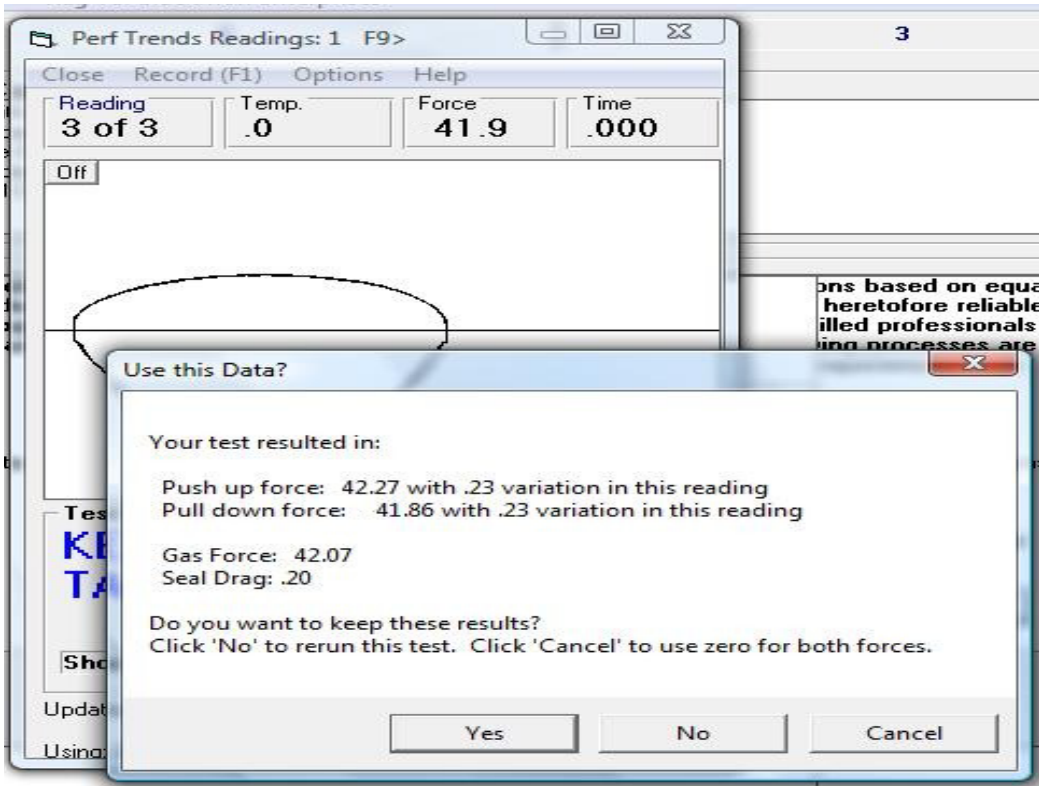


Figure A16 Manually Entering Gas Force, or Calculating if from Gas Pressure

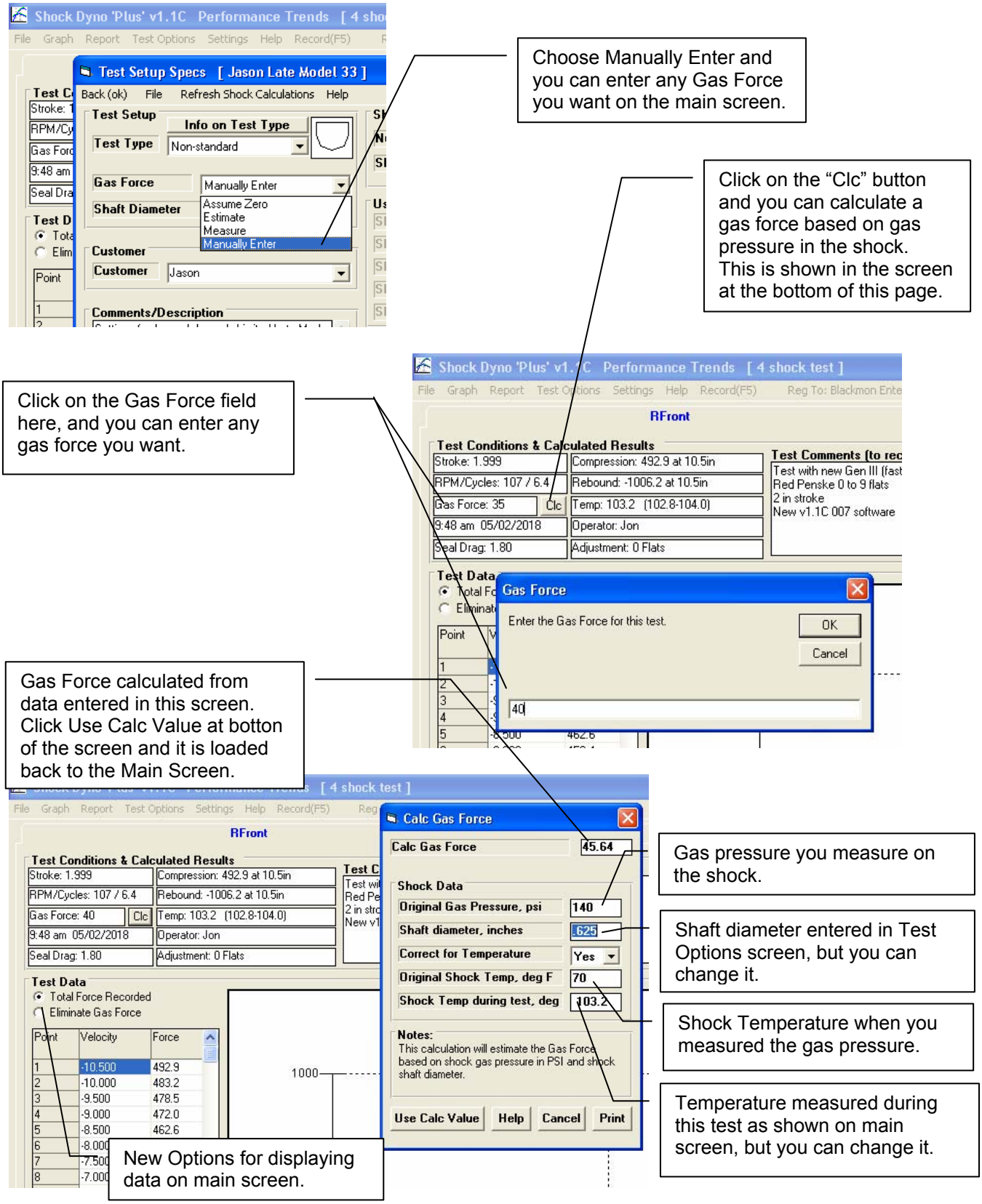
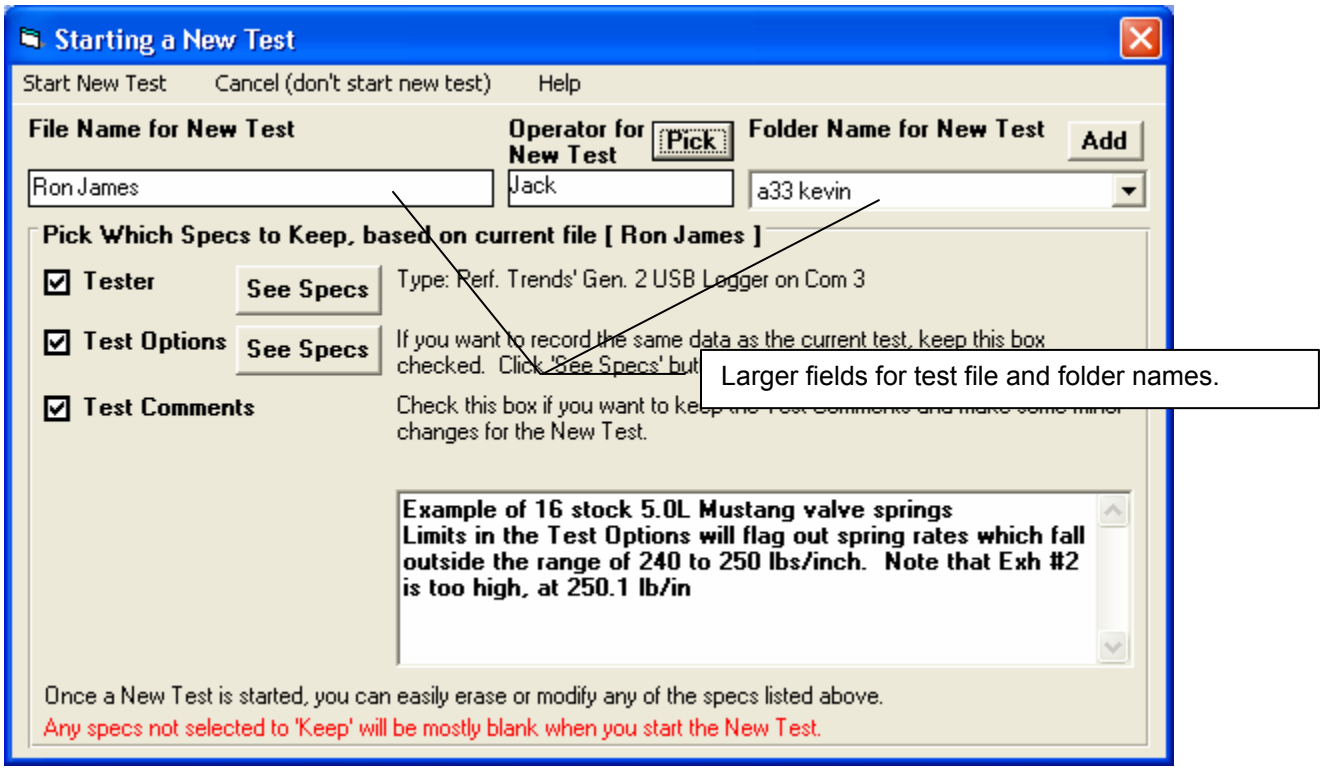
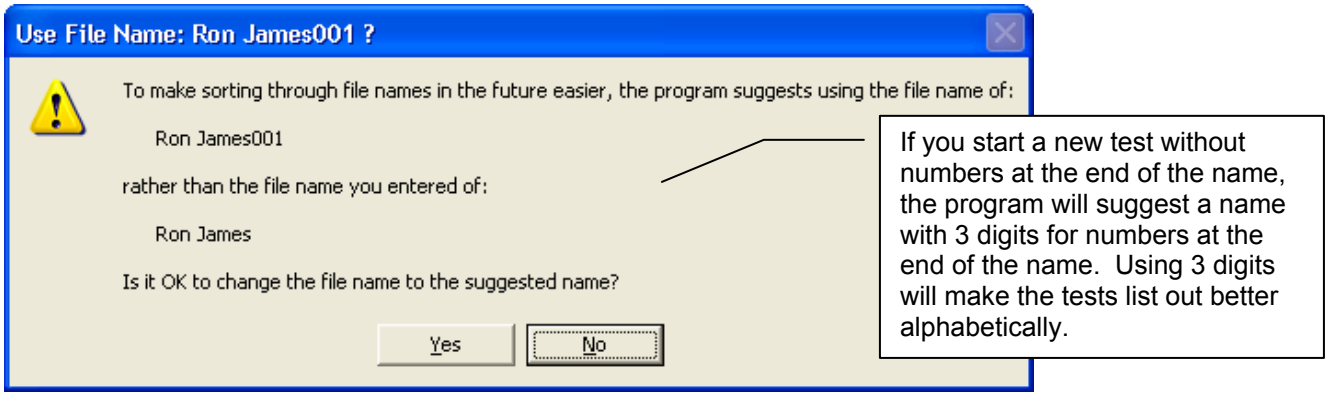


