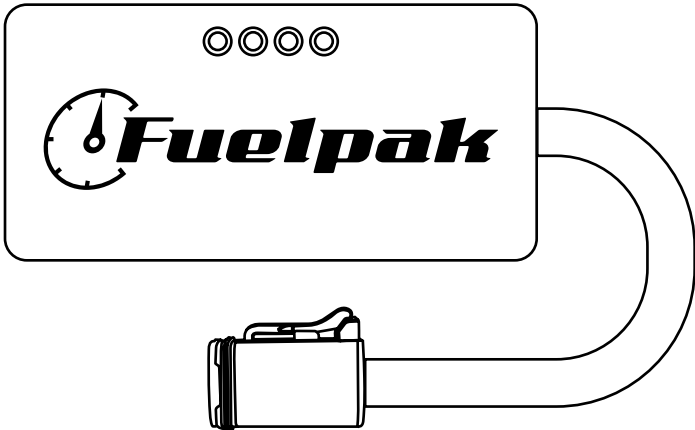# Fuelpak

BY: VANCE & HINES

USER'S MANUAL

INCLUDES iOS & ANDROID INSTRUCTIONS

Part Number:
66005 (CAN Bus Models)
66007 (J1850 Models)

The Fuelpak FP3 has fast become the best selling ECU tuner for Harley Davidson motorcycles in the world. That's because the FP3 gives you the power to control your motorcycle right through your smartphone. Map optimizations such as throttle progressivity to improve responsiveness and in-app control over popping on deceleration let you dial in your ride to suit your style. The ability to read and clear diagnostic trouble codes allows you to keep a finger on the pulse of your machine. All backed up by world-class customer service features that allow Vance & Hines to remotely assist with your riding experience.
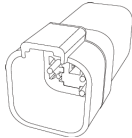
TABLE OF CONTENTS

SCAN TO DOWNLOAD FUELPAK FP3 APP

fuelpak.vanceandhines.com/download/

Google play

Available on the iPhone App Store

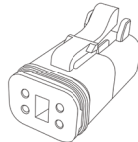### 6-PIN (CAN Bus Models)

Connector from bike

Connector from FP3 unit

4-PIN (J1850 Models)

Connector from bike

Connector from FP3 unit

CONNECTOR LOCATION BY MODEL
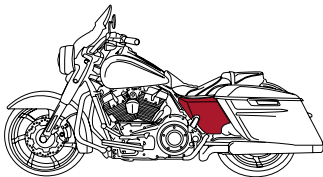
'14-'19 Touring Models connector location is under the left hand side electrical cover.
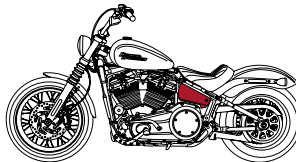
'18-'19 Softail Models connector location is under the left hand side electrical cover.
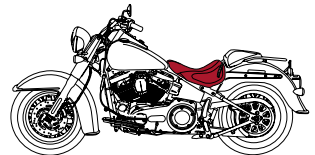
'11-'17 Softail Models connector location is under the seat.
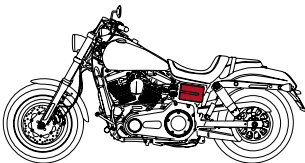
'12-'17 Dyna Models connector location is under the left hand side electrical cover.
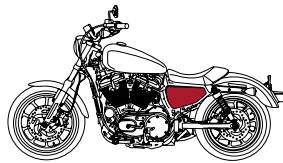
'14-'19 Sportster Models connector location is under the left hand side electrical cover.
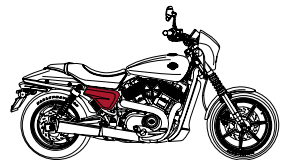
'15-'19 Street Models connector location is under the right hand side electrical cover.

