

# XRAY X412

1/12 PAN CAR

**IIIC**  
INTERNATIONAL INDOOR  
CHAMPION

**3x** EUROPEAN  
JUNIOR INDOOR  
CHAMPION

**3x** BRCA  
CHAMPION

**3x** US  
SNOWBIRD  
NATIONALS  
WINNER

MADE IN  
EUROPE

**USA**  
CHAMPION  
**2x**

EUROPEAN  
CHAMPION  
**2x**

INSTRUCTION  
2016 MANUAL

## BEFORE YOU START

The X12 is a high-competition, high-quality, 1/12-scale touring car intended for persons aged 16 years and older with previous experience building and operating RC model racing cars. This is not a toy; it is a precision racing model. This model racing car is not intended for use by beginners, inexperienced customers, or by children without direct supervision of a responsible, knowledgeable adult. If you do not fulfill these requirements, please return the kit in unused and unassembled form back to the shop where you have purchased it.

Before building and operating your X12, **YOU MUST** read through all of the operating instructions and instruction manual and fully understand them to get

## CUSTOMER SUPPORT

We have made every effort to make these instructions as easy to understand as possible. However, if you have any difficulties, problems, or questions, please do not hesitate to contact the XRAY support team at [info@teamxray.com](mailto:info@teamxray.com). Also, please visit our Web site at [www.teamxray.com](http://www.teamxray.com) to find the latest updates, set-up information, option parts, and many other goodies. We pride ourselves on taking excellent care of our customers.

You can join thousands of XRAY fans and enthusiasts in our online community at: [www.teamxray.com](http://www.teamxray.com)

the maximum enjoyment and prevent unnecessary damage. Read carefully and fully understand the instructions before beginning assembly.

Make sure you review this entire manual, download and use set-up book from the web, and examine all details carefully. If for some reason you decide The X12 is not what you wanted or expected, **do not continue any further**. Your hobby dealer cannot accept your X12 kit for return or exchange after it has been partially or fully assembled.

Contents of the box may differ from pictures. In line with our policy of continuous product development, the exact specifications of the kit may vary without prior notice.

### XRAY Europe

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USA  
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Fax: (214) 744-2401  
E-mail: [xray@rcamerica.com](mailto:xray@rcamerica.com)

**Failure to follow these instructions will be considered as abuse and/or neglect.**

## SAFETY PRECAUTIONS

Contains:

LEAD (CAS 7439-92-1) ANTIMONY (CAS 7440-36-0)

WARNING: This product contains a chemical known to the state of California to cause cancer and birth defects or other reproductive harm.

CAUTION: CANCER HAZARD

Contains lead, a listed carcinogen. Lead is harmful if ingested. Wash thoroughly after using. DO NOT use product while eating, drinking or using tobacco products. May cause chronic effects to gastrointestinal tract, CNS, kidneys, and blood. MAY CAUSE BIRTH DEFECTS.

When building, using and/or operating this model always wear protective glasses and gloves.

Take appropriate safety precautions prior to operating this model. You are responsible for this model's assembly and safe operation! Please read the instruction manual before building and operating this model and follow all safety precautions. Always keep the instruction manual at hand for quick reference, even after completing the assembly. Use only genuine and original authentic XRAY parts for maximum performance. Using any third party parts on this model will void guaranty immediately.

Improper operation may cause personal and/or property damage. XRAY and its distributors have no control over damage resulting from shipping, improper construction, or improper usage. XRAY assumes and accepts no responsibility for personal and/or property damages resulting from the use of improper building materials, equipment and operations. By purchasing any item produced by XRAY, the buyer expressly warrants that he/she is in compliance with all applicable federal, state and local laws and regulation regarding the purchase, ownership and use of the item. The buyer expressly agrees to indemnify and hold harmless XRAY for all claims resulting directly or indirectly from the purchase, ownership or use of the product. By the act of assembling or operating this product, the user accepts all resulting liability. If the buyer is not prepared to accept this liability, then he/she should return this kit in new, unassembled, and unused condition to the place of purchase.

## IMPORTANT NOTES - GENERAL

- This product is not suitable for children under 16 years of age without the direct supervision of a responsible and knowledgeable adult.
  - Carefully read all manufacturers warnings and cautions for any parts used in the construction and use of your model.
  - Assemble this kit only in places away from the reach of very small children.
  - First-time builders and users should seek advice from people who have building experience in order to assemble the model correctly and to allow the model to reach its performance potential.
  - Exercise care when using tools and sharp instruments.
  - Take care when building, as some parts may have sharp edges.
  - Keep small parts out of reach of small children. Children must not be allowed to put any parts in their mouth, or pull vinyl bag over their head.
  - Read and follow instructions supplied with paints and/or cement, if used (not included in kit).
  - Immediately after using your model, do NOT touch equipment on the model such as the motor and speed controller, because they generate high temperatures. You may seriously burn yourself seriously touching them.
  - Follow the operating instructions for the radio equipment at all times.
  - Do not put fingers or any objects inside rotating and moving parts, as this may cause damage or serious injury as your finger, hair, clothes, etc. may get caught.
  - Be sure that your operating frequency is clear before turning on or running your model, and never share the same frequency with somebody else at the same time. Ensure that others are aware of the operating frequency you are using and when you are using it.
  - Use a transmitter designed for ground use with RC cars. Make sure that no one else is using the same frequency as yours in your operating area. Using the same frequency at the same time, whether it is driving, flying or sailing, can cause loss of control of the RC model, resulting in a serious accident.
  - Always turn on your transmitter before you turn on the receiver in the car. Always turn off the receiver before turning your transmitter off.
  - Keep the wheels of the model off the ground when checking the operation of the radio equipment.
  - Disconnect the battery pack before storing your model.
  - When learning to operate your model, go to an area that has no obstacles that can damage your model if your model suffers a collision.
  - Remove any sand, mud, dirt, grass or water before putting your model away.
  - If the model behaves strangely, immediately stop the model, check and clear the problem.
  - To prevent any serious personal injury and/or damage to property, be responsible when operating all remote controlled models.
  - The model car is not intended for use on public places and roads or areas where its operation can conflict with or disrupt pedestrian or vehicular traffic.
  - Because the model car is controlled by radio, it is subject to radio interference from many sources that are beyond your control. Since radio interference can cause momentary loss of control, always allow a safety margin in all directions around the model in order to prevent collisions.
  - Do not use your model:
    - Near real cars, animals, or people that are unaware that an RC car is being driven.
    - In places where children and people gather
    - In residential districts and parks
    - In limited indoor spaces
    - In wet conditions
    - In the street
    - In areas where loud noises can disturb others, such as hospitals and residential areas.
    - At night or anytime your line of sight to the model may be obstructed or impaired in any way.
- To prevent any serious personal injury and/or damage to property, please be responsible when operating all remote controlled models.

## **IMPORTANT NOTES - ELECTRICAL**

- Insulate any exposed electrical wiring (using heat shrink tubing or electrical tape) to prevent dangerous short circuits. Take maximum care in wiring, connecting and insulating cables. Make sure cables are always connected securely. Check connectors for if they become loose. And if so, reconnect them securely. Never use R/C models with damaged wires. A damaged wire is extremely dangerous, and can cause short-circuits resulting in fire. Please have wires repaired at your local hobby shop.
- Low battery power will result in loss of control. Loss of control can occur due to a weak battery in either the transmitter or the receiver. Weak running battery may also result in an out of control car if your car's receiver power is supplied by the running battery. Stop operation immediately if the car starts to slow down.
- When not using RC model, always disconnect and remove battery.
- Do not disassemble battery or cut battery cables. If the running battery short-circuits, approximately 300W of electricity can be discharged, leading to fire or burns. Never disassemble battery or cut battery cables.
- Use a recommended charger for the receiver and transmitter batteries and follow the instructions correctly. Over-charging, incorrect charging, or using inferior chargers can cause the batteries to become dangerously hot.

## **R/C & BUILDING TIPS**

- Make sure all fasteners are properly tightened. Check them periodically.
- Make sure that chassis screws do not protrude from the chassis.
- For the best performance, it is very important that great care is taken to ensure the free movement of all parts.
- Clean all ball-bearings so they move very easily and freely.
- Tap or pre-thread the plastic parts when threading screws.
- Self-tapping screws cut threads into the parts when being tightened. Do not use excessive force when tightening the self-tapping screws because you may strip out the thread in the plastic. We recommended you stop tightening a screw when you feel some resistance.
- Ask your local hobby shop for any advice.

## **WARRANTY**

XRAY guarantees this model kit to be free from defects in both material and workmanship within 30 days of purchase. The total monetary value under warranty will in no case exceed the cost of the original kit purchased. This warranty does not cover any components damaged by use or modification or as a result of wear. Part or parts missing from this kit must be reported within 30 days of purchase. No part or parts will be sent under warranty without proof of purchase. Should you find a defective or missing part, contact the local distributor. Service and customer support will be provided through local hobby store where you have purchased the kit, therefore make sure to purchase any XRAY products at your local hobby store. This model racing car is considered to be a high-performance racing vehicle. As such this vehicle will be used in an extreme range of conditions and situations, all which may cause premature wear or failure of any component. XRAY has no control over usage of vehicles once they leave the dealer, therefore XRAY can only offer warranty against all manufacturer's defects in materials, workmanship, and assembly at point of sale and before use. No warranties are expressed or implied that cover damage caused by what is considered normal use, or cover or imply how long any model cars' components or electronic components will last before requiring replacement.

Due to the high performance level of this model car you will need to periodically maintain and replace consumable components. Any and all warranty coverage will not cover replacement of any part or component damaged by neglect, abuse, or improper or unreasonable use. This includes but is not limited to

## **QUALITY CERTIFICATE**

XRAY MODEL RACING CARS uses only the highest quality materials, the best compounds for molded parts and the most sophisticated manufacturing processes of TQM (Total Quality Management). We guarantee that all parts of a newly-purchased kit are manufactured with the highest regard to quality. However, due to the many factors inherent in model racecar competition, we cannot guarantee

Recharge battery when necessary. Continual recharging may damage battery and, in the worst case, could build up heat leading to fire. If battery becomes extremely hot during recharging, please ask your local hobby shop for check and/or repair and/or replacement.

- Regularly check the charger for potential hazards such as damage to the cable, plug, casing or other defects. Ensure that any damage is rectified before using the charger again. Modifying the charger may cause short-circuit or overcharging leading to a serious accident. Therefore do not modify the charger.
- Always unplug charger when recharging is finished.
- Do not recharge battery while battery is still warm. After use, battery retains heat. Wait until it cools down before charging.
- Do not allow any metal part to short circuit the receiver batteries or other electrical/electronic device on the model.
- Immediately stop running if your RC model gets wet as may cause short circuit.
- Please dispose of batteries responsibly. Never put batteries into fire.

Please support your local hobby shop. We at XRAY Model Racing Cars support all local hobby dealers. Therefore we ask you, if at all possible, to purchase XRAY products at your hobby dealer and give them your support like we do. If you have difficulty finding XRAY products, please check out [www.teamxray.com](http://www.teamxray.com) to get advice, or contact us via email at [info@teamxray.com](mailto:info@teamxray.com), or contact the XRAY distributor in your country.

damage from crashing, chemical and/or water damage, excessive moisture, improper or no maintenance, or user modifications which compromise the integrity of components. Warranty will not cover components that are considered consumable on RC vehicles. XRAY does not pay nor refund shipping on any component sent to XRAY or its distributors for warranty. XRAY reserves the right to make the final determination of the warranty status of any component or part.

### **Limitations of Liability**

XRAY makes no other warranties expressed or implied. XRAY shall not be liable for any loss, injury or damages, whether direct, indirect, special, incidental, or consequential, arising from the use, misuse, or abuse of this product and/or any product or accessory required to operate this product. In no case shall XRAY's liability exceed the monetary value of this product.

**Take adequate safety precautions prior to operating this model. You are responsible for this model's assembly and safe operation.**

**Disregard of the any of the above cautions may lead to accidents, personal injury, or property damage. XRAY MODEL RACING CARS assumes no responsibility for any injury, damage, or misuse of this product during assembly or operation, nor any addictions that may arise from the use of this product.**

**All rights reserved.**

any parts once you start racing the car. Products which have been worn out, abused, neglected or improperly operated will not be covered under warranty.

We wish you enjoyment of this high-quality and high-performance RC car and wish you best success on the track!

**In line with our policy of continuous product development, the exact specifications of the kit may vary. In the unlikely event of any problems with your new kit, you should contact the model shop where you purchased it, quoting the part number.**

**We do reserve all rights to change any specification without prior notice. All rights reserved.**

# SYMBOLS USED

Part bags used 	Assemble in the specified order 	Assemble left and right sides the same way 	Pay attention here 	Assemble as many times as specified (here twice) 	Cut 	Apply CA glue 
Apply oil 	Apply grease 	Ensure smooth non-binding movement 	Tighten screw gently 	Detail view 	Assembly view 	Follow Set-Up Book 

# TOOLS REQUIRED

<b>HUDY TOOLS:</b> Allen: 1.5mm, 2.0mm, 2.5mm Socket: 5.5mm 	<b>Combination Pliers</b> (HUDY #189020) 	<b>Side Cutters</b> (HUDY #189010) 	<b>Hobby Knife</b>  <b>Scissors</b> (HUDY #188990) 	<b>Turnbuckle 3mm</b> (HUDY #181030)  <b>Turnbuckle 4mm</b> (HUDY #181040) 	<b>Reamer</b> (HUDY #107600) or (HUDY #107601) 
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# EQUIPMENT INCLUDED

<p><b>XRAY Premium Silicone Oil</b> 700cSt (#359270) 3000cSt (#359303)</p>	<p><b>Diff. Grease</b> (HUDY #106211)</p>
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# NOT INCLUDED

<p>To ensure that you always have access to the most up-to-date version of the XRAY Set-up Book, XRAY will now be offering only the digital online version at our website at <a href="http://www.teamxray.com">www.teamxray.com</a>. By offering this online version instead of including a hardcopy printed version in kits, you will always be assured of having the most current updated version. The Set-up Book features the T-bar version of the XII, however the majority of all set-up adjustments and theory are the same. We strongly recommend that you read and understand the Set-up Book before operating your car.</p>	<table border="1"> <thead> <tr> <th colspan="2">SAMPLE OF OPTIONAL PARTS</th> </tr> </thead> <tbody> <tr> <td>#37XXX</td> <td>OPTION 1</td> </tr> <tr> <td>#37XXX</td> <td>OPTION 2</td> </tr> <tr> <td>#37XXX</td> <td>OPTION 3</td> </tr> </tbody> </table>	SAMPLE OF OPTIONAL PARTS		#37XXX	OPTION 1	#37XXX	OPTION 2	#37XXX	OPTION 3	<p>XRAY offers wide range of optional tuning parts which are listed in a table like this. Please refer to the exploded view of each main section to verify which parts are included in the kit; other parts are available as optional parts, and must be purchased separately.</p>
SAMPLE OF OPTIONAL PARTS										
#37XXX	OPTION 1									
#37XXX	OPTION 2									
#37XXX	OPTION 3									

