

TEAM LOSI LST SUPER TRUCK



Operations Guide



Not Responsible For Errors. All prices subject to change without notice.

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Introduction

Thank you for choosing the Team Losi Sport LST Monster Truck. This is a highly developed off-road vehicle that features a sophisticated computer based radio system and does require some mechanical experience and direct adult supervision. This guide contains the basic instructions and drawings for operating and maintaining your new LST. Please take the time to read through it completely before running the model. Your hobby dealer cannot under any circumstances, accept a model for return or exchange that has been run.

Customer Support Contacts:

**Mach .26 Engine & JR Propo Radio Gear
Horizon Hobby Inc.
4105 Fieldstone
Champaign, IL 61821
1-877-504-0233**

LST Chassis Components:

**Team Losi
4710 E. Guasti Road
Ontario, CA 91761
909-390-9595 Fax 909-390-5356**

Safety Precautions

THIS IS NOT A TOY! The LST is a sophisticated, high performance radio controlled model, which needs to be operated with caution and common sense. Failure to operate this model in a safe and responsible manner could result in a personal and/or property damage. It is your responsibility to see that the instructions are followed and precautions adhered to. The LST is not intended for use by children without direct adult supervision. Team Losi, JR and Horizon Hobby shall not be liable for any loss or damages, whether direct, indirect, special, incidental or consequential arising from the use, misuse or abuse of this product or any product required to operate it. * **This is still a model, don't expect it to do unrealistic stunts.**

Warnings

- The LST is equipped with a reverse gear. Just like a real automobile, you must wait for the model to come to a complete stop before shifting between forward and reverse. **Failure to do so will cause damage to the transmission.**
- Fuel is dangerous if handled carelessly. Follow all directions and precautions on the fuel container.
- Keep fuel and all chemicals out of reach of children.
- Always keep the fuel container closed and never use around an open flame or while smoking.
- The exhaust emits poisonous carbon monoxide fumes. Always run the model in a well ventilated area and never attempt to run it indoors.
- The top of the engine and the exhaust pipe are extremely hot during and for a time after use. Use caution not to touch these parts, especially when refueling.
- The engine can be loud, especially when run in a confined area. If you find the noise objectionable, use ear protection.
- This model is controlled by a radio signal that is subject to interference from sources outside your control. Interference can cause temporary loss of control so it is advisable to always keep a safety margin in all directions to avoid collisions.
- Always operate your model in an open area away from people and cars. The potential speed of this model can cause injury or damage.

Required Equipment

You will need the following items to operate your new LST.

12 AA Alkaline batteries, (8 for the transmitter, 4 for the receiver/truck).

Quality Model Car Fuel - preferably "Sport" type with 20% Nitro content Fuel bottle.

1.5v glow plug igniter (preferably with a meter).

7.2v 6 Cell "Stick" battery pack for the remote starter.

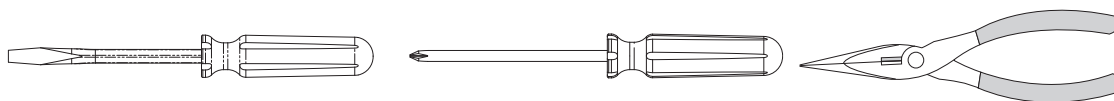
Battery charger for the 7.2v 6 cell "Stick" battery pack.



Tools You Will Find Handy

In addition to the tools included with the LST, you will find the following both useful and in some cases necessary.

- Small flat blade and Phillips screwdrivers
- Needle nose pliers
- Glow plug wrench (5/16 nut driver)
- Quality .050", 1/16", 5/64", 3/32", and 2.5mm hex (allen) Drivers



Engine Break-In and Adjustments

Breaking-in your new engine is critical for proper performance. Failure to follow the break-in procedures can cause damage and shortened engine life. During break-in always use the same fuel and nitro content you plan to run. Although the carburetor is preadjusted at the factory, you must be familiar with the following adjustments and break-in procedure. If you change fuel or run in dramatically different environments (hot/cold, high/low elevation, etc) you will probably have to adjust at least the high speed needle to prevent overheating and maintain proper performance. Never, under any circumstances allow the engine to rev freely with the wheels off of the ground.

Break-In Procedure

The first three tanks of fuel should be run with the high and low speed needles noticeably "rich" (see explanation below). There should be a slight sluggishness and thick smoke when accelerating with the smoke decreasing as the model gains speed. At speed there should still be a noticeable trail of smoke from the exhaust pipe. Run the LST on a flat surface in an oval pattern. Ease into the throttle as you accelerate on the straight sections easing off as you approach turns letting the model roll through the turn before easing back on the throttle. This will also allow you to get a feel for the steering response and handling characteristics of the truck. If you are an accomplished driver, you can also break in the engine by placing the truck up against a wall or fixed object and allow the engine to idle through two tanks of fuel.

Understanding "Rich" and "Lean" Fuel Mixture

Adjusting the carburetor is one of the most critical facets of running a nitro powered R/C vehicle. The fuel mixture is referred to as being "rich" when there is too much fuel and "lean" when there is not enough fuel for the amount of air entering the engine. The amount of fuel entering the engine is adjusted with high and low speed threaded needle valves. The low-speed needle is located in the front of the moving slide. The high-speed needle sticks straight up at the back of the carburetor. Both feature a slotted head that is used as a reference and receptacle for a flat blade screwdriver for adjustments. The mixture is made richer by turning the needle counter-clockwise and leaner by turning in clockwise. An overly "rich" mixture will yield sluggish acceleration and performance with thick smoke from the exhaust. A "lean" mixture can cause the engine to hesitate before suddenly accelerating briskly or in some cases, to lose power momentarily after the initial acceleration. A lean mixture also makes the engine run hotter than desired and does not provide enough lubrication for the internal engine components causing premature wear and damage. It is always advisable to **run the engine slightly rich** and **never lean** to avoid overheating and possible damage.

