Factory Five Racing

Assembly Manual

Type 65 Coupe

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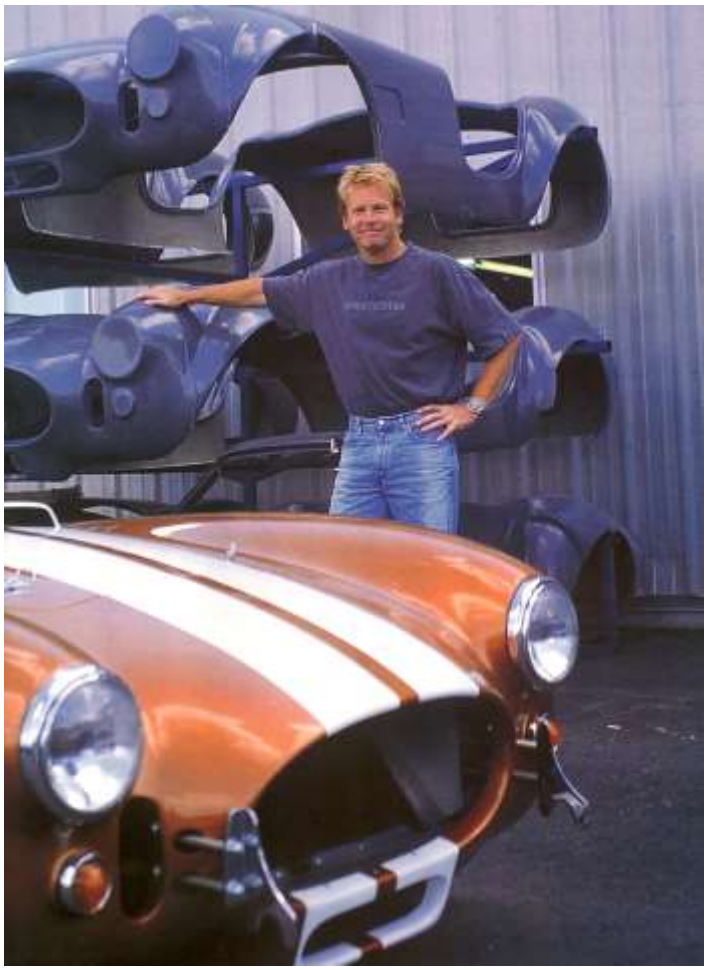
Chapter 1

General Information

Foreword



If you are reading this, you are are embarking on a embarking on a on a mission to build your own car, or at least considering doing so. I wanted to share with you some of my experiences and lessons learned while working with literally thousands of people who have completed this undertaking with us. The lessons learned here are important and will hopefully help with your decisions as well as with the project and the completed car.

First of all, the idea of building your own car is NOT for everyone. It is a serious endeavor that should be undertaken with care and consideration. The desire to build your own custom car goes way back. It is part of our uniquely American car-centric culture, and those who build their own cars are at the very center of this. Since the earliest days of Hot Rodding, literally tens of thousands of people

have built their own cars. Even more have done restorations and major customizations to existing cars. As fun as this project is, a person should be candid about their abilities turning a wrench. This is not a place for novices. That is even truer in racing, where danger and risk are part of the very definition of always trying to go faster. The late Carroll Smith wrote something I really loved that speaks to this point.

"There is no magic! The one basic truth of successful racecar preparation bears repeating. There is no magic. There is only logic, common sense, forethought, vast amounts of hard work, and a fanatic dedication to the task at hand".

Carroll Smith

"Prepare to Win"

I can't think of anything more appropriate to say about the right way to approach the serious work of building your own car. Carroll passed away not too long ago, but his accomplishments behind the Ford Lemans victories and his contributions to the motorsports community continues in his writings that are all at the top of my list of recommended readings for the car builder or racer.

After being honest about the skills, responsibility, and dedication required to build a car, I feel the need to talk about the PROCESS of building a car in an equally candid manner.

The process of building a car is a lot like the process of having kids. As a matter of fact, it's absolutely the best analogy I can find (apologies in advance to all of you without kids, try and bear with me). Both things are easy to get started. With a car project you order a manual, talk to car guys, get all excited over glossy photos and perhaps order a kit from us. With the whole pregnancy thing, well for most folks that's even easier to get started…

When my wife was pregnant with our first daughter I was sure we would never have any more children. From the swollen ankles to the morning sickness, to the delivery room scene from the movie "Alien", the whole process was difficult, and while she didn't complain too much thru the nine months, it was obviously hard work. Another thing, she wouldn't have been the best salesman for others considering getting started on the baby thing.

When it comes to the car project, once the kit arrives and the process begins it is much the same as pregnancy. Frankly the degree to which a person breezes thru the project or languishes is commonly a factor of skill, but still, building a car for anyone is a tough job and there are inevitably issues. How many times have you gotten the wrong part at

NAPA, gotten home to realize the alternator has a six ribbed pulley not five…? You will meet challenges building this car and you will be frustrated at times. Thankfully there are internet discussion forums where you can vent your frustrations and complain about the idiots who designed this kit. We smile when reading these posts because we know that while the pregnant woman complains, the mother loves her children in an unreasonable and perhaps even undeserved way!

All the way thru the process, as you build your car, the seasoned guys at Factory Five in tech support will help you. The larger community of Factory Five customers will also be there for you, as the one thing that really sets us above the crowd of other companies is the size, competence and enthusiasm of our customer community.

When the baby arrives and when your car is done, there will still be more work. With babies, it's up all night, diapers, and strange maternity contraptions that men don't speak of in the light of day… With the car it will be other challenges. Registration and licensing can be frustrating and laws vary from state to state. A wrench dropped from 25 feet away will inexplicably shoot sideways into any freshly painted surface and my favorite was my own engineers who felt the need to test out how long an 8.8" rear diff can run on a track without gear oil (answer, about three laps before deciding to stop moving).

There will be highs and there will be lows, but in the end, there are few parents who don't treasure their children more than life itself, and there are few Factory Five owners whose lives remain unchanged by the experience and the artwork they have crafted.

It's one of the greatest experiences in the world to raise children. It's also one of the most rewarding things I know to build your own car. Even today at car shows, open houses, and events wherever Factory Five cars are found, I smile to hear the inevitable first words every guy says to me… "Let me show you what I've done".

The cars that we build are more than cars. They are a reflection of us. The badge of honor that comes with having built your own car is a special one indeed. You will join a community of others who have earned their own… and THAT is the story of Factory Five Racing and that is what awaits you in this process.

David Smith
President

Safety Notice

While there are many things to love and be proud of in our country today there are a few things that we wish were different. With regret and a small amount of resentment we include the following warning and statement of non-liability at the advice of men with soft hands and necks the size of pencils.

Motorsports involves the operation of machines and materials near the limits of performance. Racing involves an inherent amount of risk. Any decision to proceed in the project of building one's own racecar must be made with the acceptance of personal responsibility. If, while building, driving or racing this Factory Five Racing kit, should you become injured or die, it will be the result of your own conscious decision and we at Factory Five Racing, Inc., disclaim any responsibility of any kind.

The procedures and recommendations contained in this book are to be used as a guide with the ultimate determination of safe construction and race-worthiness to be made by you. If you feel uneasy about whether you have the skills to build your own vehicle, DO NOT PROCEED. This project involves building a car from the bare frame all the way up to a finished vehicle. It is intended for individuals who have the skills and abilities commensurate with the scope of a project of this magnitude.

This kit is only a collection of parts designed for use primarily as a race car. Factory Five Racing does not build completed or partially completed vehicles. You are responsible for ensuring that the vehicle you build complies with all Federal, State and local laws regarding its use. Except as may be specified in writing, Factory Five makes no warranties, expressed or implied, on the products (parts, or kits) offered for sale. All implied warranties of merchantability and fitness for a particular purpose are expressly disclaimed by Factory Five.

While Factory Five products are thoroughly tested under actual race conditions, Factory Five cannot control the quality of the installation or application of these products. The products offered for sale are true race car components, the installment of which often requires considerable time and fabrication skill. Before attempting any installation or assembly, the purchaser should determine the suitability of the product for the intended use, the time, and level of skill necessary for correct installation or assembly.

Factory Five does not make any warranty, expressed or implied. Purchaser expressly ASSUMES THE RISK of all personal, property and economic injury, damage or loss, either direct or indirect, arising from the use, misuse, or failure to determine the appropriate use of any Factory Five product.

Safety Tips

- Read the manual. It is at least a good guide and place to start.
- Don't take short cuts.
- Before starting work, make sure you have the proper tools, the required parts, and sufficient space for the job. If you damage any parts, it will probably be because they were either not stored properly or, the wrong tool was used to install them.
- Don't work when you're too tired or upset. The car you will be building is capable of supercar levels of performance, and your life depends on the quality of your workmanship.
- Never work under a raised car unless it is well supported by stands intended for that purpose. Never work under a car supported by a jack.
- Always observe good safety practices such as the use of eye protection, protective clothing, and gloves.
- Keep the battery disconnected whenever you work on fuel or electrical systems and always keep a fire extinguisher handy.
- Don't allow children in the work area.
- Partially assembled cars attract a crowd. Keep garage doors closed or mark off work areas.
- Make sure that all electrical equipment is grounded. If working alone, have someone check on you periodically.
- When using an engine hoist, make sure that the working load rating is correct for the weight.
- Work in a well-ventilated and well-lighted area.
- Use portable safety lights for under-carriage work. Never use an exposed bulb type light.
- Be mindful of the environment. Avoid spills of solvents or engine fluids. If a spill occurs, clean up immediately and dispose of it in hazardous waste containers
- Never let a friend or someone else drive your car.
- Always wear your harnesses.
- Clean your build area after each assembly is completed. This will speed your build process as it ensures that you know where your tools are and prevents tripping injuries.
- It is impossible to anticipate all of the possible hazards. Care and Common Sense will prevent most accidents

How to use This Book

This Assembly manual is intended to help you build your Factory Five Kit. This book will not explain such things as engine or transmission building. A secondary purpose of this book is to use it as reference for owners that want to do maintenance work on their cars or for those that purchase finished cars, to understand their cars better.

This manual was written with the average weekend mechanic in mind. It is best to follow the manual step by step but if there is a part missing from the kit move to the next section and come back to it late when the part is available. If the instructions are followed then the resulting car should be a great handling sports car.

ICON KEY
Valuable information
Tools needed
Parts Needed

We have included an Icon key as the beginning of each section that contains useful information for each assembly that details the tools needed for that assembly, what assembly in the kit parts are packaged in that are needed for that step and any useful information or warnings.

There are differences between the base kit which uses Mustang suspension pieces and the complete kit which uses FFR spindles and other new parts. Please keep this in mind when assembling the kit.

What You Get

The Factory Five Coupe kit gives you everything you need to build your car, in one big package. We include everything from the frame, body, complete interior, and all trim down to the smallest details like correct fasteners, brackets, and badges. We make it easy for you to use the engine of your choice with a list of available exhaust and motor/trans mount choices (no charge). For a complete packing list, see the Appendix.

Frame: Complete jig-welded original style 4" round tube frame. 95" wheelbase chassis. Includes all mounts ready to accept small block Ford 302 and 351 engines and Ford running gear from 1987-1993 Mustangs.

Body: Hand laid 3/16" laminate composite body and panels made with vinyl ester resin.

Chassis Aluminum Panels: 20 Laser cut, pre-formed 6061-T6 aluminum panels for cockpit, and engine bay. 1200 pre-packaged rivets.

Front Suspension: Tubular upper control arms, Upper Ball joints, Koni™ brand high performance mono-tube, rod-end shock absorbers, Custom Spindle Adapter brackets.

Rear Suspension: Traction Lok brackets, and fasteners to mount your Mustang 8.8" solid axle.

Brake/Fuel lines: Pre-flared brake and fuel lines, ($^{3}/_{16}$", ¼" and $^{5}/_{16}$") fasteners to use OEM Ford Mustang fuel tank and system. Includes polished vintage Aston Lemans style flip top gas cap, integral modern fuel pressure cap and adaptor kit.

Steering parts: Steering adapter kit to utilize Mustang steering rack includes upper shaft, pillow block bearing, flange bearing, fasteners, nickel plated lower steering shaft, 14" wood steering wheel w/ polished aluminum mounting boss and ceramic Factory Five Badge.

Cooling System parts: Electric cooling fan and mounting hardware, stainless Steel radiator hose kit incl. adapter kits, Radiator, inline filler neck, overflow tank and 185°F thermostat fan control switch.

Engine/Exhaust parts: Kit comes with alternate drive pulley assembly, oil filter relocate kit, and exhaust assembly to adapt Mustang engine and headers to vintage side exit exhausts.

Gauges and Dash and Electrical Assembly: Kit parts are included to adapt the Mustang wiring harness. The kit comes with components to build your car with an authentic original street style dash. Complete assembly comes with aluminum dash, toggle switches and indicator lights, gauges and horn button.

Interior Accessories: Authentic style Coupe bucket seats, black vinyl w/fasteners, 5-point Simpson Brand harnesses, Emergency brake boot, High-quality fabric headliner, Interior rear view mirror w/fasteners, Stainless steel shifter handle, shift knob, boot, polished ring and fasteners.

Exterior Accessories and Lighting: DOT approved windscreen, License plate light and bracket, Ceramic Factory Five nose and tail badges, turn signals, and tail-lights, DOT approved headlights, side mesh, DOT approved glass rear hatch.

Assembly Manual: Bound assembly manual that is full of pictures and diagrams.

Fasteners: Over 1500 top quality zinc plated, chrome and stainless steel fasteners, numbered and packed individually by assembly.

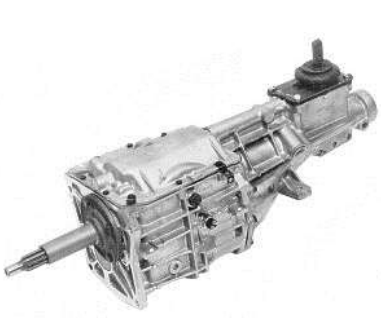
What You Need

For a complete check off list see the Appendix.

Major Components

Engine: Small block Ford 289/302/351 engine.

Transmission: T5, Tremec TKO or T-56 (See the Transmission prep section for more info)



Driveshaft: 1987-1993 Ford Mustang.

Rear End: 1987-1998 Ford 8.8" rear axle. 1987-1993 width is optimal

Paint: Most customers will send out the body and paint work to a professional body shop.

Steering Rack: 1987-2004 Ford Mustang.

Fuel tank/pump and filter: 1987-2004 Ford Mustang.

Electrical: 1987-1993 Ford Mustang chassis and EFI harnesses with sensors, computer, ignition switch and turn signal stalk.

Brake parts: 1987-2004 Ford Mustang pedals, master cylinder, Front spindle and brake assemblies.

Battery: We recommend a battery sized for a Ford Mustang.

Wheels and Tires: See the appendix for complete recommended sizes.

Serial Number Identification

Factory Five Racing has included a Certificate of Origin along with a Nameplate for your kit. The serial number from the Certificate of Origin matches the number engraved on the 2"x 2" tube going across the car at the front of the cockpit. Below is an example of how the nameplate looks. The VIN number space is provided so that your state issued VIN number can be engraved if you so desire. This can be engraved at any Trophy or mall engraver.

Optional part Instructions

Part instructions for all Factory Five parts and options can be found online at:

www.factoryfiveparts.com/instructions/

Tools List

The following lists detail the tools and supplies that are needed to build your kit. The "helpful" items are not crucial to the assembly but make life easier. Home Depot HUSKY®, Sears CRAFTSMAN®, and Snap-On® tools are all guaranteed for life and we've found them to be more reliable over discount tools.

Storage shelves for kit and running gear parts
Body storage area (can be outside)
SAE and metric socket set, a 52-piece set that includes an 18mm is a good choice
Deep sockets for some common sizes are helpful.
SAE Combination wrench set ($^{3}/_{8}$" – $^{15}/_{16}$")
Metric combination wrench set (10mm – 18mm)
Full set of standard and Phillips head screwdrivers
Standard Hex key set
Long nose pliers, 4.5"
Snap ring pliers
Pop rivet tool with $^{1}/_{8}$" and $^{3}/_{16}$" heads
Drill
Drill bits ($^{3}/_{32}$", $^{1}/_{8}$", $^{9}/_{64}$", $^{3}/_{16}$", $^{7}/_{32}$", $^{5}/_{16}$", $^{7}/_{16}$", ½")
Caulk gun
24 oz. Plastic Dead Blow hammer
Razor knife
Wire stripper/crimping tool
⅞", 1¼" and 2¼" hole saws (Body cut outs)
Bench top vise
Tape measure or straight edge ruler/T-square
Hydraulic floor jack
Work Bench or 2 Saw horses with 4'x 8' ¾" Plywood Top
Engine hoist
Spring compressor (Mustang disassembly only)
6' $_{5}/_{16}$" chain (to lift engine)
4 Jack stands
Hack saw (metal blade)
¼", $_{5}/_{16}$" Fuel/brake line bender (hand held)
Jig saw (Body cut outs)
Torque wrench (Click style, ⅜" drive)
Bucket
Eye protection
Gloves
The thing between your ears

Required Supplies

Stick with name brand products like Eastwood®, 3M®, and Duplicolor®. The Eastwood brand coatings are great for bringing weathered and oxidized parts up to show quality. PPG brand and DuPont brand paints are excellent.

_____ Engine degreaser
_____ Silicone Door and window sealant, GE Silicone II or equivalent - 4 tubes
_____ Coolant – 2 gallons of concentrate
_____ Engine oil, 10W-30 – 5 Qts
_____ Gear oil, 80W-90 (for rear end) – 2 Qts.
_____ Transmission fluid, Mercon automatic Trans fluid – 4 Qts.
_____ Brake fluid, DOT 3 – 1 Qt.
_____ Oil filter
_____ Fuel filter
_____ Battery
_____ Spark plugs
_____ 5 minute epoxy glue
_____ Black permanent marker with pointed tip – 2 ea.
_____ 2" Masking Tape – 1 roll
_____ Duct tape
_____ Electrical tape
_____ Bodywork supplies
_____ Rags
_____ Gojo® pumice hand cleaner
_____ Spray paint (for donor parts, pick a color)
_____ Acetone, carburetor cleaner, or other solvent
_____ Aluminum polish/cleaner
_____ 3M Super 77 spray adhesive – 1 large can

Helpful Tools

_____ #8 hex driver attachment for cordless drill
_____ Adapter for cordless to use ¼" socket driver
_____ Wire brush or wire wheel attachment for drill
_____ Flare nut wrenches (⅜" x 7/16")
_____ Flat file and round file
_____ Scissors
_____ Aluminum snips
_____ Friends
_____ Pizza and beer for previous line item

Chapter 2

Donor Parts and Prep

This chapter deals with the Mustang parts needed in addition to our kit. Many people choose to use parts from a single Mustang donor. If you are not going to use a donor car but choose to acquire parts separately, this section may still be useful. The complete list of parts required to build the FFR Coupe is included in the Appendix of this manual. For specifications on the different year cars, check out the "Mustang Specifications" Appendix.

The 5.0L Mustang

In 1987, the 5.0L Mustang started a modern muscle-car revolution. For slightly more than $10,000 the average Joe could pick up a brand new 225 hp car that weighed in just over 3000 lbs. (in LX trim). Since its introduction, virtually every enthusiast magazine has hailed the 5.0L Mustang as the best speed bargain of the decade. It had performance numbers of six seconds 0-60 and a quarter mile time in the 14's right off the showroom floor. This factory hot rod came with stainless tubular headers, a five speed transmission, a big 8.8 inch ring and pinion, limited slip rear end, 11" front disc brakes and much more... all standard! The 5.0L Mustang literally created a multi-billion dollar aftermarket in less than five years because of the great bang for the buck that Ford was providing. From racetracks and drag strips all across the country to street racers in every town, the **5.0L Mustang has earned a faithful following for its high performance, reliability, and affordability.** Many who have owned or driven 5.0L Mustang's feel that the car is the rightful heir to the legacy of the original high performance 289 Mustangs of the 60's.

We saw the Mustang as more than just the functionally perfect donor car. It is truly the spiritual successor to the factory muscle Fords of the 60's. The 289 block that beat Ferrari in 1965 still beats strong in each donor built Factory Five Coupe. The lightweight small block with Electronic fuel injection is one of the keys to our well-balanced replica. Our design bridges the gap between yesterday and today. Our kit delivers the precise handling of a racecar along with the mechanical reliability of a modern Mustang without compromising vintage period authentic looks.

We have found that the best balanced fun street cars have 300 to 350 horsepower. To do this with a 5.0L means upgrading the following parts: heads/cam/intake/mass air/fuel injectors. The ultimate decision is the builder's preference.

Not using a donor

Many people will build this car without using a Mustang donor car. That is, they will want to use a combination of new and used parts from a variety of sources. Use your best judgment when buying new parts. Some of these parts, such as the pedal box and upper steering shaft do not get a lot of wear and are quite expensive when purchased new. These can be easily sourced from a salvage yard. An alternative would be the Factory Five Complete Coupe kit in which you are provided with all new parts except for Engine, Trans., wheels, tires, paint and fuel pump. Check out details on the website.

- Read the appendix carefully to determine what you'll need to get.
- Read the Performance parts section for ideas and places to get parts.

Donor Parts Selection Tips

87-93 Mustang

The following are a few tips we've picked up over the years when dealing with used parts. In addition to the parts that come with the kit, you have to provide the running gear and some other parts that can be taken directly off a 1987-1993 Mustang. This section deals with those donor parts. If you are getting parts from a different source, please refer to the last section in this chapter, "Not using a Donor". If you find that some parts of your donor are too rusted or not usable, Factory five does have all of the parts, except for engines and transmissions, available as modules (i.e. Fuel system, cooling system, spindles/brakes, etc.…).

Other Donor years

The Factory Five Coupe kit is designed to use parts from the 1987-1993 Mustang. You can use many of the same parts from earlier and later model Mustangs but there are some differences. For example, before 1987 the Mustang used smaller components such as 10" front brakes, 7.5" rear-ends, and the engines produced less horsepower. Likewise, the 1994-95 and the 1996-2004 models have many shared parts but there are some important differences. If you choose to use older or newer donor parts, check out the "Different Donor Vehicles" Appendix for information on the different parts or call the FFR tech department and ask about what specific parts you can use.

If you go to a salvage yard for parts, the donor parts list in the Appendix will help you check to see that you have procured all the required parts in order to avoid a return trip. Try to get everything you need before you pay and leave. We've found that the average parts yard doesn't exactly serve as a model of modern customer service philosophy. Ford made over a million Mustangs so the availability of complete running, non-crashed cars is also good.

Where to look

- Junkyards – If they do not have one on the lot, usually they go to auctions weekly and can get what you want.
- Newspaper classifieds.
- www.ebaymotors.com – search for wrecked mustang
- Internet search - search for wrecked mustang
- The following is a list of companies that will take all the parts needed, palletize it and ship it to you.

USA East Coast

Connecticut Mustang	Bridgeport, CT	203 384 0525	Bob Rick		www.connecticutmustangllc.com
Menard's Auto	Chester NH	603 887 4049		Menard	
Action Auto parts	Rochester, NY	716 424 1200	Terry	Sullivan	actionautoparts.biz

Fox's Auto	Dover, PA	717 292 2537	Bill Fox	www.billfoxsautosales.com
USA Midwest				
Body Doctor	Holland, OH	800-845-0270	Greg LaPointe	www.lapointauto.com
USA South				
Mustang Parts Specialties	Statham, GA	800-236-1156	Greg or Ben	www.mpsautosalvage.com
USA West Coast				
All Mustang Performance	Phoenix, AZ	800-454-8387	Tommy Thompson	www.ampperformance.com
Mustang Village	Fontana, CA	909 823 7915	Scott or Tom	www.mustang-village.com
Cypress Auto	Berkley, CA	510 451 3034	Mike Percy	www.cypressautorecyclers.com/factory5.html
Mustang Depot	Las Vegas, NV	702 281 4517		www.mustangdepot.com

Price

Whether you're buying a complete salvage yard car or a bunch of parts, it's important to remember which parts are worth money to the salvage yard and which ones are of little or no value. The drive train, body panels and interior are of the most value. The other pieces such as the steering shaft, pedal box, and other miscellaneous pieces usually are very inexpensive for the yard to include. When negotiating the price from the parts yard, you might get a better deal if you promise to let them have the parts you won't be utilizing. Look at the donor parts list again and you'll see that the glass, body panels, interior parts, and doors are not needed. We believe it is usually better to take the parts off yourself; you will inevitably do a more careful job. If you are using parts that are already taken off, you gain the advantage of being able to cherry pick the best of those that are available. It is not hard to buy a complete donor car from a salvage yard for less than $3,000.00.

Running Gear

In order to make a wise choice on running gear, there are several things to look for. First, make sure that the VIN numbers on the transmission and engine are present and match the numbers on the vehicle title (if available). If the numbers don't match, (let's say the transmission was replaced) make sure the parts yard records the new numbers on their bill of sale. In the unfortunate event that these components were stolen, you need to have documentation on the origin and sale price. Check the numbers twice. The VIN numbers are located on the back of the engine block, on a flat spot between the heads where the bell housing meets the block. Some solvent or WD-40 can usually clean this area off enough to see the numbers. The VIN numbers on the transmission are typically stamped on the side of the main transmission housing at the lower front edge of the passenger side, near the seam of the bell housing. Check these numbers against the codes listed

in a Chilton's manual to find out the year of manufacture. Here are some tips to follow when checking out running gear.

- Examine the **engine mounts**. Some small splits in the rubber area of the mount are normal, but any serious splitting should be avoided. Aftermarket engine and transmission mounts are cheap and an excellent alternative to donor car ones.
- Check the steel sections of the engine mounts for damage since these are areas that can bend.
- **Mileage** is not the most important aspect of selecting a donor Mustang. The 5.0L drivetrain is one of the toughest things about these cars. It's obvious however, that the lower the mileage the higher the chances of avoiding additional expenses down the road.
- The **rear end assembly** should be free from oil leaks. Oil leaking out the sides of the 8.8" rear end near the brakes, or around the pinion snout (drive shaft connection area) is an indication that there may be more than 100K miles on the rear axle, or that it was abused. One way to check the rear end is to grab the rear wheel at the top and rock the car back and forth (by pushing and pulling in and out). This will give you an idea of free play in the axles. Some play (about 1mm) is OK. What you are looking for is a large amount of movement side to side within the housing. Avoid cars with bent axles (from rollovers or hard side hits). These are not too hard to fix but it's good to know up front when you're planning your budget. A quick way to verify mileage is by inspecting the drum brake shoes on the unit. The drum pulls straight out, off the axle. Rear shoes are never really replaced until about 60-100K miles unless there was severe duty (read abuse) placed on the car.
- The easiest way to avoid engine work is to buy a donor car with an **engine that runs**. Everyone will tell you it runs, but it's best to hear for yourself. Bring a battery with you since for some reason, that's usually the first thing that gets taken out. A battery also helps when some guy says, "Don't worry it runs great, but since I don't have the battery you'll have to trust me." The Mustang is computer controlled and should run really well the first or second time it is turned over. If at all possible, put the car into the gear and drive it forward and backward. If you can't drive it, let it run for a moment, and then re-start it. Look for main bearing oil leaks (behind the harmonic balancer) or oil pan leaks. Leaks aren't common unless the car has high mileage. Valve cover gaskets commonly leak at around 50,000 miles and are easy to replace so don't sweat them.

- If the **engine block** has been painted, it is a good indication that the engine was re-manufactured since the block was never painted at the factory. Even brand new 5.0L blocks with relatively few miles on the odometer will have a surface dusting of corrosion.
- Since our kit can use the original **drive shaft** (that gets shortened), the quality and condition of the slip yolk (transmission end) and the rear flange is important. The slip yolk must be smooth and clean without scores or gouges that can cause premature wear and develop leaks down the road. We recommend using only yokes from manual transmission cars; the automatic cars have a weight that limits the universal joint movement.
- The **front spindles** should be clean, dry, and have decent rotors and calipers without much dirt or crud accumulation. There should be no deep grooves or huge flakes of rust inside the rotor contact area. If you do have rotors with lots of rust inside the cooling fins, you are usually looking at an older car part or it has been sitting for a while.

We've rarely seen serious problems with donor car parts. An occasional bent axle, bad steering rack, or mangled tie rod end are about all we've come across. Second gear seems to get the lion's share of abuse in the T5 transmission. The factory drivetrain is remarkably tough so try not to worry excessively about the donor parts; odds are they will work just fine.

In 1993 the emergency brake cables were shortened and will no longer reach the handle in the FFR frame, if your donor is this year you will need to find a set of the earlier (87-92) cables.

Disassembly of a Mustang Donor for Parts

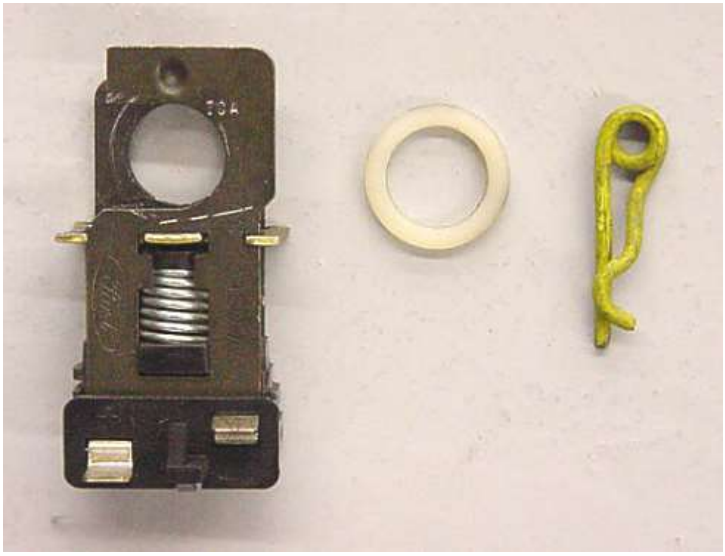
Ford Motor Company designs all of their cars for rapid and accurate assembly. These cars come apart quickly and easily if you remember to look at it from the assembly point of view. The rear vertical shock, for example, is not as much an individual part as it is a part of the entire rear end assembly. The engine and transmission are actually dropped in and fastened at four points (2 engine mounts, 1 transmission mount, and the drive shaft). Think of this job as a reverse assembly line and it will go faster. If you are getting ready to disassemble a Mustang, please refer to the "donor parts list" Appendix. A Chilton's repair manual has quite good step-by-step disassembly instructions for each assembly. We have tried to be helpful here but a Chilton's manual or any other quality manual will make it that much easier. Many manuals licensed by Ford use excellent Ford drawings, schematics and diagrams.

When in doubt, don't throw it out. That one little OEM bolt could save you a trip to the auto parts store.

87-95 Brake Power Booster

Socket set, wrenches or box wrenches for brake lines, tube cutter, tape, and marker pen.
Mustang power booster push rod, brake light switch/spacer/clip.

Remove the brake rod retainer clip from the top of the brake pedal.
Remember the order in which these washers and spring clips are removed so that you can reinstall them faster later.



Brake switch parts.

Remove the four bolts that retain the power booster to the firewall, these bolts also go through the pedal box front mount plate inside the foot-box area.

Attach tape to the brake lines and mark their positions on the master cylinder and distribution block. Leave the lines that go from the distribution block to the master cylinder in place.

Cut 4" into the hard brake lines from the distribution block. New brake line is provided with the kit.

The power booster/master cylinder assembly can now be taken out of the engine compartment.

87-93 Steering Rack

🛠 $\frac{5}{8}$", $\frac{11}{16}$" wrenches, needle nose pliers, hammer

🚗 Mustang steering rack assembly, rubber mounting bushings.

Remove the U-joint bolt from the steering column sleeve.

Remove the lower steering shaft by taking off the two bolts at the flexible collar in the area where the splined steering rack shaft begins.

Remove the steering rack outer tie rod nuts and cotter pins. If the tie rod will not come out of the spindles easily, use a hammer but be careful not to damage the threads.

✋ Never heat or lubricate the tie rod end to make removal easier.

Remove the two bolts that secure the steering rack to the frame and lower the rack out of the car.

Mustang steering rack with lines removed with rubber bushings and fasteners.

Engine Bay Sensors and Electrical Connections

🛠 Socket set, combination wrenches, Phillips head screwdriver, slip joint pliers, tape, marker, and bucket.

🚗 Mustang coil, EGR assembly, vacuum lines, starter solenoid, mass air meter, and throttle cable.

✋ Remember to identify both ends of every connector disassembled. The easy way to do this is to tape and number each side of the connector the same. The connectors will only work if they're mated to the other similar shaped connector. Each connector is different in the car.

Disconnect and remove the battery.

At the starter solenoid and coil, disconnect the wires, labeling which wires connect to which screw.

Disconnect the connectors from the headlights and engine harnesses.

Disconnect and remove the coil from the engine compartment wall.

Disconnect and remove the starter solenoid from the same area.

Disconnect and remove the Barometric Air Pressure sensor from the firewall behind the engine.

Disconnect and remove the mass air sensor. Store it with the computer.

Disconnect the throttle cable from the throttle body on the engine.

Cut the heater core hoses from the firewall on the passenger's side making sure to leave the bends intact on the larger hose so it can be used to complete the coolant circuit loop.

Napa sells a replacement heater hose loop, part number #10743. This part is designed to loop the heater hose circuit perfectly and it works better than the stock hose, which has two different inner diameters. Connect the two hard black heater tubes on the engine with the one larger diameter tube with a bend. Do not kink the hose.

Remove the power steering lines from the pump, catching the fluid in a bucket.

Remove the braided ground strap from the rear driver's side of the engine.

Follow the fuel lines off the engine and cut the lines 4" after they turn into the hard plastic line.

Remove and discard the front driver's side plastic wheel well using a 7mm socket to loosen it from the body.

Disconnect and remove the horns. They are located just forward of the wheel well on the driver's side (accessed from the wheel well). Label and mark the connectors with tape.

Interior

Socket set

None.

Remove the seats from the car.

Remove the center consul cover the handle.

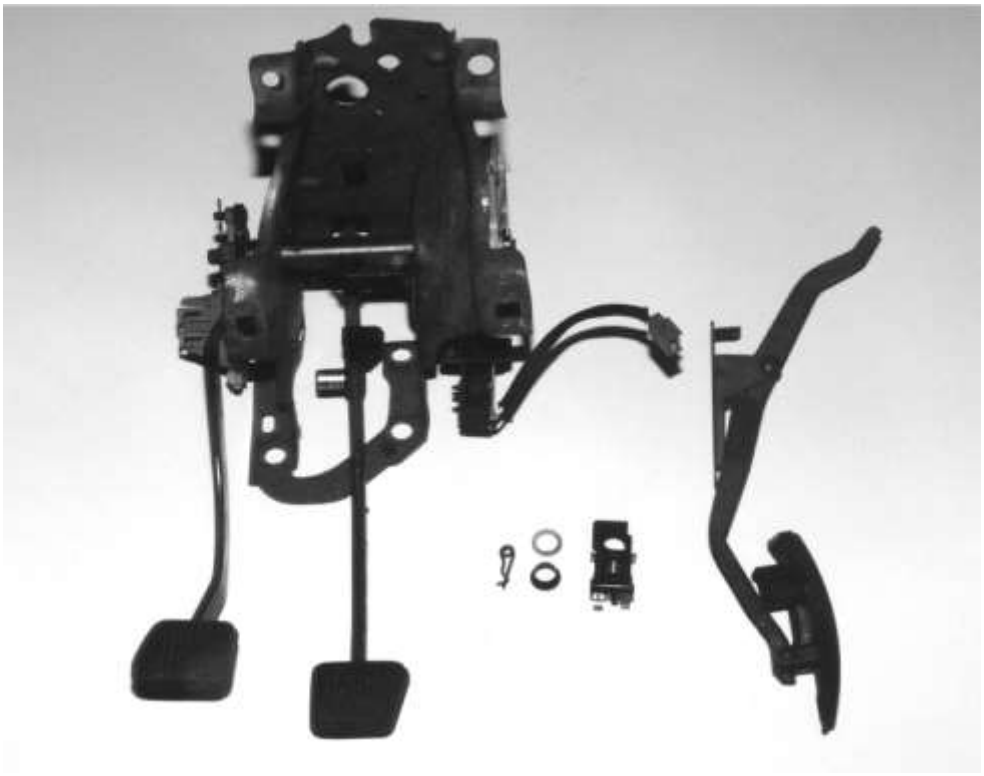
Remove the carpet from the car.

Pedal Box, Accelerator Pedal and Clutch Cable

Socket set, wrenches, Phillips head screwdriver, flat head Screwdriver.

Mustang pedal box, accelerator pedal and clutch cable.

The pedal box comes unpainted from Ford. Even on newer cars there is a light coating of rust on this part. You can clean and paint this part. Take care to avoid painting any of the moving parts.



87-93 Pedal box assembly with switch and throttle pedal.

Remove the clutch cable from the pedal box by releasing the automatic tensioning cog from the toothed clutch pivot on the pedal box assembly. This is done by pushing on the round end of the mechanism while moving the cable wheel toward the firewall. The clutch cable can be easily released from the grooved wheel at this point.

Unbolt and remove the pedal box.

Computer

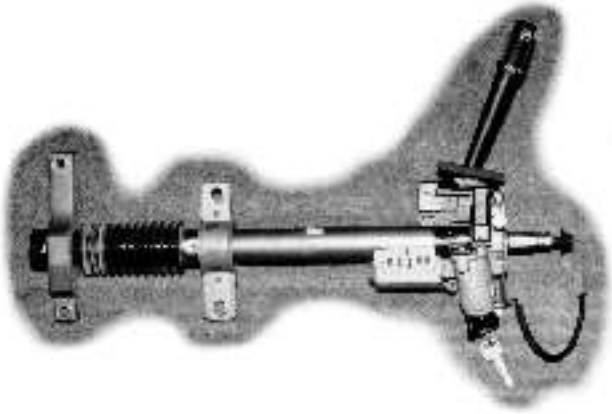
- Socket set.
- Mustang Computer and OEM plastic cradle.
- If you are going to run the car with a Carburetor you can disregard the EFI wiring harness part in this section.
- We recommend the use of a fuel inertia cut off switch in your car if using an electric fuel pump.

EEC-IV computer and cradle.

Remove the kick panel in the passenger footbox.
Disconnect the ground strap in the footbox next to the computer.
Remove the computer and its plastic holder from the passenger footbox area.

Turn Signal and Ignition Switches

🛠 Socket set, extension, Phillips head screwdrivers, needle nose pliers, T-15 Torx screwdriver
🚗 Turn signal and ignition switches



87-93 Steering column (with ignition, turn signal stalk)

Remove the steering column mounts located under the dash above the driver floor. Allow the column to fall down.
Remove the wiring connectors have from the turn signal and ignition switches.
Remove the turn signal stalk

Dash Wiring Harness

🛠 Socket set, extension, regular, Torx and Phillips head screwdrivers, needle nose pliers, hammer, and marker tape.
🚗 Dash wiring harnesses

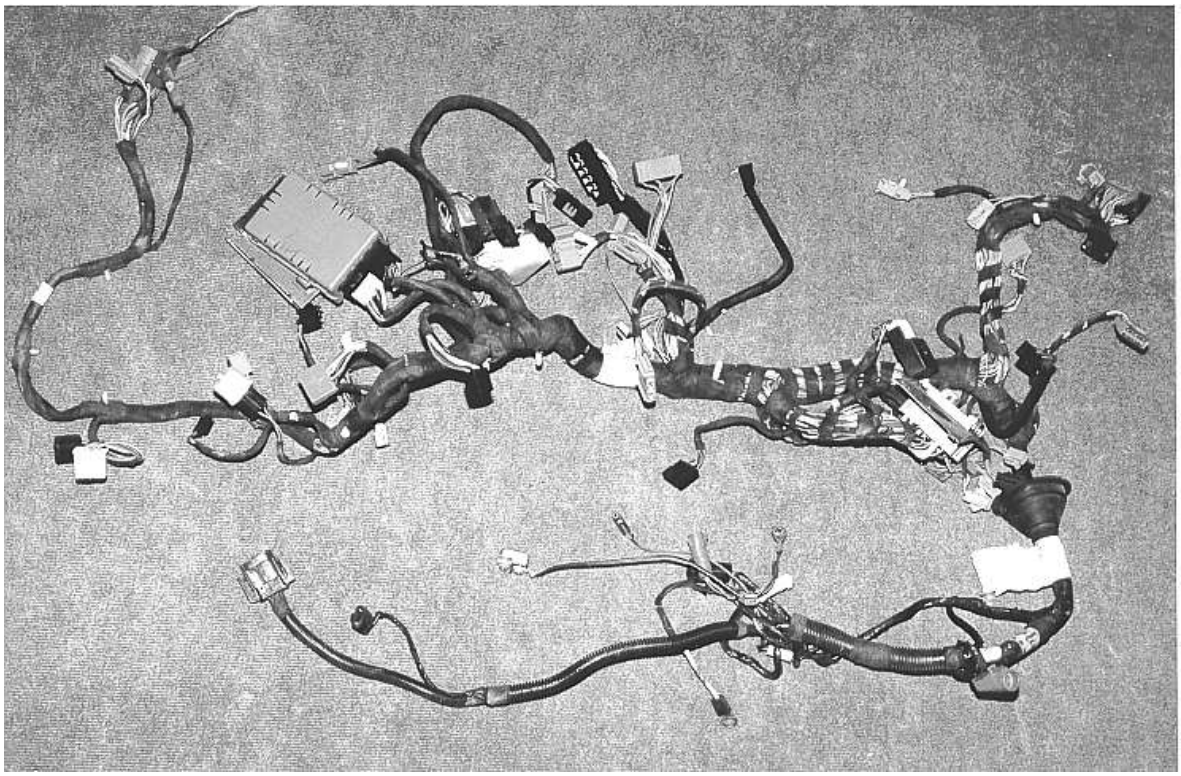
The wiring comes out in stages. Keep the sub-assemblies together as they are removed. Remember to identify both ends of every connector that you disassemble. The easy way to do this is to tape and number each side of the connector the same or use colored zip ties. The connectors will only work if they're mated to the other similar shaped connector. Almost every connector is different in the car, so cross wiring is rare. Labeling will help speed up the job later.

Remove the dash from the car.

Remove the wiring harness and all of the "black boxes" hooked into it from the dash. Mark all of the connectors to prevent any confusion later.

Disconnect the connectors from the headlights and engine harnesses marking each connector with what it connects to.

The headlight dimmer switch should be kept if dash lights are wanted otherwise the switch will have to be bypassed.



87-93 Dash harness with air bag and fuse panel attachments.

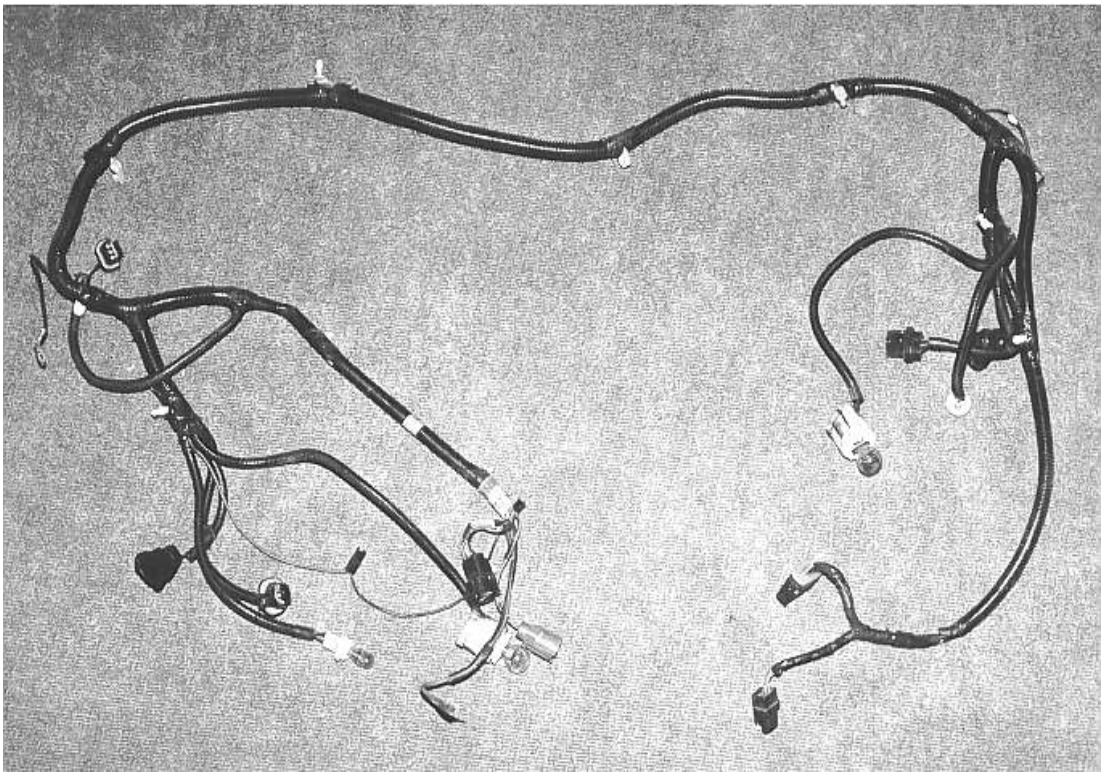
Front Wiring Harness

Socket set, extension, regular, Phillips head screwdrivers, needle nose pliers, hammer, and marker tape.

Front wiring harnesses.

Pull the rubber grommet out of the firewall into the engine bay.

Remove the front light harness from the engine bay wall working from the starter solenoid area to the alternator. Unscrew any ground wires and mark the connectors (Especially the headlight and turn signal lights) as you go.



87-93 Front wiring harness with hookups for headlights, alternator, and horn.

Speedometer and Clutch Cables

🛠 Socket set, duct tape.
🚗 Speedometer cable and sending unit, clutch cable.

Pull the speedometer cable out from the dash area keeping the rubber grommet that is on it in place. This grommet will also get used.

Remove the bolt that holds the cable to the body near the exhaust in the engine bay.

Remove the wiring harness plug from the sending unit.

Remove the speedometer sending unit bolt using an 11mm socket.

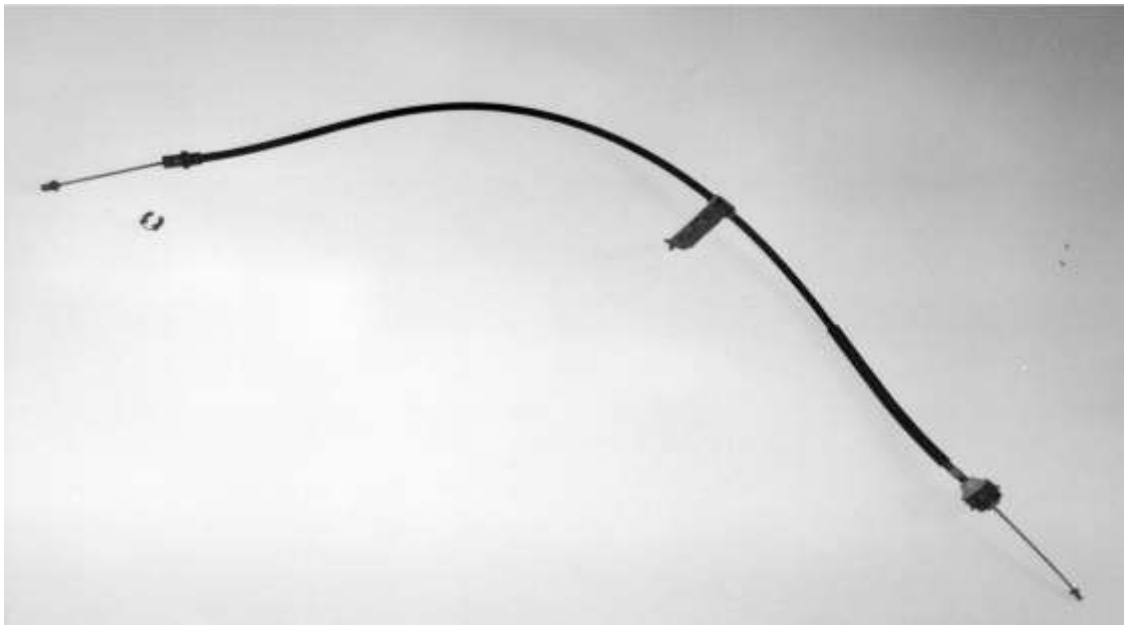
Pull the sending unit straight out.

Replace the screw in the transmission once the sending unit is removed.

Cover the speedometer drive hole with duct tape to prevent dust and dirt from entering.

Remove the clutch cable cover from the bell housing and push the cable out of the clutch fork.

Release the cable sheath retainer clip. Pull the cable out and replace the clip on the cable. You may even want to tape it in place.



Clutch cable and retainer circlip.

Shifter and Shifter handle

Socket set, Phillips head screwdriver.
Shifter
The kit comes with new bolts for the shifter handle so you don't need the OEM bolts. Save them anyway according to rule #85 of the car guys' handbook which states "save any and all fasteners in rusty coffee cans". This, of course, makes finding and using such fasteners in the future all but impossible but it makes us feel good.

Remove the shifter knob from the handle.
Unscrew the plastic console that retains the boot.
Remove the shifter boot and unbolt the rubber boot below it.
Unbolt and remove the shifter and handle from the cockpit.
Duct tape over the handle hole and shaft opening.

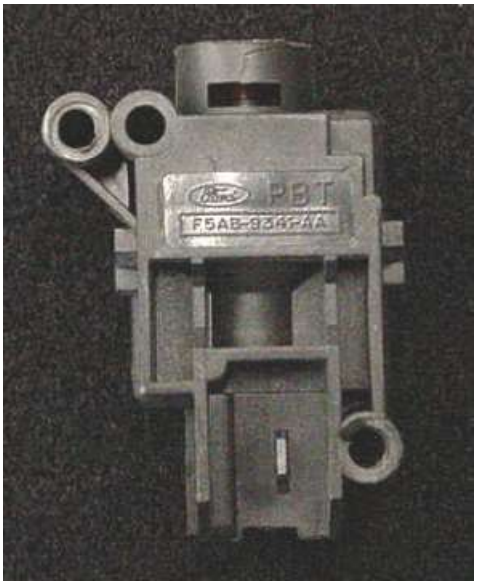
Emergency Brake Handle

Socket set, Phillips head screwdriver.
Mustang emergency brake handle and "T" cable.

Hold the emergency brake handle button in and push the handle all the way down.
Under the car locate the "T" junction and short cable attached to the handle. This is where the two rear cables attach to the handle.
Pull on the "T" cable coming from the handle it should move a couple of inches.
Carefully remove one brake cable from the "T" at a time.
Unbolt and remove the emergency brake handle.

Fuel Inertia cut-off switch

- Socket set, nut driver, Phillips head screwdriver, wire cutters to cut plastic fasteners, marker pen, and tape.
- Fuel inertia cut-off switch.
- It is recommended that a fuel inertia cut-off switch be used in the car.



Inertia cut-off switch.

From inside the trunk, unscrew and remove the panel covering the driver side taillight.

The inertia cut-off switch is a small black box (about 2"x 3") with either a red or white button on top. Unscrew the inertia switch from the body.

Rear and Transmission Wiring Harnesses

- Socket set, nut driver, Phillips head screwdriver, wire cutters to cut plastic fasteners, marker pen, and tape.
- Donor car rear wiring harness.
- Whenever you handle a wiring harness make sure to avoid cutting any leads. Ford uses multiple grounds in circuits and cutting any line may interrupt a circuit. Keep any/all seemingly useless leads intact and handle harness with care. If you decide to cut your harness down (remove all non-essential wires) follow a wiring schematic.

Remove bulb bases from the rear light housings if they are still on your donor. Use tape and a marker to label the wires.

Remove the rubber body plug from the fuel harness exit point in the base of the trunk area and unplug the connector.

Follow the rear harness toward the front of the car pulling it away from the wall of the car as you go. It is helpful to remove the panels that cover the harness as it goes into the cockpit. This makes pulling the wire assembly through easier.

The rear harness ends at the front driver's side of the cockpit.

The transmission harness must be removed along with the rubber plug. This runs along the driver's side of the transmission tunnel.

Store the rear harness and transmission harness.

Exhaust

🛠 Wrenches, $^{11}/_{16}$" socket, socket extension, ratchet, adjustable wrench, hack saw.

🚗 O_2 Sensors.

✋ Handle the Mustang Catalytic Converters with care since the honeycomb inside breaks easily. Some parts yards will want these, since they get a recycling credit for each. They are not used.

Remove the rear exhaust from the H-pipe in the middle area of the car with four bolts.

✋ The H-Pipe is mounted to the headers using four nuts, and is mounted to the transmission cross-member with sliding ⅝" pins inside rubber sleeves.

Cut the air tube connected to the H-pipe.

Disconnect the O_2 sensors from the engine harness.

Remove the nuts connecting to the headers so that the H-pipe can be moved rearward sliding the pins out of the transmission cross-member sleeves.

Lower the H-pipe assembly and remove.

Remove the O_2 sensors from the H-pipe with an adjustable wrench. Do not touch the ends.

Engine Removal

🛠 Engine hoist, socket set, wrenches, floor jack, used tire or engine stand, rags, chain, duct tape, friends.

🚗 Mustang engine/transmission assembly, engine mounts, transmission mount, OEM fasteners.

✋ Make sure to use an engine hoist that has sufficient load capacity for the job. Use extreme caution when moving engine assembly. Work on a clear and level surface.

Remove the two large nuts that hold the engine mounts to the frame of the car. The driver's side bolt-hole is notched for ease of removal. The passenger's side engine mount has a single bolt hole.

Disconnect the drive shaft from the rear end pinion Using a 12-point 12mm wrench or socket.

Remove the drive shaft carefully. Do not damage the front snout. Thread the bolts back into the rear end so you do not lose them.

Drain the transmission fluid. This can be done on the passenger side of the transmission through the plug with the square socket on it. Use a ⅜" ratchet handle to undo it.

Tape over the rear of the transmission so that it doesn't leak or drip fluid.

Undo the transmission mount from the cross-member.

Loosen the cross-member attachment bolts.

Place a bucket under the radiator drain petcock on the lower passenger side of the radiator

Loosen the radiator drain petcock with pliers.

Collect all of the used coolant and dispose of the coolant properly (local garage or parts store).

Loosen and remove the radiator hose clamps and hoses at the engine block. There may be residual fluid in hoses so try to avoid spilling.

Use duct tape or zip ties to secure the lower radiator hose up to the power steering pump area so that it will not spill fluid as the engine is removed later.

Get help with the next few steps, as the parts involved are heavy!

Attach an engine hoist to the engine lift points at the driver's front and passenger's rear areas of the engine. One easy way to do this is with a chain and bolt on the other side of the hole. An alternative to this is to wrap chains through the back of the engine mounts and bolt the chain together for lifting. This will give you a balanced lift point.

Take up the slack on the chain slowly. Check to make sure that no hoses or wires remain connected to the engine.

Remove the bolts from the transmission cross-member and remove the cross-member.

Check again to make sure that all wires and straps are removed.

Lift the engine off the engine mounts and guide it out of the engine bay. Guide the rear of the transmission out of the transmission tunnel carefully.

Set the engine/transmission assembly on an old tire with no rim or on engine stands to avoid damaging the oil pan.

There is an exhaust H-pipe tube holder plate sandwiched between the transmission mount and the transmission that must be removed. All you need is the transmission mount with the two bolts sticking down.

Front Suspension

Spring compression tool, socket set, wrenches, breaker bar, tubing cutter, floor jack, tire iron, jack stands, chain, needle nose pliers, rags, ball joint removal tool or plastic dead blow hammer.

Brake calipers, rotors, spindles, front lower control arms.

The front springs are compressed in their fitted positions even when the suspension pieces are lowered in their mounts! These springs will cause serious injury or death if you are not extremely careful.

Loosen the lug nuts on the front wheels.

Raise the front of the car up with a floor jack and support it with jack stands.

Remove the front wheels.

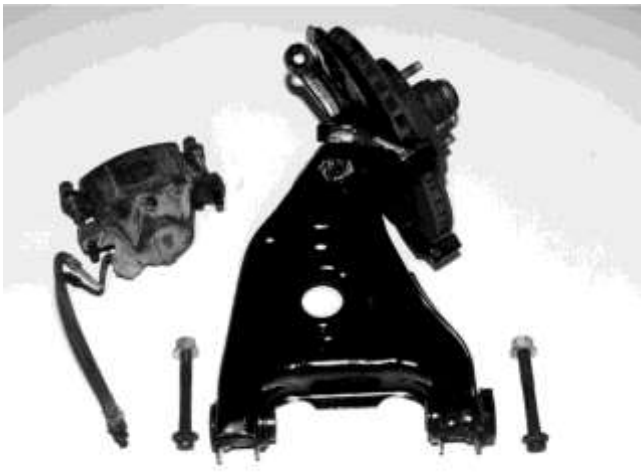
Disconnect the front sway bar and remove the mounts from the control arms.

Follow the flexible brake line from the front brakes to the mounting bracket on the body, unscrew or cut the steel brake line 4" after the bracket.

Remove the bracket clips from the brake line body mounts keeping them to use later.

Pull the brake line through the bracket. Put a rag or duct tape over the end to prevent brake fluid from dropping on the floor.

Put a jack underneath the ball joint on the lower control arm.



Lower A-arm w/bolts, brake caliper, spindle and brake rotor.

Use a spring compression tool to remove the front springs or chain the spring to the chassis.
Remove the three bolts that retain the struts to the top mounting plate.
Slowly lower the Jack and the strut assembly will come out of the body mount (sometimes violently) and allow the lower control arm to go down.
Remove the springs with extreme caution!
Unchain the spring once it is removed from the car.
Uncompress the spring compression tool slowly.
Remove the two bolts that attach the strut to the top of the spindle and save.
Remove the Brake caliper from the spindle
Remove the dust cap on the rotor
Remove the cotter pin and nut holding the rotor on.
Remove the rotor from the spindle.
Remove the cotter pin and castle nut from the lower control arm.
Use a ball joint separation tool or dead blow hammer the ball joint through the spindle.
Remove the spindle from the car.
Remove the large bolts and nuts from the lower control arm mounts. These bolts and nuts should not be heated, get a big wrench and breaker bar to remove them.
Remove the lower control arm from the car.

Fuel Tank

- Socket set, wrenches, small flat head screwdrivers, floor jack, jack stands, fuel line disconnect tool, goggles with side splash protection, plastic dead blow hammer.
- Fuel tank with lower plastic cover, mounting straps, fuel cap, fuel filter, evaporative canister, and vapor line.
- Extreme caution should be used when handling and storing used fuel tanks. Make sure to close off openings. Use the factory cap and seal off open fuel line ends. Keep the tank level. Avoid dropping the fuel tank as the baffles and fuel pump inside are subject to damage. For more information, refer to a Chilton's or other repair manual for fuel system assemblies.

Loosen the rear wheel lug nuts.

Raise the rear of the car and place on jack stands.

Open the gas cap to relieve any pressure built up in the tank.

Remove the screws that hold the upper fuel cap and flange to the body of the car.

Remove the set screw and metal ring collar retainer from the fuel neck where it meets the tank.

Remove the fuel neck from the upper fuel fill area and slide the lower fuel tube out of the rubber grommet on the side of the tank.

The fuel tank is held in place with two straps that go under the tank and bolt to the body in front.

Place a floor jack under fuel tank and loosen the strap bolts.

Remove the bolts and lower tank enough to reach the high-pressure fuel lines and return lines located on the top of the tank, on the passenger's side.

Use a fuel line disconnect tool or two small screwdrivers to remove the fuel line from the smaller low-pressure return line on the fuel pump.

Disconnect the fuel line at the fuel filter by removing the small white clip with a regular head screwdriver.

Pull the fuel vapor hose off the plastic fitting on top of the gas tank.

With the help of a friend, drop the gas tank and store on a level surface.

Re-insert the fuel neck into the tank with the ring collar and screw that retain the fuel neck to the side of the tank.

Remove the rear strap retainer by removing a pin that is contained inside a sheet metal box mount. Use a small screwdriver or pushing tool to push on the pin from the side as you push upwards to align it to the exit hole. The pin is a very loose fit and you will see that this is not very difficult.

Remove the fuel vapor line going to the front of the car if you plan to use it.

Rear End

Drill, ¼" drill bit, socket set, wrenches, duct tape, tire iron, floor jack, and jack stands.

8.8" rear-end assembly, complete with quad shocks and springs. Rear brake assembly w/lines, OEM fasteners, Quad shock fame brackets.

The rear end assembly weighs 225 lbs. Use caution when removing this assembly. Use extreme caution when removing any compressed coil spring. Make sure not to damage, dent or crimp the brake lines mounted to the rear end.

If using an independent rear suspension, you will still need to remove the quad shocks but you do not need the frame brackets.

Remove the rear wheels.

Remove the flexible brake line from the body-mounted bracket.

The brake cable sheath is held onto the body on the left and the right sides at the point where the sheath ends. A 13mm, 12 point wrench will help push the pins in so that the cable will release from the socket. Slide the wrench over the cable to the bracket with the sleeve in it. Push the sleeve and wrench towards each other, then pull the sleeve out of the bracket.

Put a jack on the flat part of the middle of the rear axle.

In the trunk/hatch area of the car, undo the nuts on the top of the vertical shocks.

On the axle, undo the bolt that secures the quad shock using a 15mm socket. Move the shock out of the bracket and replace the bolt so that it will not get lost.

Lower the jack slowly with the rear end so that they come down together.

When the rear end has dropped down low enough, you can easily remove the coil springs and upper rubber spring mount. Save the rubber bushings above and below the springs.

Remove the bolts and nuts from the lower rear Mustang control arm, where the arms are mounted to the body/chassis.

Remove the bolts and nuts from the upper Mustang control arm, where the arms are mounted to the body/chassis.

All of the arms should remain attached to the rear end assembly. Once off, place the bolts back into the arms and attach nuts so they do not get lost.

Remove the rear end from under the car.

Remove the brackets that secure the quad shocks to the frame.

Use a drill with a ¼" bit to drill out the rivets on the brake bracket, which retain it to the body above the differential. Keep this bracket for use later.

Fuel filter and connectors

Socket set, small flat head screwdriver, tin snips or razor knife.

Rear fuel lines and fuel filter mount.

Remove the fuel filter and fuel filter mount from the frame.

Disconnect the rear fuel line going from the tank to the filter and store.

Cut the plastic return line hose going to the tank 4" from the tank and store.

Donor Part Preparation

Rear Coil Springs

Hack saw or chop saw

Remove the rubber tubular spacer from inside the coil.

Cut one full coil from the top of the spring for correct ride height setting.

Cut the upper rubber spring seat so that during assembly of the kit, it will conform to the spring mount on the frame. This is done with one cut across the part. Do not replace these bushings with aftermarket silicone pieces, as these will allow the springs to slide since they contain a slippery release agent in them.

Solid Axle

- ¾" sockets, ¾" wrench, ½" drill bit, drill, floor jack, jack stands, Torque Wrench
- 8.8" Rear axle assembly, Solid axle adapters/hardware Box, Mustang lower control arms.
- Use caution when working with the rear end assembly, it weighs 225 lbs.

If not already done, fill the axle with gear oil. See Appendix for specifications and capacities.

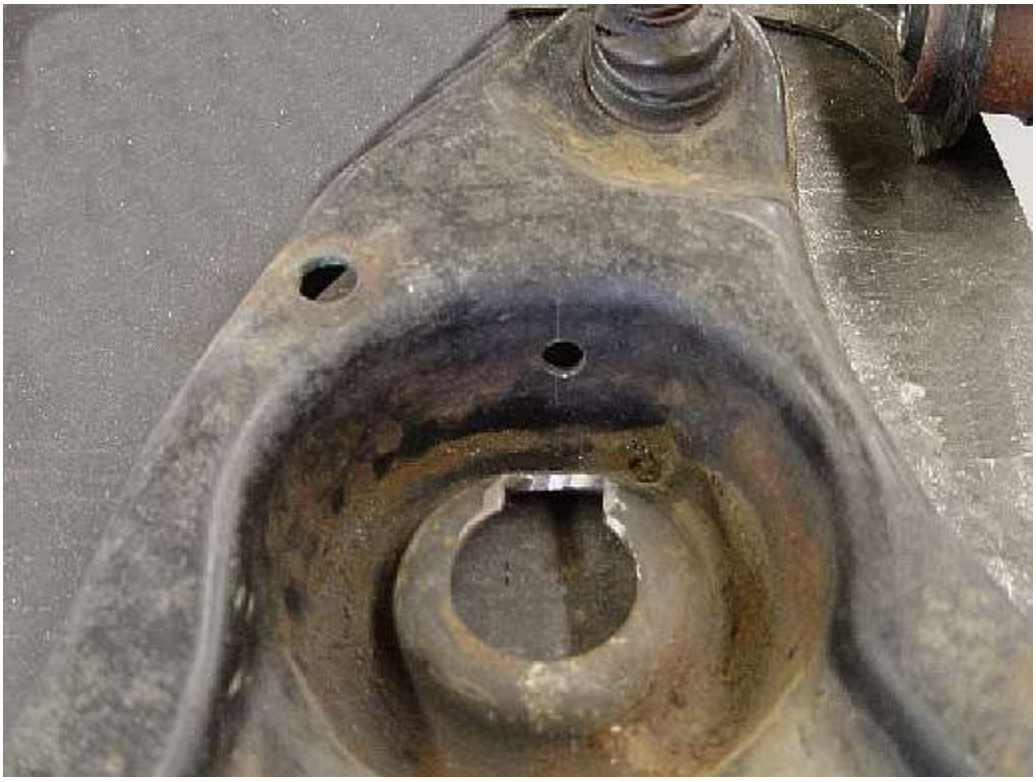
If using a used rear axle, remove the lower shock mounts and the anti-vibration weight under the pinion.

Drill the lower control arm holes out with a ½" drill bit.

The lower shock mount brackets will get used on the front lower control arms to mount the front shocks

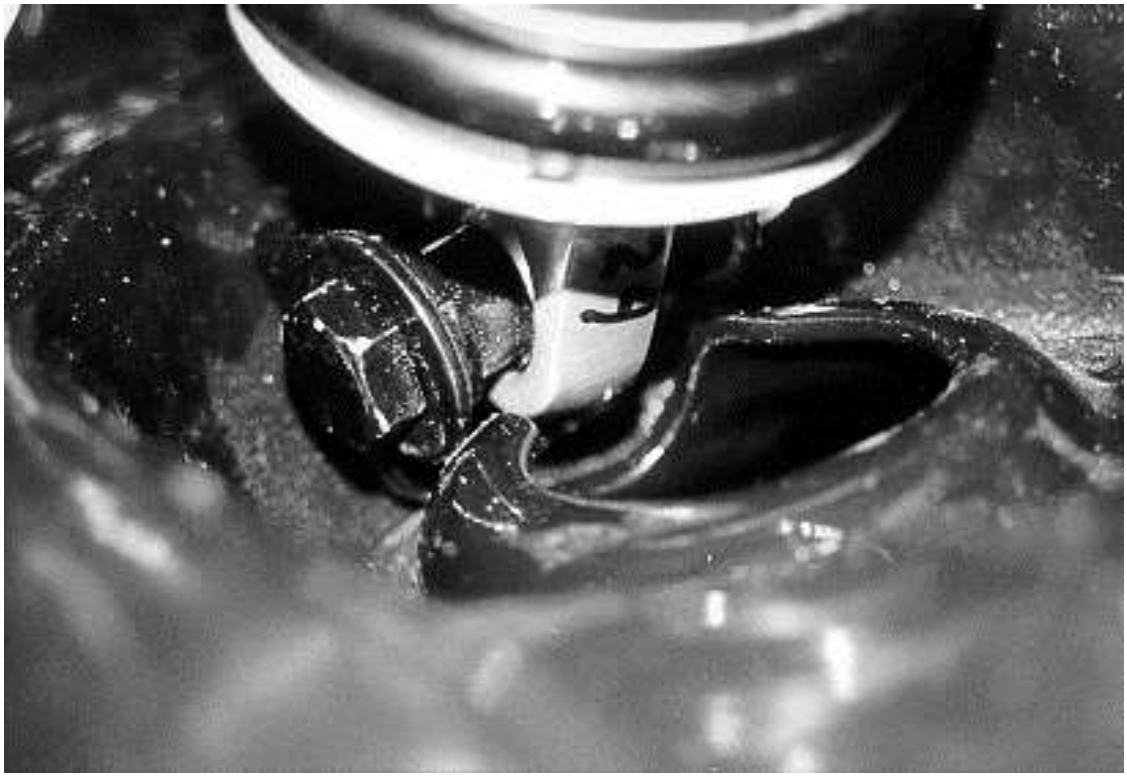
Front Lower Control Arms

Hack saw, file grinder



Remove the area, near the center of the spring mount to prevent damage to the coil-over unit thru any contact whatsoever.

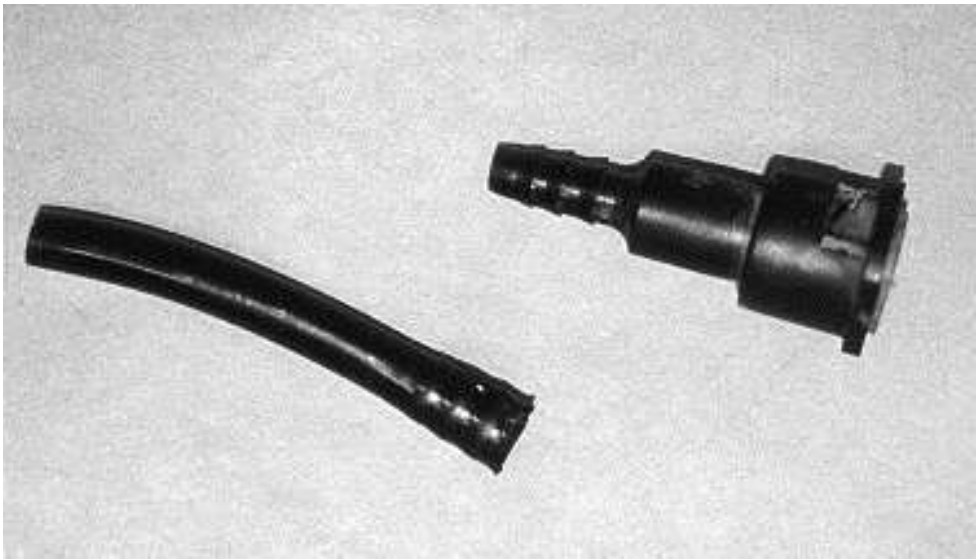
Attach the rear shock mount to the control arm through the hole in the spring seat with the small leg sticking up.



Check clearance with the new shock and the new mount. These parts must move freely without contacting the control arm surface.

Fuel Filter Fittings

- Razor knife
- Donor plastic fuel line fittings from fuel filter to body hard line and from return line from body hard line to fuel tank.



Carefully without damaging the plastic barb, cut the hard plastic off the plastic barbs.

Fuel Tank

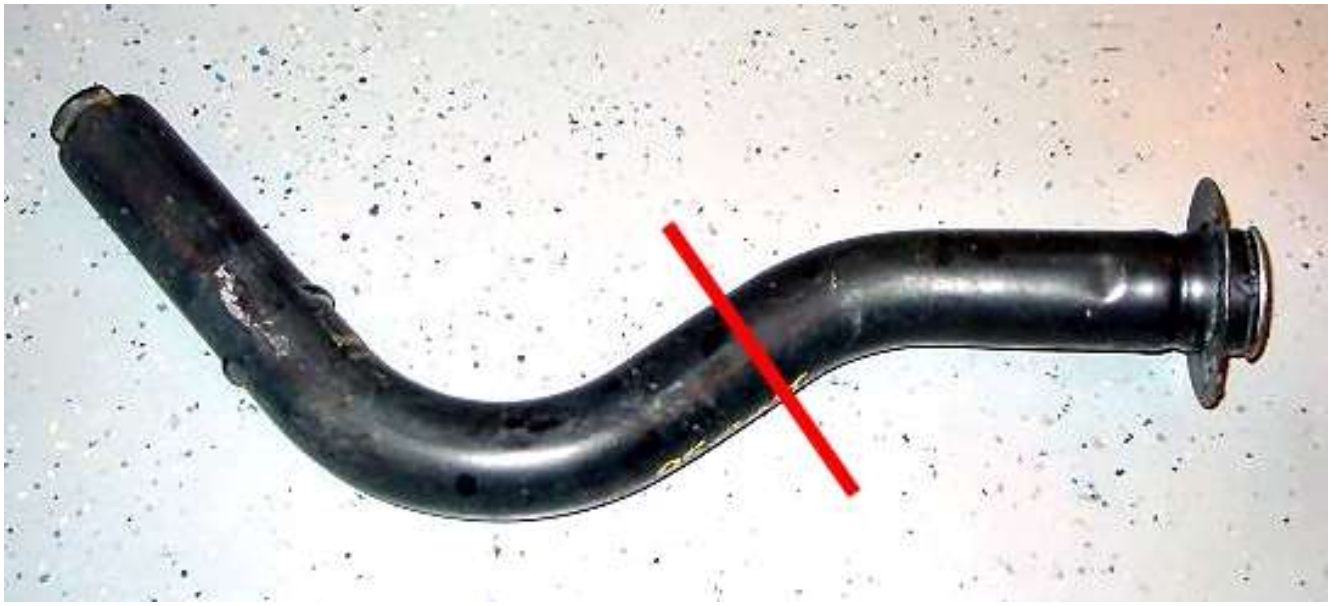
- Pliers

Fuel Tank

At the locations on the tank where the tank straps come near the tank, use a pair of pliers and bend the bent parts flat.

Fuel Filler Neck

Hack saw
Fuel Filler neck



Cut the Mustang steel fuel neck in the mid-section after the 90° bend. Leave enough straight tube, to attach a hose clamp to each side.

Remove the inner rubber hose.

Brake Pedal

Hack saw
If you are not using the hydro-boost/power brakes, it is highly recommended that the stock Mustang brake pedal, which is set-up for power brakes, is modified to put more pressure on the master cylinder.
By keeping the master cylinder push rod in the same place and lowering the brake pedal bolt to a different location, more pressure is put on the master cylinder when the pedal is pressed.

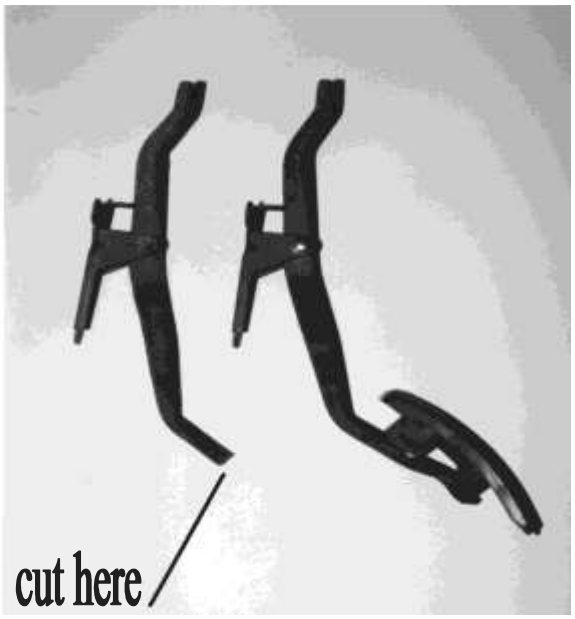
Remove the Brake pedal from the pedal box

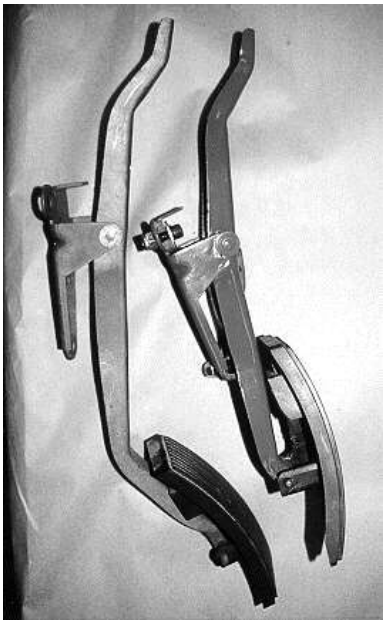
Look at the pedal box where the brake pedal pivot bolt is attached and you will notice that 1.5" lower than the bolt, there is another set of holes. This hole is the four-cylinder pivot bolt hole.

Cut the brake pedal between the mounting bolt and the master cylinder push rod attachment stud. Remove 1.5" from the middle and MIG weld the pedal back together. Make sure the top piece where the bolt is located is oriented correctly, as the spacer on each side of the pedal is different.

Accelerator Pedal

Remove the plastic part of accelerator pedal by pushing out the pin.





Trim the accelerator pedal as shown, just above the plastic pedal support pad. It is possible to mount the original plastic pedal piece onto the shortened pedal if desired. This can be accomplished by squeezing the bottom of the trimmed pedal and drilling a hole for the stock pin.

Remove the cruise control switch located under the plastic clutch quadrant on the right side of the pedal box.

Pedal Box

🛠 Marker, hack saw, measuring tape

Mark the mounting face of the 1" up from the bottom of the mounting plate.

Cut-off the marked area (bottom of the front mount flange) with a hack saw. This is necessary for steering shaft clearance.

Wiring Harness

🛠 Razor knife, electrical tape.

✋ Many people choose to cut down the wiring harness to use only the wires and leads that are needed. You can save about 20 lbs. by doing this. Be sure to follow the schematics and avoid cutting circuits you need. Some suggested parts to remove are:

Speaker wires
Radio wiring
Heater wires
Air bag blue boxes and wires
Electronic seat and window controls.
Remote trunk release wires

Not only does this take weight out of the car, it gives additional room behind the dash. Look at the plugs and compare them to a Chilton's manual to make sure you are cutting the correct plug before actually cutting.

Brake Power Booster Push-rod

Remove the master cylinder from the power booster.

The power brake assembly is changed to a manual brake assembly for this kit. This simple modification is done on many SCCA Mustangs for improved brake feel. In a 2,100 lb. car, the feedback is good and power brakes are not really necessary.

The brake push rod is on the cockpit side of the booster canister and must be removed for use.

To get the power booster push rod out of the housing, put cockpit side of the booster in a vise and break the plastic end.

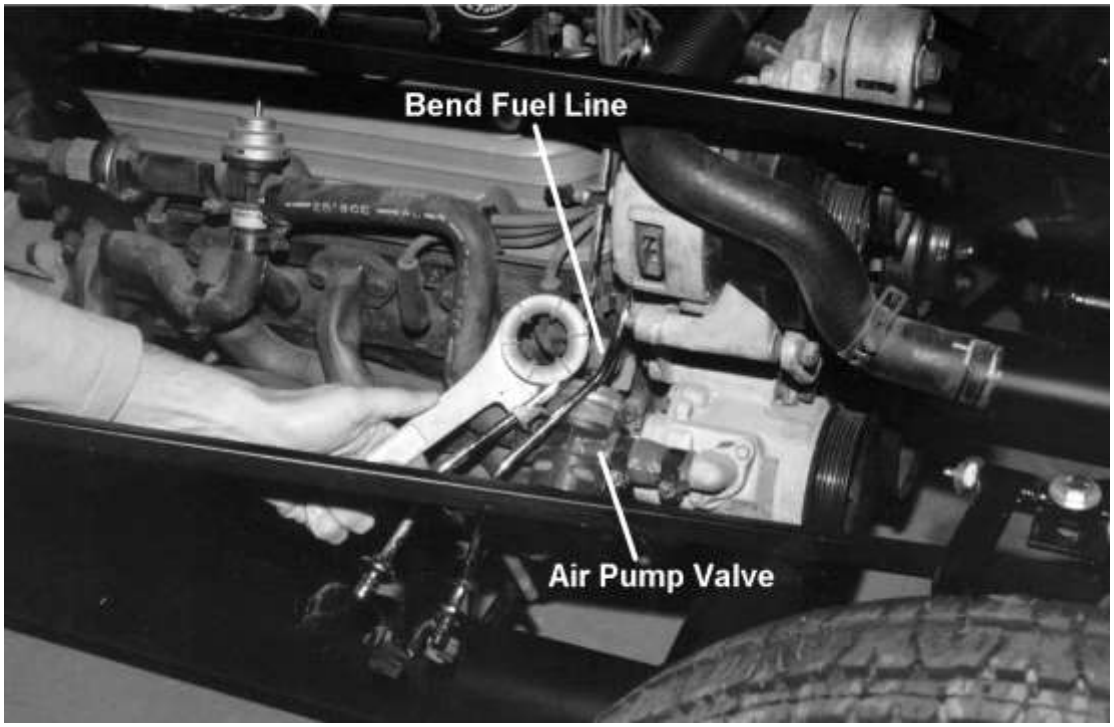
After separating the booster housing, pull the rod out. This rod will have an aluminum fitting attached to it. In order to get it to release, heat the aluminum fitting with a torch and the rod will pop right out.

Driveshaft

Shortening a driveshaft is not for the "Do-it-yourselfer". Take the driveshaft to a professional shop to have it shortened to the drawing. If you don't know of one, ask a local auto parts store or search the yellow pages. See appendix A for the driveshaft diagram to provide the shop with written instructions. Make sure your machine shop puts new U-joints on your shortened driveshaft and balances it (a pro does this anyway). You should expect to pay about $100.

Engine Preparation

🛠 $^{7}/_{16}$", ½" sockets, tube bender, ratchet



Bend the fuel lines away from the engine block just at the point where they are held in place by the retaining clips. This is so that the fuel does not travel near the hot header. Don't make tight bends here or it will affect your fuel flow.

If you are using a Lakewood bell housing, trim the area around the starter so that is flush with the inspection cover.

If you are not running emissions equipment, the only engine controls that need vacuum are the PCV valve in the valve cover and the fuel pressure regulator. The EGR can be left unhooked. Make sure to close off any extra vacuum ports.

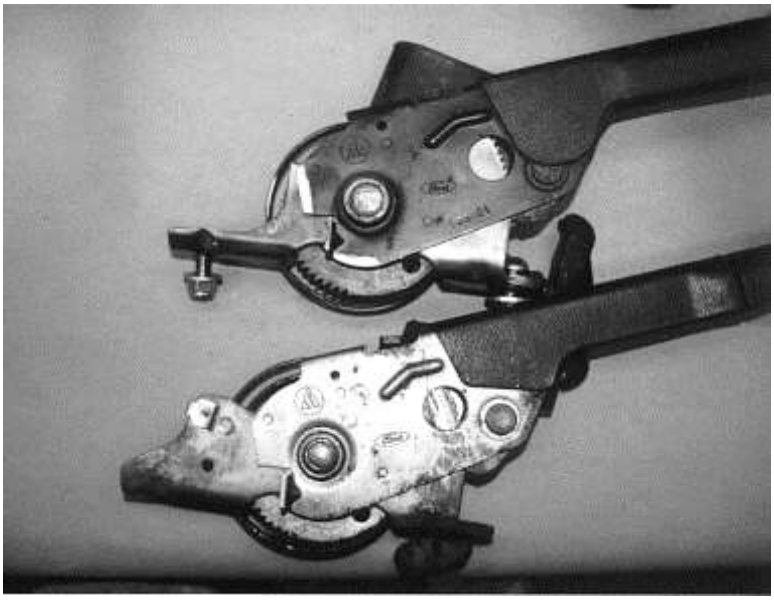
If you are not running emissions equipment, the hoses, mounts and solenoids can be removed.

Install the headers using the header originally for the left side on the right side of the engine, and the right header on the left side of the engine. Thread all of the bolts on the headers before tightening any of them, to make installation easier.

Emergency Brake Handle

🛠 Grinder, scissors

✋ Refer to appendix for the emergency brake handle diagram.



Cut the diagram in Appendix A out with scissors and mark where the emergency brake handle needs to be cut. This is done so that the passenger seat will not rub up against the back part of the emergency brake handle.

Trim the handle with grinder, it is very hard steel.

Alternate Drive Pulley Preparation

- Cordless drill, ½" drill bit, needle nose pliers
- Alternate drive pulley template
- On 87-93 EFI cars, the pulley and fan belt supplied replace the A/C compressor and power steering pump.
- If you are planning on using under drive pulleys, do not use the template.
- If you are planning on running power steering the alternate pulley is not needed. You will however need the power steering mounting brackets for a non A/C car.

Remove the A/C and power steering pump. Use the alternate drive pulley template to prepare the bracket for the pulley.

Use the template in appendix A to drill into the original Mustang A/C bracket. If you are choosing to run either A/C or power steering, you do not need to use this alternate drive pulley assembly.

If you really want power steering on the car use the non-A/C power steering brackets from Ford to move the power steering unit up out of the way of the steering shaft.

Steering Rack

- $^{11}/_{16}$" and ⅝" wrenches, ruler, hack saw, marker.

Remove the outer tie rods.

Remove the inner tie rods.

Cut 1.75" off the end of the inner tie rods.

- If you are planning on running power steering the next steps are not needed.

Remove the hydraulic lines. Drain all fluid by turning it, lock to lock, upside down over a collection pan. Dispose of the fluid properly. The rack is greased on the gears at the ends.

The Mustang power rack is converted to a manual rack by removing the hydraulic lines from it and draining the fluid. You can leave the holes open without concern since the hydraulic cylinder is no longer used, however, for cosmetic reasons you may want to close them off. You can use a ½" Non-threaded hole plug. Keep in mind, this must not be airtight! Air must be allowed to move in and out of the holes. If you use a hole-plug, drill a small air release hole in the center.

Cleaning and Detailing

- Before you start assembling your car, cleaning is the best way to assess what needs to be done to the donor parts. Based on your close-up inspection you may choose to re-build or replace some of the parts that you have just removed. Areas to inspect include transmission tail shaft side to side free play, pinion oil seal on the rear end, valve cover gaskets, distributor cap for excessive build-up deposits, and clutch wear.
- When using engine degreaser, collect the waste solvents and dispose of properly.

- Steam clean or use a strong detergent such as Gunk™ engine cleaner.

If the parts are really dirty, you can take the parts and assemblies to a do-it-yourself car wash. They usually have an engine degreaser as an option and most places run very high water temperature that helps loosen debris and grease. If doing this, tape over the engine intake holes, engine wiring connectors, and coolant openings. Let the parts dry completely before removing the tape.

- Be sure to clean the bay after you clean your stuff.

- A wire wheel on a drill can bring even the most oxidized aluminum up to a nice finish. Be sure to wear gloves and safety goggles. This can be done on the bell housing, transmission, alternator, valve covers, steering rack, engine intake, water-pump, and engine accessory brackets.
- Apply clear coat paint on aluminum parts so the parts will not oxidize.

Wire brush and paint control arms and the rear end. Avoid rubber bushings and quad-shock travel shafts (shiny areas). When repainting parts, a consistent color scheme works best and looks the nicest.

-
- Wait until the wiring harness is installed and the car is running before you cover the harness up with a nice wrapping of electrical tape. If it's dirty, wipe it off gently with a moist (not wet) rag.
- Use common sense when cleaning these parts; don't use a wire wheel on a drill close to any wires or lines. Keep solvents away from rubber lines/hoses.
- After cleaning the engine, replace the spark plugs. When removing the plugs, look for oil on them or if they look burned. If you have any doubts, ask a mechanic or a good auto parts store what the condition of the spark plug reveals about the engine's performance. When replacing the spark plugs, make sure you gap them before installing them.

Chapter

3

Disassembly of the kit

Unpacking Your Kit

Customer picking up a kit at our Wareham, MA facility in June 2000.

- Please note that your boxes are numbered, when you read your packing list you will see that next to each assembly there is a number circled. This is the box number that the assembly was packaged in. The kit is packaged in the order that you will be using the parts.
- After everything is safely in your garage, open each box and do a physical inventory of all the parts.
- Call and report any potentially missing parts within 45 days of receiving your order.

Body Removal

- Gloves, 2 friends.
- Be careful of the raw fiberglass edges, they can splinter into your skin

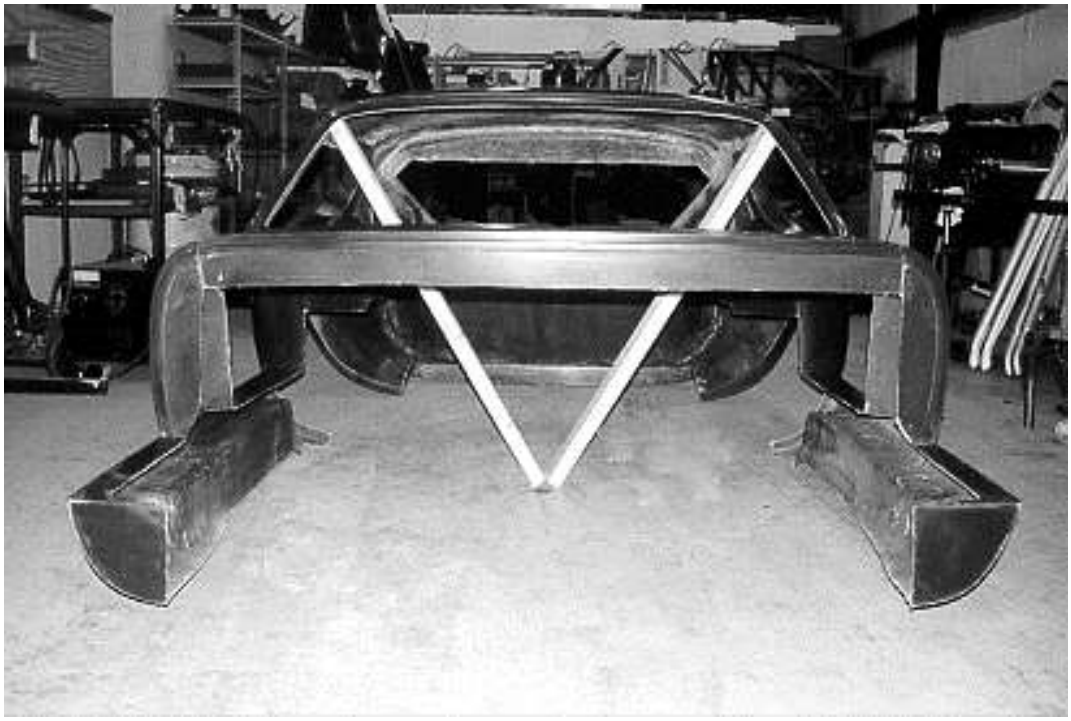
The body is shipped sitting on the frame.
Using two people, one person on each side of the body hold the body in the wheel well area.
The nose section removes easily from the front. Slide it forward before lifting off.

Lift in the exhaust recess and the rear wheel well. Carefully pull the front sides of the body out and up around the door hinge mounts while at the same time lifting the rear of the body.

Rotate the back of the body down and the front up once the back is clear of the frame.

Remove the body by walking towards the rear of the frame.

Store the body on the ground using two 43" long 2"x 4"'s wedged over the doors to keep the sides from having a lot of weight on them.



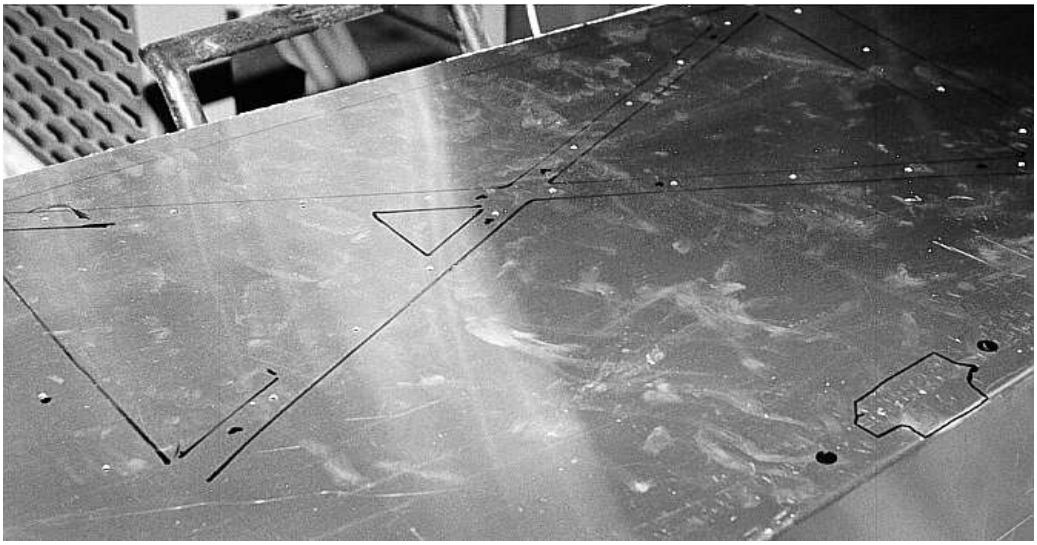
Body with sides supported.

Aluminum Removal

🛠 ¼” nut driver, jack stands, marker.

✋ Do one panel at a time. Be careful of the sharp aluminum edges, they can cut you.

Using a marker outline the underside of each panel where it contacts the chassis. This is done to locate where to drill rivet holes when the panels are permanently mounted later on.



Mark each panel and take pictures of how the panels fit together (i.e. which is on top). Remove each panel after it has been marked until the chassis is bare. Keep the #8 screws to help with aluminum positioning later during build-up.

Use jack-stands to position your frame in your workspace with plenty of room to move things around.

Chapter

3

Chassis Assembly

Rivet Spacing Tool

Packaged Aluminum

In most cases we use a 3” rivet spacing when mounting aluminum panels to the chassis and a 2” spacing when mounting panel to panel. The rivet spacing tool has this hole spacing marked. The distance from the edge of the tool to the holes is correct to center the rivets on the ¾” tubes. Align the edge of the tool with the marker line made around the tubes and mark the rivet holes with a marker.

Use the ⅛” rivets for all of the aluminum panels unless otherwise directed.

Front Suspension

Front lower control arm

⅞” socket, $^{15}/_{16}$” wrenches, Torque wrench
Mustang lower control arms and fasteners

Mount the front lower control arms on the frame

The front lower control arm bolts may need to be trimmed or use a washer under the head for the front bolts due to the manufacturing process of the bolt.

While holding the control arm parallel to the ground, torque the bolts to **135-149Nm (100-110 lbft).**

Front upper control arm

Vise, Thread locker, ⅜”, ¾” wrench, ¾” socket, Torque wrench
IFS components
The bolts and no flange locknuts for the rear bolt location are packed with the spindles.

Unpack the upper control arm assembly.

Put thread locker on the upper ball joint threads.

Screw the upper ball joints into the control arms so that the ball joint angles out on the bottom

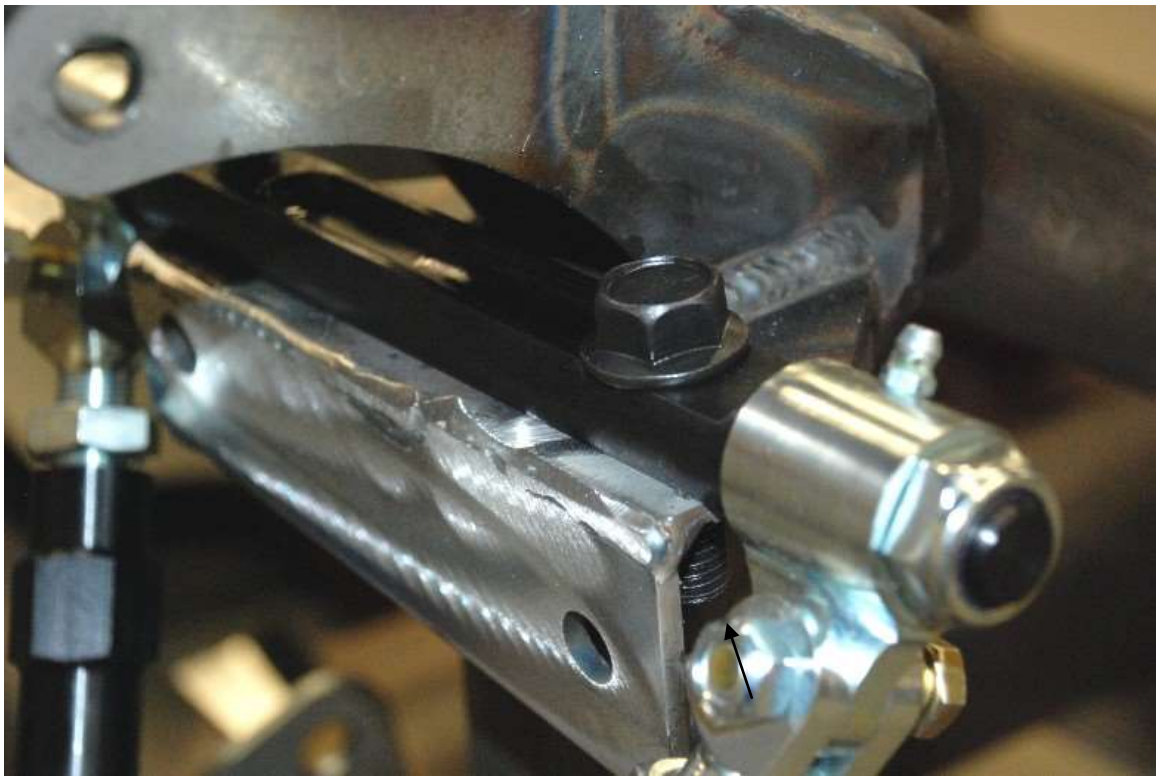
Tighten the ball joint using the arm for leverage with a Vice holding the ball joint.

Screw the grease fittings in to the ball joints and tighten with a ⅜" wrench.

If assembling a complete Coupe kit with the FFR spindles, skip to the next section.

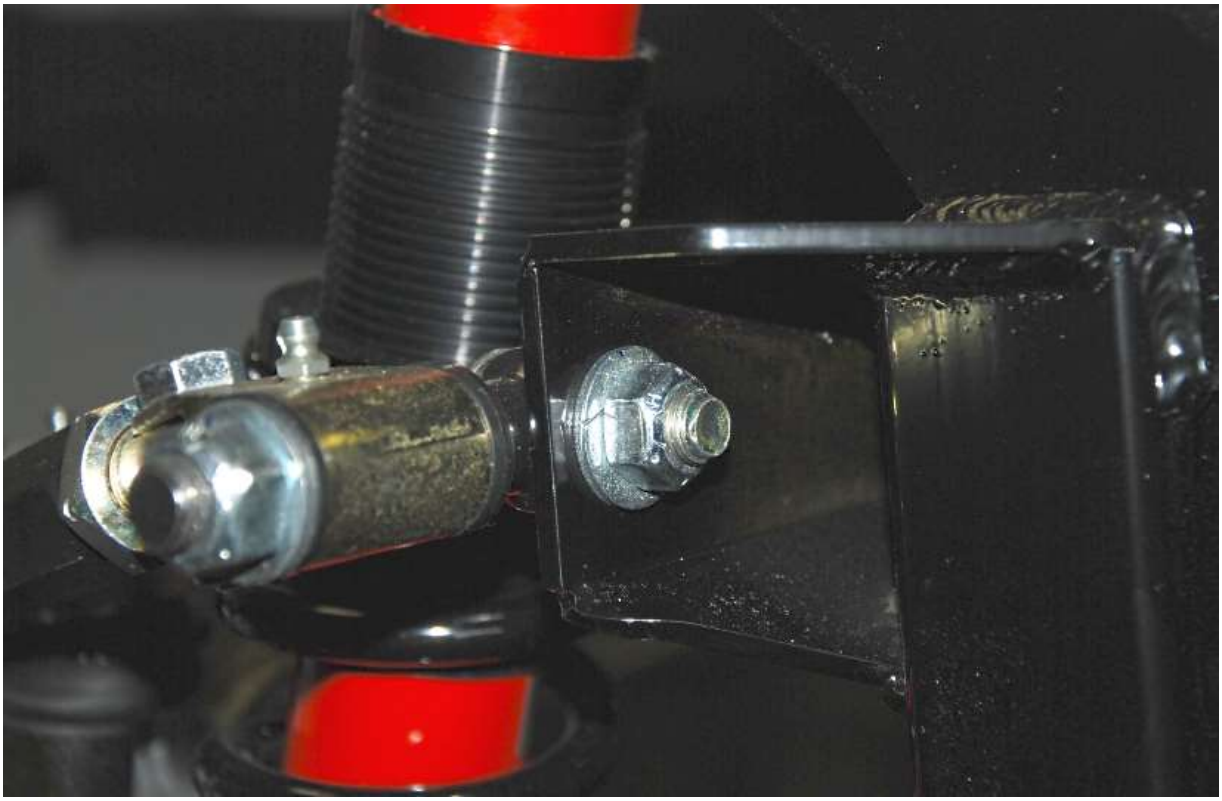
Front upper control arm mounting with donor spindles

Mount the upper control arms to the chassis with the grease fittings pointed up. Use the mount holes that are **horizontal** on the top of the 2"x 3" tube, **not** the side vertical ones. Torque the two bolts that hold the arm to the frame to **135-149Nm (100-110 lbft).**

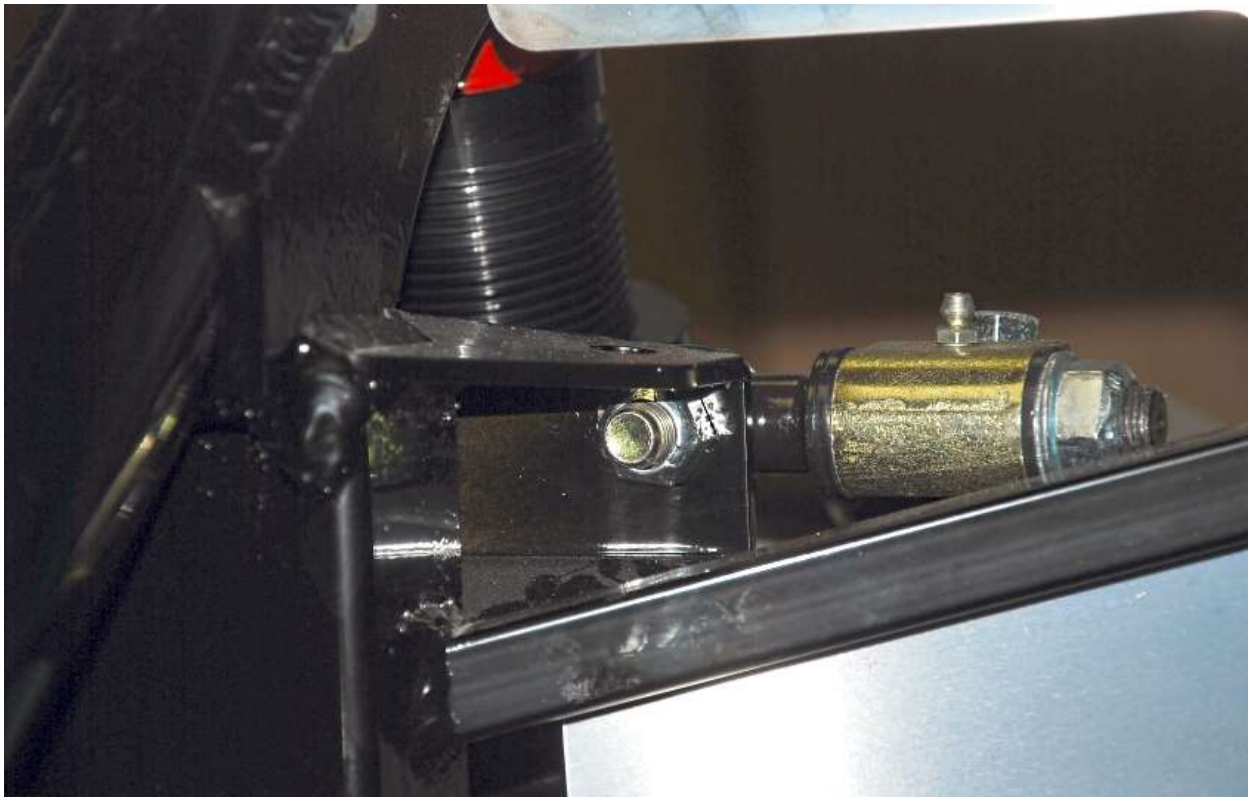


Front upper control arm mounting with FFR Spindles

Mount the upper control arms to the chassis with the grease fittings pointed up. Use the mount holes that are vertical on the side of the 2”x 3” tube, not the top horizontal ones.



Use a washer with the front locknut.



Do not use a washer on the rear locknut.

Torque the two bolts that hold the arm to the frame to **135-149Nm (100-110 lbft).**

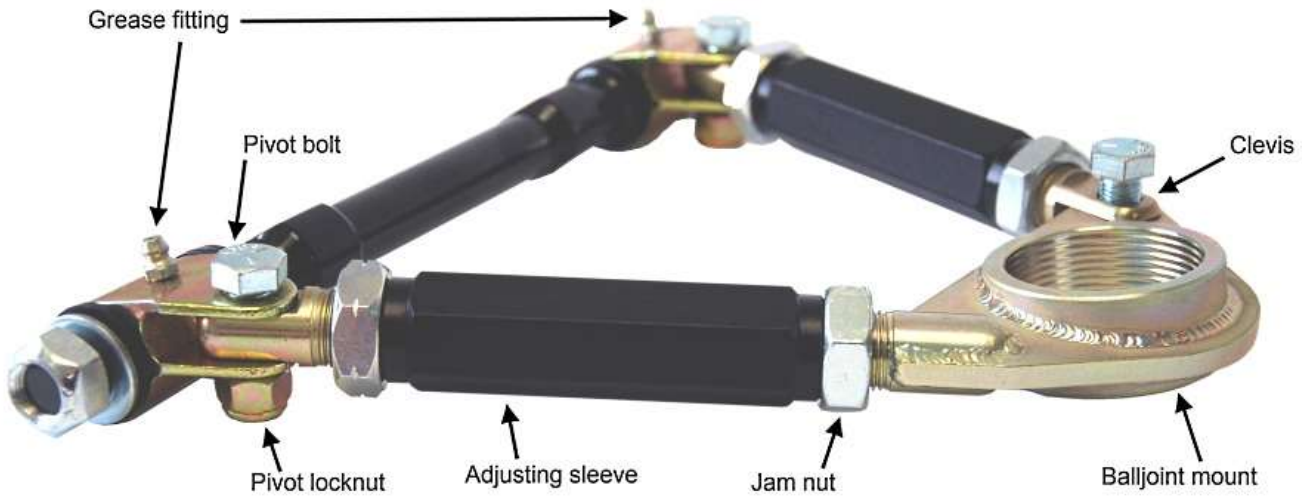
Pivot endplay

Adjust the locknuts on the ends of the pivot shaft so that there is minimal endplay but so the pivots can still rotate easily on the shaft.

- The pivots may be a little stiff at first but once on the car they will loosen slightly.

Adjusting the upper control Arm

- Use the diagram below for reference.



Slightly loosen the three pivot bolts using a ⅝" and $^{11}/_{16}$" wrench.

Loosen the jam nuts on both ends of each adjusting tubes using a 1⅛" wrench. Turn the adjusting tubes to lengthen or shorten the arm.

After you have adjusted the arm to the desired length, tighten down the jam nuts against the adjusting tubes, and then tighten each of the three pivot bolts. Torque the pivot bolts to 60 lbft.

Grease both ends using chassis grease frequently to insure smooth, trouble free operation.

- If the pivots will not take grease, the endplay may be too tight.
- There should never be more than 1" of thread showing past the tightened down jam nuts on either end of both adjusting tubes.

The Pivot Bolts must be loosened while the car is being aligned and retightened afterwards

Front Coil-Over Shock Assembly

- Snap ring pliers, ¾" wrench, ¾" socket, Ratchet, Torque wrench
- Front shock set, IFS Components, Insulated clip hardware.
- The front shocks are pre-valved at the factory in compression and rebound for good street use. The shocks can be adjusted in rebound as per Koni's instructions if so desired. The front springs are 500lb. Other springs are available for different ride characteristics.
- WARNING! Incorrect assembly and maintenance of this part can cause serious injury or death.

If using the silver double adjustable shocks, these must be mounted with the body of the shock down.

Unpack the front shocks, coil-over's and hardware.

Double check the jam nut under the rod end and bump stop to make sure that it is tight.
Screw the spring seat down on the sleeve so it is closer to the unthreaded end.

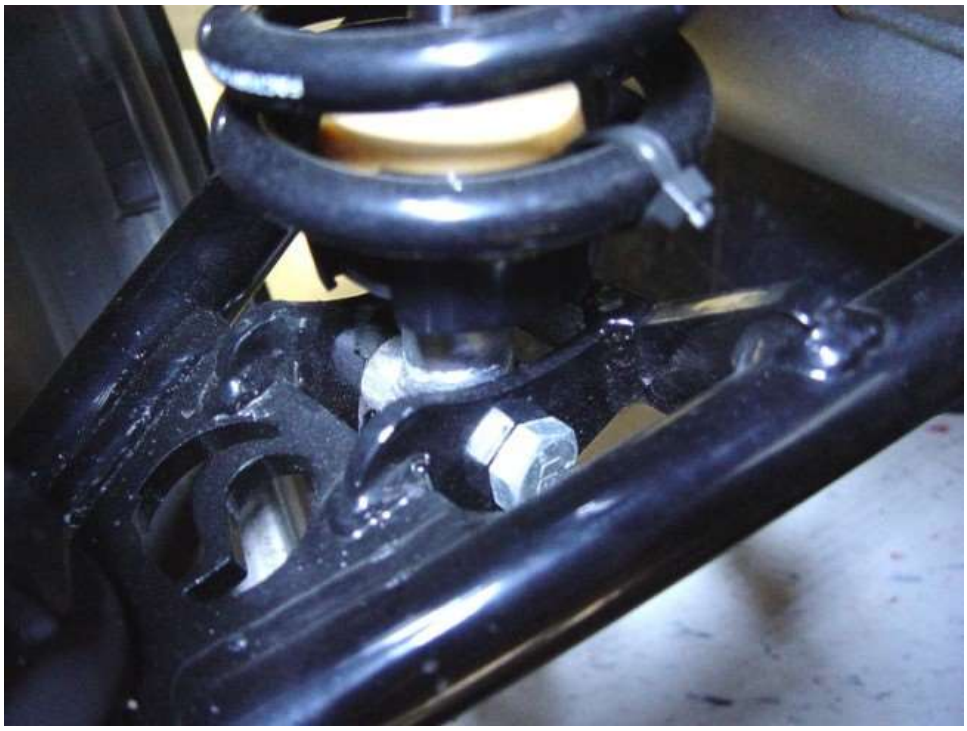
Slide the coil sleeve over the body of the damper beginning at the end which has the rubber bump stop. The unthreaded end of the sleeve goes first so that it will sit on the snap ring on the shock body.

The coil-over hats have a snap ring which holds it in place. Remove this snap ring to assemble the coil over shock.

Slide the rubber bumper about two inches down on the shaft.

Put the spring and hat on the shock and rotate the spring seat back up the sleeve so that the spring pushes the hat tight against the end of the shock.

Install the snap ring on the spring hat so that it holds onto the shock end. Make sure that the slot in the snap ring and the slot in the spring hat are not aligned.



Pass the shock assembly (**with the body of the shock up**) through the upper control arm and attach them to the lower control arm using the 0.43" spacers that are supplied in the kit.

Check for shock clearance on brake lines, emergency brake cables, brake calipers, frame and axle parts.

Check to make sure that the spring is seated correctly on the shock.

Run zip ties through the holes in the spring hat and around the spring to prevent the spring from becoming unseated.

Fasten the shock to the top mount with the fasteners and 0.675" spacers provided and torque both upper and lower mounts to **40 ft-lbs**.

Spindles

If assembling a complete Coupe kit with the FFR spindles, skip to the next section.

Donor Spindles

$^{13}/_{16}$" socket, Torque wrench, Needle Nose Pliers, Rubber Mallet

IFS components, Mustang Spindles.

Make sure the grease boot is in place on the lower ball joint then mount the spindle to the lower control arm.

Attach the castle nut and torque the ball joint to **106-149Nm (80-110 lbft)** and install a new cotter pin from the IFS components assembly.

FFR Spindles

$^{13}/_{16}$" socket, Torque wrench, Needle Nose Pliers, Rubber Mallet

Spindle Assembly, IFS components.

Unpack and lay out the hardware for the spindles assembly.

The spindles are marked DSS (Driver Side Spindle) and PSS (Passenger Side Spindle). These refer to the way they are mounted on the FFR Hot Rod. Which is rear steer The FFR Roadster uses these as Front steer so they are mounted opposite, The DSS spindle is mounted on the Passenger side and the PSS spindle is mounted on the Driver side.

Make sure the grease boot is in place on the ball joint then mount the spindle to the lower control arm.

Place the spacer under the castle nut to ensure that the cotter pin is at the correct height. Torque to **106-149Nm (80-110 lbft)** and install the cotter pin.

Attach the upper ball joint to the spindle and torque to **75 ft-lbs** and install the cotter pin.

The upper ball joint boot will look crushed and out of shape when the car is in the air, this is OK. The boot will seat when the car is on the ground.

Bolt the steering arms to the spindles with the taper facing down. Torque to **60 ft-lbs**.

The hub is a snug fit on the spindle and may require a light tap with a soft mallet to get in place. Torque the hub nut to **305-338Nm (225-250 ft-lbs)**.

Using a large socket or a flat head screwdriver and rubber mallet, hit the dust cap onto the hub.

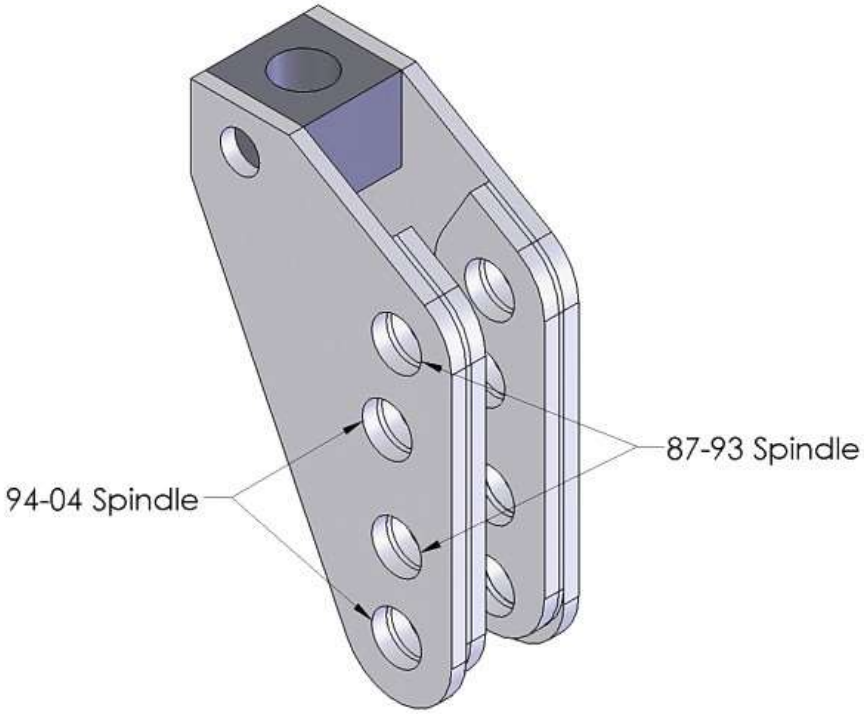
Front Suspension Torque Specs Chart

Item	Nm	Lbft
Front lower control arm to frame	135-162	100-110
Front lower ball joint to spindle	106-163	80-120
Upper A-arm to frame	135-162	100-110
Upper ball joint to Spindle	95-122	70-90
Spindle hub nut	305-338	225-250

IFS Bracket

IFS components, Mustang strut bolts

These are not used in the complete Coupe kit



- Using the 87-93 spindles, use the hole closest to the ball joint and the third hole down. Using a 94-04 Spindles, attach the bracket using the bottom and third hole up so that the ball joint is further away from the spindle.

