

FI Tuner Pro

**True MAP-based FI tuning module specifically designed
for SUZUKI motorcycles**

User's Manual

1. Foreword

The FI Tuner Pro from HealTech Electronics Ltd. is a unique product with some exciting features not found in competing fuel injection tuning modules.

Other FI modules connect AFTER the ECM (bike computer) hence they override the ECM and control the injectors. Installation takes considerable time, even with the plug-in versions.

The FI Tuner Pro (FIT module) connects to the ECM expansion port, and the ECM adjusts the fueling based on the fuel table stored in the FIT. This means that all 8 injectors remain under control of the ECM in the best possible way - taking in account the engine load conditions and all sensor readings.

The fuel tables (MAPs) stored in the FIT module can be edited by a computer connected via a USB cable. The software runs on any version of Windows and is extremely easy to use. The software and hardware is very responsive, the user never has to wait for an operation to complete. Automatic, fail-safe firmware and software updating is another unique feature not found in competing products.

2. List of Features

True MAP-based FI tuning module: Can be mapped at 11 throttle positions, in 500 RPM increments across the full RPM range. Supports fuel addition as well as subtraction. Adjusts all injectors (up to 8), which results in better air-fuel mixture compared to other modules which only drive half the injectors.

Quick and simple to install: Connects to the ECM expansion port under the seat and tap two ECM wires. No need to remove the fuel tank or any fairing panels.

One module fits most Suzuki EFI motorcycles (1997-2011): Transferable to a new bike within minutes. Purchase the module once and use it on your next Suzuki without complications.

Native USB support: No need to install drivers and no need to use a UART bridge. The software runs on any version of Windows (2000, XP, Vista, Windows 7).

Simple interface: All information is on one screen. No confusing options to select/fill.

Auto cell select and immediate Air/Fuel (AFR) response: During setup, the TPS/RPM cell is automatically selected on screen. When the operator changes the value, the device adjusts the fueling immediately. This makes it quick and easy to set the optimal AFR.

Maps can be custom made by any tuning center, and freely shared among bikes with similar modifications.

3 independent, user-selectable maps: It is possible to store two different fuel maps and the rider can switch between 3 maps (MAP1, MAP2, Zero MAP).

3-color status LED: Provides status information and indicates which map is in use.

Compact dimensions: Full SMD design. It is by far the smallest, most compact FI module on the market, fits under the rider's seat.

Automatic, fail-safe update: The software is automatically updated when the computer is connected to the internet. Later, when the computer is connected to the device, the unit firmware is also updated. The stored maps on device are NOT lost/erased during this process. Fail-safe updating guarantees that the unit will continue to function even if the firmware update is interrupted or power is lost.

Automatic MAP backup and restore: In case power is lost or the computer crashes while you work with the software, next time you start the application it will load the MAP.

30-day money back guarantee and 5-YEAR WARRANTY: It's a quality product with an industry leading warranty.

Best value (price/performance) for the money: There is no other true map-based FI tuning module available for this price, even without the special features it offers.

Fully compatible with all HealTech products (including the X-TRE, SpeedoHealer, OBD Tool and all Gipro models) and other aftermarket products.

3. Using the FI Tuner Pro software and module

3.1 Installing the software application

Minimum System Requirements:

- Windows PC (Windows 2000, XP, Vista, Windows 7), either 32-bit or 64-bit
- Screen resolution: 800x600 (or higher)
- One USB port

1. Download and Run the setup file (FIT-Suzuki_Setup.exe) from our website.

➔ Type in your browser: **www.fi-tuner.com/install** and hit Enter.

2. Follow the on-screen setup instructions then run the application.

3.2 How to use the application

It is possible to use the application either with or without the device connected.

