



FACTORY FIVE

R A C I N G



Mk4 Roadster Base Kit Assembly Manual

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General Information

Foreword

If you are reading this, you are embarking 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

Warning!

Assembly of a Factory Five vehicle kit should ONLY be performed by persons experienced, trained, and familiar with custom vehicle work including, but not limited to, brakes, wheels/tires, engines/running gear, steering systems, suspension systems, automotive restoration, competitive driving, and all aspects of custom vehicle work. **Failure to safely assemble a Factory Five Racing vehicle parts kit can result in serious injury or death.**

Advice of Factory Five Technical Support does not guarantee proper installation. YOU, or the person who does the assembly must be qualified to do this. It is not possible for Factory Five to foresee or understand all potential issues that may arise during your build while we offer advice and assistance over the phone, via email, or even in person.

Do not assume anything. Like all vehicle work, improperly assembled vehicle parts can cause serious injury or death.

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.

Factory Five vehicles are part of a category of vehicles that include custom builds such as hot rods, Cobra replicas, and other high-performance vehicles. They are capable of extreme performance and should be operated safely, and only by skilled drivers. Do not loan your Factory Five to a friend!

Building your own car and racing are dangerous endeavors, and the buyer expressly assumes the risk of all personal, property, or economic injury resulting from the use of said products.




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 later** when the part is available. If the instructions are followed then the resulting car should be a great handling sports car.

I C O N K E Y		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.
	Valuable information	
	Tools needed	
	Parts Needed	

Most fasteners are packaged together with a quick size key in the appendix.

What You Get

The Factory Five Mk IV Roadster 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 tube frame. Includes all mounts ready to accept all Ford Engines: Small block, 4.6L, 427/428 FE, 429/460 engines.

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

Chassis Aluminum Panels: 66 Laser cut, pre-formed 6061-T6 aluminum panels for cockpit, trunk, 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 ($\frac{3}{16}$ ", $\frac{1}{4}$ " and $\frac{5}{16}$ "), 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.

Engine/Exhaust parts: The Mk4 base kit is configured to accommodate the 5.0 or 4.6L engines. The kit comes with an alternate drive pulley assembly, oil filter relocater kit, air

filter and exhaust assembly to adapt the Mustang engine and headers to vintage side exit exhausts.

Gauges and Dash and Electrical Assembly: Base 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, padded vinyl dash cover, toggle switches and indicator lights, and gauges.

Interior Accessories: Metal framed vinyl bucket seats, 5-point Simpson™ harnesses, carpet set, emergency brake boot, interior rear-view mirror w/fasteners, door latches, original style shifter handle, knob, boot, mounting ring, accelerator cable, adjustable door hinges with bronze bushings and shifter boot.

Exterior Accessories and Lighting: DOT approved windscreen, License plate light and bracket, DOT approved headlights, turn signals, and tail-lights, hidden trunk hinge kit, hood pin kit, hood and trunk handles, and side louvers.

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

Fasteners: Over 1600 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 with unequal length shorty headers, 4.6L modular engine with unequal length shorty headers, 5.0L Coyote engine*, or 427/428 FE engine. *Check our parts catalog online for Coyote instructions



Transmission: T5, Tremec TKO.



Driveshaft: 1987-2004 Ford Mustang.



Rear End: 1987-2004 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.

Radiator and Fan shroud: 1987-2004 Ford Mustang.

Steering Rack: 1987-2004 Ford Mustang.

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

Electrical: 1987-2004 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.

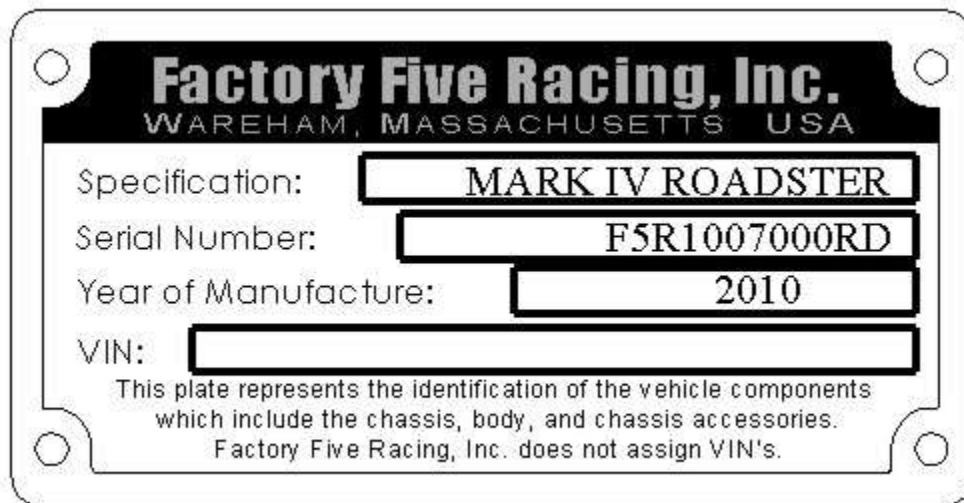


Battery: We recommend a group 34 size battery.



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®, Lowes CRAFTSMAN®, Tekton, 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 ($\frac{3}{8}$ " – $\frac{15}{16}$ ")

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 $\frac{1}{8}$ " and $\frac{3}{16}$ " heads

Drill

Drill bits ($\frac{3}{32}$ ", $\frac{1}{8}$ ", $\frac{9}{64}$ ", $\frac{3}{16}$ ", $\frac{7}{32}$ ", $\frac{5}{16}$ ", $\frac{7}{16}$ ", $\frac{1}{2}$ ")

Caulk gun

24 oz. Plastic Dead Blow hammer

Razor knife

Wire stripper/crimping tool

$\frac{7}{8}$ ", $1\frac{1}{4}$ " and $2\frac{1}{4}$ " 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' $\frac{3}{4}$ " Plywood Top

Engine hoist

Spring compressor (Mustang disassembly only)

6' $\frac{5}{16}$ " chain (to lift engine)

4 Jack stands

Hack saw (metal blade)

$\frac{1}{4}$ ", $\frac{5}{16}$ " Fuel/brake line bender (hand held)

Jig saw (Body cut outs)

Torque wrench (Click style, $\frac{3}{8}$ " 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
- _____ Blue Loctite/Threadlocker – 0.20oz (6ml)
- _____ Coolant – 2 gallons of concentrate
- _____ Engine oil – 5-8 Qts
- _____ Gear oil, 80W-90 (for rear end) – 2 Qts.
- _____ Transmission fluid, Mercon automatic Trans fluid – 3 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 1/4” socket driver
- _____ Wire brush or wire wheel attachment for drill
- _____ Flare nut wrenches (3/8” x 7/16”)
- _____ Flat file and round file
- _____ Scissors
- _____ Aluminum snips
- _____ Friends
- _____ Pizza and beer for previous line item



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 Roadster 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 Roadster. 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.

The 4.6L Mustang

In 1996, the Mustang 5.0L engine was replaced with a 281 or 4.6L engine. There have been two different revisions to the Mustang between 1996 and 2004. The SN 95 Generation 1 (1996-1998) and Generation 2 (1999-2004). There are a few differences between the two different generations. See the Appendix for a detailed explanation of all of the differences.

Differences between a 5.0L build and a 4.6L build

There are a few differences we have found between building a kit with a 5.0L donor and using a 4.6L donor, each has their strengths and weaknesses:

- The 5.0L build is a manual brake car where the 4.6L build is usually done with power brakes and can also get fitted with the donor ABS brakes if desired.
- The 4.6L, especially the 4 valve (Mach 1 and Cobra™) engines, have more horsepower to begin with.
- The 4.6L engine is a higher revving (7000rpm vs. 6250rpm) and smoother feeling engine.
- The 4.6L engine is quiet while cruising and loud upon acceleration where the 5.0L is loud all the time.

- The 4.6L gets better mpg for the same horsepower level.
- The 4.6L engine is more expensive to upgrade parts. You have to buy two or four cams vs. one, etc...
- The 4.6L build is harder because the engine has a more complex engine management system with the passive anti-theft system (see a couple sections down) built in.

We have found that the well-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. This level of power is stock with the 4.6L 4 valve engines. The ultimate decision is the builder's preference.

Donor Part Selection Tips

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 1987-2004 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.).

The Factory Five Roadster kit is designed to use parts from the 1987-2004 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 "Mustang Specifications" 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.



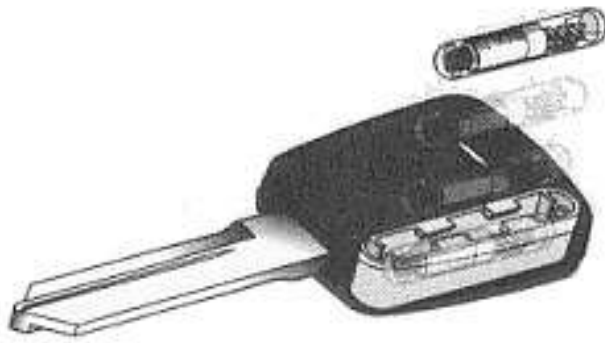
The 03-04 4.6L DOHC Cobra™ engine is not a direct bolt-in. The steering requires relocation, the hood may require modifications and the front 4" crossmember needs cutting to clear the crank pulley.



The T-56 Should only be used with an IRS because the driveshaft becomes too short.

FORDS PASSIVE ANTI-THEFT SYSTEM (PATS)

The keys for these vehicles, 1996-2004 Mustangs, have a tiny radio frequency transponder imbedded in the plastic head.



When you attempt to start the vehicle, the computer sends out a RF signal that is picked up by the transponder in the key. The transponder then returns a unique RF signal to the vehicle's computer, giving it the ok for the vehicle to start and continue to run. The car will not work without the key.

1996-1997 PATS I System - This system requires at least one key in order to program another key.

1998-2002 PATS II System - This system requires at least two keys in order to program another key.

If you do not get a key with your donor, you will have to have new ones programmed by a Ford dealer or an Auto Lock specialist.

For the 1996-2004 computers, the stock computer can be flashed so that a PATS key is not necessary. This can be done with a Diablo or SCT tuner.

For the 1999-2004 Mustangs it is important to keep all of the boxes that are connected to the wiring harness and along with the gauge cluster. If you are not using the stock gauges, you will still need them to be connected behind the dash in order for the car to run.

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	www.connecticutmustangllc.com
Menard's Auto	Chester NH	603 887 4049	Rick Menard	
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
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USA South

Mustang Parts Specialties	Statham, GA	800-236-1156	Greg or Ben	www.mpsautosalvage.com
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USA West Coast

All Mustang			Tommy	
Performance	Phoenix, AZ	800-454-8387	Thompson	www.amppperformance.com
Mustang Village	Fontana, CA	909 823 7915	Scott or Tom	www.mustang-village.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.
- The Ford 4.6L block was never painted at the factory. Even brand new 4.6L SOHC blocks with relatively few miles on the odometer will have a surface dusting of corrosion. 4.6L DOHC blocks are aluminum up to 2002.
- 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.



The 03-04 4.6L DOHC Cobra™ engine is not a direct bolt-in. The steering requires relocation and the hood may require modifications.



The T-56 Should only be used with an IRS because the driveshaft becomes too short.

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.

RADIATOR/COOLING SYSTEM



Metric sockets, extensions, large pliers, and waste container/bucket.



Mustang radiator, hoses and fan shroud w/overflow reservoir. Refer to Appendix B.



Try to avoid spilling used coolant.



Take care when handling the Mustang radiator.



When removing the A/C system make sure that an authorized service center evacuates the Freon in your A/C system. Dispose of hazardous waste correctly.



If your car was in a front collision and the radiator shroud and reservoir were damaged and you would like to use them, the Ford part number for the shroud is E6ZZ-8146-A and the reservoir part number is F2ZZ-8A080-B.

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 upper radiator hose clamp at engine block. There may be residual fluid in hoses so try to avoid spilling.

Loosen and remove the upper and lower hose clamps at the radiator.

Remove the upper radiator hose.

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.

Remove the fan clutch from the water pump shaft so that it is sitting in the fan shroud.

Loosen the bolts on the brackets at the top of radiator.

Lift the radiator, shroud and the fan up and out of the engine bay. Discard the 1987-1993 fan. Keep the shroud. You will not need the 1987-1993 Mustang fan since a 16" electric fan is included in the kit.

If the car was fitted with A/C, remove the condenser at this time.



If you started with a good running car that has the A/C system intact it's your environmental responsibility to have the Freon removed and disposed of safely. Do not release this into the ozone.

Store the radiator, fan shroud and overflow reservoir in a safe place.

87-95 BRAKE POWER BOOSTER



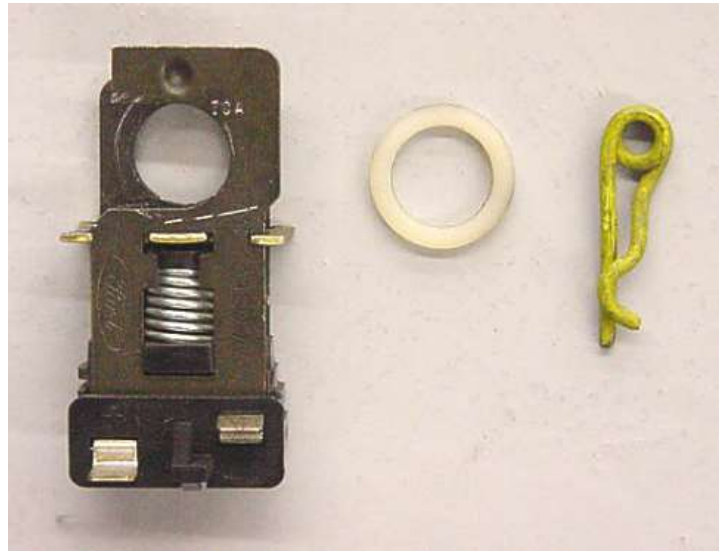
Socket set, wrenches or box wrenches for brake lines, tube cutter, tape, and marker pen.



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.

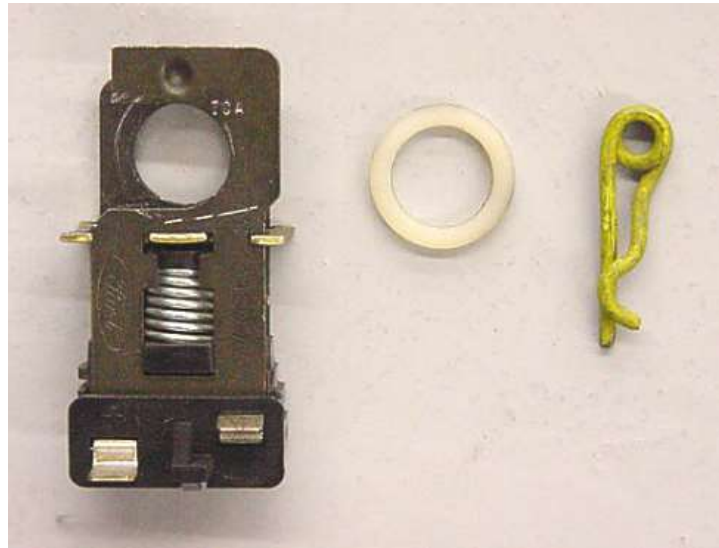
Cut 4" into the hard brake lines from the distribution block. New brake line is provided with the kit. The power booster/master cylinder assembly can now be taken out of the engine compartment.

96-04 BRAKE HYDRO-BOOSTER

- ✂ ½" ratchet, Snap ring pliers, wrenches or box wrenches, tape, marker, bucket, rags.
- 🚗 Mustang Hydro-booster, master cylinder, and power booster hoses.

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.

Place a bucket under the Hydro-booster.

Label all hoses that attach to the hydro booster.

Disconnect the hoses draining them into the bucket.

Attach tape to the brake lines and mark their positions on the master cylinder and distribution block.

Remove the four bolts that connect the hydro boost mount and pedal box to the firewall

On the Hydro-booster, remove the snap ring in front of the retaining nut inside the car

Remove the nut that retains the hydro booster to the firewall using the tool provided with the kit.

Remove the Hydro-booster/Master cylinder assembly from the car.

Thread the retaining nut back onto the booster and reattach the snap ring so they do not get lost.

Drain the power steering fluid from the pump.



1997 Hydro-booster, Master cylinder, Hydro-boost retaining nut and snap ring.

1996-2004 ABS BRAKES

If power brakes are going to be used, an addition that is optional and not necessary but is very useful is the use of the ABS system from the Mustang. This does complicate the brake set-up but when driving the car, the difference is noticeable. The brake line fittings used on the controller and the Master cylinder are single flare. If ABS is going to be used label the location of the brake lines and remove all the brake lines in the front half of the car. This will minimize the number of flares needed. Remove the ABS controller and mounting bracket from the engine bay.

87-95 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.

96-04 STEERING RACK AND POWER STEERING COOLER



$\frac{5}{8}$ " and $1\frac{1}{16}$ " combination wrenches, Adjustable wrench, plastic dead blow hammer, long nose pliers, bucket, rags



Mustang rack, rubber mounting bushings, power steering hoses/lines, power steering cooler.

Disconnect the lower steering column by removing the bolt on the flexible collar in the area where the Pyramid shaped steering rack shaft begins.

Remove the inner clamps from the steering rack boots and pull them back.

Remove the steering rack inner tie rods from the rack.

If equipped, disconnect the power steering cooler lines from the cooler.

Remove the power steering cooler from the frame and save.

Remove the two bolts that secure the steering rack to the frame and lower the rack gently out of the car along with the power hoses.

Remove the cotter pins from the tie rod ends.

Remove the castle nuts from the tie rod ends.

Using the plastic dead blow hammer, hit the tie rod ends out of the spindles.

Throw the inner and outer tie rods away. New shorter ones are provided in the kit.

Keep the rack body and boots.

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.



95-04 Mass Air Meter and Air Filter housing.

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.

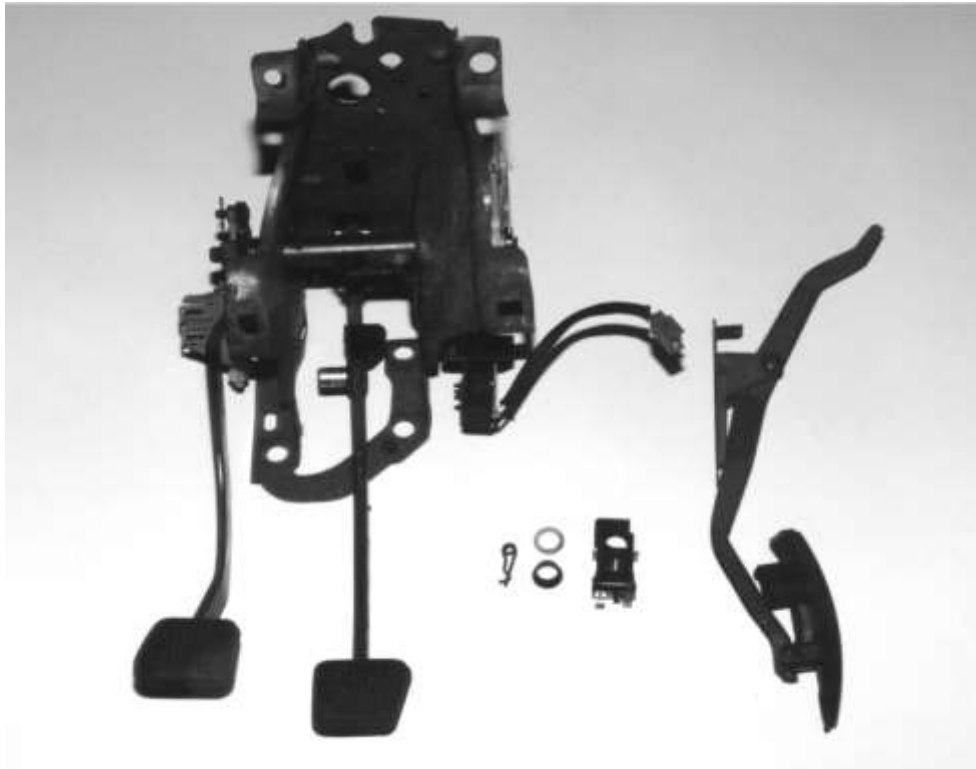
Remove the seats from the car.

Remove the center consul cover the handle.

Remove the carpet from the car.

PEDAL BOX, ACCELERATOR PEDAL AND CLUTCH CABLE

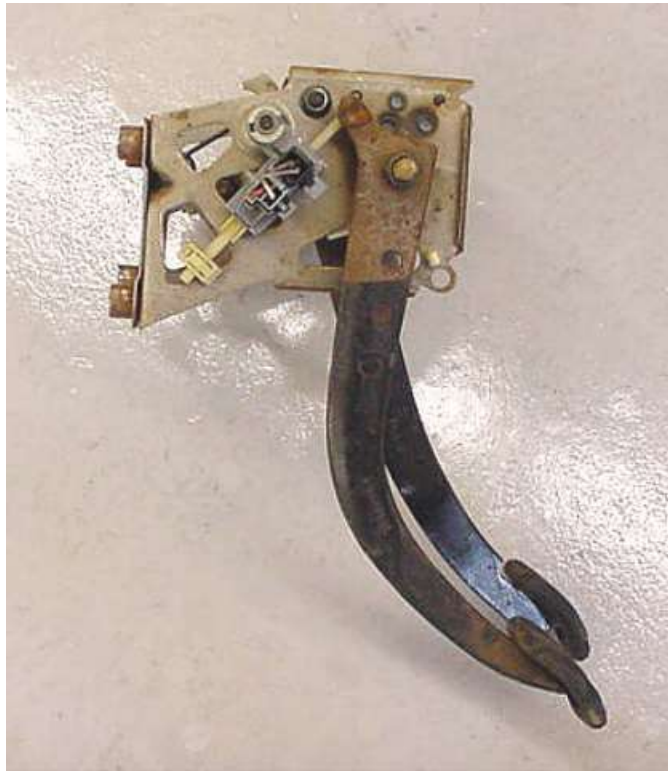
- ✂ Socket set, wrenches, Phillips head screwdriver, flat head Screwdriver.
- 🚗 Mustang pedal box, accelerator pedal and clutch cable.
- 👤 The pedal box comes unpainted from Ford. Even on newer cars there is a light coating of rust on this part. You can clean and paint this part. Take care to avoid painting 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.



94-04 Pedal box assembly

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.



EEC-V computer.

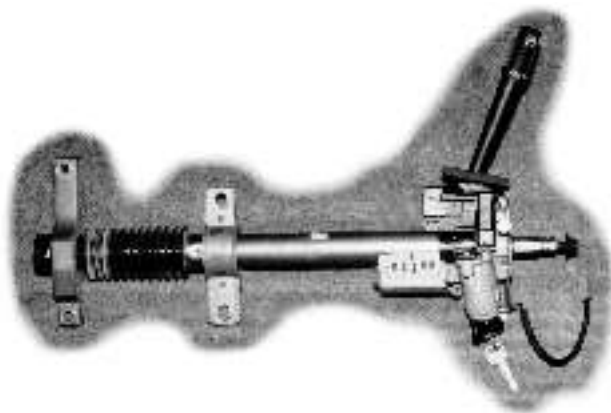
Remove the kick panel in the passenger footbox.

Disconnect the ground strap in the footbox next to the computer.

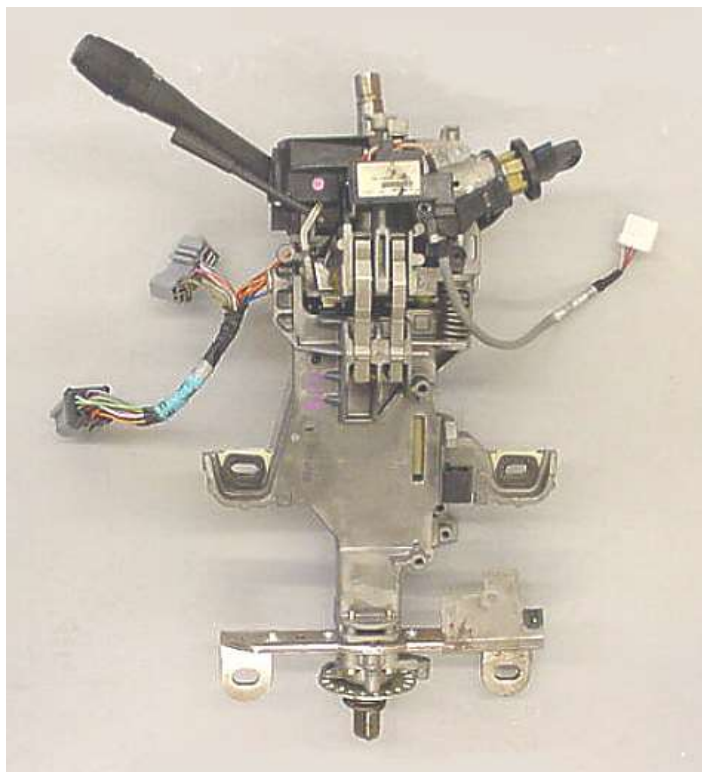
Remove the computer and its plastic holder from the passenger footbox area.

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)



96-04 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






96-04 Turn signal stalk.

Remove the ignition switch and for 96-04 donors the anti-theft module from the column.



Key and anti-theft module

DASH WIRING HARNESS


-  Socket set, extension, regular, Torx and Phillips head screwdrivers, needle nose pliers, hammer, and marker tape.
-  Dash wiring harnesses, 96-04 traction control switch
-  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.

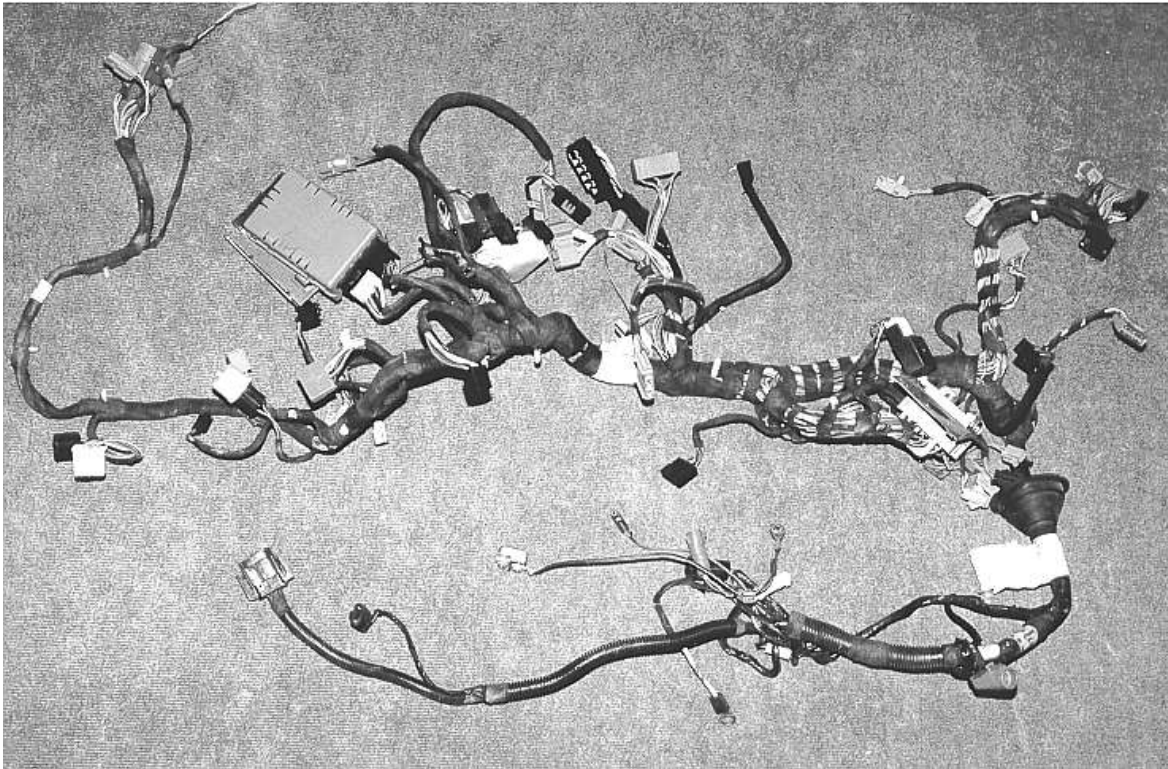
Remove the wiring harness and all of the “black boxes” hooked into it from the dash. Mark all of the connectors to prevent any confusion later.

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

Remove the traction control switch from the car if it is so equipped. If you do not want to use the switch you can use a SPDT switch available at Radio shack or Home Depot.

-  On 96-04 Mustangs, if the traction control switch is not plugged in, the computer by default will leave the traction control ON which will make the engine cut power ~5000 rpm under heavy acceleration (really annoying). It is a good safety precaution though if someone else will be driving the car that is not used to the performance levels capable from this kit.

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



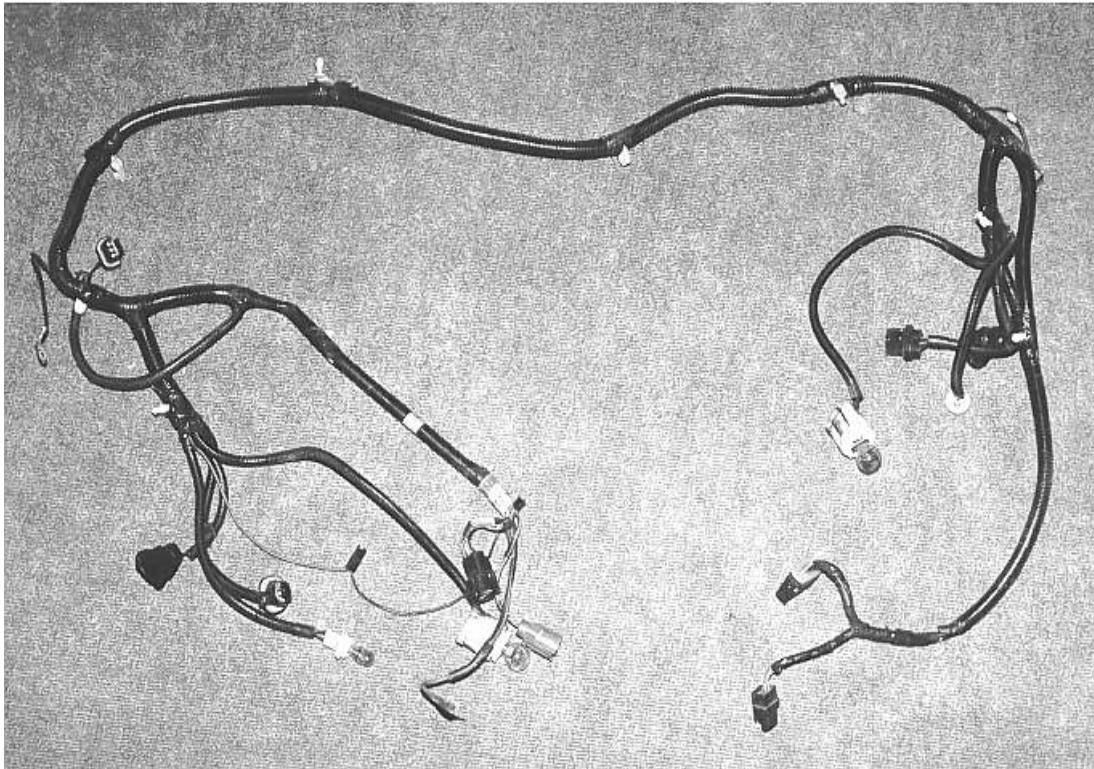
87-93 Dash harness with air bag and fuse panel attachments.

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.

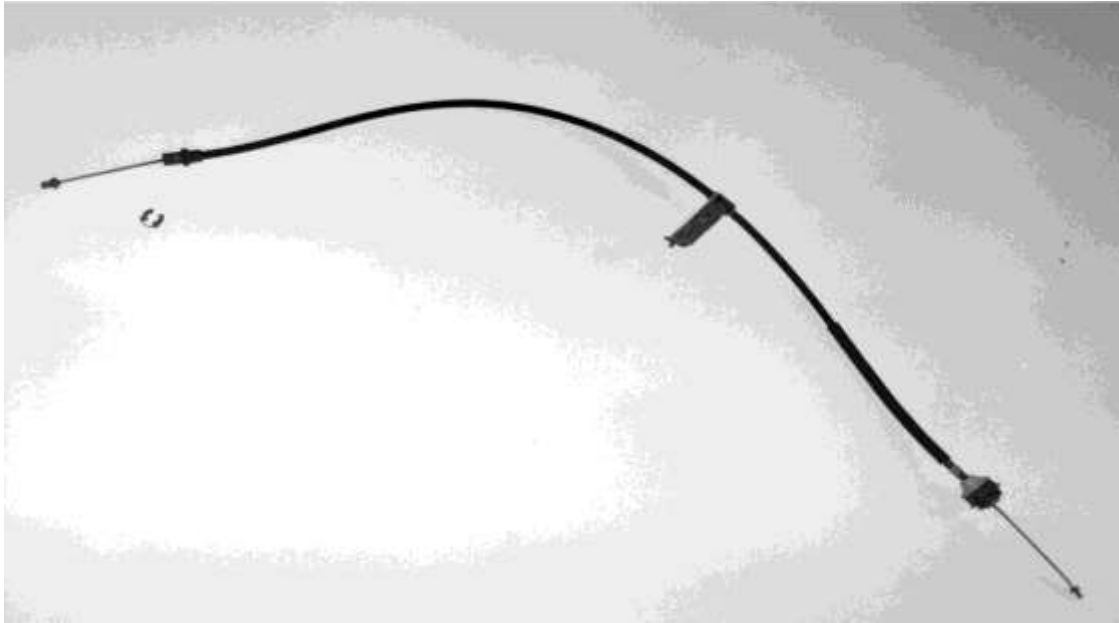
Pull the sending unit straight out.

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.
-  O₂ 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 5/8" pins inside rubber sleeves.

Cut the air tube connected to the H-pipe.




Disconnect the O₂ 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 O₂ 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 3/8" ratchet handle to undo it.

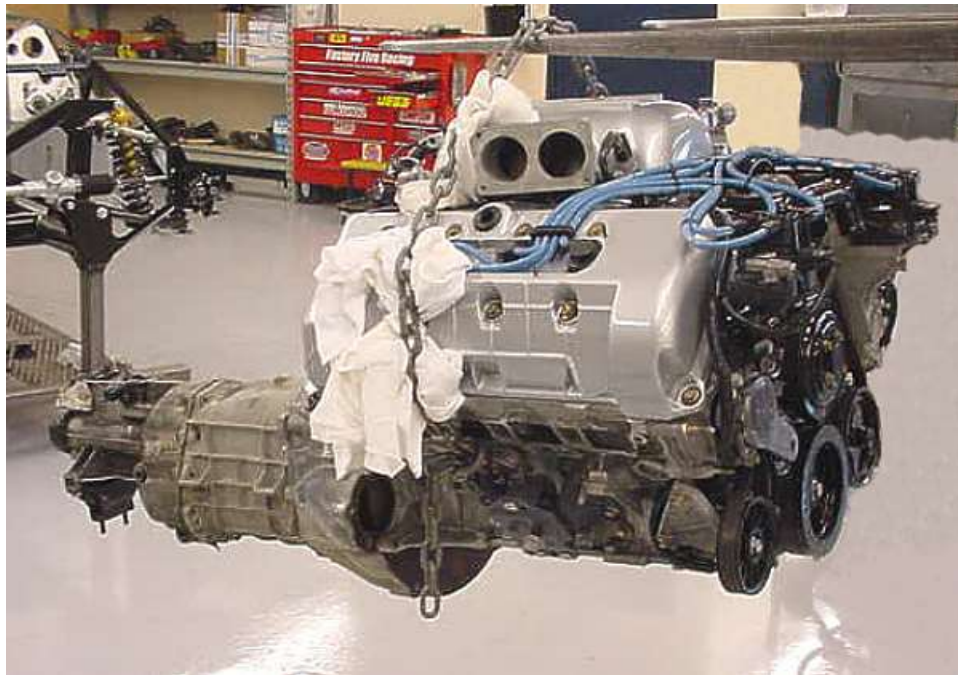
Tape over the rear of the transmission so that it doesn't leak or drip fluid.

Undo the transmission mount from the cross-member.

Loosen the cross-member attachment bolts.

-  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.



1997 4.6L DOHC Engine and T-45 transmission on hoist

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.



The 4.6L oil pan is too deep to use and must be changed for a shallow pan from Canton or Morosso



2003 4.6L DOHC Engine and 3650 transmission

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

87-93 - Remove the dust cap on the rotor

87-93 - 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, 1/4" 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 frame 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.

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 1/4" 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.



96-98 Donor fuel system parts.

Donor Part Preparation

REAR COIL SPRINGS

✂ Hack saw or chop saw



Rear coil spring.

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.

REAR END

✂ ½" drill bit, drill, vise

Remove and save the control arms from the axle

Remove the lower shock mount brackets.



Using a 1/2" drill bit, enlarge the hole on the Ford lower shock mount brackets.



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

See the Solid Axle suspension section of the manual for more solid axle preparation.

FRONT LOWER CONTROL ARMS



Hack saw, file grinder



Stock 94-04 front lower.

If using the stock 94-04 front lower control arms, drill a ½" hole in the spring seat area shown in the picture below using the rear end shock mount as a guide for height. If the hole is drilled too low, you will have to clearance the middle of the spring area so the shock will not hit when installed.

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



Drilled and modified front lower control arm.

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

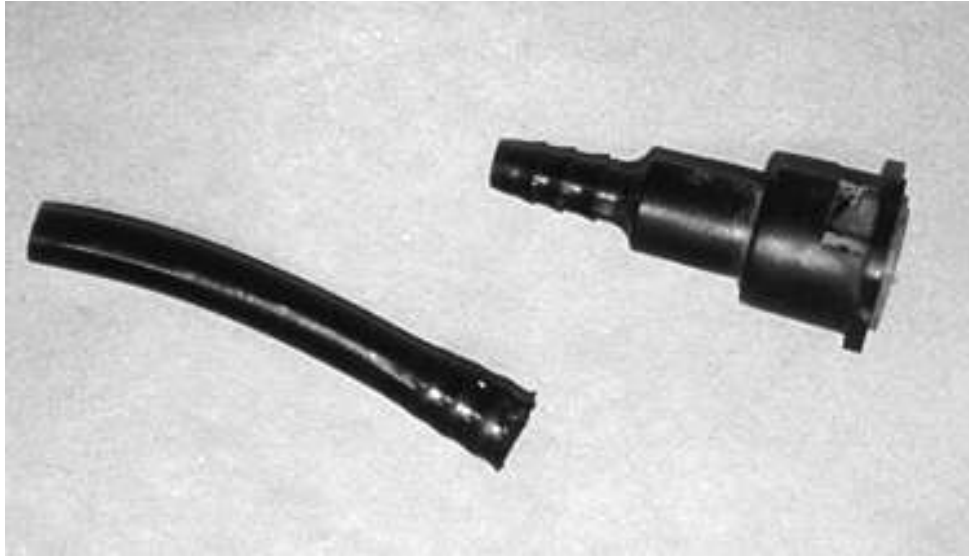
Check clearance with the new shock and the new mount. These parts must move freely without contacting the control arm surface.



Coil-over mounted in lower arm with clearance hole.

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.

On 99-04 engines, cut the metal fuel line off the Fuel Pulse Dampener (disc shaped object in the fuel send line) on the inlet side.

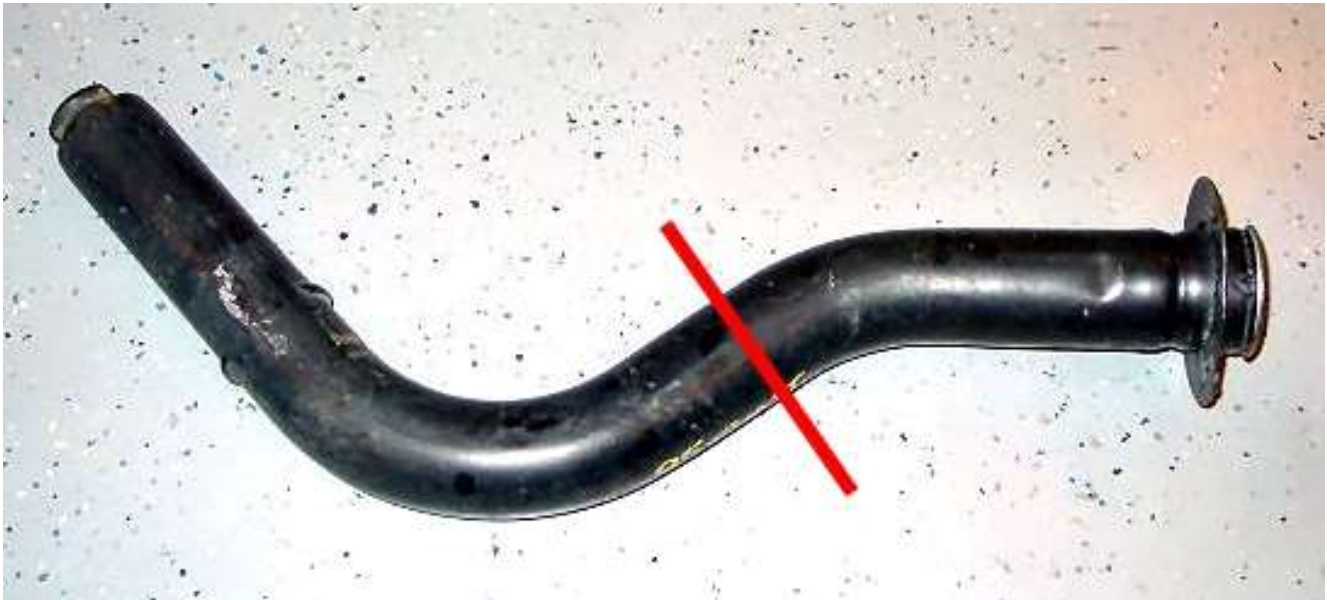
FUEL TANK

- ✂ 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



87-98 - 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.



Uncut Filler Neck



Cut Filler Neck

99-04 – Cut the donor filler neck just above the crimp line below the mounting flange.



Cut the filler neck above the bend but below where the small fuel tubes attach to the side of the larger tube making sure to leave enough room to attach a fuel filler hose and hose clamp.

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

87-93 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.

94-04 Pedal box - On the pedal box, measure down 1.5" from the stock location and mark the pedal box on both sides.

Drill a new mounting hole through both sides of the pedal box.



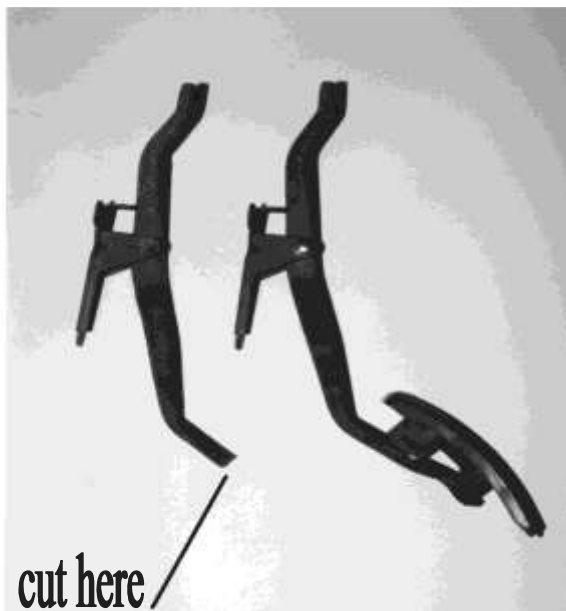
Cut the brake pedal between the mounting bolt and the master cylinder push rod attachment stud. Remove 1.5" from the middle and MIG weld the pedal back together. Make sure the top piece where the bolt is located is oriented correctly, as the spacer on each side of the pedal is different.



Cut and welded pedal

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.

87-93 PEDAL BOX

✂ Marker, hack saw, measuring tape

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

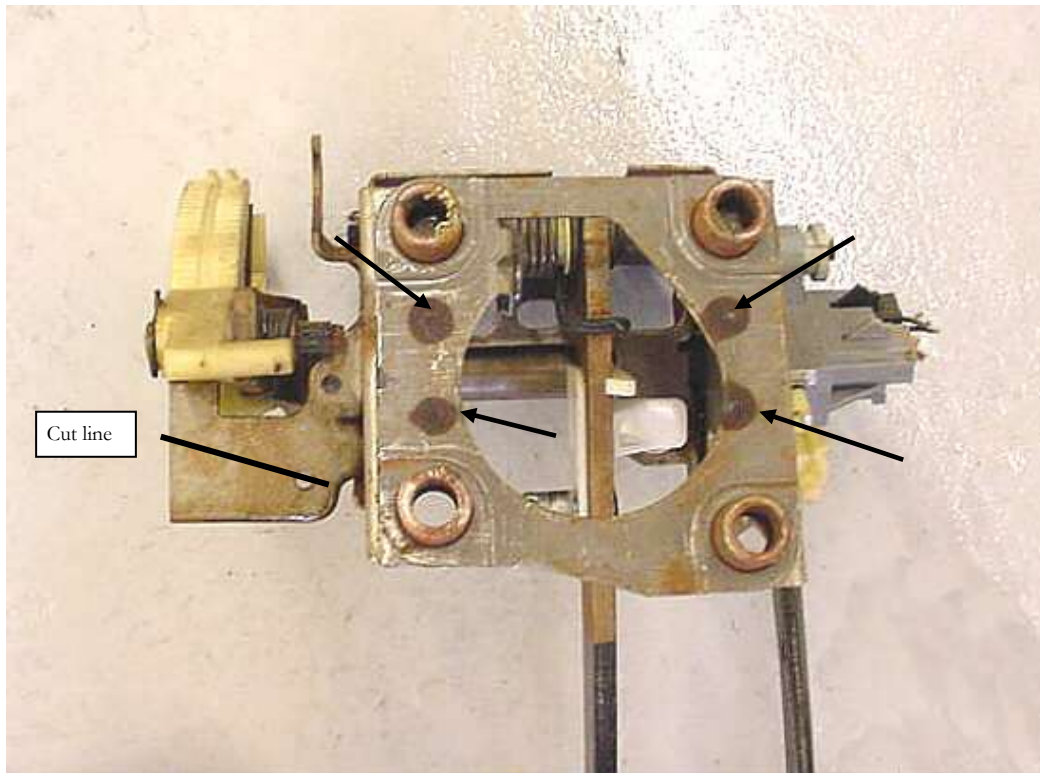


Mark the mounting face of the 1" up from the bottom of the mounting plate.

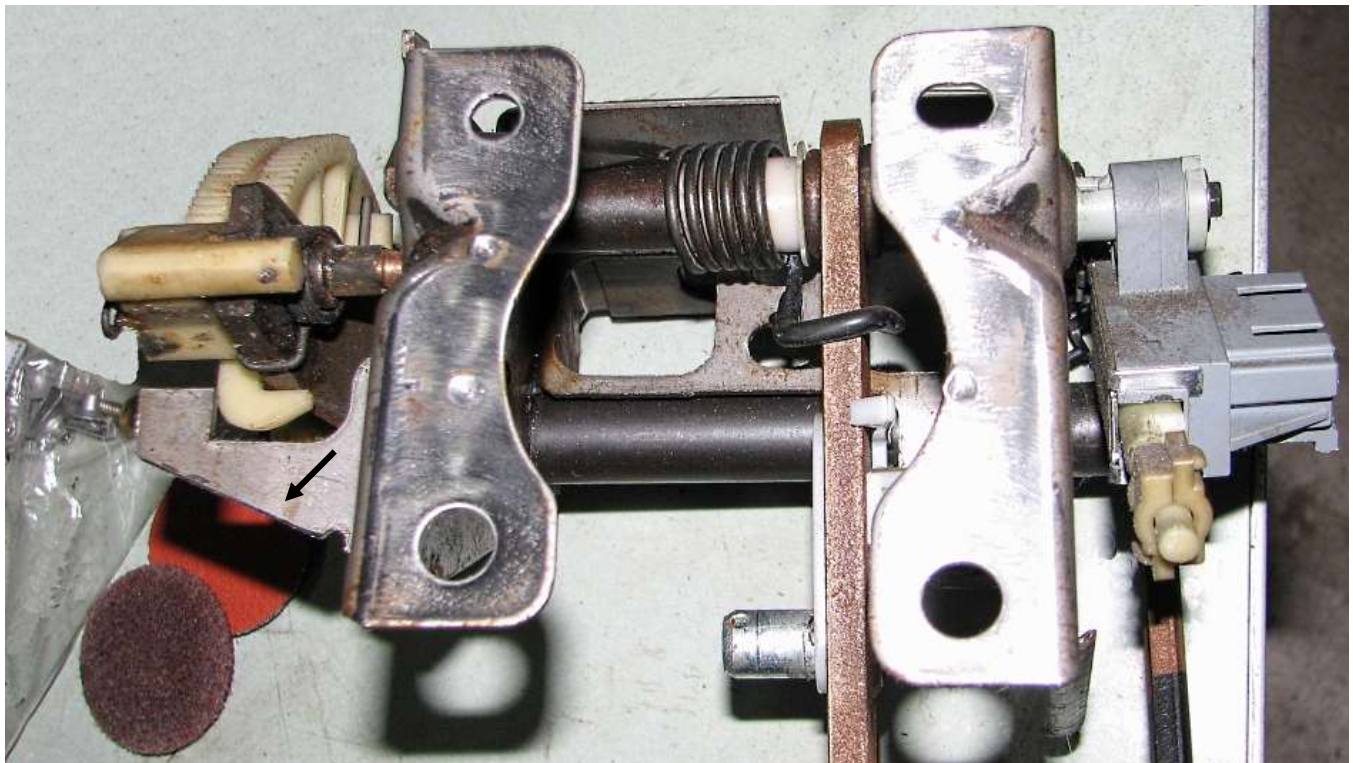
Cut-off the marked area (bottom of the front mount flange) with a hack saw. This is necessary for steering shaft clearance.

1994-2004 PEDAL BOX

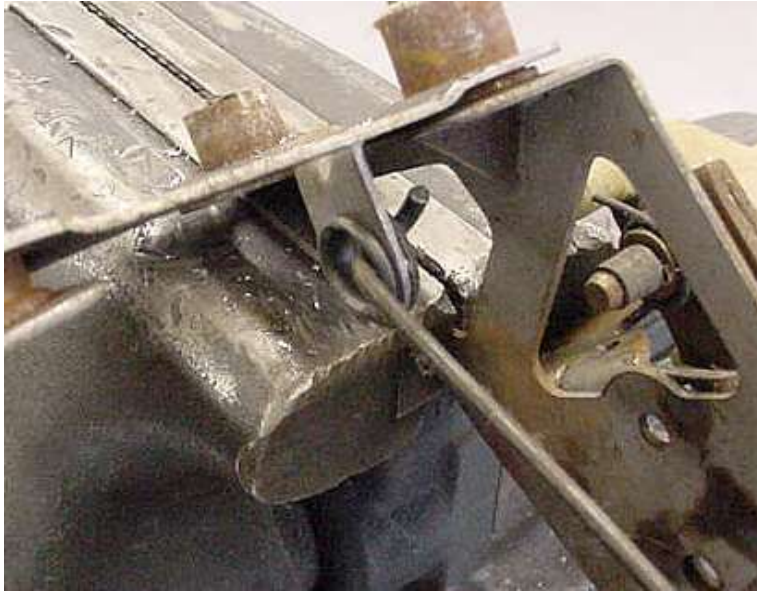
✂ Drill, drill bits



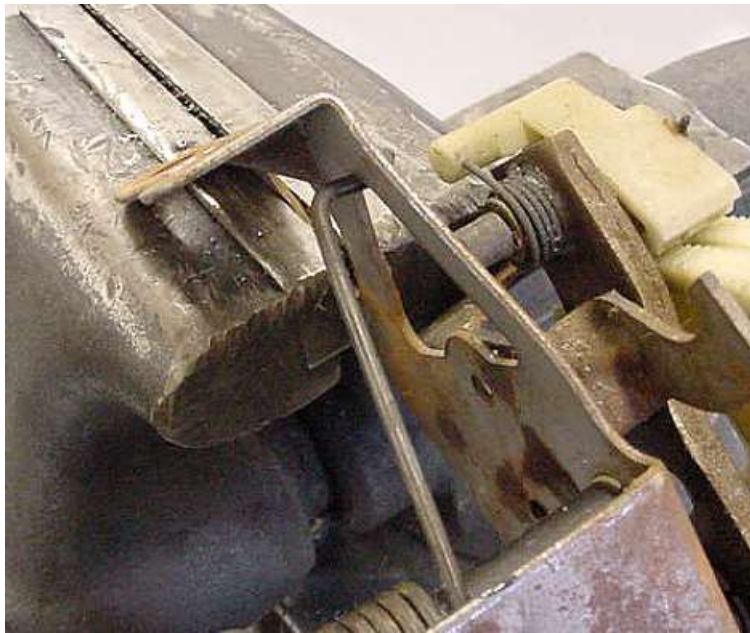
Drill out the four spot welds on the front face of the pedal box.



Cut off the lower corner of clutch quadrant stop shown in the picture for accelerator pedal clearance.



Remove the brake pedal spring from its mount hole and remove the plate on the front of the pedal box along with the round spacers.



Relocate brake pedal spring to pedal box triangular opening.

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.

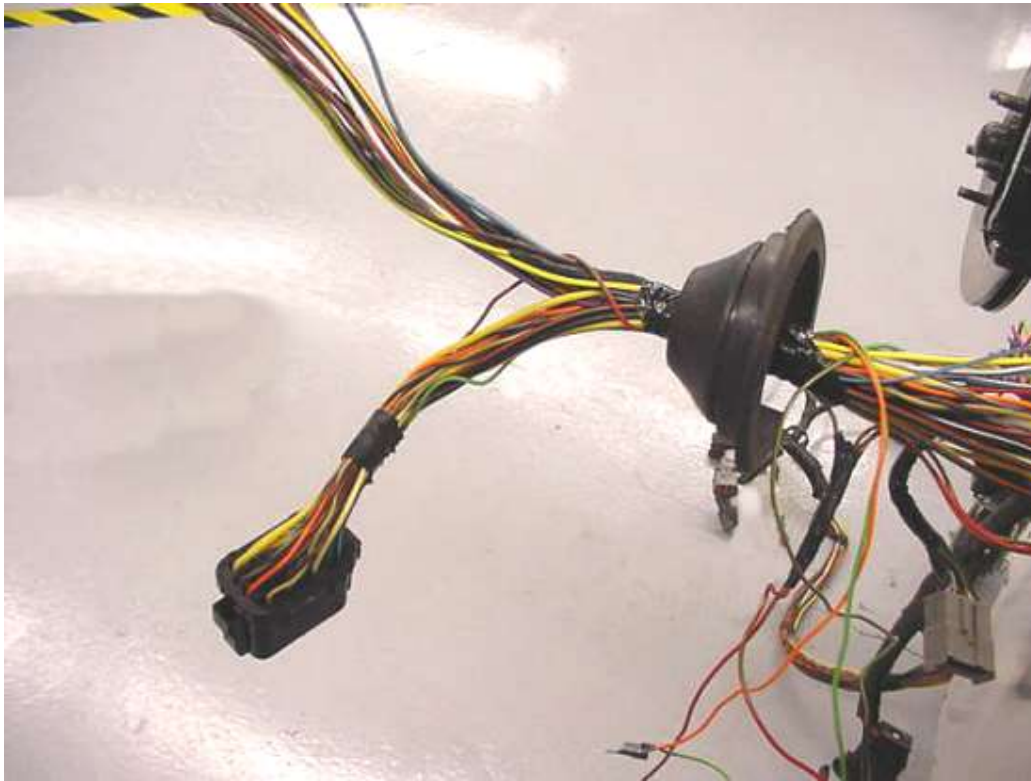
96-04 Harness



The following 2 steps can be done two ways, cut and move the firewall grommet or cut a hole in the top outside panel of the footbox (near the front) for the connector to attach through. This would allow the grommet not to be cut.



Cut the front wiring harness firewall grommet so that it can be taken off the harness.



Move the harness grommet backwards on the harness behind the short wiring “branch with the large rectangular plug on it. All of the remaining plugs should be pulled back behind the firewall plug.



Rewrap the harness with electrical tape from where the grommet was back to the new grommet location.

87-95 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.



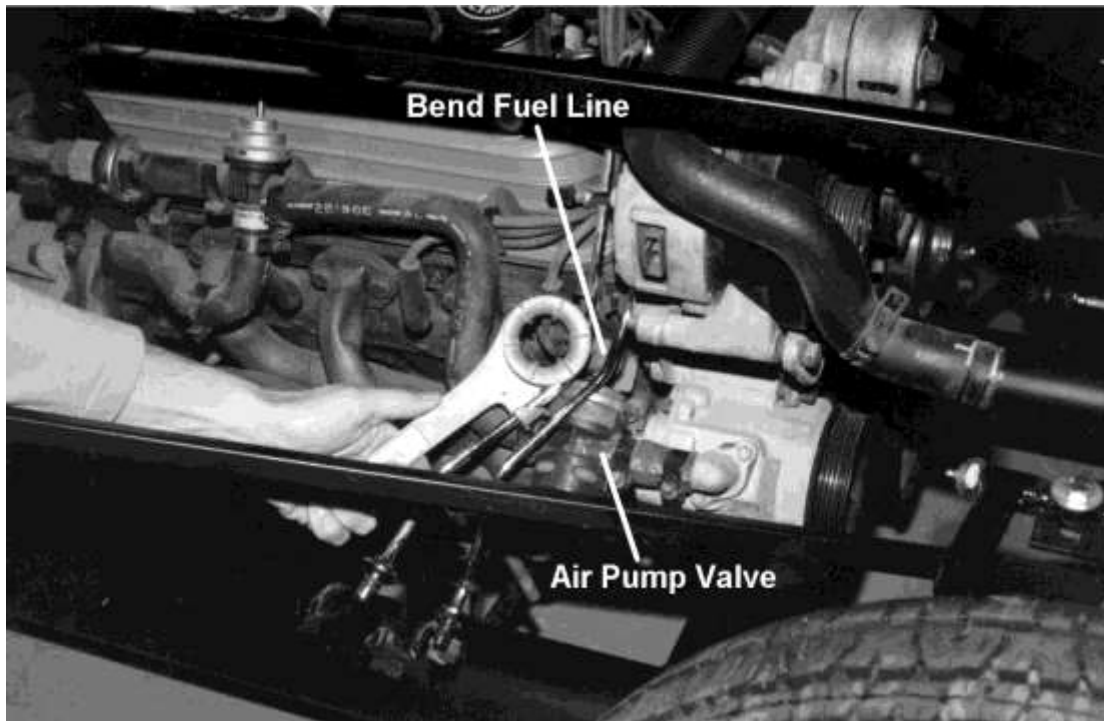
After separating the booster housing, pull the rod out. This rod will have an aluminum fitting attached to it. In order to get it to release, heat the aluminum fitting with a torch and the rod will pop right out.

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”, 1/2” sockets, tube bender, ratchet



87-95 - 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.

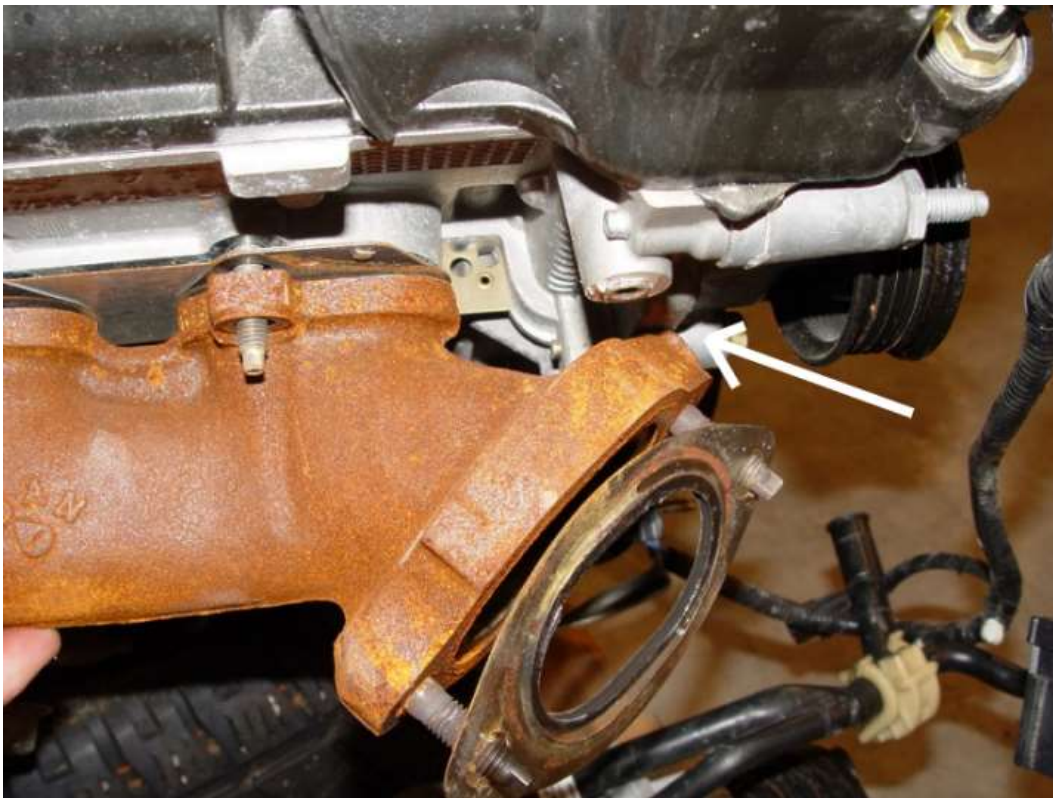
If you are not running emissions equipment, the only engine controls that need vacuum are the PCV valve in the valve cover and the fuel pressure regulator. The EGR can be left unhooked. Make sure to close off any extra vacuum ports.

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

87-95 - 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.



96-04 Driver side manifold.



96-04 Passenger side manifold. Note the casting touches the block.

96-04 - Install the headers, leave the header on the correct side of the engine but flip them over so that they point forward

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.
- 👤 On 96-04 EFI cars, the pulley supplied replace the A/C compressor
- 👤 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 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.

96-04 Additional prep



Remove the spring pins from the A/C bracket.



Insert the spring pins back into the two front holes on the block. It may be helpful to put a dab of silicone to hold the pins in place until the bolts are installed.

87-95 TRANSMISSION

✂ Hack Saw



If you are running a T-5 Transmission, remove the casting tab with the hole in it that is sticking out on the passenger side with a hack saw.

STEERING RACK

✂ $1\frac{1}{16}$ " and $\frac{5}{8}$ " wrenches, ruler, hack saw, marker.

Remove the outer tie rods.

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



If you are planning on running power steering this section is 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 $\frac{1}{2}$ " 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.

Pull the rubber boots back and remove the inner tie rods, store until the kit arrives.

96-04 POWER STEERING COOLER (IF EQUIPPED)



Ford changed the design of the steering cooler in 2000 to one that has radiator like fins on it. This type supersedes the earlier plain tubular version.

Old style



Cut half of the passenger side power steering mount off.



✂ Drill a mounting hole in the bracket using a $\frac{3}{16}$ " drill bit.

INTAKE TUBE



The year and type of engine may give a different style intake tube. Similar modifications can be done to different styles.



Uncut 1997 DOHC Cobra™ intake hose

Cut the intake hose in the crease on the intake side of the bellow section marked in the picture. Make sure not to cut the large bellow section.

96-04 AIR FILTER HOUSING



Unclamp the air filter housing from the Mass Air Meter.



Mark the housing around the base of the dome.



Cut the flange off the housing. Keep in mind, the flange is the part you want to keep.



Re-assemble the air filter and cut flange clamping them together with the stock clamp.

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.

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.



Read the appendix carefully to determine what you'll need to get.



Read the Performance parts section for ideas and places to get parts.

Disassembly of the kit



Unpacking Your Kit



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. It is a good idea to work one box at a time and replace all the contents before going on to the next box.

Fastener Pack

The Roadster kit packages all the fasteners together in one box. The assembly manual will tell you which fasteners to use in which location. There is a list of the fasteners in the appendix. There are also full-size fastener diagrams for both Metric and standard fasteners in the appendix.

Kit Parts Prep

There are a number of parts in the kit that are packed as bare metal. This is done to allow you to paint, powder coat, or chrome the parts as you desire. It makes the build a lot smoother if you coat these parts ahead of time so you do not have to wait for them when doing the assembly. These parts are:

13203	3-LINK UPPER LINK AXLE MOUNT	EA	1.00
13704	SIDE EXHAUST SIDE MOUNT PLATE	EA	2.00
13531	DOOR LATCH SPACER	EA	2.00
12470	QUICKJACK, LEFT SIDE (HOOK ON OUTSIDE OF CAR)	EA	2.00
12471	QUICKJACK, RIGHT SIDE (HOOK ON OUTSIDE OF CAR)	EA	2.00
12426	DRIVER SIDE 4 INTO 4 SIDE EXHAUST	EA	1.00
12427	PASSENGER SIDE 4 INTO 4 SIDE EXHAUST	EA	1.00

Carpet and Dash



Razor Knife



Interior Trim/Carpet Box

If you have the space unpack your carpet and dash material and lay them out flat to store until you are ready for them. This will prevent difficult wrinkles and creases when you go to install them.



Body Removal



$\frac{5}{8}$ " socket, Ratchet, $\frac{5}{8}$ " wrench, gloves, 2 friends.



Be careful of the raw fiberglass edges, they can splinter into your skin



Unbolt the door from the hinge leaving the hinge attached to the chassis. Cut the zip ties in the door latch area.

Remove the hood and unbolt the trunk from the chassis.



Unbolt the body sides from the chassis on the underside of the car.



Unbolt the Quick Jacks and remove the body. Two people can do this but it is much easier with a third person to pull the sides clear of the chassis.

When you store the body on the ground (unsupported) for long periods of time you may get slight distortion (bowing) around the walls forward of the doors. In order to avoid the chance of this happening, we recommend putting two short 2"x 4" braces (24" long) under the windshield holes

(running vertically to support the hood cowl area just forward of the doors under the windshield holes). Use these 2"x 4" 's whenever the body is on the ground, otherwise make a body buck to support it. A body buck diagram is in the appendix. The dimensions do not have to be exact. A rough shape is all that is needed to hold the body.



Body buck

Aluminum Removal



¼" nut driver, jack stands, marker.

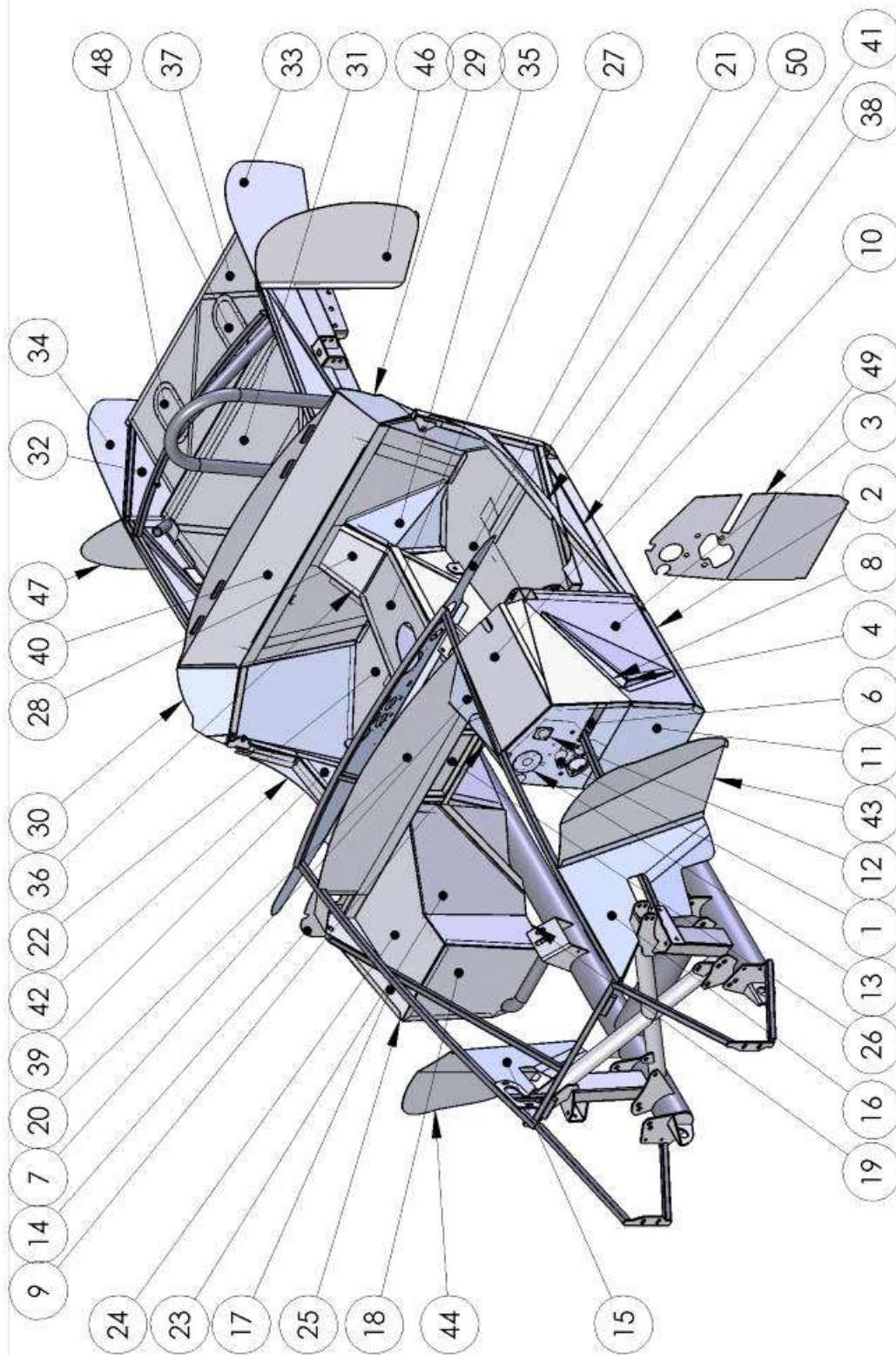


Do one panel at a time. Be careful of the sharp aluminum edges, they can cut you.



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.



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 Factory Five Racing, Inc.		DATE 2010
DRAWN JI	NAME JI	TITLE ROADSTER KIT
UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN INCHES TOLERANCES: TWO PLACE DECIMAL ±0.01 THREE PLACE DECIMAL ±0.005 FOUR PLACE DECIMAL ±0.001		SIZE A
MATERIAL FINISH		DWG. NO. 10500 kit
USED ON APPLICATION		REV mk4
PRINTED 11/1/2019		SCALE: 1:18 WEIGHT: SHEET 1 OF 5

ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	13806	BRAKE MASTER CYLINDER FILL PLATE	1
2	12985	LEFT SIDE DROPPED FLOOR	1
3	15966	LEFT FOOTBOX, VERTICAL WALLS, OUTSIDE	1
4	15968	LEFT FOOTBOX OUTSIDE WALL EXT. FLNG, INSIDE	1
5	15969	LEFT FOOTBOX, VERTICAL WALL, INSIDE, TOP	1
6	15970	LEFT FOOTBOX, VERTICAL WALL, INSIDE	1
7	15973	LEFT FOOTBOX, TOP INSIDE	1
8	15967	LEFT FOOTBOX OUTSIDE WALL EXT. FLANGE, OUTSIDE	1
9	15521	LEFT FOOTBOX TOP INSIDE COVER	1
10	10858	LEFT FOOTBOX, TOP/OUTSIDE SECTION	1
11	16736	LEFT FOOTBOX FRONT- WILWOOD START 1/1/19	1
12	15802	WILWOOD PEDAL CLUTCH HOLE COVER	2
13	12407	FRONT HARNESS BLOCK-OFF PLATE	1
14	10963	ALUM PANEL, FIREWALL EXTENSION, RIGHT SIDE	1
15	10863	16671 - ENGINE BAY "F", RIGHT	1
16	10864	10864 - ENGINE BAY "F", LEFT	1
17	15015	RIGHT FOOTBOX, TOP/OUTSIDE	1
18	13138	RIGHT FOOTBOX, FRONT VERTICAL WALL	1
19	13634	RIGHT FOOTBOX, DROPPED FLOOR	1
20	10559	FIREWALL PANEL	1
21	10557	COCKPIT FLOOR, LEFT SIDE, W/TUNNEL WALL	1
22	10558	COCKPIT FLOOR, RIGHT SIDE, W/TUNNEL WALL	1
23	13139	RIGHT FOOTBOX, VERTICAL WALL, INSIDE WALL	1
24	10853	RIGHT FOOTBOX, TOP	1
25	10551	RIGHT FOOTBOX, VERTICAL WALL, OUTSIDE WALL	1
26	12806	TRANS TUNNEL FRONT VERTICAL WALL	1
27	10563	TRANSMISSION TUNNEL TOP COVER	1
28	10906	U-JOINT COVER	1
29	15022	15020 - COCKPIT REARCORNER, LEFT	1
30	15022	15021 - COCKPIT REARCORNER, RIGHT	1
31	10560	FRONT TRUNK FLOOR	1
32	15223	TRUNK WALL REAR SIDE COVER	2
33	15402	OUTSIDE TRUNK WALL, LEFT	1
34	15403	OUTSIDE TRUNK WALL, RIGHT	1
35	14583	TRANS TUNNEL, REAR CORNER, LEFT	1
36	13247	TRANS TUNNEL, REAR CORNER, RIGHT	1
37	15222	REAR TRUNK FLOOR	1
38	14582	COCKPIT SIDE, UNDER DOOR, LEFT	1
39	13642	COCKPIT SIDE, UNDER DOOR, RIGHT	1
40	10823	REAR COCKPIT VERTICAL WALL	1
41	13803	COCKPIT SIDE, UNDER DOOR, TOP, LEFT	1
42	14584	COCKPIT SIDE, UNDER DOOR, TOP, RIGHT	1
43	10861	SPLASH GUARD, LEFT	1
44	14587	SPLASH GUARD, RIGHT	1
45	15016	FUEL STRAP BLOCK OFF PLATE	1
46	14585	REAR SPLASH GUARD, LEFT	1
47	14586	REAR SPLASH GUARD, RIGHT	1
48	12959	BLOCK OFF PLATE	2
49	10904	LEFT FOOTBOX, FRONT - MUSTANG PEDALS	1
50	13544	CUT DASH	1




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

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 $\frac{3}{4}$ " 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 $\frac{1}{8}$ " rivets for all of the aluminum panels unless otherwise directed.