Attach the Spindle adapter bracket to the upper control arm to the spindle using the factory strut bolts and torque to 135-149Nm (100-110 lbft).

Attach the upper ball joint to the spindle and torque to **75 ft-lbs** and install the cotter pin.

The upper ball joint boot will look crushed and out of shape when the car is in the air, this is OK. The boot will seat when the car is on the ground.

Front Brakes

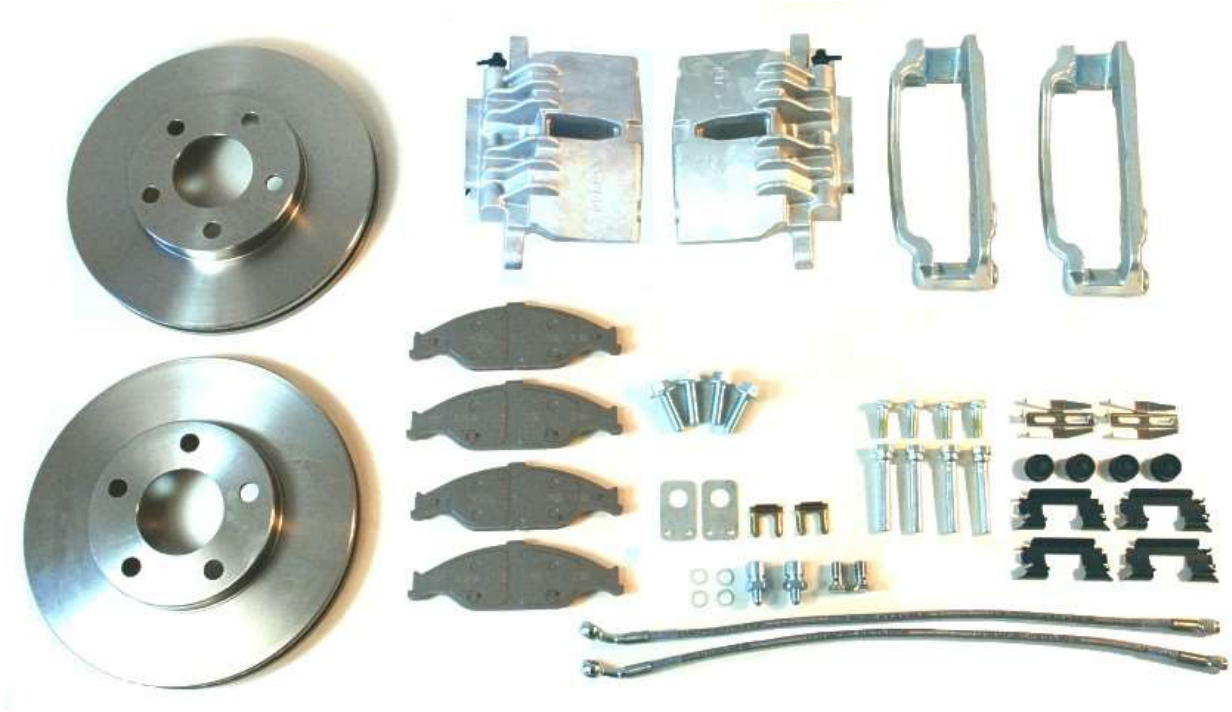
Sockets, Ratchet, Torque wrench, chassis grease, rags, brake cleaner,
Mustang front brake calipers and rotors
Make sure that your brake pads and rotors are in good condition.

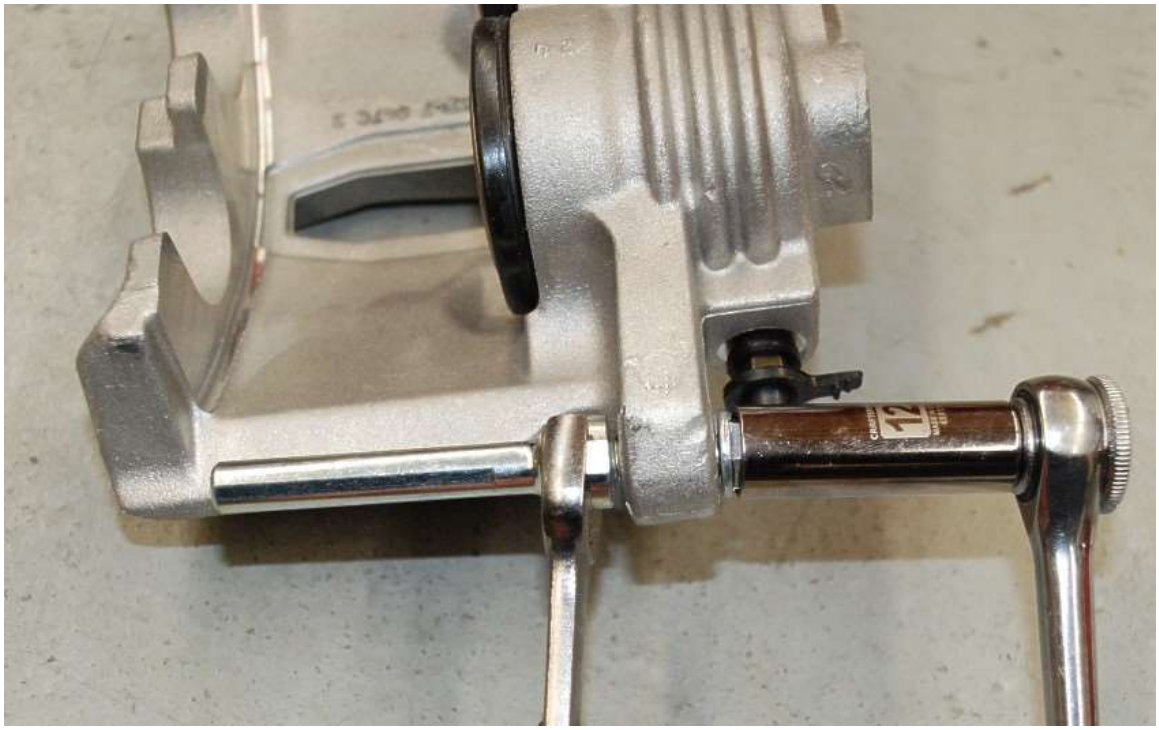
Donor Front Brakes

Make sure that the hub bearings are greased correctly and adequately.
Push the rotor onto the spindle.
Push the outer bearing on then the flat washer, and adjusting nut.
Adjust the bearing play.
Attach the nut lock and insert a cotter pin.
Using a large socket or a flat head screwdriver and rubber mallet, hit the dust cap onto the rotor.
Clean the rotor with brake cleaner.
Install the caliper on the spindle; make sure that the fluid bleeder is at the top of the caliper. Torque the caliper mounting bolts to **61-88Nm (45-65lbft)**.

Complete kit Front Brakes

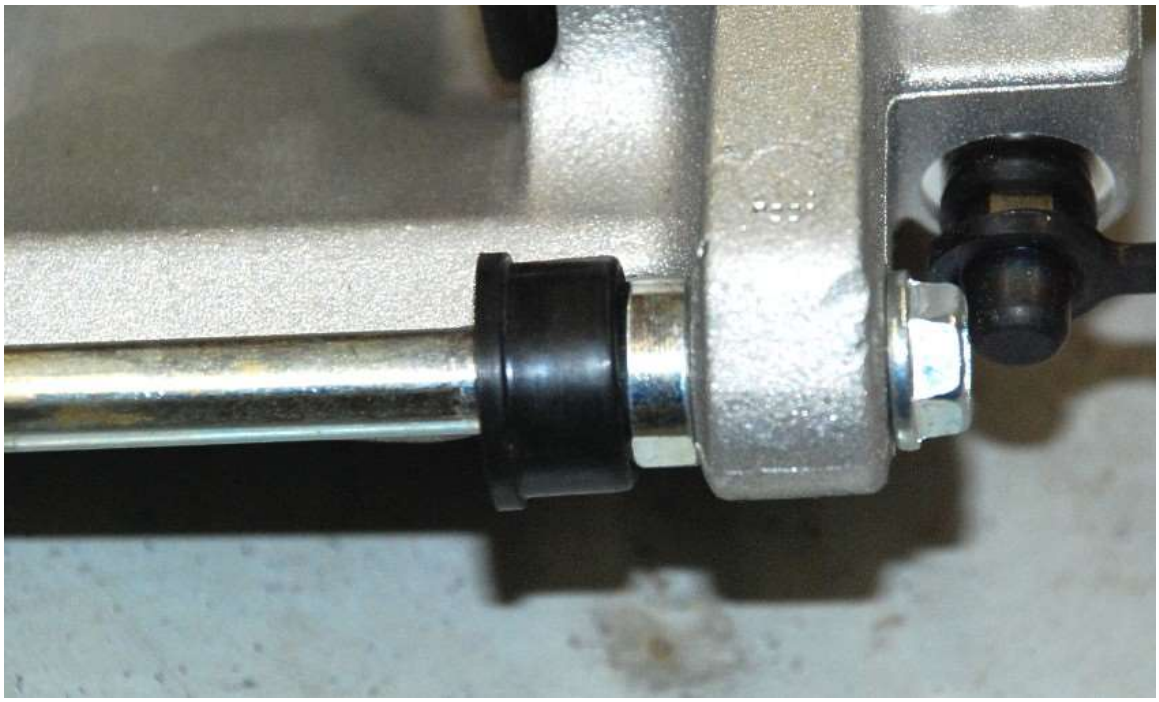
12mm socket, Ratchet, 16mm wrench, Torque wrench, thread locker
Front 11" Caliper/Rotor Assembly



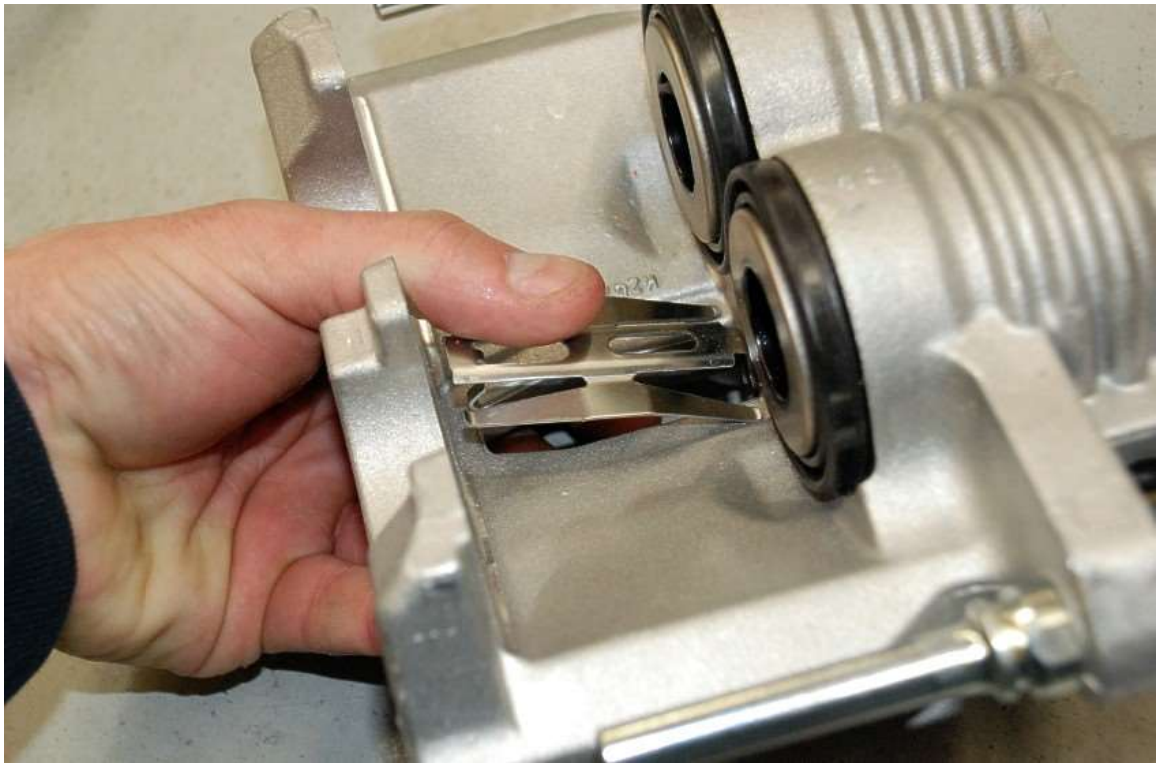


Install the caliper slider pins on the caliper using the supplied bolts and a 16mm wrench and 12mm socket. Torque to **23-26 ft-lbs**.

Install the slider grease boots on the slider pins.

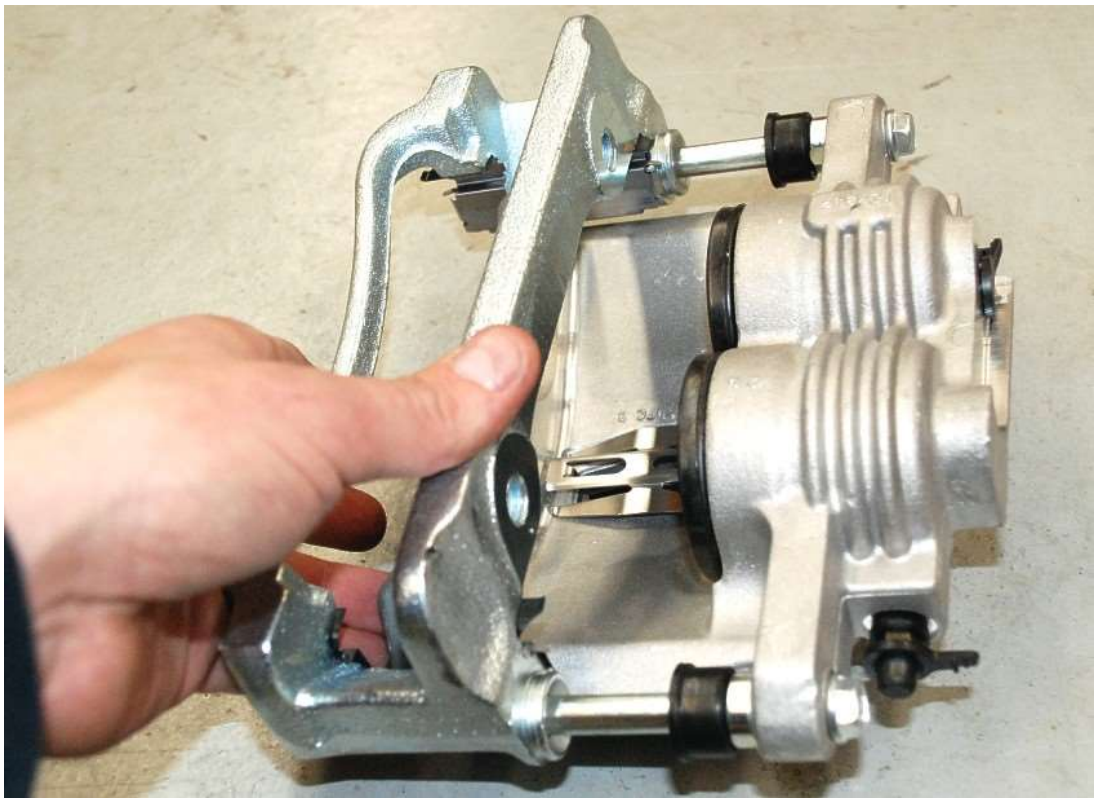


In the supplied hardware bag there are six steel clips that are designed to separate the pads from the caliper. These clips allow the pads to slide on a smooth surface and not wear on the caliper. The four clips that go on the ends of the hanger are different end to end, and must be installed with the long tab facing out.

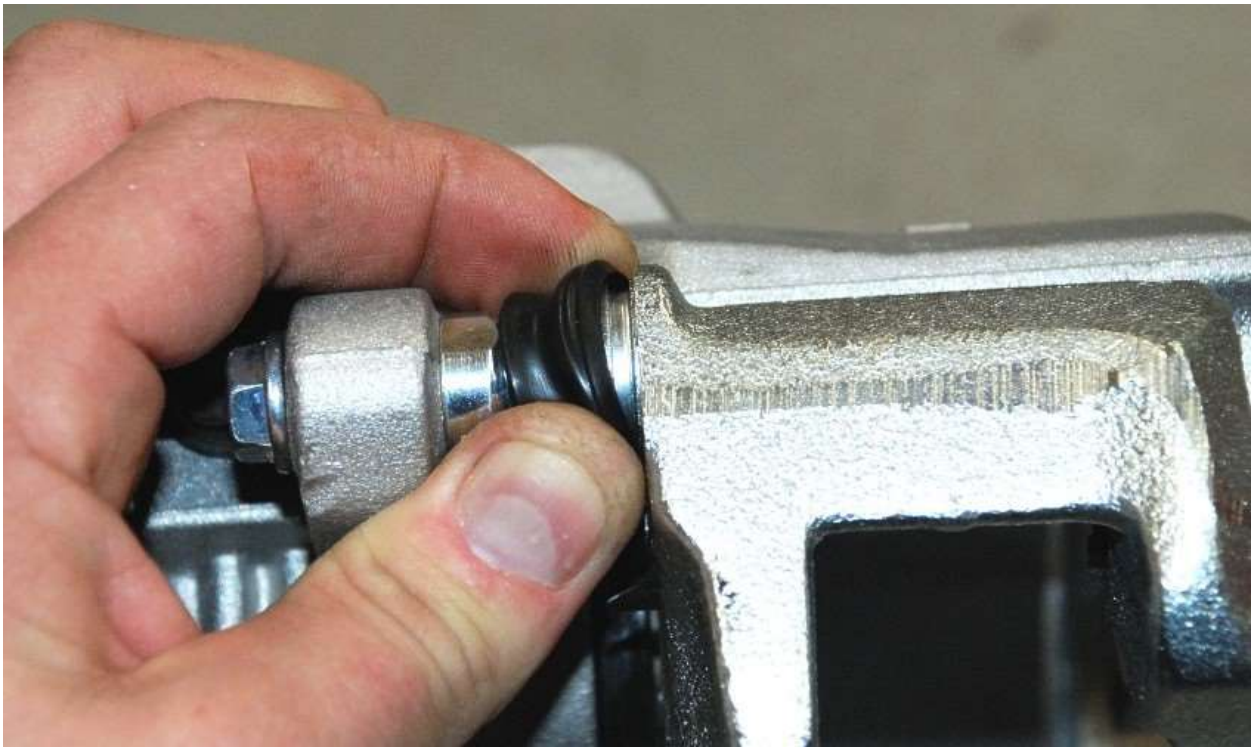


The two clips that are left go in the center of the caliper with the tab sticking up through the center hole. Insert the clip from the inside of the caliper through the large center hole with the larger tab on the side facing the pistons then press down on the outer part of the clip so the small clip goes through the large hole and clips on.

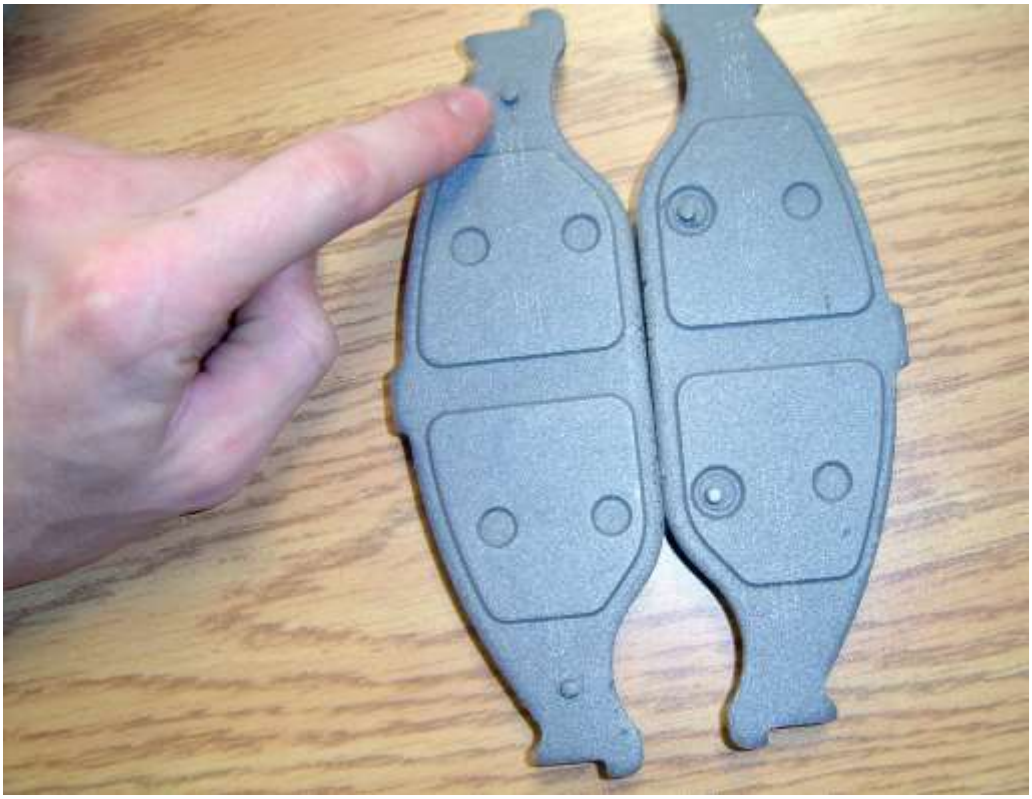
Grease the slide pins using the supplied grease.



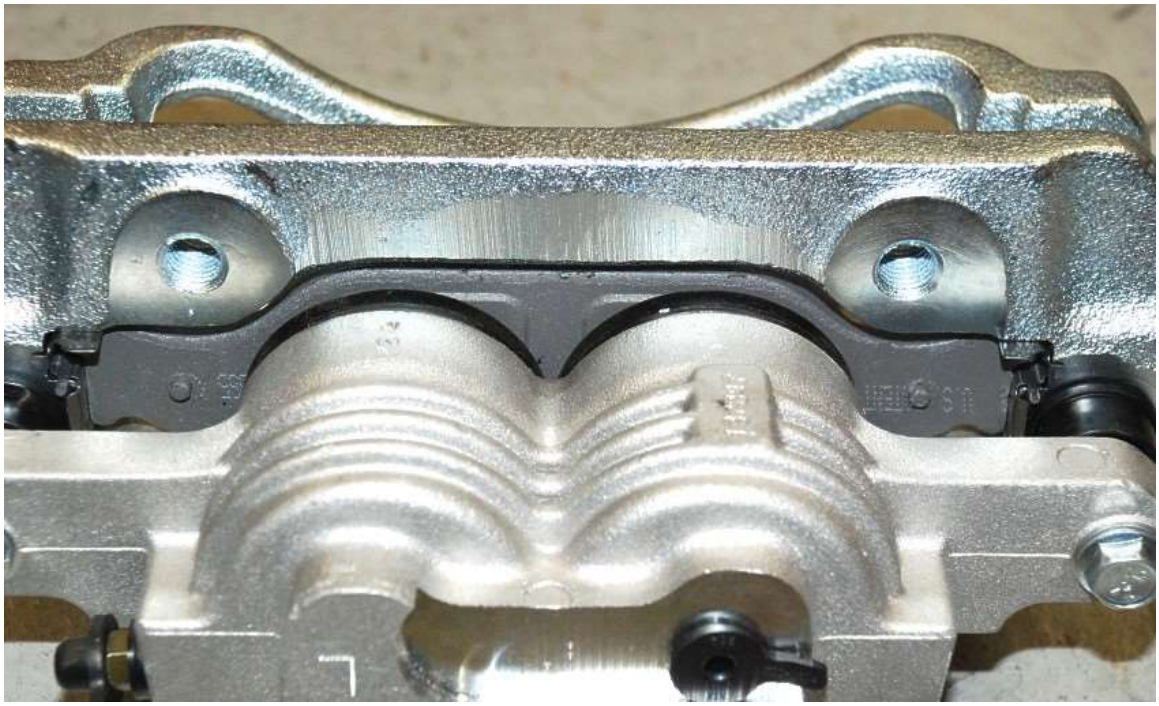
Slide the caliper hanger onto the caliper.



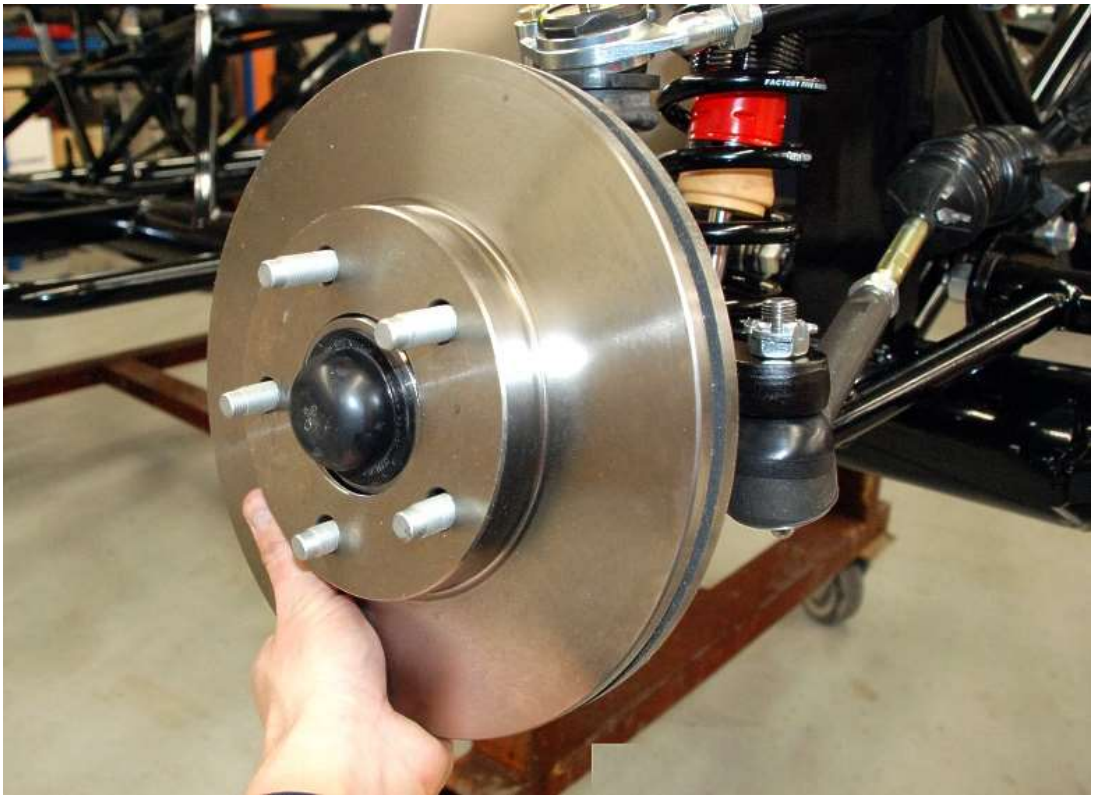
Push the rubber boots over the lip on the caliper bracket to seal the slider bolts correctly.



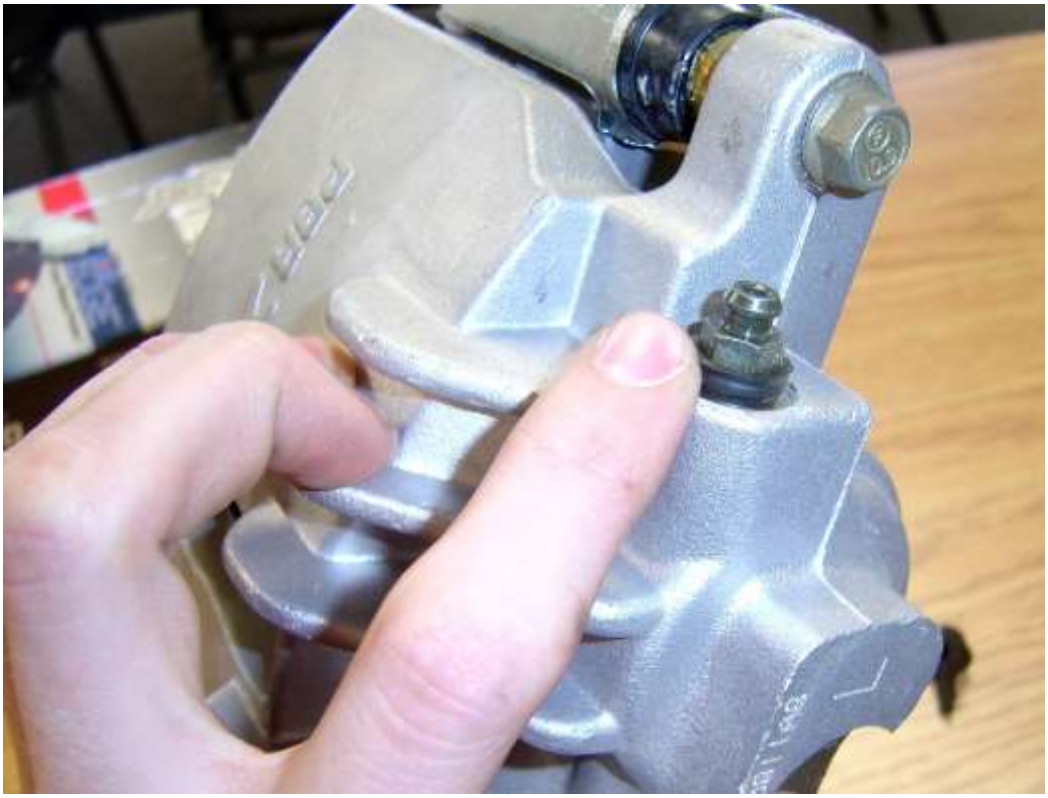
Look at the back side of each brake pad to find the inside pads and the outside pads. The difference is the location of the studs that are on the back of each pad. The studs on the inside pads are out near the ends of the pad, while the studs on the outside pads are near the middle.



Install the brake pads in the Caliper.



Clean the rotor with brake cleaner and push it onto the hub.



Install the caliper on the spindle; make sure that the fluid bleeder is at the top of the caliper.

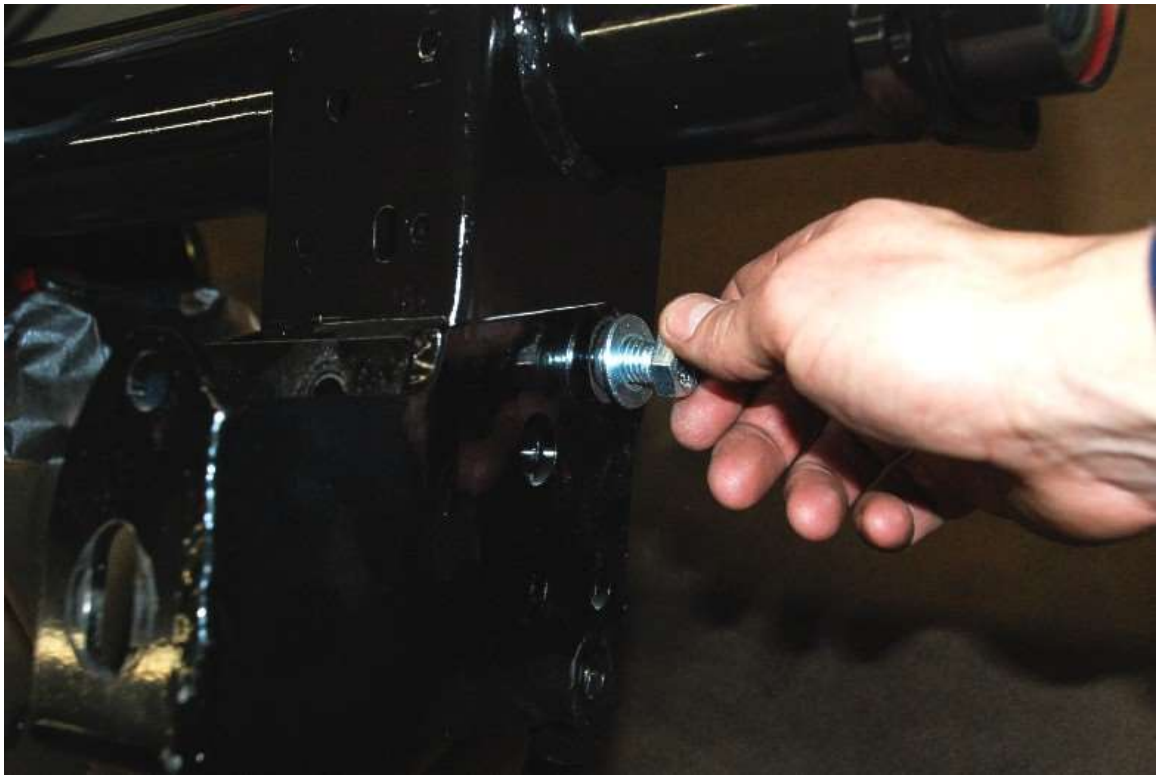
Torque the caliper mounting bolts to **130Nm (95 ft-lb)**.

Solid Axle Rear Suspension

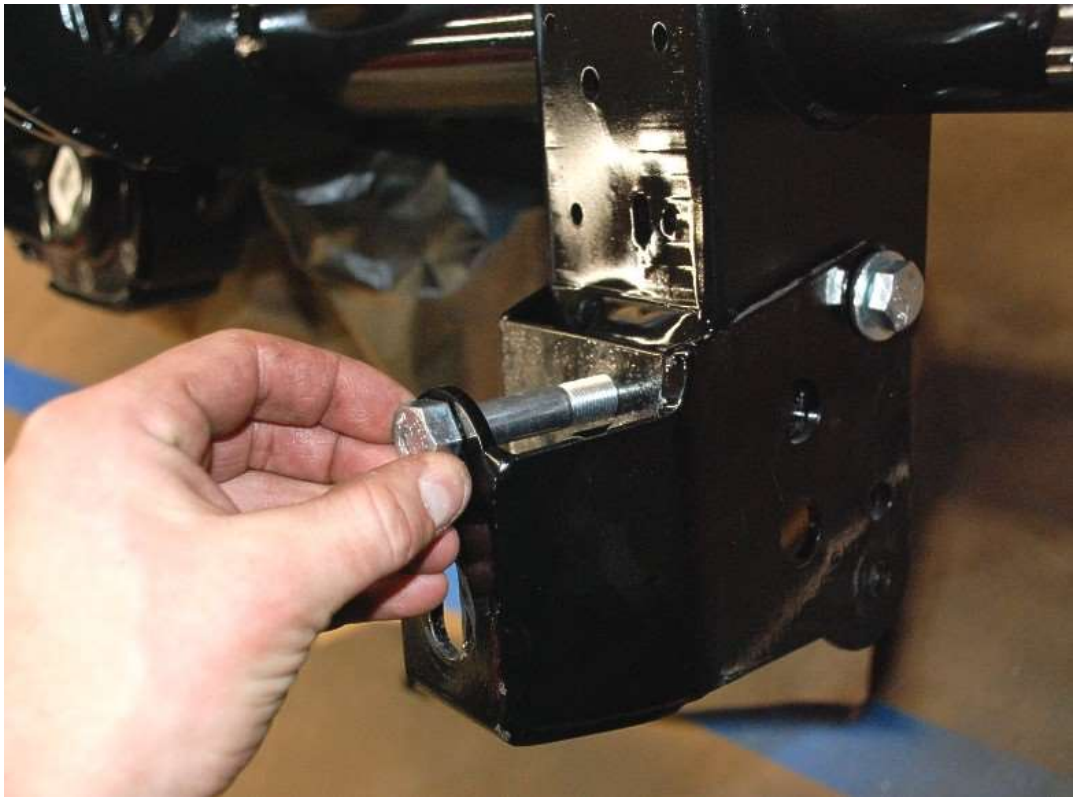
- 🛠 ¾” sockets, ¾” wrench, ½” drill bit, drill, floor jack, jack stands, Torque Wrench
- ✋ 8.8” Rear axle assembly, Box 11 Solid axle Traction Lok brackets, Rear control arms.
- ✋ Use caution when working with the rear end assembly, it weighs 225 lbs.
- ✋ Skip to the Independent Rear suspension if not installing a Solid axle.
- ✋ See the donor parts prep section if the control arm holes have not been drilled out

Axle Bracket Driver's Side

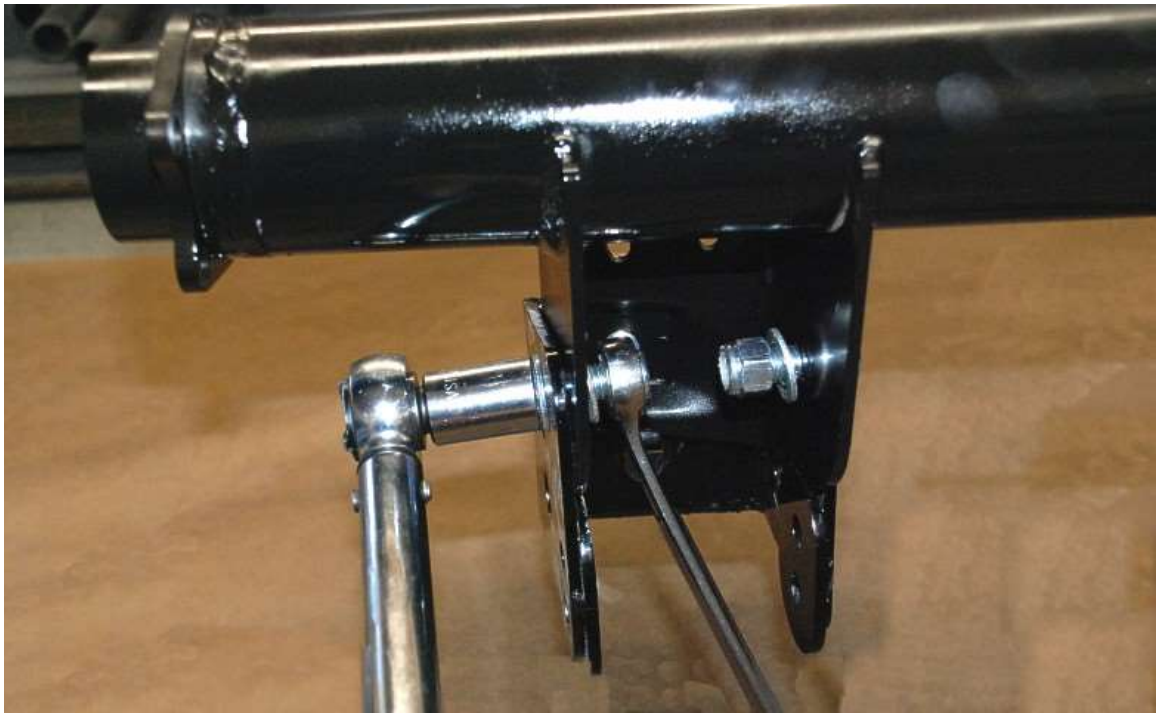
Axle Bracket Passenger Side



Position the Traction Lok brackets on the rear end with the bolts provided (the two short bolts go on the sides).



Temporarily put the lower shock bolt through the traction lock bracket and stock shock hole on the axle.



Tighten the two short bolts. Torque to Ford Specs 75-95 Nm (**55-70 lbft**).

Attach the lower control arms to the brackets on the axle using the bolt provided. Torque to 101-111Nm (**75-82 lb-ft**)

- The lower bolt holes provide more traction than the upper holes.
- If using Rear coil-over shocks, skip the next section.

Spring Perch mounts

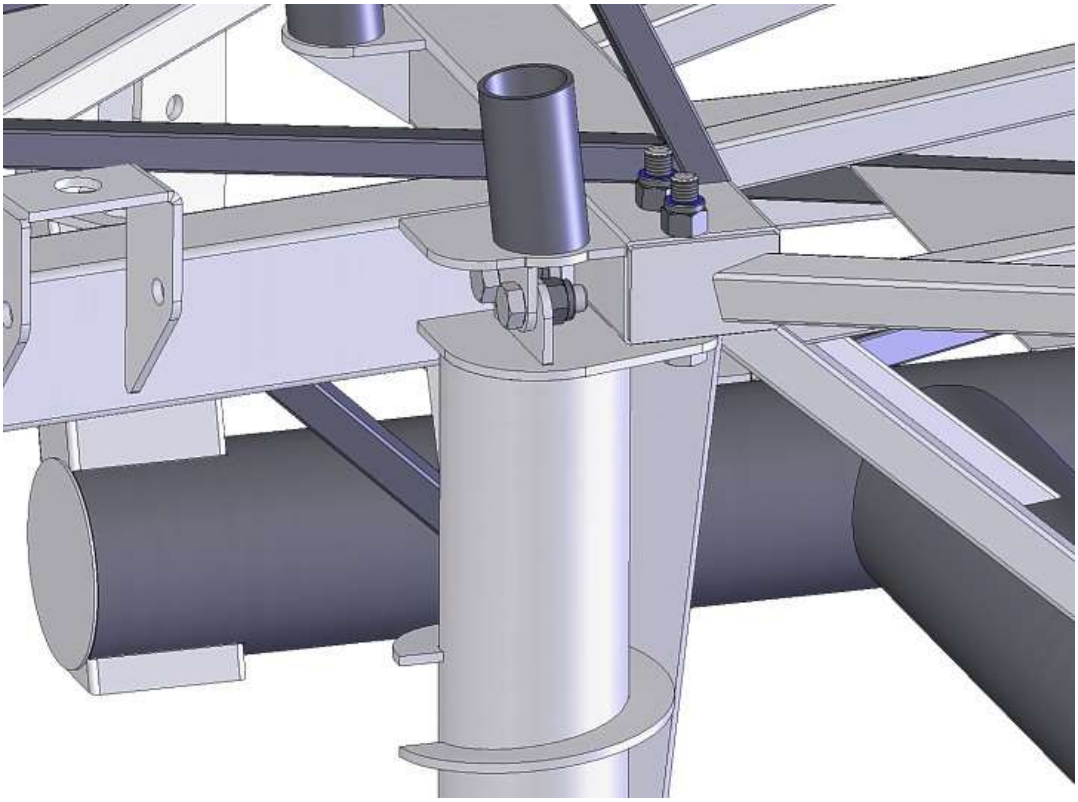
½" drill bit, drill, ¾" wrench, ¾" socket, ratchet

Rear spring perches, Mustang springs and rubber isolator mounts

Hold the spring perches up to the frame so the vertical perch mount is in between the 2"x 3" tube and the vertical frame mount.

Mark the location of the holes on the bottom of the 2"x 3" tube with a marker.

Drill the two hole locations all the way through the tube using a ½" drill bit.



Bolt on the perch using the ½" bolts provided.

Thread the cut rear springs onto the conical frame mounts all the way.

Insert the cut rubber spring mount between the spring and the steel seat. Make sure the end of it is flush with the end of the spring mount.

Suspension height adjustments are done in the rear by turning the spring from its normal position on the mount to a position higher or lower. Remember that the spring is located halfway to the arm mount, so any height changes at the spring will be multiplied by roughly two at the axle.

4 Link Rear Suspension

18mm sockets, ratchet, 15mm wrench

Mustang upper control arms and hardware.

Attach the Mustang upper rear control arms loosely to the rear end using the Mustang hardware.

Skip the 3 Link section and continue on with the **rear axle** section.

Optional 3 Link Rear Suspension

$^{3}/_{16}$”, ⅜”, ½” drill bits, ⅝”, ¾”, $^{15}/_{16}$”, 1” wrenches, ⅜”, ⅝”, ¾”, $^{15}/_{16}$” sockets, $^{5}/_{16}$” Hex key, Ratchet, Torque Wrench, Drill, Ruler/Tape measure, Pliers, Flat head Screwdriver, Tin Snips/scissors/razor, Marker.

3-Link rear suspension with kit.

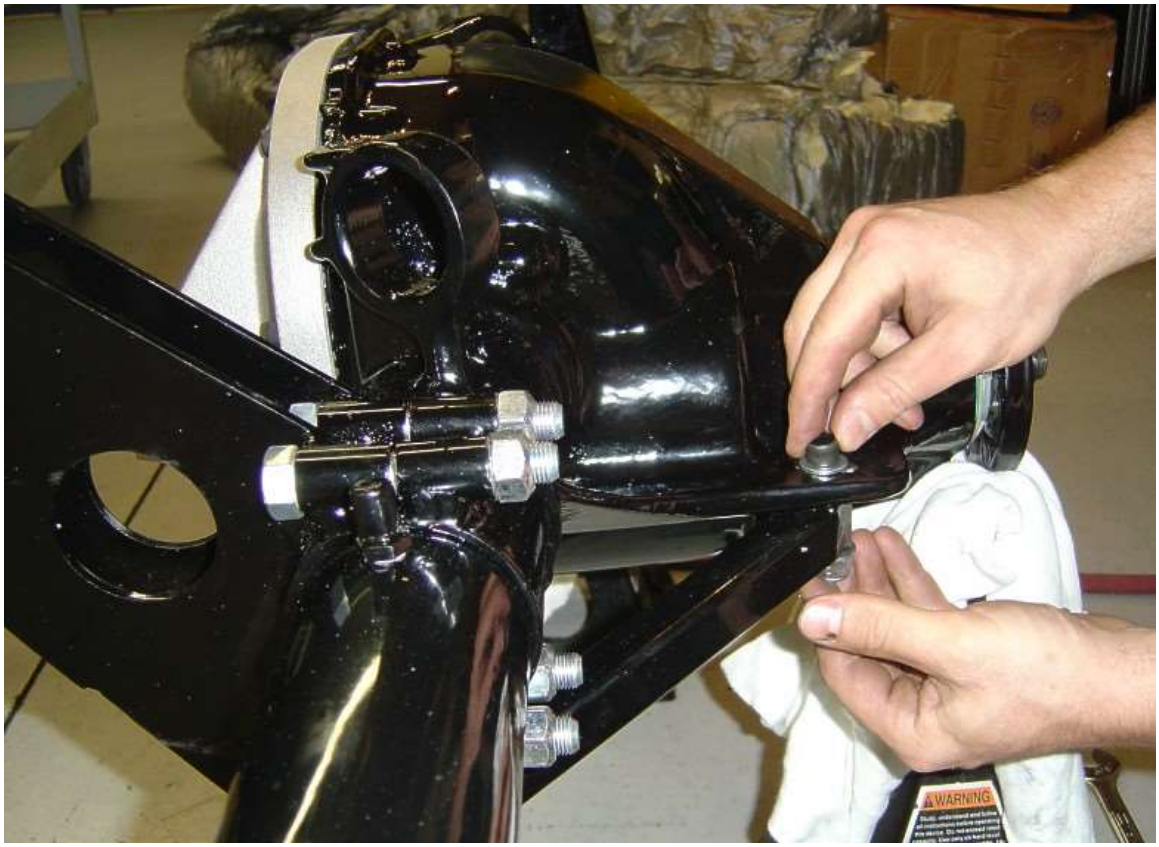
Upper Link Axle Mount

If using the FFR Moser axle skip to the next section since the upper link bracket is welded to the axle.

Test fit the two halves of the upper arm mount together. If it is hard to put all of the bolts in the mount holes, put in as many as you can then use a ½” drill bit through the remaining bolt holes.

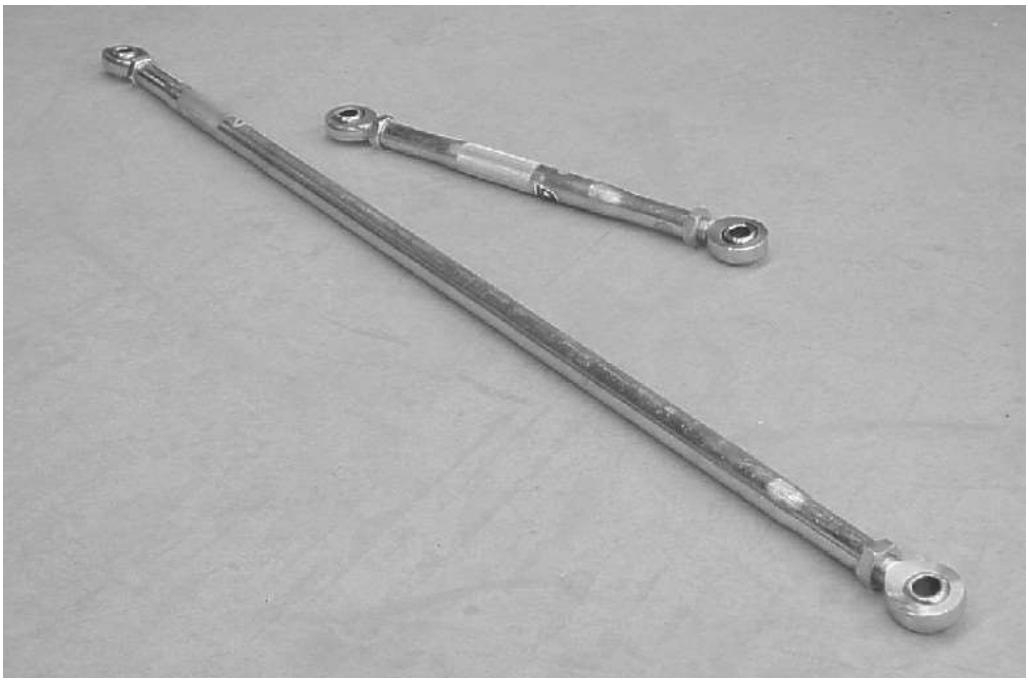
Attach the upper link bracket onto the axle using the fine hardware (FFR# 12217 & 12218)

The front attachment of the upper link axle mount attaches to the hole on the flange section of the pumpkin. This hole has some variance and may need to be drilled out from the bottom side using the mount as a guide.



Attach the front of the upper link axle mount to the front axle flange.

Install a jam nut on each of the rod ends, remembering that two of them are left hand thread.



Insert the rod ends into the swedged tubes (one is right hand thread and one is left hand thread). The longer tube is the Panhard bar and the shorter one is the upper link.

Upper Link

Attach the short upper link tube to the axle upper link mount using the ¼" spacers on either side of the rod end.

Rear Axle installation

✋ Have someone help with this step, the rear axle is very heavy and mistakes can result in serious injury.

Use a floor jack to position the rear axle assembly under the frame.

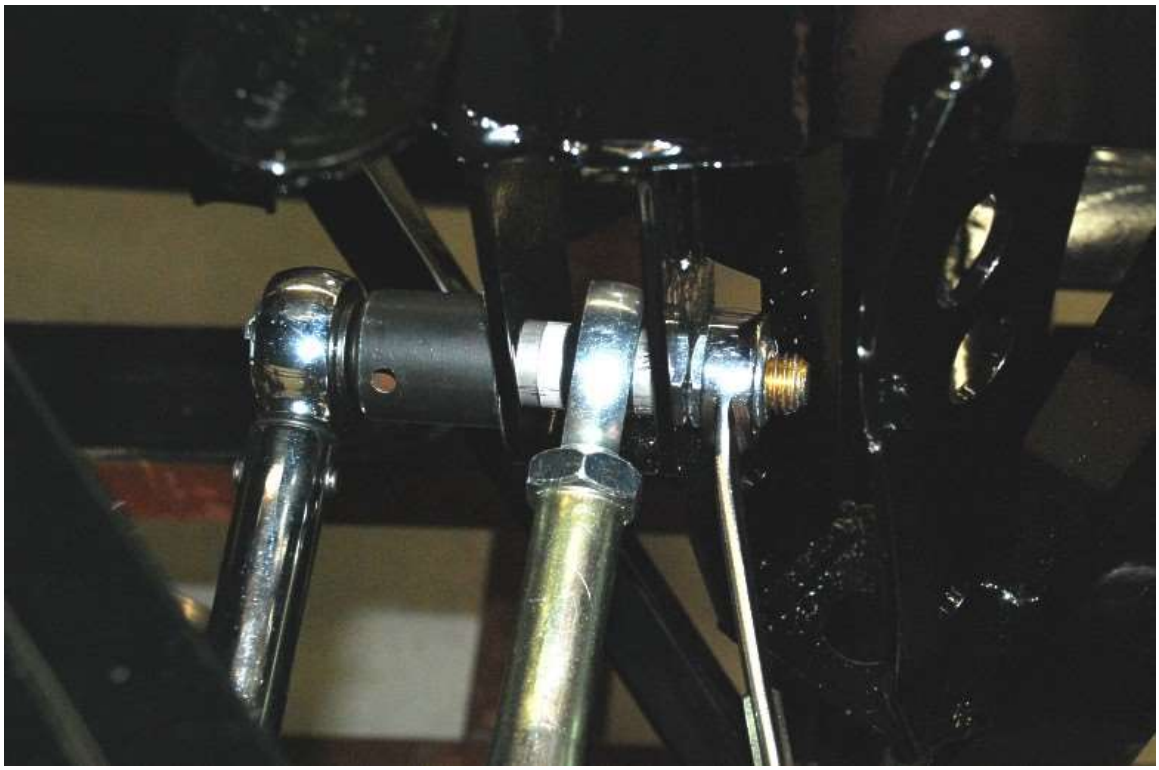
- Make sure that the rear jack stands are positioned under the 4” round tube as far back as possible to prevent the frame from tipping up once the axle is mounted
- Do not hold the end of the axle from the bottom of the disc, if the axle falls, the axle can crush your fingers and result in serious injury.

With one person holding a side of the axle, raise the axle so that the lower control arms can be bolted onto the frame.

Attach the lower control arms to the frame mounts.

Jack the rear axle up.

If using a 4 link, attach the upper control arms to the frame.



If using a 3 Link, attach the upper link to the frame.

- If using the stock Mustang shocks, skip the next section.

Optional Rear Coil-Over Shock Assembly

- Snap ring pliers, ¾" wrench, ¾" socket, ratchet, ruler, marker, hack saw.
- Roadster/Coupe rear shock kit
- The rear shocks are pre-valved at the factory in compression and rebound for good street use. The shocks can be adjusted in rebound as per Koni's instructions if so desired. The rear springs are 350lb. Other springs are available for different ride characteristics.
- WARNING! Incorrect assembly and maintenance of this part can cause serious injury or death.
- If using the silver double adjustable shocks, these must be mounted with the body of the shock down.

Unpack the rear shocks, coil over's and hardware.

Double check the jam nut under the rod end and bump stop to make sure that it is tight.

Screw the spring seat down on the sleeve so it is closer to the unthreaded end. The center high part of the set should be pointed away from the unthreaded end.

Slide the coil sleeve over the body of the damper beginning at the end which has the rubber bump stop. The unthreaded end of the sleeve goes first so that it will sit on the snap ring on the shock body.

The coil-over hats have a snap ring which holds it in place. Remove this snap ring to assemble the coil over shock.

Slide the rubber bumper about two inches down on the shaft.

Put the spring on the shock, then install the spring hat on the shaft end of the shock and push the rubber bumper up against it.

Rotate the spring seat back up the sleeve so that the spring pushes the hat tight against the end of the shock.

Install the snap ring on the spring hat so that it holds onto the shock end. Make sure that the slot in the snap ring and the slot in the spring hat are not aligned.

Assembled solid axle Koni coil-over shock.

Use zip ties to hold the spring to the spring hat.

Attach the body end of the shock to the upper shock mount using the two equal length (1.09”) spacers.

Jack the rear axle up so the rod end of the shocks can be mounted on the axle through the shock mount hole.

Rear shocks

🛠 Torque wrench, ratchet, ¾" socket, 15mm wrench

🚗 Mustang vertical shocks, quad shocks, quad shock brackets, Quad shock fasteners assembly, rear spring perches, rear traction Lok brackets/fasteners.

Attach the rear vertical shocks at the top through the holes in the plates located in the trunk area using the Mustang rubber bushings and fasteners. **Torque to 37-47Nm (27 lbft)**.

Passenger side

Driver Side

Install the kit ½"x 4" bolts are provided for each lower shock mount. From the rear, the bolt goes through the bracket, ⅛" shim, shock, then the long spacer (1.09") followed by the bracket and axle. Use a ¾" socket and Torque wrench to tighten both upper and lower mounts to **40 ft-lbs**.

Check for shock clearance on brake lines, emergency brake cables, brake calipers, frame and axle parts.

Check to make sure that the spring is seated correctly on the shock.

Mount the quad shocks and their brackets to the rectangular frame plate hanging under the 2"x 3" tube behind the axle.

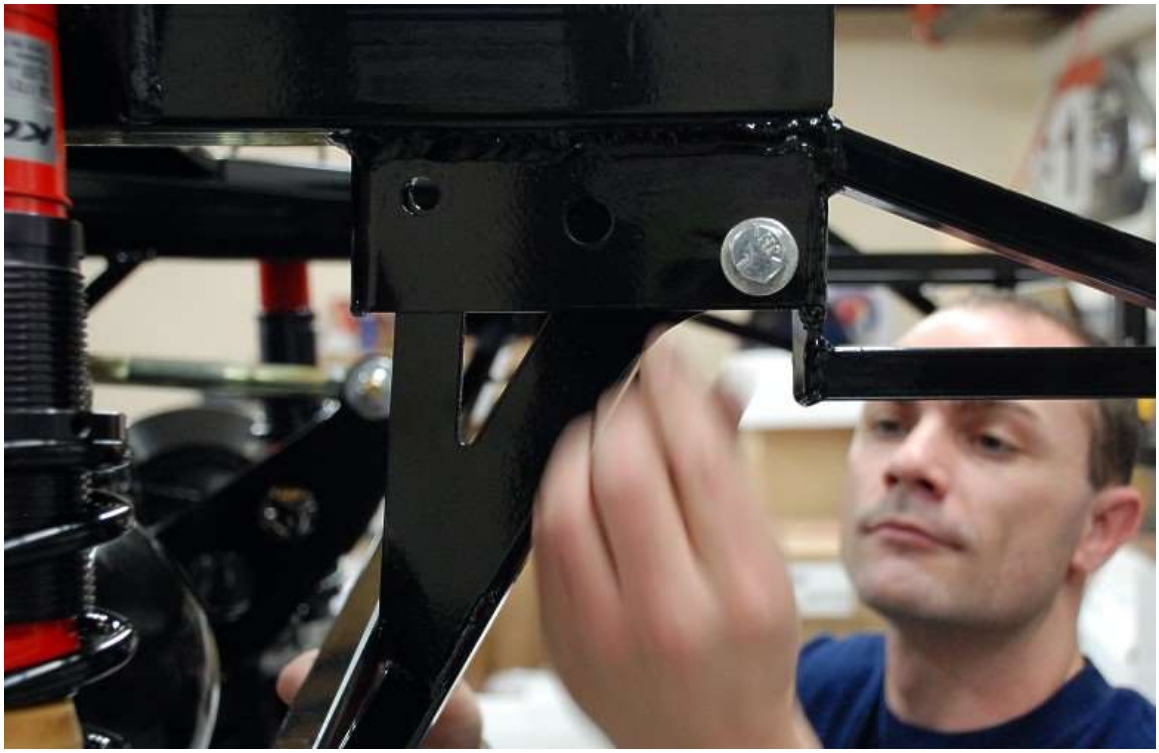
Attach the rear end axle straps (included with the kit). These cables will prevent drive shaft binding if you happen to achieve airborne status. The rear end straps bolt to the front bolt of the quad shock up high, and back side of the vertical shock down low.

4 LINK REAR SUSPENSION TORQUE SPECS CHART

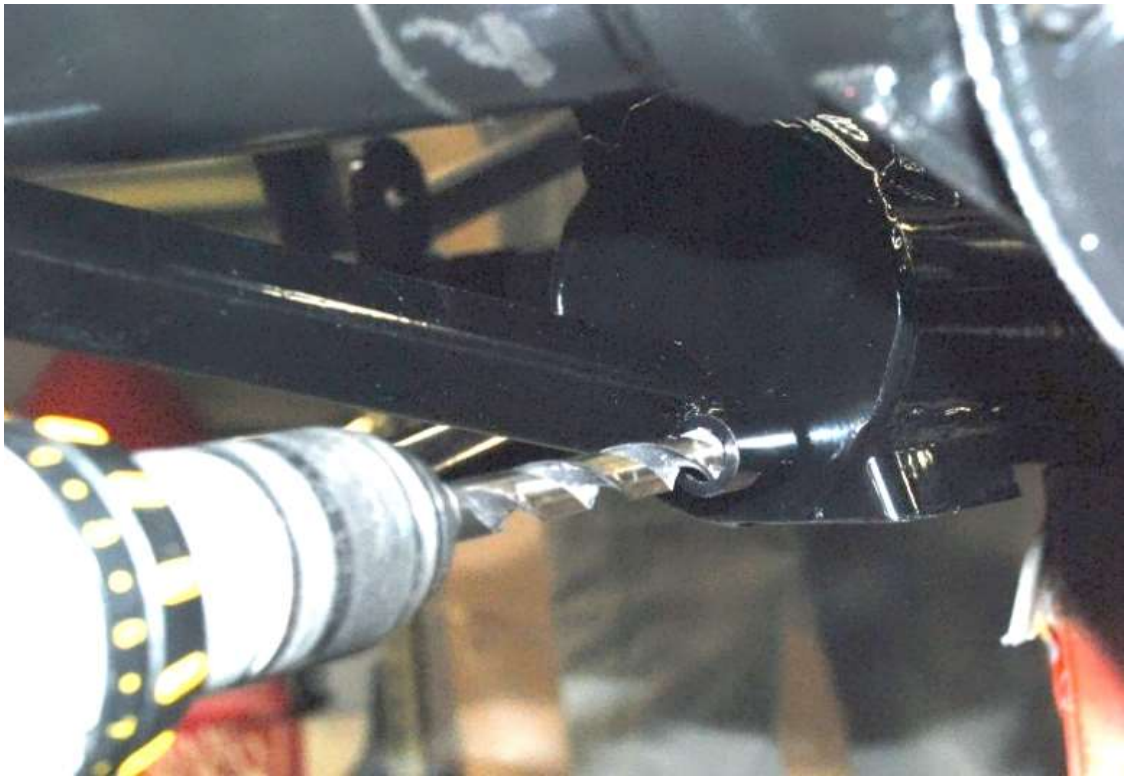
Item	Nm	Lbft
Upper control arm to axle	101-111	75-82
Upper control arm to frame	101-111	75-82
Lower control arm to axle	101-111	75-82
Lower control arm to frame	101-111	75-82
Upper Mustang shock to frame	37-47	27-34
Lower Mustang shock to axle bracket	54-67	40-50
Upper optional shock to frame	54-67	40-50
Lower optional shock to axle bracket	54-67	40-50

If running a 4 link, skip to the Firewall and Driver front footbox aluminum section.

Panhard Bar Frame mount

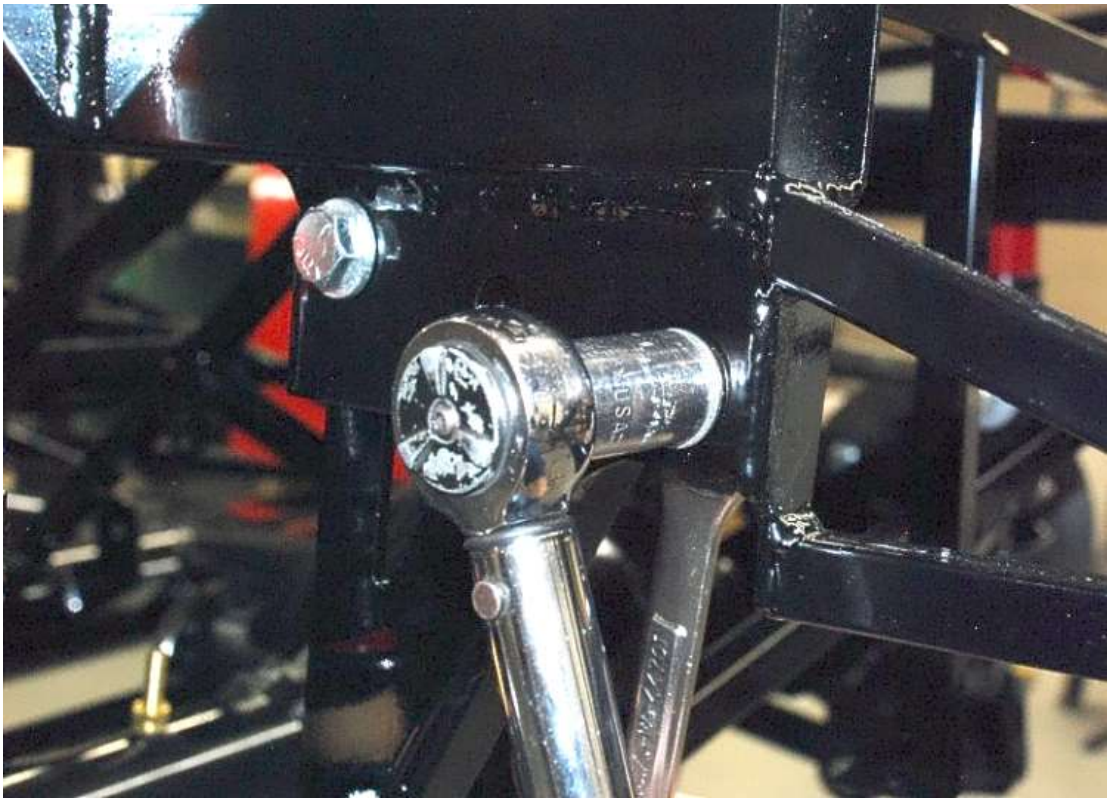


Attach the Panhard Bar frame mount to the inside of the quad shock brackets, the forward leg will attach to the back of the angled 2”x 3” tube. Do not tighten the quad shock bracket bolts yet.

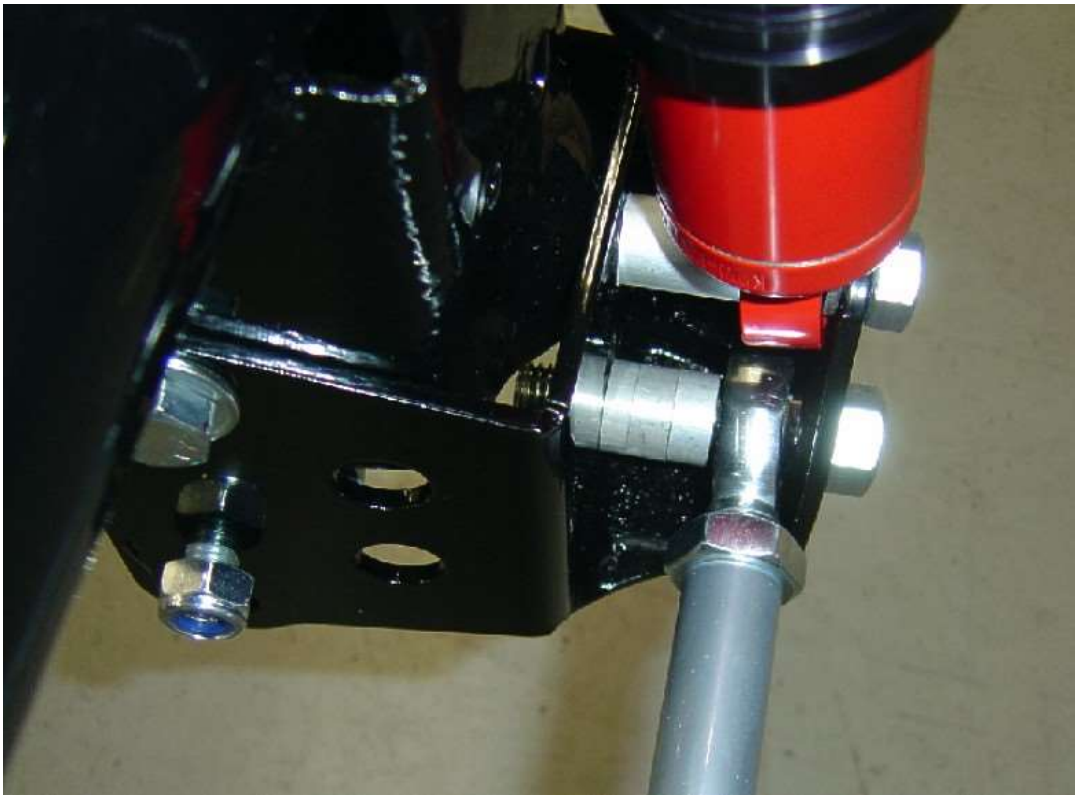


For the front mount, use a ½" drill bit and drill through the sleeve on the mount. Make sure before drilling that the hole is away from the side of the 2"x 3" tube so that a nut can be attached on the back of the bolt from the bottom of the tube.

Install the ½"-13 x 2.5" bolt and tighten.



Tighten the bolts on the quad shock brackets.



The Panhard bar mounts to the car using the ½" bolts and spacers. Install the Panhard bar to the passenger side traction lock bracket. Three spacers are used in the front (2) 0.375" and (1) 0.25". The rear uses the thin 0.125" shim. It will be necessary to adjust the length some to fit, make sure that you adjust the same amount on both sides. There should never be less than ¾" of threads screwed into either the Panhard bar or the upper arm.

Attach the Panhard bar to the frame mount using the spacers provided.

- There should never be less than ¾” of threads screwed into either the Panhard bar or the upper arm.

To set the pinion angle, make sure that your ride height is where you want it, and then adjust the upper arm until the desired angle is reached. We usually run about 2° up on the rear axle, but you can adjust this to fit your particular set-up.

The Panhard bar can center the axle left to right in the frame.

At ride height, level the Panhard bar as much as possible.

Double check all your nuts and bolts, and make sure that all four jam nuts are tight.

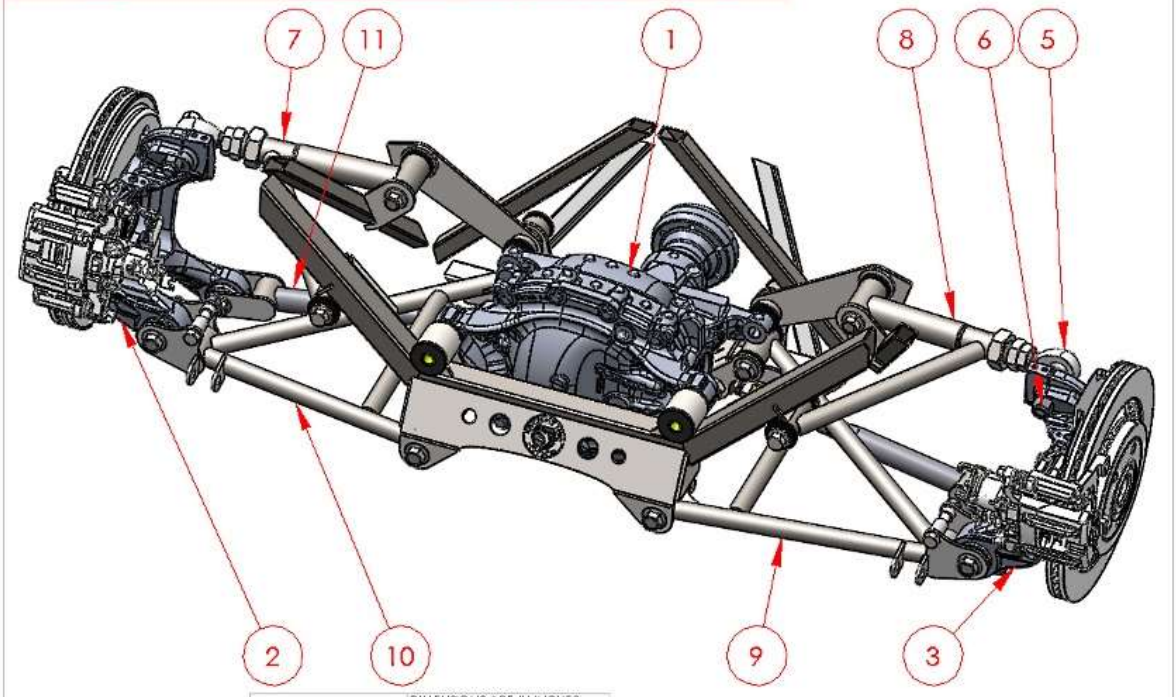
3 Link Rear Suspension Torque Specs Chart

Item	Nm	Lbft
Upper link to axle	101-111	75-82
Upper link to frame	101-111	75-82
Lower control arm to axle	101-111	75-82
Lower control arm to frame	101-111	75-82
Upper shock to frame	54-67	40-50
Lower shock to axle bracket	54-67	40-50
Panhard bar	101-111	75-82

- If a 3-link was used, skip the next section on the IRS.

Optional Independent Rear Suspension – Standard width

ITEM NO.	PART NUMBER	DESCRIPTION	Roadster/QTY.
1	CENTER SECTION		1
2	LEFT SIDE SPINDLE		1
3	RIGHT SIDE SPINDLE		1
4	15857	ANGLED MOUNT ADAPTER	2
5	HBOLT 0.6250-18x3.5x1.5-N		2
6	NLN-625C	NYLON INSERT LOCKNUT	2
7	16078	IRS LEFT UPPER CONTROL ARM	1
8	15898	IRS RIGHT UPPER CONTROL ARM	1
9	15911	IRS RIGHT LOWER CONTROL ARM	1
10	15907	IRS LEFT LOWER CONTROL ARM	1
11	15902	IRS TOE ADJUSTMENT ARM COMPONENTS	2



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DIMENSIONS ARE IN INCHES
TOLERANCES:
TWO PLACE DECIMAL ±0.01
THREE PLACE DECIMAL ±0.005
FOUR PLACE DECIMAL ±0.001
MATERIAL
FINISH
USED ON
APPLICATION ROADSTER/COUPE
PRINTED 8/4/2015

Factory Five Racing, Inc.
ROADSTER/COUPE IRS COMPONENTS
NAME DATE
DRAWN JI 3/23/15
COMMENTS:
SIZE A DWG. NO IRS Assembly REV A
SCALE:1:9 WEIGHT:

- L&R lower control arms, L&R upper control arms, Toe arms, L&R CV axles, Koni coil-over shocks, Springs, Fasteners, Driveshaft adapter
- Philips head screwdriver, $^{5}/_{8}$" Drill bit, $^{13}/_{16}$", $^{15}/_{16}$" wrenches, $^{13}/_{16}$", $^{15}/_{16}$" 18mm Sockets, Large adjustable wrench – up to $1^{5}/_{8}$", $^{1}/_{8}$" Hex Key, Marker, Ruler, Hacksaw, Drill, Plastic mallet, Hammer, Torque wrench

Parts needed

2015 or newer Ford Mustang IRS parts
Super 8.8" center section
L&R spindles
L&R brake parts

Mustang IRS Specifications

	2.3L Ecoboost	3.7L V6	5.0L Coyote
Housing	Steel	Aluminum	Steel
Weight	93lb	78lb	93lb
Gear Ratios	3.15:1, 3.31:1, 3.55:1	3.15:1, 3.55:1	3.15:1, 3.55:1
Brakes	12.6" (320mm) Solid rotor, 45mm single piston aluminum caliper	12.6" (320mm) Solid rotor, 45mm single piston aluminum caliper	13.0" (330mm)Vented rotor, 45mm single piston iron caliper

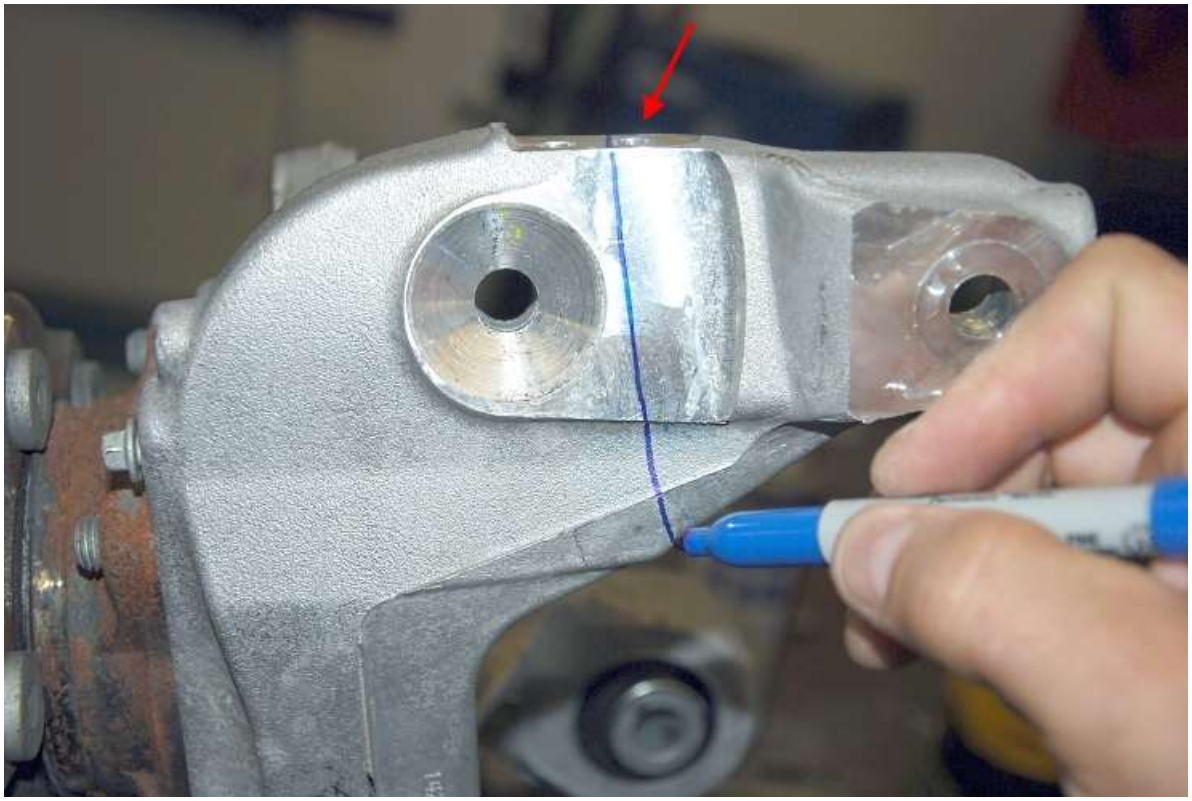
Parts preparation

Spindles

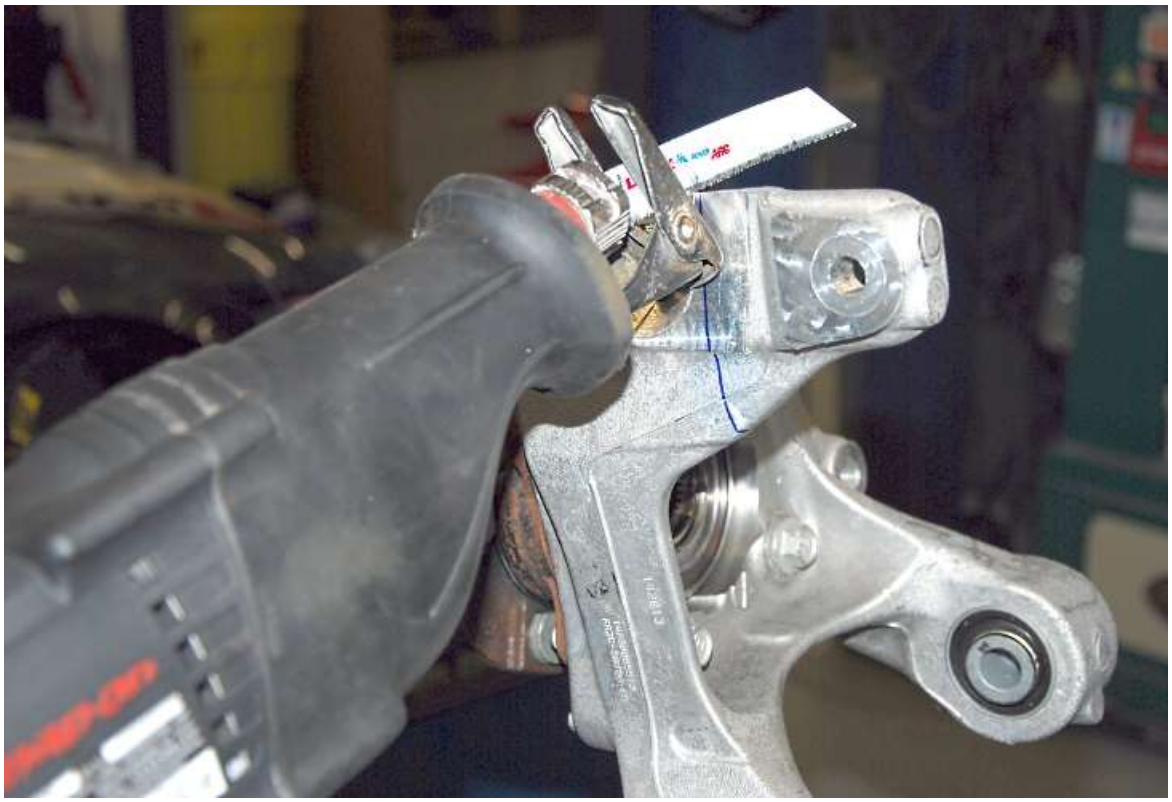
🛠 $^5/_8$" drill bit, drill, saw, marker

Remove the brake calipers from the spindle if they are mounted. They will be reinstalled after the spindle is put on the car.

Use a $^5/_8$" drill bit to drill out the tapered hole at the top of the spindle.



Mark the spindle starting at the top just to the inside of the top inside hole down to the corner of the small boss at the bottom of the ear.

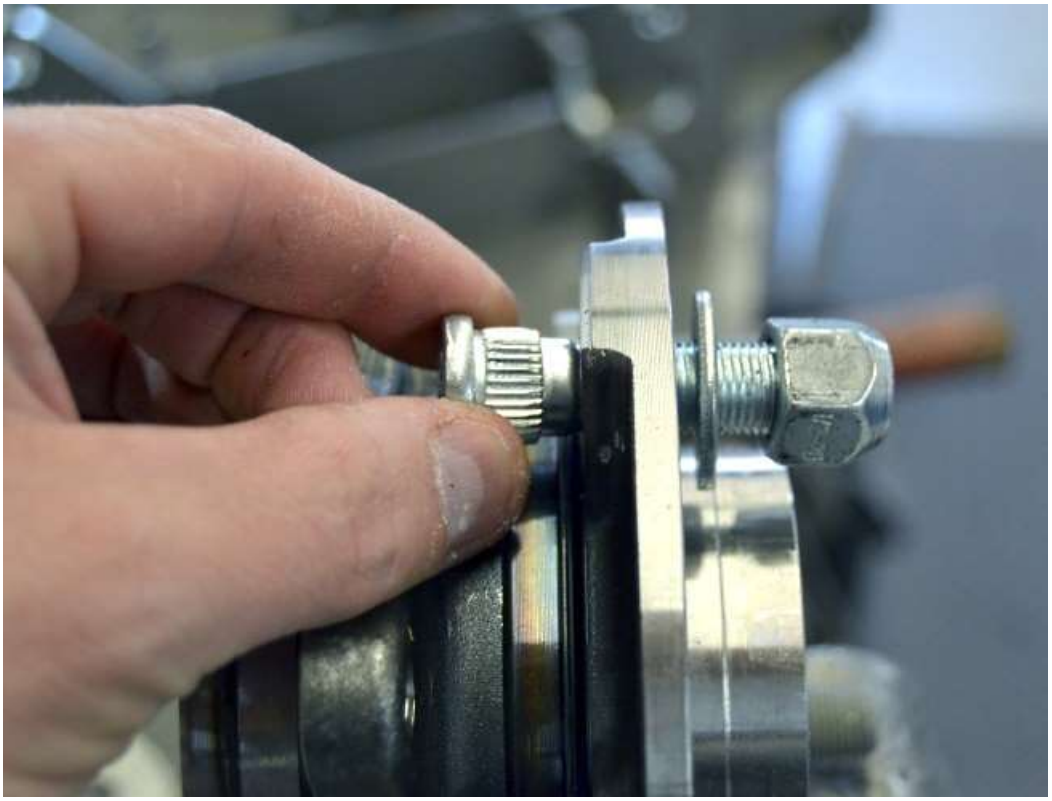


Use a saw to cut the ear off the spindle. If using a Sawzall or similar, use a wood blade; a 14tpi blade or finer will just get gummed up with the aluminum.

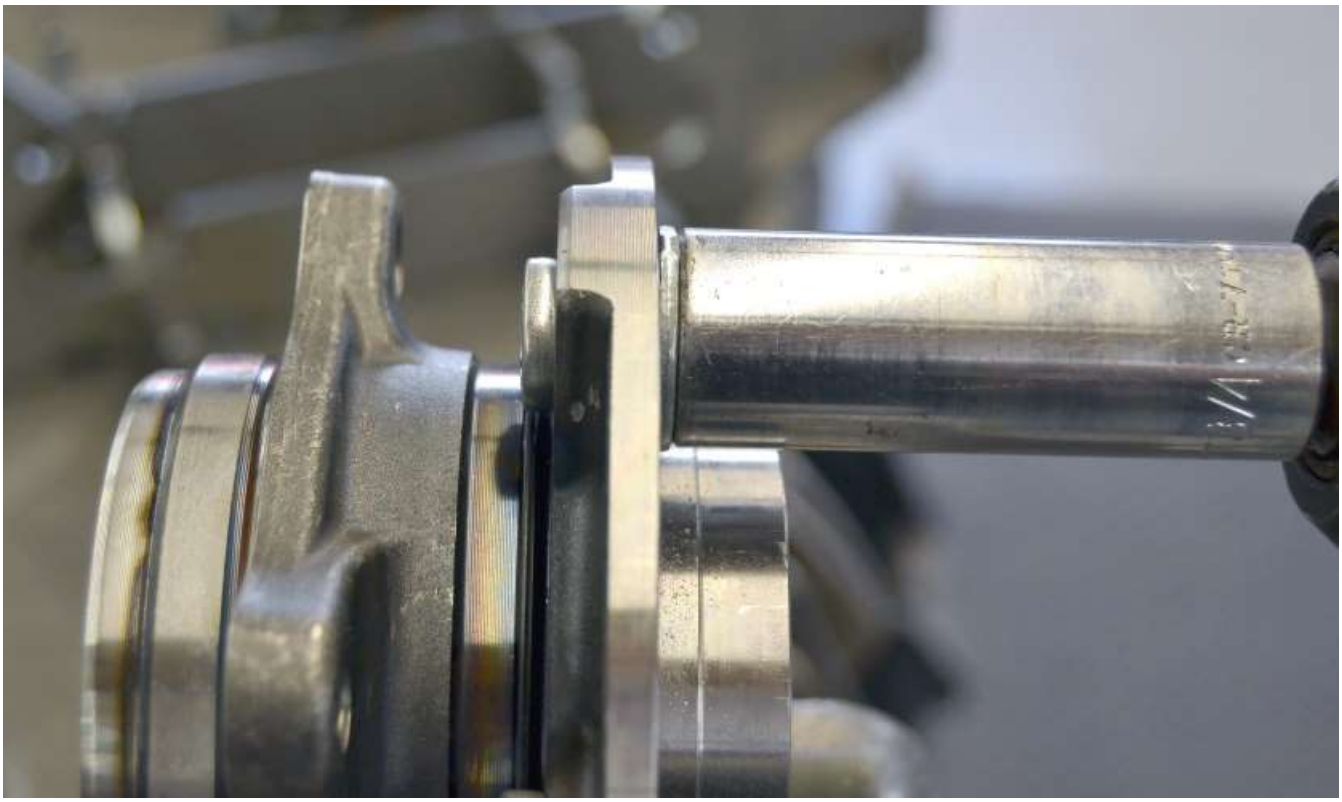
Hubs

🛠 Hammer, vise, ratchet, ½”-20 lugnut, torque wrench.
🚘 Rear wheel studs.
✋ Removal of the hub from the spindle is not necessary but can make things easier.

Use a vise to lightly hold the side of the wheel stud head then use a hammer to bang out the Mustang studs. Repeat for all of the studs.



Insert one of the included wheel studs into the hub from the back and use a washer and lug nut on the front side.



Use a ratchet to draw the wheel stud into the hub and torque the stud to **135Nm (100lb-ft)**.

Repeat for the other wheel studs.

If the Hub was removed, use Loctite on the threads and reattach to the spindle.

Torque the bolts to **133Nm (98ft-lb)**.

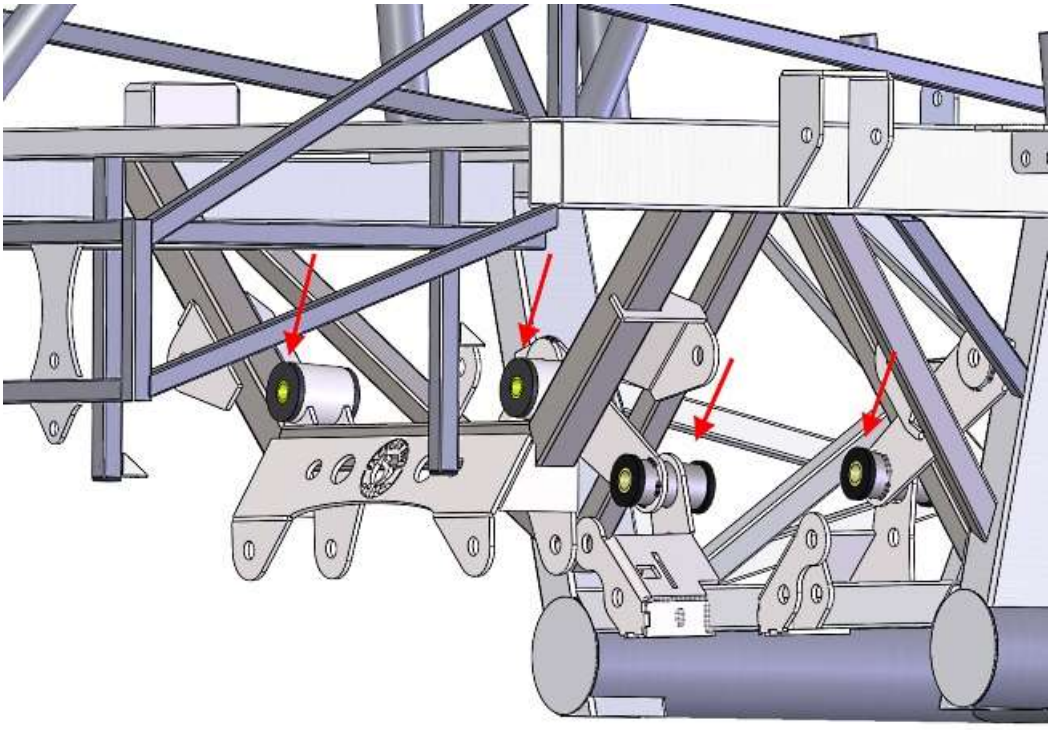
Center section

🛠 $^{5}/_{8}$" drill bit, drill.

Use a $^{5}/_{8}$" drill bit to chase the front mount holes on the center section.

Frame

🛠 Rubber/plastic mallet
🚗 Differential mounting components



Bushing locations.

Use a plastic mallet to install the polyurethane bushings marked 2048 and the longer ($3^{1}/_{16}$”) sleeves where the front of the center section will mount.

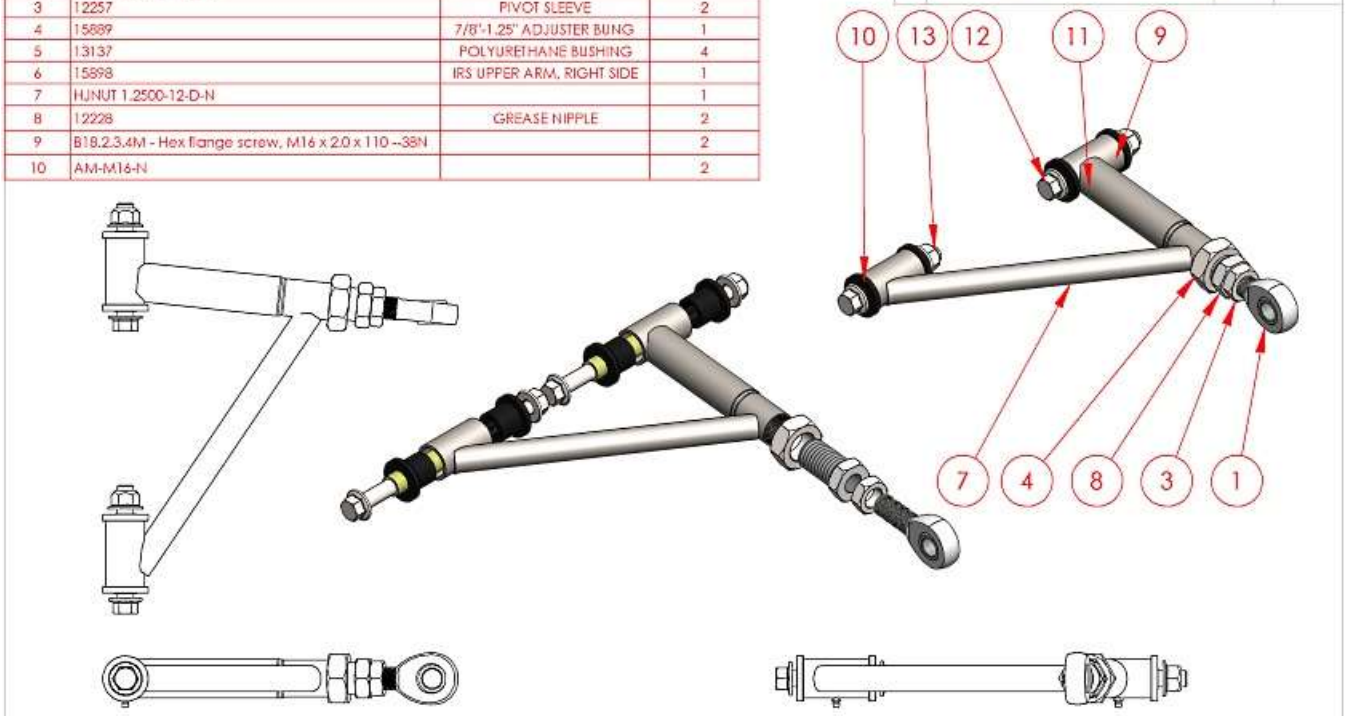
Use a plastic mallet to install the polyurethane bushings marked 2123 and the shorter (2.40”) sleeves where the rear of the center section will mount.

Upper control arms

- Upper control arm components
- Grease gun

ITEM NO.	PART NUMBER	DESCRIPTION	Default/QTY.
1	15890	7/8"-14 LH THREAD ROD END	1
2	HJNUT 0.8750-14-D-N		1
3	12257	PIVOT SLEEVE	2
4	15889	7/8"-1.25" ADJUSTER BUNG	1
5	13137	POLYURETHANE BUSHING	4
6	15898	IRS UPPER ARM, RIGHT SIDE	1
7	HJNUT 1.2500-12-D-N		1
8	12228	GREASE NIPPLE	2
9	B18.2.3.4M - Hex flange screw, M16 x 2.0 x 110 --38N		2
10	AM-M16-N		2

REVISIONS			
REV.	DESCRIPTION	DATE	APPROVED
A	INITIAL RELEASE	12/31/14	



ROADSTER
COUPE

UNLESS OTHERWISE SPECIFIED:
DIMENSIONS ARE IN INCHES
TOLERANCES:
TWO PLACE DECIMAL ±0.01
THREE PLACE DECIMAL ±0.005
FOUR PLACE DECIMAL ±0.001
MATERIAL
FINISH
USED ON
APPLICATION 2015 IRS

	NAME	DATE
DRAWN	JI	11/20/14
COMMENTS:		

FINISHED 8/17/2015

Factory Five Racing, Inc.

TITLE: 15898 - IRS RIGHT UPPER CNTRL ARM

SIZE A | DWG. NO. 15899 | REV A

SCALE: 1:5 | WEIGHT: | SHEET 1 OF 1

Assemble each of the upper control arms as shown.

Grease the control arms using chassis grease until the grease comes out of the flutes in the bushings next to the pivot sleeves.

Lower control arms

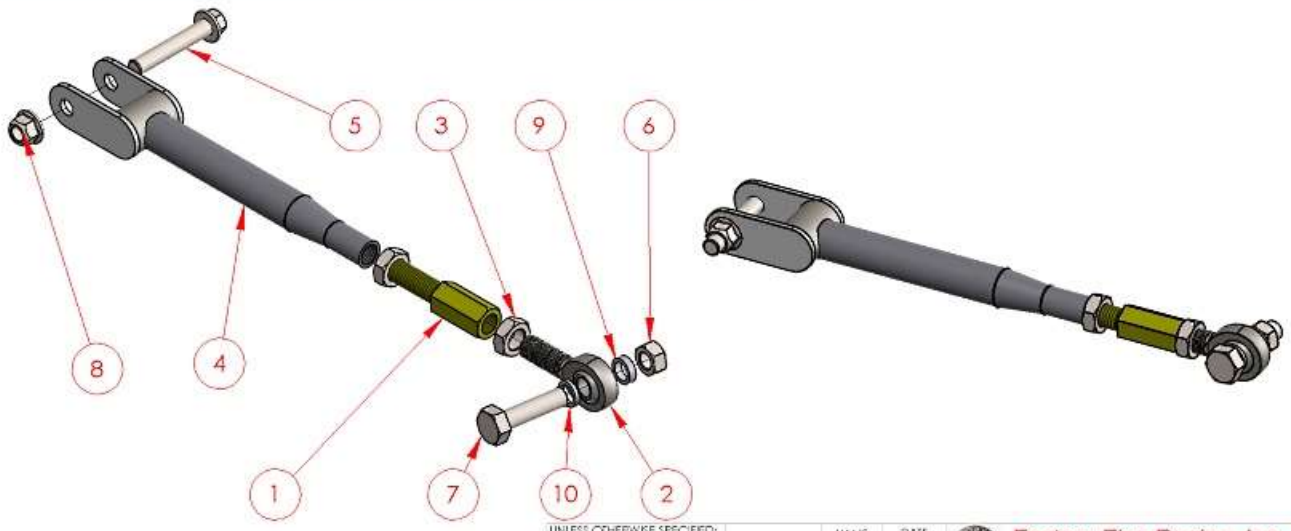
🛠 Grease gun

Grease the control arms using chassis grease until the grease comes out of the flutes in the bushings next to the pivot sleeves.

Toe adjustment arms

ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	33388 - LINKAGE ADJUSTER	LINKAGE ADJUSTER	1
2	12348 3-4 ROD END BODY	12348 - 3/4"-16 THREAD x 5/8" BORE ROD END	1
3	HJNUT 0.7500-16-D-N		2
4	15903	IRS TOE ARM	1
5	B18.2.3.4M - Hex flange screw, M14 x 2.0 x 80 --34N		1
6	HNUT 0.6250-11-D-N	15936	1
7	HHBOLT 0.6250-11x2.5x1.25-N	15216	1
8	AM-M14-N		1
9	33240	14739 0.25" SPACER	1
10	15908	0.25" SPACER	1

REVISIONS			
REV.	DESCRIPTION	DATE	APPROVED
A	INITIAL RELEASE	1/23/15	



UNLESS OTHERWISE SPECIFIED:		NAME	DATE
DIMENSIONS ARE IN INCHES TOLERANCES: TWO PLACE DECIMAL ±0.01 THREE PLACE DECIMAL ±0.005 FOUR PLACE DECIMAL ±0.001	DRAWN	JI	1/6/15
	COMMENTS:		
MATERIAL			
FINISH			
NEXT ASSY	USED ON		
ROADSTER COUPE	APPLICATION 2015 IRS	PRINTED 5/2/2016	

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Factory Five Racing, Inc.

TITLE:
IRS TOE ADJUSTMENT ARM COMPONENT

SIZE	DWG. NO.	REV
A	15902	A

SCALE: 1:4 WEIGHT: SHEET 1 OF 1

Assemble each of the toe adjustment arms as shown.

Installation

Center section

- Rubber/plastic mallet, torque wrench, 18mm, $^{13}/_{16}$" sockets, $^{15}/_{16}$" wrench.
- Differential mounting components.
- Use a friend to help with the heavy center section in the next steps.

Use rags to protect between the front center section mount on the frame.

With the help of a friend, lift the center section nose up into the frame and over the front mount.

Flatten the center section out so it is horizontal then back it up so it is above the mount locations and lower it down so the bolts can be installed. The smaller/shorter bolts are used for the rear mounts.

The larger/longer bolts and nuts are used for the front mounts.

Torque both the front and rear bolts to **135Nm (100 ft-lb)**.

Toe Adjustment arms

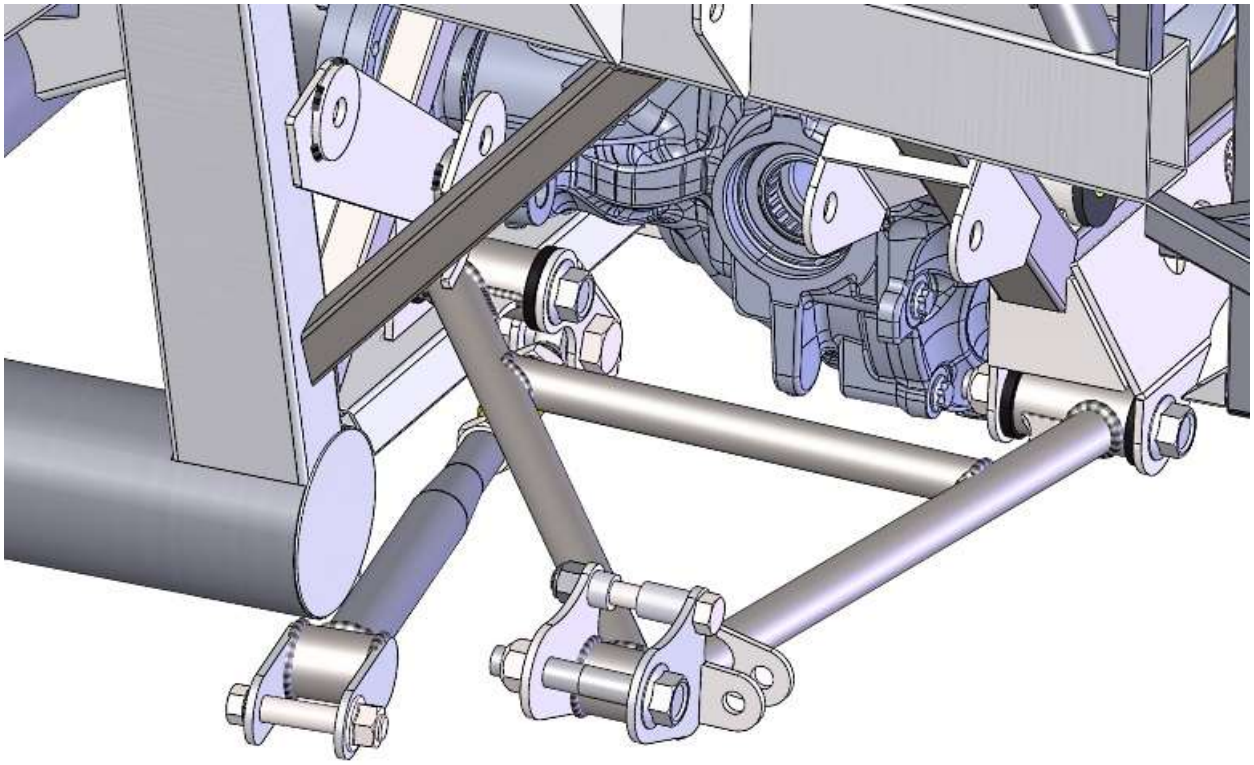
- IRS Toe adjustment arm components
- $^{13}/_{16}$" socket, $^{15}/_{16}$" wrench, torque wrench.
- If using the sway bar option, pass the bolt through the frame mount bracket when installing the toe arms.

Attach the toe arms to the frame below the front lower arm mount using the $^{1}/_{8}$" thick spacer in the back and the ¼" spacer on the front side of the rod end. Use the $^{5}/_{8}$" x 2.25" bolts to attach them to the frame.

Torque bolts to **135Nm (100 ft-lb)**.

Lower control arms

- IRS lower control arm components
- $^{13}/_{16}$" socket, $^{15}/_{16}$" wrench, torque wrench.

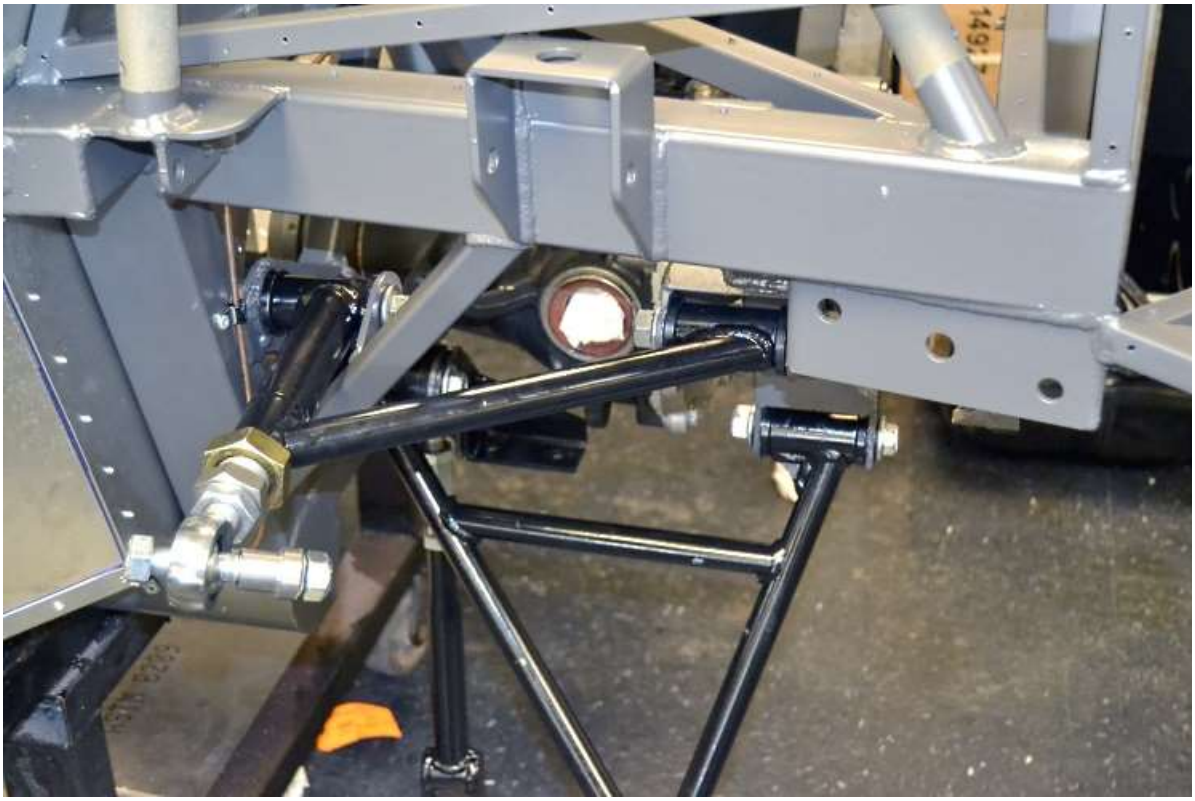


Attach the control arms to the frame with the shock mount towards the rear and spindle brackets up. Use the longer M16 x 110mm (~$4^{5}/_{16}$") bolts.

Hold the arm horizontal and torque the bolts to **135Nm (100 ft-lb)**.

Upper control arms

IRS upper control arm components
$^{13}/_{16}$" socket, $^{15}/_{16}$" wrench, torque wrench.

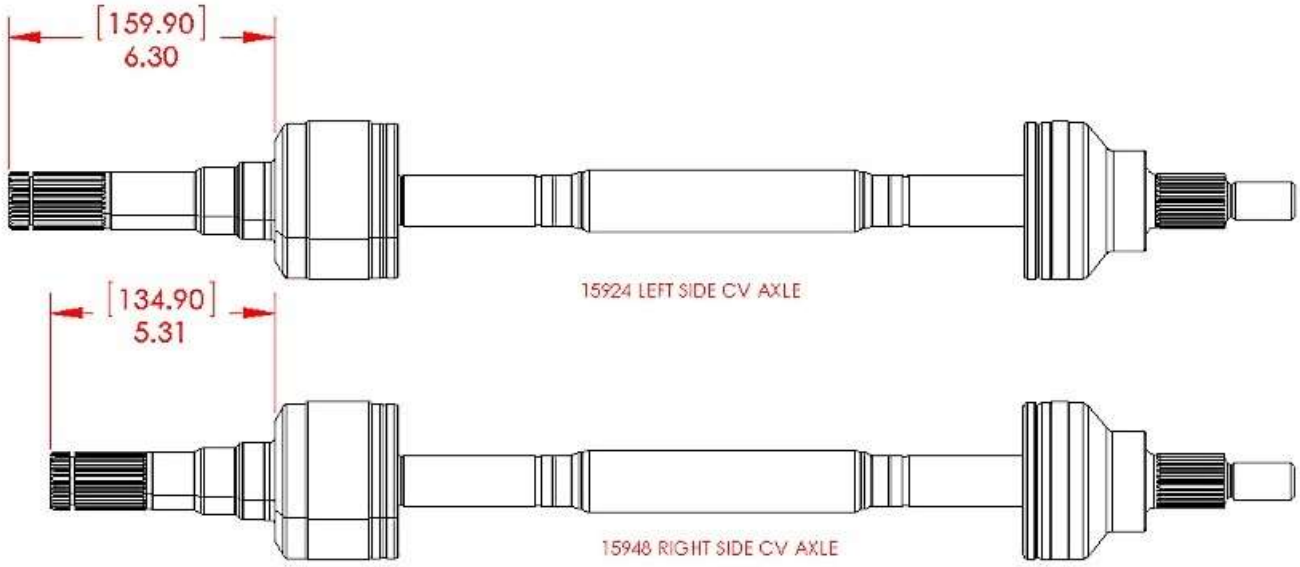


Pass the upper control arm thick tube through the triangular area as shown in between the frame mounts. Use the longer M16 x 110mm (~$4^{5}/_{16}$") bolts.

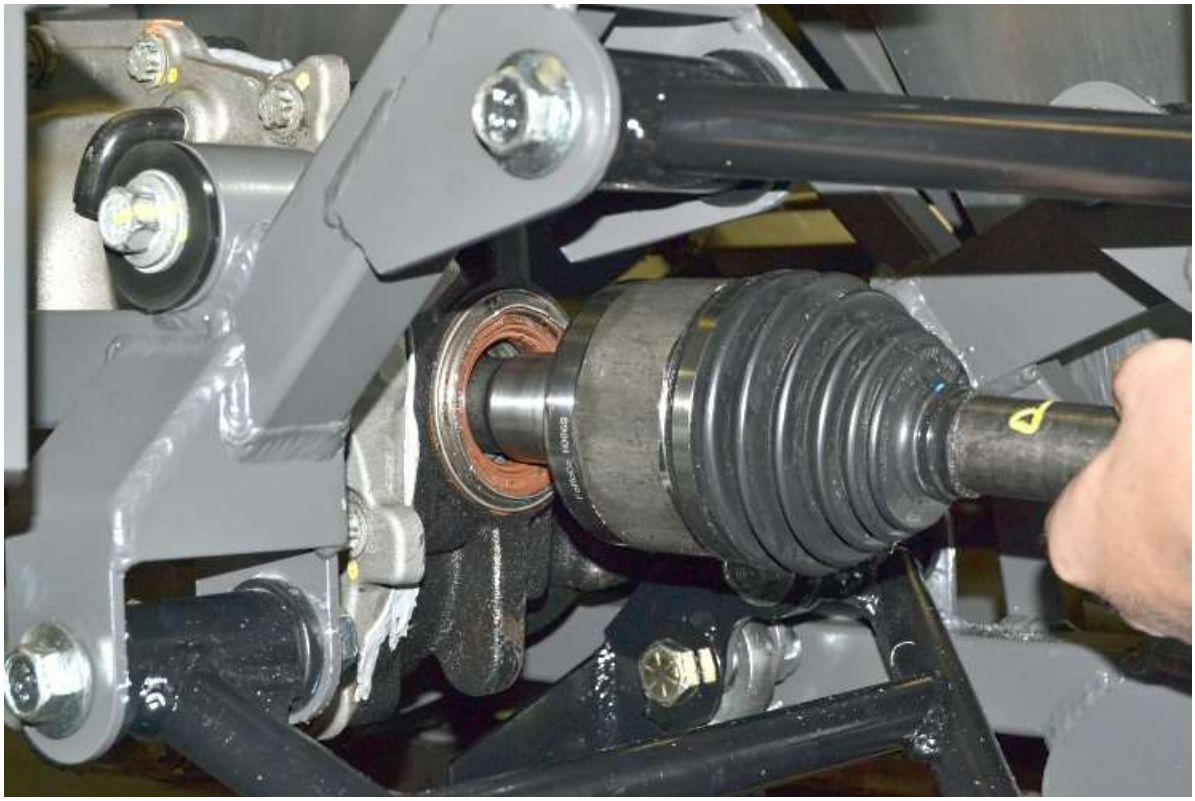
Hold the arm horizontal and torque the bolts to **135Nm (100 ft-lb)**.

CV Axle

- CV Axles, spindles

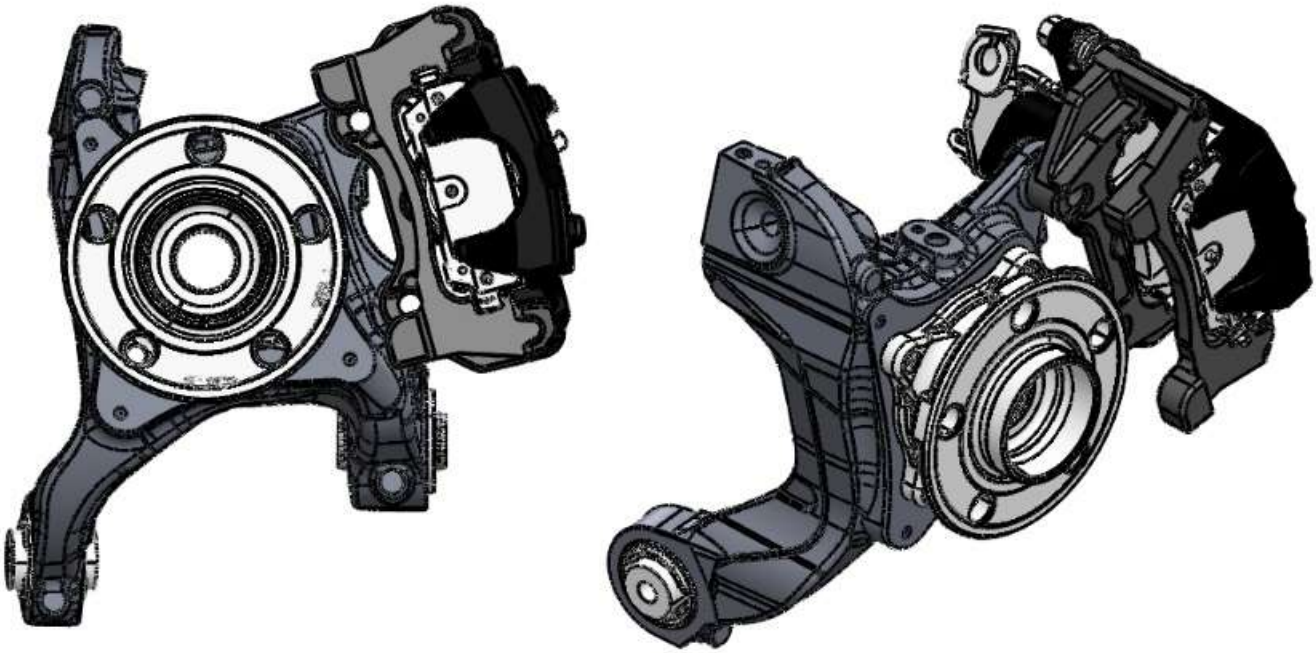


The inside CV joint is different for each side of the car, make sure to use the correct one when installing.