1. You can create and save maps to the PC's hard drive which you can open, edit or send to the FIT device later.
2. **Select the map you wish to edit** by clicking on the MAP1 or MAP2 buttons on the right. The content of the selected map is shown in the middle of the screen.
3. **Select the specific TPS/RPM cell(s)** you wish to change, either by mouse or by the arrow keys. Multiple cells can be selected by the SHIFT and CTRL keys. For quick navigation by keyboard, you can also use the Home and End buttons. CTRL+A will select all cells of the map.
4. **To change the value** of the selected cell(s), you can either:
 - Use the PageUp / PageDown keys
 - Use the scroll wheel of the mouse
 - Enter the desired value (-20 to +30)

By default, all cells have a 0 value (shown with dark grey color). Cells with zero value do not change the fueling in any way. Increase the value to add more fuel at the selected TPS/RPM range, decrease the value to make the AFR (Air-Fuel Ratio) leaner in the specific area. The values are also differentiated by red and blue color gradients.

5. Type your notes in the **Comments** box, which describe the bike (model, year, exhaust type, etc).
Both MAP1 and MAP2 share the same comments, so if you use both maps describe the intended purpose (e.g. MAP1 for street, MAP2 for track).
6. If you wish, you can **Copy MAP1 to MAP2** and vice versa, which makes it possible to quickly create the second map using the first as a basis.

The **Automatic MAP backup and restore** feature saves your work in one-minute intervals to the "Auto Backup.FITS" file in the install folder. In case power is lost or the computer crashes while you work with the software, next time you start the application it will prompt you to load this MAP and you can continue your work where you left off.

When the MAP is complete, make sure to **Save** it to disk and **Send** to the device (if connected).

3.3 Connecting the device to the computer for the first time

For the successful connection, you need:

- The FIT module installed on the bike.
 - The USB cable (supplied) connected.
 - The ignition key in ON position and engine stop switch in Run position. The engine does NOT have to be running.
1. When the device is connected for the first time, a window pops up to inform you that **TPS** (Throttle Position Sensor) **calibration** will be performed. Follow the on-screen instructions. It can be done with the engine off.
 2. Start the engine and verify that the RPM indication on the PC screen is about the same as shown on the bike's rev counter at idle speed.
Otherwise, change the "Pulse p. rev" value under the "**RPM calibration**" box, until you see the correct value on screen.

3.4 Using the Application with the device connected

When the device is connected, the "Hardware SN" and "Firmware ID" are shown on the screen, and there's a "**Connected**" message at the bottom-left corner.

- Click on the "**Get MAPs**" button to transfer the maps stored on device to the PC application.
- Click on the "**Send MAPs**" button to transfer the maps from the PC application to the device memory.

If you change the MAP selection on screen, the device will also select that map and changes the LED color:

- MAP1: **Green**
- MAP2: **Red**
- Zero MAP: **Orange**

When you start the engine, the current TPS and RPM values are shown on screen. The TPS value must be **0%** with the throttle released and **100%** at full throttle. Otherwise, click on the "**TPS Calibration**" button and perform the procedure with the engine running.

When the engine is running, the **Auto cell select** feature is active: the current TPS/RPM cell is selected on screen. If you change the value in the selected cell, **the device immediately adjusts the fueling** which can be seen if you monitor the exhaust gas with an AFR meter.

This means, you do NOT have to click on the "Send MAPs" button to see the AFR response during the setup procedure.

However, when the map is complete, you must press the "Send MAPs" button before you disconnect the device, otherwise the changes in the device will be discarded (the software gives a warning if you terminate the connection before sending the maps to the device).

3.5 Software Update

Each time the software is started and the computer is connected to the internet, it checks for new version automatically.

When a new version is found, the software will prompt to update now or later. The software will also update this PDF Manual on your computer when new version is available.

You can verify whether the "**Update check at startup**" was "OK" or "Failed" by clicking on the "**About**" button. If you get "Failed" status even if your internet connection is working, please check your firewall application.

If the software was updated, the next time you connect your computer to the device it will automatically check the device firmware and updating it if necessary. Internet connection during the firmware update is not required.

This automatic mechanism ensures that the software and firmware versions are always in sync, you can't use the software with obsolete firmware and vice versa. The firmware update takes less than a minute and will NOT erase the stored MAPs, the Comments and TPS calibration from the device.

The update mechanism was designed with great care (**fail-safe**): the device will continue to function even if the connection is terminated or power is lost. The update process will restart the next time the unit is connected to the computer.

3.6 Using the device after setup (without the computer connected)

After setup, the device adjusts fueling based on the maps stored.

The maps and settings will NOT be cleared even if the battery is replaced or removed.

