

TE-TAP

Timing advance processor

User manual

www.tegas.it

Ver.1.04 (2015.09.01)

Device description

Single channel time advanced processor TE-TAP is designed to make additional time advancing angle of ignition in engines running on LPG or CNG.

Due to that LPG has much higher octane number than petrol, the mixture in the combustion chamber is burning longer. As a result, the mixture either does not burn fully down or is finishing to burn in the manifold what leads to the loss of power and sometimes even to the damage of valves. Therefore, the mixture of air gas requires advanced ignition. Time advanced processor TE-TAP connects with both the chain of crankshaft position sensor, according to which the mixture arson time is determined and with electronic control unit. This connection makes additional time advancing angle of ignition. In this way, the mixture ignites earlier and burns fully.

Timing advance processor can work with both inductive and Hall sensors. Timing/delay angle can set by the switch wick located near connector or by adjusting inner angle vs. RPM table. This table set by TE-TAP software.

Time advance processor TE-TAP has ability to configure by software or rewrite the internal program to adapt it for proper signal type. By default, the device comes with the firmware for the crankshaft 60-2 Bosch (firmware TETAP-01-x).

Device indication

- LED does not lit.** Time advance processor is off. There is no connection with the power supply.
- LED is red.** Time advance processor is on. There is either no input impulses or low amplitude exists or engine's RPMs are lower than 400 RPM/min (RPM per min).
- LED is blinking red.** When the blinking is longer than 10 sec. it means that there is either the error of input signal or absence of synchronization or retransmission of input signal is going on.
The causes of the input signal error/ Input signal error causes:
 1. Chosen type of crankshaft position sensor is wrong
 2. Low amplitude of signal/ there is low amplitude of signal
 3. Electromagnetic noise of the space under the hood
- LED is blinking yellow.** Engine is running on gasoline/ petrol. Time advanced processor is synchronized to the input signal and time advancing angle is equal to 0.
- LED is blinking green.** Time advancing angle is working. Time advanced processor is synchronized to the input signal and time advancing angle of ignition corresponds to the meaning set on potentiometer.

Configuration of Time Advanced Processor

Timing advance/delay

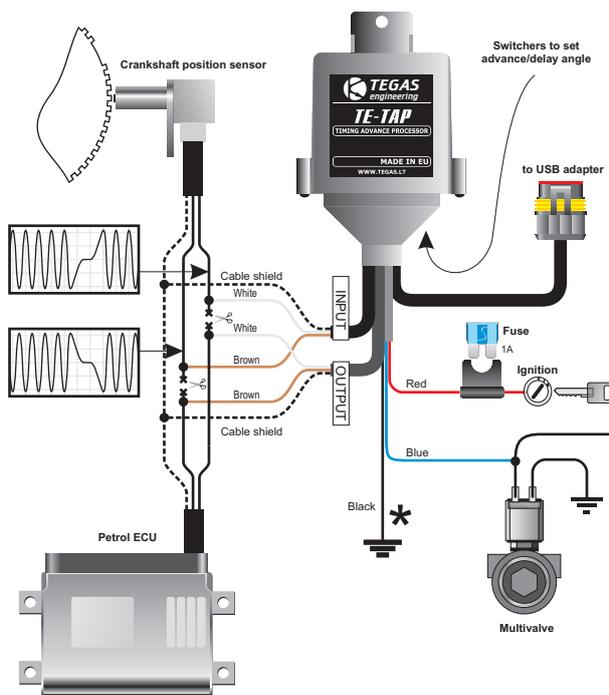
| | |
|---|---|
|  | -3° (ignition advance) |
|  | -6° (ignition advance) |
|  | -9° (ignition advance) |
|  | -12° (ignition advance) |
|  | +3° (ignition delay) |
|  | +6° (ignition delay) |
|  | +9° (ignition delay) |
|  | +12° (ignition delay) |
|  | <i>The angle is set using TE-TAP software (default angle equals zero)</i> |

