HUDY

SET-UP BOOK

50 PAGES & 112 IMAGES

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SOLUTION COMPONENTS FOR 1/10 TOURING CARS

The HUDY All-In-One Set-Up Solution for 1/10 Touring Cars includes the following top-quality components:

109305 Universal Exclusive Alu. Set-Up System for Touring Cars



- CNC-machined alu. and acrylic components
- fully ball-bearing equipped
- precision engraving
- directly measures camber, camber rise, caster, toe, steering throw symmetry easy 'one-screw' assembly/disassembly.

107904 HUDY Quick-Tweak Station



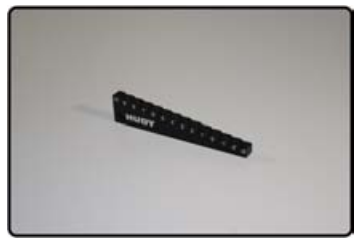
- best-in-class solution for quick & easy tweak adjustment
- innovative, easy-to-use, high-tech design
- fully ball-bearing equipped for smoothness and high precision.
- ultra-sensitive balance platform gives highly-accurate readings, allowing you to quickly & easily read and interpret tweak.

107702 Droop Gauge Support Blocks



- CNC-machined high-grade aluminum
- precision engraving
- supports chassis when checking downstops
- used with 107712 Droop Gauge or 107714 Ultra-Fine Droop Gauge

107712 Droop Gauge



- CNC-machined high-grade aluminum
- precision engraving
- measures downstops when used with 107702 Droop Gauge Support Blocks

107714 Ultra-Fine Droop Gauge



- for more precise adjustment of droop
- super-precise increments of 0.2mm
- measures downstops when used with 107702 Droop Gauge Support Blocks

107716 Ultra-Fine Ride Height Gauge



- CNC-machined high-grade aluminum
- precision engraving
- measures ride height

For more information on each of these components, see the HUDY website at www.hudy.net

109370 Alu Set-Up Wheels

- used for tweak correction
- perfect set-up adjustment
- precise set-up wheels of the same size



108201 Set-Up Board

- suitable for 1/10 R/C touring cars
- exceptionally flat, warp-resistant surface
- very small, compact size
- provides perfectly flat reference surface for chassis set-up



108211 Set-Up Board Decal

- self-adhesive set-up decal for 108201 Set-Up Board
- accurate, clear markings with 1mm grid for adjustment of 1/10 touring cars
- tough, smooth, liquid-resistant plastic surface



HUDY ALL-IN-ONE SET-UP SOLUTION

Congratulations on choosing the HUDY ALL-IN-ONE SET-UP SOLUTION. This innovative set of expertly designed and crafted tools will provide you with everything you need to tune and set up your R/C car for maximum performance.

R/C car set-up systems were originally designed and developed by Dipl. Eng. Hudy Juraj to enable R/C drivers to set up their cars for high performance. After huge successes with their original set-up systems, HUDY once again proves itself the leader in professional tool development by creating innovative, original, and revolutionary R/C solutions with this completely new, integrated, ALL-IN-ONE SETUP SOLUTION. Combining a wealth of set-up knowledge and expertly crafted tools, the ALL-IN-ONE SETUP SOLUTION takes all the guesswork out of setting up an R/C car.

The easy-to-use HUDY ALL-IN-ONE-SETUP SOLUTION takes you quickly and intuitively through setting up your R/C car. Even with extensive knowledge of your car and the theories of handling and suspension dynamics, it is sometimes easy to become confused because of the inherent complexity of car set-up. With the HUDY ALL-IN ONE-SETUP SOLUTION we bring you powerful, easy-to-use new tools and knowledge to take the effort and confusion out of car set-up. Follow this guide step by step, and let it educate you as you go through the process of setting up your R/C car.

The solid construction and innovative features of the HUDY All-In-One Set-Up Solution give you instant, accurate, and reproducible readings. No more imprecise eyeballing of settings, no more inaccurate guessing, just consistent and precise settings like the world's top drivers use.

There are several types of suspensions used on R/C cars, such as pivotball and C-hub suspensions. Each suspension type has its own way of making adjustments to car settings such as downstops, camber, caster, toe, etc. For detailed information on adjusting the settings on your car, refer to the appropriate set-up manuals for your car.

Adjustments & Measurements

The HUDY All-In-One Set-Up Solution can be used for the adjustment and measurement of the following:

- downstops
- track-width
- ride height
- camber & camber rise
- caster
- toe
- steering throw symmetry
- tweak

Main Features of the HUDY All-In-One Set-Up Solution:

- the scientific approach to chassis tuning
- quick and straight-forward 'one screw' assembly/disassembly
- backlash-free, wobble-free mounting
- fully ball-bearing equipped set-up stands (12 high-precision ball-bearings)
- ultra-smooth, ultra-precise movement and operation
- CNC-machined high-grade aluminum stands are hardcoated for increased durability
- CNC-machined toe/steering plate made from tough acrylic plastic
- all components have precision engraving for instant, reliable readings
- carrying box with foam inserts for smart and safe storage and transportation
- unmatched value and long life
- world famous and prestigious Hudy luxurious design and smart innovative solution

SET-UP THEORY

The Set-Up Theory section starting on page 28 describes the effect of making set-up changes on your R/C car.

In this manual we depict the XRAY T4 luxury electric touring car and XRAY NT1 nitro touring car. Most nitro touring cars use pivotball suspension, while most electric touring cars use C-hub suspension. Some of the settings and adjustments described in this manual may not be the same as for your own touring car. You should always refer to your car's instruction manual and set-up manual for more information about making setup changes.

ASSEMBLING AND INSTALLING THE SET-UP STANDS

When you are measuring and adjusting track-width, camber & camber rise, caster, toe, steering throw symmetry, you will need to assemble and install the set-up stands.

When you are measuring tweak, downstops and ride height, you do not need to use the set-up stands.

ASSEMBLING THE SET-UP STANDS

The set-up stands of the HUDY All-In-One Set-Up Solution must be assembled in order for you to use them. These stands were designed for quick and easy "one screw" assembly and disassembly

The set-up stands consist of the following pieces:

- alloy side plates (4)
- alloy camber gauges (4)
- acrylic toe gauge (1)
- alu nuts (4)



1. Attach a camber gauge to a side plate using alu nuts through the ball-bearing at the top of the camber gauge.



2. Tighten the alu nuts until snug.



3. Make sure the stand operates freely without binding.



ASSEMBLING THE SET-UP BOARD

The completed set-up board consists of the Set-Up Board and the Set-Up Board Decal.

IMPORTANT:
You should always use only the HUDY set-up board when setting up your car with the HUDY All-In-One Set-Up Solution. This exceptionally flat, warp-free board will ensure accurate, precise measurements.

1. Clean the board with a soft cloth to remove any debris or contaminants.

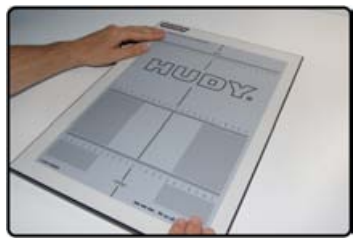


2. Remove the paper from the rear of the decal, exposing the adhesive backing.



3. Center the decal on the board, and then press the entire decal firmly onto the board.

4. Rub the decal until it is flat and completely adhered to the board.



INSTALLING THE SET-UP STANDS

After you have assembled the four set-up stands, mount them to your car as follows (remember that the car should equipped with all electronics, including the battery).

1. Remove the wheels from the car.

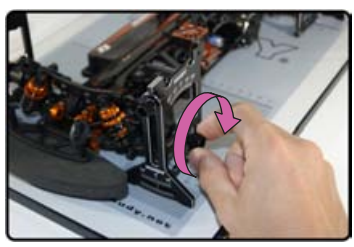
2. In place of the wheels, mount a set-up stand on each of the four axles.



The camber gauge of each stand should face outward so it is easy to read. The camber gauge of the front stand should face forward, while the camber gauge of the rear stand should face rearward.



3. Attach the set-up stand to the axle using wheel nuts or alu nuts.



4. Place the car (with the mounted set-up stands) on the set-up board.



OVERVIEW OF CAR SET-UP

When setting up your car, use the components of the Hudy All-In-One Set-Up Solution as follows.

To measure/adjust	Use	See page
Downstops	· Droop Gauge Support Blocks · Droop Gauge	10
Ride height	· Ride Height Gauge	12
Droop	· Small ruler	10
Track-width	· For quick track-width checking with wheels mounted, use the set-up board decal.	13
Camber & camber rise	· Assembled set-up stands	16
Caster	· Assembled set-up stands	18
Toe	· Assembled set-up stands · Toe gauge	19
Steering throw symmetry	· Assembled set-up stands · Toe gauge	21
Tweak	· Alu wheels · Tweak station	23

There are several types of suspensions used on R/C cars, such as pivotball and C-hub suspensions. Each suspension type has its own way of making adjustments to car settings such as downstops, camber, caster, toe, etc. For detailed information on adjusting the settings on your car, refer to the appropriate set-up manuals for your car.

When setting up your car, you should always prepare the car so it is ready to run, though without the body. This means you should install all electronics, batteries, and fill the fuel tank (nitro only).

SET-UP ORDER

We recommend setting up your car in the order indicated in the table below. The order of the settings has been determined as the most logical to set up your car properly and easily. Also, certain settings must be made before others, as changing one setting will impact another setting.

The table below gives you a breakdown of what components need to be attached on the car, and what you will need to measure the setting.

	CAR			SET-UP COMPONENTS						
	Shocks	**Anti-Roll Bars**	**Wheels**	**Set-Up Stands**	**Droop Blocks & Gauges**	**Ride Height Gauge**	**Toe Gauge**	**Tweak Station**	**Ruler**	**Set-Up Board Decal**
Downstops	attach	doesn't matter	remove		use					
Ride Height	attach	attach	attach			use				
Droop	attach	attach	attach						use	
Track-width	attach	doesn't matter	attach							use
Camber & Camber Rise	attach	doesn't matter	remove	use						
Caster	attach	doesn't matter	remove	use						
Toe	attach	doesn't matter	remove	use			use			
Steering Throw Symmetry	attach	doesn't matter	remove	use			use			
Tweak	attach	use/ don't use	alu wheels					use		

DOWNSTOPS





Downstops limit how far the wishbones travel downward (which determines how far upwards the chassis travels). Make sure you adjust downstops so they are equal on both left and right sides.

For detailed information on adjusting the downstops of your car, refer to the appropriate set-up manuals for your car.

INITIAL STEPS	SET-UP COMPONENTS:
Prepare the car as follows:	**Use the following set-up components:**
• Wheels: Remove all wheels.	• Droop Gauge Support Blocks • Droop Gauge

MEASURING DOWNSTOPS

1. Place the droop gauge support blocks on the set-up board, and then place the chassis on the support blocks.

Make sure the chassis is solidly mounted on the support blocks so it does not move.



2. Check if the suspension is working smoothly.

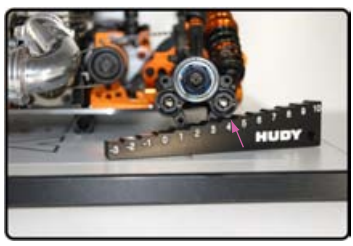


3. Using the droop gauge, measure the downstop value.

FRONT DOWNSTOPS:
Pivot ball suspension: Measure at the bottom of the front steering blocks.
C-hub suspension: Measure at the bottom of the arm



REAR DOWNSTOPS:
Pivot ball suspension: Measure at the bottom of the rear upright.
C-hub suspension: Measure at the bottom of the arm

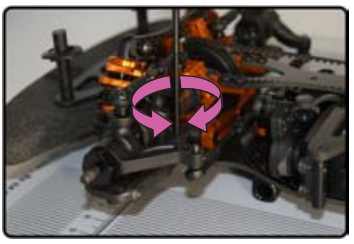


POSITIVE numbers indicate the distance (in mm) ABOVE the level of the support blocks (or, above the bottom of the chassis). **NEGATIVE** numbers indicate the distance (in mm) BELOW the level of the support blocks (or, below the bottom of the chassis).

4. Adjust the front or rear downstops to the desired settings.

ADJUSTING DOWNSTOPS

downstop adjustment is the same for front and rear.



Increase
Turn IN the downstop screw so the lower arm RISES slightly

Decrease
Turn OUT the downstop screw so the lower arm DROPS slightly.

DROOP

Droop is sometimes interchanged with downstop. This is correct and incorrect. Droop refers to the amount that the chassis travels downward after the car is dropped and the wheels touch the ground; it is also the amount that the chassis travels upward before the wheels lift from the ground.

Droop is in large part affected by the downstop setting, but is also affected by ride height adjustment.

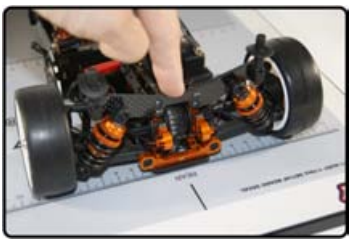
- A higher downstop setting creates a smaller gap between the downstop setscrew and the chassis at rest. This smaller gap reduces the amount that the chassis rises before the wheels lift from the ground. The result is a smaller droop value.
- A lower downstop setting creates a larger gap between the downstop setscrew and the chassis at rest. This larger gap increases the amount that the chassis rises before the wheels lift from the ground. The result is a larger droop value.

INITIAL STEPS	SET-UP COMPONENTS:
Prepare the car as follows:	**Use the following set-up components:**
• **Shocks:** Attach front & rear shocks. • **Anti-roll bars:** Attach front & rear anti-roll bars. • **Wheels:** Attach all wheels. It is important that both left & right wheels (at either front or rear of car) are the same diameter.	• Small Ruler

MEASURING DROOP

Measure droop with the car ready-to-run.

1. Place the car on the set-up board.



2. Push down & release the front and rear of the car a few times so that the suspension settles.

3. Place the ruler vertically beside the end of the chassis, so that you can see how much distance there is between the flat surface and the bottom of the chassis.



4. Keeping the ruler in place, slowly lift the chassis at its centerline. The chassis rises slightly until the wheels just lift from the set-up board.

5. On the ruler, note the distance to the chassis bottom. The amount that the chassis rose before the wheels lifted is the droop value.

6. Repeat steps 3-5 for the other end of the car.

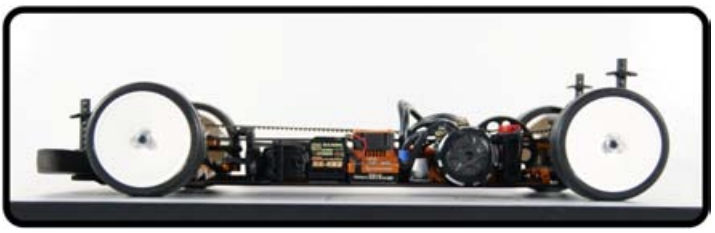
7. Adjust the front or rear downstops to change the droop of the desired settings.

