

TLR® 8IGHT-X™ Elite Tuning Guide

Overview

It is time to start making some setup adjustments to the TLR 8IGHT-X Elite! Before making changes, there are a few decisions to make.

- Tires - Tires have a tremendous impact on performance. Before making changes to chassis setup, observe fast cars at the track and try to obtain information about the tire tread, compound, and inserts being used.
- Feel – Setup adjustment outcomes will vary based on the driver's personal "feel".
- One at a Time - It is suggested to only make one setup change at a time. If the change does not improve the handling, return to the previous position and try a different change.
- Recording - It is a great idea to record setup changes by recording change and the result observed. Even if the change was not a positive, it can aid future setup decisions.
- The normal/typical setting suggested for all setup options is the setting listed on the kit setup sheet, included in this instruction manual.
- Track Ready – Whenever checking any of the table top settings (camber, toe, ride height, etc.), do so with the car track ready, including the body, wing, tires, wheels, and battery pack.
- Kit Setup - The Team Losi Racing development team put in time to develop the kit setup. After making some changes, if the "handle" or "feel" of the vehicle becomes poor, return to the kit setup. Kit setups are posted to www.TLRacing.com.
- Optional Setups - Other setups that have worked well for the race team are posted to www.TLRacing.com. When trying any setup, make sure to try the setup in its entirety. Each setup item works together to make a well driving vehicle. If only parts of a setup are used, it likely will not produce the desired results.
- Race Team – If a TLR team driver is present at the local track, and help is need – ask them.

Please check the Team Losi Racing web site and the Team Losi Racing blog periodically to find new setup information. There are many ways to set up a car. The results of setup changes can be different based on many factors including driving style, track conditions, and traction levels. Try things and find a setup that works well.

Pre-Run Checklist

- Engine is tuned correctly.
- Receiver pack is charged.
- Droop measurement is set as desired.
- Ride height is set as desired.

Check each of these before each run. If of these settings has changed drastically, it is a sign something is wrong. For example, if ride height is set to 27mm Front, 27mm Rear and it has been correct five times, then when check again it is 25mm F/27mm R, something is wrong. Check the vehicle to be sure there is not a bent shock shaft or hinge pin, and nothing else is broken or damaged.

Power and Drivetrain Settings

Engine Tuning

Follow the engine manufacturer's instructions and suggested settings.

General Notes:

- Turning the needle valve clockwise, the fuel mixture becomes leaner, meaning the engine will draw less fuel. A leaner mix will run hotter engine temperatures and have better fuel mileage.
- Turning the needle valve counterclockwise, the fuel mixture becomes richer, meaning the engine will draw more fuel. A richer mix will run cooler engine temperatures and have worse fuel mileage.
- The high speed needle affects the fuel mixture from mid to full throttle. The low speed needle affects the fuel mixture from idle to low throttle.

To Stop the Engine

There are two ways to stop a nitro engine.

- Plug the exhaust pipe.
- Stop the flywheel, by using a wrench or plastic handled tool.

Once the engine is stopped, move the flywheel to move the piston away from top dead center (TDC) while it cools. TDC is the tightest point of the engine's compression. This will help the engine last longer by not prematurely diminishing engine compression.

The Receiver Battery

The receiver battery is an important part of nitro-powered vehicles. A battery with low voltage can cause loss of vehicle control and/or weak and slowed throttle and steering response. Battery life will depend on servos used and battery ratings. Always fully charge the battery to start each day at a minimum. Make sure your battery is not swollen and is balanced properly.

Clutch

Build Tips:

- Use steel wool or fine sandpaper to clean the inner surface of the clutch bell.
- Clean the inside of the clutch bell with nitro cleaner to remove all oil and debris. It is recommended to use nitro cleaner to spray the grease out of the inner clutch bearing (5x13x4mm). If it is not cleaned out, the grease may move into the clutch assembly.
- Do NOT use thread-lock on the clutch pins.
- Check for proper clutch shoe movement by pulling out each installed clutch shoe 1mm and allow it to snap back into place.
- Ensure clutch bell has .25 to .50mm of movement on the crank shaft and spins freely.
- Break-in – hold vehicle firmly down (all four tires and chassis plate on ground), apply ½ throttle for two seconds. Lift vehicle clear out engine. Repeat for a total of three times.

