THUNDER TMAX
EFI made simple.

#309-562, 2014 Touring & Trike Models

Thank you for purchasing a ThunderMax ECM! Please read through the following instructions before beginning the installation procedure. Following these instructions will ensure that the ECM is installed and setup properly for optimal results. If you have any problems or questions, please refer to the TMax Tuner .pdf Manual, included on the CD (Help Menu) with this package. Record serial number NOW below for your records!

Serial # TMTM_____

Step 1: Insert the TMax Tuner CD into your computer. TMax Tuner will automatically open the InstallShield Wizard when the computer finds the CD-Rom. Follow the instructions and install the software on your computer.

After installing and opening the software the first time, you will be prompted to install the driver for the USB connection (see step 3). The TMax Tuner software package is designed to run on personal computers using Microsoft® Windows 2000™, Windows XP™, Windows Vista™ and Windows 7 & 8 operating systems. The computer system must have an adequate amount of free space on the hard drive for proper operation. TMax Tuner is approximately 140MB when installed. TMax Tuner is not supported by any other operating systems.

Step 2 : Module Installation - Touring Models

FL-A: Remove seat and both side covers. Remove the main 50A fuse located on the left side of the bike, on bikes with security turn the ignition switch on prior to removing the 50 A fuse (or consult manual).

Installation / Setup Guide

Please Note: This product is Legal in California only for racing vehicles which may never be used upon a highway. The user shall determine suitability of the product for his or her use. Installation and use on a pollution-controlled vehicle constitutes tampering under the U.S. EPA guidelines and can lead to substantial fines. Review your application and check your local laws before installing.

FL-B: Remove the stock narrow band sensors from the exhaust pipe. *Special Note – If you have previously installed another tuning device such as a Power Commander,* **be sure to remove the device and any "O₂ Sensor Eliminators" that may have been installed at the sensor harness plugs at that time!**

If replacing the factory exhaust system, ensure the system you purchase is equipped with 18mm exhaust oxygen sensor bungs, as used on 2009 models. H-D® switched to 12mm narrow-band sensors in 2010. Unless the pipe manufacturer you've chosen has equipped their exhaust with both 12 and 18mm bungs, you should source a 2009 year pipe as the sensor size and location will be correct for use with ThunderMax 18mm wide-band sensors. All other pipe dimensions and mounting points are the same as 2010-2014 touring model exhaust systems; just the sensor bungs are different.

If retaining factory catalyst-equipped headpipes, 18mm bungs will need to be added to the headpipes. Bungs should be located no more than 3-4" from the head pipe

connection (for ideal location, refer to the factory location on 2009 models). Weld-in bungs are available from many sources in straight or angled designs. See Video on adding new bungs on the web at YouTube.com (search ThunderMaxAV) or through your smart phone by scanning the QR code on page 8.

Stock 12mm O₂ sensors are located downstream on the factory header pipes, between the engine and transmission; unplug and remove them as they will affect your ThunderMax system performance if left plugged in. Stock sensor connectors are located under the bike's right side cover (black and gray plugs). 12 mm pipe bung O₂ caps are available from many sources.

FL-C: Install supplied wide-band sensors into the pipes; route the front sensor along the cross brace on the

frame in front of the engine and down the lower frame rail on the right side of the motorcycle.

FL-D:. Route the rear sensor lead between transmission top cover and the starter, then towards the ABS caddy located under the right side cover. Place the sensor connector under the ABS caddy.

