

# TEAM LOSI LS2



## 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 LST2 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 LST2. 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 427 Engine & JR Propo Radio Gear**  
**Horizon Hobby Inc.**  
**4105 Fieldstone**  
**Champaign, IL 61821**  
**1-877-504-0233**

**LST2 Chassis Components:**  
**Team Losi**  
**4710 E. Guasti Road**  
**Ontario, CA 91761**  
**1-800-899-LOSI Fax 909-390-5356**

### **Safety Precautions**

THIS IS NOT A TOY! The LST2 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 personal and/or property damage. It is your responsibility to see that the instructions are followed and precautions adhered to. The LST2 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 LST2 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 LST2.

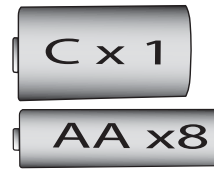
8 AA Alkaline batteries for the transmitter.

1 C Alkaline battery for the ignitor

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

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

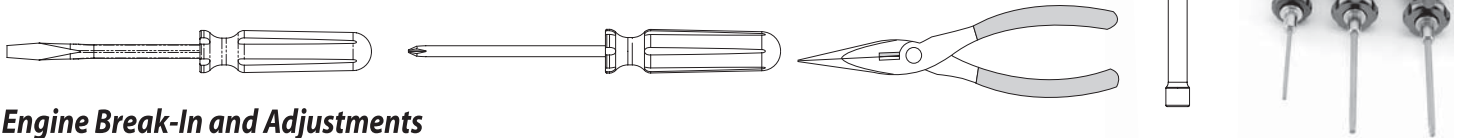
Battery charger for the 7.2v 6 cell "Stick" battery pack.



## Tools You Will Find Handy

In addition to the tools included with the LST2, you will find the following both useful and in some cases necessary.

- Small flat blade and Phillips screwdrivers
- Needle nose pliers
- Quality .050", 1/16", 5/64", 3/32", 1.5mm 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 LST2 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. 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 – 4 turns out from bottom

