Sportwerks™ Turmoil™ PRO
Assembly and Tuning Manual

Length:
19.4 in (492mm)

Width:
12.2 in (310mm)

Track:
Front-Adjustable
10.6 in–12.2 in
(270mm–310mm)

Rear 12.2 in (310mm)

Wheelbase: Adjustable
12.8 in–13.0 in (325mm–330mm)

Weight:
7.0 lb (3380 grams)
(without electronics)

Gear Ratio:
10.86 to 1

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Introduction

Thanks for your purchase. If you're an experienced off-road gas racer, you'll find the Sportwerks™ Turmoil™ to be a no-compromise competition racing buggy of the highest caliber. If you're new to gas off-road, hang on! You're about to discover just how much fun trying to tame an overpowered 1/8-scale monster can be. As you've already discovered, the Turmoil Pro comes assembled and all that's needed to make it race-ready is to install your radio system and, in some cases, your engine and exhaust system (#SWK1105 version only). While experienced racers will be tempted to disassemble the Turmoil, checking each part, then reassembling to assure correct parts fit, checking the torque of the screws and filling the differentials and shocks with their preferred fluids, rest assured this is not necessary. The Turmoil is professionally built and assembled by racers. The shocks are filled with 30wt. silicon oil while the differentials have 7000wt. silicon in the center differential, 5000wt. in the front and 1000wt. silicon oil in the rear differential. In short the Turmoil comes assembled, ready to win!

The front section of this manual features step-by-step illustrations and photos that take your Turmoil from box to race-ready. The following pages include exploded view isometric drawings with part numbers and parts listings, helpful when disassembling your Turmoil for repair or maintenance. Also included are setup sheets, one with a recommended base line setup and a blank version allowing you to record you own settings. The last page includes helpful information and specifications for your Turmoil.

Good luck, have fun and see ya at the track!

Sportwerks Product Development Team

Warranty Information

Limited Warranty Period

Horizon Hobby, Inc. guarantees this product to be free from defects in both material and workmanship at the date of purchase.

Limited Warranty & Limits of Liability

Pursuant to this Limited Warranty, Horizon Hobby, Inc. will, at its option, (i) repair or (ii) replace, any product determined by Horizon Hobby, Inc. to be defective. In the event of a defect, these are your exclusive remedies.

This warranty does not cover cosmetic damage or damage due to acts of God, accident, misuse, abuse, negligence, commercial use, or modification of or to any part of the product. This warranty does not cover damage due to improper installation, operation, maintenance, or attempted repair by anyone other than an authorized Horizon Hobby, Inc. service center. This warranty is limited to the original purchaser and is not transferable. In no case shall Horizon Hobby's liability exceed the original cost of the purchased product and will not cover consequential, incidental or collateral damage. Horizon Hobby, Inc. reserves the right to inspect any and all equipment involved in a warranty claim. Repair or replacement decisions are at the sole discretion of Horizon Hobby, Inc. Further, Horizon Hobby reserves the right to change or modify this warranty without notice.

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As Horizon Hobby, Inc. has no control over use, setup, final assembly, modification or misuse, no liability shall be assumed nor accepted for any resulting damage or injury. By the act of use, setup or assembly, the user accepts all resulting liability.

If you as the purchaser or user are not prepared to accept the liability associated with the use of this product, you are advised to return this product immediately in new and unused condition to the place of purchase.

Safety Precautions

This is a sophisticated hobby product and not a toy. It must be operated with caution and common sense and requires some basic mechanical ability. Failure to operate this product in a safe and responsible manner could result in injury or damage to the product or other property. This product is not intended for use by children without direct adult supervision.

The product manual contains instructions for safety, operation and maintenance. It is essential to read and follow all the instructions and warnings in the manual, prior to assembly, setup or use, in order to operate correctly and avoid damage or injury.

Questions, Assistance, and Repairs

Your local hobby store and/or place of purchase cannot provide warranty support or repair. Once assembly, setup or use of the product has been started, you must contact Horizon Hobby, Inc. directly. This will enable Horizon to better answer your questions and service you in the event that you may need any assistance.

Questions or Assistance

For questions or assistance, please direct your email to productsupport@horizonhobby.com, or call 877.504.0233 toll free to speak to a service technician.

Inspection or Repairs

If your product needs to be inspected or repaired, please call for a Return Merchandise Authorization (RMA). Pack the product securely using a shipping carton. Please note that original boxes may be included, but are not designed to withstand the rigors of shipping without additional protection. Ship via a carrier that provides tracking and insurance for lost or damaged parcels, as Horizon Hobby, Inc. is not responsible for merchandise until it arrives and is accepted at our facility. Include your complete name, address, phone number where you can be reached during business days, RMA number, and a brief summary of the problem. Be sure your name, address, and RMA number are clearly written on the shipping carton.

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To receive warranty service, you must include your original sales receipt verifying the proof-of-purchase date. Providing warranty conditions have been met, your product will be repaired or replaced free of charge. Repair or replacement decisions are at the sole discretion of Horizon Hobby.

Non-Warranty Repairs

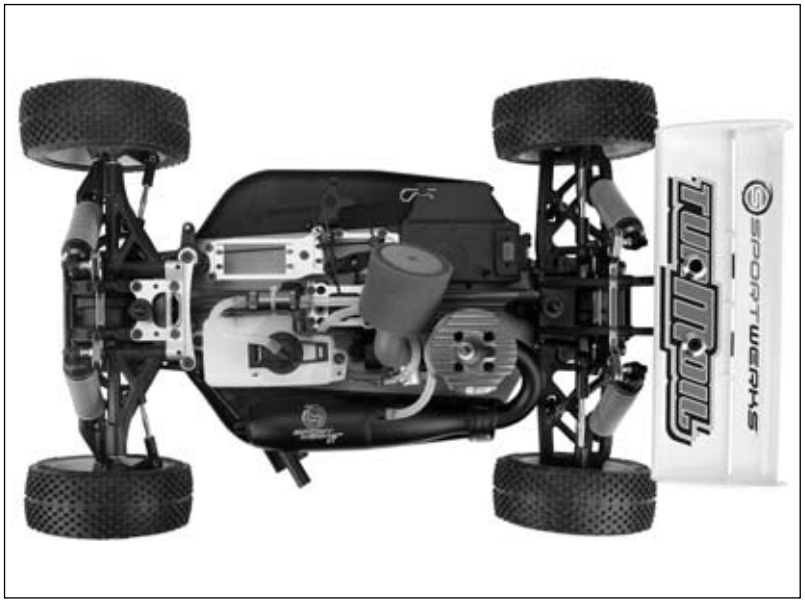
Should your repair not be covered by warranty and the expense exceeds 50% of the retail purchase cost, you will be provided with an estimate advising you of your options. You will be billed for any return freight for non-warranty repairs. Please advise us of your preferred method of payment. Horizon Hobby accepts money orders and cashiers checks, as well as Visa, MasterCard, American Express, and Discover cards. If you choose to pay by credit card, please include your credit card number and expiration date. Any repair left unpaid or unclaimed after 90 days will be considered abandoned and will be disposed of accordingly.

Electronics and engines requiring inspection or repair should be shipped to the following address (freight prepaid):

Horizon Service Center
4105 Fieldstone Road
Champaign, Illinois 61822

All other products requiring inspection or repair should be shipped to the following address (freight prepaid):

Horizon Product Support
4105 Fieldstone Road
Champaign, Illinois 61822



Recommended Tools

SWK9920
Metric Allen Driver Set

SWK9912
3 in 1 Tuning Screwdriver

SWK9910
EZ-On Clutch Spring Tool

SWK9911
Header Spring Tool

SWK9914
1/8 Scale Turnbuckle Wrench

DYN2828
#1 Phillips Screwdriver

DYN2511
Curved Lexan Scissors

Recommended Radio

JRP374075
Z-1 Synthesized Racing Radio System

Steering Servo
JRPSZ8800S
Digital High-Speed Servo

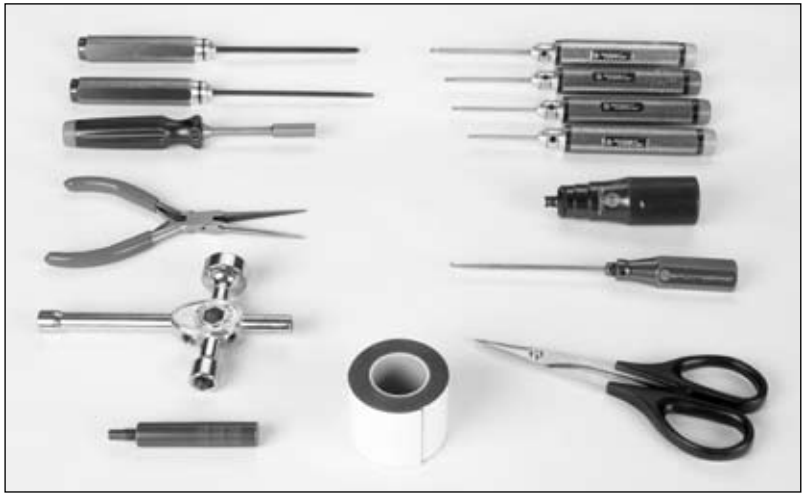
Throttle
JRPSZ8800T
Digital High-Torque Servo

Receiver battery and charger
DYN1432
6V 1100mAh Rx Pack with Charger

Tools You Will Find Handy

In addition to the tools included in this kit, you will find the following items useful when performing maintenance or repair to your Turmoil.

- 1.5mm hex wrench
- 2mm hex wrench
- 2.5mm hex wrench
- 3mm hex wrench
- 5.5 mm nut driver
- #2 flat screwdriver
- #1 Phillips screwdriver
- Needle-nose pliers
- Scissors
- Servo tape
- Clutch spring tool
- Header spring tool
- Piston lock or crank lock tool
- 10mm deep socket wrench



Additional Equipment Required for Assembly

- 2- or 3-channel car radio w/ 2 servos (steering servo should have a minimum of 80 oz/in of torque)
- Rechargeable 5-cell flat receiver pack and charger
- R/C car paint for polycarbonate bodies

Additional Items Needed to Operate

- Glow igniter
- Air filter oil
- Car fuel
- Fuel bottle
- Starter box and battery

SWK1105 requires the following additional items (not included)

- .21–.26-size rear exhaust engine with SG type crankshaft
- 1/8-scale buggy exhaust system

Recommended Items

DYN1925
Metered Glow Driver w/Ni-Cd & Charger

DYN2502
Air Filter Oil 45cc

DYN2270
Blue Thunder Race Formula 20%

DYN2003
Fast Fill Fuel Bottle 500cc

DYN5610C
Ready Start Starter Box Combo

Recommended Engine

SWK8082
.21 V2 Engine SG

SWK9203
007 HT Tuned Pipe

Preparing the Engine for Installation

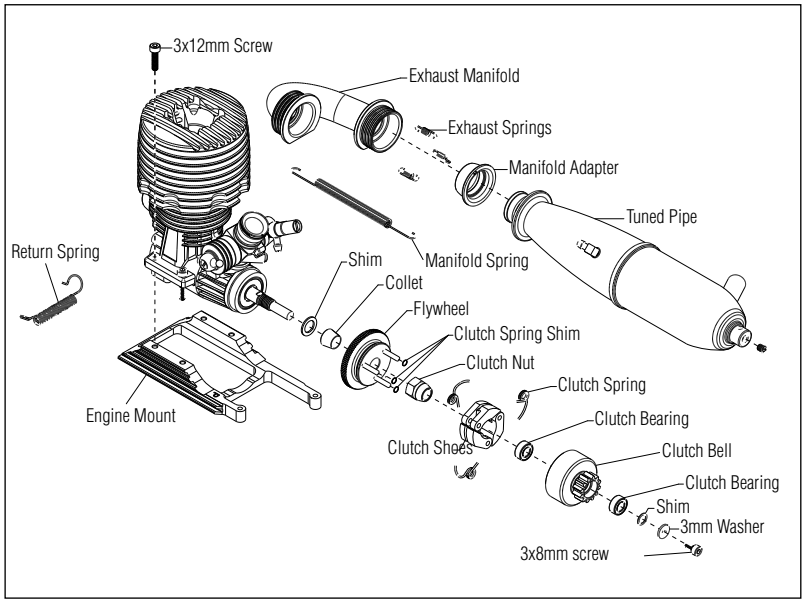
Note: If you're assembling the Turmoil™ Pro with engine version (#SWK1155), the engine, clutch and exhaust system are already installed. Skip this section and proceed to page 15, Installing the Radio System.

Required Items (included)

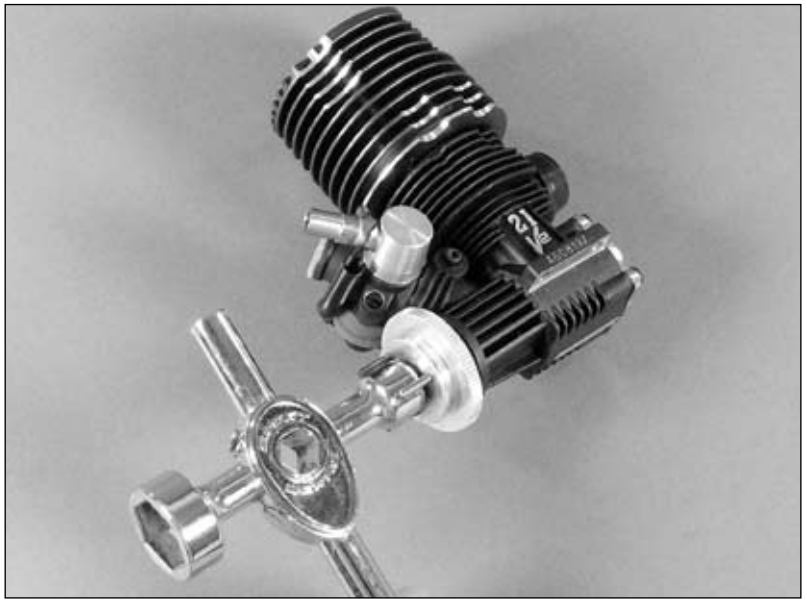
- *Flywheel (SWK3190)*
- *Flywheel Collet (SWK3192)*
- *Clutch Nut (SWK3194)*
- *Clutch Springs (3) (SWK3196)*
- *Clutch Shoe (3) (SWK9196)*
- *13-Tooth Clutch Bell (SWK3213)*
- *5x10mm Clutch Bearings (2) (SWK2620)*
- *3x6mm Cap Head Screw (SWK2122)*
- *3mm Washer (SWK2282)*
- *Clutch Shim (SWK3194)*
- *Engine Mount (SWK9230)*
- *3x12mm Engine Mounting Screws (4) (SWK2028)*

Required Items (not included)

- *Engine w/SG Type Crankshaft*
- *Exhaust System*



1. Install the flywheel collet, then the flywheel and then the clutch nut in that sequence on the crankshaft as shown in the illustration.



2 Using a 10mm deep socket wrench, tighten the clutch nut securely. A piston locking tool or crank lock tool should be used to prevent the engine from turning over while tightening. If one is not available, adjustable pliers can be used, carefully gripping the circumference of the flywheel while tightening the clutch nut.

3. Install the clutch shoes and springs on the flywheel pins. Note the springs must be positioned such that the ends are in the groove on the clutch nut. Use the Sportwerks EZ-On Clutch Tool (SWK9910) to install the springs and shoes into place.

