

1/12 LUXURY PAN CAR

XTRAY X12



INSTRUCTION MANUAL
X12'21 EU & US EDITION

BEFORE YOU START

This is a high-competition, high-quality RC 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 XRAY, **YOU MUST** read through all of the operating instructions and instruction manual and fully understand them to get the maximum enjoyment and prevent unnecessary damage.

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. Also, please visit our Web site at 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

Carefully read 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 this is not what you wanted or expected, do not continue any further. Your hobby dealer can not accept your 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.

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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 warranty 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.

XRAY

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 RC 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. 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.

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.

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 to get advice, or contact us via email at info@teamxray.com, or contact the XRAY distributor in your country.

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 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.

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 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.

TOOLS REQUIRED



Combination Pliers
(HUDY #189020)



Side Cutters
(HUDY #189010)



Pocket Hobby Knife
(HUDY #188981)



Special Tool for Turnbuckles, Nuts (HUDY #181090)



Turnbuckle Wrench 4mm (HUDY #181040)

Allen 1.5mm (#111545 - HUDY EXCLUSIVE Limited Edition)



Allen 2.0mm (#112045 - HUDY EXCLUSIVE Limited Edition)



Allen 2.5mm (#112545 - HUDY EXCLUSIVE Limited Edition)



Arm Reamer 4.0mm (#107644 - HUDY EXCLUSIVE Limited Edition)



Socket 5.5mm (#175535 - HUDY EXCLUSIVE Limited Edition)



Reamer (#107602 - HUDY EXCLUSIVE Limited Edition)



Scissors (HUDY #188990)



Professional Multi Tool
(HUDY #183011)

NOT INCLUDED



Alexander Hagberg
(Factory Driver)

VIDEO TECH TIP



When a QR CODE is found in the instruction manual, scan the code to be directed to an online video that explains that feature or adjustment in more detail. Make sure to watch all of the instructional videos to get the most performance out of your car.



SAMPLE OF OPTIONAL PARTS

#37XXX	TYPE1	OPTION 1
#37XXX	TYPE2	OPTION 2
#37XXX	TYPE3	INCLUDED

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 part is included in the kit while all other parts are available only as an optional part and must be purchased separately.

COLOR INDICATIONS

At the beginning of each section is an exploded view of the parts to be assembled. There is also a list of all the parts and part numbers that are related to the assembly of that section.

The part descriptions are color-coded to make it easier for you to identify the source of a part. Here are what the different colors mean:

- 371212** **STYLE A** - indicates parts that are included in the bag marked for the section.
- 371116** **STYLE B** - indicates parts that are included in the box.
- 378002** **STYLE C** - indicates parts that are already assembled from previous steps.

INCLUDED

* Kit includes smaller but sufficient amount of oil and grease to build the car.

450cSt (#106345)
HUDY Premium Silicone Oils



10,000cSt (#106510)
HUDY Premium Silicone Oils



(HUDY #106211)
Differential Grease



ALSO REQUIRED

Transmitter



Receiver



Speed Controller



Steering Servo



Electric Motor & Pinion Gear with Setscrew



LiPo Battery



Battery Charger



Bearing Oil (HUDY #106230)



Tires



1/12 Bodyshell

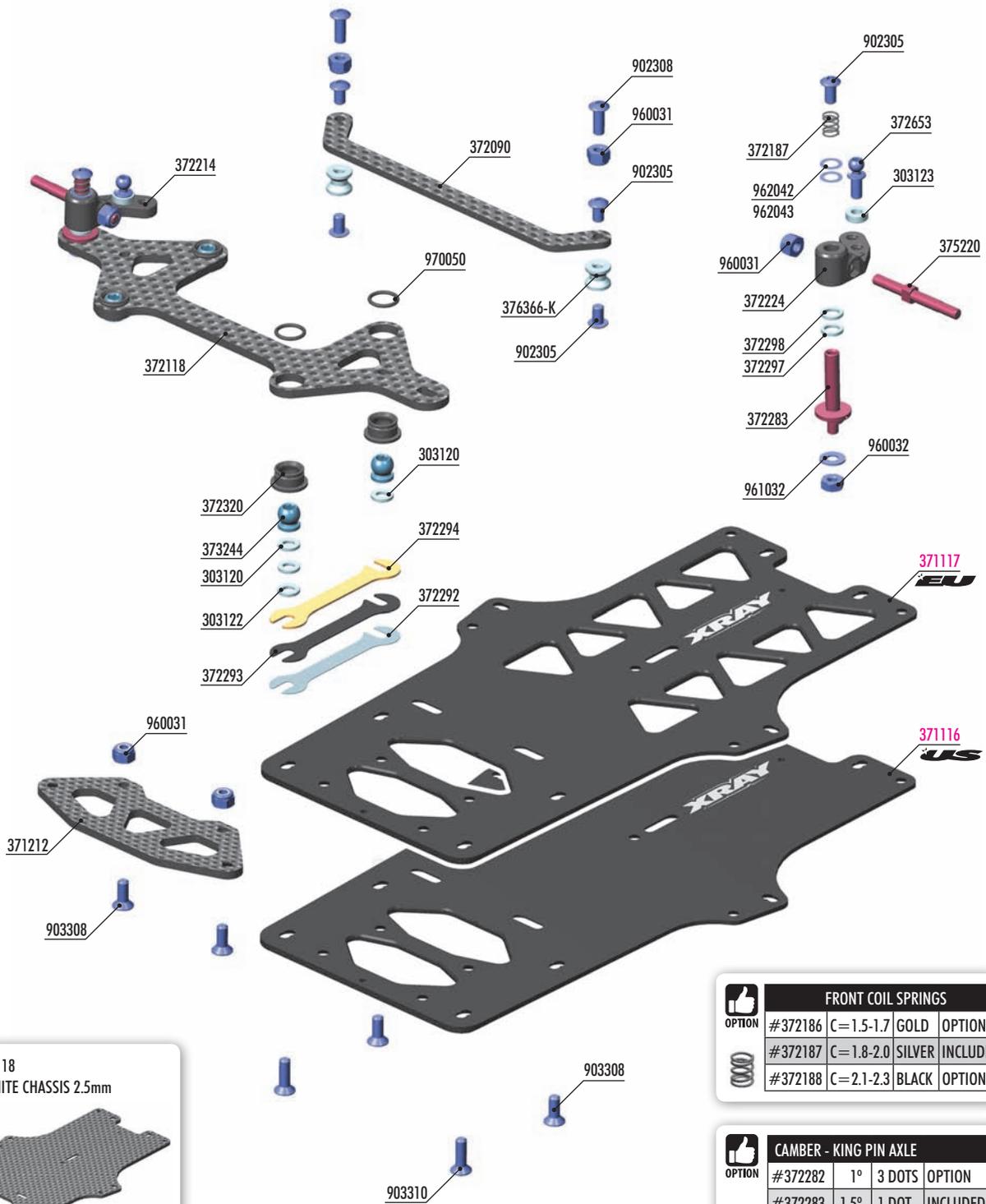


Lexan™ Paint



Double-sided Tape (HUDY #107875)





#37118
GRAPHITE CHASSIS 2.5mm

FRONT COIL SPRINGS				
OPTION	#372186	C=1.5-1.7	GOLD	OPTION
	#372187	C=1.8-2.0	SILVER	INCLUDED
	#372188	C=2.1-2.3	BLACK	OPTION

CAMBER - KING PIN AXLE				
OPTION	#372282	1°	3 DOTS	OPTION
	#372283	1.5°	1 DOT	INCLUDED
	#372284	2°	2 DOTS	OPTION

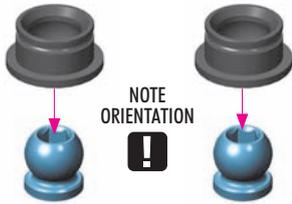
BAG

01

- 303120 SET OF ALU SHIM (0.5MM, 1.5MM, 2.5MM)
- 303122 ALU SHIM 3x6x1.0MM (10)
- 303123 ALU SHIM 3x6x2.0MM (10)
- 371212 GRAPHITE BUMPER LOWER HOLDER 2.5MM
- 372090 FRONT BRACE - GRAPHITE 2.0MM
- 372118 GRAPHITE LOWER SUSPENSION ARM PLATE 2.5MM
- 372187 FRONT COIL SPRING FOR 4MM PIN C=1.8-2.0 - SILVER (2)
- 372214 COMPOSITE STEERING BLOCK FOR 4MM KING PIN - RIGHT - GRAPHITE
- 372224 COMPOSITE STEERING BLOCK FOR 4MM KING PIN - LEFT - GRAPHITE
- 372283 X12 KING PIN 4MM - 1.5° (2)
- 372292 STEEL SHIM 0.2MM - SILVER (2)
- 372293 STEEL SHIM 0.4MM - BLACK (2)
- 372294 STEEL SHIM 0.6MM - GOLD (2)
- 372297 ALU SHIM 4x6x1.0MM (10)
- 372298 ALU SHIM 4x6x0.5MM (10)
- 372320 COMPOSITE ARM BUSHING (4)
- 372653 BALL END 4.2MM WITH 8MM THREAD (2)

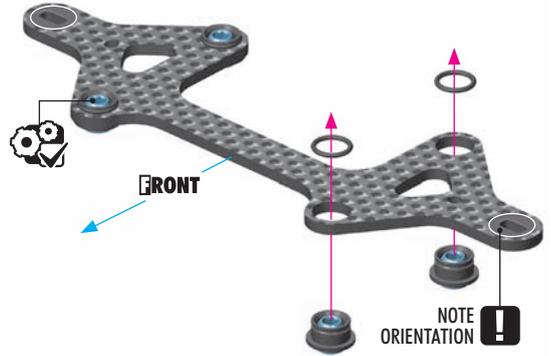
- 373244 BALL END 6.0MM WITH HEX - HUDY SPRING STEEL™ (2)
- 375220 FRONT WHEEL AXLE (2)
- 376366-K ALU MOUNT 6.0MM - BLACK (2)
- 902305 HEX SCREW SH M3x5 (10)
- 902308 HEX SCREW SH M3x8 (10)
- 903308 HEX SCREW SFH M3x8 (10)
- 903310 HEX SCREW SFH M3x10 (10)
- 960031 ALU NUT M3 (10)
- 960032 NUT M3 (10)
- 961032 WASHER S 3.2 (10)
- 962042 WASHER S 4x6x0.1 (10)
- 962043 WASHER S 4x6x0.2 (10)
- 970050 O-RING 5x1 (10)

- 371116 X12'21 ALU SOLID CHASSIS 2.0MM - 7075 T6
- 371117 X12'21 ALU FLEX CHASSIS 2.0MM - 7075 T6



2x L=R

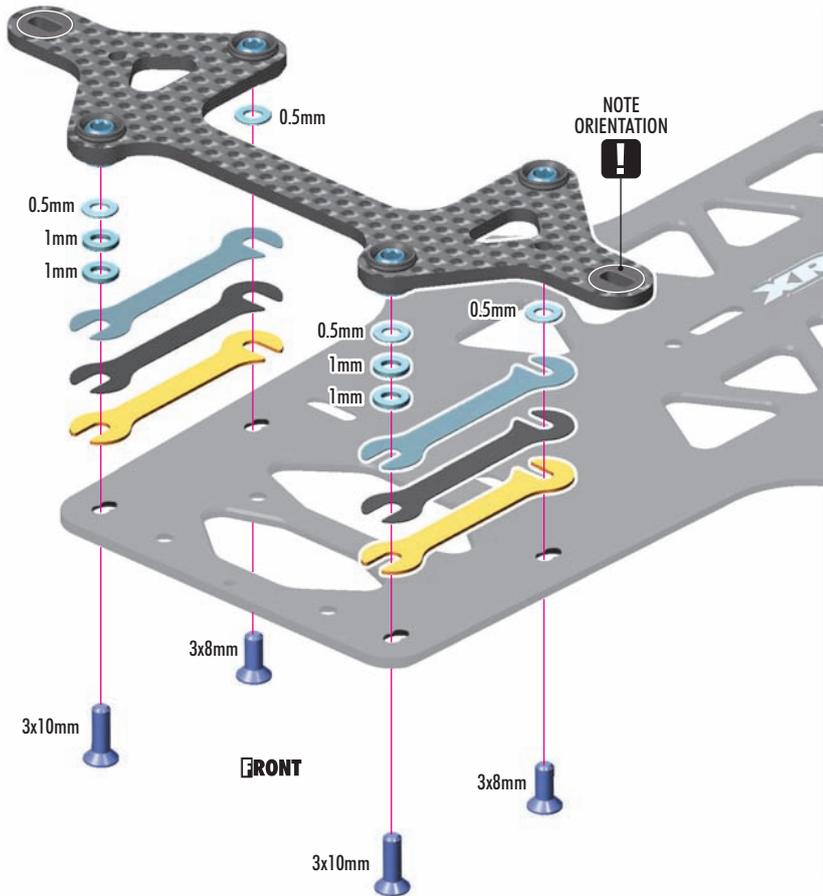
CUTAWAY VIEW



TIP Install the balls with Professional Multi Tool (HUDY #183011)



2x L=R



#371118 GRAPHITE CHASSIS 2.5mm



INITIAL SETTING

- 0.2mm - SILVER
- 0.4mm - BLACK
- 0.6mm - GOLD

RIDE HEIGHT AND CASTER ADJUSTMENT

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



VIDEO TECH TIP



CASTER ADJUSTMENT

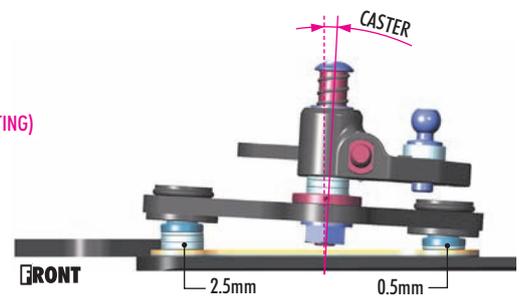
CASTER ADJUSTMENT SETTING

Caster is adjusted by the shims placed under front ball.

Please see the table beneath the to understand how to set caster.

EXTRA SHIM UNDER FRONT BALL	
SHIM DIFFERENCE	CASTER
1mm	1.5°
2mm	3°
3mm	4.5°
4mm	6°
5mm	7.5°

(INITIAL SETTING)



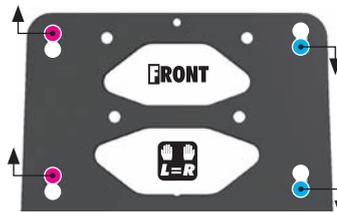
2.5 - 0.5 = 2.0mm (Shim Difference and Caster 3°)

ALTERNATIVE FRONT POSITION LONG WHEELBASE

(INITIAL SETTING)

Longer wheelbase is recommended for bigger tracks with longer sweepers. Makes the car more stable and easier to drive.

FRONT WHEELBASE ADJUSTMENT



ALTERNATIVE REAR POSITION SHORT WHEELBASE

Shorter wheelbase allows the car to rotate better in corner to maintain cornering speed. Recommended for tight, technical tracks or tracks with numerous 180° hairpin corners.



902305
SH M3x5



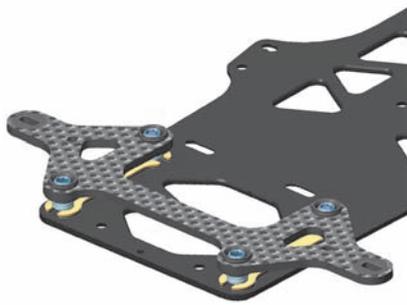
902308
SH M3x8



960031
ALU N M3

FRONT SUSPENSION FLEX SETTING

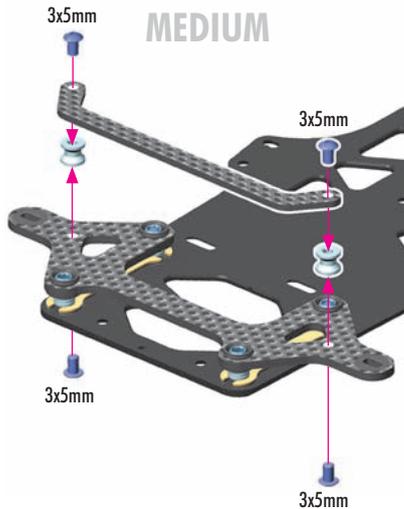
SOFT



SOFT - (NO BRACE)

Makes the car initially less responsive, but will provide more mechanical grip. Recommended for low-grip carpet conditions, and asphalt.

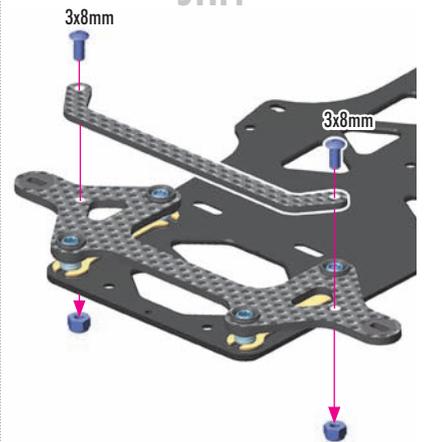
MEDIUM



MEDIUM (INITIAL SETTING)

Brace mounted to the graphite arm with posts provides a balance between initial response and mechanical grip. Recommended for most conditions.

STIFF



STIFF

Brace directly mounted to the graphite arm gives maximum responsiveness but decreases mechanical grip. Recommended for high-traction bite conditions (such as US black carpet).



303123
SHIM 3x6x2



960031
ALU N M3



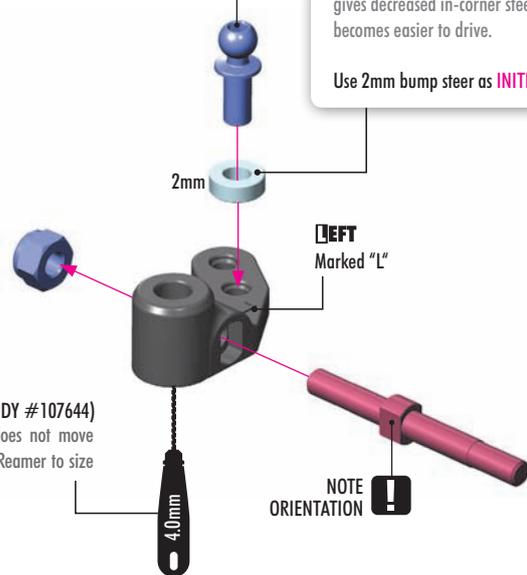
The steering link mounting position on the steering block has a direct effect on the Ackermann. Please see the ACKERMANN SETTING page: 25



RIGHT
Marked "R"

TIP

Arm Reamer 4.0mm (HUDY #107644)
If the suspension arm does not move freely, use a HUDY Arm Reamer to size the holes of the arms.

