Thunder Tiger

EK4-S2 ARR

1/8 OFF-ROAD, 4WD MONSTER TRUCK

No.6216

INSTRUCTION MANUAL

JD1440.V3

WARRANTY

Thunder Tiger Corporation guarantees this model kit to be free from defects in both material and workmanship. The total monetary value under warranty will in no case exceed the cost of the original kit purchased. This warranty does not cover any components damaged by use or modification. Part or parts missing from this kit must be reported within 60 days of purchase. No part or parts will be sent under warranty without proof of purchase. To receive part or parts under warranty, the service center must receive a proof of purchase and/or the defective part or parts. Should you find a defective or missing part, contact the authorized Thunder Tiger Service/Distributor nearest you. Under no circumstances can a dealer or distributor accept return of a kit if assembly has started.

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INTRODUCTION

Thank you for the purchase of this Thunder Tiger product. You should enjoy many hours of trouble free use from this advanced R/C product. Thunder Tiger strives to bring you the highest level of quality and service we can provide. We race and test our products around the world to bring you state-of-the-art items.

We offer on-line help 24-7 on our www.acehobby.com forum and our product specialists are ready to take your call if you have any technical questions. Please read all instructions and familiarize yourself with the systems and controls of this product before operating. Have fun and enjoy the exciting world of R/C.

ITEMS REQUIRED FOR OPERATION

8217 Ace Jaguar 2AP Pistol Radio
8216 Ace Jaguar 2AD 2-Stick Radio
8114 Ace S1903 Standard Servo (3kgcm/ 41.6 ozin)
8120 Ace S1807MG High Torque Servo (6.9kgcm/ 95.8 ozin)
8118 Ace S2008MG High Torque Servo (7.8kgcm/ 108.3 ozin)

Glow Fuel, Methanol
5% to 30% Nitro
15% to 25% Caster / Synthetic Oil

1261 Fuel Bottle, 600cc
1266 Fuel Bottle, 300cc

Alkaline Batteries
(12), AA-size

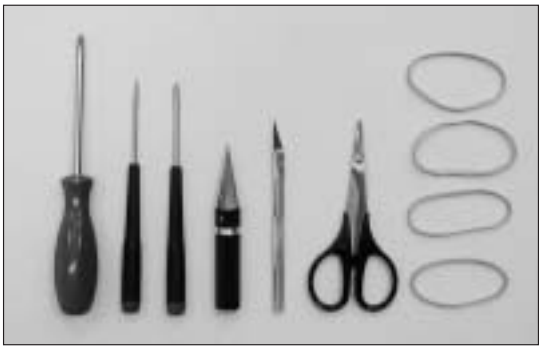
2165 Long Glow Starter 1300 mAh w/220V Chgr
2166 Long Glow Starter 1300 mAh w/110V Chgr

2674 Starter 1.2V H.D. 90
2675 Starter 1.2V H.D. 180

TOOLS INCLUDED

3801 Extended 6mm
Hex Starting Tool

1117 5-Way Wrench
W/ Extension



Screw Drivers, Lexan Body Reamer, Hobby Knife, Lexan Scissors, Rubber Bands.

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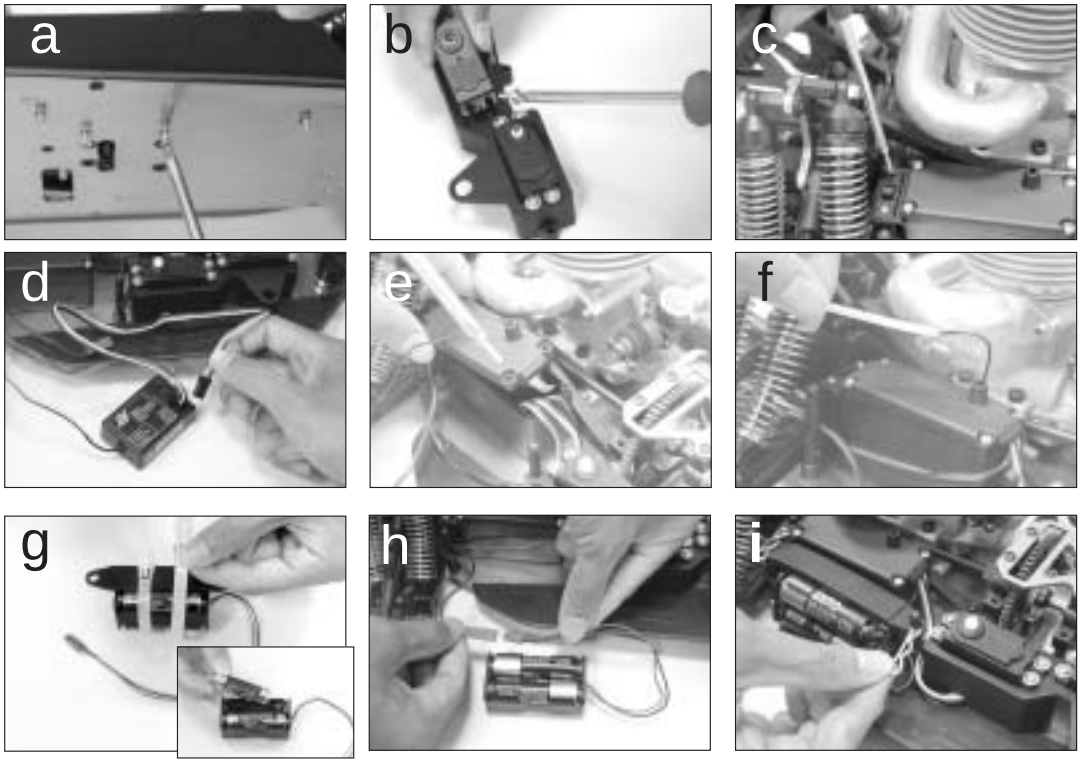
1 INSTALLING THE RADIO GEAR



