Appendix 10 New Features in v4.2 B

The Dyno DataMite Analyzer has had many updates since this user manual was written for the original v3.2 for Windows. Here is a brief listing of some of the features released in Version 4.2 B.

Here's a list of the most notable features which have been added or changed. For a complete list of changes, check the readme.doc file on the website right below the demo program download option (with the spinning disk). Some of the features listed here apply to only the Professional or Enterprise Edition, and it will be noted. Anything which applies to the Professional "Pro" version also applies to the Enterprise Edition.

> **The website will have the most up-to-date information. This can be found under Support, then FAQs, then Dyno DataMite…, or Support, then User Manuals, or Programs, then Data Loggers, then either Dyno DataMite or Dyno DataMite – Enterprise Edition.**

New Controller Features and Hardware Enhancements

There is a new "Hybrid" control option, where the controller (Figs 10.01, 10.02, 10.03):

- Starts in RPM control mode. This way you can easily open the throttle to full power and the RPM stays low, at the starting RPM you have dialed in with the knob.
- Then when you press the Start switch, the controller switches to load control during the acceleration to the maximum RPM you have programmed. Load control is typically smoother than RPM control during the acceleration.
- Once maximum RPM is reached, it reverts back to RPM control to bring the engine back to the starting RPM.

There is a new option of "Stand Alone Control". In this mode, the controller does not need to communicate with the PC for doing a test. The controller knows the type of control you want to perform, the ramp rate, and the maximum RPM. This ensures more reliable testing because the controller's communication with the PC is not needed. NOTE: This mode works only for doing accelerating tests, not for decelerating tests. (Figs 10.01, 10.02)

- If you are doing an accelerating test in PC Control mode, the PC watches for the maximum RPM and sends a command to the controller to return to the starting RPM when maximum RPM is reached. You will see a Max RPM number on the controller screen which is slightly greater than maximum RPM as a safety backup. If the controller sees this maximum RPM, it will also ramp back to the starting RPM. Therefore it is critical that the PC is reading a correct RPM signal and the Max RPM on the PC screen is correct.
- If you are doing an accelerating test in Stand Alone mode, the controller watches for the maximum RPM and returns to the starting RPM when maximum RPM is reached. Therefore it is critical that the controller is reading a correct RPM signal and the Max RPM on the controller screen is correct.

There is now a controller "Control Panel" on the Current Readings screen. This way you can make simple changes to the controller settings without having to do a full tune through the DataMite screen. The Control Panel also has features not found elsewhere in the program, like (Figs 10.04, 10.05):

- Change Ramp Rate: Here you can change the typical Ramp Rate for doing an accelerating test. You can also set this to 0 and when you start recording, the controller does not start ramping the RPM either up or down. This is great for recording data for some custom type test.
- Keep Recording at End of Run: Use this feature to keep the Current Readings screen open and continue recording after the acceleration test is done. You will then have to stop recording manually by pressing the Record switch, or clicking on the yellow "Stop Recording" button with the mouse.

You can now program in a controller schedule for doing testing. The schedule lets you program various times to be at certain RPMs and throttle openings if you have the Auxiliary throttle control. You can select to have this schedule repeat a certain amount of times, should you want to run a particular schedule, like for a break in. Enterprise Edition only. (Figs 10.06, 10.07)

When running a Controller Schedule, here are suggestions for it to work well:

- The controller must be set to PC Control and "Water Brake w RPM Control".
- The Schedule should have some Segments where the start RPM and ending RPM are the same. This is where the controller is not ramping the RPM (which is less precise), but is commanding an exact RPM which is precise.

- Segments should be about 2 seconds or longer. Ramping segments are more accurate if they are longer than 2 seconds.
- Segments 1 and 2 should have the same RPM and the last 2 segments should have the same RPM. This ensures a stable, exact RPM at the start and end of the test.
- The Schedule is controlled by the PC so the USB communications to the controller must be very reliable. Suggestions to ensure good communications include:
    - Slow down the recording rate in the DataMite specs screen, down from say 50 samples/second to 10 samples/second.
    - Slow down the update rate of the Current Readings screen, down from say 10 updates/second to 5 or less. This is done under Options at the top of the Current Readings screen.
    - Do not maximize the Current Readings screen, but leave it at it's default (smaller) size. The bigger the gauges, the more computer time it takes to update them and the less time for USB communications to the controller.

When you are in the controller settings screen and you make significant changes to the type of control, the program will warn you that you should probably click the "Defaults" button to load reasonable default settings before doing a "Tune" on the controller. This will prevent you from loading very wrong settings.

The program better ensure that Max RPM in Controller Screen matches 'Max RPM in Test Conds screen. If they are different, it can create some problems.

An option for not allowing F1/F2 to start/stop recording has been added. If this feature is turned Off, it can help when the controller is Stand Alone, and only the Record button on the hand held controller is used to start and stop recording. (Fig 10.00)

The Dyno Controller now has an option for Averaging the RPM signal. This can create better control for 1 cylinder dynos, where 1 revolution (the 'power stroke) is faster than the other rev (overlap stroke).

If you are doing Load Control, now you can have 2 ramp rates for doing accelerations. Some users have found that if there is only one ramp rate, the acceleration rate can slow down on the way to the maximum RPM. This option lets you set an RPM at which a 2nd ramp setting will take over to allow the acceleration rate to keep more constant.

You can now temporarily disable the Accel or Decel ramp from the Current Readings screen by entering a Ramp Rate of 0. This only works with the controller in PC control mode. This way you can record data for a custom test without the controller ramping the engine up or down.

There is a new feature "Shutdown Rate after Test" so you can tell the controller how quickly to return to the starting condition after doing an accelerating test. For most engine dynos with low inertia, you probably want this to be Fast. For chassis dynos with more inertia and a vehicle, you may want this to be Medium or Gentle.

The screen for setting up the Auxiliary Controller (typically throttle) has been simplified.

Check your controller's Quick Start for more complete and up-to-date features.

New Program Operation Features

Now the program stores preference settings and critical config settings with each data file. This way if you have an old data file, you can more completely restore all the program's settings to what they were when this test was run. You have to request this file to be opened in a special way to accomplish this. (Fig 10.08)

Program now has a Preference setting for "Starting a New Test" where the default is a "new method" started in version 4.2 B. Now you can start a new test with new settings, comments, DataMite calibrations, etc. ***before*** running the actual test. If you do not run a test after making these changes, there will be no data file for this test. This was not allowed in previous versions and made it difficult to make changes ***before*** running a test. As always, you can still make changes after a test and the data will refigured based on your changes. You can also set this Preference to "Old Method" if you wish.

Program now has a Preference to graph 1additional data channel to the main screen. This could be A/F, Boost, most anything you are measuring. This graph will also appear on printouts of the main screen. Obviously the full Graph features let you graph most anything you want, up to 8 channels. Pro and Enterprise version only. (Fig 10.09)

Program now has a Preference to allow choosing the color of the graph lines on the Main Screen. (Fig 10.09)

After running the first test, the program will connect to the DataMite III or DataMite 4 faster.

Program now has a Preference to allow you turn on the Test Method of "Measure TqHP from Accel/Decel". Many users got this test type confused with the ***much*** more typical test type "Measure TqHP from Accel". Obviously the preference lets you turn on the ability to choose the Test Method of "Measure TqHP from Accel/Decel".

You can now set a Min RPM and Max RPM (starting and ending RPM) for automatically recording dyno data in Test Conditions. Here are some notes about this option Enterprise Edition only. (Figs 10.14, 10.15):

- This option is not available if you are using the Controller, or do not have the Enterprise Edition.
- The RPM that is monitored for recording is Engine RPM, whether it is actually measured, or calculated from dyno RPM.
- Recording will actually start slightly before and end slightly after these RPMs. That is to better ensure the Min and Max RPMs are included in the data.
- The software will very precisely measure the time between these 2 RPMs and display it on the Main Screen, and also in the History Log. For example, it may say "2000->6000 7.561" meaning it took 7.561 seconds to accelerate from 2000 to 6000 RPM. It may also say something like "2239->6000 7.561" which means the data set did not include 2000 RPM, and 2239 RPM was the lowest RPM recorded.
- If you choose this option, and you are doing accelerating tests like with an inertia dyno, you should enter the Current Readings screen with the RPM less than the Min RPM. Otherwise recording will start immediately. If the RPM is above the Max RPM, recording will also end immediately.

Now you can position the report columns in different orders. For example, if you want Boost PSI and A/F to come before Corr Tq and Corr HP, now you can. (Fig 10.10)

Program now has fixed bug where the last data point of an inertia dyno run could jump up. Now the last data point is based on more than just 1 data point.

If the DataMite logger is encountering severe electrical noise, it can affect the sampling rate, or the time stamps between data readings. For example, if you are sampling 50 times per second, the time stamps should be 20 milliseconds apart. If the program finds time stamps different than expected in a data set, it warns you how badly the data set is corrupted. For inertia dynos where acceleration rate is critical, bad time stamps can introduce significant errors measuring torque and HP. Warning you of these errors can be very useful for trying to troubleshoot the source of the noise. We've seen electric motors (especially VFD motors), light fixtures, ultra-sonic cleaners, and more produce electrical noise producing this problem. Repositioning the logger or sensor cables typically fixes it. Additionally, if bad time stamps are found, the program asks if it should try to fix the data. At this point, the software appears to do a very good job of correcting data for this problem. (Fig 10.11)

The software now has a Preference setting which tells the program what to do if electrical noise is encountered. With the correct choice, the noise can be handled automatically if it is found. (Fig 10.21)

Digital Outputs for ***Analog Channels*** now work with firmware v 313 DataMite 4. The program now also has a message about powering down and powering up the DataMite after loading Digital Output info to properly activate the settings.

The Main graph(s) now better fill all the available screen area. The data grid on the left side has also been enlarged as needed to avoid possible problems where the slide bar could flicker and be disabled. (Fig 10.09)

There are new Graph options to temporarily slide graphs up or down for better comparisons, Dyno Enterprise Edition, or Pro versions of Road Race/Circle Track or Drag Race software only. (Fig 10.12)

There's a new Preference for "Allow Back-to-Back Dyno Tests very Quickly" under "Calculations, cont" tab. This setting loosens up the requirements for a dyno test to allow for them to happen more quickly back to back, and not require as much RPM change to be called a dyno test. These looser tolerances work better for finding beg and end of dyno runs that happen very rapidly, back to back.

Inertia dyno runs should now produce data closer to the ending RPM for tests where the acceleration continues through the last RPM recorded. The software was originally designed to work best when there was a short deceleration after the maximum RPM was reached.

You can now specify a "red line" marker on both of the round gauges in Current Readings. (Fig 10.17)

Program now limits or let you permanently hide many info messages with Preference settings. You now have a “Don’t Show This Again” option for the Warning message which appears on program startup. A new Preference has been added to allow choosing Make Assumptions to Eliminate Messages and messages which appear at the end a dyno run will now be answered by the program, and not show you the choices. This will eliminate most all messages after the test, and works well if your data has no problems. If this is set to No, you will see options and notes about your test. These can help explain what your test looks like and why. If you keep this setting at No, you can just press the Enter key for these messages to accept the standard default choice. As with most all messages, if you just press Enter, the default choice is made. You do NOT have to click a button with the mouse.

If you set all the new and old Preferences to No for showing warning messages after a test, you should be able to click the Start Dyno Run button to start a new test with no messages at all.

There are 2 new Print options for Graph History to eliminate some columns for less cluttered printouts. (Fig 10.17)

You can click on the “Save?” label for the “Save?” column in the History Log and the program gives you the option to set most all the entries in this column to Yes or blank them out. This action will start on the top line displayed in the log. For example, let’s say you want to keep the first 40 lines of the history log but delete all the rest. If you scroll through the History Log so line 1 is the top line displayed, you can set most all the lines to Yes. Then scroll so line 40 is the top line displayed, you can blank out all lines starting at 40 through 100. If you choose to “Clear History Log”, the top 40 lines are marked with a Yes to save and will not be cleared. (Fig 10.16)

Now if you select a combination of Report specs which are not allowed, the program will offer you a correct combination.

The option to Turn Off Fan for USB loggers work faster.

The program has fixed some issues so printouts now better space things out when 'pictures are included in the printouts.

The program is more reliable for not writing a corrupt config file.

The program now has enhanced Preferences for sending emails under the Emailing tab. (Fig 10.20)

New Sensor Options

Now you can more accurately re-zero the Performance Trends BlowBy sensor.

Now when you re-zero or adjust most any sensor, the program presents a small, blue progress bar so you know things are happening, and how much longer it will take. This also occurs when you click on the “Read” button when calibrating an analog sensor like torque.

Program now has 2 new types of temperature sensors. These sensors can also be assigned to be used for Engine Intake Air temperature to be used for weather correction factors.

- Standard GM temperature sensor, typically used in intake manifolds, with a range from about 40 to 180 deg F..
- The RTD temperature sensor we use with our flow bench data loggers, with a range from about 35 to 200 deg F.

The program has enhanced method to make formatting SD card work better in Win 10 and Win 11 for vehicle data loggers.

The Circle Track/Road Race DataMite version allows Shock Dyno Data to be used to calculate shock and spring force on the track. Pro version ony.

You can now specify a Fuel Table for the calibration of fuel turbines. This will allow for more accurate fuel flow and BSFC readings. Enterprise Edition only. (Fig 10.13)

You can now calculate Volumetric Efficiency from A/F and Fuel Flow. (Fig 10.19) There are some limitations to this calculation:

- There must not be any channel for measuring Air Flow. Otherwise this channel will be used for measuring air flow.
- You must have only 1 fuel flow channel measuring all fuel to the motor.
- The A/F channel must use one of the built in calibrations for A/F systems provided in the DataMite Calibrations, or if it is a user supplied calibration, it must have the name of the channel start with either the 3 characters of "A/F" or "AFR".
- The program must have accurate weather data recorded by the logger or entered in the Test Conds screen.