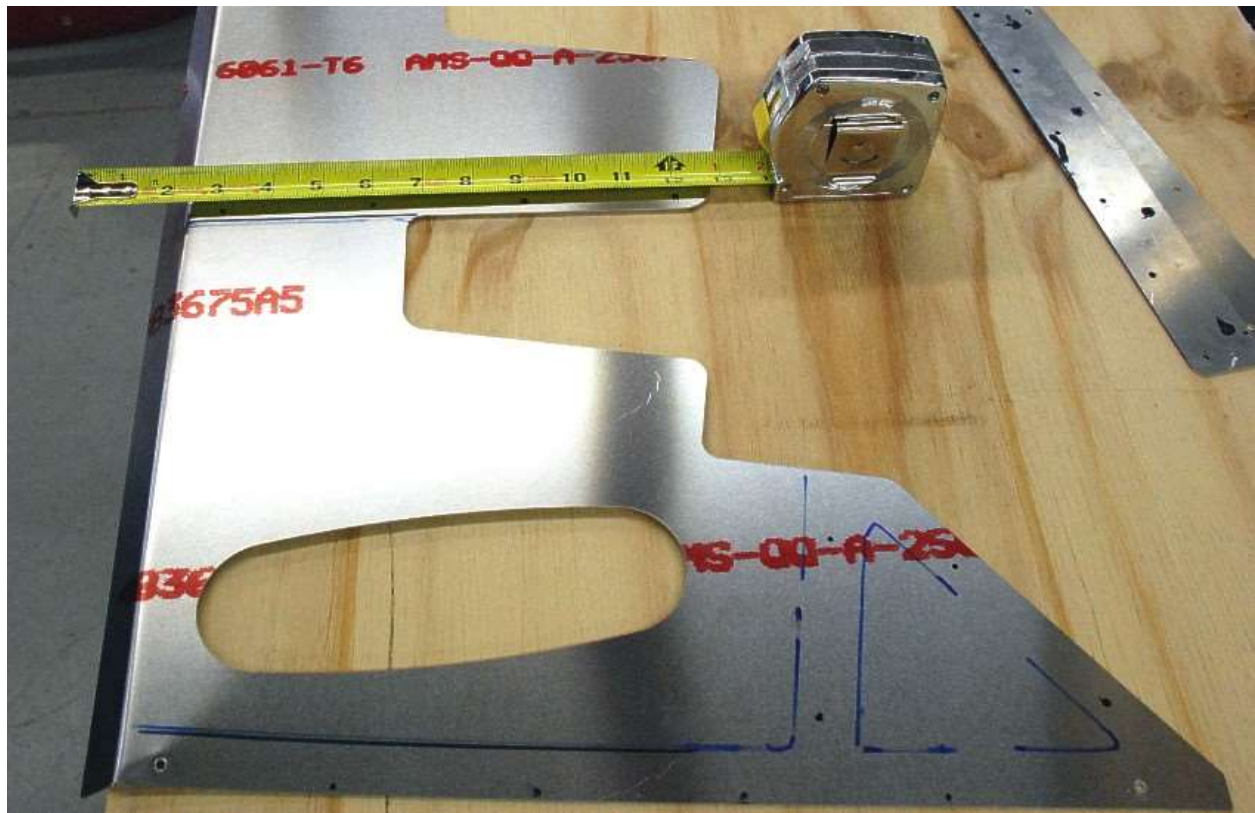
Engine bay F panel aluminum



Marker, $\frac{1}{8}$ " drill bit, drill, Rivet gun, Silicone, Caulking gun, brake cleaner or acetone



Secondary Body Fasteners



The "F" shaped aluminum panels that mount behind the suspension are mounted first. Locate them and mark your rivet pattern in the location you traced.



Drill the panels using a $\frac{1}{8}$ " bit then clean the marker lines and labeling off using acetone or brake cleaner.



Apply silicone to the panel or chassis (whichever is easier) in the areas where they will make contact.



Use the original #6 screws to remount the panel then drill the $\frac{1}{8}$ " rivet holes through the panel holes into the chassis.

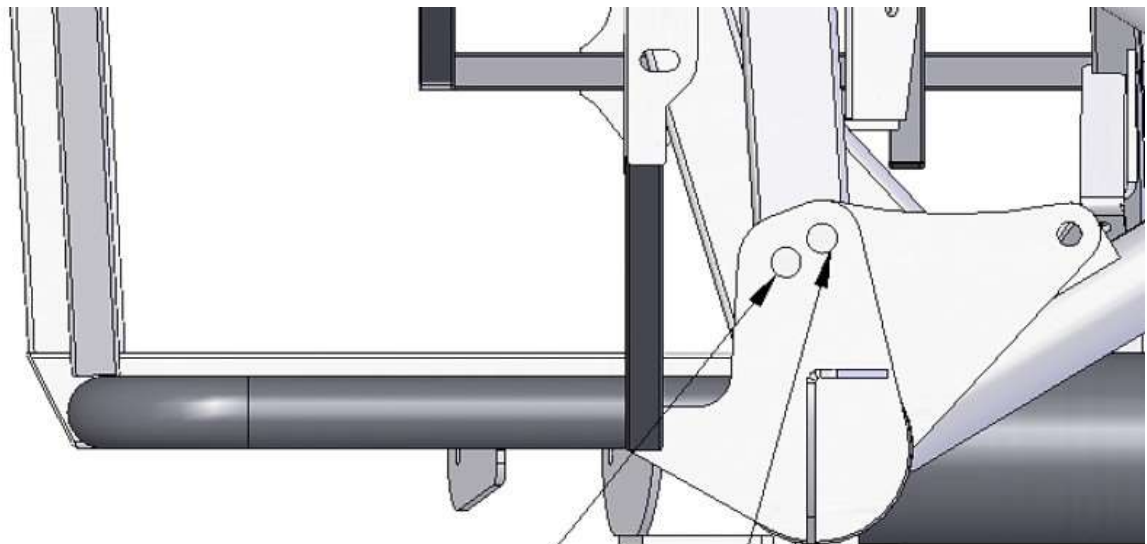


Rivet the panel in place using $\frac{1}{8}$ " short rivets, then remove the screws and replace them with rivets. Repeat for the other side.

Front Suspension

FRONT LOWER CONTROL ARM

- ✂ 7/8" socket, 15/16" wrenches, Torque wrench
- 🚗 Mustang lower control arms and fasteners



87-93 CONTROL ARM
FFR CONTROL ARM

94-04 CONTROL ARM

87-93 - Mount the lower control arms using the outer set of holes on the chassis using the supplied hardware.

94-04 - stock lower control arms, use the inner set of bolt holes.

FFR tubular lower control arms - use the outer mounting holes.

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

FRONT UPPER CONTROL ARM

- ✂ Vise, Thread locker, 3/8", 3/4" wrench, 3/4" socket, Torque wrench
- 🚗 IFS components, 1/2"x 1.75" flange head bolts and locknuts

Unpack the upper control arm assembly.



Put thread locker on the upper balljoint threads.



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



Tighten the balljoint 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 $\frac{3}{8}$ " wrench.



Mount the upper control arms to the chassis with the grease fittings pointed up using the ½"x 1.75" flange head bolts and locknuts. 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 **108-115Nm (80-85 lb-ft)**.



All pivot bolts on the control arm should be installed from the top of the arm so that the locknuts are on the bottom of the arm.



The side mount holes are for the Factory Five optional spindles and provide a slightly different front geometry and handling

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.

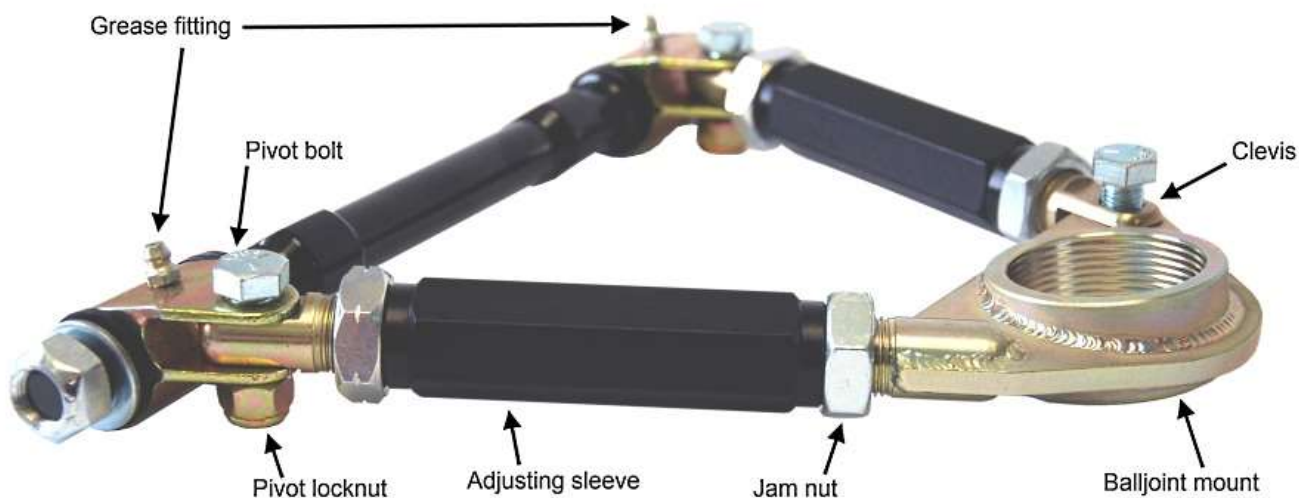


The pivots may be a little stiff at first but once on the car they will loosen slightly.

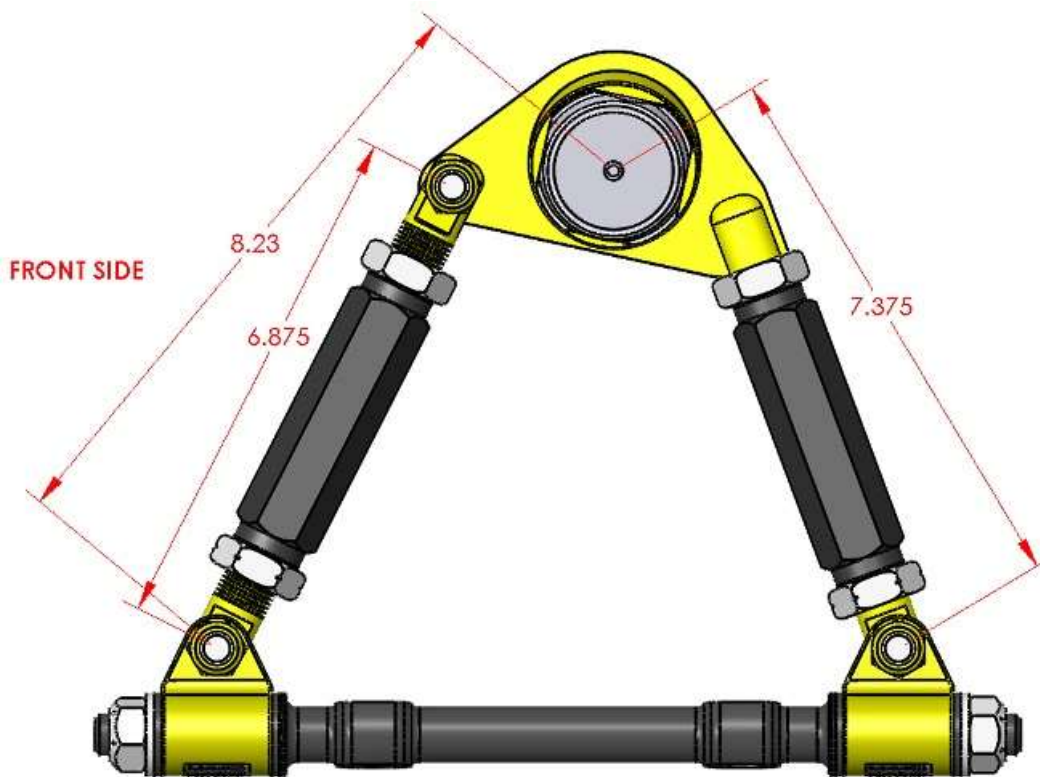
ADJUSTING THE UPPER CONTROL ARM



Use the diagram below for reference.



Slightly loosen the three pivot bolts using a $\frac{5}{8}$ " and $\frac{11}{16}$ " wrench. Loosen the jam nuts on both ends of each adjusting tubes using a $1\frac{1}{8}$ " wrench. Turn the adjusting tubes to lengthen or shorten the arm.



For a **rough** alignment using power steering (high caster) use the measurements above until you can get the car aligned. This picture shows the right side. Left side will have the solid side of the balljoint plate on the front side.

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 lb-ft. 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, 3/4" wrench, 3/4" socket, Ratchet, Torque wrench, chassis or lithium grease.



Front shock set, IFS Components, Insulated clip hardware, (2) 1/2"x 2.75" + (2) 1/2"x 3.25" bolts.



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.



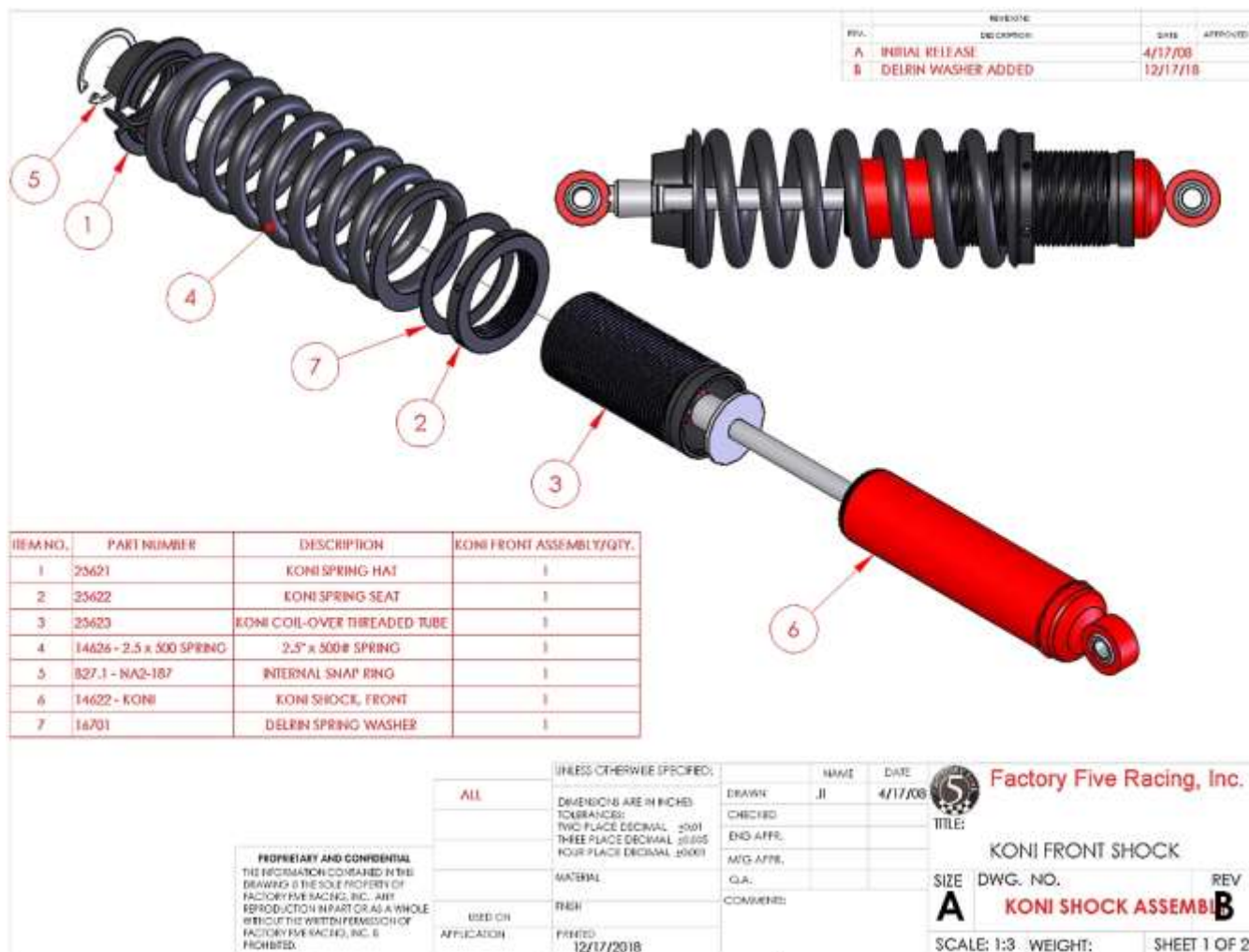
The front/IRS shock extended measurement is 15.15" center to center. They are 2.50" shorter than the solid axle rear shocks



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.



Place a small amount of white lithium or chassis grease on one side of the Delrin washer.



Put the Delrin spacer grease side down onto the spring seat on the threaded tube (shown without tube)



The coil-over hats have a snap ring which holds it in place. If installed, remove this snap ring to assemble the spring on the shock.



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



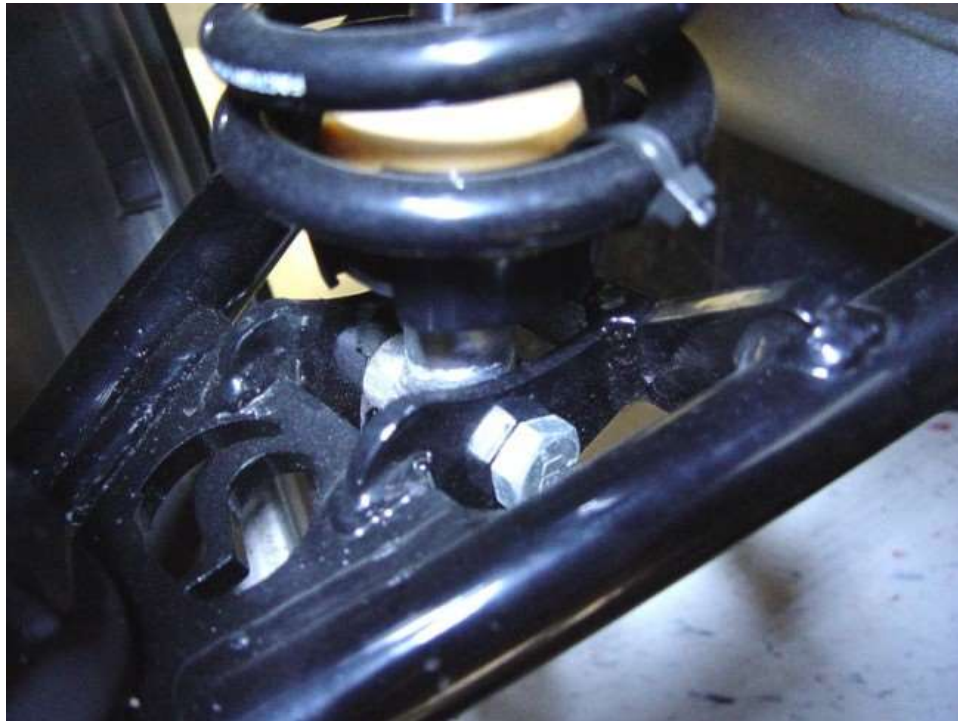
Put the spring and hat on the shock and rotate the spring seat back up the sleeve so that the spring pushes the hat tight against the end of the shock.



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. Use the (2) ½"x 2.75" for the lower mounts.

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.



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



For the stock red Koni shocks, use the **lower** holes.



Fasten the shock to the top mount with the $\frac{1}{2}$ "x 3.25" bolts and 0.675" spacers provided. Torque both upper and lower mounts to **40 ft-lbs**.

SPINDLES

- ✂ $\frac{13}{16}$ " socket, Torque wrench, Needle Nose Pliers, Rubber Mallet
- 🚗 IFS components, Mustang Spindles.

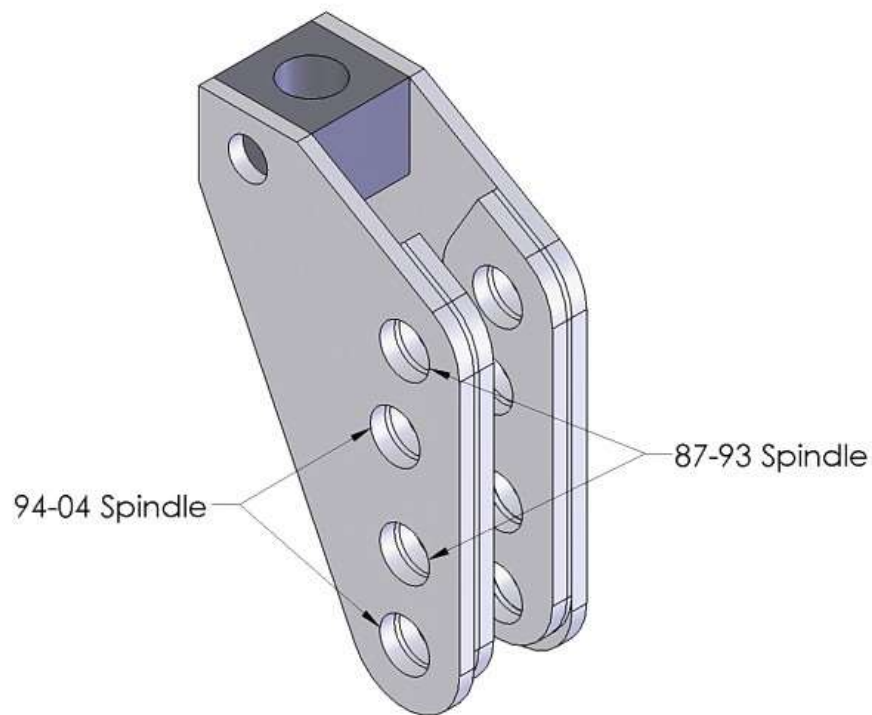
Make sure the grease boot is in place on the lower balljoint then mount the spindle to the lower control arm.

Attach the castle nut and torque the balljoint to **108-122Nm (80-90 lb-ft)** and install a new cotter pin from the IFS components assembly.

IFS BRACKET

- 🚗 IFS components, Mustang strut bolts

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 lb-ft)**.



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 upper ball joint to the spindle and torque to **75 lb-ft** 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 SUSPENSION TORQUE SPECS CHART

Item	Nm	lb-ft
Front lower control arm to frame	135-162	100-110
Front lower ball joint to spindle	108-115	80-85
Upper A-arm to frame	108-115	80-85
Upper A-arm pivot bolts	73	54
Upper ball joint to IFS Bracket	95-108	70-80

87-93 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.

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.

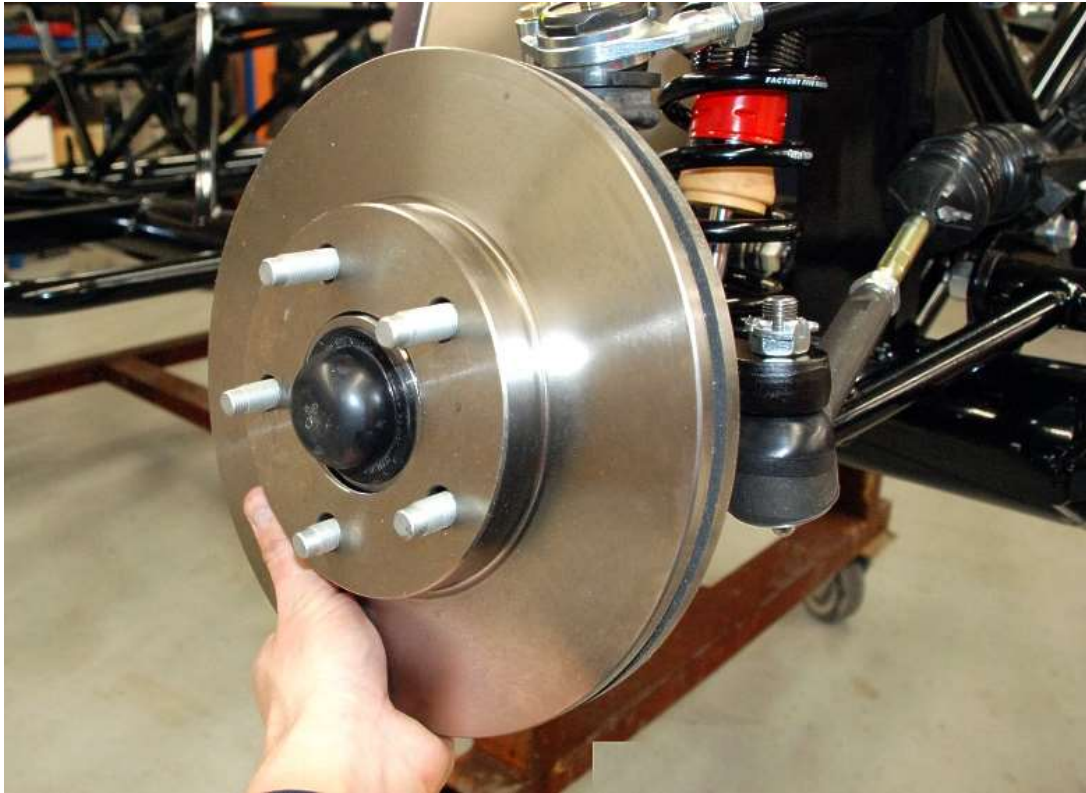
Attach the nut lock and insert a cotter pin.

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)**.

94-04 Front Brakes



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



Skip to the Independent Rear suspension if not installing a Solid axle.

SOLID AXLE PREPARATION

-  3/4" sockets, 3/4" wrench, 1/2" drill bit, drill, floor jack, jack stands, Torque Wrench
-  8.8" Rear axle assembly, Solid axle adapters, (4) 1/2"x 1.25" bolts, (2) 1/2"x 3" bolts, 1/2" locknuts, (2) M12 x 110mm bolts and locknuts, Mustang lower control arms.
-  Use caution when working with the rear end assembly, it weighs 225 lbs.



If not on the axle, attach the desired rear brakes to the axle.

-  Check out the Appendix for the optional FFR brake install or www.factoryfiveparts.com for Wilwood brake options.



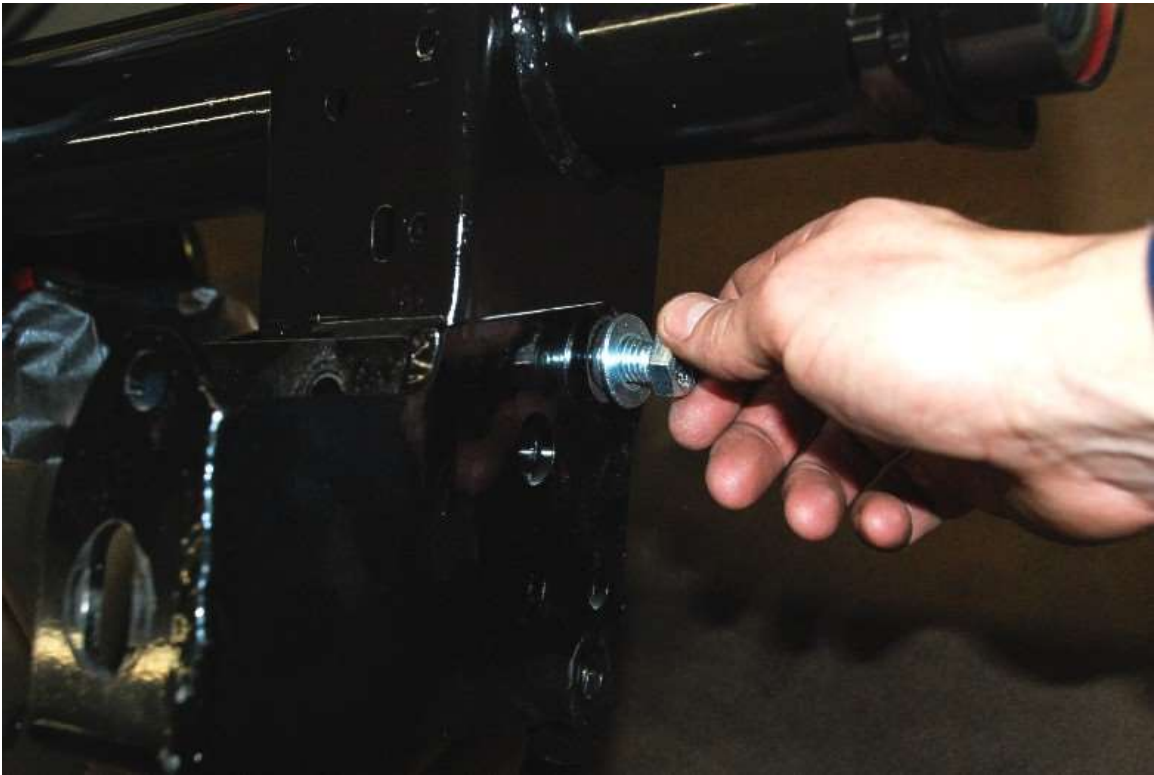
If not already done, fill the axle with gear oil. See Appendix for specifications and capacities.

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



87-98 Axle – Drill the lower control arm holes out with a ½” drill bit.

✂ 99-04 Axle - Drill the lower control arm holes out with a 9/16” drill bit.



Position the Traction Lok brackets on the rear end with $\frac{1}{2}$ "x 1.25" bolts.



Axle Bracket left Side



Axle Bracket right Side



Temporarily put the lower shock bolt ($\frac{1}{2}$ "x 3" 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 lb-ft**).



Attach the lower control arms to the brackets on the axle using the M12 x 110mm 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.

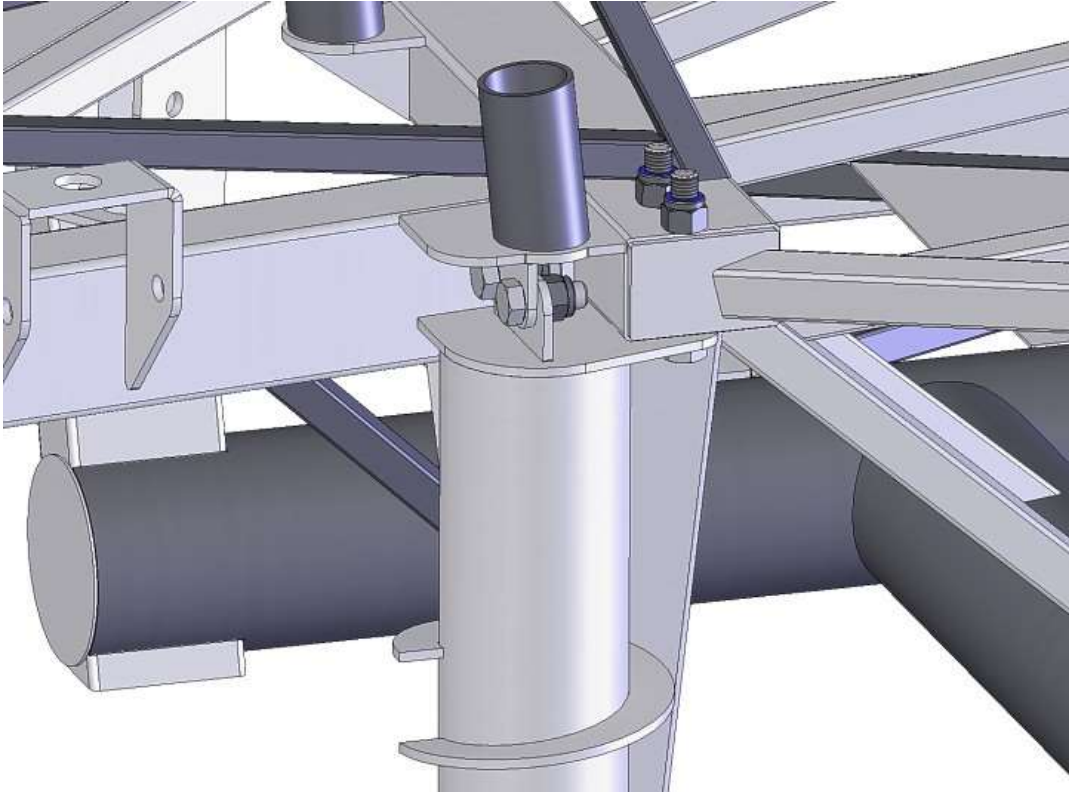
SPRING PERCH MOUNTS

- ✂ $\frac{1}{2}$ " drill bit, drill, $\frac{3}{4}$ " wrench, $\frac{3}{4}$ " socket, ratchet
- 🚗 Rear spring perches, (4) $\frac{1}{2}$ "x 1.25" bolts, (4) $\frac{1}{2}$ "x 3.25" bolts and locknuts, 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 $\frac{1}{2}$ " drill bit.



Bolt on the perch using the $\frac{1}{2}$ "x 1.25" and $\frac{1}{2}$ "x 3.25" bolts and locknuts.

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



$\frac{3}{16}$ ", $\frac{3}{8}$ ", $\frac{1}{2}$ " drill bits, $\frac{5}{8}$ ", $\frac{3}{4}$ ", $\frac{15}{16}$ ", 1" wrenches, $\frac{3}{8}$ ", $\frac{5}{8}$ ", $\frac{3}{4}$ ", $\frac{15}{16}$ " sockets, $\frac{5}{16}$ " Hex key, Ratchet, Torque Wrench, Drill, Ruler/Tape measure, Pliers, Flat head Screwdriver, Tin



3-Link rear suspension with kit.



The Panhard bar frame mount is mounted to the chassis during shipping



3-Link Fasteners



The 3-link kit packages all the fasteners together in one box.

17156	3-LINK DELUXE FASTENERS	1.00	EA
13976	1/2" WASHER	20.00	EA
10834	1/2"-13 NYLON LOCK NUT	11.00	EA
10833	1/2"-13 x 1.25" BOLT	8.00	EA
12385	1/2"-13 x 2.50" BOLT	1.00	EA
12332	1/2"-13 x 4" BOLT	2.00	EA
12218	1/2"-20 MECH LOCK NUT	6.00	EA
12217	1/2"-20 x 3" BOLT	6.00	EA
12380	3/4" JAM NUT, RH THREAD	1.00	EA
13166	3/4"-16 LFT HAND JAM NUT	2.00	EA
13977	3/8" WASHER	6.00	EA
13964	3/8"-16 NYLON LOCK NUT	4.00	EA
10520	3/8"-16 x 1" SOCKET HEAD	2.00	EA

60387	3/8"-16 x 2" SOCKET HEAD	2.00	EA
12387	5/8" WASHER	4.00	EA
15216	5/8"-11 MECH LOCK-NUT	4.00	EA
12382	5/8"-11 x 3" BOLT	4.00	EA
13212	5/8"-11 x 3.50" BOLT	1.00	EA
13751	M12 GRADE 10.9 LOCKNUT	2.00	EA
13706	M12 x 110MM BOLT	2.00	EA

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.

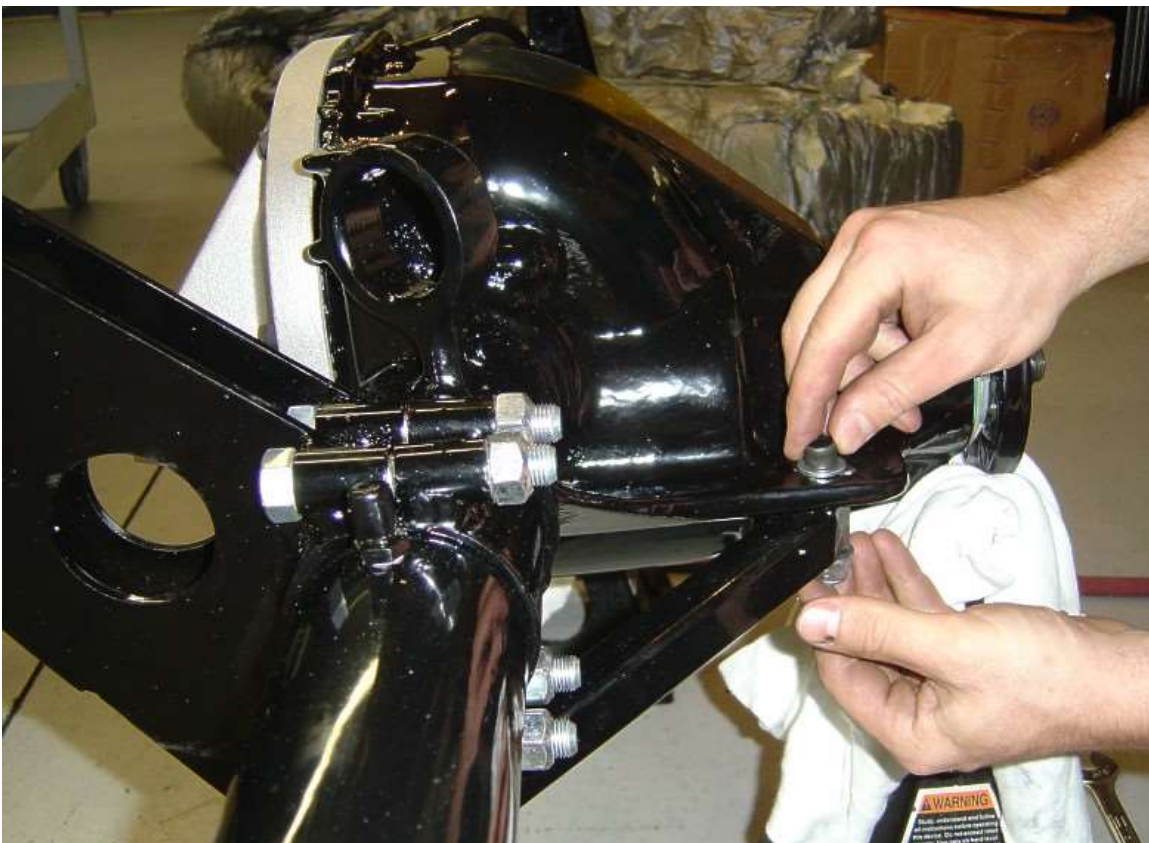


Test fit the two halves of the upper arm mount together. If it is hard to put all of the bolts in the mount holes, put in as many as you can then use a 1/2" drill bit through the remaining bolt holes.

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

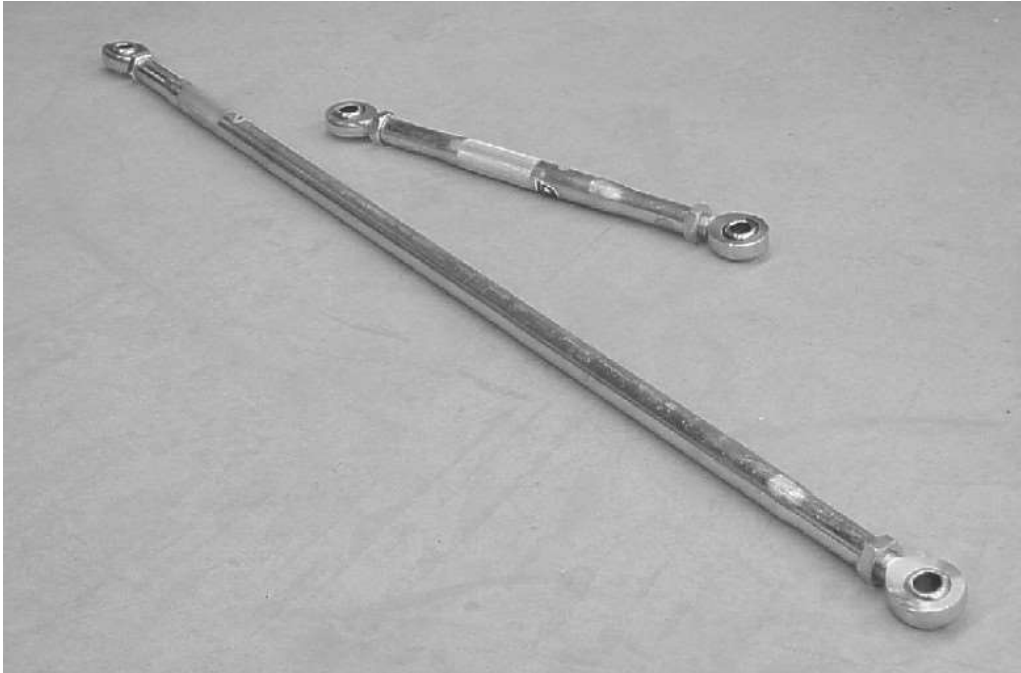


The front attachment of the upper link axle mount attaches to the hole on the flange section of the pumpkin. This hole has some variance and may need to be drilled out from the bottom side using the mount as a guide.



Attach the front of the upper link axle mount to the front axle flange using the $\frac{3}{8}$ " x 2" bolt and locknut.

Upper Link



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 swaged 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.



Attach the short upper link tube to the axle upper link mount using the $\frac{1}{4}$ " spacers on either side of the rod end and the $\frac{5}{8}$ "x 3" bolt.

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 using the M12 x 110mm bolts.

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 using a $\frac{5}{8}$ "x 3" bolt.

OPTIONAL 3-LINK PANHARD BAR FRAME MOUNT



The Panhard bar frame mount is mounted to the chassis during shipping





With the axle jacked up, 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 1/2" 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 1/2"-13 x 2.5" bolt and tighten.



Tighten the bolts on the quad shock brackets.

PANHARD BAR



The Panhard bar mounts to the car using the $\frac{5}{8}$ "x 3" bolts and spacers. Install the Panhard bar to the passenger side traction lock bracket. Three spacers are used in the front (2) 0.375" (FFR# 14064) and (1)

0.25" (FFR# 14065). The rear uses the thin 0.0625" shim (FFR# 13337). 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 $\frac{3}{4}$ " 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 $\frac{3}{4}$ " 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



With the rear end correctly installed with the 3-link, the rear axle will rest on the 3-link Panhard bar mount with the suspension at full droop.



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

OPTIONAL REAR COIL-OVER SHOCK ASSEMBLY



Snap ring pliers, $\frac{3}{4}$ " wrench, $\frac{3}{4}$ " 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.



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.

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



Assembled solid axle Koni coil-over shock.



Attach the body end of the shock to the upper shock mount using the two equal length (1.09") spacers and ½"x 4" bolts.

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



Right side



Left Side

Install the kit $\frac{1}{2}$ "x 3" bolts are provided for each lower shock mount. From the rear, the bolt goes through the bracket, $\frac{1}{8}$ " shim, shock, then the long spacer (1.09") followed by the bracket and axle. Use a $\frac{3}{4}$ " 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.



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

REAR SHOCKS

✂ Torque wrench, ratchet, $\frac{3}{4}$ " 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 lb-ft)**.



Passenger side



Left Side

Install the kit $\frac{1}{2}$ "x 3" bolts are provided for each lower shock mount. From the rear, the bolt goes through the bracket, $\frac{1}{8}$ " shim, shock, then the long spacer (1.09") followed by the bracket and axle. Use a $\frac{3}{4}$ " 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.



Tighten the bolts on the quad shock brackets.

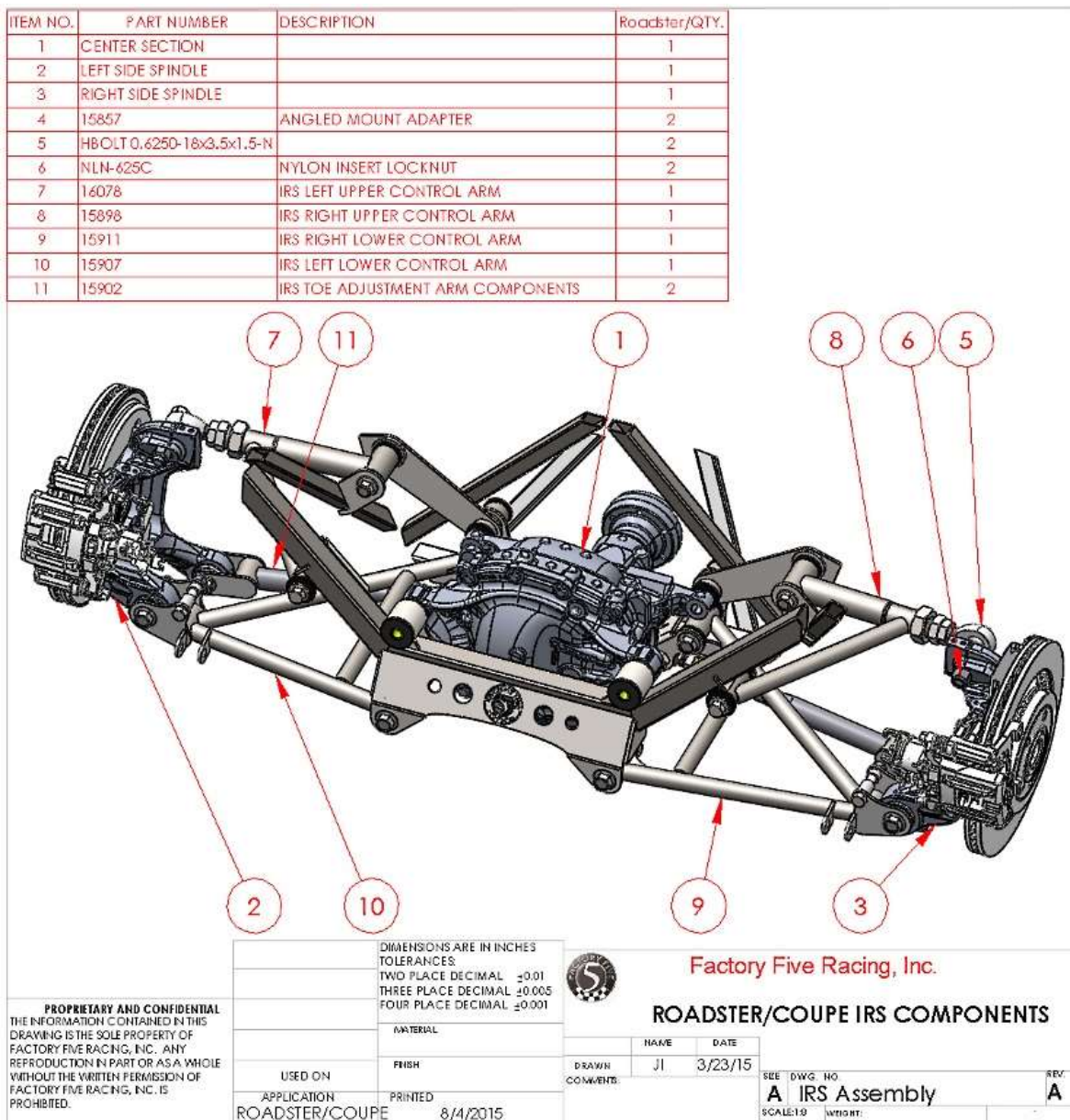
4 LINK REAR SUSPENSION TORQUE SPECS CHART

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.

Optional Independent Rear Suspension



- 🚗 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, $\frac{5}{8}$ " Drill bit, $\frac{13}{16}$ ", $\frac{15}{16}$ " wrenches, $\frac{13}{16}$ ", $\frac{15}{16}$ " 18mm Sockets, Large adjustable wrench – up to $1\frac{5}{8}$ ", $\frac{1}{8}$ " 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

IRS FASTENERS



The IRS kit packages all the fasteners together in one box.

17157	IRS FASTENERS	1.00	EA
10834	1/2"-13 NYLON LOCK NUT	4.00	EA
12386	1/2"-13 x 3.25" BOLT	2.00	EA
12332	1/2"-13 x 4" BOLT	2.00	EA
13166	3/4"-16 LFT HAND JAM NUT	2.00	EA
12387	5/8" WASHER	2.00	EA
15216	5/8"-11 MECH LOCK-NUT	4.00	EA
15937	5/8"-11 x 2.25" BOLT	2.00	EA
16242	5/8"-11 x 4.25" BOLT	2.00	EA
16040	M10 x 20MM SOCKET HEAD	4.00	EA
15961	M10 x 25MM SOCKET HEAD	10.00	EA
14759	M14-2.0 FLANGED LOCK NUT	2.00	EA
15962	M14-2.0 x 100MM FLNG HEAD	2.00	EA
15936	M14-2.0 x 80MM FLNG HEAD	2.00	EA
14925	M16-2.0 x 110MM FLNG HEAD	8.00	EA
15963	M16-2.0 x 130MM FLNG HEAD	2.00	EA
15909	M16-2.0 x 90MM FLNG HEAD	2.00	EA
14515	M16-2.0MM FLANGED LOCK NUT	12.00	EA

PARTS PREPARATION

Spindles

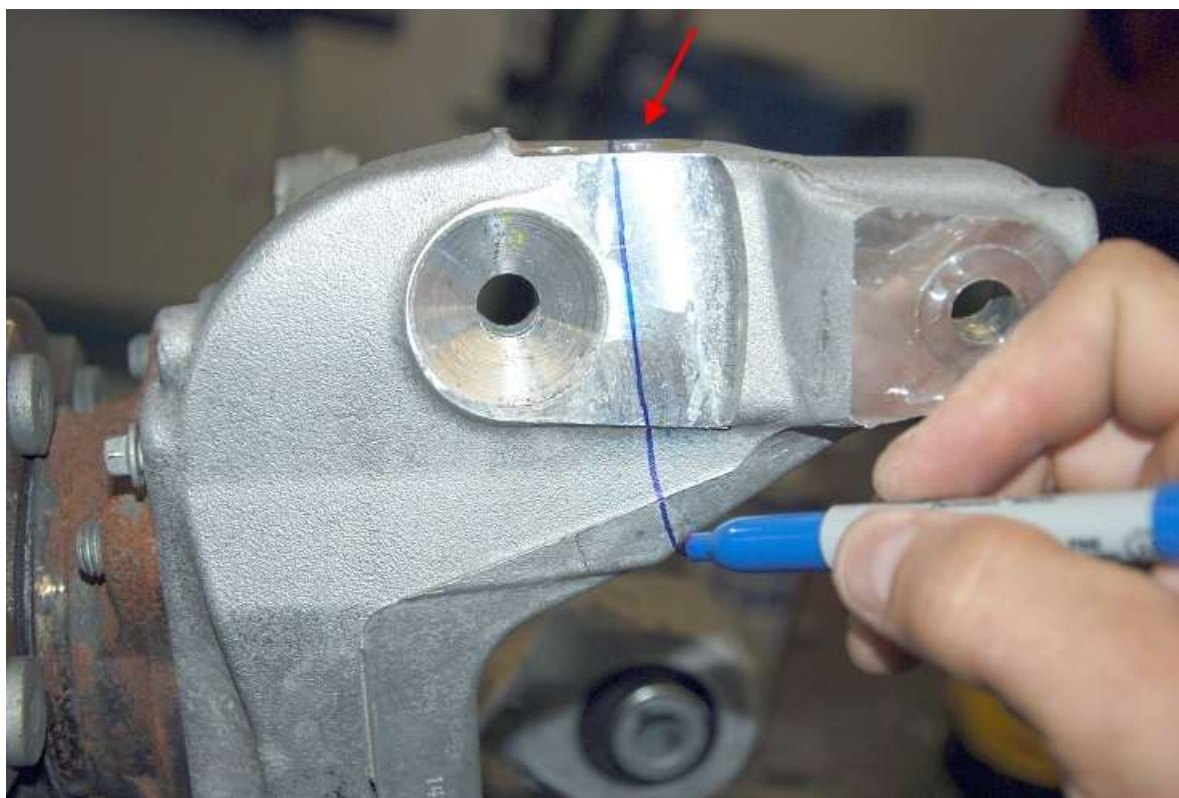


⁵/₈" drill bit, drill, saw, marker

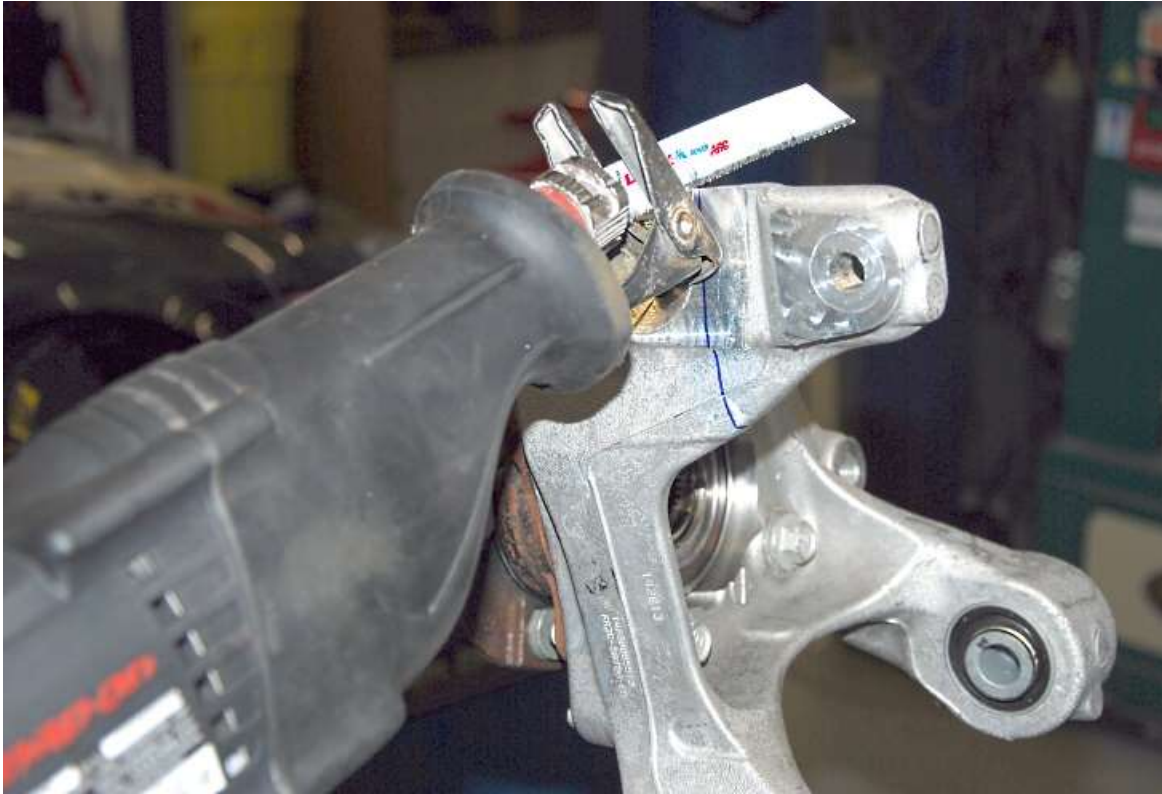
Remove the brake calipers from the spindle if they are mounted. They will be reinstalled after the spindle is put on the car.



Use a $\frac{5}{8}$ " 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.



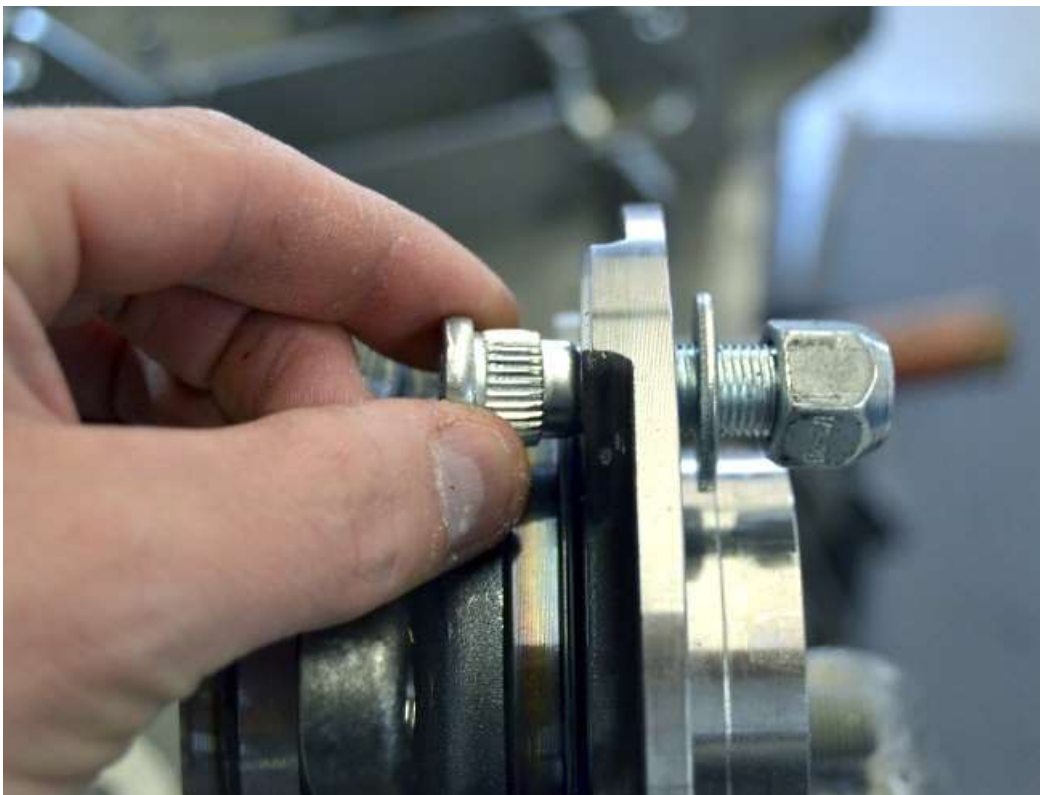
Rear wheel studs.



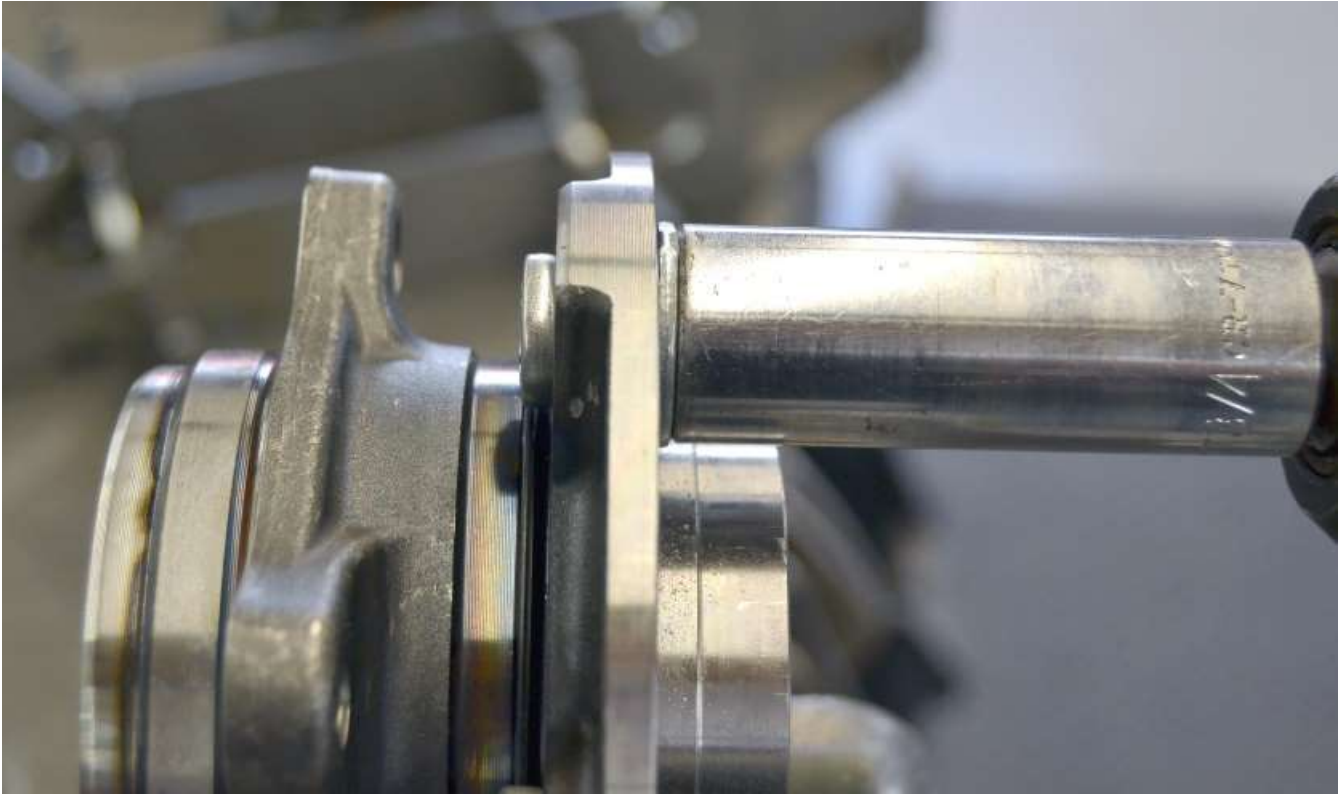
Removal of the hub from the spindle is not necessary but can make things easier.



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

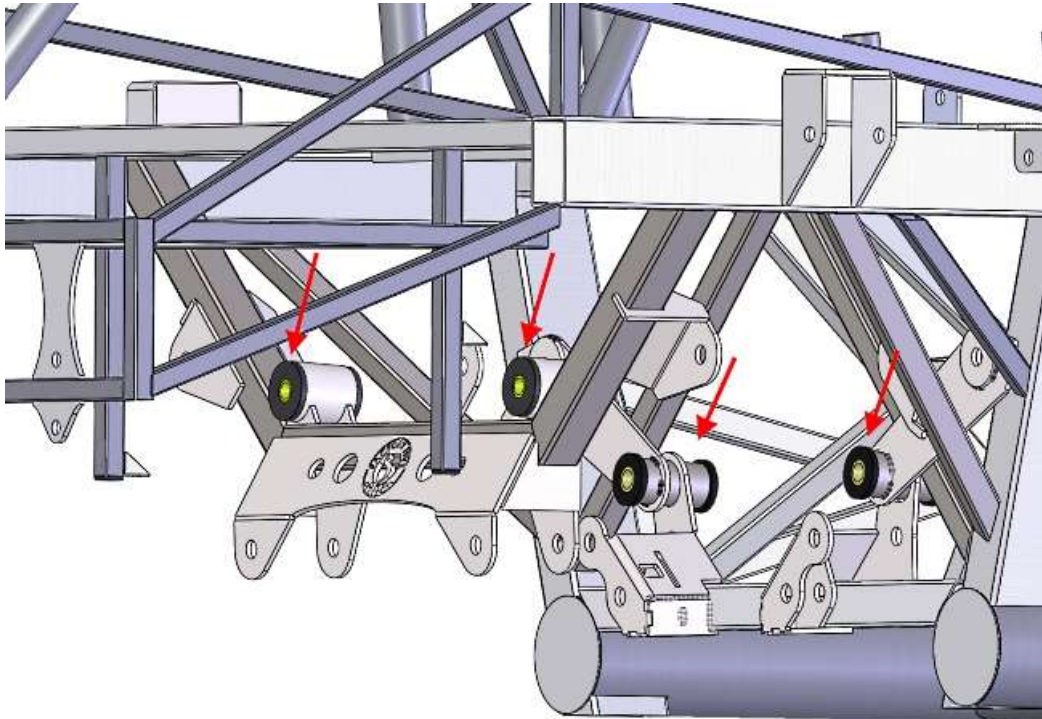
✂ $\frac{5}{8}$ " drill bit, drill.



Use a $\frac{5}{8}$ " 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 ($3\frac{1}{16}$ ") sleeves where the front of the center section will mount.

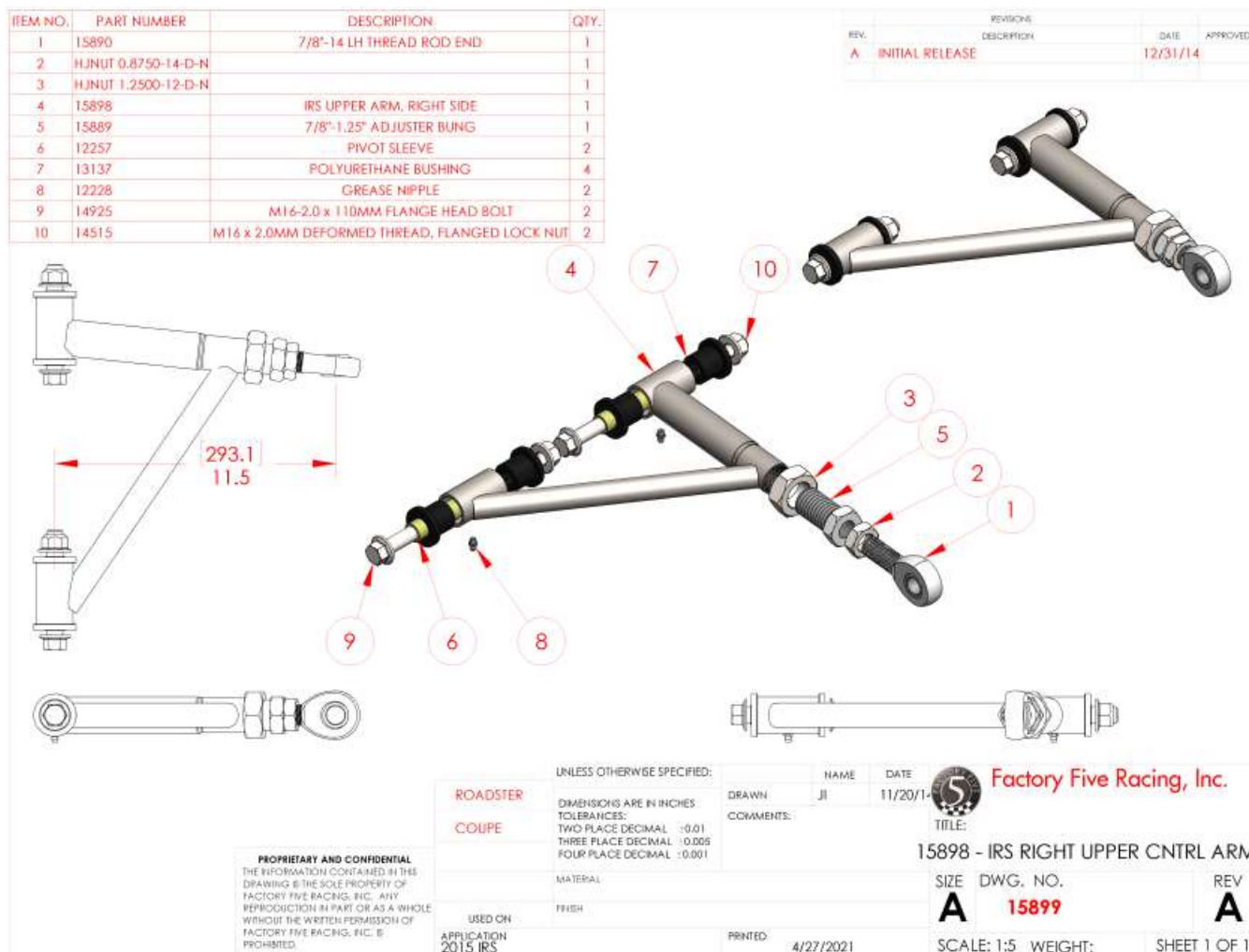


Use a plastic mallet to install the polyurethane bushings marked 2123 and the shorter (2.40") sleeves where the rear of the center section will mount.

Upper control arms



Upper control arm components
Grease gun



Assemble each of the upper control arms as shown. Rough alignment length 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

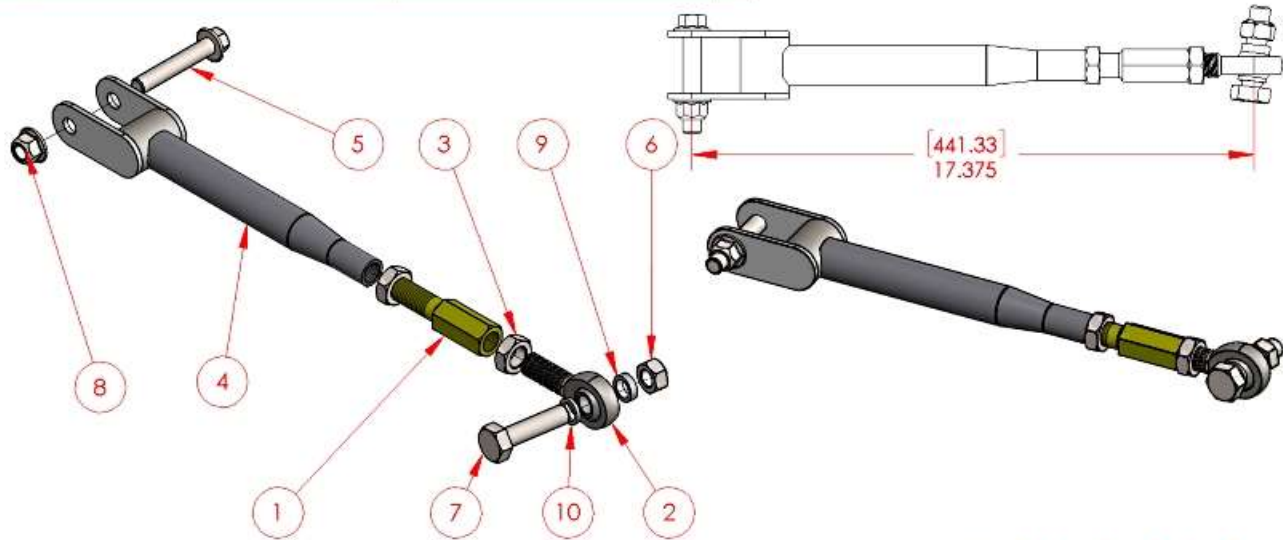
✂ Grease gun

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	0.25" SPACER	1
10	15908	0.25" SPACER	1

REV.	REVISION	DATE	APPROVED
A	INITIAL RELEASE	1/23/15	



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UNLESS OTHERWISE SPECIFIED:	NAME	DATE
ROADSTER	JL	1/6/15
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		
2015 IRS		
PRINTED		
2/5/2019		

	NAME	DATE		Factory Five Racing, Inc.	
DRAWN	JL	1/6/15			
COMMENTS:			TITLE:		
IRS TOE ADJUSTMENT ARM COMPONENT					
			SIZE	DWG. NO.	REV
			A	15902	A
PRINTED	2/5/2019		SCALE: 1:4	WEIGHT:	SHEET 1 OF 1

Assemble each of the toe adjustment arms as shown. Rough alignment length 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)**.

Center section Vent

- ✂ Pliers, wire cutters, hammer
- 🚗 Vent hose, vent nipple, insulated clips, secondary body fasteners.



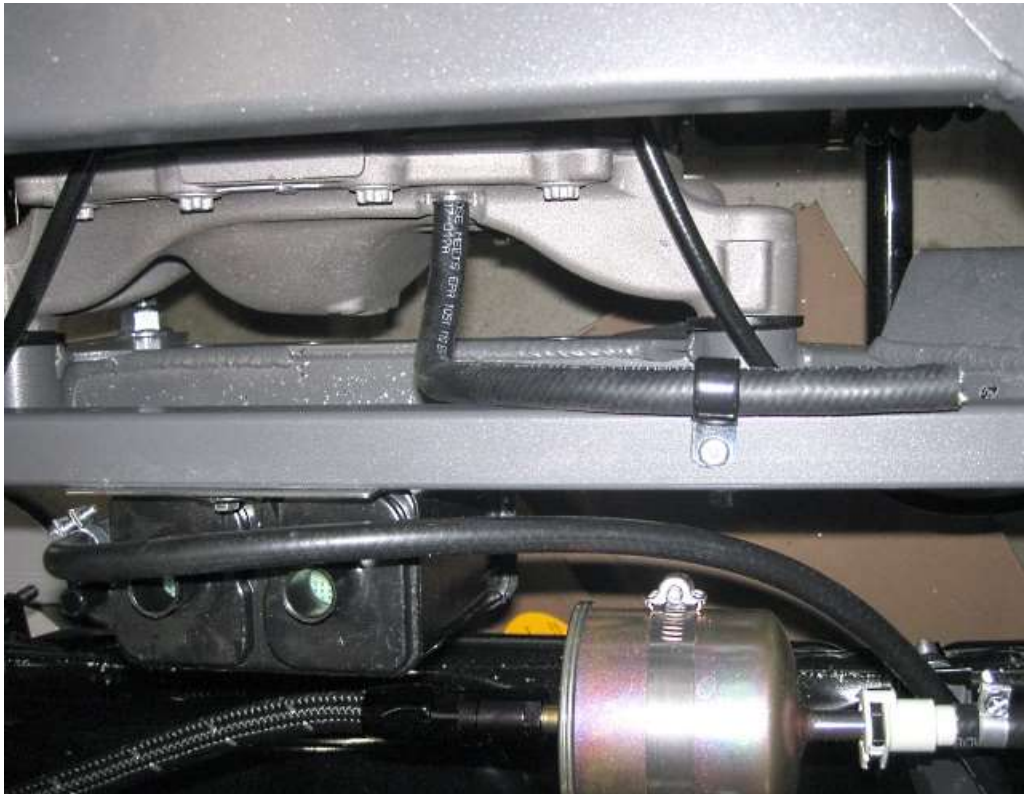
Remove the plug at the top of the rear cover.



Use a hammer on the end of the barb to put the nipple in the rear cover.



Push the 12.00" piece of $\frac{5}{16}$ " fuel hose onto the barb.



Run the hose up to the 1" tube that goes across the back of the IRS and use one of the kit $\frac{5}{8}$ " insulated clips and $\frac{3}{16}$ " rivet to hold it in place.

Toe Adjustment arms



IRS Toe adjustment arm components



$\frac{13}{16}$ " socket, $\frac{15}{16}$ " wrench, torque wrench.





If using the sway bar option, pass the bolt through the frame mount bracket when installing the toe arms.

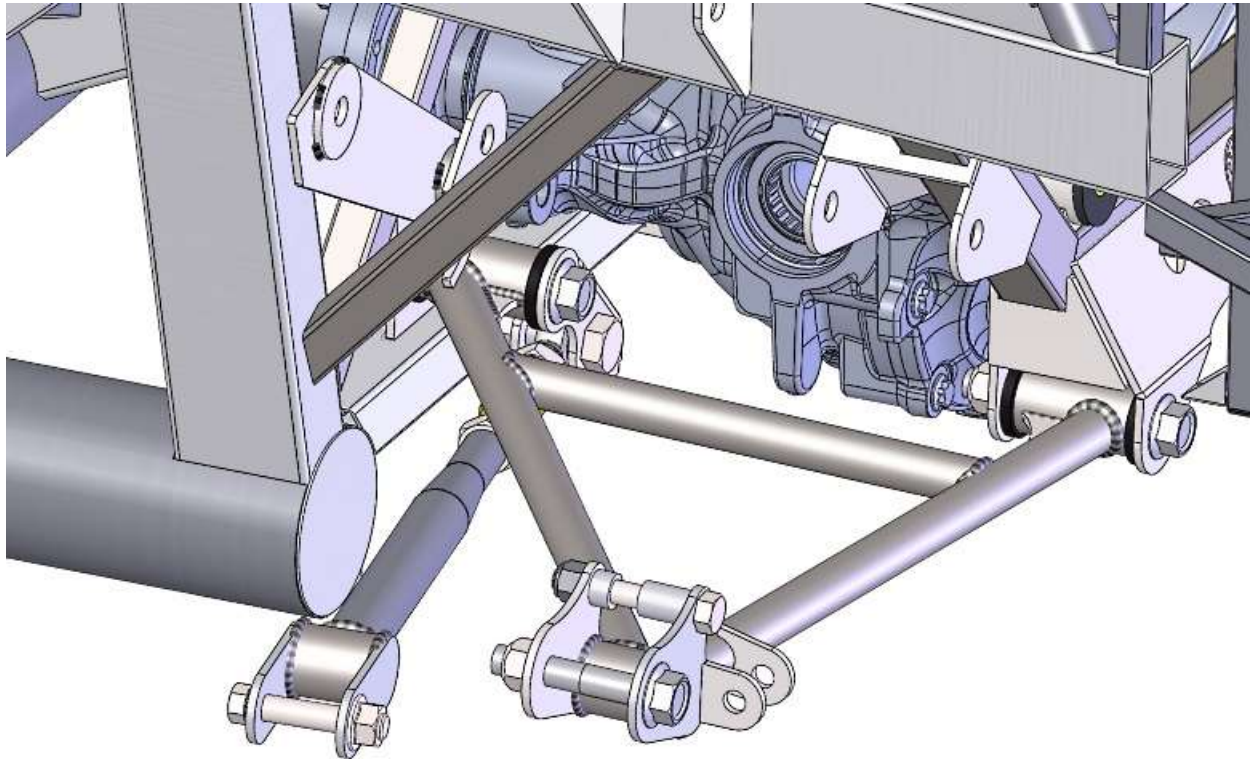


Attach the toe arms to the frame below the front lower arm mount using the $\frac{1}{8}$ " thick spacer in the back and the $\frac{1}{4}$ " spacer on the front side of the rod end. Use the $\frac{5}{8}$ " x 2.25" bolts to attach them to the frame.

