Sportwerks Mayhem Pro
Assembly and Tuning Manual

Specifications:

Length:	19.4 in (492mm)
Width:	12.2 in (310mm)
Track:	Front - Adjustable 10.6–12.2 in (270–310mm)
	Rear - 12.2 in (310mm)
Wheelbase:	Adjustable 12.8–13.0 in (325–330mm)
Weight:	7.6 lb (3450 g) (Depending on equipment installed)
Gear ratio:	10.86:1

Introduction

Thanks for your purchase. If you're an experienced off-road gas racer, you'll find the Sportwerks™ Mayhem™ 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 Mayhem 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 (SWK1100 version only). While experienced racers will be tempted to disassemble the Mayhem—reassembling and checking each part to assure parts fit correctly, checking for proper use of threadlock and filling the differentials and shocks with their preferred fluids—rest assured this is not necessary.

The Mayhem is professionally built and assembled by racers. The shocks are filled with 30-weight silicone oil while the differentials have 5000-weight in the center differential, 5000-weight in the front and 1000-weight silicone oil in the rear differential. In short, the Mayhem comes assembled and ready to win!

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

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

Sportwerks Product Development Team

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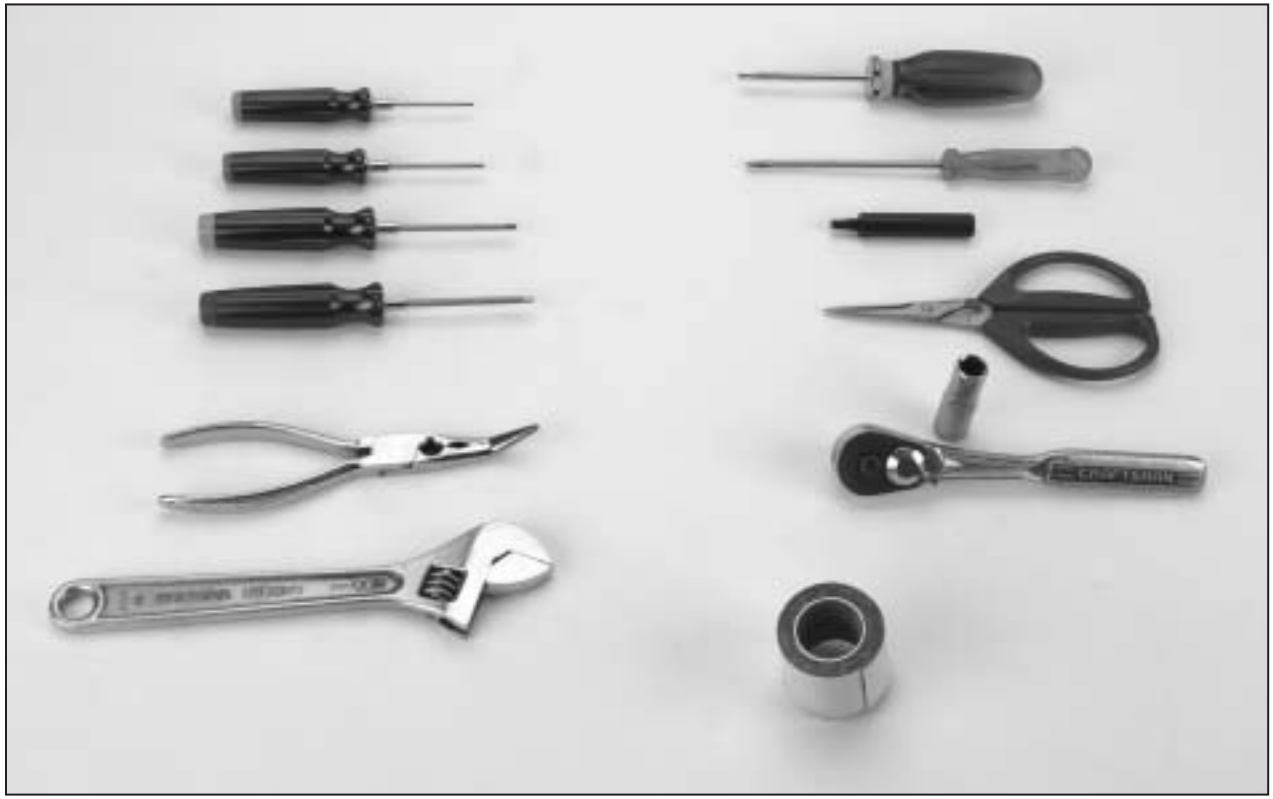
Parts Diagrams:

Required Tools



Tools required:

- 1.5mm hex wrench
- 2mm hex wrench
- 2.5mm hex wrench
- 3mm hex wrench
- 17mm open end wrench or adjustable wrench
- 10mm deep socket wrench
- #2 flat screwdriver
- #1 Phillips screwdriver
- Needlenose pliers
- Scissors
- Servo tape
- Piston lock or crank lock tool (or large adjustable pliers)

Additional Equipment Required

Additional equipment required for assembly (not included):

- 2- or 3-channel car radio w/ 2 servos (steering servo should have minimum of 80 oz/in of torque)
- Rechargeable 5-cell flat receiver pack and charger (DYN1415 1100mAh Ni-MH RX pack recommended)
- RC car paint for polycarbonate bodies

Additional Equipment Required

Additional items needed to operate

• Glow Igniter	DYN1925
• Air Filter Oil	DYN2502
• Car fuel	DYN2270
• Fuel Bottle	DYN2000
• Starter Box and Battery	DYN5610C

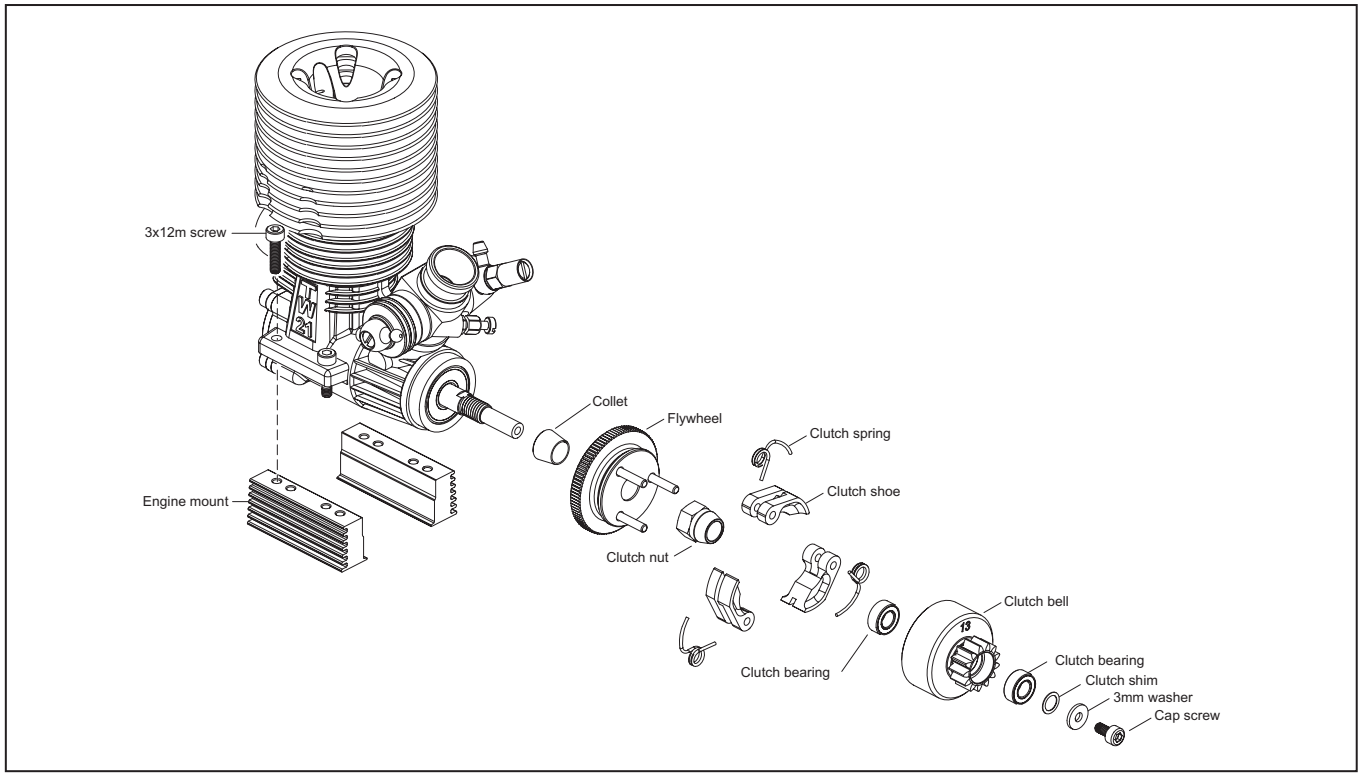
SWK1100 requires the following additional items (not included)

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

Note: If you're assembling the Mayhem Pro with engine version (SWK1150), the engine, clutch and exhaust system are already installed. Skip this section and proceed to page 13, Radio System Installation.

Items needed

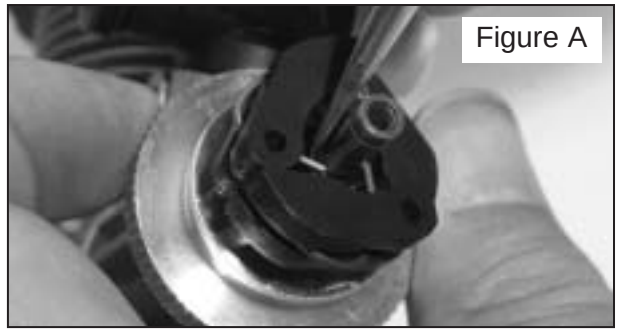
Flywheel (SWK3190)
Flywheel Collet (SWK3192)
Clutch Nut (SWK3194)
3 Clutch Springs (SWK3196)
3 Clutch Shoes (SWK3198)
14-Tooth Clutch Bell (SWK3214)
2-ball 5x10mm Clutch Bearings (SWK2620)
3x6mm Cap Head Screw (SWK2122)
3mm Washer (SWK2282)
Clutch Shim (SWK3194)
Engine Mounts (SWK3228)
Four 3x12mm Engine Mounting Screws (SWK2028)
Engine w/SG-type crankshaft (not included)
Exhaust system (not included)



Step #1

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

Step #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.



Step #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 of a flat-bladed screwdriver (and patience) is required to install the springs and shoes in place.

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

Step #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, about .004 – .006 in (.10 – .15mm) exists. Install the 3x6mm screw and washer, and tighten securely, making certain to use threadlock on the screw.

Step #5
Install the engine mounts to the engine using the provided 3x12mm cap screws.

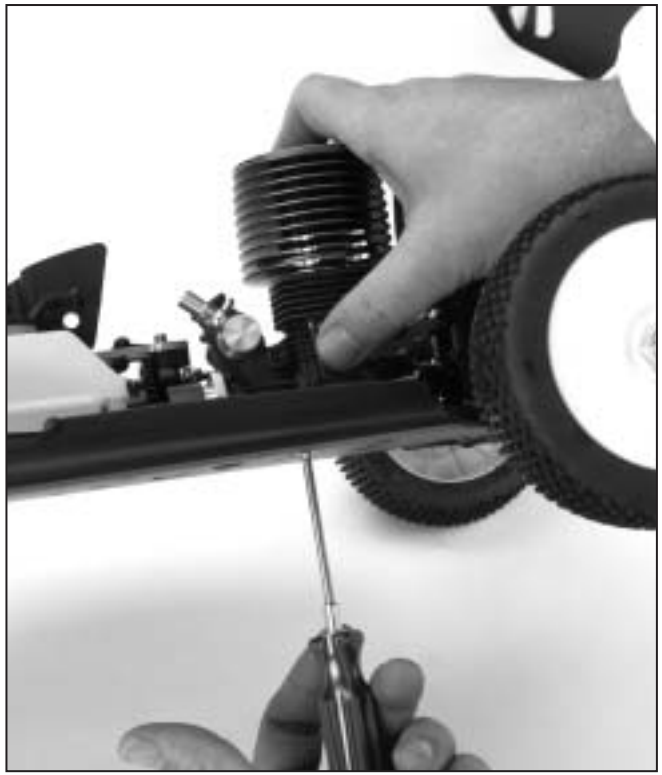
Important: Note the orientation of the carburetor in the above illustration. Be sure that the carburetor on your engine is installed per the illustration with the throttle arm on the correct side as shown. It may be necessary to rotate the carburetor 180° to position the throttle on the correct side.

Engine and Exhaust System Installation

mayhem

Items needed

The prepared engine from previous step
The assembled buggy
Four 5x8mm Engine Mounting Screws (SWK2074)
Tuned Pipe Mounting Wire (SWK3238)
Tuned Pipe Mount (SWK3240)
Exhaust system (not included)
4x4mm Set Screw (SWK2440)
4x8mm Flathead Screw (SWK2054)
Air Filter (SWK3232)
Air filter oil (not included)
Fuel tubing (not included)

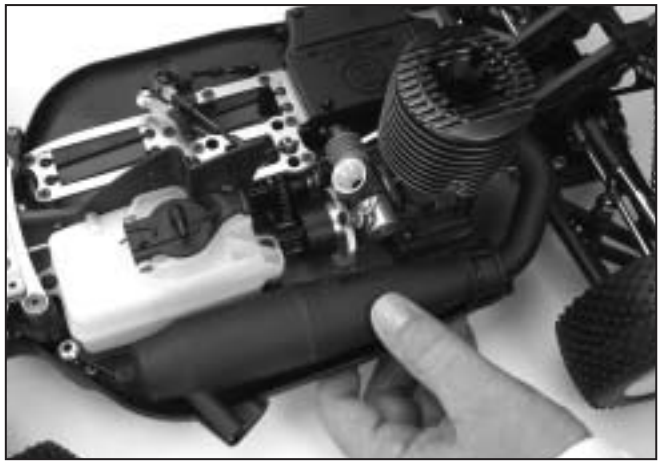


Step #1
Using the four 5x8mm engine mounting screws, mount the engine to the chassis, tightening lightly.