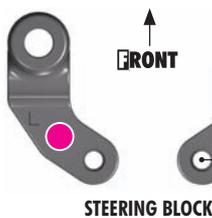


BUMPSTEER SETTING

The thickness of shims changes the steering linkage angle. Thicker shims gives decreased in-corner steering, but car becomes easier to drive.

Use 2mm bump steer as **INITIAL SETTING**

NOTE
ORIENTATION



STEERING BLOCK

FORWARD POSITION (INITIAL SETTING)

Initial setting for most tracks provides a neutral steering feel similar to that of the old X12. Provides a good balance between initial response and cornering speed.

REARWARD POSITION

Makes the car freer because of increased Ackermann (less steering lock on the outer wheel in relation to the inner). Recommended for medium- to high-traction tracks.



TIP



M3x3 #901303
(NOT INCLUDED)

When using rearward hole, you can reinforce the steering block (for hard crashes) by installing an M3x3 setscrew in the forward hole.



960032
N M3

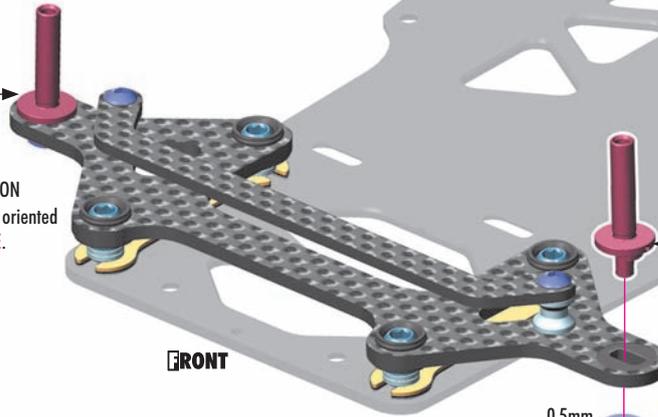


961032
SHIM 3.2

2x



NOTE ORIENTATION
The **DOT** must be oriented towards **OUTSIDE**.



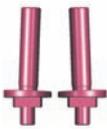
NOTE ORIENTATION
The **DOT** must be oriented towards **OUTSIDE**.

0.5mm
STEEL



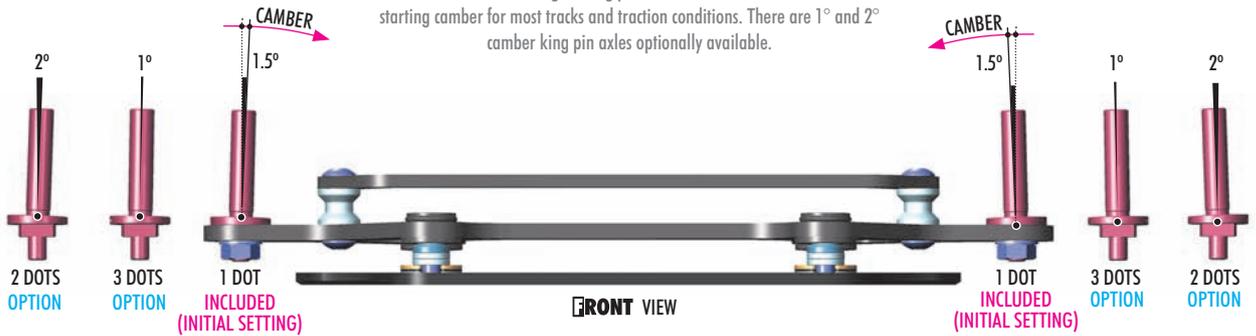
OPTION

CAMBER - KING PIN AXLE			
#372282	1°	3 DOTS	OPTION
#372283	1.5°	1 DOT	INCLUDED
#372284	2°	2 DOTS	OPTION



CAMBER ADJUSTMENT

The car features 1.5° angled king pin axles which are the recommended starting camber for most tracks and traction conditions. There are 1° and 2° camber king pin axles optionally available.



INCREASING THE CAMBER ANGLE
will increase the car steering, however, will make the car more difficult to drive.

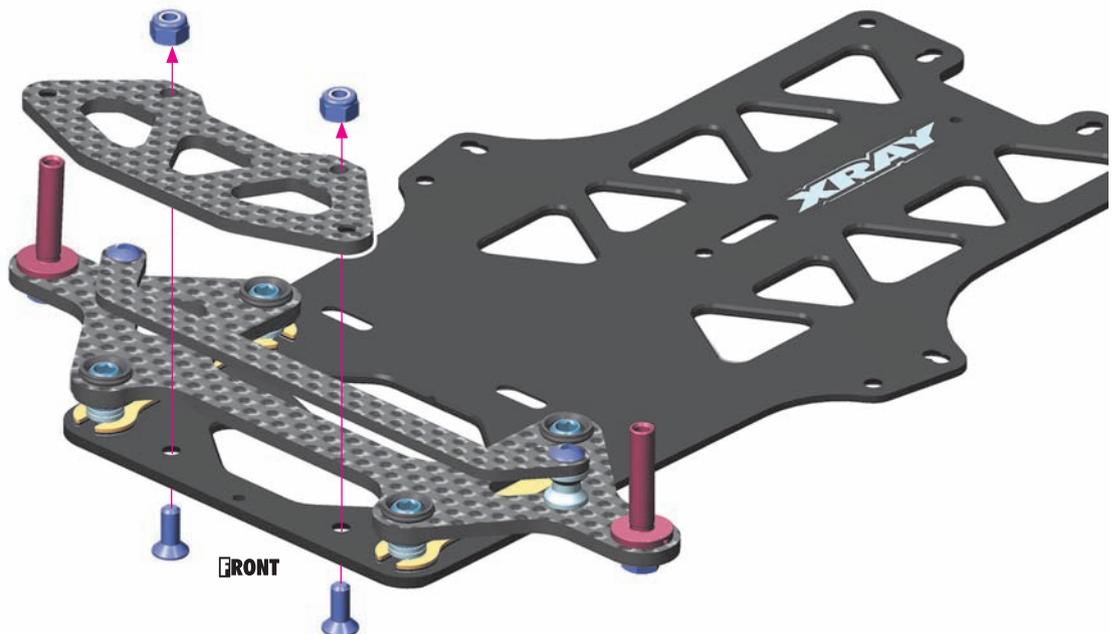
DECREASING THE CAMBER ANGLE
will decrease the steering which will make the car easier to drive and also helps to prevent traction rolling.

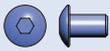


903308
SFH M3x8



960031
ALU N M3





902305
SHIM 3x3.5



372297
SHIM 4x6x1



372298
SHIM 4x6x0.5



962042
S 4x6x0.1



962043
S 4x6x0.2



TIP

Alexander Hagberg
(Factory driver)

RIDE HEIGHT AND DROOP ADJUSTMENT SHIMS:

The ride height is adjusted with the supplied long shims that can be fitted under the arms (silver/black/gold). I recommend using as low of a ride height as you possibly can, unless you race on a bumpy or rough surface, then the car can benefit from having a slightly higher ride height, to increase stability, and improve the handling over bumps.

The front axle height can be adjusted with shims under the steering block. You can't change the roll center on the front end of the X12'21, simply because there is no upper arm. Adding shims under the steering block (raising the steering block) will raise the front axle height, and at the same time, decrease bump steer. Removing shims will lower the steering block, and increase bump steer. For more information about Ackermann & Bumpsteer, see PAGE 25 (servo mounting).

I recommend using the kit shimming for the front steering block - this will be a good basic setting for most conditions.

RIDE HEIGHT ADJUSTMENT

INITIAL SETTING

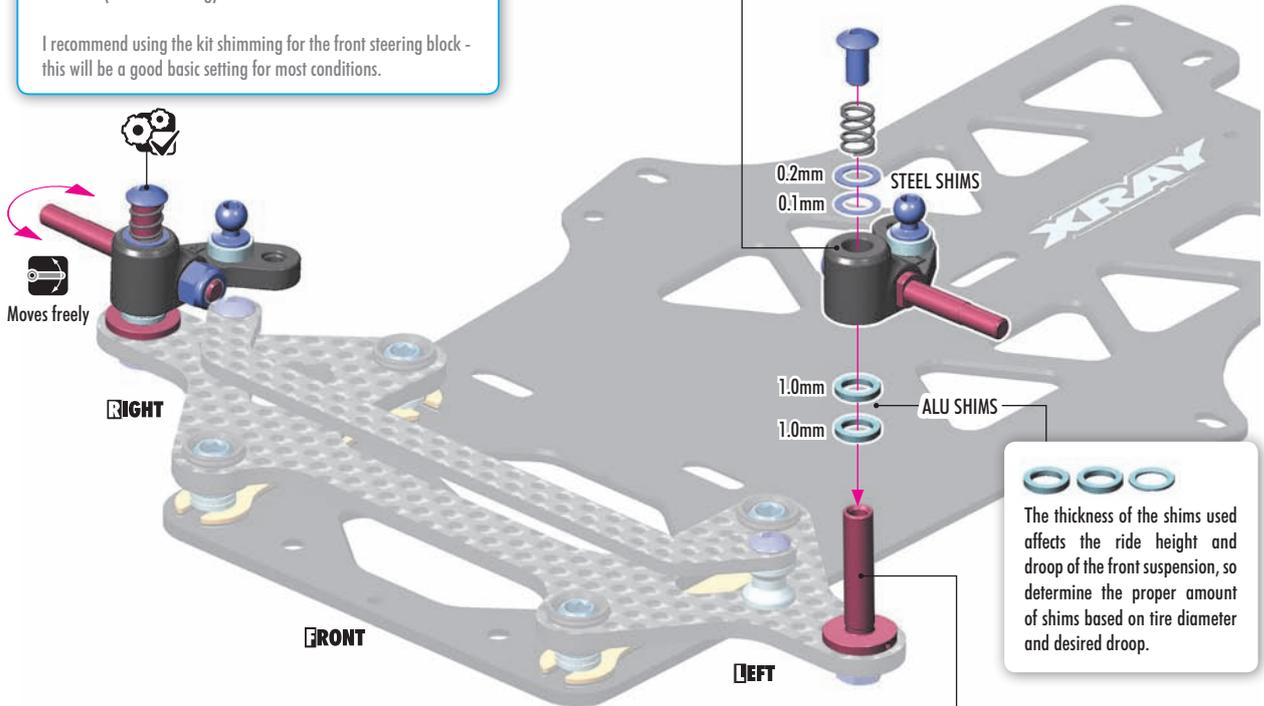
- above upper arm (0.3mm)
- below steering block (2.0mm)

FRONT DROOP

Front droop is adjusted by the preload of the front spring. More shims between the steering block and the spring will increase preload - and decrease droop. Removing shims will have the opposite effect.

MORE DROOP will make the car initially less responsive, but it will give the car more front grip, especially in the middle of the corner. The car will be less precise and more difficult to drive, because of increased roll. More droop is best suited for low- to medium-traction carpet, or asphalt.

LESS DROOP will decrease roll but the car will change direction quicker. Less droop is best suited for high-traction surfaces such as US black carpet, especially when traction rolling is an issue (and particularly when a rear solid axle is used).



Moves freely

RIGHT

FRONT

LEFT

0.2mm STEEL SHIMS

0.1mm

1.0mm ALU SHIMS

1.0mm



The thickness of the shims used affects the ride height and droop of the front suspension, so determine the proper amount of shims based on tire diameter and desired droop.

use HUDY Silicone Oil
10K cSt (INCLUDED)



VIDEO TECH TIP



FRONT KINGPIN OIL



VIDEO TECH TIP



FRONT DROOP & RIDE HEIGHT



FRONT COIL SPRINGS

OPTION	#	C	COLOR	STATUS
	372186	1.5-1.7	GOLD	OPTION
	372187	1.8-2.0	SILVER	INCLUDED
	372188	2.1-2.3	BLACK	OPTION

SOFTER SPRINGS

Makes the car easier to drive over bumps and increases steering as it makes the car roll more, especially in the middle of a corner.

HARDER SPRINGS

Makes the car more responsive and increases initial steering. Recommended for high-traction and flat tracks.

TIP

Arm Reamer 4.0mm
(HUDY #107644)

The front suspension parts were updated to eliminate play to ensure better steering performance. The updated holes in the steering blocks may cause a tighter fit of the kingpin in the steering block; it is important that the steering block moves freely but without excessive play. If the kingpin does not insert into the steering block easily, use a 4mm Arm Reamer to enlarge the hole. Be very careful to remove only enough material so you can insert the kingpin without a lot of force.



LOW traction & bumpy track

7K ~ 10K cSt

HIGH traction & smooth track

15K ~ 30K cSt

FRONT DAMPING with different oils.

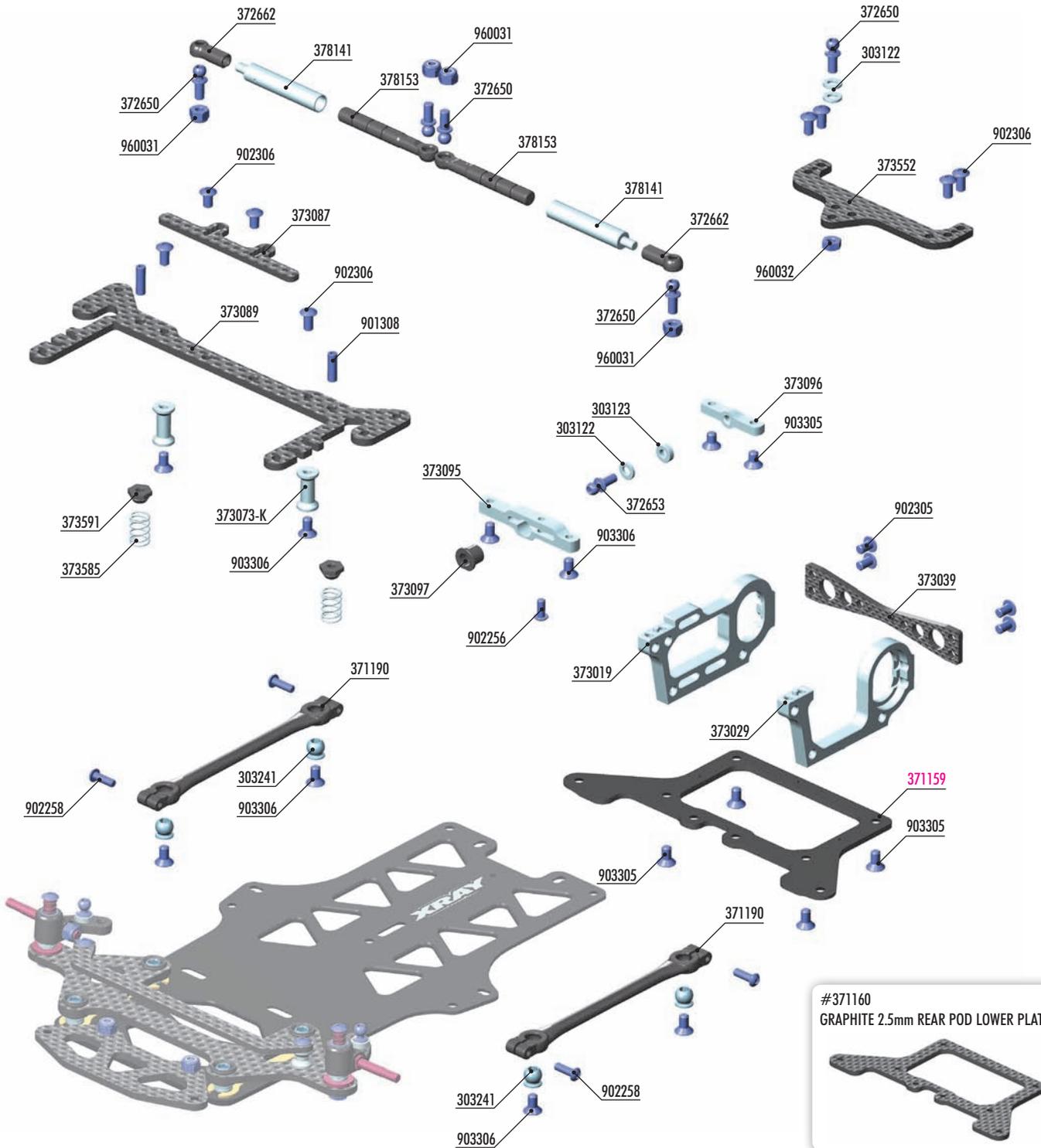
TRACK CONDITIONS

Thinner oil is recommended for low-traction tracks, while thicker oil is recommended for high-traction tracks.

DAMPING

Using thicker oil on the king pin axle makes the car less responsive but easier to drive. Thicker oil also increases stability but decreases cornering speed.

