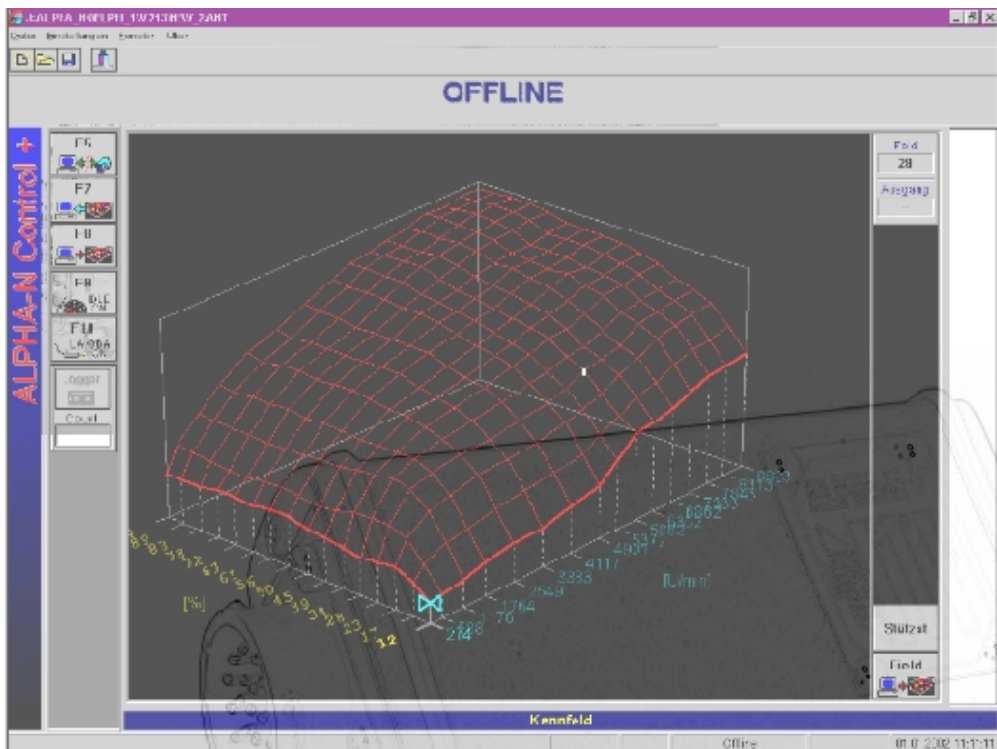


Alpha-N Control

for Windows 3.11, WfW and Windows 95/98/ME/XP/NT/2000



Short Manual

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Table of Contents

1	Introduction	3
1.1	Disclaimer	3
1.2	Safety hints	3
1.3	Basic Requirements.....	3
1.4	System requirements	3
1.5	Required Tools.....	4
2	Installation.....	4
2.1	Basics.....	4
2.2	Installation	4
3	Program start.....	5
3.1	Start with connected Alpha-N Module.....	5
3.2	Start without connected Alpha-N Module (preparation mode).....	5
3.3	Window Areas	5
4	Basic Settings.....	6
4.1	Serial Connection.....	6
4.2	Language setting.....	6
4.3	Type settings.....	7
5	Program handling.....	9
5.1	Page Selection	9
5.2	Selection of parameters	10
5.2.1	Changing single values in maps	10
5.2.2	Changing parameters in 2D map curves.....	10
5.2.3	Changing parameters in 3D-maps	11
5.3	Saving mapping data	11
5.4	Loading mapping and configuration data from a mapping file	12
5.4.1	Download mapping data into the Alpha-N module.....	13
5.4.2	Downloading selected mapping curves.....	13
6	Type configuration	14
6.1	Standard mode (without internal lambda functionality).....	14
6.2	Lambda mode via signal on pin E	15
6.3	Lambda mode via signal on pin F	16
7	Application to the engine	17
7.1	Step by step	17
7.2	Setting number of impulses of crank sensor.....	17
7.3	TPS settings.....	18
7.4	Setting the idle and full throttle contacts	18
7.5	Setting location of load and RPM sites	19
7.6	Idle control function	19
7.6.1	Activation/Deactivation of the idle control function	20
7.6.2	Determining the 2D idle-map	20
7.7	Lambda function.....	21
8	Appendix	22
9	Notes.....	23

1 Introduction

The PC-program Alpha-N Control is used to control the Alpha-N Plus module manufactured by MAXX-automotive.

The following functions are supported:

- Mapping of the Alpha-N module
- Display of current parameters and maps
- Save mappings to file
- Load mappings from file
- Save mapping to the Alpha-N module
- Data logging

1.1 Disclaimer

Liability claims against the vendor regarding damage caused by the application and use of the Alpha-N-Controller Unit provided will be rejected, except in cases of defects in materials and workmanship.

1.2 Safety hints

Incorrect mapping of the Alpha-N module can cause severe damage to the engine (1.1).

1.3 Basic Requirements

Alpha-N Control will run under the following operating systems: Windows 3.11, Windows for Workgroups or Windows 95/98/2000/ME/XP. See section 1.4 for minimum system requirements. The user should have good PC skills. The user must understand basic engine principles and have knowledge of fuel injection, in particular the operation of "Alpha-N" and how to "map" an engine.

1.4 System requirements

- IBM PC (Notebook/Laptop) or compatible system
- Windows 3.11, Windows for Workgroups or Windows 95/98/XP/ME/2000 (This product does not work under DOS, Windows 3.0, or Windows NT)
- 80486 33 MHz processor or better
- 8 MB Ram
- 2 MB harddisk space required for the installation
- VGA 640x480, 16 colors or 1024x768, 16 million colors
- V24 serial port (COM1...COM8), 9600 Baud

1.5 Required Tools

- Alpha-N Download cable

2 Installation

2.1 Basics

"Alpha-N Control" consists of a single EXE-file. An INI-file is generated automatically by Alpha-N Control. In the interest of keeping installation simple and to allow easy transfer of the program between windows platforms, an installer-program is not used.

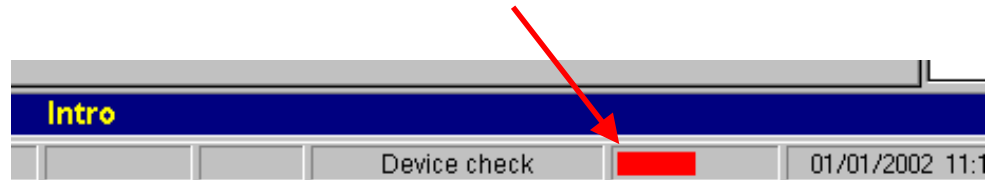
This means that the program directory and any links to the executable must be created by the user.

2.2 Installation

- Load the Alpha-N Control disk/CD into the proper drive
- Start Explorer
- Open drive C
- Create a new file folder and name it "Alpha-N"
- Create a new file folder "Data" within your Alpha-N directory
- Change working directory to your disk/CD drive
- Copy alpha_n.exe to C:\Alpha-N
- Copy example files (*.ant) to C:\Alpha-N\Data
- Make a link on your desktop to point to C:\Alpha-N\alpha_n.exe

3 Program start

The program executable "alpha_n.exe" is started without additional parameters. After program start, Alpha-N Control immediately tries to connect to the Alpha-N module via the serial COM-port. The connection status is shown in the status bar at the bottom of the window.



