

Set Up Your Radio-Control Car to Win!

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Ackermann

less Ackermann

more aggressive steering
harder to drive

more Ackermann

less aggressive steering
easier to drive

Ackermann is a term describing the effect of the inside front wheel turning tighter than the outside front wheel.

More Ackermann means the inside wheel is turning in a tighter arc.



You change Ackermann settings in the RC10B4.1 buggy by moving the connection from the current holes (standard Ackermann) to the lower holes.

Anti-dive (onroad)

lower angle

decreasing anti-dive

adding anti-dive

larger angle

increases corner entry steering

increases caster at the wheel

This setting refers to the angle of the front arm mount when the rear arm mount is higher than the front arm mount. The "dive" refers to the tendency of the front end to dive, or lower, when braking.

Anti-roll bars can also help balance the pressure between the front and rear. If your car is oversteering, consider adding a front anti-roll bar only (or making the front bar thicker than the rear). If your car is understeering, consider adding a rear anti-roll bar only (or making the rear bar thicker than the front).

Anti-roll Bars, Sway Bars

softer or thinner bars

for low and med. bite tracks

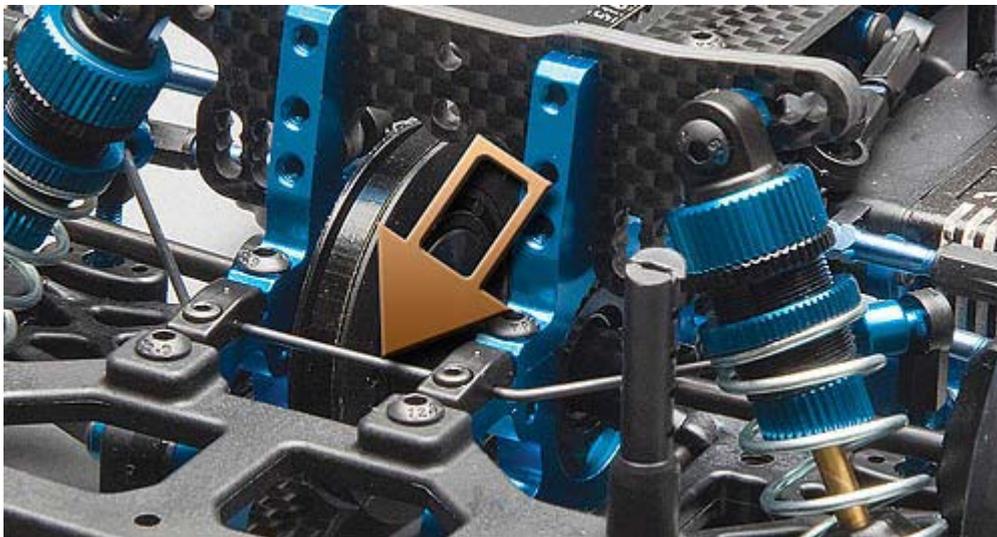
stiffer or thicker bars

for high traction tracks

Anti-roll bars are used to stabilize a vehicle from excessive chassis roll (such as when a buggy leans through the turns by centrifugal force).

On a high-traction surface, a vehicle not using anti-roll bars will tend to have a lot of chassis roll, which results in the vehicle being less responsive.

Adding anti-roll bars (or making them thicker if you already have them on) will help minimize the chassis roll, making the vehicle more responsive in cornering, and at the same time making it more stable.



Roll bar on the front of the #30106 Factory Team TC6 1:10 scale electric touring car.

Anti-squat, off-road

less anti-squat

more side traction in corners

more rear traction for slick or bumpy surfaces

more anti-squat

less side traction in corners

more rear lift in jumps

Anti-squat denotes the angle of the rear arms relative to the chassis, when looked at from the side.

0 deg. anti-squat means that the rear arms are flat, parallel with the chassis. 2 deg. anti-squat means the front of the rear arms are creating a 2 deg. angle to the chassis.



This photo shows a 2 deg. anti-squat angle on the rear of an RC10B4.1 buggy.

Change anti-squat by placing shims underneath the front of the rear arm mounts, angling them higher.

Anti-squat, onroad

decreasing

less steering entering corner

improve acceleration over bumps

increasing

more steering entering corner

more traction exiting corner

Anti-squat denotes the angle of the rear arms relative to the chassis, when looked at from the side.

0 deg. anti-squat means that the rear arms are flat, parallel with the chassis. 2 deg. anti-squat means the front of the rear arms are creating a 2 deg. angle to the chassis.

Axle Height, off-road

lower

more steering entering corners

less steering exiting corners

higher

less steering entering corners

more steering exiting corners

The front axle height on Team Associated 2WD off-road vehicles (such as the B4, T4, and SC10) can be raised or lowered to optimize handling for different track conditions.



By moving both spacers to the top or bottom, you can change the axle height.

Bump Steer

fewer washers

bumpsteer in
less steering
More stability

more washers

bumpsteer out
more aggressive
less stable

Bump Steer takes its name from the fact that when the car goes over "bumps," it changes the "steering." Bump steer is the undesirable effect of extra toe-in or toe-out as your car goes over randomly-spaced hilly



bumps closely spaced together in an area, making your steering unpredictable. Your car then bounces back and forth instead of going straight through the bumps.

You modify bump steer by adding or removing spacers on this ballstud.

Camber, front

less (0 deg.)

more straight-line acceleration

tyre is vertical

more (2 deg.)

more high-speed traction through turns

tyre leans inward

Camber describes the angle at which the tyre and wheel leans toward the car when looked at from the front or back.

Negative camber means that the tyre leans inward at the top.

Positive camber means that the tyre leans outward at the top. (Positive camber is not recommended.)

Camber is measured in degrees.

You can use Associated's #1719 camber gauge to set your camber.



The front camber of the B44.1 is being checked with the #1719 Factory Team Camber + Track Width Tool Camber Gauge. The number at the bottom corner of the gauge nearest the tyre indicates the angle of camber.

Camber Link, front

shorter link

*standard for high-grip tracks
more corner entry steering
less mid and exit corner steering*

longer link

*better for med.-grip loose tracks
less corner entry steering
more exit steering*

The front camber link is the turnbuckle link connecting the ballstud on the shock tower to the ballstud on the caster block.

Lengthening or shortening the camber links can affect traction, stability, and handling.



You lengthen or shorten the camber link by mounting the camber link turnbuckle in one of two holes in the tower (SC10 short-course truck shown).

Camber Link, rear

shorter link

better for med.-grip loose tracks
stiffer rear suspension
accelerate better
more turn-in steering
less mid-to-exit corner steering
decreases traction
more side-to-side stability

longer link

standard for high-grip tracks
softer rear suspension (more chassis roll)
less corner entry steering
more exit corner steering
more traction
less side-to-side stability

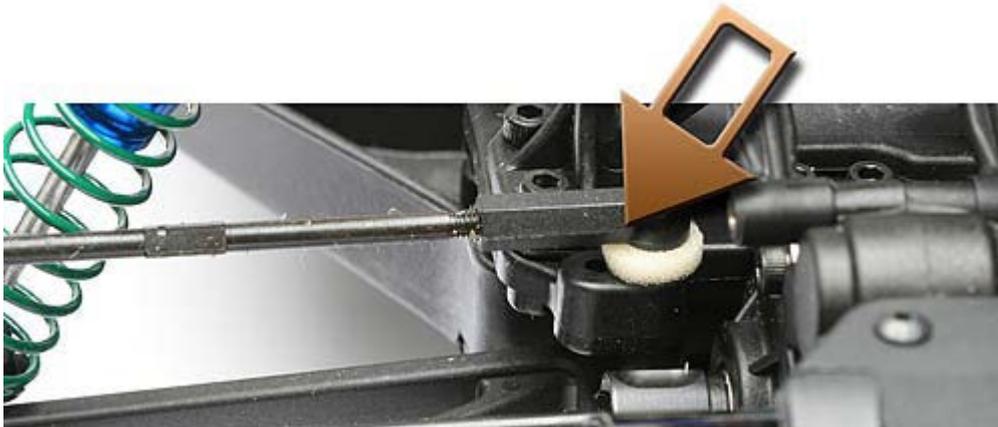
The camber link is the turnbuckle that connects the ballstud on the shock tower to the ballstud on the rear hub.

Lengthening or shortening the camber link turnbuckles can affect traction, stability, and handling.

The camber link will affect how much the camber changes during suspension travel.

The longer the link, the less camber change, and the more traction.

The shorter the link, the more camber change, and the less traction.



This vehicle provides two mounting options for the shock tower ballstud.

Camber, rear

less (-2 deg.)

*More high-speed traction through corners
tyre leans inward*

more (2+ deg.)

*removes straight-line acceleration
tyre leans outward*

Camber describes the angle at which the tyre and wheel leans toward the car when looked at from the front or back.

Negative camber means that the tyre leans inward at the top.

Positive camber means that the tyre leans outward at the top.

At zero degrees, the tyre is vertical; benefit of zero camber is more straight-line acceleration than positive camber.

Camber is measured in degrees.



The rear camber of the B44.1 is being checked with the #1719 Factory Team Camber + Track Width Tool Camber Gauge. The number at the bottom corner of the gauge nearest the tyre indicates the angle of camber.

Caster, front

less caster

*less steering entering corners
more steering exiting corners*

more caster

*more steering entering corners
less steering exiting corners*

Caster describes the angle of the kingpin when it is leaning toward the rear of the vehicle. Positive caster means the kingpin leans rearward at the top. Negative caster (leaning the kingpin forward) is never used.



You can see the angle of caster on this SC10 short-course truck.

Chassis Length

shorter

more steering

quicker response in corners

quicker left-right turning

longer

more stability in high-speed corners

more rear traction

slower turn-in steering

better stability on rough tracks

slower turn-in steering

better jumping

Some vehicles have more than one chassis length available.

Diff Fluid, Centre Diff, off-road

lower weight, lower viscosity

thinner or lighter

smoother acceleration, better in bumps

for rough, low-traction conditions

higher weight, higher viscosity

thicker or heavier

accelerates harder, but worse in bumps

for smooth, high-traction conditions

Diff Fluid, Front Diff, off-road

lower weight, lower viscosity

thinner or lighter

more steering, but less stability

for low-traction conditions

higher weight, higher viscosity

thicker or heavier

less steering, but more stability on power

for high-traction conditions

Use the pro setup sheets online for reference and recommendations.