Step #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).

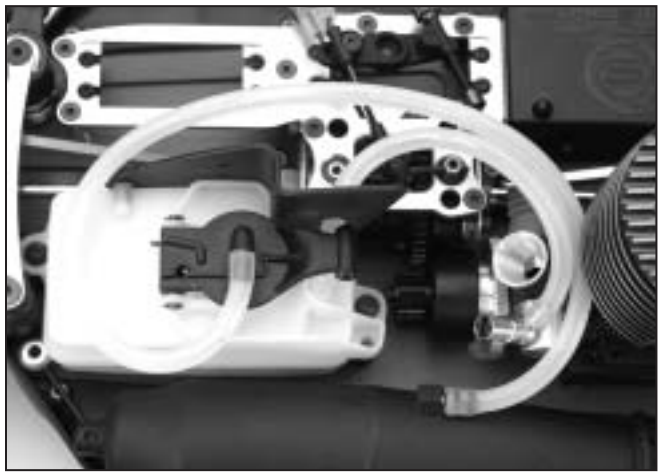
Step #3
Assemble and install the tuned pipe mount and mounting wire on the chassis using the 4x4mm set screw and the 4x8mm flathead screw. Don't tighten these screws at this time.



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

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

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



Step #6
Attach the fuel lines as shown.

Step #7
Apply air filter oil to the air filter and install on the carburetor. Use the included cable ties to attach the air filter securely in place.

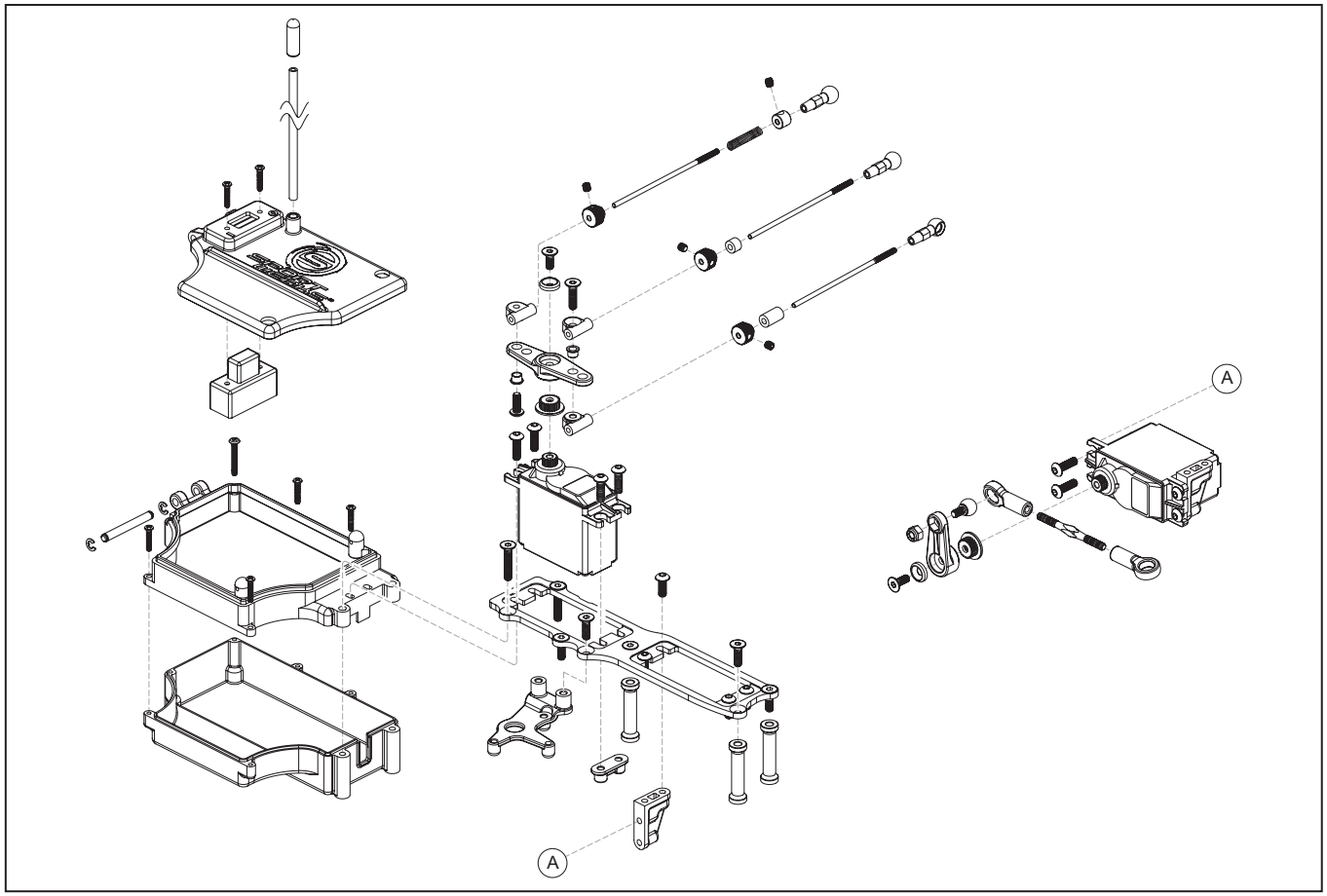
Radio System Installation

Items needed (not included)

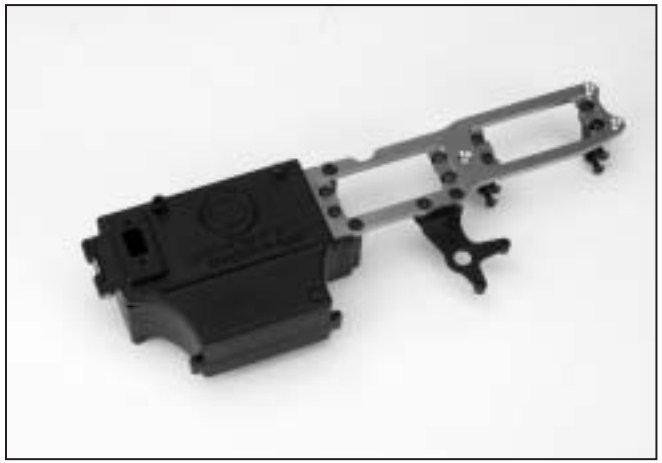
2 servos (steering servo with 80 oz/in of torque or greater recommended)
Receiver
Rechargeable 5-cell flat receiver pack (DYN1415 recommended)
Switch harness
Servo tape

Items needed-(included)

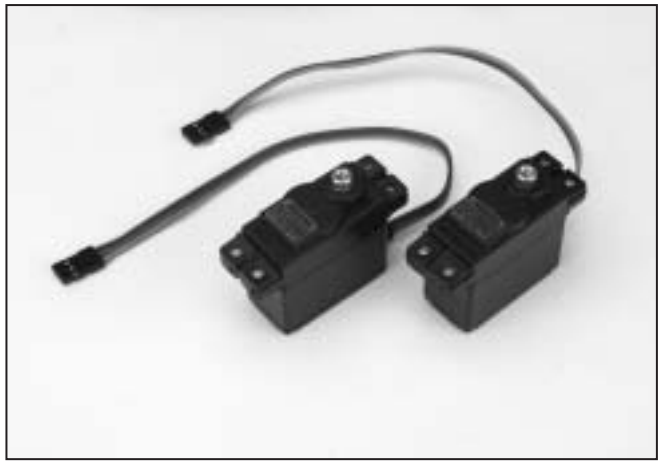
Steering Arm (SWK3108)
Servo Adaptors (SWK3108)
Steering Linkage (SWK2550)
Antenna (SWK3114)
Antenna Cap (SWK3114)
Switch Cover (SWK3118)
8-3x10mm Button-Head Screws (SWK2226)
2-2x10mm Switch Mounting Screws (SWK2306)
2-3x8mm Flathead Screws (for servo arms) (SWK2024)
2-3mm Cone Washers (SWK3108)
6.8mm Pivot Ball (SWK2470)
3mm Locknut (SWK2382)



Note: While it's possible to install the radio system in the Mayhem™ 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.



Step #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.



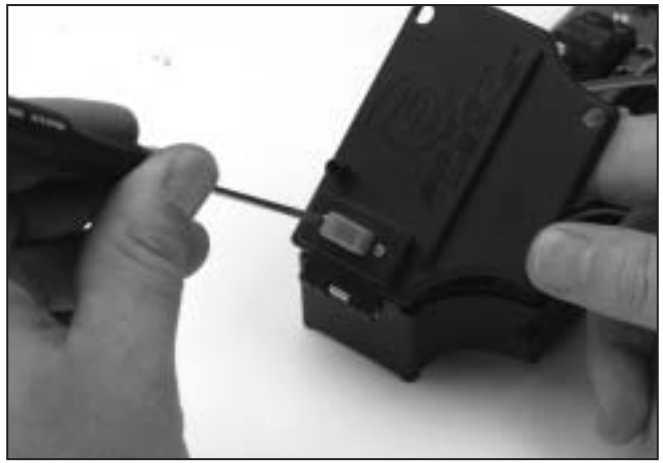
Step #2
Install the grommets and eyelets included with your radio system in both servos.

Step #3
Using the eight 3x10mm button-head screws included in the kit, install the servos in the tray as shown, noting the position of the output shafts.

Note: If using a personal transponder, install it on the provided mount at this time.

Step #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.

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



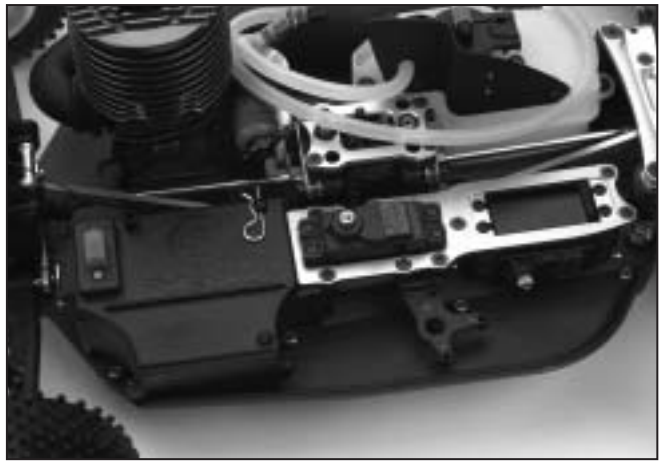
Step #6
A waterproof switch cover is included. Install the switch (not included) in the switch cover using two 2x10mm screws; fasten the switch in place.

Step #7
Secure the receiver in place as shown using two layers of servo tape. Use two layers of servo tape under the receiver to help isolate it from vibration.

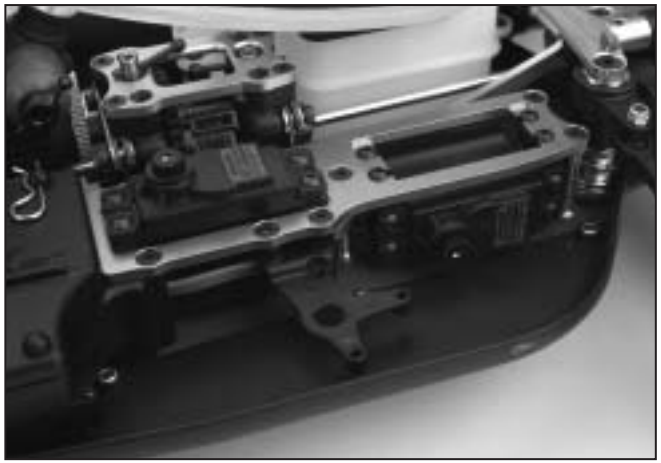
Step #8
Install the antenna tube and thread the antenna through the tube, allowing several inches to be exposed at the tip of the tube. Place the antenna cap over the end of the antenna to fasten it in place.

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.

Step #9
Hook up the servos, battery and switch per the instructions included with the radio system and charge the receiver pack.



Step #10
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.

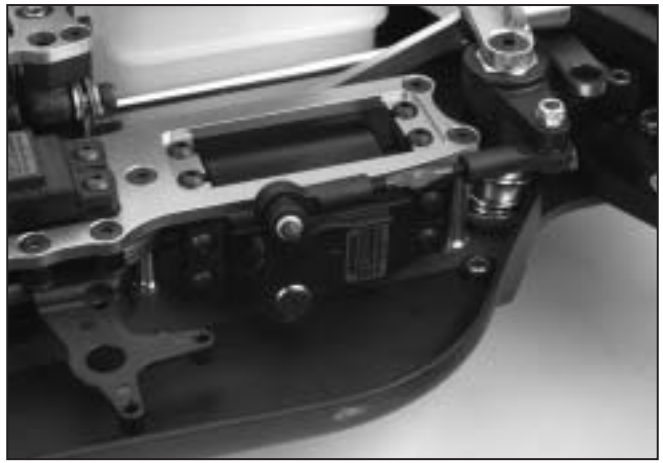


Step #11
Select the two servo adapters that fit your brand of radio and install them on the servo output shafts.

