

THUNDER MAX

EFI made simple.

Part # 309-362, TBW Touring 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 on your warranty card, and below for your records!

Serial # TMWM

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 page 4). The TMax Tuner software package is designed to run on personal computers using Microsoft® Windows 2000™, Windows XP™, Windows Vista™ and Windows “7” 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 Install the ThunderMax ECM. Remove seat and both side covers. Push up on the bottom of the fuse box cover to remove the cover (located on the left side of the bike), then remove the ECM fuse from the fuse box.



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.

Step 3 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!**

2008-2009 models: 18mm sensors are located at the top of the head pipe; supplied 18mm wide-band sensors will replace the stock narrow band sensors. Some stock 2008 model rear bung location may cause interference with the transmission lid when using the longer ThunderMax oxygen sensor. If this is the case, crease the pipe next to the bung to change the angle of the sensor for clearance, or relocate the bung for proper clearance. **DO NOT pull or pry on the sensor to gain clearance—the sensor will be damaged if you do!**

2010 models: If retaining the factory catalyst-equipped headpipes, 18mm bungs will need to be added to the headpipes. Before adding bungs, verify map selection for your application. 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). **Stock 12mm sensors are**

located downstream on the pipes, between the engine and transmission; unplug and remove them as they will affect your ThunderMax system performance. 12 mm bung caps are available from many industry sources. Stock sensor plugs are located under the right side cover (black and gray plugs).

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Step 4 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.

Step 5. 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.



Step 6. Remove factory ECM 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.



Step 7 Disconnect the ECM from the connector as per the following procedure:
Depress button on socket housing of the connector; rotate locking bar until it reaches the full rearward position (the index pin on locking bar will engage the rear notch in the socket housing).



The connector internal latches are not fully disengaged until the locking bar on the connector is seated to the full rearward position to complete removal of the connector. If you force the socket housing with latches partially engaged, it will result in damaging the connector. Once index pin is fully seated, with steady yet careful attention, pull apart the connector from the factory ECM and remove it from the motorcycle.

Step 8 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.



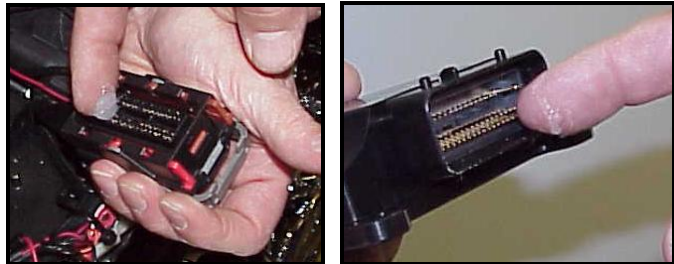
Step 9. If equipped with factory alarm, detach alarm antenna from ECM caddy clip by lifting slightly and sliding to the right of bike (do not disconnect).



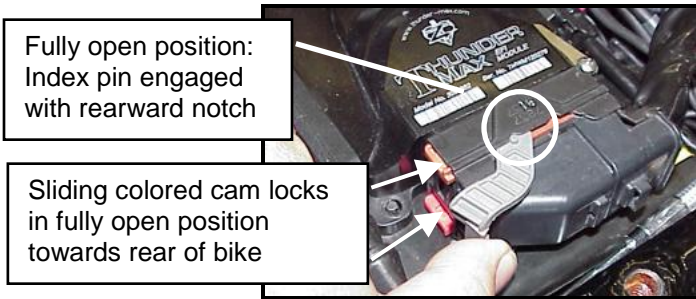
Step 10 Locate orange package of dielectric grease included with communication cable. Spread a small amount of grease on the AutoTune harness plug inboard of the mounting flange to allow the plug to easily slide into the ThunderMax ECM, with ThunderMax logo on harness plug facing up. Attach with screws provided.



Step 11 Install main harness connector to ThunderMax ECM. Before installing connector, lightly spread some dielectric grease on harness connector terminals, and on the inside lip of the connector port opening of the ECM to allow the rubber weather seal in the connector plug to slide into place without binding. See 'Tips' on page 7 for additional dielectric grease instructions.