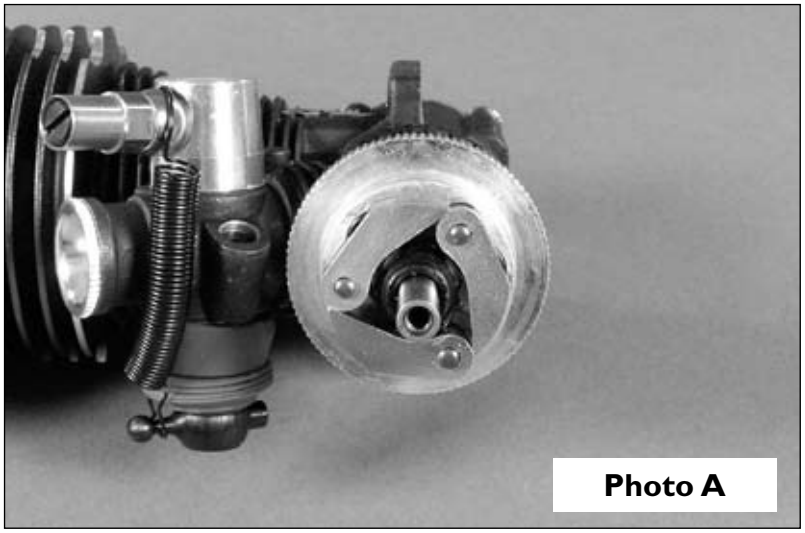
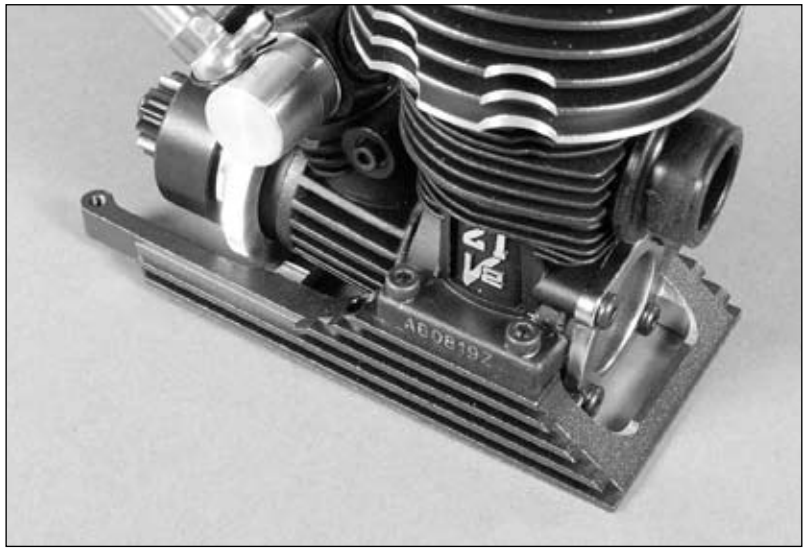


Photo A

Photo B

Note: The clutch shoes can be installed in one of two directions. Trailing (as shown below in figure A) will cause the clutch to engage slightly more smoothly, ideal for slick conditions; while the leading edge position (figure B) causes the clutch to engage slightly more aggressively, advantageous on high traction tracks.

4. Install two 5x10mm ball bearings in the clutch bell and slide the clutch bell onto the crankshaft. Several shims are included and, depending on your specific engine, the number of shims that will be needed to properly space the clutch bell will vary. Install the appropriate number of shims such that when the 3x6mm cap screw and washer is tightened in place a small amount of endplay, aprox. .004" to .006"(.10mm to .15mm) exists. Install the 3x6mm screw and washer and tighten securely.



5. Install the engine to the one-piece engine mount using the provided 3x12mm cap screws.

Important: Note the orientation of the carburetor in the above illustration. Be sure that the carburetor on your engine is installed per the illustration with the throttle arm on the correct side as shown. It may be necessary to rotate the carburetor 180º to position the throttle on the correct side.

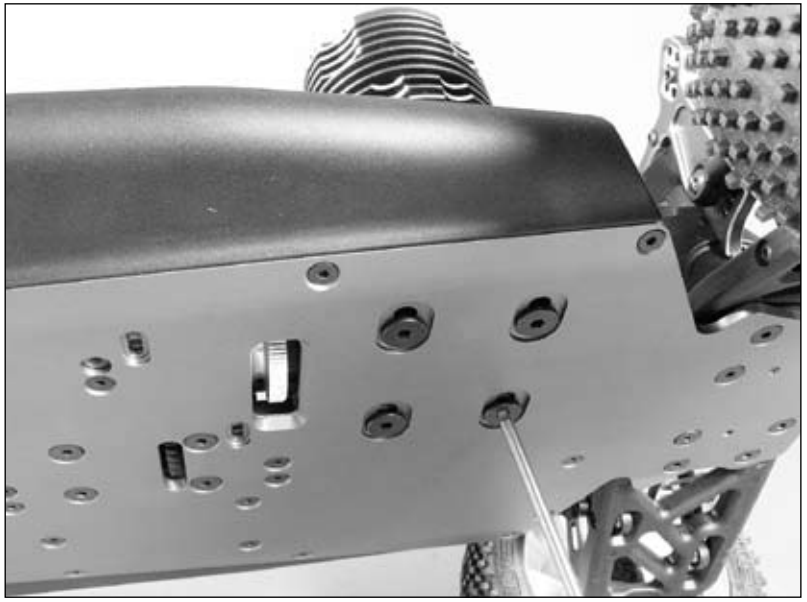
Installing the Engine and Exhaust System

Required Items (included)

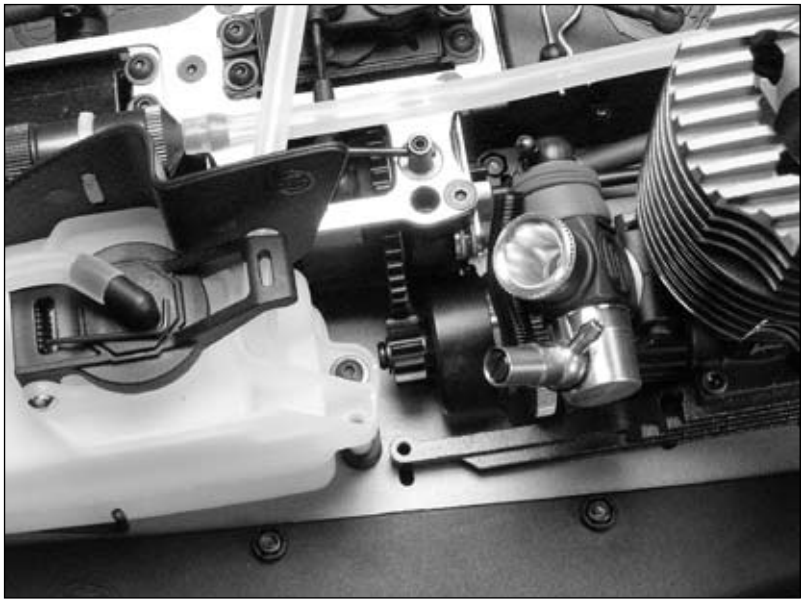
- *Engine from previous section*
- *Assembled chassis*
- *Pipe Hangar Wire (SWK3238)*
- *Muffler Stay (SWK3240)*
- *4x8mm Flathead Screw (SWK2054)*
- *Air Filter (SWK3232)*
- *4x4mm Set Screw (SWK2440)*
- *5x8mm Engine Mount Screws (4) (SWK2074)*

Required Items (not included)

- *Air filter oil*
- *Fuel tubing*
- *Exhaust system*



1. Using the four 5x8mm engine mounting screws, mount the engine to the chassis lightly tightening the mounting screws.



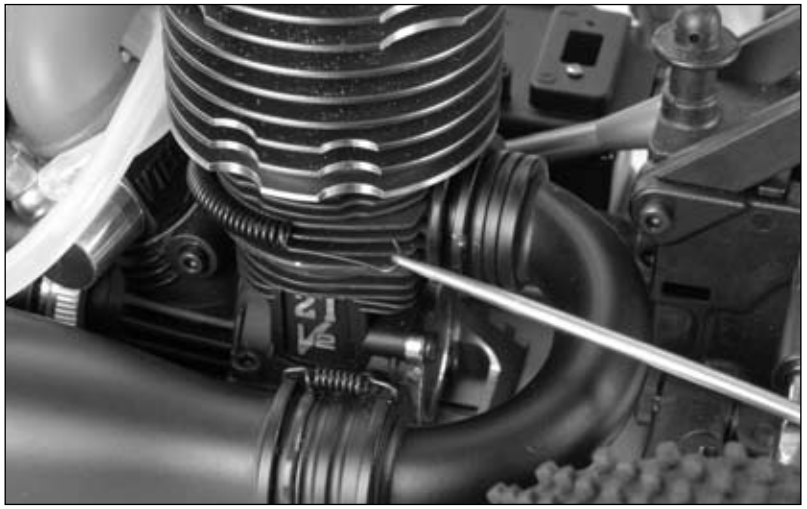
2. Adjust the gear mesh such that the clutch bell has only a slight amount of backlash, then securely tighten the engine mounting screws. Recheck for proper gear mesh and adjust as necessary.

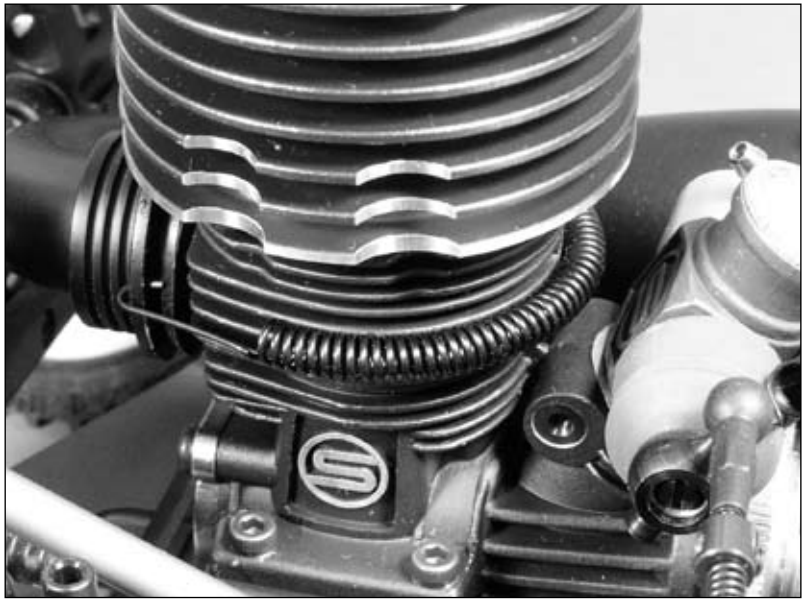
Note: The gears should freely spin with minimal noise and only a slight amount of backlash (gear free play).

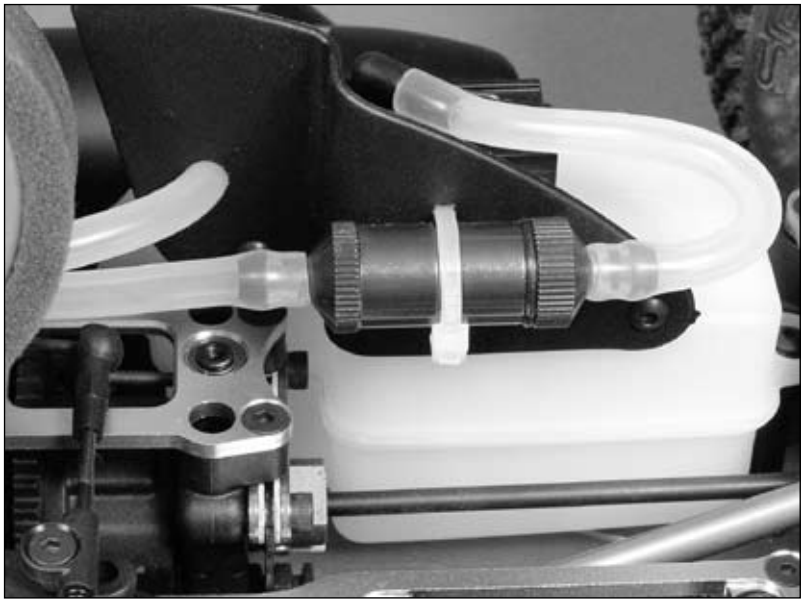
3. Assemble and install the muffler stay and pipe hanger on the chassis using the 4x4mm set screw and the 4x8mm flathead screw. Don't tighten these screws at this time.

4. Assemble the exhaust system (not included) and trial fit it in place. Note that the pipe hanger should be adjusted to allow the pipe to naturally align with the engine exhaust outlet. When you're satisfied with the position of the muffler stay and pipe hanger, securely tighten the screws.

Note: On some exhaust systems, it may be necessary to slightly trim the mud-guard to provide clearance for the exhaust.







The Turmoil™ fuel tank comes with an internal fuel filter located inside the tank. The large blue reservoir on the outside of the tank is actually used to prevent a lean bog condition. This extra volume of air helps prevent the engine from sagging after refueling, due to fuel sloshing into the pressure line and reducing tank pressure under acceleration.

5. Secure the header to the engine using the spring supplied with the exhaust system.

7. Attach the fuel lines as shown.

8. Apply air filter oil to the air filter and install it on the carburetor. Use the included cable tie to assure the air filter is securely in place.

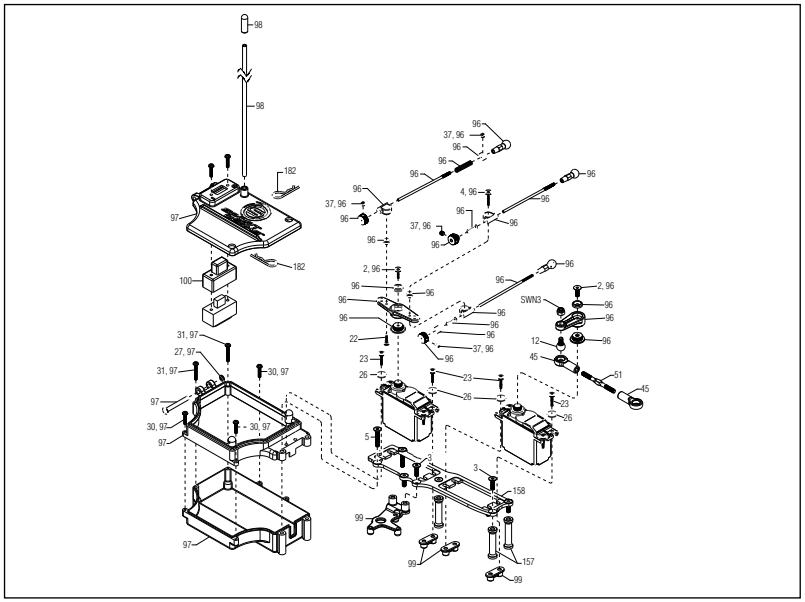
Installing the Radio System

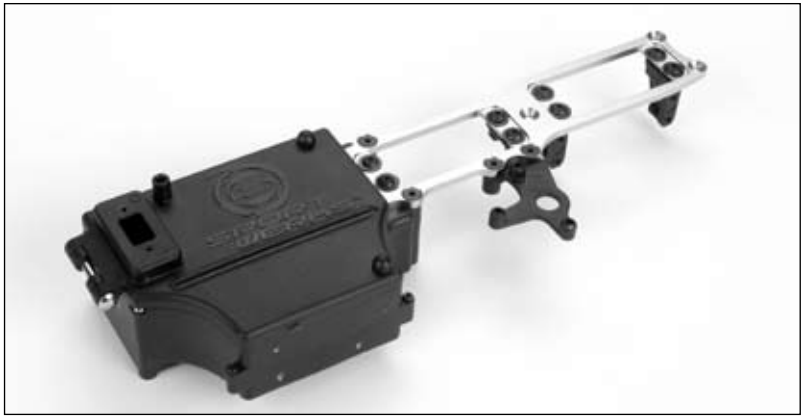
Required Items (included)