ADJUSTING DROOP

You adjust droop by adjusting downstops. To increase the droop value, decrease the downstop setting. To decrease the droop value, increase the downstop setting.
For more information on downstops, see “Downstops” on page 10.

Droop is also affected by ride height changes.
For more information on ride height, see “Ride Height” on page 12.

1.2 RIDE HEIGHT



Ride height is the distance between the bottom of the chassis and the reference surface on which the car is sitting. Adjust ride height with the car ready-to-run but without the body.

Adjust ride height using spring preload only. DO NOT adjust ride height using downstop screws.

For detailed information on adjusting the ride height of your car, refer to the appropriate set-up manuals for your car.

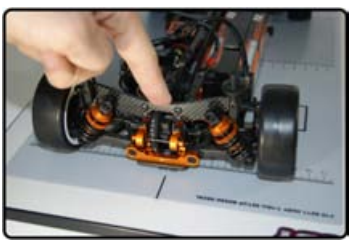
INITIAL STEPS	SET-UP COMPONENTS:
Prepare the car as follows:	**Use the following set-up components:**
• **Shocks:** Attach front & rear shocks. • **Anti-roll bars:** Attach front & rear anti-roll bars. • **Wheels:** Attach the wheels. It is important that both left & right wheels (at either front or rear of car) are the same diameter.	• Ride Height Gauge

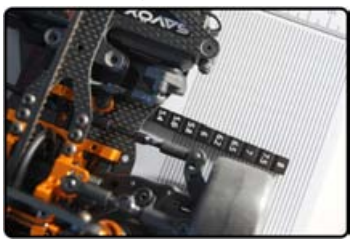
MEASURING RIDE HEIGHT

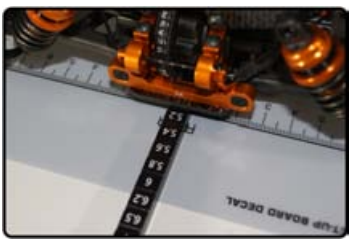
1. Place the car on the set-up board.

2. Push down & release the front and rear of the car a few times so that the suspension settles.

3. Measure the ride height using the ride height gauge at the front and rear of the car at the lowest points of the chassis.







4. Adjust the front and rear ride height to the desired settings.

ADJUSTING RIDE HEIGHT

Adjust ride height using spring preload only.
DO NOT adjust ride height using downstop screws.
Your car may use threaded spring preload collars or preload spacers.

Preload setting	Threaded preload collar	Preload spacers
Increase	TIGHTEN collar so it moves DOWN the shock body.	Use THICKER spacers above spring.
Decrease	LOOSEN collar so it moves UP the shock body.	Use THINNER spaces above spring.

ADJUSTMENT RIDE HEIGHT

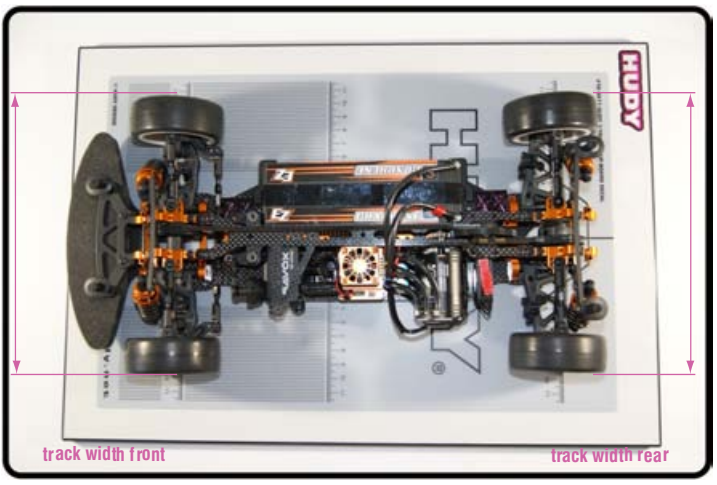
Ride height adjustment is the same for front and rear.

Increase
INCREASE preload on both springs, on left and right side EQUALLY.

Decrease
DECREASE preload on both springs, on left and right side EQUALLY.



1.3 TRACK-WIDTH



Track-width is the distance between the outside edges of the wheels, front or rear. It is important that front or rear track-width is adjusted symmetrically, meaning that the left and right wheels must be the same distance from the centerline of the chassis.

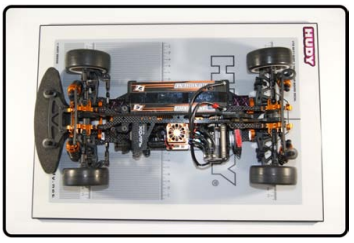
For quick track-width setting with the wheels mounted on the car, you can use the set-up board decal.

For detailed information on adjusting the track-width of your car, refer to the appropriate set-up manuals for your car.

MEASURING TRACK-WIDTH USING THE SET-UP BOARD DECAL

INITIAL STEPS	SET-UP COMPONENTS:
Prepare the car as follows:	**Use the following set-up components:**
• **Shocks:** Attach front & rear shocks. • **Wheels:** Attach all wheels.	• Set-Up Board (with Decal)

1. Place the car on the set-up board.



2. Align the center of the car with the centerline on the set-up board decal.

Make sure both front and rear are centered on the decal.

When measuring FRONT track-width: Make sure the front wheels rest on the front track-width graduation marks.

When measuring REAR track-width:
Make sure the rear wheels rest on the rear track-width graduation marks.

Typical track-width values:
Electric touring cars = 190mm
Nitro touring cars = 200mm

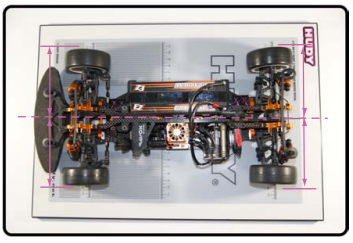
Note: The track-width measurements assume a wheel offset of 0mm.

3. Look where the outer edge of each front wheels lie on the front track-width graduation marks. Use a straight-edge against the wheel if necessary to see what the measurement is.



The measurement represents the distance from the car's centerline to the outer edge of each wheel.
For example, on a 190mm wide touring car, the measurement should be close to 95mm (1/2 the track-width) for each wheel.

4. Repeat step 3 to check the track-width of the rear wheels.



5. If the front track-width is not symmetrical, adjust the car's front track-width so that both front wheels are the same distance from the car's centerline.

6. If the rear track-width is not symmetrical, adjust the car's rear track-width so that both rear wheels are the same distance from the car's centerline.

Adjust the left and right track-width adjustments until the left and right measurements are symmetrical.

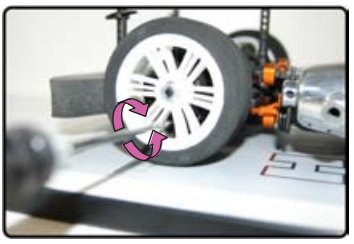
NOTE: Changing front track-width setting will also affect the front toe setting.

ADJUSTING TRACK-WIDTH – PIVOTBALL SUSPENSION

FRONT TRACK-WIDTH

Increase (wider)
Turn OUT both front upper & lower pivotballs equally.

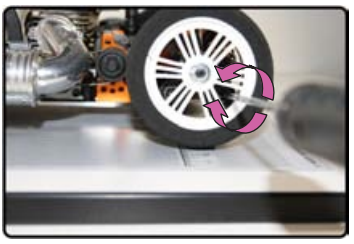
Decrease (narrower)
Turn IN both front upper & lower pivotballs equally.



REAR TRACK-WIDTH

Increase (wider)
Turn OUT all rear upper & lower pivotballs equally.

Decrease (narrower)
Turn IN all rear upper & lower pivotballs equally.



NOTE: Changing front track-width setting will also affect the front toe-in setting.

ADJUSTING TRACK-WIDTH – C-HUB SUSPENSION

For detailed information on adjusting the track-width of your car, refer to the appropriate set-up manuals for your car.

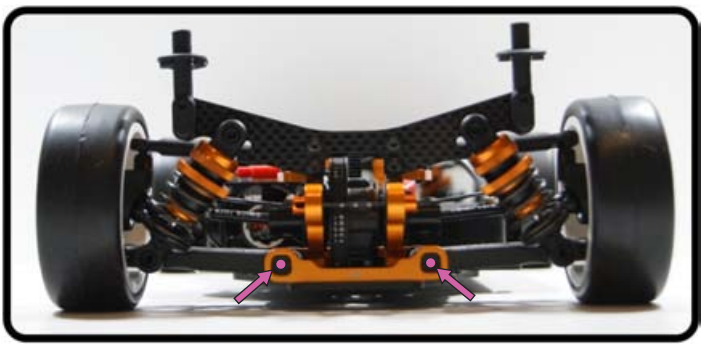
For C-hub suspension you adjust the track-width by changing the position of the eccentric bushings.

Moving the dot more towards the center of the car = decreases track-width

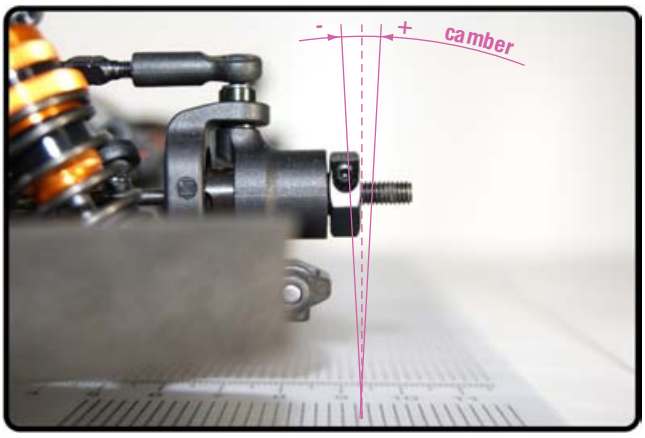
Moving the dot more away from the center of the car = increases track-width



Composite eccentric bushings



1.4 CAMBER & CAMBER RISE



Camber is the angle of a wheel to the surface on which the car is resting (with wheels and shock absorbers mounted). Zero degrees (0°) of camber means that the wheel is perpendicular to the reference surface. Negative camber means that the top of the wheel is leaning inwards towards the centerline of the car. Positive camber means that the top of the wheel is leaning outwards from the centerline of the car. Camber affects the car's side traction.

For detailed information on adjusting the camber of your car, refer to the appropriate set-up manuals for your car.

INITIAL STEPS	SET-UP COMPONENTS:
Prepare the car as follows:	**Use the following set-up components:**
• **Shocks:** Attach front & rear shocks. • **Wheels:** Remove all wheels.	• Assembled Set-Up Stands

MEASURING CAMBER

1. Assemble the set-up stands.



2. Mount the set-up stands on the axles.

3. Place the car on the set-up board.

4. Push down & release the front and rear of the car a few times so that the suspension settles.



5. Read the camber setting from the camber gauge of each of the four set-up stands.



Each graduated mark indicates a 1° camber value. You should be able to set camber with a resolution of 0.5°

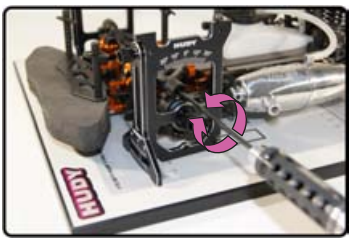


6. Adjust the camber to the desired settings.

ADJUSTING CAMBER – PIVOTBALL SUSPENSION

FRONT CAMBER
Increase (more –ve)
Turn IN the front upper pivotball.

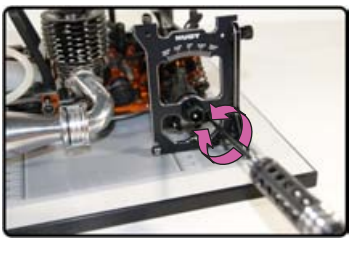
Decrease (less –ve)
Turn OUT the front upper pivotball.



REAR CAMBER – REAR (LOWER) PIVOTBALLS, FIXED UPPER PIVOT

Increase (more –ve)
Turn OUT both rear lower pivotballs equally.

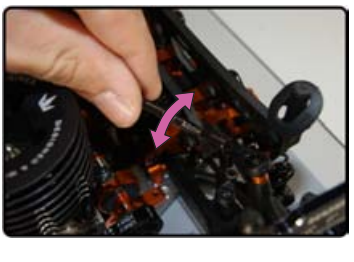
Decrease (less –ve)
Turn IN both rear lower pivotballs equally.



REAR CAMBER – REAR (LOWER) PIVOTBALLS, ADJUSTABLE UPPER CAMBER LINK

Increase (more –ve)
SHORTEN the rear upper camber link.

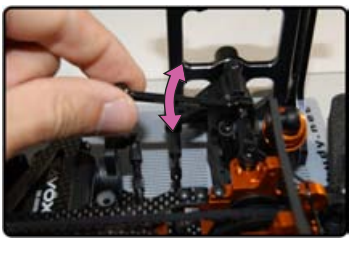
Decrease (less –ve)
LENGTHEN the rear upper camber link.



ADJUSTING CAMBER – C-HUB SUSPENSION

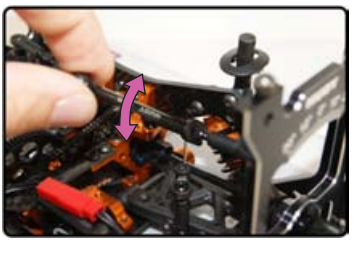
FRONT CAMBER
Increase (more –ve)
SHORTEN the front upper camber link.

Decrease (less –ve)
LENGTHEN the front upper camber link.



REAR CAMBER
Increase (more –ve)
SHORTEN the rear upper camber link.

Decrease (less –ve)
LENGTHEN the rear upper camber link.

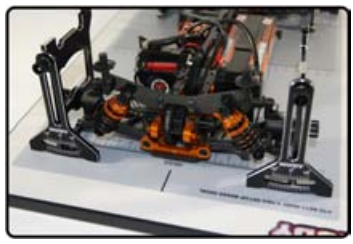


CAMBER RISE

Also referred to as "camber intake," this measurement quantifies how much the camber changes on the car when the suspension is compressed. Usually, a shorter upper link will result in a large camber rise, while equal length upper & lower links (or suspension arms) help keep the camber rise minimal.