Clutch Springs:

- 8IGHT Clutch Springs, Soft to Stiff: Black, Green, Gold, Silver
- Softer springs - engage at a lower RPM, smoother power, easier to drive, decreases wheel spin.
- Stiffer springs - engage at a higher RPM, hit harder, feels like more bottom end, good for high traction or hard to clear jumps.
- If the engine lacks low end power, stiff springs should help. If the springs are too stiff, the clutch may slip more.

Clutch Shoes:

- 8IGHT Clutch Shoes, Least Grab to Most: Composite, Silver Aluminum, Blue Aluminum
- Two composite and two blue aluminum shoes works best for most tracks.
- Four composite shoes allow more slip for smoother acceleration, and work best for loose, rough tracks without hard to clear jumps.
- Four blue aluminum shoes provide the most punch but is not good for slick or rough tracks.
- Silver Long-Wear aluminum shoes (LOSA9109) fall between composite and blue shoes. They slip more than blue aluminum shoes but less than composite shoes.

Gearing

- Gearing Up – installing a larger pinion or smaller spur gear decreases bottom end and increases top end speed. Better for larger, sweeping tracks.
- Gearing Down - installing a smaller pinion or larger spur increases bottom end and reduces top end speed. Better for clearing jumps (when wheel spin is not the issue).
- Kit gearing for the 8IGHT-X Elite is a 13 tooth clutch bell and a 48 tooth spur gear, 13/48. Different options available are as below.
 - Clutch Bells – 12, 13, 14
 - Spur Gears – 45, 46, 47

Fuel Tank

Fuel tanks include a preinstalled fuel tank insert to meet ROAR and IFMAR 125cc fuel capacity rules. The insert can be modified to push closer to the 125cc limit at the racer's discretion. When racing where these rules are not applied, remove the insert for an additional 3cc and longer run times.

An EFRA Fuel Kit is also included with the vehicle and should be used at all EFRA races. The EFRA Fuel Kit ensures the fuel line and clunk do not come out of the tank, illegally increasing fuel volume.

Brake Setup

Brake bias is adjusted easily using the two red thumb screws. The top thumb screw controls front brake and the bottom thumb screw controls rear brake.

- Less Front Brake, More Rear Brake – increases vehicle rotation.
- More Front Brake, Less Rear Brake – increases stability under braking.

Differential Oils

Front Oil:

- Thinner - increases steering corner entry. If oil is too thin, steering will be grabby and inconsistent.
- Thicker - increases off-power stability and on-power steering, especially corner exit.

Center Oil:

- Thinner - decreases acceleration, increases off-power steering, unloads front more under acceleration, easier to drive on rough and slick tracks.
- Thicker - increases acceleration, decreases off-power steering, increases on-power steering, better on smooth and high traction tracks.

Rear Oil:

- Thinner - increases cornering traction, increases steering corner entry to mid corner
- Thicker - decreases steering mid corner, increases forward traction corner exit.

Tabletop Adjustments

Ride Height

Ride height is the height of the chassis from the ground/pit board. Ride height is measured with the body on and vehicle ready to run.

- It is best to measure on a flat level surface, such as a pit board.
- Drop the vehicle from 12 in (30cm) and allow the suspension to settle.
- Measure from the flat surface to the bottom of the chassis plate using a ride height gauge
 - Front - Measure behind the bend in the chassis
 - Rear - Measure under the rear gear box
- Use shock collars to lower or raise the ride height, adjusting left and right equally.
- Recheck

When the front ride height is adjusted, it can affect the rear ride height and vice-versa. Once one end is adjusted, always check the height at both ends again.

- Front - higher decreases steering, increases weight transfer to the rear on-power. Lower increases steering, decreases weight transfer to the rear on-power.
- Rear - higher decreases rear traction, increases steering. Lower increases rear traction, decreases steering.
- Both - higher improves handling on bumpy tracks. Lower increases corner speed and stability for smoother tracks.

Camber

Camber is the angle a wheel/tire leans in/out from bottom to top. It is adjusted by changing the length of the camber link turnbuckle. It is adjusted at ride height with vehicle ready to run.

More Negative Camber:

- Front - increases steering and responsiveness.
- Rear - decreases rear traction corner entry, increases on-power steering, less grabby in bumps.

Less Negative Camber:

- Front - decreases steering, smoother feel.
- Rear - increases rear traction and make the rear end stay flatter, but if traction is lost it will be more abrupt.

*After adjusting front camber, recheck front toe in/out.