a. Take out the 4 screws on the chassis securing the plastic servo tray.

b. Install the servos with tap screws. Notice the orientation of the steering and throttle servo output shafts.

c. Install the receiver switch onto the rear of the receiver box with its original screws.

d. Properly plug the connectors/wires into the receiver: steering servo connector/wire into channel 1 slot, throttle servo connector/wire into channel 2 slot, and battery switch connector/wire into battery slot.

e. Remove the receiver box top's 4 screws and place the receiver and the wires inside the receiver box, thread the receiver antenna/wire through the box top hole, and reinstall the box top.

f. Thread the receiver antenna/wire through the antenna tube, then install the antenna tube onto the box top hole.

g. Install 4 AA size alkaline batteries in receiver battery box and strap the battery box onto the battery plate with two large nylon zip-ties.

h. Connect the receiver battery box wire/connector to the receiver switch wire/connector.

i. Install the battery box & plate onto the posts, then use the large body clips to secure the plate onto posts.

2 INSTALLING STEERING SERVO LINKAGE

a. Build the steering linkage as shown on the diagram.

b. Install the servo horn onto steering servo output shaft with its original screw.

c. Pop the tie-end onto the standoff ball on the steering rack.

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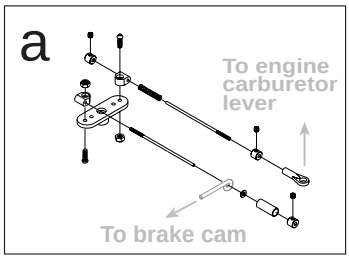
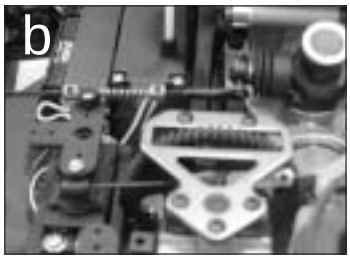
3 INSTALLING THROTTLE LINKAGE





a. Build the throttle/brake linkages as shown on the diagram.

b. The throttle/brake linkage should appear as shown.

c. Install the servo horn onto throttle sero output shaft.

4 CHARGING THE GLOW PLUG IGNITER

Thunder Tiger Optional Part #2165, 1300MAH Glow Starter w/220V Charger.
Thunder Tiger Optional Part #2166, 1300MAH Glow Starter w/110V Charger.

a. Plug the charger into an AC outlet.

b. Line up the charging adapter with the tip of the glow plug igniter.

c. Pull on the glow plug igniter lever to accept the charging adapter.

d. Plug the charging adapter into the glow plug igniter. At this point, the small red LED indicator on the charger should light up indicating the charging sequence is in progress.

e. Unplug the glow plug igniter from charger after charging is complete. Pull on the glow plug igniter lever.

f. Pull the charging adapter out of the glow plug igniter.

Charge the new glow plug igniter for 16 to 24 hours on the first charge. For subsequent charges, charge it about 12 hours before next use.

NOTE:

If the igniter gets warm or hot during the charge, unplug the igniter from charger immediately. A warm / hot igniter means the igniter is overcharged. Overcharging can damage the internal battery in the igniter; thus, shortening its life.