Base Start-up Settings from the factory

High-Speed Needle -- 2 1/2 turns out from bottom

Low-Speed Needle -- 2 turns out from bottom

Engine Tuning

After the engine is broken in you can tune it for optimum performance. When tuning it is critical that you be cautious of overheating as severe damage and premature wear can occur. You want to make all carburetor adjustments in "one hour" increments.

Low Speed Adjustment

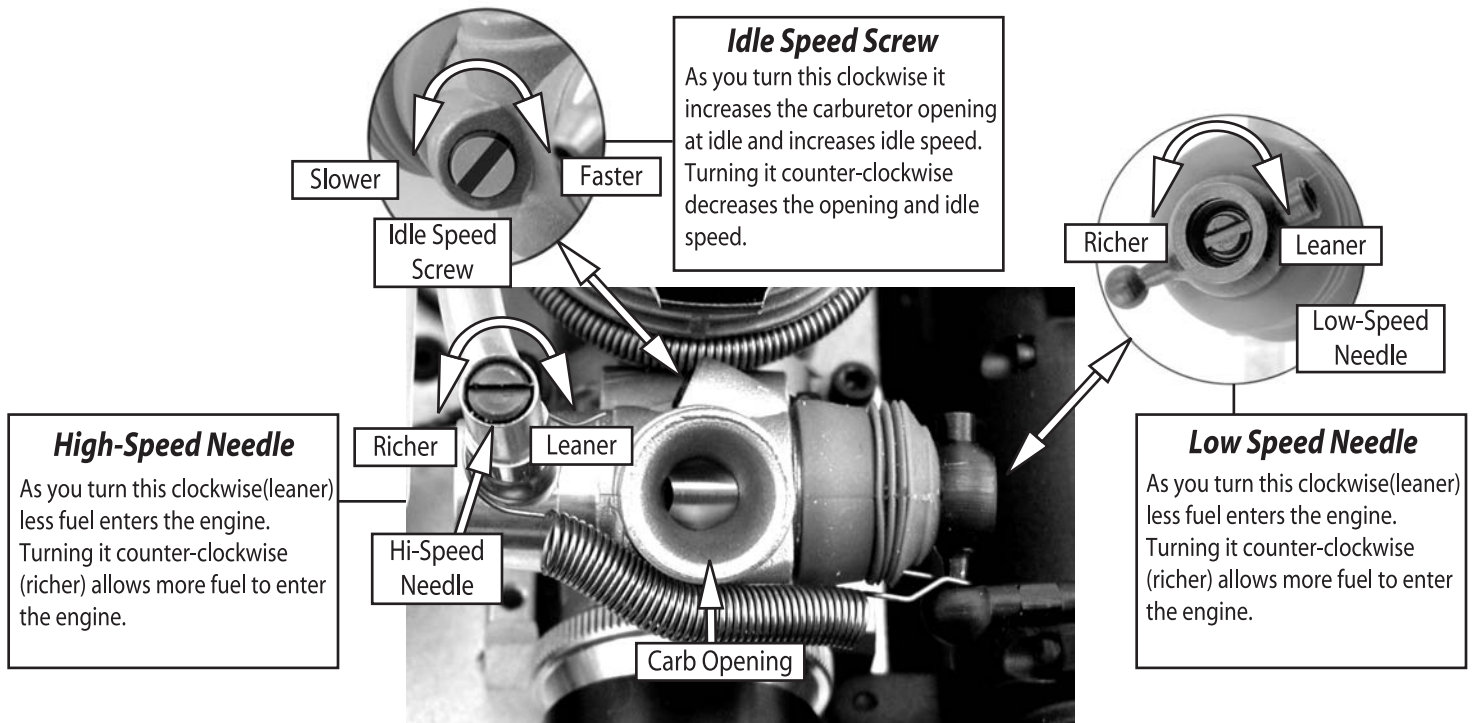
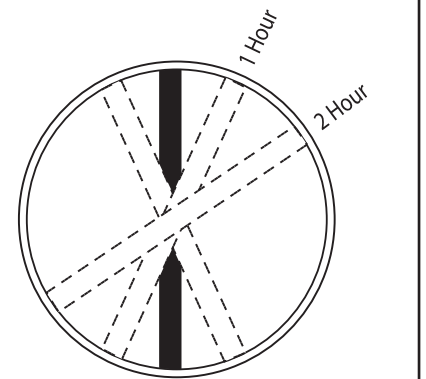
The low speed adjustment effects the idle and slightly off idle performance.

The optimum setting allows the motor to idle for at least 8-10 seconds. The truck should then accelerate with a slight amount of sluggishness and a noticeable amount of smoke. The simplest way to check this is to make sure the engine has been warmed up and let the engine idle for 8-10 seconds. If the low speed mixture is so far off that the engine won't stay running this long, turn the idle stop screw clockwise, increasing the idle speed. With the engine at idle, pinch and hold the fuel line near the carburetor, cutting off the flow of fuel and listen closely to the engine RPM (speed). If the low speed needle is set correctly, the engine speed will increase only slightly and then die. If the engine increases several hundred RPM before stopping, the low speed needle is too rich. Lean the mixture by turning the needle clockwise one hour and trying again. If the engine speed does not increase but simply dies, the needle is too lean and needs to be richened up by turning the needle counter-clockwise one hour before trying again. After you have optimized the low speed setting, the engine will probably be idling faster. You will have to adjust the idle stop screw counter-clockwise to slow down the engine idle speed. The engine should accelerate at a constant pace without hesitating.

Carb Adjustments:

Make all carburetor adjustments in one hour increments.