The unit selects **MAP1** every time the engine is started, this is the default map.

If you wish to select **MAP2**, follow the special start-up sequence below:

- Have the ignition key in OFF position and the engine stop switch in RUN position.
- **Pull FULL throttle** and hold it while you turn the ignition key ON.
- Release the throttle and start the engine.

If you wish to select the **Zero MAP**, follow the special start-up sequence below:

- Have the ignition key in OFF position and the engine stop switch in RUN position.
- **Pull** about **HALF throttle** and hold it while you turn the ignition key ON.
- Release the throttle and start the engine.

Note: If you stop the engine and then start it normally, the unit will select the default MAP1.

It is recommended to use MAP1 as the main map, and MAP2 for special occasions or experiments. The Zero MAP can be used for testing purposes, as it bypasses all changes to the fueling table.

3.7 Status LED indications

By color:

Green	MAP1 is used
Red	MAP2 is used
Orange	Zero MAP is used

By flashing status:

Solid color	Engine is running and/or USB connection is active.
Blinking	Engine is stopped and USB connection not active. The flashing rate should increase as the throttle is pulled. If the LED is flashing slowly in red color, firmware update is in process.
LED off	The ignition key or the RUN switch is turned off. If the LED stays off even when the engine is running, the unit does not work - verify the connections.

4. How to make MAPs for the module

4.1 Having a Custom MAP made by a Tuning Center

Any Tuning Center or shop equipped with a motorcycle dynamometer (dyno / rolling road) is able to make a custom map for your FI Tuner Pro. The installation and setup is so simple that they will be able to do it even if they haven't used the module before.

There are two ways to make the map when the bike is on the dyno. Both methods require monitoring of the exhaust gas by the dyno's AFR meter:

1. **Precise method:**

Install the module and start the engine. Keep the TPS in one position (e.g. 2%) and monitor the AFR meter. The module automatically selects the TPS/RPM cell on the screen. Adjust the value of the selected cell (PgUp/PgDn) and the AFR meter will respond to the changes immediately. Setup the applicable RPM range only, by using the dyno's Eddy current brake system.

Note:

- AFR meters at low TPS/RPM usually don't respond to very small changes, so it's recommended to adjust the fuel table cell by 4 units at a time.
- Considering the FI Tuner Pro adjusts all 8 injectors, the AFR response for a cell value can be different compared to other modules which adjust only 4 injectors, especially above 8000 RPMs.

The Precise method is recommended to adjust the **0, 2 and 5%** TPS values.

2. **Quick method:**

Do one run at each TPS value (from **100% to 10%**), and log the performance and AFR curves. **IMPORTANT:** These runs must be done with the module installed and table cells (map) cleared, or using the "Zero MAP" option. Do NOT perform the reference runs without the module installed (see FAQ #12).

Based on the AFR curves, an experienced dyno operator can enter the required values to the map table.

Send the MAP to the device and repeat a few runs to verify the AFR curves. If needed, fine-tune the values in the table.

4.2 Making a MAP without a dyno

There are more options here as well:

1. "Seat of the pants":

If throttle response is poor from closed throttle, adjust the 0%, 2% and 5% TPS values. This can be adjusted in real time, while the engine is running in neutral.

Also, if you feel that the engine does not perform well at a specific TPS/RPM range, change the cell values here by about 4-5 units at a time, then test.

2. Using an AFR logger or AFR meter:

If you have an AFR logger or AFR meter installed, this will greatly help to fine-tune your map.

3. Using a downloaded MAP:

The MAPs can be freely shared on the internet, so you can use a map file which was custom-made for a similar bike, with similar modifications. We are offering maps for download through our website.

Note: All bikes are different from the factory and require different fueling for optimal performance. The difference will be larger depending on how the bike was run-in, usage, location (market and climate) and other aftermarket products installed.

If the downloaded map does not work well on your bike, you need to fine-tune the map or get a custom map made by a dyno center which is tailored for YOUR bike.

5. Troubleshooting

You can test whether the unit functions correctly either with or without a computer.

