

ROEHRIG ENGINEERING, INC.

SHOCK 5.1

**SOFTWARE AND OPERATORS MANUAL FOR
CVS DYNAMOMETER**



TABLE OF CONTENTS

GETTING STARTED	2
THE PROGRAM	3
ICONS	3
ANALYZING YOUR DATA	4
<u>MENUS</u>	6
TEST	22
VIEW	28
THE DYNAMOMETER	28
TO CHANGE THE STROKE OF YOUR DYNO	29
THE COMPUTER	29
MAINTENANCE	29
GLOSSARY	30

INTRODUCTION

Thank you for purchasing an REI Damper Dynamometer. This manual explains the operation of the SHOCK5 software package that is part of your system.

The SHOCK5 software runs under the Microsoft WINDOWS 98,2000,NT,ME,and XP operating system. If you are new to this operating system, refer to the Microsoft manuals that were included with your computer. Go through the tutorials and become familiar with window and mouse operations.

Shock5 will open data collected in shock96 with the same OPEN DATA button used to open SHOCK5 collected data.

GETTING STARTED

This manual is written as a supplement to enhance your factory training, not replace it. It is recommended that you read the entire manual before attempting to run the dynamometer. Some things that may not be clear when first encountered in this manual will be more fully explained later. As an aid, all computer commands and options will appear as a different font: **Computer Command**. All options are preset at the factory to allow you to run test without any option changes. A Glossary is provided at the end of this manual to define any terms you may not be familiar with and an index is included to help you locate specific topics. The first pages of this manual are designed to help you learn to run a test and graph the resulting data. Subsequent pages will help you become familiar with options and preferences to customize the program for your particular application.

In addition to this manual, the following documents are supplied to aid in the hookup and operation of your dynamometer. A diagram explaining how to connect the wiring to a switch box; a manual which Toshiba provides with the motor controller. We also provide a separate document describing the mechanics of damper dynamometers, and how they collect data. This should be read first to give you a background on what the dynamometer is doing, and how it collects the information about your shock. If you are missing any of these documents, please contact Roehrig Engineering for a replacement.

When your computer is turned on you will see the Windows desktop. To start the program, click on the Shock5.1 shortcut icon.



THE PROGRAM

The top of the screen should show a menu bar containing the following choices: **F**ile, **E**dit, **G**raph, **T**est, **H**ardware, **V**iew, **W**indow, and **H**elp. If you click on the **T**est menu and the **P**erform Test option is not highlighted then the software key for this program is not connected to the parallel port (LPT1) of the computer. Before putting the key in place, exit the program. As a note, the Shock5 program is key operated and you will not be able to collect data without it. You can still look at, and print files without the key in place. **It is very important to keep the key in a safe place since its replacement cost is equal to the software price.**



ICONS

Certain commands can be accomplished by clicking the icons on the Tool bar below the Menu Bar. When this is the case, the icons appear next to the corresponding commands in this manual.



COLLECTING DATA

CVP DATA COLLECTION

1. When you are ready to collect data, click on **T**est in the pull down menu and then click **P**erform **t**est.
2. Select your test profile and click edit if you wish to make any changes. CVP test is set up from the factory with the most popular settings and will perform a CVP test at 10 ips on a two-inch stroke.

4. At this time be sure the dyno is at bottom dead center. If you need to bring the dyno to BDC press the **Go To BDC** button. Hang the shock damper from the upper clevis so that it is not touching lower clevis.
5. Click the **Zero Load** button to zero the load cell and take the weight of the shock out of the data. You can verify the results by looking at the live force reading.
6. Lower the cross bar and connect the damper to lower clevis.
7. Pull cross bar down a minimum of ¼ inch to preload damper and tighten clamps, this is done to prevent the damper from bottoming out in extension.
8. Tighten the clevis handles by turning clockwise until brass button in clevis seats against shock eye. This is done to remove any free play in the damper ends.
9. Connect the temperature sensor to the damper body. The program is set by default to do a 90-deg. temperature based warm-up. To check what warm up type you have selected click on **EDIT TEST**.
10. The program, by default, is set to do an automatic gas test to measure and record the gas force in the shock. (If you have changed this setting to do a manual gas test, click **Gas Test** to record the gas force.) From the factory the program is set to remove the gas force from the displayed data. To check what gas test you have selected click on **EDIT TEST**.
11. Click **Start Test** to begin the test. .
12. The **Data Description** window will now appear.(when this window appears can be changed in preferences) Enter data and valving information that you want to save with your data. The **Test Data** tab of this window will display numeric data after the collection is complete.
13. After you click OK on the **Data Description** window click OK on the start test prompt. The **Warm Up** option will run to the preset temperature of 90 degrees F do the gas test and take the collection. (warm up may be changed in the EDIT TEST window) You can follow the progress of the collection by watching the status window.
14. When the machine has stopped, the **Save As** window will appear, name the file and click **OK** to save to the hard drive.


PVP TEST

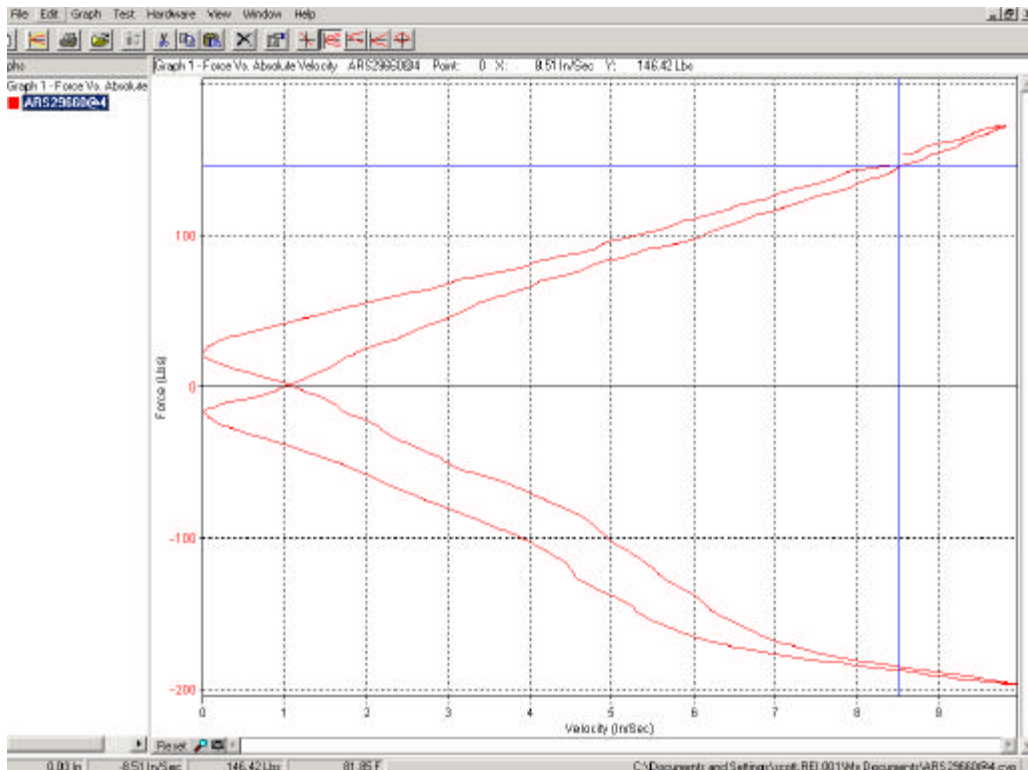
1. Your Shock5 program allows you to collect at as many peak velocities as you wish. When you wish to perform a PVP test, click **Test** and **Perform Test** from the pull down menus.
2. Select the factory set PVP test from the **Test:** window. You can run the preset velocities or click edit to change velocities. At any time you can select **Create Test** from the **Test** pull down menu to create your own test. New test created will then show up in the **Test:** window on the **Perform Test** page.
3. The test procedure is the same as a CVP test; again you can follow the collection as it runs each test speed by watching the **Status window**.
4. Files will be saved with a pvp extension rather than a cvp extension.

ANALYZING YOUR DATA

The program will display the graph of the last collected data file automatically after a test has been run and a name given to the file. File names are displayed on the left side of the main screen. The program will overlay all open data files. To display only selected open files use the **L** hot key or **click Graph**, then **Data**, and then **select Data to display**. From here the user can highlight the data files to display. This allows the user to keep files open in the program, but hidden on the graph. Left clicking on the graph name on the left side of the main screen and then right clicking on the highlighted graph name can also access this same window. Another method that allows the user to control which data files are displayed is to choose to **hide** or **show** a file on the graph. Right clicking on that file name will bring up the **Data** window. This data window is available in the **Graph** menu if the file name is highlighted in the left side of the main screen.

For other graphing and display options see the section in this manual explaining the **Graph** pull down menu. If there are no graphs open you must first click **New Graph** before you can open a data file. There are many options to control how you view your data. To fully understand all the graph options we advise you to read the entire manual. Reference to specific commands or options can be found in the index at the back of this manual. To close a data file or a graph, highlight the file or graph you wish to close, click the **Edit** menu, and then click **Remove**.

To quickly move a graph to a document click on the camera icon at the bottom of the graph open a document and click paste. 

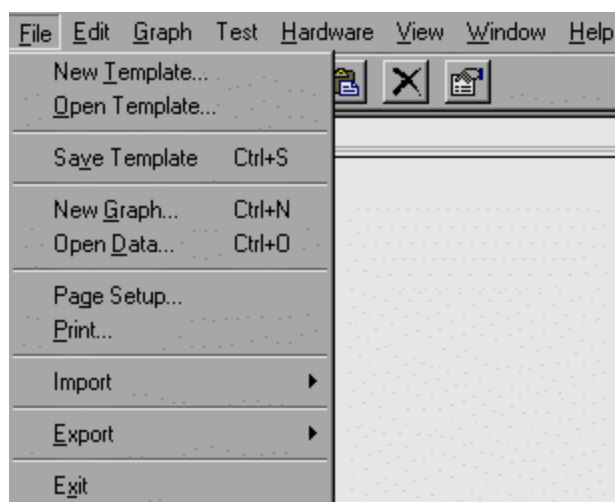


3.

MENUS

Each menu displays options and various tasks that can be done in the program. The following is a description of each menu, and what can be found under each menu heading. Please be aware that some sections are for advanced users only and should not be used unless you are very familiar with the program. Any hot keys are listed next to the option. Main menus are displayed in blue.