FL-E: Remove factory ECM located under the seat from the caddy by spreading the plastic caddy latches at the sides of the ECM. Lift the ECM up and to the right to release it from the caddy.
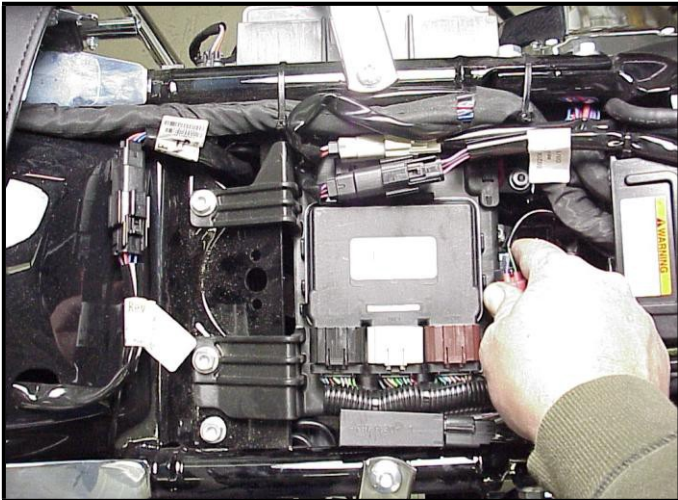
FL-F: Disconnect the ECM from the three connectors by depressing the tab on the top of each connector.

FL-G: With the factory ECM removed, route the AutoTune harness thru the opening on right side of the frame below the down tube for the seat, towards the ECM caddy.

FL-H:. Route the AutoTune harness plug under the brake lines to the ECM caddy area. Locate the package of dielectric grease included with communication cable.
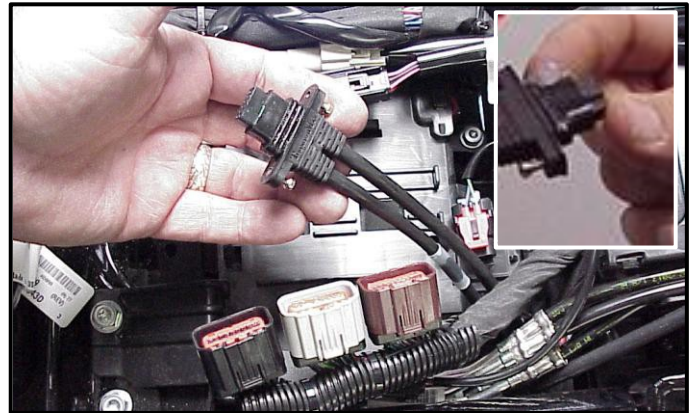
Spread a small amount of grease on the AutoTune harness plug inboard of the mounting flange to allow the plug to easily slide into the ThunderMax ECM.

FL-I: Install the AutoTune harness to the ECM with the ThunderMax logo on harness plug facing up. Attach with screws provided.

FL-J: Install main harness connectors to ThunderMax ECM. Before installing the connectors, lightly spread some dielectric grease on harness connector terminals.
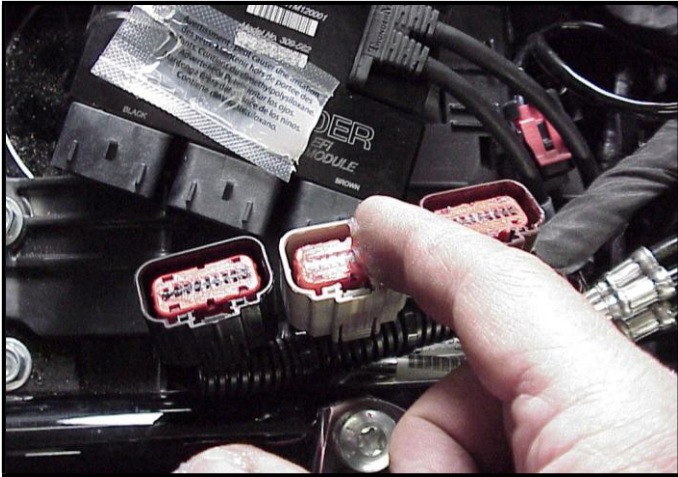
FL-K: Once the three harness plugs are connected, place the ThunderMax ECM into the ECM caddy.

FL-L: Connect the oxygen sensor harnesses to the AutoTune harness. Carefully wire tie the leads to the motorcycle. Take extra care to ensure harness and sensor leads are safe from rubbing or chaffing on the motorcycle. Use all supplied wire ties; add extra ties if needed to properly secure wiring on your installation.

