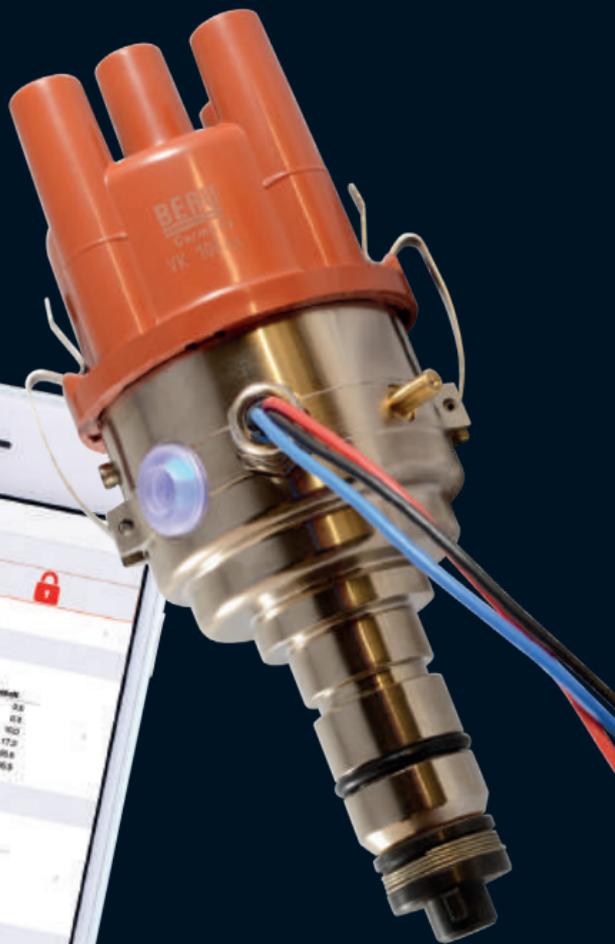# 123ignition.nl

ignition systems for classic cars

installation manual 123\TUNE+

WIRING THE 123\TUNE+

The 123/**TUNE+**-4-R-V and the 123**TUNE+**-6-R-V can be used on cars with 'battery-minus' connected to the body of the car ("NEG-EARTH"), **but also** on cars with 'battery-plus' connected to the body of the car ("POS-EARTH").
The 8-cyl. version however (123**TUNE+**-8-R-V) can **only** be used on cars, with the 'battery-minus' connected to the body of the car. (this is also called 'NEG-EARTH')

Check the diagrams, at the last pages of this manual, for proper wiring.

The 123**TUNE+**-4-R-V, 123**TUNE+**-6-R-V and the 123**TUNE+**-8-R-V can be used on cars with 6 and 12 Volt batteries.

MOUNTING THE 123\TUNE IN YOUR CAR

Check, before removing the old distributor from the car, in which direction the rotor is moving. (you can do this, by first removing the wire from the distributor to the coil. Then remove the cap, and ask some-one to look at the rotor, whilst you activate the start-motor)
Now you know if the rotor rotates clockwise (CW) or counterclockwise (CCW) seen from the top, that is. (put that on a little note, together with the proper ignition sequence)
The next thing: bring the engine to the static timing point, at the end of the compression-stroke, for cylinder number 1. (the rotor on the old distributor should point to the cable that connects to the sparkplug of cylinder number 1)

After having done all this, you can now put your 123\TUNE in the car and find a position where the cables and the vacuum-nipple come out conveniently. Connect the wires according to the proper diagram, and for

now, do not yet connect the black wire.
Turn on the ignition.

If your rotor rotates CW: rotate the unit CCW until the green LED **just** lights up. (also press the rotor in a CCW direction, to remove any free play in the drive)

If your rotor rotates CCW: rotate the unit CW until the green LED **just** lights up. (also press the rotor in a CW direction, to remove any free play in the drive)

(The LED shines through one of the holes in the aluminum disc below the rotor)

For all models: if you expect a bad ground connection: use the M5-threaded hole in the bottom-face of the housing, for a direct wire to ground.

Turn off the ignition.

Now, connect the black wire to the coil according to the schematic.
Connect the spark plug leads in the proper sequence to the cap, starting with the wire for the number one cylinder at the position pointed to by the rotor of the '123'.