2. REAR SUSPENSION



BAG

02

- 303122 ALU SHIM 3x6x1.0MM (10)
- 303123 ALU SHIM 3x6x2.0MM (10)
- 303241 BALL UNIVERSAL 5.8 MM HEX (4)
- 371190 COMPOSITE POD LINK (2)
- 372650 BALL END 4.2MM WITH 6MM THREAD (2)
- 372653 BALL END 4.2MM WITH 8MM THREAD (2)
- 372662 COMPOSITE BALL-JOINT 4.2 MM (4)
- 373019 ALU REAR BULKHEAD - MOTOR - RIGHT
- 373029 ALU REAR BULKHEAD - LEFT
- 373039 GRAPHITE REAR BULKHEAD BRACE 2.0MM
- 373073-K ALU REAR BRACE MOUNT 16MM - BLACK (2)
- 373087 GRAPHITE BATTER BACKSTOP 2.0MM
- 373089 GRAPHITE REAR BRACE 2.5MM
- 373095 ALU CHASSIS PIVOT HOLDER - SWISS 7075 T6
- 373096 ALU POD PLATE PIVOT HOLDER - SWISS 7075 T6
- 373097 COMPOSITE PIVOT BRACE BUSHING
- 373552 GRAPHITE REAR POD UPPER PLATE 2.5MM

- 373585 SIDE SPRING C=0.9 - GOLD (2)
- 373591 COMPOSITE SIDE SPRING HOLDER (2)
- 378141 ALU SIDE TUBE (2)
- 378153 COMPOSITE SIDE TUBE SHAFT (2)
- 901308 HEX SCREW SB M3x8 (10)
- 902256 HEX SCREW SH M2.5x6 (10)
- 902258 HEX SCREW SH M2.5x8 (10)
- 902305 HEX SCREW SH M3x5 (10)
- 902306 HEX SCREW SH M3x6 (10)
- 903305 HEX SCREW SFH M3x5 (10)
- 903306 HEX SCREW SFH M3x6 (10)
- 960031 ALU NUT M3 (10)
- 960032 NUT M3 (10)

371159 ALU 2.0MM REAR POD LOWER PLATE - 7075 T6

#371160
GRAPHITE 2.5mm REAR POD LOWER PLATE



2. REAR SUSPENSION



903305
SFH M3x5

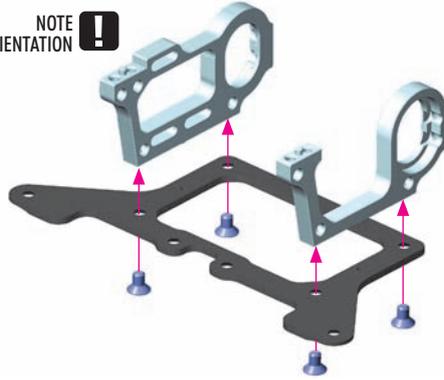


VIDEO TECH TIP



REAR POD BUILD

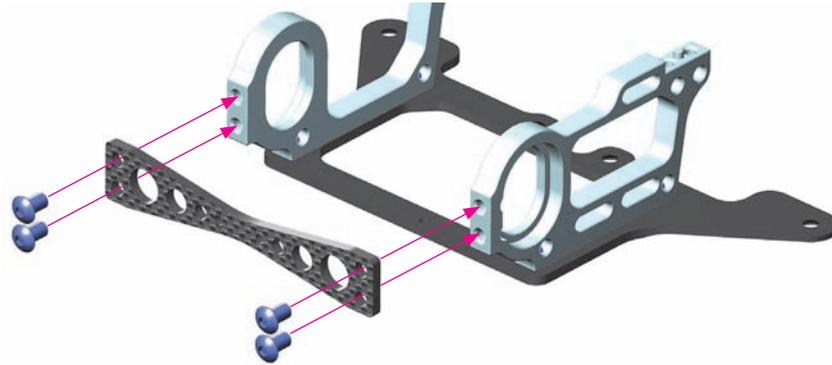
NOTE ORIENTATION



#371160
GRAPHITE 2.5mm REAR POD LOWER PLATE



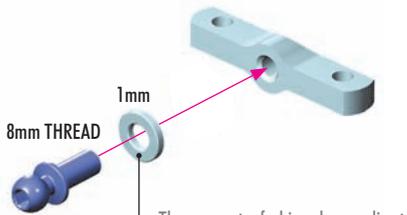
902305
SH M3x5



303122
SHIM 3x6x1



903305
SFH M3x5

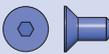
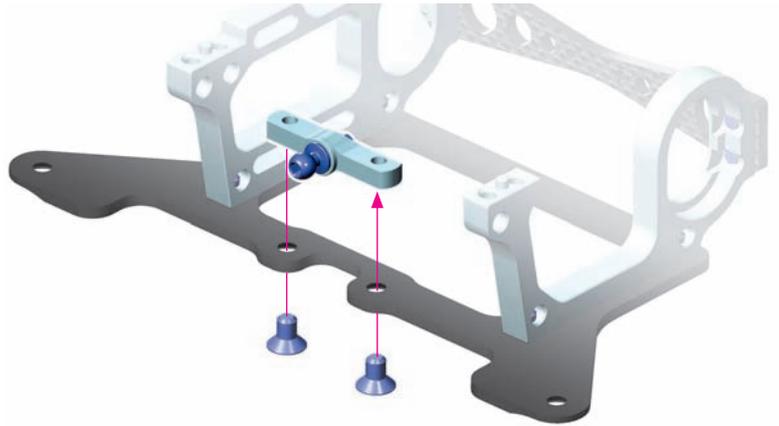


8mm THREAD

1mm

The amount of shims has a direct effect on the pivot mounting position.

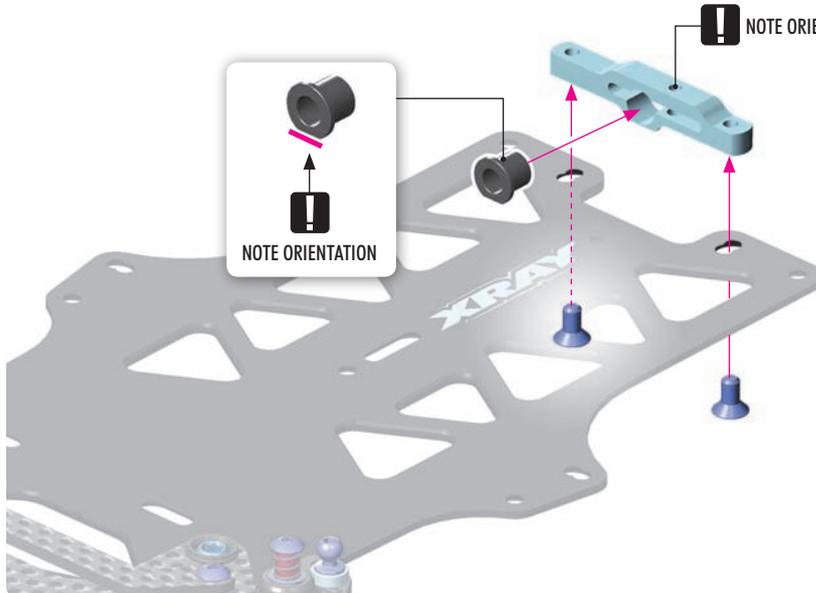
Please see: PAGE 12
INITIAL SETTING - rear pivot position
1mm shim



903306
SFH M3x6

NOTE ORIENTATION

NOTE ORIENTATION



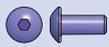
(INITIAL SETTING)



VIDEO TECH TIP



CENTER POD PIVOT BUILD



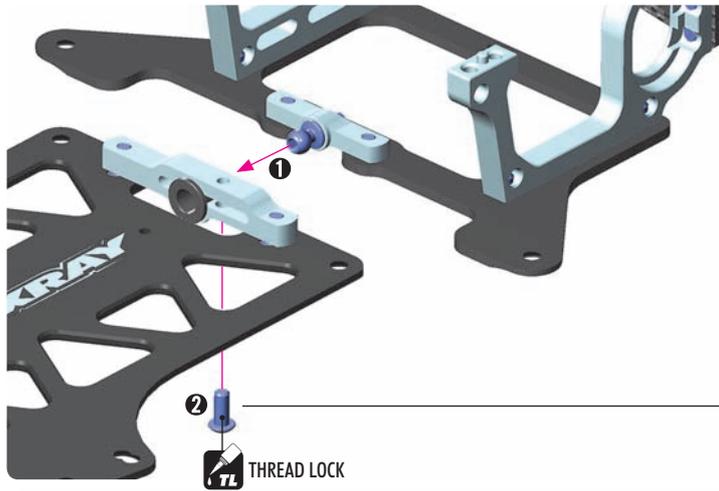
902256
SH M2.5x6



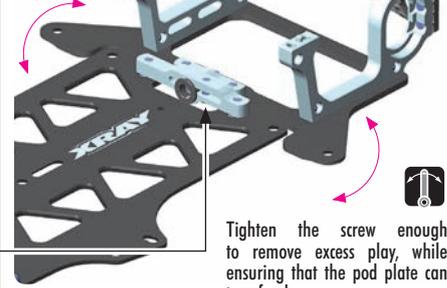
VIDEO TECH TIP



CENTER PIVOT BUILD



Ensure free, smooth movement

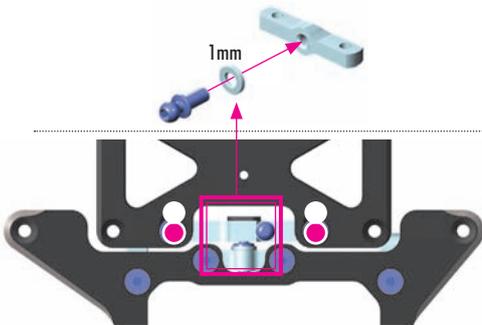


Tighten the screw enough to remove excess play, while ensuring that the pod plate can turn freely.

PIVOT MOUNTING ALTERNATIVE

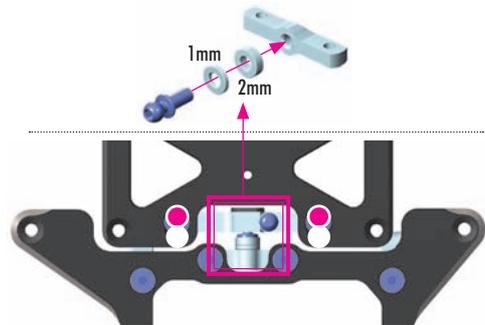
REARWARD: (INITIAL SETTING)

Pivot mounted in rearward chassis holes, and 1mm shim used under the pivot ball. The rearward pivot mounting position gives the most steering and most free rear end. Recommended for high-traction conditions such as US black carpet.



FORWARD:

Pivot mounted in forward chassis holes, with 3mm shims under the pivot ball. The forward pivot mounting position gives a good balance between front and rear traction.



303122
SHIM 3x6x1



303123
SHIM 3x6x2



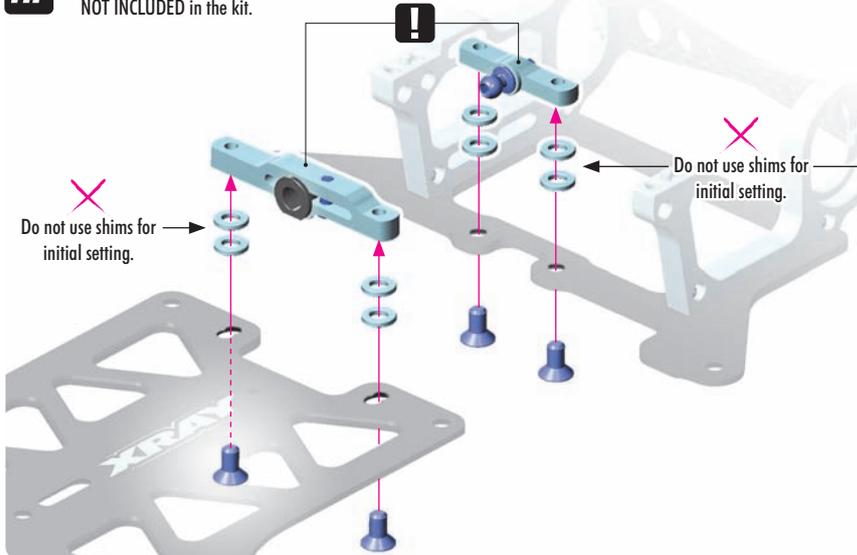
303122
SHIM 3x6x1



303123
SHIM 3x6x2

TIP #303122 & 303123 shims are NOT INCLUDED in the kit.

NOTE ORIENTATION



ROLL CENTER ADJUSTMENT

The roll center can be adjusted by adding or removing shims from beneath the aluminum pivot mounts.

LOWER ROLL CENTER

(INITIAL SETTING - NO SHIMS) will give more traction and increase chassis roll.

HIGHER ROLL CENTER

(adding shims) will increase steering by making the car rotate more on and off-power

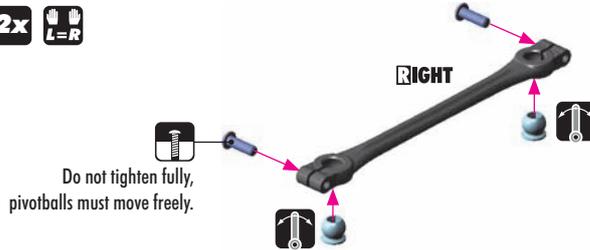


IMPORTANT! Always use same shim thickness on both sides of both aluminum holders

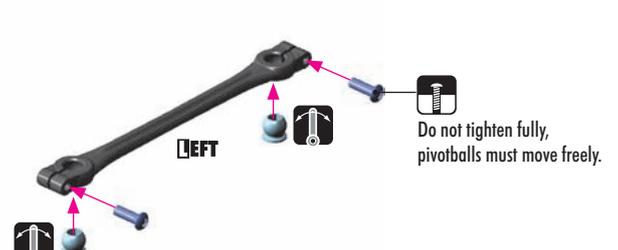


902258
SH M2.5x8

2x L=R



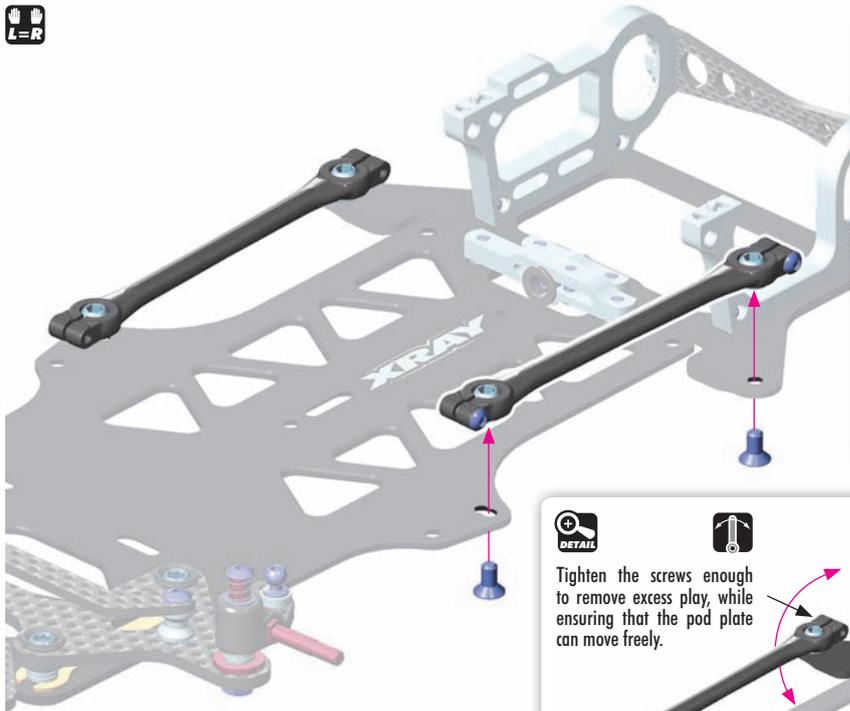
Do not tighten fully, pivotballs must move freely.



Do not tighten fully, pivotballs must move freely.



903306
SFH M3x6



POD LINKAGE POSITION

OUTER POSITION - (INITIAL SETTING)

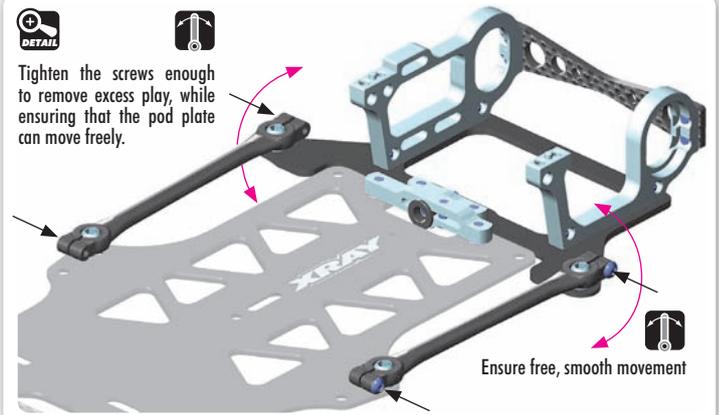
LESS ANGLED side links make the car easier to drive.

INNER POSITION

MORE ANGLED side links give increased in-corner steering.



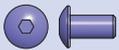
Tighten the screws enough to remove excess play, while ensuring that the pod plate can move freely.