Specifications

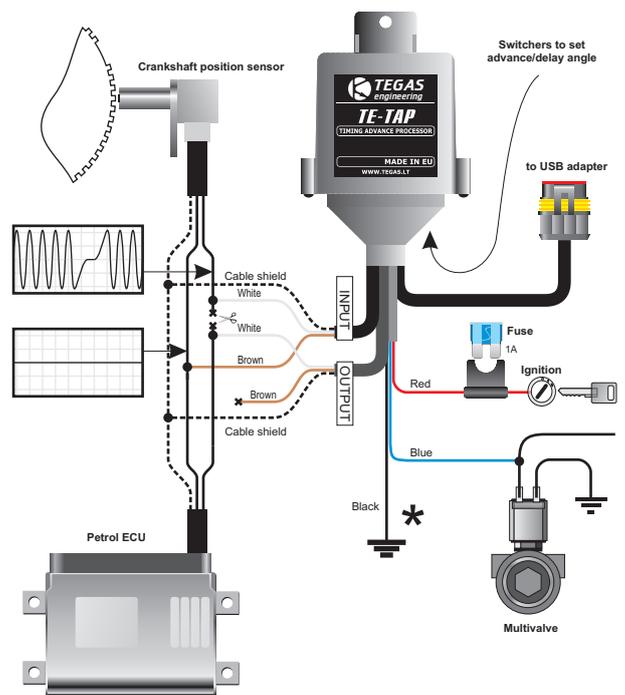
| | |
|---|----------------|
| The range of time advancing angle of ignition | -15°...15° |
| The range of engine RPMs | 400...8000 RPM |
| The range of the amplitude of input signal | 0,5...40 V |
| Range of voltages | 10...15 V |
| Current | 40 mA |

Installation of Device

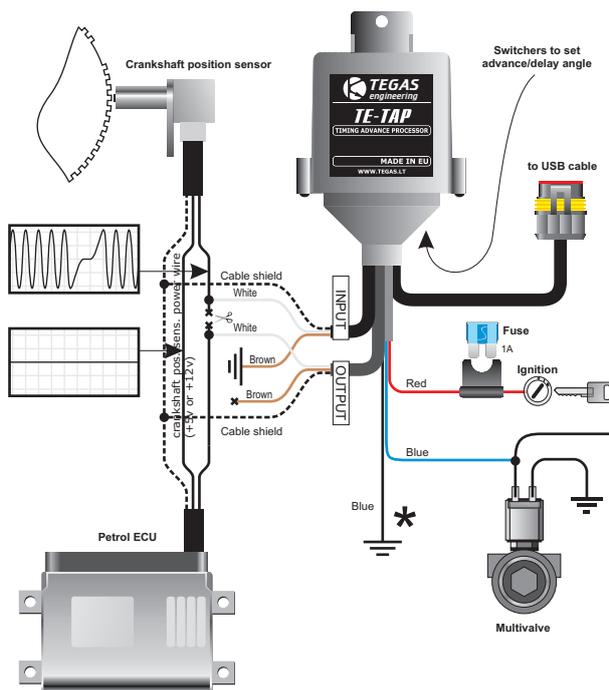
Inductive crankshaft position sensor with differential output



Inductive crankshaft position sensor with grounded output



Digital crankshaft position sensor (Hall sensor)



* Attention!

Do not connect ground wire (black) to the wire from petrol ECU, which has 0.V. This wire can be mistakenly accepted as ground wire.

Overview of TE-TAP program

Overview of TE-TAP software

TE-TAP software is designed to calibrate TE-TAP time advance processor.

With software you can:

- Calibrate table of advance / delay angle
- To record waveform of the input signal
- To replace the firmware in the device

Software communication with PC is performed via Tegas engineering COM or USB adapters.

