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1 KMS (Kronenburg Management System)

This management system can be used as an independent injection/ignition system for virtually all types of Otto engine (engines in which the fuel mix is ignited via a spark plug).

This system provides the opportunity to give the desired spark timing at any running condition, in order to achieve maximum torque and fuel efficiency at any rpm and load. This system also contains options as; shift-light, RPM-limiters, launch control and powershift.

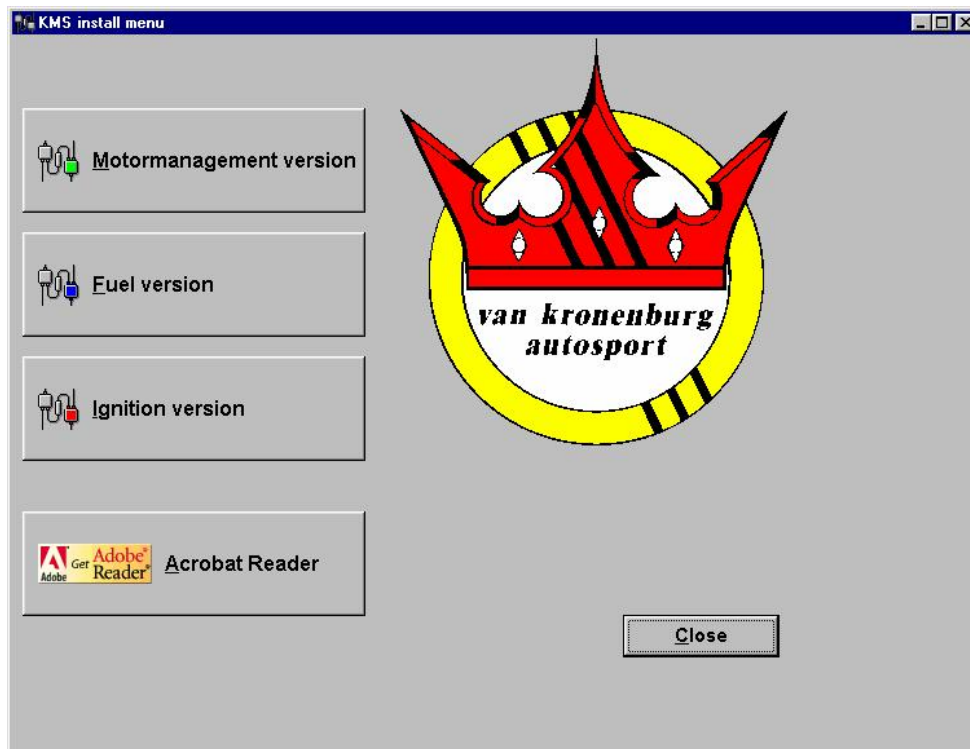
The set-up of the system software is kept as clear and simple as possible, so that even people with little computer experience will be able to use this system. Working with the software is simple, but if the settings are incorrectly configured, there is a serious risk of engine damage. We recommend you leave the programming to specialists.



2 Software installation

The software is supplied together with the system, on a CD-ROM. Installing the software is very simple. The CD-ROM carries the KMS installation program, which launches automatically when the CD is inserted.

Once installed, the program is set to work via communication port COM1. If this port is already being used or not available, another communication port can be used. For the procedure to change the communication port, see 3.2.4.6.



3 KMS software

When the program is started, the main screen will appear, which is composed of three parts:

- The ignition characteristic diagram
- The function bar
- The communication bar

The following sections describe the possibilities and functions of the system.

3.1 The ignition characteristic diagram

The spreadsheet is a two-dimensional diagram showing engine speed against engine load.

The engine speed range is fixed and stretches from 500 rpm to 12,500 rpm.

The engine load range is sub-divided into 16 boxes dividing the range that has been set for the engine load sensor.

The rows and columns are shown in graphs (in the form of bar charts), when the left mouse button is clicked on an engine speed or a load value. For further information, see section 4.2.

In the ignition spreadsheet, figures can be entered that indicate the advanced ignition angle in degrees of crankshaft rotation. This means that for any engine speed and any engine load, the desired ignition moment can be entered..

