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Statement of Non-Liability

While there are many things to love and be proud of in our country today there are a few things that we wish were different. With great regret and not a small amount of resentment we include the following warning and statement of non-liability at the advice of our legal council.

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

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

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

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

Factory Five does not make any warranty, expressed or implied, or other representation about the use of any of its products under specific applications. Factory Five products are expressly sold for racing and off-road use and are not intended to be used in conventional passenger or other legal highway applications. 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.

Roadster Assembly Manual, Revision 1F

Foreword

This manual is designed only as a guide to help you assemble your kit. In order to perform the work efficiently and avoid costly mistakes, please read through the sections before starting any work. In preparing this manual, we divided it into three major sections. The first section deals with the donor parts. The second section covers the sequential assembly of the kit, which assumes all of the pre-requisite parts and assemblies have been purchased. The third section deals with things you may want to know after your kit is complete. At Factory Five Racing we are very proud of our product and are committed to providing you with the best parts and assemblies for your project. We have tried to make this manual a helpful guide, however it is assumed that the builder of this kit has a working knowledge of automotive assemblies and a familiarity with the tools and equipment used in automotive construction.

You will find the appendices at the end of this manual very helpful. They include a bill of materials for both the parts included in the kit, and the other mechanical and running gear parts that we don't sell or provide. It is a good idea to review the donor parts list to start planning ahead. At the top of each new work section there are the following helpful notations...

ATTENTION: *This indicates important information, tips and things that may require special care.*

TOOLS: *This is for the list of tools needed for the particular task in that section.*

PARTS: *This indicates what specific parts are required for the job.*

Our goal is to help you build and drive your car without any problems, injuries or frustrations. The following are some simple, but important, safety tips that can help avoid costly mistakes.

- Read the manual. It is at least a good guide and place to start. Follow commonly accepted automotive recommendations. 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 single jack.
- Always observe good workmanship 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 cordon 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.

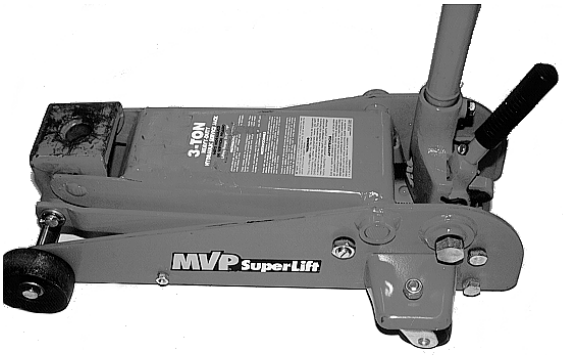
Keep in mind that most accidents are caused by carelessness and a lack of common sense. The aforementioned safety tips are in no way a complete list. Use common sense.

Building this kit is going to be a lot of fun, and we will be there for you if you hit any bumps in the road. Our ultimate success depends upon you completing and driving this car and relating your experience to others. Our name and reputation go along with every part we provide and sell. We want to hear from you and about your progress, positive and negative. Your feedback is invaluable to create a better kit and for out growth and success.

Tools and Supplies 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® tools, Sears CRAFTSMAN® tools, and Snap-On® tools are all guaranteed for life and we've found them to be reliable tools.

Required Tools



Storage shelves for kit and running gear parts
Body storage area (can be outside)
SAE and metric sockets
    Deep well sockets for some common sizes are helpful.
    52-piece set that includes an 18mm socket is a good choice
SAE Combination wrench set ($^{3}/_{8}$" – $^{15}/_{16}$")
Metric combination wrench set (10mm – 18mm)
Full set of standard and Phillips head screwdrivers
Standard Hex key set
Slip joint pliers, 6.75"
Long nose pliers, 4.5"
Pop rivet tool with $^{1}/_{8}$" and $^{3}/_{16}$" heads
Drill and drill bits ($^{3}/_{32}$", $^{1}/_{8}$", $^{9}/_{64}$", $^{3}/_{16}$", $^{7}/_{32}$", $^{5}/_{16}$", $^{7}/_{16}$", ½")
Caulk gun
Pry bar and claw hammer
Rubber mallet
Razor knife
Wire stripper/crimping tool
1", 1 ¼" and 2 ¼" hole saws
Bench top vise
Tape measure or straight edge ruler/T-square
Hydraulic floor jack
Engine hoist
Jack stands
Hack saw (metal blade)
Fuel/brake line bender (hand held)
Tube cutter
Small square file
Tire cross wrench
Jig saw
Brake line double flare kit
Torque wrench (Click style with $^{3}/_{8}$" drive)
Eye protection and gloves
Spring compressor (Mustang disassembly only)
Bucket
The thing between your ears

Required Supplies

Engine degreaser
Silicone sealant
    About 4 tubes
Fluids:
    Coolant
    Engine oil 10W-30
    Gear oil (for rear end)
    Transmission oil
    Friction modifier (for rear end)
Oil filter
Fuel filter
Battery
Spark plugs
5 minute epoxy glue
Black permanent marker
Duct tape and 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

Helpful

Cordless drill (w/clutch helpful, 14-18 volt units are best)
#6 hex driver attachment for cordless drill
Adapter for cordless to use ¼" socket driver
Wire brush or wire wheel attachment for drill
Flare nut wrenches ($^{3}/_{8}$" x $^{7}/_{16}$")
Vise grips
Hand held propane torch
Flat file and round file
Scissors
Aluminum snips
Friends
Pizza and beer for previous line item

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.

Chapter 1 - Donor Parts and Parts Needed

This chapter deals with the donor parts needed in addition to the parts that we included with our kit. Many people choose to use parts from a single Mustang donor vehicle. 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 Appendix B of this manual.

Donor Parts and the Mustang 5.0

In 1987, the Mustang 5.0 started a modern muscle-car revolution. For slightly more than ten thousand dollars the average Joe could pick up a brand new 225 hp car that weighed in at only about 3000 lbs. (in LX trim). Since its introduction, virtually every enthusiast magazine has hailed the Mustang 5.0 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 terrific five speed transmission, a big 8.8 inch ring and pinion traction locking rear end, 11" front disc brakes and much more... all standard! The Mustang 5.0 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 ***Mustang 5.0 has earned a faithful following for its high performance, reliability, and affordability.*** Many who have owned or driven Mustang 5.0'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 Factory Five Roadster. The lightweight small block with modern computer controls 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.

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 modern Mustang 5.0. 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"

The Factory Five Roadster kit is designed to use parts from the 1987-1993 Mustang 5.0. 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 later SN95 models have many shared parts but there are some important differences. If you choose to use older or newer donor parts, call the FFR tech department and ask about what specific parts you can use. Check out Appendix B.

If you go to a salvage yard for parts, the donor parts list 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 very good. It is also easy to buy a complete donor car from a salvage yard for less than $3000.00.

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, because you'll inevitably do a better, 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.

Steering Columns

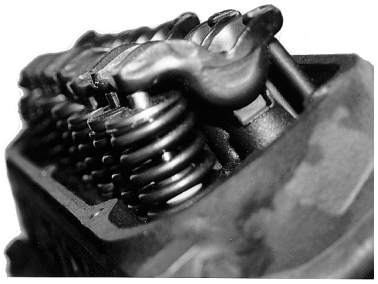
Select a Mustang that has a non-tilt steering wheel. If your donor has a tilt column, you can use a shaft from a 4-cylinder model. The 1990+ models with air bags work great or get an 87-88 and change out the steering shaft.

Running Gear

In order to make a wise choice on running gear, there are several things to look for. First of all 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 and at the apex 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 the 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.
- The **mileage** is not the most important aspect of selecting a donor Mustang. The 5.0 drive train 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 and quad shock 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. A 30,000 mile car should have a good amount of rear shoe material remaining. *Note: In 1993 the emergency brake cables were shortened and will no longer reach the handle in the FFR frame, if your donor is this year you will need to find a set of the earlier (87-92) cables.*
- Try to avoid cars with **aftermarket undercoating**. Undercoating all over the front suspension is really hard to get off.
- 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. Let a leak serve as a clue that the car probably has more than 40,000 miles on the odometer.



- If the **block** has been **painted**, it is a good indication that the engine was re-manufactured since the Ford 5.0 block was never painted at the factory. Even brand new 5.0 blocks with relatively few miles on the odometer will have a surface dusting of corrosion.
- Since our kit can use the original **drive shaft** (that gets shortened), the quality and condition of the slip yolk (transmission end) and the rear flange is important. The slip yolk must be smooth and clean without scores or gouges that can cause premature wear and develop leaks down the road. We recommend using only yokes from manual transmission cars; the automatic cars have a weight that limits the universal joint movement.
- The **front spindles** should be clean, dry, and have decent rotors and calipers without much dirt or crud accumulation. There should be no deep grooves or huge flakes of rust inside the rotor contact area. If you do have rotors with lots of rust inside the cooling fins, you are usually looking at an older car part or it has been sitting for a while.
- Take a look into the **throttle body** of a low mileage car. There will be some black carbon immediately behind the plate when it is opened. A throttle body with 50,000 miles of use will have a film thickness equal to that of a piece of paper.

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 drive train is remarkably tough so try not to worry excessively about the donor parts; odds are they'll work just fine.

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 Appendix B (donor parts list). The Chilton's repair manual has quite good step-by-step disassembly instructions for each assembly. We have tried to be helpful here but the 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

ATTENTION: *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, the Ford part number for the shroud is E6ZZ-8146-A and the reservoir part number is F2ZZ-8A080-B.*

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

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

1. Place a bucket under the radiator drain petcock on the lower passenger side of the radiator
2. Loosen the radiator drain petcock with pliers.
3. Collect all used coolant.
4. Close drain petcock and dispose of the coolant properly (local garage or parts store).
5. Loosen and remove the upper radiator hose clamp at engine block. There may be residual fluid in hoses so try to avoid spilling.
6. Loosen and remove the upper and lower hose clamps at the radiator. Save the clamps.
7. Remove the upper radiator hose.
8. Use duct tape or zip ties to secure the lower radiator hose up to the power steering pump area so that it won't spill fluid as the engine is removed later.
9. Remove the fan clutch from the water pump shaft so that it is sitting in the fan shroud.
10. Loosen the bolts on the brackets at the top of radiator.
11. Lift the radiator, shroud and the fan with clutch up and out of the engine bay. Discard or sell the fan. Keep the shroud. You won't need the Mustang fan since a 16" puller fan is included in the kit.

12. 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. Don't release this stuff into the ozone.
13. Store radiator, fan shroud and overflow reservoir in a safe place.

Computer

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

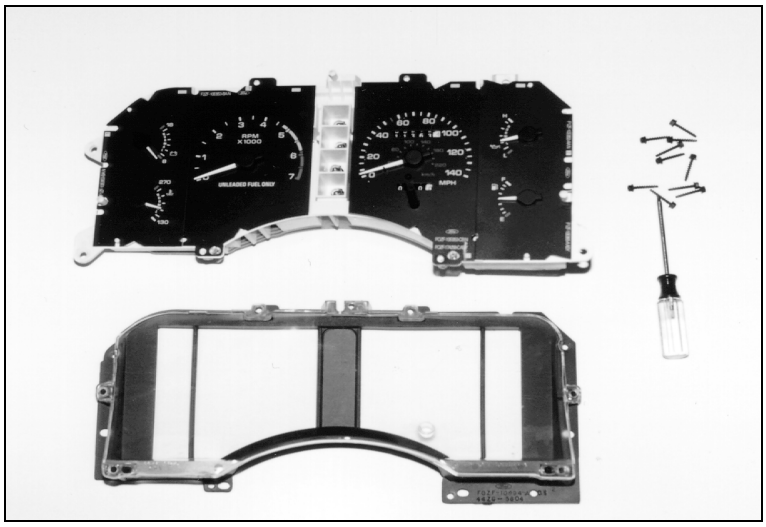
EEC-IV computer and cradle.

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

Gauge Cluster and Speedometer Cable

TOOLS: *Socket set, Phillips head screwdrivers, Needle-nose pliers.*
PARTS: *Mustang Speedometer cable.*

1. Remove all visible screws from the dash gauge pod. You can reach the two screws above the instrument pod with a short Phillips head screwdriver. The two gauge wiring connectors are removed from the gauge cluster by squeezing the outside clips.
2. The speedometer cable is unsnapped from the speedometer by squeezing the white retainer ring and then pulling off.
3. The other end of the cable will be removed later in the disassembly.
4. Remove the snap connectors that feed the outside pod switches. This is done by pulling the switch out toward the driver and requires a regular head screwdriver to press on the side before the piece can slide out.

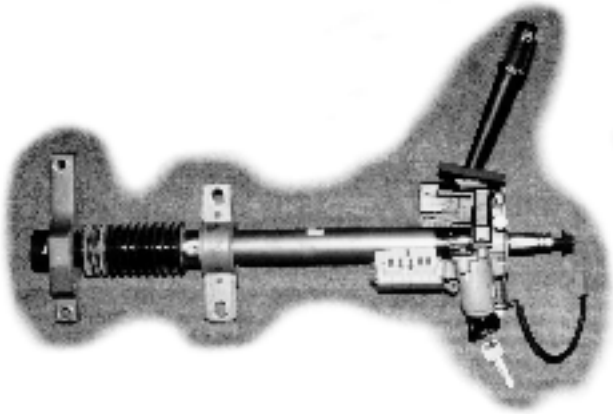


Mustang gauges mounted in gauge pod.

5. The two gauge wiring connectors are removed from the gauge cluster by squeezing the outside clips. Remove the clear plastic gauge cover with a Torx screwdriver and discard. Place the switches and gauge pod in your parts area, awaiting kit assembly.

Upper Steering Column

TOOLS: *Socket set, extension, Phillips head screwdrivers, needle nose pliers.*
PARTS: *Mustang upper steering shaft.*



Steering column (with ignition, turn signal stalk, and under dash mounts).

1. Remove the steering column mounts located under the dash above the driver floor. Allow the column to fall down, once it is free of the dash and the wiring connectors have been removed from the turn signal and ignition switches, pull it straight back. It may be difficult but it will come loose. The housing for the upper column comes with mounts for the turn signals and the ignition. This 1½" tube cover must be removed from the main steering shaft inside. Most of this large assembly will be discarded and you will only need the inner steel shaft.
2. Remove the steering wheel from the shaft with a steering wheel puller.
3. Remove the horn/airbag contact ring.

4. Remove the snap ring and pull the inner shaft from the tube assembly.
5. Remove the turn signal stalk and the ignition switches from the column.

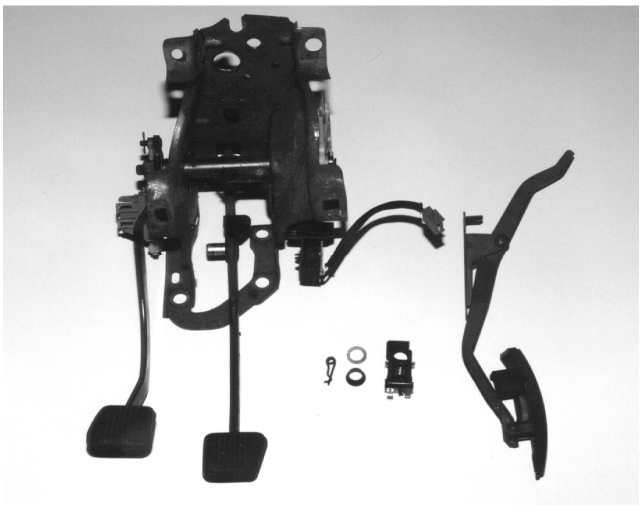
Brake Power Booster

TOOLS: *Socket set, wrenches or box wrenches for brake lines, tube cutter, tape, and marker pen.*
PARTS: *Mustang power booster push rod.*

1. Remove the brake rod retainer clip from the top of the brake pedal.
2. Remember the order in which these washers and spring clips are removed so that you can reinstall them faster later.
3. 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.
4. 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.
5. Cut 4" into the hard brake lines from the distribution block. New brake line is provided with the kit.
6. The power booster/master cylinder assembly can now be taken out of the engine compartment.

Pedal Box, Accelerator Pedal and Clutch Cable

ATTENTION: *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.*
TOOLS: *Socket set wrenches, Phillips and flat head Screwdrivers.*
PARTS: *Mustang pedal box, accelerator pedal and clutch cable.*



Pedal box assembly with switch and throttle pedal.

1. 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.

2. Unbolt and remove the pedal box.

Shifter and Shifter handle

ATTENTION: *The kit comes with new bolts for the shifter handle so you don't need the OEM bolts. Save them anyway according to rule #65 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).*

TOOLS: *Socket set, Phillips head screwdriver.*

PARTS: *Shifter*

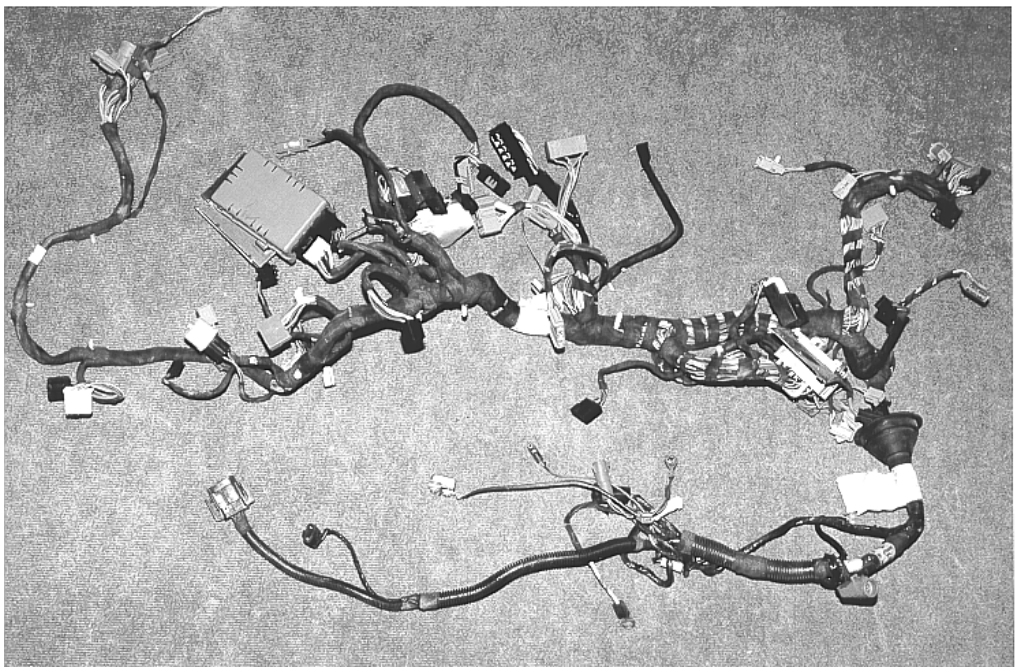
1. Remove the shifter knob from the handle.
2. Unscrew the plastic console that retains the boot.
3. Remove the shifter boot and unbolt the rubber boot below it.
4. Unbolt and remove the shifter and handle from the cockpit.

Wiring Harness

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

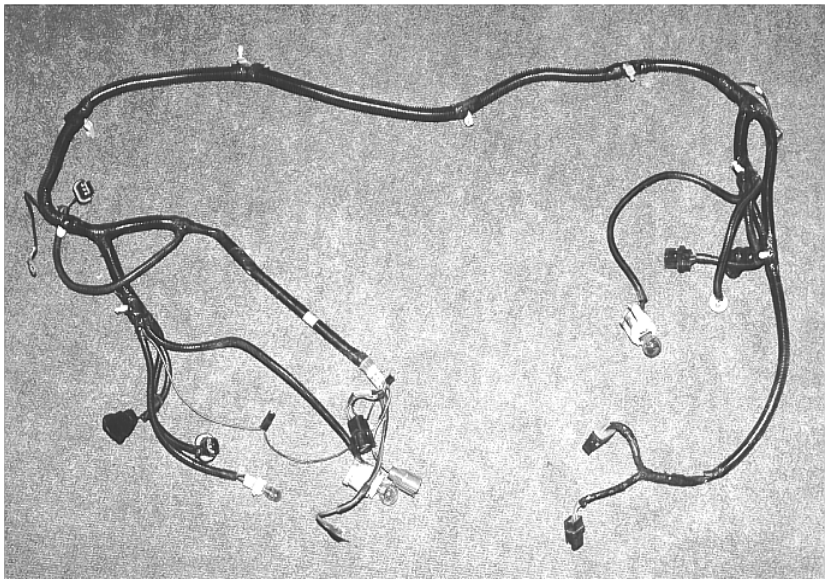
PARTS: *Donor car dash and front wiring harnesses.*

1. The wiring comes out in stages. You want to 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. Each connector is different in the car, so cross wiring is not a problem. Labeling will help speed up the job later.
2. The headlight dimmer switch should be kept if dash lights are wanted otherwise the switch will have to be bypassed.



Dash harness with air bag and fuse panel attachments.

3. The remainder of the dash can now be unscrewed so that it can be removed from the car. In order to remove the dash, it is necessary to disconnect some wiring connectors in the engine compartment that are part of the dash harness.
   a. Start at the firewall ahead of the driver. You will find a large bundle of wires covered in black tape with a rubber bushing in the firewall.
   b. Trace along this bundle and pull it away from the engine bay wall where it is attached with plastic press-in studs.
   c. At the starter solenoid and coil, disconnect the wires, labeling which wires connect to which screw.
   d. Disconnect the connectors from the headlights and engine harnesses.
   e. Try to keep the engine bay wires together and push the rubber bushing through the firewall with the wires into the cockpit.
4. Remove the front light harness in a similar but less complicated way 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.



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

Fuel Inertia cut-off switch

ATTENTION: *Socket set, nut driver, Phillips head screwdriver, wire cutters to cut plastic fasteners, marker pen, and tape.*

PARTS: *Fuel inertia cut-off switch.*

1. It is recommended that a fuel inertia cut-off switch be used in the car. In the Mustang, it is located driver's side next to the rear taillights.
2. From inside the trunk, unscrew the panel covering the driver side taillight.
3. The inertia cut-off switch is a small black box (about 2" x 3") with either a red or white button on top. Cut the inertia switch wires where they enter the rear harness.

Rear Wiring Harness

ATTENTION: *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.*

TOOLS: *Socket set, nut driver, Phillips head screwdriver, wire cutters to cut plastic fasteners, marker pen, and tape.*

PARTS: *Donor car rear wiring harness.*

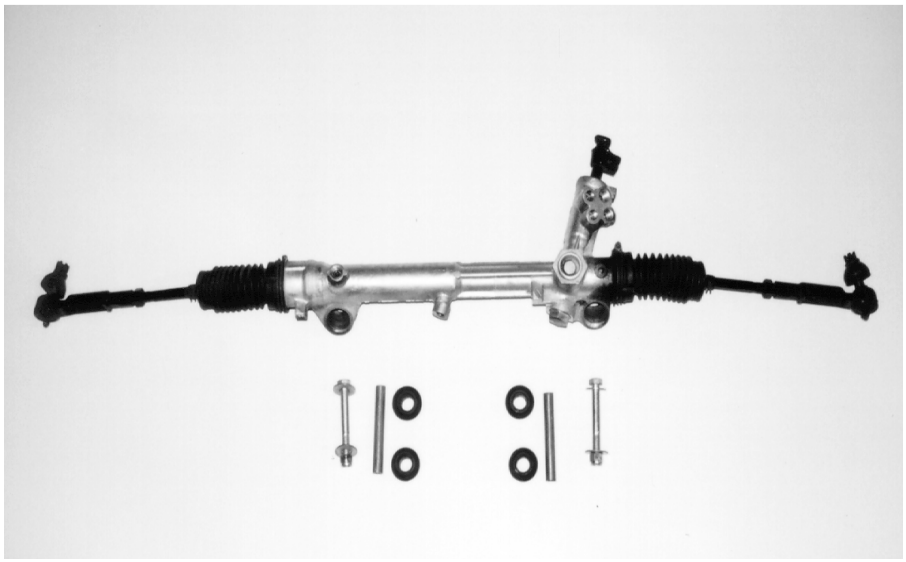
4. Remove bulb bases from the rear light housings if they are still on your donor. Use tape and a marker to label the wires.
5. Remove the rubber body plug from the fuel harness exit point in the base of the trunk area and unplug the connector.

6. 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.
7. The rear harness ends at the front driver's side of the cockpit.
8. The transmission harness must be removed along with the rubber plug. This runs along the driver's side of the transmission tunnel.
9. Store the rear harness and transmission harness.

Steering Rack and Column

TOOLS: *⅝" and 11/16" combination wrenches.*
PARTS: *Mustang rack assembly, mounting bolts, nuts and washers w/rubber bushings.*

1. Remove the U-joint bolt from the steering column sleeve.
2. Remove the lower steering column by taking off the two bolts at the flexible collar in the area where the splined steering rack shaft begins.
3. Remove the steering rack outer tie rod nuts and cotter pins. If the tie rod will not come out of the spindle easily, use a hammer but be careful not to damage the threads. Never heat or lubricate the tie rod end to make removal easier.
4. Remove the two bolts that secure the steering rack to the frame and lower the rack gently out of the car.

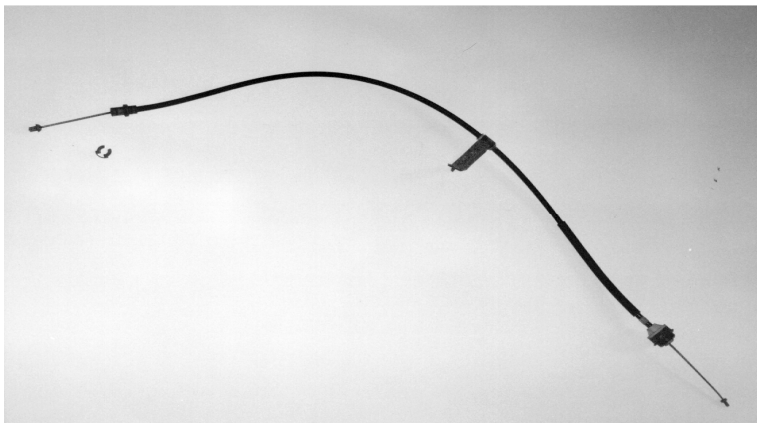


Mustang steering rack with lines removed with rubber bushings and fasteners.

Speedometer and Clutch Cables

TOOLS: *Socket set, duct tape.*
PARTS: *Speedometer cable and sending unit, clutch cable.*

1. Before removing the engine, the speedometer cable must be disconnected. Pull the speedometer cable out from the dash area keeping the rubber grommet that is on it in place. This grommet will also be used.
2. Remove the bolt that holds the cable to the body near the exhaust in the engine bay.
3. Remove the wiring harness plug from the sending unit.
4. Remove the speedometer sending unit bolt using an 11mm socket.
5. Pull the sending unit straight out.
6. Replace the screw in the transmission once the sending unit is removed.
7. Cover the speedometer drive hole with tape to prevent dust and dirt from entering.
8. Remove the clutch cable cover from the bell housing and push the cable out of the clutch fork.
9. 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.

Emergency Brake Handle

TOOLS: *Socket set.*
PARTS: *Mustang emergency brake handle and "T" cable.*

1. Hold the emergency brake handle button in and push the handle all the way down.
2. 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.
3. Pull on the "T" cable coming from the handle it should move a couple of inches.
4. Carefully remove one brake cable from the "T" at a time.
5. Remove the center consul cover the handle.
6. Unbolt and remove the emergency brake handle.

Engine Bay Sensors and Electrical Connections

ATTENTION: *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.*

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

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

1. Disconnect and remove the battery.
2. At the starter solenoid and coil, disconnect the wires, labeling which wires connect to which screw.
3. Disconnect the connectors from the headlights and engine harnesses.
4. Disconnect and remove the coil from the engine compartment wall.
5. Disconnect and remove the starter solenoid from the same area.
6. Disconnect and remove the Barometric Air Pressure sensor from the firewall behind the engine.
7. Disconnect and remove the mass air sensor. Store with the computer.
8. Disconnect the throttle cable from the throttle body on the engine.
9. 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.

ATTENTION: *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.*

10. Remove the power steering lines from the pump, catching the fluid in a bucket.
11. Remove the braided ground strap from the rear driver's side of the engine.
12. Follow the fuel lines off the engine and cut the lines 4" after they turn into the hard plastic line.
13. Remove and discard the front driver's side plastic wheel well using a 7mm socket to loosen it from the body.
14. 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.
15. Pull the engine harness, rubber firewall bushings, and computer connector out through the firewall.

Exhaust

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

TOOLS: *Combination wrench set. $^{11}/_{16}$" socket, socket extension, adjustable wrench and hack saw.*

PARTS: *Mustang exhaust bushings (rubber), O_2 Sensors.*

1. The rear exhaust is removed from the H-pipe in the middle area of the car with four bolts.
2. Keep the rubber bushings that hold the rear exhaust up for use later. You will use these small oval rubber pieces to hang the rear post on the side exhaust to the frame.
3. 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.
4. The air tube is connected to the H-pipe and must be loosened or cut off.
5. Disconnect the O_2 sensors from the engine harness.
6. 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.

7. Lower the H-pipe assembly and remove.
8. Remove the O_2 sensors from the H-pipe with an adjustable wrench. Do not touch the ends. Store in a safe place.

Engine Removal

ATTENTION: *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.*

TOOLS: *Engine hoist, socket set, combination wrenches, floor jack, used tire or engine stand, rags.*

PARTS: *Mustang engine/transmission assembly, engine mounts, transmission mount, OEM fasteners.*

1. 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.
2. Disconnect the drive shaft from the rear end pinion Using a 12-point 12mm wrench or socket.
3. 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.
4. Tape over the rear of the transmission so that it doesn't leak or drip fluid.
5. Undo the transmission from the cross-member.
6. Loosen the cross-member attachment bolts.
7. Disconnect the two remaining harness plugs from the transmission.
8. 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.

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

9. 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.
10. Take up the slack on the chain slowly. Check to make sure that no hoses or wires remain connected to the engine.
11. Remove the bolts from the transmission cross-member and remove the cross-member.
12. Check again to make sure that all wires and straps are removed.
13. 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. Watch your fingers!
14. Set the engine/transmission assembly on an old tire with no rim or on engine stands to avoid damaging the oil pan.
15. There is an exhaust H-pipe tube holder plate sandwiched between the transmission mount and the transmission that must be removed. All you want in place is the transmission mount with the two bolts sticking down.
16. Have the drive shaft shortened at a reputable machine shop that commonly does this. Ask a local auto parts store or search the yellow pages. See Appendix A for the drive shaft diagram to provide the shop with dimensions. Make sure your machine shop puts new U-joints on your shortened drive shaft. You shouldn't pay any more than about $100.
17. Remove the headers.

Front Suspension

ATTENTION: *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.*

TOOLS: *Spring compression tool, socket set, combination wrenches, breaker bar, tubing cutter, 3/16" drill, floor jack, tire iron and jack stands.*

PARTS: *Brake calipers, rotors, spindles.*

1. Raise the front of the car up with a floor jack, support with jack stands, and remove the front wheels.
2. Install a spring retaining/compression tool to hold the spring in the compressed position.
3. Remove the front sway bar and discard making sure to remove the bar mounts from the control arms.

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

4. Follow the flexible brake line from the front brakes to the mounting bracket on the body, cut the steel brake line 4" after the bracket.
5. Remove the bracket from the body keeping it to use later.
6. Put a jack underneath the ball joint on the lower control arm.
7. Use a spring compression tool to remove the front springs or chain the spring to the chassis.
8. Remove the three bolts that retain the struts to the top mounting plate.
9. 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.
10. Remove the springs with extreme caution!
11. Remove the large bolts and nuts from the spindle to the strut. Put these aside for use later.
12. 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. The spindle/control arm assembly is heavy. Be careful.
13. Remove the spindle/lower control arm assembly from the car.

Fuel Tank

ATTENTION: *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 Chilton's or other repair manual for fuel system assemblies.*

TOOLS: *Socket set, combination wrenches, small regular head screwdriver, floor jack, jack stands, fuel line disconnect tool, goggles with side splash protection, rubber mallet.*

PARTS: *Donor car fuel tank w/integral plastic fuel tank lower cover, mounting straps, fuel cap, fuel filter, evaporative canister, and vapor line.*

1. Raise the rear end of the car and place on jack stands.
2. Relieve any fuel line pressure by using the bleeder valve on the fuel rail just behind the alternator.
3. Open the gas cap to relieve any pressure built up in the tank.
4. Remove the screws that hold the upper fuel cap and flange to the body of the car.
5. Remove the set screw and metal ring collar retainer from the fuel neck where it meets the tank.
6. 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.
7. The fuel tank is held in place with two straps that go under the tank and bolt to the body in front.
8. Place a floor jack under fuel tank and loosen the strap bolts.
9. 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.
10. 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.
11. Disconnect the fuel line at the fuel filter by removing the small white clip with a regular head screwdriver.
12. Pull the fuel vapor hose off the plastic fitting on top of the gas tank.
13. With the help of a friend, drop the gas tank and store on a level surface.
14. Re-install the fuel neck into the tank with the ring collar and screw that retain the fuel neck to the side of the tank.
15. 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.
16. Remove the fuel filter, mounting bracket and connected lines from the body of the car.
17. You should have the tank, plastic cover, straps, fuel filter, fuel filter bracket and lines from fuel filter to tank. Store these items.
18. Lower the car onto the ground.

Rear End

ATTENTION:

- *The rear end assembly weighs 225 lbs. Use caution when removing this assembly. Use extreme caution when removing any compressed coil spring. Make sure not to damage, dent or crimp the brake lines mounted to the rear end. If using an independent rear suspension, you will still need to remove the quad shocks but you do not need the frame brackets.*

- *Ford changed the parking brake cables mid 1992. If you have a 1993 donor you must get cables from a 1992 or earlier.*

TOOLS: *Cordless drill, ¼" drill bit, socket set, combination wrenches, duct tape, tire iron, floor jack, and jack stands.*

PARTS: *8.8" rear-end assembly, complete with quad shocks and springs. Rear brake assembly w/lines. All rubber bushings and OEM fasteners.*

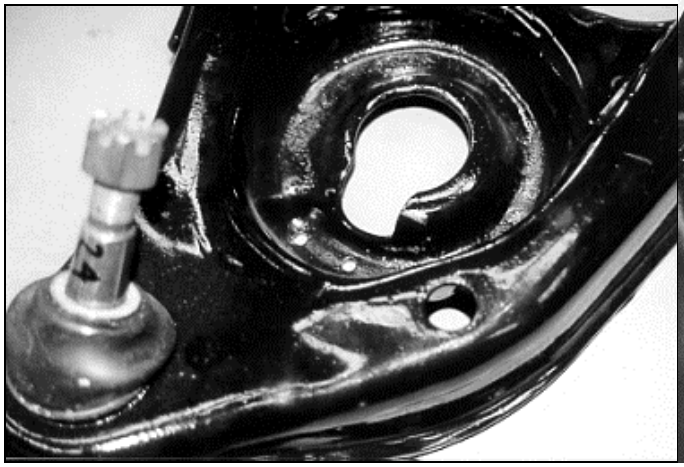
Before starting, raise the rear of the car, place on jack stands and remove the wheels.

1. Remove the flexible brake line from the body-mounted bracket. 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.
2. Remove the emergency brake cables from the "T" junction below the handle in the transmission tunnel. Do this by pressing the handle all the way down. From the underside, pull the "T" and remove the cables. 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, 12point 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.
3. Put a jack on the flat part of the middle of the rear axle.
4. In the trunk/hatch area of the car, undo the nuts on the top of the vertical shock absorbers.
5. 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.
6. Lower the jack slowly with the rear end so that they come down together.
7. When the rear end has dropped down low enough, you can easily remove the coil springs. Save the rubber bushings above and below the springs.
8. Remove the OEM bolts and nuts from the lower rear Mustang control arm, where the arms are mounted to the body/chassis.
9. Remove the OEM bolts and nuts from the upper Mustang control arm, where the arms are mounted to the body/chassis.
10. All of the arms should remain attached to the rear end assembly. Once off, place the OEM bolts back into the arms and attach nuts so they do not get lost.
11. Remove the brackets that secure the quad shocks to the frame. Make sure you get the complete bracket and not just the shock.
12. Remove the emergency brake handle and "T" junction cable.
13. The entire emergency brake cable assembly should remain attached to the rear end and you should save all the OEM brake hardware including the handle.
14. The sway bar is located under the lower control arm and remains there. It can be used on our car but we do not recommend it. The sway bar does not improve the handling of the car.

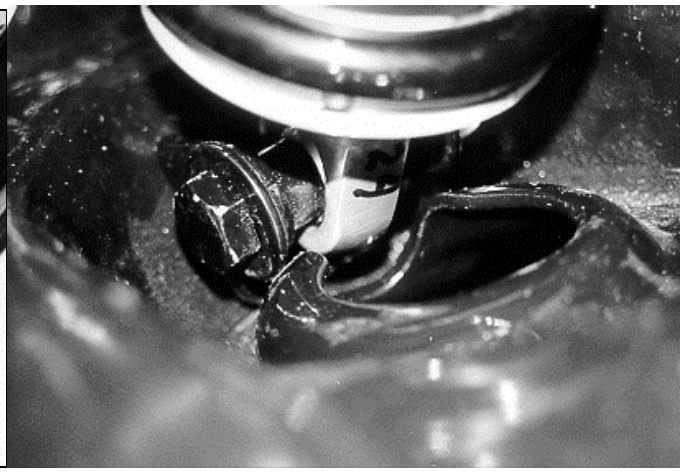
Donor Part Preparation

Front Lower Control Arms

The coil-over shocks that are included in the kit will mount to the lower arms through the small hole in the Mustang spring mount. The area, near the center of the spring mount, needs to be bent or removed to prevent damage to the coil-over unit thru any contact whatsoever. Check clearance with the new shock and the new mount. These parts must move freely without contacting the control arm surface.



Section removed from front lower control arm



Coil-over mounted in lower arm with clearance hole.

Rear Coil Springs

Rear coil spring.

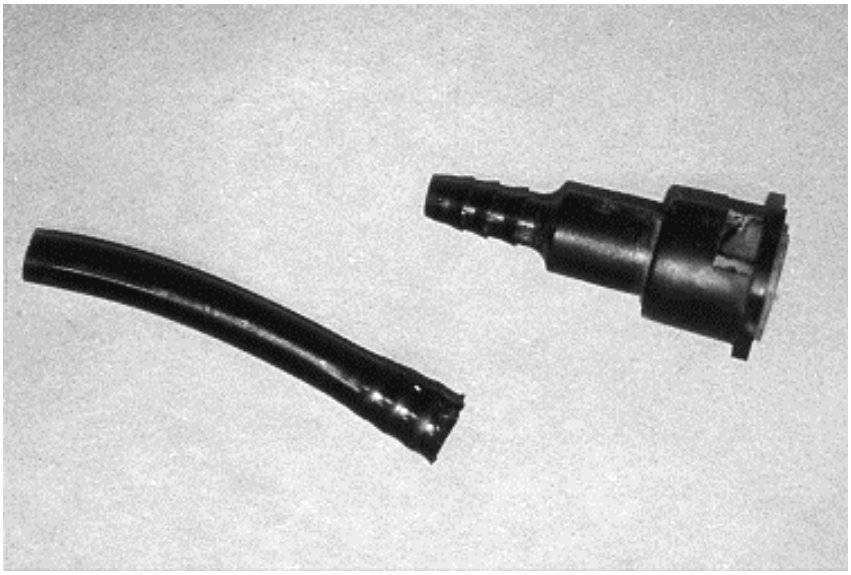
1. Change the rear end oil. Use 80W 90 and friction modifier. It is easier to do out of the car and probably hasn't been done for a while if at all. RTV is good to use to seal the cover.
2. Remove the rubber spacer from inside the coil.
3. Cut one full coil from the top of the spring for correct ride height setting.

4. 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.

Fuel Filter Fittings

TOOLS: *Razor knife*
PARTS: *Donor plastic fuel line fittings from fuel filter to body hard line and from return line from body hard line to fuel tank.*

1. Cut the hard plastic off the plastic barbs.

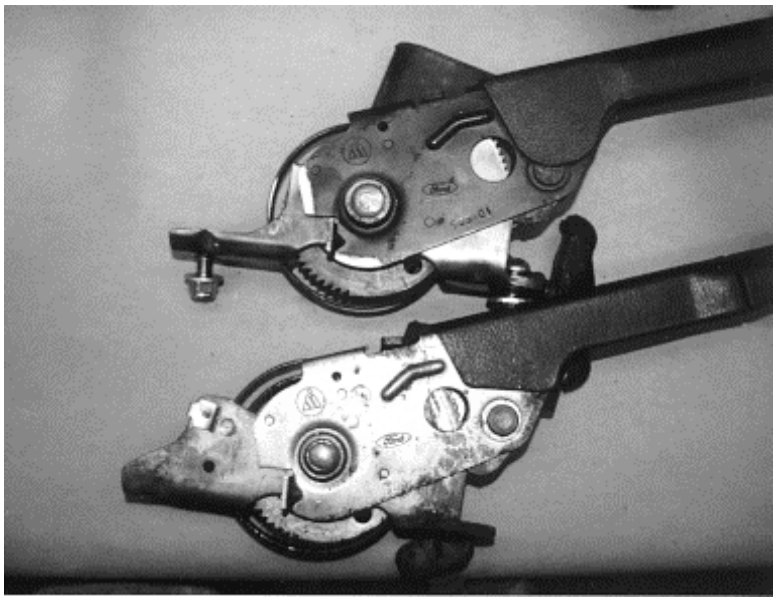


Barbed fitting removed from plastic hose.

Emergency Brake Handle

TOOLS: *Grinder, scissors*
PARTS: *Refer to Appendix A, emergency brake handle diagram.*

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



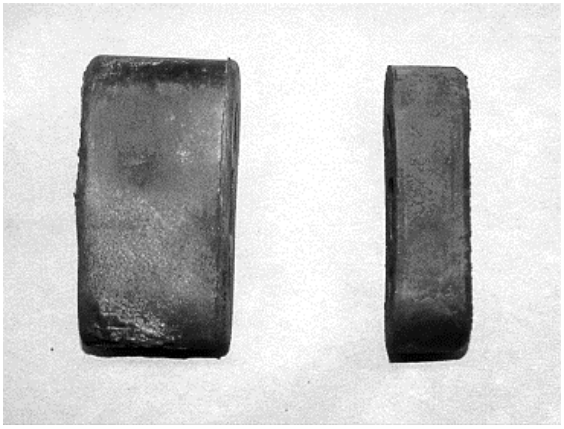
Top: Trimmed handle. Bottom: Untrimmed handle.

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

Exhaust Hanger

TOOLS: *Hack saw*

1. The donor exhaust hanger parts are oval looking rubber parts with two holes at opposite ends. Cut this part in half lengthwise.



Exhaust mount cut in half.

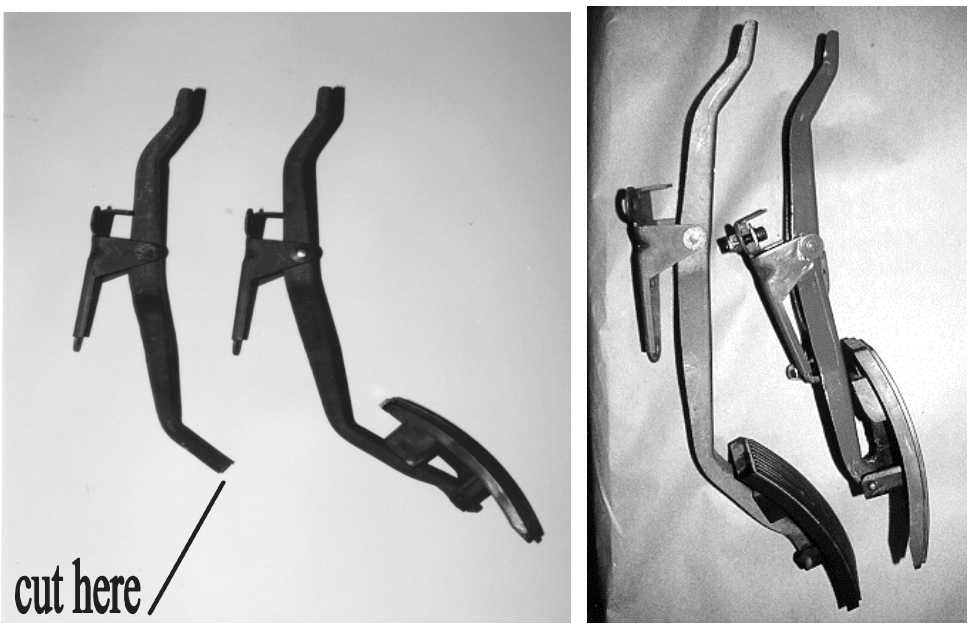
Pedal Box and Accelerator Pedal

The FFR Roadster uses a manual braking system. It is highly recommended that the stock Mustang brake pedal, which is set-up for power brakes, be modified to put more pressure on the master cylinder. There are two ways to change the brake pedal.

Change the 5.0 brake pedal. A pedal from a 1982 four cylinder Mustang with manual brakes provides better leverage.

Cut the existing pedal. 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. By keeping the master cylinder push rod in the same place and lowering the brake pedal bolt to the four-cylinder location, more pressure is put on the master cylinder when the pedal is pressed. You can accomplish this by cutting the brake pedal between the bolt and the master cylinder push rod attachment. 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.

1. Remove the throttle cable from the accelerator pedal.
2. Remove the accelerator pedal.
3. 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.



Accelerator pedal modified.

Wiring Harness

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:

1. Speaker wires
2. Radio wiring
3. Heater wires
4. Air bag blue boxes and wires
5. Electronic seat and window controls.

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

Brake Power Booster Push-rod

1. Remove the master cylinder from the power booster.
2. The power master cylinder assembly must be changed to manual 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 fine and power brakes are not really necessary.
3. The brake push rod is on the cockpit side of the booster canister and must be removed for use.
4. 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.
5. 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.

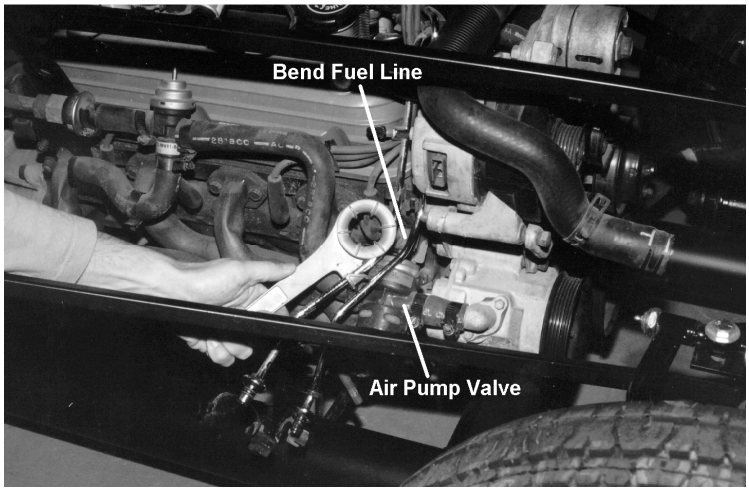
Power booster with the rod removed.

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

TOOLS: *$^{3}/_{8}$", ¾", $^{7}/_{16}$" sockets, $^{5}/_{16}$" hex keys, regular screwdriver, Teflon tape, tube bender, $^{9}/_{16}$" deep socket, ½", $^{9}/_{16}$" combination wrenches, $^{5}/_{16}$" drill bit, drill.*



Bending the fuel lines on the engine.

1. 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.
2. If you are using a Lakewood bell housing, trim the area around the starter so that is flush with the inspection cover.

Alternate Drive Pulley Preparation

ATTENTION: If you are planning on using under drive pulleys, do not use the template.
TOOLS: *Cordless drill, ½" drill bit.*
PARTS: *Alternate drive pulley template, appendix A. On all EFI cars the pulley and fan belt replace the A/C compressor and power steering pump.*

1. Remove the A/C and power steering pump. Use the alternate drive pulley template to prepare the bracket for the pulley.
2. 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.
3. If you really want power steering on the car (which is not necessary in a car this light) use the non-A/C power steering brackets from Ford to move the power steering unit up out of the way of the steering shaft.

Steering Rack and Shaft

TOOLS: *$^{11}/_{16}$" and ⅝" wrenches*

5. Remove the hydraulic lines. Use $^{11}/_{16}$" and ⅝" wrenches. 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.
6. The Mustang power rack is converted to a manual rack by removing the hydraulic lines from it and draining the fluid. You can leave the holes open without concern since the hydraulic cylinder is no longer used, however, for cosmetic reasons you may want to close them off. You can use a ½" **Non-**

threaded hole plug. Keep in mind, this must not be airtight! Air must be allowed to move in and out of the holes. If you use a hole-plug, drill a small air release hole in the center.
7. Grind the small triangular tabs off the lower steering shaft "rag" joint.

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.

Oil leaks should be clearly visible so look for them. 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. There are quite a few aluminum parts on the engine that can be polished and shined. Common cleaning methods include, wire wheel followed by clear coat paint, bead blasting, or aluminum polish. The following is a good procedure:

1. Steam clean or use a strong detergent such as Gunk™ engine cleaner. When using engine degreaser, collect the waste solvents and dispose of properly. Brush everything except the harness and the electrical pieces. 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. Be sure to clean the bay after you clean your stuff. Let the parts dry completely before removing the tape.
2. 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. Always apply clear coat paint so the parts will not oxidize.
3. Wire brush and paint the rear end. The factory doesn't coat these rear ends so almost all of them have some rust. We pay extra attention to the rear cover. Avoid rubber bushings and quad-shock travel shafts (shiny areas).
4. 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 or dusty, wipe it off gently with a moist (not wet) rag. Use caution when handling the computer. 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.
5. When repainting parts, a consistent color scheme works best and looks the nicest.
6. 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 5.0 Mustang donor car. That is, they'll 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 appendix B carefully to determine what you'll need to procure. Here are some tips on where to get started.

Spindles/brakes - High Performance/Aftermarket	Stainless Steel Brakes
Spindles/brakes – Stock	Ford Dealer
Engine – crate 302/351	Ford Motorsport
Transmission – Heavy duty T-5	Ford Motorsport
Tremec TKO with mid shift	Forte's Parts
Bellhousing – Blow-proof	Lakewood or McCleod
Drive shaft	Local drive shaft shop

ATTENTION: If you are using a Lakewood Bell-housing, trim the area around the starter so that it becomes flush with the inspection cover.

The Internet has changed this part of the business forever. Parts are now much easier to find on-line. Check out a number of customer and enthusiast based forums for help and advice.

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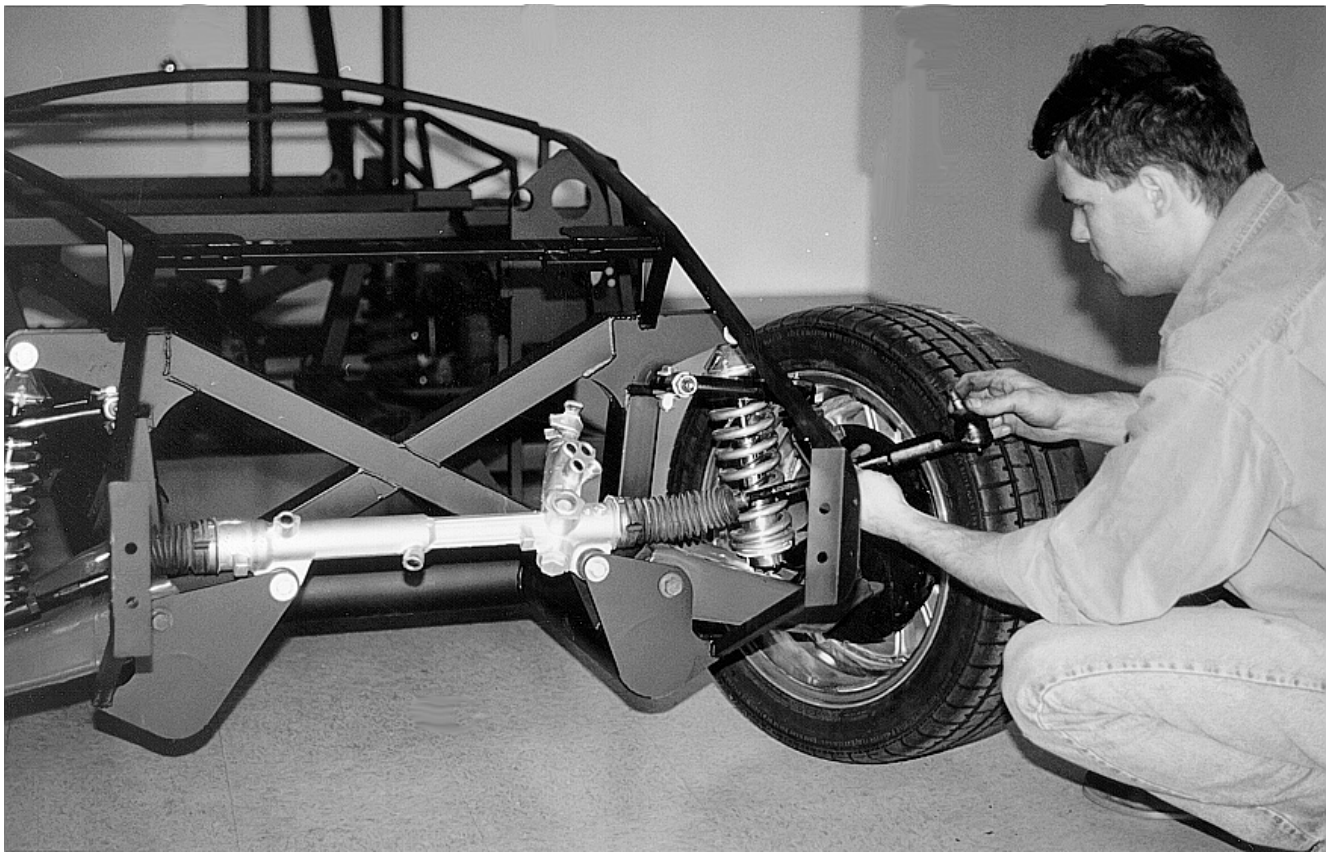
If you are going to use donor parts from a year other than 1987-1993, see Appendix B

Chapter 2 - Step By Step Chassis Build-up



Unpacking Your Replica Kit

This section is primarily intended for customers who have their kit shipped to them. If you have picked up your car at the factory, you may want to skip the crate disassembly section. For those of you who have had your kit shipped to you, let's walk through the delivery, unpacking, and disassembly of the kit.

Customer picking up his kit at our Wareham, MA facility.

ATTENTION: *Save the wood from your shipping crate in order to build an excellent body buck to hold the body when off the frame. The body buck drawing can be found under Appendix A.*

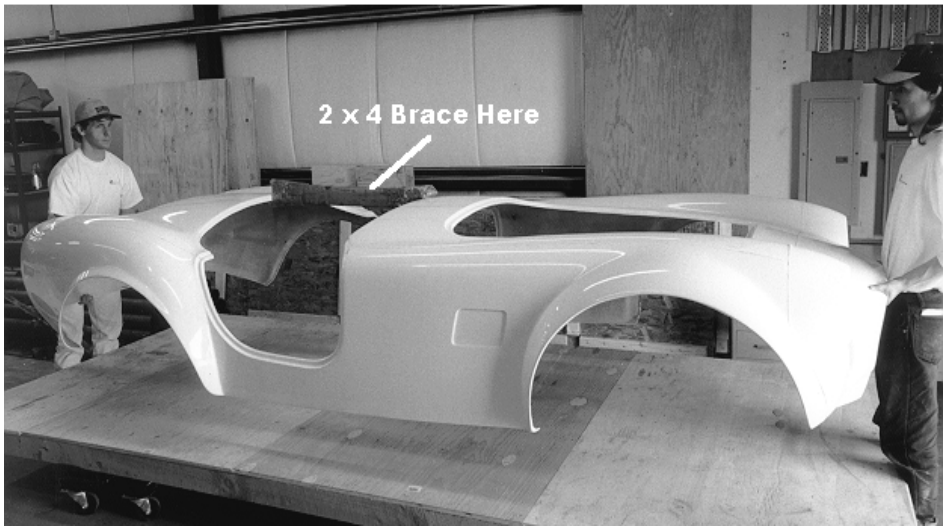
TOOLS: *Heavy-duty pry bar, claw hammer, a pair of bolt cutters comes in handy. Jack stands, 3/8" socket, and friends.*

PARTS: *Contained inside your crate is your kit documentation package (including the packing list). This is in a brown 9"x 12" padded envelope and is located inside the cockpit of outgoing kits.*

Removal of Body & Aluminum

ATTENTION: *Mark all aluminum panels with a marker for easier installation. Acetone will remove even permanent markers as well as any ink that is on the aluminum.*

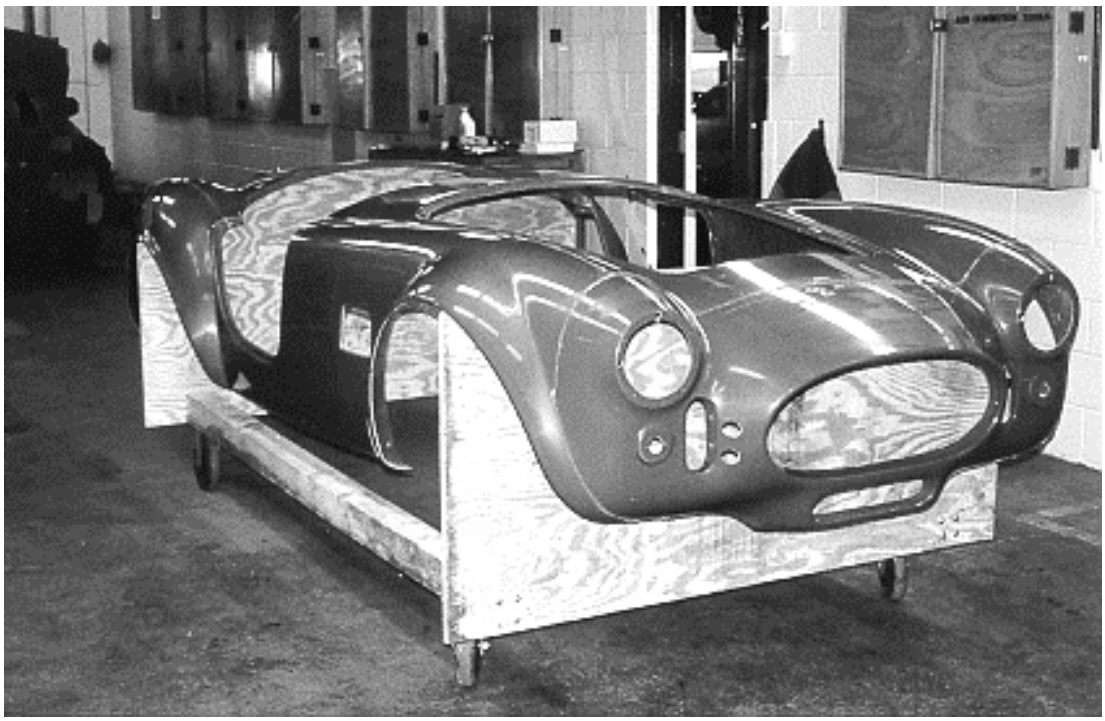
TOOLS: *½", 9/16", ⅝" sockets, "vise-grip" pliers or slip joint pliers, hex key set, ½", ⅝" wrenches, marker, 2"x 4"x 36" brace, 2"x 4"x 24" (for body support), duct tape.*



When lifting the composite body shell use a cockpit brace as shown.

1. Four strong guys can lift and move the body/frame assembly off the pallet and into a work area. Lift by the quick jacks in the back and the radiator/nose hole and wheel wells in the front. If it's not raining or snowing it is easier to take the body and aluminum off the frame while it's still sitting on the pallet.
2. Remove the aluminum under the doors to prevent scratching. Mark the panels with "driver's" or "passenger's".
3. Remove the doors by either unbolting them from the hinges with a 9/16" socket or unbolting the hinge from the frame.
4. Remove the front and rear quick-jack bumpers with a ⅝" socket and ⅝" wrench. Bag and mark all loose fasteners. The body is shipped bolted to the frame at a couple of places. The inner side of the front nose (use a hex wrench and ½" socket), one bolt on each side (use a hex wrench and ½" wrench), and the rear quick jack bumpers are some of the body mount points that have to be loosened. On the side body bolts use a ⅝" wrench and socket.
5. Now that the body is no longer fastened to the frame you are ready to remove it. *Removing the body should be done very carefully*.
6. Use a 36" x 2" x 4" wooden brace across the top of the cockpit cowl. Tape it in place so it doesn't slip out. The best way to remove the body is with four people, one per wheel well, with each person watching out to not stress the narrow body section under the door area. If you only have two people you can remove the body like we do here at the plant with one person at each end lifting in the nose and under the back. The point here is that the body is basically two large halves joined together at a narrow strip. Some companies cut the body in half to make this easier but then it is difficult bodywork to get it straight.
7. Remove the body by lifting the rear end up over the trunk aluminum first and then sliding the nose slightly forward past the quick jack supports, then up and away. Notice the dash hoop support to clear is tapered so as you go up it gets wider.
8. When you store the body on the ground (unsupported) for long periods of time you can 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.

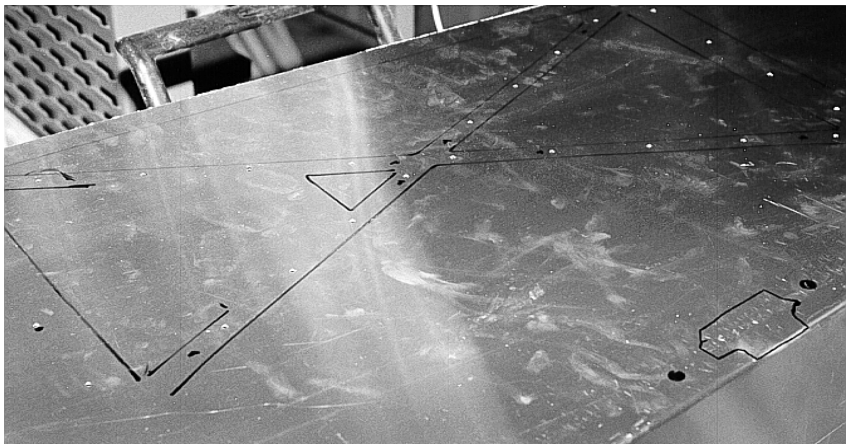


Body buck

Aluminum Removal and Preparation

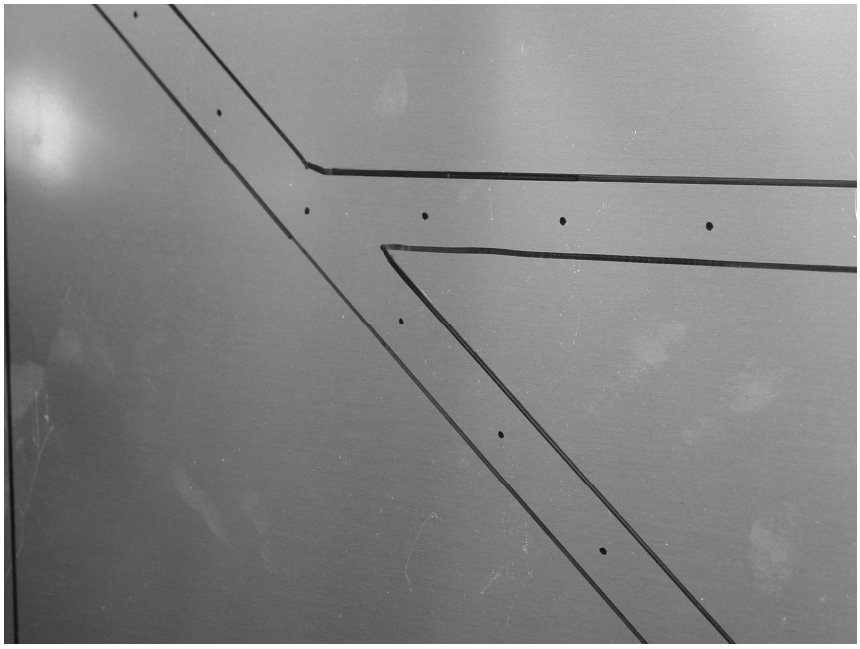
ATTENTION: *The spacing of the rivets is a personal preference. The kit includes enough rivets to space them every 3" except in the foot boxes where spacing can be every 2".*

1. Mark each panel and take pictures of how the panels fit together (i.e. which is on top).
2. Mark the floors, trunk walls and floor, and cockpit rear wall panels for the rivets before removal. To get straight and evenly spaced rivets, draw on the underside of the aluminum panel around the frame members with a black permanent marker.



Trace around the frame members, and then use a ruler to mark rivet locations.

3. Remove any screws holding the panel to the frame and remove the aluminum panels. Keep the #6 screws to help with aluminum positioning later during build-up.
4. Using a ruler and marker, mark every 3 inches along the centerline of the pen outline that you made on the aluminum.