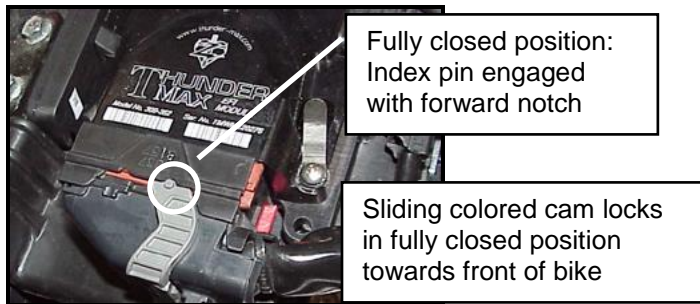


Before connecting, verify that the locking bar is in the fully open, rearward position (locking bar index pin is fully engaged with rear notch in the socket housing).



Important Note: If socket housing with grounding pin are not properly aligned during connector installation damage to the grounding pin will likely occur, which will require you to return the ThunderMax ECM for repair to the damaged pin.

Rotate the locking bar forward to engage the connector. Observe that the colored cam locks are moving with the locking bar; proper execution will show both colored cam locks visible in equal amounts on the forward-facing side of the connector when the locking bar is in its fully seated position with the button lock engaged, as in the image below (**do not force the locking bar**). Index pin will engage front notch in socket housing.



Important Note: Pin and socket housing of the connector must be fully engaged before you rotate the locking bar to the forward position. Forcing the locking bar forward before the connector is fully engaged will damage the connector and/or the ECM

Step 12 Place the ThunderMax ECM into the ECM caddy. If equipped, position alarm antenna as shown.



Step 13 Connect the oxygen sensor harnesses to the AutoTune harness. Carefully wire tie the leads to the motorcycle. Take extra care to ensure wire 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.

Step 14 Position the rear connector under the ABS caddy and attach with wire ties provided as shown.



Step 15 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.



Step 16 Re-install the ECM fuse and replace the side covers.

Programming the ThunderMax ECM

Now it's time to turn your attention back to your computer. Open your TMax Tuner software. There is no need to link 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 **[TMax Tuner Update]** and follow the prompts. After uploading new software (if found), next click **[EFI Maps]** **[EFI Map Listings / Definitions]**, double-click any map; when the Base Map Name Encoding window appears, click the **[Check Internet For Updates]** button and follow the prompts. Close the window after updating.

Next, 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, 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. Once your software and maps databases are verified as up-to-date, and you have installed the USB driver, move on to selecting and loading your base map.



Selecting A Base Map File from the Database

Note: The map selection process for the TBW ThunderMax is the same as the original ThunderMax system; if you are familiar with the map selection process, select your map and proceed to Initializing (page 6). If you purchased a pre-mapped system, you may also skip these steps and proceed to Initializing (page 6).

The TMax Tuner EFI Map Database will help you choose a Base Map for your application. To open the Map Database, select from the toolbar **[EFI Maps]** **[EFI Map Listings / Definitions]**.

Once the "Base Map Definitions" window appears, you will 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).

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. 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.**

Catalyst-equipped models include:

2008 California & International Touring models (mufflers)

2008 All CVO Touring Models (mufflers)

2009 California & Int'l Touring models (head pipes)

2009 All CVO Touring Models (head pipes)

2010+ All Domestic & Int'l Touring models (head pipes)

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

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, 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.