KMS Ignition-Map																
	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
500	20,5	24,0	27,5	28,3	28,1	27,9	27,7	27,5	27,3	26,7	26,1	25,4	24,8	24,2	24,2	24,1
1000	19,1	18,1	22,9	27,6	28,1	28,0	28,0	27,9	27,9	27,3	26,6	26,0	25,3	24,7	24,6	24,6
1500	5,4	8,0	16,0	25,9	28,8	28,7	28,6	28,5	28,4	27,7	27,0	26,3	25,6	24,9	24,9	24,8
2000	3,4	5,0	17,0	25,0	28,9	28,9	28,8	28,8	28,7	28,0	27,3	26,6	25,9	25,2	25,2	25,2
2500	5,8	8,0	22,0	27,9	29,8	29,7	29,6	29,5	29,4	28,6	27,8	27,1	26,3	25,5	25,5	25,5
3000	8,0	13,0	28,0	30,5	30,4	30,3	30,2	30,1	30,0	29,2	28,4	27,5	26,7	25,9	25,9	25,9
3500	9,0	19,9	28,0	31,8	31,6	31,5	31,3	31,2	31,0	30,1	29,1	28,2	27,2	26,3	26,3	26,3
4000	11,0	24,0	28,0	32,9	32,7	32,6	32,4	32,3	32,1	31,0	30,0	28,9	27,9	26,8	26,8	26,8
4500	11,0	18,0	26,0	34,2	34,0	33,8	33,5	33,3	33,1	31,9	30,8	29,6	28,5	27,3	27,3	27,3
5000	11,0	20,0	27,0	34,0	34,8	34,6	34,4	34,2	34,0	32,9	31,7	30,6	29,4	28,3	28,3	28,3
5500	11,0	21,0	29,0	36,0	35,8	35,6	35,4	35,2	35,0	33,9	32,7	31,6	30,4	29,3	29,3	29,3
6000	11,1	23,0	31,0	36,0	35,9	35,7	35,6	35,4	35,3	34,3	33,3	32,4	31,4	30,4	30,4	30,4
6500	11,0	25,0	33,0	37,0	36,7	36,4	36,0	35,7	35,4	34,6	33,8	33,0	32,2	31,4	31,5	31,4
7000	11,0	24,0	31,0	36,0	35,9	35,9	35,8	35,8	35,7	34,9	34,1	33,3	32,5	31,7	31,8	31,8
7500	11,0	25,0	32,0	37,0	36,8	36,5	36,3	36,0	35,8	35,0	34,3	33,5	32,8	32,0	32,0	31,9
8000	11,0	24,0	33,0	37,0	36,8	36,6	36,4	36,2	36,0	35,2	34,4	33,6	32,8	32,0	32,0	32,0
8500	11,0	24,0	33,0	37,0	36,8	36,6	36,4	36,2	36,0	35,2	34,4	33,6	32,8	32,0	32,0	32,0
9000	11,0	23,9	32,0	37,0	36,8	36,6	36,3	36,1	35,9	35,1	34,3	33,6	32,8	32,0	32,0	32,0
9500	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
10000	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
10500	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
11000	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
11500	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0



3.2 The function bar

The vertical bar on the right-hand side of the screen shows several function keys, which can be activated using the mouse arrow or the relevant function keys on the keyboard. An explanation on the different function keys is given in the following sections.



3.2.1 Function key F1

This function key gives access to the manual in Acrobat reader. Acrobat reader 3.0 or higher is required. Acrobat reader 5.0 can be found on the installation CD-ROM.



3.2.2 Function key F2

This function key enables a previously saved file to be retrieved from the hard disk, floppy, CD-ROM etc. The files can be recognised by a red floppy  icon and by the extension .i00



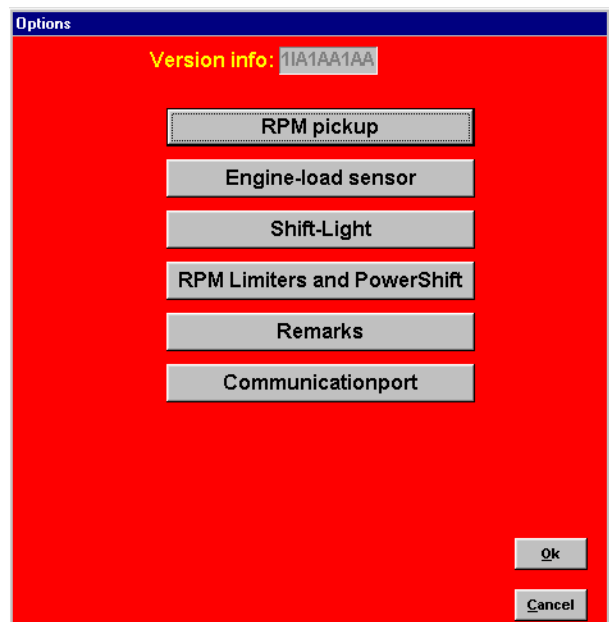
3.2.3 Function key F3

This function key is used to save modified files. The names of these files automatically receive the extension .i00.