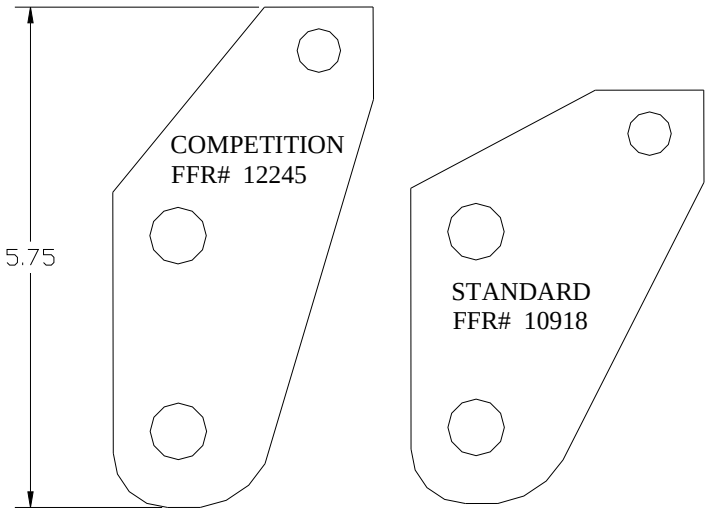
Panel marked for rivet holes

5. Drill the marks with ⅛" drill bit.
6. Position your frame in your workspace with plenty of room to move things around. Use jack-stands or 4" blocks to put the frame 4" above the ground. This is close to ride height, making the suspension easier to position.

Assuming you have either completed your disassembly of the donor 5.0 Mustang, or have procured the individual parts and prepared them for installation, you are now ready to begin assembly of your car. We will begin with the chassis and address each sub-assembly in a sequential fashion.

Front Suspension Installation

ATTENTION: *Use extreme caution when working with coil springs. If you are using 1994 or newer spindles make sure you have the Competition IFS brackets. The 1993 and earlier measure 4.75" tall and the 1994 and later brackets measure 5.75" tall.*

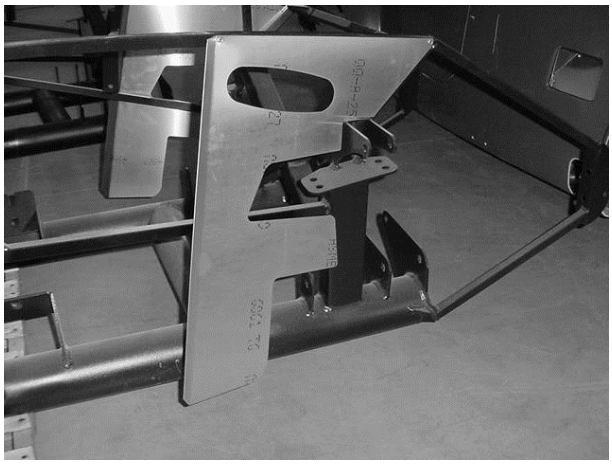


TOOLS: *Combination wrenches, coil-over adjusting tool (FFR# 10961), ⅜", ⅝", ¾", 13/16", ⅞", 15/16", 1 ⅛", 18mm sockets. Rubber mallet, eye protection, drill w/#6 hex nut driver, 1/8", ½" drill bits, drill, rivet tool, torque wrench, silicone, caulk gun, #6 self tapping screws.*

PARTS: *Mustang lower control arm, front suspension ball joint brackets (FFR# 10918), IFS assembly (FFR# 11074), ⅛" rivets (FFR# 10782), aluminum engine bay assembly (FFR# 10892).*

Engine Bay Aluminum

1. Before you install the front suspension, you need to position and install your left and right engine bay aluminum pieces and aluminum firewall. The engine bay panels look like big letter "F's." Align the panel to the hole where it was mounted at the factory. Note where the aluminum touches.
2. Apply silicone to ¾" tubular steel frame where aluminum will touch.
3. Secure the panel in the original position as received from factory using positioning screws.
4. Drill rivet holes using ⅛" bit and rivet using short rivets. The middle of the "F" will need to be pushed into the frame in order to fasten it to the ¾" tubing.

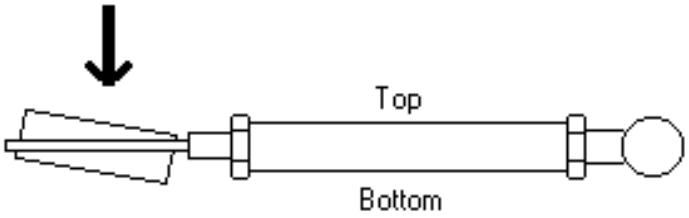


The passenger side engine bay F-shaped aluminum panel.

5. Position the firewall to see where to apply silicone.
6. Run a silicone bead along the front of the horizontal 2”x 2” between the ¾” upright on the passenger side and the ¾” angled tubes in the driver foot box area.
7. Use the #6 sheet metal screws to position the firewall panel while riveting. Use sheet metal screws and no silicone (for now) for the area around the driver foot box since this area will be pulled back later when installing the wiring for the dash harness. Silicone and rivet from one side to the other.

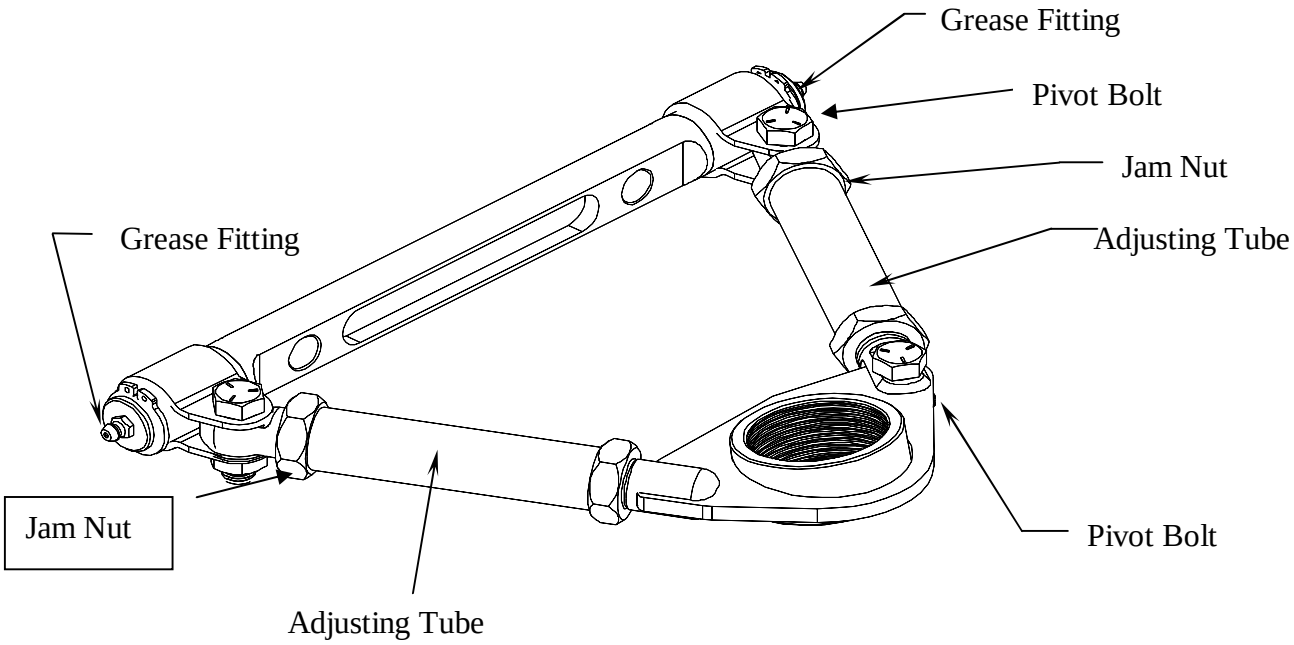
Front Upper A-Arms

1. Install ball joints into the control arms making sure to **orient the arm according to the drawing below**. The same arm is used for both sides of the car. There is not a left and right arm.



Tightening the upper balljoint

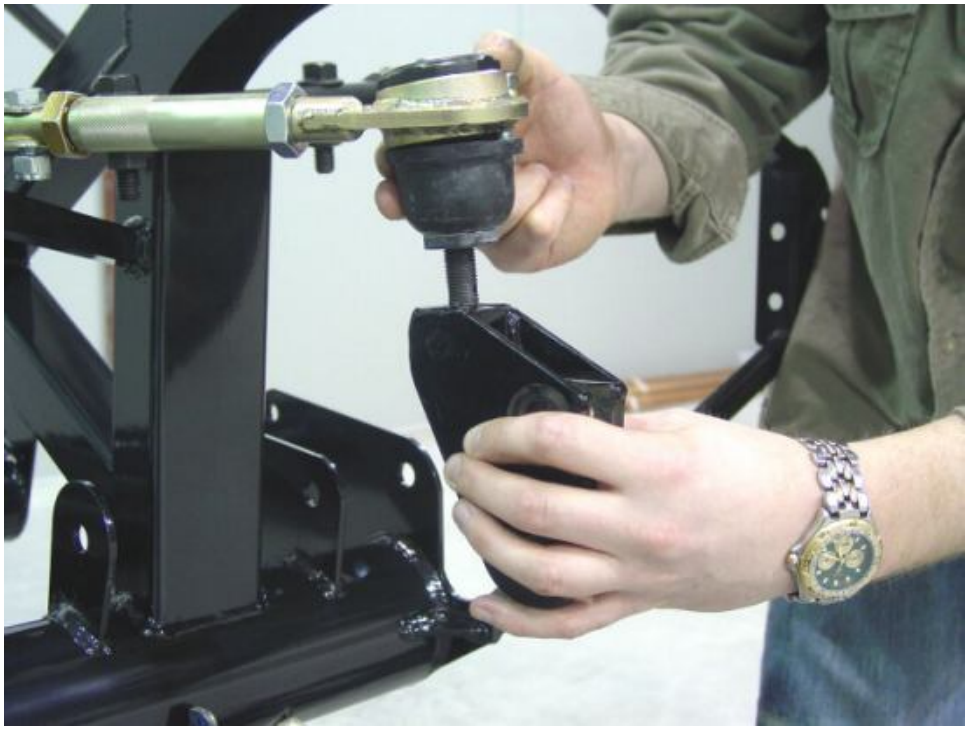
Adjusting the Arm - Use the diagram below for reference.



2. Slightly loosen the three pivot bolts using ⅝" wrenches.

ATTENTION:
MAKE SURE THAT THE BOLTS ARE INSERTED FROM THE TOP AS SHOWN ABOVE.

3. Loosen the jam nuts on both ends of each adjusting tubes using a 1⅛" wrench. Turn the adjusting tubes to lengthen or shorten the arm.
4. 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 to 60 lb-ft of torque. There should never be more than 1" of thread showing past the tightened down jam nuts on either end of both adjusting tubes. The cross shaft comes pre-greased from the factory. Re-grease both ends frequently to insure smooth, trouble free operation.
5. Insert the ball joint into the IFS bracket (FFR# 10918). This bracket replaces the Mustang strut. Be sure to use the cotter pins included with the ball joint. If the top of the crown nut goes past the hole in the ball joint, use the spacer that comes with the ball joint.

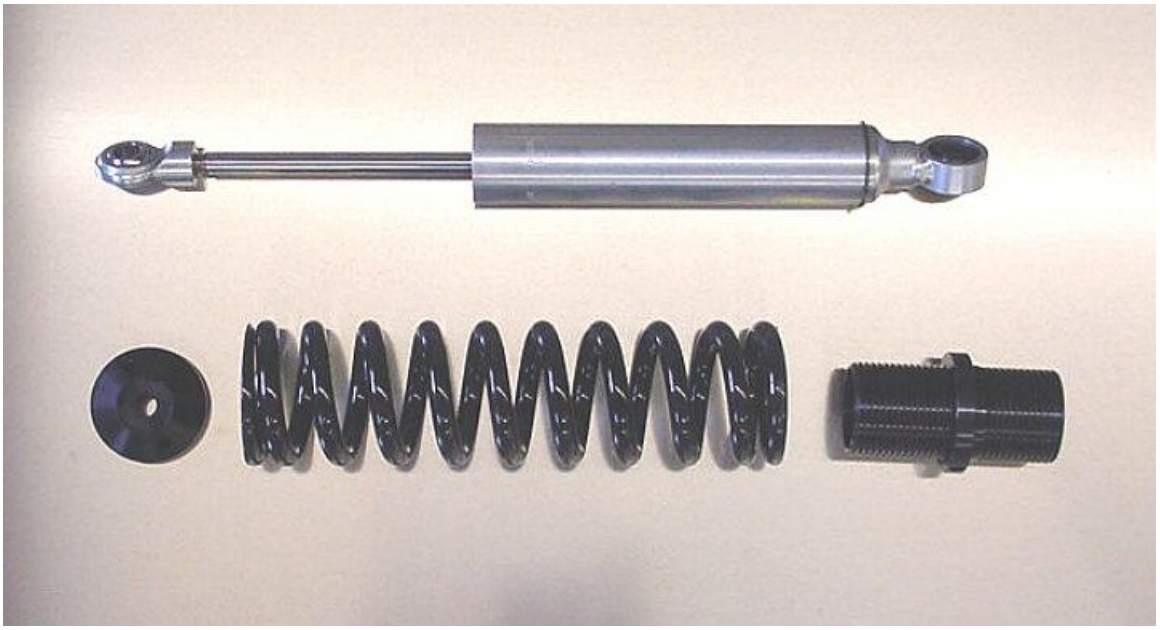


Inserting balljoint into IFS Bracket

6. Attach the IFS bracket/upper A-arm assembly to the spindle using the factory strut bolts and Ford **Torque spec 190-271Nm (140-200 lb. ft).**
7. Mount the lower control arm to the frame with the Mustang lower control arm bolts. It may help to use a rubber mallet to get the control arm in between the frame brackets. Tighten by hand for now.
8. Attach the spindle assembly to the lower control arm on the frame. Removal of the brake caliper and disc along with the brake shield may be necessary. **Use the Mustang crown nut and Torque specs 106-163Nm (80-120 lb. ft).**
9. Attach the upper A-arm hand tight to the mount plate using the fasteners provided.

Front Coil-Over Assembly

ATTENTION: The front shock is pre-valved at the factory. We supply 450 lb. springs with the kit. Other springs are available for different ride characteristics.



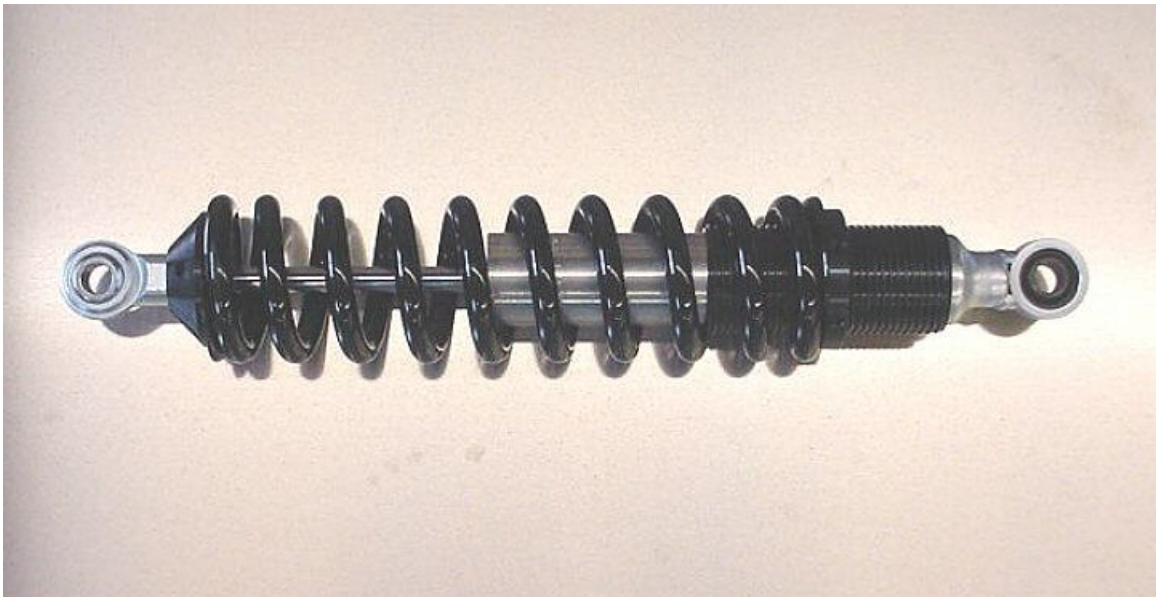
Front shock and coil-over spring parts.

1. Remove the rod end from the end of the shock.
2. slide the coil-over threaded sleeve on the shock. It may be fairly tight. **Make sure that the end with the groove in it goes on first**. This covers the snap ring already installed at the factory.
3. Check the spring seat on the sleeve to make sure that the taller part near the threads is on the top so that it keeps the spring from rubbing the threads and that it is not on the bottom.

Threaded tube assembled on shock with spring seat screwed on correctly.

4. Slide the spring on the assembly.
5. Place the spring hat on the shaft so it sits on the spring.

6. Screw the jam nut and rod end back on the shaft and tighten the jam nut.

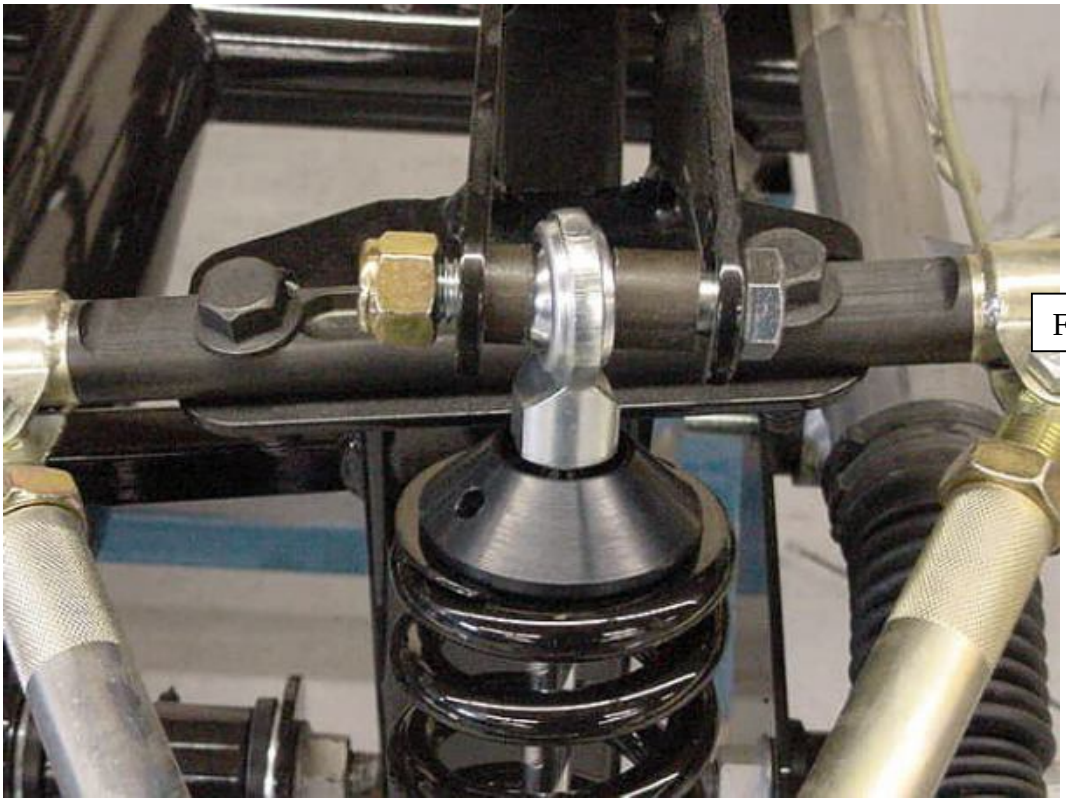


Coil-over shock assembled.

7. Using a ½" drill bit, enlarge the hole on the Ford bracket (FFR# 10810).
8. Attach the lower shock to the Ford bracket using the spacers provided in the kit.

Lower shock mount with Ford bracket and spacers.

9. The area on the control arm towards the center of the spring mount needs to be bent or cut away to prevent damage to the coil-over unit. Check the clearance with the new shock and the mount.
10. Pass the shock assembly through the upper A-arm and attach them to the lower control arms using the spacers that are supplied in the kit.
11. Fasten the shock to the top mount with the fasteners and spacers provided. The longer spacer should go towards the front of the frame on the top.



Upper shock with spacers.

12. Tighten the upper A-arm bolts to the mount plate. **Torque to 100-120 lb. ft**.


Torque upper A-arm bolts to spec.

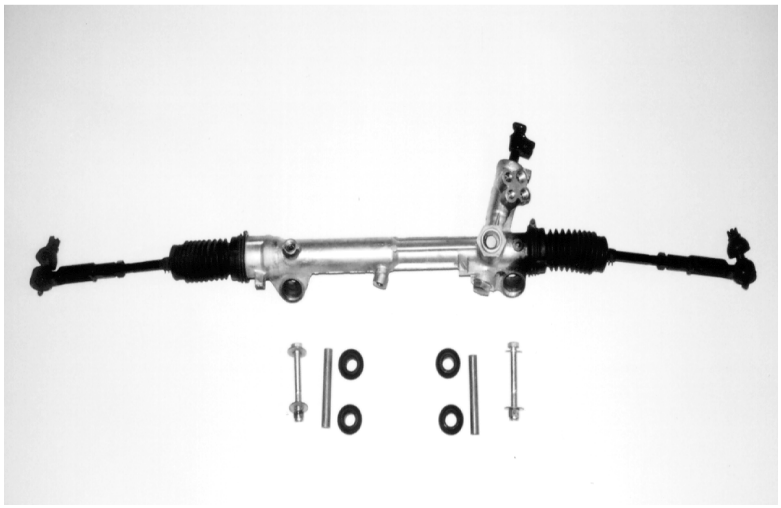
13. The upper ball joint boot will look crushed and out of shape when the car is in the air, this is OK. The boot will seat when the car is on the ground. It is only a dust boot and the grease will not leak.

IFS bracket and Balljoint boot with suspension in full droop.

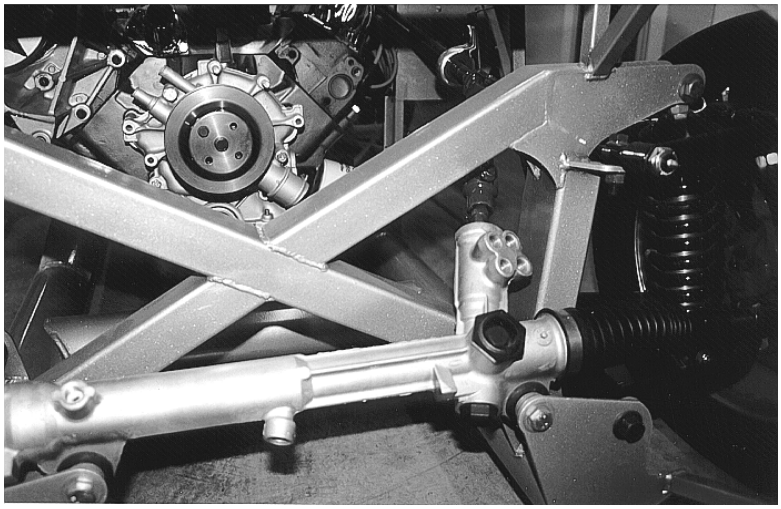
Steering Rack Installation

TOOLS: *¾" Socket, ¾" Wrench, Needle nose pliers*
PARTS: *Steering rack/shaft assembly (FFR# 11073).*

1. Place the steering rack between the rack mounts on the frame (above the front lower control arm bolt) making sure the rubber bushings and spacer sleeves are inside the rack mount.
2. Using the bolts, spacers and washers from the kit, put all of the washers to the front of the rubber bushings. The spacers go inside the rubber bushings in the rack and must be positioned as bolts are run through the rack. The front lower control arm bushing is slightly wider than the steering rack so the mounting tabs will compress to clamp the rack.
3. The track of the FFR Roadster front end is a little narrower than the Mustang. Screw in the tie rod ends until the inner rod is flush with the end of the threaded section on the driver side, ¾" past the end on passenger's side.
4. Attach the tie rods to the spindles and secure with the nuts and cotter pins.



Above: Ford steering rack and fasteners (hydraulic lines removed).



Installed steering rack.

Battery

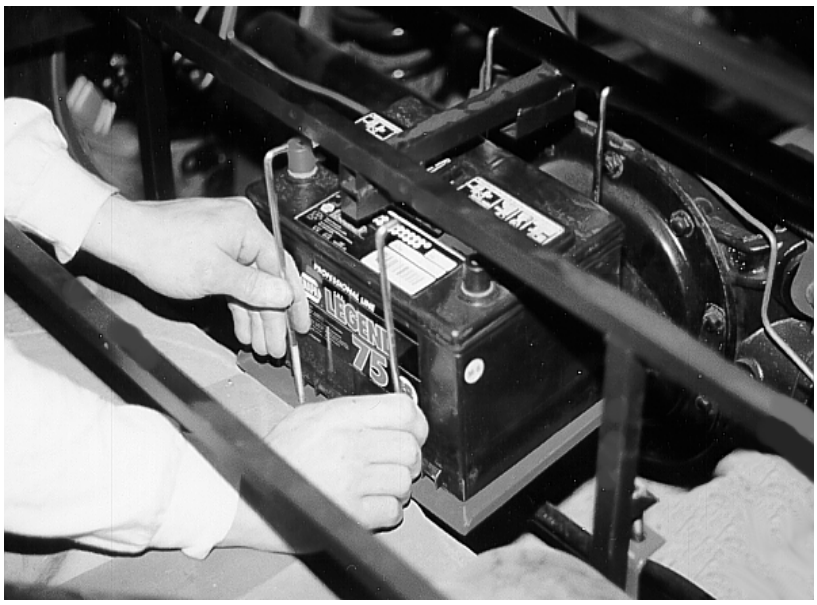
ATTENTION: *If you have an optional IRS or have ordered a rear trunk battery box, these instructions do not apply. Please see the instructions for the IRS under appendix G in the back of this manual. It is recommended that you purchase a new battery. The battery tray is designed to accept the standard Ford Mustang 5.0 battery. Do not expose the battery to any spark source. Do not connect the battery.*

TOOLS: *$^{7}/_{16}$" deep socket, ¼" drill bit, drill, marker pen. Duct Tape.*

PARTS: *Battery/tray assembly (FFR# 10819)*

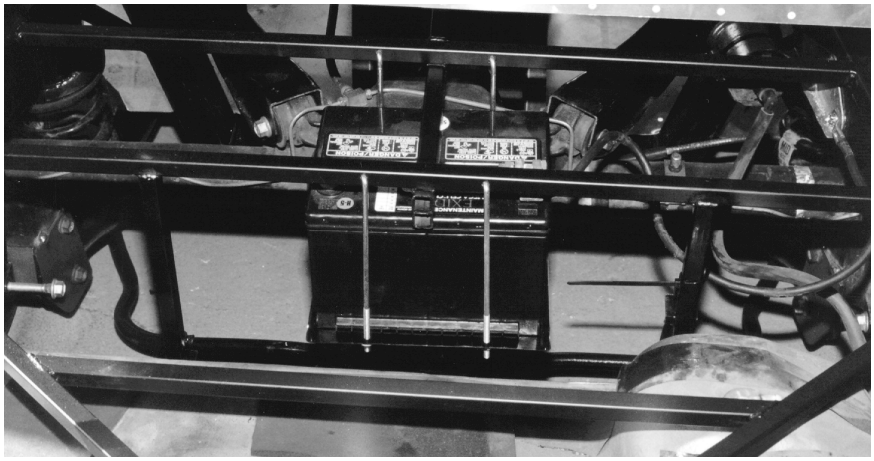
1. Place the battery tray, on top of the trunk floor, with half of the plate on each side of the cross brace.
2. Mark where the holes line up on the rear facing side of the ¾" tubing.
3. The holes should be drilled on the rear face of the ¾" tube so that the battery tray does not hit the differential (see photo). On IRS cars, a trunk mounted battery box is supplied since the IRS framework takes up the space where the battery normally goes.

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



Hooks attach to trunk floor cross members.

5. Hold the tray up to the drilled holes on the frame and insert the hooks into the holes.
6. Duct tape the hooks into the holes to help in the assembly process.
7. Place the battery onto the tray with the positive terminal on the driver's side.
8. One by one, wipe clean of any grease/oil on the hook bolt. Using *JB Weld* cover each hook before they are inserted into the holes drilled for them. This will help prevent any hook from coming out if it is not tight.
9. As you tighten the battery plate upward, make sure that the battery brace is lined up with the depression on the battery to ensure the battery is straight.
10. Tighten the battery down until it is snug against the frame and does not move. Do not over tighten and bow the sides of the battery causing damage to the battery. The bolts should be tightened evenly and none should be loose.



Battery installed. View from rear of trunk.

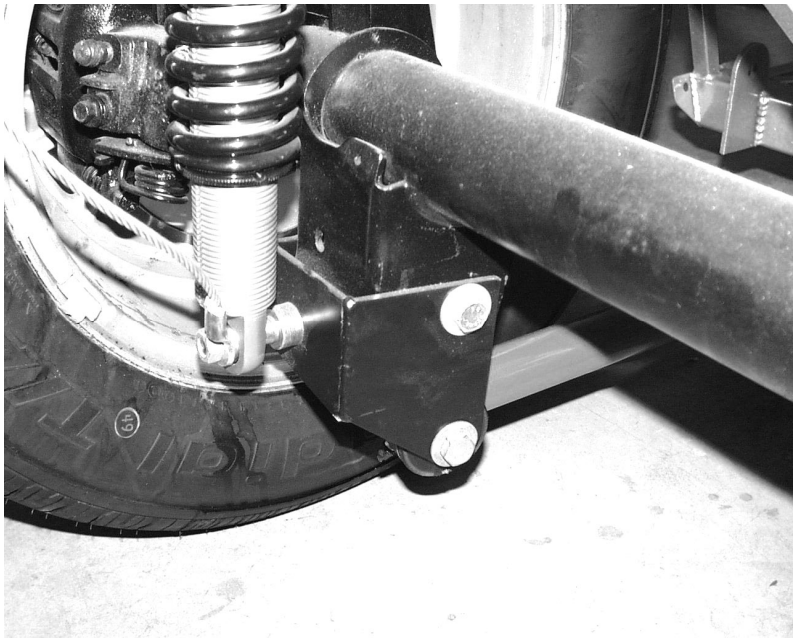
Rear-End

ATTENTION: *Make sure to use caution when working with the rear end assembly, it is heavy.*
TOOLS: *15mm, 18mm and ⅝" sockets, ¾", ⅝" combination wrenches, ½" drill bit, drill, floor jack.*
PARTS: *Rear-end assembly with quad shocks, rear control arm bolts, flexible brake line mounting bracket, rear traction-lock assembly (FFR# 10885).*

1. Open up the lower control arm holes on the rear end with a ½" drill bit. The FFR rear Traction-Lok brackets drop the control arm height, aid in anti-squat, and give the solid axle car the correct ride height.

Enlarging the rearend bolt holes.

2. Position the brackets on the rear end with the bolts provided (the two short bolts go on the sides). Attach the lower shock bracket through the traction lock bracket at the stock location. **Torque to Ford Specs 75-95Nm (55-70lbft)**.
3. Tighten the two short bolts.
4. Attach the lower control arms loosely to the brackets on the axle using the long bolt provided.

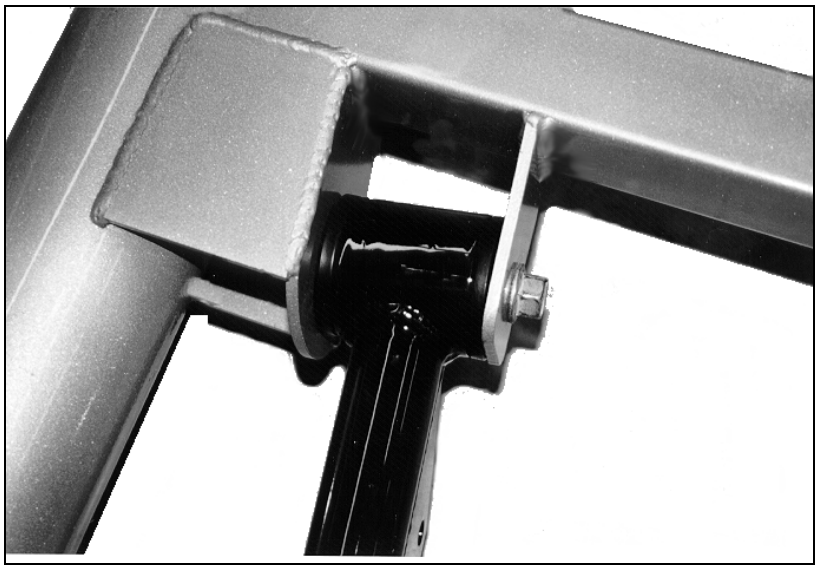


Rear traction lock bracket installed with rear coil-over option

5. If not already on the axle, attach the Mustang upper rear control arms loosely to the rear end.
6. Attach the vertical shocks to the axle brackets. Insert the bolts from the inside out. Do not tighten the bolts yet.
7. Thread the cut rear springs onto the conical frame mounts all the way.
8. 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.
9. Place the flat part of the rear end on a floor jack.
10. Raise the rear end so that the upper control arms are flat.
11. There are three sets of bolt holes that the upper control arms can attach to. As a guideline, if the engine you are using has under 300hp use the top set of holes. If the engine has between 300 and 400 hp use the middle set of holes. If the engine has more than 400 hp use the lowest set of holes. Use the highest set of holes possible that don't cause axle hop.

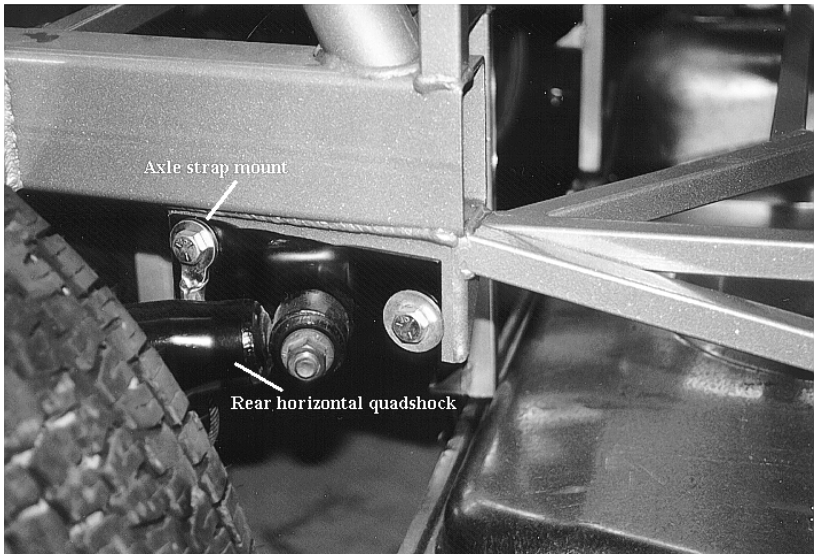
ATTENTION: *The best street and track handling is achieved using the highest set of holes. For the best launch at the drag-strip use the lowest set of holes. Using the lower set of holes requires putting the bolts in from the opposite direction. Once the rear cockpit wall aluminum is installed, these bolts will not come out unless a hole is drilled in the aluminum.*

12. Bolt the upper control arms into the upper mount brackets on the frame. The bolts install from the outside in. Leave the bolts hand tight.
13. Lower the rear end so the lower control arms can mount to the frame using the Mustang bolts. Tighten the bolts by hand for now.



Passenger side tubular rear lower control arm in the frame mount.

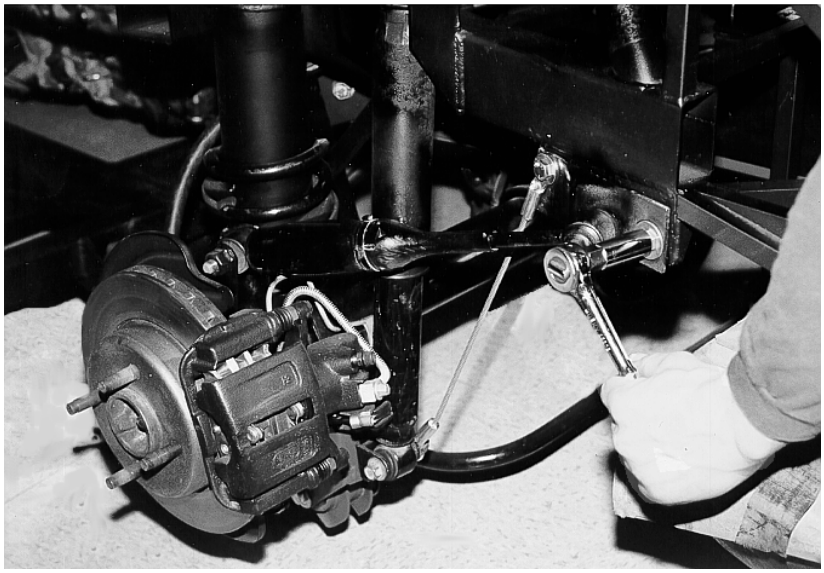
14. Start raising the rear, taking care to position the two lower control arm rubber spring mounts and the springs in their correct seats on the lower control arms.



Rear driver's side quad shock mount. Leading bolt holds axle-limiting cable.

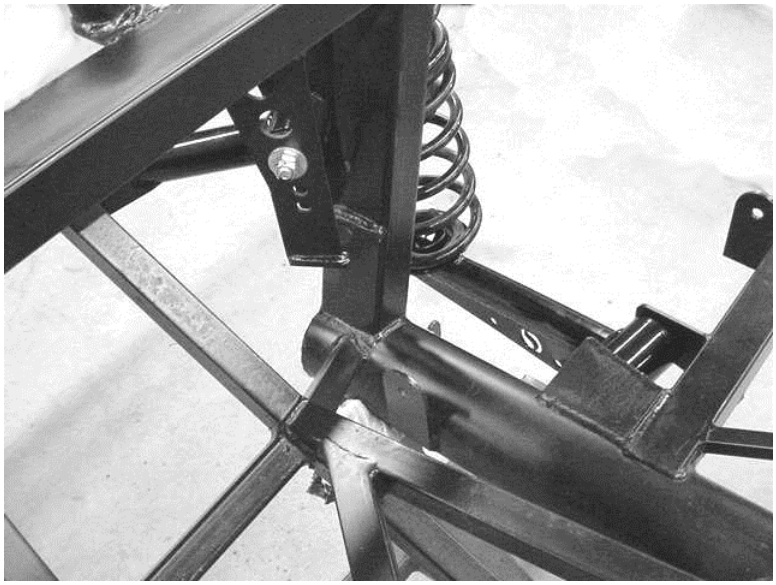
15. Screw the springs down so the end of the spring is ½ coil past the end of the mount.
16. Suspension height adjustments are done in the rear by turning the spring from its normal position on the mount to a position higher or lower. Remember that the spring is located halfway to the arm mount, so any height changes at the spring will be multiplied by roughly two at the axle.
17. 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 (27lbft)**.
18. Mount the quad shocks and their brackets to the rectangular frame plate shown in the picture.

19. 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 the inboard side of the vertical shock down low.



Bolting the rear horizontal quad shock to the frame w/ axle straps.

20. Put the wheels and tires on the suspension and lower the chassis to the correct ride height. Tighten upper and lower control arms to the correct torque specification, shown on the following chart. This is done so that the bushings are not pre-loaded which will affect handling and ride quality.



Optional upper and lower control arms attached to frame.

21. The rear end is attached to the Factory Five Racing frame at the shocks, springs, and control arms (upper and lower). Checking the tightness of the bolts on the rear control arms should be done with your car's regular maintenance.

22. Using the rear sway bar is not recommended. The bar can be installed on the factory mounts for auto-crossing or depending on your driving style.

ATTENTION: *Torque the nut if possible. Only torque the head of the bolt if the nut is inaccessible.*

Torque Specs Chart

Item	Nm	Lbft
Front End		
Upper control arm to frame	135-162	100-120
Upper control arm pivot bolts	81	60
IFS bracket to Spindle	190-271	140-200
Lower control arm to frame	149-203	110-150
Upper Ball Joint	108-162	80-120
Lower Ball Joint	108-162	80-120
Rear End		
Upper control arm to axle	95-135	70-100
Upper control arm to frame	108-142	80-105
Lower control arm to axle	95-135	70-100
Lower control arm to frame	108-142	80-105
Lower vertical shock to axle bracket	61-81	45-60
Quad shock bracket to frame	75-95	56-70
Quad shock to bracket	75-95	56-70
Quad shock to axle	75-95	56-70

Source: Chilton's 1989-92 Ford Mustang Repair Manual, FFR

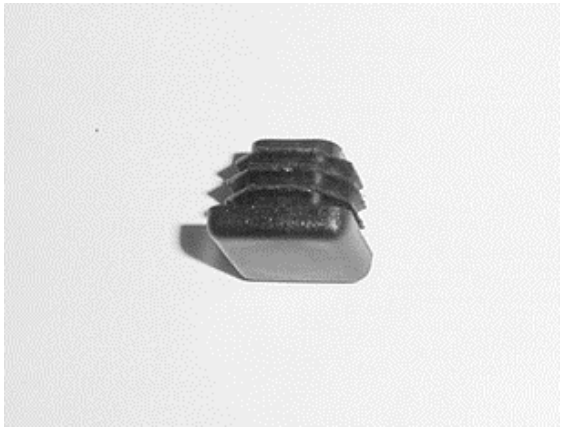
Fuel Tank and Fuel Filter

ATTENTION: *Extreme caution should be used when handling and storing fuel tanks that contain fuel. Make sure to close off the tank with the factory cap and seal the fuel line ends. Keep the tank level.*

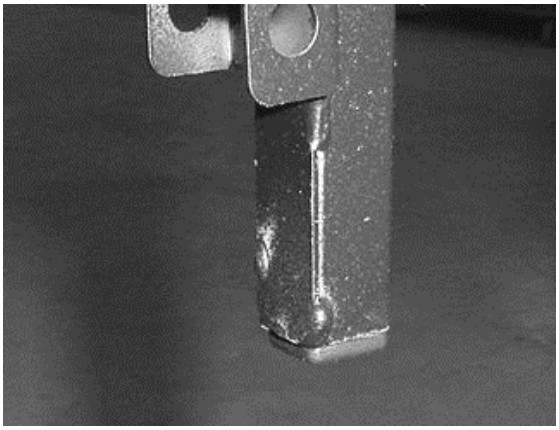
TOOLS: *$^{9}/_{16}$" and $^{5}/_{16}$"deep sockets, combination wrenches, rubber mallet, hammer, $^{5}/_{16}$" hex key, floor jack, friend.*

PARTS: *Donor fuel tank, mounting straps, fuel line from tank to filter and fuel neck. Fuel tank assembly (FFR# 10896), fuel line assembly (FFR# 11078).*

1. Put the four square plastic plugs (FFR# 10996) into the ¾" vertical frame extensions under the trunk area (these are the open ended tubes that stick straight down from the floor of the trunk steel framework). The plastic caps prevent the metal tube from touching the fuel tank edge flange.

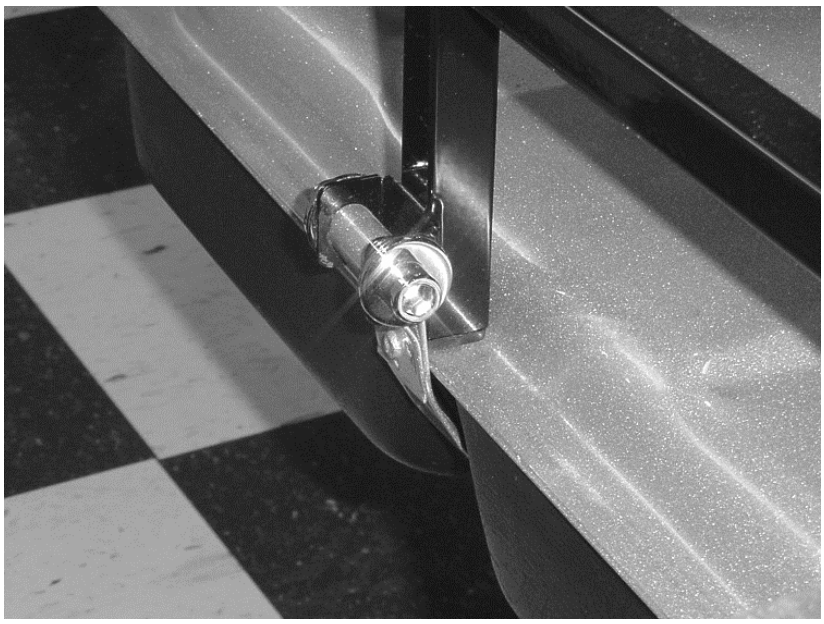


Cap Plug



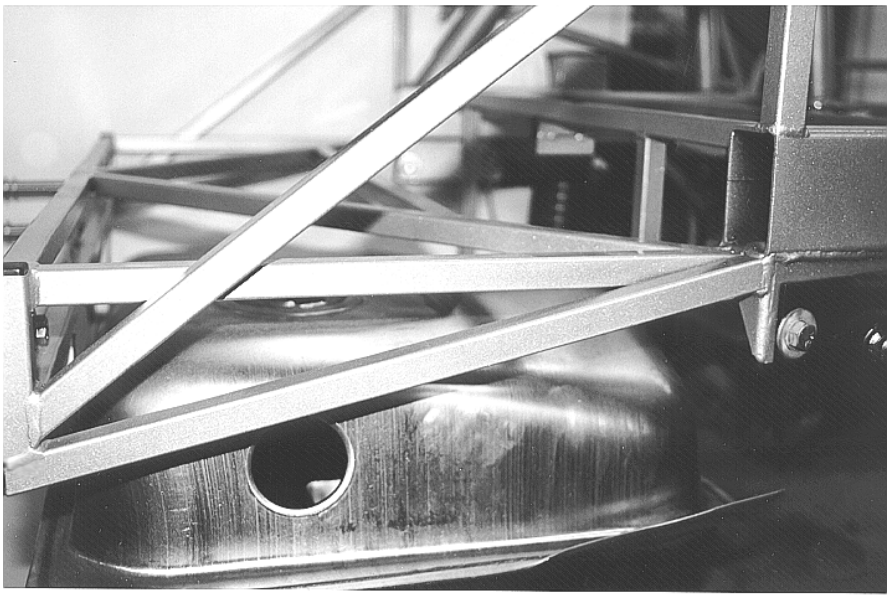
Cap Plug installed

2. Place the plastic cover on the fuel tank bottom (if not already in position) and position the tank behind the trunk so that the fuel filler neck is on the passenger's side.
3. Put a floor jack underneath the center of the gas tank with a friend holding one end of the gas tank for balance.
4. Raise the tank and hold it up to the ¾" vertical tubes while you get the straps positioned.
5. The straps install first at the rear of the frame with the 2" bolts provided. Swing the straps under the tank and bolt them to the front posts. Use kit fasteners provided.



Tank strap attached to frame

6. Don't tighten the rear strap fasteners (ends closest to the cockpit). The tank will have to be lowered slightly later in order to mount the body and the bumpers.

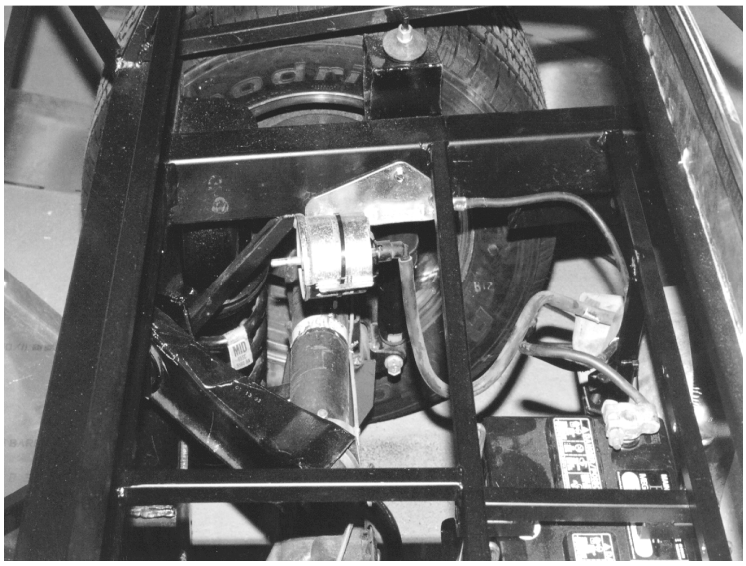


Side view. The Mustang fuel tank installed into the rear frame.

Fuel Filter

ATTENTION: *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.*

1. Attach the stock Mustang high-pressure (large diameter) hose to the fuel tank and to the in side of the fuel filter in its bracket.
2. Mount the bracket and filter on the inside of the passenger side 2"x 3" rear trunk frame extension.
3. Make sure that the fuel line will not get in the way of the tire. Use zip-ties or fasten the lines securely to make sure there is sufficient clearance.

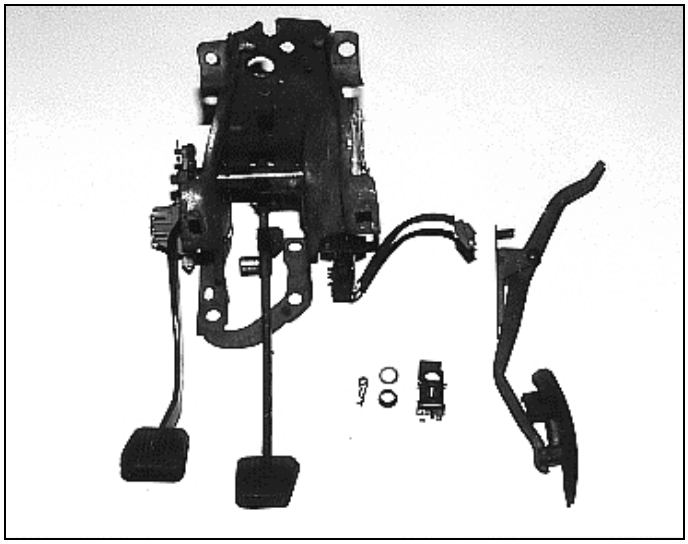


Fuel filter mounted to the passenger side 2"x 3" tube.

Pedals

TOOLS: *⅜", 9/16" sockets, 3/16", 5/16" hex key, drill, 9/16" combination wrench, ⅛", ¼", 7/16" drill bits, silicone, rivet tool, marker, hacksaw.*

PARTS: *Mustang pedal box, pedal box fastener assembly (FFR# 11023), aluminum cockpit assembly (FFR# 10890), ⅛" rivets.*

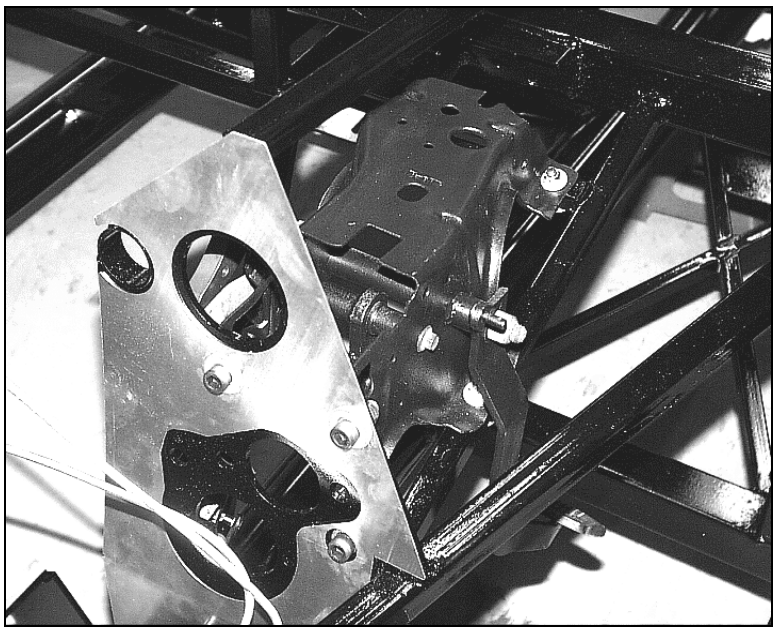


Mustang pedal box and Accelerator pedal

1. Temporarily install the driver's side foot box front vertical wall (FFR# 10904) using the factory screws to position it.

Foot box vertical wall attached to frame

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



Positioning the pedal box.

3. There are four holes on the Mustang pedal assembly on top of the ¾" tubing. Mark these holes on the foot box.
4. 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.
5. Mark the corner of the pedal box that sticks out past the front foot box plate. This will have to be trimmed.

Pedal box positioned. Note corner to be removed on pedal box.

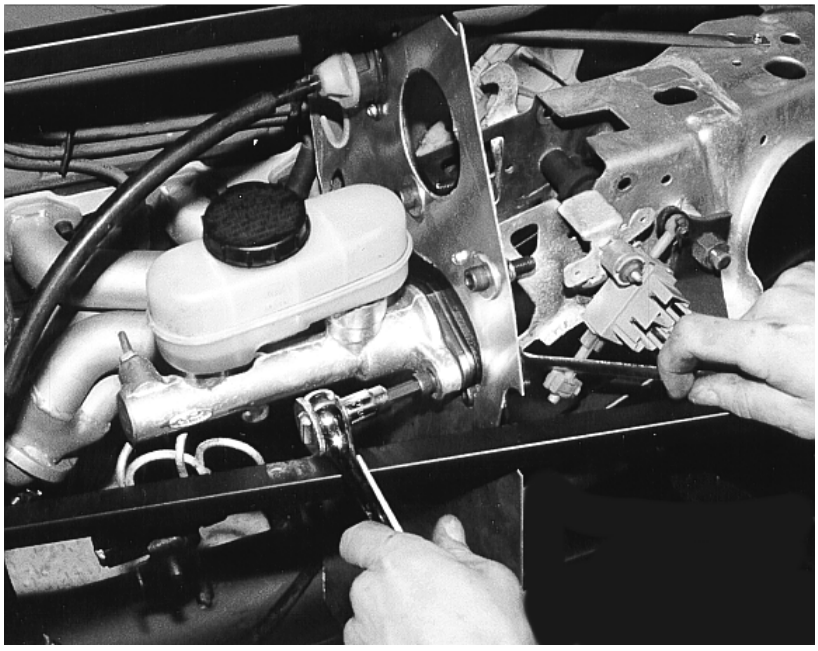
6. Remove the pedal assembly.
7. Drill ¼" holes completely through the ¾" tubing for the pedal box.
8. Use a $^{7}/_{16}$" drill bit to drill the bolt hole in the pedal box for the master cylinder bolt.
9. Trim the corner off the pedal box using a Hacksaw.
10. The front foot box aluminum panel can now be bonded (silicon) and riveted in place with the $^{1}/_{8}$" long rivets.
11. Install the pedal box with the two ⅜" bolts and washers at the top as before. They go through existing holes in the front of the foot box. The four ¼" socket head bolts hold the foot box to the ¾" tubes. Use the large fender washers (FFR# 12337) on the underside of the tubing.
12. Attach the trimmed accelerator pedal using the kit fasteners [(2) ¼" x ¾" long bolts (FFR# 12335), washers and nuts (FFR# 10802)] to the bracket on the vertical ¾" tubing at the front of the foot box.

Master Cylinder & Push Rod

ATTENTION: *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.*

TOOLS: $^{5}/_{16}$" hex key, $^{9}/_{16}$" socket, *tube bender, double flaring set, tube cutter.*

PARTS: *Master cylinder, Mustang power booster push rod, OEM brake line fittings, pedal box fastener assembly (FFR# 11023).*



Tightening the master cylinder. Note the spacers directly behind it.

1. Use the ⅜"x 2" bolts provided to mount the master cylinder and spacers to the footbox front wall. The number of spacers used dictates the height of the brake pedal. Start with one spacer unless you are 6' or taller then use more.
2. One of these bolts doubles as a foot box lower mounting bolt.
3. Tighten all of the mounting bolts for the pedal box and master cylinder.

4. Install the push rod from the power booster into the master cylinder and insert the white plastic bushing in the ring end.
5. Hold the rod between the two ears of the brake light switch and slide it over the brake pedal post.
6. Put the clip through the hole in the pedal so that the push rod will not come off.
7. 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.

Cockpit Aluminum

ATTENTION: *Do one panel at a time. Be careful of the sharp aluminum edges, they can cut you. If you have not marked and drilled the panels for rivets, as explained in the uncrating and disassembly of the kit, do so at this time.*

TOOLS: *Drill, ⅛" drill bit, rivet tool, Silicone, #6 self tapping screws, #6 hex nut driver, ruler, marker, Acetone or carburetor cleaner, rags.*

PARTS: *Aluminum cockpit assembly (FFR# 10890), secondary body fasteners assembly (FFR# 10788).*

Aluminum Floor Panels

1. Position the pieces before doing any work to make sure you are familiar with placing them in the frame accurately.
2. Attach the floor panels with self-tapping screws.
3. Apply silicone or bonding agent to the frame on the main contact points of the 4" round tube, 2" cross member supports, and the ¾" tubes. Lay the floor into position and attach the panel with self-tapping screws once again. Press firmly on all surfaces to squeeze bonding agent out and along panel.
4. With the floor in place, drill through the holes in the aluminum and into the frame.

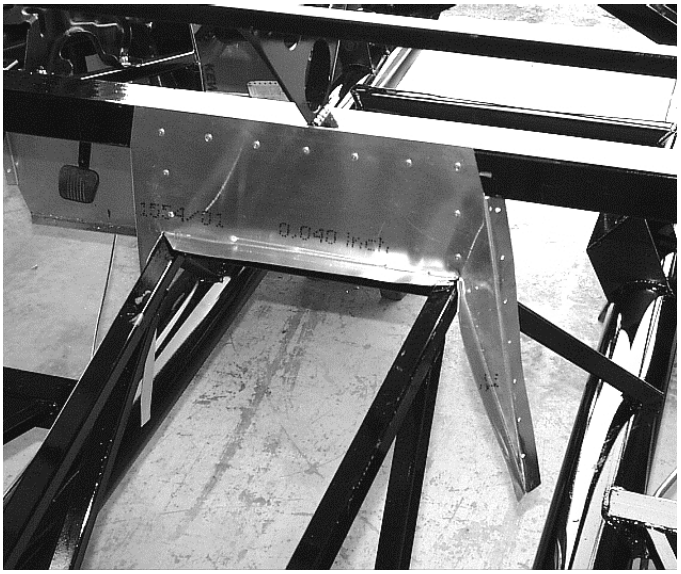
With the panel clearly marked, drill all rivet holes in advance.

5. Wipe and clean the aluminum panel and rivets.

6. Repeat for the other floor panel.

Transmission tunnel front vertical wall

1. Position the panel on the frame.
2. Mark where the rivets will go.
3. Remove the panel and apply silicone to the frame.
4. Attach the panel with #6 self-tapping screws.
5. Rivet the panel in place.



Transmission tunnel front vertical wall.

Driver's Foot Box

1. Position the foot box floor. The front edge sits on top of the front wall bottom tab and the back gets attached to the 2"x 2" tube.
2. Mark where the rivets will go.
3. Remove the panel and apply silicone to the frame.
4. Attach the panel with #6 self-tapping screws.
5. Rivet the panel in place.
6. Position the outside wall on the foot box. The tab on the front wall goes on the inside of the outside foot box wall.
7. Mark where the rivets will go.
8. Remove the panel and apply silicone to the frame.
9. Attach the panel with #6 self-tapping screws.
10. Leave the top edge of the panel that rests along the ¾" tubing unattached so that the foot box top can fit under it later.
11. Rivet the panels in place.
12. Position the inside wall on the foot box from the engine compartment side. The bent tabs go behind the front wall.

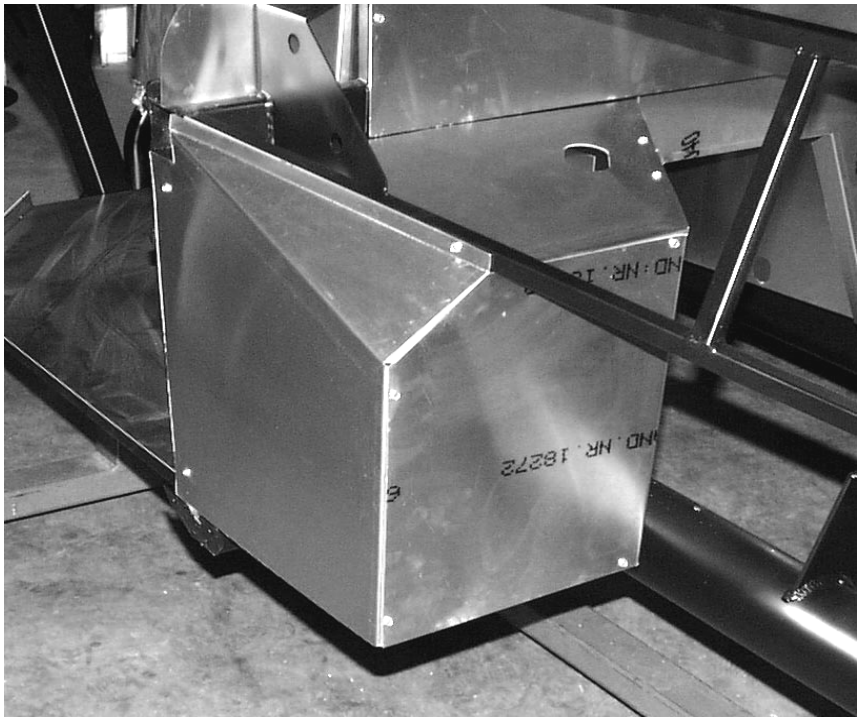
13. Mark where the rivets will go.
14. Remove the panel and apply silicone to the frame.
15. Attach the panel with #6 self-tapping screws.
16. Rivet the panel in place.
17. Position the top/inside panel.
18. Remove the panel and apply silicone to the inside wall, front wall and along the top ¾" frame tube.
19. Rivet the panel to the inside and front walls only.

ATTENTION: *Leave the top/outside of the driver's footbox open in order to do the wiring.*

20. Take a look at the completed foot box and floor for gaps between the panels and around the seat harness mounts. Use silicone to fill these gaps.
21. Temporarily place a seat on the driver's side floor.

Passenger Foot Box

1. Attach the foot box top panel to the frame using the factory-mounting hole and #6 self-tapping screws. Note where the panel touches the frame.
2. Remove the panel.
3. Apply silicone to the underside of the 2"x 2" frame tube where the panel will contact.
4. Install the top panel again with a #6 self-tapping screw.
5. Drill and rivet the panel to the underside only of the 2"x 2" frame tube.
6. Position the foot box inside wall with #6 self-tapping screws in the factory holes. Note where the panel tabs go under the floor and top panels.
7. Use a ruler and marker to mark where rivets will go.
8. Remove the inside wall.
9. Apply silicone to the inner wall tabs.
10. Install the inner wall with #6 self-tapping screws.
11. Drill and final rivet the panel in place.
12. Position the outside wall with #6 self-tapping screws.



Passengers outside wall assembled with #6 self-tapping screws.

13. Mark where the rivets will go, remove the panel and apply silicone to the panels.
14. Install the outer wall and drill and rivet the panel into place. The entire passenger foot box should now be complete. With both foot boxes complete, use silicone to seal any holes and around each seat harness mount.

Steering Shaft

ATTENTION: *Like the suspension and fuel/brake lines, you will be trusting this assembly with your life. Use extra care when doing the final assembly.*

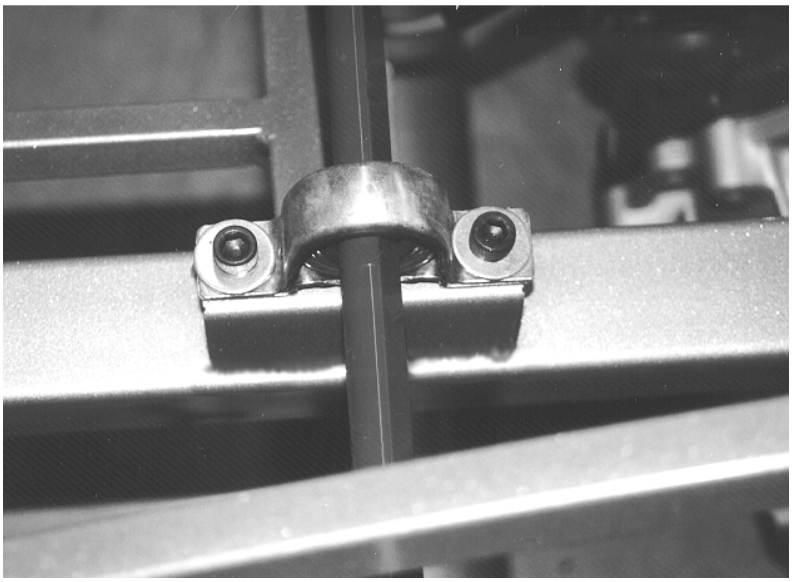
TOOLS: *5/16" hex key, 10mm, 9/16" wrench, 15 mm deep socket, Phillips head screwdriver, ruler, marker, rivet gun, ⅜", ⅛" drill and drill bit.*

PARTS: *Pillow block assembly (FFR# 11072), steering rack/shaft assembly (FFR# 11073), steering wheel assembly (FFR# 11071), ⅛" rivets (FFR# 10782).*

1. The steering column needs to be positioned in order to fit the cover on the driver's inside foot box wall. The 1" lower pillow block (FFR#10938) goes on the lower steering shaft that is included in the kit. It is a tight fit to get the bearing to the right place on the shaft.
2. Measure ¾" from one end of the lower steering shaft provided and drill a ⅜" hole through the tube to attach the Mustang rag joint/universal shaft.