Figure 10.00 Turning Off F1 and F2 Keys

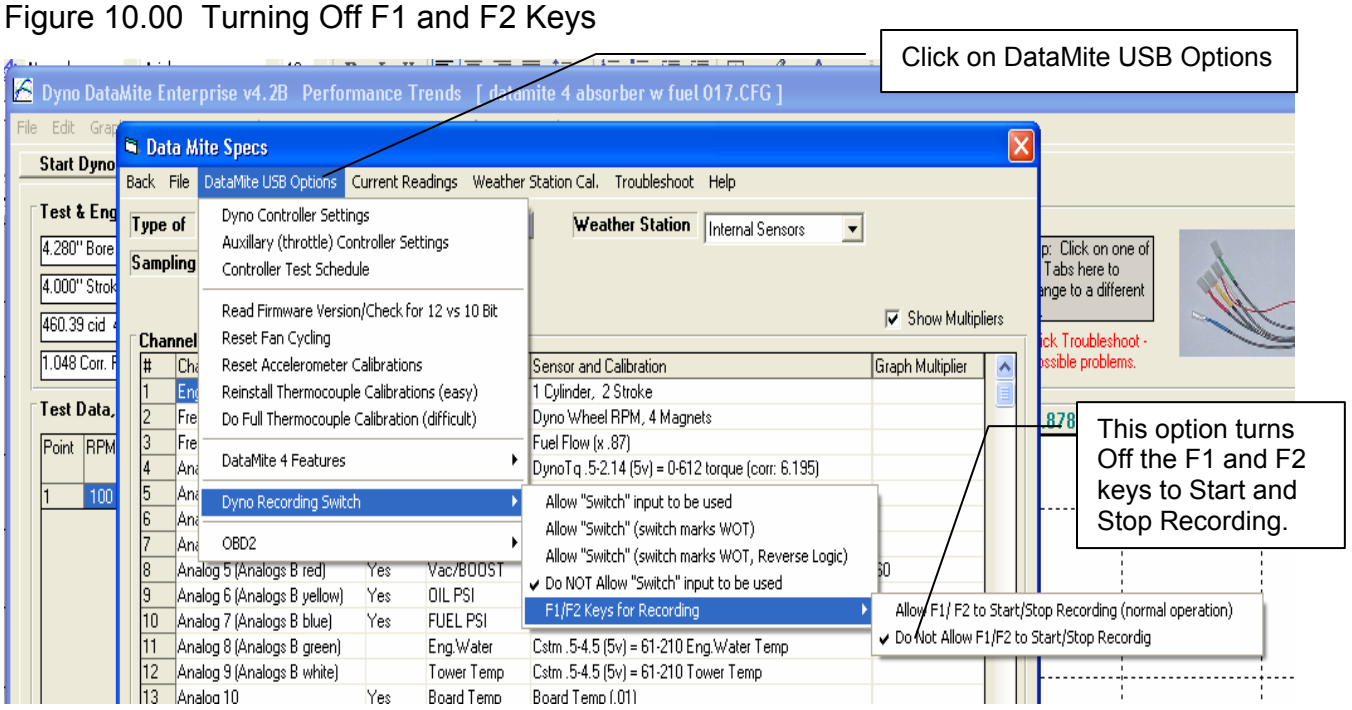


Figure 10.01 New Controller Options

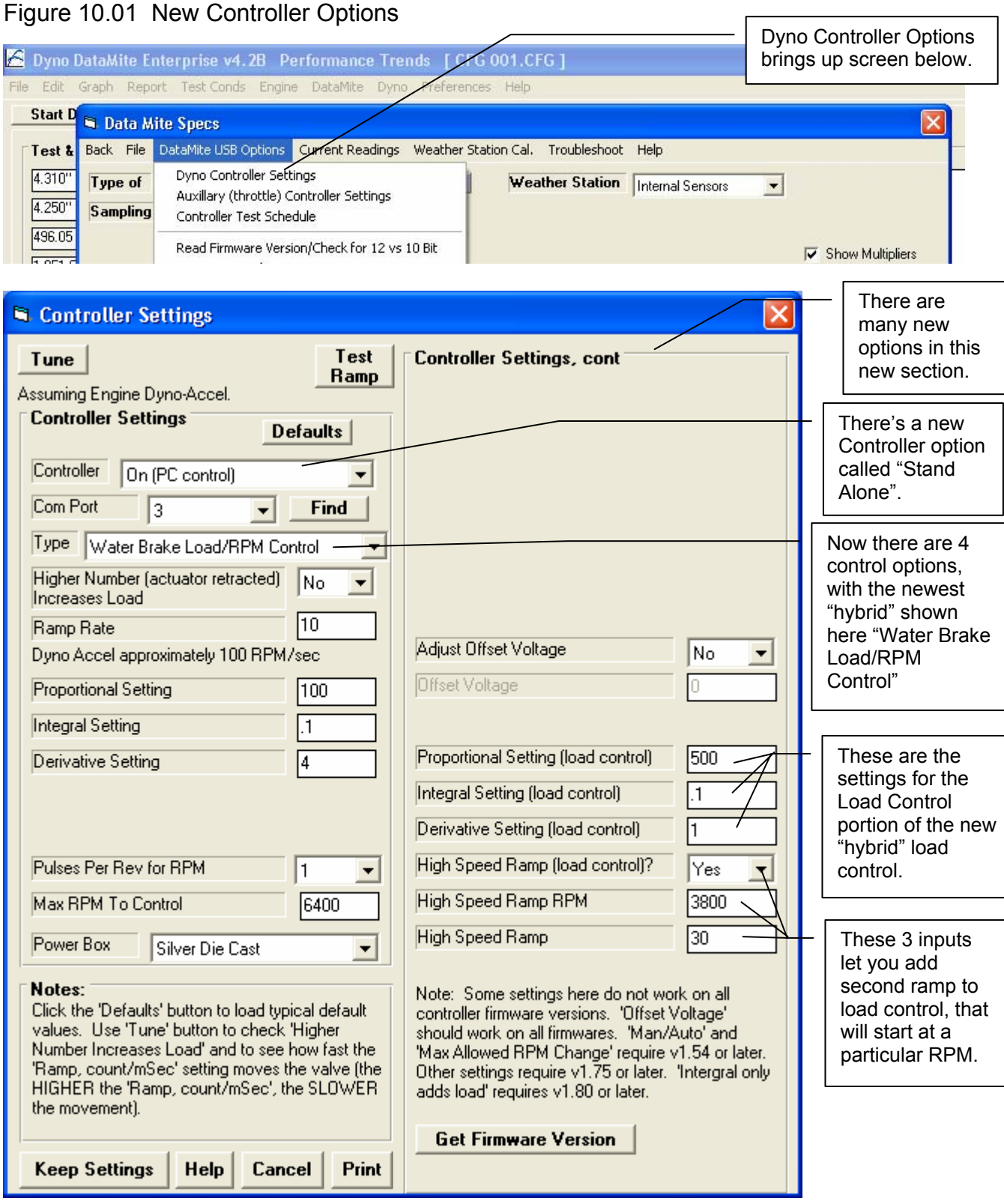
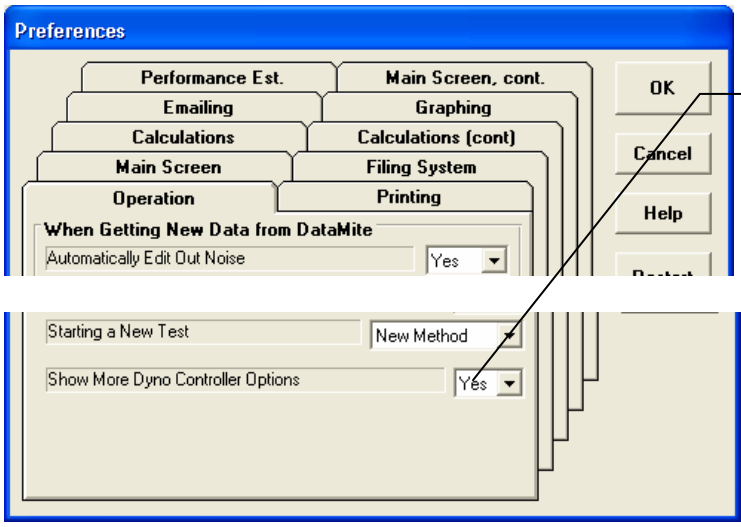
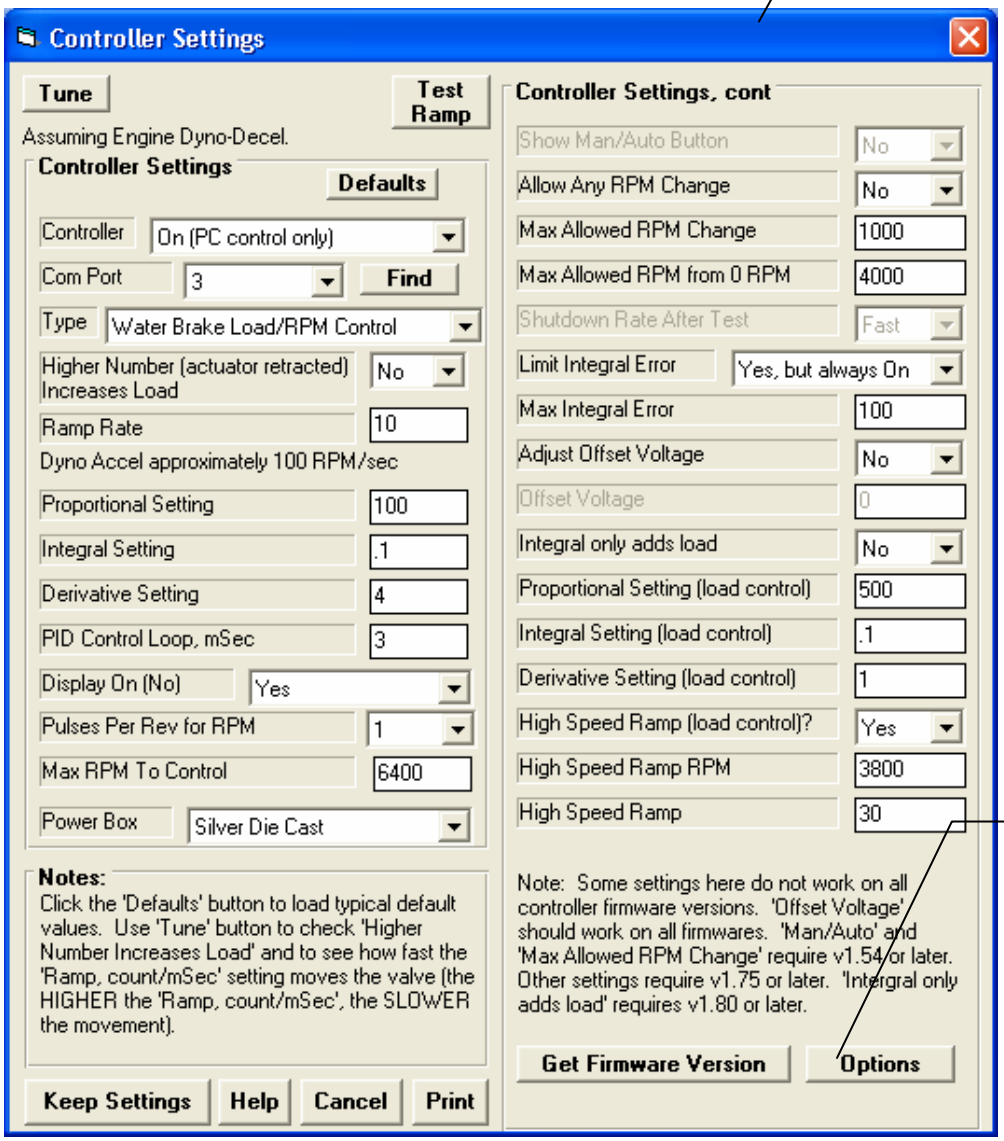


Figure 10.02 More Controller Options if you Change Preferences



Under Operation tab, set Show More Dyno Controller Options to Yes, then click OK to keep this change.

You now have more setting to change to "fine tune" a controller. Typically changing these from the default settings is not needed.

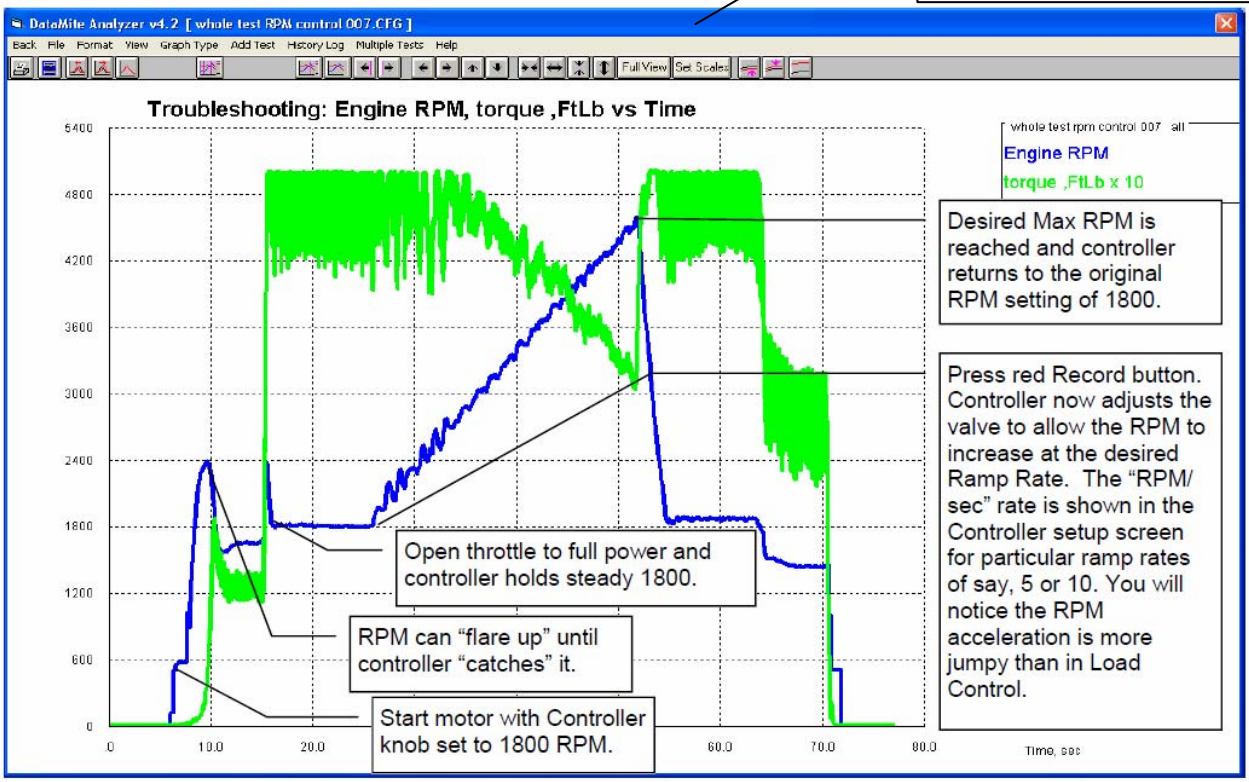


Even more options are available here, by clicking this button.