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

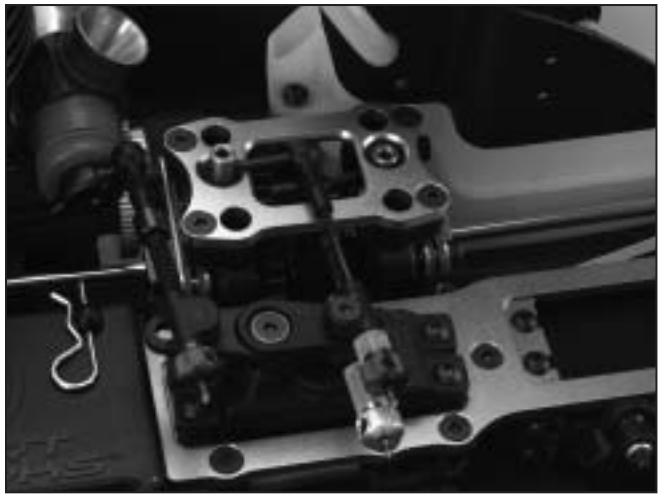
#23 - JR, Airtronics, KO
#24 - HiTec
#25 - Futaba

Step #12
Turn on the transmitter and receiver and center the trims, which will also center the servos. Install the steering servo arm on the steering such that it is positioned exactly vertically as shown in Step 13; secure it in place with a 3x8mm flathead screw and 3mm cone washer.



Step #13
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; adjust the length of the steering turnbuckle until the front wheels are straight and properly trimmed.

Brake Linkage Setup



Step #1
Turn on the radio system and adjust the throttle trim to the desired neutral position.

Step #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.

Step #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.

Step #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.

Step #5
Loosen the setscrew in the blue knurled knob and slide the knob such that it just contacts the molded pivot on the arm; retighten the setscrew.

Step #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.

Step #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.

Step #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.

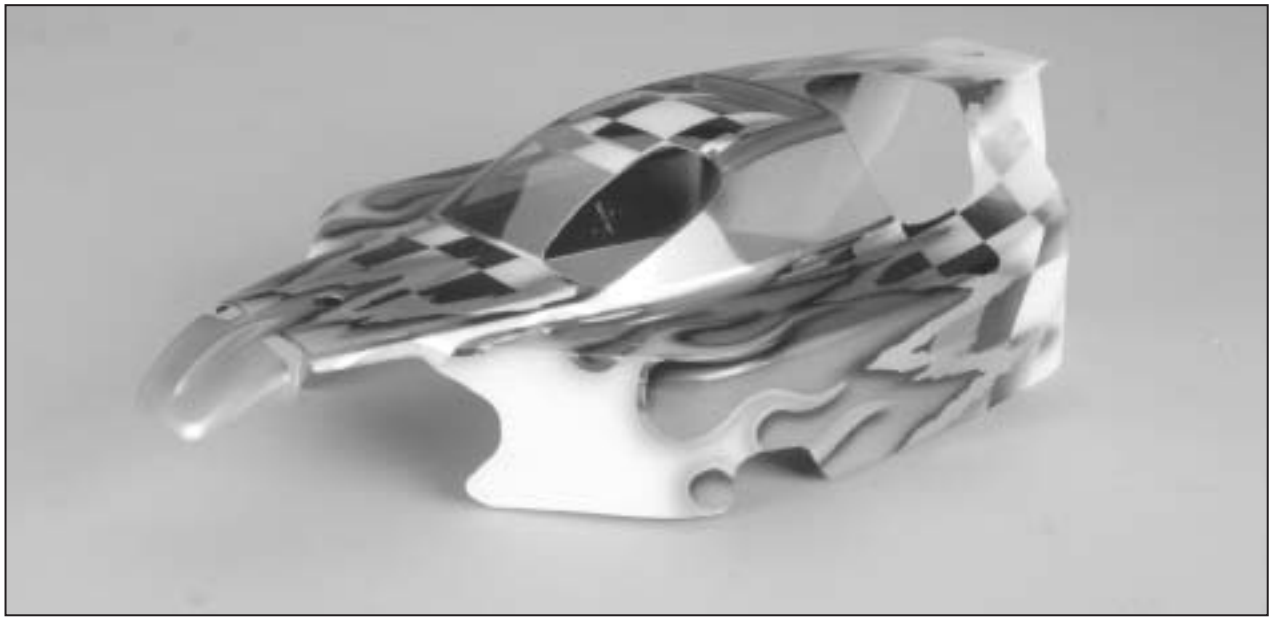
Step #9
Cut off the excess lengths of linkage to clear the body.
By rotating the silver adjusting knob, the front brakes can be accurately adjusted; rotating the red knob will affect the rear brake adjustment.

Initial Brake Adjustment
With the radio on and the throttle trim at neutral, adjust the front brake using the silver adjusting knob until it just starts to apply pressure to the front tires. Now back the front brake off one turn. Adjust the rear brake using the red adjusting knob until it just starts to apply slight pressure to the rear tires then back the rear brake off 1/2 turn. These are the neutral starting settings for the front and rear brakes.

Painting the Body

Note: A clear protective film is applied to the outside of the body to protect it from overspray 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 manufacturing 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 and masking tape can be used to create color separation lines. Be sure to use high-quality polycarbonate paint.



Your First Run

Note: If this is your first gas car, we highly recommend that you have an experienced gas-car driver or local hobby dealer help during the first startups 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 Mayhem™ came with an engine, carefully read the engine instructions on the following pages. Pay particular attention to the needle settings recommended for starting and to the break-in procedures suggested.

After Run Engine Maintenance

After you're through racing for the day, it's important to empty the fuel tank 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. Remove the air cleanier, then 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 engine features a slide-valve carburetor and includes three inserts of various diameters. These carburetor inserts are used to alter the power curve of the engine. The three diameters included have the following effect:

6.5mm – Gives smooth controllable acceleration; offers best fuel mileage; best-used for slick tracks/surfaces or beginning gas drivers.

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.

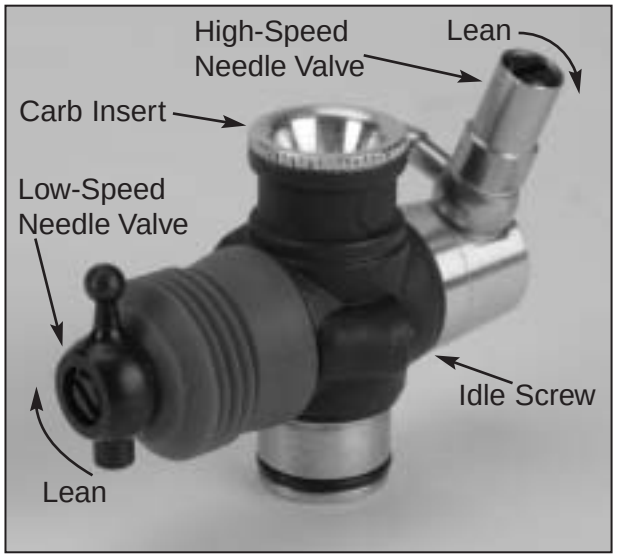
Setting the needles

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 (counterclockwise) from closed

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 startups and the first several minutes that your engine is running is the most critical time of it's 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 that the engine is rich (a good thing during break-in). During the first tank of fuel, you may wish 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 to 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 at a properly adjusted low-speed needle setting with the glow igniter attached. Then, remove the igniter. If you hear no appreciable change in 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’ve 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!**

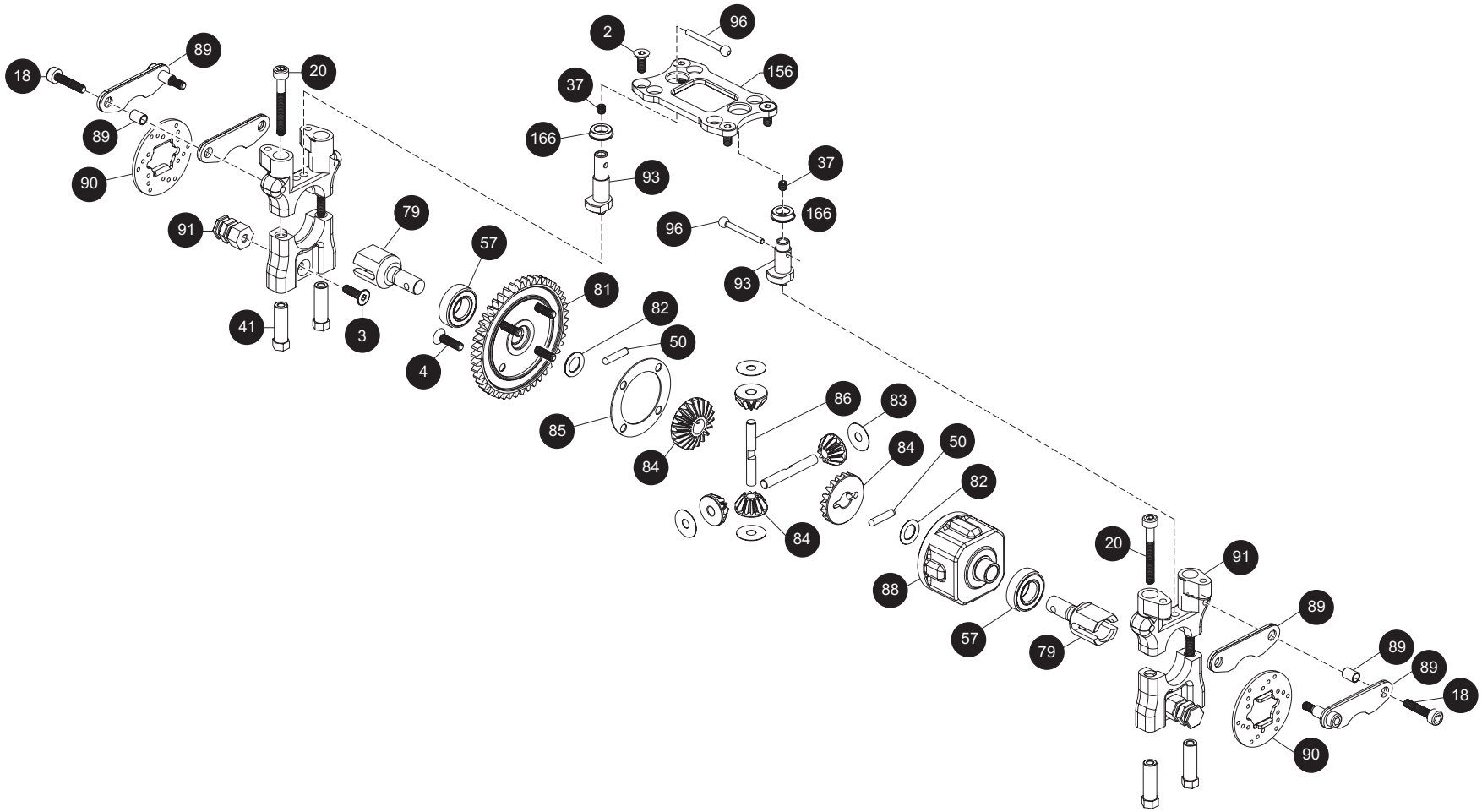
Tuning the Low-Speed Needle

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 while carefully listening to 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 ideal setting results in the RPM ’s increasing a slight amount (about 200 RPM's) after pinching the fuel line before dying.

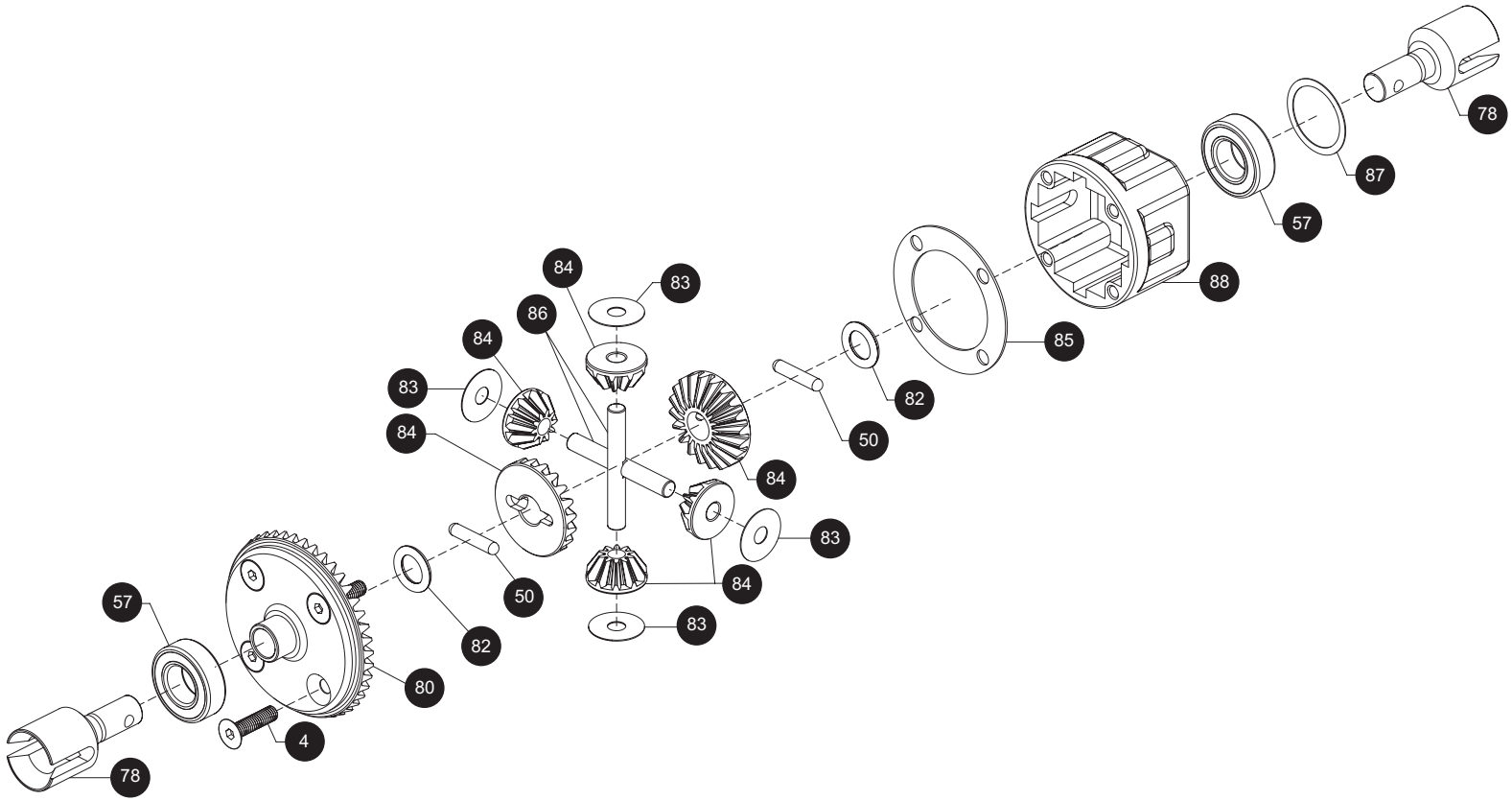
Setting the Idle RPM

The last setting to be made is the idle RPM. Turning 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.