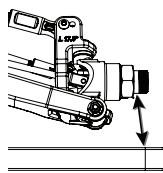
Front Toe

Toe is the angle of the tires compared to the centerline of the chassis. To check and set front toe, the steering assembly needs to be centered and the vehicle needs to be at ride height. Adjust the toe by shortening or lengthening the steering turnbuckles. Always set the steering turnbuckles to equal lengths, then adjust equally.

- Toe In - front tires point inward. This will have a - or negative value (-2°). Toe in decreases steering response entering and mid corner, increases on-power steering.
- Toe Out - front tires point outward. This will have a + or positive value (+2°). Toe out increases steering response at corner entry, increases straight-line stability, decreases on-power steering, smoother corner exit.

Droop

Droop is the measurement of how far the tires fall at full suspension extension. Droop is measured on the 8IGHT vehicles by removing the tires and wheels, placing the chassis on droop blocks, then using a ride height gauge to measure from the flat surface to the underside of the threads on the wheel hex. TLR 1/8 Droop Blocks (TLR72004) are recommended or any droop blocks that are 36mm.



To reduce droop (higher measurement number), turn the droop screw for the suspension arm clockwise. To increase droop (lower measurement number) turn the droop screw for the suspension arm counterclockwise. After making an adjustment, compress the suspension by hand, then allow it to settle before measuring again.

More droop (lower number)

- Front - Decreases on-power steering, increases rear traction corner exit by allowing more weight transfer to the rear.
- Rear - Increases off-power steering by allowing more weight transfer to the front. Less stable under braking.
- Both - Accelerates better in bumps when straight but can traction roll in rutted corners easier.

Less droop (higher number)

- Front - Increases on-power steering with more static weight on the front by allowing less weight transfer to the rear.
- Rear - Increases stability under braking. Decreases side to side weight transfer on higher speed/smooth tracks.
- Both - Slides over bumps better in corners. Stays flatter to carry more corner speed on high speed and high traction tracks.

Shocks

Shocks

Shocks have several options for tuning, such as piston, oil, and spring. The piston and oil work together to make up the shock dampening.

Front

- Thicker dampening decreases steering.
- Thinner dampening increases steering.

Rear

- Thicker dampening decreases rear traction.
- Thinner dampening increases rear traction.

*When dampening settings are outside the window it will result in decreased traction front or rear.

Pistons

Pistons have three key design variations that affect dampening: size of the valving holes, quantity of valving holes, and piston shape (flat or tapered).

- Smaller sized or decreased quantities of valving holes provide thicker dampening. Smaller hole pistons (1.2mm) slow weight transfer and responsiveness but improve large jump landing.
- Larger sized or increased quantities of valving holes provide thinner damping. Large hole pistons (1.3mm) increases traction, quicken weight transfer and responsiveness, but do not land large jumps as well.
- Tapered pistons provide different speeds for compression and rebound. The taper face is typically run down to increase the rebound speed. Quicker rebound speed helps the tire maintain contact with the ground better, providing more overall traction.

Shock Oil

- Thinner oil provides thinner dampening which increases overall traction and reacts quicker.
- Thicker oil provides thicker dampening which decreases overall traction and reacts slower. Better for high traction, smooth tracks.
- Drastic ambient temperature changes (20–25°F, 10–15°C) require adjustment to shock oil to maintain the same dampening. Colder temperatures require thinner shock oil, hotter temperatures require thicker shock oil.

Springs

Springs are available in many different spring rates, which measure the force to compress over a fixed distance.

General

- Stiffer spring rate decreases weight transfer, decreases roll, quickens rebound, decreases overall traction, keeps chassis flatter.
- Softer spring rate increases weight transfer, increases roll, slows rebound, increases overall traction.

Front

- Softer - increases off-power steering, smooths steering response.
- Stiffer - decreases off-power steering, quickens steering response.

Rear

- Softer - increases rear traction on-power corner exit, increases mid corner rotation.
- Stiff - increases straight-line forward drive, increases mid corner stability.

Shock Mounting Locations

Arm Position

- Inside - softer suspension, increases responsiveness, increases traction.
- Outside - increases stability, increases side traction, easier to drive.

Tower Position

- Inside - increases responsiveness, stiffer/thicker shocks feel, decreases side traction.
- Outside - increases initial chassis roll, increases side traction, more forgiving.
- Front - inside on the tower is easier to drive, slows steering response. Outside on the tower increases lift off jumps, improves bump handling.
- Rear - inside on the tower increases mid corner traction. Outside on the tower increases traction corner entry.

