SERPENT 710 FAQ v1.1.1

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Compiled from members‘ postings to the rctech 710 Forum.

www.rctech.net

INDEX

1. Shopping.

1.1 Europe

www.rccarinternational.com (good supply!)
www.serpent.at (good prices on tyres)
shop.the-border.nl (good range of Serpent cars/parts and fast service!)
www.pro8.de (German online shop - excellent prices!!)

1.2 International

http://shopping.rcmodel.com.hk/
http://controlcentre.rctech.net/
http://www.rc-mushroom.com/

2. Manuals and Setup Information.

710 Product Page:
http://www.mytsn.com/products/desc.asp?prid=3293

710 Default setup sheet:
http://www.mytsn.com/products/dnlfile.aspf?prid=3293&flid=2337&fnm=710setupsheetDEFAULT%2Epdf

710 Blank setup sheet:
http://www.mytsn.com/products/dnlfile.aspf?prid=3293&flid=2336&fnm=710setupsheetEDITABLE%2Epdf

Setup book:
http://www.mytsn.com/products/dnlfile.aspf?prid=3293&flid=2279&fnm=710setupbookletSAMPLE%2Epdf

710 Additional sheet:
http://www.mytsn.com/products/dnlfile.aspf?prid=3293&flid=2180&fnm=Additionalsheet%2Epdf

710 Reference guide:
http://www.mytsn.com/products/dnlfile.aspf?prid=3293&flid=2145&fnm=710RefGuideSAMPLE%2Epdf

710 Manual:
http://www.mytsn.com/products/dnlfile.aspf?prid=3293&flid=2144&fnm=710manualSAMPLE%2Epdf

3. Tool sets for the 710

The correct wrenches are listed as the following below. If you want to get Hudy tools (they are one of the best for RC use but a little expensive), I have mentioned the part numbers too.

1.5mm Hex Allen Wrench (111540)
2.0mm Hex Allen Wrench (112040)
2.5mm Hex Allen Wrench (112540)
3.0mm Hex Allen Wrench (113040)
7.0mm Hex Socket Wrench (170070)
4 mm Phillips Screwdriver Wrench (164040 (18mm))
5 mm Phillips Screwdriver Wrench (165000 (22mm) or 165040 (18mm))

You may also want to get the 2.5 mm ball tip allen (132540) to access the engine crankcase mounting screw onto the engine mounts.

The Hudy Glowplug / Clutchnut Wrench is also very useful. Part number is 107581. One of my favourite tools. It includes a wrench for your clutch nut, glow plug and the 5mm allen to screw in the pivot ball into the knuckles. I also suggest a flywheel holder like the one made by Ofna to lock the Centax flywheel when you tighten the flywheel nut with the 107581 wrench.

For tie rods, you can get the Hudy turnbuckle wrench 181030. I find this useful especially when you want to set the front toe in / toe out. For exhaust spring or caster clip remover, Hudy makes a tool for this too. Get it if you want. I have not needed to use this. Part number is 107610. If you do not want to get your hands all sore when building shocks (which is not a big matter anyways), you can also get the Hudy shockabsoreber assembly tool. Part number is 183010.

If you're using a Nova based engine (RB, Novarossi and NovaMega included), I suggest you get the slotted screwdriver specially for engine head. Part number is 155830.

Fur engine tuning screw, you can also get a Hudy one. Very nice but a normal inexpensive one will do fine. If you're interested, the 4 mm slotted 154050 or the long version 154060 is perfect for the job.

In addition to the above tools, you probbaly also need normal pliers, long nose pliers etc.

4. Lubes and Oils

4.1 Recommended

- Graphite grease - a dry fine powder lubricant which doesn‘t attract dust - should be available from car shops.
- Silicone oil/Serpent's Bearing Lube Oil (#1682)
- General grease, i.e. Mugen Super Grease (#B0308) or AE Stealth diff lube (#6591)
- Shock Oil - Serpent shock oils.
- A spray degreases for cleaning out bearings - something like car brake clearner is good.
- As a substitue for the small tubes of air filter oil, you can use a spray can of K&N air filter oil or after-run oil has also been suggested.

4.2 Usage

- For pillow balls and hinge pins - fine graphite grease
- For the main shaft and middle shaft where the shafts make contact with the bearings AND for dog bones - a small amount of silicone oil/bearing oil
- Thrust bearings and diff bearings - Mugen super grease or AE stealth diff lube, use sparingly.
- For all other bearings, Serpent‘s bearing lube oil is recommended.

5. Servicing.

5.1 Drivershaft lube tip from Rob Kuijper:

Since the new #1682 bearing oil is an excellent oil for lubricating bearings to ensure low friction and a long life time, it is also great for lubricating the ball and pin of the driveshafts. When you clean the ball and drive cup with #1690 cleaning putty and a soft cloth, just put one drop of oil on the ball and pin and take off the oil that is excessive with a piece of cloth, put the shaft back into place. You will notice a big improvement in the free running of the driveshaft system and the car is also handling better, a reduce in the wear of the drivetrain ! This oil does not attrack a lot of dust so it is safe to use for this purpose.Do this every hour of running for optimum performance.

Good luck and be amazed ;-)

Rob

PS;You can also use it on the steel ball and cup from the front adjustable anti roll bar !!

Original article: http://www.mytsn.com/publ/publ.asp?pid=9215

NOTE: To take the driveshafts out, it is best to remove the pivot-pins, that way you ensure that you don‘t have to re-set the track width, toe-in or camber.