Also connect the high voltage wire from the coil to the center position of the cap. Attach the cap to the distributor. Route all wires well away from the high voltage leads and away from moving parts, using tie-wraps or other suitable means.
Connect the vacuum-tube (if there is one) from the carburetor to the nipple on the '123'. Older engines may have a screw-connection for the vacuum-advance diaphragm. In this case you can use a short length of rubber hose to connect to the 123, or remove the hard line to the carburetor and replace it completely with thick-

walled rubber vacuum-hose.

If you loaded the proper advance-curve before, you can now start your engine!

INSTALLING THE APP

- Please download the 123**TUNE+** App in the Appstore, search for 123TUNE.
  123igniton Tune+ needs a Bluetooth 4.0 device. All Apple devices of the last few years have Bluetooth 4.0
- The **TUNE+** needs to be powered (6 Volt or 12 Volt) if you like to connect with the 123**TUNE+** App

HOW TO CONNECT

- Start the app
- A welcome message will be shown the first time, push on "show settings"
- The available devices will be shown, push the 123**TUNE+** device. (don't forget to power the unit)
- For entering the ignition a PIN code is required (standard PIN code: 1234)
- The connection will be made after the right PIN code has been entered
- The PIN code will be stored in the App, so it has to be entered only the first time
- On the dashboard a message and a green point will be shown as a sign of a successful connection
- You can now start your engine!

SETTINGS

- If you like to change some settings go back to the settings tab by pushing the dashboard somewhere and
  then push the settings button in the right upper corner
- It is possible to change the PIN code with the "Set PIN" button

- On top you can activate the immobilizer by pushing the red lock symbol and unlock by pushing the green unlock symbol
- The rest of the settings will explain themselves

CHANGING THE ADVANCE CURVE

- Please be aware the engine cannot run when advance curves will be changed
- Push somewhere on the dashboard, the title bar will be shown
- In the left corner a button for changing the advance curve will be shown. (only available when the ignition is powered and the engine is not running), push on it
- For changing the advance curve push on the RPM table
- Now it is possible to change the RPM advance curve
- Entering a Max RPM value results in a Rev limiter (soft limiter, only 60% of the sparks will be random cut off)
- Pushing the green + will add a new point on the bottom of the list, (the 8000 rpm point is fixed and can't be moved or removed)
- Pushing the red - button will remove a point
- Moving the "move symbol" (three lines on the right side of the table) up or down will move a point to another position in the table
- The RPM values has to be ascending otherwise the value will not accepted
- If the curve is modified and you like to store the advance curve in the ignition, don't forget to push the "Save" button on the right upper corner of the screen

CHANGING THE VACUUM ADVANCE CURVE

- Push on the MAP curve table to modify the vacuum advance curve
- Entering a "Start @ RPM" value results in a ported vacuum function (vacuum curve is not active below the

entered RPM)
- Changing the vacuum curve works the same way as the rpm curve
- For storing the vacuum advance curve in the ignition, don't forget to push the "Save" button on the right upper corner of the screen
- Go back to the dashboard by pushing the Dashboard button on the left upper corner
- Start the engine!

Example 1
This demonstrates how to set the unit in a real-life situation, using the original data from the 'one-fits-all' Bosch-distributor 0.231.170.034 for Volkswagen. (see the picture at the last pages of this manual)
As the original data is VERY often based on distributor speed, and distributor advance, you
have to be aware, that both numbers have to be multiplied by a factor 2, in order to get to speed crankshaft, and advance crankshaft. If we now look at the 0.231.170.034, we see that the advance starts at 500 rpm distributor. In the list, you will find this as point no. 2 (1000; 0,0). Then it advances to say 4,5 degrees at 750 rpm, and you will find this in the list as point no. 3 (1500;9,0). After that, the slope gets less steep, and the advance ends at 10,5 degrees at 1750 rpm. after which it remains constant. Hence you will find point no.4 (3500;21,0) and point no.5 (8000;21,0)
The vacuum-curve is a little more complicated. The horizontal axis indicates the vacuum, but it does that **relative** to the atmospheric pressure, **and** Millimeters-Hg. (this is not a standardized value; 123ignition uses the **kP** (kilopascal) and **absolute** manifold pressure)

Here is the conversion table:

0 mmHg = 100 kpascal	-100 mmHg = 87 kPascal
-200 mmHg = 73 kPascal	-300 mmHg = 60 kPascal
-400 mmHg = 47 kPascal	-500 mmHg = 33 kPascal
-600 mmHg = 20 kPascal	-700 mmHg = 7 kPascal

Back to the 0.231.170.034 : the vacuum-advance starts at 100 mmHg **below** atmospheric. In the list you will find this as point no.3 (87;0,0). It then advances to a maximum of 5,0 degrees at 200 mmHg, which translates

to point no.2 (73;10,0) and point no.1 (0;10,0)!
The MAP-start is set to 1500 rpm: the vacuum-part of the advance **thus** only comes into play, above 1500 rpm. The RPM-limit is set to 8000 rpm, indicating that no rev limiting is active.