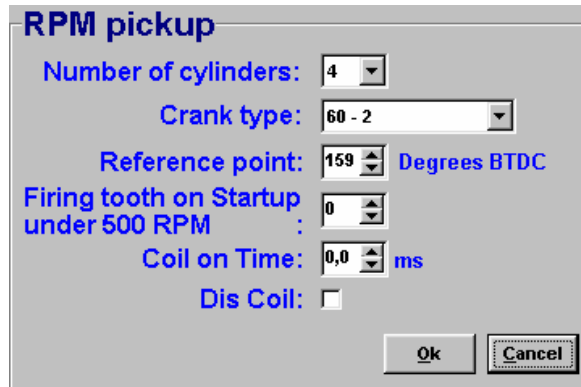


3.2.4 Function key F4

When this function key is activated, a menu will appear on the screen, which gives the option of several settings. The options will be explained in the following sections.



3.2.4.1 RPM pickup



In this menu, the settings for the crankshaft signal, the type of ignition and the injection frequency can be entered.

Crank type: The engine speed signal should be obtained from an inductive sensor in combination with a cog that matches one of the types shown in the 'Crank type' drop-down.

<i>Crank type</i>	<i>Engine</i>	<i>Remarks</i>
60 –2 (bosch)	4,6 cylinders	
36 –1(ford)	4,6 cylinders	
12 –3 v engine	4 cylinders	Discoil only
12 –3 line engine	4 cylinders	Discoil only

Reference point: The reference point (the position of the piston at the moment the first tooth after the missing tooth/teeth passes the sensor) of the cog is between 0 and 180 degrees before TDC. The 6+1 cog (delphi system) is an exception to this rule. The correct place for it is explained in the diagram shown in Appendix 1.

Number of cylinders: The number of cylinders in the engine can be filled in here. If the engine has five or six cylinders, the 60-2 or 36-1 cogs are the only ones that can be used.

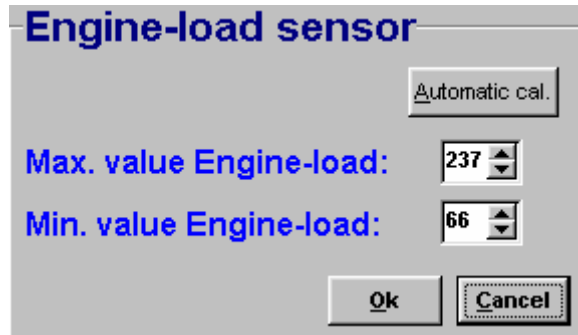
Firing tooth under 500 rpm: This is for setting the number of teeth before TDC at which an ignition impulse is given (under 500 rpm). Keep this number as low as possible to prevent backfiring when the engine is started. For engines with a high compression ratio do not set this to a number higher than 1.

Coil on time: A coil should be charged before every discharge (plug spark). The coil charging time is indicated in milliseconds. It should normally be 3.0 to 3.5 milliseconds. Longer coil charging leads to unnecessarily high power consumption and heat development, shortening the service life of the coil.

Dis coil: The choice is between dis coil and single coil control (rotor and distributor cap). Ticking the box selects dis coil mode.



3.2.4.2 Engine-load sensor



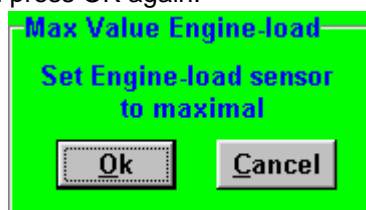
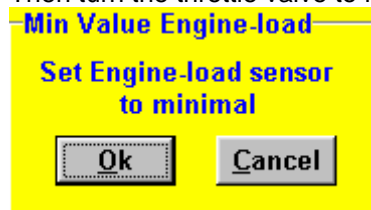
The engine load sensor connected to the system will have to be calibrated. The range within which the sensor operates can be set here. A load sensor issues a voltage of 0 to 5V. The range is divided into 8 bits (256 steps). In practice a load sensor does not run through its full range. For this reason, the upper and lower limits must be set, so that the 16 columns in the spreadsheets can be best utilised.

