

## Installation manual 123\TUNE+

### Wiring the 123\TUNE+

The 123\TUNE+ Bluetooth distributor for 4 and 6 cylinder can be used on cars with negative earth (battery minus connected to the body of the car) and on cars with positive earth (battery plus connected to the body of the car).

The 8 cylinder version however (123\TUNE+-8-R-V) can only be used on cars with negative earth (battery minus connected to the body of the car).

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

All 123\TUNE+ versions can be used on cars with 6 and 12 volt batteries.

### Mounting the 123\TUNE+ in your car

Before removing the old distributor from the car, check in which direction the rotor moves. You can do this, by first removing the thin wire between distributor and coil at the coil. Then remove the cap and ask someone to look at the rotor, whilst you activate the starter motor for a short time.

Now you know whether the rotor rotates clockwise (cw) or counter clockwise (ccw) seen from the top, that is. Put that on a note, together with the ignition sequence.

Next, bring the engine to the static timing point, at the end of the compression stroke, for cylinder number 1. The rotor of the old distributor should thereby point to the cable that connects to the spark plug of cylinder number 1.

Now remove the old distributor and mount the new one. Take care the drive dog (or gearwheel) at the bottom of the distributor shaft mates the counterpart in the engine properly. Most likely the rotor will point in another direction than the old one did, which you don't have to worry about.

Turn the body of the distributor to a position where the cables and the vacuum nipple come out conveniently. Connect the wires according to the proper diagram (last page), and for now, do not yet connect the black wire.

Turn on the ignition.

**If your rotor rotates cw:** rotate the body of the unit ccw until a green LED just lights up through one of the slots in the aluminium disc below the rotor. Also press the rotor in a ccw direction to remove any free play in the drive.

**If your rotor rotates ccw:** rotate the body of the unit cw until a green LED just lights up through one of the slots in the aluminium disc below the rotor. Also press the rotor in a cw direction to remove any free play in the drive.

Should the cables and/or the vacuum nipple now come out at an inconvenient position, turn the body of the distributor further or back by 90 degrees (4 cylinder distributor), by 60 degrees (6 cylinder distributor) or by 45 degrees (8 cylinder distributor). Repeat above procedure.

Turn off the ignition.

8 cylinder models: The rotor can be attached in 2 different positions on the distributor shaft. The aluminium disc underneath the rotor is engraved with the letters 'R' and 'L'. If your rotor rotates cw, attach the rotor that it points to 'R'(ight), if it rotates ccw attach the rotor that it points to 'L'(eft). If you have to reposition the rotor, pull it straight off the shaft and attach it to the appropriate position. Take care that it is fully seated again.

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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 1 cylinder at the position pointed to by the rotor of the 123\TUNE+. In case the rotor points between 2 terminals, the proper one is the one located in the contrary direction of the turning direction of the rotor. Also connect the high voltage wire from the coil to the centre position of the cap. Install the distributor cap taking care to have it seated straight and properly. 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 carburettor to the vacuum nipple on the 123\TUNE+. 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\TUNE+, or remove the hard line to the carburettor and replace it completely with thick-walled rubber vacuum hose.

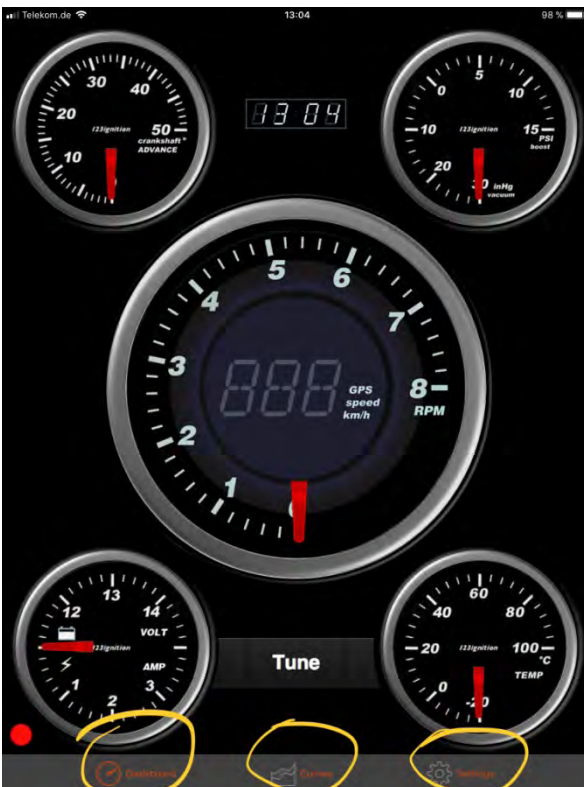
If you loaded a suitable advance curve before, you can now start your engine.

