SECTION BOOKLET

A Setup Button

5 guides · compiled Oct 18, 2026 · https://help.impactwiringsolutions.com/section/tuning-overview/setup-button
Each guide keeps its own page numbers and version stamp. The newest versions are always online.

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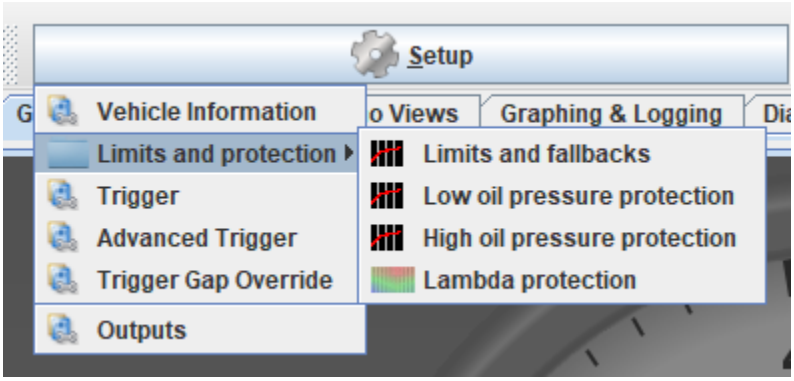
Setup Button in TS



1. Vehicle Information:

- This section contains essential settings related to the engine's fundamental configurations, such as **Displacement, VIN**, and other parameters crucial for proper ECU operation.

2. Limits and Protection:

- Allows you to set safety limits for engine parameters, such as RPM, coolant temperature, and oil pressure. This ensures the ECU can take protective actions if these values exceed safe thresholds, helping prevent engine damage.

3. Trigger:

- Contains settings for configuring the engine's crankshaft or camshaft position sensor (also known as the trigger). These settings are essential for synchronizing the ECU with the engine's rotation.

4. Advanced Trigger:

- This provides more detailed configurations for the trigger system, including settings for advanced triggering modes. This is usually required for engines with more complex timing needs or custom setups.

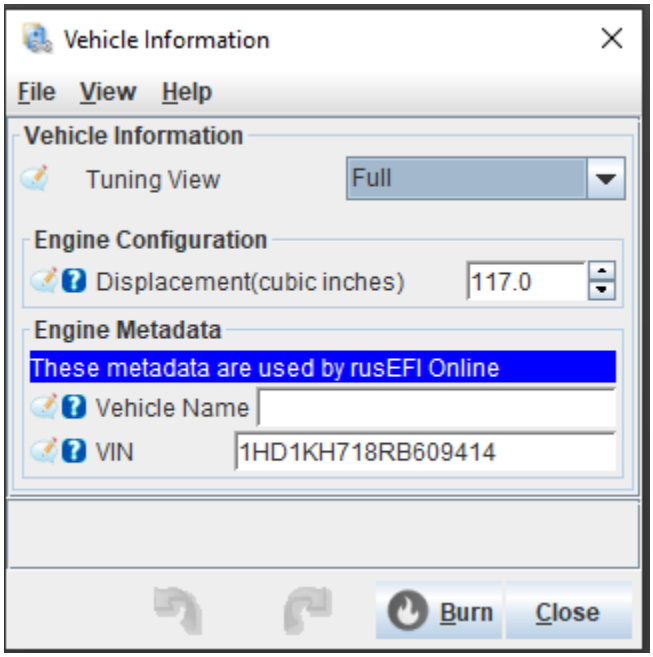
5. Trigger Gap Override:

- Allows you to manually set a gap override for the trigger signal. This option is useful if the standard trigger setup does not accurately detect gaps, which could affect engine timing.

6. Outputs:

- Configures various ECU outputs that control engine components, such as fans. These settings allow customization of how the ECU controls each output signal.

Vehicle Information Settings Window



1. Tuning View:

- **This dropdown lets you choose the complexity of the settings display**. For most users, the Tuning layout is recommended as it hides some less commonly used buttons, creating a cleaner interface. However, we will explain everything using the Full layout in this manual to ensure clarity.

