



Superformance S1 Roadster Service Bulletins and Technical Service tips



2647 MORGAN LANE STATE ROUTE 120 ROSS, OHIO 45013
TEL: (513) 738-4000 FAX: (513) 738-4005

S1 Technical Service Bulletins quick reference

0201sb S1Fenders: Needed up grade to older car to keep fenders from loosening up or falling off.

0202sb Speedometer shows no speed: Possible problem with drive pin backing out causing no speed signal.

0203sb Windshield Frame: Problem with widow frame movement on some vehicles.

0304sb Poor performance, lack of power cars with Alpha K20016 or K20020 system: Problem with inadequate throttle plate opening on some vehicles equipped with multi throttle body induction systems.

0305sb Intermitted stalling or engine dying on cars with Alpha K20016 or K20020 system: Loose conection at fuse or relay causing lose of fuel pump pressure.

0306sb Fluid leak from Axle Ends: Fluid leaks at the rear axle that appear to be an axle seal leak, are likely to be fluid leaking from around the wheel bearing.

0307sb Flipped Munford Link: Factory adjustable repair for cars with flipped Munford links.

S1 Service Tips quick reference

0201st Decreasing engine heat in the S1 Roadster: Now to decrease the engine operating temperature and cockpit heat in the S1

0302st Tire and Wheel Guide: Tire and wheel buyers guide including recommended tire and wheel sizes and stock wheel dimensions.

0303st Details on adjusting the Alpha K20016 Multi Throttle Bodies: How to adjust and synchronize the Alpha multi throttle body induction systems.

0404st Munford Link Support Plate: How to fabricate and install a Munford link support plate.



Service Bulletin: 0201sb S1Fenders

This bulletin details problems that have been encountered with the early S1 concerning the fender loosening. If the fender loosens up at the bracket there is a good chance that the bolt head will shear off and cause the fender to drop. If your car already has chrome acorn nuts on the backside of the fender attachment points, your car has already been modified. If you have the acorn nut and your fender has loosened, you should tighten the Allen bolts inside the fenders.

Front fender loosening or coming detached:

The fix at this is the upgraded bolt setup used now by Superformance *Fig. 1*. The following instructions will allow you to repair the car with the same size bolts used by the factory. Plain metric nuts can be used temporarily and we can supply the chrome acorn nuts that can be swapped in at a latter time. We recommend that you make these modifications now, to avoid any damage to the fenders. If it is convenient for you, Snakebite can make this repair for you.



Fig. 1 Latest fender attachment used by Superformance.

Making the repair:

You will need four 4 centimeters long, 8 mm - 1.25 bolts with a 1 to 2 centimeter shank. Four 8mm - 1.25 chrome acorn nuts (or lock nuts) and four lock washers. We can provide this hardware for you if needed. You will also need a 17/64; a 5/16 drill bit and a 8mm -1.25 tap to modify the bracket.

Start by removing the wheel and remove the original 6-mm bolts attaching the fender to the brackets. The modification can be done on the car but you may find it easier to remove the bracket from the spindle.

Drill out the 6-mm hole in the bracket all the way through with the 17/64 drill bit. Next drill into the hole from the fender side about half way through with the 5/16-drill bit. Tap the hole with the 8-mm tap. Repeat on all four-support brackets

Open up the holes in the fender with the 5/16-drill bit.

Use the 8-mm bolts to attach the fender and tighten securely. Install the lock washer and the acorn nut on the backside of the bracket holding the bolt as you tighten. *Fig. 2*

Install the wheel and check for proper clearance.



Fig. 2 Modified brackets.

Loose Fenders on Cars Factory Equipped with Acorn Nuts

If you have a latter car with acorn nuts and notice the fenders have loosened then they should be tightened immediately. This is most likely to happen on a new car but should be checked periodically on all cars. To tighten the fenders simply remove the wheel, loosen the acorn nut, tighten the Allen bolt in till there is no more movement in the fender. While holding the Allen bolt securely, tighten the acorn nut to lock it in place.

Checking your fenders should be considered routine maintenance.

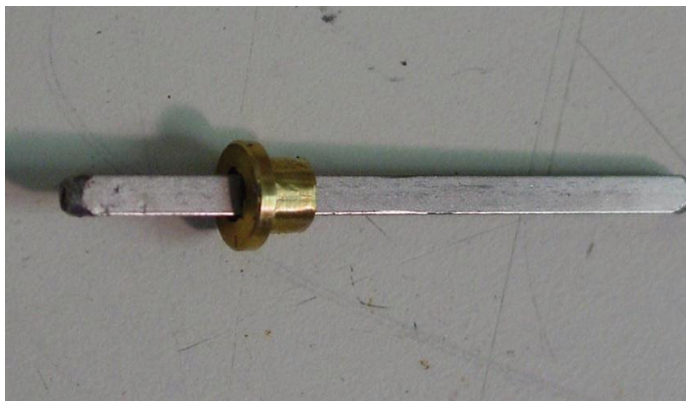
This Information has been researched and written by Mike Evangelo for use by Snakebite Performance and Dynamic Motorsports.

Any unauthorized use of this information is sticky forbidden. Copyright© 2002
Any questions about the contents please contact Mike Evangelo at 513-738-4000

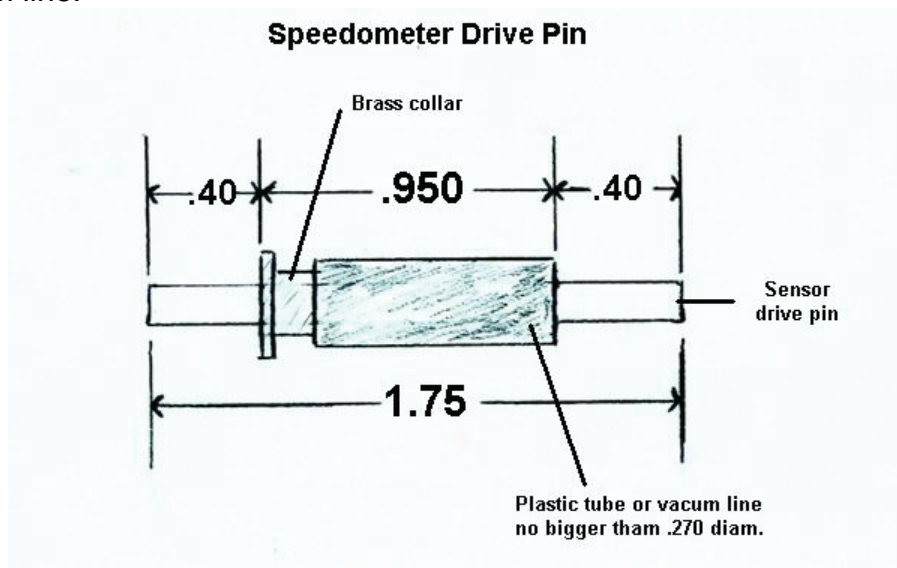


S1 Bulletin: 0202sb Speedometer shows no speed.

It has come to our attention that under some circumstances the speedometer will quit showing any speed. The meter seems to be operating normally otherwise. Needle will sweep on start up and odometer will show the miles.



The speedometer sensor drive pin shown above, has been found to walk out of the sensor, causing the above-mentioned problem. To prevent this from occurring, a small sleeve can be made from plastic or a vacuum line.



Fit the sleeve as shown above. Insert the pin, brass collar towards sensor. This will prevent the pin from walking out.

This Information has been researched and written by Mike Evangelo for use by Snakebite Performance and Dynamic Motorsports.
Any unauthorized use of this information is sticky forbidden. Copyright© 2002
Any questions about the contents please contact Mike Evangelo at 513-738-4000

2647 MORGAN LANE STATE ROUTE 120 ROSS, OHIO 45013
TEL: (513) 738-4000 FAX: (513) 738-4005



S1 Bulletin: 0203sb Windshield Frame

Some cars may experience a problem with the windshield frame seeming to pivot forward and backward. This movement may be very subtle and only shows up as a gap at the base of the windshield frame and cowl. You may also find a gap around the wiper grommets and there may be problems with the doors rubbing the rear fenders. Car numbers are not verifiable but could be in the range of SP0018 and SP0040.

Movement in the S1 windshield Frame

Originally the S1 windshield was attached to the frame with a pedestal type mount. This mount was causing alignment problem during assembly. To align the windshields, washers were used to shim the pedestal. (See fig. 1) This proved to be an insufficient adjustment. A production change occurred around car #18, to a mount, with a pivoting adjustment point. After adjustments were made the bolt would be tightened and the pivot welded. Some cars got through without being welded. (See fig. 2) You must first check under the dash on either side to see which mount you have. If you have the early mount (See fig. 1) you will have no problems. If you have the later one with one large bolt in it, (See fig. 2) check to see if it is welded or has a second smaller bolt. If not it will need to be repaired.



Figure 1 Original Mount



Figure 2 New Style Mount

Making the Repair

First thing to do is reposition the windshield frame if it has moved out of place. You will want to push the frame far enough forward to close the gap in between the frame and cowl. When you have the frame where you want it you may need to have a helper hold it in position while you tighten the large bolt on the mount. You will need a short 19mm wrench to hold the nut in the back. After getting these bolts as tight as possible the frame should stay till holes are drilled for second bolts. Drill a 5/16 hole at the bottom rear corner of the mount. If drilled at the spot pictured, (*see fig. 3*) there should be no chance of drilling through and hitting the outer body since there is a ledge in the frame, that can be seen in the pictures. Secure the mount using a 5/16 bolt and lock nut. Do this on each side.



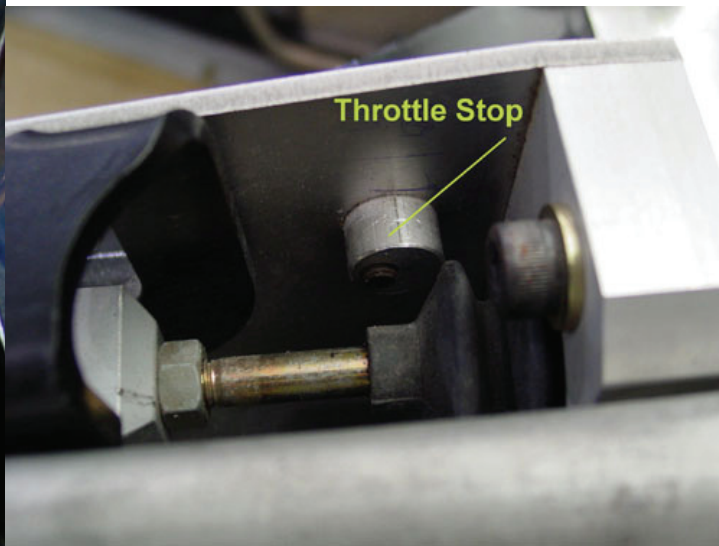
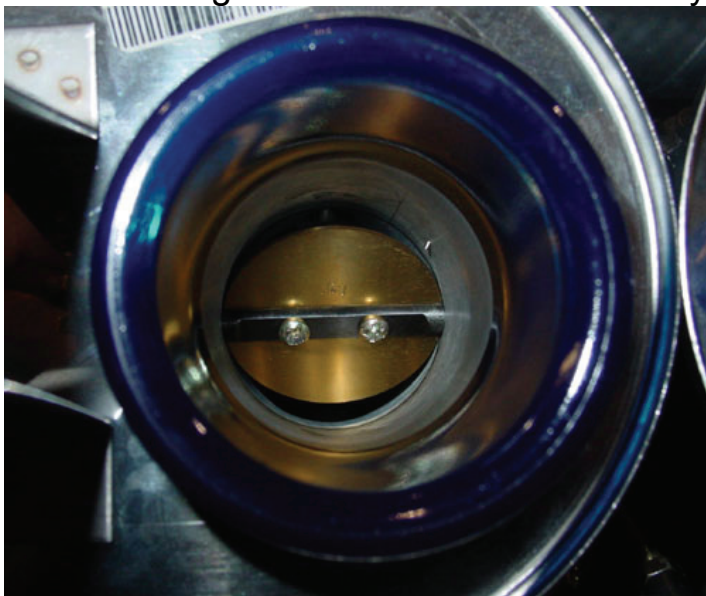
This Information has been researched and written by Mike Evangelo for use by Snakebite Performance and Dynamic Motorsports.
Any unauthorized use of this information is strictly forbidden. Copyright© 2002
Any questions about the contents please contact Mike Evangelo at 513-738-4000



snakebite
PERFORMANCE INC

S1 Bulletin: 0304sb Poor performance, lack of power cars with Alpha K20016 or K20020 system.

