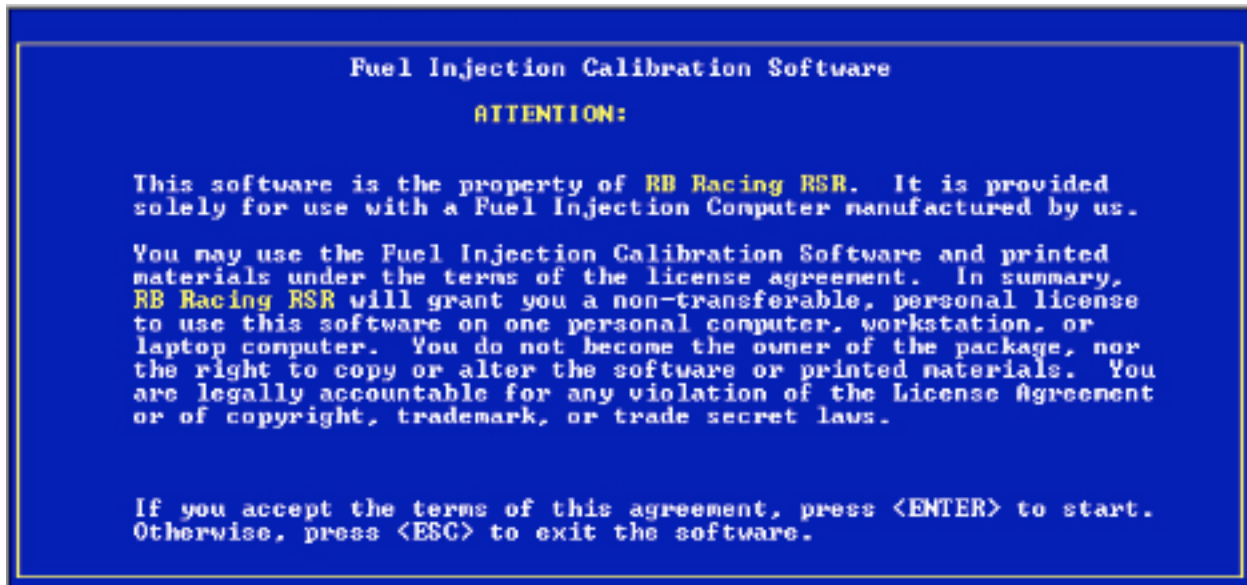


Autocal.V6 FUEL Serial Software



RSR Fuel Injection Systems are flexible, easy to calibrate, and have a proven record in all form of competition from drag racing championships to multiple Bonneville and Maxton world speed records.

The systems are essentially waterproof and shockproof and are unique in that they can be programmed in minutes for .5, .75 (special order), 1, 2, or 3 Bar pressure ranges and from 3000 to 16000 rpm for both high and low impedance injectors. The system can support four low impedance (2-3 Ohm) injectors or up to eight high impedance (12-16 Ohm) injectors.

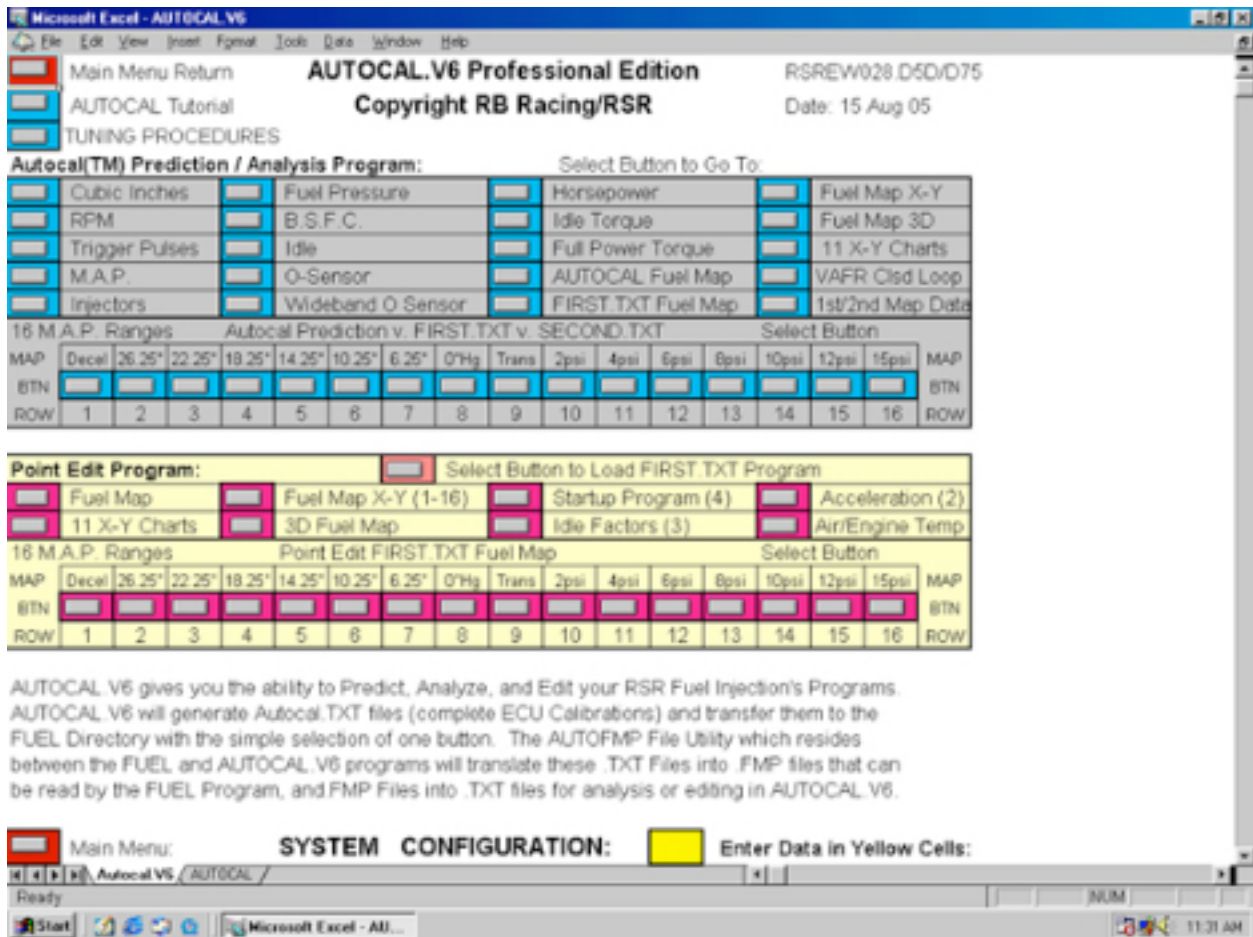
Driver circuits exist on all RSR ECU for 8 low impedance injectors or as many as 32 high impedance injectors. Contact RB Racing if you need applications in these ranges.

The system can be programmed to run in open or closed loop and, unlike other systems, there are no millisecond values, volumetric efficiency tables, "gamma" values, or other hard to understand acronyms.

Autocal.V6 FUEL is a DOS based program and can run on operating systems up to and including Windows 2000. It is installed at C:\FUEL\

Overview

Digital Fuel Injection is not "easy". There are literally hundreds of items or data points to enter, all of which are, in some way, interrelated. This is the problem. Given a blank sheet of paper you would have no idea what to enter for these hundreds of items for your given application.



To solve this issue RB Racing created a separate program, **Autocal.V6 Professional Software**, one step removed from the Autocal.V6 Serial Software described in this document. Simply by entering data in fifteen paragraphs in Autocal.V6 Professional you create a starting ecu calibration for your application that brings all setup data, sub tables and fuel map into agreement with one another.

We require that all customers purchase Autocal.V6 Professional Software as it is the only way all the digital information can be correctly configured. Changes in configurations like larger injectors or a different fuel pressure can be entered and the entire ecu calibration can be changed in a few minutes.

Autocal.V6 FUEL Serial Software allows you to communicate with your RSR ECU, to maintain a library of ecu calibrations, and to point edit these calibrations either directly with the ecu or off-line.

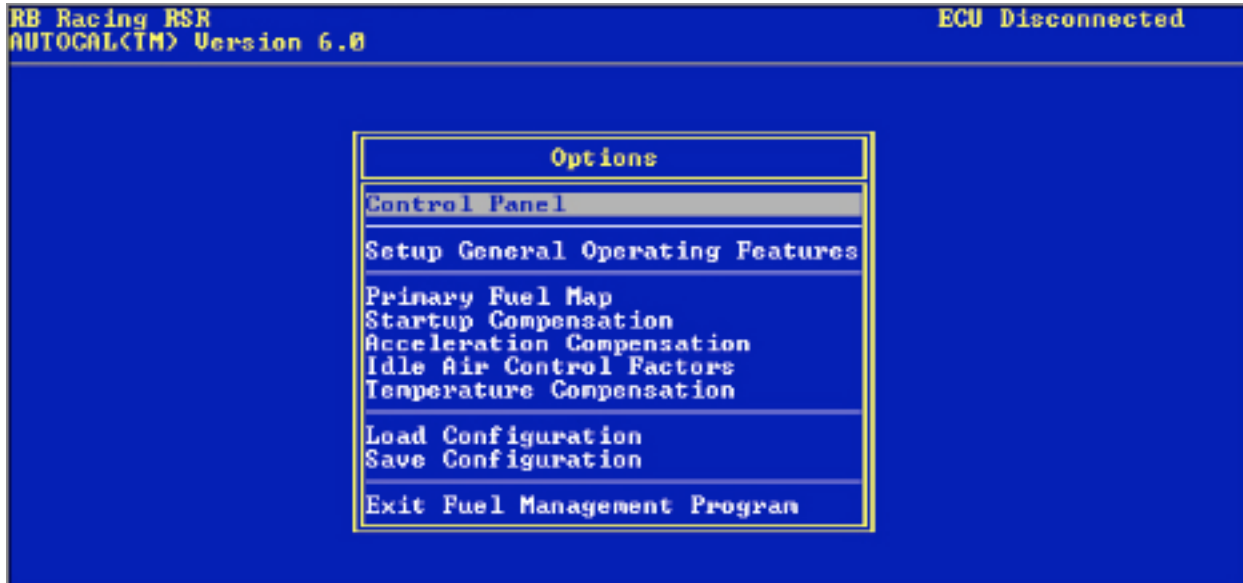
Point editing is where you change one thing at a time. Autocal.V6 Serial Software makes this very simple from a graphical standpoint and does not burden you with a lot of information that you would not remember anyway. We have found that 99% of the users never edit any of the many sub-tables of information.

Using Autocal.V6 Serial Software

In DOS at the DOS prompt type C:\ <enter>

This will get you to the C prompt. You then change to the fuel directory by typing cd fuel <enter>. Then type fuel <enter> which will get you to the license screen and if you accept the below menu will appear.

In the upper right hand corner you should see ECU Disconnected. If this is not visible then you entered through Windows. Restart in DOS and try again.



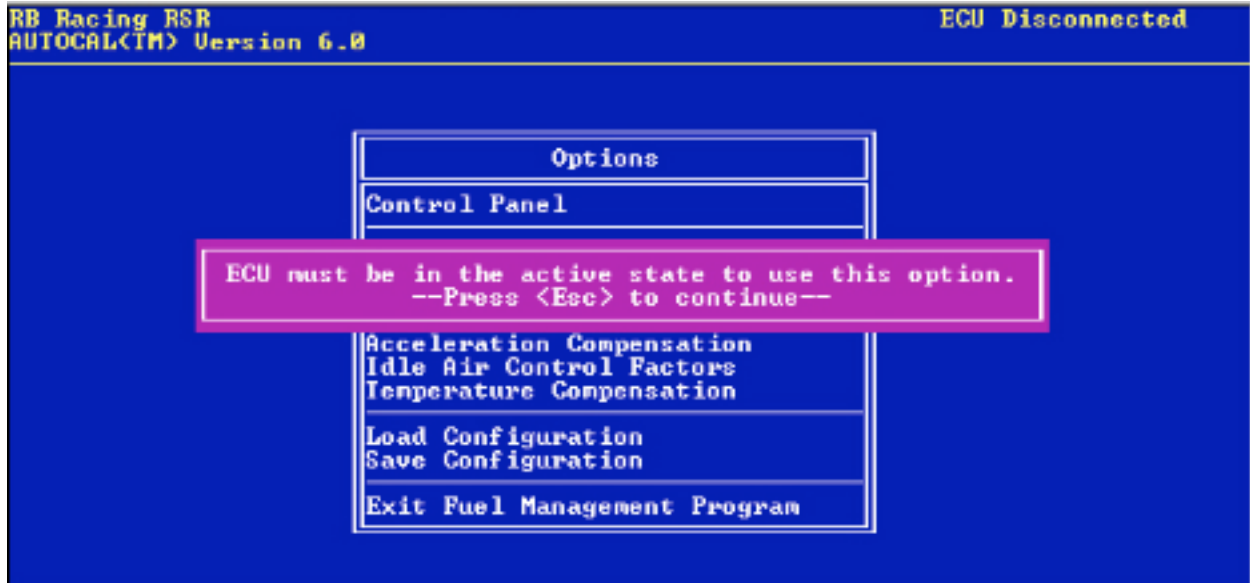
If you are connected to your RSR ECU with the serial cable AND the ecu is powered up then the ECU Disconnected will change to ECU Negotiating and then to ECU Active.