Ensure free, smooth movement



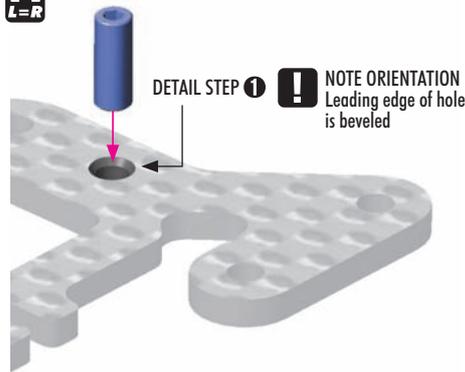
901308
SB M3x8



902306
SH M3x6



960031
ALU N M3



DETAIL STEP 1

NOTE ORIENTATION
Leading edge of hole is beveled

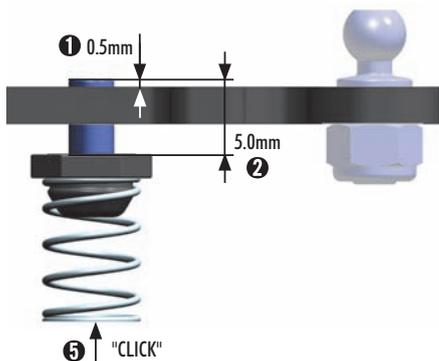
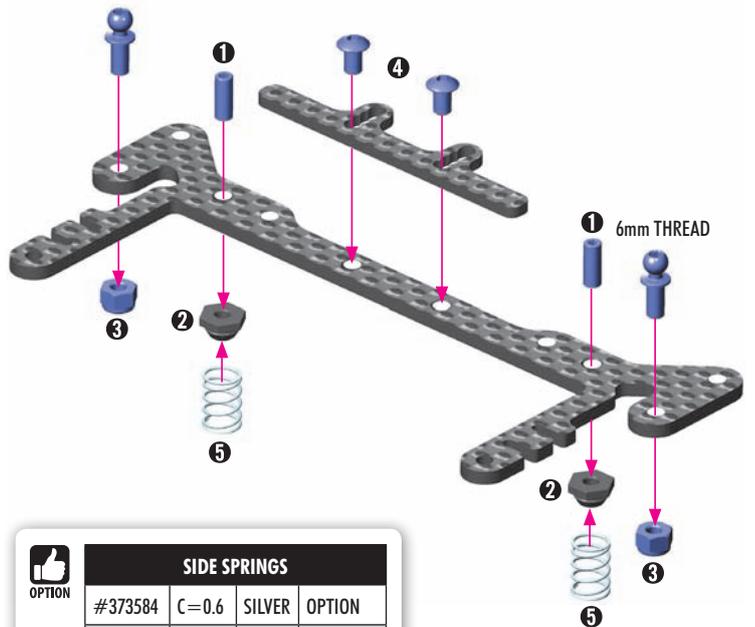


For battery backstop adjustment, see PAGE 28



INITIAL SETTING

6mm THREAD



1 0.5mm

5.0mm

2

5 "CLICK"



SIDE SPRINGS

OPTION	#	C	COLOR	STATUS
	#373584	C=0.6	SILVER	OPTION
	#373585	C=0.9	GOLD	INCLUDED
	#373586	C=1.2	BLACK	OPTION
	#373587	C=1.5	SILVER	OPTION
	#373588	C=1.8	GOLD	OPTION



VIDEO TECH TIP



TWEAK & SIDE SPRINGS SETTING

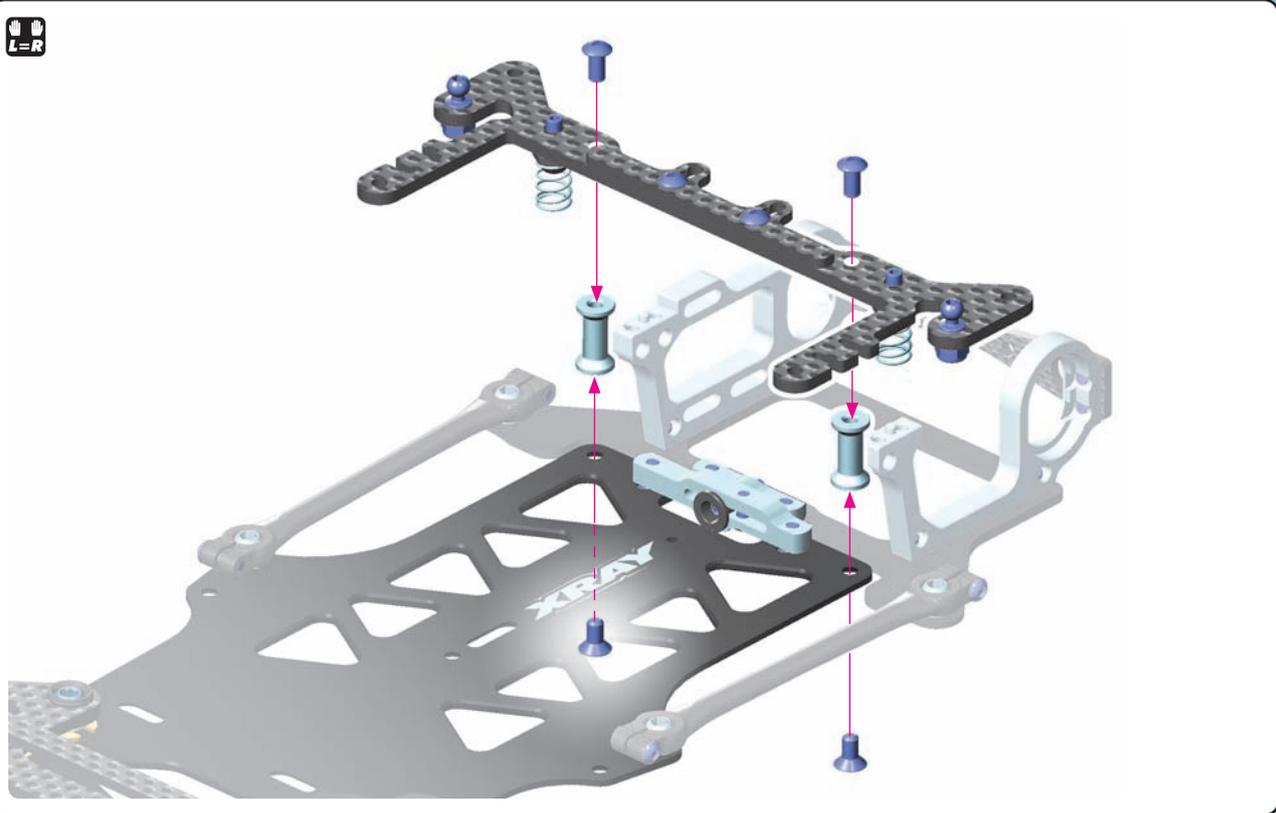
2. REAR SUSPENSION



902306
SH M3x6



903306
SFH M3x6



303122
SHIM 3x6x1

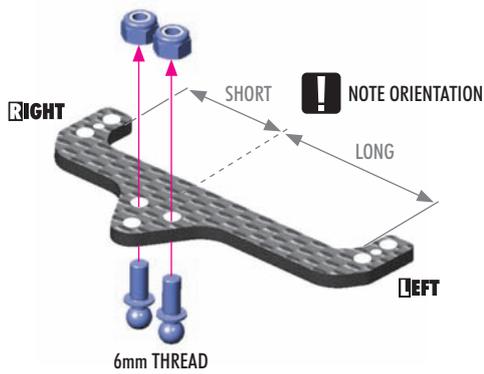


960031
ALU N M3



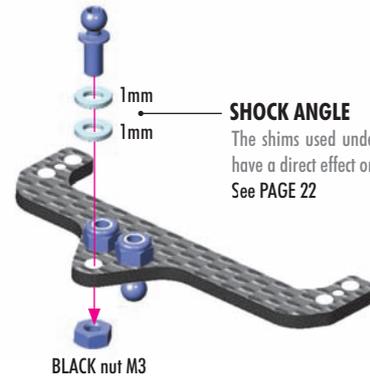
960032
N M3

1

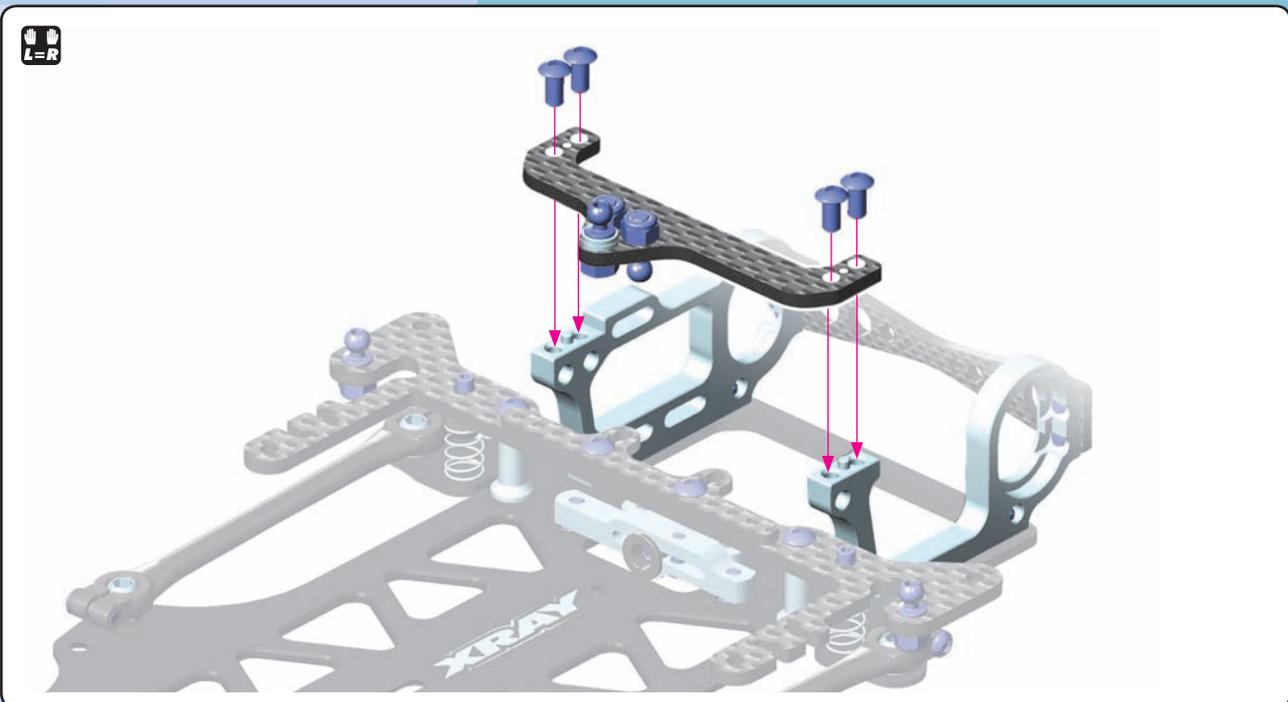


2

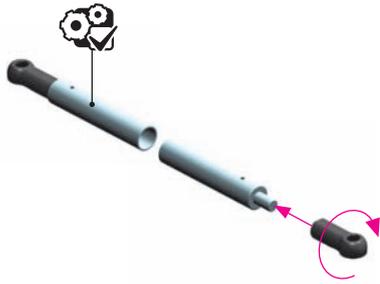
6mm THREAD



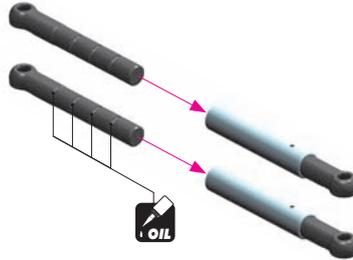
902306
SH M3x6



2x



2x



Add oil in each slot of the COMPOSITE side tubes.

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

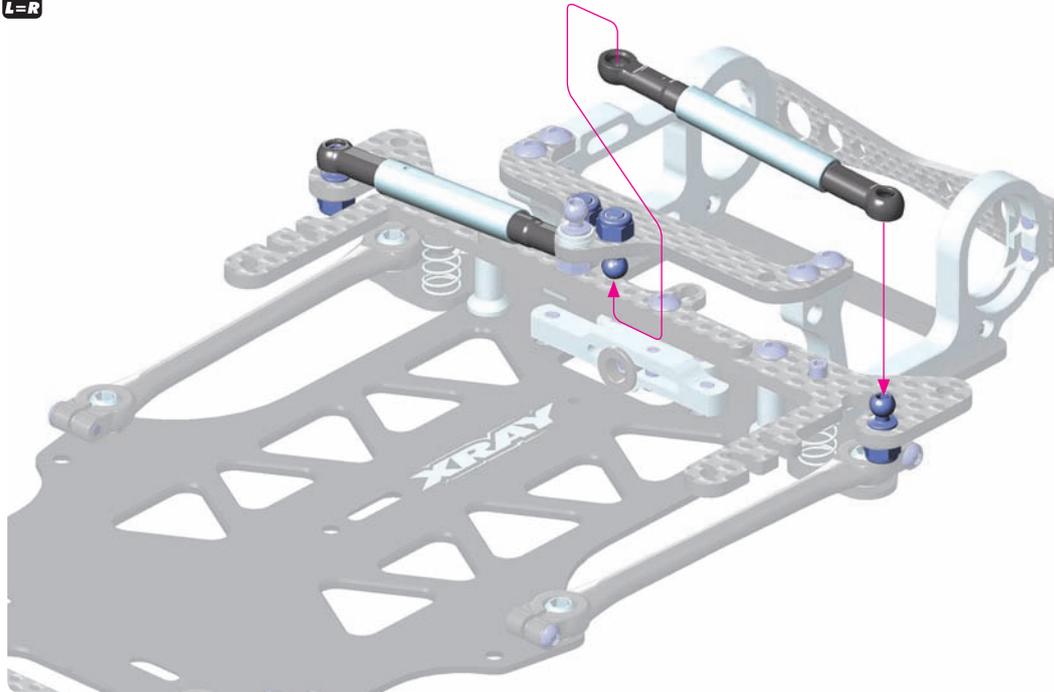


HUDDY OILS 50ml

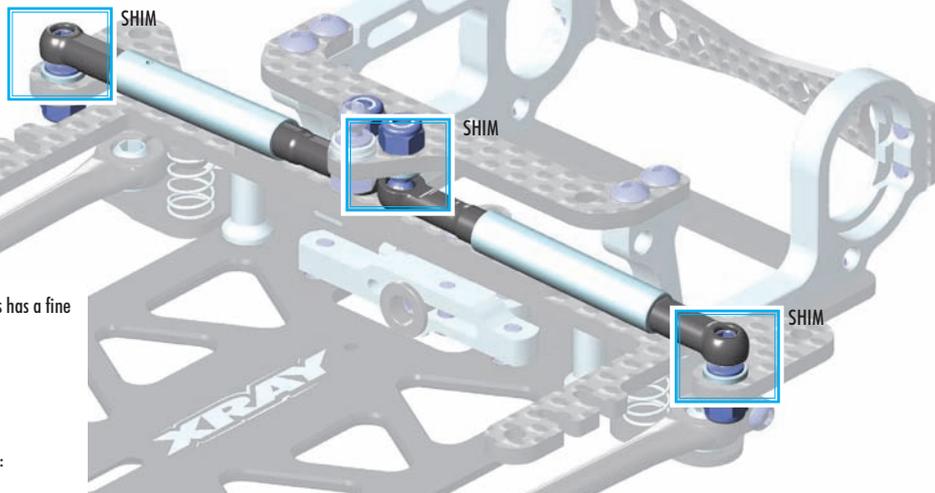
#106450	5.000cSt
#106460	6.000cSt
#106470	7.000cSt
#106480	8.000cSt
#106510	10.000cSt
#106515	15.000cSt
#106520	20.000cSt
#106530	30.000cSt



INCLUDED



TIP SIDE TUBE ANGLE



The angle of the side tubes has a fine effect on car performance.

HIGHER ANGLE:
Stiffer feeling, less roll

LOWER ANGLE (FLATTER):
Softer feeling, more roll



3. BALL DIFFERENTIAL



#930230
OPTION XRAY CERAMIC BALL 3.175MM (12)



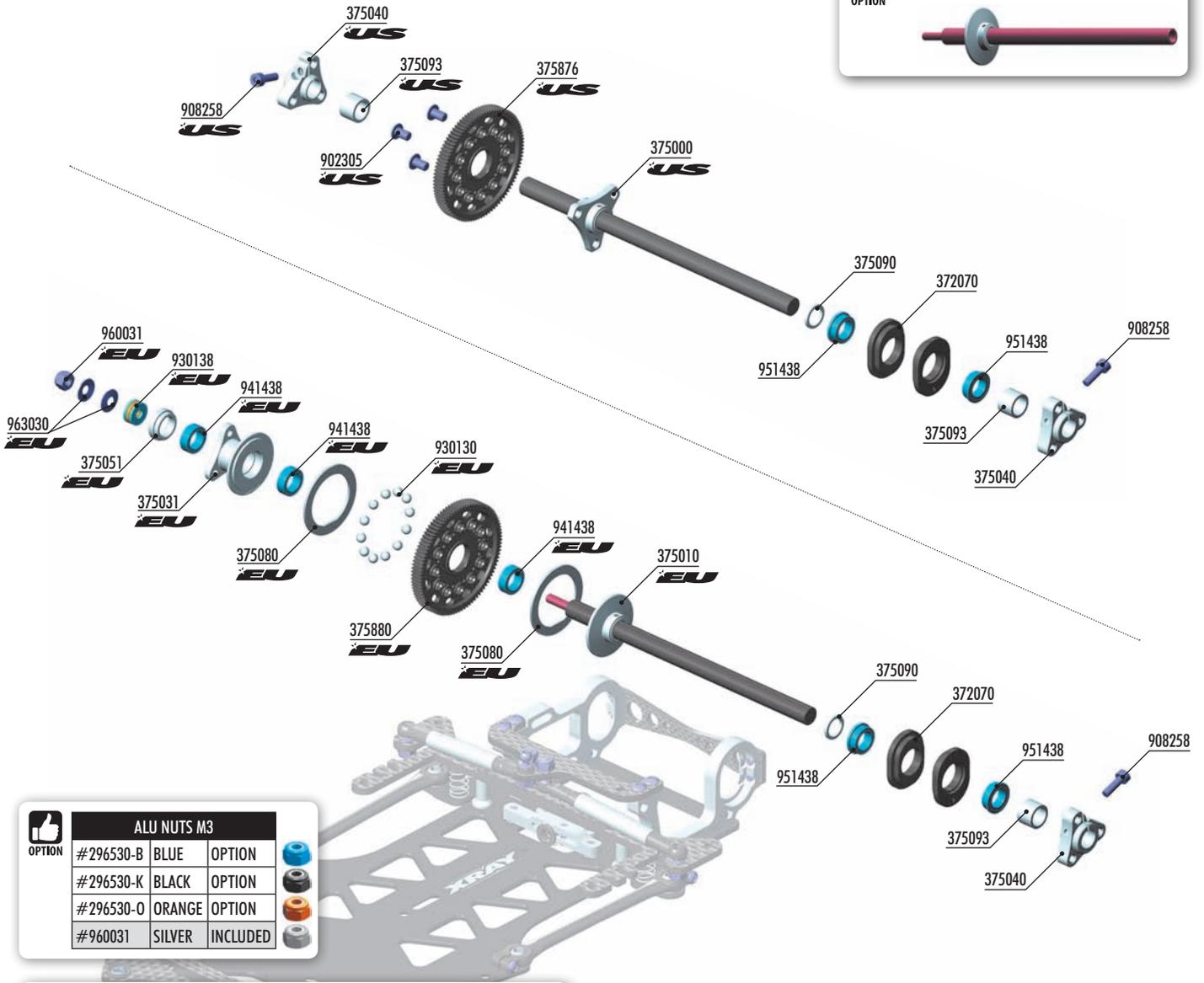
#930238
OPTION CERAMIC BALL-BEARING AXIAL F3-8 3x8x3.5



#375000
OPTION XRAY SOLID AXLE 1/12 PAN CAR - SET



#375012
OPTION STEEL REAR AXLE SHAFT - HUDY SPRING STEEL™



ALU NUTS M3

#296530-B	BLUE	OPTION
#296530-K	BLACK	OPTION
#296530-O	ORANGE	OPTION
#960031	SILVER	INCLUDED

#374900
OPTION XRAY GEAR DIFFERENTIAL 1/12 PAN CAR - SET



GEAR DIFF - SPUR GEARS

#375776	76T / 64P	OPTION
#375780	80T / 64P	OPTION
#375784	84T / 64P	OPTION
#375788	88T / 64P	OPTION
#375792	92T / 64P	OPTION