Figure A17 New Features for Starting a New Test





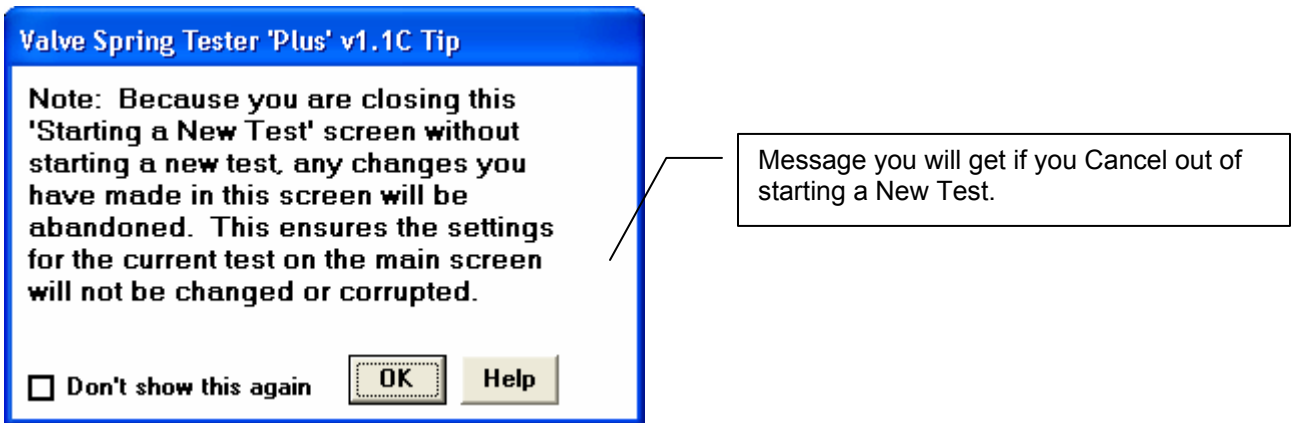


Figure A18 New Features Deleting, Adding, etc Files and Folders

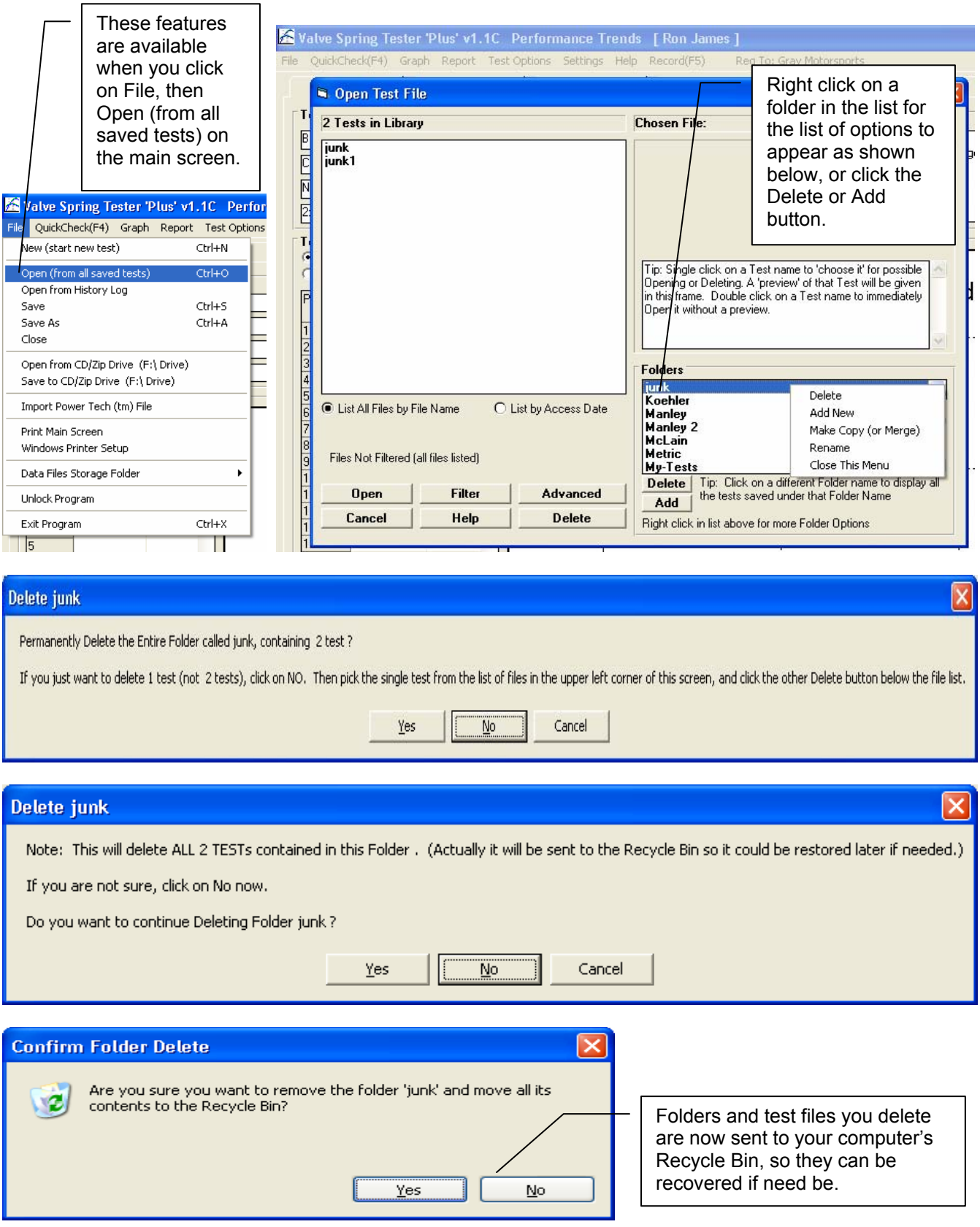
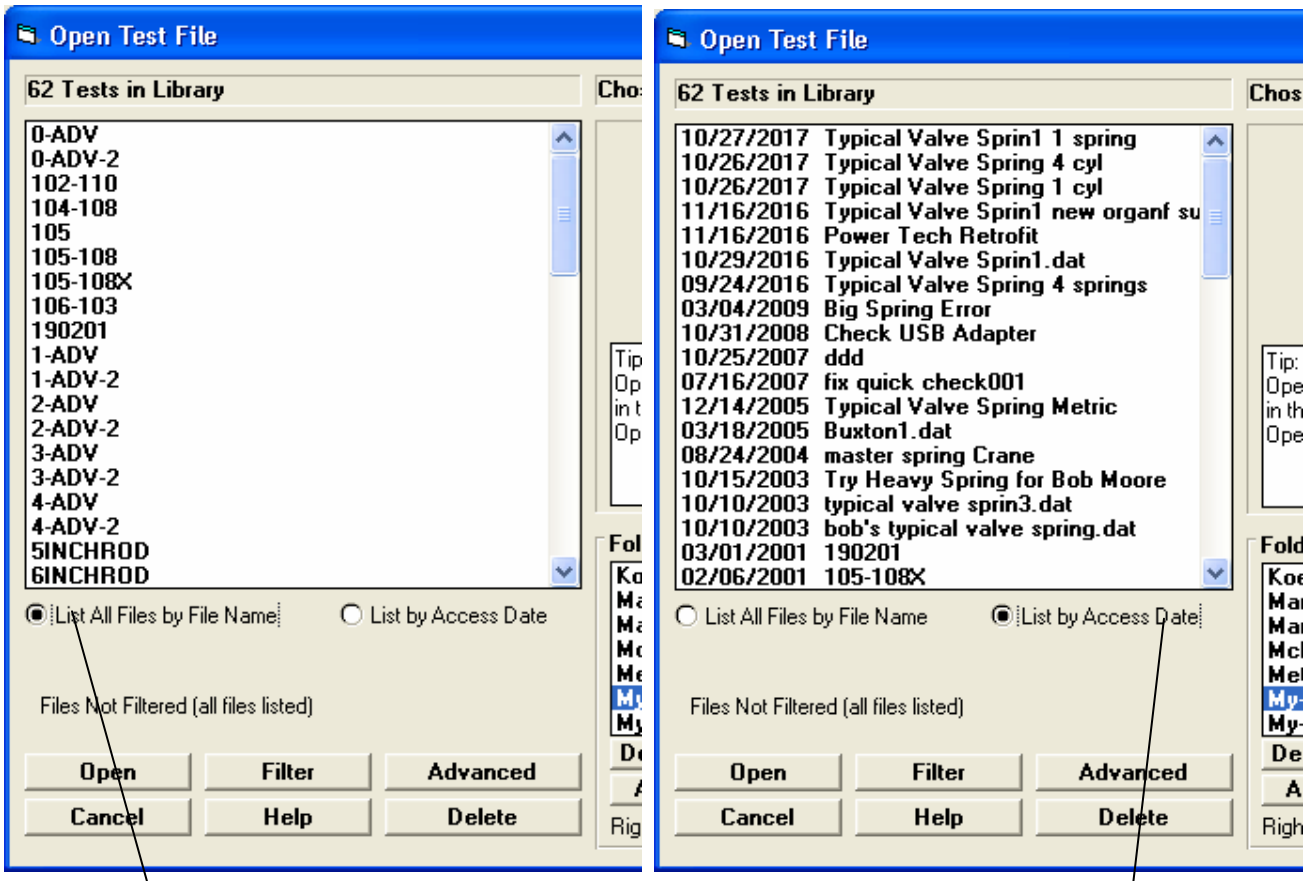