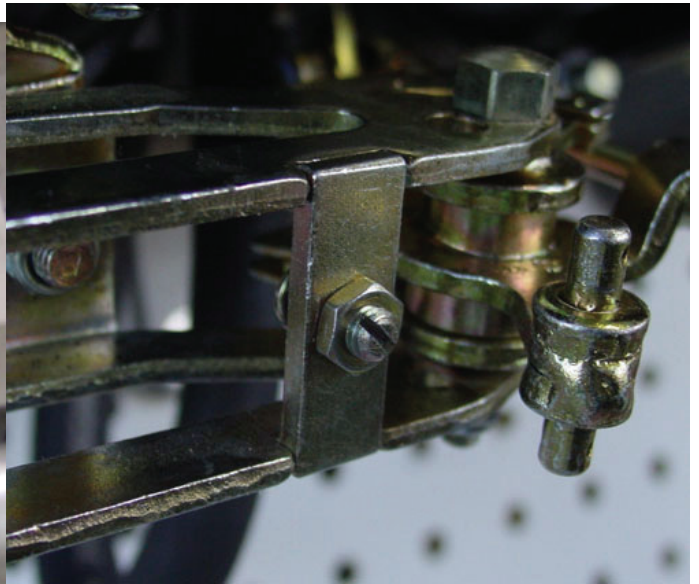
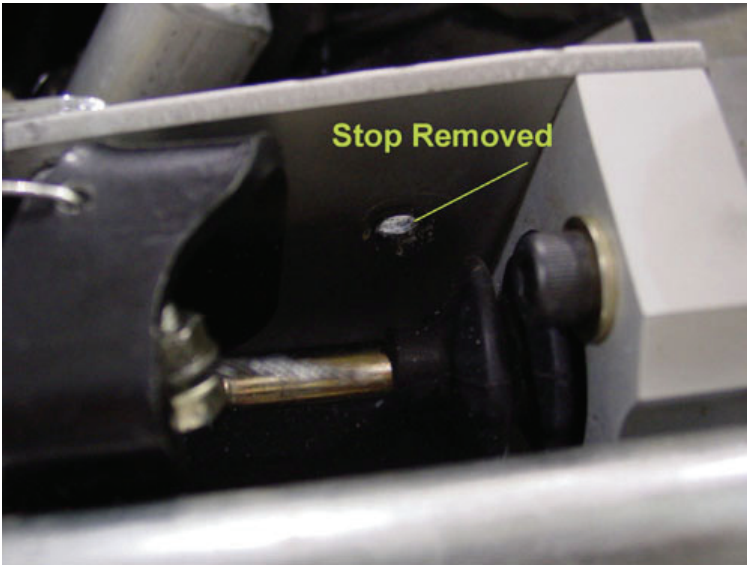
The Alpha systems are all preprogrammed with the same information. Besides the initial air balance adjustments there is little that can cause one car too perform much differently from another with the same system. Complains about resent cars performing differently then that of our demo have raised some concerns. Investigating this has reveled that the problem lies in a fairly basic problem of not enough throttle opening. It seem that the factory decided at one point that the cars needed a throttle opening stop, as our older cars at the shop do not have this and are not effected. Adding this stop has created a situation were the multi throttles will not open completely. We checked a recently built car just after install and found only a 25% throttle opening. You can imagine that this would drastically affect engine performance.



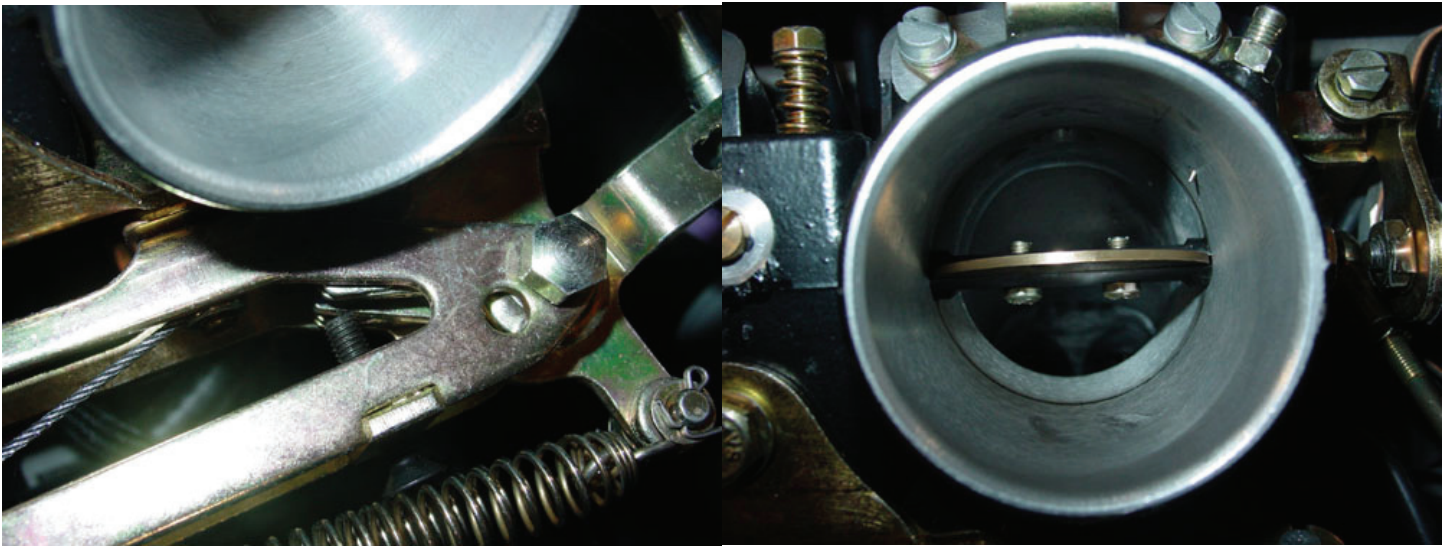
As shown above, with the pedal to the floor, this is the most throttle opening we had. The problem was the factory throttle stop shown to the right.

Fortunately the Alpha system incorporates it's own throttle stop on the bell crank bracket and the factory one can be eliminated.

To remove the factory stop you will need to hold the aluminum barrel with a vice-grips or pliers and loosen with a 3mm Allen wrench.



With the throttle stop removed have someone fully depress the pedal. On the throttle bodies, look for the lever stop, a small screw locked in place with a small nut. (Shown above) The lever should come in close contact with the back of this screw. Adjust the screw to make contact with the lever at full throttle. Check that the plates are fully open. You may need to adjust the linkage rod, off of the lever, to achieve this. In extreme cases if the lever will not reach the stop a longer screw can be used (5mm 0.9) being sure to lock nut it in place. Below, we put the lock nut on the back side.



When finished you should have 100% throttle opening as shown here. Performance will also be 100%.

This Information has been researched and written by Mike Evangelo for use by Snakebite Performance and Dynamic Motorsports.
Any unauthorized use of this information is sticky forbidden. Copyright© 2003
Any questions about the contents please contact Mike Evangelo at 513-738-4000

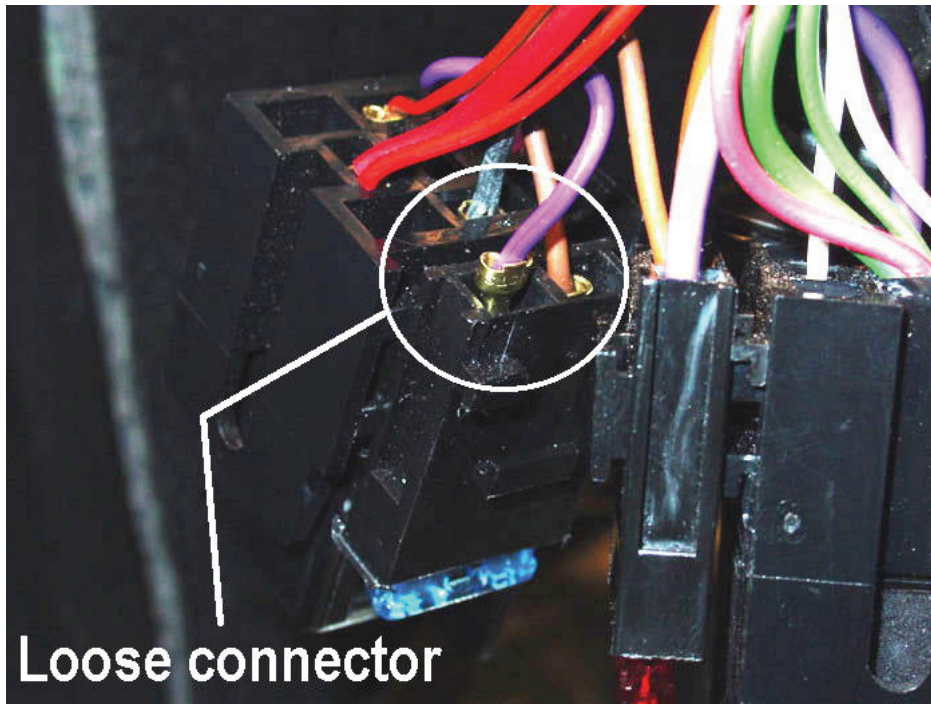


snakebite
PERFORMANCE INC

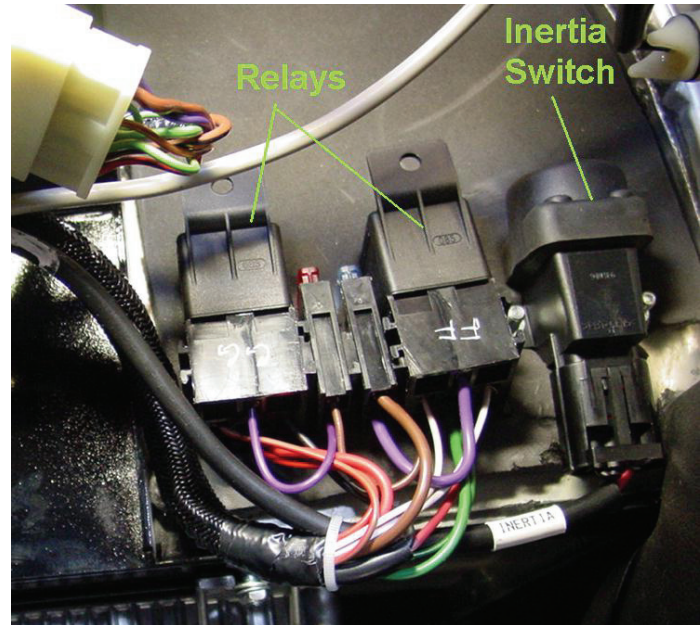
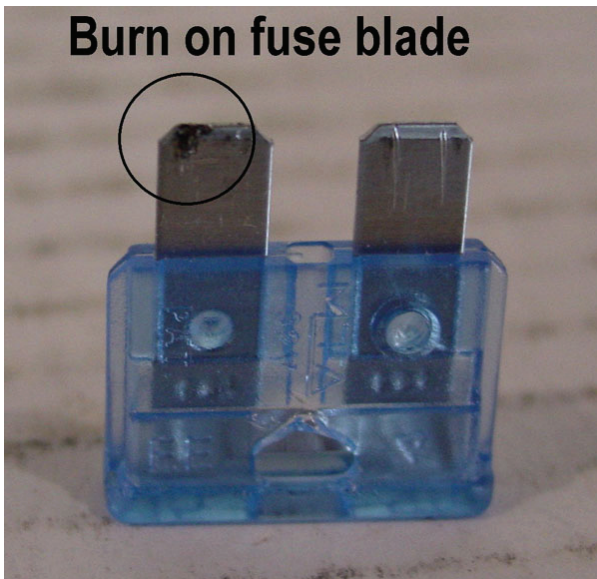
S1 Bulletin: 0305sb Intermitted stalling or engine dying on cars with Alpha K20016 or K20020 system.

There have been a few cases of cars with Webcon Alpha systems exhibiting intermitted stalling that seems as if the engine runs out of fuel. First symptoms resemble that of a fuel pump failure or the pump starving for fuel. When the problem occurs, an increase in fuel pump noise has been noted. Car may restart and die or not restart at all for some time.

The problem has been tracked down to loose connection at the fuel pump relay or fuse holder. In some cases the male spade connectors did not seat properly in the holder. When the fuse or relay is install the connector is pushed out, but was making a connection.



The loose spade can be seen here protruding from the back of the fuse holder. As the weak connection heats up the spade expands and loses its grip on the fuse or relay. The increase in resistance causes the fuel pump to lose voltage and the fuel pressure drops off until the car dies.



The burn on this fuse shows the break down of the connection at the spade connector. This car would operate fine for about 20-30 minutes then the fuel pressure would drop to about 18 psi causing the engine to stall. After an hour of sitting everything would return to normal.

Fuel pump and ECU relay mounting location is shown in the above right photo, behind the glove box, under the dash on the passenger side. All wires at the fuel pump and ECU relay and fuses holders should be checked for protruding connectors. If a loose connector is found, remove the fuse or relay, bend out the tab on the spade connector and reinsert it into the holder. Pull gently on the wire to make sure it is seated. If the fuse or relay is burnt it should be replaced.

Note: This same problem could happen to the ECU relay or fuse and cause different symptoms than those listed in this bulletin.

This Information has been researched and written by Mike Evangelo for use by Snakebite Performance and Dynamic Motorsports. Any unauthorized use of this information is strictly forbidden. Copyright© 2003. Any questions about the contents please contact Mike Evangelo at 513-738-4000



S1 Bulletin: 0306sb Fluid leak from Axle Ends.