Imagine the slot in the needle is the hour hand on a clock. Adjust it as though you were moving the hour hand from one hour to the next or previous one.



Hi-Speed Adjustment

After initial acceleration the engine should pull at a steady rate while maintaining a two-stroke whine and a noticeable trail of smoke. If the engine labors and is sluggish with heavy smoke, the mixture is too rich and needs to be leaned by turning the hi-speed needle clockwise in one hour increments until it runs smoothly. If the engine isn't smoking, it is too lean and you must richen the mixture by turning the needle counter-clockwise. Don't be confused by the sound of the engine and the actual performance. A leaner mixture will produce a higher pitch exhaust note but this does not necessarily mean improved performance as the engine is on the verge of over heating and possible damage. Ideally you want to run the engine so that it is on the slightly rich side of optimum. This will give you the best combination of speed and engine life. **CAUTION:** The engine is too lean and overheating if it accelerates rapidly with a high pitch scream then seems to labor, stops smoking, or loses speed. This can be caused by the terrain, atmospheric conditions, or drastic altitude changes. To avoid permanent engine damage, **Immediately** richen the mixture by turning the hi-speed needle counter-clockwise at least "two hours" and be prepared for further adjustments before running anymore.

About Glow Plugs

The glow plug is like the ignition system in your automobile. The coiled element in the center of the plug glows red hot when connected to a 1.5-volt battery (located in the igniter). This is what ignites the fuel/air mixture when compressed in the cylinder. After the engine fires, the heat generated by the burning fuel keeps the element hot. Common reasons for the engine not starting is the 1.5 volt battery being weak or dead, the glow plug being wet with fuel, or the element burned out. Use a spare glow plug to check the igniter. If the igniter makes the element glow, remove the plug from the engine to check it in the same manner. A wet glow plug means there is excess fuel in the engine. To eliminate this, put a rag over the head and turn the engine over a few seconds with your "Spin-Start". Reinstall the glow plug making sure you have the brass gasket on it. The engine should now start.



Testing the Temperature

The ideal operating temperature for the engine will vary with the air temperature but in general it should be in the 200°F to 230°F (93.3°C to 110°C) range. A simple way to check the engine temperature is to put a few drops of water on the top of the head/heatsink. It should take 3-5 seconds for the water to evaporate. If it boils away quickly the engine is overheating and the Hi-Speed needle richened (turned counter-clockwise) at least "two hours". If you plan on racing or prolonged hi-speed running, there are several inexpensive hand held digital temperature gauges available you may want to invest in.

About the Radio

The JR radio installed in the LST is a professional level system with more than the usual features you may find useful. Be sure to read through the Radio manual included for complete instructions on what and how to use these. The following is a simple guide to commonly used and referred to items needed to run your truck.

- 1. Power Switch - Turns your transmitter ON and OFF**
- 2. Steering Wheel - Controls the trucks steering**
- 3. Steering Trim Tab - Allows you to fine-tune the neutral position of the steering**
- 4. Throttle Trigger - Pull back for throttle and push forward for brakes**
- 5. Throttle Trim Tab - Allows you to set the idle/brake of the truck**
- 6. Forward/Reverse Switch (A) - Used to shift the transmission between forward and reverse.**
- 7. Transmitter Display - Digital readout shows battery voltage, frequency, feature functions/settings.**
- 8. Transmitter Antenna - Transmits signal to the receiver in the truck.**



Radio Operation

It is important that you familiarize yourself with the radio system, as this is your direct link to the truck.

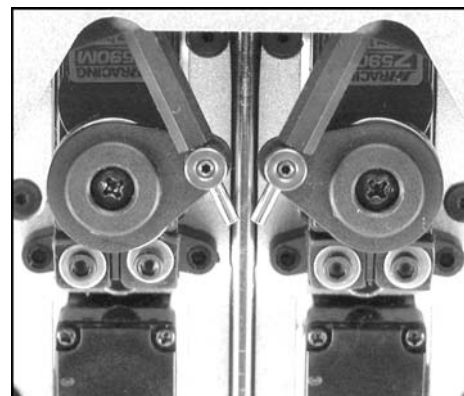
- Never run your truck with low receiver or transmitter batteries.
- Never leave the power on or the batteries will not last long.
- Always fully extend the transmitter antenna before running your truck
- Always turn the transmitter ON **before** turning the truck ON.
- When finished running, always turn the truck OFF **before** the transmitter.
- For best operation it will be necessary to keep the "trims" adjusted for both the steering and throttle as noted below.

Steering Trim: The truck should go straight without turning the steering wheel. If not, tap the trim lever found just above the steering wheel in the direction needed for the truck to go straight. Each tap of the trim button will be accompanied by an audible tone indicating a change has been made. It may take several taps to get the correct trim setting.

Throttle Trim: The truck should idle without the tires rotating when the trigger is at its neutral position. If not, tap the trim tab located to the left of the steering wheel to reposition the throttle servo and close the carburetor and apply more brakes. Note that additional braking force is applied when you push the trigger forward.

Synchronizing the Steering Servos: If you remove the steering servos or the servo savers you will probably have to make some small adjustments to insure they are working together at maximum capacity. With the servo savers removed and the linkage attached;

- Turn on the radio and reset the steering trim to read "0" (which is neutral) on the radio screen.
- Loosen the set screws securing the linkage slightly and mount the servo savers so they are timed as close as possible like that seen in the photo.
- Use the steering trim on the transmitter to fine-tune the timing of the servo savers.
- Make sure the front tires are pointing forward and lock the steering linkage in place by tightening the setscrews.

