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2 step launch control

Last Updated 5/15/2020 by Taylor Ward Share this article! In the most basic definition, a 2 step is a rev limiter that you install on your car which has 2 stages, one with a lower RPM and the other at a higher RPM. The lower RPM limiter is usually used for launch control, while the higher RPM limiter will be located on redline or slightly more than redline. This is to prevent excessive revving and engine damage. The 2 step also cuts the ignition instead of cutting the fuel, like the factory rev limiters. This is usually cut at a specific rpm lower than the main rev limiter for the purpose of building boost for launch better from standstill. Once the ignition is cut, the unburned fuel can burn in and out in the exhaust manifold and turbine housing. This flushes the turbo and makes boost, even though the engine is not under load. By limiting the revs, whether it's on the 2nd stage for engine protection or 1st stage for better launches, it all leads to a better driving experience. What Mustang needs you do look no further than Late Model Restoration to provide you with the necessary parts to give you a quality 2 step rev limiter. Gear and Tech : 11 December 2008 Two-step and three-step. It has a goal in mind, making a lot of noise and propel you as fast as possible. Don't dance. Let's start with the basics first. Two-step is also known as a stutterbox and is a form of launch control. Essentially two-step works as a secondary rev limiter. Two steps works off your speed sensor so it knows when you're moving and when you're not. If you do not move and the clutch is pressed down, the engine will be able to rev and hold at a lower set value. This puts load on the engine and if you are performing a turbo setup it will also build a few pounds of boost. Three steps just adds one next step (no kidding) and comes into play after you've been on the move. Three steps is a third rev limiter essentially and you no lift shift. NLS also allows you to keep boost between shifts. So basically if you're on the dragstrip and you roll up and stage, you'll be able to lock the car into gear, put your foot on the floor and it will stick to whatever RPM you take the two-step before. All you have to do now is link it to the third yellow slip and proceed to launch as 'eff. This is where three-step comes into play, after you first put the pedal on the floor and secure powershift in 2nd, 3rd and so on. By using two and three-step, you would build boost not only on the staging line, but between shifts as well. MSD Ford 2-Step in action, New Best The best way to start 2 steps is to take an AEM EMS or MSD 2 step get it. A 2 or 3 step is a very good way to build the line's boost and be able to keep boost between shifts. It will be cut you 1/4 times and give you a better launch guaranteed. Contributed by: Enginebasics.com We got two emails in a matter of a few days requesting this information, so I thought there was probably more demand than that, but people don't want to send us an email and request so here we go. What is a 2-step rev limiter? In short, most people call it just two step, but it's exactly as the name implies, it's a rev limiter that instead of just one setting, has two settings that have stepped one after the other. Most OEM manufacturers today have a stock rev limiter that has only one RPM (revolutions per minute) setting. Which means it hasn't stepped, but instead just an RPM setting that when hit, is just held there. This is what most know of as The Rev Limiter. With a two-step limiter, however, you have two tour limiters, each set with its own parameters. For example, you set one rev limiter at 4200 RPM and another at 6500 RPM. NOTE ---->2step is not anti-lag. This is said time and time again, and it is a common misconception. While 2step does build boost on the line, it's different from anti-lag. How does the limiter work? A rev limiter works by slowing down the timing or cutting the fuel to the cylinders of the engines. Most tuners refer to rev limiters in two ways. One is called a soft cut rev limiter and a hard cut rev limiter. On a soft cut limiter, the timing is slowed down to the point that the engine can no longer rev higher. This is called a soft cut, because the engine slowly starts to lose power and will not continue to rev higher. The other is called a hard cut rev limiter. This type of rev limiter is set to not only slow down the timing, but also cut the fuel to the cylinders. When the fuel is cut to the cylinders it causes a very abrupt cut to revving the engine, hence it is called a HARD CUT rev limiter. How you set up a 2-step rev limiter Most of this section depends on the parameters you change