Some cars have been experiencing a leak at the axle tube ends that seems to be a seal leak. The end of the tube behind the brake will become soaked with fluid and can even be thrown onto the wheel. See *Fig. 1*

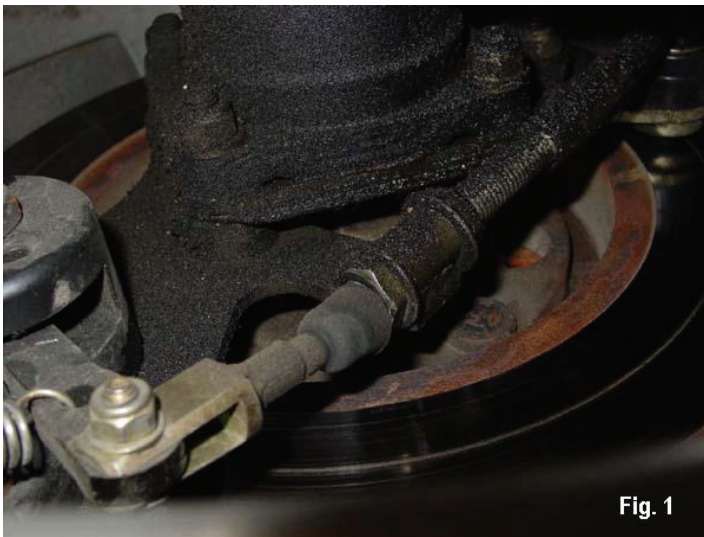


Fig. 1

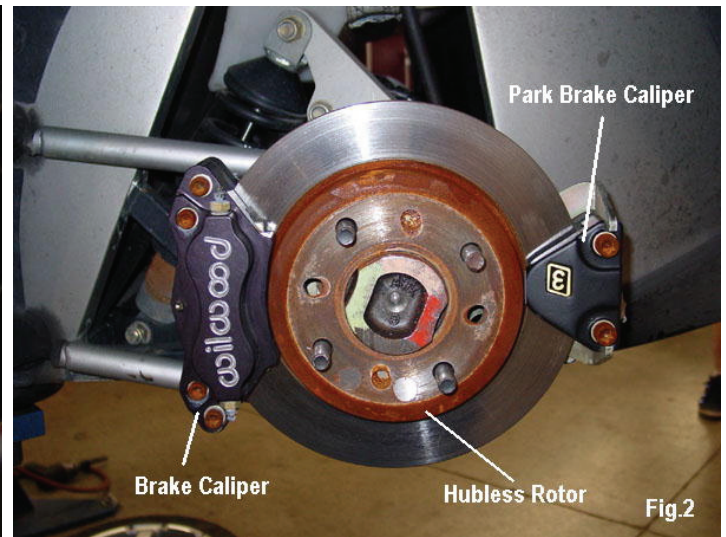


Fig.2

This leak is not the seal, which is part of the bearing, but fluid leaking around the wheel bearing. Repairing this leak takes about 45 min. per side and requires only a RTV type sealant. We highly recommend "Permatex Right Stuff"®.

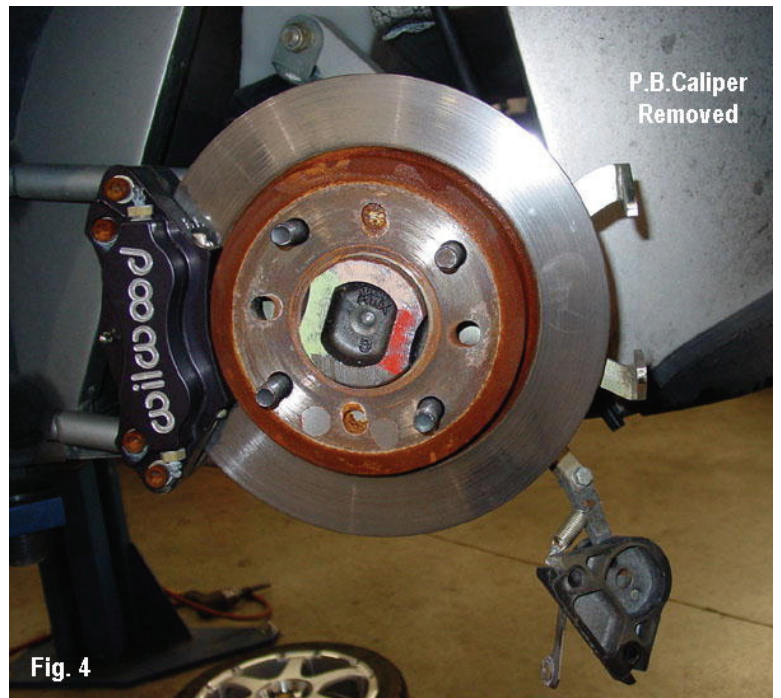
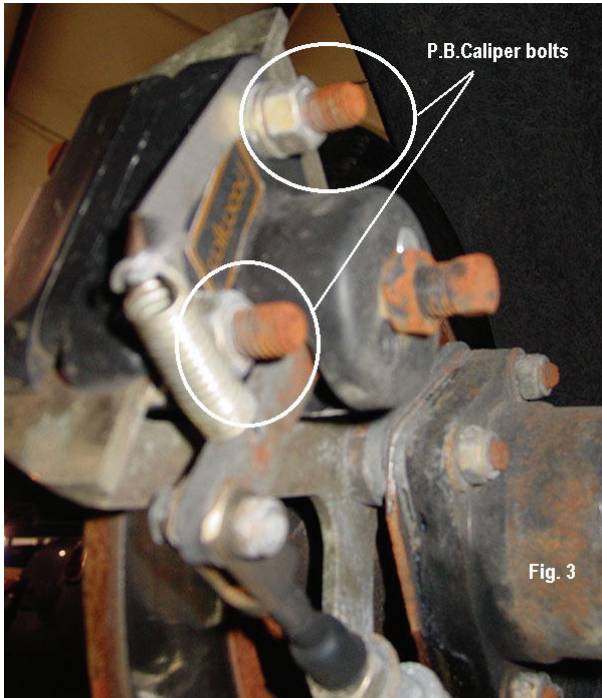
You will also need a 6mm Allen socket, a 5/16 Allen socket, a 9/16 wrench and a 17mm wrench.

Repairing the leak

Start by jacking the car up and setting it on jack stands. See the installation manual Chapter 6 page 1 for instructions on jacking and supporting the car.

Remove the rear wheels; your brake assembly will look like that in *fig. 2*.

The brake caliper, park brake caliper and rotor will need to be removed to access the flange bolt to remove the axle.



Remove the two Allen bolts on the park brake caliper. Nuts on the backside are shown in *fig.3*. The caliper will split in half and the rear half can be left attached to the cable. *Fig.4*



On the park brake:
You will have removed, the front caliper half with attached brake pad. The long Allen bolts and caliper half spacer.
Parts from the rear caliper half are, first the push-pin, the pad backing, then the inside pad.
These pieces like to fall out when the caliper is unbolted so be careful and make sure you have located all of them.
See Fig.5

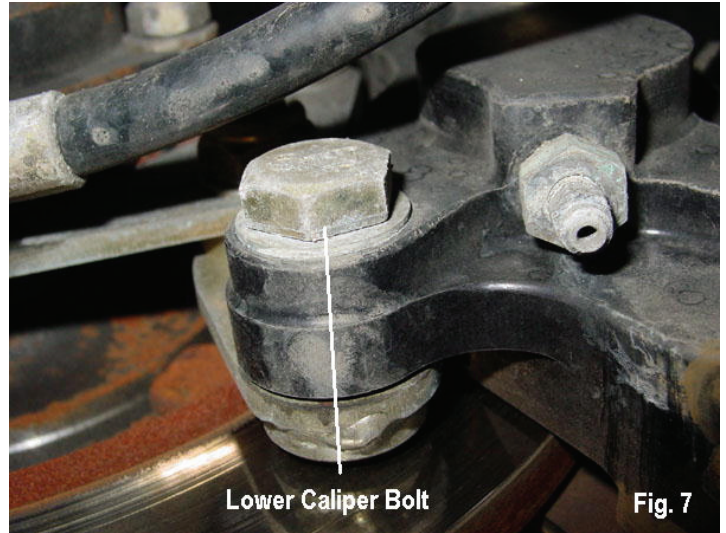
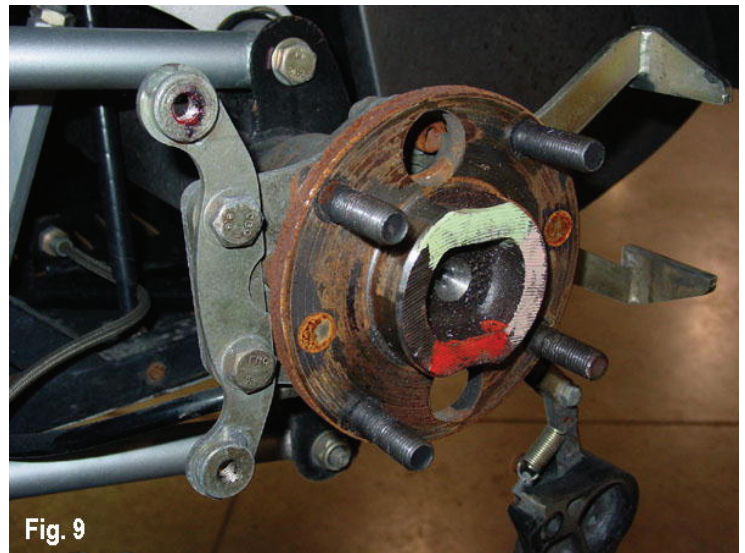
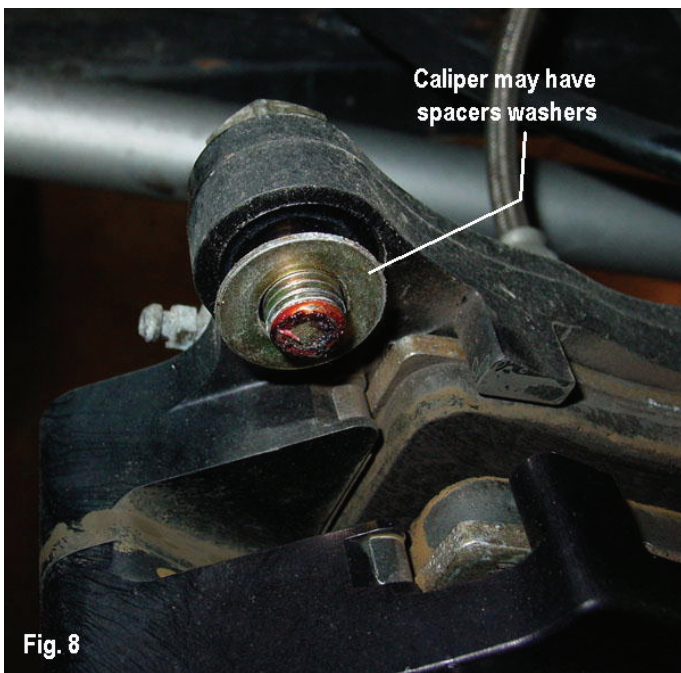


Fig.6 and 7 shows the top and bottom bolts that secure the brake caliper.



When the caliper is removed, watch for spacer washers that could be positioned between the caliper and mount. *Fig.8* The caliper should be left attached to the brake hose.

After the brake caliper is removed the brake rotor can be simply slipped off of the axle. You may find a plastic ring on the hub in front of the rotor. Remove this before removing rotor. *Fig.9*

Four Allen bolts secure the axle flange and brake-mounting bracket to the differential housing. Access to these bolt can be gained by lining up the holes in the axle hub with the bolts. *See fig. 10 and 11 next page*

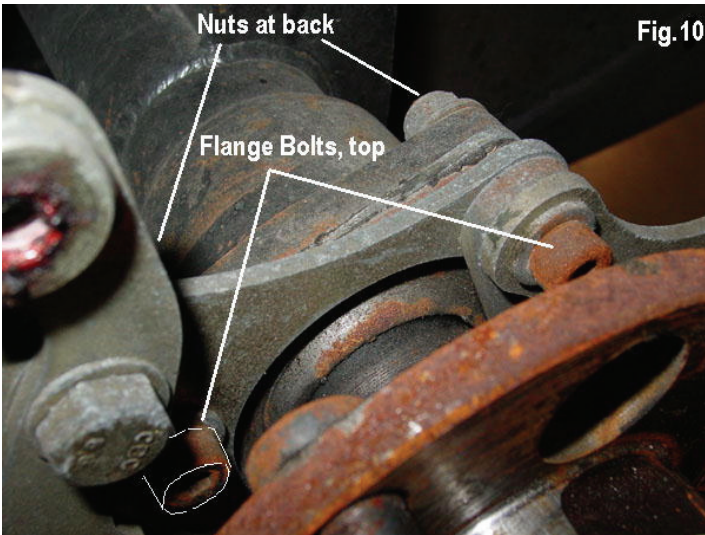


Fig. 10

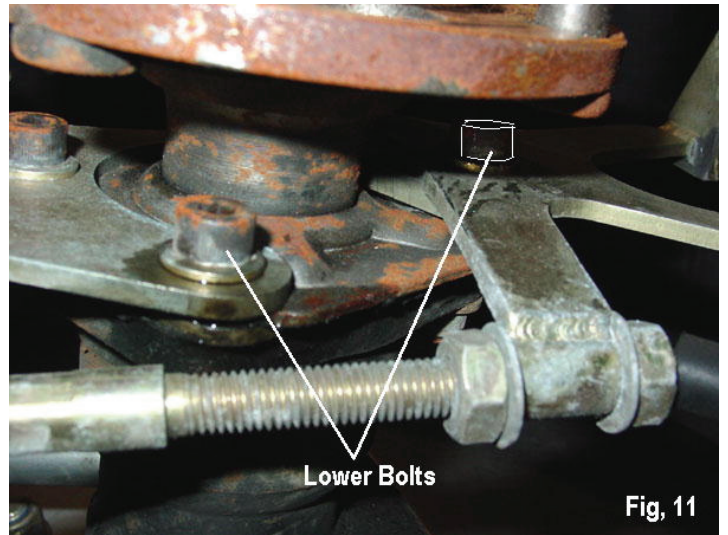


Fig. 11

The flange bolt are a different length front and rear so keep them together with the bracket they came off with. The top front bolt may have a washer that is cut flat on one side. Be aware of its position during reassembly.