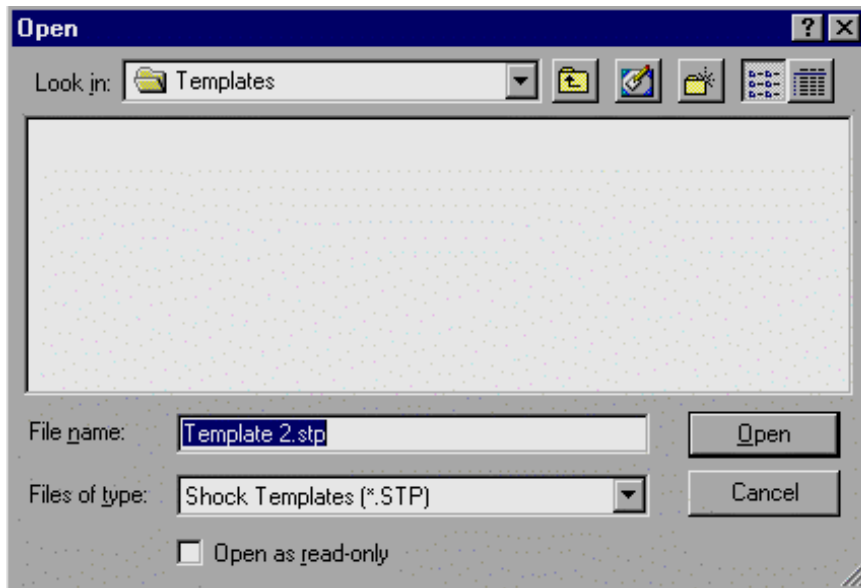
File



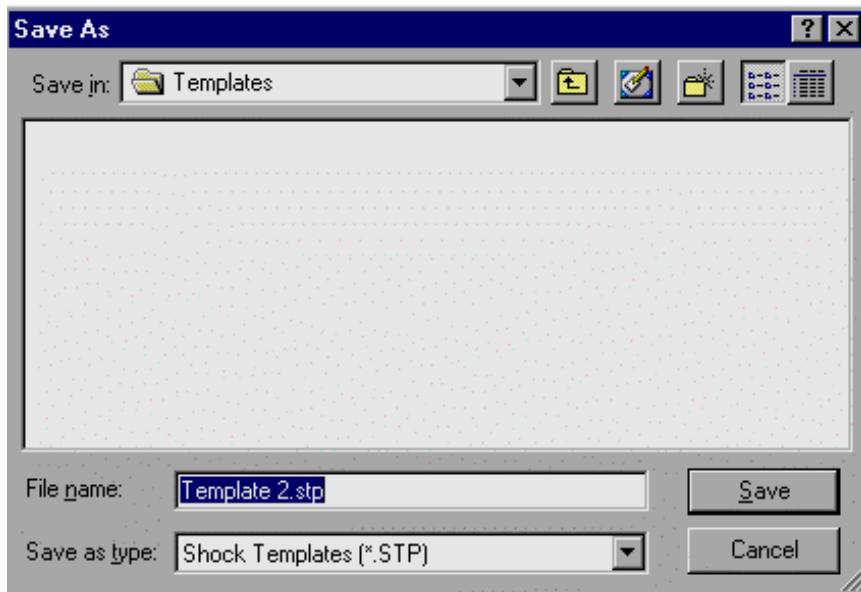
New Template Templates will save all open data file in one file. To make a new template, click on **New Template...** and set any options you wish to save within the program.

Clicking on **Save Template...** allows the user to name the template when the **save** window appears. Templates are saved to a separate directory and named by the user. This option can also be used to save multiple traces on one graph.

Open Template This menu opens to the directory that stores all templates allowing the user to select a preferred template.



Save Template Selecting this option will open the save template window. To save a new template, give a name to your new template and click **Save**.



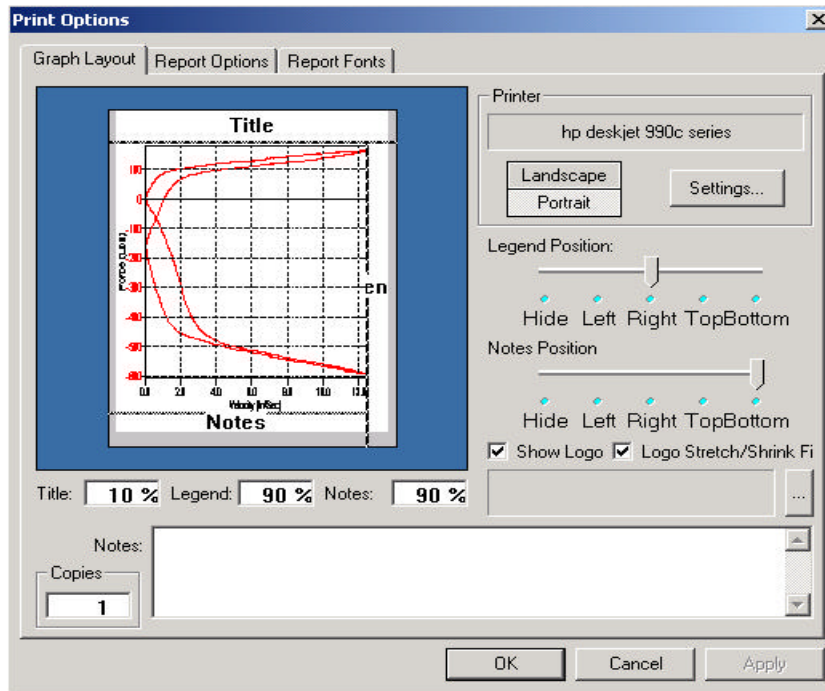
New Graph This will allow you to have more than one graph open at a time. You can look at different data files or the same files in a different graph type without altering the graph you have open by selecting **New Graph** and then opening your data files.



Open Data - Use this selection to open and graph saved data files.

Print Setup - Displays the Windows 98 Print Setup screen. The paper **Orientation** may be changed from **Portrait** to **Landscape** at this screen.

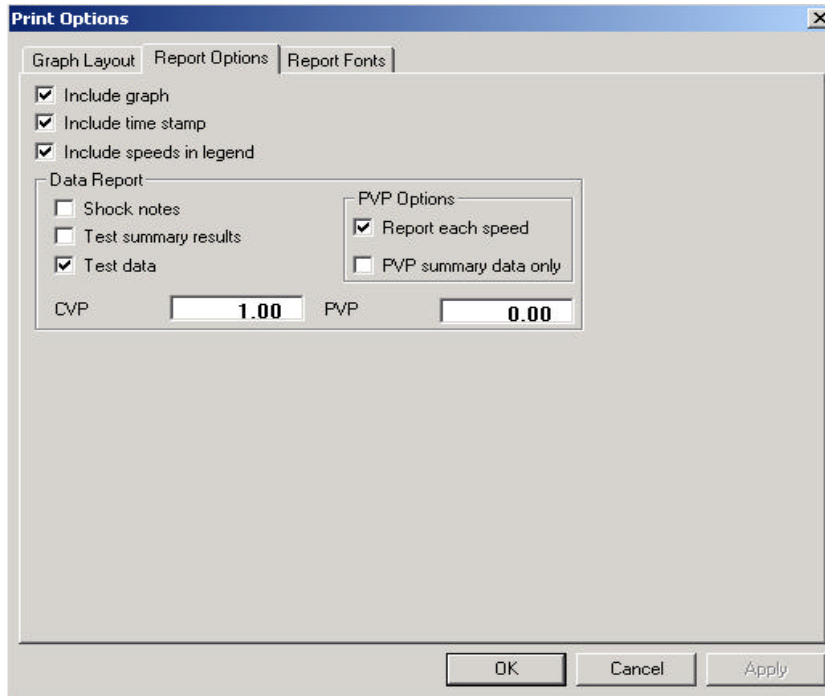
Print - All used definable print features can be found on this page.



The graph layout fraction allows the user to size his graph, legend, and notes on the paper to fit his needs. The numbers that are entered under the picture of the graph are the percent of the page from top or left that each item will start at. If the notes were positioned at the bottom of the page and set on 90% the note box would start at 90% of the page, measuring from the top of the page. The legend and notes can be located on the left, right, top, and bottom of the page or hidden. Moving an item will require a change in the page percent number to keep the graph area the same. In most cases selecting the same print settings on different machines will produce the same size graph on the paper if you attempt to match graph sizing on different printers it may be necessary to set the size number different to create the same size graphs.

Show Logo- Check this box to include a logo on your printer graph. To select a new logo click the small button to the right of the status bar under the show logo box and select the bit map file to use. The loaded logo file name will appear in the status box. If you select the **stretch to fit** box the program will fit the logo to the page without changing the graph size. If this box is not checked the program will display the logo as the saved size.

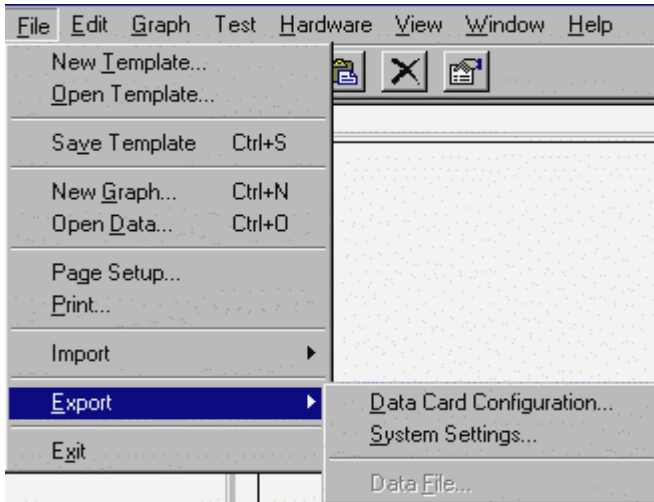
Report options this page defines all parameters for the numeric reports that are printed, To print only the graphs with no report remove all check marks on the **Data Report** section of this page. To print only the reports without the graphs uncheck the **print graph** box at the top of the page. To print only the graph with no report remove all check marks in the **Data Report** section of the **Report Option** page. To print the actual PVP speeds on a report type 0 in the PVP display spacing box at the bottom of the **Data Report** box.



Report Fonts- This page is used to define the font for each area on the graph and report. Double click on each area to open the font dialog box.

Import- To import a data file the file must be in a very specific Excel format. An example of this format is included at the back of this manual. The data header and signal definition information must be in the exact location. The user can import as many signals as desired. Each signal gets its own column. The units specified must match the short unit names listed in the back of this manual.

Export- You may export your Data card configuration, System settings or a data file. To export a data file open the file highlight the file name on the left of the main screen and select export.



Exit Use this to exit program

Edit



Cut

Copy

Paste Use these commands to move or copy data files between open graphs. These commands operate in standard windows format.

Paste as not used at this time

Remove Click on this to remove the graph that is highlighted in the left-hand side of the screen. Also use to close any data files that you no longer want displayed.

Preference In this window the user can define most of the default settings that control how a test will be run and how data will be graphed. Keep in mind that these are default settings and can be changed in other areas of the program without affecting the default settings.

Display

This page will define how collected data is displayed.

Initially remove Gas Force-With this box checked program always removes gas force from the graph.

Assume Shock96 Data has Gas Force removed-only applies to imported shock96 data

Filter Shock96 data to Single Complete Cycle-Only applies to shock96 data set as default to graph with single cycle.