Diff Fluid, Front Diff, onroad

lower weight, lower viscosity

thinner or lighter

more steering through the centre of the corner

for low-traction conditions

higher weight, higher viscosity

thicker or heavier

less steering into corner and smoother through centre of corner

for high-traction conditions

A gear diff in the front requires a thick fluid somewhere in the neighbourhood of 300K or thicker. Using too thin of a fluid in the front diff will result in an inconsistent car through the corner, making the car very hard to drive.

Diff Fluid, Rear Diff, off-road

lower weight, lower viscosity

thinner or lighter

more grip, but less stability on power

for low-traction conditions

higher weight, higher viscosity

thicker or heavier

less grip, but more stability on power

for high-traction conditions

Use the pro setup sheets online for reference and recommendations.

Diff Fluid, Rear Diff, onroad

lower weight, lower viscosity

thinner or lighter

more corner entry steering

for low-traction conditions

higher weight, higher viscosity

thicker or heavier

more on power steering and less steering into corner

for high-traction conditions

Droop, onroad

less droop

less shock travel

for smooth, high-traction tracks

larger number on Droop Gauge

more droop

more shock travel

for rougher, lower-traction tracks

lower number on Droop Gauge

You can limit the amount of shock travel by increasing or decreasing an onroad car's suspension arm droop.

One of its effects is to reduce "chassis roll."



Team Associated's #3987 Factory Team Droop Gauge helps measure droop.

Final Drive Ratio

Lower number

more top end speed possible

slower acceleration

higher number

less top end speed

quicker acceleration

Final Drive Ratio is: (Spur Gear divided by Pinion or Clutch Bell tooth count) times Transmission Ratio

No matter what vehicle you have, the equation is the same.

You'll get the transmission ratio from the instruction manual or the manufacturer. (This app supplies the transmission ratios for most Team Associated vehicles.)

Gear Pitch

smaller pitch

best for onroad

finer gearing adjustments possible

more efficient

quieter

more easily damaged by rocks

larger pitch

stronger teeth

best for nitro

best for off-road

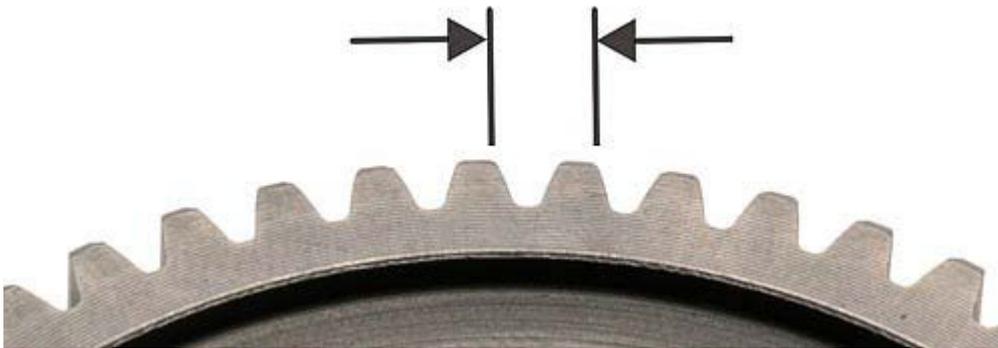
fewer gearing adjustments

In the RC hobby we use mostly 32-, 48-, and 64-pitch gears.

The pitch has to do with the size of the teeth, not number of the teeth, on the gear.

32-pitch gears are the largest pitch with fewer teeth per inch.

Fewer teeth per inch means the teeth are larger and therefore stronger.



The gear pitch distance from tooth to tooth.

Gear Ratio

lower number

"gear up"

more top end speed

higher number

"gear down"

faster acceleration

Gear ratio is Spur Gear divided by Pinion Gear. Example: 75-tooth spur gear divided by 15-tooth pinion gear = 5.

This means the pinion gear must turn five times to make the spur gear turn one complete revolution.

On large tracks, you might aim for more top end (using a pinion gear with more teeth). For small tracks or tracks with tighter turns, you might aim for more acceleration. So using a pinion with fewer teeth will help.

Kickup

less kickup

*better turn-in and through a corner
fast weight transfer to front of car
best for high traction tracks*

more kickup

*turns into corner more
standard for most situations*

Kickup refers to the angle, at which the on-road front suspension is mounted, measured from the horizontal, when looked at from the side of the vehicle.

0 deg. kickup means your front arms are level with the chassis.

20 deg. kickup means the front of the front arms are higher, creating a 20-deg. angle with the chassis.



Here's the kickup angle of an RC10B4.1 buggy.

Pinion Gear

fewer teeth

more acceleration

more run time

gear ratio goes down

more teeth

more top speed

less run time

gear ratio goes up

The pinion gear is attached directly to the electric motor shaft and drives the spur gear, which in turn interfaces with the transmission.

Changing the pinion gear to more or fewer teeth will make big changes to your vehicle's run time and top speed.



#8255 18 Tooth, Precision Machined 48-Pitch Pinion Gear shown.

Ride Height, front

lower

creates more push

onroad: best for carpet

onroad: less chance of flipping in corners

higher

creates more steering

onroad: higher chassis means more chassis roll and better traction on bumpy tracks

The front ride height is the distance from the ground to the bottom of the chassis measured at the front (with the vehicle fully equipped). This adjustment helps to speed up or slow down how fast the car changes direction when cornering.

To set the standard front ride height for off road, lift up the entire car about six to eight inches off the bench and drop it.

When the suspension settles, the front edge of the A-arms should be level.

If they are not in a straight line, then add or subtract preload spacers to the front shocks, or adjust the threaded shock collar up or down until it is level.

If you move the batteries forward or back, then recheck the ride height and adjust so it is level.

You should always check the ride height after making all your other adjustments, just before you are ready to race.



You change the ride height of the B44.1 buggy by turning the shock collar on the threaded shock bodies.



You can measure the ride height with a tool, such as the #1449 Factory Team Off Road Ride Height Gauge.

Ride Height, rear

lower

less rear end sliding in corners

higher

better acceleration in loose terrain

better lift off jumps

The rear ride height is the distance from the ground to the bottom of the chassis measured at the rear (with the kit fully equipped).

Check the ride height by lifting up the entire car about six to eight inches off the bench and dropping it. After the suspension "settles" into place, then add or remove preload clips, or adjust threaded shock collars up or down so the dogbones are in a straight line.

If you decide to move the battery pack forward or back, then recheck the ride height and adjust so it is level.

The rear ride height setting you should use most often in off-road is with the outdrive, driveshaft, and axles all on the same imaginary horizontal line (referred to as "bones level").

Making large ride height adjustments up or down from this setting will tend to make the car feel unpredictable.

You should always check the ride height after making all your other adjustments, just before you are ready to race.

Ride height "bones level" is a starting point.



You change the rear ride height on the SC10 short-course truck by adding or removing preload spacers (arrow).

Roll Centre

lowering roll centre

more washers under ballstud

lower rear inner pin

for high-traction tracks

leans more when cornering

raising roll centre

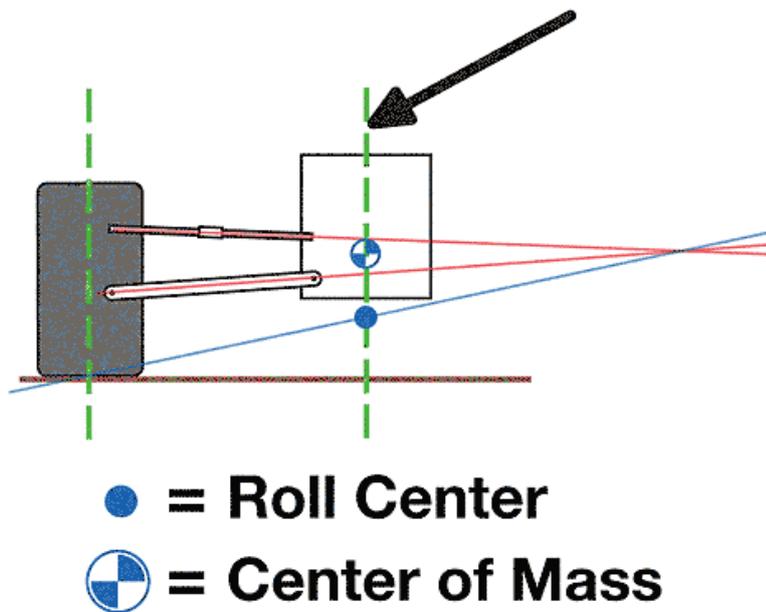
fewer washers under ballstud

higher rear inner pin

for low-traction tracks

The roll centres for a chassis are defined by the suspensions' geometry. Roll centres are effectively positions in space (see drawing) that the suspension will "roll around." The roll centre height can be adjusted by changing the angle of the suspension arm, camber link, or both. Typically, this is done by changing the height of the inner positions of these members (the inner pin for suspension arm, and inner ballstud for camber link).

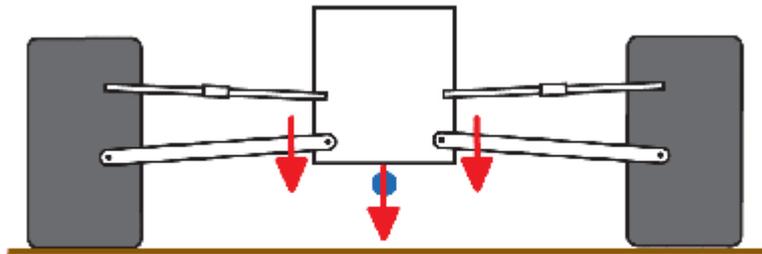
Centerline of Chassis



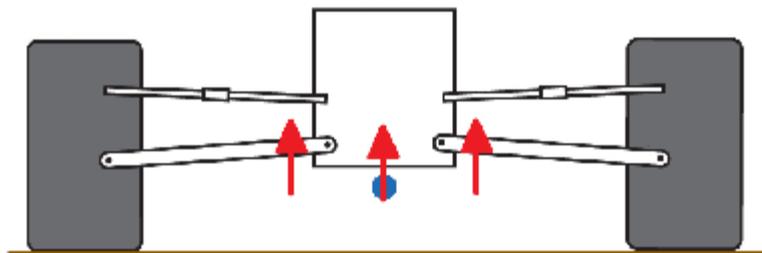
Changing arm position.

On some chassis, the inner pin position for the suspension arm can be adjusted up and down to change the angle of the suspension arm.

In this case, the roll centre will move in the same direction as the adjustment to the inner pin: if the inner pins are moved up, then the roll centre moves up as well.