3.1 Start with connected Alpha-N Module

If the Alpha-N module is connected and active (ignition in the "on" position) at program startup, then the internal map and other data within the module are loaded into the PC. After upload has completed, the mapping page is opened and a 3D-map of the Alpha-N will be shown. The program is automatically in the "Online" mode and shows continually the current map values of the Alpha-N Module.

Note: The used Com-port must be selected (see 4.1 Serial Connection).

3.2 Start without connected Alpha-N Module (preparation mode)

If no active Alpha-N module is connected or the ignition is switched off, then the program remains on the "Intro" page and tries to make a connection with the Alpha-N module. On this page you can generate a new Alpha-N file or load an existing file. After loading a map, the program will be in the "Offline" mode and show the 3d-map on the display.

3.3 Window Areas

The window of Alpha-N consists of 4 important areas:

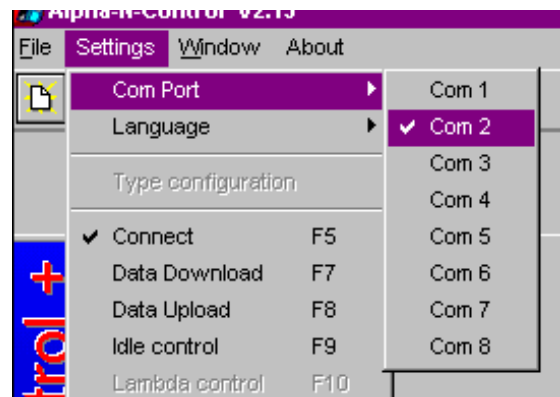
- Menu bar
- Current values bar (under the menu bar)
- Map (center window)
- Pushbutton menu bar with short cuts to often needed functions (left window)

The "current values" bar is only active when online, e.g. the Alpha-N module is connected and powered up. If you're in the offline mode, this bar simply shows the text "Offline".

4 Basic Settings

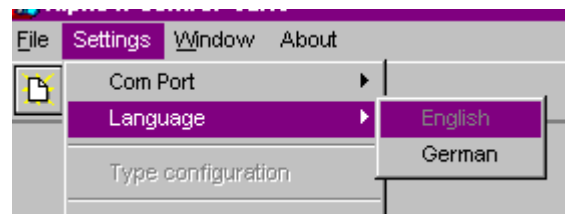
4.1 Serial Connection

The connection of the Alpha-N module to your PC or Notebook is achieved via a special "Alpha-N Download Cable". NOTE: only connect the cable to the module with the ignition in the "off" position. In the PC program, you must select the proper COM-port (COM1...COM8).



4.2 Language setting

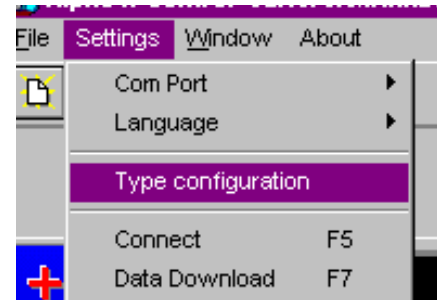
The program "Alpha-N Control" supports German and English.



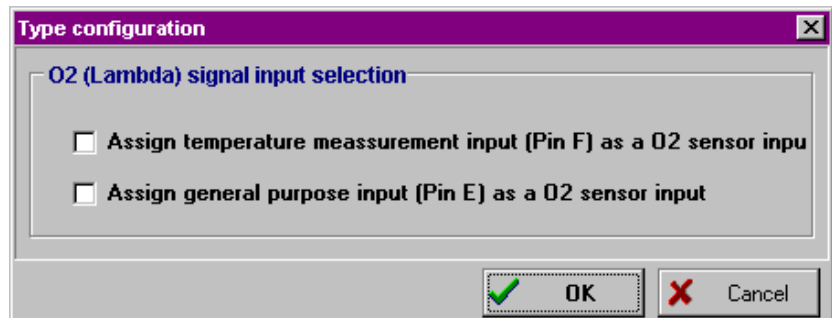
4.3 Type settings

The Alpha-N module can be configured for lambda-control or display of lambda. Furthermore, if lambda control is used, the shift lights may be used to indicate either shift points or lambda tendencies (see 0 Type configuration).

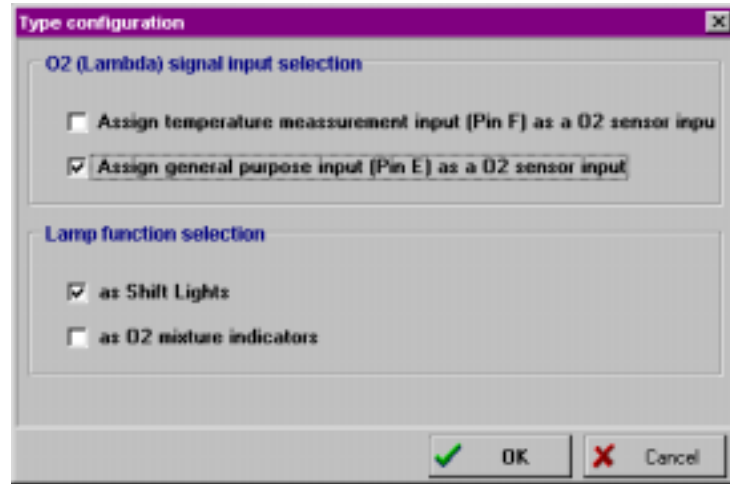
Menubar → Settings → Type configuration



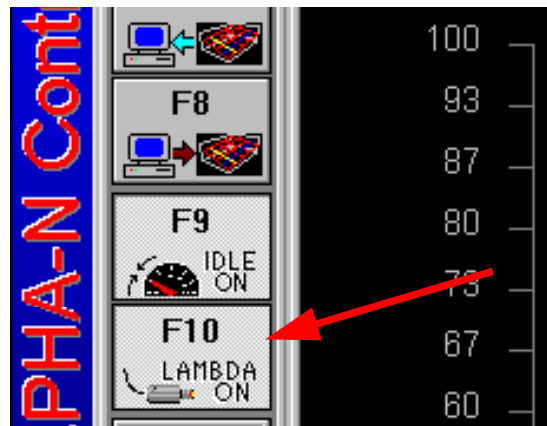
A popup window will open allowing you to determine which pin, pin E or pin F, is used for the lambda signal input. Pin E is a general input pin. If a lambda control via the Alpha-N module is not desired, then leave the control boxes for Pin E and Pin F empty.



If lambda measurement is active, then the user may determine the mode in which the shift lights operate. The user selects either "Shift Lift mode" or "Lambda mode".



If lambda measurement is active then there will be additional graphical icons shown in the display window.