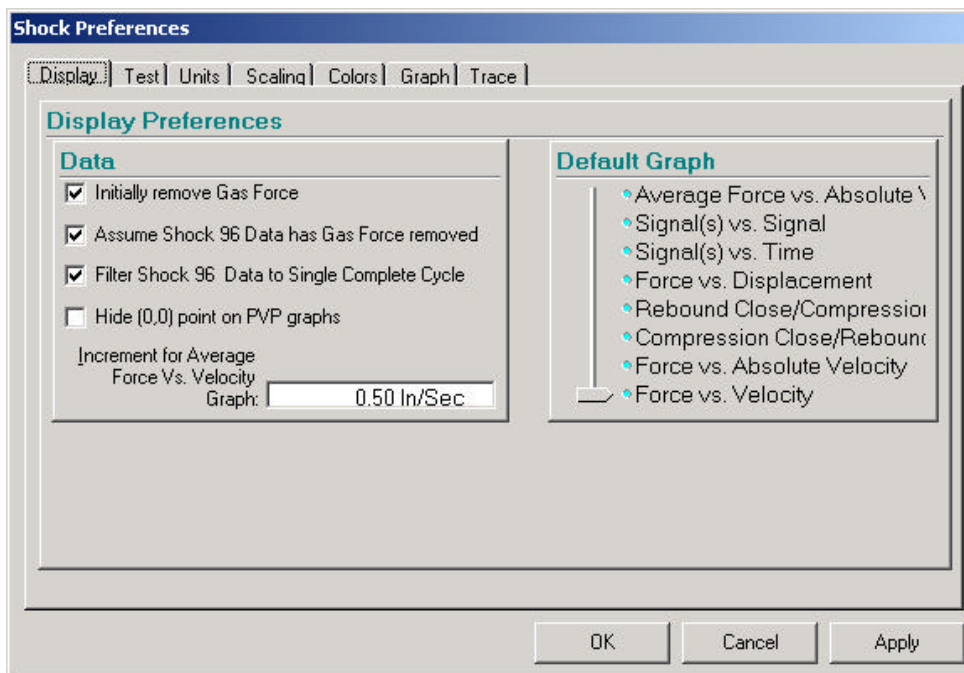
Hide (0,0) point on PVP graphs- A zero point will not be included in PVP graphs if this box is checked

Increments for Average force Vs. Velocity graph. -Only applies to Average force graph will control how far the cursor moves at each step.

Trace display width-Defines the thickness of the trace line being displayed,

Print display width-Defines the thickness of the trace being printed, this allows you to use different trace thickness when printing or viewing data to make them easier to read.

Default graph type-graph type your program will bring up. If graph type is changed in another area program will return to this graph type when re-started.



Test options

New data file name-This is the default name followed by a number the program will give each collection if you don't name it when saving a new collection.

Gas Test Settle-Time-The period of time the dyno is stopped to perform the gas test.

Zero Velocity Settle Time-The time the dyno is stopped for zero velocity recording.

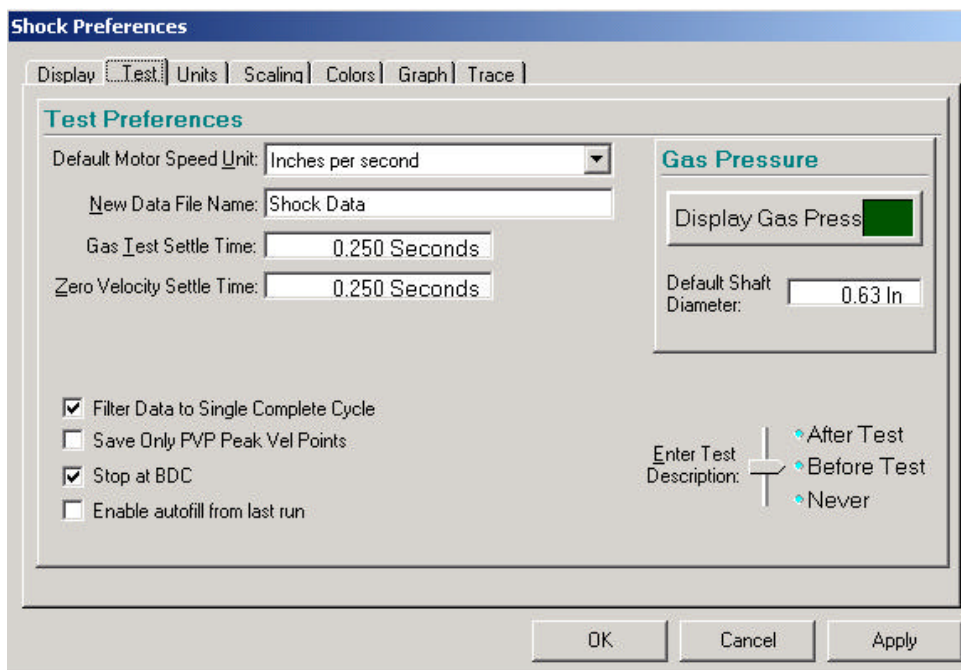
Filter Data to Single Complete Cycle-check this box to display one complete cycle.

Save only PVP Peak Vel Points-Don't check this box if you want to record CVP data for each PVP point you select.

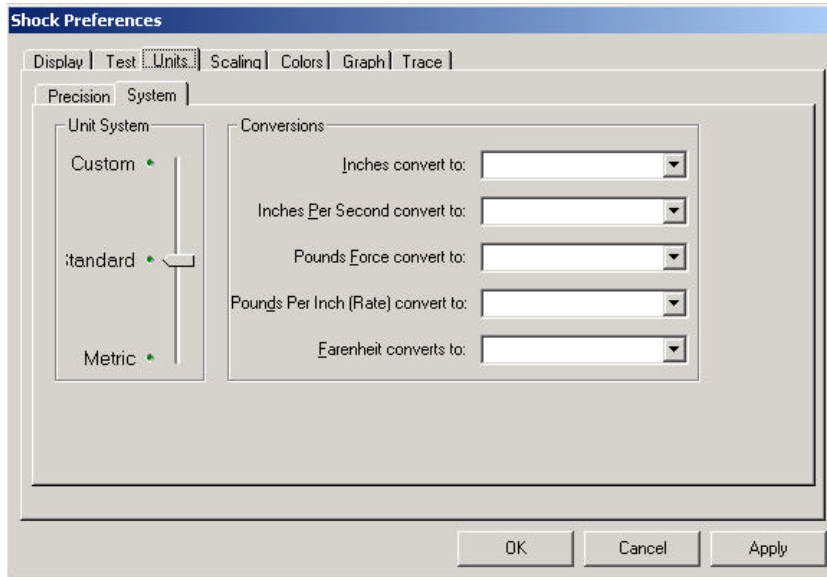
Enter Test Description-Use this box to control when the test description page will be displayed for user to fill in test information

Default Motor Speed Units-This box displays the units for motor speed. For most testing, this will be set to **Velocity**.

Display gas force or gas pressure- In you test results you can display gas pressure, or by entering you correct damper shaft diameter you can display the force the gas pressure is exerting on the shaft.

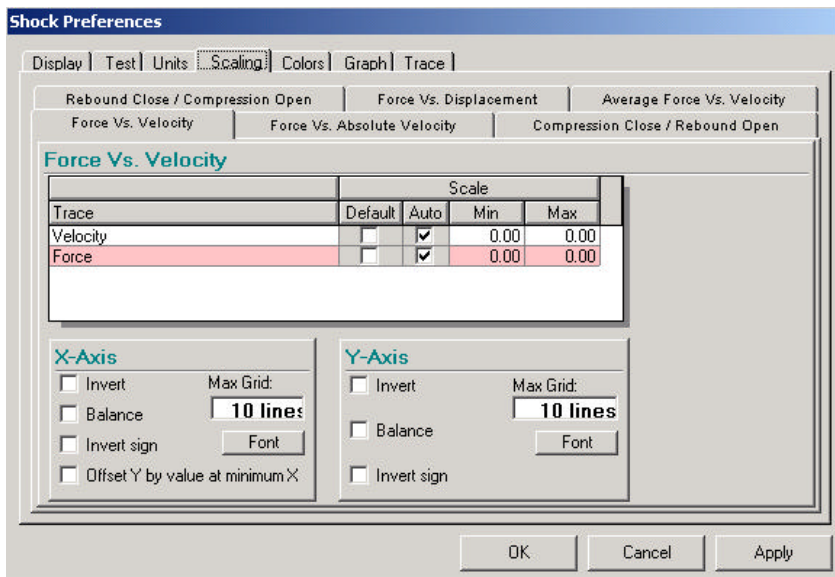


Units use this box to set English or metric measurements in displayed data, **Custom** option allows user to mix systems. To switch between metric and US units quickly use the CTL-F12 hot key.



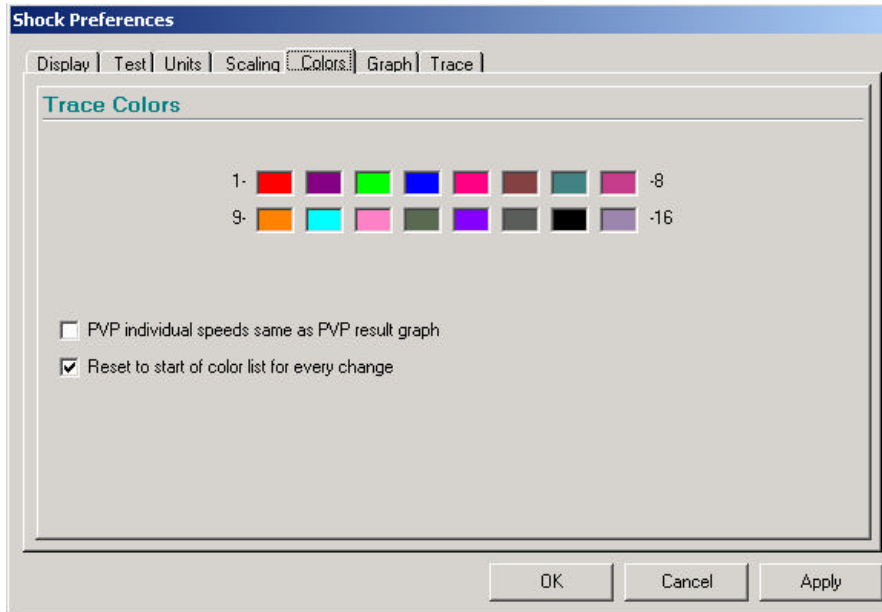
Scaling

This page allows the operator to define scaling for each graph type and channel. The operator can select different scaling for different graph types. If auto scale is selected the program will size the graph to fit the trace, If default is selected the program will use the scaling defaults on the trace page. The number of grid lines can be controlled with the max grid boxes. The program will only display grid lines by multiples of 1,2,5,10 of that axis, any other requested number will be forced to the closes number. You may invert the axis or the sign (change a negative number to positive) by using the invert buttons.