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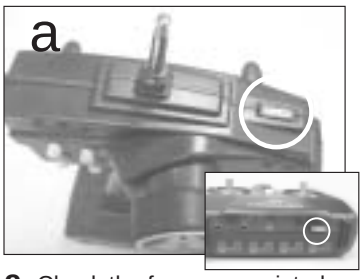
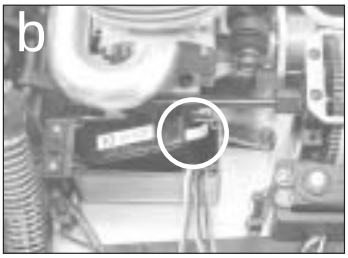
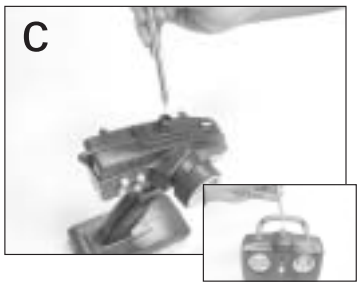
5 PREPARING THE RADIO





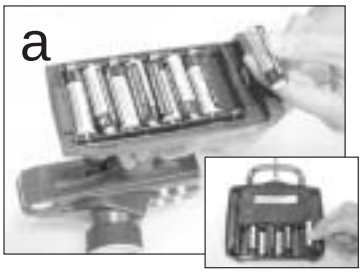


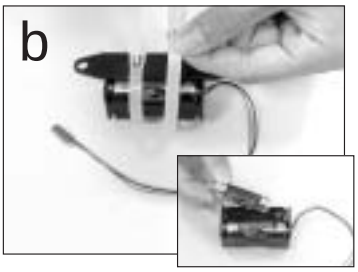
a. Check the frequency printed on the transmitter crystal.

b. Check the frequency printed on the receiver crystal, and make sure it matches with the transmitter crystal. Make sure no one will operate on the same frequency when you are. When there is a radio glitch, it will most likely be caused by improper crystal, damaged crystal, or people operating on the same frequency.

c. Install the antenna into transmitter.

6 RADIO BATTERY INSTALLATION



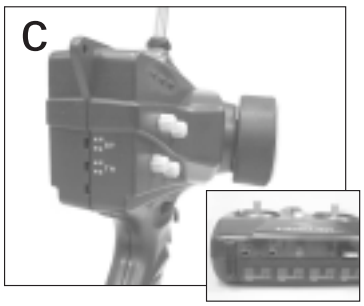


a. Install 8 AA-size alkaline batteries into transmitter.

b. Undo the large zip-tie, and remove the receiver battery box. Install 4 AA-size alkaline batteries into receiver battery box.

c. Secure the receiver battery box with batteries back onto the posts with large body clips.

7 RADIO OPERATION



a. When turning radio on, first turn on the transmitter.

b. Then, turn on the receiver. When turning off, first turn the receiver off, then the transmitter off.

c. To reverse the functions of servos, use the small, white servo reverse switches located on top of the pistol transmitter (or the inset servo reverse switches located at the center of the stick transmitter). To trim the servos on pistol transmitter, use the large, red trim levers on top and side of the steering wheel (the top trims steering, and the side trims throttle/brake). On a stick transmitter, the trim levers are located accordingly around the sticks.

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8 OPERATING RADIO STEERING FUNCTION

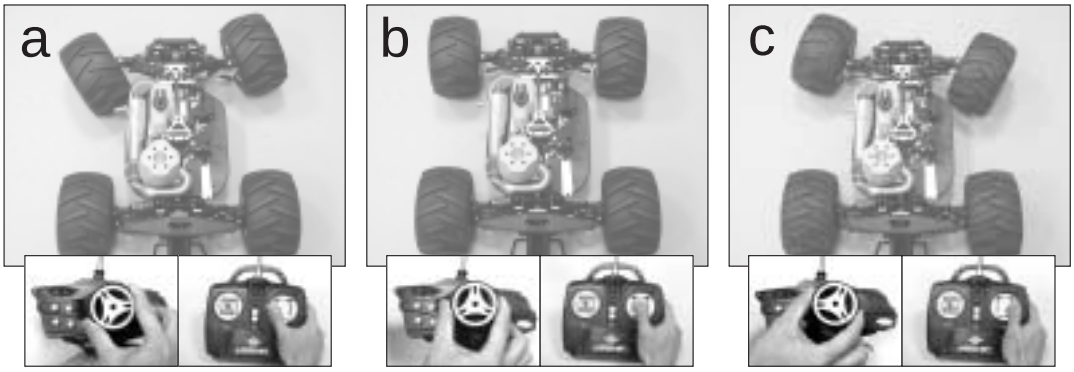
a

Install the wheel extension wrench as shown.

b

Install the tire/ wheel as shown.