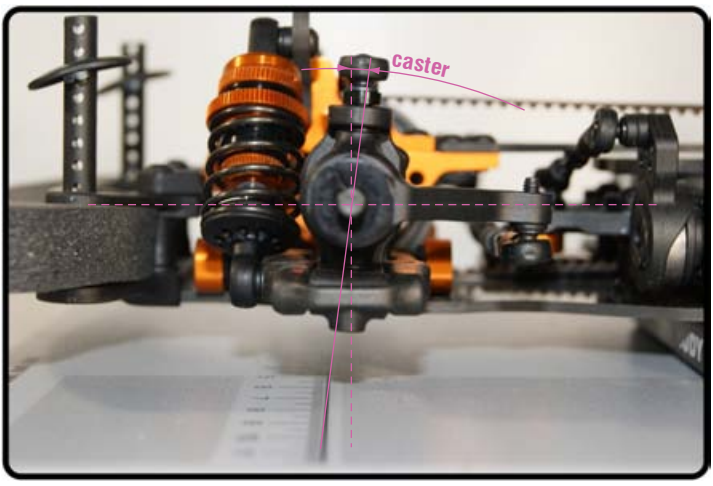
To measure camber rise, set the car at normal ride height and then measure the camber on the camber gauges. Next, push on the suspension, and measure the camber again. The difference between those two camber angles represents the camber rise. It can usually be adjusted by changing the upper link/arm mount location on the shock tower. Note that not all cars offer this adjustment.





STOP! After you set the camber, recheck the ride height settings. Camber and ride height settings affect each other, so be sure to recheck both when you adjust either.

1.5 CASTER



Caster is one of the most important adjustments on a racecar. Caster greatly affects the way the car steers during on- and off-power transitions.

Caster angle is the angle of an imaginary line between the front steering block's top pivot point and the bottom pivot point, with respect to a line perpendicular to the ground. For detailed information on adjusting the caster of your car, refer to the appropriate set-up manuals for your car.

INITIAL STEPS	SET-UP COMPONENTS:
Prepare the car as follows:	**Use the following set-up components:**
• **Shocks:** Attach front & rear shocks • **Wheels:** Remove all wheels.	• Assembled Set-Up Stands

MEASURING FRONT CASTER

1. Assemble the set-up stands.

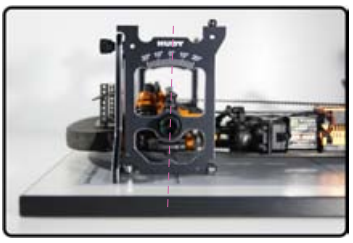
2. Mount the set-up stands on the axles.

3. Place the car on the set-up board.

4. Push down & release the front and rear of the car a few times so that the suspension settles.



5. Read the caster angle from the side of the front set-up stands.



Read the caster angle on the side plates between the imaginary line that goes from the top pivot point to the bottom pivot point.

Each graduated mark indicates a 2° camber value. You should be able to set camber with a resolution of 1°.

6. Adjust caster to the desired settings.

ADJUSTING FRONT CASTER – PIVOTBALL SUSPENSION

Increase (more laid back)
Use MORE caster spacers in front of the front upper arm.



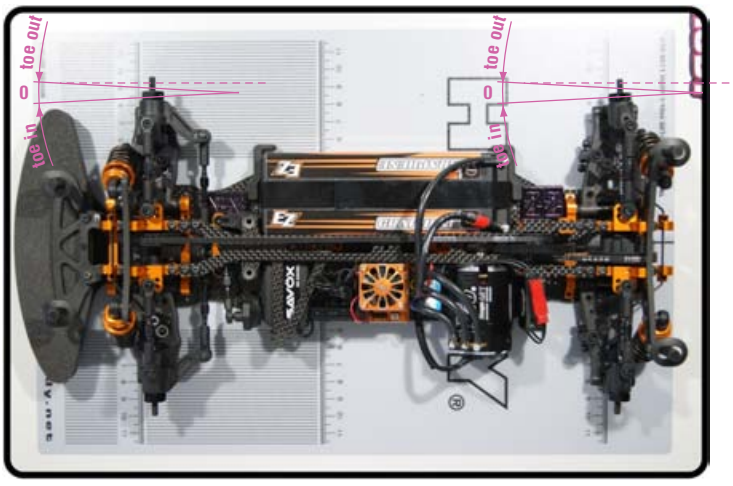
Decrease (more upright)
Use LESS caster spacers in front of the front upper arm.

NOTE:
We recommend using the #107610 HUDY EXHAUST SPRING / CASTER CLIP REMOVER.

ADJUSTING FRONT CASTER – C-HUB SUSPENSION

To change the front caster on a car with C-hub suspension, you must change the front C-hubs to others that have a different caster value.

1.6 TOE



Toe is the angle of the wheels when looked at from above the car. When the wheels are parallel with the centerline of the car, toe is 0° (neutral). When the wheels are closed towards the front, this is called toe-in (positive value). When the wheels are open towards the front, this is called toe-out (negative value).

The front wheels can have either toe-in or toe-out. The rear wheels should always have toe-in; they should never have toe-out.

Rear toe-in is a primary adjustment, and will dictate the symmetry of the handling of the car. It is critical that you adjust rear toe-in perfectly symmetrical from left to right.

For detailed information on adjusting the toe of your car, refer to the appropriate set-up manuals for your car.

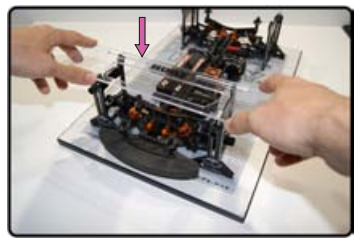
NOTE:
Changing front track-width setting will change the front toe setting.

INITIAL STEPS	SET-UP COMPONENTS:
Prepare the car as follows:	**Use the following set-up components:**
• **Shocks:** Attach front & rear shocks. • **Wheels:** Remove all wheels. • **Motor:** Remove the pinion gear. • **Electronics:** Connect the radio electronics so the steering is activ when you turn on the car. e	• Assembled Set-Up Stands • Toe Gauge

When using the acrylic toe gauge, the toe gauge does not fit over the pins on the set-up stands so that the toe gauge is in one position. The toe gauge is designed to slide over the pins from one side to the other, depending on which wheel you are measuring (left or right). Follow the instructions carefully.

MEASURING TOE

1. Assemble the set-up stands.



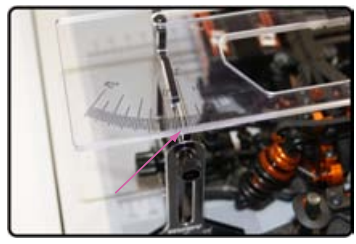
2. Mount the set-up stands on the axles.

3. Place the car on the set-up board.

4. Turn on the transmitter.

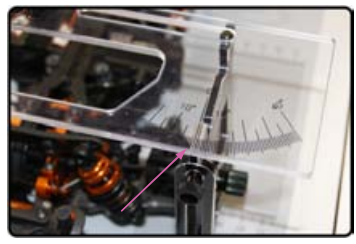
5. Turn on the receiver. The steering should respond to the transmitter.

6. To adjust rear toe, set the toe gauge atop the rear set-up stands.



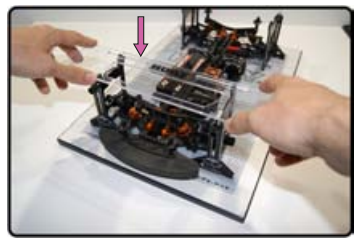
The pins at the top of the stands fit in the machined slots in the toe gauge.

7. To read the toe value of the left rear wheel, push the toe gauge to the right until the pin on the top edge of the left set-up stand hits the edge of the slot in the toe gauge.



Now read the toe value on the toe gauge. The black line on the top edge of the stand points to a toe value engraved in the toe gauge. Each graduated mark indicates a 1° toe value. You should be able to set toe with a resolution of 0.5°

To read the toe value of the right rear wheel, push the toe gauge to the left until the pin on the top edge of the right set-up stand hits the edge of the slot in the toe gauge. Read the measurement.



8. Adjust the rear toe to the desired settings.

7. To adjust front toe, set the toe gauge atop the front set-up stands and then repeat the procedure.

We recommend you adjust front toe after the rear toe and steering trim has been set.

ADJUSTING TOE – PIVOTBALL SUSPENSION

FRONT TOE

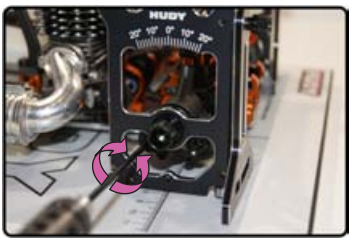
Increase (more front toe-in)
LENGTHEN both front steering rods equally.



Decrease (less front toe-in)
SHORTEN both front steering rods equally.

REAR TOE
Increase (more rear toe-in)
Turn IN the forward lower pivotball and turn OUT the rearward lower pivotball equally.

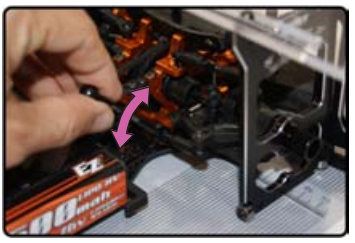
Decrease (less rear toe-in)
Turn OUT the forward lower pivotball and turn IN the rearward lower pivotball equally.



ADJUSTING TOE – C-HUB SUSPENSION

FRONT TOE
Increase (more front toe-in)
LENGTHEN both front steering rods equally.

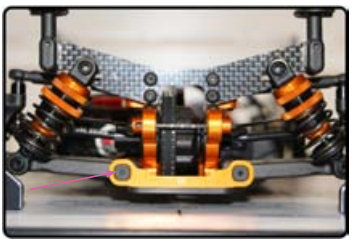
Decrease (less front toe-in)
SHORTEN both front steering rods equally.



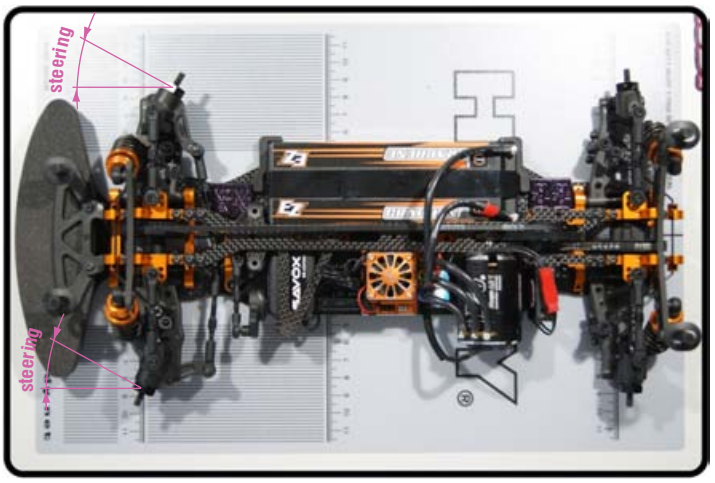
REAR TOE
Refer to your car's instruction manual for more information about changing rear toe in.

Different cars use different methods to adjust rear toe-in, including spacers between the pin holders and bulkheads, or toe-in blocks.

(For example, the XRAY T4 chassis allows rear toe adjustment using eccentric bushings.).
Refer to your car's instruction manual for more information.



1.7 STEERING THROW SYMMETRY



Although most cars' front suspension geometry is designed such that the turning radius of the car is the same from left to right, sometimes this isn't the case. You can use the toe gauge plate to make sure that the steering turns as sharply to the left as it does to the right.

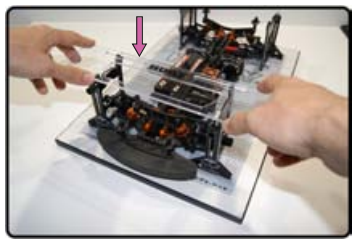
If it is not the case and if your radio has EPA (End Point Adjustments), adjust the EPA on your transmitter in order to achieve steering throw symmetry. The wheels should turn equally in both directions for balanced handling.

For detailed information on adjusting end point adjustment, refer to the instruction manual for your transmitter.

INITIAL STEPS	SET-UP COMPONENTS:
Prepare the car as follows:	**Use the following set-up components:**
• **Shocks:** Attach front & rear shocks. • **Wheels:** Remove all wheels. • **Motor:** Remove the pinion gear. • **Electronics:** Connect the radio electronics so the steering is active when you turn on the car.	• Assembled Set-Up Stands • Toe Gauge

MEASURING & ADJUSTING STEERING THROW SYMMETRY

1. Assemble the set-up stands.



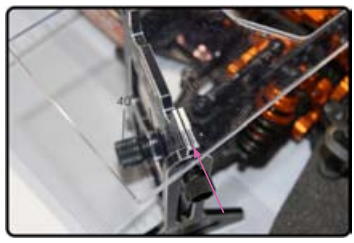
2. Mount the set-up stands on the axles.

3. Place the car on the set-up board.

4. Turn on the transmitter.

5. Turn on the receiver. The steering shloud respond to the transmitter.

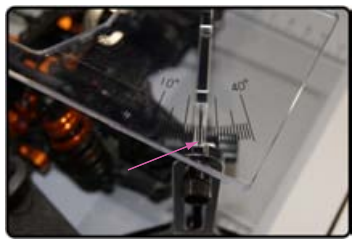
6. Set the toe gauge atop the front set-up stands.



The pins at the top of the front stands fit in the machined slots in the toe gauge.

7. Push the toe gauge to the right until the pin on the top edge of the left set-up stand hits the edge of the slot in the toe gauge.

Then slide the toe gauge to the left until it stops against the pin on the right front stand.



8. Adjust the transmitter steering trim until you get the same toe value on both front wheels.

9. Turn the steering to the left, and push the toe gauge against the pin on the right front stand.

Note the amount that the wheel turns to the left (in degrees) on the toe gauge.

10. Turn the steering to the right, and push the toe gauge against the pin on the left front stand.

Note the amount that the wheel turns to the right (in degrees) on the toe gauge.

11. Compare the amounts that the steering turns left and right. They should be the same.

If they are different, adjust the left or right EPA (end point adjustment) settings on your transmitter until the left and right steering amounts are the same.

12. Turn off your receiver, then turn off your transmitter.

1.8 TWEAK

Correct tweak is one of the most important things that influences the overall performance of the car; a badly-tweaked car has a very negative impart on a car's handling. As such, it is very important to check and correct tweak regularly; pro racers check tweak a number of times after each run.

The new HUDY Quick-Tweak Station allows you to quickly and easily check and correct tweak on your race car to help ensure proper, consistent handling.

Other "bubble-type" tweak stations are not as effective at measuring tweak as the HUDY Quick-Tweak Station; they are difficult & ineffective as they must work on an ultra-flat surface, and if it is not then the readings will not be accurate. The HUDY Quick-Tweak Station uses the tension of the suspension to determine the tweak,so you can use the tweak station under any conditions or on any surface. Also, front & rear suspensions do not have to be aligned.

The HUDY Quick-Tweak Station level indicates the amount of tweak of the end of the car resting on the set-up board (not the end of the car on the tweak station). For example, by placing the REAR stands on the tweak station and the front stands on the set-up board, the tweak station indicates the amount of tweak at the FRONT of the car.

For detailed information on adjusting the tweak of your car, refer to the appropriate set-up manuals for your car.