Program version 1.02 is available only in English language

The screenshot shows the TE-TAP software interface with the following callouts:

- Angle of advance / delay**: Points to the 'Angle' parameter field.
- Engine RPM**: Points to the 'RPM' parameter field.
- Table of advance / delay angle**: Points to the 'Settings' section.
- Table of advance / delay angle in the specified range**: Points to the 'Delay' and 'Advance' sliders.
- Switching: table method / constant angle**: Points to the 'Constant angle' button.
- Communication with block Indicator**: Points to the 'Connected' status indicator.
- Indicator of the fuel type**: Points to the 'Fuel type' dropdown menu.
- Indicator of the input signal polarity**: Points to the 'Input signal polarity' indicator.
- Indicator of TAP switches position**: Points to the 'Switch status' indicators.
- Indicator of TAP synchronization**: Points to the 'Synchronization' indicator.
- Save TAP settings to file**: Points to the 'Open' and 'Save' buttons.
- Save settings to the block**: Points to the 'Transmit' button.
- Communication with block Indicator**: Points to the 'TE-TAP' and 'TE-TAP-014' status indicators.
- Name of the connected device**: Points to the 'TE-TAP' label.
- Name of connected firmware**: Points to the 'TE-TAP-014' label.

Angle of advance / delay - actual ignition advance / delay indicator

Engine RPM engine RPM indicator

Table of advance / delay angle - table of angle advance / delay dependency from engine RPM. Table limits divided into 500 rpm cells. In the limits of one cell, five intermediate values.

For example:

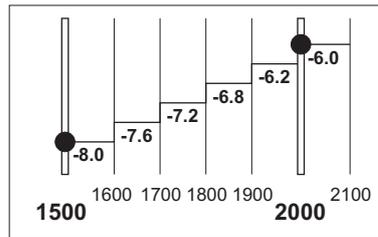


Table of advance / delay angle in the specified range setting advance / delay in the limits $-15^\circ \dots +15^\circ$ with 1° step, where “-” - advance, “+” - delay of the ignition angle.

Switching: table method / constant angle - switch button between angle change modes, according the table and constant angle.

- Constant angle. By clicking this button, values of the entire table are equal to first corner of the "slider". Therefore shift of the angle equals to the entire RPM range.

- Angle from table. By clicking this button, the angle is set depending on engine RPM.

Indicator of data communication between block and PC During connection between PC and TAP indicator flashes red and green.

Communication with block Indicator indicates established connection with TAP.

„Connected” - Connection exist

„Disconnected” - No connection

Name of the connected device - indicates name of the connected device.

Save settings to the block by clicking “Transmit” processing data transferring into block

Save TAP settings to file - recording settings to a file with the specified name.

Open - file with saved TAP settings opens TAP settings file

Indicator of the input signal polarity - it shows direct or inverted signal comes to the TAP input (white wire). This indicator generally applicable for inductive crankshaft position sensor. Polarity signal test operates only on petrol mode.



Input signal polarity **Correct**



Input signal polarity **Wrong**

Indicator of TAP synchronization indicates compatibility of firmware and crankshaft position sensor.

“Synchronized” incoming signal of crankshaft position sensor detected, TAP has been synchronized and after switching to gas can be operated with ignition angle shift. Synchronization should switch no later than 2 seconds after ignition.

-“No synchronization” incoming signal of crankshaft position sensor is not detected. Firmware does not match crankshaft position sensor. Also, reasons for synchronization fail can be the following:

- Low engine RPM, for crankshaft position sensor - less than 450 RPM for 60-2 (60-1) and 600 RPM for 36-1 (36-2)
- Electromagnetic noises in the engine compartment.