Using the correct axle, push the inner CV joint into the center section.

- When fully installed there should be an $^{1}/_{8}$" (~3mm) gap between the inside of the CV joint and the center section. If necessary, compress the CV axle and with the CV axle nut on the end hit the CV axle in with a plastic mallet. Pull on the inner CV joint to make sure that it does not come out.



LEFT SIDE SPINDLE

Slide the spindle onto the outer CV joint and start the nut on the end.

Spindle to Lower arm

Connect the bottom of the spindle to the lower control arm using the M16 x 90mm bolts and locknuts. Right side shown.

Wait to torque the bolts until after the other arms are installed.

Spindle to Upper arm

Insert the angled mount adapter into the upper arm rod end.

Reuse the $^{5}/_{8}$" washer that was on the old bolt and place it on the new $^{5}/_{8}$" x 4.25" bolt along with a misalignment spacer.

Attach the upper control arm to the spindle using the bolt with the misalignment spacer.

Use a $^{15}/_{16}$" wrench, $^{15}/_{16}$" socket and ratchet to tighten the locknut.

Wait to torque the bolts until after the other arms are installed.

Check the angle of the upper control arm rod end, make sure that the rod end is not touching the spindle and that it is aligned with the upper control arm.

Toe Link

Attach the Toe link arm to the spindle using the M14 x 80mm bolt and locknut.

Repeat for the right hand side.

Use the torque specifications page at the back of the instructions to torque the control arm to spindle bolts.

Coil-Over Shock Assembly

- Snap ring pliers, ¾" wrench, ¾" socket, Ratchet, floor jack
- Shock set, Insulated clip hardware.
- The shocks are pre-valved at the factory in compression and rebound for good street use. The shocks can be adjusted in rebound as per Koni's instructions if so desired.
- The Roadster/Coupe IRS springs are 400lb. Other springs are available for different ride characteristics.
- WARNING! Incorrect assembly and maintenance of this part can cause serious injury or death.
- If using the silver double adjustable shocks, these must be mounted with the body of the shock down.

Unpack the shocks, coil-over's and hardware.

Double check the jam nut under the rod end and bump stop to make sure that it is tight.
Screw the spring seat down on the sleeve so it is closer to the unthreaded end.

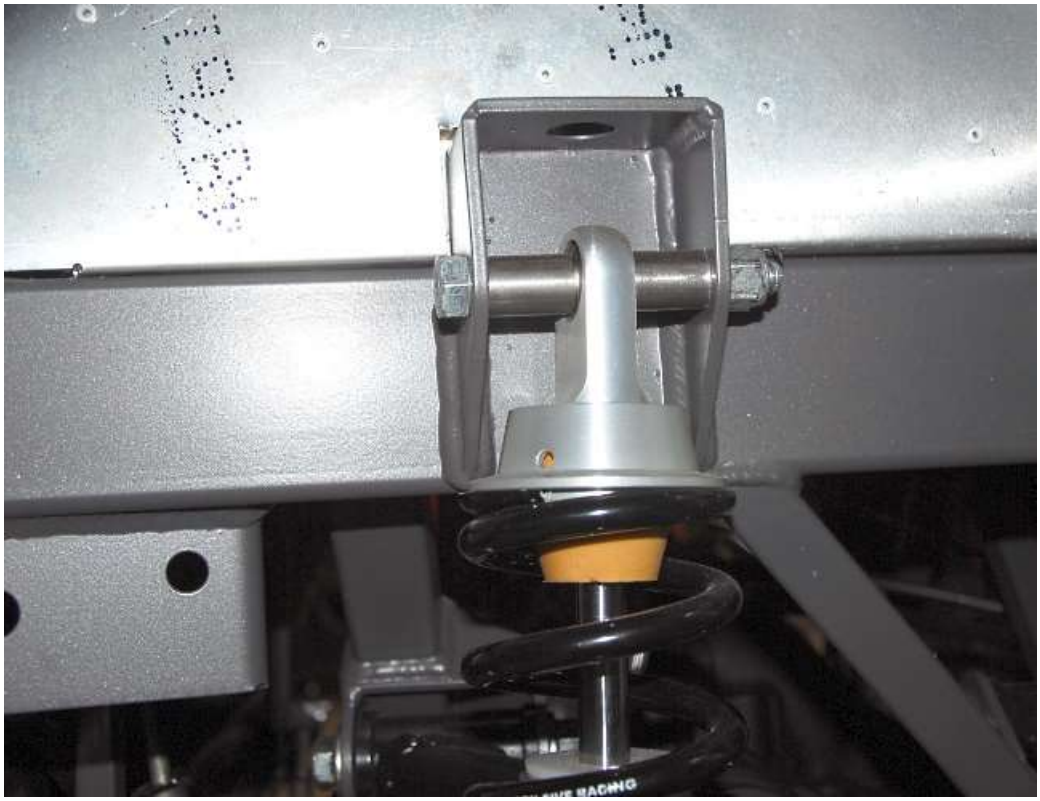
Slide the coil sleeve over the body of the damper beginning at the end which has the rubber bump stop. The unthreaded end of the sleeve goes first so that it will sit on the snap ring on the shock body.

The coil-over hats have a snap ring which holds it in place. Remove this snap ring to assemble the coil over shock.

Slide the rubber bumper about two inches down on the shaft.

Put the spring and hat on the shock and rotate the spring seat back up the sleeve so that the spring pushes the hat tight against the end of the shock.

Install the snap ring on the spring hat so that it holds onto the shock end. Make sure that the slot in the snap ring and the slot in the spring hat are not aligned.



Attach the rod end of the shock to the upper shock mount using the two equal length 1.09" kit spacers.

Torque the upper shock bolt to **54Nm (40 ft-lb)**.

Jack the spindle up so the body end of the shocks can be mounted on the shock mount on the control arm using the longer 1.09" spacer on the back and $^{7}/_{16}$" spacer in front of the shock.

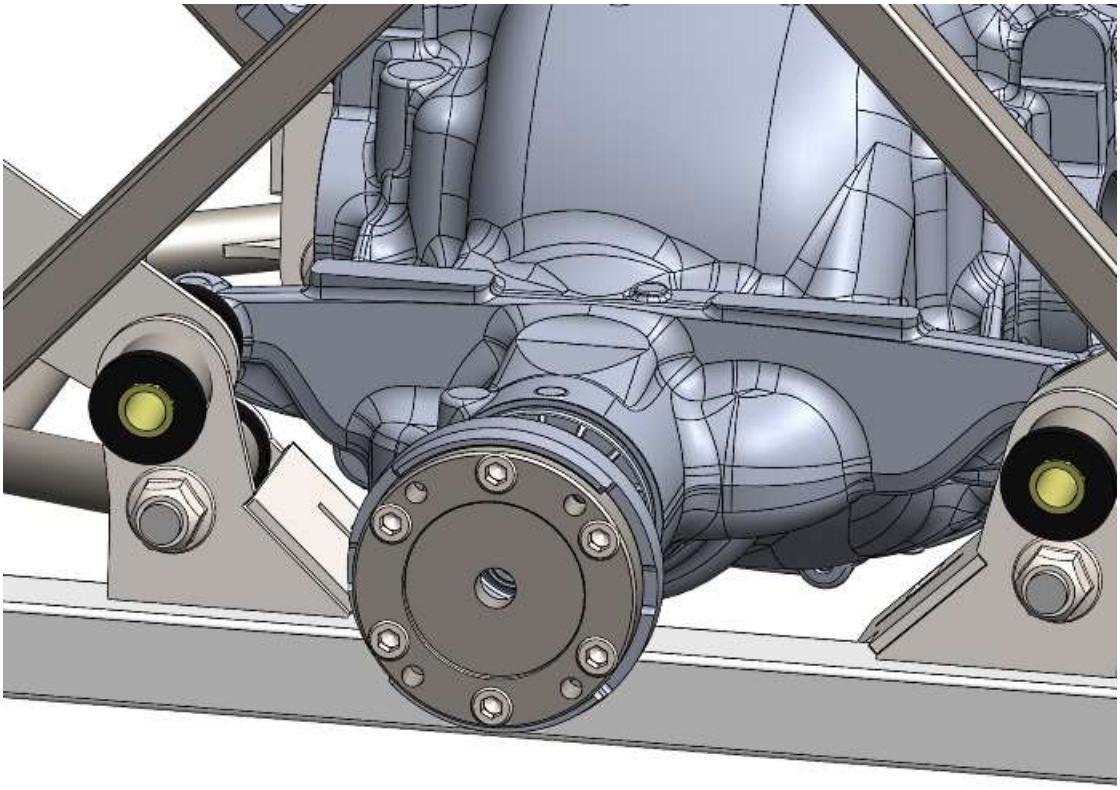
Torque the lower shock bolt to **54Nm (40 ft-lb)**.
Remove the floor jack.

Driveshaft adapter

- There are two different Driveshaft adapters, one for center sections from automatic cars which is coated clear zinc. The Driveshaft adapter for center sections from manual cars is coated yellow zinc.
- Driveshaft adapter, fasteners
- 8mm hex socket, torque wrench, Loctite.

Apply the emergency brake.

Apply Loctite to the (6) M10 x 25mm socket head screws.



Attach the driveshaft adapter to the center section pinion flange and torque the bolts in a star pattern to **55Nm (41 ft-lb)**.

Insert the driveshaft into the transmission, bolt the rear flange to the driveshaft adapter and torque the bolts to **109Nm (80 ft-lb)**.

Fluids

Name	Specification
Motorcraft® Additive Friction Modifier (U.S.) XL-3 (U.S.)	EST-M2C118-A
Motorcraft® SAE 75W-85 Synthetic Hypoid Gear Lubricant XY-75W85-QL	WSS-M2C942-A

Fill the rear axle with fluids.

Capacities

Fluid	Amount
SAE 75W-85 Synthetic Hypoid Gear Lubricant	3.15-3.30 pt (1.49-1.56 L)
Friction Modifier	3.0-3.5 oz. (0.089-0.104 L)

Alignment specs

Camber: -0.5°to -0.75°
Total Toe: 1/8" Toe in

Torque Specifications

	LB-FT	Nm	
CENTER SECTION TO FRAME FRONT	129	175	
CENTER SECTION TO FRAME REAR	129	175	
BRAKE CALIPER TO CALIPER BRACKET	24	32	
BRAKE CALIPER BRACKET TO SPINDLE	129	175	
BRAKE HOSE BANJO BOLT TO CALIPER	29	39	
LOWER CONTROL ARM TO FRAME	100	135	
LOWER CONTROL ARM TO SPINDLE	100	135	
TOE LINK TO FRAME	100	135	
TOE LINK TO SPINDLE	100	135	
UPPER CONTROL ARM TO FRAME	100	135	
UPPER CONTROL ARM TO SPINDLE	100	135	
HUB TO SPINDLE	98	133	
CV AXLE NUT	98	133	THEN ROTATE 45°
DRIVESHAFT ADAPTER TO PINION FLANGE	41	55	
DRIVESHAFT TO DRIVESHAFT ADAPTER	80	109	

Once the car has been aligned, use a $1^{5}/_{8}$" wrench to loosen the upper control arm large jam nut and put some Loctite on the threads where the jam nut will sit.

Retighten the jam nut.

Optional IRS Brakes

Download the 2015 IRS brake instructions from www.factoryfiveparts.com/instructions and install the brakes.

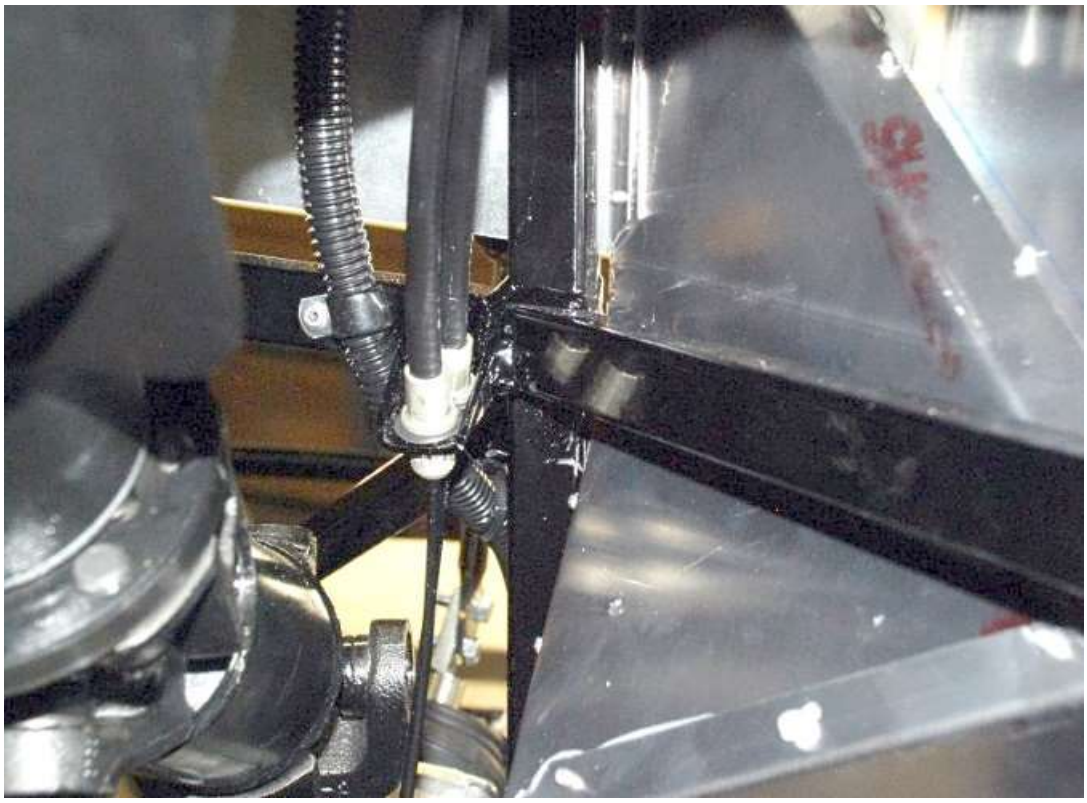
Connect the brake hose to the brake caliper.

Torque the banjo bolt to **39 Nm (29 ft-lb)**.

Run the brake hose over to the frame while the suspension is in droop and keep the brake line slack to locate the frame mount.

Run the hard brake lines in the kit to the brake line mount.

E-brake cables



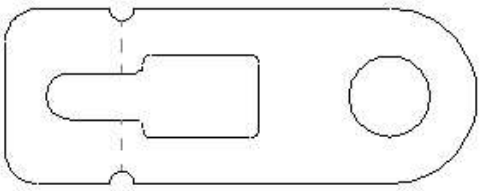
Make sure the FFR cables go through the upper bracket in the transmission tunnel until the sheath end clicks in place.

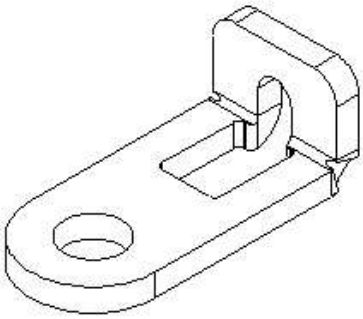
Wilwood brake routing

Run the left e-brake cable over the top of the center section and left rear mount then down and over to the brake caliper.

Run the right cable over the center section and right rear mount then down and over to the brake caliper.

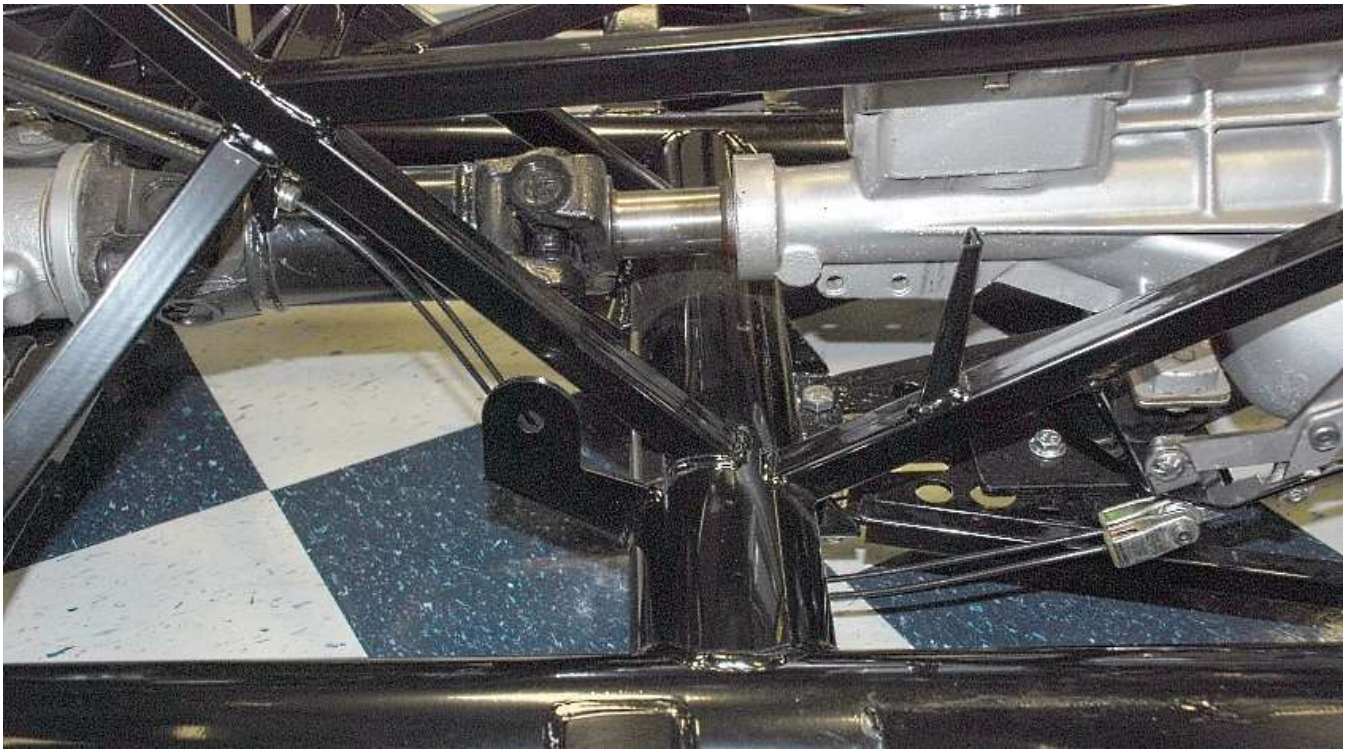
WILWOOD E-BRAKE ADAPTER





WILWOOD CALIPER E-BRAKE ADAPTER

Insert the cable end into the bent bracket then bolt the bracket to the e-brake lever.

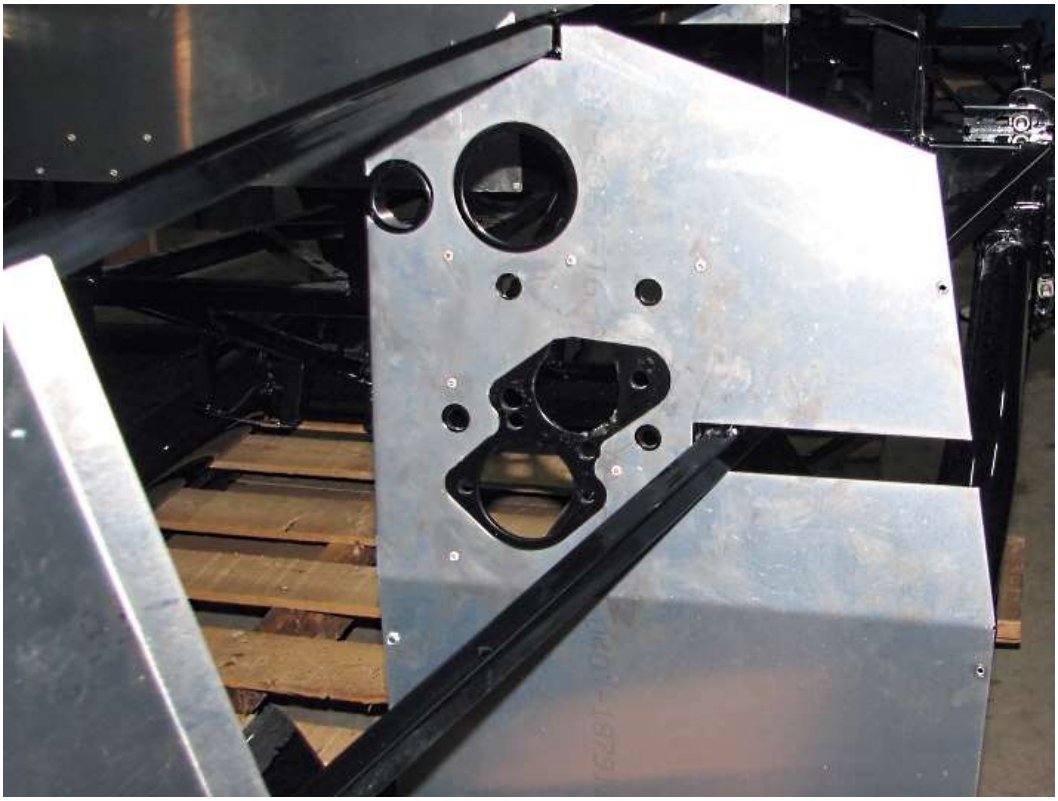


Make sure to run the other end of the brake cables under the 4” crossmember and connect them to the e-brake handle and adjust.

Driver Front Footbox Aluminum

- Drill, 1/8” drill bit, rivet tool, caulk gun, silicone
- Firewall and Driver Footbox Front aluminum, Secondary body fasteners.
- If you are installing a heater/defroster it is much easier to cut the firewall before installing. Refer to those instructions for the template.
- If you are installing the complete kit Wilwood pedalbox use the front panel that is packed with it.

Mark, drill, and rivet in place the driver’s side footbox front panel, leave the lower section that attaches to the 1” tube un-siliconed and un-riveted for the inside wall to slip underneath later.



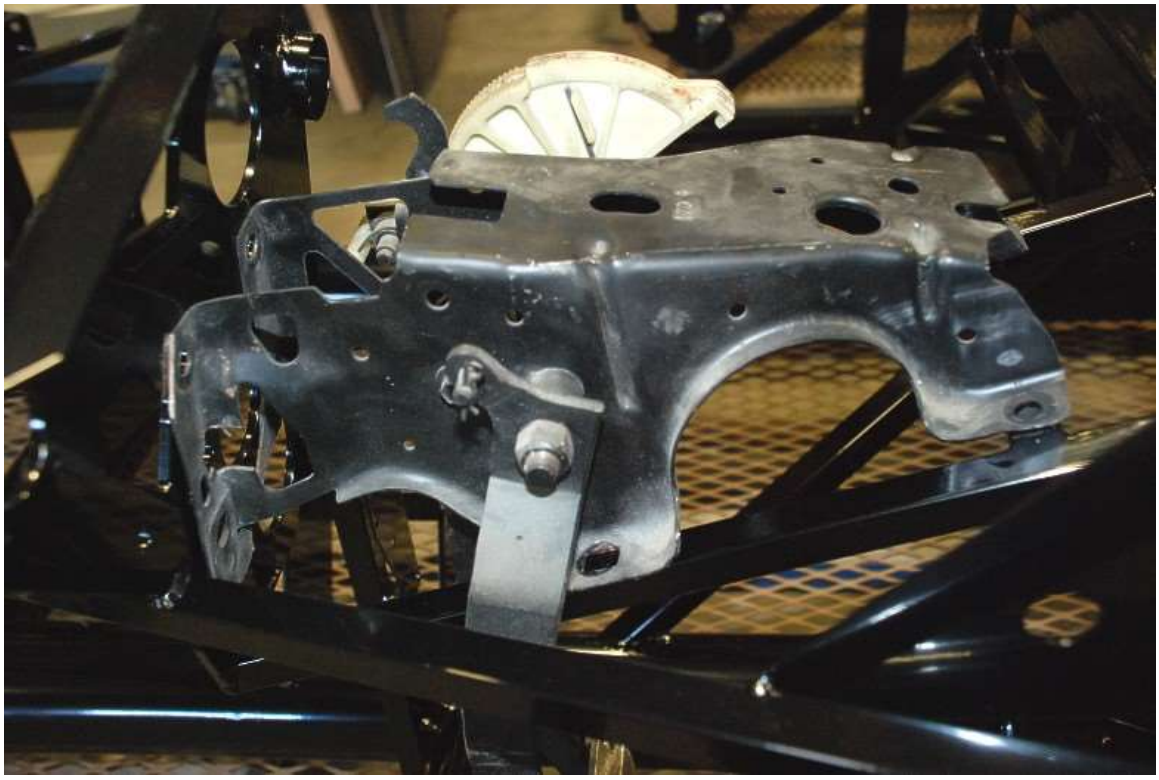
Pedal Box

🛠 ⅜”, $^{9}/_{16}$” sockets, $^{3}/_{16}$”, $^{5}/_{16}$” hex key, drill, $^{9}/_{16}$” wrench, ⅛”, ¼”, $^{7}/_{16}$” drill bits, silicone, rivet tool, marker.

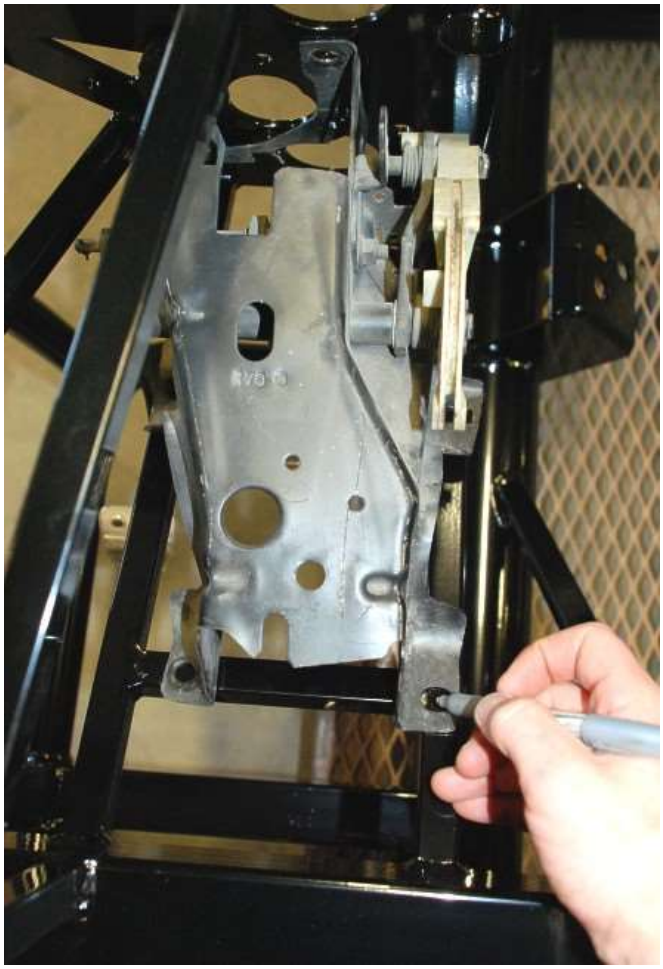
🚘 Mustang pedal box, pedal box hardware, cockpit aluminum.

Mustang Pedal Box

Position the Mustang pedal box on the two angled ¾" tubes over the driver's feet, and attach using two short ⅜" bolts and two washers to the front wall at the front of the foot box.



There are four holes on the Mustang pedal assembly on top of the ¾" tubing. Mark these holes on the tubes.



The right hole for the master cylinder must also be marked on the pedal box. Use the laser cut hole in the foot box steel as a guide to mark the Mustang pedal box.

Remove the pedal assembly.

Drill ¼" holes completely through the ¾" tubing for the pedal box.

Use a 7/16" drill bit to drill the bolt hole in the pedal box for the master cylinder bolt.

Trim the corner off the pedal box using a Hacksaw.

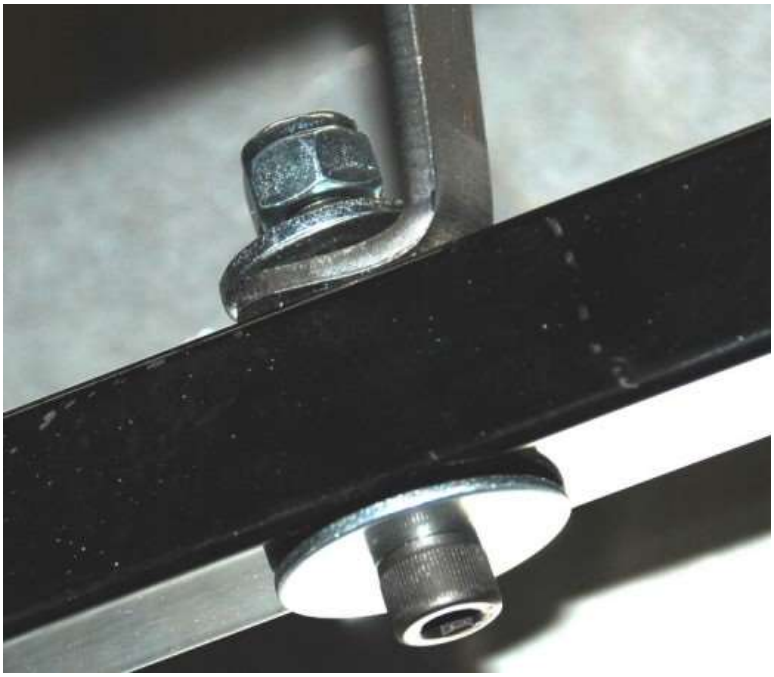
Silicon and rivet the front foot box aluminum panel in place using ⅛" long rivets.

Install the pedal box with the two ⅜" bolts and washers at the top as before. They go through existing holes in the front of the foot box. The four ¼" socket head bolts hold the foot box to the ¾" tubes. Use the large fender washers (FFR# 12337) on the underside of the tubing.

Attach the trimmed accelerator pedal using the kit fasteners [(2) ¼" x ¾" long bolts (FFR# 12335), washers and nuts (FFR# 10802)] to the bracket on the vertical ¾" tubing at the front of the foot box.

Loosen the bolts and remove the pedal box assembly from the footbox then use a ¼" drill bit and drill to drill through the ¾" tubes at the locations marked for the rear mount.

Reinstall the pedal box assembly in the driver's footbox; use the ¼"x 1.50" screws from the pedal box fastener assembly with a fender washer next to the head. Leave all the hardware hand tight.

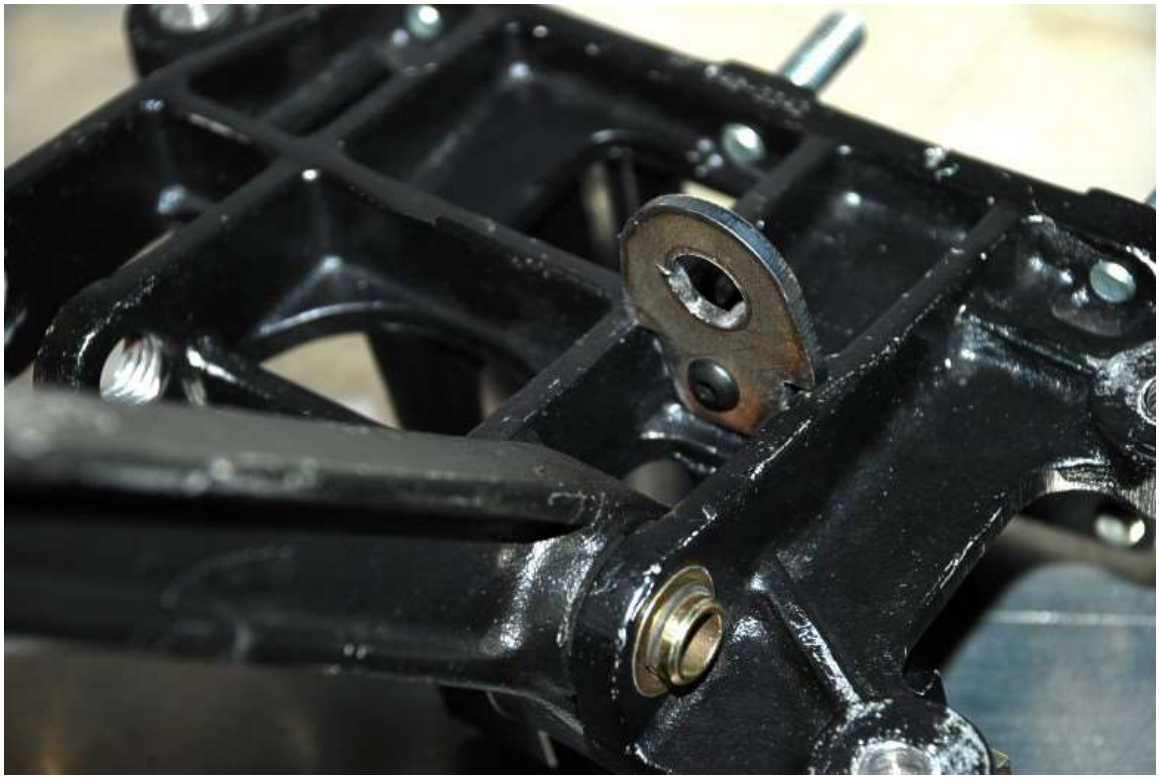


Complete kit Pedal Box

🛠 ½", $^{9}/_{16}$" sockets, ¼", ⅜", ½" wrenches, ¼" drill bit, drill, Philips head screwdriver, $^{3}/_{16}$", $^{5}/_{16}$" Hex Key, snap ring pliers

- Pedal Components, pedal box hardware.
- This pedal box is set-up to use either a hydraulic clutch or a cable clutch. The parts and instructions required for a cable clutch installation are included below.
- Unpack the pedal box assembly. Now is a good time to paint all of the bare steel brackets.
- The brake switch may look different than in the pictures.
- The pedal box comes with two pedal switches, one for the brake lights and the other can be used as a clutch safety switch (used to prevent starting the car while in gear) if desired.

Brake switch mount



Place the switch mount between the brake pedal mount tabs on the side closest to the brake pedal pivot holes and drill a $^{3}/_{16}$" hole through the brake switch mount hole and the pedal box.

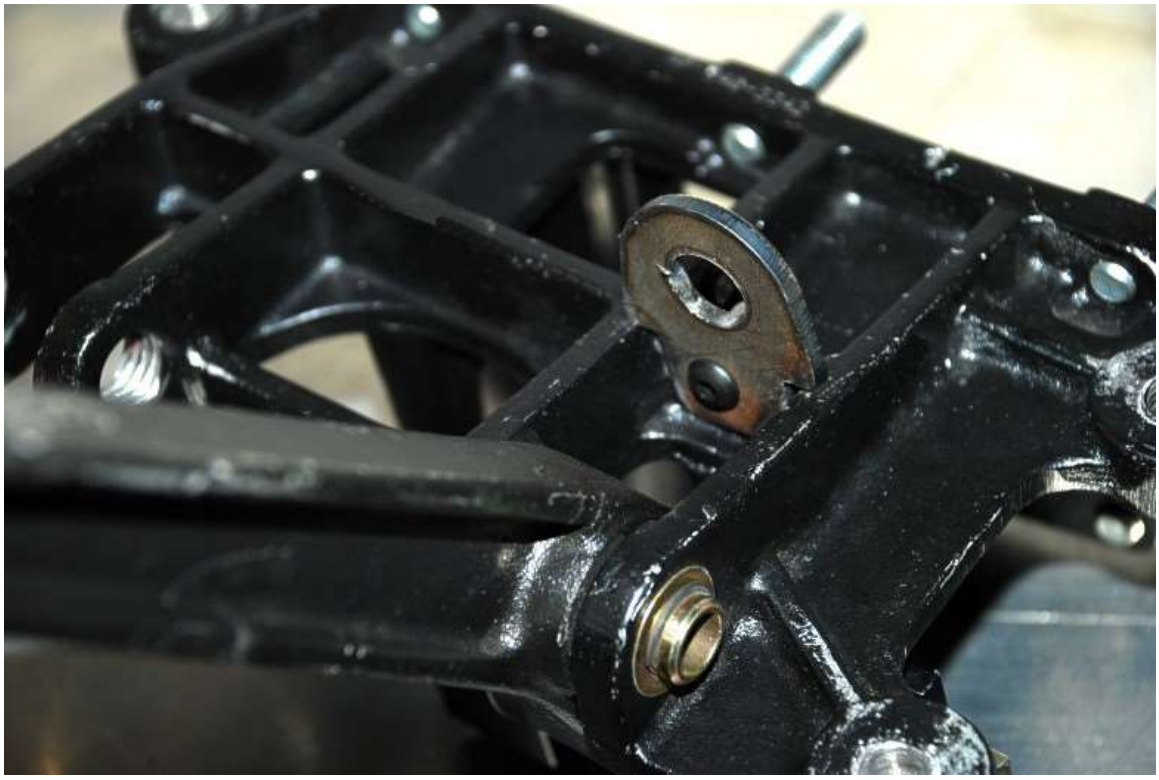
Attach the switch mount to the pedal box using the black #10 screw and locknut.

Connect the switch to the switch mount using a hex nut on each side of the mount bracket.

See the Chassis harness instructions for connecting the switch.

Clutch safety switch mount

The clutch switch mount attaches the same way as the Brake switch mount.



Place the switch mount between the clutch pedal mount tabs on the side closest to the clutch pedal pivot holes and drill a $^{3}/_{16}$" hole through the switch mount hole and the pedal box.

Attach the switch mount to the pedal box using the black #10 screw and locknut.

Connect the switch to the switch mount using a hex nut on each side of the mount bracket.

See the Chassis harness instructions for connecting the switch.

Clutch Cable Quadrant

🛠 $^{3}/_{16}$", $^{5}/_{16}$" hex keys, ½", $^{9}/_{16}$" wrenches, ½" socket, ratchet, file, external snap ring pliers.

Use snap ring pliers to remove the clevis at the top of the clutch pedal.

ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	15608	CABLE PIVOT PLATE	1
2	15609	INSIDE QUADRANT SIDE PLATE	1
3	15610	LEFT CABLE SIDE PLATE	1
4	15611	PEDAL SPACER PLATE	1
5	15612	OUTSIDE QUADRANT SIDE PLATE	1
6	10802	NYLON INSERT LOCKNUT	2
7	HBOLT 0.2500-20x1.25x0.75-N		2
8	HX-SHCS 0.375-16x1.25x1.25-N		1
9	13964	NYLON INSERT LOCKNUT, 3/8-16 UNC	1

REV.	DESCRIPTION	DATE	APPROVED
A	INITIAL RELEASE	4/15/14	

	NAME	DATE
DRAWN	JI	10/4/13
COMMENTS:		

UNLESS OTHERWISE SPECIFIED:
DIMENSIONS ARE IN INCHES
TOLERANCES:
TWO PLACE DECIMAL ±0.01
THREE PLACE DECIMAL ±0.005
FOUR PLACE DECIMAL ±0.0001

MATERIAL
STEEL
FINISH

PRINTED 4/25/2014

Factory Five Racing, Inc.

TITLE:
WILWOOD CLUTCH QUADRANT ASSEMBL

SIZE A | DWG. NO. 15613 | REV A

SCALE: 1:3 | WEIGHT: | SHEET 1 OF 1

ROADSTER
COUPE
HOT ROD

USED ON
APPLICATION

PROPRIETARY AND CONFIDENTIAL
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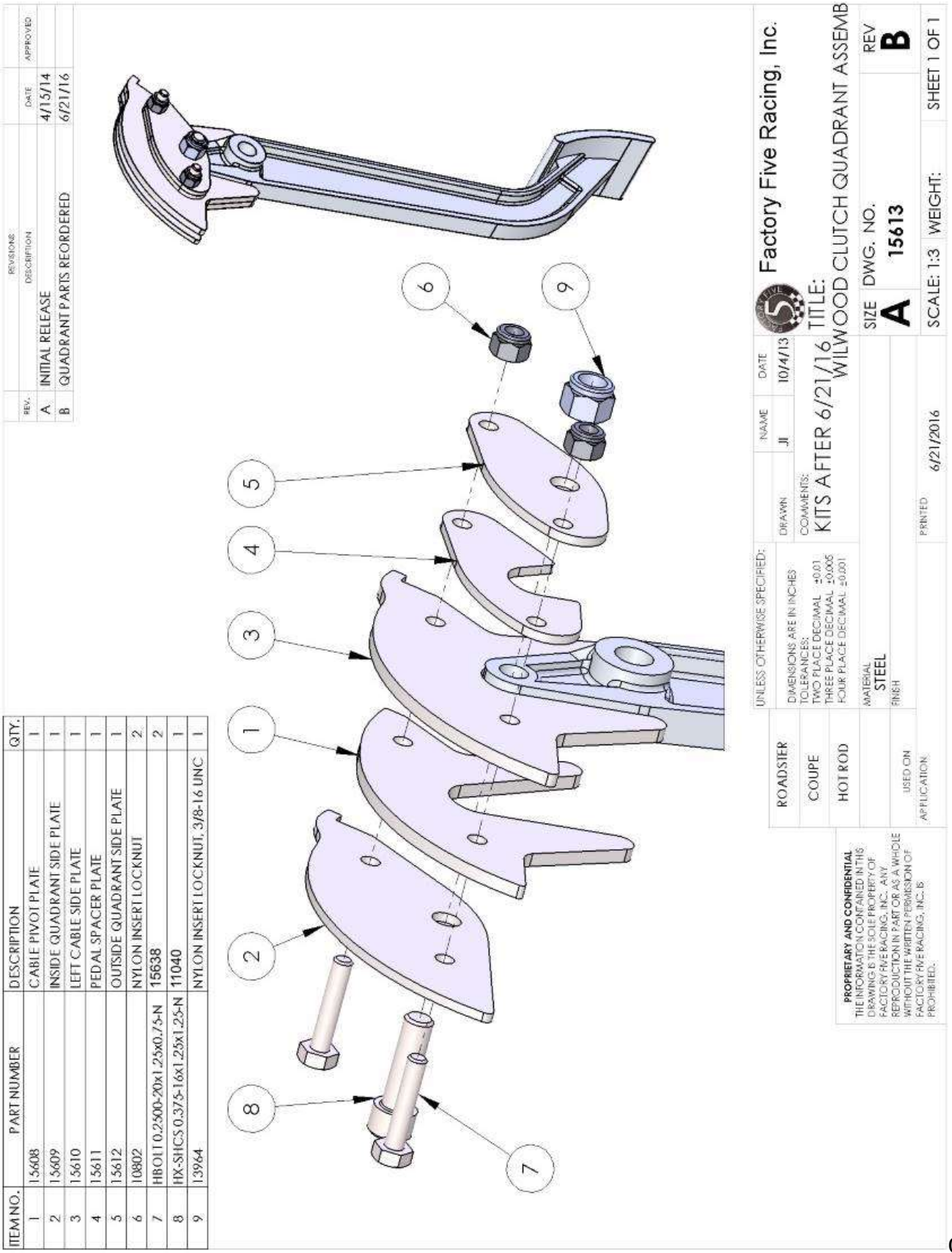
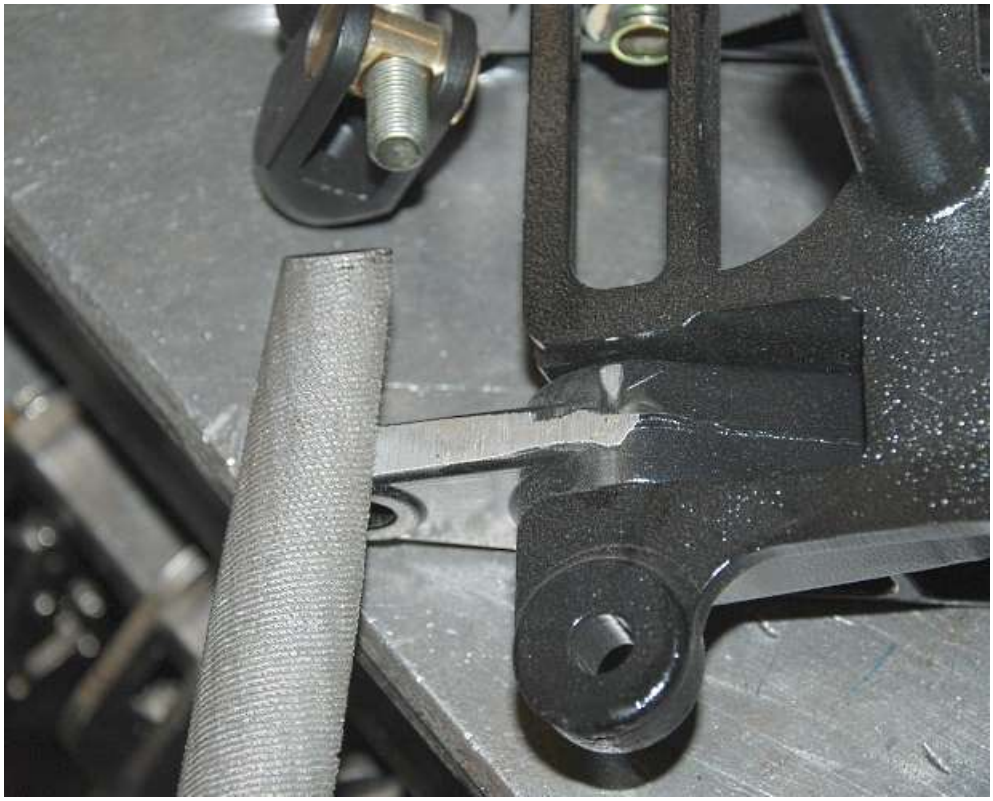
Quadrant assembly order for kits older than 6/21/16

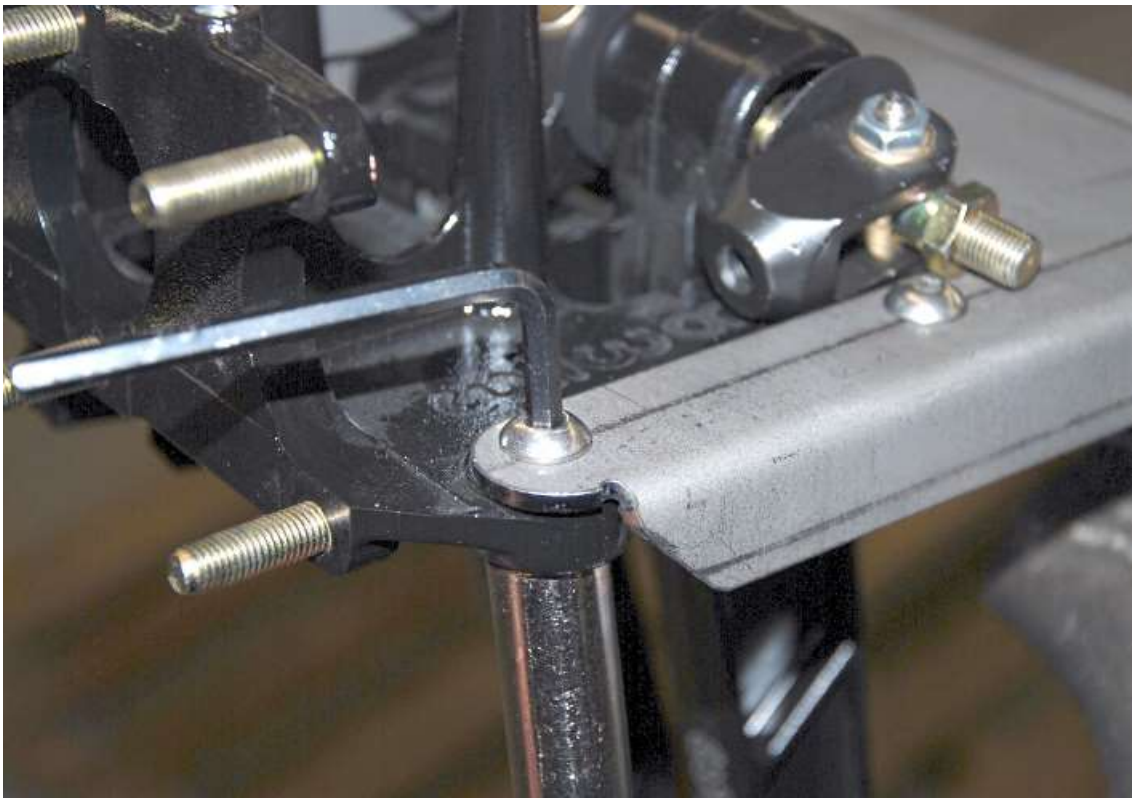


Quadrant assembly order for kits newer than 6/21/16.

Assemble the clutch quadrant to the Wilwood clutch pedal as shown above.

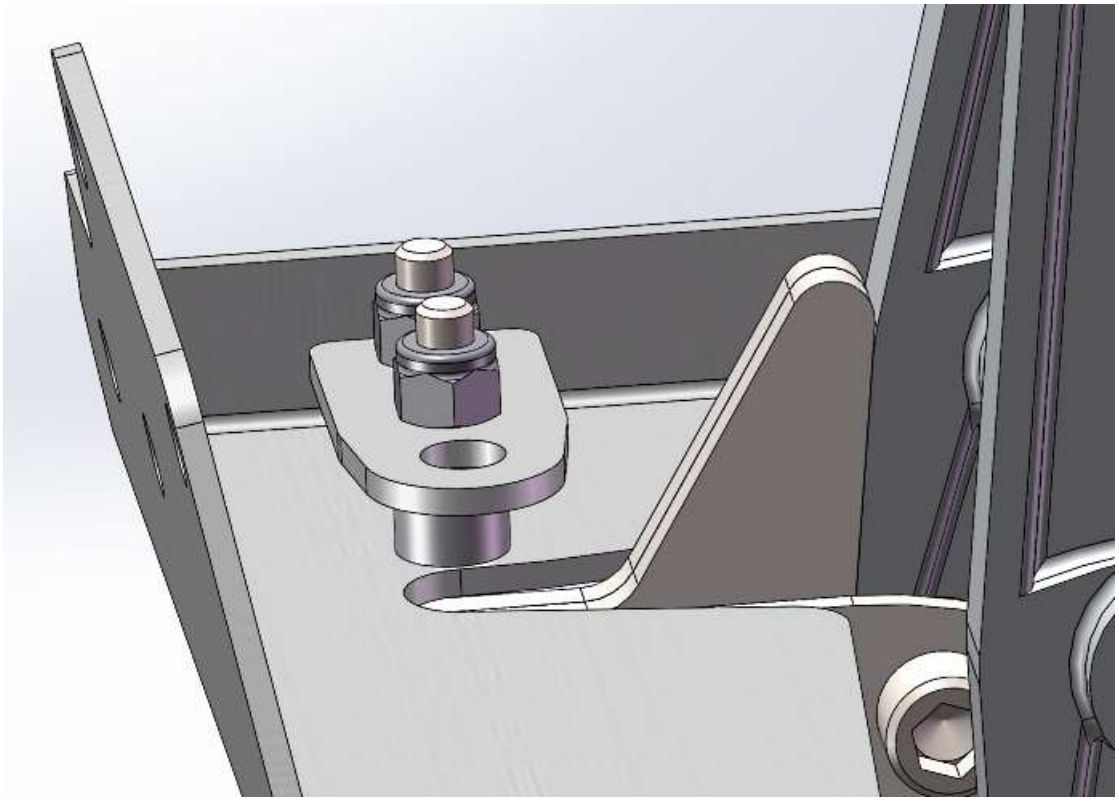


If necessary use a file to remove the forging centerline so the $^{3}/_{8}$" bolt can go through the clutch pedal hole.



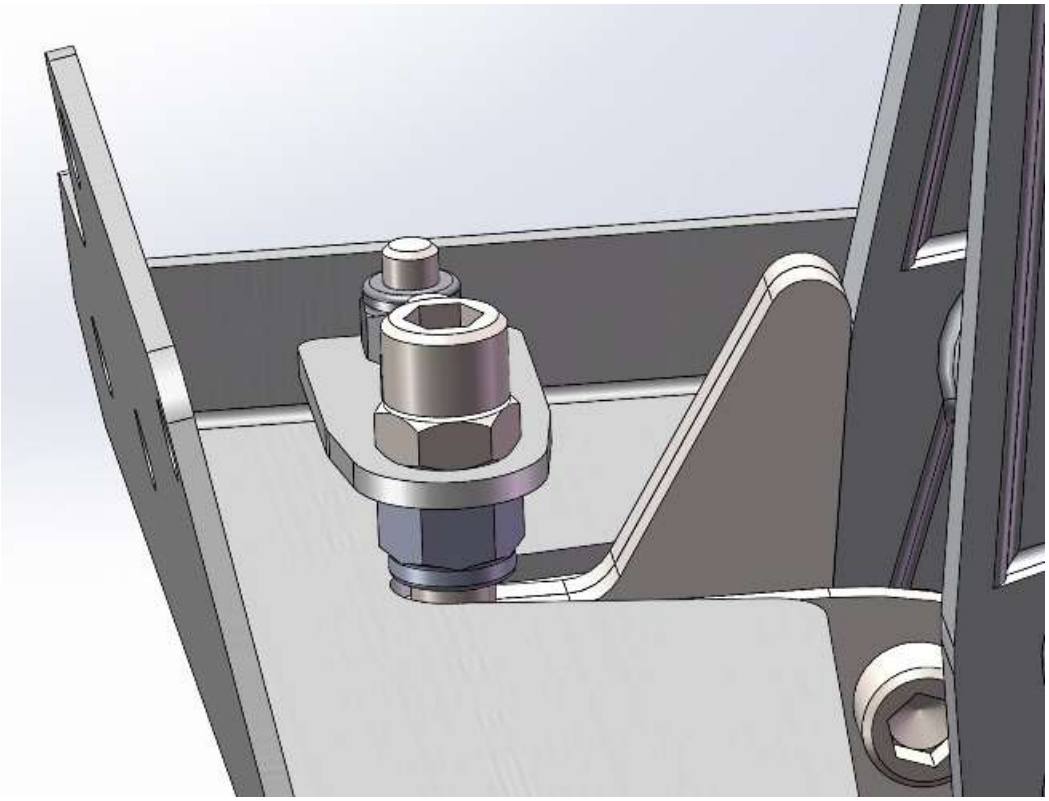
Attach the Wilwood pedals to the underside of the mounting bracket using four $^{5}/_{16}$" Button head screws, locknuts, $^{3}/_{16}$" hex key and ½" wrench.

Clutch Quadrant stop



Attach the Clutch pedal stop mount to the bottom of the pedal box using two ¼” socket head screws, spacers and locknuts.

Thread the jam nut onto the ⅜”x 1.25” screw provided in the quadrant box.



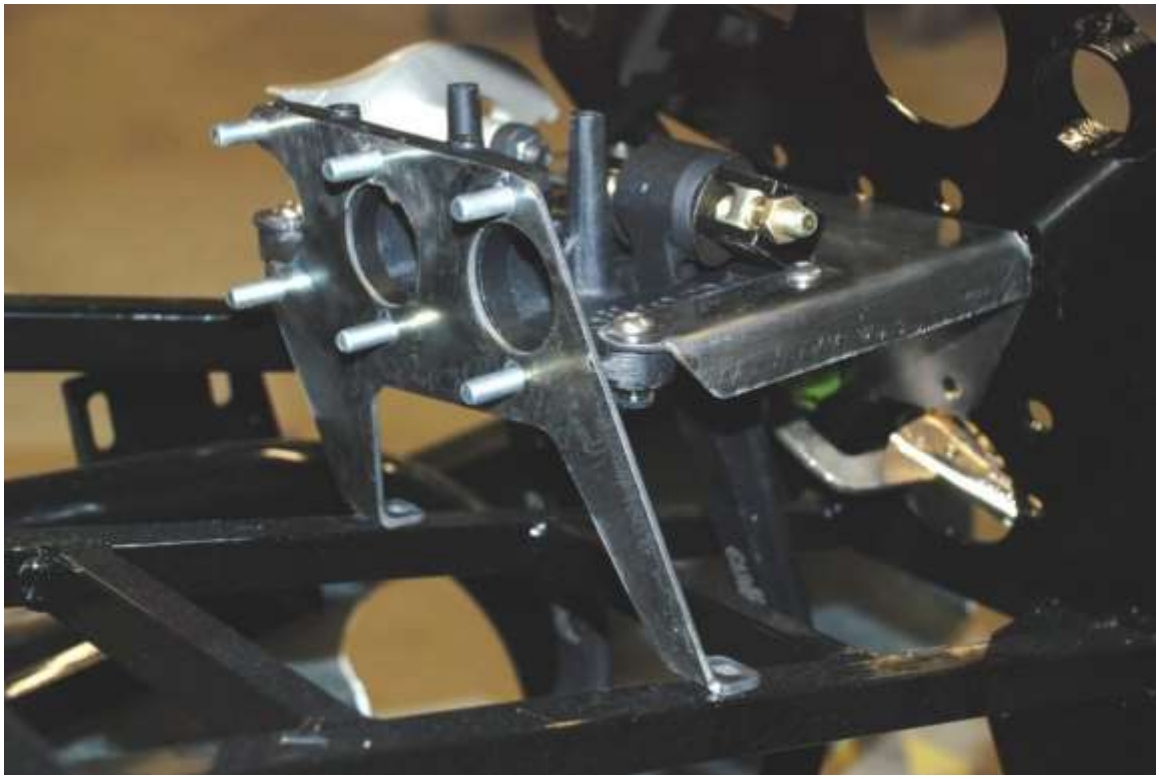
From the underside, push the screw through the quadrant pedal stop mount plate and hand tighten the locknut on the screw.

Frame Installation

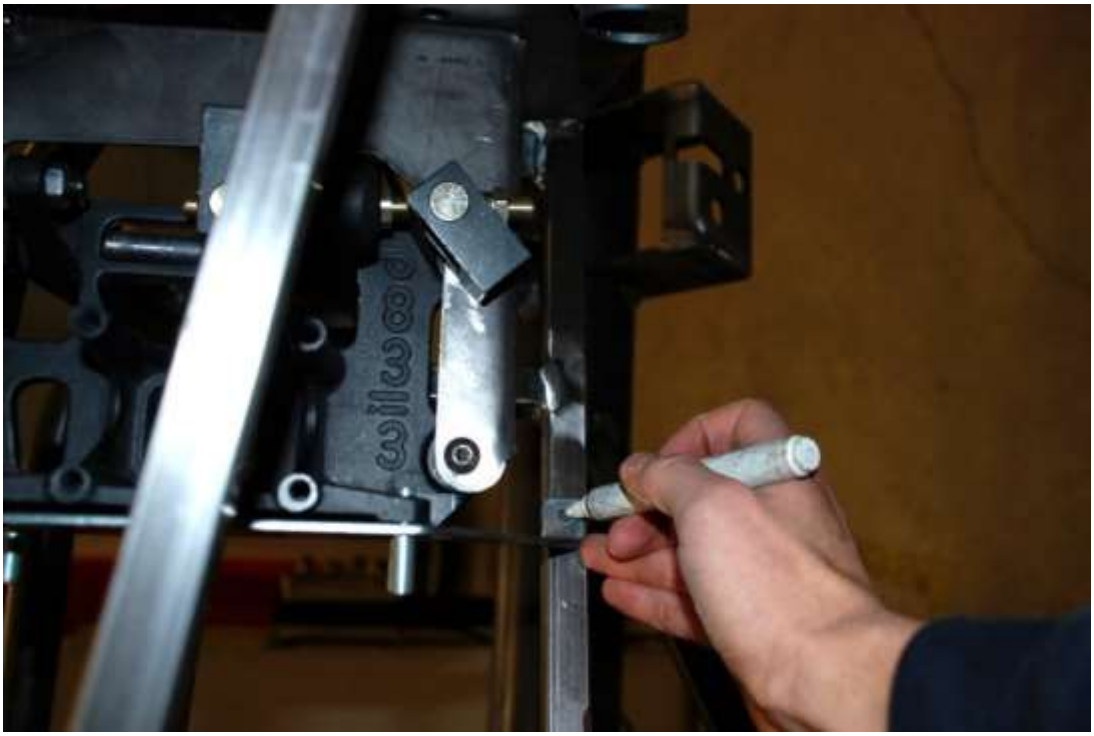
Place the pedal box assembly in the driver's footbox. Make sure that the brake pedal goes in front of the ¾" cross tube on the frame.

Unpack the pedal box hardware from the secondary chassis components box.

Insert three ⅜” x 1” socket head screws from the pedal box hardware assembly and the one included in this pedal assembly through the front of the footbox and through the pedal box mount.

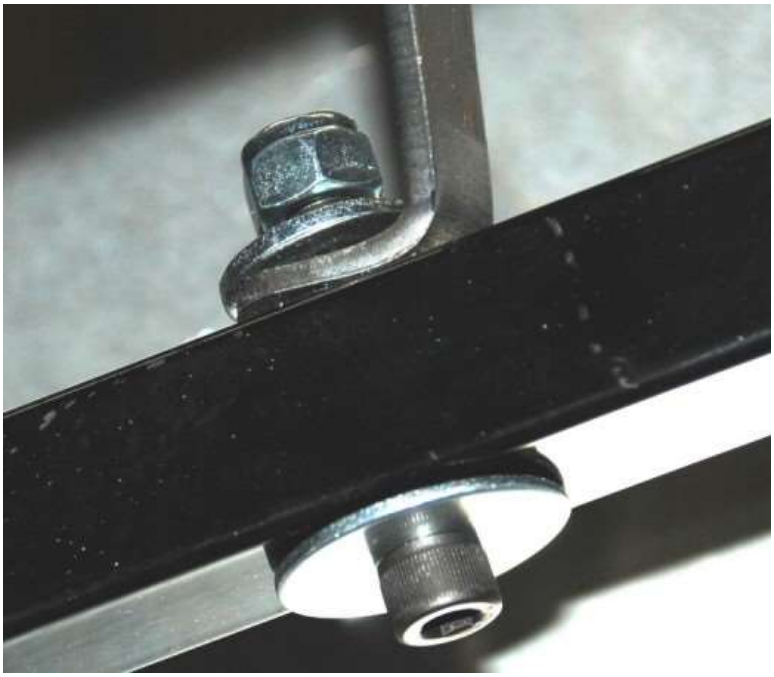


Push the rear pedal box mount onto the master cylinder mount studs and use a few of the jam nuts from the Wilwood pedal assembly to temporarily hold the rear mount in place.



Tighten two of the front ⅜" screws then use a marker to mark the locations of the rear mount holes on the ¾" tubes.

Loosen the bolts and remove the pedal box assembly from the footbox then use a ¼" drill bit and drill to drill through the ¾" tubes at the locations marked for the rear mount.



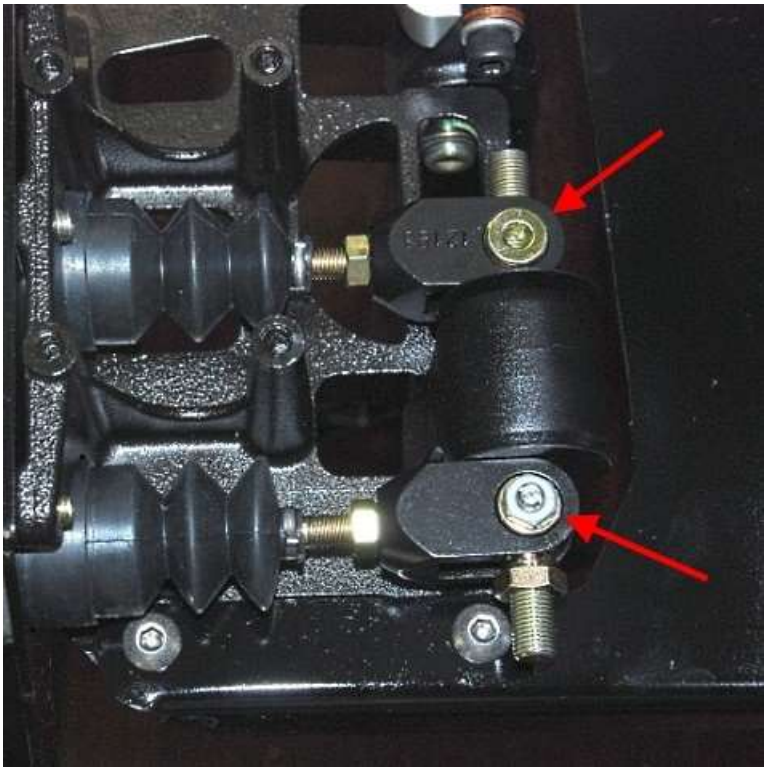
Reinstall the pedal box assembly in the driver's footbox; use the ¼"x 1.50" screws from the pedal box fastener assembly with a fender washer next to the head. Leave all the hardware hand tight.

Master Cylinders

- 6mm socket, ½" deep socket, ratchet, ½" wrench
- Master cylinders

Screw the 90° brake line adapter into the end of the master cylinder making sure that the opening points up when tight.

Put one of the master cylinders onto one of the brake master cylinder mounts and turn the threaded shaft into the threaded mount on the brake pedal. As a starting point, thread the shaft in until you can see it is flush on the other side of the mount.



- The brake pedal master cylinder pushrod mounts are different from each other. Only one has a screw and nut. This is normal.

Attach and tighten the locknuts using a ½" wrench and ½" deep socket holding the master cylinder to the pedal box then repeat for the other master cylinder.

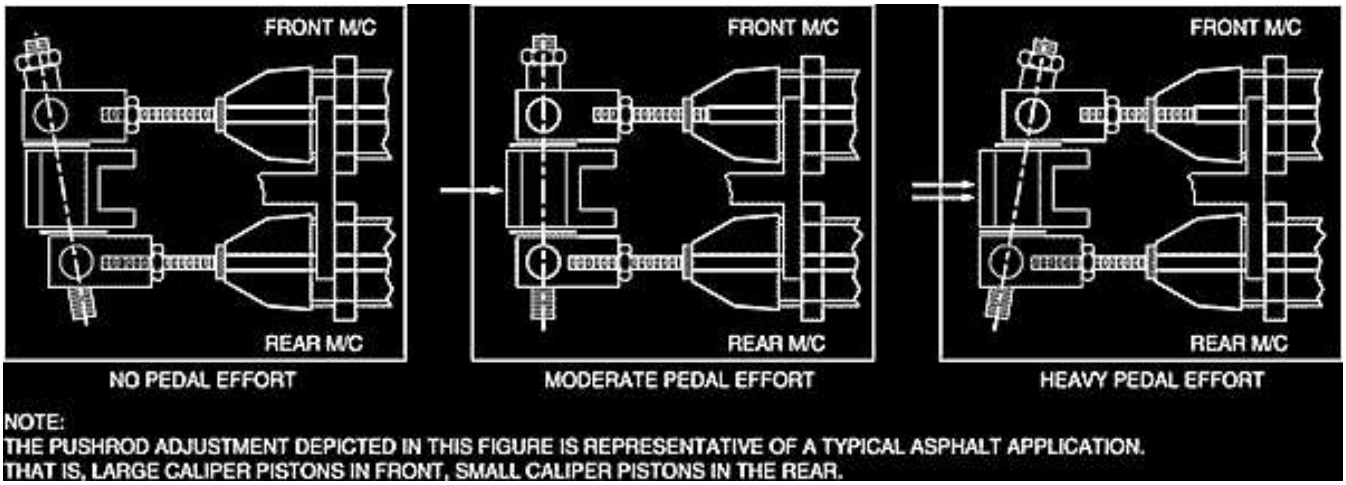
Put the plastic angled inlet adapter with hose clamp on the master cylinders. Use a 6mm socket and ratchet to tighten the hose clamp.

Tighten all the remaining hardware mounting the pedal box to the chassis.

Balance Bar adjustment

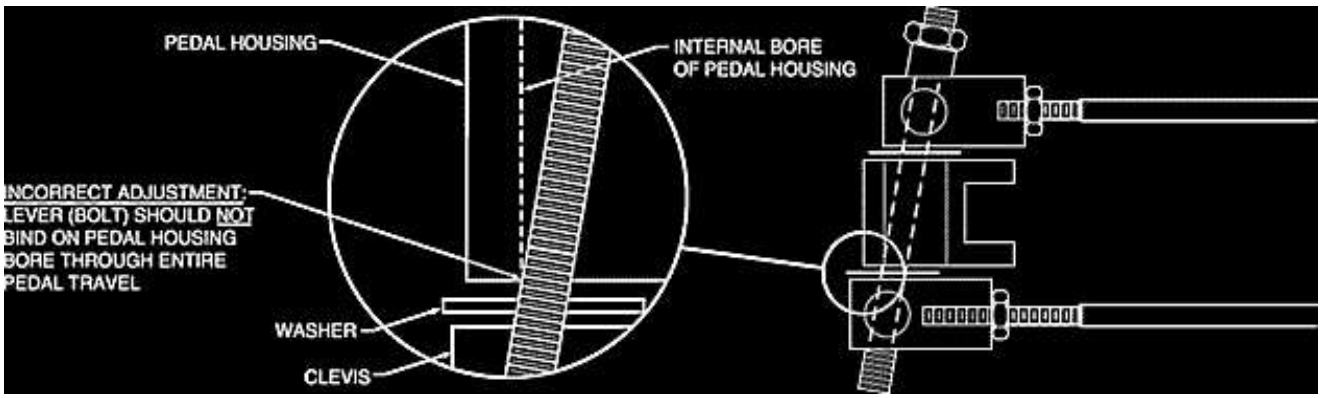
The balance bar is an adjustable lever (usually a threaded rod), that pivots on a spherical bearing and uses two separate master cylinders for the front and rear brakes. Most balance bars are part of a pedal assembly that also provides a mounting for the master cylinders. When the balance bar is centered, it pushes equally on both master cylinders creating equal pressure, given that the master cylinders are the same size bore. When adjusted as far as possible toward one master cylinder it will push approximately twice as hard on that cylinder as the other.

To set up the balance bar, thread the master cylinder pushrods through their respective clevises to obtain the desired position. Threading one pushrod into its respective clevis means threading the other one out the same amount.



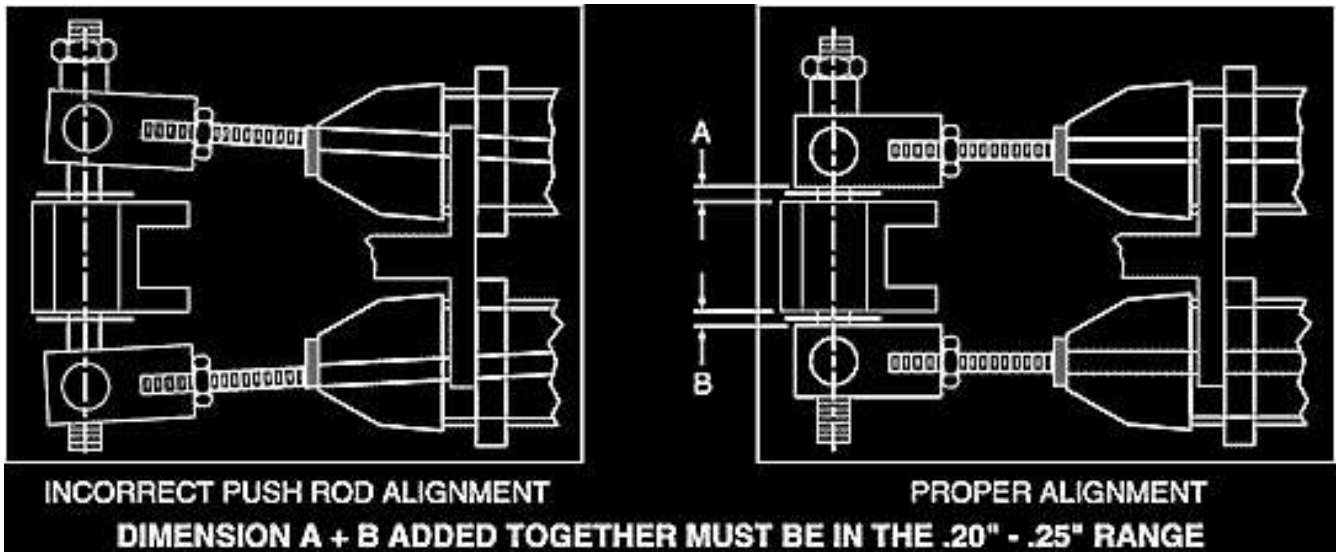
Sometimes this will lead to a "cocked" balance bar when the pedal is in the relaxed position, "no pedal effort". This is acceptable as long as each master cylinder pushrod is completely free of pressure when the pedal is relaxed.

- The pushrod adjustment depicted in the figure is representative of a typical asphalt application. That is, large caliper pistons in front, small caliper pistons in the rear.



It is important that the operation of the balance bar functions without interference by over adjustment. This can occur when a clevis jams against the side of the pedal or the lever (bolt) hits the pedal bore during any point of pedal travel.

Lever movement should be unimpeded throughout pedal travel. In the neutral position, clevises should have between .20" - .25" total clearance between the side of the pedal. The large washers between the pedal and clevis should remain loose.



Make sure that the master cylinder pushrods remain true in relationship to the cylinder during entire pedal travel; pushrods should not be pushing master cylinder pistons at an angle.

In its non-depressed position, the pedal and balance bar should allow the pushrod of the master cylinders to fully return. This can be checked by feeling pushrods for very slight movement, not loose movement. Master cylinder pistons should be against the retaining snap ring (under boot).

Accelerator Cable

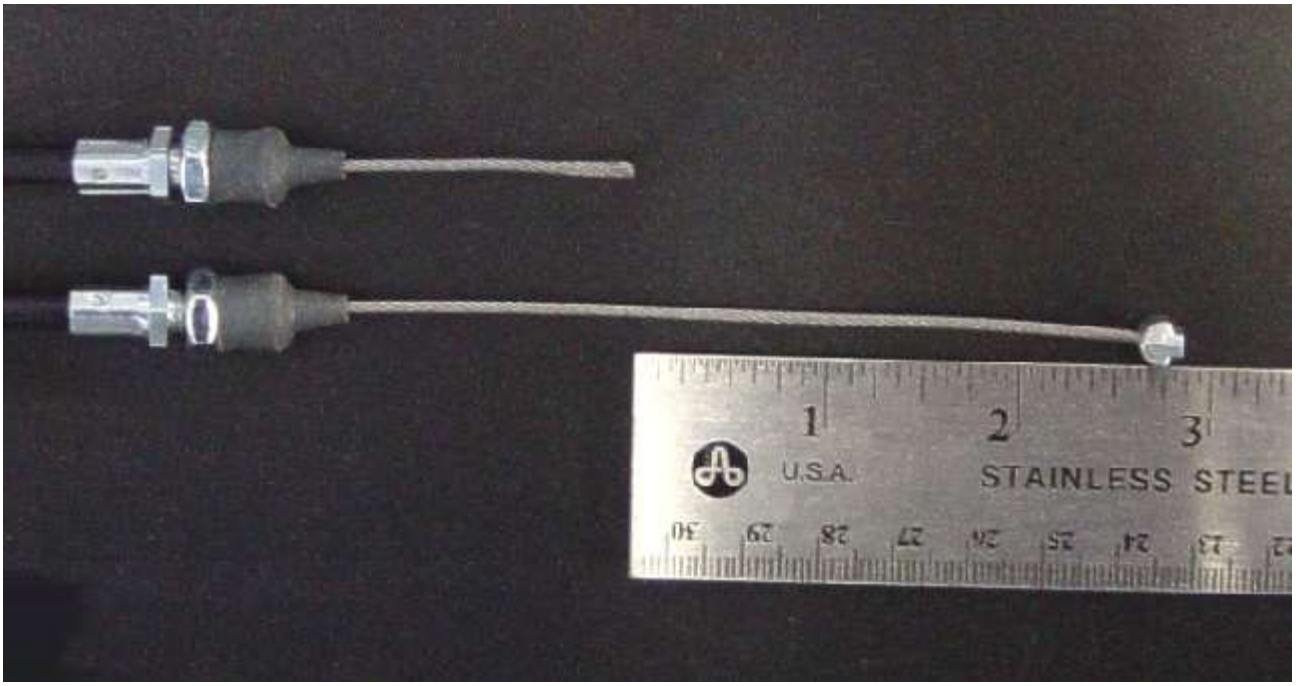
$^{5}/_{64}$" hex key, ⅜", $^{7}/_{16}$", ½" wrenches, wire cutters.

Pedal box hardware, Accelerator cable components.

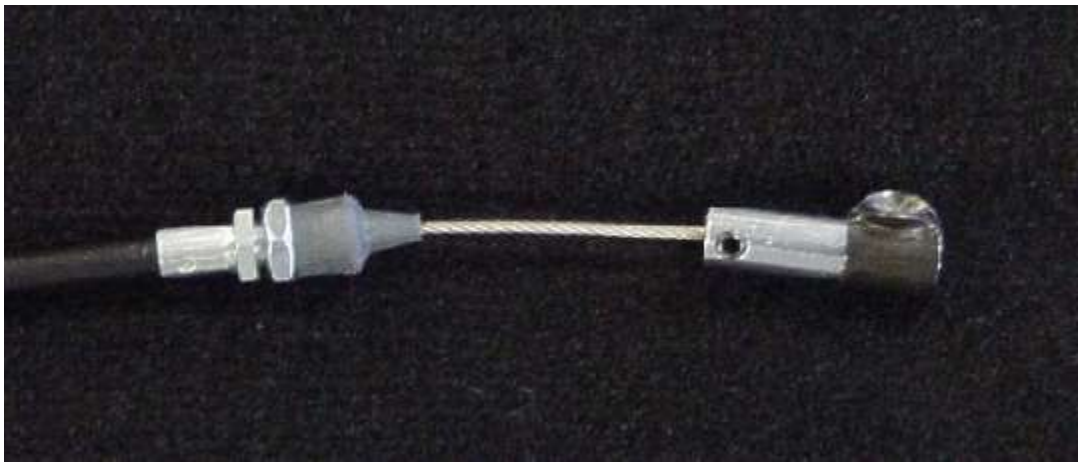
The cable design is set up for a 96-04 4.6L Mustang engine with an OEM pedal but using the supplied ball studs and retainers it can be adapted for all applications.

87-93 Fuel Injected and Carbureted Applications

Using a ruler and marker measure and mark 2⅝" from the cylinder slug on the engine end of the cable.



Using a pair of wire cutters, cut the cable at the location marked.
Remove and discard the included ball stud. It is for carbureted applications
Push and twist the included ball stud retainer onto the end of the cable. Do not tighten the set screw yet.



Insert the pedal end of the cable into the foot box.
Screw on and tighten the $^{5}/_{16}$" locknut on the cable sheath inside the foot box using two ½" wrenches.

The engine end will get installed later.

Accelerator Pedal

$^{3}/_{16}$" hex key, $^{7}/_{16}$" wrench, pliers
OEM accelerator pedal, accelerator cable components

Hold the accelerator pedal up to the mount on the ¾" tube at the front of the foot box. The higher you can mount the pedal the better the pedal will be positioned on your foot. The key things to watch for is clearance between the accelerator pedal and clutch quadrant stop and keeping the cable straight so it will not rub on the side of the cable sheath. If a higher location is desired, some material can be removed from the bottom of the clutch quadrant stop. If mounting higher, mark and drill new holes for the bolts in the pedal.

Attach the accelerator pedal to the mount using the ¼"x ¾" bolts, washers and lock nuts.

Cut the accelerator pedal capture in the corner using a pair of wire cutters.

Slip the accelerator cable through the cut so that the ball will sit in the recess.

Push the capture into the end of the throttle pedal.

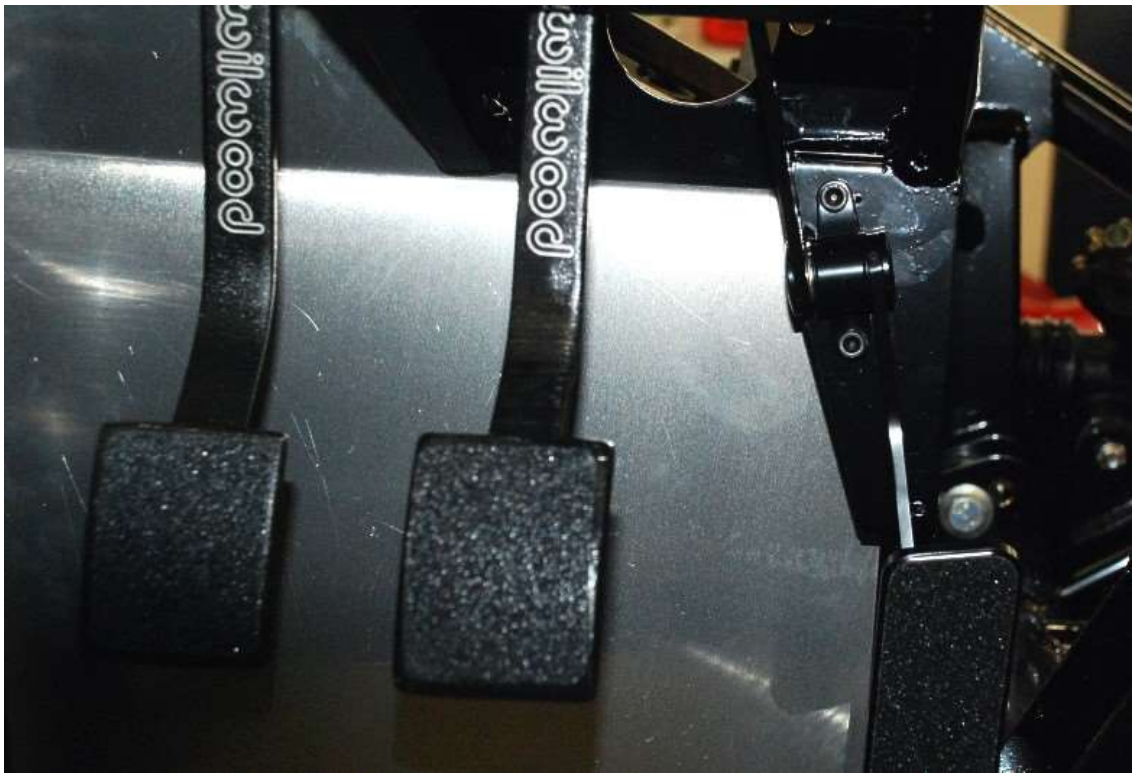
Check the full range of the accelerator pedal travel to ensure that there are no interferences with the pedal or travel.

Complete kit Accelerator pedal

$^{5}/_{64}$" hex key, ⅜", $^{7}/_{16}$", ½" wrenches, wire cutter, ¼" drill bit, drill, marker, masking tape.
Accelerator cable components, accelerator pedal components, pedal box hardware.

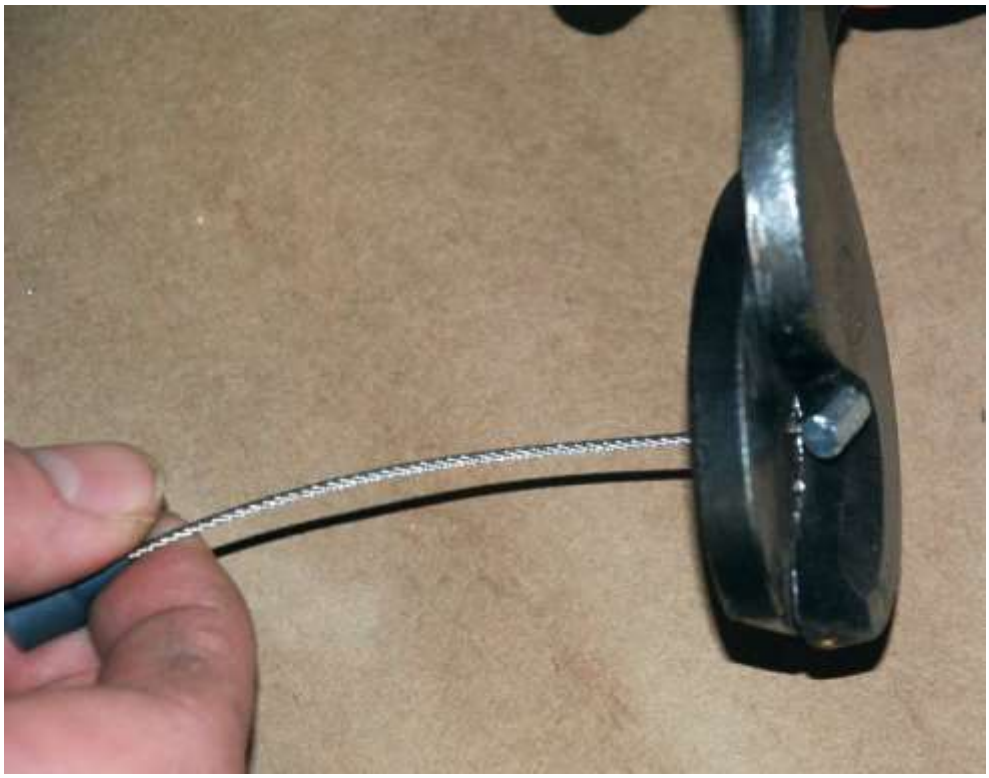
The Accelerator cable is designed to be used with all types of engines, carbureted or fuel injected. The stock cable has the barrel end on it for the 4.6L throttle body and the ball for a Mustang accelerator pedal.

Unpack the throttle pedal and separate the arms. You can leave the screw loose for now as this will be adjusted for fit later.

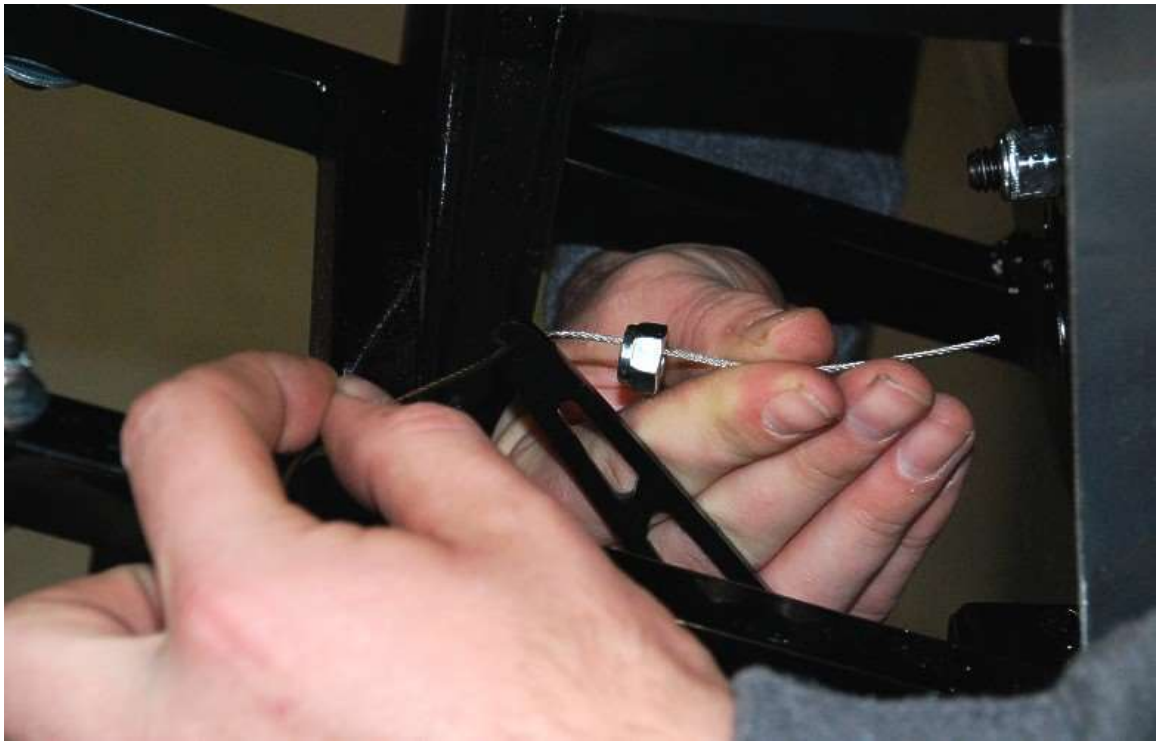


Use one ¼"x ¾" screw and locknut from the pedal box hardware position the accelerator pedal using the top hole in the accelerator pedal mount so that the top of the pedal lines up with the accelerator cable hole so the cable will come out straight. Mark the lower accelerator pedal mount hole then drill the plate to bolt the pedal in place.

Bolt the pedal to the mount plate using the ¼”x ¾” screws and locknuts



Unpack the throttle cable and cut the cylinder end off. Make sure your cutters are very sharp so as not to fray the cable.



Thread the inner cable through the cable retaining lock nut from the accelerator cable components assembly.

Route the cable through the hole in the firewall and slide the sheath back over the cable.

Tighten the cable sheath to the firewall with the retaining nut. A piece of tape on the end of the cable will help prevent it from backing out of the sheath.

Check the full range of the accelerator pedal travel to ensure that there are no interferences with the pedal or travel.

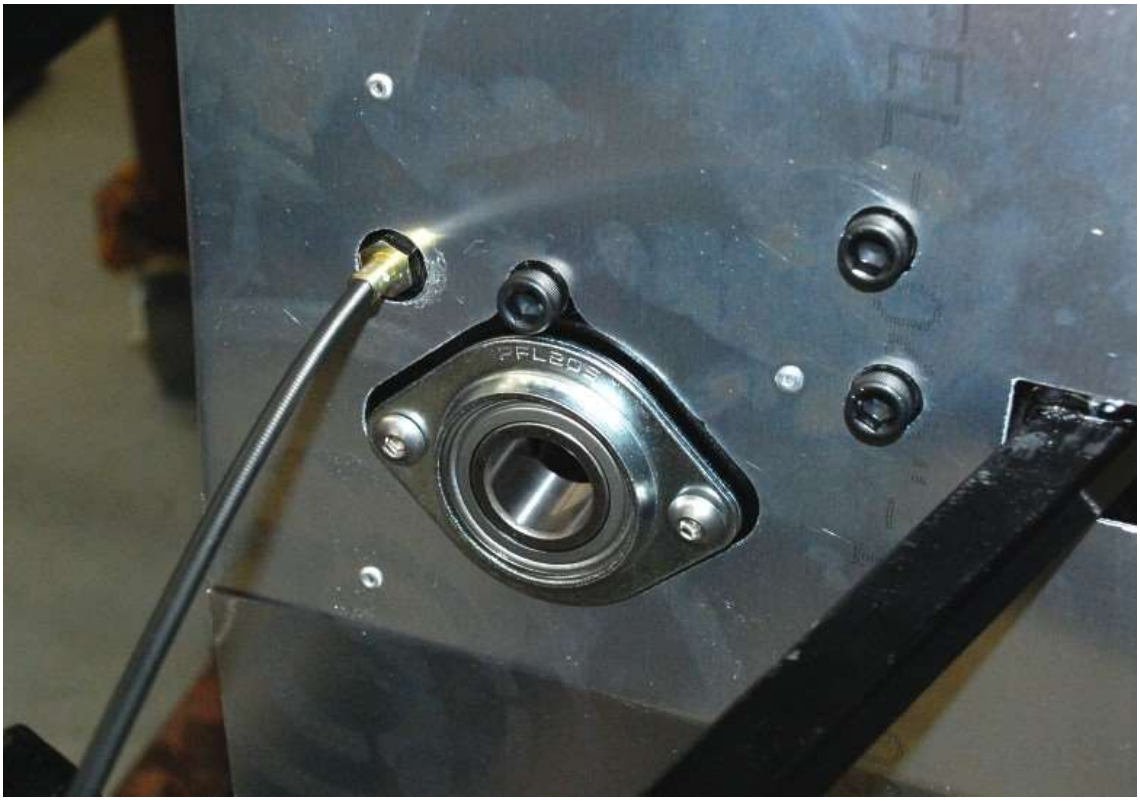
Steering System

Steering Shaft

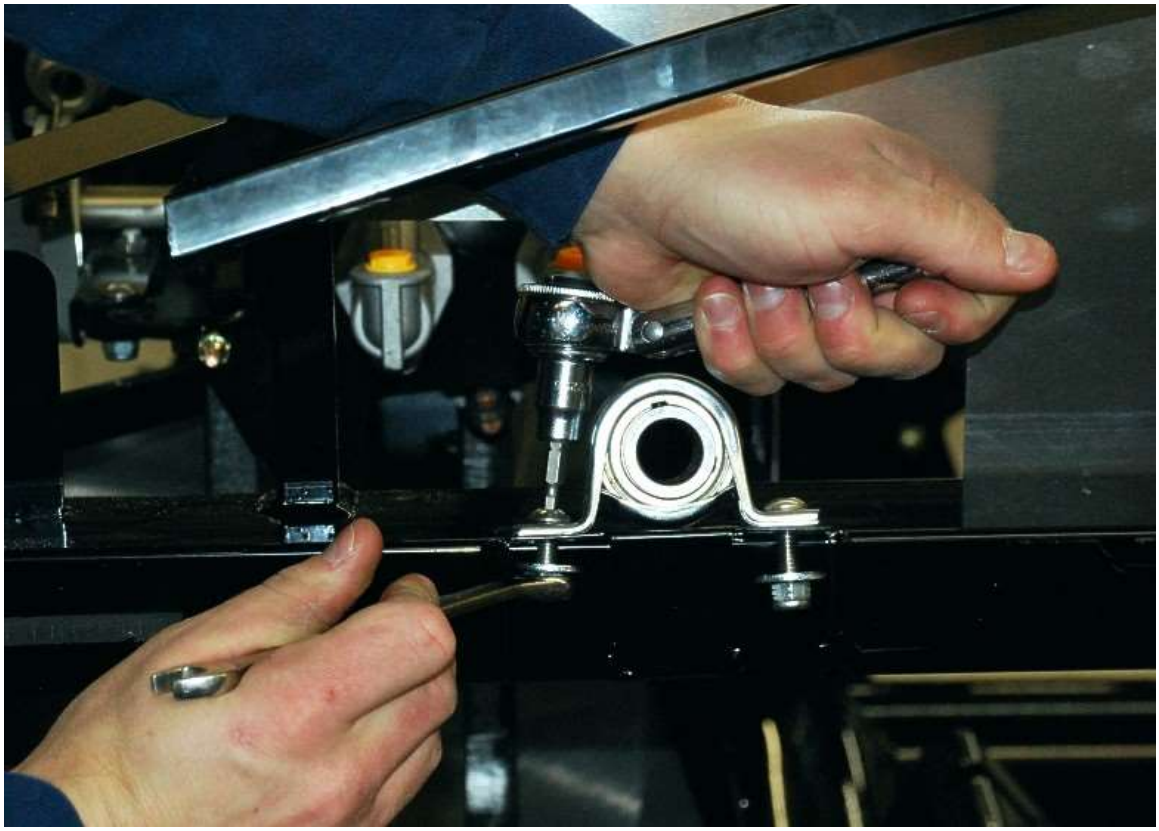
🛠 $^{3}/_{16}$", $^{5}/_{16}$" hex keys, ½", $^{9}/_{16}$", 10mm wrenches, marker, drill, $^{3}/_{16}$" drill bit, Phillips head screwdriver, 15mm deep socket, ratchet.

🚘 Steering bearings/Hardware, Steering shaft.

Unpack the steering shaft assembly.



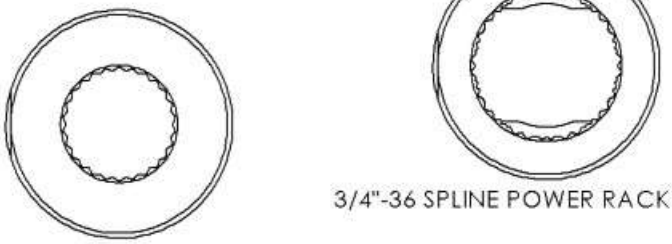
Loosely mount the flange bearing to the footbox front with the set screw toward the inside of the footbox. Both sides of the flange mount to the front side of the footbox plate.



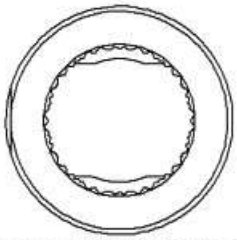
Loosely mount the top pillow block to the chassis with the set screw toward the rear of the car.

Slide the steering shaft into the footbox from the engine bay through the lower bearing.

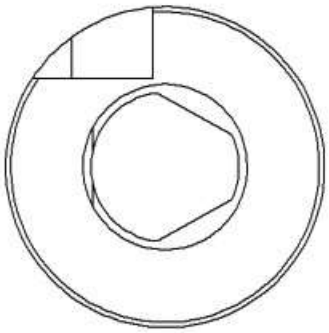
87-93 Power steering racks have a different spline than a manual steering rack and the 94-04 Power rack uses a “Pyramid” shaped end. All of these lower adapters are available from FFR.



9/16"-26 SPLINE MANUAL STEERING ADAPTER



3/4"-36 SPLINE POWER RACK ADAPTER



94-04 PYRAMID STEERING ADAPTER

Steering Rack

Needle Nose Pliers, ¾” wrench, ¾” socket, Ratchet, 1.50” wrench or Adjustable wrench.

Mustang Power steering rack, Steering System Hardware

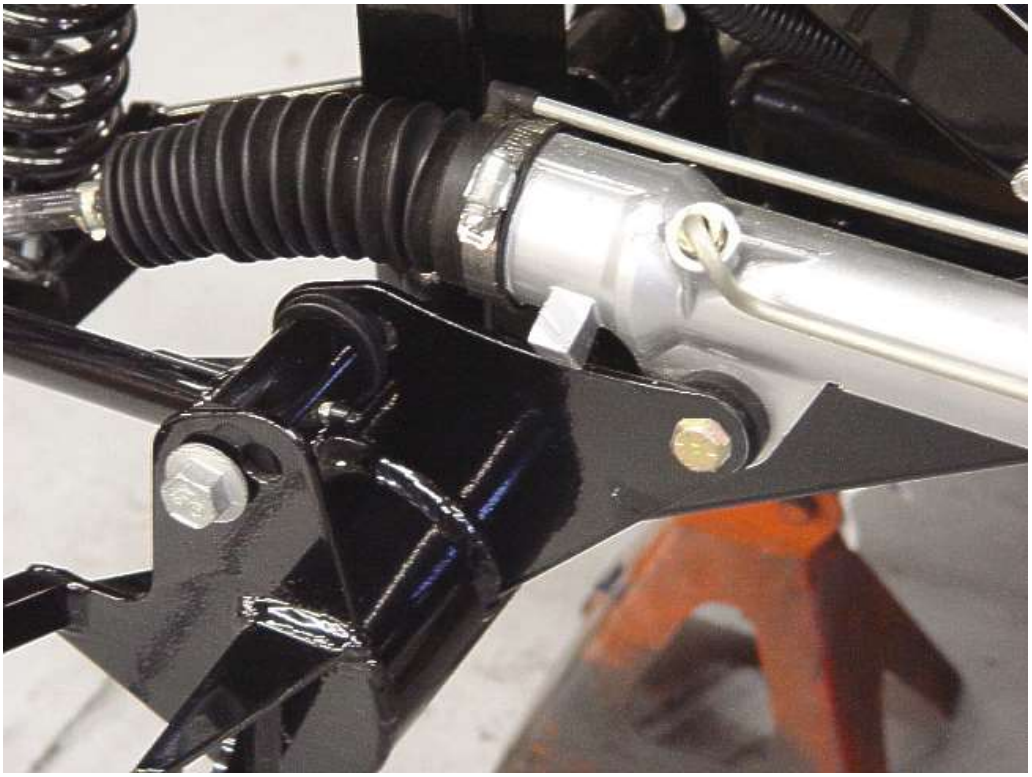
87-93 steering rack and fasteners (hydraulic lines removed).

If not already in, insert the stock rubber bushings and kit spacer sleeves into the rack.

Pull back the rubber boot on the inner tie rod and remove the inner tie rod from the steering rack if not already done.

Line up the steering shaft and adapter and push the rack onto the steering shaft.

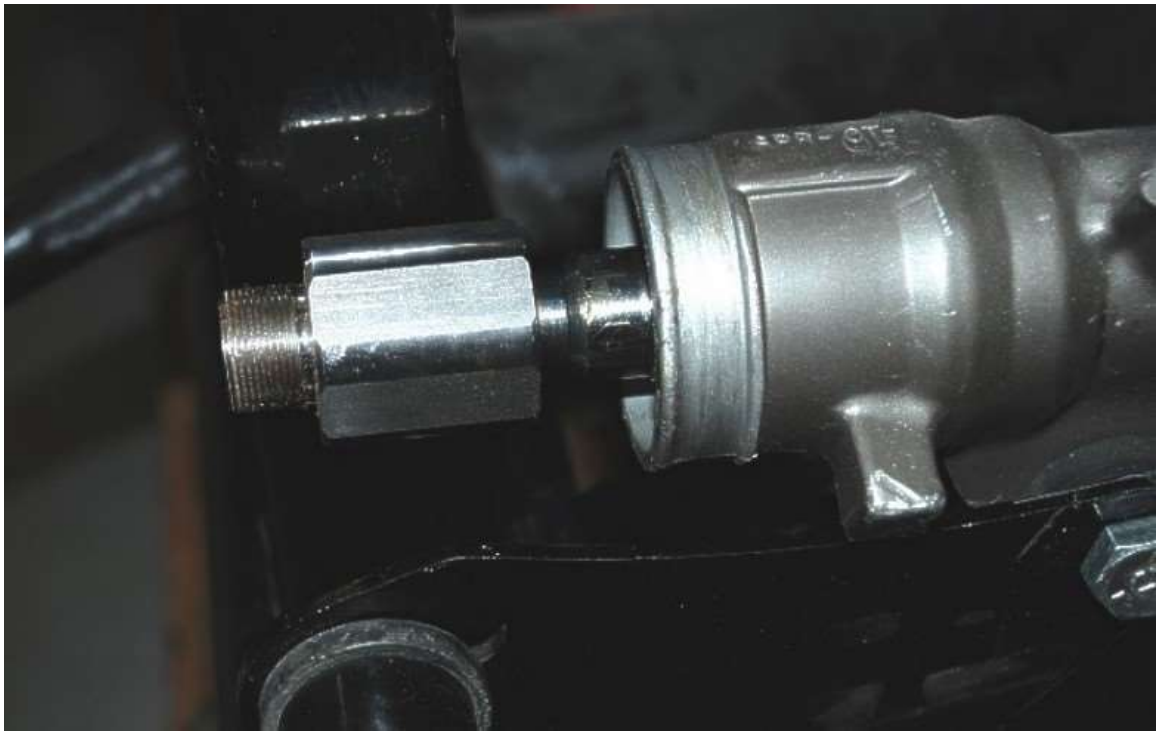
Bolt the rack into the frame. It is easier to do the driver side first then swing the passenger side down into the mount.



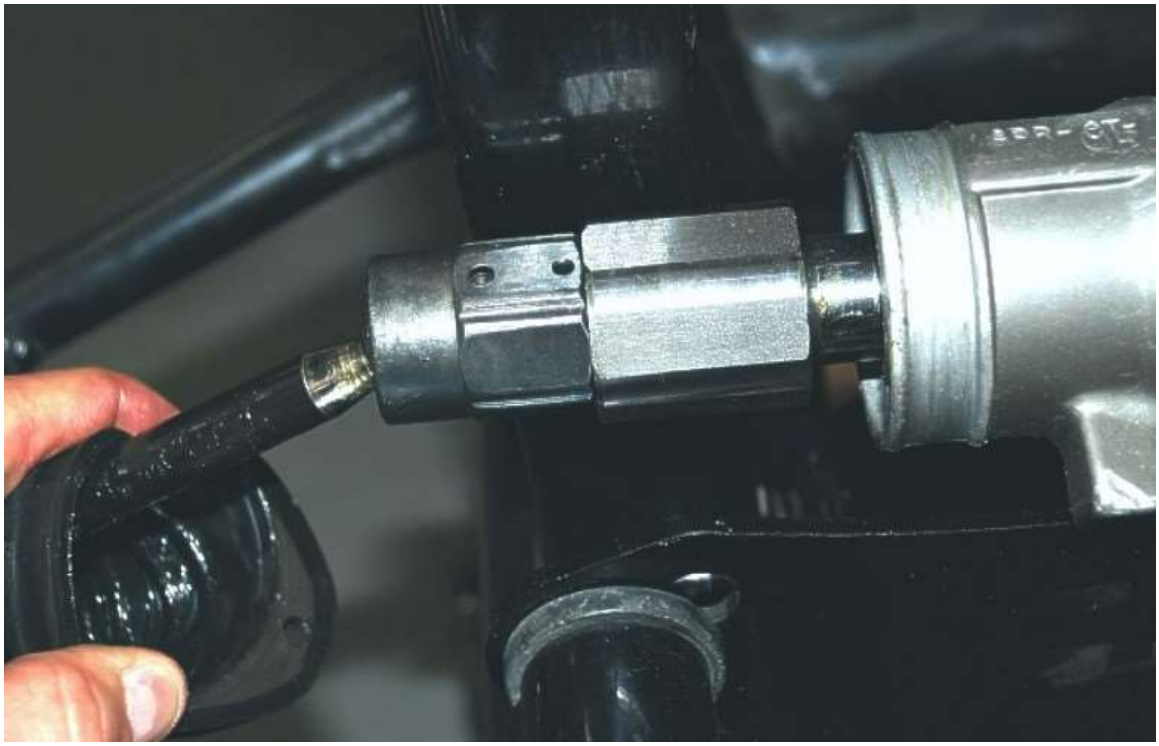
- Use thread locker on all of the steering shaft screws that do not have jam nuts and the adapter screws.

- The inner Tie Rod Extensions are for **stock** Power Steering Racks only.
- The inner Tie Rod Extensions are **not** for the FFR manual steering rack.

- The inner Tie Rod Extensions are **not** for the FFR power steering rack.
- If using the power rack and you have not already done this in the donor prep stage, cut 1.75” off the end of the inner tie rod.



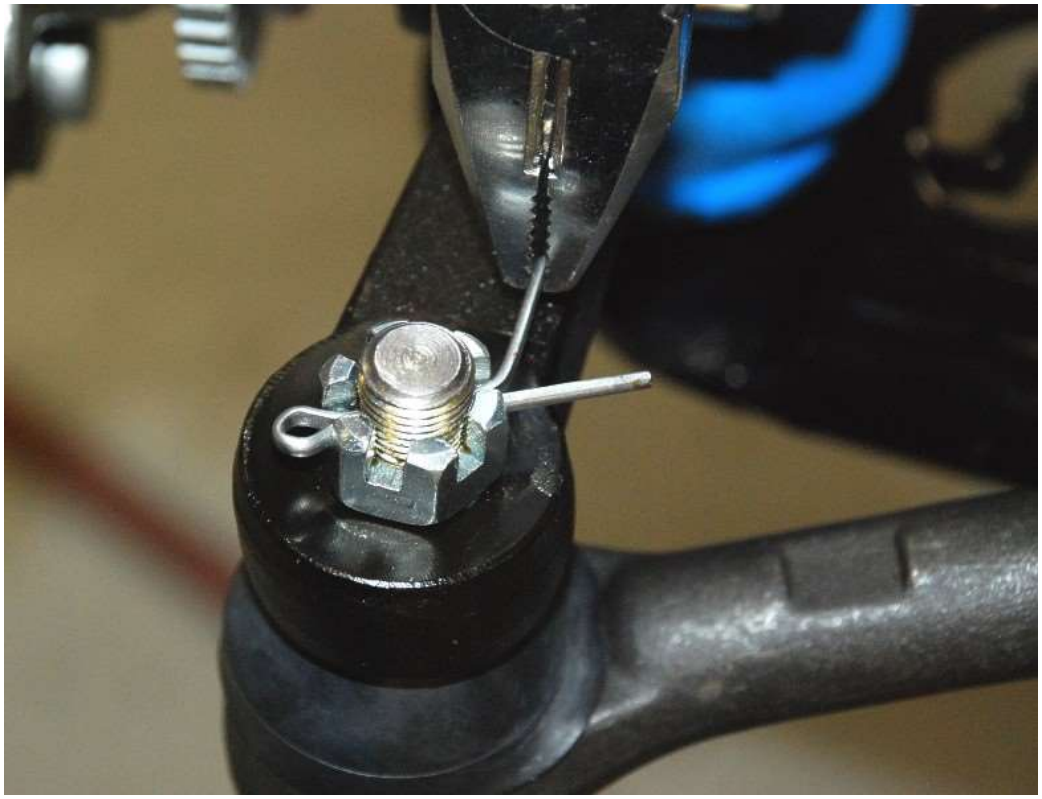
Put a dot of thread lock on the threads of the steering rack and attach the steering rack extension to the steering rack using a 1.50” wrench.



Put a dot of thread lock on the threads of the steering rack extension and attach the Mustang inner tie rods to the steering rack.

Push the boot back onto the steering rack body and attach with zip ties.
The track of the FFR Coupe front end is narrower than the Mustang. Screw in the tie rod ends until the wheels are straight.

The outer tie rods may come with either a castle nut and cotter pin or a nylon locknut.



Attach the tie rod to the spindle, torque the nut to **25 ft-lbs**. If a castle nut is used, torque the nut then install the cotter pin.

Steering rack installed.

Upper Steering Shaft

- 5/32", 3/16", 5/16" hex keys, ½" wrench, rubber mallet
- Steering system hardware

Unpack the upper steering shaft from the primary chassis components box.

Slide the steering shaft through the upper bearing and start it in the lower shaft.

Turn the steering shaft so the recessed bosses for the spring washers are facing up and set the washers in place. Then tap the upper shaft down until the upper clip just disappears into the lower shaft.

Tighten the upper and lower bearings. Also tighten the set screw on the upper shaft.

Cockpit Aluminum

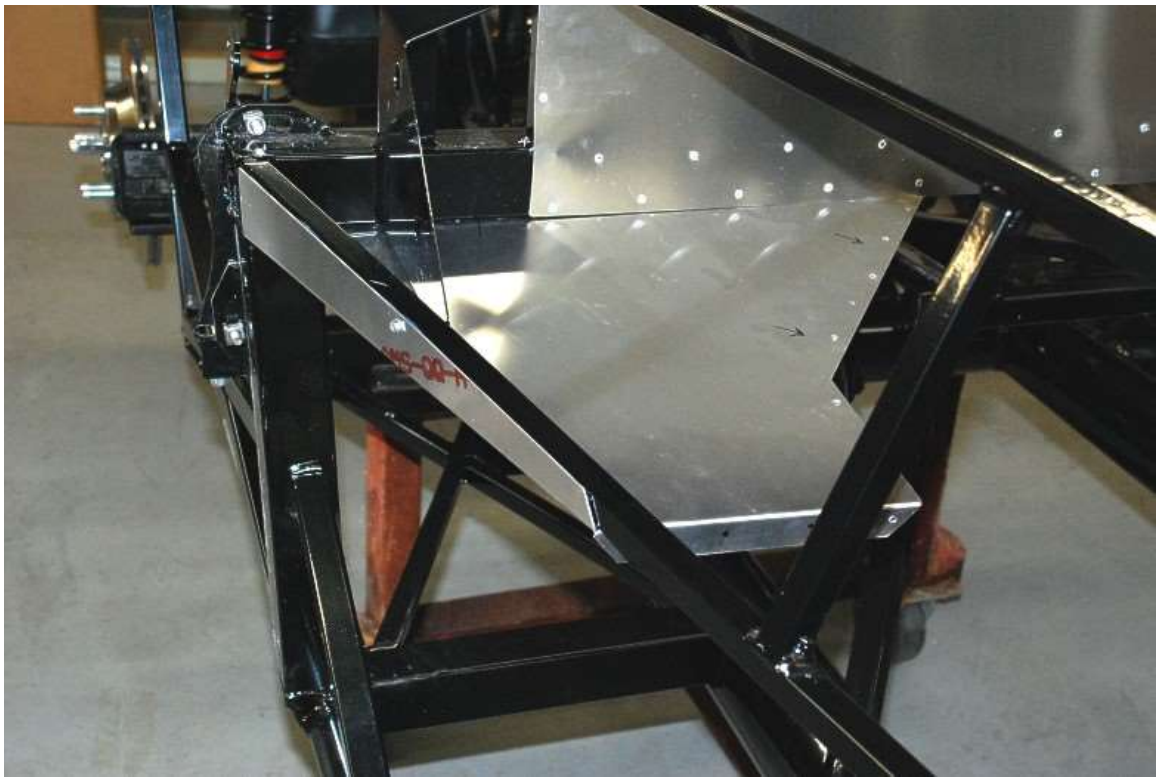
🛠 Drill, ⅛" drill bit, rivet tool, Silicone, caulking gun, #8 self-tapping screws, #8 hex nut driver, ruler, marker, Acetone or carburetor cleaner, rags.

Packaged aluminum, mounted aluminum, Secondary body fasteners.

Do one panel at a time. Be careful of the sharp aluminum edges, they can cut you.

Passenger Footbox

Locate the passenger footbox top and drill and mark the holes in the top flat surface only.



Silicone this panel where it meets the chassis and rivet along the bottom of the 2" square frame crossbar only. Use one of the original screws to temporarily hold it to the other small chassis tube.

Drill the tunnel front A-shaped piece where it meets the chassis and silicone and rivet it in place.

Mark and drill the two vertical edges of the passenger footbox inside wall.

Silicone and rivet the panel to the front tunnel “A” and the footbox top.

Mark the holes in the passenger footbox front panel upper and outer edges but do not drill yet.

Silicone the panel and install with the temporary screws then drill through both panels and rivet it in place.

Silicone the flanges for the passenger footbox floor then install and rivet it in place. The floor sits on top of the flanges from the footbox walls.

Silicone the remaining flanges then install the outer wall/top on the footbox with rivets. Make sure the rear edge is flush to the chassis and not caught up on the door hinge before you start riveting.

Passenger Floor

Drill the passenger side floor where it was marked to attach to the chassis. Mark the two front flanges but do not drill yet.

Silicone the chassis where the aluminum floor will touch. The main chassis rails are not riveted to but still need a bead of silicone run along the tops. The top edge of the tunnel is not riveted yet but gets silicone as well.

Drill and rivet the floor in place to the chassis. Use a couple clamps or tape to hold the tunnel top to the tunnel until the silicone sets.