There is a waterproof tuning switch in the wiring harness that allows the RSR ECU to be powered up without turning on the ignition key. The ECU must be active to see the Control Panel.

You should wait for the ECU Active to appear before doing any menu navigation. The Software has to read all of the data in the RSR ECU and entering a category like the Primary Fuel Map will only show a table of zeros unless all of the data has been read.

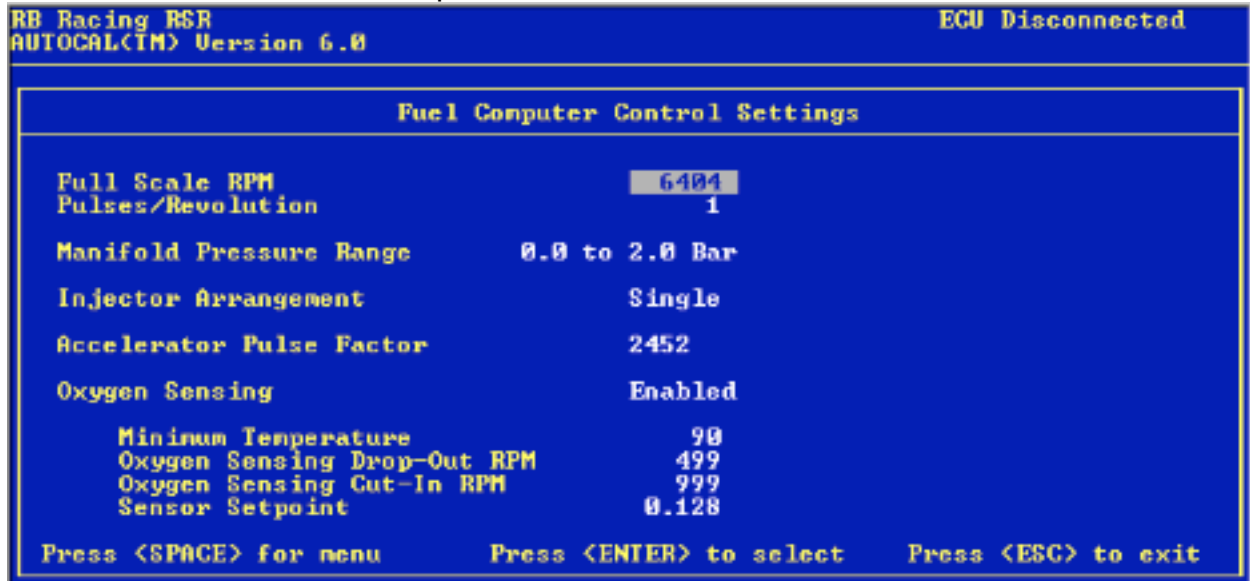
In DOS you can toggle between full screen by hitting simultaneously ALT <enter>

If you have configured a shortcut to FUEL in DOS and you are also using the Windows based Autocal.V6 Professional Software, you can toggle back and forth by hitting simultaneously ALT TAB

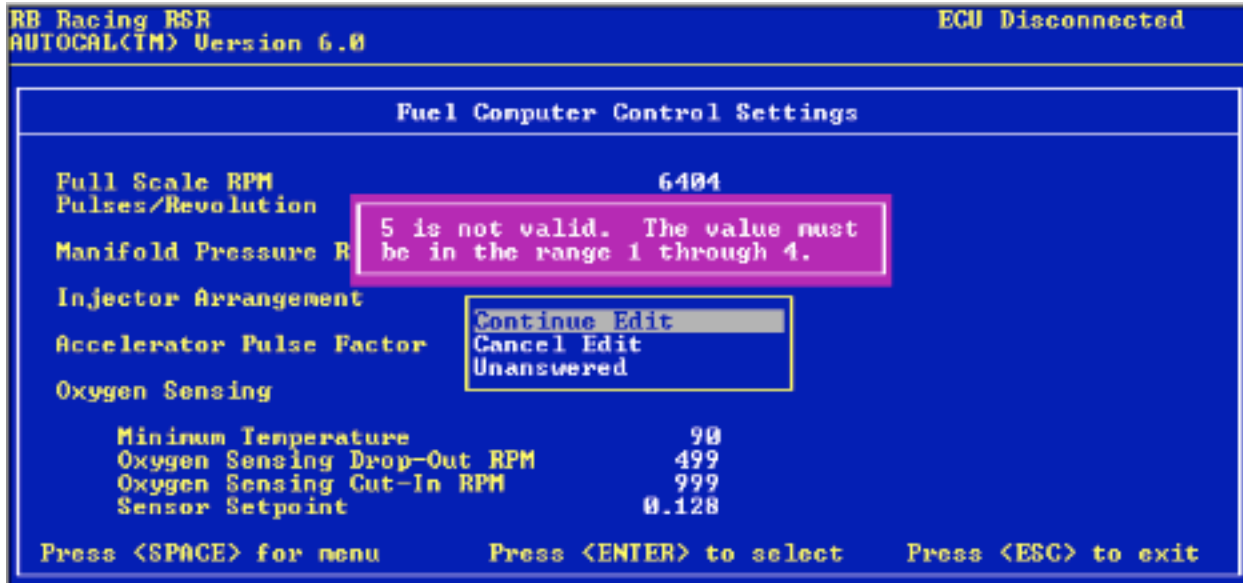


Setup General Operating Features

Look at the bottom of the screen. ESC always takes you backwards. Use up and down arrow keys to navigate. Use Spacebar to open each menu for the items listed. RPM must fall between 3000 and 16000 rpm.

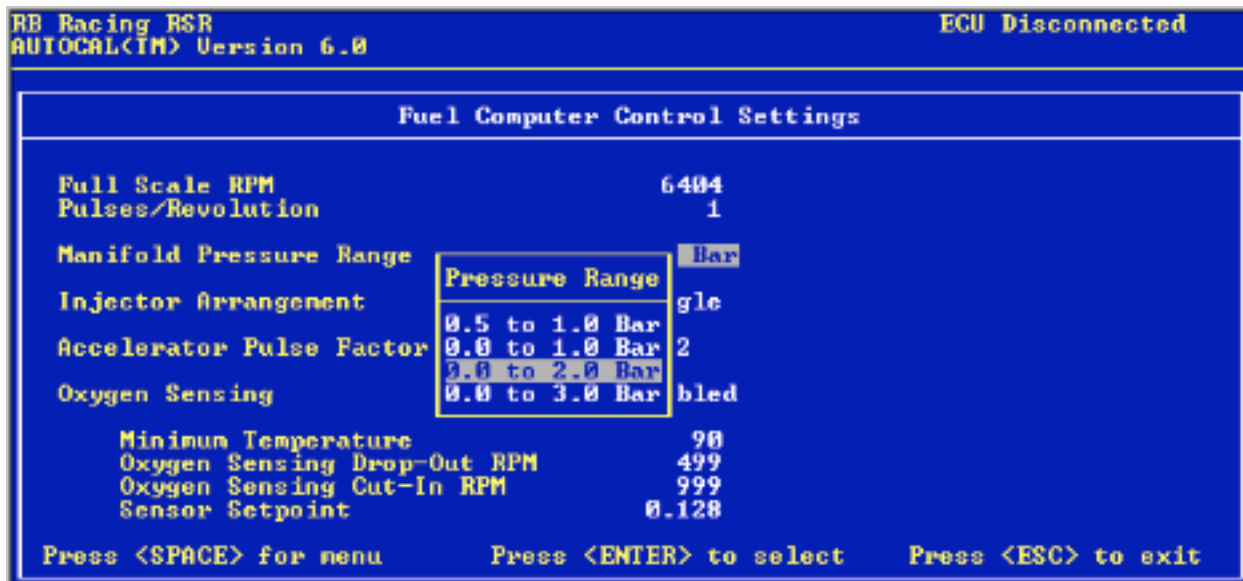


Pulses/Revolution can be one to four. The RSR ECU must see one pulse per engine revolution. The injectors will simultaneously fire twice per four stroke cycle or once per engine revolution.



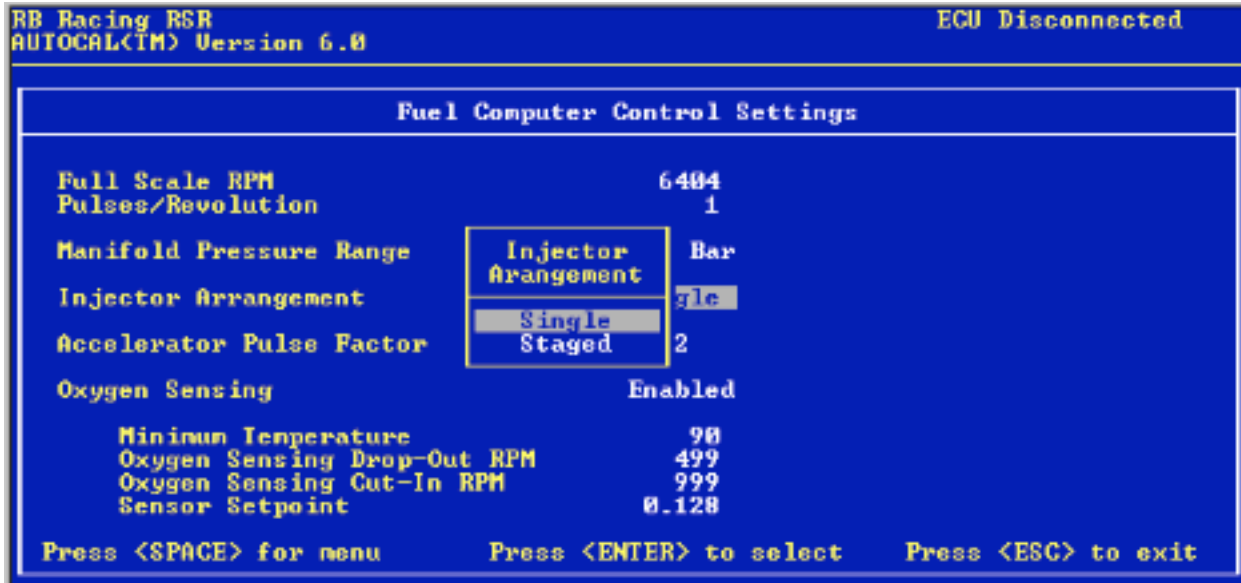
Running the injectors in batch mode eliminates any need to synchronize any firing events with separate sensors and in the case of forced induction helps pull heat out of the inlet tract.

Manifold Pressure Range. Spacebar for menu. Select whether you are running .5/1/2 or 3 Bar MAP Sensor. Normally aspirated motorcycles run .5 Bar. A special configuration for .75 Bar (22.5 In Hg to 0" Hg) can be ordered from RB Racing.



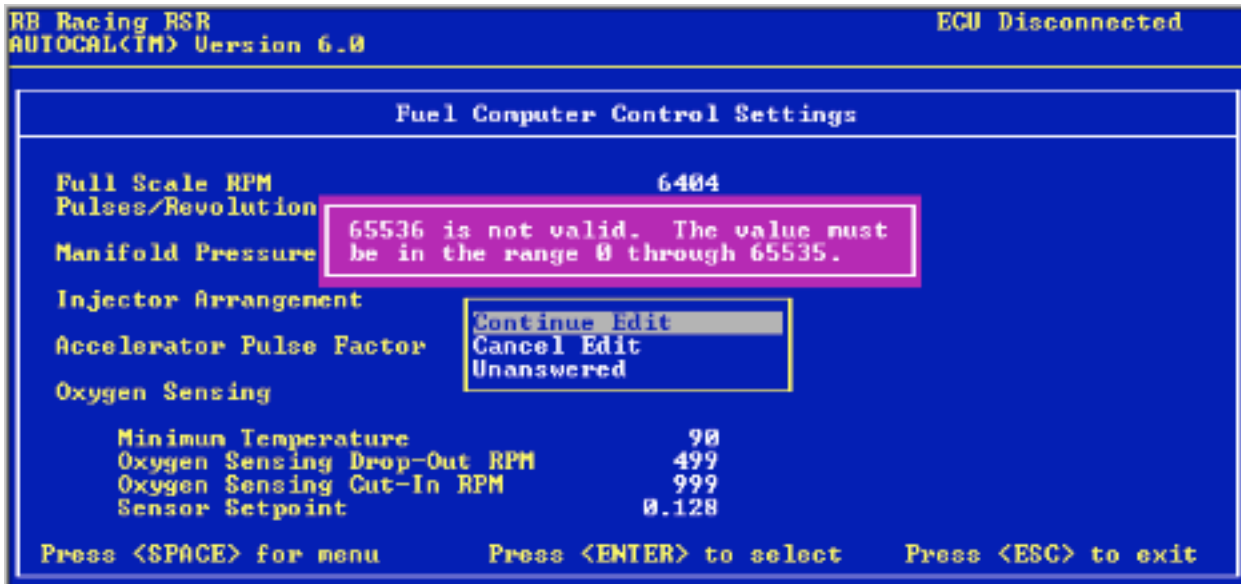
Injector Arrangement. Single means all injectors fire at same time. If horsepower requirements cannot be met by single injectors then a second set of injectors can be added and your RSR ECU programmed to run Staged. Staged means that there will be primary and secondary injectors and that the secondary injectors will "kick in" automatically to cover

your horsepower requirements.