Indicator of TAP switches position - indicates TAP switches position. "On" - switch position down. "Off" - switch position up.

| Advance/delay angle | | | | |
|---------------------|-----|-----|-----|-----------------------------------|
| OFF | OFF | OFF | OFF | -3° |
| OFF | OFF | ON | OFF | -6° |
| OFF | OFF | OFF | ON | -9° |
| OFF | OFF | ON | ON | -12° |
| ON | OFF | OFF | OFF | +3° |
| ON | OFF | ON | OFF | +6° |
| ON | OFF | OFF | ON | +9° |
| ON | OFF | ON | ON | +12° |
| OFF | ON | OFF | OFF | <i>Angle setted from switches</i> |

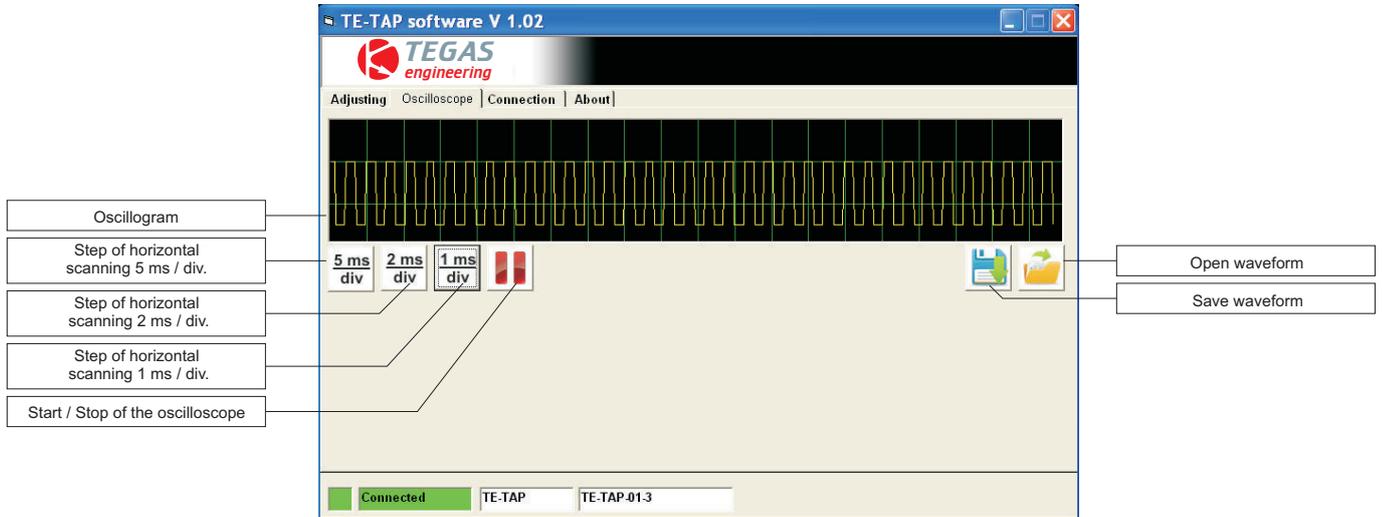
Indicator of the fuel type indicates engine fuel type.

"GAS" - Engine is running on gas. TAP blue wire voltage is + 12V.

"Petrol" - engine runs on petrol. TAP blue wire voltage is 0V.

Oscilloscope

Oscilloscope function is an important tool in determining the correct connection of TAP to crankshaft position sensor. This feature is not an oscilloscope in the conventional sense. It displays the digitized signal of crankshaft position sensor coming to the port of the processor. However, the oscilloscope option allows to determine the type of the crankshaft (number of crankshaft cog) and accuracy of connection to the sensor. Also, this feature is useful for identifying noises in the input signal



Oscillogram - display field of the waveform

Step of horizontal scanning 5 ms / div. -Installation of horizontal scanning step 5 ms / div.