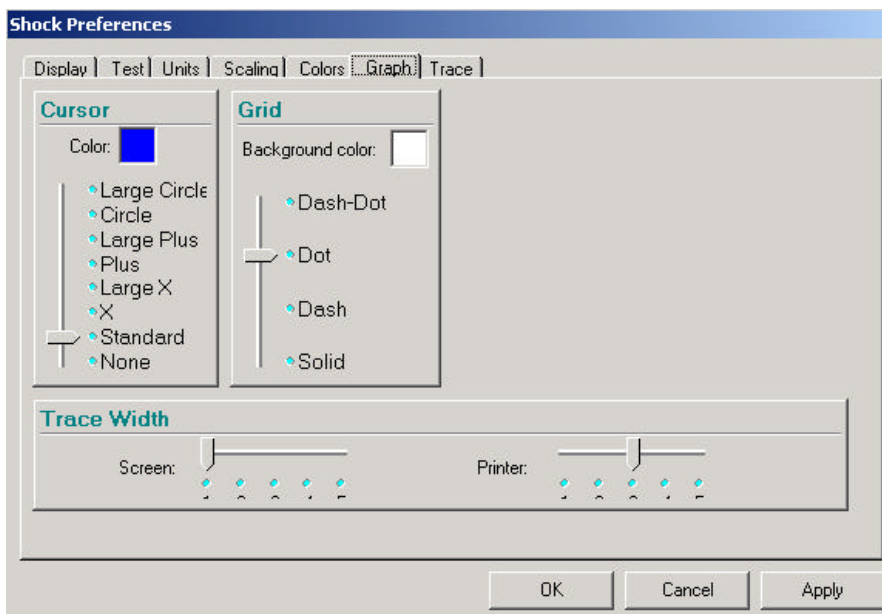
Colors

Lets the user define the colors and order of the colors that the program will use for signal displayed on your graphs. Left mouse click on the color box to bring up the complete window of colors available. Hitting the "C" key with the data file highlighted can also change colors.

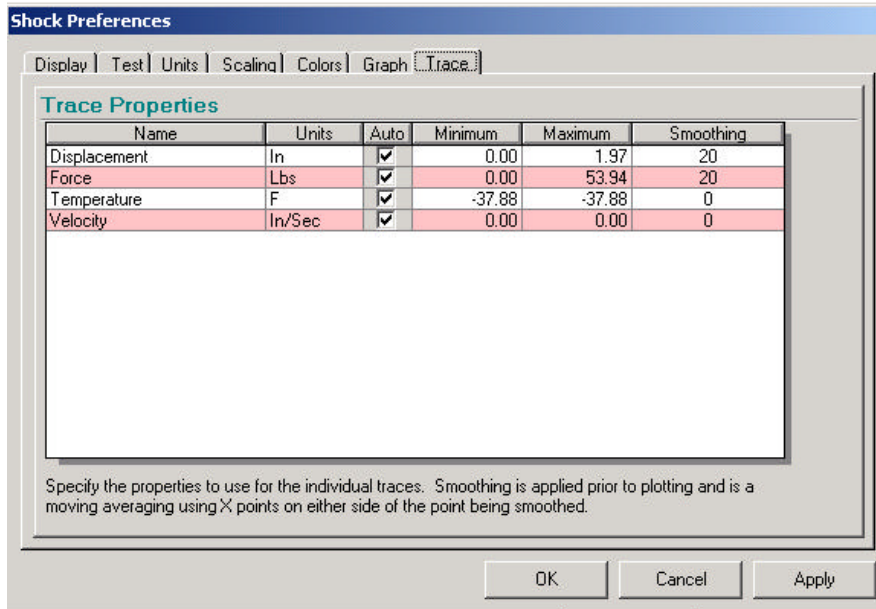


Graph

Graph, grid and cursor styles can be modified from the graph page. Trace width will define the thickness of the data traces on the monitor and printed graph.



Trace - If you select default on a graph type on the Scaling page the program will default to this page for scaling. If you select default on each graph types all graphs will scale to this page. Like the Scaling page selecting auto scale will size the graph to fit the data trace. Smoothing will filter the signal for that channel to remove electronic noise. If all channels used are scaled at the same value under 30 the accuracy of the data will not be effected. Filtering only one channel or using a value over 30 could offset the graph.



Graph

Data - The data window controls what graphs you will display. This window can also be opened by right clicking on a graph name on the left-hand side of the main screen.

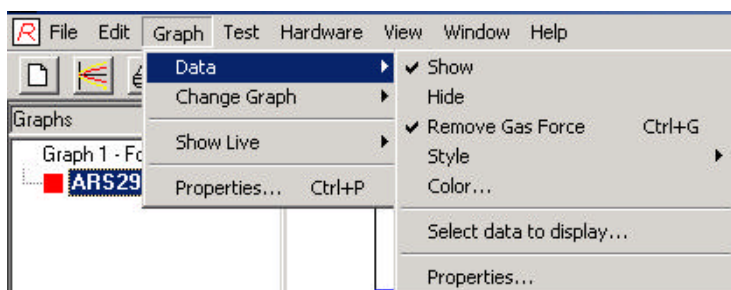
Show- Check this command to display the data that is highlighted to the left of main screen on the graph.

Hide- Check this command to hide the data that is highlighted to the left of the main screen on the graph.

Select data to display- this brings up a window displaying all data open, highlight data you wish to Display

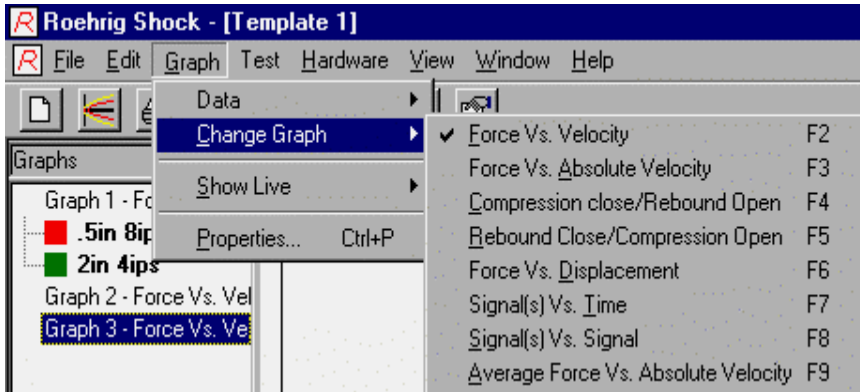
Remove Gas force- When this box is checked gas force in the shock will not be displayed on the graph.

Style- use this menu to change the data trace style from a solid line to dots or dash.

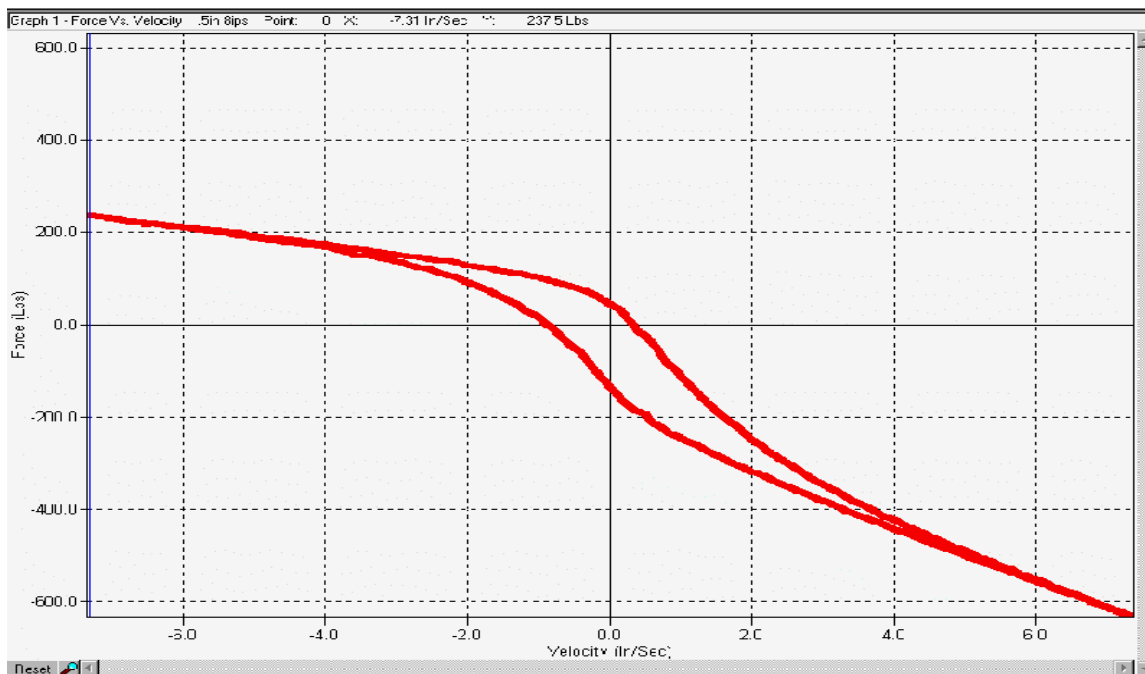


Change Graph

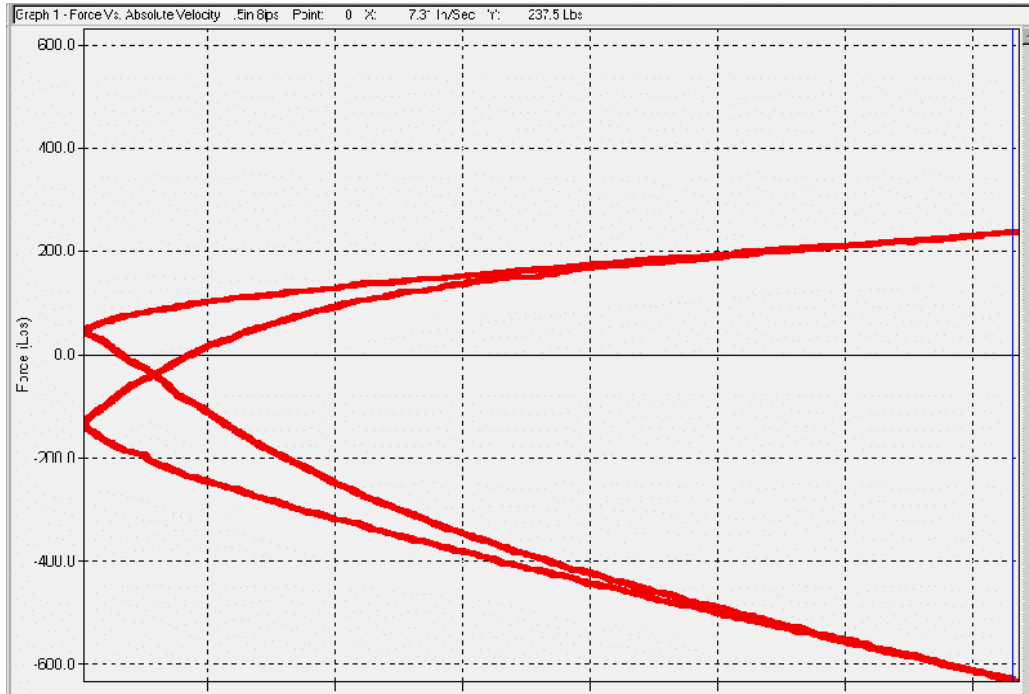
This window allows you to select how your data is displayed. Select the type of graph you wish to use by clicking on the appropriate graph type. Following is a short description of each graph type. In the graph examples, compression forces are above the zero force line and rebound forces are below.