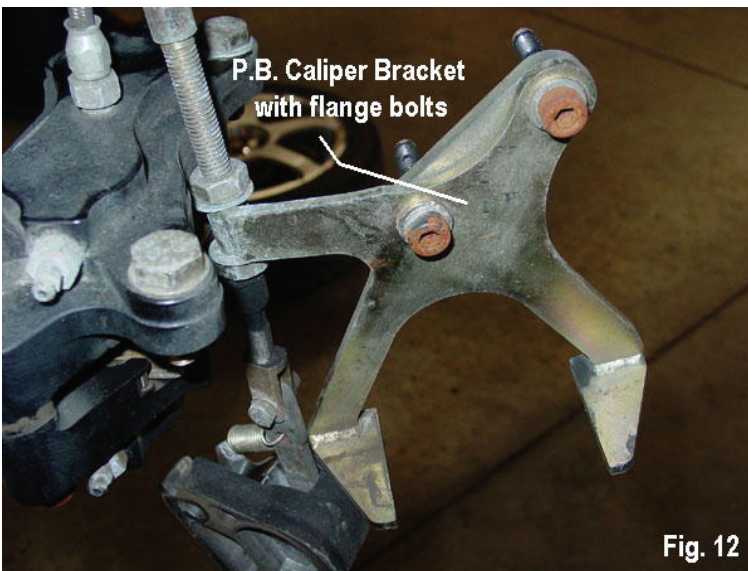


Fig. 12

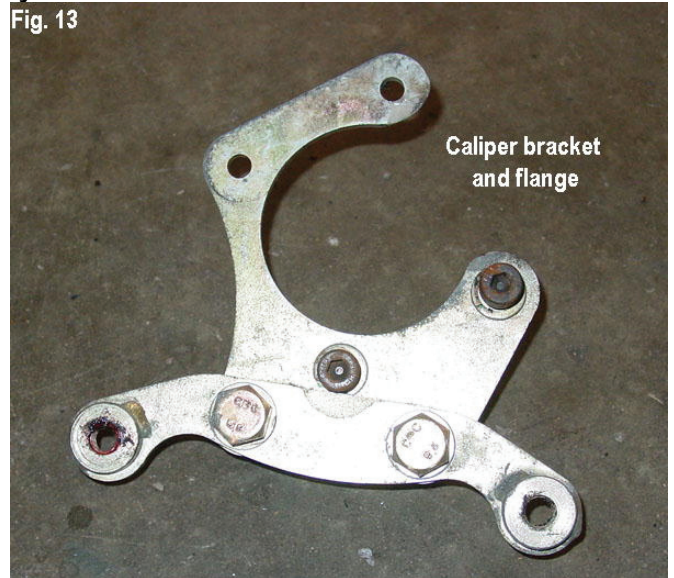


Fig. 13

The brackets will look like fig. 12 and 13. The rear bracket can be left attached to the cable.

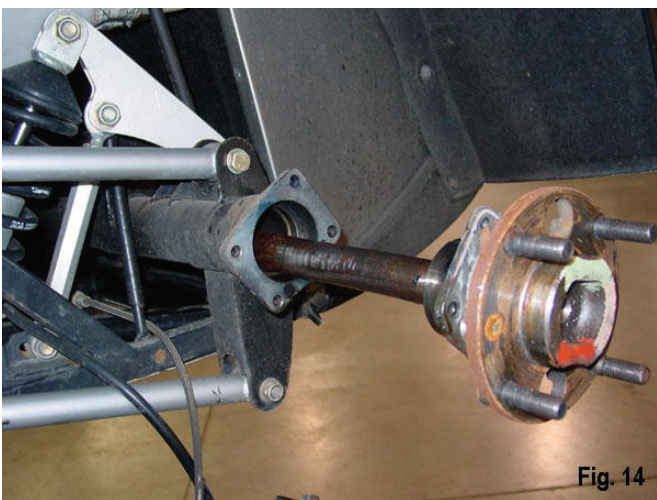


Fig. 14

The axle can now be simply pulled out.

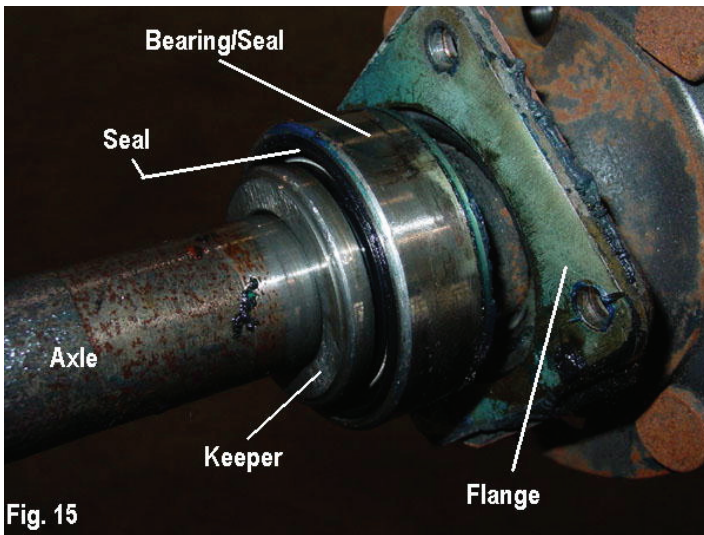
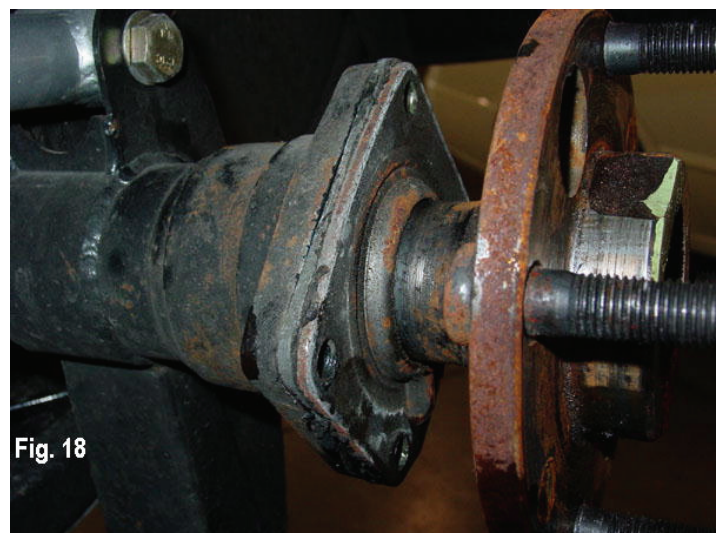


Fig. 15 lists the parts on the axel assembly. You can see that the oil seal is made into the bearing; therefore the bearing must be sealed to the housing. The housing must be cleaned out completely. All other parts soaked with oil should also be cleaned up. *Fig. 16*



Coat the inside of the housing with sealer as shown in fig. 17. Reinstall the axle and line up the flange. *Fig.18*

Reinstall the balance of the parts in the reverse manor of disassembly. The brake should not need bleeding if the hose was not removed.

The differential fill plug can be found behind the access cover inside of the trunk. Remove fill plug on the differential. Fluid should be level with the hole.

This Information has been researched and written by Mike Evangelo for use by Snakebite Performance and Dynamic Motorsports.
 Any unauthorized use of this information is strictly forbidden. Copyright© 2003
 Any questions about the contents please contact Mike Evangelo at 513-738-4000

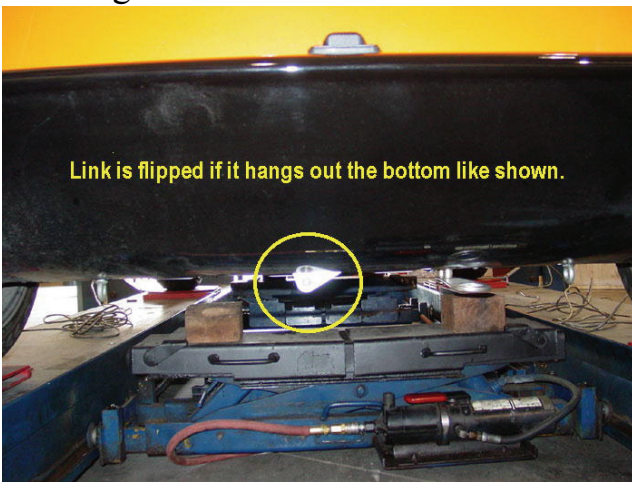
MSD • VDO • Dynamat • A.R.P. Bolts • Milodon Oil Pans
Deist Safety • Comp Cams • Made for You Wire Looms

American Racing Wheels • Ford Motorsport SVO
Edelbrock • Fuel Safe • Tremec • Wilwood • Trigo



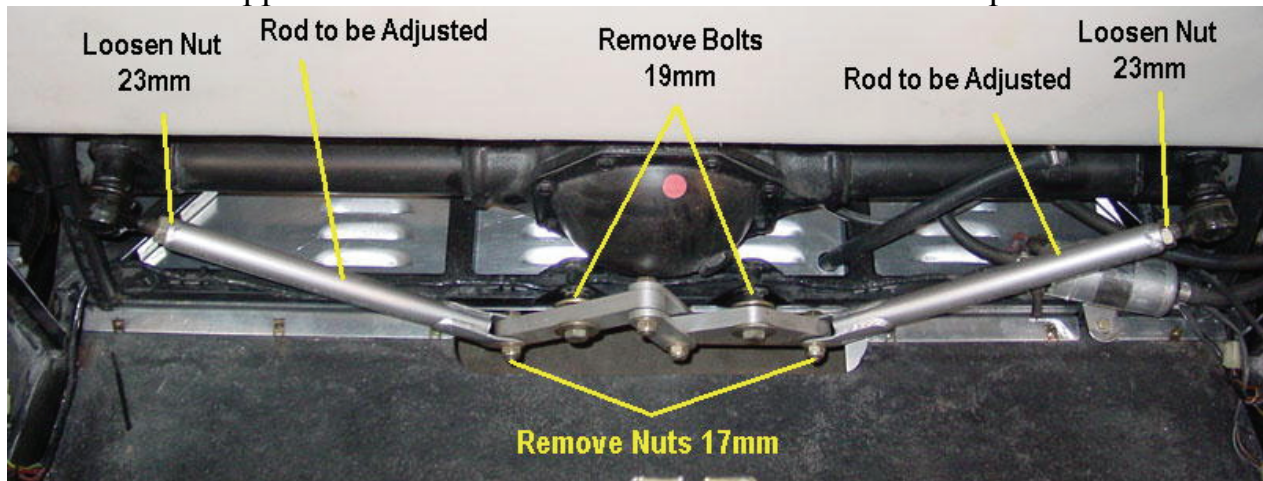
S1 Bulletin: 0307sb Flipped Munford Link

It is advised that any cars numbed 36 to 60 range be checked for a flipped Munford link on the left side. (See photos below) If your car is in this range and the link looks normal, be aware that under extreme driving or a severe hard bump the link could flip. The following adjustments can eliminate this as a problem. If the link becomes flipped it will have little effect on driving and is not dangerous.



Flipped link, trunk side view.