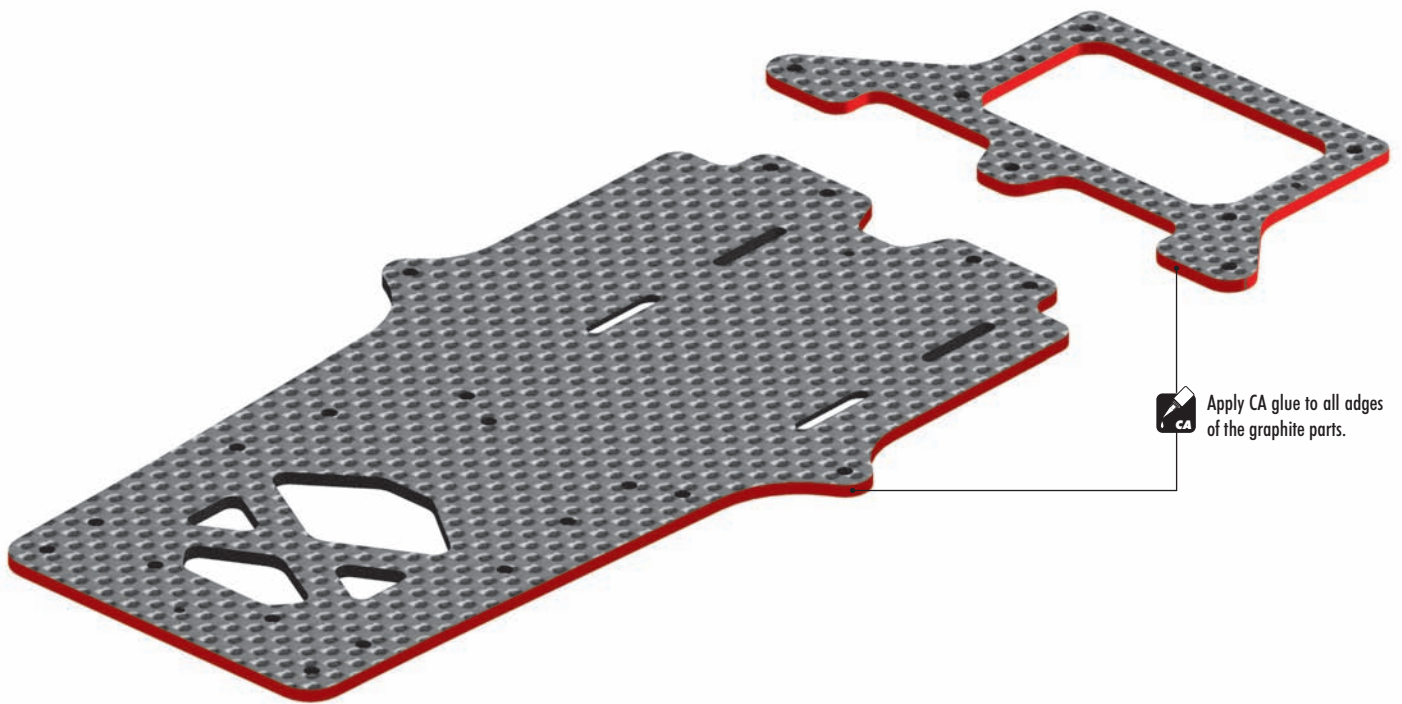
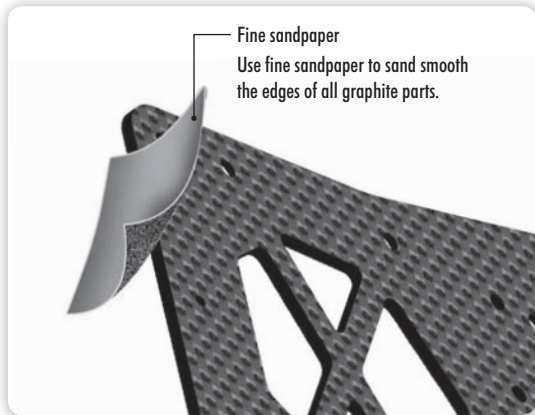
# EQUIPMENT REQUIRED

<b>Transmitter</b> 	<b>Receiver</b> 	<b>Steering Servo</b> 	<b>Electric Motor &amp; Pinion Gear and Setscrew</b> 	<b>Bearing Oil</b> (HUDY #106230) 	<b>Speed Controller</b> 
<b>Body Shell</b> 	<b>LiPo Battery</b> 	<b>Lexan™ Paint</b> 	<b>Battery Charger</b> 	<b>Fibre Tape (HUDY #107870) Double-sided Tape</b> 	<b>Tires</b> 

# GRAPHITE PART PREPARATION

## PREPARE ALL GRAPHITE PARTS

To protect and seal edges of graphite parts, sand edges smooth and then apply CA glue.



# 1. FRONT SUSPENSION

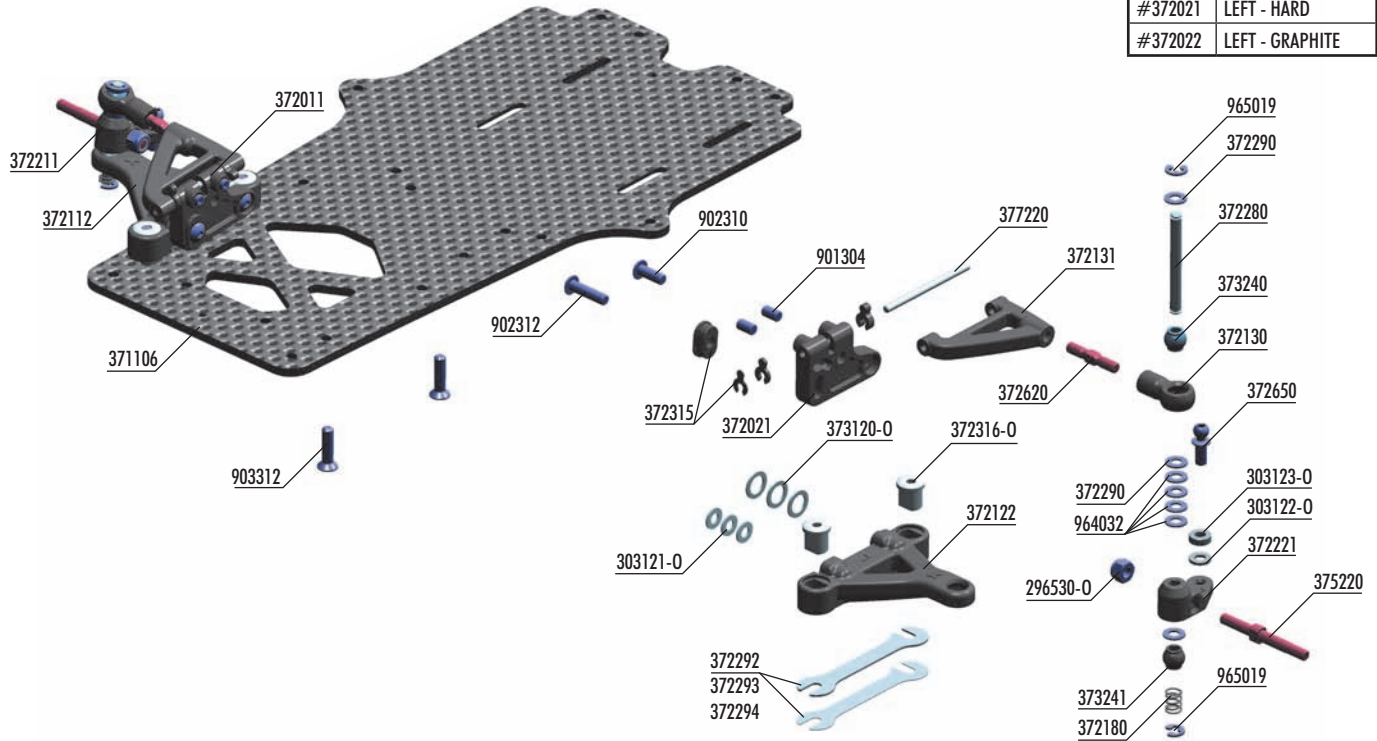
FRONT COIL SPRINGS - SOFT	
#372176	C=1.5 - GOLD (SOFT)
#372177	C=2.0 - SILVER (SOFT)
#372178	C=2.5 - BLACK (SOFT)
#372179	C=3.0 - GREY (SOFT)

FRONT COIL SPRINGS	
#372180	C=3.5 - GOLD
#372181	C=4.0 - SILVER
#372182	C=5.0 - BLACK
#372183	C=5.5 - GREY

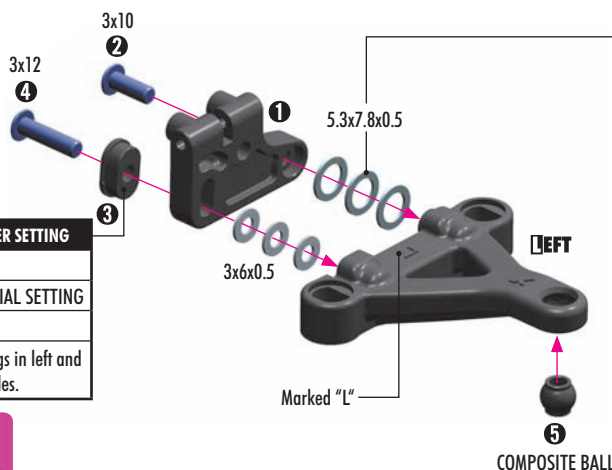
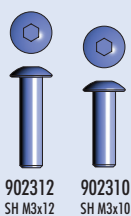
ALU ECCENTRIC BUSHINGS	
#372316-0	0MM - STANDARD
#372317-0	0.5MM - OPTION
#372318-0	1.0MM - OPTION

SUSPENSION ARMS	
#372112	RIGHT - HARD
#372113	RIGHT - GRAPHITE
#372122	LEFT - HARD
#372123	LEFT - GRAPHITE

UPPER ARM MOUNTS	
#372010	RIGHT - STANDARD
#372011	RIGHT - HARD
#372012	RIGHT - GRAPHITE
#372020	LEFT - STANDARD
#372021	LEFT - HARD
#372022	LEFT - GRAPHITE



- |          |   |          |   |
|----------|---|----------|---|
| 303121-0 | ALU SHIM 3x6x0.5MM - ORANGE (10)                    | 372294   | STEEL SHIM 0.6MM - GOLD (2)                         |
| 303122-0 | ALU SHIM 3x6x1.0MM - ORANGE (10)                    | 372315   | COMPOSITE ECCENTRIC BUSHINGS + CASTER CLIPS (2)     |
| 303123-0 | ALU SHIM 3x6x2.0MM - ORANGE (10)                    | 372316-0 | ALU ECCENTRIC BUSHING 0.0MM - ORANGE (2)            |
| 371106   | X12"16 CHASSIS - 2.5MM GRAPHITE                     | 372620   | ADJ. TURNBUCKLE M3x17 MM - HUDY SPRING STEEL™ (2)   |
| 372011   | COMPOSITE FRONT UPPER ARM MOUNT - RIGHT - HARD      | 372650   | BALL-END 4.2MM - THREADED - HUDY SPRING STEEL™ (2)  |
| 372021   | COMPOSITE FRONT UPPER ARM MOUNT - LEFT - HARD       | 373120-0 | ALU SHIM 5.3x7.8x0.5MM - ORANGE (10)                |
| 372112   | COMPOSITE SUSPENSION ARM FRONT LOWER - RIGHT - HARD | 373240   | PIVOTBALL UNIVERSAL 6.0 MM - HUDY SPRING STEEL™ (2) |
| 372122   | COMPOSITE SUSPENSION ARM FRONT LOWER - LEFT - HARD  | 373241   | COMPOSITE PIVOTBALL 6.0 MM (2)                      |
| 372130   | COMPOSITE FRONT UPPER SUSPENSION ARM & BALL JOINT   | 375220   | FRONT WHEEL AXLE (2)                                |
| 372131   | COMPOSITE FRONT UPPER SUSPENSION ARM - HARD         | 377220   | FRONT UPPER PIVOT PIN 2x31MM (2)                    |
| 372180   | FRONT COIL SPRING 3.6x6x0.5MM, C=3.5 - GOLD (2)     | 296530-0 | ALU NUT M3 - ORANGE (10)                            |
| 372211   | COMPOSITE STEERING BLOCK - RIGHT - HARD - V2        | 901304   | HEX SCREW SB M3x4 (10)                              |
| 372221   | COMPOSITE STEERING BLOCK - LEFT - HARD - V2         | 902310   | HEX SCREW SH M3x10 (10)                             |
| 372280   | KING PIN (2)  | 902312   | HEX SCREW SH M3x12 (10)                             |
| 372290   | ALU SHIM 3.2x4.8x0.5 (4)                            | 903312   | HEX SCREW SFH M3x12 (10)                            |
| 372292   | STEEL SHIM 0.2MM - SILVER (2)                       | 964032   | WASHER S 3.2 x 4.8 x 0.2 (10)                       |
| 372293   | STEEL SHIM 0.4MM - BLACK (2)                        | 965019   | E-CLIP 1.9 (10)                                     |



REACTIVE CASTER SETTING	
	= 2.5°
	= 5° INITIAL SETTING
	= 7.5°

Use same bushings in left and right sides.



## UPPER ARM POSITION ADJUSTMENT SHIMS

The shims influence the camber gain change.

**MORE** shims = less camber gain, reduced initial steering, reduced steering sensitivity (less twitchy).

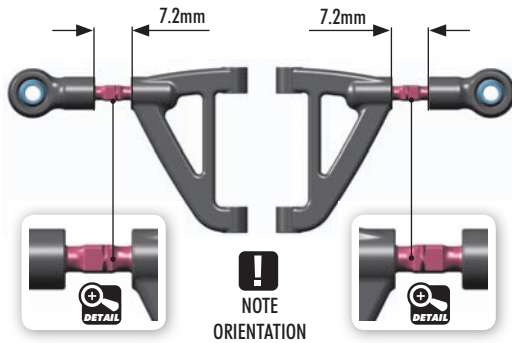
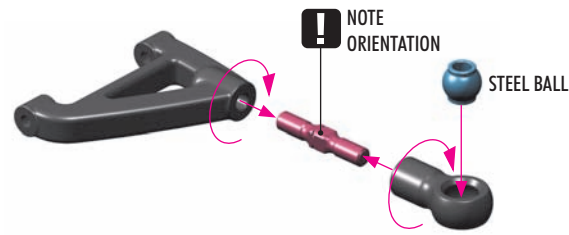
**LESS** shims = more camber gain, increased initial steering, increased steering sensitivity.