FL-M: Position the rear connector under the ABS caddy and attach with wire ties provided as shown.
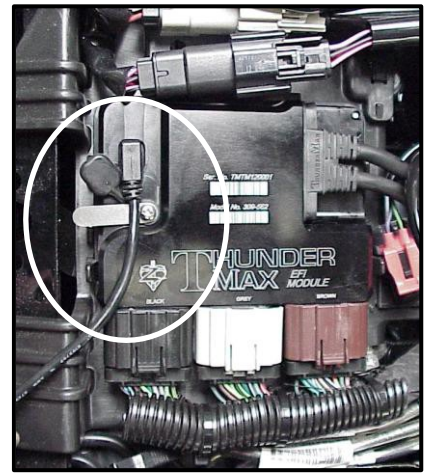
FL-N: Position front connector above lower frame rail between engine and transmission. Attach to existing harness with provided wire ties. Inspect all wiring to make sure it is clear of moving parts and excessive heat.

FL-O: Re-install the 50A fuse and replace the side covers.

Step 3: Linking and Installing a Map

The TMax Tuner software for the ThunderMax Throttle By Wire EFI systems contains the correct drivers required for USB interface with the ECM. Connect the USB cable to the specific port on your PC that the driver will be configured to, and the ThunderMax ECM connector located under the retainer plate (loosen retainer screw, rotate retainer plate and open rubber weather seal). Open the TMax Tuner software and turn the bike's ignition and handlebar switches to the on/run positions. Follow the prompt instructions for installing the driver. Turn off ignition when finished.

Now it's time to turn your attention back to your computer (there is no need to be linked to the module at this time). To ensure you are working with the latest version of TMax Tuner software and have the most up-to-date selection of base maps, it is suggested that you establish an Internet connection and click **[Configure]** on the tool bar, then **[TMaxI Software Update]** and follow prompts.
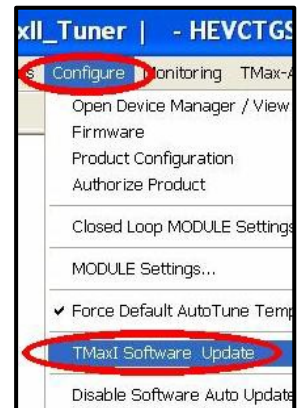
After uploading latest software (if found), next click **[EFI Maps] [EFI Map Listings (Throttle By Wire)]**, double-click any map; when the Base Map Name Encoding window appears, click the **[Check Internet For Updates]** button and follow the prompts. Close window after updating.

Loading VIN Number and Product Registration

With the communication cable connected to your computer and the ThunderMax ECM, cycle the ignition switch to the 'on' position and linking to the ThunderMax will occur automatically. (red **[Link]** button turns green). You will be prompted to enter the bike serial number (VIN); answer **[OK]** and enter your motorcycle's serial number (CAPITAL LETTERS ONLY), click **[OK]** then **[Close]**. Now click **[Yes]** when the product registration prompt appears. When the product registration window opens, fill in the requested fields then click **[Close]**. Unlink (click green **[Link]** button) and turn off ignition when finished. Once your software and map databases are verified as up-to-date and your module is registered, move to selecting and loading your base map.
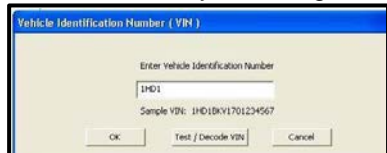
Selecting A Base Map File from the Database

If you purchased a pre-mapped system, you may skip the map installation process.

The TMaxII Tuner EFI Map Database will help you chose a Base Map for your application. To open the Map Database, select from the toolbar **[EFI Maps] [EFI Map Listings (Throttle By Wire)]**.

Available base maps will be shown (if the **[Show All Maps]** button at the lower left of the screen is highlighted, click it to clear any filtered maps so all maps will be shown).

You will now be able to select the closest Base Map for your engine combination. Please read the following section on Key Elements, this will help you quickly narrow down the selection of available Base Maps and find the right one for your application.