Example 2
This demonstrates how to set the unit in a real-life situation, using the original data from a Bosch-distributor 0.231.116.051 (see the picture at the last pages of this manual)
This distributor was kind of special, because it had 'negative vacuum', e.g. the more vacuum the less advance.
This 'trick' was used in two situations:
a. European car-manufacturers were faced with more stringent emission-rules in the USA and Canada. Retarding the advance around idle was a popular solution to improve emissions.
b. cars with automatic gearboxes; once set in "neutral" the advance was retarded, thereby keeping the engine-speed acceptably low.
Back to the 0.231.116.051 : the vacuum-**retard** starts at say 100 mmHg **below** atmospheric.
But how can we retard? Simple as '123'! In the list you see point no.5 as (99;11,0); it is **important** to use **only 99 kP** to achieve this!
The 123\TUNE will now produce 11,0 degrees advance, **immediately** after starting the engine. That is why **off-course** the MAP-start is set here to zero!
The advance then begins to drop around 100 mmHg, point no.4 (85;11,0) to eventually 400 mmHg at point no.2 (50;0,0)

Example 3
This demonstrates how to use the centrifugal advance to get idle-control; the engine will tend to stay in the dip around 1100 rpm. In the vacuum-curve you can see an example of how to achieve so-called "gear-shift-retard". If the absolute pressure in the manifold gets below 37 kP, the advance will fall to zero. The result is, that if you release the throttle (and the engine begins to produce vacuum) you either want to engine-brake

or to shift gears. In both situations you don't want to create thrust anymore, hence the removal of the (in this example) 10,0 degrees advance does exactly that!

Example 4
This demonstrates how to set the unit in a real-life situation, using the original data from the Bosch-distributor 0.231.129.009 / 0.231.173.009; also referred to as the '009'!
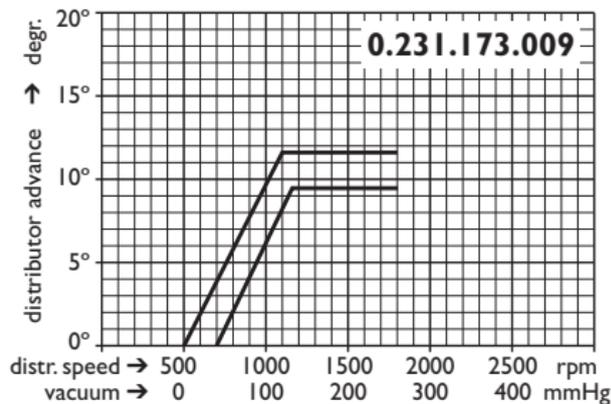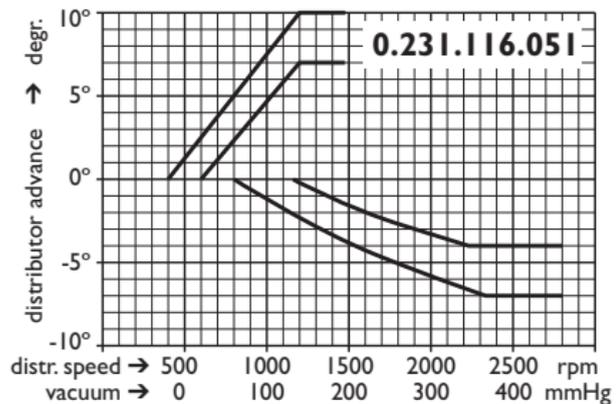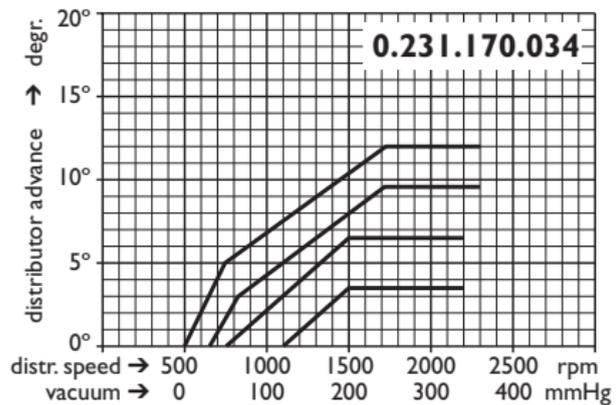As this distributor did not offer vacuum-advance, the manifold-pressure curve shows a straight line at zero degrees. (see the picture at the last pages of this manual).
For the air-cooled **VW** engine and **'009'** distributor, the maximum advance MUST be between 28 and 32 degrees at 3000+ rpm; so if you use this example curve, you should start by setting it statically to 7 degrees. This way it would reach exactly 28 degrees at 2600 rpm.; at idle it would show 5 plus 7 degrees is 12 degrees. This is a safe way to start the tuning process: the advance at idle is not really important. (an engine will never be damaged at idle) Too much advance at high revs. will eventually ruin an engine. Always be aware of this! This example also indicates that it is possible, to integrate (part of) the static-advance into the 123**TUNE+**.