There are two ways of calibrating the load sensor:

- 1) Automatic calibration
- 2) Manual calibration

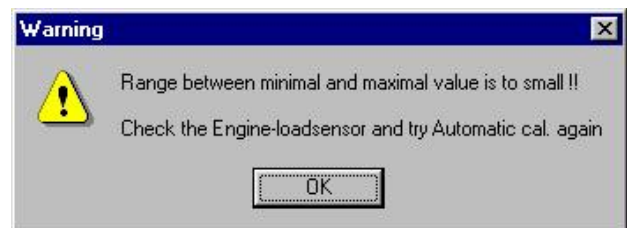
When a throttle valve potentiometer is used, it is easy to opt for automatic calibration. Select 'Automatic cal.' and then keep the throttle valve in rest position, pressing OK.

Then turn the throttle valve to full load and press OK again.



The minimum and maximum values of the throttle positions will now be shown.

A warning will appear if automatic calibration cannot be finished correctly. For possible causes, see 'Fault tracing'.



When a map sensor or an air mass sensor is used, automatic calibration is not easy, because the minimum and maximum output signals of the sensor are not known before the engine has run. We recommend filling in the figures by hand, making sure that the output signal of the sensor under any engine operating condition is between the two figures set. Tip: make the minimum value 15 and the maximum value 250.



3.2.4.3 Shift-Light



This menu enables a shift light to be activated at a certain engine speed or engine load. Operation is in principle the same as with the AUX. So an extra output can be activated, providing an earth-switching output directly (up to 15 watts) or via a relay.

3.2.4.4 RPM Limiters and Powershift

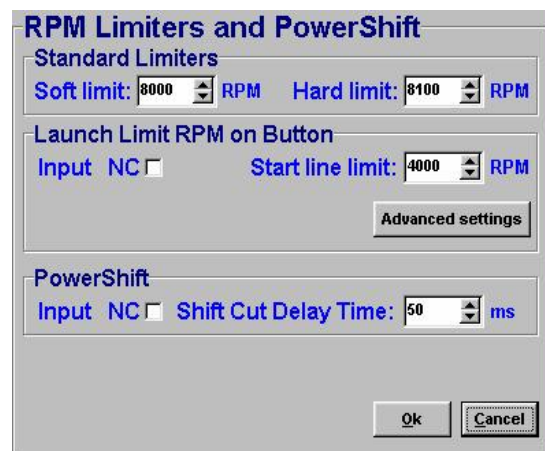
This menu can be used to set various speed limiters and PowerShift.

The standard limiters include a soft and a hard limiter. The soft limiter stops ignition partially so that power is lost. The hard limiter switches off ignition completely.

Under Launch limit an extra limiter can be set, which is activated, for instance, by a button. Depending on the type of button, NC (normally closed) or NO (normally open), 'Input NC' will have to be ticked or not. If the NO type is used, do not tick the box.

'Advanced settings' gives the possibility of setting the ignition moment for several engine speeds at a maximum of 54 degrees after ignition (after ignition is indicated by a negative number). This enables a high boost pressure to be built up in turbocharged engines without further increasing the engine speed.

Should the engine speed increase in spite of 'after ignition', the extra limiter will intervene by stopping ignition and injection.

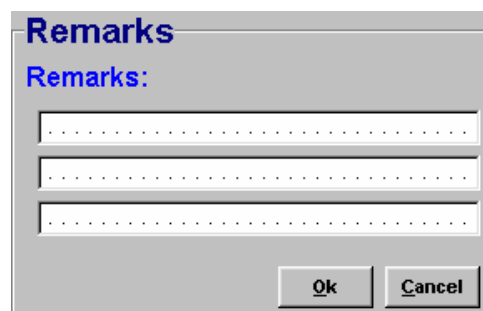


Warning: When after ignition is applied, the temperature of the exhaust gases may rise so high that the exhaust valves, exhaust manifold and turbocharger are damaged. We recommend you do not activate this function for longer than a few seconds!

PowerShift is a function that can be used for changing gear in sequential gearboxes with dog clutch. A switch on the gearbox enables the engine output to be briefly interrupted, so that a gear change can be made with the throttle valve fully open. This minimises the duration of gear-changing. The duration of the interruption can be set to a maximum of 200 milliseconds. Depending on the type of switch, the 'NC' box should be ticked.

