Part 1: Module Installation

"DISCLAIMER: NOT LEGAL FOR SALE OR USE IN CALIFORNIA ON ANY POLLUTION CONTROLLED MOTOR VEHICLES" *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.*
* **CA Proposition 65 "known to the state of CA to cause [cancer] [birth defects or other reproductive harm]"**
see www.p65warnings.ca.gov for details

#309-485 2004-2011 Dyna®, 2010-2013 XL Sportster®, 2008-2010 Rocker®, 2009 CVO FXSTSSE2®, 2008-12 XR1200®
The Model number on ECM will be 309-460 (the instructions and communication pigtail are the only difference).

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. The manual can be found in the software (see part 2), under the Help button in the menu. Record serial number NOW, in the space below for later use registering your ECM.

Serial # TMRM_____

All Models - Oxygen Sensor Installation Tips

Your ThunderMax kit includes robust Wide-Band oxygen sensors that report data from every cylinder combustion event to the ThunderMax ECM for automatic air/fuel corrections. These sensors replace the factory supplied narrow-band sensors first used on 2006 Dyna® and in most cases are direct bolt-in replacements (2004-2005 Dyna® models will require the addition of 18mm sensor bungs to the exhaust header pipes). Installation of the wide band sensors into most bung-equipped headpipes presents no clearance problems; however, some pipe brands may require exhaust pipe modification or sensor bung relocation for interference-free installation. The sensors must mount freely without contacting surrounding components. ***If this is not possible, do not attempt to bend or modify the sensor in any way as it is a sensitive electronic component and will be damaged if you do so.*** Modify the pipe if required for clearance. Weld-in bungs are available for exhaust systems not equipped with bungs or if current bungs present clearance issues. Bungs should be located no more than 3-4" from the head/pipe connection (for ideal location, refer to the 2007 factory location). Weld-in bungs are available in straight or angled style from many industry sources; see video installation link on page 9. After installation, route the sensor harness away from the engine and along the frame when possible, above the lowest frame point to avoid the possibility of dragging ground during operation.

Avoid routing harnesses where engine movement or sharp edges can contact and cut into the harnesses or connector plugs.
Tie the harnesses to the frame or existing component harnesses, taking care to avoid contact with any vibrating component that may chaff the sheathing or wires. Some disassembly of bike components may be required for best harness routing. **Remove any previously installed ancillary tuning device including oxygen sensor eliminators that may be plugged into the factory oxygen sensor harness.**

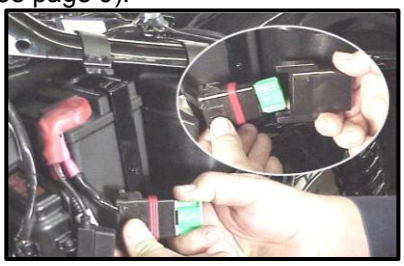
All Models - A packet of dielectric grease is included with your ThunderMax. After you have installed the Pigtail communication cable harness, before installing the ECM connector, apply the provided dielectric grease to the inside lip of the ThunderMax ECM to ensure the rubber weather seal does not bind during installation and across the clear case on the 36 pin ECM connector. Spread the grease across all of the female terminal openings, making sure the grease penetrates openings. This grease will help maintain vital conductivity between the ThunderMax and the 36 pin connector.


Also apply dielectric grease to the ThunderMax oxygen sensor harness connector terminals for to help maintain conductivity, and to the outer housing to prevent binding upon installation to the ECM.

Module Installation – Sportster®
(Skip ahead for other models)

Remove any previously installed ancillary tuning device including oxygen sensor eliminators that may be plugged into the factory oxygen sensor harness.

XL-A Unplug and Remove the factory oxygen sensors. Rubber caps are included to cap off the factory oxygen harness connectors (see page 9).



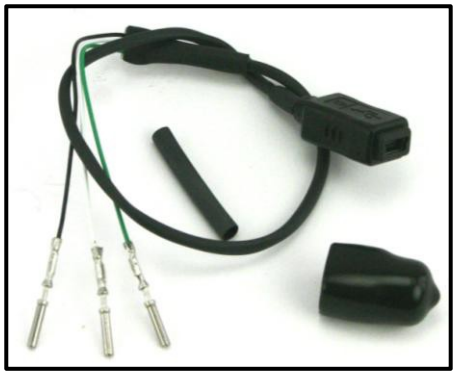
XL-B Remove the left side cover to expose the battery and main fuse compartment. Remove the main fuse cover, then the main fuse (Note: if equipped with optional security system, turn on ignition before you remove the fuse to avoid tripping the alarm).