Figure 10.03 RPM and RPM/Load Control Modes

RPM Control

Improved RPM Control



RPM/Load Control

New hybrid RPM/Load Control Process

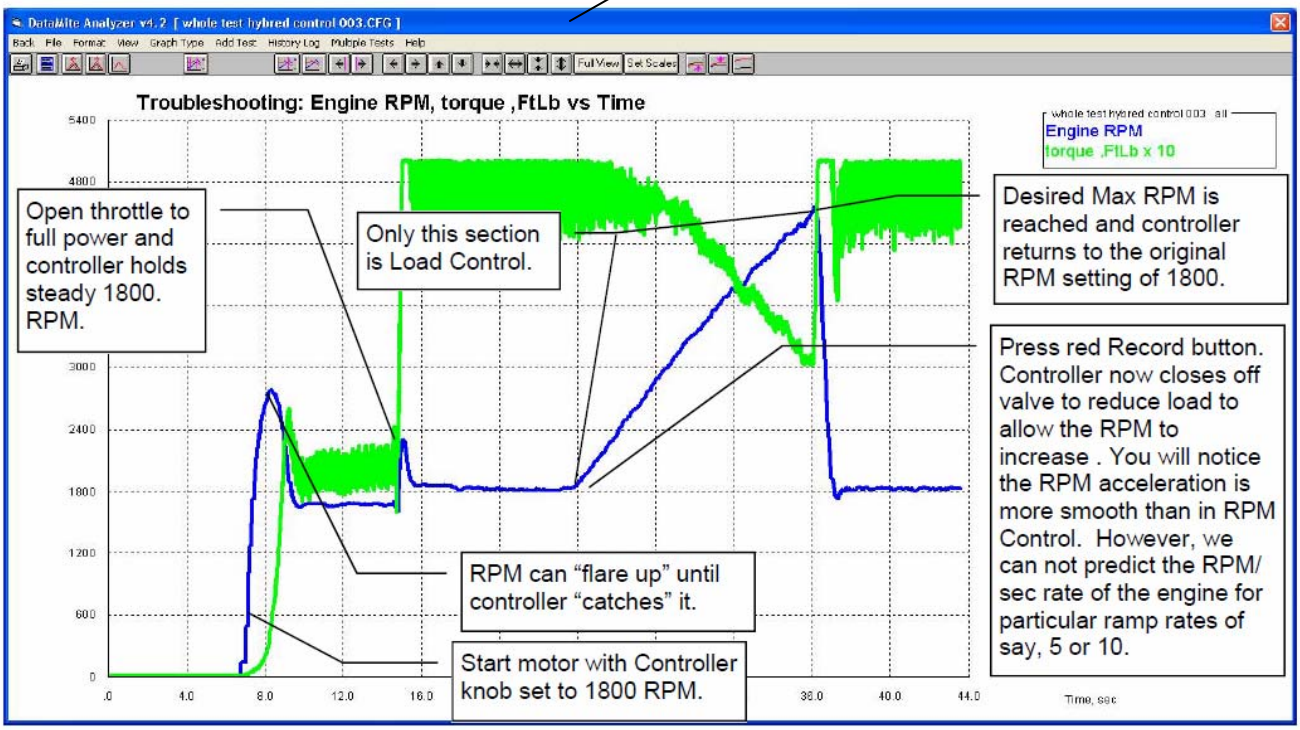
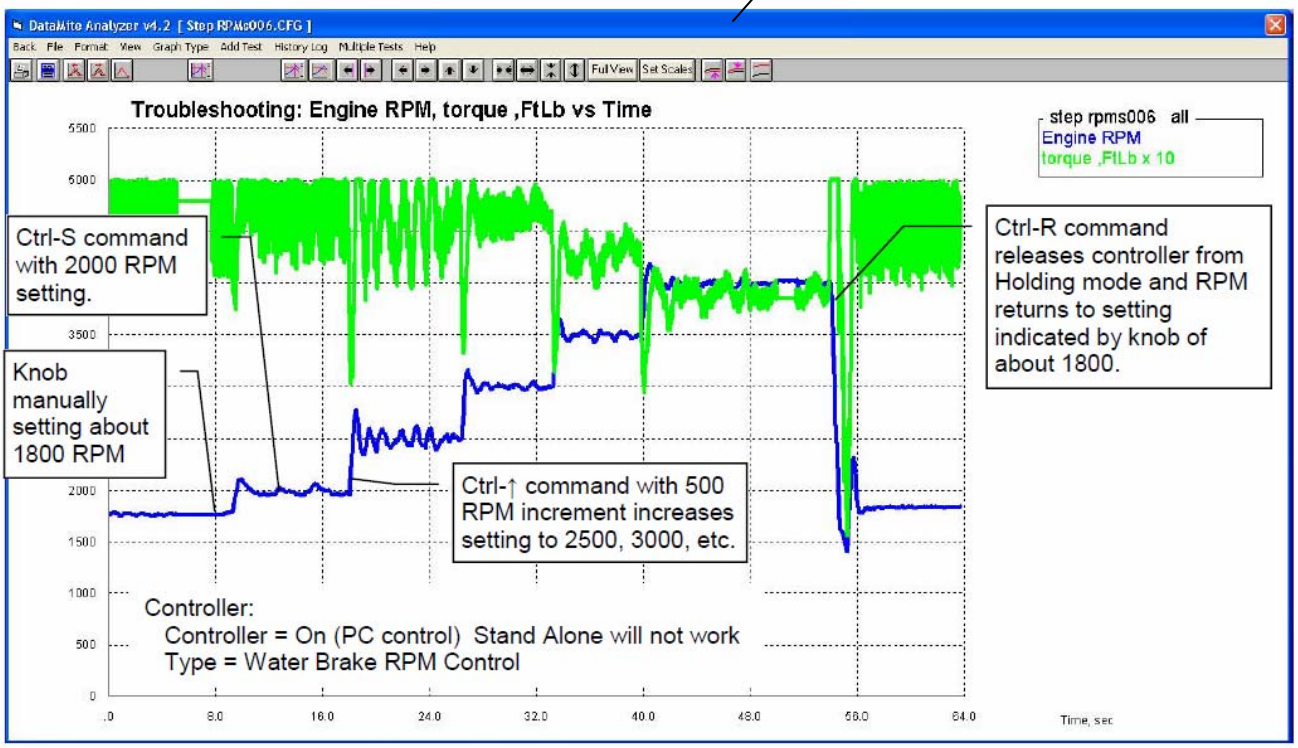


Figure 10.04 RPM Holding and Decel Control Modes

Water Brake RPM Control in Hold Mode

New Hold RPM options



Water Brake Load Control for Decel Testing

Doing Decel tests in PC Control Mode

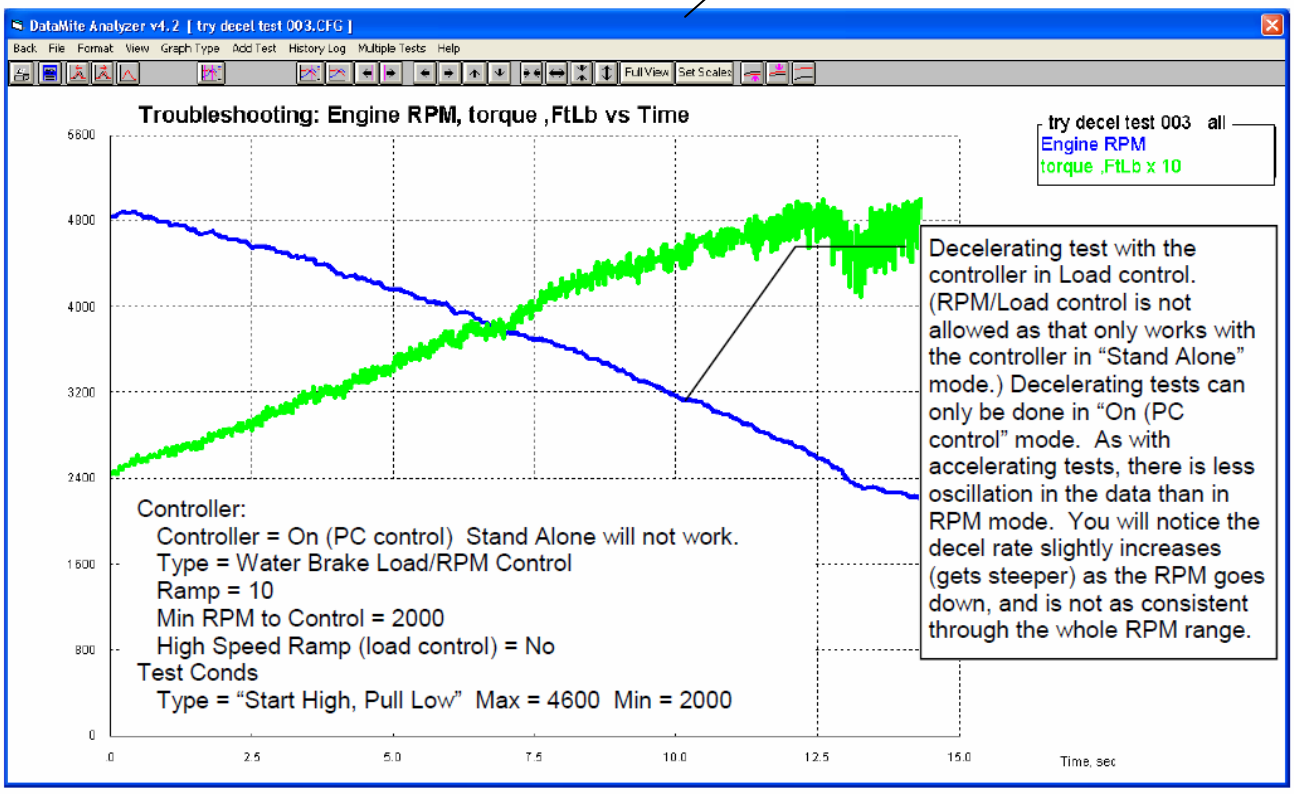


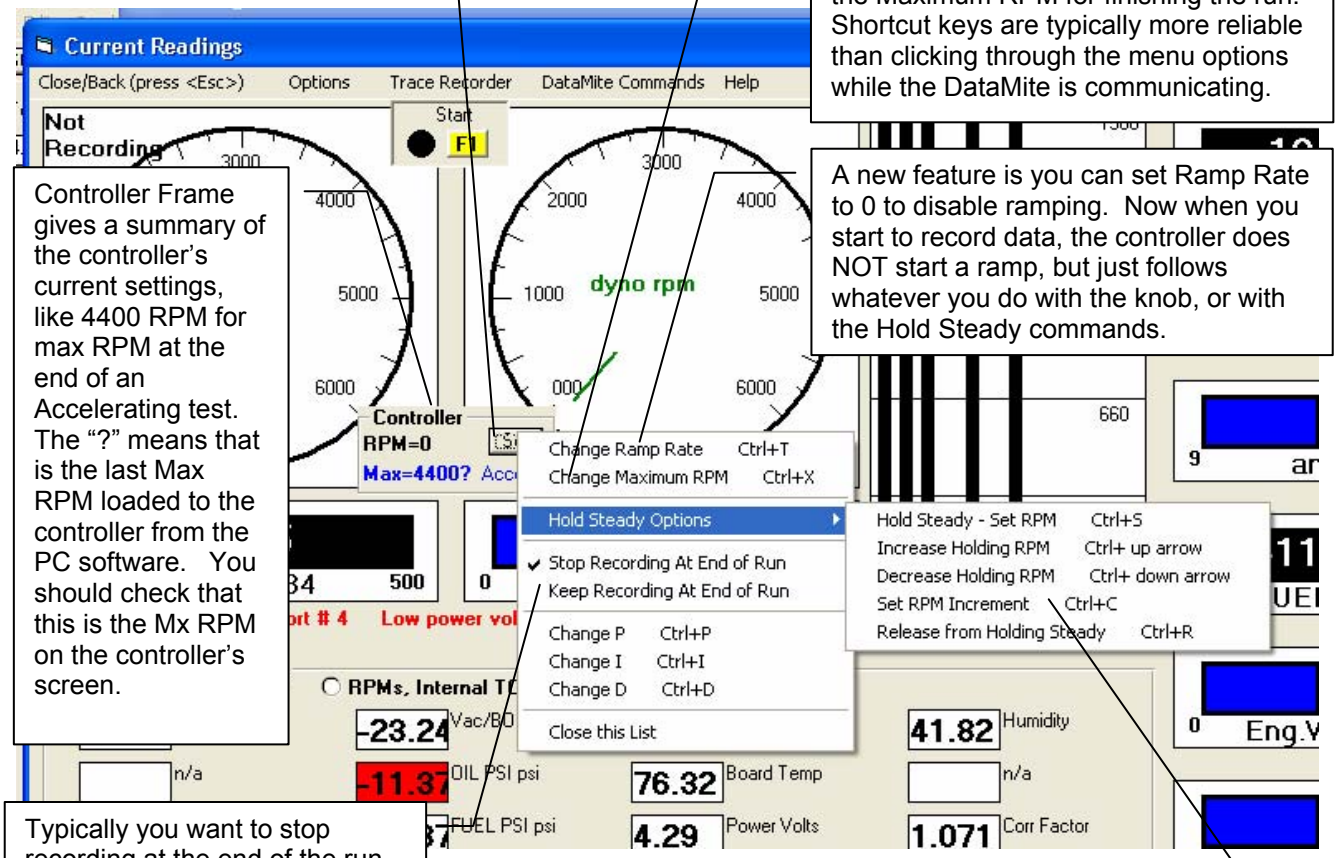
Figure 10.05 New Control Options in the Current Readings Screen

Click on “Set” button for these new options.

Here’s the list of new items you can change on the Current Readings screen. Note the shortcuts, like Ctrl+X to change the Maximum RPM for finishing the run. Shortcut keys are typically more reliable than clicking through the menu options while the DataMite is communicating.

Controller Frame gives a summary of the controller’s current settings, like 4400 RPM for max RPM at the end of an Accelerating test. The “?” means that is the last Max RPM loaded to the controller from the PC software. You should check that this is the Mx RPM on the controller’s screen.

A new feature is you can set Ramp Rate to 0 to disable ramping. Now when you start to record data, the controller does NOT start a ramp, but just follows whatever you do with the knob, or with the Hold Steady commands.