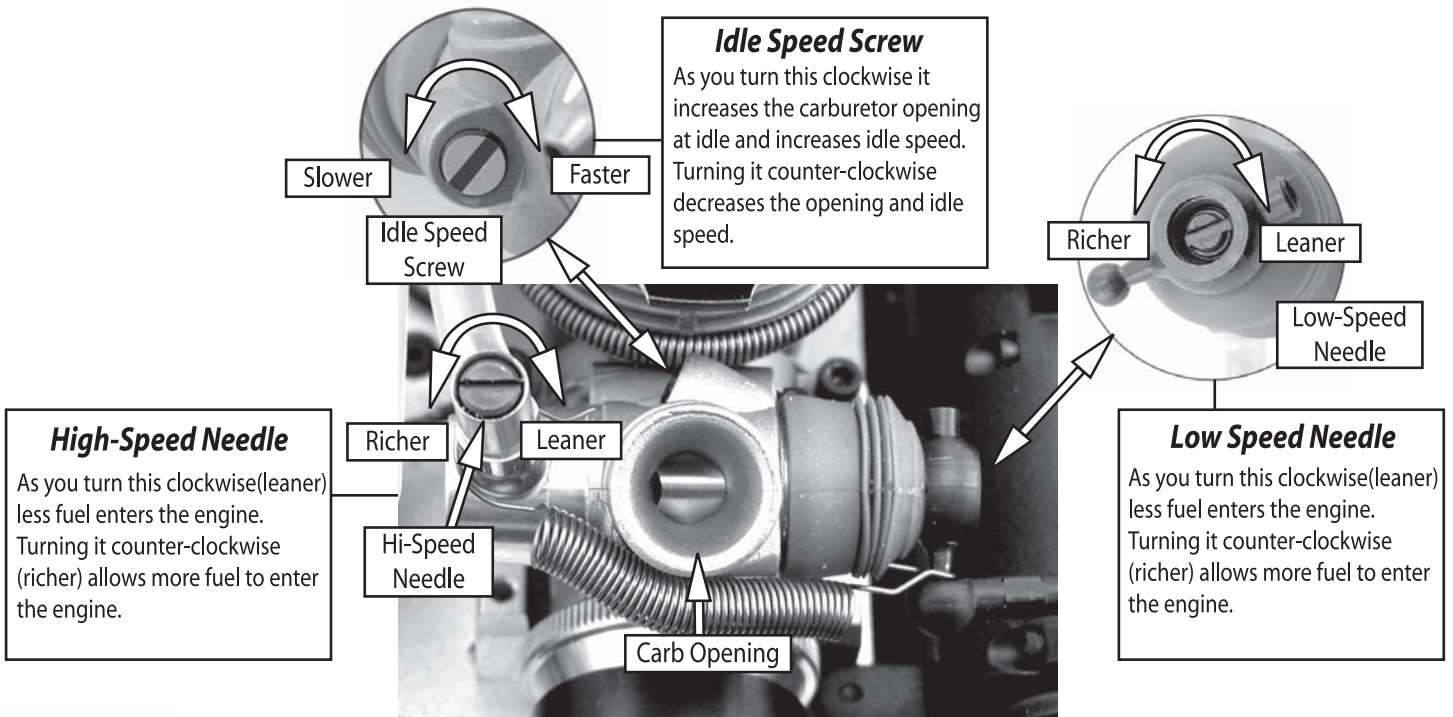
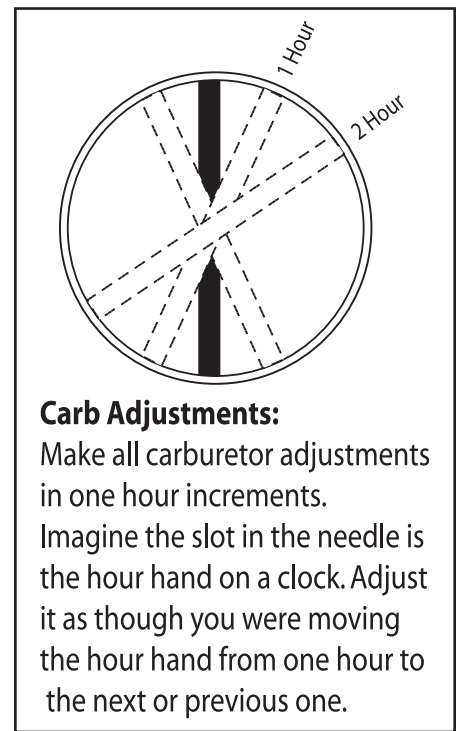
Low-Speed Needle -- 2 turns out from bottom

### 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.



## 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 LST2 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.

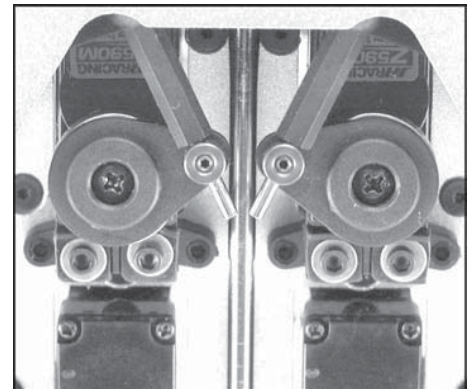
- Never run your truck with low receiver or transmitter batteries.
- Never leave the power on or the batteries will not last long.
- Always fully extend the transmitter antenna before running your truck
- Always turn the transmitter ON **before** turning the truck ON.
- When finished running, always 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.



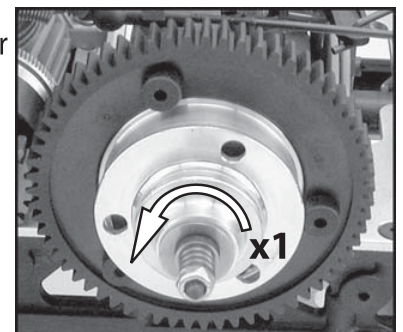
## Maintenance

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.

## Adjusting the Slipper

The slipper is a key component of the drivetrain that is designed to help absorb sudden or large impacts that would otherwise stress various drivetrain parts. You should never run the LST2 with the slipper locked (completely tight). The slipper can also be used as a tuning aid for extremely slick conditions. To adjust the slipper start by turning the 1/4" adjustment nut clockwise (tighten) until it gets tight and the spring is compressed - Do Not Over Tighten as you will strip the nut. Now turn the adjustment nut counter-clockwise (loosen) one full turn. This should be a good overall setting.