5.2 Bearing service:

After a lot of people asked me how and what I'm using to lubricate my bearings, here is how i do it. First of all there bearings that come with the kit have been lubricated with light grease and this grease should hold up for several hours of use, but when you check the car over getting ready for the next meeting or practise session, maintaining lubrication is essential and also ensures that every bearing in the car (specialy wheelbearings and clutch, layshaft bearings) are being serviced. The way to do it is first of all clean the outside schields of the bearing with #1690 cleaning putty taking all the loose dirt off. Then using a pointy knife take of the seal (only possible with the Purple or Blue schielded bearings) and clean out the old grease and dirt washing the bearings with white spirit or brake cleaner, put them on a towel to dry and spin the bearing to feel if there is still dirt inside (grinding noise and rough feel) when it feels smooth but with a metallic sound, the bearing is clean and ready for reassembeling > press into place one of the shields and then use our new # 1682 high performance bearing oil (we tested this new oil in hard competition in all major races during the 2003 season) to lubricate the bearing (a few drops will do) spin it again and the noise will be gone. Then press in the other seal and spin it once again to be sure it turns freely. Do this maintanance after every 5 hours of driving and you will have the smoothest rolling car on the track !!

Good Luck and keep them clean and oiled up !

Greetzzzzz

Rob

PS; be sure that you always take care using hand tools and knives oils and cleaners, use protective gloves and goggles at all times to reduce the risks to the minimum

Original article: http://www.mytsn.com/publ/publ.asp?pid=9214

6. Assembly

6.1 Additional Centax III instructions:

http://www.rctech.net/forum/attachment.php?s=&postid=629596

6.2 Side stiffner fitting:

Tighten both side stiffener first then X bracket and top deck - the stiffener design is flush with chassis and top deck

6.3 Better front and rear assembly:

JULIUS' COMMENT TO BELOW TIPS: "In general, build the entire car (leave shocks off) and then check the freedom of movement. Like Goldfinger said, intalling all parts can sometimes make a huge difference. The fit of the car is very good (I think) but we did not want to create free movement with excessive play. As some parts need others to construct the complete suspension it will sometimes seem to bind until you install all parts."

6.3.1 The front.

- Should be no problem since both arm(lowr and upper) is hold by 1 piece part. If still, loosen every screw by half turn. Tighten the all the screw that will make "bulkhead assy" in 1 piece. Then tighten the lower 2 screw that holds "bulkhead" on chasis.
- Remove caster clip and check arm moving.

6.3.2 The rear.

- I was tempting to use my "luxurius file", the problem in the insert. Clean all the flash in the insert even a little flash, especially in the back end (where you going to put inside back plate or front mount) Coz if still in there, it wll reducing the arm "play".
- Loose and tighten the screw like in the front. But this time dont tighten lower(on chassis) then. Install and tighten the top carbon (brake and stab. holder) mount. This carbon is playing a major role of the rear assembly. After that tighten the screw on chasis.

6.4 Differential

There is no real need to grease the large rings. If you chose to, then use only very little.

The way you have set the diff is correct. To be sure of the setting check if you need a considerable amount of force to make the diff slip when you try and turn the first gear of the 2-speed while holding the rear wheels.

6.5 Centax clutch assembly

1) First of all make sure that the gears on the clutchbell are tight enough. Assembell and dissas-emble these a few times. Clean between each assembly.

2) Place only the 0.5mm shim behind the ""Brass cone"". Make sure you use the Brass one and not any other.

3) Assemble the clutch as described and record your A & B measurements, as per manual page 28.

4) Now the correct gap between the clutch shoe and the bell is 0.7mm. If its closer then your motor will bog down, and if too much then the clutch will have a delayed action and your clutch shoe wont last long as its just grabbing and may even slip too much. This is very important in the Centax Clutch. Get this wrong and you might as well use a electric car.

5) With these 2 measurements take the difference A - B = Clutch Gap 0f 0.7mm.
6) Find the right shims that will give you 0.7mm difference and then place them per diagram.

7) Say you measured 1mm for B and 3mm for A. then the difference will be 2mm. Now there is a total gap of 2mm. You must reduce this to 0.7mm for the right amount of clearance. So you must add 1.3mm of shims to achieve this.
8) Now add the smallest shims so that you minimise the endplay leave about 0.2mm gap.

9) You should always be able to spin the clutchbell when the motor is held verticaly with the clutch facing up or in the down position. If the clutch doesnt spin for at leat 5 seconds recheck your adjustments. Do this without any lubrication on the thrustbearing. Then when your happy lubricate the thrustbearing.

Set the spring collar as per manual. Try this. If it is still a little slugish as I doubt it will be then turn it clockwise 1/4 of a turn at a time and try it till the setting suits you.

You can do this without taking the motor out with a allen key if you didnt know. Just place the key in one of the holes on the clutch bell, locate the spring collar recess and turn.

NOTE: Others recommend the end float be set to 0.4mm instead of 0.7mm

6.6 Shock Absorbers

1. Don't fill the shock with the oil, just enough were the piston is fully covered (1/4 full).
2. Tilt the shock body so that when you pull the piston up and down (slowly), there's one big bubble that goes out of one of the holes in the piston. The bubbles rises up faster than having the shock filled up with the oil.
3. Once you see no more bubbles, it's now time to fill it up and do the normal procedure.

6.6.1 Shock reboung adjustment:

Instead of pressing the rubber bladders onto the shock body, I press it nicely and fit it in the plastic cap together with the aluminum ring over the plastic cap before screwing it onto the shock body. While the shock body is filled with shock oil to the brim, I quickly and carefully mount the plastic cap (together with the aluminum ring and rubber bladder) and screw it down onto the shock body. Some excess shock oil will spil out. This is normal.

The shock may be hard after assembly but what I do is slowly compress it till excess oil bleeds out from the bottom of the shocks. Then I adjust rebound on both left and right shocks (first by eyeballing it and then on the Losi shock tool) by releasing / unscrewing the top plastic cap and pressing the shock shaft in. After that is done, tighten down the caps on both shocks and put springs on it.

Mine last very long. I find no air leaks into my shocks and the shock oil remains clean after I take it out to refill them after 3 or 4 weekends of running.

Oh, I use the optional foam inserts 909447. They help a lot to maintain consistant rebound. Hope that helps.

6.7 Wire Routing - Rene Cornella:

See picture via this link:
http://pic1.picturetrail.com/VOL115/1851334/3571702/48523408.jpg

6.8 Weight Balance:

Rene Cornella calculated that when using about 20 grams of weight on the chassis just left of the tank the chassis would close to perfect balance.