GET CONNECTED

1. Download/install the FP3 app through Apple App Store or Google Play Store
2. Plug the FP3 into the motorcycle's diagnostic port
3. Turn ignition to the "on" position
4. Turn the handlebar run switch to the "on" position
5. Open FP3 app and connect to FP3
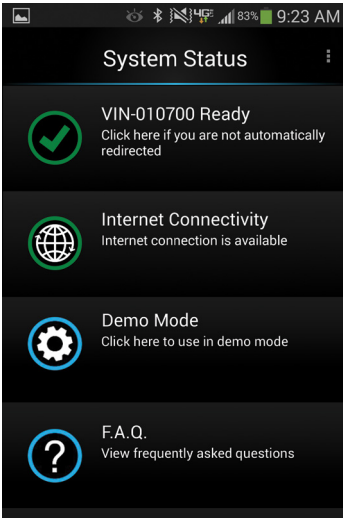
Android: Enable Bluetooth and pair to device through app
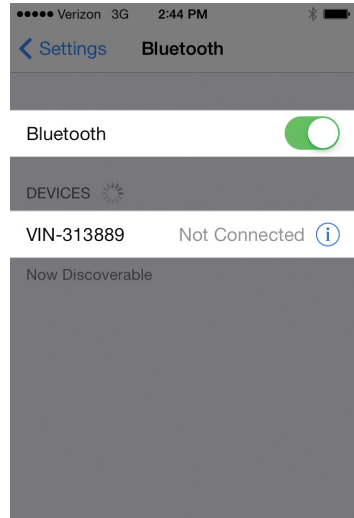
iOS: Pair to the device through iOS Bluetooth settings (located in Settings app)

6. Verify strong internet connection before proceeding
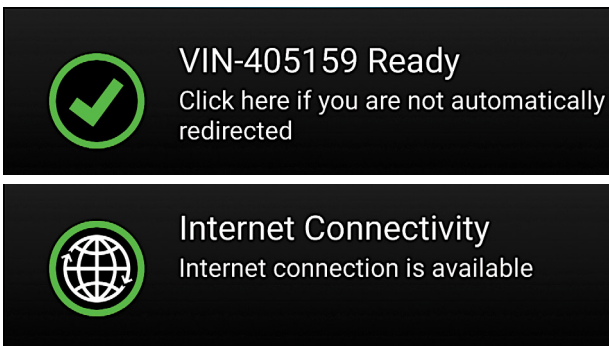
> **IMPORTANT:** The FP3 will marry to the first VIN that it flashes. Once you flash a motorcycle, the FP3 is permanently married to the VIN. There is no way to undo this. The FP3 does not marry to the VIN until you complete the first flash. You can use the same FP3 device on a different bike to read and clear trouble codes or view live sensor data, but will not be able to flash.

MAP FLASHING

1. Go to 'Search for a Map' to search for an appropriate map for your configuration.

a. *The FP3 will show only maps available for your specific model and factory engine configuration. If further modifications to the map are needed, they will be made after flashing your base map. (page 9)*

   b. *If you do not see your exhaust listed, please choose an equivalent Generic or Vance & Hines map. Contact V&H Customer Support if you need assistance selecting a map.*

   c. *All FP3 maps are dyno tuned for high flow air intakes. If you have a stock intake, flash the map for your exhaust with high flow air intake – the ECU will trim the map automatically as you ride.*
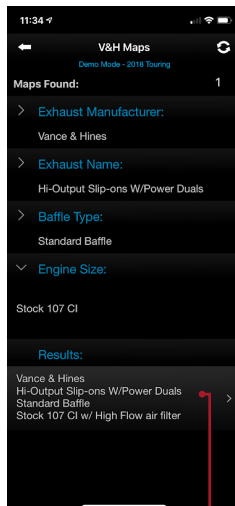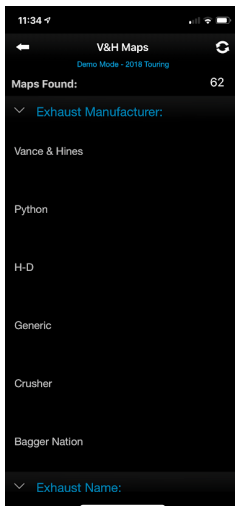
PRESS MAP RESULT AFTER FILTERING SELECTION

2. After selecting components, locate and press your map result, located at the bottom of the page.

3. Press 'Flash' (Android) or 'Program Bike With This Map' (iOS) and follow on screen prompts.
   - Pressing 'Save' (Android) will save the map to your library, but will not flash it to the bike.

IMPORTANT:
DO NOT INTERRUPT POWER, CLOSE THE APP, OR ACCEPT A PHONE CALL DURING THE FLASHING PROCESS. THE BIKE CAN NEVER BE RUNNING WHEN TRYING TO FLASH A MAP.

VIEW / EDIT MAPS

Easily switch between maps, edit and optimize maps, or flash back to your original stock map (slot #0). Your FP3 can store up to 6 maps at a time, located in the 'View/Edit Maps' section.