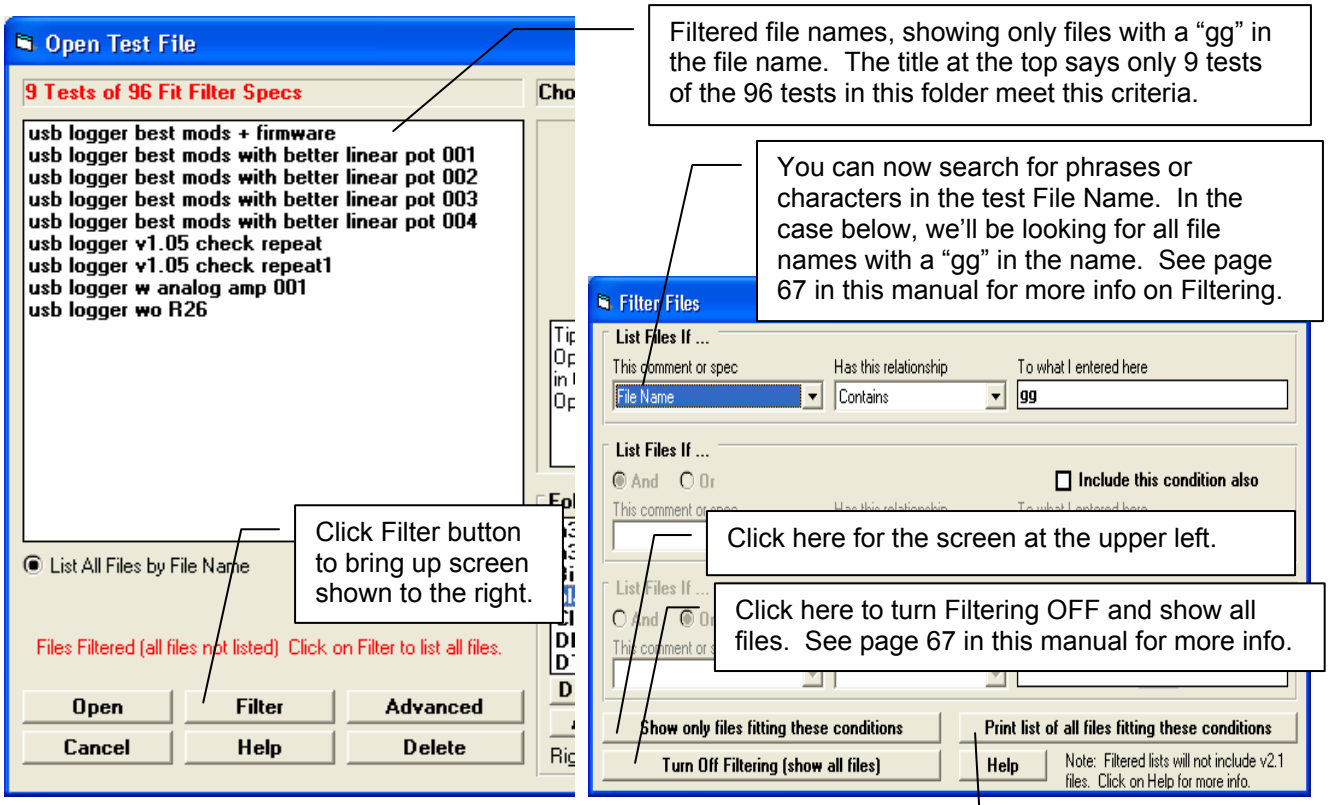
Figure A19 New Feature for Listing Files by Date



The typical method for listing files is alphabetically as shown here.

The new method available is to list them by the last date the files were “accessed” or opened. This may not be the date of the test. For example if you ran the test in July, but opened the test in September, the test will be listed by the September date.

Figure A20 New Features for Filtering (finding) Test Files



Filtered file names, showing only files with a "gg" in the file name. The title at the top says only 9 tests of the 96 tests in this folder meet this criteria.

You can now search for phrases or characters in the test File Name. In the case below, we'll be looking for all file names with a "gg" in the name. See page 67 in this manual for more info on Filtering.

Click Filter button to bring up screen shown to the right.

Click here for the screen at the upper left.

Click here to turn Filtering OFF and show all files. See page 67 in this manual for more info.

Filtered.txt - Notepad

File Edit Format View Help

Folder	Test
black box	usb logger best mods + firmware
black box	usb logger best mods with better linear pot 001
black box	usb logger best mods with better linear pot 002
black box	usb logger best mods with better linear pot 003
black box	usb logger best mods with better linear pot 004
black box	usb logger v1.05 check repeat
black box	usb logger v1.05 check repeat1
black box	usb logger w analog amp 001
black box	usb logger wo R26
My-Tests Full Boar	Haggerty
My-Tests Full Boar	Haggerty2
My-Tests Full Boar	Haggerty3
My-Tests Full Boar	Haggerty3-kev
PRI 2005	Briggs.dat
Sanborn	Haggerty2.txt
Sanborn	Haggerty3.txt
USB Logger	Try USB Logger
USB Logger	Try USB Logger -Mini BB Cal
USB Logger	Try USB Logger -Mini BB Cal + USB Logge1
USB Logger	Try USB Logger -Mini BB Cal + USB Logger
USB Logger	USB Lggr 1.04 w Dif Caps Rests
USB Logger	USB Lggr 1.04 w Dif Caps Rests #2
USB Logger	usb logger best mods + firm compare
USB Logger	usb logger best mods + firm compare 2
USB Logger	USB Logger Best Mods Repeats
USB Logger	usb logger best mods with better linear pot
USB Logger	usb logger w analog amp
USB Logger	usb logger w analog amp 001
USB Logger	usb logger w analog amp new-old firmware

Ln 1, Col 1

Click here to obtain a screen as shown to the lower left, a list of all file names and folders where the test name contains a "gg".

Figure A21 Selecting Multiple Shocks for Graphing and Cursor Displays Several Readings

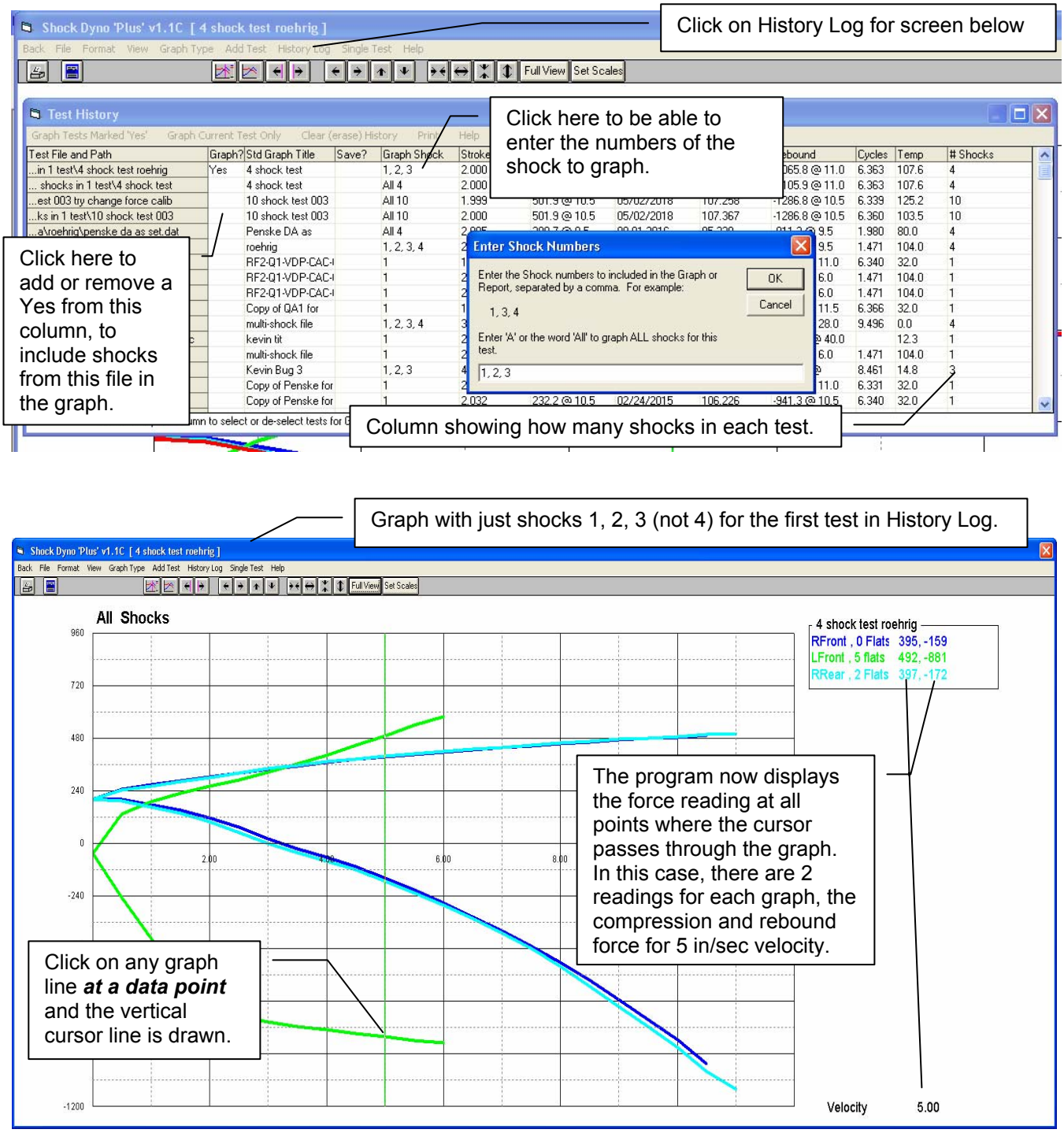
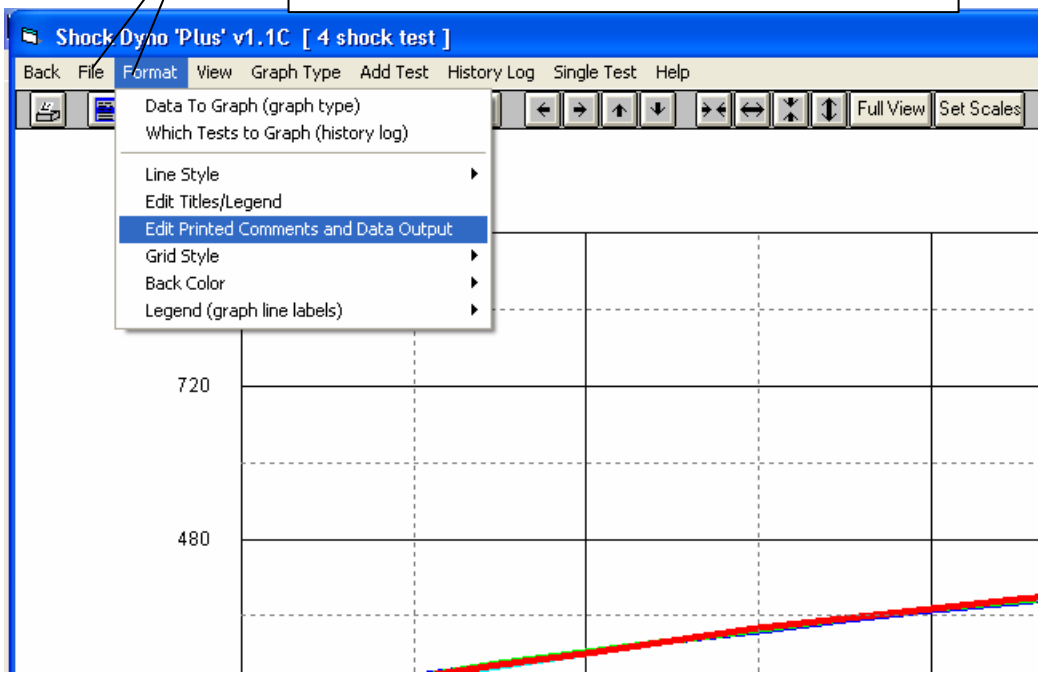
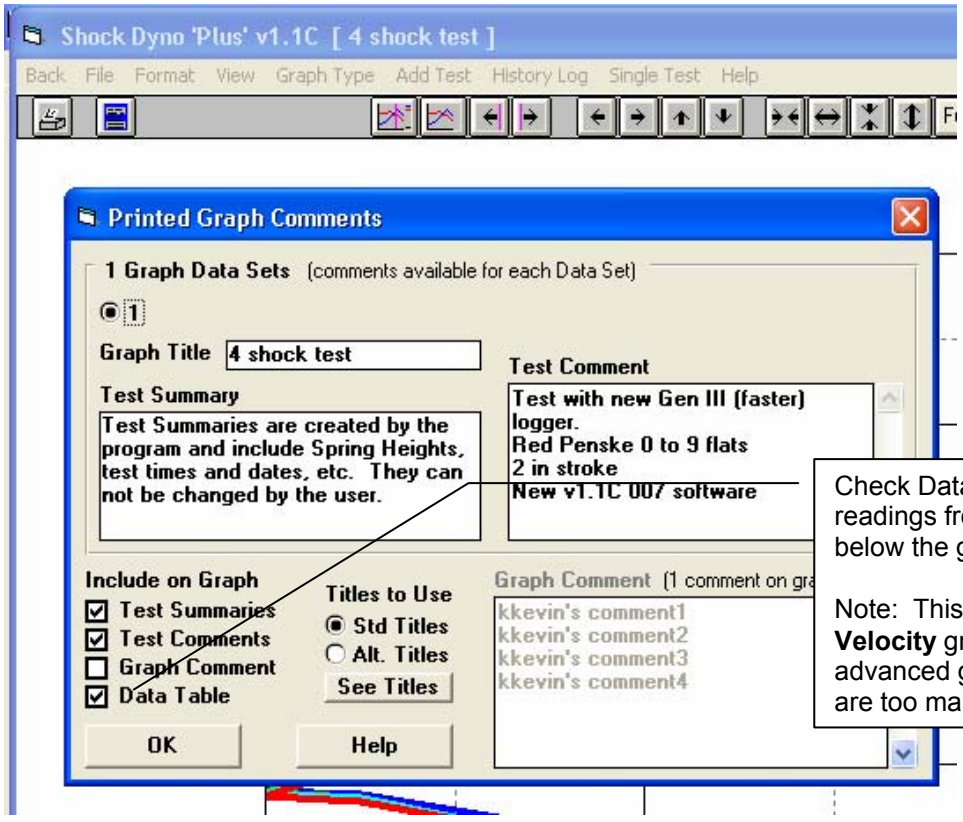