To be honest I think only very few drivers would notice the difference. Often a small tweak in the spring settings is more noticable....

The 20 grams is not accurate for all engine/radio setups - some may require more weight!!!

6.9 Break and Throttle Linkages - Glenn Cauley:

Refer to the excellent article at the mytsn website:
http://www.mytsn.com/publ/publ.asp?pid=9742

6.10 Steering Linkage:

Julius: “I made it slightly shorter than in the book. I made it around 42mm. To do so I used a plain m3 threaded rod. Then you can use the ball joints unmodified and thread them on till they touch each other. You'll have the correct lenght then.” NOTE: This regards the fitment for Sanwa servos

7. Setup and Tuning

7.1 Tyres

7.1.1 Tyre Hardness

To determine when to change to a different hardness, bear in mind that there are two types of tyre traction: forward traction and side bite. Forward traction dictates how hard the car can accelerate and side bite is the amount of traction obtained when the tyre is loaded due to cornering forces. Generally soft tyres give more forward traction and harder tyres give more side bite. And this is why fronts are generally harder than rears.
There are obviously limits to this and going too far in either direction will result in loss of traction.

7.1.2 Kit Tyre Hardness and Out-Of-The-Box Handling:

My durometer indicated that the kit tires were probably F/R 40/37. The car understeered alot. I didn't have any red springs, so I changed to F/R 40/40, and this helped a little. Then I changed the DRS to the "above" position and there was a noticible lessening of the push in the high speed sweepers, but it was also better in the infield. Then I shortened the position on the anti-roll bar about 2mm, and the car is now nearly dead neutral when it drifts at high speed, with just a little too much front push left.

7.1.3 Art Carbonell‘s tyre selection method:

There are a lot of brands of tires, and more are coming out all the time. Most of these tires come from the same place, but from past experience I know that some work better than others. I'm not sure exactly why, since they come from the same company.

You shouldn't be afraid to try different brands of tires. You have to remember, your only contact with the road is with this black rubber. Nothing is more important to the handling of your car than having a good set of tires.

7.1.3.1 Tire Hardness
I prefer to start with a harder compound, unless the track is really dirty, in which case I have to go to a softer tire. One reason I don't like to run softer compounds, is that with softer compounds the car wanders a lot, like a flat tire on your real car. With harder tires, the car will slip more, but the fact is the opposite really. Putting firmer tires on increases side-wall stiffness, which helps stabilize the car. The car becomes more predictable. One way you can tell if you have too soft a rubber is by tire wear - the surface of the rubber. If the outside looks "shredded" that often means the tire is too soft.

7.1.3.1.1 Warm-up
Some tires require a warm-up period on the track before they become useable. This depends on the manufacturer. Sometimes at the track I start a 30 minute race using "40" durometer tires on the front, and "35" on the rear. When I just start out, if my car turns perfectly, I know I'm in trouble, because when the tires warm up, I know I'll have too much steering. If this happens, I'll pull in, and go to a harder front tire, maybe a "42" or so. Tracks are different. For many tracks, I want my car to push a little at the start, as in 10 minutes it will be good and stay that way throughout the race. Some brand name tires do this more than others. It's something you have to try, and learn by experience.

7.1.3.1.2 Tire Wear
Some manufacturer's tires wear longer than others. Again, I'm not sure why, because they mostly come from the same place. You should start with the car manufacturers recommended setup. It's a good starting place, but you want make your own tests.

When you want to measure tire wear, it's important to measure both the front and rear tires. Measure them going out, and coming in, so you get a reference for tire wear. Don't forget that although large and small diameter tires may wear at the same rate, the same amount of wear has a larger effect on the diameter of a small tire than on a larger tire. The smaller the tire diameter gets, the more quickly tire wear will further decrease the diameter.

The tires on the "outside" of your car usually wear more than the tires on the "inside". For most on-road events, the cars go around the track in a clockwise direction, so the left side tires are the "outer" tires, and will probably wear the most.

By measuring beforehand, you can predict how much your tires will wear, and you can determine ahead of time what tire size of tires to use in your Final, before you even start the race. You can even compensate for the "outside" tires wearing more, by starting with slightly larger diameter tires on the left side of the car.

7.1.3.1.3 New Tires
When you put new tires on your car, they'll run a little differently at first, until they break in. Even if your car doesn't feel right, run 10 to 15 laps to get the tires run in. A lot of people don't - they change right away. They switch to different tires before they break in the first set. If I have time, I usually try to run my tires in a little the day before the race. By "scuffing them in", they'll be more ready to race than if I just put them on for the first time on race day.

Don't be afraid to write all these things down; that's a big part of setting a car up for a long race. Just a few other observations. First, I usually run the same brand of tires on the front and back of my car. Second, for four-wheel-drive, the front and rear must be a specified overdrive ratio. You have to keep this in mind when selecting tire sizes.

7.1.4 Tyre Selection For Equal Wear.

Julius: “With the 710 I find using same shore front and rear gives close to perfect wear. With 40 shore and harder you may want to use one step softer fronts to get the wear to be even. Use the roll center and other settings to balance the handling.”

Julius’ setup can be found here:
http://www.mytsn.com/setups/setup.asp?sid=2340

Short description here:
I was running without sway bars first. Our track is fast and flowing and running without bars makes the car smoother and easier to drive. On small tracks you'd probably find the response too slow.

In the end I wanted a little more steering so I decided to put the rear bar back on. Using the inner holes on the arm makes it softer. That way I manange to keep the change from no rear bar small. Then I played around a bit with the position on the bar to fine tune the steering.
It's like the rear roll center spacers. The bottom spacer is a big step and you fine tune with the top.
In the roll bar the arm position is a big step the position on the bar is fine tuning.
BTW: The wing mentioned in the setup is from the Serpent Volvo.

7.1.5 Useable Tyre Sizes

The setup in the book will work with tires anywhere between 64-58. As with any setup it's a compromise. The roll center is affected by the change in setup you propose. But the change is small and in my opinion does not require compensation.