SWITCHING MAPS/FLASHING BACK TO STOCK MAP

ANDROID:
1. Go to 'View/Edit Maps'
2. Long press the map you want to flash
3. Press the flash button in the upper right corner (lightning bolt)

iOS:
1. Go to 'View/Edit Maps'
2. Swipe left on the map you want to switch to
3. Press the flash button (slot #0)

NOTE: *Flashing to the stock map can be a useful diagnostic tool if you are having issues with the bike. If an issue persists when the bike is on the stock map, the issue is not related to the fuel mapping or FP3.*

DELETING MAPS

NOTE: *You cannot delete the stock slot #0 map or the map slot that is currently flashed to the ECU.*

ANDROID:
1. Go to 'View/Edit Maps'
2. Long press the map you want to delete
3. Press trash can logo in upper right corner

iOS:
1. Go to 'View/Edit Maps'
2. Swipe left on desired map
3. Press 'Delete' button

RENAMING MAPS

ANDROID:
1. Go to 'View/Edit Maps'
2. Long press the map you would like to rename
3. Press the (pencil logo) in the upper right corner and edit name accordingly

iOS:
1. Go to 'View/Edit Maps'
2. Swipe left on desired map
3. Select 'Edit' button and rename accordingly
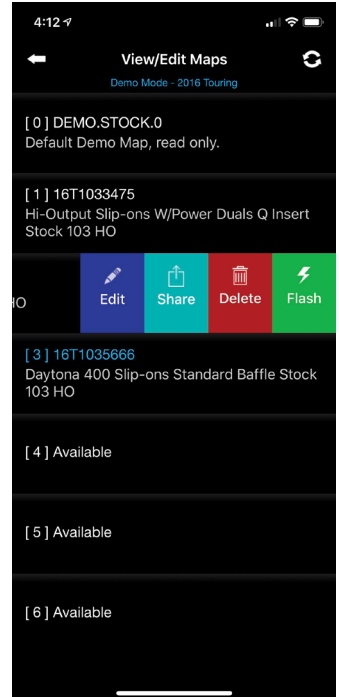
EDITING MAPS

The FP3 allows access to all of the ECU's tables for adjustments, as well as map optimization features to improve your riding experience.

NOTE: Vance & Hines does not recommend adjusting ECU tables if you are not familiar with tuning. Engine damage can result from improper settings.
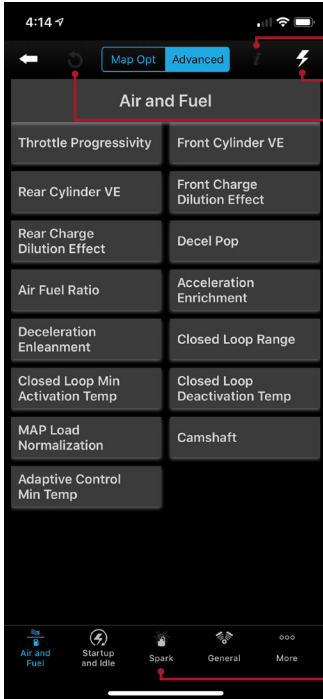
MORE INFORMATION ABOUT TABLE

FLASH MAP

RESET TABLE TO ORIGINAL SETTINGS

CHANGE TABLE CATEGORY

HIGHLIGHT TWO ADJACENT CELLS TO CREATE A BLOCK OF CELLS TO EDIT
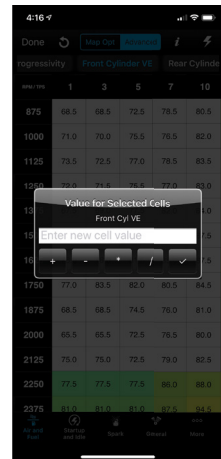
USE FUNCTIONS TO EDIT CELLS. HERE, 10% IS BEING ADDED TO CELL AREA BY MULTIPLYING BY 1.1

1. Go to 'View/Edit Maps'
2. Press the map you want to edit
3. Select the table you want to edit
4. Select a single cell to change, or change several cells at once by long pressing a cell, then long pressing an adjacent cell to highlight all cells in between
5. You can manually type in a value, or use the calculator to add, subtract, multiply, or divide to achieve your desired results.
   Example: To increase cells by 10%, highlight appropriate cells and multiply (*) by 1.1.
6. Once desired changes have been made, press the flash button (lightning bolt) and follow the on screen prompts.

THROTTLE PROGRESSIVITY

The throttle progressivity feature alters the primary and secondary throttle blade control tables to deliver various levels of throttle response on fly-by-wire equipped bikes.