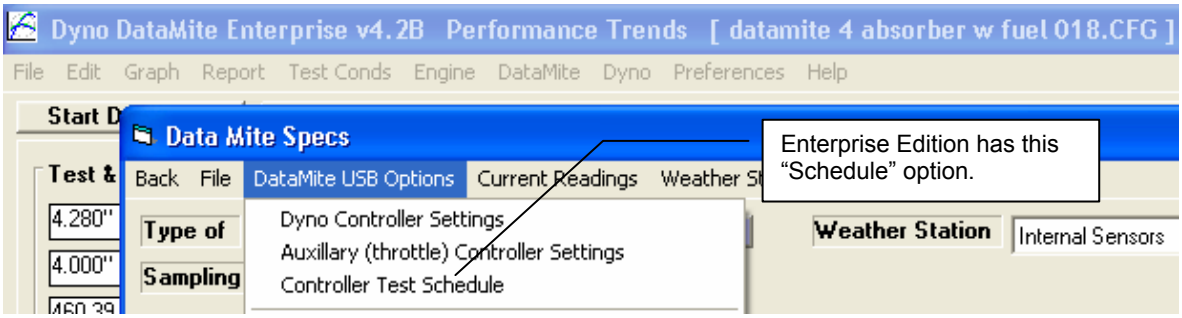
Typically you want to stop recording at the end of the run. But for some custom types of test you may want recording to continue until you click the yellow “Stop” button, or press the F2 key if it is activated.

Hold options work for holding RPM constant.

- Ctrl+S (hold the Ctrl key down and press and release the S key) lets you enter an RPM you want to hold constant.
- Ctrl+↑ and Ctrl+↓ let you step up or down the constant RPM by the RPM Increment.
- Ctrl+C lets you specify the increment for the arrow keys.
- Ctrl+R lets you “resume” normal testing, not holding RPM constant.

These Hold options only work with the controller in PC Control mode, because the PC must send commands to the controller.

Figure 10.06 Controller Test Schedule, Enterprise Edition Only



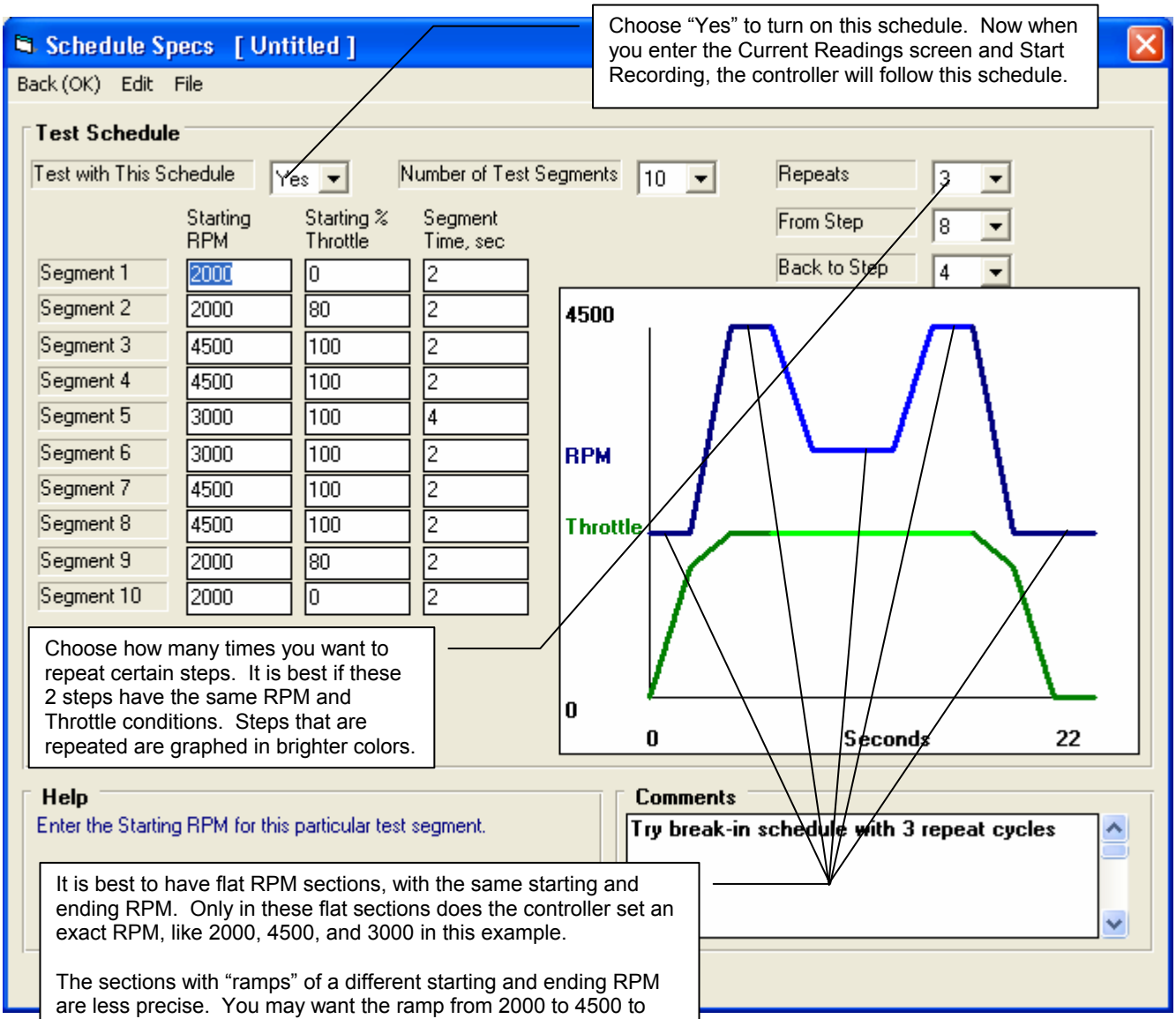
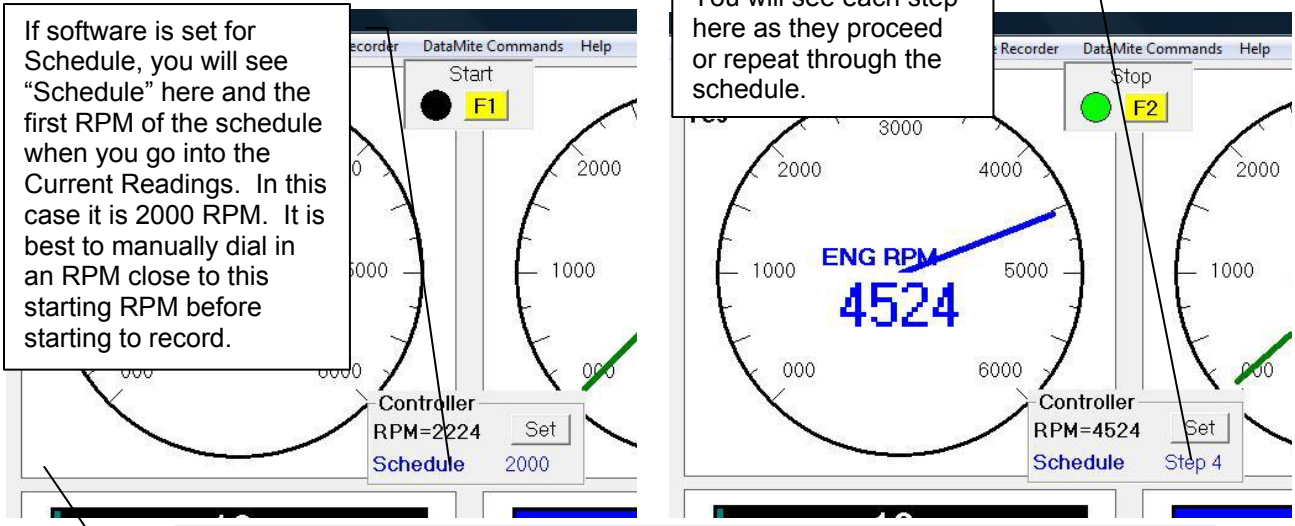


Figure 10.07 Controller Test Schedule, Enterprise Edition Only, cont

If software is set for Schedule, you will see "Schedule" here and the first RPM of the schedule when you go into the Current Readings. In this case it is 2000 RPM. It is best to manually dial in an RPM close to this starting RPM before starting to record.

You will see each step here as they proceed or repeat through the schedule.



It is critical to have good USB communications to run a Schedule. Read the suggestions at beginning of this Appendix.

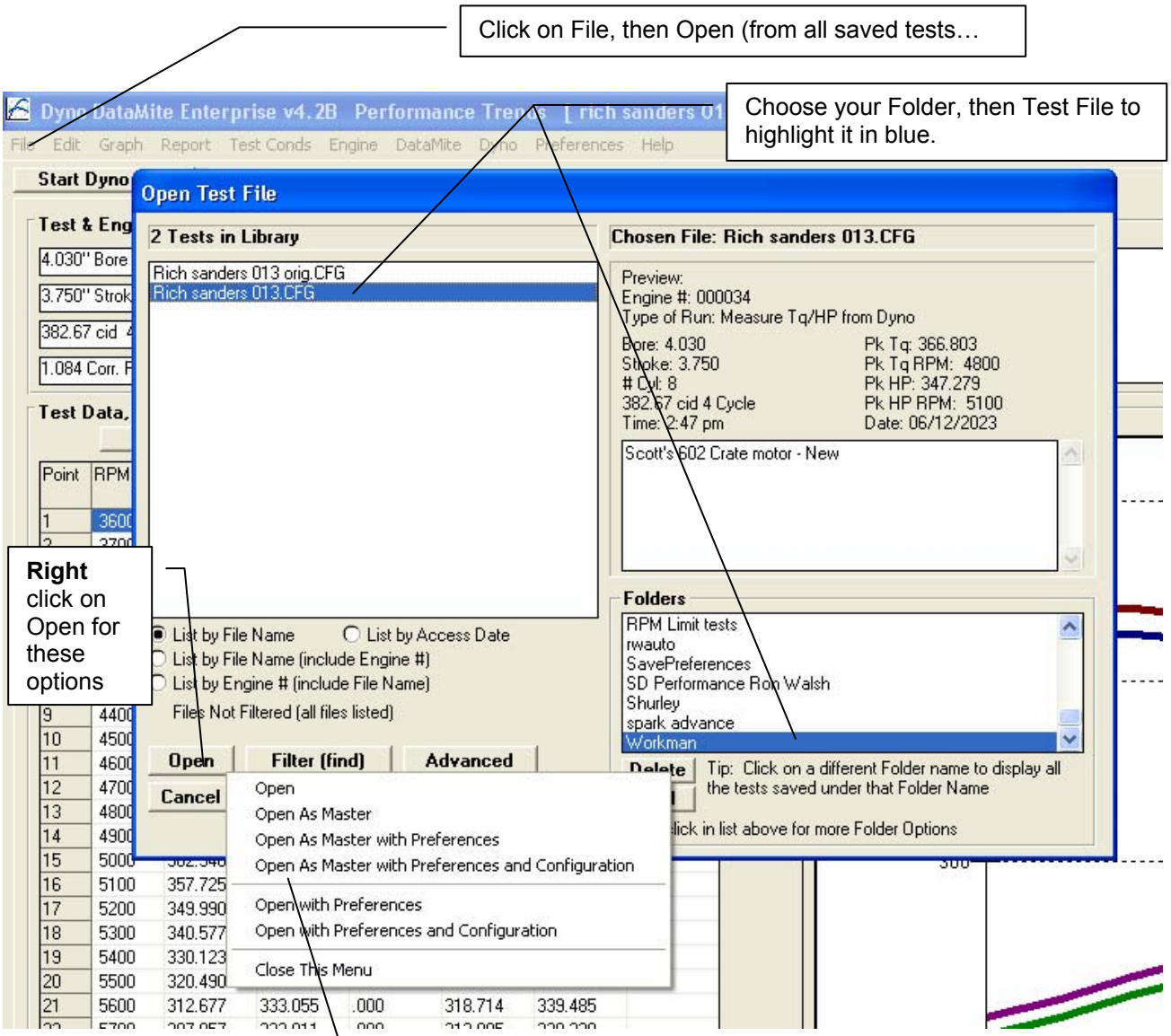
After 2 seconds at 4500 with Segment 8, the schedule goes back to Segment 4 and holds 2 additional seconds at 4500. It repeats Segments 4 though 8 two times, then proceeds to the to the end to Segment 10 which is held until you stop recording.

Throttle is closed and engine is shut down on Segment 10. Recording continues for another 5 seconds or so.

Schedule holds 2000 for 2 seconds, then starts ramping up to 4500.

When recording starts (Record button press, F1 key, etc) the schedule starts, controller commands first RPM, 2000 RPM in this case. It is best to manually set an RPM close to this starting RPM with the controller knob before starting to record.

Figure 10.08 New Features for Opening Tests

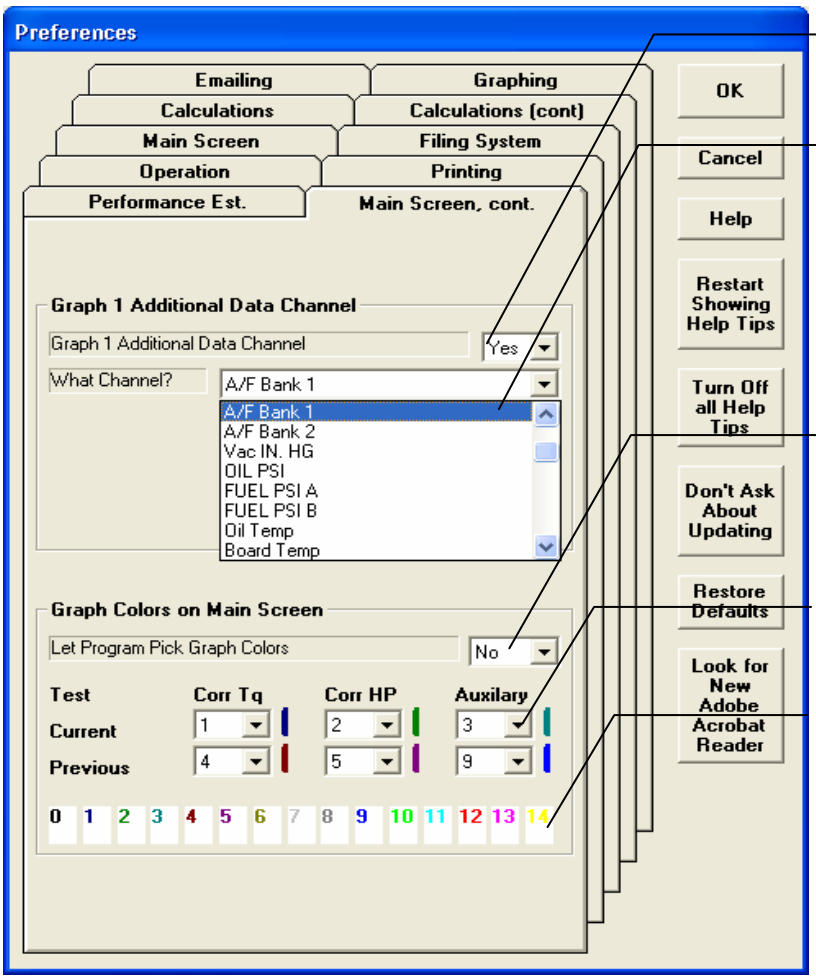


The "Open as Master" options will open the file you have chosen AND load that file's DataMite and Dyno settings as the Master settings. Master settings describe your DataMite and Dyno as they are today, and what you will use for new tests.