Use same shim thickness on both left & right sides.



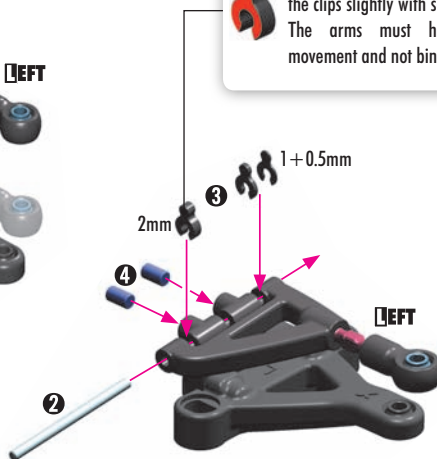
# FRONT SUSPENSION

2x L=R

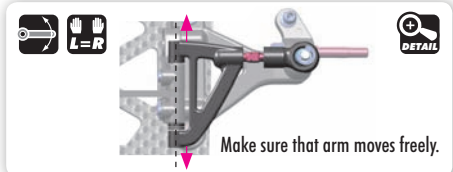


**SET-UP BOOK**  
CAMBER

2x L=R

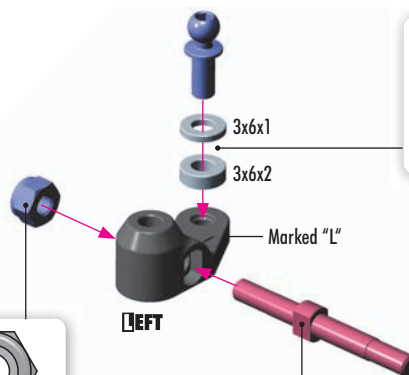


If the arm does not have enough play, remove the clips and thin the clips slightly with sandpaper. The arms must have free movement and not bind.

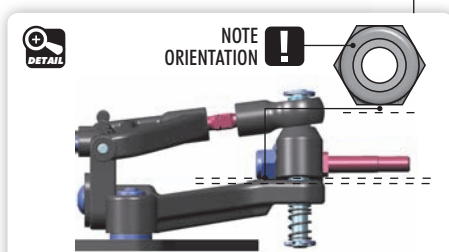


**SET-UP BOOK**  
CASTER

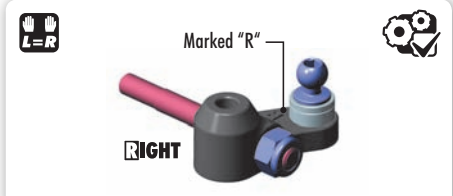
2x L=R



The thickness of shims changes the steering linkage angle. Thicker shims gives decreased in-corner steering, but car becomes easier to drive.  
Use 3mm bump steer as INITIAL SETTING.



The flat of the nut must be **PARALLEL** to the lower arm.



296530-0  
ALU N M3

303122-0  
SHIM 3x6x1

303123-0  
SHIM 3x6x2

# FRONT SUSPENSION



372290  
S 3.2x4.8x0.5



964032  
S 3.2x4.8x0.2



965019  
C 1.9

2x L=R

LOW traction & bumpy track

10K cSt (#359310 XRAY)

HIGH traction & smooth track

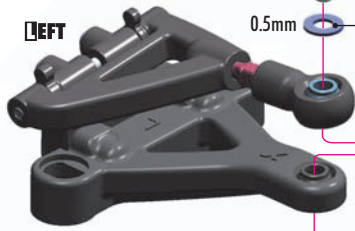
30K cSt (#359330 XRAY)

use XRAY Silicone Oil



The thickness of shims used affects the ride height of the car, so determine the proper amount of shimming based on tire diameter.

LEFT



0.5mm

0.5mm

0.2mm (4x)

**FRONT RIDE HEIGHT ADJUSTMENT**

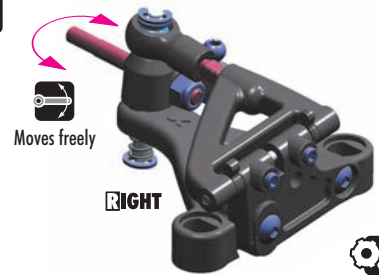
**INITIAL SETTING**

- above upper arm (0.5mm)
- above steering block (1.3mm)
- below steering block (0.2mm)

FRONT COIL SPRINGS - SOFT	
#372176	C=1.5 - GOLD (SOFT)
#372177	C=2.0 - SILVER (SOFT)
#372178	C=2.5 - BLACK (SOFT)
#372179	C=3.0 - GREY (SOFT)

FRONT COIL SPRINGS	
#372180	C=3.5 - GOLD
#372181	C=4.0 - SILVER
#372182	C=5.0 - BLACK
#372183	C=6.0 - GREY

L=R



Moves freely

RIGHT



RIDE HEIGHT



903312  
SFH M3x12

2x L=R

The X12 has adjustable front track-width. There are 3 different bushings - 0mm centric (included in kit), or 0.5mm or 1.0mm eccentric (optional). Use the same bushing in front and rear, and also use the same orientation of the bushing on both right and left sides.

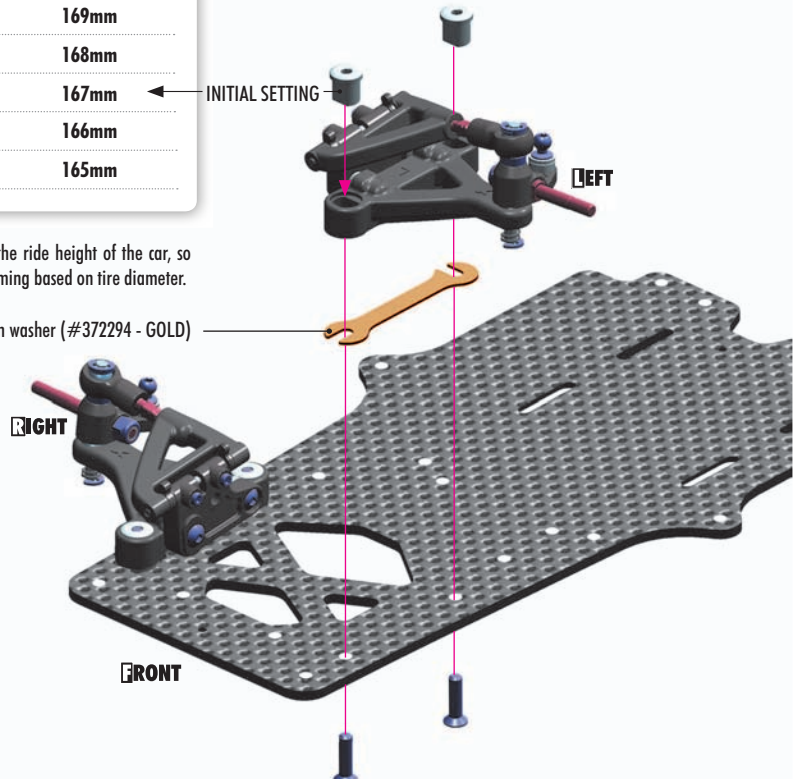
Use the proper matching bushings to achieve the desired front track-width

LEFT	+	RIGHT	=	TRACK-WIDTH
	-1mm			169mm
	-0.5mm			168mm
	0mm			167mm
	+0.5mm			166mm
	+1mm			165mm

INITIAL SETTING

The number of washers used affects the ride height of the car, so determine the proper amount of shimming based on tire diameter.

INITIAL SETTING = 0.6mm washer (#372294 - GOLD)



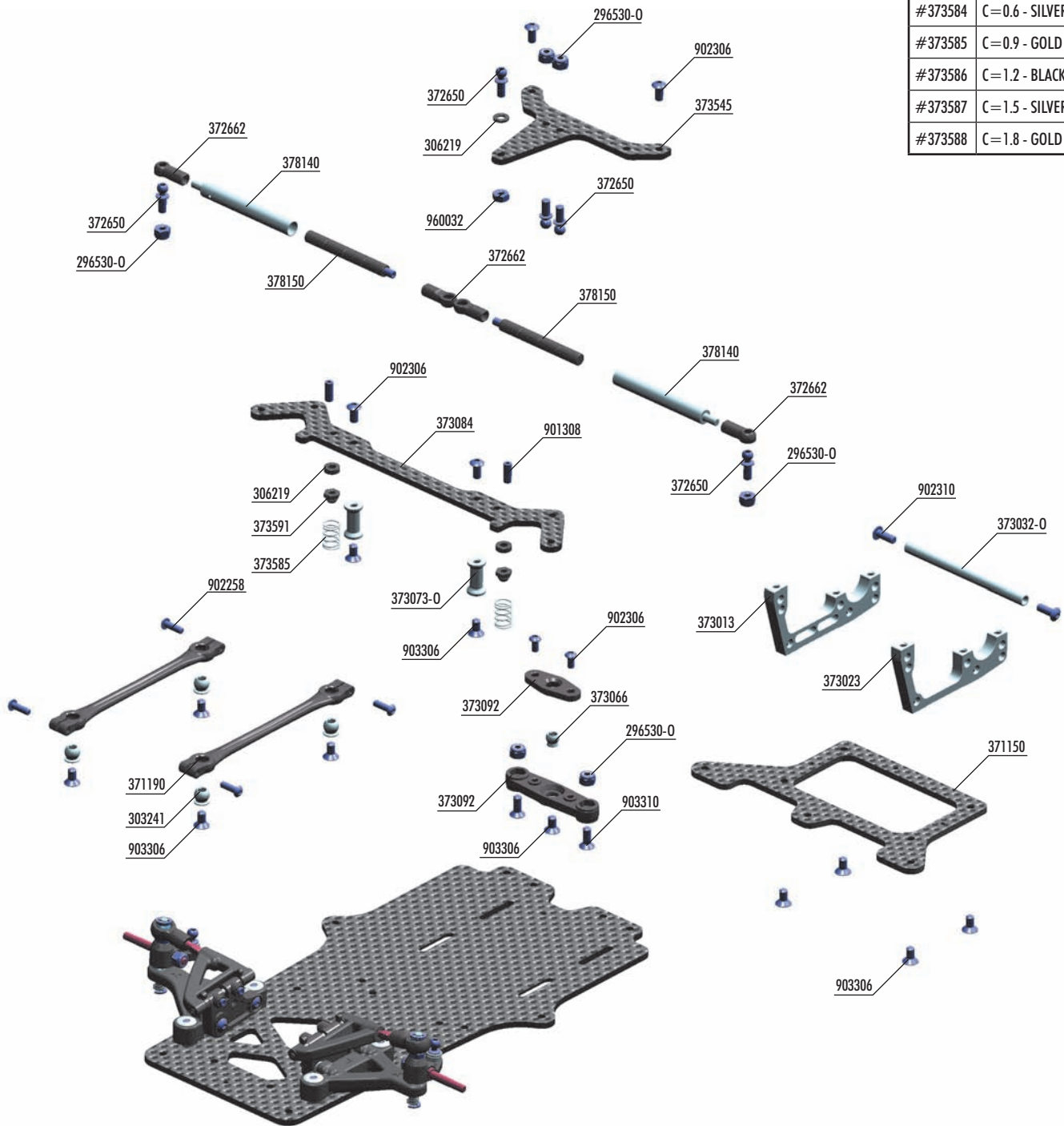
RIDE HEIGHT TRACK-WIDTH



# 3. REAR SUSPENSION

## SIDE SPRINGS

#373584	C=0.6 - SILVER
#373585	C=0.9 - GOLD
#373586	C=1.2 - BLACK
#373587	C=1.5 - SILVER
#373588	C=1.8 - GOLD



**BAG**

**03**

- |          |   |          |                                  |
|----------|---|----------|----------------------------------|
| 303241   | BALL UNIVERSAL 5.8 MM HEX (4)                         | 373591   | COMPOSITE SIDE SPRING HOLDER (2) |
| 306219   | COMPOSITE SET OF SERVO SHIMS (4)                      | 378140   | SIDE LINKAGE TUBE (2)            |
| 371150   | LINK GRAPHITE 2.5MM REAR POD LOWER PLATE              | 378150   | SIDE SHOCK SHAFT (2)             |
| 371190   | COMPOSITE POD LINK (2)                                |          |                                  |
| 372650   | BALL-END 4.2MM THREADED HUDY SPRING STEEL™ (2)        | 296530-0 | ALU NUT M3 - ORANGE (10)         |
| 372662   | COMPOSITE BALL-JOINT 4.2 MM (4)                       | 901308   | HEX SCREW SB M3x8 (10)           |
| 373013   | ALU REAR BULKHEAD - MOTOR (RIGHT)                     | 902258   | HEX SCREW SH M2.5x8 (10)         |
| 373023   | ALU REAR BULKHEAD - LEFT                              | 902306   | HEX SCREW SH M3x6 (10)           |
| 373032-0 | ALU REAR BULKHEAD BRACE                               | 902310   | HEX SCREW SH M3x10 (10)          |
| 373066   | ALU PIVOT BALL  | 903306   | HEX SCREW SFH M3x6 (10)          |
| 373073-0 | ALU REAR BRACE MOUNT 16MM- ORANGE (2)                 | 903310   | HEX SCREW SFH M3x10 (10)         |
| 373084   | LINK REAR BRACE - GRAPHITE 2.5MM                      | 960032   | NUT M3 (10)                      |
| 373092   | COMPOSITE LOWER & UPPER PIVOT BRACE - LOW ROLL-CENTER |          |                                  |
| 373545   | X12'15 REAR POD UPPER PLATE - GRAPHITE                |          |                                  |
| 373585   | SIDE SPRING C=0.9 - GOLD (2)                          |          |                                  |

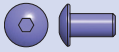
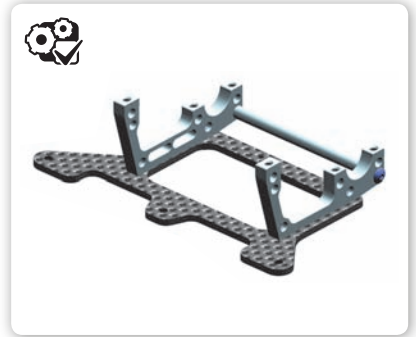
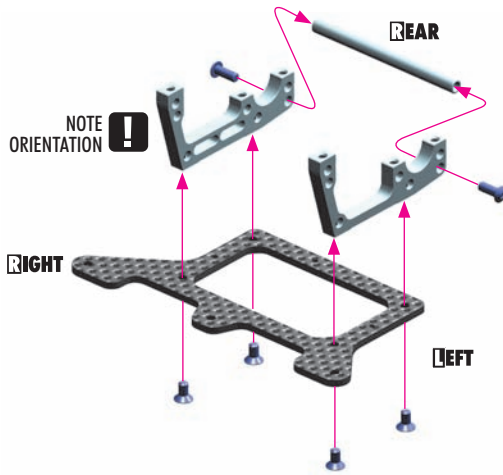
### 3. REAR SUSPENSION