NOTE: *This feature does not apply to throttle by cable bikes.*

1. *Go to 'Map Optimizations'*
2. *Go to 'Throttle Progressivity'*
3. *Turn the dial to desired setting*
4. *Press flash (lightning bolt) button and follow on screen prompts*

SENSITIVITY LEVELS:

CUSTOM: *Default setting, unchanged from stock or using user built custom tables*

STANDARD: *Stock settings*

STANDARD PLUS: *Marginally more responsive than stock*

MODERATE: *Smooth and controlled throttle response. Noticeable difference compared to stock*

AGGRESSIVE: *Fast, crisp throttle response off the line and when accelerating (V&H Recommended Setting)*

RACE 1:1: *Maximum setting, 1:1 response. Use with caution – highly sensitive*

Aggressive

ROTATE DIAL TO CHANGE SETTING

DECEL POP

The decel pop feature is designed to reduce or eliminate popping on deceleration. It progressively enrichens the first column of the air fuel ratio table. The more firecrackers, the more fuel that's being added in attempt to reduce popping. V&H recommends starting with the '1 firecracker' setting and only using the 2 or 3 firecracker settings if necessary.

1. Go to 'Map Optimizations'
2. Go to 'Decel Pop'
3. Turn dial to your desired setting
4. Press the flash (lightning bolt) button and follow on screen prompts

ROTATE DIAL TO CHANGE SETTING
MORE FIRECRACKERS = MORE FUEL TO REDUCE POPPING
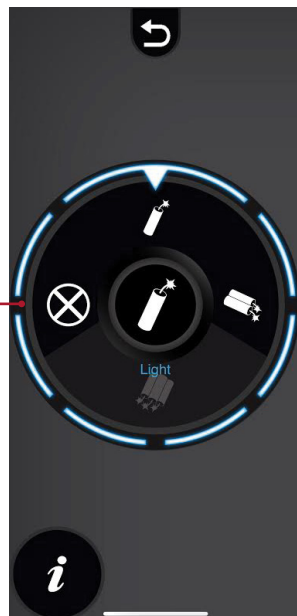
CAMSHAFTS & ENGINE MODIFICATIONS

Modifications for engine components can be added after flashing a base map. Engine displacement, injector size, camshafts, and more can be adjusted. Once you make a change, be sure to press the flash (lightening bolt) button to flash the changes into the bike.

CAMSHAFTS

NOTE: *For J1850 (4-pin) users, it is recommended to contact V&H after flashing your base map for assistance in setting up a map for cams. Either call or send an email through the 'Customer Support' section after uploading your base map (page 14)*

1. Go to 'Map Optimizations'
2. Select 'Camshafts'
3. Select camshaft(s) model
4. Press flash (lightning bolt) button and follow on screen prompts

EDIT MAPS / MAINTENANCE
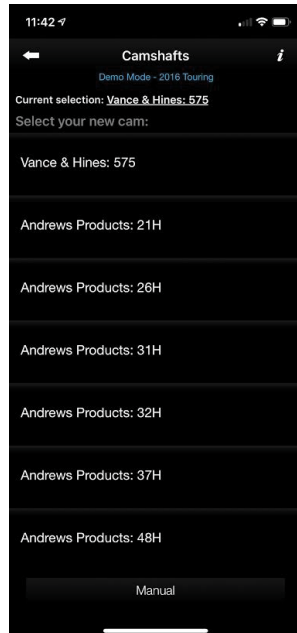
ENGINE MODIFICATIONS

Additional tables for engine modifications can be found in the 'Map Optimizations' section. Rev limit, engine displacement, injector size, and other parameters can be altered here. Be sure to press the flash button (lightening bolt) after making new changes to apply them to your map/bike.

SERVICE ODOMETER

This feature is available for CAN BUS (6-pin) equipped motorcycles and allows the user to easily keep track of miles/kilometers for maintenance such as oil changes, tires, break-ins, etc.

1. Go to 'Maintenance'
2. Select 'Service Odometer'
3. Select an available counter
4. Type in a name for the counter, i.e. "Oil Change"
5. Press check mark to begin counter
6. When ready, press 'Reset' to set the counter back to 0.0.
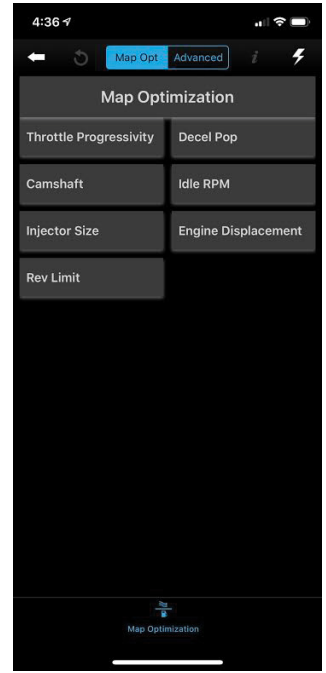
READ / CLEAR TROUBLE CODES