Figure A22 Graph Printout Options, including Better Data Table

Click on File or Format, then Edit Printed Comments and Data Output for the screen shown below.





Check Data Table to have the data readings from the graph get printed below the graph.

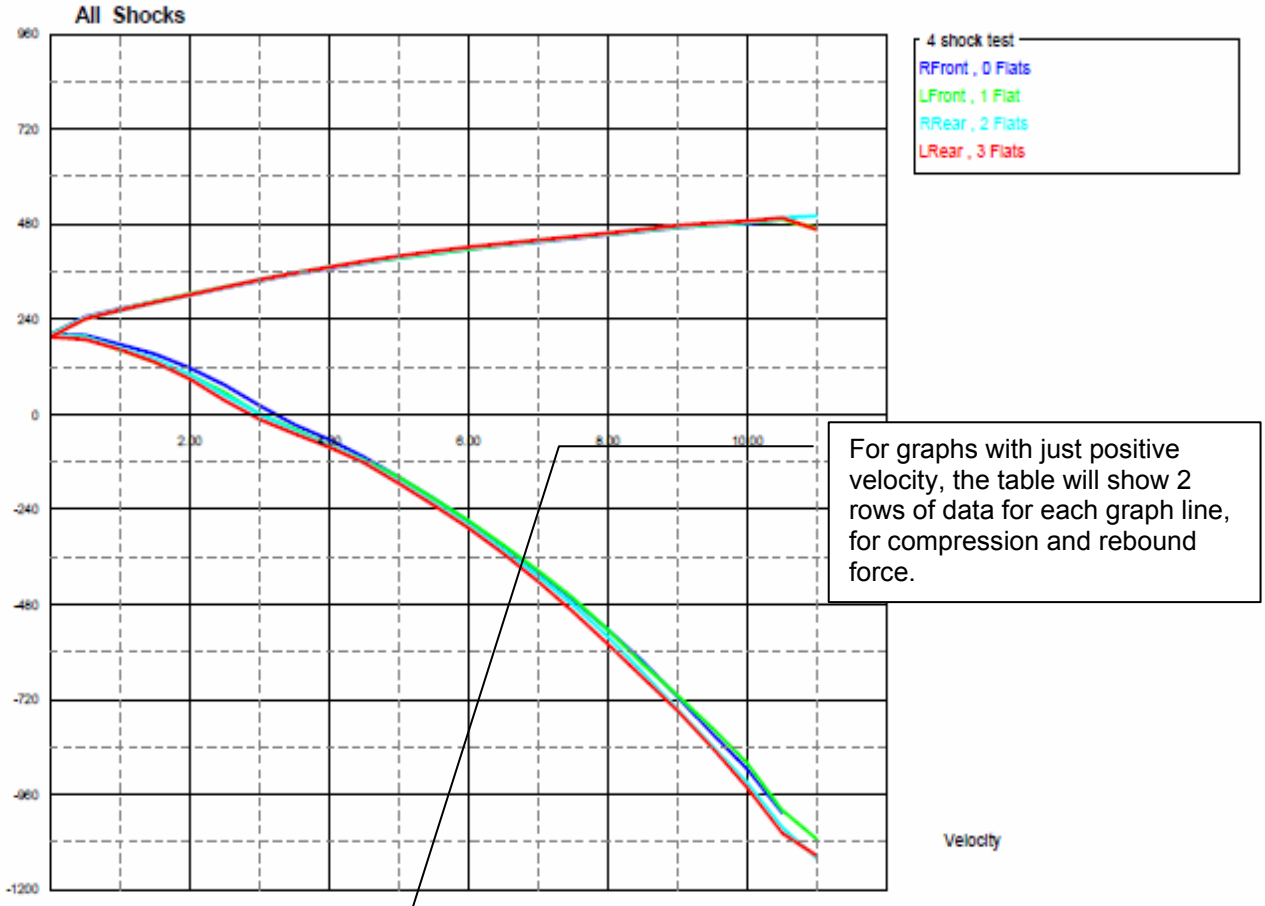
Note: This only works for **Force vs Velocity** graphs, not Loop or more advanced graph types because there are too many data points to print.

Figure A 23 Printout with Data Table for Force vs Velocity Graph

Shock Dyno 'Plus' v1.1C
Test: 4 shock test
Folder: Multiple shocks in 1 test

GRAY MOTORSPORTS
704-809-1070
Performance Trends (C) 2017

This Graph Printed:
11:23 am 05-20-18
Page: 1



For graphs with just positive velocity, the table will show 2 rows of data for each graph line, for compression and rebound force.

Test Summary and Comments for: 4 shock test

Test Time		Force	Vel.	Stk/RPM	Cyc/Tmp	Graph of:	All 2 Cylinders
9:48 am	Compression:	496.1	11.0	2.000	6.363	Operator:	Jon
05/02/2018	Rebound:	-1114.8	11.0	107.296	107.6	Errors:	None

Test with new Gen III (faster) logger.
Red Penske 0 to 9 flats

2 in stroke
New v1.1C 007 software

Vel	.00	.50	1.00	1.50	2.00	2.50	3.00	3.50	4.00	4.50	5.00	5.50	6.00	6.50	7.00	7.50	8.00	8.50	9.00	9.50	10.00	10.50	11.00
RFront , 0 Flats	202.4	246.2	266.7	284.2	301.9	319.6	337.3	354.2	368.4	382.4	395.5	406.6	417.6	427.0	435.9	444.7	453.4	462.6	472.0	478.5	483.2	492.9	
		199.2	175.7	151.8	116.5	73.5	21.7	-26.4	-63.8	-108.2	-159.2	-213.0	-270.7	-333.6	-400.2	-469.4	-544.0	-624.5	-714.0	-806.4	-895.4	-1006	
LFront , 1 Flat	200.9	242.4	263.9	285.3	304.2	321.8	339.3	356.8	371.5	384.2	395.2	406.1	417.0	428.0	438.1	446.8	455.4	464.1	472.8	478.2	485.3	492.2	469.0
		194.0	162.9	132.2	100.0	54.7	1.1	-36.6	-79.2	-116.5	-158.3	-212.6	-269.5	-330.1	-394.4	-463.9	-544.3	-630.7	-709.8	-792.2	-880.7	-999.3	-1073
RRear , 2 Flats	198.9	243.1	261.9	281.4	300.9	320.4	339.7	356.1	371.3	385.5	397.5	409.4	420.4	429.6	438.6	447.7	456.7	466.3	474.9	480.5	486.8	495.5	501.0
		192.5	166.2	139.1	99.7	47.4	.6	-43.0	-79.7	-120.4	-171.7	-225.0	-282.2	-344.0	-410.2	-481.2	-562.1	-651.8	-745.1	-837.1	-929.9	-1042	-1121
LRear , 3 Flats	195.6	241.3	263.3	282.6	301.9	321.1	340.2	356.3	371.4	386.6	399.7	411.7	422.4	431.2	439.9	448.7	457.6	467.2	476.7	482.9	488.5	496.1	466.4
		189.1	163.0	131.7	88.6	34.4	-12.8	-48.7	-82.9	-122.6	-175.0	-229.5	-287.2	-351.6	-422.3	-498.7	-580.9	-664.6	-748.7	-842.5	-943.2	-1057	-1115