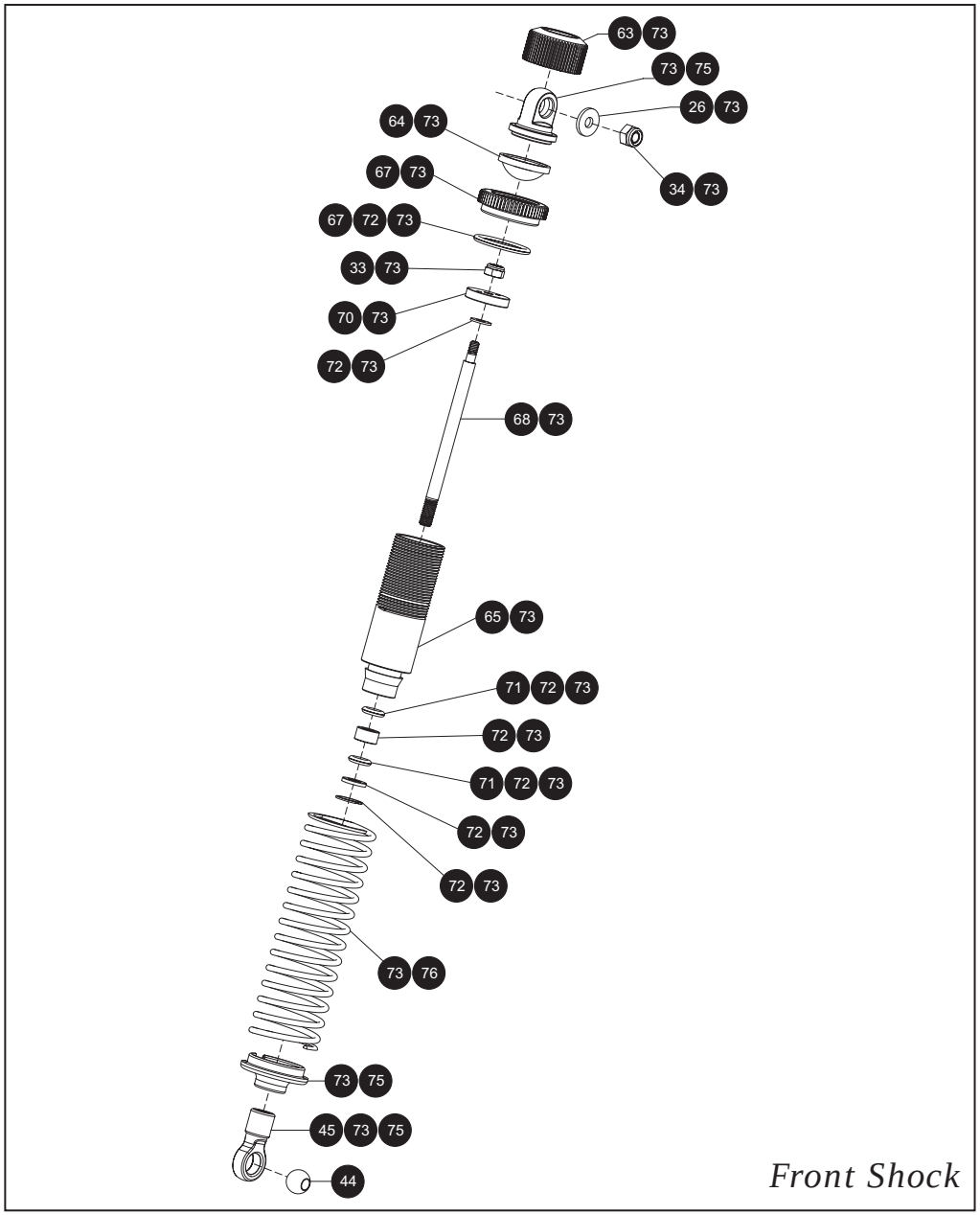
Center Differential



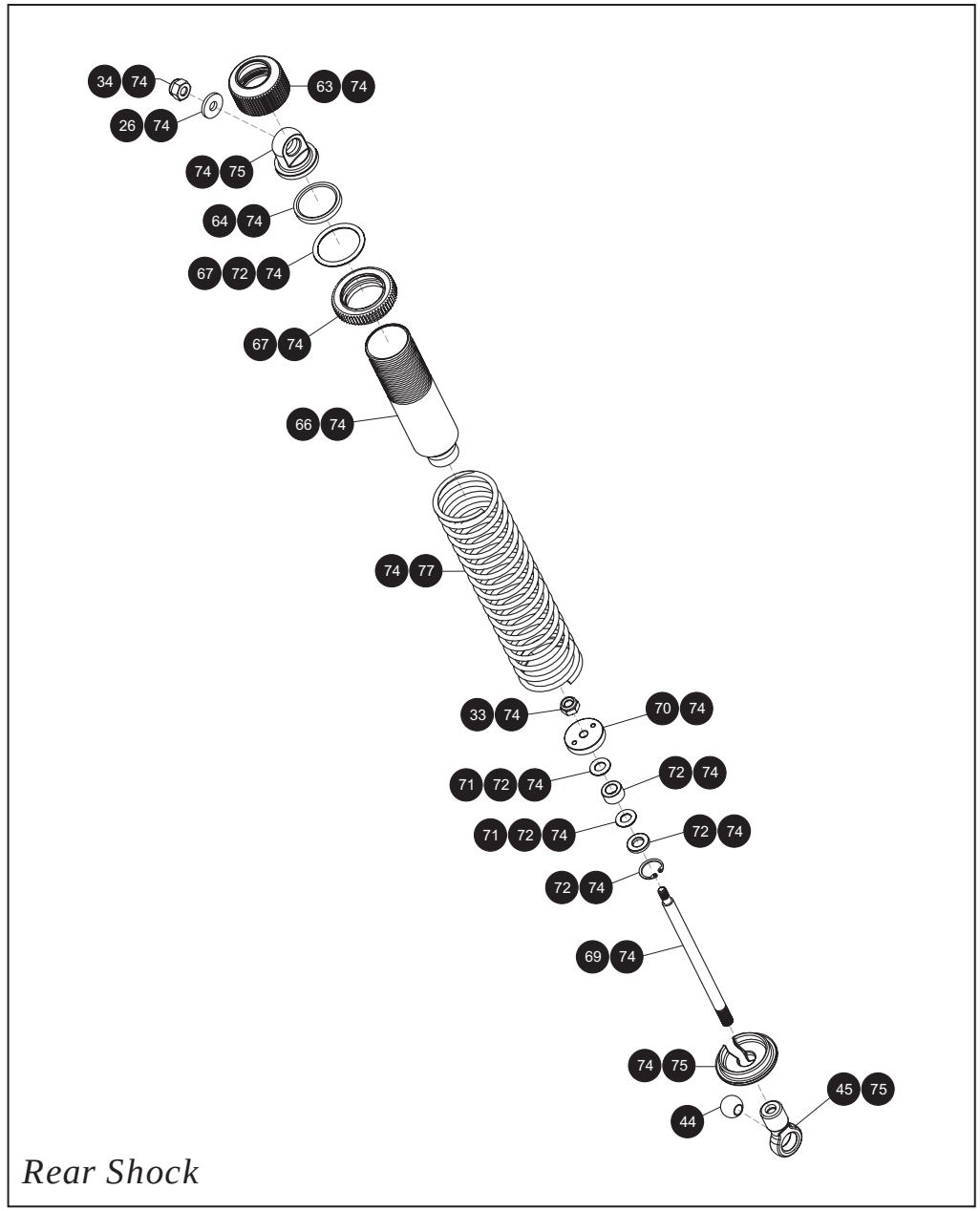
Front and Rear Differential



Front and Rear Shocks

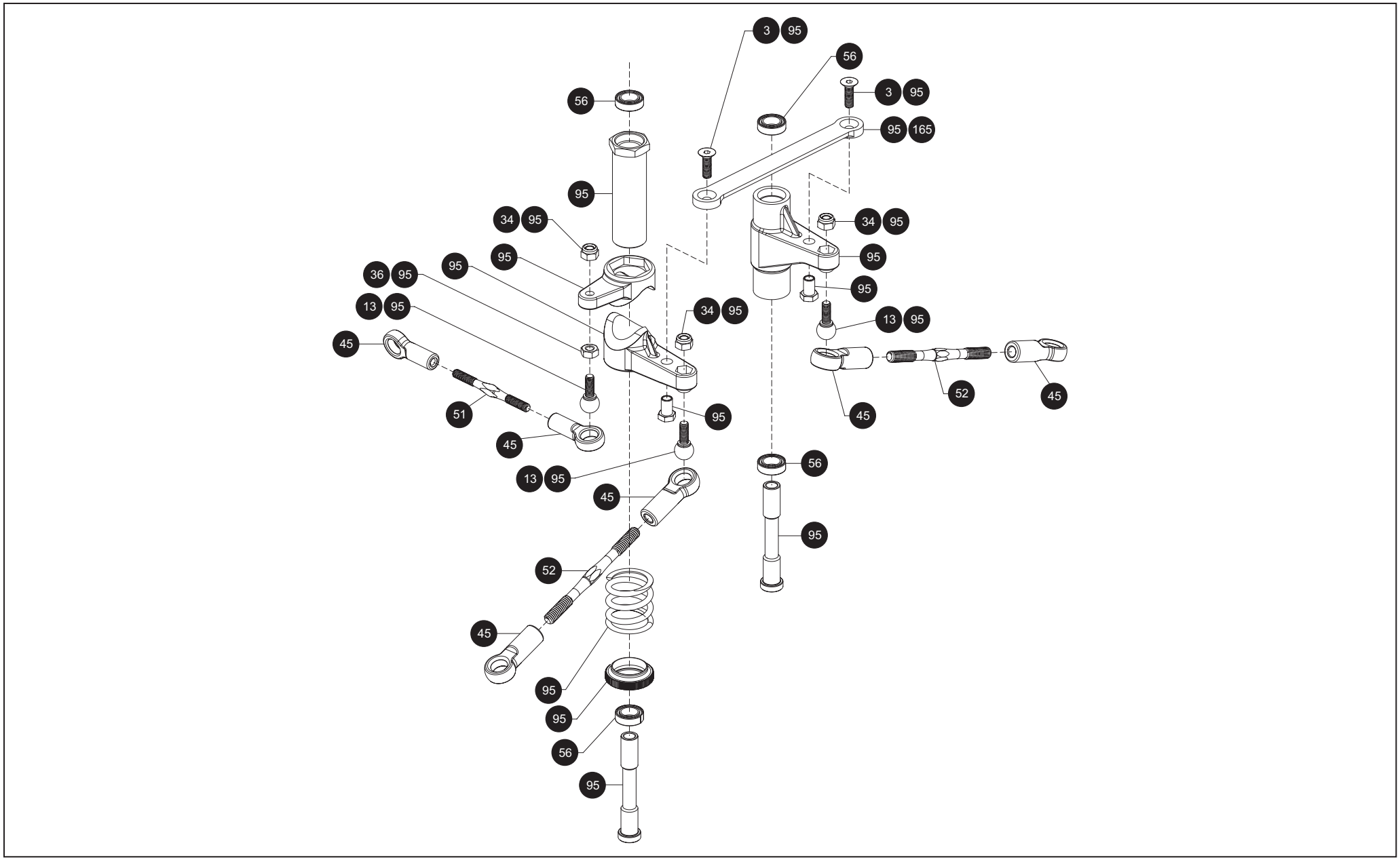


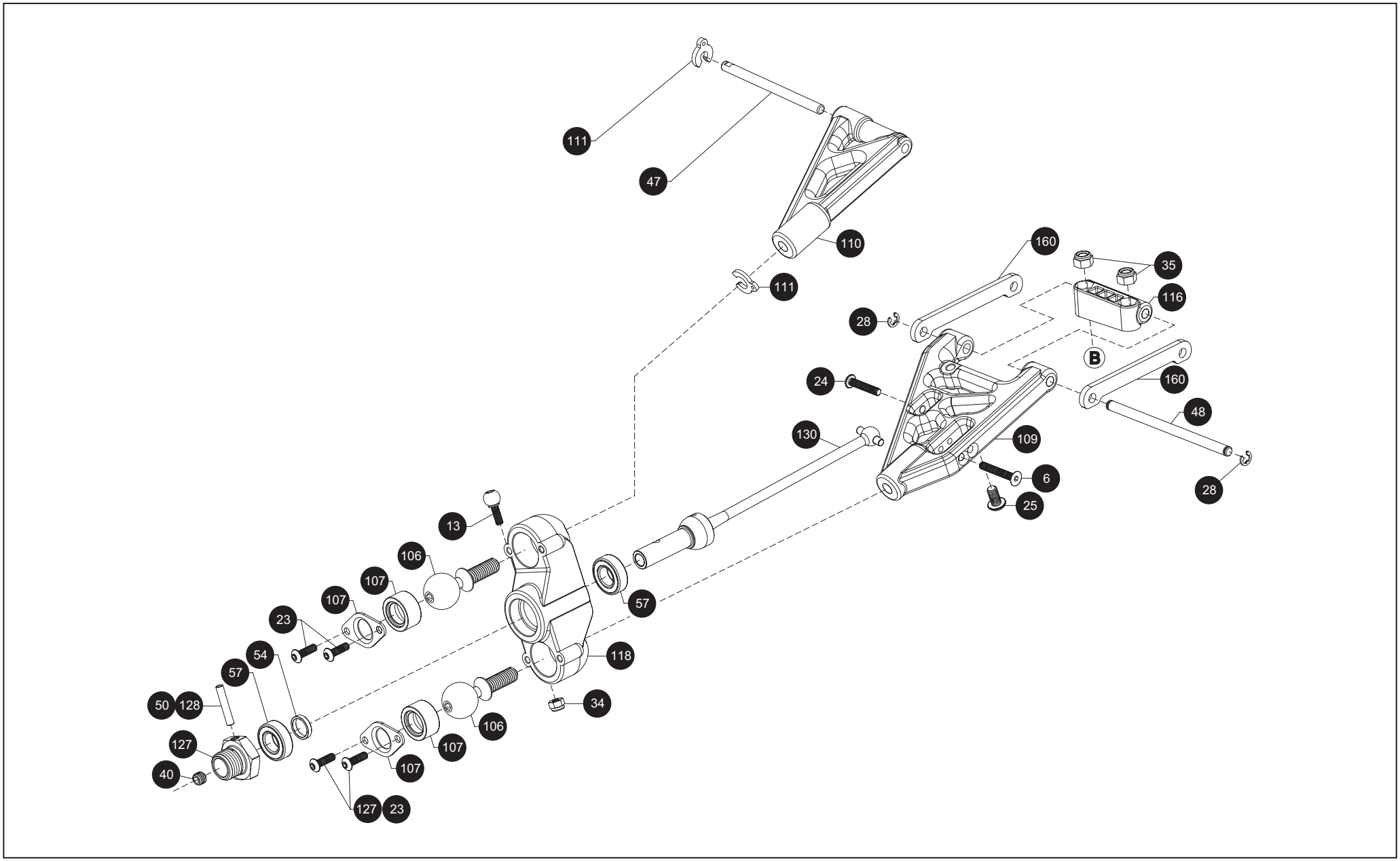