## Installing the app

Download the 123\TUNE+ app in the App Store (Google Play Store). Search for 123tune.

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

The 123\TUNE+ distributor needs to be powered (6 volts or 12 volts) if you want to connect with the 123\TUNE+ app.



## The 123\TUNE+ app

The app has 3 windows, which can be selected by tapping on 1 of 3 symbols at the bottom of the screen. By default the dashboard will be shown after the first start of the app. If the symbols (marked with yellow circles) at the bottom of the display are hidden, touch the display at any place, except the big dial in the middle. The dashboard is selected by the most left symbol.

The gauge at the upper left corner shows the total degrees (rpm- and vacuum-wise) the distributor has advanced the ignition. That means it shows the advance without the static advance. The degrees refer to the crankshaft.

In the upper right corner you find a gauge showing the pressure conditions in the inlet manifold, if a vacuum hose has been connected to the nipple. The scale shows a positive pressure (turbo) cw from 0 to 15 PSI, a negative pressure ccw from 0 to 30 mmHg.

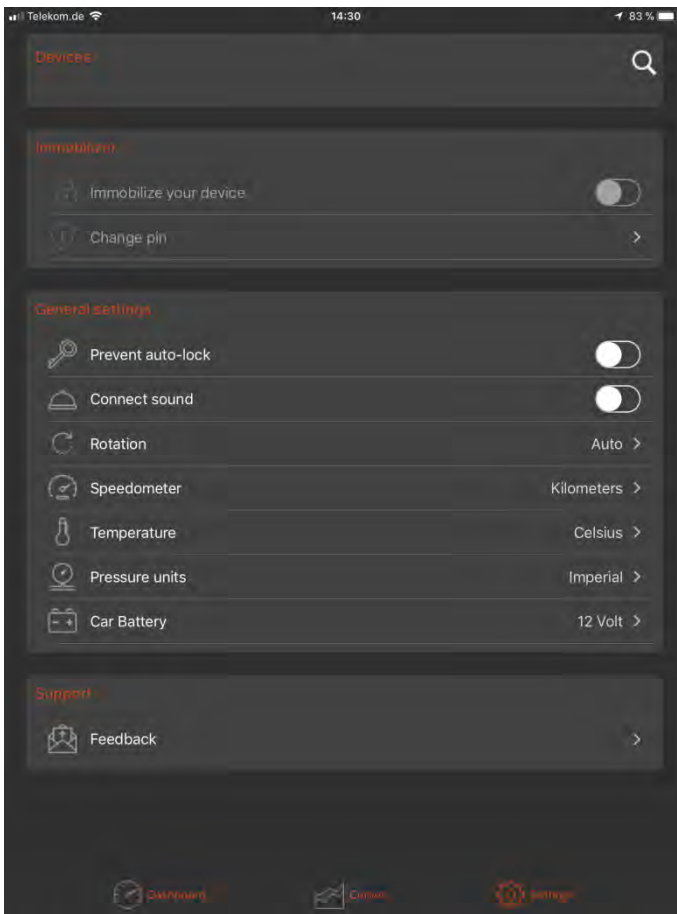
Between both dials there is a digital clock.

The big dial in the middle is a tachometer. The rpms shown refer to the crankshaft (not distributor), like the degrees. In the middle of the tachometer there is a 3-digit display. If your Smartphone/tablet is equipped with a GPS chip the speed of your vehicle is shown here. Speed is not calculated, as you might be used to, from the rotational speed of the wheels, the prop shaft or some gearbox shafts, but from GPS signals. Even if the GPS-system often is more precise in that respect over conventional speed measuring, don't rely on it if in doubt. There's a probability of suboptimal satellite reception leading to inaccurate speed signals.

In the left lower corner there is a dual gauge. The upper half shows the voltage of your battery, the lower half shows the current flowing through your coil.