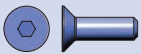
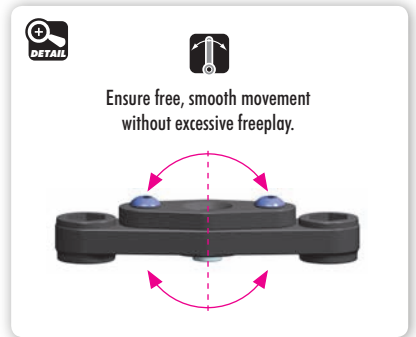
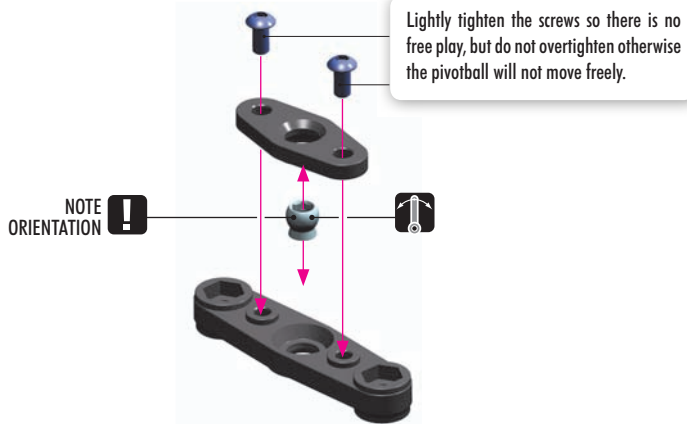
902310  
SFH M3x10



903306  
SFH M3x6



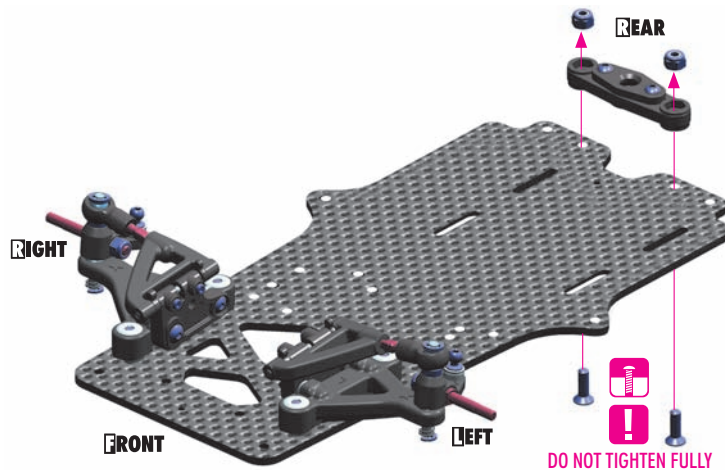
902306  
SFH M3x6



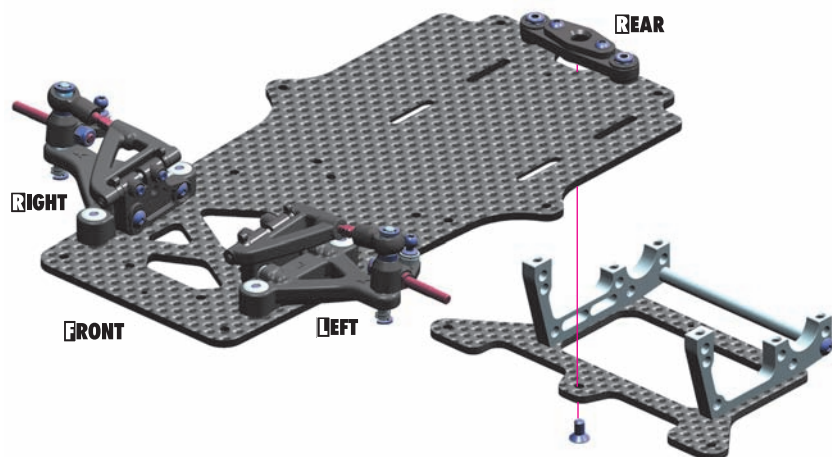
903310  
SFH M3x10



296530-0  
ALU N M3



903306  
SFH M3x6

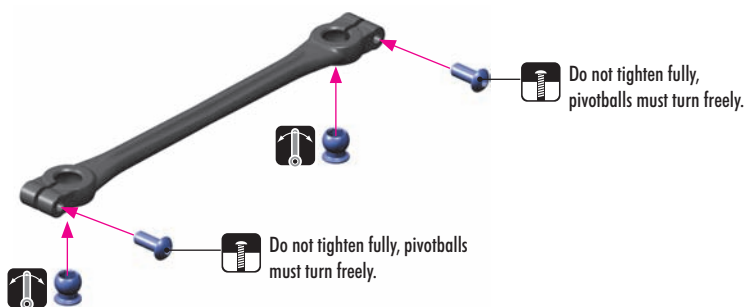


### 3. REAR SUSPENSION



902258  
SH M2.5x8

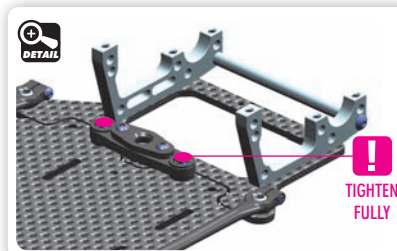
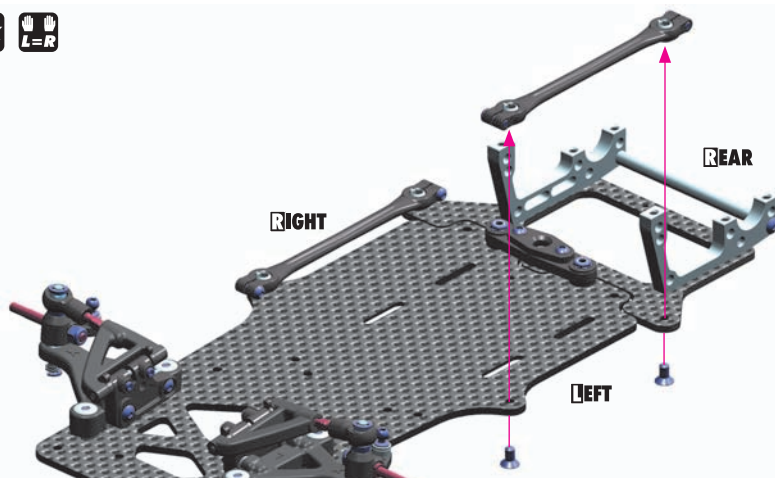
2x



903306  
SFH M3x6

2x

L=R



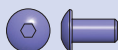
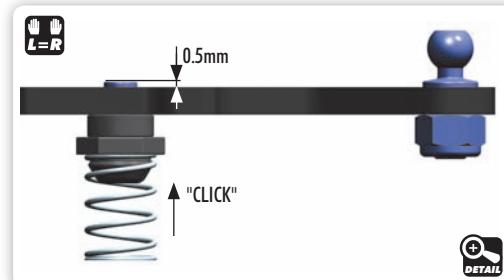
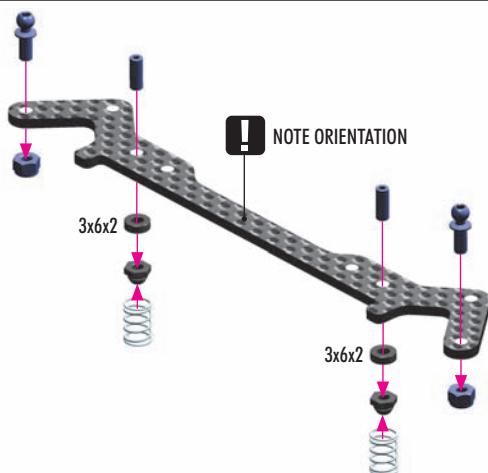
296530-0  
ALU N M3



306219  
SHIM 3x6x2



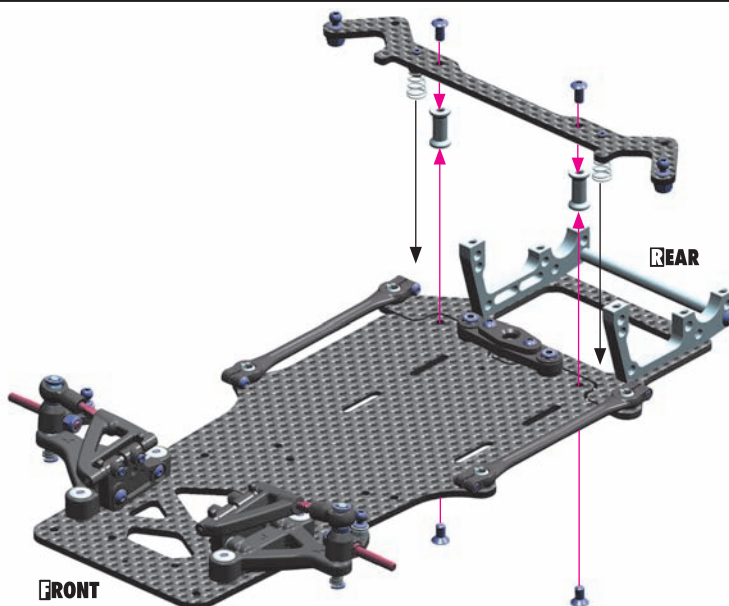
901308  
SB M3x8



902306  
SH M3x6



903306  
SFH M3x6



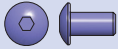
# 3. REAR SUSPENSION



296530-0  
ALU N M3



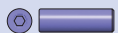
306219  
SHIM 3x6x2



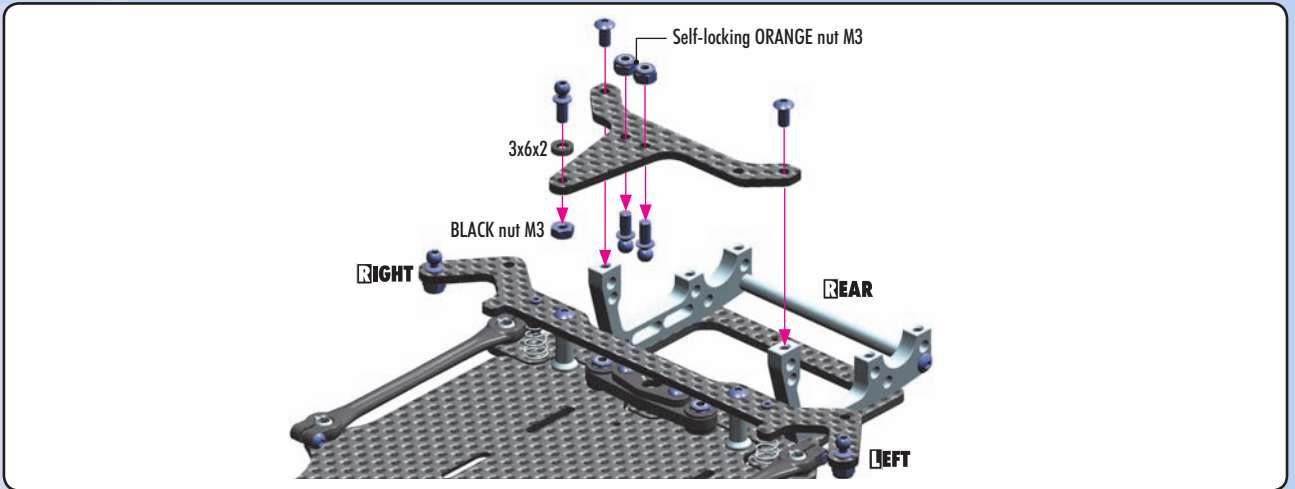
902306  
SH M3x6



960032  
N M3



901310  
SB M3x10



**NOTE:** Add oil only in the slots, not on the whole tube. After assembling the side tubes, check for smooth operation. It is very important to re-oil the side tubes, at least once per race day. You may use different oil thicknesses depending on track conditions.

**TIP** For HIGH grip use SOFTER oils  
For LOW grip or ASPHALT use HARDER oils

OILS	
#359301	1000cSt
#359302	2000cSt
#359303	3000cSt
#359305	5000cSt
#359306	6000cSt
#359307	7000cSt
#359308	8000cSt
#359310	10000cSt

**TIP** The angle of the side tubes has a fine effect on car performance. The higher the angle, the stiffer it feels and the less it rolls. The less (flatter) the angle, the softer it feels and the more it rolls.

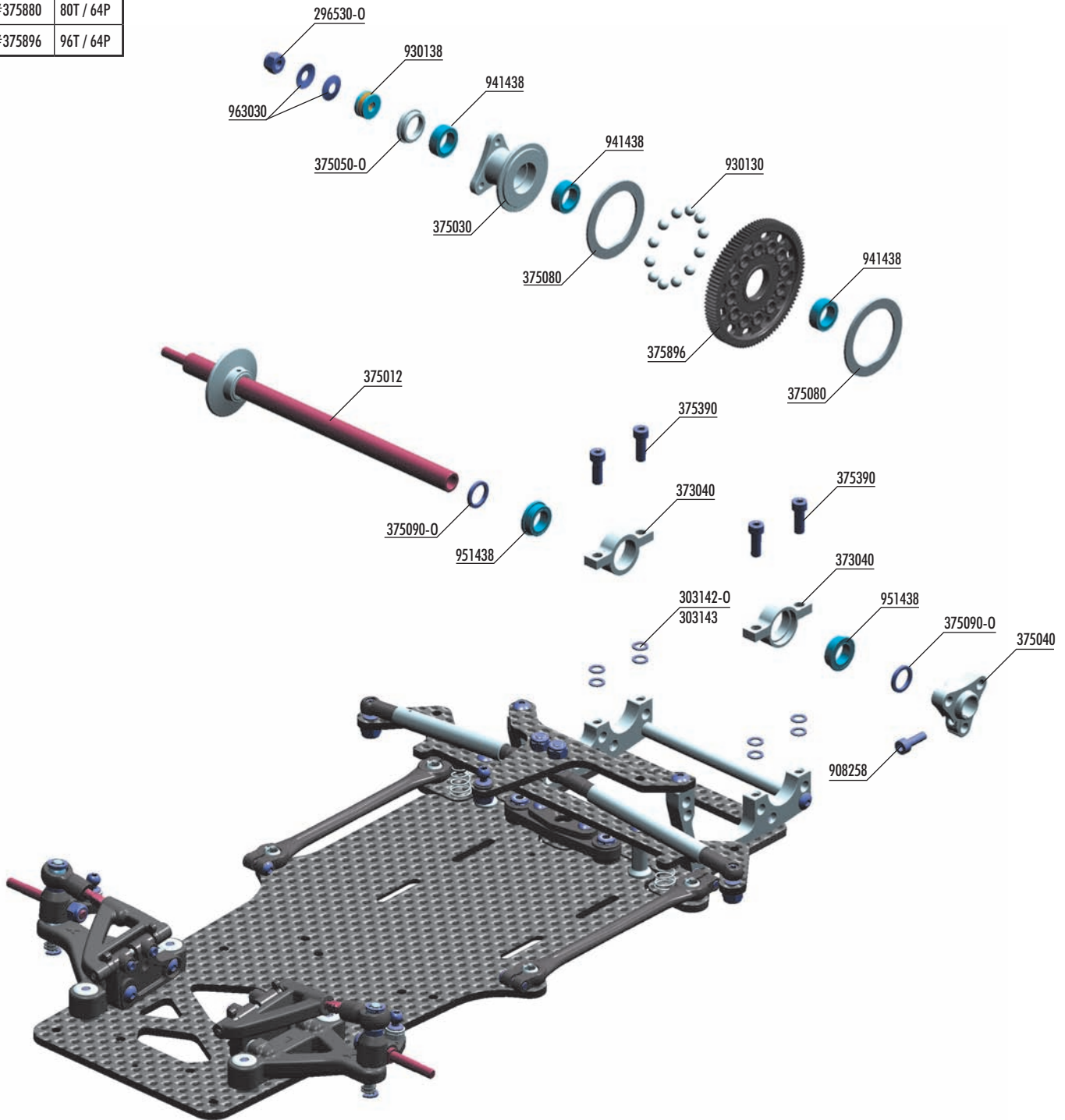
**OPTIONAL SIDE SHOCK**

Optional side shock can be used to improve traction in low- and medium-grip conditions. "The optional side shock replaces the 2 side tubes."