Front Shock



Rear Shock

Steering Bellcrank

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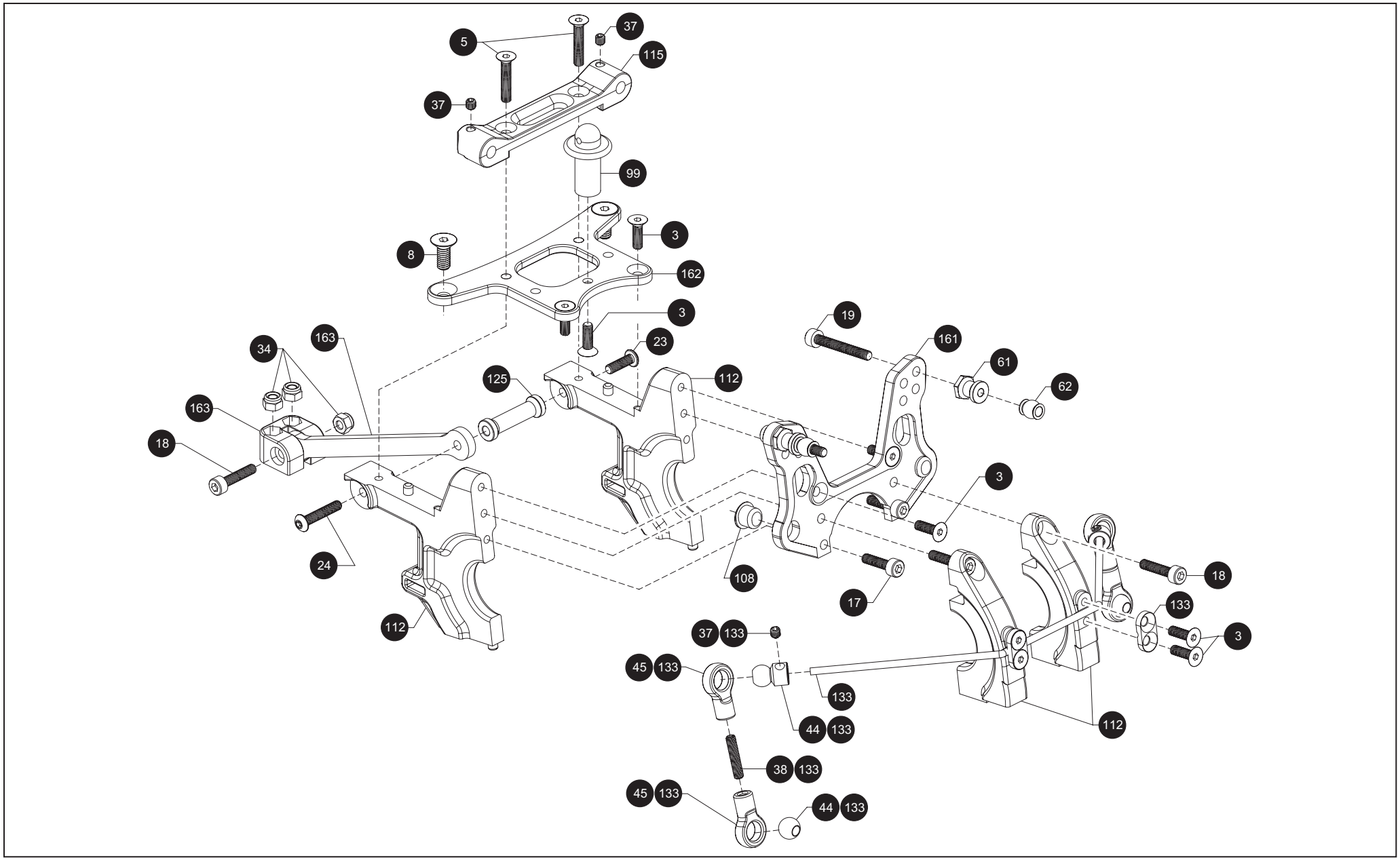
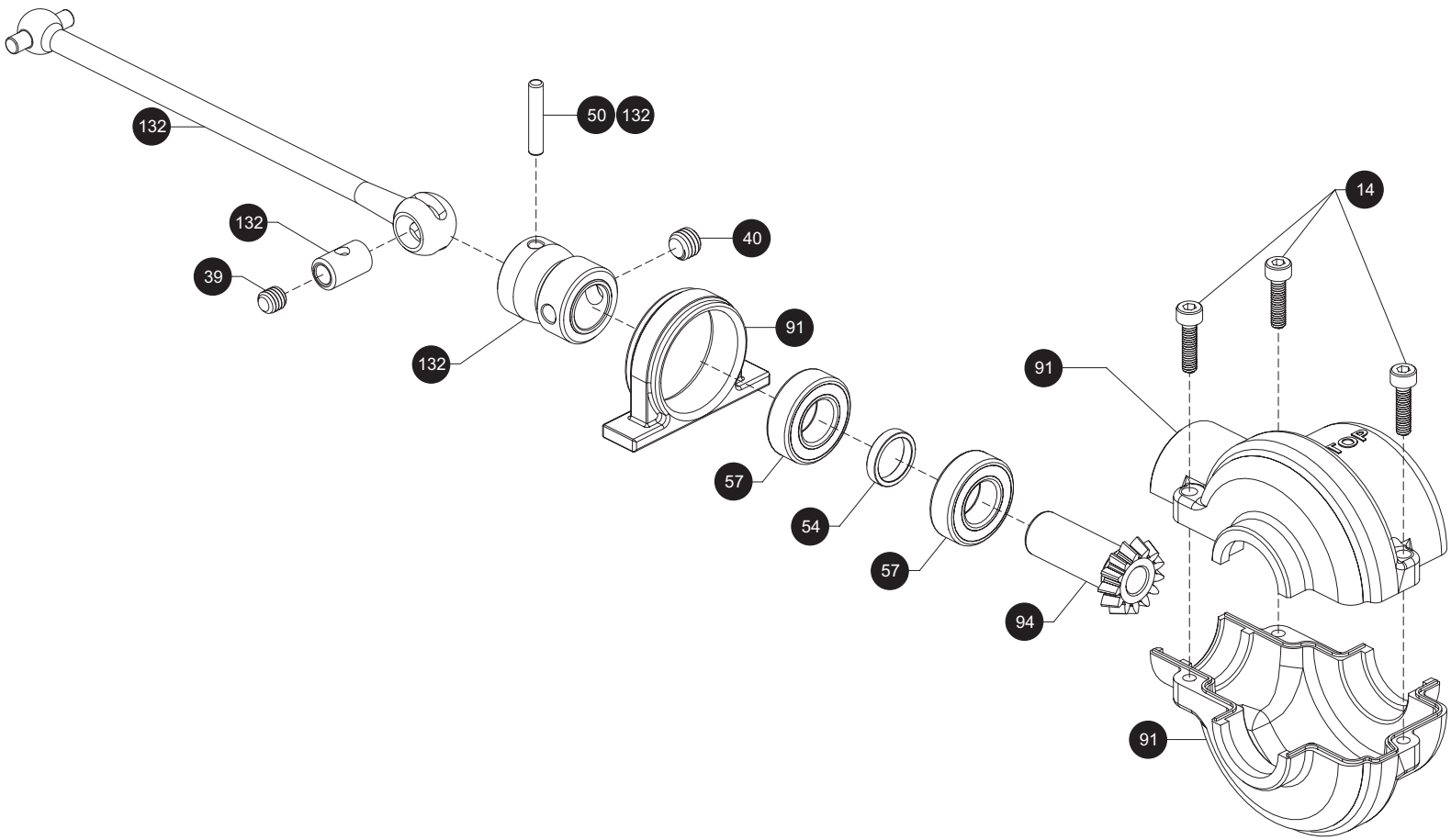
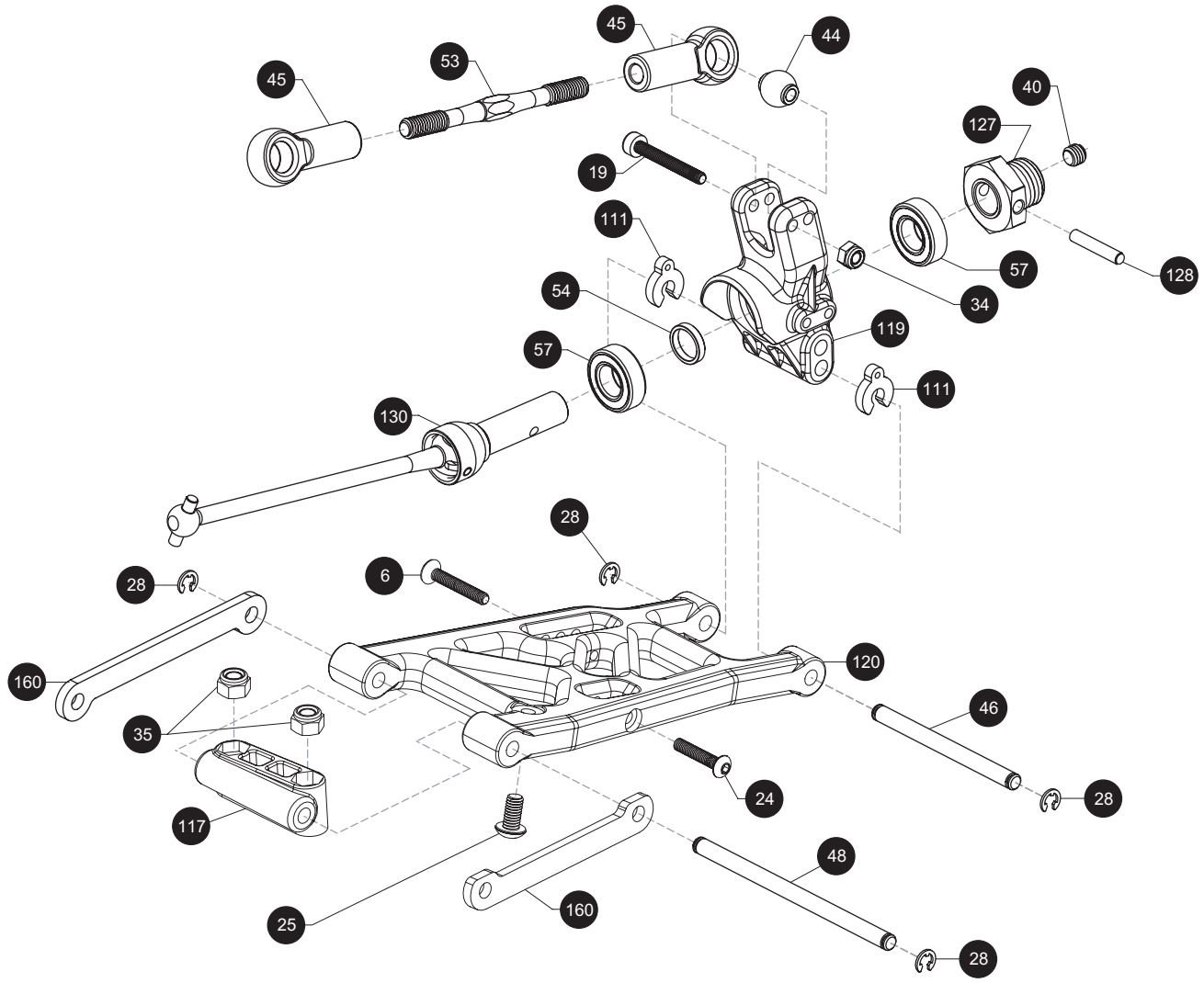
Front Gearbox Mount