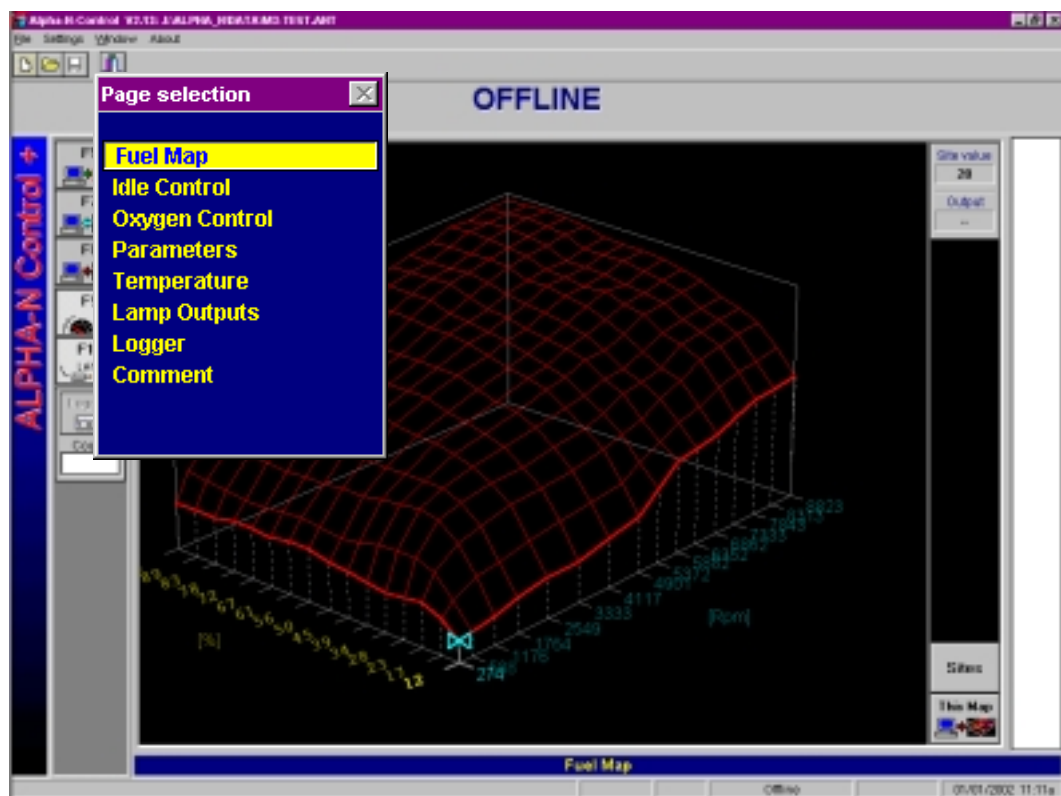


This concludes the type setup.

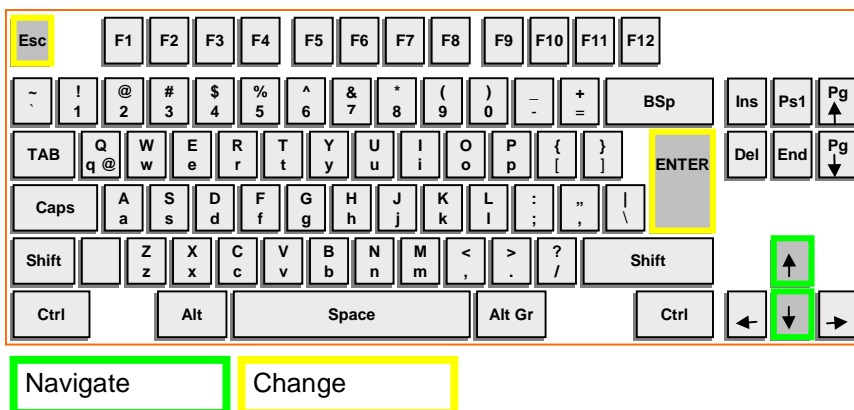
5 Program handling

5.1 Page Selection

By pressing the ESC-key you will call up the page selection popup window.



Pages may be selected by pressing the cursor up and down keys. In the background, the selected page is displayed and by pressing the enter key, the page view mode becomes selected.

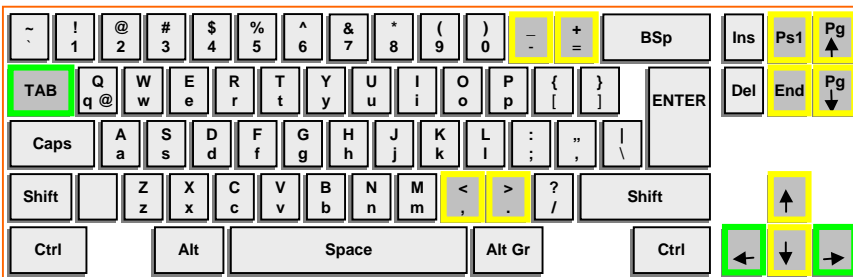


5.2 Selection of parameters

5.2.1 Changing single values in maps

Single mapping values are modified by using the cursor up/down keys or +/- key for small steps. By using page up/down keys the parameter value may be changed in larger steps. The TAB key is used to jump to the next parameter. The currently selected parameter is highlighted in white.

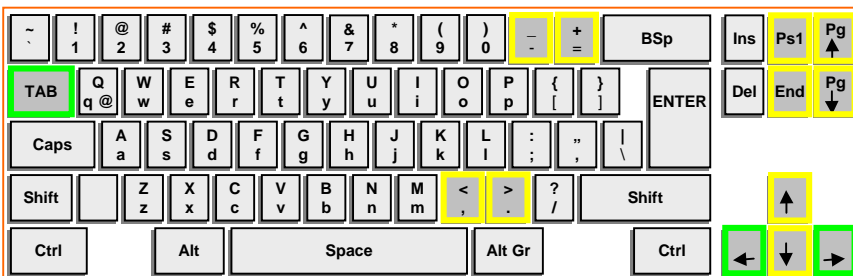
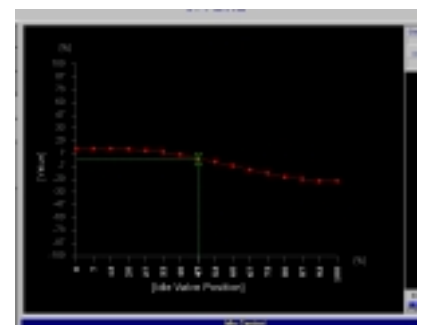
- > step between parameters TAB - key / Cursor left,right
- > small steps + / - / Cursor up,down - keys
- > large steps Page up/down - keys
- > Max-,min-values Pos1/End



5.2.2 Changing parameters in 2D map curves

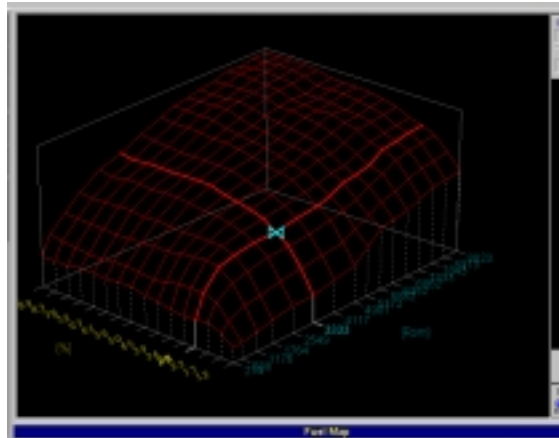
To change the parameters value in a map directly the same keys are used: cursor up/down for normal steps, +/- for small steps, and page up/down for large steps. Use the cursor left/right keys to navigate along a map curve.