XL-C: Remove the socket head screw and slide the ECM cover towards the left side of the bike to remove it (remove wires from ECM caddy cover channels).

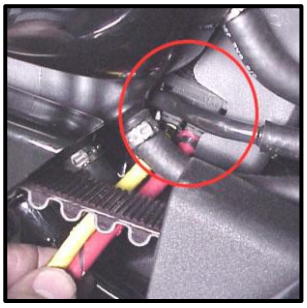
XL-D: Remove the stock ECM out of the caddy, towards the primary side of the motorcycle. Lift tang on the top of the caddy to help release the unit.

XL-E: Fully depress connector tab and disconnect the stock ECM from the 36 pin connector.

XL-F: Install ThunderMax Pigtail connector # 309-424 to 36 pin harness connector per connector instructions. Run the communication cable straight up inside the caddy towards the left side of the motorcycle, between the module area and the frame back bone, coming out above the battery. Use a wire tie on the connector to the main harness above the battery for easy access under left side cover.



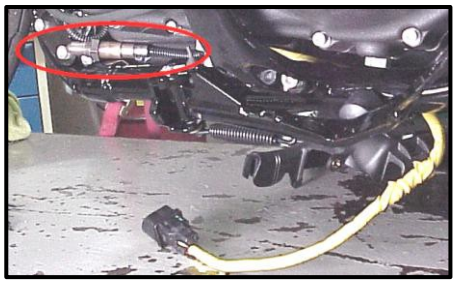
XL-G: Route the oxygen sensor harness into the ECM caddy. Starting from under the chassis between the rear engine mount and rear frame cross member, behind the belt, tight to the engine case. Feed the ECM plug between the bottom two oil tank hoses into the ECM caddy opening (it's a tight fit, you may have to push the plastic caddy forward while working the plug into the opening at the caddy bottom). Pull the harness through the caddy to the left side of the engine above the primary cover, being mindful that the rear oxygen sensor connector will limit how far the harness can pull up.



XL-H: Insert the greased oxygen harness connector into the ECM with the imprinted "ThunderMax" logo facing up. Using a long Phillips screwdriver inserted through the frame from right to left, tighten the (2) Phillips connector screws.

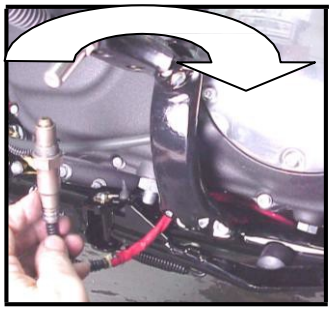
Connect the greased 36-pin ECM connector to the ThunderMax ECM. Install the ThunderMax ECM into the ECM caddy while gently pulling the oxygen sensor harnesses down from under the bike to reduce slack. Verify that the harnesses are **clear of the drive belt.**

XL-I: Starting from under the chassis between the rear engine mount and rear frame cross member, feed the oxygen sensor for the



front cylinder towards the front of the engine between the left frame tube and the engine (a tight fit that may require some patience).

Install the rear sensor the same way, except once it's through the frame, loop the sensor and harness over the footpeg bracket towards the rear of the bike.



XL-J: Route the un-tied front and rear sensors to the exhaust pipes and install them into the pipes (leave all leads loose to allow them to rotate during tightening). Plug oxygen sensors into Thundermax ECM sensor harness under transmission. Securely tie all harnesses to the frame and/or other harnesses with supplied wire ties. Avoid sharp turns while routing harnesses and avoid areas where engine movement, sharp edges, exhaust systems or hot engine components can contact and cut into the harnesses or connector plugs. Bundle excess harness together under transmission and secure so that they will not drop below frame rails or be contacted by engine movement.

XL-K: Re-install main fuse. Advance to **Step 3.**

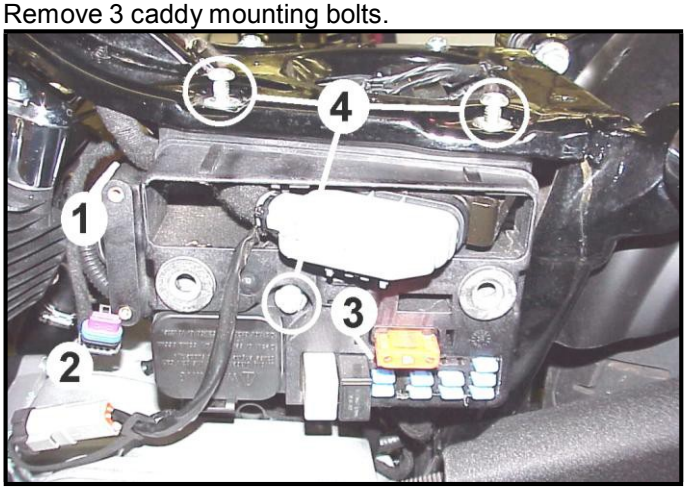
Module Installation – Dyna® Models

FXD-A: Remove seat. Disconnect fuel line from fuel tank by carefully pushing up the ribbed quick disconnect ring on the tank fitting while gently pulling the fuel line down. Loosen front fuel tank mounting bolt; remove rear mounting bolt, prop up tank rear 4-5" with a wood block.

