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Installation Instructions for S&S Fuel System Upgrade Kit with Magneti Marelli® Style VFI Module and Single Bore Throttle Body

DISCLAIMER:

S&S parts are designed for high performance, closed course, racing applications and are intended for the very experienced rider only. The installation of S&S parts may void or adversely affect your factory warranty. In addition such installation and use may violate certain federal, state, and local laws, rules and ordinances as well as other laws when used on motor vehicles used on public highways, especially in states where pollution laws may apply. Always check federal, state, and local laws before modifying your motorcycle. It is the sole and exclusive responsibility of the user to determine the suitability of the product for his or her use, and the user shall assume all legal, personal injury risk and liability and all other obligations, duties, and risks associated therewith.

The words Harley®, Harley-Davidson®, H-D®, Sportster®, Evolution®, and all H-D part numbers and model designations are used in reference only. S&S Cycle is not associated with Harley-Davidson, Inc.

SAFE INSTALLATION AND OPERATION RULES:

Before installing your new S&S part it is your responsibility to read and follow the installation and maintenance procedures in these instructions and follow the basic rules below for your personal safety.

- Gasoline is extremely flammable and explosive under certain conditions and toxic when breathed. Do not smoke. Perform installation in a well ventilated area away from open flames or sparks.
- If motorcycle has been running, wait until engine and exhaust pipes have cooled down to avoid getting burned before performing any installation steps.
- Before performing any installation steps disconnect battery to eliminate potential sparks and inadvertent engagement of starter while working on electrical components.
- Read instructions thoroughly and carefully so all procedures are completely understood before performing any installation steps. Contact S&S with any questions you may have if any steps are unclear or any abnormalities occur during installation or operation of motorcycle with a S&S part on it.
- Consult an appropriate service manual for your motorcycle for correct disassembly and reassembly procedures for any parts that need to be removed to facilitate installation.
- Use good judgment when performing installation and operating motorcycle. Good judgment begins with a clear head. Don't let alcohol, drugs or fatigue impair your judgment. Start installation when you are fresh.
- Be sure all federal, state and local laws are obeyed with the installation.
- For optimum performance and safety and to minimize potential damage to carb or other components, use all mounting hardware that is provided and follow all installation instructions.
- Motorcycle exhaust fumes are toxic and poisonous and must not be breathed. Run motorcycle in a well ventilated area where fumes can dissipate.

IMPORTANT NOTICE:

Statements in this instruction sheet preceded by the following words are of special significance.

WARNING

Means there is the possibility of injury to yourself or others.

CAUTION

Means there is the possibility of damage to the part or motorcycle.

NOTE

Other information of particular importance has been placed in italic type.

S&S recommends you take special notice of these items.

WARRANTY:

All S&S parts are guaranteed to the original purchaser to be free of manufacturing defects in materials and workmanship for a period of twelve (12) months from the date of purchase. Merchandise that fails to conform to these conditions will be repaired or replaced at S&S's option if the parts are returned to us by the purchaser within the 12 month warranty period or within 10 days thereafter.

In the event warranty service is required, the original purchaser must call or write S&S immediately with the problem. Some problems can be rectified by a telephone call and need no further course of action.

A part that is suspect of being defective must not be replaced by a Dealer without prior authorization from S&S. If it is deemed necessary for S&S to make an evaluation to determine whether the part was defective, a return authorization number must be obtained from S&S. The parts must be packaged properly so as to not cause further damage and be returned prepaid to S&S with a copy of the original invoice of purchase and a detailed letter outlining the nature of the problem, how the part was used and the circumstances at the time of failure. If after an evaluation has been made by S&S and the part was found to be defective, repair, replacement or refund will be granted.

ADDITIONAL WARRANTY PROVISIONS:

(1) S&S shall have no obligation in the event an S&S part is modified by any other person or organization.

(2) S&S shall have no obligation if an S&S part becomes defective in whole or in part as a result of improper installation, improper maintenance, improper use, abnormal operation, or any other misuse or mistreatment of the S&S part.

(3) S&S shall not be liable for any consequential or incidental damages resulting from the failure of an S&S part, the breach of any warranties, the failure to deliver, delay in delivery, delivery in non-conforming condition, or for any other breach of contract or duty between S&S and a customer.

(4) S&S parts are designed exclusively for use in Harley-Davidson® and other American v-twin motorcycles. S&S shall have no warranty or liability obligation if an S&S part is used in any other application.