9 OPERATING RADIO STEERING FUNCTION

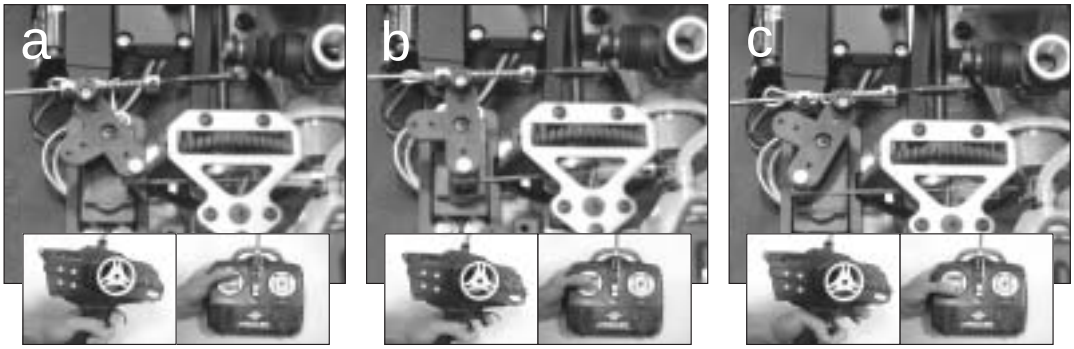


a. Check the radio steering functions. With the radio transmitter and receiver on, turn the steering wheel/stick to the left. The front tires/wheels should turn left accordingly. If not, flip the steering servo reverse switch.

b. Return the steering wheel/stick to neutral. The front tires/wheels should point straight forward. If not, use the steering trim lever to correct it.

c. Turn the steering wheel/stick to the right. The front tires/wheels should turn right accordingly.

10 OPERATING RADIO THROTTLE / BRAKE FUNCTION



a. Check the radio throttle/brake functions. With the radio transmitter and receiver on, pull the trigger/push the stick forward. The carburetor should be fully opened and the brake disengaged. To reverse this function, flip the throttle/brake servo reverse switch.

b. Return the trigger/stick to neutral. The carburetor should be closed to a point where the idle has been set (see step for ADJUSTING THROTTLE/BRAKE LINKAGE), and the brake still disengaged. If not, use the throttle/brake trim lever to correct it.

c. Push the trigger/pull the stick backward. The carburetor opening should still be the same at neutral, throttle spring compressed slightly, and the brake engaged.

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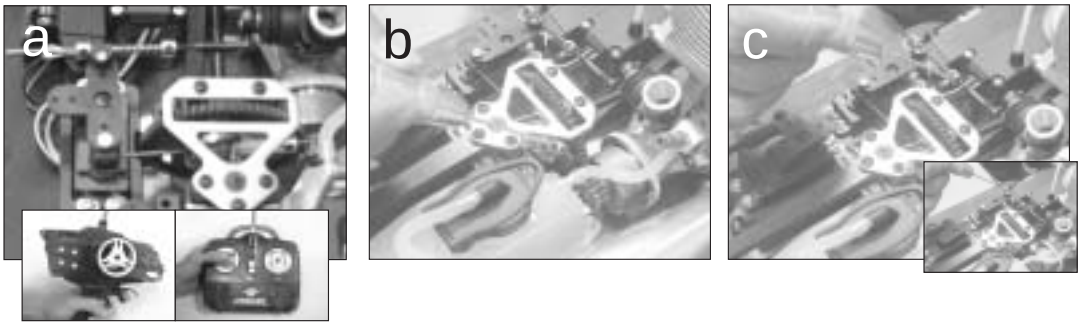
11 ADJUSTING THROTTLE / BRAKE LINKAGE