We tested the car with 64-55mm tires. We used a setup for 61mm and just ran the tires to the rim The change in handling was surprisingly small.

7.1.6 Rollout Chart:

http://www.rctech.net/forum/attachment.php?s=&postid=722766

7.2 Droop

Droop dictates the amount of travel in the downwards direction the suspension arms can achieve. Droop is adjusted by the downstops. The greater the downstop number, the less droop.
More droop (more movement of arms) will make more contact path for tires to the ground, thus more grip when cornering with speed.

7.2.1 Droop for larger tyres:

The kit stock setup recommends 62 mm at 6 mm front / rear ride height with 0 front and 7 rear droop. If you use 66 mm, set the car to 6 mm ride height for the front and rear as per the stock setup and decrease the front and rear droop by 2 (66-62 = 4, 4/2 = 2). So you should use +2 front and +9 in the rear when you use new out of the box uncut tires with 6 mm ride height.

7.3 Springs

The yellow spring that comes with the 710 is fine. The yellow spring that came with the 705 is the one coming from Veteq. It is longer and softer as well than the stock shorter rear yellow springs that come with the Impulse Streetspec and the 710. Rene cornella mentioned that the longer rear yellow Veteq springs are equivalent to the short orange rear springs. The rule of thumb is that the Veteq rear springs are always 2 colors softer.

Yellow springs are pretty neutral and standard for most tracks. I guess that is why Serpent included them in the 705 and 710 kit. For high speed tracks, red springs are the way to go.

Still looking at the 710, it is much lighter than the 705. With the 705, my personal feeling was that yellow springs were too soft. Putting red spring on the 705, you need to mount the shocks more horizontal. This makes the shocks softer and more progressive. Whereas on the 710, the shocks are mounted more vertical. In some ways, the yellow springs will be "harder" on the 710 than it is on the 705.

7.3.1 Spring selction for the 710:

(SOFT->HARD) Orange (909414), White (909415), Yellow (909416), Red (909417) and Blue (909418). Stock that comes in the kit is Yellow (909416). Be careful not to get the springs from Veteq as they have similar colour springs and pretty similar part numbers.

Also, if you look in the setup booklet (if you've downloaded the PDF file), you will see on page 19 listing all the shock springs available.

Note that new optional shock springs will be available from Serpent very soon.

7.4 Sway Bars

You can use a 2mm hexdriver to adjust the front anti-roll bars! Just put it in the end of the 2 blades and you can turn like you want.

7.5 One-Way

When using a one-way, it is also important to check that the breaking action isn‘t too strong, i.e. as only the rear wheels provide the breaking mechanism, then it is very easy to lock the wheels and cause a spin. To set up the breaks correctly, first place the car on the surface on which you want to drive and fully engage the brakes. Now adjust the breaks so that when you push the car, the rear wheels aren‘t locked. This forms the starting point for tuning your brakes on the track. During a run, you can now increase the braking force with the transmitter until you find a level which is good for you.
Secondly, the rear droops play a critical role in braking with a one-way: The less downward travel the suspension has the better the braking gets. A downstop setting of about 8-9mm is good. I find the range for downstop in the rear to be between 6 and 9. This depends a bit on tire size and ride height settings though.
And finally, the tighter the rear-diff, the easier it is to brake - but a tight diff should only be used on high-grip surfaces, otherwise it adversly affects the handling of the car.

7.6 Shockabsorbers

7.6.1 The 5th Damper Hole

Is the damping with 4 holes and 35wt oil the same as 5 holes with 40wt oil?

No it is not the same. Because part of the oil goes through the holes and part around the piston. The 5th hole is the same size as the others. It was done so you'd have 2-5 holes instead of 1-4 holes. This means the adjusment steps are smaller. The initial damping is slightly softer (always 2 holes).

7.7 Rear Track Width Limitations

The narrower the rear track width is set the less the rear suspension will travel in the upwards direction. It is therefore recommended to keep the rear track as close as possible to 200mm. Also, it can occur that the right rear DRS arm can rub against the centax gear if the rear track is greater than 200mm or the right-hand side track width is greater than 100mm (i.e. measured from the centre to the edge of the wheel rim). Ensure both left and right track widths are equal!!

7.8 DRS Positions

The DRS suspension has three main positions.

- **Neutral**, No change in toe.
- **Up**, The wheel gets less toe-in when the suspension compresses. This makes the rear steer more in corners.
- **Down**, opposite to up. It will make the car more stable under accelleration and braking (just using more static toe-in would make braking more difficult) but reduces the steering in fast corners.

7.9 Differential

7.9.1 Rear diff access:

The drive shafts hinder to removing of the diff, so aswell as taking off the top-blocks (holding in the diff), remove the upper pivot-pins of the rear suspension or the rear back-plate. Then you can access the diff without problems.

7.10 Driveshafts

SER-808220 Impact front drive shaft (63mm) is also usefull to make your front track width at 199mm EXACTLY (with 2deg camber) without dog bones binding on wheel axle.

7.11 Brakes

7.11.1 Drag Brake

I learned the drag brake trick the hard way.. waited and waited and finally watching burch and cyrul and those guys tunning in ther brakes and making the corners i just could not get the car to do .. I understood.. you want to tune it on the track, i use the trim on my throttle to adjust the drag brake.. most radios will not have any effect on end point so you can just trim to brake and fine tune it while you drive and you want to have the tires warm as the car will handle different after 5 or 6 laps from cold.... but tune the drag brake in so you can drive the majority of the track without having to reach for the brake.. and adjust for the extremes later, areas were you need not brake or area were you need a touch more, you will find you can tune your lines in better and become more consistent with your corner entry and exit and with that you build confidence and go faster.. end result the fun factor goes way up.

7.12 Gearing

7.12.1 Internal Ratio

The internal gear ratio is 1.875.