Lowering Roll Center, arms



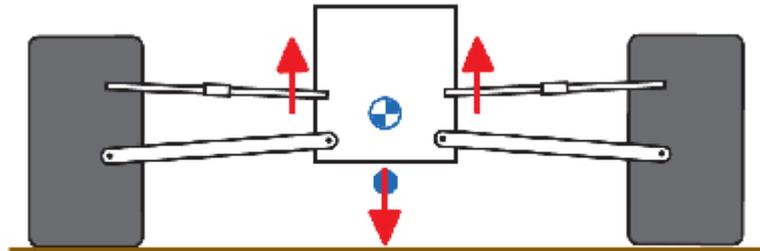
Raising Roll Center, arms

Changing ballstud height.

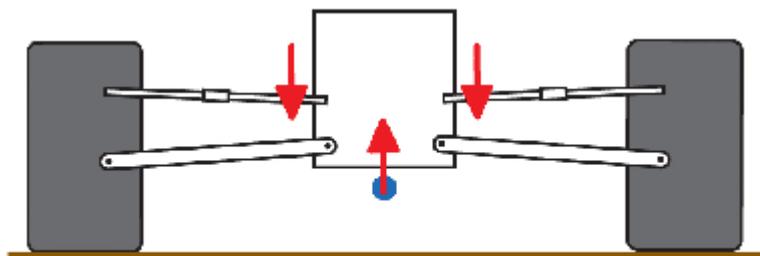
The angle of the camber link can be changed by changing the height of the inner ballstud.

This angle change has a much smaller effect on the height of the roll centre, so it is a finer adjustment and less noticeable on the track.

With this adjustment, the roll centre will move in the opposite direction than the adjustment to the inner ballstud: if the ballstud is raised, the roll centre is lowered.



Lowering Roll Center, ballstuds



Raising Roll Center, ballstuds

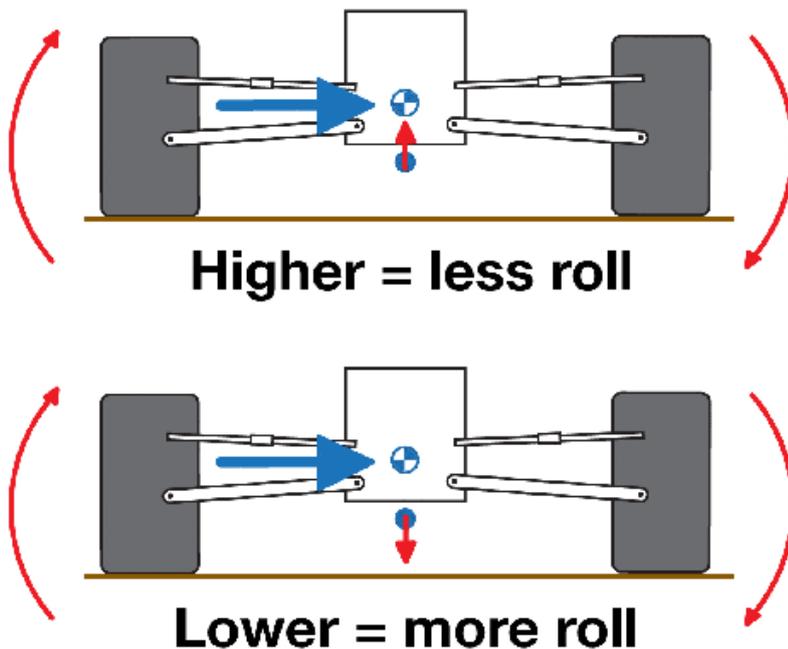
High and low roll centre effects.

Changing the roll centre height will affect the stiffness of the suspension when the chassis is in roll (or leaning).

This is due to how the inertial forces are applied to the chassis as it goes through a corner. As the car changes direction to transfer through a corner, these forces are applied at the centre of mass of the chassis.

The farther away that the roll centre is from the centre of mass (or, in other words, the lower the roll centre is), the more leverage the inertial forces will have to make the chassis roll.

So in effect, as the roll centre is lowered, the chassis will be softer in roll, allowing it to lean more in the corner.



Suspension systems with lower roll centres are less responsive (or less "reactive"), and more forgiving than those using a higher roll centre.

Typically, lower roll centres are used on a smooth, high-traction surface and higher roll centres are used when the traction is low.

Keep in mind that the front and rear roll centres may not be the same, as it depends on the mounting position of the suspension arm and camber link. Staggering the roll centres front and rear can be an effective tool in helping to balance the car through the corner. You can raise or lower the ballstuds by inserting washers where the ballstuds are mounted to the tower



Shock Mounting, front suspension arm

inner hole
softer
less stable

outer hole
stiffer
more stable



These holes on the front arm of the T4.1 truck give you two mounting options.

Shock Mounting, front tower

inner hole

*increases initial steering into corners
less lift off of jumps*

outer hole

*softer less steering entering corners
more front end lift off jumps
stiffer*



In this B44.1 4WD buggy, you change the top shock mounting with these two hole options.

Shock Mounting, rear suspension arm

inner hole

softer

good for bumps and jumps

outer hole

stiffer

less responsive, more locked in



These holes on the rear arm of the T4.1 truck give you two mounting options.

Shock Mounting, rear shock tower

inner hole

more stability in entry and cornering traction

less lift off jumps

better in bumps

onroad: more traction

outer hole

softer less side bite (less cornering traction)

more lift off jumps

onroad: less traction

stiffer



In this B44.1 buggy, you change the top shock mounting with these two hole options.

Shock Fluid

lower weight, higher weight

higher viscosity, thinner or lighter
faster rebound
for many small bumps

lower viscosity

thicker or heavier
less bottoming out

Shock Pistons

smaller holes

*improve jump lifts and landings
for smoother tracks
increases responsiveness
more damping*

larger holes

*for small bumps
less damping*

The shock piston has two or three holes through which the oil flows as the piston travels up and down in the shock. Pistons along with shock oil help determine shock damping.

A shock's damping is a measure of the resistance of the shock as it is compressed. Changing the piston hole size changes the damping characteristic of the shock.

Keeping the same oil, the smaller holes provide more damping, also known as more "pack," while the larger holes provide less damping, or less "pack."

Associated #6465 includes these 2-hole pistons: #1 (.055" hole diameter), #2 (.052"), and #3 (.047"). Four of each size are included.

When changing to the next smaller hole, it will have a similar feel of increasing shock oil by 5 wt. thicker.

A shock with a #1 piston and 30 wt. oil, when changed to a #2 piston with the same oil, will give the feel of thicker 35 wt. oil, because the #2 piston has smaller holes and moves with more resistance.



Shock pistons #6465 (left), #6463 (centre), #89353 (right). #6463 are blank pistons, which means that you may drill your own size holes, as many or as few as you wish.

Shock Springs

softer

lighter tension

great on rear for off-road

gives more traction

best for small bumps

stiffer

heavier tension

creates less traction

lifts higher off jumps

better suspension response

The springs' purpose is to keep the vehicle level.

The shock spring controls the stiffness of the suspension.

This affects how the car corners and how it lifts off of jumps.

Several spring tensions are available to moderate these factors.



Shock spring on the Factory Team TC6 touring car.

Shock Travel Limiters

fewer limiters

for bumpy tracks

more limiters

used in side shocks when car leans too much in turns

in rear shocks they add traction when front end rises on acceleration

Limiters placed outside the body will limit the up-travel of the shock.

Limiters placed inside the shock limit shock down-travel.



These travel limiters will be placed on the inside of the shock body.

Slipper Clutch

tighter

for high bite tracks

more instant acceleration

smoother corner entry

looser corner exit

onroad: feeling of less steering

looser

for tracks with low traction

more traction exiting corner

By adjusting the clutch, you determine how much you will allow the wheels to slip.



On this Team Associated vehicle, adjust the slipper by turning this nut. (To help you remember which way to turn, think: "lefty loosen, righty tighty.")

Spur Gear

fewer teeth

smaller gear ratio

more teeth

larger gear ratio

off-road: more traction because it pushes the motor back

The spur gear is attached to the transmission. It interfaces between the motor's pinion gear and the transmission.



The spur gear.

Tyre Compound

softer compound

for smoother surfaces

for higher temperatures

harder compound

for bumpier surfaces

for grass

for wet conditions

Tyre Inserts, foam

softer

more traction

more drag

harder

less rolling resistance

better cornering

Tyres are typically thin and need support to retain their shape.

Tyre inserts give this support.

The foam insert's density is important.

The foam insert that comes with the tyres nine times out of ten is the insert you should use.

Too firm an insert will cause your car to bounce, resulting in loss of traction.

Too light a foam will cause the car to wander and to be very unstable.



You can see the white foam inserts that come standard with every pair of #21254 off road tyres.

Tyre Profile

flatter

for flat and smooth surfaces

higher contact patch gives better traction on smooth surfaces

best for onroad and oval for

rounder

bumpier surfaces

for tracks with many turns

best for off-road

Tyre Sauce, Tyre Additive

no sauce

when surface is dusty or dirty

add sauce

for prepared surfaces

for rubber tyres

Toe-in, toe-out, front

0 deg. toe

standard for all conditions

toe-out

quicker corner turn-in

unstable in bumps and slippery straightaway

Front toe-out describes the angle of the wheels when viewed from above, the front of the wheel turning inward (toe-in) or outward (toe-out), or pointing straight ahead. It is measured in degrees.

Aftermarket gauges are available to help you measure it.



The 1 deg. toe-out angle is seen from the top of the vehicle.

Weight Distribution, adding weights

front

more steering while accelerating
changes direction slower
more nose-down jumping

rear

less steering
more rear traction
more stable under acceleration and braking

You can balance the chassis' weight by adding weights to the car, or by shifting your batteries forward or back.



The 87g #9776 Ballast Weight has been inserted into the Factory Team B44.1 buggy.

Wheelbase

shorter

wheels closer together
more rear traction
weight shifted to back

longer

wheels farther apart
slightly more steering
better stability
weight shifted to front

The wheelbase is the distance between the front and rear wheels at the axle centre lines.

You can make adjustments to your wheelbase. That is, you can shift the wheels forward or back to lengthen or shorten the wheelbase.



Moving these spacers to the other side will shift the front wheel back, shortening the wheelbase.

Wing

steeper angle

more rear traction

more horizontal

standard traction

Wings are a vital part of the car's stability. The angle at which you place the wing and how much of the wing you cut will cause the car to handle differently.

Wing angle aids in rear traction.

You can adjust the amount of traction by changing the wing angle.

On road: You can slide the wing back for more rear traction. Some aftermarket wings allow more adjustments.

