IMPACT ECU · FUEL BUTTON GUIDE

Long Term Fuel Trim

Long term fuel trim (LTFT) is the ECU's memory for fuel corrections. Short term fuel trim fixes the fuel moment to moment, but forgets everything when you turn the key off. Long term fuel trim watches those corrections over many rides and **learns** them into two tables, one for the rear cylinder and one for the front. With Apply Correction on, every ride starts with part of the correction already in place.

You can use what it learns two ways: let the ECU apply it on top of your VE tables, or move it into the VE tables for good.

WHERE TO FIND IT

Fuel ▸ Long term fuel trims

Fuel ▸ Rear Cylinder Long Term Fuel Trim and Front Cylinder Long Term Fuel Trim (the learned tables)

How it works

- **It learns from short term fuel trim**, not from the O2 sensors directly. If the short term trim keeps adding 4% at some RPM and load, LTFT slowly learns +4% there. These settings stay greyed out until **Short term fuel trim** is enabled, and LTFT stops learning whenever closed loop is off (see "Off or just paused?" in that guide).
- Each cell learns only while you ride near that cell's RPM and load. A full table takes many rides.
- Two separate switches: **Gathering Data** (learn) and **Apply Correction** (use what was learned).
- What it learns is kept in the Impact ECU's own internal memory, so it's still there after you turn the key off. Your tune file (.msq) is not a reliable record of it.

The pictures were taken with no ECU connected, so the gauges and trim tables read 0 and the status lights are red. The numbers come from one example bike; don't copy them. Units are Metric (°C, kPa, km/h). Red numbers in each picture match the table below it.

The Long term fuel trims window

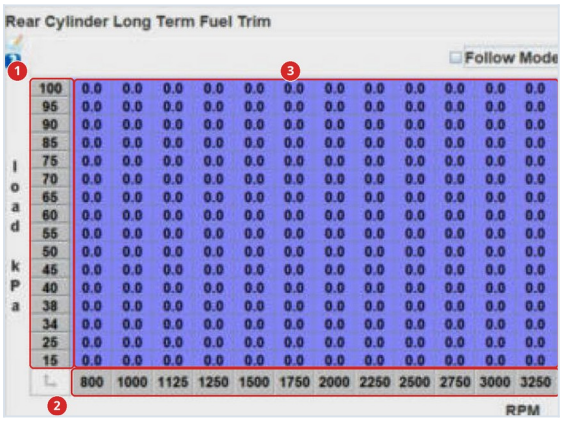


#	SETTING	WHAT IT DOES
1	**Gathering Data** MAIN SETTING	**yes:** learn. **no:** stop learning (what's already learned is kept). The trim tables in the Fuel menu are greyed out while this is **no**.
2	**Time const for Idle region (sec)**	How fast each region learns: roughly the seconds to learn most of a correction while riding on a cell. **Bigger = slower and steadier.** The regions are set in the Short term fuel trim window ("Cruise" here is "Main" there).
3	**Time const for Overrun region (sec)**	The same, for closed-throttle coasting.
4	**Time const for Power region (sec)**	The same, for heavy throttle.
5	**Time const for Cruise region (sec)**	The same, for everything else (mostly cruising).
6	**Max add (%)**	The most fuel any cell may add (up to 25%).

#	SETTING	WHAT IT DOES
7	**Max remove (%)**	The most fuel any cell may take away (up to 25%).
8	**Learning deadband (%)**	Short term corrections smaller than this are ignored, so LTFT doesn't chase tiny numbers.
9	**Apply Correction** MAIN SETTING	**yes:** the learned trims are added to the fuel **all the time**: cold starts, wide open throttle, everywhere, even when closed loop isn't active. **no:** the ECU still learns (if Gathering Data is yes) but doesn't use what it learned.
10	**Reset LTFT trims**	Sets every cell in both trim tables back to 0.
11	**Apply LTFT to VE and reset**	Adds the rear cylinder's learning into the Rear Cylinder VE table and the front's into the Front Cylinder VE table, then sets the trims back to 0. Use the steps in "Moving the learning into the VE tables" below.
12	**Status** DISPLAY ONLY	Green **Gathering data** and **Correcting** mean it's learning and applying. When it isn't, they read "No gather data" and "Not correcting" in red. The counters show how often it learned (hits), was outside the table (miss), or had nothing to learn (deadband).
13	**Trim bank 1 (rear cylinder)** DISPLAY ONLY	Top: the trim being applied to the rear cylinder right now (0 while Apply Correction is no). Bottom: a running total of all learning since power-up or the last Reset, a progress counter, not a fuel amount.
14	**Trim bank 2 (front cylinder)** DISPLAY ONLY	The same two gauges for the front cylinder.

Burn means save. Changes go to the ECU as you make them, but they are only kept after you click **Burn**.

The learned tables



1. **MAP (kPa) rows**
   The same load rows as the Rear Cylinder VE table.

2. **RPM columns**
   The same RPM columns as the Rear Cylinder VE table.

3. **Learned trim (%)** DISPLAY ONLY
   +3.0 = this cylinder wanted about 3% more fuel here (VE too low there); −3.0 = 3% less; 0.0 = nothing learned there yet. With Apply Correction on, the real need is about twice the number shown (see Good to know).

The ECU fills these tables in; you only need to look at them. **Fuel ▸ Front Cylinder Long Term Fuel Trim** is the same table for the front cylinder.

Using it step by step

1. Set up **Short term fuel trim** and make sure it's working (its own guide).
2. In **Long term fuel trims**, set **Gathering Data** to **yes**. Leave **Apply Correction** on **no** for now if you just want to see what it learns. Click **Burn**.
3. Ride normally, at different speeds and loads, over several rides.
4. Open the **Rear** and **Front Cylinder Long Term Fuel Trim** tables. Steady numbers well away from 0 show where each cylinder's VE table is off.
5. Then either set **Apply Correction** to **yes** and Burn, or move the learning into the VE tables with the steps below.

MOVING THE LEARNING INTO THE VE TABLES 1. Turn the ignition on and connect TunerStudio to the ECU.

2. Open **Fuel ▸ Rear Cylinder Long Term Fuel Trim**, then **Fuel ▸ Front Cylinder Long Term Fuel Trim**. Let each table fill in with the learned numbers from the ECU.

3. Open **Fuel ▸ Long term fuel trims** and click **Apply LTFT to VE and reset**. The ECU adds the learning into both VE tables and sets the trims back to 0.

4. Click **Burn** to save the VE tables.

Good to know

- LTFT can't learn more than the short term trim is allowed to correct (its Max add and Max remove).
- With Apply Correction on, the work is shared: LTFT learns about half of the correction, and the short term trim adds the rest again after each start. That's normal. Moving the learning into the VE tables may then take two or three rounds.
- After a big change (injectors, exhaust, cams, or big VE table changes), click **Reset LTFT trims** so old learning isn't applied to the new setup. The next time you connect, check that both trim tables read 0.
- After loading a different tune, check the two trim tables. If they don't suit the new tune, click **Reset LTFT trims**.
- If you send us your tune, send screenshots of the two Long Term Fuel Trim tables too.

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