7.12.2 Spur Gear Options

- Pinion (1st gear)
  16T, 17T (stock) and 18T

- Pinion (2nd gear)
  21T, 22T (stock) and 23T

- Spur (1st gear)
  61T, 60T (stock) and 59T

- Spur (2nd gear)
  57T, 56T (stock) and 55T

7.12.3 Centax Spur Shim

SER-802511 Centax-3 Gear Pinion Shim

7.13 Fuel Tank

Julius: „With the "new" tank I still use an external filter. No in tank filter I know of will keep all particles out. In the .12 engines even the smallest particles can cause tuning problems. Better safe than sorry.“

7.14 Glow Plugs

In general there are two sorts of glow plugs Turbo and non turbo

First the non turbo plug this type of glow plug has been the mother of all glow plugs
and it has been around for a large number of years.easily recognized by the copper washer under the plug towards the combustion chamber.

There are several sorts of these normal glow plugs the main difference is in the material and thickness of the internal coil. Often there are numbers on the glow plugs (4,5,6,7 etc) so what do they mean ??

For let's say a number 4 glow plug this is a hot plug with a thin coil and the higher the nr. (a thicker coil wire) on the plug the colder the glow plug gets that means a hotter glow plug let's say an nr 4 again burns more intense and will improve the idle and low rev pick up this plug is also more likely to fail under heavy load or high temperatures.
If you take for instance a nr 6 glow plug the coil is thicker and the coil has more resistance so the burning is less intense and the high RPM performance of the engine will improve, but the bottom end pick up is less good than with a hotter plug so you always have to compromise between them.

My personal favorite always has been the # 2310 cold serpent glow plug this one doesn't carry a nr but is extremely all round and very well suited to engines between 2.1cc and 3.5cc. This plug also has a blank body on witch you can tell if the pug and engine has been running to hot by looking at the colour of the plug body if it is turning golden or coffee brown it is perfect temperature but when it is turning dark blue then you should richen the settings on your carb.

From Nova Rossi the personal favorite plug is the 2313*6GS then what does GS mean ?
GS means Gold Special and that stands for the material used and the type of coil used.
What part is Gold on these plugs, the pin witch is on top of the plug is coated with a thin gold layer this is done to make optimum contact with the coil, so giving it less resistance.
But what is Special then ? Special is the material used for making the coil this is a sort of platinum mixed with other metals for better all round performance.

The Turbo Plug.
This was a big step in glow plug technology it started at the beginning of 1989 and was a radical new step made by Nova Rossi, they were so convinced that they had developed something very special that they patented the design for a number of years.

What is so significant about TURBO plugs ?

The biggest change is that a turbo plug has a conical shape towards the bottom of the plug and that fits perfectly in the combustion chamber of a model engine. The thread and shape of the combustion chamber is also very different than of a normal glow plug, so you can absolutely not combine a turbo plug with a normal one and vice versa ! If you want to do that you also have to change the combustion chamber accordingly !!!

What is all the fuss about then what does it bring !?

The fitment of the plug is so good that the plug and the combustion chamber become almost one so heat transfer is optimal and compression is been kept perfectly without leaking .

With the thickness of the coil it is the same story as the normal plugs but you then have for instance a nr 6 TF plug and a nr 6 TC plug what is the difference between them ?

You have to see it this way:
TF means Turbo Fredda (cold in Italian)
TC means Turbo Calda (hot in Italian)

What makes a plug hotter or colder when it uses the same coil then ?
The part that is making the change is the plug body the hot TC plug has more material in the plug body (easy to see at the hexagon part were you put your glow plug wrench, this part is thicker)
Because it carry's more material it stays hotter during combustion and the idle and pick up is very good this type of plug is often used for small engines 2.1cc and 2.5cc for getting better idle and stop the engine from bogging down after refueling when driving out of the pit-lane.(I also use thi type of plug in rainy conditions)
The TC plug is also favorite with 1/8th buggy drivers because of this and they don't run such high RPM as the on-road cars.

Then the TF plug , this is the high performance plug best suited to on-road cars with 2.5cc and 3.5cc on fast sweeping tracks with lots of RPM being asked from their engines.
This plug is very well resistant to hot conditions and heavy loads without breaking the coil.
For me the 7Tf plug is favorite and can be used on most of the tracks, engines and conditions.
When the temperature is above 25 degrees Celcius I use an 8TF plug witch is a little colder and it makes the fuel consumption better in fuel consuming tracks. But take care that the idle and bottom pick-up is less good with such a cold plug but sometimes you just have to test it and experience the performance yourself.

With the turbo plugs you also have the TGF version with the same advantages as the normal Gold plugs so less resistance in the pin and better flow through the Special coil, also easy to recognise through the 2 grooves in the pin.

Original article from Rob Kuijper:
http://www.mytsn.com/publ/publ.asp?pid=8538&ccid=8

7.15 Tweak/Why Does My Car Spin Under Braking

This is due to the car being tweaked.

This can be caused by the following:

- Without the shocks attached, do the suspension arms drop down freely.
- Check the shock lengths are correct and the left and right sides are equal.
- Check the droop settings front left and right are euqal, and the droop settings rear left and right are equal.
- Follow the instructions given here in the section “Tweaking.” on page 24.

7.15.1 Why tweak-boards don‘t work:

The problem with a tweak board is you have no idea which side of the car is off!

Lets try this mind experiment: Take a perfectly adjusted car (no tweak) and set the left front and left rear shock one turn stiffer. On a tweak board you will see no difference as front and rear are equal, but the chassis is no longer horizontal.

experiment #2: Take a perfectly adjusted car (no tweak) and set only the left front shock one turn stiffer. On a tweak board you will see tweak. If you would turn the left rear shock stiffer the tweak is gone even though you actually turned the wrong spring.

Using the method of lifting the car on a flat surface (with equal downstops) gives not only perfect tweak, but also a level chassis! Remember that tweak boards are made for straight rear axle cars where you'd normally only adjust the t-plate.
Good thing is: a flat wooden board is a lot cheaper and easier to come by than a tweak board!