The canards, which are sides of the wings, can change the handling based on how tall and long they are. Use side dams when you need more stability in the straights and high speed corners.



The wing angle of the B44.1 buggy (as seen from this underside view) is changed by the use of tapered wing shims.

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Battery "C" Rating, LiPo

lower rating

lower discharge load

higher rating

higher discharge load

more punch when accelerating



The #629 Reedy LiPo battery has a C rating of 60C.

Battery mAh Capacity

lower number

*lower capacity
shorter run time
less cost*

higher number

*higher capacity
longer run time
more cost*

Your battery's capacity is rated in milliamp-hours, abbreviated mAh.



The #629 Reedy LiPo battery has a capacity of 5500mAh.

Battery Cell Count

fewer cells

lower voltage
less speed

more cells

higher voltage
more speed



Six cells are in this Factory Team TC5R.

Battery Label (NiCd and NiMH)

Battery resellers enhance the performance of their cells and provide certain cell characteristics on their labels.

The cells are machine-tested and labelled. Compare these numbers on the NiCd and NiMH battery labels to get the best cells. You'll find this information on matched packs, not your regular stick packs.

A/V (Average Voltage).

Higher number means more voltage.

Higher number = better.

A I/R (Actual Internal Resistance in Milliohms).

Lower number means better power output because less loss through resistance.

Lower number = better.

SEC (Cell Runtime).

Higher number means more run time.

Higher number = better.

Battery Placement

forward

more steering

less rear traction

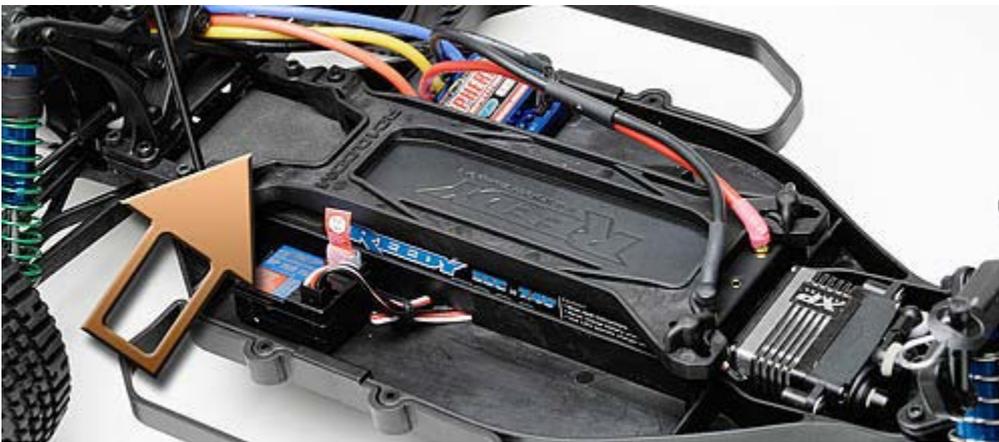
rearward

less steering

more rear traction

You can slide the batteries forward or back. Its weight bearing down on the front or rear will emphasize that area's unique suspension aspects.

(Off road: on extremely high or low traction tracks, moving batteries forward may balance the car and give better rear traction.)



This foam bar at the rear of the Team Associated SC10 short-course truck pushes the batteries forward. The foam can be cut, moving the batteries back incrementally, placing the cut pieces at the front.

Battery Voltage

lower voltage

*slower acceleration
runs cooler*

higher voltage

*faster acceleration
runs hotter*



The #629 Reedy LiPo battery is 3.7 volts.

Drag Brake

less drag brake

free-wheel to a stop

more drag brake

faster brake engagement

The amount of braking achieved when the throttle is returned to neutral.

A setting of 0 per cent means the car will free wheel to a stop while higher settings will stop the car faster.

Change this setting by adjusting your radio transmitters brake EPA setting.

Some high-end transmitters can adjust this setting. Otherwise, it's set through a electronic speed controls (ESCs).

Dual Rate (D/R)

lower percentage

*turns down the amount of steering you have from full left to full right
use when you keep over-compensating for your steering mistakes on the road
for larger tracks
for a softer steering feel*

higher percentage

*gives more steering left to right
use when you have smooth control over your car
good for tighter tracks
for a more responsive (aggressive) steering feel
to make tighter turns*

The dual rate refers to setting your steering servo's maximum angle of rotation, or "throw," to two different limits.

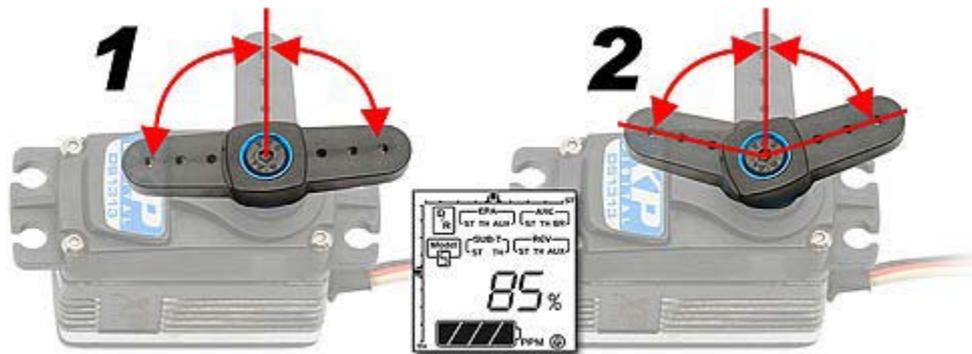
The steering servo has a maximum throw to its travel left and right.

Those points are the "end points."

First you set the end point adjustment of the steering servo; the dual rate setting for left and right will be a percentage of that value.

This transfer from one rate to the other is achieved by a control on the transmitter. It affects your turning radius.

You adjust the dual rate amount so that you can make the turns most efficiently. Since the control is located near your thumb on the transmitter, you can adjust the rate at will for different parts of the track.



Picture #2 shows the angle change when you set the dual rate to 85% of the setting in picture #1.

Expo/Exponential, steering servo

negative percentage

decreases (softens) the steering rate at initial wheel turn and accelerates rate at end

positive percentage

accelerates the steering rate at initial wheel turn and decelerates (softens) rate at end

Without an expo setting, if you turn your transmitter wheel left or right, the servo turns left or right at the same linear rate of speed.

But with a negative expo percentage applied, one adjusts this rate of change so that at the initial turn of the transmitter wheel, the steering response is minor or softened; but as you continue turning the wheel, the steering response is accelerated exponentially (hence the name, "exponential.")

A greater negative percentage will accentuate the rate.

A positive percentage will reverse these rates.

A linear rate is set at expo 0%, which is a comfortable and predictable rate for beginners. (The Team Associated XP3D radio manual calls this feature the ARC/ST, Adjust Rate Control, steering servo.)

Expo can also be applied to the brakes and the throttle.

For instance, a more negative percentage will soften the rate at the initial control movement (braking or acceleration) and accelerate the rate at the end of the movement.

EPA/End Point Adjustment, steering servo

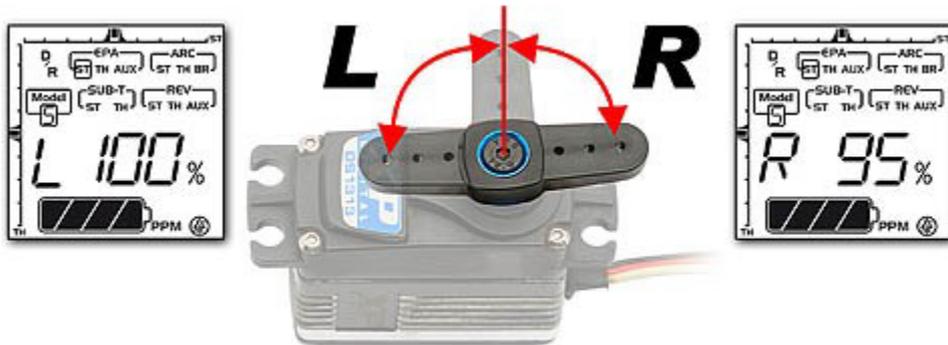
lower percentage
makes wider turns
shorter throw

higher percentage
makes tighter turns
longer throw

The steering servo has a limit or maximum "throw" to its travel left and right. Those points are called the "end points."

You adjust the end points to achieve an equal amount of steering left and right, then you adjust the "dual rate" to fine tune the adjustment. To this end, the EPA for left and right steering are adjusted individually.

You can set the steering servo throw end points for the left and right individually.



Here, the left is set at 100% of the throw while the right is limited to 95% of the throw.

EPA/ATV/End Point Adjustment, throttle/brake

lower percentage

shorter throw

higher percentage

longer throw

The throttle/brake servo on nitro vehicles has a maximum throw to its travel left and right. Those points are the "end points."

You adjust the end points to achieve maximum throw or less throw when setting up your throttle and brake.

Throttle/brake setup

The same servo controls the throttle and brakes, and depends on their corresponding linkage setup to work together properly.

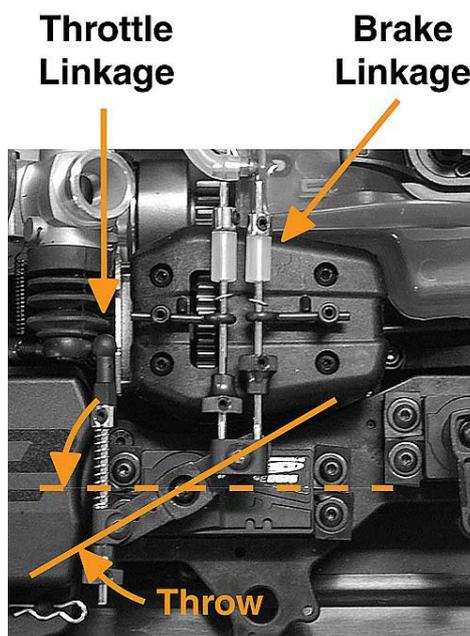
Set the throttle servo linkage so that when you apply full throttle, the barrel of the carburettor is open all the way. Then you fine-tune the EPA for that throw so it stops just short of fully open.

Set the brake linkage so that when you push the trigger outward for braking, the brakes are fully applied. Then fine-tune the EPA for that throw so the plates stop just short of full pressure on the brakes.

When the throttle trigger is in its centre or neutral state, you want the carb to be at its idle position with little to no brakes are applied.

If you want to have a measure of drag brake at neutral, then set it with the brake linkage or EPA. (Drag brake means that the brakes being slightly applied at neutral.)

It's important to adjust the linkage in concert with the EPA settings so that the linkage will not be jammed or strained at full left or right throw, but is just right.