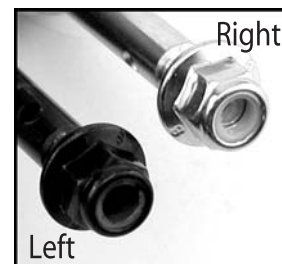


Maintenance

In addition to the service needs pointed out in this guide, you should try to maintain your new truck for proper performance and to prevent wear. If dirt gets in the moving parts it can seriously hinder the performance of the model. Use compressed air, a soft paintbrush, and/or toothbrush to remove dirt and dust. Avoid using solvents, if possible, as this can actually wash the dirt into bearings and areas not accessible without disassembly causing additional wear. We suggest you follow these basic guidelines.

- Remove as much freestanding dirt and dust as noted above.
- Never leave fuel in the tank for more than a couple of hours.
- When done running for the day or longer, let the engine run out of fuel. Remove the air cleaner and pour a little WD40, or quality after-run engine oil into the carburetor and spin the engine over a few seconds.
- if needed, clean and re-oil the air cleaner before installing it back on the truck.
- Inspect the truck for worn, broken, or binding parts and repair as necessary.

NOTE: You will notice that the **left side axles and wheel nuts are black** but on the **right side they are silver**. The silver nuts/axles have traditional (right hand) threads and are removed by turning them counter-clockwise. The black nuts/axles are left hand thread and work exactly the opposite - needing to be turned clockwise to remove. Do not mix these up or switch sides during maintenance.



2-Speed Adjustment

Although pre-adjusted at the factory, the two-speed can be adjusted to shift at the point that suits you best. Under normal circumstances, it should shift slightly before the engine reaches maximum power. The actual distance traveled will vary with the gear ratio and tune of the engine. There are two adjustment screws (see fig 1) that must be changed evenly for the two-speed to function correctly. Turning these clockwise will make it shift later and require the engine to rev higher. Turning them counter-clockwise will make it shift earlier and require less engine speed. If you should get lost adjusting the two-speed, start over at the **factory setting** by lightly bottoming out the adjustment screws and then backing them out **five** full turns. The procedure for adjusting the two-speed is as follows:

- Remove the gear cover.
- Turn the spur gears until the adjustment hole is visible in the aluminum bell between the large and small spur gears.
- Hold the small spur gear and using your thumb, rotate the slipper forward until you can see the head of one of the adjustment screws.
- Use a 5/64 Allen wrench to make your adjustment in 1/2 turn increments. Use the bent leg of the wrench as your guide.
- Turn the slipper forward 1/2 rotation to adjust the other adjustment screw like the first.
(Remember to always adjust BOTH screws the same amount)
- Test drive the truck to check the new shift point and **replace the gear cover** if satisfied.
- **Never** run your truck without the gear cover as it is dangerous and gear damage will occur!

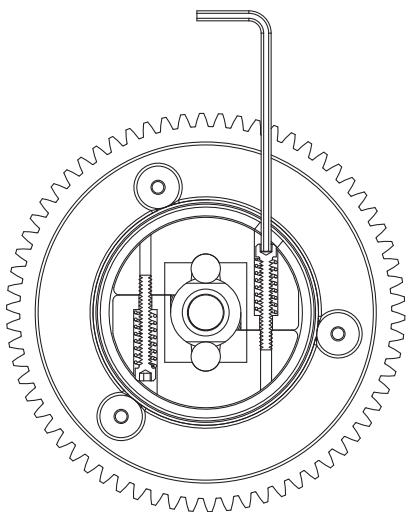
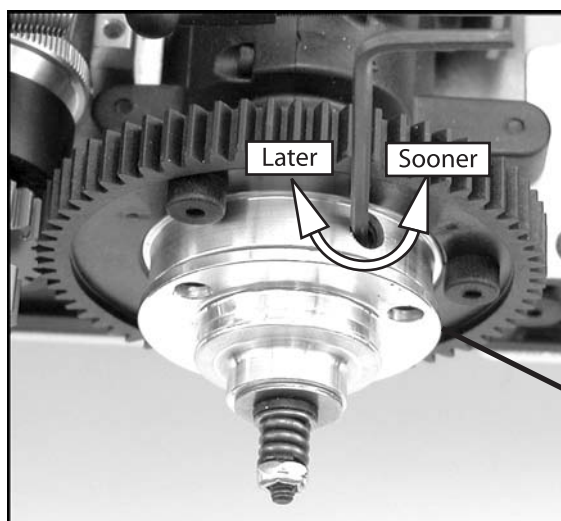


Fig 1

Always adjust BOTH Adjustment screws evenly.



Note:
Outer (Low) Spur
gear removed for
photo.

Turning the adjustment screws counter-clockwise makes the 2-speed shift sooner, turning clockwise will make it shift later.

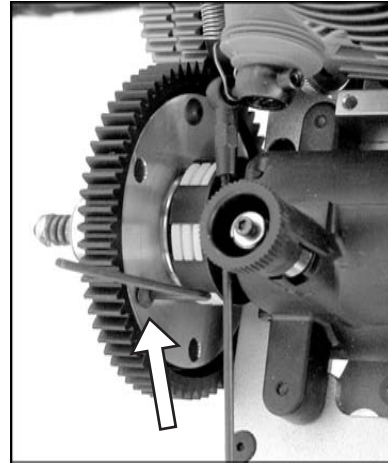
Replacing the Gears

The gear ratio for the two-speed requires that both gears must be changed as a pair if you wish to use an optional gear ratio. This means that both the pinion (on clutch bell) and the spur (on the two-speed) must be changed as a combination. If you want to change either the first (low) or 2nd (high) gear ratio follow the steps for both pinion and the spur gears.