5.1 Without a computer connected

1. To be able to monitor the LED on the device, remove the seat.
2. Have the engine stop switch in RUN position then turn the ignition key ON.
→ The LED should be flashing in Green color.
3. Slowly pull the throttle.
→ The LED should be flashing faster and stay lit at full throttle.
4. Release the throttle and start the engine.
→ The LED should stay lit.

5.2 With a computer connected

1. If you haven't done yet, install the software (refer to chapter 3.1) and start the application.
2. Connect the device to the computer by the USB cable supplied.
3. Have the engine stop switch in RUN position then turn the ignition key ON.
→ The LED should come on and stay lit in Green color.
→ The PC application should indicate "Connected".
4. Click on the "Get MAPs" button and then "Save MAPs" to save the file.
5. Start the engine and slightly pull the throttle.
→ The TPS and RPM readings on the screen should change accordingly.

6. Warranty

The unit is completely sealed and epoxy-encapsulated, which gives maximum protection of the internal parts from shock, vibration and water ingress. To ensure trouble-free operation from the start, all units have been extensively tested prior to shipment.

Our dealers are offering a 30-day money-back guarantee on HealTech products, thus you will get your money back if the product does not fulfill your expectations (*all parts must be returned in original condition for full refund*).

Furthermore we offer a 5-year replacement warranty (*the product should not be damaged or subjected to over-voltage*).

Return shipping fees will not be refunded.

7. Frequently Asked Questions

1. Will you make the FI Tuner Pro for other bikes than Suzuki ?

The FIT module is very much Suzuki specific, but we might make other versions sometime later.

2. How long does it take to install the module ?

All connections take place under the seat. On most bikes, dealers with experience can install the module in about 5 minutes. It can take about 10-40 minutes (depending on bike model) for customers who install it for the first time. Please follow the install instructions supplied with the kit.

3. Do I need to remove the unit if I take the bike for service ?

No. However, in case you want to remove the unit for any reason, just disconnect the 8-pole and 2-pole connectors and the ECM will use the stock map.

4. If I remove the unit or the battery from the bike, will I lose my maps ?

No. The stored maps will not be changed until you change it with the FI Tuner Pro software application.

5. How can I switch to MAP2 ?

Please refer to chapter 3.6

6. Do I need to purchase O2 sensor eliminators ?

No.

7. Can I use it with an ... exhaust ?

Yes, the FI Tuner Pro can be used to get the fueling right on stock bikes as well as on bikes with an aftermarket airfilter and/or exhaust.

8. Can I use a TRE device with the FIT module ?

Yes. It's not required, but highly recommended for best results. The TRE removes the retarder from the lower gears, the FIT module adjusts the fueling.

Using a TRE also eliminates the need to spend time and money to make trim maps for different gears. Our GIpro/ATRE and X-TRE products have been tested and found fully compatible with the FIT module.

9. Should I remap the FIT module if I add an ATRE/XTRE ?

No, but if you have the option it's best to install and configure the TRE first.

10. I have a stock bike without any changes, is there any benefit to use one ?

Yes. Stock fuel maps are far from perfect, especially at partial throttle positions which you use the most.

11. Do you offer MAPs for download ?

Yes. Please refer to chapter 4.2.3 for more information.

12. Does the module come with a specific map loaded ?

The module comes with clear (zero) map. This means that it will not make any changes to the fueling and you won't feel any difference after installation.

Note: If your Suzuki ECM does not use the stock fuel map (it was remapped by a tuning center), the ECM will revert back to the stock map and you can use the FIT module to make changes to the fuel table.

For this reason, it is important to do the first reference dyno runs with the module installed using the zero map, and build the custom map from there. Also, when you want to do a before/after comparison run, do not uninstall the module, just select the map you wish to use (map1, map2, zero map).

13. Can I get the module pre-loaded with a map ?

Distributors and dealers offer this service. In order to pre-load a map without the module installed on the bike, a special USB cable is needed which is available for purchase separately.

14. My ECM was flashed but I'm not satisfied with the result, can I still use this product ?

Yes you can use it without any restrictions.

15. How it compares to having the ECM flashed ?

- Shops who flash the ECM load a generic map, not a custom map.
- There's a danger that the flashing fails and the ECM should be replaced.
- You can't restore the factory map or do changes, unless you pay again.
- You can't load, save, share and edit your map.
- You can't transfer it to a new bike, nor you can sell to someone else.