The throw has been set for throttle and brake linkages in this RC8B 1:8 nitro buggy.

Brushless Motor Speed, KV

lower KV

slower acceleration

higher KV

faster acceleration



The #917 Reedy 540R Brushless Motor is 3900kv.

Motor Springs, brushed motors

less tension

more RPM

more tension

more torque

You can change the tension of the spring by changing the angle of its two ends (by squeezing them closer together or pushing them farther apart). The tension of the spring affects the pressure of the brush against the armature.



The #780 Motor Spring has a 9 oz. rate. Thicker and thinner wires change the rate.

Timing, brushed motor

clockwise

more RPM

less torque

"advancing"

counter-clockwise

less RPM

more torque

Brushed motor timing is accomplished by loosening (but not removing) the top screws of the endbell (not the brush hood screws) and turning the endbell slightly. Then the screws are tightened again.

Timing marks are found on the hood (top of the motor), marked on the side of the can (see photo below), or on a label.

There is usually a mark on the hood that would line up with the timing marks. Each vertical line of timing marks off 4-6 degree increments.

It's best not to go below the 0-degree mark, for it retards the time and could create efficiency problems. Too much timing will have a similar effect; even though you can hear the motor has a lot more RPM, advancing the time takes away efficiency and could cause the motor to overheat or burn off the armature wire's coating - ruining the motor.

You can see the notches in the endbell hood for lining up with the small timing indicator stamped into the can.



The far left vertical line marks 0 degrees.

Motor Turns, brushed

fewer turns

higher RPM

higher top end

more battery draw

less run time

more turns

lower RPM

more acceleration

less battery draw

more run time

Turns refers to the number of times the wire was wound around each armature arm.

Sintered Rotor, brushless motors

smaller diameter
more RPM

larger diameter
more torque



The #LRP50638 LRP Works X-12 Sintered Rotor is 13.0mm in diameter.

Steering Servo

more torque

best for large vehicles

more speed

best for on road

Off-road needs more torque because of the larger wheels and rougher ground. Monster trucks need the most torque because of the power needed to turn the heavier wheels.



This T4.1 truck is using an XP digital servo available from Team Associated.

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Carb Restrictor

smaller hole

less acceleration

better control

lessens wheelspin (better traction)

better fuel economy

larger hole

more speed

harder to control

reduced fuel economy

Carb restrictors "restrict" the amount of air entering the carburettor. Carb restrictors can be used to help control the amount of wheel spin coming out of corners, resulting in a vehicle that's easier to drive, but top speed will be reduced.



Reedy's carb restrictors for the 121 engine range from 6.5mm to 9mm. Shown from left: #28028 (6.5mm), #28029 (7.5mm), #28030 (8.5mm).

Carb: High-speed Needle

clockwise

smaller opening

leaner

less fuel

more air

compensates for higher elevation

increases temperature

counter-clockwise

larger opening

richer

more fuel

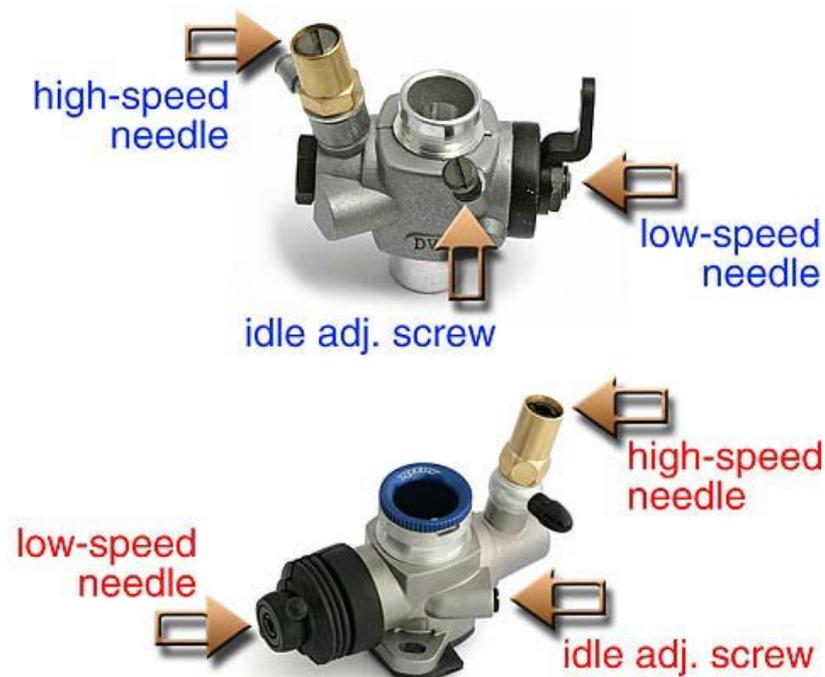
less air

lowers temperature

The high-speed needle adjusts the quantity of fuel when the throttle is fully open. The high-speed needle setting is determined by driving your vehicle at maximum speed on the longest straight. After each full speed run, close the high-speed needle 1/16 of a turn at a time, noting the difference in speed. The goal is to achieve the highest straight-line speed while maintaining a visible trail of smoke from the exhaust.

A poorly performing clutch assembly (bad bearings, weak or broken springs, worn clutch shoes, interference with engine or chassis components, etc.) may trick you into making adjustments that are not necessary or incorrect.

Be sure your clutch assembly is in perfect running order at all times. (From the Reedy #800 engine manual.)



Here are the screw locations for the carb settings for a rotary carb (top) and slide carb.

Carb: Idle Adjustment Screw

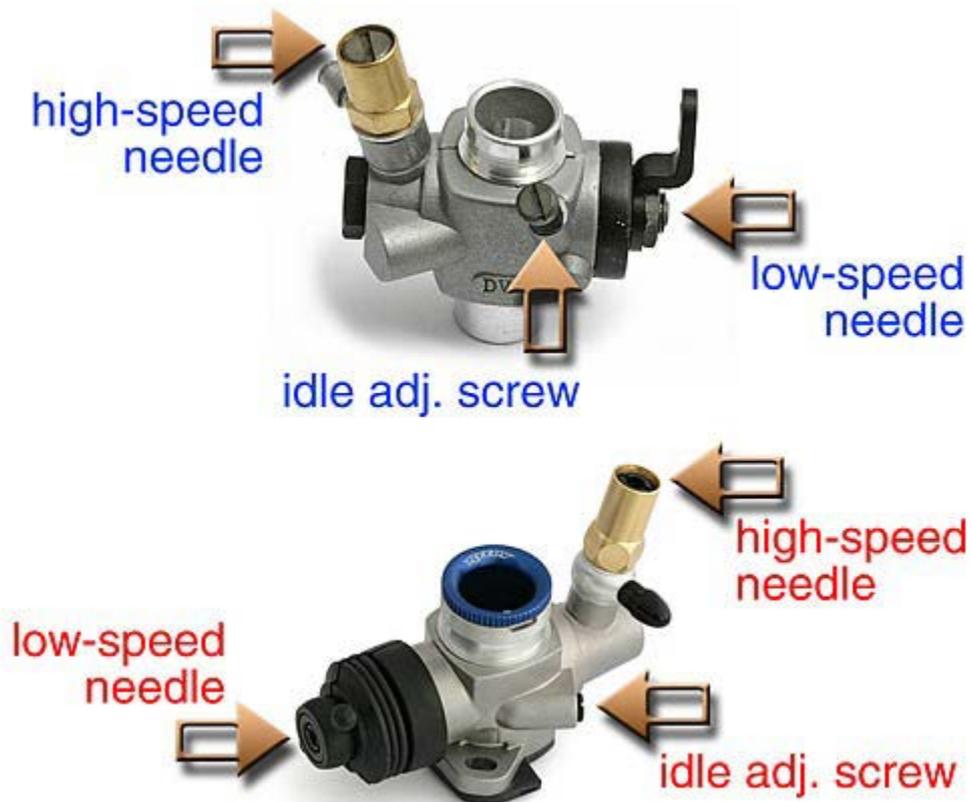
clockwise

increases idle RPM

counter-clockwise

reduces idle RPM

Adjusts the engine idle speed at neutral throttle. The idle adjustment screw should be set so that the engine will keep running, but not so that the vehicle will be running on its own.



Here are the screw locations for the carb settings for a rotary carb (top) and slide carb.

Carb: Low-speed Needle

clockwise

smaller opening

leaner

less fuel

more air

counter-clockwise

larger opening

richer

more fuel

less air

compensates for overheating

compensates for hot outdoor temp

more acceleration from standstill or low RPM

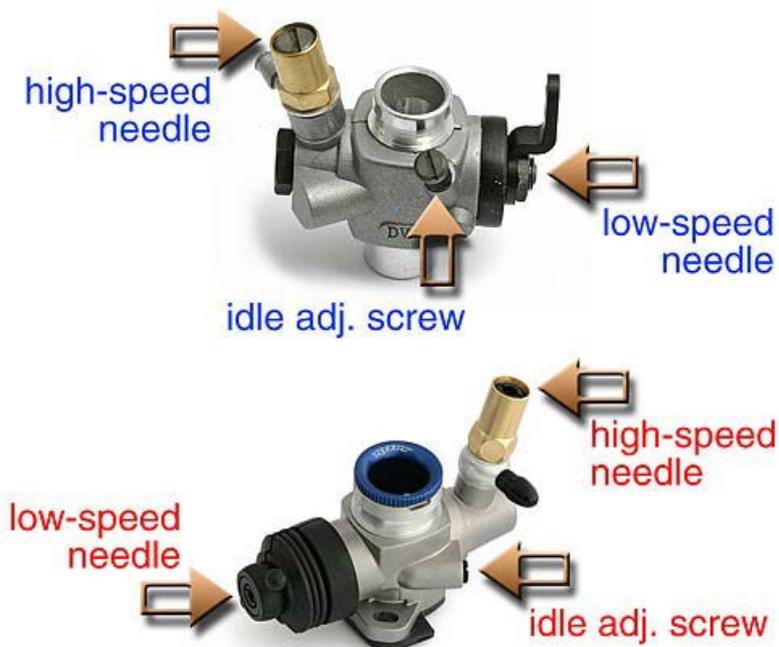
This setting adjusts the quantity of fuel for best acceleration from standstill or low RPM. Bring the vehicle to a complete stop and let it idle for 5-6 seconds, then give 100% throttle.

If the vehicle emits excessive smoke and does not accelerate smoothly and quickly, the mixture is too rich. Turn the needle in 1/16 of a turn increments until the vehicle accelerates quickly and smoothly.