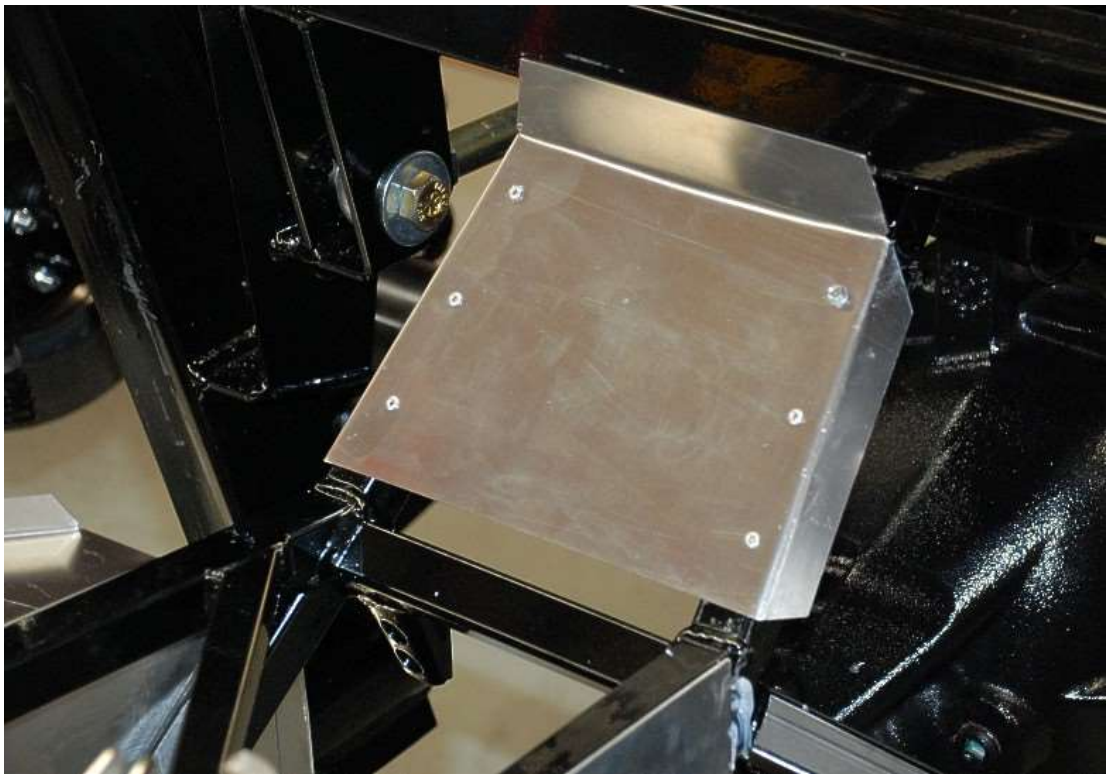
Driver Floor

Drill silicone and install the driver's footbox floor. The outer flange does not get drilled yet.

Silicone, drill, and install the driver side floor.

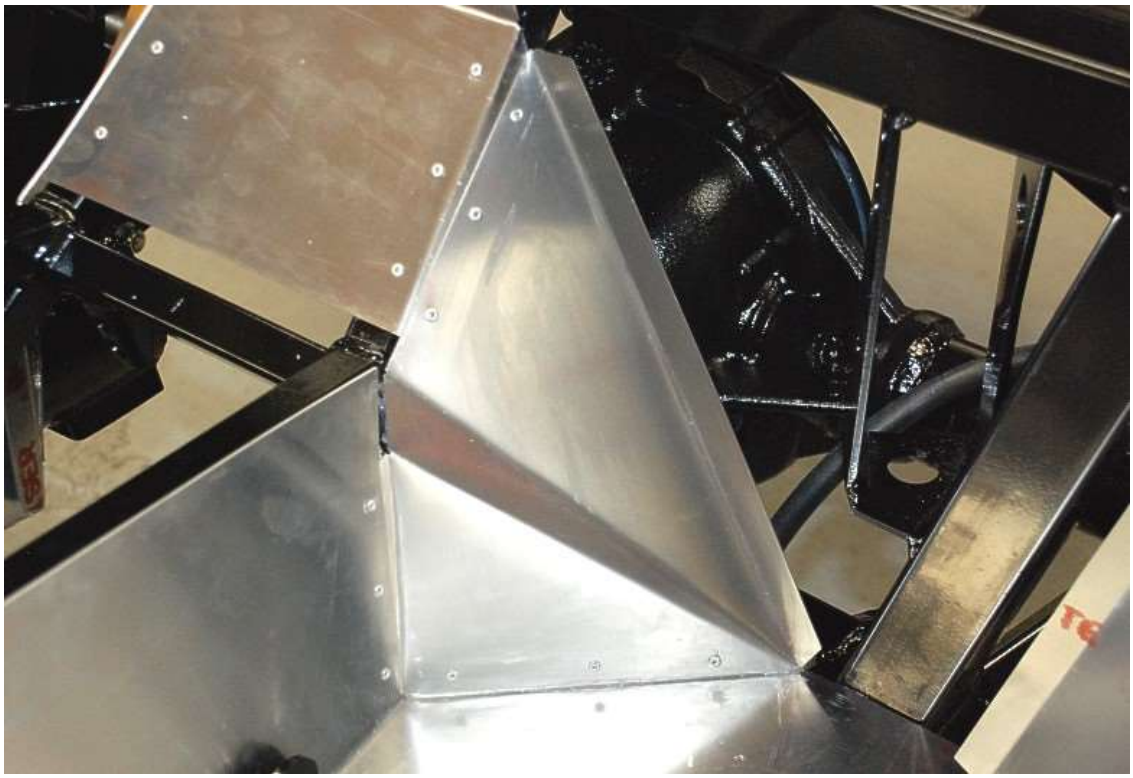
Drill, silicone and install the inner footbox wall. The front flange tucks in behind the front. Put a little silicone on both sides of this flange.

U-Joint Cover



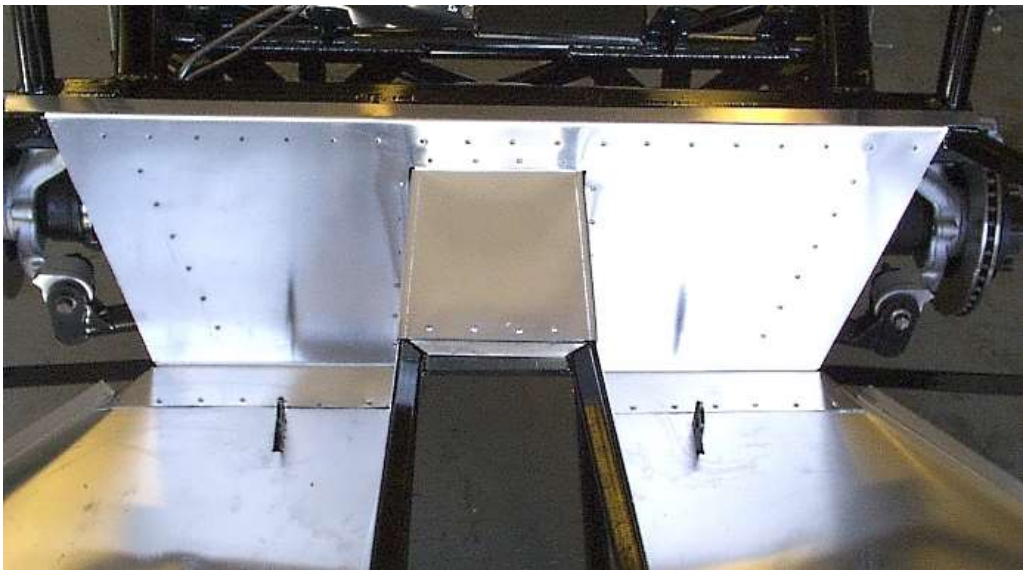
Mark the rear tunnel cover where it meets the chassis then silicone and rivet it in place.

Transmission Tunnel rear corners



The inner rear corner pieces tuck behind the tunnel sides and sit on top of the floor. Mark the rivet spacing on the top edge and silicone and rivet the three flanges that make contact.

Cockpit rear wall



Mark and drill the rear cockpit wall. Silicone the chassis and aluminum flanges where it attaches and rivet it into place.

Cockpit rear corners

The outer cockpit corners get marked on the bottom flange and where they meet the chassis. Drill silicone and rivet these in place.

Fuel System

Fuel Tank

🛠 $^{9}/_{16}$" deep socket, ratchet, hammer, $^{5}/_{16}$" hex key, floor jack, friend.

🚘 Mustang Fuel tank, fuel tank straps, Secondary Body Fasteners Assembly, Fuel strap fasteners, fuel line components, fuel lines.

Unpack the fuel strap fasteners.

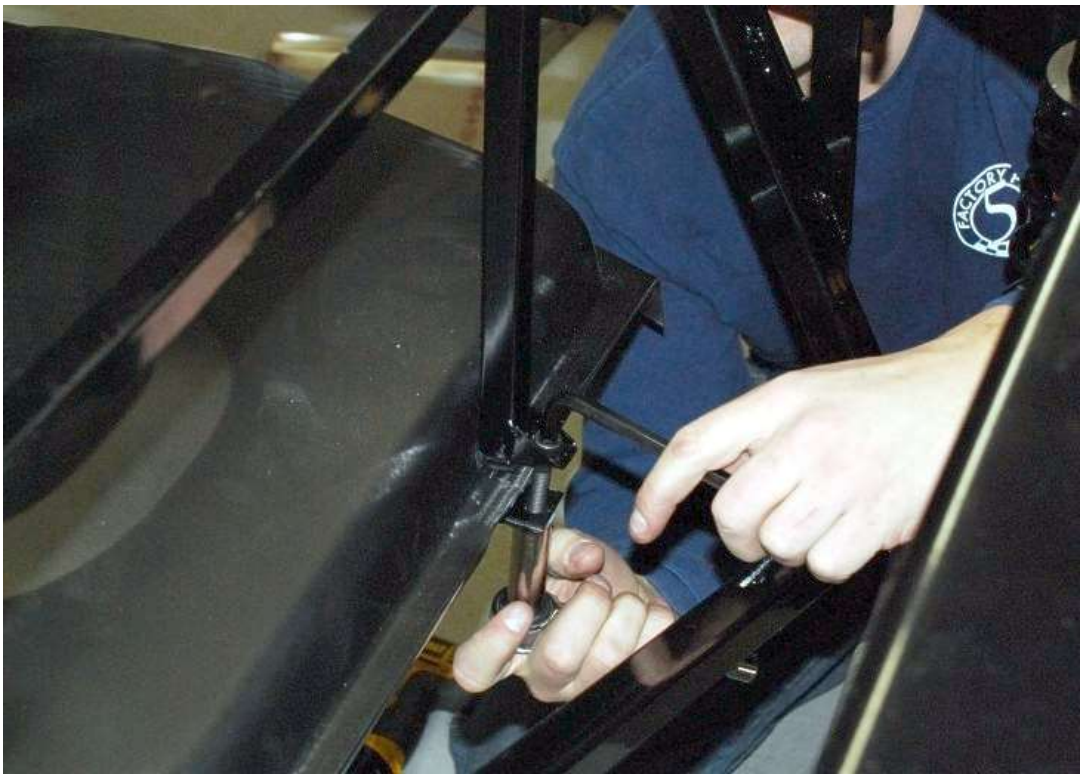
Unpack the ¾” square plastic end caps from the secondary body fasteners.

Push the four plastic end caps into the tubes hanging down in front and behind the gas tank.

Hang the fuel tank straps from the rear mount of the chassis using two of the strap fasteners. The longer strap goes on the passenger side.

Using a jack, raise the tank up into place on the chassis. Make sure the plastic cover is in position below the tank.

Bolt the straps in with the strap fasteners and drop the jack.



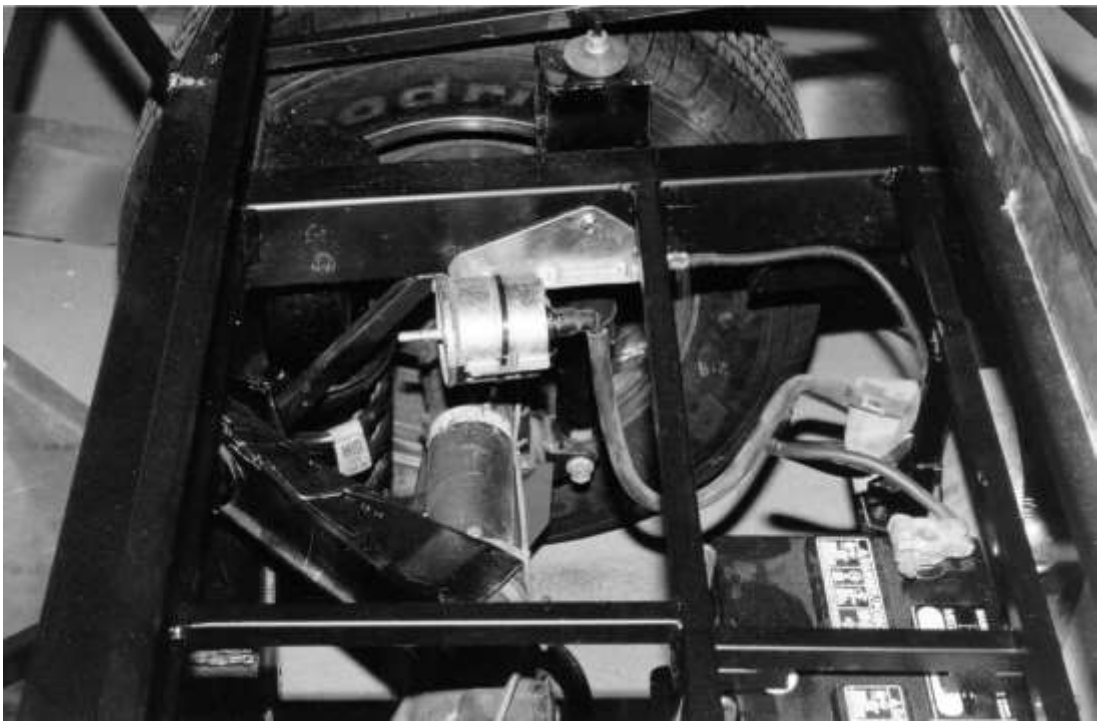
Tighten only the driver's side strap as the passenger one will be removed for aluminum fitment later on.

Fuel Filter

🛠 Tube bender, $^{3}/_{16}$" drill bit, drill, rivet tool, marker, tape measure, flat head screwdriver, $^{9}/_{16}$" wrenches

- Insulated clip hardware, Fuel line components, ¼", $^{5}/_{16}$" fuel lines, Mustang Fuel filter and mount, Mustang tank to filter nylon hose, Mustang fuel vapor hose.
- Make sure to install the fuel filter in the correct flow direction.
- Determine whether or not a new filter is needed. It's a good general rule to replace the filter no matter what.

Attach the Mustang nylon fuel line to the filter and the tank to see where the mount location must be.



Hold the filter up to the 2"x 3" chassis tube, mark the holes, then drill and rivet the bracket on using $^{3}/_{16}$" rivets.

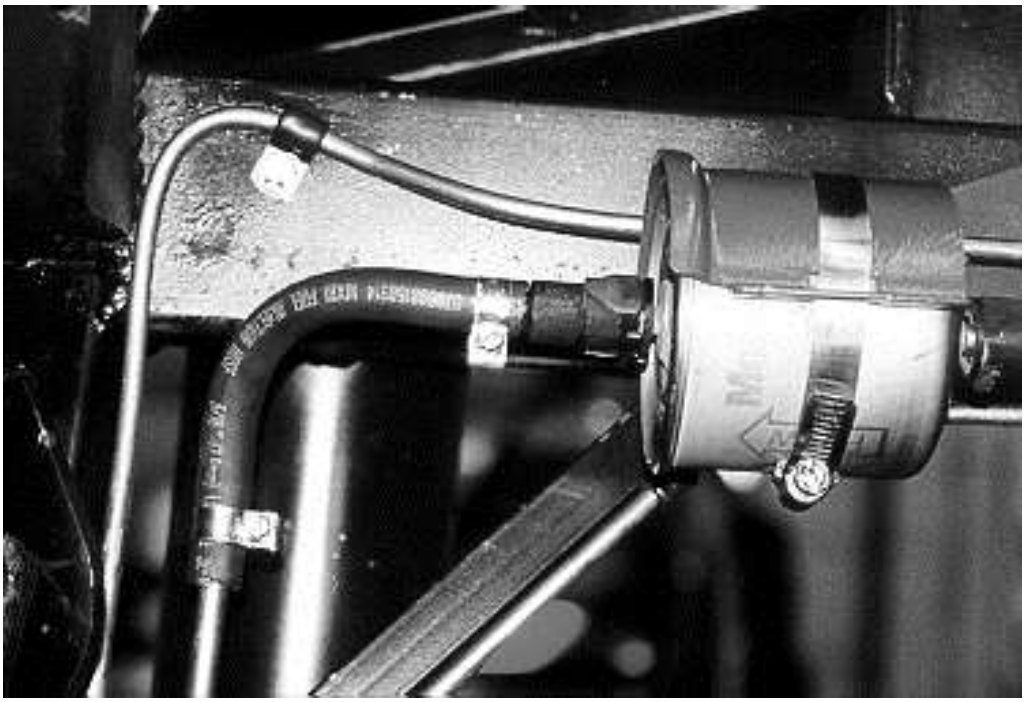
Fuel Lines

Unpack the fuel lines and the fuel line assembly which is in the secondary chassis components box.

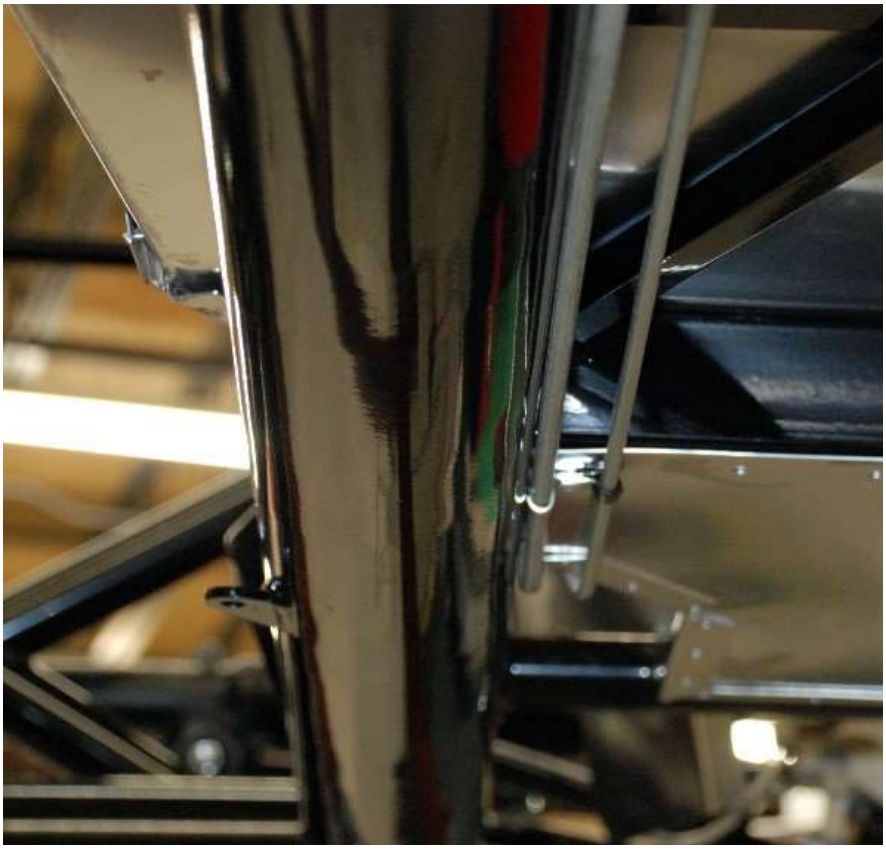
The fuel line routing will depend on your style of fuel pump, whether it is in-line, in-tank, or mounted on the engine.

- The most important things are: To route the lines so that they are protected by the chassis; not close to any heat source or moving parts; and provide enough slack in the rubber hoses for the engine to move.
- The larger $^{5}/_{16}$" line is the send fuel line to the engine. If you are running a return system then there is ¼" line provided for that as well. There are barbed fittings provided for both sizes.

Use the ¼" flexible line, $^{5}/_{16}$" flexible line, and fuel injection hose clamps to connect the Mustang fuel line connectors to the hard lines.



From the filter we generally run the lines down the 2"x 3" tube behind the rear cockpit wall and alongside the outside of the main 4" frame tube.



- Which side of the frame you run down may depend on where you are hooking up to your fuel rail, carburetor, or pressure regulator. We usually run the fuel lines on the passenger side of the car and the brake lines on the driver side of the car.

Fasten the lines to the 2”x 2” square cockpit outriggers with the insulated line clips and $^{3}/_{16}$” rivets.

If you are going to use the mustang Fuel vapor line, run it along with the other fuel lines.

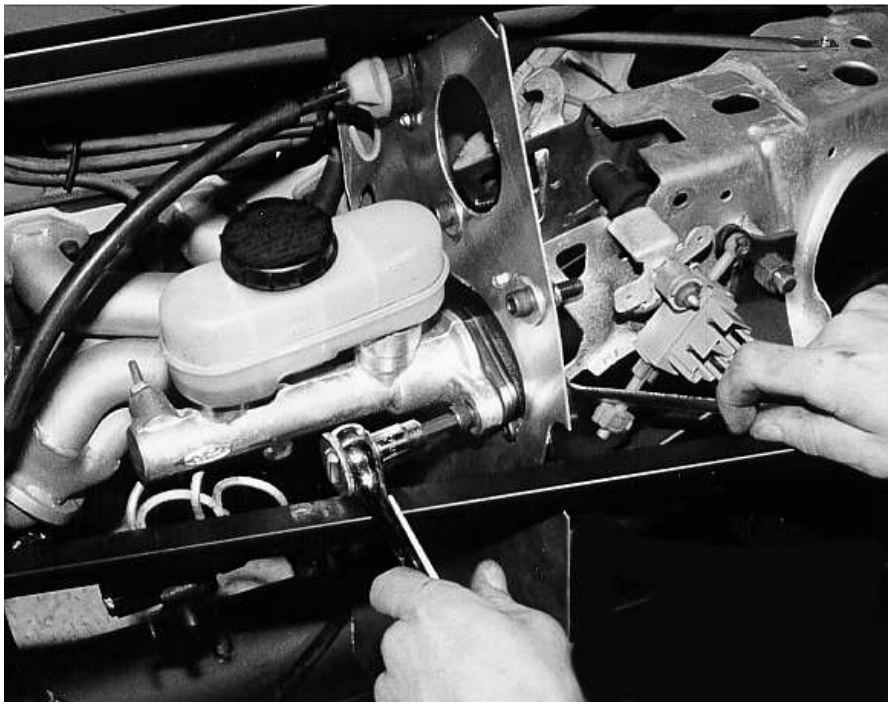
Brake System

🛠 Tube bender, $^{3}/_{16}$", ¼" drill bits, drill, rivet gun, marker, tape measure, razor knife, round file or sand paper, brake fluid, $^{5}/_{16}$" hex key, ½", $^{9}/_{16}$" wrenches.

🚘 Pedal box hardware, Insulated clip hardware, Brake line components, $^{3}/_{16}$" brake lines, Mustang master cylinder, Mustang power booster push rod.

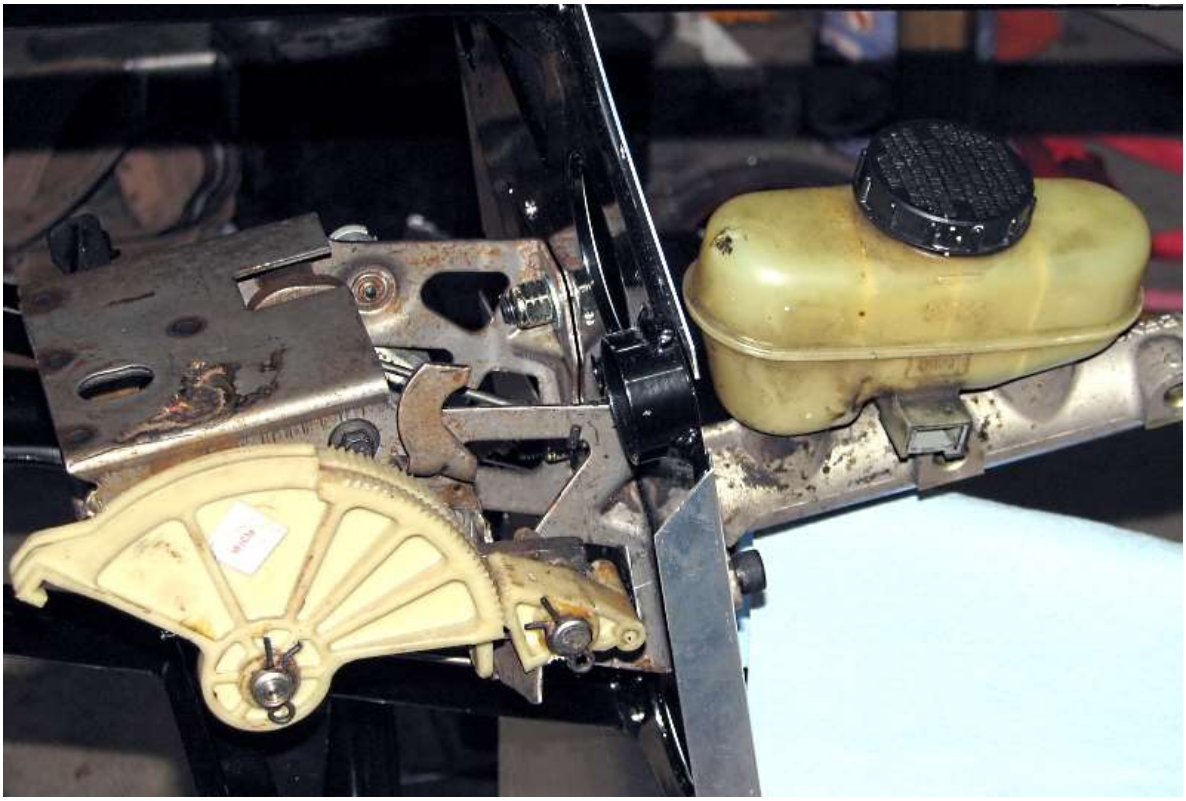
✋ Avoid dripping brake fluid on any painted surfaces. Clean up spills immediately. The Master cylinder that you use depends on the size and number of pistons in the brake calipers.

Manual Brake Master Cylinder and pushrod

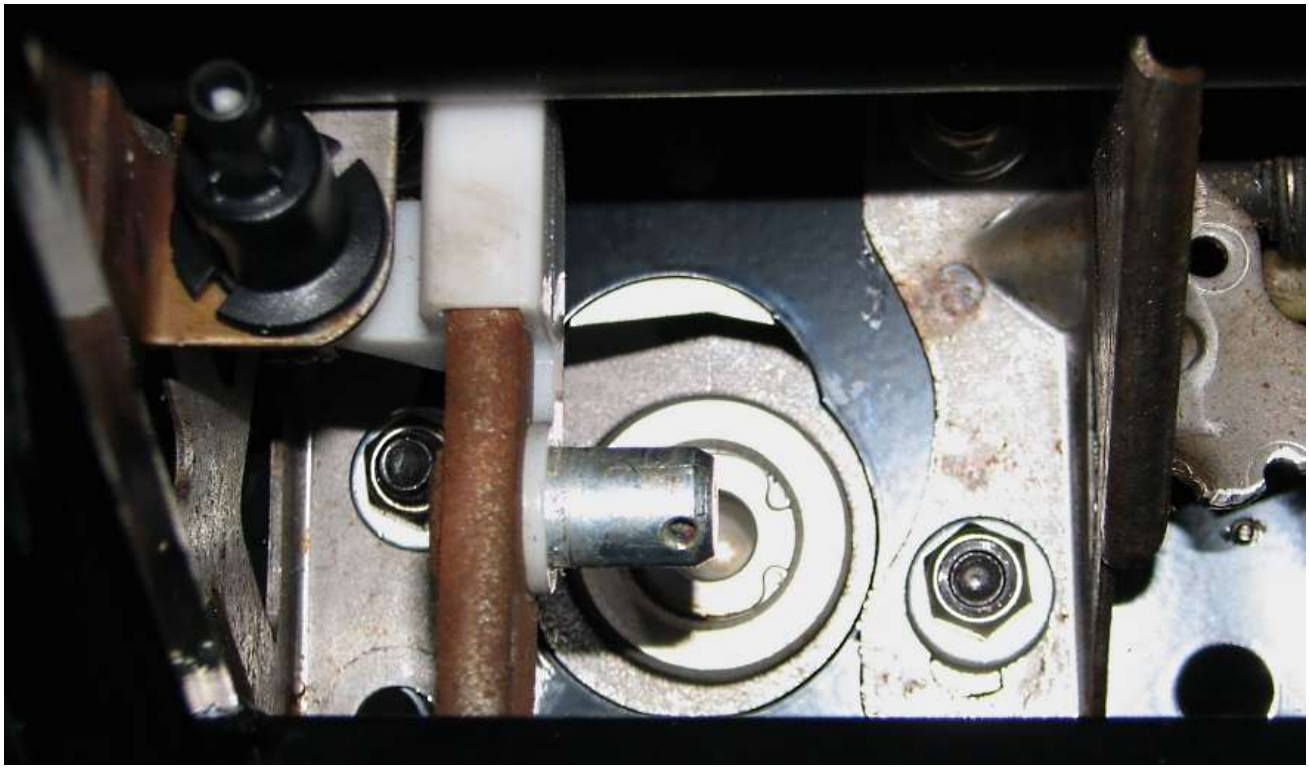


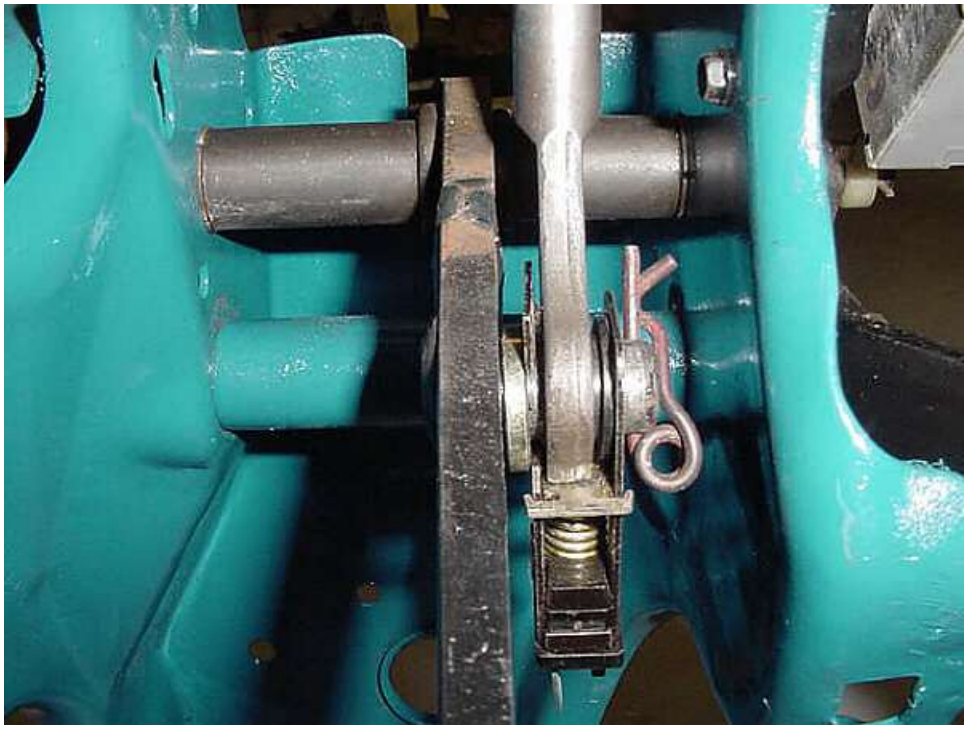
Use the ⅜”x 2” bolts provided to mount the master cylinder and spacers to the footbox front wall. The number of spacers used dictates the height of the brake pedal. Start with one spacer unless you are 6’ or taller then use more.

One of these bolts doubles as a foot box lower mounting bolt.



Tighten all of the mounting bolts for the pedal box and master cylinder.





Install the push rod from the power booster into the master cylinder and insert the white plastic bushing in the ring end.

Hold the rod between the two ears of the brake light switch and slide it over the brake pedal post.

Put the clip through the hole in the pedal so that the push rod will not come off.

View up at the mounted brake pedal

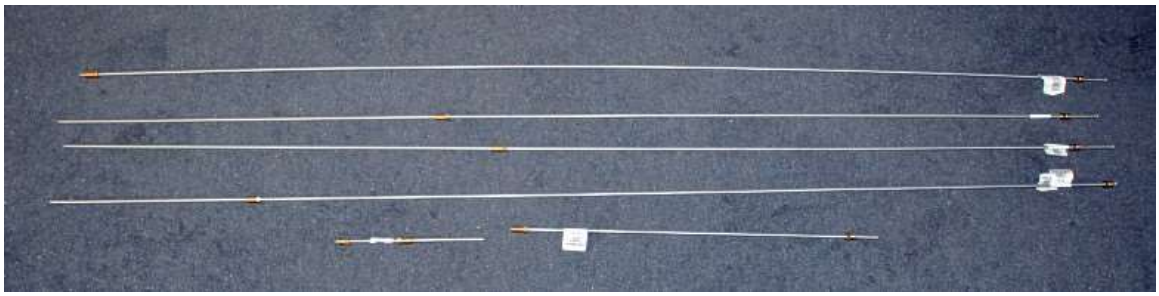
If you plan to race frequently, use some small springs and attach them to the brake pedal and pedal box to prevent the pedal from moving during severe acceleration.

The small aluminum piece packed in the assembly is not used for this application.

Tighten all the remaining hardware mounting the pedal box to the chassis.

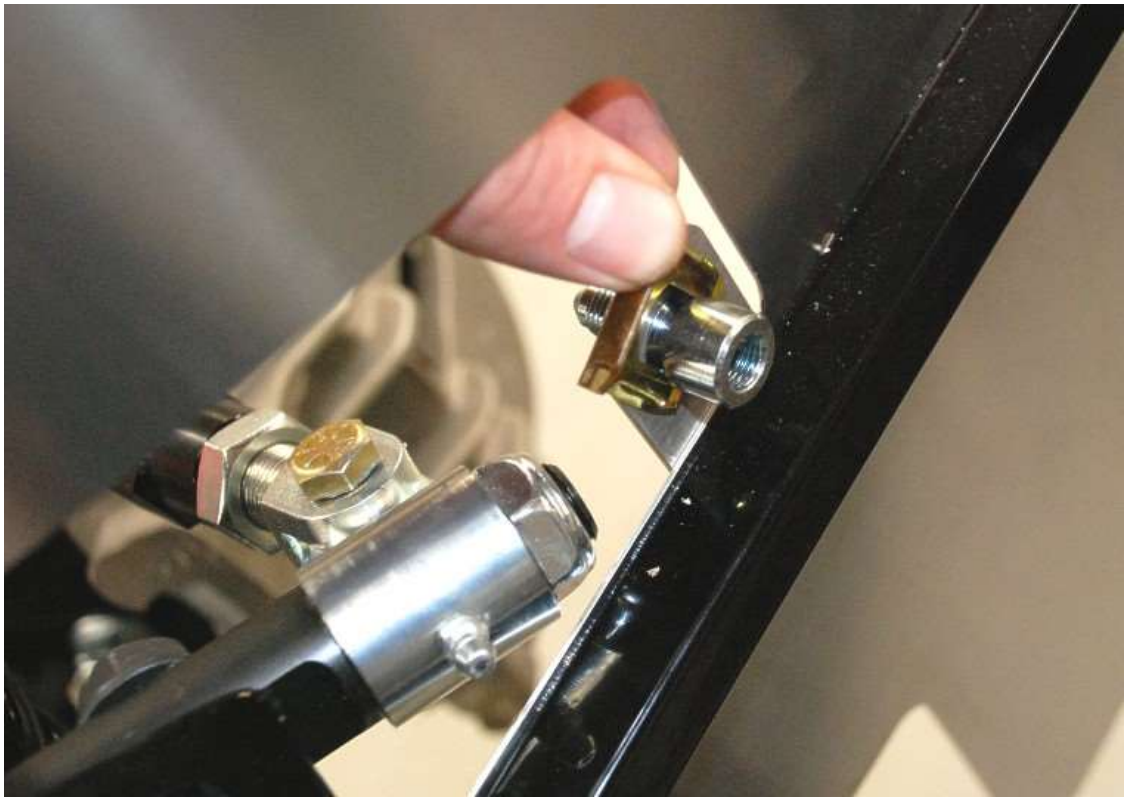
Front flexible brake lines

Unpack the hardware from the brake line components.



Lay out the various lengths of brake line so you can see what you have to work with. Like the fuel lines, there are many ways to run these lines but you must be very careful to keep them protected from moving parts, heat, or being too close to the bottom of the car.

- Which side you run down may depend on where you are hooking up to your fuel rail, carburetor, or pressure regulator. We usually run the fuel lines on the passenger side of the car and the brake lines on the driver side of the car.



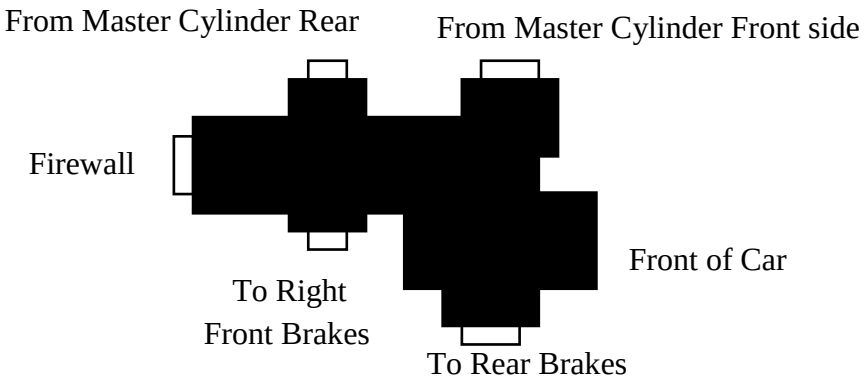
The laser cut brackets from the front brake assembly attach to the chassis right behind the front upper control arms.

Drill and rivet these in place using two $^{3}/_{16}$" rivets.
Push the brake line adapters through the brackets from the outside in and install the clips that hold them in place.
If removed, attach the front brake line to the caliper making sure there is a crush-washer on either side of the fitting. Hand tight is fine on all these for now.

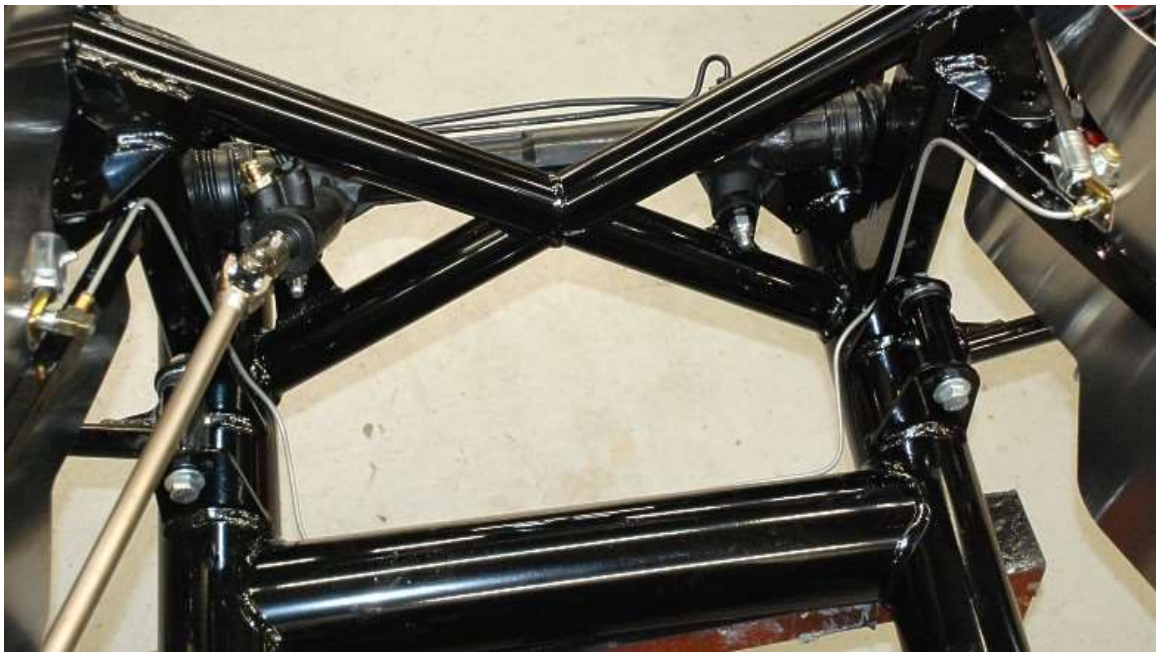
Hard brake lines

From the bottom of the master cylinder, run the 20" brake line forward to the left front brakes.
Using the distribution block diagram below, attach a 60" brake line to the **Right Front brake** outlet.

Brake Line Routing at Distribution Block



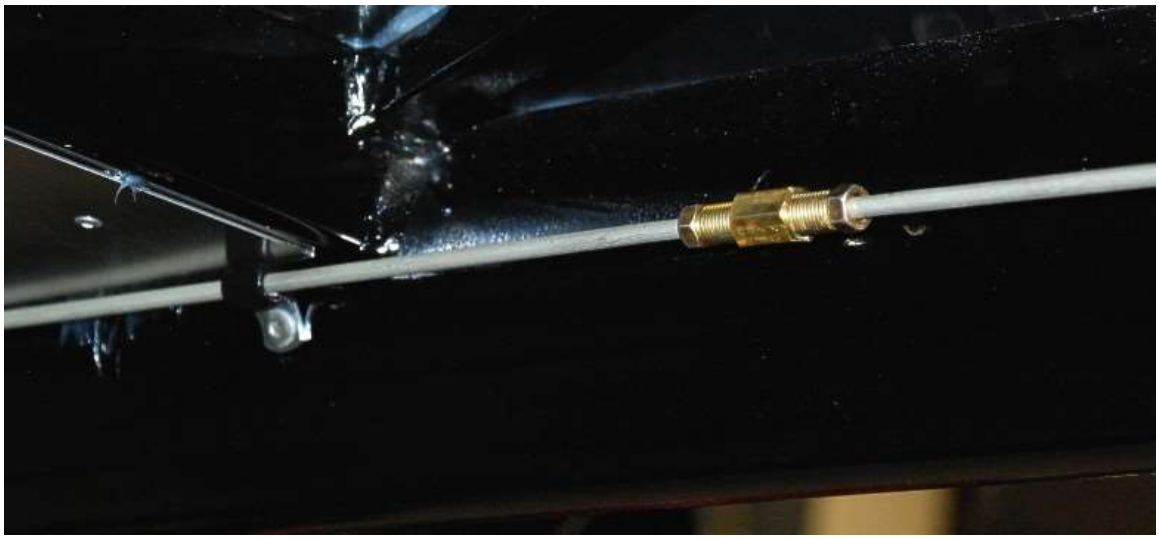
Brake distribution block line routing. Right is towards front of car.



From the distribution block, run one of the longer 60" brake lines over to the right side brake hose mount. The line will bend very easy but be careful not to kink it.

When you are happy with the routing use the small insulated line clips and $_{3}/_{16}$" rivets to hold it in place.

Use a long 60" brake line and route from the distribution block **Rear brakes** outlet down the front of the footbox and back toward the rear of the car.

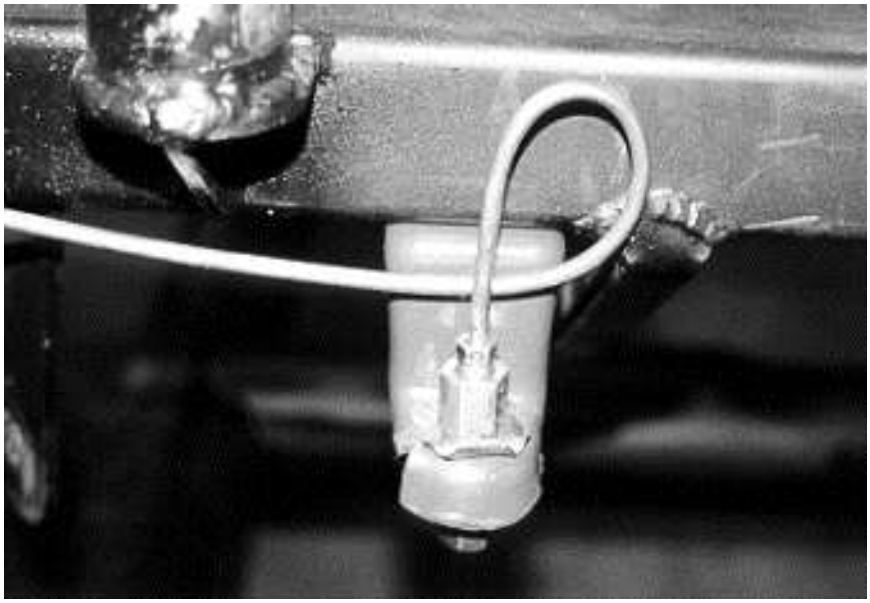


Use a union to attach a second 60" brake line.

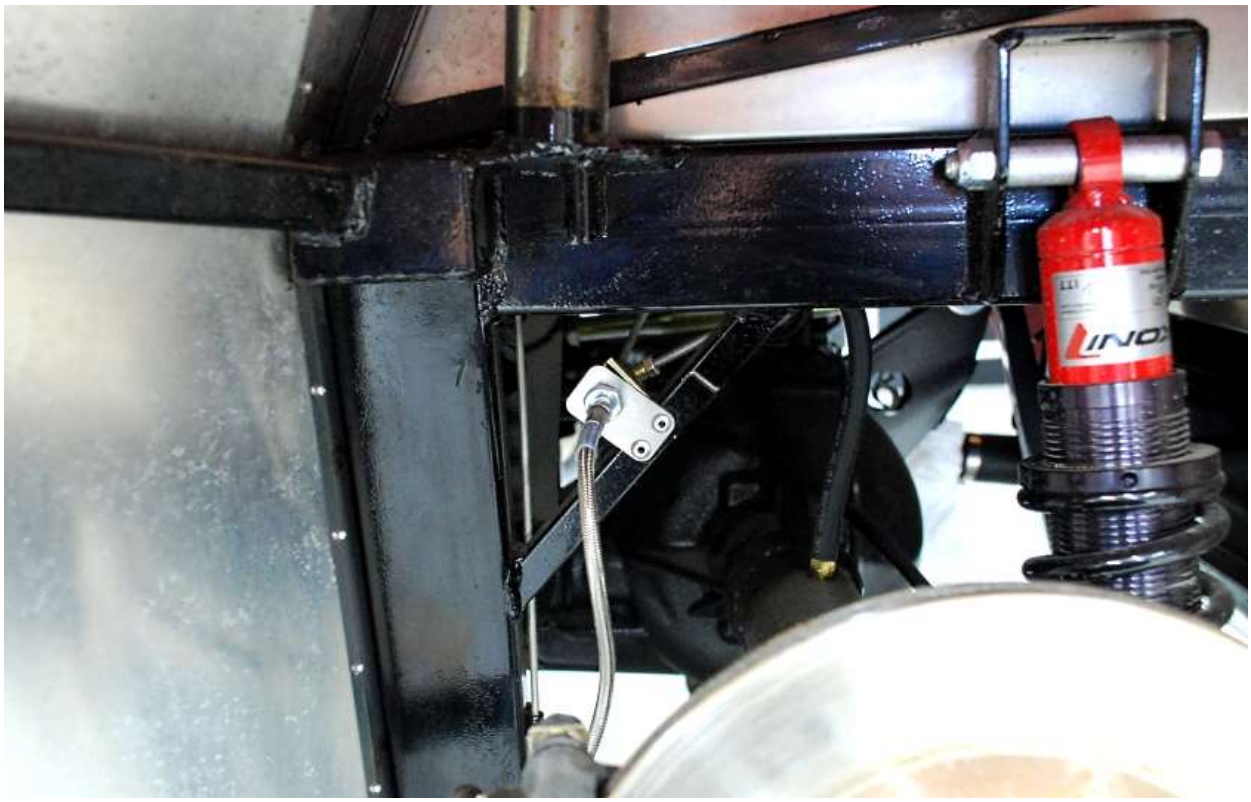
Run the brake line up the back of the 2"x 3" tube.

✋ At this point your routing will depend on your rear brakes. 87-95 Mustang solid axles have a single flex line that runs to the middle of the axle then out to the calipers. Newer axles and the FFR rear brakes run the flexible brake lines direct from the chassis to the caliper (the IRS is done like this, there is an extra length of line and a T to allow similar routing to the front.)

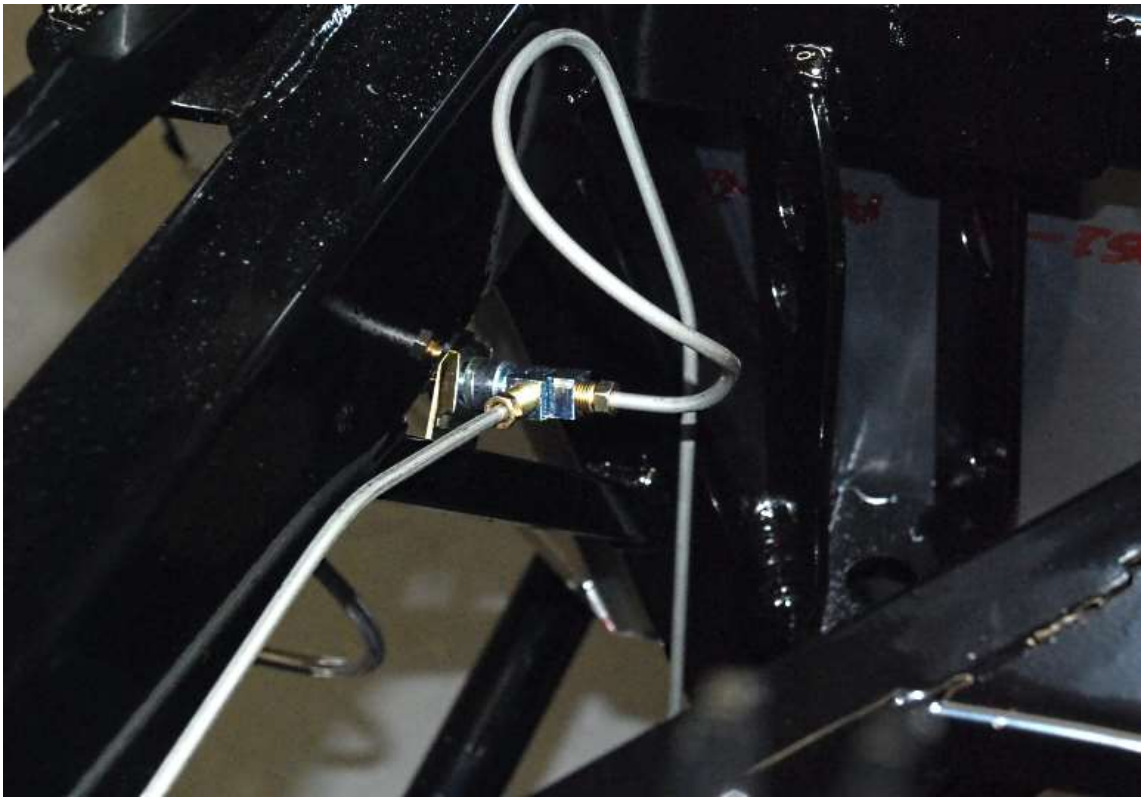
If using the 87-95 Mustang mount, drill two holes for the Mustang brake bracket on the underside of the 2”x 3” frame member and mount the Mustang bracket.



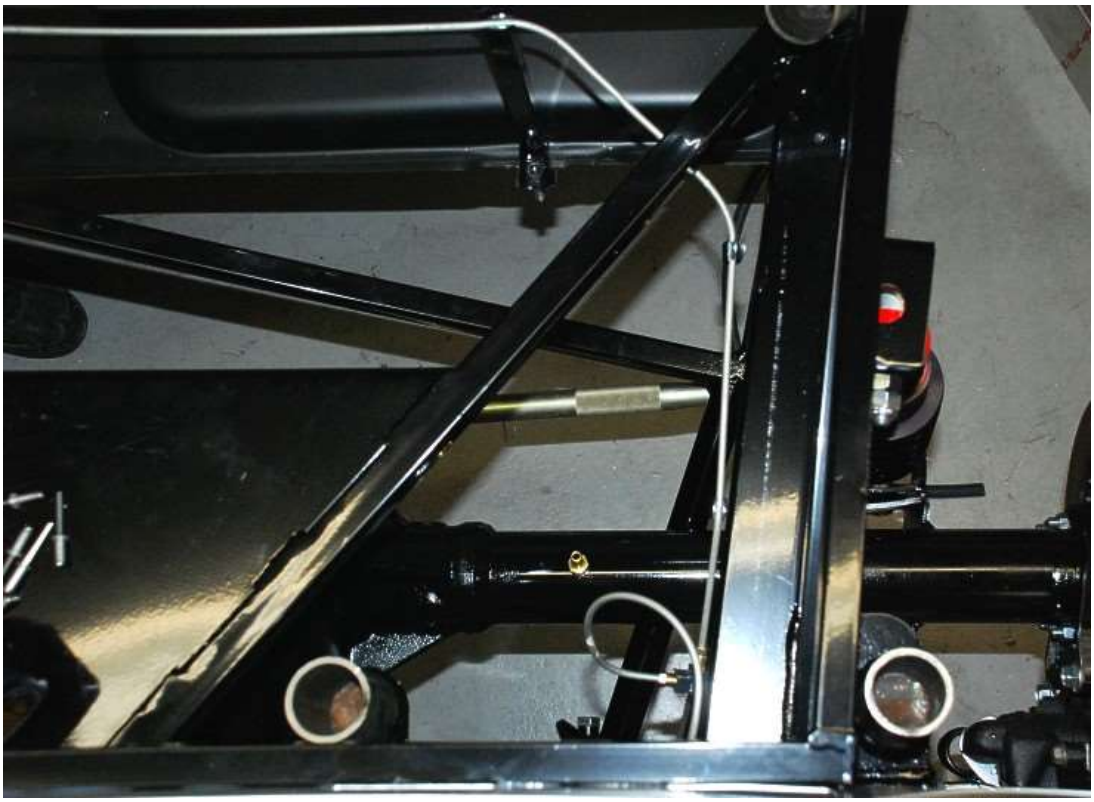
Attach the brake line to the Mustang mount.



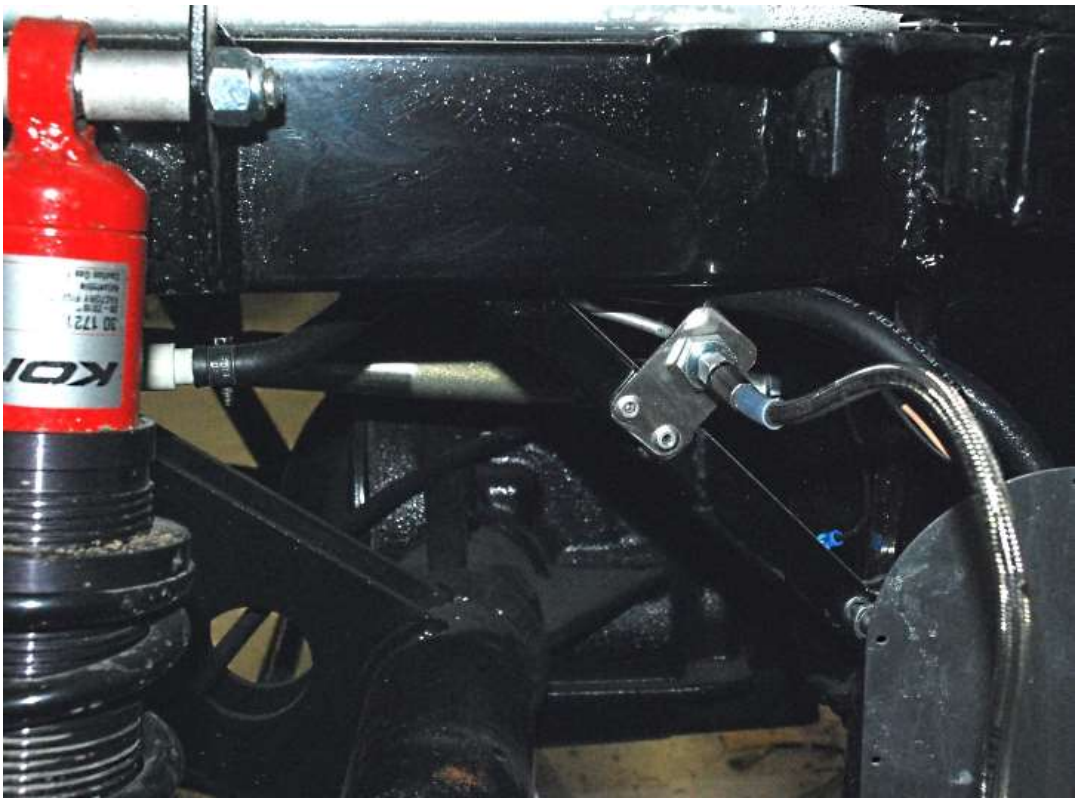
Using the FFR rear brakes, we attached the flexible brake line mount to the driver side diagonal ¾” tube with the brake line clip.



Attach the “T” adapter to the flexible brake line and route the hard brake line coming from the front to the “T”.



Run a 60” brake line from the “T” up the ¾” tube to the front fuel tank mount tubes and over to the passenger side ¾” tube. An alternative to running it this way would be to run it across the backside of the 2”x 3” tube.



Attach the passenger side flexible brake line mount to the ¾" tube and attach the flexible brake line to the bracket with the brake line clip.

Attach the hard brake line to the flexible brake line.

Make sure that your flex lines will not interfere with anything in the suspension, wheels during travel or turning full lock to lock.

Tighten the banjo bolts on the calipers

Banjo bolt torque specs

87-95 Front Brake hose to caliper Banjo bolt – **(34Nm) 25lbft**

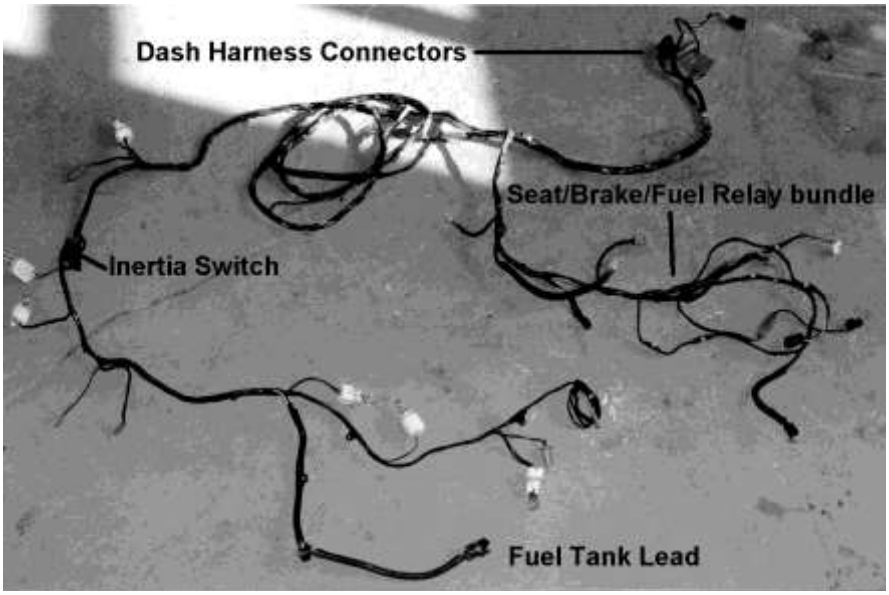
Rear brake caliper hose to caliper Banjo bolt – **(43Nm) 32lbft**

Fill the system with fluid and bleed being very thorough in checking for leaks.

Wiring Harness

- ⅜" socket, regular head screwdriver, slip joint pliers, ⅛", 3/16" drill bits, drill, #8 nut driver, electrical tape, wire cutters.
- Misc. electrical components, wiring harness mounting hardware, insulated clip hardware
- If during this section, you decide to cut your harness, wait until after the car has been started then remove sections one at a time, starting the car after each cut to make sure it runs. Helm electrical manuals for the model year you are using are invaluable. They cost between $30-$55 ea. but are well worth the money. www.helminc.com
- If you did not take the harness out of the car yourself, when connecting the plugs together, check the wire colors going into and out of the plugs to make sure that they line up and are the same color. The only plug that may not be the same color is the fuel tank harness. All other plugs that go together should be matching in color and shape or they will not connect. Different color plugs means you may have a different year harness than the rest of the harness that you have and could cause complications later when trying to start the car.
- If you decide not to use the Mustang chassis harness because there are so many extra wires, the Factory Five chassis harness is a good alternative, it comes pre-loomed and labeled. It can also be used in combination with the Mustang engine harness if running fuel injection.
- There are three ways to wire an EFI engine. One is to use the entire Mustang harness and transplant it. Another way is to use an engine harness from the Mustang and splice the power leads into an aftermarket chassis harness such as the FFR chassis harness using Chilton's or Ford wiring diagrams. The third way is to use an aftermarket chassis harness and an aftermarket standalone engine harness.

Rear Harness



Run rear harness from the hole in the driver foot box inside wall, along inside the transmission tunnel with the battery cable and straight back to the rear of the frame. Use zip ties, insulated line clips, and the wire loom to hold the wires and battery cable.

At the rear of the frame, run the wires low on the frame so that they are accessible after the body is mounted to the frame. Run the brake light wires to the far corners of the frame. The lights will mount to the $^{1}/_{16}$" plates on the rear of the frame.

Use the Mustang inertia cut-off switch inline with the fuel pump power.

Locate the switch out of the way but still accessible in case it is tripped.

Use the inertia cut-off switch as a template and drill two holes in the trunk aluminum on the far corner of the driver's side.

Mount the inertia fuel cut-off switch on the inside using the screws provided

Run (2) wires (using the blue wire extensions in the misc. electrical components) from the left rear, side marker light, up through the roll bar rear leg hole to be used for the license plate light. Leave the wires in the trunk for now.

The remaining section of the rear harness runs to the battery where it joins the battery cable and runs along the transmission tunnel down tubes.

From the battery forward, use some of the black plastic wire loom (misc. electrical components) to cover and protect the rear harness and the battery cable.

Replace the cable ties that were used earlier during the battery cable install with the large insulated line clips where possible.

Run the harness forward with the battery cable (zip tie them together to prevent movement) to the beginning of the driver foot box, passing over the transmission harness section on the way.

Place insulation grommeting around the ¾" hole in the upper corner of the inside driver foot box.

Slide the harness down the edge of foot box into hole.

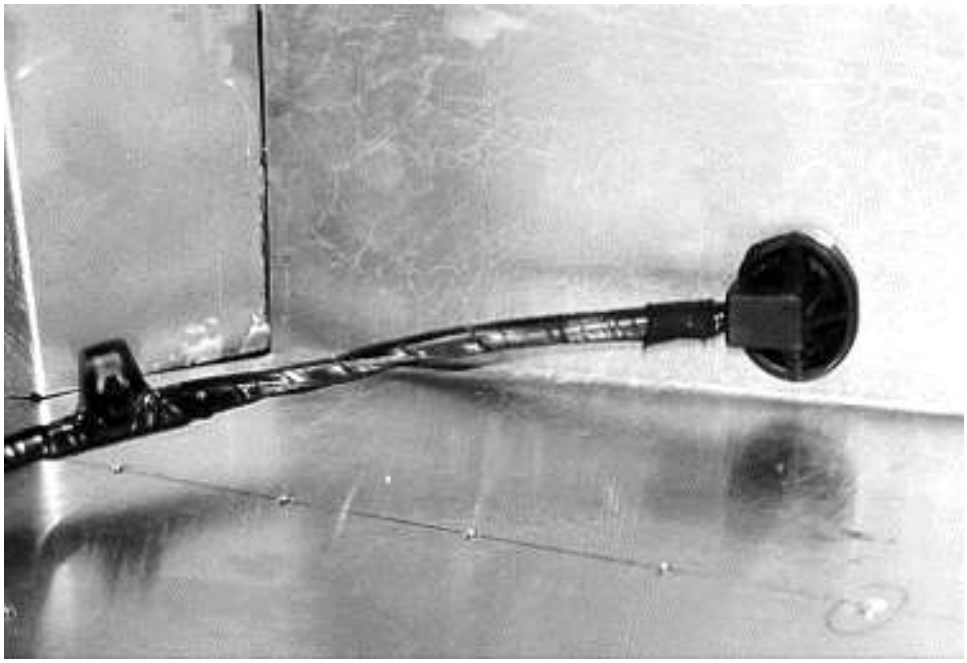
Cable ties can be used to secure the harness up to the hole by drilling two $^{3}/_{16}$" holes about a ¼" apart and passing a zip tie through it.

At the front of the tunnel, the rear harness goes up into the top foot box area where it meets the dash/engine main harness.

Wrap the extra harness around the ¾" tubing in the foot box and zip tie it in place.

Transmission Harness

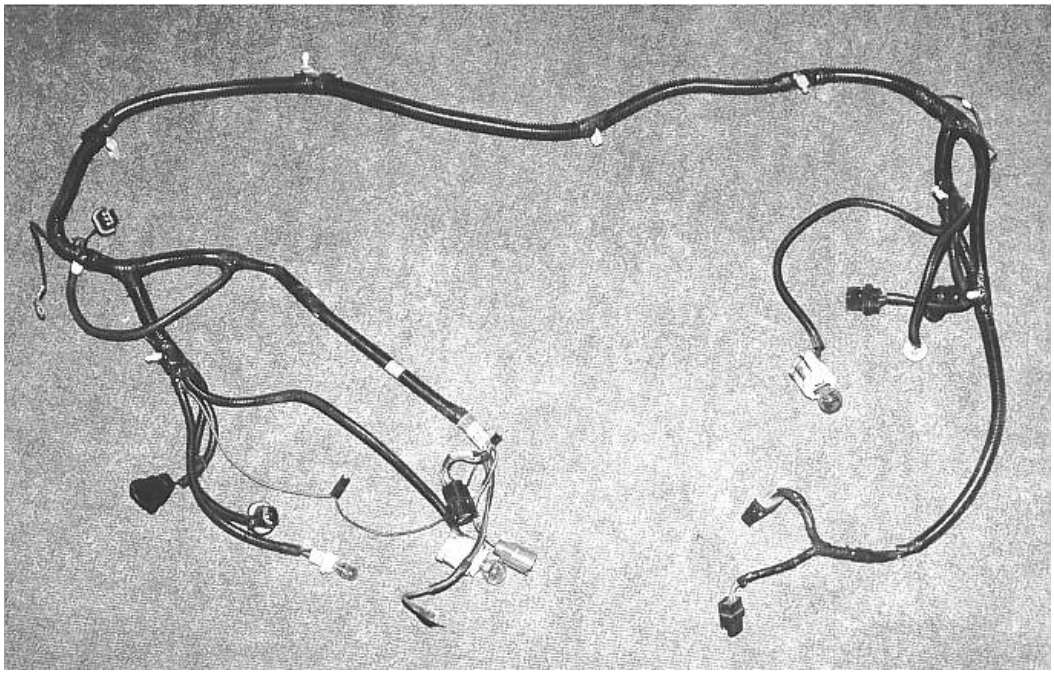
Transmission harness



Push the harness plugs through the hole in the driver's side floor aluminum.

Run the harness forward into the corner to the ¾" tube at the foot box front. Then go up and along the angled ¾" tube to its connector. Make sure that it does not get in the way of the accelerator pedal. Use the drilled holes and the zip tie trick to keep the harness in the corner along the floor.

Headlight Harness



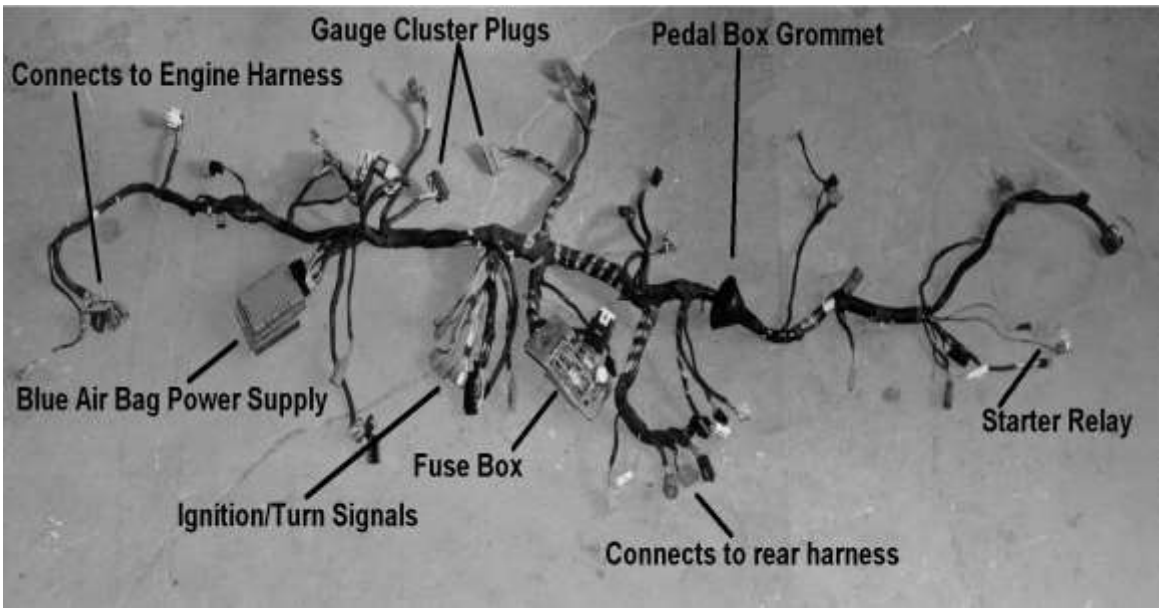
The headlight harness is started at the alternator and runs forward to the passenger headlight area, then goes under the fan shroud to the driver's side headlight area and then rearward to the coil and starter relay area.

The Mustang is wider than the FFR Coupe in front and there is extra wiring between the headlights.

By removing the tape from the harness under the radiator, overlapping the wires, re-taping and using the loom material provided, a cleaner looking harness can be made.

Attach the harness to the channel on the bottom of the radiator using zip ties.

Dash Harness



Dash harness

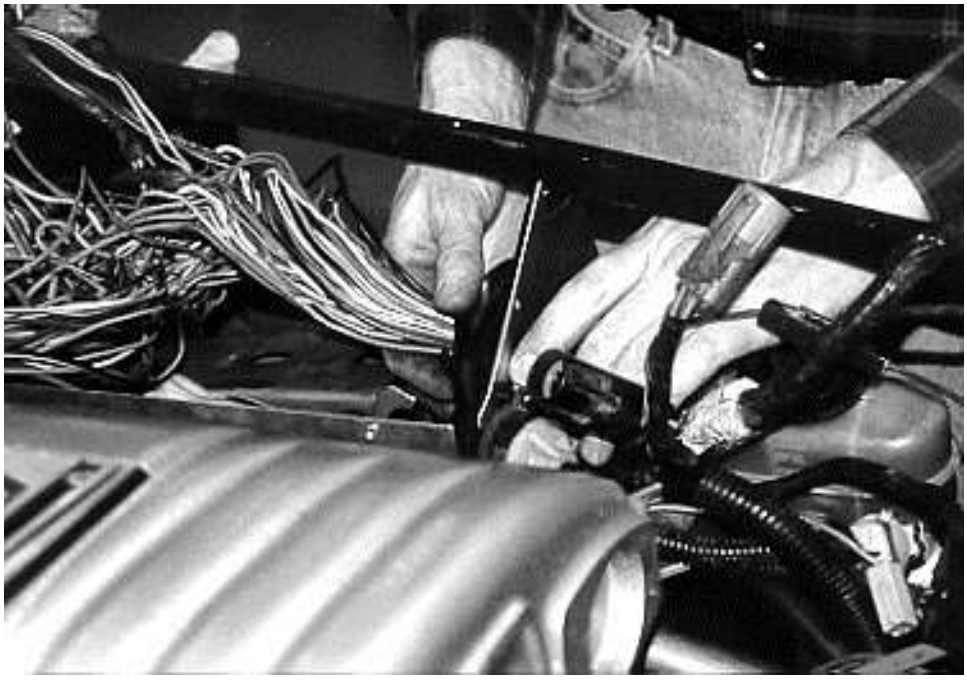
The dash harness begins at the coil area and goes rearward to the large hole in the front of the driver's side foot box.

The key to routing the dash harness is to start on the inside of the foot box and push the smaller items through the large hole from the inside.

The connections for the coil, starter relay, and the connectors for the rest of the harness easily fit through this hole and the big rubber grommet on the harness press fits into the laser cut hole.

Remove 4" of the tape covering the harness wires on the outside of the dash harness grommet.

Pull enough of the harness through the grommet so that the coil can still mount on the outside of the ¾" tubing next to the master cylinder. By doing this, the amount of visible wiring in the engine bay is reduced.



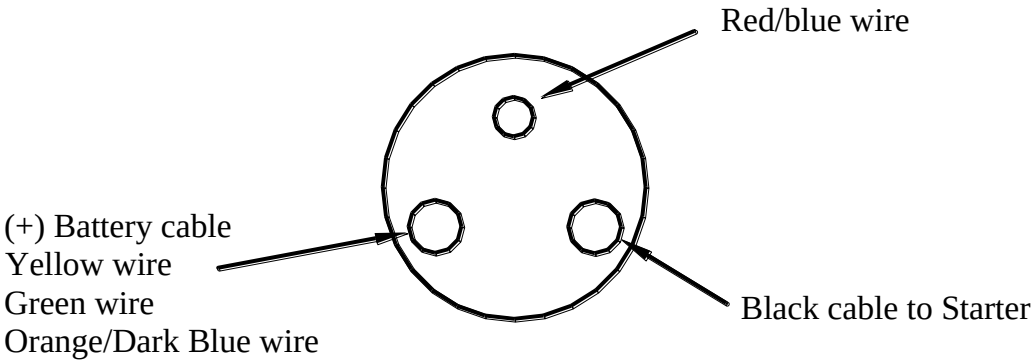
Run the harness over the pedal box and through the large hole in the front of the footbox.

The dash harness can then be run on top of the 2"x 2" square tube over to the computer side. Run everything loosely so that final positioning can be done.

Starter Solenoid

There are two different starters that were used and the wires are run differently for each.

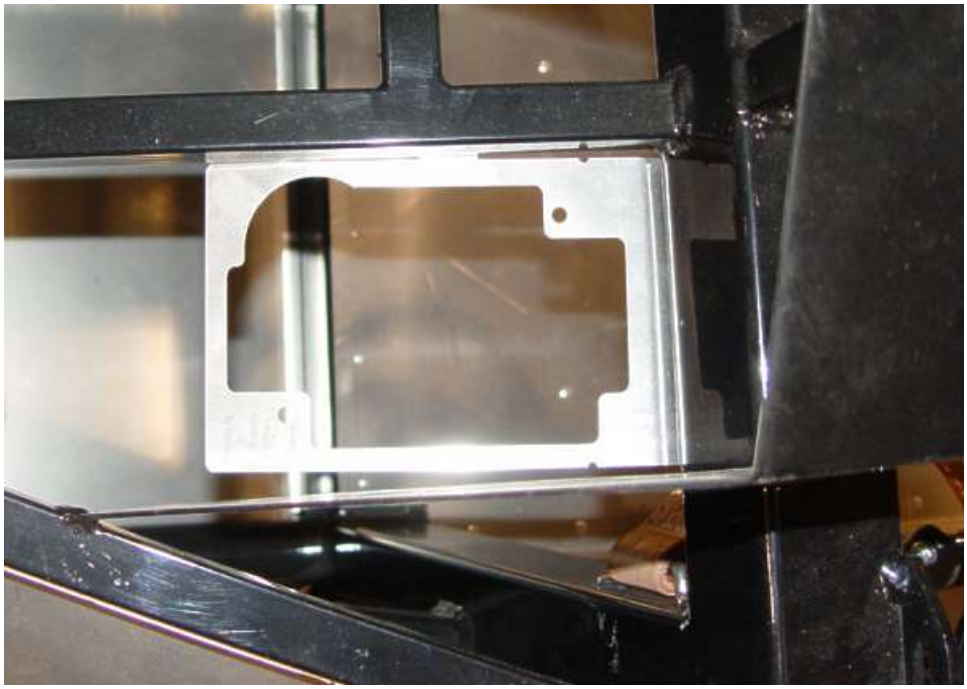
- On older (large) starters, the cable runs from the starter to the empty post on the solenoid.
- On the newer starters the heavy starter wire connects to the same terminal as the body and the smaller 8-10 gauge wire runs to the empty terminal. The newer starters can be recognized by their smaller size and solenoid mounted on top.



Starter Solenoid Wiring

Old Starter

New Starter

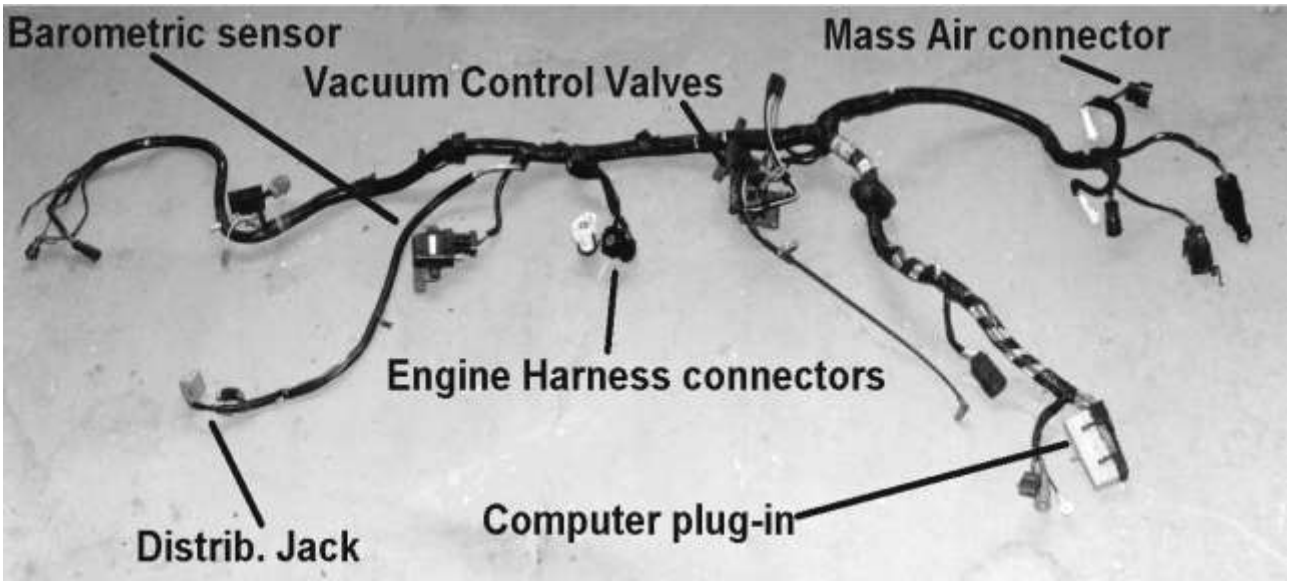


When the wire harness is installed, mount the fuse panel (Use the diagram in Appendix A to determine the correct shape) to the 2”x 2” dash hoop support and between the two ¾” x ¾” frame tubes in the driver’s side footbox using the aluminum bracket provided and a few of the self-tapping screws.

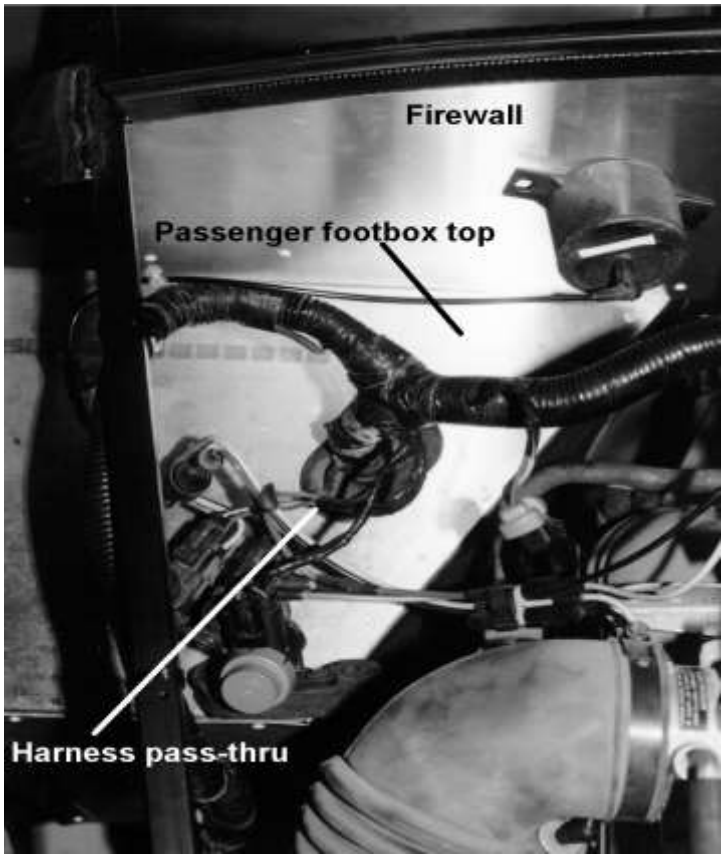
Leave the headlight and hazard switches hanging for now.

Attach the harness across the 2”x 2” tube, using the insulated line clips.

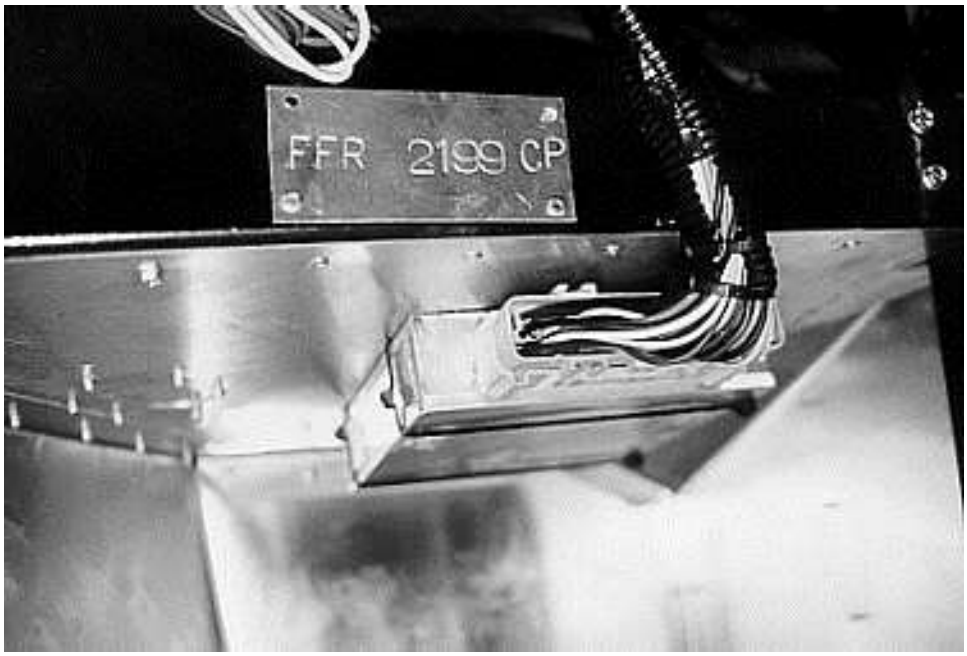
Engine Harness



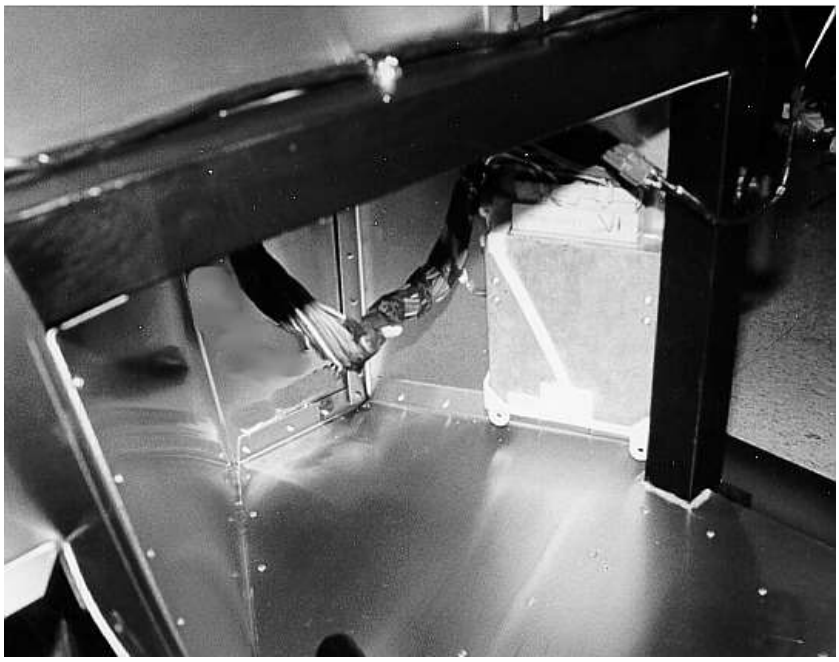
- 🛠 ⅜" socket, regular head screwdriver, slip joint pliers, $^{3}/_{16}$" and ⅛" drill bits, drill, #6 nut driver, electrical tape, wire cutters.
- 🚘 Mustang engine harness, engine harness assembly
- ✋ The aluminum is laser cut for the EFI (Electronic Fuel Injection) rubber grommets, the kit comes with block-off covers if a carbureted engine is used.
- ✋ If you are running a carbureted engine you do not need this section.
- ✋ Make sure that the battery is not connected any time you are working with the computer.



The engine harness begins in the passenger foot box. The computer plug is pushed through the oval shaped hole on the passenger footbox top.



The computer can be mounted in a couple of places, to the underside of the top of the passenger foot box using the plastic bracket from the Mustang and the screws provided.



Alternatively, the computer can be mounted to the inside of the right footbox or Behind the firewall if the optional heater/defroster is **not** being used.

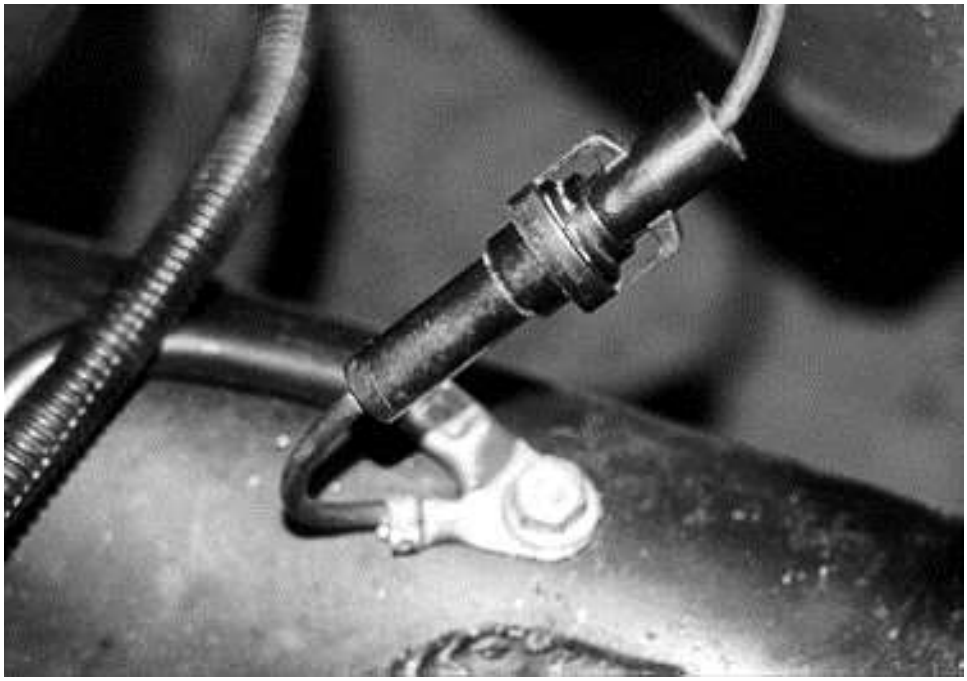
Use the drilled holes and cable tie trick to hold the extra harness to the top of the passenger foot box. The harness splits into two on top of the foot box. The short, smaller harness goes forward and connects to the mass air sensor and to the harness on the engine for the O_2 sensors and oil level sender. The other larger bundle goes along the firewall and contains the vacuum control lines for the EGR valve and engine, the connector to the distributor, the two large plugs for the fuel injectors, the power connectors to the dash harness by the master cylinder, and the coil plug.

- If you are running EFI without emissions equipment, the vacuum/electrical solenoids located on top of the foot box along with the vacuum reservoir on the firewall are not necessary. Plug the vacuum outlets on the intake remove the unused parts.

Use screws provided with kit to mount the vacuum controls and BAP (Barometric Air Pressure) sensor to the firewall.

- The BAP sensor is similar to a MAP sensor used on speed density cars except it does not get hooked up to vacuum; it is left open to the air.

Attach the computer connectors to the starter solenoid and the ground to the backside of the solenoid against the ¾" tubing. The ground looks like a female stereo jack (sort of). The other half of the connector is on the battery negative cable, so just cut the connector off and use the ring connector.



Computer ground near driver's foot box

Ignition and Turn signal stalk

🛠 Hack saw, $^{5}/_{16}$" socket, $^{9}/_{64}$" drill bits, drill.
🚗 Dash Electrical Components, Mustang ignition switch and turn signal stalk.

Mount the turn signal stalk with the stalk pointed towards the seat as high as possible between the plate steel that also holds the windshield and the vertical ¾" tubing next to it. The switch spans the gap. Use two 1" screws and a $^{5}/_{16}$" socket and $^{9}/_{64}$" drill bit.

The ignition switch mounts under the turn signal stalk on the 2"x 2" frame hoop that has the door hinge mounted to it. With the door closed, mount the switch as close to the hinge as possible without hitting it. Use two 1" screws and a $^{5}/_{16}$" socket and $^{9}/_{64}$" drill bit.

The turn signal stalk can be cut shorter so that when it's mounted it will not protrude past the dash lip. If you want to cut the stalk length, do it after the dash is installed and you have sat in the car to see if it is needed. Cut half of the length first. Do not worry about the pieces that fall out, they are for the Mustang wipers and are not used. Re-use the end cap and epoxy glue it to the newly cut stalk to give it a nice finished look.

Battery

Mount

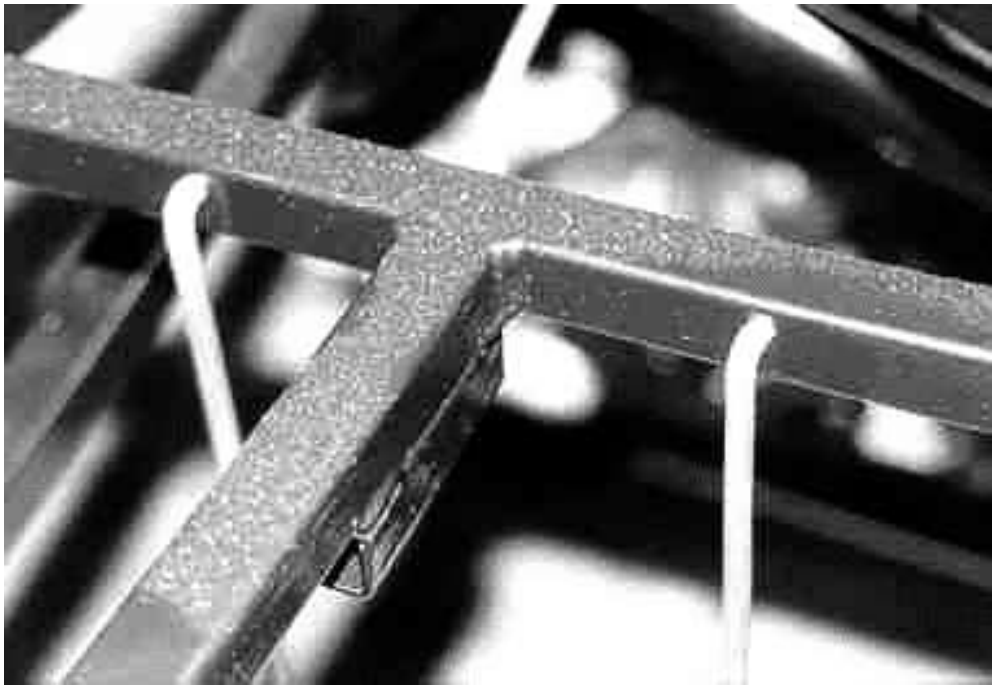
🛠 $^{7}/_{16}$" deep socket, ¼" drill bit, drill, marker pen. Duct tape, silicone or JB weld.
🚗 Battery/tray assembly
✋ It is recommended that you purchase a new battery. The battery tray is designed to accept the standard Ford Mustang 5.0 battery. Do not expose the battery to any spark source. Do not connect the battery. There are two battery locations available. One is in the center of the car behind the solid axle, and must be used when using a stock Mustang tank. The other location is

on the driver's side at the rear of the trunk area. This can be used if the Coupe fuel cell kit is used.

Place the battery tray, on top of the trunk floor, with half of the plate on each side of the cross brace located on the driver side of the trunk.

Mark where the holes line up on the rear facing side of the ¾" tubing.

Drill the holes for the hooks on the rear face of the ¾" tube.



With the bends on the battery tray pointed up, put the hook rods through the tray holes and thread the washer and nut onto the ends.

Hold the tray up to the drilled holes on the frame and insert the hooks into the holes.

Duct tape the hooks into the holes to help in the assembly process.

Place the battery onto the tray with the positive terminal on the driver's side.

One by one, wipe clean of any grease/oil on the hook bolt. Using *JB Weld* or silicone, cover each hook before they are inserted into the holes drilled for them. This will help prevent any hook from coming out if it is not tight.

As you tighten the battery plate upward, make sure that the battery brace is lined up with the depression on the battery and make sure the battery is straight.

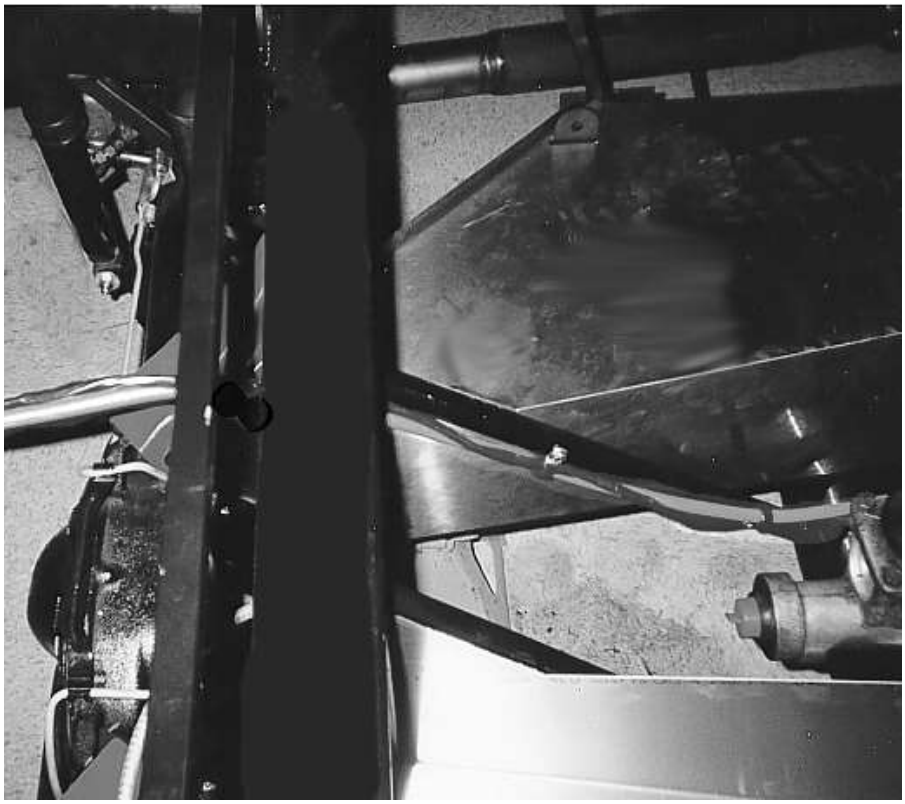
Tighten the battery down until it is snug against the frame and does not move. Do not over tighten and bow the sides of the battery causing damage to the battery. The bolts should be tightened evenly and none should be loose.

Battery Cables

🛠 ⅜", ½" socket, ¼", 5/16" drill bit, drill, 3/16" Hex key, marker, tin snips/razor, sand paper.

🚘 Engine ground cable assembly, OEM braided ground strap, engine/harness assembly, insulated line clip assembly, misc. electrical assembly.

Do not connect the battery yet. Leave the cable zip tied. The cable will need to be run through the trunk floor later.



Run the battery cable from the positive terminal of the battery straight forward, down the driver's side of the transmission tunnel. Zip tie as you go.

If the starter solenoid was mounted behind the engine, run the cable up the transmission tunnel front wall behind where the engine will sit and to the solenoid. If the starter solenoid was mounted to the 1" tube near the master cylinder, run the cable to the front of the floor/tunnel bend and along the edge to the front of the driver's foot box. Run the cable under the floor to the outside of the car and up to the starter solenoid.

Use the grommeting on the edge of the aluminum where needed to prevent cable damage.

Leave the battery cable fastened for now with zip ties everywhere so that the rear harness can be run with the cable later. Use the insulated line clips and screws for final assembly.

Drill a $^{5}/_{16}$" hole in the side of the passenger frame engine mount in order to attach the engine ground cable.

Sand the contact area down to bare metal.

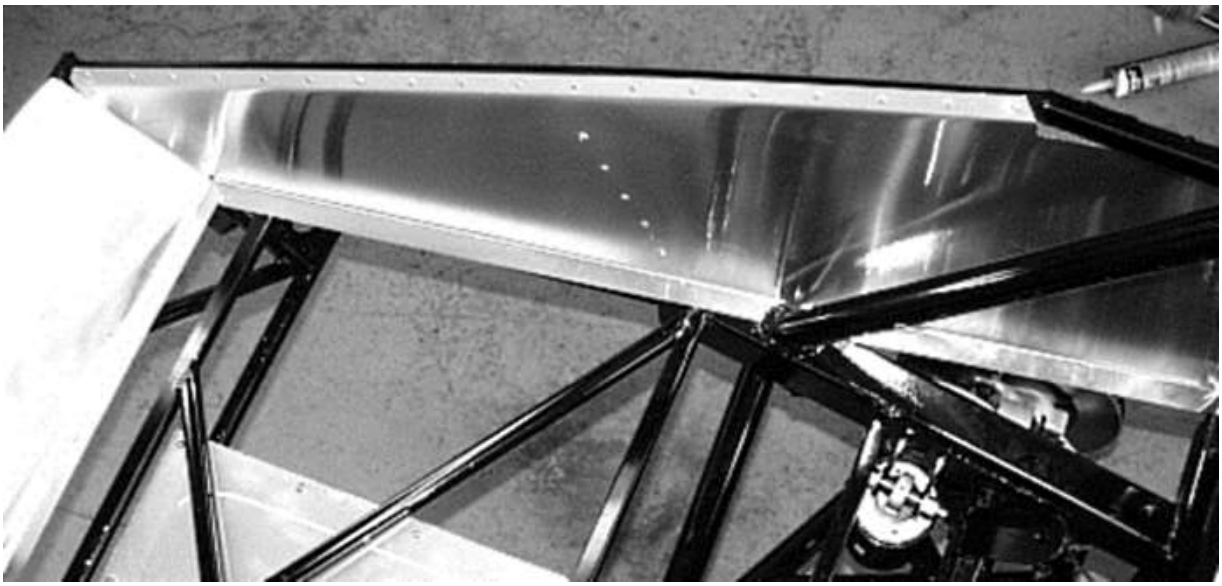
Attach the OEM braided engine ground strap on the back of the driver's side cylinder head to the 2"x 2" tube on the frame using a ¼"x ½" screw from the engine/harness assembly. Make sure to sand the contact area down to bare metal before attaching.

Trunk Aluminum

$^{1}/_{8}$" drill bit, silicone, rivet gun, caulk gun, $^{9}/_{16}$" wrench, $^{5}/_{16}$" hex key.

Mounted Aluminum, Packaged Aluminum, secondary body fasteners

Side Walls

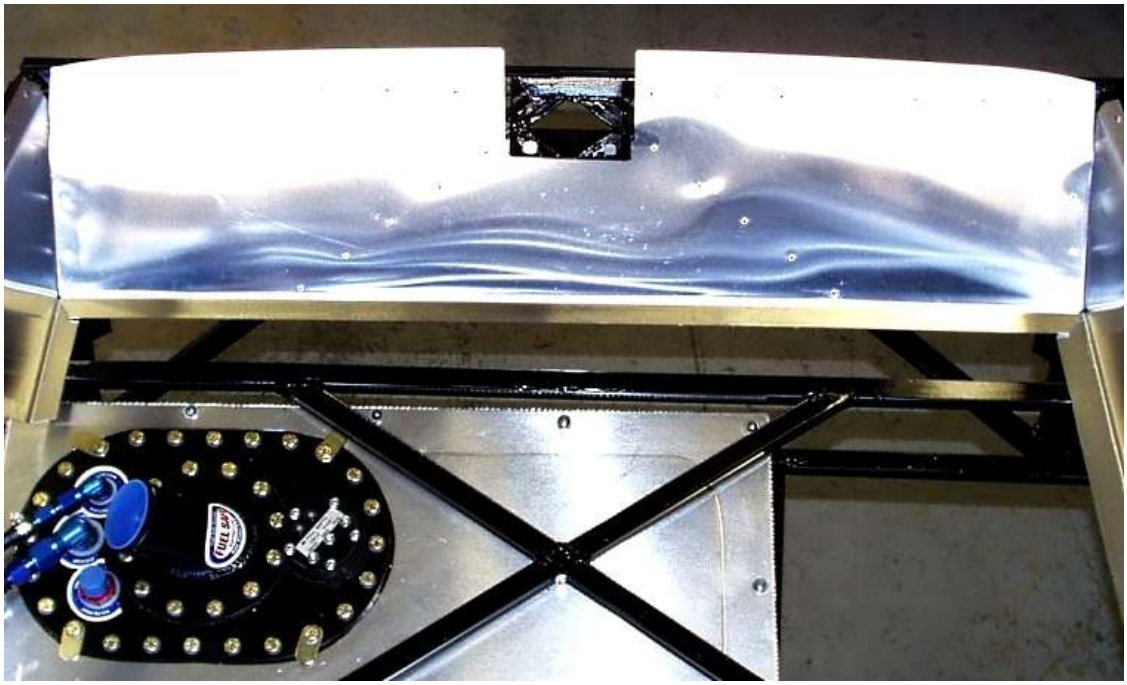


Silicone and rivet the panels to the sides and back, do not rivet the bottom edge.

Rear Wall

🛠 $^{1}/_{8}$" drill bit, silicone, rivet gun, caulk gun, $^{9}/_{16}$" wrench, $^{5}/_{16}$" hex key.
🚘 Mounted Aluminum, Packaged Aluminum, secondary body fasteners

Position the panel on the frame overlapping the side wall tabs.
Mark where the rivets will go by tracing around the tubes the same way previously done.
Remove the panel and apply silicone to the frame and side wall tabs.
Attach the panel with #6 self-tapping screws.



Rivet the panel in place.

Floor

With the rear taillight harness tied up and secure, silicone and install the lower trunk floor.

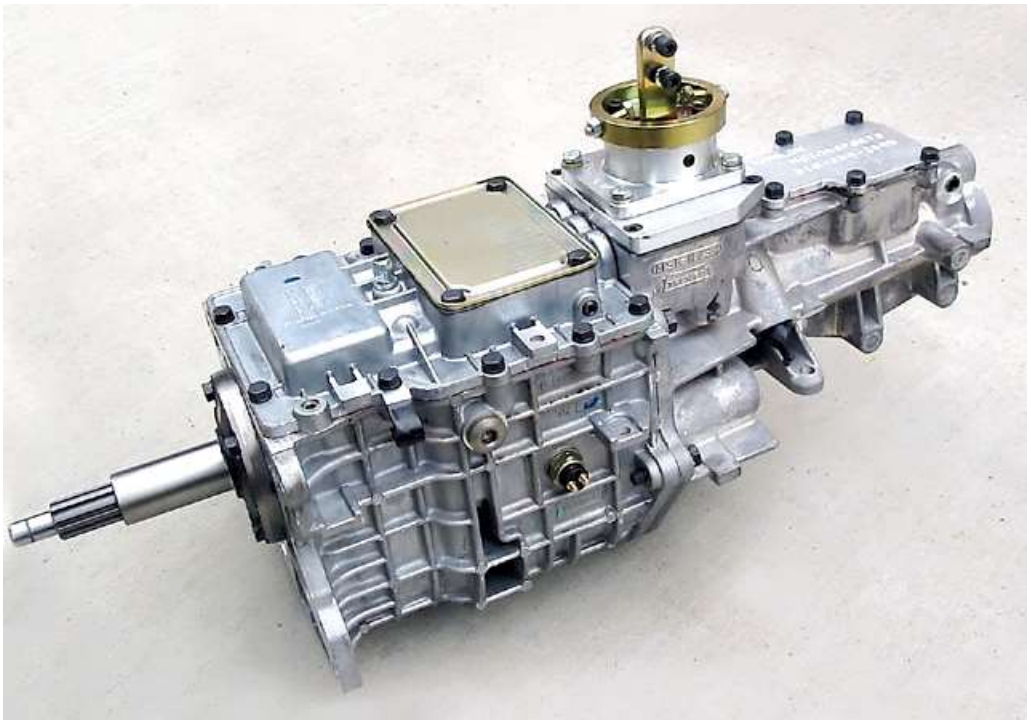
Drivetrain Preparation

Aftermarket TKO 500 and TKO 600 prep

🛠 Hack saw or Reciprocating saw, ¾" socket, ratchet

🚘 Transmission, Polyurethane engine/transmission mount kit

✋ The Coupe works well with the midshift option that is available with the TKO. This moves the shifter from the Mustang rear location to the middle location which allows for a vertical shifter handle instead of the forward leaning handle.



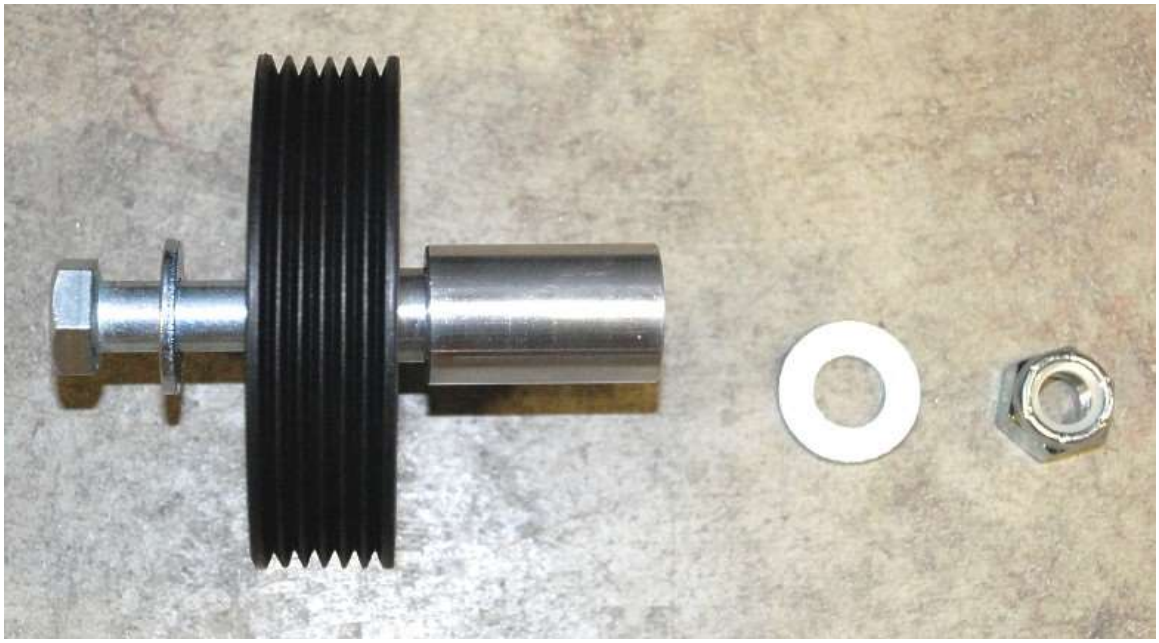
Trim off the unused mounting boss on the bottom of the case so it is flush or just below the pad for the transmission mount.

87-93 Alternate Drive Pulley

- ¾" socket, ¾" wrench.
- Alternate drive pulley components
- If you are using under-drive pulleys or eliminating the smog pump do not drill the A/C bracket according to the diagram. Instead use the belt as a guide to mount the pulley where the belt will fit and have sufficient tension.

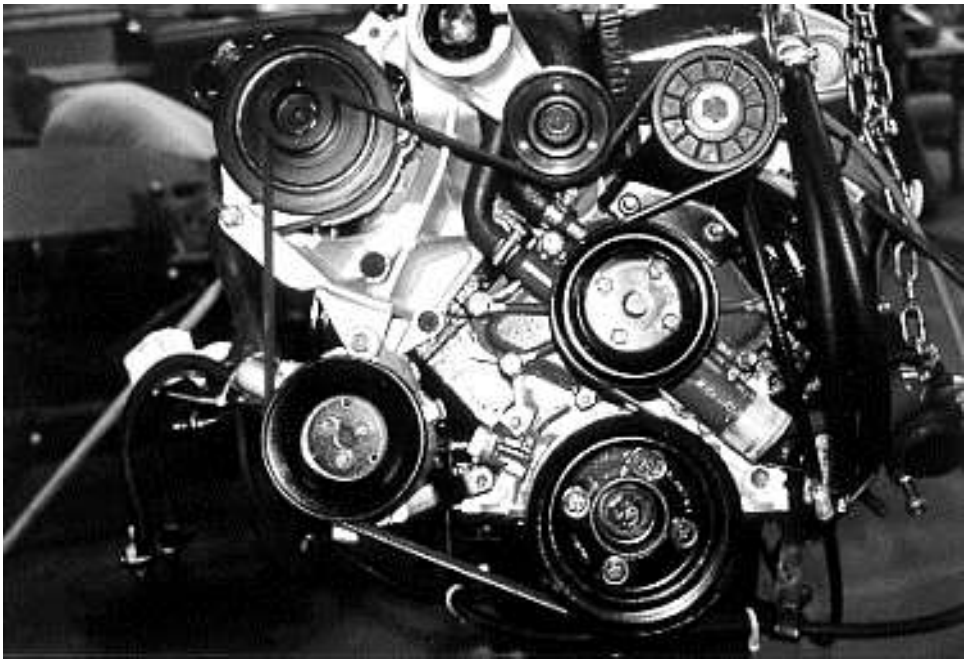
Place a washer onto the bolt.

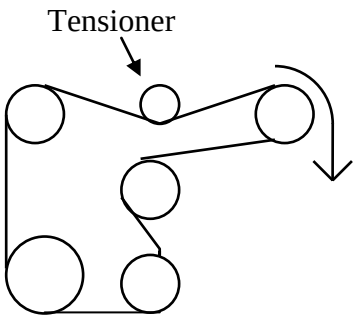
Place the pulley wheel on the bolt.



Place the aluminum sleeve on the bolt with the flange towards the pulley wheel, so that it slides inside the pulley.

Install the bolt assembly on the A/C bracket (previously drilled in the disassembly section), using the lock nut provided.





Belt Routing

Pull the tension pulley back with a pry bar carefully and install the fan belt. If the belt does not fit using this routing, check to see if after-market under-drive pulleys have been fitted on any of the accessories or the crankshaft, if so you may have to also use an after-market belt.

Check the pulley wheel for alignment with the other pulleys so that premature belt wear does not occur. With one eye, carefully align the front side of the pulley with the front side of the other pulleys. If the new pulley is not lined up properly and is too far in, use the arbor shims included with the kit to go between the aluminum sleeve and the pulley wheel, effectively pushing the assembly outwards.