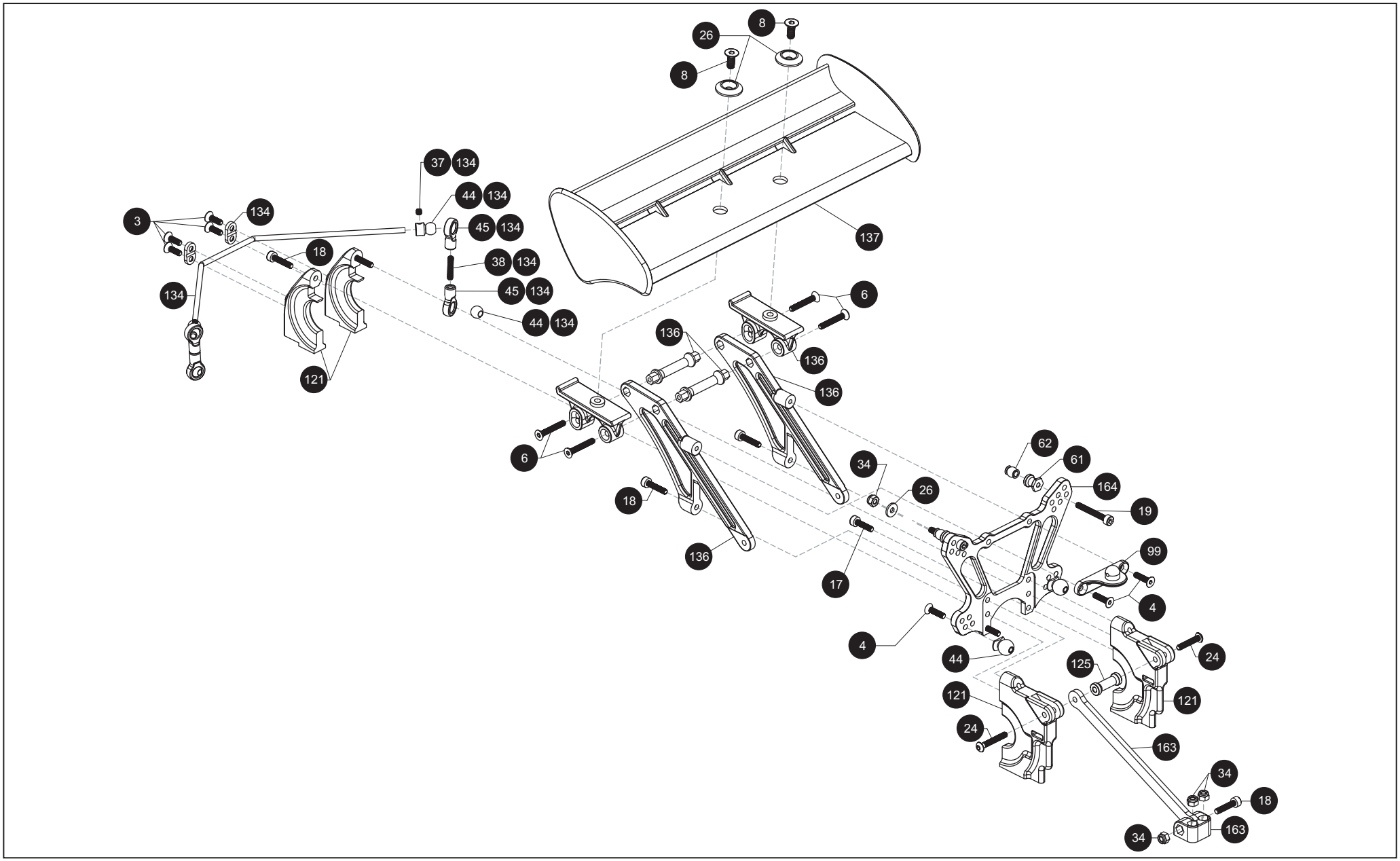
Center Driveshaft - Front



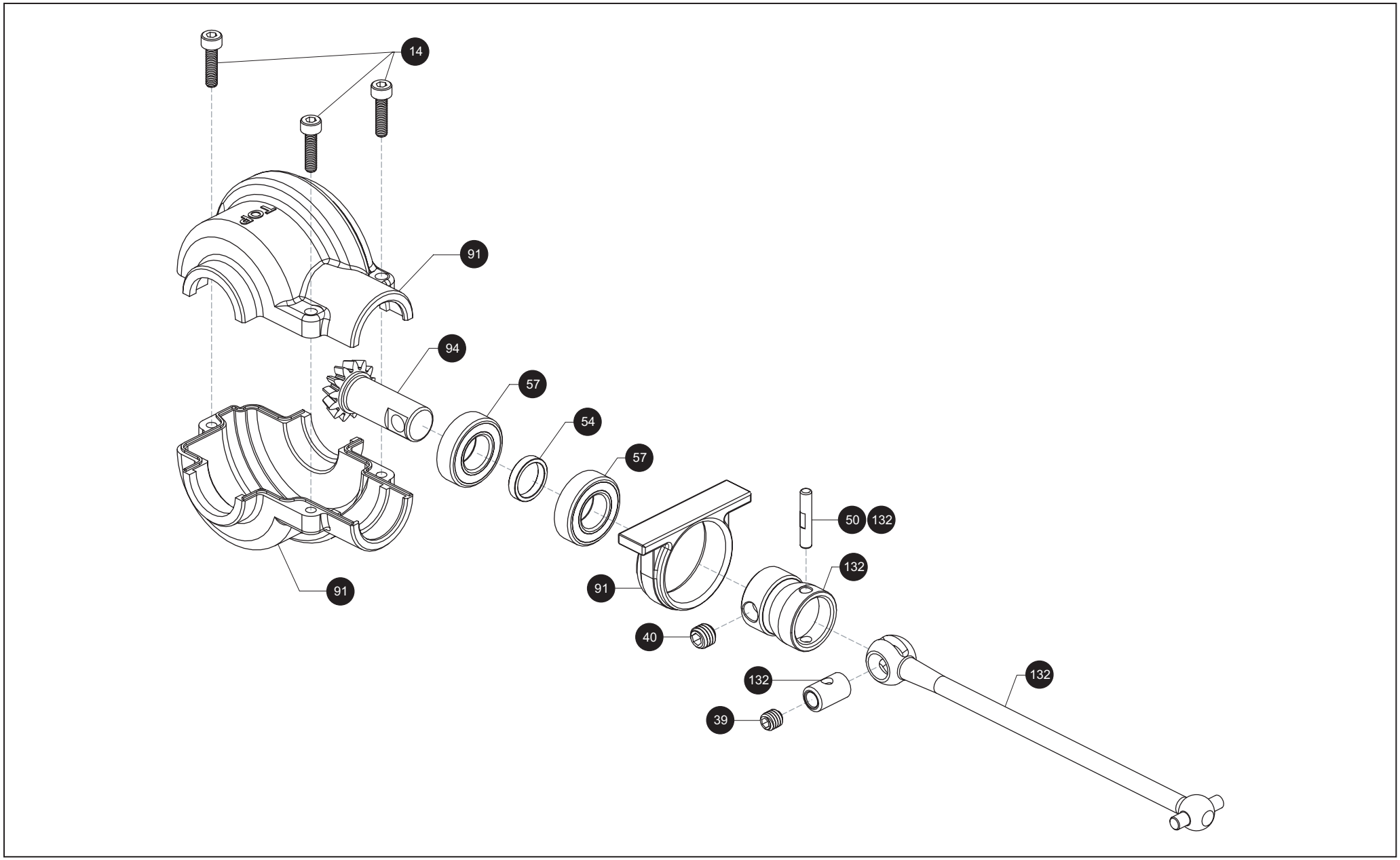
Rear Suspension

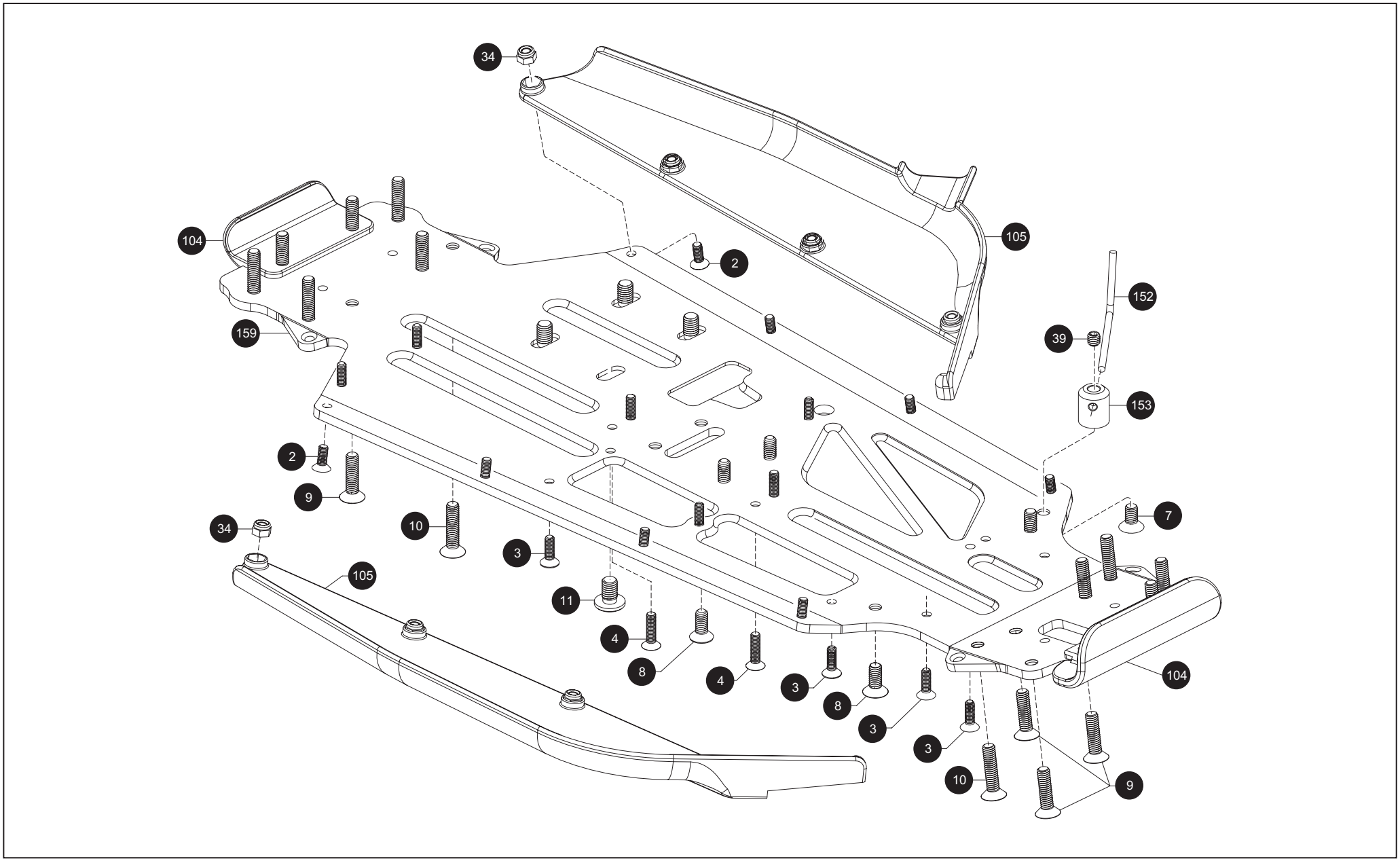


Rear Gearbox Mount



Center Driveshaft - Rear

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