However, if the engine speeds up momentarily and then cuts out abruptly when 100% throttle is applied, the mixture is too lean. So turn the low-speed needle counter clockwise and test.

A poorly performing clutch assembly (bad bearings, weak or broken springs, worn clutch shoes, interference with engine or chassis components, etc.) may trick you into making adjustments that are not necessary or incorrect.

Be sure your clutch assembly is in perfect running order at all times.



Here are the screw locations for the carb settings for a rotary carb (top) and slide carb.

Clutch Bell

more teeth

more top end

less acceleration

fewer teeth

less top end

more acceleration

The clutch bell teeth transfers engine power to the spur gear to drive your rear wheels. The ratio between your clutch bell teeth and spur gear teeth (its "gearing") will affect how fast your vehicle goes (its top speed) and the rate your vehicle accelerates.

Like a see-saw effect, changing the top end will adjust the acceleration in the opposite direction. (Higher top end will result in slower acceleration.) You can adjust your top end and acceleration by changing your clutch bell to one with a different number of teeth.



Clutch bell on the MGT monster truck.

Clutch Shoes

shorter shoes

use when less traction

slower engagement

longer shoes

use when good traction

quicker engagement

creates quicker acceleration

When the engine revs increase, the clutch shoes, attached to the engine shaft within the clutch bell, are flung outward by centrifugal force. The shoes engage the inside of the clutch bell to turn the bell and accelerate your vehicle.

The shorter the clutch shoes, the longer the engine must rev before the shoes engage (a shorter contact patch contributes to this too).

A clutch shoe at stock length engages the clutch bell more quickly than short ones do.

To adjust when your clutch engages, you change the number of clutch shoes used, or alter their length.

Nowadays, racers adjust the clutch spring rate rather than the shoes.



right: #7601 clutch shoes, PTFE material which you can cut, used on the RC10GT truck.

left: #25720 clutch shoes, aluminium.

Clutch Springs

softer

softer spring rates

engages the clutch earlier in the engine RPM range

can cause the engine to "bog" if the load is too great for the low RPM

stiffer

stiffer spring rates

engages the clutch later in the engine RPM range

makes the power delivery more abrupt and can cause wheel spin (low traction)

Generally, three spring settings are given for a vehicle.

The standard setting is using the middle value.

On low traction, use a softer clutch to limit wheel spin or to make the power "softer."

On tracks needing heavy acceleration out of corners, use a stiffer clutch to engage the power more violently. This is helpful in stringing jump combinations together.

Additionally, if there is a heavy load on the car due to mud or sand, a stiffer clutch is desired to not "bog" the engine.

Clutch spring stiffness also effects the coasting of a vehicle.

A softer clutch will stay engaged when power is removed and can cause a "run-on" effect.

A stiffer clutch disengages more quickly and allows the car to freewheel sooner.



Clutch springs (coloured blue for this photo) being installed into the RC8B nitro buggy.



You can see the difference in thickness between these two clutch springs for the RC8B nitro buggy, softer on left, stiffer on right. (left: #89157, 0.9mm. right: #89158, 1.1mm.)

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Active Strut Upper Arm Mount

lower angle

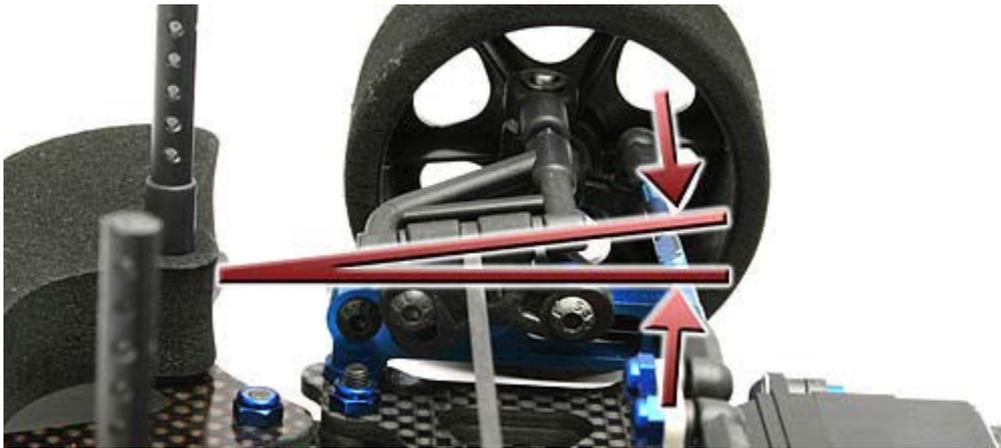
more consistent through the corner in high-bite conditions

higher angle

more entry steering

less mid-corner steering

The active strut system dynamically controls caster through suspension travel. The active strut upper arm mount adds an angle to the upper arm hinge pin, pointing the front of the pin down. This angle removes caster as the suspension is compressed.



Here is the caster angle for the active strut front suspension.

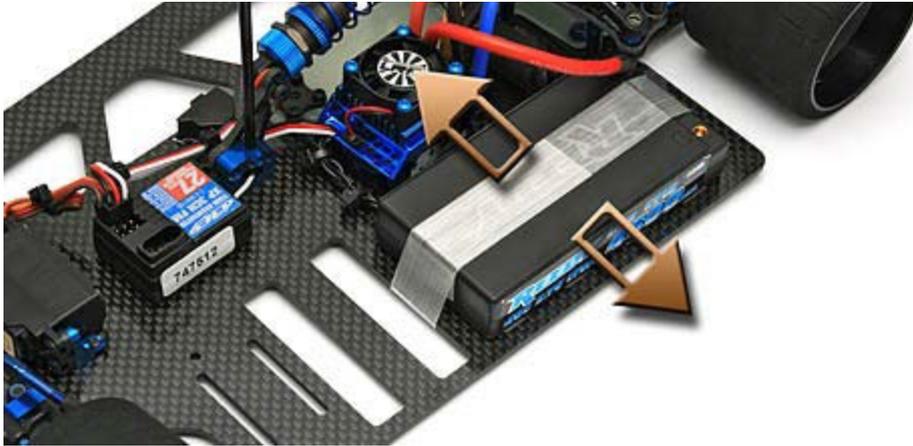
Battery Placement, oval

inward

*for high-bank cornering
for large tracks*

outward

improves cornering on tight, low-bank (or flat) oval tracks



Sliding the batteries in or out will change the cornering performance.

Centre Damping

lower weight, lower viscosity

thinner or lighter

more rear grip on high-bite tracks

higher weight, higher viscosity

thicker or heavier

stiffens rear of car

increases mid-corner steering

Centre damping is based on shock fluid viscosity in the middle shock. The damping controls the speed at which the chassis ride height changes when going over the bumpy sections of an asphalt track, and as it accelerates and decelerates.



Change shock fluid in the centre shock to change the damping.

Centre Spring

softer

slower rebound

stiffer

faster rebound

The centre spring controls how much the chassis ride height changes when going over the bumpy sections of a track, and as it accelerates and decelerates.



Change the spring on the centre shock to adjust rear stiffness.

Inline/Trailing Axle

inline

standard setting

more aggressive steering

trailing

easier to drive

less aggressive steering



RC10R5 Oval with inline axles.

Kingpin Damping

lower weight fluid

standard setting

higher weight

more consistent through the corner in high-bite conditions

You affect the damping of the kingpin by applying shock fluid to the outside of the kingpin where the kingpin slides through the lower pivot ball.

This lubrication affects the damping. With slower spec motors and high-bite conditions, thicker fluid can make the car more consistent in the corners.



Apply shock fluid to the outside of the kingpin.

Kingpin Springs

softer

increase steering

stiffer

decrease steering

This spring sets the stiffness of the Active Strut front end.

Oval racers sometimes use a different rate spring on each side. With a softer spring on the left, the tyre grabs harder. A stiffer spring on the right helps to free up the car coming out of the corner.



This spring compresses when the tyre goes over bumps. A softer spring helps make the car more consistent on bumpy surfaces.

Rear Pod, oval

centred

*for substantial banking
for large tracks*

offset

improve cornering performance on tight, low-banked (or flat) oval tracks

Side Damping, rear

lower weight

lower viscosity shock fluid

side-to-side transition is quicker

heavier weight

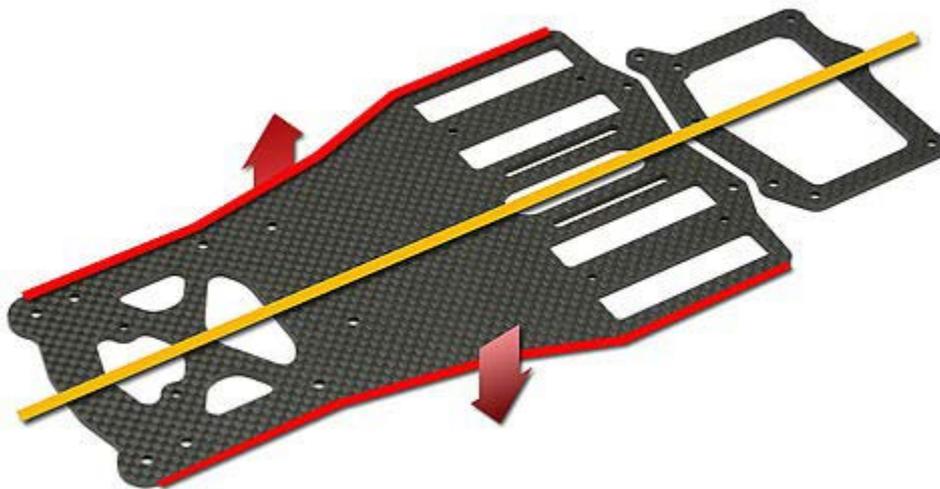
higher (thicker, heavier) viscosity shock fluid

side-to-side transition is slower

more consistent through corners in high bite conditions

Side damping is based on shock fluid viscosity in the side shocks.

This damping controls the speed at which the chassis rolls through the corners.



This photo shows the chassis rolling motion around the yellow centreline.



Change the shock oil in the side shocks to change the damping.



Change the spring to change the damping in the RC12R5.1 pan car.