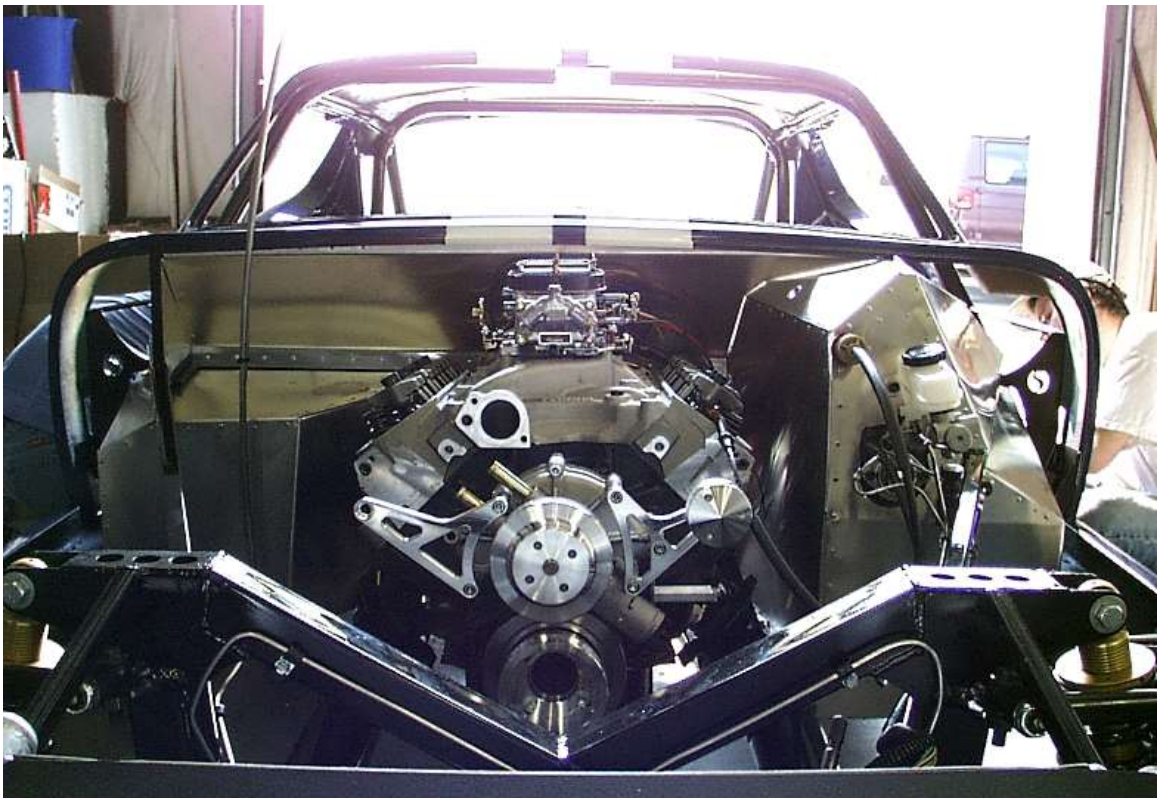
Engine/Transmission Installation

🛠 Engine hoist, chain, ¾", $^{15}/_{16}$" sockets, ratchet, extension

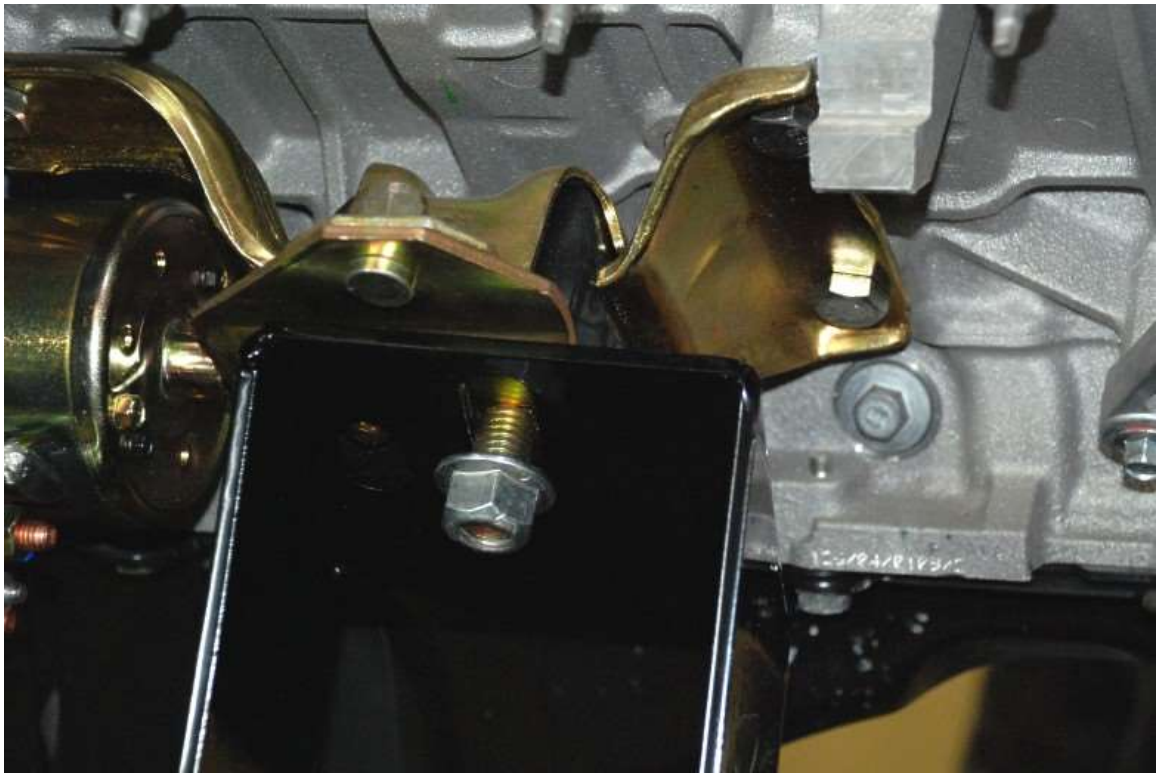
🚗 Engine, engine/transmission mounts

✋ Locate the pin stamped VIN number on the engine and the transmission. Some states check for these numbers during registration. It may be useful to take pictures of these for the inspector. The engine VIN is located on the drivers' side on the engine block just above the oil pan near the bellhousing (it is very small). The Transmission VIN number is on the drivers' side in front of the Speedo sensor near the middle of the transmission (it is very small).

✋ The easiest method to install the drivetrain is with the engine and transmission already bolted together and lowered in as a unit. Also remove anything that will make your job easier (shifter assembly, headers, power steering pump, etc.…).



Lower the engine and transmission into place. The more hands you have to help the better. Go very slowly and make sure the transmission tail-shaft is above the rear cross-member.



Install the engine mount to chassis nuts and tighten down all the engine mount hardware. Make sure the alignment pins on the mounts are in the holes on the chassis pads.

Tighten the transmission mount to the frame.

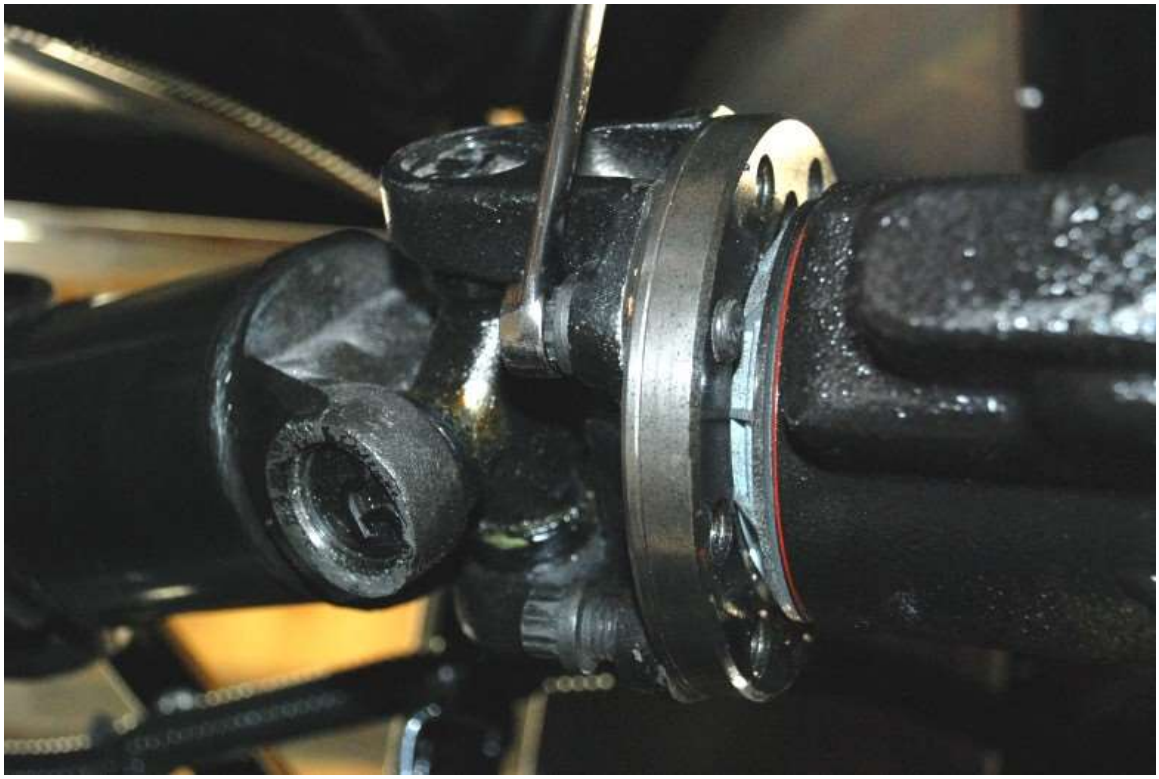
Driveshaft

🛠 14mm wrench, thread locker
🚘 Mustang driveshaft and fasteners

If not already done, the driveshaft should be shortened to the length specified in the appendix for the engine/transmission combination being used.

Slip the shortened driveshaft up into the rear of the transmission. The most room to do this is usually to hold the shaft just above the center section and come in from the driver's side.

The Mustang driveshaft bolts should have thread locker on them already. If thread locker is not there, put a small bead on each bolt.



Fit the driveshaft snug against the yoke and install the bolts and tighten. You can put the transmission in gear to stop the driveshaft from turning while you tighten.

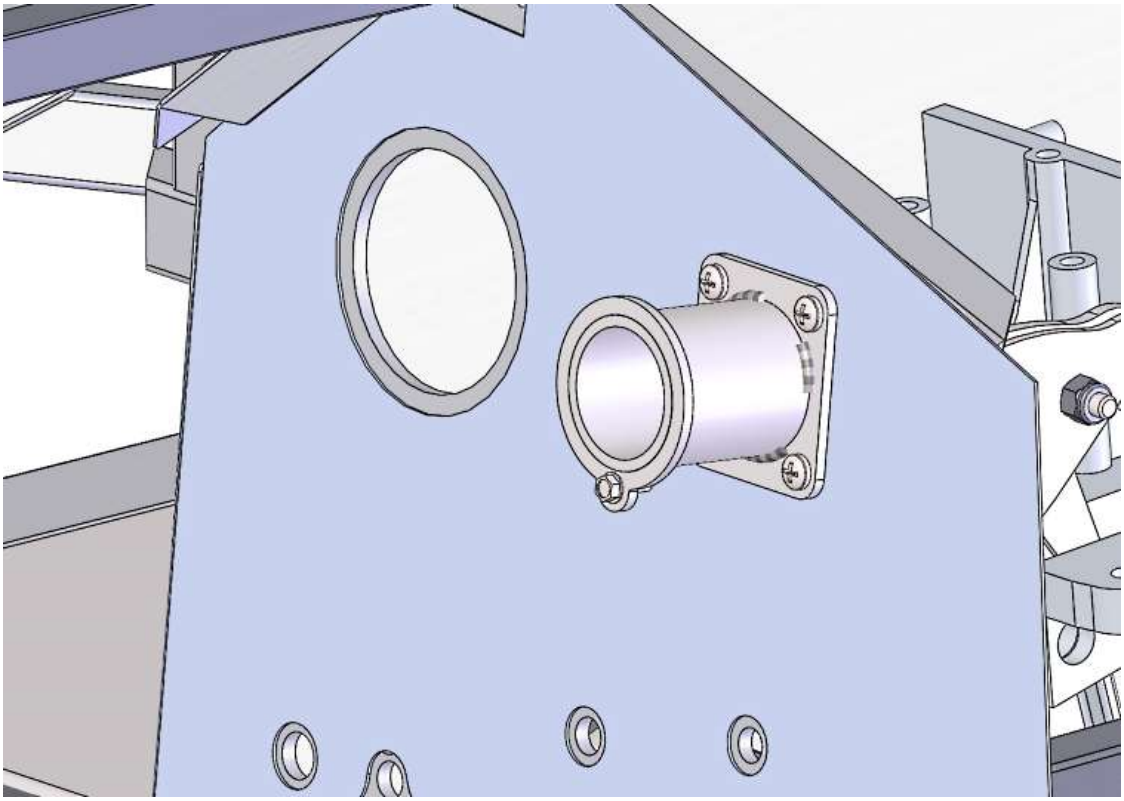
Fuel Lines to engine

- flat head screwdriver
- Fuel line components

Finish running your fuel system by hooking up either to your carburetor or fuel rail. Here we mounted a pressure regulator on the firewall and ran a single line over to the rail.

Clutch Cable and Firewall Spacer

Up until 7/20/16



Push the firewall spacer into the front of the footbox and attach to the front of the pedal box using the screws provided and a Philips head screwdriver and $^{3}/_{8}$" wrench.

After 7/20/16 the firewall spacer is not used, the clutch cable length was changed.

Clutch Cable

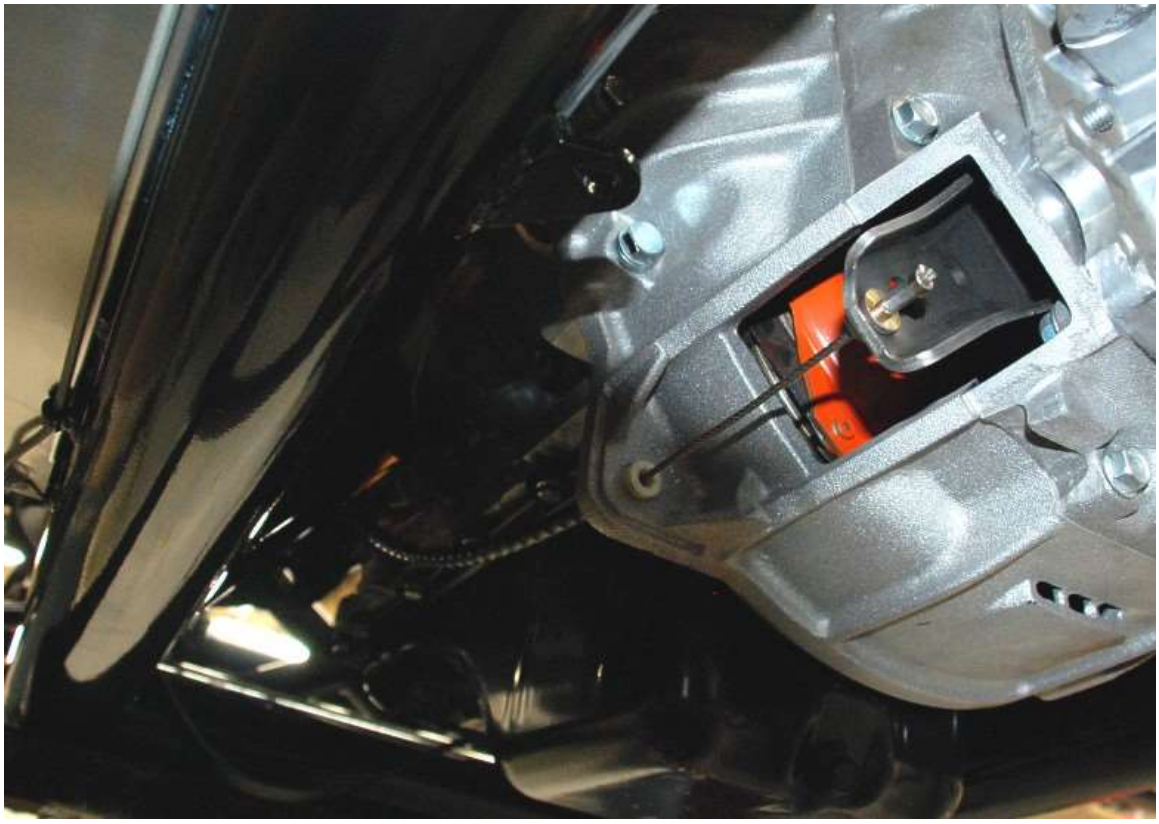
Clutch cable, insulated clip hardware

Slide the clutch cable end through the firewall spacer and loop the cable over the quadrant.

Attach the clutch cable to the firewall spacer using the small #6 screw provided and ¼" wrench.

Route the clutch cable down to the bellhousing. Using zip ties or insulated clips tie the cable safely away from the headers and the moving steering components. It can be fastened to the engine using the bracket on the cable to the front lower bolt that holds the starter cable just before it leaves the block or, to the lower engine bay ¾" tubing.

Make sure that the cable is clear of the hot exhaust header and the steering shaft or the cable may fail prematurely.



Connect the clutch cable to the bellhousing and the clutch fork.

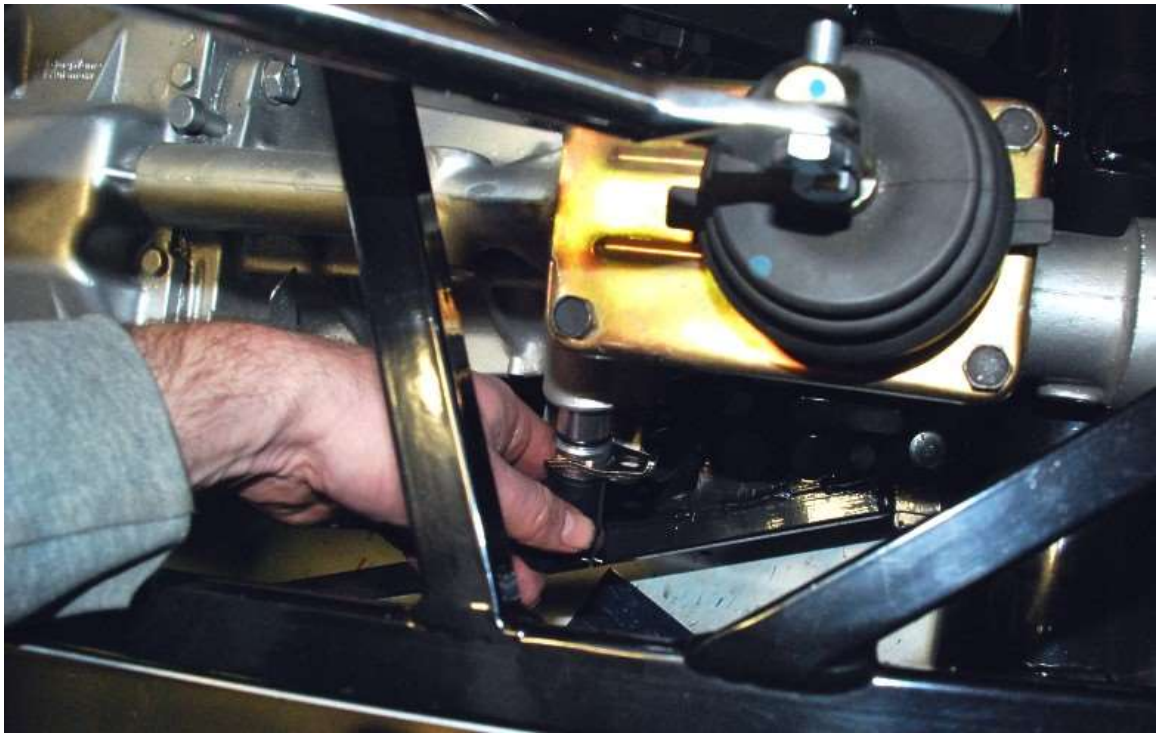
Thread the cable end adjuster nut on so that the cable has no play in it.

Adjust the pedal closer or further away as desired by screwing the pedal stop screw up or down.

Check the full range of travel for the clutch pedal.

Speedometer Sending Unit

11mm deep socket, ratchet.
Mustang speedometer sending unit.



Put a little oil on the O-ring and install the sender in your transmission. Use the original bolt to hold the sending unit in place.

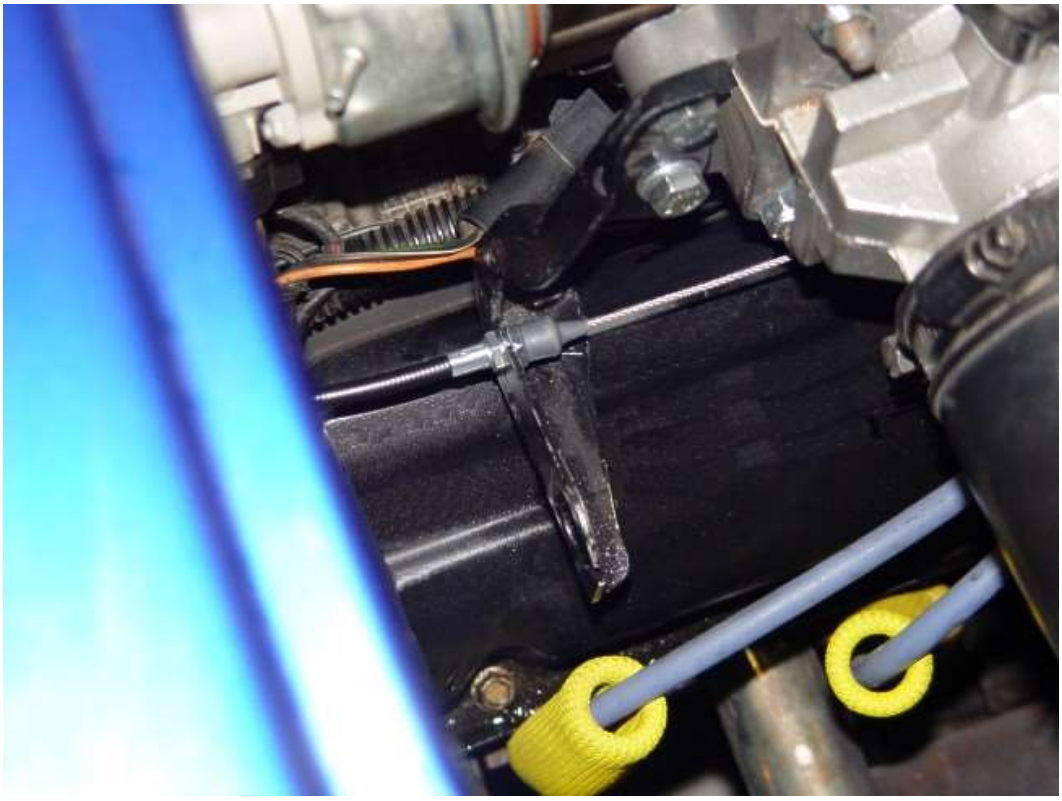
Plug the wire harness connector into the sender.

Accelerator Cable

🛠 $^{5}/_{64}$" hex key, ⅜", $^{7}/_{16}$" wrenches
🚗 Insulated clip hardware.

Fuel Injected application

Attach the engine end of the cable sheath to the cable mount on the intake using ⅜" and $^{7}/_{16}$" wrenches.



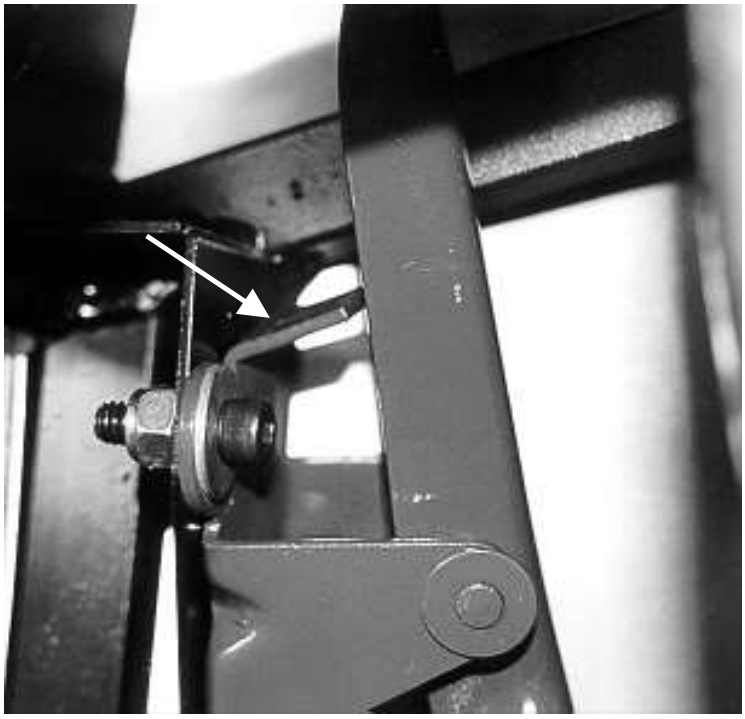
Put a dab of silicone on the rear edge of the rubber wipe then push the rubber wipe back onto the threads.

Push the ball stud retainer onto the ball on the bottom of the throttle body.

Push/pull the cable into the retainer so that the cable is tight.

Tighten the set screw in the retainer using a $^{5}/_{64}$" hex key.

Check the idle screw underneath the throttle body to see if the throttle arm is hitting it. If it is not, either loosen the ball stud retainer set screw and readjust the cable or, bend the small tab behind the accelerator pedal until the idle screw hits the throttle arm. You will notice a fairly high idle later when the car starts if the throttle is held open.



Stop tab on accelerator pedal.

After driving the car for the first time you may want to adjust the pedal locations for optimum heal/toe and shoe size differences.

Make sure the accelerator cable is tied up and out of the way of moving or hot parts as well.

Carbureted applications

Attach the cable sheath to your cable mount on the engine.

If necessary, attach the supplied ball stud to the carburetor in the appropriate location. Refer to the carburetor instructions for placement.

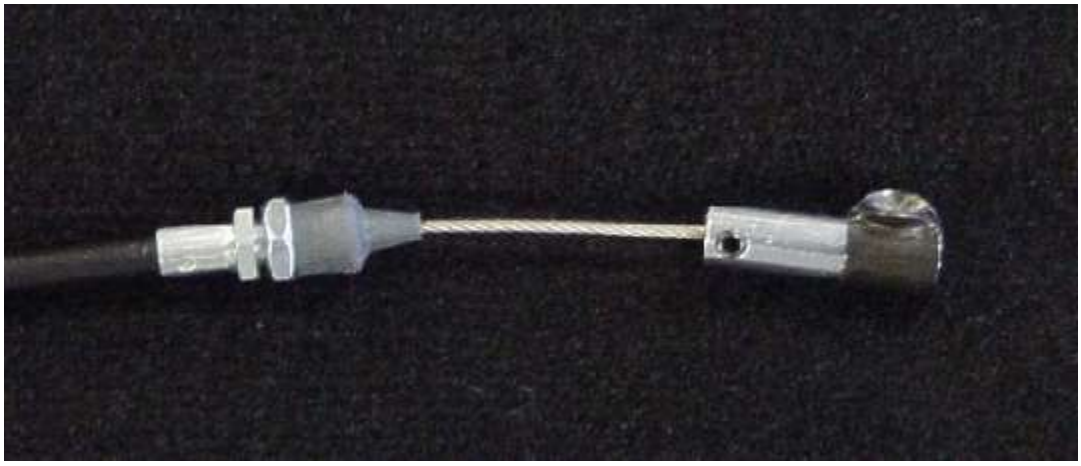
Attach the ball stud retainer to the ball stud.

Pull the cable tight holding the cable against the ball stud retainer. Align the ball stud retainer with the cable as if the cable was going into the retainer.

Mark on the cable where the retainer ends.

Measure ⅜" from the mark towards the end of the cable and re-mark the cable.

Using a pair of wire cutters, cut the cable at the new location marked.



Push and twist the ball stud retainer onto the end of the cable. Do not tighten the set screw yet.

Attach the engine end of the cable sheath to the cable mount on the engine using ⅜" and 7/16" wrenches and push the cable wiper onto the remaining threads.

Push the ball stud retainer onto the ball stud.

Push/pull the cable into the retainer so that the cable is tight.

Tighten the set screw in the retainer using a 5/64" hex key.

- After driving the car for the first time you may want to adjust the pedal locations for optimum heal/toe and shoe size differences.

Mass air meter, Air filter and Intake hose

- Drill, 3/16" drill bit, ⅜" socket
- Wire harness mounting hardware, Mustang mass air sensor, mustang intake hose and clamps, air filter.
- Mass Air Meters are used on 1989 and newer Mustangs.

Turn the Mass Air meter on its side and attach it to the 1" frame tubing above and just forward of the passenger foot box.

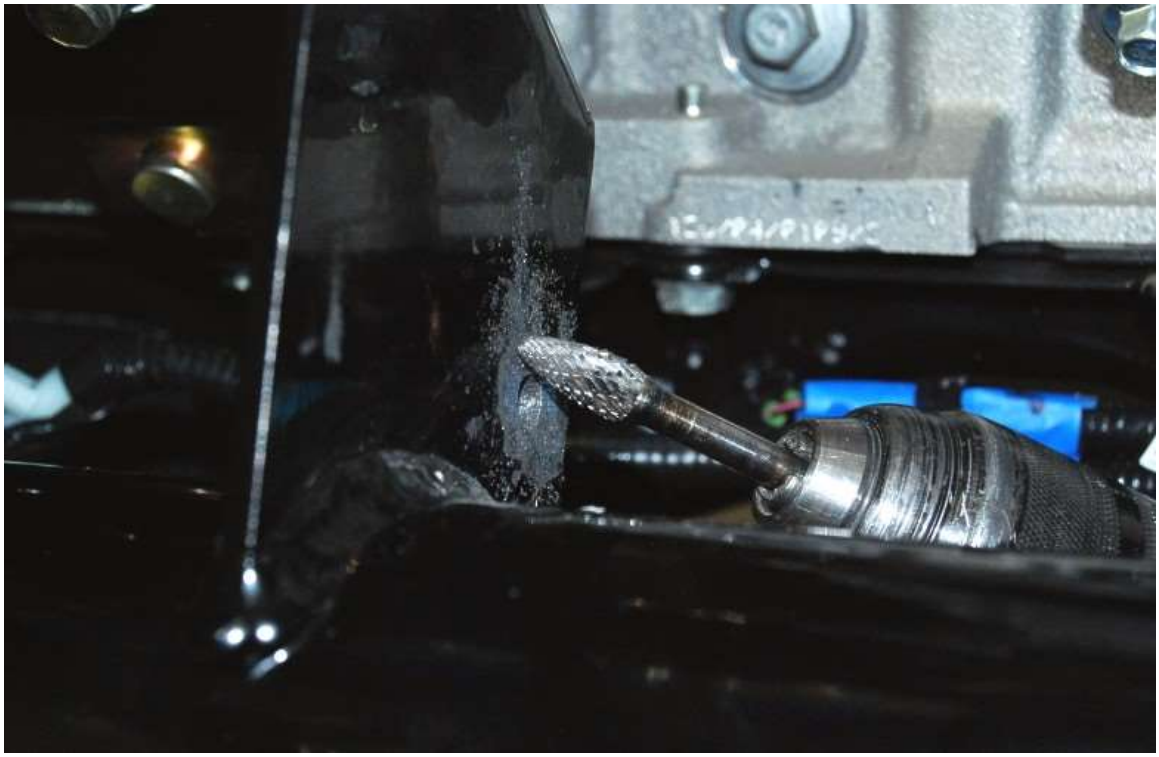
Use kit fasteners to secure bracket.

Attach the intake hose between the mass air meter and the intake.

Attach the air filter to the mass air meter.

Engine Ground

- Sand paper or grinder bit, ½" socket, ratchet, 3/16" hex key
- Mustang Engine ground strap



Clean the powder coating from the hole in the engine mount.

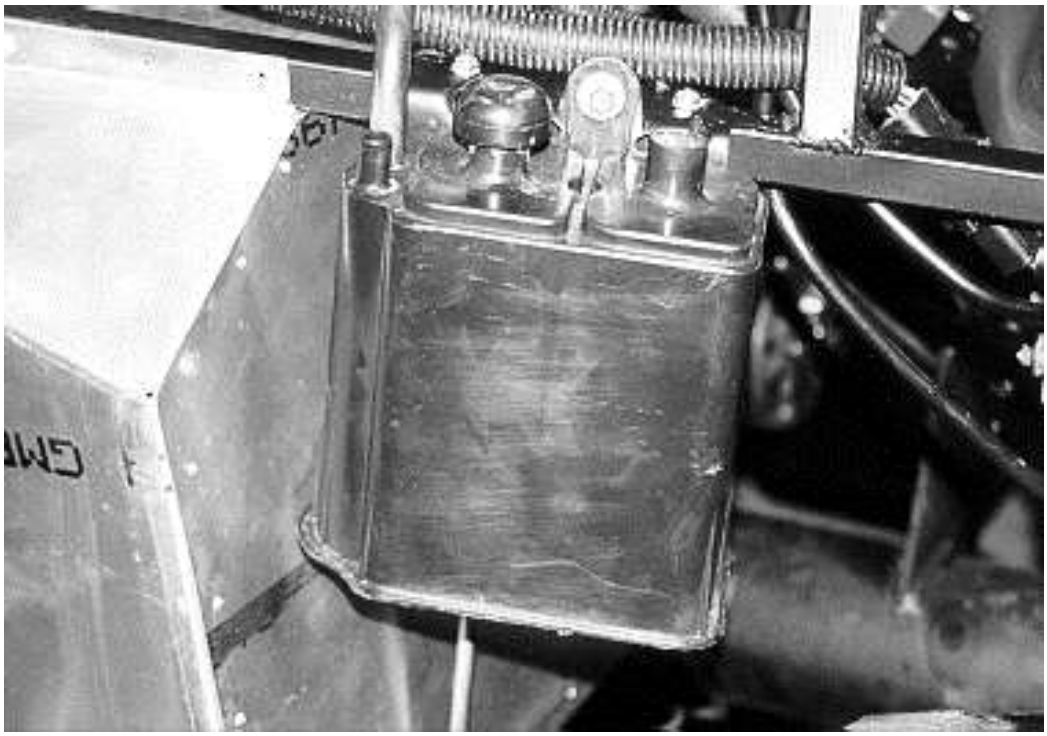
Bolt the ground strap to the hole and then run the other end to a boss on the block. In this case we used an engine mount bolt.

Fuel Vapor Canister

🛠 Drill, $^{3}/_{16}$" drill bit, ⅜" socket

🚘 Wire harness mounting hardware, Mustang Fuel vapor canister

The emissions canister can be mounted to the right side of the engine bay on outside of the 1" horizontal tubing just behind the mass air meter.



Drill two $^{3}/_{16}$" holes through the canister bracket OEM holes. Mount with two #14 screws.

Attach the vent hose from the gas tank to the canister and the hose leading to the engine.

Cooling System

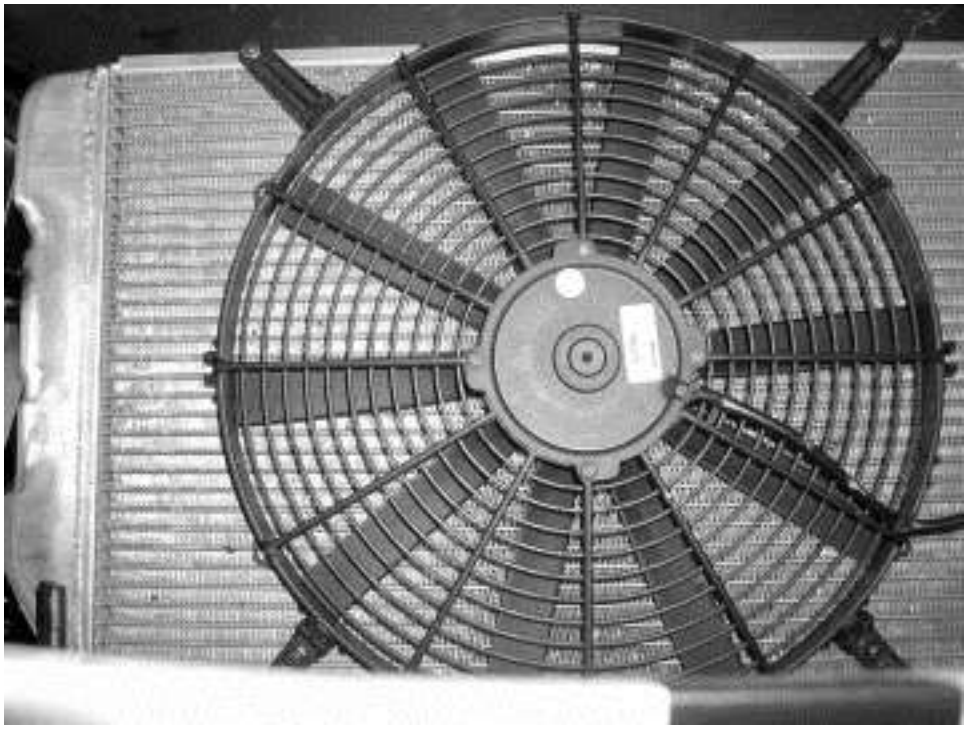
$^{5}/_{16}$", ⅜", ½" Sockets, ⅛", $^{7}/_{32}$", $^{5}/_{16}$" Drill bits, drill, tin snips, hack saw, razor knife, ⅛", $^{3}/_{16}$" hex key, marker, silicone, rivet gun.

Fan mounting components, high flow fan, radiator hose kit, radiator mount components, secondary body fasteners assembly, and aluminum engine bay assembly.

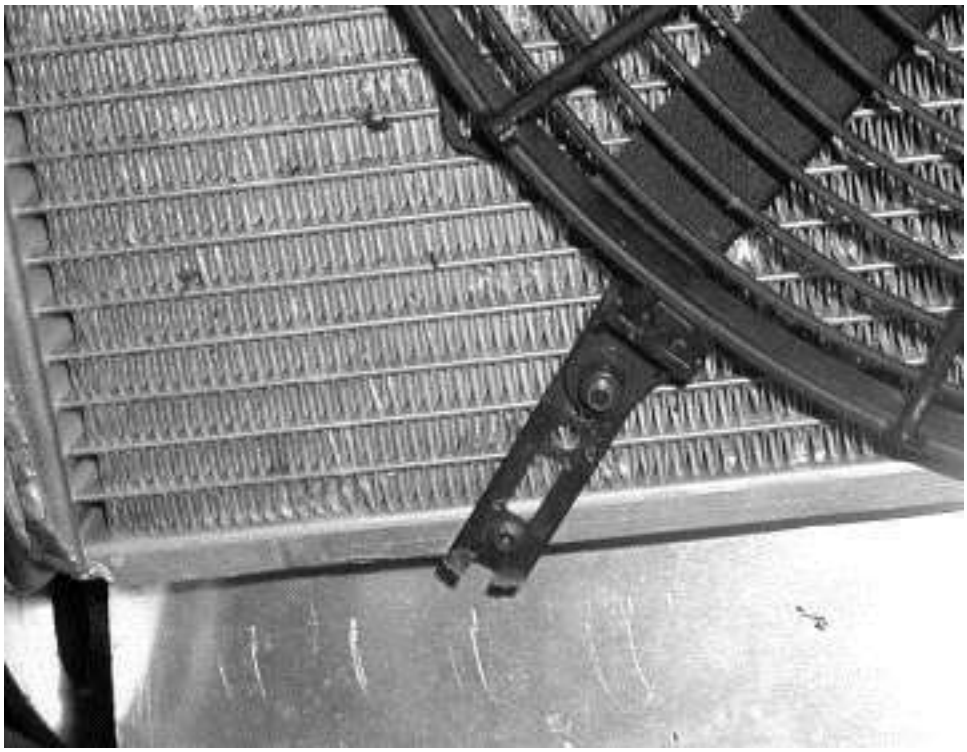
Make sure the electric fan shroud does not bend/oval or it will cause the fan blades to hit. Do not lean on the fan shroud while engine is running as this may bend shroud and cause fan blade to hit fan shroud.

Fan Mounting

Attach the two plastic mount tabs to the top of the electric fan.
Attach the two metal strip mount tabs to the bottom of the electric fan.
Lay the radiator down with the front side up.
Center the fan left to right on the back of the Radiator.



Raise the fan as high as possible so that the fan mount nut can go on the bolt while sitting in the top radiator flange.



Angle the lower mounting tabs at a 45° angle outward then adjust them so that the mounting bolts will again go through the flange and the nut will go on the bolt.

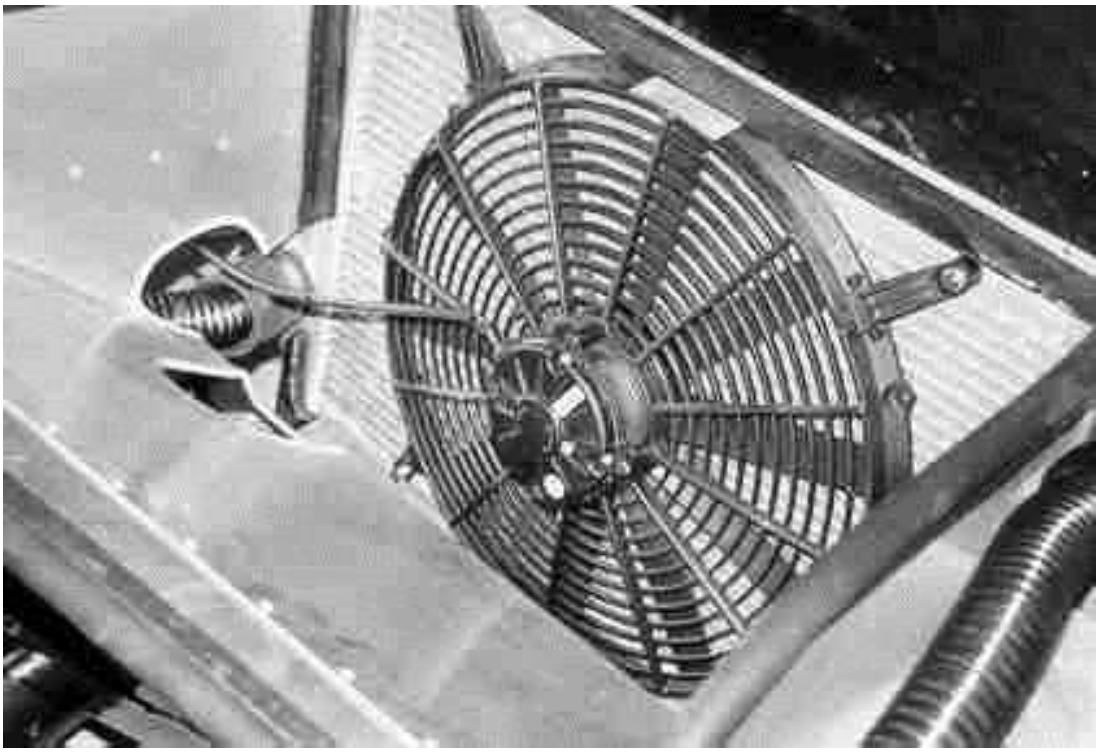
Mark the upper and lower mount tab holes on the radiator flanges.

Mark where the lower mount tabs can be trimmed.

Remove the fan from the radiator.

Drill the mount tab holes in the radiator using a $^{7}/_{32}$" drill bit.

Trim the excess off the lower fan mount tabs.



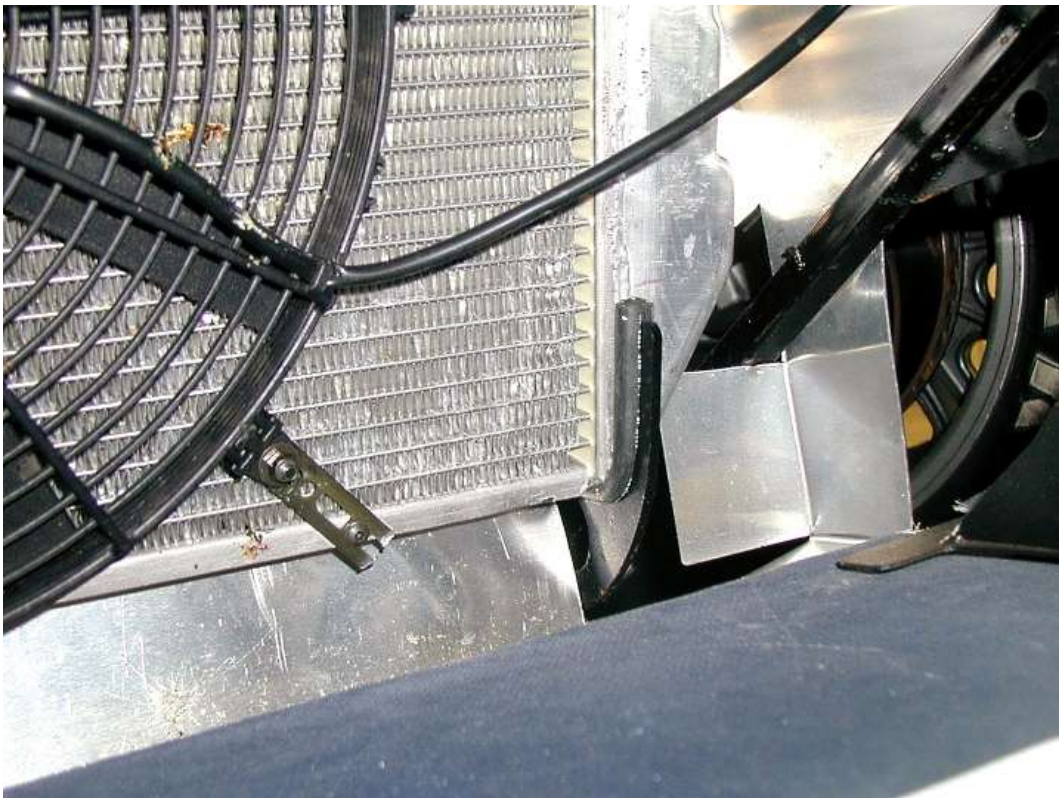
Attach the fan to the radiator using the black #10 x 1" screws on the top and the #10 x $^{5}/_{8}$" screws on the bottom.

Make sure that the fan blades do not hit the sides of the fan housing once the fan is attached to the shroud. If they do make contact with the housing, loosen the screws attaching the mount bars, and bend the tabs of the mount bars so that the fan housing is not pulled out of round when the fasteners are tightened.

Radiator Mounting

Use a razor knife and slit the 8.5" long sections of fuel line lengthwise.

Push the slit sections of fuel line onto the lower radiator frame mounts at the front of the frame and trim off any extra.



Install the radiator from above the frame.

Attach some stick on weather stripping to the underside of the radiator top mount bracket.
Position the top mount bracket so that the small tab sticking up is on the rearward side of the bracket.

While holding the bracket on top of the radiator, mark the location of the mount bracket holes on the 1”x 1” tubes. Do not let the end of the bracket overhang the tube, another piece of aluminum will be attached to the outside of the tube later (see picture below).

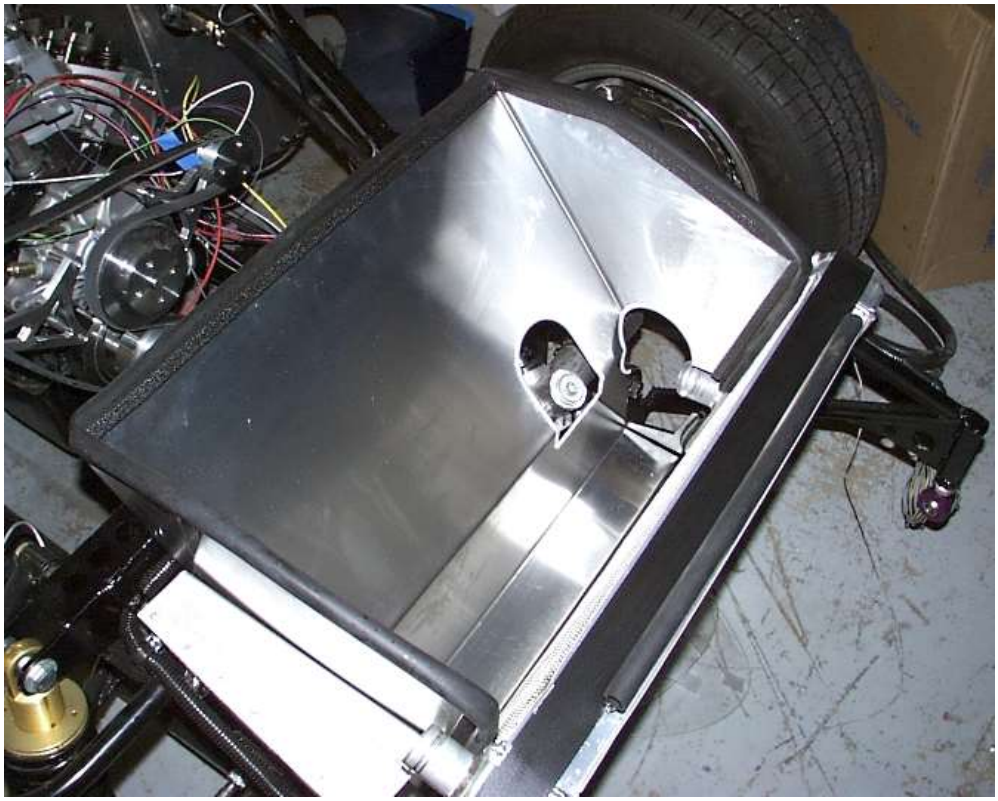
Remove the top mount bracket and drill through the 1”x 1” tubes at the marked locations using a $^{5}/_{16}$” drill bit.

Attach the top radiator mount bracket using the $^{5}/_{16}$”x 1.5” screws, washers and locknuts.

Radiator Aluminum

Rivet and silicone the radiator side aluminum to the center air duct panel. The side with the semicircle cut-out goes on the driver side.

From the secondary body fastener assembly, use some press-on weather stripping on the three top sides, the sides that will contact the radiator, and along the lower front edge of the large radiator duct.



Insert the radiator duct aluminum from behind the radiator.

Attach the side duct brackets to the top of the 1”x 1” tubes and the sides of the main duct using ⅛” rivets and Silicone.

Driver side bracket

Stainless Radiator Hoses

Unpack the stainless radiator hose kit and remove the hose connectors from the boxes.

Use the smaller sections of tube inside the adapters to fit them to smaller fittings on the radiator and intake.

Then fit the larger adapters over them.

Upper radiator hose

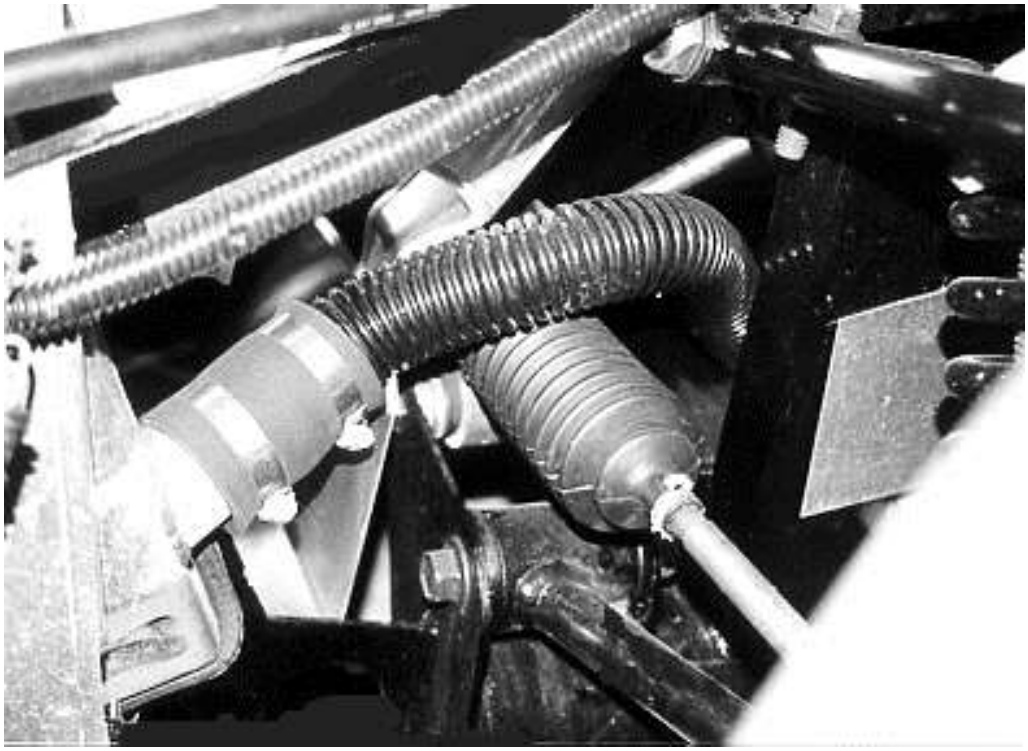
Start at the engine and route the tube along the top of the passenger side duct bracket.

The kit includes a remote fill adapter that should be installed at the highest point in the cooling system which is the return hose back to the radiator.

Mark the tube where it needs to be cut so that the tube will just touch the attaching location.
Remove the tube from the vehicle.
Cut the tube using a hack saw or if available a cut-off wheel. If necessary clean the end up with tin snips or a grinder.
Shake and blow the tube out so that no metal pieces are in the tube.
Reattach the tube assembly to the engine and tighten the hose to the radiator.

Lower radiator hose

Connect the lower radiator tube to the engine.



Starting at the radiator, route the lower radiator hose over the top of the steering rack tie rod and under the steering shaft to the water pump.

Mark the tube where it needs to be cut so that the tube will just touch the attaching location.

Remove the tube/hose assembly from the vehicle.

Cut the tube using a hack saw or if available a cut-off wheel. If necessary clean the end up with tin snips or a grinder.

Shake and blow the tube out so that no metal pieces are in the tube.

Remount the tube assembly and tighten the hose clamps on the mount locations.

Attach the overflow container to the front "X" using the supplied screws.

Attach the overflow tube and nipple to the overflow tank.

Zip-tie the hose to the corrugated upper radiator hose and run it to the radiator fill adapter.

Fan Wiring

Wire crimp tool

Fan mounting components, dash electrical components

There are a few ways to run the electric fan. The kit includes a relay, wiring, and a thermostat switch to get used with the relay to turn the fan on and off at 185°F. The alternative way is to use the relay with a dash mounted on/off switch

Dash mounted on/off switch

Using this set-up, the driver must watch the water temperature gauge and manually turn the fan on when the water temperature gets to 212°F. The fan should only be needed while going less than 35mph or in traffic.

- This set-up will only power the fan with the ignition on. If you desire the fan to run with the key out which could drain your battery, power the fan directly from the battery or from an always hot fuse in the fuse panel.

Ground the black electric fan wire to the frame.

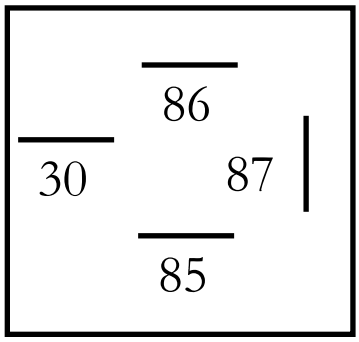
Connect the other electric fan wire to the #87 tab on the fan relay.

Ground the #85 tab to one of the 2-position dash toggle switches. The toggle will serve as your on-off switch.

Ground the other side of the dash switch to the frame.

Connect the #86 and #30 tabs to a +12V 30A fuse in the fuse panel.

30 – +12V
85 – Ground
86 –+12V
87 – Fan

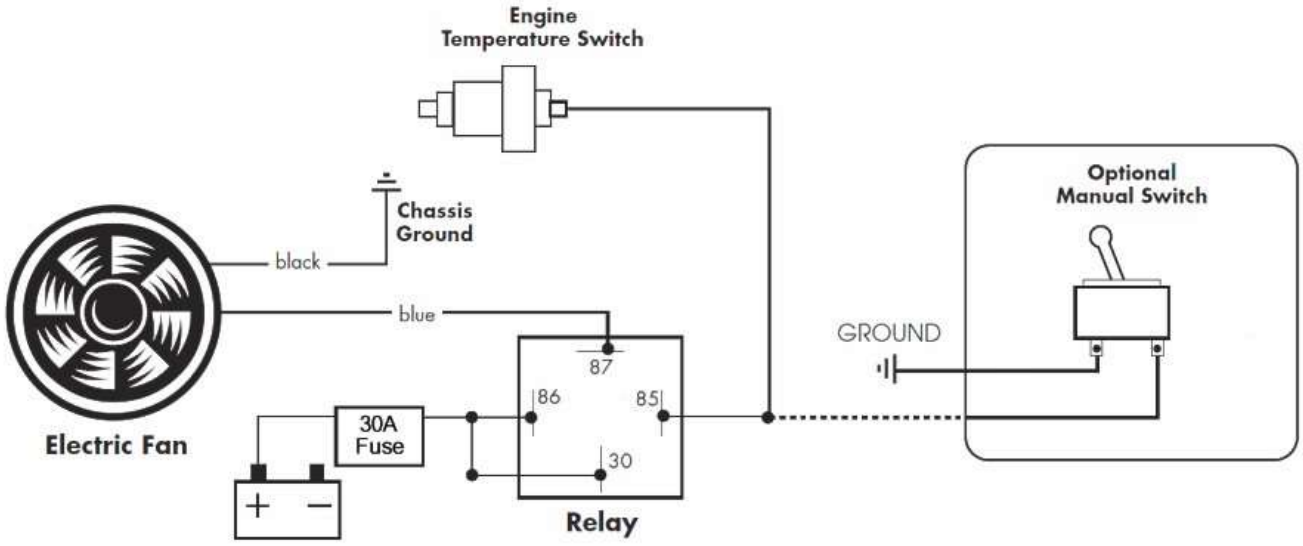


Thermostat switch

- Using this set-up, the fan will turn itself on and off when needed. If desired, an override switch can be installed as well to manually turn the fan on if desired.
- This set-up will only power the fan with the ignition on. If you desire the fan to run with the key out which could drain your battery, power the fan directly from the battery or from an always hot fuse in the fuse panel.

Locate a coolant access point in your engine block or cylinder head to install the thermostat switch and thread it in.

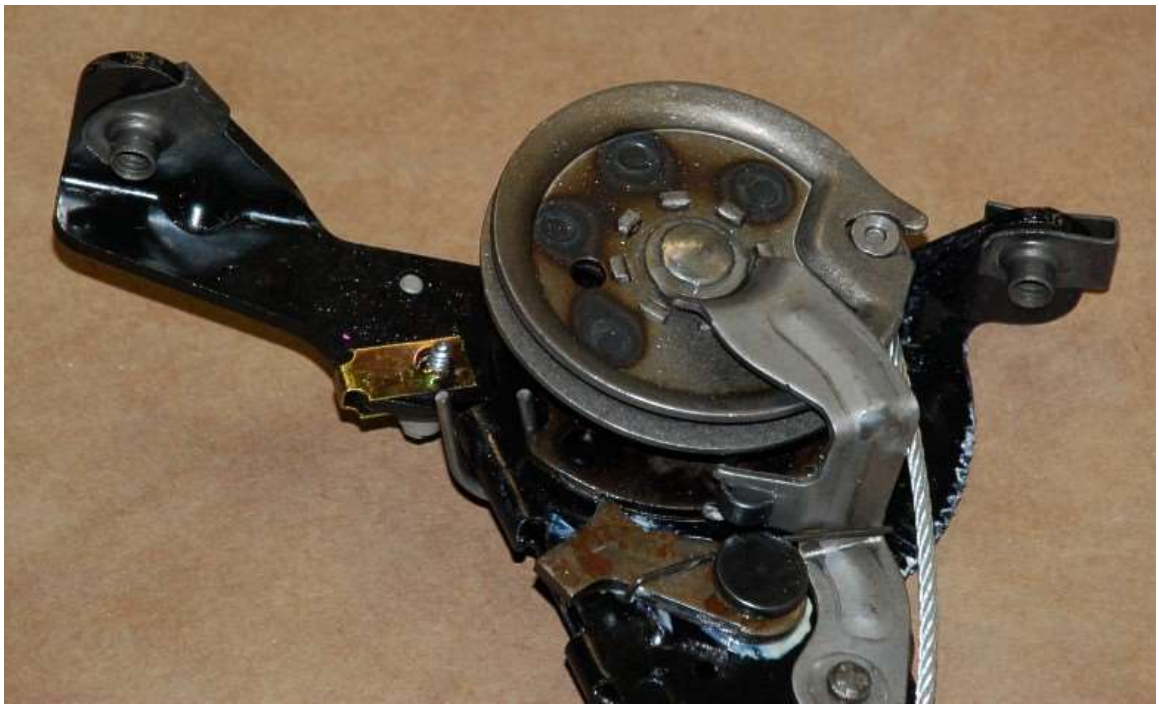
Ground the black electric fan wire to the frame.
Connect the other electric fan wire to the #87 tab on the fan relay.
Attach the #85 ground tab to the thermostat switch.
Connect the #86 and #30 tabs to a +12V 30A fuse in the fuse panel.



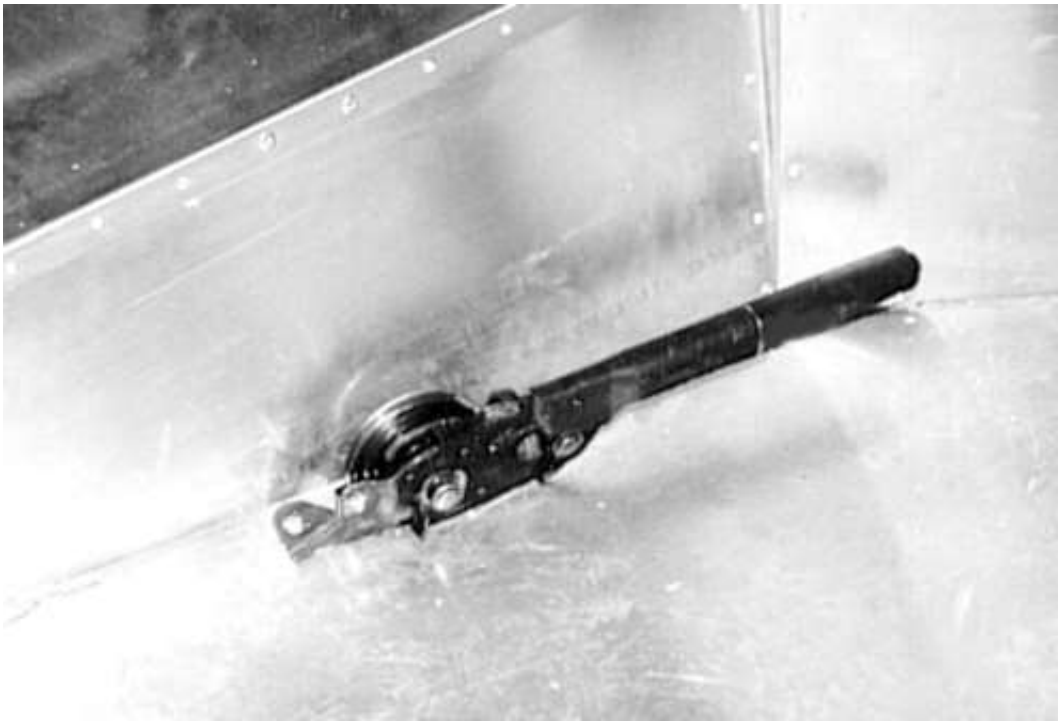
Emergency Brake

Mustang Handle

🛠 ½" deep socket, $^{3}/_{16}$" hex key, marker, scissors, hacksaw.
🚘 Mustang E-brake handle, brake line components



Push the U-nuts from the brake line components onto the E-brake handle.

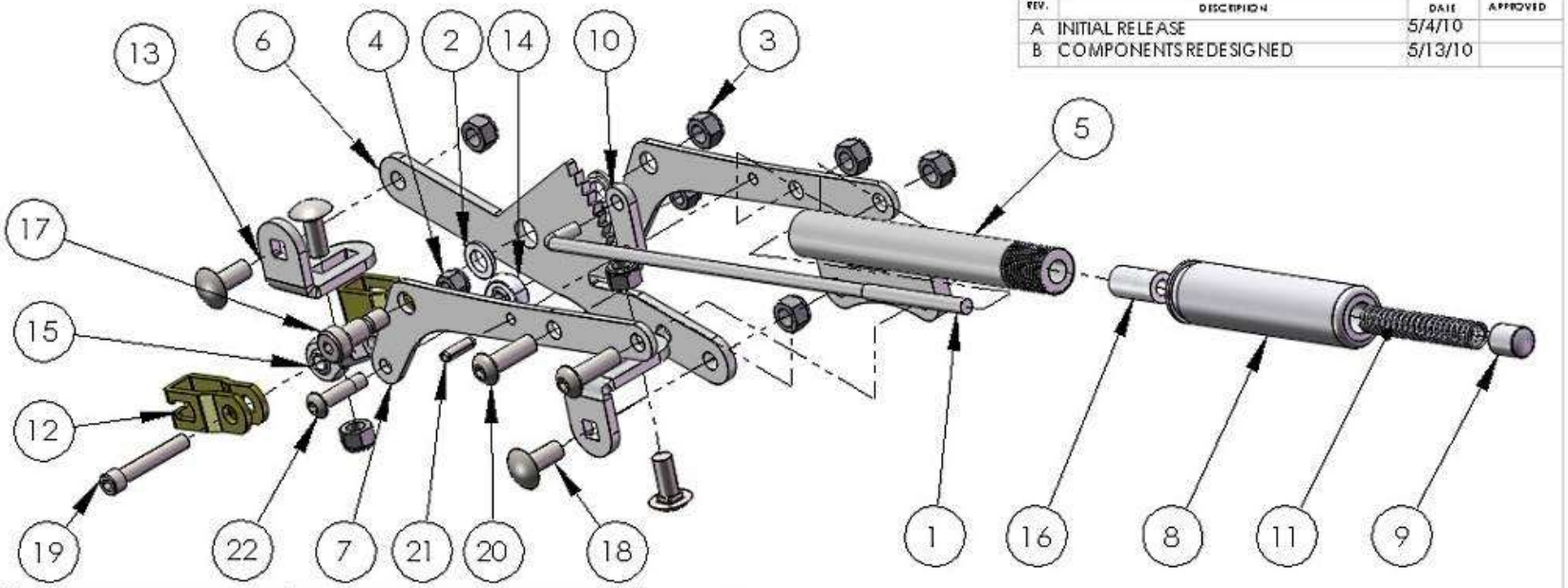


Bolt the handle to the mount bracket using the kit fasteners. The holes are slotted so the handle can get positioned properly to allow room for your hand around the handle.

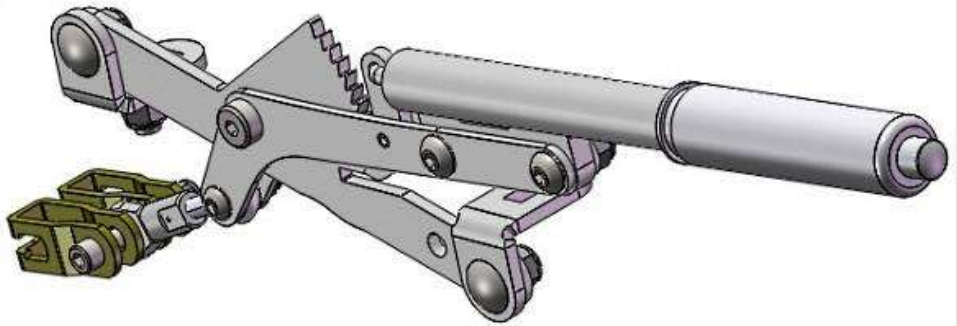
Complete Kit E-brake Handle

- 🛠 $^{5}/_{32}$", $^{3}/_{16}$" hex keys, $^{7}/_{16}$", ½" wrenches, channel lock pliers, WD-40
- 🚘 E-brake handle assembly, brake line components

REVISIONS			
REV.	DESCRIPTION	DATE	APPROVED
A	INITIAL RELEASE	5/4/10	
B	COMPONENTS REDESIGNED	5/13/10	



ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	10801	ANCHOR BOLT, 1/4-20 x 10", 4.25" THREAD LENGTH	1
2	15165	NYLON BUSHING	3
3	NLN-3125C	NYLON INSERT LOCKNUT, 5/16-18 UNC	7
4	10802	NYLON INSERT LOCKNUT	2
5	15176	LOWER HANDLE ASSEMBLY	1
6	15167	FIXED GEAR	1
7	15168	HANDLE TO RATCHET MOUNT	2
8	15173	HANDLE GRIP	1
9	15174	E-BRAKE BUTTON	1
10	15169	RATCHET TOOTH	1
11	COMPRESSION SPRING	2.625"L 0.08"in COMPRESSION SPRING	1
12	15181	E-BRAKE CABLE CLEVIS	2
13	15170	MOUNT BRACKET	2
14	15177 - 1-4 MALE ROD END	1/4" MALE ROD END	1
15	15180 - 1-4 FEMALE ROD END	1/4" FEMALE ROD END	1
16	Nylon Spacer	0.50" OD x 0.25"ID x 1" NYLON SPACER	1
17	SHSSCREW 0.375x0.5-N		1
18	RHSSNBOLT 0.3125-18x0.75x0.75-N		4
19	HX-SHCS 0.25-20x1.5x1-N		1
20	SBHCSCREW 0.3125-18x1-HX-N		2
21	SPS 0.1875x0.625		1
22	SBHCSCREW 0.25-20x1-HX-N		1



UNLESS OTHERWISE SPECIFIED:
DIMENSIONS ARE IN INCHES
TOLERANCES:
TWO PLACE DECIMAL ±0.01
THREE PLACE DECIMAL ±0.005
FOUR PLACE DECIMAL ±0.001

	NAME	DATE
DRAWN	JI	4/26/10

COMMENTS:
8.12:1 LEVERAGE RATIO

ROADSTER
COUPE
HOT ROD

USED ON

APPLICATION

PROPRIETARY AND CONFIDENTIAL
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MATERIAL
FINISH

PRINTED 7/20/2010

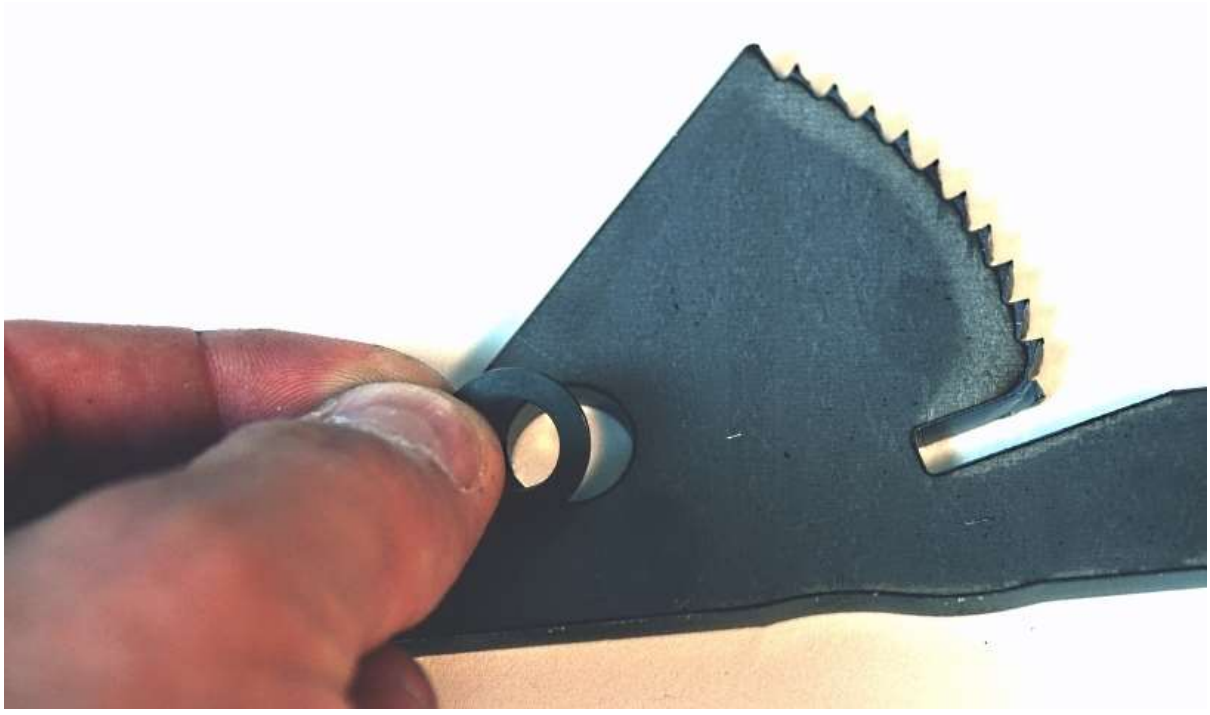
Factory Five Racing, Inc.

TITLE:
E-BRAKE HANDLE

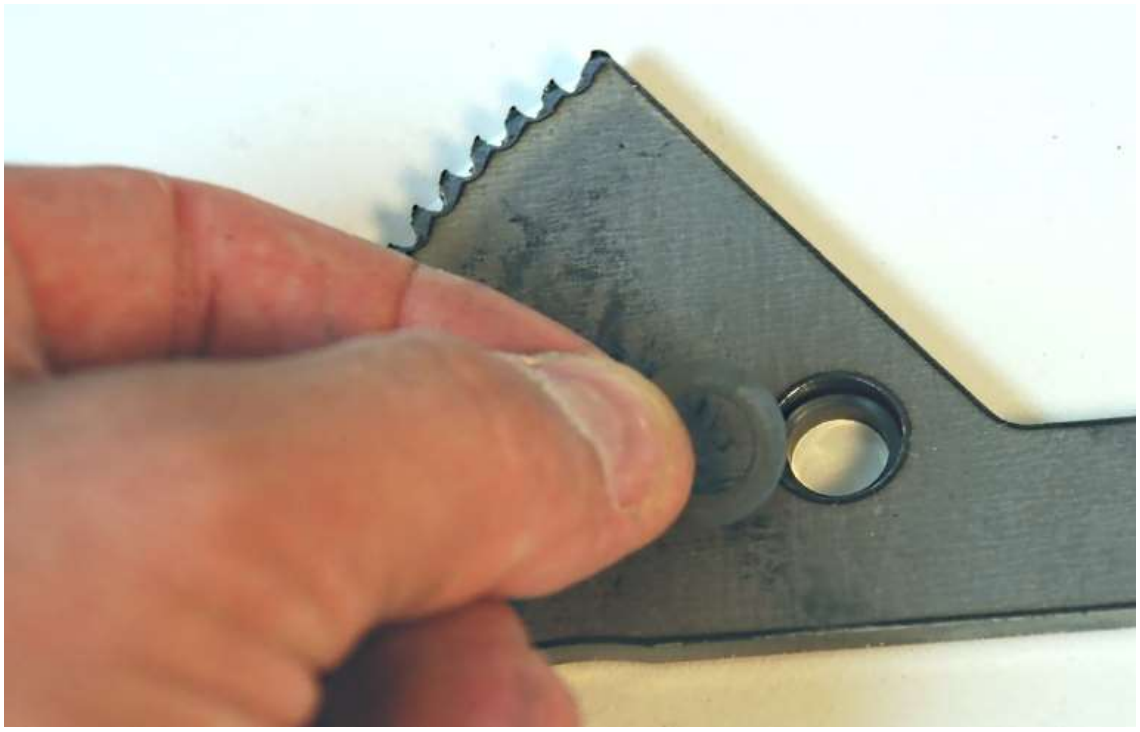
SIZE	DWG. NO.	REV
A	15183	B

SCALE: 1:2.5 WEIGHT: SHEET 1 OF 2

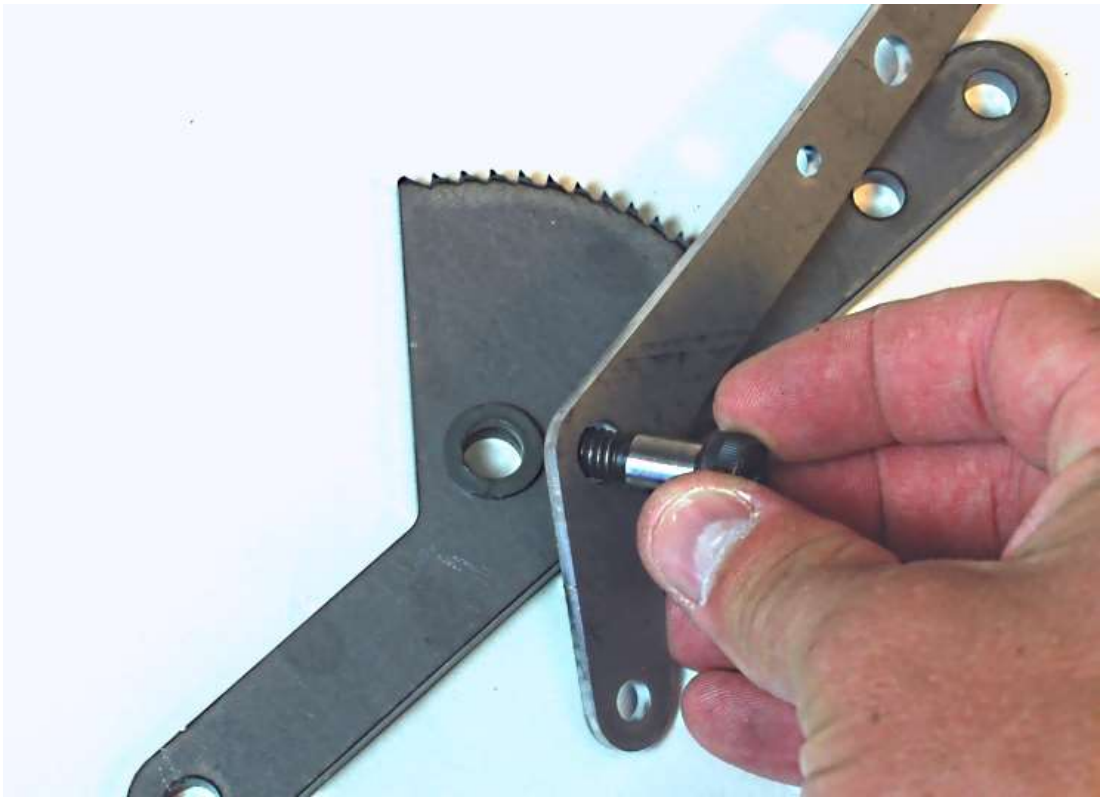
Unpack the emergency brake handle components.



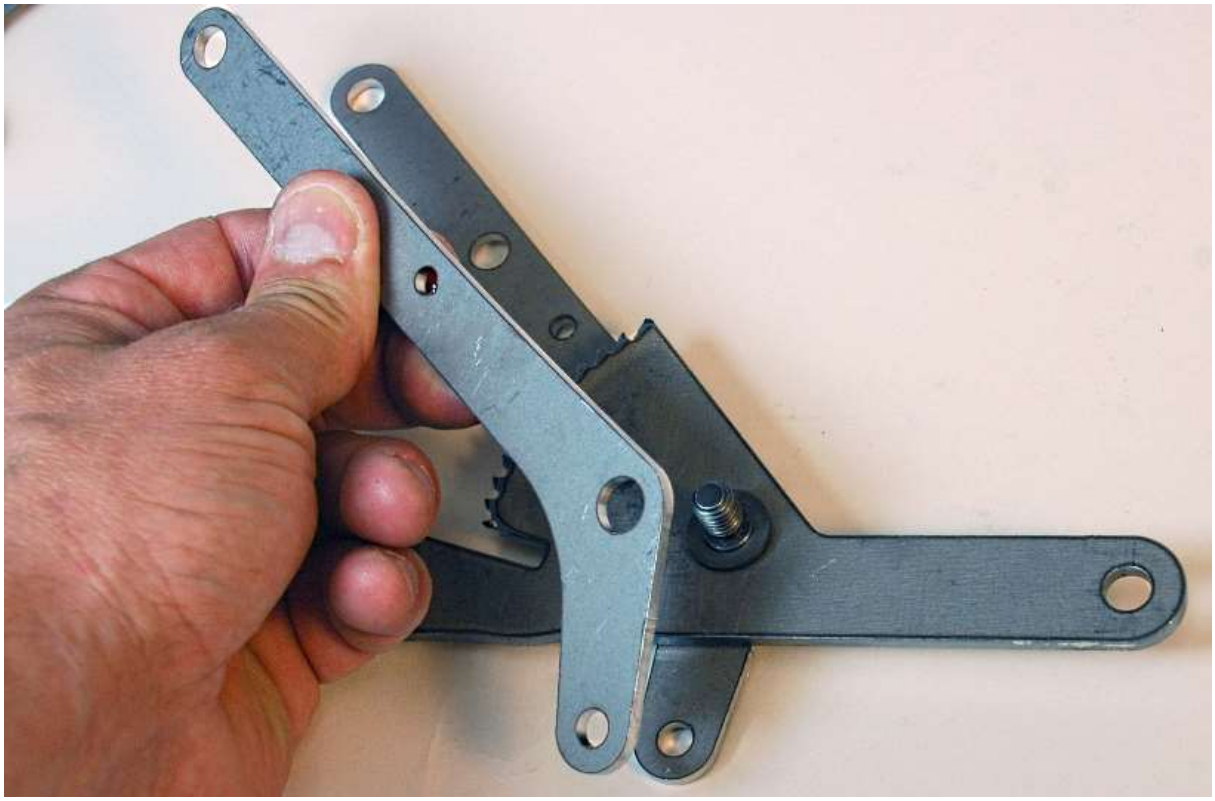
Push a nylon bushing into one side of the fixed gear.



Push the other bushing into the other side of the fixed gear.



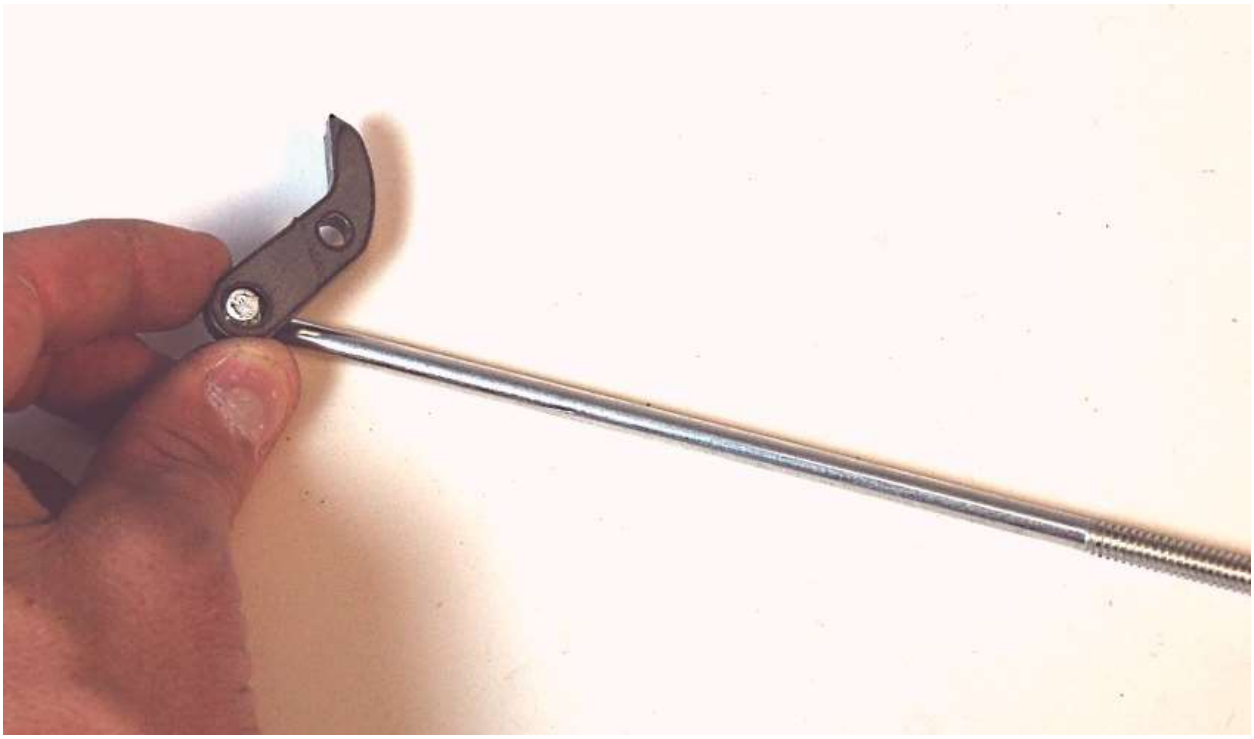
From the right side of one of the Handle to ratchet mounts, insert the shoulder bolt through the ratchet mount and then the fixed gear.



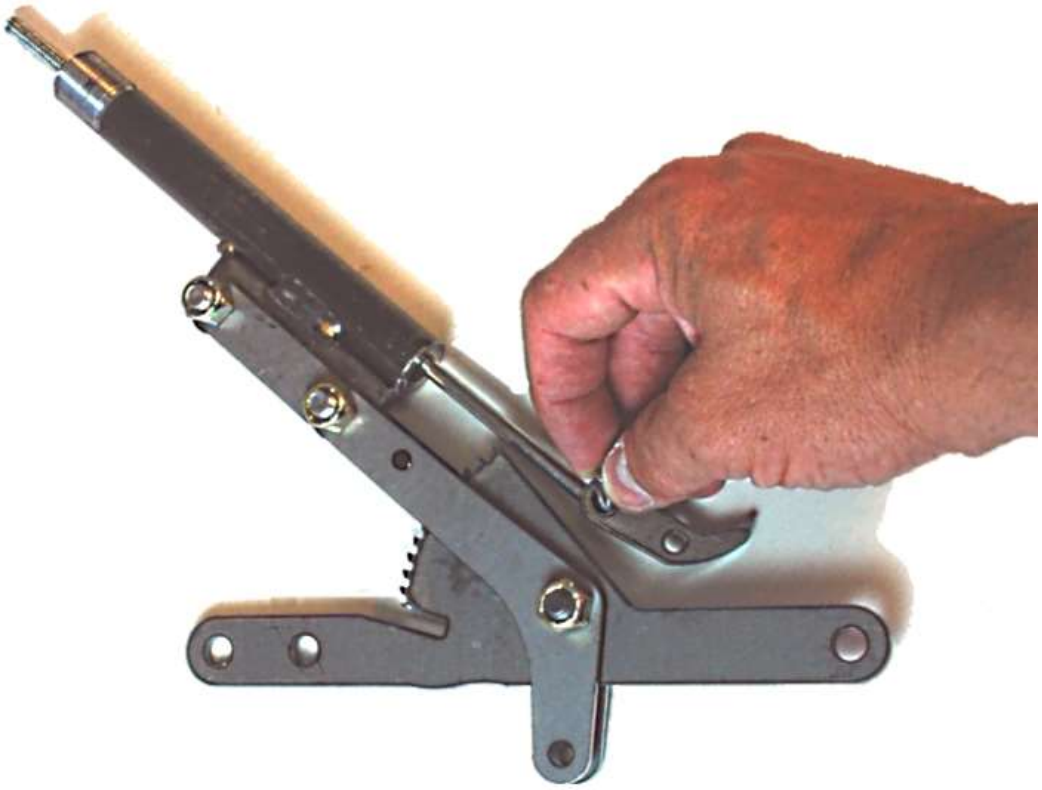
Put the other ratchet to handle mount on shoulder bolt from the other side of the fixed gear.

Using a $_{3}/_{16}$" hex key and ½" wrench, tighten the shoulder bolt lock nut so that the ratchet to handle mount plates are against the bushings but they can still move up and down. Make sure the ratchet to handle mount plate next to the locknut does not get caught on the edge of the shoulder bolt.

Slide the lower handle between the ratchet to handle mount plates and bolt the three pieces together using the two $_{5}/_{16}$”x 1” button head screws.



Put the ratchet tooth on the long anchor bolt as shown in the picture below.



Rotate the fixed gear out of the way and pass the anchor bolt up through the lower handle.

Rotate the ratchet tooth between the handle to ratchet mount plates and align the mount holes.

Push the included spring pin through the ratchet mount plates and the ratchet tooth using a pair of channel lock pliers.

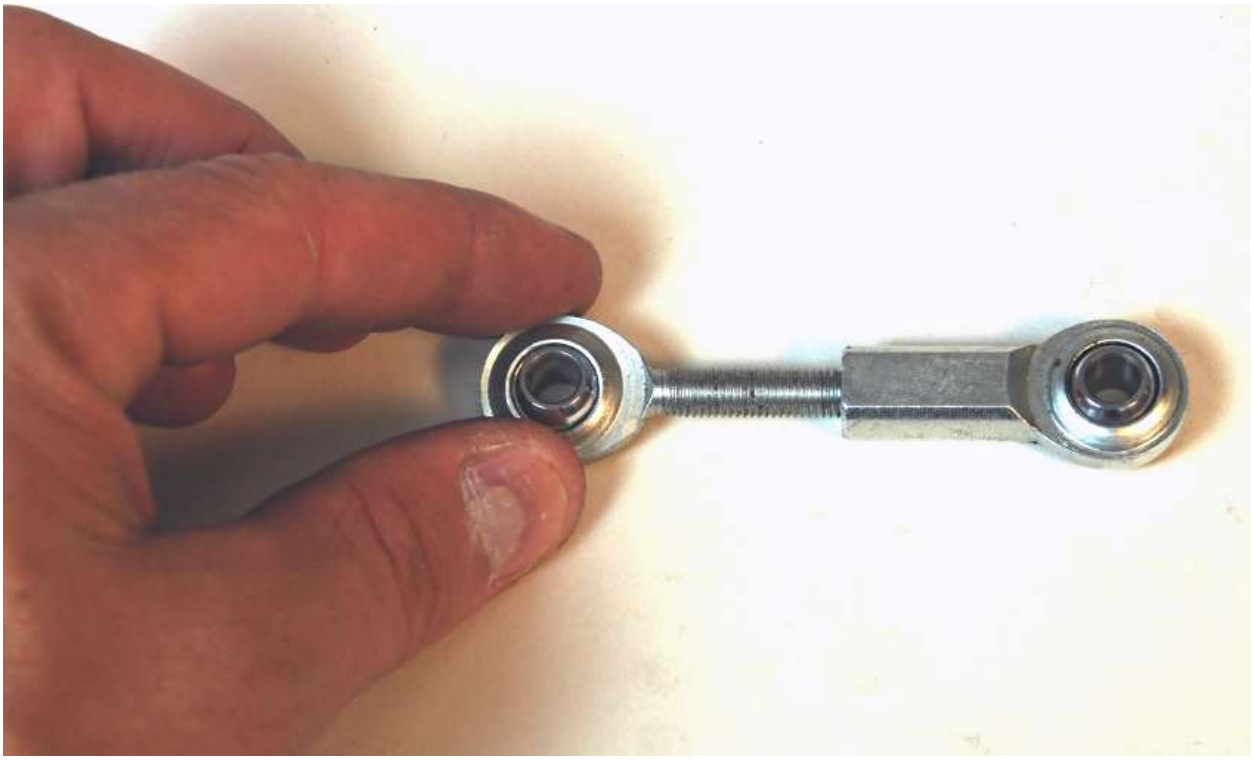
Slide the 1” nylon spacer onto the end of the anchor bolt.

- There are two nylon spacers included. They provide preload on the spring so there is more force holding the ratchet tooth to the fixed gear and making the release button harder to push. Try using the 1” long spacer first. After the handle is assembled, try the handle and if desired the other ½” spacer can be added.

Spray a little WD-40 on the lower handle threads and screw the upper handle onto the lower handle.

Insert the spring into the upper handle over the anchor bolt.

Screw the button onto the end of the anchor bolt.



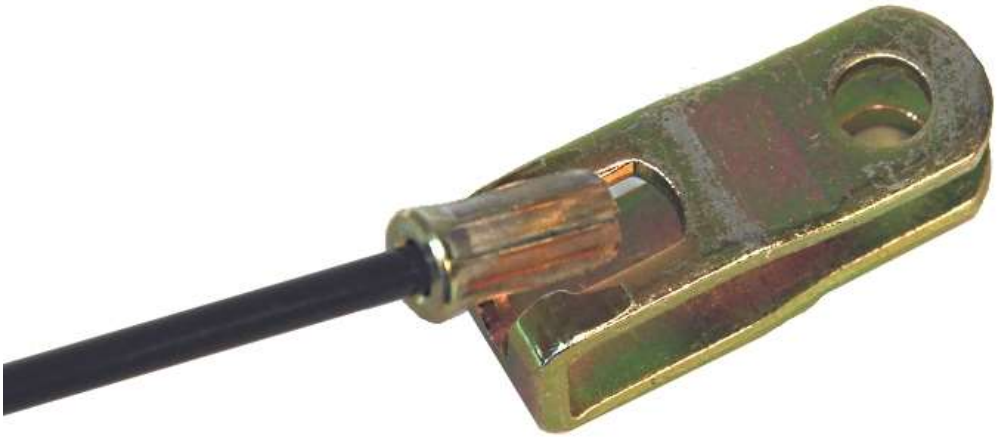
Screw the male and female rod ends together.

Use a wrench to spread the ears of the ratchet to handle mounts so that the rod end can just slide between them.

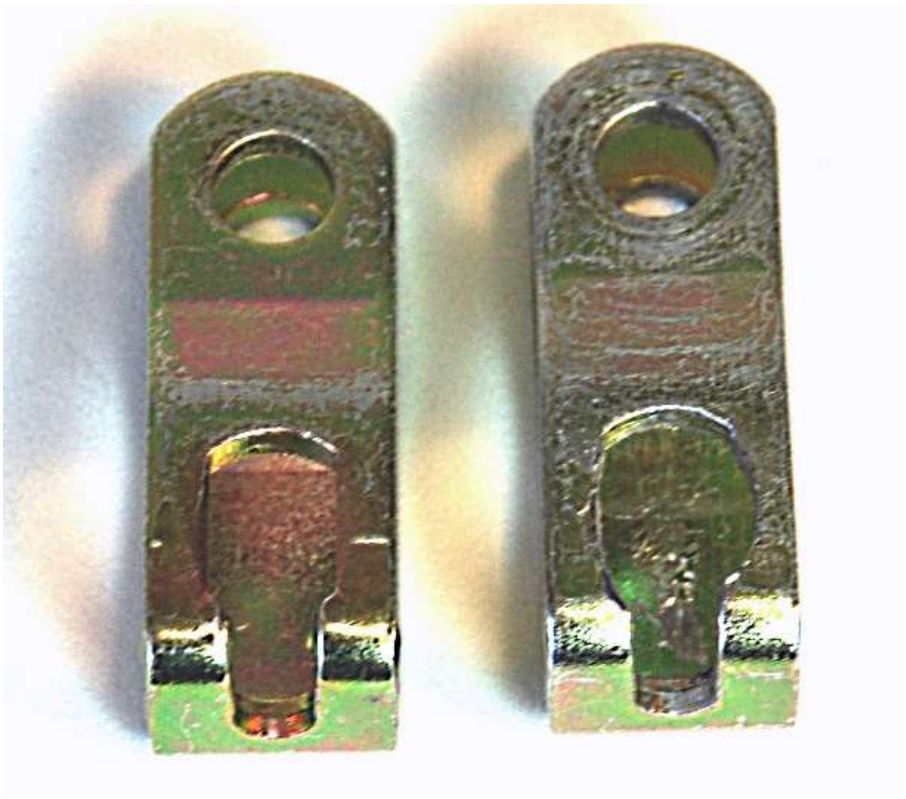
Slide the male rod end between the ratchet to handle mount plates and attach it using the ¼" flange head bolt and locknut.

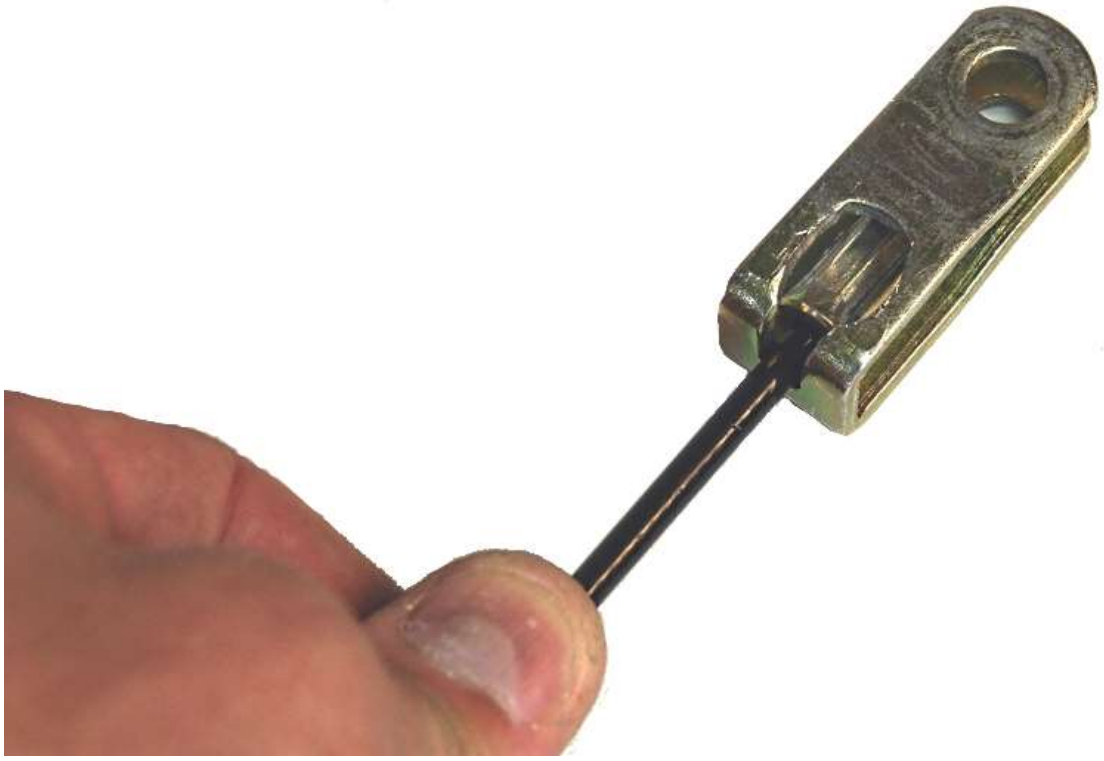
Insert a $_{5}/_{16}$" carriage bolt into one of the bent mount brackets so the square shoulder is in the square hole.

Attach the mount brackets to the fixed gear using a ½" wrench. Leave the locknut slightly loose so positioning can be done on the frame later.



Check the fit of the emergency brake cable end in the brake cable clevis.





If necessary, use a drill bit and drill or a Dremel tool to open up the slot slightly.

Facing the cable slots towards each other, attach one of the cable clevises to each side of the female rod end using the ¼”x 1.50” socket head bolt and locknut. Just start the nut for now, do not tighten it.

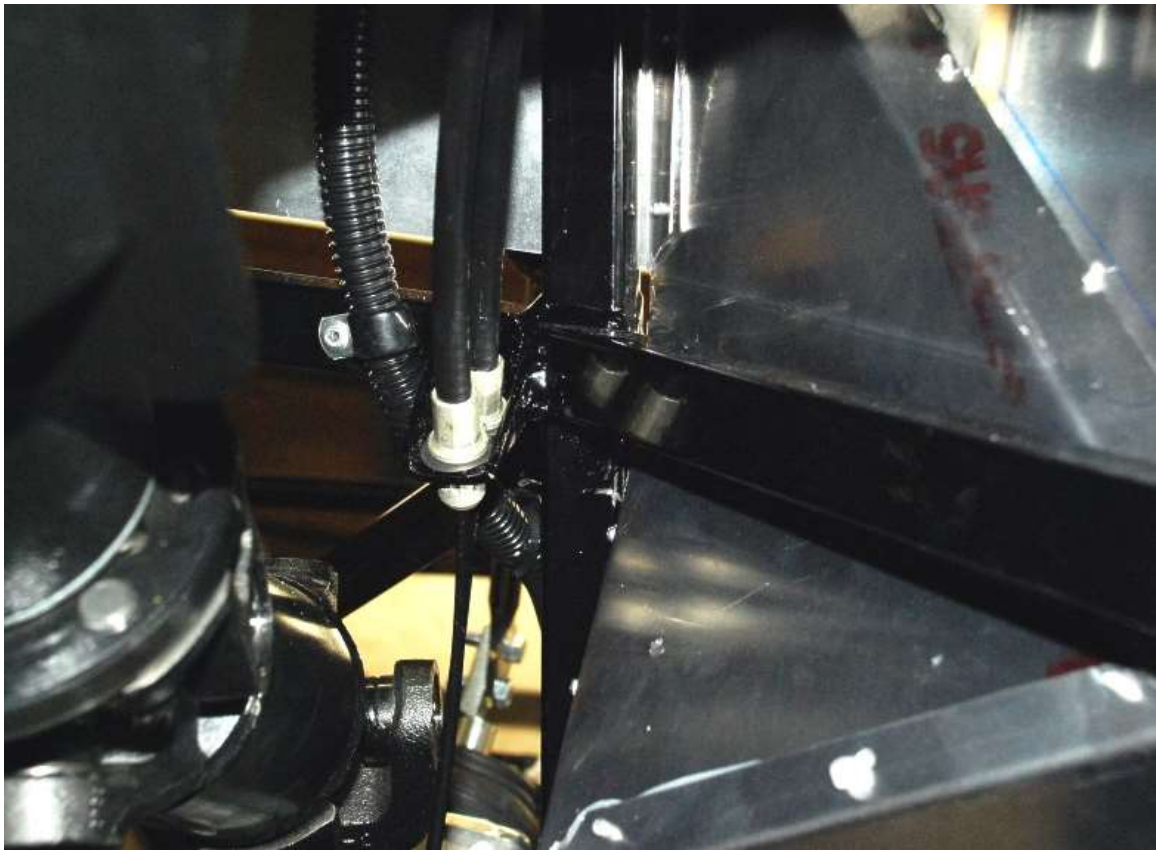
Attach the handle to the frame using the $^{5}/_{16}$” carriage bolts. Leave the locknuts loose enough so that the mount bracket can still slide on the frame mount. The front mount bracket goes under the frame bracket while the rear goes on top. The fixed gear straddles the frame mount.

Tighten the mount bracket to fixed gear carriage bolts.

E-Brake Cables

- Your E-brake cables should be from the same car as your rear brakes.
- 87-92 Mustang cables or the FFR cables mount to the bracket up near the 2”x 3” tube.

Route the cables through the upper bracket in the transmission tunnel until the sheath end clicks in place.



Route the inner cable down under the chassis and hook them to the T cable.

Solid Axle

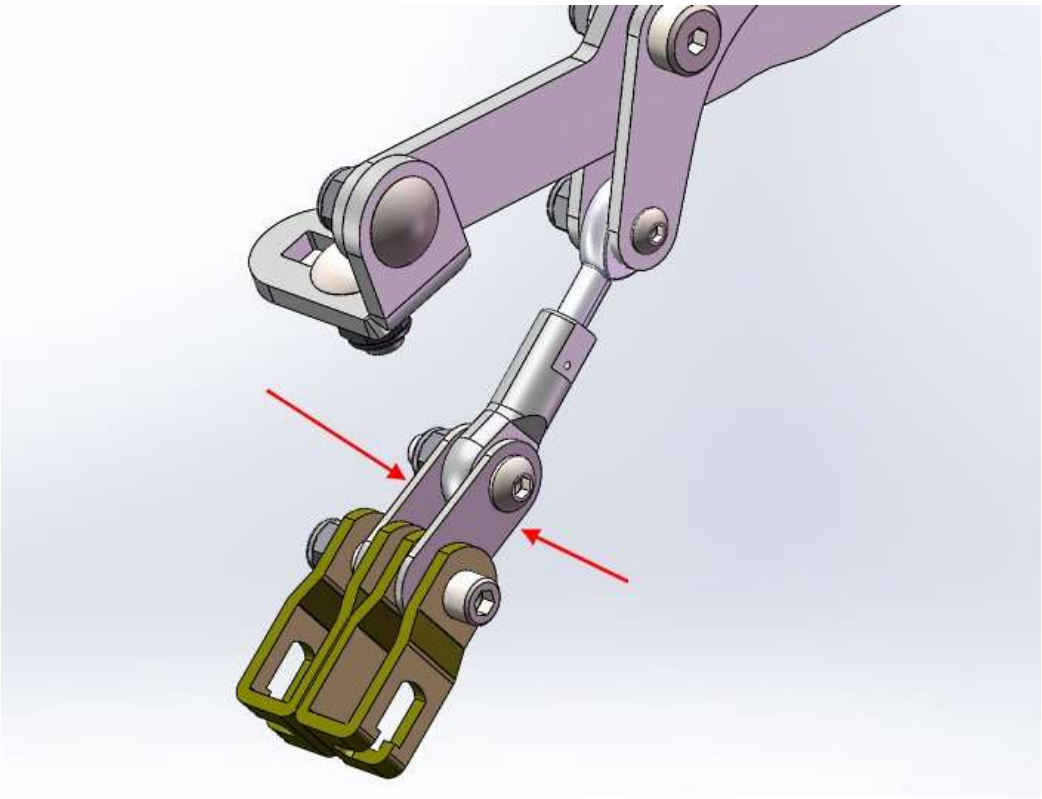
Route the cables back to the calipers and attach. Make sure your routing is out of the way of any moving parts and the cable has slack to move with the axle.

Emergency brake cable in caliper bracket.

Mustang handle

Pull up on the handle a few times to make sure the self-tensioner works and there are no problems with the cable.

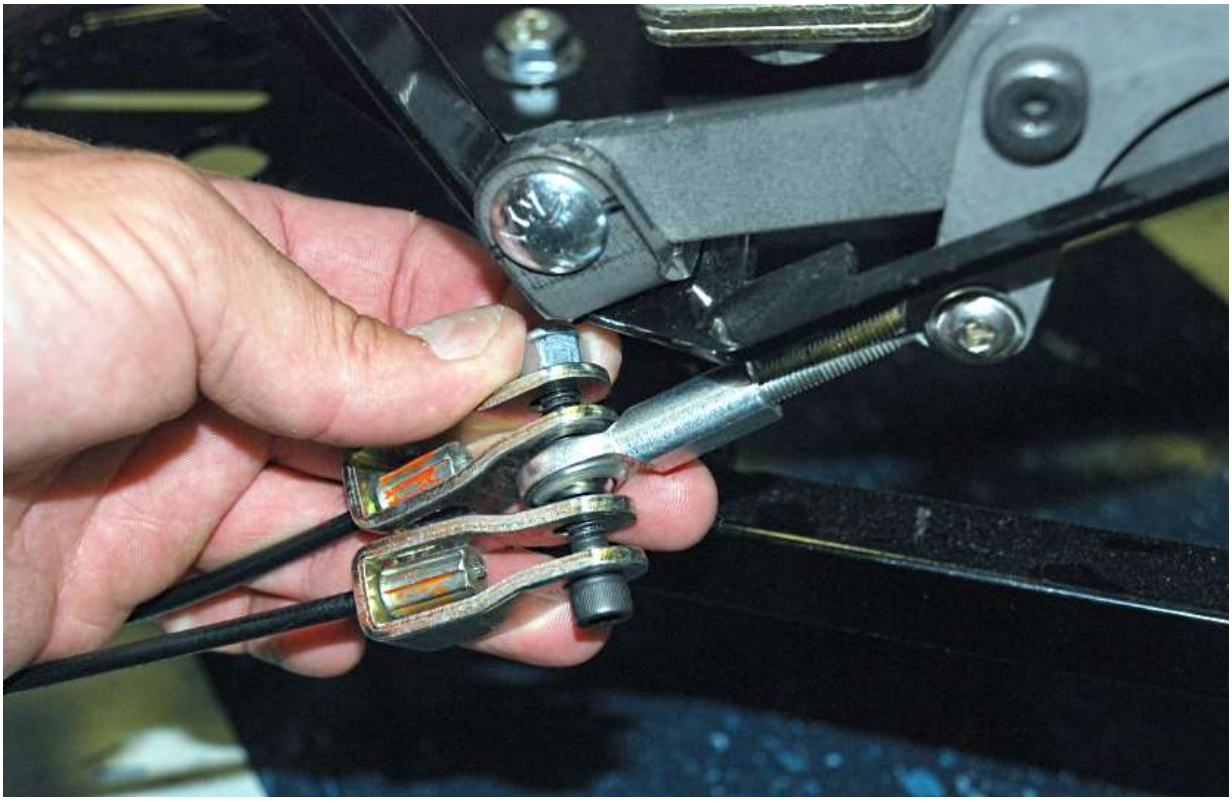
Complete kit Handle and Cable Adjustment



- If using Wilwood brakes attach the two spacer brackets included with the brakes between the clevises and rod end.

Remove the cable clevises from the rod end and attach them to the cable ends.

Adjust the rod end so that the ¼” bolt goes through the rod end and both clevises and the cable is tight.



Put the locknut back on the ¼” bolt hand tight.

Emergency Brake Boot

🛠 ⅛” drill bit, drill, Phillips head screwdriver
🚘 Interior Trim

Unpack the e-brake boot and a few of trim screws.

Fit the boot over the handle and check the handle actuation. When you are in a position where the boot clears the handle movement drill through the material into the tunnel and screw it into place.

Interior Aluminum

Transmission Tunnel Cover

🛠 Drill, ⅛" drill bit, Silicone, Caulking gun, Rivet gun

🚗 Secondary Body Fasteners Components, Packaged Aluminum, mounted aluminum

Remove the seats, roll bar, and harnesses and silicone and install the transmission tunnel top.

Silicone and install the shifter hole cover. Make sure it does not interfere with the movement of the shift lever.

Silicone and install the tunnel plug patch panel if not using the Mustang transmission harness.

Driver Footbox

Silicone and install the front patch panel.

Seats Harness

🛠 ¾” wrench, ¾” socket, ½” drill bit, drill, ratchet

🚗 Seat Harness/Fasteners

Unpack the seat harnesses and hardware.

Bolt the lap harness in position.

Remove the mounting tab from the harness.

Loop the harness over the roll bar crossbar.

The shoulder harnesses are side specific so make sure you have the sides correct.

Follow the manufacturer's directions inside the seat harness boxes on how to loop the harness straps through the slider bracket.

Adjust the harnesses to where they fit you comfortably.

Shifter Handle and Boot

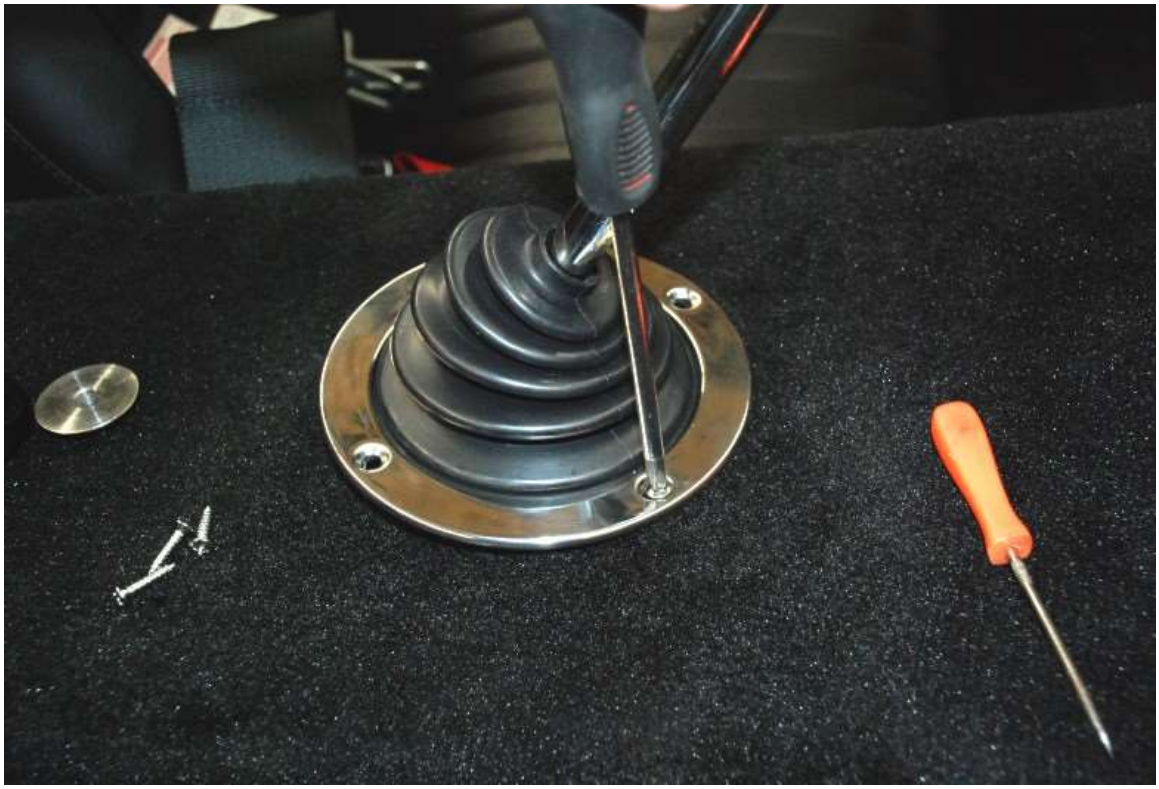
🛠 ½” wrench, ⅛”drill bit, drill, Phillips head screwdriver, marker, thread lock
🚘 Shifter handle components

Unpack the shift handle and bolt it to the transmission. These bolts have a tendency to rattle loose so use a little thread locker.

Push the boot and trim rind down over the handle so it sits flush on the tunnel.

Using a silver marker or white paint marker, mark your screw holes on the tunnel.

Remove the boot and drill ⅛” holes in the spots you marked.



Re-install the boot and screw down to the tunnel with the countersunk screws. A small screwdriver can help to locate the holes.

Screw the two piece knob onto the shift handle and tighten so the shift pattern is in the correct orientation.

Seats

- $^{5}/_{16}$" drill bit, drill, $^{3}/_{16}$" hex key, ½" deep socket, marker
- Seat mount hardware, seats
- These instructions show the install of the more popular Roadster street seat. Racing seats with less padding give more room, the more upright the angle of the seat the more room to straighten out your legs.

Unpack the seats and set them in the cockpit.

Sit in the seats and locate them in the position you are most comfortable. This is a critical fitment so take your time and make sure you are happy with the location.

Mark the seat location on the floor.

Remove the cover and drill through the seat into the frame

If using the Roadster seats, lift up the bottom of the cushion to reveal the seat frame.

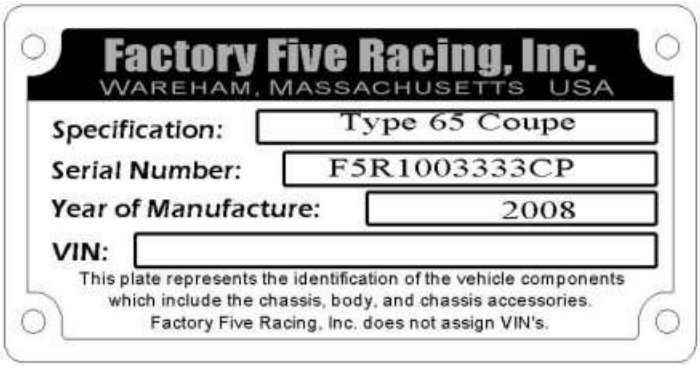
Using the rivet heads as a guide mark where the rails of the seat frame are above the seat mounting plates.

Drill the first hole for the seat mounting and install the bolt.

Drill the remaining holes for mounting the seats and install the bolts.

Nameplate

- 1/8" drill bit, rivet gun, drill
- Secondary body fasteners, certificate of origin envelope
- Factory Five Racing has included a Certificate of Origin along with a Nameplate for your kit. The serial number from the Certificate of Origin matches the number engraved on the 2"x 2" tube going across the car at the front of the cockpit on the driver side. Below is an example of how the nameplate looks. The VIN number space is provided so that your state issued VIN number can be engraved if you so desire. This can be engraved at any Trophy or mall engraver.



A few places that people have riveted these plates are: front of the 2"x 2" hoop in the cockpit to the left of the steering shaft; on top of the driver footbox; on top of the passenger footbox

Steering Wheel

🛠 Phillips head screw driver, 10mm wrench, $^{5}/_{16}$" hex key
🚘 Steering wheel/Hardware
✋ The standard steering wheel is a 14" wood wheel, we also have a 14" leather wheel available.

Unpack the steering wheel hardware.

Bolt the steering wheel to the boss. The pattern is not symmetrical so it will only line up in one direction.

Bolt the steering wheel assembly to the steering shaft. Use thread-locker on this bolt.

Rolling Chassis Check

Front Suspension

Now is a good time to double check all your hardware, make sure your wiring and hoses are away from extreme heat and moving parts, make sure the steering turns freely lock to lock, and make sure your brake flex lines have enough slack for the full range of wheel movement.

Fluid Levels and Grease

🛠 Grease gun, chassis grease, ratchet, rags
🚘 Transmission fluid, rear axle gear oil, engine oil, coolant, water

IRS

Fill the rear differential with gear oil. Any 8.8 in. ford has a fill plug that is removed and filled until the oil just reaches that level. The IRS has it in the rear cover and the solid axle has it in the front.

Transmission

Fill the transmission with fluid and install the shifter assembly. Leave the shift handle and knob off for now.

Engine

Fill the engine with Oil and coolant. Both these fluids should be rechecked after you have started the engine for the first time. Make sure there is some coolant in the overflow to start out, about 1/3 full is good.

Get the engine up to temperature and check for leaks and make sure the fan is working.
If you need to you can temporarily bolt your side-pipes in place to keep things quieter.