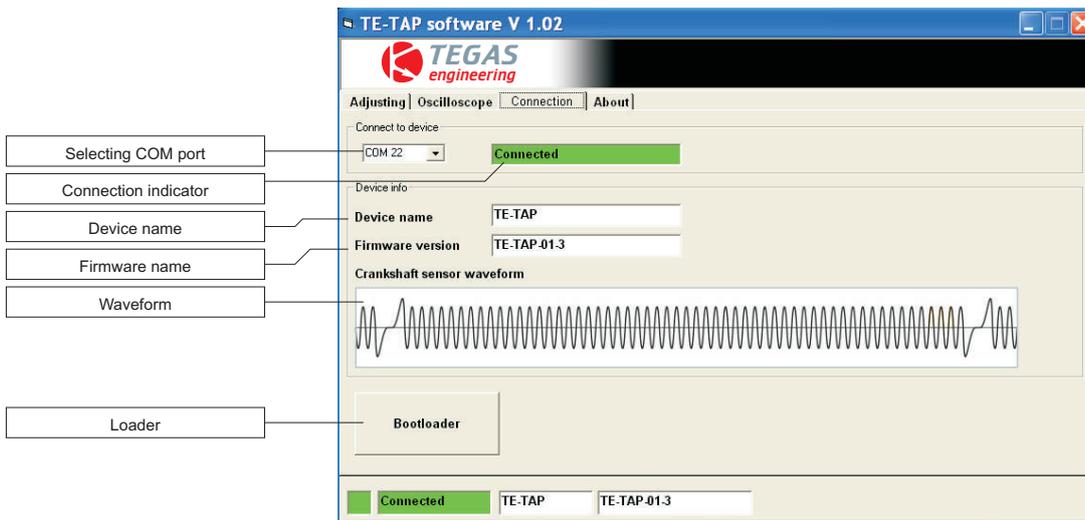
Step of horizontal scanning 2 ms / div. -Installation of horizontal scanning step 2 ms / div.

Step of horizontal scanning 1 ms / div. -Installation of horizontal scanning step 1 ms / div.

Start / Stop of the oscilloscope start and stop (pause) button of the oscilloscope.

Open waveform - waveform display from file

Save waveform - save waveform to file



Selecting COM port - choose COM port for connection to the device. After selecting the port connection occurs automatically.

Connection indicator - indicates connection establishment.

Connected - connection exist

Disconnected - no connection

Device name - indicates connected device name.

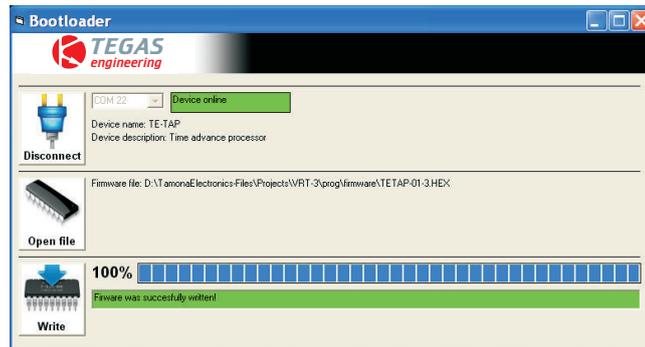
Firmware name - indicates firmware name

Waveform - graphical waveform image

Loader - opens new window with firmware loader

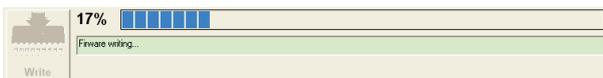
Bootloader

There is firmware replacement provided in TE-TAP. In order to replace firmware you have to start special software loader. "bootloader" software start button is in "connection" tab..