The gauge in the right lower corner informs you about the temperature inside of the distributor.

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Touch the settings button at the bottom of the display if you want to change some settings. The settings screen is divided into 4 areas. The upper area 'Devices' lists all 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. Remember, the distributor has to be powered (6 or 12 volts). After that you will be prompted for a PIN-code, which is 1234 by default. After you have entered the PIN-Code a connection will be made. You can check whether a connection has been established by selecting the dashboard. The red dot in the lower left corner should have turned green. The PIN-code will be saved in the app and not be prompted for anymore. Furthermore your device will recognise your distributor in the future, so you will not have to connect manually anymore. In the 2nd area 'Immobilizer' you have the possibility to immobilise your car by tapping the switch on the right side. To switch off the immobiliser, tap again. The immobiliser causes the firing pulse from the coil to be interrupted every time shortly after the car has been started. This means, the engine fires up and momentarily dies again. Beneath you can change the PIN-code.

The items of the 3rd area 'General settings' will explain themselves. By touching 'Feedback' in the 4th area 'Support' you open an e-mail which will be sent to the manufacturer of the electronics. If you should experience problems with your 123\TUNE+ it is better to contact us via [info@123ignition.de](mailto:info@123ignition.de) or +49 2452 9574661.

## Changing the advance curve

The advance curves cannot be changed while the engine is running. Touch the middle symbol 'Curves' at the bottom of the display.

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-dependent 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. The rev limiter is a so-called soft limiter, meaning only 60% of the sparks will be random cut off. If you enter 8000 (maximum value), the rev limiter will be deactivated.

The 2nd area 'Degrees crankshaft' allows you to delete timing points (dustbin), add timing points (Add point) and edit values of existing points. Points '500 rpm' and '8000 rpm' cannot be deleted. You can only add points with values between those two. Degrees can have a value between 0 and 50. The rpm values have to be ascending from top to bottom. To edit values just tap the value (rpm or degrees) and enter the new value. After having edited the advance curve to your like tap 'Save' in the upper right corner of the display. The modified data will be transferred into the distributor.

Similar to editing the rpm-dependent curve you can edit the **vacuum-dependent curve**. Tap the red button 'Edit MAP curve'. Entering a 'Start @ RPM' value results in a ported vacuum function (vacuum curve is not active below the entered rpm value). Changing the vacuum curve works the same way as changing the rpm curve. Values accepted range between 1 and 99 kPa for negative pressure and between 101 and 199 kPa for positive pressure. Degrees will be accepted between 0 and 20. For storing the vacuum curve into the 123\TUNE+, don't forget to tap the 'Save' button in the upper right corner.

We strongly advise you to look at the examples shown on the following pages to get familiarised with the values to enter and their effects.

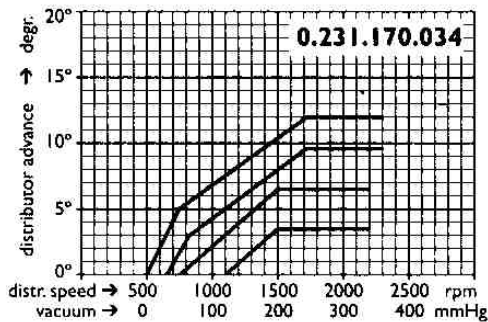
123ignition.de stores a huge number of original advance curves. We will be happy to support you with these data when buying a distributor from us. Call us +49 2452 9574661 or send us an e-mail [info@123ignition.de](mailto:info@123ignition.de).

If you own a heavily modified engine (hot camshaft, twin spark, high compression, heavily modified inlet and/or exhaust manifold, etc.) we cannot deliver any data. In this case please contact a specialist with a roller dynamometer.

We recommend the use of an ignition amplifier (booster) when installing the 123\TUNE+ on 8 cylinder engines and high-revving 4 and 6 cylinder engines. Have a look in our webshop [www.123ignition.de](http://www.123ignition.de) and search for product no. 8755 and 8757 for our 123-BIG-FAT-SPARK and 123-BIG-FAT-COIL.



## Example 1



4.5 degrees at 750 rpm distributor, 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 distributor, after which it remains constant. Hence you will find point no. 4 (3500 | 21.0) and point no. 5 (8000 | 21.0). The value 'RPM limit' is set to 8000, meaning the rev limiter is deactivated.