Note: If the “ECU Active” is in effect and you disconnect the serial cable, “Active will remain on the screen. It is safer to exit the program and reconnect once you reconnect the cable.

Acceleration Pulse Factor. This is part of your accelerator pump programming. The initial value is set in the Autocal.V6 Professional Software calibration. The value is milliseconds of fuel added between the normally timed injection events. This prevents hesitations or backfires. You normally enter numbers from 0 to 8000. It is best left alone. There is a tendency to put too much fuel in this area. Sometimes less is better.

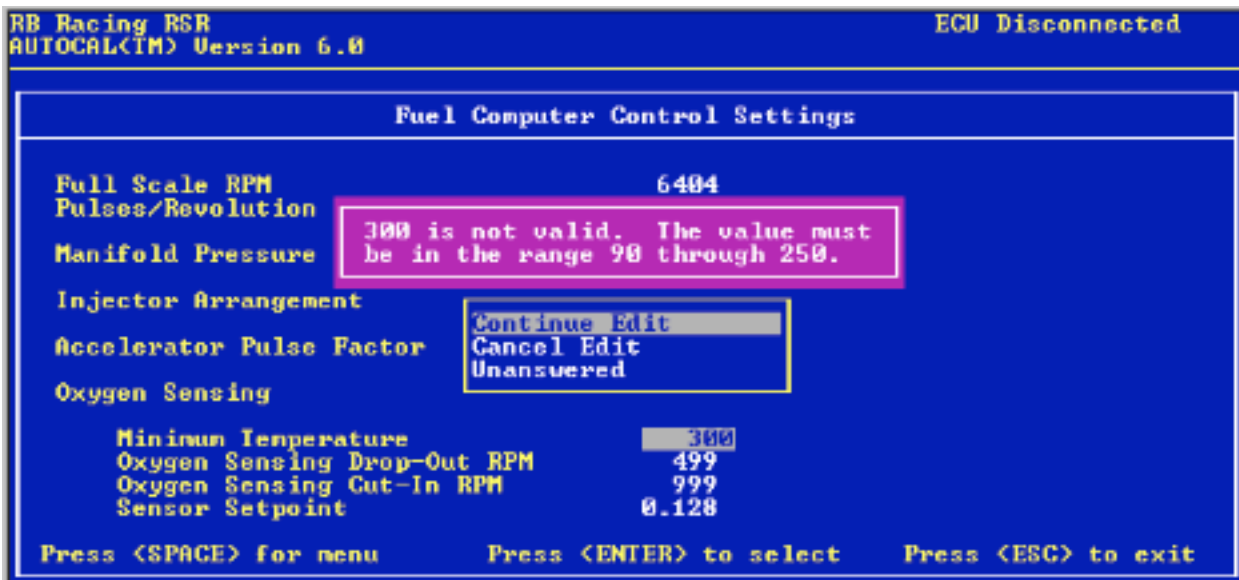


Oxygen Sensing. This turns the closed loop on or off. If you are running leaded racing fuels it is normally “Disabled”. It is best to tune in closed loop despite what the common wisdom would indicate.



We normally run closed loop at idle, programming the idle range to be about 10% rich at normal operating temperatures, leaner at low load cruising and richer at higher loads and rpms.

Minimum Temperature. We normally set the minimum temperature to enter closed loop fairly low, typically at 90 Deg F engine temperature. The conventional way is to put the engine in closed loop at the point where the Coolant or Engine Temperature correction zeros out...maybe 150 Deg F. We like to get into closed loop quickly.



Drop-Out RPM. Below this point the system drops out of closed loop. We generally set this well below our programmed idle speeds so the system only drops out of closed loop if the engine quits. Sometimes, when using very large injectors you may want to raise this point well above the idle target so the idle is more stable.

```

RB Racing RSR                                     ECU Disconnected
AUTOCAL(TM) Version 6.0

Fuel Computer Control Settings

Full Scale RPM                                     6404
Pulses/Revolution                                 1
Manifold Pressure Range                           0.0 to 2.0 Bar
Injector Arrangement                              Single
Accelerator Pulse Factor                          2452
Oxygen Sensing                                    Enabled
  Minimum Temperature                             90
  Oxygen Sensing Drop-Out RPM                       499
  Oxygen Sensing Cut-In RPM                         999
  Sensor Setpoint                                  0.128

Press <SPACE> for menu      Press <ENTER> to select      Press <ESC> to exit

```

Injectors do not open in a linear fashion so if the actual idle falls into the nonlinear portion of their opening cycle the O2 corrections will also be nonlinear. In extreme cases you might have a 10% correction and it essentially shuts the injector "off".

Cut-In RPM. Above this point the system goes into closed loop, assuming the temperature requirements have been met. We typically set this about 500 rpm above the Drop-Out value. The screen below shows 999 rpm. This essentially means it will be in closed loop at idle because you will certainly go past 999 rpm and not below 499 in the warm up phase or in normal driving.

```

RB Racing RSR                                     ECU Disconnected
AUTOCAL(TM) Version 6.0

Fuel Computer Control Settings

Full Scale RPM                                     6404
Pulses/Revolution                                 1
Manifold Pressure Range                           0.0 to 2.0 Bar
Injector Arrangement                              Single
Accelerator Pulse Factor                          2452
Oxygen Sensing                                    Enabled
  Minimum Temperature                             90
  Oxygen Sensing Drop-Out RPM                       499
  Oxygen Sensing Cut-In RPM                         999
  Sensor Setpoint                                  0.128

Press <SPACE> for menu      Press <ENTER> to select      Press <ESC> to exit

```

Sensor Set Point. We can code the RSR ECU to target different fuel ratios under closed loop. Normally this is not activated as it is really best to target 14.7:1. Set this at 128 and forget it. Your RSR ecu automatically goes out of closed loop past half throttle as we have

set the internal code to do this.

```
RB Racing RSR                               ECU Disconnected
AUTOCAL(TM) Version 6.0

Fuel Computer Control Settings

Full Scale RPM                               6404
Pulses/Revolution                             1
Manifold Pressure Range                       0.0 to 2.0 Bar
Injector Arrangement                          Single
Accelerator Pulse Factor                      2452
Oxygen Sensing                                Enabled
  Minimum Temperature                          90
  Oxygen Sensing Drop-Out RPM                   499
  Oxygen Sensing Cut-In RPM                     999
  Sensor Setpoint                               0.128

Press <SPACE> for menu      Press <ENTER> to select      Press <ESC> to exit
```

Hitting the ESC key will exit the Fuel Computer Control Settings menu. At that point, if you are in the “ECU Active” mode, your RSR ECU will be rewritten to accept the new settings. ECU Updating will appear in the upper right-hand corner of the screen. When ECU Active appears the updating will be complete.

```
RB Racing RSR                               ECU Disconnected
AUTOCAL(TM) Version 6.0

Fuel Computer Control Settings

Full Scale RPM                               6404
Pulses/Revolution                             1
Manifold Pressure Range                       0.0 to 2.0 Bar
Injector Arrangement                          Single
Accelerator Pulse Factor                      2452
Oxygen Sensing                                Enabled
  Minimum Temperature                          90
  Oxygen Sensing Drop-Out RPM                   499
  Oxygen Sensing Cut-In RPM                     999
  Sensor Setpoint                               0.128

Press <SPACE> for menu      Press <ENTER> to select      Press <ESC> to exit
```

Primary Fuel Map. RPM increases to the right. Increased manifold pressure as you go “up” the map. There are no milliseconds. 16 x 16 or 256 sites. 16 columns for rpm. 16 rows for manifold pressure.

RB Racing RSR AUTOCAL(TM) Version 6.0		ECU Disconnected															
Max Bar	38	76	165	239	324	412	487	563	637	675	695	715	738	755	773	793	
	35	70	151	219	296	379	445	515	583	620	638	657	675	694	708	729	
Manifold Air Pressure	32	64	136	198	268	340	403	463	525	560	576	590	608	627	642	659	
	28	56	119	172	233	300	352	406	460	492	505	518	535	548	564	575	
Min Bar	26	53	115	166	225	287	338	390	442	472	483	499	514	526	540	556	
	25	50	108	156	211	268	316	368	417	439	453	465	478	492	504	518	
	19	39	85	123	165	211	249	287	327	347	356	369	379	386	395	409	
	16	32	68	99	134	172	201	233	266	284	290	297	306	313	324	332	
	15	30	59	84	114	143	167	195	223	244	255	268	280	291	305	319	
	14	28	50	71	92	115	134	159	183	203	219	239	254	274	287	307	
	12	25	40	57	70	86	100	121	140	164	184	206	228	252	270	294	
	12	24	39	56	68	83	97	118	136	159	180	201	223	240	263	287	
	12	24	38	52	65	79	95	115	133	151	175	196	213	235	257	275	
	11	23	37	51	64	76	92	108	129	148	167	187	208	229	246	268	
Ø RPM	22	35	49	61	74	89	105	126	143	162	182	202	218	239	256		
Engine Speed																	
																	MAX RPM n

If the serial cable is connected and the RSR ECU is "ECU Active" a set of yellow brackets will indicated where you are running. If the engine is off then the yellow brackets will be in the lower left corner. If running, it will track where the engine is at that moment.

Values that can be entered are 000 to 999. 000 means no fuel. 999 means all the fuel possible. 500 means one half the fuel possible. Use the left/right and up/down arrow keys to move to a point where you wish to edit. Hit the <enter> key and input a value. We should tell you that the first column can have a maximum entry of 100, the second a maximum value of 200 etc. By the time you get to the 10th column you can enter 999.

These values are linearized fuel delivery. If you have a point you want 10% more fuel and the existing value is 100 then just enter 110.

This brings up the basic problem in fuel maps and point editing. Each "point" is surrounded by eight other sites. The RSR ECU interpolates between these values so they are in fact related to one another. If a particular point need editing then it is logical to assume the other eight need massaging also. What to do...What to do????

If you are idling at some point and the engine is "lean" then you should increase the fuel in all nine sites i.e. the one it is idling in and the eight points surrounding this point.

RB Racing RSR		ECU Disconnected															
AUTOCAL(TM) Version 6.0																	
Max Bar	38	76	165	239	324	412	487	563	637	675	695	715	738	755	773	793	
	35	70	151	219	296	379	445	515	583	620	638	657	675	694	708	729	
	32	64	136	198	268	340	403	463	525	560	576	590	608	627	642	659	
	28	56	119	172	233	300	352	406	460	492	505	518	535	548	564	575	
Manifold Air Pressure	26	53	115	166	225	287	338	390	442	472	483	499	514	526	540	556	
	25	50	108	156	211	268	316	368	417	439	453	465	478	492	504	518	
	19	39	85	123	165	211	249	287	327	347	356	369	379	386	395	409	
	16	32	68	99	134	172	201	233	266	284	290	297	306	313	324	332	
Min Bar	15	30	59	84	114	143	167	195	223	244	255	268	280	291	305	319	
	14	28	50	71	92	115	134	159	183	203	219	239	254	274	287	307	
	12	25	40	57	70	86	100	121	140	164	184	206	228	252	270	294	
	12	24	39	56	68	83	97	118	136	159	180	201	223	240	263	287	
	12	24	38	52	65	79	95	115	133	151	175	196	213	235	257	275	
	11	23	37	51	64	76	92	108	129	148	167	187	208	229	246	268	
	11	22	35	49	61	74	89	105	126	143	162	182	202	218	239	256	
	11	22	35	49	61	74	89	105	126	143	162	182	202	218	239	256	
		0 RPM														MAX RPM n	
Engine Speed																	

In the fuel map above, if you were in the heat of battle at the race track, and you were concerned with peak rpm and load, your life just got easier. Let's say you are a bit "fat" based on your riders opinion and your unbiased look at the spark plugs or turbine wheel.