- > step between parameter windows TAB-key
- > navigate along a map curve Cursor left,right - keys
- > small steps + / - / Cursor up,down - keys
- > large steps Page up/down - keys
- > Max-,min- values Pos1/End

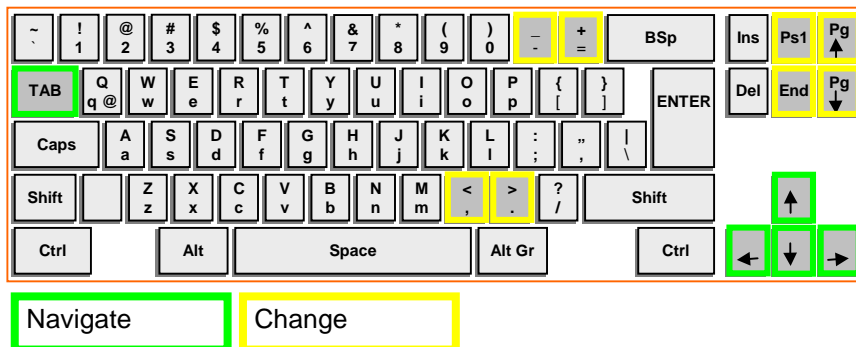


5.2.3 Changing parameters in 3D-maps

To change the parameters value in a map directly the same keys are used: +/- for small steps, and page up/down for large steps. Use the cursor left/right keys and cursor up/down keys to navigate the 3D map.



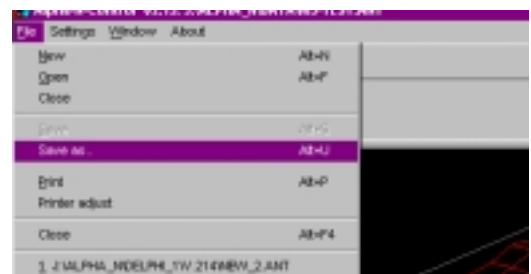
- > step between parameter windows TAB-Taste
- > navigate the 3D map Cursor left,right / up,down keys
- > small steps + / - keys
- > large steps Page up,down keys



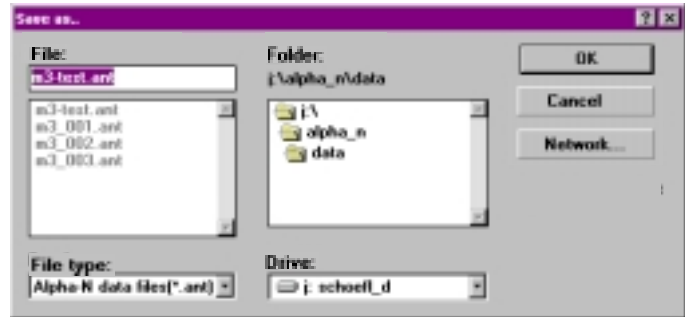
5.3 Saving mapping data

The mapping and configuration data can be saved to file (*.ant) at any time:

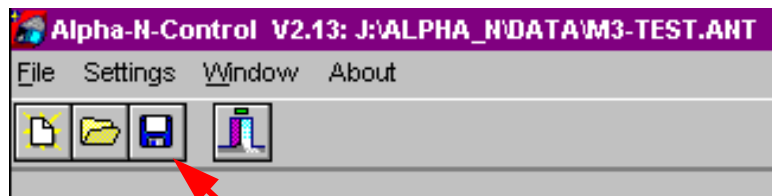
Menubar→File→Save as..



A file popup window showing the files and subdirectories in the current directory will appear. File names should be limited to 8 characters and end with the postfix ".ant".



The program is linked to this file until the user exits the program or selects another file. The current file is displayed in the title bar of the main window (e.g. J:\ALPHA_N\DATA\M3-TEST.ANT).



Once a file is selected, the user may quickly save data by clicking on the blue diskette symbol or Menubar→File→Save.

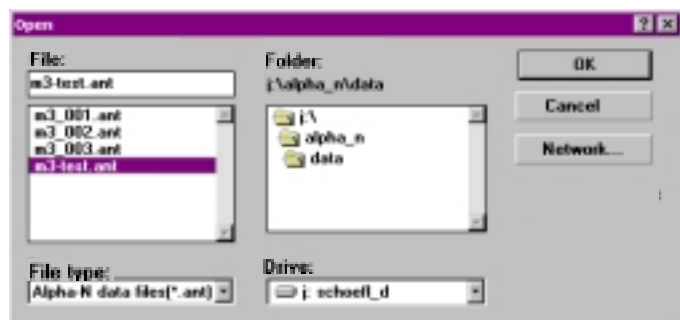
5.4 Loading mapping and configuration data from a mapping file

The data in an Alpha-N module can be rewritten at any time.

File open



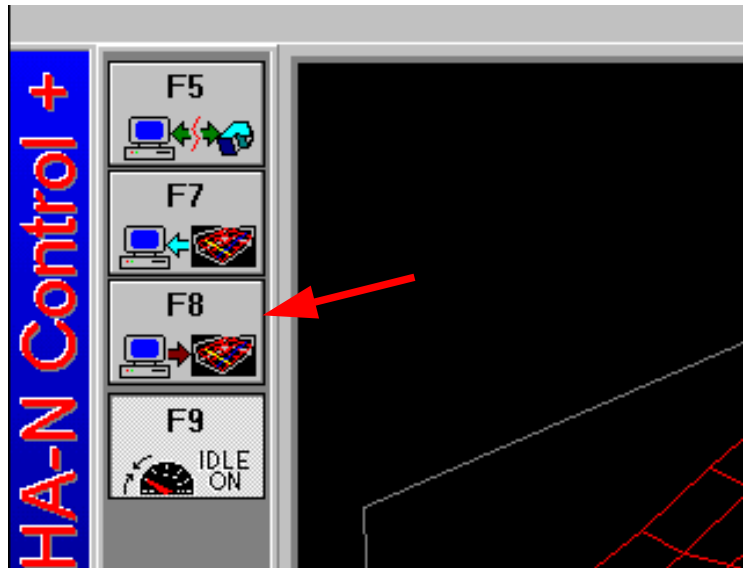
In the popup file window, select the appropriate mapping file (*.ant)



The program will switch automatically into the offline mode and graphically display the mapping data. At this point the data is loaded into the program, but not the Alpha-N module. The user may edit values while offline.