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

Lower control arms

-  IRS lower control arm components
-  $\frac{13}{16}$ " socket, $\frac{15}{16}$ " 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 (~4⁵/₁₆”) 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.

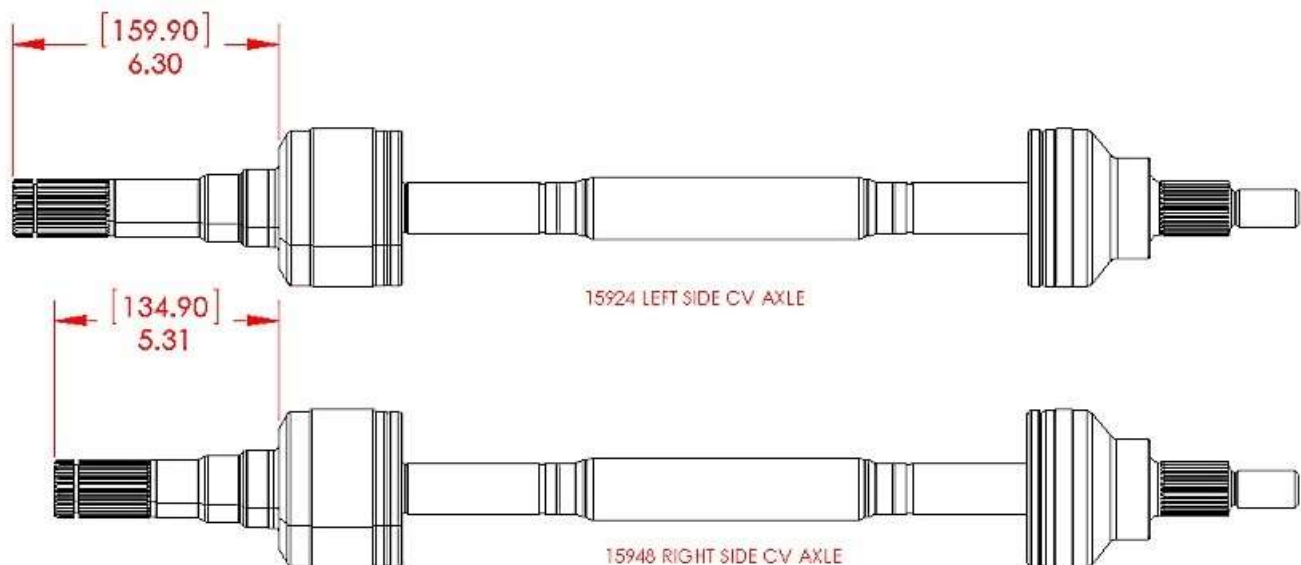


Pass the upper control arm thick tube through the triangular area as shown in between the frame mounts. Use the longer M16 x 110mm ($\sim 4\frac{5}{16}$ ") bolts.

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

CV Axle

 CV Axles, spindles



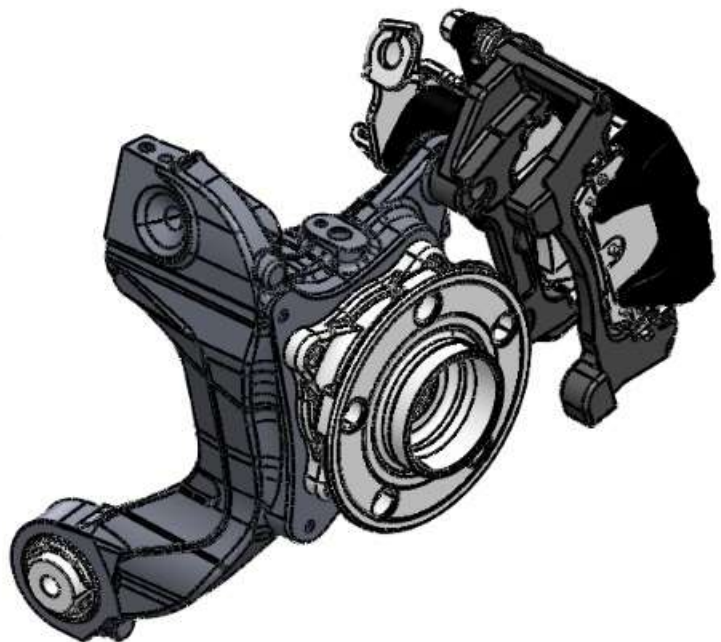
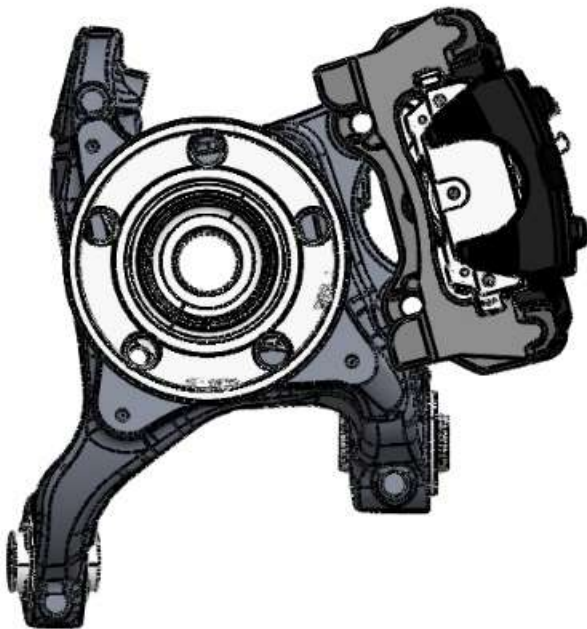
The inside CV joint is different for each side of the car, make sure to use the correct one when installing.



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



When fully installed there should be an $\frac{1}{8}$ " (~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 and brakes are installed.

Spindle to Upper arm



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



Attach the upper control arm to the spindle using the $\frac{5}{8}$ " x 3.50" bolt and locknut.

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

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, 3/4" wrench, 3/4" 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.



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.



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



For the stock red Koni shocks, use the **lower** holes.



Attach the rod end of the shock to the upper shock mount lower holes 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 $\frac{7}{16}$ " spacer in front of the shock.

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

Remove the floor jack.

OPTIONAL IRS BRAKES

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

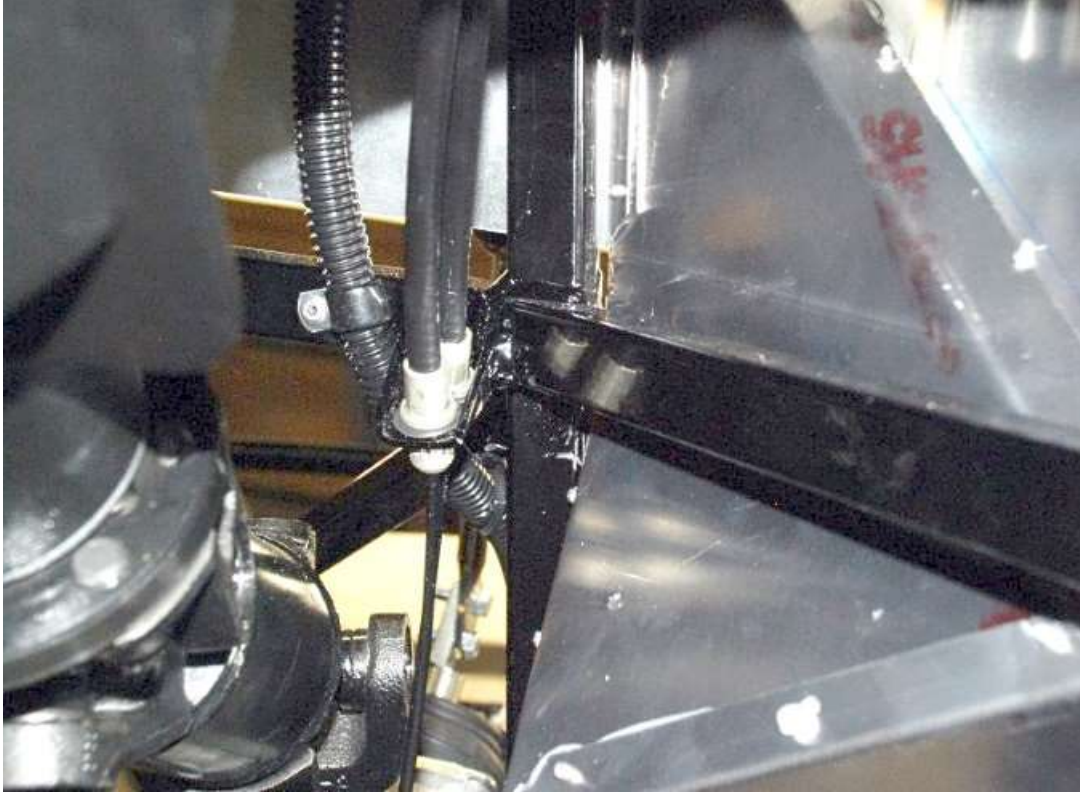
Connect the brake hose to the brake caliper.

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

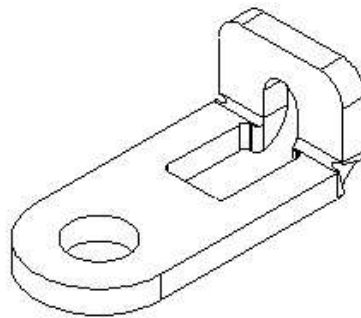
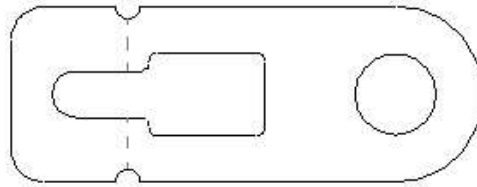


Run the left e-brake cable over the top of the center section and left rear mount then down and over to the brake caliper.



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.

CV AXLE NUT



Wait to torque the axle nut until after the e-brake cables are installed.

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 or 0.28° in

- ✎ For every full clockwise (screwed in) of the **Toe Link**, Camber increases by 0.7° (gains positive Camber) and Toe goes in by 0.156".
- ✎ For every full clockwise (screwed in) of the **Upper Control Arm**, Camber decreases by 0.9° (gains negative camber) and Toe goes in by 0.14".
- ✎ In order to increase negative Camber while maintaining Toe, for every 1 clockwise turn of the upper control arm, the Toe link should be turned counterclockwise 1 full turn. Each full turn of the upper control arm equals -1.6°.
- ✎ In order to change Toe while maintaining Camber, for every 1 full turn of the Toe Link, the Upper control arm should be turned in the same direction 3/4 turn. Clockwise will Toe in and counterclockwise will Toe out.

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
DRIVESHAFT ADAPTER TO PINION FLANGE	41	55
DRIVESHAFT TO DRIVESHAFT ADAPTER	70	95

THEN ROTATE 45°

Firewall & 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.



Mark the firewall and drill for riveting.



Rivet the firewall in position on the chassis.



Mark, drill, and rivet in place the left side footbox front panel, do not silicone or rivet the right lower section that attaches to the $\frac{3}{4}$ " vertical tube in order to allow the inside wall to slip underneath.

Pedal Box

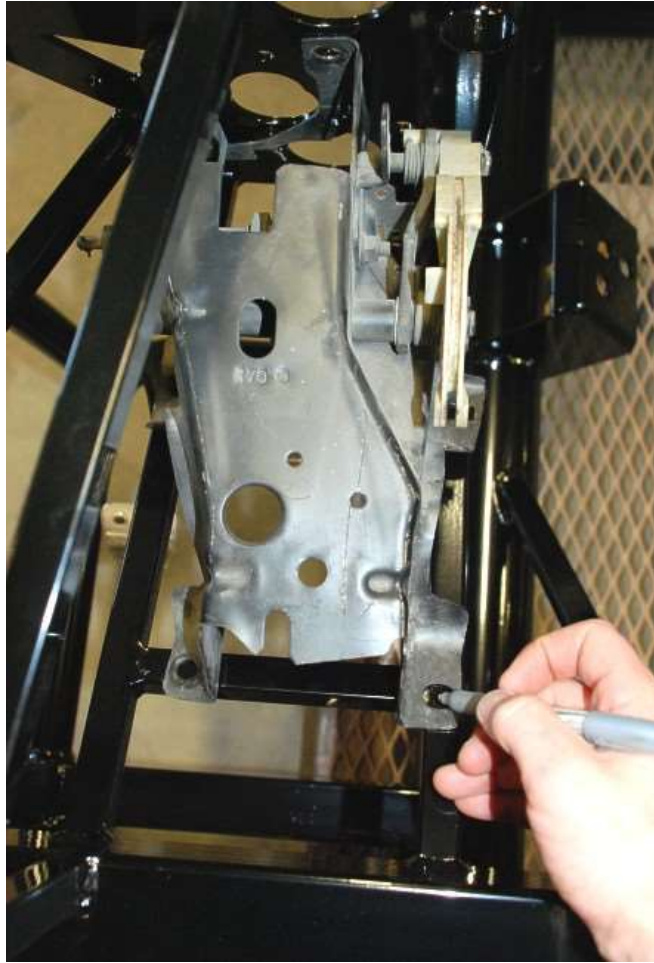
- ✂ $\frac{3}{8}$ ", $\frac{9}{16}$ " sockets, $\frac{3}{16}$ ", $\frac{5}{16}$ " hex key, drill, $\frac{9}{16}$ " wrench, $\frac{1}{8}$ ", $\frac{1}{4}$ ", $\frac{7}{16}$ " drill bits, silicone, rivet tool, marker.
- 🚗 Mustang pedal box, (2) $\frac{1}{4}$ "x $\frac{3}{4}$ " socket head bolts, (4) $\frac{1}{4}$ "x 1.50" socket head bolts, (3) $\frac{3}{8}$ " x 1" button head screw, (2) $\frac{3}{8}$ "x 2" socket head bolts, locknuts, cockpit aluminum.

87-93 PEDAL BOX





Position the Mustang pedal box on the two angled $\frac{3}{4}$ " tubes over the driver's feet, and attach using two short $\frac{3}{8}$ " 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 $\frac{3}{4}$ " 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.



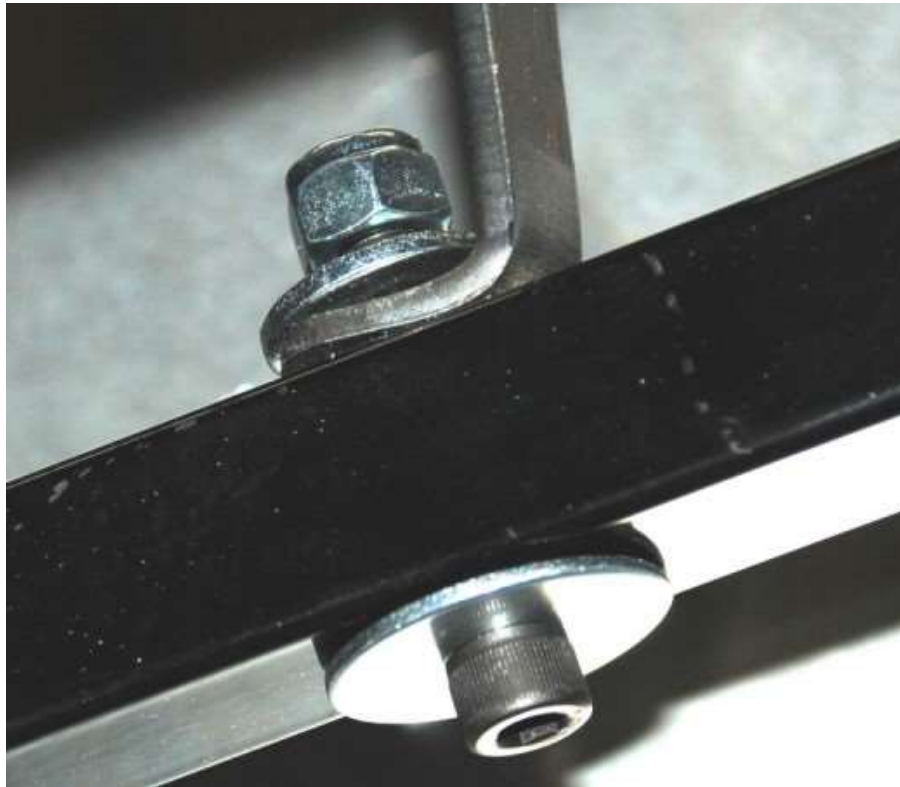
Drill $\frac{1}{4}$ " holes completely through the $\frac{3}{4}$ " tubing for the pedal box.

Use a $\frac{7}{16}$ " 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.

Silicone and rivet the front foot box aluminum panel in place with the $\frac{1}{8}$ " long rivets.

Install the pedal box with the two $\frac{3}{8}$ "x 1" button head bolts and washers at the top as before. They go through existing holes in the front of the foot box. Leave all the hardware hand tight.



The four $\frac{1}{4}$ "x 1.50" socket head bolts hold the foot box to the $\frac{3}{4}$ " tubes. Use the large fender washers (FFR# 12337) on the underside of the tubing.

Once the $\frac{1}{4}$ " bolts are through the holes tighten all of the pedalbox fasteners.

94-04 PEDAL BOX

Position the Mustang pedal box over the two angled $\frac{3}{4}$ " tubes over the driver's feet, the clutch pedal goes to the left of the tubes and the brake pedal goes between the tubes.

Attach the pedal box using two short $\frac{3}{8}$ " bolts and two washers to the front wall at the front of the foot box.

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.

If not already done, mark the corner of the pedal box that sticks out past the front foot box plate. This will have to be trimmed.

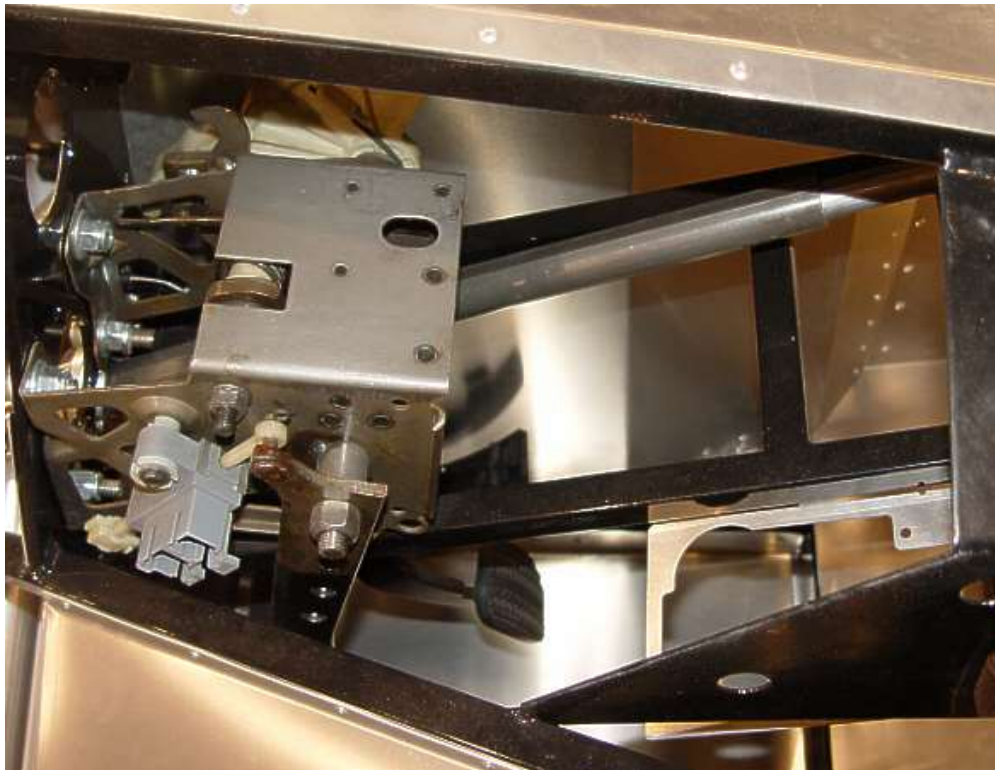
Remove the pedal assembly.

Use a $\frac{7}{16}$ " drill bit to drill the bolt hole in the pedal box for the master cylinder bolt.

Silicone and rivet the front foot box aluminum panel in place with the $\frac{1}{8}$ " long rivets.



Install the pedal box with the two $\frac{3}{8}$ " bolts and washers at the top as before. They go through existing holes in the front of the foot box.



Accelerator Cable

✂ $\frac{5}{64}$ " hex key, $\frac{3}{8}$ ", $\frac{7}{16}$ ", $\frac{1}{2}$ " wrenches, wire cutters.

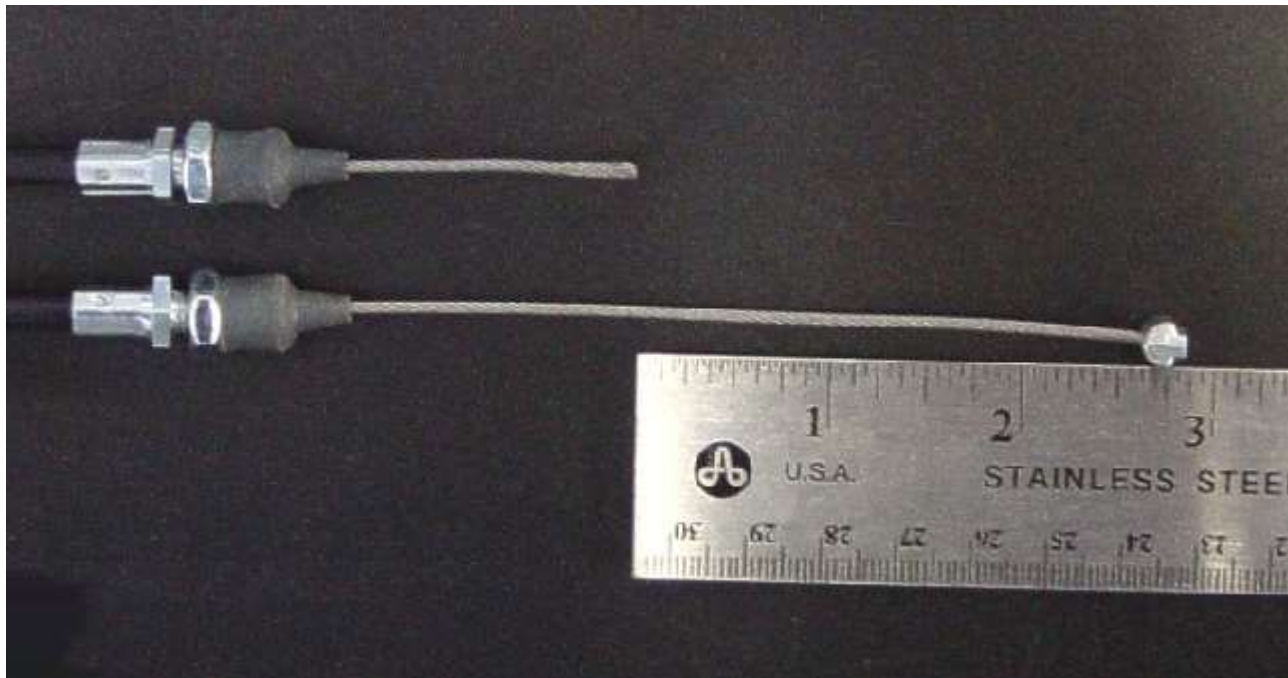


Pedal box hardware, Accelerator cable components. $\frac{5}{16}$ "-24 locknut



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.

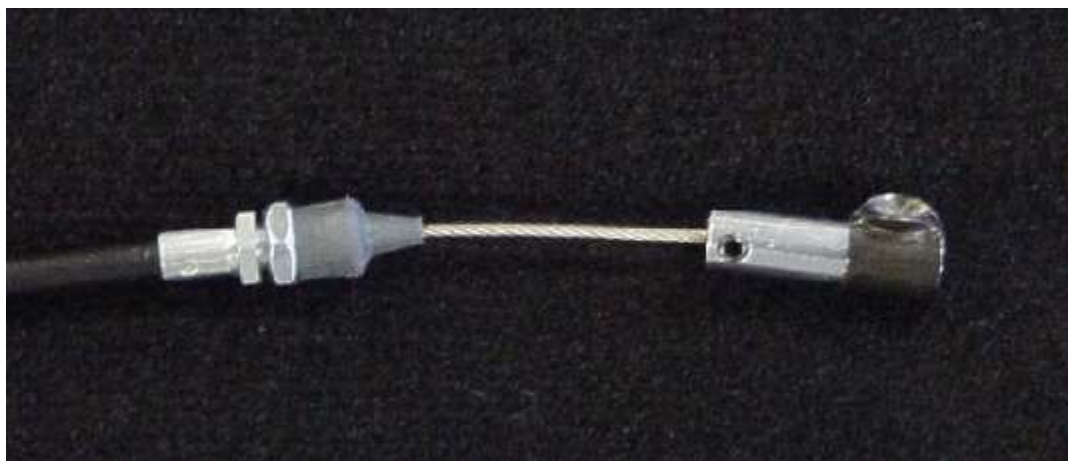
87-93 FUEL INJECTED AND CARBURETED APPLICATIONS



Using a ruler and marker measure and mark $2\frac{5}{8}$ " 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 $\frac{5}{16}$ " locknut on the cable sheath inside the foot box using two $\frac{1}{2}$ " wrenches.



The engine end will get installed later.

94-04 FUEL INJECTED APPLICATIONS

Loosen the nut on the engine end of the accelerator cable with the cylinder slug on the end.

Put the accelerator cable in the stock accelerator bracket slot on the engine intake.

Tighten the nut against the bracket.

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



Accelerator cable mounted on '98 4 valve intake.



Accelerator cable mounted on '96 2 valve intake.

Run the cable from the mount plate, tightly against the intake and over to the driver's foot box front panel.

Insert the pedal end of the cable into the foot box.

Screw on and tighten the $\frac{5}{16}$ " locknut on the cable sheath inside the foot box using two $\frac{1}{2}$ " wrenches.

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 idle screw underneath the throttle body to see if the throttle arm is hitting it. If it is not, the small tab behind the accelerator pedal may be stopping the plate from closing. Bend it up until the idle screw hits the throttle arm. You will notice a fairly high idle later when the car starts if this has not been done. Use the accelerator cable without modification. Follow the installation instructions above.

Accelerator Pedal

✂ $\frac{3}{16}$ " hex key, $\frac{7}{16}$ " wrench, pliers

🚗 OEM accelerator pedal, accelerator cable components

Hold the accelerator pedal up to the mount on the $\frac{3}{4}$ " 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 $\frac{1}{4}$ "x $\frac{3}{4}$ " 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.

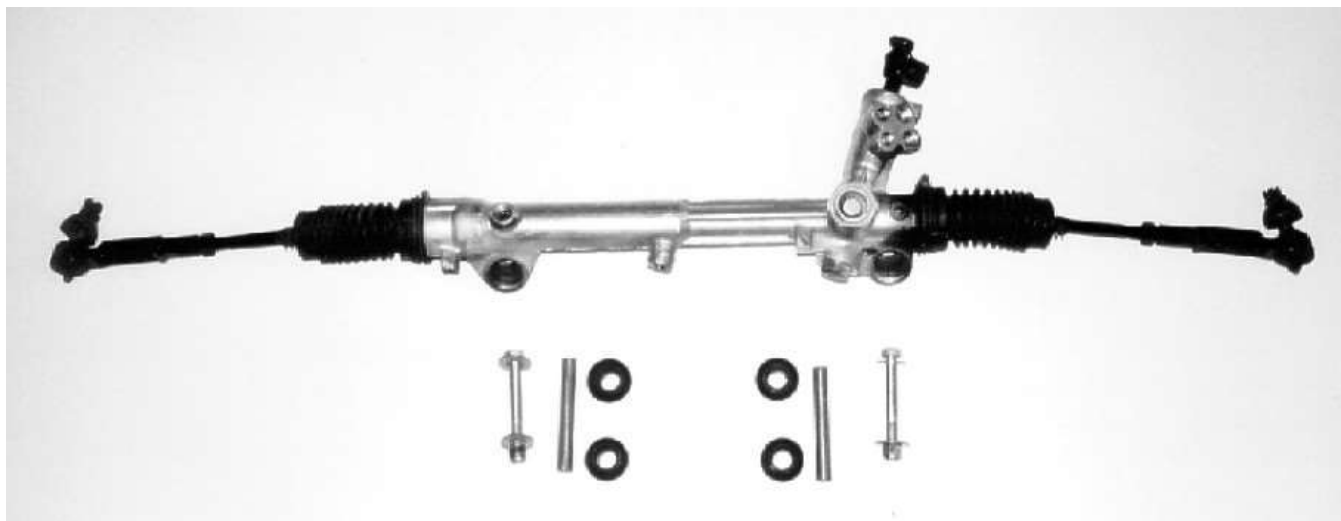
Push the capture into the end of the throttle pedal.

Steering System

STEERING RACK

✂ Needle Nose Pliers, $\frac{3}{4}$ " wrench, $\frac{3}{4}$ " socket, Ratchet, 1.50" wrench or Adjustable wrench

🚗 Mustang Power steering rack, Steering System Hardware, $\frac{1}{2}$ "x 4" bolts and locknuts



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 the rubber boots back and remove the inner tie rod ends



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



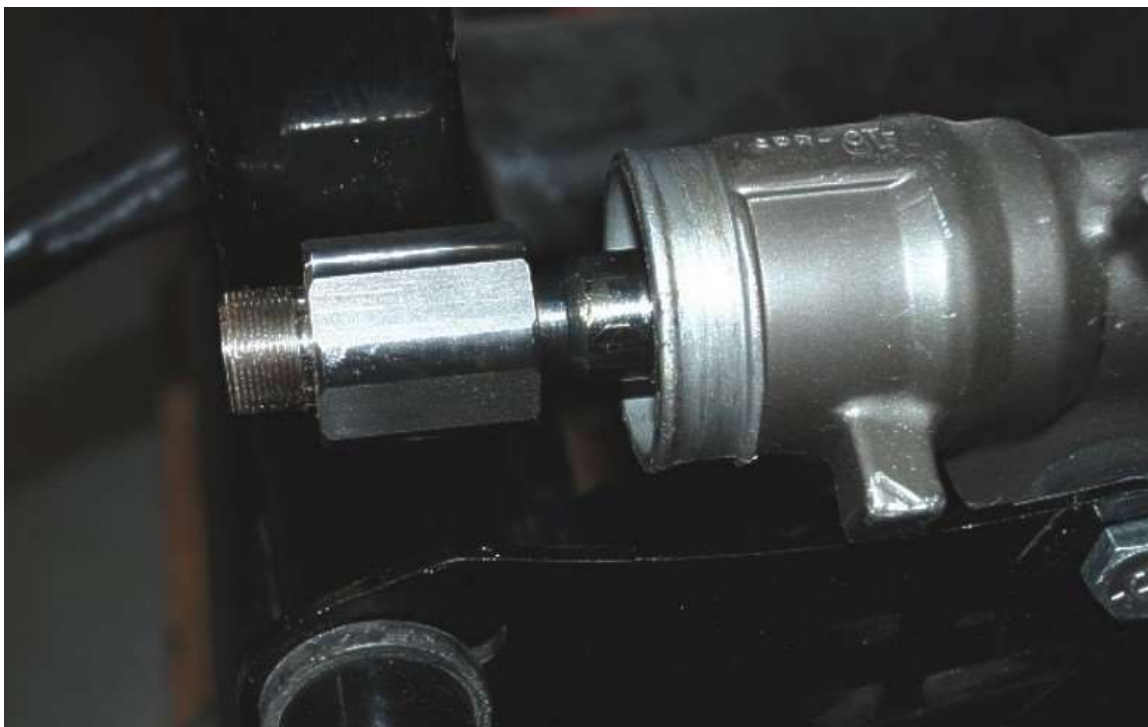
Bolt the rack into the frame using the ½"x 4" bolts. It is easier to do the driver side first then swing the passenger side down into the mount.



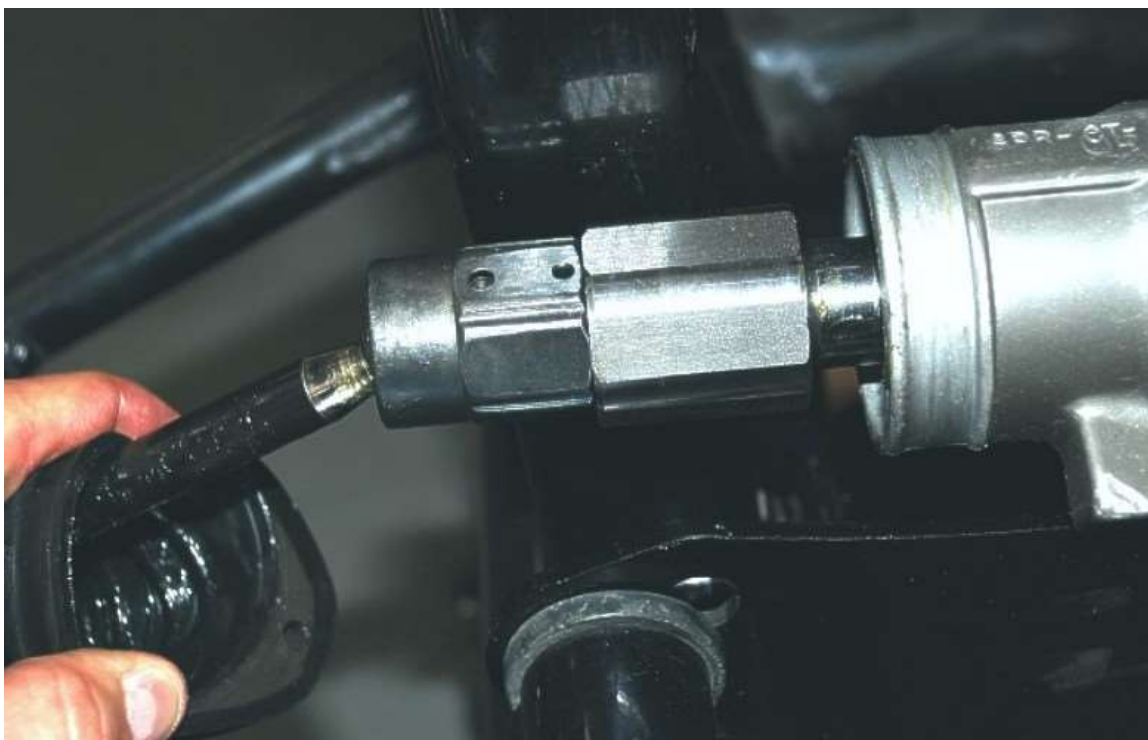
The inner Tie Rod Extensions are for **stock** Power Steering Racks only, **not** for **FFR** manual or power steering racks.



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

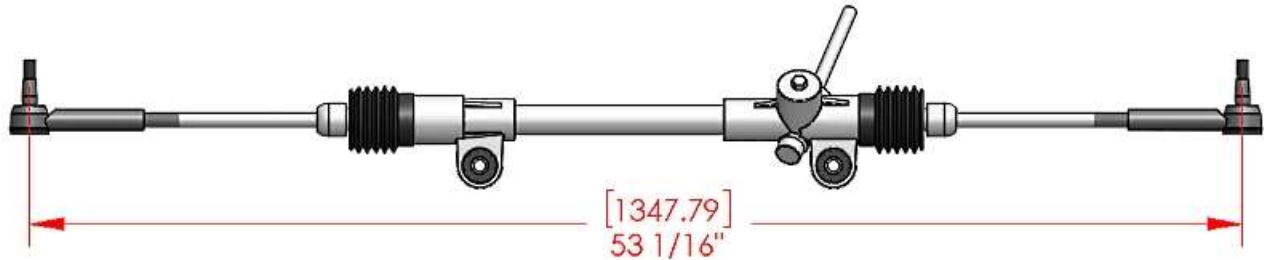


87-93 - Put thread lock on the threads of the steering rack extension and attach the Mustang inner tie rods to the steering rack.

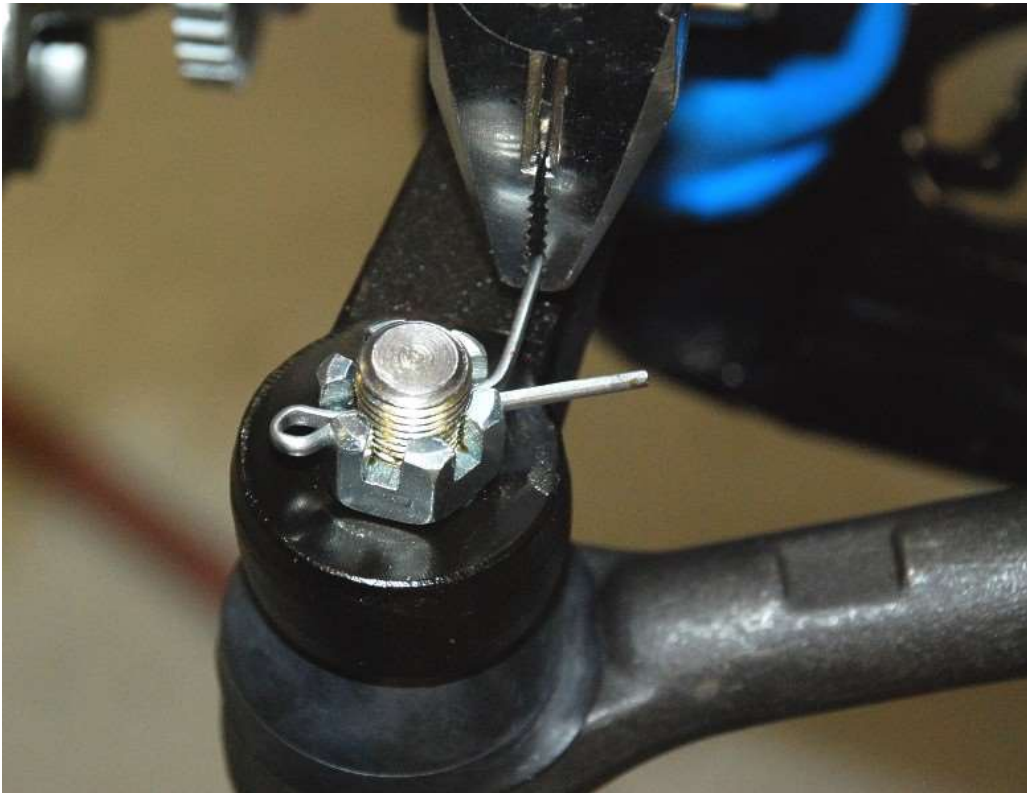
94-04 - Put thread lock on the threads of the steering rack extension and attach the new inner tie rods to the steering rack.

Push the boot back onto the steering rack body and attach with zip ties.

Insert the tie rod ends into the spindles with the nut hand tight.



As a **rough** setting until an alignment can be done, the center-to-center distance for the top of the outer Tie Rod End stud should be 53.0625". Try and keep the number of threads sticking out the same on both sides.



Attach the tie rod to the spindle, torque the castle nut to **25 lb-ft** and install the cotter pin from the kit.



If the tie rod has a locknut instead of a castle nut, torque to **80Nm (59 lb-ft)**.

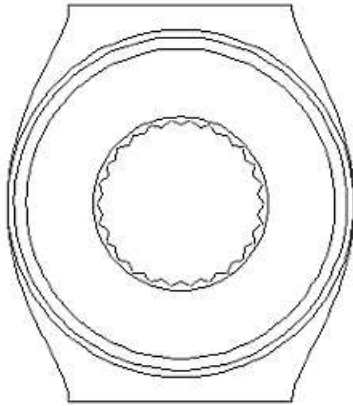
STEERING SHAFT



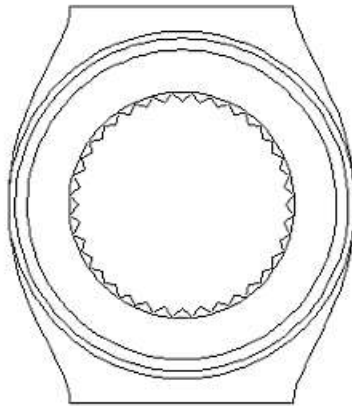
$\frac{1}{8}$ ", $\frac{5}{32}$ ", $\frac{3}{16}$ " hex keys, $\frac{1}{2}$ ", $\frac{9}{16}$ " wrenches, marker, drill, $\frac{3}{16}$ " drill bit, Philips head screwdriver, 15mm deep socket, ratchet.



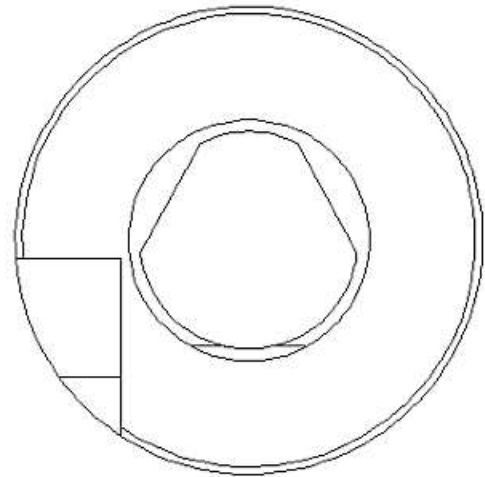
Steering bearings, $\frac{5}{16}$ "x 1" buttonhead screws, Steering system.



9-16"-26



3-4"-36



94-04 FORD PYRAMID

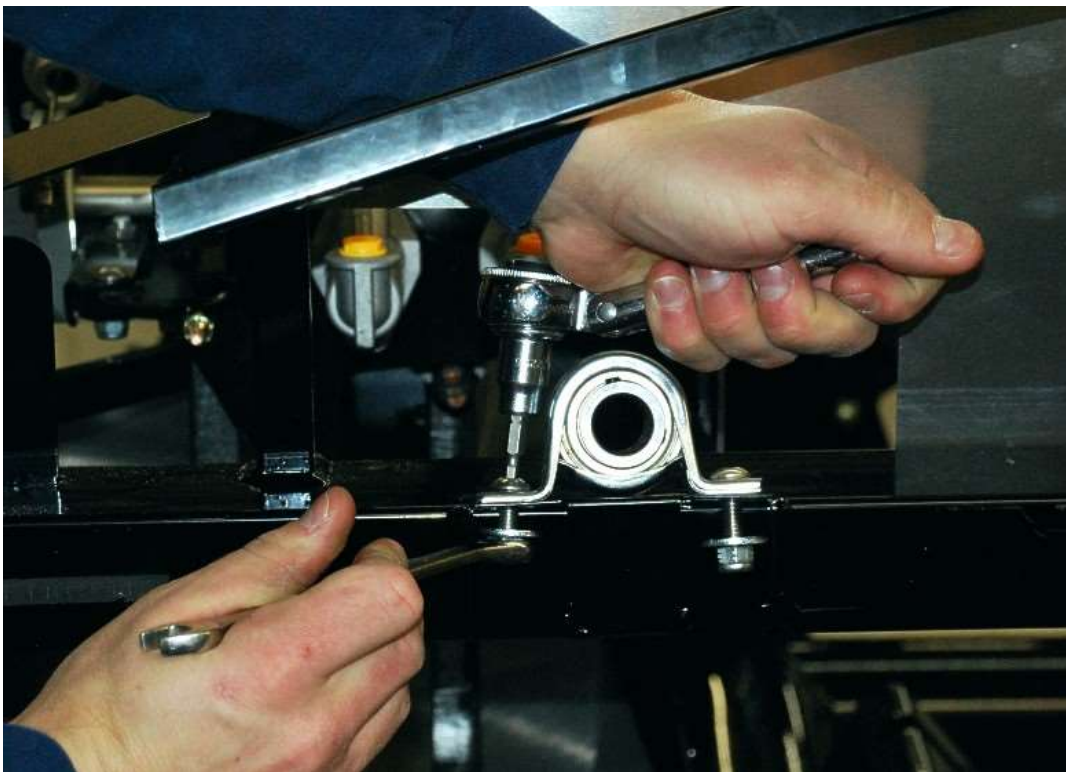


87-93 Power steering racks have a different spline than a manual steering rack and the 94-04 Power rack uses a "Pyramid" shaped end. All of these universal joints are available from FFR.



Unpack the steering parts.

Bearings



Loosely mount the top pillow block to the chassis with the set screw toward the rear of the car using $\frac{5}{16}$ " x 1" button head screws, $\frac{3}{16}$ " hex key and $\frac{1}{2}$ " wrench.

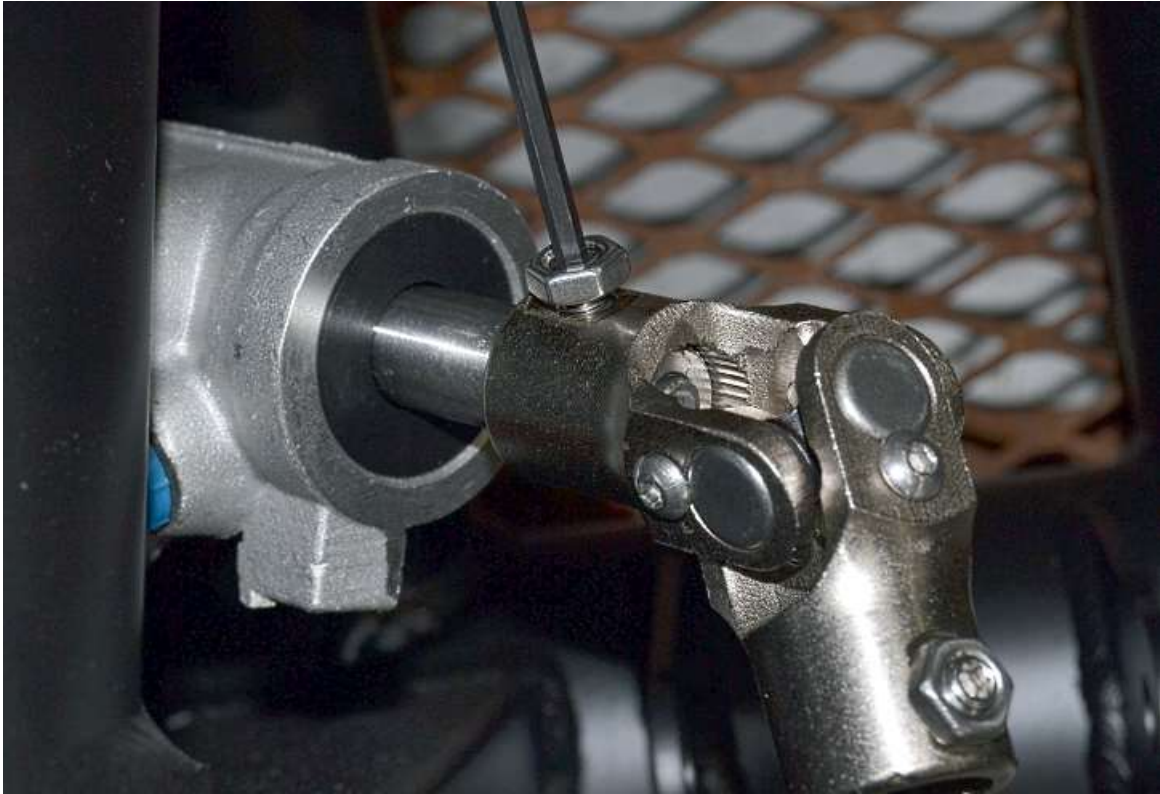


Attach the flange bearing to the front of the footbox with the set screw flange in the engine bay as shown using $\frac{5}{16}$ " x 1" button head screws, $\frac{3}{16}$ " hex key and $\frac{1}{2}$ " wrench.

POWER STEERING



Note the location of the set screw on the splined end of the u-joint compared to the recessed unsplined area in the middle of the input shaft on the steering rack.



Push the shaft into the steering joint so that the set screw will go into the recessed area on the input shaft then tighten the set screw and jam nut using a $\frac{5}{32}$ " Hex key and $\frac{1}{2}$ " wrench.

1"DD tube prep



Remove the set screw from the 1"DD end of the 15840 universal joint.



Slide the 1"DD tube into the upper u-joint so that it is flush on the inside of the joint.



Mark the 1"DD tube through the set screw hole then remove the tube.



Use a $\frac{3}{16}$ " drill bit followed by a $\frac{5}{16}$ " drill bit at the point marked to create a slight recess for the set screw.



Reattach the joint to check the fit and position of the recess then remove the tube.

Lower shaft



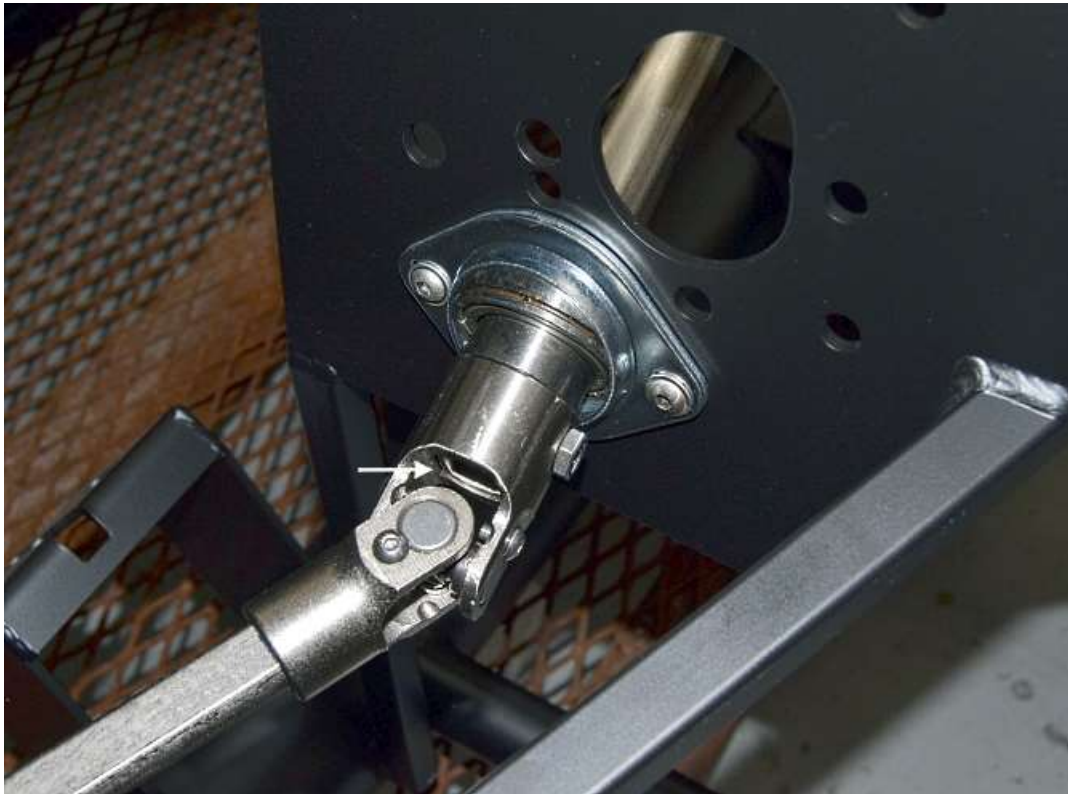
Push the $\frac{3}{4}$ "DD end of the u-joint onto the $\frac{3}{4}$ "DD shaft.



Push the shaft into the steering joint so that it is flush with the inside of the joint as shown above then tighten the set screw and jam nut using a $\frac{5}{32}$ " Hex key and $\frac{1}{2}$ " wrench.



Insert the lower shaft into the steering rack joint.



Slide the 1"DD tube through the footbox bearing into the upper u-joint so the set screw on the 1"DD tube goes into the recess made earlier.

UPPER STEERING SHAFT

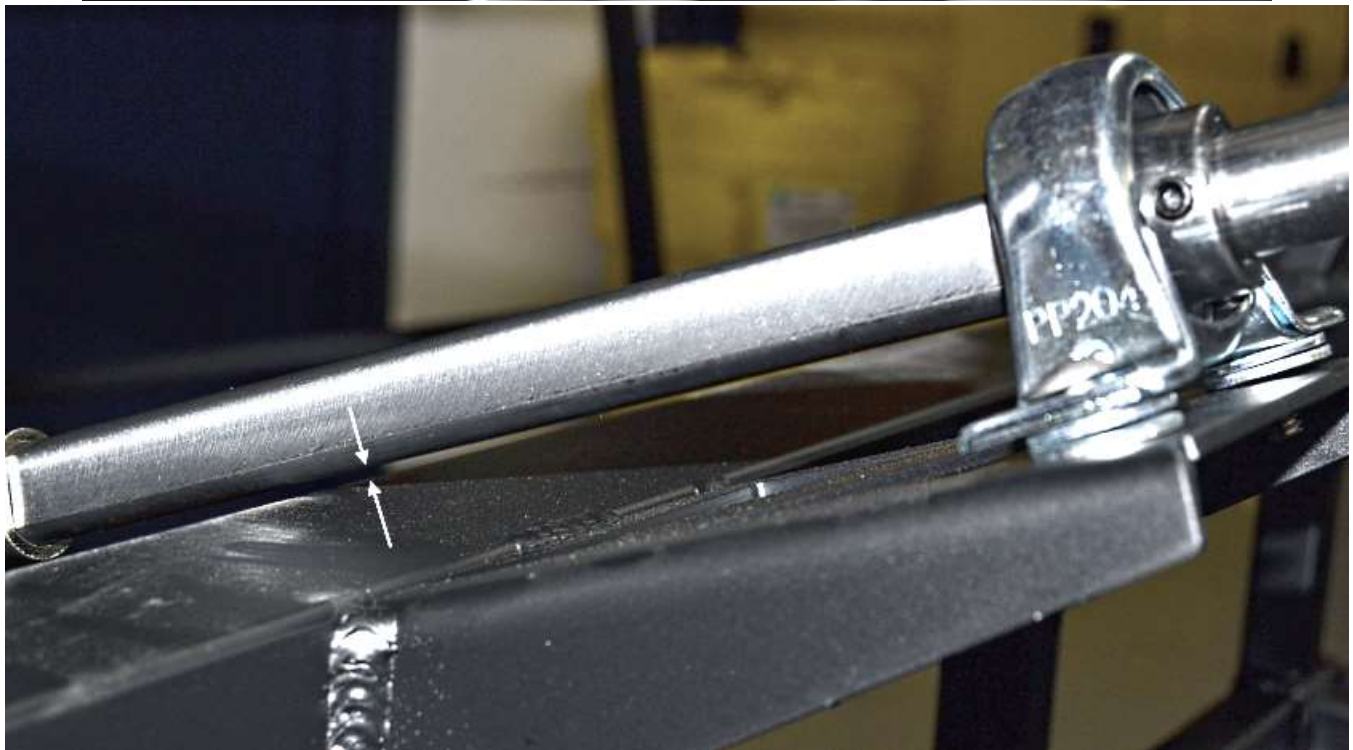
- ✂ $\frac{5}{32}$ ", $\frac{3}{16}$ ", $\frac{5}{16}$ " hex keys, $\frac{1}{2}$ " wrench, rubber mallet
- 🚗 Steering system hardware, $\frac{3}{8}$ "x1" socket head bolt and washer.
- 👤 Use thread locker on all the steering shaft screws that do not have jam nuts and the adapter screws.



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.



If necessary or to raise the height of the steering wheel, put washers under the upper pillow block bearing mount so that the upper shaft does not hit the frame or the wheel is at the height desired.

Tighten the upper and lower bearings.



On the lower shaft make sure the shaft does not go into the lower joint and is no more than flush on the inside.



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 set screws on the bearings using an $\frac{1}{8}$ " Hex key.

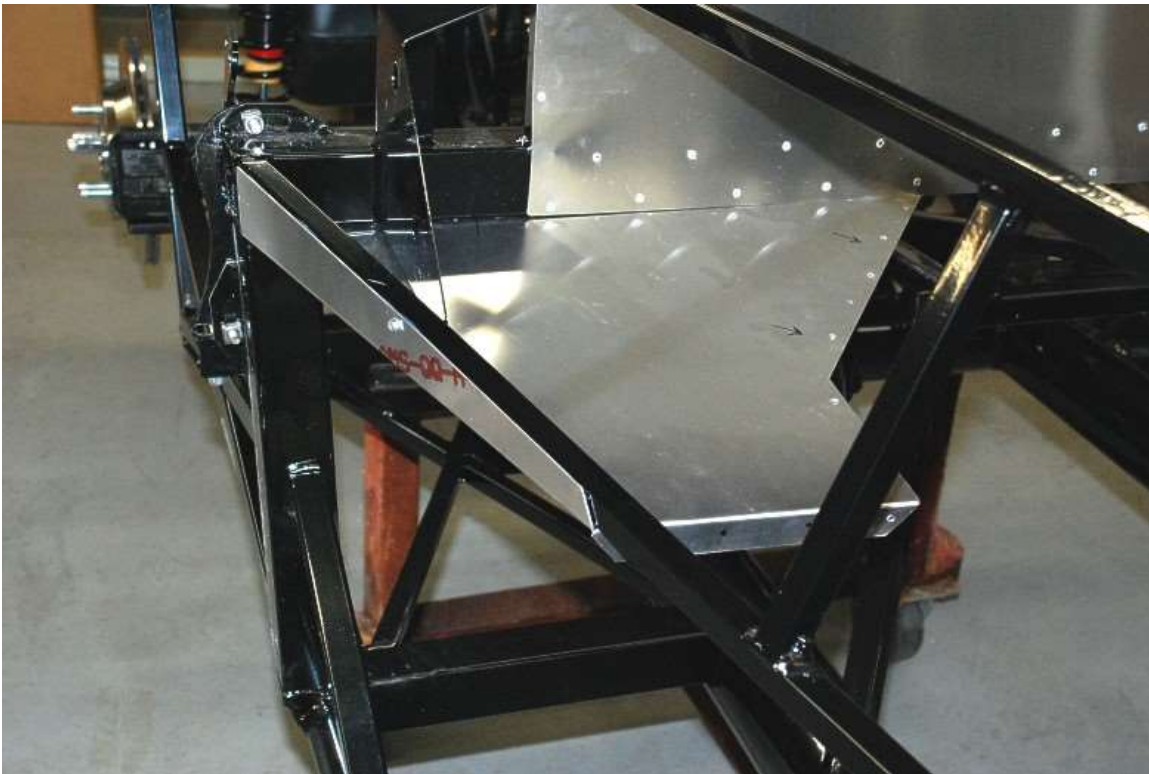
Cockpit Aluminum

- ✂ Drill, $\frac{1}{8}$ " 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.

RIGHT 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.





Mark and drill all three flanges on the passenger outer footbox top.



Silicone the flange between the outer top and the outer wall and attach the two pieces together using the temporary screws.



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.

RIGHT 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.



Drill, silicone, and rivet the right side under door piece in place. Leave the rivets out of the rear vertical flange for now.

LEFT 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.

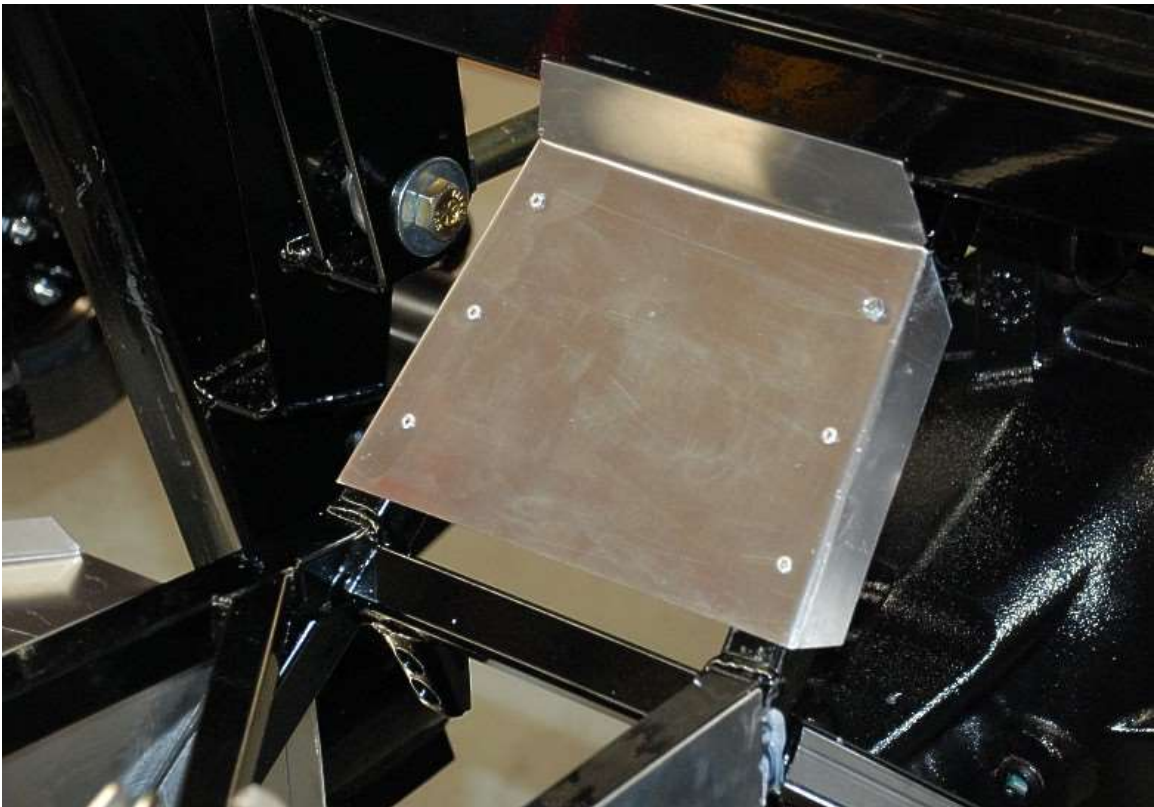


Install the left side under door aluminum like the right side.



Drill, silicone and install the inner footbox wall. The front flange tucks in behind the front wall that was left unriveted. 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 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

- ✂ $\frac{9}{16}$ " deep socket, ratchet, hammer, $\frac{5}{16}$ " hex key, floor jack, friend.
- 🚗 Mustang Fuel tank, fuel tank straps, Secondary Body Fasteners Assembly, $\frac{3}{8}$ "x 2" socket head screws and locknuts, fuel line components, fuel lines.



Fasteners.



Unpack the $\frac{3}{4}$ " 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.



87-93 - 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.



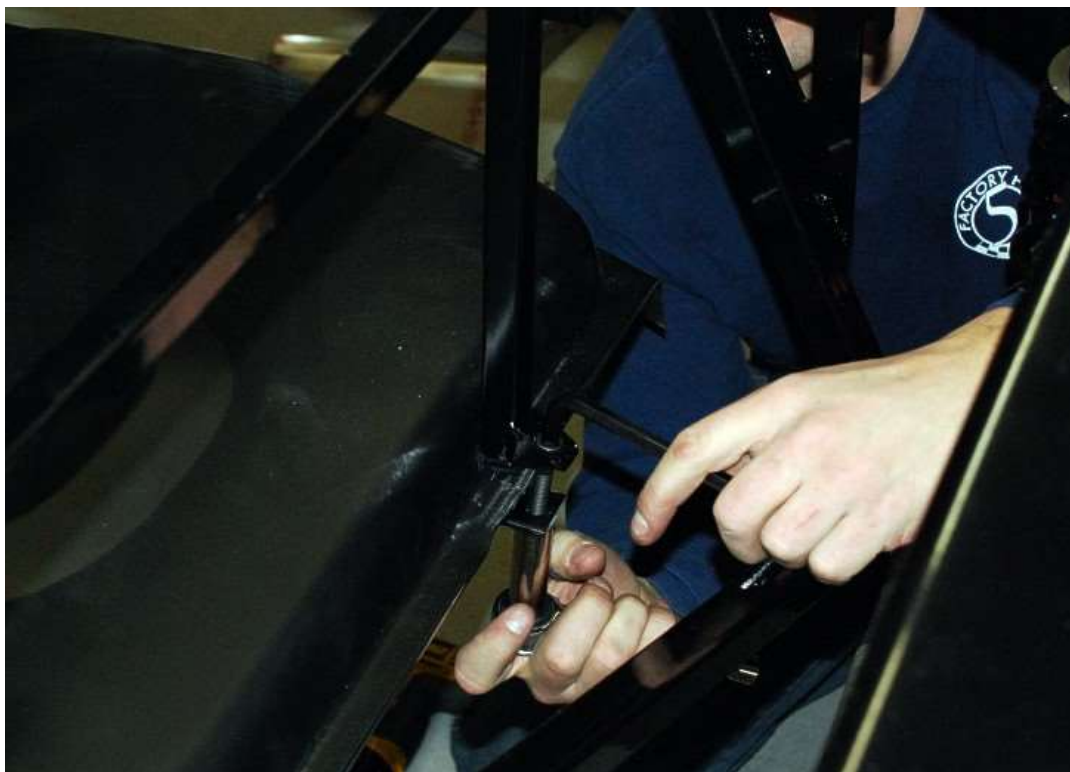
94-04 - Hang the fuel tank straps from the rear mount of the chassis using two of the strap fasteners. The Strap with both flat ends goes on the passenger side (shown).



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.



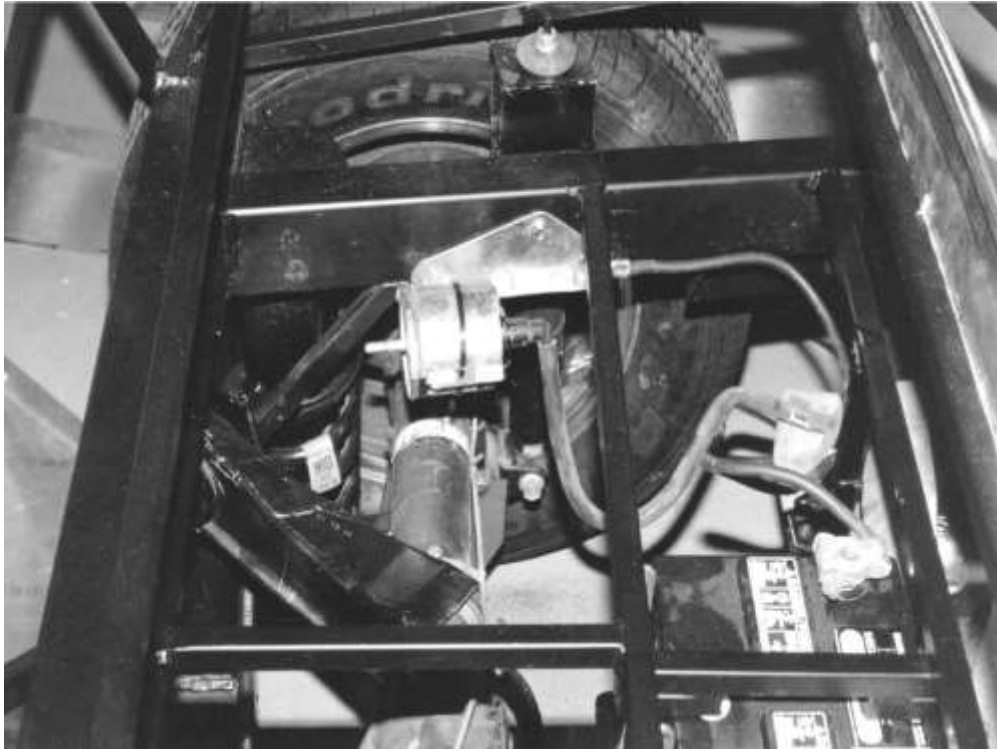
Tighten only the driver's side strap as the passenger one will be removed for aluminum fitment later on.

FUEL FILTER

- ✂ Tube bender, $\frac{3}{16}$ " drill bit, drill, rivet tool, marker, tape measure, flat head screwdriver, $\frac{9}{16}$ " wrenches

- ✂ Insulated clip hardware, Fuel line components, $\frac{1}{4}$ ", $\frac{5}{16}$ " 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 show where your mounting 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 $\frac{3}{16}$ " rivets.

FUEL LINES



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



✂ The larger $\frac{5}{16}$ " line is the send fuel line to the engine. If you are running a return system then there is $\frac{1}{4}$ " line provided for that as well. There are barbed fittings provided for both sizes.

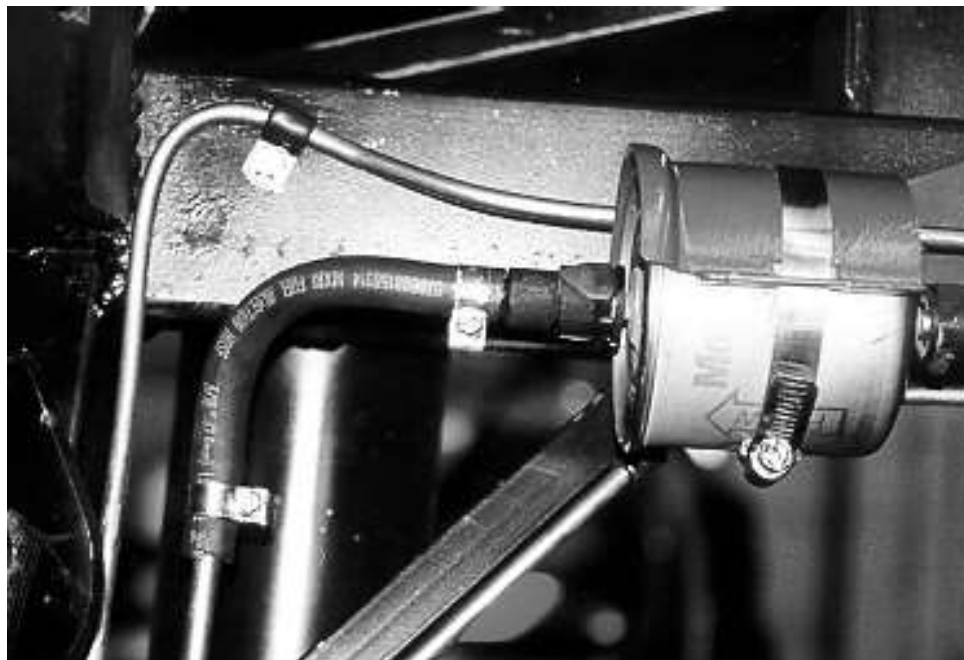


The fuel line routing will depend on your style of fuel pump, whether it is in-line, in-tank, or mounted on the engine.



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.

Use the 1/4" flexible line, 5/16" flexible line, and fuel injection hose clamps to connect the nylon fuel line connectors to the hard line.



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 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 $\frac{3}{16}$ " rivets.

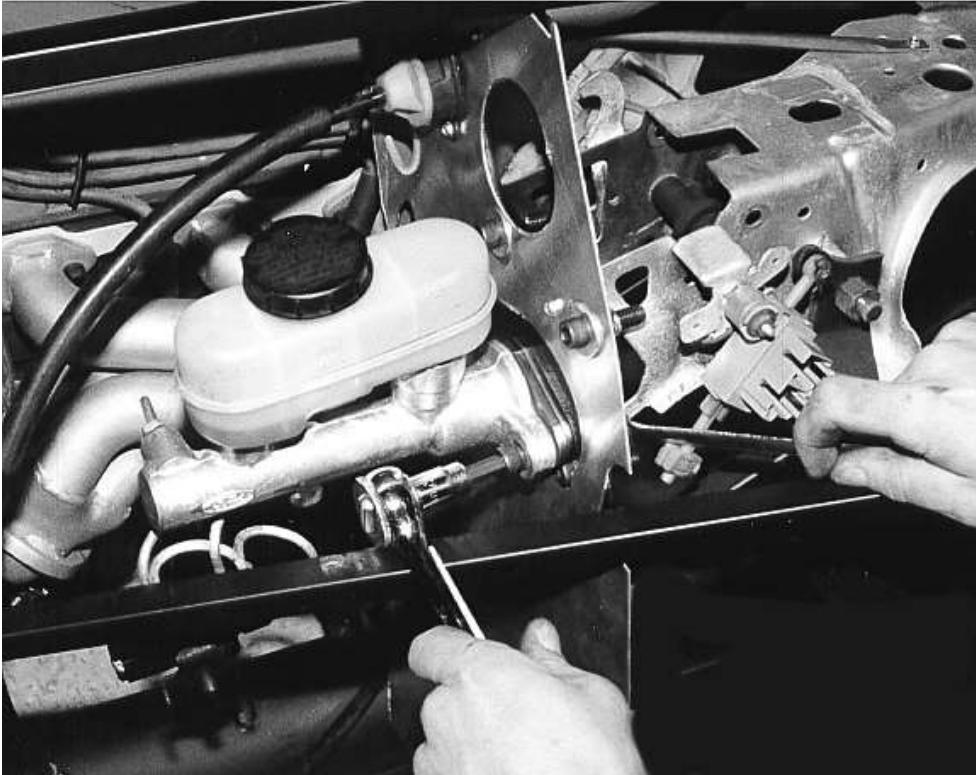


If you are going to use the mustang Fuel vapor line, run it along with the other fuel lines.

Brake System

- ✂ Tube bender, $\frac{3}{16}$ " , $\frac{1}{4}$ " drill bits, drill, rivet gun, marker, tape measure, razor knife, round file or sand paper, brake fluid, $\frac{5}{16}$ " hex key, $\frac{1}{2}$ " , $\frac{9}{16}$ " wrenches.
- 🚗 $\frac{3}{8}$ "x 2" socket head screws and locknuts, insulated clip hardware, Brake line components, $\frac{3}{16}$ " 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.

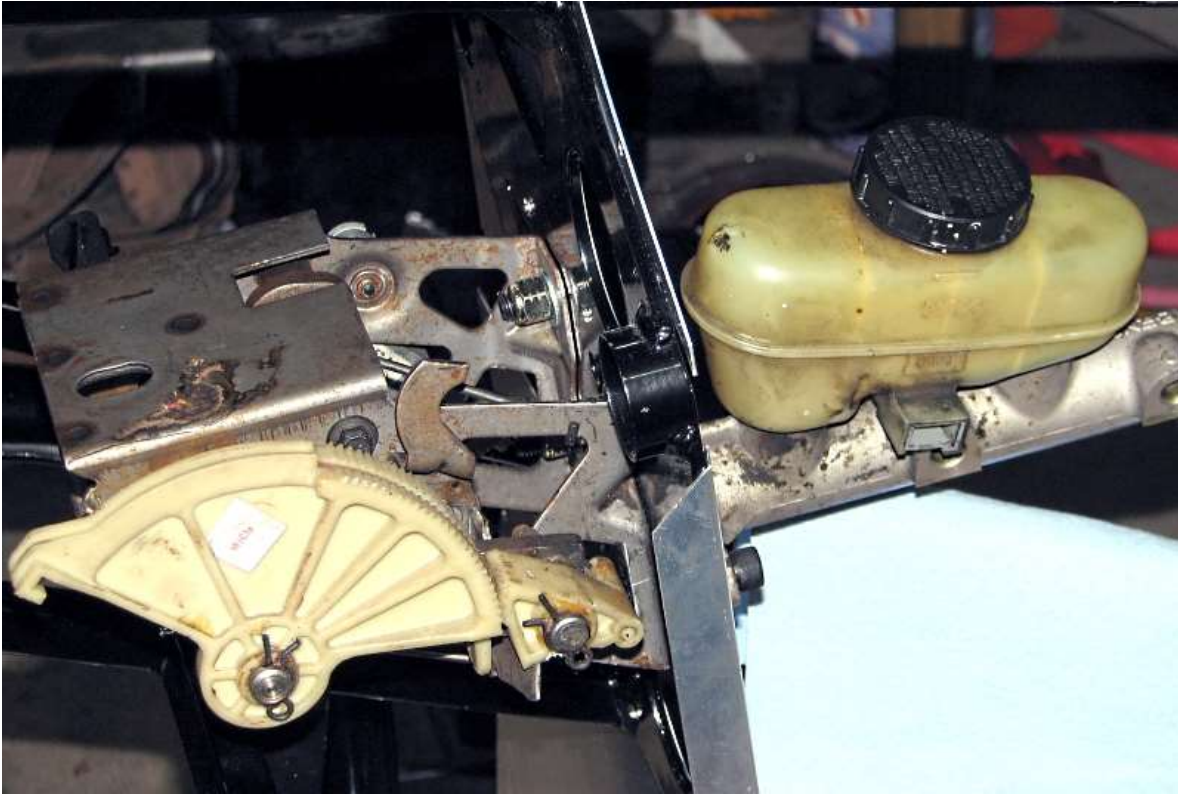
MANUAL BRAKE MASTER CYLINDER AND PUSHROD



Use the $\frac{3}{8}$ "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.