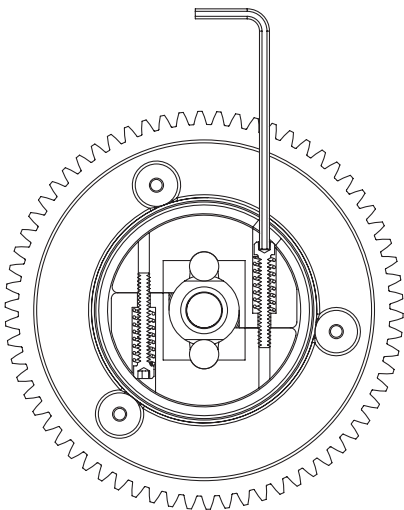


**Slipper - 1 turn out**

## 2-Speed Adjustment

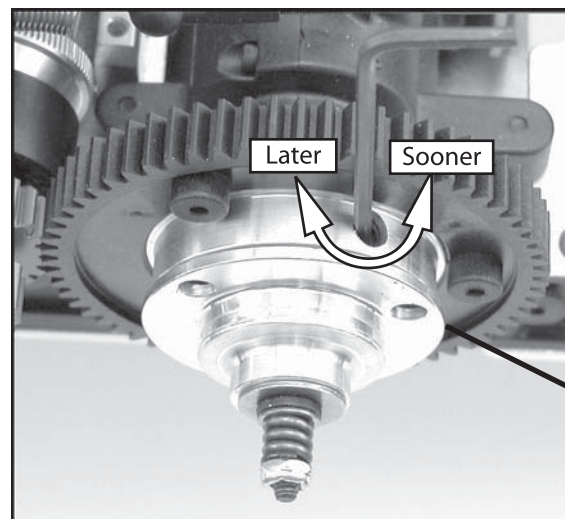
Although pre-adjusted at the factory, the two-speed can be adjusted to shift at the point that suits you best. Under normal circumstances, it should shift slightly before the engine reaches maximum power. The actual distance traveled will vary with the gear ratio and tune of the engine. There are two 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 (1st) Spur gear removed for photo.

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

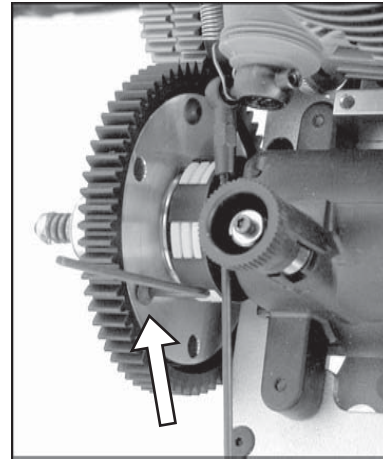
## Replacing the Gears

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 clutch bell and the spur (on the two-speed) must be used as a combination.

### 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.





## 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.

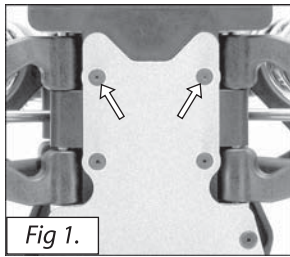


Fig 1.

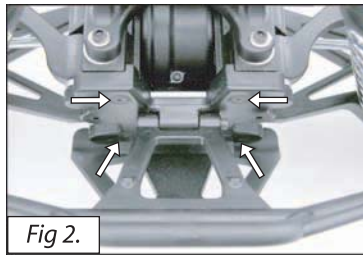


Fig 2.