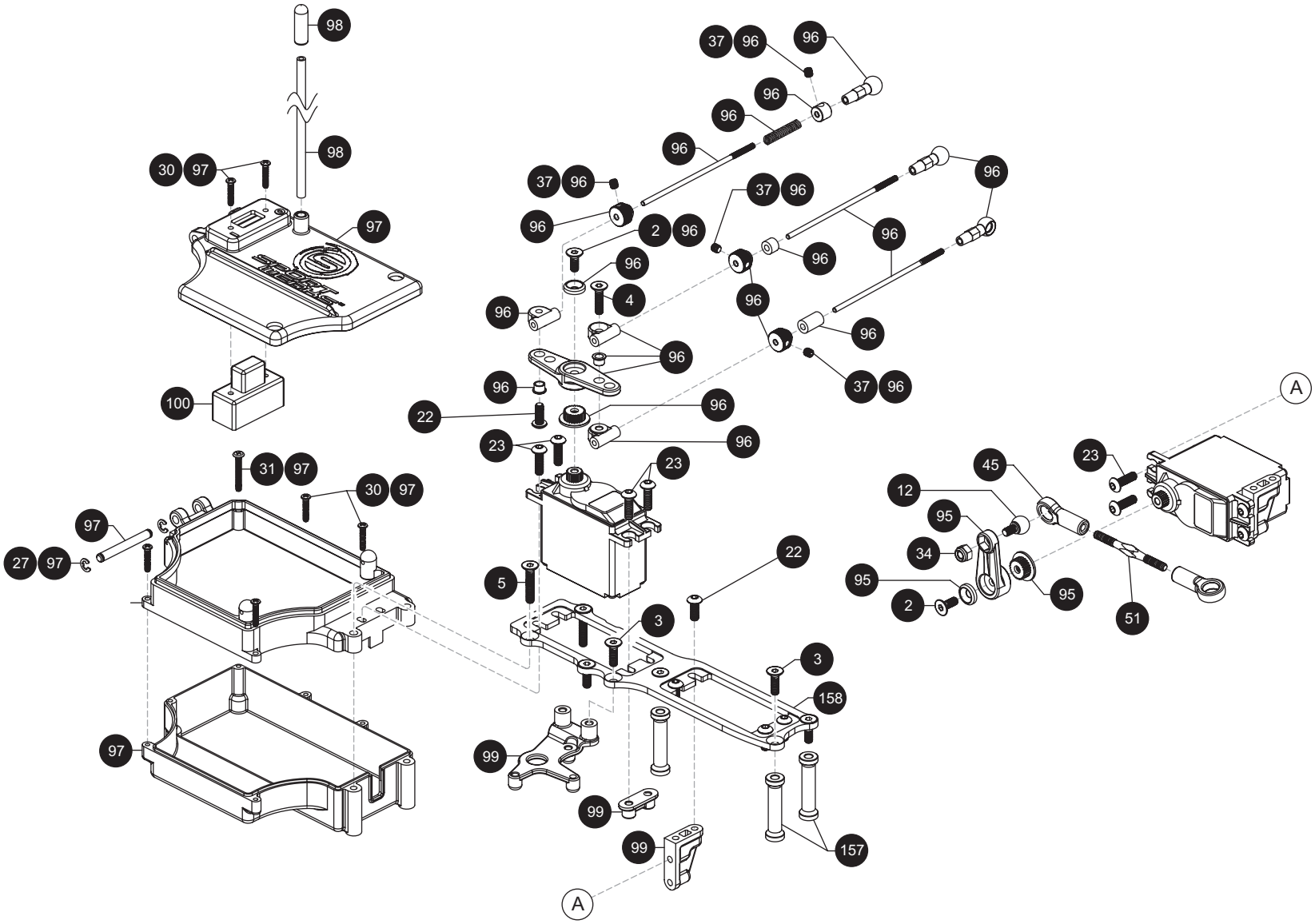
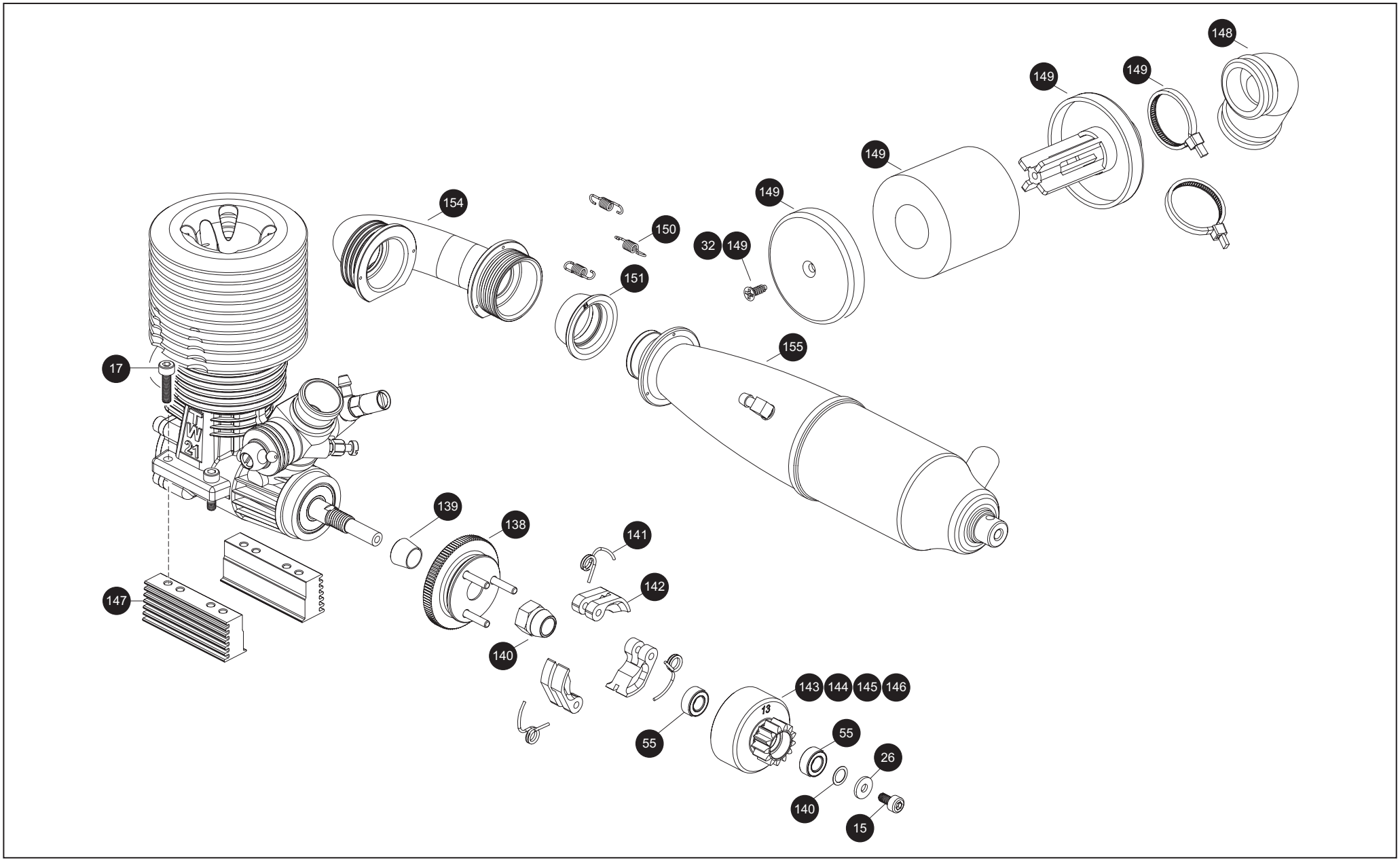
Radio Tray Assembly

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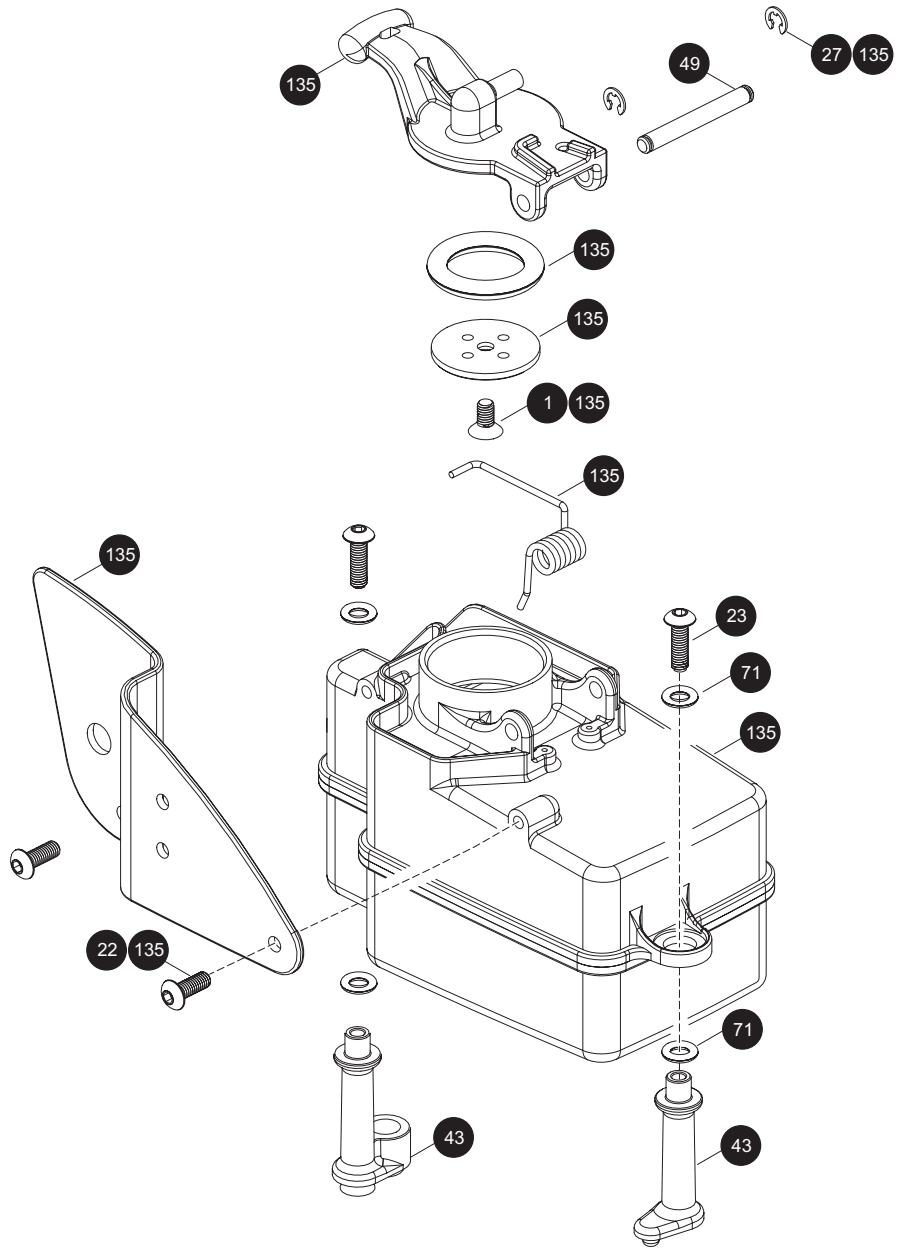
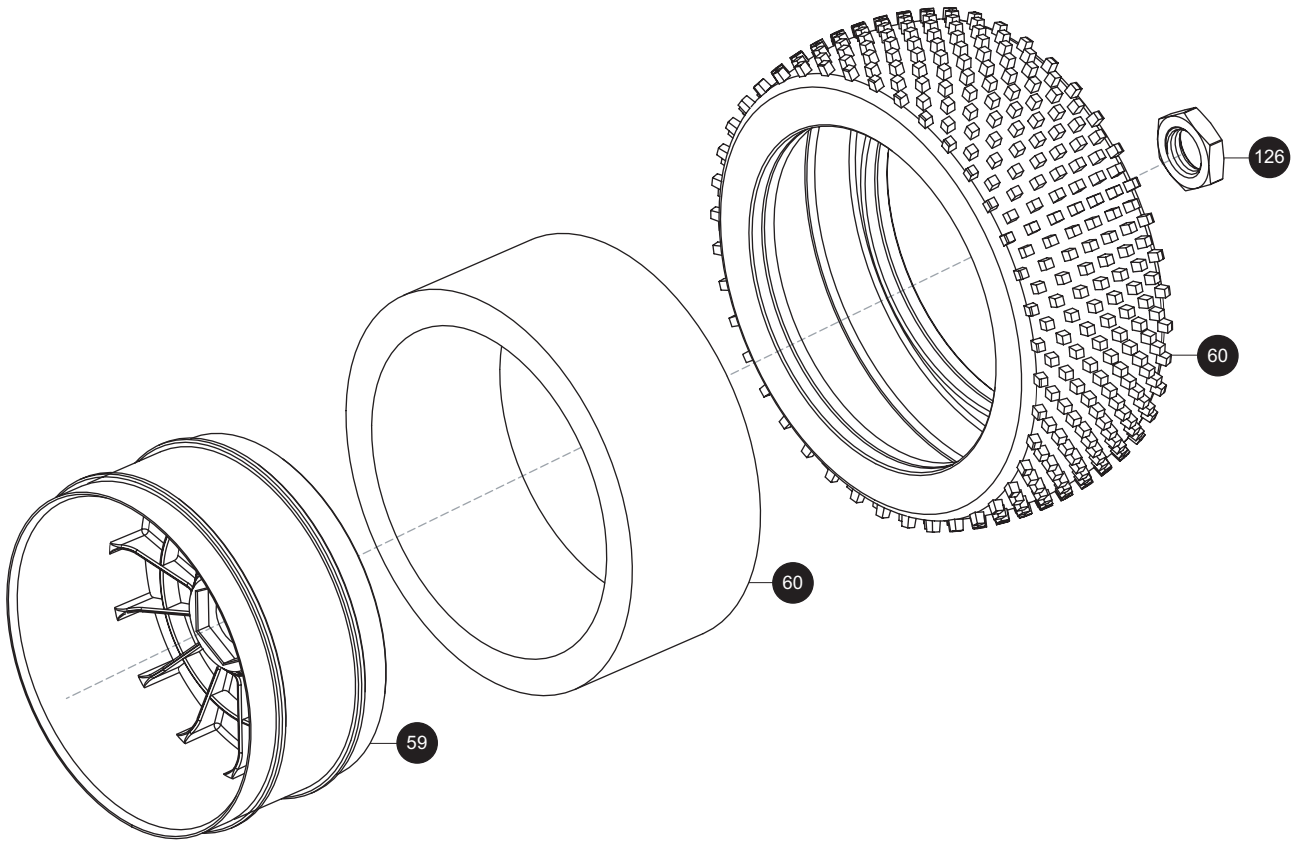
Fuel Tank