- *Steering Arm (SWK3108)*
- *Servo Adapters (SWK3108)*
- *Steering Linkage (SWK2550)*
- *Antenna (SWK3114)*
- *Antenna Cap (SWK3114)*
- *Switch Cover (SWK3118)*
- *6.8mm Pivot Ball (SWK)*
- *3mm Locknut (SWK2382)*
- *3x10mm Button Head Screws (8) (SWK2226)*
- *2x10mm Switch Mounting Screws (2) (SWK2306)*
- *3x8mm Flathead Screws (for servo arms) (2) (SWK2024)*
- *3mm Cone Washers (2) (SWK3108)*

Required Items(not included)

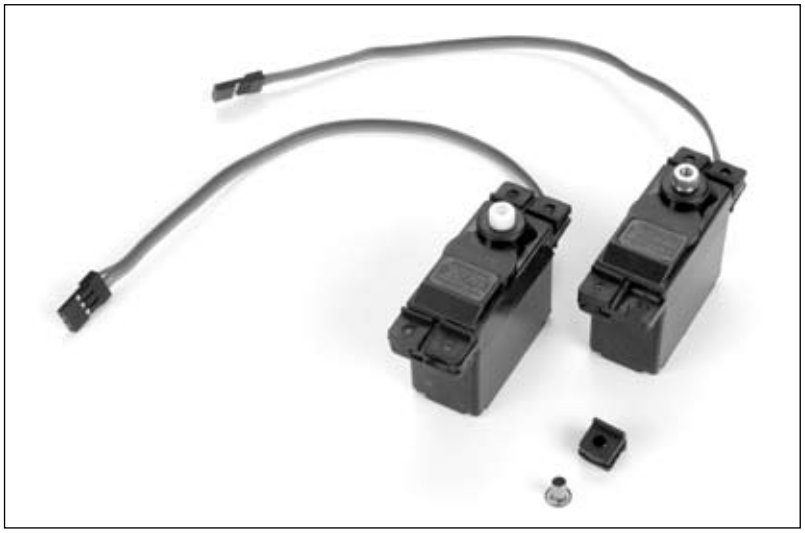
- *Receiver*
- *Switch harness*
- *Servo tape*
- *2 servos (steering servo with 80 oz/in of torque recommended)*
- *Rechargeable 5-cell flat receiver pack (#DYN1415 recommended)*





1. Remove the three 3x10mm flathead screws on the top of the radio tray and the four 3x10mm flathead screws on the bottom of the chassis that attach the radio box, and remove the assembly from the chassis.

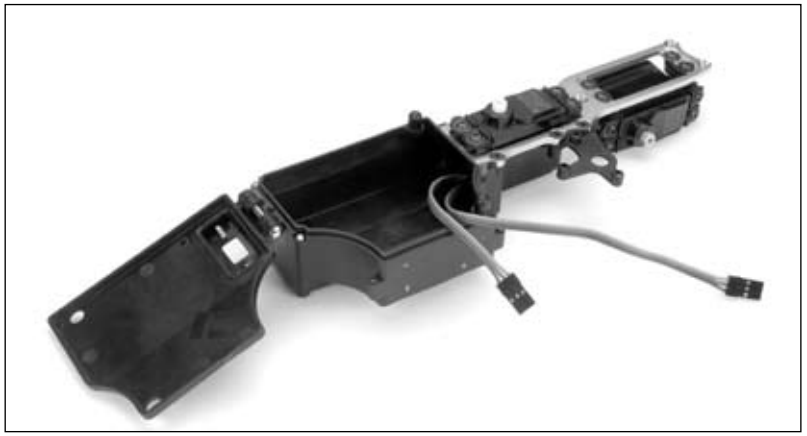
Note: While it's possible to install the radio system in the Turmoil™ without removing the radio tray and radio box from the buggy, it's much easier and recommended that the radio tray and box be removed from the chassis during radio installation.



2. Install the grommets and eyelets included with your radio system in both servos.

3. Using the eight 3x10mm button head screws and plastic servo mounts included in the kit, install the servos in the tray as shown noting the position of the output shafts. The steering servo may be installed in the standard or lay-down position.

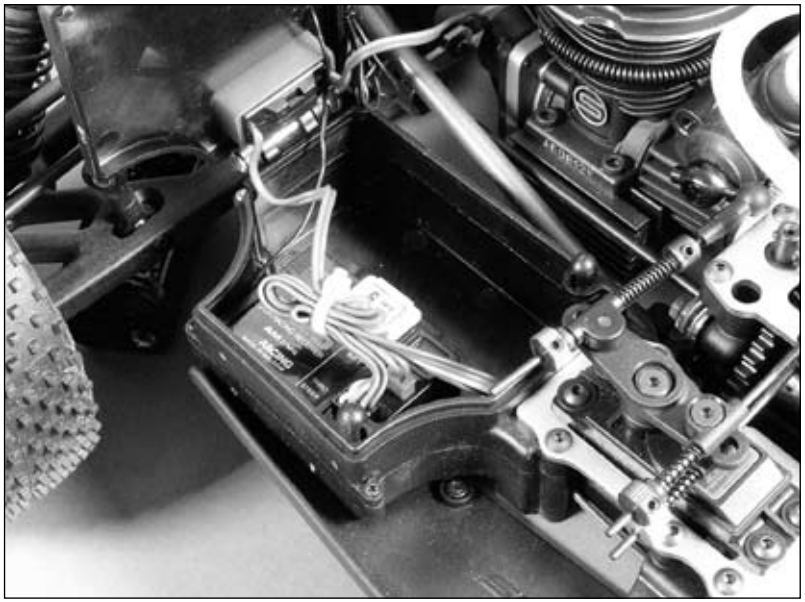
Note: If you're intending to use a personal transponder, install it on the provided mount at this time.

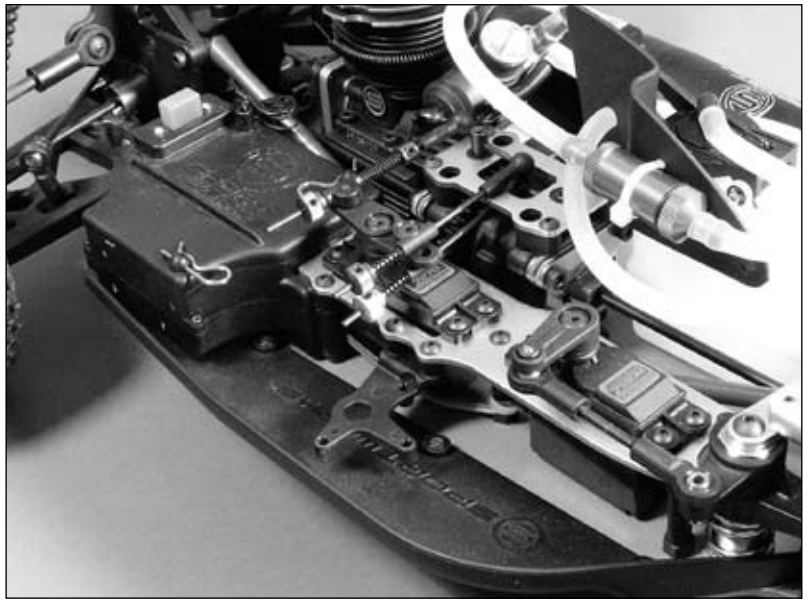


4. Feed the servo leads through the opening in the radio box. It may be necessary to loosen the 2x10mm radio box screws and slightly separate the center of the radio box from the bottom to allow the servo connectors to pass through.

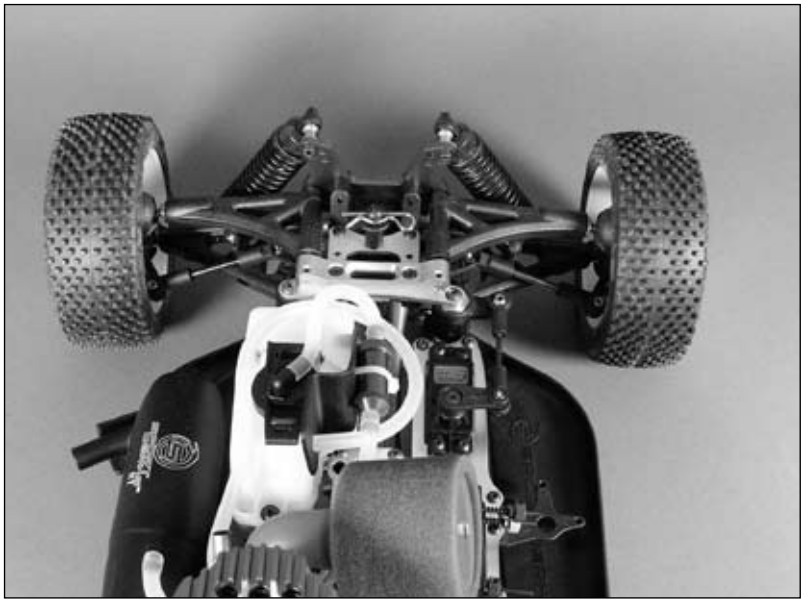
4. Using servo tape, secure a 5-cell receiver battery pack (not included) in place as shown.

5. A waterproof switch cover is included. Install the switch (not included) in the switch cover and using two 2x10mm screws, fasten the switch in place.





6. Secure the receiver in place as shown using two layers of servo tape. Use two layers of thick servo tape to help isolate the receiver from vibration.
7. Install the antenna tube and thread the antenna through the tube, allowing several inches to be exposed at the tip of the tube. Place the antenna cap over the end of the antenna to fasten it in place. Note: A single drop of thin CA glue can be used to secure the antenna tube to the radio box, preventing the tube from falling out during a crash.
8. Hook up the servos, battery and switch per the instructions included with the radio system and charge the receiver pack.
9. Reinstall the radio tray assembly in the buggy, using the same seven 3x10mm screws. Three screws are used in the top to attach the radio tray and four from the bottom of the chassis to attach the radio box.



10. Select the two servo adapters that fit your brand of radio and install them on the servo output shafts.

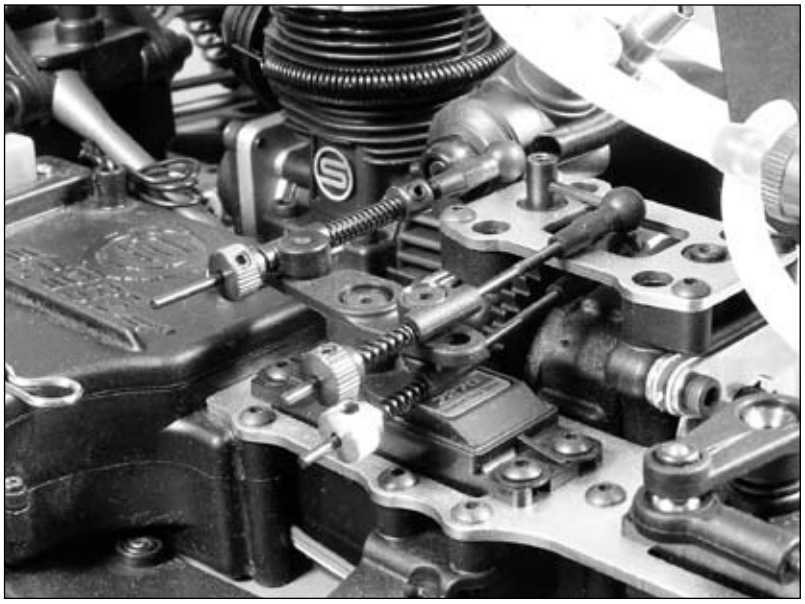
Note: Three types of servo adapters are included that fit the follow servos:

#23- JR, Airtronics, KO
#24- HiTec
#25- Futaba

11. Turn on the transmitter and receiver and center the trims, which will also center the servos. Install the steering servo arm on the steering servo such that it is positioned exactly vertically as shown and secure it in place with a 3x8mm flat head screw and 3mm cone washer.

12. Install the 6.8mm pivot ball in the arm and secure it with a 3mm locknut. Snap the steering linkage onto the pivot ball. Turn on the radio system and check that the steering is operating in the correct direction. Then adjust the length of the steering turnbuckle until the front wheels are straight and in trim.

Setting the Brake Linkage



1. Turn on the radio system and adjust the throttle trim to the desired neutral position.
2. Install the arm with attached linkage on the servo adapter such that the brake linkage will be parallel to the arm with the brake ball links attached.
3. Be sure the ball links are snapped onto the front and rear brake and on the carburetor.

Note: It may be necessary to adjust the position of the throttle return spring to allow the ball link to snap on the ball.

4. Adjust the position of the return spring collar until the correct tension is achieved. With the throttle at neutral, the spring should just close the carburetor barrel with light tension.
5. Loosen the setscrew in the blue knurled knob and slide the knob such that it just contacts the molded pivot on the arm, then retighten the setscrew.
6. Adjust the full throttle position with the programming in your transmitter such that the carburetor is full open just as the trigger reaches the full throttle position. By rotating the blue throttle knob, you can now precisely adjust the throttle dead band (the amount the throttle moves before the carburetor barrel actually opens) without disturbing the spring preload settings.
7. With the throttle at neutral, pull the front (silver knob) brake linkage through the molded pivot such that the front brakes are slightly applied. Loosen the setscrew on the silver adjusting knob and slide it into position such that it just contacts the molded pivot and retighten the setscrew.
8. With the throttle at neutral, pull the rear (red knob) brake linkage through the molded pivot such that the rear brakes are slightly applied. Loosen the setscrew on the red adjusting knob and slide it into position such that it just contacts the molded pivot and retighten the setscrew.
9. Cut the excess lengths of linkage off to clear the body. By rotating the silver adjusting knob, the front brakes can be accurately adjusted while rotating the red knob will affect the rear brake adjustment.

Painting the Body

Note: A clear protective film is applied to the outside of the body to protect it from over spray during painting. Remove this film after painting.

The body comes cut, trimmed and mounted ready for paint. Before painting, clean the inside of the body with warm soapy water to remove any remaining mold release that may be present from the molding process. Use masking tape to tape the windows. Stencils are available through several manufacturers (like Parma) that can be used to create elaborate paint effects or striping; masking tape can be used to create color separation lines. Be sure to use a high quality polycarbonate paint.

Your First Run

Note: If this is your first nitro car, we highly recommend that you have an experienced car driver help during the first start-ups and runs. He will be able to properly adjust your engine for break in and then tune your engine for reliable performance.

Before attempting to start your new buggy, be sure to read the instruction manual that was included with your engine. If your Turmoil™ came with an engine, carefully read the separate engine manual that's included. Pay particular attention to the needle settings recommended for starting and the break in procedures suggested.

After Run Engine Maintenance

After you're done racing for the day, it's important to empty the fuel tanks and run the remaining fuel from the engine. Continue to try to start the engine for several seconds after it will no longer fire to ensure that all fuel is out of the engine. Put several drops of after run oil in the carburetor and turn the engine over on the starter box for several seconds to coat the internal engine parts with after run oil.

Clean the air filter regularly using warm soapy water, then allowing it to air dry before applying air filter oil. Keeping your air filter clean and oiled is vital to the life of your engine.

The Sportwerks™ .21 V2 engine features a slide-valve carburetor and includes two inserts of various diameters. The carburetor inserts are used to alter the power curve of the engine. The two diameters involved have the following effect.