The vacuum curve is a little more complicated. The horizontal axis in the diagram above indicates the vacuum, but it does that relative to the atmospheric pressure, and mmHg as unit. This is not nowadays standard. We use kPa (kilopascal) and absolute manifold pressure.

Here is the conversion table:

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

Back to the 0 231 170 034, the vacuum advance starts at 100 mmHg **below** atmospheric pressure. 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 value 'Start @ RPM' is set to 1500 rpm. The vacuum part of the advance thus only comes into play above 1500 rpm.

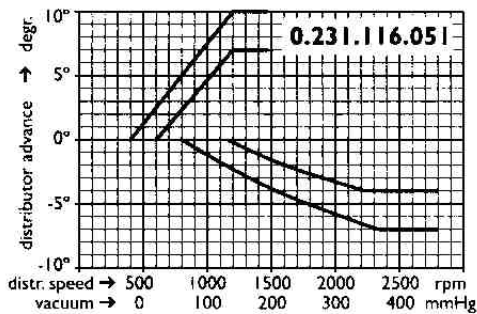
This demonstrates how to set the unit in a real-life situation, using the original data of the 'one-fits-all' Bosch distributor 0 231 170 034 for Volkswagen.

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 of 2, in order to get to speed crankshaft and advance crankshaft. The data in the app always refer to crankshaft, not distributor!

If we now look at the 0 231 170 034, we see that the advance starts at 500 rpm distributor. In the list of the image below you will find this as point no. 2 (1000 | 0.0). Then it advances to say



## Example 2



This demonstrates how to set the unit in a real-life situation, using the original data of a Bosch distributor 0 231 116 051. This distributor was kind of special, because it had 'negative vacuum', i. e. the more vacuum, the less advance. This 'trick' was used in 2 situations:

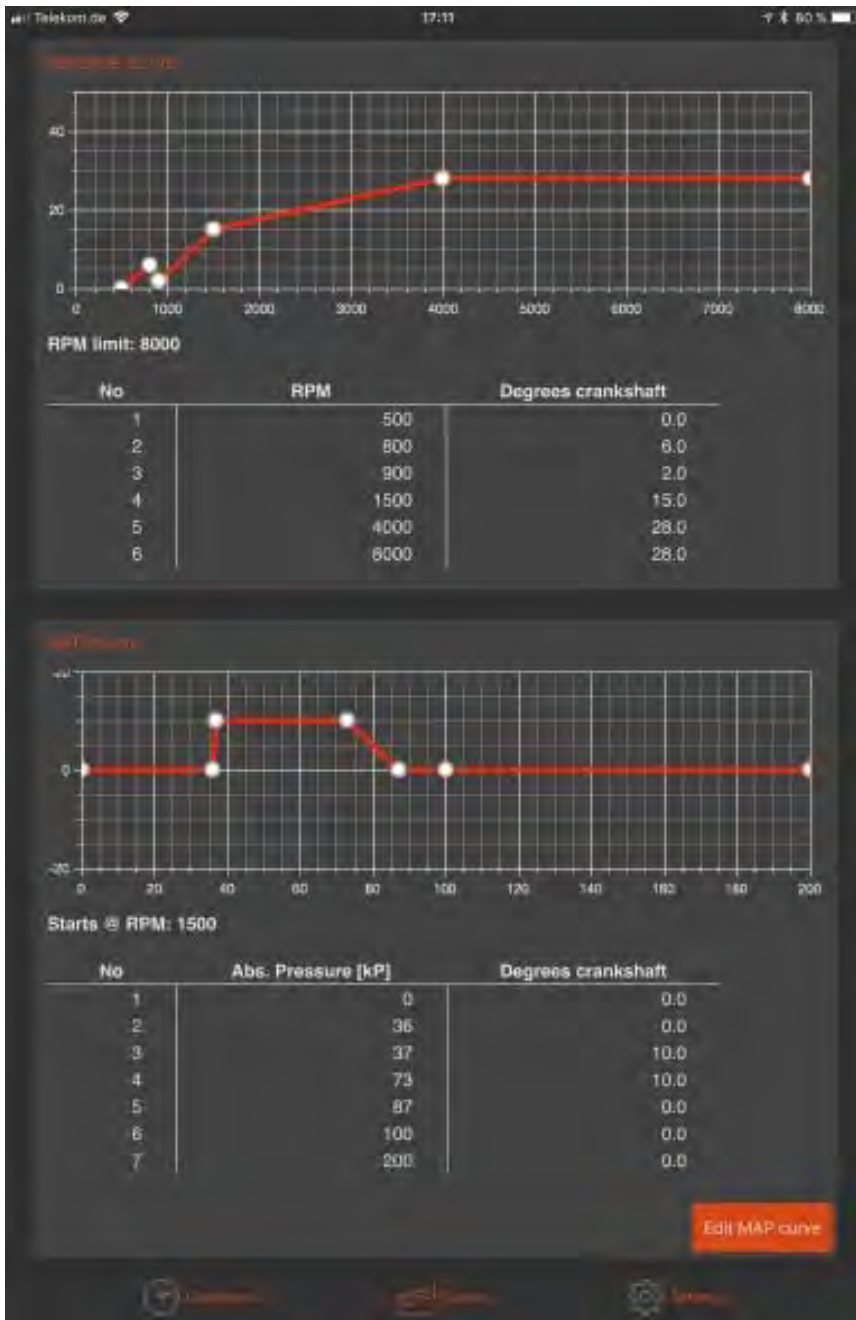
- European car manufacturers were faced with more stringent emission rules in the USA and Canada. Retarding the advance at and near idle was a popular solution to improve emissions.
- Cars with automatic gearboxes once set in 'neutral', the advance was retarded, thereby keeping the engine speed acceptably low.