and change with your specific ECU. We will then have to speak very broadly in this part in the hope of helping everyone with their specific ECU. The parameters you usually operate with a rev limiter are: 1. Target RPM 2. Fuel Cut RPM 3. Ignition Cut RPM 4. Rev Retard RPM 5. Vehicle Speed Sensor (VSS) MAX 6. Boost Pressure Max These are the most common parameters, but as mentioned above, each ECU will be different. Here's the 2step set up for an AEM ECU Setting up a 2 step rev limiter for a Naturally Sucked in (N/A) engine when setting up a 2 step rev limiter on an n/a engine it's usually just one thing, and that's consistency. A 2 step rev limiter is a great thing for those with a manual transmission who want to improve the launch with the car. When you reduce the number of variables to a little, you get consistency. Consistency is is Important when trying to get a high power car out of the hole in drag racing. You essentially set the rev limiter to keep an RPM on the line, so you don't have to worry about what your right foot is doing. You simply plant it on the floor and worry more about entering into the clutch smoothly and launching the car successfully. With an N/A application, all you have to worry about is setting the target RPM, Fuel Cut RPM, Ignition Cut RPM, and VSS max. Below in the article, I'll talk about how you're going about choosing the ideal settings for each of these parameters. (CLICK IMAGE to enlarge) Setting up a 2-speed rev limiter for a Turbocharged engine This is where a 2-speed rev limiter can really shine. Improving your cars 60 ft. and 0-60 times can improve in a way you never thought possible just by setting up 2 step. The reason why is that you build boost pressure on the starting line, without load on the engine, by setting up the 2 step limiter with the right parameters. While getting boost on the line is a plus, you also get all of the same consistency and simplicity things we discussed above in the N/A section. How does the 2step rev limiter build boost without load What two steps gives you the ability to do is slow down the ignition at a certain RPM to keep the engine from revving higher in the RPM range. By slowing down the ignition at a specific engine rpm, we ensure that the combustion takes place later in the engine cycle. If you are not super familiar with a 4 stroke engines cycle you should check our article here to help you with this explanation. With the ignition slowed down, and the combustion continued, the exhaust gas temps (EGTs) will rocket sky, and the manifold pressure will shoot. There will now be a higher manifold pressure and temperature in the exhaust manifold which can usually only be found when the car is under load or at a higher RPM. This increased manifold pressure in turn will rotate the turbine and give the engine boost pressure usually never seen on the start line. As the timing is delayed even further in the combustion cycle process, the outlet will open and the combustion of the gas and air may even occur in the exhaust manifold itself, increasing pressure and heat even further in exhaust manifold and building even more boost pressure. This is why when you put the 2step rev limiter on a boood car it becomes extremely loud and you hear all of the back shooting. Backfiring is when a car does not burn all its fuel in the combustion process, and then burns in the exhaust system. The important parameters when setting up a boosted application will usually be all of them. How Setting up the 2 step rev limiter Unfortunately there is no magic number for every car, and every set-up, because there are so many variables. However, the goal is the same. Let the car have the fastest 60 ft. or 0-60 time We can do that. To do this there will be a balance between making great power, and not having the tires slip. Of course we can bounce the car out of the stock rev limiter and release the clutch, but this is just going to wash the tires and give us a terrible launch. Our goal is to take our two steps not to let this happen, but to have a strong controlled launch every time. For an interesting article on band contact patch to help you with traction, follow this link. For N/A Cars 2 step Choose a TOERENtal where you believe your engine is peak torque. Then set the fuel cut and ignition cut to the same RPM. Then set the VSS speed to the speed you want this rev limiter to stop limiting the engine and letting the car rev up all the way up. For tips on what the VSS set to read the steps for the boosted applications below as it will be the same. Turbocharged cars and step 1 in 2 steps: Choose a speed now where your engine makes its peak torque. Step2: Based on the RPM, you chose the fuel reduction at an astronomical level, so the