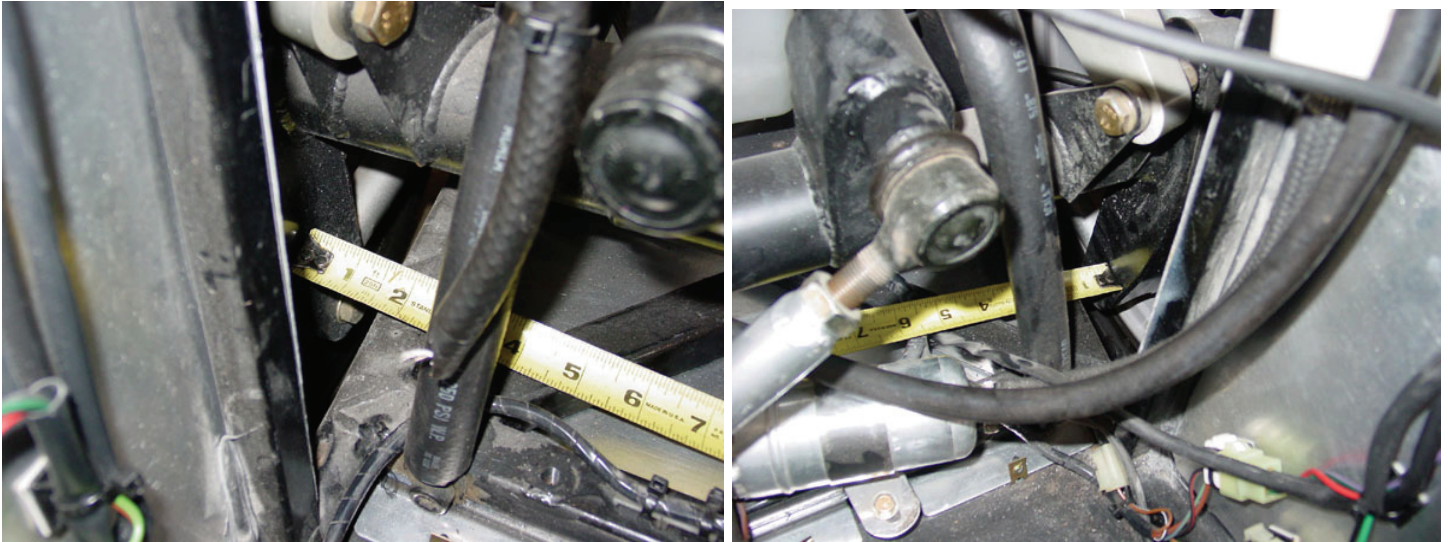
A flipped link can be identified as shown in the above photos.



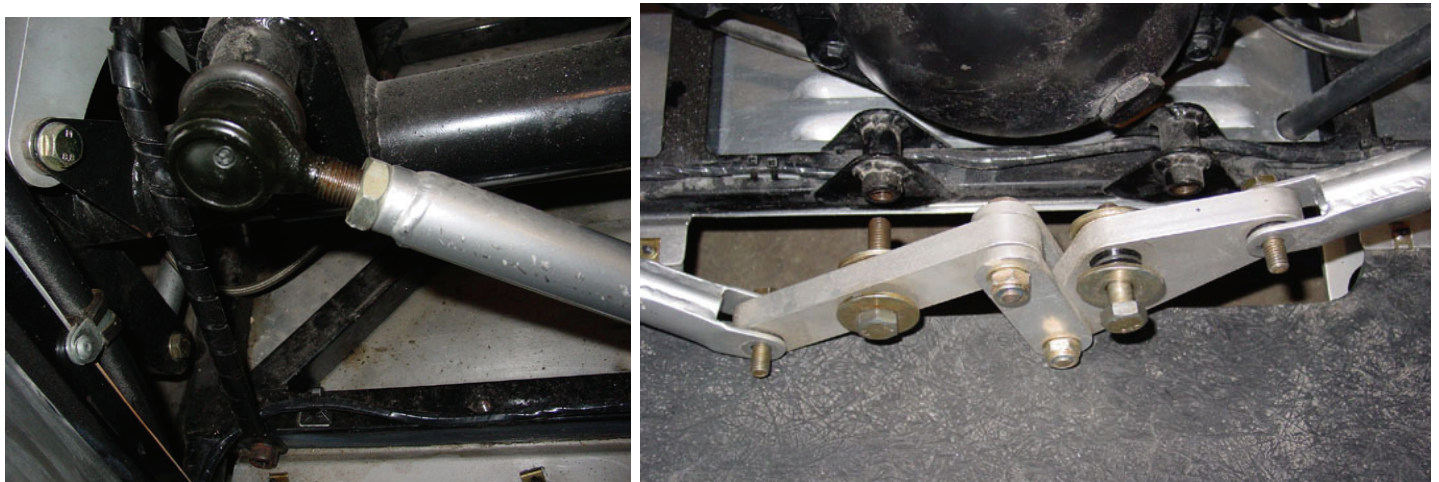
To make the adjustments, the rods shown above will needed to be lengthened. Because of the difficulty in removing the tie rod end, it is easier to unbolt the center pivots to make the adjustments. The above photo shows the wrench sizes needed to performer this adjustment.

2647 MORGAN LANE STATE ROUTE 120 ROSS, OHIO 45013
TEL: (513) 738-4000 FAX: (513) 738-4005

Start by checking and recording the rear tracking. Note: if your link is flipped at this time you must first get the link back in the normal position. To do this remove the 19mm pivot bolt on the left side. With this bolt out the link can be flipped back to the normal position as shown in the last photo on the previous page. Temporarily reinstall the bolt. You do not need to completely tighten it.



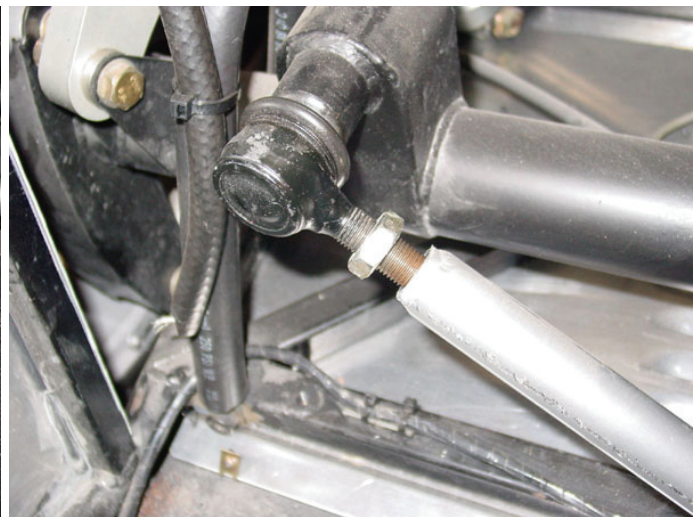
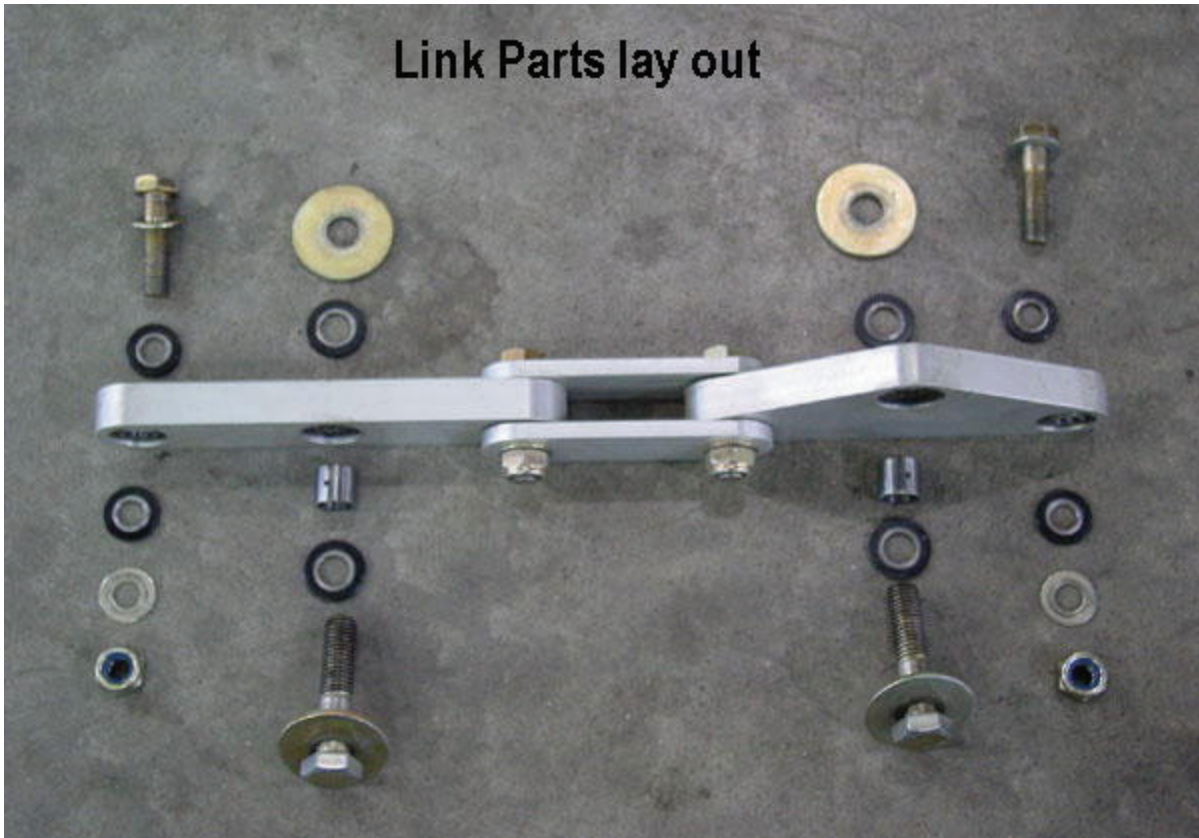
Measure the tracking from the frame to the lower four-link mount. Do this on both sides and write down the lengths. These numbers should be very close but often are not.



You will next need to break loose the lock nut at each rod end shown here in the upper left photo. Remove the nuts from the pivot side of the rods, 17mm. Then remove the two pivot bolts (19mm) pull the links away as shown. Try to keep your hardware all together.

Remove the two link end bolts, 17mm and then move the entire pivot assembly out of the way. You may find that even with your best efforts some small parts will fall off the links. These part will undoubtedly fall out the bottom hole. Therefore it is a good idea to put a rag or box under the hole to catch any fallen parts.

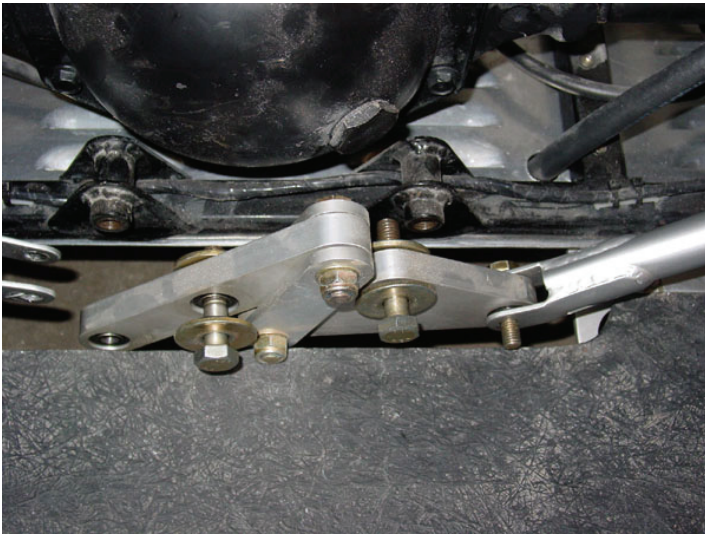
On the next page there is a lay out the shows the parts arrangement.



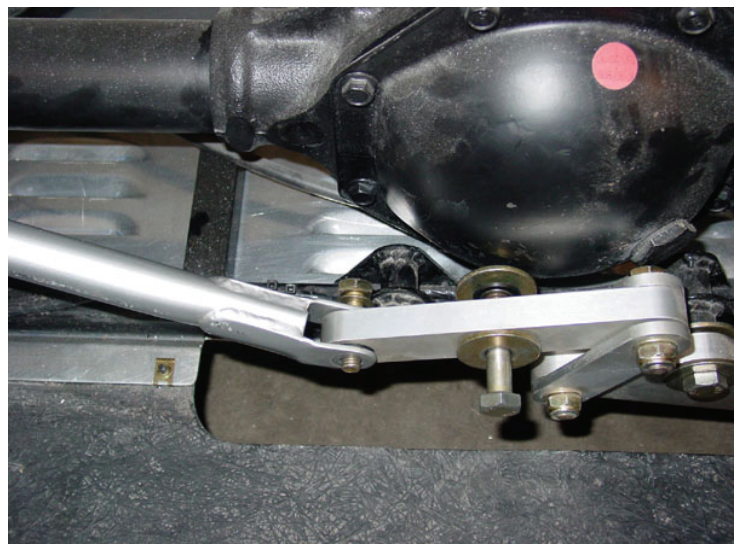
With the link out of the way, turn out the right side rod 10 turns. This is equal to about 9/16". Turn out the left side rod 5 turns. This should keep your tracking about even.

Start reassembly by first installing the bolt for the right side rod. Then the left side rod, 17mm wrench size. Install the two pivot bolts (19mm wrench size). Only completely tighten the right side bolts, leave the left side loose for final adjustment.