2. Engine Configuration

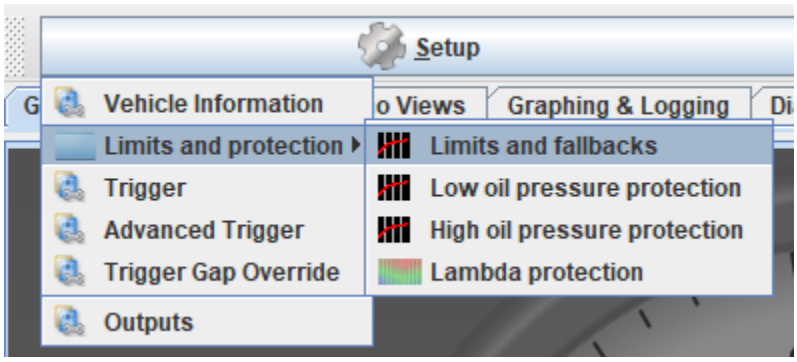
- Displacement (Cubic Inches): Enter the engine displacement in Cubic Inches, an essential input for calculating air-fuel ratios and other tuning parameters.

****NOTE: Some older versions of firmware still have displacement in liters, please make note of this and use the correct value**

3. Engine Metadata:

- These fields are primarily used to provide additional context, though they aren't necessary for basic Impact ECU functionality.
- Vehicle Name: A custom name for the vehicle (e.g., "Chris's Harley"), useful if managing multiple vehicles.
- VIN: in newer firmware versions the VIN input box is located here, input your VIN in all caps to get rid of any "VIN ERR" on your bike's dash

Limits and Protections (Setup Menu)



Limits and Protection (Base Engine Menu)

The **“Limits and Protection”** submenu under **“Setup”** includes essential settings for protecting the engine by setting operational limits. This section is crucial for safeguarding the engine against conditions that could lead to damage. The available options are:

1. Limits and Fallbacks

- This setting allows users to define **maximum operational limits** for various engine parameters, such as **RPM, boost pressure, and temperature.**
- When limits are reached, fallback strategies (like reducing power or triggering a safe mode) are activated to prevent damage.

  Example: Setting an RPM limit to ensure the engine doesn’t exceed a specified threshold, which can prevent mechanical failure.

2. Oil Pressure Protection

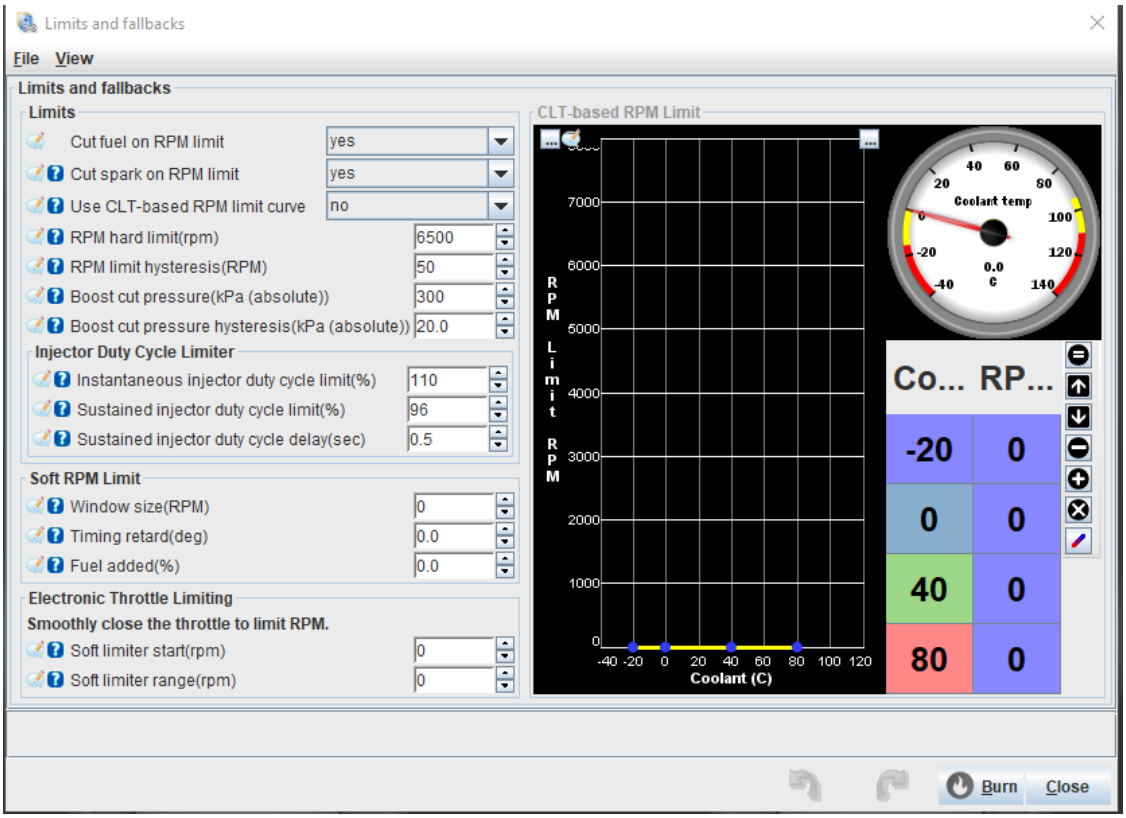
- Monitors oil pressure levels to protect the engine from insufficient lubrication, which can cause severe damage. This is typically not used on Harleys as they operate with an Oil Pressure Switch as opposed to an oil pressure sensor.

