

**#1 in Dodge Cummins Performance**

## **Super Sport Revo TUNING INSTRUCTIONS**

**Please read carefully!**

The **SSR** provides just one base performance software that takes care of all the limiting factors like the speed / RPM / Torque & boost limiters. Then the customer will need to fine tune the injection duration, injection timing & rail pressure to the truck's needs.

In order to allow the customization of the performance software to the particular engine's needs the **SSR** provides 50 levels each for the following parameters:

- 1) Low Load injection Timing ( LLT )**
- 2) High Load injection Timing ( HLT )**
- 3) Low Load injection Duration ( LLD )**
- 4) High Load injection duration ( HLD )**
- 5) Low Load Rail Pressure ( LLRP )**
- 6) High Load Rail Pressure ( HLRP )**

### **LOW LOAD Range : a few tips how to proceed with the fine tuning.**

As a foreword for the low load settings.

Everything in the low load range can really be done simply testing on the road. Keep the low load smoke in check, keep an eye on the EGT's and listen to the engine that's all that's to it.

Low Load Duration is about smoke on the road ( you want as little as possible ) and spool up for the track. Too much fuel will not spool the turbo. Not enough fuel will do the same.

Find the happy medium.!

With excessive low end smoke adjust the LLD down ( numerically lower LLD settings ) until the smoke is minimal or possibly completely gone. Find the right balance between smoke and throttle responsiveness.

Listen to the engine for eventual combustion noise ( often referred to as "timing rattle ) and adjust to the best possible combination of EGT's / low load smoke. As a remainder, injecting the fuel too late ( numerically lower LLT settings ) makes for a sluggish & unresponsive engine.

The Rail Pressure settings in the low load range have more to do with a little better responsiveness of the engine rather than with all out performance.

### **HIGH LOAD RANGE tuning instructions .**

**To get the most out of your engine you NEED to dial in the right settings on a dyno! This is especially true when it comes to the injection timing! While with too much injection Duration what you get is less power and higher EGT's, with fuel injected too early aka HLT set too high, you can ( NO! You WILL ) destroy your engine!!! One more time, to find the right high load settings for YOUR particular combination of modifications you NEED A DYNOMETER!!! Period.**

#### **Step one : Start with dialing in the HLD.**

The Duration : as a rule of thumb, every time it smokes you're losing power and / or the ability to spool the turbo(s). The old thinking " if it doesn't smoke, it makes no power" is no longer valid for the electronically controlled engines! At most, a light brown / grayish haze is what you want.

On the dyno, start out with the HLD set to "20".

This will provide a "base" run to compare to your further results.

Now increase the HLD to " 30 " and compare the dyno graphs. Did you gain or lose power? Did the power band become broader? (Or in other words, have you gained power in the high RPM range?)



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1) Power was gained : set the HLD to "40" and proceed with the next run.

2) Power was lost: set the HLD to "25" and proceed with the next run.

Case 1) HLD set to "40 " did loose power. Do the next run with the HLD set to "35" and continue testing from there. Adjust the levels until you've reached the best possible power

Case 2) HLD set to "25" did gain power compared to the runs with "20" and "30". You most likely found the happy medium. Eventually try a little higher and lower settings and compare the results.

### Step two : dial in the HLRP

The higher you set the rail pressure then more fuel you will get through the injectors for a given time. In other words, depending upon the size of the injectors you may ( or not ) see an increase in power output. If the injectors are real tall or not matched to the air flow of the turbo(s) then all you will get increasing the rail pressure is more smoke. As said before, smoke is less power.

At first, proceed increasing the value by " 10 " ( i.e. from 20 to 30 to 40 ) and compare the findings on the dyno graph. At some point, increasing the RP further, you will no longer see any power increase. Of course, it is pointless the increase the RP any further then.

### Step three : dial in the HLT

The timing is **MOST CRITICAL** for the performance and engine survival !!! Over advance the timing too much and the motor is going to suffer in no time! Typically the dyno runs do not last long enough to damage the engine even with and over advanced timing. That makes it somewhat save to test the timing on the dyno. NEVER EVER run the truck on the road or track with too much timing advance!!!

On the opposite side, not enough timing will kill the performance.  
Or in other words, if you really want to perform...

## YOU NEED THE TIMING SET RIGHT!



This dyno graph shows the result of over advancing the timing.  
(All other parameters have remained unchanged during these runs!)

HLT set to " 20 " makes 630 hp

HLT set to " 30 " makes 656 hp ( and the most power above 3.900 RPM )

HLT set to " 40 " makes 592 hp.



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It is clear that level " 40 " is injecting the fuel too soon, thus the fuel starts to burn too soon and before the piston has reached the top dead center. Very bad idea... In the case of this dyno graph the right proceeding after the findings with HLD " 40 " would be to reduce the timing to " 35 " and then compare the result with the " 30 " run. Then decide how to proceed from there...