Back to the 0 231 116 051, the vacuum retard start at say 100 mmHg **below** atmospheric pressure. In the list you see point no. 4 as (99 | 11.0). It is important to use only 99 kPa to achieve this!

The 123TUNE+ will now produce 11.0 degrees advance immediately after starting the engine. That is why off-course the MAP-start is set to 0. The advance then begins to drop around 100 mmHg, point no. 3 (85 | 11.0) to eventually 400 mmHg at point no. 2 (50 | 0.0).



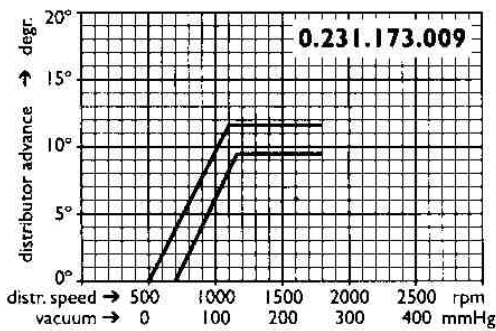
## Example 3



This demonstrates how to use the centrifugal advance to get idle-control. The engine will tend to stay in the dip at 900 rpm.

In the vacuum curve you can see an example of how to achieve a so-called 'gearshift-retard'. If the absolute pressure in the manifold gets below 37 kPa, the advance will fall to 0. If you release the throttle (and the engine begins to produce vacuum), you either want to engine-brake or shift gears. In both situations you don't want the engine to create thrust anymore, hence the removal of the (in this example 10 degrees) advance, what does exactly that.

## Example 4



This demonstrates how to set the unit in a real life situation, using the original data of 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 0 degrees.

For the air-cooled VW engine and '009' distributor, the maximum advance must be between 28 and 32 degrees BTDC at 3000+ rpm. If you use this example curve, you should start by setting it statically to 7 degrees BTDC. This way it would reach exactly 28 degrees BTDC at 2300 rpm. At idle it would show  $5 + 7 = 12$  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, tap the 'TUNE' button in the dashboard window to enable real time tuning. By tapping '+' (advance) you can increase the total amount of advance with a maximum of 10 degrees crankshaft, in steps of 1 degree.

By tapping '-' (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 looking to optimise engine power. The advance or retard found this way will not be stored in any way, so you will have to remind your findings and adapt the active advance curve accordingly.