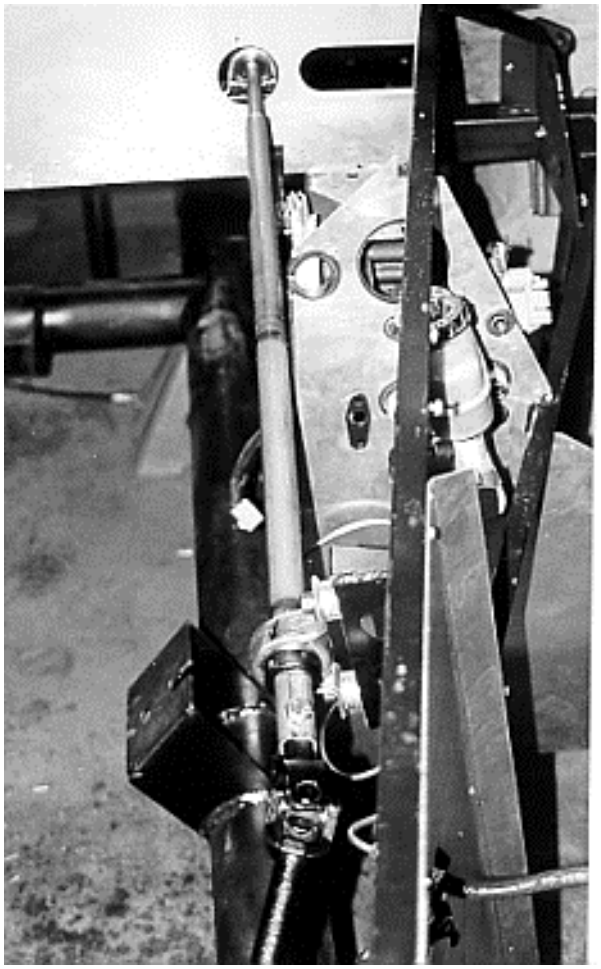
Hole drilled in steering shaft.

3. Attach the Mustang rag joint/universal shaft to the steering rack and slide it into the lower steering shaft and attach with the Mustang fasteners. This is done to find the correct location on the shaft for the pillow block (in order to mount it to the frame bracket). Put the pillow block ring collar to the front side of the bearing (uses Allen head screw). On the lower steering bearing, you may need to add ⅜" flat washers to adjust the spacing of the steering shaft away from the pedal box wall.
4. Mount the pillow block using a $^{5}/_{16}$" hex key and $^{9}/_{16}$" wrench along with the kit fasteners.
5. Mount the ¾" upper pillow block to the bracket on top of the 2"x 2" tube. Again, use a $^{5}/_{16}$" hex key, $^{9}/_{16}$" wrench and the kit fasteners.
6. Remove the two small OEM clips that are on the end of the upper shaft, for now, as we are only positioning the column.



Overhead view looking down onto upper steering pillow block installed on frame 2"x 2" dash support.

7. Slide the upper steering column through the upper pillow block. Guide the lower steering shaft through the steering shaft cover, through the slot in the inner foot box wall, and over the upper steering shaft. The steering shaft cover will sit flat against the outside of the driver's side foot box inside wall.
8. Attach the aluminum steering wheel boss to the wood rim steering wheel. Use a 10mm wrench and a Phillips head screwdriver.
9. Attach the steering wheel boss to the upper steering column using a 15mm deep socket. Be careful not to force fit the aluminum steering wheel boss onto the hardened steel shaft. Forcing this part may damage the aluminum. When it is aligned properly, then you can tighten, as the aluminum is then press fit onto the Mustang steel shaft.
10. Match the flat sides on the shaft to the flat sides on the boss.
11. Sit in the car and adjust the steering wheel to desired height by adding washers under the upper pillow block.
12. Center the shaft in the steering shaft cover opening. Hold the flat side of the steering shaft cover against the foot box wall. Trace the outlined location of the steering shaft cover onto the surface of the aluminum foot box panel.
13. Mark and drill ⅛" rivet holes through the steering shaft cover and through the foot box wall.
14. If you wish to paint the cover at the same time as the body shell, do not attach the cover to the foot-box. Otherwise, attach the cover using ⅛" long rivets and silicone.
15. Remove the lower steering shaft, the seat, and the steering wheel for the engine installation.



Lower pillow block mount and steering shaft.

Fuel, Brake and Battery Lines

ATTENTION:

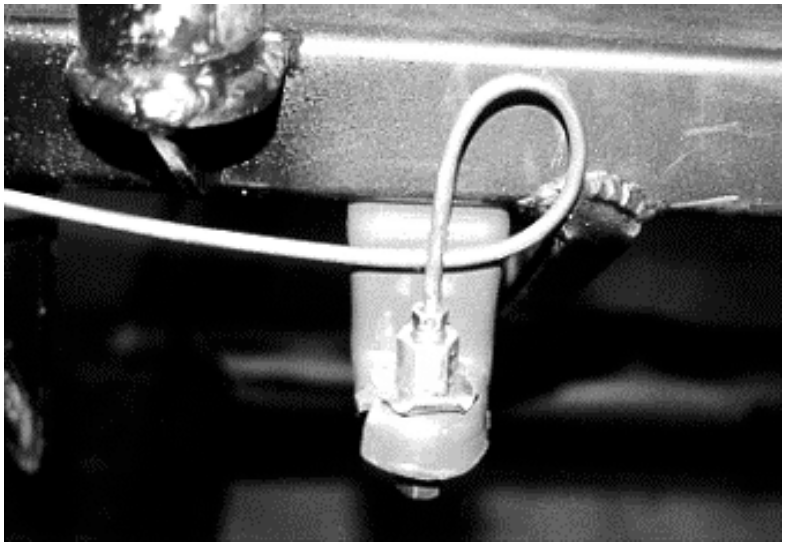
- *Use care not to crimp any lines, make sure to avoid over-tightening any mounts that may lead to bending or crimping.*
- *It is a good idea to make a small 2"-3" loop at the end of the lines (where they secure to the brake or terminal block). This loop will provide good adjustment for any small variances without bending or crimping the line.*

TOOLS: *Phillips and regular head screwdrivers, tube bender, double flaring set, tube cutter, $^{3}/_{16}$"drill bit, drill, rivet tool, marker, tape measure, electrical tape.*

PARTS: *Insulated line clip assembly (FFR# 11029), battery/tray assembly (FFR# 10819), misc. electrical assembly (FFR# 10975), fuel line assembly (FFR# 11078), Brake Fastener assembly (FFR# 11076).*

Rear Brake Line

1. Using the distribution block diagram below, attach the 51" brake line and one of the 60" lines and the union, run the rear brake line under the driver's side on the outside of the 4" round tube and fasten to the 2" x 2" cockpit outriggers. Run up along the backside of the 2"x 3" frame members and across to the ¾" tubing that runs down forward to the transmission rear mount.
2. Attach the line to the frame with the small size insulated line clips (FFR# 10970) and 3/16" rivets provided with your kit.
3. Drill two holes for the Mustang brake bracket on the underside of the 2"x 3" frame member and mount the Mustang bracket.

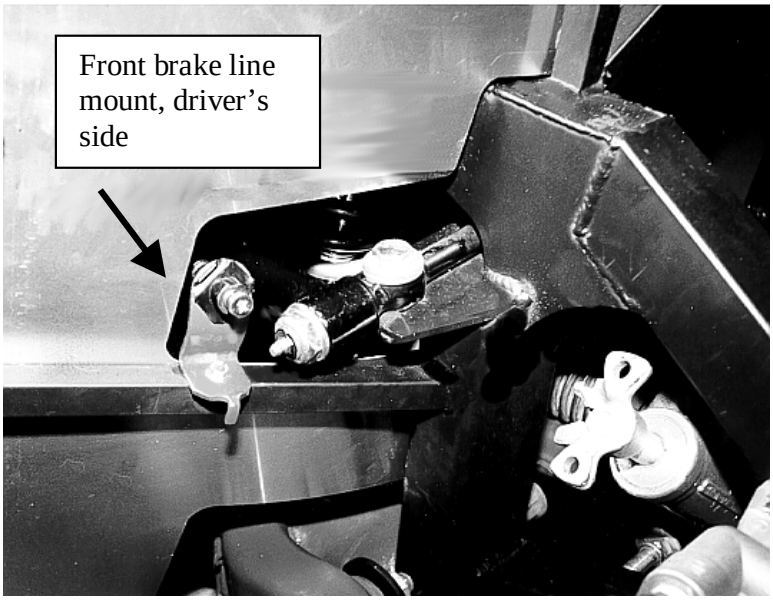


Rear end brake line mount next to the ¾" tubing.

4. Attach the brake line to the Mustang mount.

Front Brake Line

1. Attach the front flexible brake line to frame mount just behind the upper A-arm on the ¾" tubing.



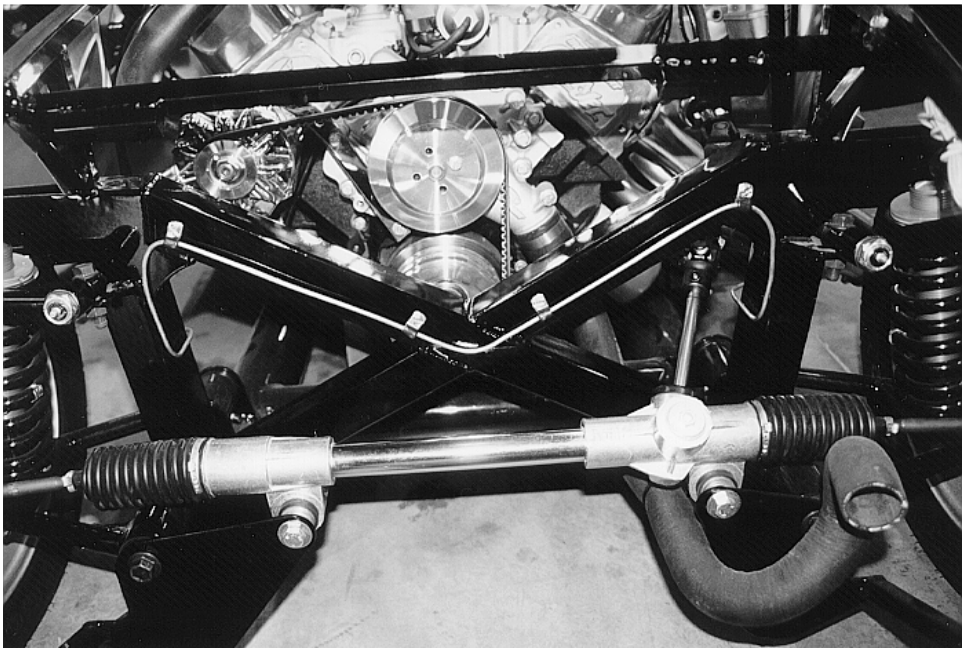
Front brake line mount.

2. Use the Mustang clip to attach the flexible line.

Installing the front brake line clip.

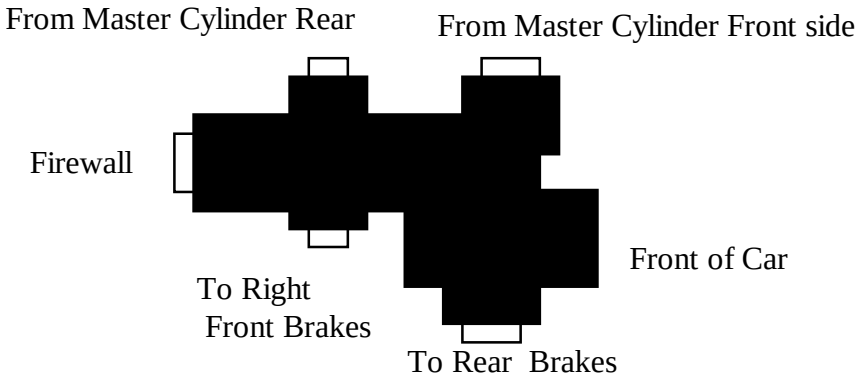
3. From the bottom of the master cylinder, run the 20" brake line forward to the left front brakes.
4. Using the distribution block diagram below, attach the other 60" brake line to the distribution block and run the line forward along the ¾" tubing to the front side of the "X" member for a clean engine

appearance. Go down along the "X" and up again then along the ¾" tube to the right front brake bracket.



Brake line routing along frame X-member. This car has a Flaming River manual steering rack.

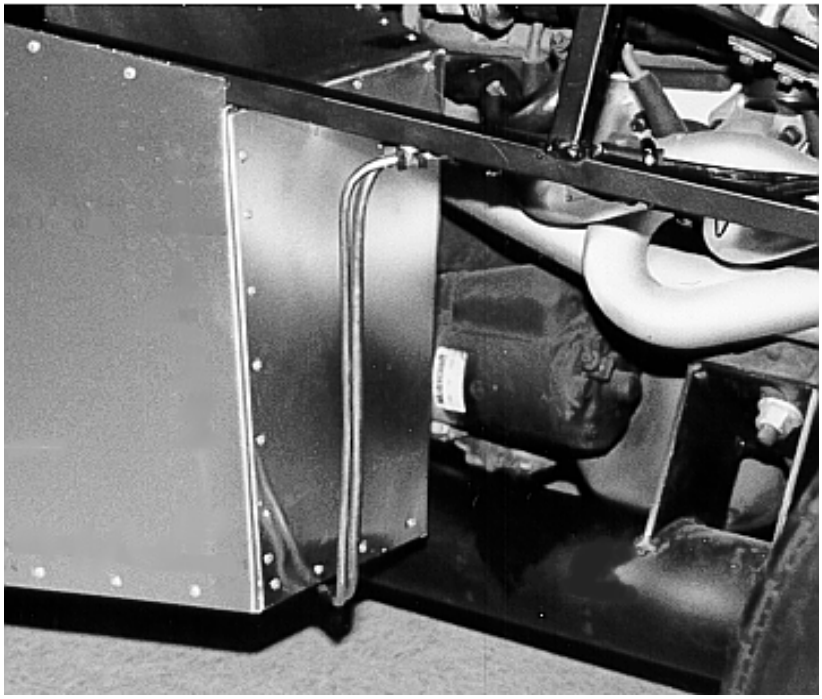
Brake Line Routing at Distribution Block



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

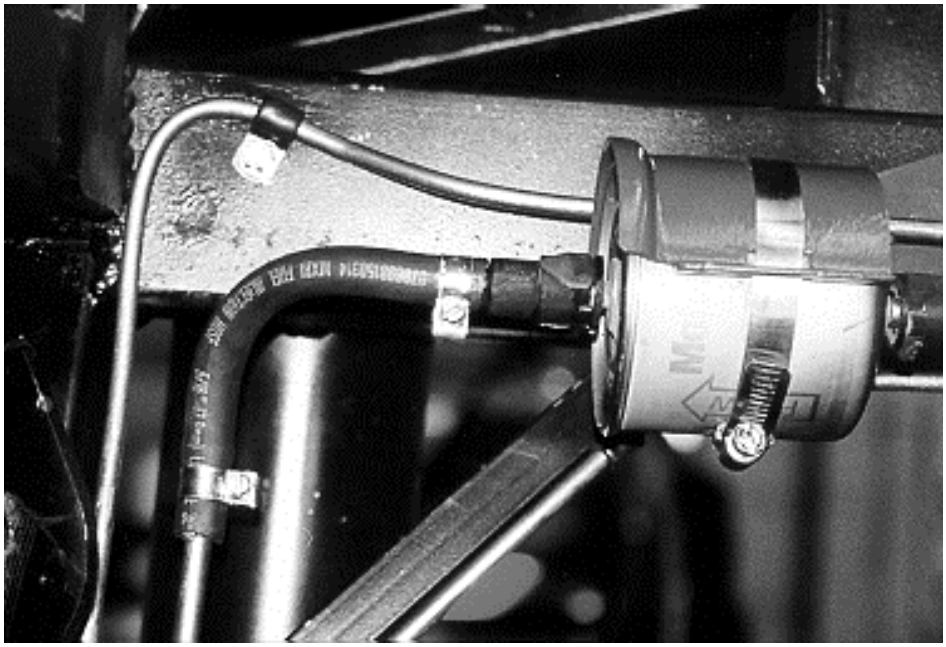
Fuel Line

1. The ¼" return (FFR# 10784) and $^{5}/_{16}$" send (FFR#10783) fuel lines are provided in the kit. The vapor line is used from the Mustang donor.
2. Measure two feet of both lines and mark with a marker pen. Use a tube bender of the appropriate size, make a 90° bend at the point marked. This bend goes at the front right corner of the passenger foot-box so that the lines stick straight up in the air and give enough so that the exact engine location can be made.



Fuel line routing in front of the passenger foot box.

3. From the passenger outer corner, go towards the first 2”x 2” frame outrigger alongside the 4” round tube.
4. Fasten the lines to the 2”x 2” square cockpit outriggers with the insulated line clips.
5. In a similar fashion to the rear brake line, run the fuel lines up the back of the 2”x 3” frame member to the fuel filter for the $^{5}/_{16}$” line. Cut the 5/16” line three to four inches from the fuel filter.
6. Continue the ¼” line to the end of the 2”x 3” frame member then go down and make another bend so that the line will clear under the ¾” tubing that forms the lower trunk section.
7. Bend the line so that it will cross to the fuel return connector (the smaller tube) on the gas tank.
8. Cut the line four inches from the connector.
9. Double flare the ends of the fuel lines. Use the ¼” flexible line (FFR# 10997), $^{5}/_{16}$” flexible line (FFR# 11051), and fuel injection hose clamps (FFR# 10855) to connect the Mustang connectors to the hard line.



Rubber fuel line and Mustang connector on fuel filter

10. Attach the connectors onto the fuel filter and fuel pump.
11. Run the vapor line to the plastic connector on the fuel tank along with the hard line to the fuel canister, which will be mounted later to about where the fuel lines end up in the engine bay.

Battery Cable

1. Attach the battery ground cable securely to an area free of paint, behind fuel filter bracket. NAPA sells a 2 ft. long cable with an eyelet at one end and terminal connector at the other end if the donor piece is not available or is not usable.
2. Run the battery cable (FFR# 10579) from the positive terminal of the battery straight forward, down the driver's side of the transmission tunnel to the floor/tunnel wall bend and along the edge to the front of the driver's foot box. Zip tie as you go.

Battery cable routing.

3. Run the cable under the floor to the outside of the car and up to the ¾" tube next to the master cylinder. Wrap the end of the cable with electrical tape to prevent any short-circuiting.
4. Use some of the white press-on plastic grommeting (included in the kit) on the edge of the aluminum to prevent cable damage.
5. Attach the cable to the side of the foot box and the floor using kit zip ties.
6. Drill two $^{3}/_{16}$" holes and pass the zip ties through one hole, inside the car then through the other hole and fasten it.
7. Leave the battery cable fastened for now with zip ties everywhere so that the rear harness can be run with the cable later. Use the rubber insulated clips and screws for final assembly.

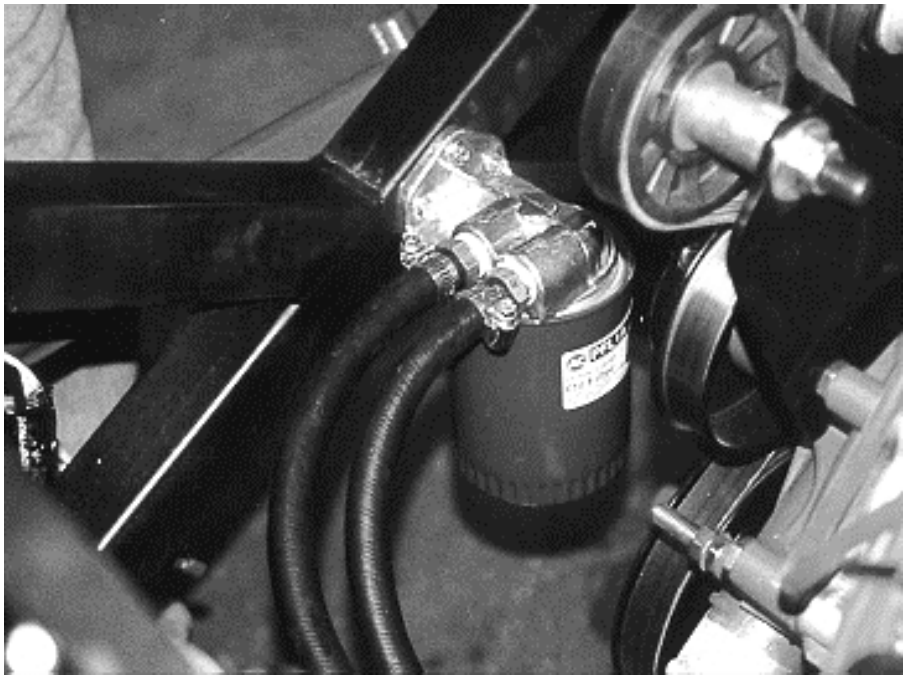
Engine Preparation

ATTENTION: *The air tube assembly should be used on computer-controlled engines. Improper or incomplete installation of air tubes or vacuum lines may result in emissions level problems.*

TOOLS: ¾", ⅜" sockets, $^{5}/_{16}$", ⅜" hex keys, regular screwdriver, Teflon tape, tube bender, $^{9}/_{16}$" deep socket, $^{9}/_{16}$", ½" combination wrenches, ⅛" drill bit, drill.

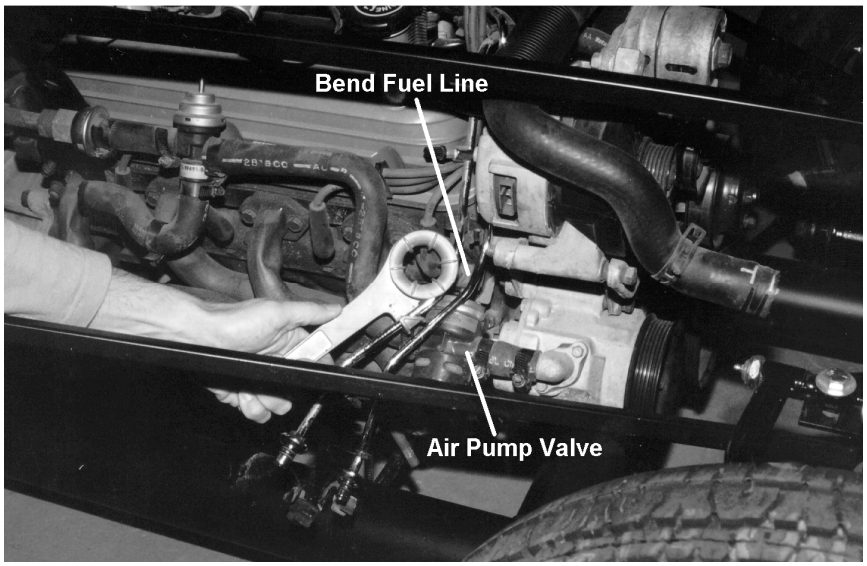
PARTS: *Oil filter relocate assembly (FFR# 10992)*

1. Install the oil filter relocate base plate to the engine. The short end of the threaded nipple goes into the engine first. 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 ½ turn after solid resistance is felt. The outlets for the hoses should be facing *towards* the front of the engine.
2. Install the block off plugs (with a ⅜" 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 lbft**.



Remote oil filter mount on the X-member.

3. Mount the oil filter relocate 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, make sure to drill this before you install your engine. Otherwise, your drill won't fit in between the engine and the frame.
4. 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 reversed header. Don't make tight bends here or it will affect your fuel flow.
5. 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. It's a good idea to thread all the bolts on the factory headers, before tightening any of them, to make installation easier.



Bending the fuel lines on the engine.

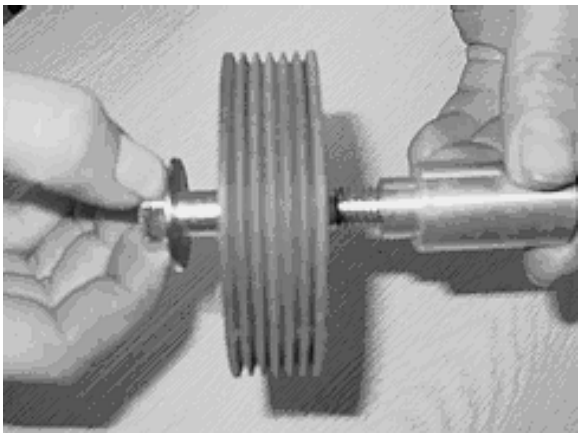
Alternate Drive Pulley

***ATTENTION**: 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*

***TOOLS:** ¾" socket, ¾" combination wrench.*

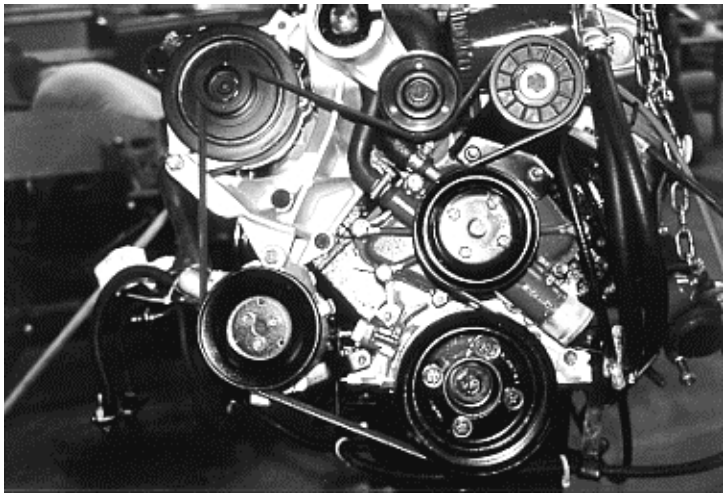
***PARTS:** Alternate drive pulley assembly (FFR# 11080*)

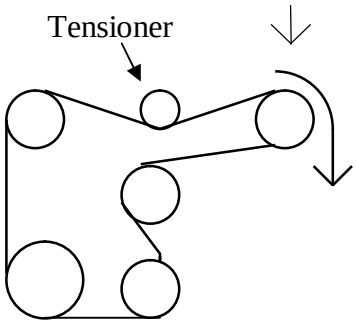
1. The fasteners should be packed with the pulley.
2. Place a washer onto the bolt.
3. Place the pulley wheel onto the bolt.
4. Place the aluminum sleeve on the bolt with the flange towards the pulley wheel, so that it slides inside the pulley.



Assembling pulley on mount sleeve

5. Install the bolt assembly on the A/C bracket (previously drilled in the disassembly section), using the lock nut provided.
6. Pull the tension pulley back with a pry bar carefully and install the fan belt. If the belt does not fit using this routing, check to see if after-market under-drive pulleys have been fitted on any of the accessories or the crankshaft, if so you may have to also use an after-market belt.





Belt Routing

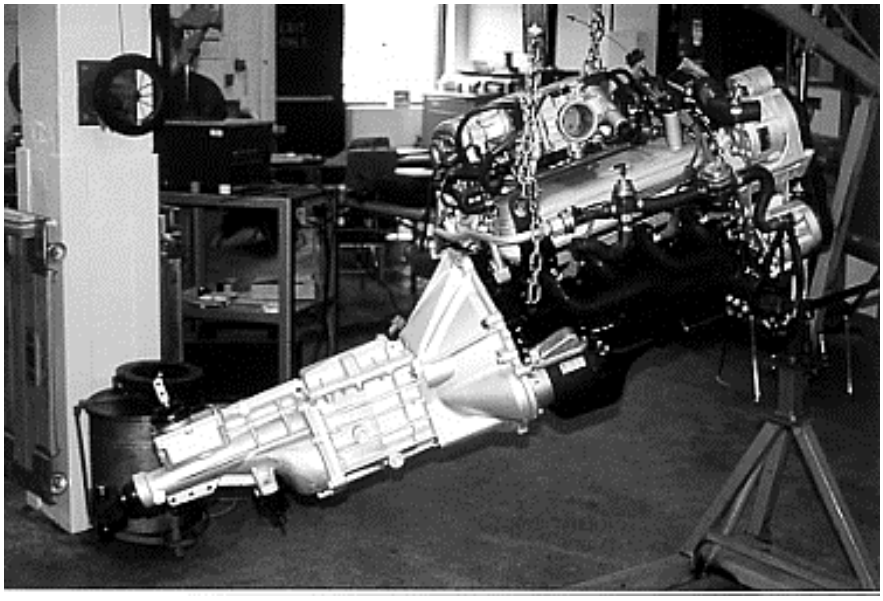
7. Check the pulley wheel for alignment with the other pulleys so that premature belt wear does not occur. With one eye, carefully align the front side of the pulley with the front side of the other pulleys. If the new pulley is not lined up properly and is too far in, use the arbor shims included with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

Engine/Transmission/Drive shaft

ATTENTION: *Use extreme caution when lifting and positioning engine assembly. Never get underneath an engine hoist. A couple of extra people come in handy at this point in the build-up. It's easier to roll the car under the engine/trans than to roll the engine into the car.*

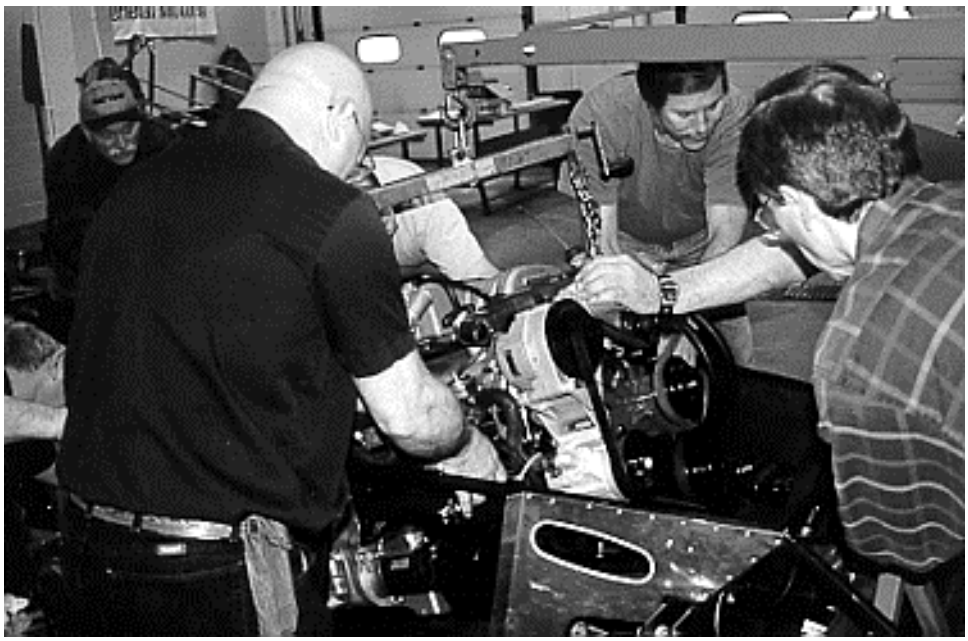
PARTS: *Engine hoist, $^{9}/_{16}$" deep socket, 12pt. 12mm wrench, ⅝", $^{13}/_{16}$" sockets, $^{5}/_{16}$" drill bit, drill, combination wrenches, and friends.*

1. Lift the engine using the two factory brackets that are on the 5.0 engine (make sure that the brackets are turned the correct way). Sometimes folks put these lift brackets on backwards since they are removed when removing the headers and reversing the headers.



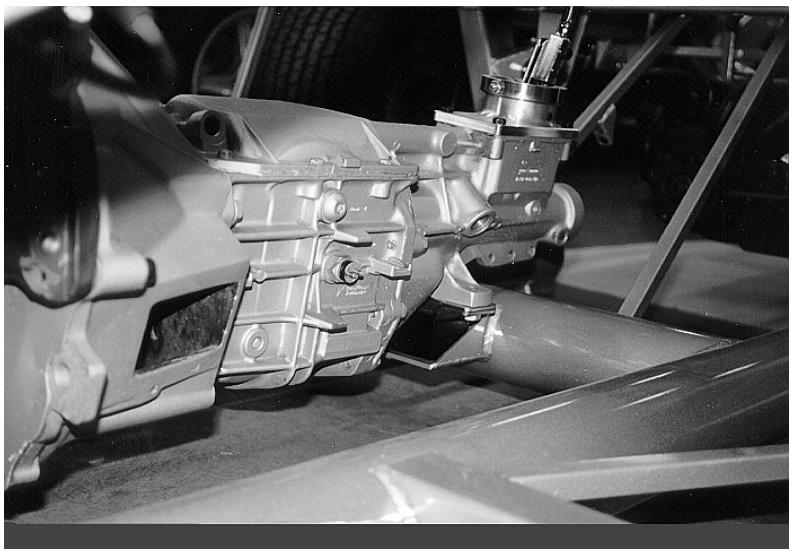
Engine/transmission on hoist

2. The engine/transmission assembly should be drained of oil to ease installation and so that the transmission oil does not leak when at the installation angle. Apply tape over the rear of the transmission to help reduce drips even if already drained of fluid.
3. Make sure that the Ford rubber engine mounts are installed on the engine.
4. Slowly lower the engine and transmission assembly in the engine bay.



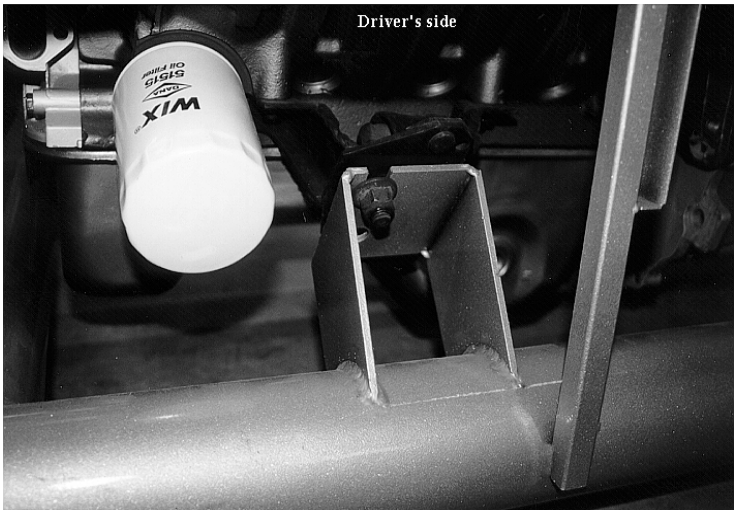
Lowering engine into frame. Friends are helpful here.

5. Lower the transmission mount bolts into the rear transmission mount plate on the cross member and then lower the engine onto the frame engine mounts. Make sure that the passenger's side engine mount hole is installed first, followed by the slotted driver's side mount.



Driver's side view of transmission in mount.

6. Level the engine in the frame using the top two bell-housing bolts and a bubble level, not the intake manifold. The other way is to look at the engine mounts and note where the bolts are in the slots.



Engine mount on frame.

7. Tighten the large engine mount bolt on each side and secure the two smaller transmission bolts.
8. Attach the engine ground cable to a starter solenoid frame mounting screw (not the terminals). Make sure to sand the contact area down to bare metal before attaching.
9. Attach the braided engine ground strap on the back of the driver's side cylinder head to the frame. Make sure to sand the contact area down to bare metal before attaching.
10. Before installing the driveshaft, the rear axle should be allowed to hang with the frame being supported and the transmission should be in neutral.
11. Slide the driveshaft on the end of the transmission then line up the four holes in the rear flange with the holes in the rear axle and install the pinion flange bolts using a 12pt. 12 mm wrench.

12. Hook the oil lines up to the 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.

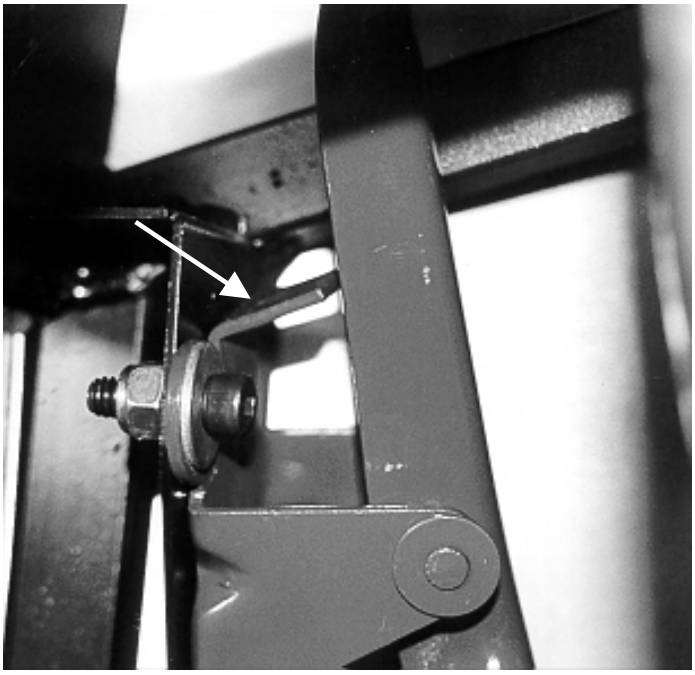
Accelerator and Clutch Cable

ATTENTION: *Inspect donor clutch cable for signs of wear.*
TOOLS: *Pry bar, ⅜" and $^{5}/_{16}$" sockets, $^{5}/_{16}$" drill bit, regular screwdriver, drill.*
PARTS: *Pedal box fastener assembly (FFR# 11023), clutch cable.*

1. The accelerator provided with the fuel injection kit is 4" longer than the stock cable. It does however need a small amount of trimming in order to work properly. Trim the accelerator cable end back to the straight part of the housing. Use a hacksaw to cut all the way around the cable housing. Do not cut into the cable as it will fray and may cause the throttle to stick. Cut along the length just cut in order to remove it from the cable.

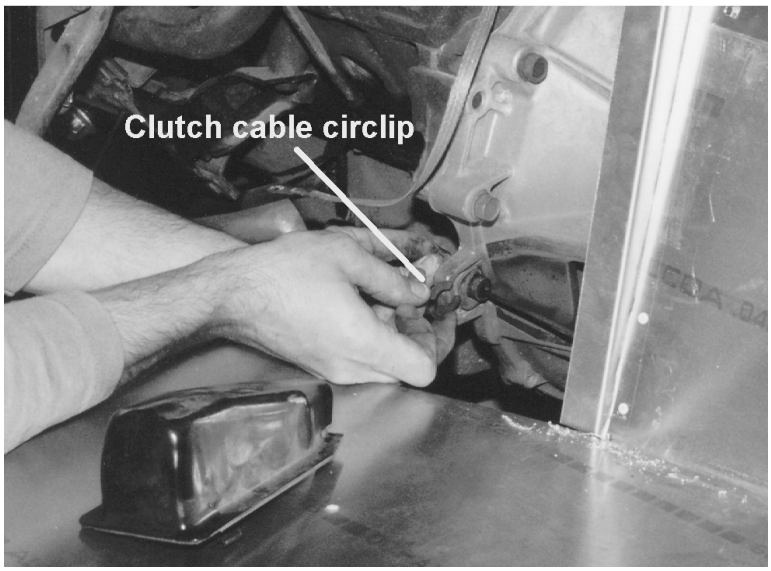
Accelerator cable marked for cutting

2. The accelerator cable must be routed in order to fit the tighter path than it took in the Mustang. Attach the cable to the throttle body on the engine Use a zip tie to hold it in the slot. Run the cable from the throttle body mount plate behind the EGR sensor, tightly against the intake manifold down tubes. A straight line to the driver's foot box front panel under the upper intake is what we are looking for here since the cable assembly is just long enough.
3. Push the cable into its mount on the front of the foot box.
4. Use the ¼" x ¾" screws and nuts provided to bolt the throttle bracket to the foot box.
5. Attach the cable to the throttle pedal.
6. 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.



Stop tab on accelerator pedal.

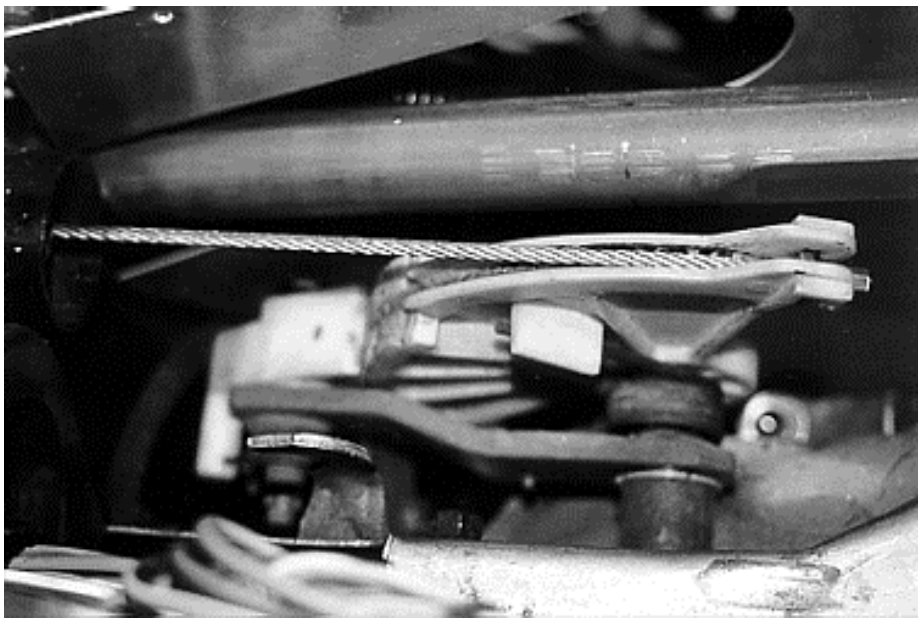
7. Anchor the clutch cable to the clutch release arm, which is located under the small cover on the bell housing. A $^{5}/_{16}$" bolt anchors the cover and a circlip anchors the cable shielding to the bell housing. Be careful anchoring the cover as the aluminum threads can strip easily.



Installing the clutch cable.

8. The clutch cable is routed under the exhaust header and up behind the oil pressure-sending unit. 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. It is then looped around to the clutch-mounting hole on the foot box front. The mount tab that is located about halfway along the cable should be affixed to the old A/C plate at the lower hole, or to the side engine bay ¾" tubing.

9. Mount the cable so that it is clear of the hot exhaust header or the cable may fail prematurely. Make sure clutch and throttle cables line up with pedals. Check with foot box top cover off.



Clutch cable on stock Clutch Quadrant.

Mass Air Meter, Fuel Vapor Canister

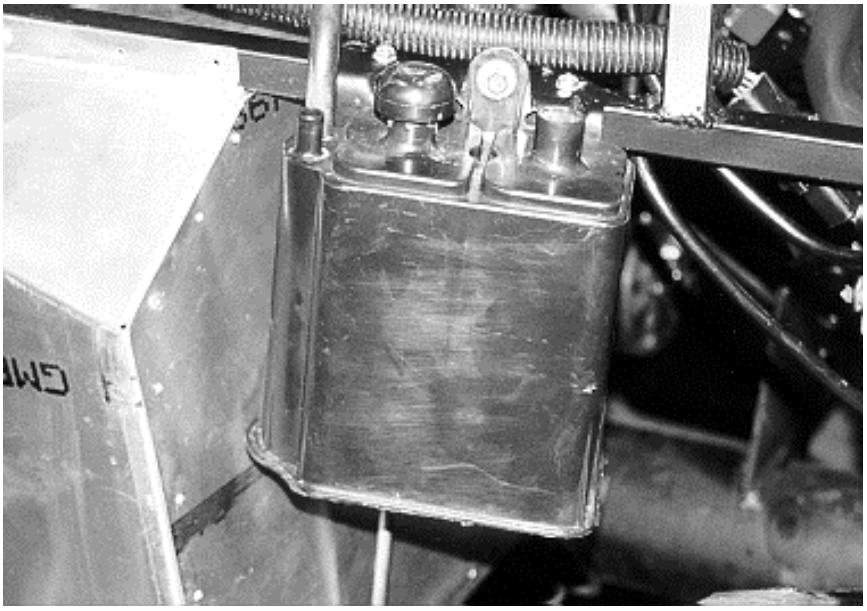
ATTENTION: *If you've chosen to run a carbureted engine, this step is not needed.*
TOOLS: *Drill, $^{3}/_{16}$" drill bit, ⅜" socket.*
PARTS: *Engine/harness assembly (FFR# 11070), mass air sensor, Mustang fuel vapor canister.*

Mass Air Mounting
If your engine is a 1989 or newer, follow this procedure for mounting the mass air meter and air filter.

1. 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 ¾" frame tubing above and just forward of the passenger foot box.
2. Drill a second hole through the bracket and into the ¾" frame tubing.
3. Use kit fasteners to secure bracket.

Fuel Vapor Canister
The emissions canister can be mounted to the right side of the engine bay on outside of the ¾" horizontal tubing just behind the mass air meter.

1. Drill two $^{3}/_{16}$" holes through the canister bracket OEM holes. Mount w/ two #14 screws.
2. Attach the vent hose from the gas tank to the canister and the hose leading to the engine.



Emissions fuel vapor canister mounted.

Radiator, Hoses & Fan Shroud

ATTENTION: *Avoid damage to the delicate radiator fins during handling. 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.*

TOOLS: *$^{5}/_{16}$" and ⅜" sockets, 1/8", $^{9}/_{64}$", $^{3}/_{16}$" drill bits, drill, jack stands (2), razor knife to cut hoses, Phillips head screwdriver.*

PARTS: *Fan mounting assembly (FFR# 10760). Radiator hose assembly (FFR# 11079), misc. electrical assembly (FFR# 10975), Mustang fan shroud & overflow reservoir.*

1. Attach the $^{1}/_{16}$" steel strips to the electric fan using the Philips head screws provided.
2. Remove the radiator reservoir using a $^{5}/_{16}$" socket.
3. The fan will be attached to the fan shroud via the mount strips. Position fan assembly in the mouth of the fan shroud so that the fan and shroud are flush.

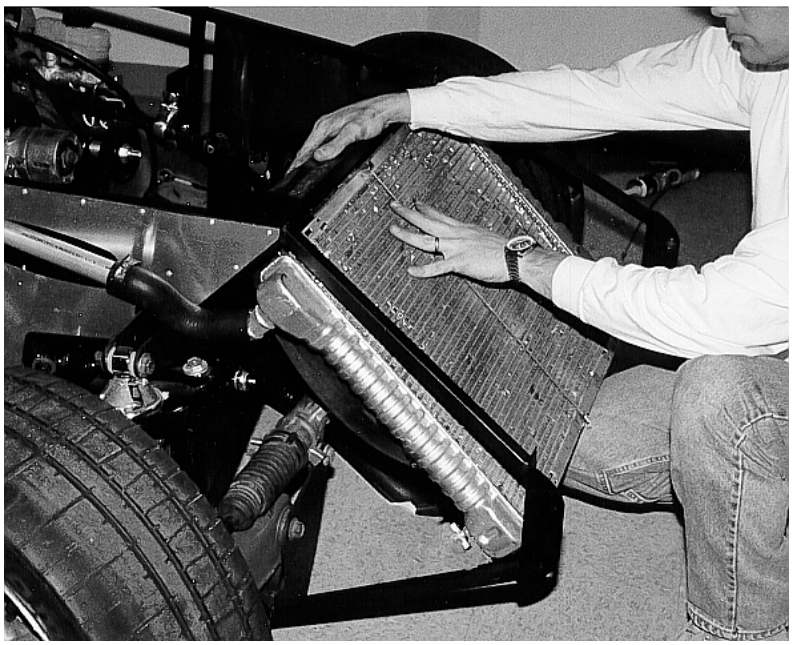
Fan attached to mount strips

Mustang fan shroud with kit fan and mount strips

4. Bend the tabs on the mount strips outwards slightly to hold it in place.
5. Mark the position of the mounting strip holes and drill guide holes into fan shroud with ⅛" drill bit.
6. Drill the holes through the plastic shroud until the drill touches the mounting strip tabs.
7. Reposition the fan assembly and mount using the #8 oval Phillips head screws, countersunk washers and flat nuts.
8. Remount the radiator reservoir with a $^{5}/_{16}$" socket. Connect to the radiator using the donor hose.

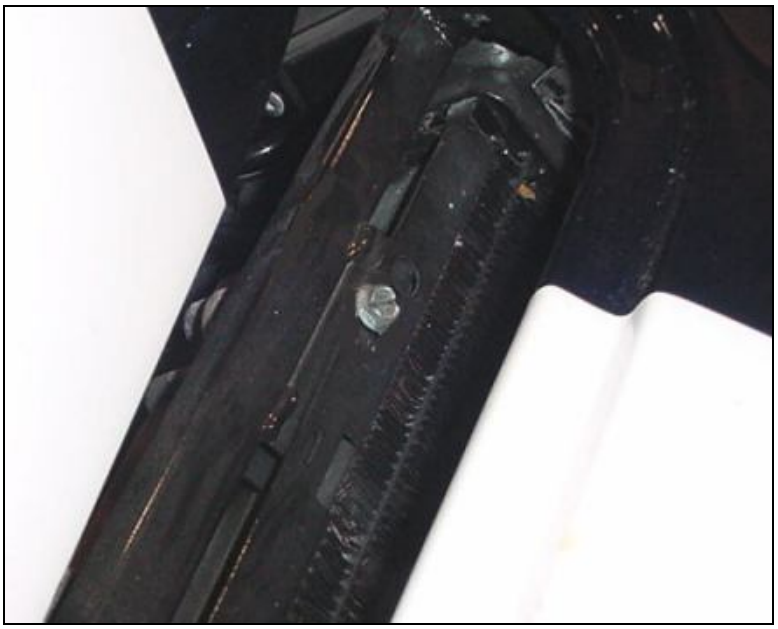
Note: Make sure that the fan blades do not hit the sides of the fan housing once the fan is attached to the shroud. If they do make contact with the housing, loosen the screws attaching the mount bars, and bend the tabs of the mount bars so that the fan housing is not pulled out of round when the fasteners are tightened.

9. Mount the shroud and fan to the radiator using the fasteners that you removed earlier.
10. Install the Mustang radiator from the underside of the rolling chassis up to the top support bar. Hold the radiator at an angle with the lower edge pulled out about 8 inches so the front of the top lip is fully contacting the ¾" support.
11. Use cable ties to hold it in place against the upper frame support tube. Position the radiator left to right to move the radiator towards passenger side until the filling cap just clears the frame.



Mounting the radiator.

12. While holding the radiator in place, drill a hole through the middle of the upper radiator channel slots into the ¾" supports. Use the #14 x ½" screws and two ¼" washers in these holes.



Mounting screw at top of radiator.

13. Use (2) cable ties to hold the lower front edge of the radiator forward (preventing the bending of the upper metal lip). Run the cable tie through one of the front quick jack holes on the frame.
14. The aluminum nosepieces that form a picture frame-like support for the entire lower edge of the radiator will be installed after the body is in place.
15. Cut the donor upper radiator hose as shown in the photo. Use the aluminum tubing extension pieces and the included lower hose from the kit to effectively extend both radiator hoses. This is fairly easy.

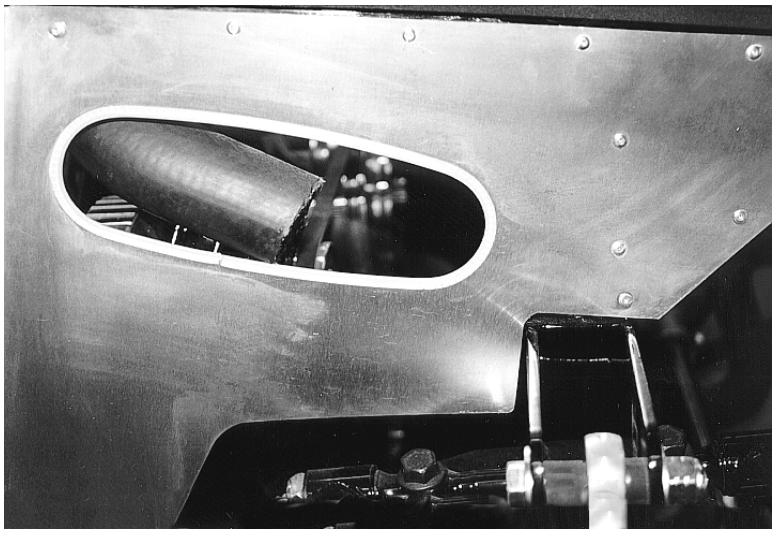
If possible, bead the end of each aluminum tube for a superior seal. Do not tighten the hose clamps yet.

Radiator hoses with kit extensions attached.

16. Use aluminum polish on the upper radiator extension tube to really make it stand out. Apply clear coat to make finish last against oxidation.
17. Inspect radiator hoses for wear and replace if necessary.
18. Connect the lower radiator hose to the engine.
19. Run the hose next to the 4" main rail and under the steering rack. The bend in the hose should lead the hose right to the radiator outlet. Twist the hose on the aluminum tube as necessary.

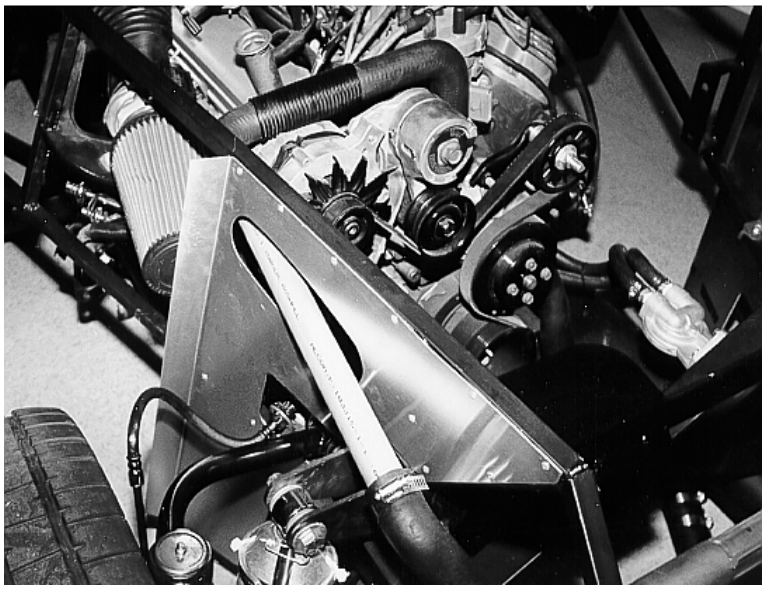
Lower radiator hose next to 4" main rail.

20. Tighten the hose to the radiator.
21. Check to see if the lower hose is hanging down. Twist the hose on the aluminum tube if necessary and tighten the remaining hose clamps.
22. Push some grommeting onto the passenger side aluminum "F" panel slot to prevent any chaffing of the tube or hose.



Passenger F-Shaped aluminum with grommeting and upper radiator hose in place.

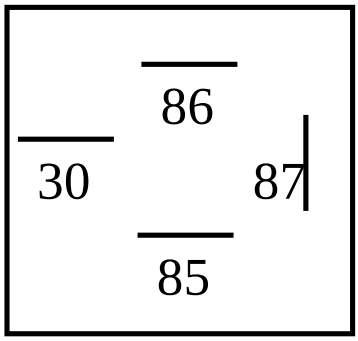
23. Pass the upper radiator hose through the passenger side “F” panel and connect it to the upper radiator outlet. Some additional cutting of the hose and twisting of the hose on the aluminum tube may be necessary.



Upper radiator tube through “F” aluminum panel.

24. Attach the upper hose to the engine and tighten the hose clamps on the upper hose.
25. When filling the radiator, use the upper hose for coolant filling. Make sure to get as much air out of the system as possible.
26. Wire the black electric fan wire to the frame. It serves as the ground.
27. Connect the other electric fan wire to one of the dash toggle switches through the relay provided. The fan is not needed all of the time. The 2-position toggle will serve as your on-off switch. If a thermostat control is desired, you can pick one up at your local auto parts store.

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



Wire Harness and EEC-IV

ATTENTION:

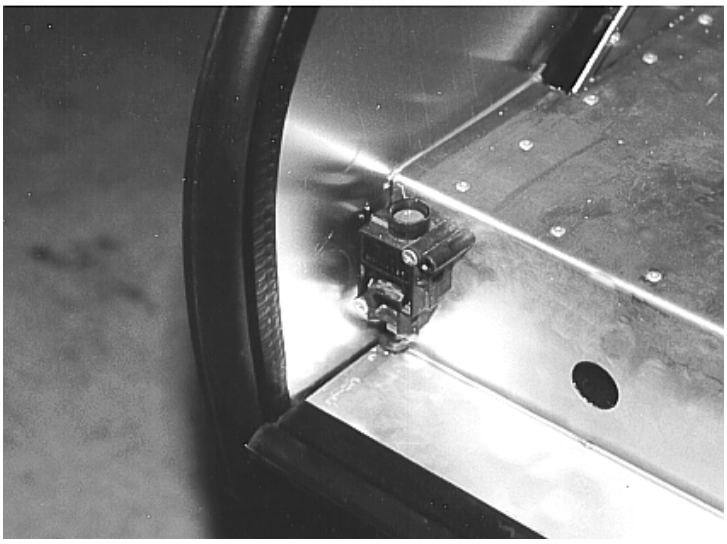
- *If you are running a carbureted engine in your car you do not need this section. Call us and let us know at time of purchase and we will delete the EFI gear and include a non-EFI wiring harness and block-off plates (for the EFI wires) at no charge. Aftermarket gauges will have to be used.*
- *There are after-market harnesses available for both carbureted and fuel injection applications.*
- *Make sure that the battery is not connected any time you are working with the computer unit.*
- *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. Use the Chilton's or Ford wiring diagrams!*
- *If you did not take the harness out of the car yourself, when connecting the plugs together, check the wire colors going into and out of the plugs to make sure that they line up and are the same color. The only plug that may not be the same color is the fuel tank harness. All other plugs that go together should be matching in color and shape or they will not connect. Different color plugs means you may have a different year harness than the rest of the harness that you have and could cause complications later when trying to start the car.*

TOOLS: *⅜" socket, regular head screwdriver, slip joint pliers, $^{3}/_{16}$" and ⅛" drill bits, drill, #6 nut driver, electrical tape, wire cutters.*

PARTS: *Misc. electrical assembly (FFR# 10975), insulated line clip assembly (FFR# 11029)*

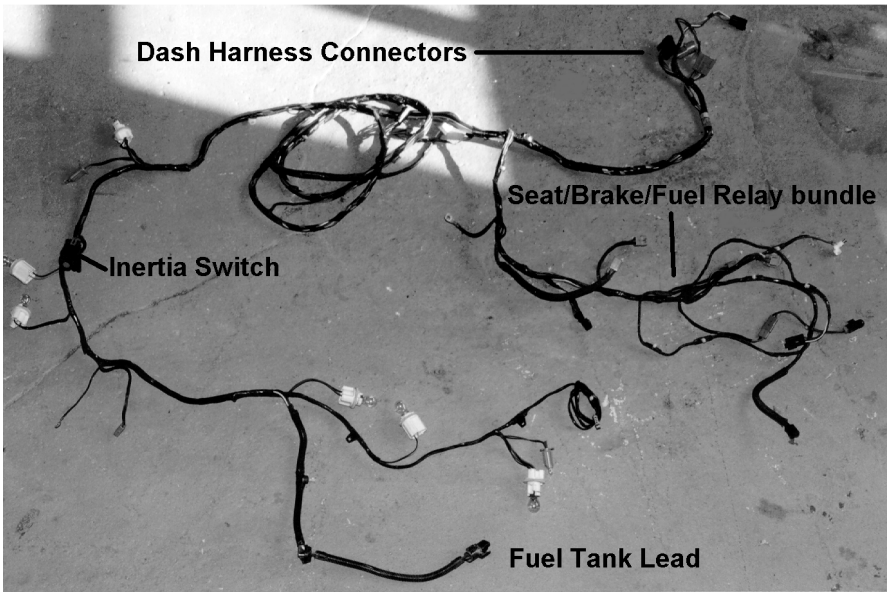
Rear Harness

1. Run rear harness along left side of the frame trunk extensions.
2. 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.



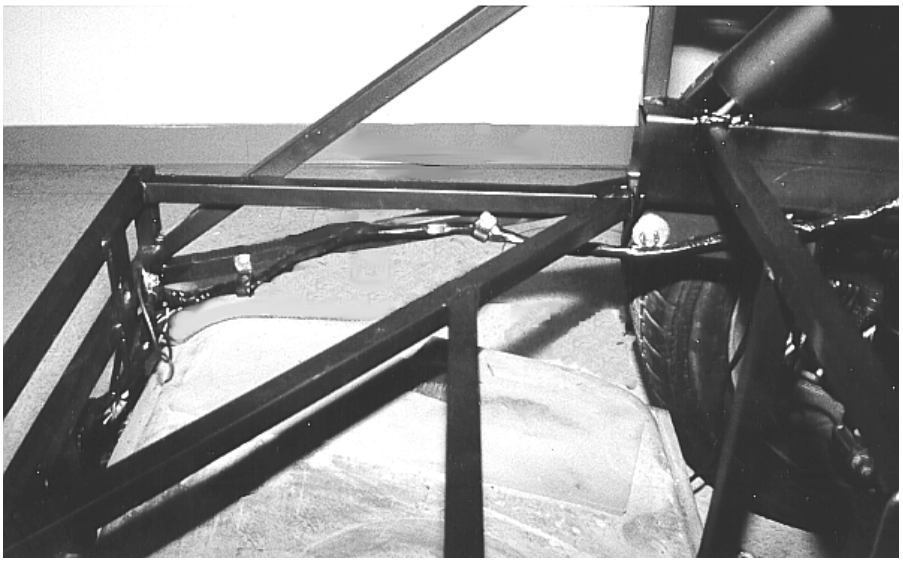
Mustang inertia cut off switch.

3. Run (2) wires (using blue wire extensions provided in kit) 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.



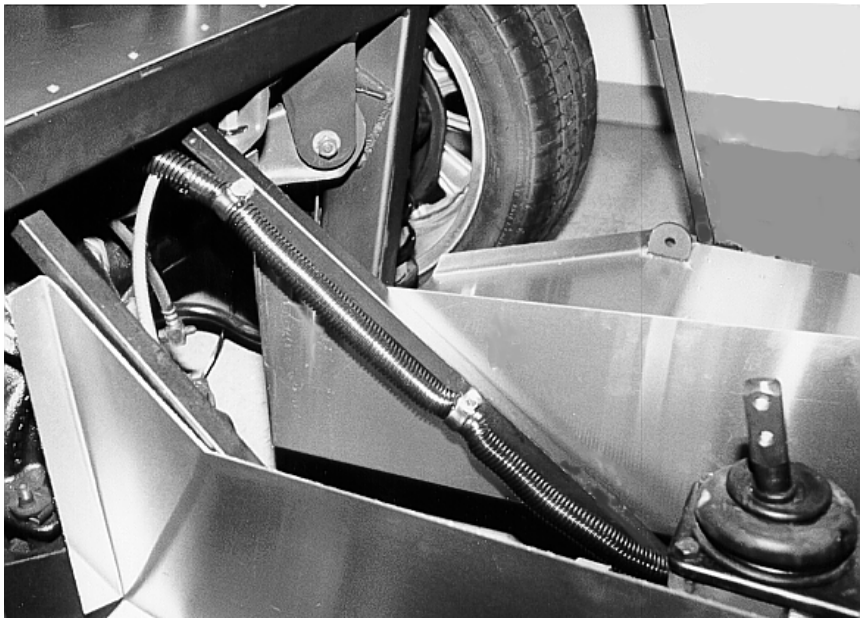
Rear harness

4. 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.



Rear trunk wiring harness attached along frame.

5. From the battery forward, use some of the black plastic wire loom (included with kit) to cover and protect the rear harness and the battery cable.
6. Replace the cable ties that were used earlier during the battery cable install with the large insulated line clips where possible.
7. 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.



Rear harness and battery cable run down the transmission tunnel.

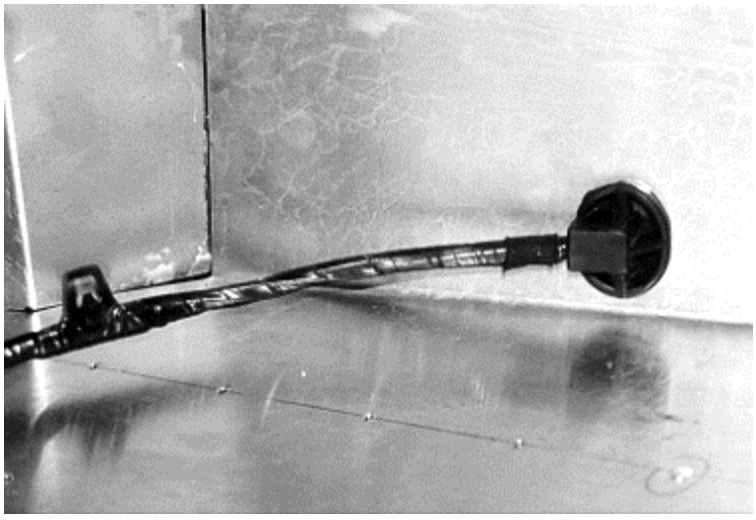
8. Place insulation grommeting around the ¾" hole in the upper corner of the inside driver foot box.
9. Slide the harness down the edge of foot box into hole.
10. Cable ties can be used to secure the harness up to the hole by drilling two $^{3}/_{16}$" holes about a ¼" apart and passing a zip tie through it.

11. 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.
12. Wrap the extra harness around the ¾" tubing in the foot box and zip tie it in place.