The "Open with Preferences" and "Open with Preferences and Configuration" options will set these settings to what they were when this particular file was saved. This can be very handy to restore you settings should you think something got corrupted. This is also very handy to copy these settings to a new computer.

BUT, this depends on the old computer still working so you can copy files, OR you made backup copies of some of your tests.

Figure 10.09 New Features for Graphs on Main Screen



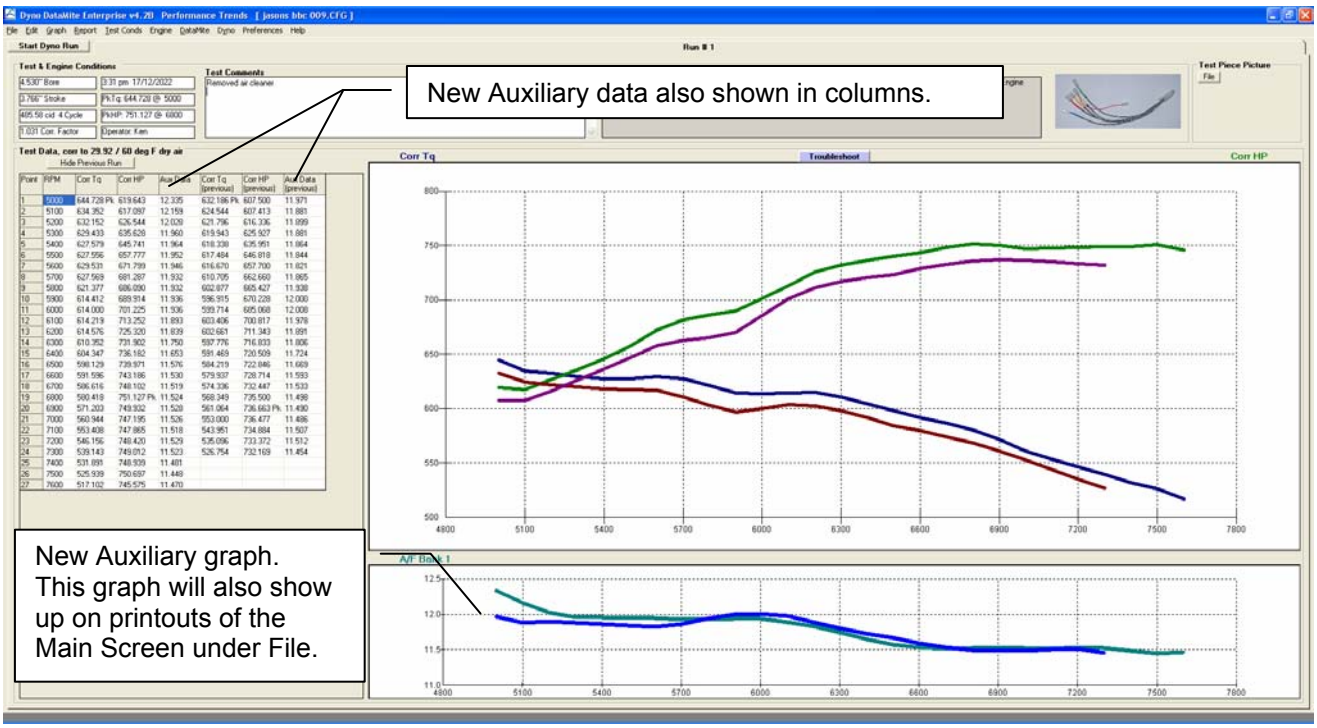
Click Yes here to add another graph to the main screen.

Pick what channel's data to want graphed in this additional graph. If you click on Graph at upper left of main screen you have **many more** graph options. Check Section 3.3 in the users manual for more info.

Set this to No and you can choose the colors for the graph lines on the Main Screen and when the Main Screen is printed.

Choose the Color Number for each graph.

The colors for the different numbers are shown here, a number from 0 to 15.



New Auxiliary data also shown in columns.

New Auxiliary graph. This graph will also show up on printouts of the Main Screen under File.

Figure 10.10 Reorganize Column Order in Reports

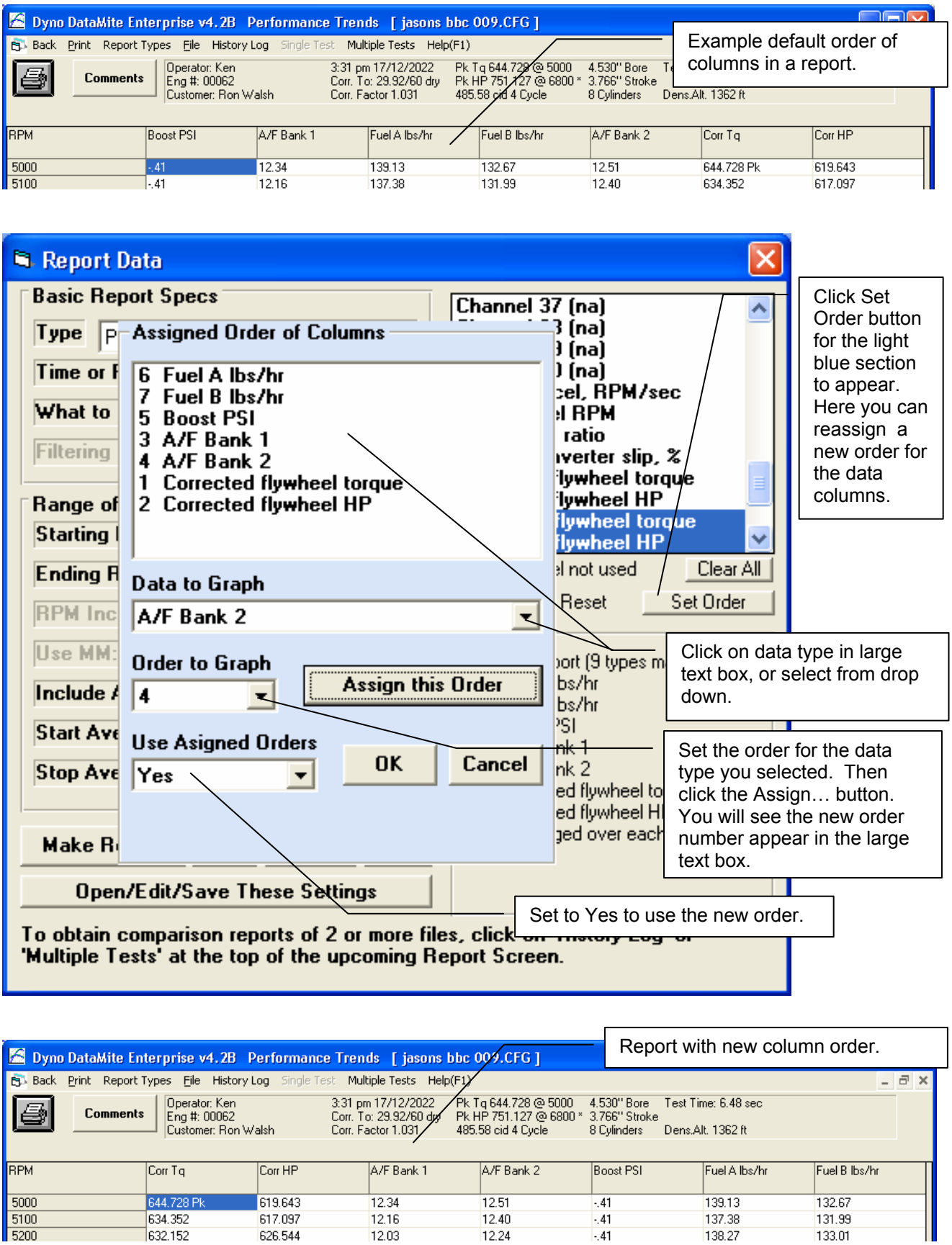
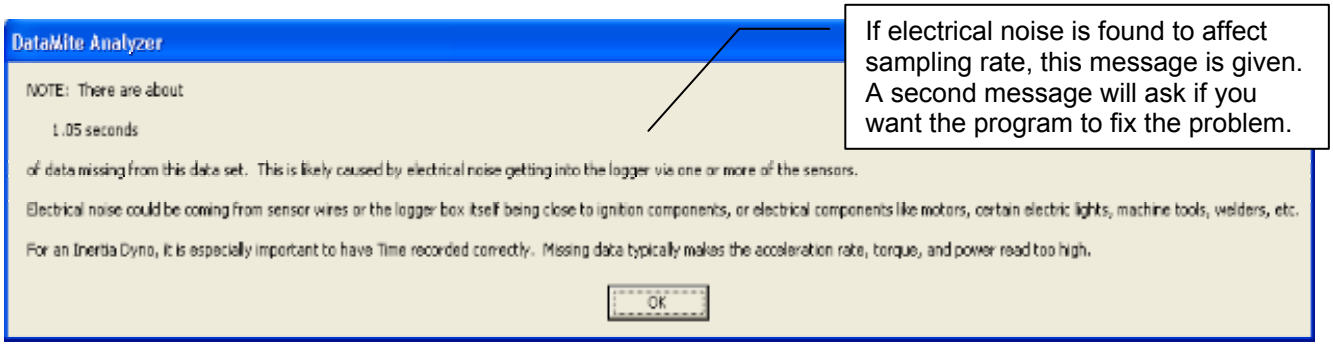
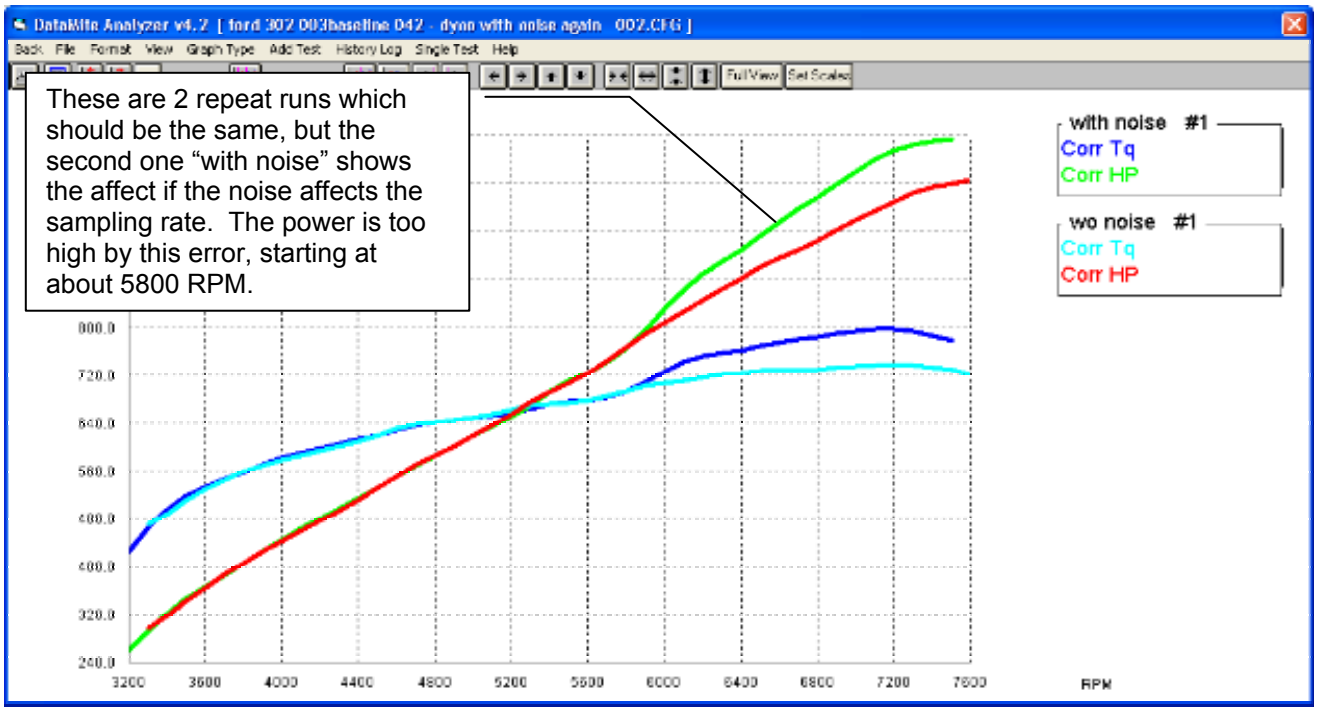


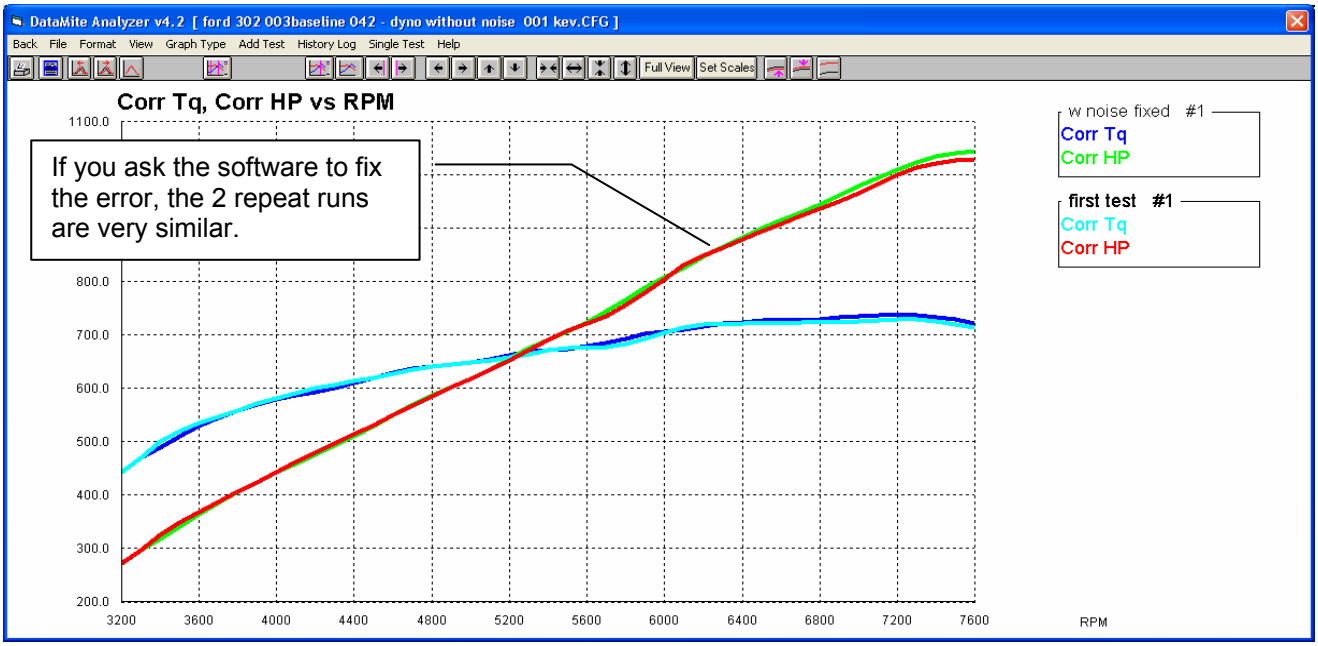
Figure 10.11 Fixing “Unseen” Electrical Noise Issues



If electrical noise is found to affect sampling rate, this message is given. A second message will ask if you want the program to fix the problem.