Side Springs, rear

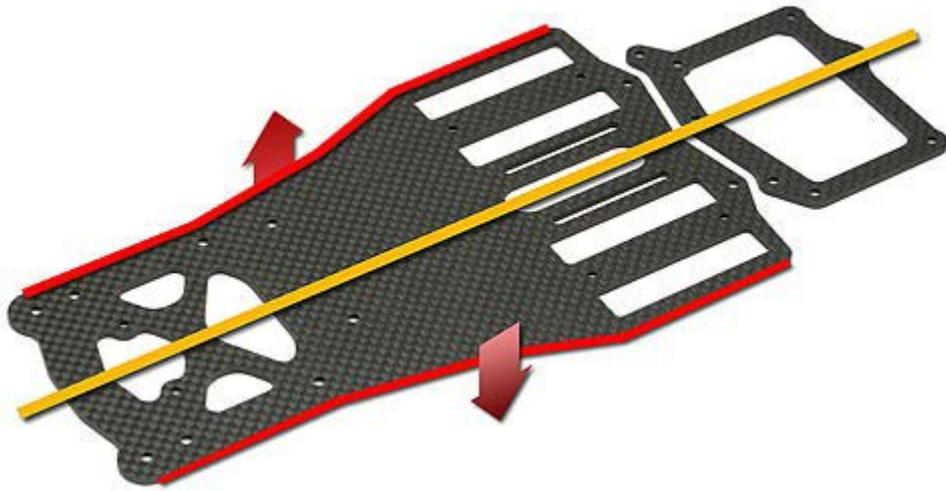
softer

more consistent in low bite and bumpy conditions like asphalt

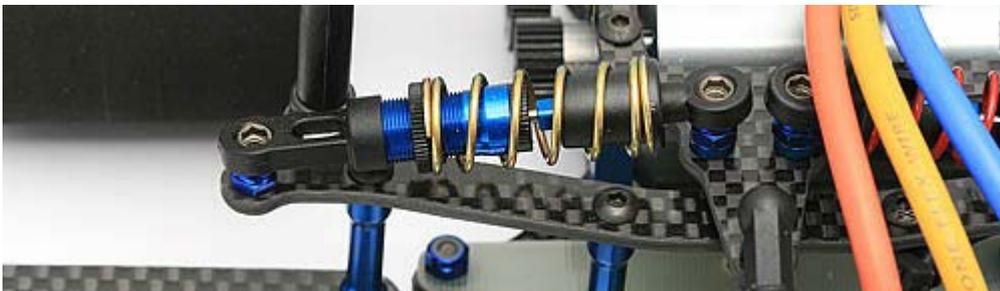
stiffer

better for smooth surfaces

The side springs control the change in ride height as the chassis rolls through the corners. Softer springs allow one side to lift (or both sides to "roll"), more.



This photo shows the chassis rolling motion around the centreline of the chassis.



You may use different springs on either side shock for finer adjustments.



Change this spring in the RC12R5.1 pan car.

T-Bar Flex, oval

2 holes

standard setting

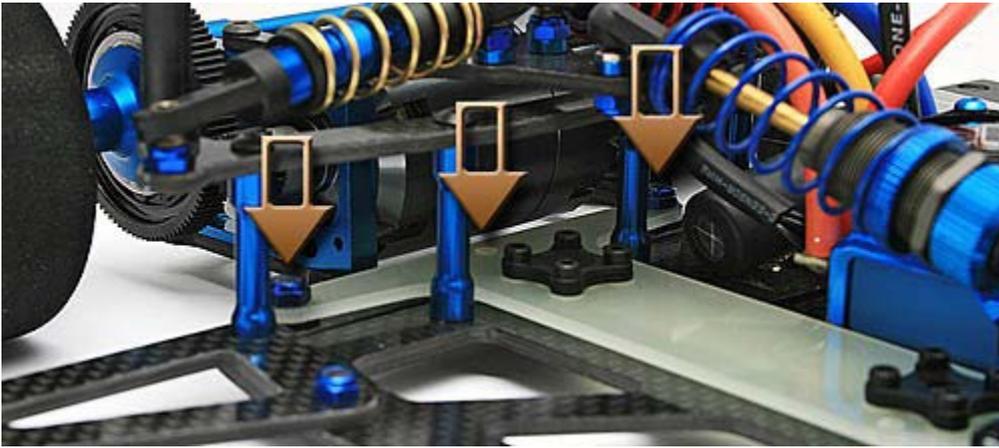
very active (soft) front-to-rear

3 holes

more rear traction

accelerate through bumps better

best for smooth, high-traction conditions



Mounting the T-bar at two or three locations will change the relationship of the rear end to the rest of the car.

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Maintenance Checklist

Your vehicle will give you many hours of trouble-free operation when you regularly check for wear and tear. You should periodically check all the moving parts of the car, especially before a big race. Here is a sample checklist in alphabetical order.

A-arms, front and rear

Check for cracks from crashes.

Make sure arms move smoothly; remove dirt build-up.

Make sure hinge pins are still straight.

Air filter

Clean and reapply filter treatment #7719; replace filter if needed.

Ball cups

Check for cracks to see if they need replacing.

Clear the ballstuds of dirt.

Apply ballstud dust covers to minimize dirt.

Batteries

Check that battery is fully charged, and connections and mounting are secure.

Body

Check that body clips are not missing, and body is not touching tyres.

Brake parts

Check for worn brake disc and proper adjustment.

Bushings and bearings

Clean and lube; replaced if needed.

2-speed clutch

Check for proper shift point and that shoes are not worn.

Receiver and servos

Check for firm mounting.

Receiver battery pack

(Nitro vehicles) Check that battery is fully charged and secure in vehicle.

Shocks

Check for consistent dampening all around.

Refill with new oil.

At that time, check and replace worn inner shock seal parts.

Steering blocks and hub carriers

Check for cracks from crashes.

Make sure they move smoothly.

Remove dirt build-up.

Transmitter

Check batteries are fully charged.

Wires

Check for any frayed wires or loose connections.

NITRO

Clutch shoes

Check that engine clutch shoes are clean and springs are working properly.

Glow plug

Check that it's heating up properly, replace if some coils are not heating up.
If engine will not start, replace glow plug.

Fuel tank

Check for leaks and dirt, good seal around O-rings.

Fuel tubing

Check for cracks and possible air leaks.

Be sure that the fuel line is not rubbing on any component that could cause damage or a leak.

Screws

Because of the vibration of nitro engines, check that all screws are tight before each run. (Racer Tip: Apply locking compound #1596 for all screws that are metal to metal.)

Clean out the screw head opening before inserting your driver to minimize wear.

Use quality drivers to keep from stripping out screw heads.

RC Toolbox, electric

These items are good to have on hand near your workbench or at the track.

Electrical

Battery charger (peak detection charger recommended)

Extra battery packs

Battery Discharger for NiMH or NiCad type batteries

Extra AA batteries (for transmitter)

LiPo balancer, for LiPo batteries

Fireproof bag, for LiPo batteries

Fluids

Tyre adhesive (to glue tyres to wheels)

CA glue

Paint for body

Thread-locking compound

Performance Plus 3 or similar for cleaning car

Performance Plus 3 or similar for cleaning bearings

Tyre Sauce (onroad)

Body cleaner

Tools

Phillips screwdriver

Flat blade screwdriver

Needle nose pliers

Shock wrench or multitool

Hex driver set

Socket driver set

Wire or diagonal cutters

Turnbuckle wrench

Camber gauge

Droop gauge (onroad)

Ride height gauge

Pencil-type soldering iron with Rosin core solder to solder motor wires

Hobby knife

Precision ruler

Body scissors

Body reamer

Body cleaner

Parts and Accessories

Wire ties

Motor brushes

Motor springs

Extra suspension arms and bumpers and whatever parts you seem to break the most

Extra nuts and locknuts of a variety of sizes

Extra screws and set screws of a variety of sizes and types

Extra washers of a variety of sizes and types

Extra E-clips and similar clips

Extra body clips

Extra diff balls

Extra glow plugs

Extra ball cups

Extra tyres and tyre types

Extra crystals with different frequencies

Extra servo gears

Extra shock internal parts

Extra belts, for belt-drive vehicles

Other

Servo tape

Masking tape for body designs

Portable desktop light source

Rag for wiping and cleaning

Hand cleaner

Shrink Tubing, various diameters, and flame lighter or heater to shrink it

Towel for workbench (keeps area clean and prevents bearings and other parts from rolling)

Small paint brush (1 inch wide) to clean

Stopwatch

Pit bag

Toolbox and parts trays

Pen and pad of paper for notes

Blank setup sheets

Instruction manuals and catalogues

First aid kit

Safety eyewear

Safety gloves (for handling hot items like engines or heated motors)

Strapping tape (for batteries)

Favourite RC magazine

RC Toolbox, nitro

These items are good to have on hand near your workbench or at the track.

Electrical

Extra AA batteries (for transmitter)

Starter box extra battery

Receiver battery pack

Battery charger

Fluids

Foam Prefilter Treatment

Fuel

Tyre adhesive (to glue tyres to wheels)

CA glue

Paint for body

Thread-locking compound

Performance Plus 3 or similar for cleaning car

Performance Plus 3 or similar for cleaning bearings

Tyre Sauce (onroad)

Body cleaner

Tools

Glow plug wrench

Phillips screwdriver

Flat blade screwdriver

Needle nose pliers

Shock wrench or multitool

Hex driver set

Socket driver set

Wire or diagonal cutters

Turnbuckle wrench

Camber gauge

Droop gauge (onroad)

Ride height gauge

Pencil-type soldering iron with Rosin core solder to solder motor wires

Hobby knife

Precision ruler

Body scissors

Body reamer

Temp gauge for engine

Parts and Accessories

Wire ties

Extra suspension arms and bumpers, whatever parts you seem to break the most

Extra nuts and locknuts of a variety of sizes

Extra screws and set screws of a variety of sizes and types

Extra washers of a variety of sizes and types

Extra E-clips and similar clips

Extra body clips

Extra diff balls

Extra glow plugs

Extra ball cups

Extra tyres and tyre types

Extra crystals with different frequencies

Extra servo gears
Extra shock internal parts
Extra belts, for belt-drive vehicles
Extra clutch springs

Other

Air filter elements
Glow plugs
Glow starter/igniter
Starter box, or hand-held starter
Fuel tubing
Shrink Tube, various diameters
Servo tape
Masking tape for body designs
Portable desktop light source
Rag for wiping and cleaning
Hand cleaner
Towel for workbench (keeps area clean and prevents bearings and other parts from rolling)
Small paint brush (1 inch wide) to clean
Stopwatch
Pit bag
Toolbox and parts trays
Pen and pad of paper for notes
Blank setup sheets
Instruction manuals and catalogues
First aid kit
Safety eyewear
Safety gloves (for handling hot items like engines or heated motors)
Favourite RC magazine

Checklist: How to Go Faster

Here is a checklist of areas to consider that may be "scrubbing" speed. Don't overlook these if you want faster lap times.