Transmission Harness

Transmission harness

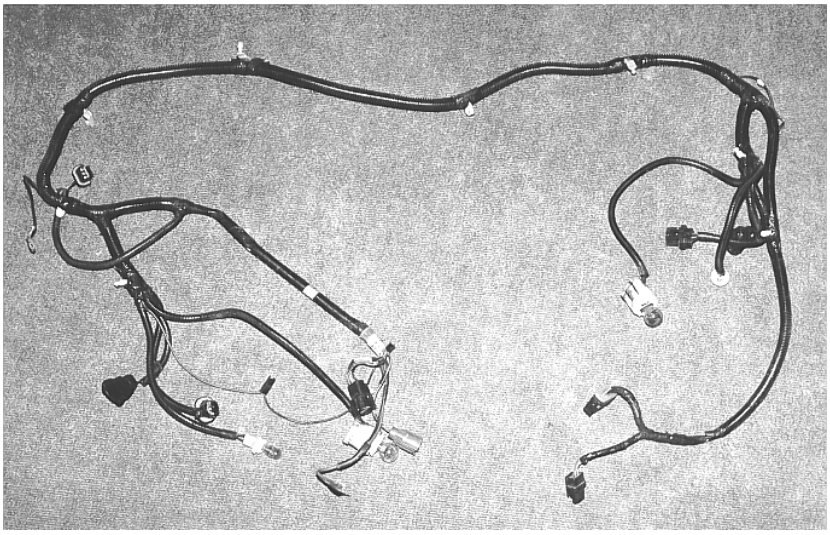
1. Push the harness plugs through the hole in the driver's side floor aluminum.



Harness plug in floor aluminum

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

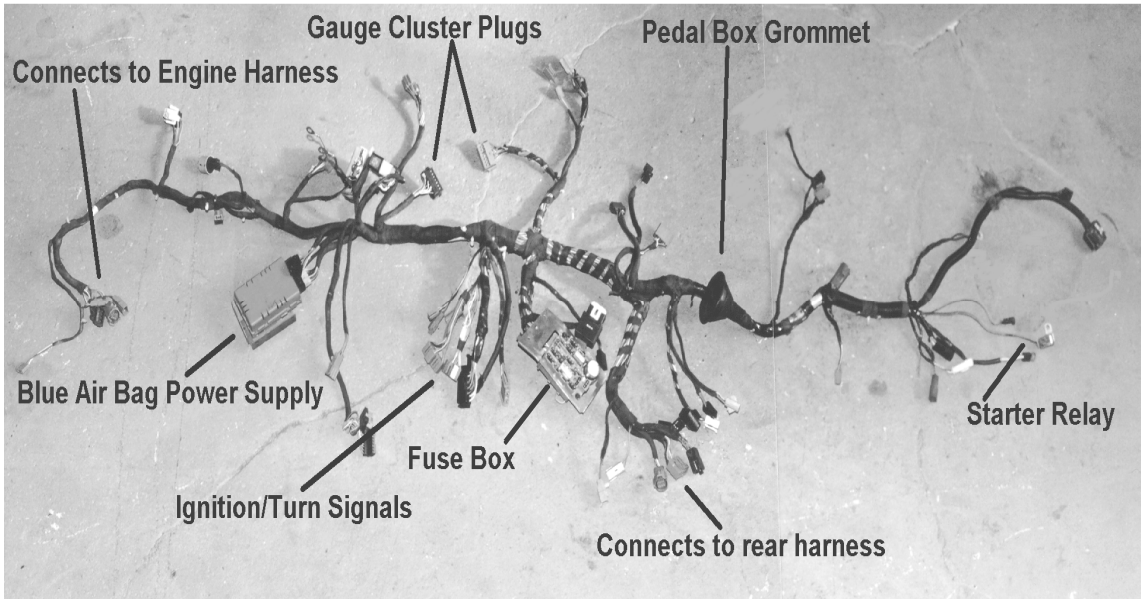
Headlight Harness



Headlight harness section.

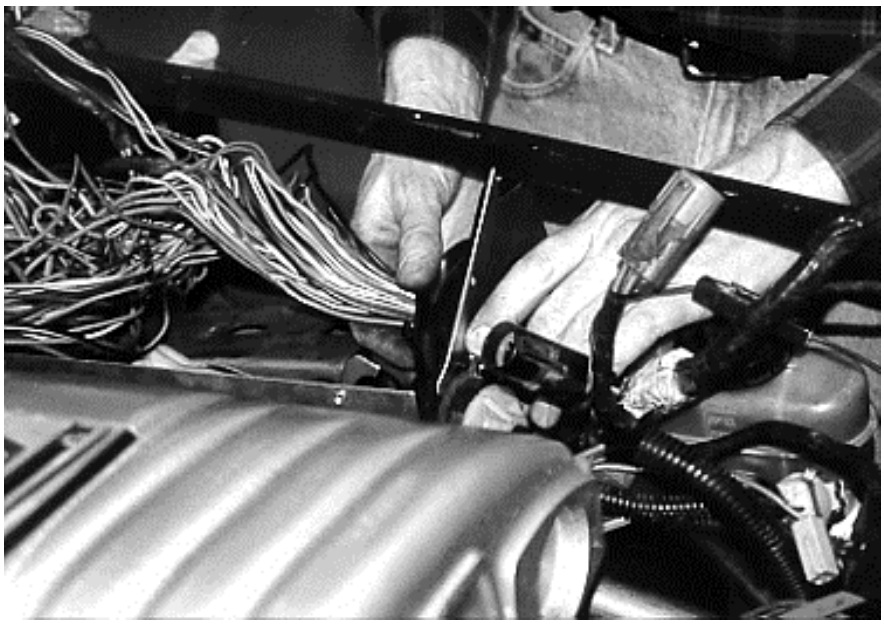
1. The headlight harness is started at the alternator and runs forward to the passenger headlight area, then goes under the fan shroud to the driver's side headlight area and then rearward to the coil and starter relay area.
2. The Mustang is wider than the FFR Roadster in front and there is extra wiring between the headlights.
3. 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.
4. Attach the harness to the channel on the bottom of the radiator using zip ties.

Dash Harness



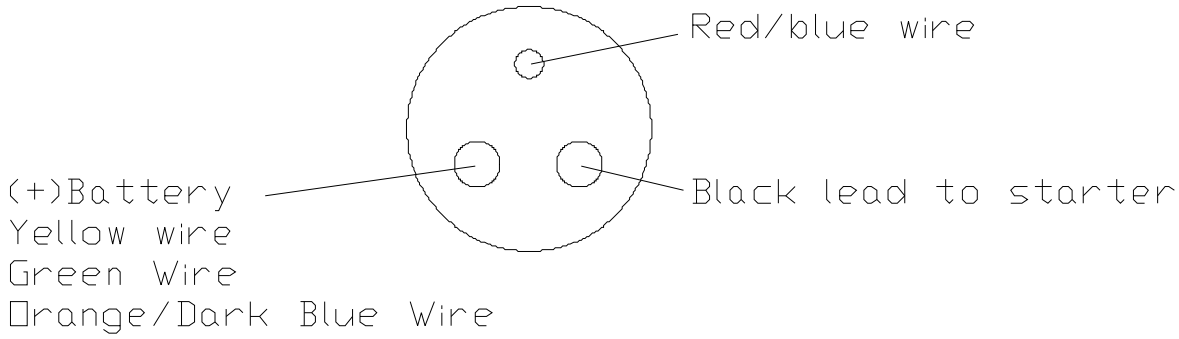
Dash harness.

1. 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.
2. 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.
3. 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.
4. Remove 4" of the tape covering the harness wires on the outside of the dash harness grommet.
5. Pull enough of the harness through the grommet so that the coil can still mount on the outside of the ¾" tubing next to the master cylinder. By doing this, the amount of visible wiring in the engine bay is reduced.
6. Run the harness over the pedal box and through the large slot in the firewall.



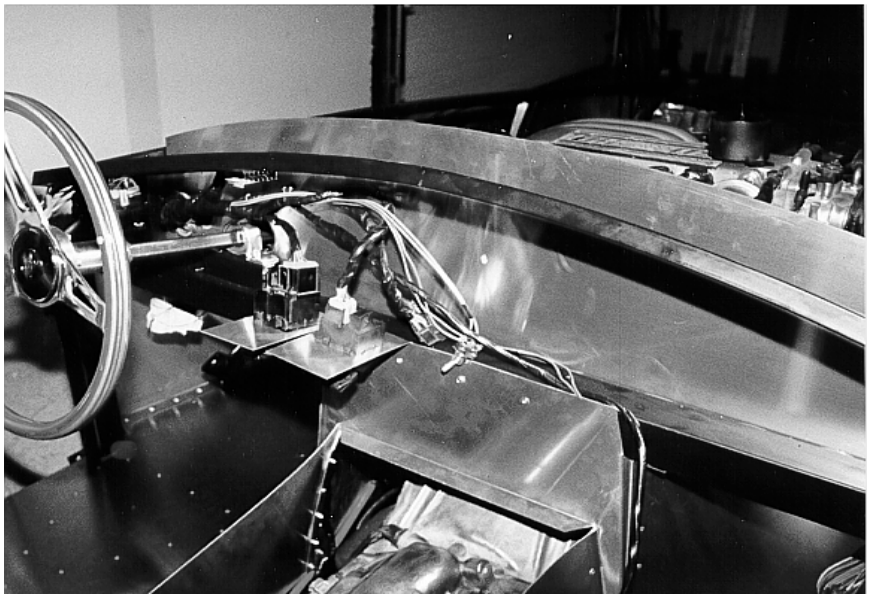
Dash harness going through laser cut hole.

7. 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.
8. Connect the relays and snap connectors to their original spots along with all sensors and relays.



Starter Solenoid Wiring

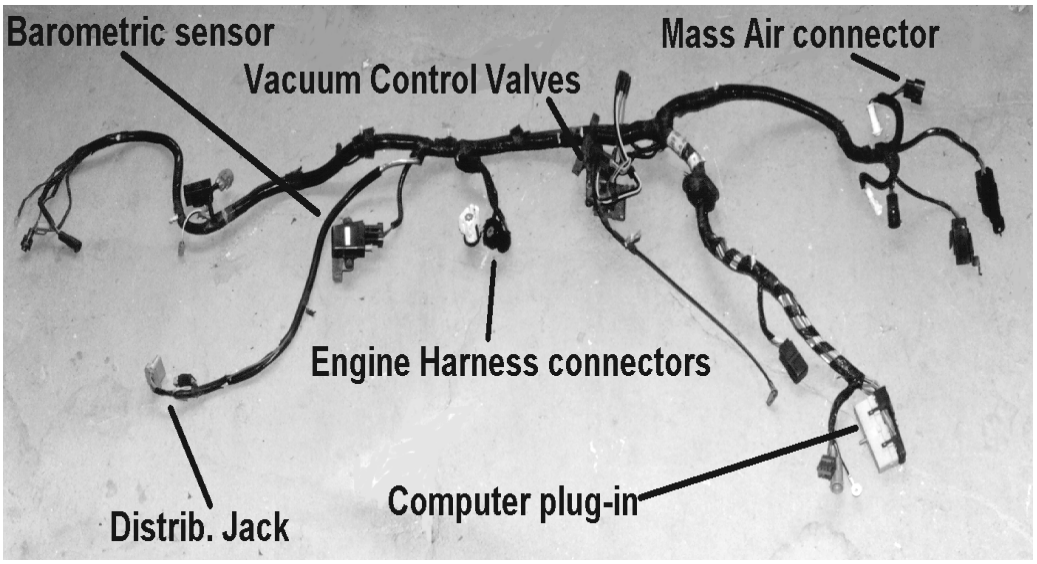
9. When the wire harness is installed, mount the fuse panel to the 2”x 2” dash hoop support and between the two ¾” x ¾” frame tubes in the driver’s side footbox using the Mustang metal brackets and a couple of the #6 self-tapping screws.



Dash harness in place. Note the headlight and hazard switches mounted to the 2”x 2”.

10. Mount the headlight and hazard switches using the aluminum pieces (FFR #’s 10566, 10638) in the center of the car just to the left of the transmission front cover.
11. Attach the harness across the 2”x 2” tube, using the insulated line clips.

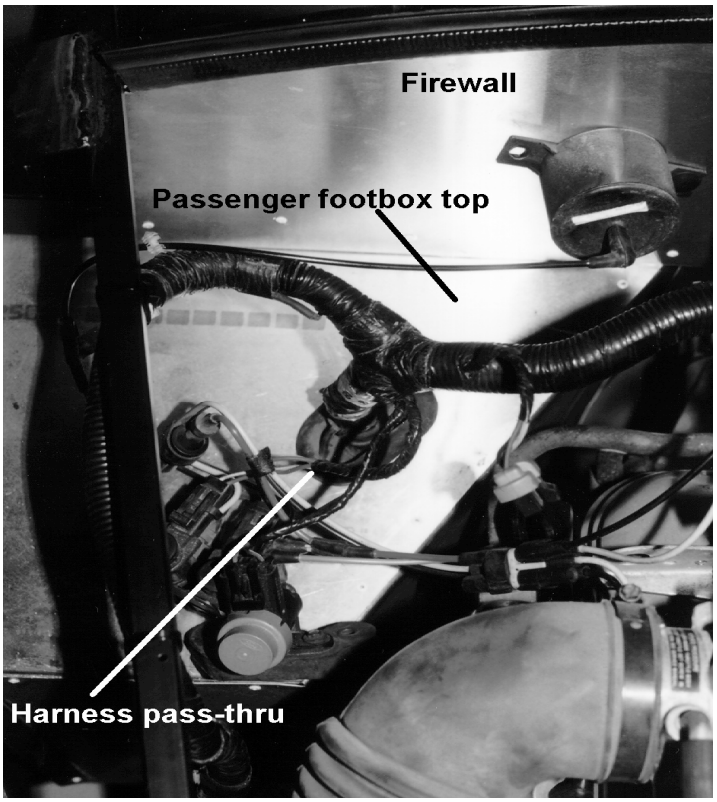
Engine Harness



Engine harness.

1. On the passenger's side, the engine harness begins in the passenger foot box. The computer plug is pushed through the oval shaped hole on the passenger's foot box top from the engine bay side.
2. 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 provided the optional heater/defroster is not being used.

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

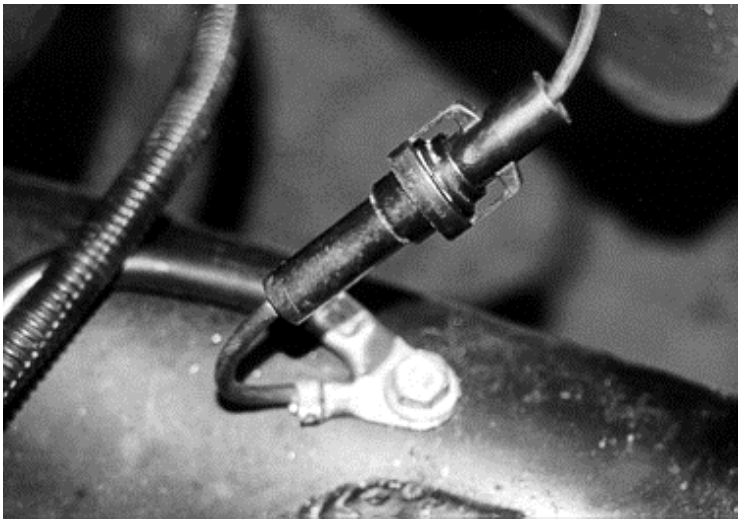


Passenger's foot box top in engine bay, shows firewall and insertion point for wiring harness.

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

ATTENTION: *Note: The BAP sensor is similar to a MAP sensor used on speed density cars except it <u>does not</u> get hooked up to a vacuum source, it is left open to the air.*

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



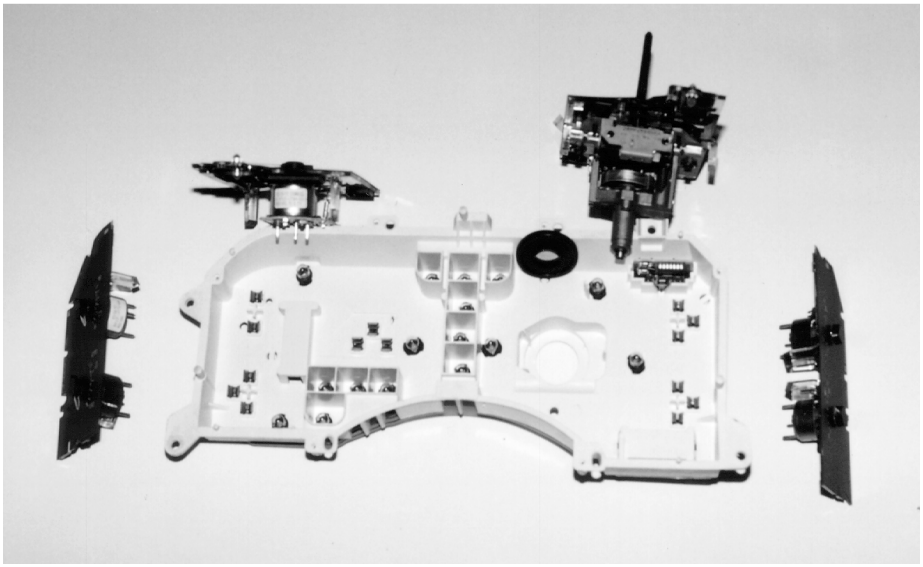
Computer ground near driver's foot box

Gauge Pod Installation

ATTENTION: *If you are using aftermarket gauges, skip this section.*

TOOLS: *Wire stripper, crimping tool, electrical tape, wire cutters, Phillips head screw driver, ⅜" socket head and socket wrench, razor knife, spray adhesive, silicone, caulk gun, scraper, tape, marker, 11/64" drill bit, drill, paper, five minute epoxy glue, small Torx screwdriver.*

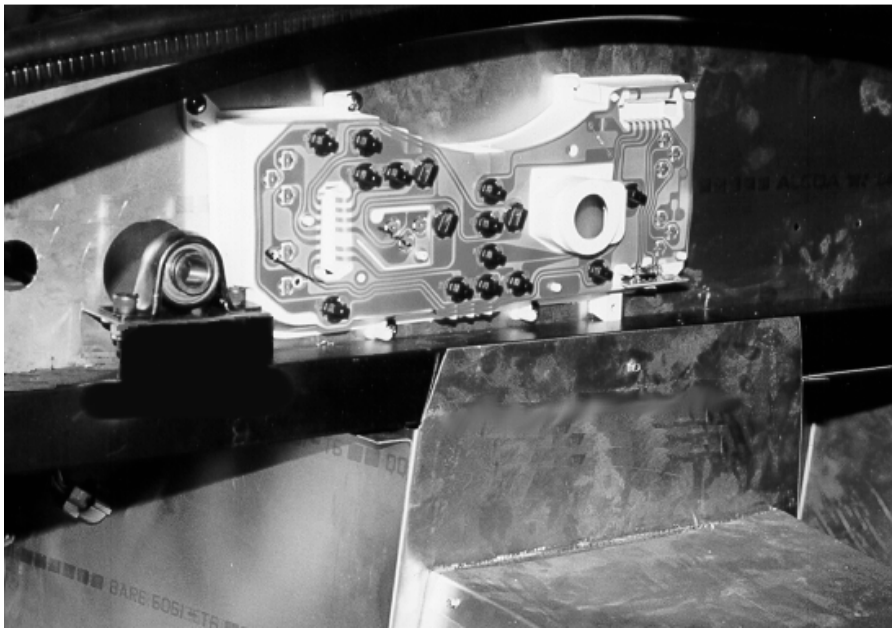
PARTS: *Mustang donor gauge cluster, interior trim assembly (FFR# 11064), gauges/dash assembly (FFR# 10893),misc. electrical assembly (FFR# 10975).*



Disassembled Mustang gauge cluster.

1. Remove the Mustang gauges from the white gauge pod with a small Torx screwdriver.
2. Cut the locating pins for the gauges off the white gauge pod so that the pod will lie flush against the firewall when mounted.

3. Use an $^{11}/_{64}$" drill bit and a steady hand to enlarge the holes in the gauge connectors on the back of the gauge pod. This will help the jumper pins that come with the kit to seat in the holes.
4. Attach the male pin connectors in the kit to one end of the wire extensions using a crimping tool.
5. Attach the blue wire connectors to the other end of the wire extensions using a crimping tool.
6. With a razor knife, cut the blue plastic on the female blue wire connectors that overhang so that the metal part is flush with the end of the connector. This will give more contact area for the gauges to grab.
7. Push the wire extensions into the enlarged holes on the gauge pod so that they are tight.
8. Tape the wires for each individual gauge together to help prevent them from pulling out.
9. Mark on the tape, which gauge each wire, goes to. The name of the gauge is written on the back of the pod near each of the connectors.
10. Position the housing upside down and as far to the left as possible. More of the harness may have to be pulled through the firewall to make sure the harness plugs reach the connections on the pod. You can trim the corner nearest the steering shaft pillow block so that the housing is sitting over the bearing bolt and closer to the left if the harness is too tight.



Mustang gauge pod mounted to firewall.

11. Use the pod as a template to mark and drill the mounting holes in the aluminum using a ⅛" drill bit.
12. Mount using the screws provided in the kit. Use flat nuts on the back of each screw. A cool way to mount the pod is with the screws coming from the engine bay side and the flat nuts holding the pod. This way you cannot see screw ends when looking into the engine bay and only see the chromed screw heads.
13. The dash harness gauge pod connectors can then be pushed into the pod connectors. These are tight, so click them into the white housing before drilling.

Ignition and Turn Stalk

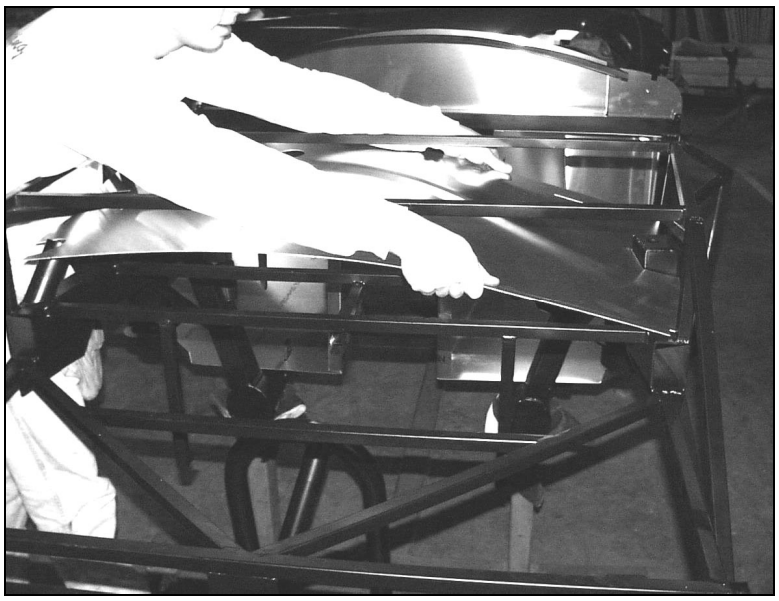
TOOLS: *Hack saw, 5/16" socket, 9/64" drill bit, drill.*
PARTS: *Gauge/dash assembly (FFR# 10893), Mustang ignition switch and turn signal stalk.*

1. Mount the turn signal stalk with the stalk pointed towards the seat as high as possible between the plate steel that also holds the windshield and the vertical ¾" tubing next to it. The switch spans the gap. Use two 1" screws and a 5/16" socket and 9/64" drill bit.
2. 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.
3. 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.

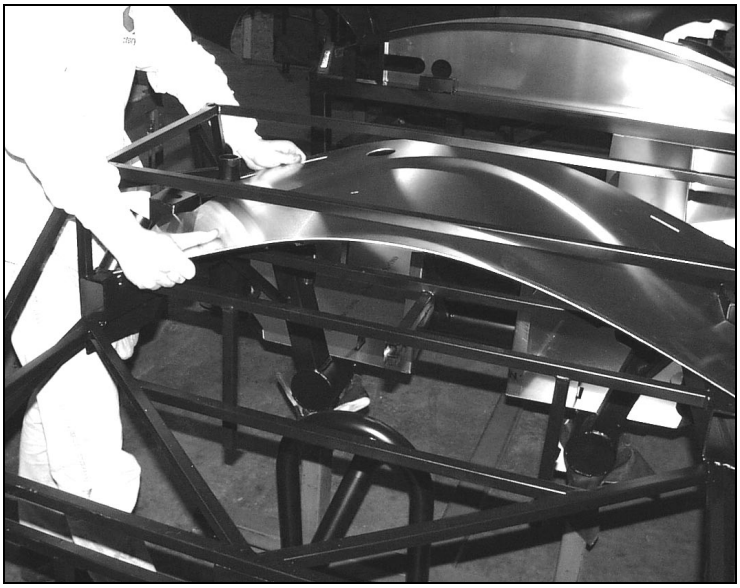
Aluminum Trunk & Side Walls

TOOLS: *Drill, #6 hex head driver, ⅛" drill bit, rivet tool, silicone, caulk gun, marker, ruler.*
PARTS: *Aluminum rear trunk assembly (FFR# 10889), ⅛" rivets (FFR# 10782)*

1. Place the mid-trunk floor panel (FFR# 10560) over the roll bar tube mounts by arching the panel up in the middle lengthwise and passing it from the cockpit side into the upper trunk. This can be tricky, but take your time and it will fit without damage. This is one of those steps where you need to take your time and proceed slowly.
2. Trace around the frame with a marker.
3. Remove the aluminum panel. Measure and mark the panel for the rivets every 2-3 inches.



Fitting the mid-trunk panel. Bend the panel as shown and insert the passenger's side first.



Then insert the driver's side next.

4. Drill ” holes where the rivet holes were marked.
5. Apply silicone to the flat surfaces of the frame where the aluminum will contact.
6. Re-install the aluminum panel.
7. Use #6 screws to hold the panel in place.
8. Drill through the aluminum rivet holes into the frame.
9. Wipe and clean the aluminum.
10. Rivet the panel in place with the short rivets.
11. The rear trunk floor is riveted in the same manner with rivets spaced every 2 - 3 inches along the 3/4” tube framework. You can use the self-tapping screws to make this go faster, but final installation must be done with the rivets.
12. The aluminum sidewalls are positioned so that the edges of the lower trunk extensions and the lower edge of the 2”x 3” rear frame extension line up exactly.
13. All wiring that will pass through these panels should be nearby so that they can be positioned.
14. Silicone around the seat harness mounts in the trunk.

Passenger Side Firewall Extension

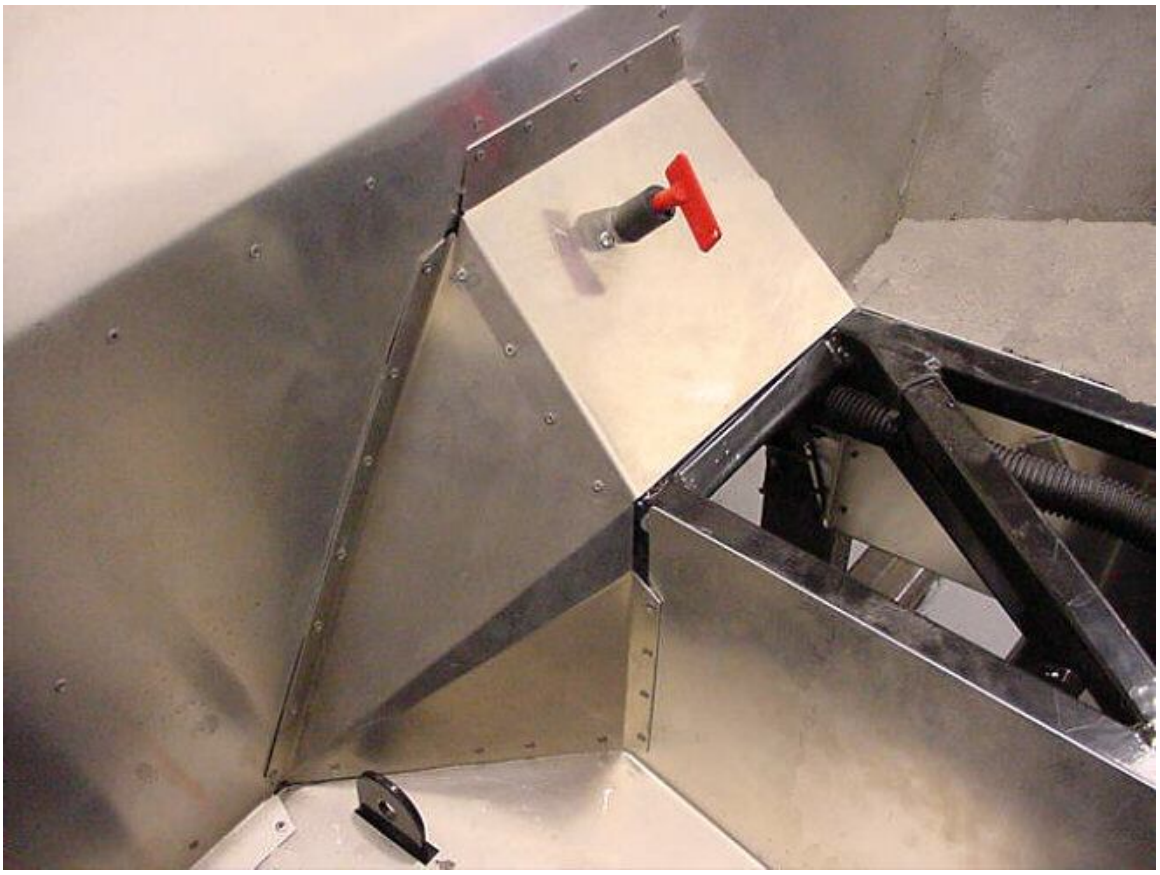
1. Push some of the push-on weatherstripping along the top (curved) side of the panel.
2. Position the panel on the frame using the sheetmetal screw as a guide.
3. Trim the weatherstripping to allow a flush fit of the aluminum against the frame.
4. Mark where the rivets will go.
5. Remove the panel and apply silicone to the aluminum tab and ¾” tube.
6. Attach the panel with #6 self-tapping screws.
7. Rivet the panel in place.
8. Apply silicone to fill any air gaps.

Cockpit Rear Wall

1. Position the panel on the frame. The panel sits on top of the floors.
2. Mark where the rivets will go.
3. Remove the panel and apply silicone to the frame and aluminum tabs.
4. Attach the panels with #6 self-tapping screws.
5. Rivet the panel in place.

Transmission Tunnel aluminum

Transmission Tunnel U-joint Cover



Ujoint and Transmission rear corner pieces

1. Position the panel on the frame as shown in the photo above.
2. Mark where the rivets will go.
3. Remove the panel and apply silicone to the frame.
4. Attach the panels with #6 self-tapping screws.
5. Rivet the panel in place.

Transmission Tunnel Rear Corners

6. Position the panels on the frame.
7. Mark where the rivets will go.
8. Remove the panel and apply silicone to the frame.
9. Attach the panels with #6 self-tapping screws.
10. Rivet the panel in place.

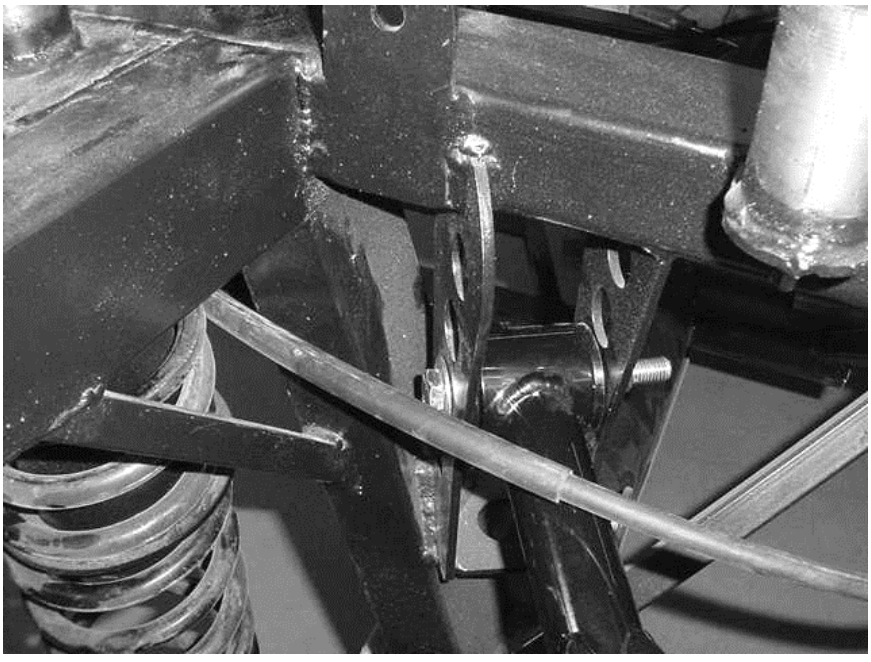
Transmission Top Cover

1. Slide the top cover under the rear U-joint cover, then forward and down as much as possible on top of the front wall tab.
2. Use a marker and ruler to mark rivet positions.
3. Remove the panel and silicone where the panel will touch the already mounted panels.
4. Reassemble the Transmission cover using a couple of #6 self-tapping screws to hold the top and sides in position.
5. Drill the rivet holes.
6. Rivet the panel in place.
7. The transmission/clutch are removed through this panel for service if necessary.

Emergency Brake Handle

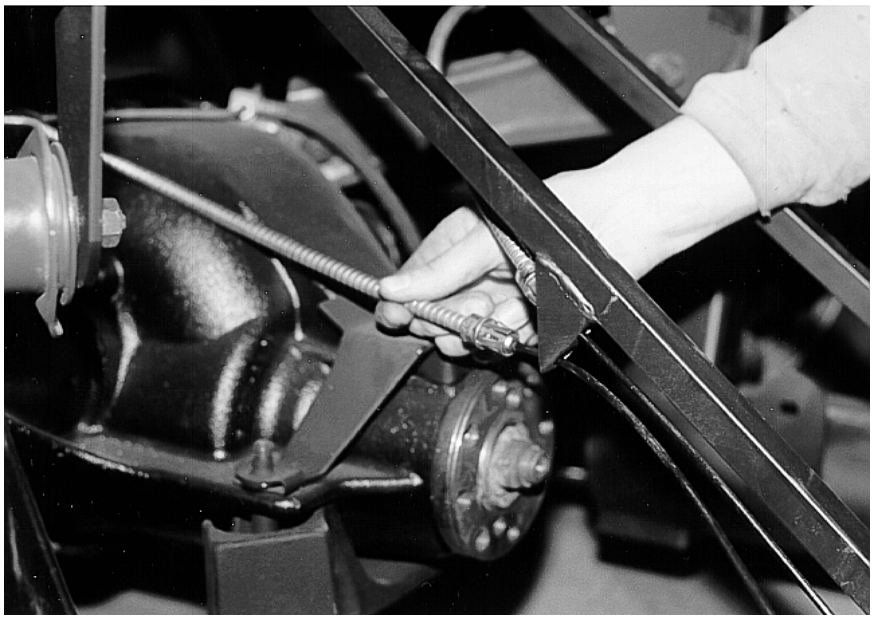
ATTENTION: *½" deep socket, $^{3}/_{16}$" hex key, marker, scissors, hacksaw.*
PARTS: *Interior trim assembly (FFR# 11064), brake fastener assembly (FFR# 11076).*

1. The emergency brake lines are run from the rear end forward in front of the spring mounts and through the triangular area between the ¾" tube and the 2"x 3" tubes. From there, go over the upper control arms and rear-end to the transmission tunnel area of the car. A bracket with two holes is mounted to the ¾" transmission supports.



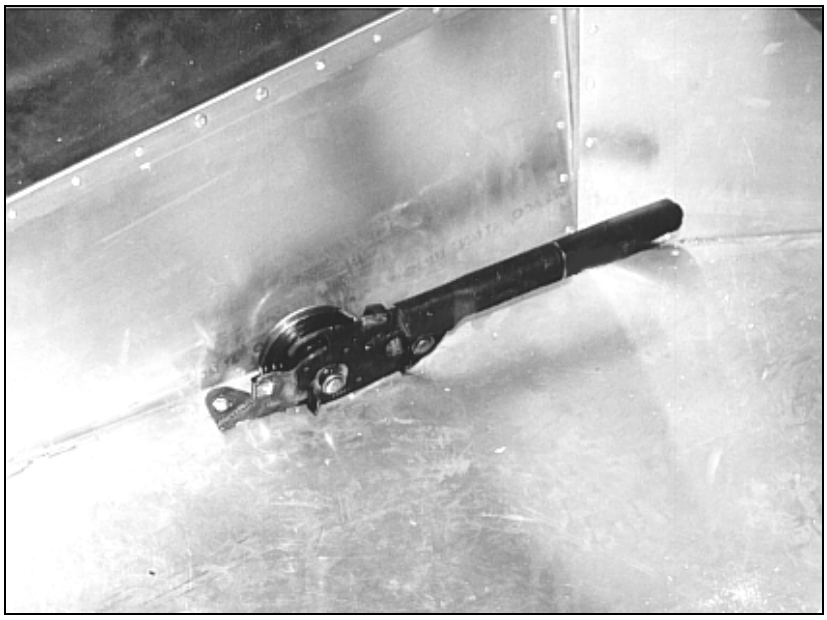
Parking brake cable passing through triangle and in front of coil spring on driver's side

2. Push the cable through the holes, which will snap the cable retainers in place (these are already on the cables from the Mustang).



Mustang emergency brake cable next to mounting bracket.

3. Run the cable sections under the 4" round tube transmission cross member and up to the handle area.
4. Push the captive nuts onto the handle so the screw can be attached from the underside.
5. Mount the emergency brake handle to the floor mount leaving the screws loose for now. The carpet and E-brake boot will be installed later and will go under the handle.
6. Attach the 2-into-1 cable with the "T" connector to the handle if it is not already there.
7. Release the emergency brake handle using the button and make sure it is all the way in the down position.
8. Pull on the cables one at a time and slide them into the slots on the "T" connector from the Mustang.
9. Pull up on the emergency brake handle, so that the automatic tensioning cog can adjust the free play in the lines.



Emergency brake handle mounted. Note cut section on rear of handle.

Wheels, Tires and Ride Height

ATTENTION: *The wheel/tire size charts are in the performance modification section of the manual.*

II. Mount the wheels onto the car.
II. The ride height in the front is 4.5". This is measured from the bottom of the 4" round tube to the ground, using 235/60R15 tires.
II. Ride height in the rear is 4.5". This is using 275/50R15 tires and includes a person in the driver's seat. If you use 255/60R15 tires, the ride height will be slightly higher.
II. The initial suspension heights will settle approximately ¾" with the first 50 miles of driving and will have to be re-adjusted upwards at that time.
II. For the 17" wheels, the recommended tire sizes are 275/40R17 in back and 245/45R17 in the front. These are popular sizes.

Checking the Running Gear

1. Secure loose and unused wires with cable ties. Look up the function of the wires in your Chilton's manual before you tape. Never get out the snips to cut a seemingly unimportant wire or bundle.
2. Problems are commonly due to a wire or relay not being hooked up or grounded properly. Sand through the paint to bare metal whenever attaching a ground.
3. Before you start your engine. Check the ground connections. The computer ground is near the starter solenoid (sort of looks like the female part of a stereo head phone connector). Check the following items…
   Battery ground strap
   Engine to frame ground
   Fuel pump/rear harness ground

Fuel pump relay ground near the seat area
EEC IV computer ground near the computer
Lighting grounds at each corner where the lights are located
Dash area grounds
Any other black wires with circular toothed clips.

4. When the ignition is turned to the "on" position, the fuel pump should be heard whirring for about three seconds and then shuts off. This sound is simply the fuel pump pressurizing the system. If you don't hear this sound. Check the emergency inertia cut-off switch. The red button should be pressed in. Double-check that the computer is hooked-up and re-check all of the ground connections. The computer ground near the starter solenoid has a black plastic one wire quick disconnect that many people forget to ground because the other half of the connector is missing. If it is found to be missing, cut the connector off and attach a circular ground connector.
5. Various clicking and whirring sounds are a great indication that things are working well.
6. **Check the oil level** and oil filter relocate hoses. Double-check the in/out relationship of the oil filter re-locate lines. Follow the arrows on the casting.
7. **Check the coolant level**.
8. Crank the engine for ten seconds with the coil connector removed so that the oil pressure can build up before starting the engine.
9. Reconnect the coil lead and start the car.
10. After running the car for two minutes at idle, turn off the engine and recheck everything for leaks and problems.
11. If you run the motor for any longer than two minutes it will be necessary to bleed the air out of the cooling system.
12. Several warm-up and cool down cycles are necessary before air in the coolant system is bled out enough to allow water to be pumped by the water pump. You will ruin your motor if you start it and drive without checking to see if the radiator is getting hot water pumped to it from the water pump. The best way to tell if the water pump is working is to feel the radiator after the engine has warmed up and see if it is warm. Usually it will be very cool if water is not being pumped through and you will have to add water and allow the purge tank to replace some of the water as the motor cools down. The purge tank on the shroud should be full all during the test sessions so that it can bleed water into the system as the motor cools. Twenty cycles is not too many to purge air out from the cooling system.
13. Turn the steering stop to stop to check for wheel rubbing on the control arm or aluminum wheel wells. There should not be any contact. If there is contact, you can put an extra spacer ring in the steering rack. This effectively changes (reducing) your steering travel and turning radius, but it's a good trick to remember if you use oversize tires or have bought custom wheels (not from us!) and the wheels rub slightly.

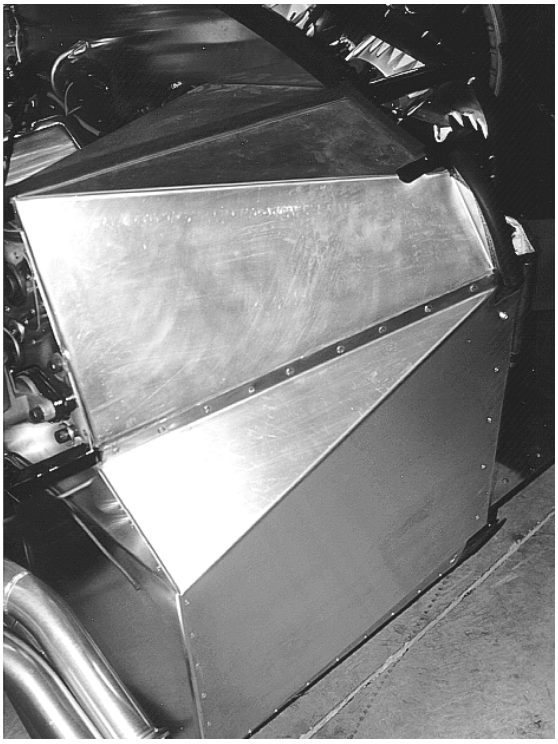
Foot Box Top Cover

ATTENTION: ***Check for electrical*** *problems now, it is easier to fix a problem now than later.*
TOOLS: *Drill, #6 nut driver, ⅛" drill bit, rivet tool, silicone, caulk gun.*
PARTS: *Aluminum cockpit assembly (FFR# 10890), ⅛" small rivets.*

1. All wires should be inspected in the foot box area before the foot box top is installed. Double check the following areas:
   a. Clutch pedal movement. As the clutch pedal moves you don't want contact with any wires.

b. Check the distance to the white gauge pod on the firewall. The length of the wires from the ignition and turn signal switches to the white control box is very tight. Make sure that these items are installed and wired before the top panel is put in place.

2. Run the speedometer cable through the hole in the foot box top, the rubber grommet on the cable pushes into the laser cut hole.
3. When positioning the foot box top take care to keep the speedometer cable out of the way of the pedals and steering shaft. The cable runs through the slot in the firewall along with the wiring harness inside the foot box and down the transmission tunnel to the transmission on the outside.
4. If you are at this point and are driving the rolling chassis, remember that the car does not charge the battery without the charge indicator light and resistor hooked up and the battery will run down over time.



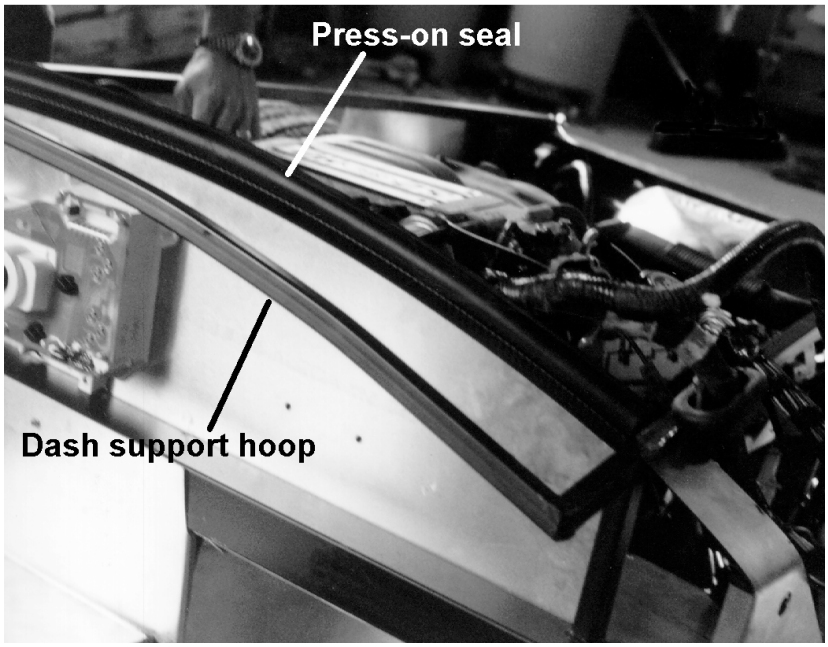
Driver's side foot box completed.

Rubber Seal on Aluminum

ATTENTION: *Press on the bulb type gasket material with care. Do not press too hard, use caution, the bare edge of trimmed aluminum can be sharp.*

TOOLS: *Tin snips, razor knife, slip joint pliers.*

PARTS: *Secondary body fasteners assembly (FFR# 10788)*



Press on bulb seal on firewall aluminum.

1. Any aluminum edge that will contact the fiberglass body must have the kit rubber bulb seal (FFR# 10761) pushed in place before the body is lowered on and installed. The contact areas are as follows…
    a. Front splash guards (installed after body is on)
    b. Fire-wall
    c. Rear trunk side-walls
    d. Lower trunk floor
    e. Small flap on driver outside top foot box.
    f. Top of splashguards in front of rear tires.
    g. Radiator side panels.


Press on bulb seal on trunk sidewall.

2. The top edge of the aluminum cockpit rear wall (FFR# 10823) does not have a rubber seal since it does not go all the way to the body seat, but is covered with the rear lip flange of the body.
3. Use the adhesive backed ½" flat weather stripping (FFR# 10857) on the ¾" tubing from the firewall forward that will touch the edge of the hood opening and the arched ¾" tube that is over the trunk. It can also be used on the door and trunk openings once the car is complete.

Roll Bar Drilling

TOOLS: *Drill, $^{5}/_{16}$" long drill bit, vise grips*

1. Assemble the roll bar on the frame. Put the rear leg on, then slide the front tube on all the way down to the small knobs on the holders. Push the rear leg up onto the front tube.
2. Use vise grips or a friend to hold the rear roll bar leg in place.
3. Drill $^{5}/_{16}$" holes for the stainless roll bar bolts. Insert one of the bolts after drilling each hole to prevent movement and ensure fit.
4. Remove roll bar.

Roll Bar from inside trunk view, assembled and bolted in place.

Body Cut-Outs

At this time you should be finished with the rolling chassis. This is an exciting time because the bulk of the real difficult work is behind you. From here on out, the time is really in the details. Take your time with the bodywork. Since the body is in one piece, get four people to help when you're ready to position the body onto the frame. The body is delicate at the area near the doorsills. During bodywork, take care to look for any small flaws. Time spent here will pay off down the road.

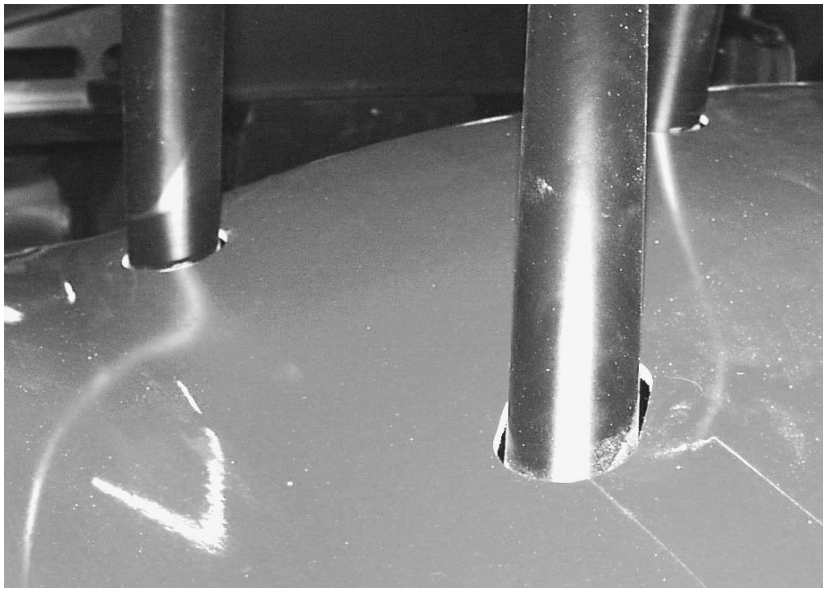
ATTENTION:

- *If body cut outs were ordered, the roll bar, side exhaust, louver, headlight, tail light, turn signal, windshield slots, wipers (if ordered), gas cap, hood scoop, and side mount holes are done at the factory. The body comes standard with the large nose hole, oil cooler hole, and side holes cut.*
- *The roll bar holes are marked for you on the top of the composite body.*

Roll Bar Cut-outs

TOOLS: *Drill, large file, 2.25" hole saw, safety goggles.*

1. In an open area with the body on the ground, use a 2.25" hole saw to cut the roll bar holes. Center the hole-saw on the marks and drill just so the center bit goes through.
2. Make a circle with the hole-saw and compare it to the marks. Adjust the drill if necessary.
3. To cut the rear roll bar leg, make 2 holes overlapping so that they form the right length. Use a file to connect the holes and create an oval.
4. Enlarge the holes if necessary or desired. Try not to cut or grind off too much material.



Roll bar holes cut out with roll bar installed.

Gas Filler hole

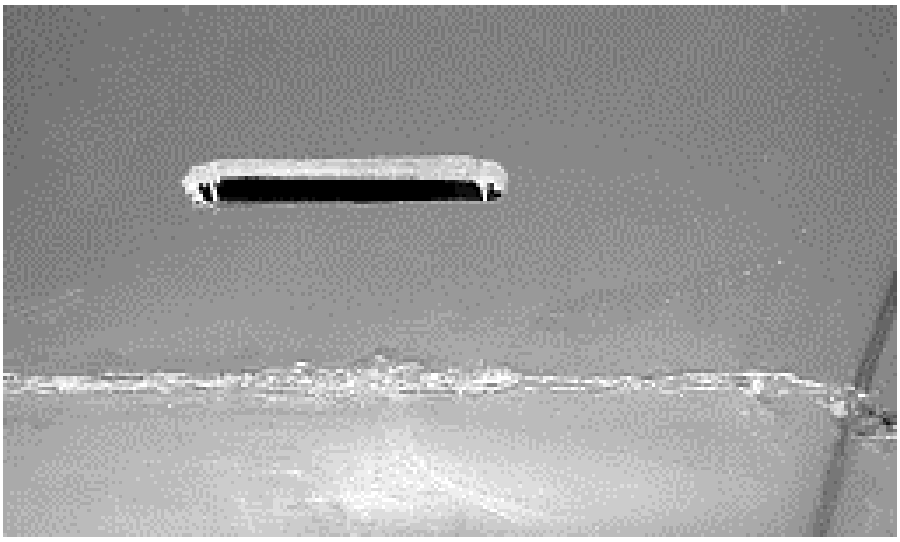
TOOLS: *2.25" hole saw*

1. Use the template in appendix A.
2. Cut the large circle out of the template.
3. Center the circle in the gas cap location.
4. Drill the 2.25" hole in the center of the cutout.

Windshield Cut-Outs

TOOLS: *Hand jigsaw, marker pen and ruler.*

1. At the factory, in the chassis assembly station, we drill two holes at each side of the body, forward of the cockpit area and near the back top of the fender. These holes serve to locate the position of the windshield cutouts. Use a ruler and marker to connect the outside edges of the two holes just forward of the door openings.
2. Connect the two holes on the lines with a jigsaw to make an elongated oval.



Connect the two holes with a jig saw to form the windshield slot

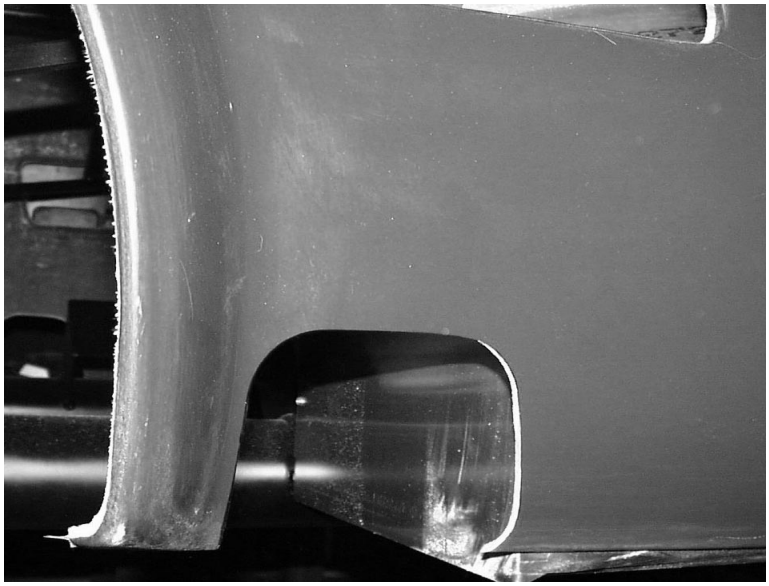
3. Repeat on the other side of the body. These ovals will be the slots through which the windshield bars will insert.

Side Exhaust Cut-Outs

ATTENTION: *Use caution when cutting. Go slowly measure twice, and cut once. Make two photocopies of the template (one for each side of the car) from Appendix A so that it does not get lost or destroyed.*

TOOLS: *Hand jigsaw, 2.5" hole-saw, drill, marker, clear tape.*

1. Cut out the side exhaust template from Appendix A.
2. The template goes down to the bottom edge of the body. There is nothing but air under the side exhaust.
3. Tape or hold the template and mark around it with a pen.
4. Use a 2.5" hole saw in the two upper corners to ease the amount of cutting needed and to make the corners look nicer.
5. Use a jigsaw to cut out the marked area.
6. The template is tight so enlarge the holes after fitting the side pipes later if desired. Do not allow the exhaust to get too close to the body or it will cause the paint to blister from the heat.



Driver's side exhaust cut out

Turn Signal and Tail Light Cut-Outs

TOOLS: *1.25"holesaw.*

1. Use the templates in appendix A.
2. Only cut the outer lines of the shapes out.
3. Position templates on the body in their correct locations and tape in place.
4. Use a 1.25" hole saw to make the center holes and a 3/16" bit for the small holes.
5. Test fit the lights. You may have to bend the ground tab slightly or file away a bit at the hole to make it fit perfectly.

Side Louver Cut-Outs

TOOLS: *Hand jigsaw, ⅞", 1.25" hole saw.*

1. At the corners of the louver indentation, use a 1.25" hole-saw for the larger angle and a 7/8" hole saw for the smaller angle.
2. The hole-saws will fit in the louver lip.
3. Use a jigsaw or hacksaw for the straight edges.

Side louver cut out.

Headlight Cut-Outs

TOOLS: *Hand jigsaw, drill, marker, compass, clear tape, $^{7}/_{16}$" drill bit.*

1. Use the template in Appendix A.
2. Fold the paper into quarters to find the center of the circle.
3. Use a compass and set its length from the center of the circle to the guide hole centers.
4. On the body, put the stationary end of the compass in one of the small guide hole divots.
5. Draw an arc across the headlight area.
6. Repeat this using the other guide hole divot.
7. Where these arcs cross, is the center of the circle.
8. Using the folded template, set the compass length from the center to the large inner circle.
9. On the body, at the point just found to be the center, place the stationary end of the compass.
10. Draw a circle around this point.
11. Using a $^{7}/_{16}$" drill bit, drill the marker holes and make sure that they do not hit the circle.
12. Drill a $^{7}/_{16}$" hole in the inside of the circle so that the edge of the hole is just touching the circle.
13. Use a jigsaw to cut the circle out.

Headlight and turn signals cut out.

Hood Scoop Cut-out

TOOLS: *Hand jigsaw, ¾" hole saw.*

A painted hood with the hood scoop cut out.

1. Use a ¾" hole saw in the upper corners of the hood scoop leaving room on the edge slightly more than the thickness of the material.
2. Cut out the scoop making sure that the saw has clearance on the backside and is not at an angle.
3. File the edges of the scoop so that the cutout follows the surface of the hood on the bottom and follows the underside of the top with no noticeable ridge.

Trunk License Plate Light Hole Cut-Outs

ATTENTION: *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, Sate 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.*

TOOLS: Drill, *$^{3}/_{16}$", ⅜" drill bits, masking or clear tape.*

PARTS: *License light/bracket assembly (FFR# 11041)*

1. Position the template (found in Appendix A) on the flat area on the edge of the outside of the trunk lid.
2. Affix the template to the trunk with tape.
3. Use the $^{3}/_{16}$" drill bit for the small holes.

Drilling the license plate light holes in the trunk.

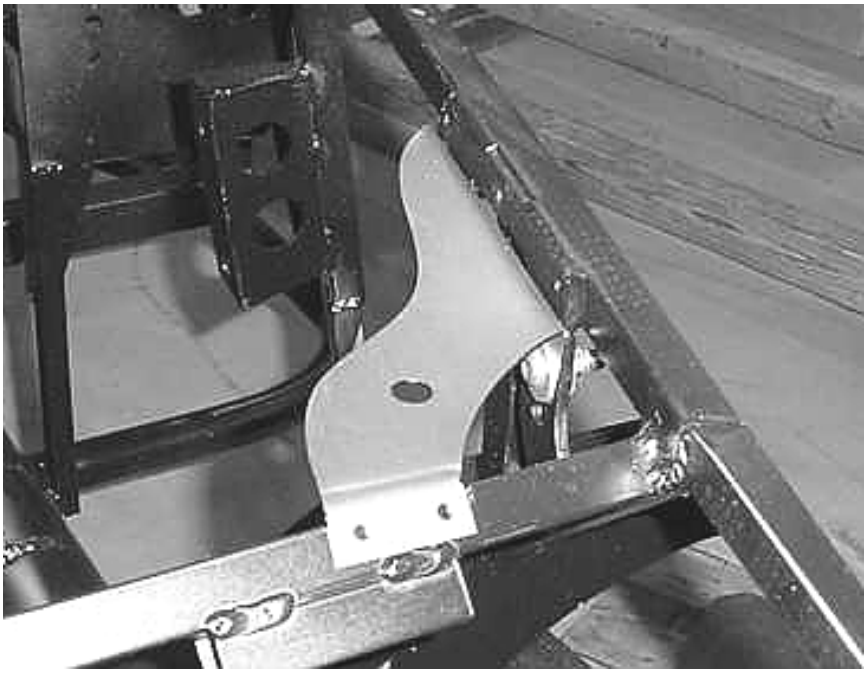
4. Use the ⅜" drill bit for the large hole.
5. Remove the template.
6. Test fit the part.

Hood Pins

TOOLS: Drill, *$^{3}/_{32}$",7/16" drill bits, Phillips head screwdriver, (2) $^{11}/_{16}$" combination wrenches.*

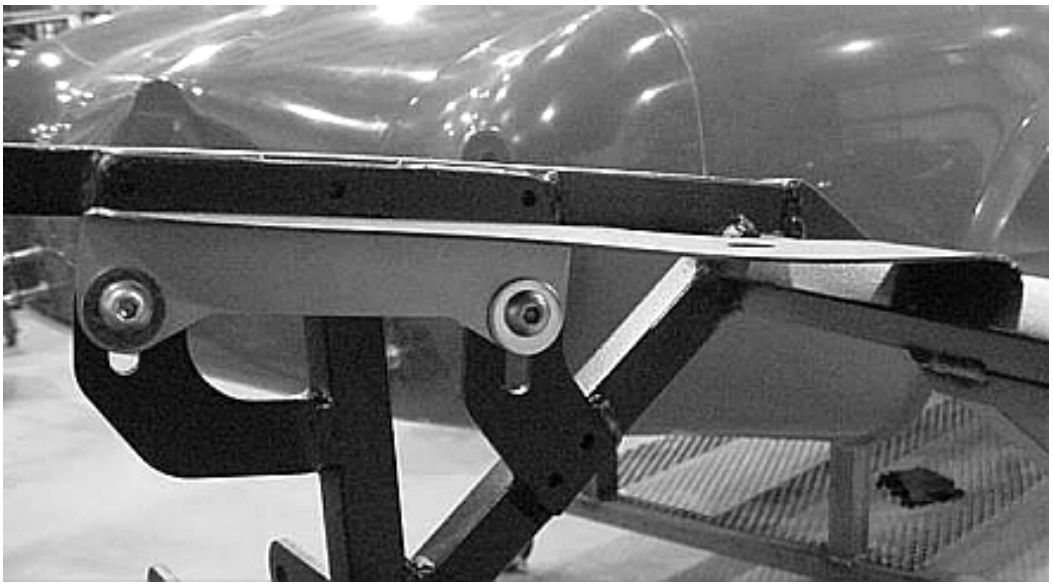
PARTS: *Three lock set assembly (FFR# 11019), hood/trunk fasteners assembly (FFR# 10646).*

1. At the front side corners of the engine bay, on the ¾" frame tubing, there are steel mounting plates which to attach the hood pin vertical mounting plates.



Top hood pin plate ready for drilling and riveting.

2. Bolt the top mounting plates to the side mounting plates. (Be sure to line the top plate with the front ¾" tube.



Top hood pin plate mounted to side plate.

3. Drill a 3/16 hole in the front ¾" tube.
4. Rivet the plate to the front ¾" tube.

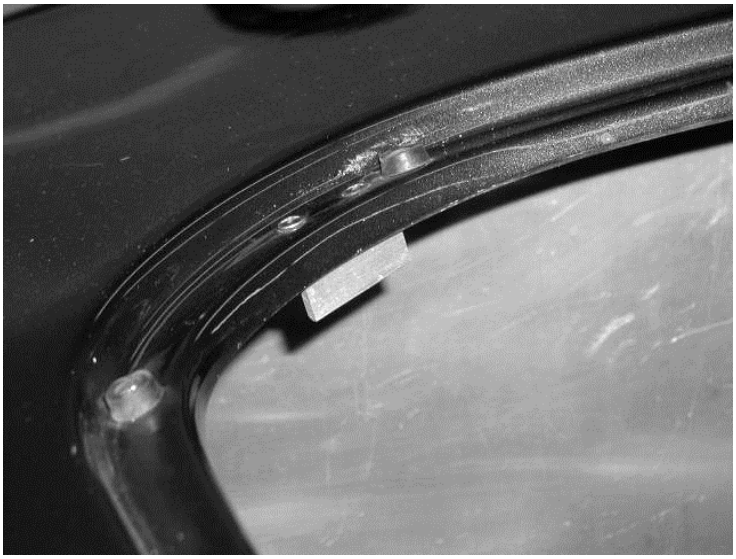
L-Shaped Hood Handles

TOOLS: *Drill, 1/8"drill bit, 7/8" hole saw, Phillips head screwdriver, small hex key set, small square file, hack saw, masking tape.*
PARTS: *Three lock set assembly (FFR# 11019), hood/trunk fastener assembly (FFR# 10646)*

1. Position the rear L-shaped handles (part of the three lock set FFR# 10624) in the holes near the rear of the hood. Point the handles to the rear of the hood.
2. Use a small square file to make room for the tabs on the handles.
3. Using a ⅛" drill bit, drill holes in the hood for the mounting screws. Attach the handles to the hood using the Philips head screws.
4. Using the key for the three-lock set, lock the handles.
5. Place the hood on the car. The driver's side handle square rod is too long and hits the top of the foot box. Mark and shorten this rod with a hacksaw until it clears the foot box.
6. The handle is locked pointing towards the back of the car. Place some masking tape on the body behind the handles then, using a pen, mark on the body where the handle is pointing.

Driver side hood handle.

7. Remove the hood. Hold the angled aluminum brackets (included with kit) to the underside of the hood lip at the locations just marked.



Hood handle hold down bracket mounted to underside of hood lip.

8. Using a pen, mark on the brackets where two screws can go.
9. Drill two ⅛" holes through the bracket.
10. Using a pen, mark the location of the bracket holes on the hood lip.
11. Remove the bracket and drill the holes.
12. Countersink the holes on the body's hood lip a little by turning a Philips head screwdriver in the hole.
13. Mount the brackets with the angled part pointed down and towards the hood opening.
14. Attach the cam wedge to the square handle shaft using a small hex key. Adjust them so that they will go under the angled aluminum bracket when the hood is on the car and the handles are locked.
15. Cut off any excess square rod that hangs down past the cam wedge on the hood handles.

Mounted L-shaped hood handle with cam wedge.