Wheels

Install and torque your wheels. Make sure they rotate freely and do not interfere with the brake calipers, lines, or any suspension components.

Suspension

All of the suspension and steering components that have grease fitting need to be greased. With a grease gun squeeze grease into each fitting on all the control arms, including rear lowers on a slid axle, and tie rods.

Power Steering System Bleeding

If not running power steering, skip this section.

Raise the front wheels off the ground if they are not already
Turn the steering wheel all the way to the left.
Fill the reservoir to the full cold level and leave the cap off.
Turn the steering wheel lock to lock 20 times checking the fluid level every few times. Top off if necessary.
Start the engine and check the fluid level.
Reinstall the reservoir cap and turn the steering wheel lock to lock a few times.
Check for leaks, smooth assist and noiseless operation. If there are noises, turn the engine off, wait two minutes and redo the procedure.

Rattle Patrol

If you have the space in your driveway or have access to a small parking lot it is very helpful to drive the chassis around a little to make sure everything is working before you seal it all up.

 **If you do this, bolt the seat harnesses in and use them** 

You will be very surprised at how quickly the car responds to small inputs and it is amplified by being extra light without the body in place. Things to check for:

- Any leaks – brake fluid – transmission fluid – engine oil – rear diff fluid – coolant
- Wiring – loose wires – close to heat sources or moving parts – loose grounds
- Suspension – all hardware tight – no binding or clearance issues
- Chassis – all hardware double checked – nothing loose or sharp
- Steering – all set screws tight – steering wheel tight – tie rods and rack tight
- Brakes – plenty of fluid – pedal not bottoming- all fittings tight to reservoir
- Dash – All gauges working - gauge lights work – indicators and switches working
- Brake Bias – if you have space adjust your brakes bias with the balance bar (the set up and adjustment procedure is detailed in the paperwork that came with the pedal-box) Set up your brakes so that the fronts lock up just before the rears.

Footbox Fitment

One of the most important things you can do to make sure you enjoy your car is to make sure the fit and comfort of the cockpit is right for you. While you still have easy access to the foot boxes is the best time to do this. Set the brake pedal height by screwing the pushrods in or out of the master cylinders, because of the pedal pivot location a small adjustment will make a large difference. Set the pedal height of the clutch with the stop and cable adjuster, usually about ½" above the brake pedal. Make sure that your feet are comfortable on the pedals and you can press them all without hitting the others. You can also move the steering wheel in and out to get your arms at a comfortable angle until the set screw is tightened.

If you just can't get comfortable with the standard configuration some things you can do to increase room or comfort include:

- Trim the pedal pads for more room between pedals.
- Cut down or remove altogether the gas pedal pad.
- Add a dead pedal to the outside footbox wall at clutch pedal height.
- Shim under the upper steering bearing to raise the steering wheel
- Use a smaller steering wheel.
- Different shoes can make a large difference in foot room.

Left footbox aluminum

Silicone and install the footbox inside top panel. Leave the top flange un-riveted for now; use some clamps or tape to hold it in place.

Silicone and install the left side footbox outer wall. The front flanges tuck in behind the footbox front panel.

Silicone and install the outer footbox top section.

Your rolling chassis is now complete!

Chapter

4

Body Section

The Body and panel mounting are a critical part of how your car will end up looking when it is finished. Whether you are having a body shop paint your car or doing it yourself, the best results will be from fully mounting the body, all the panels and getting them to fit properly and then removing the body for the paint process. If you are not doing any of the body work yourself this means for best results, the entire car should go to the body shop for panel fitting, in this case, you should take extra precautions to tape/protect/remove anything that you don't want paint or primer on. All of the panels have been trimmed oversized so they will need material removed for a perfect fit. The easiest method for getting the best fit is to sand or trim the panel edges just enough so they will sit down in the openings, then fully mount them with hinges and latches. Once the surfaces are all matched between panels and the body, trim away the edges until the gaps are all even and slightly larger than you want them on the finished car. The paint will fill in from both sides and tighten the gaps so we usually run about $^{3}/_{16}$" of gap prior to painting. If you are planning on stripes it is also best to line them up with the body and all panels mounted.

Weatherstrip

- Tin snips, razor knife
- Secondary body fasteners

To ensure that the body is in its proper location, the weather stripping should be installed on both the frame and the firewall even if you are just test fitting the panels. Locate the adhesive backed rectangular foam weather strip and the press on bulb seal from the secondary body fasteners assembly.

The small rectangular adhesive backed weatherstrip runs along the top of the chassis tubes on either side of the hatch opening.

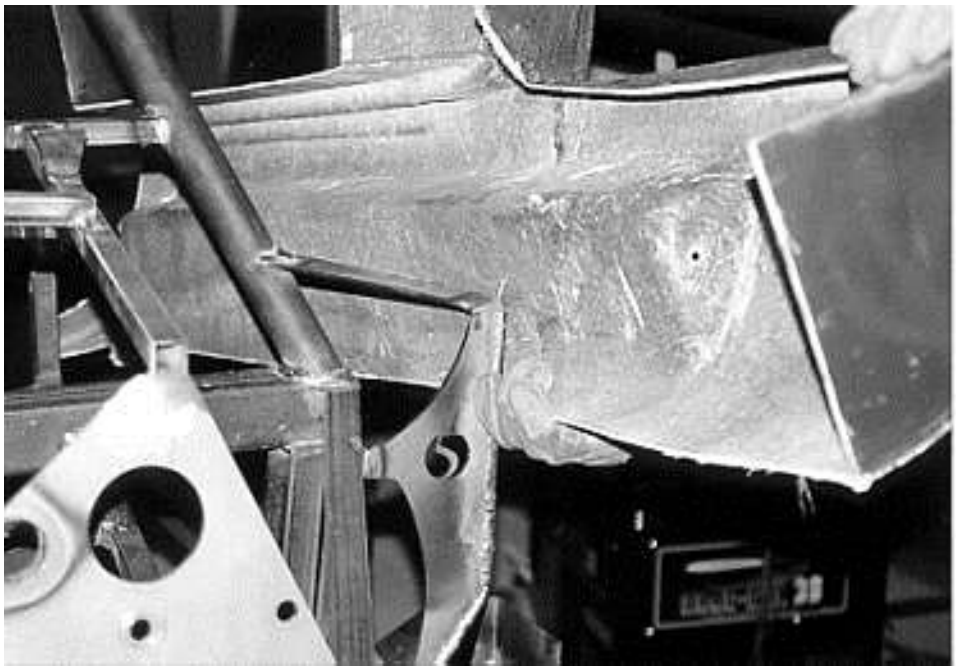
The push-on weather strip needs to run across the top of the firewall.

Body Mounting

- Gloves
- Body
- The body will be trial fit/adjusted along with the doors to ensure everything fits before the body and parts are painted. All of the trim accessories will also be trial fit/adjusted. Since the rear clip is one piece, get two people to help when you're ready to position the body onto the frame. The body is delicate but can be pulled around the frame without any problems.
- If body cut outs were ordered, the side exhaust, side louver, headlight, taillight, turn signal, wiper, gas cap, and side mount holes are done at the factory. The body comes standard with the large nose hole cut.
- It is smart to have some help when doing this step. Much of the positioning is push and pull until all holes line up. The fiberglass edges can be very sharp. Wear gloves when lifting or holding the body.

Using two people, one on each side holding the wheel well and side exhaust recess move towards the frame from the rear with the back slightly lower than the front.

Pull the sides of the body out to clear the frame.
Watching the rear of the frame, move the body forward slowly lowering the front.
Watch the door latch posts.



Pull the body out to get around the hinges.

Move forward until the rear hatch tubing is lined up with the lip on the body and put the body down in place. Watch the door hinge mounts and striker post mounts on the frame.

Once the body is in position, it will be snug against the taillight plates in the rear, the lower rear corners of the door opening should be at the corner of the tubes for the door latch and the windshield mounts should be close.

Tail lights

🛠 Drill, 1¼" hole saw, $^{7}/_{32}$" drill bit, ⅜" socket, flat head screwdriver, razor knife, marker, ruler, level.

🚘 Tail light template, tail lights and hardware.

✋ Be careful with the lenses, they are glass and can break if dropped from a fairly low height.

The rear taillights double as the rear body mount.

There is a plate mounted on the frame to receive the light mount screws.

Use the template in Appendix A to mark the body. Use a level to align the template.

Use a 1¼" hole saw to make the center holes and a $^{7}/_{32}$" drill bit for the screw holes.

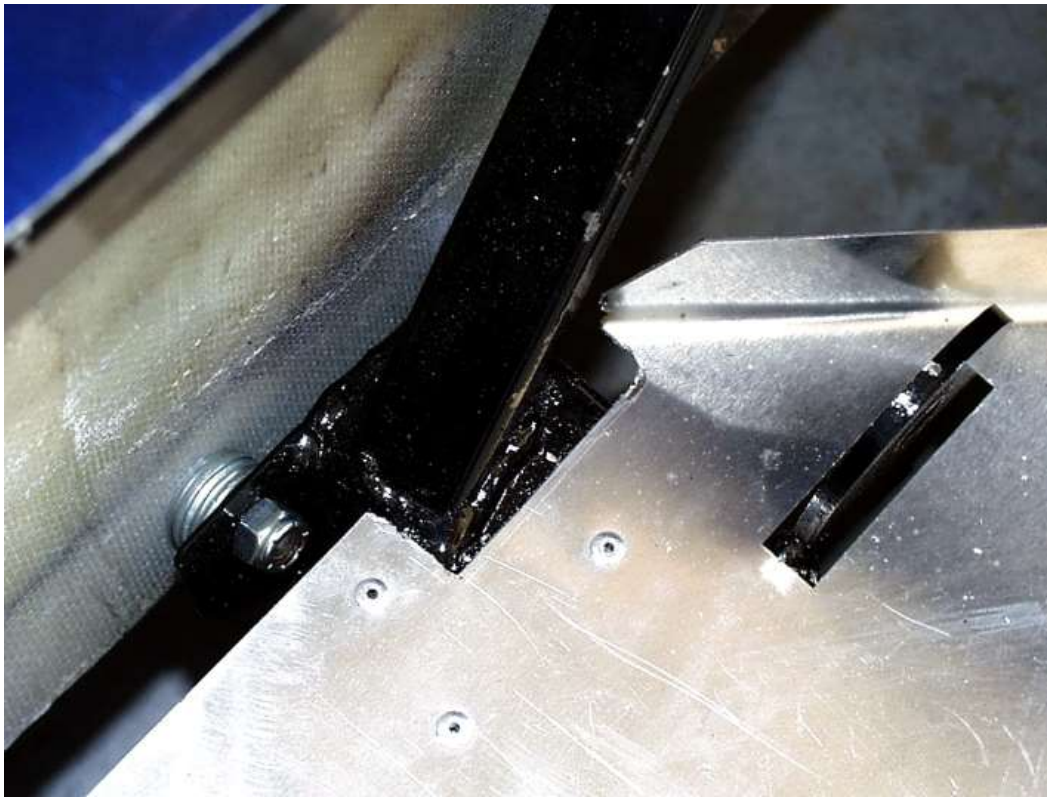
Take the lights apart and cut the protruding rubber part of the light off as in the picture below.

The lights mount from the outside of the body without the lenses and trim rings in place.
Test fit the lights. You may have to bend the ground tab slightly or file away a bit at the hole to make it fit perfectly.
Mount the lights using the supplied hardware.
This is a test fit so don't wire or mount the lens or trim ring yet.

Side Body Mounts

🛠 Drill, $^{5}/_{16}$" drill bit, $^{3}/_{16}$" hex key, ½" wrench, marker, ruler.
🚗 Secondary body fasteners

The body sides are mounted using four stainless $^{5}/_{16}$"x 1" bolts with a washer next to the head.
The rear most side body mount needs $^{7}/_{16}$" worth of washers between the body and the frame so that the body is spaced correctly and there is enough thread left so the locking part of the nut is used.
When you are fitting the doors the number of washers may have to be changed to ensure a flush door fit.
The edge of the body doorsill should be flush with the inside side of the doorsill 1"x 1" tube. Use a #6 self-tapping screw to hold it in place if necessary.
Work from the rear of the car towards the front.

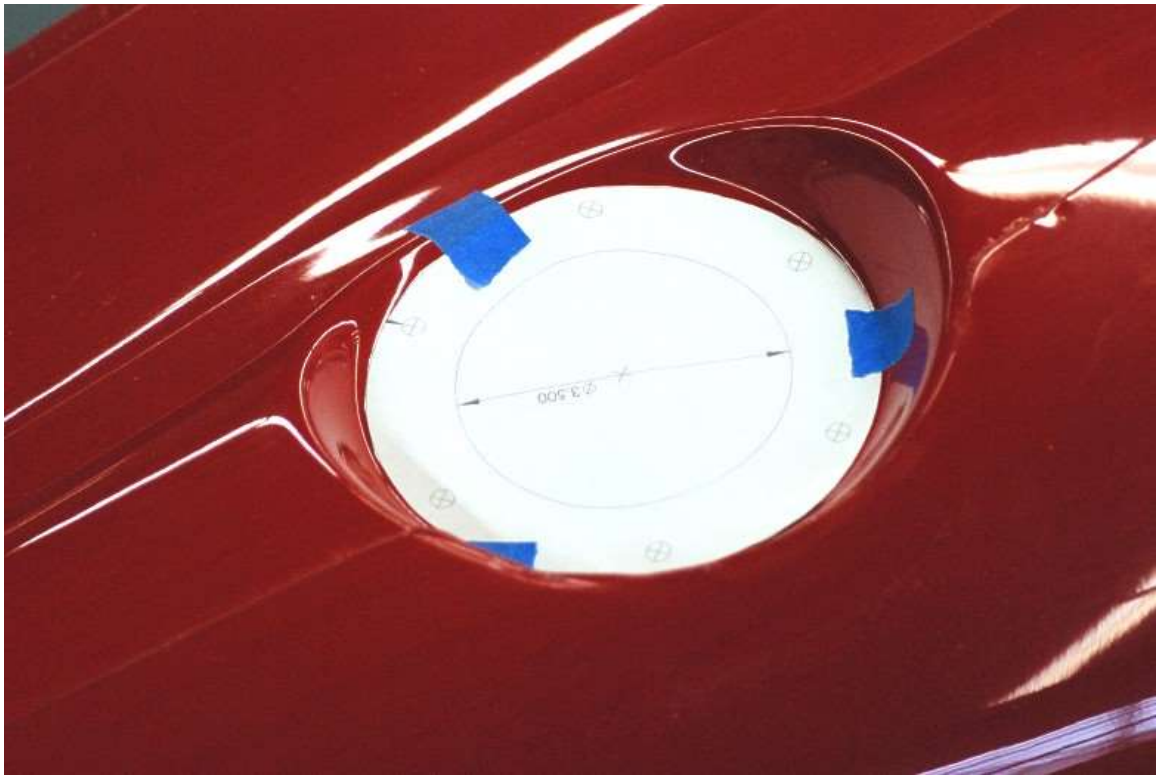


Side rear body mount.

Body Cut-outs

Fuel filler

🛠 Drill, ⅛”, 7/32” drill bit, 3½” hole saw or air saw or jig saw, masking tape, scissors.
🚗 Fuel filler template, Aston Lemans Cap components.



Locate the template in the appendix and only cut out around the outside diameter of the circle. Tape the circle in the gas cap recess of the body.

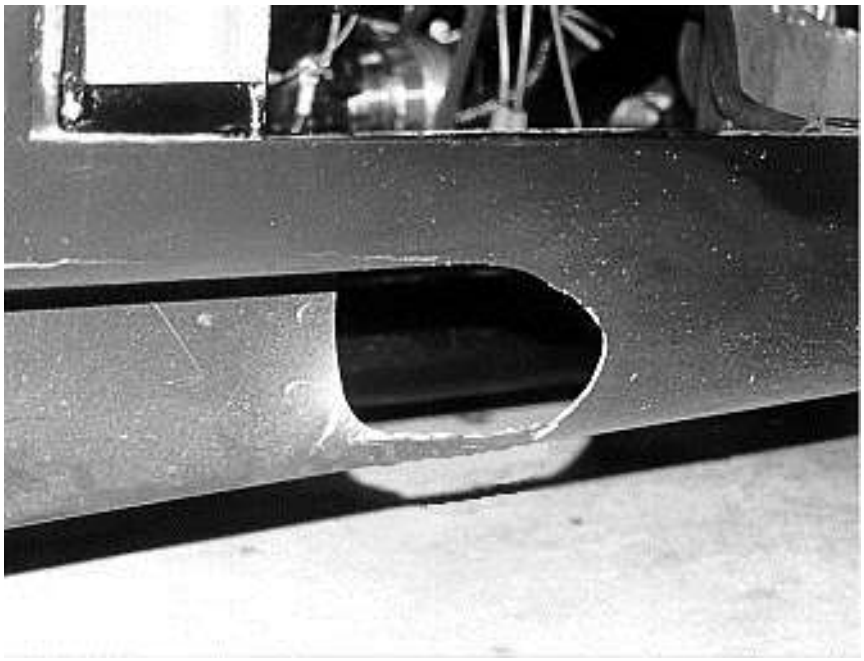
Use a ⅛" drill bit for all except one of the outer screw holes. Use a $^{7}/_{32}$" bit drill for the last small hole.

Use a 3½" hole saw for the center opening, drill out the holes for the filler. If you do not have a hole saw this size, you can cut the center circle out of the template and use the remaining template to mark for a jig-saw instead.

Side exhaust

Air saw or jig saw.
Side exhaust template

Cut out the side exhaust template.
The template goes down to the top edge of the body.
Tape or hold the template and mark around it with a pen.
Use a jigsaw to cut out the marked area.



The template is slightly tight. Enlarge the holes after fitting the side pipes later if desired.

Radiator Exit opening

Air saw or jig saw.

Use a jigsaw to cut out the area.

Turn Signal

🛠 Drill, ¾” hole saw, marker.
🚘 Front turn signal light

Drill the holes with a ¾" hole saw at the locations marked on the nose.

Test fit a light and adjust if needed. You may have to bend the ground tab slightly or file away a bit at the hole to make it fit perfectly.

Headlights

🛠 Drill, 1/8", ¼", 7/16" drill bit, razor knife, masking tape, air saw or jig saw, level.
🚗 Headlight template, headlight components,

Cut out the headlight templates from the back of the manual on the outermost diameter and tape them in the center of the fender with the line level with the ground.

Cut the center of the template out and trace the inner circle with a marker.

Drill the two smaller corner holes with a ¼" drill bit to mark their location. Follow this with a $^{7}/_{16}$" drill bit.

Using a jig saw, cut the inner hole out of the body, use a larger drill bit to make a hole to start your cut.

Test fit the light bucket and rubber gasket making sure that they sit flat and the bucket is centered on the fender. Mark and drill the four mounting screws for the headlight bucket using a $^{1}/_{8}$" drill bit.

Side louver

🛠 Drill, ½" drill bit, jig saw or air saw

At the corners of the louver indentation, use a ½" Drill bit.

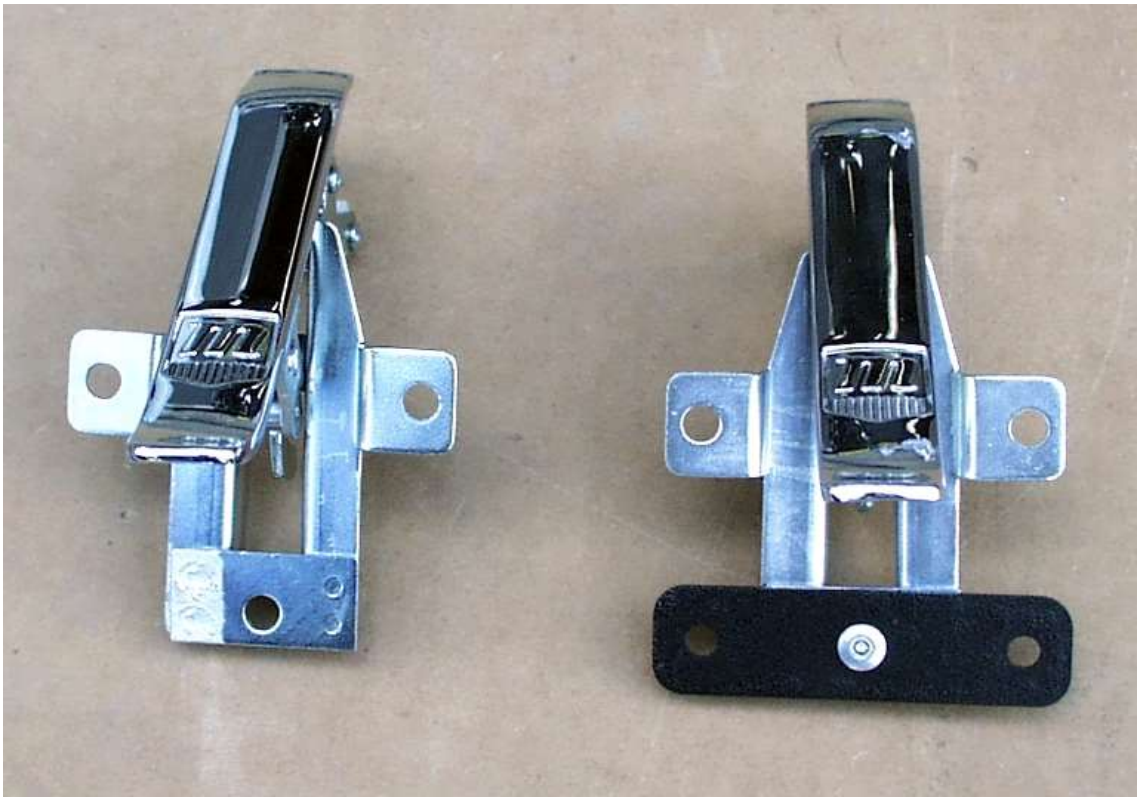
Use a jigsaw or hacksaw for the straight edges.

Hood Latch

🛠 $^{7}/_{32}$" drill bit, drill, ⅛" hex key, $^{5}/_{16}$", $^{9}/_{16}$" wrench, $^{9}/_{16}$" deep socket, jig saw, marker, chassis grease, rivet gun, masking tape.

🚘 Nose/trunk fastener assembly

Open the latches and apply a little bit of chassis grease to the sides of the latch.
Work the latches a few times to help loosen them up.

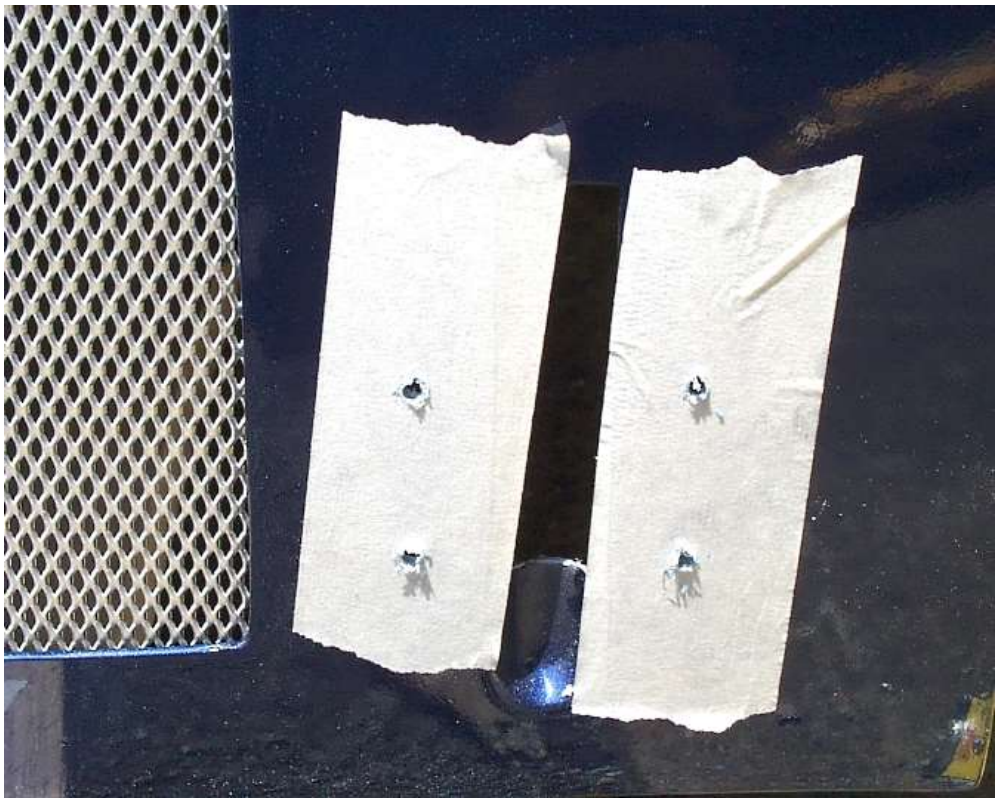


Attach the latch mount plate to the front side of the latch as shown.

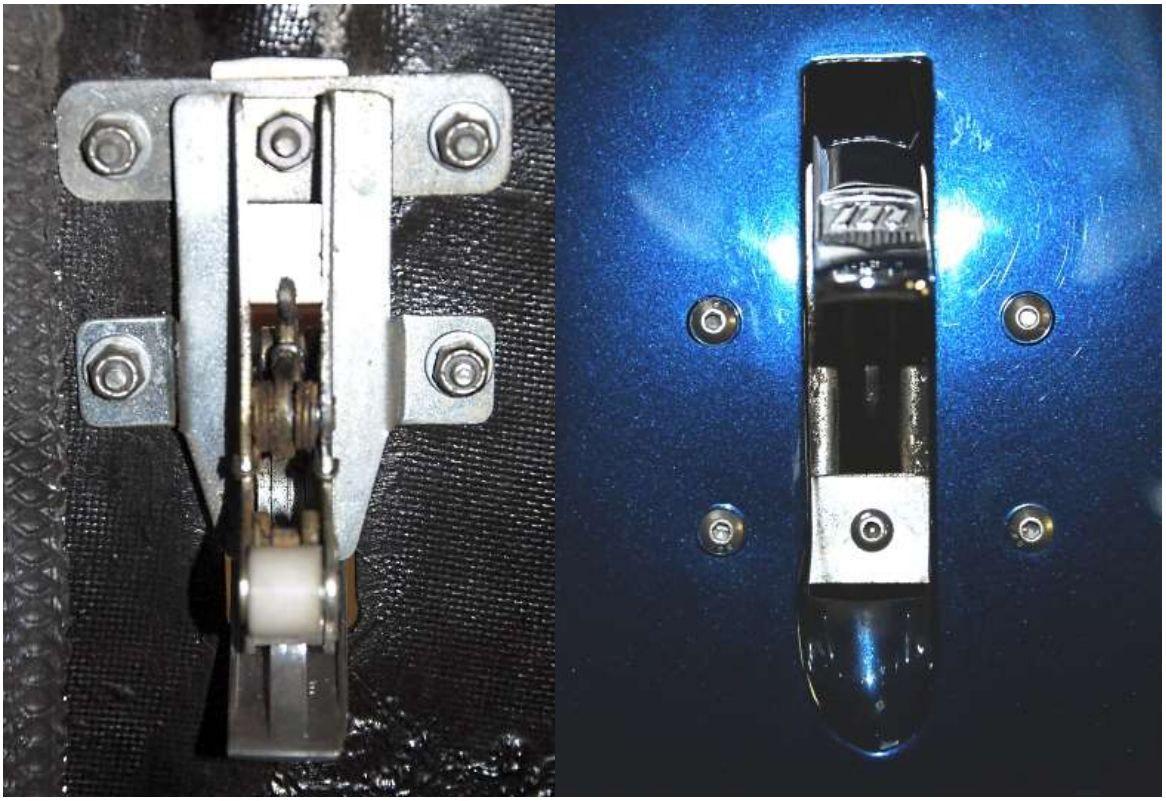
Cut the area for the latch on the nose leaving the lower finger recess for the bottom of the latch.

Tape the outside of the body around the latch area.

Position the latch from the backside of the body. Make sure the latch looks straight in the cutout and compared to the rear edge of the nose.



Drill $^{7}/_{32}$" holes for the mounting screws.



Mount the latches to the nose. Use the washers on the backside of the body.

Attach the “U” bolts to the nose latch striker mounts on the frame. Do not tighten them yet.

Nose Mounting

Base kit Fog light/Nose hinge Bracket

- 5/16" drill bit, drill, 3/16" hex key, ½" wrench, tape measure, marker.
- Nose/trunk fastener assembly, body, Mustang fog lights.
- Have some help when doing this step. The fiberglass edges can be very sharp. Wear gloves when lifting or holding the body.
- The nose mounts double as the hinges for the nose, they attach to the backside of the fog light openings and the bottom of the nose.
- The frame mounts for the nose hinges are 30 5/8" apart center to center. This is how far apart on center the hinge mounts on the nose will need to be.

Using the lower radiator opening for reference, find the centerline of the nose and mark it on bottom on the inside.

Measure from this centerline 15 5/16" to determine the center mounting location for the hinge brackets.

The hinge brackets mount with the flat round face up against the fog light recess and the "T" shaped surface along the bottom of the nose. Bend the flats of the bracket so that they conform to the body.

Angle the fog light so that the stud mount points straight back.

Put a dab of silicone on the end of the fog light bolt.

Hold the fog light in the opening so that it is centered and the lines in the glass are vertical.

Push the light in so that the mount bolt touches the back of the light bucket and leaves a mark.

Drill the mark in the fog light bucket and one other hole in the nose for an additional mount bolt.

Line the hinge plates up against the openings with the angled supports as vertical as possible. These need to be as vertical as possible to prevent binding in the hinge.

Mark the brackets through the mount holes.

Remove and drill the hinge brackets.

Bolt the hinge brackets in position.

Use a couple of the #6 screws in the legs of the "T" to hold the bottom of the nose for positioning. Do not rivet these until after the nose has been painted.

Trim the stud on the fog lights to allow full adjustment of the hinges.

Complete kit Fog light/Nose hinge Bracket

Hinge Bracket

Using the lower radiator opening for reference, find the centerline of the nose and mark it on bottom on the inside.

Measure from this centerline 15 $^{5}/_{16}$" to determine the center mounting location for the hinge brackets.

The hinge brackets mount with the flat round face up against the fog light recess and the "T" shaped surface along the bottom of the nose. Bend the flats of the bracket so that they conform to the body.

Line the hinge plates up against the openings with the angled supports as vertical as possible. These need to be as vertical as possible to prevent binding in the hinge.

Mark the brackets through the mount holes.

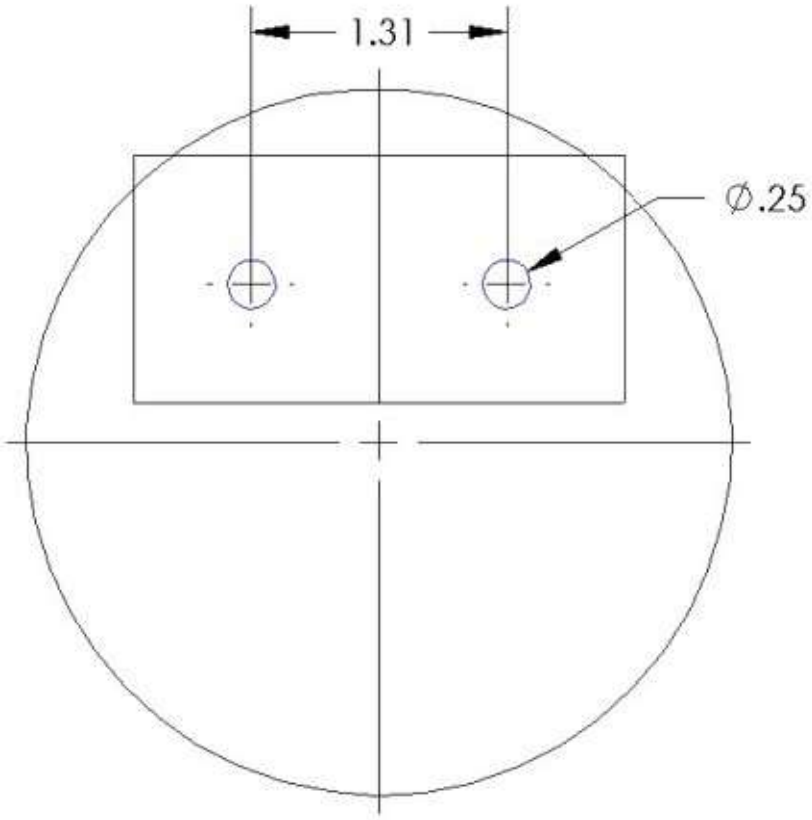
Remove and drill the hinge brackets.

Bolt the hinge brackets in position.

Use a couple of the #6 screws in the legs of the "T" to hold the bottom of the nose for positioning. Do not rivet these until after the nose has been painted.

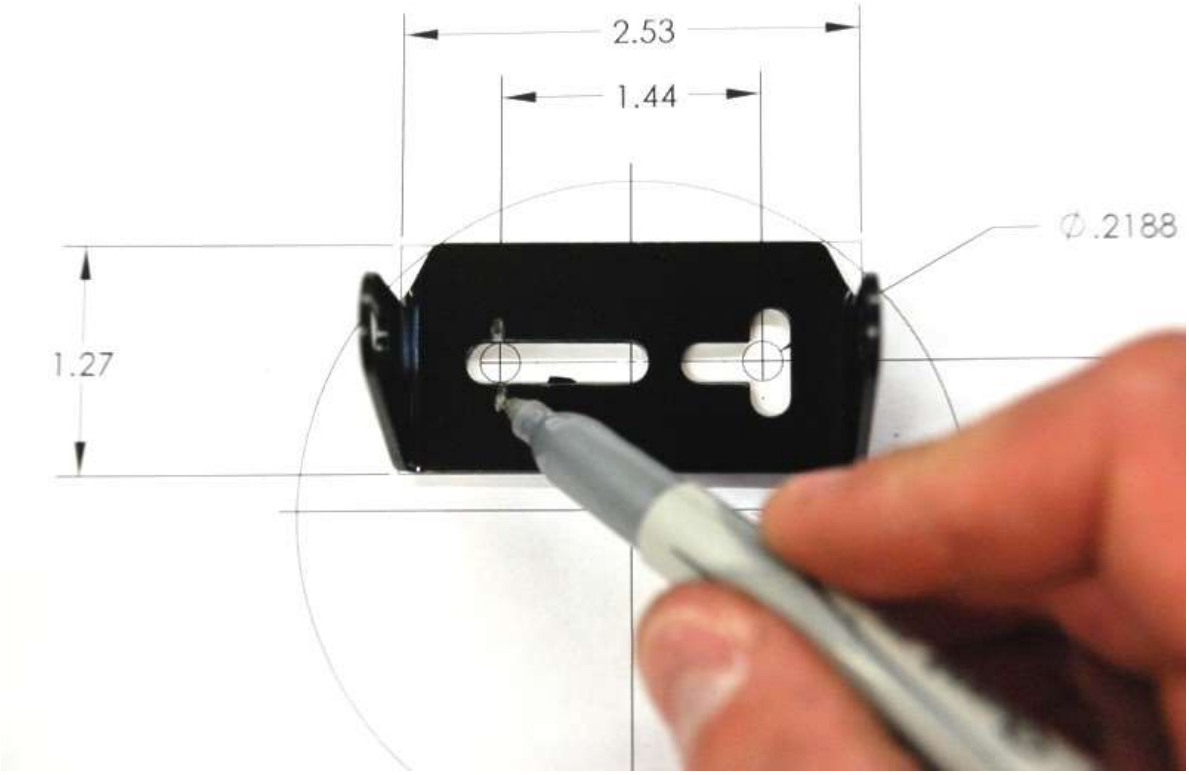
Trim the stud on the fog lights to allow full adjustment of the hinges.

Fog Lights

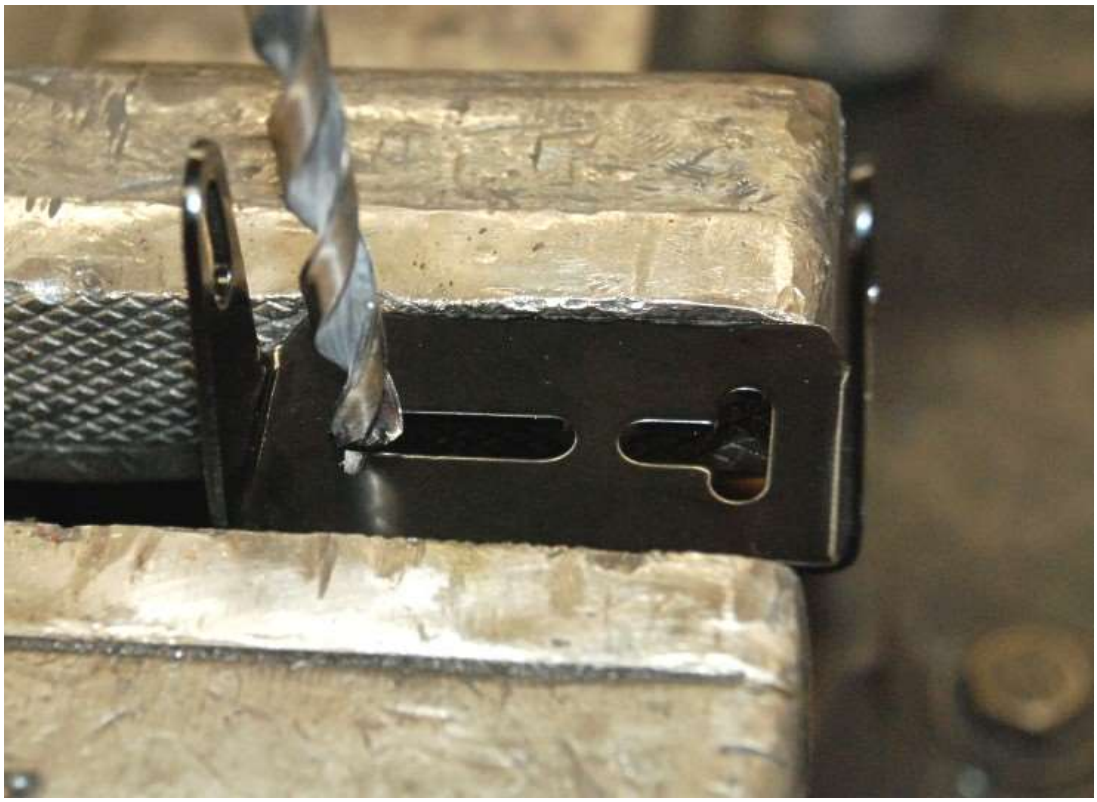


Make two copies of the this template to fit the fog lights to the nose and tape them in the light openings.

Test fit the light in the opening aligning the holes with the slots on the light mount bracket.
Remove the lights from the nose and remove the brackets from the lights.



Set the bracket on the template so the holes line up with the slot then mark the slot with the location of the hole.



With the bracket in a vise, drill the location marked and the center of the sideways “T” for rivnuts. Start with a small hole and work your way up in size to the $^{25}/_{64}$” needed.

Use a rivnut tool to install ¼”-20 rivnuts in each bracket with the bracket ears pointed away from the tool as shown.

Reassemble the fog lights.

On the nose, drill a ¼" hole in the center of the light template for the fog light wires to go through.

Drill the two mounting holes using a ¼" drill bit.
Remove the remains of the template and push the wires through the center hole.
Mount the fog light using ¼" flange head screws.
Connect the Fog lights to the fog light wires.

Nose and Hinge Alignment

🛠 $^{5}/_{16}$" drill bit, drill, $^{3}/_{16}$" hex key, $^{15}/_{16}$" wrench, $^{15}/_{16}$" socket, tape measure, marker, duct tape, sander, air saw or jig saw.

🚘 Nose/trunk fastener assembly, secondary body fasteners.

✋ It is smart to have some help when doing this step. The fiberglass edges can be very sharp. Wear gloves when lifting or holding the body.

✋ The hood has been trimmed slightly oversized to allow the panel gaps to be sanded down to fit.

Screw the jam nuts onto the rod ends all the way.

Screw the rod ends into the vertical frame mounts so that there is 1¼" of threads total sticking out of the frame including the jam nut. This is just a rough setting.

Back the jam nuts against the frame but do not tighten, they may need adjusting. With the latches unlatched, position the nose on the frame so that the rod ends are in between the nose hinge mount brackets on the nose.

Use jack stands in the front and duct tape on the back to keep the nose in place.

Raise or lower the front of the nose so that the bottom edge of the hood is parallel with the bottom edge of the body above the exhaust area.

Align the rear of the wheel well of the nose with the front of the body.

Move the nose around so there is a small gap (i.e. ⅛") along the backside of the nose against the rear body clip and along the bottom edge of the nose. Use wood or washers in the gap to keep it consistent.

✋ The hood has been trimmed slightly oversized to allow the panel gaps to be sanded down to fit.

Trim the rear edge of the nose with a sander or saw so that the gap is consistent.

Either through the nose or from under the car, look at the alignment of the rod ends and the location of the rod ends (left to right) in the brackets.

Screw the rod ends in/out as necessary to align the hole with the slots. The nose gaps may also have to be adjusted.

Once the alignment has been made, use the included spacers and shims on either side of the rod ends.

Insert the bolts through the bracket, spacers and rod end

Tighten the bolts and jam nuts.

At the back of the nose engage the latches around the "U" bolts and tighten the bolts so that the hood stays in position.

Remove the duct tape and jack stands looking for movement in the nose. Some readjustment may be necessary.

With someone on the other side of the nose, unlatch the nose and slowly raise it. You may have to pull out slightly on the latches so the bottom edge of the nose clears the "U" bolts. You can trim the nose if you like so that this is not necessary.

The bumpers or stick on weatherstrip can be used to get the nose to the correct plane with the body, you can shave small amounts off the bumpers to fine tune as needed.

Put the small bumpers around the edge of the nose opening and try closing the hood. If it is too low try the large bumpers.

Use ⅛" long rivets to attach the bumpers through the body and into the frame.

Hood Struts

$^{7}/_{32}$" drill bit, drill, ⅛" hex key, $^{5}/_{16}$" wrench, marker, measuring tape, ratchet strap.

Nose/trunk fastener assembly.

With the frame at 4” ride height in the front and the help of a friend, open the nose until the Fog light area of the nose is parallel with the ground. Use a ratchet strap or some rope to hold the nose in this position until the struts are in place.

The taller strut bracket for the nose should be positioned with the bracket starting 7⅛” from the top of the nose support rib. The bracket should be on the outside of the rib with the strut ball pointing in. The stud should be $^{7}/_{16}$” from the side of the rib to allow clearance for the strut. Mark the locations of the mounting holes.

Use a $^{7}/_{32}$” drill bit for the mounting screws.

Attach the strut brackets to the nose support. Tighten the locknuts but do not crush the support.

Attach the shaft end of the strut to the nose-mounted bracket.

Attach the frame mounted bracket to the body end of the strut.

Hold the strut against the frame so the ball faces out. Mark the mounting holes on the frame.

Use a $^{7}/_{32}$” Drill bit for the mounting screws.

Attach the strut brackets to the frame.

Nose Side Locator Brackets

🛠 Drill, ⅛", ⅜" drill bit, 1.25" hole saw, rivet gun, silicone, $^{5}/_{16}$" hex key, $^{9}/_{16}$" wrench.
🚗 Nose locator bracket assembly, secondary body fastener assembly

Hold the outside of the nose behind the wheel opening so that it is flush with the lower part of the body.
Clamp or hold the nose so that it will not move while drilling the locator hole.
Position the locator bracket on the backside of the nose so that it is aligned with the side of the nose.
Use a marker and mark all rivet holes and the large center hole.
Remove the locator bracket.
Drill a $^{1}/_{8}$" hole through the center hole mark through both the nose and the lower body section.
Open the hose and drill the remaining rivet hole marks through the nose.
Enlarge center $^{1}/_{8}$" hole with a 1.25" hole saw.
Drill the rivet location marks with a ⅛" drill bit.
Enlarge the hole drilled in the body section using the ⅜" drill bit.

Silicone and rivet the Locator bracket to the backside of the nose.

Place a washer on the $^{3}/_{8}$" locator bolt and pass it up from the underside of the body.

Place another washer on the topside of the body followed by the acorn nut.

Close the nose to test the locating pin height. Add or remove washers as needed to locate the side of the body correctly.

Scoops

🛠 Sandpaper, ⅛" drill bit, drill, marker

🚘 Coupe scoops

✋ The original Coupe had three scoops, two small ones mounted on the body and one larger one mounted on the nose.

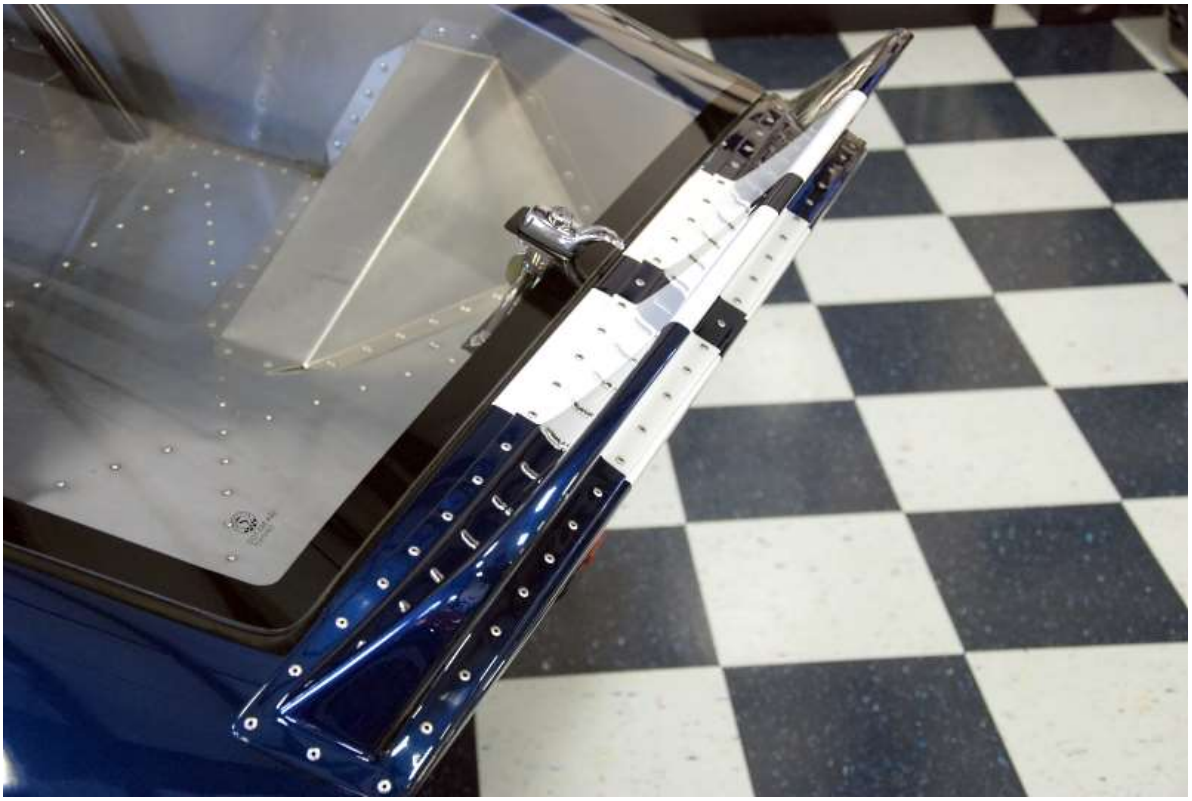

Vehicle ID

Hold the scoops up to the body in the locations desired and sand or cut the outside of them as needed to fit in the location. Make sure to keep about ½" of flange for the ⅛" rivets that will hold them on.
Mark the rivet locations on the scoop flanges.
Drill through both the scoops and the body/nose.

Rear Spoiler

🛠 Sandpaper, ⅛" drill bit, drill, marker.
🚗 Coupe rear spoiler.
✋ On the original car, this was a riveted on part but some customers have had their body shops fiberglass the spoiler into the body.

Hold the rear spoiler up to the body. Sand or cut the flange to fit or as desired.
Mark the location of the rivets.



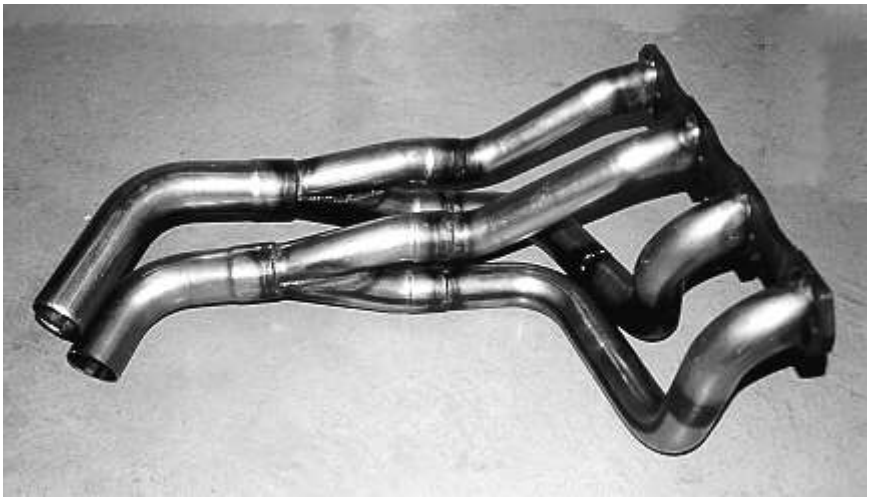
Drill the spoiler and body for the rivets.

Exhaust

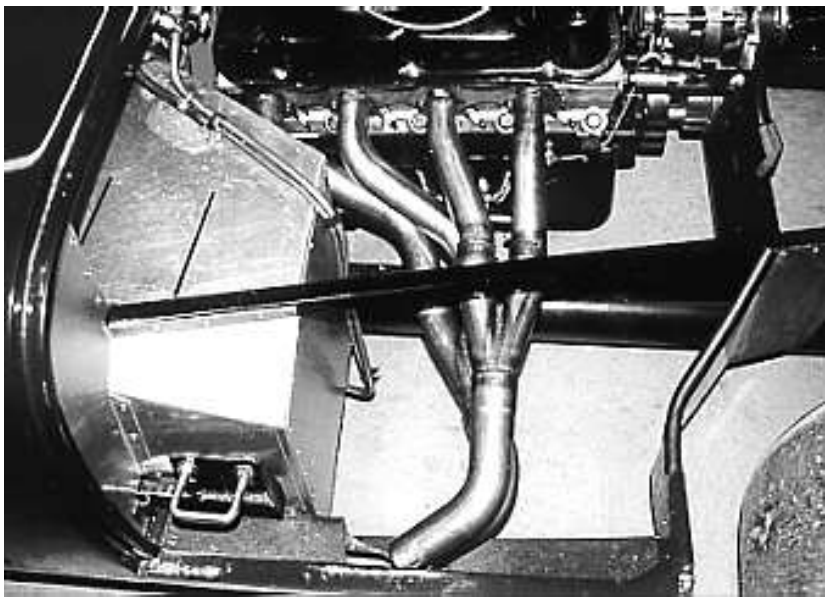
- 🛠 ½” sockets, ½” wrench, jack stands, jack, ¼”, $^{5}/_{16}$” hex key.
- Headers, side exhaust, Loctite.
- Try not to drop the side exhaust assembly as it will probably land on the outer curved surface and dent (if it sounds like this has happened to us, it has).
- The side-pipes are positioned with the rear mount on the bottom of the pipe facing the body.

Headers

Mount the headers to the engine and fully tighten. The driver side is easiest to install from above the body but underneath the 1”x 1” tube. It will also fit from the bottom if the car is raised.



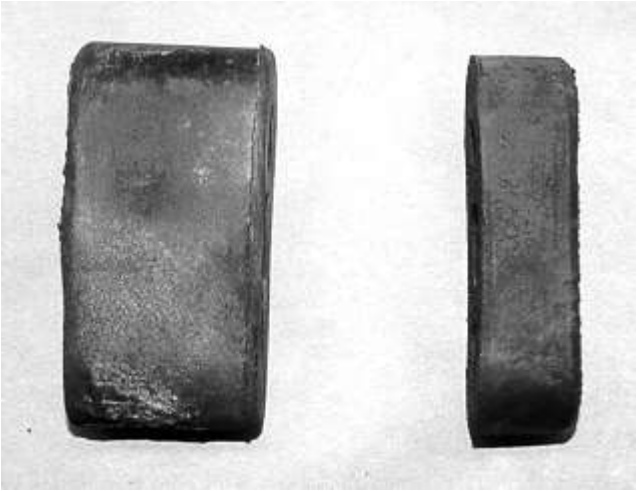
Driver side header



Passenger side header mounted.

Slide the band clamps for the side pipes onto the headers. The small diameter goes first.

Side Exhaust



Cut the large exhaust hanger in half lengthwise.

Attach one half of the rubber exhaust mount to the side pipe mount using a $^{5}/_{16}$"x 1.5" button head screw, washer and locknut. Place a washer next to the locknut so that it will not pull through the rubber.

Slide the side pipes into position over the header tubes. Align the pipes with the body.

Tighten the clamps. It helps to hold the rear of the tubes slightly upward. Torque the clamps to 75 ft/lbs.

Locate and mark the side exhaust mount on the inside of the outer 2"x 2" frame rail using the rubber mount as a guide.

Drill the four mount locations using a $^{3}/_{16}$" drill bit.

Mount the side Exhaust mount to the frame using four $^{3}/_{16}$" long rivets.

Bolt through the top hole of the rubber and the frame bracket using a $^{5}/_{16}$"x 1.5" button head screw.

Line the bottom hole up with the slot on the side exhaust and tighten the bolt.

White painted side exhaust mounted. Note the sand blasting from the front wheels on the paint.. We suggest ceramic coating as it holds up better to this abuse.

Windshield area

- Drill, 3/16" drill bit, ⅜" wrench, ⅛" hex key
- Windshield assembly, secondary body fasteners assembly, masking tape.
- Handle the windshield with care and store in a safe place.
- This is a test fit only.
- Once the windshield is installed, the screws around the windshield are not accessible making the removal of the rear part of the body impossible without the removal of the windshield.
- For the final assembly after paint, a foam dam tape is used around the windshield flange on the body. This is usually about ⅜" tall. The windshield will sit on or slightly above this in the windshield urethane glue so that it is flush with the body.

Use the large rubber bumpers from the secondary body fasteners assembly and masking tape around the windshield opening

Set the windshield in place.

Add or change the bumpers so that the windshield is flush with the body. There should be about ⅛" gap all the way around the windshield. This can be adjusted in the next step.

On the inside of the body at the center of the car, there is a body mount in the middle at the top and bottom of the windshield. Use the windshield mount spacers in these areas between the frame and the body. Add or subtract the number of spacers as needed

- Before trimming the spacers if they do not fit, check the gap around the windshield. By pulling or pushing on the windshield flange, the gap can be changed.

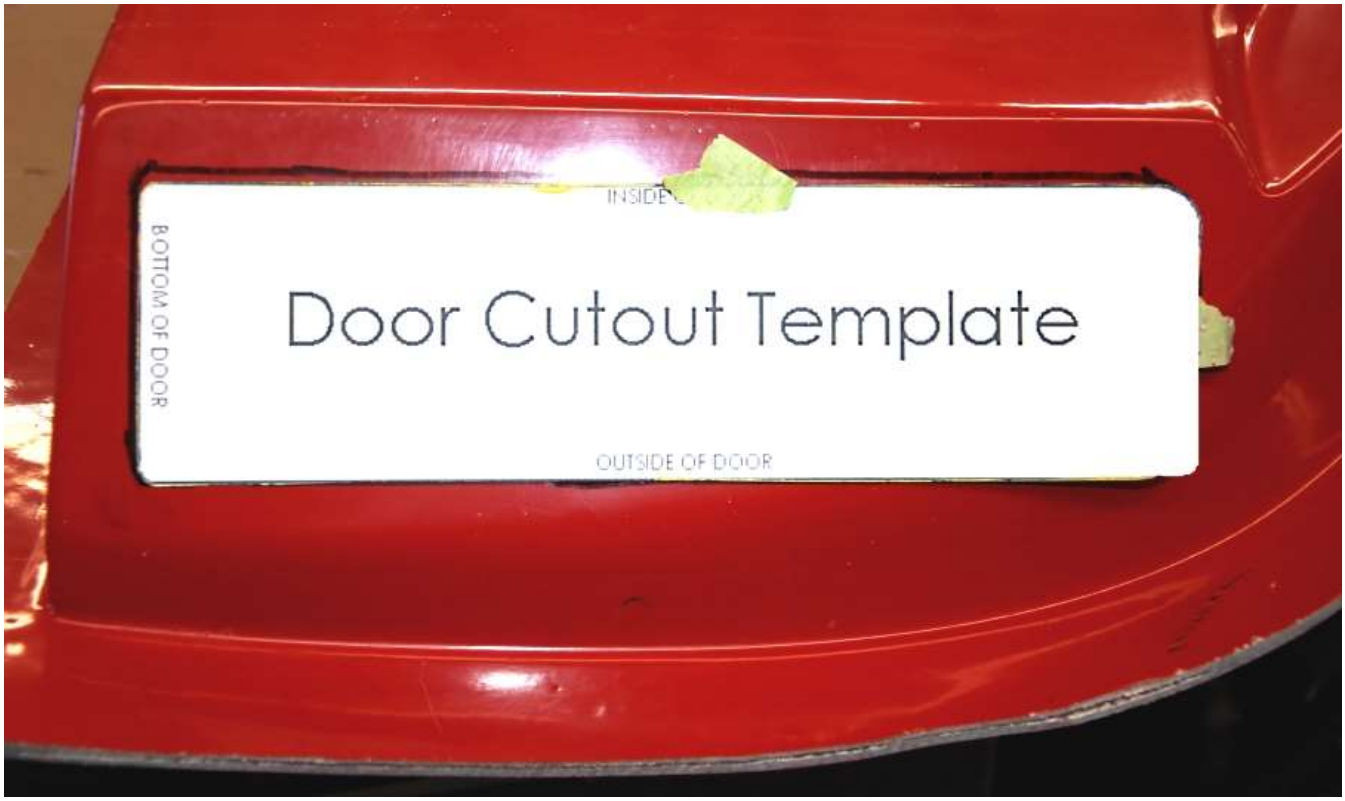
Once the spacer heights are correct, remove the windshield.
Use the $^{3}/_{16}$" bit and drill through the windshield body flange and frame mount flanges.
Attach the spacers using the #10 screws and locknuts from the secondary body fasteners.
Set the windshield in place again and double check the gap.

Doors

🛠 ½" deep socket, (2) $^{9}/_{16}$" wrenches, $^{3}/_{16}$", $^{5}/_{16}$" hex key, drill,⅛", $^{5}/_{16}$" drill bits, 1¼" holesaw, Phillips head screwdriver, Loctite, marker, jig saw, vise-grip clamps, masking tape.

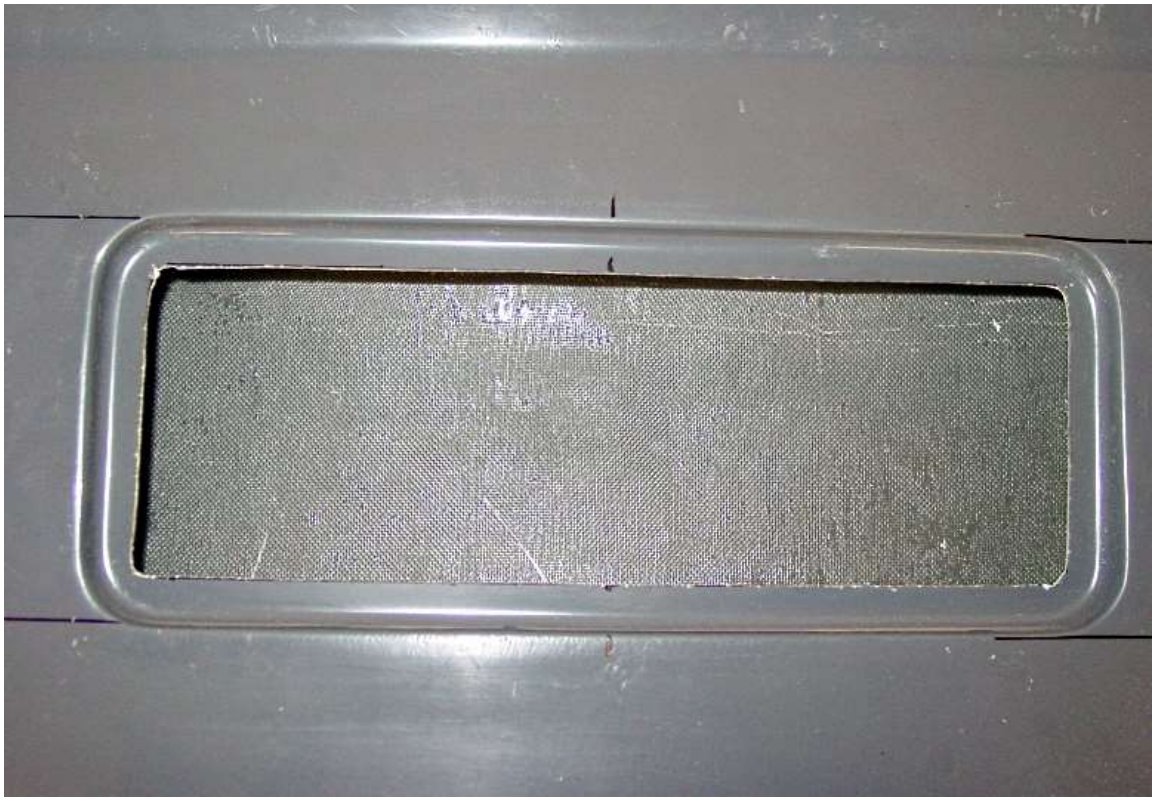
🚘 Door frame assembly, door latch/hinges assembly, body assembly.

✋ Take your time to align the doors properly. There is plenty of built-in adjustability.



Use the diagram in the appendix and a marker to mark the front of the doors.

Using a jig saw or other reciprocating saw cut out the area traced.
Draw a line ⅝" from the edge of the recessed area on the inside of each door.
Drill a ⅜" hole in one corner and use this as a starting point to begin cutting.



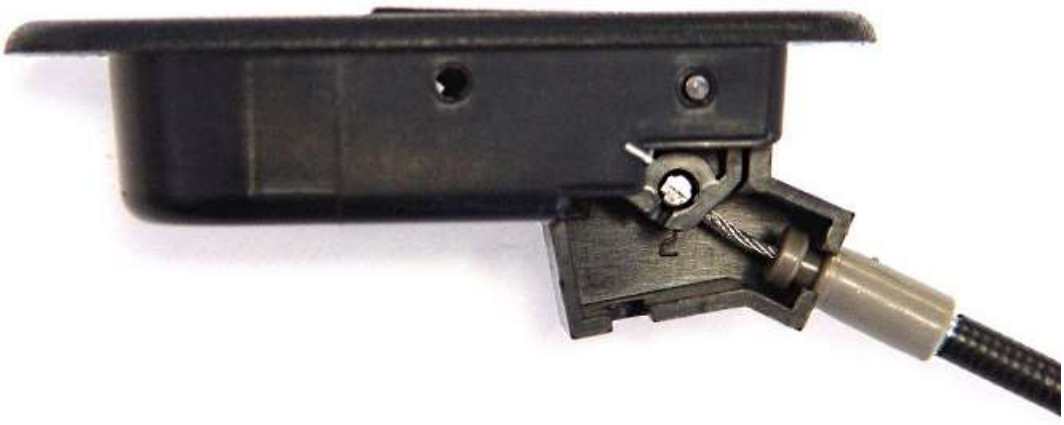
Cut and remove the inside face of the recessed area.

Attach the latch to the door frame using the 3 Phillips head screws.

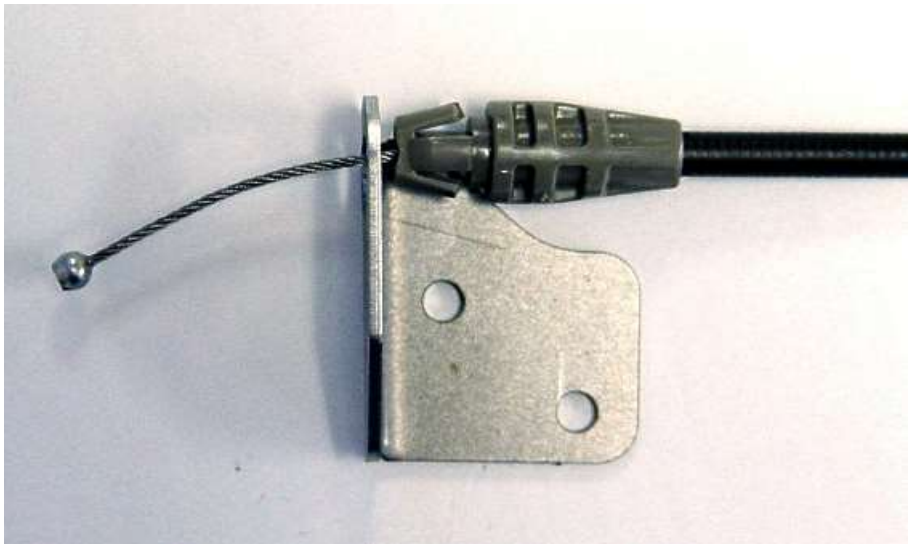
Door handle

🛠 Drill, $^{3}/_{32}$", $^{3}/_{16}$" drill bits, drill, rivet tool, air saw or jig saw, Philips screwdriver, marker, scissors.

🚘 Interior door handle components, secondary body fasteners.



Attach the cylinder end of the door handle cable to the door handle by inserting it into the slot and pushing the cable sleeve into the recess area.



Push the other end of the cable into the cable mount tab.

Place the clevis on the end of the cable and attach it to the door latch using the black button head screw. Tighten the screw enough so that the clevis is not sloppy but so that it can rotate on the latch.

Locate the mount tab on the door frame so that the cable has no slack in it and so it will not get in the way of the door skin.

Mark the location of the mount on the door frame.

Drill and mount the tabs using the $^{3}/_{16}$" rivets included.

Install the driver side door frame into the driver door through the hole in the front. To get it in you will have to start inserting it at an angle and once its part way in straighten it out and push it the rest of the way in.

Push the frame all the way in until it touches the back of the door. Clamp the frame to the door with two or three small clamps.

✋ Make sure the inside surface of the frame is resting on the top edge of the recessed area of the door.

Using a straight edge draw a line along the top and bottom edges of the recessed area. Draw a line parallel to this line ⅝" above the top line and ¾" below the bottom line.

Mark the door for drilling using the diagram for locations.

Drill through the door and frame with a $^{3}/_{16}$" bit then open it up to $^{5}/_{16}$".

Bolt the frame to the door using the stainless steel button head bolts and nuts. Do not torque the stainless bolts, snug is good.

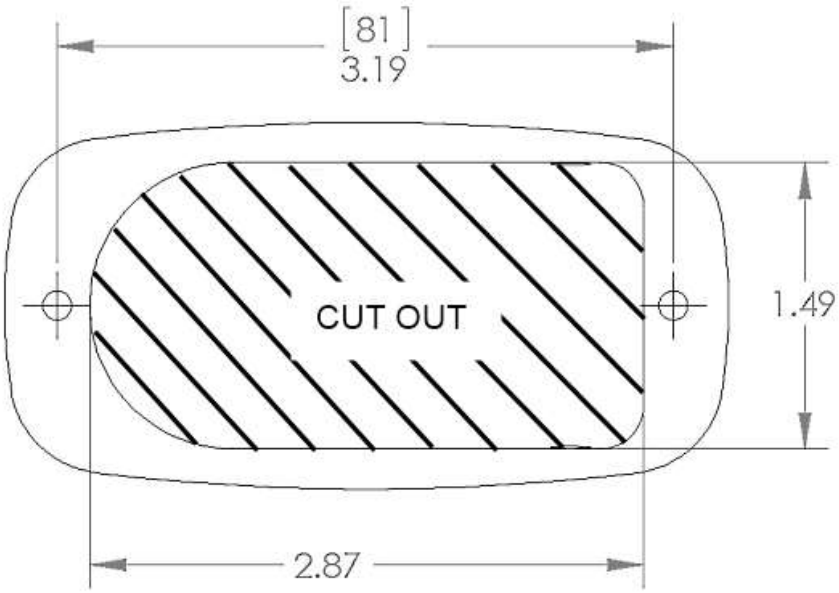
Remove the clamps.

Move the door handle around inside the door and find an approximate location that you would like to mount the handle. Make sure that the cable will be able to reach.

Do not go forward of the cut out in the door as this will hit the window frame.

Mark the location on the door.

Remove the handle from the cable by pulling the sleeve out of the recess and then removing the cable from the handle.



Use the template above to mark the inside area to cut and to drill the $^{3}/_{32}$" mounting screw holes. Use a ruler to check the scale before using.

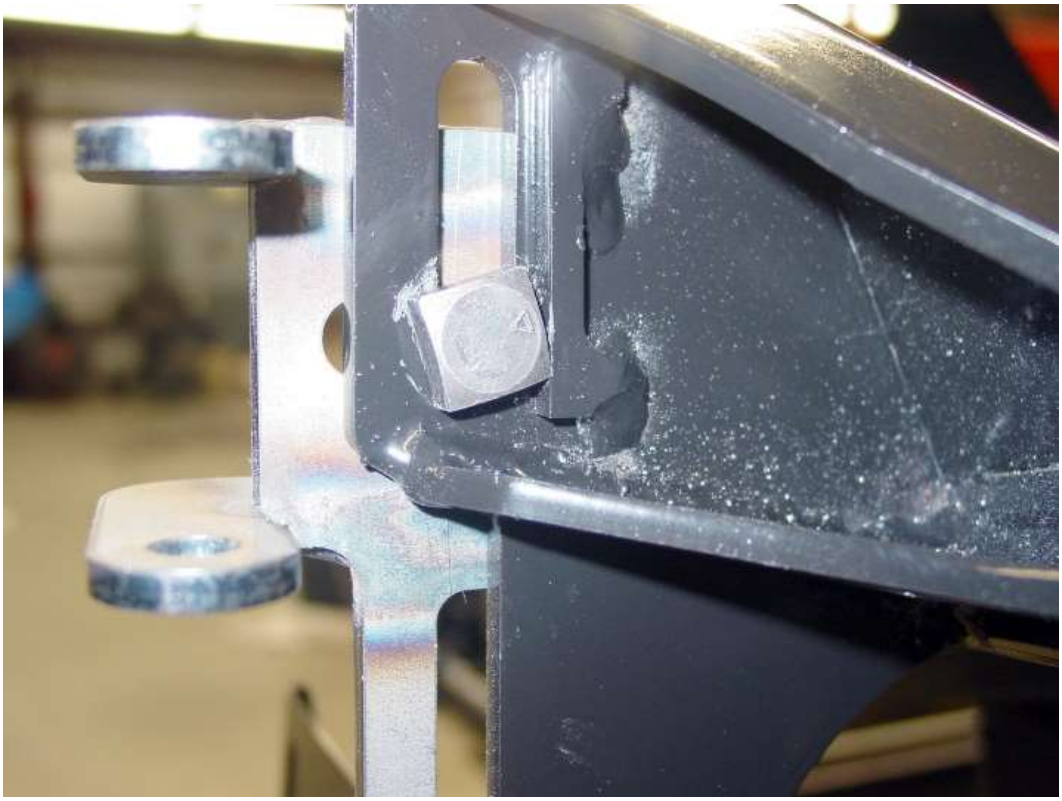
Through the hole, insert the cable barrel fitting into its hole and slide cable sheath end in into the angled slot.

Mount the handle using the #8 sheet metal screws.

Door hinge

Using the door hinge diagram in the appendix, mark the cut out locations on the body as shown.

Drill a ⅜" hole in each of the cut out locations and cut out with a jig saw.



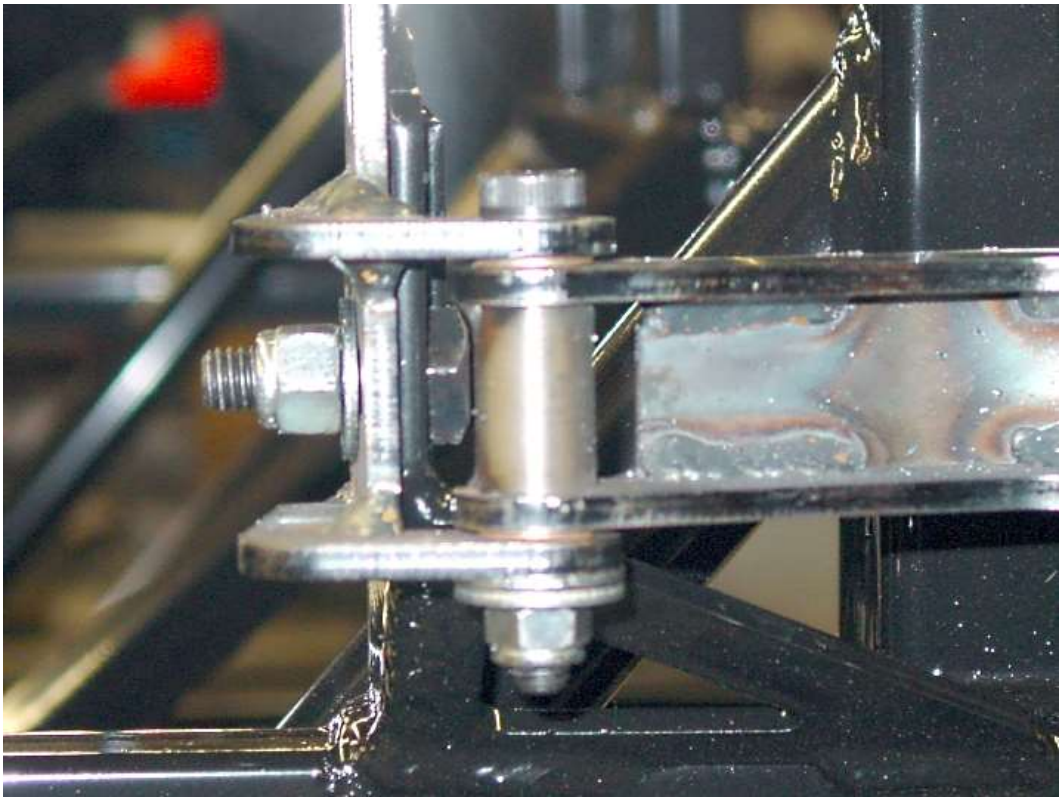
Install the adjuster plates to the frame using the ⅜” square head bolts with nuts and washers but do not tighten yet.

Press the bronze bushings into the ½” holes in the hinge arms.

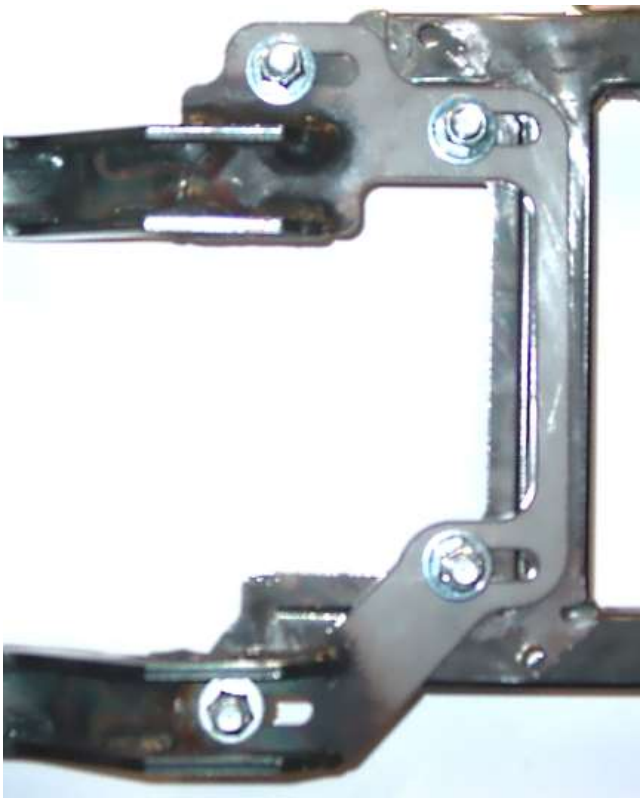
Attach the hinge arm assembly to the adjuster plate using the 2" shoulder bolts, washers and $^{5}/_{16}$" nuts. It makes installing the shoulder bolts a bit easier if you grind an angle on the end of the shoulder instead of having it square.

Tighten the nuts down until the arm is hard to move and then loosen slightly.

If you tighten the nut tight and you can still rotate the hinge easily then the washer is caught on the shoulder. Loosen slightly, adjust the washer and retighten.



Hinge arm mounted to adjuster plate. (NOTE: this photo was taken before the door was mounted to the frame to clearly illustrate the frame mounting procedure)



Attach the doors to the hinge arms using ⅜" lock nuts and washers.

Align the door in the opening with $^{3}/_{16}$" spacers under it. Tighten the nuts in the door, check the alignment, then tighten the nuts holding the adjuster plate.

Check door gaps and movement, adjust if necessary.

Striker Mounting

From inside the rear wheel well use an ⅛" drill bit through the center of the door latch striker mount to drill through the body.

Use the 1¼" hole saw to drill from the front side of the body through the hole just drilled.

Hold the door in the door opening.
Remove material from the doors if necessary to allow a good fit in the door opening. Allow an ⅛"-$^{3}/_{16}$" gap around the door.
Use a marker through the door latch striker hole to mark the location of the striker on the door.
Remove the door.

Using the aluminum rear cover as a template, center the door latch striker mark on the door in the rounded end of the latch mount and mark the door with the shape on the template.

Use a jig saw to cut out the area marked on the door.

Attach the latch striker to the mount plate on the frame using two ⅜" washers next to the striker flange to space it out and one washer next to the locknut.

Firewall Extension Aluminum

🛠 Marker, drill, ¼" hex drive bit, tin snips
🚗 Self-tapping sheet metal screws, Engine bay packaged aluminum.

Insert the aluminum pieces outside first into the area between the body and the foot boxes in the engine bay and hold in place.

Trim the outside if necessary, there should be about ⅜" between the aluminum and the body for the press on weatherstrip.

Remove the pieces once fitted.

Right side

Left side

Side Windows

🛠 $^{7}/_{32}$" drill bit, drill, ⅛" hex key, $^{5}/_{16}$" wrench, marker, hacksaw blade, Phillips head screwdriver.

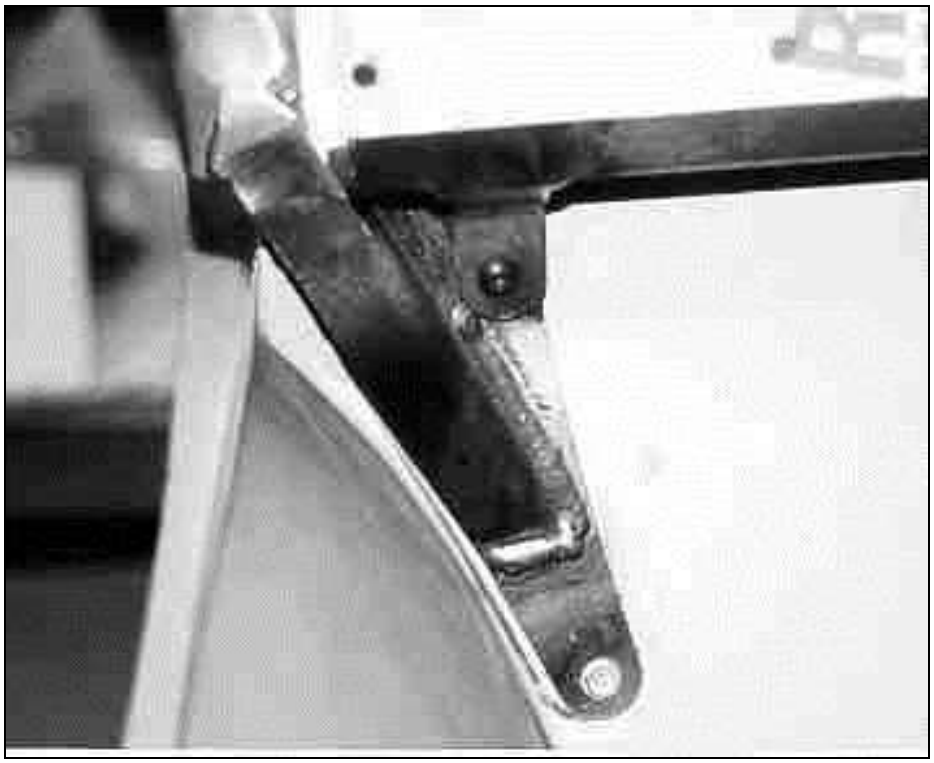
🚘 Side window assembly, secondary body fasteners assembly.

✋ The driver is different than the passenger side window, the driver side is $^{7}/_{16}$" shorter along the bottom edge than the passenger side. Test fit the side windows with the protective covering on to prevent scratching the plastic.

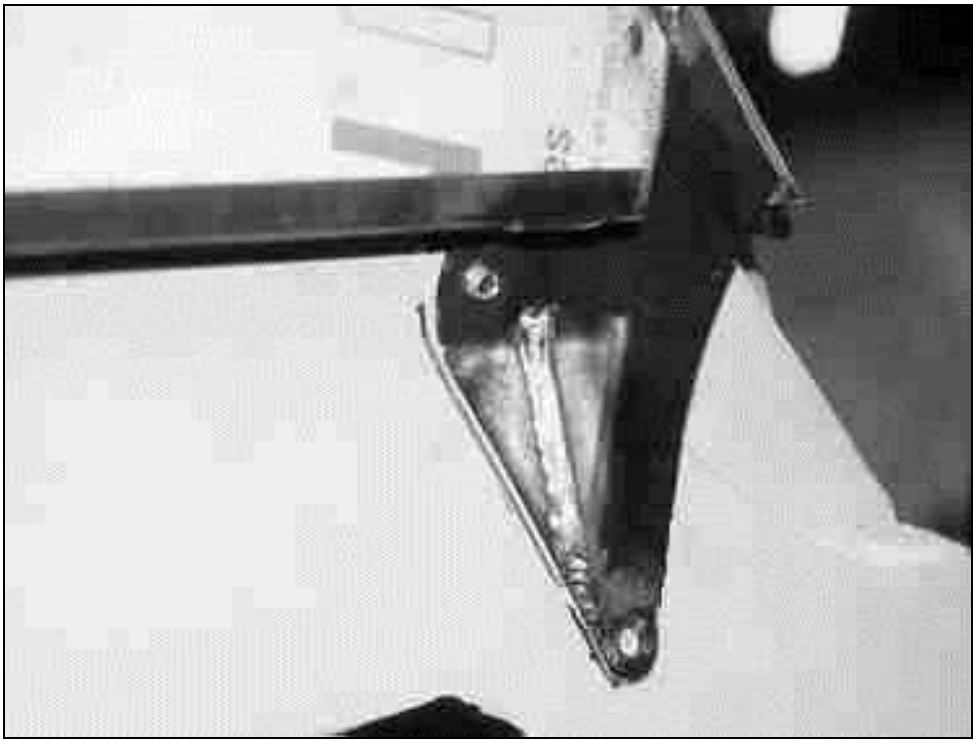
The flange around the door should measure ⅝" high. If necessary, trim the flange down to this height. This will allow a tighter seal for the weather strip.

With the help of another person, hold the window frame along with the bottom channel section up to the opening with the doors on and closed. The lower channel fits inside the outer frame so that the mounting holes line up.

Move the side window frame so that the distance to the body at the top back, top front, front top and front bottom is the same $^{3}/_{16}$". The channel can flex a little to accommodate this. Make sure though that the lower channel holes line up or the #10 screws can go through the mounting holes.

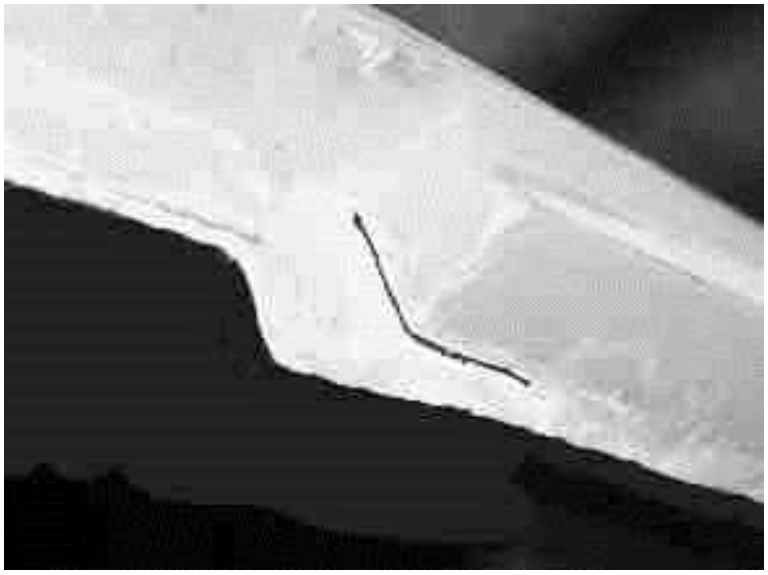


Mark the mounting holes for the window frame. Rear window frame mount shown.

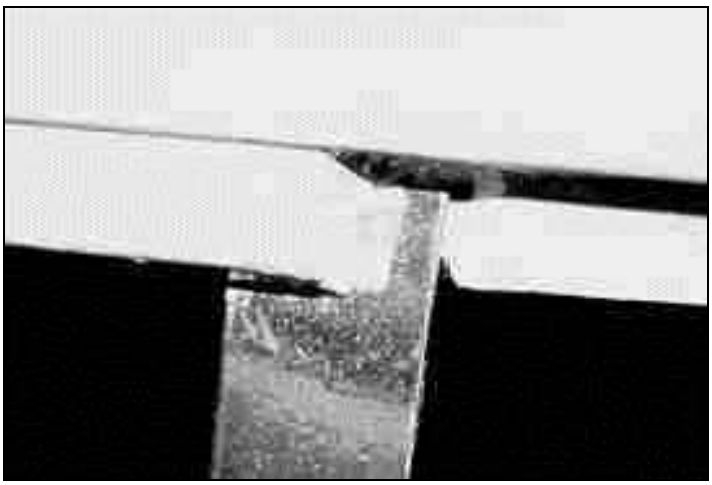


Front window frame mount.

Remove the window and drill the mounting holes with a $^{7}/_{32}$" drill bit.

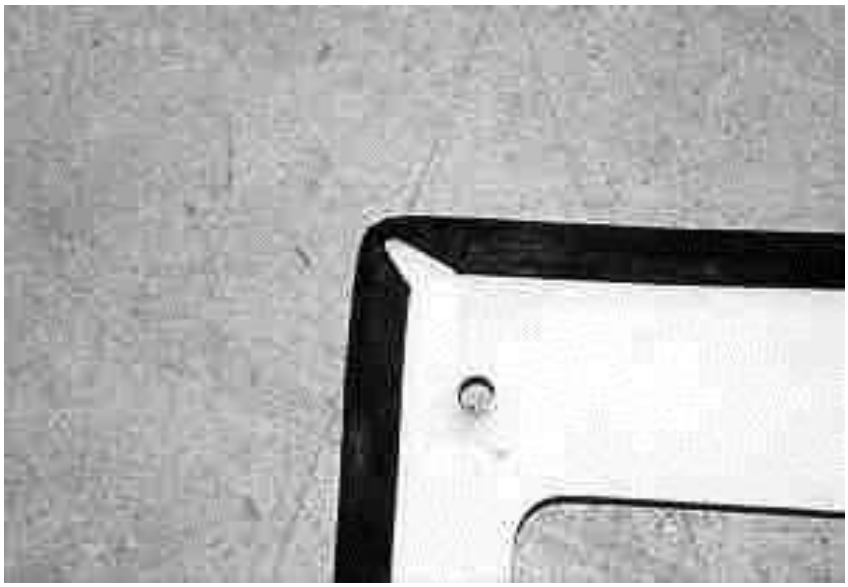


Cut a slot in the recess at the top rear of the door for the rear weather strip mount (looks like a number "1") using a hack saw blade.



Trial fit the weather strip mount. Use one of the #6 self-tapping screws from the aluminum to hold the mount in place on the bottom.

Push the rubber on side weather stripping onto the flange going around the door opening.
The window tracks mount on the outside of the window.



Push the "U" window weather stripping onto each of the side windows. The weather stripping may have to have a "V" cut with a pair of wire cutters out of the inside of the weather stripping in order to sit properly in the corners.

Insert the window into the window steel and assemble on the door using the screws provided. Use washers under both the head and Nut of each bolt.
Final assemble the rear weather strip mount using the screws provided.

Rear Quarter windows

🛠 $^{5}/_{32}$" drill bit, drill, sand paper, fine blade hack saw (finer the better), masking tape, market
🚘 Quarter windows

A drill bit designed for plastic with a 60° point instead of the standard 118° or 135° point will reduce the chance of cracking during drilling. They can be found at Mcmaster.com in their specialty drill bit section.

Put masking tape on the front edge of the quarter window.
Open the door.
Hold the quarter window in position and slowly close the door until it touches the quarter window.
Mark the quarter window where the door window touches so that there is ⅛" clearance.
Remove the quarter window and mark the remainder of the quarter window. It should be wedge shaped.
Carefully cut the window.
Hold the window up and recheck the clearance.
Remove the window and evenly mark the window screw locations.
Drill the quarter windows using a $^{5}/_{32}$" drill bit.
Hold the window up and mark the body using a marker through the holes.

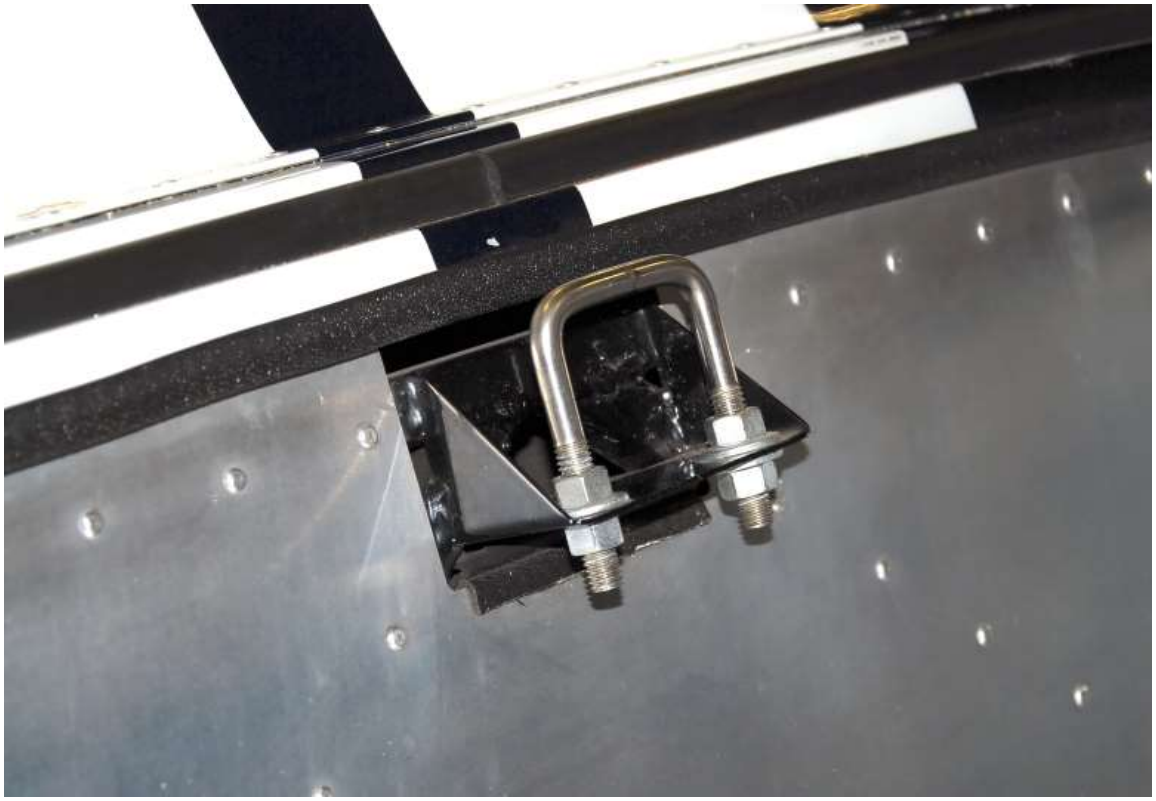
Use some of the #6 self-tapping sheet metal screws to drill/tap the body for the mounting screws, they have the same thread.

Rear Hatch

Hatch Latch striker

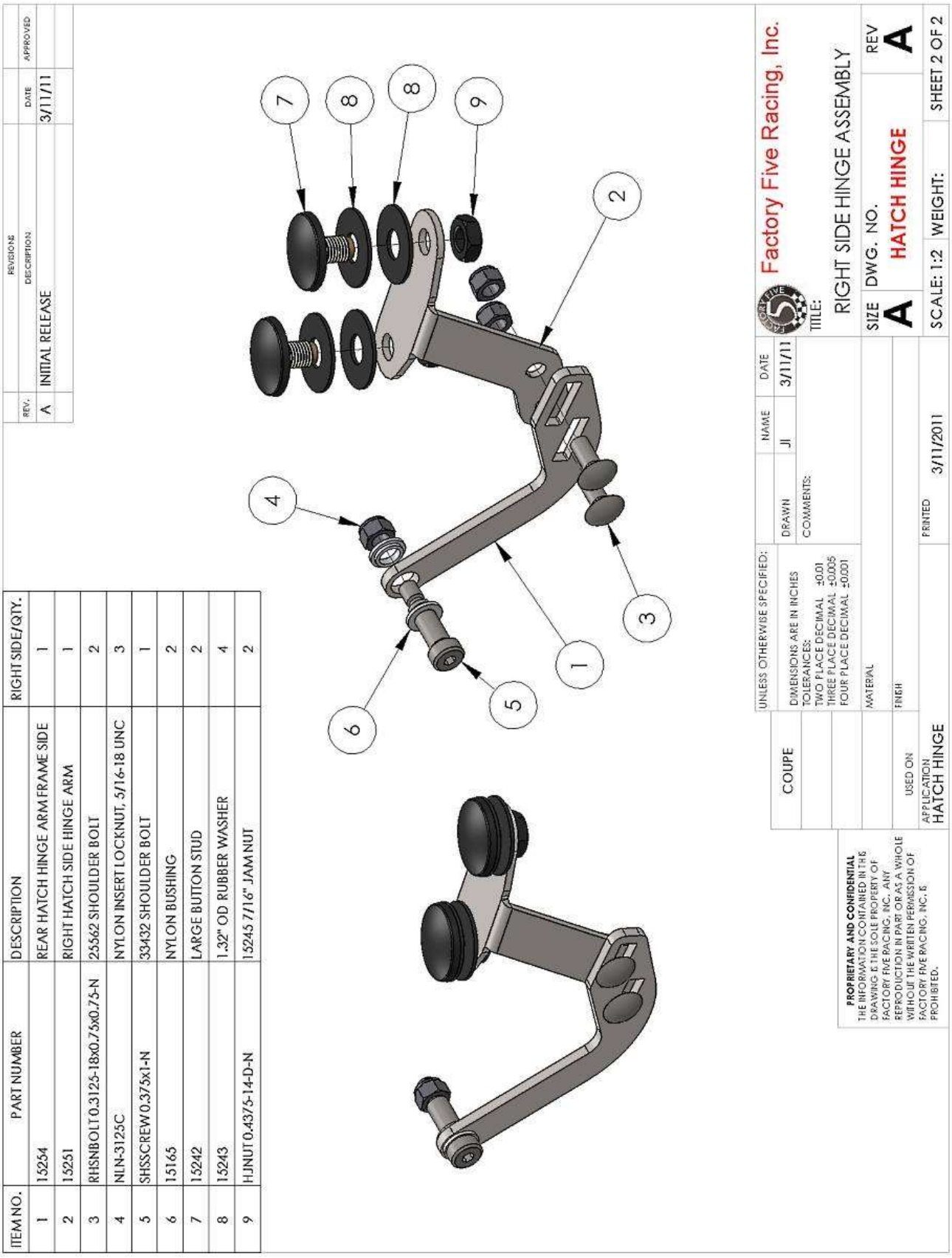
Drill, $^{3}/_{32}$" drill bit, silicone, Phillips head screwdriver, $^{5}/_{16}$" wrench, $^{5}/_{16}$" hex key, file, narrow hacksaw blade.

Rear window assembly, secondary body fastener assembly, nose/trunk fastener assembly.



Attach the Latch striker square bolt to the frame using the locknuts and washers provided. Leave it adjusted as high as possible. Do not tighten it down yet it will need some adjustment.

Hatch Hinge


REVISIONS
REV.
DESCRIPTION
DATE
APPROVED
A
INITIAL RELEASE
3/11/11
ITEM NO. | PART NUMBER | DESCRIPTION | RIGHT SIDE/QTY.
1 | 15254 | REAR HATCH HINGE ARM FRAME SIDE | 1
2 | 15251 | RIGHT HATCH SIDE HINGE ARM | 1
3 | RHSNBOLT0.3125-18x0.75x0.75-N | 25562 SHOULDER BOLT | 2
4 | NLN-3125C | NYLON INSERT LOCKNUT, 5/16-18 UNC | 3
5 | SHSSCREW0.375x1-N | 33432 SHOULDER BOLT | 1
6 | 15165 | NYLON BUSHING | 2
7 | 15242 | LARGE BUTTON STUD | 2
8 | 15243 | 1.32" OD RUBBER WASHER | 4
9 | HJNUT0.4375-14-D-N | 15245 7/16" JAM NUT | 2
1
2
3
4
5
6
7
8
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9
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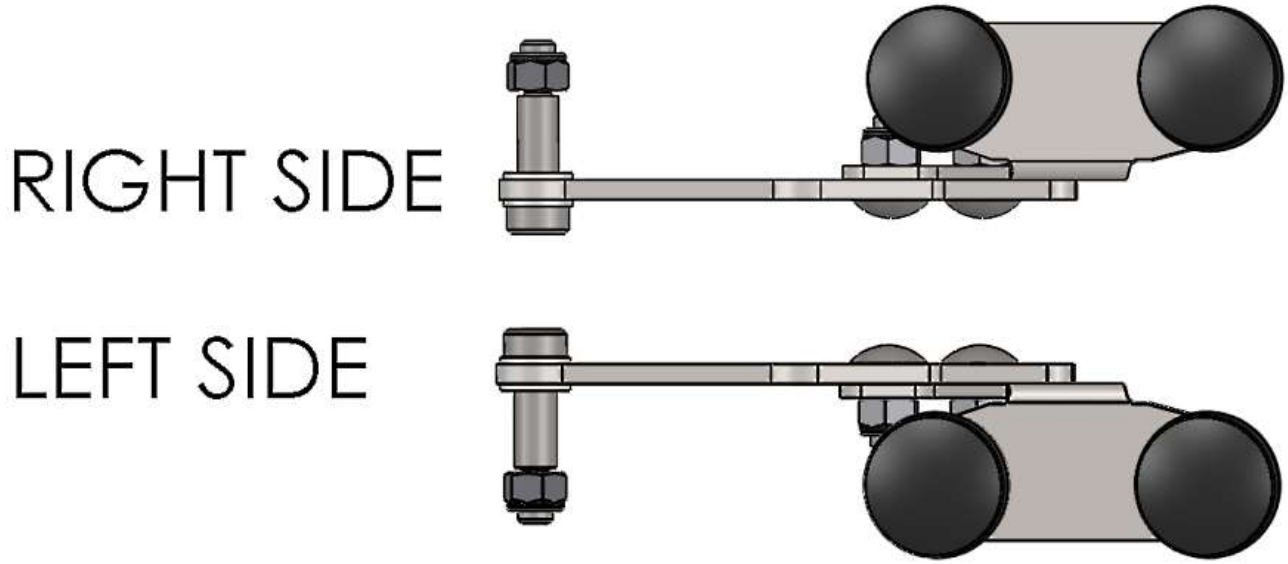
COUPE
USED ON
APPLICATION
HATCH HINGE
UNLESS OTHERWISE SPECIFIED:
DIMENSIONS ARE IN INCHES
TOLERANCES:
TWO PLACE DECIMAL ±0.01
THREE PLACE DECIMAL ±0.005
FOUR PLACE DECIMAL ±0.001
MATERIAL
FINISH
NAME
DATE
DRAWN
JI
3/11/11
COMMENTS:
PRINTED
3/11/2011
Factory Five Racing, Inc.
TITLE:
RIGHT SIDE HINGE ASSEMBLY
SIZE
A
DWG. NO.
HATCH HINGE
REV
A
SCALE: 1:2
WEIGHT:
SHEET 2 OF 2

🛠 $^{7}/_{16}$”, $^{9}/_{16}$”, $^{11}/_{16}$” wrench, ⅛”, $^{3}/_{16}$” hex key, marker, drill, $^{7}/_{32}$”, $^{7}/_{16}$” drill bit, hack saw, Philips head screwdriver, ruler, Friend

🚘 Rear glass hatch components, glass hatch.

Push the large 1.32” rubber washers onto the large button studs.
From the outside of the glass, push the Large button studs through the hinge holes in the glass hatch
Push another large 1.32” rubber washers onto the large button studs on the inside of the glass.
Put the hatch hinge arms onto the button studs so that they point forward and the arms are on the inside.



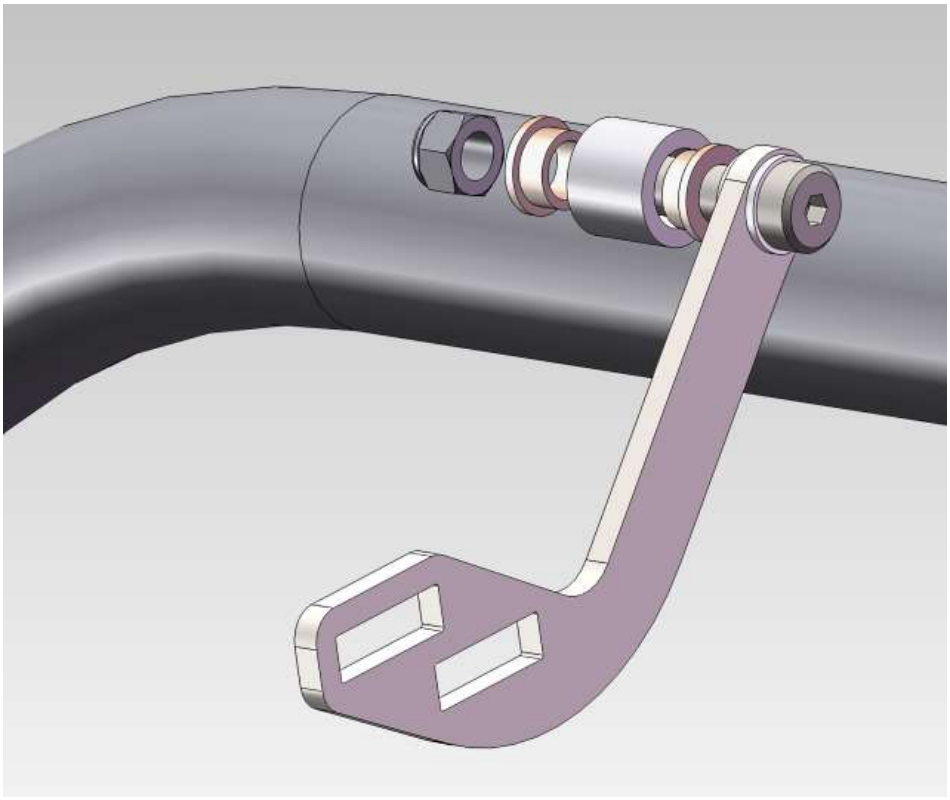
Hand tighten the jam nuts on the bottom of the studs.

Repeat for the other side.
Push the small 0.813” rubber washers on the small button studs.
Push the small button studs through the holes on the sides of the glass.

Push the medium 0.922” rubber washers onto the small button studs on the inside of the glass.
Put a washer on the small button stud.
Carefully thread on and tighten a jam nut on the bottom of the small button stud.
Thread on and tighten a ball stud on the small button stud.
Repeat for the other side.

Attach the trunk latch to the rear window using the included shield shaped flat gasket on the inside of the glass and the ⅝” long Philips head screws provided. Make sure there is a rubber gasket on each side of the glass.

Push plastic bushings into both sides of the hatch frame hinge bracket. Use a vise to push them in evenly if necessary.



Insert the bronze bushings into the frame mounts on the roll bar.

From the inside of the roll bar, attach the frame side hatch hinge arm using the shoulder bolt and $^{5}/_{16}$" lock nut.

Tighten the lock nut so that it will rotate freely but does not allow any side to side movement.

Rotate the hinge arm up so that it touches the body and mark the body where it hits.

Use a $^{7}/_{16}$" drill bit to drill a hole just below the rear hatch flange.

Cut the sides of the hole with a hack saw so the hinge arm has clearance.

Hatch Struts

The strut bracket should be positioned with the bracket starting ⅜" from the top corner of the hatch support area. The bracket should be on the inside of the hatch area with the strut ball pointing in. Make sure all of the mount holes land on the tube. Mark the locations of the mounting holes.
Use a $^{7}/_{32}$" drill bit for the mounting screws.

Attach the strut brackets to the frame. If there is a slight gap between the body and the aluminum as there was on ours, put the bracket between the body and the aluminum.

Attach the body side of the strut to the frame ball stud.

Hatch

With the help of a friend, place the glass hatch in the opening.

Locate the glass so that the gap is even all the way around the hatch opening. Use coins or washers, etc. along the bottom and sides so that the hatch is held in position.

The hatch should be flush with the body.

Rotate the frame side hinge arms up and if necessary loosen and rotate the hatch side hinge arms so that they are flat on each other or parallel.

Use the carriage bolts and locknuts to bolt the arms together from the inside out.

Carefully try opening the hatch.

Attach the rod side of the gas strut to the ball stud mounted on the hatch.

Final Prep

🛠 Sand paper

✋ All of the exterior body accessories, Windshield and side exhaust must be mounted to the car to obtain the correct body location in order to create the correct gaps and opening sizes on the car before it is painted.

One of the most important details in the bodywork is the finish on all the edges and openings. All of the following edges are visible on the finished car and need to be evened out and have a small radius sanded in for a good looking finish.

- Doors
- Nose
- Side Vents
- Exhaust
- Top radiator opening
- Lower radiator opening
- Door openings
- Hatch opening
- Cockpit edges

The side body edges are not as visible but just taking a little time here to get the lines straight and a small radius makes for a much nicer finish as well.

The headlight, taillight, fuel cap, turn signal, quick jack, and trunk openings all are covered and do not need the finish work of the other areas.

Mark the door hinges before removing the last time so that you can bolt them back together in the same position that they came off. They may still need minor adjusting during final body installation but this will get you much closer.

Look at all of the body to frame/aluminum contact areas and also look for places you think air might get into the cockpit. Make a note of these places so weatherstrip can be applied before the body goes on after painting.

Body Removal

Remove all trim, doors, windshield, and all of the trim pieces.

Remove the body.

Headliner Fitting

🛠 Razor knife, tape, newspaper/large paper.

🚘 Interior trim assembly

Tape some sheets of newspaper or large pieces of paper together matching the size of the Headliner. The paper will be used as a template for the headliner.

Put some clean rags on the ground to prevent scratching the roof of the body.

With the help of a friend, turn the body upside down and place the roof on the rags.

Place the newspaper in the roof area. Mark the paper so that you will not use the template upside down later.

Use the razor knife to trim the paper to the edge of the windshield and door flanges. Try to keep the paper cut off intact and in as few pieces as possible. The pieces can be used in the windshield side pillars and the side rear pillars.

Remove the paper template.

Place the headliner face down, on a surface that you can cut on.

Change the blade in your razor knife to make sure the cuts are clean.

Place your paper template on top of the headliner making sure that it is the same way up as it was in the body.

Carefully using a razor knife cut-out the shape of the headliner and any of the additional pieces you want.

Trial fit the headliner. It will need some additional trimming because the template does not account for the thickness of the headliner.

Body Painting

- The primer gel coat sands easily, and is a forgiving material to work with.
- The body comes out of the mold with a wax release compound and a thorough cleaning with a wax remover is the best way to begin this job.
- A lot of time and energy was spent on the mold so that the body work can be kept to a minimum.

- Allow the bodywork or repairs performed to sit for several days outside in the sun or at elevated temperatures to allow the repair materials to cure before final paint.

Chapter 5

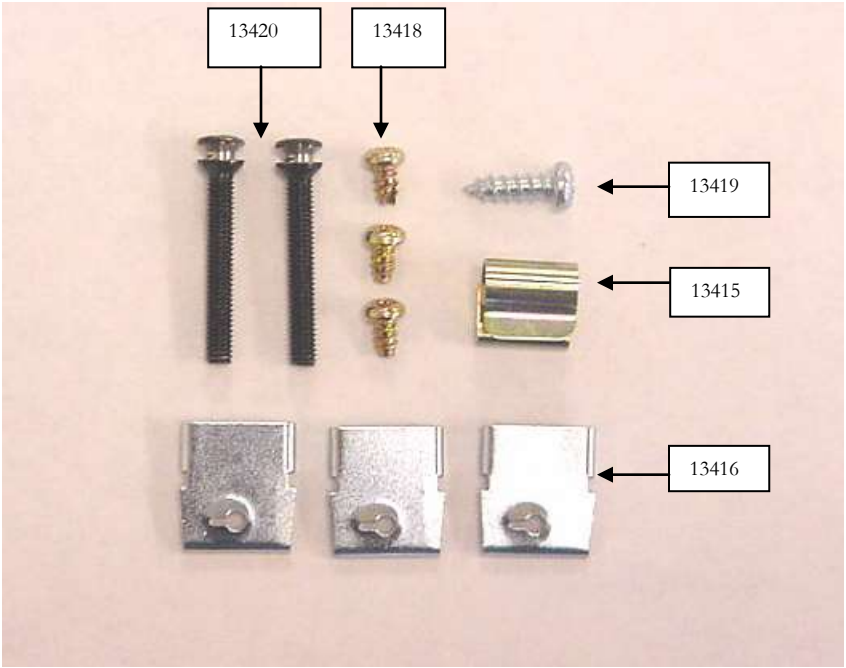
Final Assembly

Headlights

🛠 Phillips head screwdriver, drill, $^{5}/_{16}$" drill bit

🚘 Headlight components

Unpack the headlight mounting assembly.



Screw the adjuster screws about halfway into the buckets.

Push the grommet into the side of the bucket.

Run the light plug harness through from the inside.

Line up the headlight with the bucket to get the proper orientation. The bottom of the bucket is the only screw boss that comes in from the side and the writing on the headlight should be right side up.

Screw the mounting flange onto the light with the 3 small tabs and small screws. The tabs are bent to fit around the bosses on the light.

Put the gasket on the bucket with the adjuster bosses poking through the 2 larger holes.

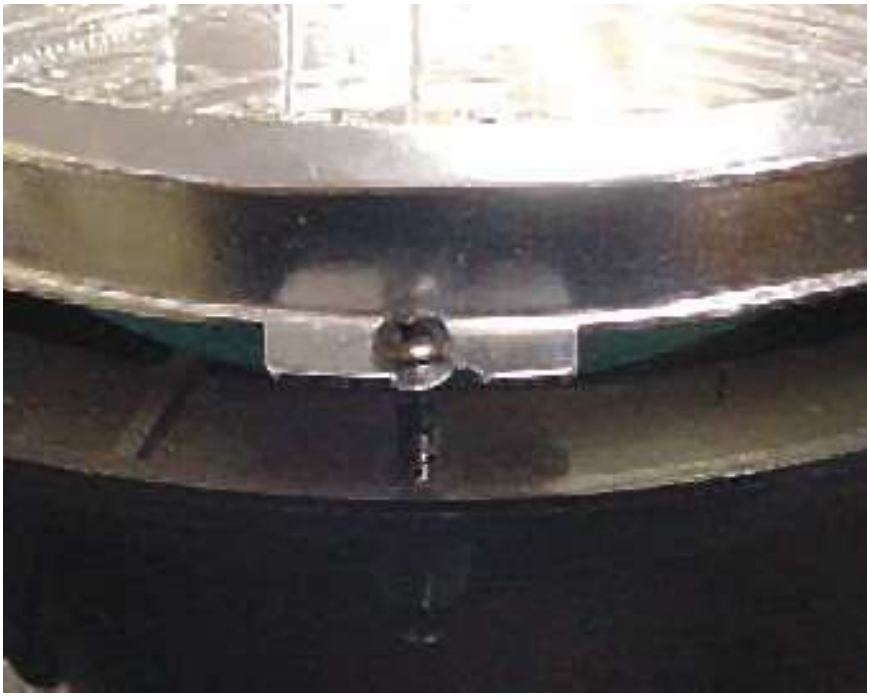
Temporarily put the bucket in the hole.

The trim ring is held on by a screw on the bottom. Mark the bottom of the headlight area where the screw mount is.

Remove the bucket and drill a $^{5}/_{16}$" hole through the bottom of the bucket.

Screw the bucket to the body using the screw that came in the mounting assembly.

Plug the light into the connector and mount the bulb to the bucket.



The slotted parts of the mounting flange go onto the adjusting screws between the screw head and flange.

Push the spring clip onto the boss near the bottom of the bucket.

Headlight Alignment

🛠 Masking tape, marker, tape measure

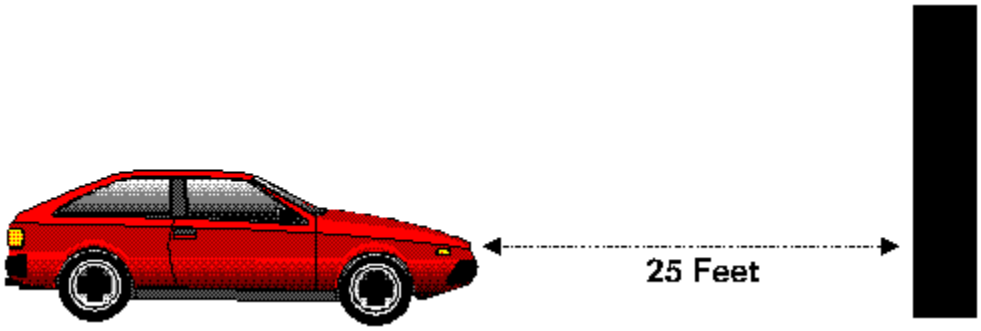
- Make sure that the car is at the correct ride height before the alignment procedure is done. Ride height should be 4½" at the front and 4½" at the back measured to the bottom of the 4" round tube with the normal number of people/weight in the car.
- It is important that the headlights are aimed properly in order for them to perform at their best. Lights that are aimed incorrectly will not only perform poorly but may also offend oncoming traffic. When replacing bulbs, it is a good idea to verify that your lights are properly aimed. Slight variances in filament position can translate to large variances in beam pattern. The following procedure does not require special aiming equipment and ensures proper aim.

Find a flat, level surface next to a vertical white wall where the car can be parked (a garage door is an ideal location at home).

Pull the car straight up to the wall as close as possible.