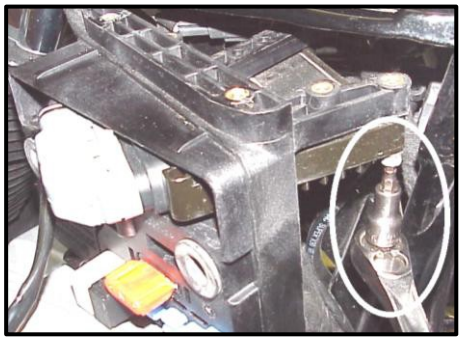
Remove any previously installed ancillary tuning device including oxygen sensor eliminators that may be plugged into the factory oxygen sensor harness.

FXD-B: Remove the factory oxygen sensors (if equipped) and install supplied Wide-Band sensors into exhaust pipes. Rubber caps are included to cap off the factory oxygen harness connectors on 2006-up models (see page 9).

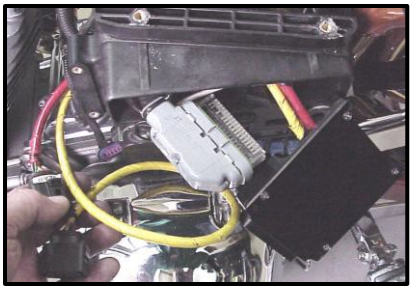
FXD-C: Remove left side cover to expose electrical caddy. (1) Unplug and remove coil assembly from caddy. (2) Slide diagnostic plug forward to remove from caddy. (3) Remove ECM fuse (top left blue fuse. (4) Remove 3 caddy mounting bolts.



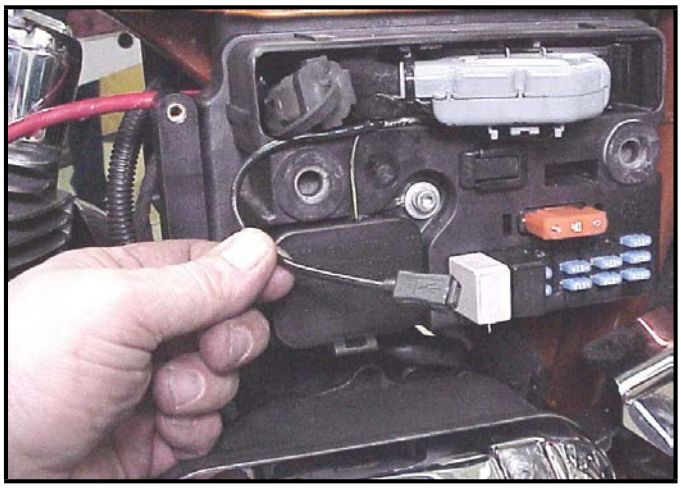
FXD-D: Gently pull caddy from chassis far enough to access the two stock ECM mounting bolts. Once ECM is unbolted from caddy, depress tang on main 36-pin ECM connector plug and remove ECM from plug. Install the included #309-424 USB pigtail harness to 36-pin connector as per instruction sheet.



FXD-E: Insert the greased oxygen harness connector into the ThunderMax ECM with the imprinted "ThunderMax" logo facing up; tighten the (2) Phillips connector screws. Feed the oxygen sensor harnesses through the ECM caddy towards the front of the bike as shown and install the T-Max ECM to the ECM caddy with original screws.

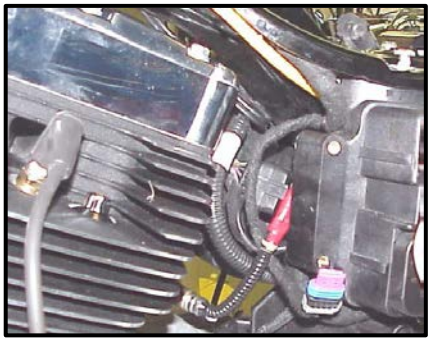


FXD-F: Reattach the caddy to the chassis with the two top frame bolts, start the 3 rd center bolt and torgue them to spec, taking care not to pinch any harnesses behind it in the process. Connect the greased 36-pin ECM connector to the ThunderMax ECM. Route pigtail harness for convenient access under cover as shown.