OPTIONAL PARTS (not included)	
#378100	Side Shock Absorber Set
#302654	Ball End 4.9mm with 8mm Thread - V2 (2)
#303120	Set of Alu Shims (0.5mm, 1.5mm, 2.5mm)
#372651	Ball Universal 4.9mm - HUDY Spring Steel™ (2)
#902308	Hex Screw SH M3x8 (10)

# 4. BALL DIFFERENTIAL

SPUR GEARS	
#375876	76T / 64P
#375878	78T / 64P
#375880	80T / 64P
#375896	96T / 64P



**BAG**

**04**

- 303142-0 ALU SHIM 3x5x0.5MM - ORANGE (10)
- 303143 ALU SHIM 3x5x0.25MM (10)
- 373040 ALU HEX SCREW M3x8 FOR REAR WHEELS (6)
- 375012 STEEL REAR AXLE SHAFT - HUDY SPRING STEEL™
- 375030 ALU REAR WHEEL HUB - RIGHT
- 375040 ALU REAR WHEEL HUB - LEFT
- 375050-0 ALU DIFF HUB - ORANGE
- 375080 D-LOCK DIFF PLATE (2)
- 375090-0 SET OF ALU SHIMS (0.5MM, 1.0MM, 2.0MM) - ORANGE
- 375390 ALU HEX SCREW M3x8 FOR REAR WHEELS (6)
- 375896 COMPOSITE SPUR GEAR - 96T / 64P

- 296530-0 ALU NUT M3 - ORANGE (10)
- 908258 HEX SCREW SOCKET HEAD CAP M2.5x8 (10)
- 930130 CARBIDE BALL 3.175MM (12)
- 930138 CARBIDE BALL-BEARING AXIAL F3-8 3x8x3.5
- 941438 HIGH-SPEED BALL-BEARING 1/4"x3/8"x1/8" RUBBER SEALED (2)
- 951438 BALL-BEARING 1/4" x 3/8" x 1/8" FLANGED (2)
- 963030 CONE WASHER ST 3x8x0.5 (10)

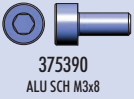
# 4. BALL DIFFERENTIAL



303142-0  
SHIM 3x5x0.5



303143  
SHIM 3x5x0.25



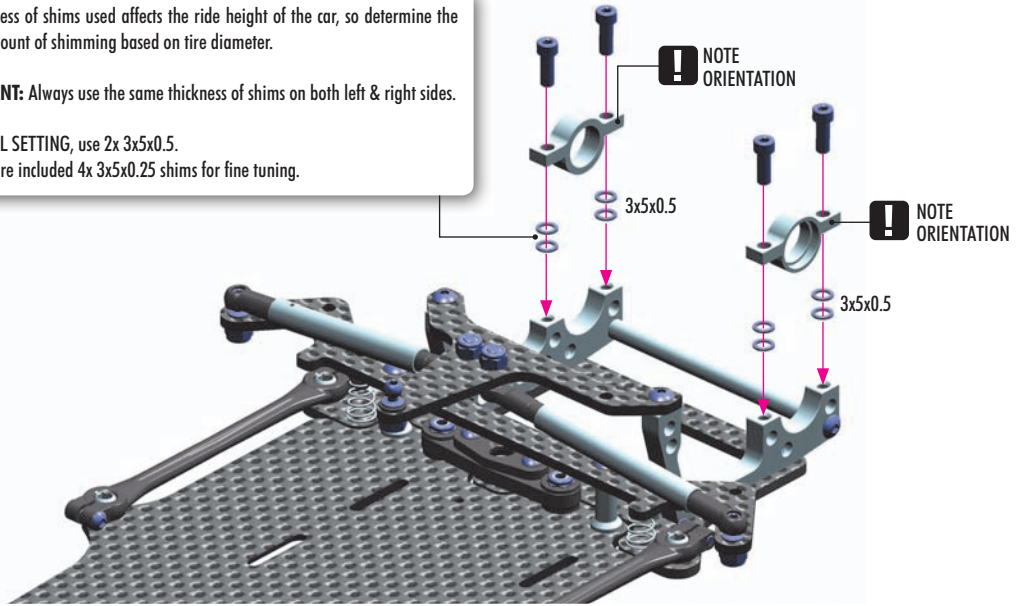
375390  
ALU SCH M3x8

2x L=R

The thickness of shims used affects the ride height of the car, so determine the proper amount of shimming based on tire diameter.

**IMPORTANT:** Always use the same thickness of shims on both left & right sides.

For INITIAL SETTING, use 2x 3x5x0.5.  
Optional are included 4x 3x5x0.25 shims for fine tuning.

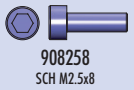


SET-UP BOOK

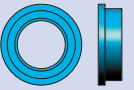
RIDE HEIGHT



375090-0  
6.4x8.4x1.0



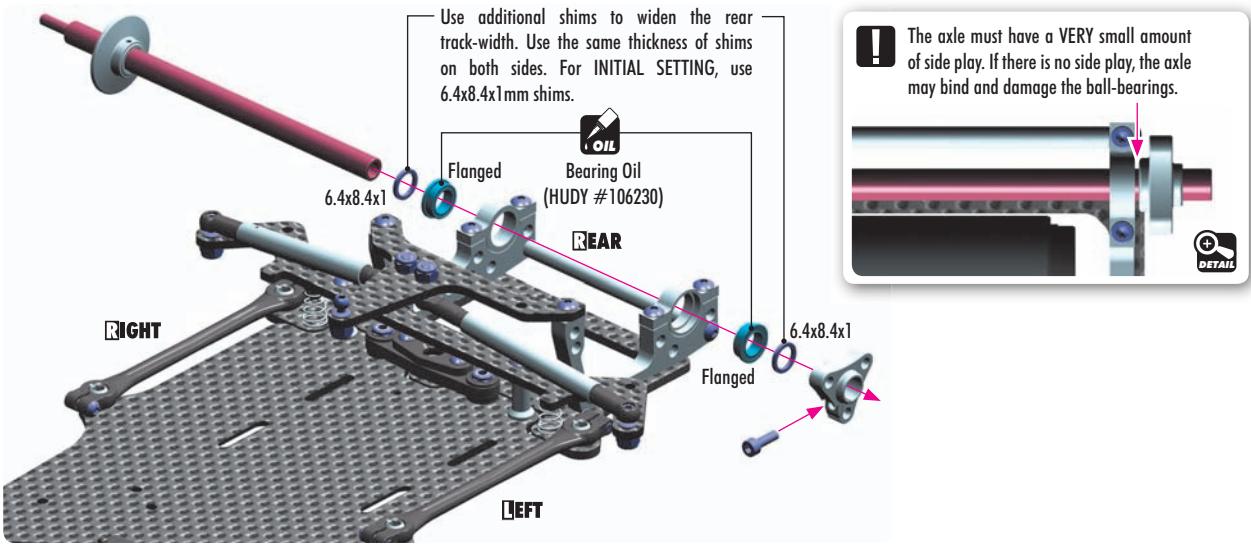
908258  
SCH M2.5x8



951438  
BB 1/4"x3/8"x1/8"

SET-UP BOOK

TRACK-WIDTH



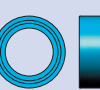
296530-0  
ALU N M3



930130  
B 3.1



930138  
BA 3x8



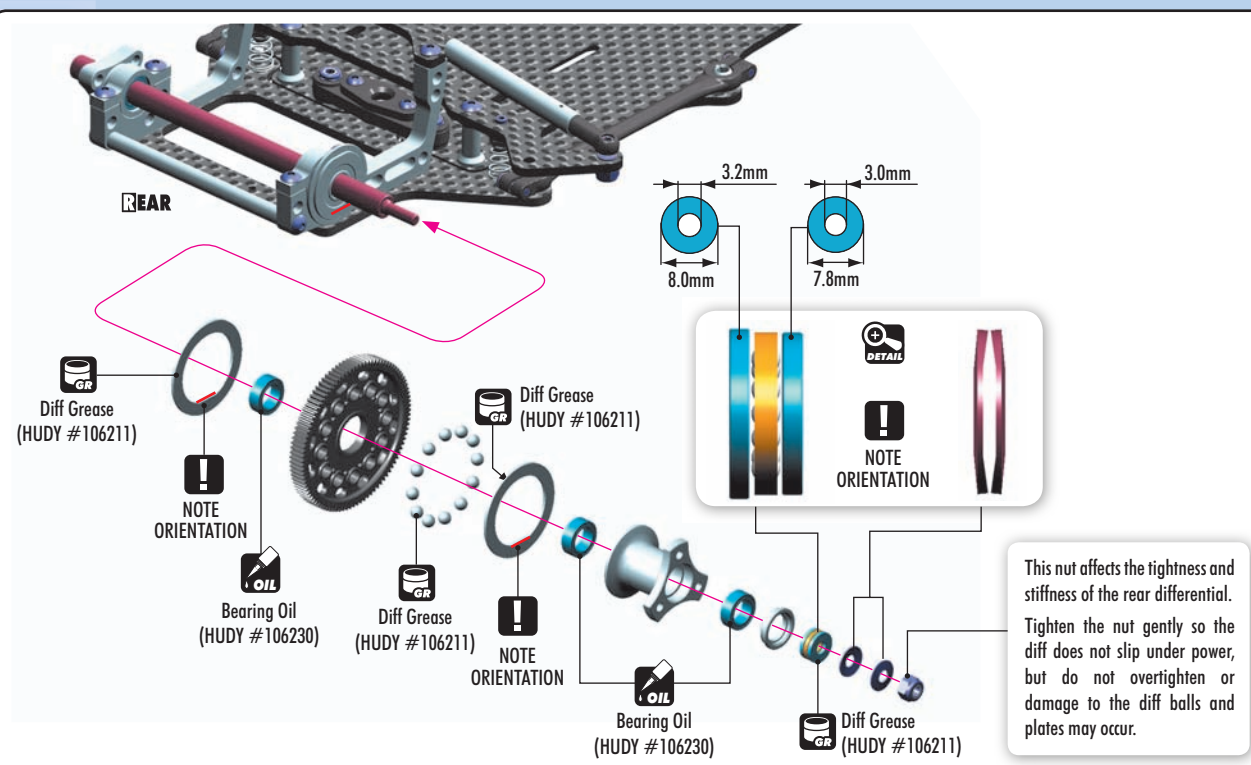
941438  
BB 1/4"x3/8"x1/8"



963030  
ST 3x8

SET-UP BOOK

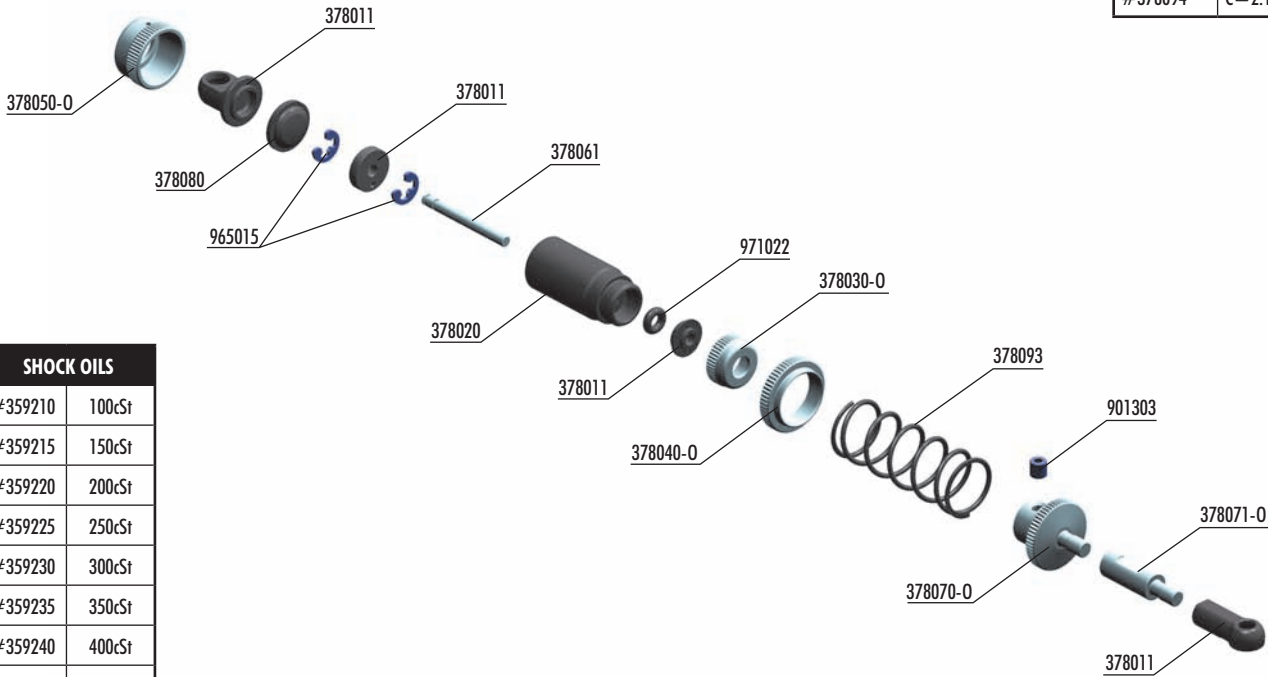
DIFFERENTIAL



# 5. SHOCK ABSORBER

## SHOCK SPRINGS

#378092	C=1.5 - SILVER
#378093	C=1.8 - GOLD
#378094	C=2.1 - BLACK



## SHOCK OILS

#359210	100cSt
#359215	150cSt
#359220	200cSt
#359225	250cSt
#359230	300cSt
#359235	350cSt
#359240	400cSt
#359245	450cSt
#359250	500cSt
#359255	550cSt
#359260	600cSt
#359270	700cSt
#359280	800cSt
#359290	900cSt
#359301	1000cSt
#359302	2000cSt