Spur Gears

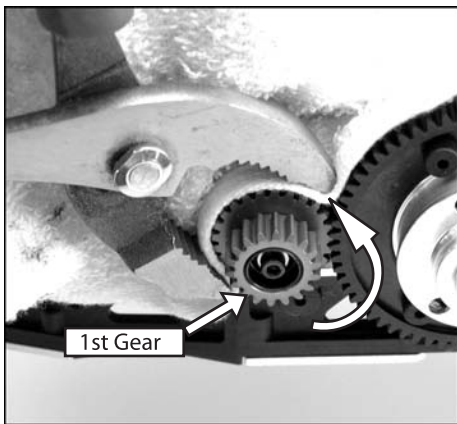


1st Gear: remove the large circlip at the outer face of the spur. Remove and replace the spur gear, being sure to line up the molded pins on the back of the gear with the holes in the slipper. Reinstall circlip. **Note:** Special Snap Ring pliers are made that make removal and installation of the circlip easier.

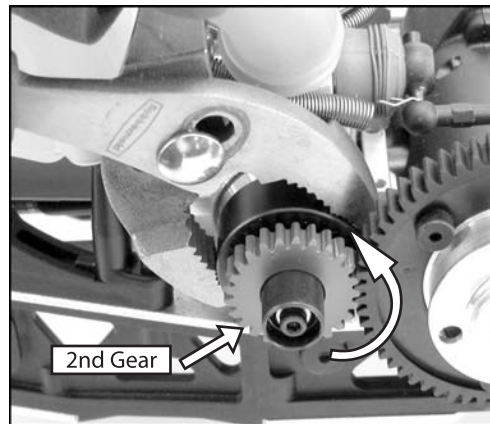


2nd Gear: with the 1st gear removed, use a 1/16 allen wrench to remove the 3 button head screws at the back of the gear. Remove and replace the gear and button head screws. Reinstall the 1st gear, circlip and gear cover.

Pinion Gears



1st Gear: Using a rag, carefully hold the larger pinion (2nd gear) with a pair of pliers and turn the smaller (1st gear) pinion counter-clockwise to loosen it. Carefully thread the new pinion on by turning it in a clockwise direction until snug.



2nd Gear: After removing the 1st gear pinion, hold the clutch bell with a pair of pliers and turn the pinion gear counter-clockwise. Remove and replace the pinion by turning it counter-clockwise until snug.

Servicing the Differentials

The differentials should be serviced periodically. Be sure to clean and inspect all of the gears and replace if severely worn. Always use plenty of high-quality grease (like Team Losi LOSA3066) on all gears. **NOTE:** These can also be made into racing type viscous diffs as noted below. Always service one diff at a time and pay close attention to install the housing with the "TOP" marking up so it can be seen looking down on the truck.

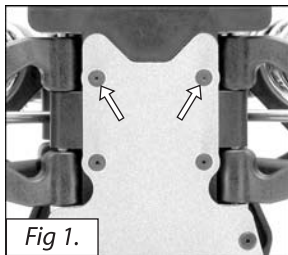


Fig 1.

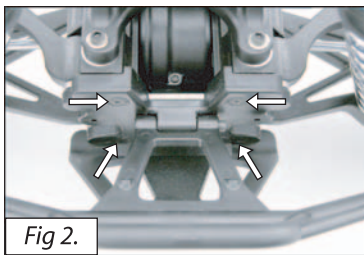


Fig 2.

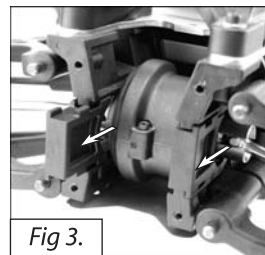


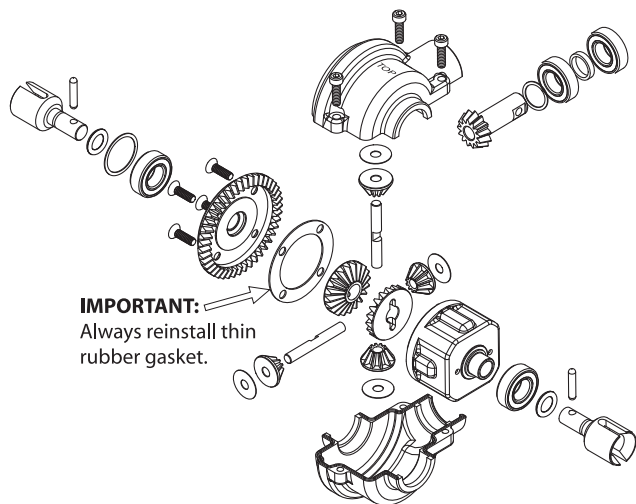
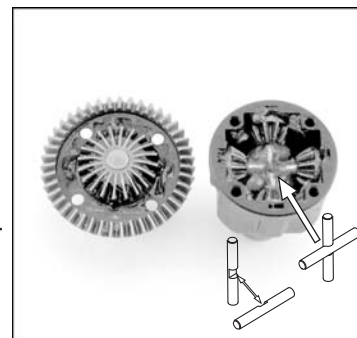
Fig 3.

Removing the diffs

- Remove the two screws in the bottom at the extreme end of the chassis (fig1)
- Remove the four screws in the bulkhead allowing the bumper/skidplates and pin mounts to be removed (fig 2).
- Remove the diff retainers and slide the diff out (fig 3). **NOTE:** On the front end only you will have to remove the lower front shock attachment screws and swing the shocks up and out of the way. On the rear end you will need to "pop" off the rear camber links.

Diff Service

- Remove the three 5/64" cap head screws and the top of the differential housing, then the diff.
- Remove the four 1/16" flat head screws from the ring gear allowing it to be removed.
- Inspect the ring and pinion gears for wear - replace if necessary.
- Remove the cross shafts, bevel gears, and shims for the carrier.
- Clean and inspect all parts - replace as needed.
- Check all ball bearings. Clean or replace as necessary.
- Remove pins from outdrives. Remove outdrives, regrease and reinstall.
- Lube all shafts and gears with LOSA3066 assembly grease and reassemble.
- Load cross shafts with gears into the carrier with extra grease. Apply the rubber gasket to the carrier and reinstall ring gear.
- Lube ring and pinion with grease and reassemble diff into diff housing.
- Reinstall into chassis with "TOP" on housing facing up.