SPUR GEARS 64P

#375872	72T	OPTION	#375880	80T	INCLUDED EU
#375875	75T	OPTION	#375884	84T	OPTION
#375876	76T	INCLUDED US	#375888	88T	OPTION
#375878	78T	OPTION	#375892	92T	OPTION

BAG

03

372070 COMPOSITE RIDE HEIGHT ADJUSTER SET - V2 (2)
 375000 XRAY SOLID AXLE 1/12 PAN CAR - SET
 375010 REAR AXLE SHAFT - GRAPHITE - V3
 375031 ALU REAR WHEEL HUB - RIGHT
 375040 ALU REAR WHEEL HUB - LEFT
 375051 ALU DIFF HUB
 375080 D-LOCK DIFF PLATE (2)
 375090 SET OF ALU SHIMS (0.5MM, 1.0MM, 2.0MM)
 375093 ALU SHIM 6.37x8.4x6.0MM (2)
 375876 COMPOSITE SPUR GEAR - 76T / 64P

375880 COMPOSITE SPUR GEAR - 80T / 64P
 902305 HEX SCREW SH M3x5 (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 - V2
 941438 BALL-BEARING 1/4"x3/8"x1/8" RUBBER SEALED - OIL (2)
 951438 BALL-BEARING 1/4" x 3/8" x 1/8" FLANGED - STEEL SEALED - OIL (2)
 960031 ALU NUT M3 (10)
 963030 CONE WASHER ST 3x8x0.5 (10)

3. BALL DIFFERENTIAL

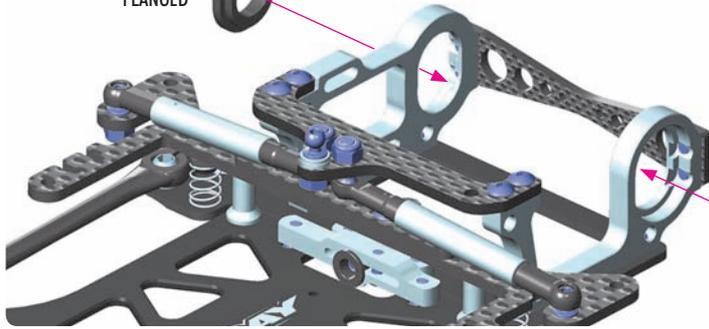


951438
BB 1/4"x3/8"x1/8"

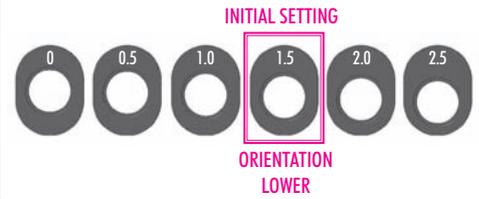
BEARING OIL
(HUDY #106230)

↓ 1.5 - ORIENTATION LOWER

FLANGED



These eccentric bushings adjust the **RIDE HEIGHT** of the rear pod. Make sure to use the **SAME** eccentric bushings on **BOTH** sides.



↓ 1.5 - ORIENTATION LOWER

FLANGED



375090
6.4x8.4x1.0



375090
6.4x8.4x0.5



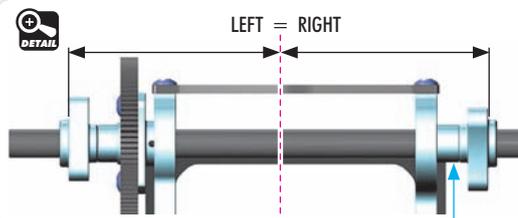
375093
6.4x8.4x6.0



908258
SCH M2.5x8

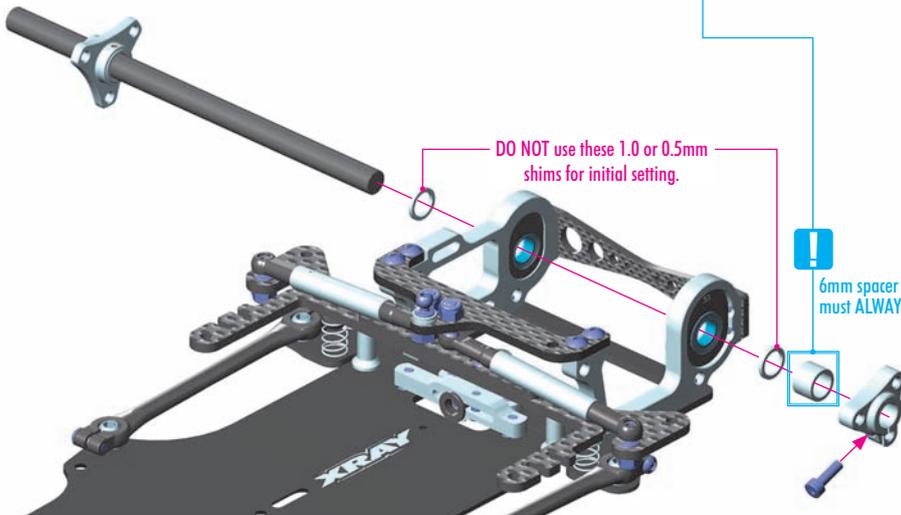


SOLID AXLE



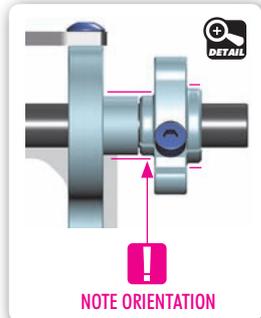
To set track-width, use the hole in the POD lower plate as the centre point; this hole should always be centred between the two rear wheels once overall track-width is set. To set the track-width more easily, set the car on a ruler or use a digital vernier caliper.

Rear track-width is directly affected by wheel offsets, which can vary depending on tire brand.



DO NOT use these 1.0 or 0.5mm shims for initial setting.

6mm spacer must ALWAYS be used



375093
6.4x8.4x6.0



902305
SH M3x5



908258
SCH M2.5x8

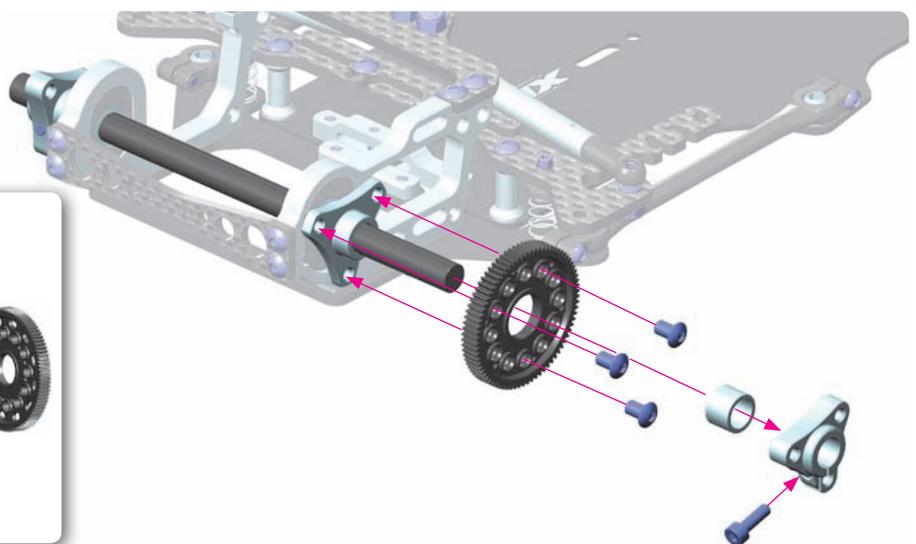


SOLID AXLE



SPUR GEARS 64P

#375872	72T	OPTION
#375875	75T	OPTION
#375876	76T	INCLUDED (US)
#375878	78T	OPTION
#375880	80T	OPTION
#375884	84T	OPTION
#375888	88T	OPTION
#375892	92T	OPTION



3. BALL DIFFERENTIAL



375090
6.4x8.4x1.0



375090
6.4x8.4x0.5



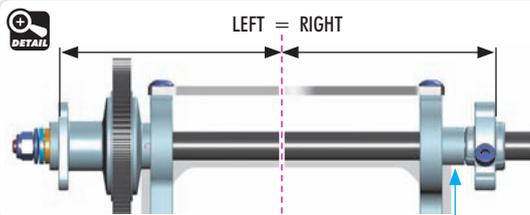
375093
6.4x8.4x6.0



908258
SCH M2.5x8

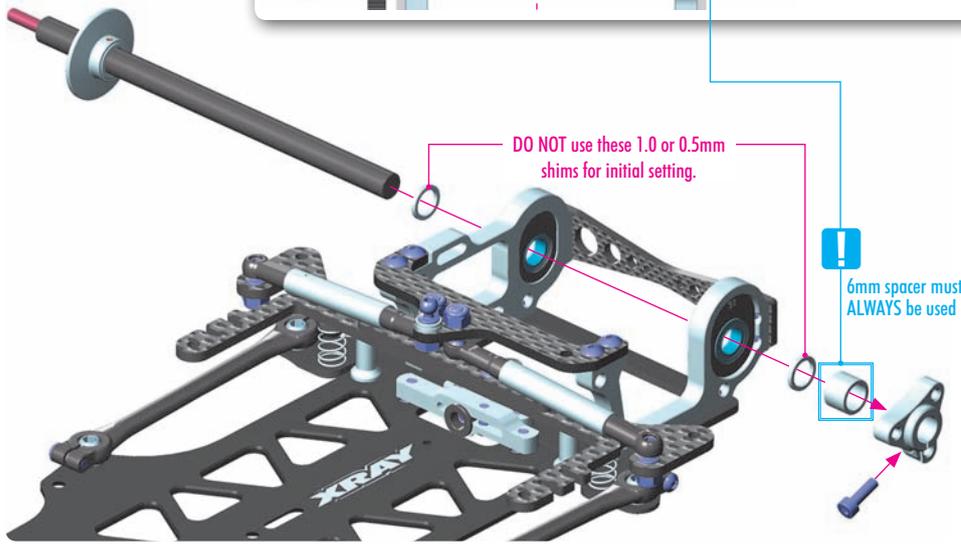


ADJUSTABLE



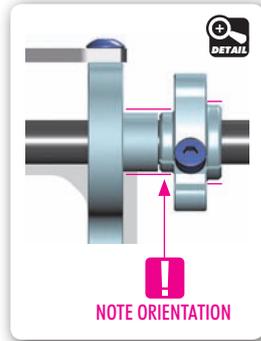
To set track-width, use the hole in the POD lower plate as the centre point; this hole should always be centred between the two rear wheels once overall track-width is set. To set the track-width more easily, set the car on a ruler or use a digital vernier caliper.

Rear track-width is directly affected by wheel offsets, which can vary depending on tire brand.



DO NOT use these 1.0 or 0.5mm shims for initial setting.

6mm spacer must ALWAYS be used



930130
B 3.1



930138
BA 3x8



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



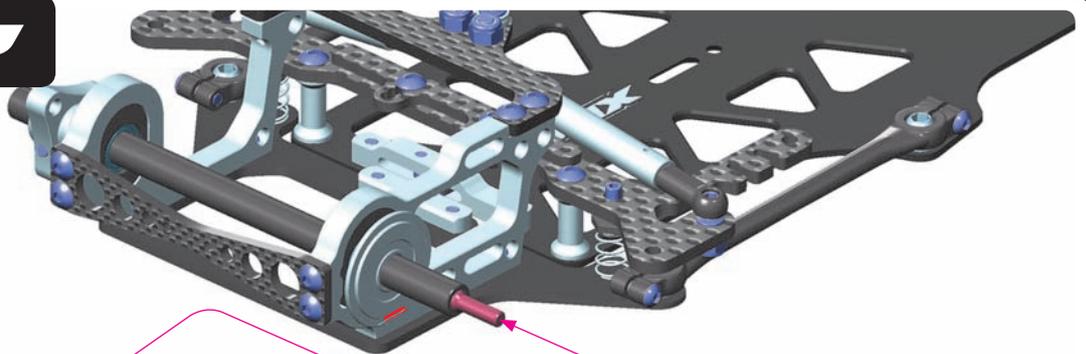
960031
ALU N M3



963030
ST 3x8



ADJUSTABLE



960031
ALU N M3

NOTE ORIENTATION



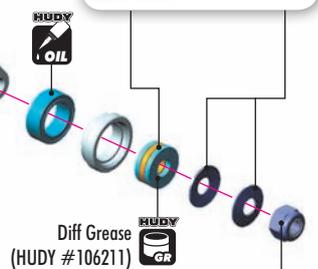
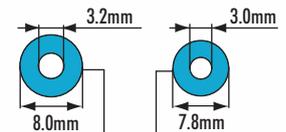
Diff Grease (HUDY #106211)

Diff Grease (HUDY #106211)

Diff Grease (HUDY #106211)

NOTE ORIENTATION

Bearing Oil (HUDY #106230)



Diff Grease (HUDY #106211)



SPUR GEARS 64P

#375872	72T	OPTION
#375875	75T	OPTION
#375876	76T	OPTION
#375878	78T	OPTION
#375880	80T	INCLUDED (EU)
#375884	84T	OPTION
#375888	88T	OPTION
#375892	92T	OPTION



IMPORTANT

This nut affects the tightness & stiffness of the rear differential. Tighten the nut gently so the diff does not slip under power, but do not overtighten or the diff balls and/or plates may be damaged.

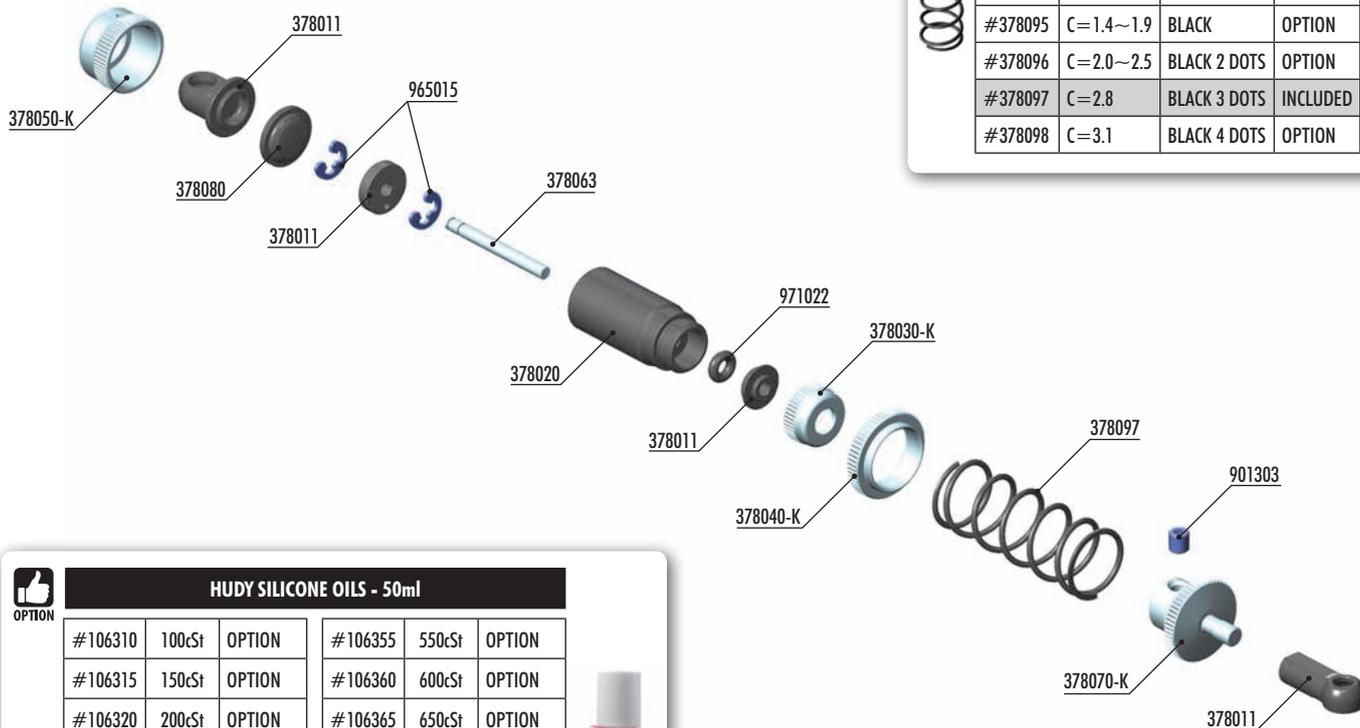


VIDEO TECH TIP



HOW TO BUILD THE BALL DIFF

SHOCK SPRINGS			
#378092	C=1.5	SILVER	OPTION
#378093	C=1.8	GOLD	OPTION
#378094	C=2.1	BLACK	OPTION
#378095	C=1.4~1.9	BLACK	OPTION
#378096	C=2.0~2.5	BLACK 2 DOTS	OPTION
#378097	C=2.8	BLACK 3 DOTS	INCLUDED
#378098	C=3.1	BLACK 4 DOTS	OPTION



HUDY SILICONE OILS - 50ml

#106310	100cSt	OPTION	#106355	550cSt	OPTION
#106315	150cSt	OPTION	#106360	600cSt	OPTION
#106320	200cSt	OPTION	#106365	650cSt	OPTION
#106325	250cSt	OPTION	#106370	700cSt	OPTION
#106330	300cSt	OPTION	#106375	750cSt	OPTION
#106335	350cSt	OPTION	#106380	800cSt	OPTION
#106340	400cSt	OPTION	#106390	900cSt	OPTION
#106345	450cSt	INCLUDED	#106410	1000cSt	OPTION
#106350	500cSt	OPTION	#106420	2000cSt	OPTION



BAG

04

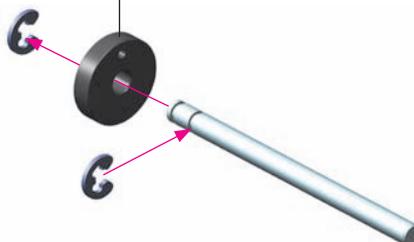
- 378002 SHOCK ABSORBER SET - BLACK
- 378011 COMPOSITE SHOCK PARTS - FRAME
- 378020 ALU THREADED SHOCK BODY - HARDCOATED
- 378030-K ALU SHOCK BODY CAP - LOWER - BLACK
- 378040-K ALU SHOCK ADJUSTABLE COLLAR - BLACK
- 378050-K ALU SHOCK BODY CAP - UPPER - BLACK
- 378063 SHOCK SHAFT 24MM
- 378070-K ALU SHOCK SPRING COLLAR - BLACK

- 378080 SHOCK RUBBER MEMBRANE (2)
- 378097 SHOCK SPRING C=2.8 - BLACK - 3 DOTS
- 901303 HEX SCREW SB M3x3 (10)
- 965015 E-CLIP 1.5 (10)
- 971022 SILICONE O-RING 2x2 (10)



965015
C15

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





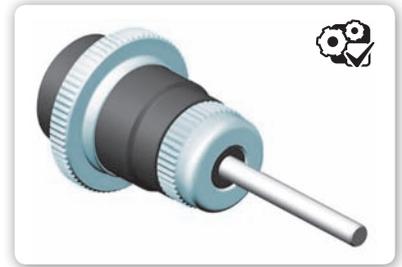
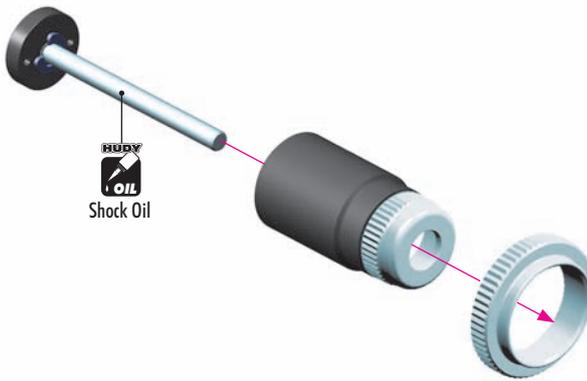
971022
0 2x2



VIDEO TECH TIP



HOW TO BUILD
CENTER SHOCK



DEFAULT SHOCK SETTING FOR SHOCK ABSORBER

Follow the steps below to set the shock.