3. Lambda Protection

- This feature monitors air-fuel ratios (AFR) to ensure the engine operates within safe combustion parameters.
- If AFR deviates from the safe range (either too lean or too rich), it can trigger corrective actions.
- **Tip:** Lambda protection is essential for turbocharged or high-performance engines that require precise fuel control to avoid detonation or poor performance.

Limits and Fallbacks

Main Options



1. Cut fuel on RPM limit:

When enabled, this option cuts the fuel supply when the RPM limit is reached. Cutting fuel provides a smoother limiting action; however, it may lead to slightly higher combustion chamber temperatures since unburned fuel is not present to cool the combustion process.

2. Cut spark on RPM limit:

When selected, this option cuts the spark to limit RPM. Cutting spark can produce flames from the exhaust due to unburned fuel igniting in the exhaust system. Additionally, this unburned fuel can help cool the combustion chamber, which may be beneficial in high-performance applications.

3. Use CLT-based RPM limit curve:

Setting this to "yes" enables the RPM limit to vary with coolant temperature (CLT), utilizing the control panel on the right. This feature allows you to set different RPM limits based on the engine's coolant temperature, providing a temperature-dependent RPM control.

RPM Limits

- **RPM hard limit (RPM)**: The maximum RPM before cut actions (fuel or spark) are triggered.

- **RPM limit hysteresis (RPM):** Sets a buffer below the RPM hard limit, helping avoid rapid cycling of cut actions by defining a range within which RPM must drop before cut actions are re-enabled.

Boost Cut Limits:

- **Boost cut pressure (kPa absolute):**
  Specifies the absolute maximum boost pressure allowed before triggering a cut.
- **Boost cut pressure hysteresis (kPa absolute):**
  Defines a pressure range below the cut limit at which boost can resume, providing smoother control over boost cut actions.

Injector Duty Cycle Limiter

- **Instantaneous injector duty cycle limit (%):**
  This sets an immediate limit on injector duty cycle. If this threshold is reached, the system will immediately cut the injectors to prevent excessive fuel delivery.
- **Sustained injector duty cycle limit (%) & Sustained injector duty cycle delay(seconds):**
  This limit allows injectors to operate up to the specified duty cycle percentage for a short period (as defined by the delay). After this delay, if the duty cycle remains above the limit, it will trigger a cut. This setting helps balance performance by allowing temporary high fuel demands while protecting the injectors from prolonged stress.