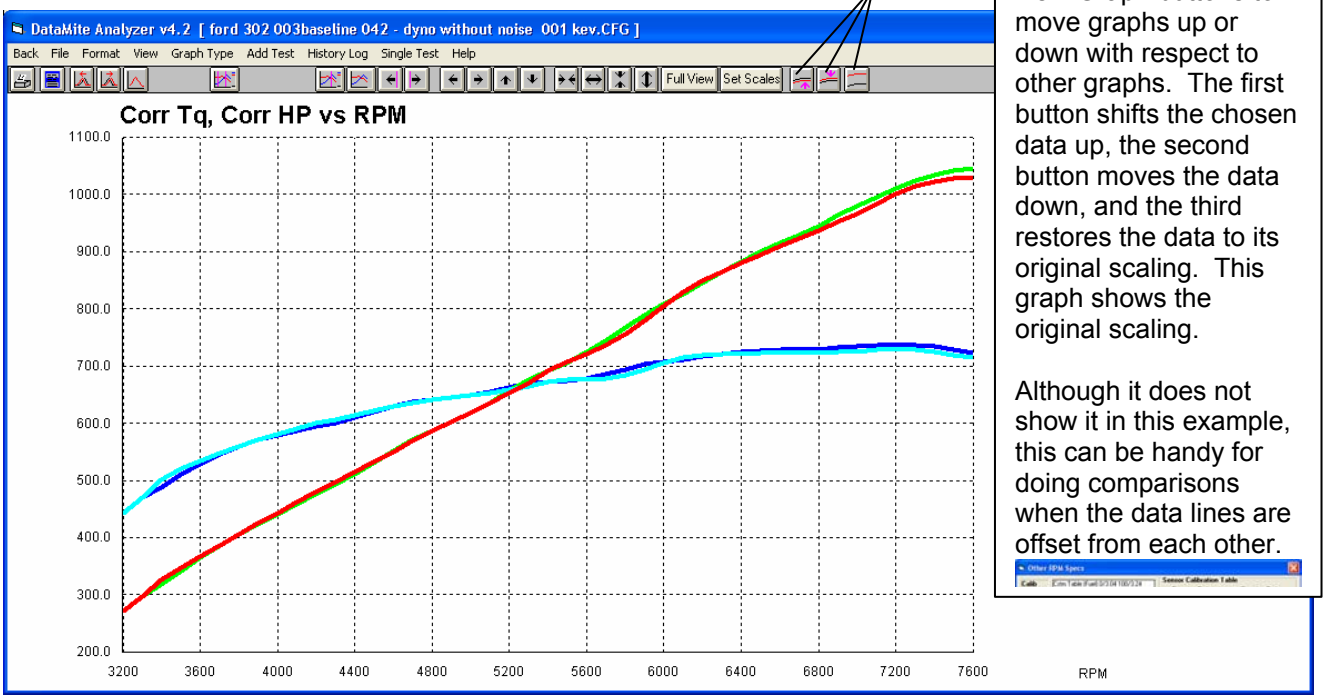


These are 2 repeat runs which should be the same, but the second one “with noise” shows the affect if the noise affects the sampling rate. The power is too high by this error, starting at about 5800 RPM.



If you ask the software to fix the error, the 2 repeat runs are very similar.

Figure 10.12 Shifting Graphs Vertically



New Graph buttons to move graphs up or down with respect to other graphs. The first button shifts the chosen data up, the second button moves the data down, and the third restores the data to its original scaling. This graph shows the original scaling.

Although it does not show it in this example, this can be handy for doing comparisons when the data lines are offset from each other.

The data you are shifting is identified with a pink outline. The amount it has been shifted is identified in the legend. In this case, the data has been shifted up 140 ft lbs and 140 HP. If you click on other file's legends, that will be the data that gets shifted. This feature is very similar to the "time align" feature discussed in Section 3.3 Graphs.

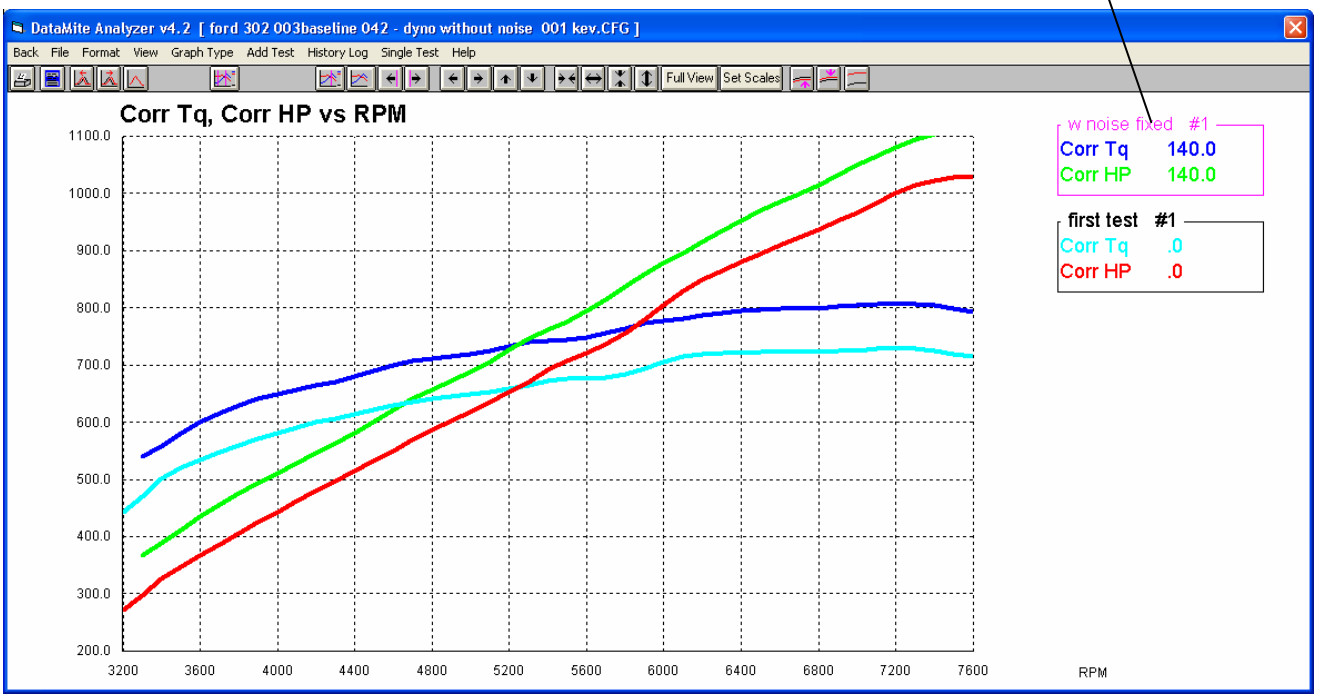


Figure 10.13 Using a Fuel Table for Fuel Flow Sensor Calibration

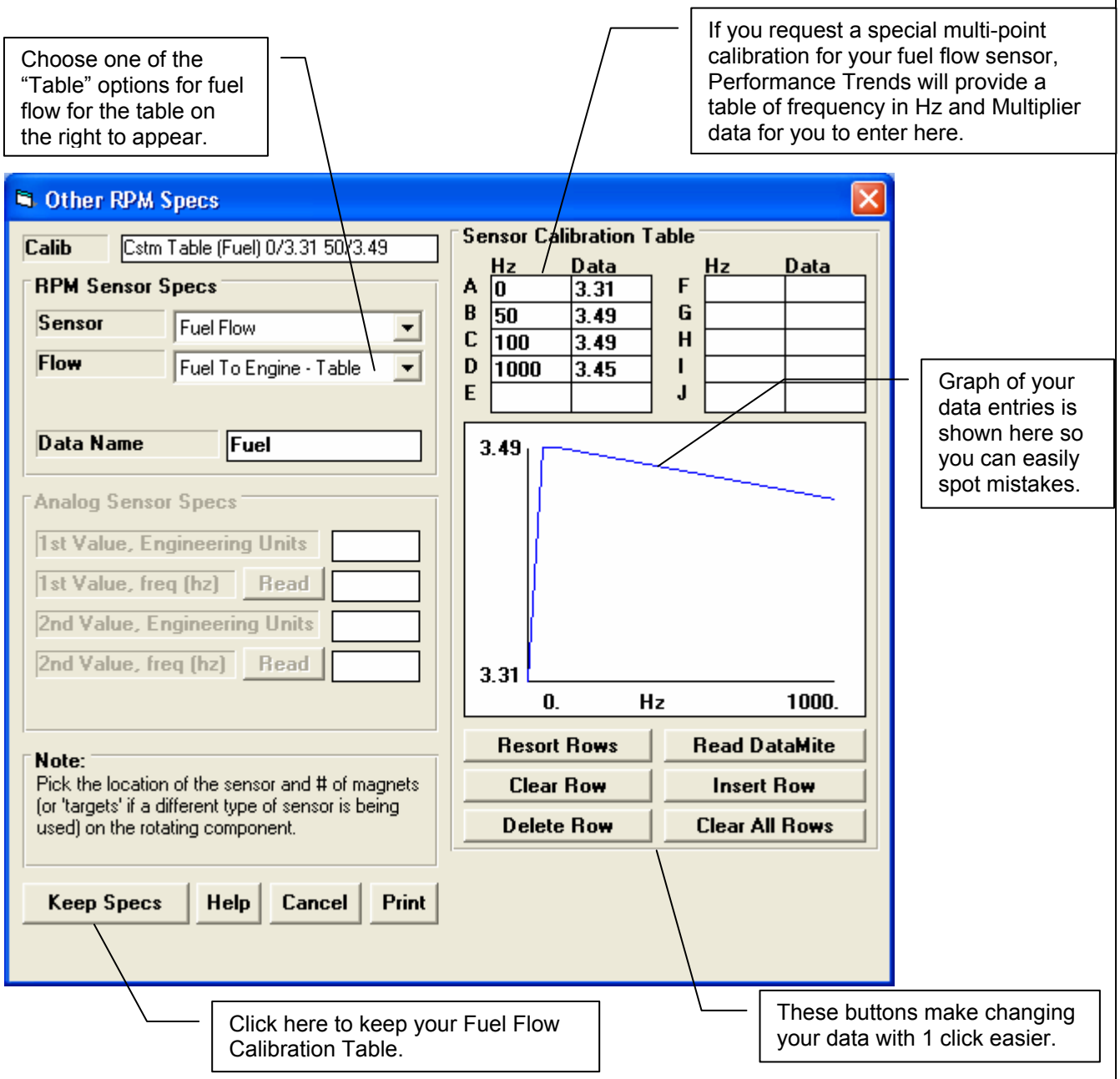


Figure 10.14 Setting Max/Min RPM for Automatic Recording in Test Conds Screen, Enterprise Edition Only