Driving

This is the place where the biggest improvements will come, but it's usually the last place we look.

Learn how to control your car.

Learn how to clear obstacles and jumps.

Learn when to go slow is to go fast. You lose time when you go fast and crash a lot. Slower and steady is best.

Practice driving repeatable laps without crashing.

Start to drive tighter lines around the course, making smooth arcs around corners.

Maintenance

A poorly maintained and worn-out car will not handle properly. Here are some general guidelines to be used after every 2-3 days on the track:

Clean all of the dirt off. Remove the shocks and check that all of the components move freely without binding.

Your shocks may have dirt inside that is causing them to stick. Consider installing new oil and new red O-rings if shock action isn't smooth.

Carefully look over all of the components on your car to see if anything is bent, worn, or broken that you may not have noticed at the track.

Equipment

Some good equipment upgrades:

Change bushings to bearings. Bearings reduce drag for more power and runtime.

Get Matched batteries. Matched packs are grouped by cells with similar output. These provide more power and runtime and are usually sold in different rating levels of runtime and voltage.

Upgrade speed control. Upgrade to a race-level speed control for maximum efficiency and smooth throttle feel.

Titanium turnbuckles should replace the kit turnbuckles for more strength and less weight.

Tyres

Make sure you are running the appropriate tyre for your track. Ask a more experienced racer for advice.

Tyres are 90% of how well a car handles.

Setups

We recommend using:

Kit setup.

A setup from a more experienced racer at your track. Use those setups as a starting point and then make adjustments.

Make sure to change only one setting at a time so you can see the effect, whether better or worse.

It also helps to switch the settings back to where it originally was and compare lap times to confirm whether the change improved the car.

Most Common Beginner Mistakes on the Track

On the track

- Gearing too high and going too fast for their skill level.
- Not slowing down enough; poor throttle control.
- Not taking the curves right; braking late or going in too fast.
- Not practicing enough.
- Thinking that pro equipment will make up for practice.
- Not remembering that having fun is key.
- Too nervous.
- Forgetting to turn off reverse.

With others

- Poor track etiquette when losing.
- Not asking for help, or not appreciative of help given.
- Having too little patience.

On the bench

- Not learning how to set up the car for the track and driving style.
- Finding it hard to fix their vehicle.
- Not learning proper engine tuning.
- Not learning proper battery care.
- Forgetting to charge batteries.
- Wiring the electronics wrong.

COMPARISONS

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2WD vs. 4WD Vehicles

2WD

less expensive

faster to build

less complicated

4WD

more expensive

better all-around traction



2WD RC10B4.1 (left) and 4WD B44.1 buggies.

Brushed vs. Brushless Motors

brushed

great for budget drivers

motor will require maintenance to keep up performance

brushless

requires little to no maintenance

more consistent performance



#9626 Reedy Radon brushed motor (left), and #917 Reedy brushless motor.

Bushings vs. Bearings

bushing

lower cost

adequate performance

less maintenance

bearing

more expensive

better performance

more maintenance



#3656 bearing (left), and #3907 bushing.

Electric vs. Nitro Vehicle

electric

cleaner

quieter

can run indoors

no messy fuels and oil

cheaper than nitro

motors easier to maintain than engines

easier for beginners

nitro

roar of a real engine

no charging/discharging of batteries

no battery matching

no battery disposal

messier than electric



Nitro RC8T-RS (left), and electric RC10T4.1 trucks.

Kit vs. Ready-to-Run Vehicle

kit

requires assembly

requires electronics (motor, speed control, servo, transmitter/receiver)

fun to build

gives the builder a better understanding of the vehicle

can include hopups during build

can paint your own body design

ready-to-run

vehicle is preassembled with electronics

great for the beginner

great for person who doesn't have time to build

body comes pre-painted

Onroad vs. Off-road Vehicle

onroad

faster speeds possible

easier to relate to real cars

more technical and challenging

quieter

off-road

can drive on more surfaces

takes higher jumps

see dirt fly

drive on unpredictable and challenging tracks with jumps, bumps, and wet surfaces



Off-road SC10 truck (left), and onroad TC6 touring car.

Pullstart vs. Non-pullstart Engines

pullstart

start anywhere

adds more weight

non-pullstart

needs starter box

less engine weight

lower centre of gravity

Nitro engines are started by several methods. By pulling the handle of a pull start, which engages a one-way bearing that causes the crankshaft to turn, which drives the piston up and down. Or when one pushes the flywheel against the starter box rubber drive wheel, which spins the flywheel and in turn spins the crankshaft and moves the piston. Or by using a drill drive or onboard starting system which spins the crankshaft, which drives the piston and pulls fuel up towards the heated glow plug.

When the piston cycles, it draws fuel into the combustion chamber, then the piston cycles up and drives the fuel into contact with the heated coil of the glow plug. Then the coil ignites the fuel and causes the engine to run.

Each subsequent cycle of the piston pulls more fuel in and again contacts the coil in the glow plug. The fuel ignites, and reheats the coil, and that continues the process and keeps the engine running, even with the glow igniter removed from the glow plug.



#25354 AE PRO 4.60 pullstart engine (left), #25480 AE Pro 8.0 non-pullstart engine.

Racing vs. Bashing

racing

can test skills against others

for those who love the competitive environment

make friends around the track

win prizes

possible sponsorships

must pay fees for club membership and/or event

bashing

make up your own rules

run when you want

no waiting your turn

run anywhere you want

make up your own track

no fees to pay

Graphite vs. Standard Material

graphite

lighter

more rigid

more responsive more expensive

less impact-resistant

standard

heavier

more flex

less responsive

budget-friendly

more impact-resistant

Stock plastic part versions are more impact-resistant. Stock plastic parts are more flexible than carbon or graphite, allowing more flex in a crash.

Experienced racers prize carbon parts, not for their strength in a crash, but for their "responsiveness:" without the minute delay of flexing, rigid interconnected parts will respond to the driver's control immediately.

Truck vs. Buggy

truck

more stable

easier to drive on rougher tracks

buggy

more agile

faster on smoother tracks



1:18 scale RC18T2 truck (left), and RC18B2 buggy.

Choosing Your R/C Car

Kits and RTRs

Radio-controlled cars come as kits that need to be assembled and as factory-assembled RTRs (Ready-To-Run).

Kits are great for the person who enjoys building and wants to choose the additional components that will go into the car.

RTRs are great for people who want to hit the road fast and who may not have the time or the desire to build a kit.

Electric and Nitro Power

Electric-powered cars are generally easier to run and maintain. They are quiet and comparatively simpler to operate than nitro-powered cars. Electric cars can be run indoors and run times can be around 6-12 minutes depending on the motor and battery. The batteries in an electric car take about 45 minutes to charge and speeds in excess of 30-40 mph are not uncommon.

Nitro-powered cars have a real working internal combustion engine that runs on nitro methane fuel. Nitro cars generally have more moving parts than electric cars. Its inherent engine vibrations require a little more vigilance to maintain. Nitro engines must be tuned according to the day's weather for maximum power and performance!

Nitro cars are very fast. Speed, power, and realism are the main attractions to running nitro!

Onroad and Off-road

Onroad and off-road R/C cars have distinct advantages. Both onroad and off-road cars may be powered by electric or nitro, depending on the model. Four-wheel drive (4WD) and two-wheel drive (2WD) models are available for onroad and off-road, and with working independent suspension systems.

Onroad cars offer the ultimate in speed and handling, but are sensitive to the surfaces on which they run.

Off-road cars are not as fast but can be run on many surfaces that an onroad car can't travel. Not to mention that off-road cars can jump and run in the dirt!

Soldering Tips

Soldering is one of those tasks that you either really enjoy or greatly despise; RC maintenance is often like that. Even if you are a nitro guy, soldering comes-up more than you'd think, and if you run electric, soldering is a vital necessity. Most beginners—and some veterans—are intimidated by soldering jobs, but if you keep a few important tips in mind, soldering can be easy and will become something you look forward to, instead of cringe over.



Use a hot iron

Soldering is a lot easier when you start with a hot iron. Avoid using an iron that is less than 40W. Low wattage irons can put your equipment at risk, because holding the iron in place too long, waiting for the solder to melt, can easily damage your components by overheating.

Pick the right tip

There are a number of different soldering iron tips on the market, and they can be used for specific tasks. In general, however, stick with a broad-faced, chisel tip. The extra surface area on the tip will improve the contact surface, allowing for more efficient heat transfer. Unless you are forced to solder in a confined space, avoid fine-tipped irons.

Wipe the tip often

Before you start a new job, dampen a sponge and keep it handy. You should wipe the iron tip with the sponge before you tin a new surface, and wipe it off in between steps. Iron tips accumulate flux, oxidation and old solder quickly, and wiping them off allows for more efficient heat transfer.

Use an iron stand

Even if you don't have a complete soldering station, you should at least purchase a coiled-wire iron stand. This gives you a place to keep a hot iron handy and will prevent you from burning your work bench and even yourself. Lying a hot iron on its side is dangerous and makes it difficult to use.

Score surfaces

Especially if you are soldering on flat surfaces, it is always useful to rough-up (score) the surface with fine-grit sandpaper. Scoring the surface cleans it and increases surface area—both of which aid in making a strong bond and prevent the solder bead from running.

Pre-tin surfaces

Any time you solder one surface to another, “[pre-tin](#)” both surfaces with a small amount of solder. When you move-on to binding the surfaces, the tinned areas will melt together much more easily than if one or both of the surfaces are naked.

Use a soldering jig

Although they may look ridiculous, investing in a soldering jig that uses alligator clips and a magnifying lens is a big help, especially when soldering connectors or wires to each other. The jig works as your third and fourth hands—an invaluable resource considering that your first and second hands are full of the iron and solder itself.

Flux helps the flow

Most hobby-grade solder is infused with flux—as substance that improves the flow of melting solder. But for heavy-duty jobs with wide-gauged wires, brushing a little extra flux paste onto the surface before starting can help the melted solder flow and its heat remain homogenous.

Do the tug-test when done

When you are done with a job and the surfaces are sufficiently cooled, give the wire a quick, moderate tug. Solder isn’t bullet-proof, but a good connection should sustain a few pounds of pressure. If your connection beaks with a slight tug, the bond is bad, and it was just a matter of time before it came loose on its own.

...Wrap-up

Soldering is an acquired skill, much like trimming a body or gluing tires. The more you [practice](#) an acquired skill, the more tips and tricks you will learn by experience. If you are nervous about soldering, try [practicing](#) on an old wire, motor or battery first.