3.2.4.5 Remarks

This is room for making notes, for instance engine specifications.



3.2.4.6 Communicationport

Select the required communication port and save using the 'Save' button.

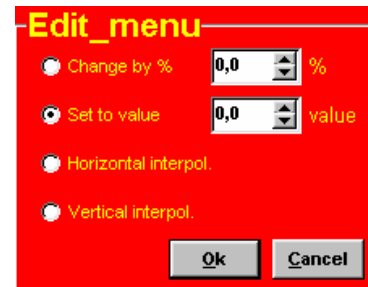


3.2.5 Function key F6



1208	0	1	2	3
500	10,0	10,9	11,9	12,8
1000	13,3	18,0	20,0	20,3
1500	16,7	17,2	20,0	20,3
2000	20,0	20,3	20,1	20,4
2500	20,0	20,3	20,1	20,4
3000	20,0	20,3	20,2	20,5
3500	20,0	20,3	20,2	20,5

2636	0	1	2	3
500	10,0	10,9	11,9	12,8
1000	13,3	18,0	20,0	20,3
1500	16,7	17,2	20,0	20,3
2000	20,0	20,3	20,1	20,4
2500	20,0	20,3	20,1	20,4
3000	20,0	20,3	20,2	20,5
3500	20,0	20,3	20,2	20,5





After this function key has been clicked and one or more boxes in the diagram have been selected, an edit menu will appear. In this edit menu the values of the selected boxes can be changed. The choice is between a change in terms of percentage, a change to a fixed value, and horizontal or vertical interpolation. Horizontal or vertical interpolation is only possible if three or more boxes have been selected in the diagram. With these functions, the values (horizontal or vertical) between the outermost selected boxes will be interpolated.



3.2.6 Function key F7

When data is changed or downloaded to the system, the screen will show the text 'DATA IS NOT LOCKED !!!'. At the same time, the silver-colour bar of the diagram will change to a yellow colour. This is to indicate that the changes have not yet been saved. Save the changes by pressing the F7 function key

When the  box is clicked, the changes will be saved. If saving is successful, the box will automatically change to . Once again, if UNLOCKED is **not** clicked after the program has been changed, the changes in the system will be lost when the power supply to the system is broken

3.2.7 Function key F8



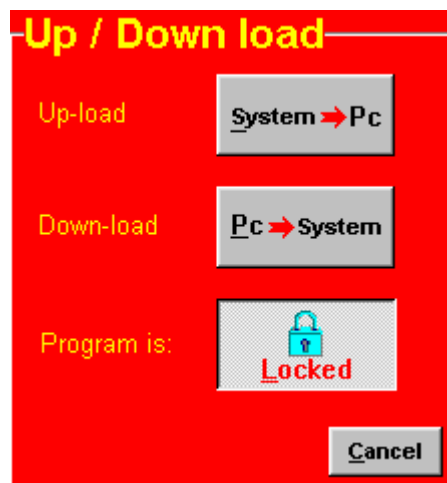
With function key F8, the cursor (the blue box) can be switched on and off. When the cursor is on, it will always follow the operating situation of the engine. At that point, it is only possible to change a selected box if it matches the operating situation of the engine at that moment. When the cursor is off, any box can be selected and changed, irrespective of the operating situation of the engine.

3.2.8 Function key F10



Function key F10 offers the choice of working off-line or on-line. It switches communication with the system on or off. Communication will also be stopped when the power supply to the system is broken. If there is no communication, a red bar will appear at the bottom of the screen. To resume the communication with the system, function key F10 should be pressed. A menu will appear offering a choice between loading the file on the PC to the system and loading the file in the system to the PC. There will still be the possibility of breaking the communication again.

Tip: On vehicles with an ignition lock switched in such a way that the power supply to the system is cut off when the engine is started, always download the data from the PC to the system (as in the PC the modified data will not get lost when the power supply to the system is broken). This is of course only necessary if the data has not been saved to the system.



3.3 The communication bar



The horizontal bar at the bottom of the screen is the communication bar. If the system is connected to the COM port of the PC and the power supply to the system is on, function key F10 can be used to activate the communication.

There are three check lights in the communication bar, which indicate the status of the relevant outputs.