Figure A24 Printout with Data Table for Force vs Velocity Graph +/-

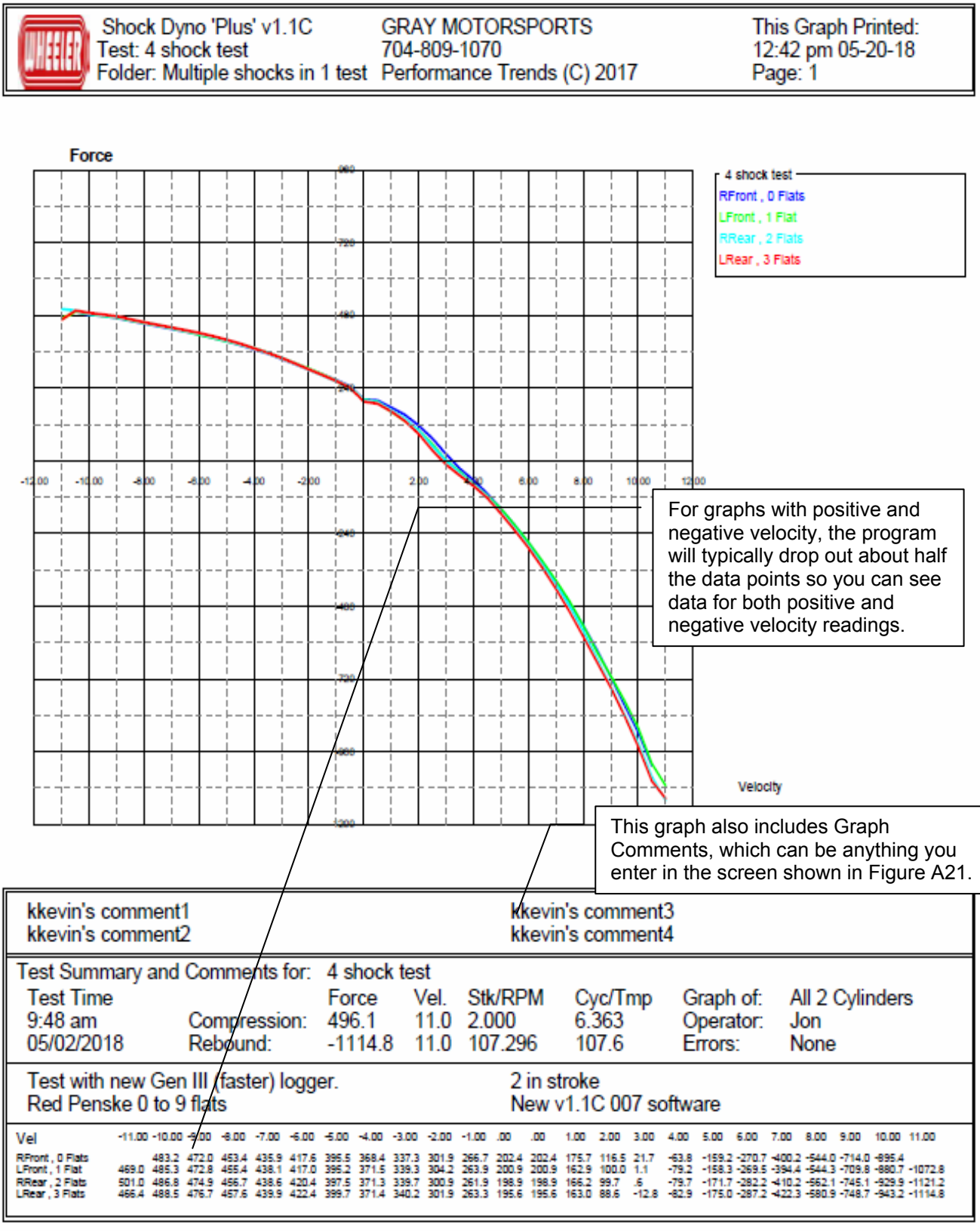
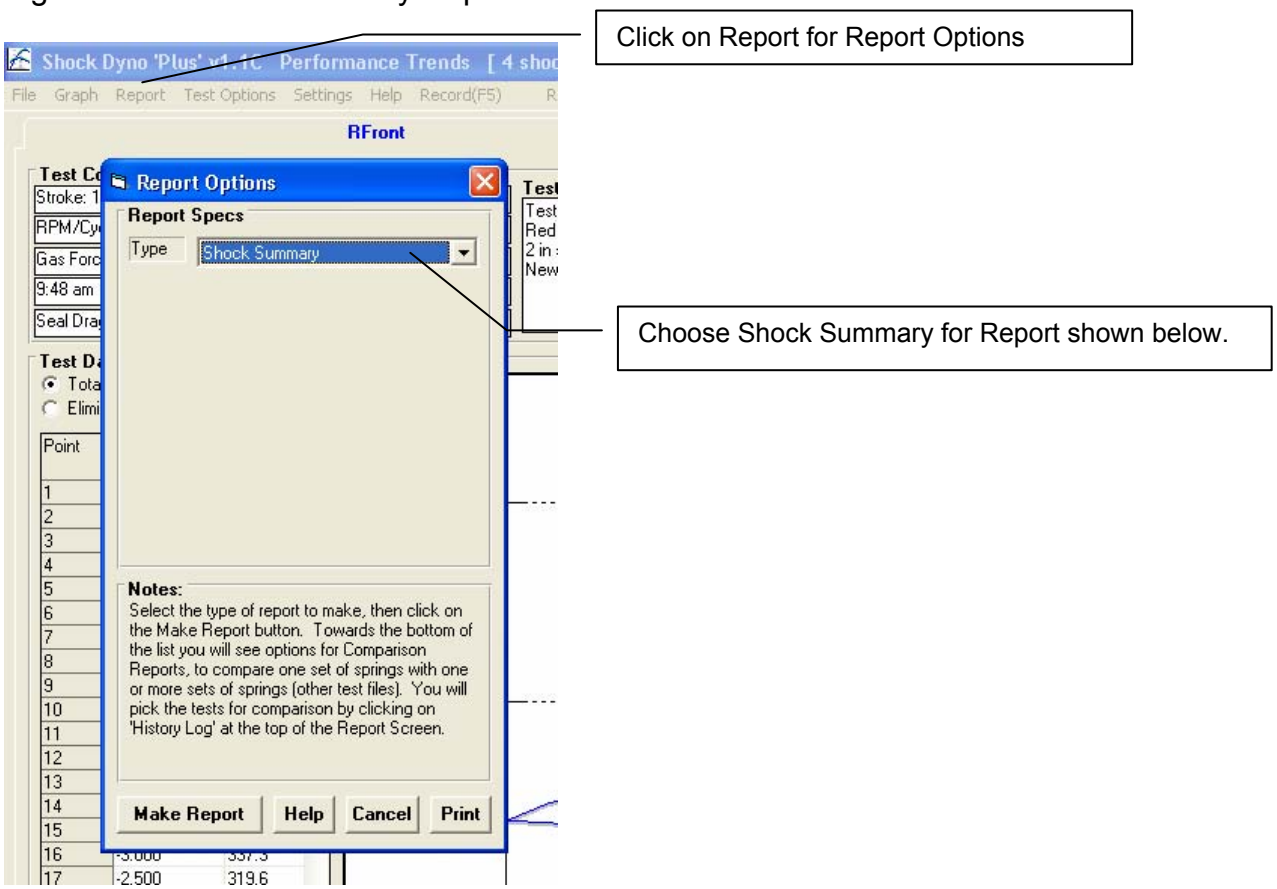


Figure A25 Shock Summary Report



Shock Dyno 'Plus' v1.1C [4 shock test]

Back Print Report Types File History Log Help

Comments

Test Time		Force	Vel.	Stk/RPM	Cyc/Tmp	Report of:	Force at Velocities
9:48 am	Compression:	492.9	10.5	1.999	6.362	Operator:	Jon
05/02/2018	Rebound:	-1006.2	10.5	106.952	103.2	Errors:	None

Shock	RFront	LFront	RRear	LRear
Adjustment	0 Flats	1 Flat	2 Flats	3 Flats
Stroke	1.999	1.999	1.999	1.999
RPM	107	107	107	107
Cycles	6.4	6.4	6.4	6.4
Rebound	-1006.2	-1072.8	-1121.2	-1114.8
Rebound Vel	10.5 in/sec	11.0 in/sec	11.0 in/sec	11.0 in/sec
Compression	492.9	492.2	501.0	496.1
Compression Vel	10.5 in/sec	11.0 in/sec	11.0 in/sec	11.0 in/sec
Avg Temperature	103.2	103.5	107.8	107.6
Temperature Range	102.8-104.0	103.0-104.1	107.1-108.3	107.0-108.3
Gas Force	40	43.44	42.1	3.14
Seal Drag	1.80	2.15	1.77	2.04
Rod Diameter	.625	.625	.625	.625
Est. Gas Pressure	130.4	141.6	137.2	10.2

Figure A26 Shock Graph Automatically Adjusts when Recording Data

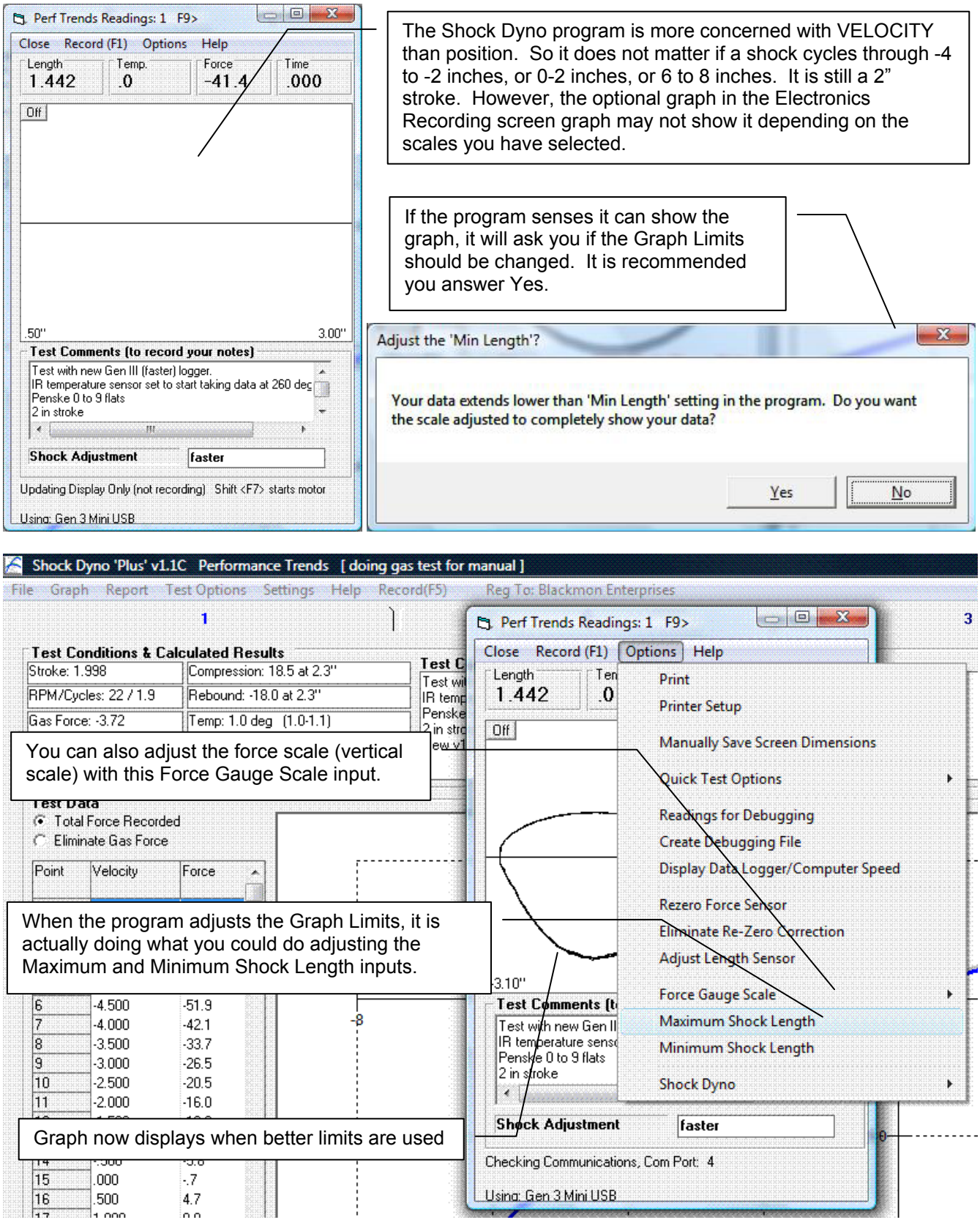
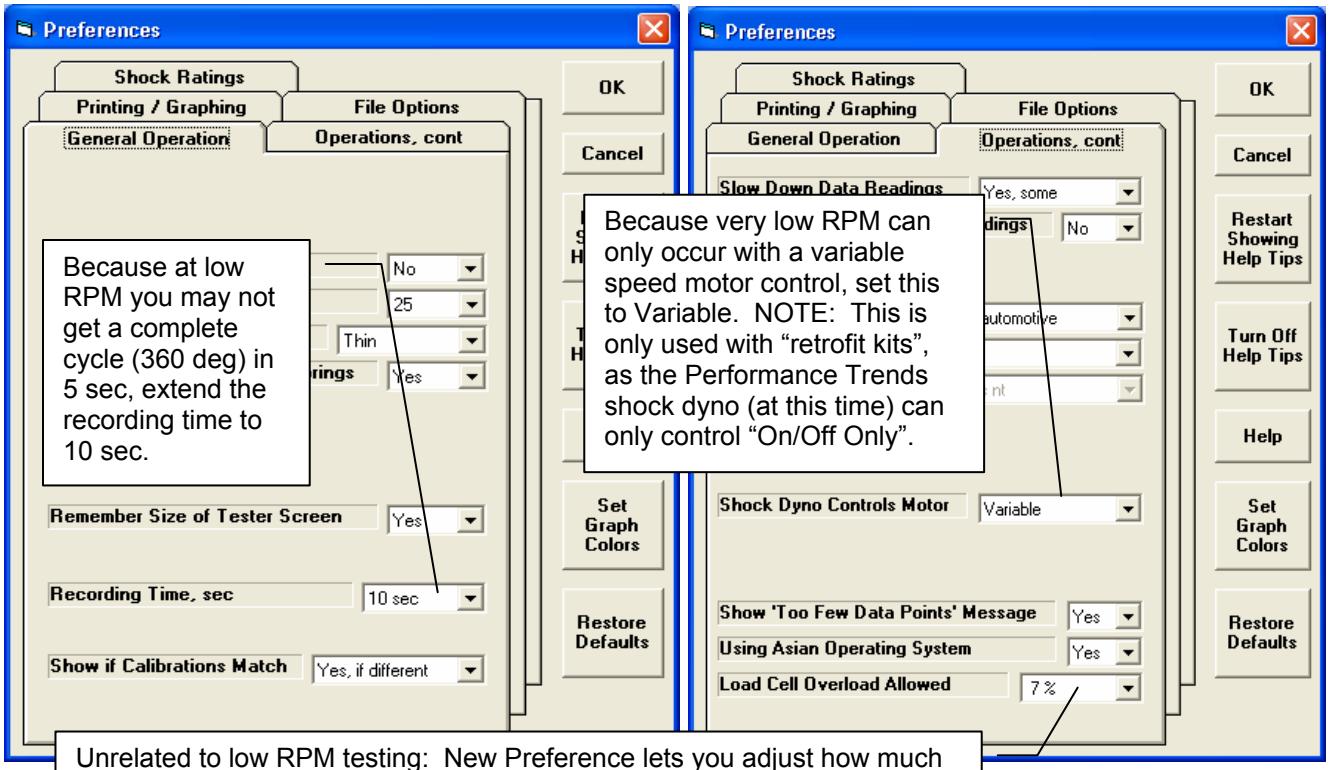