7.5mm – Develops good mid-range power; easier to control than the 9mm insert; best for medium traction, average-sized tracks/areas.

9mm – Offers explosive, sometimes difficult to control acceleration; uses the most fuel; used only for high traction, large track/open areas; for expert drivers only.

Setting the Needles

While the needles are preset at the factory, it's a good idea to verify that the needles are properly set slightly rich for break in. Following are the recommended starting settings:

High-Speed Needle: $3\,{}^{1}/_{2}$ turns out

Low-Speed Needle: 2 turns out (counterclockwise) from closed.

Note: When checking the adjustment of the low-speed needle, it is crucial that the throttle slide is closed completely and that you do not over-tighten the needles. When you feel resistance, immediately stop turning. This is the closed position.

Starting Your Engine for the First Time

Break In

The first start-up and the first few minutes your engine is running is the most critical time of its life and, in many ways, dictates how well it will perform and how long it will last.

During the first runs, when the engine starts, the exhaust should emit blue/white smoke, indicating the engine is rich (a good thing during break in). During the first tank of fuel, you may want to set a higher than normal idle speed in order to keep the engine from stalling. Drive your buggy while "blipping" the throttle and avoid operating the engine at full throttle for more than 2–3 seconds at a time. Run the entire first two tanks of fuel in this manner. After the first two tanks of fuel, begin leaning out the high-speed needle valve 1/8 turn at a time. It generally takes about 5 or 6 tanks of fuel before you'd want to start tuning for "maximum" power. Patience during break in will be rewarded with an engine that performs reliably and at its maximum power potential. Remember, glow plug failure is a common occurrence when breaking in a new engine. To test your plug, let the engine idle for a short period. Attach the glow igniter to the glow plug. Then, remove the igniter. If you hear no appreciable change in the engine rpm, the plug is still good. If the engine loads up and the rpm's decrease, it's time to replace the glow plug.

Tuning Your Engine

When tuning the needle valves for maximum performance, adjust them in small increments, 1/16 turn at a time. An engine should not be run too lean; doing so severely shortens the life of the engine. When an engine is set too lean, it will run very strong at first but will soon begin to sag and hesitate or stall when accelerating. The best way to tune an engine is by using an infrared temperature gauge, but you can also use water to check the head temperature. (Refer to "Fine Tuning Your Engine")

Fine-Tuning Your Engine

As you gain experience, you'll be able to tune your engine based on the engine's sound and feel during acceleration and at full throttle. Until you have developed this skill, we recommend the following method of engine tuning. Start your engine and drive your buggy aggressively for about two minutes. Place a drop of water on the cylinder head. If the water sizzles away (evaporates immediately), the needle setting is too lean. A correct needle setting will result in the water evaporating slowly, in about 5–10 seconds. If the water does not evaporate, the needle setting is too rich. Lean the high-speed needle 1/8 of a turn and run the engine again, adjusting the needle setting to get the desired evaporation rate of 5–10 seconds. Check the temperature each time you change the needle mixture. Do not let the engine overheat, as this will damage the engine!

Tuning the Low-Speed Needle

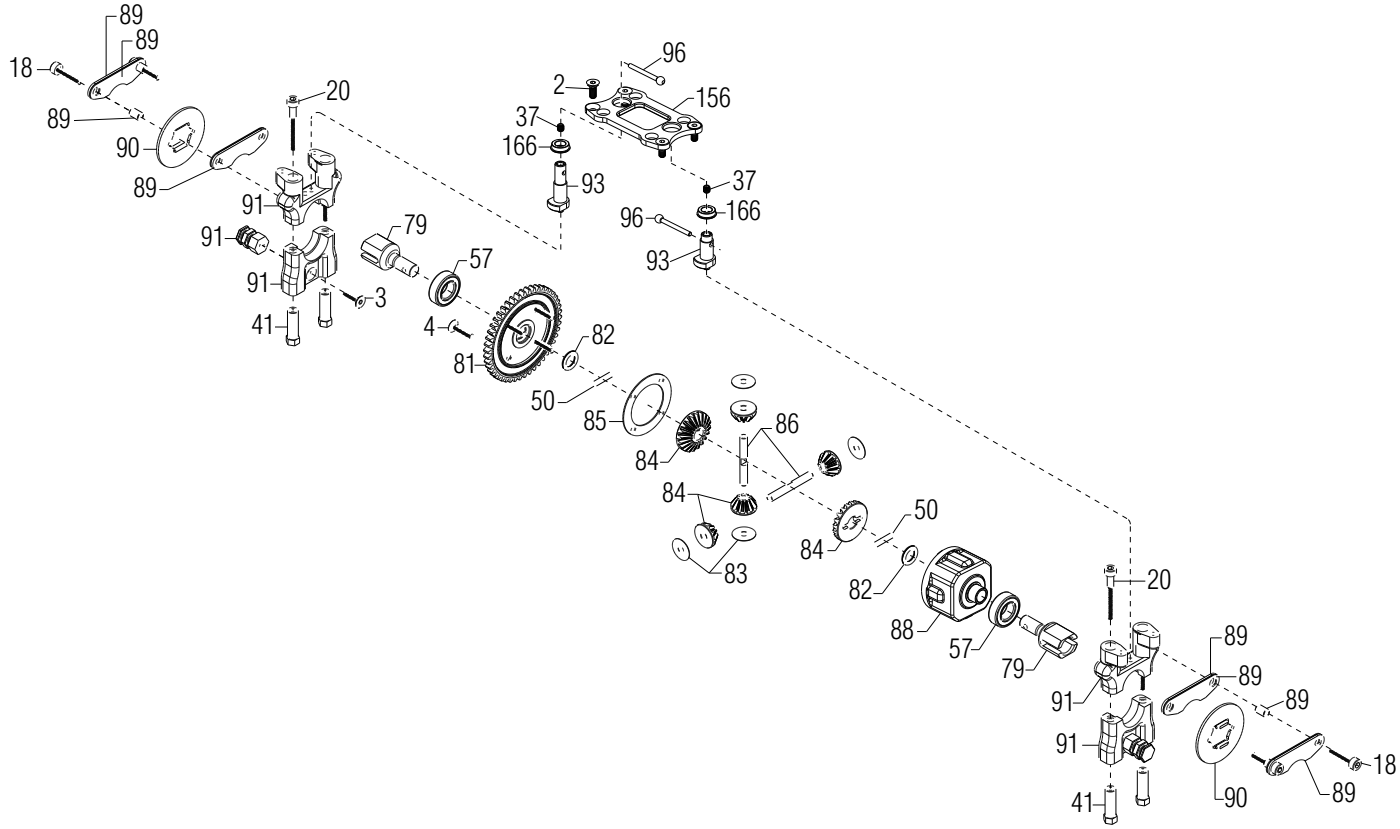
The low-speed needle (also referred to as the idle mixture or idle needle) should be set after you're satisfied with the high-speed needle setting. After achieving the engine's proper operating temperature, reduce the engine throttle to idle for about 15 seconds. Now pinch the fuel line with your fingers, close to the carb fuel inlet nipple when carefully listing the engine rpm. If the engine dies immediately without an increase in rpm, the low speed needle is set too lean.

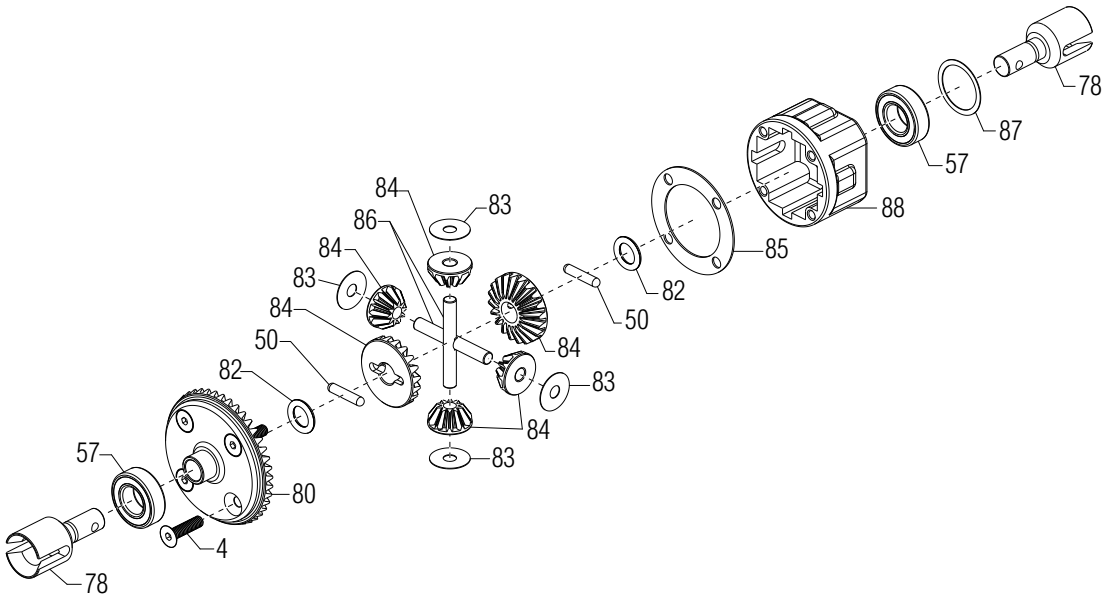
If the rpm's increase dramatically and then the engine dies, the setting is too rich. The idle setting results in the rpm's increasing a slight amount (about 200 rpm's) after pinching the fuel line before dying.

Setting the Idle RPM

The last setting to be made is the idle rpm. Tuning the idle stop screw clockwise increases the idle speed; whereas turning the screw counterclockwise will make the engine idle at a lower rpm. Ideally, the engine should idle just fast enough to give a reliable idle but not engage the clutch and, of course, never flame out.