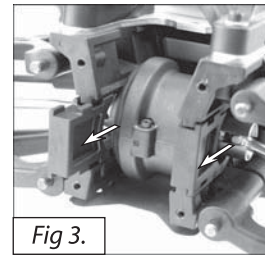


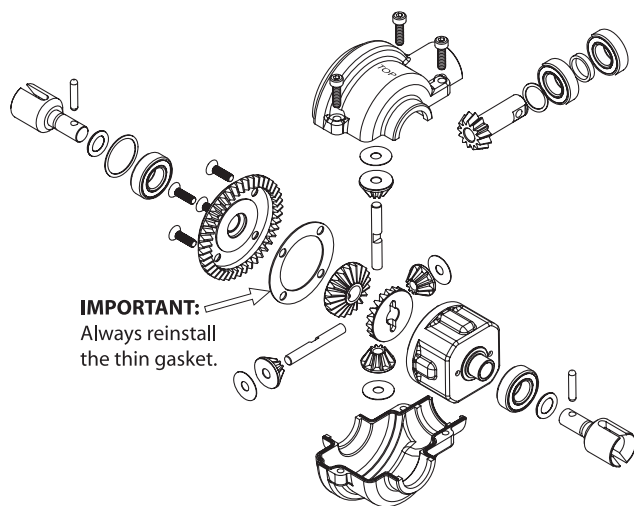
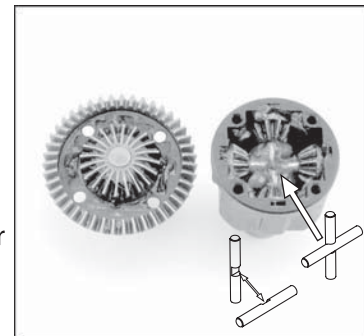
Fig 3.

### 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 5/64" 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  
the thin gasket.

### For Viscous Differential

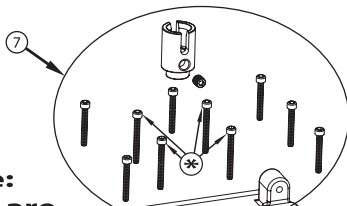
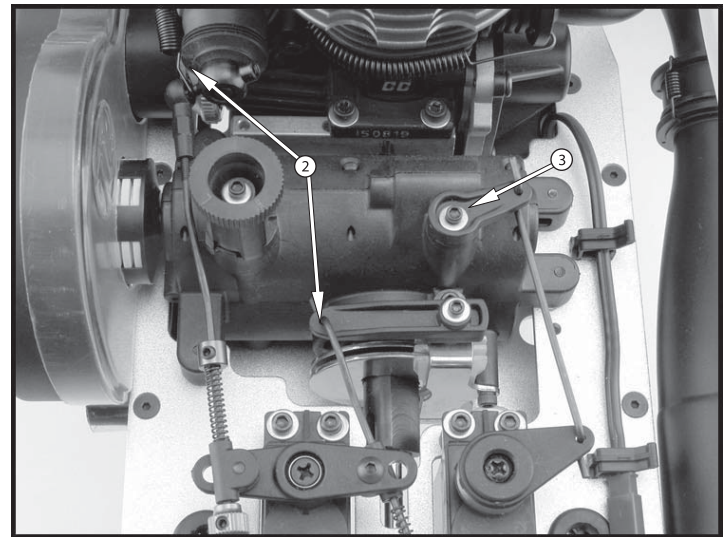
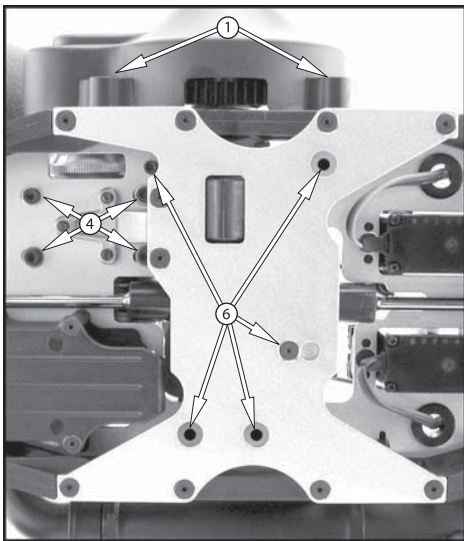
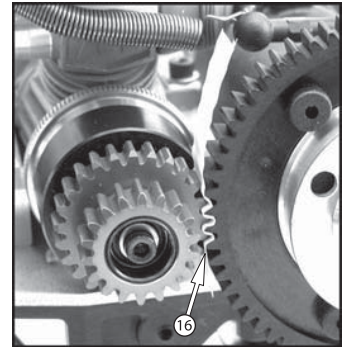
Instead of grease you can use Silicone fluid in the differential for a limited slip feel as desired for racing. Simply fill the diff up to the top of the gears before replacing the ring gear. (Be sure to reinstall the rubber gasket). You may have to replace the o-rings on the outdrives at the same time 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

