IMPACT ECU · FUEL BUTTON GUIDE

Warmup Enrichment & IAT Multiplier

Both of these are simple fuel **multipliers**. Warmup enrichment changes fuel by engine (coolant) temperature, so a cold engine gets the extra fuel it needs. The IAT multiplier changes fuel by intake air temperature.

1.00 = no change. 1.20 = 20% more fuel. 0.80 = 20% less fuel.

WHERE TO FIND IT

A **Fuel ▸ Warmup enrichment**

B **Fuel ▸ IAT multiplier**

What they do

- They work whenever the engine is **running**, at every RPM and load, for as long as that temperature lasts. They don't work while cranking; starting fuel is in the Cranking menu.
- Between two points the ECU blends smoothly. Below the first point or above the last, it uses the end value.
- If a temperature sensor fails, its multiplier goes to 1.00. A failed coolant sensor on a cold bike means no warmup fuel, and TunerStudio's "CLT OK" indicator changes to a red "CLT error".

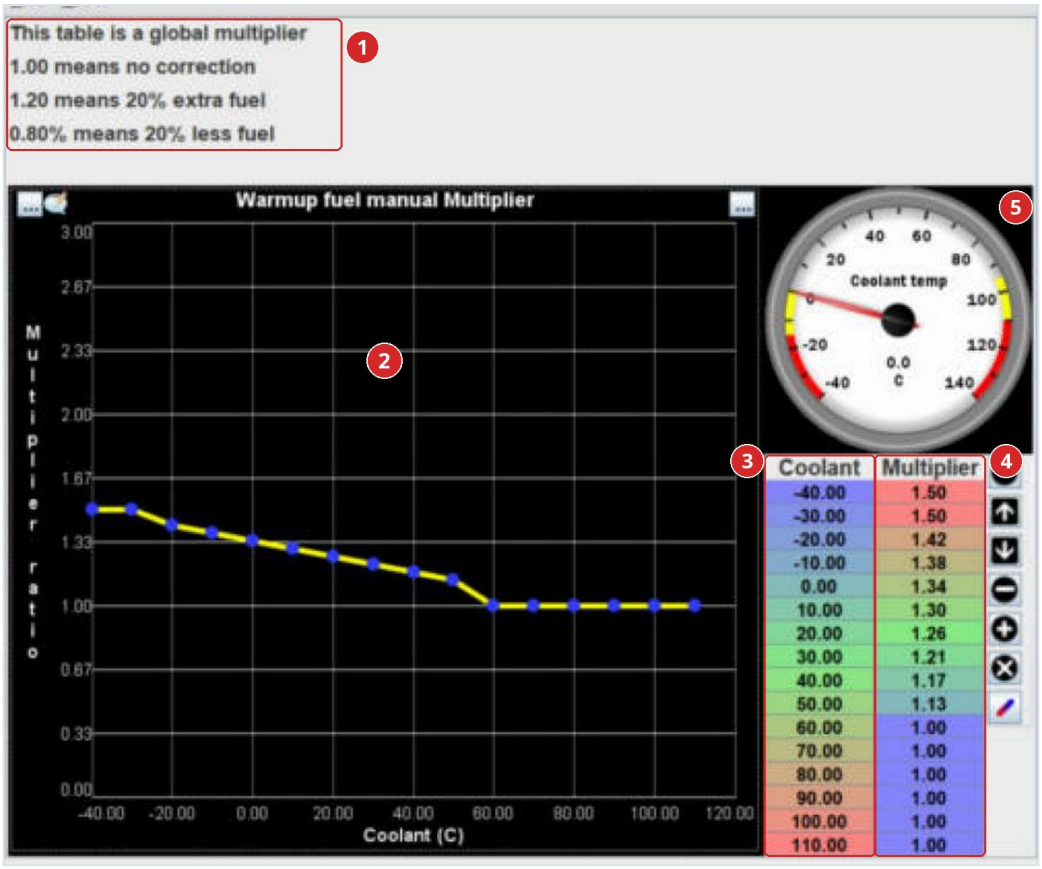
TWO RULES **Temperatures must go up, row by row.** Each one must be higher than the one above it. If two are the same or out of order, the ECU shows an error and won't run the engine until it's fixed and the ECU is restarted (key off and USB cable unplugged, then back on).

Never use 0.00. A multiplier of 0 means no fuel at that temperature.

The numbers in these pictures come from one example bike. Your tune's numbers will be different, so don't copy them. Units are Metric (°C, kPa, km/h). Red numbers in each picture match the table below it.

A Warmup enrichment

The curve is titled “Warmup fuel manual Multiplier.”