fuel cut never steps in. On my personal car I have the 2step rev limiter set to 4200 RPM, the main limiter set to 6800 RPM, and the fuel cut set to 10,000 RPM so it never engages. Step 3: Set the ignition-slowing speed to a few hundred rpm less than the desired REVS to begin with. Which means if you set your rev limiter to 4200 like I did, set your anti-inflammatory speed to 3900. Which means that when the engine gets to 3900, it will slow down the ignition. Step 4: Set your VSS at a low speed like 2-3 mph for now. This way, the 2step rev limiter will disable and let your rev out completely as soon as you reach that speed. The dangers of 2 step *** The 2 step rev limiter can be a very dangerous thing. Depending on your settings and how much timing delay you use, you are essentially exploding fuel in a place where it was never meant to be. As a result, you are setting yourself up for failures if you are not careful. Exhaust manifolds and waste gates can burst with extreme pressure and heat, valves can also fall or warp, and who knows what else. Before I scare you too much, I want to say that this, like all things, only happens when it's abused. Make sure you don't stay on the 2step limiter too much. I suggest to people never get on the 2step longer than two seconds. In this way, the exhaust pressure and temperature never build up too long. As long as 2step is well set up and not abused you will be fine. The times where I hear of it becoming a problem, is with who think all the loud popping and backfiring is so cool, that they do it all the time for extended periods of time, and then are all confused as to why the engine blew. NOW FOR THE SECRETS AND TROUBLE SHOOTING 2STEP It will all come down to having peak power without washing the tires. That's the goal for all of us every time, but how to get there will be different every car. This is based on engine size, size turbo, tire size, dif on the car, suspension set-up, and more. So you see, I can't just tell you some settings and you're going to put them in, and you're going to leave. There are just too many variables. Even the driver himself is a variable because the way each driver clutches and drives the car will be different. 1. If you want to build more boost on the line there are two things you do: one. Increase the rev limiter to a higher RPM b. Lower the anti-inflammatory RPM so that more combustion occurs in the exhaust manifold instead of the cylinder. 2. You want to build less boost on the line because you're just laying wheel on the line a. Lower the rev limiter to a lower RPM b. Set the anti-inflammatory RPM higher so that it is closer to the same as your target rpm limiter. 3. Auto launches great, but once the 2step rev limiter is turned off and the engine is allowed to rev and make full power the wheels just break loose killing your time. A. Try raising the VSS mph because once you turn the wheels the 2step limiter will be dis-occupied and allow the engine to just spin the wheels even harder and compounding the problem. Increasing this will give the car more momentum and keep the power of the engine limited to a certain speed. Make sure you don't increase this value to a value higher than what the car would do in 1st gear at your set 2step RPM value or the car will never get out of the 2step limiter. 4. Car wastes the tires when I use 2step a. Try to slip the clutch more so you don't shock the powertrain with power and break traction b. Turn the 2step rev limiter to a lower speed where the engine creates less torque c. If you increase it, reduce the difference between your target 2step RPM and the anti-inflammatory RPM. Basically just make them the same number and you will build very little, if not a boost on the line. 5. The vehicle bog hard as soon as I let the clutch out. A. Increase the 2step rev limiter to a higher RPM b. Let the clutch out more slowly and slide the engagement so that the engine does not bog, but stays in the speed with the most torque c. If strengthened, lower the anti-retardant RPM, which should build more boost and give you more power 6. Being turbocharged, and lowering the ignition delay RPM is not building a boost a. Check the timing card of the car and make sure it is chosen on a well running car b. The 2step RPM is too low to build boost even with a super backward ignition, so you need to increase the main 2step RPM value. c. The wastegate can leak and bleed from the pressure. d. The turbo is incredibly large in With the engines displacement so that no matter what you do, you just don't have enough air, pressure, and heat in the exhaust manifold to flush out the monster turbo you have. Some 2 step controllers you check after:

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