IMPORTANT:
Always reinstall thin
rubber gasket.

For Viscous Differential

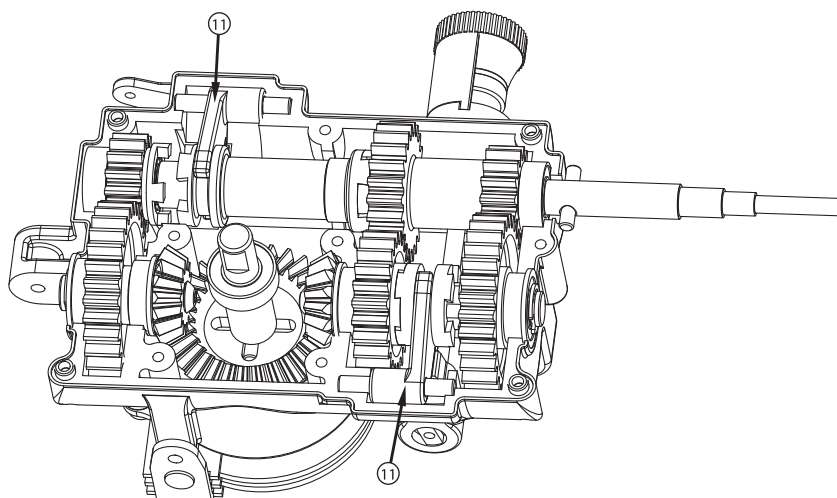
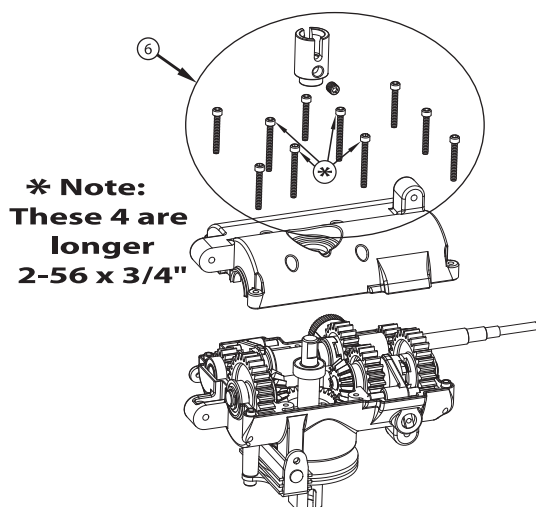
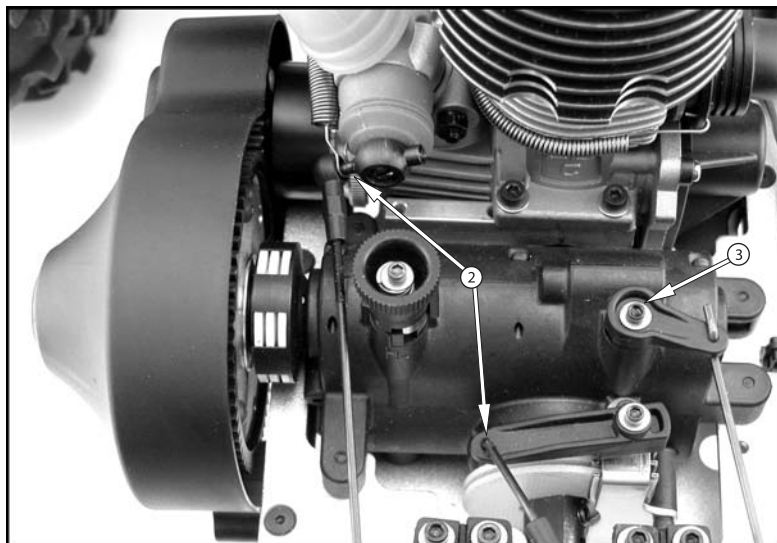
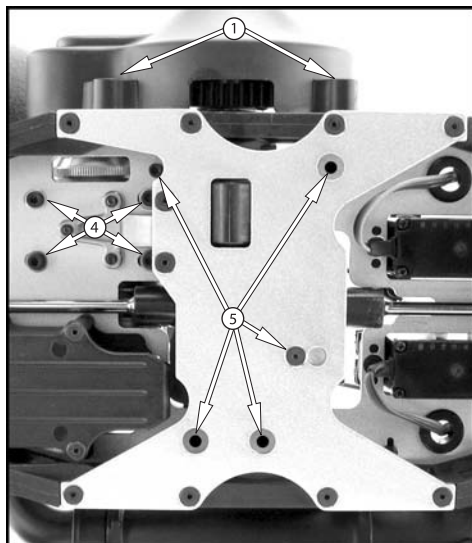
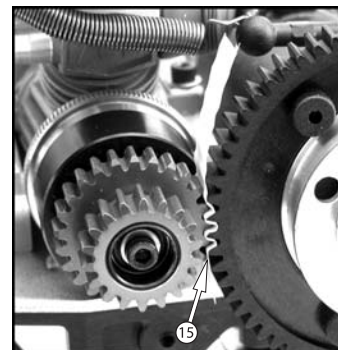
Instead of grease you can use Silicone fluid in the differential for a limited slip feel as desired for racing. Simply fill the diff up to the top of the gears before replacing the ring gear. (Be sure to reinstall the rubber gasket). You may have to replace the o-rings on the outdrives at the same time you change to this type of differential if the old ones are worn. Popular silicone fluids for monster trucks are 25,000 and 50,000cs and are available at your local hobby dealer.