Figure A27 Settings for Running Very Low RPM Tests (like under 50 RPM)



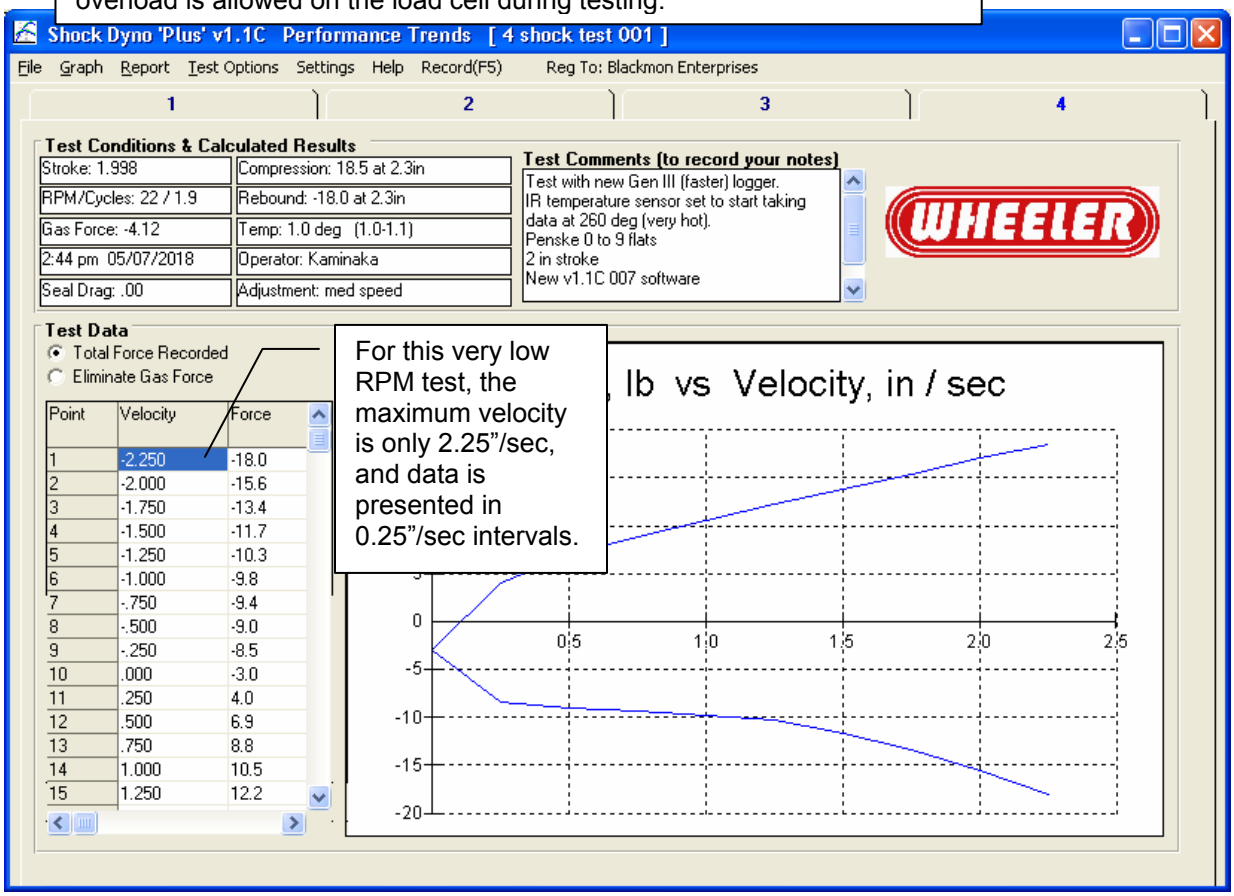
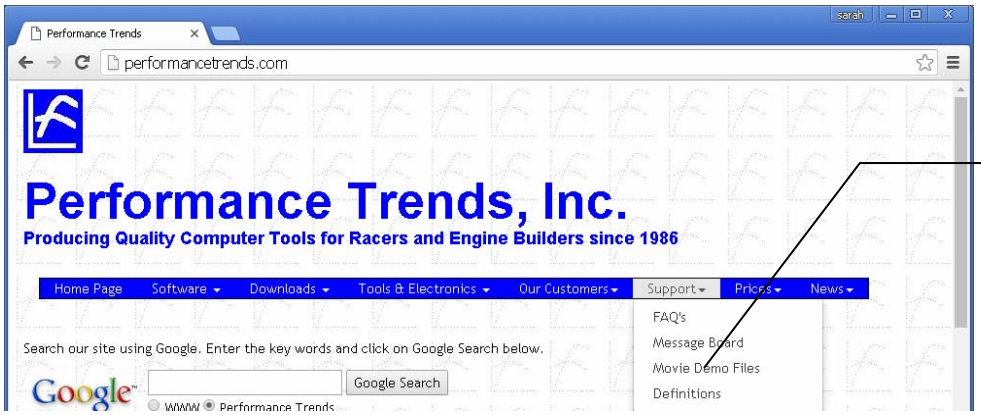
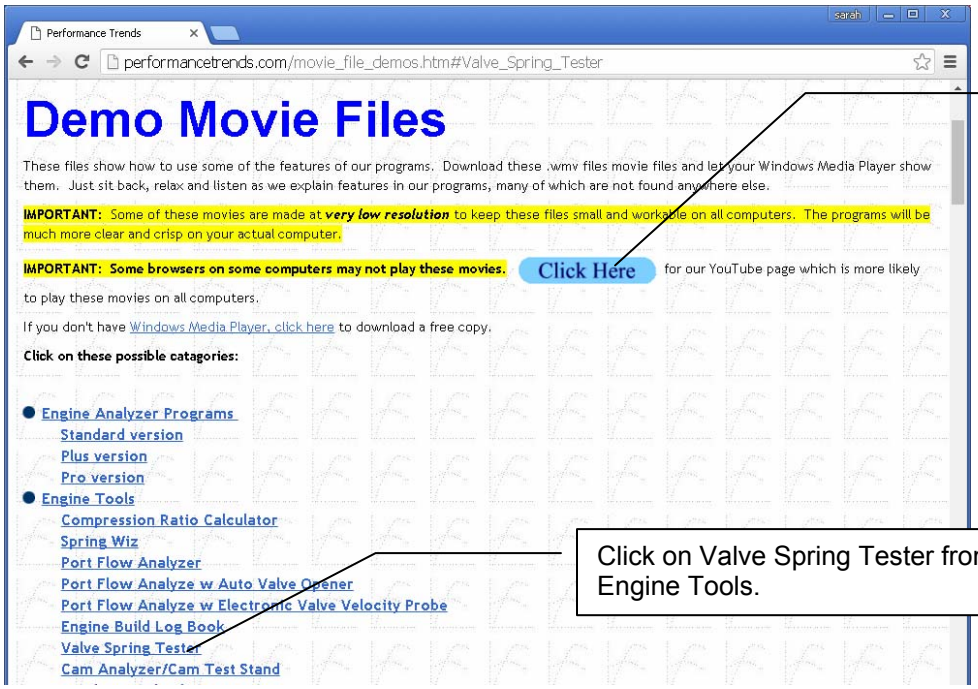


Figure A27 Video Movies to Demo the Spring Tester Features

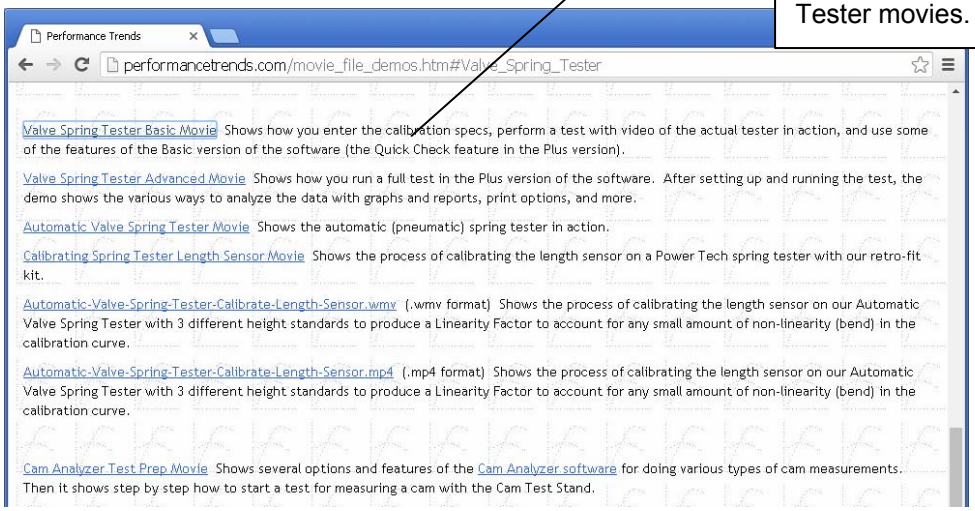


At the Performance Trends website, click on Support, then Movie Demo Files.