Body Mounting

ATTENTION: *It is smart to have some help when doing this step. Much of this positioning is push and pull until all holes line up. The fiberglass edges can be very sharp. Wear gloves when lifting or holding the body. You'll get best results if you paint your body and panels at the very end of this entire project. Final mount and fit your body and panels, then remove them, perform bodywork and paint operations and mount the painted body/panels at the end ONCE.*

TOOLS: *2"x 4"x 36" brace, duct tape.*

1. Place a 36" long 2"x 4" brace in between the front of the cockpit and the rear of the cockpit.
2. Get three friends to help with the next step.
3. Have one person lift the body at the nose and another person lift the body at the back of the body's lower edge.

Lowering a painted body down onto the completed chassis.

4. Raise the body up above the rolling chassis.
5. While holding the rear end of the body above the rear of the chassis, lower the nose section down, making sure that the $^{1}/_{16}$" bent steel plates (the front quick jack bumpers fasten to these) are not in the brake vent slots. The quick jack and body mount plate does not go through the brake vent holes nor does it go through the front nose openings.
6. Gently lower the rear tail section of the body. At the same time, have someone at the front of the body push the body towards the back of the car. Stretch the body slightly to clear the trunk aluminum and the door hinge mounts.

7. Pull the sides of the body outwards slightly to clear the 2”x 2” outriggers and lower the body.
8. Place the under door aluminum pieces (FFR# 10556) under the door openings and push the body down until the lip touches the top of the aluminum.
9. Work from the rear of the car towards the front.
10. Use the original body mounting holes to line things up.

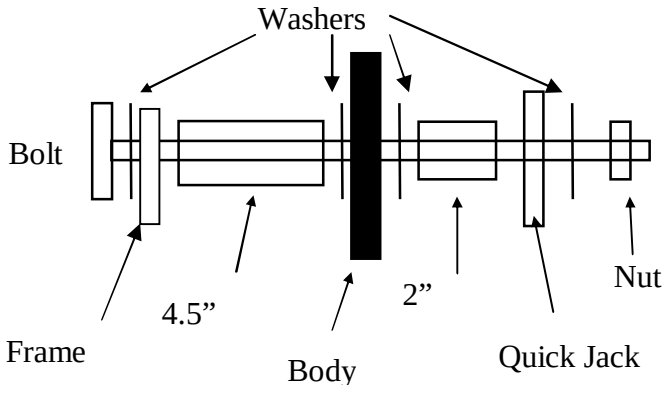
Slide the nose on first with the body up in the air.

Rear Quick Jack Bumpers

ATTENTION: *If you ordered the optional chrome bumper assembly, follow the instructions for these under the optional accessories section near the end of this manual. The quick jack bolts can be installed from the outside of the car so the gas tank does not have to be dropped.*

TOOLS: *9/16” and 5/8”combination wrenches, 5/8” socket, 5/16”hex key, floor jack.*

PARTS: *Quick jack bumper assembly (FFR# 10533)*



1. Lower the gas tank using a jack in the middle of the tank to hold it. You'll need a 9/16" wrench and 5/16" hex key. This is necessary in order to insert the bolts for the quick jacks into their holes.
2. Mount the rear quick jacks using the 4.5" and 2" stainless spacers with 4 washers on each long bolt. Use a ⅝" wrench and ⅝" socket.
3. Raise and bolt the gas tank back into place.
4. Tighten the gas tank strap bolts with a 5/16" hex key and 9/16" wrench.

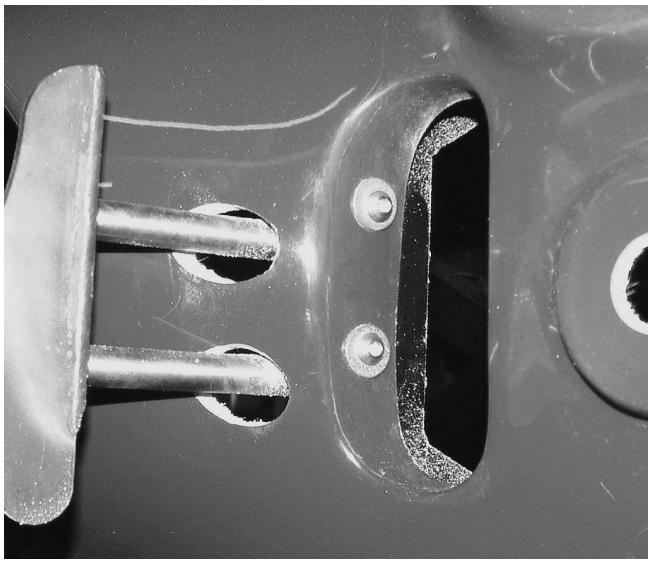
Side Body Mounts

TOOLS: *5/16" drill bit, 3/16" hex key, drill, ½" wrench.*
PARTS: *Secondary body fasteners assembly (FFR# 10788)*

1. Drill the holes at the points marked on the side of the body.
2. Push the U-nuts onto the side body mount plates.
3. Install the stainless side bolts (FFR# 10839) with a washer (FFR# 10981) next to the head and as few washers between the body and the frame as possible so that the body clears the frame and there is enough thread left so the lock part of the nut is used. Use a 3/16" hex key. If there is insufficient thread to lock, file the inside bottom edge of the body where it will meet the side mount until the nut will lock.

Front Body Mounts

TOOLS: *3/16" hex key, ½"combination wrench, tape measure.*
PARTS: *Secondary body fasteners assembly (FFR# 10788)*



Front body mounts as assembled by the factory.

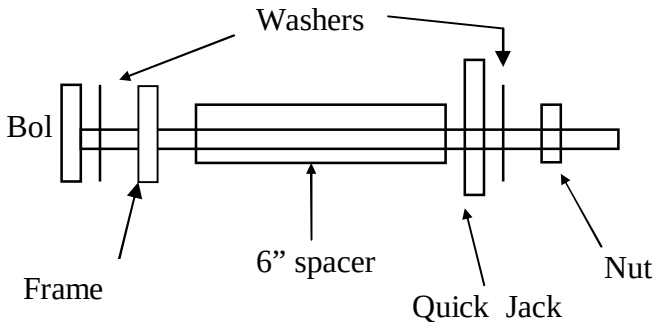
1. Center the body over the frame using a tape measure to measure from the lip of the body to the rear mounting plate of the front coil-over bracket. Check the line up with the front "X" member so that the tape measure is parallel. Make this measurement on each side of the body so that the front of the 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 lip of the body into the ¾" tube.
2. Install the front mount bolts from the outside in, with washers next to the heads. Use a *3/16*" hex key and a ½" wrench or deep socket.
3. The hood opening is attached to the ¾" frame rails using countersunk sheet metal screws. Use six screws on each side equally spaced along the length of the opening.

Front Quick Jack Bumpers

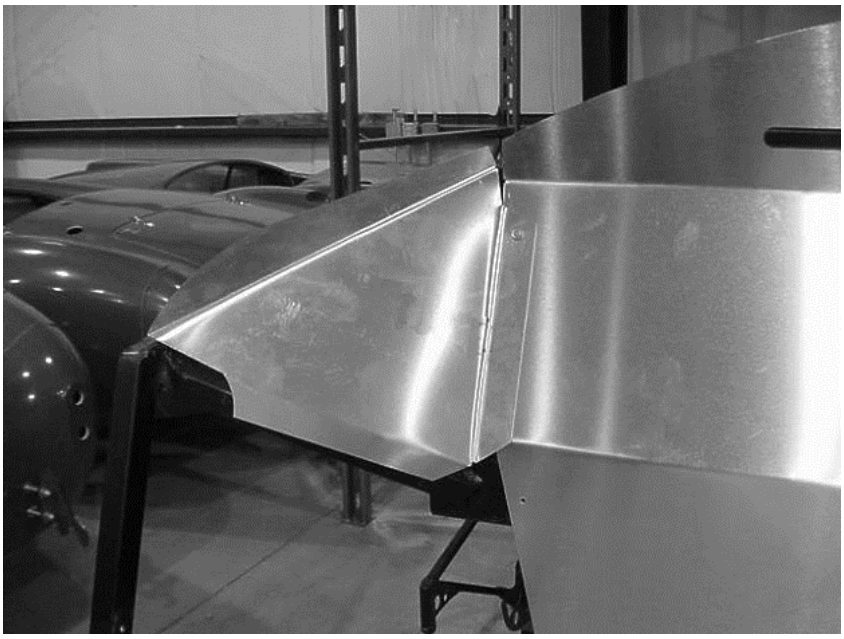
TOOLS: *9/16*" and *⅝"combination wrenches, ⅝" socket.*
PARTS: *Quick jack bumper assembly (FFR# 10553)*

1. File the inside of the quick jack hole if necessary so that the spacers do not touch the body.
2. Tighten the bolts with a ⅝" socket and ⅝" wrench.
3. If, after tightening the bolt, the spacer hits the body, move it so that it does not. The mounting plate will bend to accommodate.



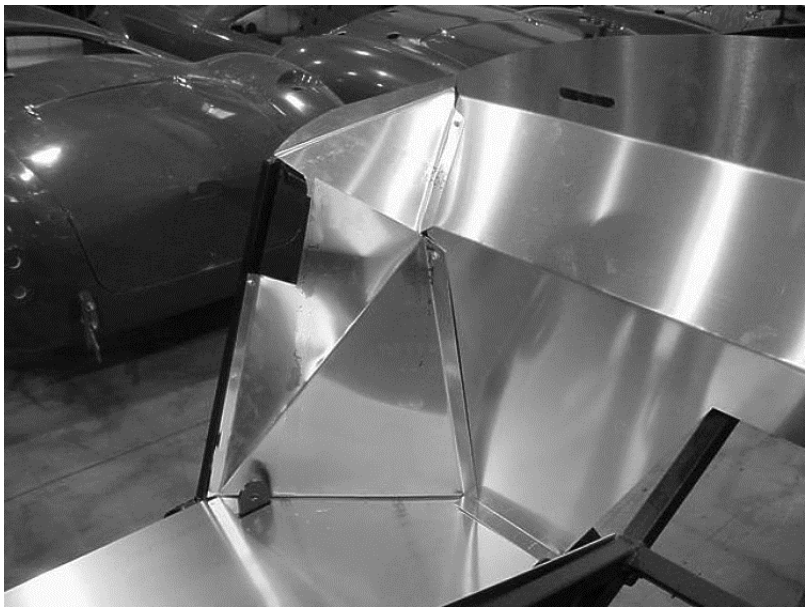
Rear Cockpit Corners

1. Position the upper splash panels so that they are flat against the rear cockpit wall and the corner is against the edge of the ¾" tube.
2. Hold the panels in place with #6 screws.



Upper splash panel.

3. Position the lower splash panels in place on top of the upper panel and the floor lip.



Upper and lower splash panels in place.

4. Hold the panels in place with #6 screws.
5. Use a marker and ruler to scribe the rivet holes on the aluminum panel.
6. Note where the panels touch each other and where they touch the frame. Remove the panels.
7. Apply silicone to the upper splash panels.
8. Install the upper splash panels with #6 screws.
9. Apply silicone to where the lower splash panels touch.
10. Install the lower splash panels with #6 screws.
11. Use ⅛" drill bit and drill the rivet marks.

12. Rivet the panels in place with ⅛" short or long rivets.

Under Door Aluminum

1. The aluminum panels under each door should be in place from fitting the body, note where they contact the floor and the frame.
2. Remove the panels and apply silicone.
3. Reinstall the panels and mark and drill the rivet holes with the ⅛" drill bit.
4. Rivet the panels in place using ⅛" short or long rivets.

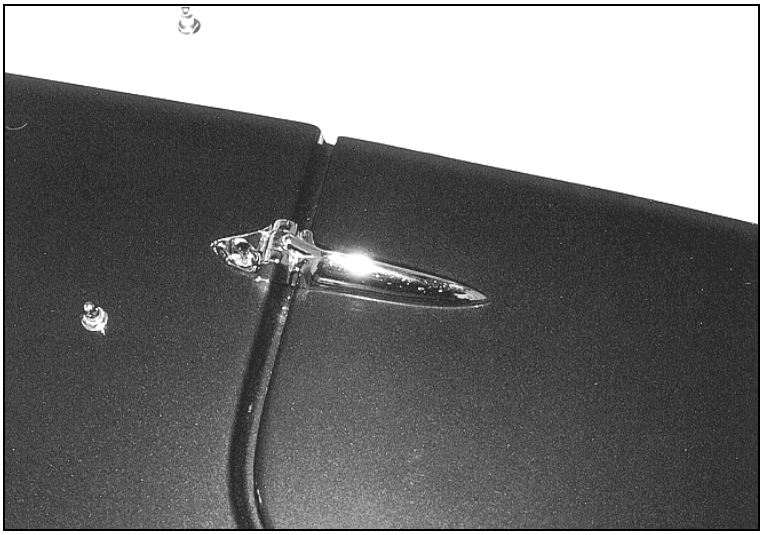
Trunk Hinges

ATTENTION: ***T****he hinges are marked left and right on the underside with a little (R) and (L). The hinges will bind and can damage the paint if mounted incorrectly.*

TOOLS: ⅜", ½" Wrenches.

PARTS: *Hood/trunk fastener assembly (FFR# 10646)*

1. Mount the hinges to the trunk lid using the original hardware as installed at the factory. The hinge studs go through the trunk lid and are fastened using washers and lock nuts.
2. Hand tighten only at this point.



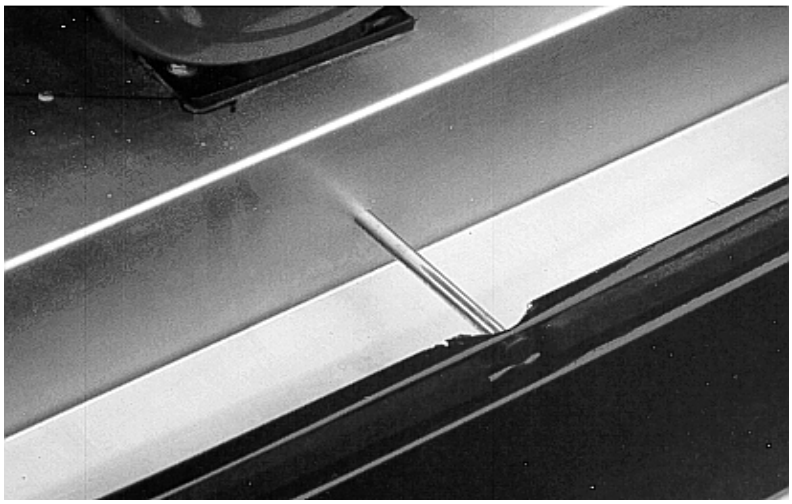
Driver's side hinge.

3. Attach the trunk to the body by pushing the hinge studs through the body. The hinge studs then go through the hole on each of the "L" shaped metal brackets. The "L" shaped metal brackets should be hanging down directly in front of the ¾" arched tube.
4. The hinge studs and "L" shaped metal brackets are held to the body with lock nuts, as installed at the factory. Rivet or screw the "L" shaped metal bracket to the arched ¾" tube, where they cross each other.
5. When satisfied with fit and alignment, final tighten the hinge nuts

Trunk Latch

TOOLS: *Regular screwdriver, Phillips head screwdriver, ⅜" wrench, marker, masking tape.*
PARTS: *Three lock set assembly (FFR# 11019)*

1. The trunk latch hook and mount are pre-assembled at the factory.
2. If the trunk latch assembly was disassembled for painting, re-assemble the trunk latch T-handle (third part of the three-lock set) in the center of the trunk. On the inside portion of the trunk you will need to slide the latch/hook over and onto the shaft.
3. The trunk latch hooks onto a pin. This should already have the hinged cap, latch pin sleeve, washer, and nut assembled in the assembly bag. Remove everything except the hinged cap.



Trunk latch pin mounted in trunk.

4. Pass the pin through pre-drilled hole in the body, then the pin sleeve and on through the aluminum and the 1/16" plate on the frame.
5. Put the washer and nut on the pin and tighten with a ⅜" wrench and regular screwdriver.
6. Engage the T-Handle and make sure that the latch hooks onto the pin securely.
7. Lock the handle and make sure it stops the trunk from opening.

Side louvers

TOOLS: *Silicone, caulk gun, and duct tape.*
PARTS: *Louver assembly (FFR# 10985)*

1. Bend more of an angle into the louver fins carefully if desired.
2. Lay a thick bead of silicone on the upper and lower flat sections of the louvers.

3. Position the louvers on each side of the body, the lovers act as air exits from the hot engine bay so the forward edge of the blades should be pointing toward the inside. Apply duct tape to both edges of each louver to secure until silicone cures.

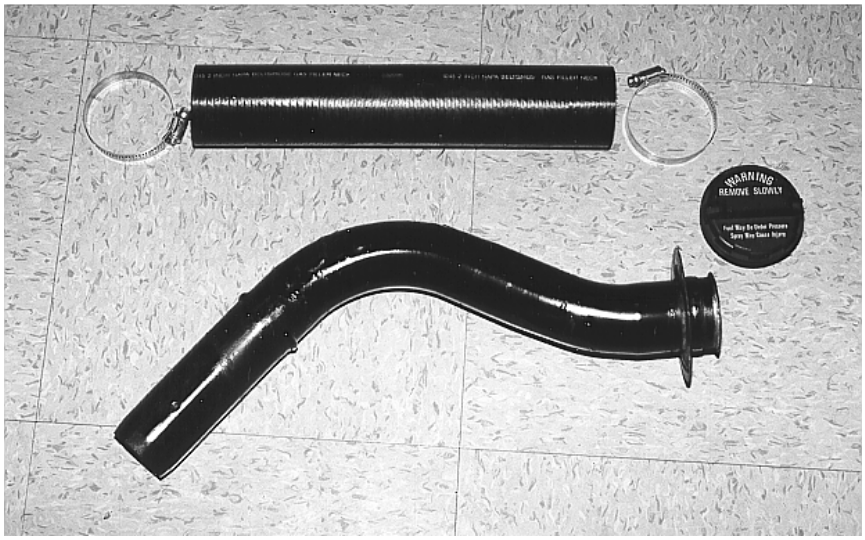
Fuel Neck and Gas Cap

ATTENTION: *When you're finished, double check the hose clamps that connect the rubber fuel neck to tank to cap. Previously the fuel neck hole was cut out of the body using the template. The template provided has holes located on it to use for mounting hardware with the flange neck.*

TOOLS: *⅜" deep well socket, hex key set, Phillips head screw driver, hack saw, drill, 9/64" drill bit, safety goggles.*

PARTS: *Fuel Filler Assembly (FFR# 12236), Fuel Tank Assembly(FFR# 10896).*

1. Remove the filler neck from the gas tank.
2. 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.



Mustang fuel tank neck with kit extension tube.

3. Use the hose clamps to attach the fuel neck extension tubing to the two halves.

Fuel tank filler neck with extension.

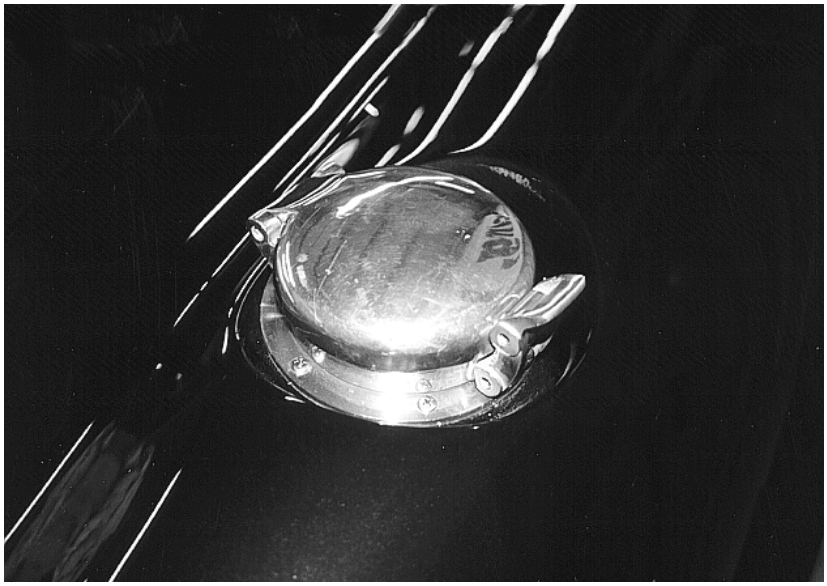
4. Insert the neck back into the tank to prevent gas fume leakage.
5. Push the filler cap through the body hole.
6. From the wheel well, rotate the filler end until the flange is parallel with the body. Get a friend to make sure the cap is centered in the previously drilled hole.
7. Mark the underside through the holes onto the body.
8. Drill three $^{9}/_{64}$" holes from the underside for the mounting bolts.
9. Connect the ring connectors to the grounding wire provided.
10. Slip the fuel neck spacers between the body and the Mustang fuel neck (this part has the gas cap and flange on it). The spacers drop the height of the Mustang screw fuel cap so that it clears the roller gas cap lid.
11. Place one end of the ground wire to one of the filler neck mounting bolts and attach the other end to the frame.

Note: This wire prevents any static charge build-up and must be used.

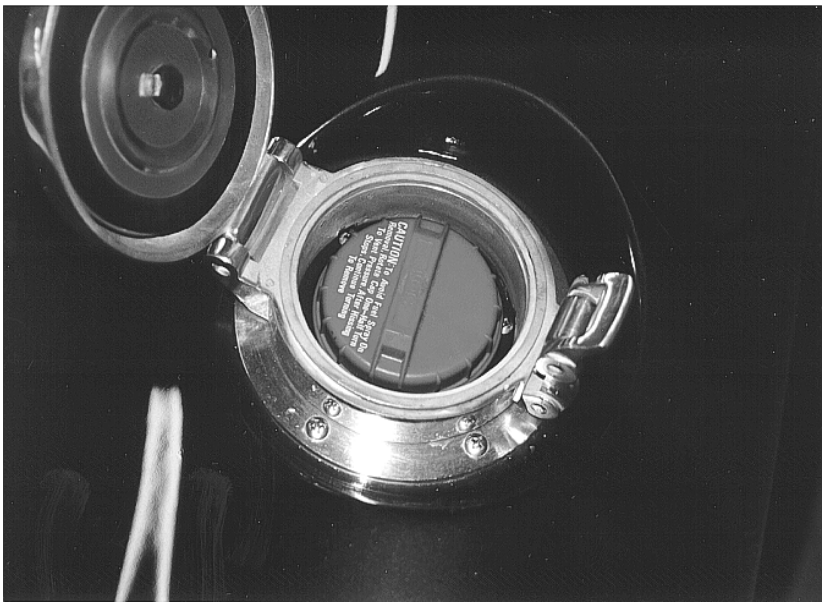
12. Attach the Mustang fuel neck to the body using the kit fasteners.

Underside view of installed fuel filler neck extension.
Mustang neck bolts up to, and through, the composite body.

13. Before fastening the Le-Mans flange neck, assemble it to the roller gas cap by screwing it on and then position the cap so that the hinge section is forward. You should do this so that when you put the gas cap back on at the end, it is lined up properly.



14. Lower the Le-Mans flange over the fuel neck that you just installed, and attach it with the same type fasteners.
15. Screw the roller gas cap onto the installed neck flange.



Le-Mans roller gas cap with concealed Mustang screw cap.

16. If the cap hits the Mustang cap, unscrew the bolt in the top of the cap and cut the small spacer that is on the bolt. Start by cutting half of it first and testing. The bolt may also need shortening. NAPA Auto parts stores also sell a replacement cap that is slightly thinner than the stock one and will help as well. Doing this will make sure that the gas cap retains it's "spring loaded" effect.

Windscreen

ATTENTION: *Handle the windshield with care. This piece costs close to $600. Store in a safe place. Use Caution while installing the screws into the windshield, they strip the brass strip very easily. Be careful to use the correct screws (the ones from the wind wings and sun visors are longer and can break the windshield if used in the wrong place).*

TOOLS: *¾" combination wrench, ¾" deep socket, small regular screw driver, small hex key set, drill, ½" drill bit, hack-saw, marker and ruler.*

PARTS: *Windshield assembly (FFR# 10895).*

1. Cut the passenger side windshield bar 1.5" from the lower end with a hacksaw to clear the top of the passenger foot box.
2. Carefully mount the sidebars on the windshield, with the included screws, using a small flat head screwdriver.
3. With the help of another person, lower the windshield into the slots that were previously cut in the body.

Inserting the windshield into the body.

4. Line up the windshield mount bars with the frame mount brackets below the body surface.
5. Press the windshield down onto the body so that the rubber along the bottom seals against the body and there are no air gaps. The metal windshield will be about ⅛" above the body.
6. If there are pre-drilled holes in the bars, they are not used. Use a marker through the laser cut frame-mounting holes to mark the windscreen mount bars with the position that the holes need to be in. Make sure that you are pressing down when this is done and the rubber is seated on the body.
7. Remove the windshield and lay it flat on a clean, non- scratching surface.

Inserting the windshield with the base plates in place.

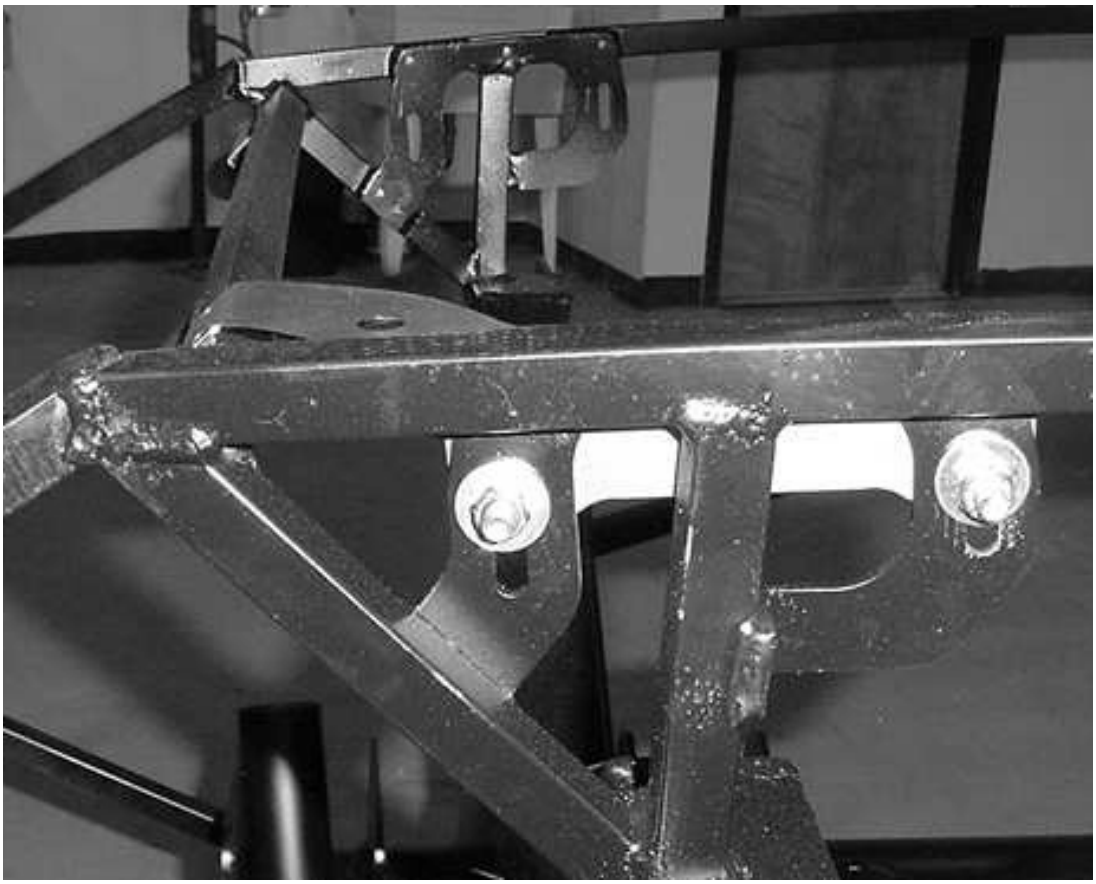
8. At the points that were just marked, move across to the center of the bar and mark again. The holes you will drill need to be centered on the bars. Disassemble the windshield sidebars from the windshield body before drilling.
9. Drill two ½" holes in the each brass windshield support bar and reassemble the sidebars to the windshield.

10. Slide the windshield base plates (FFR# 10944) over each windshield bar with the holes towards the outside. Use aluminum polish and clear coat paint on the base plates to make them shine and resist oxidation.
11. Insert the windshield into the slots and a ¾" socket and ¾" wrench to attach the windshield to the frame mounts.
12. Fasten the base plates to the body using the enclosed small screws and a matching drill bit to start the hole.

Hood Pins

TOOLS: *Drill, $^{3}/_{32}$", 7/16" drill bits, Phillips head screwdriver, (2) $^{11}/_{16}$" combination wrenches.*
PARTS: *Three lock set assembly (FFR# 11019), hood/trunk fasteners assembly (FFR# 10646).*

1. Attach the hood pin vertical posts to the top mounting plate.
2. One nut goes on each side of the plate.
3. Adjust the height of the pins.
4. When the hood is on the posts it should just barely touch the post.(This is only for alignment purposes)
5. Put a small dab of silicone or white grease on each of the hood pin posts.
6. Center the hood in the opening and press down.
7. This should leave a couple of small silicone marks on the underside of the hood.
8. Drill two $^{7}/_{16}$" holes in the hood where the marks are located.
9. Raise the height of the posts so that they stick through the hood.
10. Place the circular chrome plates, packaged with the hood posts, over the posts.
11. Drill through the circular chrome plates with a $^{3}/_{32}$" drill bit.
12. Screw the chrome plates to the hood using the short hood pin screws and a Philips head screwdriver.
13. Adjust the height of the posts and the angle of the hole through the posts so that the hood is held firmly in place. The pins can be removed and installed pointed in the direction desired.

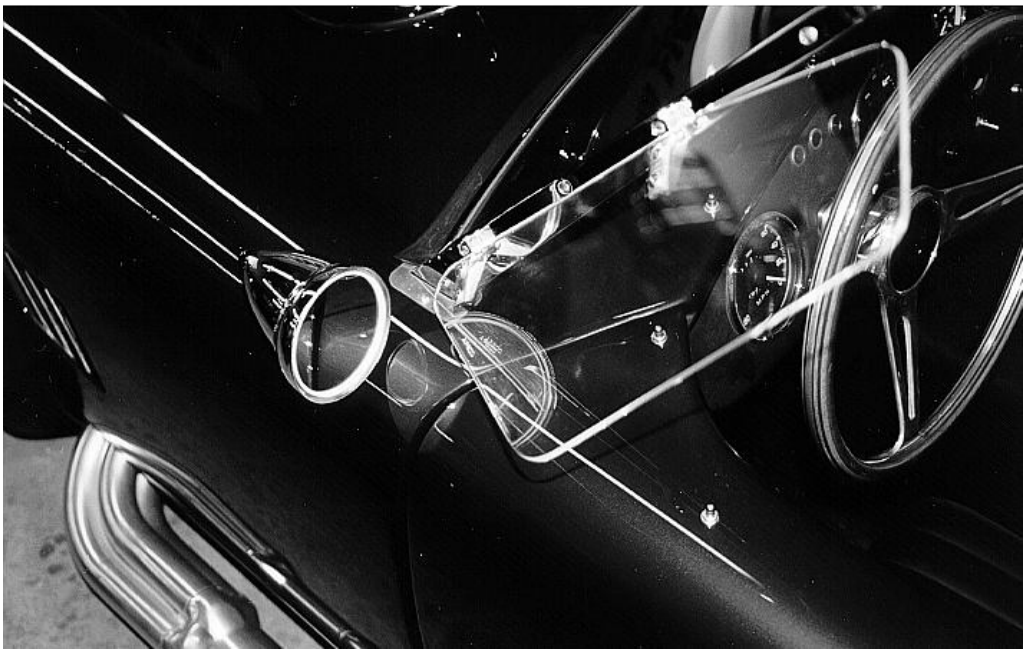


Hood pin side mounting plate with top plate bolted in. (Before the F panel is installed)

Side View Mirror

TOOLS: *½" Wrench, Drill, ⅛" drill bit, Philips head screwdriver.*
PARTS: *Mirror assembly (FFR# 11066)*

1. The side view mirror location must be determined from sitting inside the car, so place one of your seats in the driver's side.
2. The mirror must be positioned to clear the door when it is fully open. If you have ordered the wind wings, fit them now to the windshield to ensure that they don't interfere with the mirror.
3. Sit in the driver's seat and determine a comfortable position for the mirror.
4. Once you have determined a comfortable position with ample clearance, mark around the base of the mirror with a pencil.
5. Disassemble the mirror by removing the screw from the back and the screw that holds on the base.
6. Position the base plate in the center of the marks you made for the mirror and mark the screw holes.
7. Mount the mirror to the base and adjust using the screw in the back.
8. Drill the holes w/an ⅛" drill bit. Install the base w/the (2) screws and gasket provided w/the mirror.



Side view “bullet style” mirror installed.

Body Prep and Painting

If you have never done bodywork before, talk to an auto body person who is familiar with working on fiberglass first. Before painting your body and panels we recommend mounting them all on the finished car including all lights, windshield and doors. After working with more than 3500 customers we have found the best results to be with folks who paint their body at the very end. After everything is tight and aligned properly, we suggest removing the body and painting it off the car. This eliminates over spray and keeps your nice work up to this point intact.

If you will be painting stripes on your car it’s a good idea to mark or scribe the start points of the lines on the body. When the body is off the car it’s flexible and difficult to get stripes on the front half of the body to line up perfectly with those on the back half.

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.

TOOLS: *100, 220, 400 grit sand paper, sanding blocks.*

1. Remove all trim, doors, windshield etc. before beginning body work
2. Take extra care to sand away the fibers and strands specifically around the roll bar area. Finished flange around door should not exceed ½” to make sure the press-on door trim fits.
3. The primer gel coat sands easily, and is a forgiving material to work with. Remember that 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. After the body is cleaned you can begin the sanding steps.

4. The parting lines are easiest to remove with a file or scrapper (these are the lines where the mold comes apart). For a car that will be painted a dark color such as black or dark blue it is very important to understand the nature of fiberglass as a material. The vinyl ester resins used for these bodies will shrink with a final stage of curing with the elevated temperatures that are present in the sun on a dark car. The parting seams and any area of body filler repair should be given at LEAST several days to cure. If you want to heat cure the bodies do not exceed 140° F. When the final paint is applied it is very smart to add several coats of clear to those areas where work was done so that years later you or the next owner can simply sand out and buff any imperfections that may develop.
5. Much time and energy was spent on the mold so that the parts line up evenly and don't have a different height when you begin sanding. Take your time at this final fitting stage and you'll be rewarded with a fine finish, and a perfectly straight body. Of all the areas to be a perfectionist this is the one.
6. Block sand the entire body surface with 100 grit sandpaper. For flat sections you can use a harder rubber sanding block. For curved sections, use a firm sponge at an angle to the curve that you are sanding.
7. Make sure the body is clean and grease/wax free before priming.
8. 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.
9. Prime the body surface with a polyester primer/surfacer such as featherfill. Make sure you prime with a polyester primer over all areas of repair. This polyester primer is the same chemical base as gel coat and acts as a barrier between the raw fiberglass and the topcoat you will be applying.
10. Block sand with 220 grit paper.
11. The last coat of primer should be a different color so that you can see scratches or flaws that were missed the first time around. Pay particular attention to the areas on the top of the car since these are the most visible to the person looking at the car.
12. After the primer is dry, use a 400-grit wet sanding paper with wet sponge soaked frequently to finish the surface preparation. You will see the heavier 220 grit scratches in the surface you are sanding with 400 grit and you want to sand until these heavier scratches are gone.
13. While you're wet sanding, you know you're finished with an area when it appears foggy and water doesn't bead up on the surface. Wipe the area with a flat squeegee while sanding to inspect the surface for defects.
14. Spray a sealer coat over the primer and follow this with your first paint coats. The modern two stage basecoat/clear coat urethanes are the best choice since they offer the workability of the lacquer paints with the flexibility and resistance to cracking of the enamels. The clear coat should be fairly thick since you can repair this layer in the future if something happens to the cars finish. We've seen bad looking scratches repaired if the scratch didn't pass through the clear.
15. Go slow. It is amazing how many people (including us) rush the last steps in order to get the paint on the body when only a few more hours would give you a show car. Keep in mind that paint is impossible to keep looking perfect if you are going to put miles on the car. If the car will sit in a protected garage all its life then yes, spend the $5000.00 on the show car paint. If you are like the rest of the world, try to control the expense of the project. The joy we get from the *use* of our cars is because we spend $2000.00 instead of $5000.00.

ATTENTION: The door, hood and trunk panels are molded without flanges (edges), and then they are cut with a high-speed router that leaves a sharp and unfinished edge. The panels are made BIGGER than you need/want. This is so that you can custom fit them to your

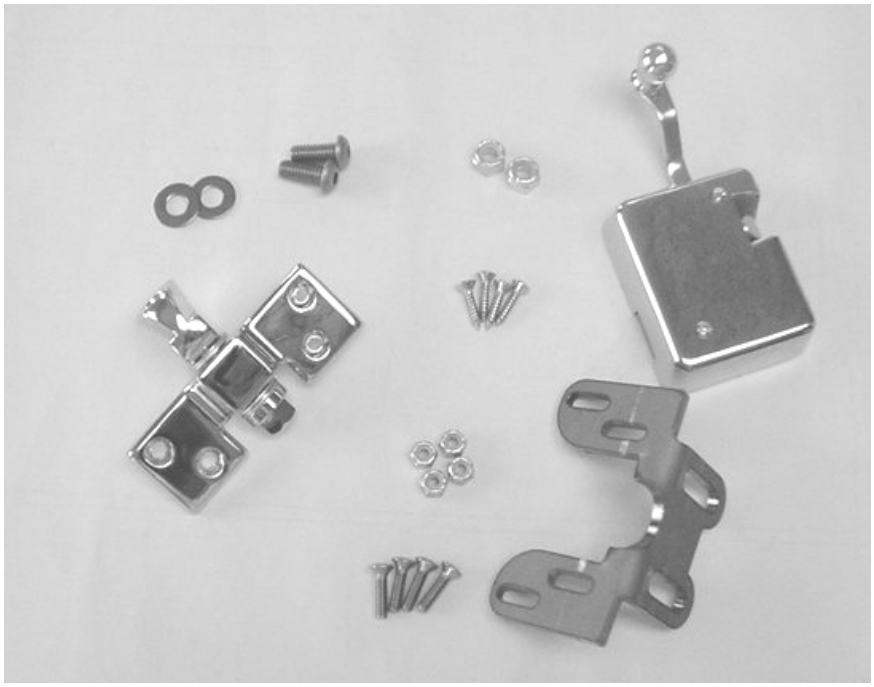
MOUNTED body. For proper panel operation, the gaps need to be sanded to greater than 3/16". Panel edges should be rounded to match the body opening radius.

Doors and Hinges

ATTENTION: *Take your time to align the doors properly.*

TOOLS: ½", 9/16" deep *socket, vise grips, drill, ⅛" drill bit, 13mm combination wrench, rivet tool, silicone, caulk gun, #6 nut driver.*

PARTS: *Interior trim assembly (FFR# 11064), door latch/hinge assembly (FFR# 11065), secondary body fasteners assembly (FFR# 10788).*



Door Latch parts.

1. Bolt the striker to the door latch adapter using the countersunk screw head bolts and locknuts. Leave the nuts just loose enough to allow the pieces to slide back and forth.

Stricker mounted to Stricker mount.

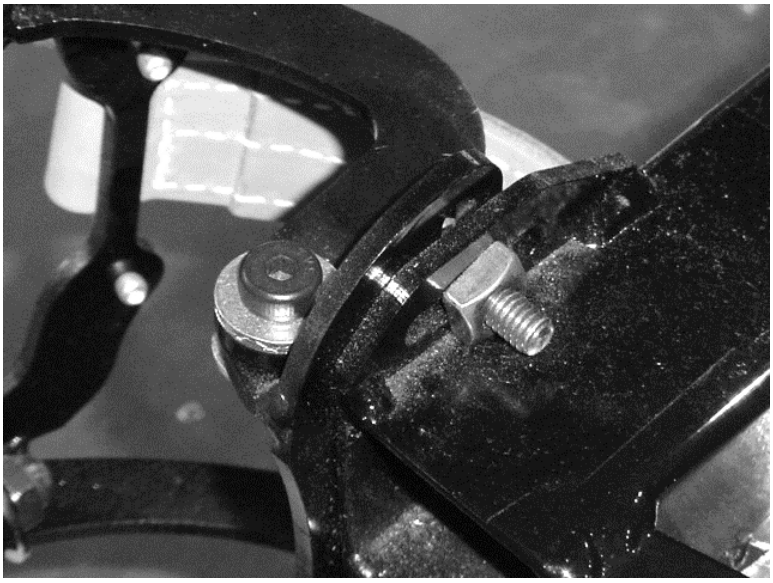
2. Bolt the entire assembly to the front side of the frame bracket using the $^{5}/_{16}$" allen head screws and lock nuts, leave these nuts slightly loose as well to allow for up and down adjustment.

Stricker and mount attached to frame.

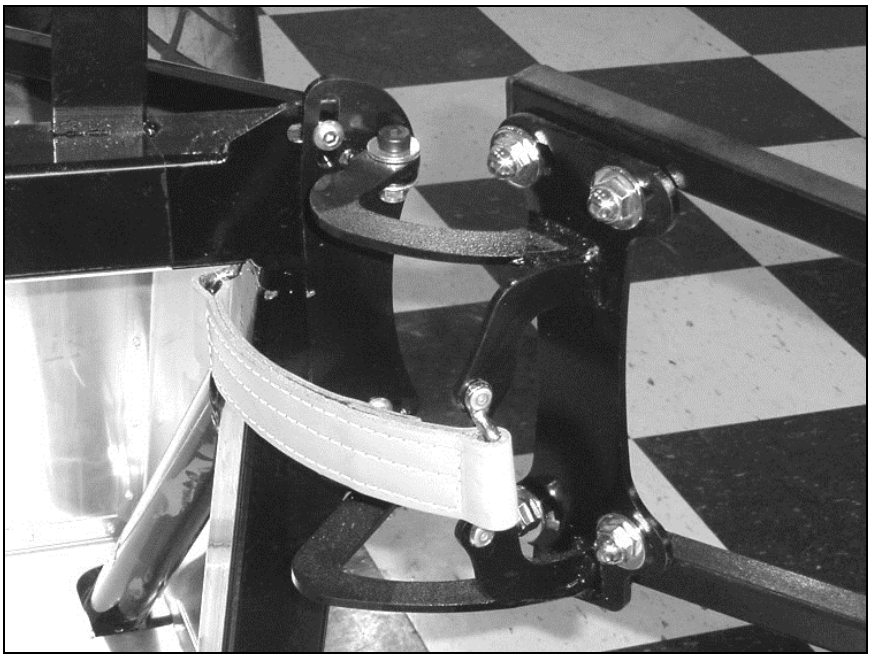
3. Remove the cover from the striker and attach to the door using four of the small screws.

Latch without cover mounted to door.

4. Bolt the door to the car and do a rough alignment at the hinge end.



Top backside of door hinge



Door hinge.

5. Shut the door slowly adjusting the striker to where it lines up with the latch. It may be necessary to shim the latch away from the door to get the best alignment.
6. Finish the alignment of the door. Tighten down the striker once you achieve a good fit between the door and stricker.
7. If you can not get the striker toward the outside of the car far enough it may be necessary to grind the ends of the bolts that hold the latch to the bracket to allow the entire assembly to adjust outward.
8. Check the door for proper operation.
9. Once you are satisfied that the doors are lined up for the final time remove the acorn nuts one at a time and put a dab of thread-locker on them.

Door Pockets

TOOLS: D*rill, ⅛" drill bit, $^{9}/_{16}$" deep socket, tape measure, 3M spray adhesive, Phillips head screwdriver.*

1. Hold the door pockets up to the door so that the top is along the bend in the door liner. The holes in the pocket go over the bolt studs.
2. Using the upper edge of the door carpet, determine the lower edge of the pocket. Fold the lower edge of the material under until the pocket just overlaps the lower carpet.
3. With the bottom of the pocket folded under, unfold the pocket leaving the tucked under section pressed against the inner door liner.
4. Drill and rivet along the bottom of the pocket through the material and liner into the door steel.
5. Place the hinge on top of the pocket and attach two of the washers and nuts with a $^{9}/_{16}$" deep socket.
6. Decide how you would like the pocket(s) to look.
7. Use the trim screws and rings to make the number of pockets desired.

8. Use a couple of the screws and rings just forward of the latch bracket.
9. Pull the material tight over the latch bracket. Attach the latch through the material into the factory holes with the screws that were removed earlier.

ATTENTION: If the latch is hard to operate remove a circle of the material behind the latch so the handle is free to turn.

10. Cut any extra pocket material so that it will not get in the way of the latch.

No Pockets

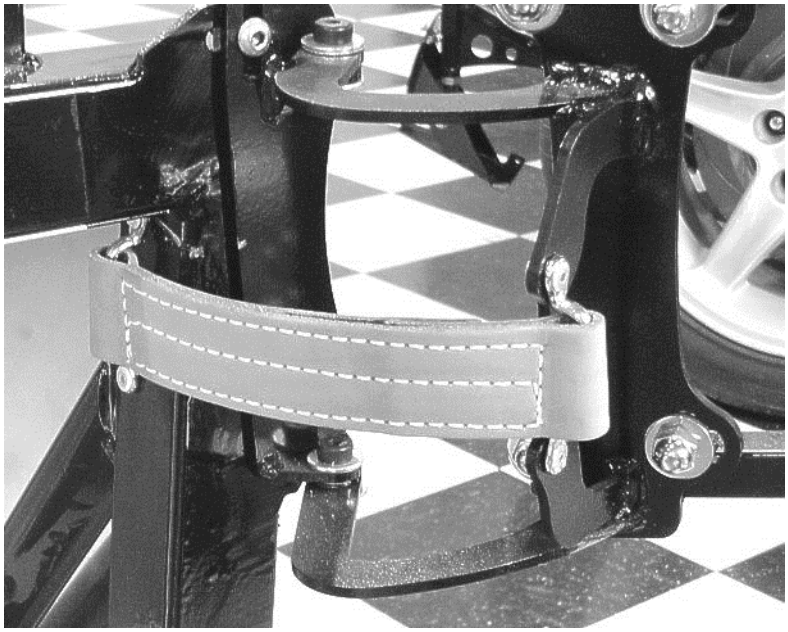
1. Leave the liner body color or, use either spray adhesive or the interior trim screws and rings to hold the door material in place flat against the liner. The top of the material goes along the bend in the liner. The holes in the material go over the bolt studs.
2. Place the hinge on top of the pocket and attach two of the washers and nuts with a $^{9}/_{16}$" deep socket.
3. Pull the material tight over the latch bracket.
4. Attach the latch through the material into the factory holes with the screws that were removed earlier.

ATTENTION: *If the latch is hard to operate remove a circle of the material behind the latch so the handle is free to turn.*

Check Straps

TOOLS: *Drill motor, ⅛" drill bit, Philips head screwdriver, rivet gun, marker pen, masking tape.*
PARTS: *Door latch/hinge assembly (FFR# 11065).*

1. Attach a check strap to each door hinge with 3/16" rivets.
2. Open the passenger 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.
3. 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".
4. Use a ⅛" drill bit to drill holes for the screws to attach the straps.
5. The door check straps simply stop the door from opening all the way up and scratching your paint. Test the placement of the strap for door travel before final assembly.
6. Repeat steps 2-5 on the driver side.



Check Strap riveted to hinge

Radiator Aluminum

ATTENTION: *Use care when handling aluminum, the edges are sharp and can cut you.*
TOOLS: *Drill, #6 nut driver, ⅛", 3/16" drill bits, rivet tool, floor jack, marker, ruler, silicone, caulk gun.*
PARTS: *Secondary body fasteners assembly (FFR# 10788), aluminum engine bay assembly (FFR# 10892).*

1. 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.
2. Use a floor jack under the radiator to hold it in place.
3. Cut and remove the zip ties.
4. Mark the radiator floor piece for either screws or rivets for a cleaner look (attach every 2" if using rivets).
5. Pass the radiator floor piece through the nose and attach it to the bottom of the radiator with a couple of #6 self-tapping screws on the marks.
6. Raise or lower the bottom of the radiator until the floor piece is underneath the nose lip enough so that later, it can be riveted as shown in the picture above.
7. 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 weather-stripping.

Radiator nose aluminum mounted.

8. Line up the edge of the radiator fins with the edge of the side aluminum.
9. The top angle of the sidepieces will not go all the way down to the top of the quick jack mount.
10. From the wheel well side of the radiator, mark the aluminum along the ¾" tubing that goes down to the quick jack mounts. This way you can get straight, evenly spaced rivets.


Passenger Side aluminum mounted with weather-stripping.

11. Remove the sidepieces, mark and drill the rivet holes.
12. Remove the floor aluminum.
13. Apply silicone to the bottom of the radiator where the aluminum will contact.
14. Insert and attach the radiator floor aluminum using either the screws provided or ⅛" rivets every 2".

Drilling the radiator and aluminum nose panels.

15. Apply silicone to the ¾" tubing where it will contact the aluminum sidepieces.
16. Install the sidepieces. The bottom goes on top of the floor aluminum. Hold the pieces in place with a couple of #6 screws.
17. Drill and rivet them into place.
18. Drill three $^{3}/_{16}$" holes and rivet the nose aluminum floor to the body with $^{3}/_{16}$" rivets.
19. Remove the floor jack from the radiator.
20. Apply silicone where the aluminum and body meet and where the radiator and aluminum meet.

Side Exhaust

ATTENTION: *Try not to drop the side exhaust assembly as it will probably land on the outer curved surface and dent (if it sounds like this has happened to us, it has). If you are using our optional headers, some of these instructions may not be necessary. Refer to the instructions provided with each.*

TOOLS: ½" and $^{9}/_{16}$" *sockets, jack stands, jack, ¼",* $^{5}/_{16}$" *hex key.*

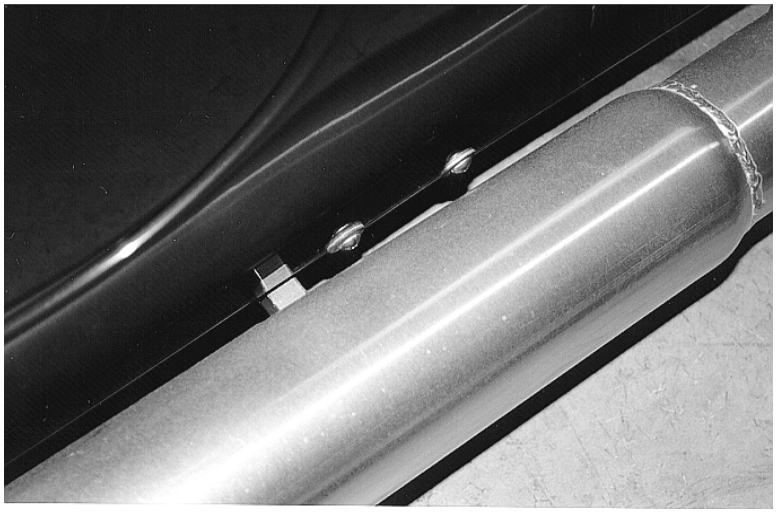
PARTS: *Side exhaust assembly (FFR# 10675), straight tube assembly (FFR# 11168).*

1. Mount the straight pipes to the Mustang headers. *The driver straight pipe has a longer extension after the converter/straight pipe.* Aftermarket headers require "ovaling" the holes on the two-bolt flange.
2. Leave the bolts hand tight in order to locate the side pipes properly.

3. The side pipes are positioned with the rear mount on the bottom of the pipe facing the body.
4. Mount the side exhausts to the three bolt flanges on the straight pipes using the kit fasteners. Don't forget the gasket in between the three bolt flanges.
5. The side pipe will fit best if you jam the rubber hanger up as high and as far outside as you can go on the 2"x 2" frame piece (the front of the two frame outriggers under the cockpit floor).

Side exhaust hangers installed.

6. Make sure that the side exhaust is parallel to the body and tighten mount post bolt to lower hole on rubber part. Do this on both sides.



Side exhaust mount post and its relative position to the front side body mount bolts

Side exhaust mounted on car.

Roll Bar

1. Slide the rear leg through the body onto its mount.
2. Slide the front tube through the body all the way down to the small knobs on the mounts.
3. Push the rear leg up onto the front tube.
4. Bolt the roll bar in place using the holes drilled earlier
   and kit fasteners (FFR#10829, 10830).

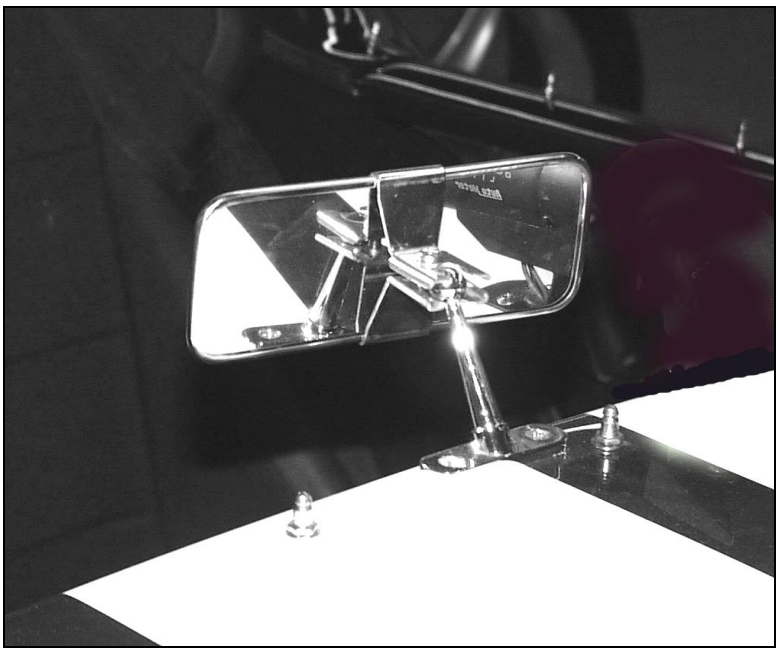
Installing the roll bar.

Rearview Mirror

TOOLS: *Drill, Philips head screwdriver, ⅛", 9/64" drill bits, tape measure, marker.*

PARTS: *Mirror assembly (FFR# 11066)*

1. Use a tape measure and marker to mark the center of the dash area on the ¾" dash tubing.
2. From the center, measure 1.5" towards the passenger side. This is the center of where the mirror is located. The mirror is off center to match the Tonneau cover.
3. Measure the distance from the middle of the ¾" tube to the edge of the body.
4. Measure this same distance and mark on top of the body. The point here is to find the location of the rearview mirror so that it will hit the ¾" tube.
5. Hold the mirror in place and mark the screw holes.
6. Drill the screw hole marks in the body with a $^{9}/_{64}$" drill bit. Use a ⅛" drill bit to drill into the ¾" tube.
7. Position the mirror and insert the long screws and the spacers between the body and ¾" tube.
8. Screw the mirror into place.



The rear view mirror, looking at it from the front of the car into the cockpit.

Gauges and Dash

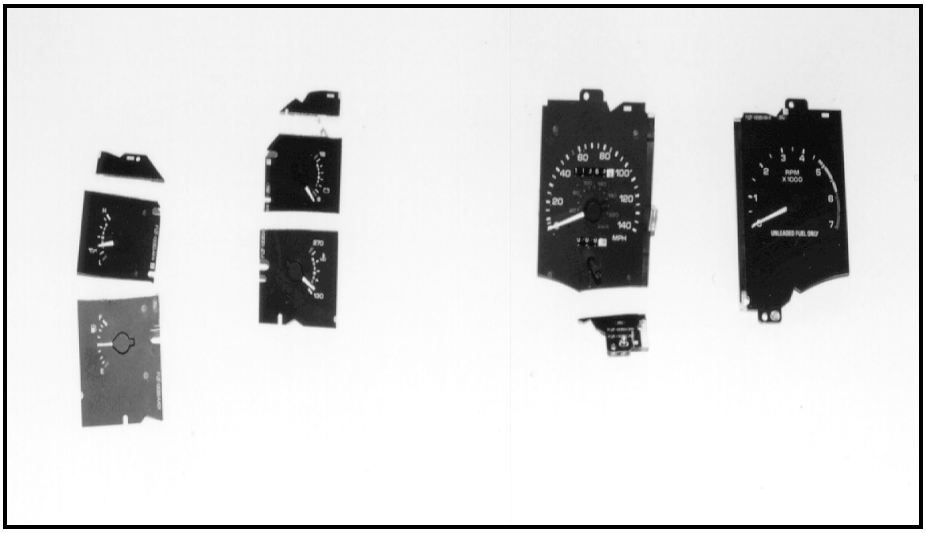
ATTENTION:

- *This assembly should be done carefully to avoid damage to the instruments. If you are using aftermarket gauges such as the Smith's or Stewart Warner, this section does not apply. The dash should only be mounted after the body is on since the top of the dash does not mate exactly with the edge of the ¾"tube.*
- ***The cut dash will only work with the Smith's or Mustang gauges. It will not work with other aftermarket gauges. The Mustang gauges do not work with the Carbureted kit.***

TOOLS: *Wire stripper, crimping tool, electrical tape, wire cutters, Phillips head screw driver, 3/8" socket head and socket wrench, razor knife, spray adhesive, silicone, caulk gun, scraper, masking tape, marker, $^{5}/_{32}$", ⅛", ½" drill bits, drill, paper, five minute epoxy glue, small Torx screwdriver.*

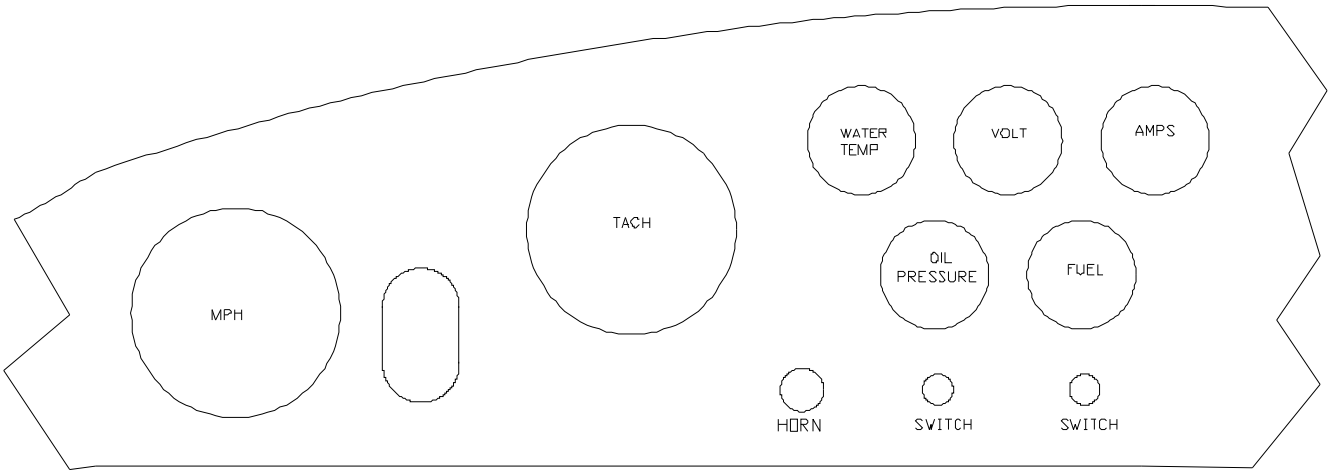
PARTS: *Gauge/dash assembly (FFR# 10893).*

1. The Mustang gauges are attached to the aluminum dash before the dash cover is applied. Trim the gauges as shown.
2. Make sure that the tachometer and speedometer edges are trimmed close to the drilled holes so that the dash assembly can be pushed up onto the ¾" hoop.
3. Cut the small gauges in half, using a hacksaw. It is best to put the gauges in a vise facing you and to only use a downward motion, with the hack saw, to avoid tearing the gauge face label.
4. Extra care should be used when cutting the fuel/oil gauges. It's a good idea to cut the thin plastic with scissors then saw the thicker plastic separately along the line.
5. When cutting the top row gauges (Tachometer, Water temp, and Ammeter), each gauge only has ⅛" between the edge and the mounting holes as the dash hoop comes close to these. Pull out the trip counter button or drill the gauge face for it.

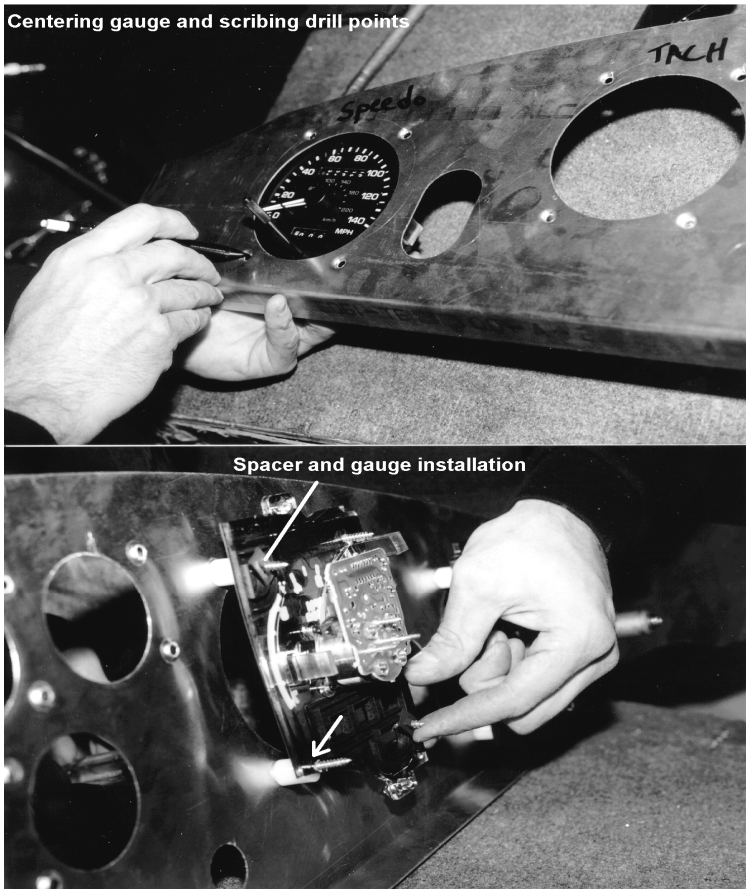


Cut and trimmed Mustang gauges.

6. Using the laser cut, counter sunk mounting holes, position the gauges in their correct locations. Mark the hole locations on each gauge so that you know precisely how much to trim and where to drill.
7. Drill the gauges with the $^{5}/_{32}$" drill bit.
8. The speedometer is on left tachometer on right. The water temperature, ammeter and extra gauge go on the top row. The oil pressure and fuel gauge go on the bottom row.



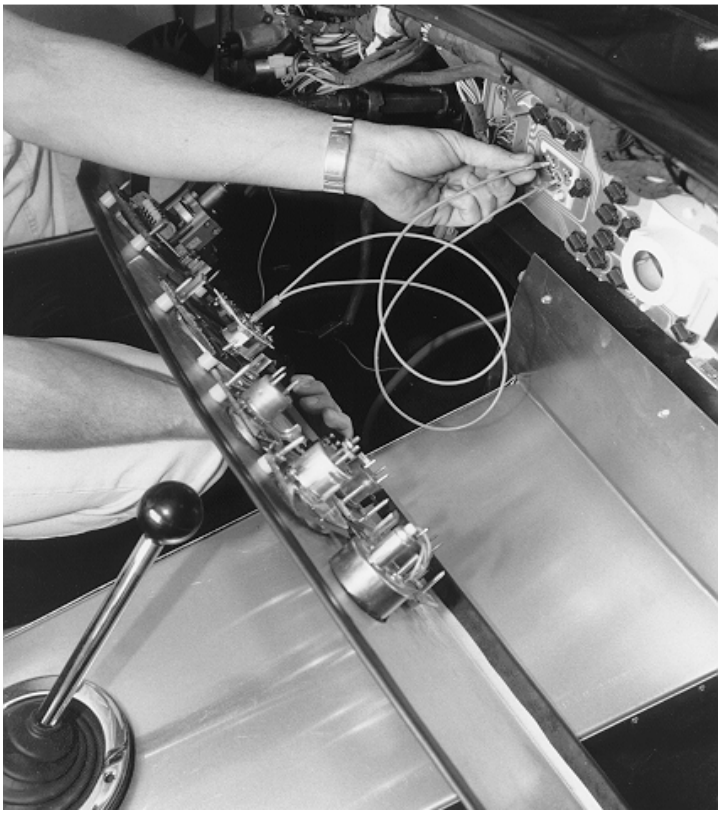
9. Install the 4” gauge spacers and 2” gauge spacers that are included with the kit so that the faces of the gauges stand away from the back face of the aluminum dash panel by about ½”. This distance has been pre-set at the factory so that the sweep hands of each gauge fit. Counter sink the spacers to match the countersunk holes for a good fit and so they lay flat against the dash.
10. If you would like to install the three lights that are included in the kit, the original Roadster’s had them positioned directly over the steering column in a straight line. Use a ½” drill bit for the holes.