5.4.1 Download mapping data into the Alpha-N module

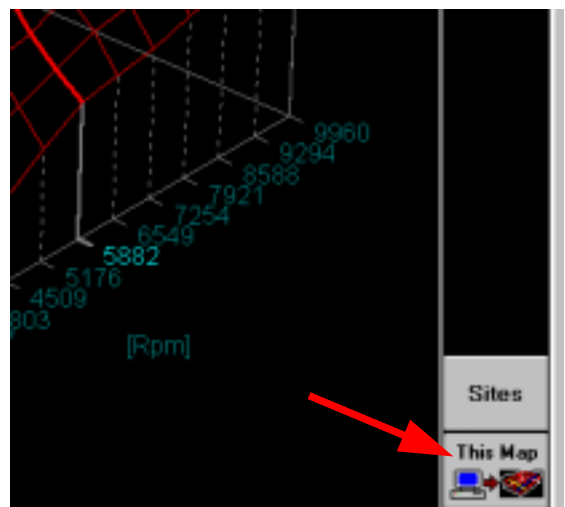
By clicking on the download button (F8), an entire mapping is loaded into the Alpha-N Module. The Alpha-N module must be active (ignition in the "on" position) to allow this operation.



By pressing F5, the user can switch to online mode again.

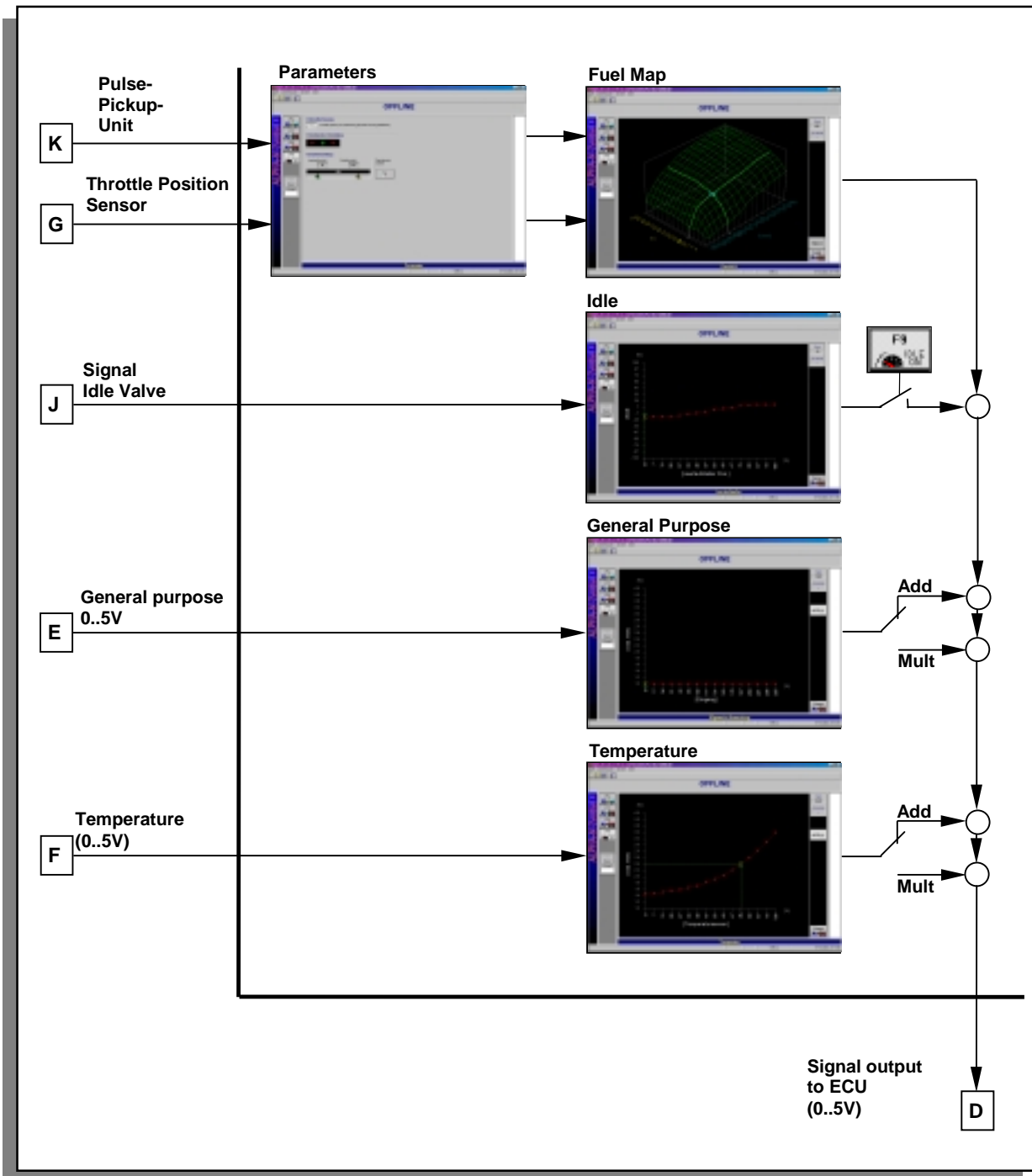
5.4.2 Downloading selected mapping curves

The user may wish to modify only selected mapping curves or parameters within the Alpha-N module. To this end, on each of the mapping display pages, the user will see pushbuttons in the bottom lower right of the window. The user may click on these to effect only the desired change.