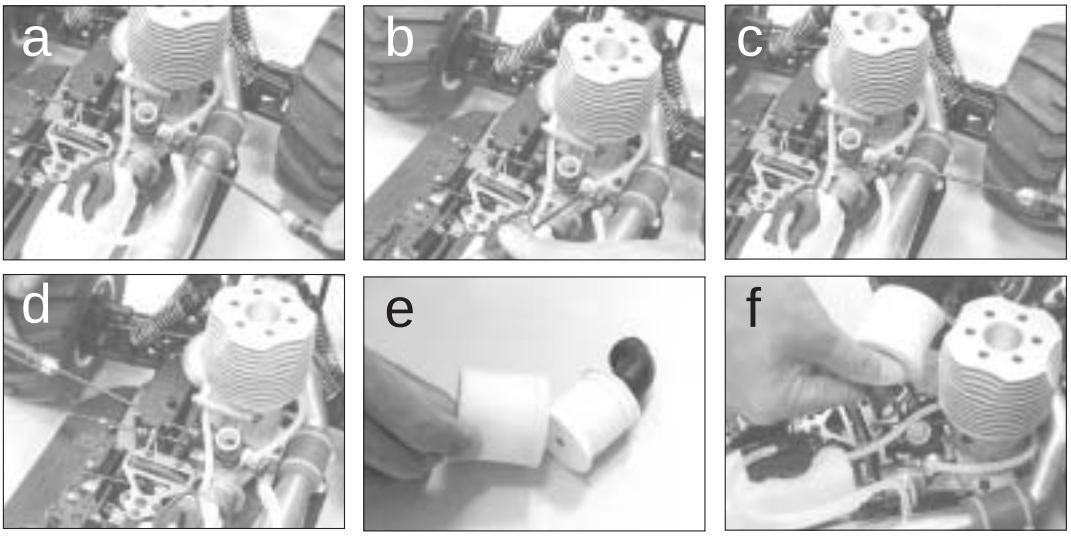


a. To set the throttle/brake linkage, first the radio should be on and neutral; thus, the servo is at neutral position.

b. With the servo at neutral, turn and adjust the brake collar to a point where the brake lever almost engages the brake system, but not yet.

c. With the servo at neutral, loosen the throttle collars. Then, manually close the carburetor, and set the collar (next to the spring) with the spring slightly compressed. Then, set the other collar next to the linkage pivot.

12 ADJUSTING CARBURETOR



a. To set the carburetor idle (small screw with spring off center on the side of carburetor body), turn the screw as pictured. Please refer to ENGINE BREAK-IN/TUNING procedures to properly set the engine.

b. To set the high speed needle (large needle sticking out from the carburetor body), turn the screw as pictured. Please refer to ENGINE BREAK-IN/TUNING procedures to properly set the engine.

c. To set the mid speed needle (large needle in the middle of the carburetor body), turn the screw as pictured. Please refer to ENGINE BREAK-IN/TUNING procedures to properly set the engine.

d. To set the low speed needle (large needle in the throttle lever), turn the screw as pictured. Please refer to ENGINE BREAK-IN/TUNING procedures to properly set the engine.

e. Remove the outer foam from filter and make it moist evenly with a few drops of fuel. If the vehicle will be operated in an area with fine dust, use filter oil or caster oil instead of fuel and make both the inner and outer foam moist. It is important that the foam is only moist to trap dirt and allow air passage. With the foam too wet, limited air can pass through; therefore, limiting engine performance.

f. Install the filter boot onto the engine carburetor and make sure the air cleaner boot is securely fastened with a zip-tie.

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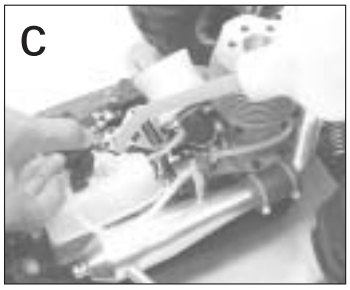
13 FUELLING



a. Remove the cap from fuel bottle nozzle.

b. Squeeze the fuel bottle, insert into fuel, and draw fuel into the fuel bottle.

c. Fill car's fuel tank with glow fuel.

FUEL RECOMMENDATION

A good quality, commercially available model engine fuel containing 5% to 30% nitro with 15% to 25% oil is recommended for initial break-in and regular run-in of this engine. Thunder Tiger also recommends that the oil composition to be made of caster oil or a caster/synthetic blend. Fuel containing only synthetic lubricant is much less tolerant of high temperature and lean carburetor settings; thus, may cause the engine to become difficult to operate under normal conditions.

Less % of nitro in fuel means that the engine will produce slightly less power. Conversely, fuel with less nitro % will have higher alcohol % which enables the engine to operate at a much lower temperature. Thunder Tiger finds that the PRO-70BX performs best (power vs. heat) with 15% nitromethane fuel.

Oil composition in fuel is vital for a 2-cycle engine's moving internal parts. More % of lubricant means that the fuel has more oil to lubricate the moving parts. This is especially important for ring engines such as the PRO-70BX. Thunder Tiger finds that the PRO-70BX performs best with 20% oil.

GLOW PLUG RECOMMENDATION

The length of the glow plug and the quality of its coil have a major impact on overall performance and reliability of the engine. The engine operates best with a platinum coil plug rated at medium to hot temperature. The following is a list of glow plugs suitable for use in this engine: Thunder Tiger 9281, Enya #3/#5, McCoy #9/#59, Novarossi C4S/C5S/C6S, OS A3/A5/#8, and Picco P6S/P7S.