11. The blue light is high beams. The red light is check engine or charge. Use wires and run them to the appropriate bulb on the white pod. The green light is for turn signals.
12. The turn signal light uses a three prong flasher unless two lights are used, one for each direction. Using the one light in the kit, remove the two-prong flasher from above the passenger compartment. Break/cut the connector for it in half and connect the purple/pink wire to the prong marked "L". Attach the other wire to the prong marked "X" and then attach the dash light to the center flasher connection with a female connector and using the 4 ft. long extension. The other lead, on the light, connects to the ground terminal block. With this set-up, the green light will flash when either the left or right turn signal is triggered.
13. Tape or silicone over the dimpled area where the set screws are, so that the dash cover does not show any wrinkles or imperfections underneath. The standard dash cover has a thin foam as a backing for the dash cover which will give the dash a padded street look and will help cover any imperfections from the screw heads.

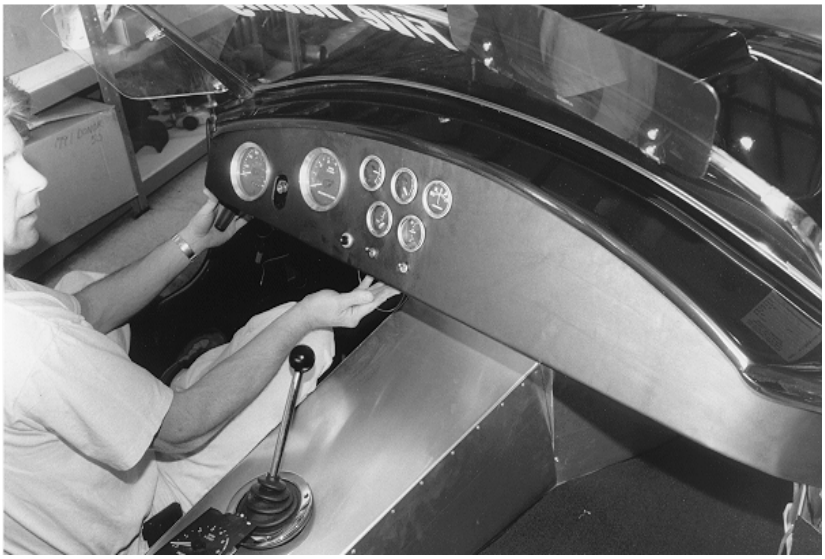
14. Cover each gauge face with paper so that spray adhesive does not get on the gauge faces.
15. Spray 3M Super Trim™ adhesive over the front of the clean aluminum dash panel as well as the back surface of the vinyl or leather dash cover.
16. Remove the paper that you placed on the gauge faces so that this paper does not adhere to the cover as you place the cover on the dash.
17. After several minutes place the cover on the aluminum dash panel. Starting in the center and gently expanding outward, smooth and remove any wrinkles that develop underneath the dash cover.
18. Trim the cover around the perimeter of the dash, leaving 1" of overlap beyond the aluminum edge.
19. Spray 3M adhesive along the back of the outer edge of the aluminum as well as the material sticking out. Slit the material along any curve with a "V" cut so that it does not overlap on the back.
20. Press the material onto the adhesive covered edge on the backside of the dash.
21. While looking at the front of the dash, find each gauge hole. Using a razor, cut the dash material from the center to the edge of the aluminum hole. Make a pizza cut with at least six linear cuts.
22. Cut out the material in the center of each opening so that there is ¾" of material hanging into the hole area.
23. If gauge illumination is desired, you can use Radio Shack LED's PN 272-1092C. Drill holes for the LED's at the same height as the Lexan face on the 4" bezels, illuminating the gauge. Use wire to connect the LED's to the gauge lights in the pod.

24. Place the clear gauge faces into the large aluminum bezels, and glue in place with an epoxy adhesive to the backside edges. Try to avoid using too much adhesive since it will drip down the gauge face.
25. Press fit the 4" and 2" bezels into the dash by pressing on the outer rim section only.
26. Using a razor, cut the switch holes.
27. Install the switches in the dash. One switch can be used to turn the fan on and off. The other is up to your discretion.
28. The black push button is used for the horn and installs in the dash next to the switches.
29. Remove the upper steering shaft by pulling the steering wheel towards the cockpit.
30. 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.
31. Use the wiring extension pins to connect the gauges to the white master panel (from the dash pod). This was previously mounted on the firewall behind the dash**.**



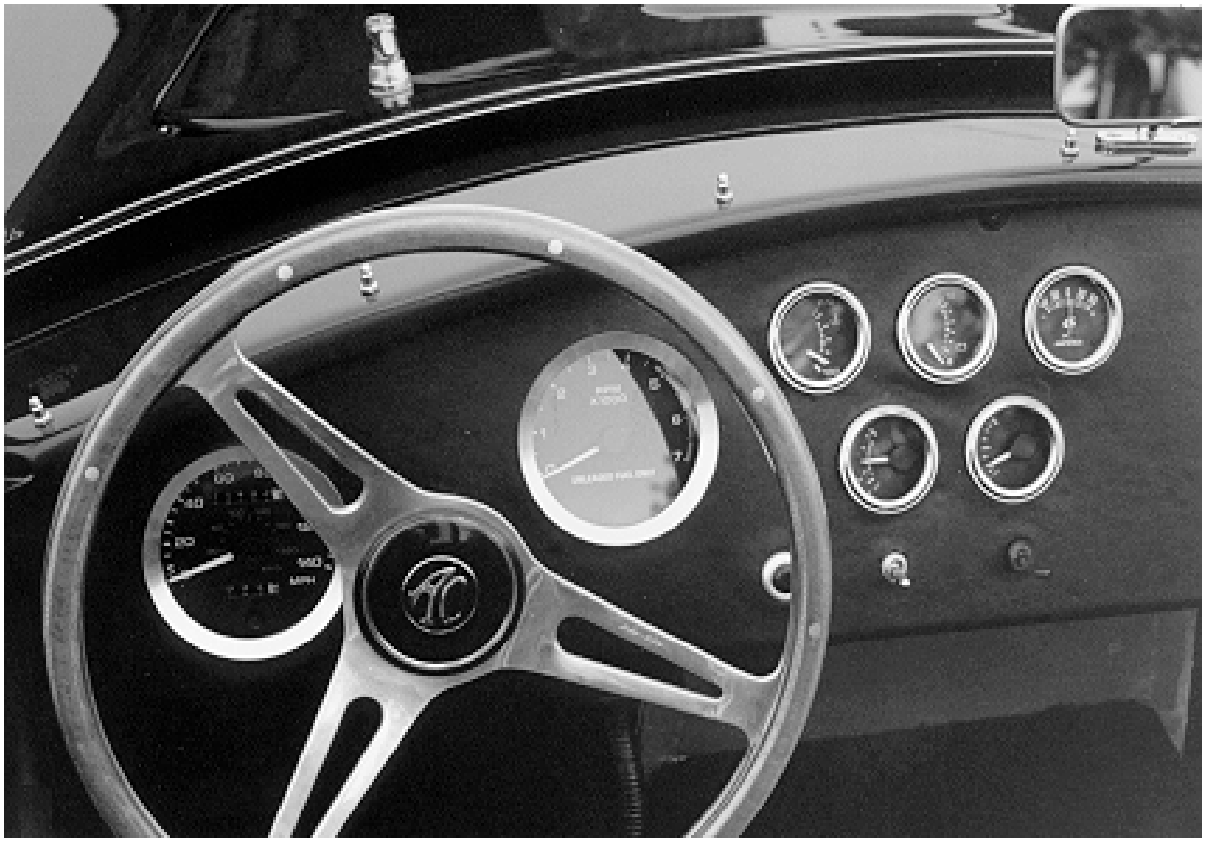
Connecting the wire extensions from the dash to the gauge pod**.**

32. Hold and center the dash by using the steering shaft and steering hole then adjust the vertical height by raising the dash. Put the collar on the front side of the bearing. Do this after the shaft is through the dash. Put the small clips back on the bottom of the shaft taken off earlier. They must be put on after the shaft is through the bearing, otherwise it will not go through. Reach up behind the 2"x 2" tube to do this. The clips help prevent the shaft from sliding in and out while driving around.
33. You should not see a gap between the dash and body at the top edge while sitting in the car.



Installation of the dash with Mustang gauge conversion set.

34. Make sure the gauges do not hit the ¾" tubing.
35. Screw the dash to the center of the dash support hoop using a ⅛" drill and Philips head screw and countersunk washer.



Detail and layout of the Mustang gauge conversion set.

36. Push the ends of the dash behind the top of the door hinge. There is a small hole at the top of the hinge piece on the 2"x 2" tube that the dash will attach to.

Front Wheel Splash Guards

TOOLS: *⅛" drill bit, drill, silicone, caulk gun, vise, tin snips, pliers, marker, #6 hex head driver.*
PARTS: *Secondary body fasteners assembly (FFR# 10788), aluminum engine bay assembly (FFR# 10892)*

1. Put some of the press-on bulb seal around the outside edge of the aluminum front splash guards (they look like large elephant ears).
2. Use the tin snips to cut the length and a pair of pliers to squeeze the bulb so that it will grip the aluminum.
3. Hold the splashguards up against the rear bent lip of the engine bay "F" aluminum. Overlap the two lips.
4. Mark where the bottom of the splashguards needs to be bent in order to go into the rear fender area.
5. Bend the bottom edge of the splashguards.
6. Apply silicone to the bent lip on the F-shaped aluminum panel where it will meet the splashguards.
7. Attach each side to the F-shaped aluminum pieces with #6 self-tapping screw.

Front Splash Guard mounted w/rubber press-on body seal along body edge.

8. 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.
9. Drill and rivet the Splash Guards to the "F" pieces using ⅛" rivets.
10. Attach the Splash Guards to the body just forward of the exhaust cut-outs. Use the tab that you bent up and the almost horizontal flat area on the body. Drill and use ⅛" long rivet or a $^{3}/_{16}$" long rivet.
11. Silicone around the splashguard from the exhaust side.

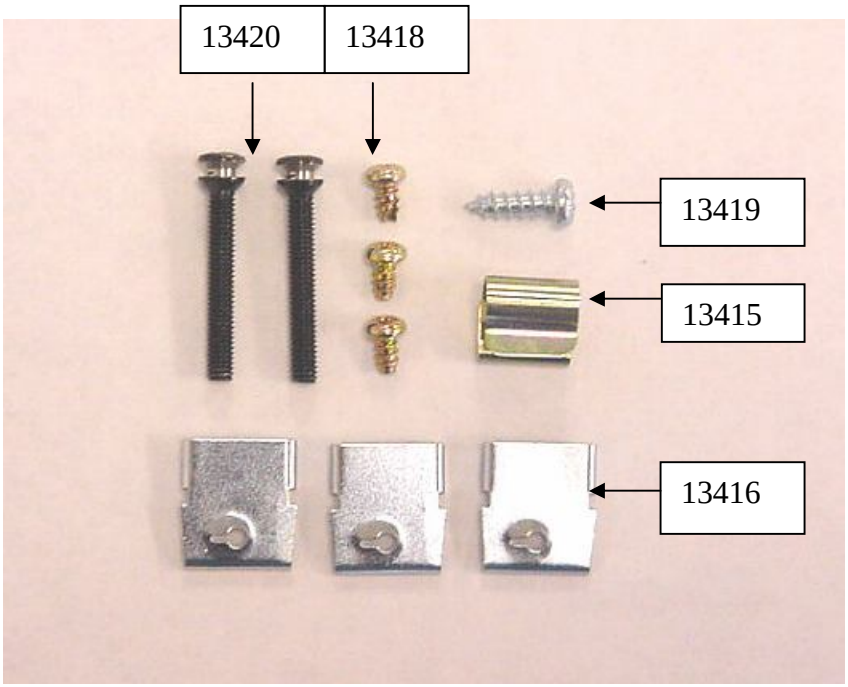
Rear Wheel Splash Guards

1. Push press-on trim onto the rear splashguards and hold in place in the wheel well. 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 also be on top of the ¾" vertical tube that is behind the trunk wall.
2. Remove the panel and silicone where it will contact the trunk side.
3. Drill and rivet the panel in place using ⅛" drill bit and ⅛" long rivets.

Headlight Assemblies

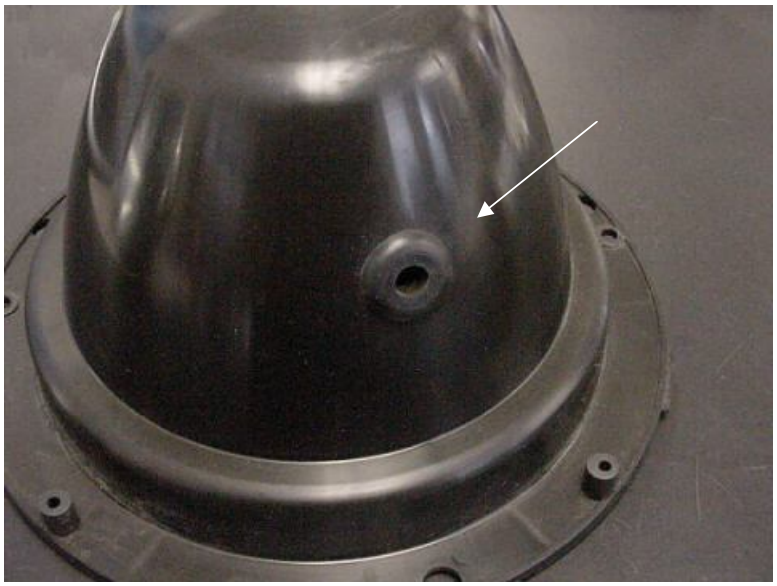
TOOLS: *Phillips head screwdriver, drill, ⅛"drill bit, wire strippers, wire cutters, electrical tape, marker, Chilton's manual.*

PARTS: *Headlamp Assembly (FFR# 11043).*



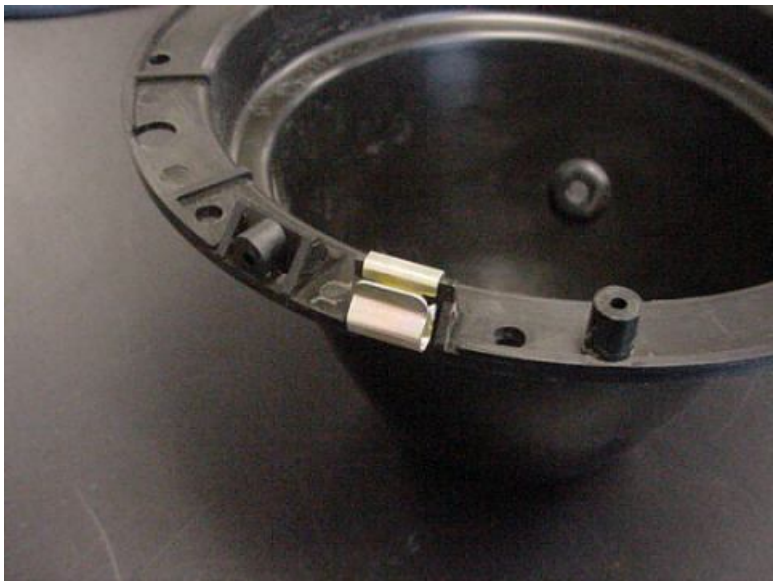
Headlight Fasteners.

1. Insert the grommet in the hole in the side of the bucket.



Grommet installed.

2. Push the headlight chrome clip (FFR#13415) onto the bucket bracket.

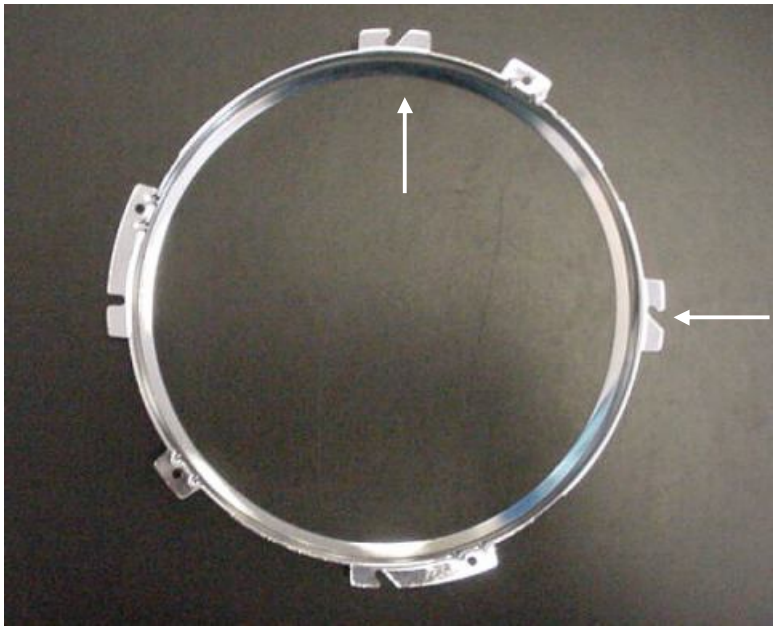


Chrome ring clip mounted.

3. Screw the two headlight adjustment screws (FFR# 13420) half way into the bucket using a Philips head screwdriver.

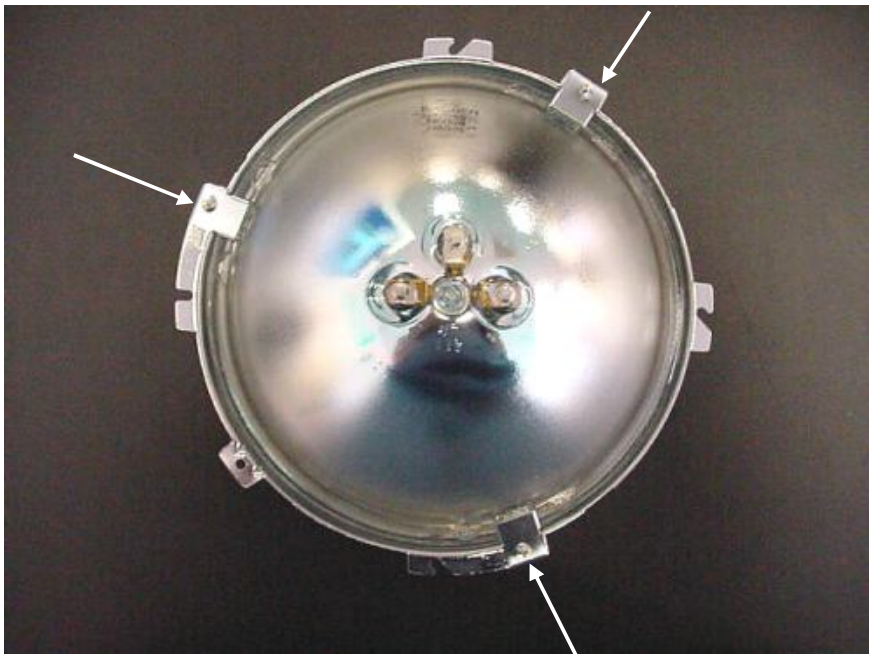
Adjustment screws installed.

4. Turn retaining ring over and positioned so that one tab is at the top and one is to the right.



Retaining ring.

5. Position the headlight in the retaining ring so that the light is the correct way up and the electrical tabs are as shown below.
6. Screw (FFR# 13418) the retaing ring clips (FFR# 13416) to the retaing ring. See the picture below for the correct locations.

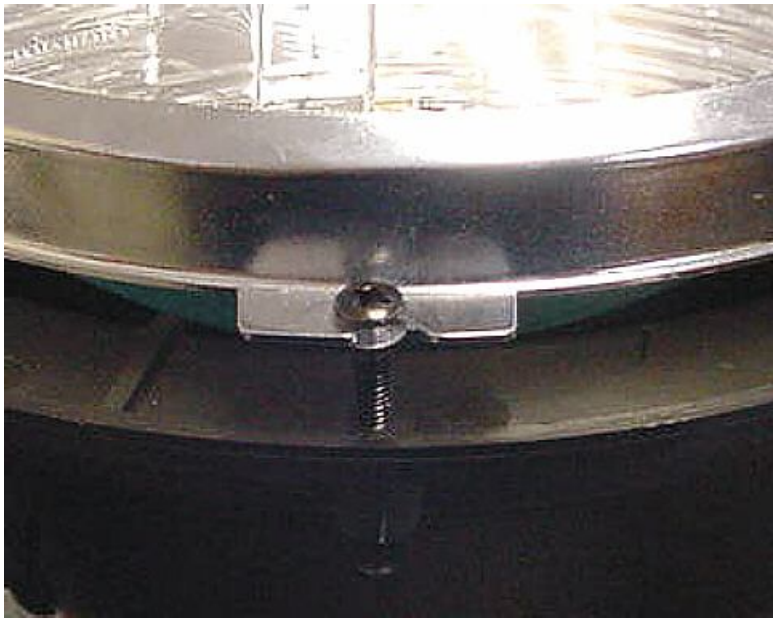


Headlight positioned and retaining tabs attached.

7. Attach the wiring pigtail to the back of the light.
8. Pass the wires from the pigtail through the grommet taking care to pull the wire covering through the grommet as well.

Pigtail wires and covering pulled through grommet.

9. Slide the retaining ring slots around the adjustment screws.



Adjustment screw in slot.

10. Attach the retaining ring to the bucket using the last Philips head screw (FFR# 13419).

Retaining ring screw mounted.

11. Hold a headlight up to the body holes cut earlier and use the bucket holes as a template to mark the screw holes.
12. Drill ⅛" mounting holes.
13. Screw on each headlight with four screws.

Attaching the headlight to the body.

14. The trim ring slides down over the top of the light and is fastened at the bottom. This is a tight fit and takes some effort to line up the lower screw hole.
15. Wire the headlights to the Mustang harness. The Mustang high beam is light green/black. The low beam is red/black. On the headlight, there are three wires, black is ground, white is high beam and the red is low beam.

Turn Signal Lights

TOOLS: *Phillips head screwdriver, regular head screwdriver, drill, ⅛" and ¼" drill bits, ⅜" deep socket, wire strippers, wire cutters, electrical tape, marker, Chilton's manual.*

PARTS: *Front turn signal assembly (FFR# 11044).*

1. Remove the lens from the turn signal lights. Push and turn counterclockwise to remove the lens.
2. Insert the light bases into the holes made earlier and mark the mounting holes with marker pen.
3. Remove the lights and drill ⅛" holes.
4. Mount the light bases to the body with the provided fasteners.
5. Re-attach the lenses to the lights.
6. Wire the turn signals up to the Mustang harness. The driver's side Mustang turn signal wire is light green/white. The passenger's side is white/light blue. The running lights are brown. On the light, the red wire is the dim light and the green wire is the bright light and the brass ring is the ground.
7. If the turn signals do not work when the lights are hooked up, the answer is commonly found in the wiring harness. In the Mustang harness, the turn signal flasher gets it's power from the rear defroster circuit. Since this is not hooked up, the power lead for the flasher (purple/orange wire at flasher-one over the passenger foot box) must be cut and hooked into the #2 fuse box hole which has a red wire on one side and now the flasher lead on the other.

Attaching the amber turn signals.

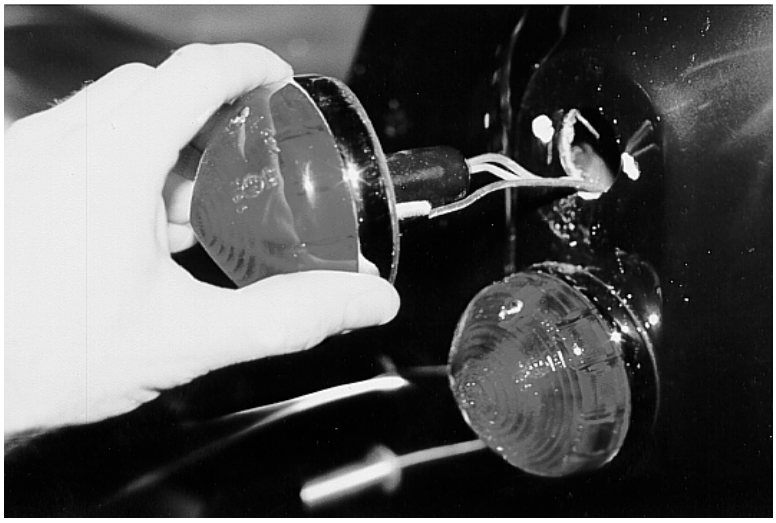
Tail-Lights

TOOLS: *Phillips head screwdriver, regular head screwdriver, drill, ¼" drill bit, ⅜" deep socket, wire strippers, wire cutters, electrical tape, marker, Chilton's manual.*

PARTS: *Tail-light assembly (FFR# 11042).*

1. Insert the taillights into the holes made earlier.

2. Use a ⅜" deep well socket and the kit supplied nylon lock-nuts and washers to fasten the lights to the body.
3. Wire the taillights into the Mustang harness. On the Mustang rear wiring harness black is ground. The running lights are brown. The red with green is the brake lights.
4. Use the top light for the brake and running lights. Use the bottom light for the turn signal and running lights.



Inserting the rear taillights into the body.

License Plate Light and Bracket

TOOLS: *Phillips head screwdriver, regular head screwdriver, drill, ⅛" and ¼" drill bits, ⅜" deep socket, wire strippers, wire cutters, electrical tape, marker, Chilton's manual.*

PARTS: *License light/bracket assembly (FFR# 11041)*

1. Insert the rear license plate lamp into the trunk holes drilled earlier. Attach the washers and the nuts to the backside of the body. The lamp comes with nuts for the bolt mounts.
2. Take the two wires from the rear harness that were spliced into the harness during the disassembly section and inserted into the trunk during the rear harness section and route them to the trunk light. Use some insulated line clips on the ¾" tube above the trunk and on one of the trunk hinge studs. Use a couple of the small insulated line clips, with screws or rivets, to hold it to the trunk lid to hold the wires.
3. Remove the chromed lamp cover and connect the wires to the light.
4. Attach the license plate to the mount using self-tapping screws provided with the kit. Measure the length of the screws protruding through the plastic nuts and remove the license plate. Grind off the measured length from the screws.
5. Put a small section (5"- 6" long) of adhesive backed foam (included with kit) on back lower edge of a license plate. Using the license plate as a guide, hold the bracket and plate up to the trunk and under the light. Mark and drill the two holes for the plate.
6. Attach the license plate bracket, making sure it is level.

License plate light and bracket installed.

ATTENTION: *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, Sate and local laws regarding its use. The inclusion of the license plate bracket does not indicate that this kit complies in any way with local, State or Federal laws.*

Seat Installation

TOOLS: *¼" hex key, ⅜" socket, drill, $^{3}/_{16}$"and $^{7}/_{32}$" drill bits, marker, ruler, silicone, and caulk gun.*
PARTS: *Seat assembly (FFR# 11082)*

1. If there are rivet ends not flush or sticking out of the seat bottom, trim the excess sleeve off so that they sit flush to the base.
2. Unscrew the seat base (Phillips head wood screws) and discard the screws (for shipping only).
3. Test fit the seats on the floor to find where it is most comfortable. (If the seat to steering wheel relationship feels good but the pedals do not you can change the height of the brake pedal by adding or removing the master cylinder spacers and both pedals will bend side to side if they are to close to each other or the gas pedal)
4. Outline the seat on the aluminum and remove the seat.
5. Mark on the floor the location of the 4" round tube, the 2"x 2" tubes, and where the frame steel mount plate is located (between the X tubes under the seat).
   a. Use a marker and a ruler and measure 2" towards the outside of the car from the inner seat belt mount.

b. Mark a line from this point forward 2 feet. This is where the 4" round tube is.
c. There should be rivets along the 2"x 2" tube and ¾" tubing, so finding these is easy.
d. Look on the underside of the frame to find the steel plate between the "X". Mark this on the aluminum.

6. The seats are mounted in four places through the base into the frame. The frame points to hit are, the 4" round tube twice, rear 2"x 2" outrigger, and the pad between the ¾" X or a ¾" tube.
7. Compare the lines drawn on the aluminum to the outline of the seating position.
8. If the seat does not hit all of these places, reposition the seat.
9. If the seat hits all of the places, drill two $^{7}/_{32}$" holes in the 4" round tube as far apart as possible and 1.5" in from the seat outline.
10. Drill two $^{3}/_{16}$" holes, one in the 2"x 2" outrigger and the other in either the pad or a ¾" tube, again as far apart as possible but still 1.5" in from the seat outline.
11. Fasten the seat screws into the holes you just made, using a ⅜" socket.

Attaching the seat to the aluminum floor and frame members.

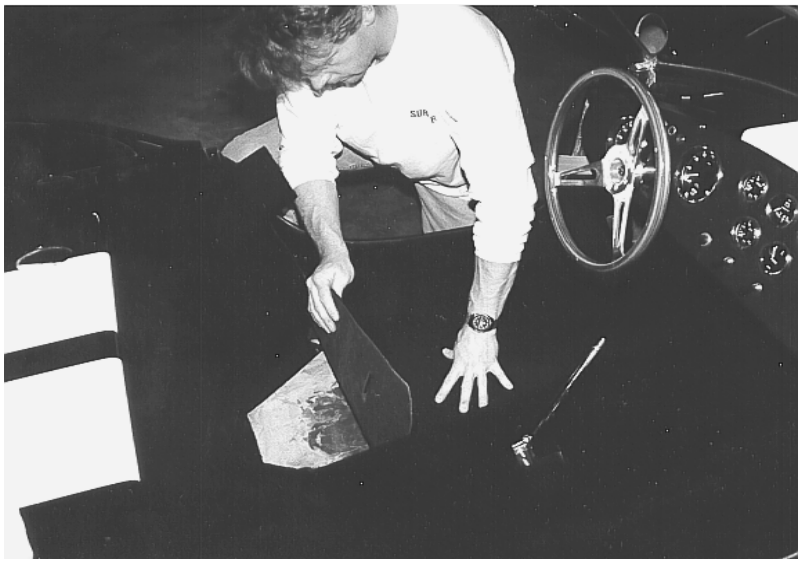
12. Put a small dab of silicone on each screw head.
13. Carefully hold the seat above the screws and position it in the same spot that was outlined.
14. Place the seat down on the screw heads.
15. Pick the seat up and place it on its front on the ground.
16. Flip the seat bottom forward so that it will not get damaged.
17. Drill $^{7}/_{32}$" holes through the seat base where the silicone is on the seat.
18. Remove the seat screws from the floor.
19. Position the seat again and make sure the holes line up.
20. Remove the seat.
21. The passenger side seat fits in the cut out section of the emergency brake handle.

Carpet Installation

TOOLS: *Razor knife, spray adhesive, marker pen, ruler, silicone, and caulk gun.*
PARTS: *Carpet assembly (FFR# 13259)*

1. For easier positioning, cut a small hole in the carpet where each seat screw hole is and around the emergency brake handle.
2. Position each piece of carpet in the correct location before installing it to do any final trimming if necessary. The floor carpet will go on last and cover any extra.
3. Wipe and clean the aluminum to ensure good adhesion and eliminate debris accumulated during the build-up process.

Clean the aluminum cockpit floor before final assembly.



Installing the cockpit floor carpet.

4. Most folks choose to glue the carpets in place. If you are never going to pull up the carpeting, use spray adhesive. Use the trim screws if you want to preserve the aluminum good looks.
5. Install the rear cockpit wall then the front middle foot box piece followed by the transmission top and finally the floor pieces and u-joint cover.

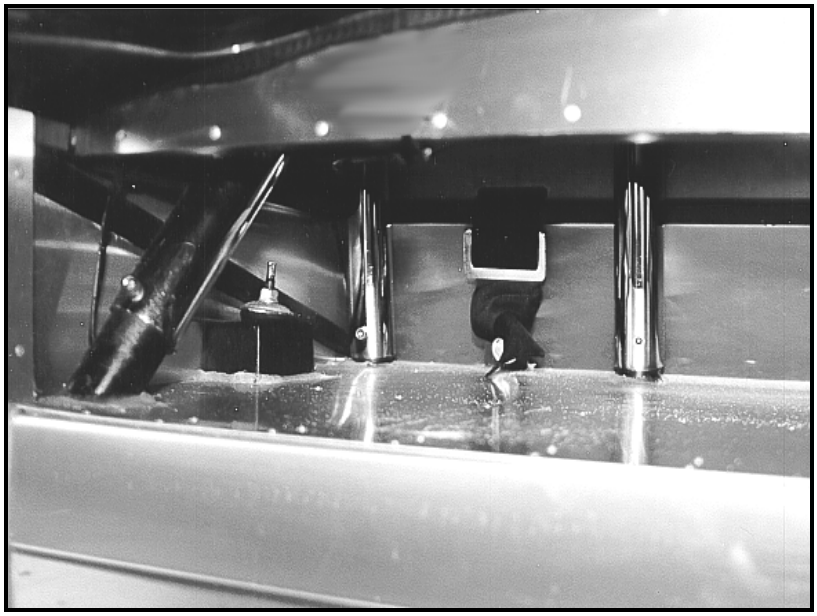
Seat Harness Installation

ATTENTION: *These seat belts are frame mounted in three locations. Never drill a hole and attach these to aluminum alone. If you are not wearing a helmet, make sure that the roll bar is padded for adequate rear head protection. Even in a small rear end collision, you can be seriously injured when your head hits steel.*

TOOLS: *¾" socket and ¾" combination wrench*

PARTS: *Seat harness/fastener assembly (FFR# 10894)*

1. Follow the manufacturer's directions inside the seat harness boxes on how to loop the harness straps through the attachment brackets.
2. Attach the harness mounts to the frame mount plates that protrude up through the aluminum. Position the brackets at the correct angle before tightening. Use a ¾" socket and ¾" combination wrench to tighten the bolts.
3. Feed the rear section of the Y-harness through the aluminum rear cockpit wall and install it from inside the trunk.
4. The seat belt quick release latch should be on the right side if you are right handed, left if you are a lefty.
5. Once the seat harnesses are installed, you can adjust the belts and shoulder harnesses with the cinching tabs that are at the end of each rolling buckle.



Interior view of mid trunk, seat harness brackets and roll bar mounts.

Final Seat Installation

1. Install the seats in the holes made earlier. Flip the seat forward and attach using fasteners.
2. Now is a good time to finish off the lower door openings (door sills).
3. Cut the door press-on trim in half and press over the body lip and carpet edge.
4. The weather-strip should start at the bottom of the door hinge area and go back along the doorsill to just below the latch. The trim presses down over the lip of the doorsill and carpet edge.

Shifter Installation

1. Install the shifter handle onto the transmission neck using the shifter bolts provided.
2. Slide the boot over the shifter to determine where the holes need to be for the screws to hold it in place.
3. Drill the four holes with a ⅛" drill bit and screw the boot down using the 4 screws provided.
4. Screw the shifter knob onto rod and hand-tighten.

Completed interior. You cannot see any of the aluminum.

Optional Installations

Instructions are included separately with each option when shipped. We can ship you any specific instructions in advance if desired. Please call for more assistance 508-291-3443.

Chapter 3 - Performance Reference Material and Technical Support

Technical Support

Our success depends on you being able to build your kit without problems or frustration. We are counting on you to build and drive this car and in so doing, provide us with the most important advertising of all.

If you have purchased a kit, we want to make sure that you know that you are not alone. Although we know our kit is the most straightforward assembly around, there may be a time when you need to speak to us. We will be there for you to make sure you are successful. No question is too simple. We are easily reached in a number of ways.

The Web:	www.factoryfive.com
Phone:	508-291-3443
Fax:	508-291-3883
E-mail:	Info@factoryfive.com
Mail:	9 Tow Rd, Wareham, MA 02571

Left: FFR's Dave Smith discusses "the line" at Sear Point Raceway with Legendary driver Bob Bondurant, Nov. 2002.
Right: FFR Engineer Jim Schenck racing at 1998 Run and Gun. If you have a problem he's one of the guys you can talk to.

Registration and Titling

You are building a race car. It was designed with closed course competition as its focus. If you choose to use this vehicle on a public road, you are responsible for complying with all State and Federal regulations governing Home-built vehicles.

Regulations vary from state-to-state. Your best source of information about titling and registration is from your State Department of Motor Vehicles. Most of these agencies have specific regulations and steps for you to complete when seeking registration of your vehicle.

Provided with your Factory Five Racing Coupe kit is a Manufacturer's Certificate of Origin. This document records the origin of the vehicle and is not a vehicle title. The component kit that we manufacture has no VIN number. The "FFR" Number is the kit serial number.

In most States, upon completion of your kit, you need to bring this certificate along with receipts for any parts used on your car and a copy of our invoice to your State DMV. Some states like Massachusetts have a separate vehicle inspection division for specialty cars and custom built cars. Often times this division handles "salvage" vehicles as well.

We know you will be excited about driving your car. Take the time to make sure you have made it race-worthy and safe and legal before you get behind the wheel.

Wheels

Factory Five Racing offers a four-lug 15" Halibrand replica wheel with a 7"or 8" front wheel and 10" rear wheel. We also offer a 4-lug 17" version.

If a modern look is what you're after, you may want to try the 17" Cobra-R or Bullet style wheels. If using the standard width 1987-93 rear, use four (4) of the 5.95" backspace wheels. If using a 1994 or later rear end or one that has been converted to 5-lug using the "Cobra" brake kit use two (2) 5.95" backspace wheels in the front and two (2) 6.72" backspace wheels in the rear.

Left: FFR car using late model 17" Cobra-R rims. Right: Ford Motorsport Cobra R 17" wheels and 12" Cobra Brakes.

17” Bullett style wheel.

15” wheel specifications:

Front	7” rim	4 5/8” Backspace
Rear	8” rim	5 ” Backspace
	9” rim	5 3/4” Backspace
	10” rim	6 1/4” Backspace

17” wheel specifications:

Front	8” rim	5.0” Backspace
Rear	9 1/2” rim	6 1/8” Backspace

For those that prefer a 5-Lug pattern there are a few different ways to change from one to the other.

1. Using stock 11” rotors and drum rear brakes:
   - A 4-lug rear axle can be converted to 5-lug using two driver side 1991 Ford Ranger pick-up truck axles. (The drum brakes from the Ranger can also be bolted on to the Mustang rear end). Ford Motorsports also sells a 5-lug drum brake kit (Part #M-1126-A) that comes with axles and drums, and is designed to utilize the Mustang drum brake hardware.
   - 82-83 Lincoln Continental or ’91 Lincoln Mark VII 5-lug front rotors work with 87-93 Mustang spindles and calipers.
2. If you want to use 17” wheels and are upgrading to larger discs see the Brake section under Performance modifications.

Performance Modifications

The following modifications and set-ups fall under the category of getting more horsepower from your

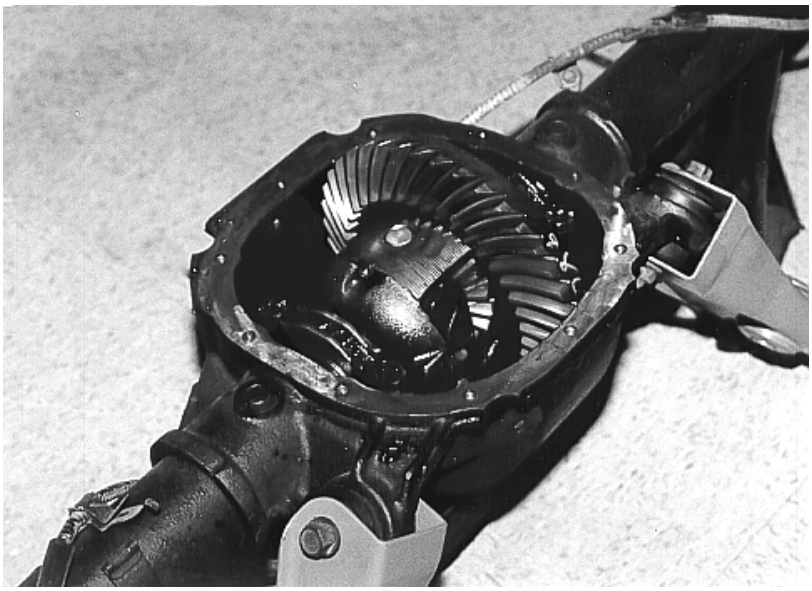
engine and making your car perform better. You will find a hundred people a day that will tell you what you've got to have. We just want to start you out with the easy modifications that net large returns without large cash outlays or serious changes to the stock motor and drive train. Remember that 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.

Greg Lapoint at Run and Gun 1997 10.50 at 139 mph. Stock Engine w/supercharger.

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 change the speedometer sending unit gear so that the speedometer reads correctly. Wherever you get the rear gears from should be able to get the correct gear for your application. If you cannot find the correct gear call "Texas Mustang Parts" 800-527-1588, www.texasmustang.com , they have the "hard to find" gears.



Rear end gears.

Induction/Fuel Injection

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 size: 58mm

A 65mm throttle body work well up to 350hp. Ford Motorsports sells a Cobra set-up that includes a 70mm mass air meter, 24 lb. fuel injectors, and a Cobra computer (different fuel curves). This set-up is about $400, which is very reasonable. It is good up to roughly 400hp.

Mass Air Meter

Stock 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 Motorsports meters work the best. Usually the mass air meter is larger than the throttle body.

Fuel Injectors

Stock 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 Motorsports division.

Heads

The 5.0 Mustang aftermarket is full of aluminum and cast iron heads for the small block Ford. Our favorites are the *Edelbrock* Victor Jr. and the *AFR* aluminum heads. These both flow very well, have stock exhaust port heights which allows the use of our headers and not only give you extra horsepower but also remove 50 lbs. in the process.

Cams

If you need to pass emissions testing, use a cam with a CARB number. We like the Ford E303 cam. We have used it with success in our racecars both naturally aspirated and in boosted applications. If building a more radical engine, match the cam to the combination.

Headers

Stock: 1½" OD

We've found that the Mustang factory headers work well for the stock engine. If you want to go to an aftermarket set, the 1⅝" MAC shorty unequal length headers or Ford Motorsports 1⅝" unequal length headers fit as bolt on parts. They will reward you with an approximate 5-10 hp bump in the top end. All aftermarket headers use mandrel (smooth consistent bends) bent tubing. The stock ones are not and are restrictive on non-stock engines.

If using a 351W engine there are two options, use 351W engine swap headers from Ford Motorsports (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 opening. For supercharged/turbocharged or big block track cars an oil cooler will help.

Factory Five offers an oil cooler with #8 Stainless Steel braided lines and mounting bracket for small block cars. For big block cars, #10 lines are recommended to prevent a drop in oil pressure.

High Horsepower Transmissions

Stock: T-5

The stock T-5 is good for the stock engine. If the engine is going to have some work done to it then an upgrade to a heavy duty, Ford Motorsports "Z" T-5 is all that is needed. The only time an additional change to a Tremec 3550 or TKO is needed is if a big block is used or racing slicks are used on a high horsepower engine. 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

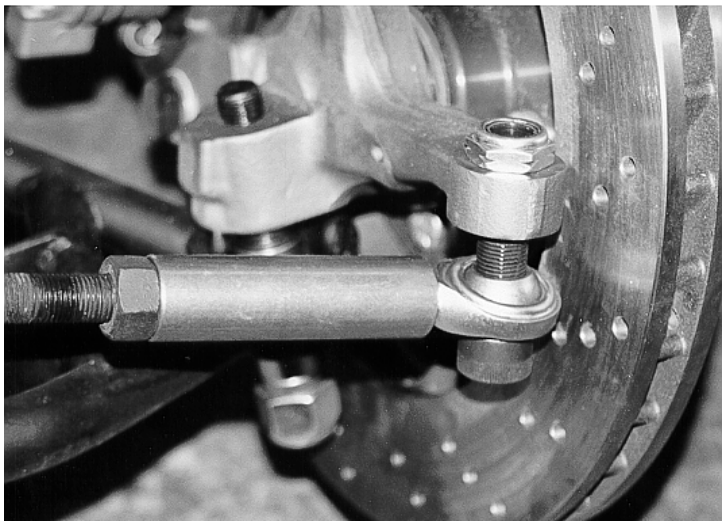
Stock: 15:1 ratio
Once the car is rolling either a 15:1 or a 20:1 rack will yield about the same effort feel. The 20:1 ratio rack means the steering wheel will have to be turned more in corners. For those that like the easy power steering type feel, switching to a manual 20:1 rack will make parking easy. For road racers and autocrossers, use a 15:1 rack or some corners/cones will be really difficult. If changing to either a manual 15:1 or 20:1 rack, a universal joint with a different number of splines will be necessary in order to connect the steering shaft to the steering rack.
There are three possible racks to choose from:

1. A manual 15:1
2. A manual 20:1
3. A 1982-93 Mustang manual rack.

The stock steering set-up uses rubber steering rack bushings. Changing to polyurethane steering rack bushings reduces the amount of slop and provides better steering response. Factory Five offers a 15:1 manual rack and polyurethane bushings.

Steering Shaft

Stock: Rubber "rag" joint
The "rag" joint in the Mustang reduces any vibration transfer to the steering wheel. Replacing the "rag" joint with a universal joint reduces the amount of slop and provides better steering response. Factory Five offers a Flaming River shaft and universal joint kit to mate up to the Flaming River rack.



FFR competition bump steer kit.

Bump Steer

When using 235 or 245 width tires and stock tie rod ends, a caster setting of 3° is good. For better performance and in order to get more caster (i.e. road race cars), the optional bump steer kit that we offer eliminates all bump-steer that is built into the stock tie rod ends.

Rear Suspension

The standard solid axle rear suspension works well, is low maintenance and is reliable. The next step in performance is the 3-Link upgrade for the solid axle. This is for the more serious driver that goes to more track events and wants to start exploring the limit without giving up the "off the line" bite of a solid axle. We recommend higher rate springs or use of the factory sway bar with the use of the 3-Link.

The ultimate rear suspension is the FFR independent rear suspension package. Both driver comfort and handling are significantly improved especially on rough surfaces.

Control Arms

Stock: Stamped steel with rubber bushings.

Front: The stock front arms work well all round. The tubular front 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 pro-roadracer, rear coil-over shocks gives you the ease to change spring rates, ride height (i.e. drag racing vs. road racing), and shock valving.

Factory Five offers a few different shock/spring packages.

- An affordable rear coil-over package which includes shocks and 250 lb/in springs.
- A roadracing oriented 3-Link and front coil-over package, which includes stiffer valved shocks and 600 lb/in front springs and 400 lb/in rear springs.

High Performance Manual Braking Systems

The braking systems recommended below are designed for those searching for higher performance braking capabilities. These are systems that have been used successfully by our customers and us. Each component below has been selected to optimize the capabilities of the system. If an attempt is made to utilize some of the specified components, but not all of them in combination, then braking abilities may not be satisfactory.

ATTENTION:

- For all manual braking setups use the brake pedal from a 1984 4-cylinder Mustang (Ford Part #08BZ2455A), this pedal can also be made by modifying the V8 Mustang pedal as specified in the FFR Manual (this modification should be done by a professional shop).
- Some of the setups may not clear some wheel sizes and designs.
- For all rear disc brake setups, use a proportioning valve on the rear brakes.
- We highly 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.

4-lug (4.25" pattern)

11"Front - Spindle OEM 87-93 V8 Mustang front spindle
Rotor OEM 87-93 V8 Mustang 11" rotor
Caliper OEM 87-93 V8 Mustang 60mm caliper

10.5"Rear - Stainless Steel Brake Corp. 87-93 Mustang disc brake conversion kit (Part #A-112-1)
OR
Disc Brakes R' Us select FORD and FACTORY FIVE for options
OR
Rotor OEM 87-88 Thunderbird *Turbo* Coupe 10.5" rotor
Caliper OEM 87-88 Thunderbird *Turbo* Coupe 1.4375" caliper
Bracket (If attempting to purchase the parts above separately, be aware that the mounting brackets for the calipers from the Thunderbirds do not work with the 87-93 Mustang axles, and the brackets are **not** sold by any major

manufacturer individually. There are a few small machine shops that sell custom brackets to make these calipers work.)

OR

Complete 87-88 Thunderbird *Turbo* Coupe rear axle (This axle measures 61.125" hub-to-hub where the 87-93 Mustang measures 59.25" hub-to-hub, so wheel offsets need to be made accordingly).

Master Cylinder - OEM 1982 Mustang Manual Brake ⅞" master cylinder, Bendix # 11764

5-Lug (4.5"pattern)

13"Front - Spindle OEM 94-newer Mustang front spindle (requires FFR Comp IFS bracket)
Rotor OEM 94-98 Mustang Cobra 13" rotor
Caliper OEM 94-98 Mustang Cobra 2 piston 1.5625" PBR caliper

11.65"Rear - Rotor OEM 94-98 Mustang Cobra 11.65" rotor
Caliper OEM 94-98 Mustang Cobra single piston 1.4375" caliper
(Some salvage yard will confuse these with '99 and newer IRS Cobra models, which do not have the same components)
Bracket OEM 94-98 Mustang Cobra caliper bracket

OR

Entire front and rear setup is available through Ford Motorsports (Part #M-2300-K)

OR

Stainless Steel Brake Corporation has a rear disc conversion kit in a 5-lug version using stock 87-93 stock width axles. This kit would use the Thunderbird Turbo Coupe 1.4375" calipers and 10.5" rotors. (SSBC Part #A-112-2)

OR

Disc Brakes R' Us select FORD and FACTORY FIVE for options

Master Cylinder - OEM 1994 Mustang Cobra $^{15}/_{16}$" master cylinder (Plastic)

OR

1984 Jeep Cherokee Manual Brakes $^{15}/_{16}$" master cylinder (All steel)

- The Cobra brakes do not clear most Halibrand style wheels.
- When using this setup, the '94 and newer rear axles have a hub-to-hub distance of 61.125" compared to the '93 and older rear axles that had a hub-to-hub distance of 59.25". Wheel offsets would need to be changed accordingly.

IRS Setup's

- Using the FFR Independent Rear Suspension with 89-97 Thunderbird *Super Coupe* rear disc brakes with the Cobra front brakes use the $^{15}/_{16}$" master cylinder. With the IRS, the rear discs are 5-lug, so vehicles need to have the front rotors converted to 5-lug to match. This five lug front conversion can be purchased from Ford Motorsports (Part # M-1102-C), or rotors from a '91 Lincoln Mark VII can be used. In both front conversions, the rotors bolt right on to the 87-93 front spindle, and use the 87-93 Mustang caliper.

- If using *Super Coupe* rear calipers and Mustang front calipers use a $^{15}/_{16}$" master cylinder. The *Super Coupe* caliper looks almost identical to the *Turbo* Coupe caliper. The *Super Coupe* caliper has a 1.6875" piston and uses a different e-brake cable attachment.

4 or 5 lug

12"Front - Baer Racing *Baer Claw System* E7FM-10119- (4 or 5) DN
Kit includes spindles, **$^{15}/_{16}$" master cylinder**, 12" diameter - 0.81" thick rotors, aluminum hubs that are separate from the rotor, 2 piston PBR calipers, stainless steel braided flexible brake lines, and pads. This kit can be purchased in 4 or 5 lug versions.

This setup will clear 17" Halibrand bolt on wheels where as Mustang *Cobra* brakes will not.

11.35"Rear - Bear Racing *Baer Claw System* F3FM-10610- (4 or 5) BN
Kit includes 11.35" - 0.81" thick rotors, single piston PBR calipers, **caliper brackets**, e-brake cables, flexible stainless steel braided brake lines, and pads. This kit can be purchased in 4 or 5 lug versions.

OR

Go a step further

13"Front - Bear Racing *Baer Claw System* E7FM-10159- (4 or 5) HN
Kit includes spindles, **$^{15}/_{16}$" master cylinder**, 13" diameter - 1.10" thick rotors, aluminum hubs that are separate from the rotor, 2 piston PBR calipers, stainless steel braided flexible brake lines, and pads. This kit can be purchased in 4 or 5 lug versions.

This setup does not clear Halibrand wheels.

12"Rear - Bear Racing *Baer Claw System* F3FM-10600- (4 or 5) DN
Kit includes 12" - 0.81" thick rotors, single piston PBR calipers, **caliper brackets**, e-brake cables, flexible stainless steel braided brake lines, and pads. This kit can be purchased in 4 or 5 lug versions.

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.

Caster: 3°
Camber: -0.5°
Total Toe: $^{1}/_{16}$"

Miscellaneous Brake Information

- The caliper from either Lincoln 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.
- Thunderbird *Super Coupe* 5-lug rear brakes have a 4.25" bolt circle where as the Mustang 5-lug bolt pattern uses a 4.5" bolt circle. The IRS hubs need to be drilled to the Mustang pattern. FFR supplies new studs with the IRS kit.
- 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.

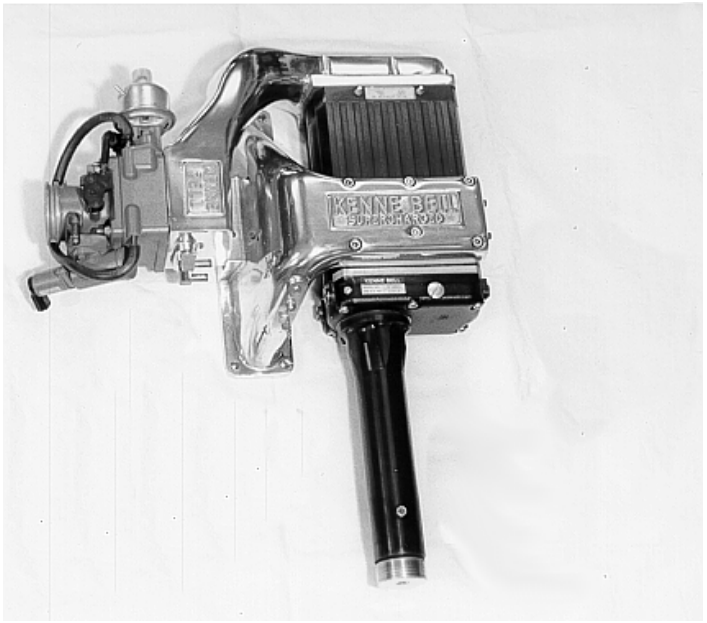
Baer Brakes	602-233-1411 www.baer.com
Stainless Steel Brakes Corporation	800-448-7722 www.ssbrakes.com
Disc Brakes R' Us	888-558-5757 www.discbrakesrus.com
Forte's Parts Connection, Inc. (Ford Motorsports Dealer)	781-647-1530 www.fortesparts.com
CNC, Inc.	619-275-1663
AFCO Racing Products (supplier of CNC components)	812-897-0900 www.afcoracing.com
Mustang Part's Specialties, Inc.	770-867-2644 www.stangparts.com
Porterfield Enterprises Ltd.	800-537-6842
Carbotech Engineering	954-493-9669
Hawk Brake, Inc.	800-542-0972 www.hawkbrake.com

- To calculate piston area, use the following equation: πr^2 (3.14159 x radius squared.)
- If using calipers with more than one piston, calculate the area for each piston, and then add the areas together. If the caliper has pistons on both sides of the rotor, disregard one side.

Caliper Piston Area (in^2)	Master Cylinder Bore Diameter (in)
Up to 3.6	5/8
3.6 to 4.2	7/10
4.2 to 4.5	3/4
4.5 to 4.7	13/16
4.7 to 5.5	7/8
5.5 to 5.9	15/16
5.9 to 6.3	1
6.3 to 7.6 max	1 1/8

Superchargers

Factory Five Racing customers have successfully installed *Kenne Bell, Vortech, and Powerdyne/Ford Motorsport* superchargers to 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.



Kenne Bell Supercharger.

Installing a Kenne Bell.

Installed supercharger.

Seats

For the roadracers/autocrossers that want more side support, Factory five offers a variety of different options. Check out www.factoryfive.com or call for a parts catalog that lists seats and seat options.

Helpful Reference Material

We have found the following books and reference manuals to be invaluable. Items are separated into two categories.

1. Must Reads
2. Helpful.

At the end of each of the books are reference lists that the authors recommend. Smith and Alexander give excellent sources for more information.

Must Reads

Chilton's 1989-93 Ford Mustang Repair Manual. Part Number 8253. 1992. Chilton Book Company, Chilton Way, Radnor, PA 19089. Available at most automotive parts stores and some bookstores.

Ford Motorsport Performance Equipment Catalog, current edition. Available at your local speedshop or authorized Ford Motorsport distributor. Call the Ford Motorsport Tech Hot-line at 810-468-1356 for your closest distributor.

Helpful

1. 5.0L Ford Dyno Tests. By Richard Holdener. Published by SA Design, Cartech. 11605 Kost Dam Rd., North Branch, MN 55056.
2. Engineer to Win. By Carroll Smith. Published by Motorbooks International Publishers and Wholesalers Inc. PO Box 2, 729 Prospect Avenue, Osceola, WI 54020
3. Prepare to Win. By Carroll Smith. Published by Motorbooks International Publishers and

Wholesalers, PO Box 2, 729 Prospect Avenue, Osceola, WI 54020.

4. Performance Handling, How to make your car handle. By Alexander and published by Motorbooks International Publishers and Wholesalers, PO Box 2, 729 Prospect Avenue, Osceola, WI 54020.
5. How to Understand, Service, and Modify Ford Fuel Injection & Electronic Engine Control, 1988-1993. By Charles O. Probst. Published and distributed by Robert Bentley Inc. Publishers, 1000 Massachusetts Avenue, Cambridge, MA 02138.

Others

1. Autoweek Magazine
2. Muscle Mustang & Fast Fords Magazine
3. 5.0 Magazine
4. Kit Car Magazine
5. Grassroots Motorsport Magazine

A Final Note about Completed Cars and Car Builders

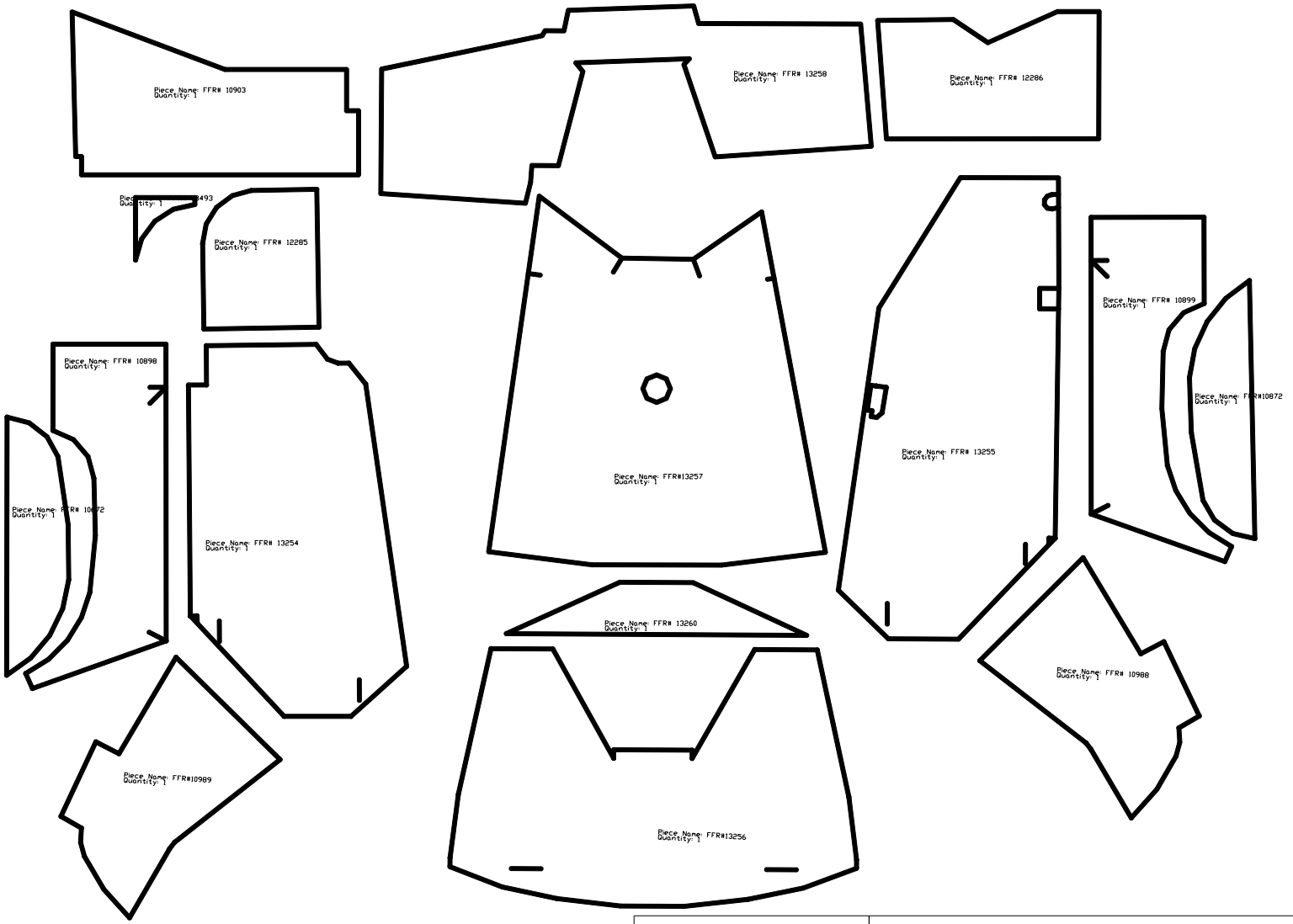
If you are reading this manual then you must be at least contemplating the task of building your own race car. Many component car companies offer services to those folks who find part or all of this too much to tackle. We don't.

If you are considering buying a completed vehicle from a third party (we do not and will not perform any vehicle assembly work for customers), keep the following in mind.

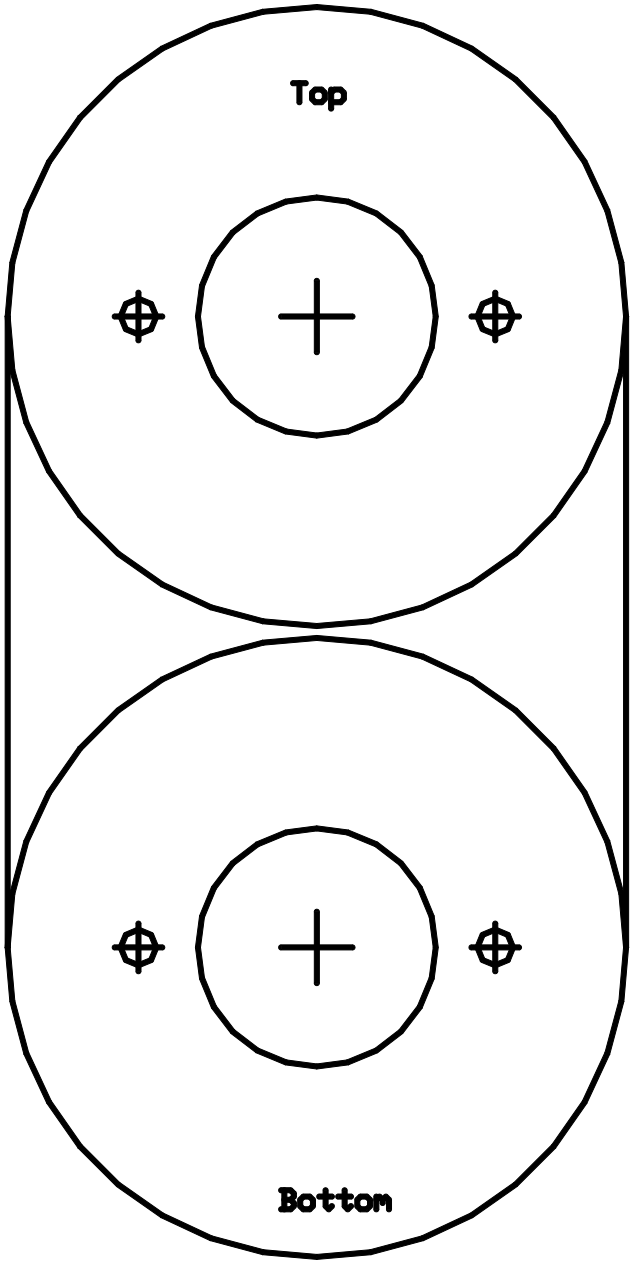
Factory Five Racing does not build or sell completed or partially completed vehicles. We are aware of a number of performance and hot rod shops that claim to specialize in building race cars and kit cars. We have over the years compiled a list of some of them, which includes parts yards, used parts suppliers, paint and body shops, hot rod assemblers, and race car shops.