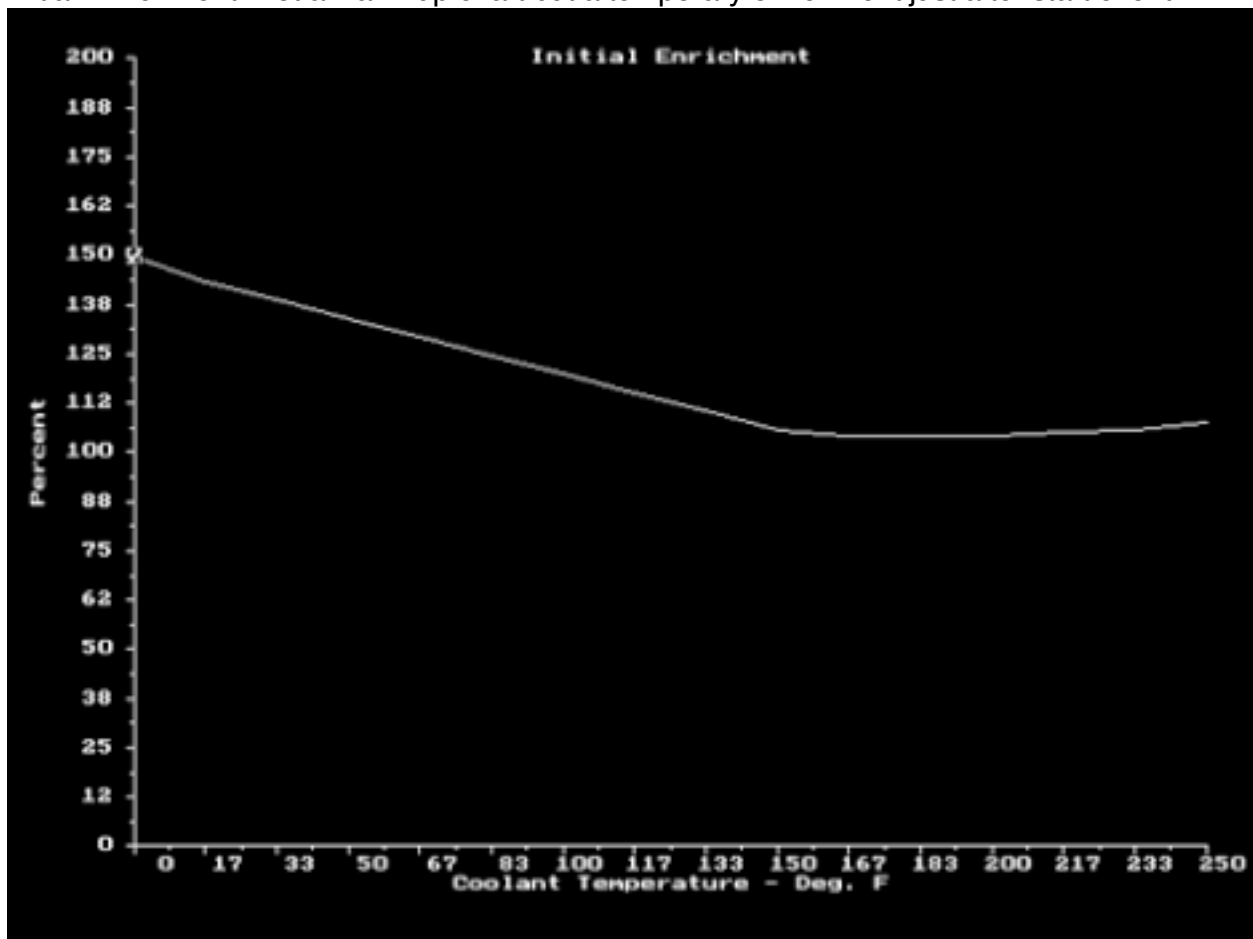
Since you are a cautious type, and you spent half your life getting bathed in float bowl gasoline, you decide to take 3% out of the system. Just get out your calculator and multiply the last four columns and the top three rows (12 sites) by .97 and get back in line. It's that simple.

You aren't going to remember squat about what you entered so it would be a good idea to save the RSR ECU calibration before you make the change and save it to a different name after the changes. These can be analyzed later in the Autocal.V6 Professional Software program which has more than 70 graphs to help you out with the statistics already calculated.

Remember, you use the arrow keys to get to where you wish to edit. Don't make the mistake of thinking that you are editing where the yellow (running) brackets are. Startup Compensation. Four sub charts to edit things related to how your engine gets fuel during the start sequence. Once again, use arrow keys to navigate and use the ESC key to step backward.

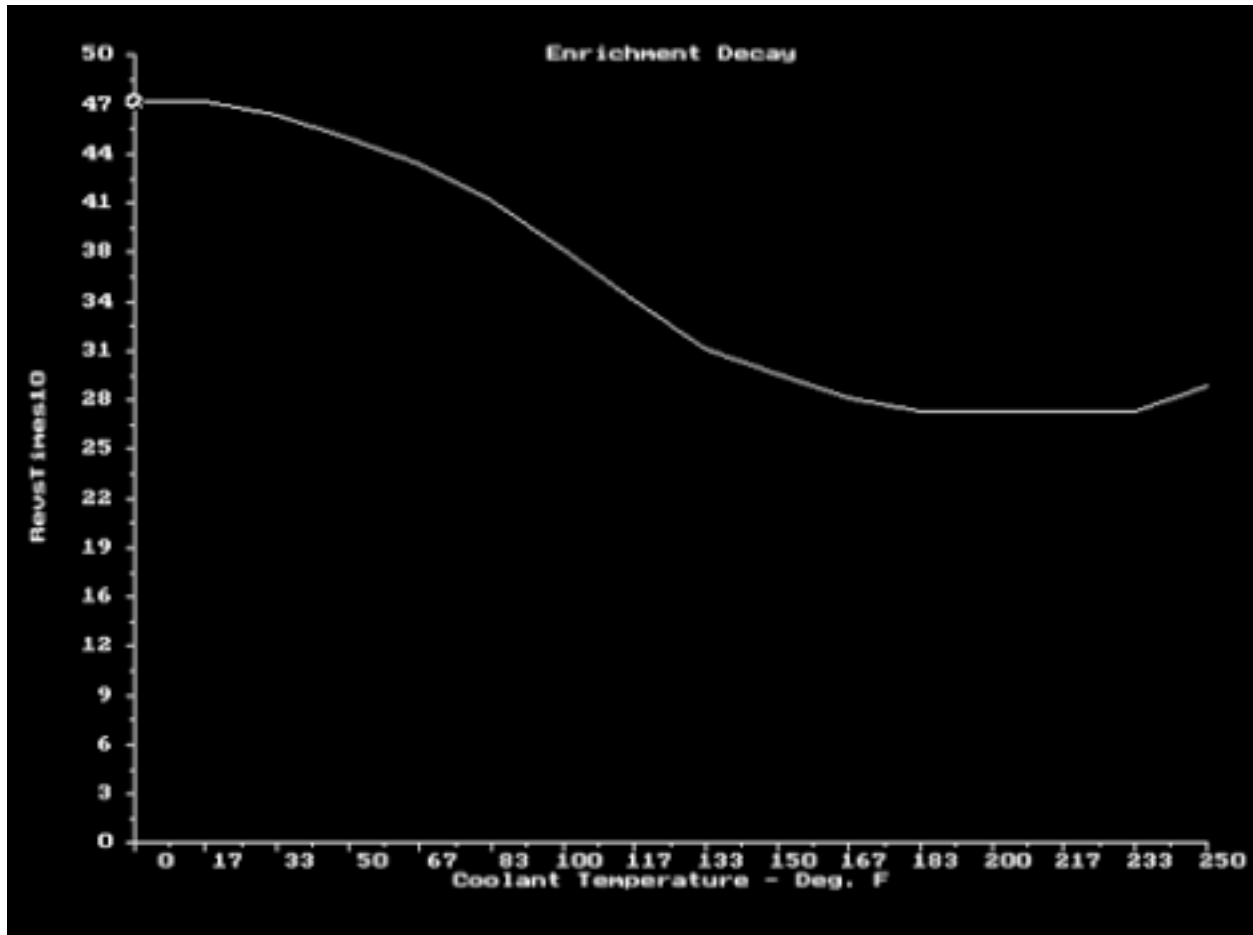


Initial Enrichment. Not a warm up chart but a temporary enrichment just after start event.



This extra fuel burns off quickly and is separate from Temperature Compensation category. Arrow keys left/right to navigate. Up/down keys to modify. Using the page up/down keys increases the change by a factor of 16.

Enrichment Decay. How many revolutions after the engine starts before this extra fuel burns off. The colder it is the longer it takes. Sometimes when the engine has heat soaked and the fuel “boils” off you need a bit of extra time. Complicated stuff.



Keep in mind that this is a very sophisticated event and that each engines internal friction and the life they live are different.

Also keep in mind that you have no business whatsoever fooling with this if your fuel map is not correct.

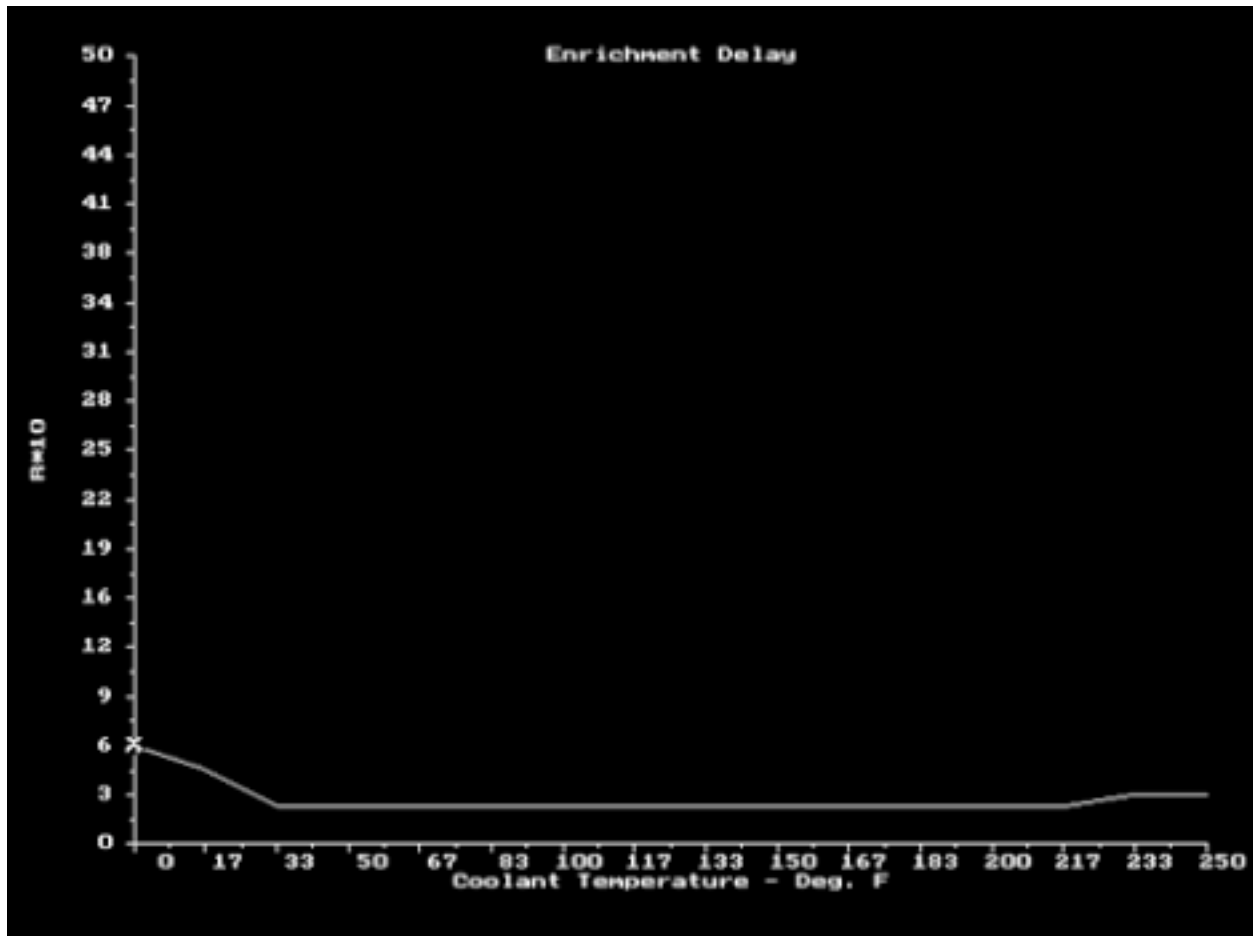
All tuning related to the fuel map has to be done when the engine is at a stable temperature in order for the various modifiers to be out of the picture. The above chart will only be able to be edited when the fuel map is correct and when things like cranking fuel have ben optimized.

Autocal.V6 Professional Software sets these tables for you based on known values.

To adjust these tables use the left/right arrow keys to select the temperature region and then use the up/down arrow keys to increase or decrease the time for the fuel to burn off.

Using the page up or page down keys increases the change by a factor of 16.

Enrichment Delay. Boy does this get complicated! This delay allows the cranking fuel to be burned off before the initial afterstart enrichment kicks in.



Use left/right arrow keys to navigate to the temperature region. Use up/down arrow keys to increase or decrease the number of revolutions before things kick in. The revs are x10.

Once again use the page/page down keys to make changes at 16x the amount the up/down keys change things.