Base Map "Key Elements"

The reason for selecting a Base Map by "Key Elements" is to find the closest Base Map match available for your combination, identified by the most critical components. These include:

Engine Size. A correct match to the engine's stroke is more important than an exact match of engine displacement. Stroke and cam timing influence engine pumping pressures. The correct shape of spark curves in the base map will be best matched by engine stroke.

Throttle Body / Injector Size. Choose the throttle body and injectors being used for your application (most applications will be "stock" unless performance parts have been installed).

Camshaft. Many popular short duration aftermarket cams (less than 240° intake duration) perform well when using a stock-cam base map. With broader timing cams (more than 240° intake duration) you may find that choosing a base map calibration developed for an aftermarket cam to be a better choice.

Exhaust System Design. There is no need for concern if an exact *brand* match does not appear in the Base Map library. Simply select the Base Map with the closest *style* of exhaust system (Slip-ons, 2:1, True Duals). Choosing the closest style will yield excellent results. Group your exhaust system in one of the following three categories:

Factory Head Pipe with Crossover: Dual exhaust systems with a cross over pipe that connects the front and rear exhaust pipes (includes 'X' pipes). Typically used with accessory slip-on mufflers. **Bikes with catalyst-equipped mufflers or headpipes require maps designed for use with catalyst-equipped systems or damage to the catalyst can result.** ThunderMax maps for use with 96, 103 and 110" internally stock engines are catalyst-safe maps.

2 into 1: Both head pipes converge into one collector.

(True) Dual Exhaust: 100% separate exhaust pipes. ThunderMax's AutoTune system allows you to choose a Base Map that isn't an exact match of components and still have excellent results. Even if your combination isn't listed, select the closest Map match and let the AutoTune create your custom Base Map while you ride. The closer match that the Base Map is to your combination, the faster the system will achieve the desired AFR Targets. This simply means less time to establish and maintain a great tune. Once you have allowed the system to establish custom AFR fuel-flow adjustments, you can use the AutoMap function to create an all-new Base Map based upon the Auto Tuned learned adjustments. To use the AutoMap feature, see the tuning manual for the procedure on how to create your custom base map using AutoMap.

Base Map File Browsing / Selection

With your Base Map Definitions window open, you may begin narrowing down the list of maps for your application. To sort the map files by a particular key element, underline-click on the column heading to arrange the column in alpha/numeric order. All of the columns can be sorted in this manner for filtering purposes. Filter the maps to identify the base map that best matches your application by following these easy steps:

First (in order of importance) place your curser over the **'Family'** heading and <u>left</u>-click to change the sort order of that column. Scroll down the list and place your mouse pointer over you bike's family match and <u>right</u>-click to filter out no-match applications from the list.

Tip - After any filtering, notice that the **[Show All Maps]** button at the bottom left is now selectable. At any time if you want to return to the complete library listing, left-click the **[Show All Maps]** button and you will start over with all Base Map Files in the library displayed.

Second, right-click the engine size under **'Engine Type'** that matches your engine. All maps that do not match your selection will be filtered from the screen.

Third, place your curser over the **'Throttle'** column and right click your match (injector size is more important than throttle body size if you have to choose).

Fourth, right-click the **'Cam'** that closest matches your application.

Fifth, right click the **'Exhaust'** that closest matches your application.

Keep right-clicking the application columns until you have located the best map match (in the case of identical maps, choose the latest date). Highlight the map you've chosen (left-click; blue bar indicates selected map) and click the **[Close]** button.

Step 4: This brings you to the 'Base Map Name Encoding' page, from which you can review the map parameters. Once verified, click the **[Load BaseMap]** button to load the map into the software.

Note - If you're still unsure of which Base Map to select, please email the specifications of your Key Elements to Support@Thunder-Max.com. Please title the email "Base Map Selection" for a faster response.

Step 5: Next, go to the **[Tuning Maps]** Tree and click the **[+]** sign next to **[Module Configuration]** to reveal the **[Basic Settings]** command. Open the Basic Settings window and click the **[Speedo Cal]** button (list window appears).