- Oil 450St**

Extend the shock shaft completely. Fill the shock body with the shock oil.
- 3~5x
UP & DOWN

Move the shock shaft up and down a few times to release the air bubbles trapped beneath the piston.
- Orient the filled shock vertically for several minutes with the shock shaft fully extended. The remaining air bubbles will release.
- Install the shock membrane into the groove in the upper shock cap.
- 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.
- Gently push the shock shaft completely into the shock body. Excess oil will flow through the hole in the shock cap.
- 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 over-tighten or the rubber membrane may be damaged. Make sure that there is no oil leakage after the cap is tightened.



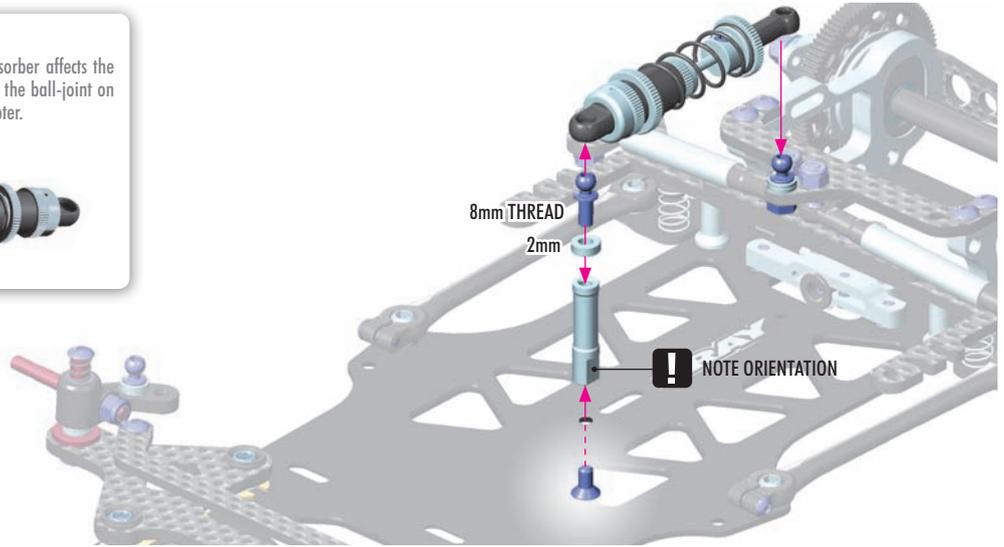
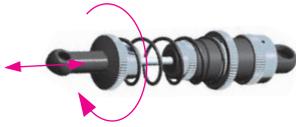
902306
SFH M3x6



303123
SHIM 3x6x2

DROOP ADJUSTMENT

The overall length of the shock absorber affects the amount of droop. To adjust, thread the ball-joint on or off the bottom spring cap or adapter.

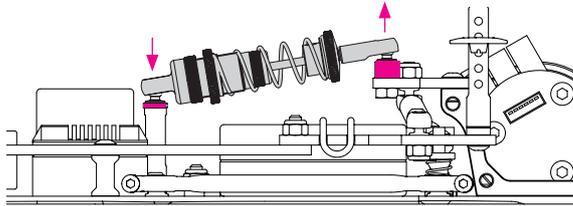


SHOCK ANGLE

MORE SHOCK ANGLE

Less shim in front, more shim in rear

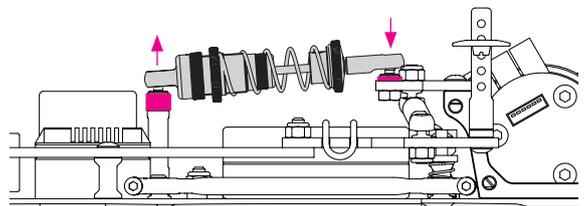
Makes the damping more progressive and increases on-power steering. Recommended for high-traction conditions when you need to free up the rear.



LESS SHOCK ANGLE

More shim in front, less shim in rear

Makes the damping more linear. Increases stability, decreases on-power steering. Recommended for low- to medium-traction conditions.



VIDEO TECH TIP



POD DROOP AND RIDE HEIGHT



306219
SHIM 3x6x1



306219
SHIM 3x6x2



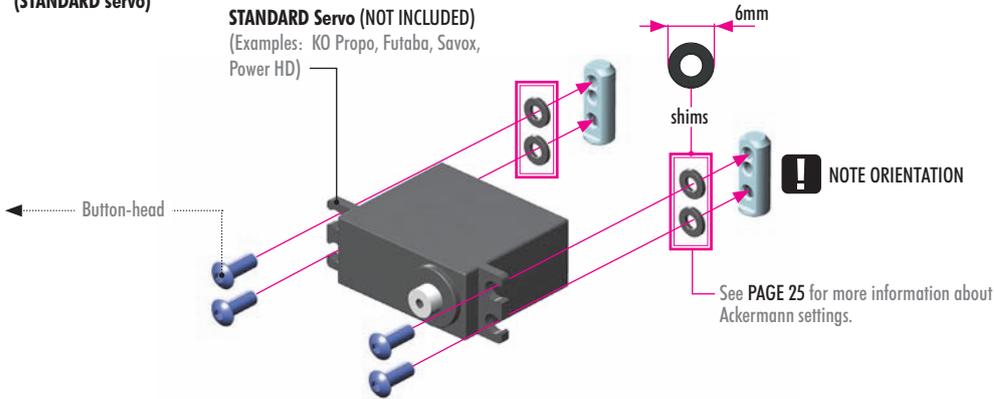
306219
SHIM 3x6x3



902308
SH M3x8

INITIAL SETTING (STANDARD servo)

STANDARD Servo (NOT INCLUDED)
(Examples: KO Propo, Futaba, Savox, Power HD)



STANDARD SERVO POSITION



VIDEO TECH TIP



ACKERMANN & BUMPSTEER



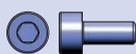
309319
SHIM 3x5x1



309319
SHIM 3x5x2



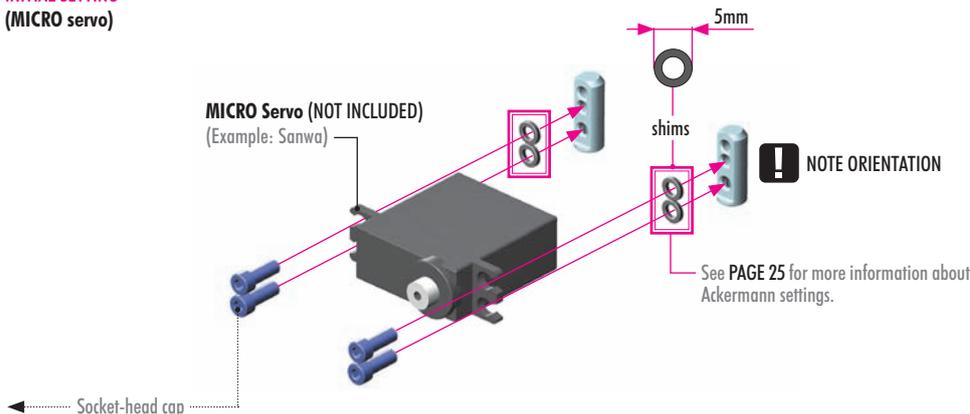
309319
SHIM 3x5x2



375390
ALU SCH M3x8

INITIAL SETTING (MICRO servo)

MICRO Servo (NOT INCLUDED)
(Example: Sanwa)



MICRO SERVO POSITION



SERVO SAVER

F = 25T H = 24T K = 23T

! Use the adapter that matches the steering servo.

6mm THREAD

Servo Screw (NOT INCLUDED)

Note the orientation of servo saver when servo is in neutral. **INITIAL SETTING**

90°

902304
SH M3x4

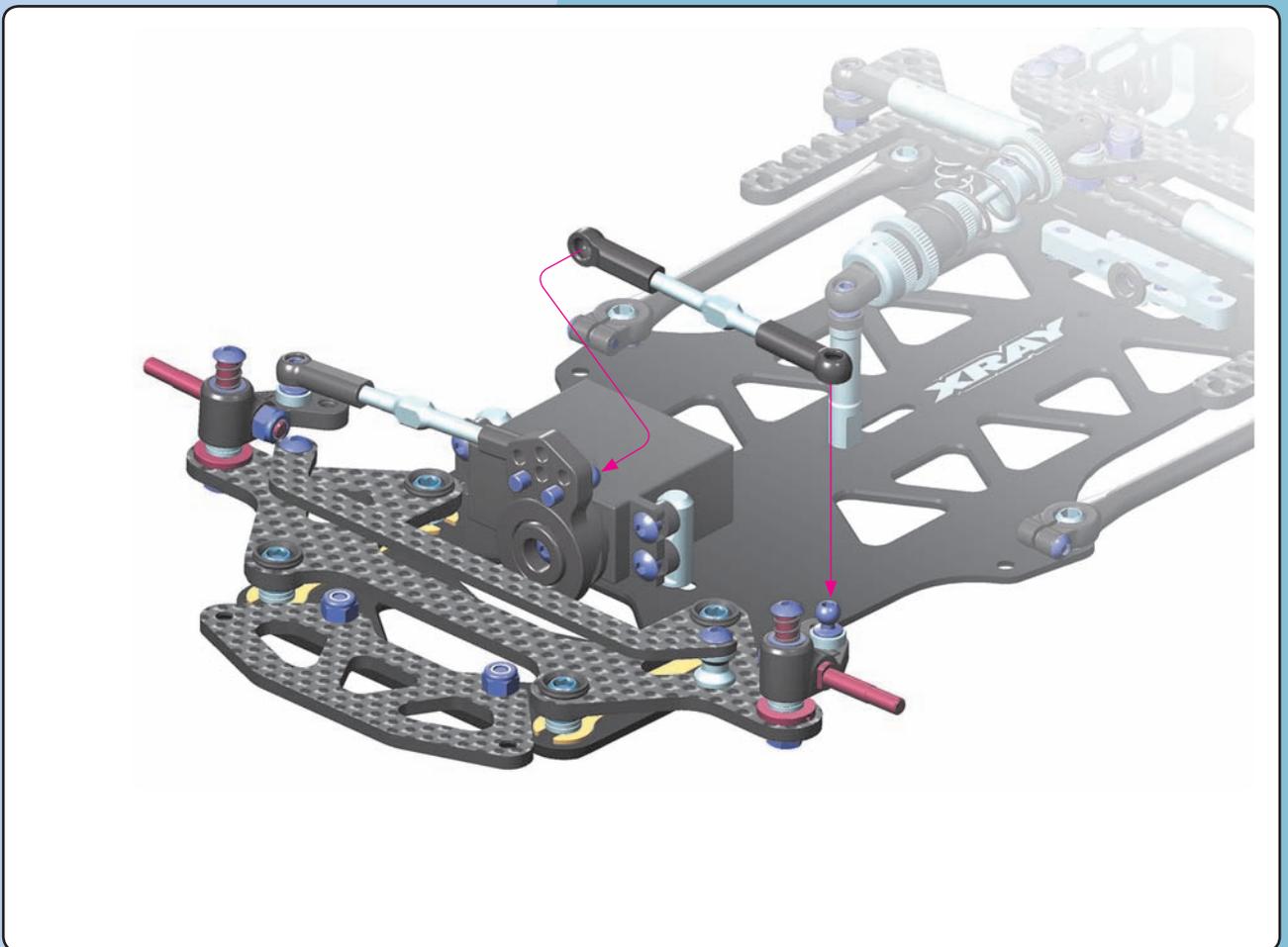
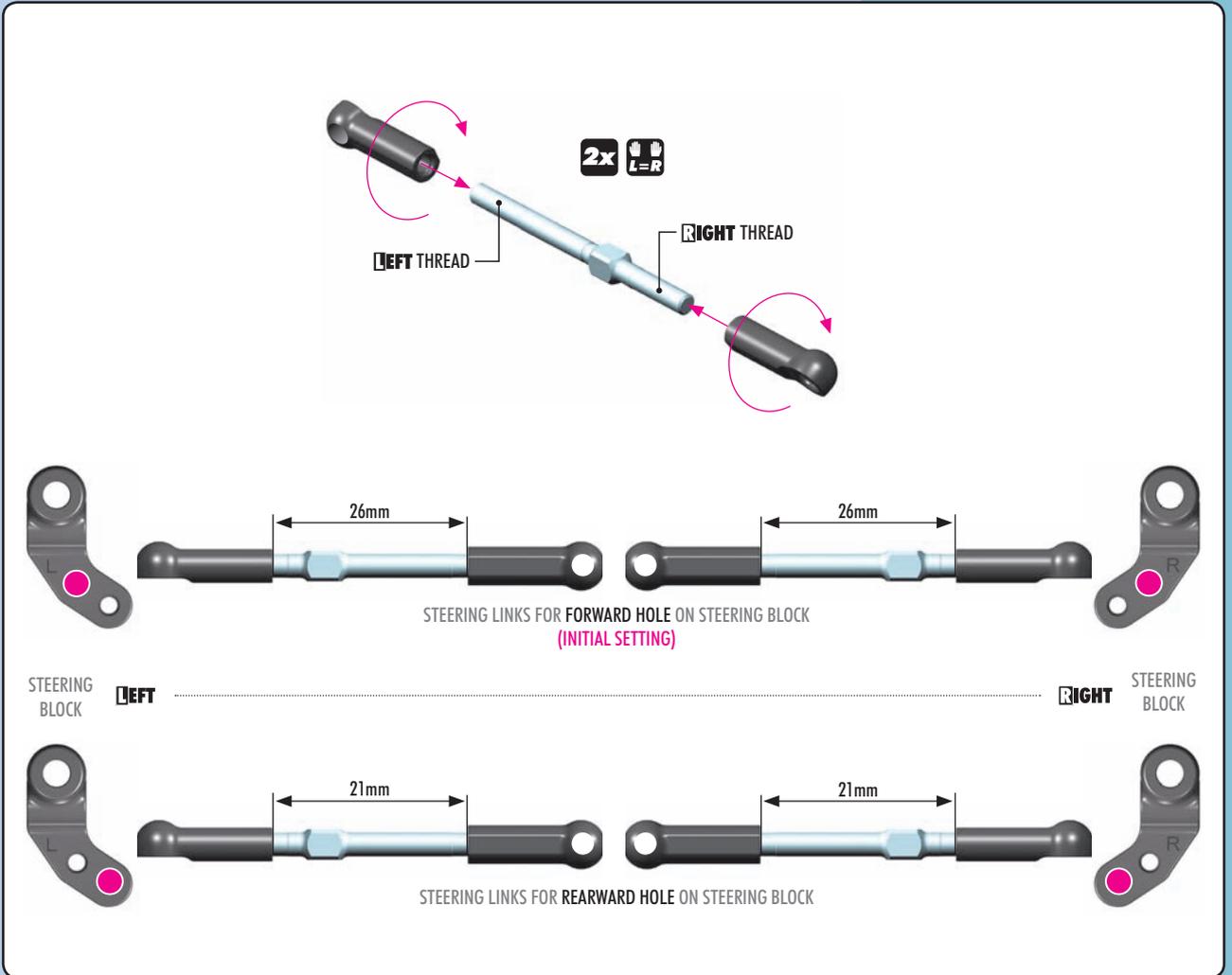
DETAIL

Make sure to center the servo saver along the chassis centerline.

TOP VIEW

To better see the chassis centerline, there is a small mark on the chassis.

BOTTOM VIEW





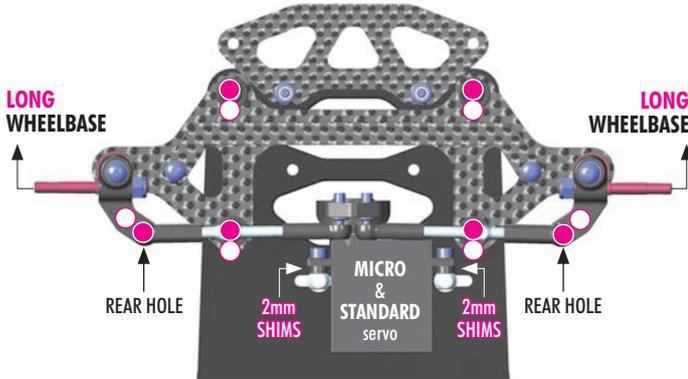
VIDEO TECH TIP ACKERMANN & BUMPSTEER SETTING

ACKERMANN SETTING

Ackermann is directly affected by wheelbase length and linkage position on the steering blocks. The configurations below are based on the use of a standard servo.