NOTE: *All brand names, trademarks or registered trademarks mentioned in these instructions are the property of their respective holders and are used in a reference only capacity.*

⚠ CAUTION

S&S Fuel Injection is not compatible with E85 fuel. Use of E85 fuel may cause your engine to run poorly and/or damage system components.

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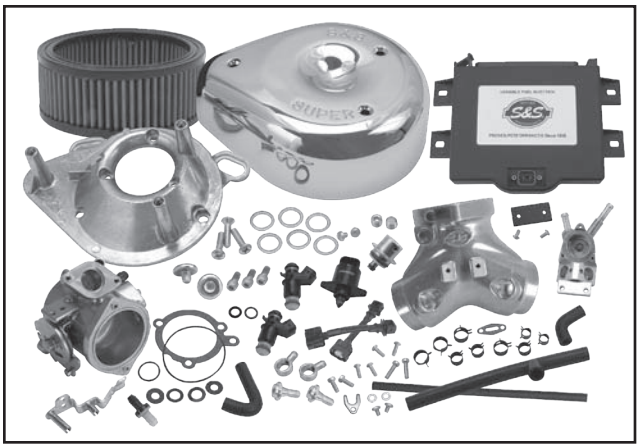
INTRODUCTION

The S&S® Fuel System Upgrade Kit includes a VFI (Variable Fuel Injection) module, 52mm single bore throttle body kit, manifold, and Teardrop air cleaner. These components replace the stock fuel injection system on 1995 to 2001 Magneti Marelli® style fuel injected touring motorcycles. The USB Magneti Marelli Style VFI module works with all 1995 through 2001 touring EFI motorcycles and comes pre-programmed with a calibration for an 80" Harley-Davidson® Evolution® engine or 1550cc (95") Twin Cam 88® depending on the kit that was ordered. Additional calibrations are available on the included Pro Tune II software CD and from the S&S website.

This instruction sheet focuses on the details specific to the fuel system upgrade kit and should be read completely before proceeding with the installation of the single bore induction system and VFI module.

KIT CONTENTS

- **VFI Module Kit**
- **52mm Single Bore Induction System**
- **Teardrop Air Cleaner**
- **Intake Manifold**



Picture 1

ADDITIONAL PARTS REQUIRED

The VFI module included in the Fuel System Upgrade Kit has been pre-programmed for a common setup; see the VFI module installation section on the following page. If the motorcycle configuration is different than the setup listed, the VFI module included in this kit may need to be reprogrammed using the included ProTune II software.

If programming is required, the following items are needed:

- A PC capable of running the included ProTune II software (see minimum requirements in Installation section of the VFI Module Instructions).
- A standard USB-A to 5-pin mini-B cable.
- A free USB Com port.

OPTIONAL ACCESSORIES

All S&S VFI modules are capable of closed-loop fuel control. If closed loop fuel control is desired, Closed Loop Oxygen Sensor kits are available to purchase.

The S&S part number for the Closed Loop Oxygen Sensor kit to be used with the VFI module described in this instruction sheet is listed below:

- 106-2067 – Closed Loop Sensor Kit for use with Magneti Marelli® Style S&S VFI Modules

INSTALLATION

Single Bore Induction System Installation

Following the installation instructions provided with the Single Bore Induction system, install the manifold, throttle body, and Teardrop air cleaner. Note the throttle body included with this kit comes with a throttle position sensor installed and set for 0.50 to 0.51 volts at closed throttle. It is not necessary to remove the throttle position sensor from the old throttle body or to perform the TPS adjustment procedure as noted in the instructions. The fuel rail included with this kit also includes a 4 bar fuel pressure regulator. This regulator must be used to work with the provided S&S VFI calibration files.

VFI Module Installation

NOTE: *Included in the VFI Module kit are components used to cover the USB port of the VFI module (o-ring, cover, and two screws). After the module is installed and any required calibration work with the ProTune II software is complete, install these components before it is put into service. These parts are required to protect the module from the elements.*

VFI Module Calibration

The VFI Module included in this Fuel System Upgrade Kit has been pre-programmed with a common base calibration for the kit that was ordered. A description of these calibrations is given below. For vehicles matching these setups it will not be necessary to connect a PC to the VFI module to install a calibration. If the vehicle setup is different than this, additional calibrations can be found on the included ProTune II CD. See the **Loading a Calibration** section below for information on how to install different calibrations.

Kit PN: 550-0067 for 1995-98 Touring bikes includes a VFI module that has been programmed for running the single bore induction system on a stock 80" Harley-Davidson® Evolution® engine with S&S 510 cam and slip-on mufflers.