Verify that the Speedometer Calibration is set for your year motorcycle based on the chart. If it is, click **[Cancel]**; if it is not, enter the correct value and click **[OK]**, then **[Close]** the Basic Settings window.

Step 6: Now that the Base Map is loaded into the TMaxII Tuner software; you must 'Write' (transfer) the Base Map to your ThunderMax ECM. With the communication cable connected, linking to the module is now automatically performed with the TMaxII Tuner software when the handle bar and key switch are in the on/run positions. Turn the ignition switch on; the red **[Link]** button will turn green to indicate a successful link.

Once linked, from the toolbar click **[File] [Write Module Maps and Settings]**, answer **[OK]** to the 'To Running Position' command in the 'Module Configuration Write Options' window that opens. When the system recognizes your motorcycle model through the VIN number entered earlier, you will receive a prompt that the chosen map has settings applied for either an air or liquid cooled engine; only if the system does not recognize your model through the VIN, the following window will appear: Choose the correct application and click **[OK]**.

The transfer bar then appears during the map load. Once the Base Map has been written to the module, clear any active Diagnostic Code readings and Learned Fuel Adjustments that may have been created during the live module testing session that each ThunderMax module must pass. While linked, from the Tuning Tree select **[Module Configuration] [Diagnostic Codes]**. When the Diagnostic Codes window appears, select [Clear Diagnostic Codes]. After completing this step, proceed to **[Map Editing]** menu on the tool bar and select **[Clear "Learned Fuel Adjustments (CLP OFFSET)"]**.

These steps ensure you will be starting with a "clean slate" Base Map.
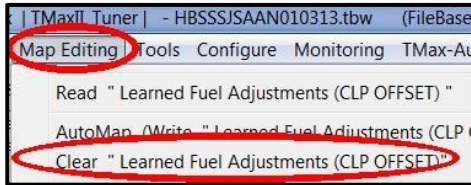
Step 7: Initialization Procedure

IMPORTANT STEP BEFORE STARTING

This step is required for new module installation, or when interruption of 12v power to the ECM takes place. Example: battery change, removal of maxi fuse, etc. Turn the ignition switch on with the handlebar rocker switch to the run position for 20 seconds, uninterrupted. After 20 seconds, cycle the ignition switch off, then on, and start the engine. Let the motorcycle idle on its own for 15 seconds. Cycle the ignition off and restart the motorcycle; normal idle speed should be attained

depending on engine temperature. Warm-up cycle will have slightly elevated idle speed (approximately 1200 rpm) until engine reaches operating temperature. To disconnect from the PC, click the Unlink button (turns to red), remove the USB cable and snap the weather seal plug into the USB cable port. Position the retainer plate over the weather seal and tighten the retainer plate screw.
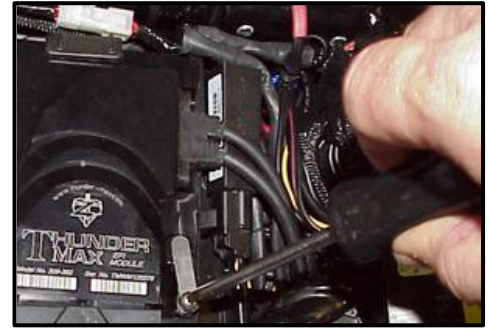
Congratulations! You have successfully installed and set up your ThunderMax ECM. Now it's time to ride the bike and let ThunderMax optimize your EFI system! Several riding sessions that allow the engine to reach normal operating temperature should be completed with as much variation in terrain and RPM as possible. Your ThunderMax customizes your map based on your engine, ambient conditions and your riding habits. Once several sessions have been logged, link to your ThunderMax and select **[TMax Module Control Center]** for an automatic analysis of the adjustments that have been made, and follow prompts for further action if more optimization is suggested.

Need Help?