INITIAL STEPS	SET-UP COMPONENTS:
Prepare the car as follows:	**Use the following set-up components:**
• **Shocks:** Attach front & rear shocks. • **Wheels:** Attach the alu wheels.	• Alu Wheels • Tweak Station

MEASURING TWEAK

Before measuring tweak, it is very important that the car has symmetrical track-width at both front & rear ends. For more information, see "Track-Width" section.

1. Assemble the HUDY Quick-Tweak Station.



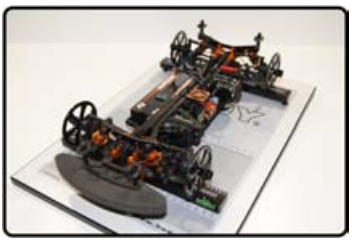
2. Place the tweak station on the set-up board.

3. Mount the alu wheels on the axles.



4. Set the FRONT wheels on the PIVOTING base plate and the REAR wheels on the FIXED base plate (You do this to check for tweak REAR of the car).

Adjust the position of the car to ensure each end of the car is centered on its base plate. The outer edge of each wheel (at one end of the car) should be beside equivalent marks on each side of the base plate.







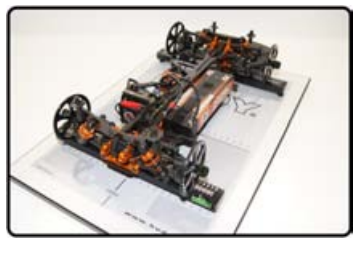
• If the bubble in the spirit level is centered, there is no tweak at the OTHER end of the car.

• If the bubble in the spirit level is offset to one side, the OTHER end of the car is tweaked.

7. Adjust the REAR suspension until the bubble is centered.

Turn the car around.

8. Place the REAR wheels on the PIVOTING base plate, and place the FRONT wheels on the FIXED base plate (You do this to check for tweak at the FRONT of the car).



Repeat the procedures to check and adjust tweak at the front of the car.

COMBATING TWEAK

If your car is tweaked, there are several things you can check or adjust. Check these areas in the following order:

- Chassis flatness
- Downstop settings
- Shock length and damping
- Binding parts
- Shock spring preload
- Anti-roll bars

Chassis Flatness

A twisted chassis will certainly cause a car to become tweaked. Since the chassis is the central attachment point for all suspension components, a twisted chassis will render all other suspension settings as unbalanced.
To check for a twisted chassis, remove the wheels, disconnect the springs, and remove the battery straps. Place the chassis on a perfectly flat surface (such as the HUDY Set-Up Board) and see if the chassis rocks from side to side. Even a small amount of twisting will result in a tweaked car.

To remedy a twisted chassis, you can try releasing the screws the hold the top deck, pressing the chassis flat on the set-up board, and then retighten the screws (if you use the graphite center brace remember to also loosen the screws and retighten them) If this does not solve the problem, you may have to replace the chassis.

Downstop Settings

Check downstop settings to make sure they are equal on the left and right sides of the car.
For more information on downstops, see “Downstops” on page 10.

Shock Length and Damping

Check shock lengths and damping to make sure they are equal on the left and right sides of the car. You typically adjust shock length by tightening or loosening the lower pivot on the shock rod. Damping adjustment varies depending on the type of shock absorber.

Binding Parts

Make sure that all suspension components move freely without binding. This includes suspension arms and pins, pivotballs, ball cups, etc..

ADJUSTING TWEAK USING SPRING PRELOAD

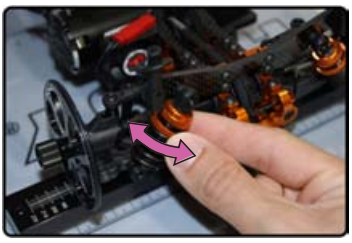
Adjusting tweak using spring preload should be done only after all other items have been checked and corrected. Incorrectly adjusted springs can result in one side of the car being firmer or higher than the other, causing handling differences when turning left or right. After adjusting spring preload to remove tweak, if the preload on the left and right sides of the car are different by more than 1～1.5mm, then you should start over again and check for other areas that may result in tweak.

This section describes how to interpret the meaning of the tweak station readings, and the adjustments to make to spring preload to adjust tweak. Make sure that both anti-roll bars are DETACHED.

Note that your car may use threaded spring preload collars or preload spacers.
To adjust spring preload do the following.

Preload setting	Threaded preload collar	Preload spacers
Increase	TIGHTEN collar so it moves DOWN the shock body.	Use THICKER spacers above spring.
Decrease	LOOSEN collar so it moves UP the shock body.	Use THINNER spaces above spring.

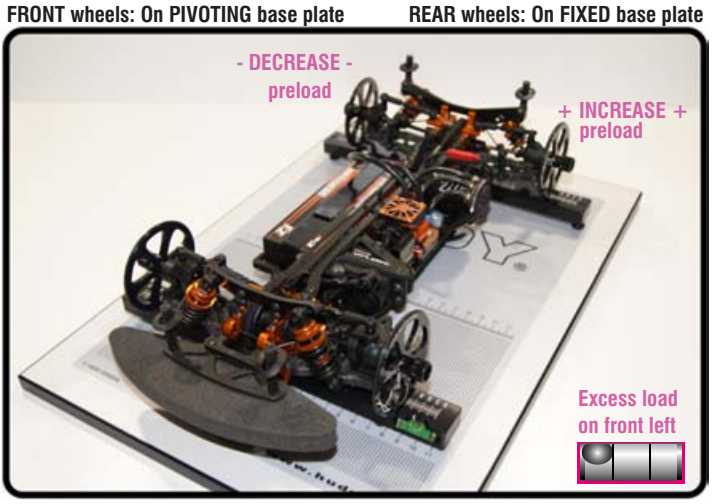
ADJUSTING TWEAK (SPRING PRELOAD)



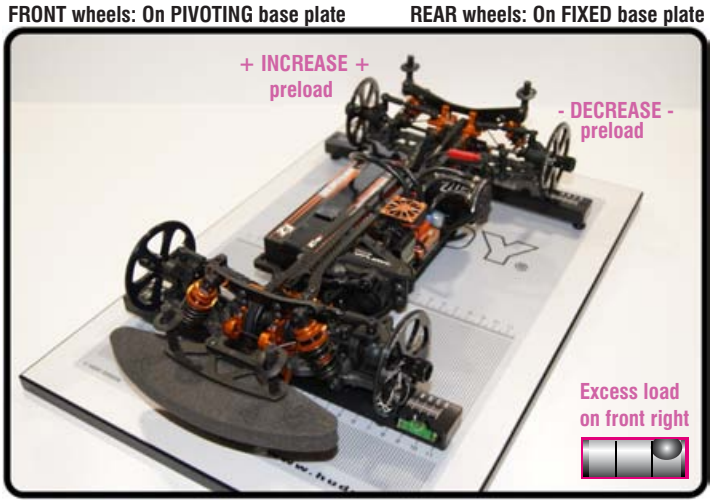
REAR TWEAK

Adjust REAR preload equally but opposite.

FRONT wheels: On PIVOTING base plate **REAR wheels: On FIXED base plate**



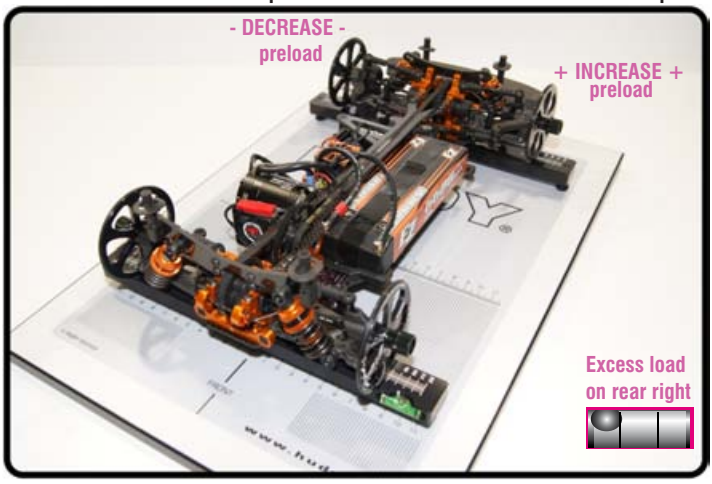
FRONT wheels: On PIVOTING base plate **REAR wheels: On FIXED base plate**



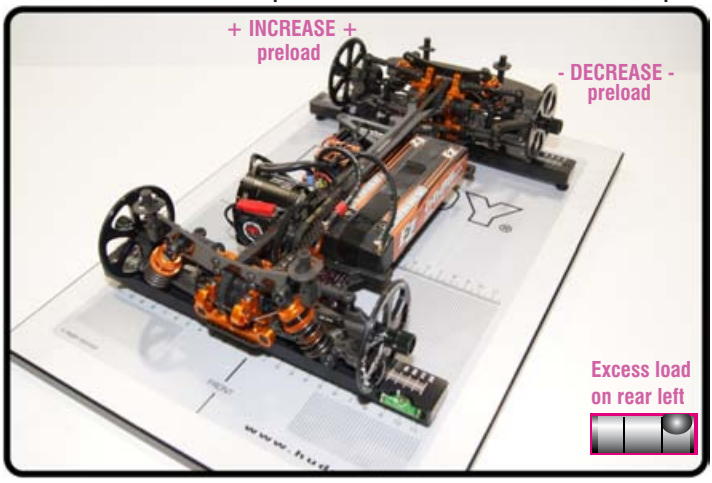
FRONT TWEAK

Adjust FRONT preload equally but opposite.

FRONT wheels: On FIXED base plate **REAR wheels: On PIVOTING base plate**



FRONT wheels: On FIXED base plate **REAR wheels: On PIVOTING base plate**



MAINTENANCE

The HUDY All-In-One Set-Up Solution does not require any specific maintenance. However, we recommend that you clean the components occasionally. Use a soft cloth to gently wipe any dirt off the components. Clean and lightly oil the ball-bearings occasionally.

DO NOT USE ANY ALCOHOL, ACETONE, OR ANY OTHER SPIRIT-BASED CHEMICAL on the components as it will damage them.

Do not allow any debris or contaminants to enter the ball-bearings, as this may cause premature wear or degradation.

When not in use, disassemble the components and store in the protective carrying case.

SUMMARY

We are confident that using the HUDY All-In-One Set-Up Solution to fine tune your car's setup will help your car perform better, and turn faster and more consistent lap times at the racetrack.

Here are some basic rules to get the most from your car:

• Regularly check for some obvious set-up problems on your car, asymmetry, positive camber or similar issues. Modern adjustable suspensions can change considerably after taking a hard hit.

• Only change one thing at a time, in order to get a better understanding of what consequence each change has on the handling of your car.

• A car that "feels" faster is not necessarily turning faster lap times. The stopwatch is the only judge.

• Remember to document all the changes you make, and the effects they have on your car and lap times.

• Do not hesitate to ask for some set-up tips from the local fast drivers. Although it is better to refine your set-up knowledge by performing and understanding your own adjustments that fit your own driving style, set-up tips borrowed from other fast drivers usually are a good place to start.

Remember to enjoy your hobby, and to recommend HUDY products to your racing partners!

Best of luck at the racetrack!
We hope you will be satisfied with the performance and quality of the HUDY All-In-One Set-Up Solution. If you have any questions or advice about how to further improve this product, please do not hesitate to contact us.

2.0 SET-UP THEORY

The Set-Up Theory section describes the effects of changing settings on your R/C car. We refer to handling effects of the car in the corner, and we distinguish three corner sections and three throttle/brake positions as follows:

- corner entry
- mid-corner
- corner exit
- braking
- off-throttle
- on-throttle

Car setup is a complex matter, as all adjustments interact. Fine-tuning the setup will make the car faster and often easier to drive near its performance limit. This means that all the effort you put into your car in preparing it and optimizing the setup will pay off in better results and more satisfaction.

Chassis stiffness (especially torsional) is an important factor when setting up your car. A stiff chassis helps to eliminate chassis flexing and twisting, which would otherwise introduce another factor that is not easy to measure or adjust. However, chassis stiffness is also a setup tool. By changing chassis stiffness by changing the main chassis plate, top deck, chassis stiffeners, or other components, you can make a “softer” or “stiffer” car that may be more or less suited for racing.

If you choose to adjust your car set-up to better suit different track conditions, make small adjustments, one at a time, and see if you find any improvement in handling with each adjustment. We advise you to keep track of your set-up changes, and record which set-ups work best at different racetracks under various conditions.
Remember that for the car to work and respond to set-up changes properly, it must be in good mechanical shape. Check the well functioning of critical areas such as the free movement of the suspension, smoothness of shock absorbers, and lubrication and wear of transmission parts after each run, and especially after a collision.

After rebuilding the chassis, or in case you become lost with your set-up, always return to the last set-up you have recorded, or use one of the set-ups posted for you car.

BASIC TERMINOLOGY

The terms “understeer” and “oversteer” appear throughout this manual. These terms describe a particular handling characteristic of the car.

Understeer
Also known as “push.”
A car understeers when the front wheels do not grip enough and the rear tires grip too much. This results in the front wheels sliding too much rather than turning. A car that understeers is easier to drive, but it is slower than a car that oversteers slightly.

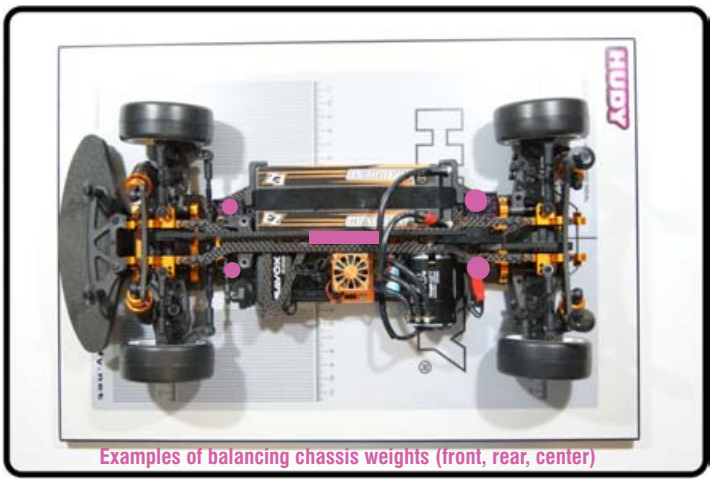
Oversteer
Also known as “loose.”
A car oversteers when the front wheels grip too much and the rear tires do not grip enough. This results in a rear end that slides. Excessive oversteer causes the rear tires to “break loose” allowing the car to spin out.

WEIGHT TRANSFER

Weight transfer is the key to car handling. Consider that a car has a certain amount of “weight” on various parts of the car, and on each wheel. By transferring weight to one end of the car (front or rear), to one side (left or right), those tires will be forced onto the racing surface more, and will have more grip or traction.
Weight transfer is affected by the car’s set-up and by the way that you drive.