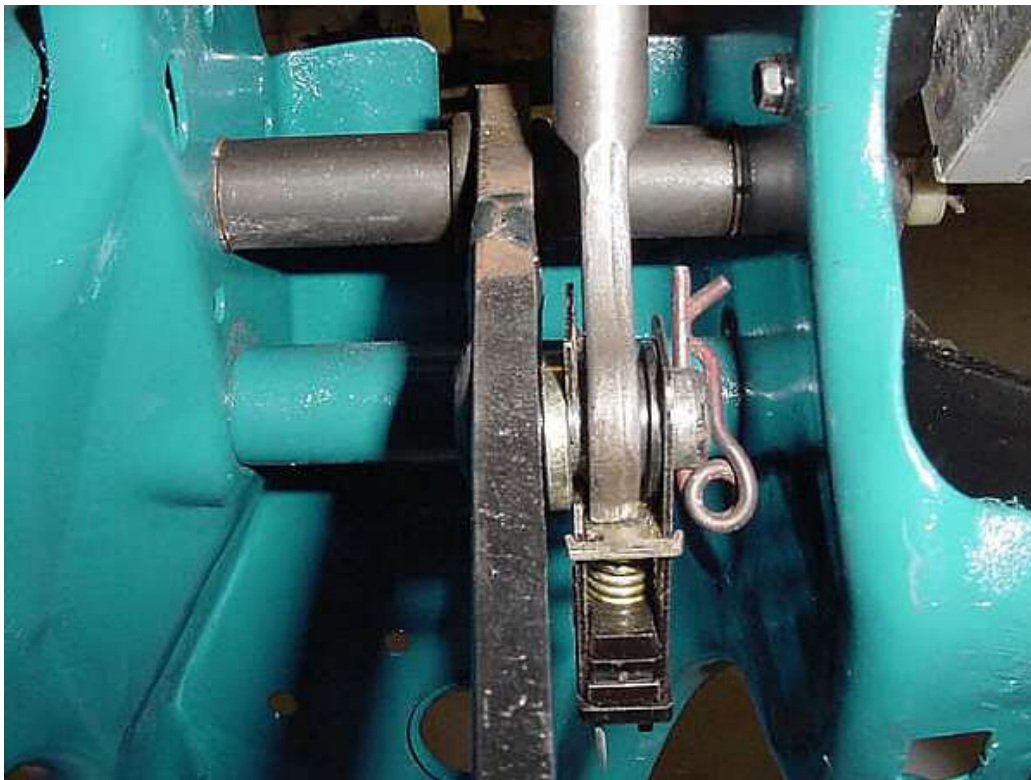
One of these bolts doubles as a foot box lower mounting bolt.



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.

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



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 block-off piece packed in the assembly is not used for this application.

96-04 BRAKE HYDRO-BOOSTER AND MASTER CYLINDER



$\frac{5}{16}$ " hex key, $\frac{9}{16}$ " socket, $\frac{3}{8}$ " ratchet, $\frac{1}{2}$ " ratchet, Hydro-boost nut tool.



Master cylinder, Hydro-booster, OEM brake line fittings, pedal box hardware.

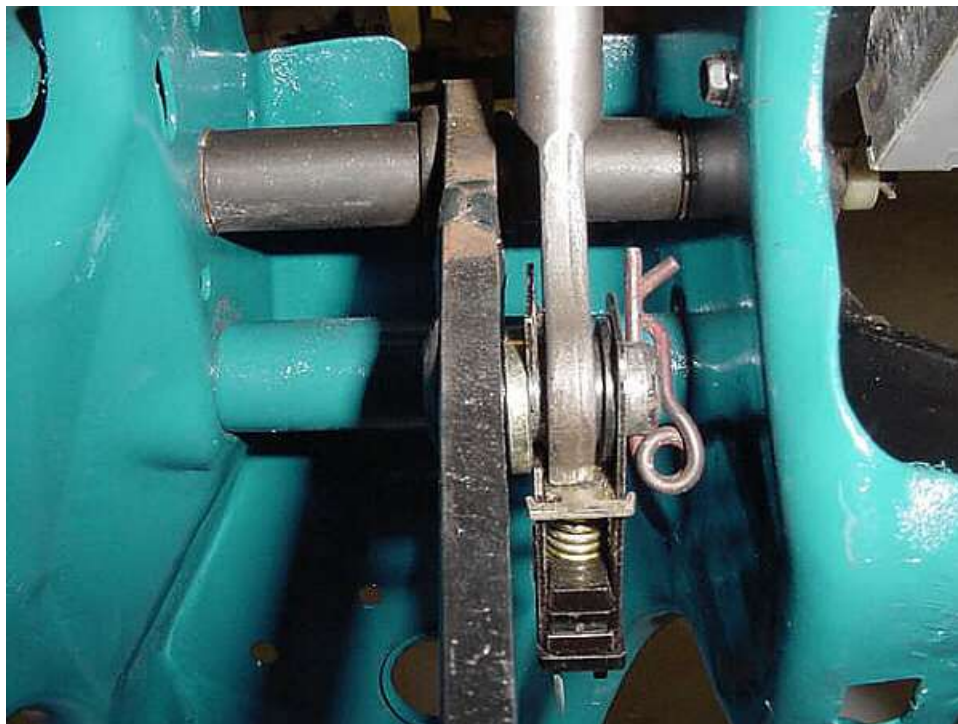
Using the Hydro-boost nut tool and a $\frac{1}{2}$ " ratchet, attach the Hydro-boost unit to the aluminum mount. Attach the Master cylinder fill plate to the front of the footbox.

Use the $\frac{3}{8}$ "x 1" bolts provided to mount the hydro-boost mount to the front of the footbox.

Tighten the mounting bolts for the hydro-boost mount.

Insert the white plastic bushing in the ring end of the brake pedal mount.

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

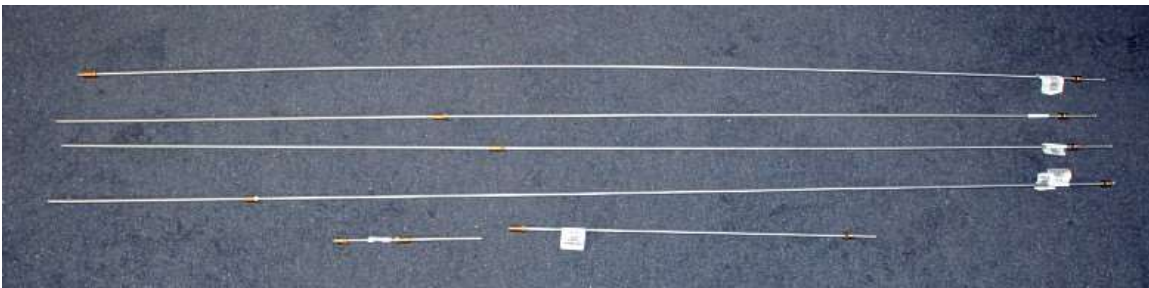


Put the clip through the hole in the pedal so that the push rod will not come off.

FRONT FLEXIBLE BRAKE LINES



Unpack the hardware from the brake line components.



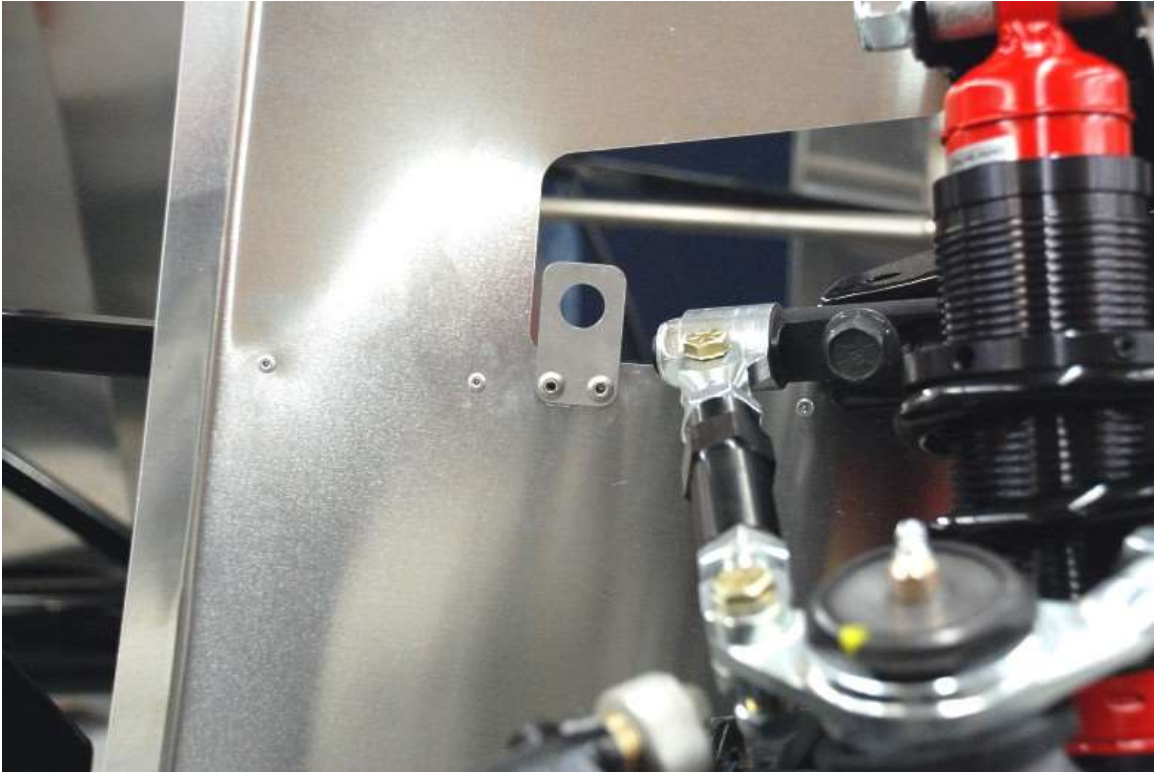
Lay out the various lengths of brake line so you can see what you have to work with. Like the fuel lines, there are many ways to run these lines but you must be very careful to keep them protected from moving parts, heat, or being too close to the bottom of the car.



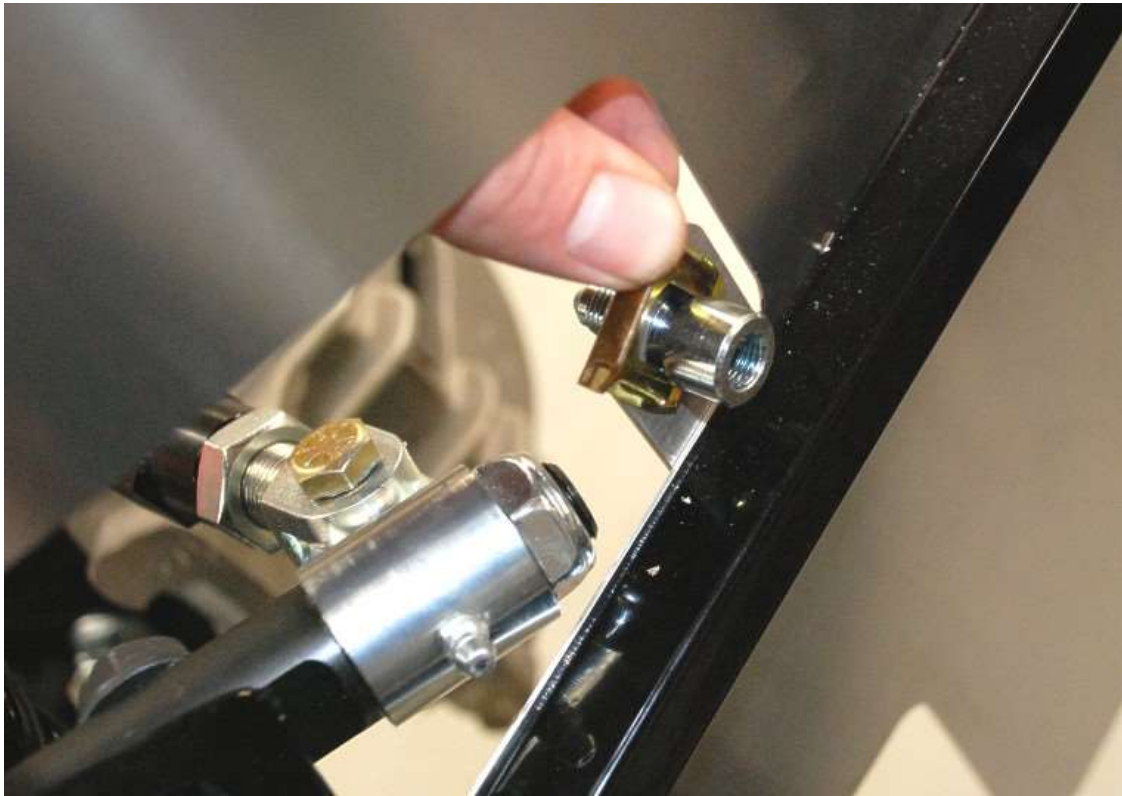
Which side you run down may depend on where you are hooking up to your fuel rail, carburetor, or pressure regulator. We usually run the fuel lines on the passenger side of the car and the brake lines on the driver side of the car.



Attach the flexible brake line to the caliper and make sure that when the steering is turned all the way in both directions that the brake line is not tight. If necessary move the location of the frame bracket.



The laser cut brackets (shown are brackets for stainless lines from the front brake assembly) attach to the chassis right behind the front upper control arms. Drill and rivet these in place using two $\frac{3}{16}$ " rivets.



Push the brake line adapters through the brackets from the outside in and install the clips that hold them in place.

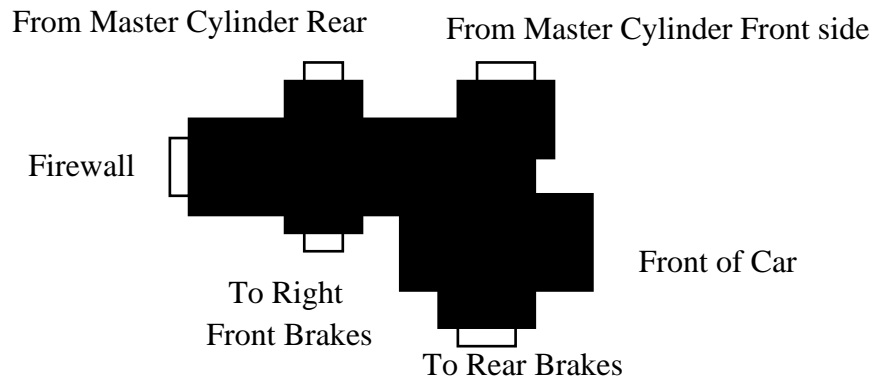
If removed, attach the front brake line to the caliper making sure there is a crush-washer on either side of the fitting. Hand tight is fine on all these for now.

HARD BRAKE LINES

Front

From the bottom of the master cylinder, run the 20" brake line forward to the left front brakes.

Brake Line Routing at Distribution Block



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



Run another 60" brake lines from the T fitting over to the right-side flexible mount.



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

Rear

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



Use a union to attach the another 60" brake line.



Run the brake line up the back of the 2"x 3" tube using line clips and rivets on the 2"x 2" tubes.



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.)

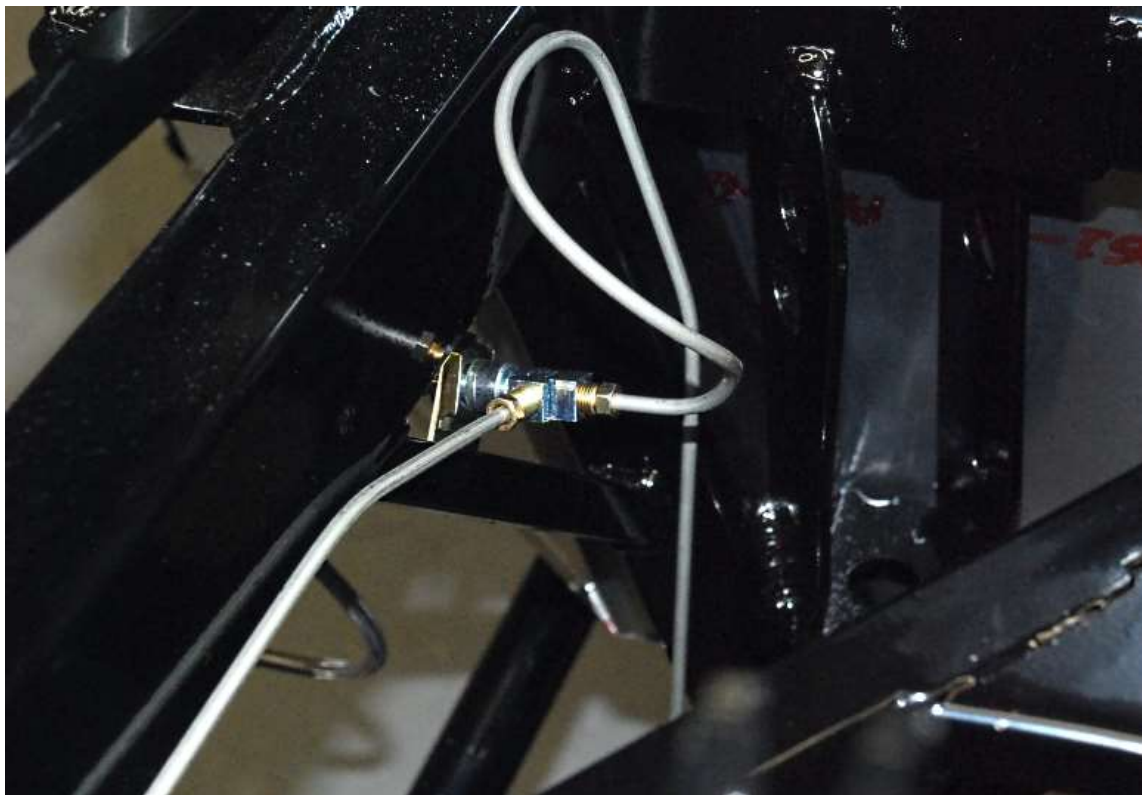
If using the 87-95 Mustang mount, drill two holes for the Mustang brake bracket on the underside of the 2"x 3" frame member and mount the Mustang bracket.



Attach the brake line to the Mustang mount.



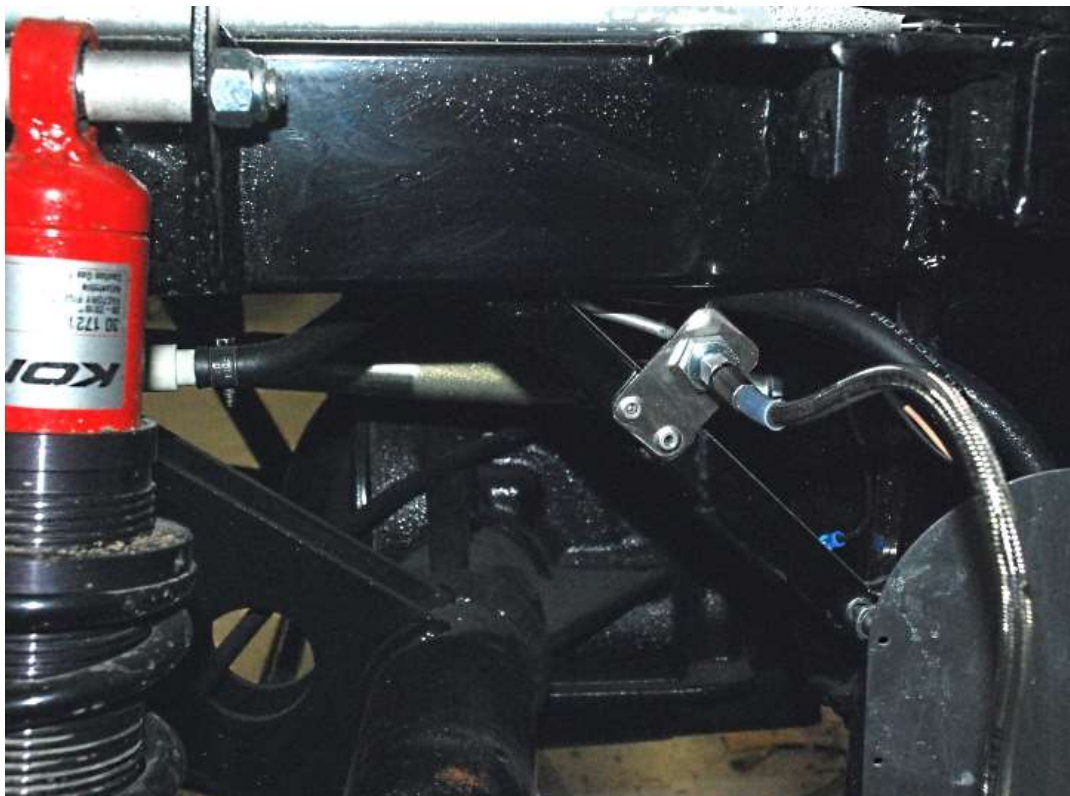
Using the FFR rear brakes, we attached the flexible brake line mount to the driver side diagonal 3/4" tube with the brake line clip.



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 $\frac{3}{4}$ " tube to the front fuel tank mount tubes and over to the passenger side $\frac{3}{4}$ " 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 $\frac{3}{4}$ " 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**

96-04 Front Brake hose to caliper Banjo bolt – **(39Nm) 29lbft**

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



When your system is finished being plumbed, go back and check all the fittings for tightness.

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

Wiring Harness



$\frac{3}{8}$ " socket, regular head screwdriver, slip joint pliers, $\frac{1}{8}$ ", $\frac{3}{16}$ " drill bits, drill, #8 nut driver, electrical tape, wire cutters.



Misc. electrical components, 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

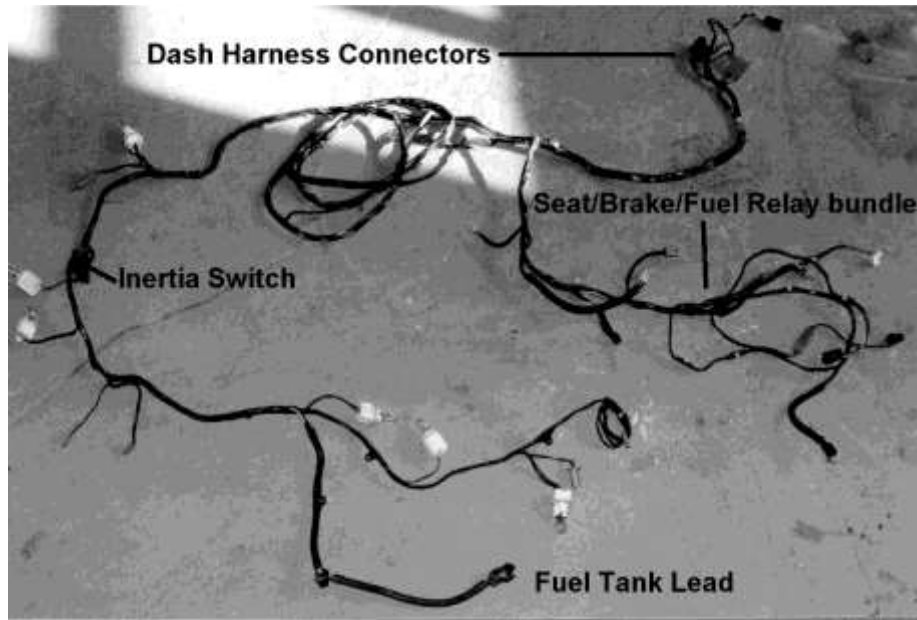


If you did not take the harness out of the car yourself, when connecting the plugs together, check the wire colors going into and out of the plugs to make sure that they line up and are the same color. The only plug that may not be the same color is the fuel tank harness. All other plugs that go together should be matching in color and shape or they will not connect. Different color plugs mean 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.

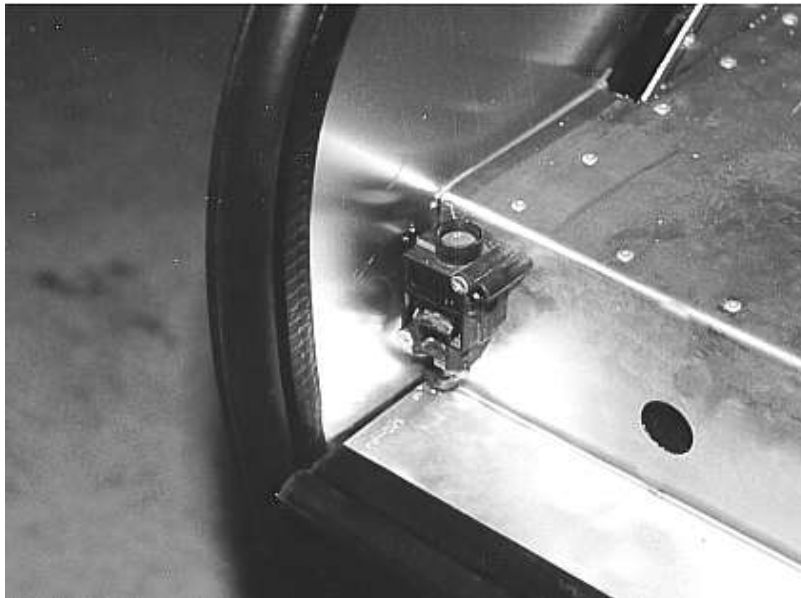


If you decide not to use the Mustang chassis harness because there are so many extra wires, the Factory Five chassis harness is a good alternative, it comes pre-loomed and labeled. It can also be used in combination with the Mustang engine harness if running fuel injection.

REAR HARNESS



Run rear harness along left side of the frame trunk extensions. Use zip ties to hold the harness in place for now.



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.

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 $\frac{3}{4}$ " hole in the upper corner of the inside driver foot box. Slide the harness down the edge of foot box into hole.



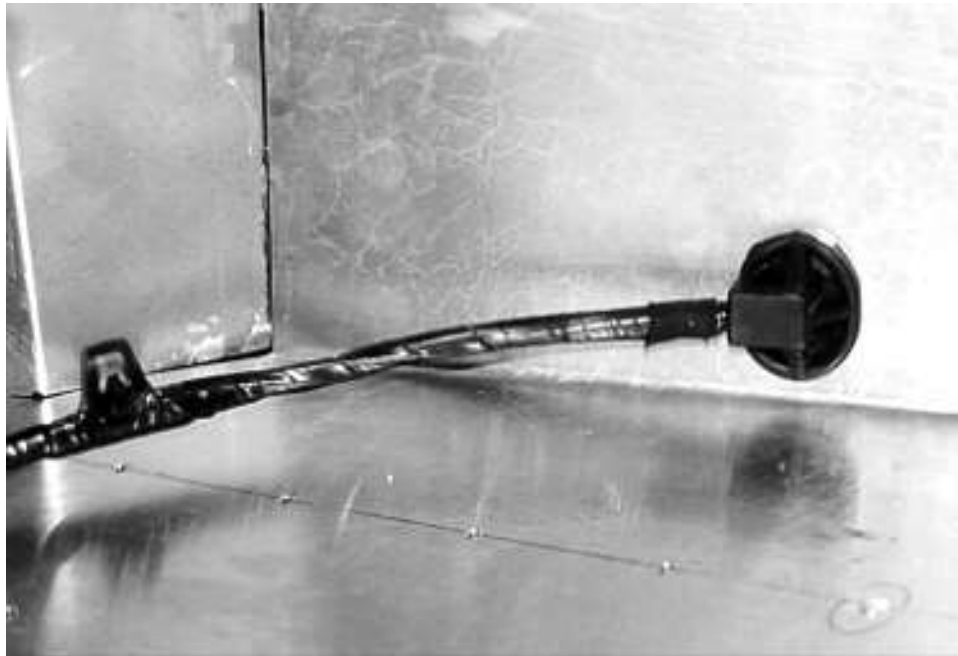
Cable ties can be used to secure the harness up to the hole by drilling two $\frac{3}{16}$ " holes about a $\frac{1}{4}$ " apart and passing a zip tie through it.

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 $\frac{3}{4}$ " tubing in the foot box and zip tie it in place.

TRANSMISSION HARNESS

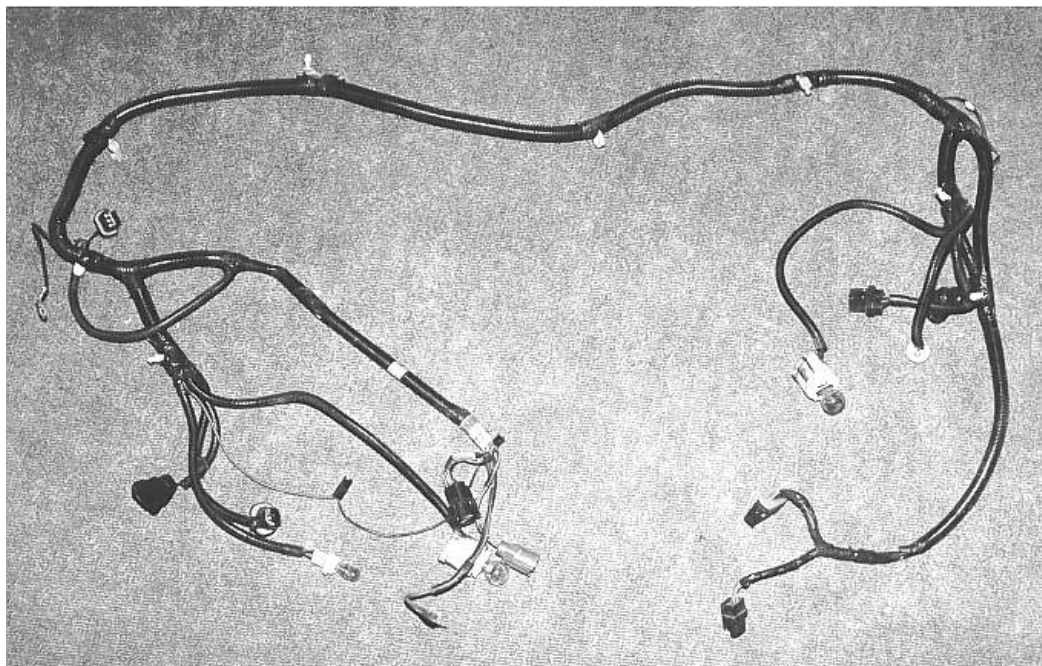




Push the harness plugs through the hole in the driver's side floor aluminum.

Run the harness forward into the corner to the $\frac{3}{4}$ " tube at the foot box front. Then go up and along the angled $\frac{3}{4}$ " 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



87-93 Headlight harness.

87-95 - 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.

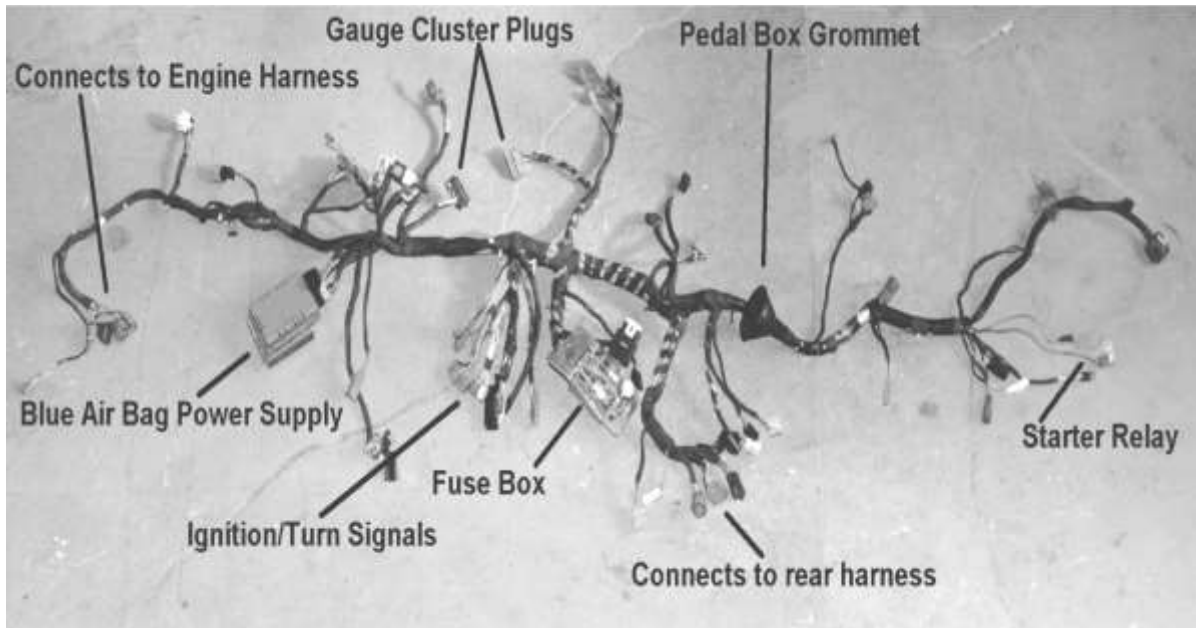
96-04 - Starts at the drivers footbox then runs forward to the “X” then over to the passenger side of the car where it attaches to the engine harness.



96-04 - Mount the engine bay fuse box using the stock mount in the front driver side corner of the engine bay to the “X” leaving room for the Hood Pin or Hood Hinge mount and the Power steering reservoir.

The Mustang is wider than the FFR Roadster 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.

87-95 DASH HARNESS



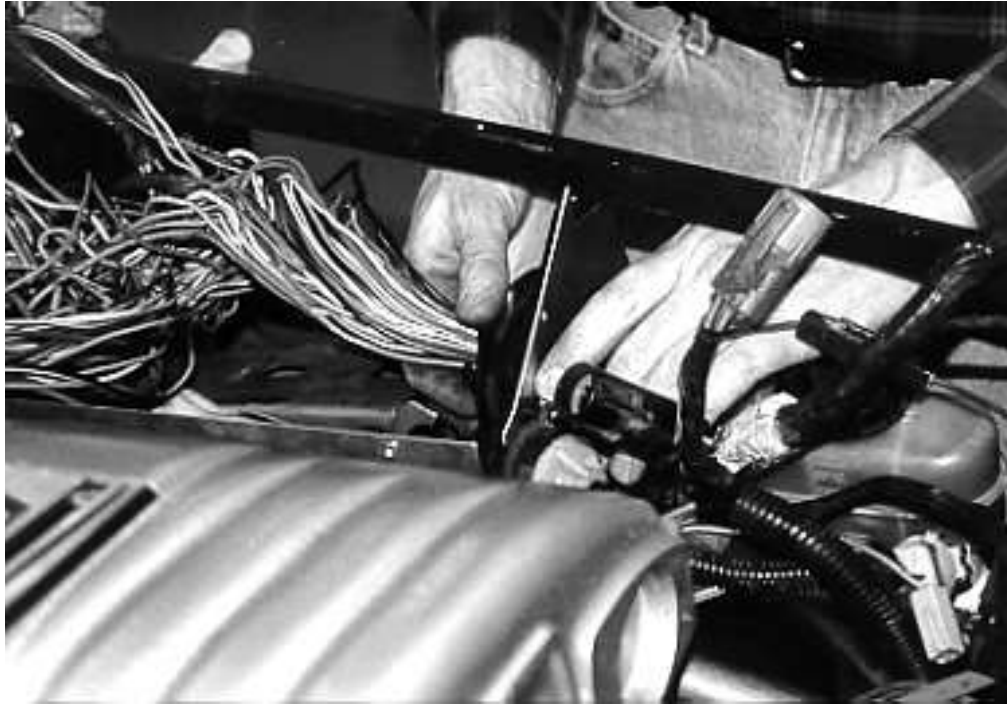
The dash harness begins at the coil area and goes rearward to the large hole in the front of the driver's side foot box.

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 3/4" 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 firewall.

Dash harness going through laser cut hole.

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

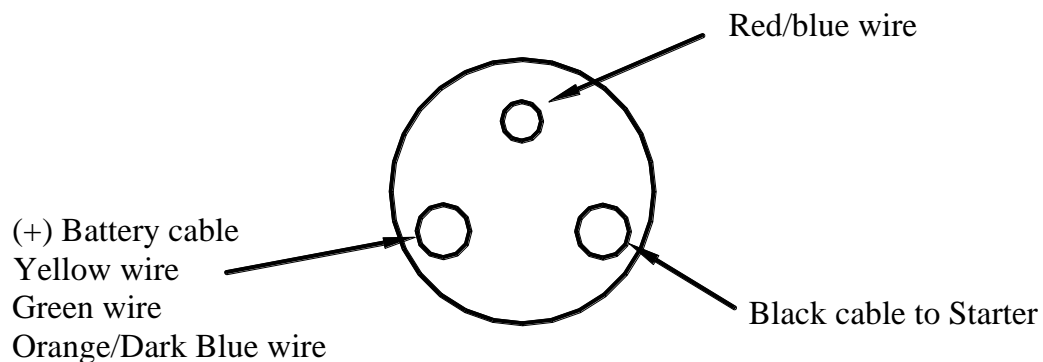
There are two different starters that were used and the wires are run differently for each.



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.



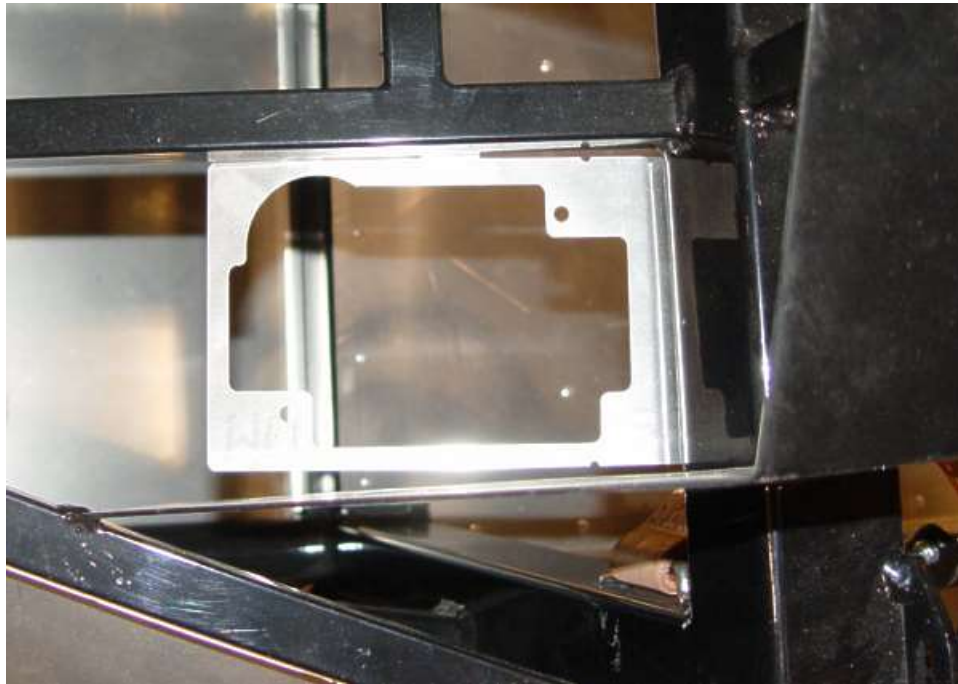
Starter Solenoid Wiring



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 $\frac{3}{4}$ " x $\frac{3}{4}$ " 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.

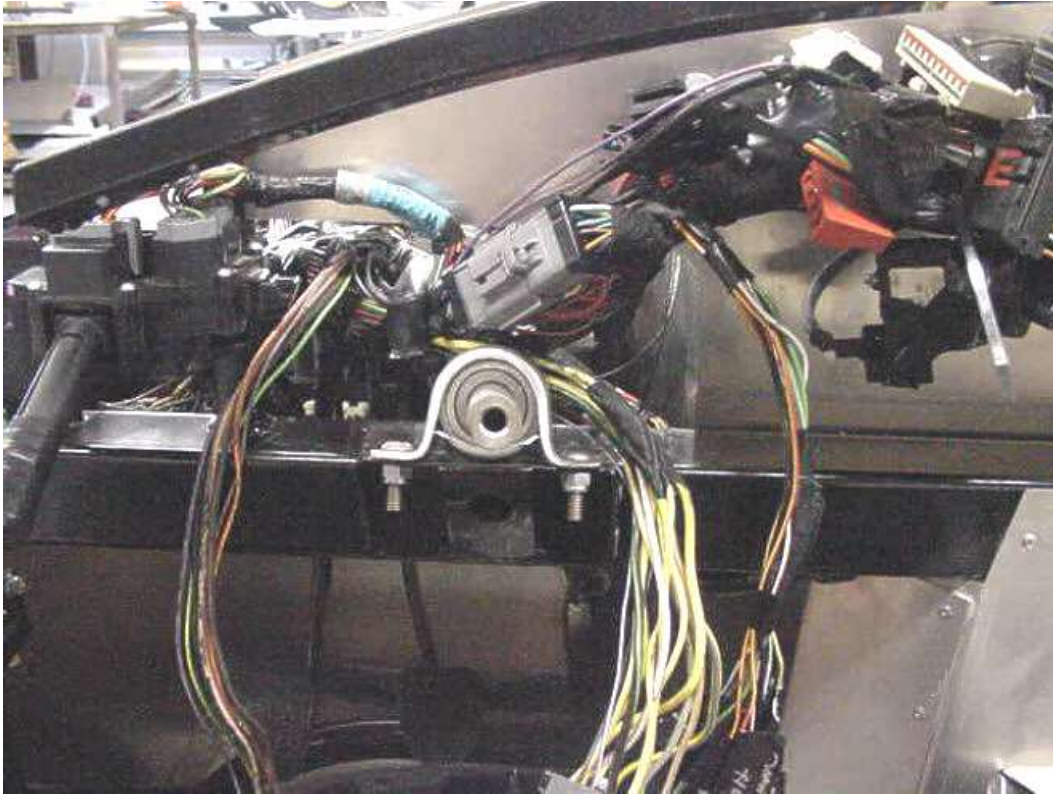
96-04 DASH HARNESS



Dash wiring showing computer mounted on the passenger side of the firewall.



Either modify the dash harness as described in the donor parts modification section at the beginning of the manual or cut a hole in the top outer footbox panel for the rectangular plug so the conical rubber bushing does not need to be cut. If you decide to cut the hole, make sure that you do it low enough so that the body will not hit it.

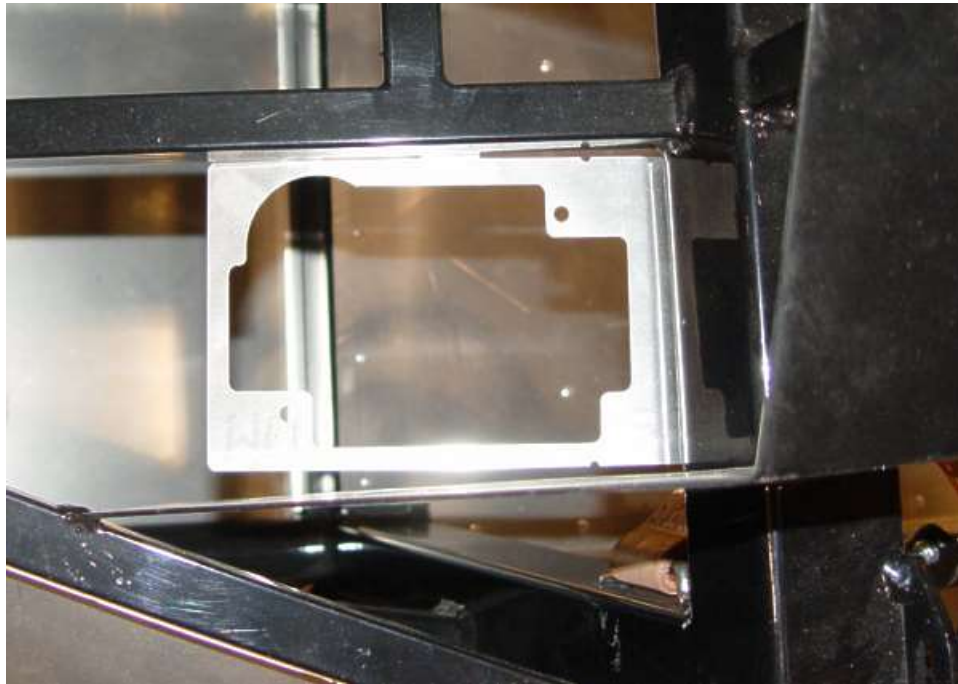


Run the harness over the pedal box and steering shaft and through the large slot in the firewall. The connectors for the rest of the harness easily fit through this hole and the big rubber grommet on the harness press fits into the laser cut hole.

Attach the rectangular plug to the other harness.

The remainder of the dash harness can 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.

Connect the relays and snap connectors to their original spots along with all sensors and relays.

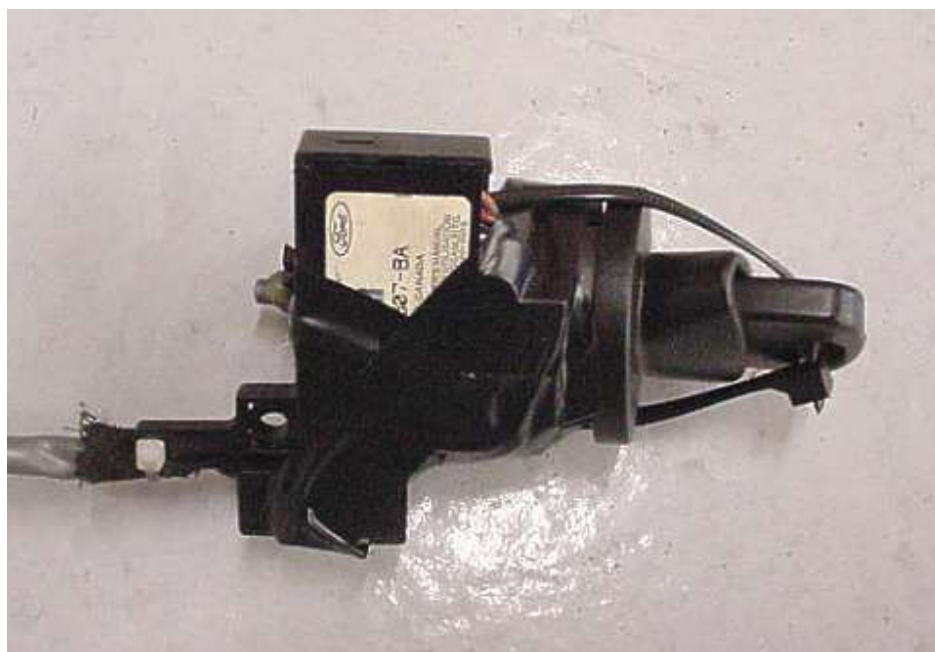


When the wire harness is installed, mount the fuse panel (Use the diagram in Appendix A to determine the correct shape) to the 2"x 2" dash hoop support and between the two 3/4" x 3/4" frame tubes in the driver's side footbox using the aluminum bracket provided and a few of the self-tapping screws.

The headlight switch can either be mounted in the dash to the left or right of the steering wheel, next to the ignition or using the stock bracket, mount it to the 87-93 headlight switch mount bracket so that it sticks vertically down under the dash.

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

The Mustang harness requires the stock **Mustang** key and PATS module. Use the ignition key provided for the ignition

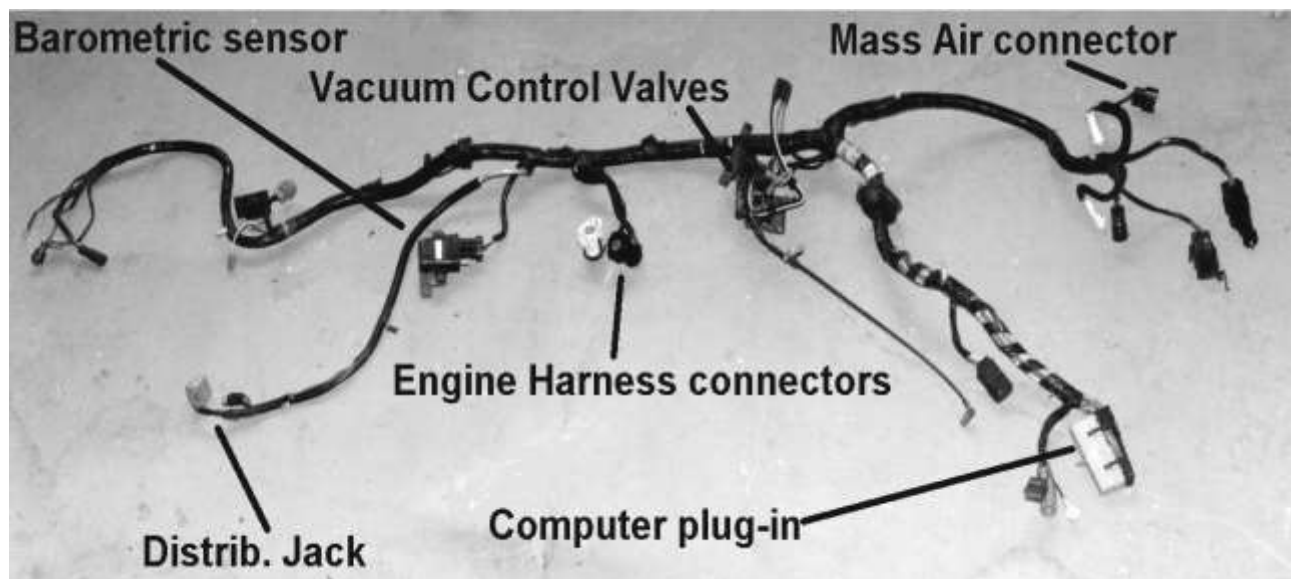


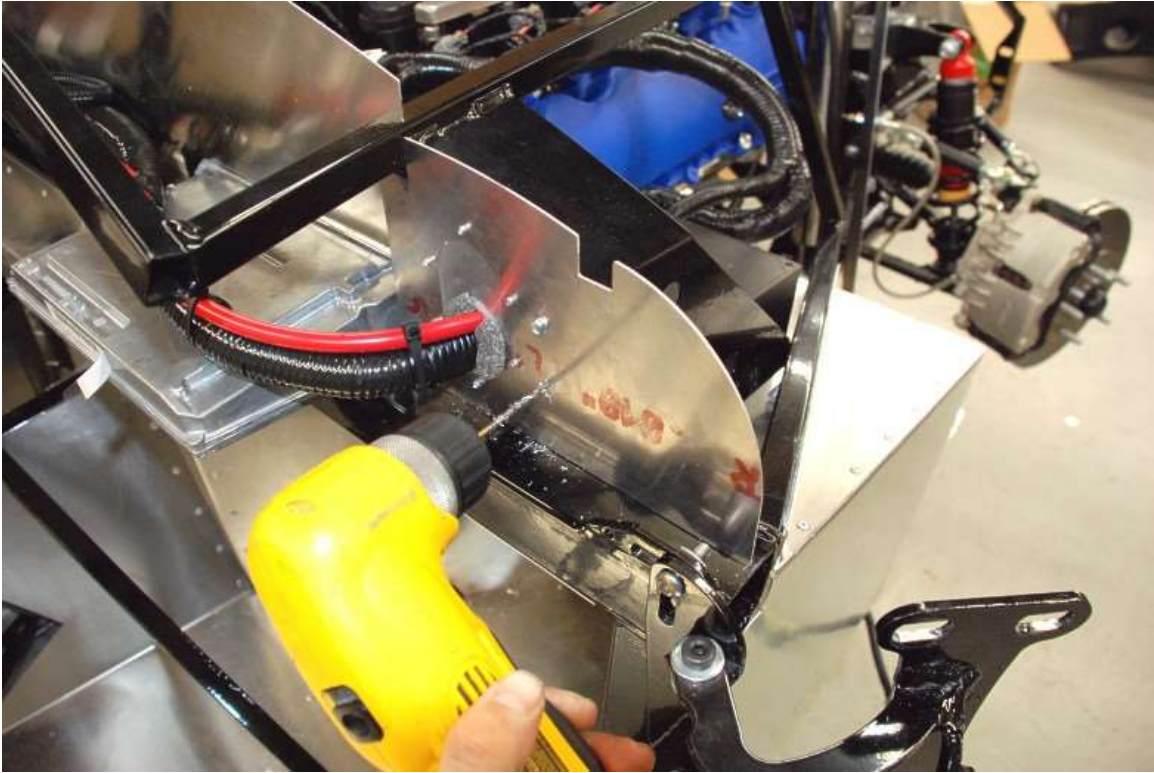
Tape or zip-tie the PATS module to the ignition key.



Attach the PATS module pigtail to the dash harness and zip-tie the ignition cylinder assembly to the dash harness.

87-95 ENGINE HARNESS

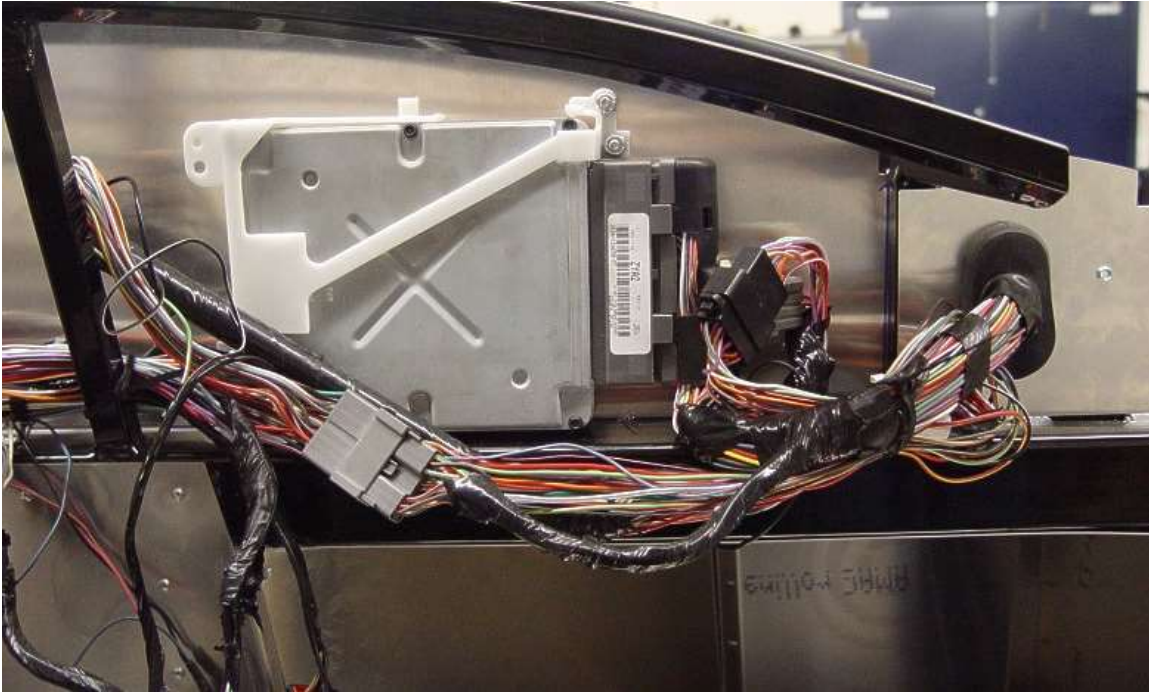




Silicone and rivet the dash extension in position.



The engine harness begins in the passenger foot box. The computer plug is pushed through the oval shaped hole on the Firewall extension from the engine bay side.



Attach the computer 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 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.

87-95 Harness

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 O₂ 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.

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 3/4" 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.

96-04 Harness



The harness splits into two on top of the passenger foot box. The harness with the square plug gets routed along the firewall as shown. This contains the wiring for the engine.



Run the other larger bundle forward to the front of the frame. Connectors shown at the front of the footbox are not needed

Using the fuel pump resistor as a template, hold it against the firewall and mark the firewall where the mount hole and tab hole.

✂ Drill $\frac{3}{16}$ " mounting holes for the resistor.



✂ Use $\frac{3}{16}$ " rivets provided with kit to mount the fuel pump resistor and to the firewall.
96-98 Fuel pump resistor mounted to passenger side firewall.



Attach the constant control relay to the top of the passenger footbox using 1/8" rivets.

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 3/4" tubing next to it. The switch spans the gap. Use two 1" screws and a 5/16" socket and 9/64" drill bit.

87-95 - 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.

96-04 - The ignition switch will get mounted in the dash. Refer to the Mustang wiring diagrams to find the correct wires to attach to the key switch.

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.

Trunk Aluminum

✂ 1/8" drill bit, silicone, rivet gun, caulk gun, 5/16" wrench, 5/16" hex key.

🚗 Mounted Aluminum, Packaged Aluminum, secondary body fasteners



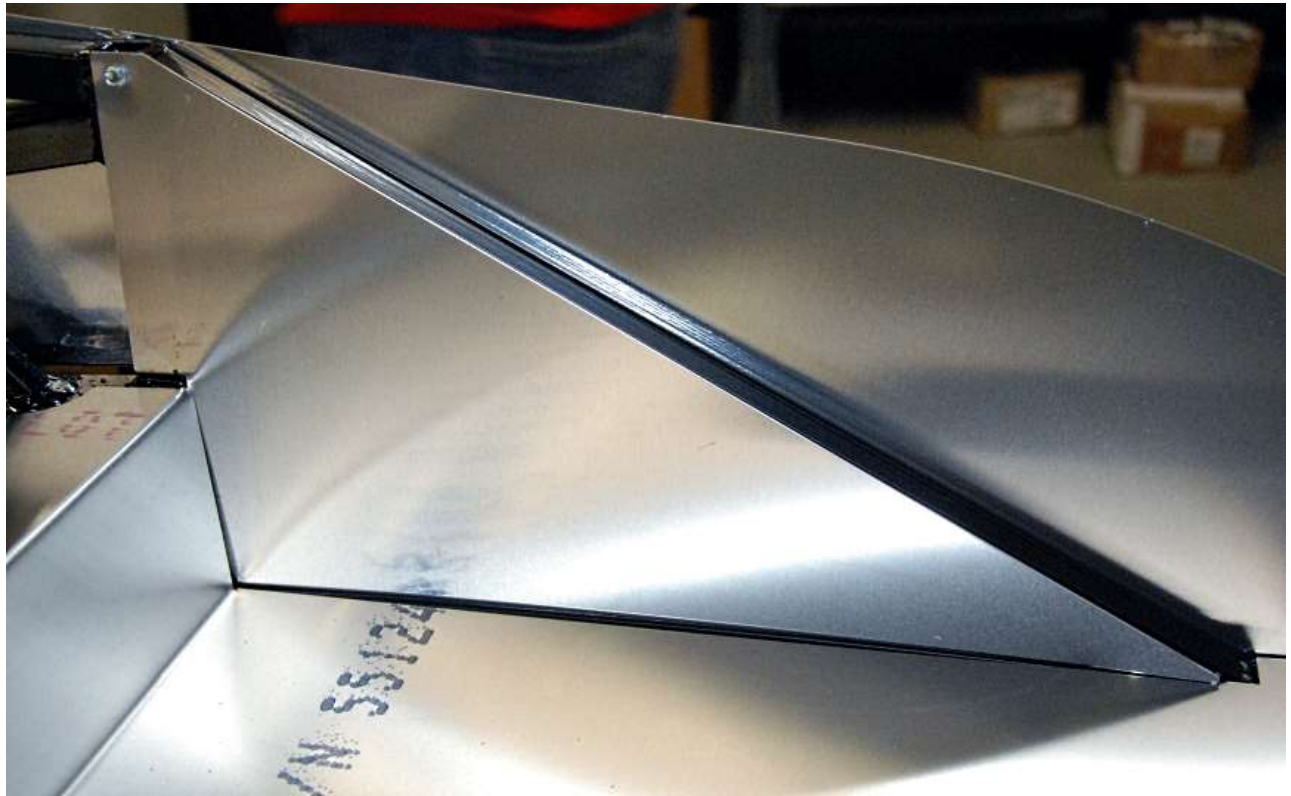
Silicone and rivet in the trunk side panels.

Remove the rear bolt of the passenger side gas tank strap.



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

Re-install the gas tank strap and tighten.



Silicone and install the trunk inner corner pieces.



Silicone and rivet the fuel tank strap patch panel from the packaged aluminum assembly.



Drill and silicone the upper trunk floor. Bend it in the middle to get it into position.



Work the corners of the panel down over the roll bar mounts and seat harness tabs a little at a time on each side.



Once the panel lies flat, finish rivet it into place. The rivets along the front 2"x 3" tube should be close to the back as possible for drill and rivet gun access.

Cockpit rear wall



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

Drivetrain Preparation



If installing a Coyote engine, call or check our parts catalog online for install instructions.

AFTERMARKET TKO 500 AND TKO 600 PREP



Hack saw or Reciprocating saw, $\frac{3}{4}$ " socket, ratchet



Transmission, Polyurethane engine/transmission mount kit




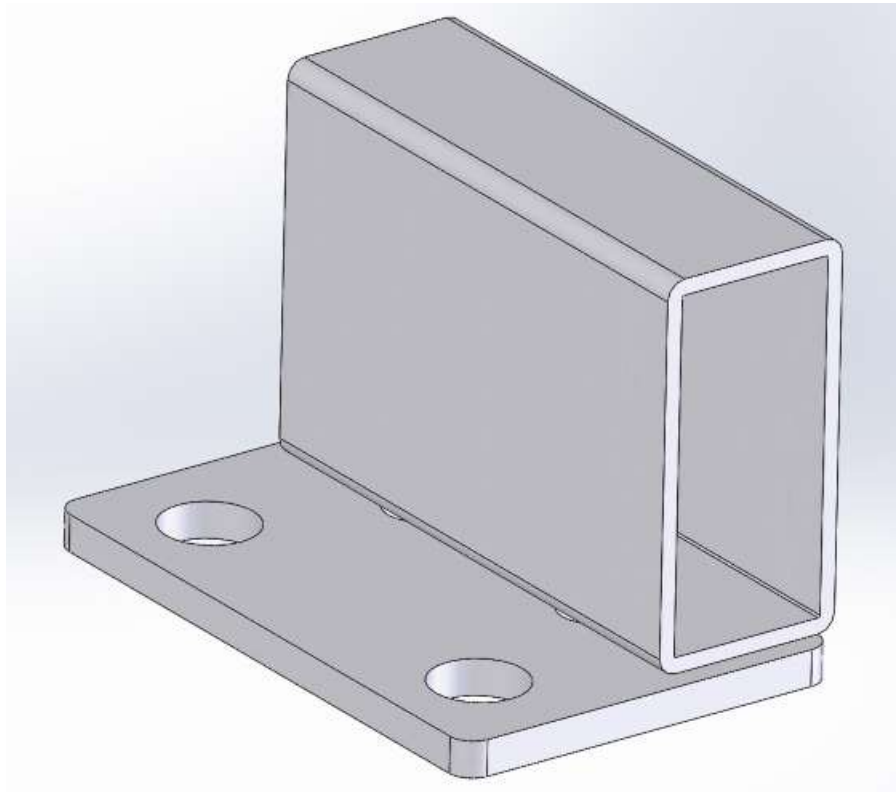
Trim off the unused mounting boss on the bottom of the case.



Trim it flush or just below the pad for the transmission mount.

99-04 TRANSMISSION MOUNT

 Transmission mount Adapter (FFR# 13969).



If using a 99-04 engine, the Transmission mount adapter bracket shown and provided in the kit must be used when using the stock transmission mount.

Drill the rivets out of the stock mount.



Locate the stock mount on the adapter so that the bottom edge of the mount is $\frac{9}{16}$ " from the adapter plate. Mark the hole locations.



Drill $\frac{5}{16}$ " holes for the bolts.



Bolt the transmission side of the mount to the bracket provided as shown.



99-04 Transmission mount on the adapter Bracket.

87-93 ALTERNATE DRIVE PULLEY



$\frac{3}{4}$ " socket, $\frac{3}{4}$ " wrench.



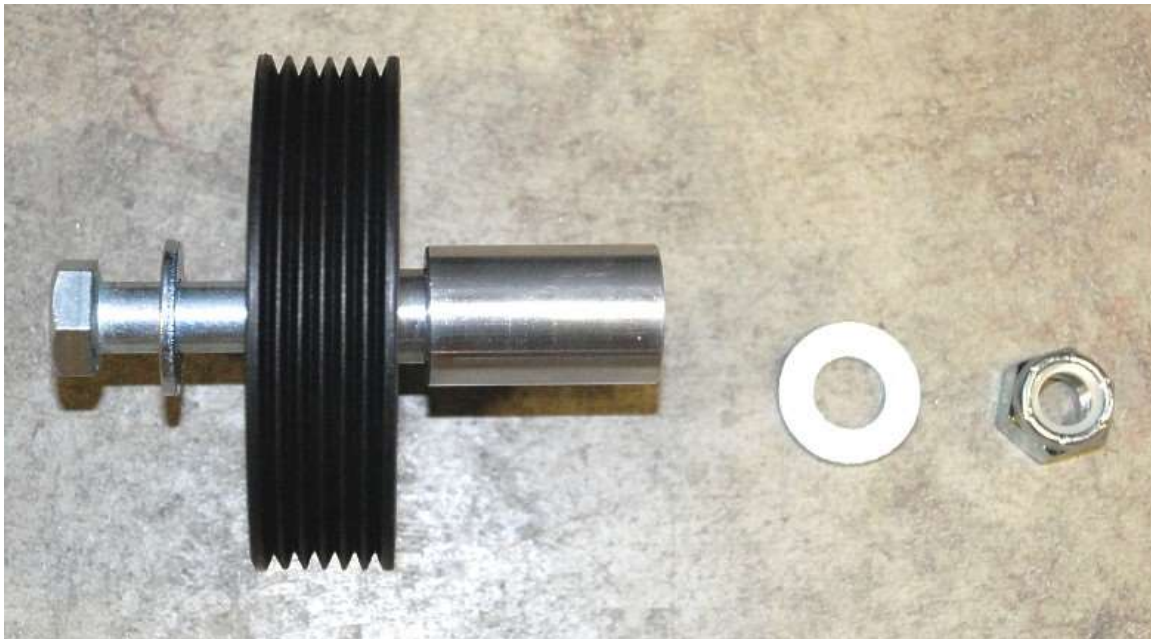
Alternate drive pulley components (FFR# 11080)



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

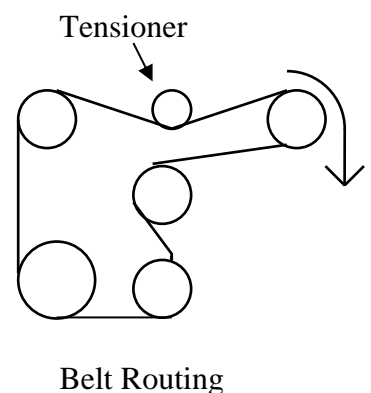
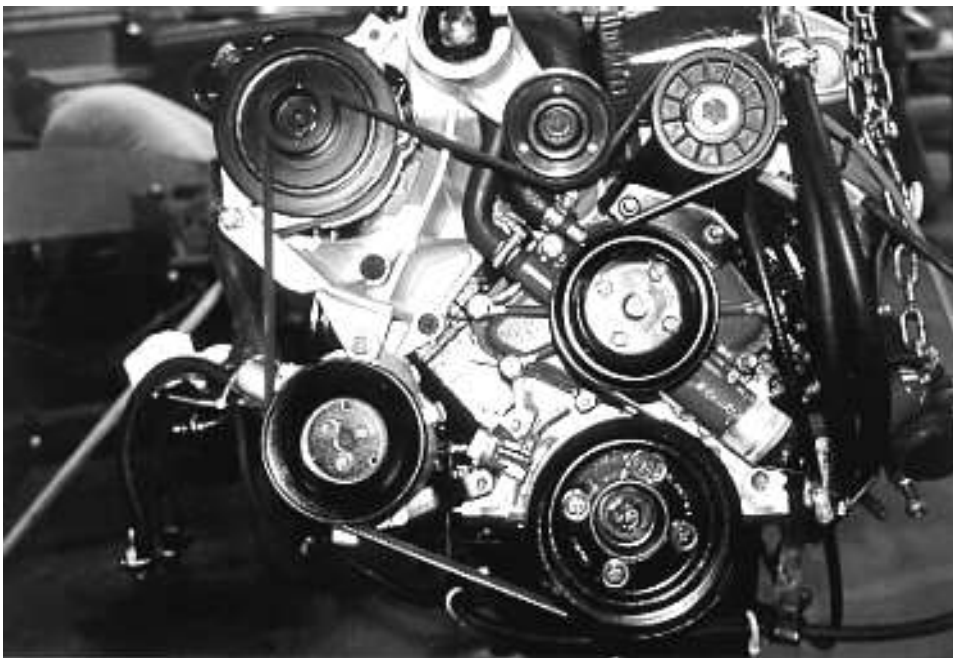
Place a washer onto the bolt.

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.






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 aftermarket under-drive pulleys have been fitted on any of the accessories or the crankshaft. If they have, you will have to also use an aftermarket 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.

87-95 OIL FILTER RELOCATOR

-  $\frac{7}{8}$ " wrench, razor knife, Teflon tape, chassis grease, $\frac{3}{8}$ " hex key
-  Oil filter relocating kit, oil, oil filter.
-  This is only required if running a 302 and Mustang shorty headers.

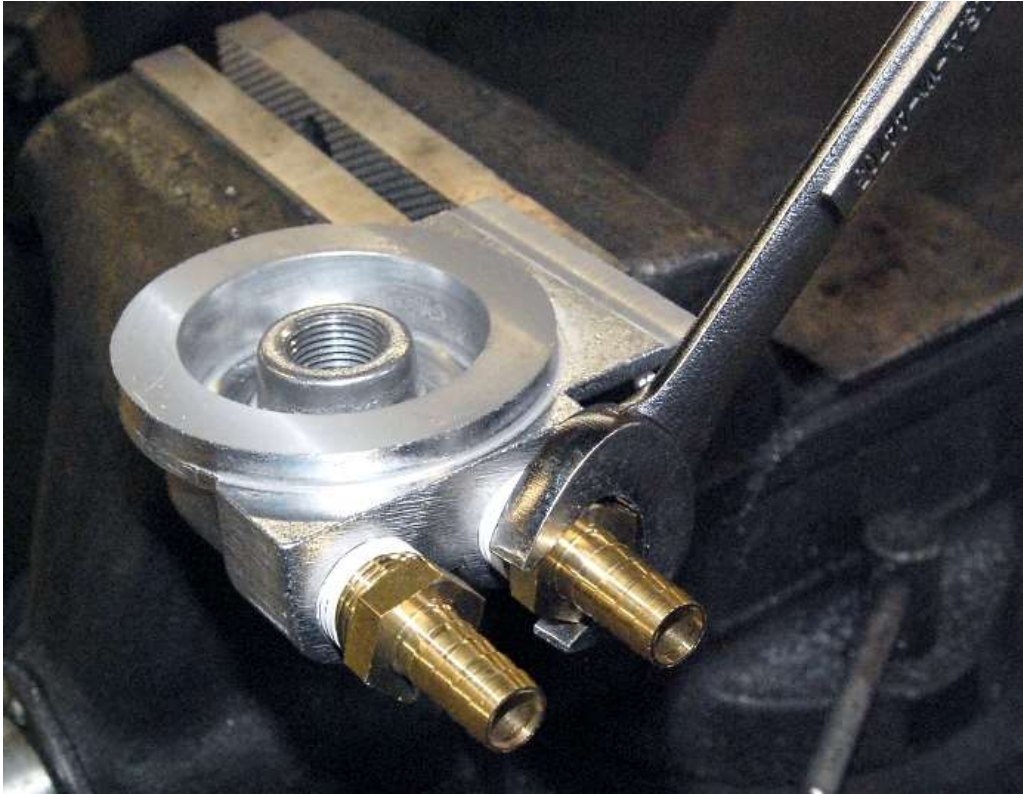


Place the O-ring in the adapter groove.

-  If the O-ring will not seat properly, put it in the freezer for 15 minutes and use a small amount of chassis grease to hold it in place while spinning on the adapter. Tighten $\frac{1}{2}$ turn after solid resistance is felt. The outlets for the hoses should be facing **towards** the front of the engine.

Install the oil filter relocate base plate on the engine.

Install the block off plugs (with a $\frac{3}{8}$ " hex key) in the adapter holes not being used. Use the Teflon tape on the threads of the plugs as you tighten them. Wrap the Teflon tape so it stretches when you attach the plug into the threaded socket. **Max torque** for the fittings on the relocate kit is **28 lb-ft**.



Use Teflon tape on the threaded barbs and thread them into the oil filter relocater.



Thread the short end of the threaded nipple into the relocater.



Mark the hole locations for the oil filter relocater on the old AC bracket or on the front frame X member (preferred location). If you're going to mount the relocate bracket on the X member.

Drill the mounting holes for the relocater.



Make sure to drill this before you install your engine. Otherwise, your drill won't fit in between the engine and the frame.

96-04 A/C ELIMINATOR KIT



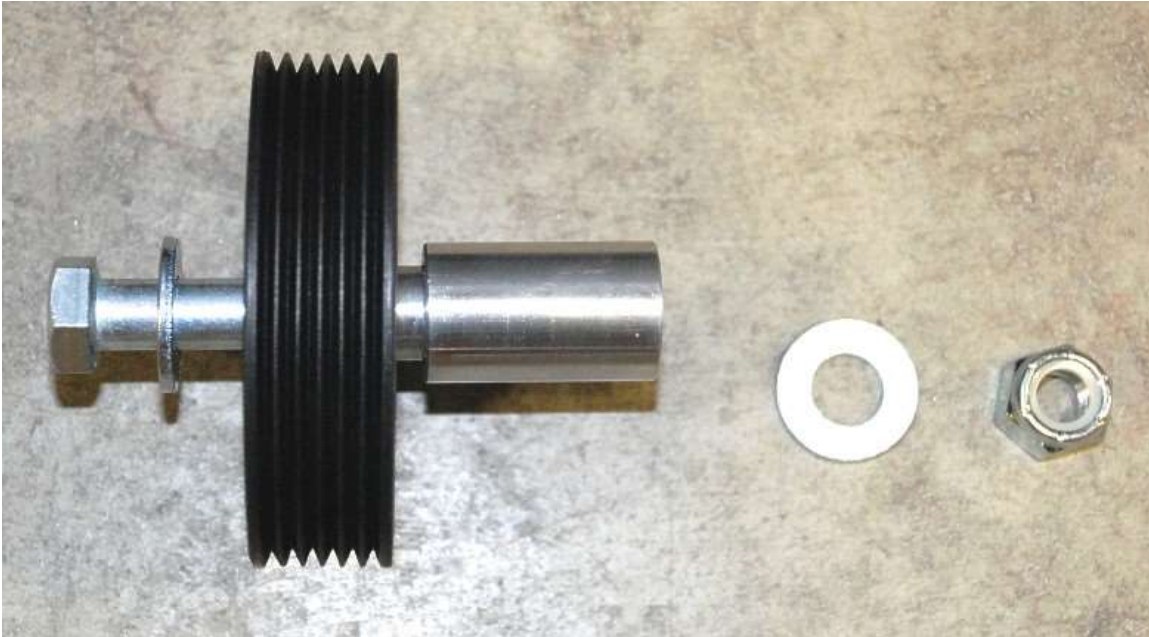
18mm socket, 18mm combination wrench.