**BAG**

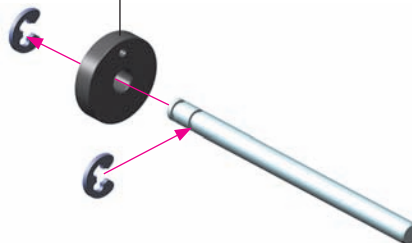
**05**

- |          |                                      |          |                            |
|----------|--------------------------------------|----------|----------------------------|
| 378001   | SHOCK ABSORBER SET                   | 378071-0 | ALU SHOCK ADAPTER - ORANGE |
| 378011   | COMPOSITE SHOCK PARTS - FRAME        | 378080   | SHOCK RUBBER MEMBRANE (2)  |
| 378020   | ALU THREADED SHOCK BODY - HARDCOATED | 378093   | SHOCK SPRING - GOLD        |
| 378030-0 | ALU SHOCK BODY CAP - LOWER - ORANGE  | 901303   | HEX SCREW SB M3x3 (10)     |
| 378040-0 | ALU SHOCK ADJUSTABLE COLLAR - ORANGE | 965015   | E-CLIP 1.5 (10)            |
| 378050-0 | ALU SHOCK BODY CAP - UPPER - ORANGE  | 971022   | SILICONE O-RING 2x2 (10)   |
| 378061   | SHOCK SHAFT                          |          |                            |
| 378070-0 | ALU SHOCK SPRING COLLAR - ORANGE     |          |                            |



965015  
C1.5

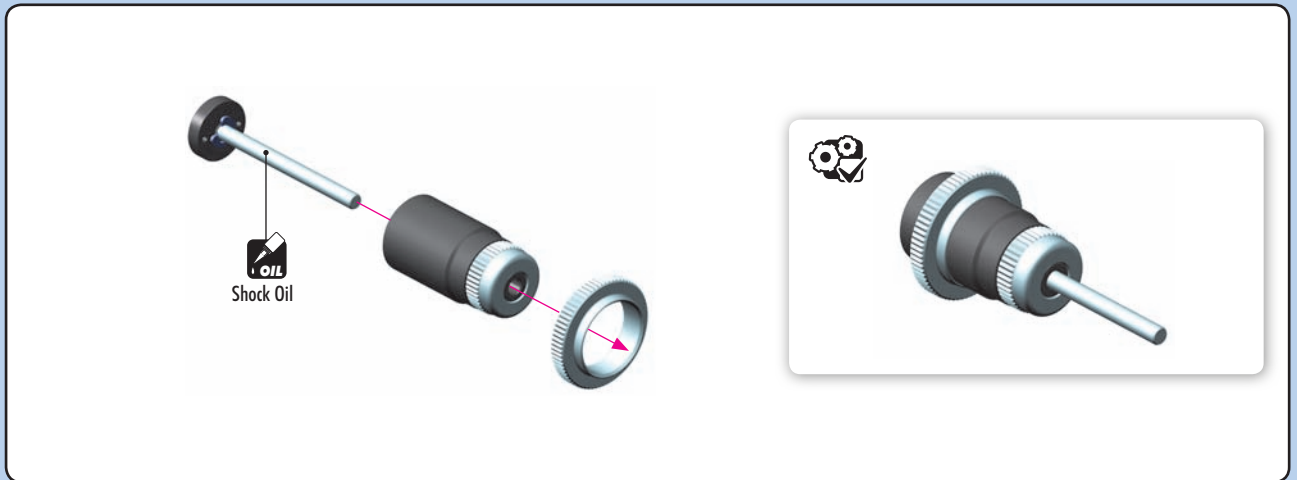
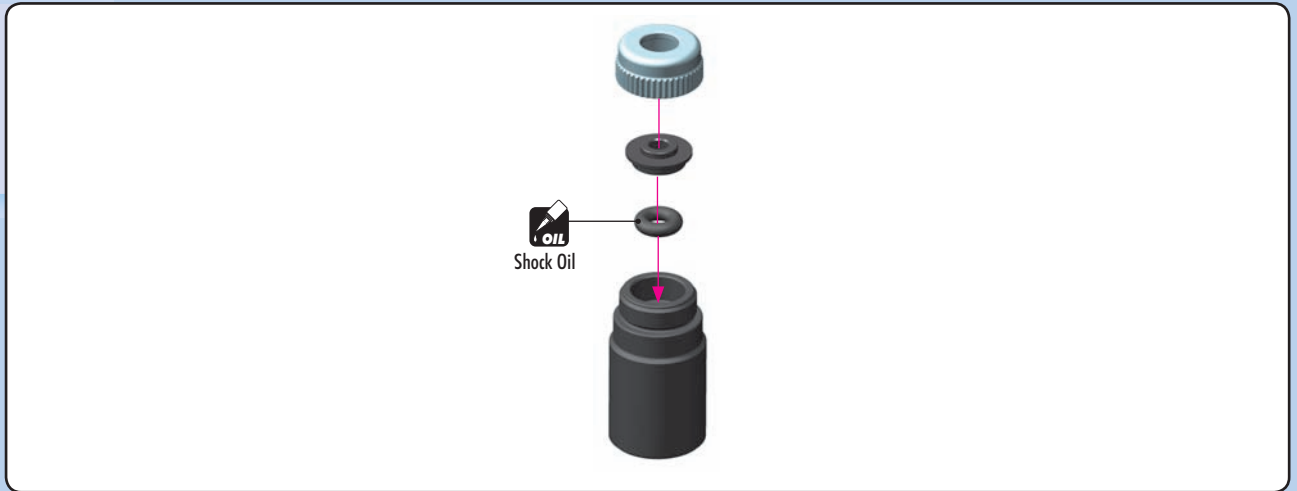
Carefully remove the shock piston from the frame, and remove all excess plastic flash.



# 5. SHOCK ABSORBERS



971022  
0 2x2



## DEFAULT SHOCK SETTING FOR CENTER SHOCK ABSORBER Follow the steps below to set the shock.

**1**

Extend the shock shaft completely. Fill the shock body with the shock oil.

**2**

Move the shock shaft up and down a few times to release the air bubbles trapped beneath the piston.

**3**

Orient the filled shock vertically for several minutes with the shock shaft fully extended. The remaining air bubbles will release.

**4**

Install the shock membrane into the groove in the upper shock cap.

**5**

HALF TIGHTEN  
50%

Gently place the shock cap assembly onto the filled shock body. Excess oil will spill from the shock. Screw the shock cap onto the body by only a few turns, approx. 50%. Excess oil will flow through the hole in the shock cap.

**6**

Gently push the shock shaft completely into the shock body. Excess oil will flow through the hole in the shock cap.

**7**

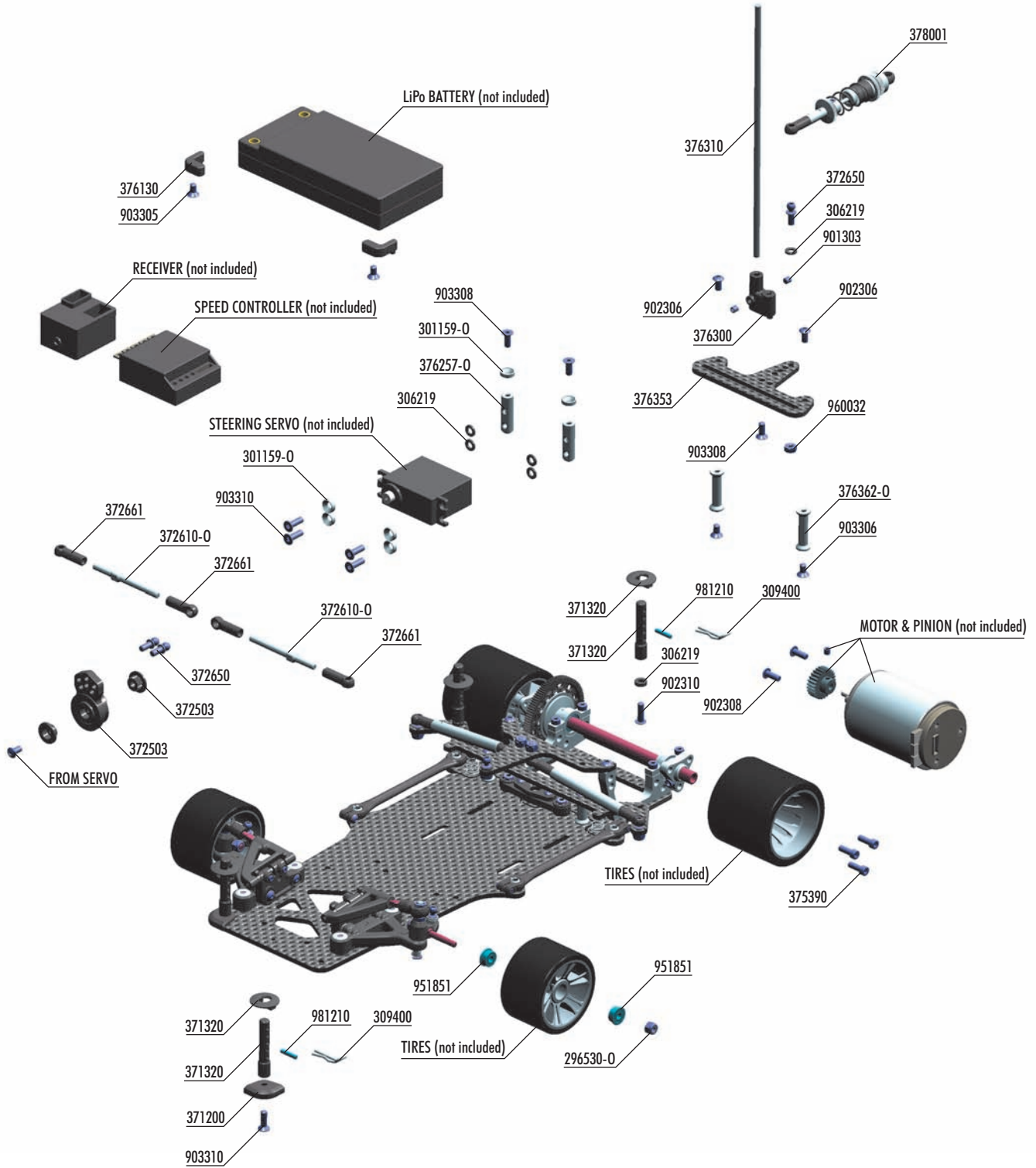
TIGHTEN FULLY  
100%

Keep the shock shaft pushed in the shock body and tighten the shock cap completely.

Tighten the cap fully but do not overtighten or the rubber membrane may be damaged. Make sure that there is no oil leakage after the cap is tightened.



# 6. FINAL ASSEMBLY

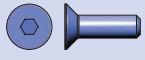


**BAG**

**06**

301159-0	ALU COUNTERSUNK SHIM - ORANGE (4)	376362-0	ALU ANTENNA HOLDER MOUNT - ORANGE (2)
305968~306000	PINION GEAR HARDCOATED 18~50T/64P	376310	FIBERGLASS SOLID ANTENNA ROD + CAP
306219	COMPOSITE SET OF SERVO SHIMS (4)	378001	SHOCK ABSORBER SET
309400	BODY CLIP FOR 5MM BODY POST (8)	296530-0	ALU NUT M3 - ORANGE (10)
371200	COMPOSITE CHASSIS PROTECTOR (2)	901303	HEX SCREW SB M3x3 (10)
371320	COMPOSITE BODY POST (2)	902306	HEX SCREW SH M3x6 (10)
372503	COMPOSITE SERVO SAVER - STIFF - SET	902308	HEX SCREW SH M3x8 (10)
372610-0	ALU ADJ. TURNBUCKLE M3x42 MM - ORANGE (2)	902310	HEX SCREW SH M3x10 (10)
372650	BALL-END 4.2MM - THREADED - HUDY SPRING STEEL™ (2)	903305	HEX SCREW SFH M3x5 (10)
372661	COMPOSITE STEERING BALL-JOINT 4.2 MM OPEN (4)	903308	HEX SCREW SFH M3x8 (10)
375390	ALU HEX SCREW M3x8 FOR REAR WHEELS (6)	903310	HEX SCREW SFH M3x10 (10)
376130	COMPOSITE LiPo BATTERY BACKSTOP (2)	951851	BALL-BEARING 1/8" x 5/16" x 9/64" FLANGED (2)
376257-0	ALU SERVO MOUNT - ORANGE (2)	960032	NUT M3 (10)
376300	COMPOSITE ANTENNA MOUNT	981210	PIN 2x10 (10)
376353	GRAPHITE PLATE FOR ANTENNA HOLDER		