Before you start adjusting your car set-up to maximize the car’s performance and ease of handling, you should ensure the following:
- Car is in good mechanical shape with no broken, binding, or loose parts.
- Car has proper weight balance front/rear and left/right.

Weight Balance
You should always try to adjust the weight on your car so it is equal front/rear and equal left/right. This will help to ensure proper, consistent handling. You can use balancing tools to check the weight distribution of your car, and to ensure that your ready-to-race car does not list to one side or one end.



Examples of balancing chassis weights (front, rear, center)

A simple balancing tool can be a set of stands with points on them. You would then place the chassis on the points of the stands so that the stand are along the car's centerline at the front and rear. If the car lists to one side (for example, to the left), add weight to the other side (say, to the right) until the car stays level when left untouched. You can do this also to check front/rear balance by putting the chassis on the balancing stands on the left and right sides half way along the length of the chassis.



Center-of-Gravity

The center-of-gravity (CG) of the car is the point on the car (in 3 dimensional space) around which the car moves, and the point at which all force is applied while the car is in motion.

- When the car goes around a corner, centrifugal force pushes the car to the outside of the turn, and that force pushes on the car's CG causing the car to tilt or roll to the outside. This transfers weight to the outside wheels of the car.
- When the car accelerates, the force pushes backward on the car's CG, causing the car to tilt backward. This transfers weight from the front wheels to the rear wheels.
- When the car brakes, the force pushes forward on the car's CG, causing the car to tilt forward. This transfers weight from the rear wheels to the front wheels.

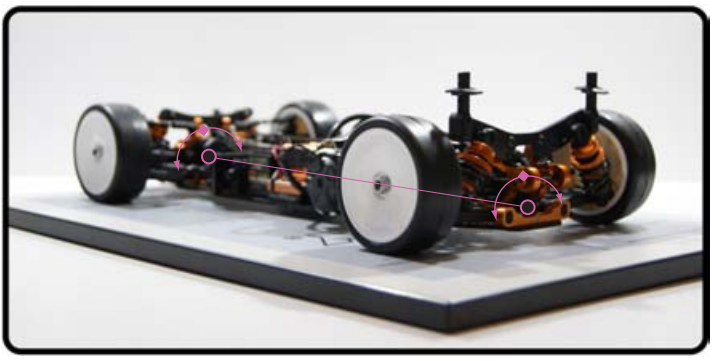
Center-of-gravity is affected by the physical weight of the car, and the placement of all components on the car. If the car is not equally balanced front/rear and left/right, the car's CG will not be centered. This will cause the car to handle differently when it turns one direction as opposed to the other direction.

It is always best to make the car's CG as low as possible to minimize the negative effects of weight transfer. Do this by placing all components down as low as possible on the car's chassis, and reduce the weight that is up high.

Weight Transfer and Car Set-Up

Every aspect of car set-up affects the way that weight transfers on the car. There is no one magical set-up change that will solve all of your car's handling problems. Car set-up is a complex interaction of the various components that make up the car, and all of these aspects of set-up will affect one another. Car set-up is always a matter of compromise.

2.1 ROLL CENTER



A “roll center” is a theoretical point around which the chassis rolls, and is determined by the design of the suspension. Front and rear suspensions normally have different roll centers. The “roll axis” is the imaginary line between the front and rear roll centers.

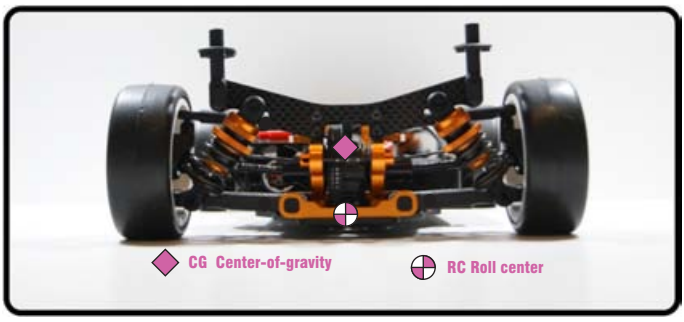
The amount that a chassis rolls in a corner depends on the position of the roll axis relative to the car’s center-of-gravity (CG). The closer the roll axis is to the center of gravity, the less the chassis will roll in a corner. A lower roll center will generally produce more grip due to the chassis rolling, and the outer wheel “digging in” more.

Roll-centers have an immediate effect on a car’s handling, whereas anti-roll bars, shocks and springs require the car to roll before they produce an effect.

ROLL CENTER BASICS

Here are some basic facts about roll center (RC) and center-of-gravity (CG).

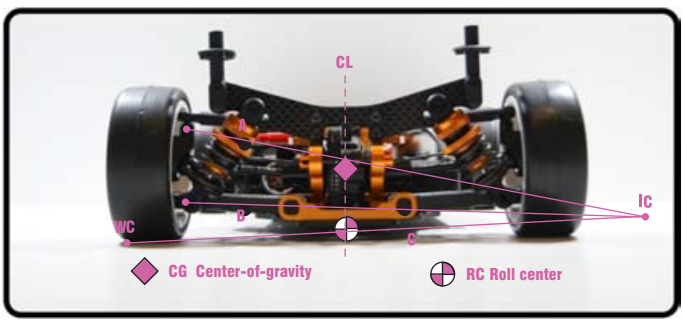
- Roll center (RC) is the point around which the car rolls.
- Each end of the car (front and rear) has its own roll center.
- Center-of-gravity (CG) is where all cornering force is directed.
- RC and CG are (ideally) in the middle (left-right middle) of the car.
- RC is vertically below the CG in cars.
- More chassis roll equals more grip.



DETERMINING ROLL CENTER LOCATION

Roll center is determined by the car’s suspension geometry. Each end of the car has its own roll center, determined by the suspension geometry at that end of the car.

The following diagram shows how you can find a car’s roll center at one end of the car or the other.



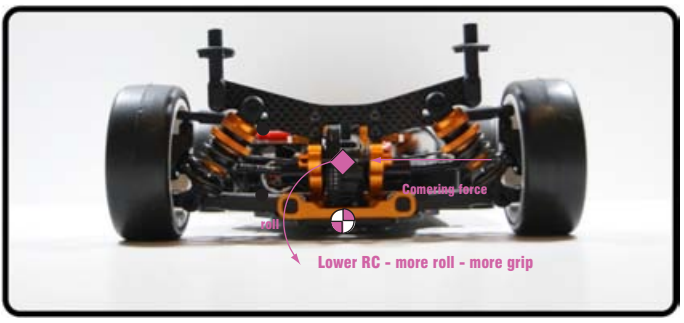
Here is a breakdown of the factors that determine roll center at one end of the car.

- Line ‘A’ is parallel to the upper suspension arm.
- Line ‘B’ is parallel to the lower suspension arm.
- Line ‘A’ and line ‘B’ intersect at point ‘IC’ (instant center).
- Line ‘C’ goes from the wheel contact point (WC – bottom center of the wheel) to point IC.
- The point at which line ‘C’ crosses the car’s centerline (CL) is the roll center.

ROLL CENTER IN ACTION

When cornering, centrifugal force is applied to the car's CG, which tends to push the car to the outside of a corner. This causes the CG to rotate around the RC. Since the RC is below the CG, cornering force causes the car to rotate AWAY from the force. Hence, the car rolls to the OUTSIDE of the corner.

- When the RC is far away from CG (lower RC), when the car corners the CG has more leverage on the RC, so the car will roll more.
- When the RC is closer to CG (higher RC), when the car corners the CG has less leverage on the RC, so the car will roll less.
- If the RC was right on top of the CG, when the car corners the CG has no leverage on the RC, so the car would not roll at all.
- Depending on what the car is doing, you will want one end or the other to roll more or less. You change the height of the RC accordingly to make it closer or further from the CG (which for all intents is a fixed point).





EFFECTS OF FRONT ROLL CENTER ADJUSTMENT

Front roll center has most effect on on-throttle steering during mid-corner and corner exit.

Front roll center	Effect
Lower	• Improved forward traction • Improved steering response • Recommended for asphalt tracks and tracks with low-medium traction.
Higher	• Decreases forward traction, • Easier to drive, less responsive • Easier to drive in chicanes and high-traction conditions. • Recommended for carpet or high traction trackss

EFFECTS OF REAR ROLL CENTER ADJUSTMENT

Rear roll center affects on- and off-throttle situations in all cornering stages.

Rear roll center	Effect
Lower	• Improves traction • Decreases cornering speed • Increases on power push • Recommended for low traction tracks
Higher	• Improves rotation • Increases on power steering • Recommended for high traction tracks

ADJUSTING ROLL CENTER

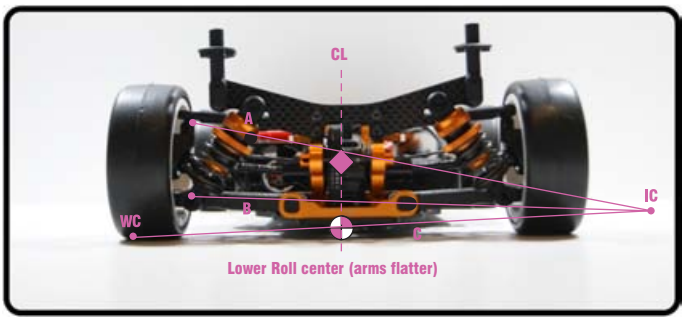
The way that you adjust the roll center differs from one car to the next. However, the theory is the same in that you want to change the angle of the suspension arms by making them more “tilted” or more “flat” horizontally.

To fine-tune roll center, make changes to the angle of the upper arm.
To make larger changes to roll center, make changes to the angle of the lower arm.

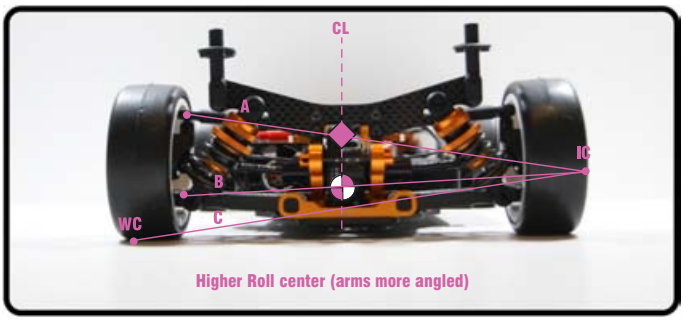
It is very important that you have the same settings on the left and right sides of the car.

This section describes common ways to change roll center settings on R/C cars. However, since different cars use different ways to change roll center, we may not depict the proper way to make roll center changes to your particular car. In that event, refer to your car’s instruction manual or set-up manual for instructions on how to adjust roll center.

IMPORTANT!
Changing roll center settings impacts several other settings on the car, such as downstops, camber, and ride height. When changing front or rear roll center, re-check your other settings.



Lower Roll center (arms flatter)



Higher Roll center (arms more angled)

ADJUSTING FRONT ROLL CENTER – PIVOTBALL SUSPENSION

Effect	Suspension Arm	Change the following…	
		Inner Pivot	Outer Pivot
Lowering front roll center	Front upper arm	Raise the position of the inner pivot pin.	
	Front lower arm	Lower the position of the inner pivot pin.	

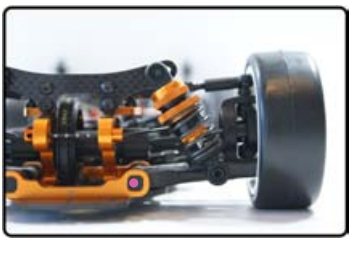
Effect	Suspension Arm	Change the following…	
		Inner Pivot	Outer Pivot
Raising front roll center	Front upper arm	Lower the position of the inner pivot pin.	
	Front lower arm	Raise the position of the inner pivot pin.	

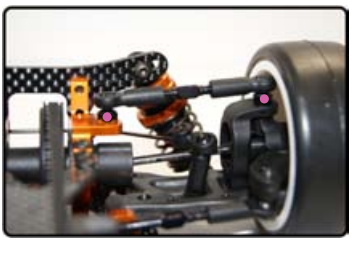


ADJUSTING FRONT ROLL CENTER – C-HUB SUSPENSION

Effect	Suspension Arm	Change the following…	
		Inner Pivot	Outer Pivot
Lowering front roll center	Front upper camber link	Raise the inner mounting position on link by adding shims	
			Lower the outer pivot by removing shims from between the link and the top of the C-hub.
	Front lower arm	Lower the position of the front lower arm's inner pivot pin.	

Effect	Suspension Arm	Change the following…	
		Inner Pivot	Outer Pivot
Raising front roll center	Front upper camber link	Lower the inner mounting position on link by removing shims	
			Raise the outer link by adding shims between the link and the top of the C-hub.
	Front lower arm	Raise the position of the inner pivot pin.	





ADJUSTING REAR ROLL CENTER – PIVOTBALL SUSPENSION

Effect	Suspension Arm	Change the following…	
		Inner Pivot	Outer Pivot
Lowering rear roll center	Rear upper arm	Raise the position of the inner pivot pin.	
			Lower the outer pivot by removing spacers from between the arm's outer pivot and the top of the rear hub carrier.
	Rear upper camber link	Raise the link by adding shims	
			Lower the link by removing shims on the top rear hub carrier.
	Rear lower arm	Lower the position of the inner pivot pin.	

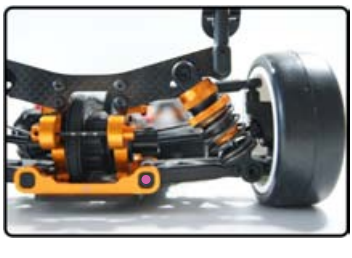
Effect	Suspension Arm	Change the following…	
		Inner Pivot	Outer Pivot
Raising rear roll center	Rear upper arm	Lower the position of the inner pivot pin.	
			Raise the outer pivot by adding spacers between the arm's outer pivot and the top of the rear hub carrier.
	Rear upper camber link	Lower the link by removing shims	
			Raise the link by adding shims on the top of rear hub carrier.
	Rear lower arm	Raise the position of the inner pivot pin.	



ADJUSTING REAR ROLL CENTER – C-HUB SUSPENSION

Effect	Suspension Arm	Change the following…	
		Inner Pivot	Outer Pivot
Lowering rear roll center	Rear upper camber link	Raise the link by adding shims.	
			Lower the link by removing shims from between the link and the top of the rear outer end of the rear hub carrier.
	Rear lower arm	Lower the position of the inner pivot pin.	

Effect	Suspension Arm	Change the following…	
		Inner Pivot	Outer Pivot
Raising rear roll center	Rear upper camber link	Lower the link by removing shims.	
			Raise the link by adding shims between the link and the top of the rear hub carrier.
	Rear lower arm	Raise the position of the inner pivot pin.	





2.2 DOWNSTOPS





Downstops limit how far the suspension arms travel downward, which determines how far upwards the chassis rises. This affects the car's handling, as it directly impacts the car's weight transfer. The effect may change with the type of track and/or amount of grip available.