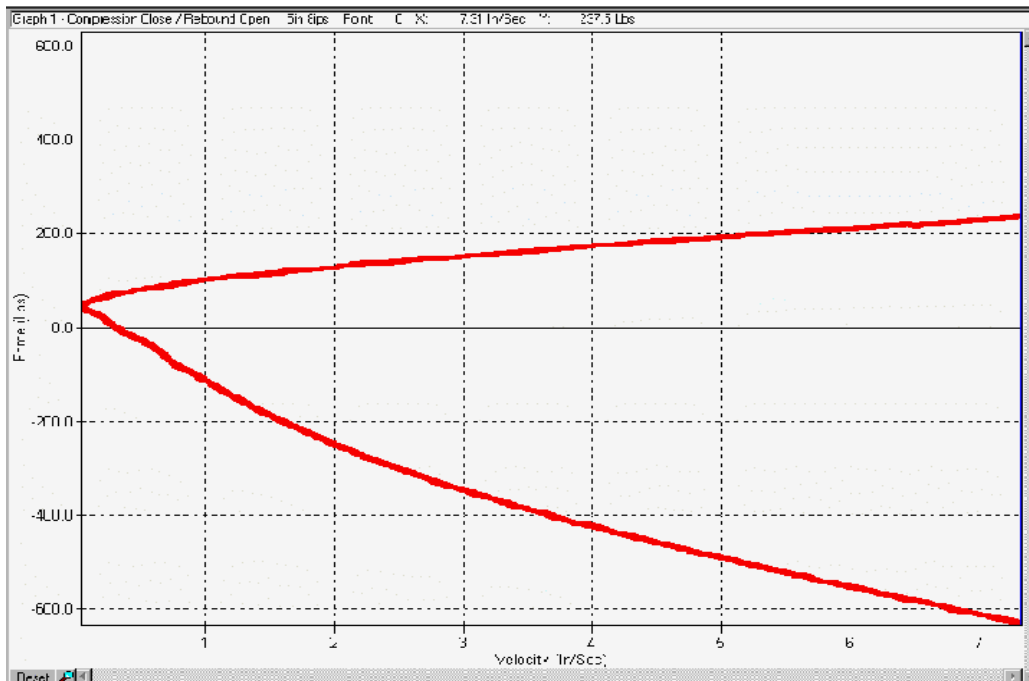
Force Vs. Velocity Depicts a full stroke cycle (360 deg.) of damper motion, showing positive and negative velocity values. The zero velocity line is in the center.



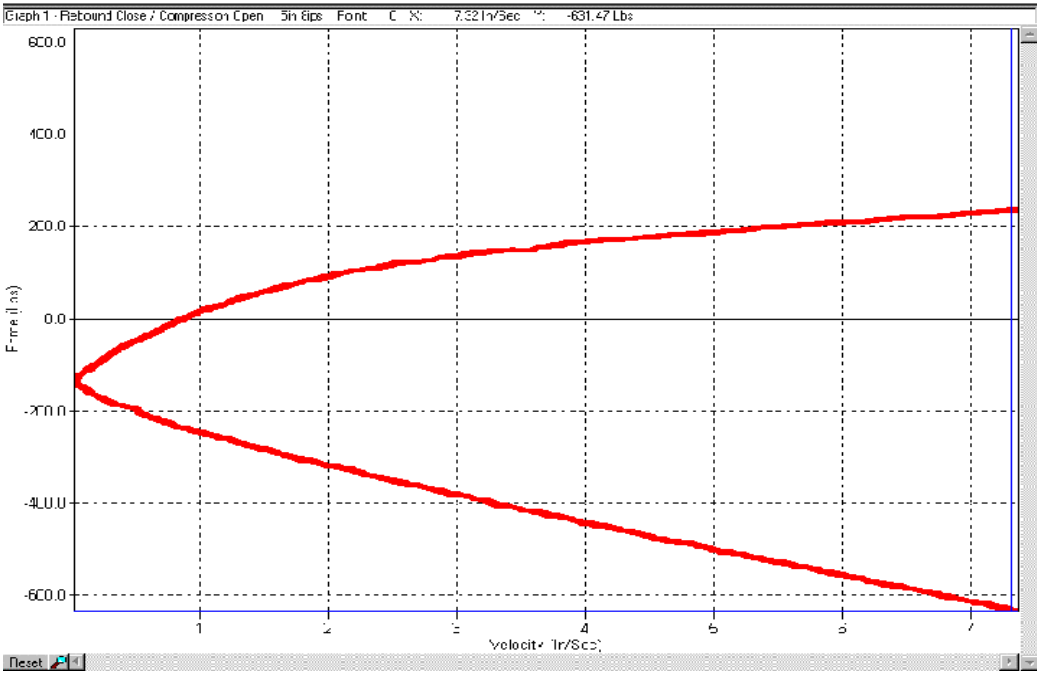
Force Vs. Absolute Velocity This type of graph depicts the complete cycle also, but all velocities are graphed as absolute (positive in value). The zero velocity line is at the extreme left. Basically, the left side of the **Force Vs. Velocity** graph is folded over the vertical axis that represents the zero velocity line.



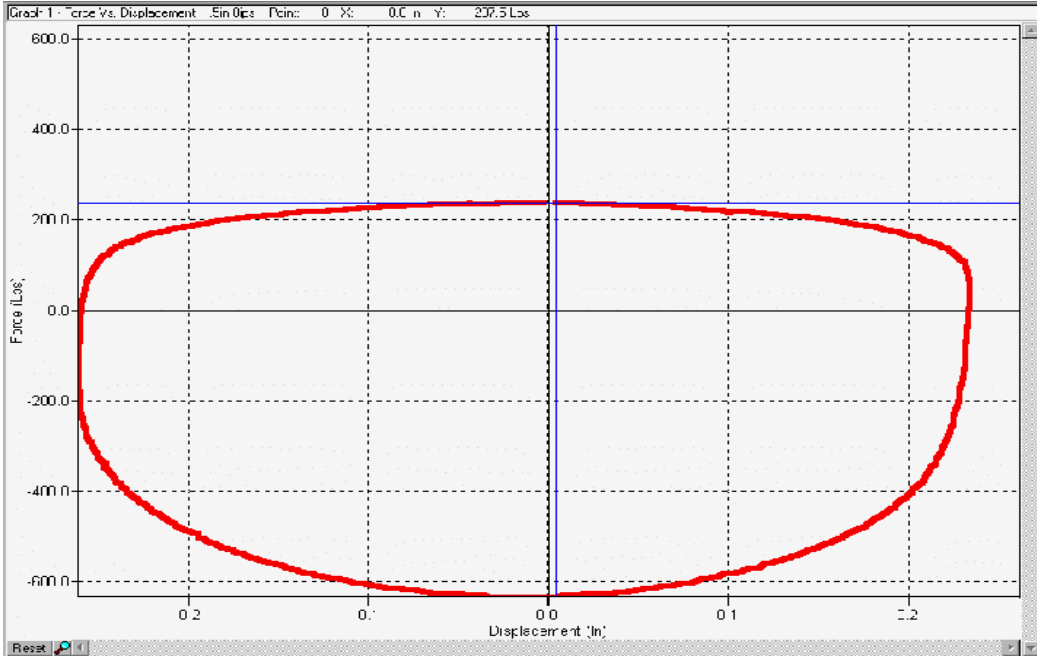
Compression close/Rebound open This graph displays the lower 180 deg. or one half of the damper cycle.



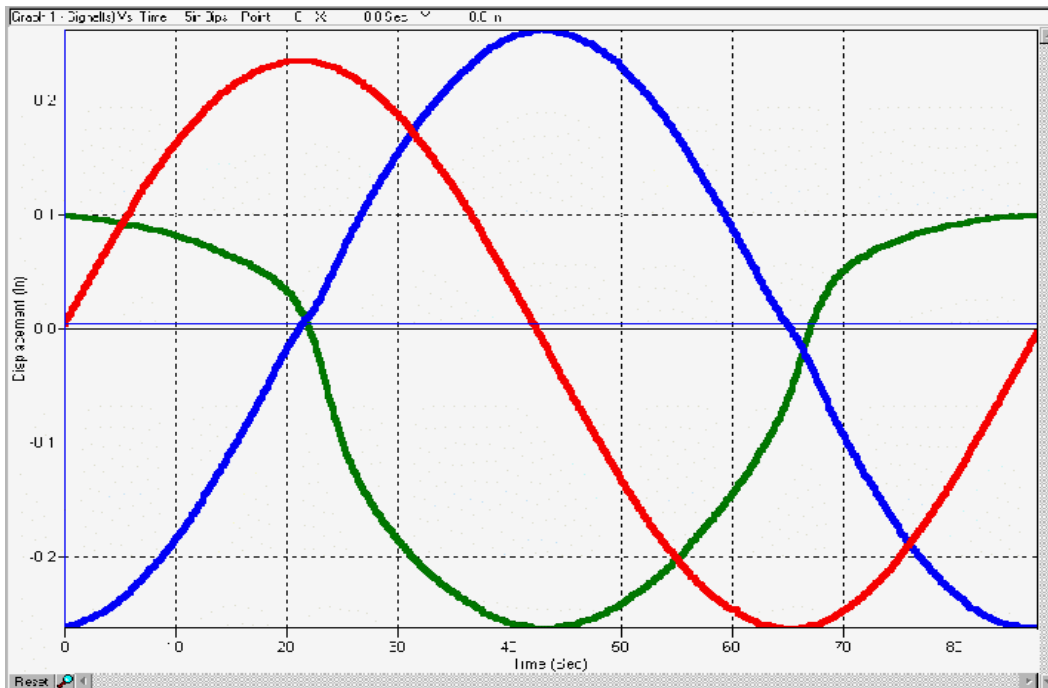
Rebound close/compression open- the other half of the cycle is depicted on this graph.



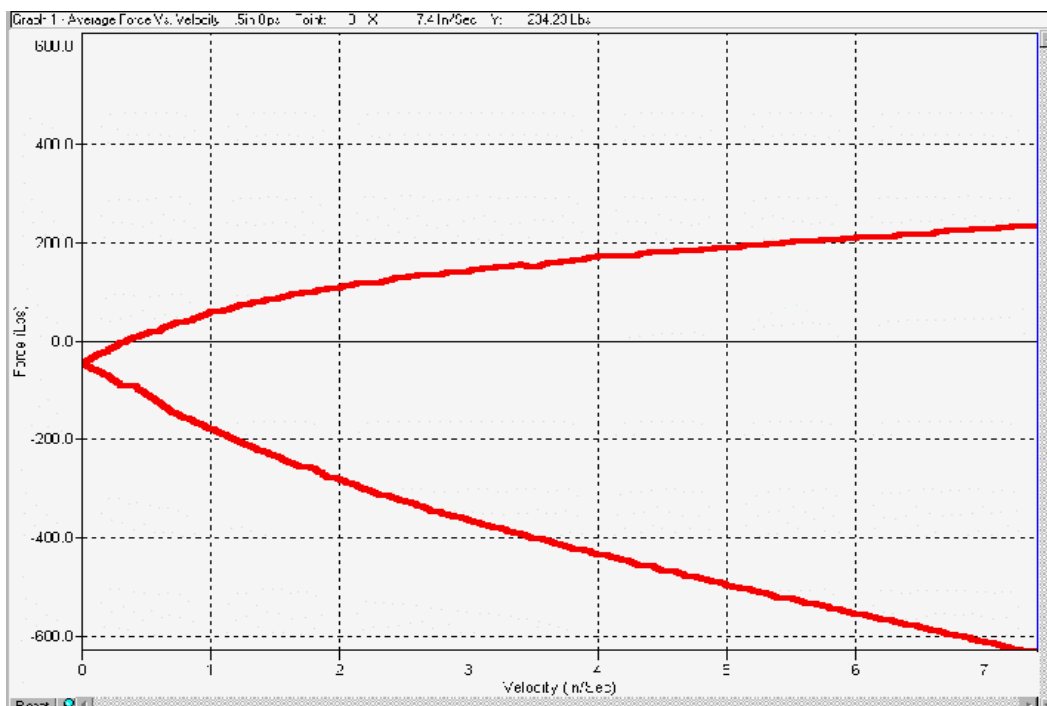
Force Vs. Displacement-data is displayed in the classic “football shape”.