Servicing the Transmission

The Transmission should also be cleaned and serviced periodically. All gears and shafts should be closely inspected for wear and replaced if necessary. Always use a high quality grease or lubricant to prevent premature wear and/or failure.

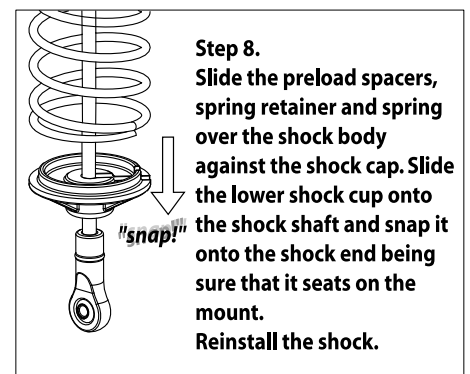
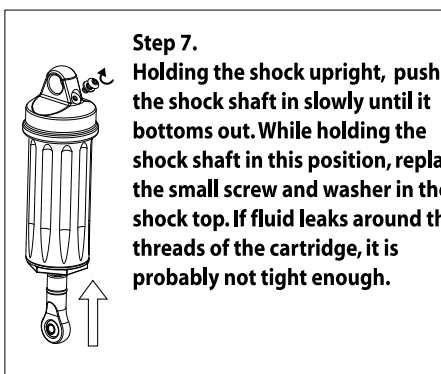
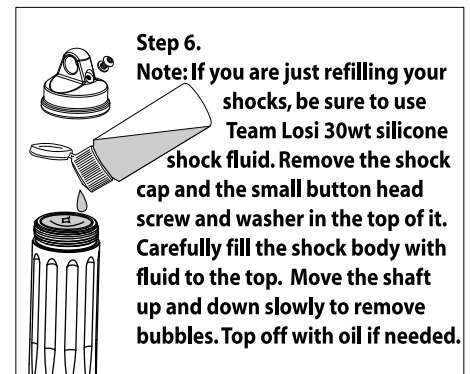
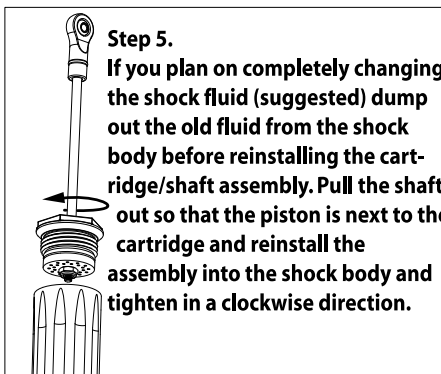
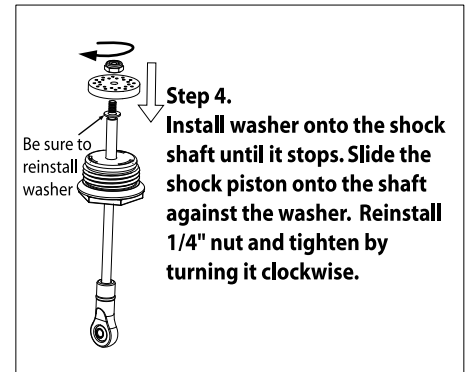
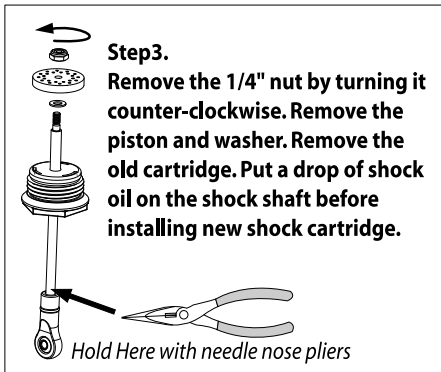
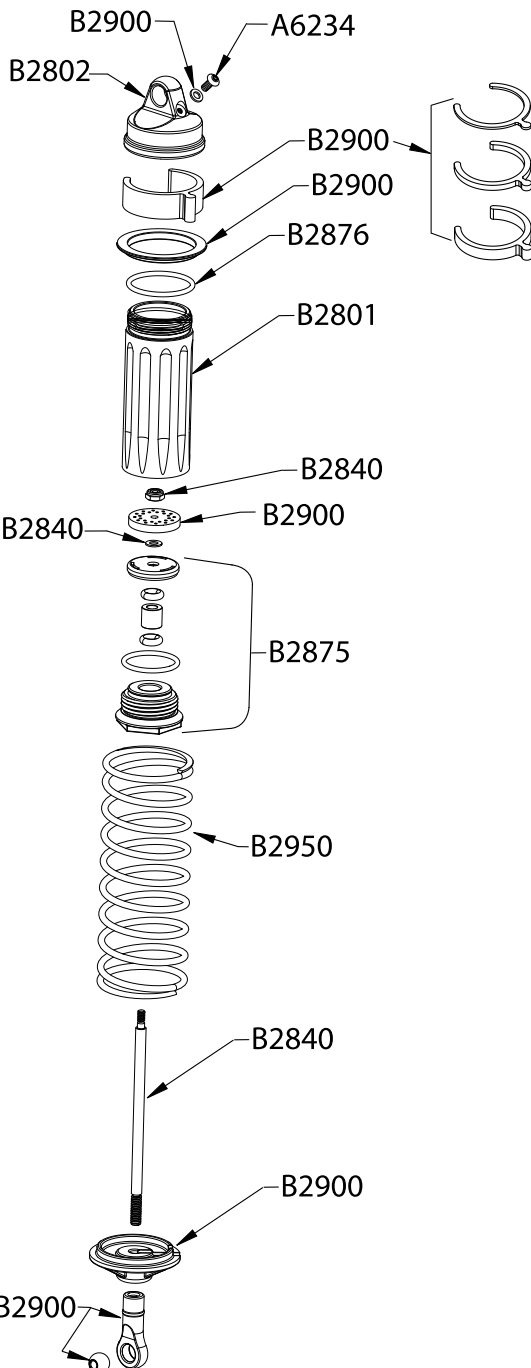
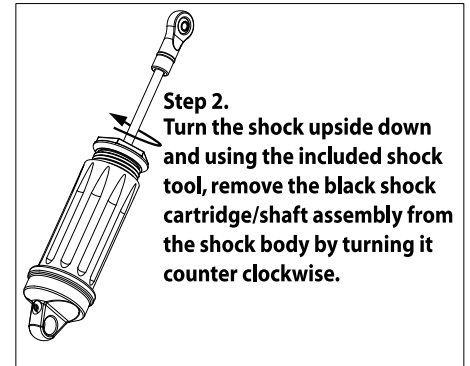
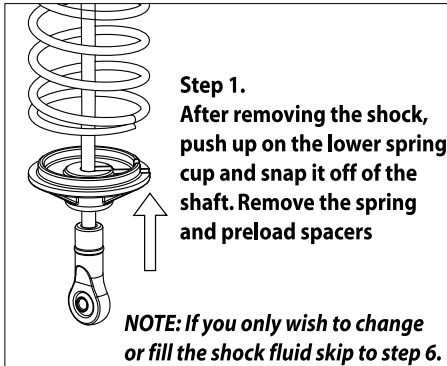
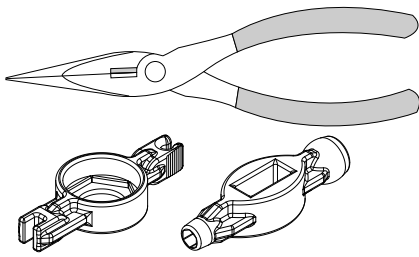
Removing the transmission