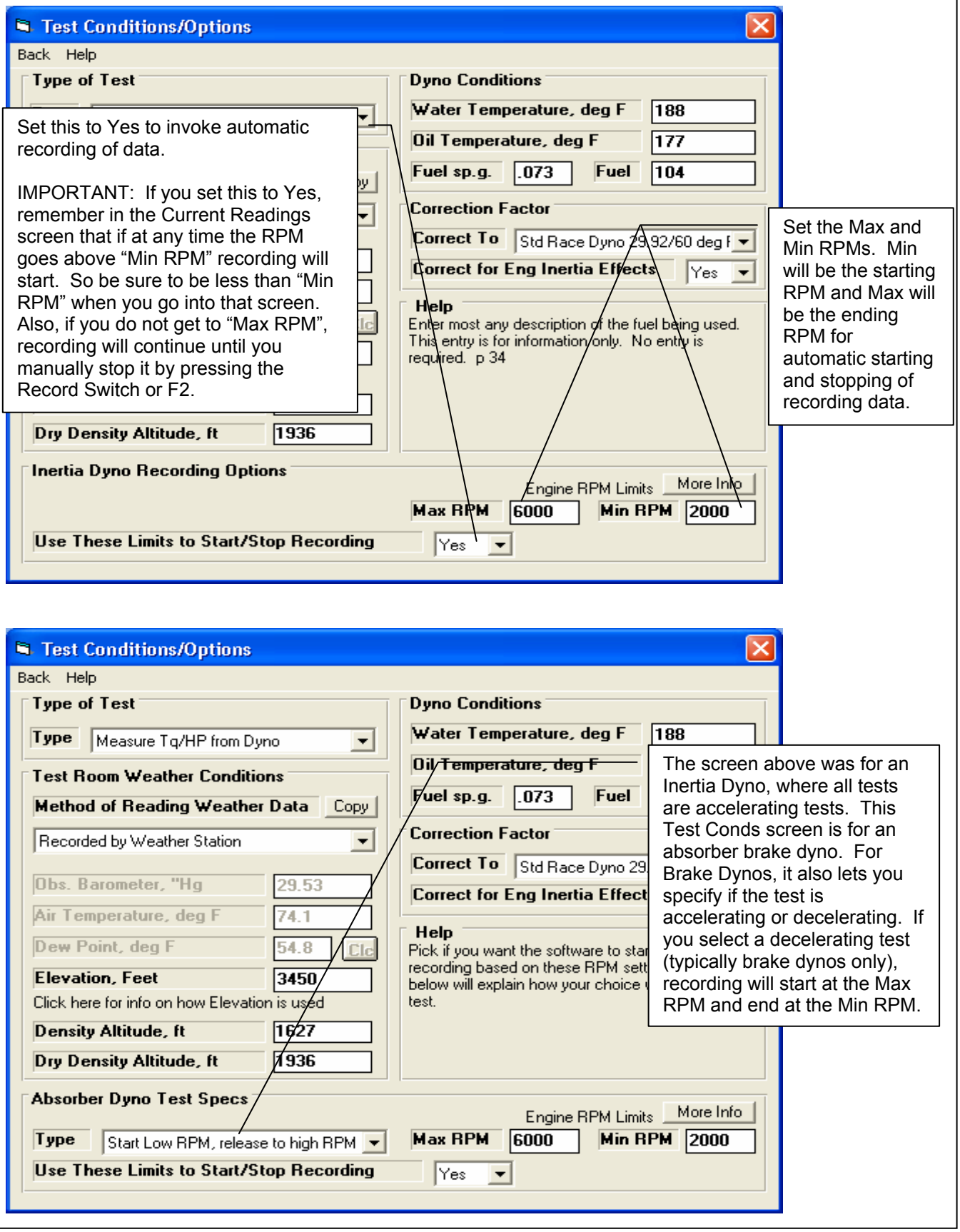
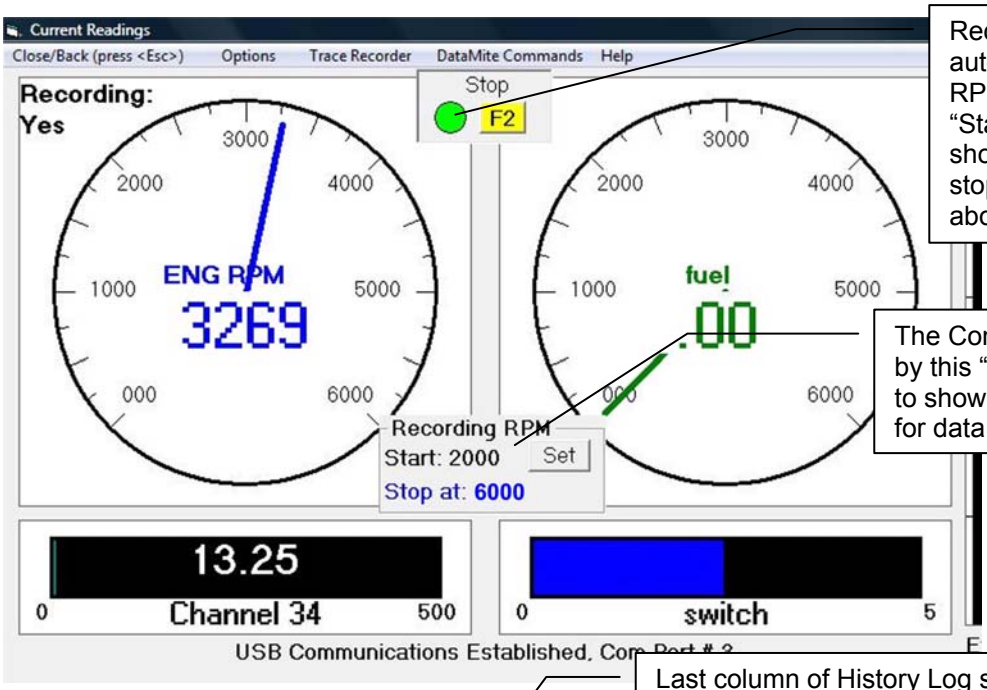
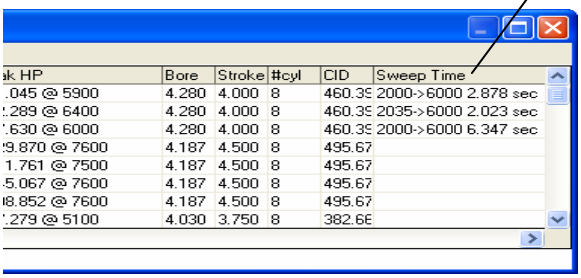


Figure 10.15 Setting Max/Min RPM for Automatic Recording in Test Conds Screen, cont.



Recording will start automatically when the RPM goes above the "Start:" RPM of 2000 as shown in this screen. It will stop when RPM goes above "Stop at:" RPM of

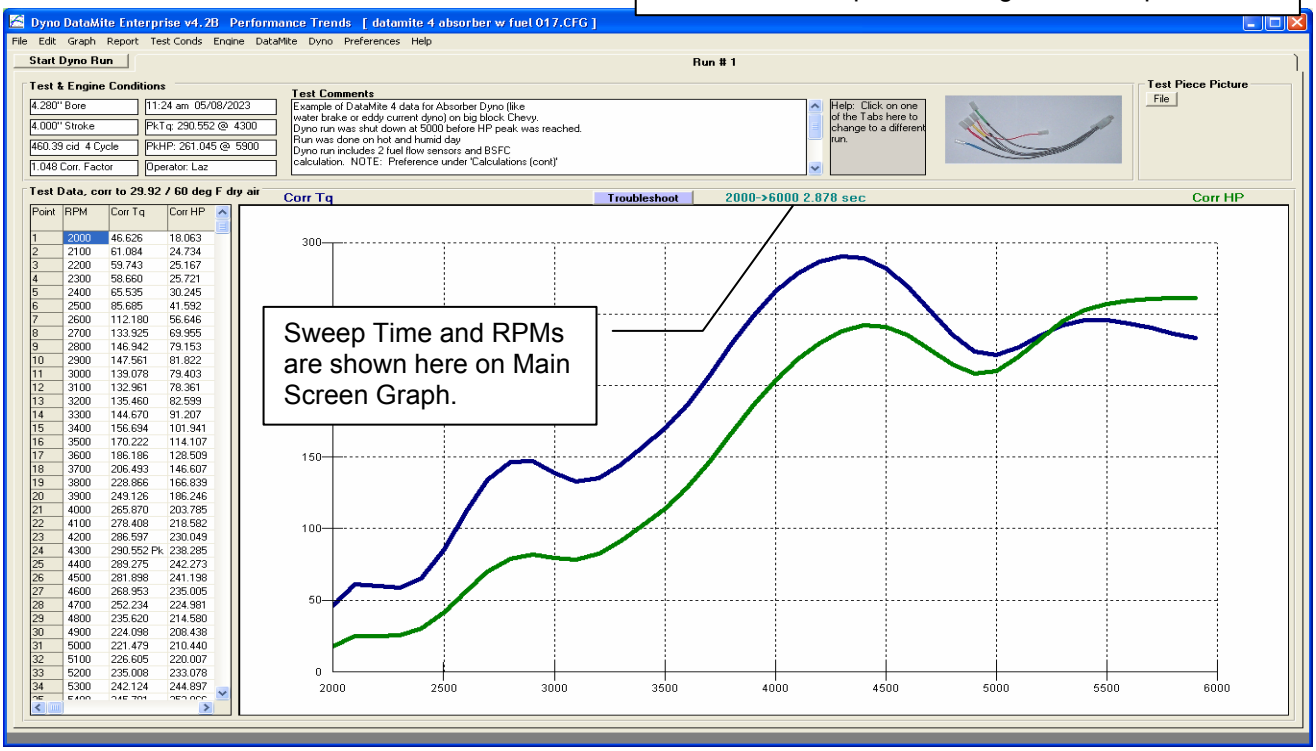
The Controller section is replaced by this "RPM Recording" screen, to show the Start and Stop RPM for data recording.



k HP	Bore	Stroke	#cyl	CID	Sweep Time
.045 @ 5900	4.280	4.000	8	460.39	2000->6000 2.878 sec
.289 @ 6400	4.280	4.000	8	460.39	2035->6000 2.023 sec
.630 @ 6000	4.280	4.000	8	460.39	2000->6000 6.347 sec
9.870 @ 7600	4.187	4.500	8	495.67	
1.761 @ 7500	4.187	4.500	8	495.67	
5.067 @ 7600	4.187	4.500	8	495.67	
8.852 @ 7600	4.187	4.500	8	495.67	
.279 @ 5100	4.030	3.750	8	382.68	

Last column of History Log shows the Starting and Ending RPM (Max and Min), and the Sweep Time. Note that the 2nd run started at 2035 seconds, not at the desired 2000 RPM. This will occur if the Starting RPM is at a point where the engine and dyno are accelerating quite quickly.

These times are for a brake dyno, so the sweep time does not indicate changes in torque and HP. If these were done on an inertia dyno, generally the shorter the sweep time the higher the torque and



Sweep Time and RPMs are shown here on Main Screen Graph.

Figure 10.16 New History Log Save Features

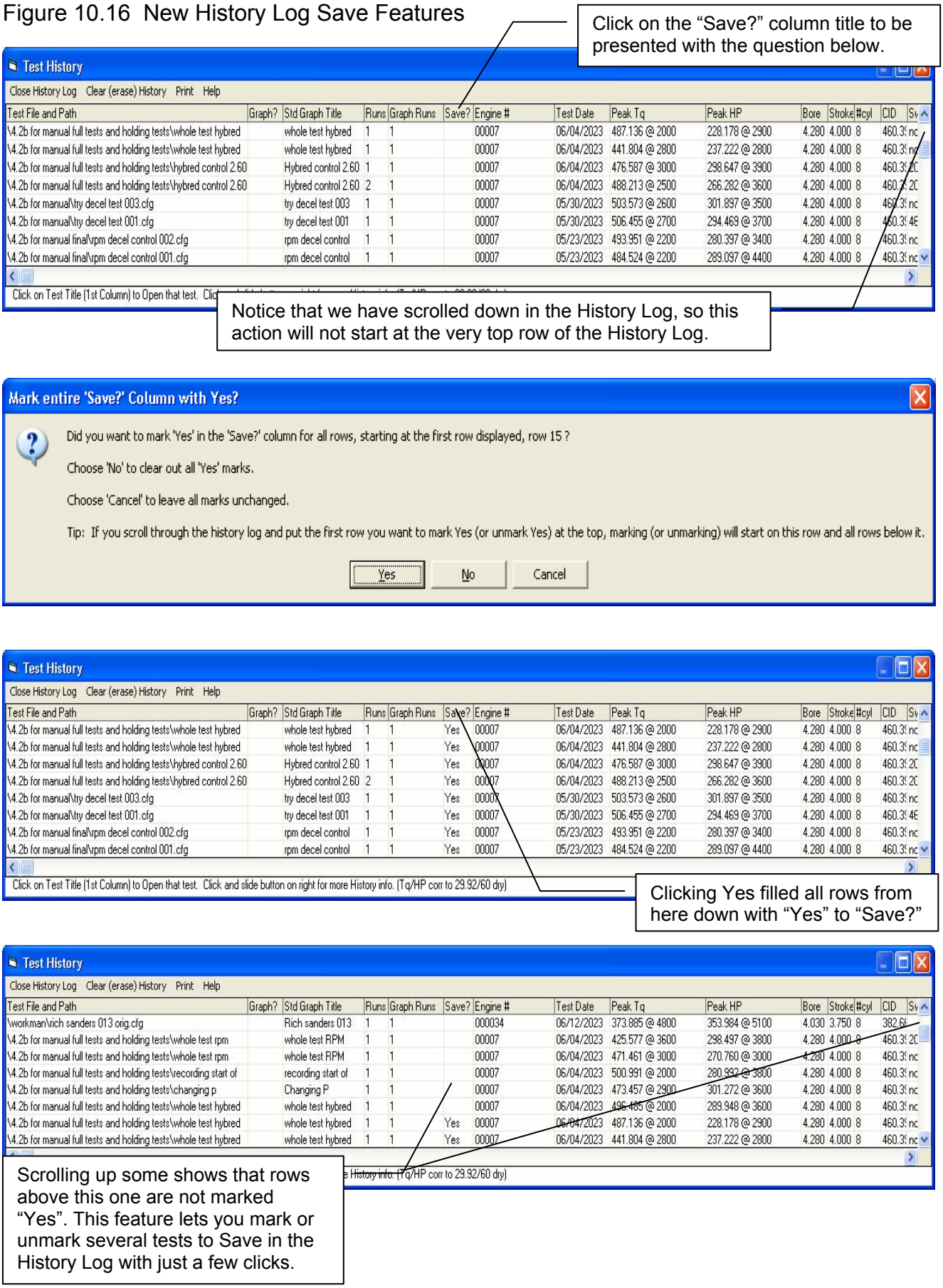
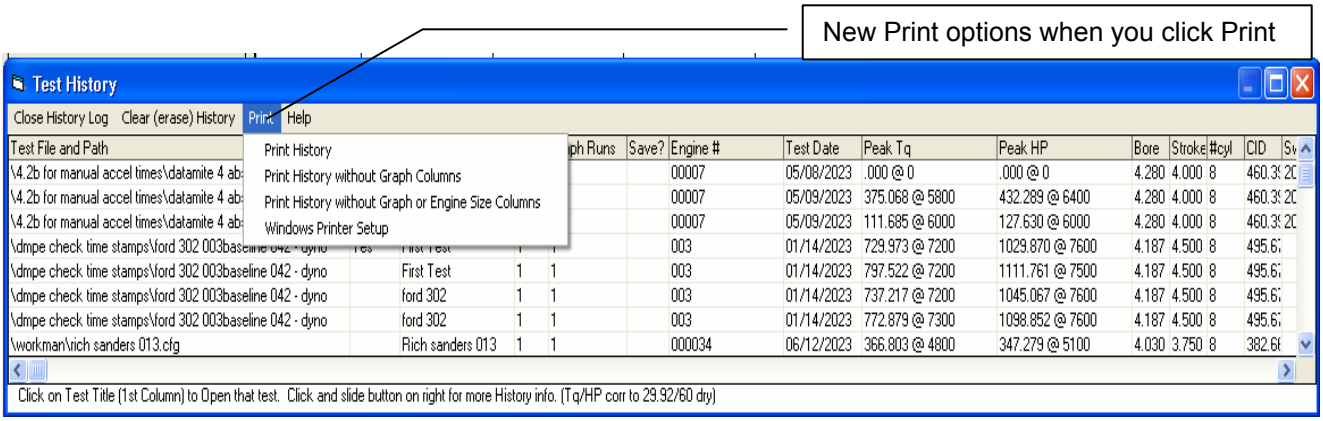
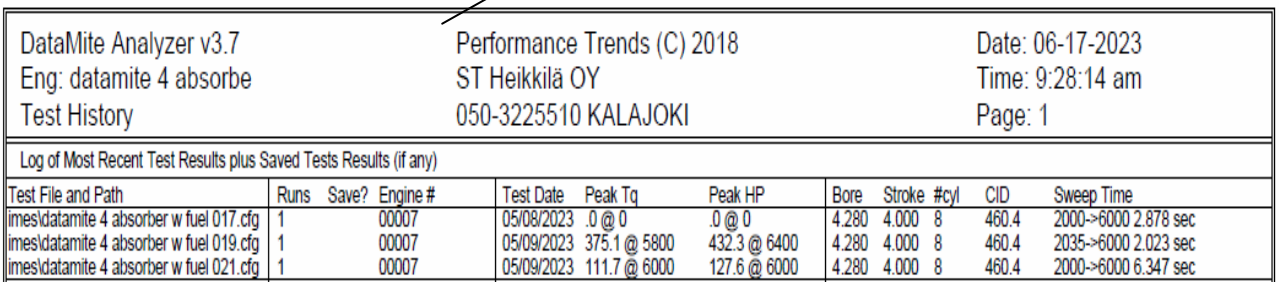