Photos of the install procedure are on the next page.



Next you will need to recheck your tracking. If your measurements are not the same, pull the left side pivot bolt only, remove the left side rod bolt then make your final adjustment with the left side rod. *(As shown below right)*

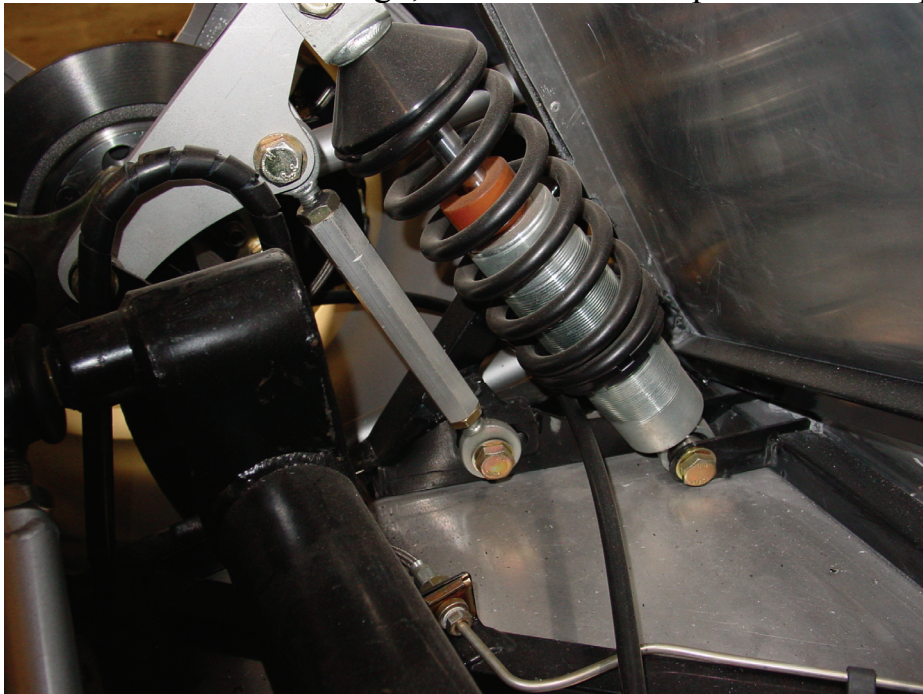


Turning the rod out will move the body to the left, turning it in will move it to the right.

Once your numbers are right, tighten all the bolts and lock nut down. Finally you will want to check the rear ride height. Below is shown a new car with no fuel and no one in the car. This one sets at about 6 ½” frame to floor. Your car may vary with use and a tank of fuel, but ideally it should not be below 5” with a driver and fuel.



If ride height needs to be set, the rear wheels will need to be removed to gain access to the spring seat adjustments under the springs. Spring seat adjustment tools can be bought from Snakebite. Caution: If the car is set too high, the shocks will top out over bumps.



This Information has been researched and written by Mike Evangelo for use by Snakebite Performance and Dynamic Motorsports. Any unauthorized use of this information is strictly forbidden. Copyright© 2002 Any questions about the contents please contact Mike Evangelo at 513-738-4000



snakebite
PERFORMANCE INC

S1 Service Tip: 0201st Decreasing engine heat in the S1 Roadster.

Why the high engine temperature?

The Ford Focus engine used in the S1 Roadster was originally set up to use a transplanted OEM computer system and Catalytic converter. Early on this idea was dropped because of the complexity and cost of using the factory computer. The converter was found to produce under hood temperature of over 400 degrees in the summer, which made the ride more than uncomfortable. We also found that performance of the OEM system was poor to say the least.

The Webcon Alpha systems were chosen for the cost and performance they offered. The converter was replaced with a header for the obvious performance and comfort it produced. Since then we are still left with considerable heat from the engine compartment. Combined with the heat of the summer this heat has caused other problems.

Ford and most manufactures have gone to 195 degree thermostats in the effort to keep there engines running as emission clean as possible. Running at the point of overheating keeps the emissions of hydrocarbons and NOx, down. Along with today's better motor oils, high engine temperature keeps moisture out of the engines, usually associated with short jolt to the mall or other short trip driving common in daily drivers. And of course the factory engine mapping is geared around this operating temperature. As for high performance application, keeping the engine far from melt down is more a concern.

Therefore, after discussing the engine running temperature vices engine temperature mapping with Webcon, we discovered that we could drop the engine operating temperature, and found it works very well.

To do this, the thermostat is changed to a 160 degree and the fan switch sensor is changed to a lower range. Instead of the engine operating at 220-230 degree it will run in the 170- 195-degree range. The cabin temperature on a hot day is also greatly reduced.

Should you lower your operating temperature?

Dropping the operating temperature of your engine is an option you may consider doing, but is not a necessity. Many have complained about the cabin temperature on a hot day, and 50 degrees less heat from the engine makes a huge difference. Just remember this is also 50 degrees less heat on a cool day.

If you are running a system other then the Webcon, lowering the operating temperature can also be an option, as long as the temperature mapping recognizes the engine being completely warmed up by 160 degrees.

If you are running the factory ECU forget it. You are stuck with the 195-degree thermostat. Factory mapping cannot be easily changed and a lower operating temperature will adversely affect the operation.

Other engines besides the Ford Zetec.

I know there are other options out there besides the Zetec engine and those of you running other package may also like a lower engine operating temperature. You can use the following instructions on the fan switch installation. This optional fan switch will bring the fan on at 180 and off at 165. You should find an appropriate thermostat for your engine and check for temperature compatibility with your management system.

Parts and tools needed.

Note: The thermostat used by the factory has a flapper valve used to operate the heater hose bypass. The thermostat we replace this with does not have this and it is not needed since there is no heater core.

The 160-degree thermostat is a Stant #13366 or a Gates # 33196. It is highly recommended that an air bleed hole be placed in the appropriate place on the stat. (See Fig. 1 next page). This hole should be from 1/6 to 1/8 inch in size.

The fan switch or fan temperature sensor is a Beck Arnley part # 201-1545.

Snakebite can supply these parts in a kit for \$39.95 plus shipping. (Note: this price can change without notice.)

The only special tool needed is a 29 mm wrench to fit the fan switch. We have found that an 11/8 wrench can be modified to do the job. You will have to grind the wrench flats to open it up slightly. You may get lucky and get the switch out with an adjustable wrench.



Fig.1

Installing the parts

1. Before you start be sure to disconnect the battery. One wire to the fan switch is always hot and it is easy to short this wire to ground while replacing the switch.
2. Draining the coolant can be a challenge since the S1 has no coolant drain. My recommendation is to start with the fan switch since it is at the lowest part. Loosen the switch and give it some time to

3. **Fan Switch** Get the car jacked up and secure on jack stands or a lift. Remove the bottom excess panel just behind the nose. (See Fig.2)

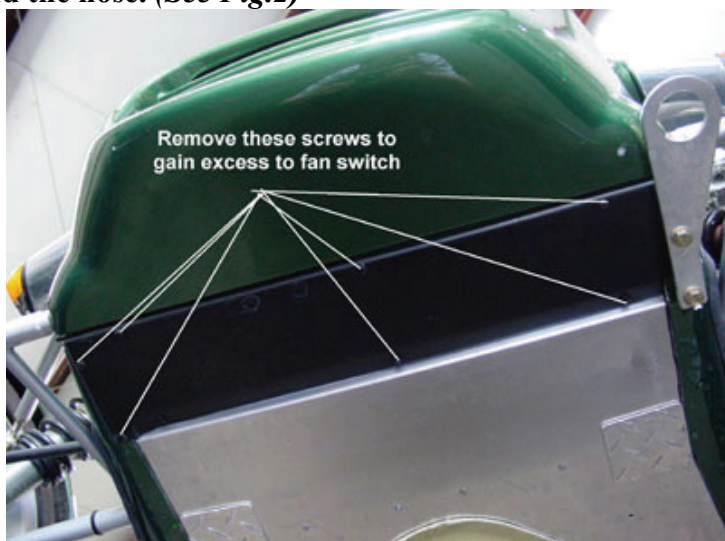


Fig.2

1. Under the cover you will find the fan switch on the right side bottom of the radiator. (See fig.3)

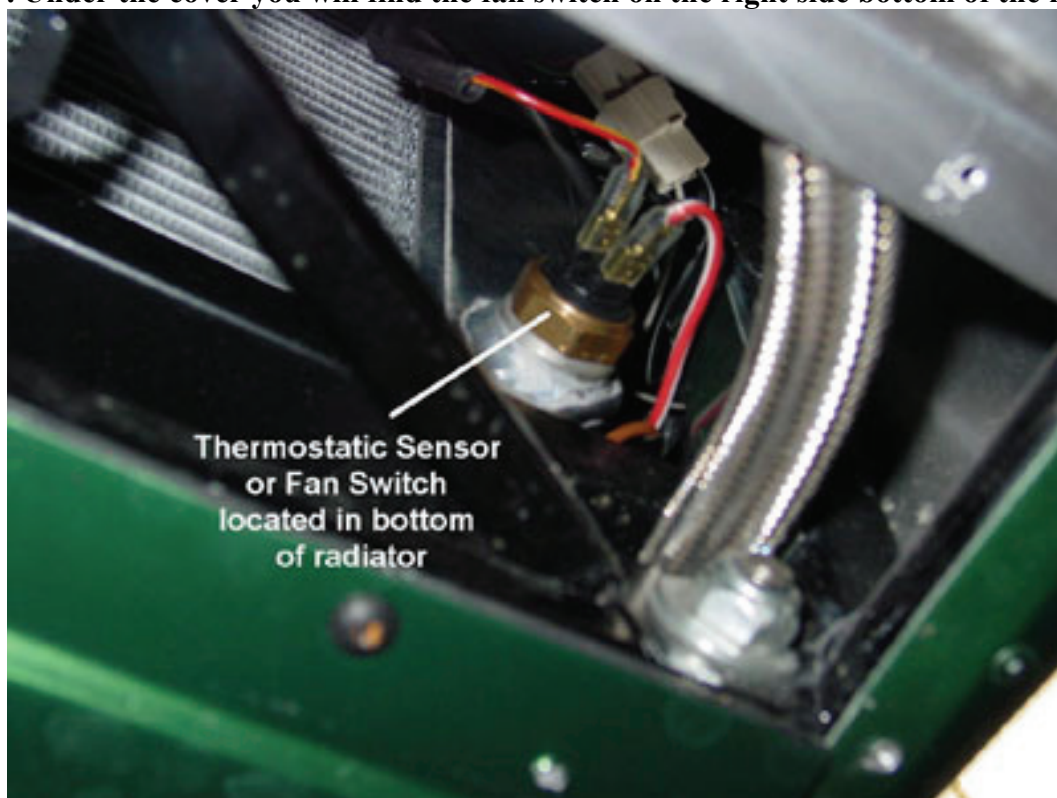


Fig.3

2. Install new fan switch using a 29mm wrench. Reconnect wires and reinstall panel.

Changing the thermostat

1. Remove the small top bleed hose.
2. Remove the three bolts on the thermostat water neck.
3. Move water neck back out of way. (See Fig.4)

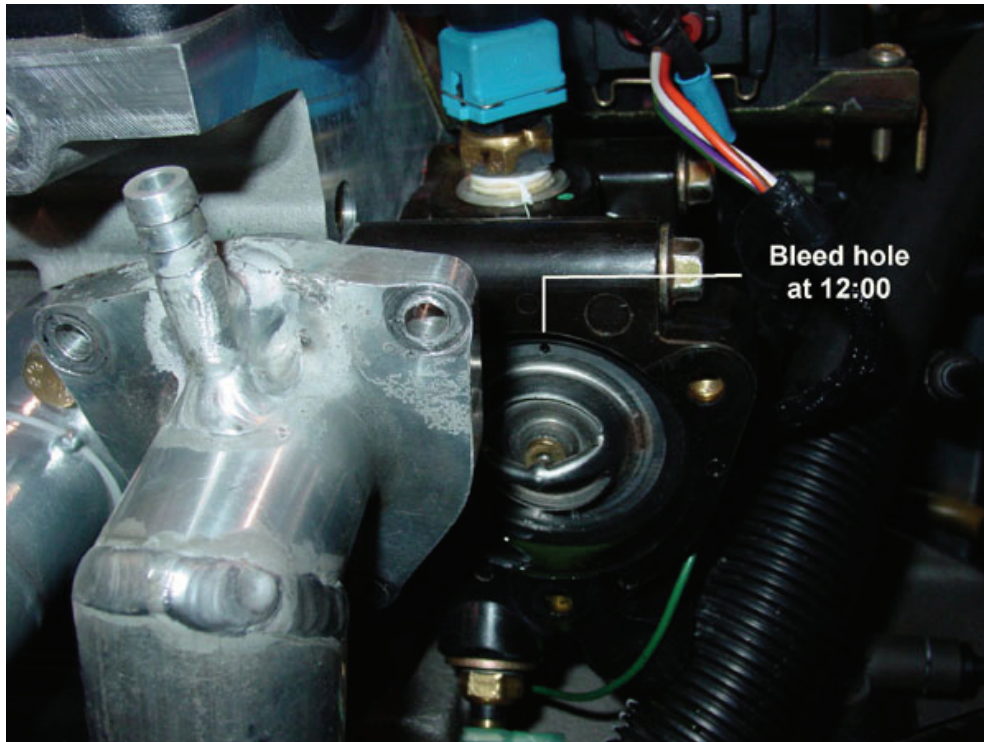


Fig.4

- 4.
5. **Inspect the seal on old thermostat. If it is not damaged it can be reused. (See Fig.5)**