1. Go to 'Maintenance'
2. Press 'Read Trouble Codes'
3. To view a more detailed description of the code, press the carrot logo next to the code
4. To clear trouble codes, press 'Clear Trouble Codes' at the bottom of the screen

NOTE: *The "U0100 Lost Communication with ECM" is normal when using the FP3 and will not trigger an engine light. There may be one or several of these codes. If a code returns after clearing, this indicates a continuing issue with the bike that needs to be addressed*

REFRESH TROUBLE CODES

PRESS TO SHOW MORE INFORMATION ABOUT TROUBLE CODE

PRESS TO CLEAR TROUBLE CODES. IF CODE(S) RETURN, THE ISSUE IS STILL PRESENT
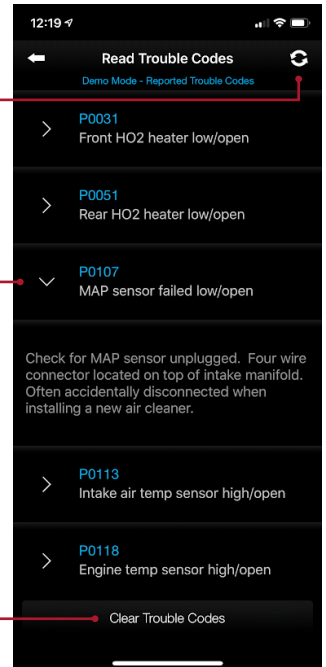
The Autotune feature utilizes your stock O2 sensors by setting your air fuel ratio table into closed loop operation and calibrating the front and rear volumetric efficiency tables (aka VE tables). Autotune will use your selected base map as a starting point to begin calibrating from. Your Finished Autotune map will be flashed into a separate map slot, leaving the base map in it's original slot. This feature is typically used if there is not an appropriate base map for your setup, there is fine tuning needed for aftermarket engine components, or there are issues with a base map.

> **NOTE:** *Vance & Hines recommends running 1-2 tanks of fuel with your base map before considering the Autotune feature. After each flash, fuel trims on the ECU are cleared, and small adjustments/improvements will be made during this period. Autotune would only be used if there is fine tuning needed after 1-2 tanks of fuel with a base map.*
>
> **NOTE:** *Be advised that while Autotune is active the bike will not perform optimally. The AFR table is in closed loop, and the cranking fuel, acceleration enrichment, and deceleration enleanment features are turned off. This may translate into poor cold start performance, erratic idle, poor throttle response, and general ride quality issues. These will resolve once you 'Finish' the Autotune. Letting the bike fully warm-up before riding while Autotune is active will help to diminish some of these symptoms.*
>
> **NOTE:** *Autotune cannot be flashed while the bike is running*

INITIALIZING AUTOTUNE

1. Go to 'Autotune' from the main menu
2. Select 'Quick Setup'
   - *'Advanced Setup' should only be used if operating the bike on a dynamometer, or directed to by V&H*
3. Select a base map to start Autotune from. Be sure to select the correct map slot number that is appropriate for your setup.
   - To verify which map is in a given slot, go to the 'View/Edit Maps' section and note the appropriate slot number
4. Follow on screen prompts to flash bike
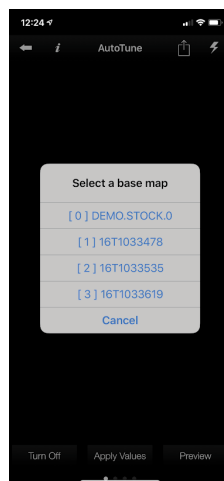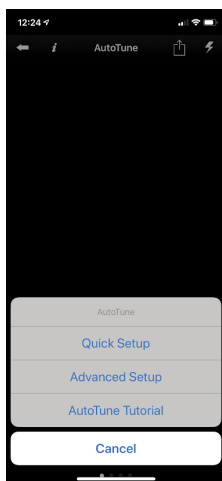
AUTOTUNE

COLLECTING DATA

Autotune collects data based off the throttle position and RPM you are riding in. Ride in a variety of RPM ranges while Autotune is active for best results. Yellow/orange indicates data has been collected in a given cell, green indicates that Autotune cannot collect more data for this session in that cell. It is important to apply periodically so that the Autotune can continue learning and honing in your map. Autotune cannot be flashed while the bike is running. Pressing 'Apply' will apply changes to your VE tables and keep Autotune on. Pressing 'Finish' will apply changes to your VE tables and complete the Autotune process. Pressing 'Turn Off' will cancel the Autotune and revert back to your prior base map. Below is the recommended guideline for running Autotune.