Signal Vs. Time- each channel is displayed as signal vs. time in this graph. This option is used for Roehrig Engineering calibration and troubleshooting.



Average Force Vs. Velocity- this graph is the average of compression forces and average of rebound forces vs. velocity, with all velocities graphed as positive. **Roehrig Engineering does not recommend the use of the graph, as it is a poor representation of the shock data.**



Show Live

Use this window to display live data as the dyno is running. Click **Start** to start a test. To enter a speed hold the left mouse bottom and turn knob or type in a speed and hit enter. If you wish to remove gas force type in the gas force number or click on gas test. To clear a graph during a test, click **Clear**.

Properties

The data displayed when you click properties pertains to the file name highlighted on the left of the main screen. If you have a graph highlighted the data relates to the graph properties. Right clicking the graph or file name on the left of the main screen can also display the Properties window. Properties windows can be opened by hitting the "P" key when the graph or data file are highlighted.

Window when file name is highlighted:

Data Description- This tab is information you have saved with the data. This information can be edited at any time.

Valving- Like data description, the valving page is more information you have recorded about this data file.

The screenshot shows a dialog box titled ".5in 8ips.cvp-File Properties". It has three tabs: "Data Description" (selected), "Valving", and "Test Data".

Under the "Data Description" tab, there is a "Date Collected" field containing the text "09:22 AM Saturday, January 9 1999".

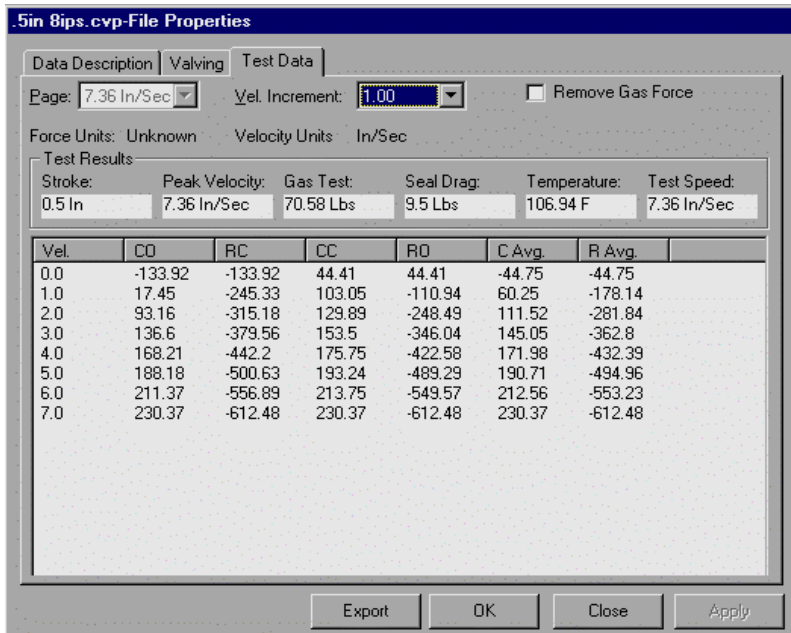
Below the date field is a "Description" section with four input fields:

- Name: []
- ID: []
- Vehicle: []
- Location: []

At the bottom of the dialog is a "Notes" section with a large, empty text area.

At the bottom right of the dialog are three buttons: "OK", "Close", and "Apply".

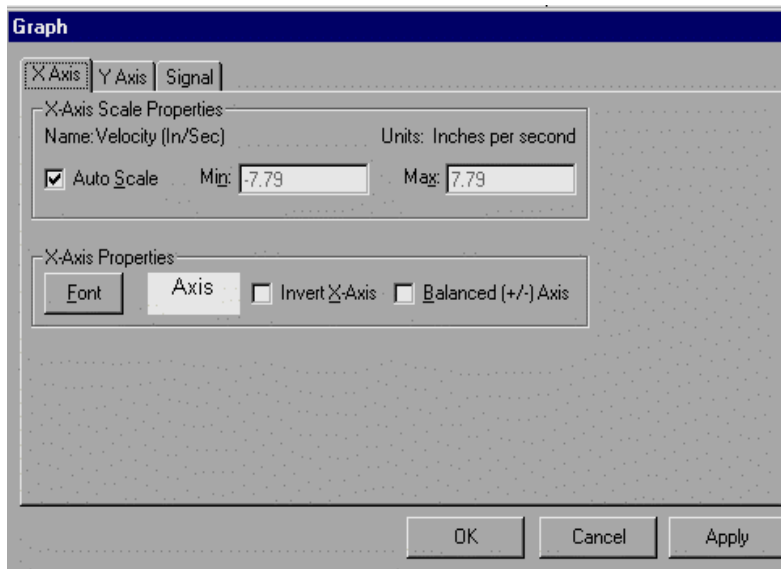
Test Data- By choosing this tab in the properties window the user can review the numerical data points for our selected data file. Use the **Vel. Increment** box to look at more or less points. This window also displays test results from your collection.



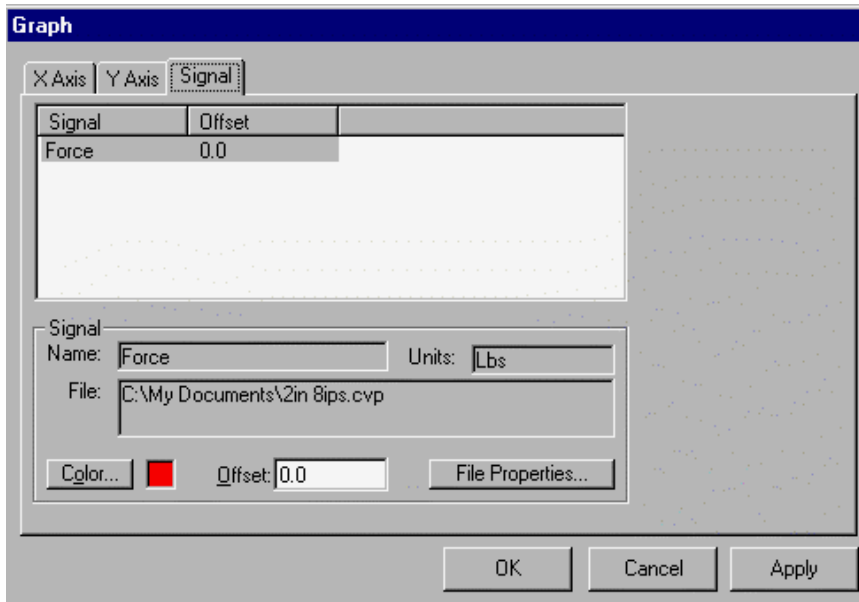
Window when graph is highlighted:

X axis- Both the X and Y-Axis tabs are where you change the scaling properties for this graph. If you select **Auto-scale** the program will size the graph to fit the data. When you remove the check from auto scale you can enter you own scaling.

Inverting the axis will rotate the graph 180 deg. about the respective axis. If you check **Balanced Axis** the scaling for positive and negative will be equal

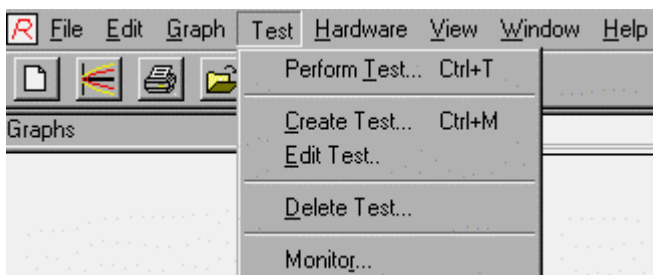


Signal- To change properties for a data signal use the Signal tab. By highlighting the signal you wish to edit you can change the color or offset. File properties open the file properties window. You must click apply after making a change.



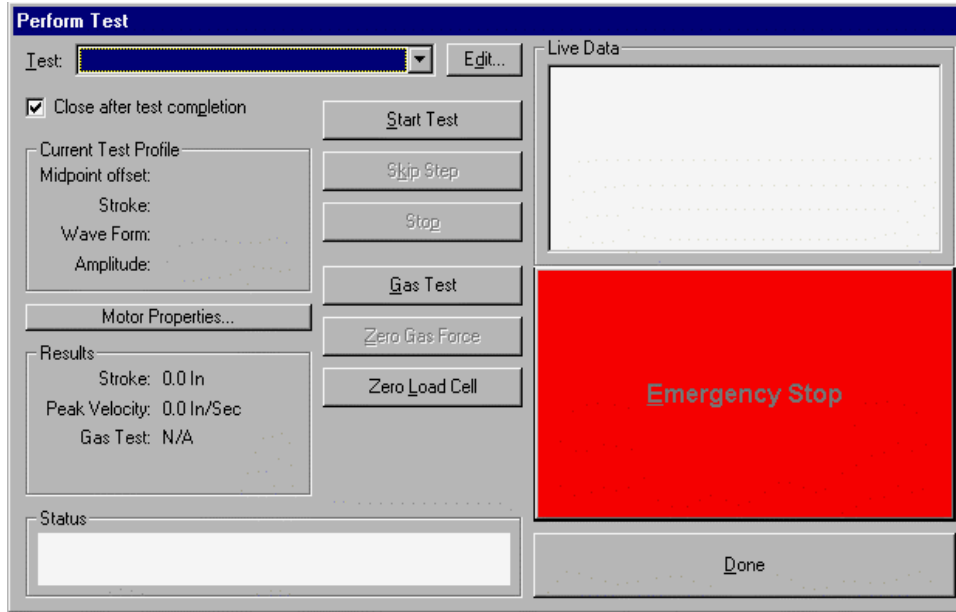
Test

The **Test** menu is where data collections are performed created or edited.



Perform Test...

This is the screen where data collections are performed. The top of the screen describes the profile that will be used in the test. This will be fully explained in the **create test** window. Existing test can be edited with the **Edit** button. The **Close after test completion** will close this screen after each test is completed.



Current test profile- This box describes the major perimeters that are set for the test described in the **Test** box.

Results- The results box list data from the last test, use this window to confirm the stroke, velocity and gas test were what you requested.

Start Test- Click on this test when you are ready to start a test. The stop test button will highlight in case you wish to cancel your test.

Gas test- The gas test button is used to manually record the gas force in the shock. This force will display in the results window.

Zero Load Cell As its name implies zero load zeros the load cell for the next collection. The program retains this zero value until you exit the program or click **Zero Load Cell** again.

Live Data Displays live force and temperature readings while the dyno is on.