7.15.2 Tweak Cam/Droops:

In the 710 the cam that "untweaks" the front sway bar effects downstop. So I set downstop then I connect the front sway bar (still on Hudy blocks) and mess around with the cam and downstop screws till droop is equal and both sides have te same play on the sway bar.

There is always a little play on the bar so make sure whether you lift the left or the right arm both sides create the same movement on the other arm.

Then I connect the shocks and tweak the car using the lifting method

7.15.3 Tweaking.

7.15.3.1 Front Tweaking (Julius)

Connect the sway bar. Set droop using the screw for te right side of the suspension only. Measure on the right side. If the right side is correctly set fo droop, use the cam of the sway bar to set left side droop. In theory the left side droop should be set a fraction lower to compensate for play in the sway bar (no more than 0.2mm so it's not really important).

Then by sliding the sway bar in it's holde disconnect the sway bar. Now set the left side droop screw to the same droop as the right. Reconnect the sway bar. Now droop is equal and the sway bar is aligned. Use lifting method.

7.15.3.2 Comprehensive Tweaking (InitialD)

Firstly, when I set rear droop and making sure left and right were the same on the droop blocks (reading taken from the lower knuckles), they lifted uneven (right was lifting earlier than left) when I did the lifting method with just the rear tires attached (new equal size tires, no shocks and no sway bar) and with the front end on a solid block. I made it equal left and right by limiting the left rear droop and making sure left and right lifted at the same time. This was still without shocks and sway bars on.

Next, I fitted the rear sway bars, without shocks and with the same equal sized new rear tires. Again the right side lifted earlier than the left. It looked like the right side lower arm could not fall freely so that the droop screw would hit the chassis. Took out the rear sway bar and left and right lifted the same. So it must have something to do with the rear sway bar then... I proceeded to lengthen the right rear sway bar linkage. Did not check how much longer I needed to make but it was probably like 3 to 4 mm more than the left linkage. So the rear was lifting equaly left and right with the rear sway bars on and without shocks.
Fitted the shocks together with the rear sway bars on and did the lifting method again. Slight minor adjustments to the rear shocks were made to make sure left and right lifted equally. All this done with the front end chassis still supported on a solid block.

Next, I did the front end. Still have not used the front sway bars yet so setting the front tweak was simple and straight forward. Did it like what I did for the rear with now the rear end chassis supported on a solid block. Front end lifted equally left and right with and without shocks.

Just to satisfy myself and perhaps also "justify" the tweakstation purchase and put it to "good" use , I put the car with one end of the chassis on a solid block (to ensure that the front part is not hanging on springs) while the other on the water bubble cantilever. Did it for the front and rear and it was smack on the middle.
Next, I put all 4 wheels with shocks (no solid block on either end) on the tweakstation and see what the bubble tells me. Balanced front and rear side !

8. Engine

There are several methods of breaking in an engine and some people have very strong oppinions about their's being the right method. The methods here are provided only as an example of good methods to use.

8.1 Non-WOT Break-in method

Break-in IS about heat cycling. Although I usually never allow my engines to go to WOT in the first couple of tanks, I don't idle them either. Bring them up to temp, let it run for a while then cool down (with piston at BDC). Way to go. I hear about a lot or airplane guys that break-in their engines using the WOT method, and controlling rpm with the HSN, but I always felt more cofortable using a slightly rich setting and staying at, say 1/2 throttle and checking the temps at minimum 200-220F, 93-105C . Simply letting an engine idle through a couple of tanks will do nothing but harming it.

8.2 WOT Break-in method

Idling an engine, letting it run slow, 1/4, 1/2 throttle is all incorrect. You want WOT after it warms up. YES WOT, even when it is brand new. This is in order to bring it up to the temp and fit the sleeve was designed to run at. Anything less and you are just leading your engine to an early death.

Yes, running at WOT slightly rich, but not 4 stroking rich is the proper way to do it. This explains the proper way and WHY it is the proper way. Here is some further explanation I wrote a while ago for newbie nitro guys that were still doing that incorrect idling method:

As for break-in, there is a whole lot of misunderstanding about this and basic engine operation. I have read and studied a lot of information on this and also by Dave Gierke who writes in RCCA and Model Airplane News (also by AirAge) about RC airplane and buggy engines and he's an expert. As well as Paris Racing, Stephen Bess, Clarance Lee, etc, in the research I have done over the last few years. It will take some time to convince yourself to bring a new engine to WOT but when you start to understand it and why it is correct, you will realize just how many people are completely breaking the engine totally incorrectly.

It.s important to learn the theory about how these engines run (2 stroke ABC, ABN, AAC), and how to break-in, especially because I see WAY TOO MANY people using the wrong procedure of idling many tanks of fuel through the engine. That is unnecessary and damaging which I will explain. Although we use the term "break-in", by its word alone it is misleading because people wrongly assume it means to slowly and gradually bring an engine to tune by idling tanks of fuel but you will see why this is incorrect and unnecessarily wastes fuel too! Please be patient and read further to understand.

These engines use a sleeve around the piston to make the seal (piston doesn’t have a ring) and it operates properly only with sufficient heat so that the sleeve can expand to its designed operating size and fit. All engines will be tight, especially when new, so on the initial runs, you want to have it get up to temp, so it can run how it is was designed to. By idling tanks and tanks through, overly rich and cool, the sleeve just wears MORE against the piston because it is not hot enough to expand to its operating size. And by doing that you are prematurely wearing out and ruining your engine. The piston/sleeve is designed to operate at running temps. Not doing this by running cool and rich on the bench leads to premature wear. By idling away tanks of fuel I GUARANTEE you are doing more harm than good. As long as the engine is warmed up first, you don.t have to drag out bringing it up to temp when it is brand new. It wont hurt or damage the working parts. These engines are very simple 2 stroke machines. They do not have extensive moving parts such as valves, cams, lifters, springs, etc. (like 4 strokers) so all this extra gentle, rich, cool operation is completely unnecessary (and worse it.s harmful). HOWEVER, the sleeve around the piston can be a delicate thing to maintain and it is not forgiving of improper treatment. And improper treatment of a piston and sleeve is running it at a temp it is not designed for. (either too cold or too hot, both are just as detrimental) Most often this is done by running it too rich which makes it too cold because the rich mixture doesn’t generate enough combustion heat for proper sleeve expansion. Just as damaging can be an excessively lean run. If it is run overly lean for any length of time it will destroy the sleeve. (that is why fuels with castor oil as part of the lube mix are very good because they tolerate the too high heat of a very lean run and will help to save the sleeve if it is not run too lean for too long. but avoiding a lean run is essential when you know enough enough about engine tuning to avoid it)