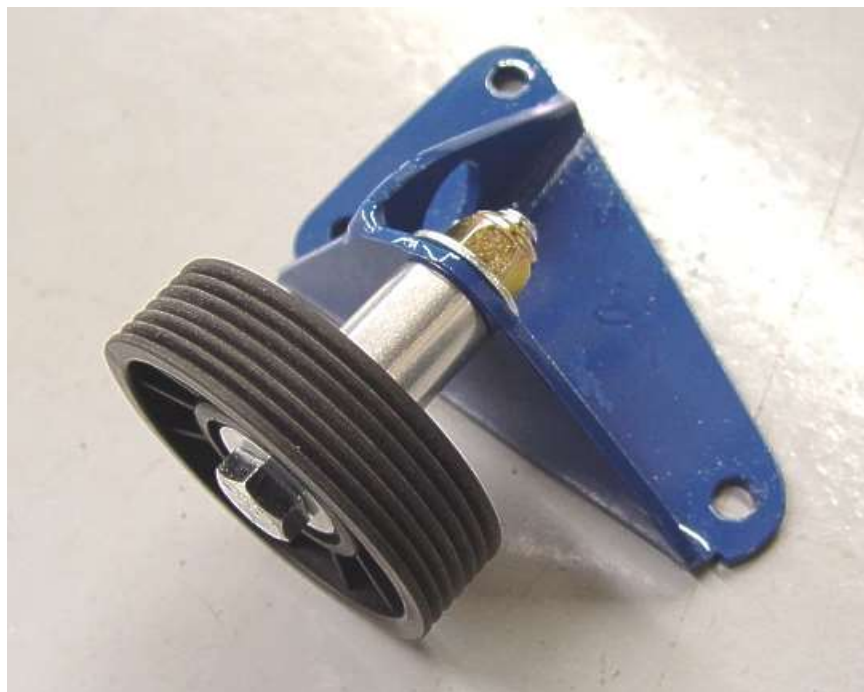
Alternate drive pulley components, A/C Eliminator Kit

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.



Attach the pulley to the bracket to using the included ½" bolt.



Attach the A/C eliminator bracket to the engine. Use double washers for the two front bolts that have the sleeves in the holes.



Pull the tension pulley back using a Ratchet in the square hole and install the serpentine belt using the picture for reference if using power steering.

96-98 DOHC Serpentine belt routed on engine using power steering.



If not using power steering, use the following picture for routing.
96-98 DOHC Belt routing without power steering.



99-03 DOHC Serpentine belt routed on engine using power steering.

96-04 HEATER BYPASS HOSE



Use the heater bypass hose provided to loop between the inlet and outlet on the back of the engine.

96-04 OIL PAN



$\frac{9}{16}$ " deep socket, $\frac{9}{16}$ ", $\frac{1}{2}$ " wrenches.



If you are installing aftermarket gauges, some of the gauge sending units will need to be changed. Do this now while the engine is empty and out of the car. See your gauge instructions for more information.



The stock 4.6L oil pan is too deep and must be changed for a shallower pan. These are available from Canton and Morosso.

Change the Oil pan now.

Frame prep



On the right engine mount there is a $\frac{5}{16}$ " hole for the engine ground cable. Grind any coating from in and around the hole to give a good engine ground.

Engine/Transmission Installation



Engine hoist, chain, $\frac{3}{4}$ ", $\frac{15}{16}$ " sockets, ratchet, extension



Engine, Polyurethane engine/transmission mount kit



Locate the pin stamped VIN number on the engine and the transmission. Some states check for these numbers during registration and they are hard to see on the 4.6. 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.

Transmission Mount



$\frac{5}{16}$ " hex key, $\frac{9}{16}$ ", $\frac{3}{4}$ " socket, ratchet, $\frac{3}{4}$ " wrench, floor jack



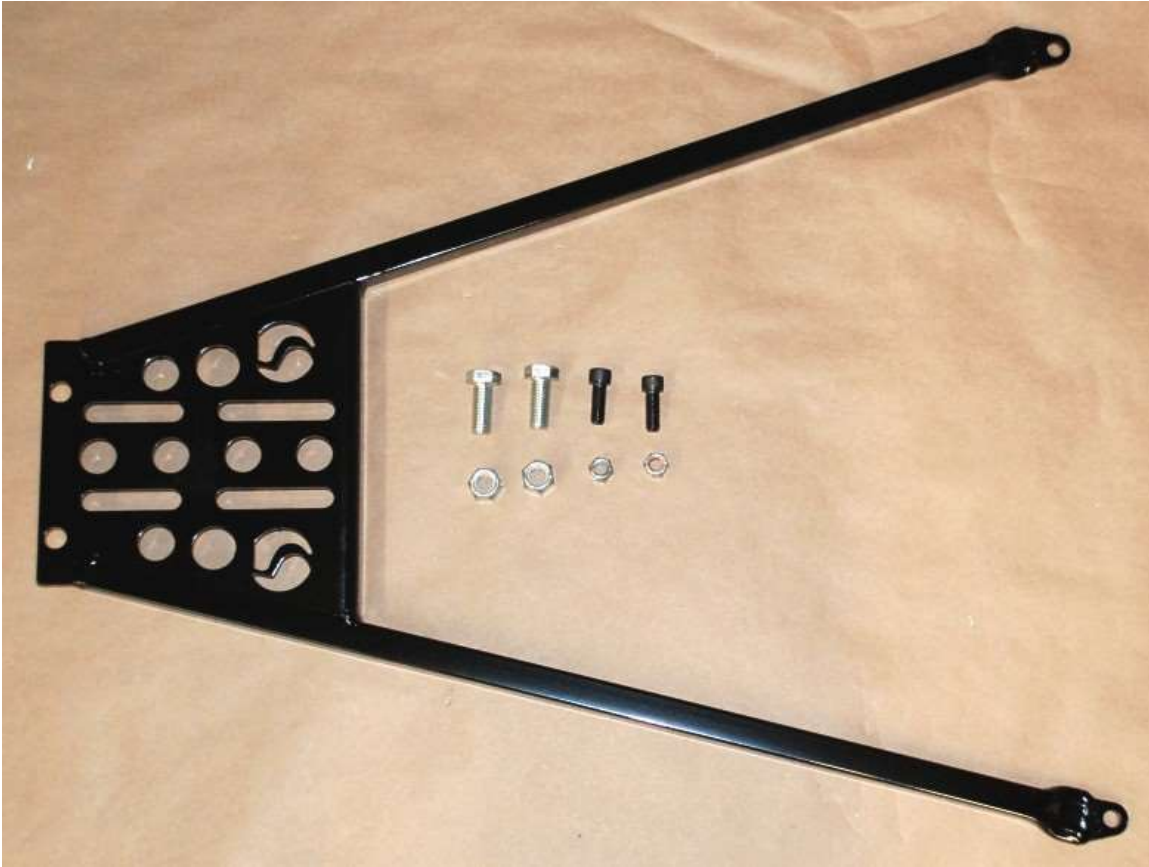
Transmission mount, $\frac{3}{8}$ "x 1" socket head screws and locknuts, $\frac{1}{2}$ "x1.25" bolts and locknuts



If using a 96-98 T-45, bolt the transmission mount to the top of the frame mounts and do not use any spacers under the mount.



If using a 99-04 T-45 or 3650, bolt the transmission mount to the underside of the frame mounts. Do not use any spacers if using the stock mount and adapter. If using the polyurethane mounts, use the spacers provided to raise the transmission.



Unpack the A-frame transmission mount and hardware.

Jack the transmission up and mount the a-frame underneath it. Normally this mounts above the frame tabs but can be attached underneath if extra clearance is needed.



Install the $\frac{3}{8}$ "x 1" socket head screws and $\frac{1}{2}$ "x1.25" bolts that hold the transmission to the mount and tighten all the hardware on the mount and a-frame.

Engine Ground



Sand paper or grinder bit, $\frac{1}{2}$ " socket, ratchet, $\frac{3}{16}$ " hex key



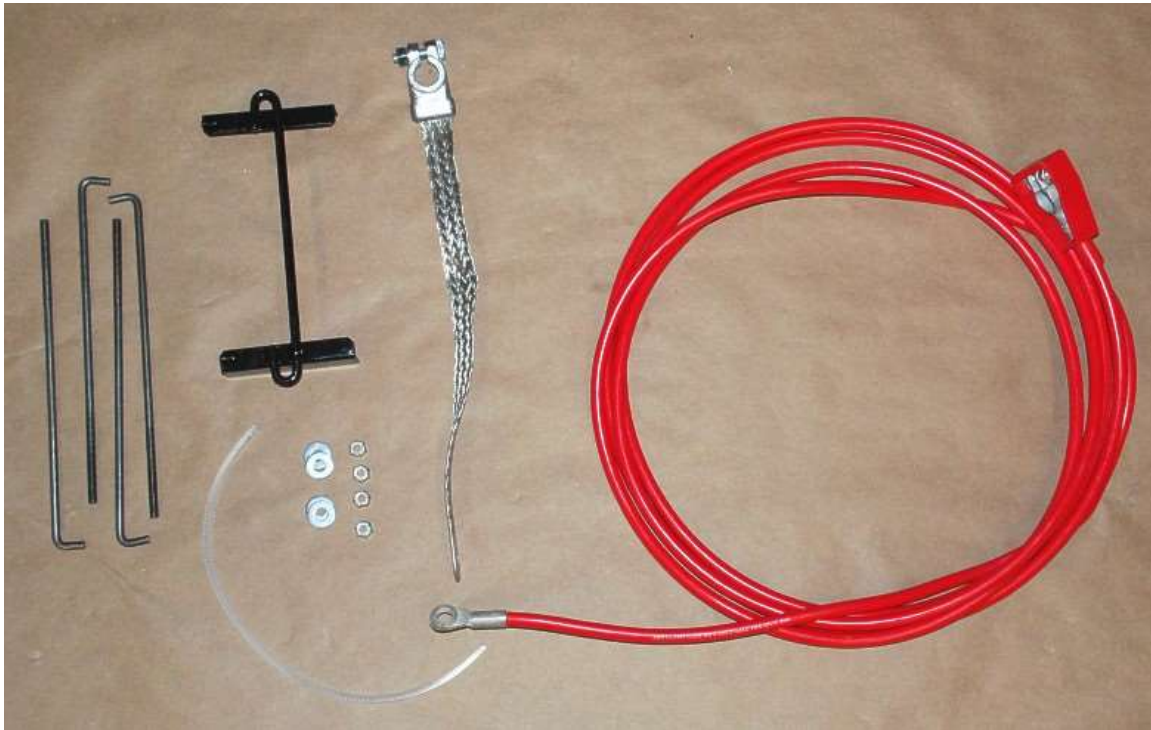
Electrical system completion components



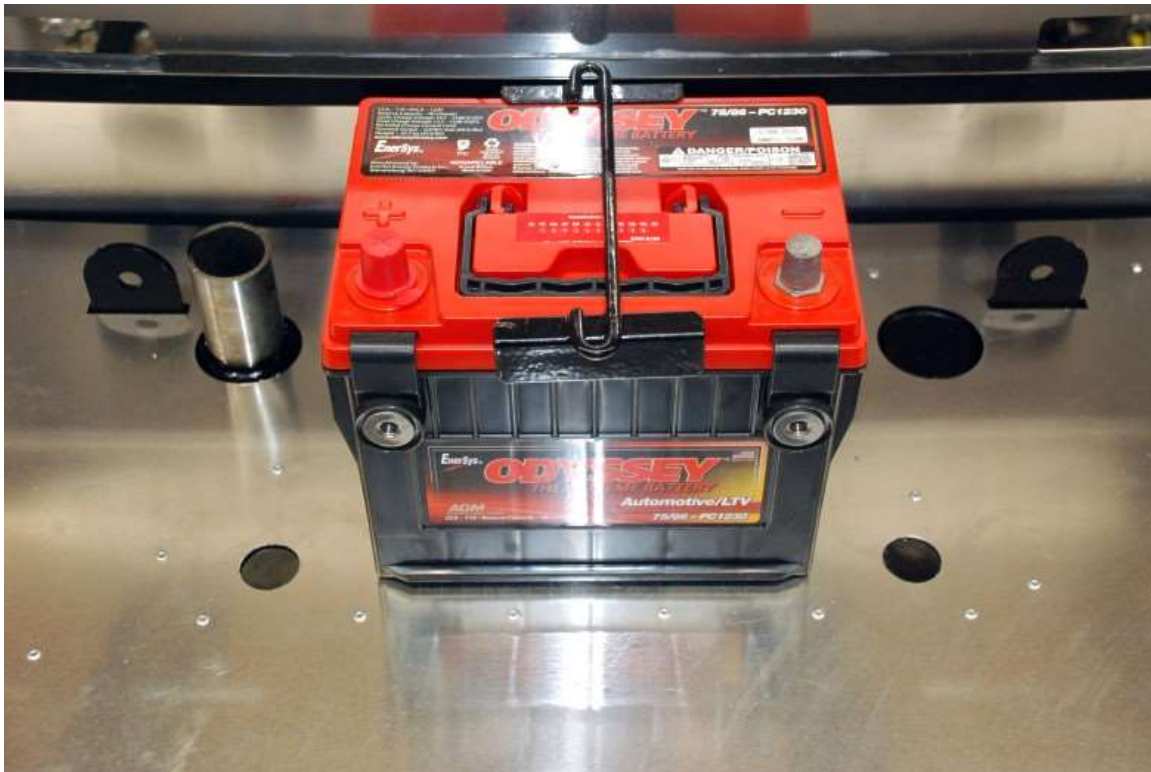
Bolt the ground strap to the hole on the frame engine mount.

Battery Mounting and Cable

- ✂ Drill, 1" hole saw, $\frac{3}{16}$ ", $\frac{1}{4}$ ", $\frac{5}{16}$ " drill bits, rivet gun, marker, $\frac{7}{16}$ " deep socket, ratchet, $\frac{1}{2}$ " wrench, $\frac{3}{16}$ " hex key.
- 🚗 Secondary Body fasteners, Battery mounting kit, Insulated clip hardware, misc. electrical components, battery, Mustang Ground cable, $\frac{1}{4}$ "x 9" J-bolts.



Unpack the Battery mounting kit.



Position the battery with mounting bracket in the trunk for mounting. It is centered side to side with just enough room for the mounting bracket between it and the front of the trunk.



Drop the J-bolts in the mounting holes and mark where they hit the trunk floor.



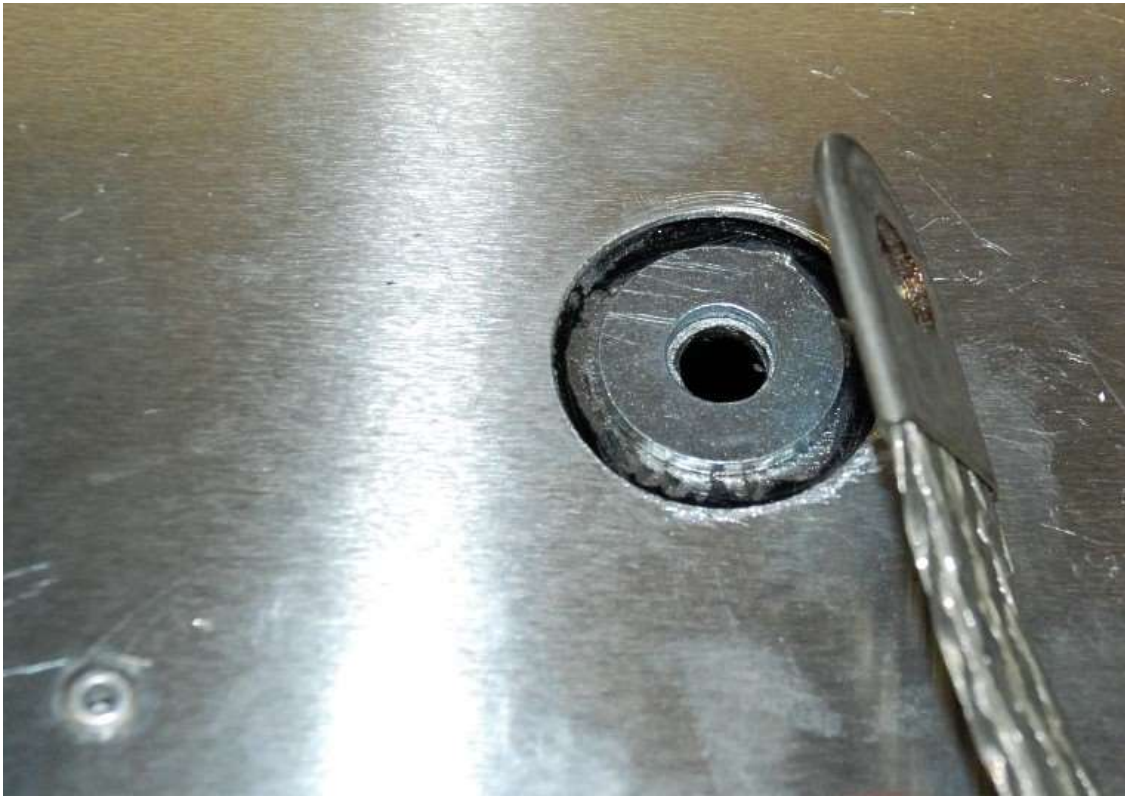
Drill the 1/4" mounting holes in the floor.



Hook the j-bolts through the floor and bolt the battery down. Hold the j-bolts with a vice grip and be careful not to over tighten and crack or distort the battery.



Remove the powder coating from the small circle in the trunk closer to the ground terminal of your battery.



Drill through the center of the circle and put a washer down in the cut out.



Attach the OEM ground strap to the chassis with the supplied $\frac{5}{16}$ " button head screw, locknut, $\frac{3}{16}$ " hex key and $\frac{1}{2}$ " socket.

👉 Do not connect the negative lead to the battery until all of the wiring on the vehicle is finished.



Drill out the hole you didn't use for the ground with a 1" hole saw.



Install one of the grommets in the hole.



Push the small end of the battery cable through the floor from the top.

Attach the battery positive terminal and leave enough slack to be able to remove the terminal easily. Run the battery cable forward on the right side of the transmission tunnel to the starter.



Attach the battery cable to the battery post on the starter.

IRS Driveshaft adapter



There are two different Driveshaft adapters; one for 2015-17 Automatic transmission cars and all 2018+ center sections which is coated clear zinc. The Driveshaft adapter for 2015-17 manual transmission center sections is coated yellow zinc. The standard one included is the clear zinc adapter.



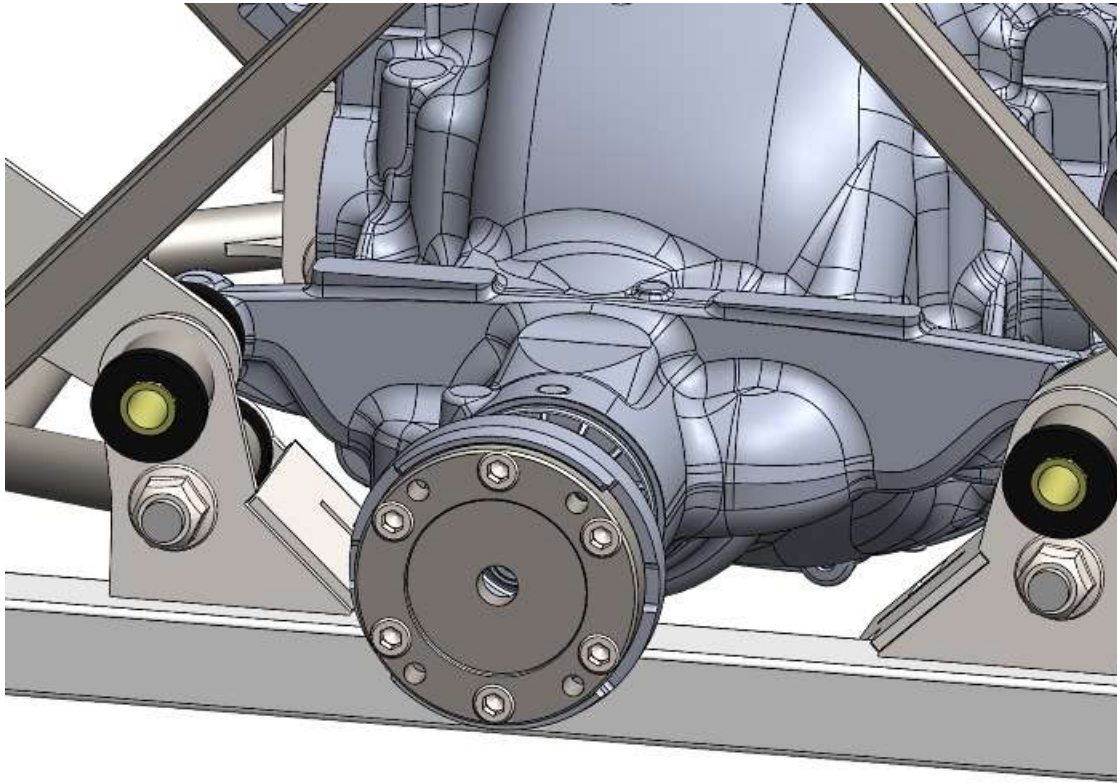
Driveshaft adapter, fasteners



8mm hex socket, torque wrench, Loctite.



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 lb-ft)**.

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.

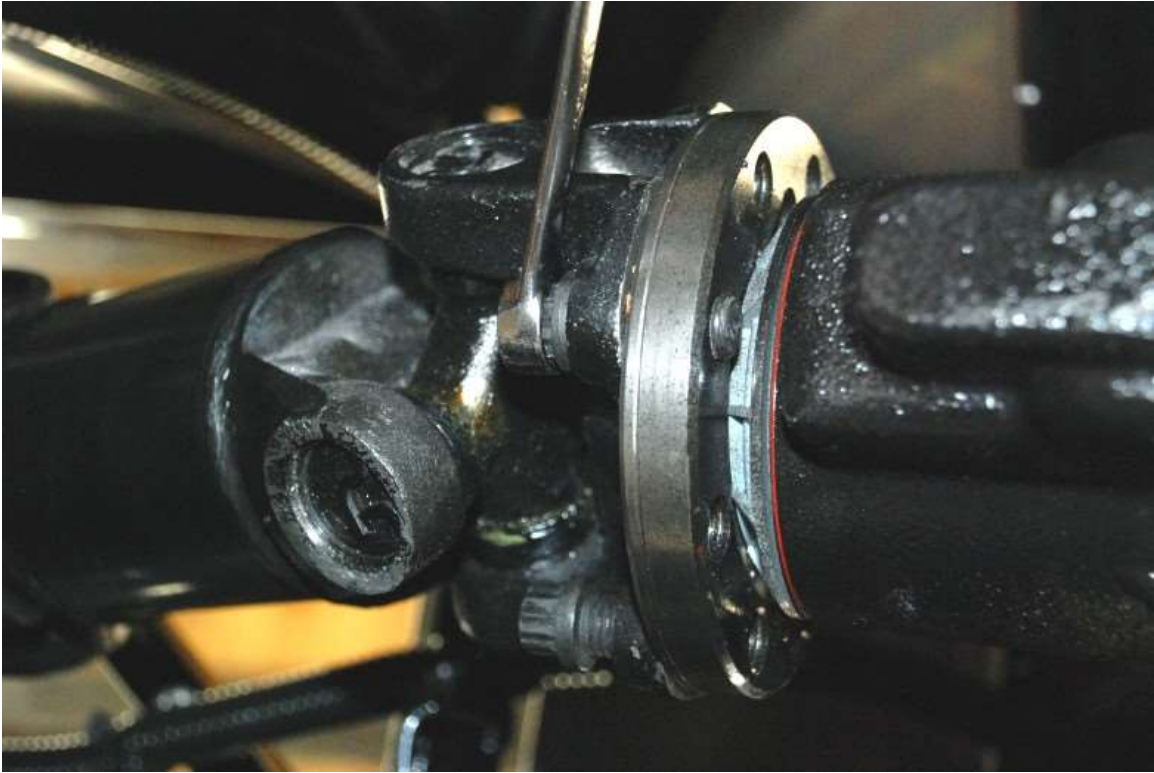


Slip the shortened driveshaft up into the rear of the transmission. The most room to do this is usually to hold the shaft just above the center section and come in from the driver's side.

SOLID AXLE



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. Torque the bolts to **95Nm (70 ft-lb)**.

2015 IRS

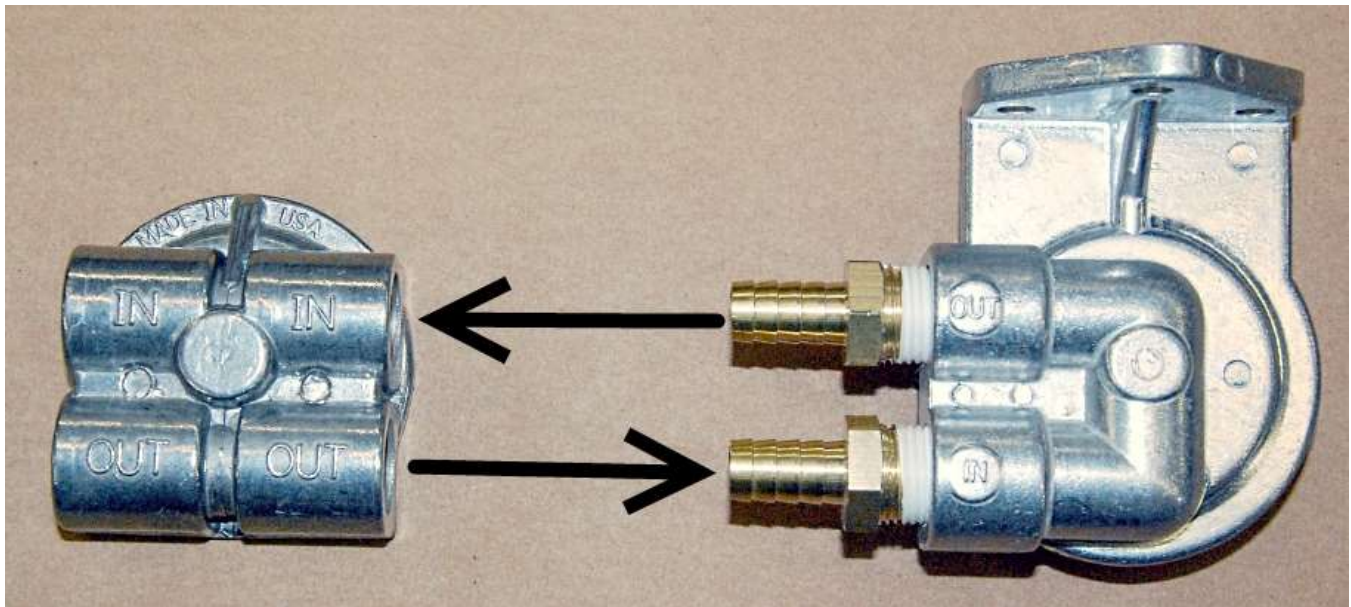


Insert the driveshaft into the transmission, bolt the rear flange to the driveshaft adapter and torque the bolts to **95Nm (70 ft-lb)**.

87-95 Oil Filter Relocator

- ✂ Razor knife, flathead screwdriver
- 🔧 Oil filter relocating kit, oil, oil filter

Hook the oil lines up to the Oil filter Relocator and the adapter on the engine. Make sure that the lines go to the correct ports or the engine will be starved for oil. The **out** on the engine goes to the **in** on the Relocator and the **out** on the Relocator goes to the **in** on the engine.



Headers and J-pipes

- ✂ $\frac{7}{16}$ " , $\frac{9}{16}$ " wrenches, $\frac{7}{16}$ " socket, ratchet, extension, $\frac{5}{16}$ " hex key
- 🔧 Mustang Shorty headers, straight tubes
- 👤 Catalytic convertors and full-length headers are available if required or preferred.

Mount the headers to the engine. Thread locker is recommended, particularly if you have aluminum heads. On a small block (302 or 351) the headers are switched side to side, this puts the collector pointed towards the front of the engine.



Mount the straight pipes to the Mustang headers. The shorter pipe will go on the passenger side. Leave the bolts hand tight in order to locate the side pipes properly.



Aftermarket headers may require “ovaling” the holes on the two-bolt flange.

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.

96-04 CONNECTIONS

- ✂ 1/4" socket, razor knife to cut hoses, flat head screwdriver.
- 🔧 Donor engine fuel line parts, Fuel line components (FFR# 11078).



✂ Insert one end of the $\frac{5}{16}$ "x 16" onto the inlet side of the fuel pulse dampener. Slide and attach the fuel injection clamp over the end of the pulse dampener end. Slide another fuel injection clamp onto the hose and push the inlet end onto the $\frac{5}{16}$ " hard line coming from the rear of the car.

96-04 Hydro-booster and Power Steering lines

- ✂ Tubing bender, $\frac{5}{16}$ " hex key, $\frac{9}{16}$ " wrench
- 🚗 Mustang power steering and Hydro-boost hoses.

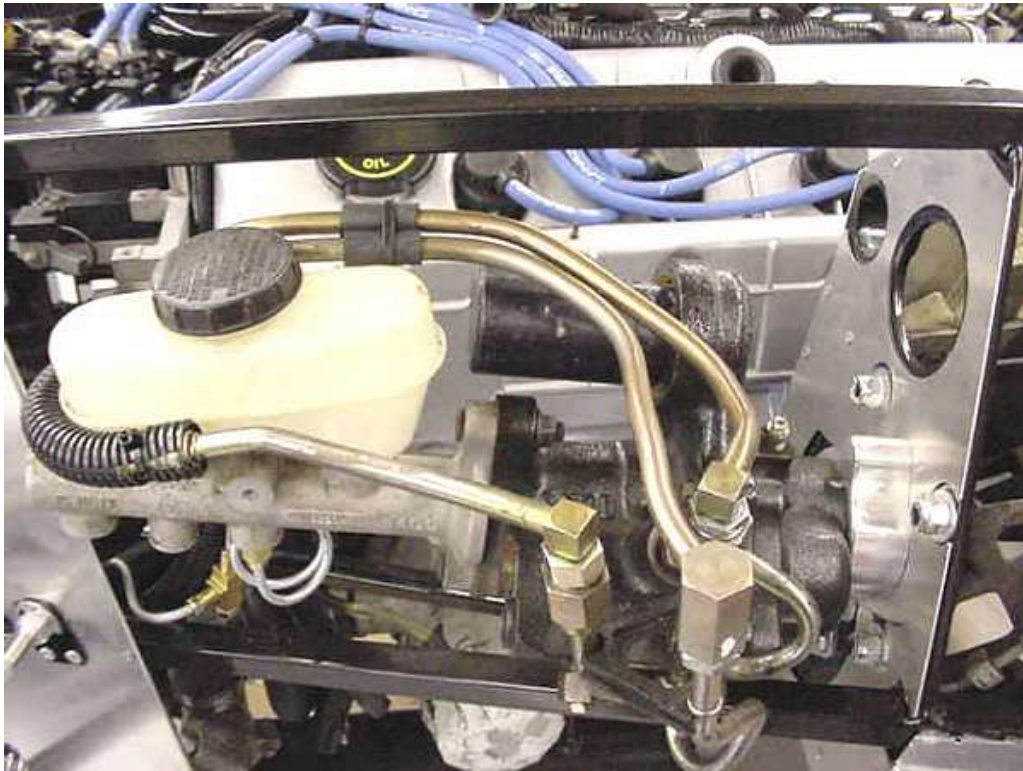
Run the power steering/hydro boost hoses from the pump to the booster to the rack then to the cooler (if being used) back to the pump. The pictures show one way to route them. An alternative way would be to run them along the outside of the $\frac{3}{4}$ " upper tube through the wheel well.



Hydro-boost lines shown in stock location. Lines must be bent and re-routed to fit behind aluminum



Tubes bent around inside of Master cylinder.



Lines in bent and routed in final locations.



Lines running from booster, along steering shaft to steering rack.




Hose routing for 96-2000 power steering cooler.



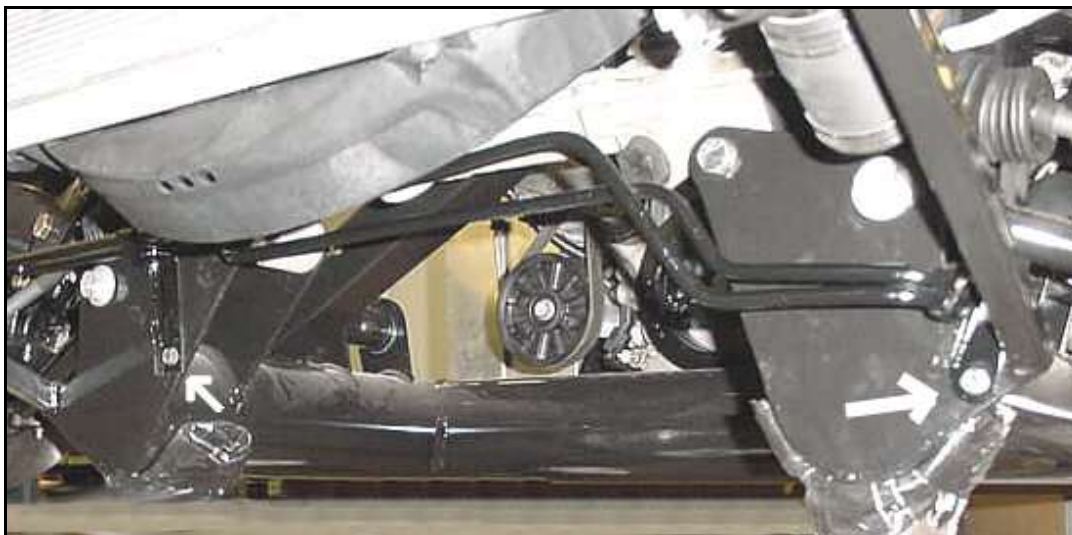
Power steering line for steering rack. Note stock line bent.

Power Steering Oil Cooler (If applicable)

✂ Drill, $\frac{3}{16}$ " drill bit, $\frac{3}{8}$ " wrench.

 Power steering cooler and hoses.

1996-1999 VERSION



- ✂ Mount the power steering cooler to the $\frac{3}{16}$ " plate on the front of the 4" main rails. Use the original mount on the passenger side and the hole drilled in the preparation section earlier on the other side.
- ✂ If using the tubular lower control arms, drill two $\frac{3}{16}$ " holes in the $\frac{3}{16}$ " plate at the locations shown in the picture below. If using the stock Mustang control arms, lower the driver side mount so that the outlets are routed under the $\frac{3}{4}$ " front body mount tube.



Location of power steering cooler inlet/outlet if using tubular control arms.

2000-2004 VERSION



This cooler is the replacement for the older coolers. There are a couple of different locations that the cooler can be mounted: To the bottom of the radiator so it is visible through the oil cooler opening or, in the location above and in front of the radiator. Both locations will require the fabrication of a mounting bracket for the passenger mount. The following shows the installation when attached to the bottom of the radiator.

Hold the cooler up under the radiator so that the inlet/outlet are on the driver side and the driver side cooler mount is under the lower front body mount $\frac{3}{4}$ " tube.

Mark the mount hole location on the $\frac{3}{4}$ " tube.




Drill and temporarily mount the driver side mount.



Measure the distance from the radiator and make a bracket to mount the passenger side mount such as the one shown. Note the 90° bent mount bracket.

Clutch Cable

 Insulated clip hardware.



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 $\frac{3}{4}$ " 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.

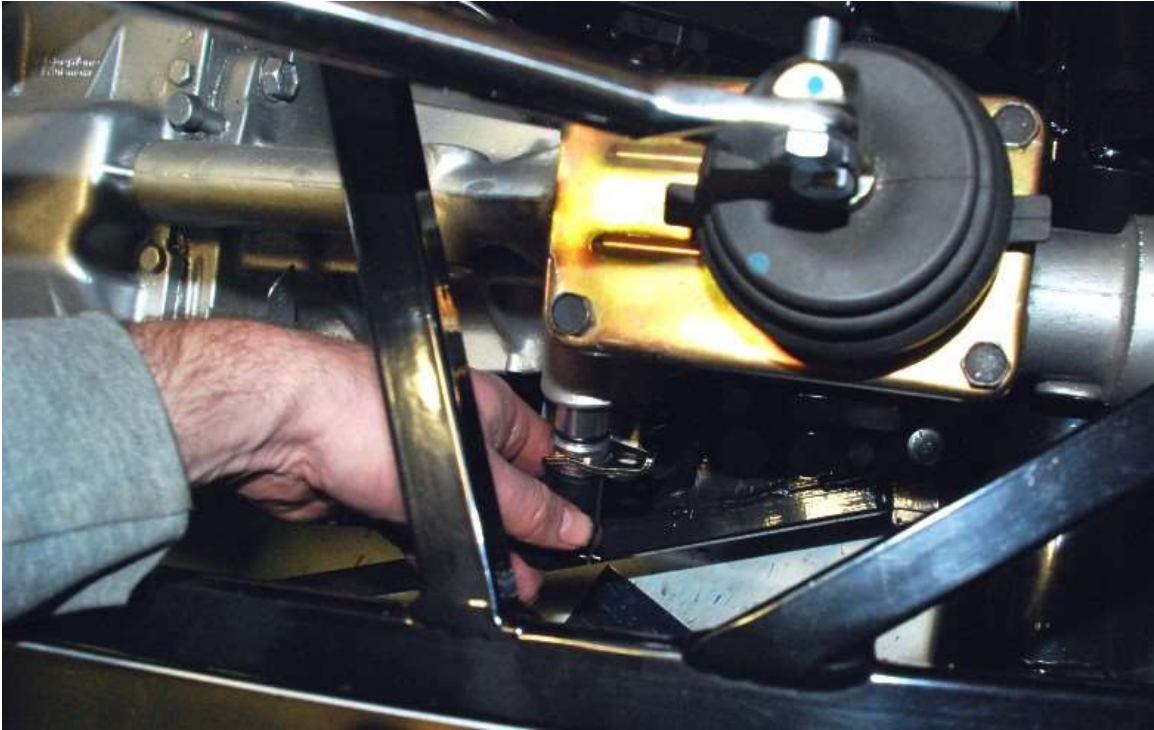
Speedometer Sending Unit



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

-  $\frac{5}{64}$ " hex key, $\frac{3}{8}$ ", $\frac{7}{16}$ " wrenches
-  Insulated clip hardware.

FUEL INJECTED APPLICATION

Attach the engine end of the cable sheath to the cable mount on the intake using $\frac{3}{8}$ " and $\frac{7}{16}$ " wrenches. Put a dab of silicone on the rear edge of the rubber wipe then push the rubber wipe back onto the threads.



87-93 mounted accelerator cable.



Accelerator cable mounted on '98 4 valve intake.



Accelerator cable mounted on '96 2 valve intake.

87-93 - 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 $\frac{5}{64}$ " 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.

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



After driving the car for the first time you may want to adjust the pedal locations for optimum heel/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

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 $\frac{3}{8}$ " from the mark on the cable 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 $\frac{3}{8}$ " and $\frac{7}{16}$ " 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 stud.

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

✂ Tighten the set screw in the retainer using a $\frac{5}{64}$ " hex key.

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



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

Intake hose and Air Filter

Slide the large hose clamp onto the intake hose.

Slide the mass air end of the intake hose over the intake end.






Position the hose clamp over the joint. Do not tighten, this will be done on the car. Modified 1997 intake hose shown



Modified 2003 intake tube.

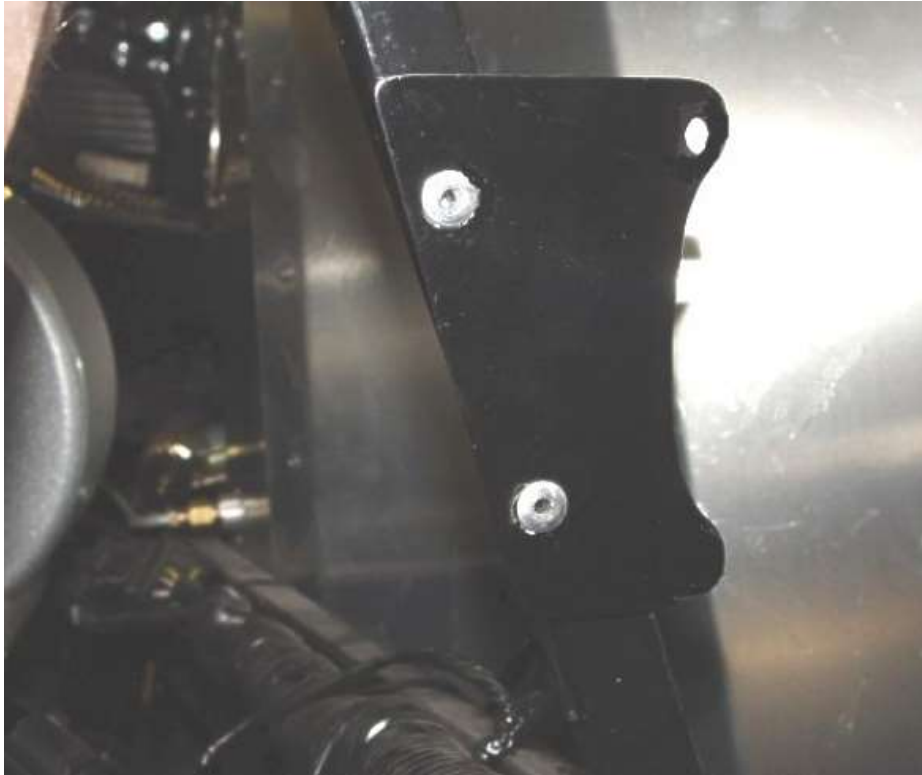
Mass air meter

-  Drill, $\frac{3}{16}$ " drill bit, $\frac{3}{8}$ " socket
-  Wire harness mounting hardware, Mustang mass air sensor
-  Mass Air Meters are used on 1989 and newer Mustangs.

89-93 MOUNTING

Flatten the outer edge of the mounting bracket using a hammer or vise. Use the top OEM hole and mount to the front side of the vertical $\frac{3}{4}$ " frame tubing above and just forward of the passenger foot box. Drill a second hole through the bracket and into the $\frac{3}{4}$ " frame tubing. Use kit fasteners to secure bracket.

94-04 MOUNTING



- ✂ Attach the mass air mount to the backside of the vertical $\frac{3}{4}$ " tube on the passenger side as shown in the picture below using two $\frac{3}{16}$ " rivets.

Attach the Mass air meter to the mount using the stock nuts.

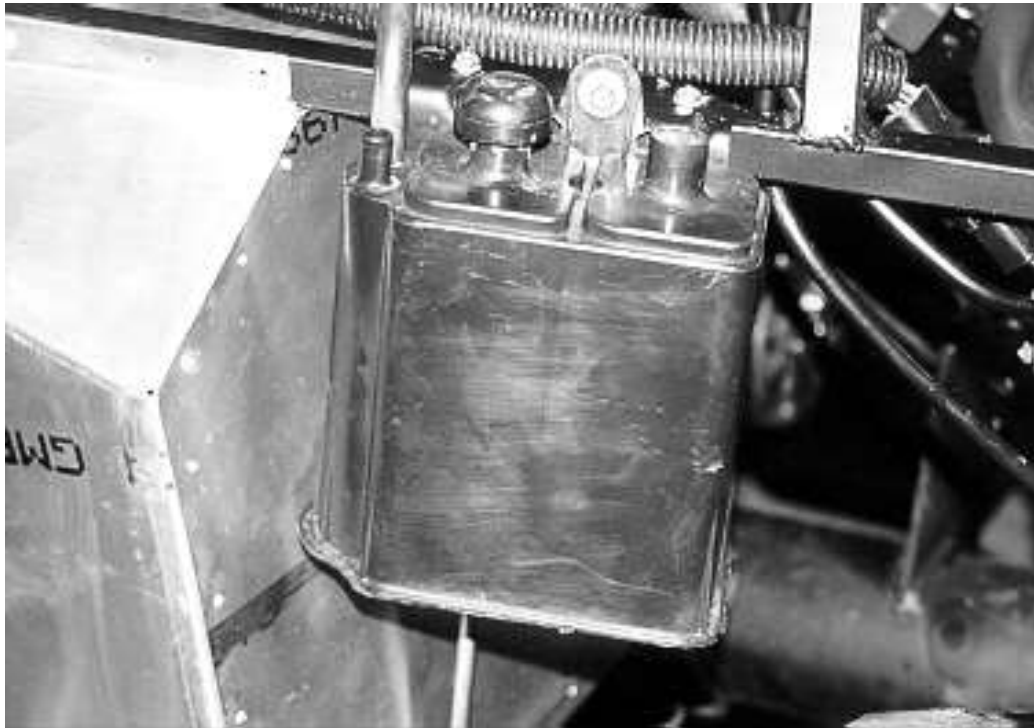
Attach the intake hose to the engine and the mass air meter. Bend the Mass Air mount so that the hose will fit on the meter. Rotate the two sections of the hose as needed

Tighten the hose clamp connecting the hoses and the clamps at the ends of the intake hose.

Fuel Vapor Canister

- ✂ Drill, $\frac{3}{16}$ " drill bit, $\frac{3}{8}$ " 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 $\frac{3}{4}$ " horizontal tubing just behind the mass air meter.

87-95 MOUNTING






✂ Drill two $\frac{3}{16}$ " 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.

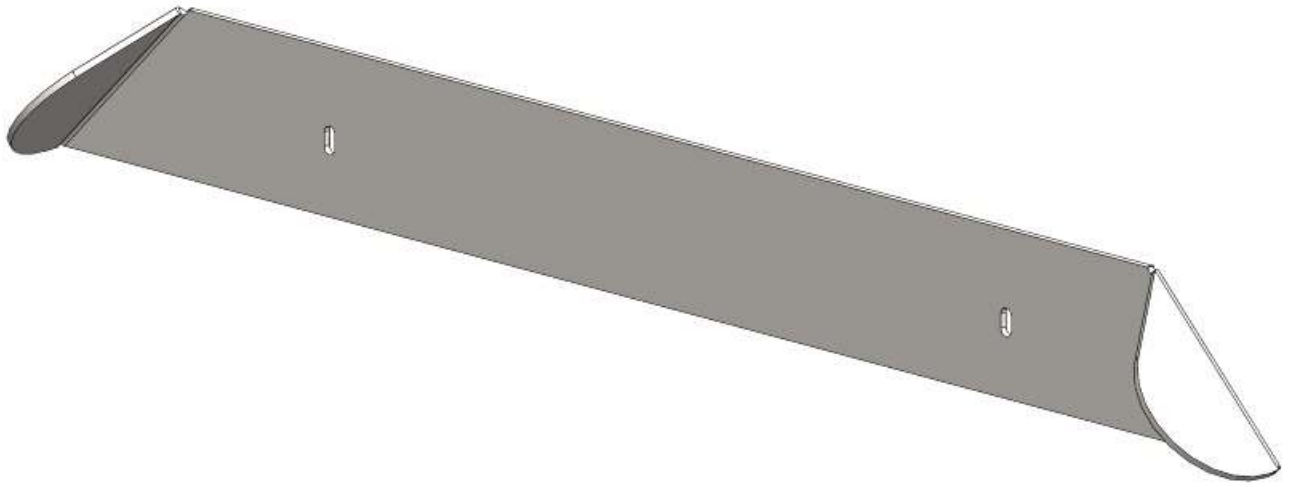
96-04 MOUNTING



If you are going to run a vapor line and a fuel evaporative canister (charcoal can), mount the can at the back of the car on the driver side using the stock bracket so that the stock plastic line will still reach the correct connection. Note: Splash guards are not mounted until after the body is on.

Cooling System

-  $\frac{5}{16}$ " and $\frac{3}{8}$ " sockets, $\frac{1}{8}$ ", $\frac{9}{64}$ ", $\frac{3}{16}$ " drill bits, drill, Phillips head screwdriver, rivet gun, Hack Saw, Tape Measure, Marker, Tin snips.
-  Fan mounting components, Stainless Radiator Hose kit, Mustang fan shroud with overflow reservoir, Mustang radiator, insulated clip hardware, packaged aluminum.
-  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 mount bracket

87-93 FAN MOUNTING

Remove the radiator reservoir using a $\frac{5}{16}$ " socket.



- ✖ Attach the $\frac{1}{16}$ " steel strips to the electric fan using the Phillips head screws provided.



Position the fan assembly in the mouth of the fan shroud so that the fan and shroud are flush, if necessary, bend the tabs on the mount strips outwards slightly to hold it in place.

Mark the position of the mounting strip holes and drill guide holes into fan shroud with $\frac{1}{8}$ " drill bit. Drill the holes through the plastic shroud until the drill touches the mounting strip tabs.

Reposition the fan assembly and mount using the #8 Phillips head screws with countersunk washers.



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.

Remount the radiator reservoir with a $\frac{5}{16}$ " socket and attach the overflow hose to the barb under the cap. Mount the shroud and fan to the radiator using the fasteners that you removed earlier.

94-04 MOUNTING

Attach the stock radiator fan/shroud to the radiator.

RADIATOR MOUNTING

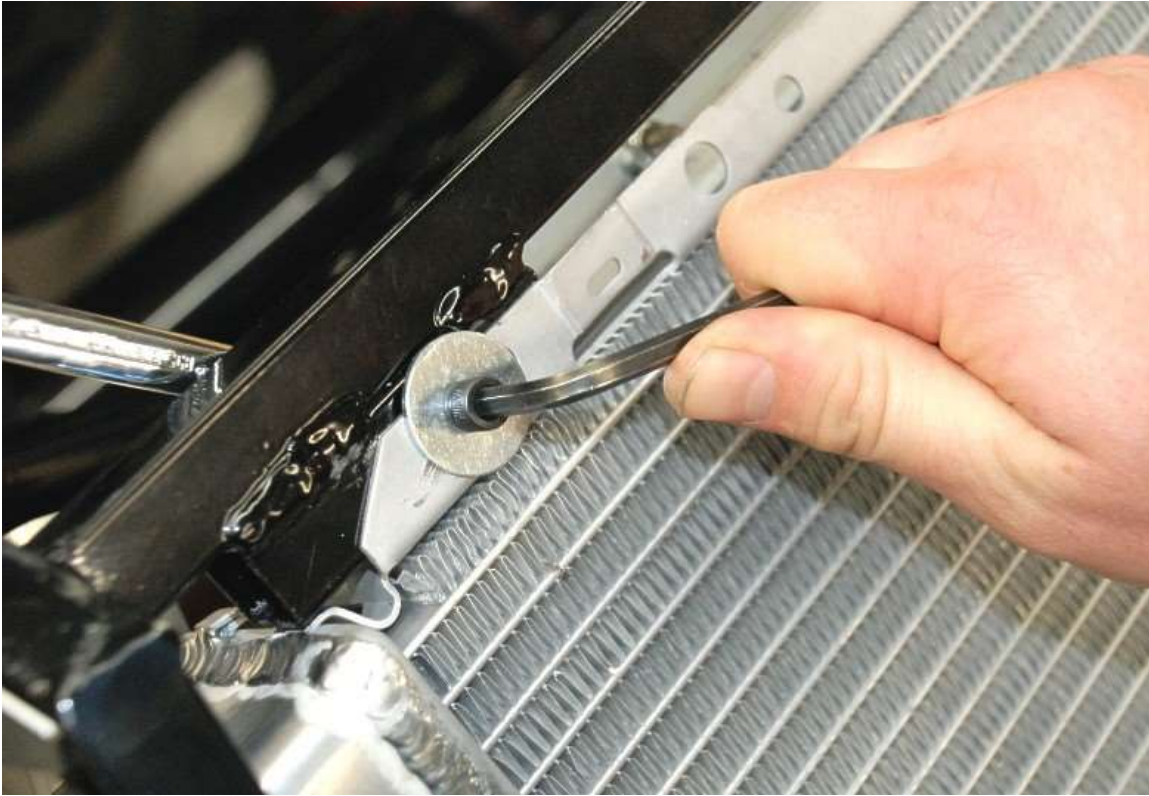


Zip tie the radiator in place on the chassis. The bottom section can just hang by a couple ties looped around the lower outlet and the drain.

Move the radiator towards passenger side until the filling cap just clears the frame.



Drill the holes to mount the radiator top flange to the two small mounting tubes on the chassis.



Mount the radiator top to the flange with the hardware provided. The bottom stays zip tied for now.

96-04 ADDITIONAL STEPS

Hold the upper radiator mount plate up to the frame, and line up the bend with the bend in the $\frac{3}{4}$ " tube. Mark rivet locations every 3"- 4".

Drill and rivet the mount plate to the tube using $\frac{1}{8}$ " rivets.

Mark the location of the radiator edge on the plate and mark rivet hole locations every 3"- 4" on the plate that will go through the top flange and mount plate.



Drill and rivet the upper mount plate to the radiator using $\frac{1}{8}$ " rivets.



Position the stock overflow tank so that it is centered across the front radiator mount plate. DOHC overflow front overflow mounts positioned on the radiator mount.



- ✂ Mount the rear of the overflow tank to the front side of the 2"x 2" frame tube using the bracket included and $\frac{3}{16}$ " rivets. Mk 3 shown.



Mount the front of the overflow tank to the radiator mount using #14x $\frac{1}{2}$ " screws provided.

- ✋ 96-04 - If you prefer to use rubber radiator hoses, use NAPA # 7575 for the top hose. Use the stock lower hose to the thermostat housing then use Gates #21383 to attach to the radiator going under the steering rack.



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 above the “X” and to the upper radiator hose location.



Mount the inline filler neck where it is both accessible and as high as possible in the upper hose.



Push some grommeting onto the right-side aluminum “F” panel slot to prevent any chaffing of the tube.

Pass the upper radiator tube through the passenger side “F” panel and route the tube 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.

Run the tube next to the 4” main rail and under the steering rack to the radiator. Route the lower tube with enough slack to be able to adjust the radiator for the nose aluminum.



Make sure that the lower hose is not hanging down. If necessary, zip tie the hose to the frame.

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.



Where the tube goes under the X use one of the extra adapters and some kit zip ties to hold it against the X to prevent any shaking while driving.



After running the car for the first time once coolant is added and while the system is still warm, retighten the hose clamps used on the cooling system.

87-93 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 and wiring for a dash mounted on/off switch. If you would like the fan to be thermostatically controlled, Factory Five offers a thermostat switch to get used with the relay to turn the fan on and off at 185°F.



If using a 94-04 harness and computer, connect the electric fan to the stock factory fan connector. The fan will be controlled by the computer.

Standard on/off switch



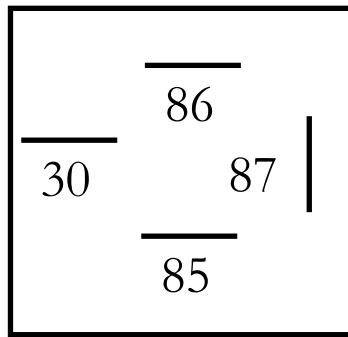
Using this set-up, the driver must watch the water temperature gauge and manually turn the fan on when the water temperature gets to 212°F. The fan should only be needed while going less than 35mph or in traffic.



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.

30 – +12V
85 – Ground
86 – +12V
87 – Fan



Back of Relay

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.

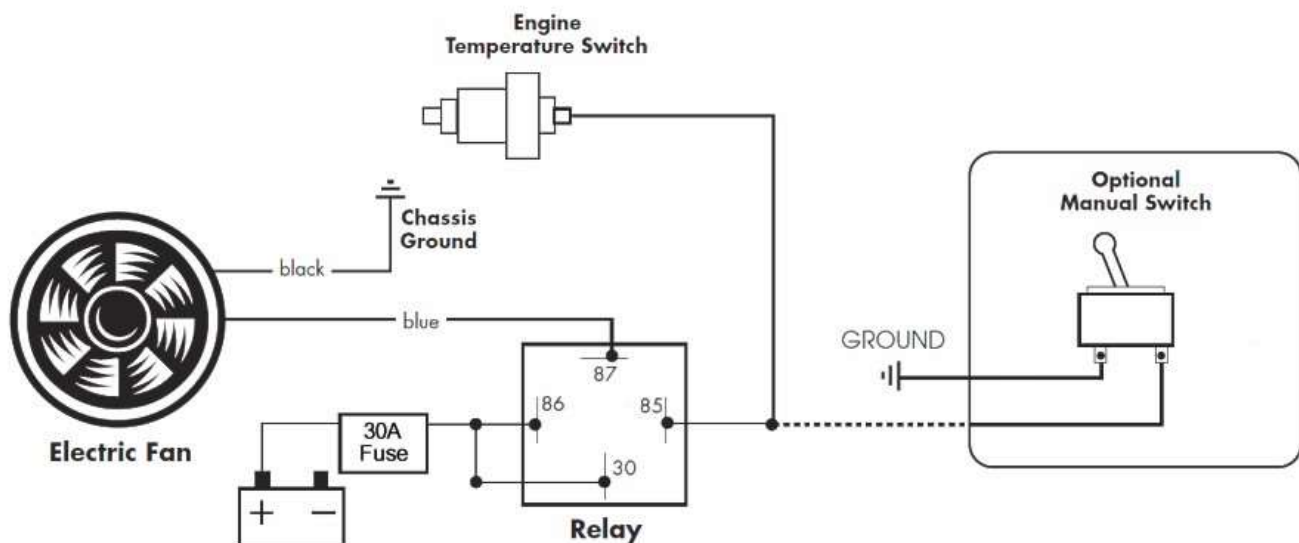
Optional thermostat switch



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.



In your engine block or cylinder head, locate a coolant access point to install the thermostat switch and screw 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.

Aluminum panels

TRANSMISSION TUNNEL COVER

✂ Drill, $\frac{1}{8}$ " drill bit, Silicone, Caulking gun, Rivet gun



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.

DRIVER FOOTBOX SIDE ALUMINUM

- ✂ 1/8" drill bit, drill, rivet gun, caulking gun, silicone
- 🚚 Mounted aluminum, packaged aluminum, secondary body fasteners

Silicone and install the driver's side footbox outer wall. The front flanges tuck in behind the footbox front panel.



Silicone and install the front patch panel.

Emergency Brake

E-BRAKE HANDLE



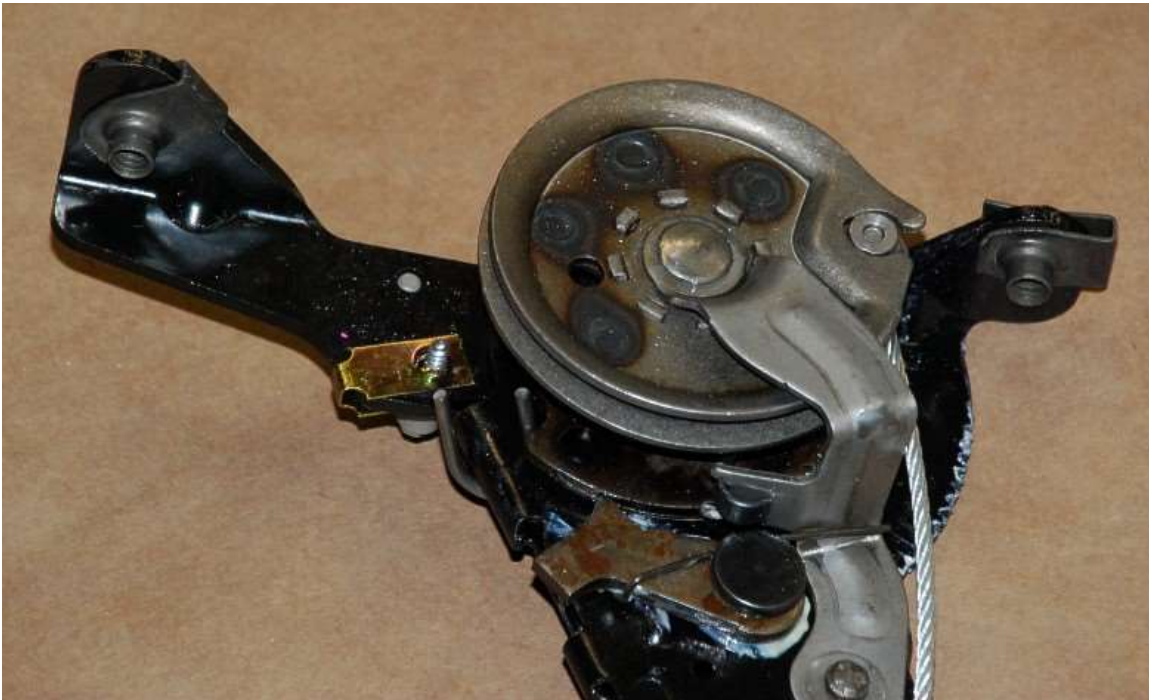
$\frac{3}{16}$ " hex key



Mustang E-brake handle, brake line components.



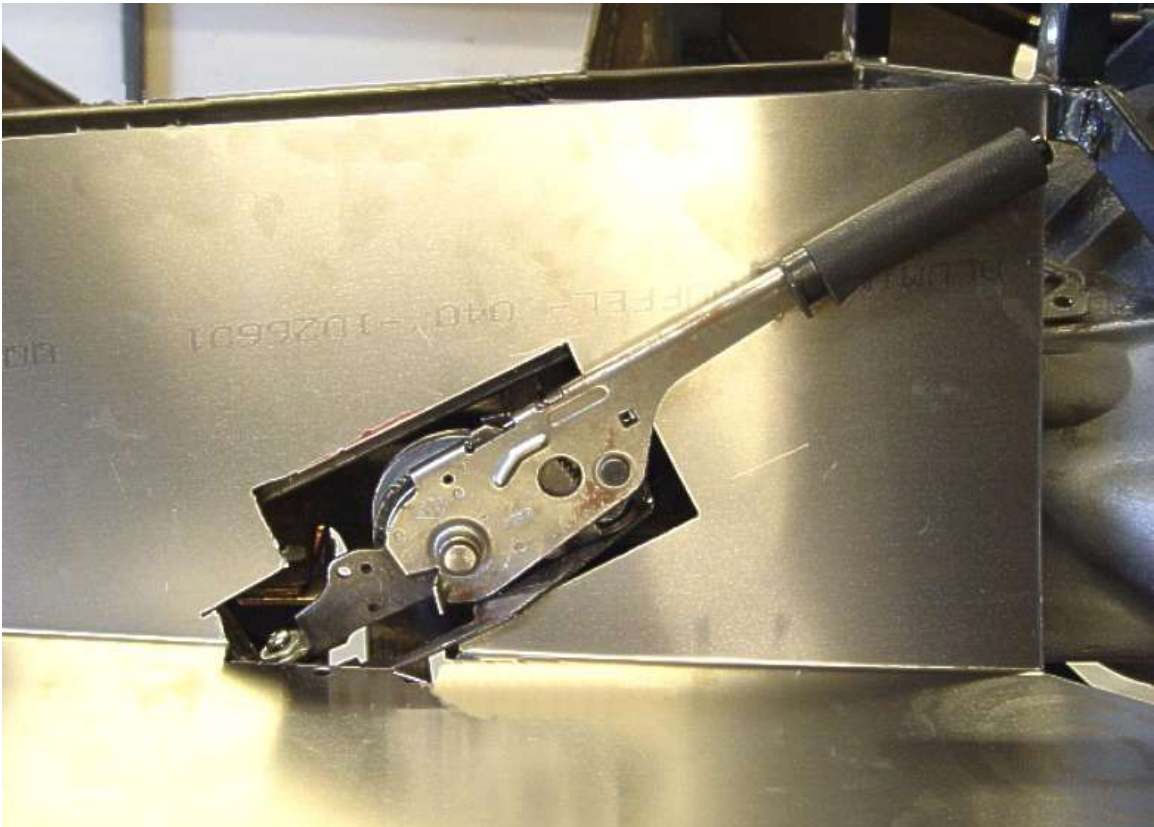
The 99-04 Parking brake handle has different mounting locations and "T" cable length than the older 87-98 handles.



Push the U-nuts from the brake line components onto the E-brake handle.



On 99-04 handles, remove the small bracket and screw that prevents the ratcheting adjustment gear from turning.



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. 2003 E-brake Handle mounted.

E-BRAKE CABLES



Your E-brake cables and handle should be from the same car as your rear brakes.

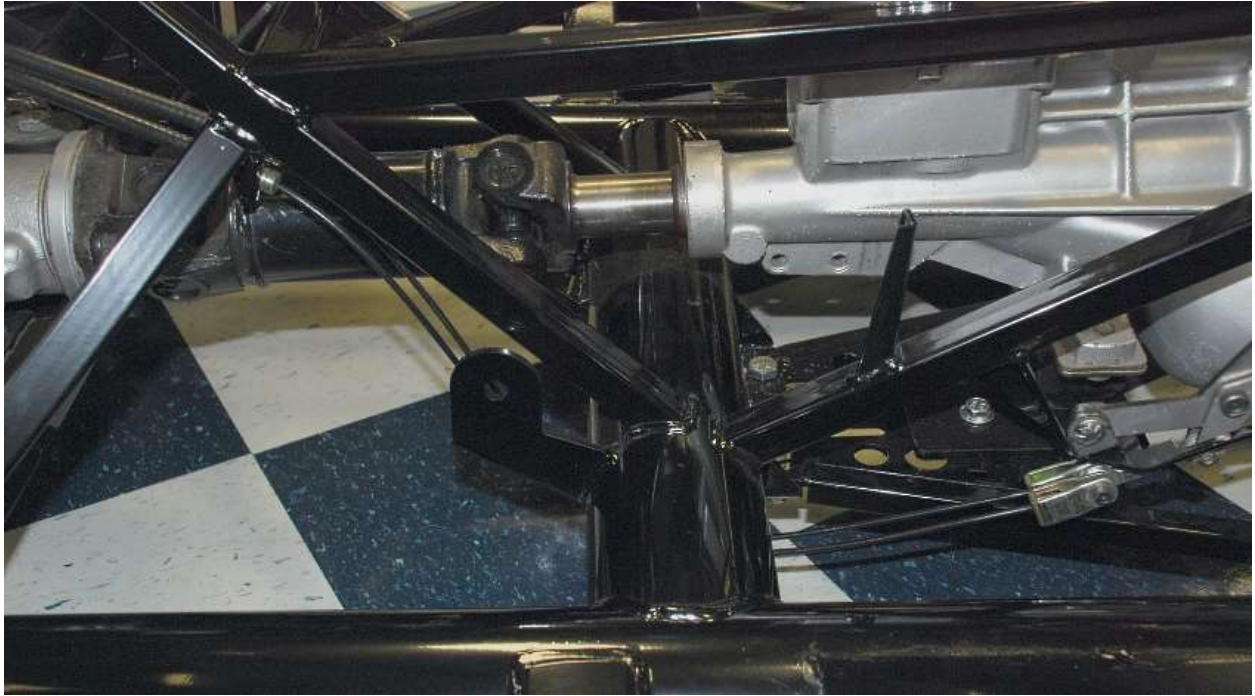
87-92 Mustang



87-92 Mustang cables or the FFR cables mount to the bracket up near the 2"x 3" tube.



For 87-92 and FFR cables route them through the upper bracket in the transmission tunnel until the sheath end clicks in place.



For 87-92 and FFR cables, route the inner cable down under the chassis and hook them to the T cable.

93-04 Mustang



93-04 Mustang cables mount to the bracket near the handle.



Route the cables through the forward bracket in the transmission tunnel until the sheath end clicks in place.



Hook the cables to the T-cable on the handle.

Solid Axle



Route the remaining cable 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.

Pull up on the handle a few times to make sure the self-Tensioner works and there are no problems with the cable.

IRS



Bend and route the cables over the center section so that they curve to the rear of the lower control arm and attach the cable to the arm using zip ties from the kit.



Emergency brake cable in caliper bracket.

Pull up on the handle a few times to make sure the self-Tensioner works and there are no problems with the cable.

Optional IRS 11.65" brakes





Attach the emergency brake cable to the caliper by pulling on the back of the caliper slightly and pushing the cable into the mount. The cable will be very close to or touch the adapter bracket. If necessary, file a small angled recess in the adapter bracket. The caliper floats so it will only get further away from the bracket as the pads wear.



Bend and route the cables over the center section so that they curve to the rear of the lower control arm and attach the cable to the arm using zip ties from the kit.

IRS CV axle Nut

✂ Impact wrench, 36mm deep socket, Torque wrench.

Apply the emergency brake.



Use a 36mm deep socket and impact wrench to tighten the CV axle nut until it touches the bearing.

Use a torque wrench to torque to **133Nm (98 ft-lb)** then rotate the nut an additional **45°**.

IRS 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

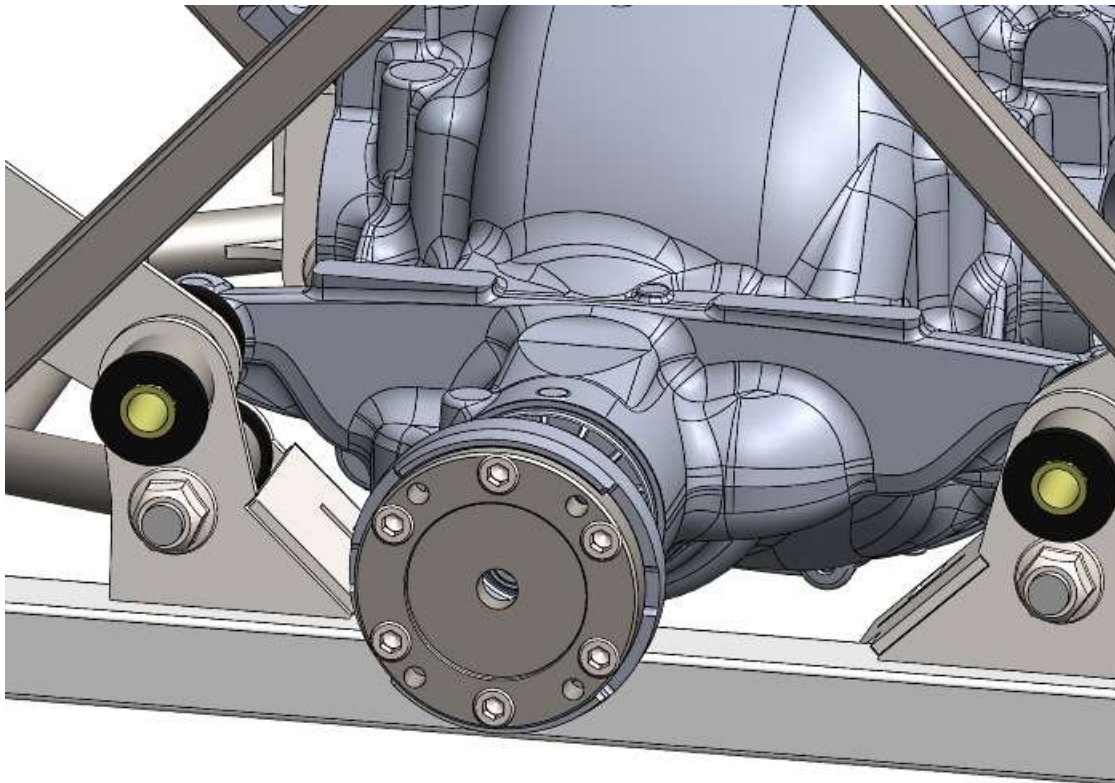


8mm hex socket, torque wrench, Loctite.

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)**.

Engine Ground

- ✂ Sand paper or grinder bit, ½" socket, ratchet, ⅜" 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.

Battery cable to starter



Attach the battery cable to the battery post on the starter.

Seats

- ✂ $\frac{5}{16}$ " drill bit, drill, $\frac{3}{16}$ " hex key, $\frac{1}{2}$ " deep socket, marker
- 🛋 Seat mount hardware, seats

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.



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



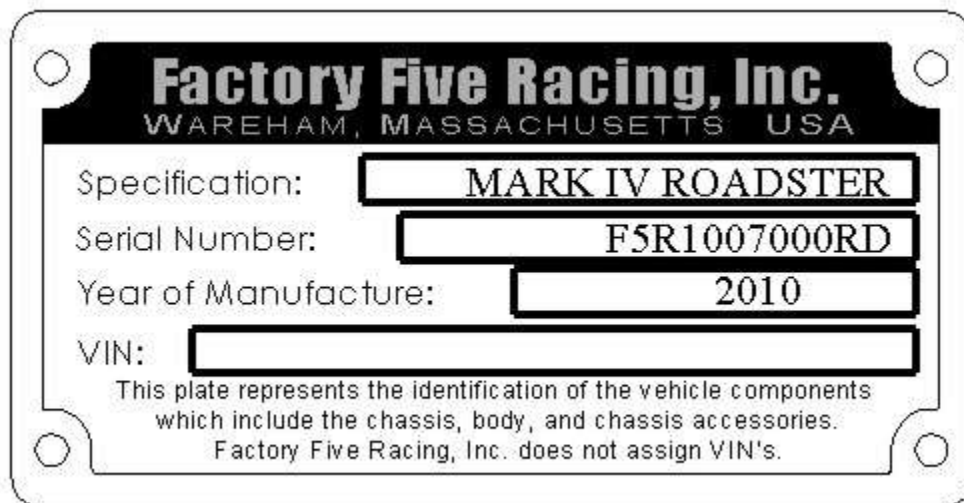
1/8" drill bit, rivet gun, drill



Secondary body fasteners, certificate of origin envelope



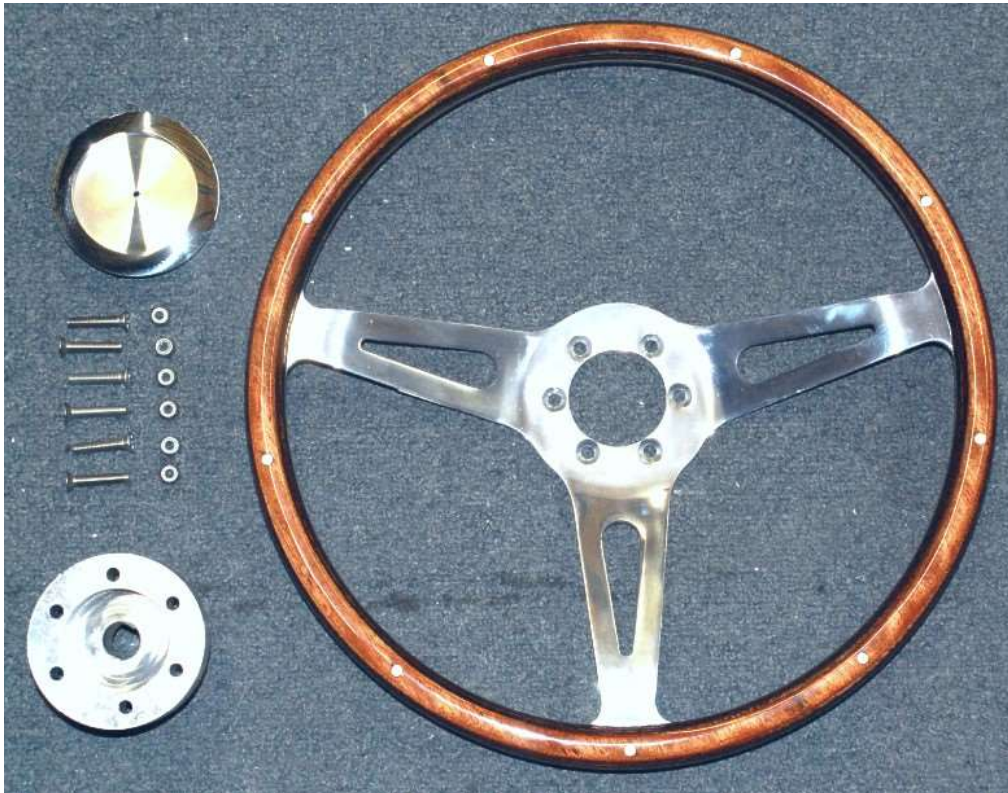
Factory Five Racing has included a Certificate of Origin along with a Nameplate for your kit. The serial number from the Certificate of Origin matches the number engraved on the 2"x 2" tube going across the car at the front of the cockpit on the driver side. Below is an example of how the nameplate looks. 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, $\frac{5}{16}$ " hex key
- 🚗 Steering wheel/Hardware, $\frac{3}{8}$ "x 1" socket head bolt and washer, (6) M6 x 30mm Philips head screws and locknuts.