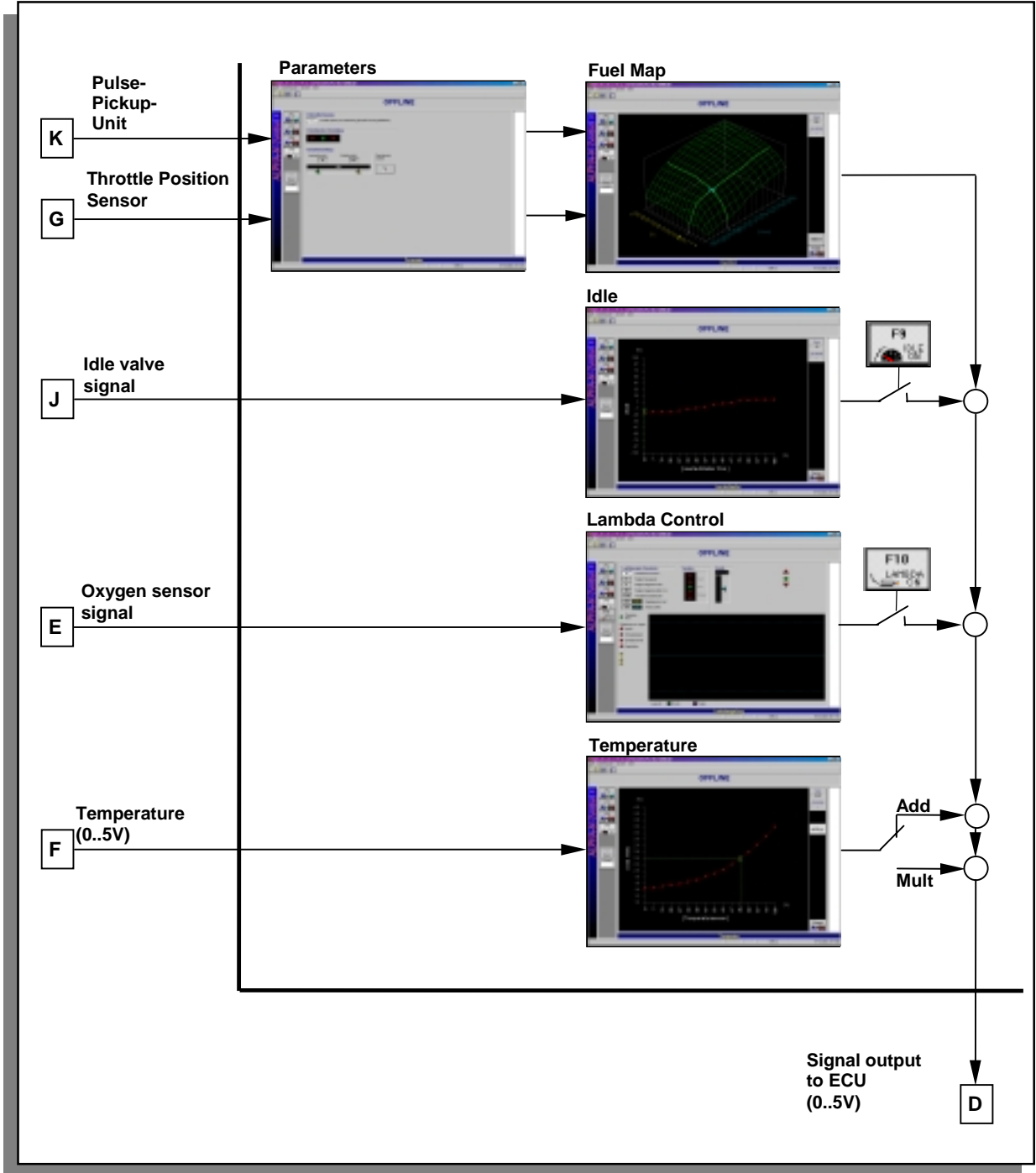


6 Type configuration

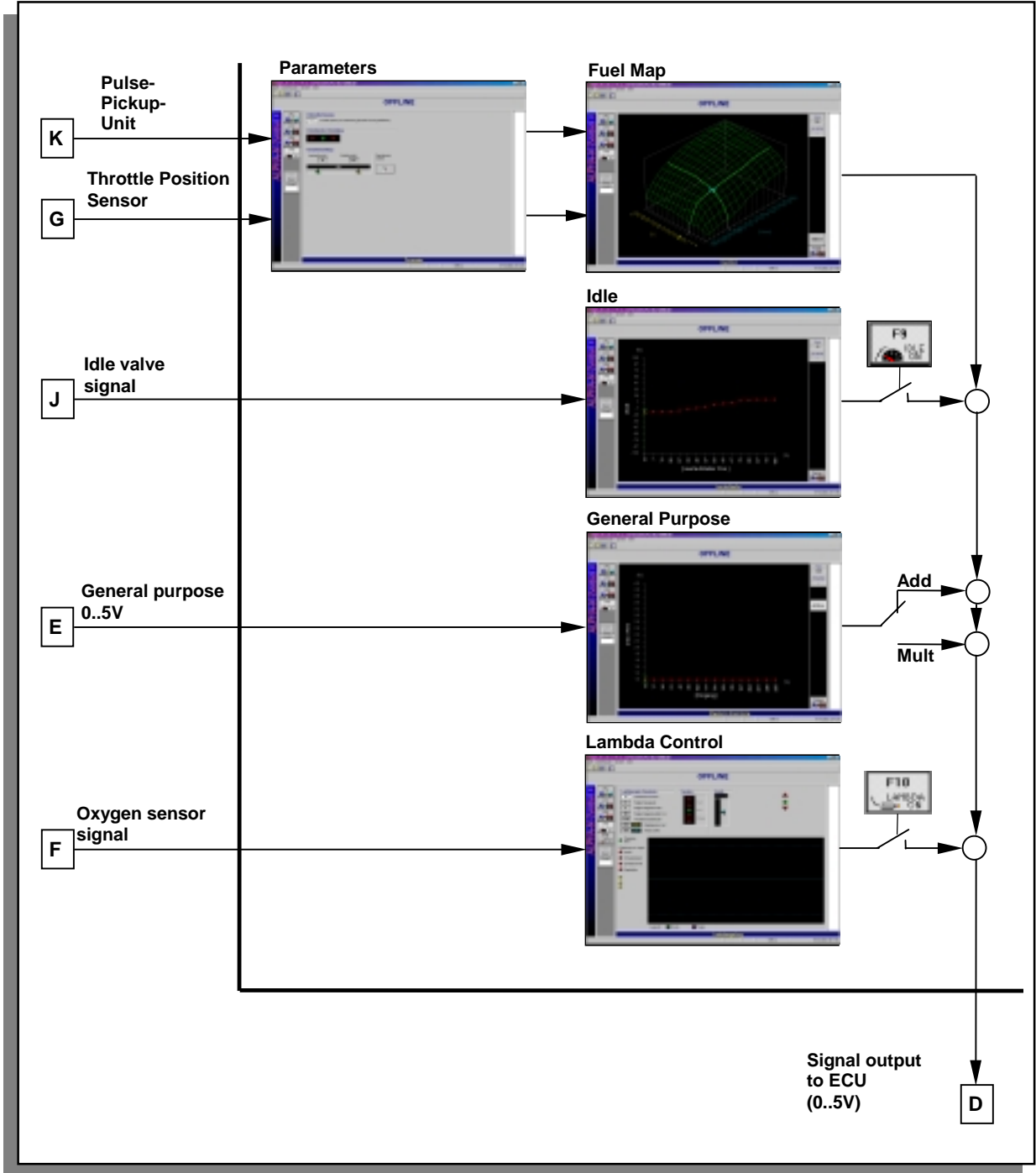
6.1 Standard mode (without internal lambda functionality)



6.2 Lambda mode via signal on pin E



6.3 Lambda mode via signal on pin F



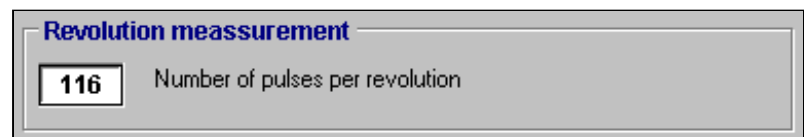
7 Application to the engine

7.1 Step by step

- Start the Alpha-N control program, user will be on the "intro" page.
- Power up the Alpha-N module by turning ignition to the "on" position
- Press the ESC key to bring up the page-menu popup and select the parameter page.
- Insert/check the number of pulses per revolution in the field "revolution measurement" (7.2).
- calibrate the throttle position sensor (TPS) (7.3).
- set the idle and full throttle contact positions of the TPS (7.4).
- set all map-curves for unused input pins to 0.
 - pin E -> page "general"
 - pin F -> page "temperature"
 - pin G -> page "Idle control"The idle control may be deactivated at any time by pressing the F9 key or clicking the icon on the main page.
- Set location of load and rpm sites on the "Map page(7.5).
- Get the motor idling smoothly by varying the appropriate fueling map points.
- On the "Idle control" page, setup the mapping curve for the idle control. Make sure the idle control function is activated [F9] (7.6).
- Mapping is continued by visiting all load and rpm sites and setting fueling to optimal values (7.7).