TUNING WITH THE 123\TUNE+

When the engine is running, you could press the **'TUNE'** to enable real-time 'TUNING' mode.
By pressing '+' (advance) you can increase the total amount of advance with a maximum of 10 degrees crankshaft, in steps of 1 degree.
By pressing '-' (retard) you can decrease the total amount of advance with a maximum of 10 degrees crankshaft, in steps of 1 degree.

This feature will come in handy, if you have your car on a rolling road, and want to optimize the engine-power. The advance or retard found is not stored in any way, so you will have to remind your findings, and adapt the active advance-curve accordingly.

Chart 0.231.170.034 — distributor advance (degr.) vs distr. speed (rpm) and vacuum (mmHg)

Chart 0.231.116.051 — distributor advance (degr.) vs distr. speed (rpm) and vacuum (mmHg)

Chart 0.231.173.009 — distributor advance (degr.) vs distr. speed (rpm) and vacuum (mmHg)

NEG. EARTH
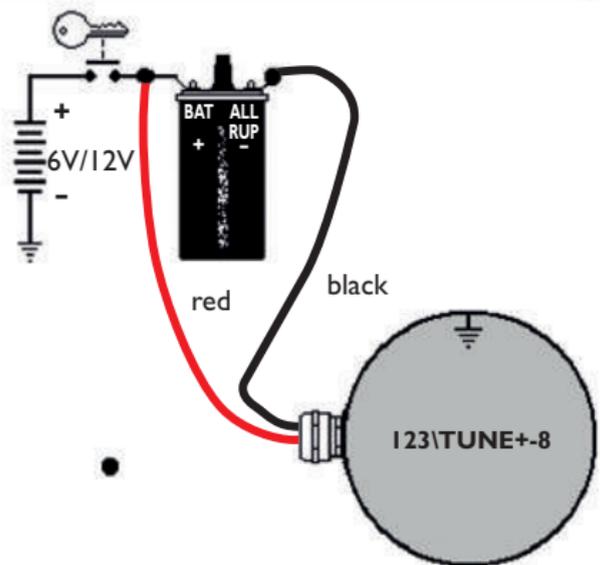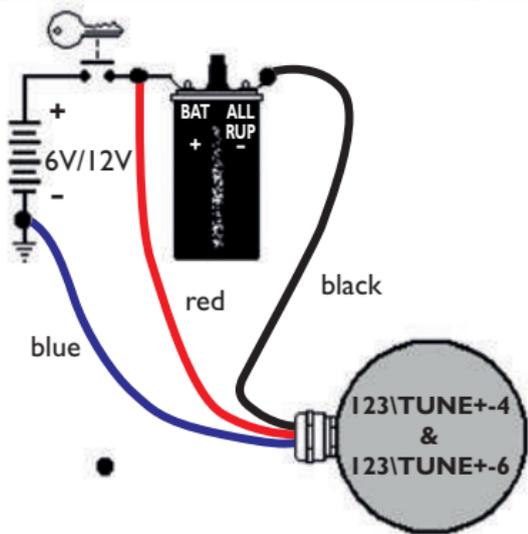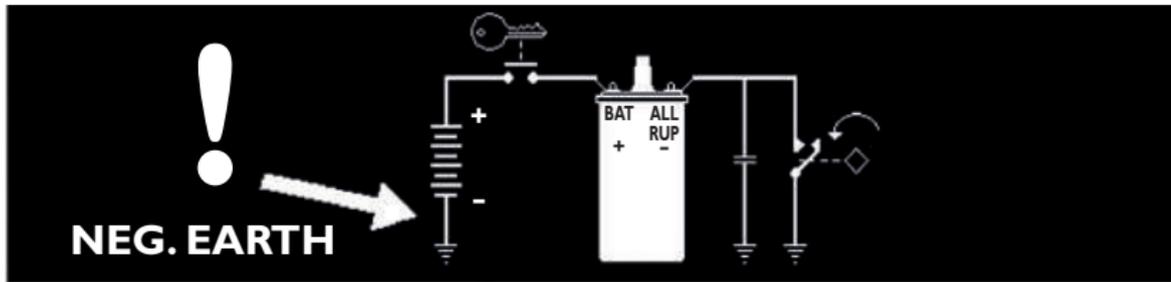
6V/12V