Unpack the steering wheel hardware.





Bolt the steering wheel to the boss using the M6 x 30mm Philips head screws and locknuts. The pattern is not symmetrical so it will only line up one way.



Bolt the steering wheel assembly to the steering shaft using a $\frac{3}{8}$ "x 1" socket head bolt and washer. Use thread-locker on this bolt.

Rollbar

-  $\frac{1}{2}$ " wrench, $\frac{3}{16}$ " hex key, $\frac{5}{16}$ " drill bit, Drill
-  Driver side Rollbar Assembly, $\frac{5}{16}$ "x 2" button head socket screw and locknuts



Unpack the rollbar and mounting hardware.



Slide the rear leg of the bar down into the chassis mount.



Slide the main hoop into the chassis mounts and wiggle or tap with a soft mallet until it lines up with the rear leg.



Slide the rear leg up over the mount on the hoop and make sure it comes all the way up flush. Clamp the rear leg up with a pair of vise grips. The front hoop will angle back about 6° or so.



Drill a hole all the way through each of the lower mounts and rollbar main hoop.



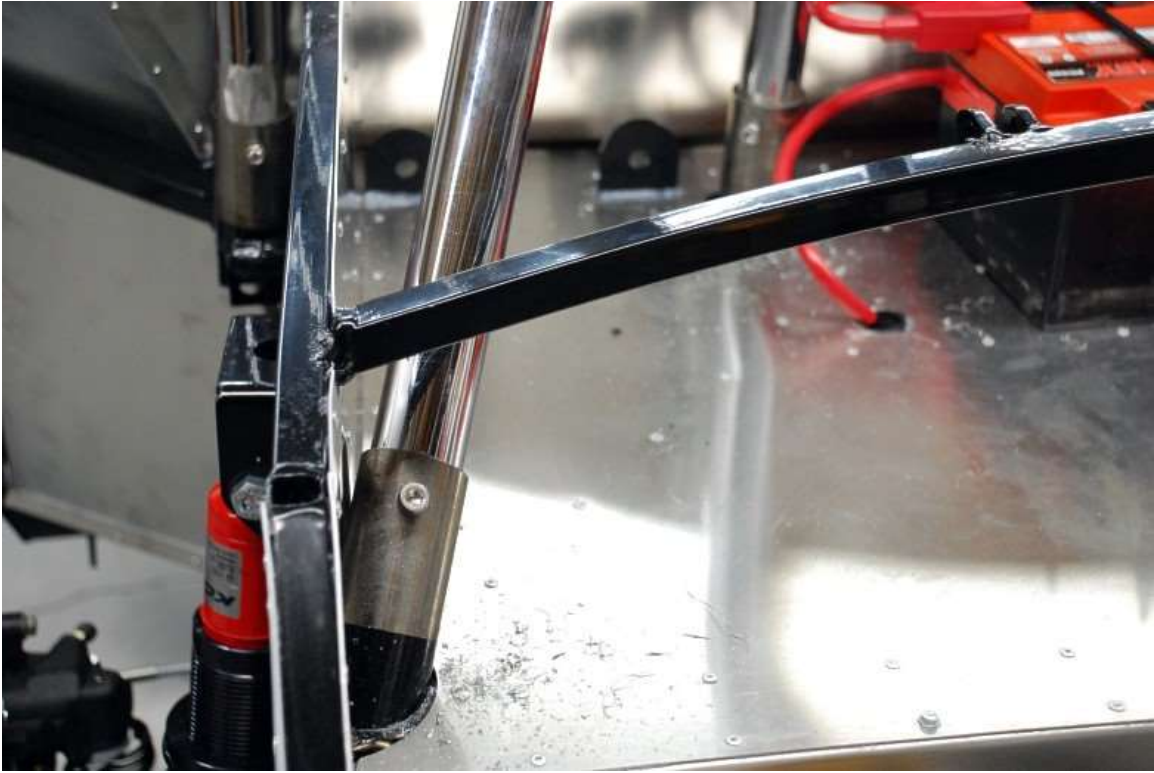
With the thick tubing and curved surface, it is much easier to start small and work your way up to a $\frac{5}{16}$ " drill bit.



Insert one of the $\frac{5}{16}$ " x 2" button head socket screws after drilling each hole to ensure that the rollbar does not move.



Make sure the rear leg is tight up against the main hoop and drill the upper hole. This bolt will be visible so keep this in mind when deciding the orientation. Install the bolt loosely to keep the leg in place.



Drill the remaining mount and install and tighten all of the bolts.

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 $\frac{1}{3}$ full is good.

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.

IRS AXLE NUTS

- ✂ Torque Wrench, 36mm socket
- 🚗 IRS components



Have a friend sit in the car and step on the brakes. Torque the rear axle nuts to 175 ft-lbs.

WHEELS



Install and torque your wheels. Make sure they rotate freely and do not interfere with the brake calipers, lines, or any suspension components.

POWER STEERING SYSTEM BLEEDING

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

Review the race car check list in the Appendix.

Get the engine up to temperature and check for leaks and make sure the fan is working.

After running the car for the first time once coolant is added and while the system is still warm, retighten the hose clamps used on the cooling system.

If you need to you can temporarily bolt your side-pipes in place to keep things quieter.



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 footboxes 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.



- Racing seats with less padding give more room, the more upright the angle of the seat the more room to straighten out your legs.

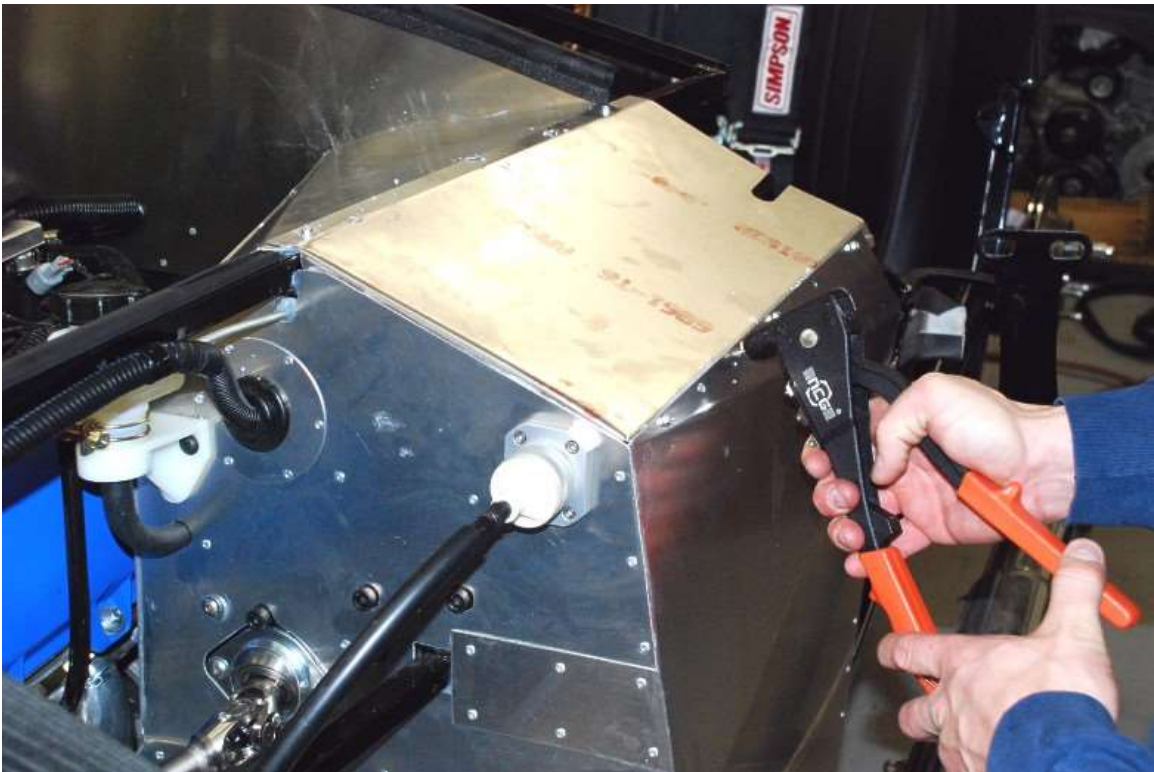
Driver Footbox aluminum



Rivet the remaining inner cockpit wall flange to the firewall.



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 outer footbox top section.

Your rolling chassis is now complete!

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 then 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 $\frac{3}{16}$ " 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.

Frame preparation

- ✂ 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 (part #10857) and the press on bulb seal (part #10761) from the secondary body fasteners assembly.



The rectangular adhesive backed weatherstrip runs along the top of the chassis tubes on either side of the hood opening and the top of the curved trunk hoop.









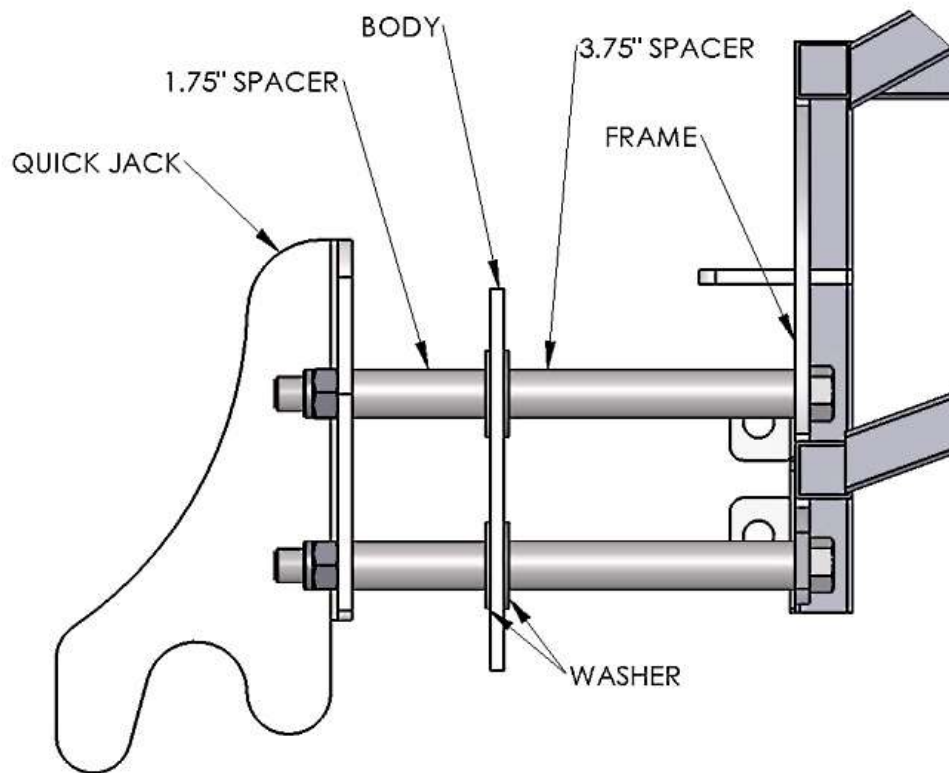
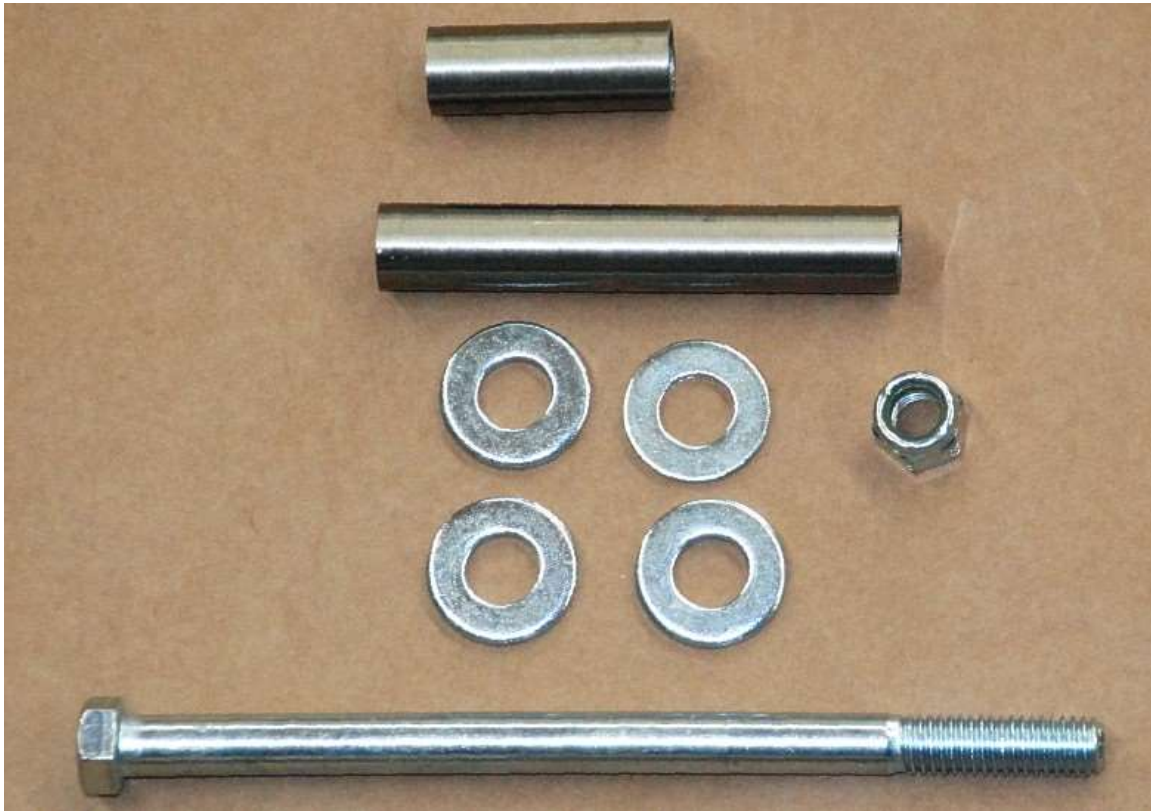
The push-on weather strip needs to run across the top of the firewall and the trunk walls and rear floor.

Mounting the Body

REAR QUICK JACKS

-  $\frac{5}{8}$ " wrench, $\frac{5}{8}$ " socket, ratchet
-  Quick jack bumper components
-  The main locating points for the body are the rear quick jack mounts; these will set the body in the correct position front to back as well as locating the rear half up and down and side to side.
-  When bolting the body down the first time to do the fitment you can leave the quick jacks off and only use the hardware, this makes it easier to maneuver around and safer when crawling out from under the car.

Find the quick Jack hardware that came mounted on the chassis.



The long sleeves go between the body and chassis with washers on both ends of all sleeves.






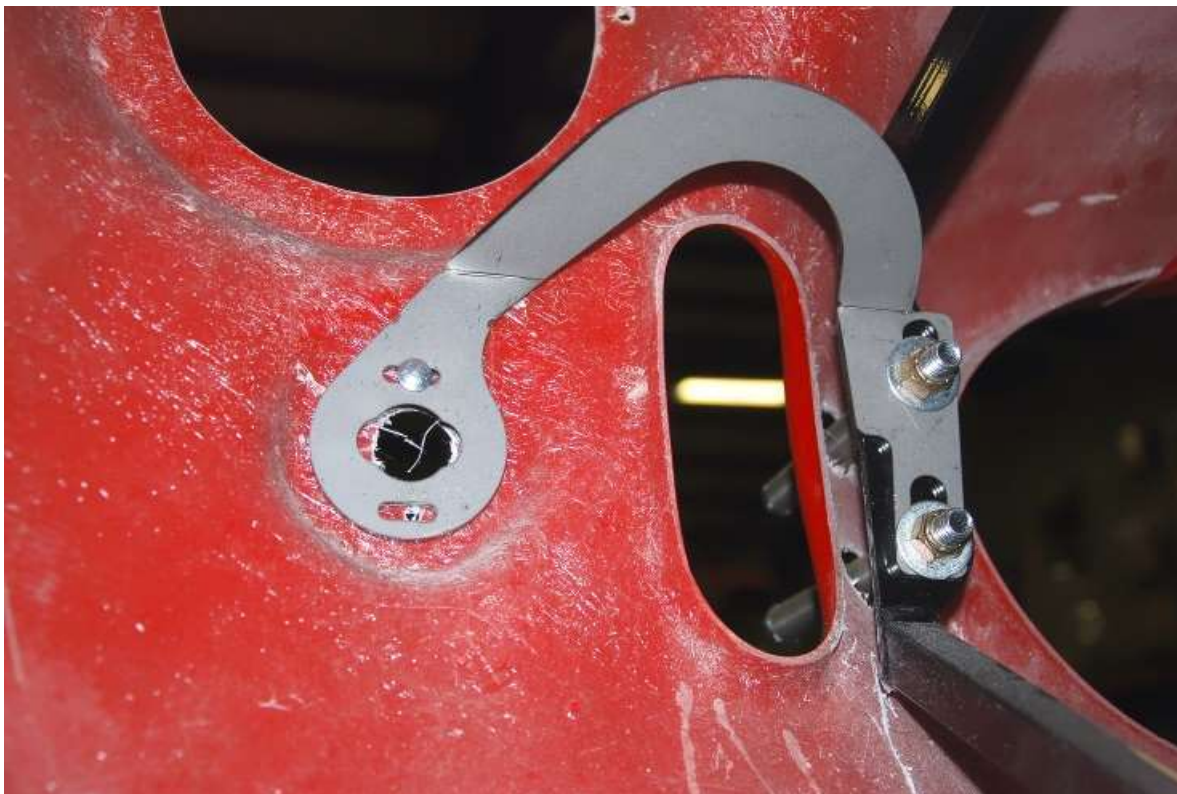
The nut and bolt use a $\frac{5}{8}$ " wrench and socket to attach the rear quick jack bolts to the frame and body.



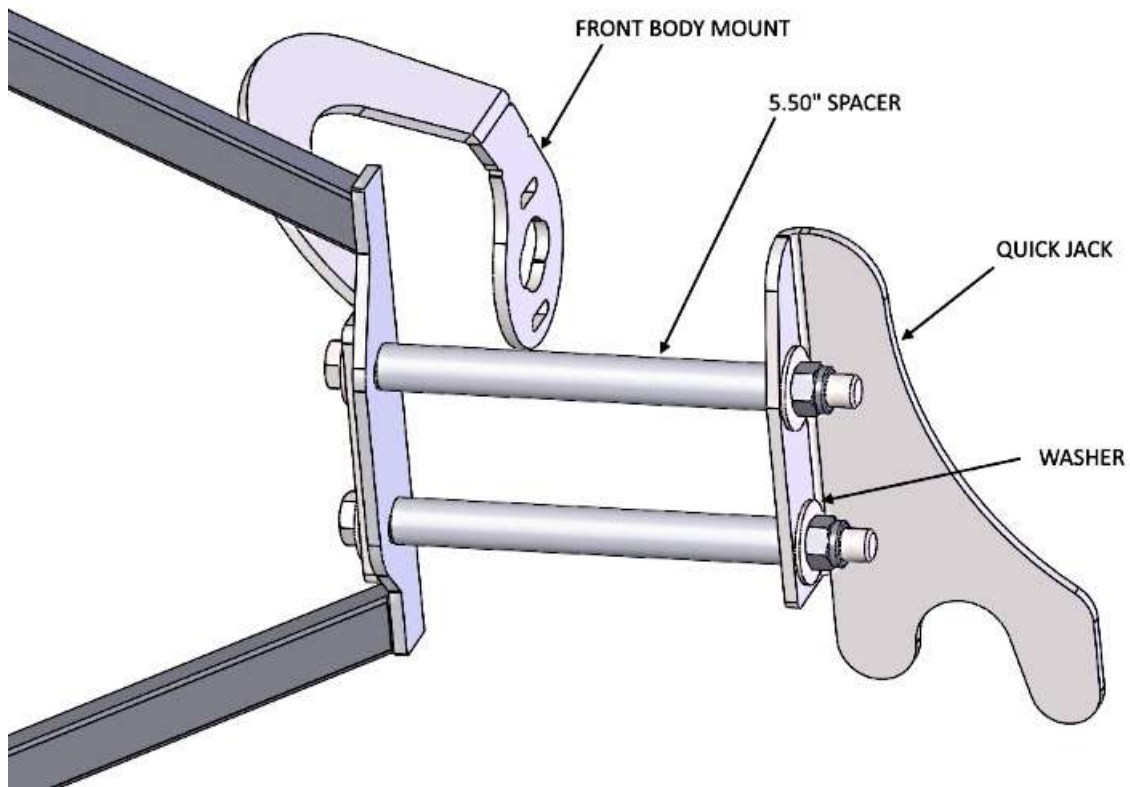
Even with the quick jacks removed, it is still a good idea to wrap the bolts with some rags and duct-tape to save yourself from painful cuts or bruises.

FRONT QUICK JACKS/FRONT MOUNTS

-  $\frac{5}{8}$ " wrench, $\frac{5}{8}$ " socket, ratchet
-  Quick jack fasteners
-  Do not tighten the bolts until directed to do so.



The body mounting bracket goes on the back side of the frame front mount.



Assemble the quick jack parts in the order shown, the bolts can be installed either way around depending on personal preference.



Use the shipping carriage bolt through the turn signal mounting hole until the turn signals are mounted.

Center the body over the frame using a tape measure to measure from the lip of the body to the rear mounting plate of the front coil-over bracket. Check the alignment to make sure the tape measure is

going straight across the car by lining it up with the front “X” member so that the tape measure is parallel. Make this measurement on each side of the body so that the front of the body is centered over the frame.

Move the front of the body as necessary. If the body will not stay where you put it, put a screw through the hood lip of the body into the $\frac{3}{4}$ ” tube.

The hood opening is attached to the $\frac{3}{4}$ ” frame rails using countersunk sheet metal screws or the small bumpers during the hood fitment next.

With the Body centered left to right and the quick jack sleeves centered in the holes, tighten the bolts.



Use a jack temporarily hold the bottom side of the body up to the frame.



Check the outside corners of the dash tube. Make sure there is a 1/2" or so gap between the body and frame. Try pushing down on the body here, it should move.

If the tube touches it will affect the door front corner fitment. Use an adjustable or 3/4" wrench to bend the tube down a bit, it will go easily the tubing has a thin wall.

Hood Fitment and bumpers

- ✂ Orbital sander, air saw, 1/8" drill bit, drill, rivet gun
- 🚗 Hood, Secondary body fasteners



The hood has been trimmed slightly oversized to allow the panel gaps to be sanded down to fit. Set the hood in place and make sure it will fit the opening in the body, if needed sand or file the edges to allow the panel to just fit with a very small gap all around.



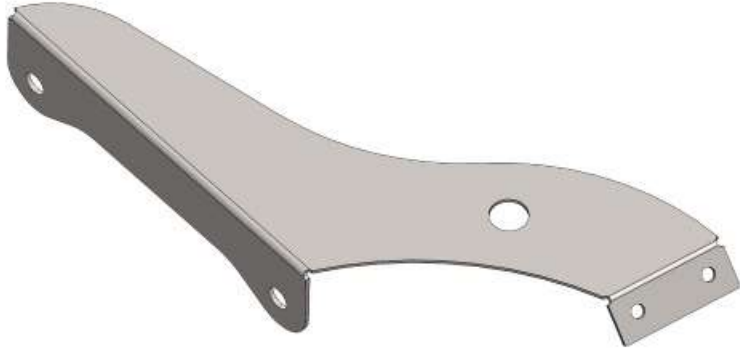
The bumpers are used to get the hood to the correct plane with the body, you can shave small amounts off either or put washers as shims to fine tune as needed.



Put the small bumpers around the edge of the hood opening and try closing the hood. If it is too low try the large bumpers.

Use 1/8" long rivets to attach the bumpers through the body and into the frame.

Once you are happy with the alignment you can set the panel gap and radius the edges. An easy way to set the gap is by using a marker. With the panel in place, run a marker around the edge of the panel so that it tubs the body lip all of the way around. This will leave a line on the panel that may be thicker or thinner in areas.

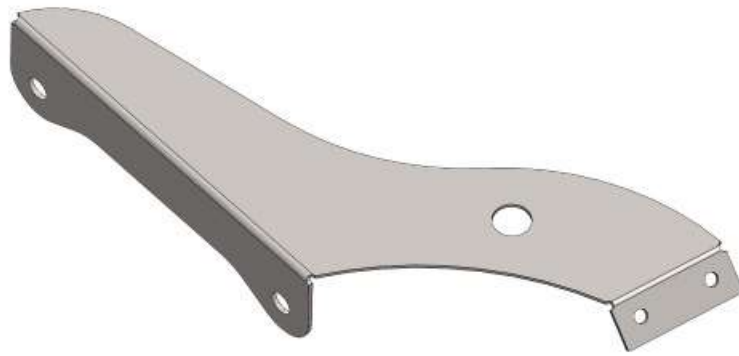


Sand, grind or cut the panel back so the marker line cannot be seen. Remount the panel and the resulting gap should be the same around the whole panel, about 3/16".

Repeat this gap procedure later after mounting the doors and the trunk.

Hood Pins

- ✂ Drill, 3/16", 3/32", 7/16" drill bits, Phillips head screwdriver, (2) 11/16" wrenches, rivet tool
- 🚗 Hood mounting components, secondary body fasteners



Hood pin mount

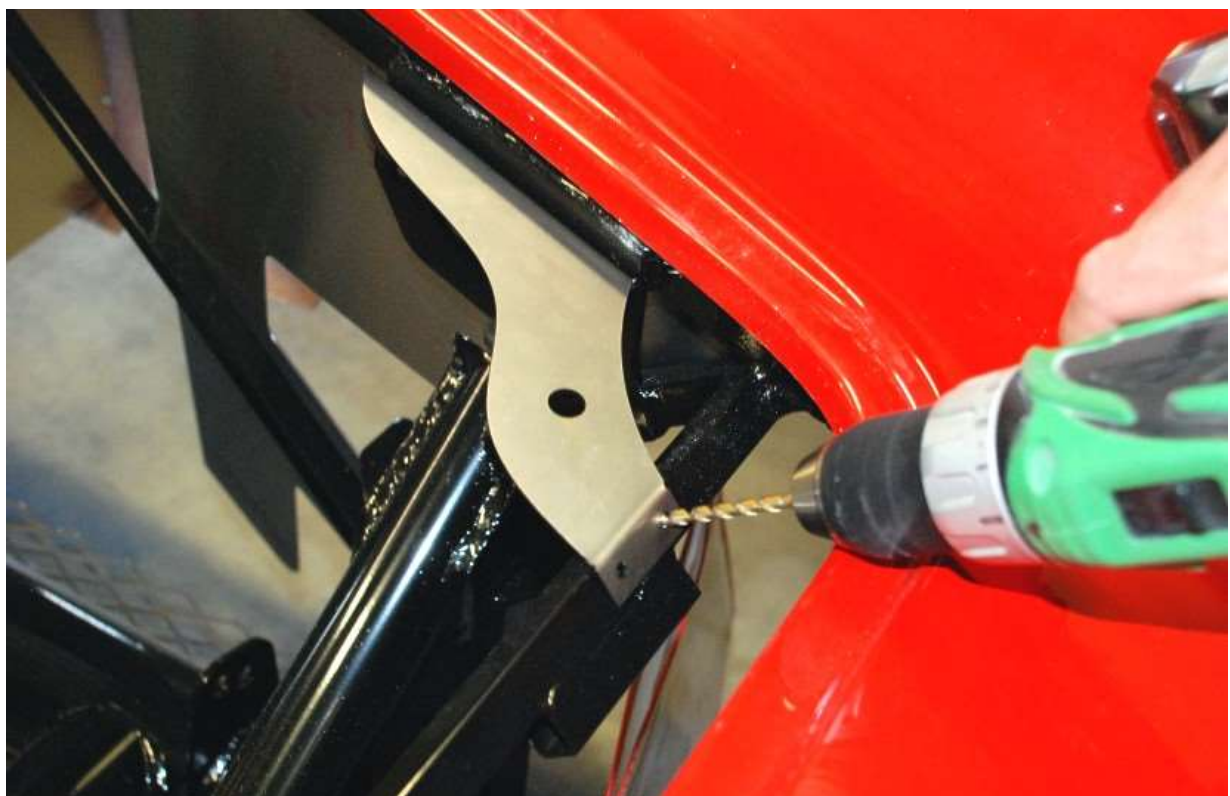


Loosely attach the hood pin mount plates to the chassis using the carriage bolts. The bolts push in from the outside.



Position the Hood pin plates on the frame.

Attach the hood pin vertical posts hand tight to the mounting plate. One nut goes on each side of the plate.



✂ Drill $\frac{3}{16}$ " holes in the front $\frac{3}{4}$ " tube through the mounting plate holes.
Rivet the plate to the front $\frac{3}{4}$ " tube.

Change the angle of the mounting plate so that the hood pin post is perpendicular to the body hood lip. Bend the front tab if necessary, so that it sits flat on the radiator mount tube.

Tighten the carriage bolts holding the mounting plates.

For alignment purposes, adjust the height of the pins so that when the hood is on, the posts should just barely touch the hood.

Put a small dab of silicone or white grease on each of the hood pin posts.

Center the hood in the opening and press down.

This should leave a couple of small silicone marks on the underside of the hood.

✂ Drill two $\frac{7}{16}$ " holes through the hood where the marks are located.

Place the circular chrome plates, packaged with the hood posts, over the posts.

✂ Drill the four mounting screw holes through the circular chrome plates with a $\frac{3}{32}$ " drill bit.

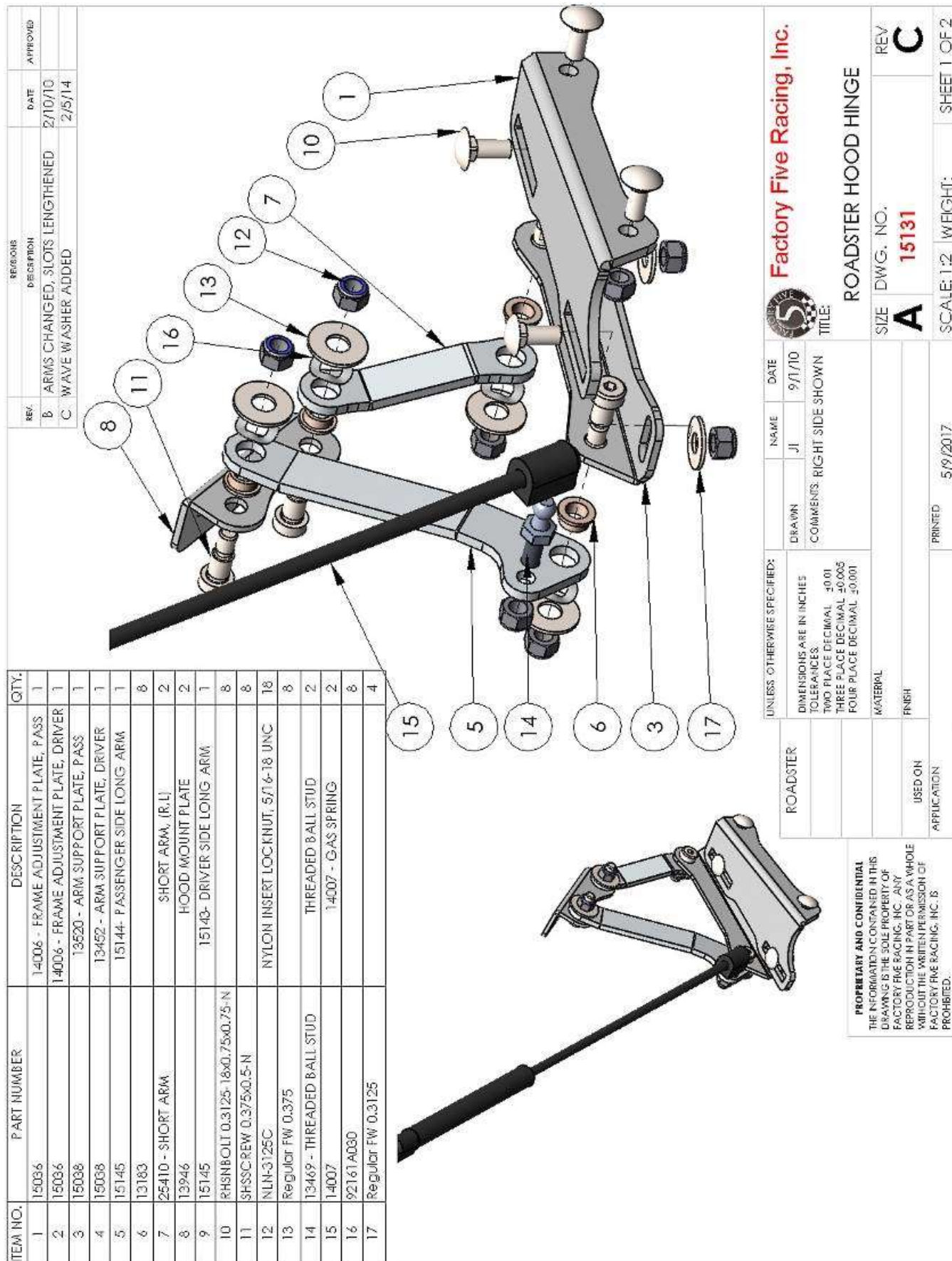
Screw the chrome plates to the hood using the short hood pin screws and a Phillips head screwdriver.

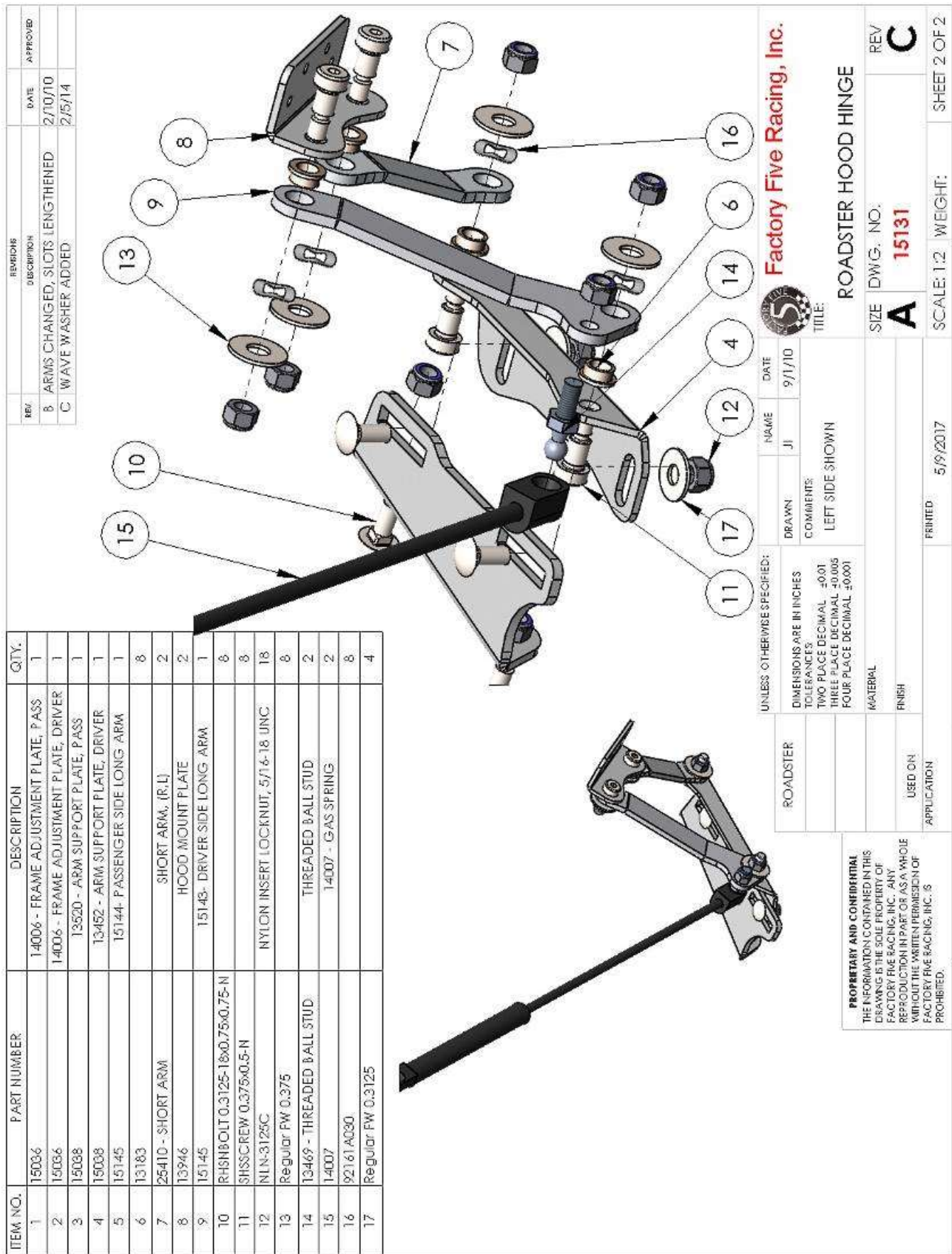
Raise the height of the posts so that they stick through the hood and the bottom of the hood pin hole is even with the chrome plate surface. The pins can be removed and installed pointed in the direction desired.

Tighten the hood pin post nuts.

Optional Hood Hinge

✂ $\frac{3}{16}$ ", $\frac{7}{64}$ ", $\frac{5}{8}$ " Drill bits, drill, measuring tape, rivet gun, marker, $\frac{3}{16}$ " hex key, $\frac{1}{2}$ " wrench
🔧 Hood hinge





Factory Five Racing, Inc.



TITLE:

ROADSTER HOOD HINGE

SIZE **A** DWG. NO. **15131** REV **C**

DATE 9/11/10
NAME JI
DRAWN
COMMENTS: LEFT SIDE SHOWN

UNLESS OTHERWISE SPECIFIED:
DIMENSIONS ARE IN INCHES
TOLERANCES:
TWO PLACE DECIMAL ±0.01
THREE PLACE DECIMAL ±0.005
FOUR PLACE DECIMAL ±0.001

ROADSTER
MATERIAL
FINISH
USED ON
APPLICATION

PROPRIETARY AND CONFIDENTIAL
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SCALE: 1:2 WEIGHT: SHEET 2 OF 2



- ✖ The hood hinge pivot mounts attach to the hood using rivets, the holes are predrilled in the hood liner but you may need to clean them out with a $\frac{3}{16}$ " drill bit. This is the initial install so you only need a few rivets if you are going to remove the hinge brackets prior to body painting (recommended).



- ✖ Install the ball pivots for the hood struts on the hood using $\frac{3}{16}$ " rivets. The ball points toward the inside of the car.



Drivers side long arm with bushings pressed in



Passenger side long arm with bushings pressed in



Press the bronze bushings into the holes in the hinge arms as shown. The short hinge arms are both the same.



Drivers side arm plate with arms attached



Driver side Hinge Assembled.

Attach the hinge arms to the arm support plate as shown using the $\frac{3}{8}$ " shoulder bolts, spacers, nylon lock nuts and washers. The spacer fits over the bronze bushing after it is pressed into the arm holes. The flange of the bronze bushings should contact the arm plate. Tighten the nuts and then back off until the arms rotate easily.



If you tighten the nut tight and the arm still moves easily then back off the nut and adjust the washer.



Attach the hinges to the chassis using the carriage bolts, these push in from the outside for easier adjustment.



Leave the bolts loose enough so that the hinge assembly can be positioned to match the hood.



Set the hood in place and attach the two arms to the brackets from the underside of the body.



Install the threaded ball studs in the hole on the long hinge arms with the ball pointed toward the outside of the car using a $\frac{5}{16}$ " locknut. Then snap the gas piston shaft onto the ball.



Attach the piston body end to the ball on the hood.

Hood Handles

- ✂ $\frac{1}{8}$ ", $\frac{7}{64}$ ", $\frac{3}{16}$ ", $\frac{5}{8}$ " drill bits, drill, measuring tape, Phillips head screwdriver, pliers, marker, 2.5mm hex key, file.
- 🔧 Three lock set and fasteners



Measure the center of the hood liner rib along the trailing edge of the hood and mark it.



Measure out from the hood center 12" on each side and mark the middle of the hood liner rib for the hood handle location. If the hood sticks up slightly at the corners, change this measurement to 13".



Drill through the hood and the liner starting with smaller bits working up to a $\frac{5}{8}$ " hole. The larger bits sometimes work better by running the drill in reverse so they do not tear the fiberglass.



Remove the hood handles from the 3-lock set and break off the bottom small tabs with a pair of pliers.



Set the handles in the holes drilled in the hood so that they are lined up squarely with the edge and mark the screw holes on the hood.



Drill the holes with a $\frac{7}{64}$ " bit then screw the handles down using the screws from the set.



Shut the hood and mark the body where the hood handles line up.



Open the hood and drill two $\frac{3}{16}$ " holes in the hood opening recess $\frac{1}{4}$ " on either side of the centerline and $\frac{1}{4}$ " back from the edge of the opening. These are for mounting the hood catch brackets.



The latch brackets are in the handle assembly, center them on the line with the corner edge up against the inner radius of the hood opening and mark the two holes.



Drill the two holes just marked with a $\frac{7}{64}$ " bit and file the edged of the bracket round with a file or grinder for a nice finish.



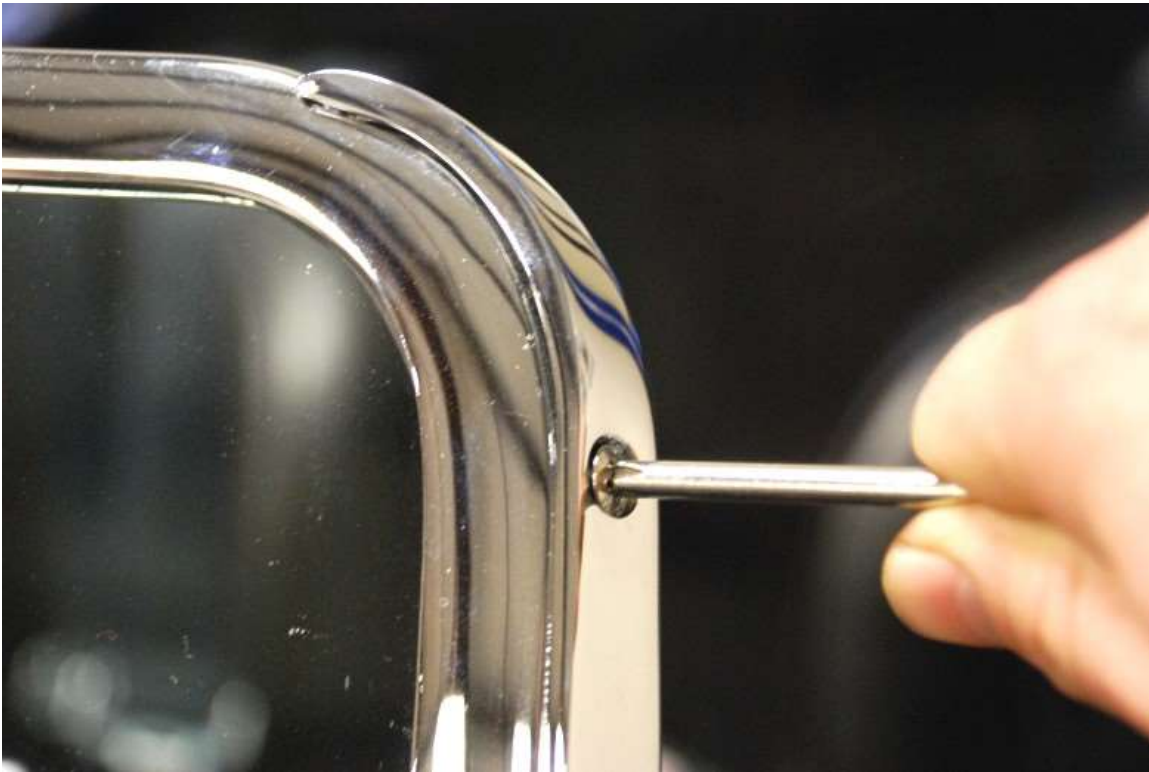
The four remaining screws are used to hold these brackets in place. They can either be countersunk into the body or used to hold down the hood bumpers to hide them completely.



Attach the cam wedge to the underside of the hood handles and adjust for tightness using a 2.5mm hex key.

Windshield

- ✂ Phillips head screwdriver, marker, ½” drill bit, drill, hack saw, ¾” wrench, ratchet, ¾” socket, friend.
- 🚗 Windscreen box.
- 👉 The strips along the sides of the windshield that the screws go into are brass. The brass threads strip easily so take your time and make sure that they thread correctly.
- 👉 Windshield cut outs may need to be expanded to get the windshield angle desired.



Unpack the windshield components and carefully screw the sidebars onto the windscreen.



With the help of a friend, slide the windshield down through the slots in the body until the bottom seal is resting on the body.



Angle the windshield so that the measurement from the center of the top side bar screw to the inside corner of the door opening is 27".



Mark the chassis mounting holes on the arms. If the arms are too long and prevent the windshield from sitting down then pull them back out and trim off the excess.

Remove the windshield from the car and then remove the sidebars from the windshield.



At the marks made on the sidebar, measure and mark the center of the sidebar to give the correct angle adjustment on the windshield. Drill the holes with a ½" bit.

Remount the sidebars on the windshield.



Slide the windshield into position and bolt in place using the windshield mounting hardware. The windshield should remain bolted down while you fit the doors.

Doors



$\frac{3}{16}$ " hex key, marker, $\frac{5}{8}$ " socket, ratchet, air saw, orbital sander, $\frac{3}{16}$ " drill bit, drill, rivet gun



Door hinges, doors, secondary body fasteners.



The windshield, inside rearview mirror, and trunk side aluminum with bulb weatherstrip must be installed in order to mount the doors correctly.



If you have removed them, remount the door hinges on the chassis. The square nuts sit alongside the tube so only one hex wrench is needed for adjustment.



Use a jack under the side of the car to make sure the body is up against the bottom of the frame. Leave the jack so that the body can be moved in and out when pulled. Start with the body all the way in.



Position the door in the body to see where it may need to be trimmed to fit the opening. Mark the door and only remove enough material to get it to fit.



Hold or tape the door in position and attach the hinge to the studs.



Adjust the door with the hinge until the panel surfaces are lined up with the body. Start at the top of the door and match the curved surfaces.



Once the front of the door is good, reuse one of the #10 self-tapping screws that the body was originally mounted with to lock the location in. Screw it up into the 2"x 2" tube near the front of the door.





Push or pull the back of the body to line it up with the door if necessary.



Once the body is painted and final mounted rivet the bottom lip of the body to the chassis using the long $\frac{3}{16}$ " rivets.

Set the gaps on the doors as you did with the hood using a marker.

Door Latch

-  $\frac{1}{2}$ " wrench, $\frac{1}{8}$ " drill bit, drill, Philips head screwdriver, marker, Lithium or silicone grease.
-  Door components



Remove the door latch striker from the original mounting bracket and keep only the striker and the washers. The bracket and nut will not be used.



Bolt the striker onto the chassis putting enough shims on the striker to bring the base of the striker head flush with the door latch pad when the door is closed.



Latch the door latch onto the striker and close the door. Adjust the striker if needed to fit the latch to the door cut out. You can also use the door latch spacers to help with this alignment.



With the door lined up and the striker in place, mark and drill the $\frac{1}{8}$ " holes for the door latch.

Lubricate the moving parts of the latch using Lithium or silicone grease. This will make the latches easier to use and prevent any binding.



Bolt everything together to double check fit and operation. The door latches will be tight at first but break in quickly with use.

Trunk

- ✂ air saw, orbital sander, marker
- 🚗 trunk



Trim the trunk lid edges enough so that it just fits into the opening.

TRUNK HINGE

- ✂ $\frac{1}{2}$ " wrench, $\frac{3}{16}$ " hex key
- 🚗 Trunk hinge components.

Press the bushings into the hinge arms from either side.



- ✂ Use the carriage bolts and $\frac{5}{16}$ " locknuts to bolt the mounting pads to the arms leaving them just snug so they can be moved without loosening the bolts.



Hang the hinge arms on the chassis using the shoulder bolts. You do not need the nuts for just doing fitment.





Screw the trunk to the mounting pads also leaving them loose enough that they will just move.



Close the trunk and wiggle it into position then open and tighten the bolts. This may take a little adjustment to get the trunk to sit down right. You can also use some of the rubber bumpers from the hood opening as a temporary means of holding the surfaces level.

TRUNK LATCH

-  $\frac{3}{8}$ " socket, ratchet, flat head screwdriver, Philips head screwdriver
-  3 lock set and fasteners



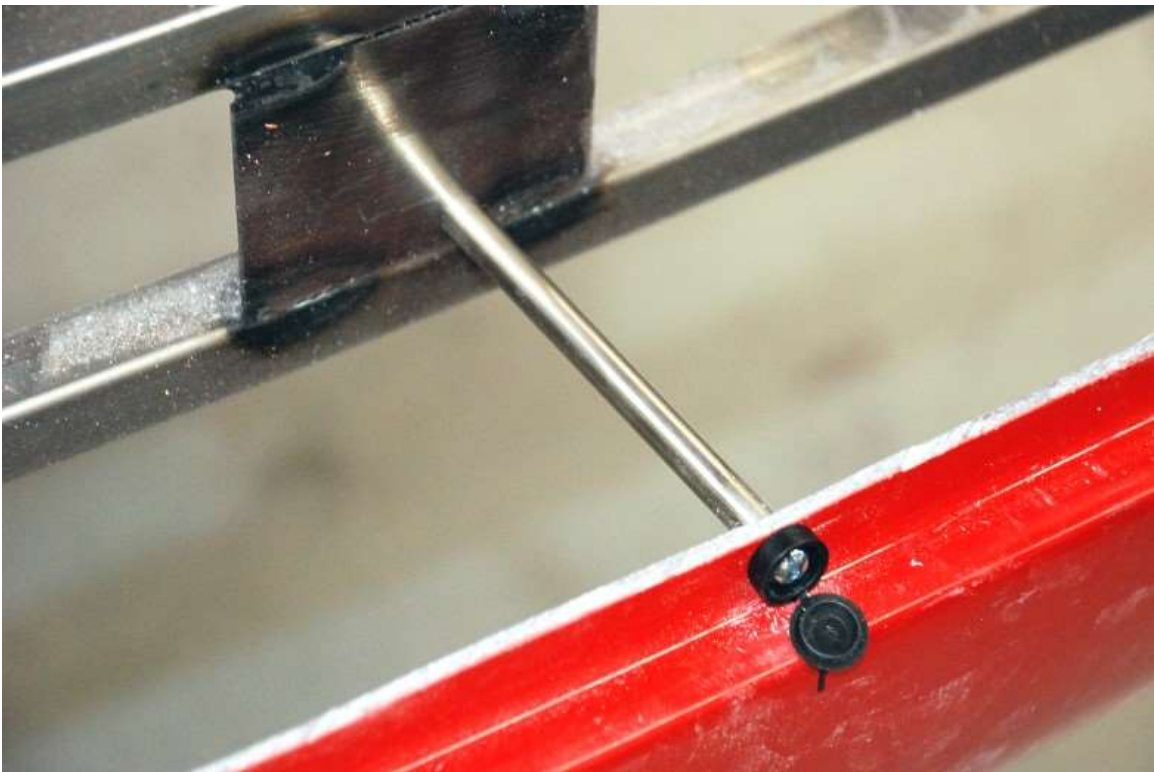
Find the trunk latch and components in the 3-lock set.



Screw the trunk latch to the holder with the short #14 screws lining the small square hole with the hole for the handle.



Bolt the handle to the trunk running the bolts through the trunk and the latch mount.



The long bolt that holds the latch pin in place goes through the plastic cap then the body then the sleeve and into the chassis plate.



Test fit to make sure the trunk is held snug. If it is loose you can bend the catch with channel lock pliers to snug it down.

Side Mirror



Drill, $\frac{13}{64}$ " or $\frac{7}{32}$ " drill bits, marker, $\frac{5}{16}$ " wrench, masking tape.



Rearview mirrors/fasteners.



Only a driver side mirror is included with the kit. A passenger side one is available if desired.



Put the gasket on the bottom of the mirror so the holes line up with the threaded hole locations.



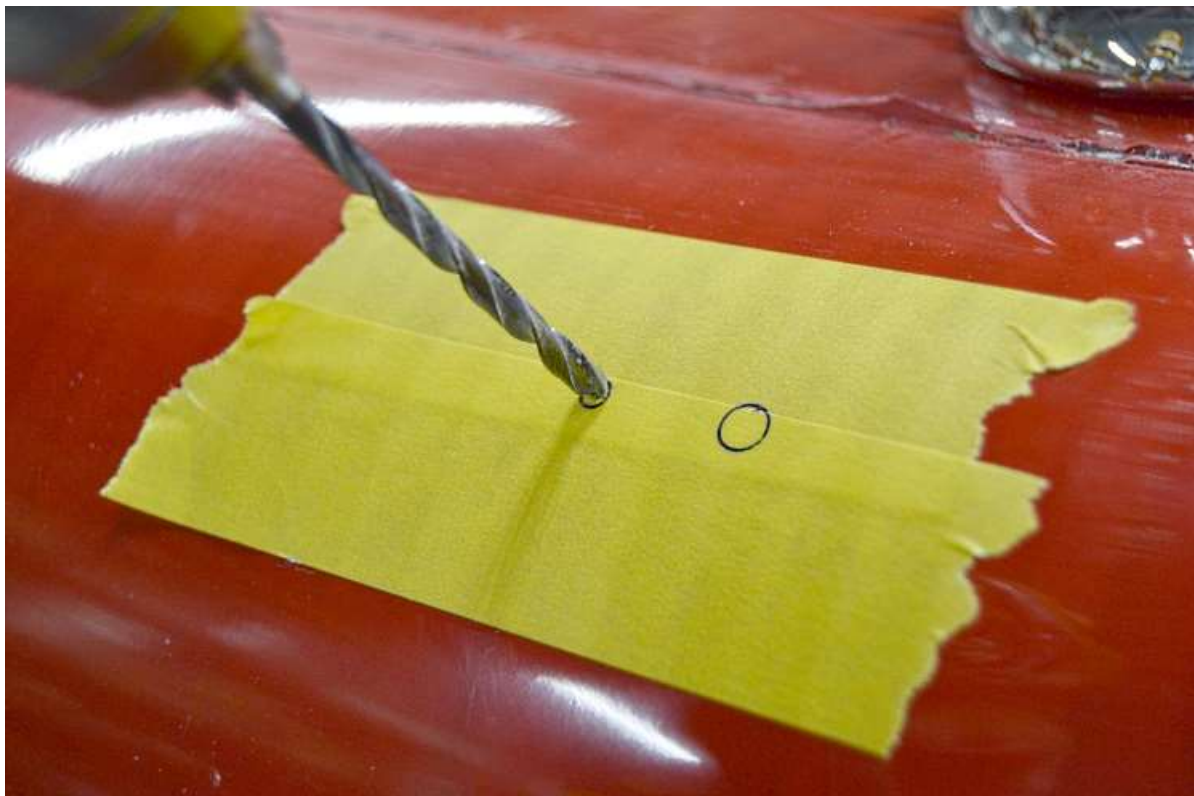
Put masking tape in the rough location of the mirror.



Sit in the seat to find a good location you can see the mirror from and see clearly over the rear fender.



Hold the gasket in place, remove the mirror and mark the location of the mounting holes.



Remove the gasket and use a $\frac{13}{64}$ " or $\frac{7}{32}$ " drill bit at the points marked.

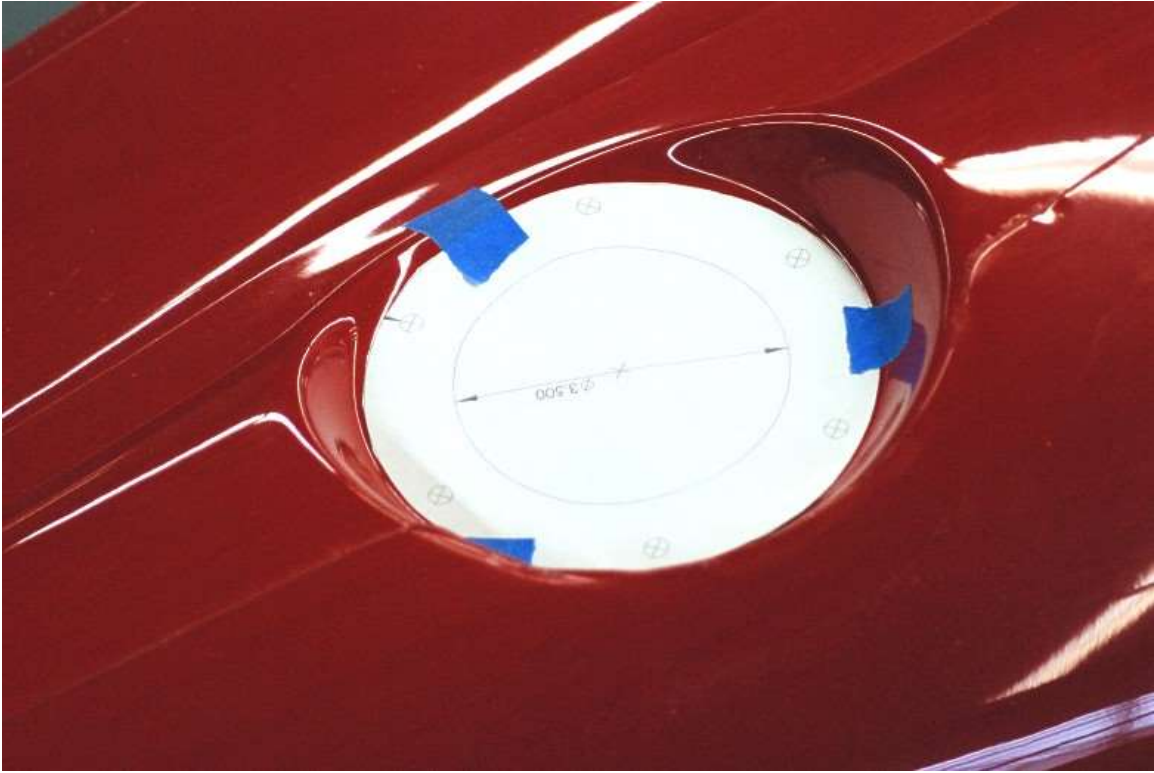


From the underside of the body, use a $\frac{5}{16}$ " socket to attach the mirror to the body.

Body Cut-outs

FUEL FILLER

- ✂ Drill, $\frac{1}{8}$ ", $\frac{7}{32}$ " drill bit, $3\frac{1}{2}$ " 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 $\frac{1}{8}$ " drill bit for all except one of the outer screw holes. Use a $\frac{7}{32}$ " bit drill for the last small hole.



Use a $3\frac{1}{2}$ " 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.

TAIL LIGHT

- ✂ Drill, $\frac{7}{32}$ ", $\frac{1}{2}$ " drill bits, file.
- 🚗 Tail light



Use one of the black tail light mounting gaskets as a guide to locate the taillight on the body.

Use a $\frac{7}{32}$ " bit to drill mounting holes for the taillight studs then use a $\frac{1}{2}$ " drill bit where the wires will go through the body.

Test fit the lights and file the holes to fit if needed.

TURN SIGNAL

- ✂ Drill, $\frac{7}{32}$ " drill bit, $1\frac{1}{4}$ " hole saw, marker.
- 🚗 Turn signal template, Amber front turn signal lights



Remove the gasket from the turn signal box and use it to center and trace the mounting holes and large center hole for the turn signal.



Drill the outer holes with a $\frac{7}{32}$ " drill bit and the inner with a $1\frac{1}{4}$ " hole saw.



Test fit a light and adjust if needed.

LICENSE PLATE LIGHT



Drill, 1/4", 3/8" drill bits, scissors, masking tape, marker



License plate light template, license plate light and bracket.



This kit is only a collection of parts designed for use primarily as a race car. 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 these laws.

Bolt a license plate to the light to get the correct spacing between the handle and the light. Put the light as high as possible. It will be tight.

Mark the trunk at the top of the light.

Remove the light.



Cut out the template in the Appendix for the license plate light and tape it in position on the trunk dimple.

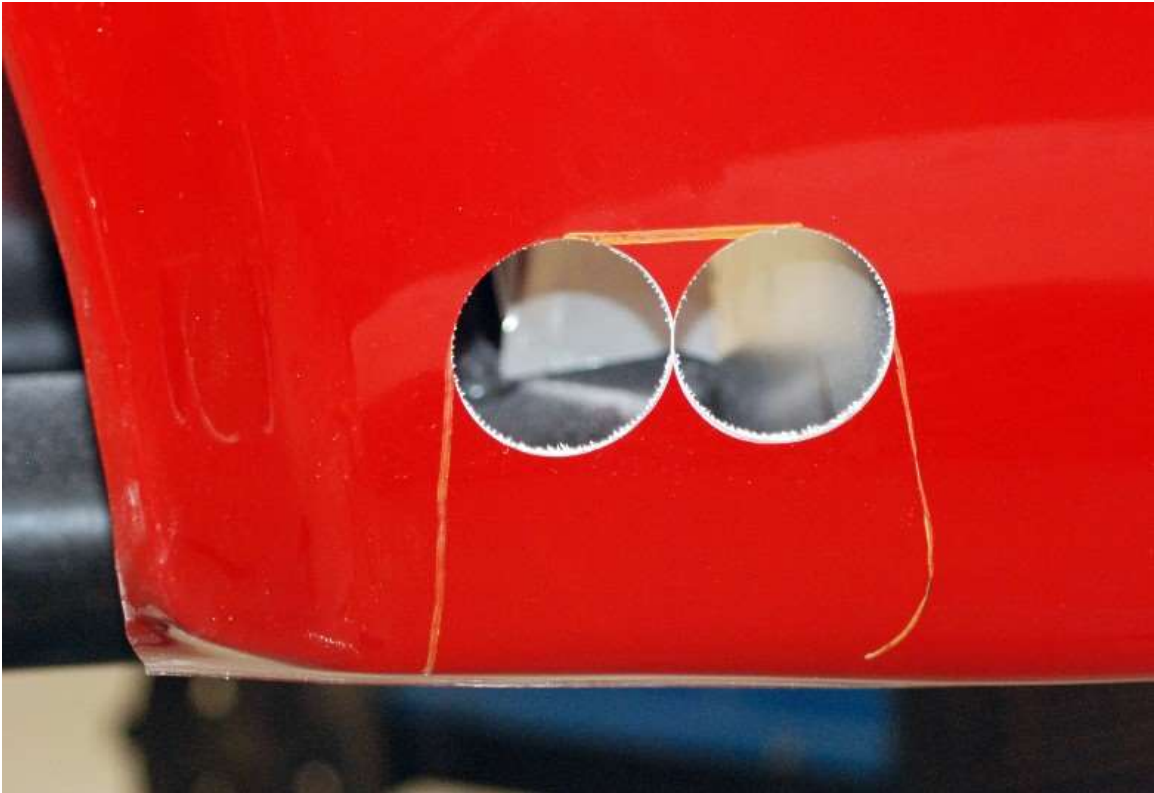
Drill the two smaller holes with a $\frac{1}{4}$ " drill bit and the larger one with a $\frac{3}{8}$ " drill bit.



Test fit the light with a license plate and adjust the holes with the drill bit if needed.

SIDE EXHAUST

- ✂ Drill, 2½" hole saw, air saw or jig saw.
- 🛠 Side exhaust template



The pattern for the standard exhaust cut-out is pre-traced on the body. Using a 2½" hole saw cut the upper two corners of the pattern out.



Using a jig saw cut the remaining straight sections and radius on the lower rear corner.

HEADLIGHTS

- ✂ Drill, $\frac{1}{8}$ ", $\frac{1}{4}$ ", $\frac{3}{8}$ " 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 $\frac{1}{4}$ " drill bit to mark their location. Follow this with a $\frac{3}{8}$ " 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 $\frac{1}{8}$ " drill bit.

SIDE LOUVER

-  Drill, $1\frac{1}{4}$ " hole saw, jig saw or air saw, measuring tape, marker
-  Side louver template



Use the template and measurements in the picture below to locate the template on the body.

Use a 1 1/4" hole saw to cut the corners on the traced opening for the side louver.



Connect the flush surfaces of the holes with a jig saw.

HOOD SCOOP

- ✂ Drill, $\frac{3}{16}$ " drill bit, marker, ruler, tape measure.
- 🔧 Hood scoop, secondary body fasteners.



On the top side of the hood scoop mark a line 0.25" in from the edge of the hood scoop flange all the way around the scoop.



Mark the line 0.50" back from the front edge of the scoop.



Mark the scoop every 3" along the straight sides of the scoop.



At the front of the scoop, measure across the front and find the center then mark the top of the scoop.



On the underside of the scoop, measure from the front back 19.50" and mark the scoop on both sides.



At the lines marked, measure across and mark the center of the scoop.



Use a square to transfer the mark to the back edge of the scoop then mark the top side of the scoop as well.



Where the scoops starts to curve measure from the last straight rivet location 2.50" back and mark the line then another 2.50".





This should make the rivet spacing look even and have a rivet hole in the back center.



Drill $\frac{3}{16}$ " holes around the edge of the scoop.

HOOD FITMENT

-  Drill, $\frac{3}{16}$ ", $\frac{3}{8}$ " drill bit, marker, ruler, tape measure, jig saw or air saw, rivet gun.
-  Hood, secondary body fasteners.



With the hood marked for its centerline, transfer this to the underside with another piece of tape.



From the front edge of the hood measure back 19" and mark the underside of the hood.



Place the hood scoop on the underside of the hood then use a square to locate the scoop left to right and the front marks to locate it to forward/backward.



Mark around the edge of the hood scoop



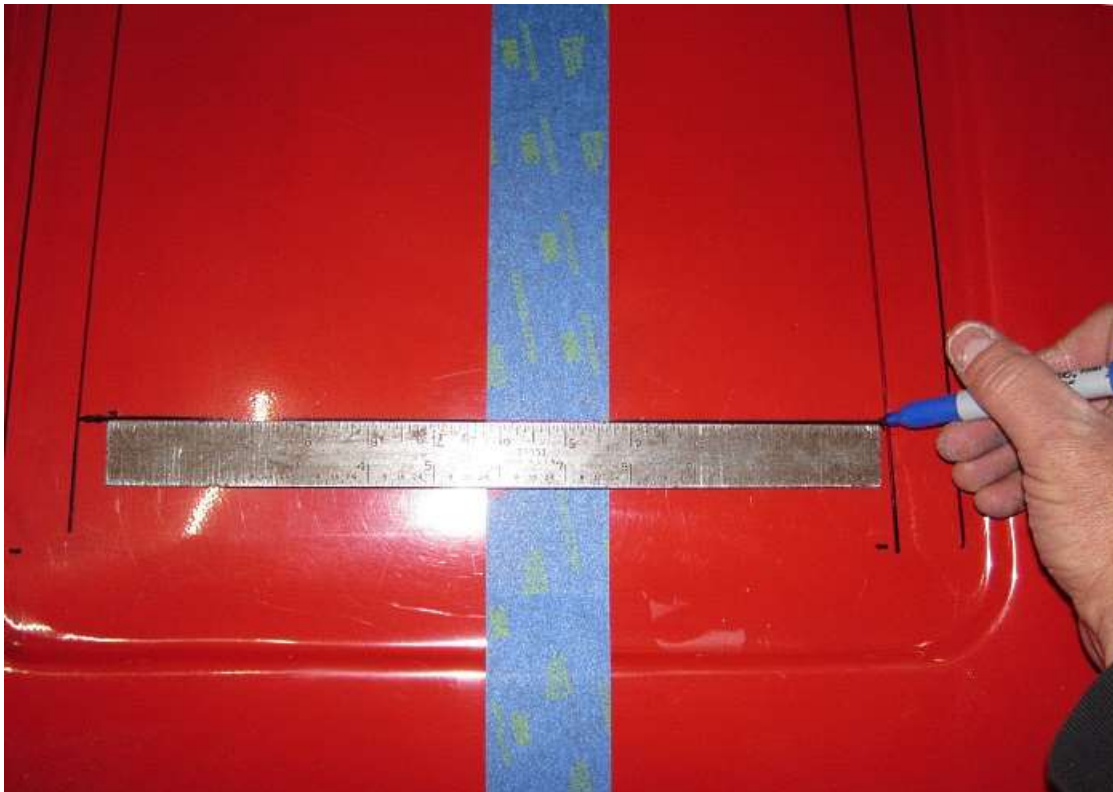
Mark 1" in from the sides.



Use the hood scoop to mark 1" in for the curved end.



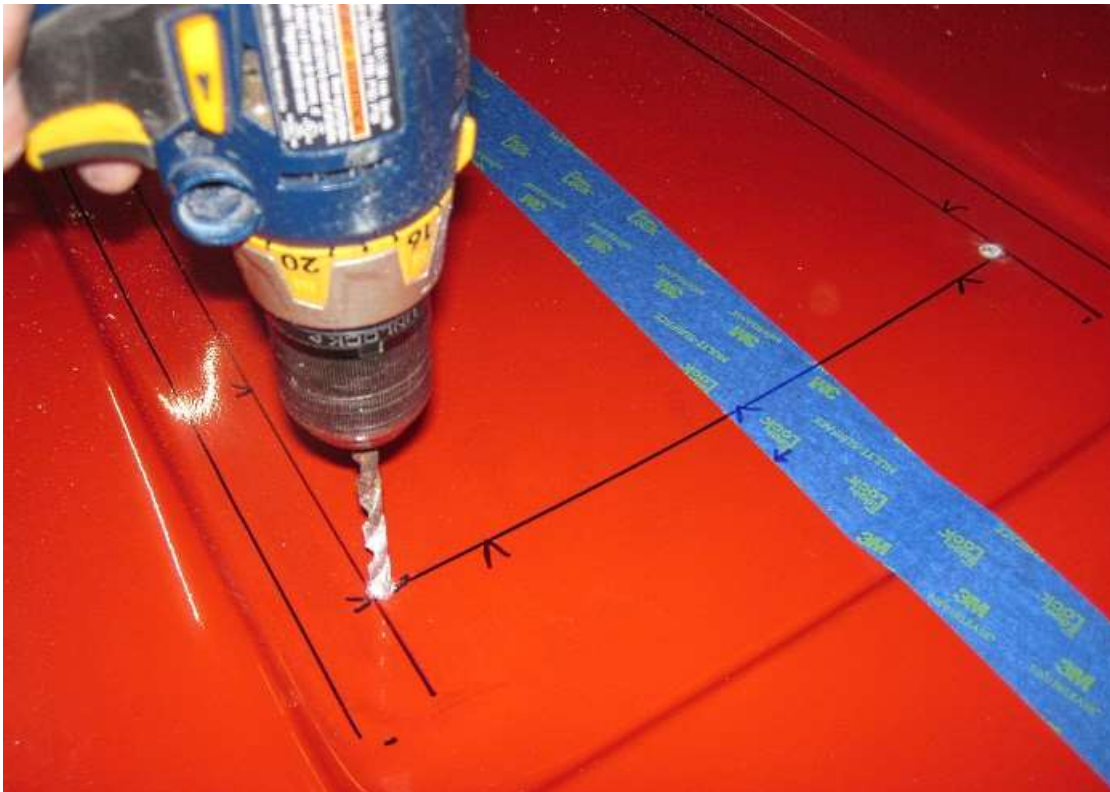
Mark the hood 2" back from the 19" front mark.



Use a ruler to connect the two sides at the 2" mark.



Mark the inner line to make sure the wrong line is not cut.



Drill $\frac{1}{4}$ " holes at the front corners of the area marked



Cut the opening in the hood using a jig saw or air saw.



On the top side of the hood measure back from the front and mark the hood at 19".



Locate the scoop using the straight edge and two marks.



Drill two of the rivet holes on opposite sides of the scoop and the back-center rivet hole using an $\frac{1}{8}$ " drill bit. After drilling each hole place a rivet in the hole so that the scoop does not move.



Drill out the remaining rivet holes putting a rivet in each hole as you go.



Separate the two pieces for painting.

ROLL BAR

- ✂ Drill, 1¼" hole saw, air saw or jig saw, file
- 🛠 1.50" driver side Rollbar.



The roll bar holes are marked on the body and need to be cut out using a 1 $\frac{3}{4}$ " holes saw. The front two holes are cut centering the saw in the marked circle and drilling vertically to match the angle the bar comes through the body.



To cut the rear roll bar leg, make 2 holes overlapping so that they form the right length. Use the same 1 $\frac{3}{4}$ " hole saw centered in the front of the traced opening and with the drill leaning at a 45° angle toward the inner front leg. Stop the drill when it has cut through half of the hole.



The rear of the hole is then finished using the whole saw vertically.



Trim the remaining flash on the opening with a file or jig saw and test fit the bar.

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.



Refer to appendix A for a drawing on how to make a wooden buck to hold the body. A body buck diagram is in the appendix. The dimensions do not have to be exact. A rough shape is all that is needed to hold the body.

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
- Hood
- Trunk
- Hood Scoop
- Wheels Wells– Flange should be $\frac{3}{8}$ ” wide
- Side Vents
- Exhaust
- Brake Duct openings
- Main radiator opening
- Oil cooler opening
- Hood Opening
- Roll Bar cut outs
- Door openings
- Cockpit edges

The curled under 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 trunk and 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.

Body Painting



- Remove all trim, doors, windshield etc. before beginning body work
- 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. Our body shop has stated that any more than 40 hours of body work is unnecessary with the Mk IV body.
- 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.

Final Assembly



With the body at paint, the interior of the car can get worked on.