Using masking tape and a marker, draw a vertical line on the wall corresponding to the centerline of the vehicle.

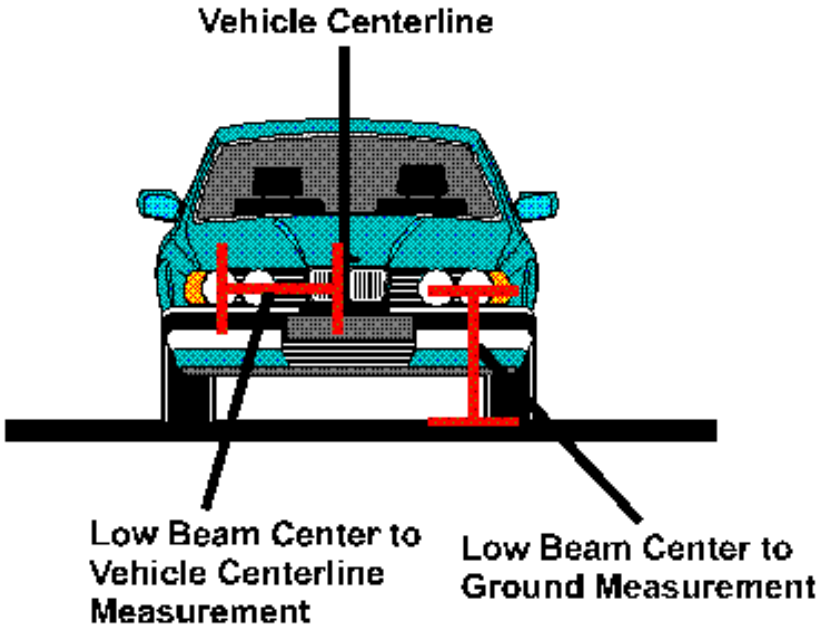
Pull the car straight back until the headlights are 25 feet from the wall.



Make the following two measurements:

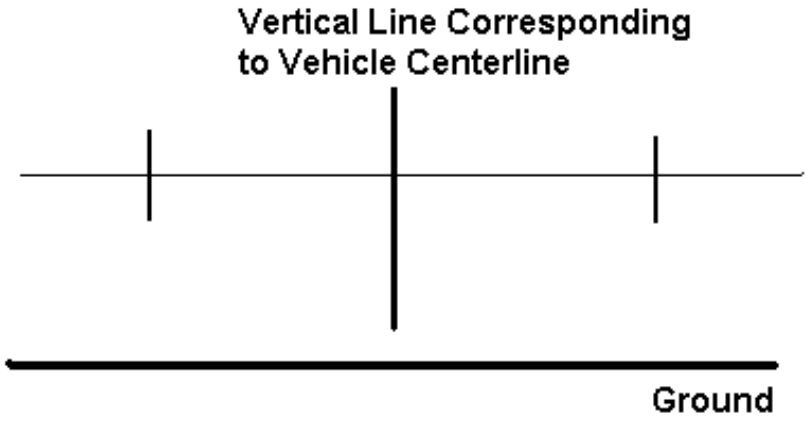
Measurement A: From the ground to the geometric center of one of the headlight lenses

Measurement B: From one of the low beam headlights to the vehicle centerline.
(Also measure from high beam center to vehicle centerline for 4 headlight systems)
Note these measurements.



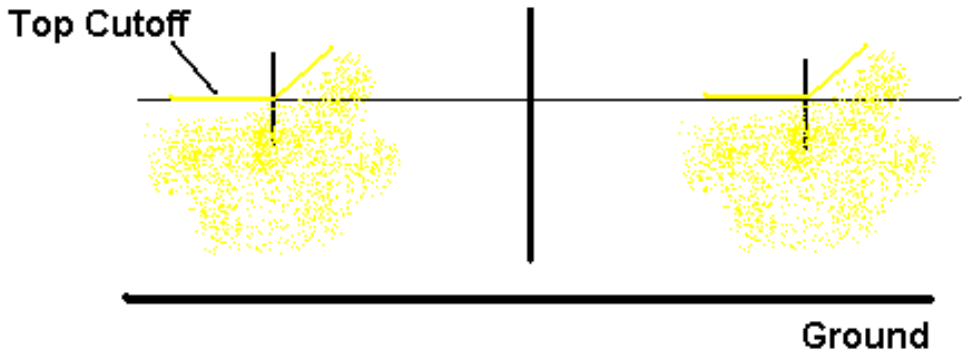
On a piece of masking tape, draw one horizontal line on the wall at a height exactly 2 inches lower than Measurement A.

On the line, make vertical marks both to the right and left of the vehicle centerline mark at the distance of Measurement B from the vehicle centerline vertical line.



Turn the headlights on and adjust the vertical aim of the headlights so that the top horizontal cutoff of each of the beams is located along the horizontal line drawn on the wall.

Adjust the horizontal aim of the low beam headlights so that the point at which the top cutoff of the beam begins to slope upwards is located at the vertical marks.



Trim Ring

Mount the trim ring hooking it over the bucket on the top and screwing it into the bottom using the countersunk screw.

Turn Signals

- Amber front turn signal lights

Push the rubber bushing into the body hole.

Slide the trim ring onto the light.

Push the light into the rubber bushing.

Headlight Covers

🛠 Drill, ⅛” drill bit, Philips head screwdriver, masking tape, marker, ruler, and sandpaper.
🚘 Headlamp covers/fasteners

Stick masking tape around the edge of the headlight bucket so the paint will not be scratched.

Position the headlight cover in the opening with your hands as shown in the picture. Only press down at four points on the cover. Move your fingers as necessary so that the cover is flush with the body everywhere. If necessary use sandpaper on the edge of the plastic to shape the plastic.

Mark on the masking tape where your fingers were located.

Remove the cover.

At the points marked, measure down from the edge of the bucket ⅛" and mark the tape.

Tape four of the mounting tabs in the bucket opening at the points marked.

Reposition the cover carefully, the tabs may need additional bending to match the surface of the plastic.

Drill and rivet the tabs to the headlight bucket.

Drill and Mark the location of the tab holes on the cover.
Drill the holes marked for the mounting screws.
Remove the masking tape from the body.
Attach the cover to the mounting tabs.

Gas Cap

🛠 Phillips head screwdriver

- Aston Lemans Cap

Unpack the fuel cap and mounting hardware.

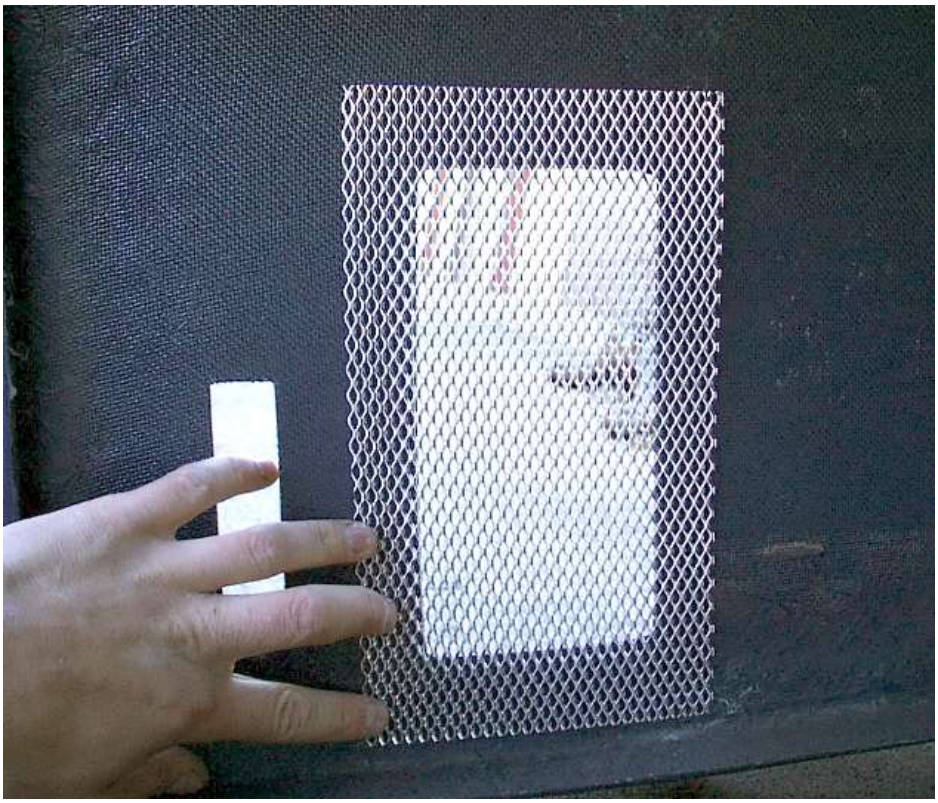
Put the gasket on the bottom surface of the cap.

Set the cap on the body and screw in using 5 of the countersunk screws. Leave the inside most forward hole open.

The one remaining cap fastener is a longer screw and nut used for the ground strap, screw it in from the top then put the ground strap washer and nut on from underneath.

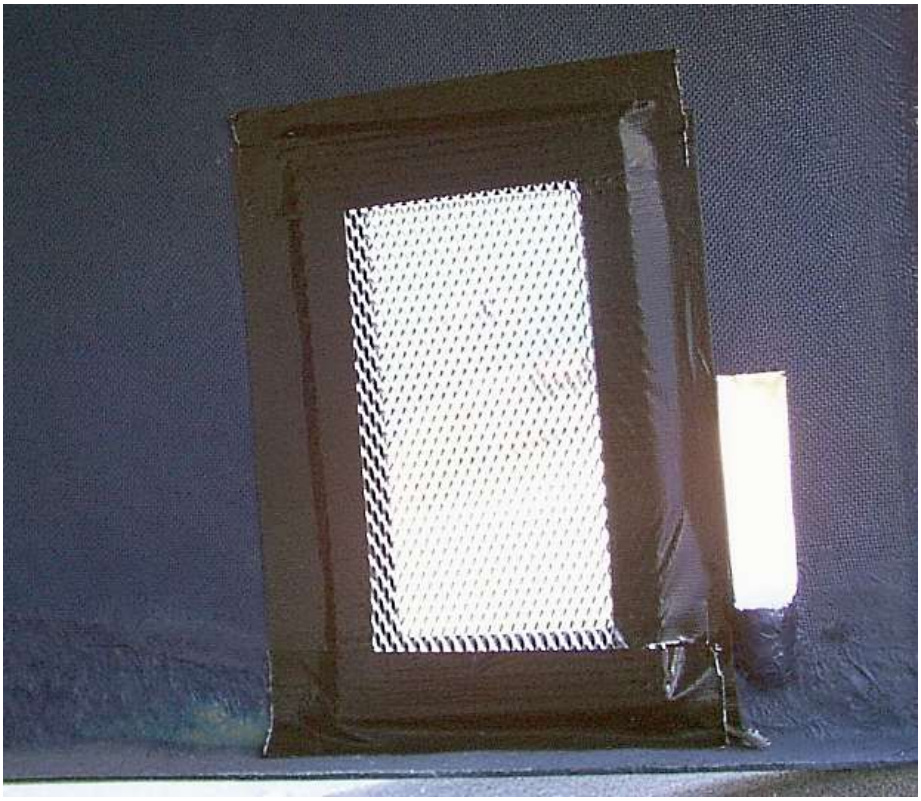
Side Louver mesh

- Silicone, caulking gun, duct tape
- Side Louver mesh



Position the mesh screen behind the louver cut-out area on the nose.

Apply silicone around the cut-out area on the nose that the mesh will touch.



Duct tape around the outside of the mesh.

Line up the mesh on the nose and tape them in place to hold them until the silicone dries (usually overnight).

Weatherstripping

Razor knife, tin snips

Secondary body fasteners

Replace any weatherstrip that was damaged during body removal.
Put additional weatherstrip on the frame where gap areas were noted before paint.

The expanding foam weatherstrip is unique in that it has an adhesive side and it expands from ½" tall to 2" tall over 24 hours. Us this weatherstrip anywhere there were larger gaps or you think extra weatherstrip is needed.

Final Body Mounting

Using two people, one on each side holding the wheel well and side exhaust recess move towards the frame from the rear with the back slightly lower than the front.

Pull the sides of the body out to clear the frame.
Watching the rear of the frame, move the body forward slowly lowering the front. Watch the door latch posts.
Move forward until the rear hatch tubing is lined up with the lip on the body and put the body down in place.
Once the body is in position, it will be snug against the taillight plates in the rear, the lower rear corners of the door opening should be at the corner of the tubes for the door latch and the windshield mounts should be close.

Final Tail light install

🛠 ⅜” wrench, ⅛” hex key, small flat head screwdriver
🚘 Tail lights and hardware.

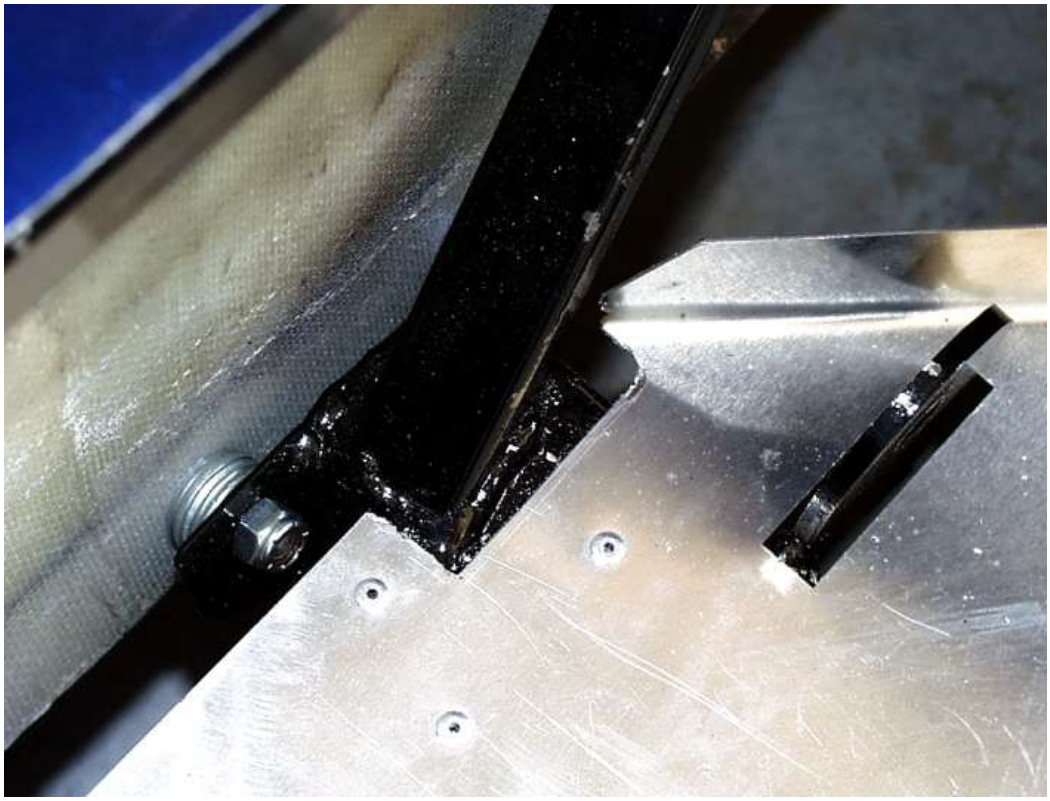
The lights mount from the outside of the body without the lenses and trim rings in place.
Wire the turn signals up to the wiring harness.
Mount the lights using the supplied hardware.

Attach the lenses and trim rings to the rubber seals using a small flat head screwdriver.

Side body mounts

🛠 Drill, $^{5}/_{16}$” drill bit, $^{3}/_{16}$” hex key, ½” wrench, marker, ruler.
🚘 Secondary body fasteners

The body sides are mounted using four stainless $^{5}/_{16}$”x 1” bolts with a washer next to the head.



The rear most side body mount needs $^{7}/_{16}$" worth of washers between the body and the frame so that the body is spaced correctly and there is enough thread left so the locking part of the nut is used.

When you are fitting the doors the number of washers may have to be changed to ensure a flush door fit. The edge of the body doorsill should be flush with the inside side of the doorsill 1"x 1" tube. Use a #6 self-tapping screw to hold it in place if necessary.
Work from the rear of the car towards the front.

Fuel Filler Neck

- Razor knife, ⅜" socket, ratchet, $^{3}/_{16}$" drill bit, drill
- Aston Lemans Cap components

Ground the fuel filler strap to the chassis using the screw that came in the cap hardware.

✋ This wire prevents any static charge build-up and must be used.

Attach the 2” fuel filler hose to the bottom section of the Mustang filler neck.

Stock fuel tank filler neck with extension.

Complete kit Stainless Steel filler neck with extension.

Install the hose between the filler neck and gas cap with the clamps that came in the cap hardware.

Screw the plastic gas cap into the Aston Lemans style cap.

Nose mounting

Re-install the hinge brackets on the nose.
Replace the bumpers you used before on the body to line up the nose.
Re-Install the nose and latches.

Door final fit

- ½" deep socket, (2) 9/16" wrenches, $^{3}/_{16}$", $^{5}/_{16}$" hex key, Phillips head screwdriver, masking tape.
- Take your time to align the doors properly.

Hinge

Reattach the door hinge to the frame.
Attach the door frame to the door hinge using the fasteners provided.
Reattach the latch striker to the frame through the body.
Slowly close and engage the door latch.
Open the latch and swing the door frame open.

Door Weather-Stripping

- Razor knife, tin snips.
- Secondary body fasteners assembly.

There are two different types of weather stripping used around the doors. Use the push-on weather strip with the bulb on the side around the top of the window.

The other weatherstrip looks like a double D with adhesive on the back. This should be pulled apart into two D's. This is used around the bottom of the door and the front.

Door

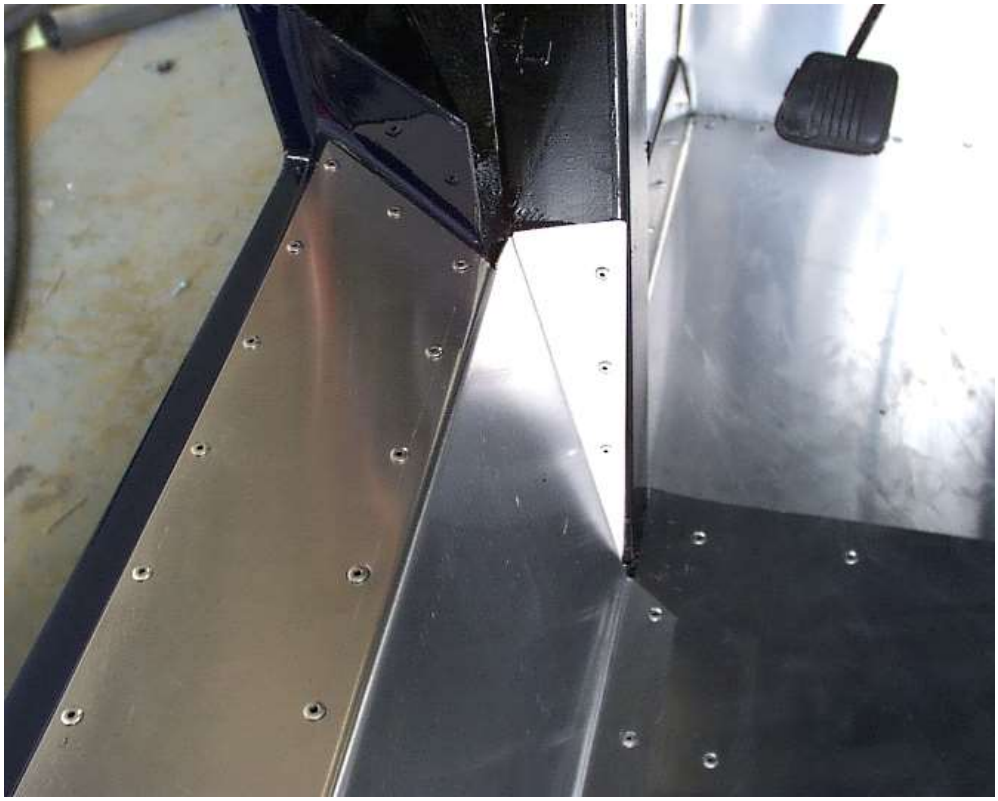
Use masking tape around the body opening to prevent scratching or chipping.
Bolt the door skin to the door frame using the 1½" long $^{5}/_{16}$" screws. If washers were used to space the skin away from the steel don't forget to put them on the screws.
Slowly try closing the door.
Adjust the hinge if necessary.

Handles

Remount the door handles and latch cables.

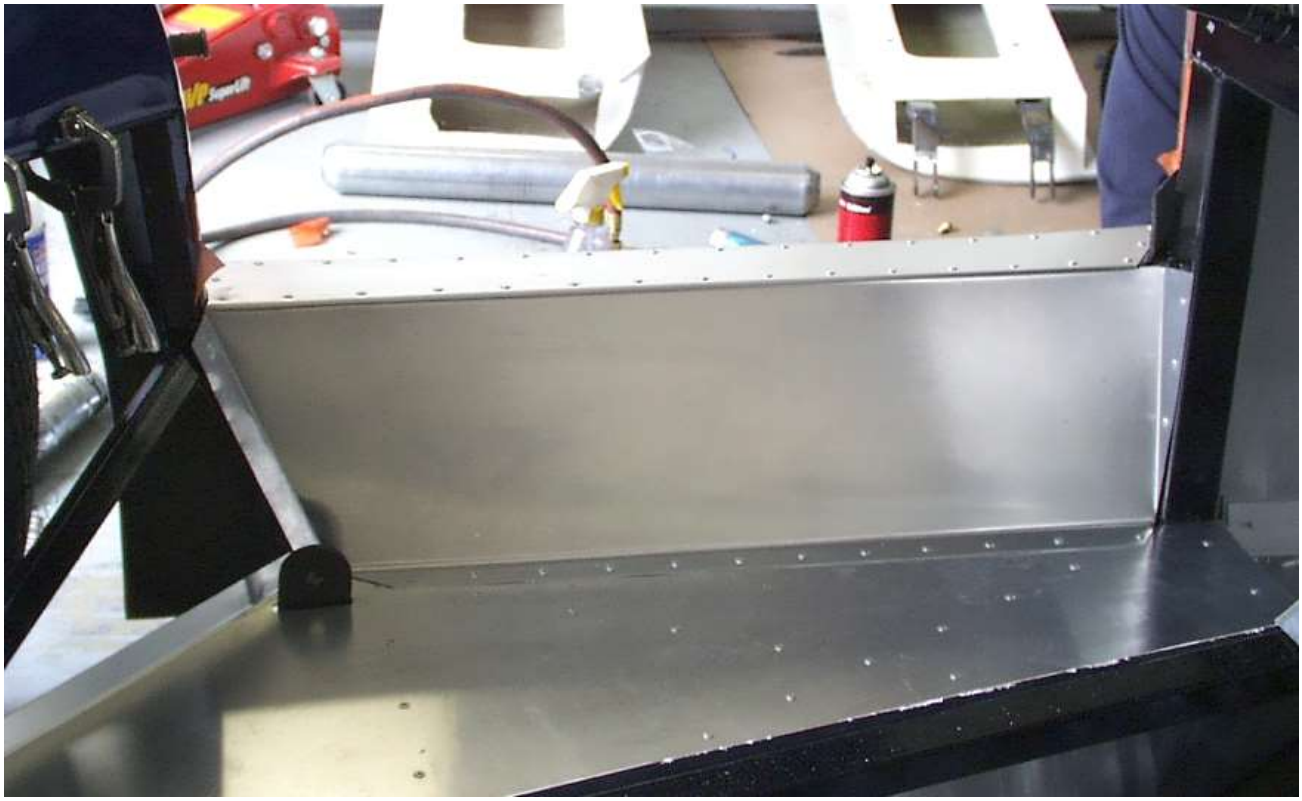
Under door aluminum

- #6 nut driver, rivet tool, silicone, caulk gun, drill, ⅛" drill bit.
- Secondary body fasteners
- If necessary, remove the seats for easier drilling.



Position the Door Sill aluminum on top of the body and even with the edge of the 2"x 2" vertical tube. The side going down to the floor will be angled slightly. Left side shown.

Use a marker and a ruler to mark the location of the rivets to hold the panel in place.
Remove the panel and spread silicon between the body and the door sill 1"x 1" tube and where the aluminum will contact the frame and body.

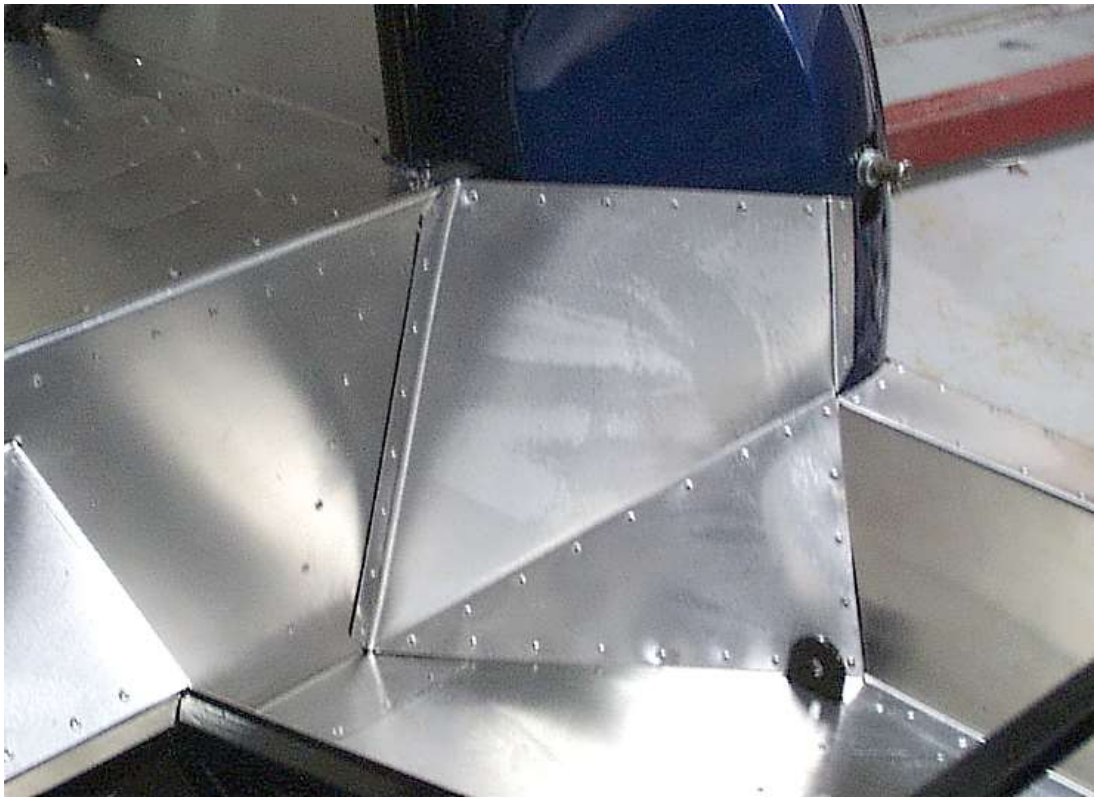


Attach the aluminum panel using the #6 sheet metal screws, and drill and rivet the panel in place.

Repeat for the opposite side of the frame.

Rear front splash guards

Position the rear front splash panels so that they are flat against the rear cockpit wall and the corner is against the aluminum panels.
Hold the panels in place with #6 screws.
Use a marker and ruler to mark the rivet holes on the aluminum panel.
Note where the panels touch each other and where they touch the frame. Remove the panels.
Apply silicone to where the lower splash panels touch.
Install the lower splash panels with #6 screws.
Use $^{1}/_{8}$" drill bit and drill the rivet marks.



Rivet the panels in place with $^{1}/_{8}$" short or long rivets.

Headlight/Turn signal wiring

- Wire strippers, wire crimpers, chassis harness instructions
- Headlight components, amber front turn signal lights, misc. electrical components

Wire in the headlights to the chassis harness. The Mustang high beam is light green/black. The low beam is red/black. On the headlight, there are three wires, black is ground, white is high beam and the red is low beam.

Wire the turn signals up to the chassis harness.

License Plate Light and Bracket

- Drill, ⅛", $^{3}/_{16}$" drill bits, 2" hole saw, marker, level, Phillips head screwdriver, file.
- License light/ bracket assembly.
- This kit is only a collection of parts. Applying the license plate bracket does not mean that this vehicle is street legal. Factory Five Racing does not build completed or partially completed street vehicles. If you choose to title, register and operate your kit on public roads, you are responsible for ensuring that the vehicle you build complies with all Federal, State and local laws regarding its use. The inclusion of the license plate bracket does not indicate that this kit complies in any way with local, State or Federal laws. Translation: If you want to drive it on the street it's all you…

The license plate light can be positioned anywhere on the rear of the body so long as it does not block the taillights.

Use the license plate bracket as a template for the mounting screws. Use a level to make sure the bracket is level since there are no straight lines on the rear of the car.

Use a ¼" drill bit for the mount screws.

Attach the bracket to the body using the two flat head screws and nuts.

Attach the license plate with the self-tapping screws.

Take the front cover off the license light to use as a template.

Center the light cover over the license plate ½"up from the license plate and mark the mount holes.

Use the ⅛" drill bit for the side mount holes.

Use a 2" hole saw centered between the two mount screws ($1^{9}/_{16}$").

Test fit the light. Enlarge the center hole with a file if necessary.

Assemble the light and attach it to the body using the two supplied screws.

Windshield

- Windshield assembly.
- Handle the windshield with care and store in a safe place.
- We highly recommend having a professional windshield installation shop do this installation. Most glass shops prefer to use their own weather strip and materials to install the glass since they warranty the installation. Our local installer used ¼"x $^{3}/_{8}$" tall foam dam tape and 409 T 102 weather stripping on our race car.
- There are two ways to install the windshield, with weatherstrip around the windshield or without weatherstrip. These instructions show with the weatherstrip.
- Once the windshield is installed, the screws around the windshield are not accessible making the removal of the rear part of the body impossible without the removal of the windshield.

Stick foam dam tape around the windshield flange on the body.

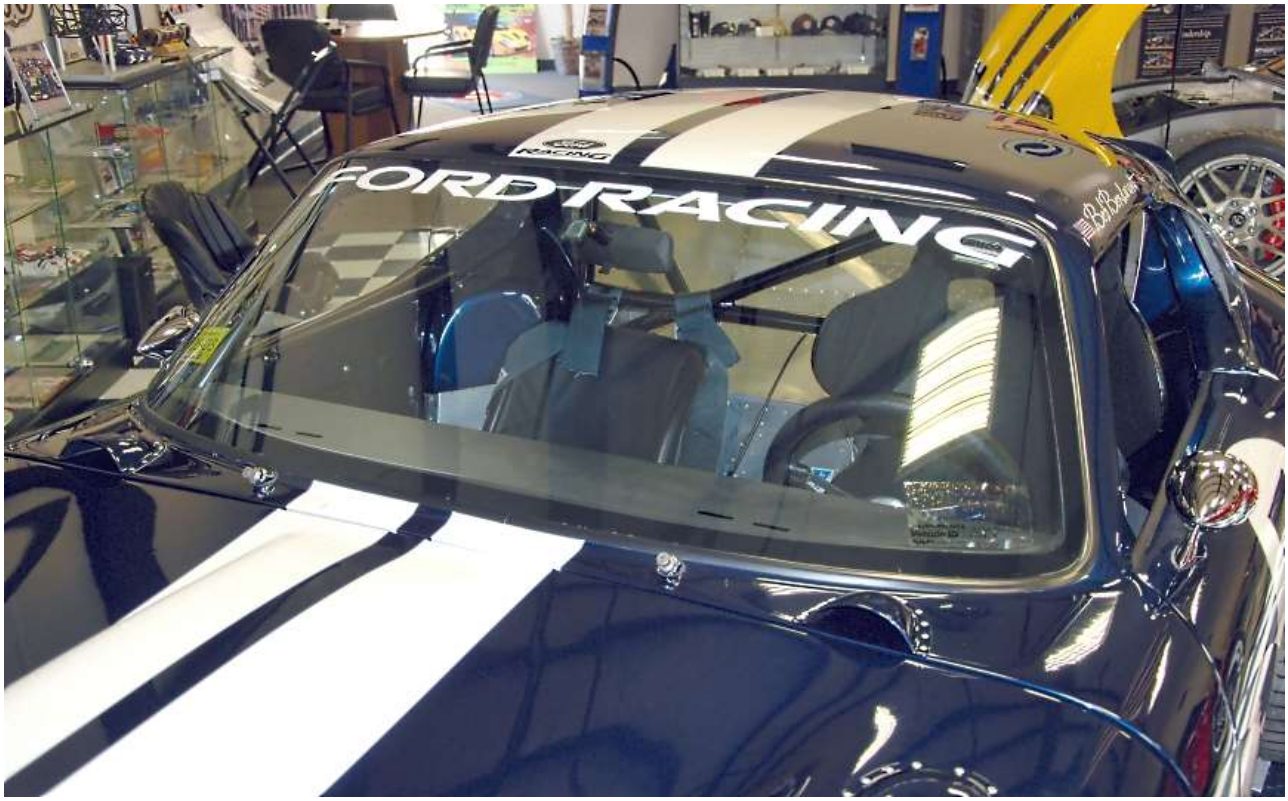
Prime the windshield flange for the urethane.

Apply urethane around the windshield flange.

Attach the weather stripping to the windshield.

Push the windshield into place.
Do not move/touch the windshield for 24 hours.

Windshield mounted on the body.



Final Hatch Mounting

- Razor knife, ½" socket, ratchet.
- Secondary body fasteners.

The rear hatch uses the weather stripping that has two legs on it, one longer than the other and has no adhesive on the back.

Press the double stick tape around the rear hatch recess area.

Starting at the bottom in the middle, press the weather stripping onto the double stick tape with the longer leg towards the inside of the hatch to help prevent water getting to the hatch area.

Remount the hatch by placing the glass back in the opening, set the gap around the body opening and bolting the two halves of the hinge arms together.

Dash and Gauges

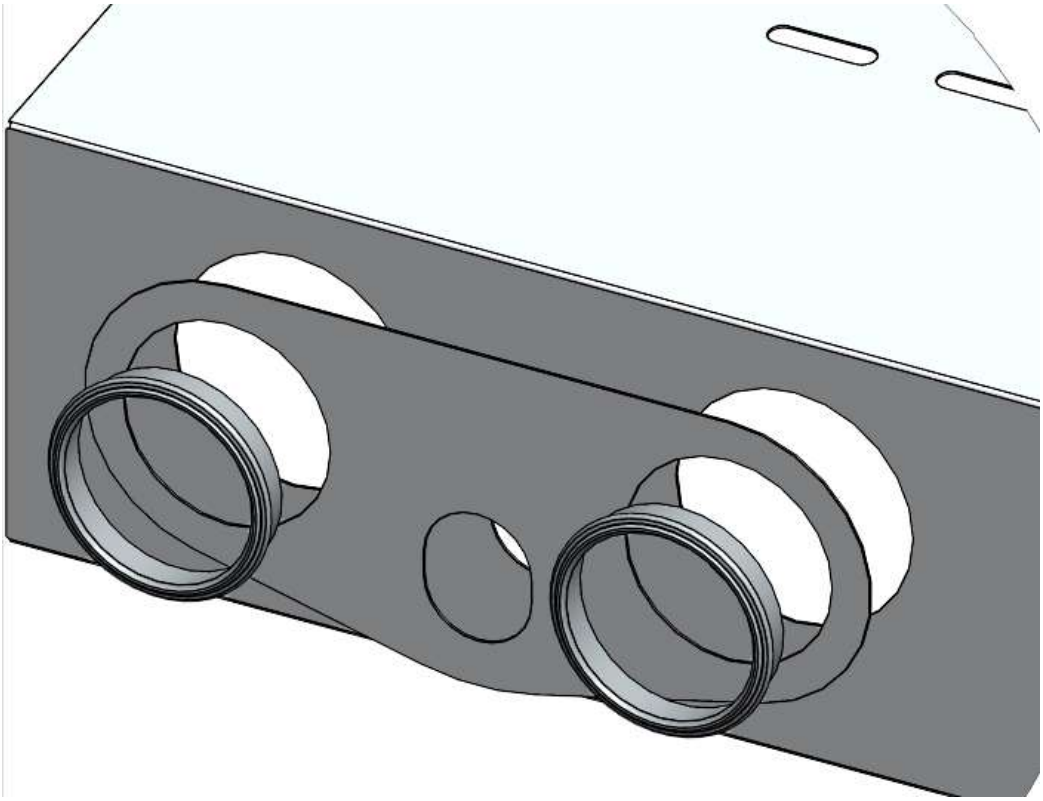
Dash

- Wire stripper, wire crimping tool, electrical tape, Teflon tape, Philips head screw driver, slotted screw driver, $^{5}/_{16}$", ½", $^{11}/_{16}$", ¾", 1" wrenches, hack saw, solder, soldering iron, pliers, $^{1}/_{8}$", ½", ⅞" drill bits, drill, marker, ruler.
- Gauge set, aluminum cockpit assembly.
- Read the instructions completely before starting. There is more than one way to run the wires for the gauges. The method described here uses wires to form a harness to run power and ground for the gauges. Another way is to use trailer plugs to allow easy dash removal later if necessary and

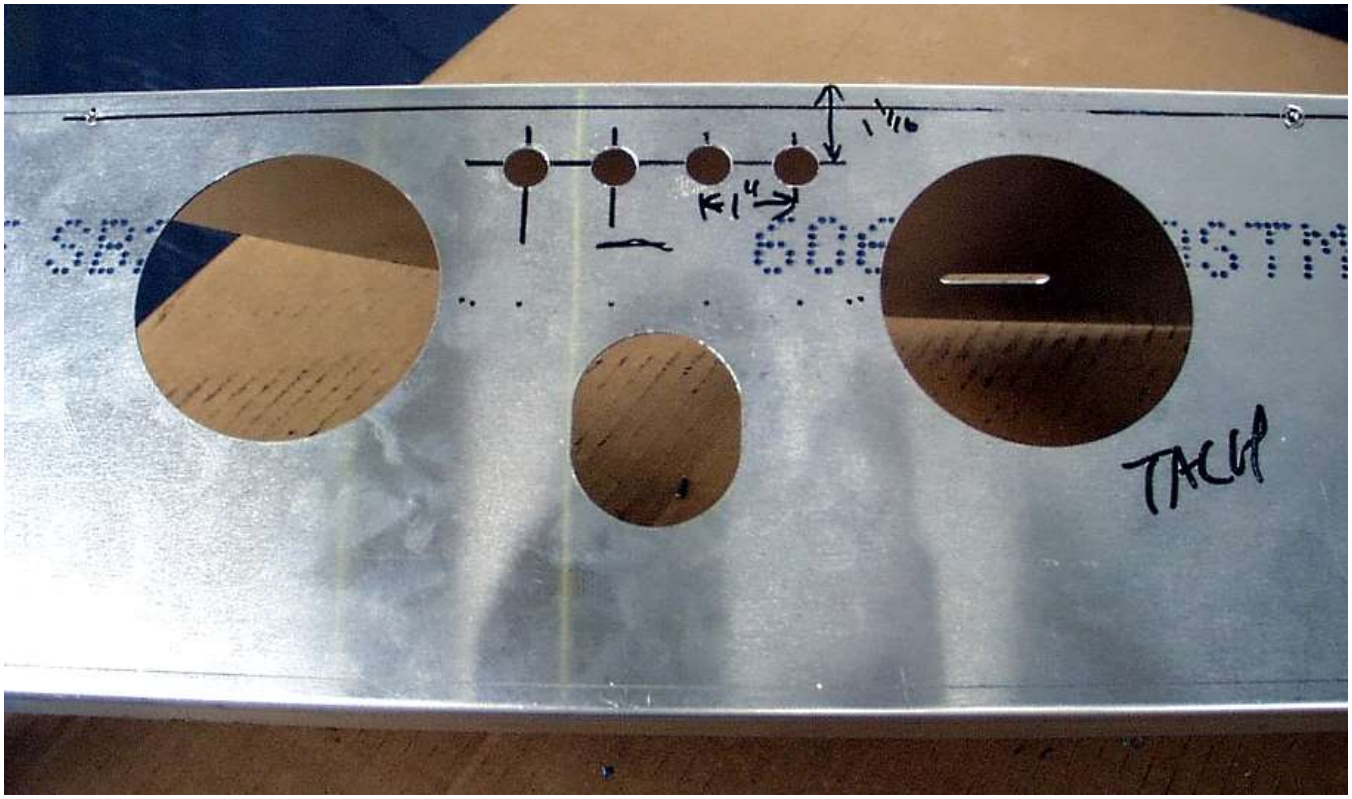
for a cleaner wiring set-up. Mount the gauges in the dash before connecting the gauges to the engine.

- The dash has been cut for the larger Vintage style gauge Speedometer and Tach. If using the Autometer gauges, use the Autometer gauge mount plate for the large gauges.
- Be sure to leave $1^{1}/_{16}$" from the top of the dash for the dash support tubing.

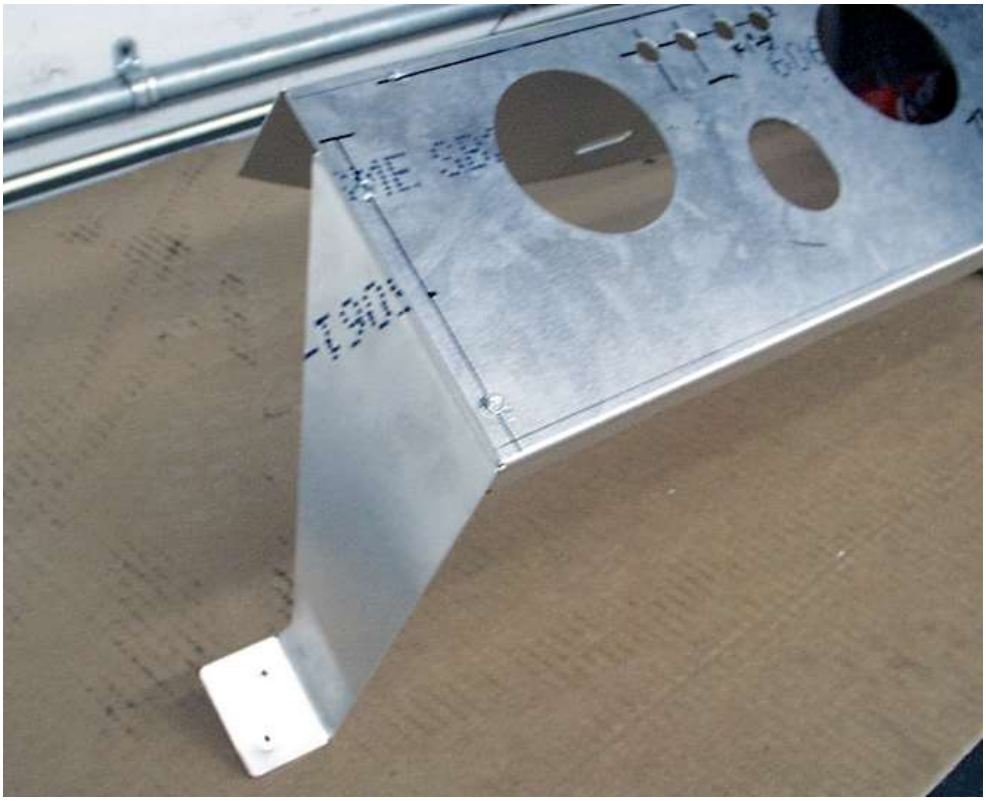
Decide on the location for your turn signal and alternator charge indicator and high beam lights. We chose to install them over the steering column. We spaced them out 1" on center.



Test fit the large gauges to make sure there will be enough room with the lights there. For the Autometer 3.375" gauges, use the mount plate provided.



Use a ½” drill bit for the warning light holes.

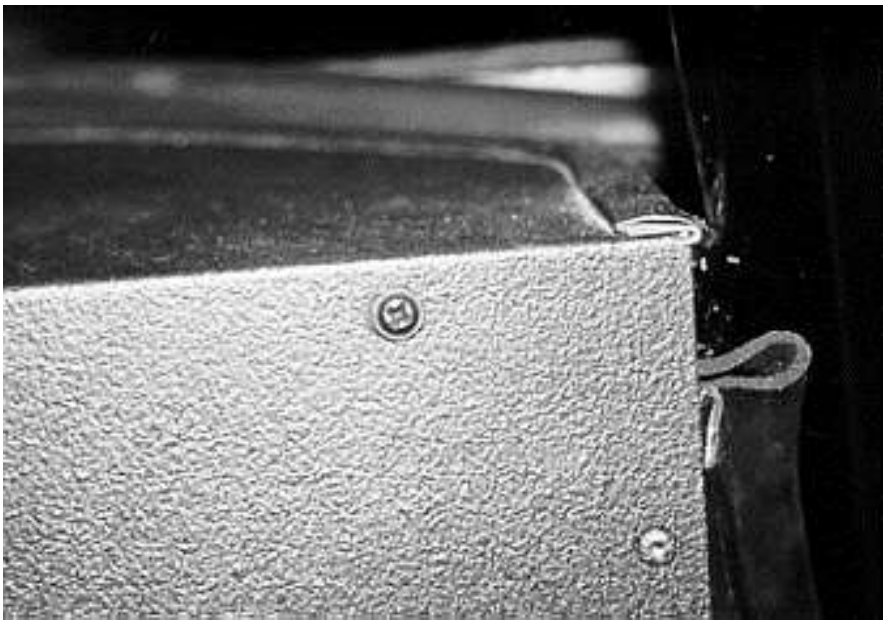


Attach the dash sides to the dash.

Push some of the push-on weather-stripping onto the top edge of the dash sides and around the front edge of the dash.

Position the dash in the cockpit.

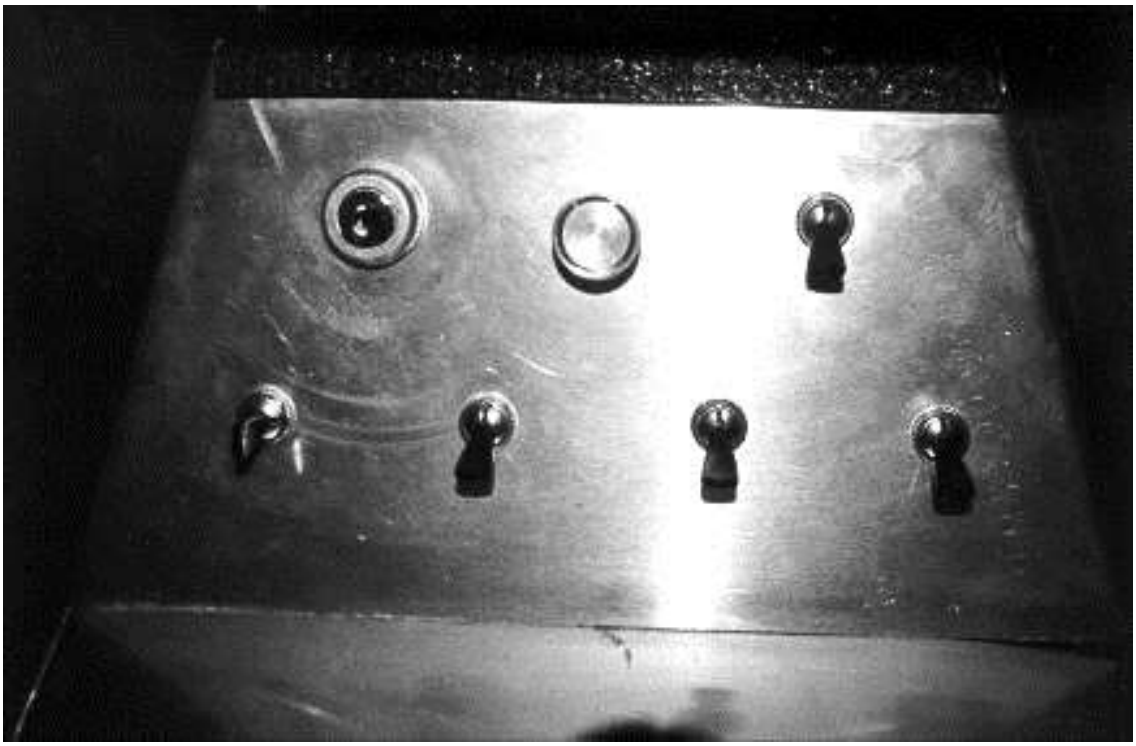
Mark four screw locations across the front face of the dash along the top, for the mounting screws and two in each of the dash side pieces into the 2”x 2” tube.



Use the self-tapping #6 screws to screw the dash to the ¾”x ¾” dash support. The final mount screws are the same size. The self-tapping ones create the threaded hole necessary for them.

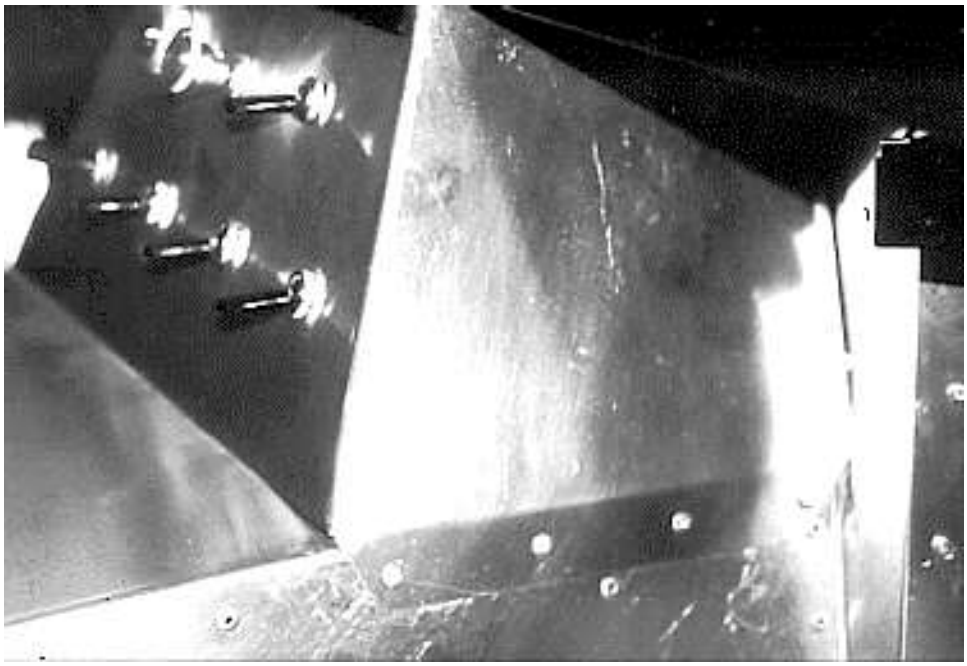
Lower Switch Panel

- Decide the layout of the lower switch panel. Below is the layout we chose. If installing a radio keep it in mind as well.
- The layout shown uses optional switches that are included in the carbureted harness option and wiper option.



Top row left to right: Ignition key, headlight/dimmer, high/low beams. Bottom row left to right: Turn signal, fog lights, open, open.

Space the switches and knobs evenly.
Use a ½" drill bit for the switches, ¾" for the ignition switch and $^{7}/_{8}$" for the Horn Button.

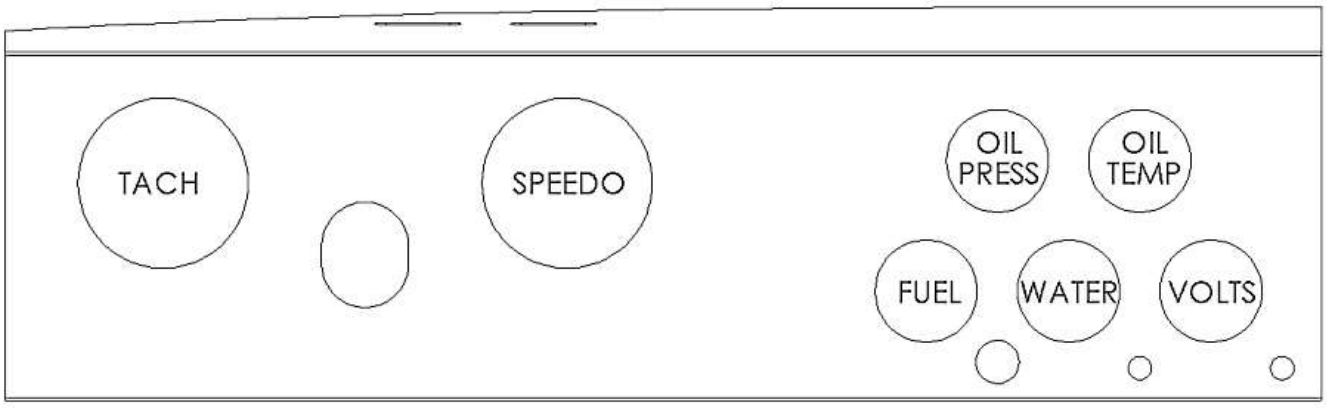


Position the switch panel under the dash and on the outside of the transmission tunnel.

Use #6 screws to hold the position until all the wiring has been done.

Gauges

- The electrical hook-ups for the gauges referenced in these instructions are provided for all years, where there are differences the different years are indicated. For 5.0L cars, the pin numbers are for 1990-1993 donor cars only! 1989 or earlier cars have different wire positions within the gauge cluster plugs. If using an early donor, look-up the positions in a *Chilton's* manual. The wire colors change between years so do not just look at the colors. The notation for the wires as written in *Chilton's* are included in bold in the instructions to aid installation.
- Using a 87-93 Mustang harness does not require the use of the Mustang white instrument pod. However, familiarize yourself with the gray and brown plugs in the wiring harness that originally plugged into the pod. You will be splicing into some of these wires. Not using the white pod makes for a cleaner installation giving more room behind the dash for access and other items, such a heater ducts, radios, or other items you may want to install.
- See the individual gauge instructions for details on the gauge senders and calibration.



Test fit all of the gauges. Shown above are the original gauge locations.

Remove the dash from the car.

Remove the gauges from the dash.

Cover/coat the dash, a matte finish or non-reflective finish is suggested. We chose spray on truck bed liner from Wal-Mart for its finish and ease of use. Powder coating would also be a good choice. Make sure to prep the surface properly before covering so it will not peel off. If painting sand it then wipe clean. Do not get finger oils on it.

Wiring Harness

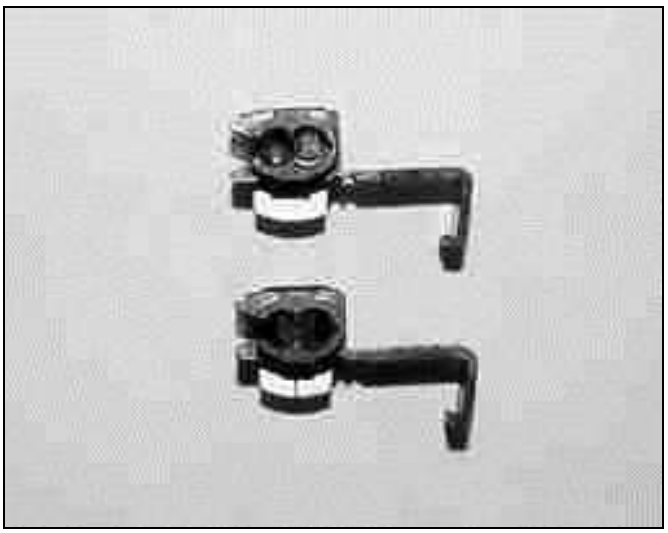
- Included with the gauge kit are wires and connectors to create a simple gauge wiring harness.

Cut the 5' long blue wire into sections. (1) 2' wire, (1) 1' wire, (3) 8" wires.

Cut the 6' long black wire into sections. (1) 2' wire, (1) 1' wire, (4) 8" wires.

Cut the 5' long red wire into sections. (1) 2' wire, (1) 16" wire, (2) 8" wires and (1) 4" wire.

Mark the red and blue 2' sections at 4", 7" and 10" from one end.



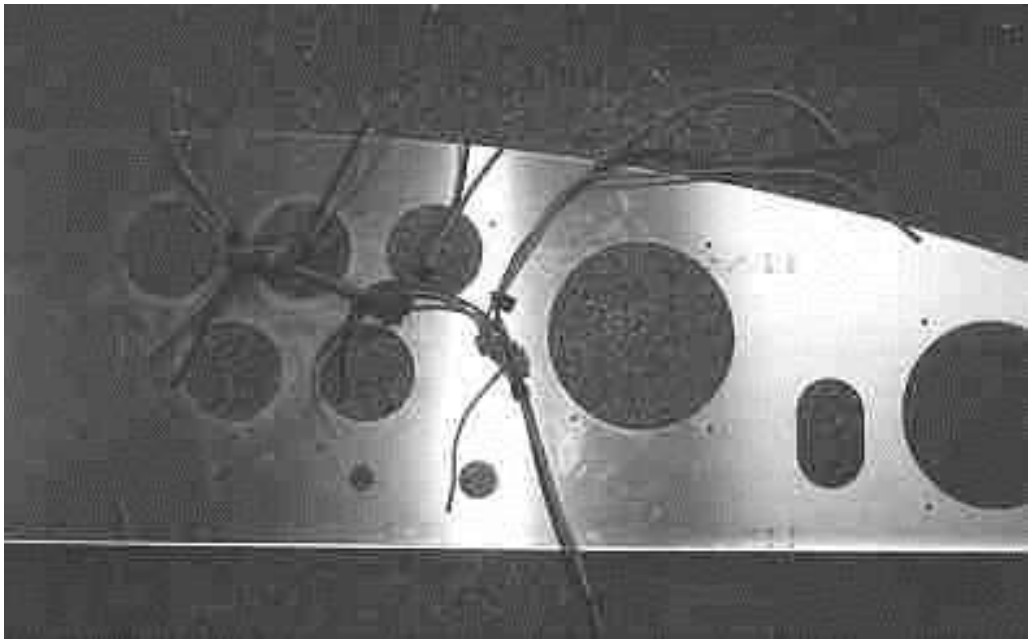
Using a ⅛" Drill bit, drill the wire blockage out of (7) of the tap connectors. Upper connector has blockage, lower is drilled.

Lay the cut dash face down on a table.

Starting at the 4" mark, place one of the drilled tap connectors on the wire along with one of the 8" wires.

Center the 8" wire on the connector and squeeze the connector with a pair of pliers. Snap the cover on the connector with your fingers.

Repeat steps 4 and 5 for the 4" and 7" marks on the red, blue and the black wires.

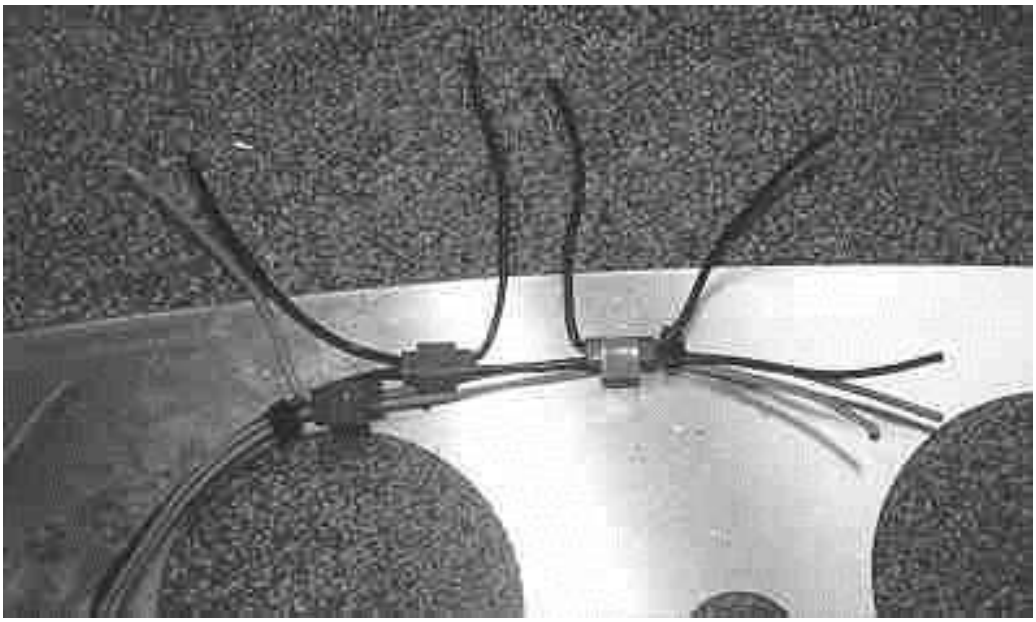


Roadster dash shown

For the black and blue wires at the 10" mark, use the 1' wire and an undrilled tap connector. This wire will run over the top of the speedometer to the tach.

For the red wire at the 10" mark, use the 16" wire and a drilled connector. Mark the 16" wire 4" from the end and connect the two wires at the 10" mark.

On the blue 1’ wire, attach the remaining 8” wire using an undrilled connector above the speedometer.
On the black wire, attach the two remaining 8” wires using drilled connectors centering the 8” wire on the connector. Position the connectors over the steering column for the small lights and so that one lead will reach the speedo light.

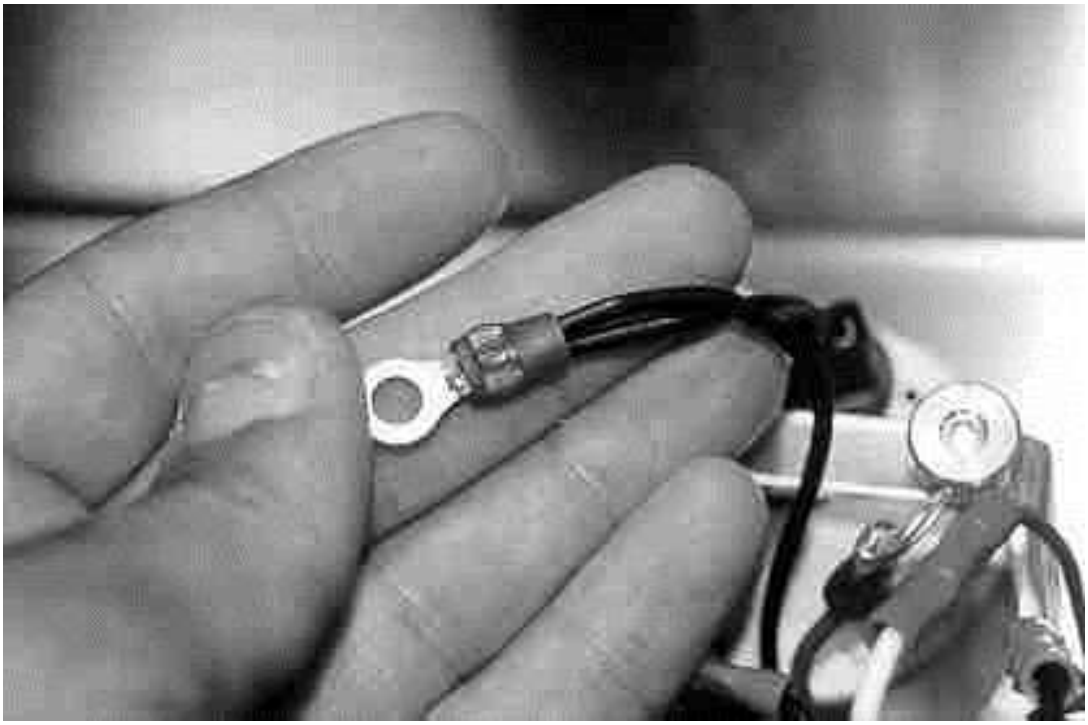


Wire leads for dash lights and Speedo

Use zip ties from the kit to tie all three wires together.
Attach the loose end of the red wire to the Mustang gauge gray plug pin #7 (**Warning Lamps Feed**).
Attach the loose end of the blue wire to the Mustang brown gauge plug pin #11.
Attach the loose end of the black wire to the Mustang gray gauge plug pin #14.
Attach the short section of red wire on the 16” section to the horn button.
Use the remaining short section of red wire to jumper over from the horn button to the fan switch. The connectors for the switch are packed with the fan.

Instrument Lighting

Attach positive leads from the gauges to the blue wire closest to the gauge using the red butt connectors. The ring connector used to ground the gauge will also act as the ground for the light. Attach the negative lead from the gauges (**except Tach and Electric Speedometer**) to the black wire closest to the gauge using a small ring connector.



Ring connector attached to gauge light ground and wire harness ground.

Wire the Tach lighting when wiring the remainder of the Tach.

If after hooking everything up, there are no lights or they are dim, check the Mustang dimmer switch for adjustment. If dimmer switch is not connected, jumper the two brown wires in the connector or jumper the brown wire coming out of headlight switch and connect to the blue wire.

Water Temperature Gauge

Remove Ford water temperature gauge sending unit from the lower intake manifold located next to the distributor on the driver's side with an $^{11}/_{16}$" wrench.

Wrap the adapter threads with Teflon tape. Install the new water temp adapter (short end goes in the manifold) with a ¾" wrench.

Use the existing wire from the old sending unit and attach a ring connector to the wire and then attach the connector to the sending unit.

Attach the ground ring connector and positive wire using a ring connector to the gauge. Pick a color wire for the sending unit wire and connect it to the gauge using a ring connector.

Attach the other end of the same color wire to the Mustang Gray plug #3 (**Water temp feed**).

Oil Pressure Gauge

Remove the Ford Oil Pressure sending unit from the driver side of the engine in front of the header with a ¾" wrench.

Assemble the new sending unit per gauge instructions, wrap the threads with Teflon tape and install in engine.

Attach the stock connector to the sending unit.

Attach the ground ring connector and positive wire using a ring connector to the gauge.

Pick a color wire for the sending unit wire and connect it to the gauge using a ring connector.
Attach the other end of the same color wire to the Mustang Brown plug #8 **(Oil pressure feed)**.

Oil Temperature Gauge

There are many ways to mount the oil temperature sending unit. Use a "T" junction and put it in line somewhere in either of the hoses that run to the remote oil filter. Use an adapter to thread into the oil filter relocater on the block. The harder way is to drain the oil from the engine. Remove the oil level sender with a 1" wrench from the driver side of the oil pan. Drill out the sending unit with a $^{5}/_{16}$" drill. Tap the remaining piece with a ⅜" x 18 NPT pipe tap just enough for the short end of the adapter to attach. Wrap the adapter with Teflon tape and attach the adapter (short section pointed in) to the tapped piece with the ¾" wrench. Attach the adapter and piece to the oil pan. Run the 8' blue wire from the gauge through the dash and firewall and attach to the adapter to ensure proper operation. DON'T FORGET TO REFILL THE ENGINE WITH OIL. Note: a machine/tool shop can do the above drill and tap for about $25 is you don't have the tools. Attach the long blue wire to the sender and run it through the hole under the 2" x 2" crossmember on the inside drivers' wall. Run the wire to the signal input on the gauge. Attach ignition power and ground wires to the blocks and the backside of the gauge.
Remove one of the plugs in the back of the driver head using a $^{5}/_{16}$" hex key.
Attach the oil temperature sending unit.
Run a new wire from the gauge to the sending unit.

Tachometer

Twist the Tach ground wire and the Tach light ground wires together, insert them into the same side of the Blue butt connector and crimp.
Attach the black wire to the other end of the Blue butt connector.
Connect the positive wires using a red connector.
Pick a color wire for the sending unit wire and connect it to the gauge using a red connector.
Attach the other end of the same color wire to the Mustang gray plug pin #11 (**SW to Ign. Coil (-)**.

Volt Gauge

Attach the ground ring connector and positive wire using a ring connector to the gauge.

Speedometer

Twist the Speedo ground wire and the Speedo light ground wires together, insert them into the same side of the Blue connector and crimp.
Attach the black wire to the other end of the Blue butt connector.
Connect the positive wires using a red connector.
Use one of the wires that was run over to the computer and connect the wire to the wire in pin #3, **(Vehicle Speed Sensor, +)** using a TAP connector.
Connect the other end of the wire to the Speedometer.

Fuel Level Gauge

Attach the ground ring connector and positive wire using a ring connector to the gauge.

Pick a color wire for the sending unit wire and connect it to the gauge using a ring connector.
Attach the other end of the same color wire to the Mustang Brown plug # 10 (**gas tank sending unit**).

Battery Charging

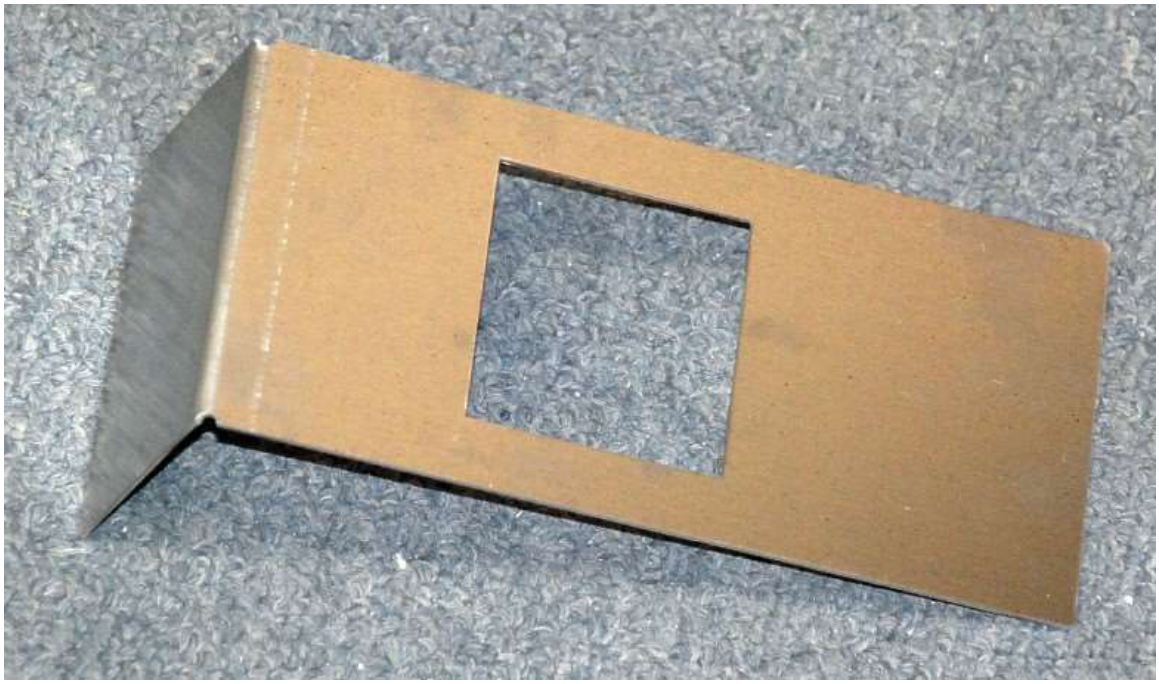
In order for the battery to charge, solder a 510 OHM resistor between the wires on the red light forming an H with the 2 wires. This resistor can be found on the Mustang white gauge pod. Carefully clip the resistor leads leaving them as long as possible. You may want to protect this junction with tape, etc. solder the wires (with resistor soldered together ahead of wire ends) on the red dash light to two of the wires on the second 4 conductor 2' section. Attach the other ends of the two wires to the Brown plug pin #2 (**Ign. Sw. to Ign. Coil (BATT)** and brown plug pin #14 **(Ign. Sw. (ACC) to Alt. Reg.**) using red connectors. When starting the car, the light will turn on and then go off. The light is part of the circuit and MUST be present.

High Beam Indicator

Connect one lead from the blue light to the black wire and the other lead to the second 4 conductor 2' section.
Attach the other end of the same wire to the gray plug pin #2 (**Dimmer to High Beams**) using red connectors.
The blue light will light when the high beams are on.

Turn Signal Indicator

In order for the green light to flash when either the right or left turn signals are turned on, a 3-prong turn signal indicator is used. Find the original 2-prong turn signal (probably round and light blue or aluminum) in the Mustang dash wiring harness in front of the passenger seat or near the center of dash. If it is not here, turn the turn signals on and follow the sound. Remove the original flasher from the wiring plug and carefully cut the two wire 90 degree wire connector in half leaving the wires connected to each piece. Put the wires on the left and right prongs of the 3-prong flasher. Run the four foot blue extension wire from the middle prong on the flasher to one of the wires on the green light. Attach the other wire on the green light to the black wire using a red connector.
Install the gauges, lights and switches using the instructions included with the gauges.



Rivet the panels to the chassis and then use the trim screws to attach them to the bottom of the dash.

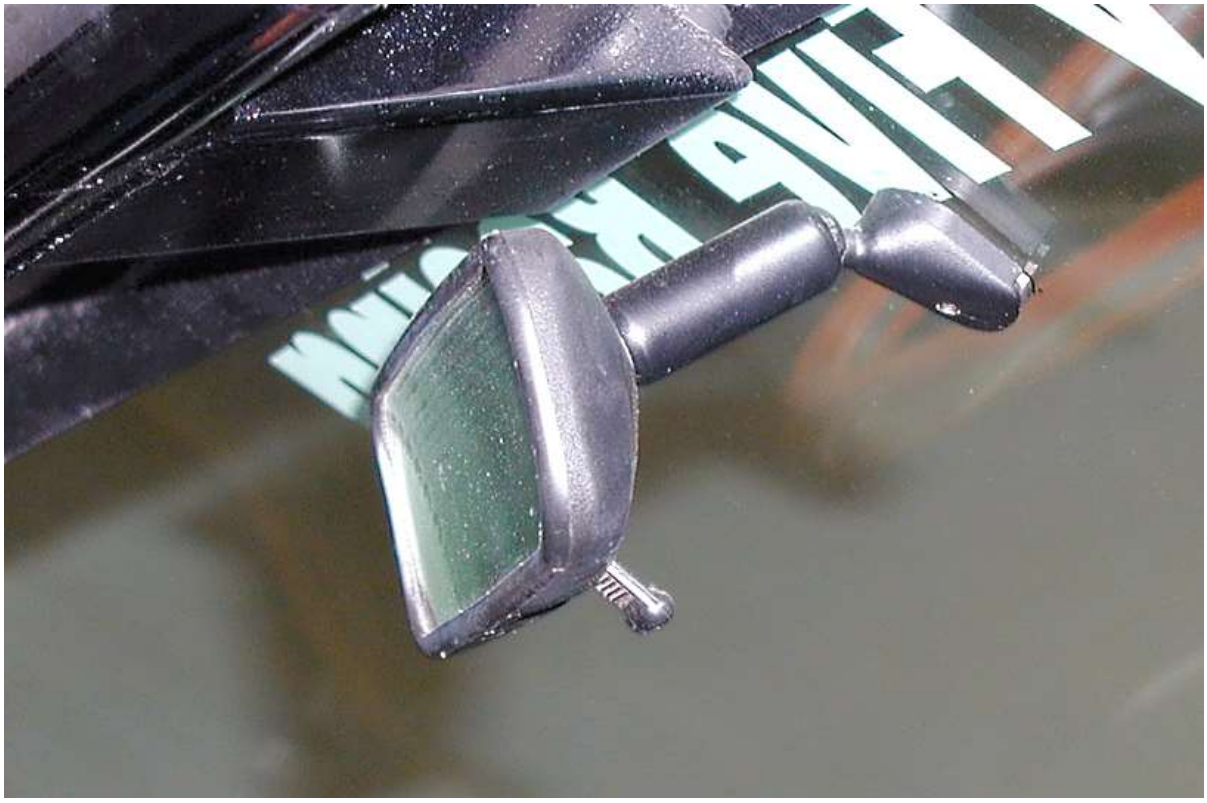
Install the Mustang headlight and hazard switches in the aluminum brackets.

Interior Rearview Mirror

- Tape measure, marker, windshield rearview mirror glue, hex key set.

- Mustang interior rearview mirror.

Use a ruler and marker pen to mark the center of the top windshield area mount on the windshield. Hold the mirror in place to find the best location up/down and mark this on the windshield. Follow the directions on the glue for attaching the mount to the windshield.



Side Mirror

- Phillips head screwdriver, drill, 3/32", 3/16" drill bits, marker, ⅜" wrench.
- Rearview mirrors/fasteners.
- Only a driver side mirror is included with the kit. A passenger side one is available if desired.

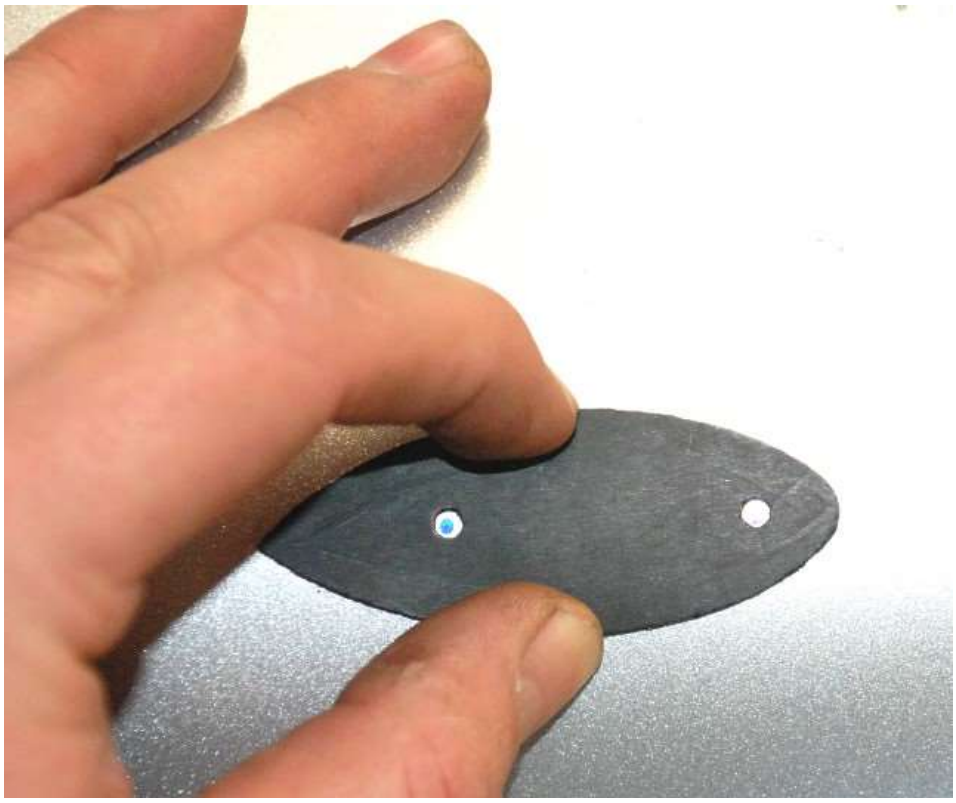
Unpack the side mirror assembly.

Disassemble the mirror, removing the large base from the stand.

The large base is replaced by the smaller insert and gasket.

Temporarily bolt the mirror back together with the small insert.

Sit in the seat to find a good location you can see it from and see clearly over the rear fender. Mark the location and use the gasket to locate and drill the mounting holes.



Disassemble the mirror and bolt the mounting insert with mounting bolt and the gasket to the body.

Slide the stand-off and upper gasket down the bolt and onto the mounting bracket.

Bolt the main body of the mirror to the mounting stand-off.

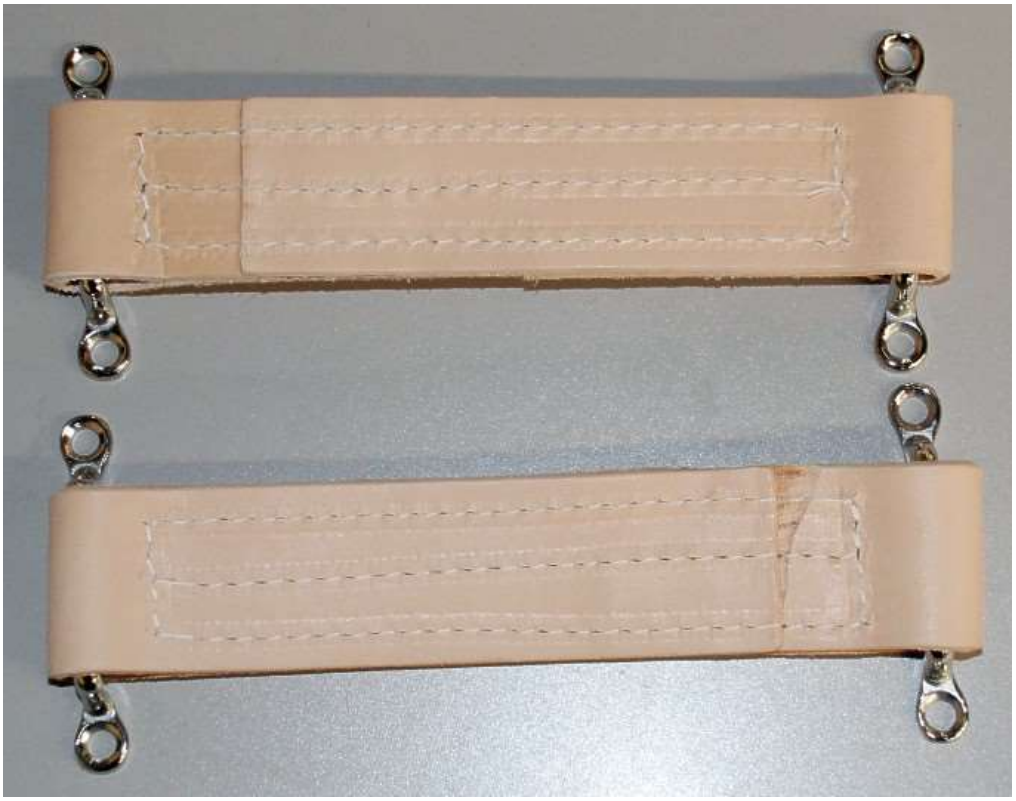
Screw the mirror into the body and adjust it before tightening.

Check straps

🛠 $^{3}/_{16}$" drill bit, drill, rivet tool, marker

🚘 Secondary body fasteners, door latch/hinge components

Unpack the door check-straps.



Sitting inside with the door closed, hold the check straps up to the door and the 2”x 2” tube and position the strap so that it will hit the framework in the door.

Use a marker and one of the check straps to mark the two mounting holes on the middle of the inside face of the 2”x 2” vertical tube that the hinge is mounted on.

Use ⅛” drill bit to start holes for the screws to attach the straps.

The door check straps stop the door from opening all the way up and scratching your paint. Test the placement of the strap for door travel before final assembly.

Open the door wide but not enough so that the door hits the body. The straps will stretch slightly over time so allow enough room for this by closing the door slightly from the maximum.

While holding the door open, pull the check strap tight and mark the location of the mount holes on the inside face of the 2”x 2” tube.

Drill $^{3}/_{16}$” holes at the marked locations

Rivet the mount to the chassis.

Steering wheel center section

- WD40, $^{5}/_{32}$” hex key
- Steering wheel/hardware, Factory Five Badge

Unwrap the steering wheel center section and push it into the steering wheel and boss, a little WD40 on the O-ring helps if it is tight.

Peel the backing off the badge and stick it in the center section making sure you are aligned with the top of the steering wheel. If necessary, file any flashing off the bottom edge of the emblem so that it will fit.

With the steering wheel in the position that is most comfortable for you tighten the set screws on the collar of the upper steering bearing.

Optional leather steering wheel.

Side Exhaust

🛠 $^{3}/_{16}$” Hex key, ⅜”, ½”socket, ratchet

🚘 Side Exhaust

Remount the side exhaust.

Aluminum Splash guards

🛠 ⅛”, 3/16” drill bit, drill, rivet gun, silicone, caulking gun, ¾” socket, ratchet, extension, marker, clamps

🚗 Secondary body fasteners, packaged aluminum, front wheel and tire

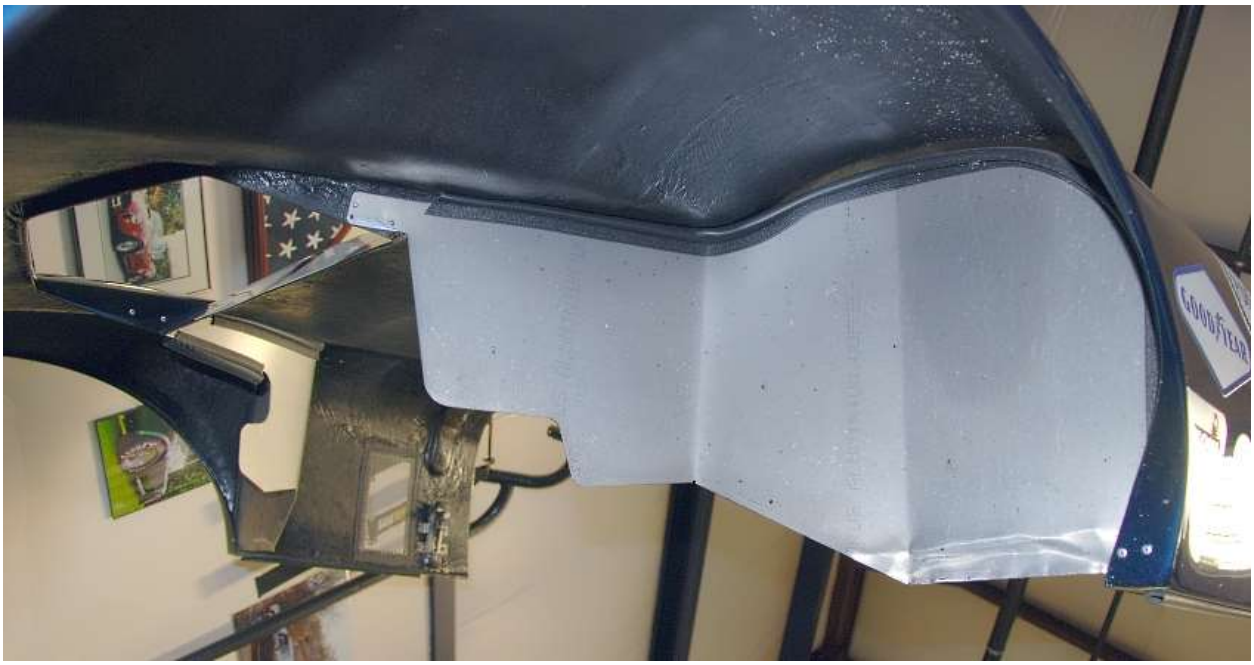
Front Wheel

With the nose up, put a wheel and tire on the front and turn the steering so that the rear of the tire is as close as possible to the frame.

Clamp the front lower half of the splash guard to the 1”x 1” tube and (from underneath) to the front part of the body.

✋ Use a level to make sure the surface that will be close to the nose is flat.

Adjust the clamp on the frame so that the aluminum splash guard will not contact the tire.
Put some of the press-on bulb seal around the outside edge of the upper aluminum splash guards.
Clamp the splashguard up against the nose. The upper splashguard attaches to the side of the nose radiator opening and the lower outside of the wheel well.



Remove the wheel.
Close the nose.

Make sure that the nose and the body sides are aligned with each other.

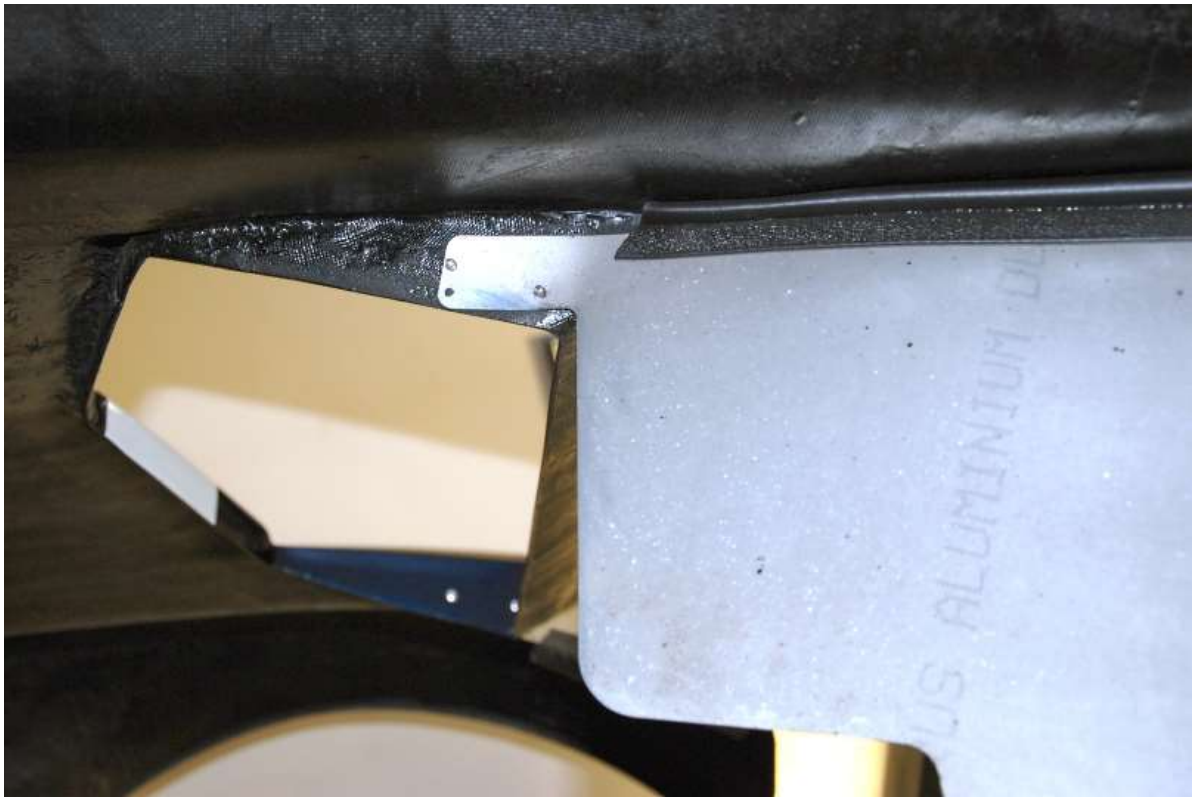
Look at the two splash guard pieces and move them forward or back so they are aligned.

Use a marker and tin snips or move the lower splash guard if necessary to create an even gap between the upper and lower splash guards. Push-on weatherstrip will be used here after the pieces are located.

Put a wheel and tire on the car and check for aluminum clearance and use some tape to mark the start location of the upper splash guard on the radiator opening and the lower splash guard on the 1"x 1" tube.

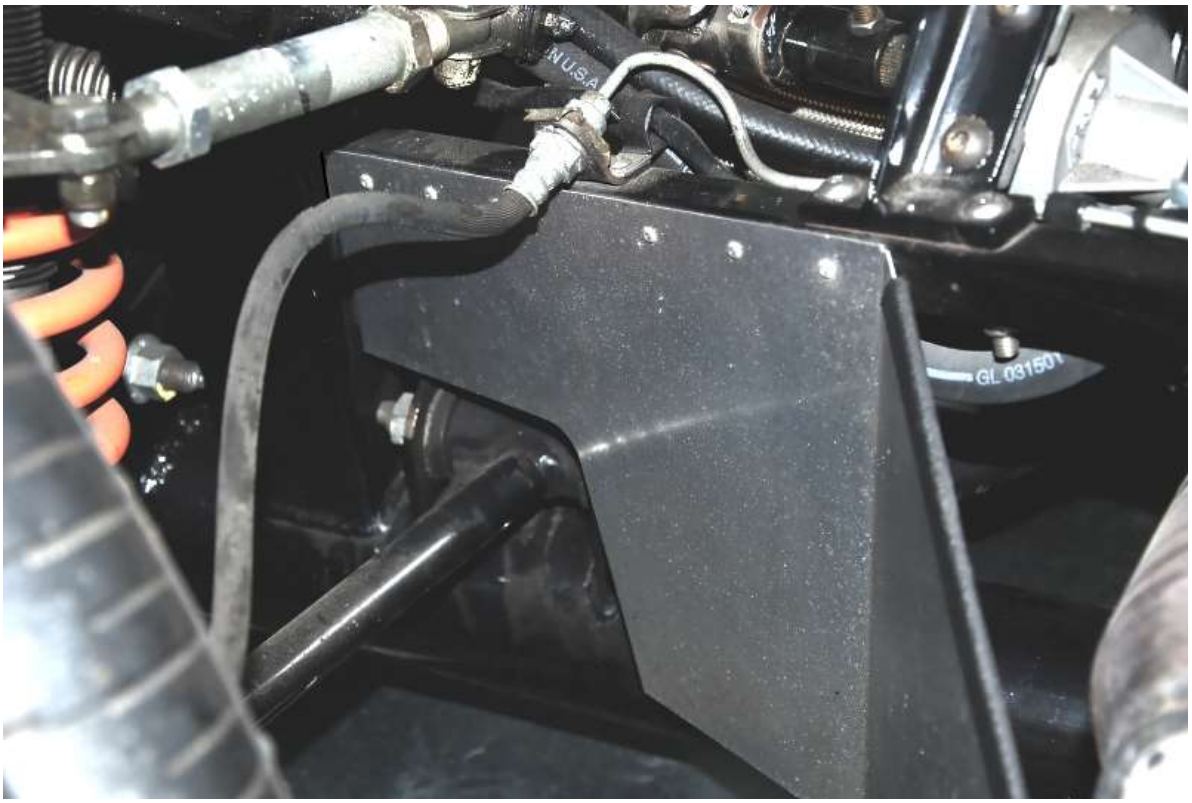
Push some of the bulb weatherstrip onto the outside of the upper splash guard from behind the radiator opening going around to the lower outside mount.

Apply silicone to the radiator opening and from the radiator opening side rivet through the fiberglass and the aluminum.



Apply silicone to the bottom outside corner of the upper splashguard and rivet through the fiberglass and the aluminum using $^{3}/_{16}$" rivets.

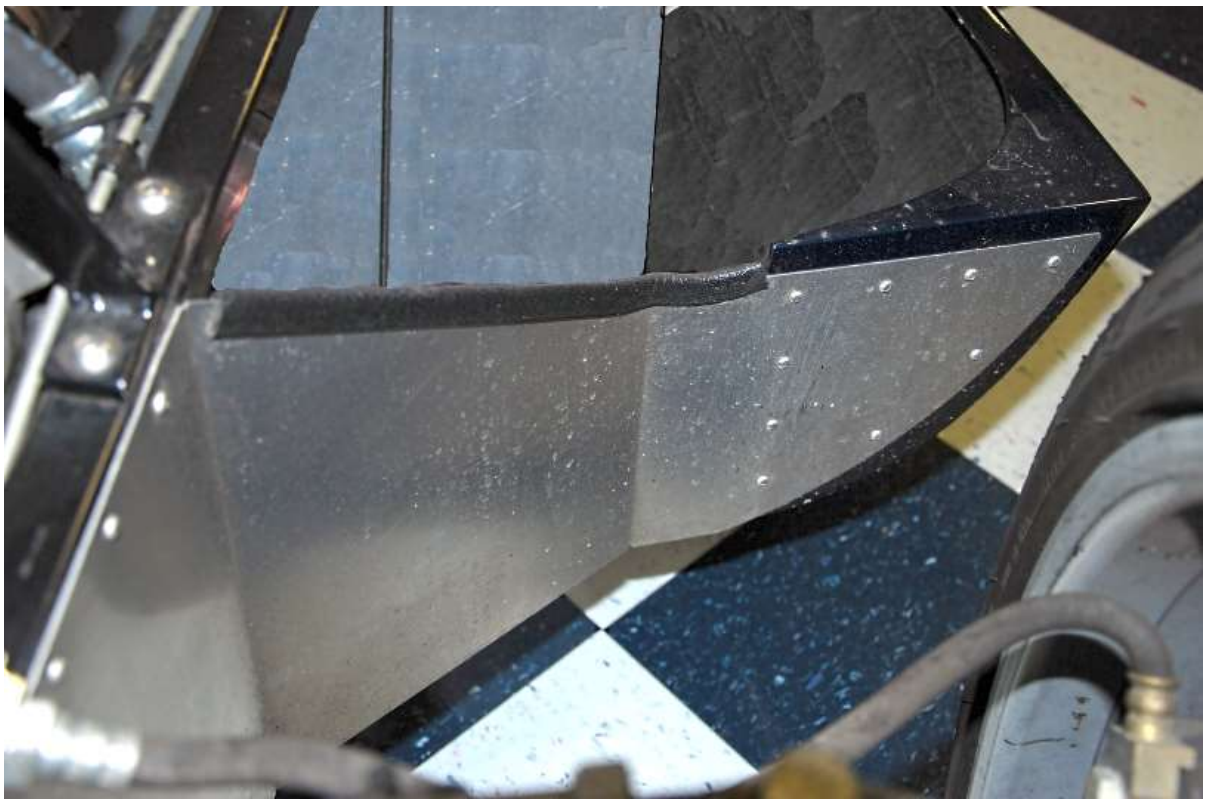
Mark the lower splash guard where it will touch the 1”x 1” tube for rivets.
Drill and rivet the lower splash guard to the tube using ⅛” rivets.



The lower splash guard on the outside can either mount on the inside of the body or on the outside of the body as shown below.

- Make sure that the front of the lower section of body is even with the nose when it is down.

Apply silicone to the outside of the lower splash guard then mark and rivet the outside of the lower splash guard to the body.



Note the Push some bulb weather-stripping onto the splashguards where they can contact each other.
Silicone the weather-stripping around the splashguard to the nose from the backside of the wheel well.

Rear Wheel

Push press-on trim onto the rear splashguards.
Hold the panel in place in the wheel well. The bent edge should be vertical and aligned with the backside of the quad shock mount. The top section should run along the ¾" tube in that area.

Use some of the self-tapping #6 screws to hold it in place.
Remove the panel and silicone where it will contact the trunk side and along the inside of the flange on the body.
Drill and rivet the panel in place along the trunk side and through the bottom corner of the body into the aluminum

Scoops

Silicone, rivet tool
Secondary body fasteners, Coupe scoops

Silicone and rivet the scoops onto the body and nose.

Rear mesh

- Tin snips, marker
- Side Louvers, fasteners
- The rear mesh is a nice touch for looks but not necessary.
- There are different ways to mount the mesh, using spacers and fasteners or bend the sides and use silicone, it is up to you.
- Lowes and Home Depot have a great fastener/parts area if using spacers and fasteners

Hold the mesh up to the rear vent area and mark the outline on the mesh.
Bend the mesh to the shape or use tin snips to cut the shape of the vent.
If bending, cut the depth you would like the mesh to sit at otherwise cut or find spacers and fasteners to get the correct depth.

Finishing Touches

Alignment Specifications

Take your new car to an alignment shop and have the car aligned properly before hitting the track. A minor flaw in alignment can cause very "twitchy" handling. Avoid temptation and never drive a car without proper alignment.

Front

For a car using a manual steering rack or the power rack without power use the following specifications:

Caster: 3°
Camber: -0.5°
Total Toe: $^{1}/_{16}$"

For a car using power steering car use the following specifications:

Caster: 7°
Camber: -0.5°

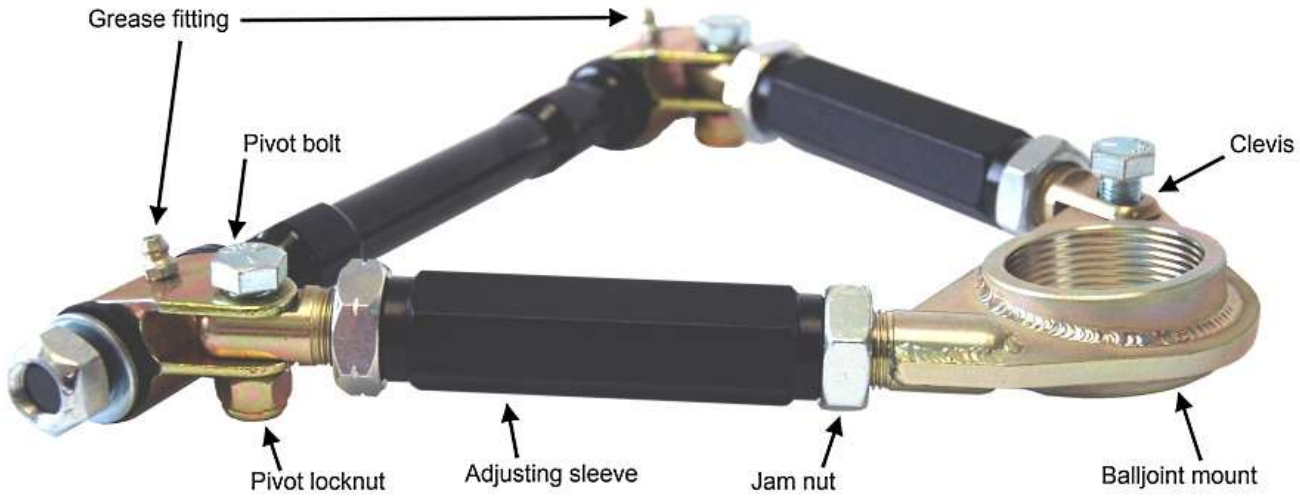
Total Toe: $^{1}/_{16}$”

Rear (IRS only)

Camber: -1°
Total Toe: $^{1}/_{16}$”

Adjusting the upper control Arm

- Use the diagram below for reference.



Slightly loosen the three pivot bolts using a ⅝” and $^{11}/_{16}$” wrench.
Loosen the jam nuts on both ends of each adjusting tubes using a 1⅛” wrench. Turn the adjusting tubes to lengthen or shorten the arm.
After you have adjusted the arm to the desired length, tighten down the jam nuts against the adjusting tubes, and then tighten each of the three pivot bolts. Torque the pivot bolts to 60 lbft.
Grease both ends using chassis grease frequently to insure smooth, trouble free operation.

- If the pivots will not take grease, the endplay may be too tight.
- There should never be more than 1” of thread showing past the tightened down jam nuts on either end of both adjusting tubes.

The Pivot Bolts must be loosened while the car is being aligned and retightened afterwards

Optional Parts

Instructions are included separately with each option when shipped.

Chapter

6

Performance Reference Material and Technical Support


Factory Five Racing
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Wheels and Tires

If using a wheel wider than 7", FFR front lower control arms are needed to prevent the wheels rubbing the control arms.

The front of the car can accommodate up to a 10" wheel with 315/35R-17. The rear of the car can accommodate up to a 12" wheel with 335/35R-17

If you are using bolt-on aluminum Halibrand style wheel, we recommend using B.F. Goodrich® Radial T/A's, but in different sizes. The dimensions are the same 235/60/R15's up front, but bigger 275/50/R15's in the rear.

Tire	Rim	Acceptable range
235/60 15		6.5 – 8.5
245/45 17	8	7.5 – 9
275/50 15		7.5 – 10
275/40 17	9	9 – 11
315/35 17	10	10 – 12
335/35 17	11	11 – 13

Information from Pirelli.com, yokohamatire.com and bfgoodrich.com

The max rim width for a 3-link is a 10.50"
If you have any questions please call the Tech department at 508-291-3443.

Wheel specifications:

	Best	Acceptable range
Front:		
8" rim	5" Backspace	
9" rim	5" Backspace	5"-6"
10" rim	6" Backspace	
Rear:		
9" rim	6" Backspace	4"- 6"
10" rim	6" Backspace	4"- 6"
11" rim	6" Backspace	5"- 6"
12" rim	6" Backspace	

If a modern look is what you're after, you may want to try the 17" Cobra™ R or FR style wheels. If using the standard width 1987-93 rear, it is possible to use aftermarket 10.5" wide, 27mm offset wheels. If using a rear end that has been converted to 5-lug using the "Cobra™" brake kit use two (4) 5.95" backspace wheels.

Ford Racing Cobra™ R 17" wheels and 13" Cobra™ Brakes.

17”x 9” and 17”x 10.5” FR style wheels.

Our online parts catalog: factoryfiveparts.com has more views of these wheels on cars.

Left: 15” FFR Halibrand style. Right 17” FFR Halibrand Style

Performance Modifications

Seats

For the road racers/autocrossers that want more side support, Factory five offers a variety of different options. Check out www.factoryfiveparts.com

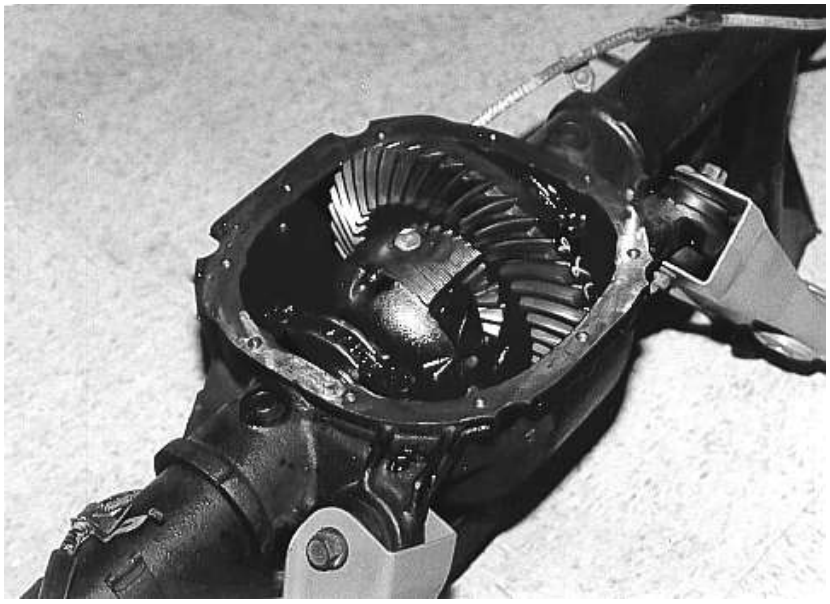
- The following modifications and set-ups fall under the category of getting more horsepower from your engine and making your car perform better. You will find a hundred people a day that will tell you what you’ve got to have. We just want to start you out with the easy modifications that net large returns without large cash outlays or serious changes to the stock motor and drive

train. Remember that a 2,100 lb. car stresses the parts less than a 3,100 lb. Mustang does, so all of the components will last longer and can take more abuse than they did on the Mustang. Check out www.factoryfive.com to see what we offer.

Gears

The Mustang 5.0 manual transmission car comes with either 2.73 or 3.08 rear end gear ratios from the factory. If you can get a rear from an automatic car it will have 3.27 gears. There is an ID tag on the rear differential. If you find that your rear end is missing its ID tag, there is a good chance that the rear end was modified. To find out what ratio is on the differential, mark the pinion and axle at a start point. Turn the axle exactly one rotation and count the number of rotations that the pinion makes compared to the reference mark. For example: 3 ½ turns is a 3.55 rear ratio, etc…. The other way to check the ratio out is to open the rear differential up and look on the ring gear. While the rear is open change the fluid. This never gets done enough on the car.

Changing the gear ratio is one of the least expensive ways to improve your car's performance and it is easiest to do before assembly, since the rear is out of the car. If you know you are going to change the gears get the 2.73 rear since these are the most readily available, the least expensive and the least abused. All of the gear ratios work well with our car but we've found that installing an aftermarket 3.55 ratio really wakes the engine up. If you change the rear end gears, don't forget to change the speedometer sending unit gear so that the speedometer reads correctly unless you are running an electric Speedometer, you can calibrate it. Wherever you get the rear gears from should be able to get the correct gear for your application. If you cannot find the correct gear call "Texas Mustang Parts" 800-527-1588, www.texasmustang.com , they have the "hard to find" gears.



EFI Engines

- There are three things an engine needs; air, fuel and spark. If you allow more of each of these into the engine, it will make more power.

Throttle Body

Stock Mustang size: 58mm
A 65mm throttle body work well up to 350hp. Ford Racing, BBK, Jegs, Summit Racing etc.… sell many other sizes.

Mass Air Meter

Stock Mustang size: 55mm
In order to increase the flow of air above 5000 rpm, upgrade from the stock mass air sensor. Aftermarket 70 mm or 75 mm mass air units are an excellent choice and have proven effective. If the mass air meter is changed make sure it is calibrated for the injectors you are using or you will have to change the injectors too. Pro-M or Ford Motorsport meters work the best. Usually the mass air meter is larger than the throttle body.

Fuel Injectors

Stock Mustang size: 19lb/hr.
The stock injectors are good for exactly that, a stock engine. If upgrading parts, step up to 24 lb/hr. injectors. They are good up to about 400hp. Make sure that you have the mass air sensor calibrated to the injectors you use.

Upper Intake

The next logical step for breathing is a more free flowing intake manifold. There are a number of intakes available from different companies (e.g. Edelbrock, Trick Flow). Ford also makes a good intake, the cast 1993 Cobra™ intake from Ford Racing.

Heads

The 5.0L Mustang aftermarket is full of aluminum and cast iron heads for the small block Ford. Our favorites are the Edelbrock Victor Jr. and the AFR aluminum heads. These both flow very well, have stock exhaust port heights which allows the use of our headers and not only give you extra horsepower but also remove 50 lbs. in the process.

Cams

If you need to pass emissions testing, use a cam with a CARB number. We like the Ford E303 cam. We have used it with success in our racecars both naturally aspirated and in boosted applications. If building a more radical engine, match the cam to the combination.

Headers

Stock: 1987-1995: 1½" OD
We've found that the Mustang factory headers work well for the stock engine. If you want to go to an aftermarket set, the 1⅝" MAC shorty unequal length headers or Ford Racing 1⅝" unequal length headers fit as bolt on parts. They will reward you with an approximate 5-10 hp bump in the top end. All aftermarket headers use mandrel (smooth consistent bends) bent tubing. The stock ones are not and are restrictive on non-stock engines.

If using a 351W engine there are two options, use 351W engine swap headers from Ford Racing (M-9430-A58) or MAC (E358692) or if smog/catalytic converters are not necessary, use our full length 4 into 4 headers.
Ford Racing offers 1⅝" unequal length Stainless Steel headers that are bolt on parts. They will reward you with a nicer look and a small horsepower increase.

Timing

Most computer chips simply change the timing of the engine and slightly enrich the mixture. Using a timing light, advancing the base timing to 14° will do the same. Higher octane fuel will be needed.

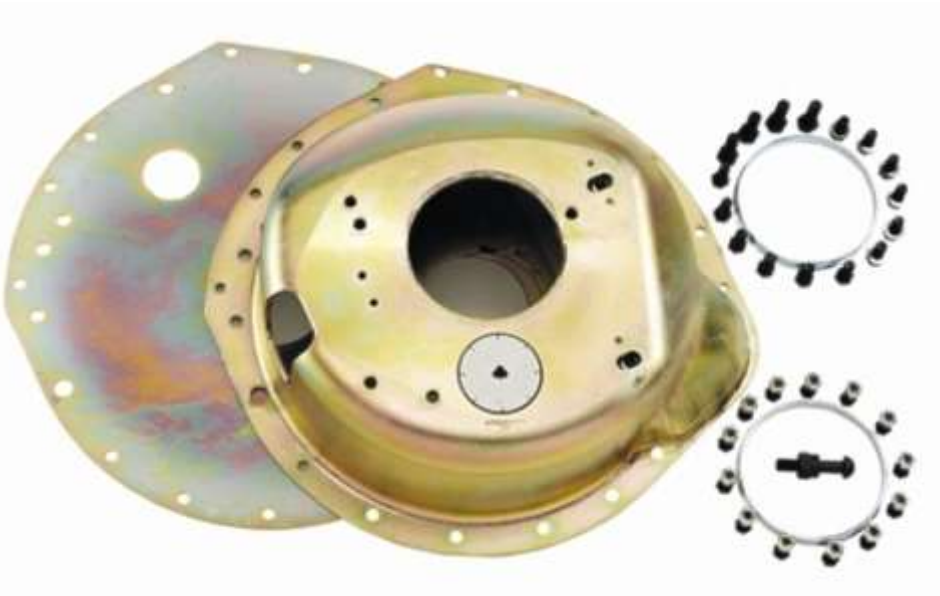
Under-drive Pulleys

Yes. They work well on all cars.

Oil Cooler

Not really necessary on small blocks or cars that aren't raced heavily. They look nice when installed in the smaller opening below the radiator. For supercharged/turbocharged or big block track cars an oil cooler will help.
Factory Five offers an oil cooler with #10 Stainless Steel braided lines and mounting bracket.

Bellhousing



If you are changing your transmission or want some safety piece of mind, using a SFI approved safety bellhousing makes sense. These usually have mounting locations for many different transmissions built into them. Ford Racing, McCloud, Lakewood, and Quicktime are a few companies that make Ford specific ones.

High Horsepower Transmissions

Stock: T-5

The stock T-5 is good for the stock 302 engine. If the engine is going to have some work done to it then an upgrade to a heavy duty, Ford Racing "Z" T-5 is all that is needed. An additional change to a Tremec TKO 500 or 600 is needed if the engine that will be used has 350lbft of torque or more. One unique feature of the Tremec TKO is it allows the shifter to be relocated 8" forward of the normal shifter location if a vertical shifter is desired verses a forward angled shifter.

Steering Rack

Stock: 15:1

Once the car is rolling either a 15:1 or 18:1 rack will yield about the same effort feel. This is good for most driving situations. We have found that many of the Challenge Car racers prefer to use power steering. This can be done by using the stock 1987-1993 15:1 Mustang power rack and power steering pump. If changing to a manual 18:1 rack, a universal joint with a different number of splines will be necessary in order to connect the steering shaft to the steering rack. Factory Five offers a 18:1 manual rack and the correct splined adapter for it.

Spindles

87-93 – 4 lug, limited wheel selection, limited brake packages available

94-04 – 5 lug, many wheels and brakes available

FFR two piece spindles (FFR#14850) – 5 lug, many wheels and brakes plus improved suspension geometry, improved steering feel and more adjustability over 94-04 spindles.

Rear Suspension

The standard solid axle 4-link rear suspension works well, is low maintenance and is reliable. Which rear suspension you choose depends on the type of driving you do a majority of the time. Each one is best for one application and is good in other applications.
4-link suspension – Good all-around suspension for everyday driving. Best for drag racing applications.

3-link suspension - This is for the more serious driver that goes to more road course track events and wants to start exploring the limit without giving up the "off the line" bite of a solid axle.