7.2 Setting number of impulses of crank sensor

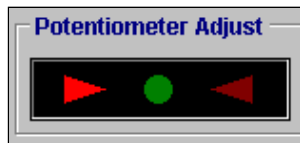
The Alpha-N module uses the impulses provided by the crank sensor to determine engine speed. The user must set the number of impulses the crank sensor provides per crank revolution. For example, the stock M3 crank sensor sends 116 pulses per crank revolution.



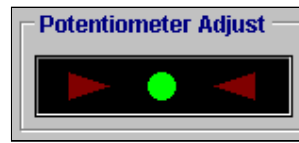
7.3 TPS settings

On the parameter page, the user can setup the TPS.

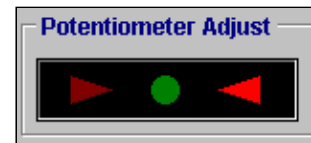
- ignition on.
- ESC key --> select "Parameters" page.
- Turn the throttle potentiometer (TPS) until the green dot lights up..
IMPORTANT: make sure the throttles are mechanically in the idle position, e.g. fully closed.



turn TPS in one direction



TPS position is good



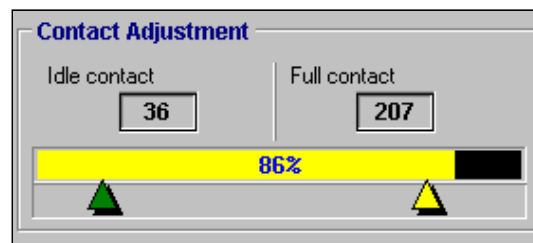
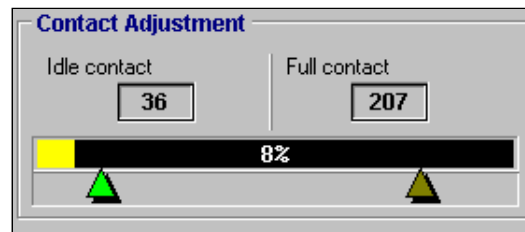
turn TPS in the opposite direction

- Now tighten the TPS screws

7.4 Setting the idle and full throttle contacts

Some motronic units (e.g. M3) require 2 input signals to signal when the throttle is fully open or fully closed. Normally these signals are provided by a throttle position switch on the end of the throttle spindle. In many applications (e.g. M3), the throttle position switch is replaced with a throttle position sensor (TPS). The Alpha-N module provides the signal inputs to the motronic for fully closed and fully open throttle position.

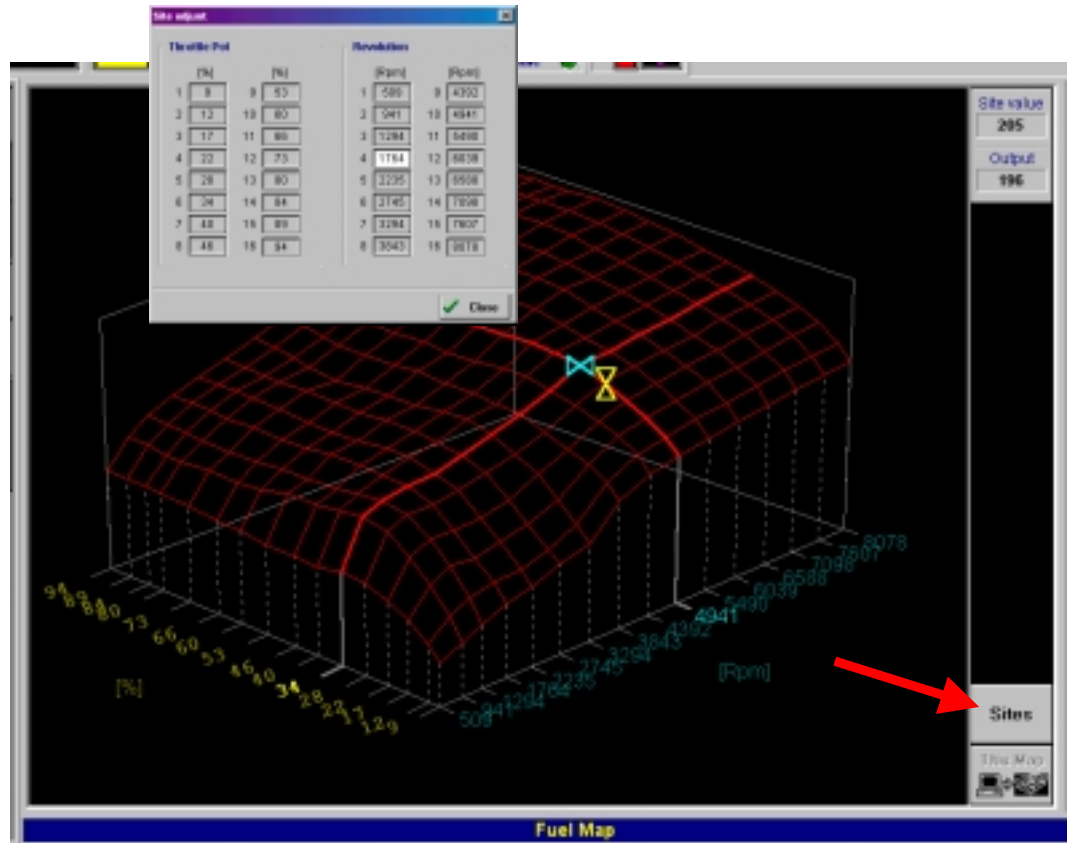
This is implemented by setting upper and lower voltage reference levels which when crossed trigger an additional signal for the motronic.



A lighted arrow in the setting popup shows that a contact is currently active. E.g. the voltage output of the TPS at the given throttle position indicates fully open or fully closed throttle.

7.5 Setting location of load and RPM sites

Each map has a total of 16 RPM and 16 load sites which the user may position as desired. It is possible to cluster more sites in difficult areas (e.g. just off idle) to achieve better control.



7.6 Idle control function

An Alpha-N module determines the load of an engine via the TPS (exception: turbo motor). Therefore, throttle position is a primary input. An idle control can be thought of as a secondary throttle parallel to the primary throttles. Therefore, we have a secondary load input. If this signal were ignored, the primary load signal would be falsified at small throttle openings. The idle is usually controlled via a PWM (Pulse Width Modulated) signal. This is a high frequency pulsed signal. The ratio of pulse on-to-off time is used to determine the load factor or air flow thru the idle. The Alpha-N module has an input pin that allows for the measurement of the PWM ratio. A lookup table (2D curve) is used to determine a correction factor which corresponds to the opening of the idle and added to the primary load signal.

7.6.1 Activation/Deactivation of the idle control function

Via the F9 key, the user can easily activate or deactivate the idle control function of the Alpha-N module.