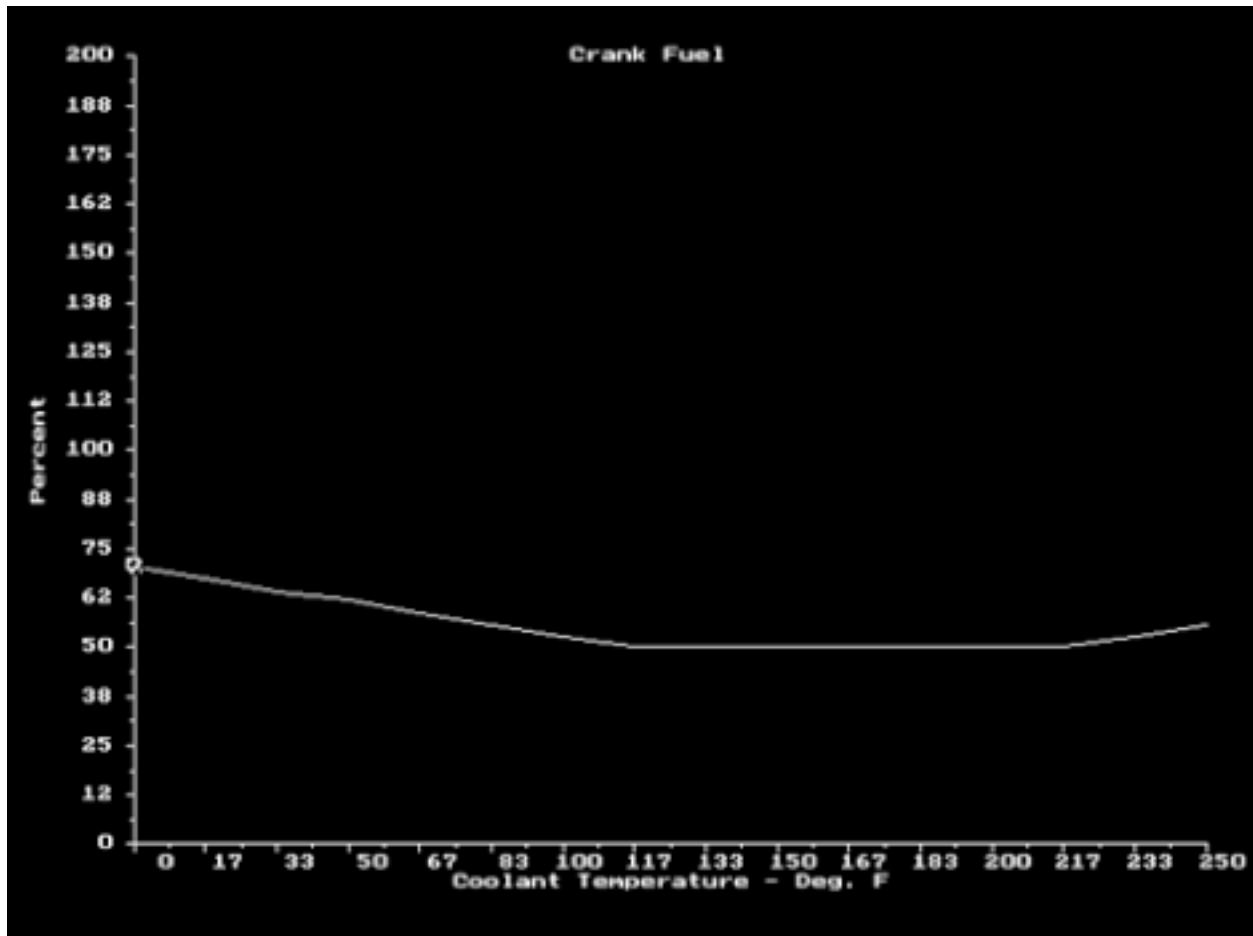
Autocal.V6 Professional Software generated these charts for you. As with any of these modifying charts, the base fuel map has to be correct before you go wild editing things.

It is very easy to get "lost" and start editing one thing to correct something else. It's the dog chasing his tail routine.

ESC to exit the chart.

Cranking Fuel. Easy to understand, Even easier to overdo. If you want more cranking fuel at a given temperature just use the left/right arrow keys to get to that range and then use the up/down arrow keys to increase or decrease the cranking fuel.

Using the page up/page down keys changes things 16x faster.



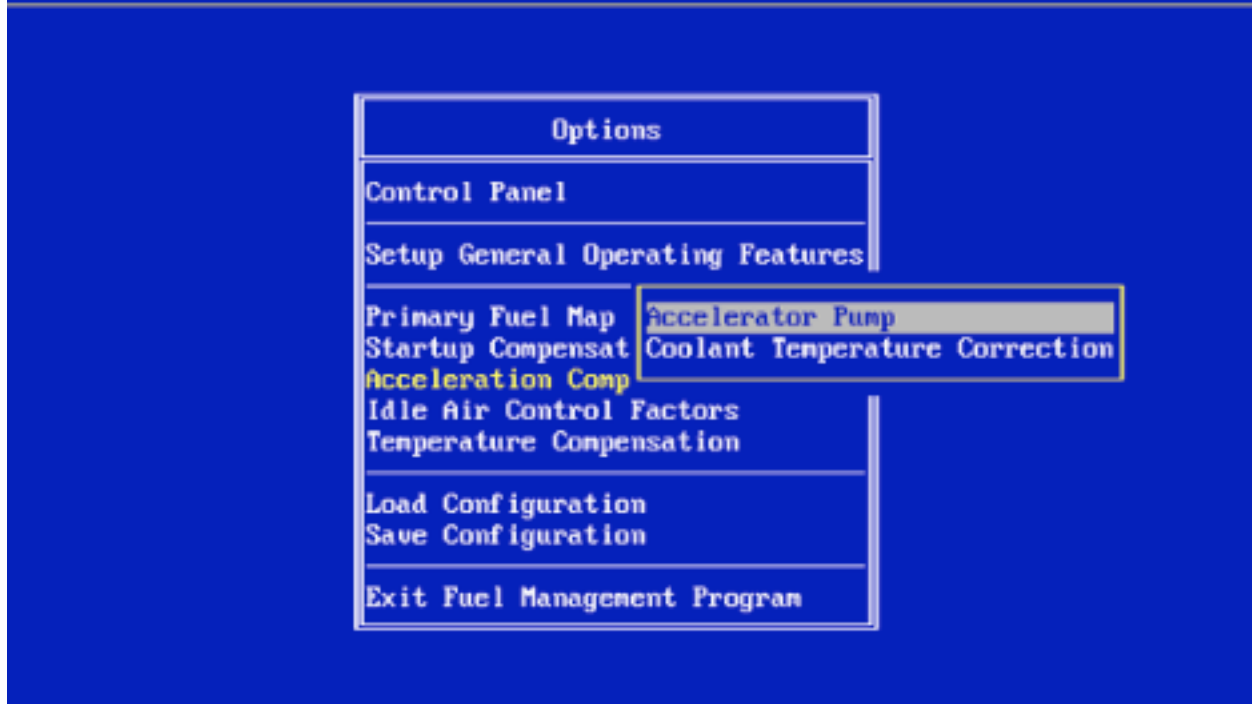
Often people use cranking fuel to try to get things to start when they really should be looking at their fuel map. The usual problem is that the row that has been predicted for the "Idle Row" is not correct and therefore during cranking the ECU outputs a base map value that is "wrong".

The base map must be correct i.e. you need to know what row the engine idles on, as well as having the correct values for this region before you go trying to correct a start issue with throwing cranking fuel at the problem.

Autocal.V6 Professional Software takes into account injectors size, fuel pressure, engine size etc. in setting these values. The advantage of Autocal.V6 is that all these factors are taken into account even before you start.

This makes your life a bit easier so you can concentrate on your fuel map and getting it in agreement with your particular state of tune. Exhaust systems, camshafts etc. give you enough to worry about.

Acceleration Compensation. Two categories to deal with. Both fairly easy to understand.



Your engine has to have additional fuel to overcome sudden loads. This is handled by these two categories.

Once again, you should not use these modifiers to correct a bad base map calibration. If your map is lean in some region, and a lean condition shows on your RSR Air Fuel Ratio Gauge, it is probably better to concentrate on the fuel map first.

It is very easy to overdo accelerator pump functions.

These two charts are navigated in the same fashion as the other sub charts. Use the right/left arrow keys to scroll to the region to be modified and then use the up/down arrow keys to increase or decrease fuel.

Unlike a carburetor electronic fuel injection allows you to compensate for temperatures as colder conditions will require more fuel.

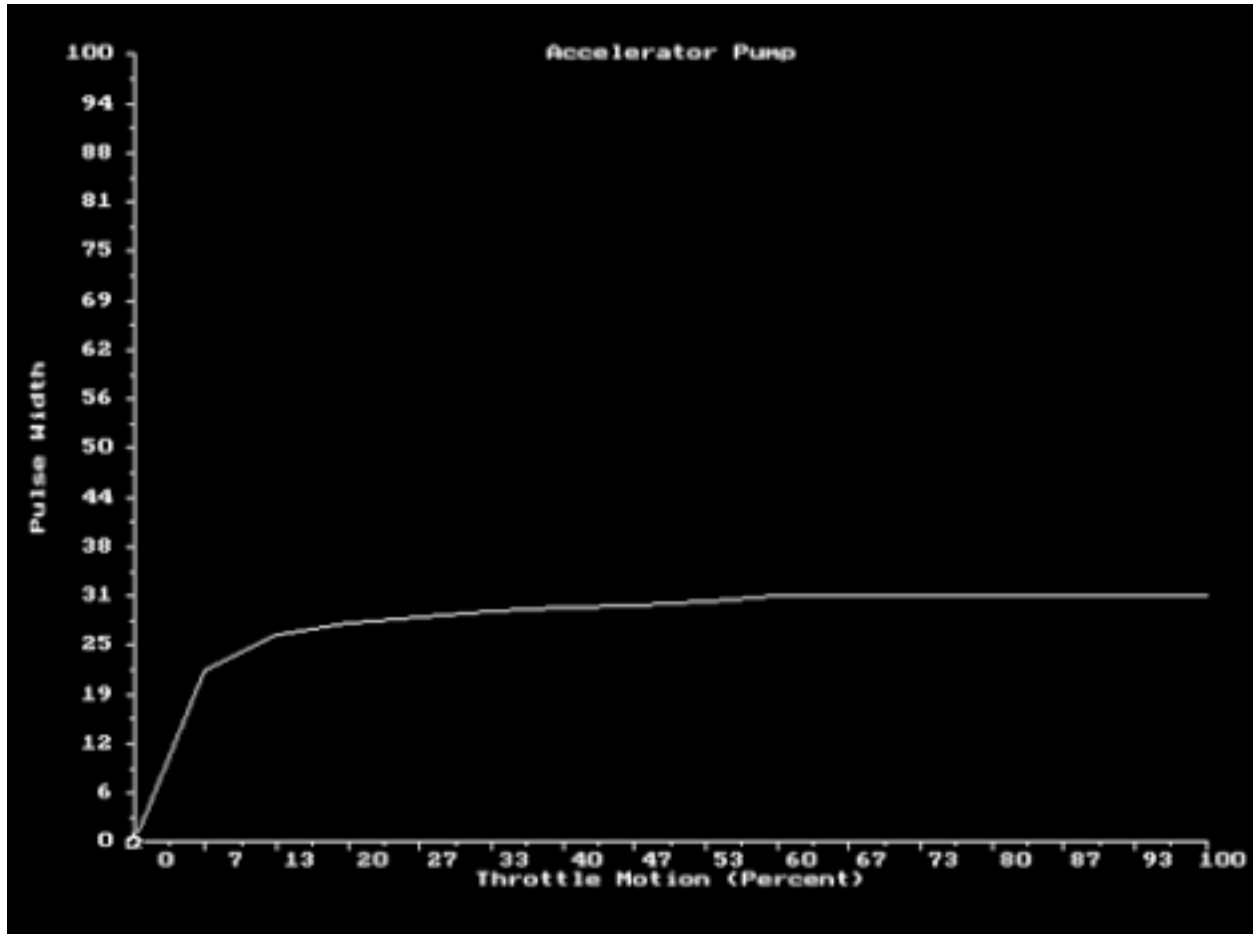
If you have ever worked on Weber Carburetors with their changeable pump ramps and nozzles you will find these charts easy to understand.

Accelerator Pump. The quicker you twist your wrist or press the accelerator pedal versus time i.e. degrees of rotation versus time, the more fuel is injected. The x axis represents on

the left no movement and to the far right “as fast as you can gas it”.

The vertical axis is the additional injector on-time for this event

The area under the curve represents the accelerator pump volume.