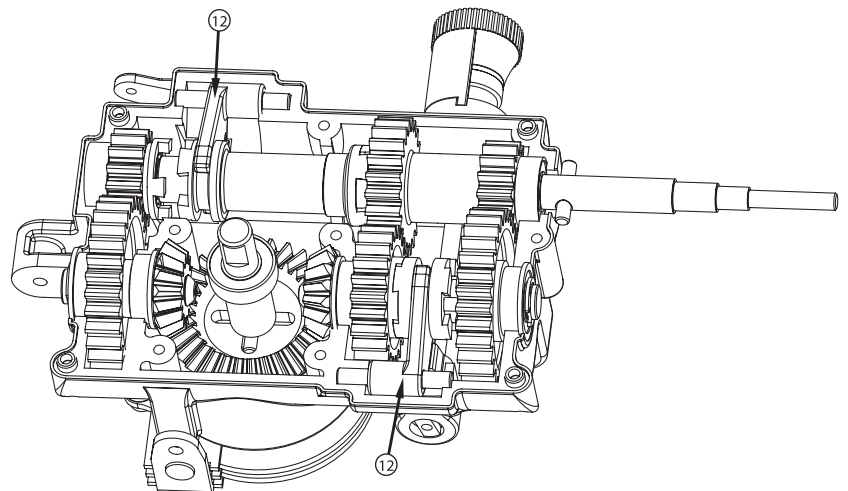
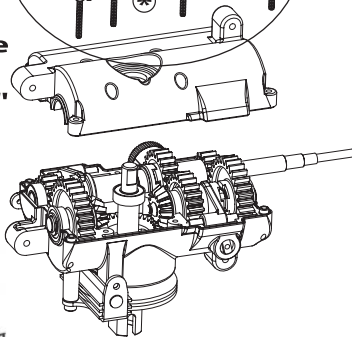
The Transmission should also be cleaned and serviced periodically. All gears and shafts should be closely inspected for wear and replaced if necessary. Always use a high quality grease or lubricant to prevent premature wear and/or failure.

### 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 2-Speed Spur Gears and back gear cover.
- ⑥ Remove the five transmission mounting screws and lift the transmission out.
- ⑦ Remove the outrdrive and ten 5/64 cap head screws. Remove the transmission case half.
- ⑧ Regrease the gears and shafts, inspecting each for wear.
- ⑨ Replace any worn or failed gears.
- ⑩ Wipe out the inside of the gear case, removing any debris, old grease and foreign matter.
- ⑪ Check all ball bearings for free movement cleaning or replacing as necessary.
- ⑫ Check for wear on shifting forks and replace as needed - NOTE: These can wear more than the gears.
- ⑬ Reinstall gears on the shafts lubing with LOSA3066 Team Losi Assembly Grease.
- ⑭ Reassemble the transmission lubricating liberally with LOSA3066 or similar hi-grade grease.
- ⑮ Make sure the setscrews in the outrdrive cups are tightened - a locking compound is highly suggested.
- ⑯ 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.