Procedure

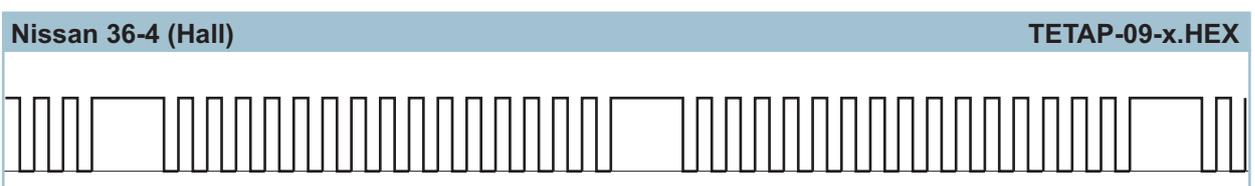
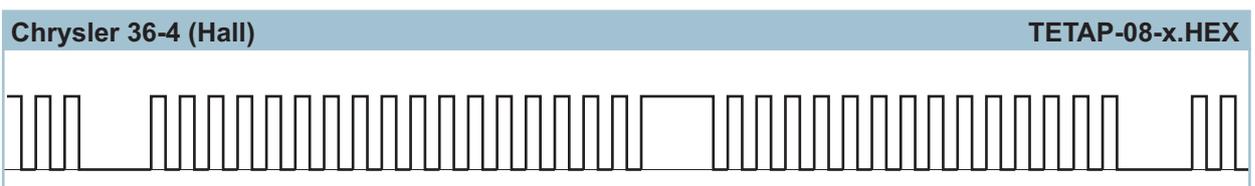
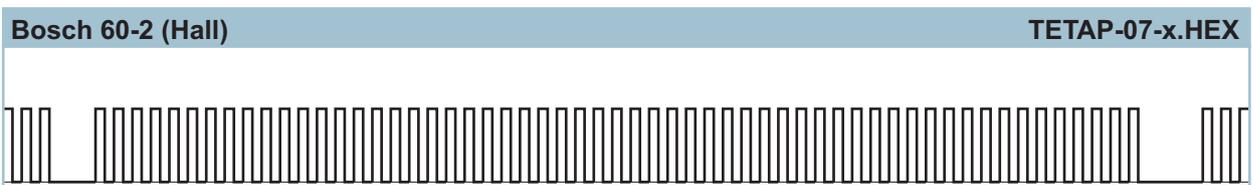
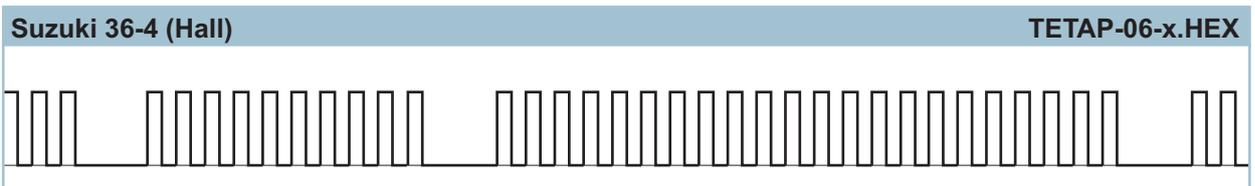
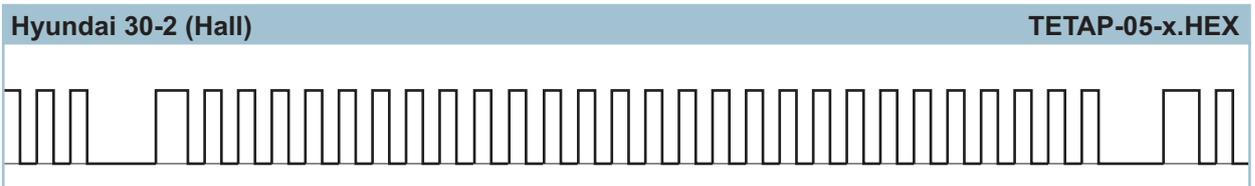
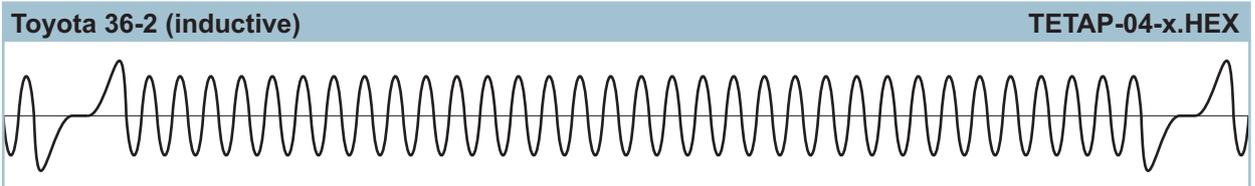
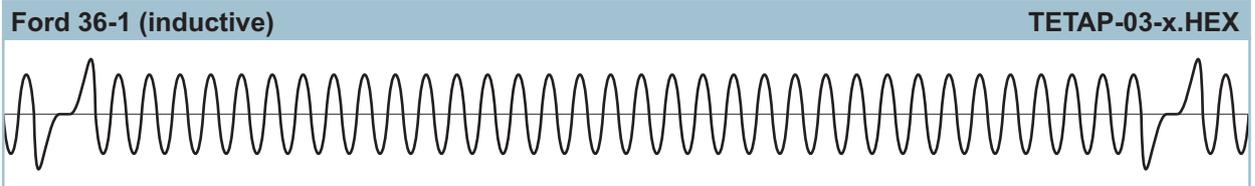
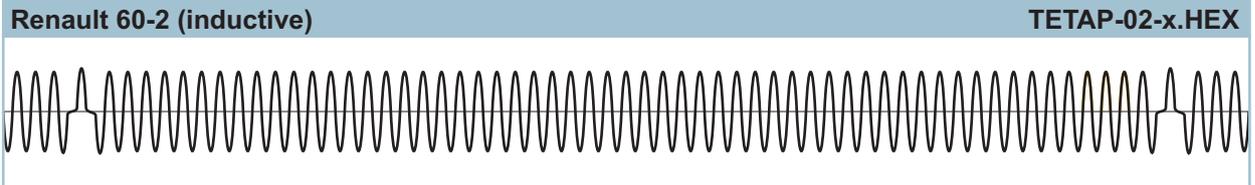
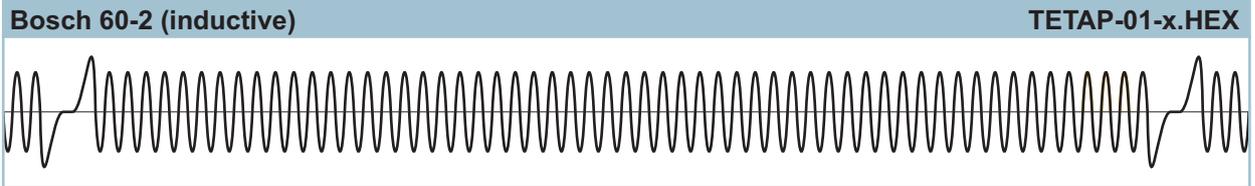
- 1) Connect the interface cable to the TE-TAP connector.
- 2) Turn the ignition (Do not start engine!). TE-TAP LED will glow red.
- 3) Select COM port and click "Connect". By connecting to TE-TAP, software will display message that device is connected ("Device online"). TE-TAP LED will blink red and green. If program reports that the device is undetectable ("No device detected"), try to select another COM port.
- 4) Next, select the firmware by pressing "Open file".
- 5) To load firmware to the TE-TAP memory click "Write". (Save)