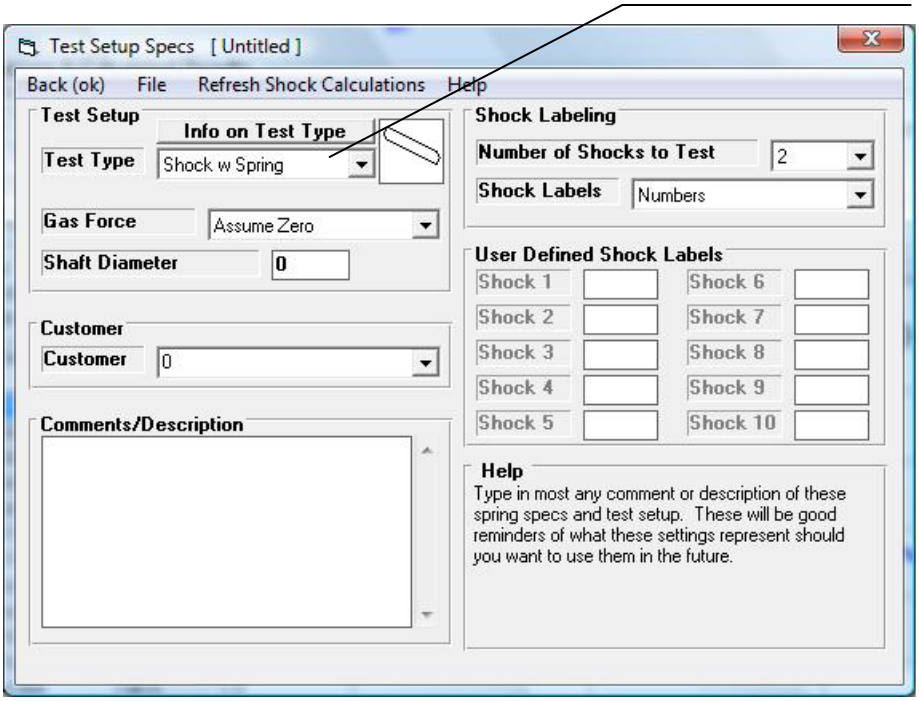
If these movies do not show up correctly on your particular computer, click this button to go to the Performance Trends youtube page. The movies on youtube will likely play correctly on most any computer.

Click on Valve Spring Tester from the list of Engine Tools.



Choose from the list of Valve Spring Tester movies.

Figure A28 Shock w Spring Test Type



New Test Type of Shock w Spring. Choose this if your shock has a spring included, like for coil over springs or motorcycle forks.

You will note that the drawing of the type of data shows a loop like other shocks, but with an angle on the data from the spring effect.

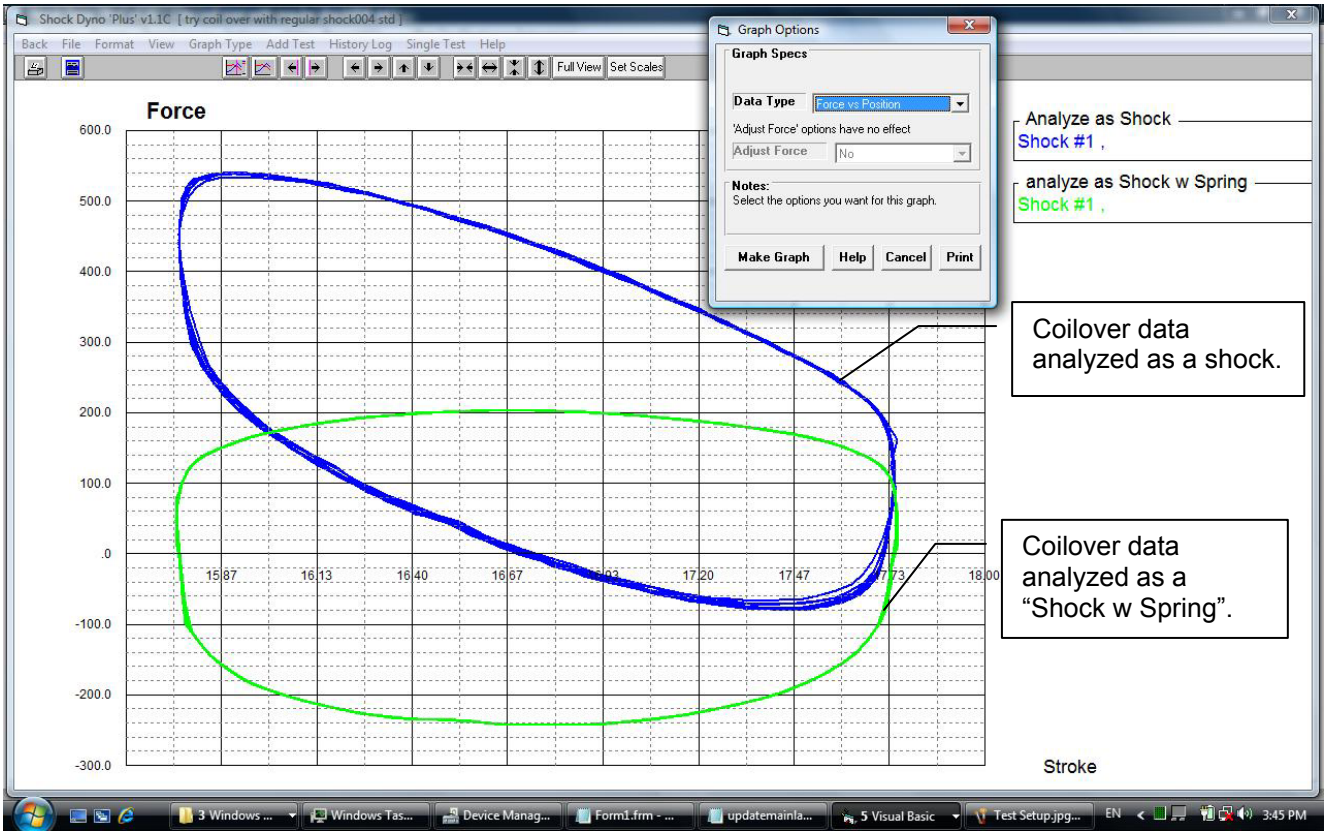
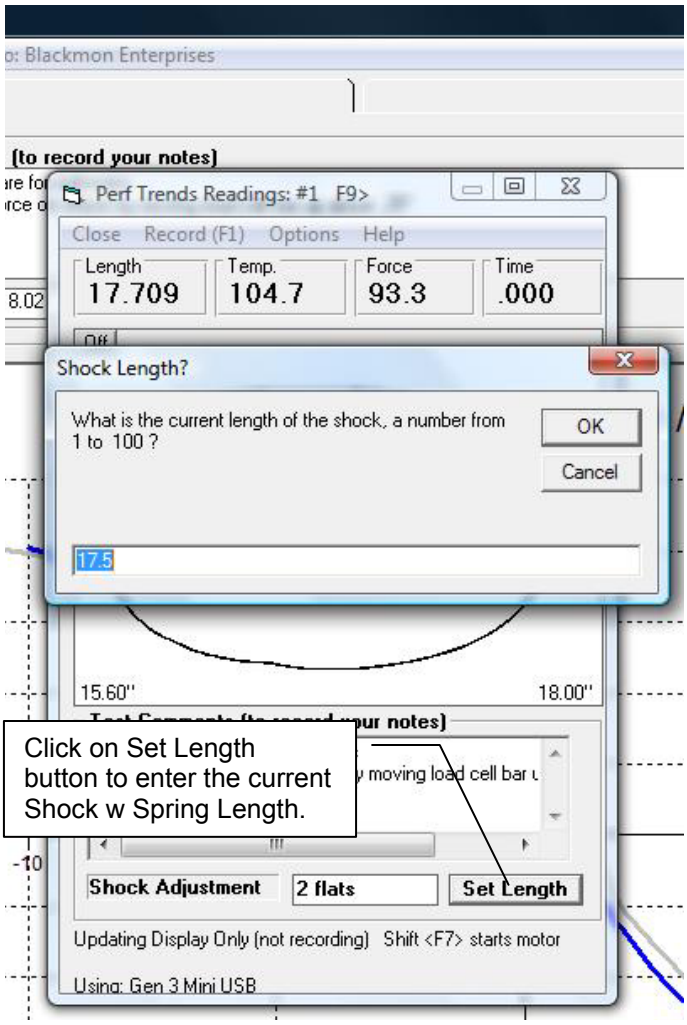
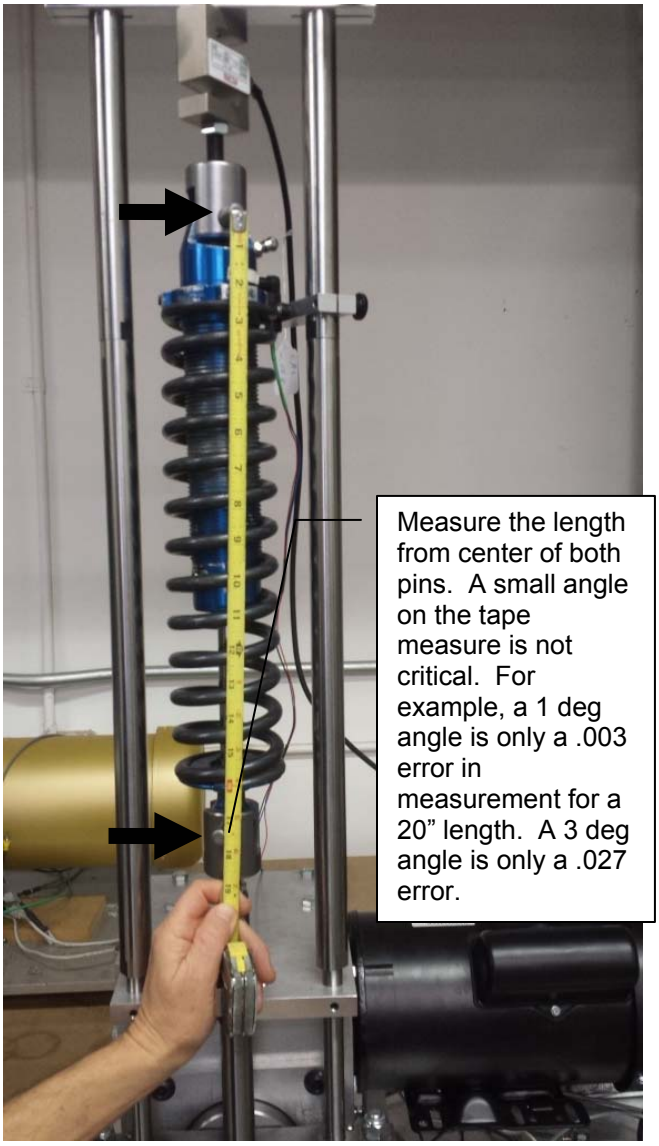


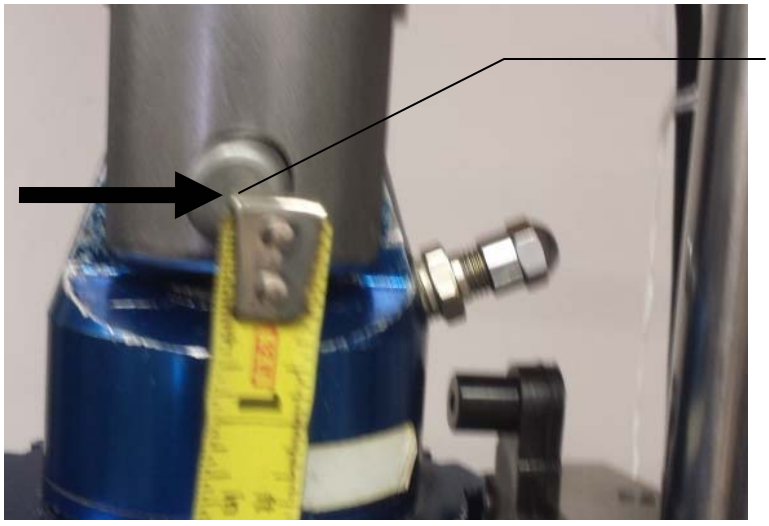
Figure A29 Shock w Spring Test Type, cont



Click on Set Length button to enter the current Shock w Spring Length.