WARNING

Thank you for purchasing a Thunder Tiger Product. Please read all instructions thoroughly before operation.

1. This product is not a toy. It is a high performance model product. It is important to familiarize yourself with the model, its manual, and its construction before assembly or operation.
2. Do not operate model products in rain, on public roads, near crowds, near airport, or near areas with restricted radio operation.
3. Always keep fuel away from heat and open flame. Only operate in open, well-ventilated area. Store fuel in cool, dry area. Keep the fuel bottle cap tightly closed. Clean up any leak or excess fuel before starting the engine.
4. This product, its parts, and its construction tools can be harmful to your health. Always exercise extreme caution when assembling and/or operating this product. Do not touch any part of model which rotates.
5. Check your radio frequency with the proper operating frequency of the area or country. Always check to see if there are any modelers operating on the same frequency as your are. Also, check your radio for proper operation before operating a mode.
6. Improper operations may cause personal and/or property damage. Thunder Tiger and its distributor have no control over damage resulting from shipping, improper construction, or improper usage.
7. Thunder Tiger assumes and accepts no responsibility for personal and/or property damages resulting from the use of improper building materials, equipment and operations. By the act of assembling or operating this product, the user accepts all resulting liability. If the buyer is not prepared to accept this liability, then he/she should return this kit in new, unassembled, and unused condition to the place of purchase.

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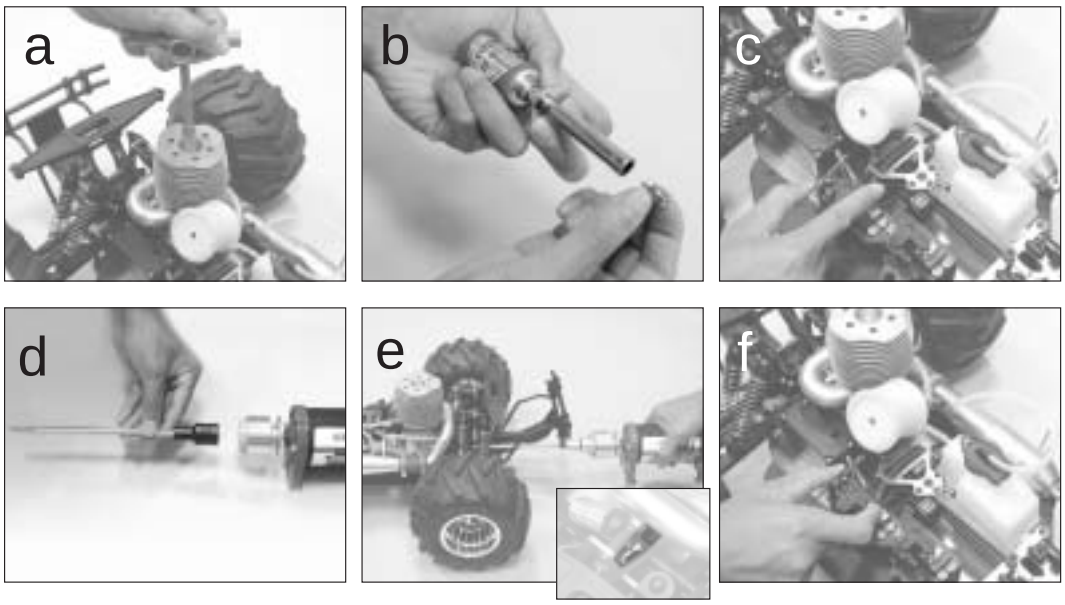
14 PREPARING THE ENGINE



a. To start an engine, first remove the glow plug.

b. Check the glow plug by plugging it into the glow plug igniter. The glow plug element should light up brightly. If it lights up dimly, then the glow plug igniter is low (and it needs recharging). If it does not light up or the plug element looks distorted, then the glow plug is bad (replace with new one). After checking, reinstall the glow plug.

c. With the radio off, manually turn the servo to open the carburetor (open throttle).

d. Install the extended 6mm hex starting tool into 12V DC starter.

e. Insert the tip of the starting tool into the engine starting hub on the back plate and turn the engine for a few seconds to prime the engine with the starter. Repeat until the fuel reaches the carburetor.

f. Manually return the servo back to neutral.

15 STARTING THE ENGINE

a. Turn on the radio (transmitter first, then receiver).

b. Clip the glow plug igniter onto engine's glow plug.

c. Insert the starting tool and turn the engine over with the electric starter for a few seconds. Repeat until the engine starts. Throttle maybe required to be opened momentarily, but release throttle back to neutral immediately after the engine starts.

Remove the glow plug igniter from engine after engine has started and warmed up. If the engine stops right after the igniter is removed, the carburetor setting is too rich. Please refer to engine setting section.