NOTE: *All data is collected on the FP3 device itself, therefore it is not necessary to have your app connected during Autotune, although it may be helpful.*
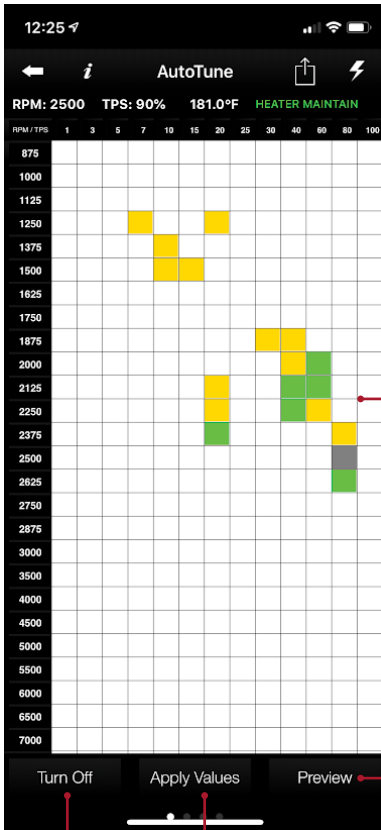
SWIPE LEFT TO VIEW SENSOR DATA SCREEN SHOWING CRITICAL READOUTS

COMPARE VE DELTA VALUES (PERCENTAGE OF CHANGE MADE COMPARED TO ORIGINAL MAP)

PRESS TO APPLY OR FINISH YOUR AUTOTUNE SESSION

CANCEL AUTOTUNE, ERASE DATA, & REVERT TO PREVIOUSLY FLASHED MAP
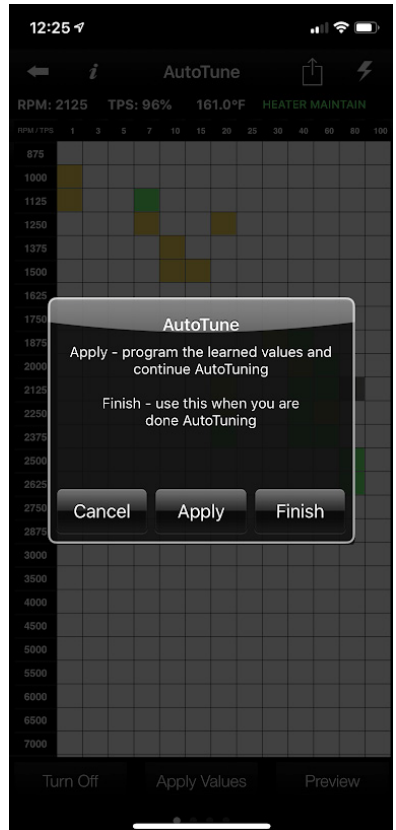
RECOMMENDED AUTOTUNE PROCEDURE

1. After initializing Autotune, ride the bike for 20-60 minutes
2. Upon completion, turn off your motor and connect to the FP3 app
3. Go to your Autotune table and press 'Apply Values', then press 'Apply' and follow on screen prompts to flash.
4. Repeat steps 1-3 for a second session of 20-60 minutes
5. Repeat steps 1-2 for a third session of 20-60 minutes
6. After completing your third session, turn off your motor and connect to the FP3 app
7. Go to your Autotune table and press 'Apply Values', then press 'Finish' and follow on screen prompts to flash

SENSOR DATA

There are 5 readouts available on screen. One in the center, and one in each corner.

To customize your readouts:

- Press the readout you want to change
- Turn the dial selector in center of screen to desired readout
- Press center of screen to accept the readout

NOTE: *Readouts available depend on the year and model of the bike.*

CUSTOMER SUPPORT

The FP3 features world-class support tools that allow V&H to remotely view, edit, and send maps over the FP3 server. Conveniently upload your map, contact V&H, and Download your new map once customer service has adjusted it. If you upload a map to V&H, you must reach out to the customer service team to notify them and discuss the issues you are having.