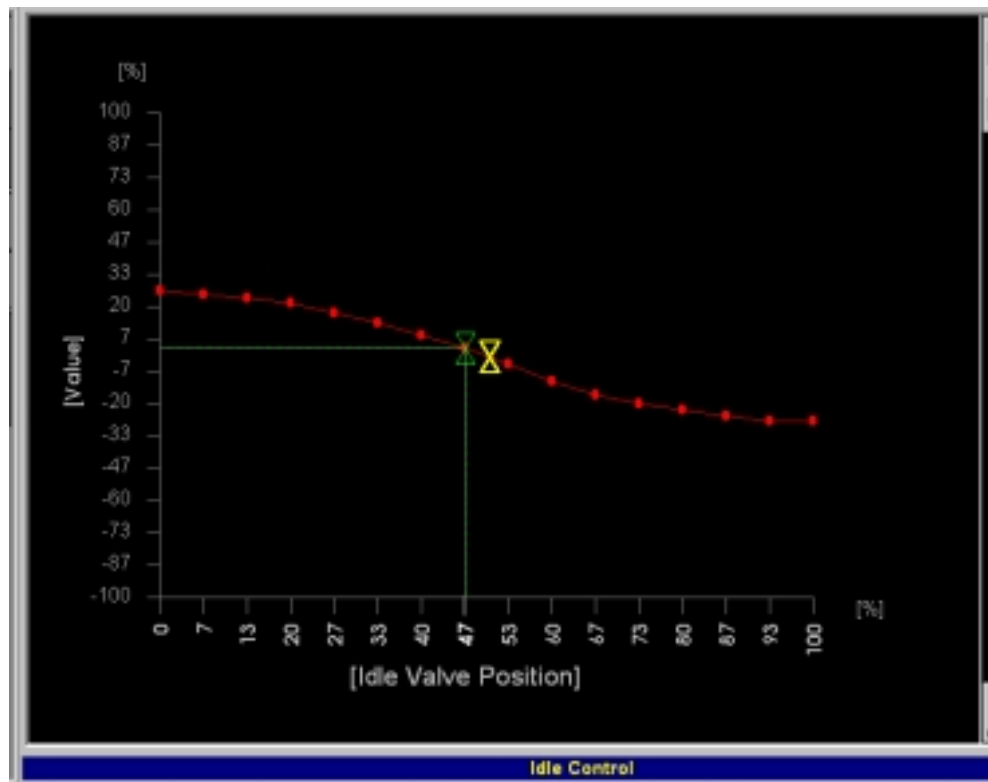
When the idle control function is deactivated, there will be no correction of the primary load input.

Note: a fluctuating idle is possible if the idle control function is deactivated, but there is an idle control on the engine.

The correction value determined by the idle control is only added to the primary load signal when the throttles are sensed to be in the closed position (see setting of TPS end contact points).

7.6.2 Determining the 2D idle-map

When the motor is warm, the correction factor for the idle control should be 0.



Since there is no way to influence the position of the idler, a trick is used to determine the direction. Put the car in 1. gear and slowly engage the clutch to put load on the motor. This will cause the RPM to fall and the motronic will respond by trying to raise RPM again via the idle. The movement left or right shows in which direction one must enrich or lean-out the mixture.

7.7 Lambda function

Although the Alpha-N unit has its own lambda control, one should use the built in lambda control of the ECU if implemented (e.g. motronic) because the ECU has more engine-parameters available as input for the control.

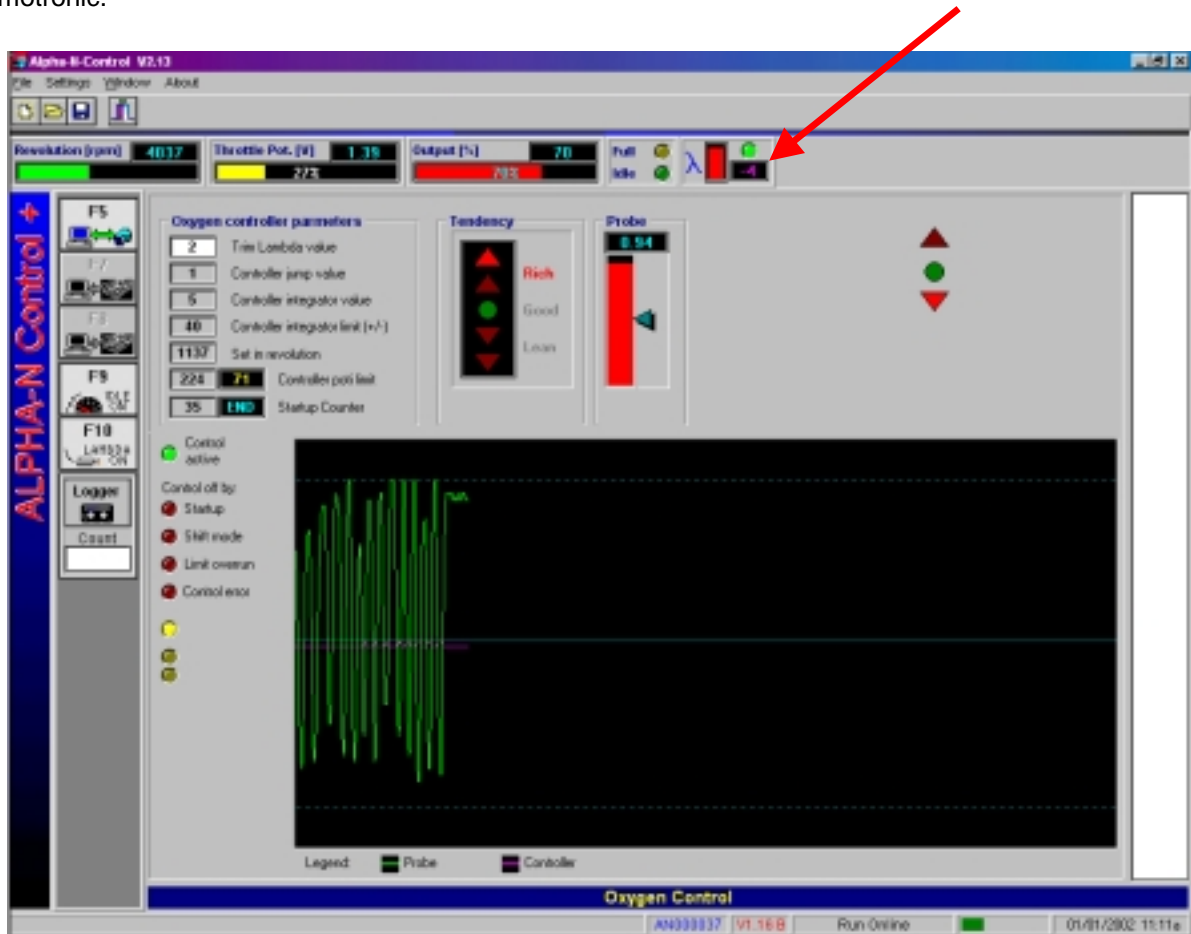
However, it can be useful during mapping of the engine to use the lambda control of the Alpha-N module. In order to do this, the motronic's lambda control signal must be disconnected).

The lambda control attempts to maintain $\lambda=1$ by generating a correction value. This correction value is shown at the top of the main window of the Alpha-N control program (see the red arrow). The correction value can be used to indicate in which direction to adjust the fueling. Good values are achieved when the correction value is within ± 4 .

Note: This number which evaluates the correction value is just an internal used value without a unit. It does not show a mixture.
The lambda control is inactive above 5000rpm.

The green LED indicates an active control.

After the mapping, deactivate the lambda control of the Alpha-N module. Reconnect the lambda signal to the motronic.



8 Appendix

9 Notes

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