If engine is hard to start, the engine maybe flooded. To unflood an engine, remove the glow plug from engine, flip the car upside down, and turn over the engine to release excess fuel. Then, reinstall the glow plug and repeat the engine starting procedure.

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BREAK-IN

For a new engine, a fuel with low nitro rating and high oil content is highly recommended for the first 10 tanks (125cc per tank). Although one can use a fuel with nitro and oil rating combination stated within the recommended guidelines, 5% nitro and 25% oil is best during break-in period. Please carefully follow the procedures below for a proper break-in, first 10 tanks of fuel:

1. Check the carburetor's high speed needle. With a fresh new engine, fully close the high speed needle, then open it 3 turns from fully closed.

2. Check the carburetor's idle setting. Set the idle screw so that the carburetor has 2mm opening when the throttle is closed.

3. Follow the procedure for starting the engine.

4. Once the engine is started, run the car in an open, flat area. Try to vary throttle positions and operate with smooth throttle transitions. Keep in mind that the new engine should be run at mostly low to mid throttle with very little time at full throttle (no more than 1 second).

5. Set the carburetor to break-in setting accordingly.

   If the engine stalls at low RPM, then set the low speed mixture leaner by turning in (clock wise) the low speed needle 1/8 turn. It is normal for engines to stall during the first 10 tanks of fuel because break-in setting is always rich.

   If the engine stalls at full throttle (no more than 1 second), then set the high speed mixture leaner by turning in (clockwise) the high speed needle 1/8 turn.

   If the engine races at full throttle (no more than 1 second), then set the high speed mixture richer by turning out (counterclockwise) the high speed needle 1/8 turn.

6. The engine should be set as rich as possible before it stalls at full throttle (no more than 1 second). To do this, turn the high speed needle out (counterclockwise) 1/8 turn at a time until the engine stalls. Then, turn this needle back 1/8 turn clockwise, and follow STEP #3 and #4 for the next 2 tanks of fuel.

7. On the 3rd tank of fuel, set the high speed mixture leaner by turning in (clockwise) the high speed needle 1/8 turn. Repeat STEP #4.

8. On the 6TH tank of fuel, set the high speed mixture leaner by turning in (clockwise) the high speed needle 1/8 turn. Repeat STEP #4.

9. Finish the break-in process by running 3 more thanks of fuel and repeating STEP #4.

10. After the 10th tank, the engine should be properly broken-in and ready for normal use. Follow the engine tuning procedure to set up the engine carburetor for normal use.

ENGINE TUNING

The included PRO-70BX engine is a ring engine, and as such, it will need to be tuned differently than a regular ABC engine. The ring on the piston requires lubrication for proper function. To achieve proper lubrication, the engine needs to be run with high oil content fuel and at rich carburetor setting.

After proper break-in, the new engine is ready for regular operations. For normal use, please use the recommended fuel formula described in the fuel section, and follow the procedures below to achieve proper carburetor setting. Clockwise needle turn will provide leaner setting (lower fuel to air mixture), and counterclockwise needle turn will provide richer setting (higher fuel to air mixture). Do not perform this procedure until the engine has been properly broken in:

1. Check the carburetor's idle setting. Set the idle screw (small screw with spring off center on the side of carburetor body) so that the carburetor has 2mm opening when the throttle is closed.

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2. Check the carburetor's mid speed needle / spray bar. Set the mid speed needle / spray bar (small screw in the center and on the side of carburetor body) so that its outer most edge sits flush with the carburetor body side. Once this is set, do not move it again. Only make engine tuning adjustments with idle screw, high speed, and low speed needles.

3. Follow the procedure for starting the engine.

4. To set the idle, turn the idle screw clockwise (higher RPM) or counterclockwise (lower RPM). Basically, the idle needs to be set at the lowest possible RPM before the engine stalls.

5. With a running engine, run the car back and forth in a straight line (full throttle achieved during each passage) in an open parking lot. Repeat and note the sound of the exhaust. Do not hold the throttle open when the engine is without load (car off the ground), or serious engine damage may result.

6. Review the sound noted in STEP #5. If the exhaust does not reach a high pitch note, then the high speed setting is rich. Turn the high speed needle (long needle extending from carburetor body, pointing up) 1/8 turn clockwise, and repeat STEP #3.

7. Repeat STEP #6 until the engine reaches peak setting (turning in the high speed needle will not yield a higher pitch, and it may even cause the engine to bog at full throttle; however, turning out the needle will cause the engine's full throttle RPM to drop a little). For normal operations, the optimum setting for high speed needle should be 1/2 to 1/4 turn counterclockwise from the peak setting. Continuous engine operation at peak setting may result in overheating and engine damage.