red

black

blue

123\TUNE+-4 & 123\TUNE+-6

6V/12V

red

black

123\TUNE+-8

Diagram for cars with NEG. EARTH
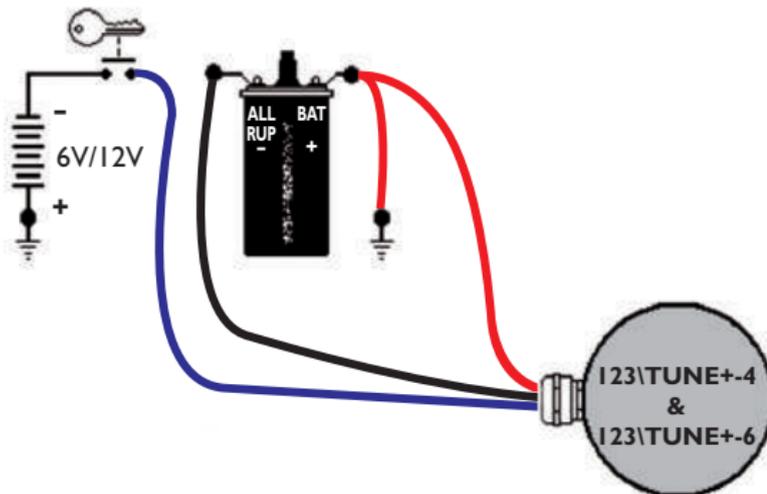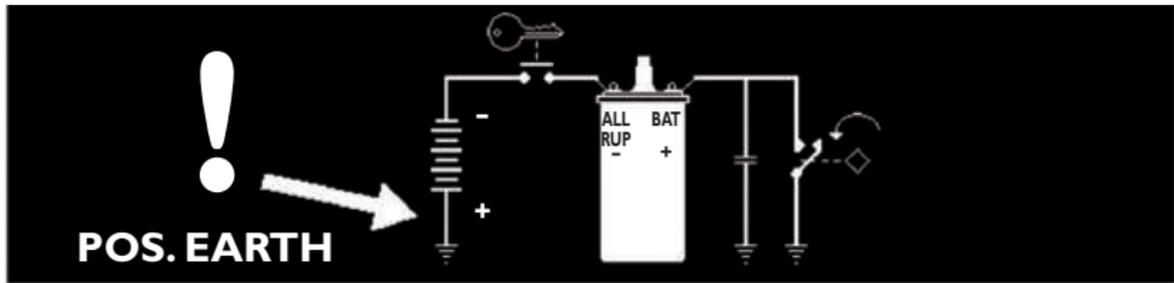
Diagram for cars with POS. EARTH

BOSCH : 1 235 522 056
BERU : VK 106
BREMI : 8045

BOSCH : 1 235 522 332
BERU : VK 334
BREMI : 8070

BOSCH : 1 234 332 024
KW : D 5026

BOSCH : 1 235 522 060
BERU : VK 102

BOSCH : 1 234 332 024
KW : D 5026

DUCELLIER : 582171   **DUCELLIER : 661920**   **DUCELLIER : 664895**

PREMIUM AUTO : RTC3197
BERU : VK465

PREMIUM AUTO : STC1857
BERU : NVL 177

CE

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