PHONE: Call Vance & Hines Customer Support, open Monday-Friday 8am-5pm PST

EMAIL: Email Vance & Hines technical support, be sure to include information about your bike, the parts installed, and any issue you are having.
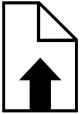
UPLOAD: Send a copy of your current map to Vance & Hines servers. Be sure to contact V&H after uploading if you need assistance with the uploaded map.
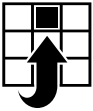
UPLOAD ECU CONTENT: Takes a pull of all tables on your ECU and sends them to V&H.

NOTE: *Before contacting V&H, please make sure both your FP3 app and FP3 firmware version are up to date. To do this...*
- *First check the app store for available FP3 updates*
- *Install if available*
- *Connect to the bike (if there is a firmware update it will automatically prompt you to install.)*

NOTE: *If you are having issues with a map...*
- *Please connect to your bike*
- *Go to 'Customer Support'*
- *Press 'Upload' to send a copy of your map before contacting V&H.*
- *Have the reference number (last 6 digits of your VIN) ready.*

TROUBLESHOOTING
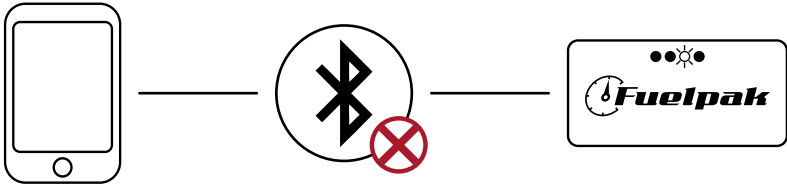
CAN'T CONNECT TO BLUETOOTH
1. Restart your phone
2. Go to your phone's Bluetooth settings and "forget device" or "unpair" the FP3 (will show as last 6 of your VIN)
3. Turn key and handlebar run switch both on
4. Wait for your VIN to re-appear as available Bluetooth device
5. Once connected, open the FP3 app.

ERROR MESSAGE WHEN FLASHING
1. Verify that your FP3 app is up to date through the app store on your phone.
2. Turn bike on and connect to the FP3 app
3. Go to Customer Support and press 'Check for Firmware Update' to verify your firmware is up to date.
   - If firmware is available, install
   - Once install is complete, try to flash the bike
4. If firmware is up to date already, or error message continues, go to Customer Support and press 'Upload ECU Content'
5. Once ECU Content is Uploaded, try to flash again
6. If error continues, contact Vance & Hines

EDITABLE TABLES

AIR AND FUEL TABLES

Primary Throttle Blade Control Progressivity is a percentage indicating how far the throttle blade should open. Compares the twist grip rotation and engine speed to find the desired throttle blade position.

Secondary Throttle Blade Control Progressivity is a percentage indicating how far the throttle blade should open. Compares the twist grip rotation and engine speed to find the desired throttle blade position.

Switchover Gear Two throttle blade control tables are available so one can be more aggressive than the other. This value indicates when to switch from the primary to the secondary table. Use this value to switch from a mild table to a more aggressive table after you are in a higher gear.

Throttle Limit vs Gear This table controls the maximum allowed throttle opening for each gear, including neutral. 0 = closed, 255 = fully open.

Front Cylinder VE A percentage indication how completely the cylinder is filling with air.

Rear Cylinder VE A percentage indication how completely the cylinder is filling with air.

Front Charge Dilution Effect Amount of exhaust gases remaining in the cylinder after the exhaust valve is closed. The computer only uses this table when manifold pressure is less than 60 kPa.

Rear Charge Dilution Effect Amount of exhaust gases remaining in the cylinder after the exhaust valve is closed. The computer only uses this table when manifold pressure is less than 60 kPa.

Air Fuel Ratio The desired or "target" air/fuel ratio. The ECU uses this number to calculate how much fuel to spray. Assumes 14.6 is stoichiometric.

Acceleration Enrichment Amount of extra fuel to add when the engine is accelerating.

Deceleration Enleanment Amount of fuel to remove when the engine is decelerating.

Closed Loop Range Within this range (Air/Fuel ratio), the ECU will use O2 sensor feedback to adjust the fuel delivery. Assumes 14.6 is stoichiometric.

Closed Loop Min Activation Temp Minimum temperature (degrees C) the engine must attain before the ECU goes into closed loop. In "Closed Loop" the Oxygen sensor is used to trim the amount of fuel sprayed into the engine.