We have included many easy-to-use features for supporting and enriching your ThunderMax experience. A full tuning manual, links to online support documents and sites as well as the ability for you to easily attach a map or recorded engine monitoring log to an email directly to our support department are found here.
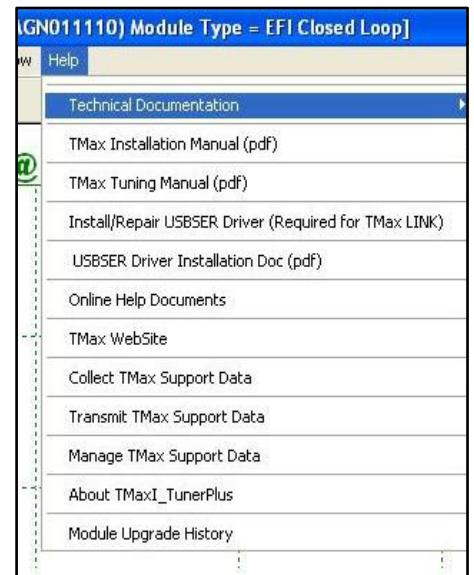
TIPS AND GENERAL INFORMATION

Several support features are located under the **[Help]** menu:

- A comprehensive tuning manual
- Links to allow transmission of module and map data via E-mail directly to TMax support
- Links to allow transmission of monitor logs (recorded riding sessions) via E-mail directly to ThunderMax support
- Links to Thunder-Max.com web site for support documents and videos

System Updates are available through TMax Tuner with an internet connection. Software, Firmware and Map updates can be downloaded; check frequently for updates.

TMax Tuner Module Control Center provides a snapshot of AutoTuned fuel flow adjustments, RPM time logs in increments of 100 RPM's, engine temperature logs and diagnostic codes. Utilize this valuable information about the condition of your tune and how you ride.

AutoMap feature creates a custom base map based on AutoTuned fuel flow adjustments. Create a custom base map with just a few clicks!

When the TMax Tuner program is opened, it automatically retrieves the last map that was open.

Any time you link to your motorcycle: *Read* the map that is installed in the ThunderMax ECM by selecting **[File]** then **[Read Module Maps and Settings]** on the TMax Tuner toolbar. This will synchronize the map file loaded into the ThunderMax ECM with the TMax Tuner software.

Save your edited maps to your hard drive using the **[Save As]** command. Document the changes in **[Map Notes]** located under **[EFI Maps]** on the toolbar. These notes are stored with the saved map; remember to edit them when making changes for future reference.

When a new map is installed any existing learned fuel adjustments need to be cleared **[Map Editing] [Clear Learned Fuel Adjustments]**. Linking or editing an existing map within the module does not require above steps.

AFR Correction vs. Engine Temperature page is used to adjust warm-up AFR's. If the engine requires more fuel during warm-up (start to 200°), use this function to adjust. See TMax Tuning Manual for procedures..

Air/Fuel-TPS @ RPM - These pages reflect desired targets of AFR to throttle position at every 256 RPM. Example: if you desire a leaner mixture for added fuel economy then you can easily edit AFR targets at specific throttle positions and RPM's that will be learned during closed loop processing. When these pages are open, you can view the target AFR by clicking on a dot and tapping the space bar to view the target at a specific throttle position for that RPM. Use arrow keys to raise/lower targets.

AFR vs. Engine Temperature - During warm-up, the AFR on both cylinders will show richer than the target AFR at operating temperatures; this is a normal part of the warm-up map. No permanent changes to AFR targets and adjustments are made below 200 degrees. See TMax Tuning Manual for applications and procedures.

Interrupting 12v power to the module (battery service/replacement) requires system to be re-initialized (Step 7). Check battery terminal tightness as part of routine service (like during oil changes); avoid stacking accessory power leads onto main battery cables. If equipped with dual battery post ports, connect any accessories separately.

In-Tank Fuel Filters should be inspected as a part of routine maintenance. The filter is small and one bad load of fuel can clog it. The factory recommended service interval is 25K miles.

Fuel pressure should be checked during periodic service; this is also the first thing to check should you experience sudden or gradual decreasing performance. For any EFI system to operate properly, your fuel system should build and maintain 55-62 PSI of fuel pressure; your service provider can perform this simple test quickly.