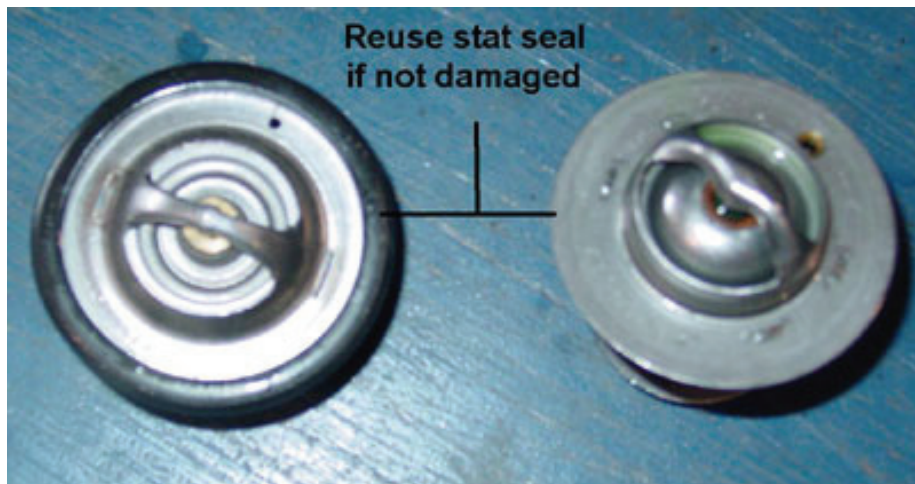


Fig. 5

6. **Install new thermostat with bleed hole at 12:00. (See Fig.4)**
7. **Reinstall water neck and bleed hose fill system and check for leaks. Warm engine up and check fan operation while watching temperature gauge.**

Note: you will notice the fan runs much longer on hot days. This is to be considered normal operation.

This Information has been researched and written by Mike Evangelo for use by Snakebite Performance and Dynamic Motorsports.
 Any unauthorized use of this information is strictly forbidden. Copyright© 2002
 Any questions about the contents please contact Mike Evangelo at 513-738-4000



S1 Service Tip: 0302st Tire and Wheel Guide

Personalizing Your S1

Many S1 owners are looking to personalize their cars with a custom tire and wheel change. Information in this document is designed to help the S1 owner choose a tire and wheel combination that suites them. Any mix of tire and wheel brands can be used depending on your personal preference. The important thing to note here is the sizing and dimensions. Take this tip sheet to your local tire dealer or use it to help you understand question they may ask you.

Basic wheel dimension explanations

If you call a wheel shop or tire store they will ask you some specific dimensions of your wheel. Use the illustration below to help you decipher what they mean.

To Determine Offset: Rim width + flange thickness on both sides, divided by 2 = centerline or zero offset. Then subtract backside measurement = positive or negative offset.

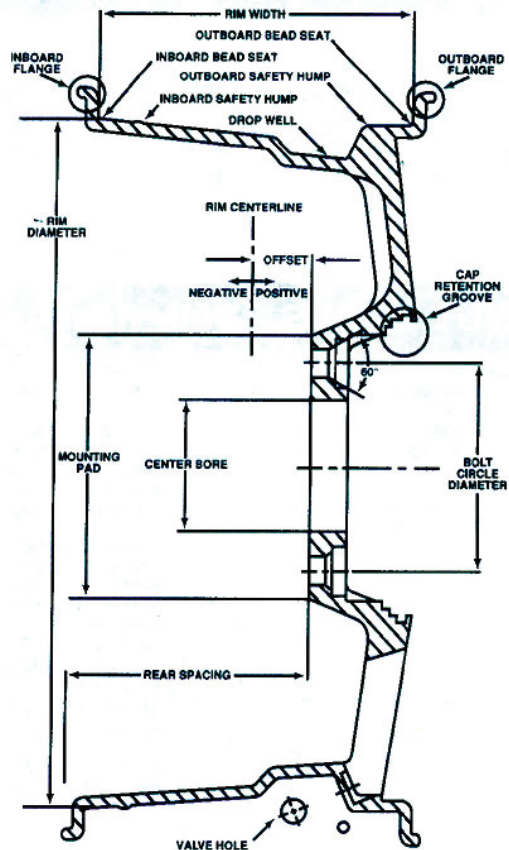
Example: 7" rim width + 1/2" + 1/2", divided by 2 = 4".
Backside of 3.75 - 4" = 1/4" negative offset

To Convert Millimeters to Inches: Divide by 25.4.

Example: 100mm divided by 25.4 = 3.937

To Convert Inches to Millimeters: Multiply by 25.4.

Example: 4.750" multiplied by 25.4 = 120.65mm



2647 MORGAN LANE STATE ROUTE 120 ROSS, OHIO 45013
TEL: (513) 738-4000 FAX: (513) 738-4005

The basic dimensions of the factory S1 wheel are as follows.

Diameter	15 inches
Width	7 inches
Mounting pad	5-½ inches
Center Bore	2.85 inches
Bolt circle diameter	4 ½ inches
Rear spacing	5 ¼ inches
Offset	1 ¼ inches negative

On the S1, most of these basic dimensions will need to stay the same. Only wheel diameter can change. The S1 can be fitted with 15" 16" or 17" wheels as long as the tire size is proportioned correctly.

Tire Sizing

Looking at the stock S1 tire sizing **205/50VR15**, the following will help explain what the numbers mean.

Tire Width

The **205** is the width of the tire in millimeters (mm), measured from sidewall to sidewall. Since this measure is affected by the width of the rim, the measurement is for the tire when it is on its intended rim size.

Aspect Ratio

This number tells you the height of the tire, from the bead to the top of the tread. This is described as a percentage of the tire width. In our example, the aspect ratio is 50, so the tire's height is 50 percent of its width, **or 176.25 mm (.50 x 205 = 102.5 mm, or 4.03 in)**. The smaller the aspect ratio, the wider the tire in relation to its height

Tire Construction

The **R** designates that the tire was made using radial construction.

Rim Diameter

This number specifies, in inches, the wheel rim diameter the tire is designed for.

Calculating the Tire Diameter

Now that we know what these numbers mean; we can calculate the overall diameter of a tire. We multiply the tire width by the aspect ratio to get the height of the tire.

$$\text{Tire height} = 205 \times .50 \text{ percent} = 102.5 \text{ mm (4.03 in)}$$

Then we add twice the tire height to the rim diameter.

$$2 \times 4.03 \text{ in} + 15 \text{ inches} = 23.06 \text{ in (585.7 mm)}$$

This is the unloaded diameter; as soon as any weight is put on the tire, the diameter will decrease.

Tire and Wheel combinations

With all the basics covered, here is a simplified chart showing known and suggested tire wheel combinations that could be used on the S1 Roadster.

Front

Wheels	Tire Size	Tire Height	Tire Width
Stock 15"x 7"	205/50VR15 Use on newer S1	23.1"	8.1"
Stock 15"x 7"	195/50VR15 Used on first few S1	22.7"	7.7"
Custom 16"x 7"	215/40ZR16	22.8"	8.5"
Custom 17"x 7"	205/40ZR17	23.45"	8.5"

Some adjustment of the front fenders may be needed with the use of the 17" tires.

Rears

Wheels	Tire Size	Tire Height	Tire Width
Stock 15"x 7"	205/50VR15	23.1"	8.1"
Custom 16"x 7"	225/50ZR16	23.1"	8.9"
Custom 17"x 7"	215/40ZR17	23.7"	8.5"
Custom 17"x 7"	235/40ZR17	24.4"	9.3"

Width is at a minimum on the rear height is not. 235/40ZR17 may contact the 4 link bars under hard cornering on some cars.

Sources

If you would like a complete explanation on tire sizing and construction I recommended a visit to <http://www.howstuffworks.com/tire.htm>

For a comparison on wheels and tires pricing visit <http://www.tirerack.com/index.jsp>
1-888-541-1777

or <http://www.1010tires.com> 1-888-825-MAGS

Special thanks to Eric Beck, S1 owner, for his research on the tire and wheel combination chart.

This Information has been researched and written by Mike Evangelo for use by Snakebite Performance and Dynamic Motorsports.

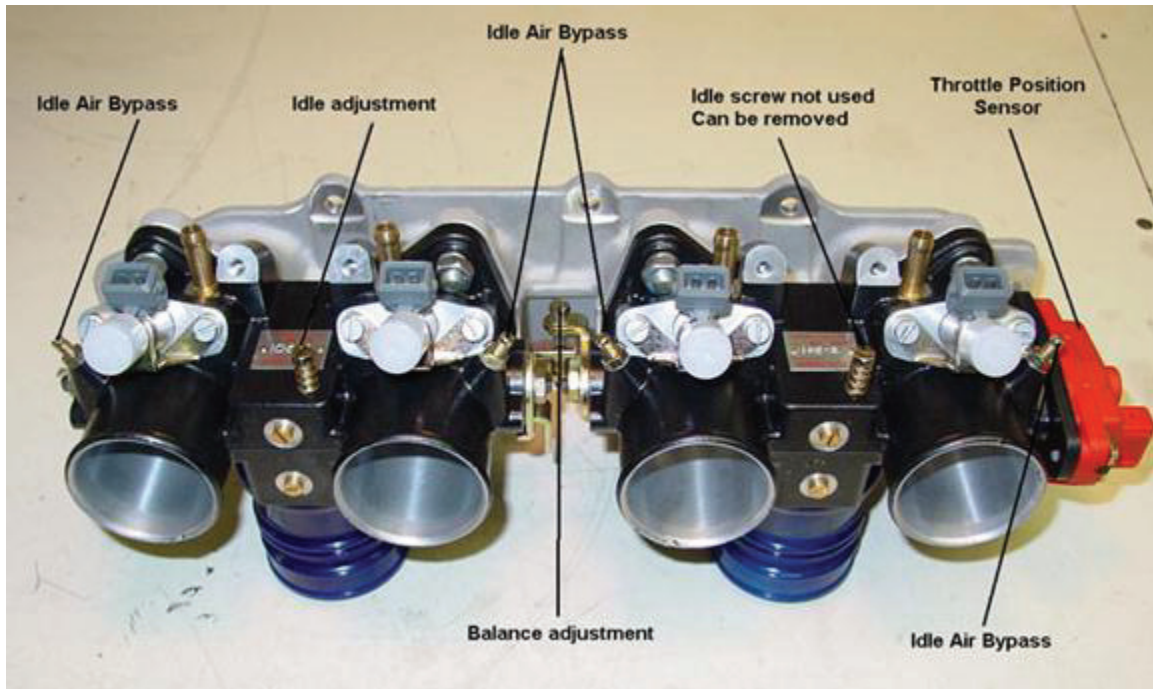
Any unauthorized use of this information is sticky forbidden. Copyright© 2003
Any questions about the contents please contact Mike Evangelo at 513-738-4000



S1 Service Tip: 0303st Details on adjusting the Alpha K20016 Multi Throttle Bodies:

Multi throttle bodies require an airflow balance adjustment the same as multi carburetion systems. This is critical to the basic operation of the system. The only special tool needed to perform this task is an air flow meter or Synchronometer. This tool is relatively inexpensive and is necessary to do an accurate adjustment. You can purchase a Synchronometer from Snakebite or from Standard Motor Products Europe Ltd (Webcon) in England.

Which screws do what:



Familiarize yourself with the adjustments on the throttle body assembly.

1. **Idle Adjustment (rear T.B.);** Use this screw to set idle speed.
2. **Idle screw (front T.B.);** See setting procedure detailed on page 3 of this instruction
3. **Balance Adjustment;** Used to balance airflow from front to rear throttle body.
4. **Idle Air Bypass;** Used to increase airflow on one individual throttle to balance airflow. This is pre-set at the factory and should require only minor adjustment. Follow the procedure on page 3 of this instruction.
5. **Throttle Position Sensor;** The sensor is pre-set at the factory and should not require adjustment.

Note: Should adjustments to the throttle position sensor be necessary, a re-set procedure is detailed on page 4 of this instruction.

Rough Settings:

Before starting you can rough set the adjustment to make balancing the throttles and initial start up easier.