AIR & FUEL TABLES - *CONTINUED*

MAP Load Normalization	Table to compensate MAP readings for intake flow restrictions.
Intake Valve Opening	Indicates to the ECU when to read the MAP sensor, measured in degrees of two crankshaft rotations. Will need to be changed if the camshaft is upgraded.
Intake Valve Closing	Indicates to the ECU when to read the MAP sensor, measured in degrees of two crankshaft rotations. Will need to be changed if the camshaft is upgraded.
Adaptive Control Min Temp	Minimum temperature (degrees C) where the ECU will start to save the O2 sensor trim values

SPARK TABLES

Front Cylinder Spark Advance	Crankshaft degrees of spark timing (crankshaft degrees before Top Dead Center) based on engine load (MAP) and engine speed (RPM).
Rear Cylinder Spark Advance	Crankshaft degrees of spark timing (crankshaft degrees before Top Dead Center) based on engine load (MAP) and engine speed (RPM).
Spark Adjust by Engine Temp	Table to adjust the base spark timing (crankshaft degrees) for different engine temperatures (degrees C)
Spark Adjust by Air Temp	Table to adjust spark timing (crankshaft degrees) for air temperature (degrees C). Gives you the ability to pull timing out at high load with high air temperature.
Spark Adjust by Head Temp	Table to adjust spark timing (crankshaft degrees) for head temperature (degrees C). Gives you the ability to pull timing out at high load with high head temperatures.
Adaptive Knock Retard	Maximum amount of knock retard (crankshaft degrees) which can be learned. Based on engine load and engine rpm.
Max Knock Retard	Maximum amount of retard (crankshaft degrees) which can be applied.
Knock Control Min Activation Temp	Minimum temperature (degrees C) where knock control will start working.
Knock Control Deactivation Temp	If the engine temperature drops below this level (degrees C), the ECU will turn off knock control.

EDITABLE TABLES

SPARK TABLES - CONTINUED

Idle Spark Control Gain	The ECU will adjust the spark timing when the engine is idling to help control the idle speed. This number affects the aggressiveness of the function.
Idle Spark Control Max	Maximum amount the spark timing will be adjusted (crankshaft degrees) to smooth idle rpm.
Front Closed Throttle Spark	Spark timing (crankshaft degrees) when the throttle is closed.
Rear Closed Throttle Spark	Spark timing (crankshaft degrees) when the throttle is closed.
Closed Throttle Max TPS	Maximum TPS setting (percent open) where the Closed Throttle Spark table is used. Above this point, the normal spark timing tables are used.

PERFORMANCE ENRICHMENT TABLES

PE Air Fuel Ratio	Performance Enrichment mode is a special "engine preservation" mode designed to help keep the motor from being destroyed. After a period of time at wide-open-throttle, the ECU can add extra fuel and reduce spark timing. This table indicates the desired AFR vs. time. The longer the engine is in this mode, the more the AFR should decrease (get richer).
PE Spark	Spark timing while in PE mode (crankshaft degrees)
PE Disable RPM	Once the engine is operating in PE mode, if the RPM drops below this level, it reverts back to normal mode.
PE Enable RPM	Engine rpm must be above this level before entering PE mode.
PE Disable TPS	Once the engine is operating in PE mode, if TPS drops below this level (percent open), it reverts back to normal mode.
PE Enable TPS	The throttle position must be above this level to enter PE mode.

START UP & IDLE TABLES

IAC Crank Steps vs Temp
When cranking, there is a minimum amount of air required to get the engine to start. This air is controlled by the IAC motor position ("steps"). When the engine is cold, more air is required. This table allows you to adjust this relationship.

IAC Crank Steps to Run
Once the engine has fired off it transitions from cranking mode to "run" mode. During this transition, the IAC will need to close to keep the engine RPM from surging too high.

IAC Warmup
Table indication the initial IAC position (steps) vs. engine temperature (degrees C). The closer these numbers are to the actual idle IAC position, the smoother the initial idle will be. Displacement changes may require adjustments to this table.

Idle RPM
Desired idle speed at various engine temperatures. Warning: Oil pressure drops as the engine rpm drops. H-D warns that 900 rpm is the minimum idle speed to have adequate oil pressure.

GENERAL TABLES

Injector Size
Rated size of the fuel injector (grams/second).

Engine Displacement
Engine volume in cubic inches. (1 cubic inch = 16.39cc)

Rev Limit
Maximum engine speed allowed. Testing this in Neutral will give results lower than expected. Stock valve springs will limit the usefulness of higher settings.

Gear Ratios
Gear ratio for each gear (first, second, third, fourth, fifth, sixth). The ECU uses this info to know which gear it is in.

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