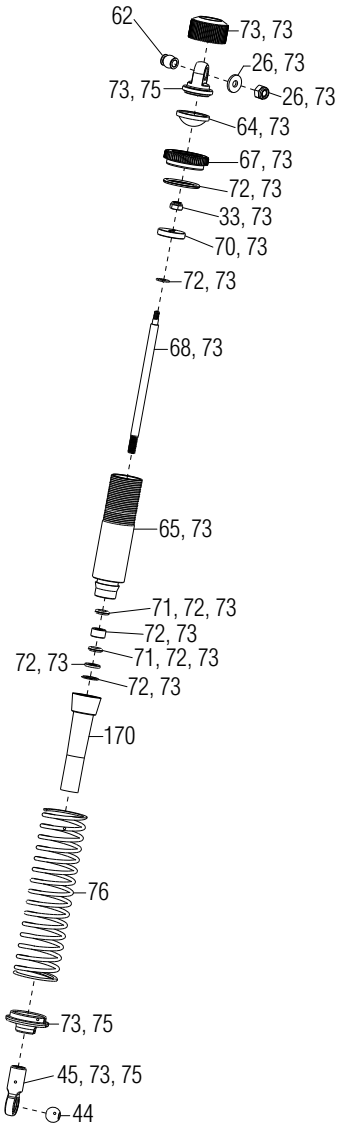
Center Differential



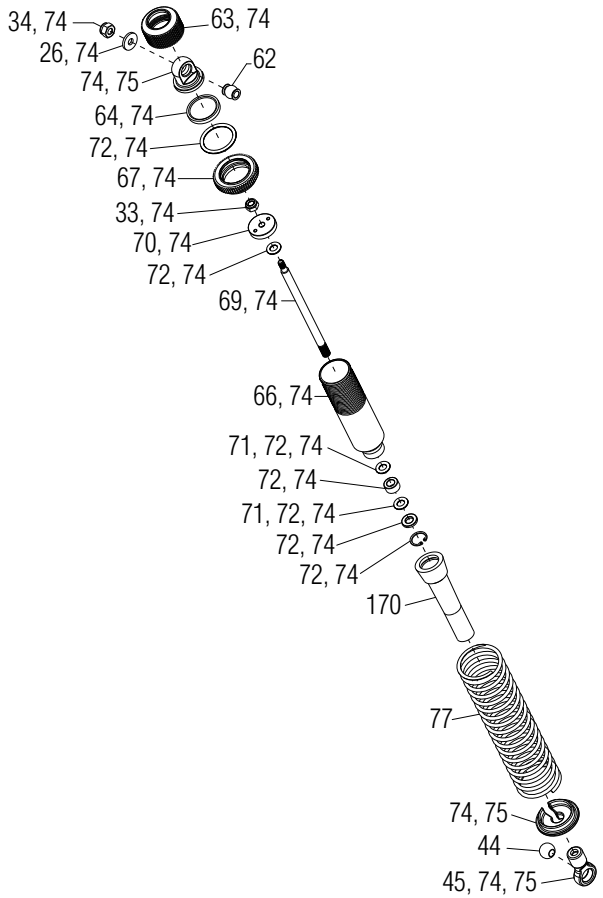


Front and Rear Differential

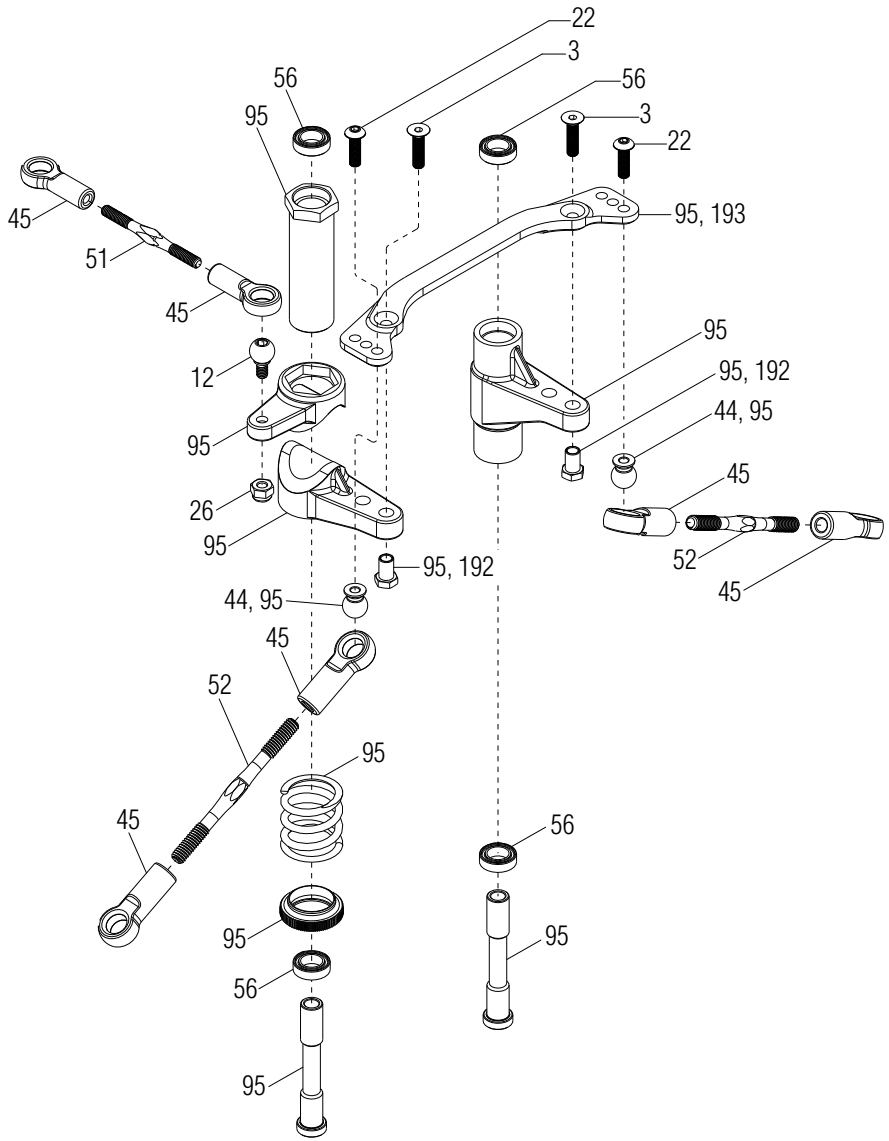
Front and Rear Shocks



Front Shock

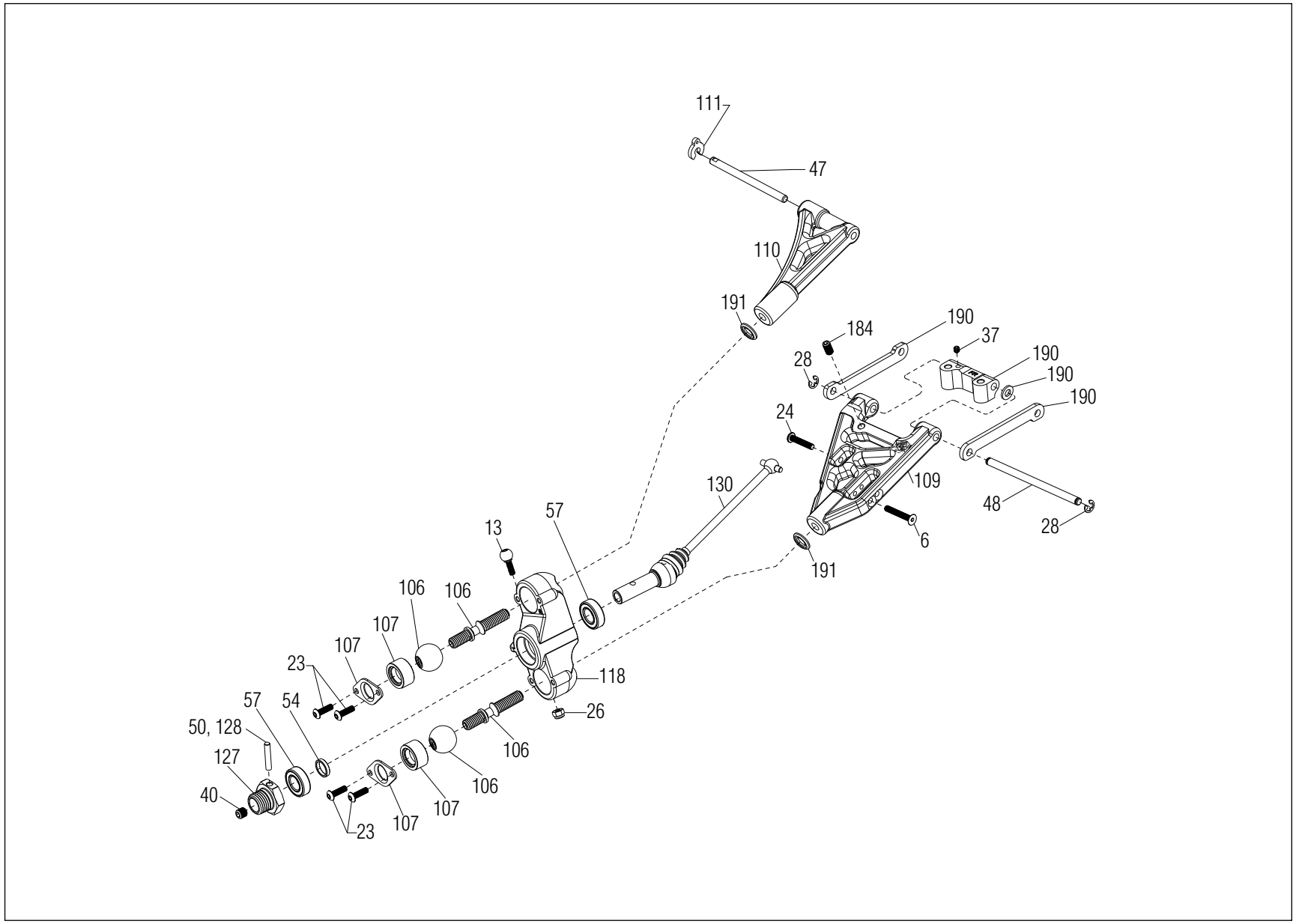


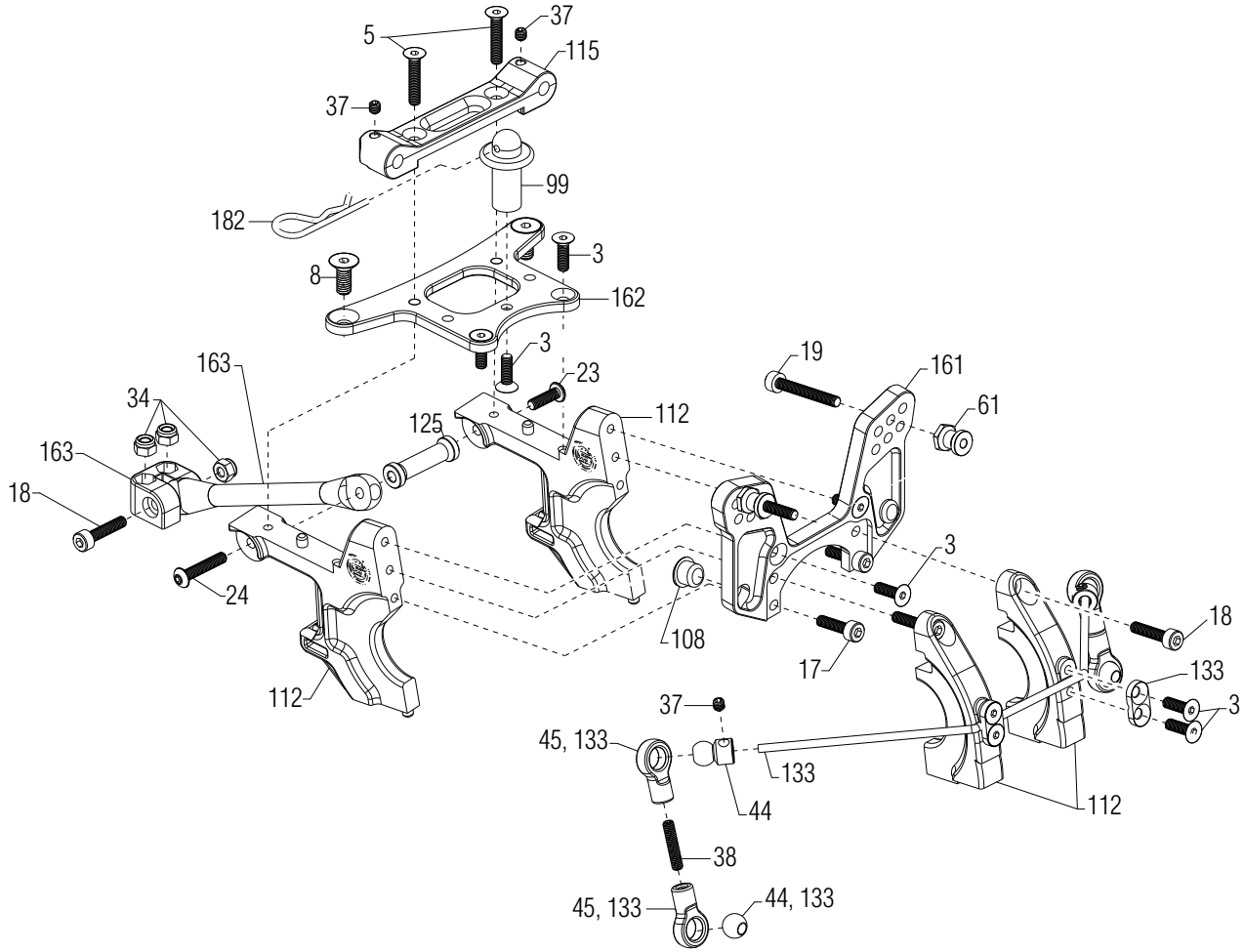
Rear Shock



Steering Bellcrank

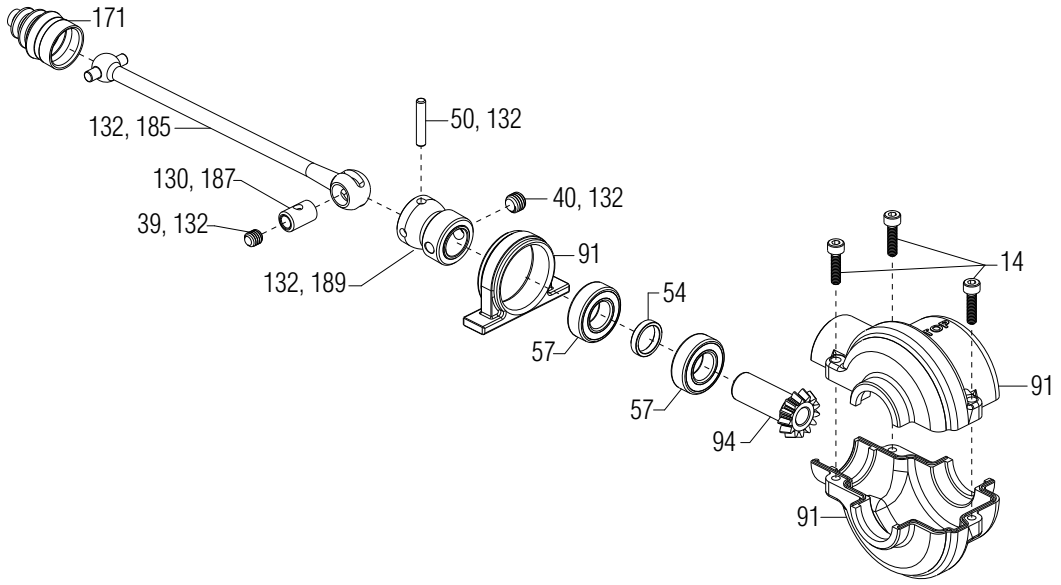
Front Suspension

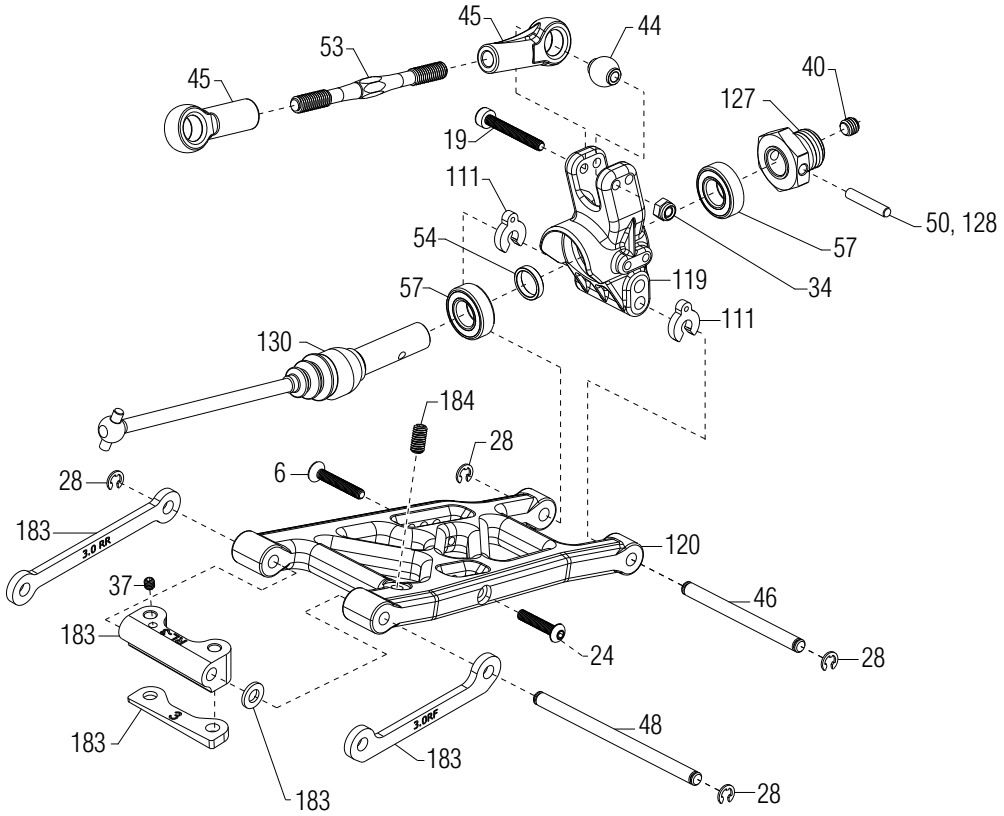




Front Gearbox Mount