# 6. FINAL ASSEMBLY



903310  
SFH M3x10

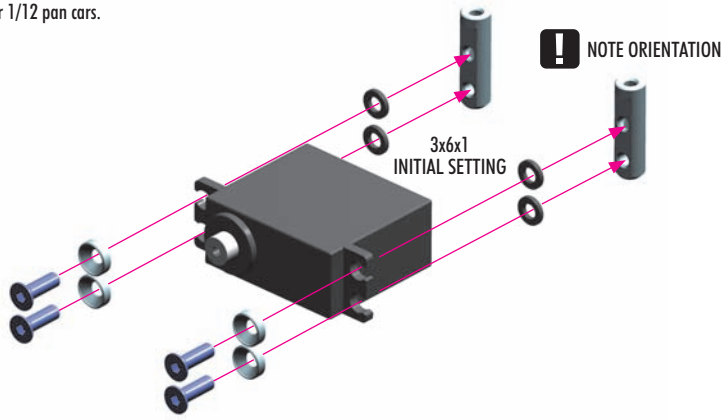


306219  
SHIM 3x6x1

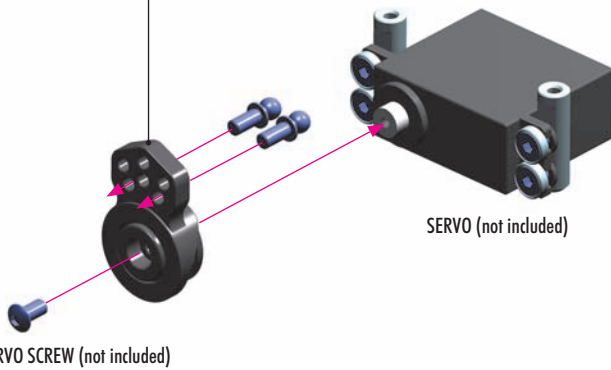
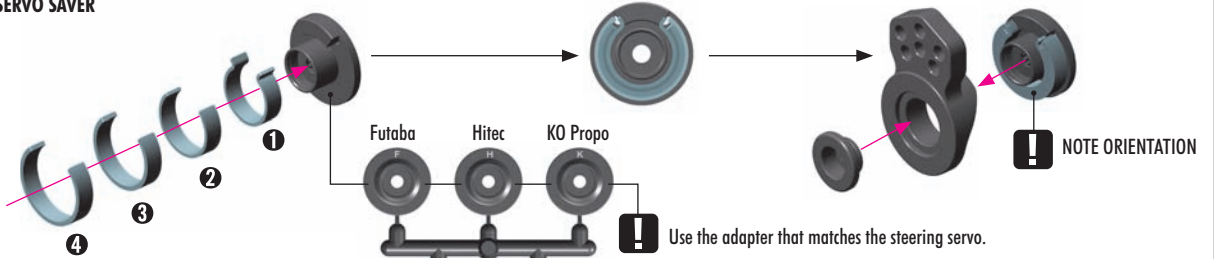


ACKERMANN

**!** We recommend using a servo for 1/12 pan cars.



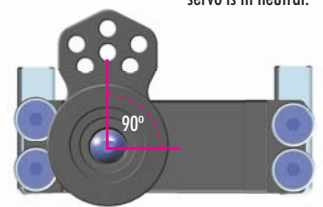
## SERVO SAVER



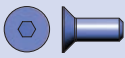
### INITIAL SETTING



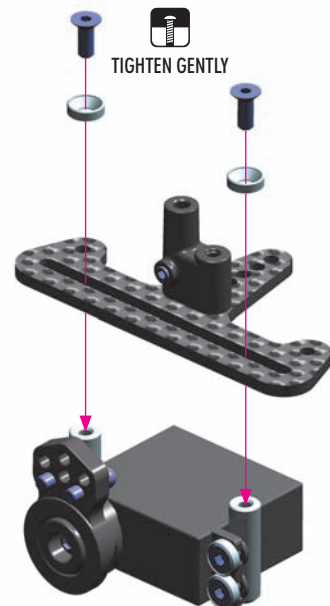
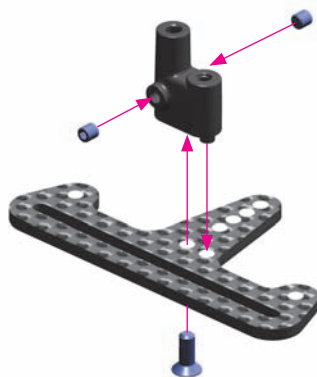
Note the orientation of servo saver when servo is in neutral.



901303  
SB M3x3



903308  
SFH M3x8



# 6. FINAL ASSEMBLY

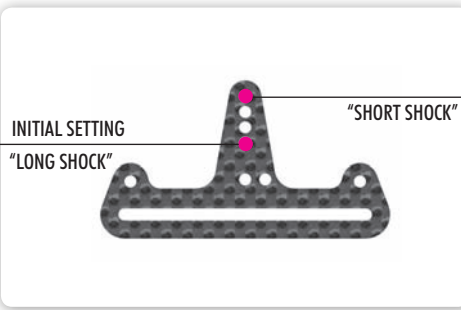
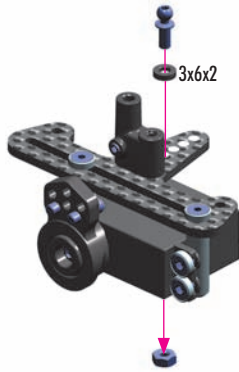


306219  
SHIM 3x6x2



960032  
N M3

## ALTERNATIVE 1 (INITIAL SETTING) LONG SHOCK (FORWARD MOUNT POSITION)



## ALTERNATIVE 2 SHORT SHOCK (REARWARD MOUNT POSITION)

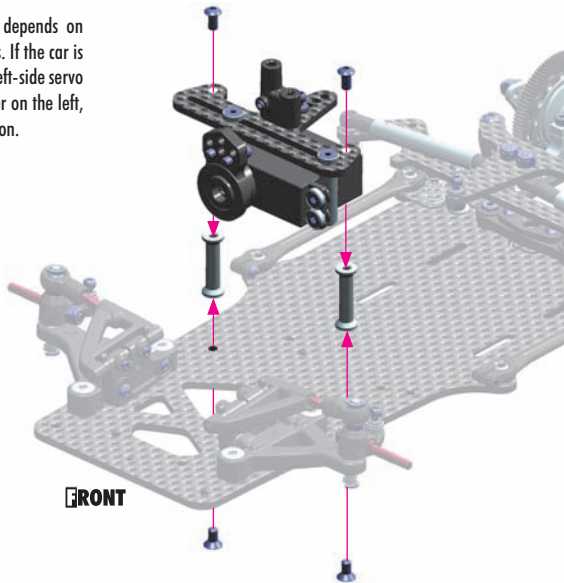


902306  
SH M3x6

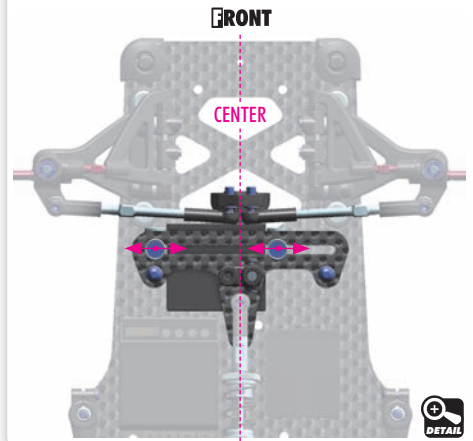


903306  
SFH M3x6

The position of the servo depends on the weight of the electronics. If the car is heavier on the right, use a left-side servo position; if the car is heavier on the left, use a right-side servo position.

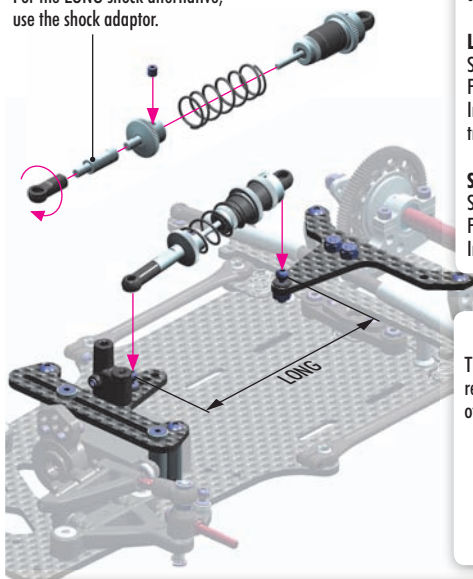


The floating servo mount eliminates unwanted tweak, and also allows you to adjust any 1/12 servo to the centerline of the chassis.



## ALTERNATIVE 1 (INITIAL SETTING) LONG SHOCK

For the LONG shock alternative, use the shock adaptor.



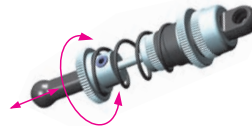
An innovative new feature is to change the center shock length (and front mounting position). By using longer or shorter shock, the damping and steering characteristics can be changed.

**LONG SHOCK (initial):**  
Shock is built WITH adaptor.  
Front mount is FORWARD.  
Improves driveability over bumps, improves on-power traction.

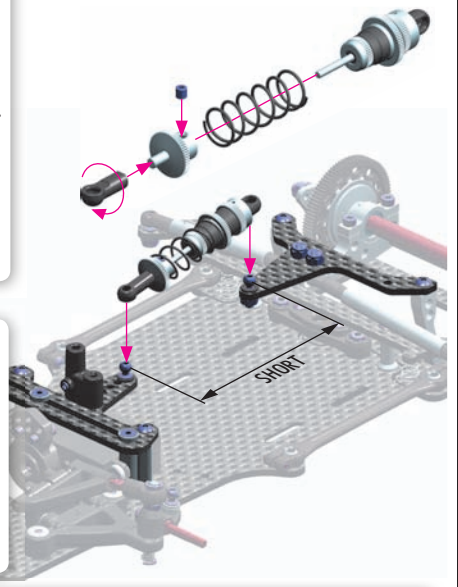
**SHORT SHOCK:**  
Shock is built WITHOUT adaptor.  
Front mount is REARWARD.  
Improves steering response, quicker direction changes.

### DOWNSTOP ADJUSTMENT

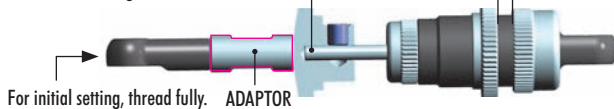
The length of the shock absorber affects the amount of rear downstop. To adjust, thread the ball-joint on or off the bottom spring cap or adaptor.



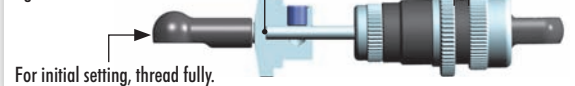
## ALTERNATIVE 2 SHORT SHOCK



Press the collar FULLY onto the end of the shock shaft and tighten the M3x3 setscrew.



Press the collar FULLY onto the end of the shock shaft and tighten the M3x3 setscrew.



# 6. FINAL ASSEMBLY



**2x** **L=R**

27.2mm  
Left thread **LEFT**

27.2mm  
**RIGHT** Left thread

**2x** **L=R**

**NOTE ORIENTATION !**

**RIGHT**

**FRONT**

**LEFT**



306219  
SHIM 3x6x3



902310  
SFH M3x10



981210  
P 2x10

**2x** **L=R**

**REAR**

3x6x3

**RIGHT**

**LEFT**



903310  
SFH M3x10



981210  
P 2x10

**2x** **L=R**

**REAR**

**RIGHT**

**FRONT**

**LEFT**

# 6. FINAL ASSEMBLY

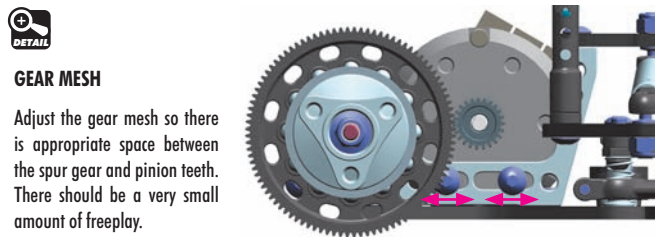
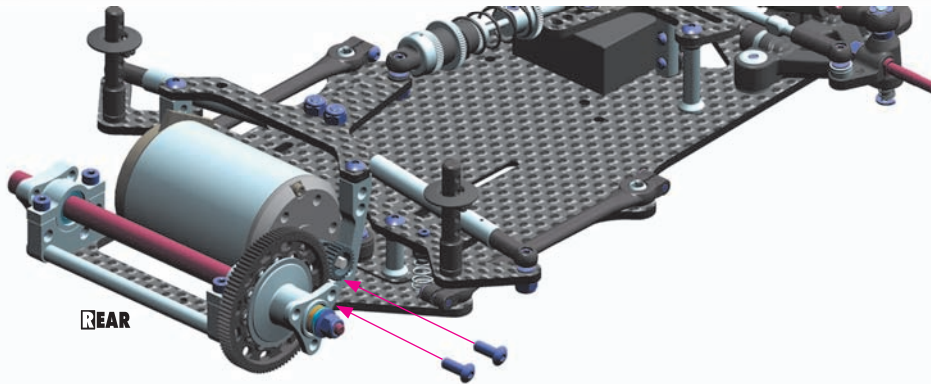
902308  
SH M3x8

MOTOR (not included)

PINION (not included)

### PINION GEARS ALU HARDCOATED

#305968	18T / 64P (option)
#305969	19T / 64P (option)
#305970	20T / 64P (option)
#305971	21T / 64P (option)
#305972	22T / 64P (option)
#305973	23T / 64P (option)
#305974	24T / 64P (option)
#305975	25T / 64P (option)
#305976	26T / 64P (option)
#305977	27T / 64P (option)
#305978	28T / 64P (option)
#305979	29T / 64P (option)
#305980	30T / 64P (option)
#305981	31T / 64P (option)
#305982	32T / 64P (option)
#305983	33T / 64P (option)
#305984	34T / 64P (option)
#305985	35T / 64P (option)
#305986	36T / 64P (option)
#305987	37T / 64P (option)
#305988	38T / 64P (option)
#305990	40T / 64P (option)
#305991	41T / 64P (option)
#305992	42T / 64P (option)
#305994	44T / 64P (option)
#305996	46T / 64P (option)
#305998	48T / 64P (option)
#306000	50T / 64P (option)



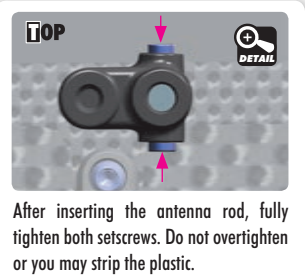
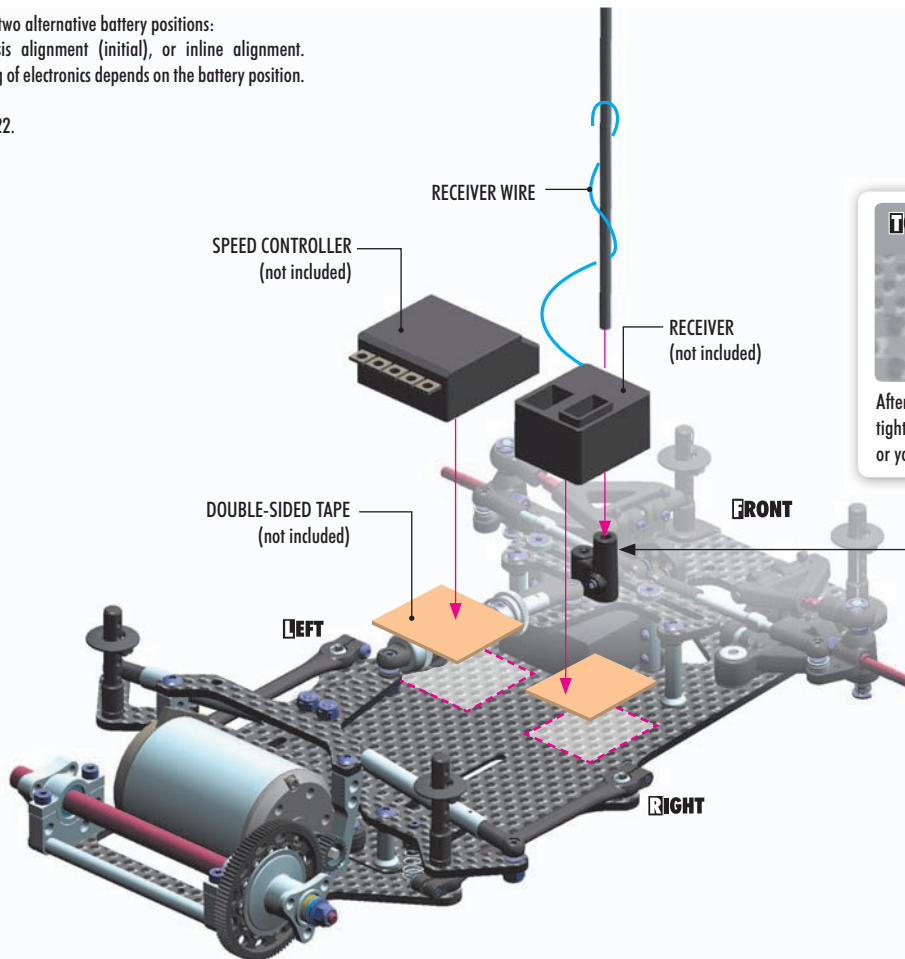
#### GEAR MESH

Adjust the gear mesh so there is appropriate space between the spur gear and pinion teeth. There should be a very small amount of freeplay.