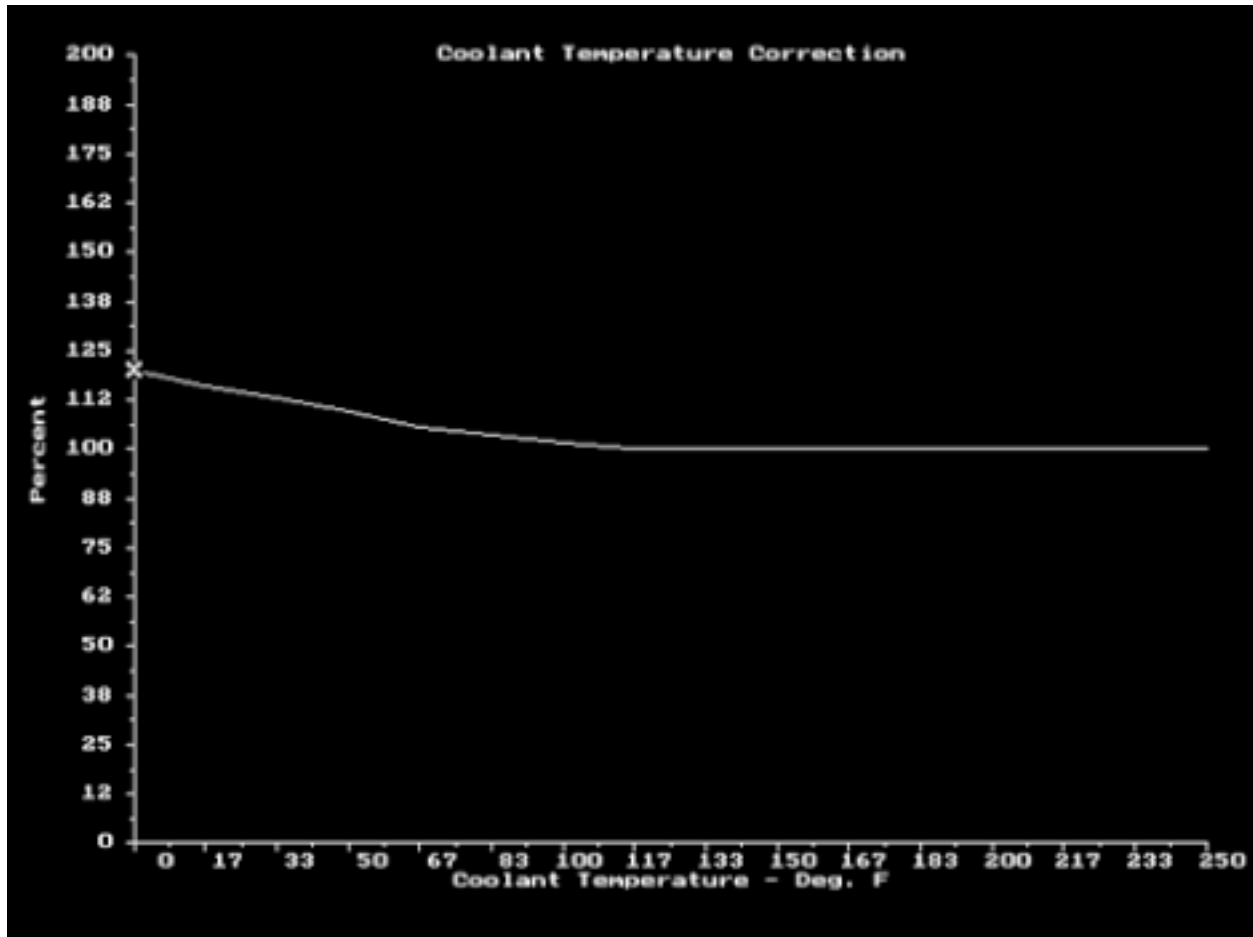


If you were weaned on 50cc Holley pump bowls and the like you will appreciate that no nozzles have to be changed. No gasoline soaked hands. No expensive Weber accelerator pump ramps to purchase.

It is very easy to add too much here. If you see black soot exiting under hard acceleration you probably have added too much.

Too much accelerator pump can cause a stumble. People generally overdo this and often is the case that decreasing the pump causes the engine to respond quicker and cleaner.

Coolant Temperature Correction. Don't get confused, this is for the accelerator pump.



Unlike mechanical devices your RSR EFI can vary the pump output according to engine temperature. This is a bit esoteric but understandable nonetheless. The colder it is the more fuel you need.

If you had a blank sheet of paper what would you do. This is where Autocal.V6 Professional Software come into play. It will output a table of values that are nominal and probably can be left "as is".

As you gain experience at different areas then you can go in and tweak things so your application works better.

As with all the sub tables and chart navigation use the left/right arrow keys to select the temperature range and then the up/down arrow keys to increase or decrease the fuel delivered. The page up/ page down keys increase this change by a factor of 16.

Use the ESC key to exit the page.

Idle Air Control Factors. When you start a new calibration or application this is one of the last things you should be adjusting. Autocal.V6 Professional Software will establish these three

sub tables for you.



Your RSR EFI has an Idle Air Control stepper motor. It will “chase” programmed values when you are idling and it also has other functions that you may not know about.

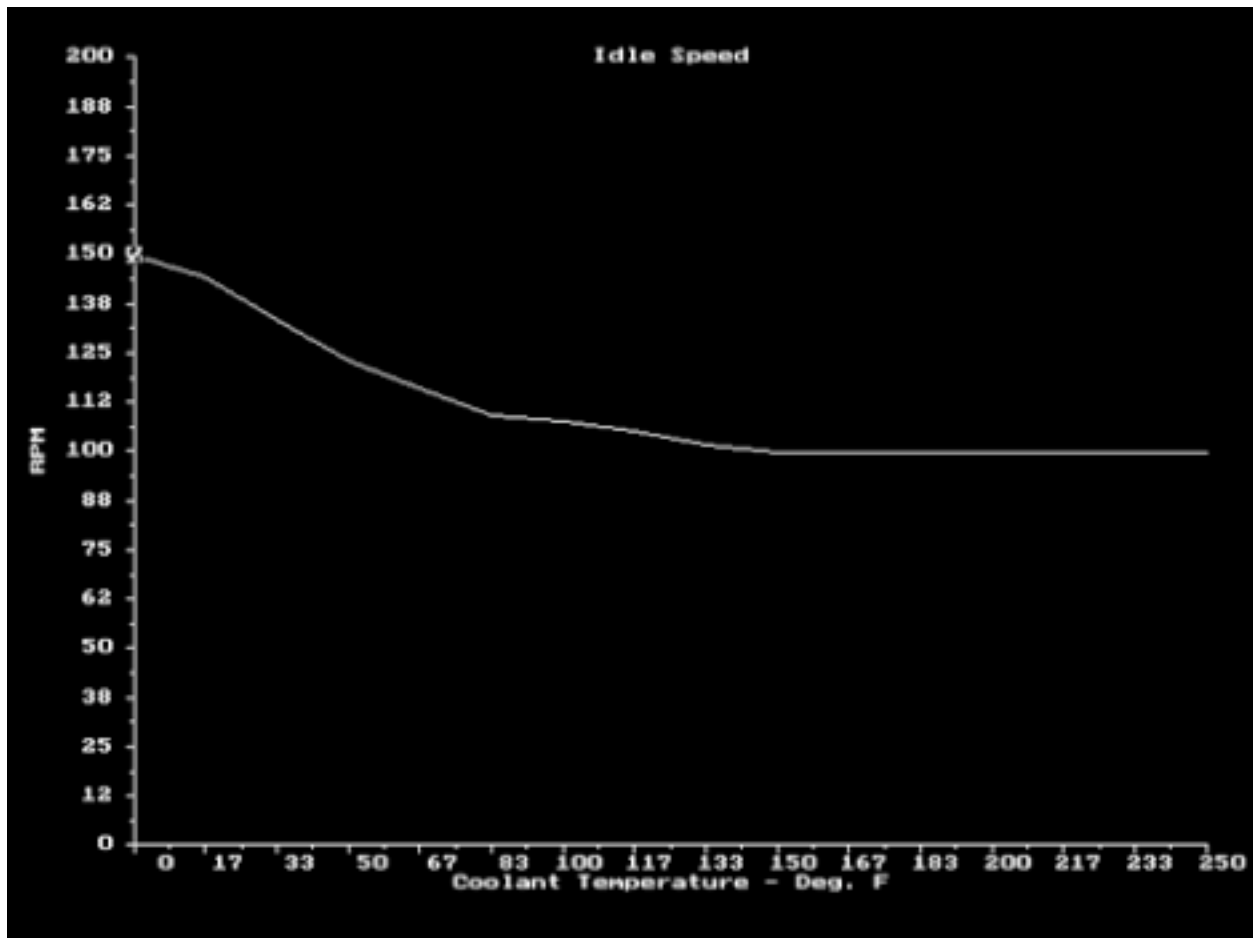
As you open your throttle wider and wider the Idle Air Control Motor (IAC) will open up so that when you suddenly close the throttle the engine will not die. The additional bypass air will prevent stalling.

The speed at which the motor reacts to errors and the actual stopping points and the slope of these changes are all critical as to how stable the system is.

It is generally recommended that you follow the below listed procedures with new applications:

1. Disconnect the four pin connector from the IAC stepped motor.
2. Set your warm idle speed with the physical idle set screw.
3. Do all of your tuning related to fuel map issues i.e. idle, cruise, transitions and wide open throttle at various rpms.
4. Then reconnect the four pin connector to the IAC.

Idle Speed. This is very understandable. You set your idle speeds versus the engine temperature.



The vertical axis is rpm x 10. Autocal.V6 Professional Software will generate an Idle Speed scenario for you based on your desired warm idle target.

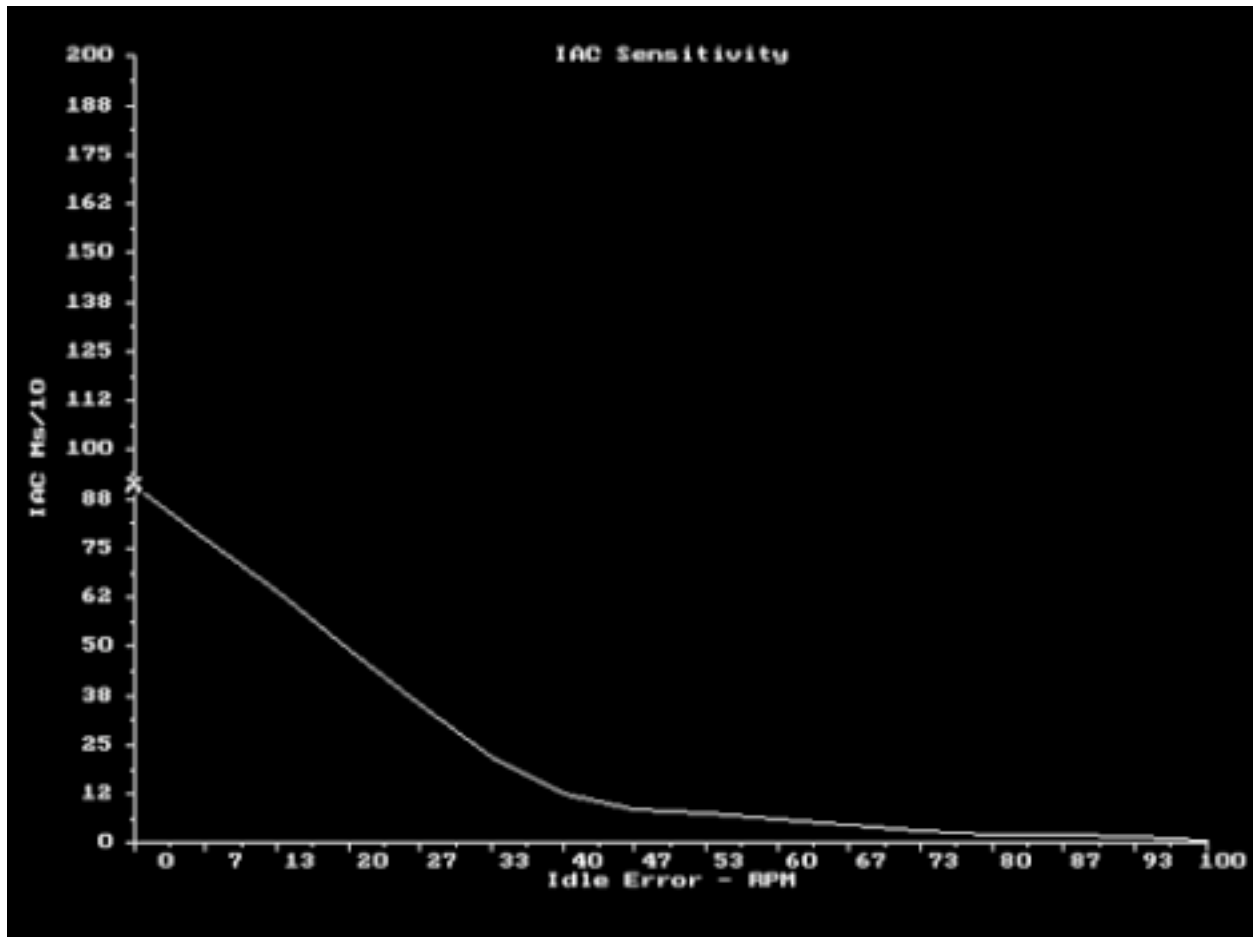
The stability of the idle is controlled by many factors. Under closed loop operation where the RSR ECU is continually adding and subtracting fuel the base map values in the idle region have to be within 10% of the stoichiometric value. Typically we set idle at about 10% negative O2 correction, or an O2 C.F. of .9.

If your fuel maps values are wildly “off” there will be wide swings and your idle will be like a roller coaster, cycling back and forth.

If your injectors are exceedingly large your idle region may be on the nonlinear portion of their opening cycle. By non linear we mean that as the injector solenoid opens each unit change in time does not give a linear change in fuel delivery. If the injectors are very large and are barely opening to provide idle fuel then an O2 correction of even a few % can either under or overfuel the engine. In these case it may be prudent to put the cut in rpm and cut out rpm regions well above the desired idle point.

In general it is best to close loop most applications at idle, even with long overlap cams.

IAC Sensitivity. This chart adjusts how fast the IAC reacts to rpm errors.



By errors we mean how far it is off from a programmed rpm target. The x axis represents the error in rpm x 10. The y axis represents how fast the IAC reacts to correct this error.