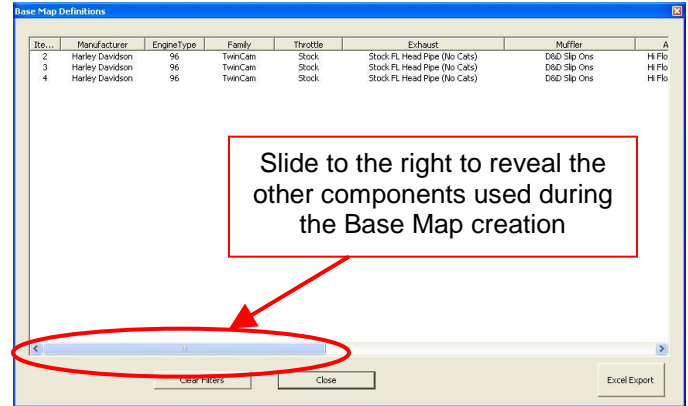
It...	Manufacturer	EngineType	Family
0	Harley Davidson	110	TwinCam CVO
1	Harley Davidson	96	TwinCam
2	Harley Davidson	96	TwinCam
3	Harley Davidson	96	TwinCam
4	Harley Davidson	96	TwinCam
5	Harley Davidson	96	TwinCam
6	Harley Davidson	103	TwinCam

Select [Engine Type] - The Base Map Definitions will be sorted by the engine displacement, which is the first Key Element you need to match to your combination. To filter the EFI Maps Database, **[Right Click]** on the engine displacement that matches your engine, as described in the Key Elements section. Right clicking will remove all other options for that particular category. Notice that the **[Clear Filters]** button is now selectable. If you want to return to the complete library listing, select the **[Clear Filters]** button and you will start over with all Base Map Files displayed.

It...	Manufacturer	EngineType	Family	Throttle	Exhaust	Muffler	A
1	Harley Davidson	96	TwinCam	Stock	True Dual Rinehart (No Cats)	(Exhaust Includes Muffler)	H Flt
2	Harley Davidson	96	TwinCam	Stock	Stock FL Head Pipe (No Cats)	D&D Slip Ons	H Flt
3	Harley Davidson	96	TwinCam	Stock	Stock FL Head Pipe (No Cats)	D&D Slip Ons	H Flt
4	Harley Davidson	96	TwinCam	Stock	Stock FL Head Pipe (No Cats)	D&D Slip Ons	H Flt
5	Harley Davidson	96	TwinCam	Stock	Stock FL Head Pipe (No Cats)	Vance & Hines Slip Ons	H Flt

Select [Throttle] - Now that an engine displacement has been selected, move to the second Key Element, the throttle body and injectors. After selecting your application, move on to the third Key Element, which is the exhaust system.

Select [Exhaust] - Choose the style of exhaust installed on the motorcycle. If you have a factory head pipe with slip-on mufflers, right click on "Stock HD FL Head Pipe" to hide all other exhaust options, as shown below.



The three Key Elements have now been satisfied, the Engine Displacement, Throttle Body / Injectors, and the Exhaust system style. As the picture above shows, there are still three choices for a Base Map for your engine combination. ThunderMax's AutoTune system has more than enough resolution to use any of these Base Maps to correctly tune your engine, but continue choosing the closest components that best match your combination to minimize learning time.

Continue selecting options until you have the library narrowed down to the fewest number of maps as possible. If more than one map remains and all components shown are the same, select the Base Map with the latest build date (last column before Notes) to ensure the newest map for your combination. Double click to select your Base Map. The next screen will allow you to review the components used on the bike that the base map was created with.

Base Map Name Encoding

Engine Manufacturer: Harley Davidson | H

Engine Type | Family: 96 | TwinCam | C

Cylinder Head Type: Stock | S

Piston Type: Stock | S

Cam: Stock | S

Exhaust: True Dual Rinehart (No Cats) | G

Throttle: Stock | S

Air Cleaner: Hi Flow Air Cleaner | A

Muffler: (Exhaust Includes Muffler) | A

Modification: None | N

Base Map File Name: HCSSSGSAAN011110.slk

Check Internet For Updates | Select BaseMap | Date: 1/11/2010

Close | Load BaseMap

Notes:
OrigMap TBW96_RTDS121809.slk
All stock 09 FL
96ci all OE
Rinehart True Dual Exhaust (no cats)
Screened Eagle 2.25 inch air cleaner
Speedo Cal: 43000

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.