Please know that there is no connection between FFR and those outside shops. There are no authorized FFR dealerships, and we cannot recommend any of the particular businesses that are on our lists, nor do we warrant 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



CONFIDENTIAL AND PROPRIETARY DATA This drawing, related detail drawings, and technical information included are the property of FACTORY 5 RACING, INC. All equipment design and application data shown herein is confidential. No use or disclosure thereof may be made without written permission from FACTORY 5 RACING, INC., Copyright 1995	Title: ROADSTER CARPET DIAGRAM
	Material: N/A
Tolerances if not Spec'd Fractions +/- 1/32" .X +/- 0.10 .XX +/- 0.05 .XXX +/- 0.01	Part Number: 13259 · Rev: A · Page: 1 OF 1 Size: A · Scale: · Qty Per Assmbly: 1 Drawn By: JI · Checked By: FFR



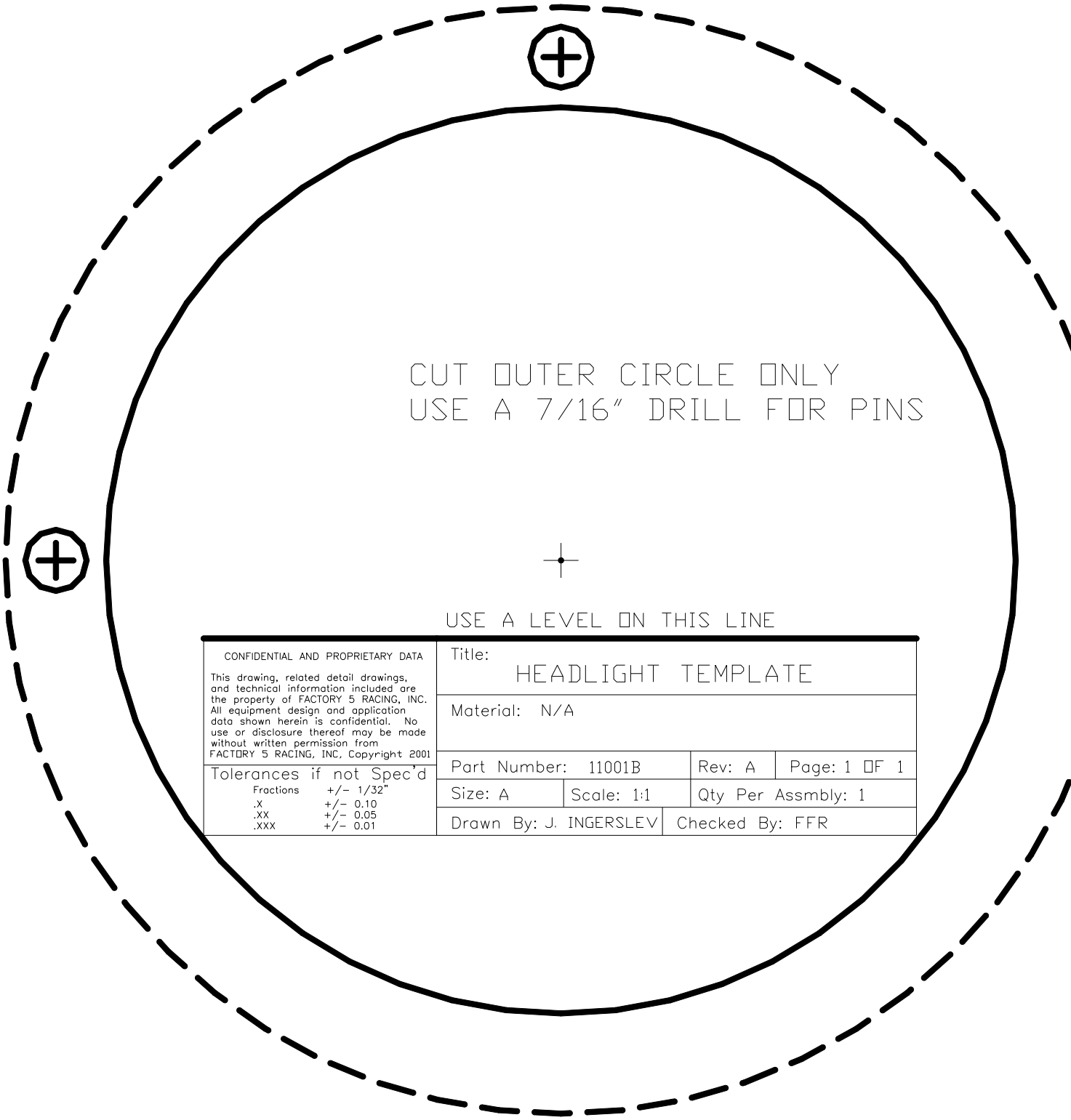
NOTE: Use 3/16" drill bit on small holes and 1 1/4" hole saw on large holes.

NOTE: Use light fixture as jig to get position for mounting holes.

Tolerances if not Spec'd

Fractions	+/- 1/32"
.X	+/- 0.10
.XX	+/- 0.05
.XXX	+/- 0.01

Title: TEMPLATE, REAR TAIL LIGHTS, (L,R)			
Material: N/A			
Part Number: 11000		Rev: C	Page: 1 OF 1
Size: A	Scale: 1:1	Qty Per Assembly: 1	
Drawn By: D. SMITH		Checked By: FFR	



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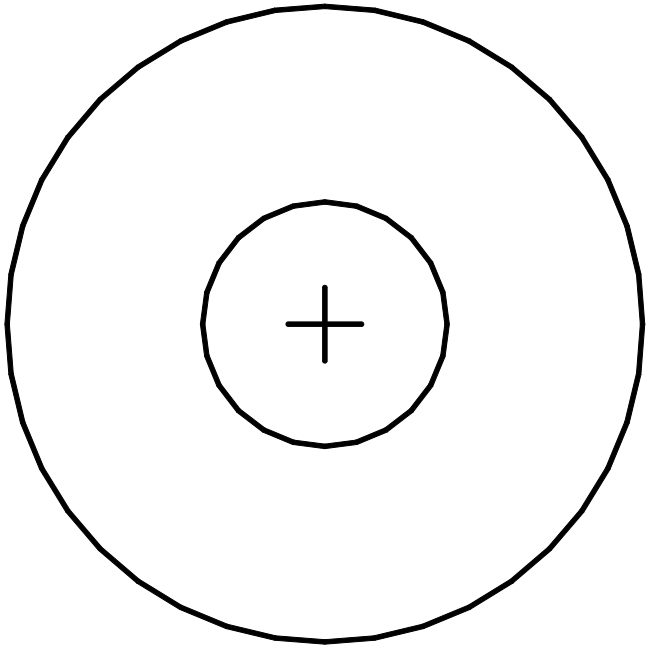
	Material: N/A		
	Part Number: 11001B	Rev: A	Page: 1 OF 1
Tolerances if not Spec'd Fractions +/- 1/32" .X +/- 0.10 .XX +/- 0.05 .XXX +/- 0.01	Size: A / Scale: 1:1	Qty Per Assmbly: 1	
	Drawn By: J. INGERSLEV	Checked By: FFR	

Top



Bottom

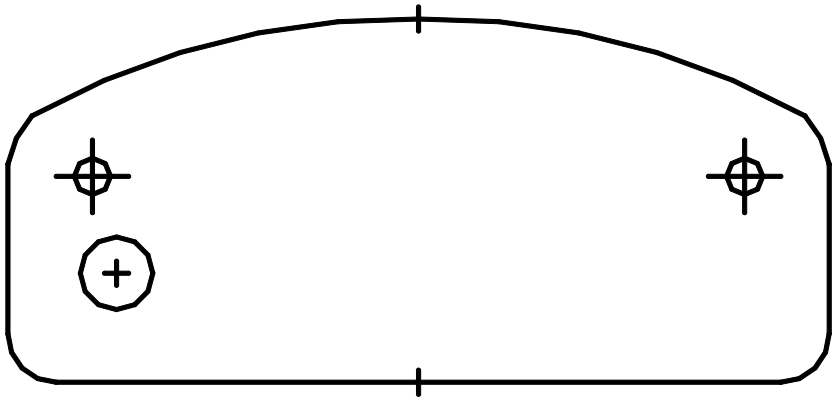
NOTE:
1 1/4" hole saw on large hole.

NOTE: Align light fixture and use holes on fixture to mark body for drilling.

Tolerances if not Spec'd

Fractions	+/- 1/32"
.X	+/- 0.10
.XX	+/- 0.05
.XXX	+/- 0.01

Title: TEMPLATE, FRONT TURN SIGNAL LIGHTS, (R,L)			
Material: N/A			
Part Number: 11002		Rev: A	Page: 1 OF 1
Size: A	Scale: 1:1	Qty Per Assmbly: 1	
Drawn By: D. SMITH		Checked By: FFR	

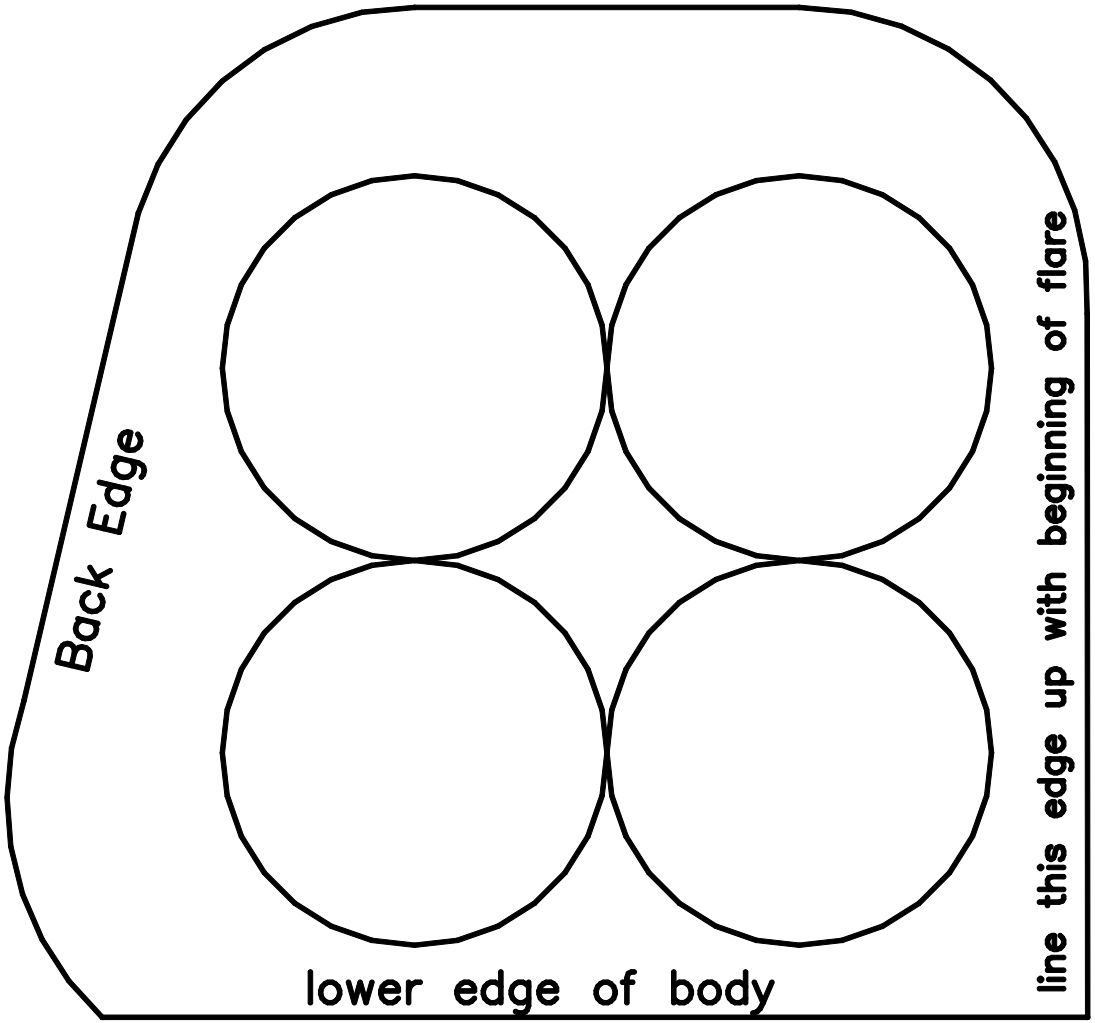


NOTE: Use 3/16" drill bit for smaller holes and 3/8" drill bit on large hole.

Tolerances if not Spec'd

Fractions	+/- 1/32"
.X	+/- 0.10
.XX	+/- 0.05
.XXX	+/- 0.01

Title: TEMPLATE, LICENSE PLATE LIGHT			
Material: N/A			
Part Number: 11003		Rev: A	Page: 1 OF 1
Size: A	Scale: 1:1	Qty Per Assmbly: 1	
Drawn By: D. SMITH		Checked By: FFR	



Note: This template is very conservative (tight), you can always cut more, it's hard to cut less.

(cut outline and use on both sides R&L)

Tolerances if not Spec'd

Fractions	+/- 1/32"
.X	+/- 0.10
.XX	+/- 0.05
.XXX	+/- 0.01

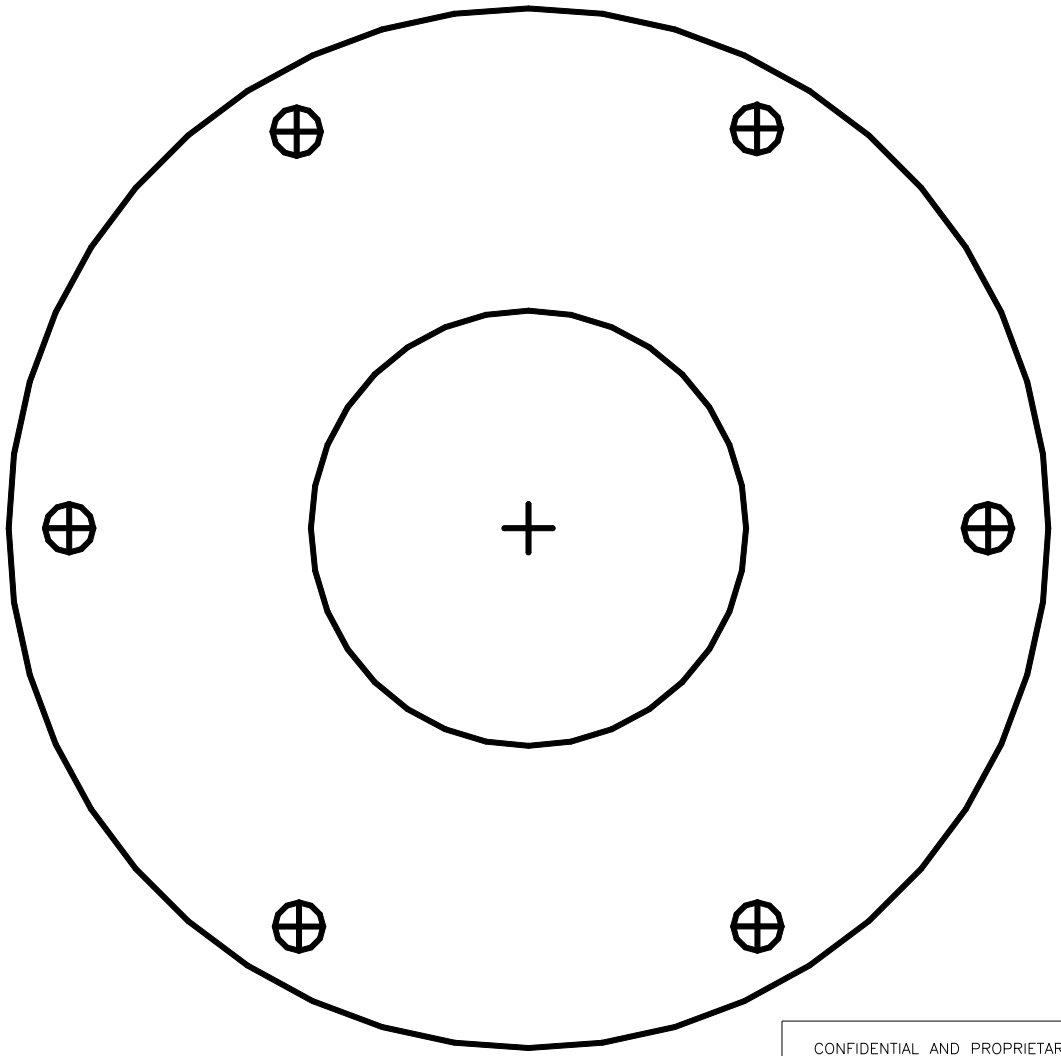
Title: Side Exhaust Cut-out Template

Material: N/A

Part Number: 11004 | Rev: A | Page: 1 OF 1

Size: A | Scale: 1:1 | Qty Per Assembly: 1

Drawn By: B. SMITH | Checked By: FFR



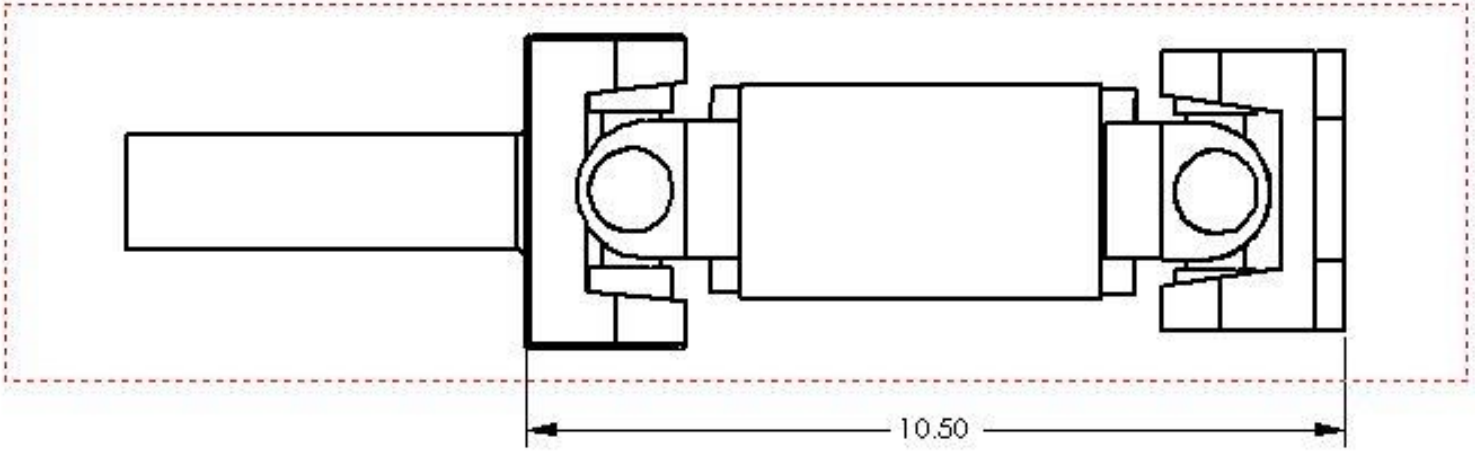
NOTE: Outside circle is shown for placement orientation only, do not cut. Use a 2.25" holesaw in center and 0.25" drill bit for small holes.

Tolerances if not Spec'd

Fractions	+/- 1/32"
.X	+/- 0.10
.XX	+/- 0.05
.XXX	+/- 0.01

Title:	TEMPLATE, FUEL NECK FLANGE		
Material:	N/A		
Part Number:	11009	**Rev:** C	**Page:** 1 OF 1
Size: A	**Scale:** 1:1	**Qty Per Assembly:** 1	
Drawn By: J. INGERSLEV	**Checked By:** FFR		

REVISIONS			
REV.	DESCRIPTION	DATE	APPROVED
A	INITIAL RELEASE	9/26/97	
B	LENGTH CHANGE	12/18/00	



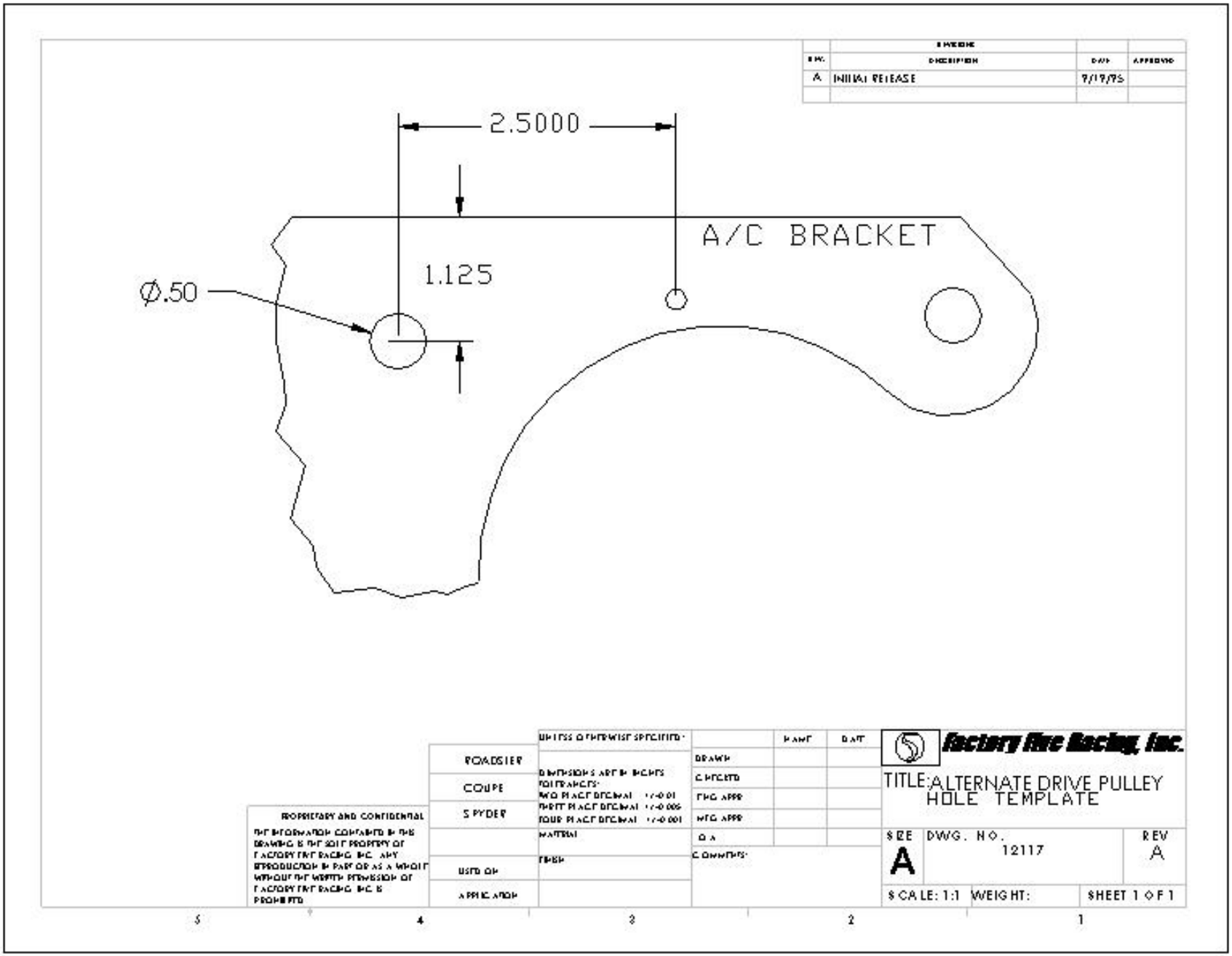
UNLESS OTHERWISE SPECIFIED:		PART	DATE
ROADSTER	DRAWN	JI	12/18/00
DIMENSIONS ARE IN INCHES TOLERANCES: TWO PLACE DECIMAL ±0.01 THREE PLACE DECIMAL ±0.005 FOUR PLACE DECIMAL ±0.001	CHECKED		
	ENG APPR		
	MFG APPR		
MATERIAL MUSTANG DRIVESHAFT FINISH	Q A		
USED ON	COMMENTS:		
APPLICATION			

Factory Five Racing, Inc.

TITLE:
ROADSTER DRIVESHAFT

SIZE	DWG. NO.	REV
A	12116	B

SCALE: 1:4 WEIGHT: SHEET 1 OF 1


REV
DESCRIPTION
DATE
APPROVED
A
INITIAL RELEASE
9/19/95
2.5000
A/C BRACKET
1.125
Ø.50
UNLESS OTHERWISE SPECIFIED:
DRAWN
CHECKED
ENG APPR
MFG APPR
Q.A
COMMENTS:
NAME
DATE
ROADSTER
COUPE
SPYDER
USED ON
APPLICATION
DIMENSIONS ARE IN INCHES
TOLERANCES:
MATERIAL
FINISH
PROPRIETARY AND CONFIDENTIAL
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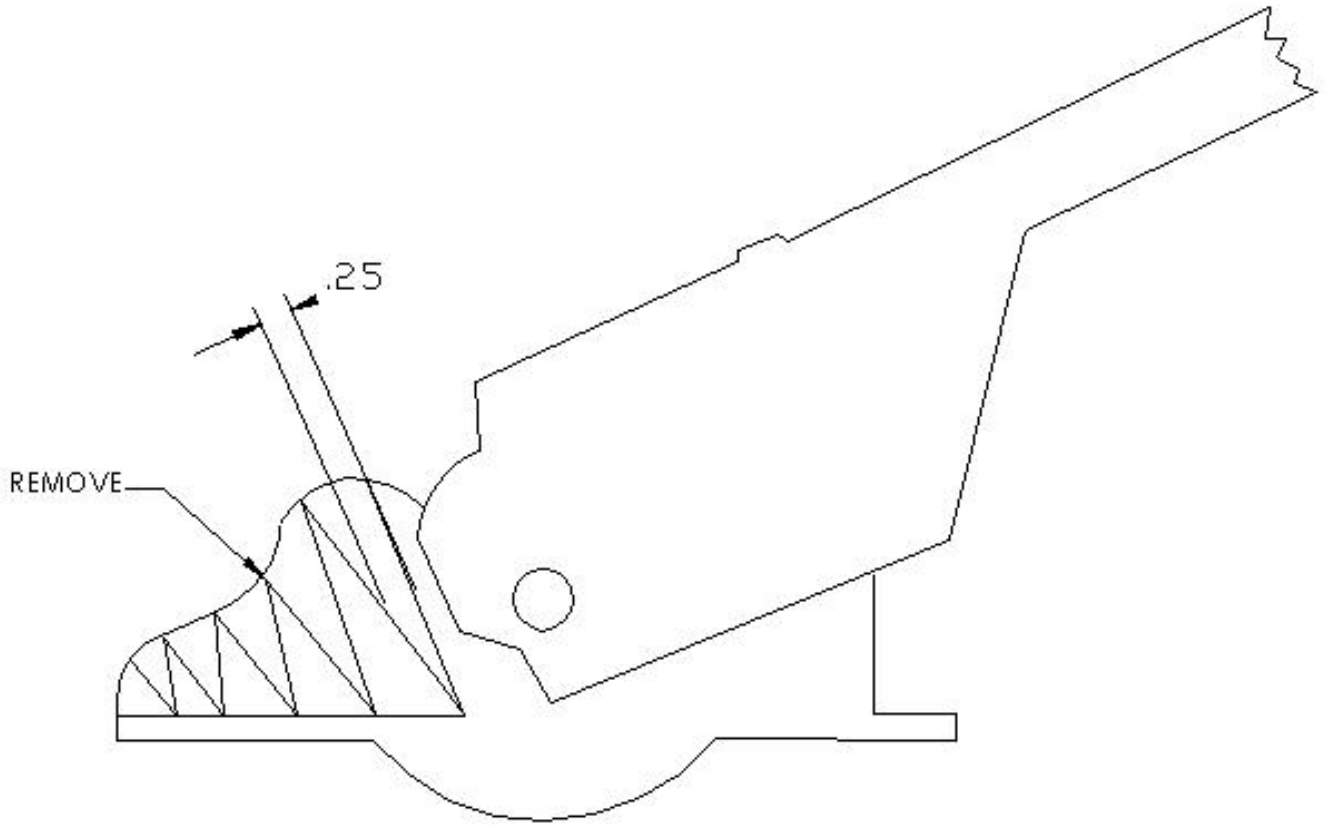
Factory Five Racing, Inc.
TITLE: ALTERNATE DRIVE PULLEY HOLE TEMPLATE
SIZE
A
DWG. NO.
12117
REV
A
SCALE: 1:1
WEIGHT:
SHEET 1 OF 1

REV.	DESCRIPTION	DATE	APPROVED
A	INITIAL RELEASE		



ROADSTER

USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED:

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

MATERIAL

FINISH

	NAME	DATE
DRAWN		
CHECKED		
ENG APPR		
MFG APPR		
Q.A		

COMMENTS:

Factory Five Racing, Inc.

TITLE:
EMERG ENCY BRAKE HANDLE
C UT DIAGRAM

SIZE	DWG. NO.	REV
A	12124	A

SCALE: 1:1 WEIGHT: SHEET 1 OF 1

5 4 3 2 1

Appendix B – Donor Parts List

DONOR PARTS FROM FORD MUSTANG 5.0, 1987 TO 1993

Assembly Name	Part Name	Quantity	Removed from donor
ENGINE/DRIVETRAIN	CLUTCH CABLE	1	
	ENGINE, 5.0L FORD & T-5 TRANS, W/BOLTS/NUTS	1	
	TRANSMISSION MOUNT W/BOLTS	1	
	DRIVESHAFT AND 4 ORIGINAL BOLTS	1	
	SPEEDOMETER CABLE	1	
	CIRCLIP, CLUTCH CABLE RETAINER	1	
	MOTOR MOUNTS, CLEAN STRAIGHT, W/OEM NUTS	2	
	MASS AIR SENSOR	1	
EXHAUST	OXYGEN SENSORS	2	
	EXHAUST HEADERS	2	
	FLANGE NUTS, HEADER	4	
	RUBBER BUSHING, REAR EXHAUST HANGER	2	
COOLING	UPPER RADIATOR HOSE	1	
	HEATER HOSES, CUT AT FIREWALL, W/OEM CLAMPS	2	
	RADIATOR W/CAP	1	
	LOWER RADIATOR HOSE	1	
	FAN SHROUD W/OVERFLOW TANK MOUNTED	1	
FUEL SYSTEM	FUEL TANK W/CAP AND MOUNT STRAPS	1	
	FUEL FILTER W/BRACKET AND HOSES	1	
	HIGH PRESSURE FUEL LINE, TANK TO FILTER	1	
	LOW PRESSURE RETURN FUEL LINE TO TANK	1	
	HIGH PRESSURE FUEL LINE W/FITTING, ENGINE BAY, CUT 4" INTO STEEL LINE	1	
	LOW PRESSURE FUEL LINE W/FITTING, ENGINE BAY, CUT 4" INTO STEEL LINE	1	
	FUEL EVAPORATIVE CANISTER, SOLENOID AND TUBING	1	
	EMERGENCY INERTIA CUT-OFF SWITCH	1	
BRAKES/WHEELS	BRAKE ASSEMBLY, FRONT, CUT 4" INTO STEEL LINES	2	
	MOUNT, REAR BRAKE LINE, RIVETED TO DONOR	1	
	MASTER CYLINDER, BOOSTER, DISTRIBUTION BLOCK, STEEL CONNECTION LINES	1	
	FRONT WHEELS, 15" ALUMINUM, FAN/TURBINE STYLE W/ 8 LUG NUTS	2	
	MOUNT, FRONT, FLEXIBLE HOSE TO STEEL LINE, MOUNTED TO BODY	2	
	EMERGENCY BRAKE HANDLE, CABLES, W/HARDWARE	1	
	BRAKE ASSEMBLY, REAR, W/LINES ON REAR AXLE	1	
	REAR WHEELS, 15" ALUMINUM, FAN/TURBINE STYLE W/ 8 LUG NUTS	2	
SUSPENSION	REAR QUAD SHOCKS W/ MOUNTS AND OEM NUTS/BOLTS	2	
	SPINDLES, FRONT	2	
	CONTROL ARMS, REAR UPPER W/BOLTS/NUTS	2	
	CONTROL ARMS, REAR LOWER W/BOLTS/NUTS	2	
	REAR AXLE ASSEMBLY, COMPLETE	1	
	COIL SPRINGS, REAR, W/OEM RUBBER ISOLATOR SEATS	2	
	REAR SWAYBAR (OPTIONAL)	1	
	A-ARMS, FRONT LOWER W/ BOLTS/NUTS	2	
STEERING	UPPER STEERING COLUMN, W/IGNITION, TURN SIGNAL STALK, NON-TILT ONLY	1	
	STEERING RACK W/TIE RODS, ENDS, BOOTS, NUTS, MOUNT BUSHINGS	1	
	STEERING SHAFT ASSEMBLY, W/LOWER U JOINT, OEM NUTS/BOLTS	1	
ELECTRICAL	WIRING HARNESS, ENGINE	1	
	HORNS	2	
	IGNITION CYLINDER WITH KEY	1	
	VACUUM RESERVOIR, CYLINDER SHAPED, BLACK PLASTIC	1	
	GROUND STRAP, BATTERY CABLE WITH TERMINAL	1	
	WIRING HARNESS, REAR	1	
	COIL, STARTER SOLENOID	1	
	WIRING HARNESS, DASH	1	
	WIRING HARNESS, FRONT	1	
	EEC IV COMPUTER W/ PLASTIC HOLDER	1	
	WIRING HARNESS, TRANSMISSION	1	
MISCELLANEOUS	PEDAL BOX, BRAKE CLIP AND (2) PLASTIC WASHERS	1	
	GAUGE CLUSTER	1	
	ACCELERATOR PEDAL	1	

DIFFERENT DONOR VEHICLE OPTIONS

We highly recommend NOT using these different donor cars for the average build. This list will help with those parting out individual items, and possibly for those not using all of the donor parts.

1982-1986 V8 Donors

- Front brakes are 10" in diameter compared to the 87-93 11" diameter.
- Gauges will not work.
- Transmission is slightly weaker, and 82 and most 83's used a 4-speed called the SROD that will not work
- Rear axle has a 7.5" ring gear, so it is weaker (86-93 axles have the 8.8" rear axle)(the 7.5" rear also did not use quad shocks)
- Engines were carbureted up until and including 1985.
- Front Spindles will work by cutting the weld tacks and removing spacers on the IFS brackets that come with the kit.
- 1986 donor vehicles were fuel injected, though they were less powerful, and they had domed pistons that make performance modifications difficult.
- 1985 and 1986 V8's with automatic transmissions, were throttle body injected.

1982-1993 4 Cylinder Donors

- Front brakes are 10" in diameter compared to the 87-93 11" diameter.
- Rear drum brakes are 9" in diameter compared to the 87-93 10" diameter.
- Gauges will not work.
- Transmission is much weaker. The input shaft is smaller, so a different pilot bearing would be needed. It also has a lower first gear.
- Rear axle has a 7.5" ring gear, so it is weaker.
- Front Spindles will work by cutting the weld tacks and removing spacers on the IFS brackets that come with the kit.
- Fuel pump will not support a fuel injected V8.
- Engine section of the harness will not work.
- Steering rack has a 20:1 ratio compared to the V8 model 15:1 steering racks.
- Radiator is only a single core .

1994 and 1995 Donors

- Front lower control arms will not work.
- Gauges will not work.
- Transmission and bell-housing will not work with a solid axle kit.
- Steering column and shafts will not work.
- Dash switches will not work.
- Tie rod ends will not work.
- Motor mounts will not work.
- Smog pump mounting brackets will not work.
- Gas tank will not work without modifications to the mounting straps.

- Rear axle is 61.125” from hub to hub, where as the pre-93 donors were 59.25”. (A different wheel offset could be used to make up the difference).
- Front spindles are shorter (if you specify, we have brackets to make them work).
- Wiring harness will not work.
- Pedal box needs spacers to raise it about ¾”.
- The accelerator cable that comes with the kit will not work with the throttle body.

Appendix C – Roadster Standard Pack list

FFR #	Part Name	Unit	Qty
11049	KIT DOCUMENTATION ASSEMBLY	EA	1.00
10669	SHIPPING LABEL	EA	1.00
11047	KIT PACKAGING CHECKLIST	EA	1.00
10788	SECONDARY BODY FASTENERS ASSEMBLY		
10983	SCREW, RUBBER HOOD POST	EA	10.00
11061	RUBBER HOOD POST, SMALL	EA	10.00
10701	RUBBER HOOD POST, LARGE	EA	10.00
10761	ALUMINUM-BODY SEAL, RUBBER PUSH-ON TRIM	FT	38.00
10857	WEATHERSTRIP, ADHESIVE-BACK, BOX	EA	1.00
11024	BOLT, BODY MOUNT	EA	6.00
11265	LOCK NUT, NYLON, BODY MOUNT	EA	6.00
11005	WASHER, BODY MOUNTS	EA	18.00
13025	"U" NUT, SIDE BODY MOUNT	EA	6.00
10782	RIVETS, 1/8" SHORT	EA	600.00
11290	RIVETS, 1/8" LONG	EA	100.00
11291	RIVETS, 3/16" LONG	EA	100.00
12129	DOOR EDGE TRIM	FT	6.00
10918	FRONT SUSPENSION BALL JOINT/BRACKET ASSEMBLY	EA	2.00
11074	IFS ASSEMBLY		
13662	SHOCK, FRONT	EA	2.00
13666	UPPER SPRING SEAT	EA	2.00
13665	LOWER SPRING SEAT	EA	2.00
13664	COIL-OVER THREADED SLEEVE	EA	2.00
10590	UPPER BALL JOINT	EA	2.00
13667	SPRING, FRONT COIL-OVER, BLACK, 1.875", 450#	EA	2.00
13067	ADJUSTABLE FRONT UPPER CONTROL ARM	EA	2.00
10961	TOOL, COIL-OVER ADJUSTING	EA	1.00
10810	BRACKET, COIL-OVER LOWER MOUNT, FORD	EA	2.00
10882	WASHER, COIL-OVER LOWER MOUNT BRACKET	EA	2.00
11027	LOCK NUT, NYLON, COIL-OVER LOWER MOUNT BRACKET	EA	2.00
10842	BOLT, COIL-OVER MOUNTS	EA	4.00
10834	LOCK NUT, NYLON, COIL-OVER MOUNT	EA	4.00
10882	WASHER, COIL-OVER MOUNT	EA	8.00
11038	LOCK NUT, UPPER TUBULAR A-ARM, GRADE 8	EA	4.00
13525	BOLT, FLANGE BOLT, GRADE 8	EA	4.00
12112	SPACER BUSHING, FRONT COIL-OVER SHOCK, TOP REAR 0, 0.62",0	EA	2.00
12113	SPACER BUSHING, FRONT COIL-OVER SHOCK, TOP FRONT, 0, 0.32", 0	EA	2.00
12114	SPACER BUSHING, FRONT COIL-OVER SHOCK, BOTTOM REAR AND FRONT, 0, 0.43", 0	EA	4.00
10937	SPINDLE TO LOWER CONTROL ARM COTTER PIN	EA	2.00
10789	AIR FILTER	EA	1.00
11073	STEERING RACK/SHAFT ASSEMBLY		
12614	1" DD TUBING	EA	1.00
12287	STEERING SHAFT COVER	EA	1.00
12393	STEERING RACK BOLT	EA	2.00
10834	LOCK NUT, NYLON, STEERING RACK	EA	2.00
10937	COTTER PIN FOR TIE ROD ENDS	EA	2.00
10584	STEERING RACK SPACER	EA	2.00
10882	STEERING RACK BUSHING WASHER	EA	14.00

10819	BATTERY/TRAY ASSEMBLY		
10579	BATTERY CABLE, POSITIVE, WITH TERMINAL, COVER & LUG	EA	1.00
10804	BATTERY TRAY	EA	1.00
10802	LOCK NUT, NYLON, BATTERY SUPPORT ROD	EA	4.00
11088	WASHER, BATTERY SUPPORT ROD	EA	4.00
10801	BATTERY PLATE SUPPORT ROD (THREAD END ROD)	EA	4.00
11119	BATTERY CABLE END LUG	EA	3.00
10885	REAR TRACTION-LOCK ASSEMBLY, (R,L)		
10833	BOLT, UPPER, REAR TRACTION-LOCK EXTENTION	EA	4.00
13706	M12 x 110MM BOLT	EA	2.00
11027	LOCK-NUT, NYLON, LOWER, REAR TRACTION LOCK BRACKET	EA	2.00
10834	LOCK-NUT, NYLON, UPPER, REAR TRACTION LOCK BRACKET	EA	4.00
10882	WASHER, REAR END TRACTION LOCK EXTENTION	EA	12.00
10993	REAR TRACTION-LOCK, 3 SIDED BRACKET, DRIVER SIDE	EA	1.00
10994	REAR TRACTION-LOCK, 3 SIDED BRACKET, PASSENGER SIDE	EA	1.00
11075	QUAD SHOCK FASTENER ASSEMBLY		
11059	LOCK NUT, NYLON, REAR HORIZ QUADSHOCK MOUNT	EA	4.00
11058	BOLTS, REAR HORIZ QUADSHOCK MOUNTING	EA	4.00
10882	WASHERS, REAR HORIZ QUADSHOCK MOUNTING	EA	8.00
11196	REAR AXLE STRAP	EA	2.00
10896	FUEL TANK ASSEMBLY		
11020	BOLT, FUEL TANK MOUNTING	EA	4.00
11221	LOCK NUT, NYLON, FUEL TANK MOUNT	EA	4.00
10585	WASHER, FUEL TANK MOUNTING	EA	2.00
10996	CAP PLUG, FUEL TANK MOUNTING POST SURFACE	EA	4.00
11023	PEDAL BOX FASTENER ASSEMBLY		
11020	BOLT, PEDAL BOX TO FRONT PLATE, MASTER CYL. MOUNT	EA	2.00
10520	BOLT, PEDAL BOX TO FRONT PLATE, UPPER	EA	3.00
11221	LOCK NUT, NYLON, PEDAL BOX TO 3/16" STEEL PLATE	EA	5.00
10585	WASHER, PEDAL BOX TO 3/16" STEEL PLATE	EA	5.00
12336	SCREW, PEDAL BOX TO FRAME DOWN TUBES	EA	4.00
11088	WASHER, PEDAL BOX, THROTTLE PEDAL AND CABLE	EA	8.00
12335	SCREW, THROTTLE PEDAL AND CABLE	EA	4.00
10802	LOCK NUT, PEDAL BOX, THROTTLE PEDAL AND CABLE	EA	8.00
10629	MASTER CYLINDER BRAKE SPACER	EA	3.00
12281	ACCELERATOR CABLE	EA	1.00
12337	WASHER, PEDAL BOX TO FRAME DOWN TUBES	EA	4.00
11029	INSULATED CLIP ASSEMBLY		
10970	INSULATED CLIP, BRAKE/FUEL/TRUNK WIRING, 3/8"	EA	45.00
13328	CABLE TIES, 8", BAG OF 100	BAG	1.00
10971	INSULATED CLIP, BATTERY CABLE/WIRING, 5/8"	EA	30.00
10992	OIL FILTER RELOCATING ASSEMBLY		
12118	OIL HOSE, CUT 5' LENGTH	EA	1.00
12119	OIL FILTER RELOCATOR	EA	1.00
12132	THREADED NIPPLE	EA	1.00
12121	BRASS FITTING, BARBED	EA	2.00
10995	OIL FILTER RELOCATOR SCREW	EA	3.00
10635	OIL FILTER RELOCATOR WASHER	EA	3.00
12120	SPIN-ON-ADAPTER	EA	1.00
12133	O-RING	EA	1.00
12134	THREADED HOLE PLUG	EA	2.00
12121	BRASS FITTING, BARBED	EA	2.00

11206	HOSE CLAMP	EA	4.00
11080	ALTERNATE DRIVE PULLEY ASSEMBLY		
10834	LOCK-NUT, NYLON, PULLEY MOUNT, (LOCATION OF A/C)	EA	1.00
10952	SLEEVE, PULLEY MOUNT	EA	1.00
10882	WASHER, PULLEY MOUNT, (LOCATION OF A/C)	EA	2.00
12386	BOLT, PULLEY MOUNT, (LOCATION OF A/C)	EA	1.00
10775	PULLEY WHEEL, ADDITIONAL TO REPLACE A/C	EA	1.00
10781	FAN BELT, SIX RIB, SINGLE, CUSTOM LENGTH	EA	1.00
11079	RADIATOR HOSE ASSEMBLY		
10664	HOSE CLAMP, UPPER AND LOWER RADIATOR HOSES & EXTENSIONS	EA	4.00
10666	TUBE EXTENSION, LOWER RADIATOR HOSE, 4"	EA	1.00
10665	TUBE EXTENTION, UPPER RADIATOR HOSE, 17"	EA	1.00
10984	SCREW, RADIATOR LOWER MOUNT BRACKET	EA	4.00
10791	HOSE, LOWER RADIATOR, FLEXIBLE	EA	1.00
10984	SCREW, UPPER RADIATOR MOUNT	EA	2.00
11088	WASHER, UPPER RADIATOR MOUNT	EA	2.00
10975	MISC ELECTRICAL ASSEMBLY		
10972	FLEXIBLE WIRE LOOM TO PROTECT WIRING BUNDLES	FT	10.00
10942	WIRE EXTENSION, TRUNK, 16 GAUGE, 2 x 8' SECTIONS	FT	16.00
10940	ELECTRICAL WIRING CONNECTOR, RED	EA	30.00
10973	FLEXIBLE SERRATED POLYETHYLENE GROMMETING	FT	4.00
11070	ENGINE/HARNESS ASSEMBLY		
10984	SCREW, SOLENOID MOUNT	EA	2.00
10984	SCREW, COIL MOUNT	EA	2.00
10984	SCREW, MASS AIR MOUNT	EA	2.00
10984	SCREW, BRAIDED GROUND STRAP	EA	1.00
10983	SCREW, COMPUTER HOLDER/ GROUND	EA	4.00
10936	WASHER, COMPUTER HOLDER/ GROUND	EA	4.00
10983	SCREW, VACUUM RESEVOIR (TUNA CAN SHAPPED)	EA	2.00
10936	WASHER, VACUUM RESEVOIR (TUNA CAN SHAPPED)	EA	2.00
10983	SCREW, MAP SENSOR	EA	2.00
10936	WASHER, MAP SENSOR	EA	2.00
10995	SCREW, INERTIA CUT-OFF SWITCH	EA	2.00
10851	SCREW, VACUUM CONTROLS	EA	2.00
11217	RING CONNECTOR, COMPUTER GROUND, 16 GAUGE	EA	1.00
11071	STEERING WHEEL ASSEMBLY		
10583	STEERING WHEEL, 15" MOTO-LITA, MAHOGANY	EA	1.00
12346	CENTER SECTION STICKER	EA	1.00
10634	ALUMINUM CENTER SECTION	EA	1.00
11008	STEERING WHEEL BOSS	EA	1.00
12338	STEERING WHEEL BOSS SCREW	EA	6.00
12339	STEERING WHEEL BOSS NUT	EA	6.00
13327	DASH ASSEMBLY	EA	1.00
10995	SCREW, TURN SIGNAL STALK	EA	2.00
10995	SCREW, IGNITION CYLINDER	EA	2.00
10942	TURN SIGNAL INDICATOR WIRE EXTENSION	FT	4.00
11180	FLASHER ELECTRICAL CONNECTOR	EA	1.00
10817	HIGH BEAM INDICATOR LIGHT, BLUE, DASH MOUNT	EA	1.00
10816	TURN SIGNAL INDICATOR LIGHT, GREEN, DASH MOUNT	EA	1.00
10815	WARNING INDICATOR LIGHT, RED, DASH MOUNT	EA	1.00
10596	SWITCH, TOGGLE	EA	2.00
10983	SCREW, DASH MOUNTING	EA	5.00

10936	TRIM SCREW RING, DASH MOUNTING	EA	5.00
11288	FLASHER, 3 PRONG	EA	1.00
11053	HORN BUTTON, ORIGINAL, DASH MOUNTED	EA	1.00
11072	PILLOW BLOCK ASSEMBLY		
10938	PILLOW BLOCK, 1" ID	EA	1.00
10577	PILLOW BLOCK, 3/4" ID	EA	1.00
11221	LOCK NUT, NYLON, PILLOW BLOCK, MOUNT	EA	4.00
10585	WASHER, PILLOW BLOCK MOUNTING	EA	4.00
11040	BOLT, PILLOW BLOCK MOUNTING	EA	4.00
12460	ROLLBAR ASSEMBLY, DRIVER SIDE, W/ FASTENERS		
10650	ROLLBAR ASSEMBLY		
10604	MAIN HOOP, ROLL BAR, 180 DEG	EA	1.00
10647	ROLLBAR REAR LEG	EA	1.00
10800	ROLLBAR FASTENERS ASSEMBLY		
10829	BOLT, ROLLBAR, TOP AND BASE	EA	4.00
11265	LOCK NUT, NYLON, ROLLBAR	EA	4.00
10646	HOOD/TRUNK FASTENER ASSEMBLY		
13466	HOOD PIN MOUNT PLATE, FRONT, DRIVER SIDE	EA	1.00
13532	HOOD PIN MOUNT PLATE, FRONT, PASSENGER SIDE	EA	1.00
11024	BOLT	EA	4.00
11005	WASHER	EA	8.00
11265	LOCK NUT, NYLON	EA	4.00
10813	HOOD PIN SET	EA	1.00
10648	HOOD HANDLE HOLD DOWN BRACKET	FT	0.25
10983	SCREW, HOOD HOLD DOWN MOUNT BRACKETS	EA	4.00
11019	THREE LOCK SET ASSEMBLY		
10624	THREE LOCK SET, TRUNK "T", HOOD "L" HANDLES AND KEYS (2)	EA	1.00
10805	CAM WEDGE, LONG	EA	2.00
10983	SCREW, THREE LOCK SET, TRUNK/HOOD LATCHES	EA	6.00
10625	LATCH/HOOK, TRUNK	EA	1.00
10984	SCREW, LATCH/HOOK, TRUNK	EA	2.00
11028	TRUNK LATCH PIN BOLT	EA	1.00
11088	WASHER, TRUNK LATCH PIN	EA	1.00
10636	LOCK NUT, NYLON, TRUNK, LATCH PIN	EA	1.00
10550	TRUNK LATCH MOUNT	EA	1.00
11062	LATCH PIN SLEEVE	EA	1.00
11063	HINGED CAP FOR LATCH PIN SCREW	EA	1.00
11041	LICENSE LIGHT/BRACKET ASSEMBLY		
10623	LIGHT, LICENSE PLATE	EA	1.00
10635	WASHER, LICENSE PLATE LIGHT	EA	2.00
10867	LICENSE PLATE BRACKET, REAR, W/FASTENERS	EA	1.00
10553	QUICKJACK BUMPER ASSEMBLY		
12470	QUICKJACK, DRIVER SIDE (HOOK ON OUTSIDE OF CAR)	EA	2.00
12471	QUICKJACK, PASSENGER SIDE (HOOK ON OUTSIDE OF CAR)	EA	2.00
10985	LOUVER ASSEMBLY		
10814	ALUMINUM SIDE LOUVER	EA	2.00
10875	FLAT NUT - LOUVER	EA	4.00
12236	FUEL FILLER ASSEMBLY		
11030	FUEL NECK EXTENSION TUBING	FT	1.00
10615	FUEL CAP, ROLLER (ASTON LEMANS), W/FLANGE NECK	EA	1.00
11050	HOSE CLAMP, FUEL NECK EXTENSION TUBING	EA	2.00
10845	BOLT, MUSTANG FUEL NECK/LE-MANS FLANGE TO BODY	EA	9.00

10846	LOCK NUT, NYLON, FUEL NECK/LE-MANS FLANGE TO BODY	EA	9.00
10635	WASHER, MUSTANG FUEL NECK/LE-MANS FLANGE TO BODY	EA	9.00
10960	SPACER, MUSTANG FUEL NECK-BODY GAP	EA	3.00
10942	FUEL CAP GROUND WIRE	FT	2.00
12223	GROUND, RING CONNECTOR AT CAP	EA	1.00
11217	GROUND, RING CONNECTOR AT FRAME	EA	1.00
10984	SCREW, GROUND	EA	1.00
10895	WINDSHIELD ASSEMBLY		
10833	BOLT, WINDSHIELD MOUNT	EA	4.00
10882	WASHER, WINDSHIELD MOUNT	EA	8.00
10834	LOCK NUT, NYLON, WINDSHIELD MOUNT	EA	4.00
10944	BASE PLATE, WINDSHIELD POST	EA	2.00
12127	BASE PLATE SCREW	EA	2.00
10876	DOOR HINGE ASSEMBLY		
10585	WASHER, DOOR HINGE MOUNT	EA	4.00
12572	ACORN NUT, DOOR HINGE MOUNT	EA	8.00
11065	DOOR LATCH ASSEMBLY		
10627	LATCHES, DOORS, MGTF, SET	EA	1.00
13531	DOOR LATCH SPACER	EA	2.00
10983	SCREW, MG DOOR LATCH	EA	8.00
12408	LEATHER CHECK STRAP	EA	2.00
10983	SCREW, CHECK STRAP	EA	4.00
11291	RIVETS, 3/16" LONG	EA	4.00
13461	DOOR LATCH STRIKER PLATE	EA	2.00
11265	LOCK NUT, NYLON	EA	4.00
12908	STRICKER PLATE TO FRAME MOUNT WASHER	EA	4.00
13465	BOLT, DOOR LATCH STRICKER PLATE TO FRAME MOUNT	EA	4.00
13471	BOLT, DOOR STRICKER TO STRICKER PLATE	EA	8.00
10846	LOCK NUT, NYLON, DOOR STRICKER TO STRICKER PLATE	EA	8.00
10635	WASHER, DOOR STRICKER TO STRICKER PLATE	EA	8.00
11066	MIRROR ASSEMBLY		
10614	MIRROR, SIDEVIEW, STREET (POLISHED BULLET), W/FASTENERS	EA	1.00
10613	MIRROR, REARVIEW, INTERIOR	EA	1.00
10983	SCREW, REARVIEW MIRROR	EA	2.00
11086	SCREW, EXTENSION, MIRROR MOUNTING	EA	2.00
10960	SPACER, MIRROR/FRAME MOUNTING	EA	2.00
11044	FRONT TURN SIGNAL ASSEMBLY		
10621	FRONT TURN SIGNAL LIGHT , AMBER, TWIN FILAMENT	EA	2.00
10983	SCREW, FRONT TURN SIGNAL	EA	4.00
11043	HEADLAMP ASSEMBLY	EA	1.00
13546	HEADLIGHT WIRE GROMMET	EA	2.00
10939	HEADLAMP CHROME RING	EA	2.00
10983	SCREW, 7" HEADLAMP MOUNTING	EA	8.00
13545	HALOGEN HEADLIGHT	EA	2.00
10619	7" HEADLAMP BUCKET ASSEMBLY	EA	2.00
13413	HEADLIGHT BUCKET	EA	1.00
13414	HEADLIGHT RETAINER RING	EA	1.00
13417	HEADLIGHT MOUNT GASKET	EA	1.00
13737	HEADLAMP BUCKET FASTENER ASSEMBLY	EA	1.00
11042	TAIL-LIGHT ASSEMBLY		
10622	REAR LIGHT, RED, TWIN FILAMENT	EA	4.00
10982	LOCK NUT, NYLON, LIGHT, REAR	EA	8.00

10635	WASHER, REAR LIGHT	EA	8.00
11082	SEAT ASSEMBLY		
11005	WASHER, SEAT MOUNT	EA	8.00
10851	SCREW, SEAT TO ALUMINUM FLOOR/STEEL FRAME	EA	8.00
10888	SHIFTER ASSEMBLY		
10601	SHIFTER BOLTS (SHIFTER TO HANDLE)	EA	2.00
10790	CHROMED SHIFTER ROD	EA	1.00
10824	SHIFTER KNOB	EA	1.00
10606	RING, GEAR LEVER, 4 HOLE	EA	1.00
10637	BOOT, GEAR SHIFT	EA	1.00
10983	SCREW, SHIFTER RING	EA	4.00
10875	FLAT NUT, SHIFTER RING RETAINER	EA	4.00
11064	INTERIOR TRIM ASSEMBLY, VINYL		
10879	BOOT, EMERGENCY BRAKE, BLACK VINYL	EA	1.00
10947	DOOR POCKET, DRIVER SIDE, BLACK VINYL	EA	1.00
10946	DOOR POCKET, PASSENGER SIDE, BLACK VINYL	EA	1.00
10983	SCREW, DOOR POCKET, BLACK VINYL	EA	14.00
10936	TRIM SCREW RING, DOOR POCKET	EA	14.00
10948	DASH COVER, PADDED	EA	1.00
11078	FUEL LINE ASSEMBLY		
10855	HOSE CLAMP, 1/4" FUEL LINE	EA	5.00
11138	HOSE CLAMP, 5/16" FUEL LINE	EA	5.00
10997	FLEXIBLE FUEL LINE, 1/4" ID, HIGH PRESSURE, 6"	FT	1.00
11051	FLEXIBLE FUEL LINE, 5/16" ID, HIGH PRESSURE, 6"	FT	1.00
10784	FUEL LINE, 1/4" O.D. X 25' COIL	EA	1.00
10783	FUEL LINE, 5/16" O.D. X 25' COIL	EA	1.00
10984	SCREW, FUEL FILTER	EA	2.00
10984	SCREW, FUEL VAPOR CANISTER	EA	2.00
11076	BRAKE FASTENER ASSEMBLY		
11024	BOLT, EMERGENCY BRAKE HANDLE MOUNTING	EA	2.00
13025	"U" NUT, EMERGENCY BRAKE HANDLE	EA	2.00
11005	WASHER, EMERGENCY BRAKE HANDLE MOUNTING	EA	2.00
10984	SCREW, DONOR BRAKE LINE BRACKET	EA	3.00
10983	SCREW, DONOR BRAKE LINE BRACKET	EA	3.00
13738	BRAKE LINE, 3/16" O.D.x 60"	EA	1.00
13739	BRAKE LINE, 3/16" O.D.x 51"	EA	2.00
13740	BRAKE LINE, 3/16" O.D.x 20"	EA	1.00
13741	BRAKE LINE, 3/16" O.D.x 8"	EA	1.00
13742	BRAKE LINE TEE	EA	1.00
13743	BRAKE LINE UNION	EA	1.00
13744	BRAKE LINE BUBBLE ADAPTER	EA	1.00
10760	FAN MOUNTING ASSEMBLY		
10668	FAN, ELECTRIC, RADIATOR, 16" DIAMETER	EA	1.00
10954	MOUNT BAR, RADIATOR FAN	EA	2.00
10983	SCREW, MOUNT BAR & RADIATOR FAN	EA	8.00
10936	COUNTERSUNK WASHER, MOUNT BAR & RADIATOR FAN	EA	8.00
10942	WIRE EXTENSION, 16 GAUGE, FAN	FT	14.00
10941	ELECTRICAL WIRING CONNECTORS, BLUE	EA	6.00
11217	RING CONNECTOR, GROUND, 16 GAUGE	EA	2.00
11126	FEMALE CONNECTER, 16 GAUGE	EA	2.00
10984	SCREW, GROUND	EA	2.00
12455	FAN RELAY	EA	1.00

11180	FEMALE TERMINAL, 16 GAUGE	EA	4.00
10894	SEAT HARNESS/FASTENER ASSEMBLY		
10833	BOLT, SEAT HARNESS MOUNT	EA	6.00
10882	WASHER, SEAT HARNESS MOUNT	EA	12.00
10834	LOCK NUT, NYLON, SEAT HARNESS MOUNT	EA	6.00
12415	SEAT HARNESS, BLACK	EA	2.00
10675	SIDE EXHAUST ASSEMBLY		
11221	LOCK NUT, NYLON, SIDE EXHAUST, MOUNT POST,	EA	2.00
10585	WASHER, MOUNT POST, SIDE EXHAUST	EA	2.00
10851	SCREW, RUBBER MOUNT POST, SIDE EXHAUST	EA	2.00
11005	WASHER, RUBBER MOUNT POST, SIDE EXHAUST	EA	2.00
11040	BOLT, FRONT EXHAUST MOUNTING FLANGE	EA	6.00
12172	LOCK NUT, EXHAUST MOUNT FLANGE	EA	6.00
11169	GASKETS, THREE HOLE, STRAIGHT TUBES (R,L)	EA	2.00
11168	STRAIGHT TUBE ASSEMBLY	EA	1.00
12430	PASSENGER SIDE STRAIGHT PIPE, SHORT	EA	1.00
12431	DRIVER SIDE STRAIGHT PIPE, LONG	EA	1.00
13259	CARPET ASSEMBLY, PRE-BOXED	EA	1.00
13493	CARPET, DRIVER FOOTBOX FLOOR, OUTSIDE FRONT	EA	1.00
13260	CARPET, U-JOINT COVER	EA	1.00
12285	CARPET, DRIVER FOOTBOX FLOOR	EA	1.00
12286	CARPET, PASSENGER SIDE, OUTSIDE/FRONT FOOTBOX WALL	EA	1.00
13256	CARPET, COCKPIT REAR WALL, BEHIND SEATS	EA	1.00
10988	CARPET, REAR WALL OUTER 1/4, DRIVER SIDE	EA	1.00
10989	CARPET, REAR WALL OUTER 1/4, PASSENGER SIDE	EA	1.00
13257	CARPET, TRANSMISSION TUNNEL, TOP/WALLS	EA	1.00
13254	CARPET, FLOOR, COCKPIT, DRIVER SIDE	EA	1.00
13255	CARPET, FLOOR, COCKPIT, PASSENGER SIDE	EA	1.00
10872	CARPET, DOOR PANEL, LOWER, PASSENGER SIDE	EA	1.00
10672	CARPET, DOOR PANEL, LOWER, DRIVER SIDE	EA	1.00
10898	CARPET, SUB-DOOR SECTION, DRIVER SIDE	EA	1.00
10899	CARPET, SUB-DOOR SECTION, PASSENGER SIDE	EA	1.00
10903	CARPET, DRIVER SIDE, OUTSIDE/FRONT FOOTBOX WALL	EA	1.00
13258	CARPET, DRIVER INSIDE/MIDDLE/PASSENGER INSIDE, FOOTBOX WALL	EA	1.00
11069	CARPET FASTENER ASSEMBLY		
10983	SCREW FOR CARPET MOUNTING	EA	10.00
10936	TRIM SCREW RING FOR CARPET MOUNTING	EA	10.00
10890	ALUMINUM COCKPIT ASSEMBLY		
10566	ALUMINUM MOUNT, DASH/SWITCH (FOUR WAY FLASHERS)	EA	1.00
10638	ALUMINUM MOUNT, DASH/SWITCH (HEADLIGHT)	EA	1.00
10869	ALUMINUM PANEL, COCKPIT REAR CORNER, UPPER SPLASH COVER	EA	2.00
10868	ALUMINUM PANEL, COCKPIT REARCORNER, LOWER SPLASH COVER	EA	2.00
11194	BLANK DASH	EA	1.00
12275	ALUMINUM PANEL, SPEEDOMETER CABLE BLOCK OFF PLATE	EA	1.00
12274	ALUMINUM PANEL, TRANSMISSION HARNESS BLOCK-OFF PLATE	EA	1.00
10906	ALUMINUM PANEL, U-JOINT ACCESS PANEL, (REAR TUNNEL COVER)	EA	1.00
13246	ALUMINUM PANEL, TRANSMISSION TUNNEL, REAR CORNER, DRIVER	EA	1.00
13247	ALUMINUM PANEL, TRANSMISSION TUNNEL, REAR CORNER, PASSENGER	EA	1.00
10563	ALUMINUM PANEL, TRANSMISSION TUNNEL TOP COVER	EA	1.00
12959	ALUMINUM PANEL, TRANSMISSION TUNNEL TOP COVER BLOCK-OFF PLATE	EA	1.00
10892	ALUMINUM ENGINE BAY ASSEMBLY		

10865	ALUMINUM PANEL, FRONT NOSE FLOOR	EA	1.00
12273	ALUMINUM PANEL, ENGINE HARNESS BLOCK-OFF PLATE	EA	1.00
12407	ALUMINUM PANEL, DASH HARNESS BLOCK-OFF PLATE	EA	1.00
10908	ALUMINUM PANEL, FRONT NOSE WALL, DRIVER SIDE	EA	1.00
10907	ALUMINUM PANEL, FRONT NOSE WALL, PASSENGER SIDE	EA	1.00
10861	ALUMINUM PANEL, SPLASH GUARD, DRIVER	EA	1.00
10862	ALUMINUM PANEL, SPLASH GUARD, PASS.	EA	1.00
10889	ALUMINUM REAR TRUNK ASSEMBLY		
12168	ALUMINUM PANEL, REAR SPLASH GUARD	EA	2.00
	PACKAGED SEPERATELY		
10611	WINDSCREEN, FULL, TINTED, CHROME ON BRASS	EA	1.00
10620	VINYL SEAT, ROADSTER STREET VERSION, BLACK	EA	2.00
12432	PASSENGER SIDE SIDE EXHAUST	EA	1.00
12433	DRIVER SIDE SIDE EXHAUST	EA	1.00
	M O U N T E D C O M P O N E N T S		
10788	SECONDARY BODY FASTENERS ASSEMBLY		
11024	BOLT, BODY MOUNT	EA	6.00
11265	LOCK NUT, NYLON, BODY MOUNT	EA	4.00
11005	WASHER, BODY MOUNTS	EA	18.00
13025	"U" NUT, SIDE BODY MOUNT	EA	2.00
10646	HOOD/TRUNK FASTENER ASSEMBLY		
10616	VINTAGE HINGES, TRUNK, L&R, PAIR	EA	1.00
11088	FLAT WASHER, VINTAGE HINGES, 1/4"	EA	4.00
11212	LOCK NUT, NYLON, VINTAGE HINGES, LARGE	EA	2.00
11213	LOCK NUT, NYLON, VINTAGE HINGES, SMALL	EA	4.00
10873	TRUNK HINGE SUPPORT, BODY MOUNT, REAR	EA	2.00
10876	DOOR HINGE ASSEMBLY (L,R)	EA	1.00
11265	LOCK NUT, NYLON	EA	4.00
11005	DOOR HINGE TO FRAME WASHER	EA	8.00
10585	WASHER, DOOR HINGE MOUNT	EA	4.00
11024	DOOR HINGE TO FRAME BOLT	EA	4.00
11221	DOOR HINGE TO DOOR LOCKNUT	EA	4.00
13027	DRIVER SIDE DOOR HINGE	EA	1.00
13028	PASSENGER SIDE DOOR HINGE	EA	1.00
10570	BODY, ASSEMBLY	EA	1.00
10841	BODY PANEL, DOOR, LEFT	EA	1.00
12181	BODY PANEL, DOOR, RIGHT	EA	1.00
10740	BODY PANEL, HOOD	EA	1.00
10887	BODY PANEL, MAIN BODY, 1 PC	EA	1.00
10818	BODY PANEL, TRUNK	EA	1.00
13482	PANEL TRIMMING STICKER	EA	1.00
10553	QUICKJACK BUMPER ASSEMBLY		
10832	BOLT, BUMPER MOUNT, FRONT/REAR	EA	8.00
11059	LOCK NUT, NYLON, QUICKJACK BUMPER BOLT	EA	8.00
10654	SLEEVE, QUICKJACK BUMPER, FRONT, 6"	EA	4.00
12456	SLEEVE, QUICKJACK BUMPER, REAR OUTER, 1.75"	EA	4.00
10957	SLEEVE, QUICKJACK BUMPER, REAR INNER, 3.75"	EA	4.00
10585	WASHER, QUICKJACK BUMPER MOUNT, 16 REAR, 8 FRONT	EA	24.00
10890	ALUMINUM COCKPIT ASSEMBLY		
11192	SCREWS, SELF TAPPERS, KIT BUILDING	EA	50.00
13483	ALUMINUM PANEL, DOOR LATCH SUB-PLATE, COSMETIC COVER	EA	2.00
10859	ALUMINUM PANEL, DRIVER FOOTBOX, TOP/INSIDE SECTION	EA	1.00

10858	ALUMINUM PANEL, DRIVER FOOTBOX, TOP/OUTSIDE SECTION	EA	1.00
10905	ALUMINUM PANEL, DRIVER FOOTBOX, VERTICAL WALL, INSIDE	EA	1.00
10904	ALUMINUM PANEL, DRIVER FOOTBOX, VERTICAL WALL, FRONT	EA	1.00
10554	ALUMINUM PANEL, DRIVER FOOTBOX, VERTICAL WALLS, OUTSIDE	EA	1.00
12985	ALUMINUM PANEL, DRIVER FOOTBOX, DROPPED FLOOR	EA	1.00
10557	ALUMINUM PANEL, COCKPIT FLOOR, DRIVER SIDE, W/TUNNEL WALL	EA	1.00
10558	ALUMINUM PANEL, COCKPIT FLOOR, PASS SIDE, W/TUNNEL WALL	EA	1.00
10853	ALUMINUM PANEL, PASSENGER FOOTBOX, TOP	EA	1.00
13139	ALUMINUM PANEL, PASS FOOTBOX, VERTICAL WALL, INSIDE WALL	EA	1.00
13138	ALUMINUM PANEL, PASS FOOTBOX, VERTICAL WALL, FRONT WALL	EA	1.00
10551	ALUMINUM PANEL, PASS FOOTBOX, VERTICAL WALL, OUTSIDE	EA	1.00
10823	ALUMINUM PANEL, REAR COCKPIT VERTICAL WALL (BEHIND SEATS)	EA	1.00
10556	ALUMINUM PANEL, SIDE COCKPIT WALL, UNDER DOOR, (L, R)	EA	2.00
10594	ALUMINUM PANEL, TRANSMISSION TUNNEL FRONT VERTICAL WALL	EA	1.00
10892	ALUMINUM ENGINE BAY ASSEMBLY		
10864	ALUMINUM PANEL, ENGINE BAY WALL "F", DRIVER	EA	1.00
10863	ALUMINUM PANEL, ENGINE BAY WALL "F", PASS.	EA	1.00
10559	ALUMINUM PANEL, FIREWALL	EA	1.00
10963	ALUMINUM PANEL, FIREWALL EXTENSION, PASSENGER SIDE	EA	1.00
10889	ALUMINUM REAR TRUNK ASSEMBLY		
10560	ALUMINUM PANEL, TRUNK FLOOR, FRONT SECTION	EA	1.00
10561	ALUMINUM PANEL, TRUNK FLOOR, REAR, MAIN CARGO AREA	EA	1.00
10870	ALUMINUM PANEL, TRUNK WALL SIDE COVER PANEL (L, R)	EA	2.00
12435	ALUMINUM PANEL, TRUNK WALL, LONG, DRIVER SIDE	EA	1.00
10562	ALUMINUM PANEL, TRUNK WALL, LONG, PASSENGER SIDE	EA	1.00
10500	FRAME, COMPLETE ASSEMBLY, PAINTED	EA	1.00

Appendix D – Big Block Instructions

Part Number: 12401	*Revision:* D	*Effective Date:* 03/12/03	*By/Date:* J. CAMIRE
Document Type (indicate):			
	° Bill of Materials	° Drawing (may be attached**)**	° Specification
	• **Assembly Instructions**	° Operating Procedure	° Other

Big Block 390/427/428/429/460
Installation Instructions

These instructions are designed to supplement the assembly manual where the assembly process is different from the build up using a small block. Sections of the manual that deal with wiring and motor preparation of the small block will not apply and can be skipped. Read through these instructions before beginning assembly as some of the changes occur early on in the build up.