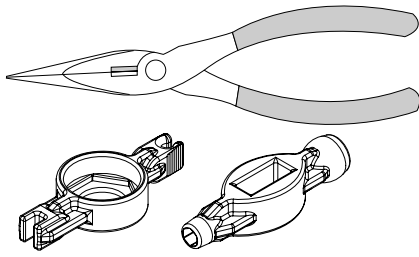


**\* Note:**  
These 4 are  
longer  
2-56 x 3/4"



# Rebuilding/Refilling the Shocks

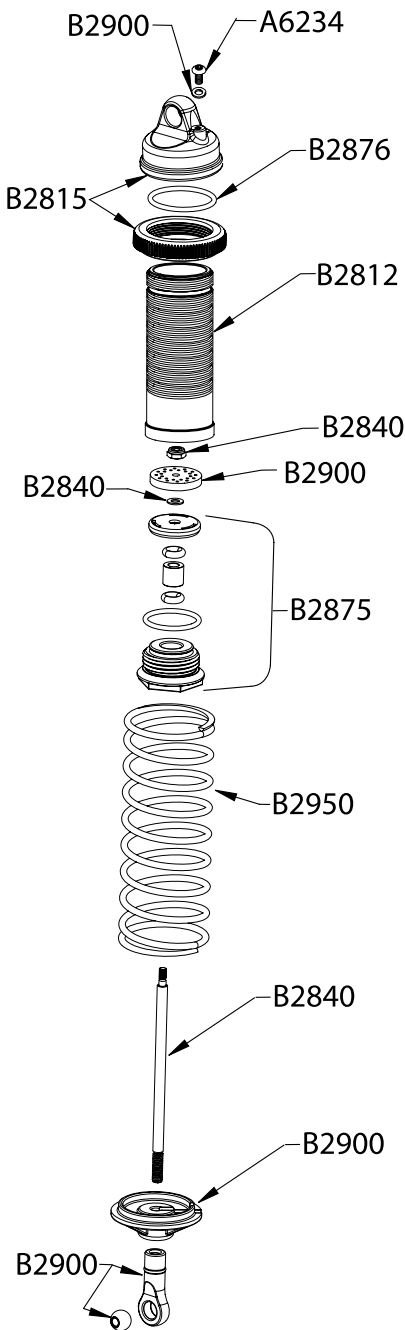
## Tools Needed



**Step 1.**  
After removing the shock, push up on the lower spring cup and snap it off of the shaft. Remove the spring.

*NOTE: If you only wish to change or fill the shock fluid skip to step 6.*

**Step 2.**  
Turn the shock upside down and using the included shock tool, remove the black shock cartridge/shaft assembly from the shock body by turning it counter clockwise.



**Step 3.**  
Remove the 1/4" nut by turning it counter-clockwise. Remove the piston and washer. Remove the old cartridge. Put a drop of shock oil on the shock shaft before installing new shock cartridge.

*Hold Here with needle nose pliers*

**Step 4.**  
Install washer onto the shock shaft until it stops. Slide the shock piston onto the shaft against the washer. Reinstall 1/4" nut and tighten by turning it clockwise.

*Be sure to reinstall washer*

**Step 5.**  
If you plan on completely changing the shock fluid (suggested) dump out the old fluid from the shock body before reinstalling the cartridge/shaft assembly. Pull the shaft out so that the piston is next to the cartridge and reinstall the assembly into the shock body and tighten in a clockwise direction.

**Step 6.**  
**Note:** If you are just refilling your shocks, be sure to use Team Losi 30wt silicone shock fluid. Remove the shock cap and the small button head screw and washer in the top of it. Carefully fill the shock body with fluid to the top. Move the shaft up and down slowly to remove bubbles. Top off with oil if needed.

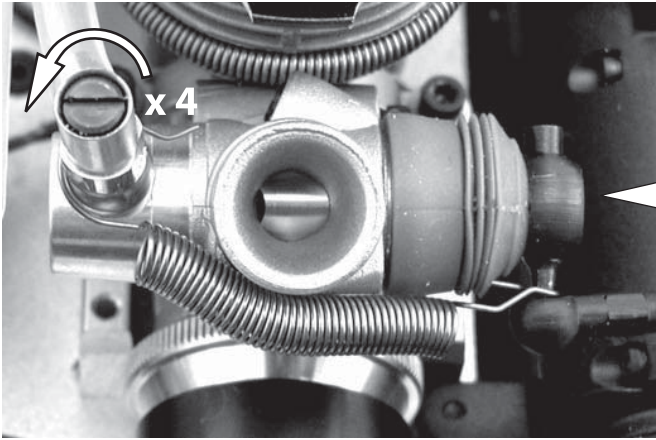
**Step 7.**  
Holding the shock upright, push the shock shaft in slowly until it bottoms out. While holding the shock shaft in this position, replace the small screw and washer in the shock top. If fluid leaks around the threads of the cartridge, it is probably not tight enough.

**Step 8.**  
Slide the spring over the shock body against the shock adjuster nut. Slide the lower shock cup onto the shock shaft and snap it onto the shock end being sure that it seats on the mount. **"snap!"** Reinstall the shock.