- ① Remove the gear cover.
- ② Remove the throttle linkage from the carburetor and the brake linkage from the servo arm.
- ③ Remove the Forward/Reverse arm from the transmission.
- ④ Loosen the four motor mount screws (bottom of the chassis) and slide the motor back.
- ⑤ Remove the five transmission mounting screws and lift the transmission out.
- ⑥ Remove the outdrive and ten 5/64 cap head screws. Remove the transmission case half.
- ⑦ Regrease the gears and shafts, inspecting each for wear.
- ⑧ Replace any worn or failed gears.
- ⑨ Wipe out the inside of the gear case, removing any debris, old grease and foreign matter.
- ⑩ Check all ball bearings for free movement cleaning or replacing as necessary.
- ⑪ Check for wear on shifting forks and replace as needed - NOTE: These can wear more than the gears.
- ⑫ Reinstall gears on the shafts lubing with LOSA3066 Team Losi Assembly Grease.
- ⑬ Reassemble the transmission lubricating liberally with LOSA3066 or similar hi-grade grease.
- ⑭ Make sure the setscrews in the outdrive cups are tightened - a locking compound is highly suggested.
- ⑮ Install the transmission in the chassis, reset the gear mesh by using a small piece of paper between the pinion and spur gears, applying pressure while retightening the engine. Reconnect all linkages and connections as necessary.



Rebuilding/Refilling the Shocks

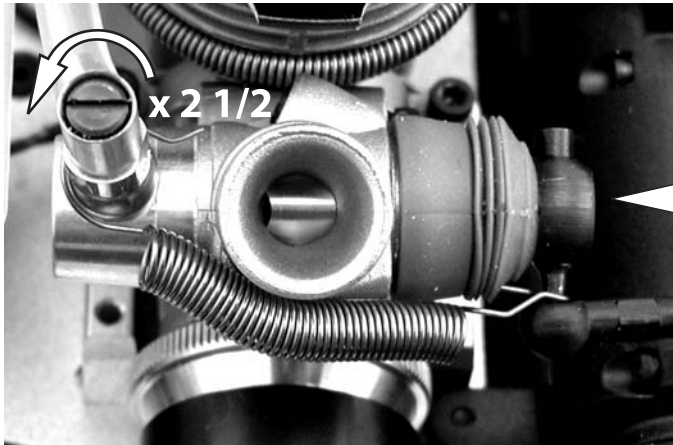
Tools Needed



Quick Reference Guide

Initial Factory Settings

Engine

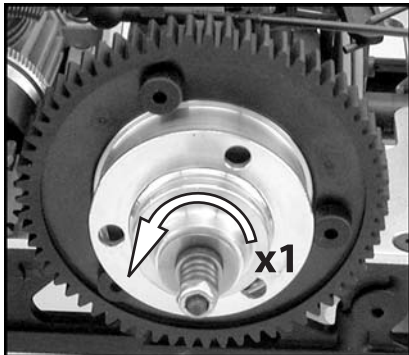


Hi-Speed Needle - 3 1/2 turns out

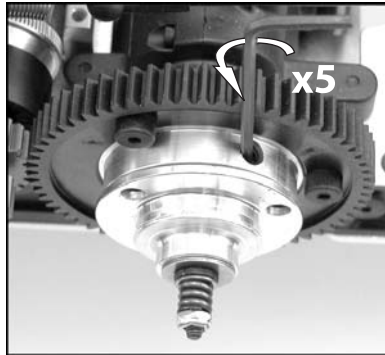


Low-Speed Needle 2 turns out

Transmission



Slipper - 1 turn out



Two-Speed - 5 turns out

Axles



**Black Axles = Left Side
Silver Axles = Right Side**

Shocks



**Team Losi 30wt
Shock Oil
(LOSA5224)**

Tie Rods