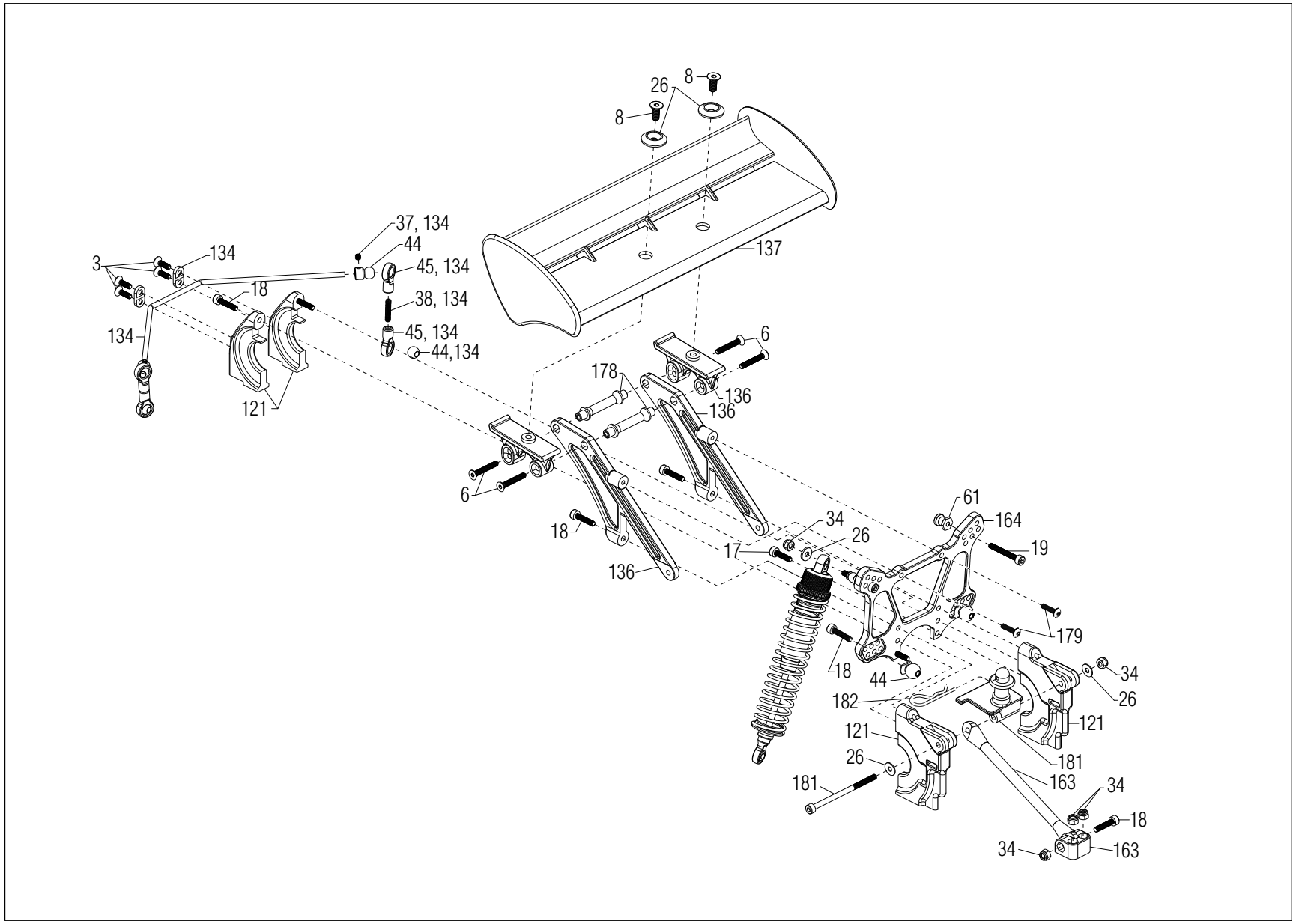
Rear Center Driveshaft

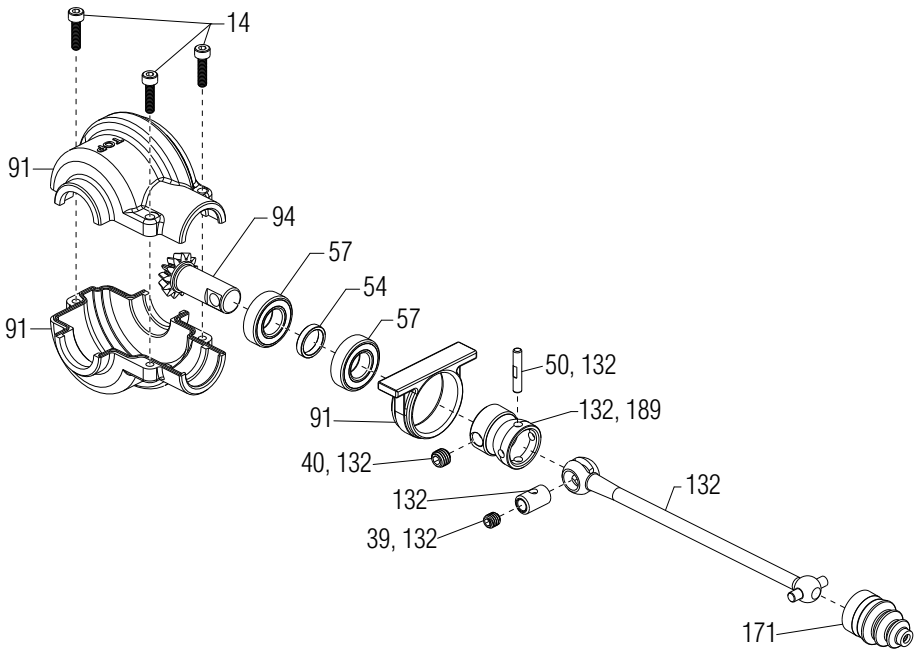




Rear Suspension

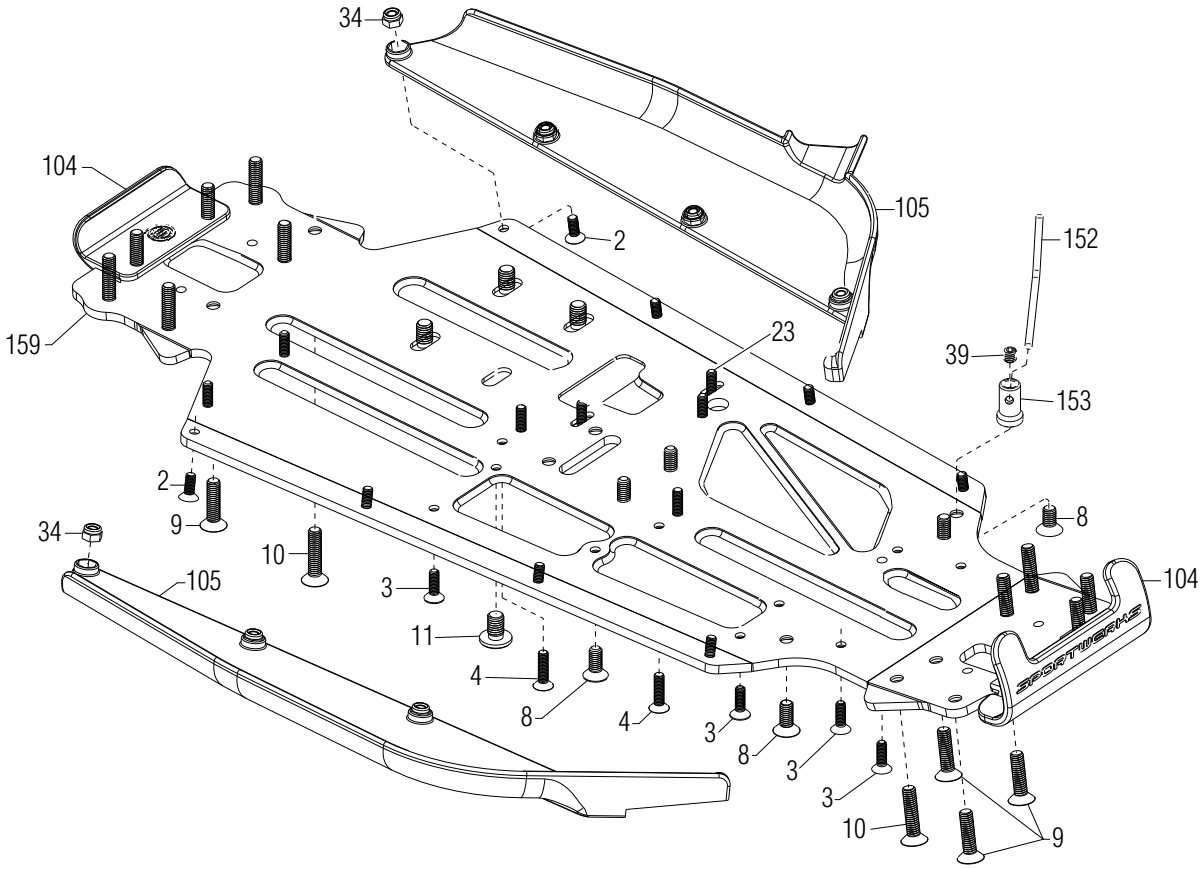
Rear Gearbox Mount



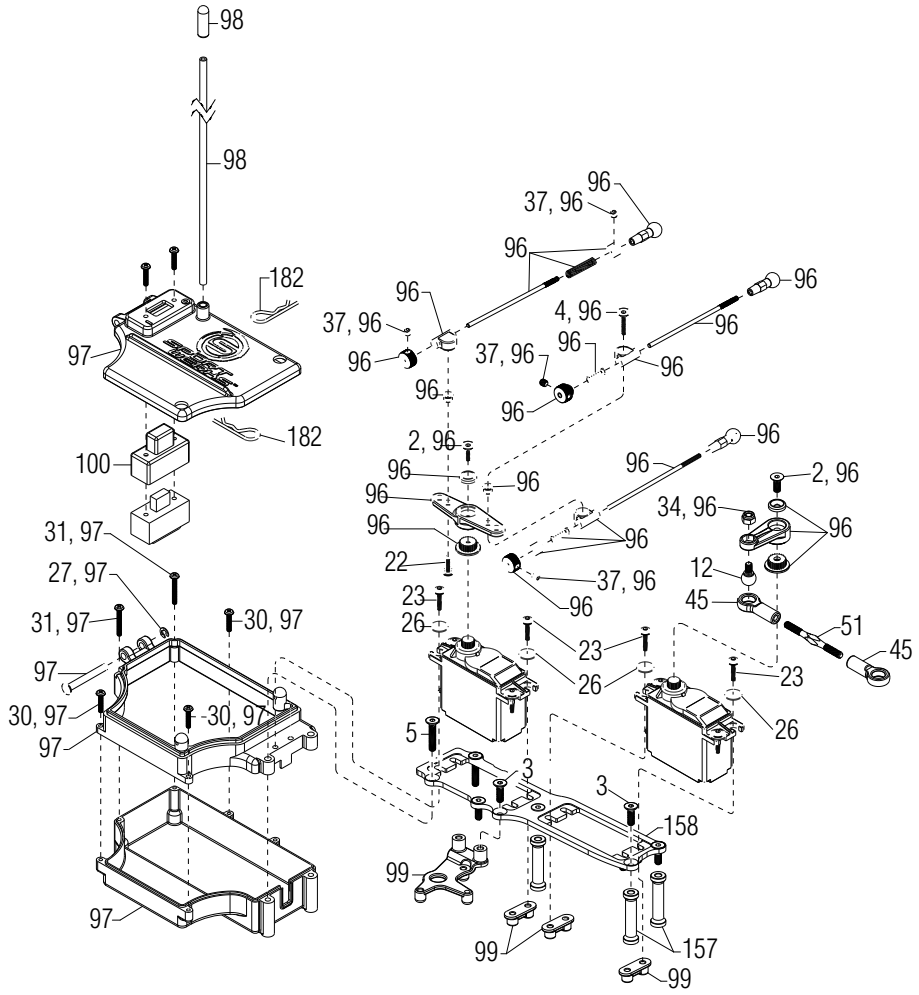


Front Center Driveshaft

Main Chassis



Radio Tray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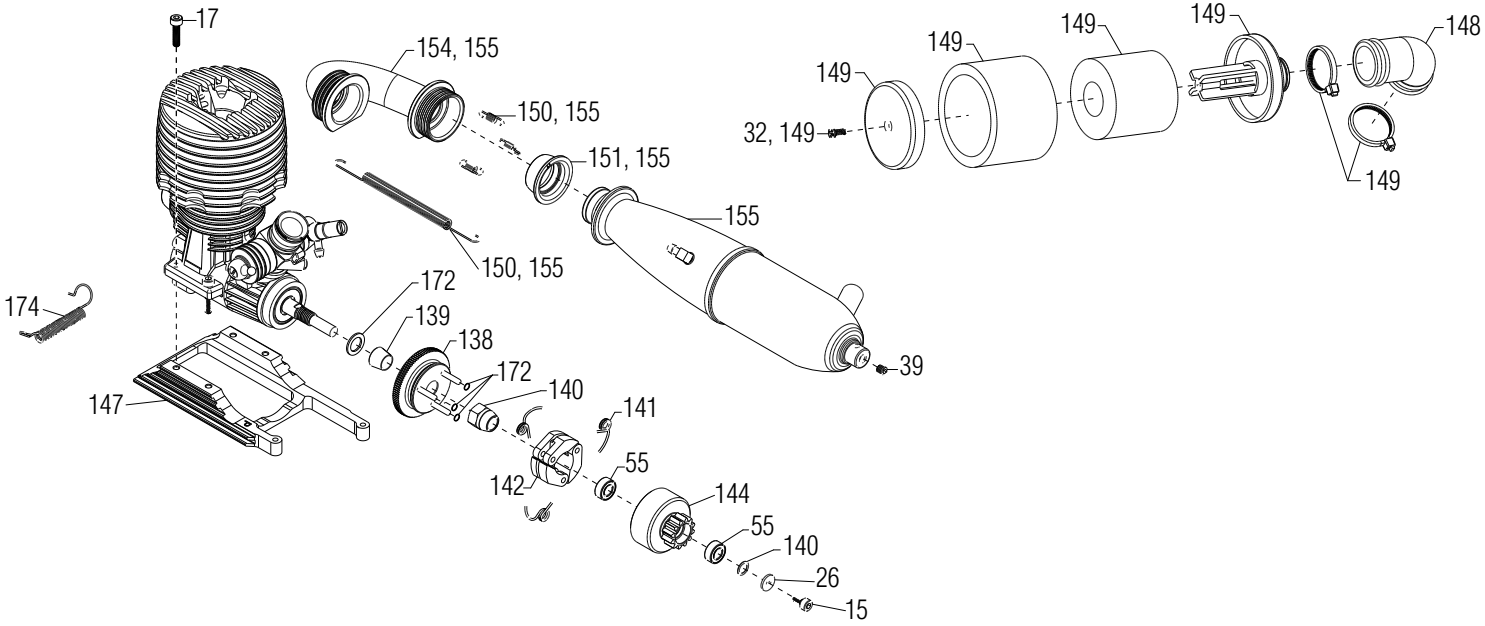
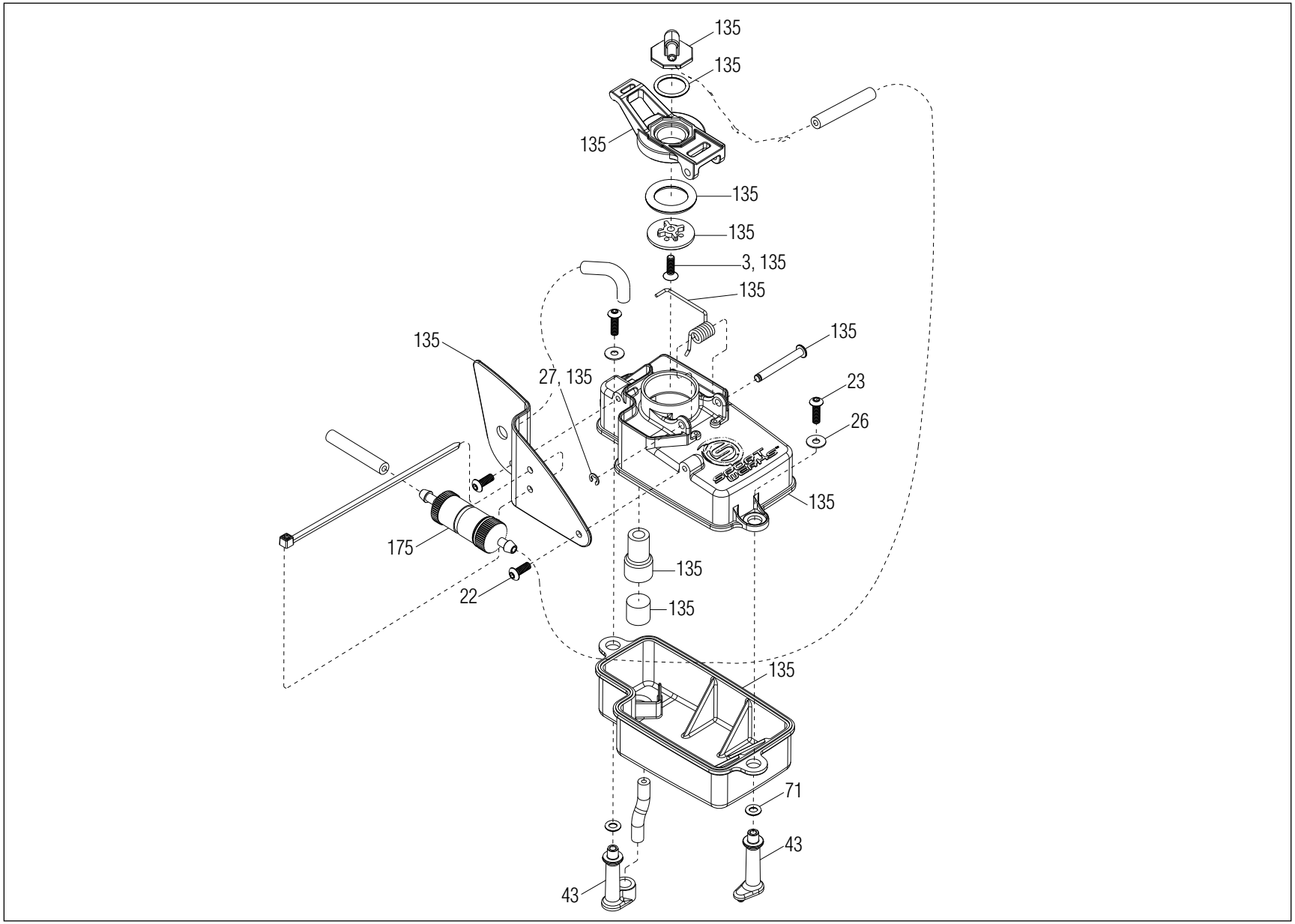
Engine/Clutch/ Air Filter Assembly