More suspension travel (lower downstop value) makes the car more responsive but less stable; it is also typically better on a bumpy track or on a track with slow corners. This allows the chassis to "pitch" rearward or forward more under acceleration or braking (respectively), which results in more weight transfer.

Less suspension travel (higher downstop value) makes the car more stable and is typically better on a smooth track. This prevents the chassis from "pitching" rearward or forward too much under acceleration or braking (respectively), which results in less weight transfer.

It is very important to have the same downstop settings on the left and right sides of the car.

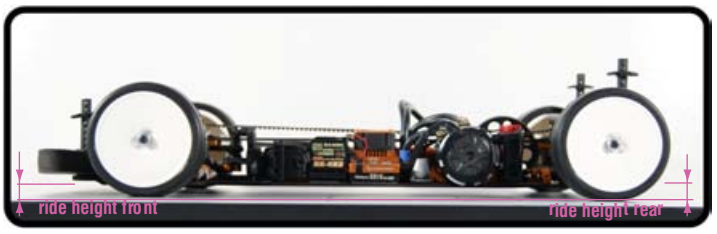
EFFECTS OF DOWNSTOP ADJUSTMENT

Front Downstops	
Higher front downstop value	• Increases off-power steering • Increases steering response • Easier to drive in chicanes
Lower front downstop value	• Decreases steering response • Improves on-power steering • Improves cornering speed
Rear Downstops	
Higher rear downstop value	• Improves stability • More on-power push
Lower rear downstop value	• Improves on-power steering • Improves cornering speed • Less stable

ADJUSTING DOWNSTOPS

For more information on adjusting downstops, see "Downstops" on page 10.

2.3 RIDE HEIGHT



Ride height is the height of the chassis in relation to the surface it is sitting on, with the car ready to run. Ride height affects the car's traction since it alters the car's center of gravity and roll center. Because of changes in suspension geometry and ground clearance, there are negative consequences to altering ride height too much.

Measure and adjust ride height with the car ready-to-run but without the body. Use the shock preload collars to raise and lower the ride height.

EFFECTS OF RIDE HEIGHT ADJUSTMENT

Decreasing ride height (lowering the car)	• Faster reaction • More overall grip • Better on smooth tracks
Increasing ride height (raising the car)	• Slower reaction • Increases chassis roll • Decreases overall grip • Better on bumpy tracks
Front lower then rear by 0,5mm	• Increased steering into corner • More stability in corners • Increased on-power oversteer

Ride Height and Tires

Ride height is measured with the wheels on the car, and the car ready-to-run. When using rubber tires, your ride height settings should stay consistent, since rubber tires do not wear down appreciably during use, which results in a fairly constant ride height. However, if using foam tires, the car's ride height decreases as the foam tires wear down to smaller diameters.

Tires may wear at different rates front-to-back, and left-to-right, which may eventually result in a car with uneven ride height at all four corners. You should periodically true your foam tires and readjust your settings accordingly.

Ride Height and Suspension Settings

Suspension settings are unaffected by the wheels/tires you put on the car, only the ride height is affected. When you use a set-up system (such as the HUDY All-In-One Set-Up Solution) to set your suspension settings, the suspension settings do not change when you put different wheels on the car. With the car sitting on the ground, it may appear that certain settings are different, but this may be due to uneven tires, or tires with different diameters. However, the settings you set using a set-up system are the true suspension settings.

ADJUSTING RIDE HEIGHT

For more information on adjusting ride height, see "Ride Height" on page 12.

2.4 DROOP

Droop refers to the amount that the chassis travels downward after the car is dropped and the wheels touch the ground; it is also the amount that the chassis travels upward before the wheels lift from the ground. Droop is a very powerful way to adjust your car's handling, as it adjusts the weight transfer of the car.

Droop is affected by both downstop setting and ride height adjustments. When you adjust ride height, you must also adjust downstops to maintain the same droop setting. This is particularly important when running a car with foam tires, since foam tires get smaller when run, requiring you to increase ride height periodically. Increasing ride height by itself will reduce droop value unless you compensate by changing the downstop setting.

EFFECTS OF DROOP ADJUSTMENT

Front Droop	
Less front droop (higher front downstop value)	• Decreases front chassis upward travel on-throttle • Less rearward weight transfer • Less responsive, more stable • Better on smooth tracks.
More front droop (lower front downstop value)	• Increases upward chassis travel on-throttle • Increases rearward weight transfer • More responsive, less stable • Better on bumpy tracks
Rear Droop	
Less rear droop (higher rear downstop value)	• Decreases rear chassis upward travel off-throttle or under braking • Decreases forward weight transfer • More stable under braking • Better on smooth tracks
More rear droop (lower rear downstop value)	• Increases rear chassis upward travel off-throttle or under braking • Increases forward weight transfer • More responsive, less stable • Better on bumpy tracks

MAINTAINING DROOP VALUE

To maintain droop values, do the following:

When you do this to RIDE HEIGHT	Also do this to DOWNSTOP	Comments
Increase	Decrease	Increasing ride height will decrease the droop value. To compensate, decrease the downstop setting.
Decrease	Increase	Decreasing ride height will increase the droop value. To compensate, increase the downstop setting.

ADJUSTING DROOP

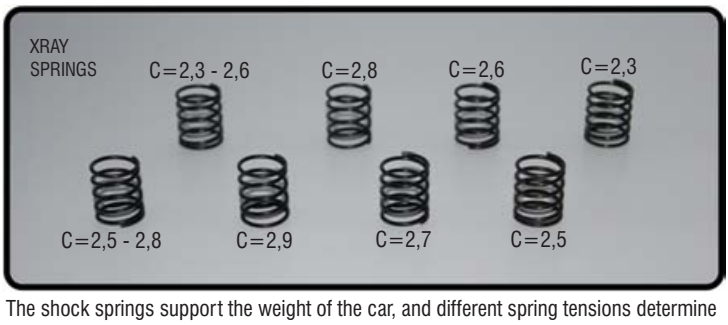
You adjust droop by adjusting downstops. Droop is affected by ride height changes.
For more information on downstops, see “Downstops“ on page 10.
For more information on adjusting ride height, see “Ride Height” on page 12.

2.5 SHOCK ABSORBERS



Shock absorbers are a key component to setting up your R/C car. There are various aspects of shock absorbers that can be adjusted: spring choice, spring preload, shock position & orientation, and damping.

SPRINGS



The shock springs support the weight of the car, and different spring tensions determine how much of the car's weight is transferred to the wheel relative to the other shocks. Spring tension also influences the speed at which a shock rebounds after compression.

Spring selection depends on whether the track is fast or slow, or has high or low grip.

Effects of Spring Selection

Stiffer springs	• More responsive • Faster reaction to steering inputs • Stiff springs are suited for tight, high-traction tracks that aren't too bumpy • When you stiffen all springs, you lose a small amount of steering, and reduce chassis roll
Softer springs	• Slightly more traction in low-grip conditions • Better for bumpy and very large & open tracks • Springs that are too soft make the car feel sluggish and slow, allowing more chassis roll

Stiffer front springs	• Increased steering response • Increased in-corner steering • Increased on-power steering • Higher top speed • Decreased mid-corner steering • Less overal grip	
Softer front springs	• Decreased steering response • Smoother steering • Increased off-power steering	• More overal grip • Increased mid-corner steering, • Smoother under braking
Stiffer rear springs	• Increased mid-corner steering • Improved initial acceleration • Less overall grip	
Softer rear springs	• Increased in-corner steering • Decreased mid-corner steering	• Increased on-power steering • Smoother, more overall grip

Spring Tensions

Spring tension determines how much the spring resists compression, which is commonly referred to as the "hardness" of the spring. Spring tension is determined by the characteristics of the spring itself, and NOT by the amount of preload placed on the spring by spring collars or preload spacers. Characteristics such as wire material, wire thickness, and other factors determine spring tension.

Spring tension is usually rated in a "weight" number that indicates how much weight (or force) is required to compress the spring by a specific amount. A spring with a higher "spring weight" number (such as a 30 lb. spring) will be harder to compress than a spring with a lower "spring weight" number (such as a 25 lb. spring). Manufacturers usually color-code their springs so that all springs of a specific weight have the same external colour. Note that spring colours are NOT standardized, so that a red spring from one manufacturer will not have the same spring tension as a red spring from another manufacturer.

Different manufacturers offer different spring tuning sets so that you can precisely choose the correct spring tension for your car. These springs are usually tailored for use on the manufacturer's own shocks, which may differ from shocks or springs from other manufacturers by length, diameter, or other characteristics.

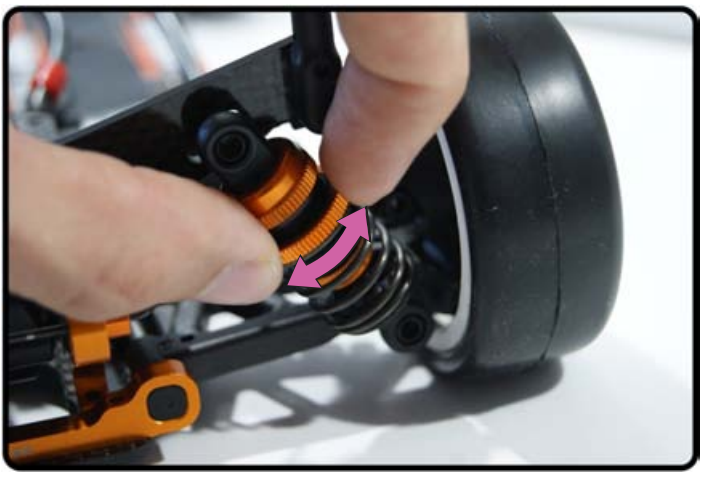
SPRING PRELOAD

Spring preload should be used only to adjust ride height. For more information on ride height, see "Ride Height" on page 12.

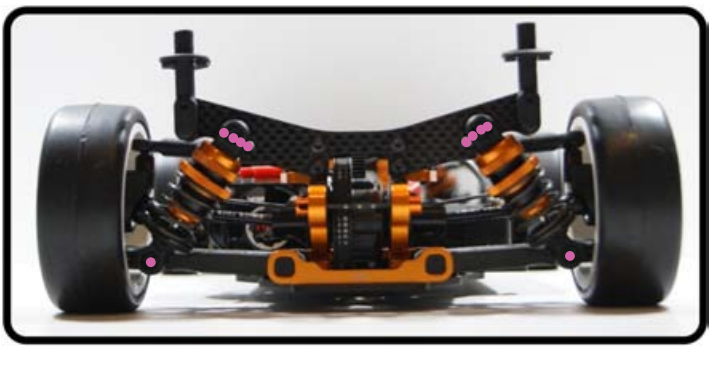
Adjust spring preload so that the springs are only slightly compressed when the car is fully equipped, ready-to-run. To change spring tension, change to a softer or harder spring rather than increasing or decreasing spring preload; that only changes the car's ride height.

Your car may use threaded spring preload collars or preload spacers. To adjust spring preload do the following:

Preload setting	Threaded preload collar	Preload spacers
Increase	TIGHTEN collar so it moves DOWN the shock body.	Use THICKER spacers above spring.
Decrease	LOOSEN collar so it moves UP the shock body.	Use THINNER spaces above spring.



SHOCK POSITION



The upper and lower shock mounting positions determine how much leverage the lower suspension arm has on the shock when compressing it, and how progressive the suspension is. Different shock position settings change how the shock reacts to compression.

Effects of Shock Position Adjustment

Front shocks more upright (vertical)	• Improves on-power steering • Decreased mid-corner steering
Front shocks more inclined	• Improves mid-corner steering
Rear shocks more upright (vertical)	• Improves initial acceleration • Increased rear stability
Rear shocks more inclined	• Improved in-corner steering

SHOCK DAMPING

Setting the right damping is always a compromise and requires a lot of "hands on" experience. Shock damping is affected by shock oil and shock piston settings.

Damping only comes into play when the suspension is moving (either vertical wheel or chassis movement or due to chassis roll), and loses its effect when the suspension has reached a stable position. When the shock is compressing or decompressing (rebounding), the shock absorber oil resists this movement. How much it resists depends on the thickness of the oil, how much the flow is restricted (affected by the number of holes in the shock piston), and the velocity of the piston. No damping means that the spring rate determines how long it takes for the spring to compress and the suspension to reach a stable position.

Shock Oil

Shock oil is usually rated in a "viscosity" number that indicates the thickness of the oil, which determines how much it resists flowing and how much it resists objects (such as shock pistons) moving through it. Shock oil with a higher "viscosity number" (such as 40W oil) will be thicker than shock oil with a lower "viscosity number" (such as 20W oil).

Shock oil thickness has the following effects on car handling:

Thicker oil	• Slower shock action • Slower weight transfer • Car more stable at high speed, more twitchy at slow speed • Better on smooth tracks • Car less likely to become unsettled with sharp direction changes such as in chicanes
Thinner oil	• Faster shock action • Faster weight transfer • Suspension works faster to keep the tire in contact with the surface, resulting in more traction • Better on bumpy tracks • Car more likely to become unsettled with sharp direction changes such as in chicanes

Thicker shock oil usually requires the use of heavier springs to compensate for the heavy damping action. Likewise, thinner oil usually requires lighter springs.

Damping and Shock Pistons

Shock damping manages the resistance of the shock as the piston moves up and down through the oil in the shock body.

Soft damping	• Produces the most grip (both front & rear) • More chassis roll • Decreases cornering speed
Hard damping	• Allows the car to break traction more easily • Less chassis roll • Higher cornering speed

Shock pistons affect shock damping by affecting how easily the piston travels through the shock oil when the shock is compressing or decompressing (rebounding). The piston has holes through which shock oil flows as the piston travels up and down inside the shock body. The number of holes helps control how quickly the shock compresses or decompresses.

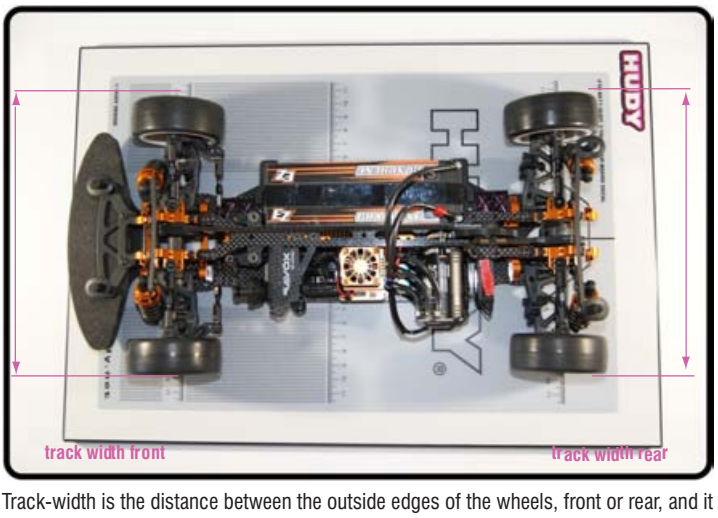
Some manufacturers offer shocks that have non-adjustable or adjustable shock pistons.