Oxygen Sensors: Included Bosch wide-band sensors are very robust and durable; under normal conditions should last 50K miles or more. Circumstances that can damage or shorten the life of your sensors include:

- Leaded fuel – Race fuel
- Oil deposits from oil consumption problems
- Excessive moisture exposure
- Excessive (extreme) heat

There is no warranty on sensors.
Replacement P/N is 309-355.

H-DD® released a Tech Tip (#418) regarding improving conductivity at the throttle body wire connector (TCA) lug. Carefully remove the harness plug from the throttle body, clean the male TCA pins with a swab and alcohol, apply dielectric grease to the female terminals and reassemble. We recommend this procedure

ThunderMax Product Limited Warranty & Return Policy

ThunderMax is a division of Thunder Heart Performance Corporation (Thunder Heart) (THP). Thunder Heart warrants that its ThunderMax products will be free from defects in materials and workmanship with the following conditions:

1. The Three (3) Year Limited Warranty covers the ThunderMax ECM and the AutoTune module against defects in materials or workmanship from the date of purchase by the original consumer for a period of three full years. There is no warranty extended to the use and operation of the oxygen sensors included with the product.

2. If the product fails under normal use due to an electronic component failure within the warranty period, THP will repair or replace at our discretion the defective item with a new, repaired or factory rebuilt replacement. The warranty will be equal to the remainder of the original warranty period on the original product. All services must be performed by THP. This warranty does not cover any labor costs or incurred shipping costs either to or from THP and shall be the responsibility of the consumer.

3a. All support returns should be directed to the manufacturer, Thunder Heart Performance Corporation. A ThunderMax (Thunder Heart) support representative must initiate any return, which requires a data collection to be received prior to any return for any reason. Following this process will correct approximately 90-95% of any suspected issues, normally without removing the system from the bike. The only exception is, if the module will not link at all. If you can't link to the module an email must still be sent to TMaxSupport@Thunder-Max.com to assist with potential linking issues. When the need to ship a ThunderMax to THP for testing has been verified by THP, the data already received will narrow the focus on the areas for THP to test. After a claim has been verified by THP, a Return Authorization # will be issued and the customer shall return the product in question with a copy of the original receipt. If possible, all returned items should be packaged in the same manner as originally shipped.

3b. If for some reason (sold bike, ordered wrong part, etc) you want to return for credit, you must go through the original source you purchased the product from.

4. All missing items claims must be reported within 72 hours of receipt.

5. This warranty is invalid if the factory applied serial number has been altered or removed from the product.

6. There are no other expressed warranties, whether written or oral, other than this Three Year Limited Warranty. All implied warranties, including without limitation the implied warranties of merchantability or fitness for a particular purpose, are limited to the durations of this warranty. In no event, shall THP be liable for incidental or consequential damages of any nature whatsoever, including but not limited to lost profit or commercial loss, to the full extent those damages can be disclaimed by law.

Thunder Heart reserves the right to repair or replace the ThunderMax product at Thunder Heart's discretion. We do not offer refunds or credit for the returned product. In addition, any product that is misused or otherwise damaged by the customer will be billed for any repair, repackaging or replacement costs associated with the damage.

LIMITED WARRANTY DOES NOT COVER MISUSE OR MINOR IMPERFECTIONS WITHIN DESIGN SPECIFICATIONS OR THAT DOES NOT MATERIALLY ALTER FUNCTIONALITY.

EXCEPT FOR THE WARRANTIES EXPRESSED IN THIS AGREEMENT, THUNDERMAX AND THUNDER HEART PERFORMANCE DISCLAIMS ALL OTHER WARRANTIES, EITHER EXPRESSED OR IMPLIED.

For additional information, scan the QR-codes below with your smart phone for links to video instructions.

Software Installation	Software Update	TBW Module Installation	Initializing Instructions
Lowering Idle Feature	Auto Support Feature	Installing Exhaust Bungs	How ThunderMax Works