Roll Centers

Roll Center (RC)

Roll center is the point in space that a vehicle rolls at or around based on complete vehicle settings. Roll centers can be affected by a lot of different items. Typically, a lower roll center produces more traction and will cause the roll effect to produce more downward force. A higher roll center helps the rear end to square up better and helps reduce traction rolling on high traction surfaces. Balance of the front and rear roll centers is key for a well handling vehicle. Adjustments below noted with RC are all adjustments that affect roll centers.

Front Camber Link (RC)

The front camber link mounting points can be adjusted up and down on the inside and outside (with option parts) as well as moved in and out.

Tower

- Lower – increases camber gain (camber change through suspension travel), higher roll center, increases off-power steering, increases aggressiveness, decreases consistency, good on small, tight, or bumpy tracks.
- Upper – decreases camber gain, lower roll center.
- Longer – decreases roll, increases high speed steering.
- Shorter – increases roll, decreases stability.

Spindle

- Lower – lower roll center.
- Upper – higher roll center.

Rear Camber Links (RC)

The rear camber link mounting positions can be adjusted up and down on the inside and outside (with option parts) as well as moved in and out.

Tower

- Lower – increases camber gain, higher roll center, improves bump handling, increases traction corner entry, decreases traction rolling.
- Upper – decreases camber gain, lower roller center, increases traction corner exit, decreases traction corner entry.
- Longer – decreases roll, increases stability, increases traction.
- Short – increases roll, increases steering, improves bump handling.

Hub

- Longer – increases stability corner entry, increases steering corner exit.
- Shorter – increases steering corner entry, increases traction corner exit.

A/B Block (RC)

By changing of the pills in both the A and B block together, the front roll center is raised and lowered. It also changes bone plunge and camber gains. When lowering the pills, also lower the inner front camber link one hole to match, vice-versa for raising the pills.

- Lower - lower roll center, increases front traction, increases steering.
- Higher – higher roll center, decreases front traction, make the front not feel “into the track”.

Rear Hub Height (RC)

The rear hub can be raised (B) or lowered (A) relative to the suspension arm, moving the axle up or down.

- A – lower roll center, increases rear side traction.
- B – higher roll center, increases forward traction.

When changing hub height, different inner camber link locations may be required. The 8X Aluminum Rear Hub Set (TLR334034) provides settings between A and B for finer tuning.

Front Spindle Height (RC)

By changing of the spindle shims, the spindle can be raised and lowered. This can change bone plunge, bump steer, and droop.

- High - lower roll center, increases front traction, increases steering, less traction rolling.
- Low – higher roll center, decreases front traction, make the front not feel “into the track”.

D Block (RC)

By changing the D block and the pills in the C block, the rear roll center can be changed. The LRC D block is 1mm lower or 1 full pill in the C block.

- STD D Block – higher roll center, increases forward traction, more rear support.
- LRC D Block – lower roll center, increases rear side traction, less rear support.

Others

Front Kick-Up

Front Kick-Up is adjusted by changing the pills in the A and/or B blocks. Kick up is the angle of the inner front hinge pins relative to the flat chassis plane. With 0/0 pills in the A/B blocks, the kick up is 12°.

- More Kick-Up – increases weight transfer on/off the front end when braking/accelerating, increases off-power steering and forward traction, improves absorption of bumps.
- Less Kick Up – decreases weight transfer on/off the front end when braking/accelerating, decreases off-power steering and forward traction, worsens absorption of bumps.

Caster

Caster is the angle kingpins are displaced from the vertical axis of the front wheels. Caster on this vehicle is the combination of the kick-up angle and the spindle carrier angle.

Example:

$$0/0 \text{ pills in the A \& B blocks} = 12^\circ$$

$$17.5^\circ \text{ Spindle Carrier} = 17.5^\circ$$

$$12^\circ + 17.5^\circ = 29.5^\circ \text{ caster}$$

- More Caster - decreases initial steering, good on bumpy tracks.
- Less Caster - increases steering, allows freer suspension movement.

Bump Steer

Bump Steer is the change in front toe throughout the front suspension travel. Bump steer is affected by caster changes also. Bump steer is adjusted by the washer height between the rod end and drag link and/or the rod end and the steering arm. More washer height (steering turnbuckle more parallel to suspension arm) has less bump out. Less washer height, more bump out.

- More Bump Out – smoother steering, decreases steering corner exit, good for bumpy tracks.
- Less Bump Out – more direct steering, increases steering corner exit.