• Non-adjustable pistons usually use a 1-piece piston with a set number of holes in it. To change the shock damping, you must disassemble the shocks and replace the piston with another piston with a different number of holes.

• Adjustable pistons come in different forms, but the main idea behind them is that you can change the shock damping by altering the shock pistons without having to disassemble the shocks and changing pistons. Adjusting the shock pistons may compress an internal O-ring in the piston, or may align a different number of holes in the pistons.

Fewer piston holes/smaller piston holes	• Less oil can pass through the piston as the piston moves • Harder damping, reacts like using thicker shock oil • More resistance to shock movement, more damping, and slower shock movement
More piston holes/bigger piston holes	• More oil can pass through the piston as the piston moves • Softer damping, reacts like using thinner shock oil • Less resistance to shock movement, less damping, and faster shock movement

2.6 TRACK-WIDTH



Track-width is the distance between the outside edges of the wheels, front or rear, and it affects the car's handling and steering response.. It is important that front or rear track-width is adjusted symmetrically, meaning that the left and right wheels must be the same distance from the centerline of the chassis.

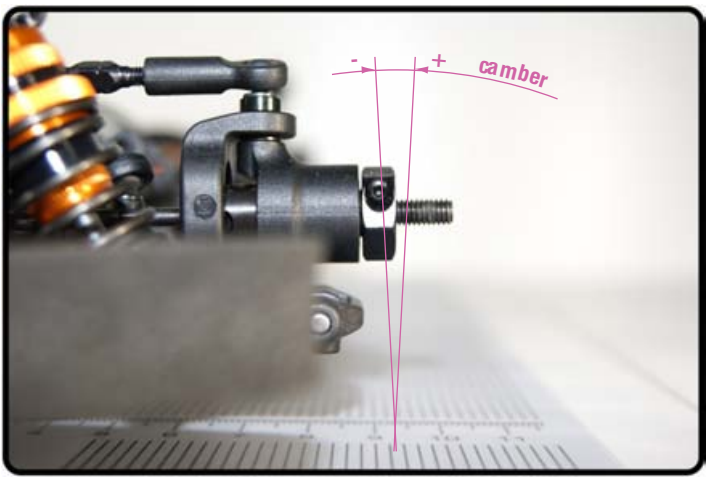
EFFECTS OF TRACK-WIDTH ADJUSTMENT

Front track-width	Wider	• Decreases front traction • Decreases steering response • Easier to drive • Reduces traction rolling • Recommended for high-traction tracks
	Narrower	• Increases front traction • Increases steering response • Recommended for low-medium traction tracks
Rear track-width	Wider	• More stable • Easier to drive • Less rotation • More on-power push • Recommended for high-traction tracks
	Narrower	• Less stable • Better rotation • Increases cornering speed • Recommended for low-medium traction tracks

ADJUSTING TRACK-WIDTH

For more information on adjusting track-width, see "Track-Width" on page 13.

2.7 CAMBER

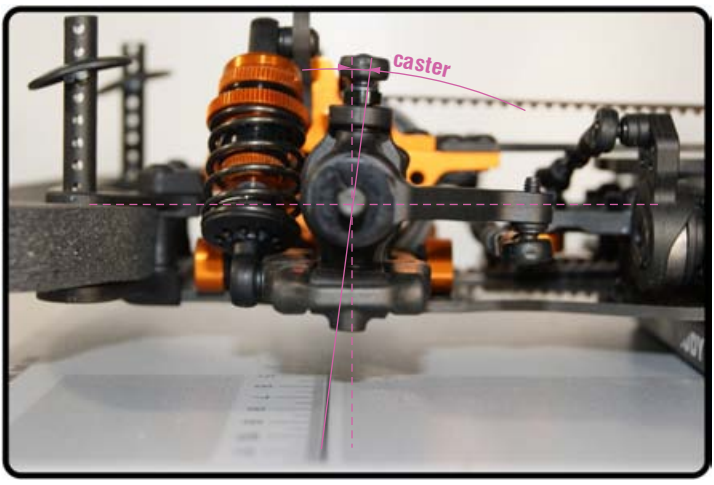


Camber affects the car's traction. Generally more negative (inward) camber means increased grip since the side-traction of the wheel increases.
Adjust front camber so that the front tires wear flat, Adjust rear camber so that the rear tires wear slightly conical to the inside.
The amount of front camber required to maintain the maximum contact patch also depends on the amount of caster. Higher degrees of caster require little or no camber, while lower degrees of caster require more negative camber.

ADJUSTING CAMBER

For more information on adjusting camber, see "Camber & Camber Rise" on page 16.

2.8 CASTER



Caster describes the angle of the front steering block with respect to a line perpendicular to the ground. The primary purpose of having caster is to have a self-centering steering system. Caster angle affects on- and off-power steering, as it tilts the chassis more or less depending on how much caster is applied.

For the purpose of R/C cars, it is generally recommended that you use a steeper caster angle (more vertical) on slippery, inconsistent and rough surfaces, and use a shallower caster angle (more inclined) on smooth, high-grip surfaces.

EFFECTS OF CASTER ADJUSTMENT

Less caster angle (more vertical)	• Decreases straight-line stability • Increases off-power steering at corner entry • Increases suspension efficiency • Decreases on-power steering in mid-corner and corner exit
More caster angle (more inclined)	• Increases straight-line stability • Decreases off-power steering at corner entry • Increases on-power steering in mid-corner and corner exit. • More stable in bumpy track conditions

Camber vs. Caster
Camber is all about contact patch – keeping as much tire on the ground as possible. Camber and caster are related in that caster can afford an amount of EFFECTIVE CAMBER change when the front wheels are turned in a corner.

Caster has the effect of progressively leaning the front tires into the direction of the corner. The more the caster angle is laid-back, the greater the effective camber change when the wheels are turned. This happens because the tops of the wheels BOTH TILT towards the inside of the corner; the wheels “dig in” more, counteracting the centrifugal forces pushing the car to the outside.

Compare that to the static camber of the wheels, which is adjusted with the car sitting on a level surface and the wheels pointed straight ahead. Static camber adjustments primarily affect the outside wheels, since these are the wheels that bear the majority of the load during cornering.
Hence, the amount of front camber required to maintain maximum tire contact largely depends on the amount of caster. A steeper caster angle requires more camber, while a shallower caster angle requires less camber.

Steeper Caster (More Vertical)

Increased OFF-power steering INTO a corner
Why? Imagine that the caster angle is vertical. Now imagine that you turn the steering; the wheels turn to the side. The steeper the caster angle, the more that the wheels deflect to the side, giving you more turn-in into a corner.

Increased suspension efficiency
Why? The inboard suspension pins are, for the sake of discussion, parallel the chassis (horizontal) which means that the suspension arms move up and down vertically. Now, imagine that the caster angle is vertical, meaning that the top and bottom of the steering “kingpin” is directly aligned with the motion of the suspension arms. And finally, acknowledge that shock absorbers are pretty much horizontally aligned (the top is no further ahead of or behind the bottom), running perpendicular to the long axis of the car. Since bumps in the racing surface cause vertical deflections of the wheel, the more

vertically oriented the steeringblock is, the better the front suspension can soak-up bumps without binding.

Decreased ON-power steering OUT of a corner
Why? When you increase the power coming out of a corner, the weight bias shifts from the front wheels to the rear wheels. The more vertical the caster angle, the less the effective camber change of the wheels, so that ONLY the static camber of the outside wheel is affecting how much the wheels "dig in". Since the wheels cannot "dig in" effectively, the reduced weight on the front wheels will cause the front to lose traction more easily, causing the car to understeer.

Decreased wheel-centering
Why? Imagine that the caster angle is vertical. Now imagine that you take hold of the forward edge of a front tire and move it from side-to-side. The wheel deflects an amount proportional to how much you move it with your hand. Vertical caster is highly unstable because there is little in the way of forces to want to keep the wheels pointing straight ahead.

Shallower Caster (More Laid-Back)

Decreased OFF-power steering INTO a corner
Why? Imagine that the caster angle is so laid-back that it is horizontal (though this would be impossible). Now imagine that you turn the steering; the wheels would not turn to the side anymore, but rather the tops of the wheels would now tilt to the side. The shallower the caster angle, the less the wheels deflect to the side, giving you less turn-in into a corner.

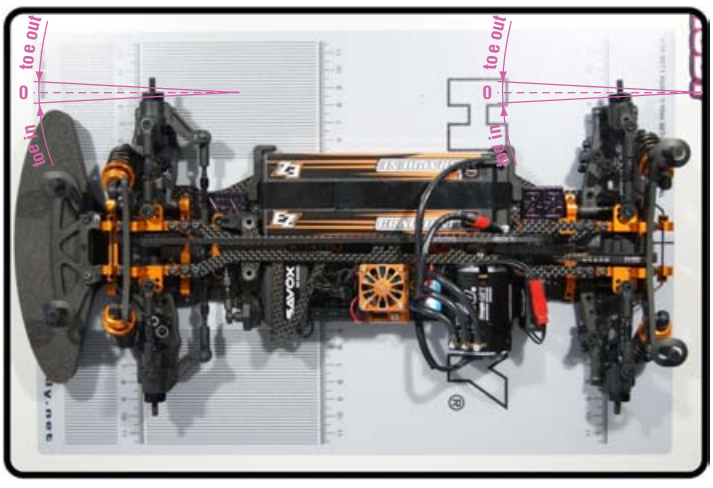
Increased ON-power steering OUT of a corner
Why? The more laid-back the caster angle, the more effective camber you get when you turn the front wheels. When you increase the power coming out of a corner, the weight bias shifts from the front of the car to the rear. Normally this would cause front to lose traction and understeer. However, since there is more effective camber at more laid-back caster angles, the "tilted" front wheels are more able to "dig" into the corner, allowing the car to resist centrifugal force and giving it a greater amount of control when exiting a corner.

Increased wheel-centering, but decreased straight-line stability
Why? Imagine that the front wheels of a shopping cart (which have extremely shallow caster). Push the cart forward, and the front wheels will always try to center themselves. The shallower the caster angle, the more the steering is always fighting to get back to center. However (you knew this was coming, right?), the shallower you make the caster angle, the greater the amount of force trying to center the wheels. Eventually the forces become so great that the wheels will start to shimmy, decreasing straight-line stability.

ADJUSTING CASTER

For more information on adjusting caster, see "Caster" on page 18.

2.9 TOE



Toe is the angle of the wheels when looked at from above the car. When the wheels are parallel with the centerline of the car, toe is 0° (neutral). When the wheels are open towards the front, this is called toe-out (negative value). When the wheels are closed towards the front, this is called toe-in (positive value).
Toe is used to stabilize the car at the expense of traction, as it introduces friction and therefore some slip in the tires.

Front wheels should be set to neutral or toe-out. Rear wheels should always have toe-in; they should never have toe-out.

EFFECTS OF TOE ADJUSTMENT

Front toe	Increasing (more toe-in)	• More stable on-power and on straight
	Decreasing (less toe-in)	• Decreases understeer • Increases steering at corner entry • Faster steering response • Less stable under acceleration • Makes car more difficult to drive
Rear toe	Increasing (more toe-in)	• Increases traction • More stable • More push • Less cornering speed
	Decreasing (less toe-in)	• Less traction • More cornering speed • More on power steering • Better rotation

ADJUSTING TOE

For more information on adjusting toe, see “Toe” on page 19.

2.10 UPSTOPS

Upstops are used to prevent the chassis from bottoming out on the pavement under braking or acceleration.
Upstop settings are directly affected by ride height. As the tires wear (foam tires in particular) the ride height decreases, and the upstop settings must be increased to prevent chassis bottoming.

IMPORTANT!
Upstop screws must be set equally on left and right sides, otherwise the car may suffer from massive tweak under braking or acceleration.

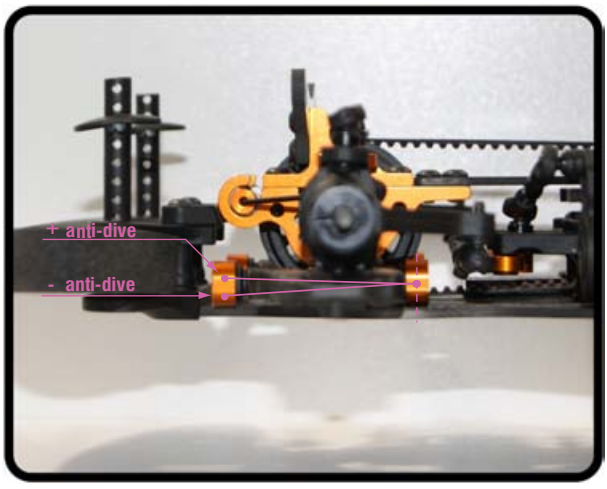
EFFECTS OF UPSTOP ADJUSTMENT

Higher upstop	• More space beneath chassis • Less chance of chassis bottoming under braking • Use with softer shock settings
Lower upstop	• Less space beneath chassis • More chance of chassis bottoming under braking • Use with stiffer shock settings

ADJUSTING UPSTOPS

For more information on adjusting upstops, see your car’s instruction manual or set-up manual.

2.11 ANTI-DIVE (FRONT)



Front anti-dive refers to the angle at which the front suspension is mounted in relation to horizontal when looked at from the side of the car. Anti-dive affects how much the front of the car dives down off-throttle and under braking.

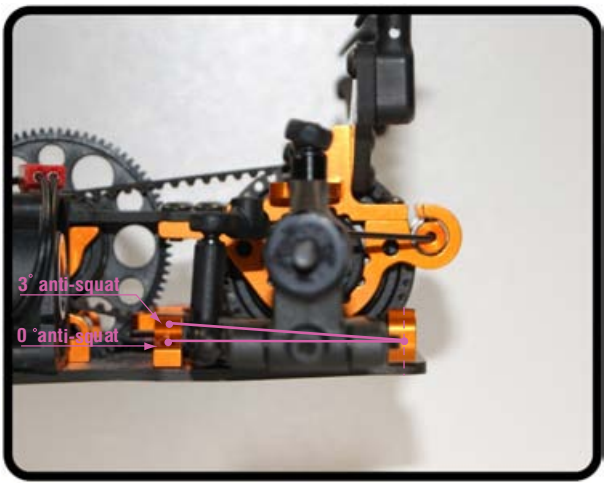
A car with no front anti-dive will have the front suspension arms level with the chassis plane.
A car with positive anti-dive will have the front suspension arms tilted “backwards” so that the front of the arm is higher than the rear of the arm.