Running a 2 stroke engine slow and rich makes it ’4 stroke’ which means it fires every other revolution, and that generates even less heat. It causes damage and wastes fuel as well! Using a fan is absolutely not necessary on it. Most important is to ’heat cycle’ the engine at least 10 times to relieve the parts of manufacturing stresses. HEAT CYCLING REALLY IS WHAT BREAK IN IS ALL ABOUT. (I even think break-in should be called "Initial Heat Cycling" instead so that people understand what and why they are doing it.)

You run the engine in the car for 2 - 3 minutes at full throttle (yes, WOT, don.t baby it), ideally on a smooth paved level surface, after briefly warming up of course, and then shut down and repeat after the engine has fully cooled. Let it cool down completely. Heat cycling is the name of the game. You want it to come up to temp for a brief time, and cool down and repeat. After shutting down, adjust the flywheel so that the piston is at BDC (bottom dead center) so that it does not get stuck in the contracting/cooling sleeve, as can often happen. (If the piston should accidentally get stuck in the sleeve, preheat the cylinder to free the piston from the sleeve.)

During these initial runs YOU WANT the temps to be at least 200 F, 93 C but not above 230-250 F, 110-120C. After break-in, running temps above 230F, 110C is fine. (in fact nitro engines perform best when run 250-300F. 120-150C below those temps they are less efficient and less powerful. However, going by the mixture is more important than trying to measure temp with heat guns, etc. which you may wind up doing inconsistently. The mixture setting on the High Speed Needle

is critical in the first runs. It should be a rich and not lean setting. However it should not be so rich that it 4 strokes.

Also, to start a brand new engine it is very worthwhile to preheat the engine with a heat gun or hair dryer if it has a very tight piston/sleeve fit and you are having trouble turning it over to start it up. This will expand the sleeve some, and when you turn it over the piston will not excessively rub, or even get stuck in the sleeve (as sometimes can happen). Preheating really works well. You do want to run it on the rich side, but you want it to come up to temp also, just not more than 2-3 minutes in beginning runs, in order to keeps temps around 230F. Listen carefully to the exhaust noise or .note., as you do not want it to be .4 stroking.. If it is, it needs to be leaned slowly until it runs 2 stroke. You can tell it is 4 stroking if it is very "boggy" and "hesitant" in acceleration and running. If it is making that "burbling" sound then it is 4 stroking which means it is running too rich and therefore too cold.

Everyone thinks they have to run it super cool and check to be sure temps are low. That’s not what it is about. The reverse is true! Cool operation is damaging operation. Little, if any, break-in will occur unless it is heat cycled properly.

The manufactures can.t make a piston/sleeve turn over smoothly at room temp, because when the engine runs the sleeve will expand and there will be no seal at operating temp. See how that makes sense?!

So preheat it if necessary and don’t run it cool, and heat cycle it, and you’ll be good to go! After you have done this several times then you can gradually lean out the HSN to get best performance, but it should then be richened up just rich of peak to ensure it lasts long too. Running it at max peak rpm will lead to the shortest useful life of the piston and sleeve. If racing that is fine but if you are just playing you may want to run just a little richer than that peak setting. After the HSN is set then it is time to set the low and/or mid range needles and idling setting.

I see a lot of people idle the engine for a tank and then they let it cool off thinking that they are "heat cycling" it. However, because they are not running it up to WOT it is not generating enough heat to be of any use to a breakin/heat cycle. So, inadvertently by idling they are just letting the engine sleeve and piston wear away from the cold tight fit that they are allowing to happen when idling away on the bench. Research has shown that basically no breakin effect takes place AT ALL unless the engine is allowed to come up to operating temp for 2 minutes. So if you are idling away and then let it cool there is zero breakin/heat cycle benefit. But if you want to wear away the sleeve and piston fit then idling will definitely do it for you.

8.3 When is an engine broken-in?

You will know when you completed break-in process when you take the engine heatsink off and check the inside of the piston liner. It should be polished. When you turn the flywheel, you can see that the piston can reach to the top of the

sleeve with a little bit of resistance. If it's still stuck half way and you cannot turn the flywheel to crank it when the heatsink is off, the engine is still not fully broken-in yet.

8.4 Tuning HSN and LSN

8.4.1 InitialD's method

What I do when I tune engine is this. I rest all needles (HSN, MSN and LSN). HSN to 6 full turns out, MSN screw flat to the carb body (or 2.5 full turns out from close if it's a NOva carb) and about 4 full turns out on the LSN. The idle needle, I open it up a little so that the engine does not die of. I start the engine and blip it to get the engine going. I'll lean the LSN so that I can get a constant idle and at the same time backing out on the idle needle so that at neutral, the slide carb opening is about 1 mm. When you lean the LSN to a point when the idle RPM starts to go up, richen it about 1/4 turn out. The idle should be steady.

Then start to lean the HSN till the engine easily reaches high RPM. Once you got that, richen it 1/4 of a turn.

The above LSN and HSN tunings are just ball park estimations to get you nearer to optimum settings. You need to put the car on the track and tune the needles.

Some pointers:
If you rev and blip the engine to WOT quickly and the engine bogs down as if there isn't enough fuel going in, then the HSN is lean. Richen it.

If after coming to the pits the engine idle goes higher and higher, then your LSN is lean. Richen it.