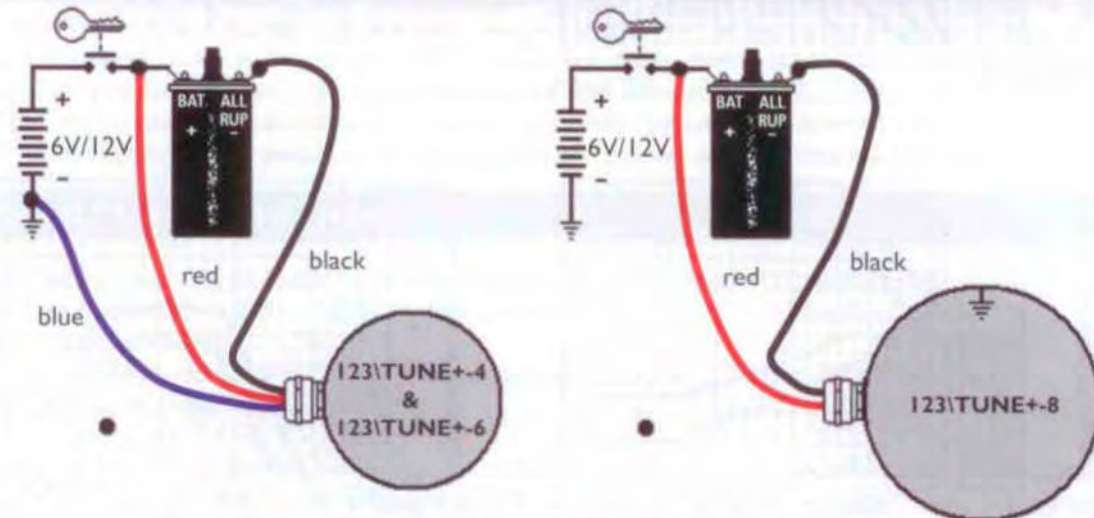


Diagram for cars with NEG. EARTH

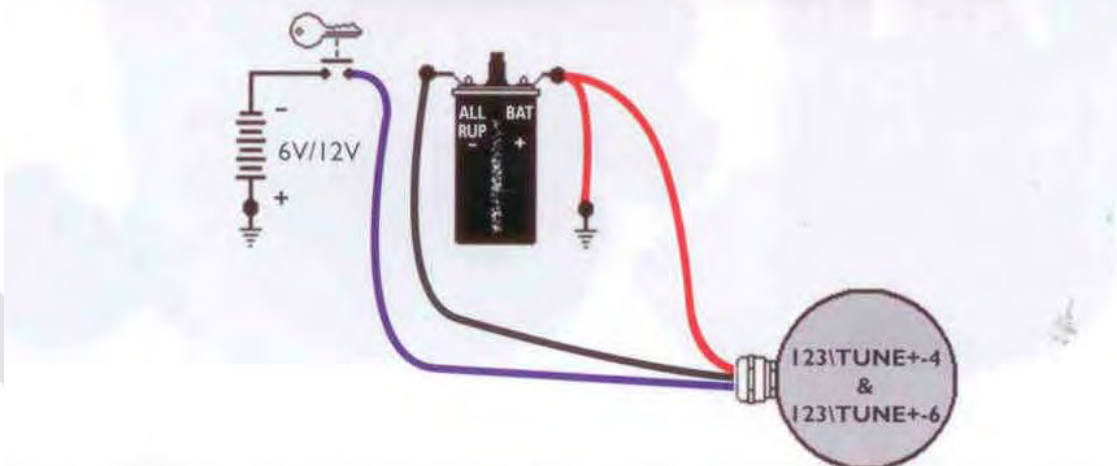
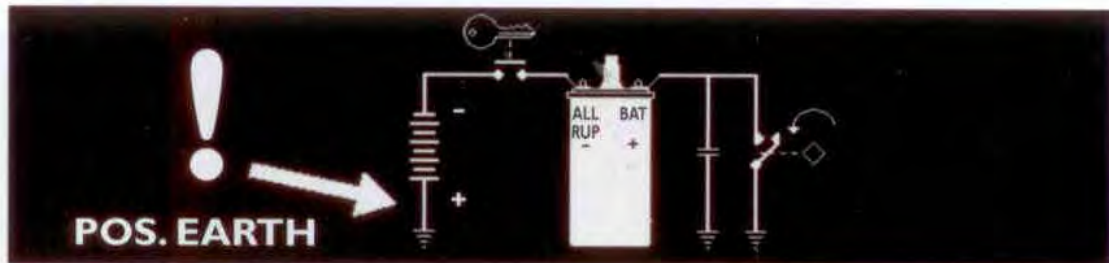


Diagram for cars with POS. EARTH