EFFECTS OF FRONT ANTI-DIVE ADJUSTMENT

No anti-dive (front arms level)	• More weight transfer to the front of the chassis off-throttle or under braking • Chassis compresses or drops more off-throttle or under braking • Works better on bumpy tracks • Decreases steering response
Positive anti-dive (front arms angled backwards)	• Less weight transfer to the front of the chassis off-throttle or under braking • Chassis compresses or drops less off-throttle or under braking • Works better on smooth tracks • Increases steering response

ADJUSTING ANTI-DIVE
For more information on adjusting front anti-dive, see your car’s instruction manual or set-up manual.

2.12 ANTI-SQUAT (REAR)



Rear anti-squat refers to the angle at which the rear suspension is mounted in relation to horizontal when looked at from the side of the car. Anti-squat affects how much the rear of the car dives down on-throttle.

A car with no rear anti-squat will have the rear lower suspension arms level with the chassis plane.

A car with positive anti-squat will have the rear lower suspension arms tilted “backwards” so that the front of the arm is higher than the rear of the arm.

EFFECTS OF REAR ANTI-SQUAT ADJUSTMENT

No anti-squat (rear arms level)	• More weight transfer to the rear of the chassis on-throttle • Chassis compresses or drops more on-throttle • Increases steering response • Better on a bumpy track
Positive anti-squat (rear arms angled backwards)	• Less weight transfer to the rear of the chassis on-throttle • Chassis compresses or drops less on-throttle • Decreases steering response • Increases rear traction • Better on a smooth track

ADJUSTING ANTI-SQUAT

For more information on adjusting rear anti-squat, see your car’s instruction manual or set-up manual.

2.13 WHEELBASE



Wheelbase refers to the horizontal distance between the front and rear axles. Changes to wheelbase can have a dramatic effect on the handling of your car, since it readjusts the distribution of weight on the wheels, which adjusts traction. Not all R/C cars have the option to adjust the wheelbase.

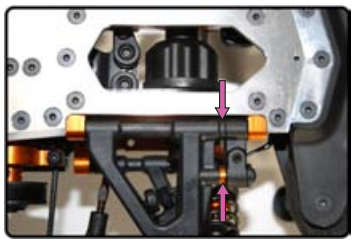
By adjusting the wheelbase at one end of the car, you affect the traction at that end of the car. For example, by shortening the wheelbase at the rear of the car, you place more weight over the rear wheels (resulting in more rear traction.)

EFFECTS OF WHEELBASE ADJUSTMENT

Longer wheelbase	• More stability • Easier to drive • Less steering response • Better on high-traction or big tracks.
Shorter wheelbase	• Less stable • More difficult to drive, more aggressive • Better steering response • Better on small, technical tracks

ADJUSTING WHEELBASE





Adjust wheelbase by adding and/or removing shims ahead of & behind front & rear arm.

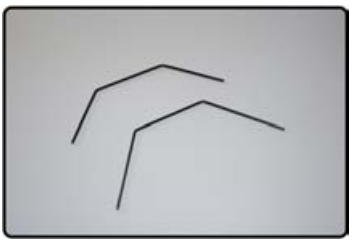
Wheelbase changes to FRONT arms	
LESS shims in front of front arm MORE shims in back of front arm	LONGER wheelbase
MORE shims in front of front arm LESS shims in back of front arm	SHORTER wheelbase
Wheelbase changes to REAR arms	
LESS shims in front of rear arm MORE shims in back of rear arm	LONGER wheelbase
MORE shims in front of rear arm LESS shims in back of rear arm	SHORTER wheelbase

Make sure you put the proper shims in front and behind the arms. For XRAY cars, the total sum thickness of all wheelbase-adjustment shims used on an arm is always 2mm; we recommend using only 0.5, 1.0, and 2.0mm shims.

For more information on adjusting wheelbase, see your car's instruction manual or set-up manual.

2.14 ANTI-ROLL BARS





Anti-roll bars are used to adjust the car's side (lateral) traction. Anti-roll bars resist chassis roll and by doing so transfer wheel load from the inside wheel to the outside wheel. The stiffer the anti-roll bar, the more load is transferred from the inside wheel to the outside wheel. However, as the outside wheel is not able to convert all of the extra wheel load into extra grip, the sum of the grip of both wheels is actually reduced. This changes the balance of the car to the other axle.

Increasing the stiffness of an anti-roll bar on one particular axle decreases the side traction of that axle and increases the side traction of the other axle.

Keep in mind that the overall traction of a car cannot be changed, but it can be balanced by distributing wheel loads. Anti-roll bars are a very useful tool to change the balance of the car.

Chassis stiffness plays a very important role in the effectiveness of anti-roll bars. A stiffer chassis makes the car more responsive to anti-roll bar changes.

FRONT ANTI-ROLL BAR

The front anti-roll bar affects mainly off-power steering at corner entry.

Effects of Front Anti-Roll Bar Adjustment

Stiffer	• Less chassis roll • Decreases front traction • Increases rear traction • Reduces off-power steering at corner entry (increases understeer) • Quicker steering response
Softer	• More chassis roll • Increases front traction • Decreases rear traction • Increases off-power steering (may cause oversteer)

REAR ANTI-ROLL BAR

The rear anti-roll bar affects mainly on-power steering and stability in mid-corner and at corner exit.

Effects of Rear Anti-Roll Bar Adjustment

Stiffer	• Less chassis roll • Decreases rear traction • Increases front traction • Increases on-power steering (may cause oversteer) • Quicker steering response in high speed chicanes
Softer	• More chassis roll • Increases rear traction • Decreases front traction • Decreases on-power steering (increases understeer)

ADJUSTING ANTI-ROLL BARS

For more information on adjusting anti-roll bars, see your car's instruction manual or set-up manual.

2.15 FRONT AND REAR AXLES

Modern R/C cars can use several different types of front and rear axles. The choice of front and rear axles depends on track conditions and driving style. At the moment the most commonly-used axles are solid axle and gear differential.

Front axles
- gear differential
- solid axle

Rear axles
- gear differential

You may use any combination of front and rear axles, but some work better together than others.

SOLID AXLES

A solid axle ties both left and right wheels together so they rotate at the same speed at all times. The effect of a solid axle is dependent on which end of the car it is used on, and the other type of axle being used with it.



FRONT SOLID AXLE

A front solid axle is typically used on large open outdoor tracks, or tracks that feature braking areas or slippery (low-traction) conditions. A front solid axle increases on-power steering, and allows the car to brake using all four wheels. This lets you brake much later than if you were using a front one-way axle (which would give rear wheel braking only). Overall, using the front solid axle makes the car quite easy to drive.

The drawbacks of a front solid axle are less off-power steering, and the car becomes more sensitive to tire diameter differences. To compensate for these effects, changes can be made to the suspension (for example, roll center, front spring rate and/or dampening, shock position, or caster).

GEAR DIFFERENTIAL

Gear differential increases on-power steering which is needed on nearly all types of tracks, and is ideal for both carpet and asphalt tracks. Another key advantage of the gear diff is that it is maintenance-free. When the diff is correctly built, there is no need for maintenance for a very long time... no need for frequent oil changes, and no leakage due to the superior sealing system.



EFFECTS OF GEAR DIFFERENTIAL ADJUSTMENT

	Front Differential	Rear Differential
Thinner oil	• Less steering response • Less forward traction • More on-power steering • Less stability on break • More cornering speed	• Less traction • More stability • Less on-power steering • More off-power rotation & steering
Thicker oil	• Higher steering response • More forward traction • Less on-power steering • Better stability under braking • Less cornering speed	• Higher traction • Less stability • More on-power steering • Less off-power rotation & steering

3.0 SET-UP QUICK REFERENCE

The quick reference table is a simple-to-use set-up guide. With the car's handling characteristics listed on the left of the table, suggestions for solutions are presented in order of importance and also shows whether the adjustment should be a positive or negative change.

HOW TO USE THE QUICK REFERENCE TABLE

A. Identify the Problem

After driving your car and getting a feel for how it's handling bring it in and decide where you feel the car could improve.

B. Using the Table

The table is separated into five main areas that represent the car's main handling characteristics:

- Understeer
- Oversteer
- Traction roll
- Straight line stability
- Steering response

Understeer, oversteer, and traction roll are further separated to identify exactly where the problem occurs (corner entry, mid-corner, corner exit) and throttle position (off- or on-throttle).

Isolate the Problem

1. In the leftmost column, select the handling characteristic that best describes your car's handling problem.

2. Identify the part of the corner that the handling characteristic occurs in. *Example: Oversteer, corner entry.*
3. Further identify the throttle setting when the handling characteristic occurs. *Example, Oversteer, corner entry, off-throttle.*

You can now identify the row on the table that will contain information that can assist you.

Identify the Solution

4. On the table row that isolates the problem, there are squares with numbers in them. These numbers are recommendations for the order in which to change things. Number 1 items should be done first, number 2 items should be done second, and so on.

5. Look at the location of the square; it will be in the "Front" section or the "Rear" section. This indicates if the changes must be made at the front or the rear of the car. *Example: Make changes first to Tires (front), and Anti-Roll Bars (front & rear).*

6. Look at the colour of the box. This tells you how to make the change. Red means to make the setting harder/increase/higher/longer. Green means to make the setting softer/decrease/lower/shorter.
Example: Make front tires harder. Make front anti-roll bar harder. Make rear anti-roll bar softer.

C. Test the Solution

When making setup changes, we strongly recommend that you try one adjustment at a time, and then test the new setting. If it has not had the expected result you can either try the rest of the changes or increase the amount of the change. If you feel you would like to try something different simply move on to the next level of possible adjustments. (For example, after trying all number 1 recommendations, move on to number 2 recommendations and so on).

Note that car set-up is always a compromise and changing one setting affects the handling of another part of the car. It is therefore important to only make small changes at a time and test each change.

Key Guide

Harder / Increase / Higher / Lengthen / Do not Use

Softer / Decrease / Lower / Shorten / Use

1 Order of importance

				FRONT														REAR												
		Off-Throttle	On-Throttle	Downstops	Camber	Caster	Ride Height	Toe	Roll Center	Anti-Roll bar	Tires	Shock Springs	Shock Damping	Shock Position	One-Way Front Axle	Solid Front Axle	Front Differential	Downstops	Camber	Ride Height	Dynamic rear steering	Roll Center	Anti-Roll bar	Tires	Shock Springs	Shock Damping	Shock Position	Rear Differential	Solid Rear Axle	Gurney Strip
How to get rid of **UNDERSTEER**	**Corner Entry**	■		5	6	4	5	5	3	1	1	3	3	4	5	5	6	3	6	5	3	2	1	3	3	3	4	4	3	3
			■	2	6	3	5	8	2	1	3	4	3	4	5	5	6	7	5	5	3	2	1	1	3	3	4	4	3	3
	Mid Corner	■		5	6	4	5	8	3	1	1	3	5	4	5	5	6	7	6	5	3	2	1	3	3	5	4	4	5	3
			■	2	6	3	5	8	2	1	3	4	5	4	5	5	6	8	5	5	3	2	1	1	3	5	4	4	3	3
	Corner Exit		■	2	6	3	5	7	2	1	3	4	3	4	5	5	6	8	5	5	3	2	1	1	4	2	3	4	3	3
	Braking	■		6	6	4	5	7	4	2	4	4	5	4	3	3	4	3	4	5	3	2	1	1	3	3	3			3
How to get rid of **OVERSTEER**	**Corner Entry**	■		5	6	4	5	5	3	1	1	3	3	4	5	5	6	3	6	5	3	2	1	3	3	3	4	4	3	3
			■	2	6	3	5	8	2	1	3	4	3	4	5	5	6	7	5	5	3	2	1	1	3	3	4	4	3	3
	Mid Corner	■		5	6	4	5	8	3	1	1	3	5	4	5	5	6	7	6	5	3	2	1	3	3	5	4	4	5	3
			■	2	6	3	5	8	2	1	3	4	5	4	5	5	6	8	5	5	3	2	1	1	3	5	4	4	3	3
	Corner Exit		■	2	6	3	5	7	2	1	3	4	3	4	5	5	6	8	5	5	3	2	1	1	4	2	3	4	3	3
	Braking	■		6	6	4	5	7	4	2	4	4	5	4	3	3	4	3	4	5	3	2	1	1	3	3	3			3
How to get rid of **TRACTION ROLL**	**Corner Entry**	■			8	2	1		2	1	1	2	3	4	4	4	5	3	6	1	3	2	1	1	3	4	5	2	2	3
			■	6	8	2	1		2	1	1	3	4	5	4	4	5	5	6	1	3	2	1	1	2	3	4	2	2	3
	Mid Corner		■	6	8	2	1		2	1	1	2	5	5	4	4	5	5	6	1	3	2	1	1	2	5	5	5	5	3
	Corner Exit		■	6	8	2	1		2	1	1	3	4	5	4	4	5		6	1	3	2	1	1	2	3	4	2	2	3
	Braking	■			8	2	1		2	1	1	2	3	4	4	4	5	3	6	1	3	2	1	1	3	4	5	2	2	3
STRAIGHT LINE STABILITY To make Better				7	5	3	7	4	7	5	3	8	4	8	8	8	8		5	6		7	7	3	8	4	8	6	6	2
STEERING RESPONSE To make Faster					6	4	4	5	1	2	4	2	1	4						4		2	3	4	4	3	4			4

Factors like quality, safety, appearance, comfort, and ease-of-use are fundamental design concerns which are addressed during the development and production of any piece of equipment that HUDY makes.

HUDY uses the most modern high-tech engineering technologies available; designing, processing, analyzing, and testing are accomplished with the use of high-end CAD PRO ENGINEER - 3D software system.
All advertising and promotion strategies, as well as the whole corporate identity, are executed by a professional team of marketing managers, designers, and developers.

Before beginning production, each prototype is accurately analyzed, and tested in extreme overload conditions. The whole test process is focused on the item‘s features, its reliability characteristics, and the life span of each of its parts and components, which HUDY strives to maximize.

HUDY‘s manufacturing facility is the most modern in the RC industry. Hudy employs over ?90 professionals,and the manufacturing facility is large over 2000m2 and HUDY uses only the most modern, computer controlled, state-of-the-art CNC machines available, to ensure the highest quality products. The production facility consists of six CNC milling machines, four CNC cutting machines, CNC moulding machine, computer controlled injection machine, cutting automats, mills, 10 high-precise grinding machines and plenty of other high-tech equipment.

HUDY is one of the very few authentic manufacturers, and all HUDY products are fully manufactured and assembled in-house to guaranty the highest quality.



MADE IN EUROPE

HUDY products are developed, designed and styled by Dipl. Eng. Juraj Hudy


HUDY
Quick
CAMBER
GAUGE
CAMBER
CASTER
TOE
ANTI-DIVE
ANTI-SQUAT
RIDE HEIGHT
DOWNSTOPS
TRACK-WIDTH
ROLL-CENTER
WHEELBASE
ACKERMANN