Kit PN: 550-0068 for 1999-2001 Touring bikes includes a VFI module that has been programmed for running the single bore induction system on a 1550cc (95") big twin engine with S&S 510 cams and slip-on mufflers.

Installing the VFI Module

1- Follow the **VFI Module Installation** section of the S&S USB Magneti Marelli® Style VFI Module and ProTune II Software installation instructions to install the VFI module.
2- If programming of VFI module is not needed installation is complete. You may proceed with installation of the USB port cover, o-ring, and screws as outlined in the VFI module installation instructions. If programming of VFI module is needed follow the instructions below.

Loading a Calibration

1- Install the ProTune II software following the **ProTune II Software Installation** section of the VFI Module Instructions.
2- Install USB Drivers following the **Installing USB Drivers** section of the VFI Module Instructions.
3- Connect to the VFI module.
   a- Using standard USB-A to 5-pin mini-B cable, connect the port on the case of the VFI module to a USB port on the PC.
   b- Open ProTune II by double-clicking the ProTune II icon on the desktop. The lower-right corner of the ProTune II window contains a communication status box. When there is no ECM (Electronic Control Module referring to the VFI module) communication this box will flash between blue and black and alternate between messages that report which ports the Pro Tune II software is searching for the ECM.

   c- Turn the ignition switch of the motorcycle to on and set the run/stop switch to "run". Do not start the motorcycle at this time.
   d- The communication status box in the lower-right corner of ProTune II will illuminate green to show that ProTune II is communicating with the VFI module. If it does not illuminate green see the **Basic Troubleshooting** section of the installation instructions for the S&S USB Magneti Marelli® Style VFI Module and ProTune II Software.

4- Sending a calibration file to the VFI module.
   a- From the File menu of ProTune II, select "Send all data to ECM…" or click on the motorcycle icon in the upper-left corner of the screen.

   b- A window will open showing a list of calibration folders for the different S&S ECMs. From the list of folders select the folder for "USB Port Magneti Marelli® Style ECM" to view the list of calibrations available for this ECM.
   c- Select the calibration for the vehicle the VFI module is installed.
      i. Calibrations are named based on the calibration part number, year group of bike, chassis, type of ECM, engine, displacement, compression ratio, cam, exhaust system, and other notes such as if it is setup for closed loop. Calibration notes can also be viewed in the "description" box located on the left side of the calibration selection window.
      ii. Locate a calibration that is correct for your year group with the closest displacement and camshaft to what you are running.
      iii. If the calibration selected is noted as closed loop, and the vehicle does not have the S&S Closed Loop Sensor kit installed, the closed loop control will need to be disabled per step 5.
   d- Once a calibration is selected click **Open** to start the calibration download process. Do not switch off power to the ECM during this time.
   e- After the calibration has loaded a message will appear advising you to cycle power on the ECM (VFI module) for at least 15 seconds. Select **OK** on the message and turn the key off on the motorcycle for at least 15 seconds.
5- Closed Loop Control Settings.
   a- If the calibration installed was noted closed loop and the vehicle does not have the closed loop kit installed the closed loop control will need to be deactivated. Failure to deactivate closed loop control on a motorcycle without a Closed Loop Oxygen Sensor kit will result in a trouble code being set and the check engine light illuminated.
   b- To deactivate closed loop control, with ProTune II connected to the ECM select "Closed-Loop Control Settings" from the view menu.
   c- A new window will open asking to select an ECM or file to edit.
   d- By default the ECM: 55-5120A will be selected. Hit **OK** to continue.
   e- In the new window that opens select "No Closed-Loop or Adaptive" from the drop down menu and hit **Save**.
6- Viewing Calibration Comment Field.
   a- The comment field for each calibration contains the calibration part number and notes on the application and software code for the calibration. To view the comment field select "Comment Field…" from the View menu in ProTune II.
   b- A new window will open to select the source for the comment field. When connected to a powered ECM the ECM will be shown first on the list by default. Select **OK** to view the comment field of the calibration in the ECM.
   c- A new window will open showing the notes for the calibration starting with the part number of the calibration. Additional notes can be added if desired and saved to the calibration by hitting **OK** on the comment field window.

The VFI module calibration is now complete. The VFI module uses an aluminum plug cover with an O-ring to protect the module's USB port from the elements. Install the O-ring and port cover on the module using the two screws provided.

For additional calibrations, troubleshooting, and tuning information see the VFI S&S USB Magneti Marelli® Style VFI Module and ProTune II Software installation instructions provided with the module.