Loading the Base Map File

Now that you've selected and reviewed the appropriate Base Map file for your engine combination, next step is to load the selected Base Map into the TMax Tuner software as the active map. Select the "Load Base Map" button on the "Base Map Name Encoding" window, as shown above. Once selected, TMax Tuner will load this Base Map and open to the Front Fuel Flow vs. TPS window.



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

Touring	2008	42450
	2009	43000
	2010+	44750

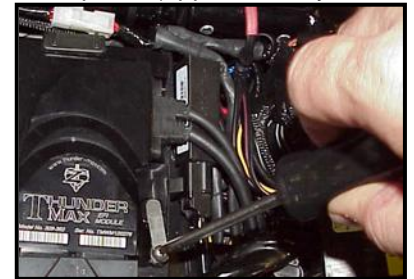
Now that the Base Map is loaded into the TMax Tuner software; you must 'Write' (transfer) the Base Map to your ThunderMax ECM. Linking to the module is now automatically performed with the TMax Tuner software. When the handle bar and key switch are in the on/run positions, the module will automatically link to the software. The red [Link] button turns green to indicate a successful link.

From the toolbar, click [File] [Write Module Maps and Settings], answer [OK] to the message that informs you that you are about to overwrite the current map in the module; the transfer bar 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".

IMPORTANT STEP BEFORE STARTING

Initialization Procedure

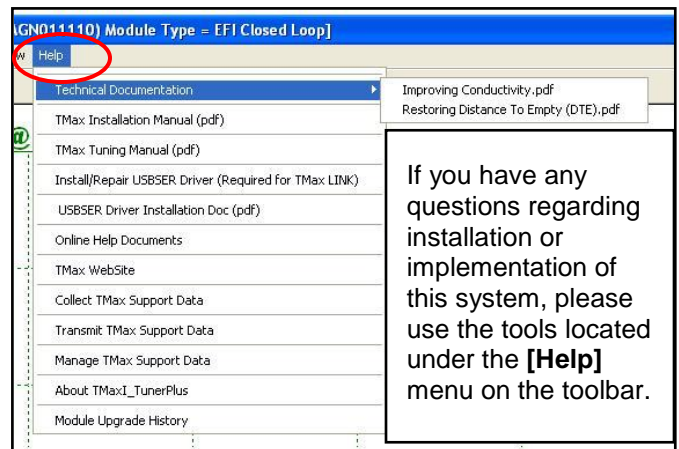
Required for new module installation, or when interruption of 12v power takes place. Example: battery change, removal of maxi fuse, etc. Turn the ignition switch on and the handlebar rocker switch to run for 20 seconds, uninterrupted. Cycle the ignition switch off and on, then start the engine. Let the 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!

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 ThunderMax 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. 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 will automatically retrieve and open 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.
- **AFR Correction vs. Engine Temperature** page is used to adjust cold start AFR's. It is active yet should be used with extreme caution. Any changes made to this page affects all maps, at every throttle position, every 256 RPM's! See TMax Tuner 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 enhance multi-tiered AFR targets at specific throttle positions and RPM's that will be learned during closed loop processing.
- **Target air/fuel ratios** can be viewed on the Air/Fuel-TPS @ RPM pages. 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. Engines equipped with catalysts should never have targets set to less than 12.8:1 AFR or damage to the catalyst system can result.
- **Accel Fuel** is be used to tune throttle response (go to [Module Configuration] [Basic Settings]).
- **During warm-up**, the AFR on both cylinders will be richer than the target AFR at normal operating temperatures; this is a normal part of the warm-up map. AutoTune and its targets are inactive below 200 degrees. AFR vs. Engine Temp is active yet you should be discouraged from making any changes to this page.
- **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.
- **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.
- **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) heatThere is no warranty on sensors. Replacement P/N is 309-355.

H-D® released a Tech Tip (#418) regarding improving conductivity at the throttle body wire connector (TCA) plug. 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.



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