Figure 10.17 New History Log Print Features





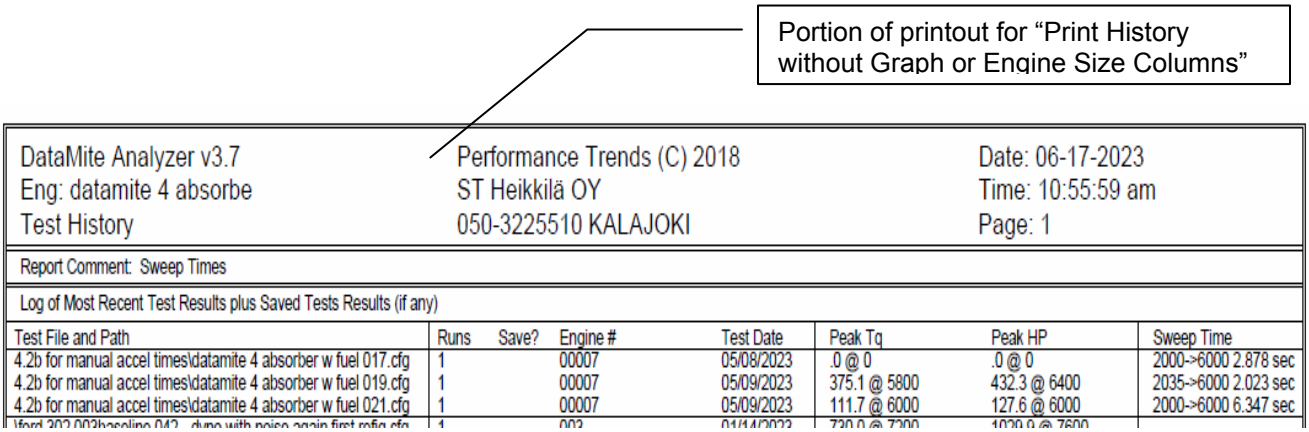


Figure 10.18 Setting Red Lines on Round Gauges

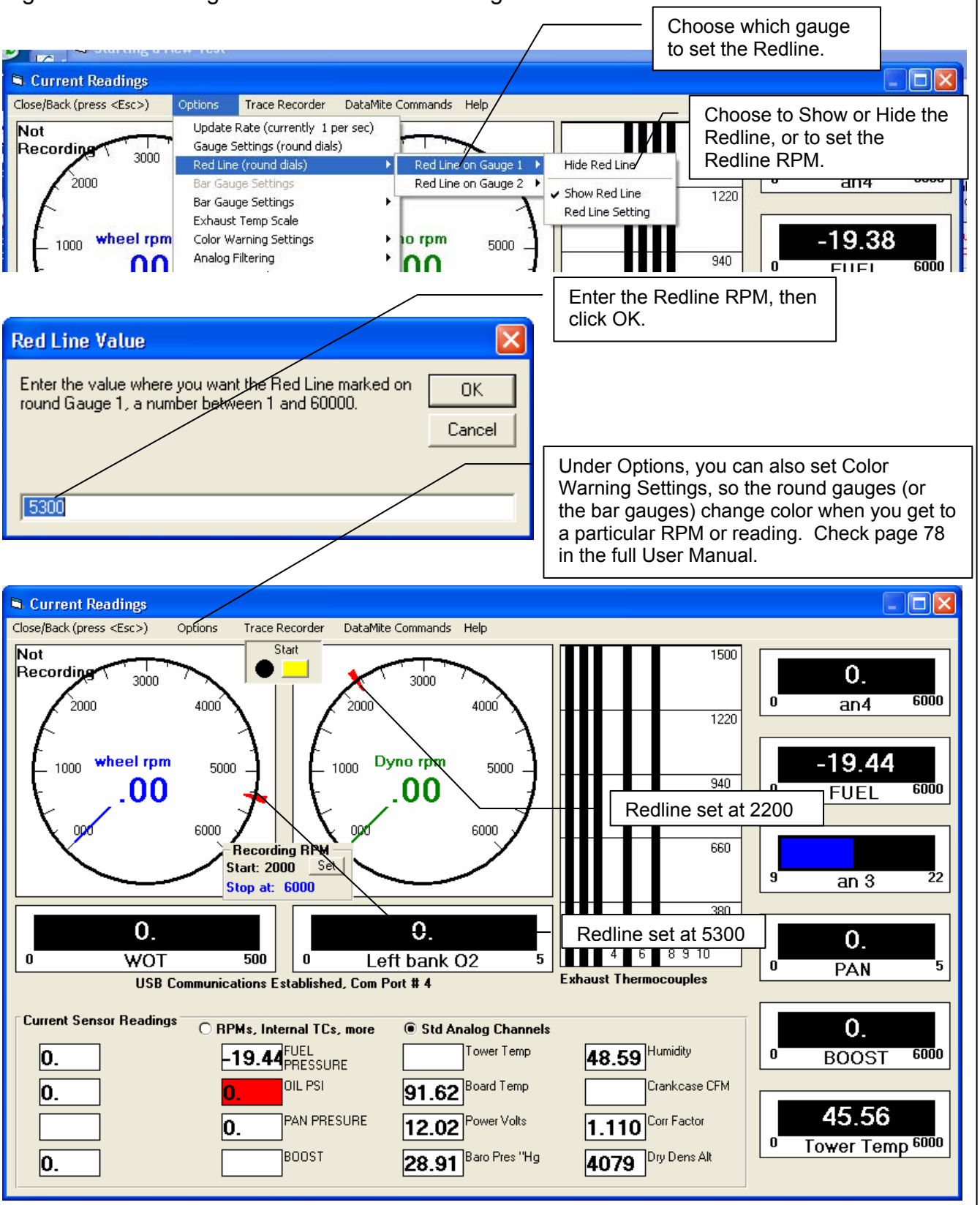


Figure 10.19 Calculating Volumetric Efficiency from A/F and Fuel Flow

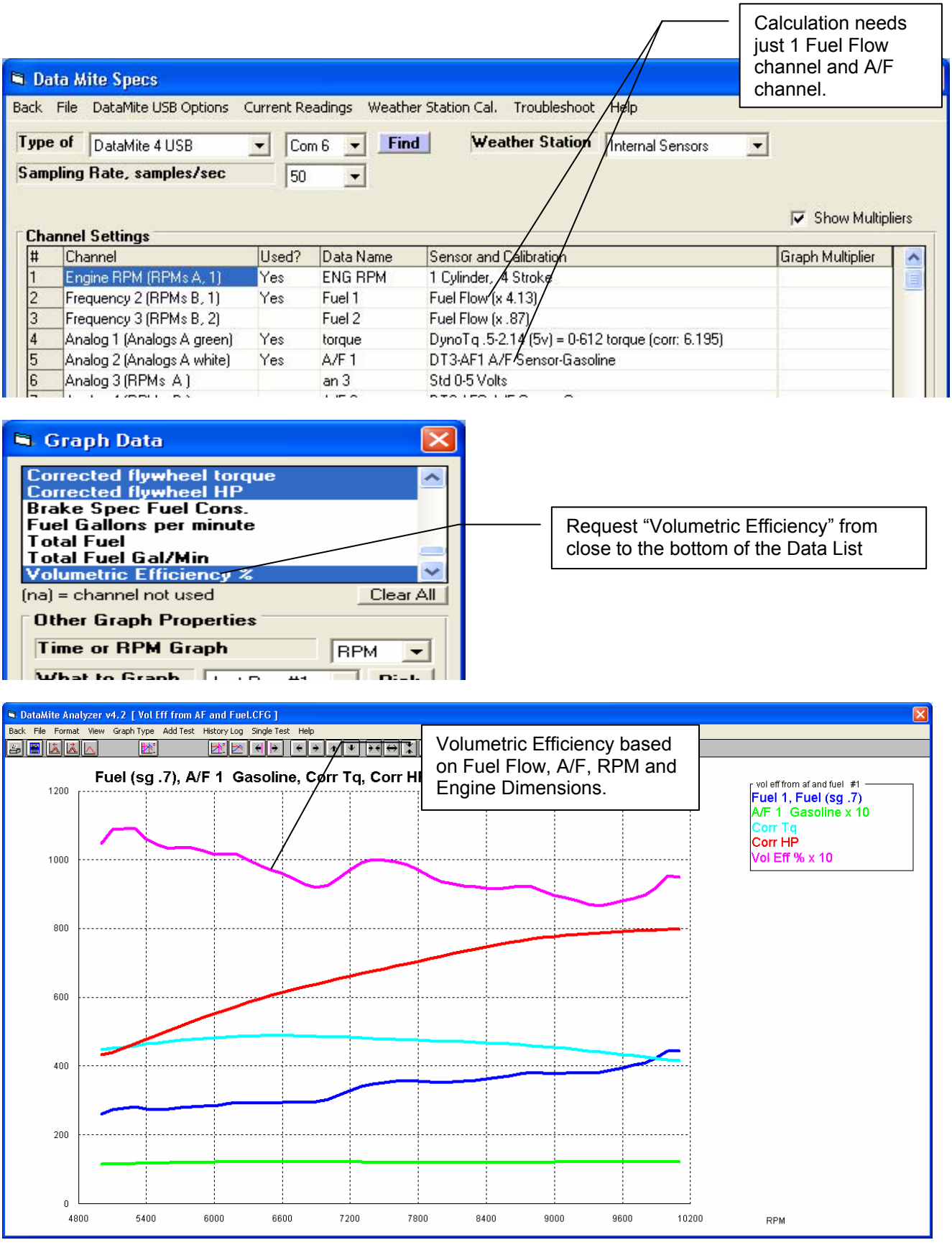


Figure 10.20 New Emailing Preferences

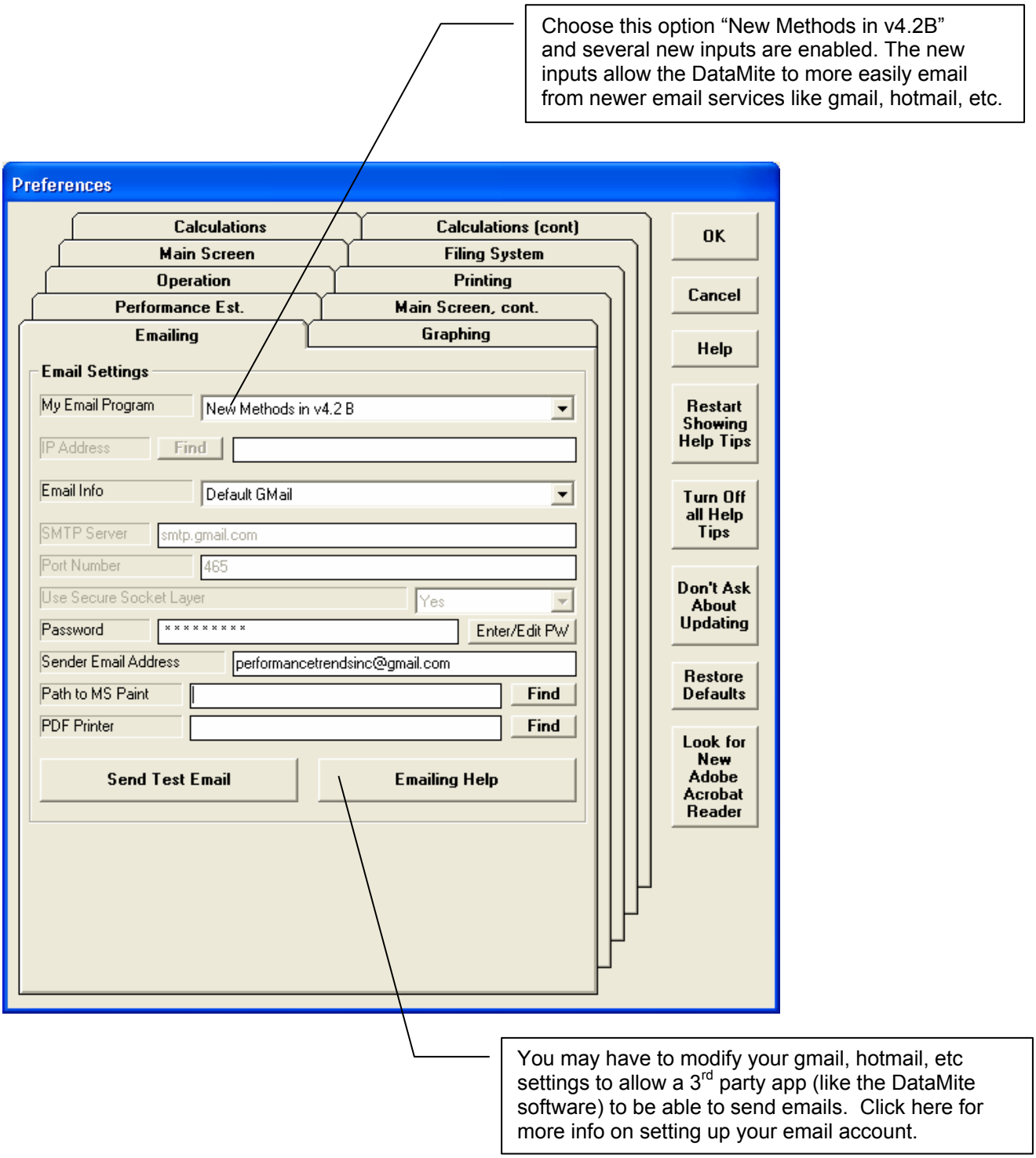


Figure 10.21 New Preference for Electrical Noise