ALTERNATIVE 1 FOR MICRO AND STANDARD SERVO

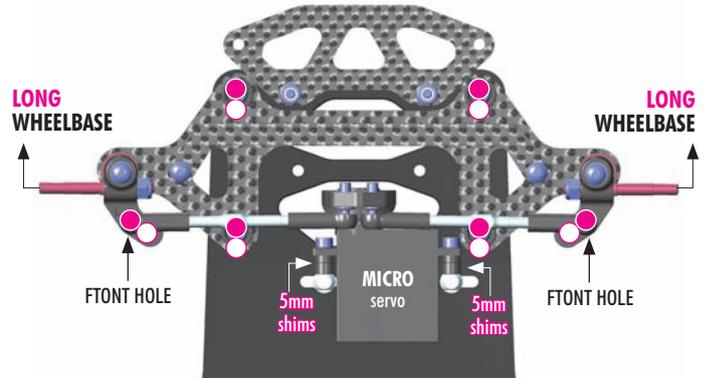
Wheelbase: LONG
Steering block: REAR holes
Servo mounting: AHEAD of posts
Servo saver: ballstuds BEHIND



Use 2mm thick shims between servo and posts.

ALTERNATIVE 2 FOR MICRO SERVO

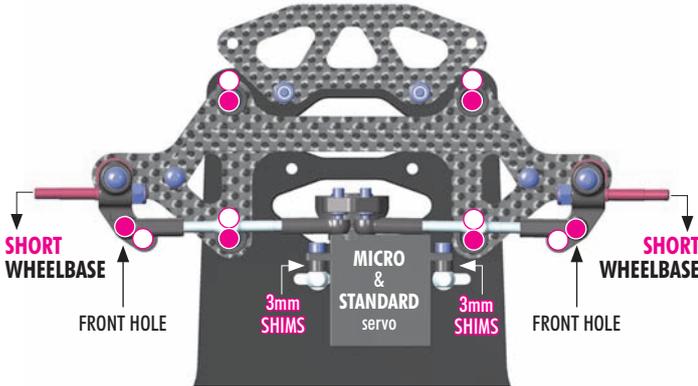
Wheelbase: LONG
Steering block: FRONT holes
Servo mounting: AHEAD of posts
Servo saver: ballstuds BEHIND



Use 5mm thick shims between servo and posts.

ALTERNATIVE 3 FOR MICRO AND STANDARD SERVO

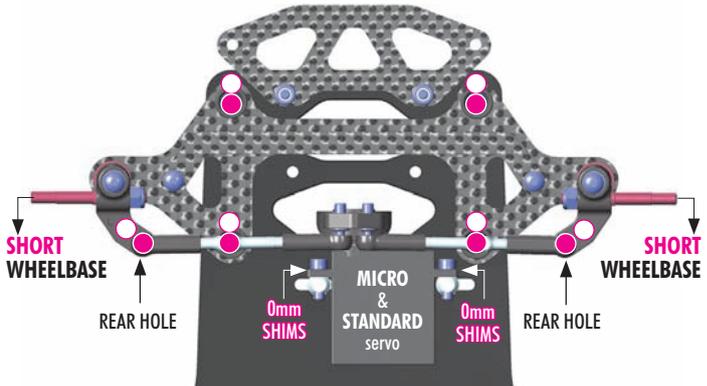
Wheelbase: SHORT
Steering block: FRONT holes
Servo mounting: AHEAD of posts
Servo saver: ballstuds BEHIND



Use 3mm thick shims between servo and posts.

ALTERNATIVE 4 FOR MICRO AND STANDARD SERVO

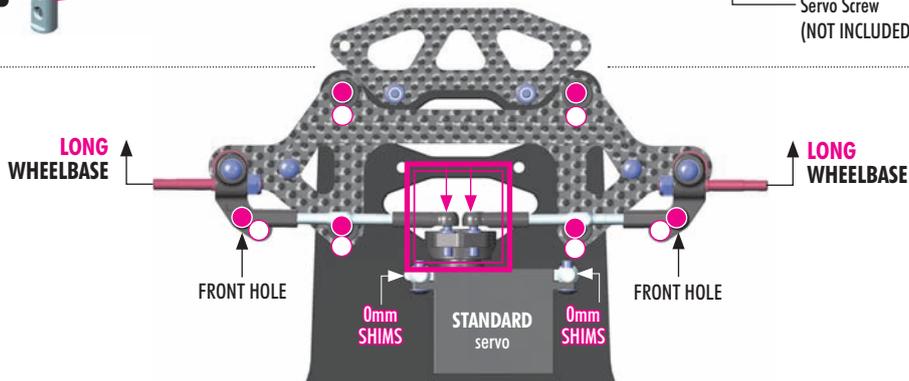
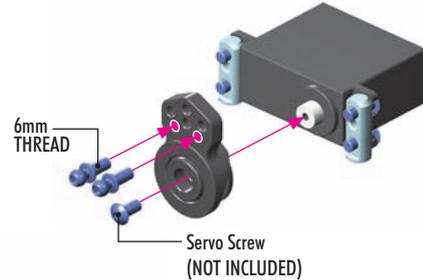
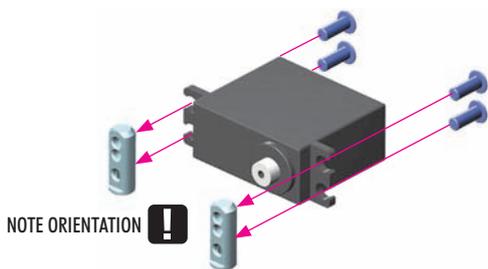
Wheelbase: SHORT
Steering block: REAR holes
Servo mounting: AHEAD of posts
Servo saver: ballstuds BEHIND



Do not add any shims between servo and posts.

ALTERNATIVE 5 FOR STANDARD SERVO

Wheelbase: LONG
Steering block: FRONT holes
Servo mounting: BEHIND posts
Servo saver: ballstuds IN FRONT



Mount the 6mm ball studs on the forward side of the servo saver.

10

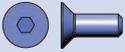
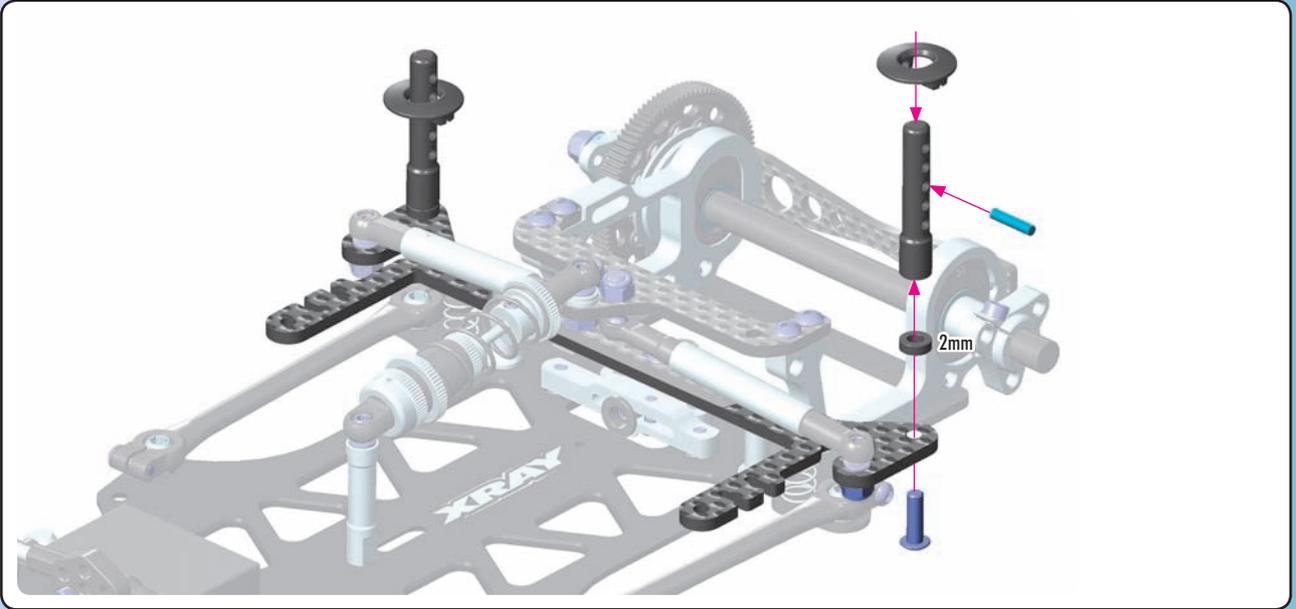
306219
SHIM 3x6x2



902310
SH M3x10



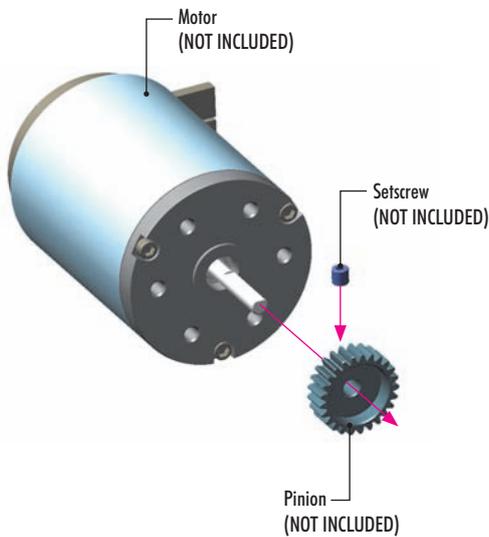
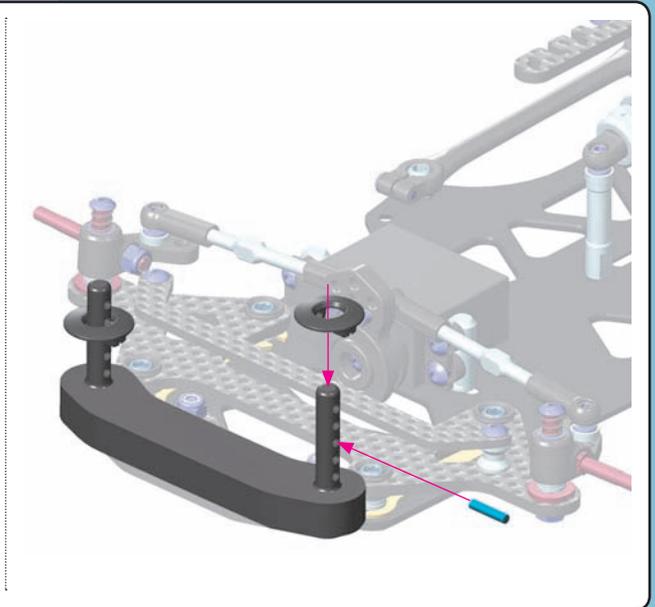
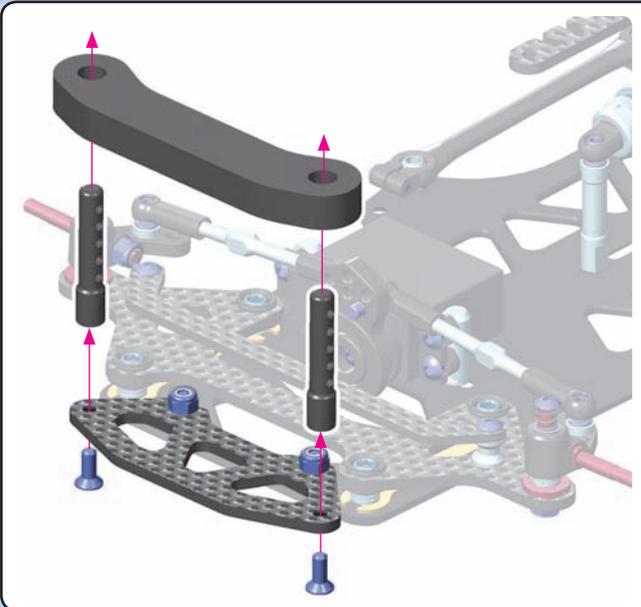
980210
P 2x10



903308
SFH M3x8



980210
P 2x10

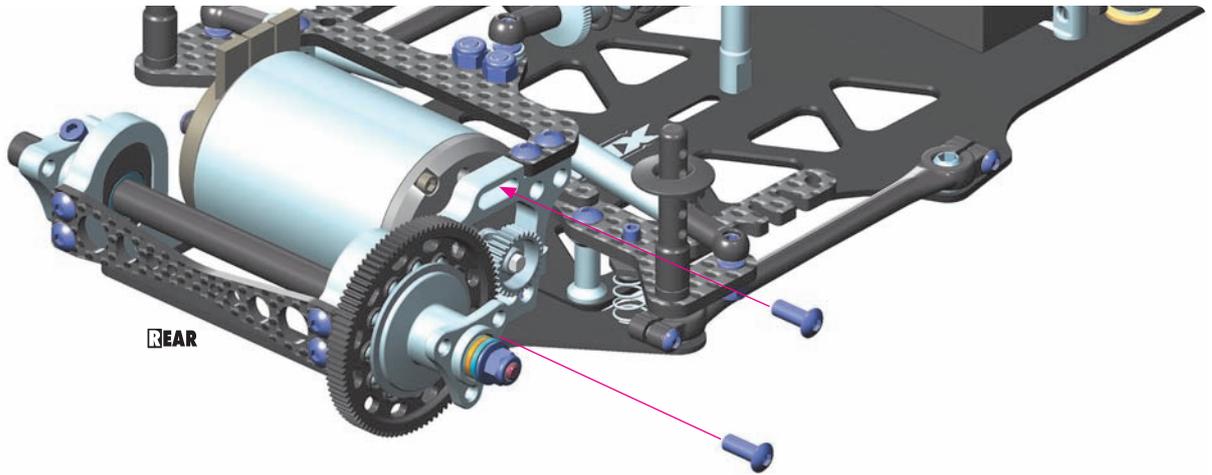


PINION GEARS ALU HARDCOATED (64P)

#305968	18T	OPTION	#305984	34T	OPTION
#305969	19T	OPTION	#305985	35T	OPTION
#305970	20T	OPTION	#305986	36T	OPTION
#305971	21T	OPTION	#305987	37T	OPTION
#305972	22T	OPTION	#305988	38T	OPTION
#305973	23T	OPTION	#305989	39T	OPTION
#305974	24T	OPTION	#305990	40T	OPTION
#305975	25T	OPTION	#305991	41T	OPTION
#305976	26T	OPTION	#305992	42T	OPTION
#305977	27T	OPTION	#305993	43T	OPTION
#305978	28T	OPTION	#305994	44T	OPTION
#305979	29T	OPTION	#305996	46T	OPTION
#305980	30T	OPTION	#305997	47T	OPTION
#305981	31T	OPTION	#305998	48T	OPTION
#305982	32T	OPTION	#306000	50T	OPTION
#305983	33T	OPTION			

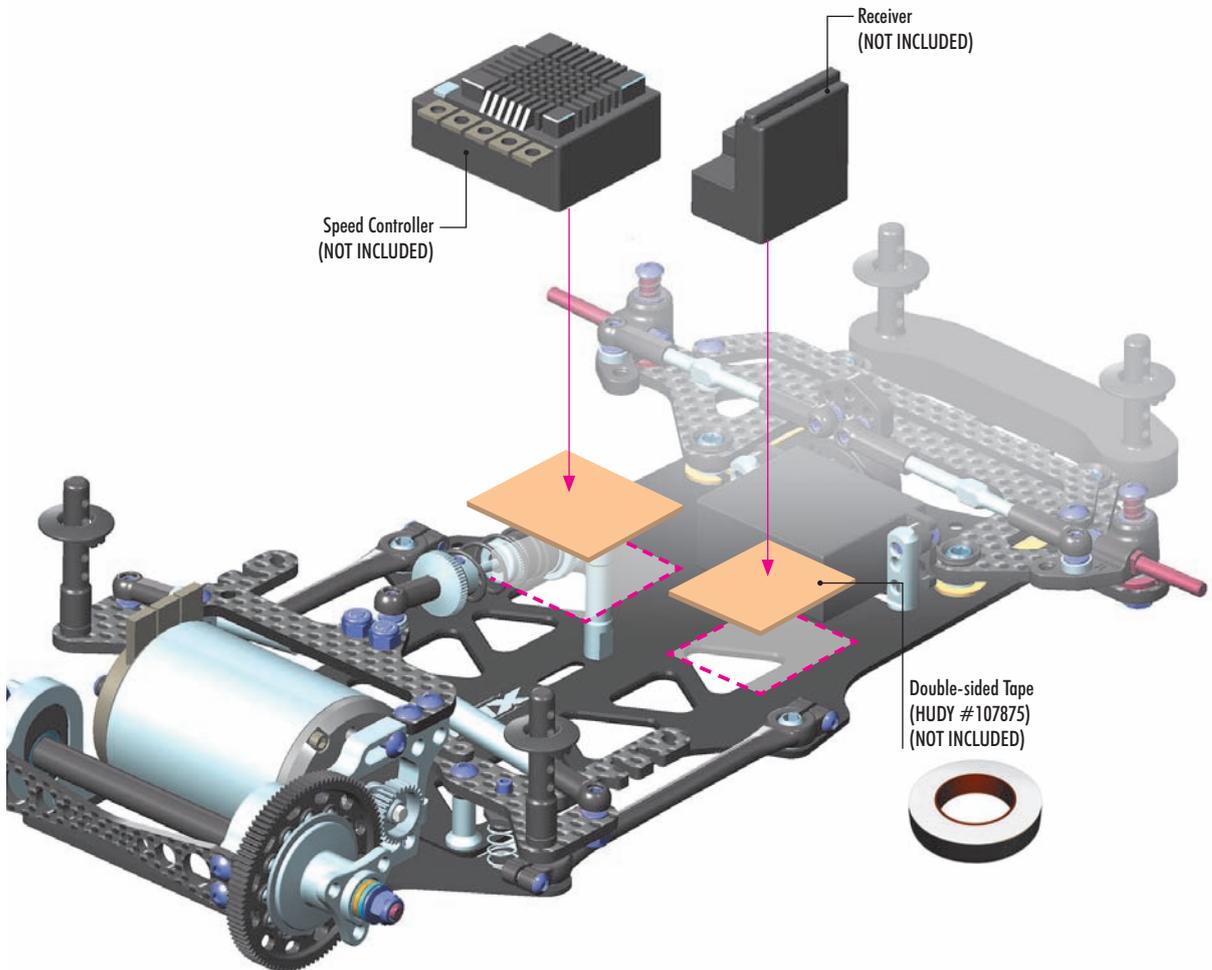
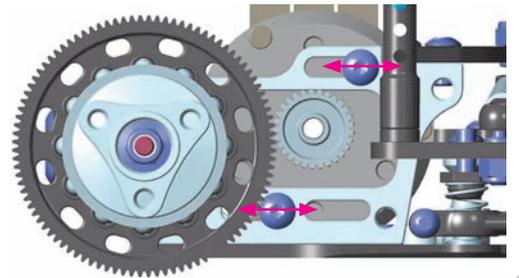


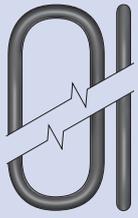
902308
SH M3x8



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.