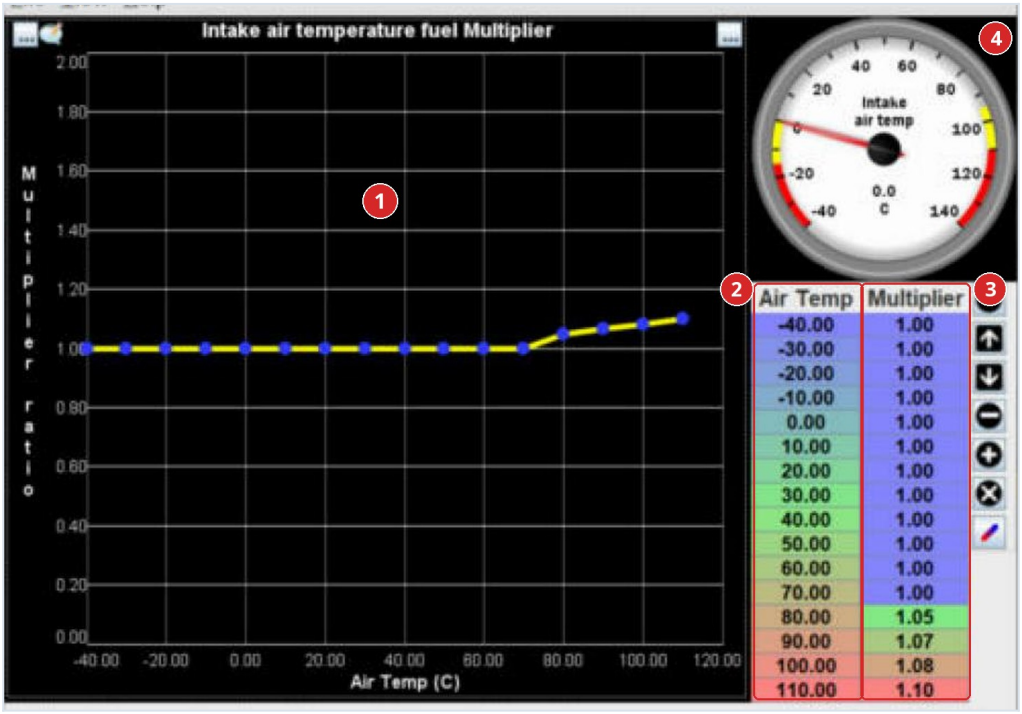


#	SETTING	WHAT IT DOES
1	**Help text** DISPLAY ONLY	Explains the multiplier. The last line has a typo: it should read “0.80 means 20% less fuel,” not “0.80%.”
2	**Graph**	The curve: coolant temperature across, multiplier up. You can drag the points.
3	**Coolant**	The temperature points, in °C.
4	**Multiplier** MAIN SETTING	The fuel multiplier at each temperature. In this example: **1.34 at 0 °C** (32 °F), coming down to 1.13 at 50 °C (122 °F), and **1.00 from 60 °C** (140 °F) up.
5	**Coolant temp gauge** DISPLAY ONLY	The live engine temperature. A marker on the graph shows where you are on the curve.

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

B IAT multiplier

Changes fuel by intake air temperature. **It's usually at or near 1.00**, because the ECU's fuel math already adjusts for air temperature: hotter air is thinner, and it gets less fuel automatically. A classic "air density" curve here would correct twice.



#	SETTING	WHAT IT DOES
1	**Graph**	The curve: air temperature across, multiplier up.
2	**Air Temp**	The temperature points, in °C.
3	**Multiplier** MAIN SETTING	The fuel multiplier at each air temperature. This example stays at 1.00 up to 70 °C (158 °F), then adds a little fuel when the intake air is very hot (1.10 at 110 °C, 230 °F).
4	**Intake air temp gauge** DISPLAY ONLY	The live intake air temperature.

The IAT window's Help text is incomplete (it stops mid-sentence). Leave this curve the way your tune came. Only change it if your logs show a fuel error that follows air temperature after the VE tables are tuned, and call us first.

Which setting fixes what?

SYMPTOM	WHERE TO LOOK
Cranks a long time or won't fire	**Cranking** menu (cranking fuel)
Starts, then dies within a few seconds	**Cranking ▸ After-start enrichment** (shows when Tuning View is Full)
Runs rough, lean or rich for the first few minutes while warming up	**Warmup enrichment** (this guide)
Idle speed too high or low while cold	**Idle** menu (that's air, not fuel)

Tuning warmup enrichment

1. Tune the VE tables with the engine fully warm first, where the warmup curve is 1.00.
2. Log a cold start all the way to fully warm: coolant temperature, **Rear Lambda**, **Front Lambda** and **Fuel: target lambda**. Lambda readings work the same on any fuel.
3. Where it's off: **new value = old value × measured lambda ÷ target lambda**. Example: 1.20 × 0.95 ÷ 0.88 = **1.30** (it read leaner than the target, so it gets more fuel). Use readings from before closed loop starts (below its Minimum CLT); after that, closed loop is already correcting.
4. Keep the curve smooth, and bring it to 1.00 by the time the engine is warm.

> **CLOSED LOOP AND WARMUP** Short term fuel trim stays off until the engine reaches its **Minimum CLT**, so warmup fuel isn't corrected until then. After that, closed loop steers toward the Target AFR and can take away some of the warmup richness. A Target AFR adder table set to CLT can make the target richer while cold.

NEED HELP? **Call (464) 250-9894**
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