SET-UP BOOK  
GEAR RATIO

There are two alternative battery positions: cross-chassis alignment (initial), or inline alignment. Positioning of electronics depends on the battery position.

See page 22.



# 6. FINAL ASSEMBLY

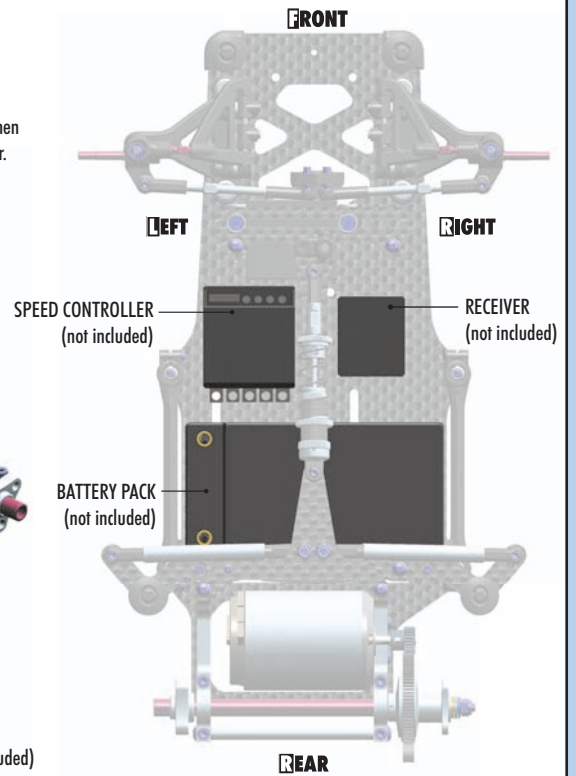
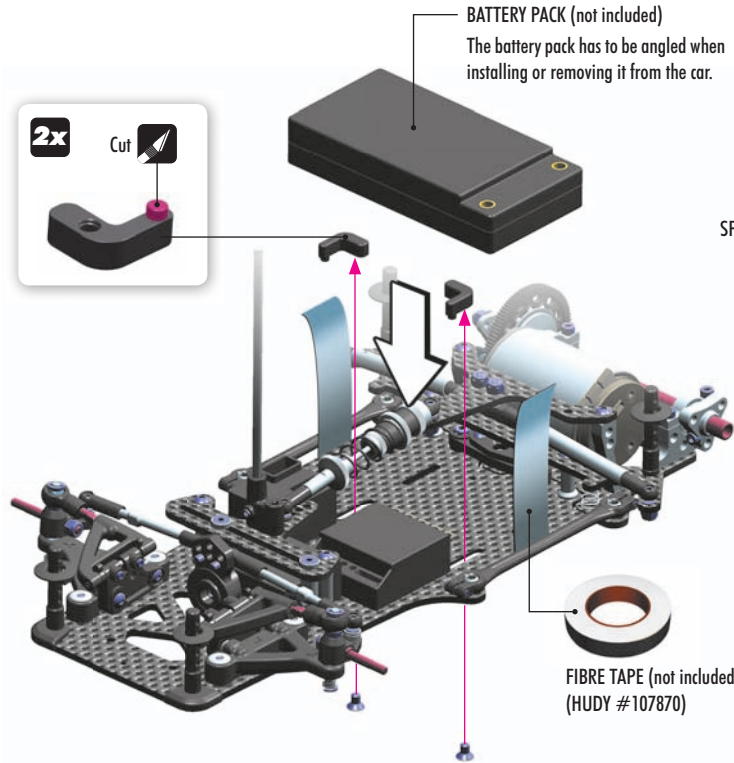


903305  
SFH M3x5

## LIPO BATTERY CONFIGURATION 1 CROSS-CHASSIS ALIGNMENT:

### INITIAL ASSEMBLY

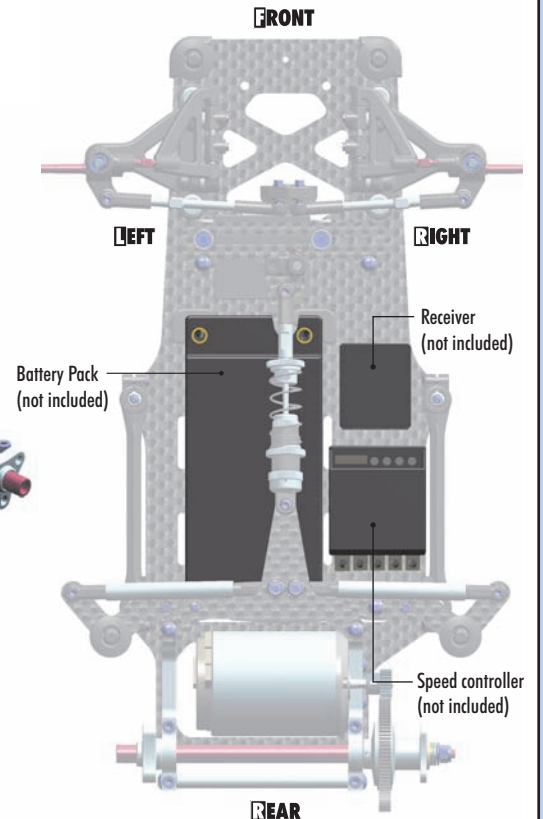
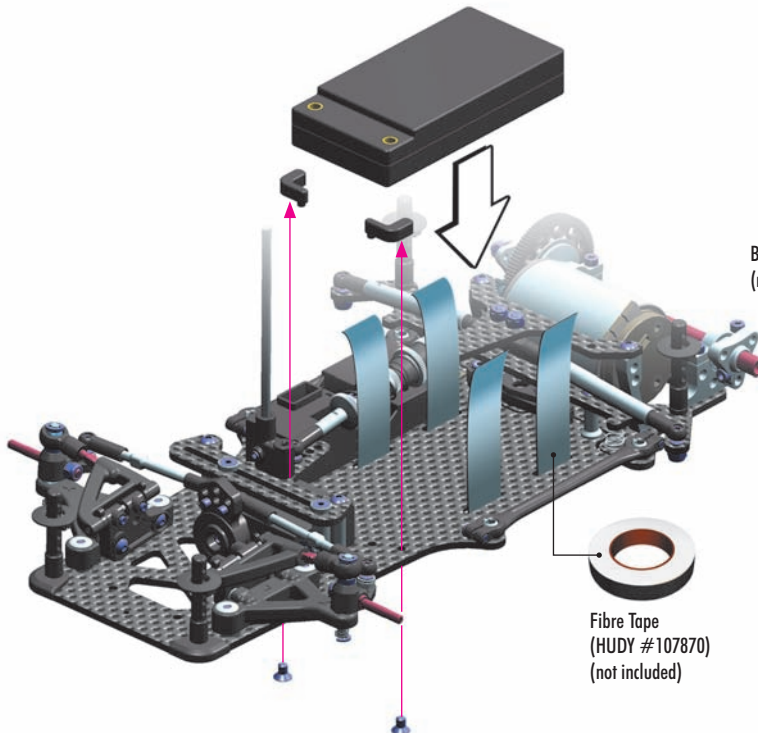
Cross-chassis alignment provides more neutral handling, making the car less sensitive to set-up changes and gives reduced steering responsive. Recommended for low- and medium-traction conditions.



903305  
SFH M3x5

## LIPO BATTERY CONFIGURATION 2 INLINE ALIGNMENT:

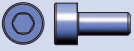
Inline battery alignment improves cornering speed and reduces the chance that the rear of the car will "diff out." Recommended for high-traction conditions.



## 6. FINAL ASSEMBLY



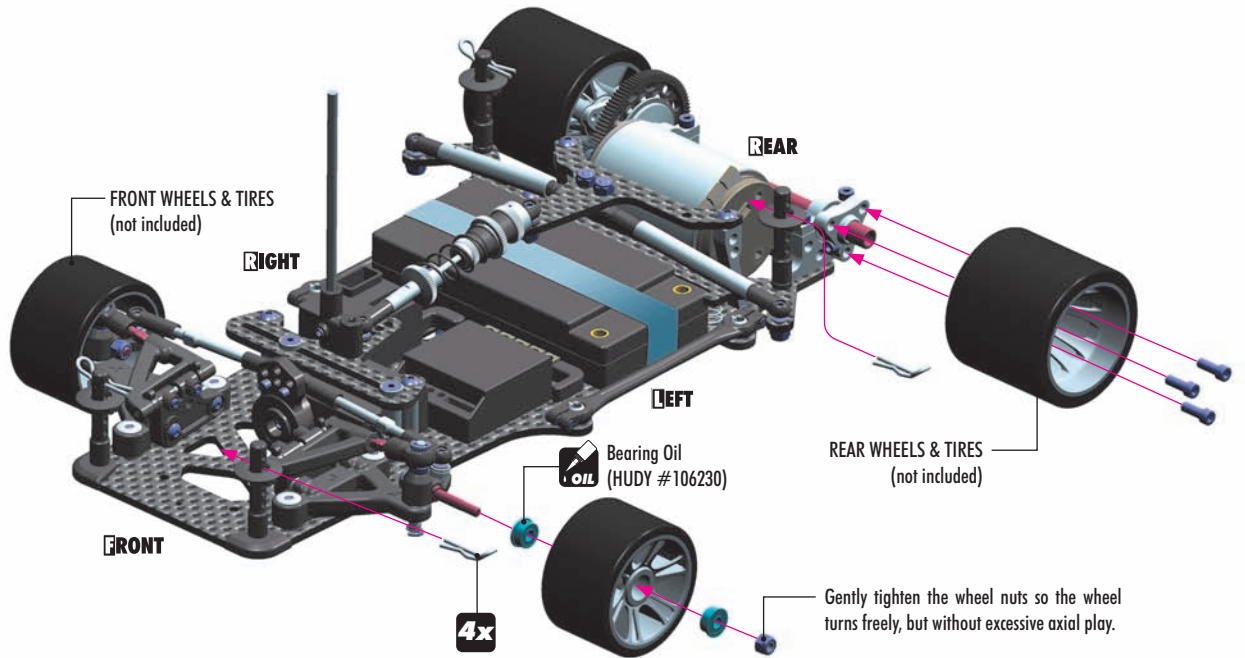
296530-0  
ALU N M3



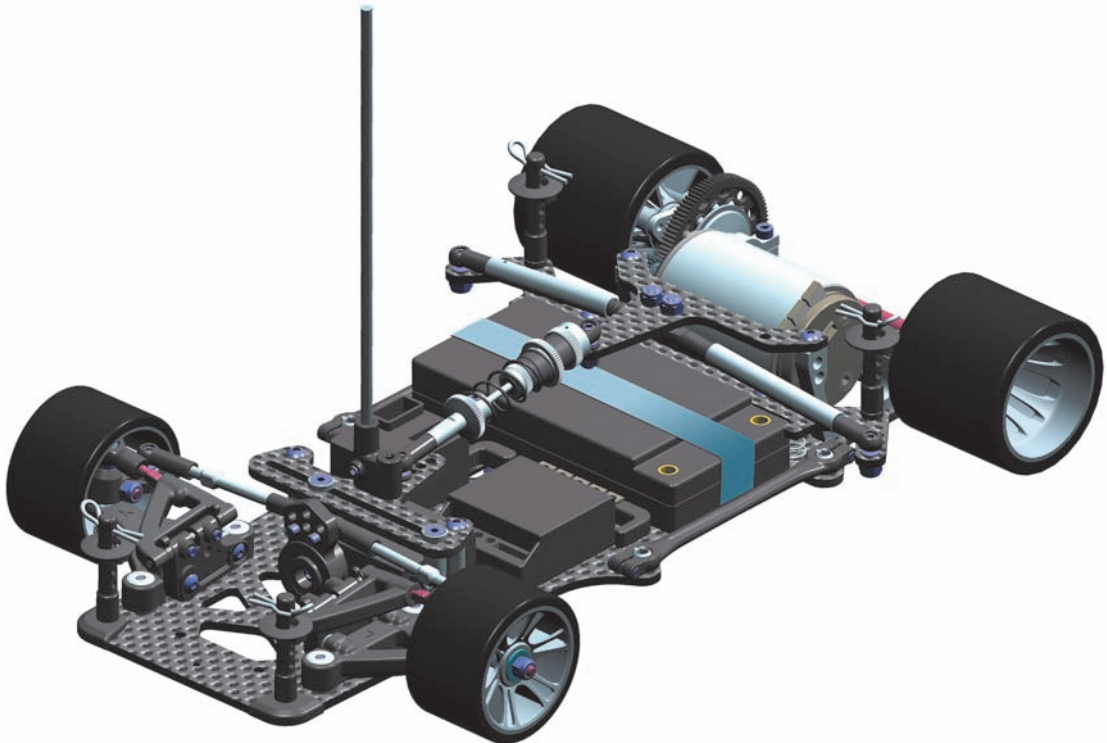
375390  
ALU SCH M3x8



951851  
BB 1/8"x5/16"x9/64"



FINAL ASSEMBLED VIEW



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