In a common sense sort of way you would want the the IAC to react quicker to large errors and more slowly to small errors.

This all gets a bit tricky and, like we said before, fooling with IAC programming is the last step in your process.

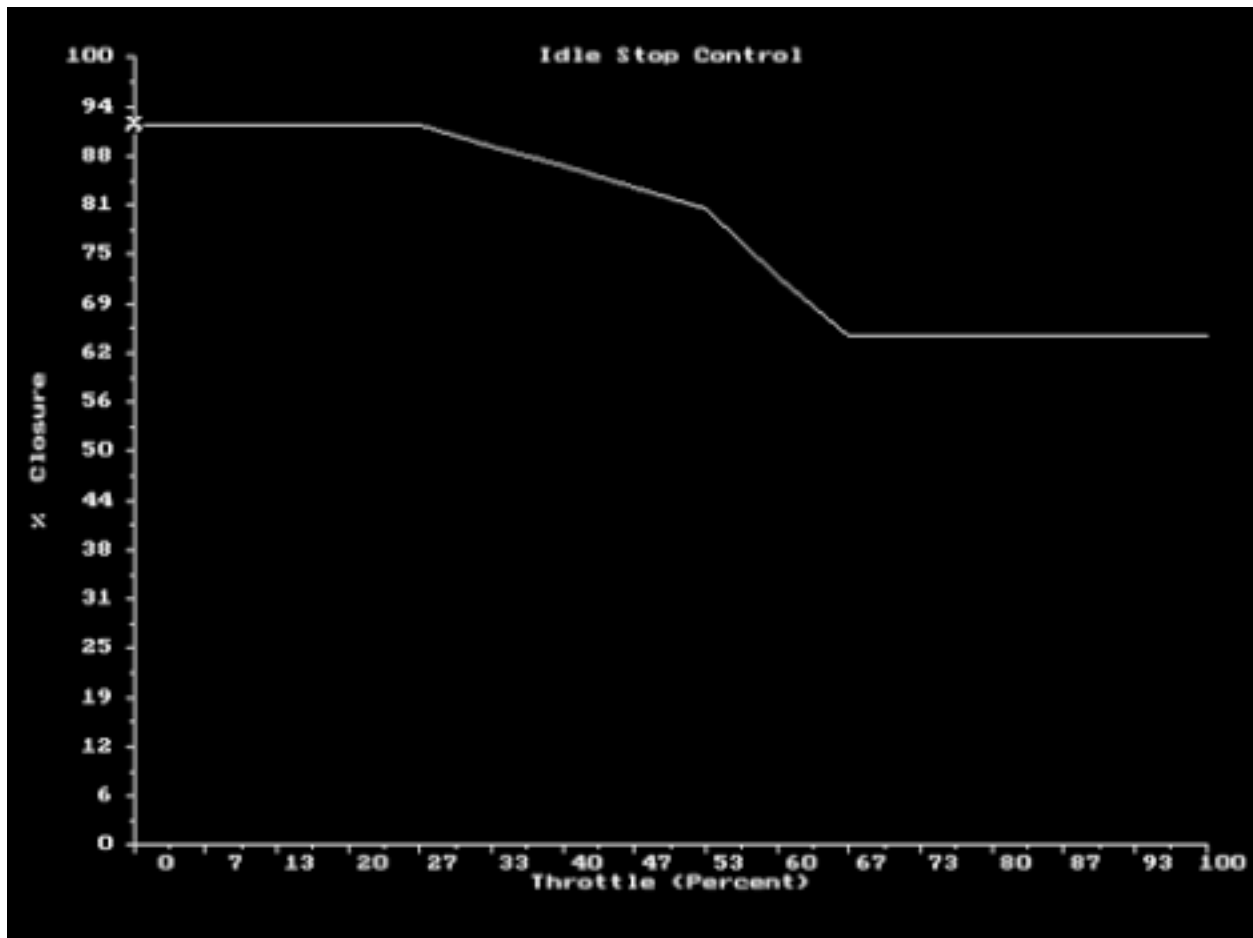
Fine tuning this to your particular situation is complicated by mechanical issues.

How accurate is your throttle plate machining? If leakage is high corrections may be futile.

Where is your mechanical idle stop set? If it is set high then the error cannot be corrected in a subtractive sense.

The size of the IAC bypass hole or orifice is part of the equation. Complicating this is if hoses are involved and they “kink” or restrict flow. Fittings themselves can valve or mask the IAC corrections.

Idle Stop Control. If you had a blank sheet of paper where would you start? Autocal.V6 sets these nominal values for you.



The x axis represents how far open the throttle is. The y axis is how far the IAC is closed.

You can set the limits for these and also change the slope of the change between closed and wide open throttle.

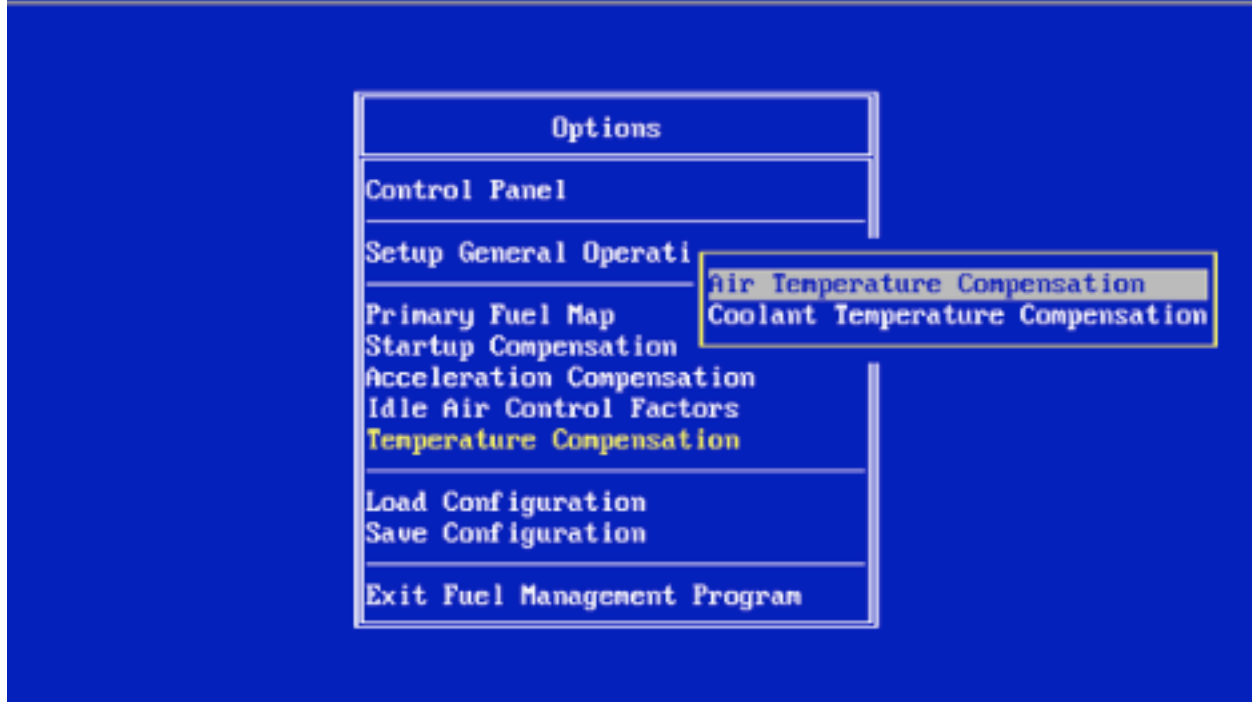
As was explained earlier, the IAC will open at large throttle openings to prevent stalling un high speed deceleration. High engine speeds with a closed throttle require additional bypass air.

If low limits are not low enough then the will be too much bypass air and the system will not be able to throttle down.

Once your application is pretty well tuned you can experiment with these tables related to Idle Air Control Factors.

ESC to exit page, Arrow keys to navigate and change values.

Temperature Compensation. It gets hotter...You need less fuel. Pretty simple. Well, maybe it is not that simple.



The two categories are Air Temperature Correction and Coolant Temperature Correction.

There are pitfalls in these areas and sometimes what seems a logical choice may in fact be the wrong thing to do.

As the inlet air gets hotter and hotter our fuel requirements drop. This is understandable if you have "tuned" carburetors on hot and cold days in the past.

When the engine is cold i.e. either the oil or coolant is cold, more fuel is required to overcome internal friction. In the case of subzero temperatures the fuel requirements go way up.

Inlet air temperature is influenced by many factors such as air cleaner location, the speed of the vehicle, and ambient conditions. You could be sitting still and the engine would start breathing engine heat lessening the fuel requirements.

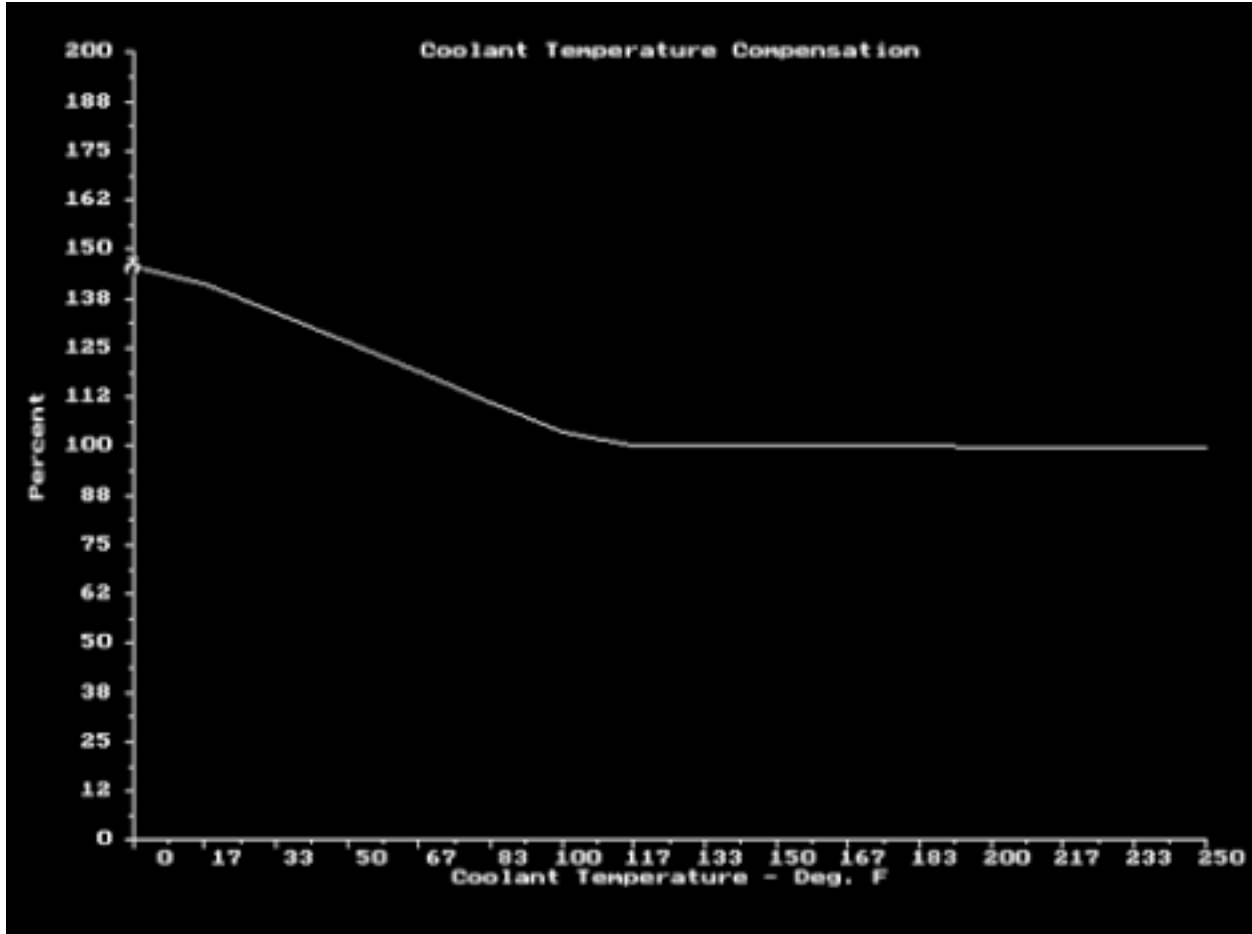
Unlike carburetors your RSR Fuel Injection allows you to modify these values. These are pitfalls however.

Autocal.V6 Professional Software takes some of these pitfalls into account when you write a calibration. For the most part these values can be left alone.

An example of what can go wrong: A customer was showing off his RSR EFI on a 400 hp Turbo motorcycle. As the bike sat idling for a long period of time with a laptop connected to demonstrate "how easy it was to adjust" the customer kept modifying the base map idle region as the engine got hotter and hotter. As he adjusted the subtraction lower and lower the RSR Air Fuel Ratio Gauge showed the bike running cleaner and cleaner. Voila! The

customer was a master of his domain.

The problem was that the base map was not the area the customer should have been fooling with because the next day the bike would not start as it had been leaned out way too much. Reinstalling the original map allowed the bike to start instantly.