FXD-G: Route front ECM sensor lead along left frame backbone under gas tank; position sensor plug just forward of engine mount top link. Route front oxygen sensor lead up left frame tube to connector as shown. Check that connector position does not interfere with gas tank when in position before securing with wire ties.

FXD-H: For the rear cylinder, connect the oxygen sensor; coil the excess harness and tie it in the pocket behind the ECM caddy in front of the frame backbone.

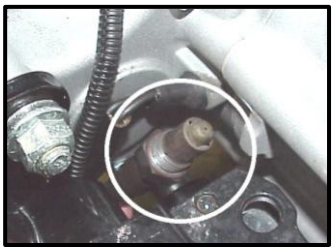


FXD-I: Securely tie all harnesses to the frame and/or other harnesses with supplied wire ties. Avoid sharp turns while routing harnesses and avoid areas where engine movement, sharp edges, exhaust systems or hot engine components can contact and cut into the harnesses or connector plugs. **Re-install the ECM fuse**, ignition coil assembly, gas tank, fuel line and seat. Advance to step 3.

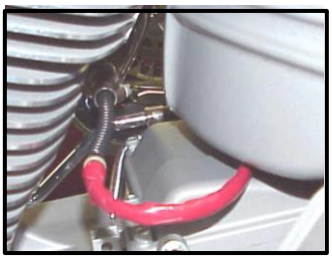
Rocker® & FXSTSSE^2 Models

Remove any previously installed ancillary tuning device including oxygen sensor eliminators that may be plugged into the factory oxygen sensor harness.

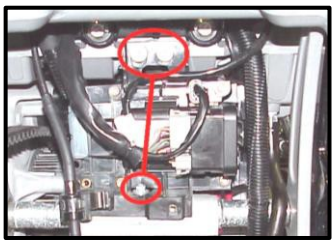
ST-A: Unplug and remove the factory oxygen sensors use supplied caps to cover factory bike O2 harness connectors (see page 9).



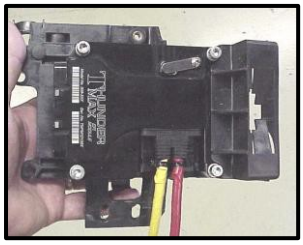
Thread the supplied front sensor up from the bottom through the gap between the engine and kickstand mount in front of inner primary cover; install into front pipe. Install sensor in rear exhaust pipe; route sensor lead under oil tank to right rear of transmission. Leave leads loose for connection after ECM installation.



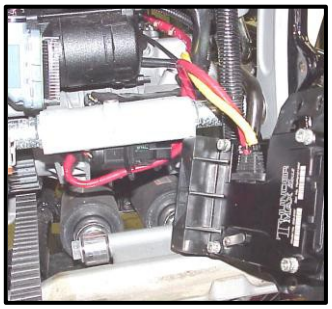
ST-B: Locate and remove the ECM fuse. Remove rear fender assembly and rear wheel to access ECM mounting caddy. Remove the plastic shield, then the ECM caddy mounting bolts.



ST-C: Remove the caddy from the chassis, then remove the factory ECM from the caddy. Mount the T-Max ECM using two mounting bolts and insert the greased oxygen harness connector into the ECM with the imprinted “ThunderMax” logo facing up; tighten the (2) Phillips connector screws.



ST-D: Install USB Pigtail Communication Harness to 36-pin ECM plug as per included instructions. Connect the greased 36-pin ECM connector to the ThunderMax ECM. Re-install the ECM caddy with the oxygen sensor harnesses routed over the top of the swingarm pivot bolt; connect the rear sensor and coil the excess harness for the rear sensor (shown red) and tie it up under the transmission housing, clear of the suspension and any other moving parts.



ST-E: Route the front sensor lead along the right frame rail, position connector as shown behind brake pedal.

ST-F: Securely tie all harnesses to the frame and/or other harnesses with supplied wire ties. Avoid sharp turns while routing harnesses and avoid areas where sharp edges, exhaust system or hot engine components can contact and cut into the harnesses or connector plugs. Replace the ECM fuse, position the pigtail for convenient access and re-install the rear wheel & fender assembly; move to step 3.

XR1200®

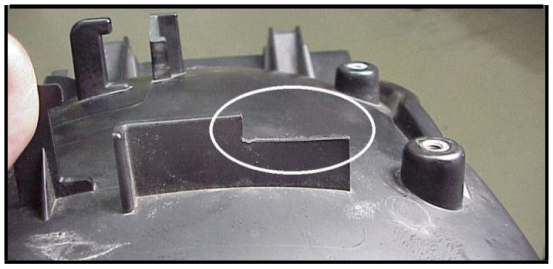
XR-A: Remove the seat and seat pan assembly. Remove the left side cover, exposing the main fuse panel. Remove the main fuse.