Carpet



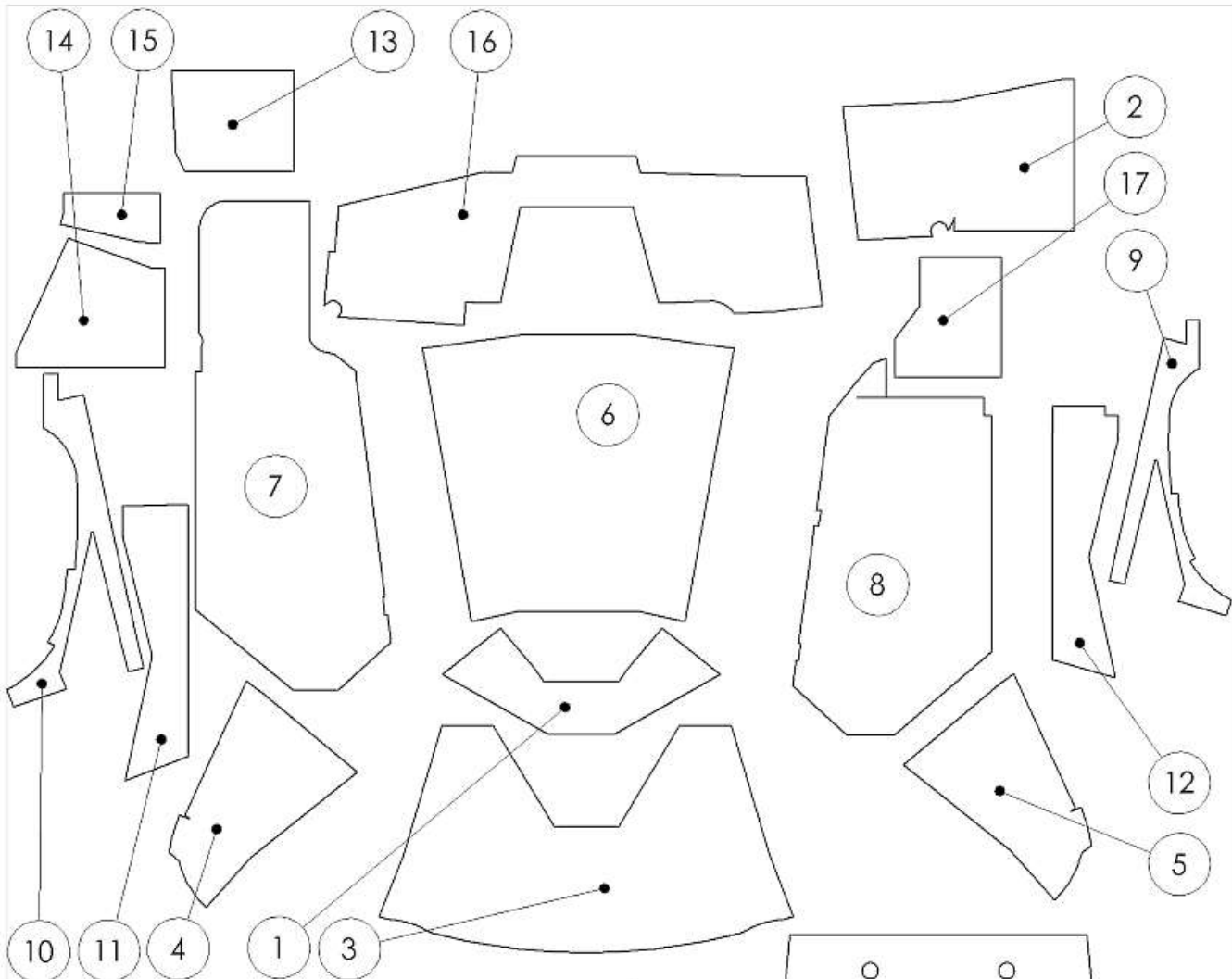
Razor knife, silicone, caulking gun, spray glue, brake cleaner or acetone.



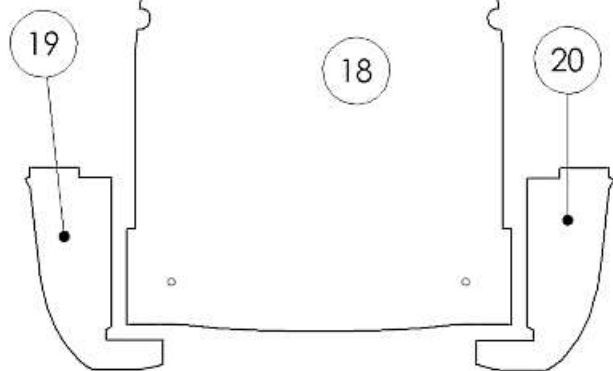
Interior trim/carpet



The adhesive used to hold the carpet down is the same as we used on the dash pad. 3M® Super77™ or Super90™ work best.



1	15051	U-JOINT COVER CARPET
2	15053	RIGHT SIDE OUTSIDE/FRONT FOOTBOX WALL CARPET
3	15054	COCKPIT REAR WALL BEHIND SEATS CARPET
4	15055	REAR WALL OUTER 1/4 LEFT SIDE CARPET
5	15056	REAR WALL OUTER 1/4 RIGHT SIDE CARPET
6	15057	TRANSMISSION TUNNEL TOP/WALLS CARPET
7	15058	COCKPIT FLOOR LEFT SIDE CARPET
8	15059	COCKPIT FLOOR RIGHT SIDE CARPET
9	15060	UNDER DOOR TOP RIGHT SIDE CARPET
10	15061	UNDER DOOR TOP LEFT SIDE CARPET
11	15062	UNDER DOOR LEFT SIDE CARPET
12	15063	UNDER DOOR RIGHT SIDE CARPET
13	16731	LEFT FOOTBOX FRONT CARPET
14	16732	LEFT FOOTBOX OUTSIDE REAR CARPET
15	16733	LEFT FOOTBOX OUTSIDE FRONT CARPET
16	15066	LEFT INSIDE/MIDDLE/RIGHT INSIDE FOOTBOX WALL CARPET
17	15067	RIGHT SIDE, FOOTBOX FLOOR CARPET
18	16672	TRUNK CARPET
19	16685	LEFT TRUNK SIDE CARPET
20	16686	RIGHT TRUNK SIDE CARPET



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			MATERIAL	CARPET
	USED ON		FINISH	
	APPLICATION		PRINTED	
				9/19/2019



Factory Five Racing, Inc.

MK 4 ROADSTER CARPET SET

DRAWN COMMENTS	NAME	DATE
	JL	1/15/10

SIZE DWG. NO.
A 15049

SCALE:1/8" = 1" WEIGHT:

REV.
G

SHEET 1 OF 1

Wipe down the bare aluminum with acetone or brake cleaner for good adhesion.



Double check the aluminum edges and corners for any areas that look like they are not sealed. Run a small bead of silicone in these corners, seams and around the slots where the seat harness mounts poke through.

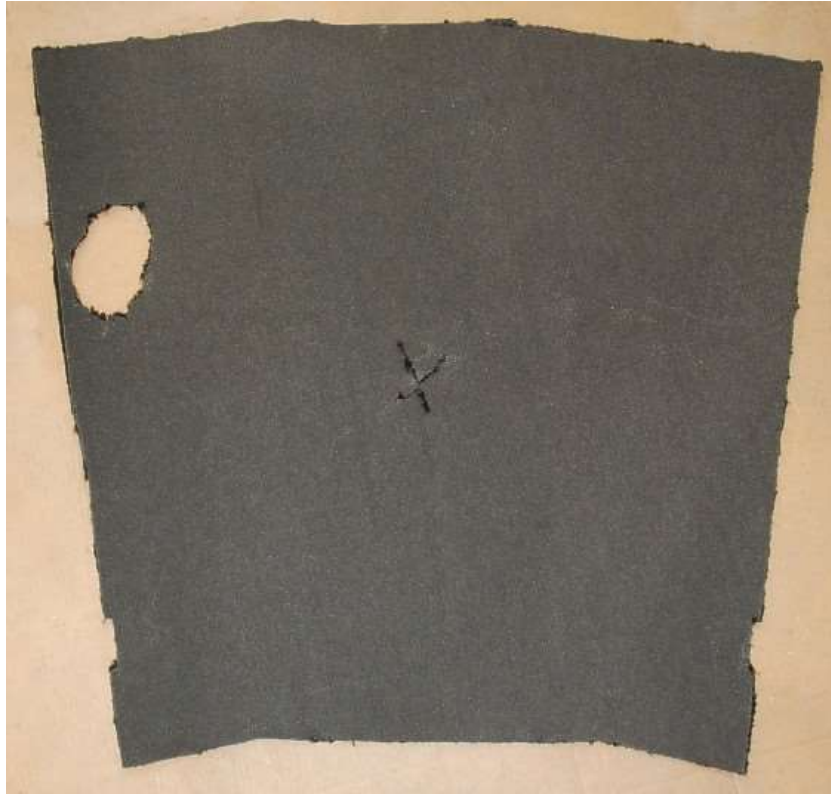


Start with the large rear cockpit wall of carpet. Position it before gluing so you understand where it will go then, apply the adhesive and glue it into position.



The cockpit rear corners go on next. Be very careful spraying the adhesive once some carpet is mounted. Guard the carpet with masking tape or cardboard.





Test fit the rear and main tunnel covers. While you are fitting cut the handle opening for the e-brake and shifter.



Glues down the tunnel top.



The tunnel rear section is slightly oversized to make sure it can cover small variances in the way the other pieces lay down. Trim it for a perfect fit then glue it in place.



Fit and glue the passenger outside footbox wall carpet section. The carpet tucks in behind the footbox protection tube. Taping off the tube helps prevent getting the adhesive on it.



Fit and glue the driver's side footbox outer carpet section. This piece also tucks behind the footbox tubing.



Fit and glue the tunnel/firewall section of carpet.



Fit and glue the lower floor sections.



Fit and glue the under-door piece.



Install the under door top piece along with the push on weatherstrip.



The floors are next. They may also need a slight trim for the best fit. Glue them down and vacuum the carpet prior to the seats going in.

Install the trunk last, tape the aluminum side walls, fuel strap and rollbar mounts so they do not get spray glued.

Remove the battery.



Start at the back of the frame poke the right-side fuel tank strap mount through the hole.



Line up the notches with the $\frac{3}{4}$ " tubes and work forward.





Pull the battery cables through the holes.



Pull the license plate wires up next to the right-side rear rollbar leg.

Seats Harness lap belt

-  $\frac{3}{4}$ " wrench, $\frac{3}{4}$ " socket, $\frac{1}{2}$ " drill bit, drill, ratchet
-  Seat Harness/Fasteners



Unpack the seat harnesses and hardware.



Drill through the inner lap belt mount into the tunnel with a ½ in. bit.



Bolt the lap harness in position with the inner most nut inside the transmission tunnel.

Emergency Brake Boot

- ✂ 1/8" drill bit, drill, Phillips head screwdriver
- 🚗 Interior Trim/Carpet



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.

Seat Final Install



Drill back up through your seat mounting holes to put holes through the carpet and re-mount the seats.

Seat Harness Shoulder Belts

- ✂ Razor knife, $\frac{3}{4}$ " wrench, $\frac{3}{4}$ " socket, $\frac{1}{2}$ " drill bit, drill, ratchet
- 🛠 Seat Harness/Fasteners, Misc. electrical components



Use some of the serrated grommeting from the electrical assembly to cover the edge where the harness passes through.



Cut the carpet with a single slit to allow the harness to pass through.



Remove the mounting tab and slider from the harness.



Slide the harness through the rear wall from the front. The shoulder harnesses are side specific so make sure you have the sides correct.



Replace the slider and mounting tab and bolt the tab to the chassis.



Adjust the harnesses to where they fit you comfortably.

Shifter Handle and Boot



$\frac{1}{2}$ " wrench, $\frac{1}{8}$ " drill bit, drill, Philips 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 ring 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 $\frac{1}{8}$ " 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.

Before body mounting

Once the body is back from paint, the following parts can get installed on the body before it is mounted since it is easier to do so.

HEADLIGHTS



Philips head screwdriver

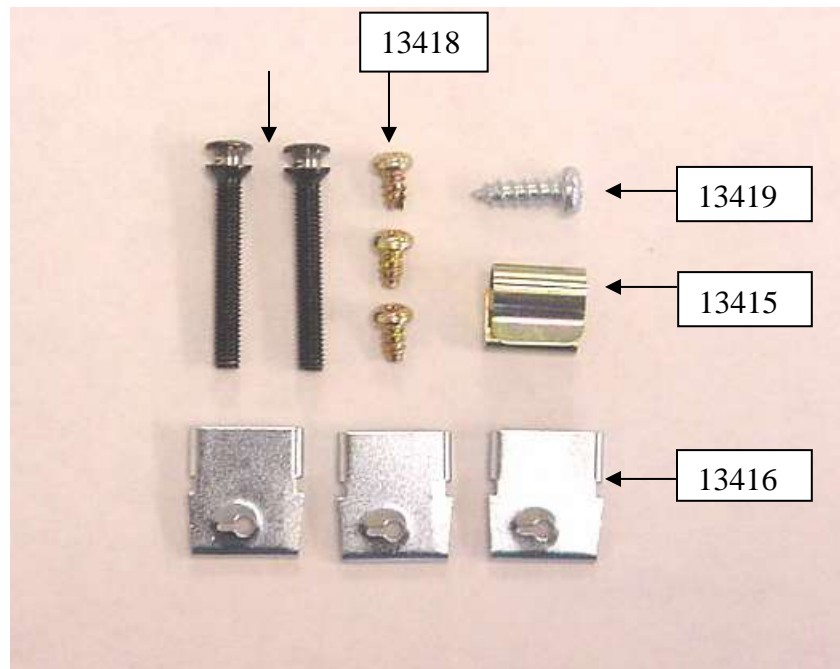


Headlight components



Unpack the headlight mounting assembly.

13420



Headlight fasteners.



Screw the adjuster screws about halfway into the buckets.



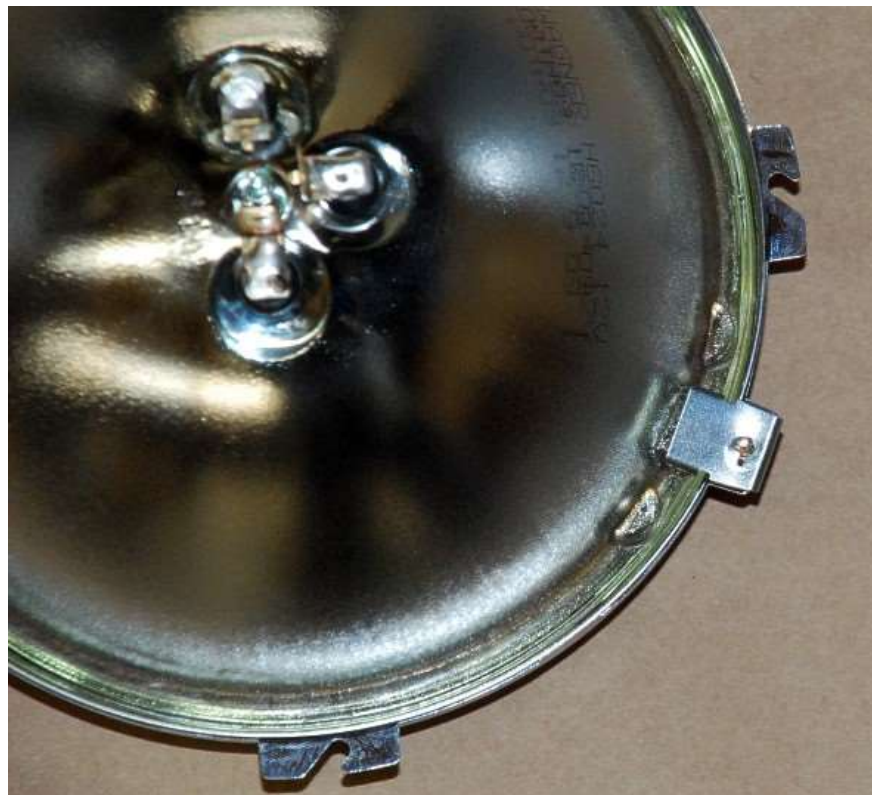
Push the grommet into the side of the bucket.



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.

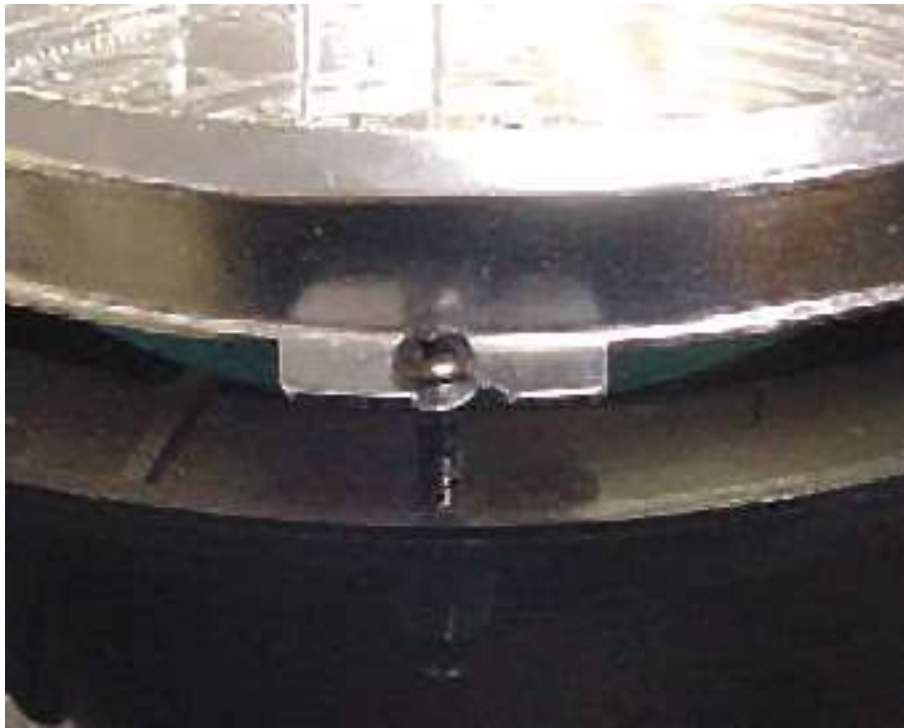


Screw the mounting flange onto the light with the 3 small tabs and small screws. The tabs are bent to fit around the bosses on the light.

Put the gasket on the bucket with the adjuster bosses poking through the 2 larger holes.



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.



Mount the trim ring hooking it over the bucket on the top and screwing it into the bottom using the countersunk screw.



TURN SIGNALS

- ✂ $\frac{5}{16}$ " deep socket, ratchet
- 🔧 Amber front turn signal lights



Mount the turn signals to the body being careful not to over tighten the locknuts.



TAIL LIGHTS

-  $\frac{5}{16}$ " deep socket, ratchet
-  Red rear lights



Attach the rectangular tail lights to the body.

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.

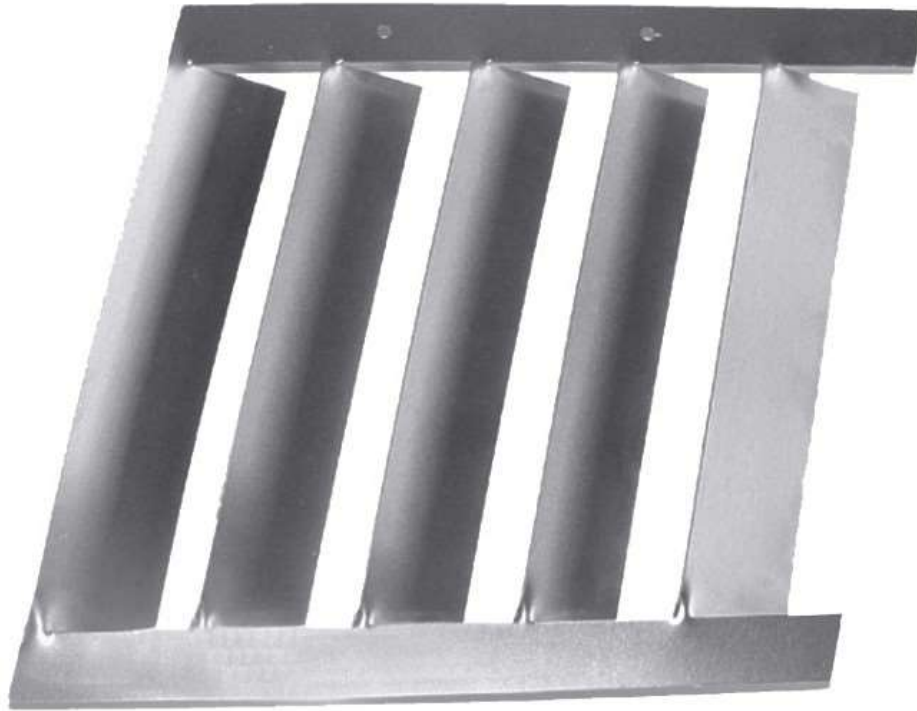


The one remaining cap fastener is a longer screw and nut used for the ground strap, screw it in from the top then put the ground strap washer and nut on from underneath.

SIDE LOUVERS

- ✂ Silicone, caulking gun, duct tape
- 🛠 Side Louvers

Unpack the side louvers.



Holding the top and bottom flanges, bend the fins in so they are roughly at a 45° angle.



Hold them up to the body to see how they fit. They are designed to allow air to exit the engine bay so the flanges point from the rear edge in.



Apply silicone down the top and bottom flange on the side facing the body.



Line up the louvers and tape them in place to hold them until the silicone dries.

TRUNK GAS STRUTS (OPTIONAL)



Drill, $\frac{3}{16}$ " drill bit, Rivet tool, $\frac{1}{2}$ " wrench, $\frac{1}{2}$ " socket, ratchet, marker, small flathead screwdriver



Optional trunk strut kit.



Screw the ball stud into the hinge arms from the outside of the car in then push the body of the gas strut onto the ball stud.



Attach the rod end of the gas strut to the ball stud bracket.

Push the rollbar front “U” onto the frame mounts.



On the left side, run the gas strut forward as straight as possible so that neither the rod nor the strut body will hit the rollbar. It should be on the inside of the right leg and on the backside of the $\frac{3}{4}$ " tube as shown with the bracket on the bottom.

Mark the left rivet hole on the frame.

On the right side if not running a right rollbar, take the left rollbar and put in on the right side temporarily.



Run the strut forward as straight as possible again so that neither the rod nor the strut body will hit the rollbar then mark the right rivet hole. It should be on the inside of the left leg and on the backside of the $\frac{3}{4}$ " tube as shown with the bracket on the bottom.

Remove the rollbar.



Remove the rod end ball stud bracket use a small flat head screwdriver to pry up on the metal clip holding the stud in.

Drill the bracket holes marked.

Hold the left bracket up placing a rivet through the left hole into the frame then drill the remaining two holes.

Hold the right bracket up placing a rivet through the right hole into the frame then drill the remaining two holes.

Rivet the brackets to the frame with the stud pointed up.

Leave the gas strut unattached until after the body has been mounted.

WEATHERSTRIPPING



Razor knife, tin snips



Secondary body fasteners



If you haven't already run the bulb seal up the sides and rear of the trunk and bolt the trunk hinges back in place and tighten.



Cut out a section of the C channel where the hoop comes across to allow one piece to run the whole way.



If you removed any of the other weatherstrip on the firewall or hood support tubes replace it now.



When you are ready to mount the body, unpack the expanding foam and run a small section up the outside of each footbox just forward of the door hinge.

Final Body Mounting



Fit the body back on the chassis. Be very careful with the sides and slowly work it down into position. Pull the sides out around the chassis and make sure the body covers the rear cockpit wall and top of the dash without pulling the material off either.

QUICK JACK MOUNTING



Re-mount the body in the rear with the quick jacks.



Re-mount the nose with the front quick jacks.

HOOD MOUNTING



Rivet the scoop back in position on the hood.



Re-install the hood latch plates and replace the bumpers you used before on the body to line up the hood.



Re-Install the hood and latches.

Radiator Aluminum

- ✂ Drill, 1/4" Nut driver, 1/8", 3/16" drill bits, rivet tool, floor jack, marker, ruler, silicone, caulk gun.
- 🚗 Secondary body fasteners, engine bay aluminum.



Use care when handling aluminum, the edges are sharp and can cut you.



The radiator and its plumbing were installed before the body was mounted. The radiator is being held up at the bottom by a couple of zip ties through a quick jack bumper hole.

Use a floor jack under the radiator to hold it in place.

Cut and remove the zip ties.

Mark the radiator floor piece for either screws or, rivets for a cleaner look (attach every 2" if using rivets).



Pass the radiator floor piece through the nose.



Position the radiator floor aluminum so that it goes under the body lip and goes across to the bottom of the radiator. Clamp the floor piece to the nose.



Attach the radiator floor piece to the bottom of the radiator with a couple of self-tapping screws on the marks or use a couple of clamps.





Drill, silicone and rivet the radiator floor aluminum to the bottom radiator lip.



Silicone and rivet the aluminum to the nose lip using three $\frac{3}{16}$ " rivets.



Pass the radiator sidepieces through the nose and put them on their respective sides.



Trimming aluminum may be necessary if you use the press-on rubber bulb seal weatherstripping.



Line up the edge of the radiator fins with the edge of the side aluminum and attach the piece to the $\frac{3}{4}$ " tube using a self-tapping screw.



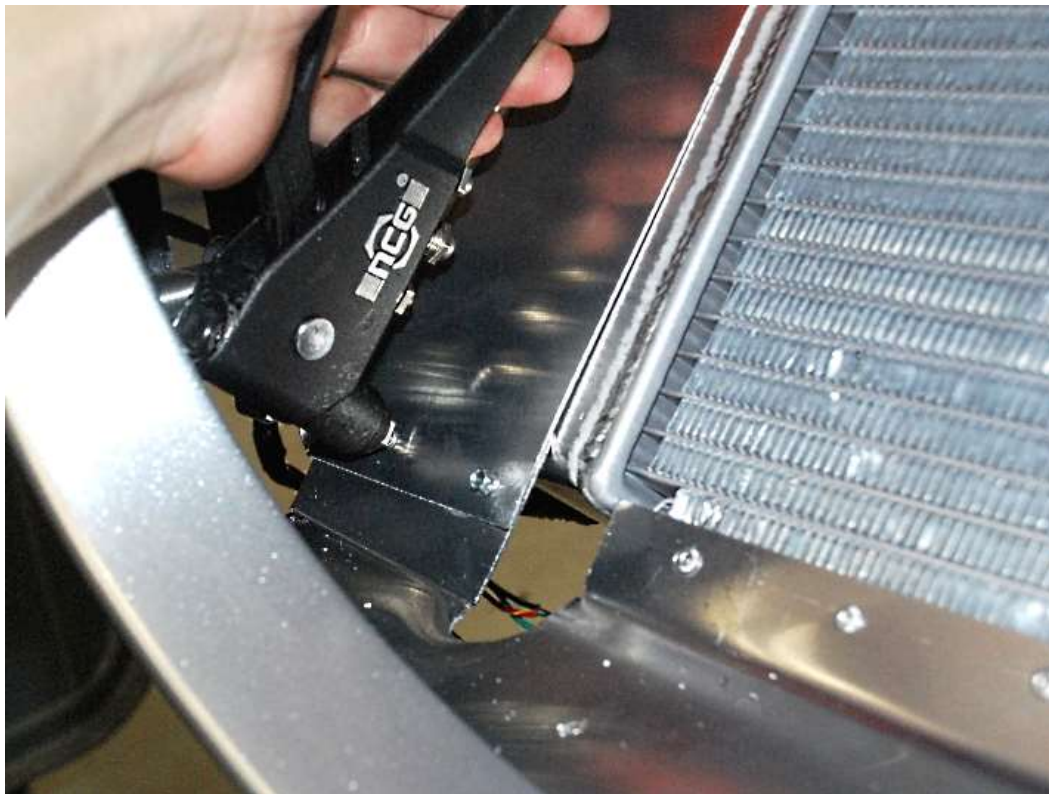
From the backside of the panel, mark the location of the $\frac{3}{4}$ " tube.



If using the press on bulb weatherstrip, make sure there is $\frac{3}{8}$ "- $\frac{1}{2}$ " of gap between the edge of the panel and the body.



Remove the side panel then measure, mark, drill rivet locations where the $\frac{3}{4}$ " tube is located and press on the bulb weatherstrip.



Reinsert the side panel then silicone and rivet the panel to the $\frac{3}{4}$ " tube and the radiator floor aluminum.



Repeat this procedure for the driver side panel.

ROLLBAR MOUNTING



A popular option are the Roll bar grommets. If installing them, do it now.



Re-mount the roll bar through the body. Make sure that the rear leg is in the correct orientation so that your holes will line up.

DOOR AND LATCH MOUNT



Reattach the doors and latches.



Once you are happy with the door fit install the covers on the door latches.

Interior Rearview Mirror

- ✂ Philips head screwdriver, drill, $\frac{1}{16}$ " , $\frac{1}{8}$ " , $\frac{3}{16}$ " drill bits, marker, measuring tape
- 🚗 Rearview mirrors/fasteners

Use a tape measure to find the center of the body by measuring between the inside front door corner areas and mark this on the body.



Use a tape measure to measure in from the body lip to roughly the center of the dash tube.



On top of the bow measure in and mark the body for the center tube location.



Line up the rearview mirror with the center mark and mark the holes in the body.

Use a $\frac{1}{16}$ " drill bit and slowly (so the bit doesn't walk off the tube) drill through the body into the tube at the mirror hole locations.

Follow this with a $\frac{1}{8}$ " drill bit into the tube.

Use the $\frac{3}{16}$ " drill bit next but **only** drill through the body.



Put the plastic spacers between the dash tube and the body so the screws can go through them.



Put the mirror screws through the mirror, body and spacers and screw them into the dash tube.

Windshield Mounting



Re-position the windshield.



Make sure that the windshield does not hit the body on any side, if necessary, file the hole bigger.



Put the rubber base plate gasket around the side bar and make sure the rubber does not go up onto the windshield bottom wipe. Trim the base plate gasket if necessary.



From the top, slide the base plate down to the body.



Make sure the base plate sits flat on the gasket, if it hits the side bar on the ends, file and angle on the end of the base plate.



Use a $\frac{3}{32}$ " drill bit through the base plate holes for the mounting screws.



Remove the base plate and silicone in the slot around the windshield.



Remount and screw the base plate to the body.

Fuel Filler Neck

✂ Razor knife, $\frac{3}{8}$ " socket, ratchet, $\frac{3}{16}$ " 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.

87-98 FUEL FILLER NECK

Attach the 2" fuel filler hose to the bottom section of the Mustang filler neck.



Stock fuel tank filler neck with extension.



Optional 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.

99-04 FILLER NECK

 99-04 fuel filler tube assembly

Push on and attach the 1" fuel filler hose to the lower part of the filler neck using the included hose clamps.

Insert the upper part of the fuel filler neck into the other end of the 1" hose.

Rotate the upper fuel neck so that there is a straight shot from the Aston cap to the filler neck.



Unpack the 2" fuel filler hose and cut a 5" long section out of one end.



Use the short section of hose to connect the upper part of the stock filler neck to the Aston fuel cap



Screw the plastic gas cap into the Aston Lemans style cap.

Fuel tank access covers

- ✂ 1/8" drill bit, drill, rivet gun, silicone, caulking gun
- 🔧 Secondary body fasteners, packaged aluminum



Silicone and install the patch panels in the trunk that cover the fuel sender and pickup access holes.

Final Trunk Mounting

- ✂ Tin snips, $\frac{3}{16}$ " hex key
- 🔩 Secondary body fasteners



Push the side mount weatherstrip on the trunk opening starting at the bottom next to the latch pin hole and working all the way around just leaving a small gap for the head of the latch pin bolt.



Re-mount the license plate light and trunk handle.



Re-mount the trunk to the hinges and re install the latch pin.

Side Mirror



$\frac{5}{16}$ " wrench



Rearview mirrors/fasteners.



Only a driver side mirror is included with the kit. A passenger side one is available if desired.



Put the gasket on the bottom of the mirror so the holes line up with the threaded hole locations.



From the underside of the body, use a $\frac{5}{16}$ " socket to attach the mirror to the body.

Light wiring

✂ Wire strippers, wire crimpers, chassis harness instructions

- 🚗 Headlight components, amber front turn signal lights, rear lights, license plate light, electrical system completion components

Headlight



Wire in the headlights to the chassis harness. On the headlight, there are three wires, black is ground, white is high beam and the red is low beam.

Front turn signal

Wire the turn signals up to the chassis harness.

	Lamp	Harness
Ground	Black	Black
Turn	Green	Dark Green (Left)/Light Blue (Right)
Running	Yellow	Tan

Taillights



On the light, the white is the ground wire and the black is the running light wire.

	Lamp	Harness
Ground	White	Black
Stop/Turn	Red	Yellow (Left)/White (Right)
Tail	Black	Tan



	Adapter	Harness
Ground	White	Black
Tail	Brown	Tan (Tail Lt. Feed.)
Left Turn	Yellow	Yellow
Brake	Red	Purple
Right Turn	Green	White

The tail light is both the stop and turn signal the tail light convertor must be wired into the harness, do this under the dash.

Wire the license plate light.

Check straps

- ✂ $\frac{3}{16}$ " drill bit, drill, rivet tool, marker
- 🚗 Secondary body fasteners, door components

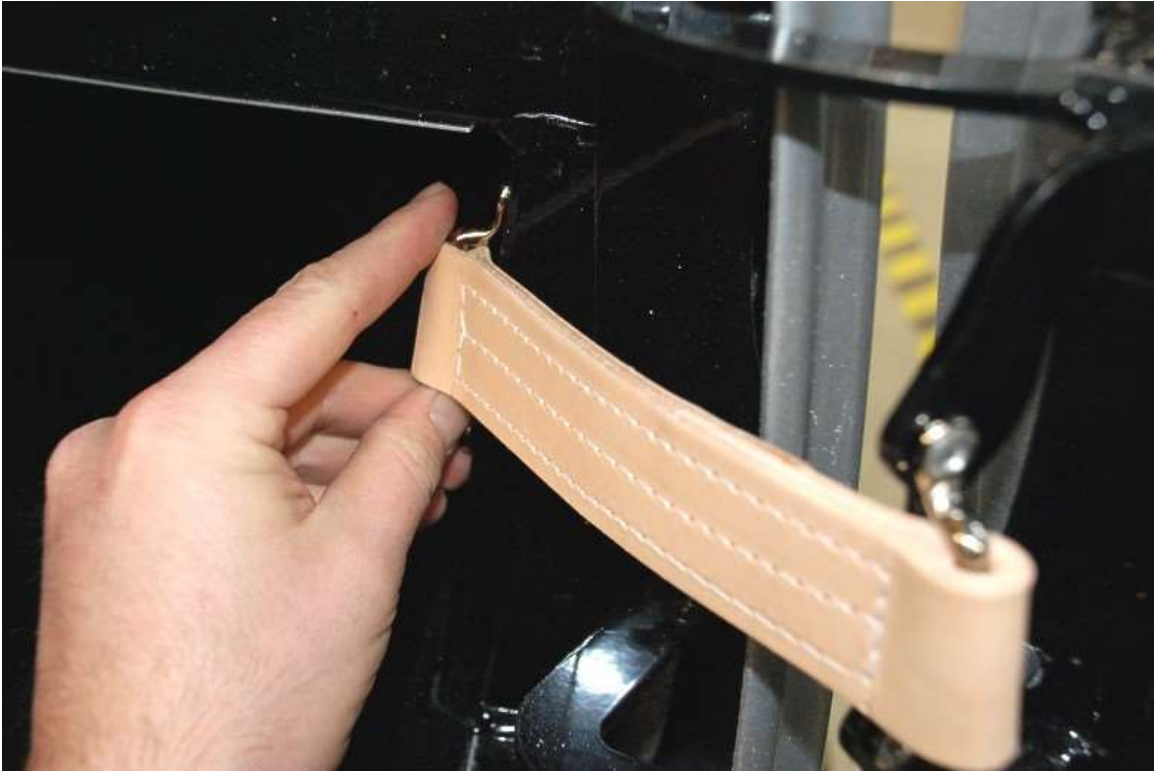


Unpack the door check-straps.

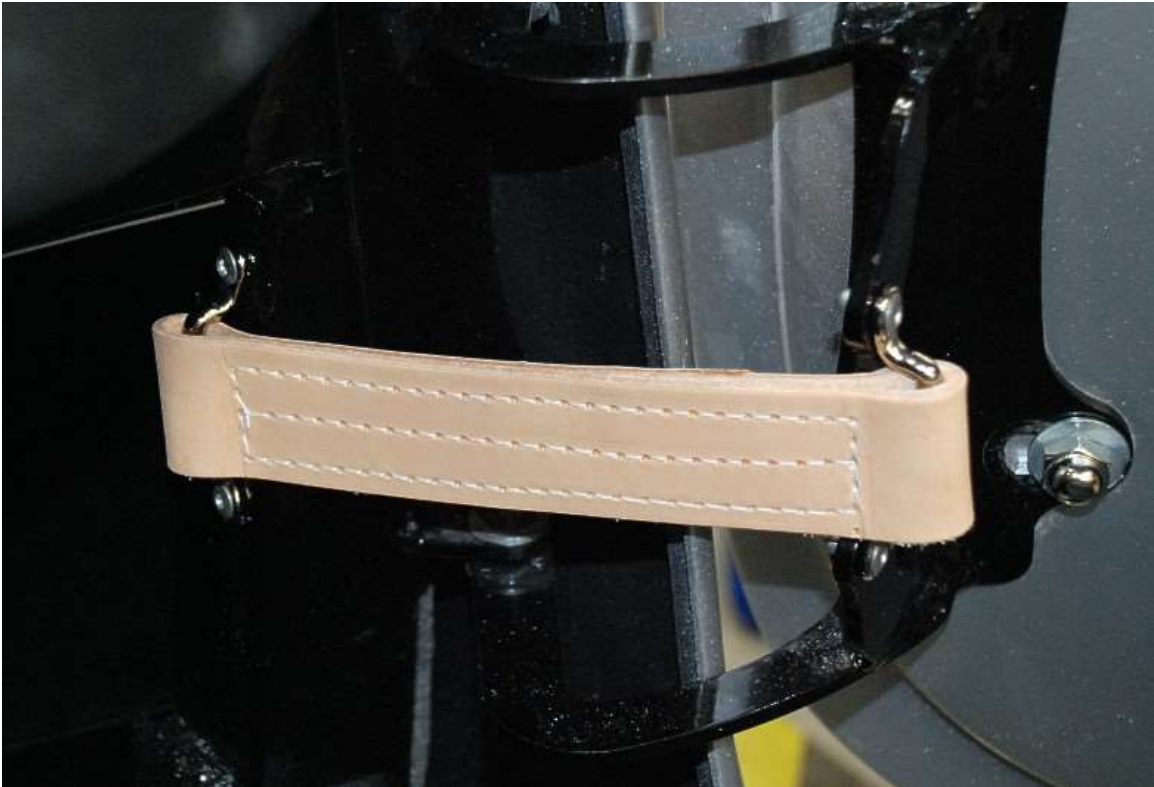


Rivet the check-strap to the door hinge using a $\frac{3}{16}$ " rivet.

Open a 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 $\frac{3}{16}$ " holes at the marked locations and rivet the mount to the chassis.

Under door Aluminum

✂ Drill, $\frac{1}{8}$ " drill bit, rivet tool, silicone, caulking gun, spray glue, tin snips.

 Packaged aluminum, interior trim/carpet, secondary body fasteners



Unpack the under-door aluminum panels. They are shaped to fit around the bottom of the door with flanges to mount to the chassis.



Silicone and rivet the panels in place, it is ok if the flanges do not cover the full width of the chassis tubes. It is more important that the panel is lined up with the body under the door.

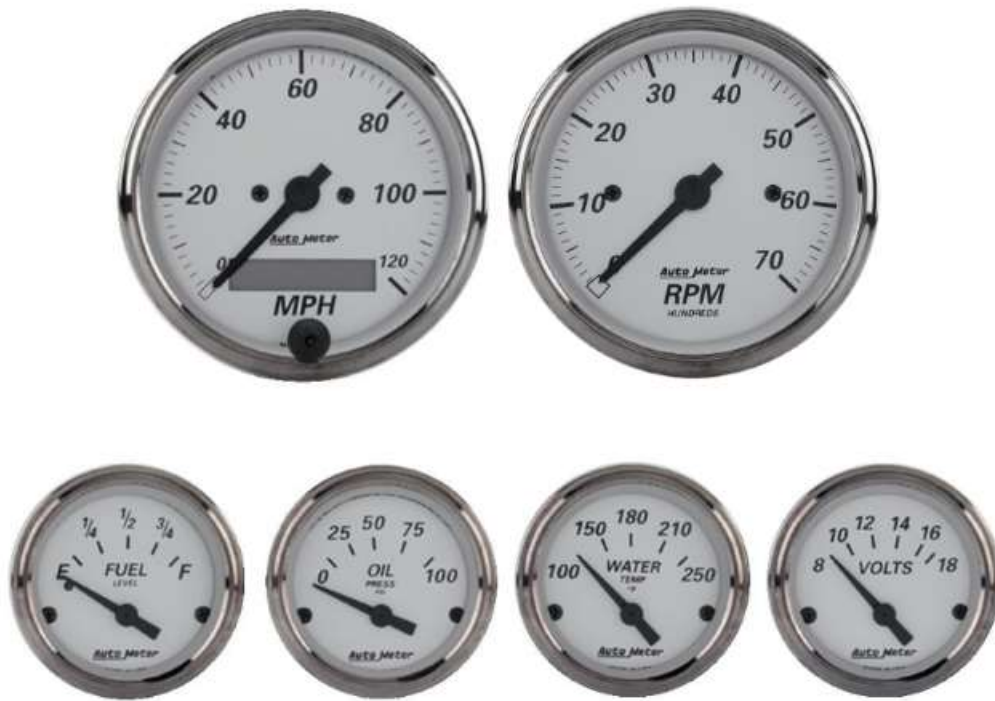


Test fit and then glue in the remaining carpet sections under the doors.



Cut a section of the large C channel weatherstrip to fit from the bottom of the door hinge to the door latch and push it in place over the body, aluminum and carpet to finish the edges off. The barb side goes towards the inside of the car.

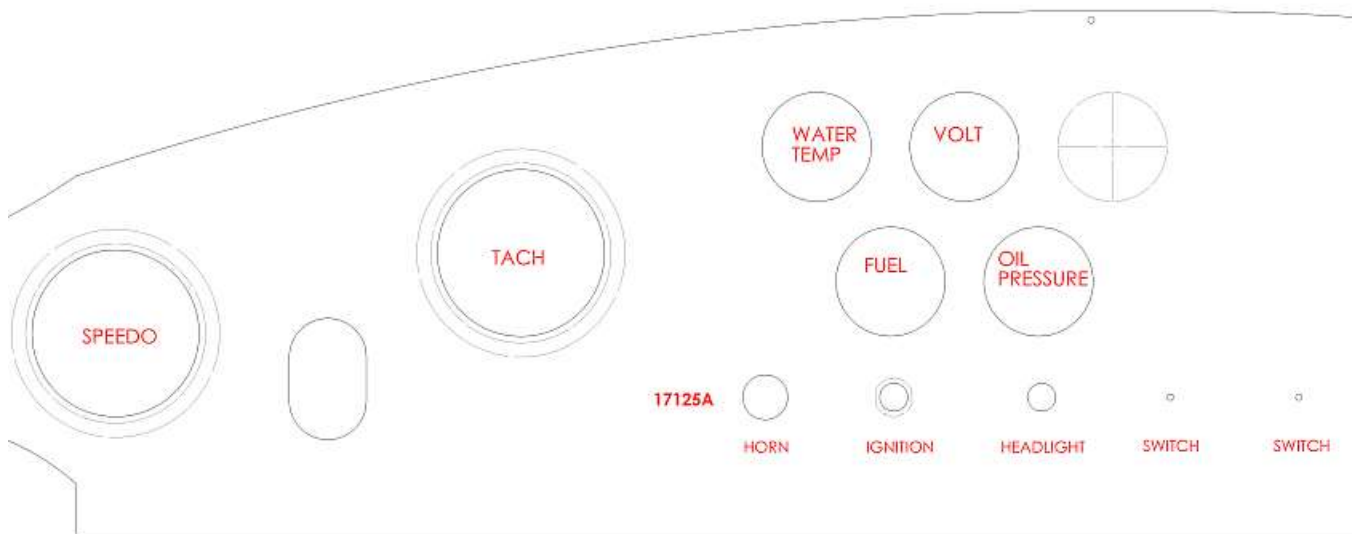
Gauges



- ✂ Tin snips, pliers, spray glue, brake cleaner, razor knife, drill, $\frac{1}{8}$ " , $\frac{3}{16}$ " drill bit, silicone, caulking gun, rivet gun, wire crimper, wire stripper, Philips screwdriver.
- 🚗 Gauge set, dash electrical components, cut dash, packaged aluminum, Interior trim/carpet box, electrical system completion components.
- 👤 Factory Five has a padded vinyl dash with glovebox and a Carbon fiber dash available as an option for use with the Vintage gauges.
- 👤 The factory Five Vintage gauges have built-in indicator lights so the large dash mounted ones included are not necessary.

DASH PREPARATION

- 👤 The speedometer and tachometer holes in the dash are designed to work for two different size gauges. You will see a laser cut dashed line surrounding the cut out. The cut hole is for Autometer gauges and the cut lines are for the Factory Five Vintage gauges.



Standard gauge layout



The extra cut $2\frac{1}{16}$ " top right location is for the FFR gauges or an additional gauge such as a clock or oil temp gauges if desired.



Depending on which gauges you are using you may need to open up the dash holes for the tachometer and speedometer. If you need the larger holes the take a tin snip and cut through from the smaller hole to the tracing for the larger one halfway between all the tabs.



Take a pair of pliers and snap the tabs off to get the larger opening.



If you would like to install the three lights that are included in the kit, one possible layout is similar to the original Roadsters, positioned directly over the steering column in a straight line. Use a 1/2" drill bit for the holes.



Clean the dash off with some brake cleaner or acetone and spray the front surface and the back surface of the dash pad with adhesive. (3M super 77 or super 90 work great).



Stick the dash to the pad leaving about an inch border all around the top, the bottom will be bigger for the flange. Taping the ends of the pad helps to keep it flat.



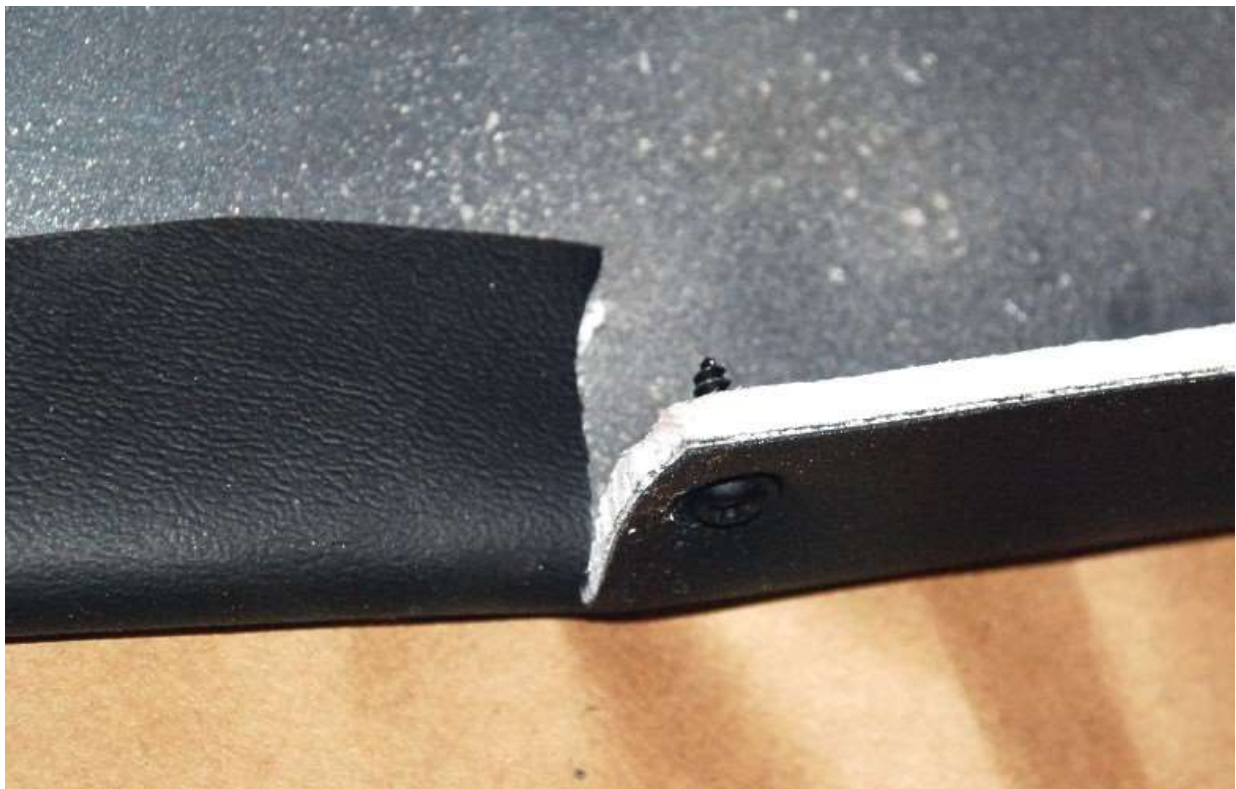
After giving the front adhesive time to set spray the bottom flange and pad and adhesive them together. This is a fairly tight corner so hold the dash in position with pressure on the mating surface with some full paint cans or something else heavy.



Cut the dash pad in angle shaped cuts every 2" (even closer in the corners) up to about 1/4" from the dash.



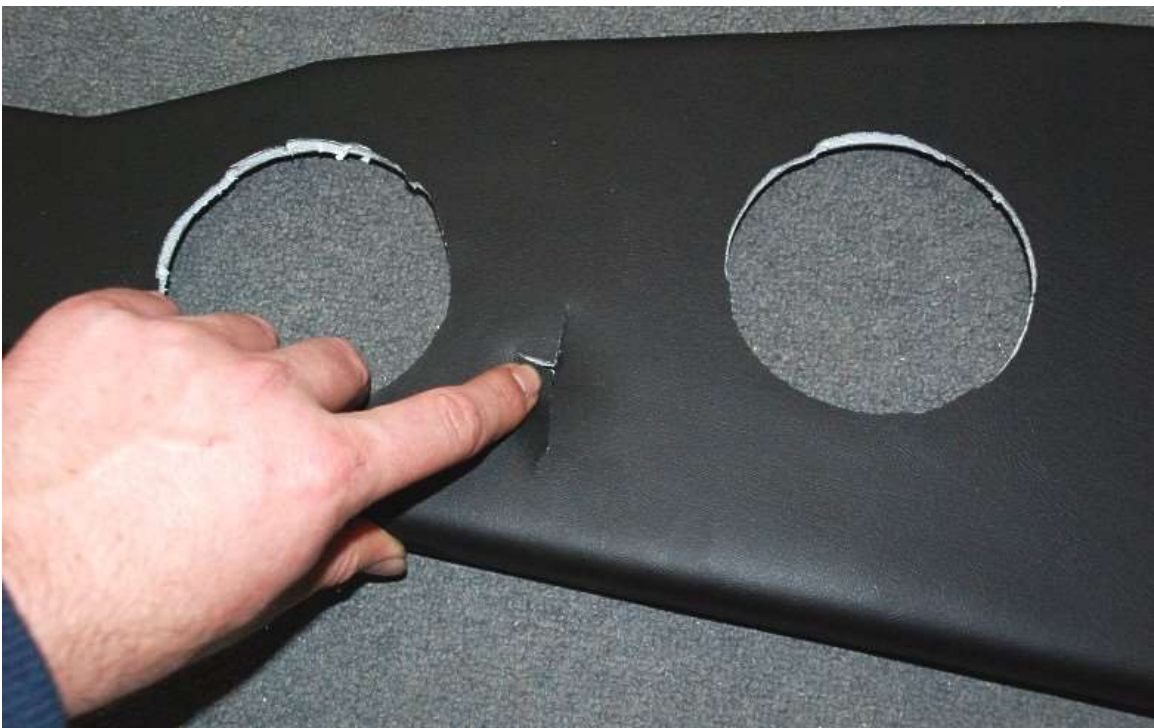
Wrap the dash pad around to the back and glue it. Use some heavy books to hold the pad in place until the adhesive has a chance to dry.



If you are having trouble getting the pad to stick on the bottom of the dash you can screw the corners down using some of the trim screws provided with the dash hardware.



Using a razor knife, cut the gauge holes and switch holes out of the dash pad, cut the holes in from the aluminum about $\frac{1}{8}$ ". DO NOT cut out the steering shaft hole.



Using the razor knife cut a "+" sign pattern into the middle of the steering shaft hole.

GAUGE WIRING HARNESS



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 an **87-98** 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.



Using a **99-04** Mustang harness **does** require the use of the Mustang gauge pod due to the anti-theft features built into the computer.



See the individual gauge instructions for details on the gauge senders and calibration.



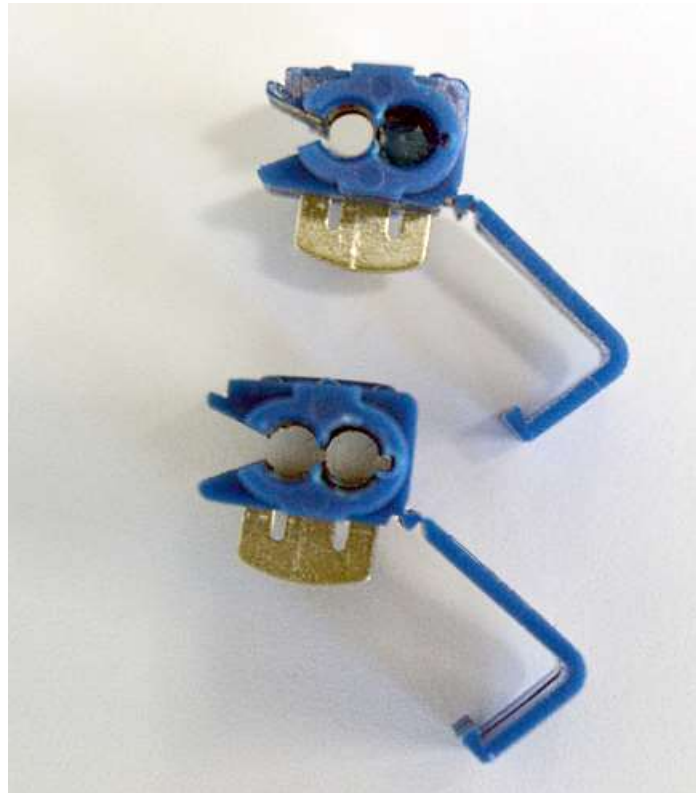
The wires and instructions included are for the standard street gauge layout provided with the **cut dash**.



Included with the gauge kit are wires and connectors to create a simple gauge wiring harness.



An alternative to using the connectors would be to remove the wire insulation at the points marked and solder the wires together



Using a $\frac{1}{8}$ " Drill bit, drill the wire blockage out of (7) of the tap connectors. Upper connector has blockage, lower is drilled.

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.

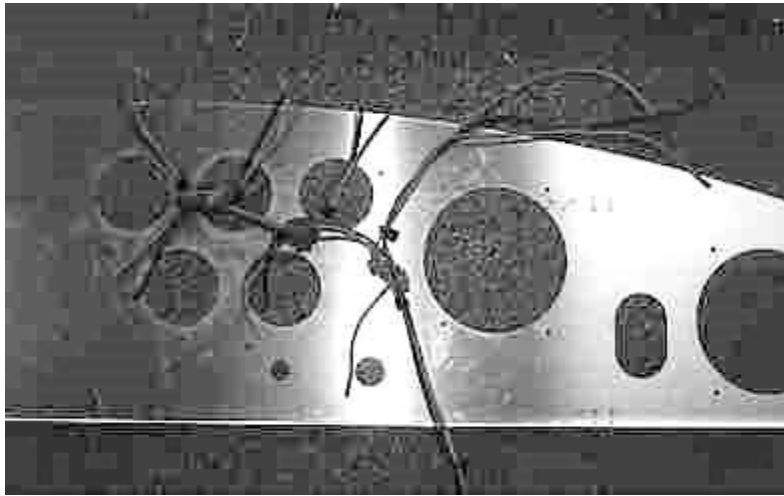
Cut the 5' long red wire into sections. (1) 2' wire, (1) 16" wire, (2) 8" wires and (1) 4" wire.

Mark the red and blue 2' sections at 4", 7" and 10" from one end.

Lay the cut dash face down on a table.



The next two steps will need to get repeated on the red, blue and the black wires.



Starting at the 4" mark, place one of the drilled tap connectors on the wire along with one of the 8" wires.

Repeat this at the 4" and 7" marks.

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.

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.

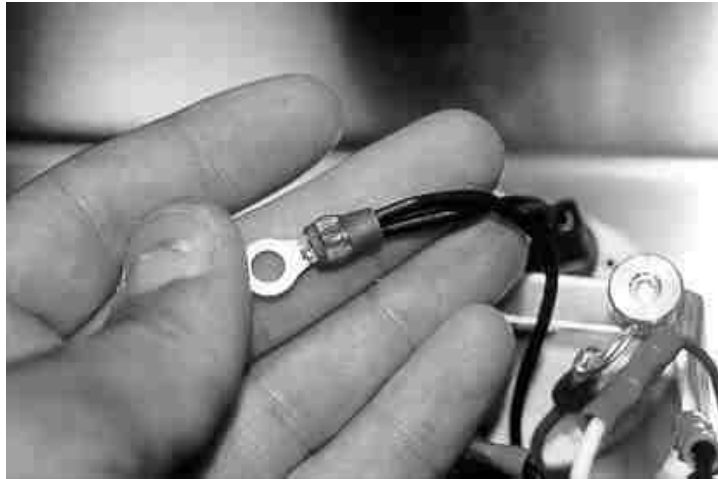
Use zip ties from the kit to tie all three wires together.

90-93 Attach the loose end of the red wire to the Mustang gauge gray plug pin #7 (**Warning Lamps Feed**).

- 96-04** Attach the loose end of the red wire to **Voltage in Start and Run** wire.
- 90-93** Attach the loose end of the blue wire to the Mustang brown gauge plug pin #11.
- 96-04** Attach the loose end of the blue wire to the **Instrument Illumination** wire.
- 90-93** Attach the loose end of the black wire to the Mustang gray gauge plug pin #14.
- 96-04** Attach the loose end of the black wire to the **Ground** wire.
- 90-93** Attach the short section of red wire on the 16" section to the horn button.
- 90-93** Use the remaining short section of red wire to jumper over from the horn button to the fan switch.
- 99-04** Run the long section of 4 conductor wire from the dash area over to the computer on the right side.

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.

87-93 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.

GAUGE INSTALL

Water Temperature Gauge

87-95 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.

96-98 Remove Ford water temperature gauge sending unit from the coolant crossover tube on the driver side.

99-04 Remove the plug in the block to the rear of the left side engine mount.

Wrap the adapter threads with Teflon tape. Install the new water temp adapter (short end goes in the

manifold) with a 3/4" wrench.

87-98 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.

99-04 Run a new wire from the gauge to the sending unit.

87-98 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.

90-93 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 3/4" 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.

90-93 Attach the other end of the same color wire to the Mustang Brown plug #8 (**Oil pressure feed**).

96-04 Attach the other end of the same color wire to the Oil pressure switch signal wire.

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 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.

Electric 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 # 68 (96-04) or pin #3 (87-95), (**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.

90-93 Attach the other end of the same color wire to the Mustang Brown plug # 10 (**gas tank sending unit**).

99-04 Attach the other end of the same color wire to the fuel pump/fuel gauge sender wire using a TAP connector.

Battery Charging

87-95 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.

90-93 Attach the other end of the same wire to the gray plug pin #2 (**Dimmer to High Beams**) using red connectors.

96-98 Attach the other end of the same wire to the High beam indicator (+).

99-04 Attach the other end of the same wire to the Power – Hot w/high beams on.

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° 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.

With the dash lying face down on a clean tabletop, bend the edges of the dash down 1.25" in from the ends so they are at a 45° angle.



The dash should be installed after the body to make sure you have access to the screws.



Install your switches and horn button.



The factory Five Vintage gauges have built-in indicator lights so the large dash mounted ones included are not necessary.



Mount the turn signal switch and high low beam switch as well as indicators in the dash. These can be mounted wherever you like, use a 1/2" drill bit for the holes on both the switches and indicator lights.

Remove the upper steering shaft.

Raise the dash up so that it is between the body and the chassis dash hoop.

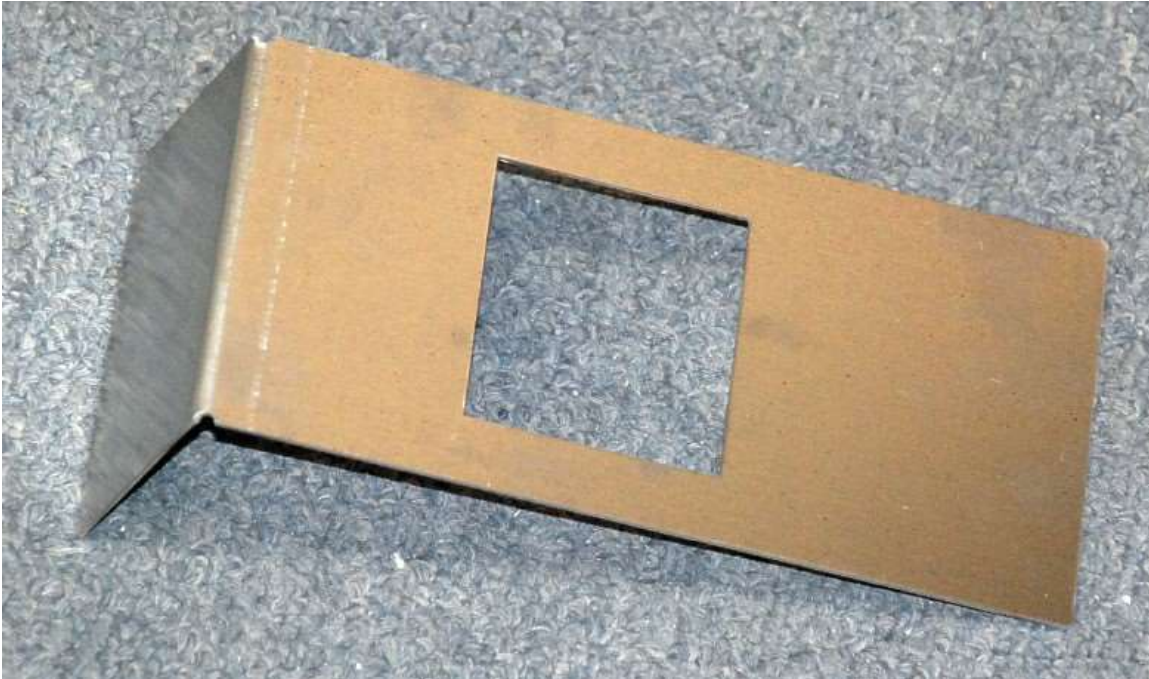
Insert the upper steering shaft back through the bearing and into the steering shaft.

Move the dash so that the steering shaft is centered left to right in the opening.

Drill for the dash mounting screws (5 evenly spread) through the dash and chassis with a $\frac{1}{8}$ " drill bit then drill back through the dash only with a $\frac{3}{16}$ " bit

Screw the dash to the chassis using the black #8 screws with washers.

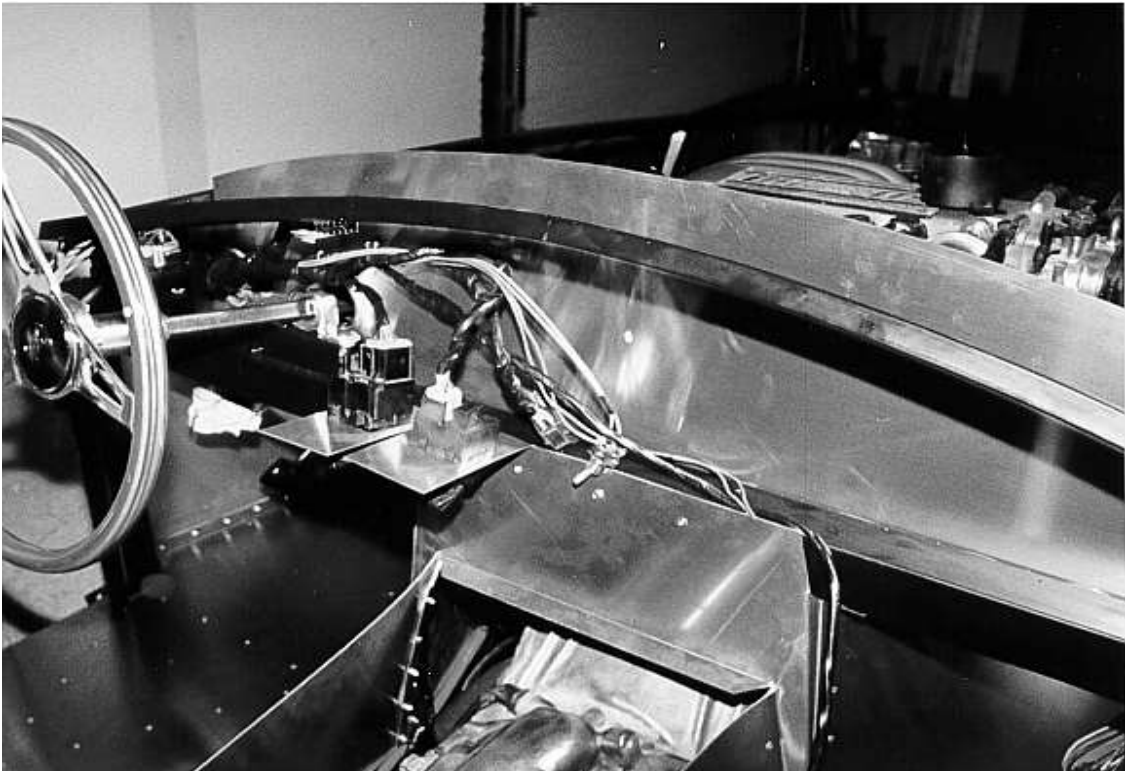
Push the ends of the dash behind the top of the door hinge and screw through the hinge into the dash end.



Unpack the dash support/headlight/hazard brackets from the packaged aluminum.



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.

Steering wheel center section

- ✂ WD40, $\frac{5}{32}$ " 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.



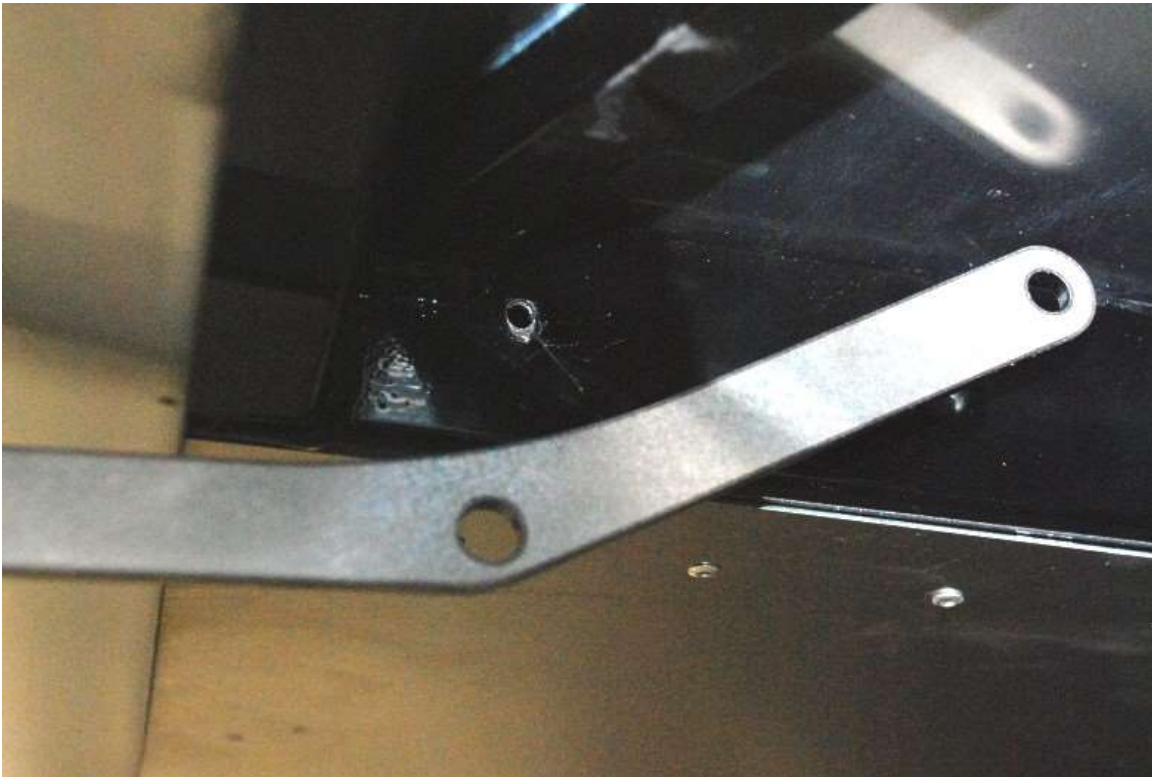
With the steering wheel in the position that is most comfortable for you tighten the set screws on the collar of the upper steering bearing.

Side Exhaust

- ✂ $\frac{3}{16}$ ", $\frac{5}{16}$ " Hex key, $\frac{3}{8}$ ", $\frac{1}{2}$ ", $\frac{9}{16}$ " socket, ratchet, $\frac{9}{16}$ " wrench, drill, $\frac{3}{16}$ ", $\frac{5}{16}$ " drill bits
- 🚗 4 into 4 Side Exhaust, $\frac{5}{16}$ "x 1" button head screws, $\frac{5}{16}$ "x 1.5" button head screws, $\frac{5}{16}$ "x 2.5" button head screws, #14 x 1.5" tapping hex head screw, $\frac{3}{8}$ "x 1.25" socket head screws and mechanical locknuts



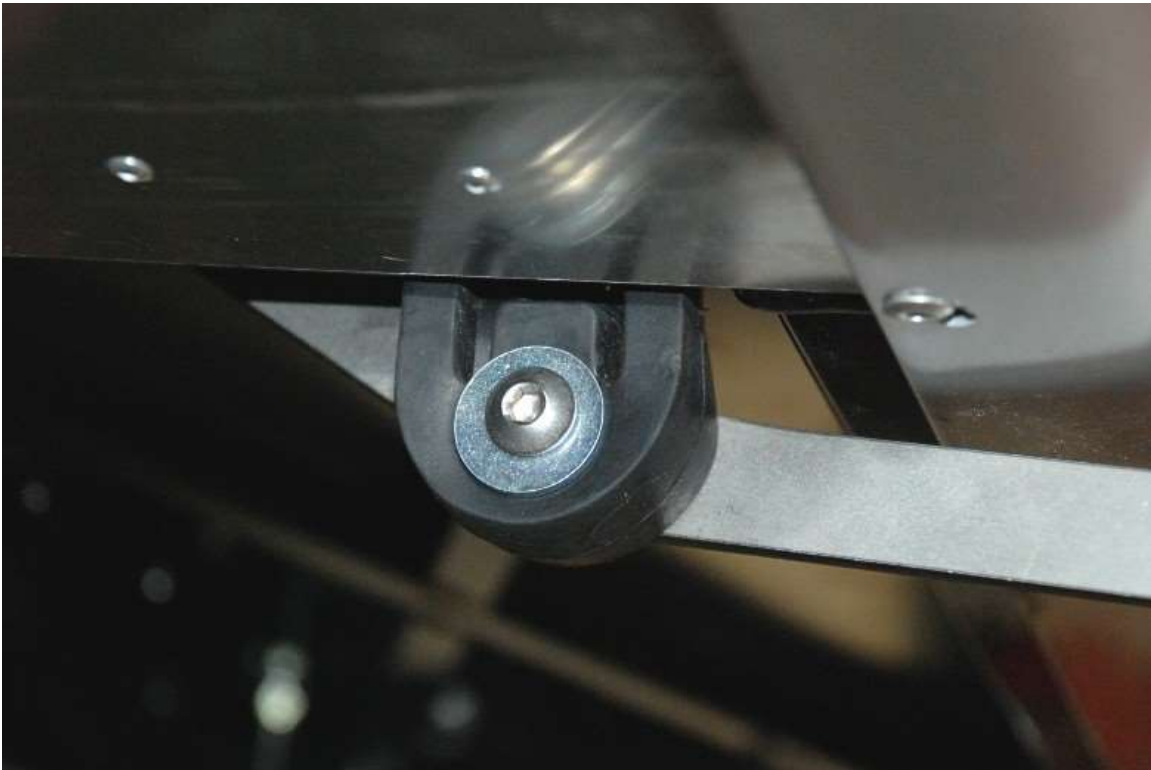
Bolt the pipe and gasket to the header or J-pipe flange with using the $\frac{3}{8}$ "x 1.25" socket head bolts and mechanical locknuts.



Drill a $\frac{3}{16}$ " hole in the 2"x 2" outrigger tube directly above the middle hole in the mounting bracket. You want this hole as high as you can get it while still being able to mount the rubber exhaust hanger. About $\frac{1}{2}$ " down from the aluminum floor.



Screw the rubber hanger onto the chassis with the #14 x 1.5" tapping screw using one of the washers between the rubber and the head of the screw.



Bolt the bottom section of the hanger to the side exhaust mounting bracket using the middle length $\frac{5}{16}$ " button head bolt with a washer to keep the hanger in place.



Using the inner hole of the bracket as a guide, drill the 2"x 2" outrigger all the way through both of the tube walls and into the footbox area with a $\frac{5}{16}$ " bit.



Insert the rubber standoff between the bracket and outrigger and put the nut on finger tight then run the long $\frac{5}{16}$ " bolt through from inside the footbox into the threads in the standoff.



Tighten the whole assembly together.

Aluminum Splash guards

- ✂ $\frac{1}{8}$ ", $\frac{3}{16}$ " drill bit, drill, rivet gun, silicone, caulking gun, $\frac{3}{4}$ " socket, ratchet, extension, marker
- 🚗 Secondary body fasteners, packaged aluminum, front wheel and tire

FRONT WHEEL



Put some of the press-on bulb seal around the outside edge of the aluminum front splash guards (they look like large elephant ears) where they will contact the body.

Hold the splashguards up against the rear bent lip of the engine bay “F” aluminum. Overlap the two lips.



Fit the splash guards in position. If needed, trim them to fit around the outside edge, the weatherstrip will cover the trimming.

Put a wheel and tire on the car and check for aluminum clearance. If necessary, push the aluminum in and mark the inside of the body at the outer edge of the splashguards.

Remove the wheel.



Silicone and rivet the panels in place down the length of the flange.