- 6) After uploading firmware "press "Disconnect".

Firmware versions for various crankshafts

Default TE-TAP version is TETAP-01-x.HEX (type crankshaft 60 - 2). Different crankshaft requires internal firmware replacement. A list of available firmware is shown below:

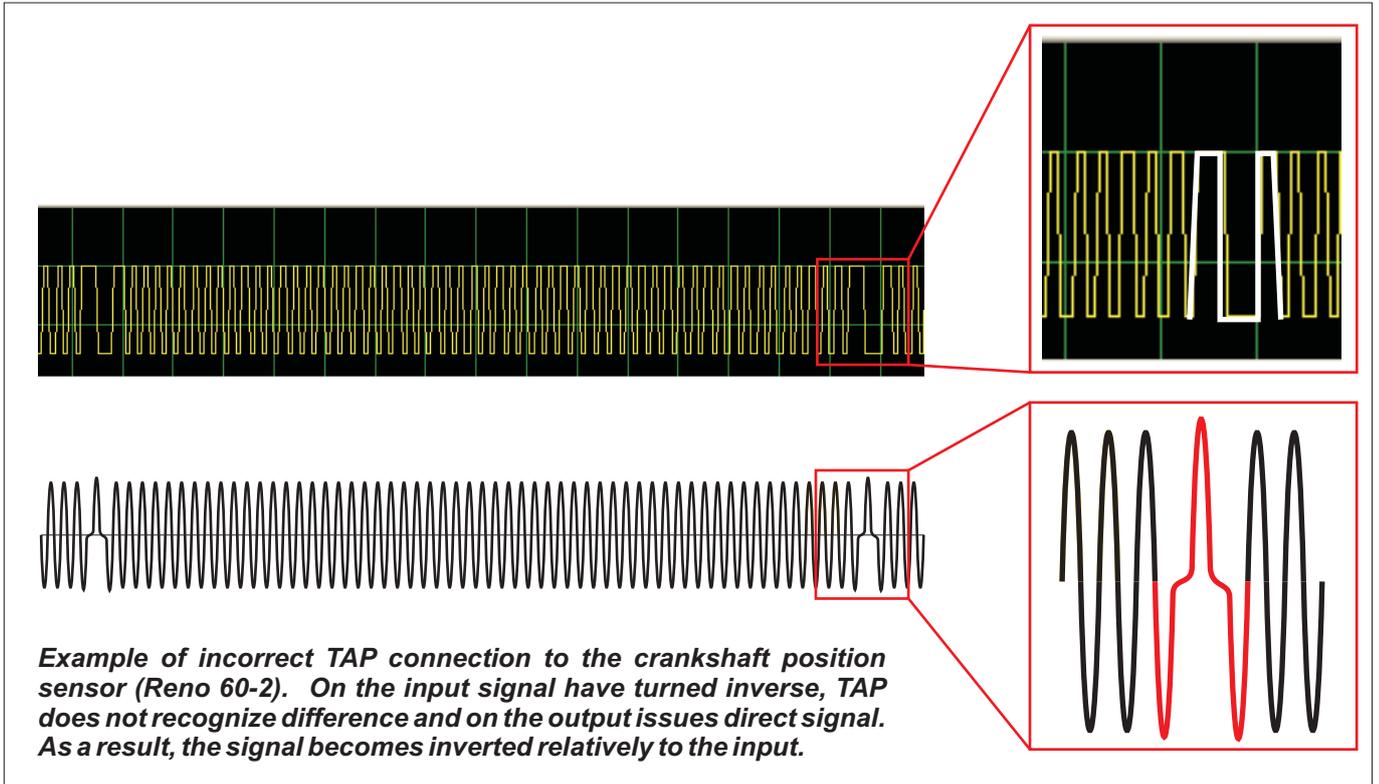


Suggestions and recommendations for TE-TAP installation

1. Installation test.

After TAP installation, test accuracy of installation with certain functions of the oscilloscope (tab "Oscilloscope"). Take a snapshot of the input signal, compare it with the image of the corresponding type of signal. Keep in mind that signal on the oscilloscope does not reflect the real signal and passes it to a digitized appearance. However, this kind of signal to determine the type of crankshaft position sensor, as well as to determine the correct installation of TAP.

Particular attention should be paid to the direct or inversion signal comes to the input of the TAP. If the signal is inverted, TAP still perceives it as a direct and for output issues direct (non-inverted signal). As a result, the signal is inverted and the petrol ECU detects a wrong connection and an error "Check Engine". In some cases, engine runs smoothly on idle. Problem occurs on power and on higher than 3000 RPM.



2. Connecting ground wire of the power supply.

It is not recommended to connect TAP ground wire to the wire from petrol ECU with 0V voltage. If engine is equipped with crankshaft position Hall sensor and/or inductive, then in some cases Hall sensor's ground power supply wire comes from the petrol ECU. Connecting black ground power supply wire is not recommended. Additional load on the sensor power supply line can damage internal components of the petrol computer.