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Key #	Stock#	Qty	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
7	SWK2054	8	4mm x 8mm 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
25	SWK2254	8	4mm x 8mm Button Head Screw
26	SWK2282	2	Wing buttons
		8	3mm Washers
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

Key #	Stock#	Qty	Description
33	SWK2380	8	2.6mm Lock Nuts
34	SWK2382	8	3mm Lock Nuts
35	SWK2384	8	4mm Lock Nuts
36	SWK2392	8	3mm Nuts
37	SWK2419	8	3mm x 3mm Set Screw
38	SWK2430	8	3mm x 14mm Set Screw
39	SWK2440	8	4mm x 4mm Set Screw
40	SWK2450	8	5mm x 4mm Set Screw
41	SWK2460	4	Threaded Chassis Inserts
43	**SWK2465**		**Chassis Stand-off Bag**
		1	Front fuel tank standoff
		1	Rear fuel tank standoff
		2	Radio tray standoff
44	**SWK2470**		**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
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 Susp. Hinge Pins 50mm
47	SWK2505	2	(Front) Upper Susp. Hinge Pins 56mm
48	SWK2510	2	Inner Susp. Hinge Pins 70mm
49	SWK2515	2	Hinge Pins for radio box, fuel tank lid
50	**SWK2520**		**Pin Bag**
		4	Wheel hub pins
		2	Outdrive pins
		2	CVD coupler pins
51	SWK2550	1	Steering Link / Turnbuckle 3x36mm

mayhem

Key #	Stock#	Qty	Description
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	SWK2700	1	Mayhem Buggy Body (Clear, Trimmed)
59	SWK2740	2	Dish Wheels, White
60	**SWK2840**		**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 2.5x5mm
		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 #	Stock#	Qty	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

Key #	Stock#	Qty	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 #	Stock#	Qty	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	SWK3050	2	Front Buggy Springs
77	SWK3060	2	Rear Buggy Springs
78	SWK3070	2	F/R 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
		2	Bearing mount
89	SWK3094	4	Brake Pads
		4	Brake pad spacers
90	SWK3096	2	Brake Discs

Key #	Stock#	Qty	Description
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
95	**SWK3108**		**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	Throttle ball cup
		2	Bellcrank post
		1	Servo saver spring retainer
		1	Servo saver spring retainer
		3	3mm x14mm ball stud
		3	3mm lock nut
		1	3mm nut
		2	Drag link bushing
		2	3mm x 10mm flathead screw
		1	Steering drag link
		1	Bellcrank shaft
		1	3mm x 8mm socket head cap screw
		1	Countersunk washer

Key #	Stock#	Qty	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 #	Stock#	Qty	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/ Ballcap Bag**
		4	Pillow Ball Retainer Plate
		4	Pillow ball cap
108	SWK3134	2	Hinge Pin Bushings
109	SWK3136	2	Front Lower Suspension Arms
110	SWK3137	2	Front Upper Suspension Arms
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, F support
		1	Front bulkhead, R support

Key #	Stock#	Qty	Description
115	SWK3146	1	Upper Hinge Pin Support
116	**SWK3148**		**Front Inner Suspension Mount Bag**
		1	Front left carrier block
		1	Front right carrier block
117	**SWK3150**		**Rear Inner Suspension Mount Bag**
		1	Rear left carrier block
		1	Rear right carrier block
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, F support
		1	Rear bulkhead, R support
125	**SWK3164**		**Bulkhead Brace Bag**
		1	Front bulkhead brace
		1	Rear bulkhead brace
126	SWK3168	2	17mm Wheel Nut
127	SWK3170	2	Wheel Hub
128	SWK3172	2	Wheel Hub Pin
130	SWK3174	2	Front/Rear Buggy CVD (pr)
132	SWK3178	1	Center CVD
133	**SWK3180**		**Front Sway Bar Bag**
		2	Sway bar pivot ball
		2	3mm x 14mm set screw
		4	3mm x 3mm set screw
		1	Front sway bar
		2	Sway bar mounts
		4	6.8mm short rod end
		2	6.8mm pivot balls

Key #	Stock#	Qty	Description
134	**SWK3182**		**Rear Sway Bar Bag**
		2	Sway bar pivot ball
		2	3mm x 14mm set screw
		4	3mm x 3mm set screw
		1	Rear sway bar
		2	Sway bar mounts
		4	6.8mm short rod end
		2	6.8mm pivot balls
135	**SWK3184**		**Fuel Tank Assembly**
		1	Lower tank half
		1	Upper tank half
		1	Fuel tank lid
		1	Fuel tank baffle
		1	Fuel tank internals
		1	3mm x 6mm flathead screw
		1	Hinge pin (radio box, fuel tank lid)
		2	1mm E-clip
		1	Cap spring
		1	Fuel tank cap gasket
		1	Splash guard
		2	3mm x 8mm button head screw
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
141	SWK3196	3	Clutch Springs
142	SWK3198	3	Clutch Shoes

Key #	Stock#	Qty	Description
143	SWK3212	1	12T Clutch Bell
144	SWK3213	1	13T Clutch Bell
145	SWK3214	1	14T Clutch Bell
146	SWK3215	1	15T Clutch Bell
147	SWK3228	2	Engine Mounts
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/Pipe Springs
151	SWK3236	1	Manifold Adapter
152	SWK3238	1	Tuned Pipe Mounting Wire
153	SWK3240	1	Tuned Pipe Mount
154	SWK3242	1	Manifold
155	SWK3250	1	Tuned Pipe
156	SWK9102	1	Pro Center Diff Support Plate
157	SWK9120	3	Pro Servo Tray Standoff
158	SWK9122	1	Pro Servo Tray
159	SWK9124	1	Pro Main Chassis
160	**SWK3132**		**Pro Pin Brace Bag**
		3	Pro Hinge pin brace
		1	Pro Rear hinge pin brace
161	SWK9142	1	Pro Front Shock Tower
162	SWK9144	1	Pro Top Plate
163	**SWK9160**		**Pro Chassis Stiffener/Mount Bag**
		2	Pro Chassis stiffener mount
		1	Pro Front chassis stiffener
		1	Pro Rear chassis stiffener
164	SWK9162	1	Pro Rear Shock Tower
165	SWK9108	1	Pro Steering Drag Link
166	SWK2610	2	Brake Cam Bearings 5x8mm

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 _____

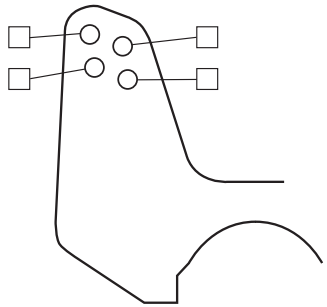
Front Shocks:

Pistons _____

Oil _____

Springs _____

Lower mounting position on arm: ☐ In ☐ Out



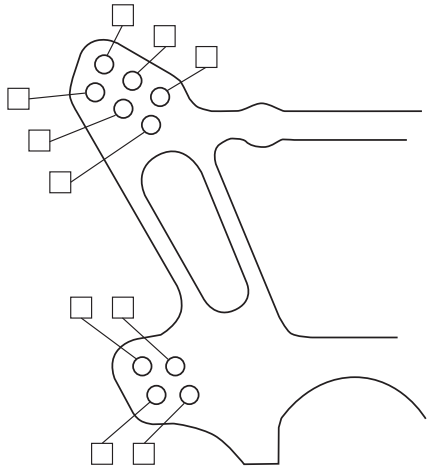
Rear Shocks:

Pistons _____

Oil _____

Springs _____

Lower mounting position on arm: ☐ In ☐ Mid ☐ Out



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Setup Sheet - Stock Settings

Driver _____

Track _____

Lap times _____

Track Conditions:

Traction: ☒ Slick ☒ Medium ☐ High

Surface: ☒ Smooth ☒ Bumpy ☐ Rough

Layout: ☐ Tight ☒ Medium ☒ Open

Front Suspension:

Track/Width ____ **12.1 in**

Camber Angle ____ **1.5 degrees**

Caster Position ☒ Forward ☐ Rearward

Toe In _____ **-1 degree**

Droop _____ **Not used**

Roll Bar _____ **Stock**

Ground Clearance **Drive shafts level**

Rear Suspension:

Track/Width ____ **12.2 in**

Camber Angle ____ **1.5 degrees**

Toe In _____ **3 degrees (stock)**

Droop _____ **Not used**

Roll Bar _____ **Stock**

Ground Clearance **Arms level**

Hub roll Center ☐ Upper ☒ Lower

Hub Position ☐ Front ☒ Mid ☐ Rear

Gearing:

Clutch Bell _____ **14**

Spur Gear _____ **46**

Clutch Shoe Position __ **Trailing**

Differential Fluids:

Front _____ **5000**

Center _____ **5000**

Rear _____ **1000**

Engine:

Type _____ **Sportwerks .21**

Plug _____ **SWK8060 #5 Glowplug**

Deck Clearance _____

Exhaust ____ **.053**

Fuel __ **White Lightning 20% (DYN2285)**

Temperature _____

Comments _____

Tires:

Front

Type ____ **SWK blocks (stock)**

Compound _____

Liner ____ **Stock**

Rear

Type ____ **SWK blocks (stock)**

Compound _____

Liner ____ **Stock**

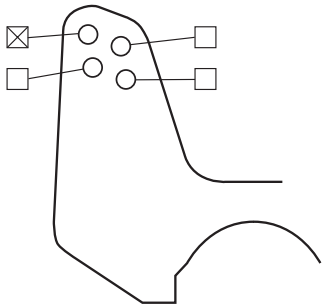
Front Shocks:

Pistons __ **2 hole - 1.5mm (stock)**

Oil ____ **30 wt**

Springs __ **Black**

Lower mounting position on arm: ☐ In ☒ Out



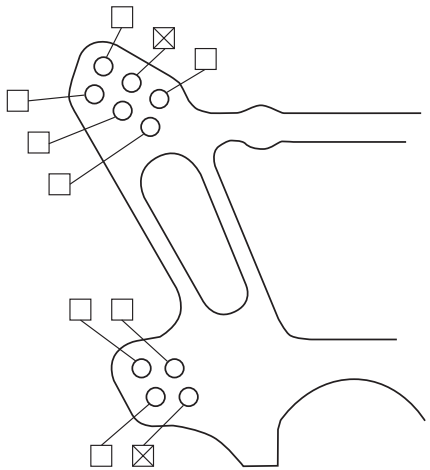
Rear Shocks:

Pistons __ **2 hole - 1.5mm (stock)**

Oil ____ **30 wt**

Springs __ **Black**

Lower mounting position on arm: ☐ In ☐ Mid ☒ Out



SPORTWERKS

Specifications and Other Information

Brake Knob - Color Code

Red - Rear brake
Silver - Front brake
Blue - Throttle

The Mayhem Comes Filled with the Following Fluids

Shocks - 30 wt. oil front and rear
Differentials - Center - 5000 wt
Front - 5000 wt
Rear - 1000 wt

Specifications - Chassis

Overall Length - 492mm / 19.4 in
Width - 310mm / 12.2 in
Wheelbase - Adjustable 325mm–330mm / 12.8–13.0 in
Caster angle - Adjustable 17–24 degrees
Fuel tank capacity - 126cc
Internal gear ratio - 3.31 to 1
Pinion gear included - 14 tooth
Spur gear included - 46 tooth
Diff pinion gear - 13 tooth
Diff ring gear - 43 tooth
Shock pistons - 2 hole / 1.5mm diameter holes
Wheel hub size - 17mm
Ball bearings - Transmission - 8x16x5mm
Clutch - 5x10x4mm
Steering - 6x10x3mm

ROAR and IFMAR 1/8 Scale Buggy Rules

Minimum track width - 10 ft continuous
Maximum length - 730mm / 28.74 in
Maximum width - 310mm / 12.20 in
Maximum height - 250mm / 9.84 in
Wheelbase - 270–330mm / 10.63–12.99 in
Minimum weight - 3200g / 7.05 lb
Maximum wheel diameter - 44.45mm / 1.75 in
Tire diameter - 109.2–119.4mm / 4.30–4.70 in
Maximum tire width - 46.99mm / 1.75 in
Maximum engine displacement - 3.5cc / .214 cu in
Transmission - 1 speed only
Tires - rubber only
Race length - Qualifiers - 5 minute
Mains - 5–60 minutes

Differential Fluids

Changing the viscosity of the fluid in the differentials affects the way the car handles and performs. The Mayhem differentials come pre-filled with 5000 wt. fluid in the center and front and 1000 wt. fluid 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 center differential affects handling, think of it as front-wheel vs. rear-wheel drive. Heavier fluid gives more rear-wheel drive effect, resulting in more acceleration and more on-power steering. Lighter fluids in the center differential allow the front tires to unload during acceleration, giving more front-wheel drive and reducing power-on steering. When your car under-steers during acceleration, try switching to a 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 3,000 to 10,000 wt. depending on track conditions (slick surfaces = lighter center diff fluid).

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 and 7000 wt.

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 racers use 1000 wt. fluid or light grease in the rear differential to get maximum rear end traction.

Choosing Tires

The single most dramatic factor affecting your car's handling is tires. Before you begin changing your setup, it's important to choose the best tires for the conditions. While experimenting with various tread designs, compounds 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 Mayhem 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 midsection 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 Mayhem offers three lower rear shock positions and two 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 rate 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 Positions: Moving the upper shock mounting position inward gives a more progressive spring and damping rate. Progressive rate means as the shock is compressed, the 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.

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