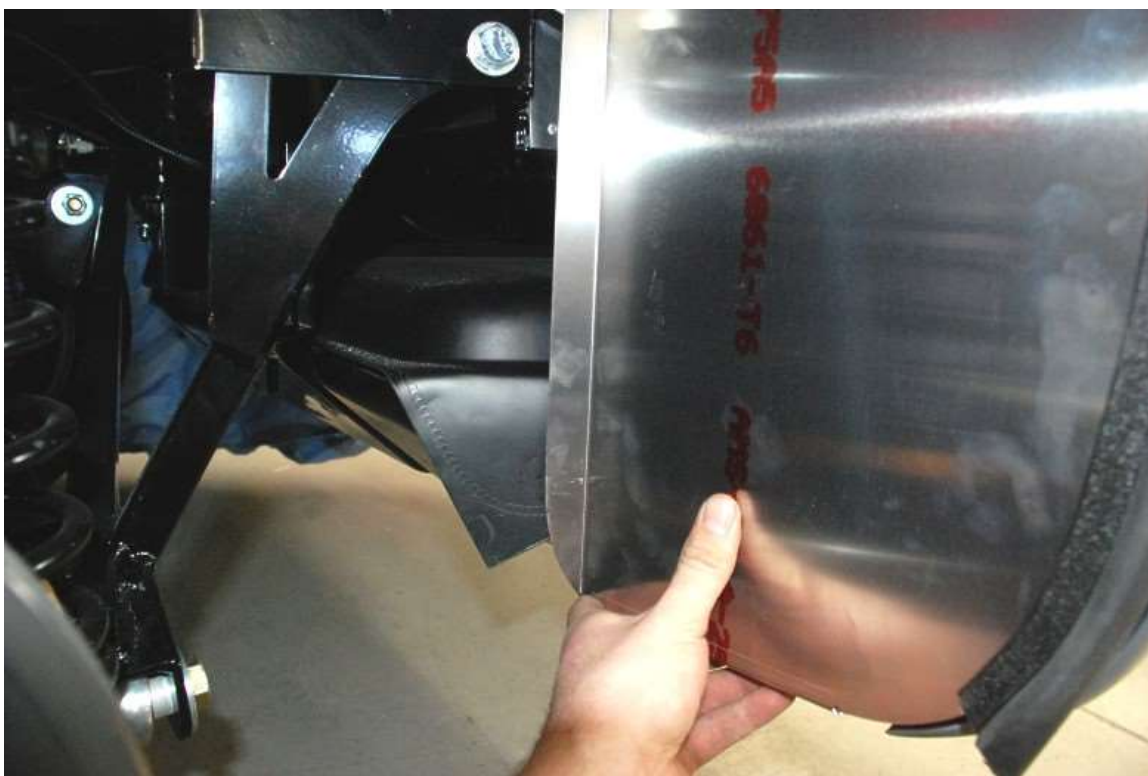


Use one of the $\frac{3}{16}$ " rivets to attach to the bottom of the fender just forward of the exhaust cut-out.

REAR WHEEL



Push a piece of the bulb seal weather stripping around both rear splash guards where they will contact the body.



Fit the panels in place and trim the outside perimeter if needed. The small tab on the bottom faces towards the rear of the car and is on the bottom. The bent edge should be vertical and aligned with the trunk side pieces where they drop down, behind the quad shock mounts. It should sit on top of the $\frac{3}{4}$ " vertical tube that is behind the trunk wall. You may also need to bend the flange of the gas tank down a little to get the panel in place.



Silicone and rivet the panels in place.



Bend the lower tab by hand to fit up flush with the body.



Use a long 1/8" rivet as low as possible to attach the tab to the lower fender.



Finishing Touches

Review the Race car checklist in the appendix.

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 $4\frac{1}{2}$ " at the front and $4\frac{1}{2}$ " at the back measured to the bottom of the 4" round tube with the normal amount of people/weight in the car.

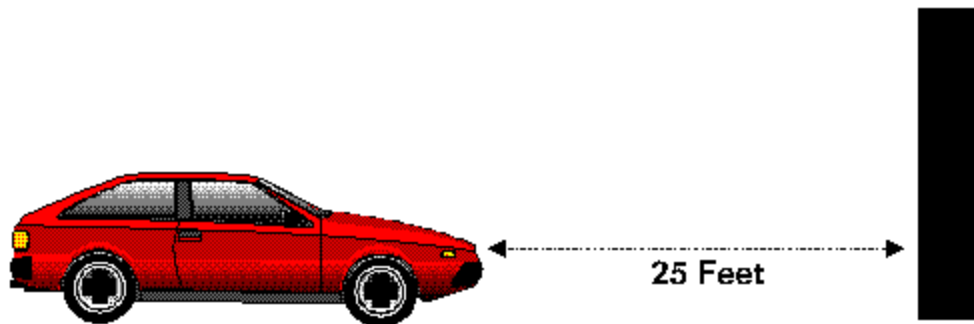


It is important that the headlights are aimed properly in order for them to perform at their best. Lights that are aimed incorrectly will not only perform poorly but may also offend oncoming traffic. When replacing bulbs, it is a good idea to verify that your lights are properly aimed. Slight variances in filament position can translate to large variances in beam pattern. The following procedure does not require special aiming equipment and ensures proper aim.

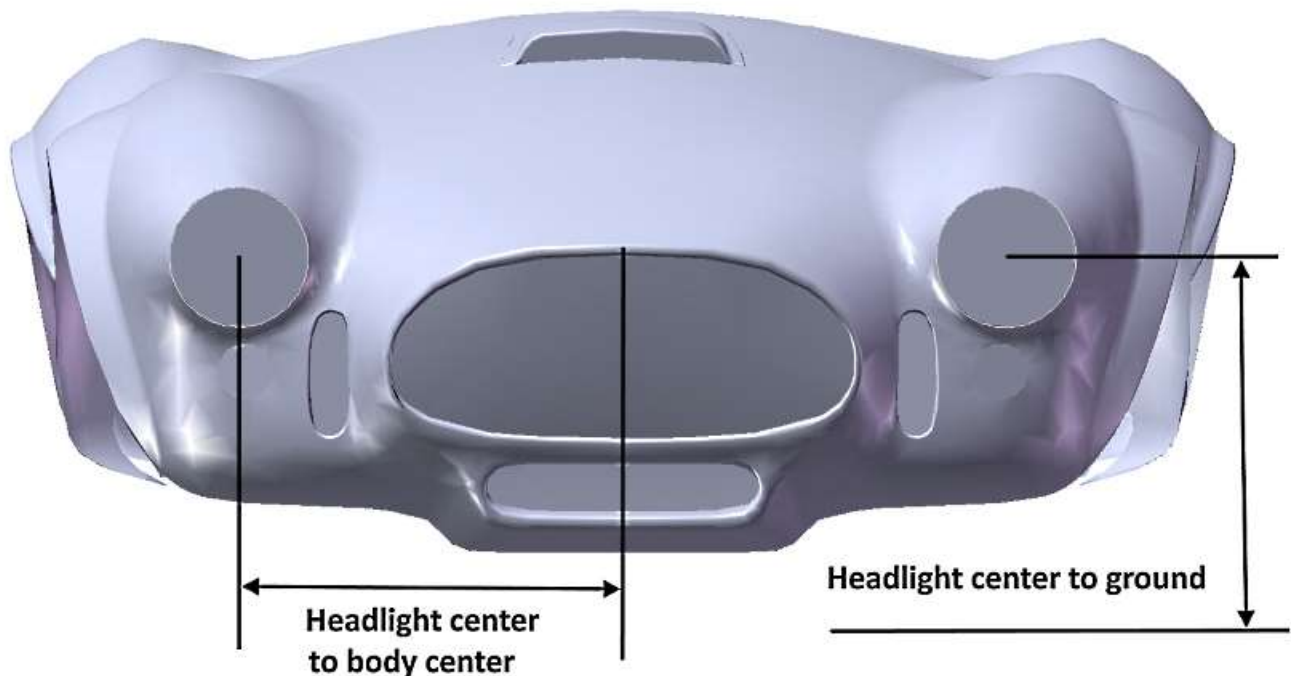
Find a flat, level surface next to a vertical white wall where the car can be parked (a garage door is an ideal location at home).

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.

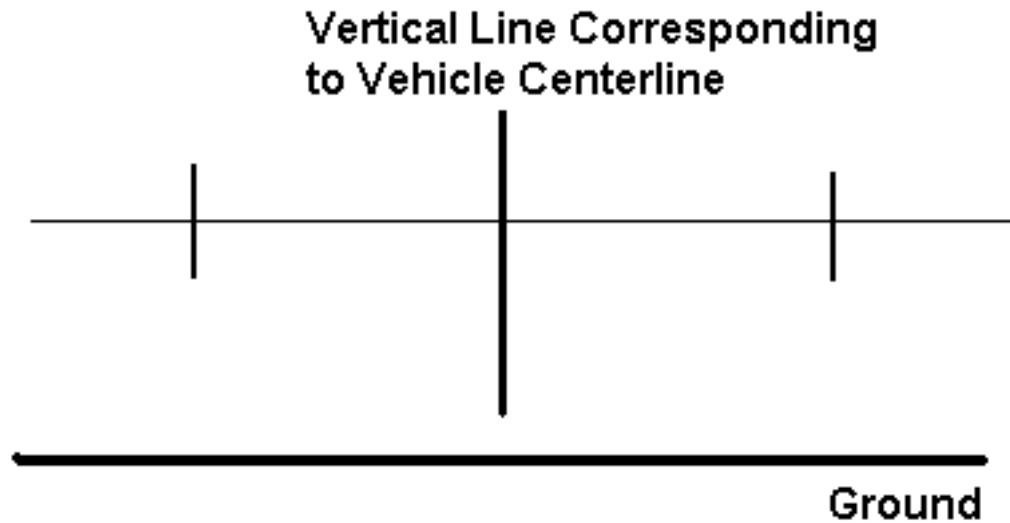


Make the following two measurements and write them down:

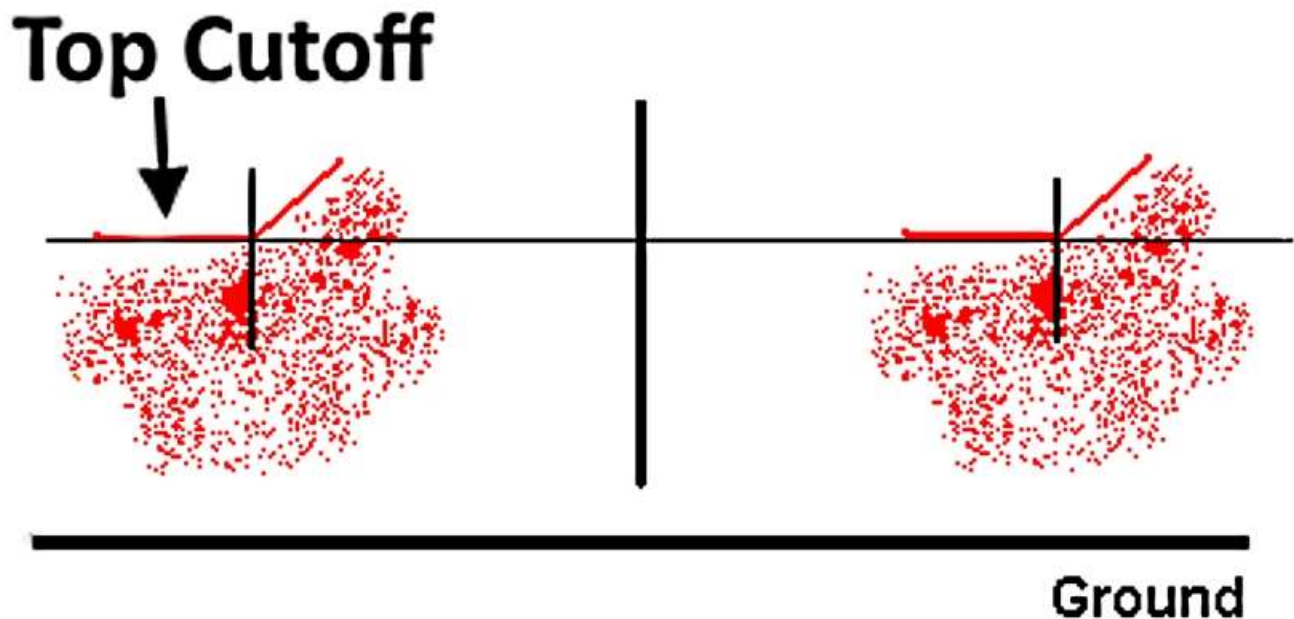
Measurement A: From the ground to the geometric center of one of the headlight lenses

Measurement B: From one of the low beam headlights to the vehicle centerline.

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.

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: $\frac{1}{16}''$

For a car using power steering car use the following specifications:

Caster: 7°

Camber: -0.5°

Total Toe: $\frac{1}{16}''$

Rear (IRS only)

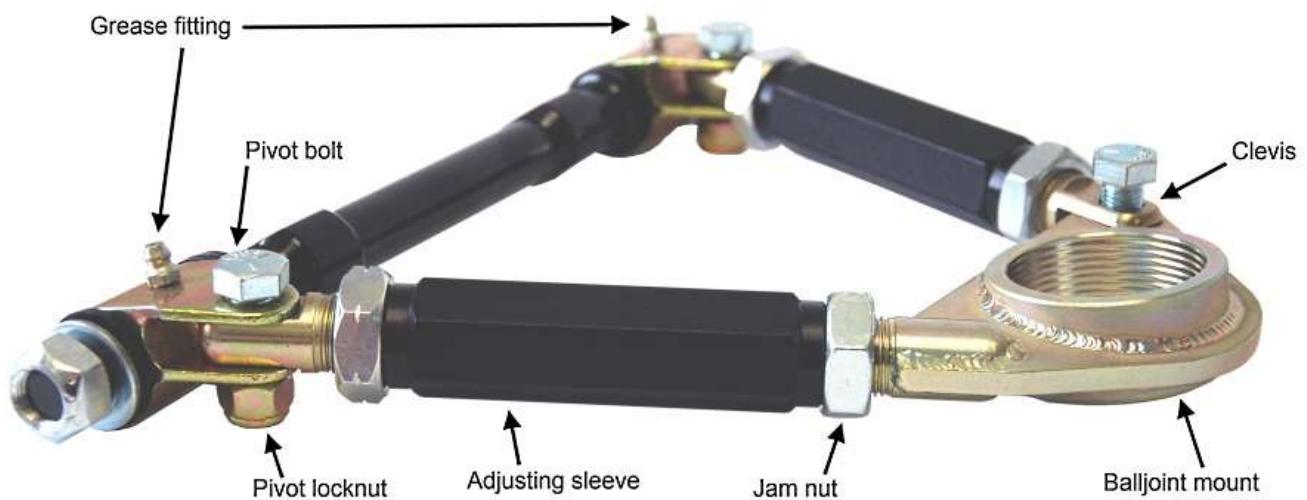
Camber: -1°

Total Toe: $\frac{1}{16}''$

Adjusting the upper control Arm



Use the diagram below for reference.



Slightly loosen the three pivot bolts using a $\frac{5}{8}''$ wrench and socket.

Loosen the jam nuts on both ends of each adjusting tubes using a $1\frac{1}{8}''$ 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 lb-ft**. Grease both ends using chassis grease frequently to insure smooth, trouble free operation.



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

Check out factoryfive.com for the latest options available.

Instructions are available in the parts catalog at www.factoryfiveparts.com

Performance Reference Material and Technical Support



Maintenance

Check the items on the race car check sheet in the Appendix on a yearly basis or before track days depending on how hard the car is driven.

Wheels



Only 7"-9" wheels are recommended for the front. If using a wheel wider than 7", FFR front lower control arms are needed to prevent the wheels rubbing the control arms.

Below is a chart indicating the **REAR** wheel sizes and backspacing that are possible using the Mark IV kit:

Rear Wheel Backspace Equations

Max Tire width	87-93	94-98	99-04
275mm*	$(\text{Width}/2)+1$	$(\text{Width}/2)+2$	$(\text{Width}/2)+2.75$
315mm	$(\text{Width}/2)+1.625$	$(\text{Width}/2)+2.5625$	$(\text{Width}/2)+3.25$

*Can be used up to 10.50" wide wheel

	99-04	94-98	87-93	
OEM 17"x 8" FRONT/REAR	5.72	5.72	5.72	MAX TIRE WIDTH 245/45 R17
AFTERMARKET 17"x 9"	-	6.00	6.00	MAX TIRE WIDTH 275/40 R17
AFTERMARKET 17"x 10.5"	-	-	6.80	MAX TIRE WIDTH 315/35 R17

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.

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.



Left: FFR car using late model 17" Cobra™ R rims. Right: Ford Racing Cobra™ R 17" wheels and 12" Cobra™ Brakes.



17"x 9" and 17"x 10.5" FR style wheels.

For a more vintage look, take a look at our Halibrand 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

1994-1998 REAR END

Use two (4) 9" wide, 5.95" backspace wheels in the front and the rear. If you would like a wider tire than this in the rear it is possible to use aftermarket 10.5" wide, 27mm offset wheels if the axles and caliper brackets are changed so that the rear is the same width as the 87-93 rear ends. See the table above for different width wheel backspacing.

1999-2003 REAR END

Because of the width of this rear end, custom wheels are needed if 10" or wider wheels are wanted. Use two (2) 9" wide, 5.95" backspace wheels in the front. See the table above for different width wheel backspacing.

Performance Modifications

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 motor up. If you change the rear end gears, don't forget to recalibrate your speedometer so that the speedometer reads correctly.

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 87-93 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 87-93 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 87-93 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 **Trick Flow** 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 Mustang: 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 1½" MAC shorty unequal length headers or Ford Racing 1½" 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.

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

Factory Five offers some great Wilwood Brake packages that are designed to fit inside the Factory Five wheels. See www.factoryfiveparts.com for more information.

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 (No longer available), 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 Panther Plus, 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 $1\frac{5}{16}$ " 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

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

13" Front/12.19"Rear

FFR Roadster two piece front spindles

Wilwood 13" front brakes

Wilwood 12.19" rear brakes

Rear

For 87-93 width rear axle

11.65" Rear

Factory Five Performance 11.65" Brake Set

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 $\frac{15}{16}$ ” 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.

11.65” Rear

Factory Five 11.65” IRS Brakes (FFR#14778)

12.19” Rear

Factory Five Wilwood IRS Brakes

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	$\frac{5}{8}$
3.6 to 4.2	$\frac{7}{10}$
4.2 to 4.5	$\frac{3}{4}$
4.5 to 4.7	$\frac{13}{16}$
4.7 to 5.5	$\frac{7}{8}$
5.5 to 5.9	$\frac{15}{16}$
5.9 to 6.3	1
6.3 to 7.6 max	$1\frac{1}{8}$

Factory Five Racing

Disc Brakes R' Us

Mustang Part's Specialties, Inc.

Porterfield Enterprises Ltd.

508-291-3443 www.factoryfiveparts.com

888-558-5757 www.discbrakesrus.com

770-867-2644 www.stangparts.com

800-537-6842 www.porterfield-brakes.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.

Superchargers

Factory Five Racing customers have successfully installed Kenne Bell, Vortech, and Powerdyne superchargers in their cars. The key to any supercharger installation seems to be the side that the supercharger is hooked up on. Use the ones that mount on the passenger side. The drivers' side blowers may get in the way of the steering shaft if the blower is too big. Alternate brackets may be available from the manufacturer to remedy this situation.



Installed supercharger.

Seats

For the road racers/autocrossers that want more side support, Factory five offers a variety of different options. Check out www.factoryfiveparts.com

Helpful Reference Material

MUST READS

- www.thefactoryfiveforum.com The largest discussion forum for Factory Five Racing kits. Also has many vendor links.

HELPFUL

- 5.0L Ford Dyno Tests. By Richard Holdener. www.cartechbooks.com
- Building 4.6/5.4L Ford Horsepower. By Richard Holdener. www.cartechbooks.com
- Engineer to Win. By Carroll Smith. www.motorbooks.com
- Prepare to Win. By Carroll Smith. www.motorbooks.com
- Ford Fuel Injection & Electronic Engine Control, 1988-1993. By Charles O. Probst. www.bentleypublishers.com/ford/mustang
- The Official Mustang 5.0 Technical Reference and Performance Handbook. By Al Kirschenbaum. www.bentleypublishers.com/ford/mustang

CATALOGS/PARTS

- **Ford Racing Performance Parts** - Catalog, current edition. Available at your local speed shop, an authorized Ford Racing distributor or www.fordracingparts.com
- **Tire Rack** - 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

- Check out the vendors section of www.thefactoryfiveforum.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
- Hagerty Insurance - www.hagerty.com

A Final Note about Completed Cars and Car Builders

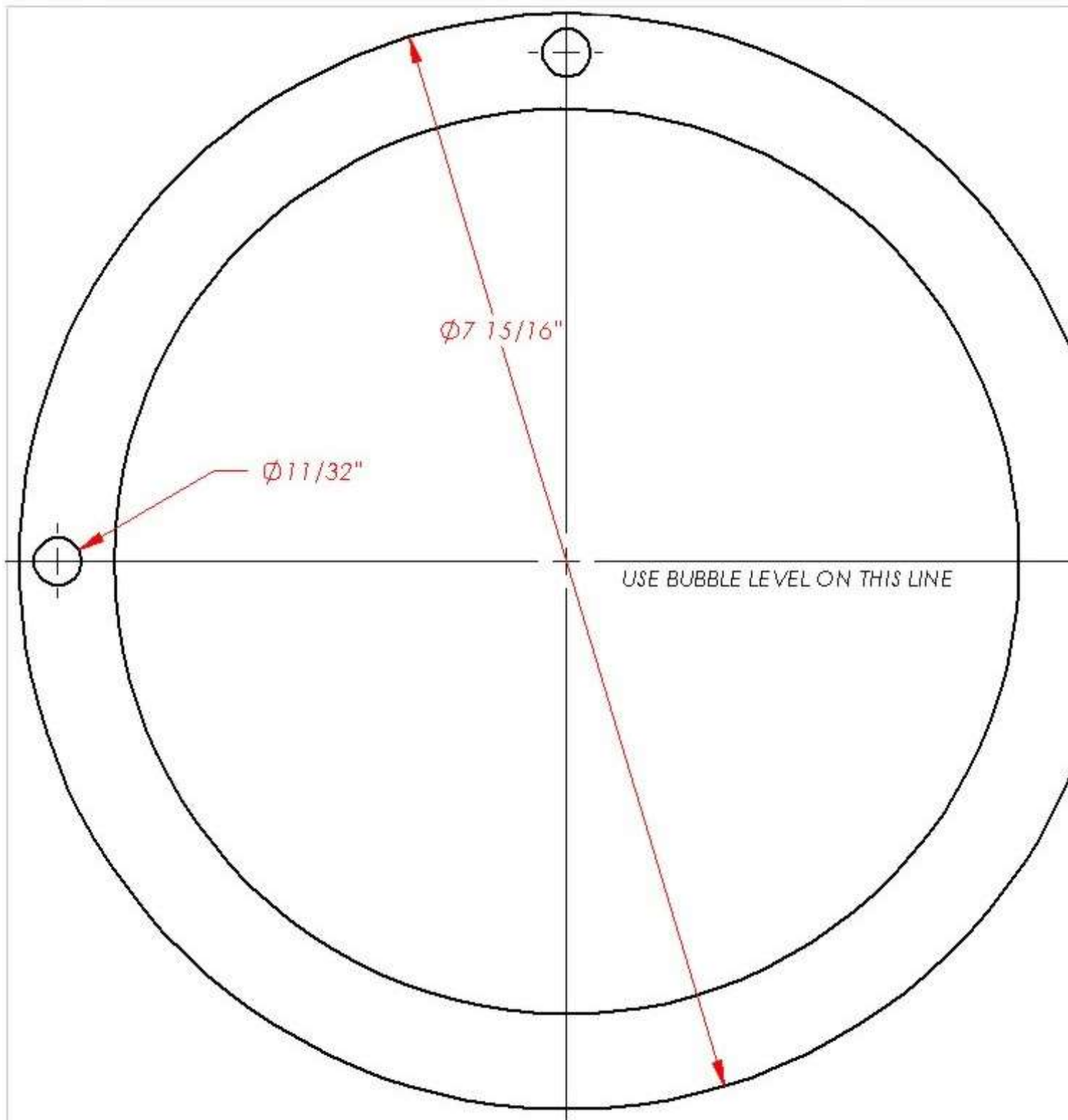
If you are reading this manual then you must be at least contemplating the task of building your own race car. Many component car companies offer services to those folks who find part or all of this too much to tackle. We don't.

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



PROPRIETARY AND CONFIDENTIAL
THE INFORMATION CONTAINED IN THIS
DRAWING IS THE SOLE PROPERTY OF
FACTORY FIVE RACING, INC. ANY
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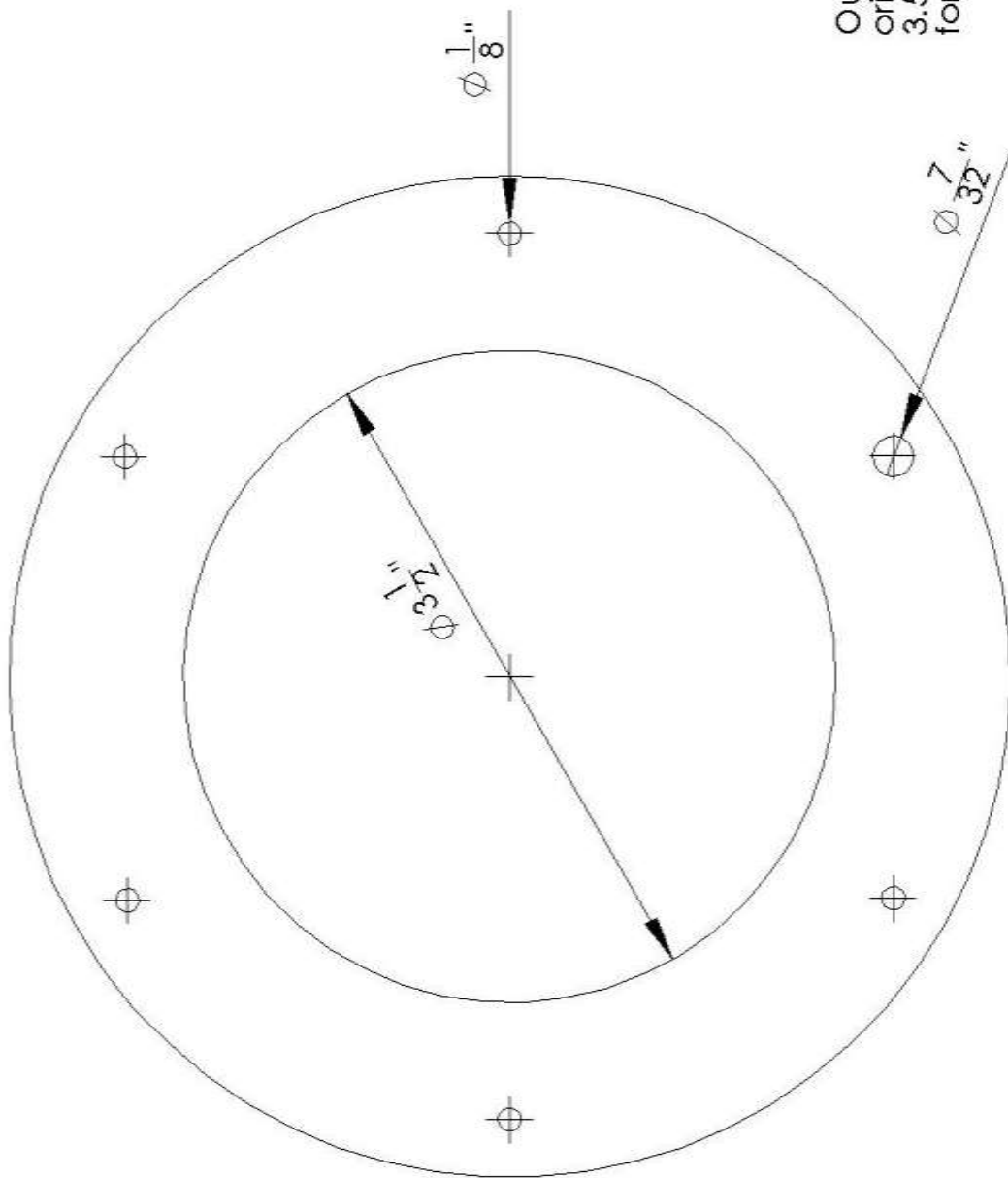
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COUPE			
	MATERIAL	ENG APPR.	
		MFG APPR.	
USED ON	Finish	D.A.	
APPLICATION	PRINTED	COMMENT:	
	6/30/2010		



Factory Five Racing, Inc.

HEADLIGHT TEMPLATE

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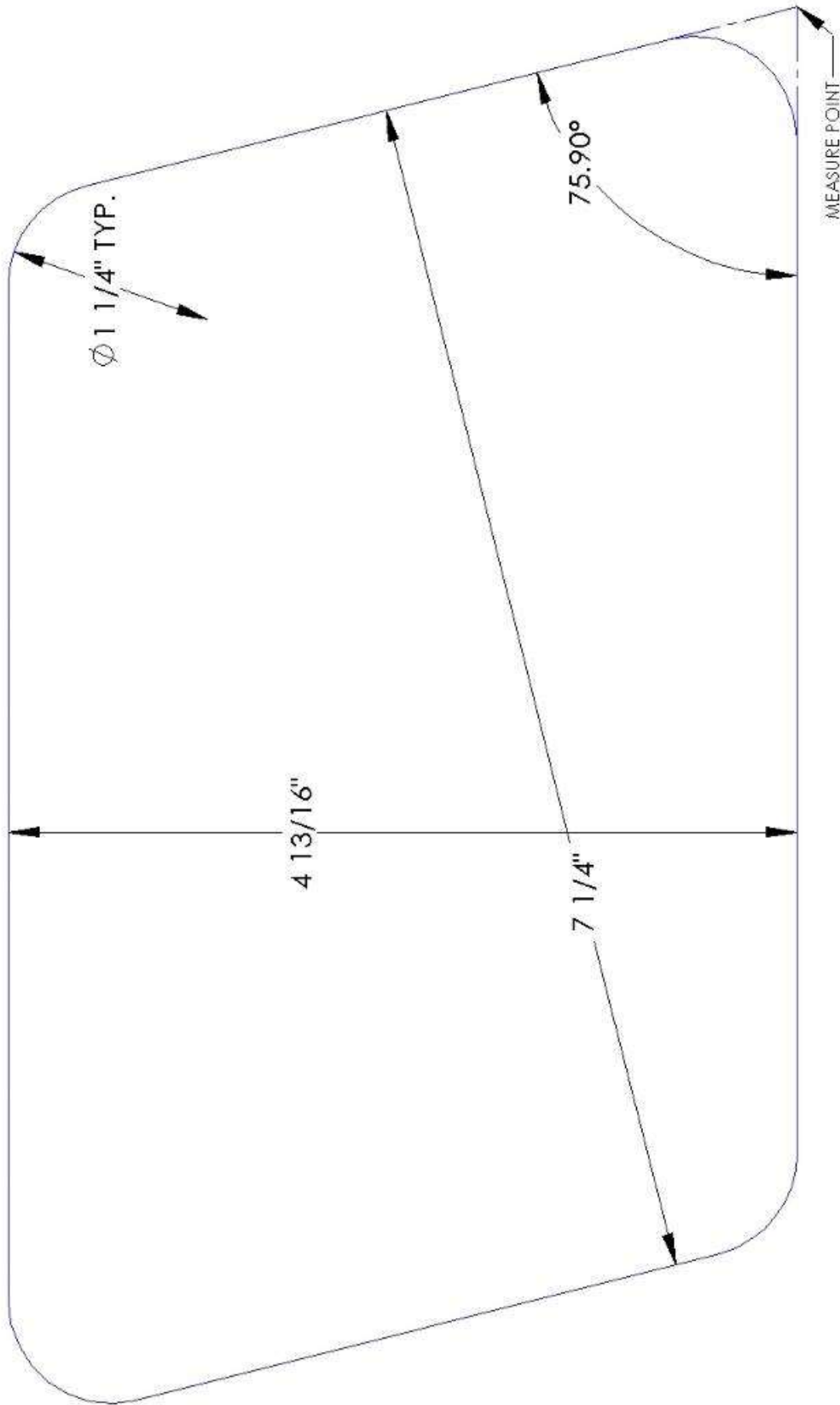


Outside circle is shown for placement orientation only, do not cut. Use a 3.5" holesaw in center and 1/8" drill bit for all except one small hole.

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		JL	9/26/97
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		G.A.	COMMENTS
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COUPE			
USED ON			
SIZE DWG. NO. A 11009			

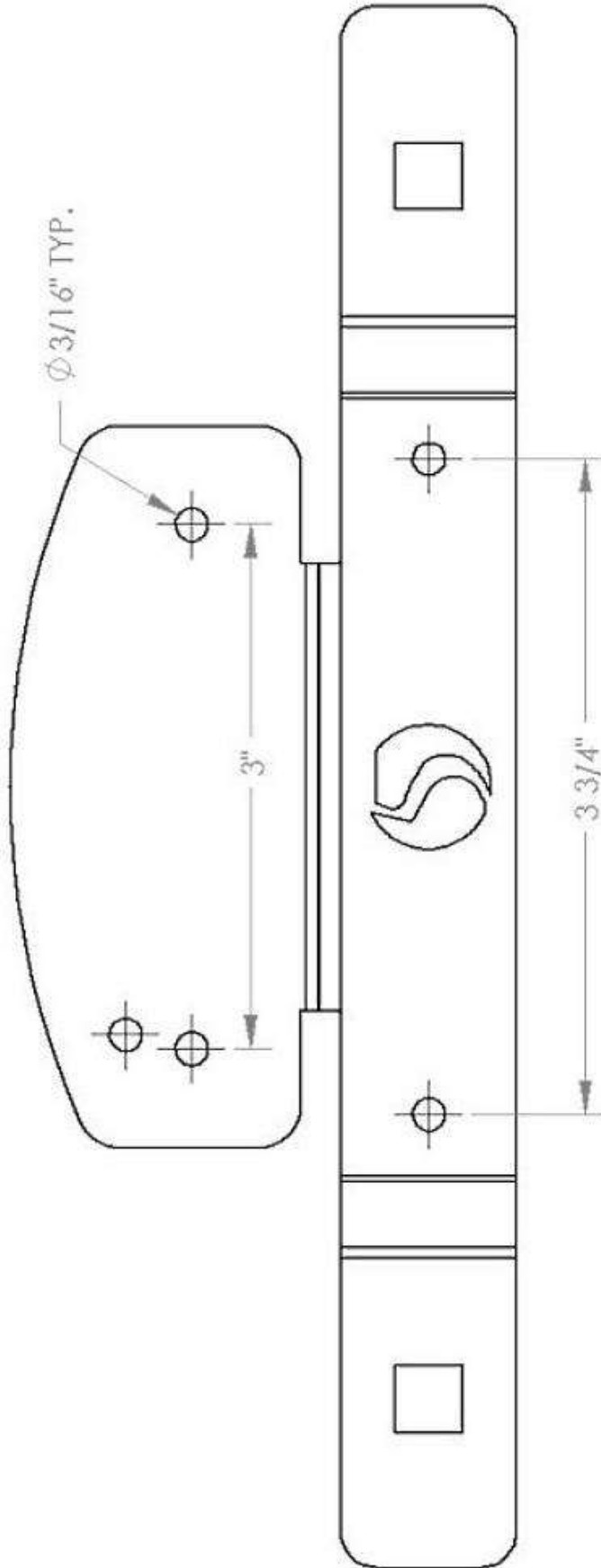
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REVISIONS		
REV.	DESCRIPTION	DATE
A	INITIAL RELEASE	12/7/11



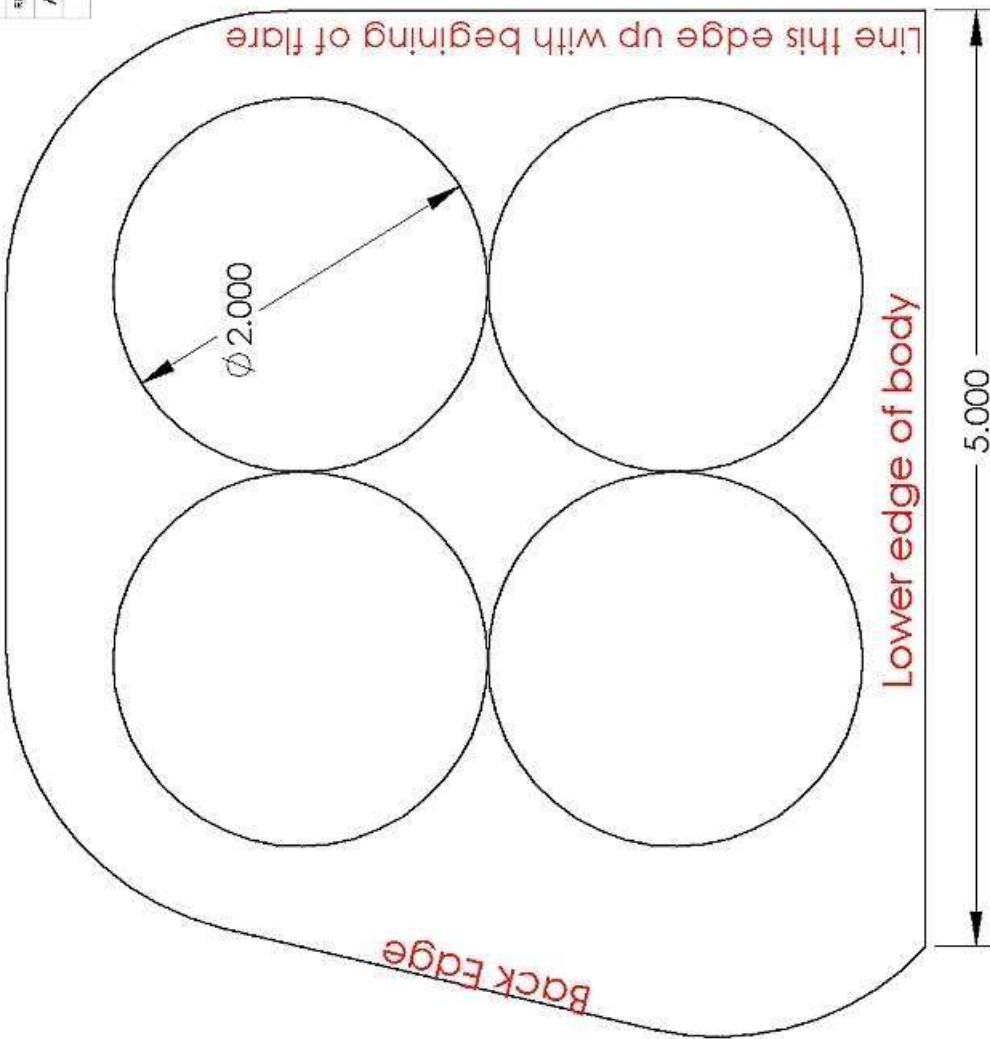
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	ROADSTER SPEC CAR		
	MATERIAL		
	PROPRIETARY AND CONFIDENTIAL THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF FACTORY FIVE RACING, INC. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF FACTORY FIVE RACING, INC. IS PROHIBITED.		
TITLE: A SIZE: A DWG. NO.: 15464		REV: A	

REV.	DESCRIPTION	DATE	APPROVED
C	ONE PIECE DESIGN	12/16/04	



Factory Five Racing, Inc. 		NAME	DATE	SIZE	DWG. NO.	REV
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MATERIAL 16 GA STEEL		Q.A.		SCALE: 1:1		
FINISH CHROME		COMMENTS:		WEIGHT:		
USED ON APPLICATION		MOUNT HOLE TEMPLATE 3/29/2010		SHEET 1 OF 1		
PROPRIETARY AND CONFIDENTIAL THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF FACTORY FIVE RACING, INC. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF FACTORY FIVE RACING, INC. IS PROHIBITED.						

REV.		REVISIONS	
DESCRIPTION		DATE	
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		9/1995	
		APPROVED	

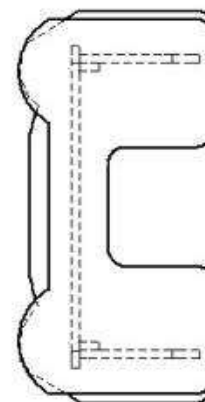
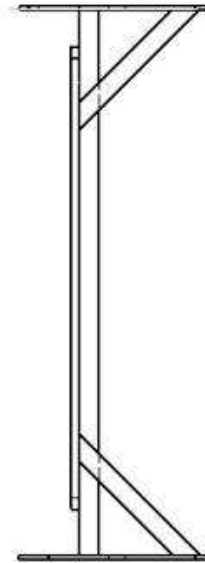
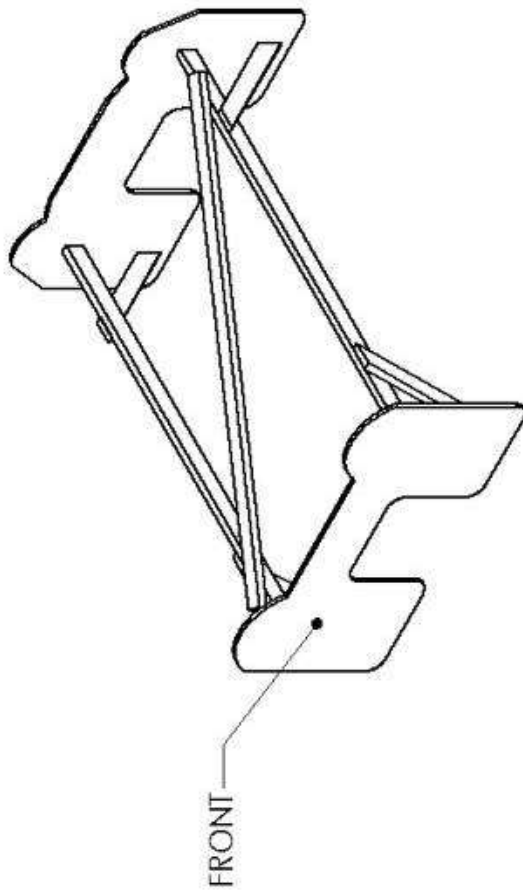


Note: This template is very tight,
you can always cut more.

Cut outline and use on both sides

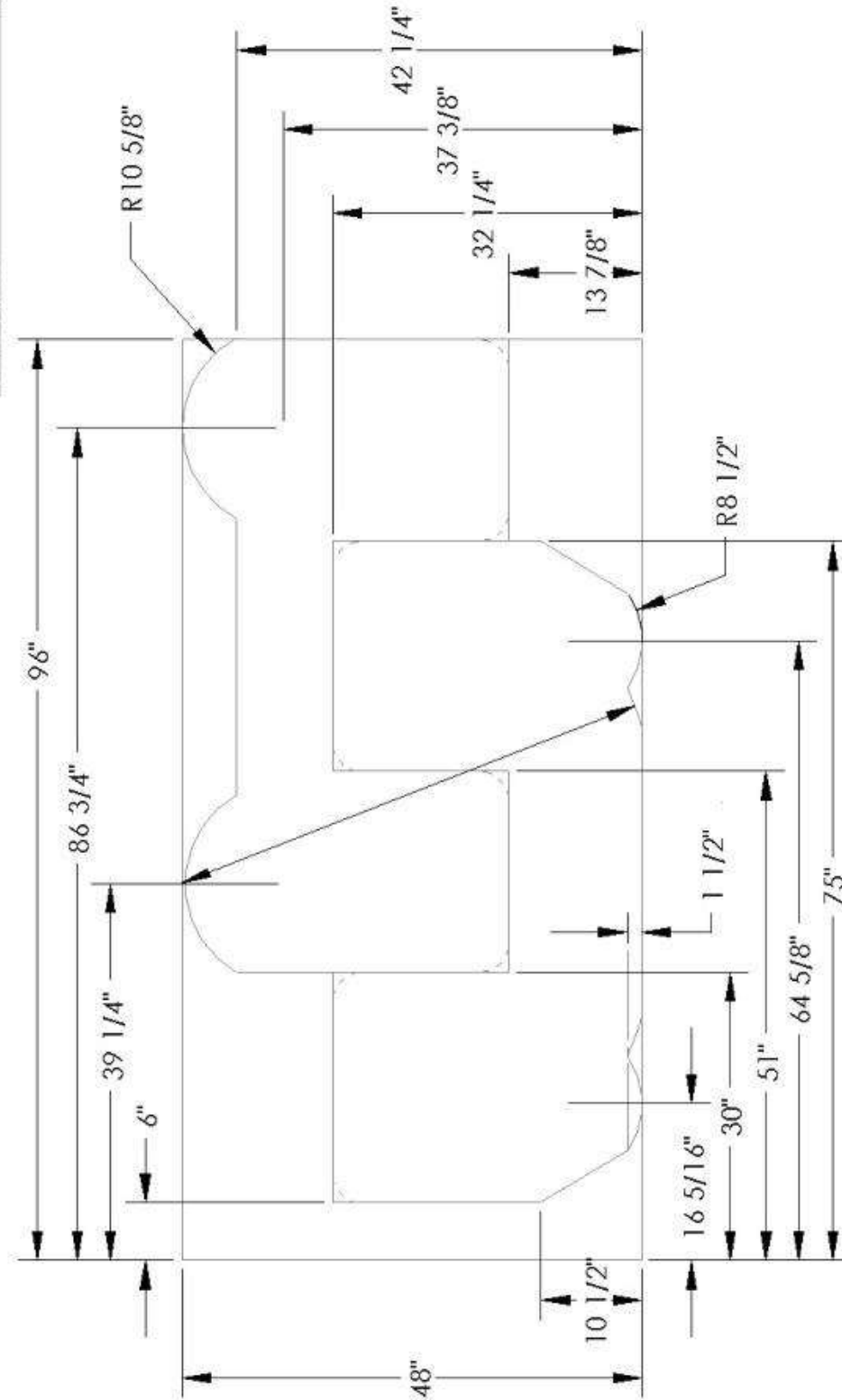
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SPEC CAR	ENG APPR.	MFG APPR.	Q.A.
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		A	11004
		REV	A

REV.	DESCRIPTION	DATE	APPROVED
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B	REDRAWN	1/21/04	



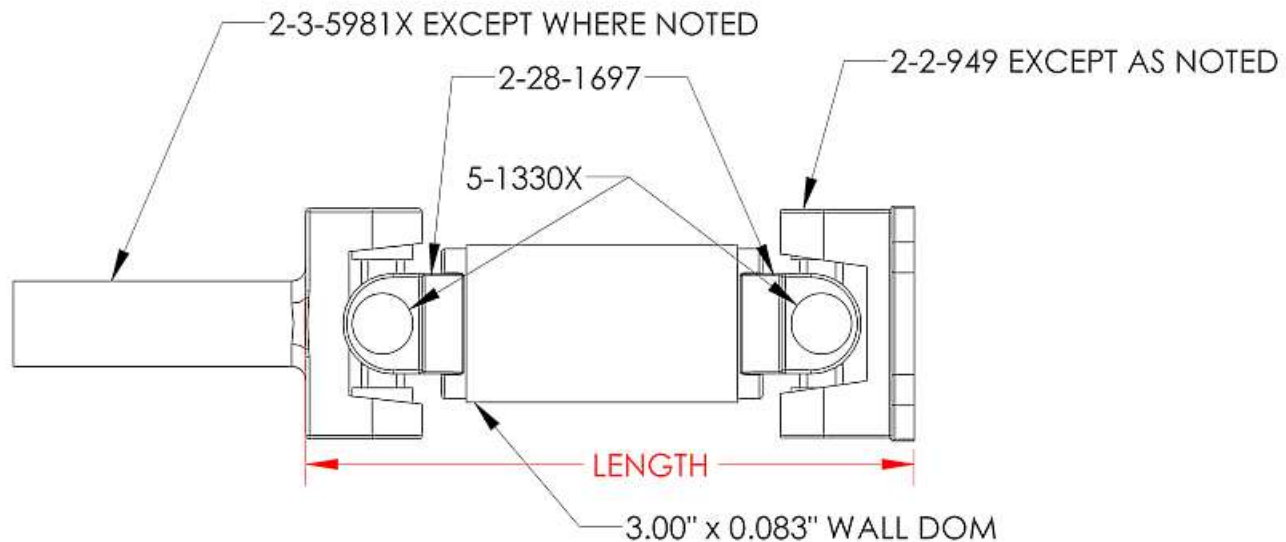
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THREE PLACE DECIMAL ± 0.005		MFG APPR.	
FOUR PLACE DECIMAL ± 0.001		Q.A.	
MATERIAL		COMMENTS:	
FINISH			
PRINTED		3/29/2010	
USED ON		APPLICATION	
PROPRIETARY AND CONFIDENTIAL THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF FACTORY FIVE RACING, INC. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF FACTORY FIVE RACING, INC. IS PROHIBITED.		SIZE	DWG. NO.
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		SHEET 1 OF 2	REV
			B

REV.	DESCRIPTION	DATE	APPROVED
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B	REDRAWN	1/21/04	



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		Q.A.		REV B	
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		UNLESS OTHERWISE SPECIFIED:			
		DIMENSIONS ARE IN INCHES			
		TOLERANCES:			
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		THREE PLACE DECIMAL ±0.005			
		FOUR PLACE DECIMAL ±0.001			
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		FINISH			
		PRINTED			
		3/29/2010			
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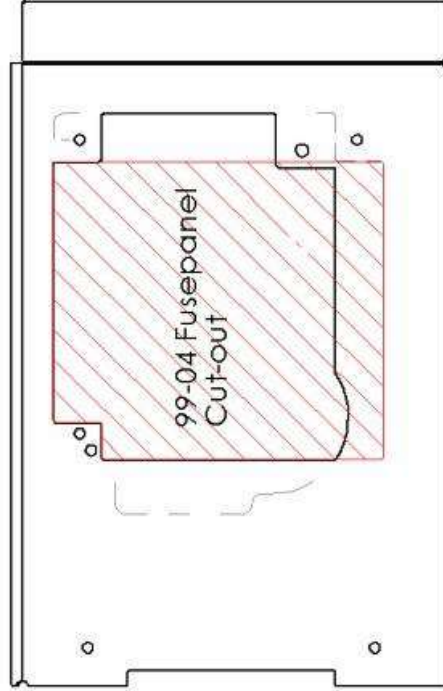
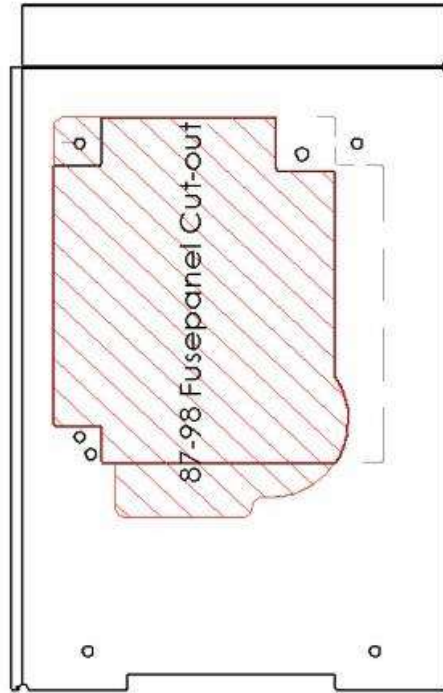
MODEL	FFR#	SPLINE	DESCRIPTION	LENGTH
COUPE	60375	31	COYOTE w/2015 IRS, 6SPD MAGNUM, 2-3-6041X YOKE, 2-2-489 FLG	9.75
COUPE	60453	28	302/351 w/2015 IRS, T-5/AOD, 2-2-489 FLG	10.50
COUPE	60450	31	302/351 6 SPD MAGNUM, 2-3-6041X YOKE	10.50
COUPE	60175	31	302/351 w/2015 IRS, TKO, 4.6L/COYOTE TKO ROADSTER, 2-3-6041X YOKE, 2-2-489 FLG	10.50
COUPE	60455	31	COYOTE 6 SPD MAGNUM, 2-3-6041X YOKE	12.75
COUPE	60376	31	COYOTE w/2015 IRS, TKO, 2-3-6041X YOKE, 2-2-489 FLG	12.75
COUPE	60454	28	302/351 T-5/AOD	13.50
COUPE	16349	31	302/351 TKO, 2-3-6041X YOKE	13.50
COUPE	60452	31	COYOTE TKO, 2-3-6041X YOKE	15.75
HOT ROD	34048	27	CHEVY w/2015 IRS, 700R4/4L60/4L65E (EXCEPT VETTE), 2-3-12051X YOKE, 2-2-489 FLG	31.00
HOT ROD	34049	31	302/351/4.6L/COYOTE w/2015 IRS, TKO, 2-3-6041X YOKE, 2-2-489 FLG	31.25
HOT ROD	34050	28	302/351/4.6L/COYOTE w/2015 IRS, T-5/AOD, 2-2-489 FLG	31.25
HOT ROD	34046	31	CHEVY w/2015 IRS, TKO, 2-3-6041X YOKE, 2-2-489 FLG	32.1875
HOT ROD	34880	27	CHEVY 700R4/4L60/4L65E (EXCEPT CORVETTE), 2-3-12051X YOKE	35.00
HOT ROD	34881	28	302/351/4.6L/COYOTE T-5/AOD	35.25
HOT ROD	34882	31	302/351/4.6L/COYOTE TKO, 2-3-6041X YOKE	35.25
HOT ROD	34883	27	CHEVY 4L60/4L65E, 2-3-12051X YOKE	35.75
HOT ROD	34884	31	CHEVY TKO, 2-3-6041X YOKE	36.1875
ROADSTER	15956	28	302/351 w/2015 IRS, T-5/AOD, 2-2-489 FLG	8.375
ROADSTER	16038	31	302/351 w/2015 IRS, TKO, 2-3-6041X YOKE, 2-2-489 FLG	8.375
ROADSTER	60175	31	4.6L/COYOTE/LS w/2015 IRS, TKO, 2-3-6041X YOKE, 2-2-489 FLG	10.50
ROADSTER	16348	28	302/351 T-5/AOD	11.25
ROADSTER	16350	31	302/351 TKO, 2-3-6041X YOKE	11.25
ROADSTER	16349	31	4.6L/COYOTE/LS TKO/T-45/3650, BIG BLOCK TKO, 302/351 TKO COUPE, 2-3-6041X YOKE	13.50
35 TRUCK	34198	28	302/351/4.6L/COYOTE USING T-5/AOD, USE 2-2-489 FLG	38.50
35 TRUCK	34199	31	302/351/4.6L/COYOTE USING TKO, USE 2-3-6041X YOKE AND 2-2-489 FLG	38.50
35 TRUCK	34202	27	CHEVY USING 4L60/4L65E (1998+), USE 2-3-12051X YOKE AND 2-2-489 FLG	38.50
35 TRUCK	34200	27	CHEVY USING 700R4/4L60 (93-97 EXCEPT VETTE), USE 2-3-12051X YOKE AND 2-2-489 FLG	39.00
35 TRUCK	34201	31	CHEVY USING TREMEC TRANS. 2-3-6041X YOKE AND 2-2-489 FLG	39.4375



- NOTE: 1. FOR ALL OTHER TRANSMISSIONS, INSTALL TRANS. AND MEASURE.
2. 94-95 BELLHOUSING AND T-5 TRANS ARE LONGER SO SHORTEN DRIVESHAFT BY 0.75".

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	COUPE			DRAWN COMMENTS:			
	HOT ROD			JI 12/18/03			
	35 TRUCK			2015 IRS USE SPICER 2-2-489 PINION FLANGE			
USED ON	APPLICATION						

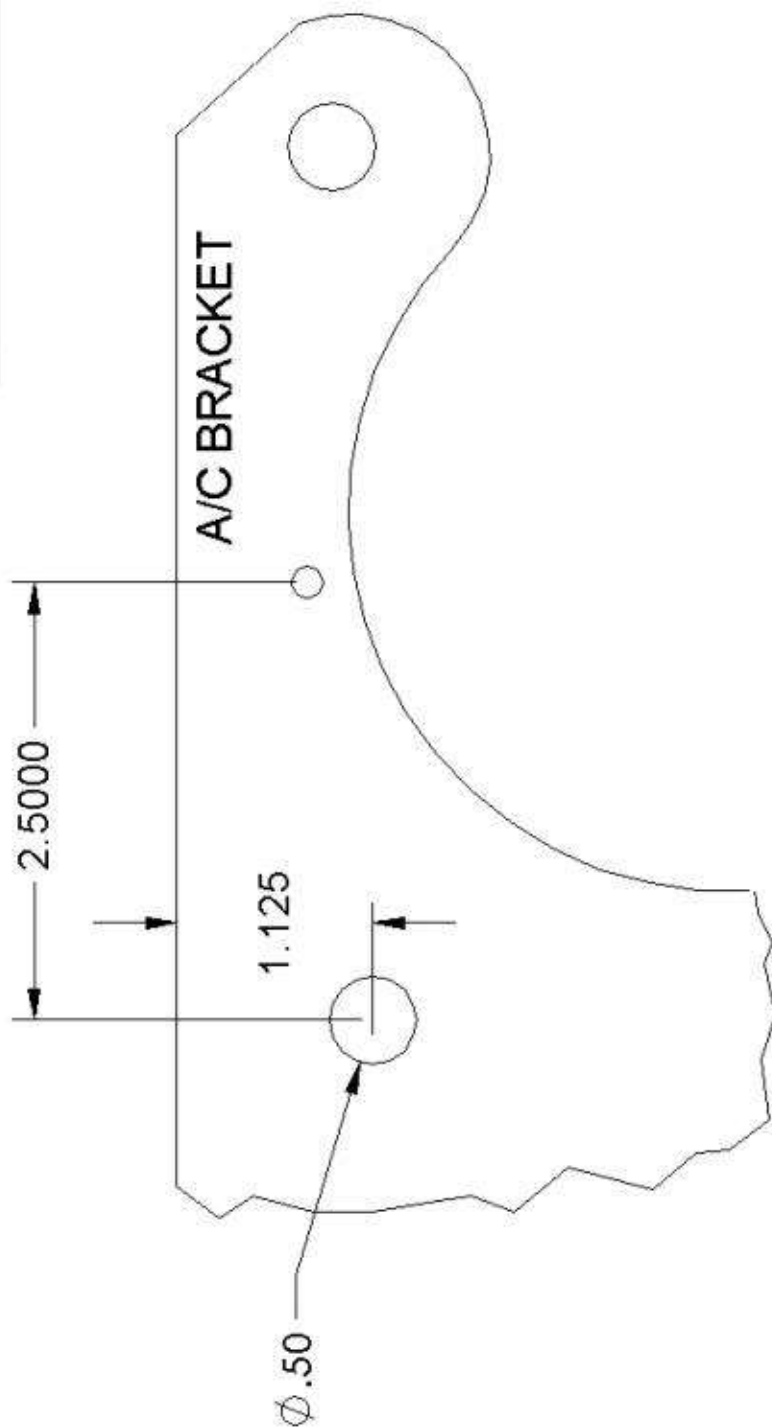
REVISIONS		
REV.	DESCRIPTION	DATE



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 Factory Five Racing, Inc.		DATE		3/2/05	
		NAME		JI	
TITLE: FUSE PANEL MOUNT		DRAWN	CHECKED	ENG APPR.	MFG APPR.
		Q.A.			
		COMMENTS:			
		NOT TO SCALE			
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					
USED ON					
APPLICATION					
PRINTED		4/14/2010			
SCALE: 1:2		WEIGHT:		SHEET 3 OF 3	

REV.	DESCRIPTION	DATE	APPROVED
A	INITIAL RELEASE	9/19/95	



 Factory Five Racing, Inc. TITLE: ALTERNATE DRIVE PULLEY HOLE TEMPLATE		SIZE	DWG. NO.	REV
		A	12117	A
UNLESS OTHERWISE SPECIFIED:		NAME	DATE	
ROADSTER	DIMENSIONS ARE IN INCHES	DRAWN		
COUPE	TOLERANCES:	COMMENTS:		
	TWO PLACE DECIMAL ±0.01			
	THREE PLACE DECIMAL ±0.005			
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SPYDER	MATERIAL			
	FINISH			
USED ON				
APPLICATION		PRINTED	7/27/2010	
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Appendix B – Donor Parts List

In some cases, not all parts listed below will be necessary, but it is suggested to obtain all parts to avoid future difficulties.

	PART NAME	CHECK
Engine/Drivetrain	Engine	
	Engine mounts, (L, R) w/nuts and bolts	
	Starter	
	Transmission, bell-housing, clutch, and shifter components	
	Transmission mount w/nuts and bolts	
	Driveshaft w/4 bolts	
	Clutch cable w/bell-housing retaining c-clip	
	Speedometer speed sensor w/plastic gear	
	Mass air sensor with flexible elbow	
Exhaust	Oxygen sensors	
	Exhaust headers w/nuts and bolts	
Cooling	Heater hoses to firewall w/clamps	
	Radiator w/clamps	
	Fan shroud or shroud with attached fan	
	Coolant overflow tank w/cap	
Fuel Sys.	Fuel tank w/plastic under tray, gas cap, and mounting straps	
	Filler neck	
	Fuel filter w/mounting bracket and hoses	
	High pressure fuel line, tank to filter	
	Low pressure return line to fuel tank	
	High and low pressure solid fuel lines attached to engine fuel rails	
	Fuel evaporative canister, solenoid and tubing	
Brakes/Wheels	Front and rear brake rotor/drum, calipers, pads, flexible lines, etc.	
	Mount front and rear brake line, riveted to donor	
	Master cylinder, w/distribution block	
	Hydro boost with all power assist lines (96-04 applications only)	
	Front and rear wheels with lug nuts	
	Emergency brake handle, w/T-junction	
	Emergency brake cables w/hardware	
Suspension	Rear quad shocks w/mounts nuts and bolts	
	Spindles, front	
	Rear upper control arms w/nuts and bolts	
	Rear lower control arms w/nuts and bolts	
	8.8inch complete rear axle assembly	
	Rear coil springs w/OEM rubber isolating pads	
	Front lower A-arms w/nuts and bolts	
Steering	Power steering lines if using power steering	
	Steering rack with mounting bushings	
	Inner and outer tie-rod ends (87-93 applications only)	
Electrical	Wiring harness (all)	
	Emergency inertia cut-off switch	
	Turn signal stalk, and ignition cylinder w/key from steering column	
	Horns	
	Vacuum reservoir, black plastic cylinder shaped	
	Battery w/ground cable	
	Coil, starter solenoid	
	EEC IV Computer w/holder	
Misc.	Brake/clutch pedal box w/brake sensor, retaining clip, washers	
	Accelerator pedal	

Appendix C – Race car check sheet



CAR_____

Date_____

Steering

- Steering wheel tight _____
- Universal joint set screws tight _____
- Rack mount bolts tight _____
- Tie rod ends tight _____
- Tie rod to spindle bolts tight _____
- Steering free lock to lock _____

Front Suspension

- Ride height _____
- Front wheel bearings tight _____
- Upper and lower ball joints tight with cotter pins _____
- Upper control arm bolts tight _____
- Upper control arm jam nuts and clevis nuts tight _____
- Lower control arm bolts tight _____
- Shock mounting bolts tight _____
- Spring collars taped/tight _____
- Tire pressure set (recommend 22-25 psi) _____
- Lug nuts tight (90 lb-ft) _____

Brakes

- Front Caliper bolts tight _____
- Rear caliper bolts tight _____
- Rotors clean no cracks or groves _____
- Brakes bled/bleeders tight _____
- No leaks under pressure _____
- Master cylinder bolts tight _____
- Reservoir full _____
- Flexible lines tied up and undamaged _____

Cockpit

- Seat securely bolted _____
- Harnesses securely bolted _____
- Harnesses free from cuts or abrasions _____
- Pedals travel freely and bolts secure _____
- Throttle return springs hooked up _____
- Brake push rod secure and clip tight _____
- Interior wiring tight _____
- Shifter tight and free _____
- Mirrors tight and adjusted _____

- Windshield side bar screws tight _____
- Inspection/registration up to date _____

Electrical

- Battery charged _____
- Battery mount and connections secure _____
- Brake lights functioning _____
- All wires free and clear of moving or hot parts _____

Rear Suspension

- Ride height _____
- Shock mounting bolts tight _____
- Spring collars tight/taped _____
- Wheel bearings tight (IRS) _____
- Tire pressure set (recommend 22-25 psi) _____
- Lug nuts tight (90 lb-ft) _____

Transmission

- Clutch height/freeplay adjusted _____
- No leaks _____
- Driveshaft universal joints no bind or wear _____
- Output shaft snug no bind _____
- Drive shaft bolts tight _____
- Transmission mount bolts tight _____
- Bellhousing bolts tight _____
- Starter tight _____

Engine

- Oil level checked/changed/cap tight _____
- Water level checked including reservoir _____
- Plug wires tight including coil _____
- Belts tight _____
- Engine mount nuts tight _____
- Fuel lines no leaks under pressure _____
- No coolant or oil leaks _____
- Exhaust tight _____
- Fuel level checked _____



This list is not complete but a suggested list of items to check before driving. It is also a good idea to check these items on a yearly basis or sooner depending on how hard the car is driven.

Appendix D – Mustang Specifications

Between 1996 and 1998 Ford made 125,231 GT and 28,708 Cobra™ versions of the Mustang
Between 1999 and 2004 Ford made ~200,000 GT, 5,582 Bullitt, 9,652 Mach 1 and 20,727 Cobra™ versions of the Mustang.

(All information is based on V8 Ford Mustangs from 1979 to 2004)

SPECIAL VERSION MUSTANGS WITH SPECIFICATIONS

Year & Model	Engine	HP	Torque	Rear Susp.	Transmission	Wheels
93' Cobra	302, 5.0L	235@4600	280@4000	Solid Axle	T-5	17"x8"
93' Cobra "R"	302, 5.0L	235@4600	280@4000	Solid Axle	T-5	17"x8"
94'-95' Cobra	302, 5.0L	240@4800	285@4000	Solid Axle	T-5	17"x8"
95' Cobra "R"	351, 5.8L	300@4800	365@3750	Solid Axle	Tremec 3550	17"x9"
96'-98' Cobra	DOHC 4.6L	305@5800	300@4800	Solid Axle	T-45	17"x8"
99'-02' Cobra	DOHC 4.6L	320@5000	317@4750	Independent	T-45	17"x8"
00' Cobra "R"	331, 5.4L	385@6250	385@4250	Independent	T-56	18"x9.5"
01' Bullitt	SOHC 4.6L	265@5000	305@4000	Solid Axle	T-45	17"x8"
03'-04' Cobra	DOHC 4.6L Supercharged	390@6000	390@3500	Independent	T-56	17"x8"
03'-04' Mach I	DOHC 4.6L	305@5800	320@4200	Solid Axle	Tremec 3650	17"x8"

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
1996-97 SOHC	215 @ 4400	285 @ 3500	SFI	9.5:1
1998 SOHC	225 @ 4400	290 @ 3500	SFI	9.0:1
1999-04 SOHC	260 @ 5250	302 @ 4000	SFI	9.4:1

TRANSMISSION

Year	Type	1st	2nd	3rd	4th	5th	6th	R	Torque Capacity lb-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
1996-98	T-45	3.37	1.99	1.33	1.00	0.670	N/A	3.22	325		109
1999-02	TR-3650	3.38	2.00	1.32	1.00	0.620	N/A	3.38	360		120
2003-04	T-56	2.97	2.07	1.43	1.00	0.800	0.62	3.28	450		129

REAR AXLE RATIO

	Manual	Optional	Automatic
2004	3.55		2.49
2003	3.55		3.27
1996-2002	3.27		3.27
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)	11.65" vented disc (Cobra)

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 11 inches 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 to 1993 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 brake lines and their 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 ($1\frac{5}{16}$ ") 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 which comes standard with FFR 96-04 EFI kits (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.

MASS AIR SENSOR

Mass air sensors are devices used to measure air flow into the engine for the vehicle's 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. When a 1996-2003 Mustang is used as a donor for a Roadster kit, the stock air filter and filter box are required to complete the 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. From 1996-2004 Mustangs used four oxygen sensors, two per side. 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.

EXHAUST HEADERS

1986 to 1993 Mustang headers have 1.5" tubes, and remained the same shape. From 1994 to 1995 Mustang headers still have 1.5" headers, but the collector flanges have a larger ball and socket joint. 1996 to 2004 Mustangs used cast exhaust manifolds. SOHC engines had circular exhaust ports, and the DOHC had oval ports; however the collector flange changed in 2003 and 2004. Factory Five Produces J-pipes to connect stock Mustang headers in a reversed position to Roadster 4 port side pipes for the following years: 1986-1995, 1996-2004. 4 into 4 headers are also available from Factory Five for the following applications: pre 1995 289/302, 96-04 SOHC 4.6L, 96-04 DOHC 4.6L, 351W, 390/427/428 big blocks, and 429/460 big blocks. For those installing 351 Windsor engines there are a few companies including Ford Motorsport that carry exhaust headers for the installation of a 351 Windsor into a 1986-1993 Mustang. These headers will work with Factory Five 1986-1995 J-pipes.

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.

RADIATOR AND OVERFLOW TANK

Radiators were painted brass 2 core radiators from 1986-1993. 1994 through 2004 used an aluminum single core radiator with plastic side tanks. All work with Factory Five Roadster kits. Overflow tanks are a required donor part for all FFR Roadster kits. In 86-93 Mustangs, the overflow was directly attached to the fan shroud. From 94-04 the overflow tank design was changed and was attached to the chassis.

FAN AND FAN SHROUD

1986 to 1993 Mustangs had a clutch fan attached to the water pump and the fan shroud was attached to the radiator which also had the overflow tank attached to it. The fan shroud, and overflow tank are required for Roadster kits using 87-93 donors. This version of the kit also comes with an electric 1300cfm. fan and brackets to attach it to the shroud. The clutch fan is eliminated. 1994 to 2004 Mustangs had a shroud with an electric fan built in, which is a required donor part.

FUEL TANK, PUMP, PICK UP, VENT

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, and then from 1999 to 2004 the diameter of the mounting bolts changed to a larger metric size.

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 $\frac{3}{4}$ ". 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
1996-98	F400/R165 F500/R265	F400/R160	
1999	F450/R210	F500/R470	
2000	F450/R210		F800/R750
2001-02	F450/R210	F500/R470*	
2003	F450/R210	F600/R600*	
2004	F450/R210		
*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 stand-alone 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.

GAUGE CLUSTER

All FFR Roadster kits can use a modified version of the 1987-2004 donor car gauges.

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 E – 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

Fluid	Amount
Motorcraft 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)

Appendix F – 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
3/8 -16	30
3/8 -24	34
7/16 -14	48
7/16 -24	54
½ -13	75
½ -20	83
9/16 -12	100
9/16 -18	100
5/8 -11	100
5/8 -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)**
 3/8” **16 ft-lb (192 in-lb)**

*Use above specs unless otherwise noted in the assembly process.

Appendix F – Metric Fastener Lengths

				ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
				1	12338	M6-1.0 x 30MM SCREW	1
				2	16040	M10 x 20MM SOCKET HEAD	1
				3	15961	M10 x 25MM SOCKET HEAD	1
				4	13706	M12 x 110MM BOLT	1
				5	15936	M14-2.0 x 80MM FLNG HEAD	1
				6	15962	M14-2.0 x 100MM FLANGE HEAD BOLT	1
				7	14925	M16-2.0 x 110MM FLANGE HEAD BOLT	1
				8	15963	M16-2.0 x 130MM FLNG HEAD	1

PRINTED 3/1/2022

DRAWN JI NAME DATE 3/1/22
COMMENTS:

 **Factory Five Racing, Inc.**
METRIC FASTENER LENGTHS
SIZE DWG. NO. REV.
A **METRIC FASTENERS** **A**
SCALE:1:1 WEIGHT: SHEET 1 OF 1

Appendix G – Standard Fastener Lengths

ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	12335	1/4"-20 x 0.75" SOCKET HEAD	1
2	12336	1/4"-20 x 1.5" SOCKET HEAD	1
3	11024	5/16"-18 x 1" BUTTON HEAD	1
4	81130	5/16"-18 x 1.5" BOLT	1
5	15100	5/16"-18 x 2.00" BOLT	1
6	16665	3/8"-16 x 1" BUTTON HEAD	1
7	60387	3/8"-16 x 2" SOCKET HEAD	1
8	10833	1/2"-13 x 1.25" BOLT	1
9	16703	1/2"-13 x 1.50" BOLT	1
10	10842	1/2"-13 x 2.75" BOLT	1
11	12332	1/2"-13 x 4" BOLT	1
12	15138	0.50-20 X 1.75	1
13	25562	5/16"x 3/4" CARRIAGE BOLT	1
14	13212	5/8"-11 x 3.50" BOLT	1
15	10984	#14 x 1/2" SCREW	1

	NAME	DATE	Factory Five Racing, Inc. STANDARD FASTENER LENGTHS	REV.	
DRAWN	JL	3/1/22		SIZE DWG. NO.	A STANDARD FASTENERS A
COMMENTS:			SCALE:1:1	WEIGHT:	SHEET 1 OF 1
PRINTED	3/2/2022				

Appendix H – Fastener Pack List

17155	ROADSTER FASTENER PACK	1.00	EA
10995	#10 x 1" SCREW	6.00	EA
10851	#14 x 1.50" SCREW	4.00	EA
10984	#14 x 1/2" SCREW	15.00	EA
12962	#6 x 1/2" SCREW	4.00	EA
16534	#8 x 1.50" OVAL HEAD SCREW	2.00	EA
10983	#8 X 3/4" OVAL HEAD SCREW	12.00	EA
13979	#8 x 3/4" SCREW w/WASHER	28.00	EA
13976	1/2" WASHER	34.00	EA
10834	1/2"-13 NYLON LOCK NUT	21.00	EA
10833	1/2"-13 x 1.25" BOLT	12.00	EA
16703	1/2"-13 x 1.50" BOLT	2.00	EA
10842	1/2"-13 x 2.75" BOLT	2.00	EA
12386	1/2"-13 x 3.25" BOLT	3.00	EA
12332	1/2"-13 x 4" BOLT	2.00	EA
12218	1/2"-20 MECH LOCK NUT	4.00	EA
15138	1/2"-20 x 1.75" FLNG HEAD	4.00	EA
12337	1/4" FENDER WASHER	4.00	EA
10802	1/4" NYLON LOCK NUT	10.00	EA
11088	1/4" WASHER	8.00	EA
12335	1/4"-20 x 0.75" SOCKET HEAD	4.00	EA
12336	1/4"-20 x 1.5" SOCKET HEAD	4.00	EA
10801	1/4-20 x 9" J BOLT	2.00	EA
13977	3/8" WASHER	4.00	EA
12572	3/8"-16 ACORN NUT	8.00	EA
12172	3/8"-16 MECH LOCK NUT	8.00	EA
13964	3/8"-16 NYLON LOCK NUT	11.00	EA
16665	3/8"-16 x 1" BUTTON HEAD	3.00	EA
10520	3/8"-16 x 1" SOCKET HEAD	3.00	EA
11040	3/8"-16 x 1.25" SOCKET HEAD	4.00	EA
60387	3/8"-16 x 2" SOCKET HEAD	6.00	EA
12908	5/16" SS WASHER	20.00	EA
11005	5/16" WASHER	55.00	EA
13963	5/16"-18 NYLON LOCK NUT	24.00	EA
11024	5/16"-18 x 1" BUTTON HEAD	10.00	EA
81130	5/16"-18 x 1.5" BOLT	8.00	EA
12776	5/16"-18 x 1.5" BUTTON HEAD	2.00	EA
11212	5/16"-24 LOCK NUT	2.00	EA
25562	5/16"x 3/4" CARRIAGE BOLT	4.00	EA
12339	M6-1.0 LOCK NUT	6.00	EA
12338	M6-1.0 x 30MM SCREW	6.00	EA