Ackerman

Ackerman is the difference in steering angle between the inside tire and outside tire turning throughout the steering throw. Ackerman is adjusted by changing the mounting hole used on the drag link for the steering turnbuckle.

- Ackerman, least to most – Front, Middle, Rear holes on draglink
- Less Ackerman – decreases initial steering, increases steering mid corner to corner exit.
- More Ackerman - increases initial steering, decreases steering mid corner to corner exit.

Rear Toe:

Rear Toe In is adjusted by changing pills in the D block.

- Less Toe In - increases wheelbase, decreases rear traction, increases top speed.
- More Toe In - increases forward traction corner exit, increases off-power steering, increases braking stability.

Rear Anti-Squat:

Anti-squat is adjusted changing pills in the C block. Anti-squat is the angle of the inner rear hinge pins relative to the flat chassis plane.

- More Anti-Squat – decreases side-to-side roll on the rear, improves height off jumps, improves rear traction under acceleration.
- Less Anti-Squat – decreases off-power steering and side-to-side roll on the rear, improves acceleration in small bumps, increases rear traction off-throttle.

Wheelbase:

Wheelbase is adjusted by moving the rear hub spacing within the rear arm. Hubs forward for a shorter wheelbase or hubs rearward for a longer wheelbase.

- Shorter Wheelbase – increases on-power rear traction, increases off-power steering, increases rear weight transfer, generally better on tight or slick tracks
- Longer Wheelbase – increases on-power steering, decreases off-power steering, increases stability, improves bump handling

*Wheelbase characteristics can sometimes also be affected by the type rear driveshafts. When changing rear driveshaft types, test wheelbase settings again.

Track Width:

Track width is adjusted by changing the width of the wheel hexes, front and/or rear.

Wider:

- Front – slows steering response, decreases front traction, decreases traction rolling.
- Rear – quickens steering response, increases front traction.

Narrower:

- Front – increases traction corner exit, decreases high speed stability.
- Rear – increases traction corner entry, increases high speed stability.

Sway Bars:

Sway bars help control the side to side sway (roll) of the chassis and distribute load from the inside wheel to the outside wheel.

Front

- Thinner - increases off-power traction, decreases on-power steering.
- Thicker - decreases off-power traction, smoother steering corner entry, increases on-power steering.

Rear

- Thinner - increases traction, decreases on-power steering.
- Thicker - increases stability mid corner, increases on-power steering, increases stability on high speed, high traction tracks.

Rear Wing:

The wing mount can mount the wing higher or lower, forward or rearward.

- High – increases traction at high speed and on-power.
- Low – increases stability at low speed from the lower center of gravity.
- Forward – decreases rotation, decreases rear swing weight
- Back – increases rotation corner exit, increases forward traction at high speed.

Arm Inserts:

Arm inserts help to control the amount a suspension arm flexes. Arms can use no insert, composite insert, or carbon insert and that is the order from most flexible to least flexible.

Front

- More Flex – more deflection off of bumps, increases steering.
- Less Flex – decreases steering, more consistent bump handling.

Rear

- More Flex - increases lateral traction, less consistent line.
- Less Flex – less lateral traction, ability to choose line more consistently.

Chassis Flex:

Chassis flex can be altered by changing the chassis rib or changing the engine mount. The engine mount can be run with the 5th screw or most forward screw in or with it out, or with the right side mount on the left or finger removed.

Chassis Rib

- None – most flex, most lateral traction, least consistent lines, jump landing decreases.
- Carbon – middle flex, good lateral traction, good consistent lines, good jump landing.
- Aluminum – least flex, ok lateral traction, best jump landing.

Engine Mount

- 5th screw in – least flex, consistent jump landing, ok lateral traction
- 5th screw out/finger removed – good lateral traction

Driveshafts:

Driveshafts control the power to the wheels and the amount of bind or lock up of the suspension when power is applied or removed. The front can use either a CVA or a universal. The rear can use a CVA universal, or DCVA.

Front

- CVA – Keeps the front end flatter, good in higher traction surfaces, good in smooth surfaces.
- Universal – Smoother steering exiting corner, better in bumps.

Rear

- CVA – Good on very smooth surfaces, least amount of lateral grip.
- Universal – Good on semi smooth to bumpy surfaces, produce most lateral grip.
- DCVA – Adjustable for various surfaces due to pin position being able to change, typically good for medium to high grip situations, provides more support. See setup sheet for pin locations. Pin 1 provides the most exit lateral grip and on power grip, pin 3 provides the most entry and off power grip.