Abort Use this button to stop the dyno in an emergency situation. To reset, press the **CLEAR** button on the dyno keypad twice.

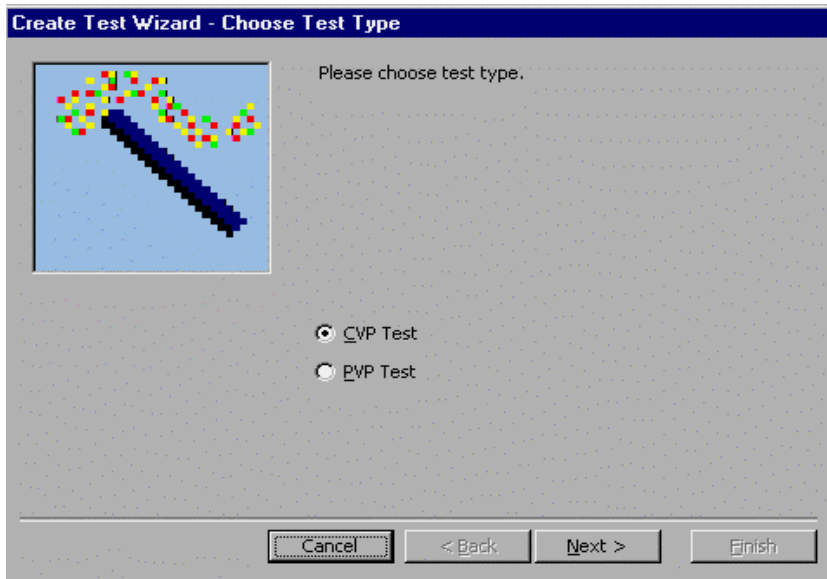
Done- Click this box to close the **Perform test** window.

Status- Displays a real time status during the collection.

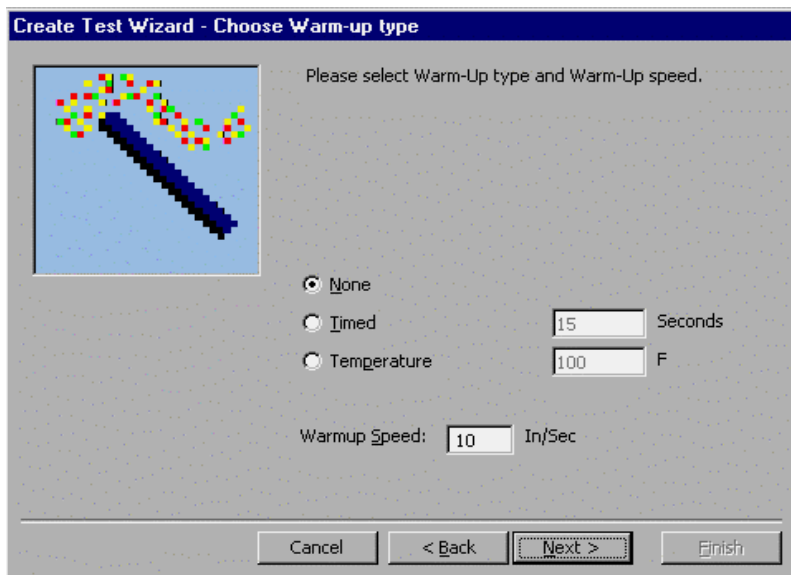
Create test

Standard test profiles are preset from the factory and can be selected in the **test** box on the **Perform Test** window. These tests do not need to be modified to operate dyno. If you wish to create new test profiles this window walks you through the options.

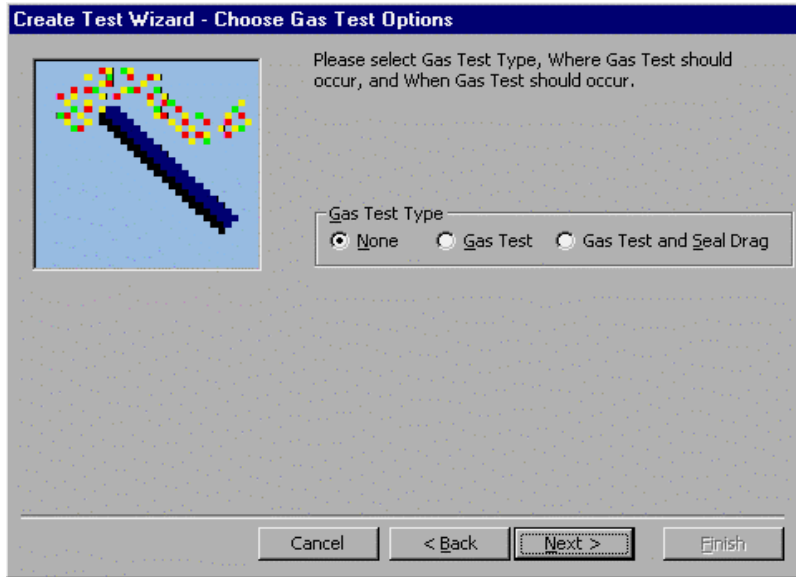
Choose Test Type Allows the user to choose between creating a continuous velocity pick-off (CVP) or a peak velocity pick-off (PVP) data collection test.



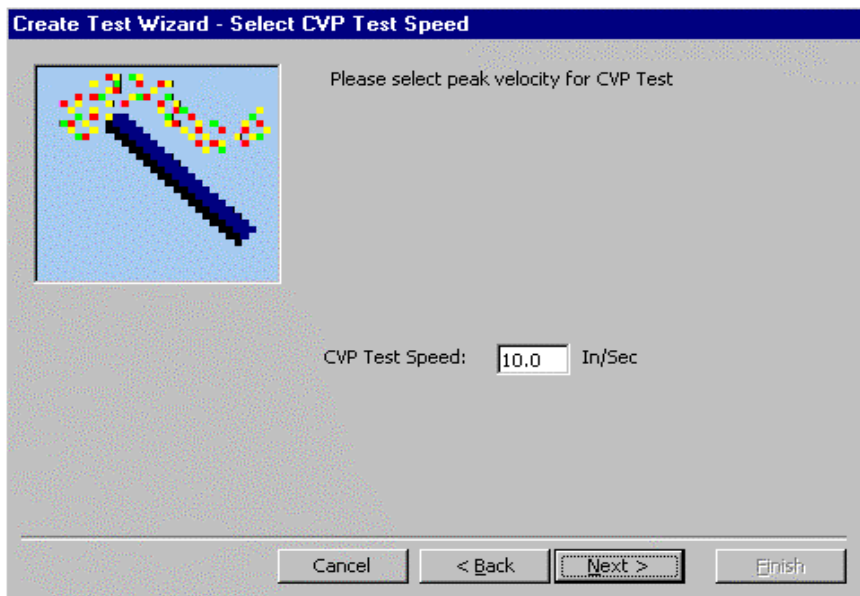
Choose warm up type- If you select **temperature** the dyno will run until it reaches your selected shock temperature. If **Timed** is selected the dyno will run for the number of seconds entered in the seconds window. The speed the dyno will run during the warm up is defined under **Warm-up Speed**.



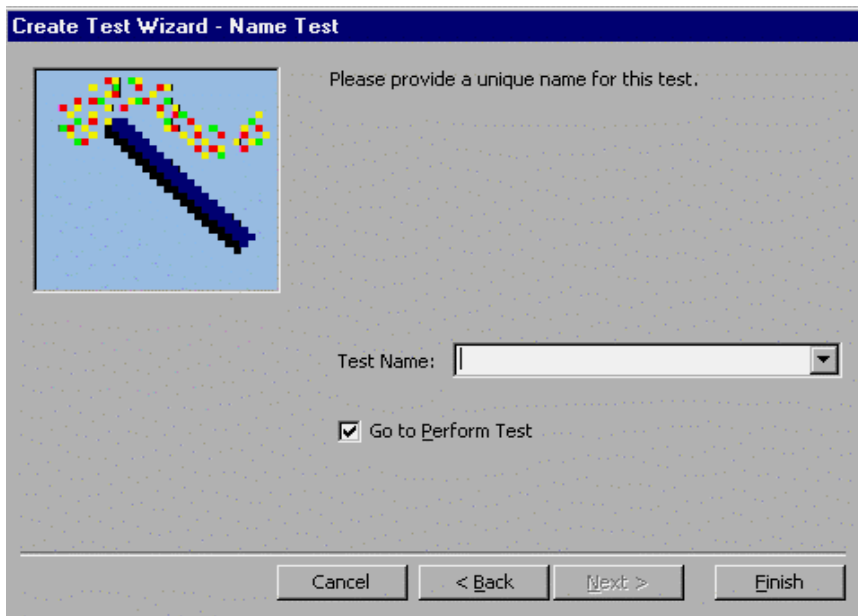
Choose Gas Test Option- if you want to record gas force before the test click on **Gas Test**. To record gas force and seal drag, select **Gas test and Seal Drag**. To run a test without recording gas force, select **None**. If a seal drag test is selected you will need to select a speed and window for this test. It is best to run seal drag test at the dynos lowest possible speed of .03 ips. For the best results.



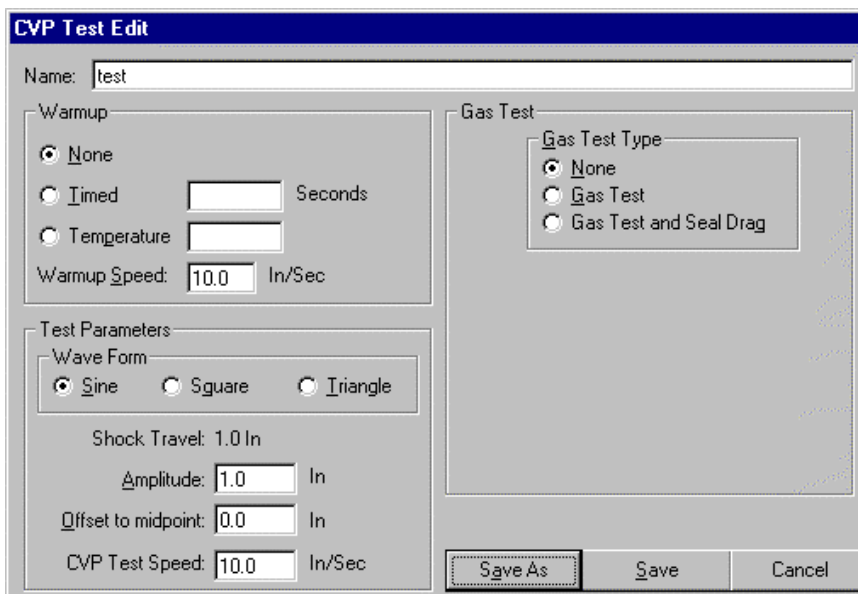
Select CVP Test Speed- Enter the test speed you wish to run for your CVP test in this box.



Name Test- after you have named the test you have created you can select it in the **Perform Test** window. This allows the operator to create and use test with different properties with out having to design a new test each time.




Test Edit- This is the window displayed when **Edit** is selected in the **test** window. The previous test parameters from your selected test are displayed in this window for easy editing. Use **Save As** to save under a new test name.