16. How it compares to other FI tuning modules ?

Comparable MAP-based tuning modules like the Power Commander, Bazzaz Z-Fi controller or Rapid Bike are more expensive and model specific. Installation takes much more time and takes valuable space from the trunk. They have extra features over the FIT unit but those require optional modules to purchase and more dyno time/cost.

If you don't need traction control and quick shifter function just perfect fueling for your engine, you won't find a better product for the money.

It comes at a very competitive price and has useful features not offered by competing modules. Please check out the list of features at chapter 2.

17. What about modules like the TFI or Juice box ?

These have two major flaws. For one: can't subtract fuel. All bikes (either with stock or racing exhaust) require fuel subtraction at many places of the fuel map. (*You don't have to believe this, just put your bike on a dyno and get the AFR logged at various load conditions.*) Without the ability to subtract fuel, the engine will not get the optimal AF ratio.

The second problem is that it's not a map-based module and only allows adjustment for 3 ranges (Low, Mid and High). You can make certain areas better but hurt other areas at the same time. Fuel injectors are not like carburetors. The AFR changes rapidly depending on actual TPS/RPM and

only a true map-based module can fix all ranges. (Again, if you put your bike on dyno and look at the AFR charts you'll understand that it is just not possible to get the fueling right by turning 3 screws on a module.)

18. Do you offer an optional quick shifter ?

No, but you can use a stand-alone quick shifter from many companies along with the FIT module.

19. Will you offer an optional module like the PC5 Autotune or Bazzaz Z-AFM ?

No, because it's not as good as it sounds:

- Installation takes considerable time. It's required to use software to configure the module, which is beyond the skills of most customers. They have to visit a dyno shop to get it installed and setup.
- Even the manufacturers of the module admit that for best results a custom map on dyno is needed along with this optional module. Considering a custom map alone can adjust engine fueling perfectly, the purpose of this module is questionable at this price for the average riders and racers. It may be useful in high-end racing where everything counts regardless of cost.

20. Do you offer a way to speed up the process of making a custom map ?

We are working on a software module which will greatly reduce the manual work. This will help dyno operators to make the map with less work in less time. It will be distributed by an automatic update when available.

21. I can't see the whole window on my PC screen, what to do ?

The minimum screen resolution to run the software is 800x600. First, downsize the application window. If your screen has higher resolution (most likely it has) and you can't see the whole application window, change the DPI setting back to default (e.g. 96 dpi) under the display properties.

22. Can we import and export a map from/to Excel ?

Yes, it is possible to Import and Export the MAP to a .CSV file, by changing the File type in the Open/Save dialogue.

The .CSV file can be opened and edited by Excel or by a text editor (e.g. Notepad). Note that only the current map view (MAP1 or MAP2) is exported and the Comments are not saved in the .CSV file.

23. How can I load two saved maps in MAP1 and MAP2 ?

You need to change the "File type" to CSV if you wish to save or open only the selected map, without affecting the other. Here's the procedure to merge maps from two files and save it as a new .FITS file:

- Open the .FITS file which you want to store in MAP2.
 - Click on Save MAPs and change the File type to .CSV, then save the file.
 - Open the .FITS file which you want to store in MAP1.
 - Select MAP2 (which is empty at this point).
 - Click on Open MAPs and change the File type to .CSV, then open the file.
 - Now you have MAP1 and MAP2 as you wanted.
- Click on Save MAPs and save it as a new .FITS file.
You can also Send it to the device.

Note that the Comments field is common for both MAP1 and MAP2, so if you store two different maps in the .FITS file, you may want to update the Comments accordingly, describing both maps.

24. What kind of performance gain can I expect ?

The Air-Fuel Ratio on most bikes are fairly good at peak power (100% throttle and high RPM), hence you can expect only a few HP gain here.

However, at about 95% of the fuel table the AFR is really off and this is why the FIT module with proper map improves:

- On/off throttle response
- Engine response at all RPM range
- Low and mid-range torque and power
- Acceleration
- Precision
- Smooth power delivery, driveability



www.healtech-electronics.com