The timing advance is directly related to the boost the engine is making. The higher the boost, then less timing advance is desired. This is due to the fact that with more air compressed into the cylinder the temperature is higher during the compression stroke. This in turn means that the Diesel fuel will ignite sooner and faster. On most dyno's the engine makes less boost than on the road / track. That's due to the dyno not fully loading the engine. In other words, if you tune the truck for the track, back out of the timing that is right on the dyno 2-4 numbers. If you tune the truck to compete on the dyno, leave as is...

### **A few hints about the proceedings on the dyno.**

-Engine fully warmed up to operating temperature!

-Wait at least 15 minutes between the runs to get the heat soak out of the motor. In hot temps use a huge fan to cool the engine. Always start the run at the same engine temp or you may get results that make no sense. That makes it in turn hard to understand what's going on.

-The runs need to be consistent!!! IE start all runs at the SAME RPM and at the SAME BOOST. Best thing is to start the dyno run with the turbo(s) fully spooled up i.e. At full boost. Unfortunately that's not always possible on inertia dynamometers. The slightest difference between the runs and you will not be able to see if something really changed.

### **Consistency is the key to successful dyno tuning!**

-Granted, dyno's don't lie but you don't want to trust them blindly either. Operator error or glitches are always waiting for you to screw the picture. When you think you got the setting right, repeat at least once if not twice the same run and then average them.

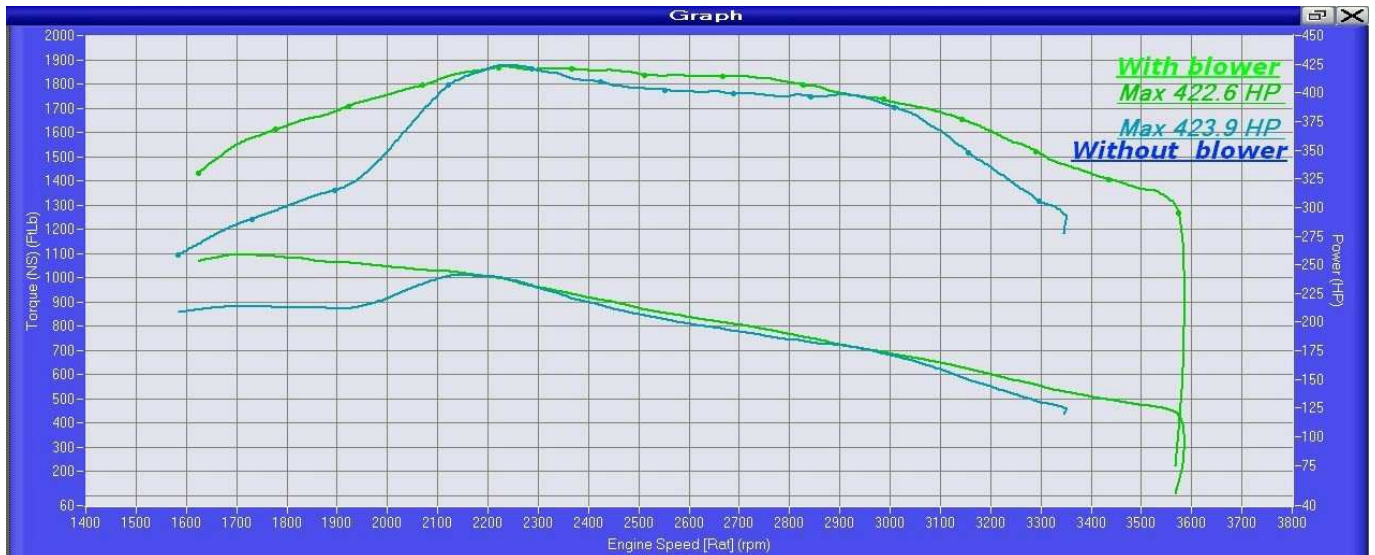
-Never ever change more than one thing at one time!!! You'll never be able to understand what did what.

-On several dyno's flex pipes are pushed over the tail pipe in order to convey the exhaust gasses and smoke out of the building. If there is no exhaust extraction blower connected to the flex pipe, this will hinder the performance especially during spool up and in the high RPM range.



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This dyno graph shows an example for exactly that situation. Sixteen feet of flex pipe connected to the exhaust with and without a blower. The difference is huge! Of course, the flex pipe without the blower makes for false readings. Yes, it is true, the max power did not change by any significant amount but notice how dramatically the power band changes!



### For comparison.

A somewhat close to stock software can be obtained with these setting's:  
(All maps of the parameters have been totally redesigned. This makes a direct comparison impossible)

LLT : 15 - HLT : 5 | LLD : 15 HLD : 1 | LLRP : 1 HLRP 1

A somewhat close to TNTR # 7 software can be obtained with these setting's:  
(Again it is not possible to directly compare the TNTR software to the **SSR**.)

LLT : 15 - HLT : 33 | LLD : 30 HLD : 15 | LLRP : 50 HLRP 50