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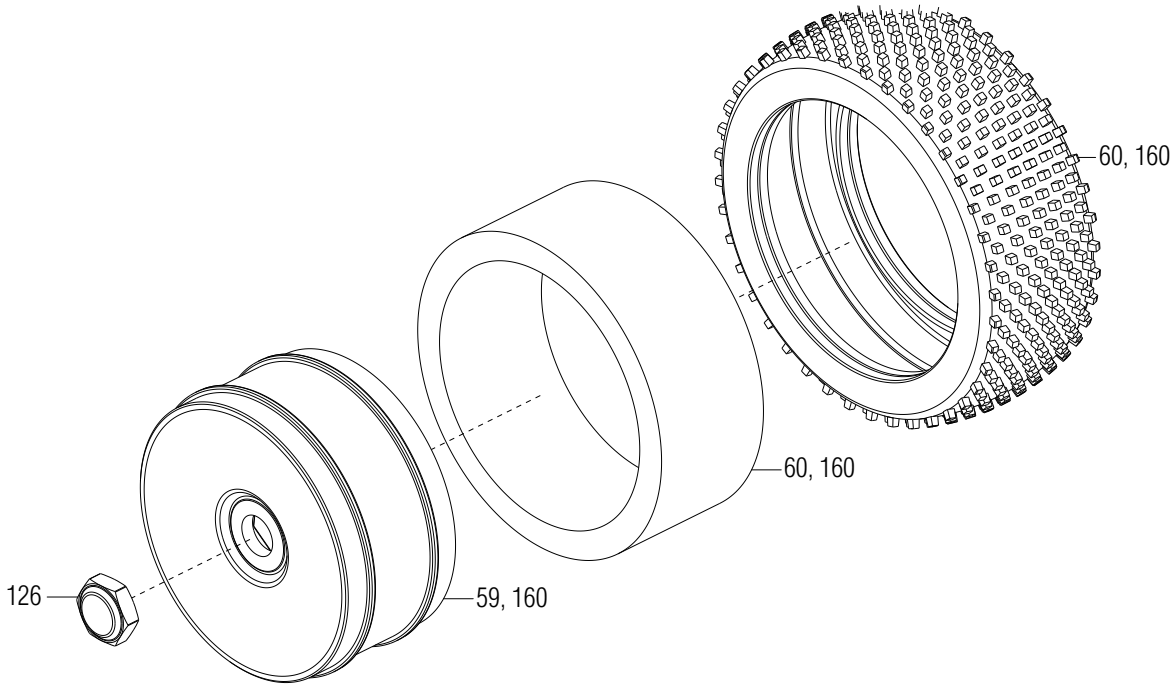
Fuel Tank

Tire/Wheel Assembly



KEY #	PART#	Quantity	Description
1	SWK2022	8	3mm x 6mm Flathead Screw
2	SWK2024	8	3mm x 8mm Flathead Screw
3	SWK2026	8	3mm x 10mm Flathead Screw
4	SWK2028	8	3mm x 12mm Flathead Screw
5	SWK2032	8	3mm x 16mm Flathead Screw
6	SWK2036	8	3mm x 20mm Flathead Screw
8	SWK2056	8	4mm x 10mm Flathead Screw
9	SWK2062	8	4mm x 16mm Flathead Screw
10	SWK2064	8	4mm x 18mm Flathead Screw
11	SWK2074	8	5mm x 8mm Engine Mount Screw
12	SWK2087	8	6.8mm x 11mm Ball Stud
13	SWK2089	8	6.8mm x 14mm Ball Stud
14	SWK2106	8	2.5mm x 10mm Socket Head Cap Screw
15	SWK2122	8	3mm x 6mm Socket Head Cap Screw
16	SWK2124	8	3mm x 8mm Socket Head Cap Screw
17	SWK2128	8	3mm x 12mm Socket Head Cap Screw
18	SWK2130	8	3mm x 14mm Socket Head Cap Screw
19	SWK2139	8	3mm x 23mm Socket Head Cap Screw
20	SWK2141	8	3mm x 25mm Socket Head Cap Screw
21	SWK2222	8	3mm x 6mm Button Head Screw
22	SWK2224	8	3mm x 8mm Button Head Screw
23	SWK2226	8	3mm x 10mm Button Head Screw
24	SWK2232	8	3mm x 16mm Button Head Screw
26	**SWK2282**		**3mm Washers/Wing Buttons**
		8	3mm Washers
		2	Wing Buttons

Parts Listings

Parts Listings

KEY #	PART#	Quantity	Description
27	SWK2290	8	1/8 E-Clips
28	SWK2292	8	3mm E-Clips
29	SWK2296	8	7mm Snap Ring
30	SWK2306	8	2mm x 10mm Phillips Head Screw
31	SWK2311	8	2mm x 15mm Phillips Head Screw
32	SWK2324	8	3mm x 8mm Phillips Head Screw
33	SWK2380	8	2.6mm Lock Nuts
34	SWK2382	8	3mm Lock Nuts
37	SWK2419	8	3mm x 3mm Setscrew
38	SWK2430	8	3mm x 14mm Setscrew
39	SWK2440	8	4mm x 4mm Setscrew
40	SWK2450	8	5mm x 4mm Setscrew
41	SWK2460	4	Theaded Chassis Inserts
43	**SWK2465**		**Chassis Standoff Bag**
		1	Front Fuel Tank Standoff
		1	Rear Fuel Tank Standoff
		2	Radio Tray Standoff
44	**SWK2471**		**Pivot Ball Bag**
		6	6.8mm Pivot Ball
		2	8.8mm Flange Pivot Ball
		2	8.8mm Pivot Ball
		4	6.8mm Flanged Pivot Ball (anodized)
		2	6.8mm Flanged Pivot Ball
		1	6.8mm x 11mm Threaded Pivot Ball

KEY #	PART#	Quantity	Description
45	**SWK2480**		**Rod End Bag**
		4	6.8mm Short Rod End
		2	6.8mm Medium Rod End
		4	6.8mm Long Rod End
		2	8.8mm Rod End
		4	6.8mm Shock Rod End
46	SWK2500	2	(Rear) Outer Suspension Hinge Pins 50mm
47	SWK2505	2	(Front) Upper Suspension Hinge Pins 56mm
48	SWK2510	2	Inner Suspension Hinge Pins 70mm
50	**SWK2520**		**Pin Bag**
		4	Wheel Hub Pins
		2	Outdrive Pins
		2	CVD Coupler Pins
51	SWK2550	1	Steering Link/Turnbuckle 3x36mm
52	SWK2560	2	Tie Rod/Turnbuckle 4x50mm
53	SWK2570	2	Camber Link/Turnbuckle 5x60mm
54	SWK2600	4	Bearing Crush Sleeve
55	SWK2620	2	Clutch Bearings 5x10x4mm
56	SWK2640	4	Rubber Sealed Bearings 6x10x3mm
57	SWK2660	4	Rubber Sealed Bearings 8x16x5mm
58	**SWK2704**		**Turmoil Buggy Body (Clear)**
		1	Turmoil Buggy Body
		1	Window Masks
		1	Turmoil Sticker Sheet
59	SWK2740	2	Dish Wheels, White

Parts Listings

Parts Listings

KEY #	PART#	Quantity	Description
60	**SWK2840**		**Havoc Buggy Tires/Inserts**
		2	1/8 Tire Foam Inserts
		2	1/8 Buggy Tires
61	SWK3000	4	Shock Standoff Nuts
62	SWK3002	4	Shock Bushings
63	SWK3004	2	Shock Caps
64	SWK3006	4	Shock Bladders
65	SWK3008	2	Front Shock Body
66	SWK3010	2	Rear Shock Body
67	SWK3012	2	Shock Adjustment Collar
		2	Adjustment Collar O-Ring
68	SWK3016	2	Front Shock Shaft 54mm
69	SWK3018	2	Rear Shock Shaft 64mm
70	SWK3020	4	Shock Piston 2-hole 1.2mm
71	SWK3022	4	Shock O-Ring
72	**SWK3024**		**Shock Rebuild Kit**
		2	Washer: 2.5mm x 5mm
		2	Adjustment Collar O-Ring
		4	Shock O-Ring
		2	Shock Shaft Bushing 3.4mm
		2	Shock Shaft Bushing 1mm
		2	Snap Ring 7mm

KEY #	PART#	Quantity	Description
73	**SWK3026**		**Front Shock Set**
		2	Shock Bladder
		2	Washer 2.5x5mm
		2	Adjustment Collar O-Ring
		2	Adjustment Collar
		4	Shock O-Ring
		2	Shock Shaft Bushing 3.4mm
		2	Shock Shaft Bushing 1mm
		2	7mm Snap Ring
		2	Shock Cap
		4	1mm Spring Clip
		4	2mm Spring Clip
		4	3mm Spring Clip
		4	4mm Spring Clip
		4	5mm Spring Clip
		4	6.8mm Shock Rod End
		4	Upper Spring Retainer
		4	Lower Spring Retainer
		4	Shock Eyelet
		2	3mm Washer
		2	3mm Lock Nut
		2	Shock Adjustment Collar
		2	2.6mm Lock Nut
		2	Shock Piston 2-hole 1.2mm
		2	Front Shock Shaft 54mm
		2	Front Shock Body
		2	Front Buggy Spring, Black

Parts Listings

KEY #	PART#	Quantity	Description
74	**SWK3028**		**Rear Shock Set**
		2	Shock Bladder
		2	Washer 2.5x5mm
		2	Adjustment Collar O-Ring
		2	Adjustment Collar
		4	Shock O-Ring
		2	Shock Shaft Bushing 3.4mm
		2	Shock Shaft Bushing 1mm
		2	7mm Snap Ring
		2	Shock Cap
		4	1mm Spring Clip
		4	2mm Spring Clip
		4	3mm Spring Clip
		4	4mm Spring Clip
		4	5mm Spring Clip
		4	6.8mm Shock Rod End
		4	Upper Spring Retainer
		4	Lower Spring Retainer
		4	Shock Eyelet
		2	3mm Washer
		2	3mm Lock Nut
		2	Shock Adjustment Collar
		2	2.6mm Lock Nut
		2	Shock Piston 2-hole 1.2mm
		2	Rear Shock Shaft 64mm
		2	Rear Shock Body
		2	Rear Buggy Spring

KEY #	PART#	Quantity	Description
75	**SWK3040**		**Shock Molded Parts Bag**
		4	1mm Spring Clip
		4	2mm Spring Clip
		4	3mm Spring Clip
		4	4mm Spring Clip
		4	5mm Spring Clip
		4	Upper Shock Eyelet
		4	Upper Spring Retainer
		4	Lower Spring Retainer
		4	Shock Rod End 6.8mm
76	SWK3047	2	Front Buggy Springs: Gray (Med Firm)
77	SWK3057	2	Rear Buggy Springs: Gray (Med Firm)
78	SWK3070	2	Front/Rear Diff Output Yoke
79	SWK3072	2	Center Diff Output Yoke
80	SWK3074	1	43T Diff Gear
81	SWK3076	1	46T Steel Spur Gear
82	SWK3078	2	Differential O-Rings
83	SWK3080	4	Spider Gear Shims .25mm
84	**SWK3082**		**Diff Gear Bag**
		2	Bevel Gears
		4	Spider Gears
85	SWK3086	1	Differential Gasket
86	SWK3088	2	Differential Cross Pins
87	SWK3090	2	Differential Shims
88	SWK3092	2	Differential Case

Parts Listings

KEY #	PART#	Quantity	Description
89	**SWK3094**		**Brake Pads**
		4	Brake Pads
		4	Brake Pad Spacers
90	SWK3096	2	Brake Discs
91	**SWK3098**		**Diff Housing Bag**
		1	Lower Diff Housing
		1	Upper Diff Housing
		1	Bearing Support
		1	Center Diff Housing (Upper)
		1	Center Diff Housing (Lower)
		1	Brake Stand-Off
93	**SWK3104**		**Brake Cam Bag**
		1	Rear Brake Cam
		1	Front Brake Cam
		2	Brake Post Bushings
94	SWK3106	1	13T Differential Pinion

KEY #	PART#	Quantity	Description
95	**SWK3109**		**Steering Servo Saver Bag**
		1	Servo Horn Adapter 23T
		1	Servo Horn Adapter 24T
		1	Servo Horn Adapter 25T
		1	Steering Servo Arm
		4	Steering Bellcrank Bushings
		1	Upper Servo Saver
		1	Lower Servo Saver
		1	Steering Bellcrank Left
		1	Ball Cup
		2	Bellcrank Post
		1	Servo Saver Spring Retainer
		1	Servo Saver Spring Retainer
		3	3mm x11mm Ball Stud
		3	3mm Lock Nut
		1	3mm Nut
		2	Drag Link Bushing
		2	3mm x 10mm Flathead Screw
		1	Ackerman Rack (Pro)
		1	Bellcrank Shaft
		1	3mm x 8mm Socket Head Cap Screw
		1	Countersunk Washer
		2	Flanged Pivot Balls

Parts Listings

KEY #	PART#	Quantity	Description
96	**SWK3110**		**Throttle Linkage Bag**
		2	Threaded Servo Arm Guide Pivot
		1	Countersunk Servo Arm Guide Pivot
		1	Servo Horn Adapter 23T
		1	Servo Horn Adapter 24T
		1	Servo Horn Adapter 25T
		1	Throttle/Brake Servo Arm
		1	Linkage Adjuster-Red
		1	Linkage Adjuster-Blue
		1	Linkage Adjuster-Silver
		3	Linkage Wire
		1	Locking Collar
		1	Linkage Spring
		1	Silicone Tubing-Rear Brake
		1	Silicone Tubing-Front Brake
		4	3mm x 3mm Set Screw
		3	Throttle Ball Cup
		2	Ballrod Linkage
		1	3mm x 8mm Socket Head Cap Screw
		1	Countersunk Washer
		2	Servo Arm Bushing
97	**SWK3112**		**Radio Box Bag**
		1	Radio Box Bottom
		1	Radio Box Center
		1	Radio Box Top
		1	Hinge Pin
		2	1mm E-clip
		6	2mm x 10mm Phillips Head Screw
		1	2mm x 15mm Phillips Head Screw
98	**SWK3114**		**Antenna Bag**
		1	Antenna
		1	Antenna Cap

KEY #	PART#	Quantity	Description
99	**SWK3116**		**Mount Bag**
		2	Servo Mounting Pads
		2	Stand-Up Servo Mounting Pads
		1	Front Body Mount
		1	Rear Body Mount
		1	Transponder Mount
		2	Steering Servo Mounts
100	SWK3118	1	Switch Cover
104	**SWK3126**		**Bumper Bag**
		1	Front Bumper
		1	Rear Bumper
105	**SWK3128**		**Chassis Mud Guard Bag**
		1	Mud Guard (Left)
		1	Mud Guard (Right)
106	**SWK3130**		**Pillow Ball Assembly Bag**
		4	Pillow Ball 14.6mm
		4	Pillow Ball Insert
		4	Pillow Ball Retainer Plate
		4	Pillow Ball Cap
		8	3mm x 10mm Button Head Screw
107	**SWK3132**		**Retainer Plate/Ball Cap Bag**
		4	Pillow Ball Retainer Plate
		4	Pillow Ball Cap
108	SWK3134	2	Hinge Pin Bushings
109	SWK3139	2	Front Lower Suspension Arms: Turmoil
110	SWK3141	2	Front Upper Suspension Arms: Turmoil