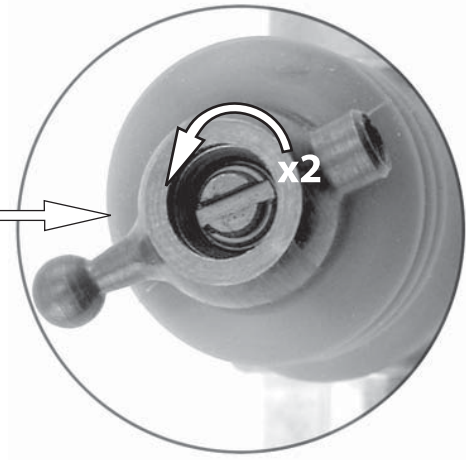
# Quick Reference Guide

## Initial Factory Settings

### Engine

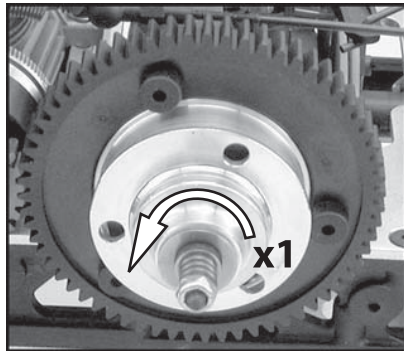


Hi-Speed Needle - 4 turns out

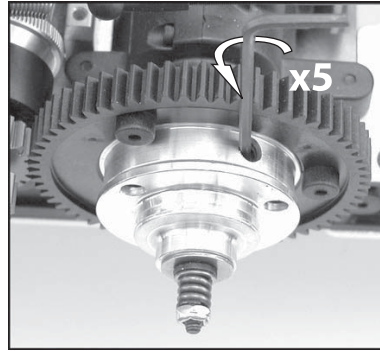


Low-Speed Needle 2 turns out

### Transmission



Slipper - 1 turn out



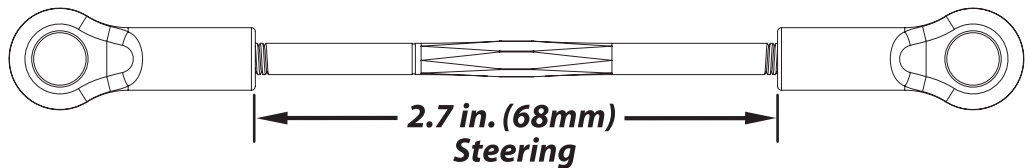
Two-Speed - 5 turns out

### Shocks



Team Losi 30wt  
Shock Oil  
(LOSA5224)

### Tie Rods



# Trouble shooting Chart

Problem	Things To Check	Remedy
Engine won't start.....	Out of fuel Spoiled or improper fuel Glow plug not lighting Glow igniter not charged Engine overheating Engine flooded Air cleaner blocked Exhaust blocked	Check/Replace Glow plug Charge/change battery Let cool - see "Testing the Teperature" Clean & reoil aircleaner
Engine won't turn over.....	Engine is flooded Engine seized	See "About Glow Plugs"
Engine starts then stalls.....	Idle speed set too low Glow plug is fouled/weak Air bubbles in fuel line Engine is overheated Insufficient fuel tank pressure/blockage	See "Carburetor Adjustments" See "About Glow Plugs" Check for split/hole in fuel line See "Testing the Temperature" Clear pressure line
Engine performing poorly.....	Hi-Speed fuel mixture is too rich Engine overheating Leaking glow plug Carburetor dirty or blocked Fuel bad or contaminated Clutch or Slipper slipping Bound up drive-train Engine worn out	See "Engine Tuning"  Replace glow plug  Try fresh fuel Clean/Adjust/Repair Check for binds in drive-train Rebuild
Engine overheats.....	Hi-Speed fuel mixture is too lean Low-Speed fuel mixture too lean Spoiled or improper fuel Cooling air is being blocked Excessive load on the engine	See "Understanding Rich and Lean"  Clean head fins Check for binds
Engine hesitates or stumbles.....	Engine overheated Hi-Speed mixture too lean Low-Speed mixture to rich Air bubbles in fuel line Glow plug fouled	See "Engine Tuning"  Check fuel line for holes Change glow plug
Engine stalls instantly when throttle is fully opened from idle.....	Glow plug fouled Hi-Speed mixture too rich Low-Speed mixture too lean	Change glow plug See "Engine Tuning"
Engine stalls while driving around turns.....	Fuel level is low Idle speed set too low	Add Fuel Increase Idle speed
Engine stalls while idling.....	Low-Speed mixture too rich Low-Speed mixture too lean Idle speed to low Clutch shoes dragging Clutch spring broken Clutch bearings failed Engine worn out	See "Engine Tuning"  Increase idle speed Check for broken clutrch springs  Check/Clean/Replace Rebuild