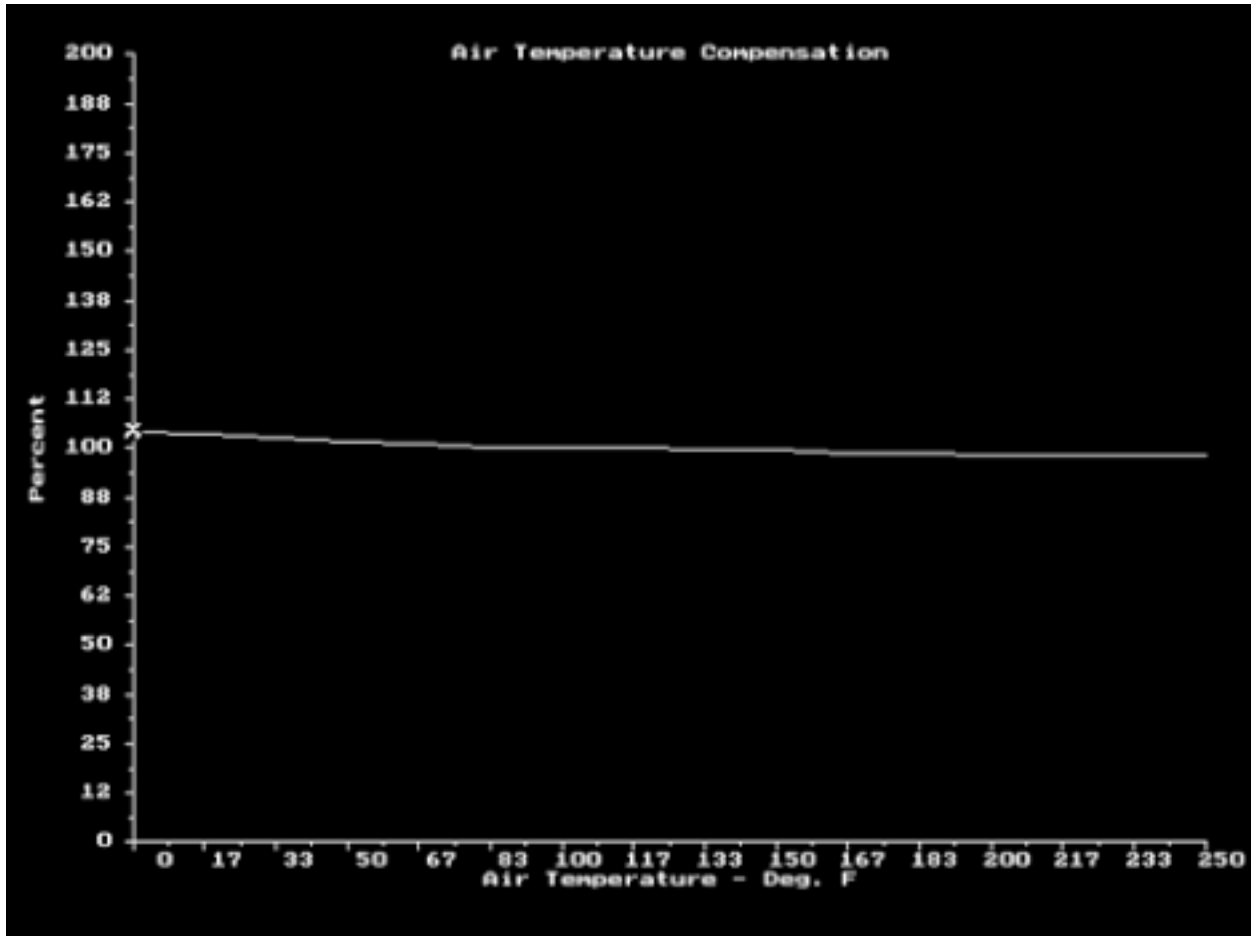


In this case you might surmise that the customer should have been adjusting the Coolant Temperature Correction instead. Wrong again! The bike was idling fine and the 400 hp 1200cc bike had eight 40lb/hr injectors idling in the nonlinear portion of their operating range. It should have been left alone. Additional subtraction could have shut the fuel off.

In the end it is not quite as simple as it seems. Just because you enter "x" does not mean you are going to get exactly "x" because there are other physical limitations at play.

Air Temperature Correction. Autocal.V6 Professional Software generated this initial curve for

you. If you want to see blow by blow percentages you have to look in the Autocal.V6 Professional version which gives extremely detailed information.



Your best bet for tuning is to leave this chart alone.

Air temperature does not entail large corrections as does coolant temperature. It is important for best operation but you will not program in corrections of 20 to 30% but only a few %.

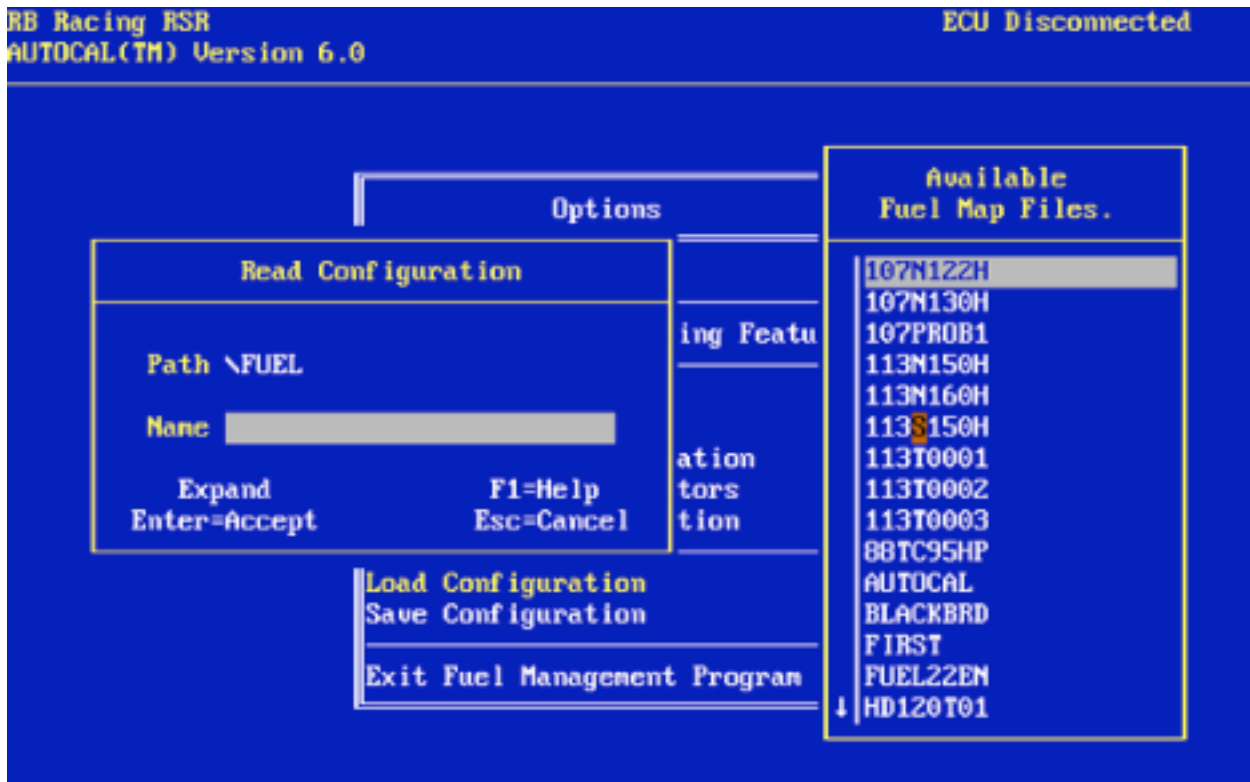
Sometimes you may need to correct mechanical issues to prevent your engine from breathing its own hot air or even more importantly you may seek to employ some form of cool air or ram air system to get a denser, cooler charge to your motor.

As with coolant correction it is often wise to set the air correction to not subtract values when you employ large injectors for extreme output situations.

If the injectors are opening in the nonlinear portion of their cycle even small subtractions can cause large percentage drops in fuel delivery.

Load Configuration. The library is accessed via a "+" key. This can be the Grey + key, or on some notebooks (IBM Thinkpad) you may have to hit NumLk and use the + key in the

numeric pad area. On other notebooks look for the multifunction key with a "+" sign.



Select the map you want using the up/down arrow key and hit <enter>. This will put the map in the dialog box. Hit <enter> again and the map will be loaded into memory so you can look at it, or, if you are connected with your serial cable the map will be loaded into your RSR ECU.

All maps in the library are files with .FMP extensions. Only files with .FMP extensions will be read.

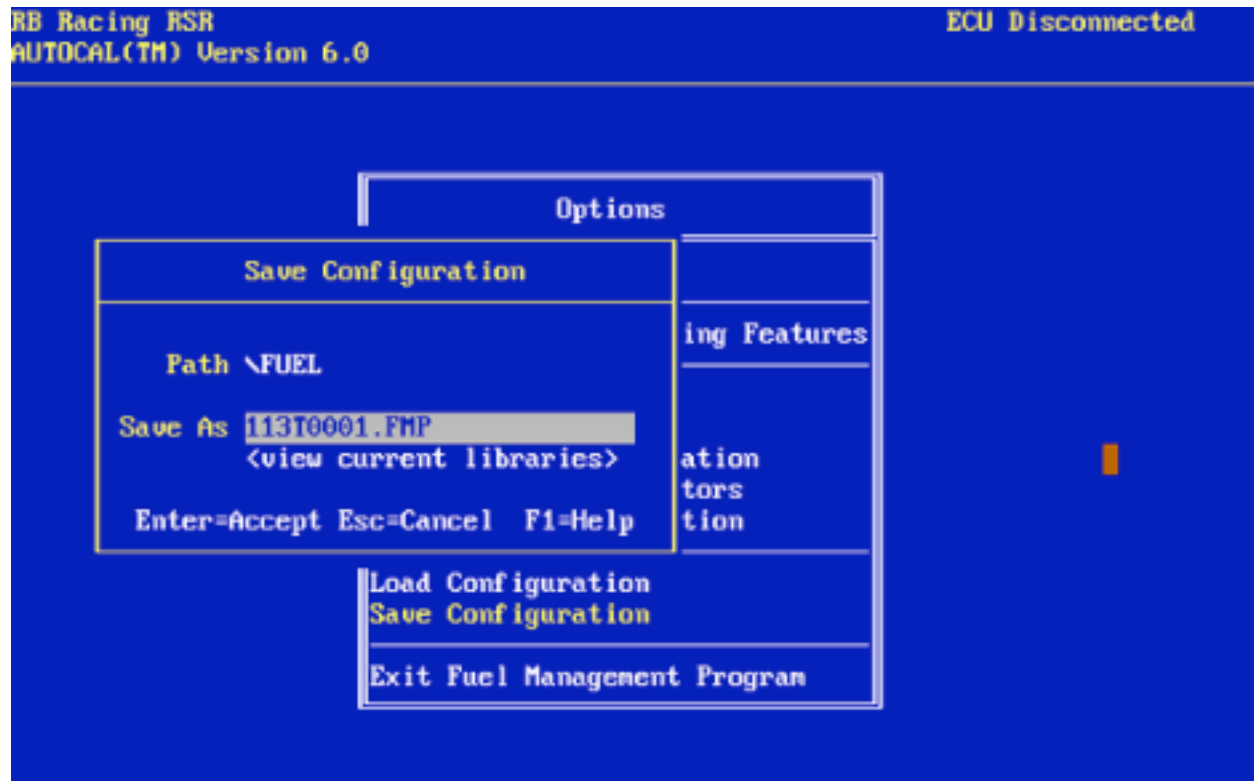
Since this is a DOS program you are limited to 8 alpha numeric characters.

If you are serially connected and the RSR ECU is powered up (Tuning Switch or Key On) the the upper right-hand corner of the screen will say ECU Updating.

When the update is complete it will again say ECU Active.

Save Configuration. If you have edited a .FMP calibration either off-line or in direct

connection with your RSR ECU and wish to save these changes to a new file you will be limited to the eight character DOS limitation AND you must type .FMP



If you do not type .FMP after the name you have given the file you will not be able to read it again.

Autocal.V6 FUEL Serial Program saves entire configurations in one fell swoop. It does not save individual sub tables in separate files.

When you initially write a RSR ECU calibration in Autocal.V6 Professional Software it will embed data about your application in the RSR ECU .FMP file. This information cannot be read by the serial FUEL program. This information covers areas like file name, injector size, fuel pressure, horsepower requirements, peak rpm, map pressure and other factors. This data can only be read in the Autocal.V6 Professional Software.

Every time you write a calibration in Autocal.V6 Professional Software these factors are preserved. People tend to forget what is installed in their system. The embedded data allows retrieval at a later time to reconstruct base maps should the tuner become "lost".

In the computer lingo it's GIGO or garbage in, garbage out. If you are programming under wrong assumptions you will get lost quickly. It is best to have core data stored where it will do the most good.

Use ESC Key to EXIT. To quit the FUEL Program ESC to the Main Menu and select the Exit Fuel Management Program. Tutorials are embedded in the Autocal.V6 Professional Software Program covering areas like file transfers as well as tuning procedures.