8. To set the low speed needle (small hex screw inside the carburetor's slide/lever), the engine needs to be broken in and high speed needle needs to be set first.

9. Repeat STEP #5 every 12 seconds (2 seconds at full throttle and 10 seconds at idle).

10. The engine RPM at idle should remain constant, drop to a lower RPM after a few seconds, and remain at that low RPM without stalling.

    If the engine stalls after a few seconds at idle, then the low speed setting is too rich.
    Turn the low speed needle clockwise 1/8 turn.

    If the engine RPM stays the same or races at idle, then the low speed setting is too lean.
    Turn the low speed needle counterclockwise 1/8 turn.

11. Repeat STEP #9 and #10 until proper engine low speed setting is achieved.

When running the PRO-70BX, the optimum carburetor setting is rich (high speed needle set at 1/2 to 1/4 turn counterclockwise from the peak performance setting), and as such, it is normal for the engine to sound rich and expel a lot of smoke. Tune this engine so that it is at maximum fuel delivery (both high and low speed) without stalling. At this optimum setting, the engine should continue to operate at normal temperature range (low 100s C or mid 200s F); thus, consistent engine temperature and performance over extended period of time. At peak carburetor setting (not optimum setting), engine performance will be much better initially, but it will soon overheat and become inconsistent. Never operate this engine at peak or lean carburetor setting.

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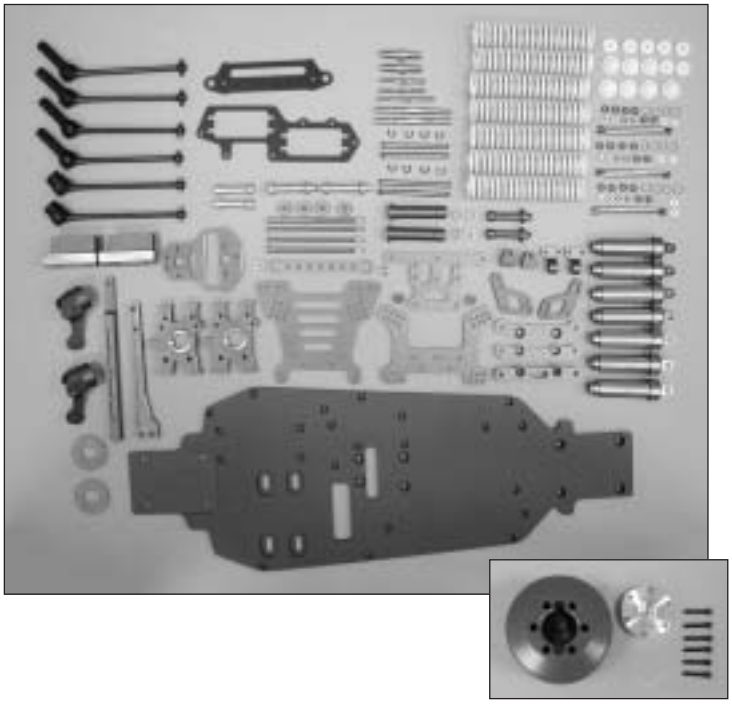
EK4-S2 Unlimited

Specifications

Wheelbase: Adjustable from 315mm to 320mm
Front Track Width: Adjustable from 295mm to 305mm
Rear Track Width: 300mm
Front Kick-Up: 0˚
Front Caster: Adjustable from 18˚ to 25˚
Rear Anti-Dive: 2˚
Rear Toe-in: 2˚
All Up Weight: 5400g

PRO-70BX ENGINE WITH UPGRADE HEAT SINK SHOWN

No.6219 EK-4 S2 UNLIMITED CONVERSION KIT



Meanest hop-ups for EK-4 S2 enthusiast

- Ferodo brake disc
- Adjustable turnbuckles
- Carbide hinge pins
- ERGAL center differential mount
- ERGAL one piece torque rod, front /rear
- ERGAL chassis, 5mm
- ERGAL front and rear shock towers
- ERGAL front upper arm mount
- ERGAL transmission plates
- ERGAL center diff top plate
- ERGAL servo saver top plate
- ERGAL steering slider
- ERGAL battery post
- ERGAL servo saver post
- ERGAL FR plate FR trans
- ERGAL FR plate RR trans
- ERGAL RR plate FR trans
- ERGAL rear toe-in block, 2 degree
- ERGAL front knuckle
- ERGAL engine mount
- ERGAL heat sink head
- Carbon battery plate
- Carbon servo tray
- Aluminum shock set & mount
- Center & rear universal

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