

## WIRING THE 123\TUNE + DINO AND 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 wired from the distributor to the coil. Then remove the cap and ask someone to look at the rotor whilst you activate the starter motor.) Now you know if the rotor rotates clockwise (CW) or counter clockwise (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, 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 convenience.

Connect the wires

Red = positive + Voltage **12 V**

Blue = negative - earth

Black = negative - coil for now do not yet connect the black wire.

Dino tachometer wiring

Black = negative coil

Purple = Tachometer

Turn on the ignition.

A timing LED shines through one of the holes in the aluminium disc. ( 123\TUNE+8 the LED shines outside the disc ) Rotate the body until the LED is off. Now slowly rotate the OPPOSITE to the direction that you have found earlier, until the green LED just lights up. While turning the body, also press the rotor in the same direction to remove any free play in the driving gear. Now tighten the 123ignition securely.

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 centre position of the cap. Attach the cap to the distributor. Route all wires well away from high voltage leads and away from moving parts, using tie-wraps or other suitable means.

## INSTALLING THE APP, HOW TO CONNECT, SETTINGS AND CHANGING CURVES.

Please download the 123\TUNE+ App in the Appstore or Playstore search for 123TUNE

123ignition TUNE+ needs a Bluetooth 4.0 device. All Apple devices of the last few years have a Bluetooth 4.0

The TUNE+ needs to be powered ( 6 or 12 Volt) if you like to connect with the 123\TUNE+App.

### The 123\TUNE+ App

The App has 3 windows, **Dashboard, Curves and Settings**. By default the dashboard will be shown after the first start of the App.

Touch the settings button, The upper area " devices "list all the Bluetooth devices within range, if you have activated Bluetooth on your device. If you want to **connect your device with the distributor**, touch the 123\TUNE+ in that area. After that you will be asked for a PIN code, which is 1234. You can check whether a connection has been made by selecting the "Dashboard button". The red dot in the lower left corner should have turned green. The PIN code will be saved in the App.

### Changing the advance curve.

The advance curves cannot be changed while the engine is running. Touch the "Curves" symbol and 2 graphs with tables underneath will be displayed. The upper graph and table show the RPM-dependent advance curve, the lower graph and table show the vacuum-dependent curve.

To change the rpm-independent curve, touch the red button "Edit advance curve". In the upper area "General" you can enter a RPM limit, This results in a REV limiter, which is a so-called soft limiter, only 60% of the sparks will be random cut off. If you enter 8000 ( max. value ) the rev. limiter will be deactivated.

The 2nd area "Degrees crankshaft" allows you to delete timing points ( touch the Dustbin button), to add timing points touch the Add point button and you can edit values of existing points.

Point "500 rpm "and "8000 rpm" cannot be deleted. You can only add points with values between those two. Degrees can have value between 0 and 50, the rpm values have to be ascending from top to bottom. To edit values just touch the value ( rpm or degrees ) and enter a new value.

Click after each line on " **GER** or **GEREED** ". After having editing the advance curve you like click at the upper right corner on "**DONE** " Scroll up and click on "WRITE". The modified data will be transferred into the distributor.

### Tuning with the 123TUNE+

When the engine is running click on the "TUNE" button in the dashboard window to enable real time tuning. by clicking on "+" ( advance ) you can increase the total amount of advance with a maximum of 10 degrees crankshaft, in steps of 1 degree, by clicking on "-" ( retard ) you can decrease the degrees.

The curve found this way will not be stored in any way, you will have to remind your curve and store it in the "CURVE" window,

### 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 page 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 2 (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 millimetres-HG. (This is not a standardized value.) 123 ignition uses the **kP** (kiloPascal) and **absolute** manifold pressure.)

Here is the conversion table:

0 mmHg = 100kPascal	- 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 picture at the last page 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 manufactures 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 3 (99;11.0); it is **important** to use **only 99kP** to archive

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 get 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 don't want to create anymore ... hence the removal of the (in this example)10.0 degrees advance with a maximum of 5.0 degrees crankshaft in steps of 0.1 degrees.

### 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 page in 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+

#### – Enable tuning

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

By pushing "-"( retard ) you can decrease the total amount of advance.

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 finding and adapt the active advance-curve accordingly.