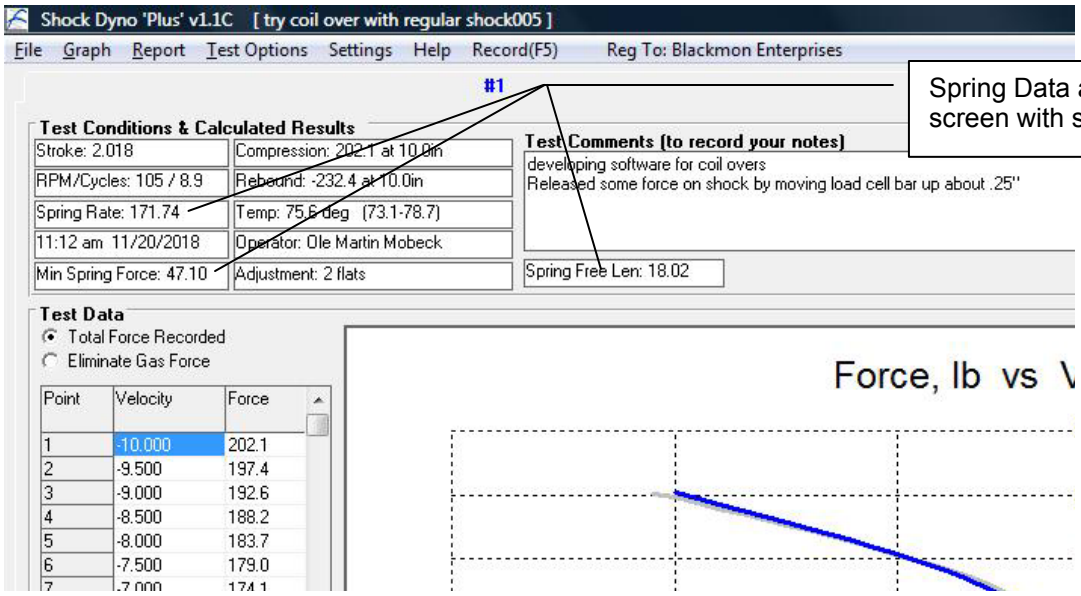


Measure the length from center of both pins. A small angle on the tape measure is not critical. For example, a 1 deg angle is only a .003 error in measurement for a 20" length. A 3 deg angle is only a .027 error.

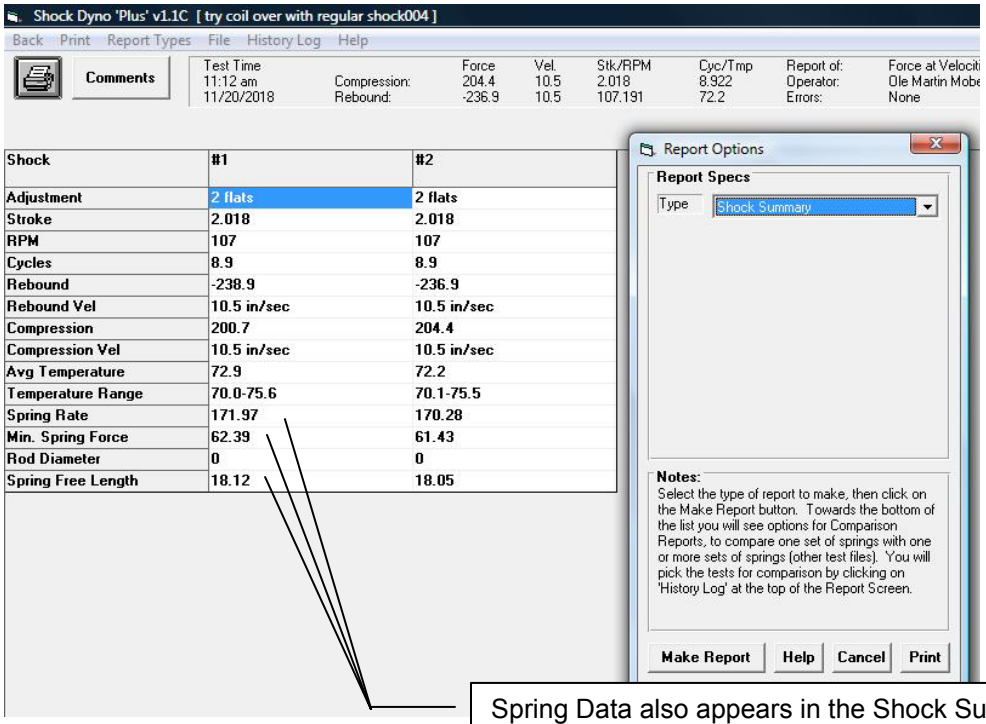


Measure to the center of both the top and bottom pins.

Figure A30 Shock w Spring Test Type, cont



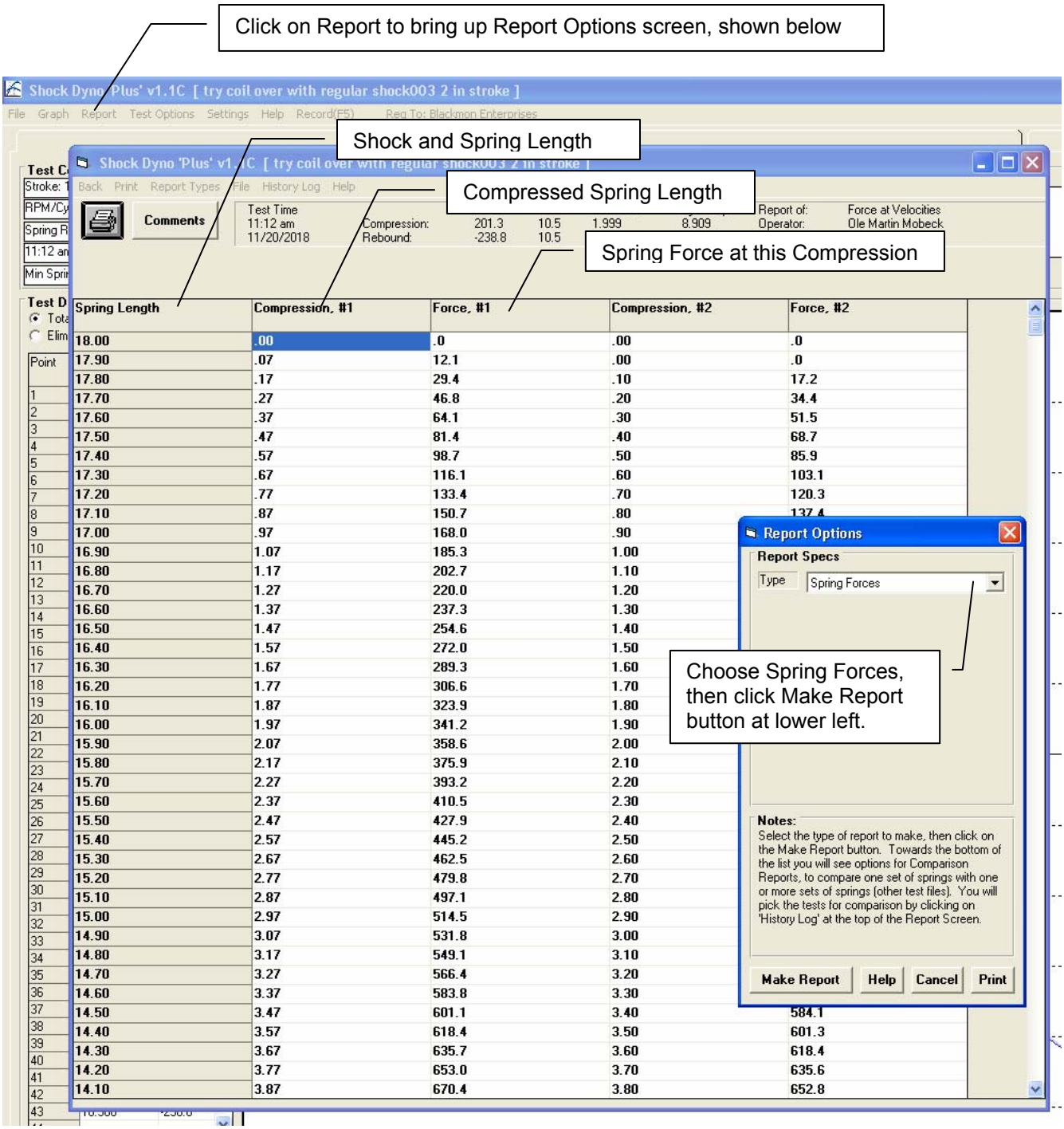
Spring Data appears on main screen with shock data.



Spring Data also appears in the Shock Summary report.

- Spring Rate is the pounds per inch for the spring (English Units)
- Min. Spring Force is the minimum spring force measured, typically when the shock dyno is at the bottom of its stroke
- Spring Free Length is what the Shock w Spring would extend out to if there were no mechanical stops in the shock. Or, this is the shock length at which the spring is no longer exerting any force on the shock.

Figure A31 Shock w Spring Test Type, cont



Spring Length	Compression, #1	Force, #1	Compression, #2	Force, #2
18.00	.00	.0	.00	.0
17.90	.07	12.1	.00	.0
17.80	.17	29.4	.10	17.2
17.70	.27	46.8	.20	34.4
17.60	.37	64.1	.30	51.5
17.50	.47	81.4	.40	68.7
17.40	.57	98.7	.50	85.9
17.30	.67	116.1	.60	103.1
17.20	.77	133.4	.70	120.3
17.10	.87	150.7	.80	137.4
17.00	.97	168.0	.90	
16.90	1.07	185.3	1.00	
16.80	1.17	202.7	1.10	
16.70	1.27	220.0	1.20	
16.60	1.37	237.3	1.30	
16.50	1.47	254.6	1.40	
16.40	1.57	272.0	1.50	
16.30	1.67	289.3	1.60	
16.20	1.77	306.6	1.70	
16.10	1.87	323.9	1.80	
16.00	1.97	341.2	1.90	
15.90	2.07	358.6	2.00	
15.80	2.17	375.9	2.10	
15.70	2.27	393.2	2.20	
15.60	2.37	410.5	2.30	
15.50	2.47	427.9	2.40	
15.40	2.57	445.2	2.50	
15.30	2.67	462.5	2.60	
15.20	2.77	479.8	2.70	
15.10	2.87	497.1	2.80	
15.00	2.97	514.5	2.90	
14.90	3.07	531.8	3.00	
14.80	3.17	549.1	3.10	
14.70	3.27	566.4	3.20	
14.60	3.37	583.8	3.30	
14.50	3.47	601.1	3.40	584.1
14.40	3.57	618.4	3.50	601.3
14.30	3.67	635.7	3.60	618.4
14.20	3.77	653.0	3.70	635.6
14.10	3.87	670.4	3.80	652.8

Index