XR-B: Remove the (3) bolts that attach the steel frame bracket to the frame, exposing the factory ECM.

XR-C: Remove the lower inner fender bolt and allow the inner fender to rest on the rear tire. Unplug and remove the factory ECM from the inner fender.

XR-D: Install included ThunderMax Pigtail connector 309-424 to 36 pin ECM connector per instructions included in package with connector.

XR-E: Remove the inner fender and trim the plastic as shown to provide clearance for the ThunderMax oxygen sensor harness.

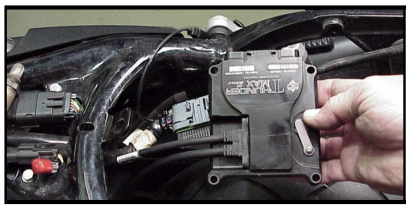


XR-F: Unplug and remove factory O_2 sensors; use supplied caps to cover factory bike O_2 harness connectors (see page 9). Route ThunderMax front oxygen sensor harness through gap between swingarm and frame. It's a tight fit; turn connector so that locking tab boss faces forward and open plug area faces to left side of bike and it will slide through. Feed connector under transmission.

XR-G: Route front O_2 sensor from under transmission through gap between lower frame rail and primary cover, along frame rail to front exhaust pipe. Carefully wind O_2 sensor harness 3-4 turns counterclockwise before installing into exhaust pipe; turn clockwise while installing to unwind harness. Connect harness plug under transmission.

XR-H: Route ThunderMax rear O_2 sensor between left frame rail and oil tank. Install O_2 sensor into rear exhaust pipe and connect plug.

XR-I Position ThunderMax O2 harness plug to approximate ECM location. After applying dielectric grease to connector, install harness to ECM with imprinted "ThunderMax" logo facing up. Tighten the (2) Phillips connector screws.



XR-J: After applying dielectric grease, carefully connect ThunderMax ECM to the 36 pin harness plug, ensuring that the harness plug weather seal does not roll out or get pinched during assembly; firmly press the plug and ECM together until latched completely. Install the ThunderMax ECM to the inner fender; tie oxygen sensor harnesses to the frame or existing component harnesses, taking care to avoid contact with any vibrating component that may chaff the sheathing or wires. Route the pigtail connector plug to gap just forward of the right shock absorber for access to the communication cable. Re-install the steel frame bracket. Re-install main fuse, seat and seat pan/fender assembly.

IMPORTANT STEP BEFORE STARTING

Initialization Procedure

This procedure allows the ThunderMax to "learn" the "home" position for the Idle Air Control (IAC) motor. This is the only setting within the system that is not retained during 12 volt power interruption. It is required only 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 (without starting the engine) for 30 seconds, uninterrupted. Cycle the ignition switch off for 30 seconds **(time it)** and then back on for 30 seconds. **Repeat the 30 on / 30 off cycles three times;** after the 3rd off cycle, start the engine. Let the motorcycle idle on its own for 15 seconds. Cycle the ignition off, then 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. Use provided rubber dust cap to protect the open end of the mini USB Pigtail while not in use.

TIPS AND GENERAL INFORMATION

Special Note for International Model Bikes with Active Exhaust Enabled: *If your bike is equipped with a working Active Exhaust Valve, you must unplug the active exhaust harness before linking to the module, as the AEV circuitry conflicts with the communication stream. You can re-connect the harness after unlinking. If the stock exhaust has been changed, disregard this step. ThunderMax does not support active exhaust.*

Please find the enclosed caps to block off the bike side of the stock oxygen sensor connector. There are 2 large caps for all motorcycles that come stock with the smaller 12mm oxygen sensors. Install per the picture to the left.

International (non-US) model notes – ThunderMax does not support active intake/exhaust functions.

Nitrous - When adding a Nitrous system, plan to use a relay to control the activation of the system. This will keep from overloading the circuit and causing damage to the ECM.

Interrupting 12v power to the module (battery service/ replacement) requires system to be re-initialized (see setup part 2 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 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 compromise 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 dealer can perform this simple test quickly.

Oxygen Sensor Care: Items that can damage or shorten the life of your sensors: Leaded fuel-racing fuel, oil deposits from oil consumption problems, excessive moisture, Excessive (Extreme heat) heat. There is no warranty on sensors (part # 309-355).

You are ready to proceed to part 2 setup of your system.