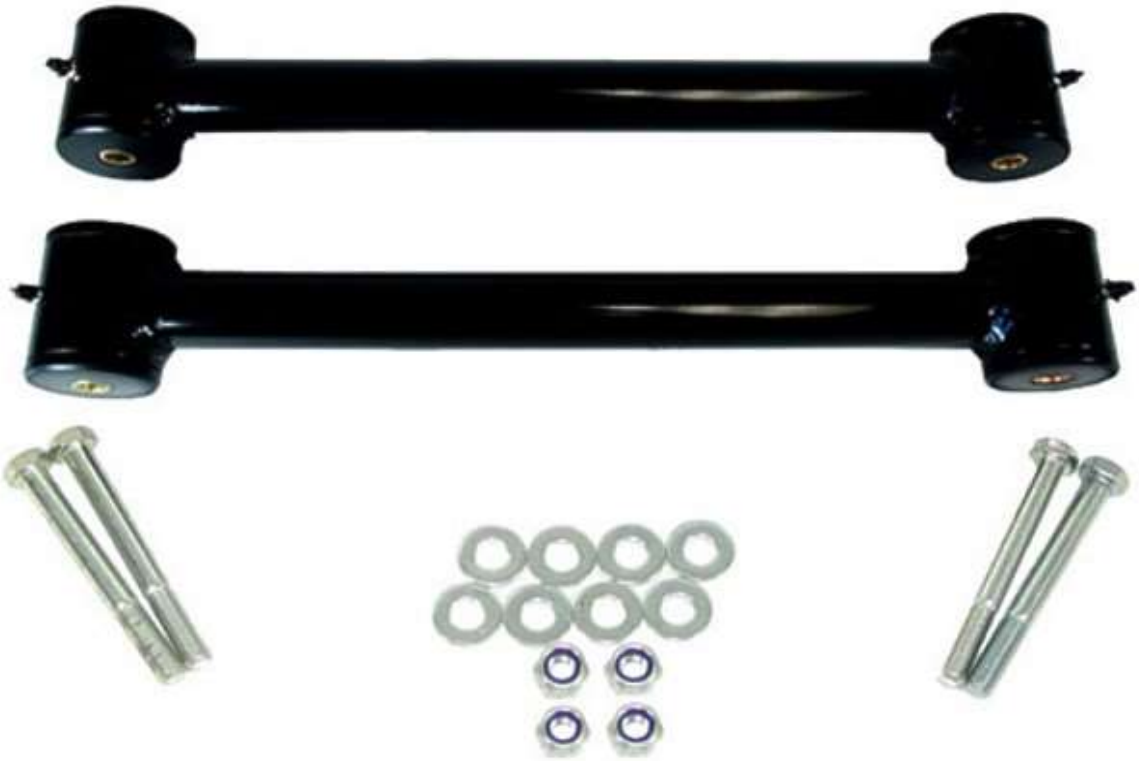
IRS suspension – Good everyday driving suspension. The IRS is best for rough surfaces

Control Arms

Stock: Stamped steel with rubber bushings.

Front: The stock front arms work well all round. The Factory Five tubular lower control arms with polyurethane bushings are lighter, eliminate the rubber and look better than the stock Mustang arms.

Rear: Using tubular control arms with polyurethane bushings helps to locate the solid axle and hook up better on the drag launches.



Shocks/Springs

Using the Mustang rear coil springs and shocks gives a comfortable ride. For a slightly stiffer suspension, replace the stock rear shocks with aftermarket units. We have found that KYB makes an inexpensive good replacement that roughly 20% stiffer than stock.

For the well balanced fun to drive car, the 3-link rear suspension combined with the Factory Five custom valved Koni rear coil-over shocks work the best.

Factory Five offers a couple different shock/spring packages.
An affordable rear coil-over package which includes shocks and 350 lb/in springs.

A road racing oriented 3-Link and front coil-over package, which includes stiffer valved shocks and 750 lb/in front springs and 500 lb/in rear springs.

High Performance Manual Braking Systems

The braking systems recommended below are designed for those searching for higher performance braking capabilities. These are systems that have been used successfully by our customers and us. Each component below has been selected to optimize the capabilities of the system. If an attempt is made to utilize some of the specified components, but not all of them in combination, then braking abilities may not be satisfactory.

- For **all** manual braking setups use the brake pedal from a 1984 4-cylinder Mustang (Ford Part #08BZ2455A), this pedal can also be made by modifying the V8 Mustang pedal as specified in the FFR Manual (this modification should be done by a professional shop).
- Some of the setups may not clear some wheel sizes and designs.
- For **all** rear disc brake setups, use a proportioning valve on the **front** brakes.
- We recommend using Porterfield R-4, Carbotech XP8 or 9, or Hawk Blue brake pads. Though costly, you will find a significant difference in your cars ability to stop. If these pads are out of your price range, next in line would be Performance Friction Z-Compound pads available at Autozone.

4-lug (4.25" pattern)

Master Cylinder – FFR $^{15}/_{16}$" Master cylinder/Proportioning valve (FFR#14739

11"Front

Spindle OEM 87-93 V8 Mustang front spindle
Rotor OEM 87-93 V8 Mustang 11" rotor
Caliper OEM 87-93 V8 Mustang 60mm caliper

10.5"Rear

Stainless Steel Brake Corp. 87-93 Mustang disc brake conversion kit (Part #A-112-1)
OR
Disc Brakes R' Us - Select FORD and FACTORY FIVE for options
OR
Rotor OEM 87-88 Thunderbird Turbo Coupe 10.5" rotor
Caliper OEM 87-88 Thunderbird Turbo Coupe 1.4375" caliper
Bracket (If attempting to purchase the parts above separately, be aware that the mounting brackets for the calipers from the Thunderbirds do not work with the 87-93 Mustang axles, and the brackets are **not** sold by any major manufacturer individually. There are a few small machine shops that sell custom brackets to make these calipers work.)
OR
Complete 87-88 Thunderbird Turbo Coupe rear axle (This axle measures 61.125" hub-to-hub where the 87-93 Mustang measures 59.25" hub-to-hub, so wheel offsets need to be made accordingly).

5-Lug (4.5"pattern)

Master Cylinder – FFR $^{15}/_{16}$" Master cylinder/Proportioning valve (FFR#14739)

Front

11"Front

FFR Roadster two piece front spindles
FFR Front Brake set (Twin piston aluminum 1.5625" PBR calipers)
OR
Spindle OEM 94-newer Mustang front spindle
Rotor OEM 99-01 Mustang **GT** 11" rotor
Caliper OEM 99-01 Mustang **GT** 2 piston 1.5625" PBR caliper

13" Front

Spindle FFR Roadster two piece front spindles
Rotor OEM 94-04 Mustang **Cobra™ or Mach 1** 13" rotor
Caliper OEM 94-04 Mustang **Cobra™ or Mach 1** 2 piston 1.76" PBR caliper
OR
Spindle OEM 94-newer Mustang front spindle
Rotor OEM 94-04 Mustang **Cobra™ or Mach 1** 13" rotor
Caliper OEM 94-04 Mustang **Cobra™ or Mach 1** 2 piston 1.76" PBR caliper

Rear

For 87-93 width rear axle

11.65" Rear
Factory Five Performance 11.65" Brake Set (FFR#14834)
OR
Rotor OEM 94-98 Mustang Cobra™ 11.65" rotor
Caliper OEM 94-98 Mustang Cobra™ single piston 1.4375" caliper
Bracket FFR 11.65" Caliper mount brackets (FFR#14571, 14572)

IRS

Master Cylinder – FFR $^{15}/_{16}$" Master cylinder/Proportioning valve (FFR#14739)

- The rear discs are 5-lug, so vehicles need to have the front rotors converted to 5-lug to match.
- Front rotors from a '91 Lincoln Mark VII can be used. The rotors bolt right on to the 87-93 front spindle, and use the 87-93 Mustang caliper.
- Thunderbird Super Coupe 5-lug rear brakes have a 4.25" bolt circle while the Mustang 5-lug bolt pattern uses a 4.5" bolt circle. The IRS hubs need to be drilled to the Mustang pattern or 1999-2004 Mustang Cobra™ IRS hubs can be used. FFR supplies new studs with the IRS kit.

11.65" Rear
Factory Five 11.65" IRS Brakes (FFR#14778)

Miscellaneous Brake Information

The caliper from the 1984 Lincoln Town Car or 1992 Lincoln Mk 7 will bolt on to the Mustang spindle although the piston is 73mm in diameter, so it would not be well suited for the recommended brake setups above. If this caliper is used, a 1" master cylinder from a '93 Mustang Cobra™, 84-86 Mustang SVO or Bendix # 12669, although this is not an ideal setup.

If you desire a dual master cylinder set up (having individual master cylinders for the front and rear), the following information will help with those installations:

There are several different versions on the market. Dual master cylinder units usually use a balance bar to proportion the amount of line pressures from the front to rear, so no proportioning valve is necessary. We have used a unit from CNC brakes (part # 241). This unit uses the Mustang bolt pattern, so it will simply bolt to the FFR foot box. Use the following table to determine each master cylinder required.

Caliper Piston Area (in^2)	Master Cylinder Bore Diameter (in)
Up to 3.6	⅝
3.6 to 4.2	$^{7}/_{10}$
4.2 to 4.5	¾
4.5 to 4.7	$^{13}/_{16}$"
4.7 to 5.5	⅞
5.5 to 5.9	$^{15}/_{16}$
5.9 to 6.3	1
6.3 to 7.6 max	1⅛

Baer Brakes	602-233-1411 www.baer.com
Stainless Steel Brakes Corporation	800-448-7722 www.ssbrakes.com
Disc Brakes R' Us	888-558-5757 www.discbrakesrus.com
AFCO Racing Products (supplier of CNC components)	812-897-0900 www.afcoracing.com
Mustang Part's Specialties, Inc.	770-867-2644 www.stangparts.com
Porterfield Enterprises Ltd.	800-537-6842 www.porterfield-brakes.com
Carbotech Engineering	954-493-9669 www.ctbrakes.com
Hawk Brake, Inc.	800-542-0972 www.hawkbrake.com

To calculate piston area, use the following equation: πr^2 (3.14159 x radius squared.)
If using calipers with more than one piston, calculate the area for each piston, and then add the areas together. If the caliper has pistons on both sides of the rotor, disregard one side.

Helpful Reference Material

Must Reads

- www.FFCobra.com . The largest discussion forum for Factory Five Racing kits. Also has many vendor links.

Helpful

- 5.0L Ford Dyno Tests. By Richard Holdener. Published by SA Design, Cartech. 11605 Kost Dam Rd., North Branch, MN 55056.
- Engineer to Win. By Carroll Smith. Published by Motorbooks International Publishers and Wholesalers Inc. PO Box 2, 729 Prospect Avenue, Osceola, WI 54020
- Prepare to Win. By Carroll Smith. Published by Motorbooks International Publishers and Wholesalers, PO Box 2, 729 Prospect Avenue, Osceola, WI 54020.
- Performance Handling, How to make your car handle. By Alexander and published by Motorbooks International Publishers and Wholesalers, PO Box 2, 729 Prospect Avenue, Osceola, WI 54020.
- How to Understand, Service, and Modify Ford Fuel Injection & Electronic Engine Control, 1988-1993. By Charles O. Probst. Published and distributed by Robert Bentley Inc. Publishers, 1000 Massachusetts Avenue, Cambridge, MA 02138.
- The Official Mustang 5.0 Technical Reference and Performance Handbook. By Al Kirschenbaum. Published by BentleyPublishers.com. 1734 Massachusetts Ave, Cambridge, MA 02138

Catalogs/Parts

- **Ford Performance Parts** - Catalog, current edition. Available at your local speed shop, an authorized Ford Racing distributor or www.fordracingparts.com
- **Tire Rack** - Wholesale tire and wheel source. 888-541-1777. www.tirerack.com
- **Repair Manuals** - Repair manual specialists. 800-426-4214. www.repairmanual.com
- **Jeg's Performance** - High performance products. 800-345-4545. www.jegs.com
- **Summit Racing** - High performance products. 800-230-3030. www.summitracing.com

Factory Five Aftermarket

- **Breeze Automotive** - Products, kits & parts to streamline FFR assembly. 508-533-6455. www.breezeautomotive.com
- **FF Metal** - Custom metal components for your FFR Roadster. 703-550-2777. www.ffmetal.com
- **Finish Line** - Large selection of vintage parts and accessories. 888-436-9113. www.finishlineaccessories.com
- **Mike's Custom Parts** - Custom billet aluminum parts for your FFR. 508-226-2265. www.replicaparts.com
- **Very Cool Parts** - Distributor of the coolest parts available for your FFR. 760-403-6266. www.verycoolparts.com

Tools

- **Craftsman Tools** - Sears brand "guaranteed forever" tools. 800-549-4505. www.craftsman.com
- **Husky Tools** – Home Depot "guaranteed forever" tools. www.homedepot.com
- **Kobalt Tools** – Lowe's "guaranteed forever" tools. www.lowes.com
- **Eastwood** - Unique automotive tools. 800-345-1178. www.eastwoodco.com
- **Harbor Freight** - Discount tools. 800-423-2567. www.harborfreight.com
- **Northern Tools** - Discount tools and service products. 800-221-0516. www.northerntool.com
- **Paint over Rust 15** - Stops rust permanently – guaranteed! 800-4576715. www.por15.com

Insurance

- **Northeast Classic Auto Insurance** - Mike Smith. 800-866-6440. www.classiccarinsurance.com
- **Country Companies** - 800-950-5877. www.countryfinancial.com
- **Spinap** - Fred Benedict. Eastern US. 914-946-9300.

Others

- Modified Mustangs and Fast Ford Magazine
- Kit Car Magazine

A Final Note about Completed Cars and Car Builders

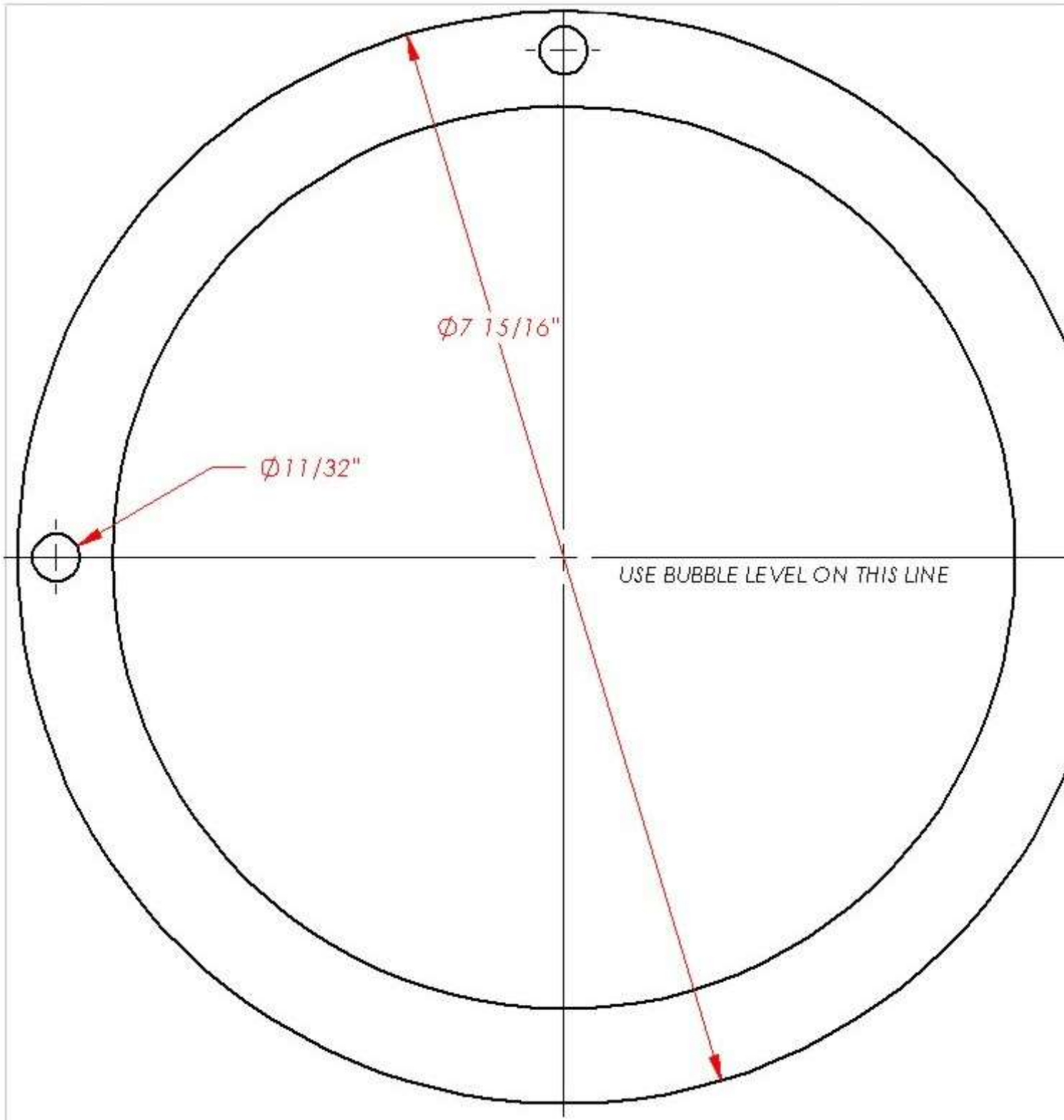
If you are reading this manual then you must be at least contemplating the task of building your own race car. Many component car companies offer services to those folks who find part or all of this too much to tackle. We don't.

If you are considering buying a completed vehicle from a third party (we do not and will not perform any vehicle assembly work for customers), keep the following in mind:

Factory Five Racing does not build or sell completed or partially completed vehicles. We are aware of a number of performance and hot rod shops that claim to specialize in building race cars and kit cars. We have over the years compiled a list of some of them, which includes parts yards, used parts suppliers, paint and body shops, hot rod assemblers, and race car shops.

Please know that there is no connection between FFR and those outside shops. There are no authorized FFR dealerships, and we cannot recommend any of the particular businesses that are on our lists, nor do we warrantee their work. They are provided simply to help you identify businesses in your area that offer these types of services. You should research these carefully before choosing to purchase their products and/or services.

Appendix A – Templates



ROADSTER
SPEC CAR
COUPE

DIMENSIONS ARE IN INCHES
TOLERANCES:
TWO PLACE DECIMAL ±0.01
THREE PLACE DECIMAL ±0.005
FOUR PLACE DECIMAL ±0.001

MATERIAL

FINISH

USED ON

APPLICATION

PRINTED
6/30/2010

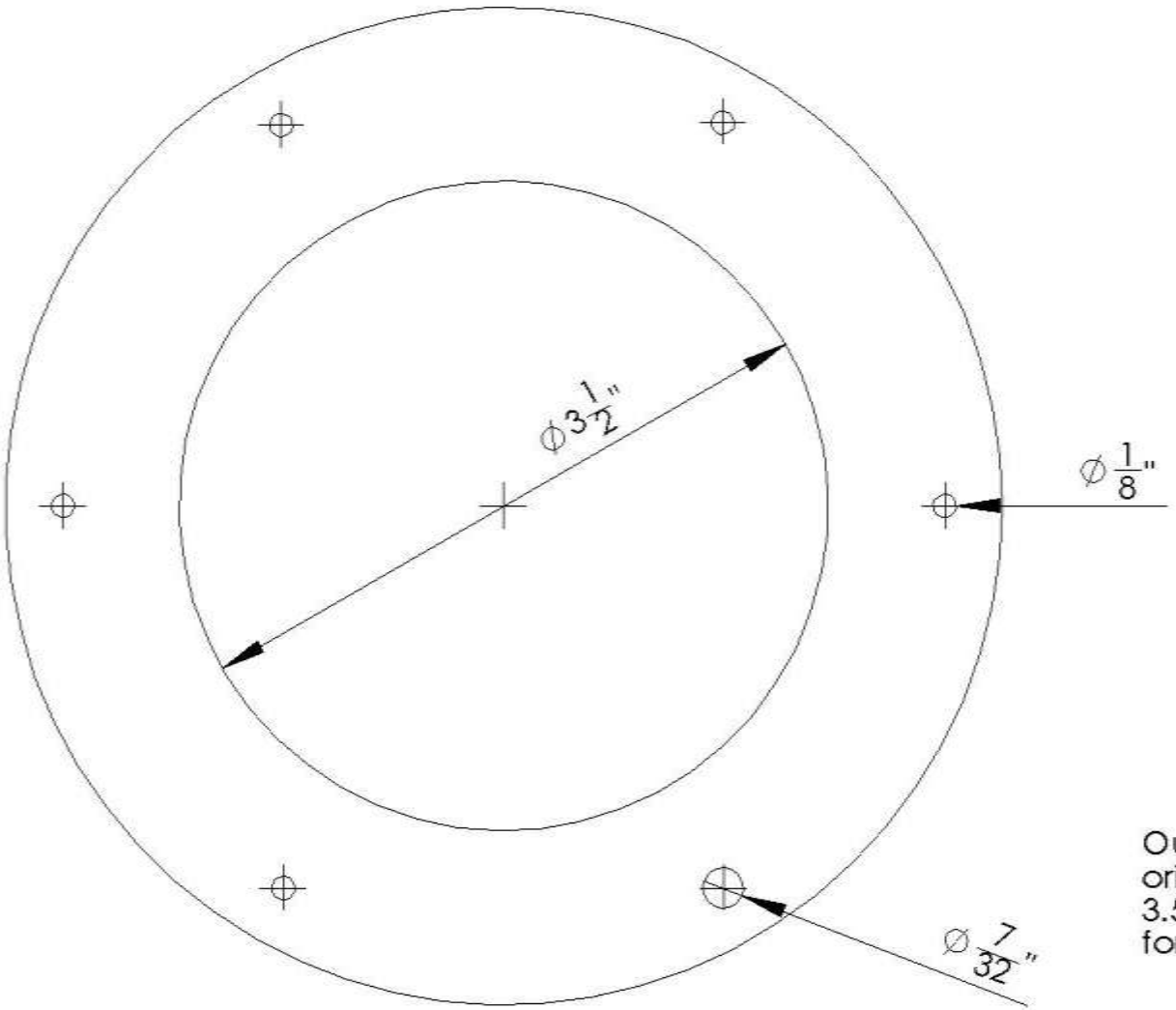
	NAME	DATE
DRAWN	JI	12/14/09
CHECKED		
ENG APPR.		
MFG APPR.		
Q.A.		
COMMENTS:		

Factory Five Racing, Inc.

HEADLIGHT TEMPLATE

SIZE A | DWG. NO. 11001 | REV. C

SCALE: 1:1 | WEIGHT: | SHEET 1 OF 1



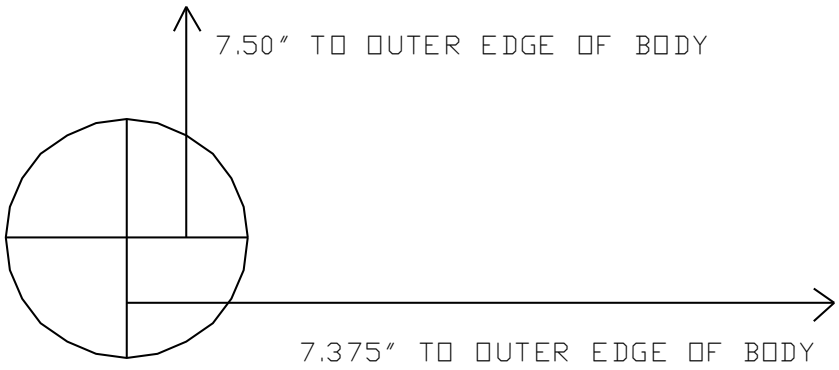
Outside circle is shown for placement orientation only, do not cut. Use a 3.5" holesaw in center and 1/8" drill bit for all except one small hole.

	UNLESS OTHERWISE SPECIFIED:		NAME	DATE
ROADSTER		DRAWN	JI	9/26/97
COUPE	DIMENSIONS ARE IN INCHES TOLERANCES: TWO PLACE DECIMAL ±0.01 THREE PLACE DECIMAL ±0.005 FOUR PLACE DECIMAL ±0.001	CHECKED		
		ENG APPR.		
		MFG APPR.		
	MATERIAL	Q.A.		
USED ON	FINISH	COMMENTS:		

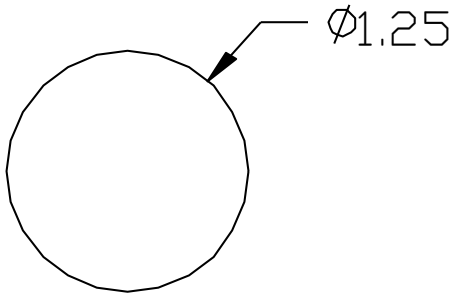
Factory Five Racing, Inc.

TITLE:
FUEL NECK FLANGE TEMPLATE

SIZE	DWG. NO.	REV
A	11009	E



USE A LEVEL ON THIS LINE

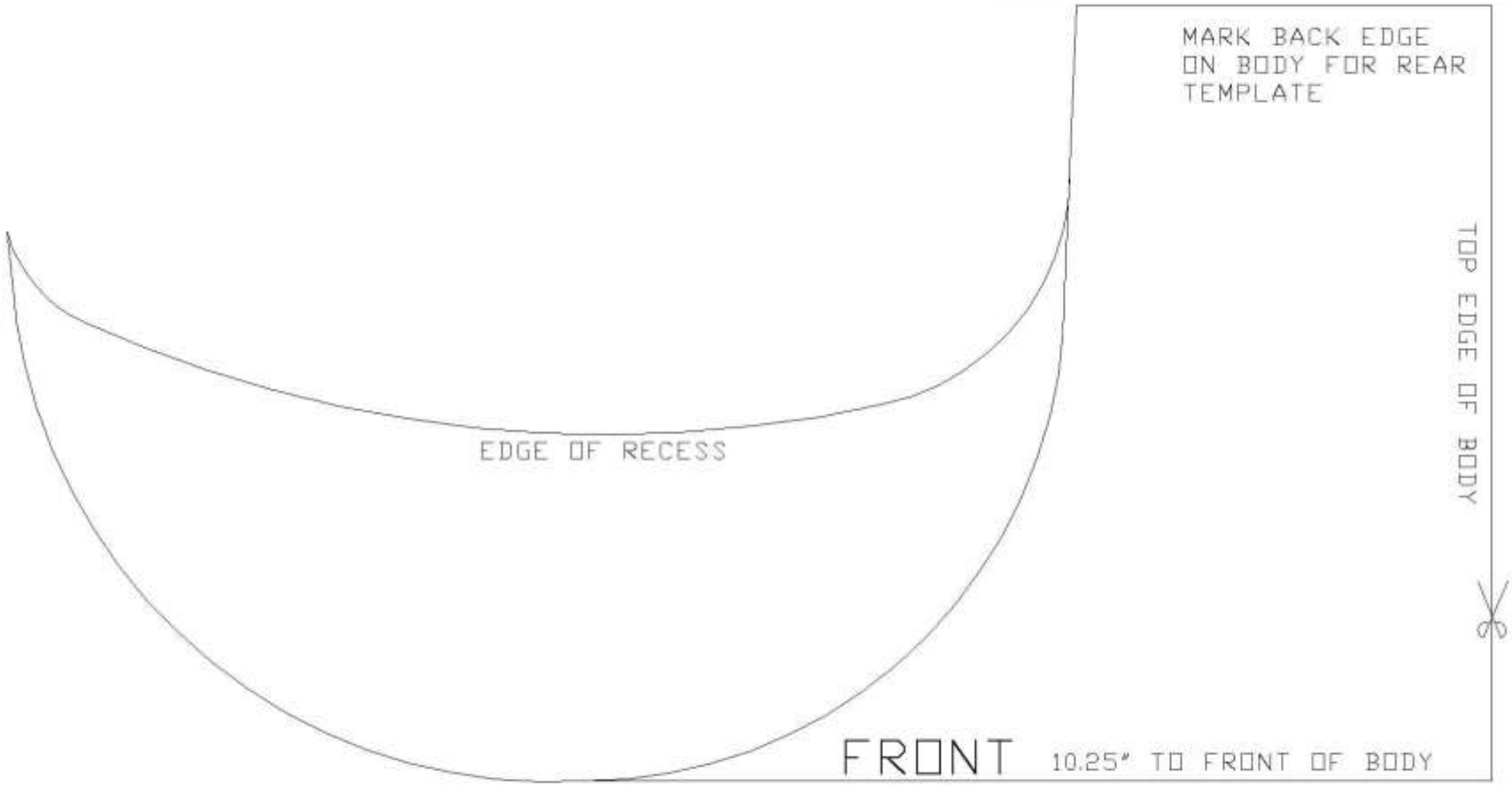


		DIMENSIONS ARE IN INCHES TOLERANCES: FRACTIONAL ±1/32 TWO PLACE DECIMAL ±0.05 THREE PLACE DECIMAL ±0.01		NAME	DATE
			DRAWN	JI	
			CHECKED		
			ENG APPR.		
			MFG APPR.		
		MATERIAL	Q.A.		
			COMMENTS:		
NEXT ASSY	USED ON	FINISH			
APPLICATION		DO NOT SCALE DRAWING			

COUPE TAIL LIGHT TEM

SIZE	DWG. NO.	
A	13022	
SCALE:1:1	WEIGHT:	SH

REVISIONS			
REV.	DESCRIPTION	DATE	APPROVED



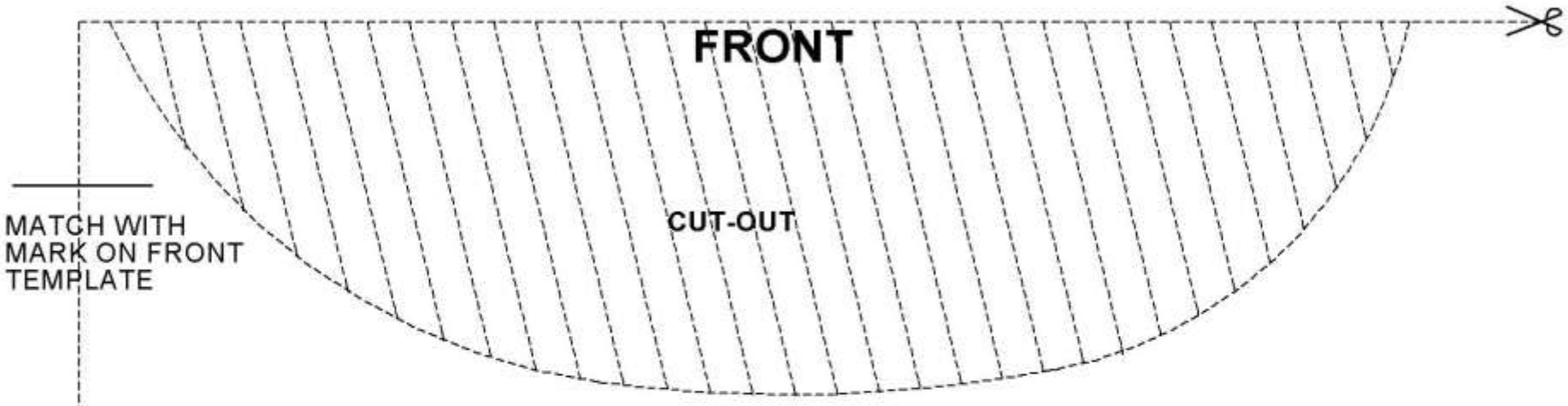
UNLESS OTHERWISE SPECIFIED:		NAME	DATE
DIMENSIONS ARE IN INCHES TOLERANCES: TWO PLACE DECIMAL ±0.01 THREE PLACE DECIMAL ±0.005 FOUR PLACE DECIMAL ±0.001	DRAWN		
	COMMENTS:		
MATERIAL			

Factory Five Racing, Inc.

TITLE:
OUTER SIDE EXHAUST TEMPLATE

SIZE	DWG. NO.	REV

REVISIONS			
REV.	DESCRIPTION	DATE	APPROVED



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		COMMENTS:		
	MATERIAL			
USED ON	FINISH			
APPLICATION		PRINTED	3/7/2011	

Factory Five Racing, Inc.

TITLE:
INNER SIDE EXHAUST TEMPLATE

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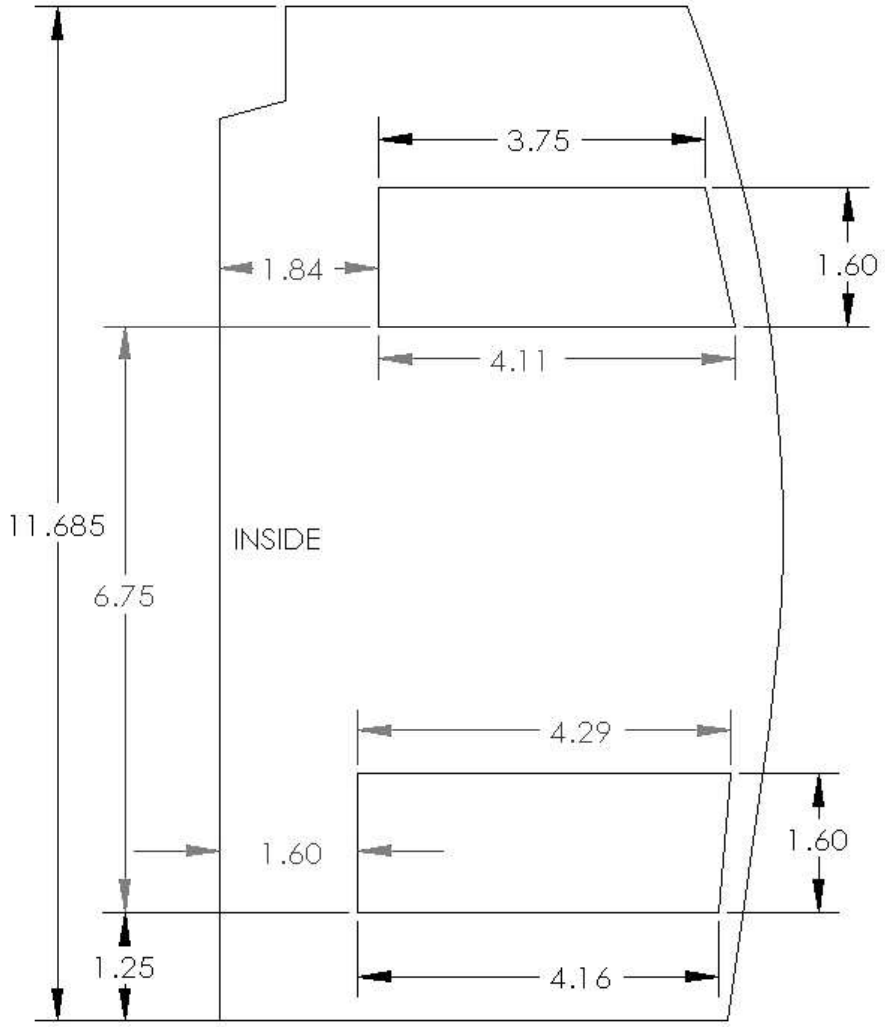
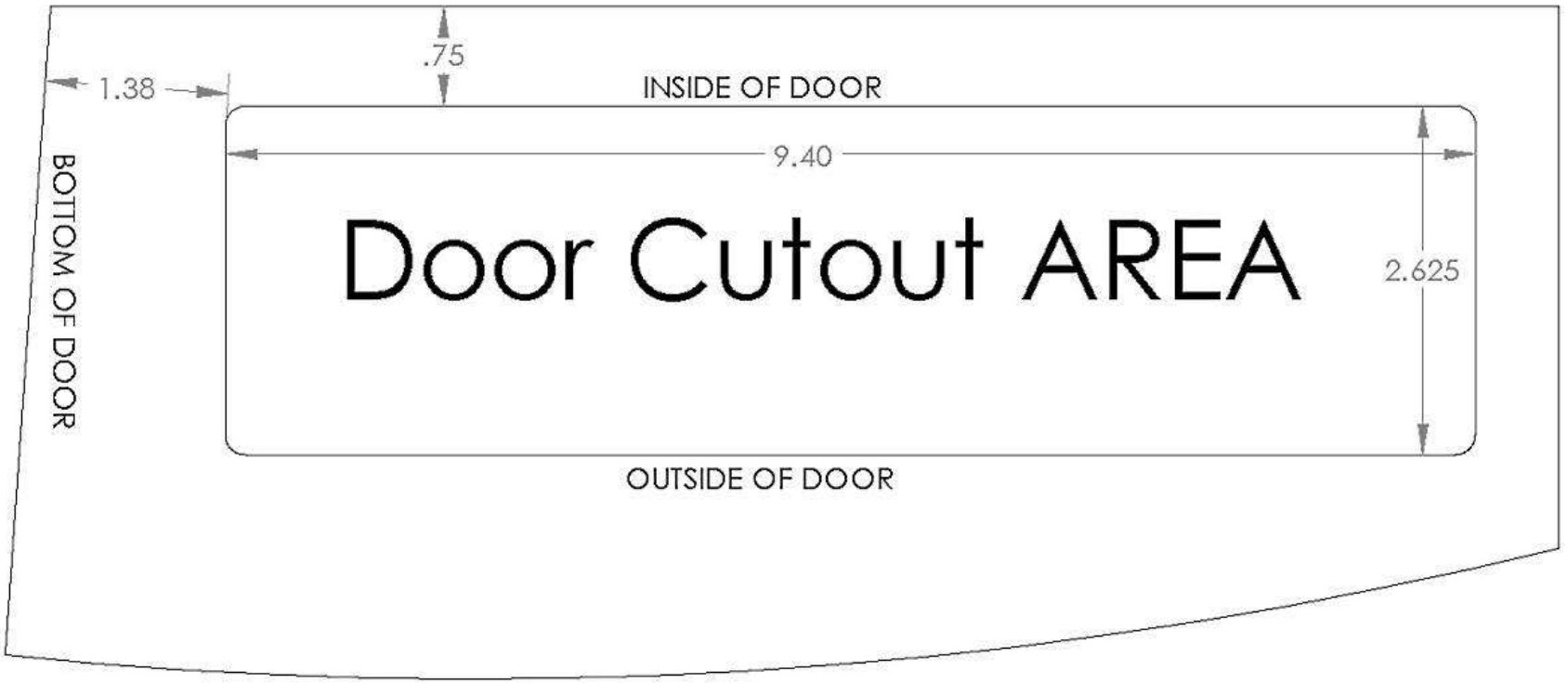
SCALE: 1:1	WEIGHT:	SHEET 1 OF 1



BOTTOM

COUPE	DIMENSIONS ARE IN INCHES TOLERANCES: TWO PLACE DECIMAL ±0.01 THREE PLACE DECIMAL ±0.005 FOUR PLACE DECIMAL ±0.001		NAME	DATE	Factory Five Racing, Inc.
		DRAWN	JC JC	11/19/03	
		CHECKED			DOOR HINGE CUT-OUT DIAGRAM
		ENG APPR.			
	MATERIAL	MFG APPR.			
		Q.A.			
USED ON	FINISH	COMMENTS:			SIZE A DWG. NO. 14035 REV. B
APPLICATION	PRINTED 12/27/2011				SCALE:1:2 WEIGHT: SHEET 1 OF 1

REVISIONS			
REV.	DESCRIPTION	DATE	APPROVED
A	INITIAL RELEASE	11/19/03	
B	BOTTOM FLATTENED	3/16/11	



				NAME	DATE
COUPE	UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN INCHES TOLERANCES: TWO PLACE DECIMAL ±0.01 THREE PLACE DECIMAL ±0.005 FOUR PLACE DECIMAL ±0.001		DRAWN	JC	11/19/03
			COMMENTS:		
	MATERIAL				
USED ON	FINISH				
APPLICATION			PRINTED	9/28/2012	

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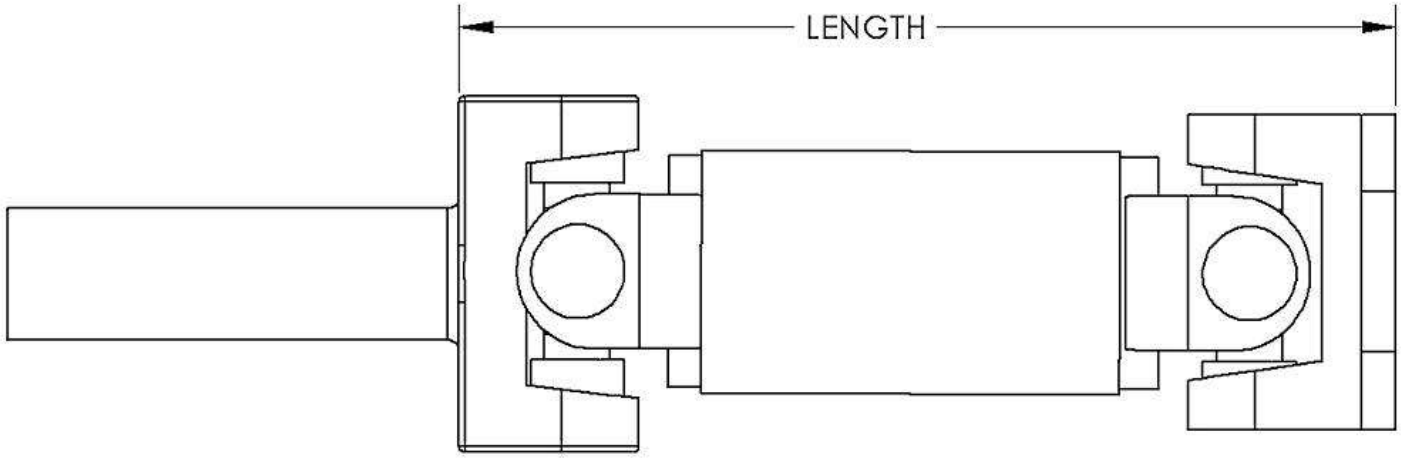
TITLE:
DOOR CUTOUT DIAGRAM

SIZE	DWG. NO.	REV
A	13768	B

SCALE: 1:1.25 WEIGHT: SHEET 1 OF 1

REVISIONS			
REV.	DESCRIPTION	DATE	APPROVED
A	INITIAL RELEASE	12/18/00	
B	ALL SPECIFICATIONS ADDED	6/8/04	
C	SPECIFICATIONS ADDED	8/20/04	
D	LENGTHS CHANGED	8/24/07	
E	LENGTHS ADDED	8/26/08	
F	HOT ROD LENGTHS CHANGED	10/20/08	
G	ROADSTER LNGTHS CHNGED	1/3/11	



Mk. IV ROADSTER	302/351 FORD ENGINE USING T-5 OR TREMEC TRANS.	10.625"
Mk. IV ROADSTER	4.6L USING T-45 OR 3650 TRANS., BB USING TKO TRANS	12.875"
COUPE	302/351 USING T-5 OR TREMEC TRANS.	12.875"
HOT ROD	302/351/4.6L USING T-5, AOD OR TREMEC TRANS.	34.25"
HOT ROD	302/351/4.6L USING T-56 TRANS.	32.50"
HOT ROD	4.6L USING T-45 OR 3650 TRANS	33.00"
HOT ROD	FLATHEAD FORD	32.00"

NOTE: FOR ALL OTHER TRANSMISSIONS, INSTALL TRANS. AND MEASURE

ROADSTER
SPEC CAR
COUPE
HOT ROD
USED ON
APPLICATION

UNLESS OTHERWISE SPECIFIED:
DIMENSIONS ARE IN INCHES
TOLERANCES:
TWO PLACE DECIMAL ±0.01
THREE PLACE DECIMAL ±0.005
FOUR PLACE DECIMAL ±0.001
MATERIAL
FINISH
PRINTED 1/3/2011

	NAME	DATE
DRAWN	JI	12/18/03
CHECKED		
ENG APPR.		
MFG APPR.		
Q.A.		
COMMENTS:		

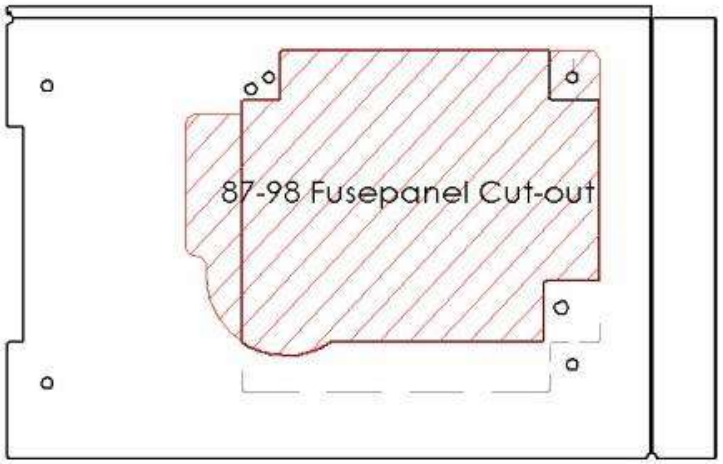
Factory Five Racing, Inc.

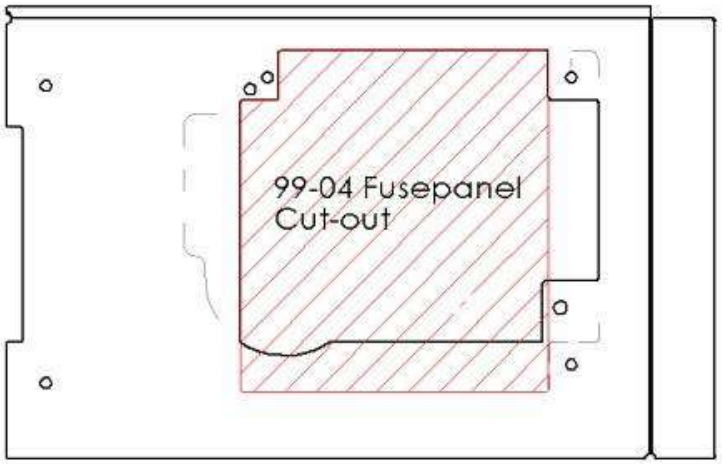
TITLE: DRIVESHAFT DIAGRAM

SIZE	DWG. NO.	REV
A	13023	G

SCALE: 1:2 WEIGHT: SHEET 1 OF 1

REVISIONS			
REV.	DESCRIPTION	DATE	APPROVED





USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED:

DIMENSIONS ARE IN INCHES
TOLERANCES
TWO PLACE DECIMAL ±0.01
THREE PLACE DECIMAL ±0.005
FOUR PLACE DECIMAL ±0.001

MATERIAL
0.040" 6061-T6 ALUM

FINISH

PRINTED
4/14/2010

	NAME	DATE
DRAWN	JI	3/2/05
CHECKED		
ENG APPR.		
MFG APPR.		
Q.A.		

COMMENTS:

NOT TO SCALE

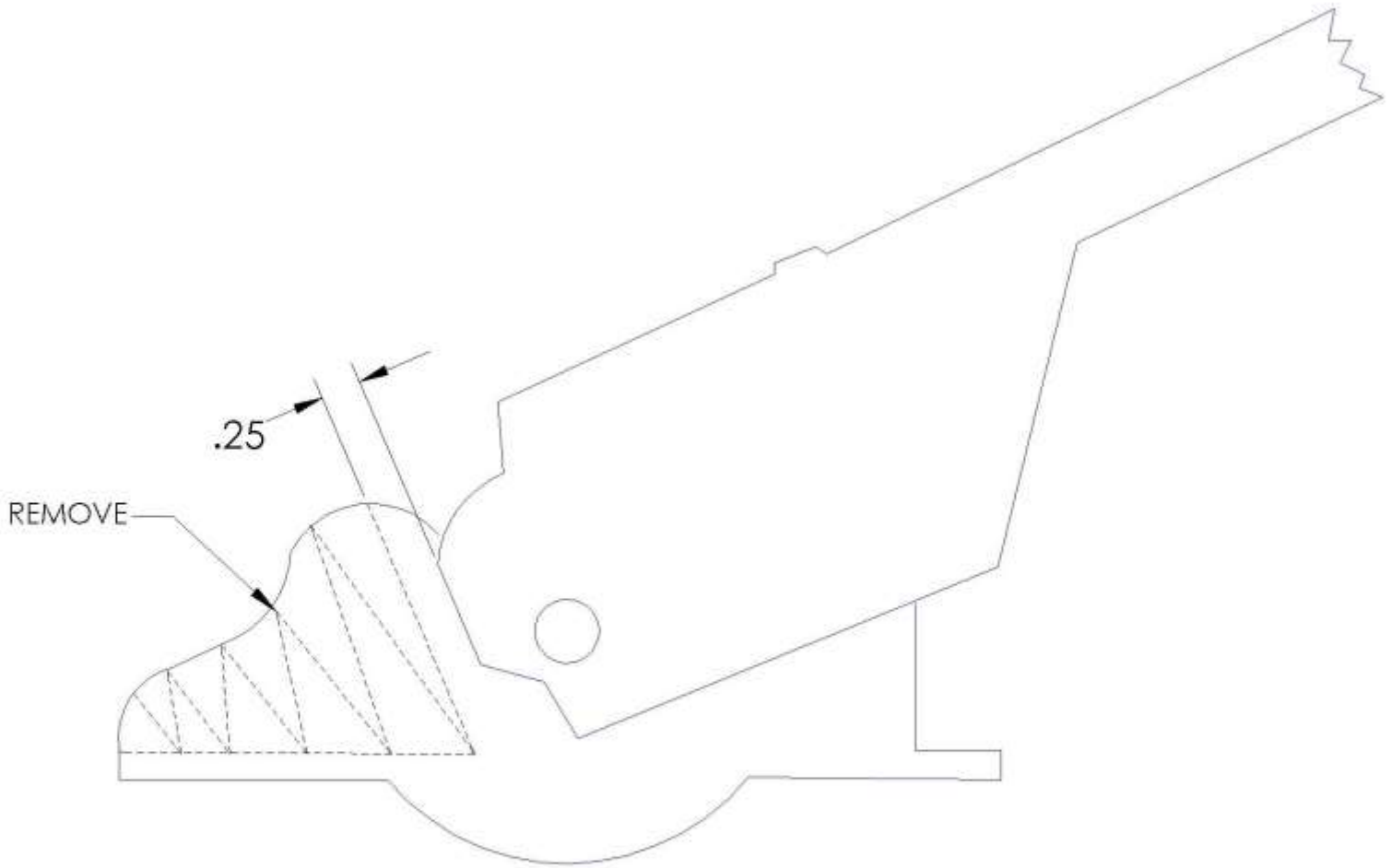
Factory Five Racing, Inc.

TITLE:
FUSE PANEL MOUNT

SIZE	DWG. NO.	REV
A	13647	B

SCALE: 1:2 | WEIGHT: | SHEET 3 OF 3

REVISIONS			
REV.	DESCRIPTION	DATE	APPROVED
A	INITIAL RELEASE		



	UNLESS OTHERWISE SPECIFIED:		NAME	DATE
ROADSTER	DIMENSIONS ARE IN INCHES TOLERANCES: TWO PLACE DECIMAL ±0.01 THREE PLACE DECIMAL ±0.005 FOUR PLACE DECIMAL ±0.001	DRAWN		
		COMMENTS:		
	MATERIAL			
USED ON	FINISH			
APPLICATION		PRINTED	3/7/2011	

Factory Five Racing, Inc.

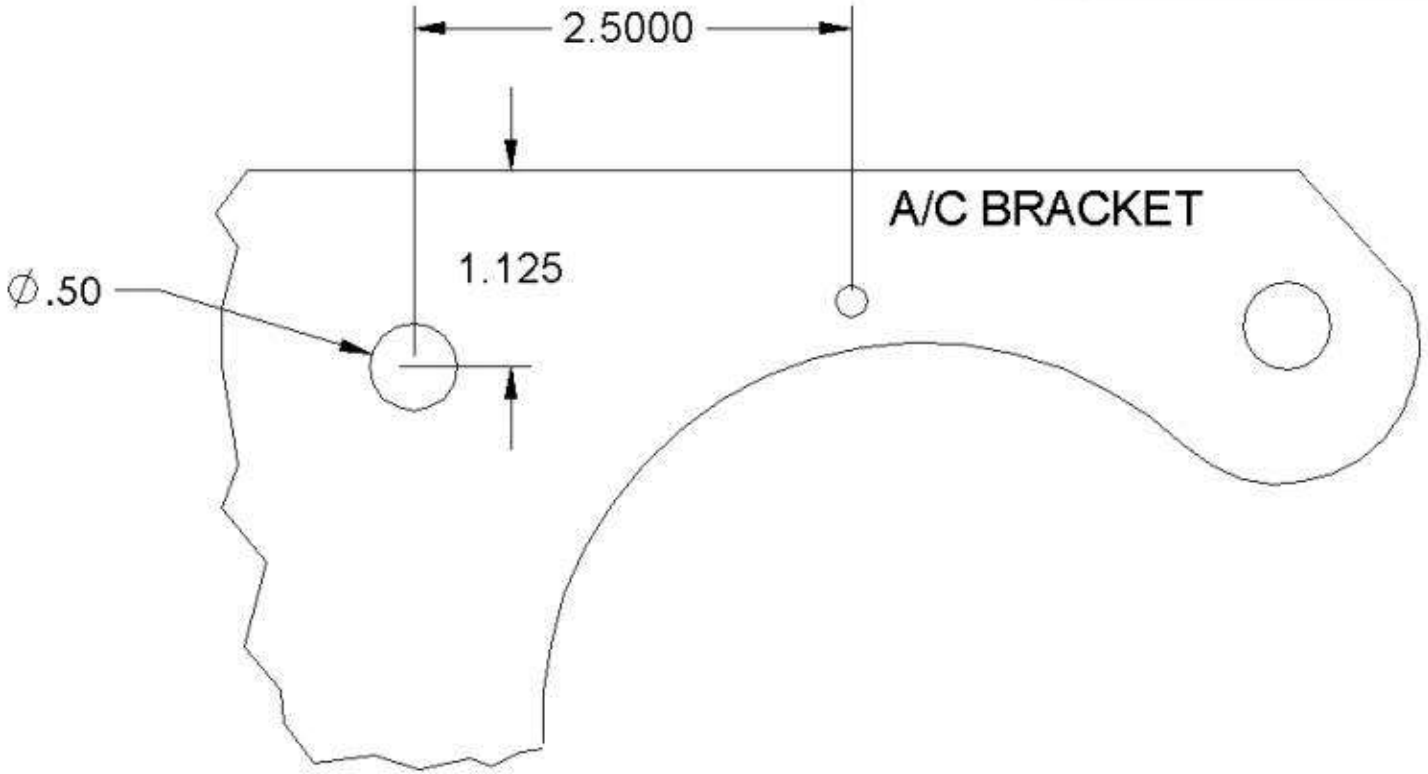
TITLE:
EMERGENCY BRAKE HANDLE CUT DIAGRAM

SIZE	DWG. NO.	REV
A	12124	A

SCALE: 1:1 | WEIGHT: | SHEET 1 OF 1

www.factoryfive.com 508-291-3443

REVISIONS			
REV.	DESCRIPTION	DATE	APPROVED
A	INITIAL RELEASE	9/19/95	



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ROADSTER
COUPE
SPYDER

USED ON
APPLICATION

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DIMENSIONS ARE IN INCHES
TOLERANCES:
TWO PLACE DECIMAL ±0.01
THREE PLACE DECIMAL ±0.005
FOUR PLACE DECIMAL ±0.001
MATERIAL
FINISH

	NAME	DATE
DRAWN		
COMMENTS:		

PRINTED 7/27/2010

Factory Five Racing, Inc.

TITLE: ALTERNATE DRIVE PULLEY HOLE TEMPLATE

SIZE	DWG. NO.	REV
A	12117	A

SCALE: 1:1 WEIGHT: SHEET 1 OF 1

Appendix B – Donor Parts List

FFR COUPE
DONOR PARTS FROM FORD MUSTANG 5.0, 1987 TO 1993

Assembly Name	Part Name	Qty	EFI ONLY	Removed from donor
DRIVETRAIN	CLUTCH CABLE AND CIRCLIP	1		
	ENGINE, 5.0L FORD	1		
	BELLHOUSING W/ MOUNT BOLTS	1		
	T-5 TRANSMISSION W/ MOUNT BOLTS	1		
	TRANSMISSION MOUNT W/MOUNT BOLTS	1		
	DRIVESHAFT AND 4 ORIGINAL BOLTS	1		
	REAR AXLE ASSEMBLY, COMPLETE	1		
	SPEEDOMETER CABLE	1		
	ENGINE MOUNTS, CLEAN STRAIGHT, W/OEM NUTS	2		
	MASS AIR SENSOR	1	*	
EXHAUST	OXYGEN SENSORS	2	*	
FUEL SYSTEM	FUEL TANK W/FILLER NECK, CAP AND MOUNT STRAPS	1		
	FUEL FILTER W/BRACKET AND HOSES	1		
	HIGH PRESSURE FUEL LINE W/FITTING, ENGINE BAY, CUT 4" INTO STEEL LINE	1	*	
	LOW PRESSURE FUEL LINE W/FITTING, ENGINE BAY, CUT 4" INTO STEEL LINE	1	*	
	FUEL EVAPORATIVE CANISTER, SOLENOID AND TUBING	1	*	
	EMERGENCY INERTIA CUT-OFF SWITCH	1		
BRAKES/WHEELS	BRAKE CALIPERS, FRONT, CUT 4" INTO STEEL LINES	2		
	BRAKE BOOSTER, DISTRIBUTION BLOCK, CONNECTION FITTINGS	1		
	MOUNT, FRONT, FLEXIBLE HOSE TO STEEL LINE, MOUNTED TO BODY	2		
	EMERGENCY BRAKE HANDLE W/ "T" CABLE	1		
	WHEELS	4		
SUSPENSION	REAR QUAD SHOCKS W/ MOUNTS AND OEM NUTS/BOLTS	2		
	SPINDLES, FRONT	2		
	FRONT SPINDLE BOLTS	4		
	CONTROL ARMS, REAR UPPER W/BOLTS/NUTS	2		
	CONTROL ARMS, REAR LOWER W/BOLTS/NUTS	2		
	COIL SPRINGS, REAR, W/OEM RUBBER ISOLATOR SEATS	2		
	A-ARMS, FRONT LOWER W/ BOLTS/NUTS	2		
STEERING	STEERING RACK W/TIE RODS, ENDS, BOOTS, NUTS, MOUNT BUSHINGS	1		
ELECTRICAL	WIRING HARNESS, ENGINE	1		
	HORNS	2		
	IGNITION CYLINDER WITH KEY	1		
	VACUUM RESERVOIR, CYLINDER SHAPED, BLACK PLASTIC	1		
	GROUND STRAP, BATTERY CABLE WITH TERMINAL	1		
	WIRING HARNESS, REAR	1		
	COIL, STARTER SOLENOID	1		
	WIRING HARNESS, DASH	1		
	WIRING HARNESS, FRONT	1		
	EEC IV COMPUTER W/ PLASTIC HOLDER	1		
	WIRING HARNESS, TRANSMISSION	1		
MISC	PEDAL BOX, BRAKE CLIP AND (2) PLASTIC WASHERS	1		
	RADIATOR CAP	1		
	FOG LIGHT	2		
	ACCELERATOR PEDAL	1		

Appendix C – Optional Rear Disc Brakes

11.65” Rear Brakes

Installation instructions

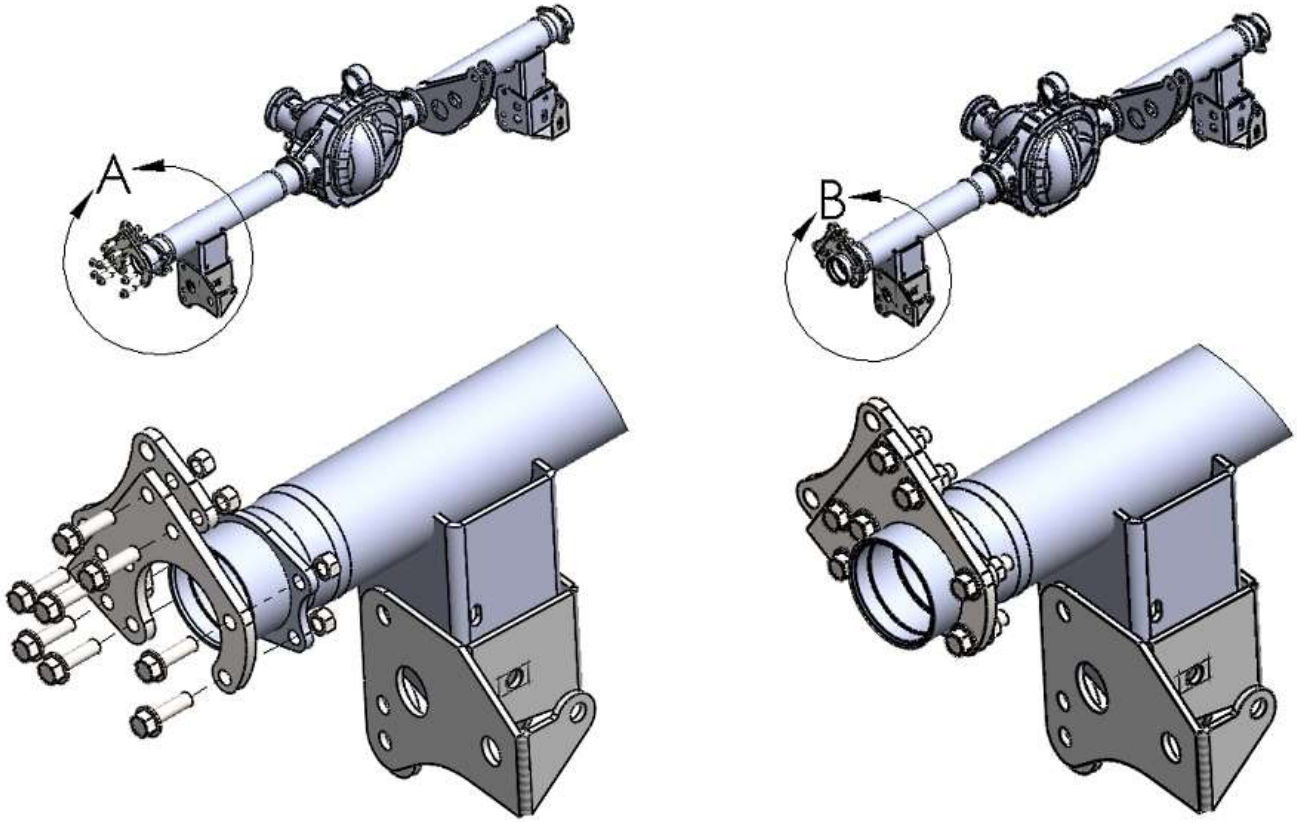
Revision: C

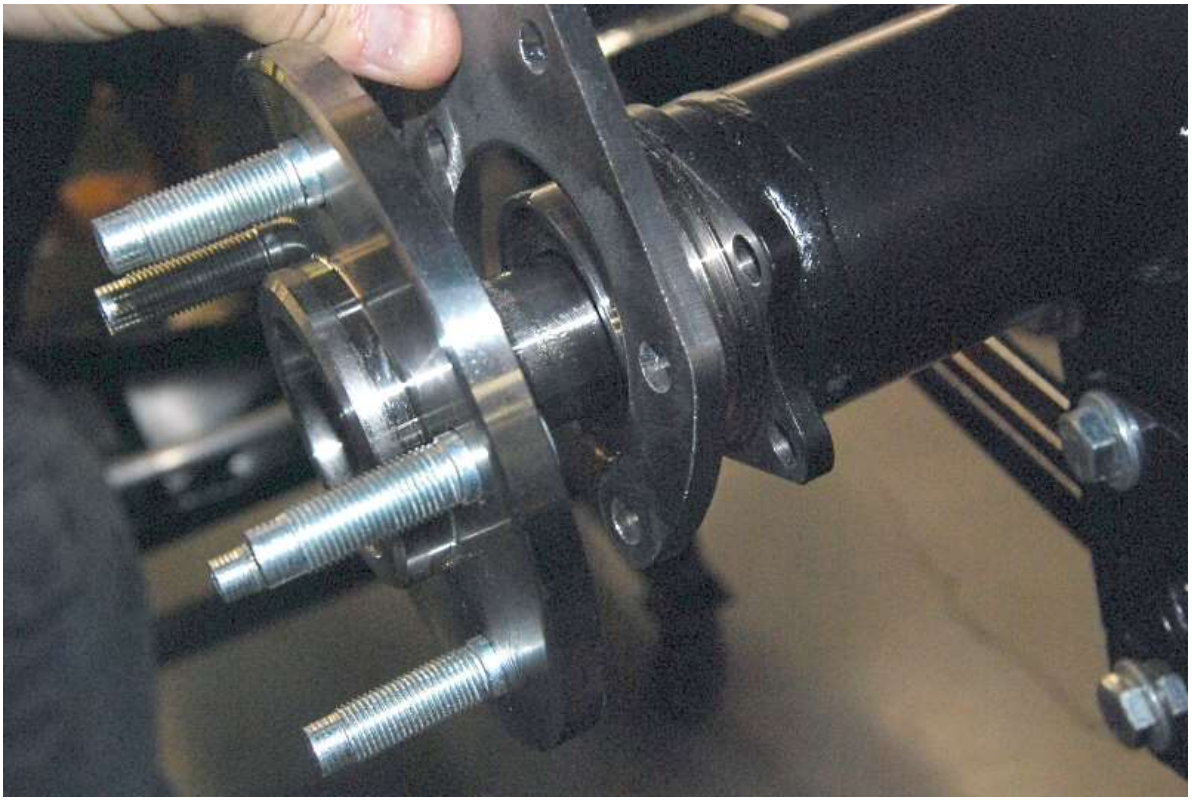
- These instructions apply to any 1986-2004 Ford Mustang 8.8 rear axle with Traction-Lok differential (FFR#s 14319,14970) using 1994-2004 OEM Mustang style disc brakes (FFR#s 14834, and 14903).
- The installation of this kit can be performed by anyone with an average amount of mechanical experience, but it is very important to follow the instructions and refer to a Mustang Shop Manual or equivalent. If you do not feel comfortable after reading the instructions and the shop manual, have the installation performed by an experienced mechanic.
- Improper installation of this kit could adversely affect the safety of your vehicle
- Torque Wrench, 8mm, 16mm, ½”$^{9}/_{16}$” sockets, Ratchet, Needle nose pliers, Small flat head screwdriver, (2) Jack stands

Supplies

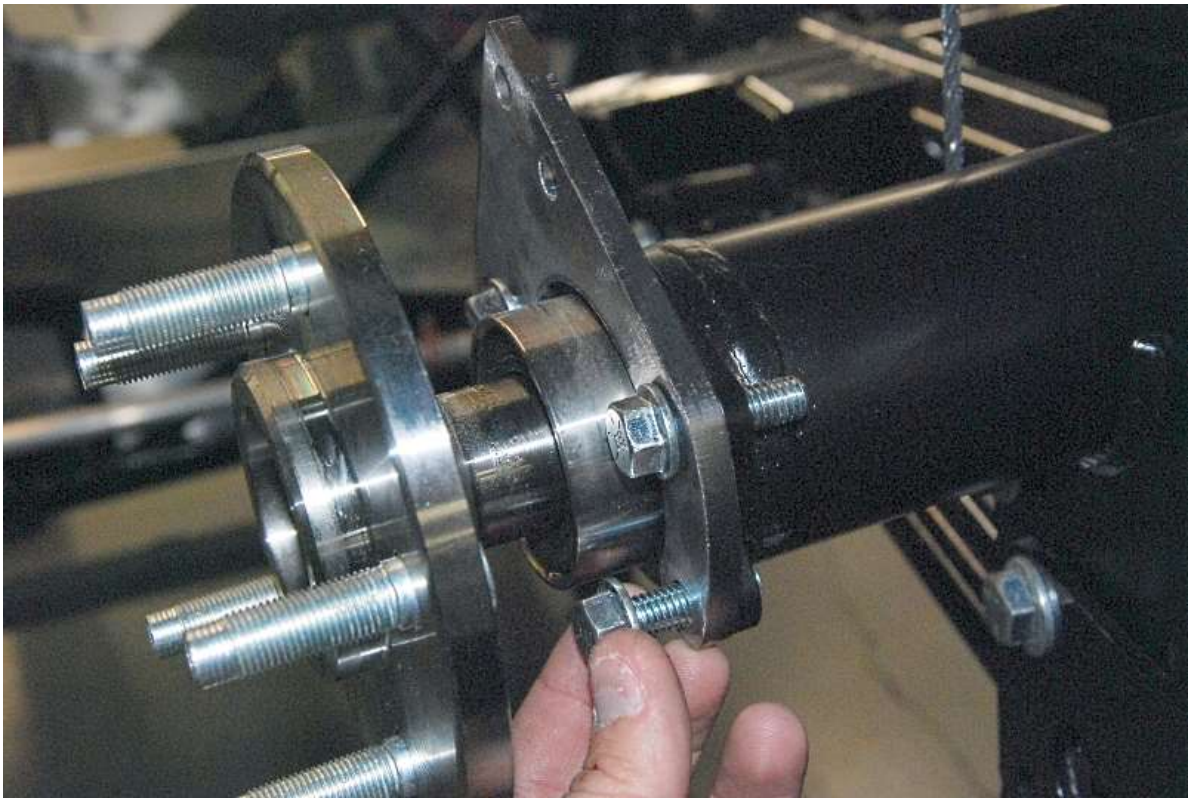
Brake Fluid

Instructions

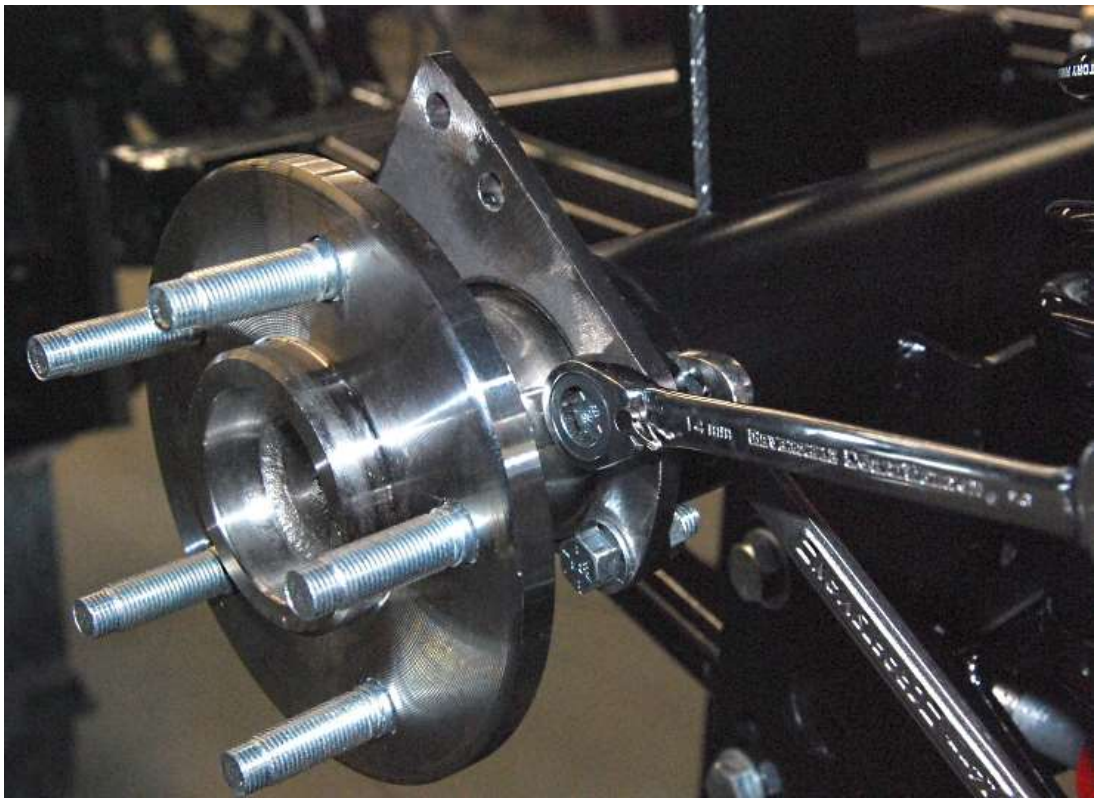




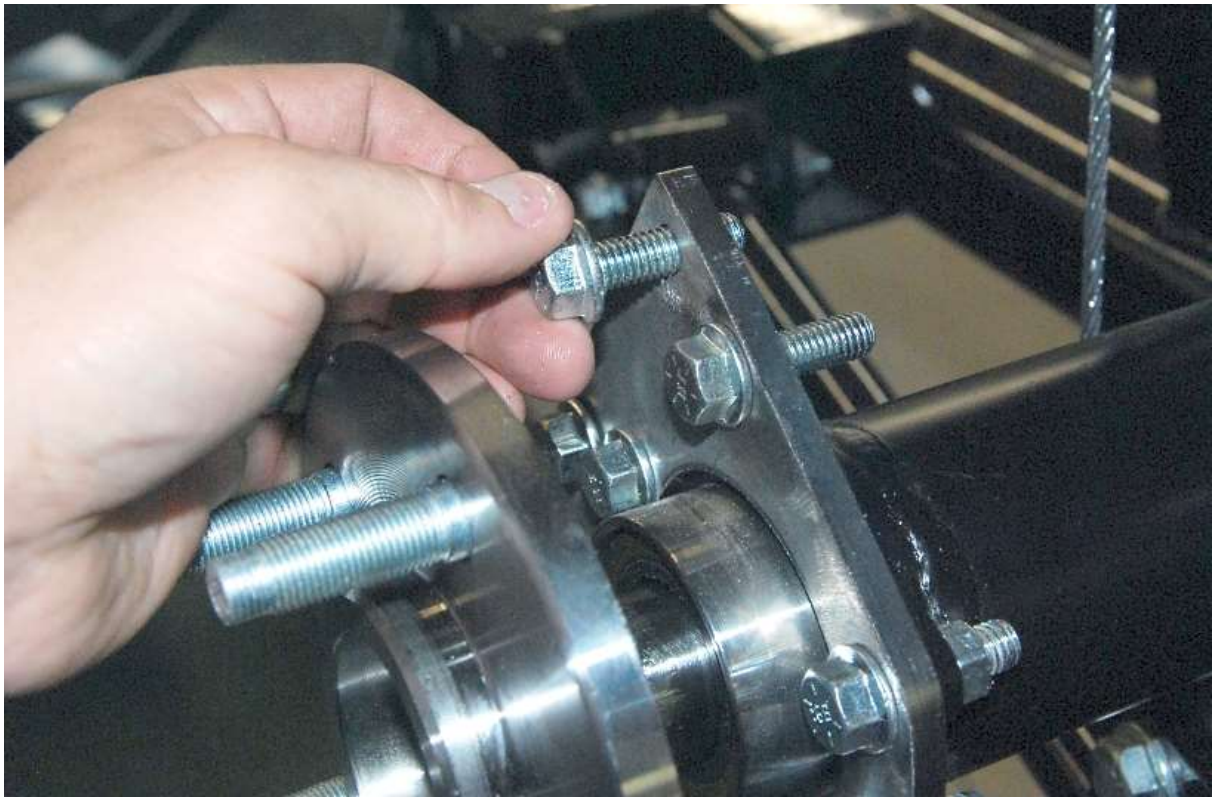
Place the caliper “C” shaped caliper axle mount bracket over the Axle so that the open part of the bracket is facing down.



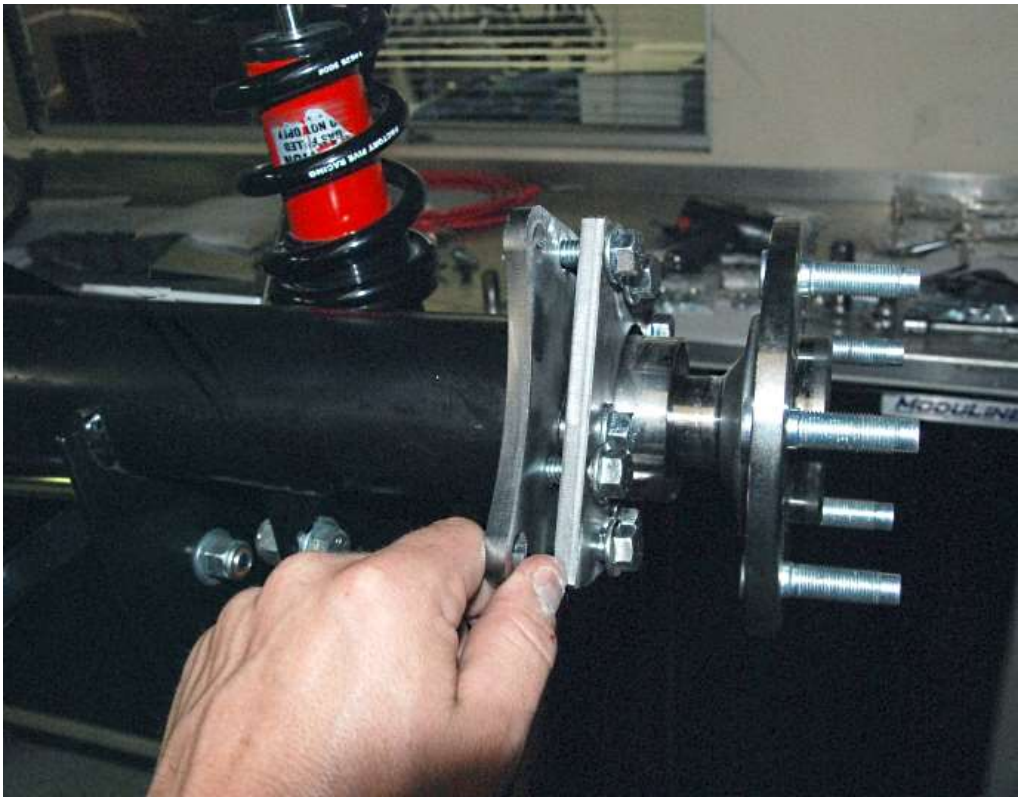
Insert the caliper axle mount bracket bolts from the outside in.



Torque the caliper bracket to 45-50 ft-lbs.

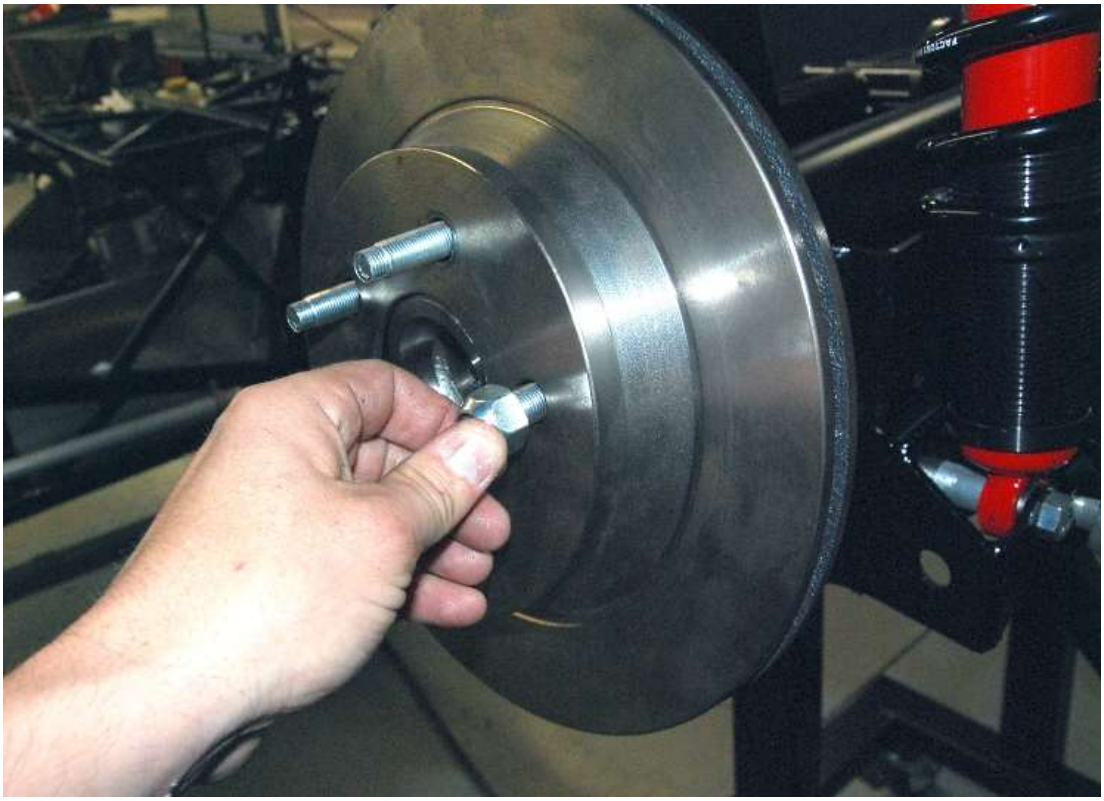


Insert the caliper mount bracket bolts from the outside in through the four remaining bracket holes.

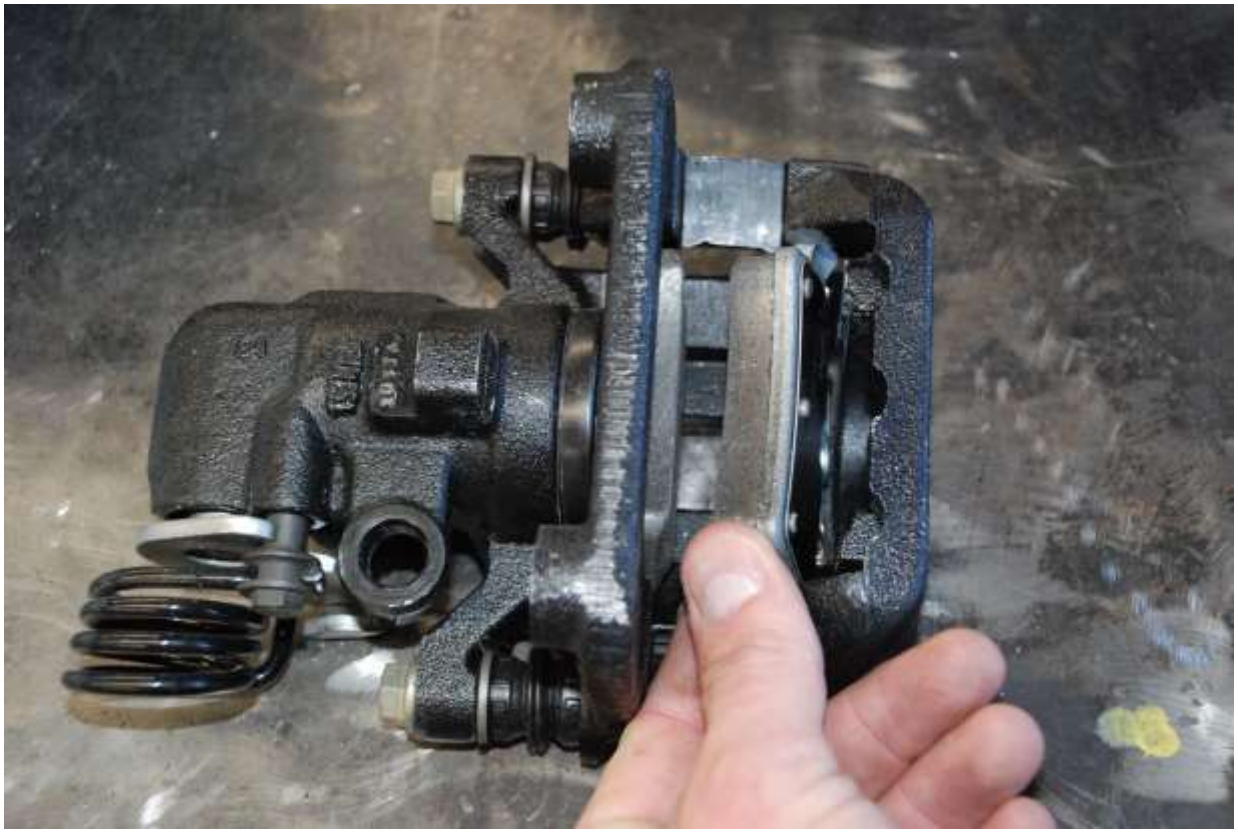


Slide the caliper mount bracket onto the four bolts.

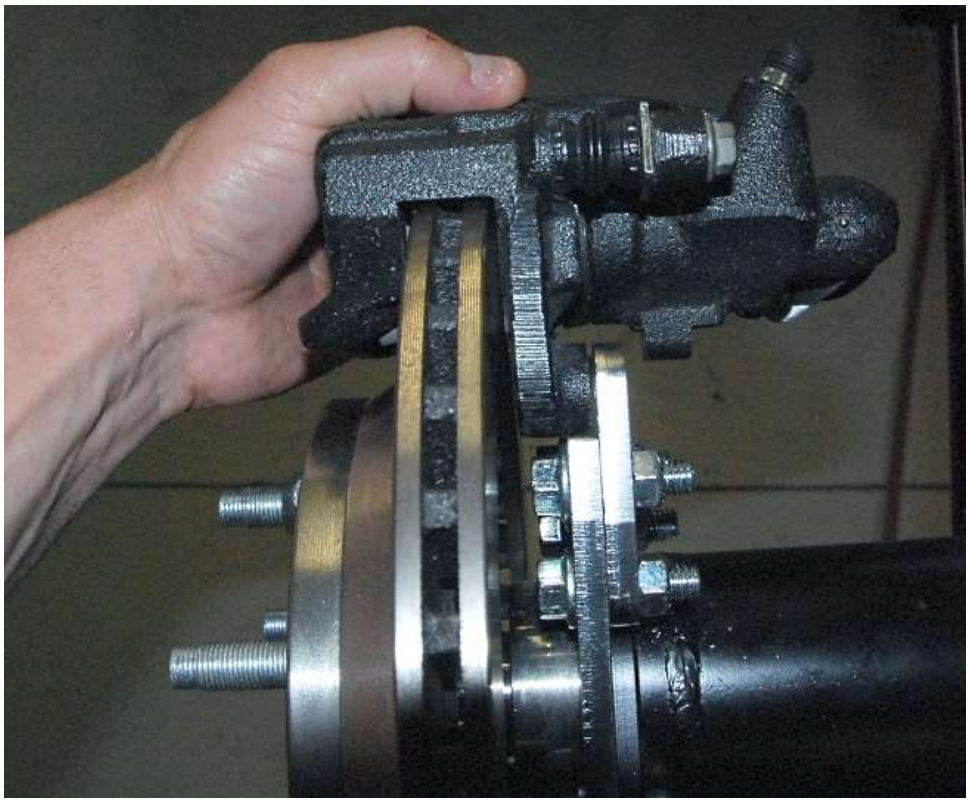
Torque the mounting bolts to the same 45-50 ft-lbs.



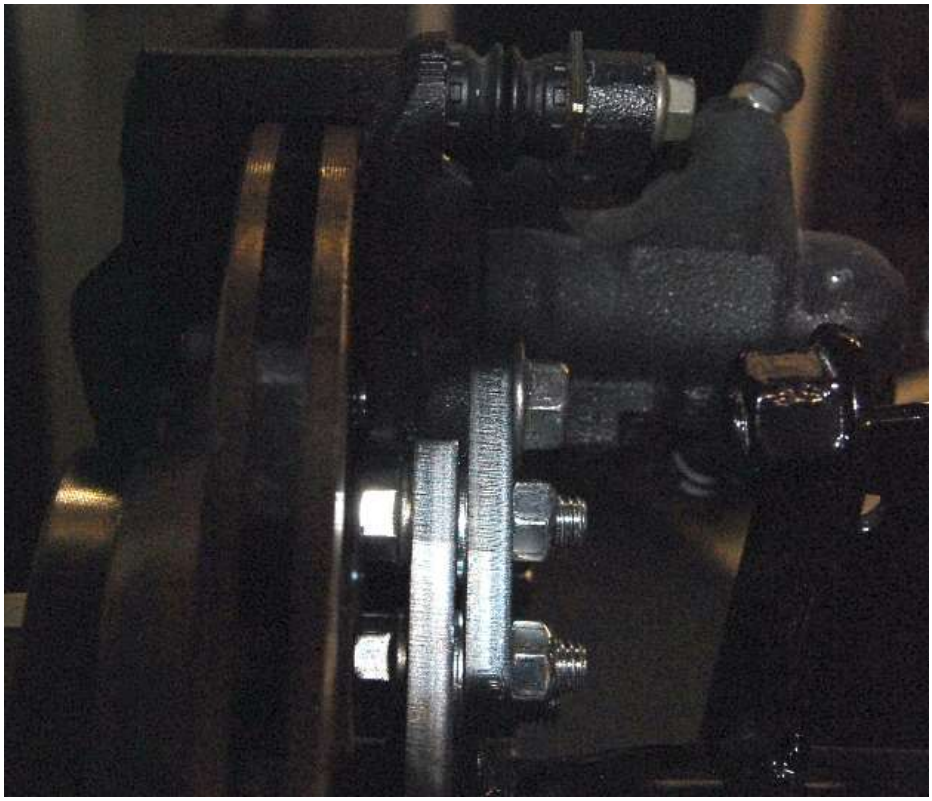
Next install the brake rotor using one lug nut to hold it in place. Make sure to clean the surface of the rotor with brake parts cleaner before installing the caliper.



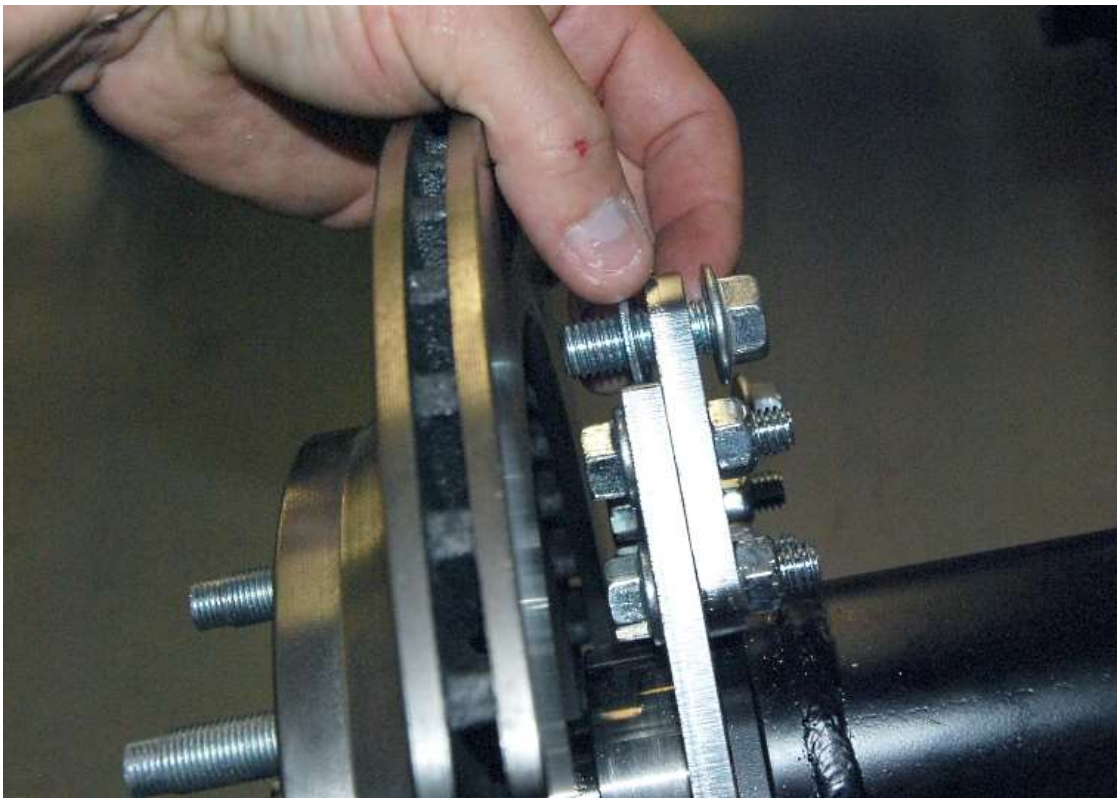
Put the brake pads in the caliper by pushing down on the pad to compress the wire springs on the top of the pad, and then slide them into the slots in the caliper bracket.



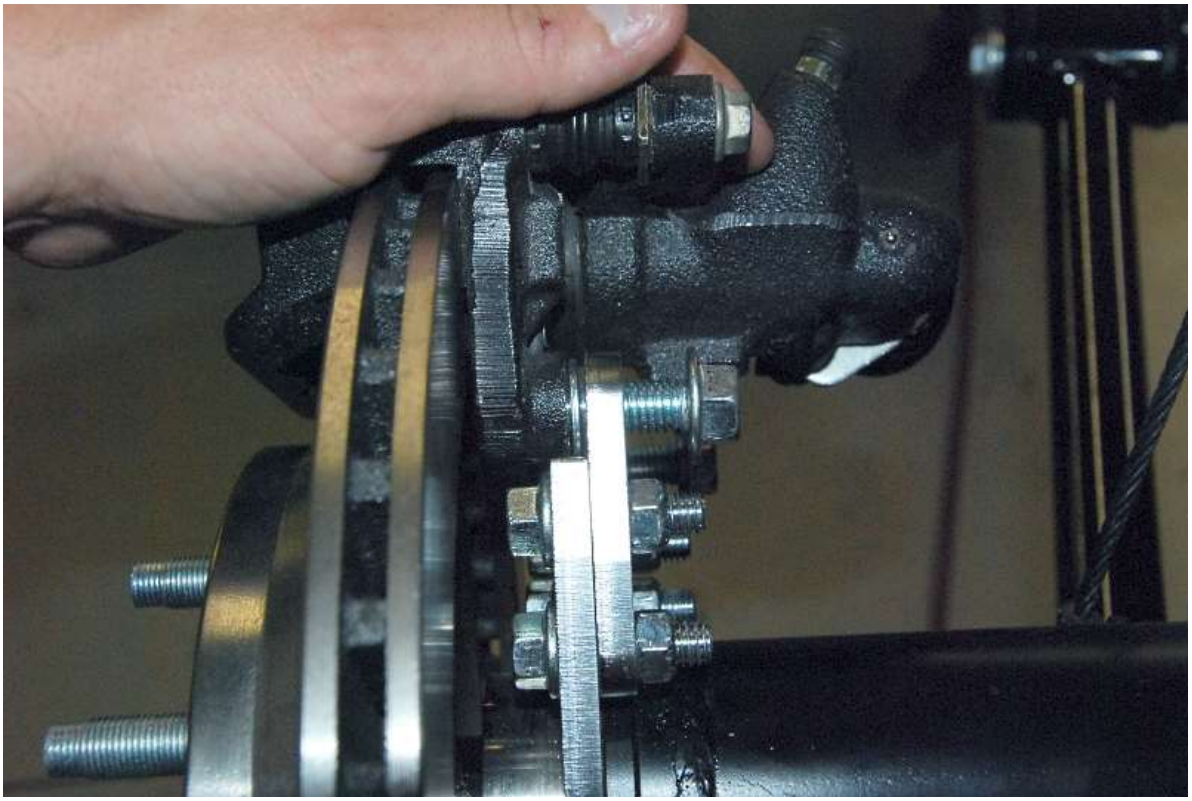
When installing the caliper make sure that the brake fluid bleed screw is on the top side of the caliper. Do not worry about the LH/RH markings on the calipers.



Make sure the caliper bracket is centered over the rotor then check to see if a spacer is needed between the caliper bracket and the caliper mount bracket or between the two brackets.

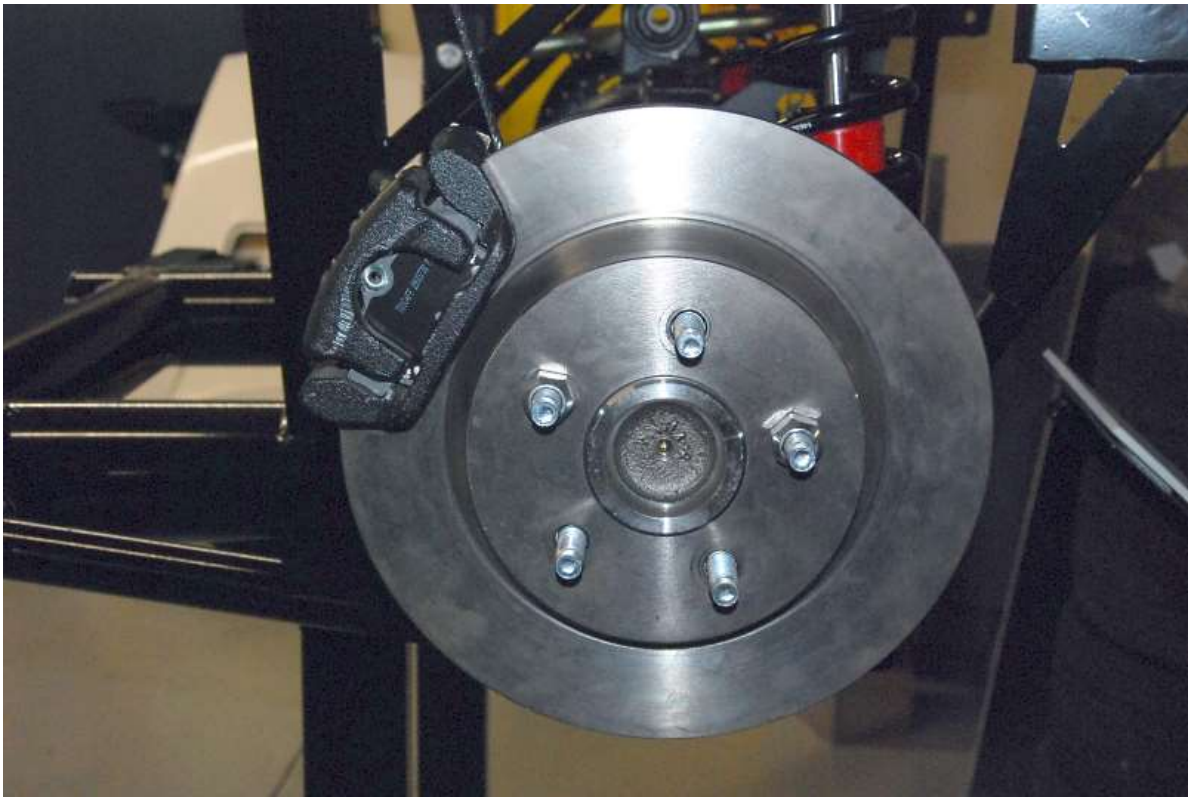


If needed remove the caliper and slide the shim onto the bolt.



Recheck the clearance between the caliper bracket and rotor.

Tighten and torque the two 12mm mounting bolts to 55ft/lbs. using a 16mm socket.



If not already done, fill the rear axle with fluid and seal the cover with RTV silicone.

Torque Specifications:

FASTENER	TORQUE (FT./LBS.)
DIFFERENTIAL PINION SHAFT LOCKING BOLT	15-30
BANJO BOLTS	30-40
WHEEL NUTS	85-105
AXLE ADAPTER/REARBACKING PLATE BOLTS	45-50
AXLE HOUSING COVER BOLTS	25-35
AXLE FILL PLUG	15-30
CALIPER MOUNTING BOLTS	70-95

Appendix D – Different Donor Vehicles

We highly recommend NOT using these different donor cars for the average build. This list will help with those parting out individual items, and possibly for those not using all of the donor parts.

1982-1986 V8 Donors

- Front brakes are 10" in diameter compared to the 87-93 11" diameter.
- Gauges will not work.
- Transmission is slightly weaker, and 82 and most 83's used a 4-speed called the SROD that will not work
- Rear axle has a 7.5" ring gear, so it is weaker (86-93 axles have the 8.8" rear axle)(the 7.5" rear also did not use quad shocks)
- Engines were carbureted up until and including 1985.
- Front Spindles will work by cutting the weld tacks and removing spacers on the IFS brackets that come with the kit.
- 1986 donor vehicles were fuel injected, though they were less powerful, and they had domed pistons that make performance modifications difficult.
- 1985 and 1986 V8's with automatic transmissions, were throttle body injected.

1982-1993 4 Cylinder Donors

- Front brakes are 10" in diameter compared to the 87-93 11" diameter.
- Rear drum brakes are 9" in diameter compared to the 87-93 10" diameter.
- Gauges will not work.
- Transmission is much weaker. The input shaft is smaller, so a different pilot bearing would be needed. It also has a lower first gear.
- Rear axle has a 7.5" ring gear, so it is weaker.
- Front Spindles will work by cutting the weld tacks and removing spacers on the IFS brackets that come with the kit.
- Fuel pump will not support a fuel injected V8.
- Engine section of the harness will not work.
- Steering rack has a 20:1 ratio compared to the V8 model 15:1 steering racks.
- Radiator is only a single core .

1994 and 1995 Donors

- Front lower control arms will not work.
- Gauges will not work.
- Transmission and bell-housing will not work with a solid axle kit.
- Steering column and shafts will not work.
- Dash switches will not work.
- Tie rod ends will not work.
- Motor mounts will not work.
- Smog pump mounting brackets will not work.
- Gas tank will not work without modifications to the mounting straps.

- Rear axle is 61.125” from hub to hub, whereas the pre-93 donors were 59.25”. (A different wheel offset could be used to make up the difference).
- Front spindles are shorter (if you specify, we have brackets to make them work).
- Wiring harness will not work.
- Pedal box needs spacers to raise it about ¾”.
- The accelerator cable that comes with the kit will not work with the throttle body.

Appendix E – Mustang Specifications

(All information is based on V8 Ford Mustangs from 1979 to 1995)

Special Version Mustangs with Specifications

Year & Model	Engine	HP	Torque	Rear Susp.	Transmission	Wheels
93' Mustang Cobra	302, 5.0L	235@4600	280@4000	Solid Axle	T-5	17"x8"
93' Mustang Cobra "R"	302, 5.0L	235@4600	280@4000	Solid Axle	T-5	17"x8"
94'-95' Mustang Cobra	302, 5.0L	240@4800	285@4000	Solid Axle	T-5	17"x8"
95' Mustang Cobra "R"	351, 5.8L	300@4800	365@3750	Solid Axle	Tremec 3550	17"x9"

Engine

Year/Engine	Horsepower	Torque Rating	Induction	Comp Ratio
1982 5.0L V8	157 @ 4200	240 @ 2400	2V carb	8.3:1
1983 5.0L V8	175 @ 4200	245 @ 2400	4V carb	8.3:1
1984 5.0L V8	175 @ 4200	245 @ 2400	4V carb	8.3:1
1984 5.0L V8	165 @ 3800	245 @ 2000	CFI	8.3:1
1985 5.0L V8	210 @ 4400	270 @ 3200	4V carb	8.4:1
1985 5.0L V8	180 @ 4200	260 @ 2600	CFI	8.4:1
1986 5.0L V8	200 @ 4000	285 @ 3000	SFI	9.2:1
1987-93 5.0L V8	225 @ 4000	300 @ 3000	SFI	9.0:1
1994-95 5.0L V8	225 @ 4000	300 @ 3000	SFI	9.0:1

Transmission

Year	Type	1st	2nd	3rd	4th	5th	6th	R	Torque Capacity lbs.-ft	Part Number	Weight
1983.5	T-5	2.95	1.94	1.34	1.00	0.725	N/A	2.76	265	E3ZR-7003-A	75
1984	T-5	2.95	1.94	1.34	1.00	0.625	N/A	2.76	265	E4ZR-7003-DA	75
1985-89	T-5	3.35	1.93	1.29	1.00	0.675	N/A	3.15	265	E(5,6)ZR-7003-(FA,FB)	75
1989-93	T-5	3.35	1.99	1.33	1.00	0.675	N/A	3.15	300	F(Z,9,0)ZR-7003-(A,AA)	75
1994-95	T-5	3.35	1.99	1.33	1.00	0.675	N/A	3.15	300		75
1995	TR-3550	3.27	1.98	1.34	1.00	0.680	N/A	3.00	350		100

Rear Axle Ratio

	Manual	Optional	Automatic
1995	3.08		3.27
1994	3.08		3.27
1987-1993	2.73	3.08	3.27

From 1986 to 2004 8.8" rear axles were used in Mustangs. In 1994 they went from a 4.25" 4-lug bolt pattern to a 4.5" 5-lug bolt pattern. Most wheels fit the 59.25" width the best. Make sure you know what axle you have before ordering wheels.

Year	Rear End Width	Rear Brake Type	
87-93	59.25"	9" drum	
94-98	61.125"	10.5" solid disc (GT)	11.65" vented disc (Cobra™)
99-04	62.52"	10.5" solid disc (GT)	

Front brakes

1987 to 1993 front rotors are 11" diameter, and use a 4.25" 4-lug bolt pattern. They use a cast iron single piston caliper. These rotors also contain the hub that carries the wheel bearings cast in as a one piece rotor/hub assembly (1982 Lincoln Continental rotors are an exact rotor/hub assembly except they have a 4.5" 5-lug bolt pattern). In 1994 the Mustang had a separate hub and rotor, and had a 4.5" 5-bolt lug pattern. The rotor stayed 11inches in diameter, but a new style caliper was added. All Cobra™ and the 1995 Cobra™ R versions of the Mustang from 1993 to 2004 used 13 inch front rotors with PBR 2 piston calipers. The 2000 Cobra™ R used Brembo 4 piston calipers and rotors. In all cases the flexible brake lines with mounting brackets and banjo bolts are required from the donor. (More brake component information can be found in the High Performance Braking Systems section of this Manual)

Rear Brakes

1987 to1993 Mustangs used a 4.25" 4-lug bolt pattern drum brake. From 1994 to 2004 Mustangs switched to have a 10.5"diameter 4.5" 5-lug bolt pattern solid rear rotor with a single piston cast iron caliper. All Cobra™ and the Cobra™ R versions of the Mustang from 1993 had an 11.65" rear vented rotors with the same calipers that the 10.5" rotors used, however the caliper slider brackets were slightly different. Because the 10.5" rotors were solid and the 11.65" rotors were vented, the caliper slider bracket is manufactured with a slightly wider opening for the rotor. All flexible brakes lines and there mounting brackets are required donor parts for FFR kits. Emergency brake cables will clip right into a Factory Five kit. (More brake component information can be found in the High Performance Braking Systems section of this Manual)

Master cylinder

1987 to 1993 Mustangs use a single master cylinder with two different piston sizes, one for the front and one for the back, which works well with the stock brakes. Vacuum boosters are not used on FFR kits due to interference with the chassis. For most disc brake applications we have found the 1994 Mustang Cobra™ master cylinder ($^{15}/_{16}$") to work the best. From 1996 to 2004 Mustangs used a brake boosting system called a hydro-boost system. This system utilized pressurized power steering fluid to assist in pedal pressure. This unit works with FFR kits with an adaptor bracket from FFR. (More brake component information can be found in the High Performance Braking Systems section of this Manual).

Starter

From 1979 to 1991 the V8 starters used were all the same one wire starters. In 1992 Ford switched to a lighter, more powerful starter which had a built in solenoid, but required a second external solenoid for wiring and they continue to use this starter.

Driveshaft

Driveshafts were unpainted steel with a 28 spline yoke from 1979 to 1993. This 28 spline fits into the T-5 and Tremec 3550. In 1994 Ford used a 31 spline yoke, which was used through 2004. This 31 spline fits the T-45, the Tremec TKO, and the Tremec 3650. The Tremec T-56 used in the 2003-2004 Cobra™ Mustang, and the 2000 Cobra™ R Mustang has a 27 spline yoke.

Clutch Cable, Quadrant

Clutch cables and quadrants remain the same from 1982 to 1995. From 1996 to 2002 cables and quadrants changed.

Speedometer cable

From 1983.5 to 1993 Mustangs used a mechanical speedometer with a cable which had a plastic gear c-clipped on to its end, which was inserted into the driver side of the transmission. This plastic gear is designed to translate the proper vehicles speeds that will correspond with the ratio of the gears in the rear axle. Below is a chart describing which plastic gear is used with the corresponding rear axle gear ratios. From 1986 to 1993 the mustang still retained a mechanics cable speedometer, and plastic gear on the transmission end, however an electronic sensor was added on the transmission end to send a signal to the vehicles computer. From 1994 to 2004 there was only the electronic sensor with plastic gear attached to the transmission. The speedometer translated the electronic signal to display the vehicles speed. The 1986 to 1995 cable, sensor and gear assembly will fit into the 1996 to 2004 transmissions.

1983-89	3.27:1(19)	3.55:1(20)	3.73:1(21)	4.10:1(23)
1990-98	3.27:1(21)	3.55:1(23)	3.73:1(23*)	4.10:1(23*)

*23 Tooth gear may not be completely accurate in the selected application without changing the transmission drive gear.

1983-98	19 Tooth	Pink	C0DZ-00017271-B
1983-98	20 Tooth	Black	C1DZ-00017271-A
1983-98	21 Tooth	Red	C40Z-00017271-A
1983-98	23 Tooth	White	E6MS-0017271C-M

Mass Air Sensor

Mass air sensors are devices used to measure air flow into the engine for the vehicles computer. These started to be used in Mustangs in 1989 and are still being used.

1986-1988 engines measured air pressure in the intake to provide information for the computer. Mass air sensors send more accurate information to the computer than speed density sensors. A speed density ('86-88) controlled vehicle can be converted to mass air by changing the computer, adding the sensor, and running 4 wires (two to the computer, one positive, and one ground). There is a flexible rubber elbow that connects the mass air meter to the throttle body, which is required for use in a Factory Five kit.

Oxygen Sensors

Oxygen sensors are placed in the exhaust to measure the oxygen content of the exhaust. This measurement is used by the computer to determine whether fuel delivery to the engine needs to be increased or decreased. From 1986-1995 Ford Mustangs used two oxygen sensors, one in each side of the exhaust system. At full throttle the oxygen sensor signals are not used by the computer, because the computer has a built in program to run the engine rich at wide open throttle. Oxygen sensors will usually be most effective when placed near the collection point of headers because the exhaust will

remain very hot, and an average measurement of all of the cylinders can be taken. All oxygen sensors are recommended to be used when placing a fuel injected engine into a Factory Five kit.

Steering components

Power steering racks from 1987 - 2004 are mostly all 15:1. In 1994 the racks switched from having a splined shaft for attachment to the steering column to a triangle shaped end, as well as changing the inner and outer tie rod ends. The 1994 to 2004 inner and outer tie rods are too long and do not work with an FFR kit. The Factory Five 4.6L steering kit includes the correct inner and outer tie rod ends along with the correct steering adapter.

Fuel tank, pump, pick-ups, vents

1986-2004 Mustang fuel tanks were stamped steel with a plastic under tray, and had two straps that held them to the chassis. All driver side straps are the same however in 1994 the passenger side strap changed. Factory Five kits can accept all versions of the strap. The fuel pumps are all in the tank. From 1988 to 1993 fuel pumps were 88 liters/hr., and the 1994 to 2004 pumps were 110 liters/hr. The Fuel filler neck is also a donor part required for an FFR kit.. In 1999, the tank filler hole and the filler neck changed to 1" from 2". The pump also changed so that it is controlled by a separate module, a pulse width modular (PWM), in the trunk location that pulses power using to the fuel pump to control pressure instead of using a mechanical regulator. The top of the tank was changed so putting an older pump or gauge sender in the tank is not possible.

Fuel lines, fuel filter and bracket

The fuel filter and bracket is the same from 1986 - 2004. All of the front and rear flexible fuel lines from the 1986-2004 Mustangs are required donor parts for all FFR EFI kits where the donor fuel rails, and tank are used.

Emergency brake handle

Emergency brake handles with the attached "T"-junction equalizer bar from 1984 to 2004 all work with FFR kits.

Rear quad shocks

Quad shocks are attached between the axle and the chassis of solid axle Mustangs from 1983.5 to 2004 to prevent wheel hop. This is a required donor part for all 4-link solid axle FFR kits, and they are also used for independent rear suspension FFR kits. There is a mounting bracket for the quad shock to mount to the Mustang chassis which is also used for solid axle FFR kits. The IRS kits do not use the mounting bracket.

Spindles

1979 to 1993 Mustang spindles used a rotor with built in bearing carrier hubs. 1994 to 2004 Mustangs used a hub that was separate from the rotor, and is often considered part of the spindle. In 1996 the mount on the spindle for the tie rod end was positioned slightly different than the 94 and 95's. Factory Five kits come with a bracket to attach the spindle to the kits upper control arm. In 1999 the lower ball joints switched over to metric. 1983.5 to 1986 spindles are similar to the 1987 to 1993 spindle except

they are thicker and are designed for a smaller 10" rotor. To use them, one of the shims tack welded into the standard IFS bracket needs to be removed.

Rear 4 link control arms

Upper control and lower control arms stay the same from 1979 to 1998.

Front lower control arms

Front lower control arms from 1979 to 1993 all have the same dimensions and will work with any FFR kit by following the simple modification shown below. In 1994 the control arms had a similar design, though they increased in length by approximately ¾". This arm can also be used by following the same modifications as the 1979 to 1993 arms. There are two sets of holes on the Factory Five chassis to mount the lower control arms. The inner holes are for the 1994 to 2004 Control arms, and the outer holes are for the 1979 to 1993 arms. FFR offers a tubular lower control arm powder coated, with polyurethane bushings, ball joints, and mounting bolts which are designed to mount in the outer chassis mount hole.

Springs (MODIFICATION)

Rear springs from 1979 to 2004 will all fit an FFR kit with a slight modification as shown below. Below is a chart of every spring rate from 1979 to 2004. These rates are for un-cut springs. In all cases there are rubber isolation pads between the spring/control arm and spring chassis, which are a required donor part for an FFR 4 link stock kit.

1979-04 Production Spring Rates (lbs./in.)

YEAR	Mustang V-8	Cobra™	Cobra™ "R"
1979	F395/R160		
1980-81	F370/R160		
1982	F395/R160		
1983-84	F410/R160		
1984.5-93	F425/R200 F525/R300		
1993	F425/R200 F525/R300	F425/R160 F525/R160	F750/R240 F850/R260
1994	F400/R165 F500/R265	F400/R160	
1995	F400/R165 F500/R265	F400/R160	F700/R200 F850/R260
*Convertible	F500/R470		

Wiring harness

With all FFR EFI kits, the donor car wiring harnesses can be used. The 87-95 harness has 5 sections: engine, rear, front, dash, and transmission. In 1990, Air bags were added to the Mustang. Within the harness, this is a separate harness of a few wires that can be separated out easily. In 1996 Ford introduced a Passive Anti-Theft System (PATS) which put a transmitter inside the key (see Donor Parts

selection tips at the beginning of this manual) so more of the harness parts must be kept or the computer will need to be flashed. In 1999 Ford added to the PATS so that the gauge cluster needs to be present to start the car. An alternative to using the donor harness would be to use a chassis harness and a standalone engine harness. FFR has a harness for Mass Air engines (89-93). Ron Francis has a harness for 96-04 engines.

For a carbureted car, we recommend using an aftermarket chassis harness.

Accelerator Pedal

The accelerator pedals remained unchanged from 1979 to 2004, and they all work with FFR kits.

Pedal Box

Pedal boxes are the same from 1982 to 1993. In 1994 the box switched to a new design. This newer pedal box needs four tack welds to be drilled out, and a notch to be made in the clutch pedal stop to allow use in an FFR kit. The notch is required for clearance of the gas pedal.

Appendix F – Fluid Specifications

Engine

	Oil Type	Capacity
302	10W-30	5.0 qts.
4.6L	5W-30	8.0 qts w/FFR pan

Transmission

Oil Type	T-5	T-45	3650	TKO	T-56
Mercon/Dexron III Trans. Fluid	2.8 qts.	3.25 qts.	4.0 qts.	2.64 qts.	4.0 qts.

8.8 Solid Rear Axle

Oil Type	Capacity	Friction Modifier
80W-90 Gear oil	1.875 qts.	4 oz.

8.8 IRS

Oil Type	Capacity	Friction Modifier
80W-90 Gear oil	1.50 qts.	5 oz.

Appendix G – Torque Specifications

General Bolt torque specifications*

Thread	SAE English
	Zinc Plated
	Ft-Lb.
¼ -20	8
¼ -28	10
5/16-18	17
5/16-24	19
⅜ -16	30
⅜ -24	34
7/16-14	48
7/16-24	54
½ -13	75
½ -20	83
9/16-12	100
9/16-18	100
⅝ -11	100
⅝ -14	100

Thread	SAE Metric
	Zinc Plated
	Ft-Lb.
M8	18
M10	33
M12	61
M14	98
M16	120

ATTENTION: Use the following specs in order to torque Stainless Bolts.

3/16” 11 ft-lb (132 in-lb)
⅜” 16 ft-lb (192 in-lb)

*Use above specs unless otherwise noted in the assembly process.