The following readings will be shown:

- Engine speed
- Advanced ignition angle
- Engine load

These readings can be used to check whether the right sensors are being used and all settings are correct.

4 Programming

Before programming is started, all connections and sensors must be checked. Look at the communication bar to check the sensors for correct functioning and setting.

If everything is in good working order, the programming of the diagrams can be started.

There are three ways of changing the values shown in the diagrams:

- 1) Filling in the data manually, using the F6 edit menu
- 2) Changing bar charts using arrow keys

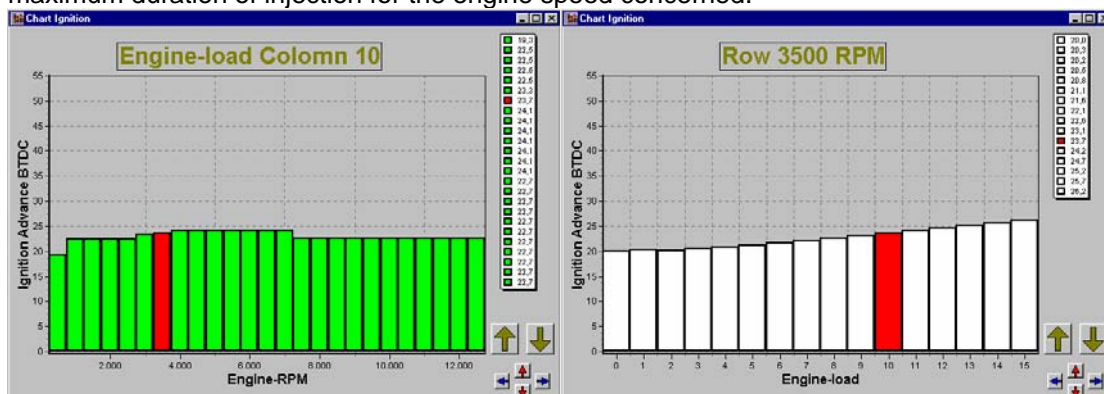
4.1 Manual changing

The value of a selected box can be changed manually. If the F6 button is on, an edit menu will appear which offers several ways to change the selected values (see 3.2.5.).

4.2 Bar charts

The columns or rows of the diagrams can also be shown in the form of bar charts. The bar charts will appear when an engine speed or engine load value is clicked. If an engine speed is clicked, a bar chart will appear showing all the values related to that engine speed.

If an engine load value is clicked, a bar chart will appear showing all the values related to that engine load value. Access to the bar charts can also be obtained by pressing the ALT + C keys or the ALT + R keys simultaneously. The thin yellow line in the graphs of the injection diagram indicates the maximum duration of injection for the engine speed concerned.



It is also possible to modify the diagram values in the bar charts by using the arrow keys, or the arrow keys in combination with the Ctrl or Alt key. The left/right arrow keys can be used to move through a column or row. When the upward or downward arrow key is used, the value will go up or down 0.10 with each touch of the key. If the Alt key is pressed simultaneously, the value will change 0.01 per touch and if instead of the Alt key the Ctrl key is pressed, the value will change 1.00 per touch. When the engine is running, the space bar can be touched to go automatically to the relevant value in the bar chart (matching the current situation of the engine), even when this value is at another engine speed or engine load.

To go to another engine speed or engine load, use the Page Up / Page Down keys.