Parts Listings

Parts Listings

KEY #	PART#	Quantity	Description
111	**SWK3138**		**Caster/Camber Shim Bag**
		2	Upper Hinge Pin Bushing
		2	Camber Shim 1mm
		2	Camber Shim 1.5mm
		2	Caster Shim 2mm
		4	Caster Shim 2.5mm
112	**SWK3140**		**Front Bulkhead Bag**
		1	Front Bulkhead, Front Support
		1	Front Bulkhead, Rear Support
115	SWK3146	1	Upper Hinge Pin Support
118	**SWK3152**		**Steering Knuckle Bag**
		1	Front Left Steering Knuckle
		1	Front Right Steering Knuckle
119	**SWK3154**		**Rear Hub Bag**
		1	Left Rear Hub
		1	Right Rear Hub
120	SWK3156	2	Rear Suspension Arms
121	**SWK3158**		**Rear Bulkhead Bag**
		1	Rear Bulkhead, Front Support
		1	Rear Bulkhead, Rear Support
125	**SWK3164**		**Bulkhead Brace Bag**
		1	Front Bulkhead Brace
		1	Rear Bulkhead Brace
126	SWK9172B	4	Capped Wheel Nuts: Blue
127	SWK3170B	2	Wheel Hub: Blue
128	SWK3172	2	Wheel Hub Pin

KEY #	PART#	Quantity	Description
130	**SWK9293**		**45-Degree Front/Rear CVD's (2)**
		2	45-Degree F/R CVD Bone: Turmoil
		2	45-Degree F/R CVD Axle: Turmoil
		2	Coupling
		2	CVD Coupler Pins
		2	4mm Setscrew
132	**SWK9294**		**45-Degree Center CVD's (2): Turmoil**
		1	45-Degree Center Bone (Front): Turmoil
		1	45-Degree Center Bone (Rear): Turmoil
		2	Center Drive Yoke: Turmoil
		2	Coupling
		2	CVD Coupler Pins
		2	4mm Setscrew
		2	5mm x 4mm Setscrew
133	**SWK3180**		**Front Sway Bar Bag**
		2	Sway Bar Pivot Ball
		2	3mm x 14mm Setscrew
		4	3mm x 3mm Setscrew
		1	Front Sway Bar
		2	Sway Bar Mounts
		4	6.8mm Short Rod End
		2	6.8mm Pivot Balls
134	**SWK3182**		**Rear Sway Bar Bag**
		2	Sway Bar Pivot Ball
		2	3mm x 14mm Setscrew
		4	3mm x 3mm Setscrew
		1	Rear Sway Bar
		2	Sway Bar Mounts
		4	6.8mm Short Rod End
		2	6.8mm Pivot Balls

Parts Listings

Parts Listings

KEY #	PART#	Quantity	Description
135	**SWK3185**		**Fuel Tank**
		1	Lower Tank Half
		1	Upper Tank Half
		1	Fuel Tank Lid Top
		1	Fuel Tank Lid
		1	Fuel Tank Baffle
		1	Fuel Tank Internals
		1	3mm x 10mm Flathead Screw
		1	Hinge Pin
		2	1mm E-Clip
		1	Cap Spring
		1	Fuel Tank Cap Gasket
		1	Splash Guard
		2	3mm x 8mm Button Head Screw
		1	Tank Lid Top O-Ring
136	**SWK3186**		**Wing Mount Bag**
		2	Wing Strut
		2	Wing Brace
		2	Wing Mount
137	SWK3188	1	Wing (White)
138	SWK3190	1	Flywheel
139	SWK3192	1	Collet
140	**SWK3194**		**Clutch Nut Bag**
		1	Clutch Nut
		4	Shims

KEY #	PART#	Quantity	Description
141	SWK3196	3	Clutch Springs
142	SWK9196	3	7075 T-6 Aluminum Clutch Shoes
144	SWK3213	1	13T Clutch Bell
148	SWK3230	1	Air Cleaner Boot
147	SWK9230	1	One-Piece Engine Mount (SWK/Picco)
148	SWK3230	1	Air Cleaner Boot
149	**SWK3232**		**Air Filter Bag**
		1	Air Filter Top
		1	Air Filter Bottom
		1	Foam Filter
		2	Tie Wrap
		1	3mm x 8mm Phillips Head Screw
150	SWK3234	3	Manifold Springs
151	SWK3236	1	Manifold Adapter
152	SWK3238	1	Tuned Pipe Mounting Wire
153	SWK3240	1	Tuned Pipe Mount
154	SWK3243	1	Round Manifold: Turmoil
155	**SWK9203**		**007 High Torque Tuned Pipe**
		1	Pipe
		1	Manifold
		3	Pipe Springs
		1	Manifold Seal
		1	Pipe Seal
156	SWK9102	1	Pro Center Diff Support Plate
157	SWK9120	3	Pro Servo Tray Standoff
158	SWK9122	1	Pro Servo Tray
159	SWK9125	1	FCG Chassis (Pro)
160	SWK2850	2	1/8 Mounted Havoc Tire: White Dish
161	SWK9143	1	5mm Front Shock Tower
162	SWK9144	1	Pro Top Plate

Parts Listings

KEY #	PART#	Quantity	Description
163	**SWK9159**		**Torque Rods (FCG Chassis)**
		1	Torque Rod (FCG Front)
		1	Torque Rod (FCG Rear)
164	SWK9163	1	5mm Rear Shock Tower
166	SWK2610	2	Brake Arm Bearings 5x8mm Flanged
170	SWK9010	4	Rubber Shock Boots (4)
171	SWK9011	6	CVD Rubber Boots (6): Black
172	**SWK3195**		**Clutch Shim Bag**
		10	Flywheel Pin Shim
		10	Clutch Bell Shim
		2	Flywheel Shim
174	SWK3233	1	Throttle Return Spring
175	SWK3244	1	Large Fuel Filter (Blue)
178	SWK9186	2	Aluminum Wing Braces (2)
179	SWK2228	8	3mm x 12mm Button Head Screw
181	**SWK3289**		**Rear Body Mount**
		1	Rear Body Mount
		1	3mm x 25mm Socket Head Cap Screw
		2	3mm Washer
182	**SWK3287**		**Body Pins: Turmoil**
		4	Large Body Pin
		4	Medium Body Pin

KEY #	PART#	Quantity	Description
183	**SWK9253**		**Aluminum 3-Degree Inner Suspension Mount Set**
		1	Left 3-Degree Mount
		1	Right 3-Degree Mount
		1	3 Front Pin Brace
		1	3 Rear Pin Brace
		2	3-Degree Anti-Squat Shim
184	SWK2441	8	4mm x 8mm Set Screw
185	SWK9295	2	45-Degree F/R CVD Bone (2)
186	**SWK9296**		**45-Degree Center Bones**
		1	45-Degree Center Bone (Front)
		1	45-Degree Center Bone (Rear)
187	**SWK9297**		**45-Degree Coupling Rebuild Kit**
		2	Coupling
		2	CVD Coupler Pins
		2	4mm Setscrew
188	SWK9298	2	45-Degree F/R CVD Axle (2)
189	**SWK9299**		**45-Degree Drive Yoke (2)**
		2	Center Drive Yoke
		2	5mm x 4mm Setscrew
190	**SWK9248**		**Aluminum Front Inner Suspension Mount Set**
		1	Left Mount
		1	Right Mount
		2	Pin Brace

Parts Listings

Parts Listings

KEY #	PART#	Quantity	Description
191	**SWK9138**		**Aluminum Camber Shims 1, 1.5, 2mm**
		4	1.0mm Camber Shim (Blue)
		4	1.5mm Camber Shim (Silver)
		4	2.0mm Camber Shim (Black)
192	SWK2461	4	Threaded Bell Crank Bushings (4)
193	**SWK9275**		**Ackerman Rack (Pro)**
		1	Ackerman Rack (Pro)
		1	Lower Servo Saver
		1	Steering Bellcrank Left
		2	Threaded Bell Crank Bushings
		2	3mm x 10mm Flathead Screw

Brake Knob Color Code

Red= Rear Brake

Silver= Front brake

Blue= Throttle

Chassis Specifications

Overall Length: 19.4 in (492mm)

Width: 12.2 in (310mm)

Wheelbase-Adjustable: 12.8 in–13.0 in (325mm–330mm)

Caster Angle: Adjustable 17–24 Degrees

Fuel Tank Capacity: 126cc

Internal Gear Ratio: 3.31 to 1

Pinion Gear Included: 13-Tooth

Spur Gear Included: 46-Tooth

Pinion Gear: 13-Tooth

Ring Gear: 43-Tooth

Shock Pistons: 2-hole/1.2 diameter holes

Wheel Hub Size: 17mm

Ball Bearings

Transmission: 8x16x5mm

Clutch: 5x10x4mm

Steering: 6x10x3mm

The Turmoil Comes Filled With the Following Fluids

Shocks: 30wt. Oil Front and Rear

Differentials:

Center: 7000wt.

Front: 5000wt.

Rear: 1000wt.

ROAR and IFMAR 1/8-Scale Buggy Rules

Minimum Track Width: 10 ft continuous

Maximum Length: 28.74 in (730mm)

Maximum Width: 12.20 in (310mm)

Maximum Height: 9.84 in (250mm)

Wheelbase: 10.63–12.99 in (270–330mm)

Minimum Weight: 7.05 lb (3200g)

Maximum Wheel Diameter: 1.75 in (44.45mm)

Tire Diameter: 4.30–4.70 in (109.2–119.4mm)

Maximum Tire Width: 1.75 in (46.99mm)

Maximum Engine Displacement: .214 cu in (3.5cc)

Transmission: 1 Speed only

Tires: Rubber only

Race length: 5-Minute Qualifiers, 5–60 Minute Mains

Turmoil Specifications and Helpful Information

Set Up Tips

Differential Fluids

Changing the viscosity of the fluid in the differentials affects the way the car handles and performs. The Turmoil™ differentials come pre-filled with 5000 wt. in the front and center and 1000wt. in the rear. For most conditions, this is a good place to start.

Center: Changing the fluid in the center differential affects the front-to-rear drive. To conceptually understand how the front differential affects handling, think of it as front-wheel vs rear-wheel drive. Heavier diff fluid gives more rear-wheel drive effect, resulting in more acceleration and more on-power steering. Lighter fluids in the front differential allow it to unload during acceleration, giving more front-wheel drive and reducing power-on steering. When your car under-steers during acceleration, try switching to heavier fluid in the center differential. When your car over-steers during acceleration, try switching to lighter weight diff fluid in the center. Typically the optimum center differential fluid is between 3000 to 10,000wt. depending on the track conditions (slick surfaces = lighter center diff fluids).

Front: The viscosity of the fluid in the front differential affects overall steering authority. Heavier fluid reduces steering while lighter fluid gives more steering. However, if the fluid used in the front diff is too light, the steering can become inconsistent, especially when accelerating from corners. Typically the optimum front diff fluid is between 3000 to 7000wt.

Rear: The fluid in the rear differential affects cornering traction and overall steering. Lighter fluid in the rear diff gives more cornering traction and more steering, while heavier fluid reduces rear side bite while reducing steering authority. Some racers replace the fluid in the rear differential with thin grease for even greater rear cornering traction. Nearly all the racers use 1000wt. fluid or light grease in the rear differential to get maximum rear end traction.

Choosing Tires

The single most important factor affecting the car's handling is tires. Before you begin changing your setup, it's important to choose the best tire for the conditions. While experimenting with various tread designs, compound and liners is the optimum way to find the best combination, it's time-consuming. If time is limited, find out what tires the fast guys are using and duplicate their selection.

Caster

The Turmoil offers two caster positions: arms forward and arms rearward. Moving the clip in front of or behind the upper front arms easily changes caster position. The rearward position gives slightly more steering in the mid-section and exiting turns, while reducing the steering on entry. The arms forward position gives more steering at corner entry, while slightly reducing the midsection and exit cornering authority.

Shock Locations

The Turmoil offers 3 lower rear shock positions and 2 lower front positions. Several upper shock locations are available.

Lower Shock Positions

Moving the lower shock mounting position will change the suspension's mechanical advantage. Moving the mounting position inward has a similar effect as using softer springs and lower weight oil. Moving the lower mounting position outward is similar to stiffening the spring weight and increasing the oil weight. If the suspension is too soft (bottoming out), moving the lower shock outward will increase the rate. If the suspension is too hard (lack of traction), moving the lower suspension mounting position inward will decrease the rate giving more traction. Remember, the optimum setting is a fine balance between the front and rear.

Upper Shock Position

Moving the upper shock mounting position inward gives a more progressive spring, and dampening rates increase more quickly. Standing up the shocks "to their outer mounting positions" gives more linear dampening and spring rate.

> **Note**: There are two sets of upper mounting positions located on the shock tower. The uppermost holes are used when the shock is positioned in the inner mounting position on the arms. The lower set of holes is used when the shocks are mounted in the outer suspension's arm positions.

Turmoil Setup Sheet

Driver _____

Date _____

Lap Times _____

Track Conditions:

Traction: ☐ Slick ☐ Medium ☐ High

Surface: ☐ Smooth ☐ Bumpy ☐ Rough

Layout: ☐ Tight ☐ Medium ☐ Open

Front Suspension:

Track/Width _____

Camber Angle _____

Caster Position ☐ Forward ☐ Rearward

Toe In _____

Droop _____

Roll Bar _____

Ground Clearance _____

Rear Suspension:

Track/Width _____

Camber Angle _____

Toe In _____

Droop _____

Roll Bar _____

Ground Clearance _____

Hub Roll Center ☐ Upper ☐ Lower

Hub Position ☐ Front ☐ Mid ☐ Rear

Gearing:

Clutch Bell _____

Spur Gear _____

Clutch Shoe Position _____

Differential Fluids:

Front _____

Center _____

Rear _____

Engine:

Type _____

Plug _____

Deck Clearance _____

Exhaust _____

Fuel _____

Temperature _____

Comments _____

Tires:

Front

Type _____

Compound _____

Liner _____

Rear

Type _____

Compound _____

Liner _____

Front Shocks:

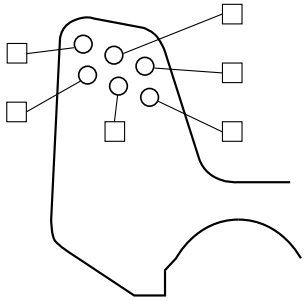
Pistons _____

Oil _____

Springs _____

Lower Mounting Position on Arm: ☐ In ☐ Out

Caster Angle: ☐ 17 Degrees ☐ 22 Degrees



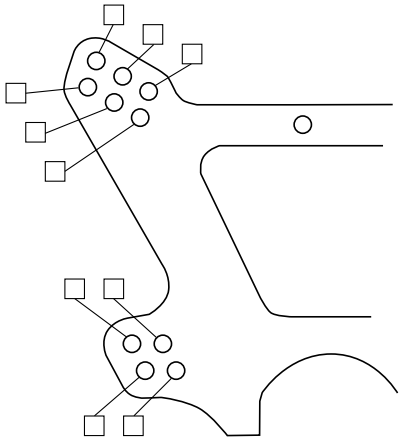
Rear Shocks:

Pistons _____

Oil _____

Springs _____

Lower Mounting Position on Arm: ☐ In ☐ Mid ☐ Out



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