Soft RPM Limit

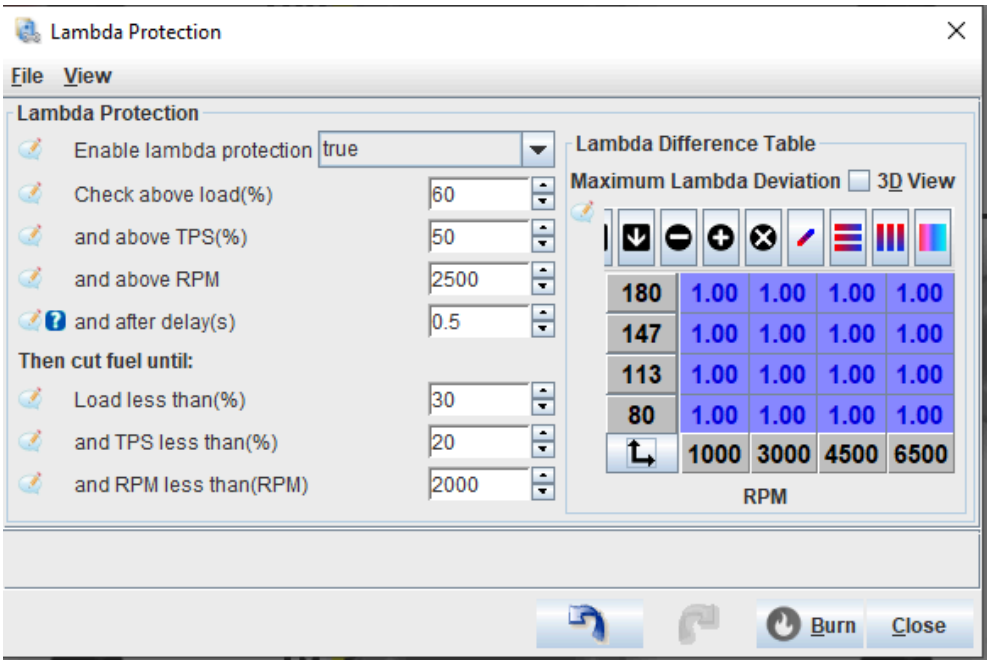
- **Window size (RPM), Timing retard (degrees), and Fuel added (%):** These options allow you to create a "soft" limiter that gradually engages, rather than abruptly cutting fuel or spark. This can help prevent sudden drops in power, making the limiter response smoother.

Electronic Throttle Limiting

- **Soft limiter start RPM and Soft limiter range (RPM):**
  Gradually closes the throttle as the RPM approaches the limit, helping to provide a smooth limiter response for electronically controlled throttles.

This section provides fine-tuned control over RPM, pressure, and throttle limits, with options for different limiter styles that balance performance and protection. For instance, using spark cut can add a visual effect with exhaust flames, while fuel cut keeps the action smooth and consistent.

Lambda Protection



The **Lambda Protection** window enables protection based on the Lambda values, which help in monitoring air-fuel ratio (AFR) deviations and ensuring safe engine operation under specific conditions. Here's a breakdown of the options:

Settings:

- **Enable lambda protection:** Allows you to toggle Lambda Protection on or off.
- **Check above load (%):** The system will check Lambda values only when the engine load exceeds this percentage threshold.
- **and above TPS (%):** Lambda values will only be monitored if the throttle position sensor (TPS) exceeds this percentage.
- **and above RPM:** Lambda protection activates only when the RPM is above this specified threshold.
- **and after delay (s)**: Sets a delay time (in seconds) before Lambda Protection engages after the above conditions are met.

Cut Fuel Until:

This section determines the conditions under which fuel will be cut when Lambda Protection is active.

- **Load less than (%):** Fuel will be cut until engine load drops below this percentage.
- **and TPS less than (%):** Fuel cut will continue until the TPS is below this percentage.

- **and RPM less than (RPM):** Fuel cut remains active until the RPM falls below this threshold.