In any case, check the temp of the engine from time to time to see if it's running OK. Use your saliva on the heatsink if you do not have any temp probe.

If your engine is overheating, your engine will protest and will not sound right. The best way to know if your engine is overheating or not is when you cut off your engine, you can easily start it back up without priming the carb and the engine can idle very smoothly.

8.4.2 Clmbia45 additional notes regarding LSN tuning,

If you do the "pinch" test (i.e. pinch the fuel tubing at the carb inlet) and squeeze slowly, the idle rpm should increase as the engine leans out. If it doesn't, you're too lean. Knowing that you're too rich, lean the LSN until the engine just increases in rpm and runs at idle. You will have to decrease idle speed at this point. Put the car on the track and run it hard. You should have the HSN adjusted to the rich side of the max power band. Now when you bring the car into the pits it will probably be idling fast and after several seconds, will drop down in idle rpm. This is a sign that the LSN is still too rich. Lean it an hour at a time, and run another 2 laps hard. Repeat the process. Turn down the idle rpm until the idle speed is slow and steady after running hard and return-

ing to the pits. Check your temp. Temp at idle should quickly drop below 200F (93C) and stabilize. Do the pinch test and confirm that the engine is still rich at idle. This works for me.

If I get confused, every thing goes back to too rich and start over again. When you first start out it really helps to keep notes.

8.4.3 AMG Racer's notes regarding an engine becoming leaner

Basically the entire chassis and the entire motor becomes fully heat soaked. This takes around 15 minutes or so to occur. You will find that your bottom end will become very dull. It can be damaging. As your engine heat soaks it becomes leaner. When you make a fuel stop you lose all your back pressure as well which leans the motor a little, possibly contributing to the noise.

On a long race I always run the LSN a little richer than usual because it will lean out after around 15 minutes.

A properly tuned motor will run with the same power no mater how long you run it.

9. Modifications/Improvements

9.1 Clutch

See the following two posts from InitialD regarding the clutch mods:

http://www.rctech.net/forum/showthread.php?s=&postid=761889&#post761889
http://www.rctech.net/forum/showthread.php?s=&postid=763170&#post76317%3Cbr%20/%3E0

9.2 2nd Gear Mod

On the 2nd gear on the transmission, along the edge in front of the teeth, there are 3 slots that are cut in the gear so you can access the screws to adjust the 2-speed clutch. These 3 slots in the gear align (kind of) with 3 holes in the alum. gear "cage" that sits in the plastic gear.

Because of the shape of the 3 cutouts (they are angled) I found it difficult to access the screws for the 2-speed clutch. It is not so bad when you have to adjust the 2 screws on the shoes (they are at an angle in the shoes), but it proves difficult to adjust the small center screws to set the shoe gap (since you have to put a 1.5mm wrench straight through the gear, perpendicular to the gear).

I solved this problem by widening the 3 slots in the plastic 2nd gear. By default, the slots are roughly 3mm wide... I widened them an extra 2mm... just enough so the entire hole in the alu cage is visible through the slots when viewed straight on.

9.3 HUDY Setup-System

Here‘s a picture of how to modify the rear Hudy prism for easier access to the 710‘s pivot balls.
http://www.rctech.net/forum/attachment.php?s=&postid=752903

9.4 Bumper

This should help to stop damage to the downstops during a frontal impact
http://www.rctech.net/forum/attachment.php?s=&postid=750456

9.5 Molzer-Mowery Post-Winternats

Here is what we found with the 710 that was worth changing:

- InitialD's (or whoever was the inventor)'s clutchmod is definately an improvment. Serpent is working on new flyweights that will improve how the clutch engages.

- Shocktower mod: Ammdrew and I found that the front shocks did not take much to brake if you contacted the boards in Ft Myers. (shafts snap). To prevent this from happening, we put spacers between the shocktower and front bulkheads and monited the shocks behind the tower instead of in front (used the spacer that comes on the shck tree, it use to be used instead of the balls that we have on the ends of the shocks, old serpent leftover, but it is a perfect spacer). This allows the shocks to flex backward on impact and put a definate end to the shafts breaking. The rear shocktower seems just fine, can't see anything wrong with it. I acctually beoke one, but that was when an 8:th scale car tried to drive through me in happy hour. Other than that, the car is a huge improvement in terms of set-up, handling and wrenching over the 705.

10. Appendix

10.1 The Famous Guys @ rctech.net

- InitialD - see next section.
- Julius - dare devil stunt pilot for KLM and was involved in the 710 design
- Rene.C - 710 Designer and german regional champion
- MichaelS - 710 Designer and one of the top 200mm and 1/8th drivers.

10.2 Just who is this InitialD guy who keeps hogging the lime-light? ;-)

Base on current facts, we can report that he:

- Is a woman
- Is a Jedi Master who has succumed to the dark side
- Has hairy legs
- Has a big pot belly
- Has a moustache
- He‘s very old
- Has some kind of fetish to do with polka dots!
- Likes bermudas
- Likes to be close to snakes!

And is somewhere in these pictures:
http://www.rctech.net/forum/attachment.php?s=&postid=615644
http://www.rctech.net/forum/attachment.php?s=&postid=507744

10.3 Julius' Flying Tips.

As you can imagine, Julius, being an experienced international pilot of 10 years or more, has accrued a number of useful tips for up-and-coming pilots. Here are his tips in order of importance:

#1 Never hit the ground!

#2 Always make a landing so that the plane can be used again afterwards (Assumption: rule #1 has been followed!)

#3 Pushing the stick forward makes the trees get bigger, pulling the stick back makes them get smaller.

#4 To determnine if you are flying upside down: a) The sky should be full of trees and b) You should hear lots of screaming. This can of course be tricky if you are flying over a desert, sea, etc. so as a back-up fail-safe check if your coffee is on the celing!!

Additional warning: Never mess with the tower!! A guy who was trying to impress his Girlfriend radioed the tower shortly before landing at night with, "Hi Tower, guess who?" - Tower replied after switching of the runway lights - "Guess where!!!!!"