Create PVP Test – Creating a PVP test is the same as creating a CVP with the exception of the select test speed window and the choose PVP test option pages. To insert pvp speed you may use the series box by inserting your starting and ending speeds selecting the increments for the speeds and clicking generate series. To enter speed by hand click the insert key on the your keyboard type in your first speed and click enter. Repeat these steps for each speed You must hit **enter** after each speed for the program to hold that speed. To delete a speed highlight the speed and click **Del**, to insert a speed in a test select the speed below where you wish to locate the new speed and click insert, to insert a speed at the end of a test use down arrow from the last speed to bring up a insert box at the end of the test.

Create Test Wizard - Select PVP Test Speeds




Please select speeds for PVP Test. This can be done by either manually entering every speed, or selecting the slowest speed, the fastest speed, and the increment between the speeds. The speeds will then be filled in for you.

PVP	Amplitude mm	Speed mm/Sec	Frequency Hz
1	25.39	3.00	0.02
2	25.39	0.00	0.00
3	25.39	2.00	0.01
4	25.39	1.00	0.01

Test Series
 Start: End:
 Increment:

PVP test Options – Select Normal under Zero Velocity force test if you want the program to record a zero velocity force. Use the **sample at** box to select when the program takes it sample selecting Peak velocity to sample at the highest velocity the program records if you select Zero Displacement the program will always sample at the zero displacement point, you must enter a window size after zero displacement.

Create Test Wizard - Choose PVP Test Options



Please select whether a Zero Velocity Force test should be performed. Also select where the Force should be collected for the PVP test.

Zero Velocity Force Test
 None Normal

Sample At
 Peak Velocity
 Zero Displacement mm

Monitor

This screen shows a live reading of what the sensors are seeing. Each channel is displayed in graph and numerical form.

This window is used to diagnosis problems with the dyno electronics.

HARDWARE

Data Card

This menu contains the specific calibration for each sensor and the data card type. It also contains spaces to calibrate four extra channels for other data you might need to collect. **WARNING ! ALTERING THESE NUMBERS WILL CHANGE THE CALIBRATION OF YOUR DYNO AND MAKE YOUR DATA INCORRECT!**

Motor

This section allows you to modify parameters associated with the operation of the motor. All settings are preset at the factory and should not be changed by the User with the acceptance of **Measure Stroke**. When you have changed the stroke on your dyno you will need to re-measure the stroke, this allows the dyno to find BDC. To measure the stroke press the **Measure Stroke** button the dyno will rotate and then stop at BDC.

View Window

These are standard windows function, consult your windows manual if you are not familiar with these functions. Remove the check for shock gauge to hide the direction indicator on the lower left side of main screen.

THE DYNAMOMETER

The dynamometer has a variable speed pulse width modulated motor that runs on either 220 or 480 volt/30 amp/3 phase or 220 volt/30 amp single phase power. When the motor is turned on, the keypad on the machine will light up and should display **OUTPUT FREQUENCY 0.0 Hz**. To operate the dynamometer manually, press the **LOCAL/REMOTE** button to gain control of the motor. A light will appear in the button. The keypad is set up to receive speed in electrical Hz. Speeds are selected and changed using the up and down arrows to scroll to the desired velocity. By pressing **RUN** the dynamometer will accelerate and run at the entered speed until the **STOP** button is pressed. The speed can be altered at any time by the same procedure even when running.

To change the stroke of your dyno

- Turn dyno power off and remove the front cover
- Remove the bearing in the center of the scotch yoke by loosening the center bolt and pulling the bearing out. The bearing and bolt will come out as a unit. Be careful not to let the yoke drop when you remove the bearing, it is better to lower the yoke to prevent a hard hit to the sensors.
- Select the hole in the crankshaft for the new stroke and install the bearing. Tighten the bolt and tap the wrench with your hand or a rubber hammer **THIS BOLT MUST BE TIGHT.**
- Replace the front cover and turn power on **NEVER RUN DYNO WITH FRONT COVER OFF INJURY COULD RESULT!**
- From the **Hardware** pull down menu select **Motor**. Click **Measure Stroke** and the program will measure the new stroke.
- You are now ready to test at your new stroke. After having the crank bolt out, check the bolt through the window in the front cover periodically to make sure it is not coming loose.

THE COMPUTER

The machine is typically supplied with an IBM compatible computer and monitor. Upon receiving the machine, the end user should register the computer with the manufacturer in order to receive and expedite customer support. If you experience any problems with your computer, it is in your best interest to contact the manufacturer directly. While Roehrig Engineering will make all possible attempts to help solve computer problems, it usually only worsens the matter to have a third party become involved.

MAINTENANCE

The columns should be kept cleaned and well oiled. For the rod surface above the top plate, WD40 is fine. Below the top plate, Mobil 1 oil or a similar product is recommended.

The wear plates themselves should be inspected about once every two months for excessive wear. Play should be checked at bottom dead center by pulling up and then pushing down and measuring the total movement. This should be no more than 0.0015". If it is more, add shim material to the lower plate to the tolerance. Do not use grease or oil on the old style gray colored plates. The new style yellow colored plates should be greased with Mobil 1 red grease or any non-molybdenum or non-Lithium. This machine is designed to provide you with years of trouble free operation if these maintenance procedures are followed.



**SHOCK5
HOT KEYS**

COLOR
C

*FILE
PROPERTIES*
CTL+P

*REMOVE
GRAPH/FILE*
DEL.

*SAVE
TEMPLATE*
CTL+S

NEW GRAPH
CTL+N

OPEN DATA
CTL+O

*PERFORM
TEST*
CTL+T

*CREATE
TEST*
CTL+M

*GRAPH
PROPERTIES*
P

HELP
F1

FORCE vs VEL.
F2

*FORCE vs
ABSOLUTE VEL.*
F3

*REB. OPEN
COMP. CLOSE*
F4

*COMP. OPEN
REB. CLOSE*
F5

*FORCR vs
DISPLACEMENT*
F6

*SELECT DATA
TO DISPLAY*
L

PREFERENCES
F-12

HIDE DATA FILE
T

GLOSSARY

Automatic Gas Test - The dynamometer automatically measures and removes the gas force.

Collection - The act of stroking the shock absorber and measuring the forces produced.

Collection Speed - The speed at which the crank rotates. See the "Frequency Versus Peak Velocity" chart to convert this to shaft speed in inches per second.

Continuous Velocity Pick-off (CVP) - When data is collected over a complete cycle of compression and rebound. The graph produced is a smooth curve.

Cycle - One revolution of the crank. It is equivalent to the shock being compressed and extended one time.

Damper - Shock Absorber.

Export - Taking data from the shock program and turning it into comma separated ASCII files that can be used in other programs.

Gas Force - The internal forces in the shock caused by the pressure of the nitrogen gas. This is why the shock automatically extends itself.

Gas Test - The measuring of the shocks gas force.

Keypad - This is not part of the computer, but the square pad attached to the dynamometer itself. It is used to manually control the machine's motor.

Live - When a "live" reading of a sensor is referred to, you are not collecting data, but viewing real time results on the computer monitor.

Load Cell - This is attached to the bottom of the cross bar. It is either a blue or stainless cylinder, or a steel "S" shaped piece. The top of your shock attaches to it, and it measures the forces generated by the shock during a collection.

Motor Units - The type of numbers entered in the **Test Options** screen. This is Hz, RPM, or (Linear) Velocity. The Velocity is calculated by multiplying the **Stroke** times the **Frequency Ratio** times Pi times the desired crank Hz.

Peak Velocity Pick-off (PVP) - The dynamometer is run at different speeds, and the data is collected and graphed only at the peak velocity of each cycle. The resulting graph is a point-to-point line graph.

Seal Drag - The internal friction of the shock caused by seals, O-rings, and binding. This number is generated during an **Automatic Gas Test**.

Shock Absorber - Damper.

Software Key - The small white plastic square connected to the printer port of your computer. Without this your computer will not talk to your dynamometer.

Temperature Sensor - The black piece of plastic that clips around the damper. It measures the temperature of whatever it touches.

Valving - The internal parts of the shock (piston, shims, bleeders) which can be changed to modify the shock curve.

INDEX

ANALYZING YOUR DATA	5
BDC.....	4, 28
calibration	19, 28
CALIBRATION	28
Choose warm up type	24
timed.....	24
clevis	4
collect data	2, 3
collect data.....	2
Collection	24, 30
collection.....	12, 21, 23, 30
Colors	14
Compression close/Rebound open	17
computer	2, 3, 29, 30
computer commands	2
Copy	10
create new test profiles	24
cross bar	4, 30
CVP.....	3, 4, 12, 24, 25, 26, 30
Cycle	11, 12, 30
Data Card	28
data collections.....	22, 23
Data Description	4, 20
data files	5, 8, 11
data.....	4, 5, 11, 19, 20, 21
Default	11, 12
dynamometer	2, 28, 30
Edit.....	3, 5, 10, 23, 26
Emergency Stop	23
Export	10, 30
File	3, 6, 22
file name	12, 20
Force	11, 16, 17, 18, 19, 30
Force Vs. Absolute Velocity	17
Force Vs. Displacement	18
Force Vs. Velocity	16, 19
gas force.....	4, 11, 12, 15, 23, 25, 30
gas test	4, 12, 23
Gas test	23, 25
Gas Test	25
graph	5, 6, 8, 11, 15, 16, 17, 18, 19, 20, 21, 28, 30
Graph	3, 5, 8, 15, 16
Hardware	3, 29
HARDWARE	28
hide	5, 15
Hide	11, 15
hot keys	6
icons.....	3
key	3, 28
keypad.....	23
Live data	23
load cell	4, 23
MAINTENANCE	29
Measure Stroke	28, 29
menu	3, 4, 5, 6, 7, 22, 28, 29
Menu Bar	3, 30
Menu Bar.....	3

<u>MENUS</u>	6
<u>Monitor</u>	28
Motor	12, 28, 29, 30
New Graph	5, 8
new template	6, 7
New Template	6
Option	25
options	2, 5, 6, 12, 24
Paste	10
peak velocities	4
Perform Test	3, 4, 26
preload	4
Print	
print	8, 11
Print Setup	8
properties	20, 21, 22, 26
Properties	20
PVP test	4
PVP TEST	4
Rebound close/compression open	18
Remove	5, 11, 15, 29
results window	23
Save As	4, 26
Save Template...	
save templete	6
scaling	21
Select data to display	15
Select Data to display	5
sensors	28, 29
Settle Time	12
SHOCK5 software	2
Shock96 Data	11
show	3, 4, 5
Show	15, 20
Signal Vs. Time	19
status window	4
stop test	23
stroke	3, 23, 28, 29
temperature	4, 23, 24, 30
test	2, 3, 4, 5, 12, 20, 21, 23, 24, 25, 26, 29
Test	3, 4, 12, 21, 22, 23, 24, 25, 26, 30
test profile	3, 23
Tool bar	3
Valving	20, 30
valving page	20
Vel. Increment	21
velocity	16, 17, 19, 23, 24, 28, 30
View	3, 28
Warm Up	4
timed	4
warm up	4
wear plates	29
Window	3, 20, 21, 28
X and Y-Axis	21
zero load	23
Zero Load cell	23
zero velocity	12, 16, 17