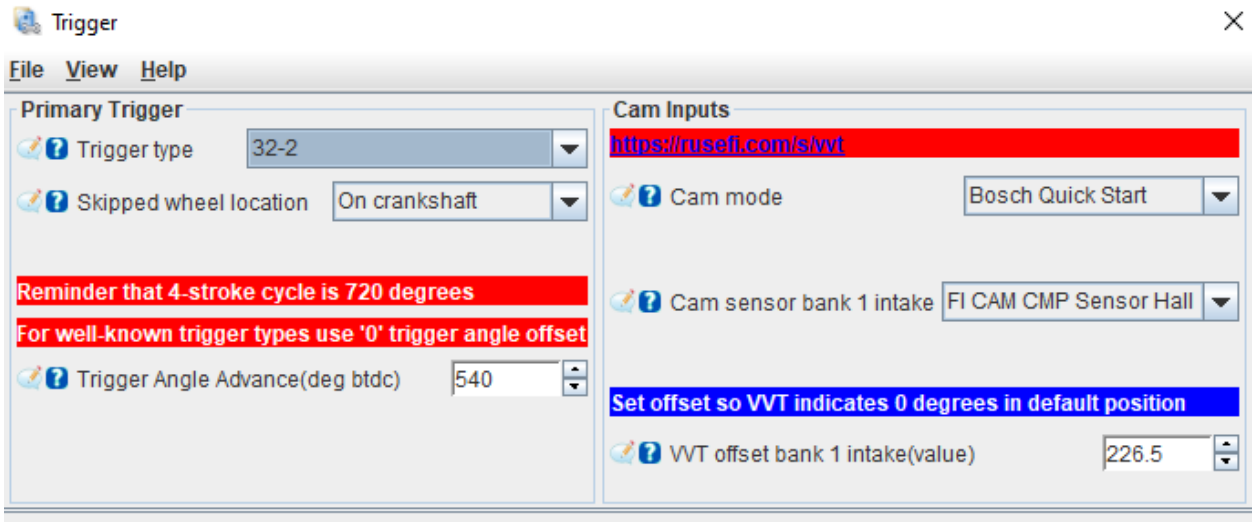
Lambda Difference Table:

The Lambda Difference Table (right side of the window) allows you to set a maximum allowable deviation in Lambda values.

- **Y-axis represents Load.**
- **X-axis represents RPM.**
- **Z-axis values represent Lambda values (not AFR)**.

This table helps define the Lambda deviation limits under various engine loads and RPMs, enabling finer control over protection levels based on actual engine performance conditions.

Trigger



Here's an explanation of the Trigger configuration based on the provided example. This setup uses a 32-2 trigger wheel, the trigger pattern for an HD M8. ***THESE SETTINGS WILL COME PRE-LOADED, AND IN MOST CASES WILL NEVER HAVE TO BE CHANGED!***

Primary Trigger Section

- **Trigger Type:** The example uses 32-2, meaning a 32-tooth wheel with 2 missing teeth, which is often mounted on the crankshaft.
- **Skipped Wheel Location:** Set to On Crankshaft to indicate that this trigger wheel is located on the crankshaft.
- **Trigger Angle Advance (deg BTDC):** Configured to 540 degrees in this setup. This setting depends on the engine's requirements.

Cam Inputs Section

Cam Mode: Set to **"Bosch Quick Start"** to indicate a Bosch Quick Start Cam Sensor Pickup Pattern is used. Can Also be set to **"Sync By Map"** to sync using a map dip threshold or **"Inactive"** to allow the bike to run in wasted spark.

Cam Sensor Bank 1 Intake: Defines which input is being Cam Sensor input. When running wasted spark or sync by map this is typically set to "NONE" otherwise the above setting is correct.

VVT Offset Bank 1 Intake: This ensure proper timing alignment when VVT is active and is set so that VVT Cam Timing Value reads "0" When we are commanding "0" cam timing.

Outputs

Fan Settings:

- **Fan 1 and Fan 2:** Configure the control of two separate fans, including:
- **On/Off Temperature (°C):** Sets the activation and deactivation temperatures for each fan.
- **Disable When Engine Stopped:** Prevents fan operation when the engine is off.
- **Disable Above Vehicle Speed:** Prevents fan operation when the vehicle exceeds a specified speed.
- **Idle Adder (%):** Adds a specified duty cycle at idle to assist with cooling at low RPMs.
- **Test Fan 1 and Fan 2 Button:** Allows you to test functionality of the fans with just the ignition on.