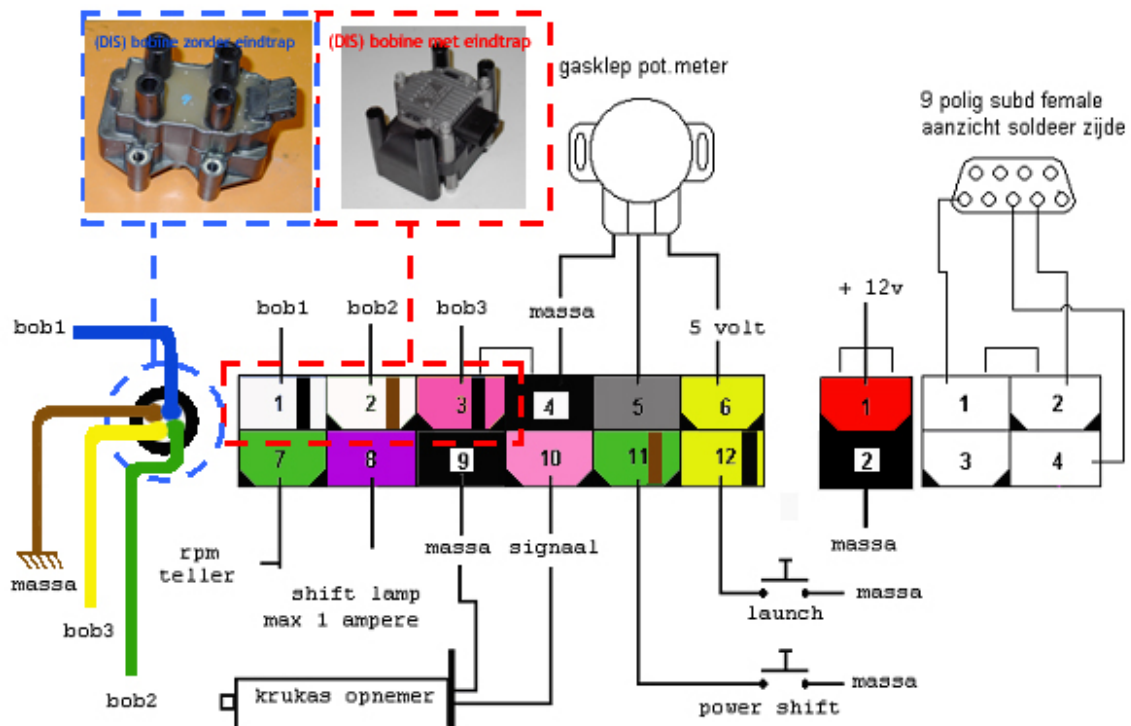
5 Hardware installation

To guarantee that the system functions properly, it is of utmost importance to adhere to the instructions given below.

5.1 Fitting the ECU

It is important that the ECU should be fitted in a dry and not too hot place. Let bij de plaatsing erop dat de communicatie kabel op een eenvoudige manier aangesloten kan worden.

5.2 Connecting wire loom



Warning: Be sure what kind of ignition coil you have. Is this a coil without amplifier, use the wires directly coming out of the ECU. If you have a coil with amplifier it's important to use the connector wires. (see picture above)
!! If the coil is not correctly connected the ECU will be severely damaged!!

6 Specifications

Minimum system requirements:

Windows 95,98,2000,NT,ME or XP
Internal memory 32Mb
Screen resolution 800x600
Standard RS232C port
CD-ROM station (software is also available on diskette)
Acrobat reader 3.0 or higher (Acrobat reader 5.0 is included on the CD-ROM supplied)

ECU specifications:

Supply voltage 8.5 - 16 volts
Power consumption 250mA at 12 volts
5 volt supply to sensors can have maximally 100mA

Inputs:

Inputs are protected up to 50 volts
Input for engine load is suitable for potentiometers, air mass meters and map sensors with an output between 0 and 5 volts.

Outputs:

Shift-lamp output max. 1 amp at 12 volts per output

Dimensions and weight:

LxWxH 100 x 66 x 23 mm

Weight appr. 0,172 kg



7 Fault tracing

Fault	Possible causes	Remedies
Geen communicatie tussen PC en systeem	<ul style="list-style-type: none"> - No power supply to the system - Cable connected to wrong COM port (standard is COM1) 	<ul style="list-style-type: none"> - Switch the contact on or check the fuse - Connect cable to COM1 or select another COM port; see section 3.2.3.9
Engine does not start	<ul style="list-style-type: none"> - No engine speed signal - Crank Type set is not correct 	<ul style="list-style-type: none"> - Check the sensor and wiring - See section 3.2.4.1.
<p>Auto calibration gives message 'warning range too small'</p> <p>Auto calibration gives message 'warning signal reversed'</p> <p>Auto calibration gives message 'engine load sensor not connected'</p>	<ul style="list-style-type: none"> - Sensor range too small or potentiometer connected incorrectly - Throttle valve potentiometer turns in the wrong direction - The engine load sensor signal does not change - Interruption in potentiometer signal wiring or potentiometer does not turn when the throttle valve is opened 	<ul style="list-style-type: none"> - Check the wiring - Fill in the values of the engine load sensor manually - Interchange the earth and 5V wiring of the potentiometer
Only coils 1-4 give ignition	<ul style="list-style-type: none"> - Dis coil box not ticked 	<ul style="list-style-type: none"> - See paragraph 3.2.4.1.