1. Make sure all the air bypass screws are seated before balancing. You will only need to use these screws if there is difference in airflow between throttles on the same body.
2. To rough set front to rear balance. Start by turning out the idle adjustment screw till throttles can be completely seated. Hold the rear throttle blades shut, compressing load plunger under balance screw. Turn in balance screw until it just contacts the balance tap on rear throttle lever. (Fig.1)

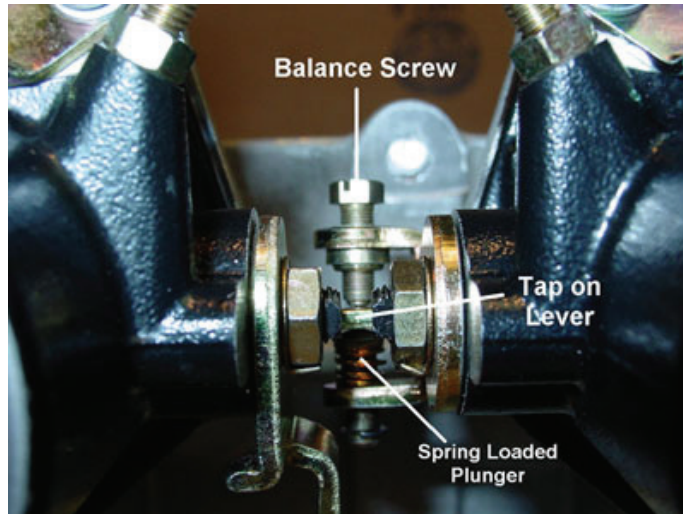


Fig.1

Balancing throttle bodies:

Start engine and warm it up to normal operating temperature. You may need to reset idle speed several times to keep it around 1000 rpm during warm up. Use the rear idle screw to set idle, the front screw should be backed out for now. See setting procedure detailed on page 3 of this instruction.



Fig.2

1. Using the Airflow Synchronometer, balance the front throttle assembly to the rear throttle assembly using the center balance screw. (Fig.1) Re-check idle rpm. Set if necessary.

2. Now pick a throttle assembly, front or rear. Check airflow at each throat. If a slight difference exists, first ensure that the idle by-pass screw (*Fig.3*) on the throat with the highest reading is closed; if slightly open (factory set) this may correct any slight imbalance. If the by-pass screw on the throat with the highest is already closed, open the by-pass screw on the throat with the lower reading to achieve the same airflow reading on both throats.

Where necessary repeat the above procedure on the remaining throttle body.

Important: When making any changes to the idle air by-pass screw factory settings, one by-pass screw on each of the two throttle bodies must remain closed.

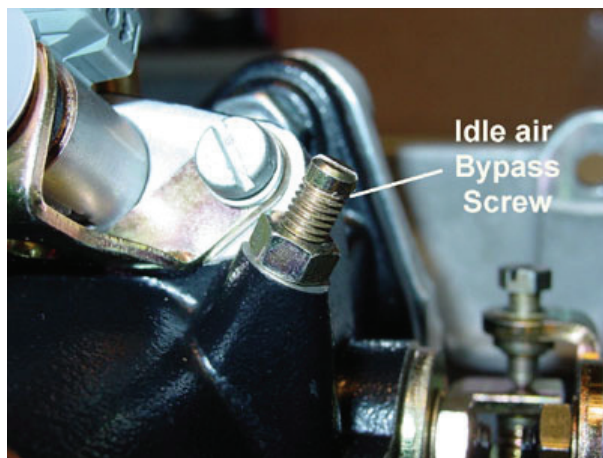
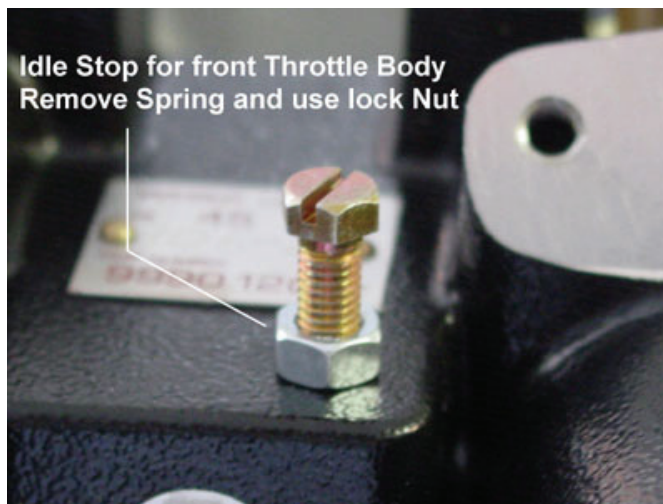


Fig.3

3. Recheck balance of front and rear assembly and set if necessary.
4. Finally, you will need to set the idle and check Throttle Position Sensor (TPS) voltage. Connect a voltmeter positive lead to pin 2 on the TPS plug (purple/blue wire). Connect the negative lead to a good ground. With the engine running, set idle in the range of 850 to 1000 rpm. The voltage should correspond closely to the rpm as follows. {850 rpm-.835 m volts / 1000 rpm-.973 m volt}
5. If you would like the O2 sensor to control air/ fuel mixture at idle, you will need to set the TPS voltage over 1 volt (1.01-1.035 recommended range). Set under a volt, the fuel mapping controls fuel mixture.
Note: If you experience idle surging during warm up you will need to recheck the idle voltage. If it is set to high, over a volt, it can cause the surging.

Idle Screw Adjustment (Front) Throttle Body

The idle screw on the front Throttle Body can be used as a stop to help stabilize the throttle shafts. To do this remove the spring and install a nut to use as a lock down. *See photo below.*



After Idle is set you can run this screw in till it just touches the throttle stop (do not increase idle) then lock down the nut.

Throttle Position base voltage settings:

TPS voltage is pre set at the factory and in most cases will not need adjusting. If you find that the above voltage reading does not closely correspond to the engine rpm it may be necessary to check the TPS base voltage. Check base voltage as follows. Connect voltmeter as mentioned above.

1. Back idle adjustment screw completely out. Make sure accelerator cable is not holding throttle blades slightly open. You may even have to back off balance screw to completely close blades on front throttle body.
2. Turn key on, but do not start engine. Check voltage with blades completely closed. Voltage should be .950 m volts or very close.
3. If adjustment is needed loosen screws on TPS and rotate sensor to achieve .950 m volts setting.
(See fig. 4)

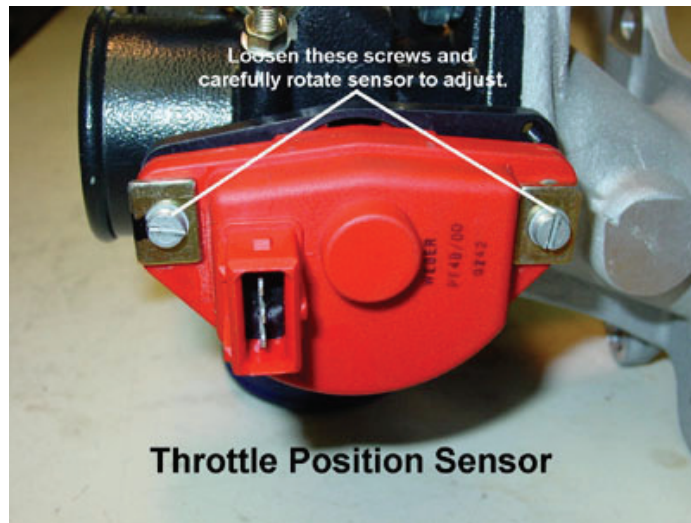


Fig.4

4. You will now need to start over, rebalance the system and reset the idle.

Throttles sticking when hot causing high idle.

If you experience a high idle when the engine is hot and this is tracked down to the throttle bodies, it is recommended that the throttle blades be re-centered hot. Caution this will need to be done on a hot engine use care to avoid being burned.

1. To do this, warm the engine completely.
2. Let the car hot soak with hood on and engine off for 5-10 minutes.
3. Remove hood and air cleaners.
4. Back off both idle stop screws
5. Back off all throttle plate screws approximately a ¼ turn. Don't back off much more than this, screws are staked and could break.
6. While holding throttles closed tightly, tighten all of the plate screws
7. Re-set idle and check for further sticking.

This Information has been researched and written by Mike Evangelo for use by Snakebite Performance and Dynamic Motorsports.
Any unauthorized use of this information is strictly forbidden. Copyright© 2003
Any questions about the contents please contact Mike Evangelo at 513-738-4000



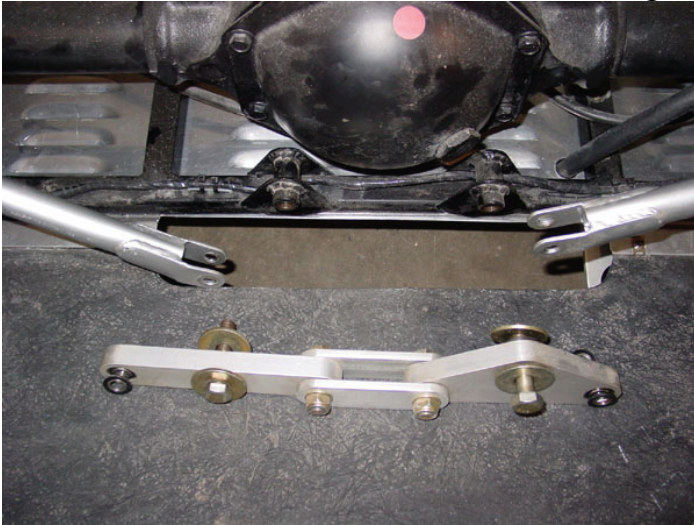
snakebite
PERFORMANCE INC

S1 Service Tip 0404st: Munford Link Support Plate

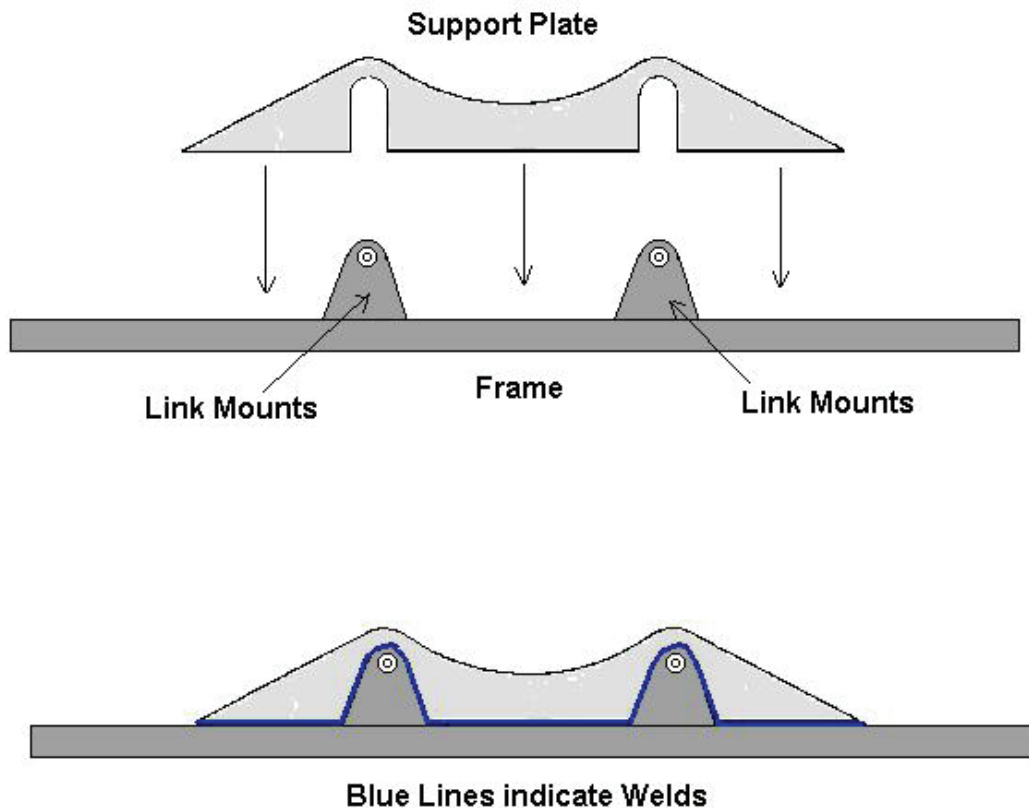
This reinforcement plate can be added to stiffen the S1 Munford link mounts. This area of the frame can be under high stress loads during racing and high speed cornering with race tires. Adding this plate is meant to distribute this stress over a wider area and keep flexing to a minimum. This plate is recommended addition to cars being raced on a regular basis. This installing will require a steel plate to be welded to the frame. This should be done by a competent welder, fabricator.



On the last page of this service tip you will find a drawing with measurement that can be used to fabricate this plate. This plate should be made from standard 3/16" thick flat steel stock. Remove the Munford link and clean all the paint off the frame where it will be welded.



The brace has been designed to slip down over the Munford link mounts and contact the horizontal cross frame.



This brace should be welded as indicated above on the front and rear side where possible. Repaint area and reinstall the link.

This Information has been researched and written by Mike Evangelo for use by Snakebite Performance and Dynamic Motorsports. Any unauthorized use of this information is strictly forbidden. Copyright© 2004 Any questions about the contents please contact Mike Evangelo at 513-738-4000