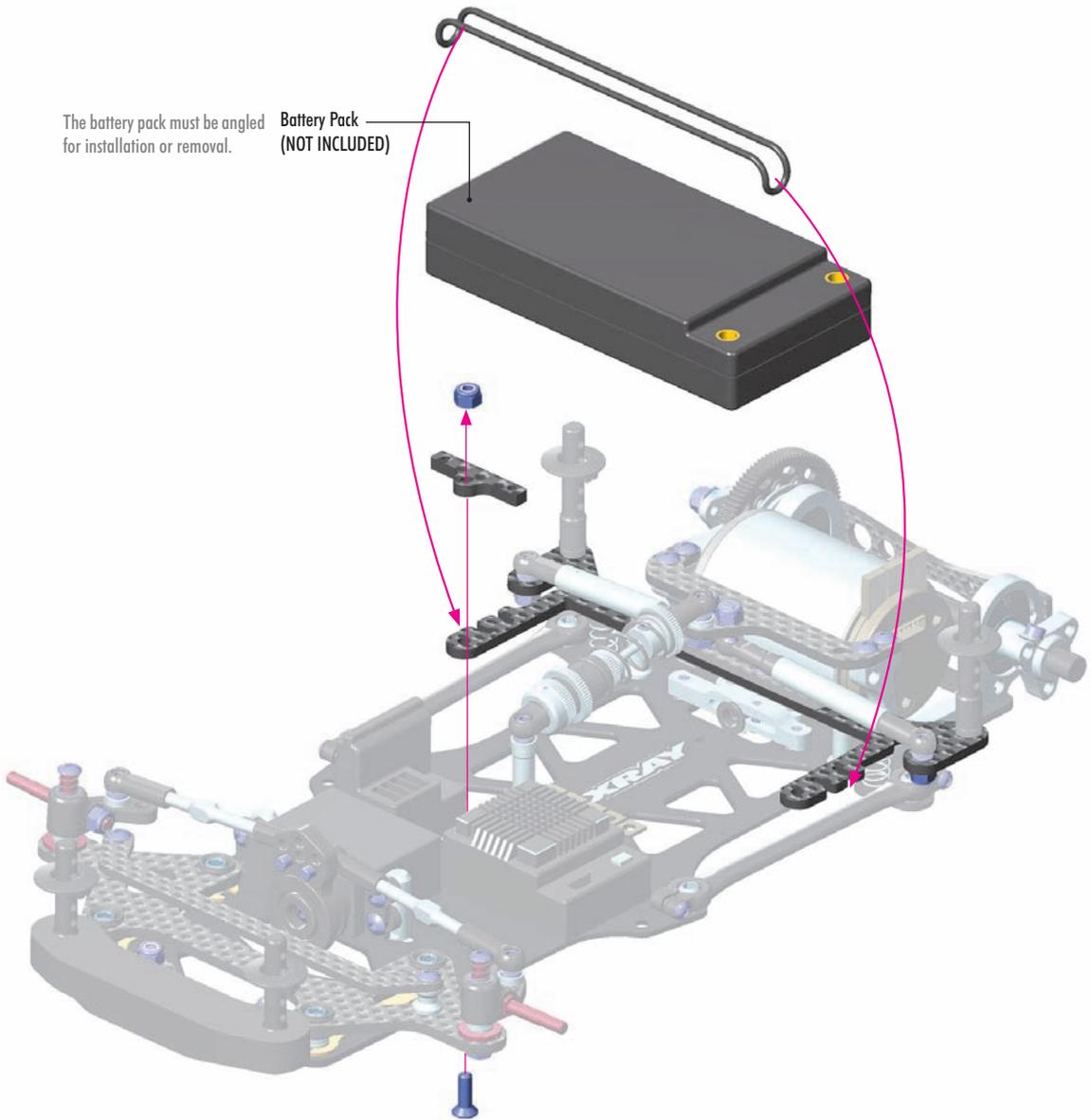
203052
0 50x1.8



903310
SFH M3x10

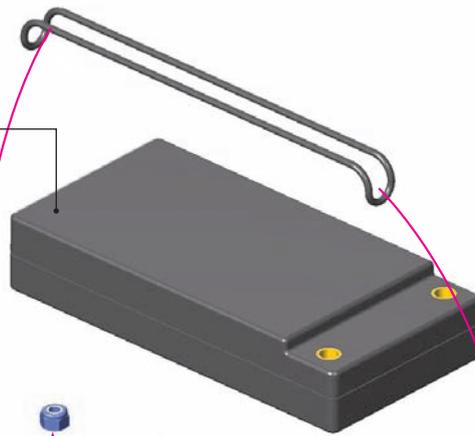


960031
ALU N M3



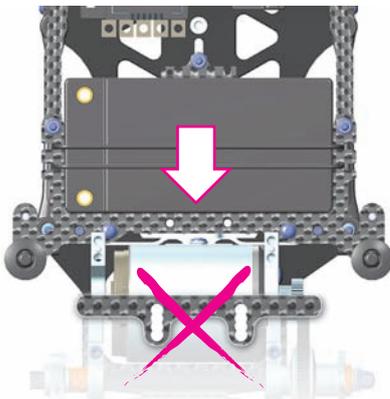
The battery pack must be angled for installation or removal.

Battery Pack
(NOT INCLUDED)

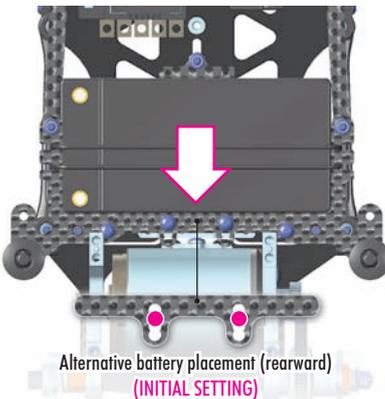


BATTERY MOUNTING POSITIONS

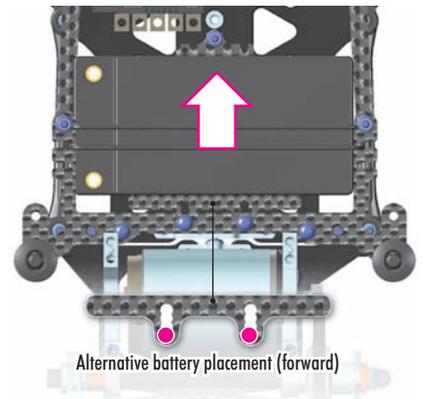
The X12 has 4 battery mounting positions. The more forward the battery is, the car will be easier to drive but it will be less responsive. The more rearward the battery is, the car will be more aggressive and have more steering.



When the battery is fully rearward, remove the battery backstop otherwise it can touch the motor



Alternative battery placement (rearward)
(INITIAL SETTING)



Alternative battery placement (forward)



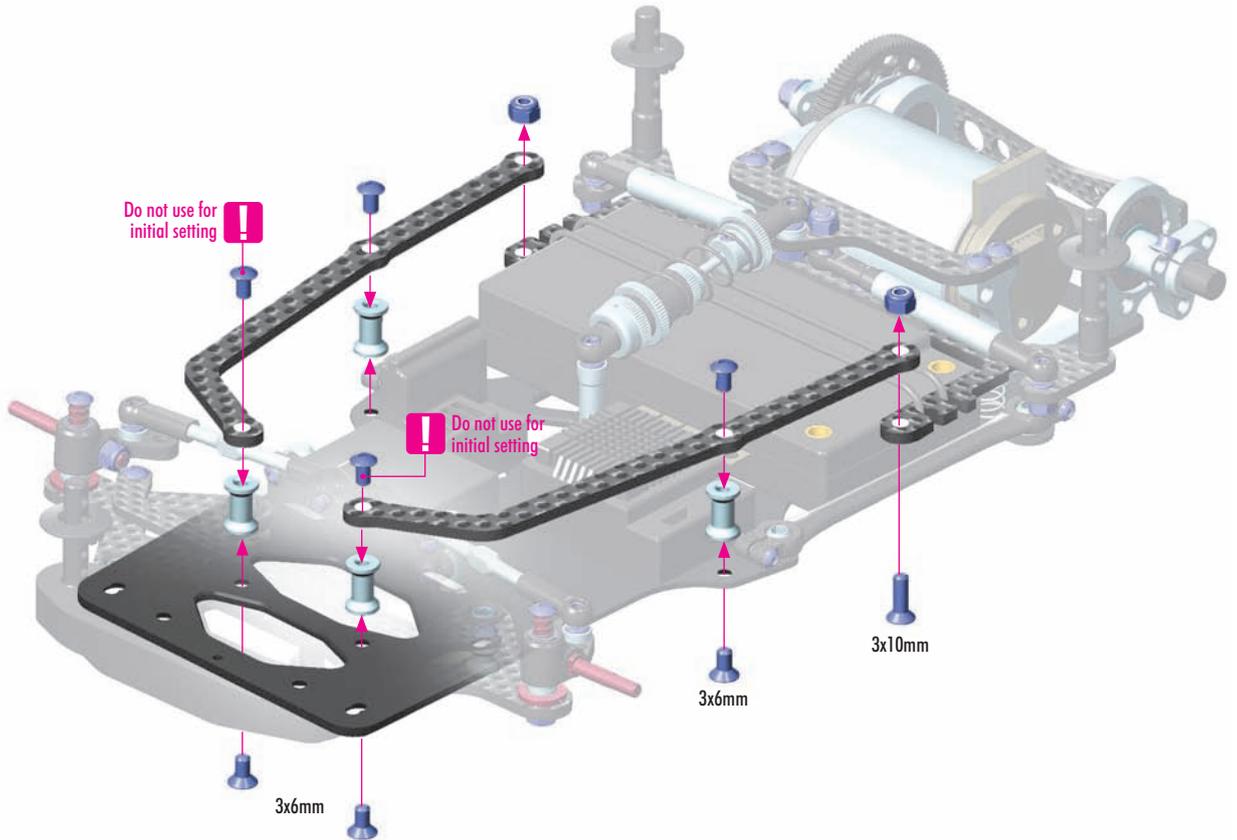
902305
SH M3x5



903306
SFH M3x6



903310
SFH M3x10



CHASSIS FLEX ADJUSTMENT



VIDEO TECH TIP



CHASSIS FLEX
ADJUSTMENT

SOFT (NO BRACES)

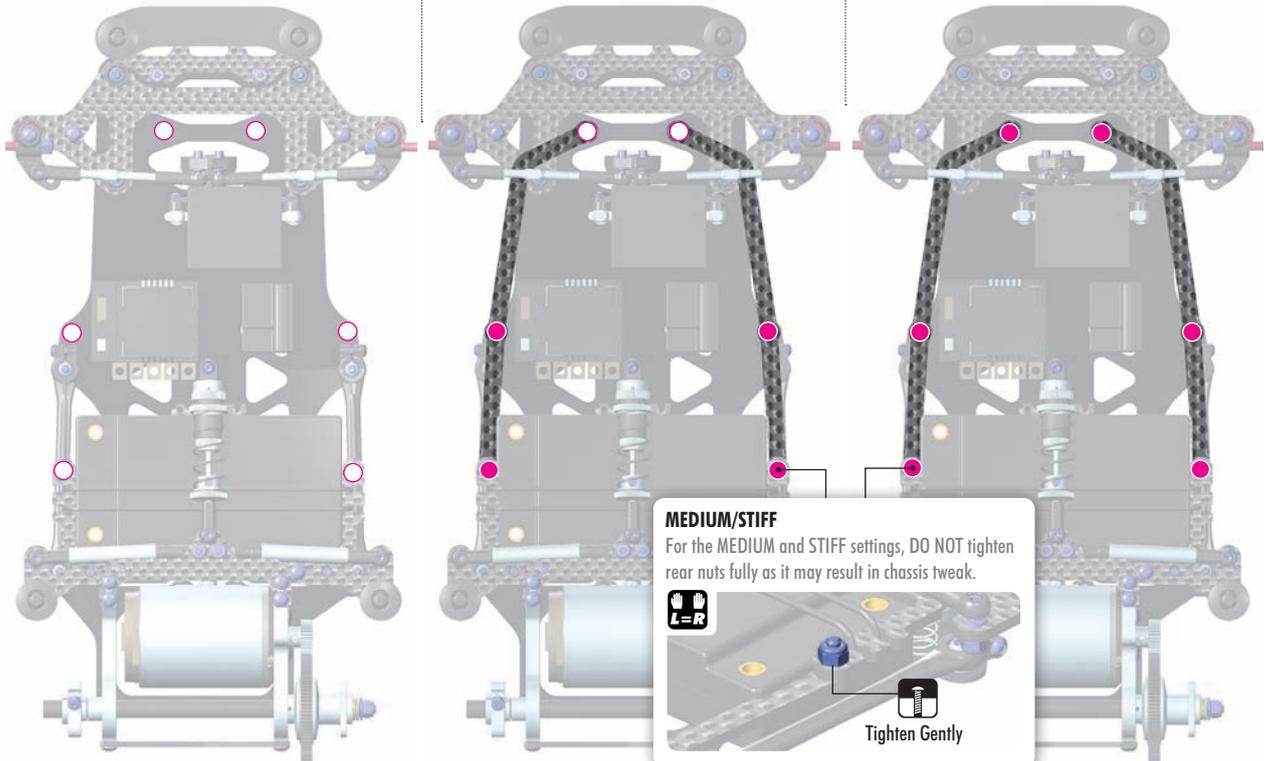
Generates more mechanical grip. Recommended for low to medium-traction carpet as well as asphalt.

MEDIUM (INITIAL SETTING)

Braces installed, attached at middle & rear only. This setting is a good compromise between mechanical grip and steering response. Ideal for most conditions.

STIFF

Braces installed, attached at front, middle, and rear. This is the stiffest, most stable setting. Recommended for high-traction carpet (such as US black carpet). The car will have less roll but will also have less overall grip.

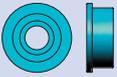




372290
SHIM 3.2x4.8x0.5



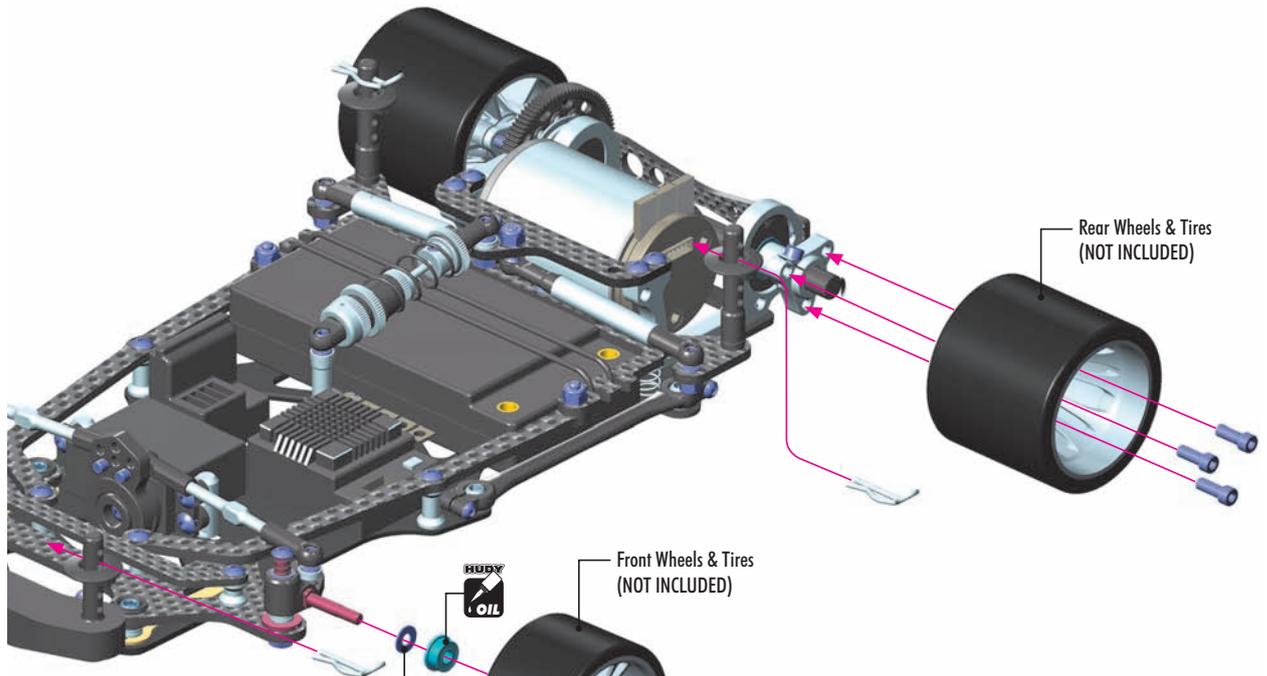
375390
ALU SCH M3x8



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



960031
ALU N M3



FRONT TRACK-WIDTH
The shim behind the wheel bearing affects the front track-width

WIDER TRACK-WIDTH
Easier to drive, less steering, less responsive

NARROWER TRACK-WIDTH
More steering, more responsive, but more difficult to drive

GENTLY TIGHTEN
the wheel nuts so the wheel turns freely, but without excessive axial play.

HUDY OIL
Bearing Oil
(HUDY #106230)

NOTE



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