427 Shown here with fuel injection.

I. Parts Included in Kit:

12349	390/427/428/429/460 KIT	EA	1.00
12351	SPRING, FRONT COIL-OVER, BLACK, 2", 500#	EA	2.00
12401	390/427/428/429/460 INSTRUCTIONS	EA	1.00
12593	429/460 ENGINE MOUNT ASSEMBLY (or 390/427/428 Engine mount assembly)		
12478	RUBBER INSULATOR	EA	2.00
10520	BOLT, ISOLATOR TO STEEL MOUNT	EA	4.00
11221	LOCK NUT, NYLON, ISOLATOR TO STEEL MOUNT	EA	4.00
10585	WASHER, ISOLATOR TO STEEL MOUNT	EA	8.00
10882	WASHER, ISOLATOR STUD	EA	2.00
11059	LOCK NUT, NYLON, ISOLATOR STUD	EA	2.00
12595	429/460 ENGINE MOUNT, WELDED ASSEMBLY	PR	1.00
12360	429/460 HEADER ASSEMBLY		
12410	HEADER BOLT	EA	16.00
12422	429/460 HEADER TO HEAD GASKET	EA	1.00
12424	429/460 DRIVER SIDE HEADER	EA	1.00
12425	429/460 PASSENGER SIDE HEADER	EA	1.00
12363	4 INTO 4 SIDE EXHAUST ASSEMBLY		
11221	LOCK NUT, NYLON, SIDE EXHAUST, MOUNT POST,	EA	2.00
10585	WASHER, MOUNT POST, SIDE EXHAUST	EA	2.00
10851	SCREW, RUBBER MOUNT POST, SIDE EXHAUST	EA	2.00
11005	WASHER, RUBBER MOUNT POST, SIDE EXHAUST	EA	2.00
11040	BOLT, FRONT EXHAUST MOUNTING FLANGE	EA	8.00
12172	LOCK NUT, EXHAUST MOUNT FLANGE	EA	8.00
12423	HEADER TO SIDE EXHAUST GASKET	EA	0.50
12426	DRIVER SIDE 4 INTO 4 SIDE EXHAUST	EA	1.00
12427	PASSENGER SIDE 4 INTO 4 SIDE EXHAUST	EA	1.00

II. Disassembly of the Mustang

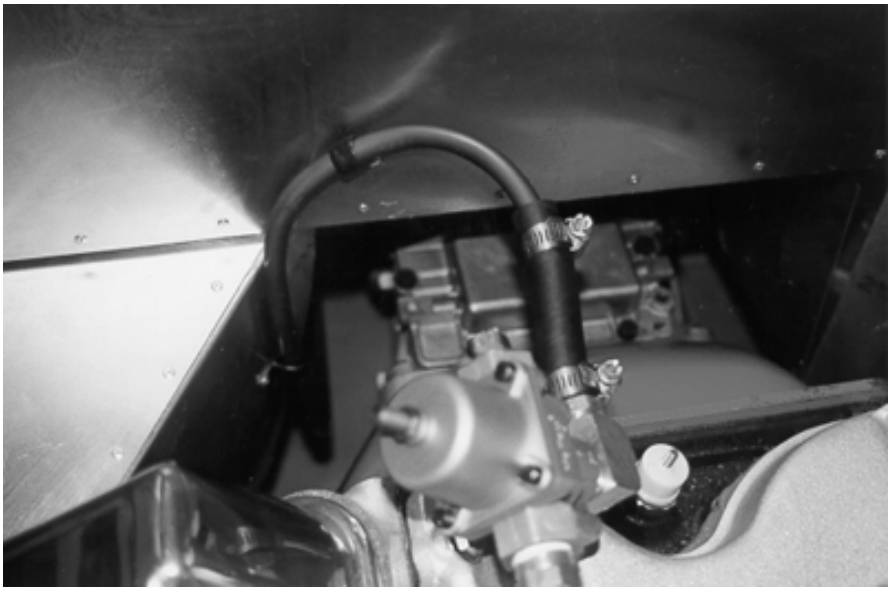
The following parts will not be required off of the Mustang donor parts list.

1. Engine and T-5 Transmission
2. Motor Mounts
3. Mass Air Sensor
4. Oxygen Sensors
5. Headers
6. Radiator
7. High pressure fuel line
8. Fuel evaporative canister
9. Wiring Harness
10. Ignition Cylinder
11. Coil
12. Computer
13. Gauge Cluster

The Throttle cable from the Mustang can be used with the Carburetor so make sure to remove and keep it.

III. Chassis Assembly

1. If you plan on using an external fuel pump, (the original pump runs to high pressure) the in tank pump will need to be replaced with either the suggested pickup or one from an earlier (1985) carbureted Mustang. The old Pickup is held into the tank with a metal ring that needs to be spun about ¼ turn to be removed. This is best accomplished with a punch (or screwdriver) and a hammer tapping a little at a time on opposite sides. The pickup can then be lifted out paying close attention to the alignment of the tubes so the new one can be mounted in the same location.
2. Larger fuel line is provided for all carbureted kits, the line routing is similar to what the manual describes for the back half of the car, however depending on the type of fuel pump you use (electric or mechanical) you may want to run the line differently. With a mechanical pump the line can be run to the front of the passenger side footbox the up as long as it is kept well clear of the header. If you are running an electric pump the line can run directly up the firewall to the inside of the footboxes and to the back of the carburetor.

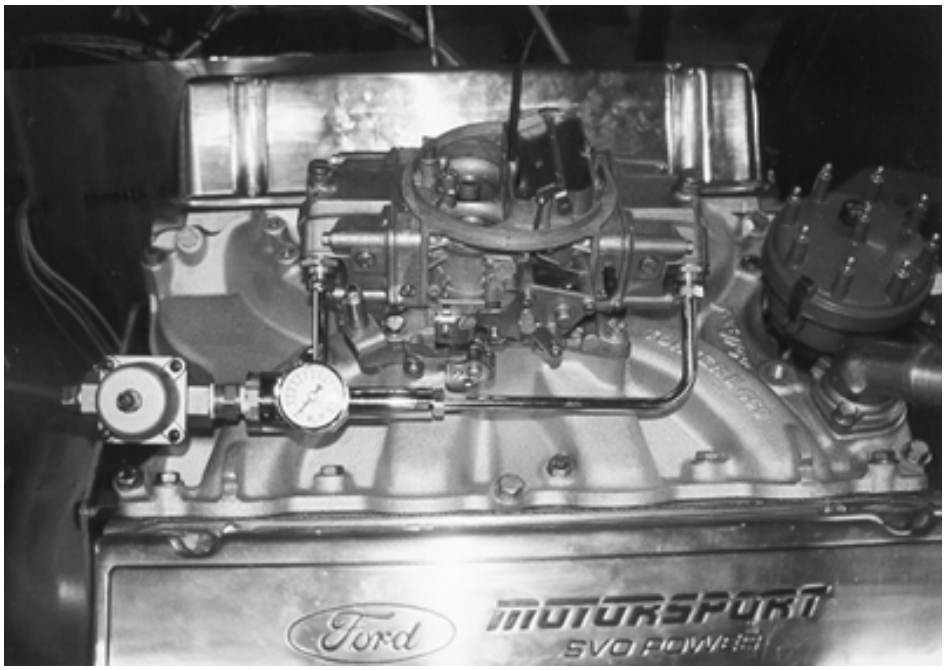


Fuel line and pressure regulator mounted at rear of engine(For carbureted applications)

3. The electric fuel pump should be mounted to a frame rail as close to the tank as is practical. The 2"x 3" next to the battery is a good solid location, however, some pumps must be mounted below the pickup so they may have to be mounted either further forward or behind the tank.

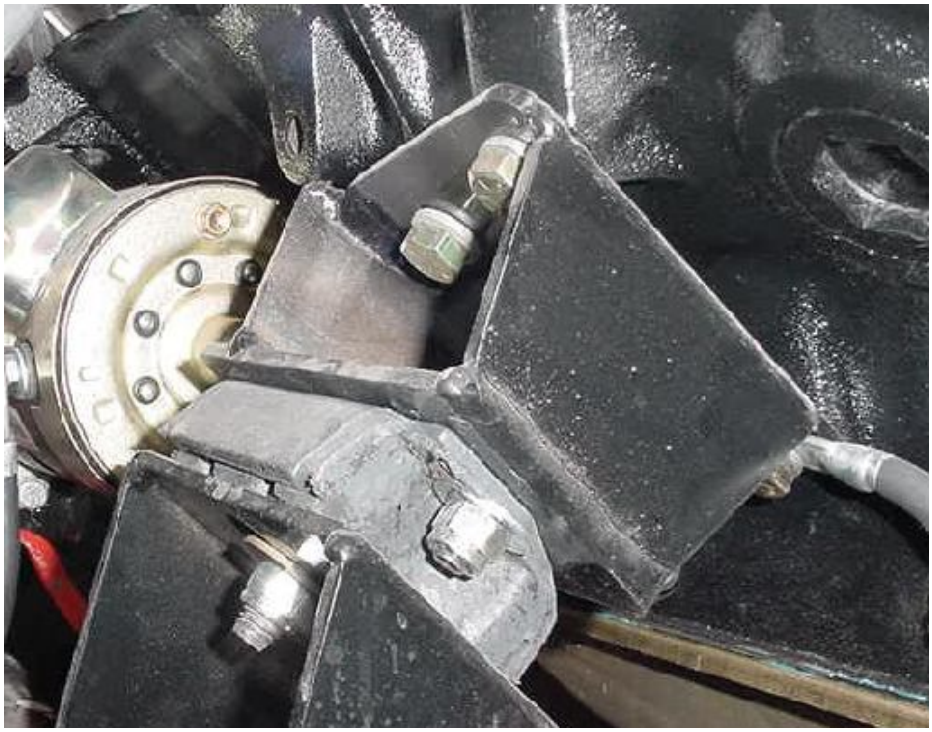
IV. Engine Preparation

1. The intake manifold used must have sufficient clearance for the air cleaner underneath the hood scoop. The Edelbrock Torker II manifold will fit but it is about the maximum height useable. The high-rise intake that comes with the 460 crate engines from Ford will not fit under the stock hoodscoop.



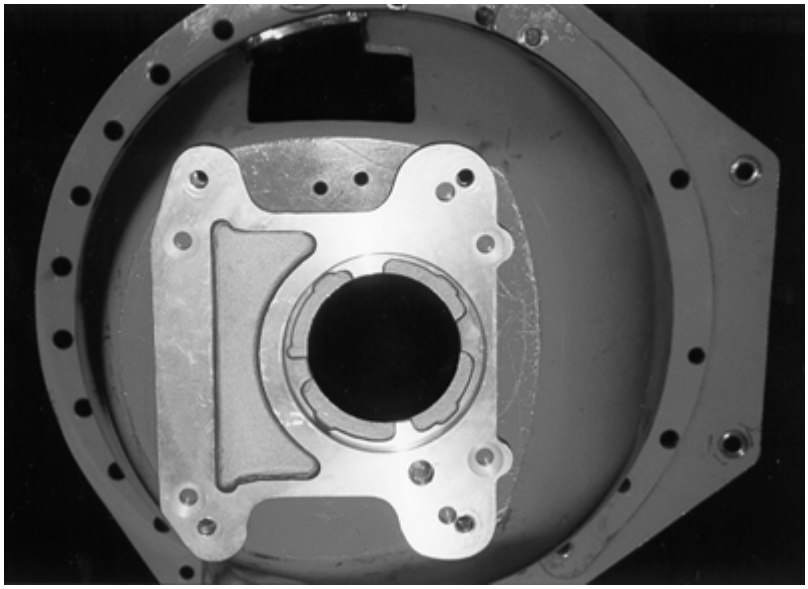
460 Single plane manifold with 850 CFM Carburetor

2. The throttle cable from the Mustang donor car can be used with a carburetor and most Holleys come with the correct linkage ball to snap on the cable. Use a universal throttle linkage bracket from Holley or equivalent to hook the cable up to the intake.
3. The oil pan that comes with the crate motor (along with most stock oil pans) is very deep and hangs downs below the frame, we suggest the canton flat bottom pan which gives sufficient ground clearance and also provides extra baffling and windage control. The pan may have to be clearanced slightly to fit the motor mount on the passenger side. This can be done by gently tapping the pan with a soft hammer or by removing some material from the mount.
4. The oil filter relocation kit is no longer necessary as the header clears the filter in its stock location, this segment of the manual can be ignored.



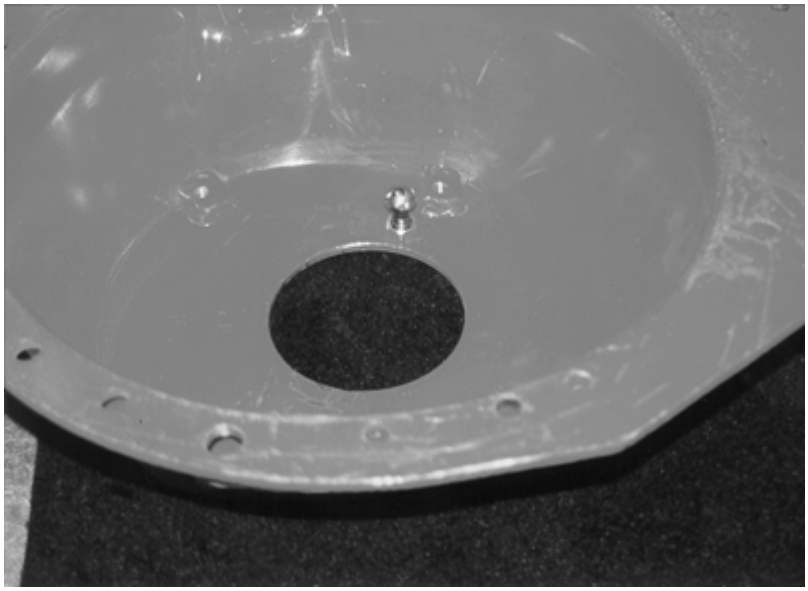
427 Engine Mount with rubber isolator.

5. The transmission we recommend is a Tremec TKO heavy duty 5 speed that will fit the big block engines with a Lakewood bellhousing and the spacer mentioned in the suggested parts list. In order to use any manual transmission the clutch linkage will need to be converted for use with the pedals and cable from the Mustang. If you are using the spacer from Mcleod it comes with a pivot and jam nut, as well as a clearance hole where the pivot needs to sit. Mark the location on the bellhousing using the spacer as a template, the pivot is centered about the hole in the spacer, then drill and tap the hole to fit your pivot. The height adjustment of the pivot should be made with the clutch attached to the motor at the correct torque spec. If you are not using the spacer but still need a ball pivot, an adjustable one is available also from Mcleod.

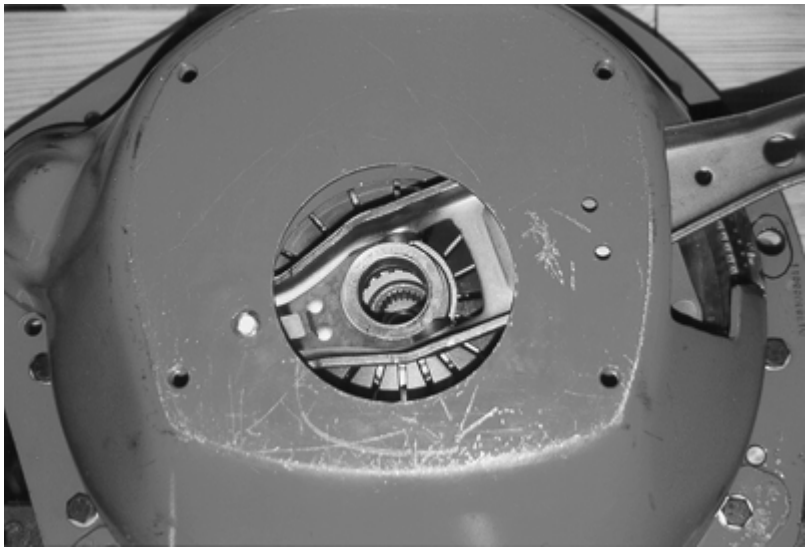


Bellhousing and spacer lined up to mark pivot hole

6. The Driveshaft will also vary in length depending on the transmission you select. Before you have your Driveshaft shortened, measure the distance between the end of the transmission and the rear axle flange with the car at ride height (4 ¾" from the ground to the bottom of the 4" round main rail). Make sure and include some room for the driveshaft to slide into the transmission with suspension travel, 1/2" is sufficient.
7. On the Lakewood scattershield there is a mount for the pivot on the driver's side for a mechanical or hydraulic linkage. This tab should be removed for extra clearance of the clutch fork. The slot for the fork should also be elongated to provide more clutch travel. Remove ½" of material toward the engine side of the shield. The last modification to the housing is to enlarge the hole for the clutch cable to pass through, the ½ " bolt hole that is directly in front of the slot for the fork needs to be drilled out with a 41/64" Drill.

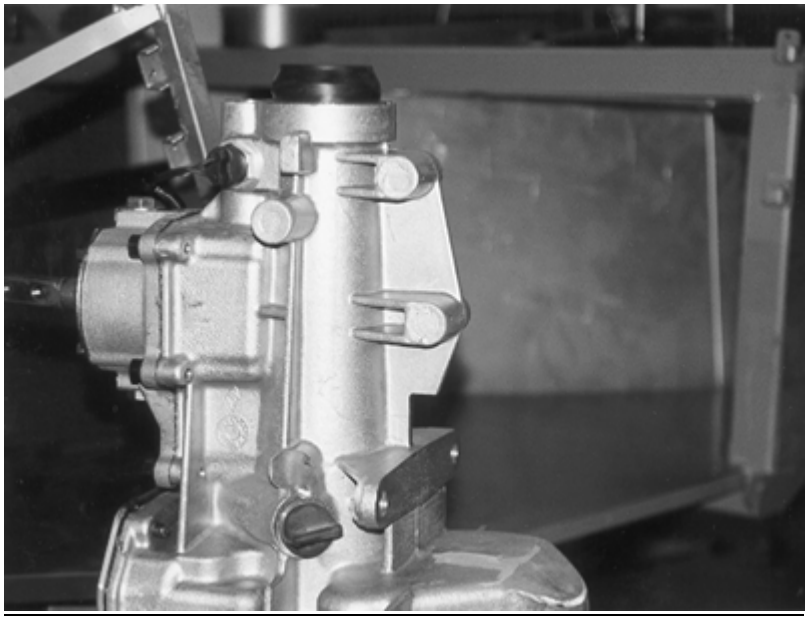


Pivot installed in bellhousing

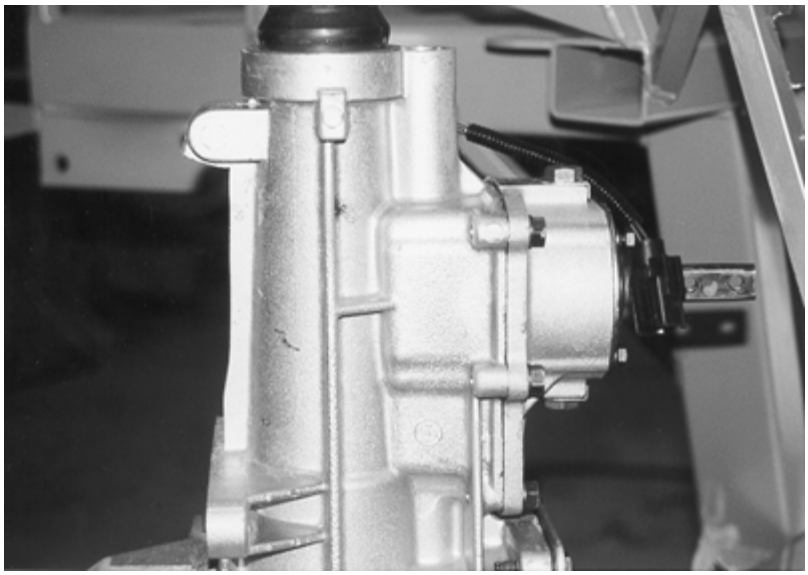


Clutch Fork installed awaiting transmission

8. The transmission mount to the crossmember must also be fitted with spacers due to the higher centerline of the Big Block crankshaft. Two one-inch spacers are fit between the mount and the transmission, which raises the entire assembly, by one inch. Even with this raise the rear of the tranny needs to be trimmed to fit over the 4-inch crossmember. The mount hanging off the bottom of the housing is for a torque arm and is trimmed off level as shown in the picture.



Tremec housing with torque arm mount

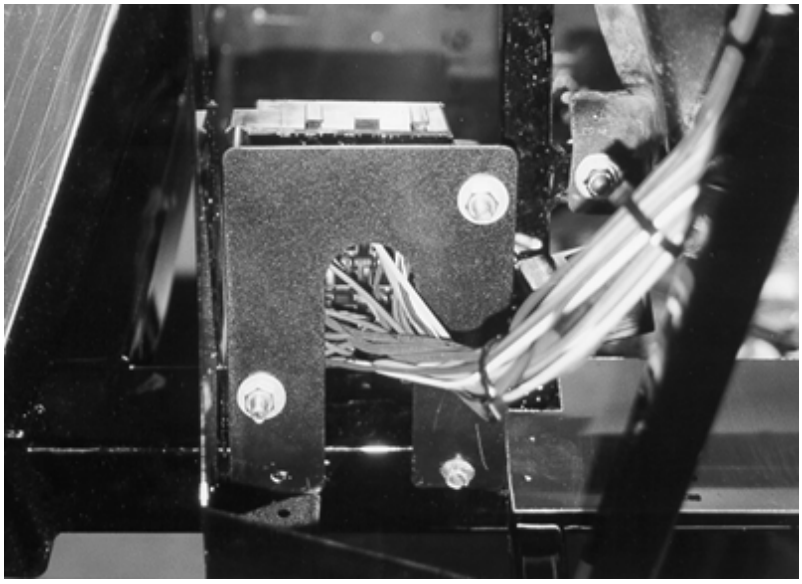


Torque arm mount removed for crossmember clearance

9. Level the motor using the intake manifold or the back of the bellhousing, this is important in order for the side exhaust to line up correctly with the body as well as for valve cover clearance on the drivers side.
10. The headers should be fitted to the engine after it has been lowered into place. Wait to mount the side pipes until after the body has been fitted. The exhaust gaskets for the side pipes will need to be cut from the material provided, it is all right to have excess material on the outside of the flange but try to keep the inside flush with the tubes.

V. Wiring Harness

1. The wiring harness that comes with the kit is labeled for all the circuits necessary to complete the car with the exception of an electric fuel pump. If you plan on running an electric pump and are not going to be installing a radio then this circuit can be used to trigger a relay for the pump. The remainder of the harness should be run according to the instructions.
2. The ignition switch provided is for mounting in the dash on the right hand side underneath the smaller gauges. The headlight switch can be place here as well or on the left side closer to the door.
3. Block off plates have been included in the kit for the holes where the fuel injection harness passes through the firewall and transmission tunnel. The blockoff plate for the driver's side footbox hole can be drilled to pass through the wires for the headlights and front turn signals. The grommet that comes with the harness can be used here to keep the firewall sealed around the wires.
4. The Starter solenoid, coil, and ignition system can be mounted to the firewall for an uncluttered look in the engine bay. There is a hole in the rear corner of the Drivers inside footbox wall for these wires, as well as the rear taillight wires to pass through.
5. The fuse box mounts easiest above the drivers footwell using the mounting hardware provided with the harness. Wherever you mount the panel make sure that you can easily access the fuses to replace them.



Fuse box mounted to driver's footbox from above

Fuse box from below

Suggested Parts

The following parts are suggestions based on a combination of parts that we know to work. These parts are not specifically required and some may be unnecessary depending on your combination.

Engine

Ford Motorsports 460	M-6007-C460 (SVO)
Intake Manifold	5066/Torker II (Edelbrock)
Flat Bottom 9 Quart Oil Pan	13-766 (Canton)
Oil Pickup	13-767 (Canton)
Starter	86 Ford F350 460 5 Speed
Aluminum V Belt Pulleys	1810 (March)
Alternator (single wire)	SUM-G1667 (Summit)
850 CFM Carburetor	0-4781 (Holley)

Transmission

5 Speed	Tremec TKO
Bellhounsing	15220 (Lakewood)
Spacer	8607 (Mcleod)
Flywheel	463226 (Mcleod)
Clutch Disk	260873 (Mcleod)
Pressure Plate	360821 (Mcleod)
Throwout Bearing	87-93 Mustang 5.0
Pilot Bearing	86 Ford F350 460 5 speed
Clutch Fork	94-95 Mustang 5.0

Miscellaneous

Fuel Pump	BG280 (Barry Grant)
Fuel Pressure Regulator	12-704 (Holley)
Fuel Pickup	8002045 (Paxton)
Aluminum Radiator	87-93 SVO

SUPPLIERS USED

Canton Racing	203-484-4900
Summit Racing	800-230-3030
Mustang Unlimited	800-243-7278
Holcomb Motorsports	800-475-7223

Appendix E – Independent Rear Suspension

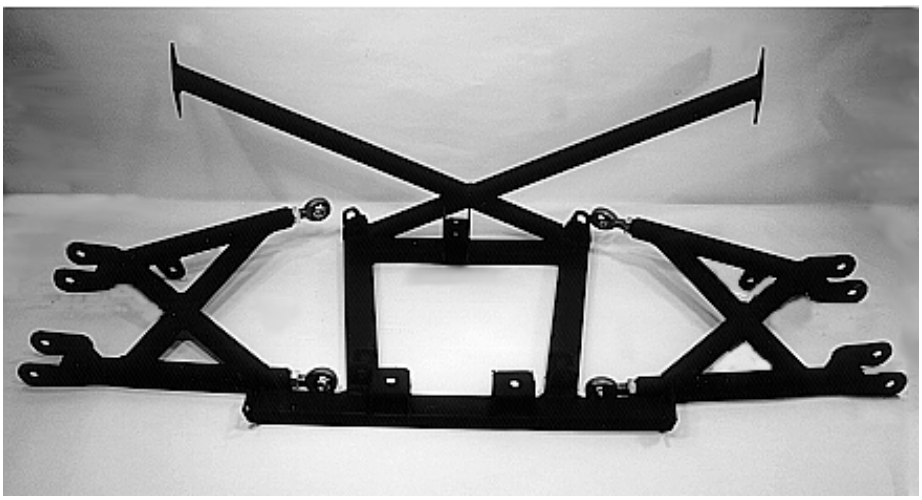
Part Number: 12449	*Revision:* G	*Effective Date:* 10/09/03	*By:* J. INGERSLEV J. SCHENCK
Document Type (indicate):			
	• **Bill of Material**	° Drawing (may be attached)	° Specification
	• **Assembly Instructions**	° Operating Procedure	° Other

Independent Rear Suspension
Installation Instructions

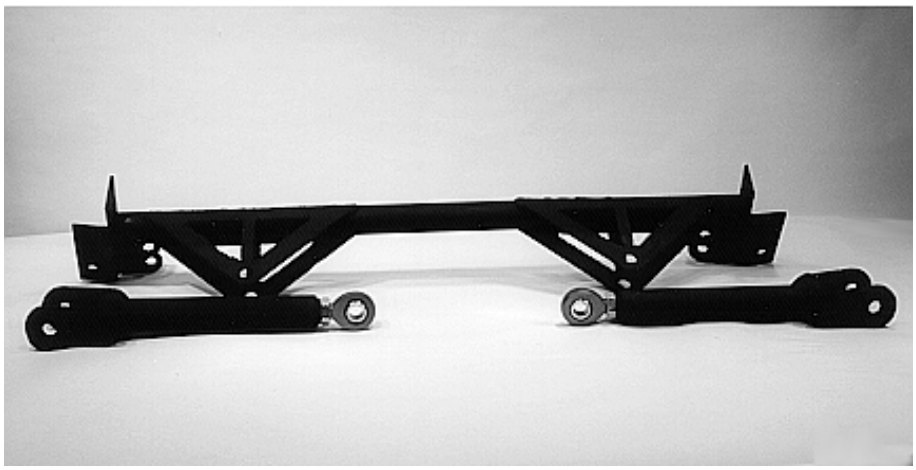
Note:

- These instructions are designed to supplement the Assembly manual where the assembly process is different from the build-up using a live axle. Sections of the manual that deal with the assembly of the rear end will not apply and can be skipped. Read through these instructions before beginning assembly as some of the changes occur early in the build-up.
- Using the Factory Five Racing Independent Rear Suspension will require a conversion to 5 lug which, if you are not currently using 5 lug will require new wheels.
- If you need 11" 5 Lug rotors for the front then use '82-'83 Lincoln Continental or '91 Lincoln Mark VII LSC or Ford Motorsport # M-1102-C

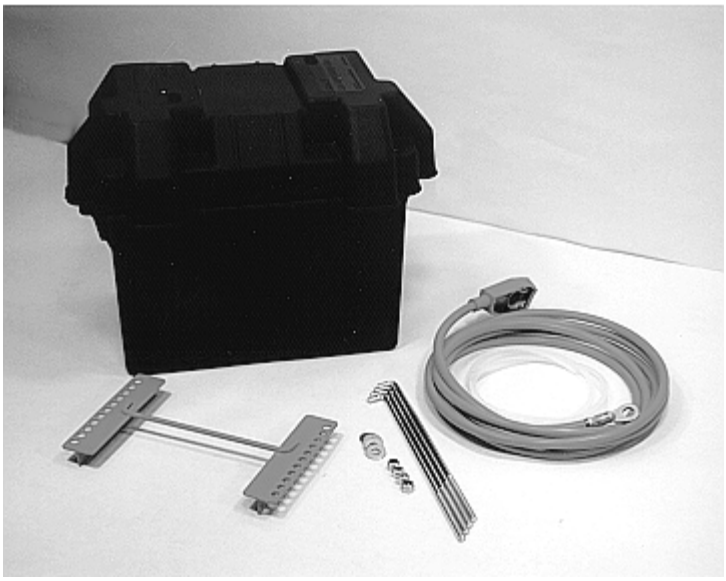
I. Parts Included in Kit:



Lower arms and Cage (Cage separate from frame)



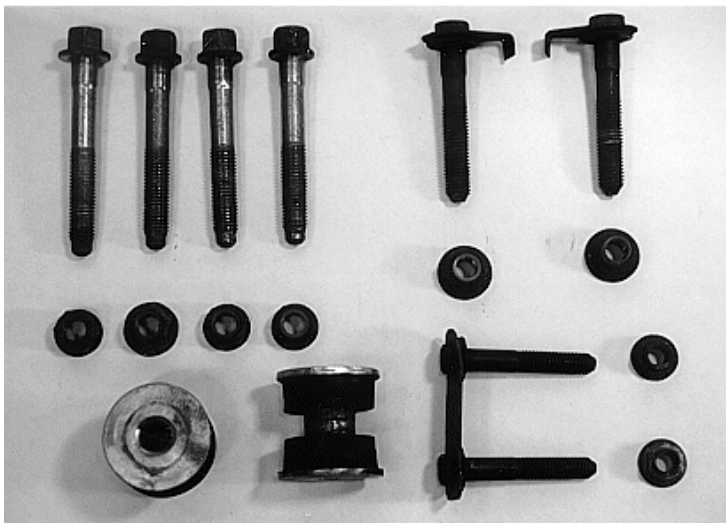
Upper arms and Cage (Cage separate from frame)



Battery relocation kit

II. Thunderbird Parts needed

- 8.8” Center section and front mounting bushings
- CV joints
- Spindles and attaching hardware
- Brakes with flexible lines and mounting brackets



Donor bolts/fasteners needed. (Upper) Spindle attaching bolts.
(Lower left) Center Section front mounts. (Lower right) Center Section rear mount bolts.

III. Non-Thunderbird parts needed

- Mustang Quad shocks – Do not use aftermarket KYB shocks
- ½" Lug nuts

IV. Tools Needed

Drill

3/16" drill Bit
3/8", ¾", 15/16" sockets
3/8", ¾", 15/16" wrenches
3/8"-7/16" Brake line box wrench
Brake line double flare tool
Brake line cutter
Brake line bender
Ruler/Tape measure
Snap ring pliers
Pliers
Flat head Screwdriver
Tin Snips/scissors/razor
Marker

V. Supplies needed

3.25 pints Gear oil
4 oz. Friction Modifier
Brake Fluid
Rear brake pads

VI. Torque Specification Chart

	Ft-lb
Metric Threads	
M12	60
U.S. Threads	
¼-20	6-9
½”-13	70
5/8”-11	85

VII. Alignment Specifications

Front:	Caster	3
	Camber	-1
	Toe in	1/16” Total
Rear:	Camber	-1
	Toe in	1/16” Total

VIII. Selection and Disassembly of the Thunderbird Donor

When selecting a donor vehicle, there are several important things to look for to avoid problems. Ford used the same IRS set-up for a few different cars. Thunderbirds between 1989 and 1997, Lincoln Mark VIII’s between 1992 and 1999, and Mercury Cougar XR7’s between 1989 and 1992. Only some of the cars have the correct parts that are needed. The points to check are as follows:

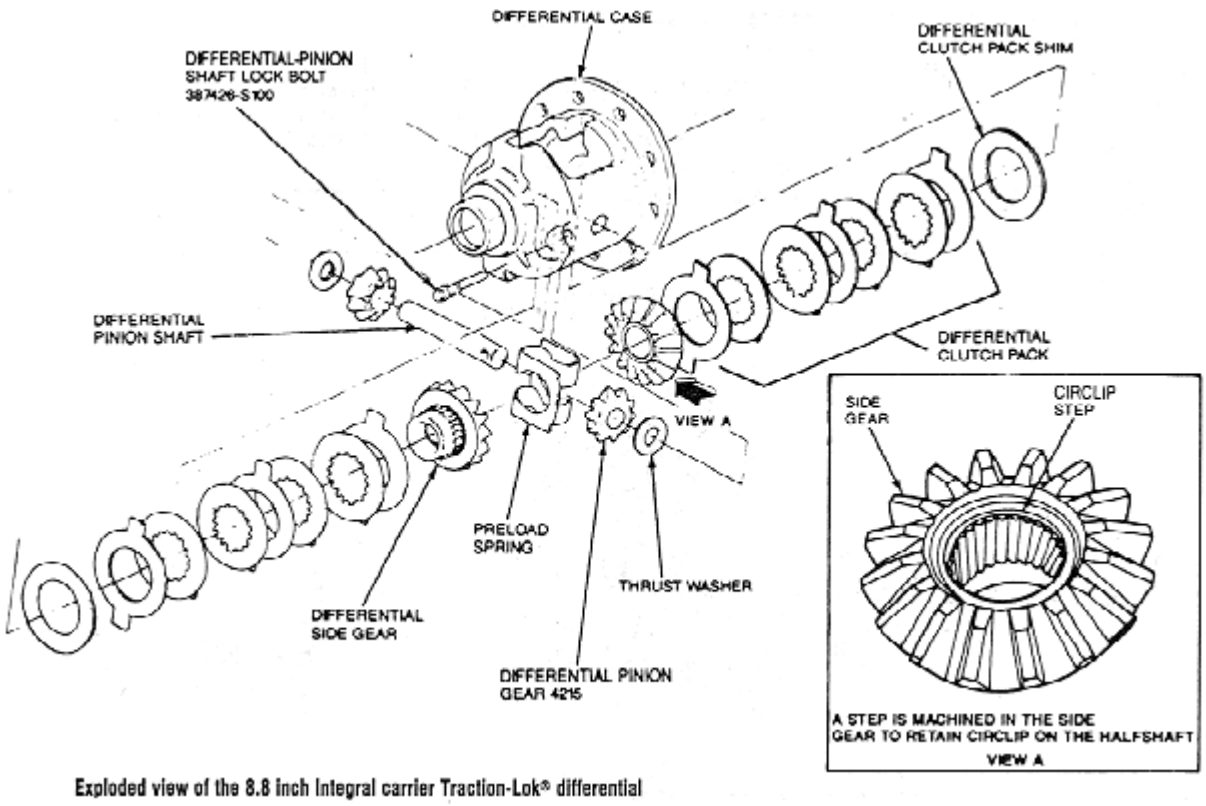
1. The first and most important item to check when looking at different rear ends is the diameter of the CV shafts. The V6 and some V8 cars came equipped with a smaller diameter CV shaft. These CV joints will not work with the new shorter shafts provided or with the Torque/Horsepower that can be made from a 5.0L HO so they should be avoided. To check for the proper shaft size, check the diameter of either side. **The correct diameter is 1.2 inches**, measured between the inner and outer CV boots. If you are using a Super Coupe, the axles will be correct even if the passenger side is considerably thicker. Under the boots, it necks down to the correct size.
2. Check the center section. What you need is an 8.8 inch unit. It will have 8.8 cast into the top of the differential and is noticeably larger than the 7.5 inch center that was also used. Lincoln Mark VIII came with aluminum center sections that are 15lbs lighter than the iron one.
3. The Thunderbirds were available with and without rear disc brakes. We recommend one with the discs (free upgrade from a drum brake solid axle).

- When you find a rear you like just ask for the whole rear clip from the car. The whole thing unbolts with four bolts and they usually cut the driveshaft. This way you will be sure to get everything that you need.

- The rearends we have found work the best are from Thunderbird Supercoupes. We have found them for between $300-$350. Lincoln Mark VIII's go for around $600.

Limited slip (Posi-traction/Traction-Lok) and Open Differentials

- Early Mark VIII center sections do not have a limited slip differential.
- The Thunderbird Supercoupe does have a limited slip differential.
- The IRS is an 8.8 center section and it can use the same gears that the solid axle 8.8 from the Mustang uses but, it can not use the same differentials. The IRS differential has a step cut in the side gears to hold the CV joints in the center section. Without this step there is nothing holding the axles from coming out.



Exploded view of the 8.8 inch Integral carrier Traction-Lok® differential

- There are only three differentials that will work in either the Mark VIII or T-bird center section, the stock Supercoupe traction-Lok, an *Auburn Gear* differential and a Torsen differential. *Auburn* offers two units that will work. The high performance unit (part # 542079) for standard OE replacement(~$250), and the pro series unit (part # 542080) for better traction and faster engagement (~$350). The *Torsen*, sold by *Ford Motorsport* is the best differential around and is used by many performance car companies (*Porsche*) as standard equipment. It is all gears inside and never wears out. It isn't designed for a life of drag racing though, its designed for roadracing. The *Ford Motorsport* part number is M-4204-T28 (~$500).

- Parts can be bought new if desired.
  Aluminum 8.8" Center section with 3.73 gears - $675 Ford Motorsport

CV joints – $120/ea	Autozone parts store
Spindles - $600/ea	Ford dealer
Brake caliper - $100/ea	Napa parts store
Spindle bolts and center section mounts -	Ford dealer

Master Cylinder Selection Chart

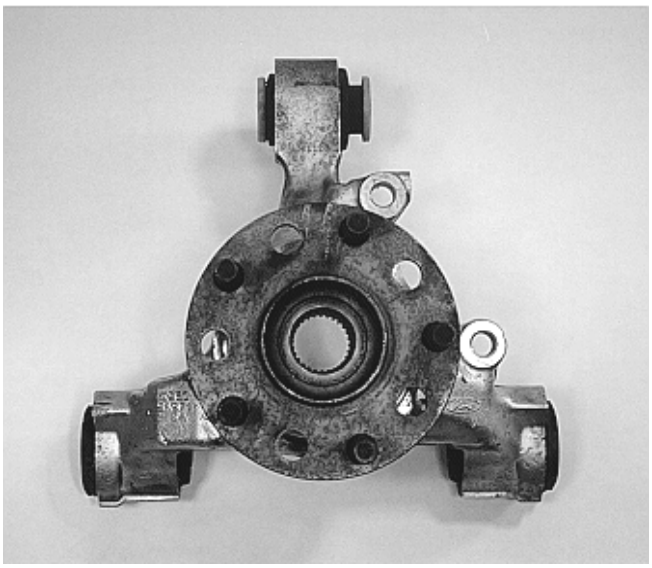
Front Calipers	MC Bore Diameter	MC Source Vehicle	Part Source	Part Number
Lincoln *Continental/Mark VII*	1”	1993 Mustang *Cobra*	Ford, Parts Store	Bendix# 12669
Cobra Mustang	15/16”	1994 Mustang *Cobra*	Ford	
Stock Mustang	7/8”	1982 4 cyl. Mustang	Parts Store	Bendix# 11764

IX. Modification of IRS parts

<u>Do not throw away any parts from the IRS until the IRS is installed and the axles have been changed.</u>

- **Spindles**

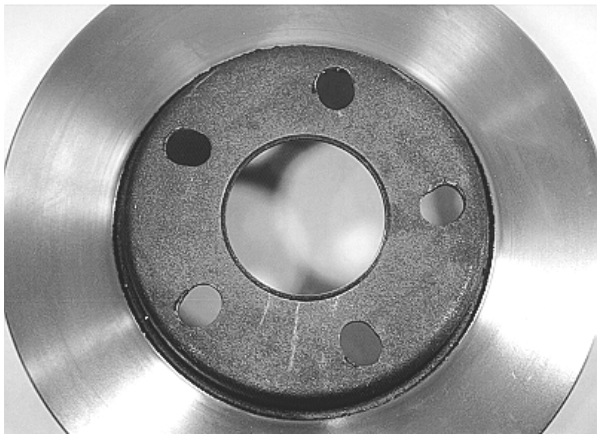
- *The Thunderbird uses a 5 lug x 4.25” Lug pattern. This is not very helpful since the Mustang uses either a 4 lug x 4.25” pattern or a 5 lug x 4.5” pattern. Unless you want a different lug pattern on your rear, the hubs will have to be drilled to the 5 lug x 4.5” pattern. We would recommend that a machine shop do this, as the measurements need to be precise otherwise your wheels will not fit. We had a shop do both hubs for $100. The machine shop will press the hubs out of the bearings and press the wheel studs out of the hubs. We have included new ½”studs so that the front and rear lug nuts are the same and are good and strong. The Thunderbird used metric studs and lugs.*
- *When you get the spindles back, check the hubs for slop in the bearings. There should be none. If there is, have the shop replace the bearings. Check the new bolt pattern in a wheel to make sure that it will go on.*



Wheel studs in new location.

- **Rotors**

Once the spindles have been redrilled, the rotors must be made to fit the new lug pattern. The easiest way to do this is using a Dremel tool or grinder to oval out the existing stud holes. Mustang 5 lug rotors can not be used as they have a different wheel mount surface to rotor surface distance.

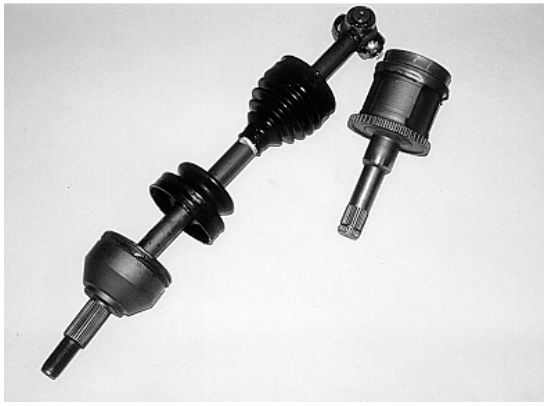


Wheel Stud holes elongated

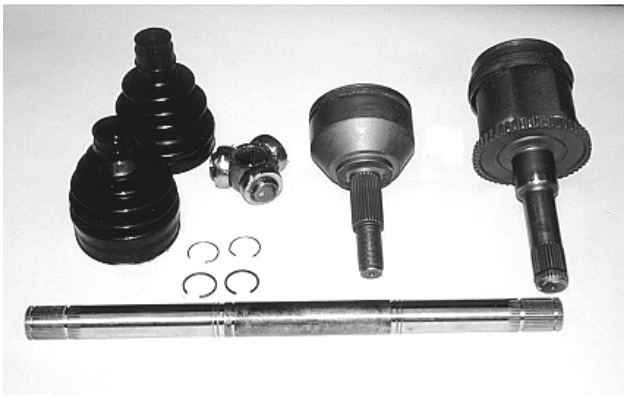
- **CV Joints**

Do not cut the CV Boots*, they may have to be reused. Some joints have one side that is bigger than the boots we supply. If you need a replacement for the larger boot they are available from your local Ford dealer.*

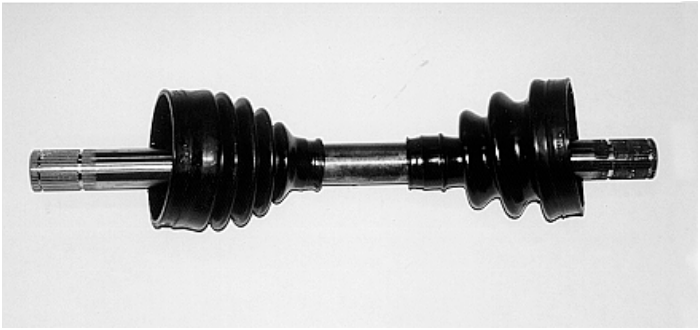
1. Cut the clamps that hold the boots to the CV joints and pull back the boots toward the center of the axle shaft. **Do not cut the CV Boots**, they may have to be reused.
2. Slide the larger joint off the shaft and set to the side.



3. The two remaining pieces, the fixed joint and the inner plunge joint, need to be tapped off with a hammer. Be very careful not to damage any of the moving parts, work from all sides to be sure each piece comes off straight.



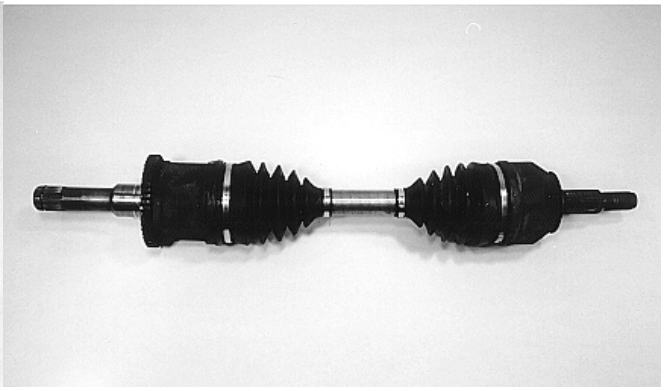
4. Once the joints have been removed, the “C” clips can be slid off the old axles using a pair of snap ring pliers.
5. Inspect the CV joints for any damage or obvious wear and re-grease.
6. Test fit the new CV boots on the joints to see if they fit. If they do not you will have to reuse the old boots.
7. Slide the boots onto the new axle shafts with the narrow openings toward the center.



Boots pushed onto the new shaft

8. Replace the “C” clips in the same grooves on the new axle shaft and tap the joints back onto the shaft. (The shaft is symmetrical so either joint can go on either end)
9. Slide the larger CV joint back into position and pull the boots up over both ends.
10. Install the boot clamps tight to prevent grease from creeping out, make sure on the larger CV joint that there is room for the joint to plunge without crushing or stretching the boot.

Old axle



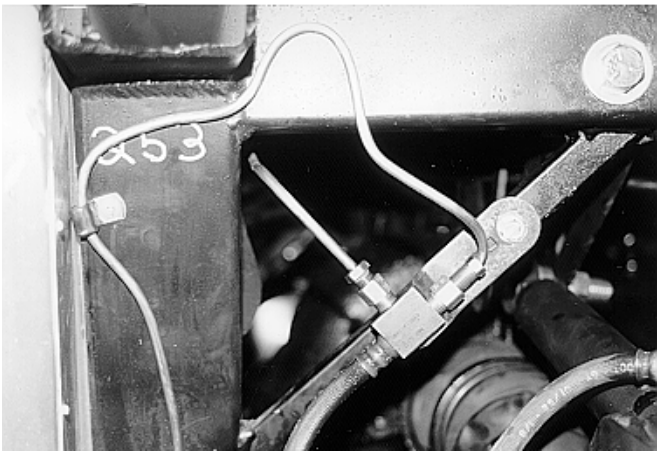
New axle

- **Brake Calipers/Lines**

1. Unpack the included parking brake cables and find the smooth end of the cable (the end without the built in retaining barbs) and try in insert it into the bracket on the caliper. Use a screwdriver and bend the bracket until the cable fits.

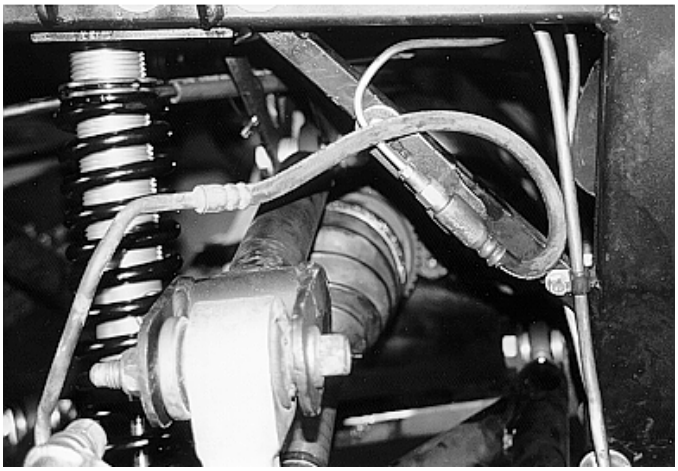
E-brake cable holder on caliper with cable sleeve inside

2. Using the Thunderbird flexible brake line with the “T” connection on it, hold it up to the ¾” tubing on the driver’s side that connects the two 2”x3” frame rails. Mark the location of the mount hole and the locating pin hole on the tube as shown in the picture.



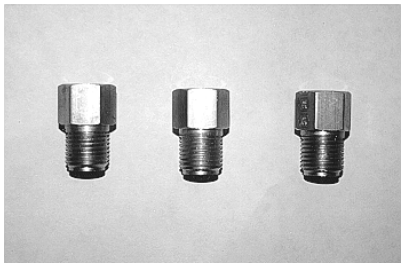
Driver side brake line mount

3. Drill two 3/16" holes, one for the mount screw and one for the locating pin.
4. Mount the "T" junction to the tubing.
5. Mount the other flexible line to the passenger side of the frame in the same location.



Passenger side brake line mount

6. Insert two of the brake fitting adapters into the”T” and tighten with a ½” wrench.



Brake line fittings

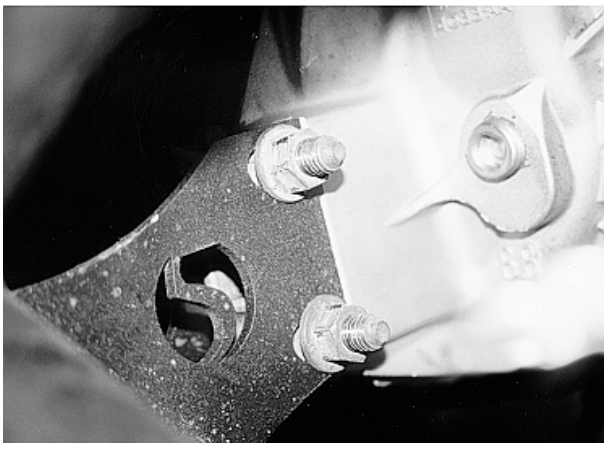
7. Attach the brake line going from the Master Cylinder to the rear brakes to the “T”.

8. Using the 60” brake line provided, make a line to run between the two flexible line mounts. Run the line along the 2”x 3” tube. Use the insulated line clips and screws provided to mount the line to the frame.
9. Check the routing of the fuel and brake lines. No lines can run up the backside of the 2”x 3” tube. Bend the lines forward and out of the way. The IRS lower arms run approximately ¾” away from the backside of the 4” frame rail.

X. Bolt-On Parts

- **Differential Installation**

1. Drain the Differential and make sure the rear cover seal does not leak. Replace if necessary. **Do not fill with oil yet!**
2. If not installed, install the Center Section front mounts from the donor onto the Center Section.
3. Slide the Center Section under the lower cage. With the help of a friend from the top and you under the Cage, raise the Differential up through the middle of the Cage, sideways and Pinion first. Rotate the differential and rest the front on the front member and insert the rear mount bolts.

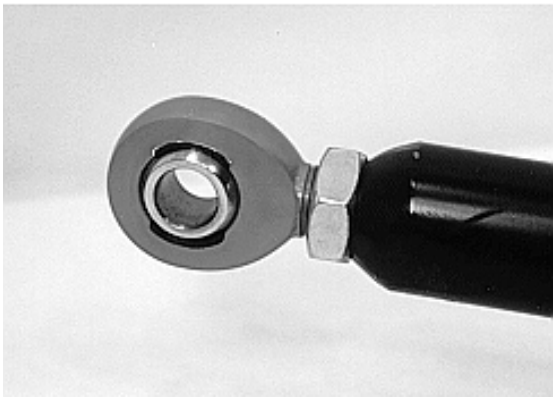


Rear of differential bolted in place.

4. Install the front mount bolts from the top down with a washer next to the head. A deep ¾” socket must be used to tighten the nut from the underside.
5. Tighten the rear differential bolts.
6. **Fill the differential** with 3.25 pints Gear oil and 4oz. Friction modifier.

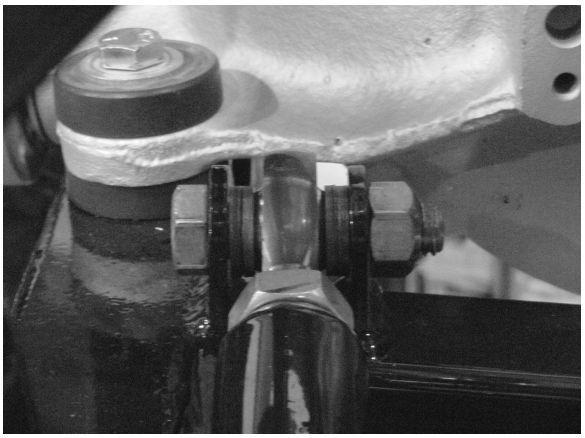
- **Lower Control Arm Installation**

1. Screw the Jam nuts all the way onto the Rod Ends.
2. Screw the Rod Ends into the lower arms so that there is only ½” total of thread (including the Jam nut) sticking out of the arms.



½” of threads sticking out of arm.

3. Attach the lower arms to the cage using the supplied 5/8” fasteners. Attach the front lower mount first using an equal number of shims on either side of the rod end.
4. Attach the rear mount using only as many shims as will fit without being forced into place on either side of the rod end. As the alignment changes the number of shims per side will change as well.
5. The shock mount should be toward the back of the car and **under** the arm.

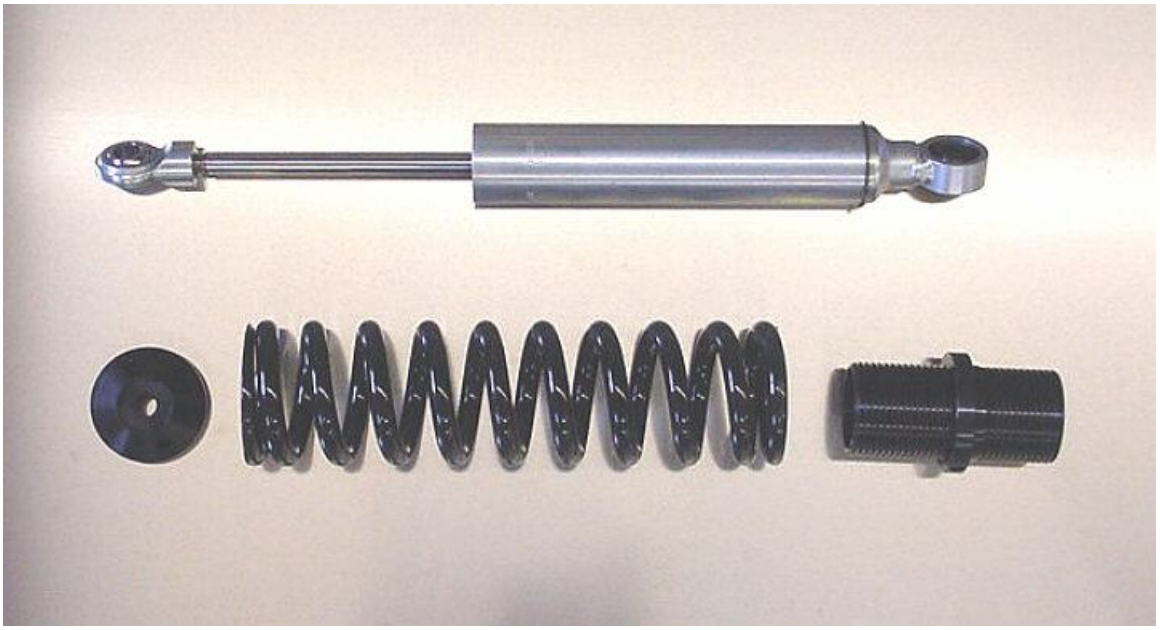


Alignment shims in place.

6. Tighten the control arm bolts to spec. Tighten the jam nuts on the rod ends making sure that the rod ends are vertical and have room to articulate as the control arm moves.

- **Shock and Spring Installation**

ATTENTION: The shock is pre-valved at the factory. We supply 450 lb. springs with the kit. Other springs are available for different ride characteristics.

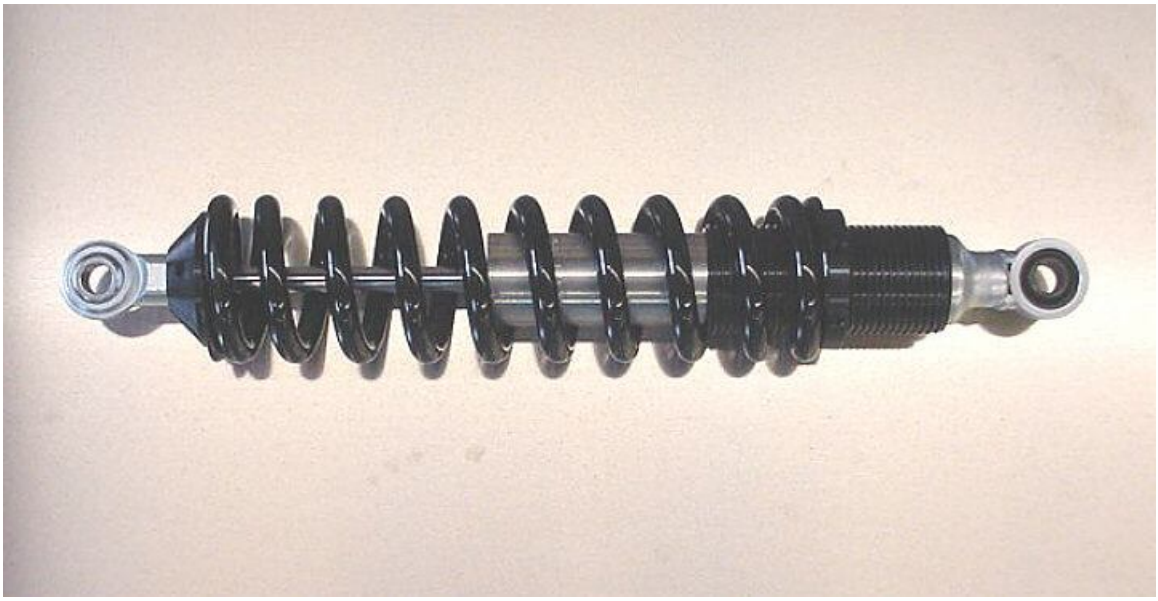


Shock and coil-over spring parts.

14. Remove the rod end from the end of the shock.
15. Slide the coil-over threaded sleeve on the shock. It may be fairly tight. Make sure that the end with the groove in it goes on first. This covers the snap ring already installed at the factory.
16. Check the spring seat on the sleeve to make sure that the taller part near the threads is on the top so that it keeps the spring from rubbing the threads and that it is not on the bottom.

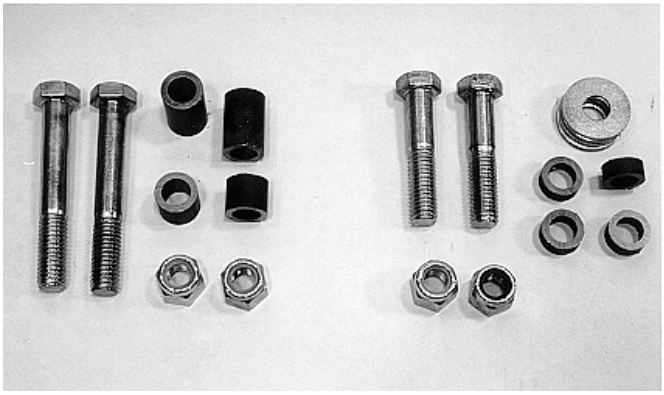
Threaded tube assembled on shock with spring seat screwed on correctly.

17. Slide the spring on the assembly.
18. Place the spring hat on the shaft so it sits on the spring.
19. Screw the rod end back on the shaft and tighten the jam nut.



Coil-over shock assembled.

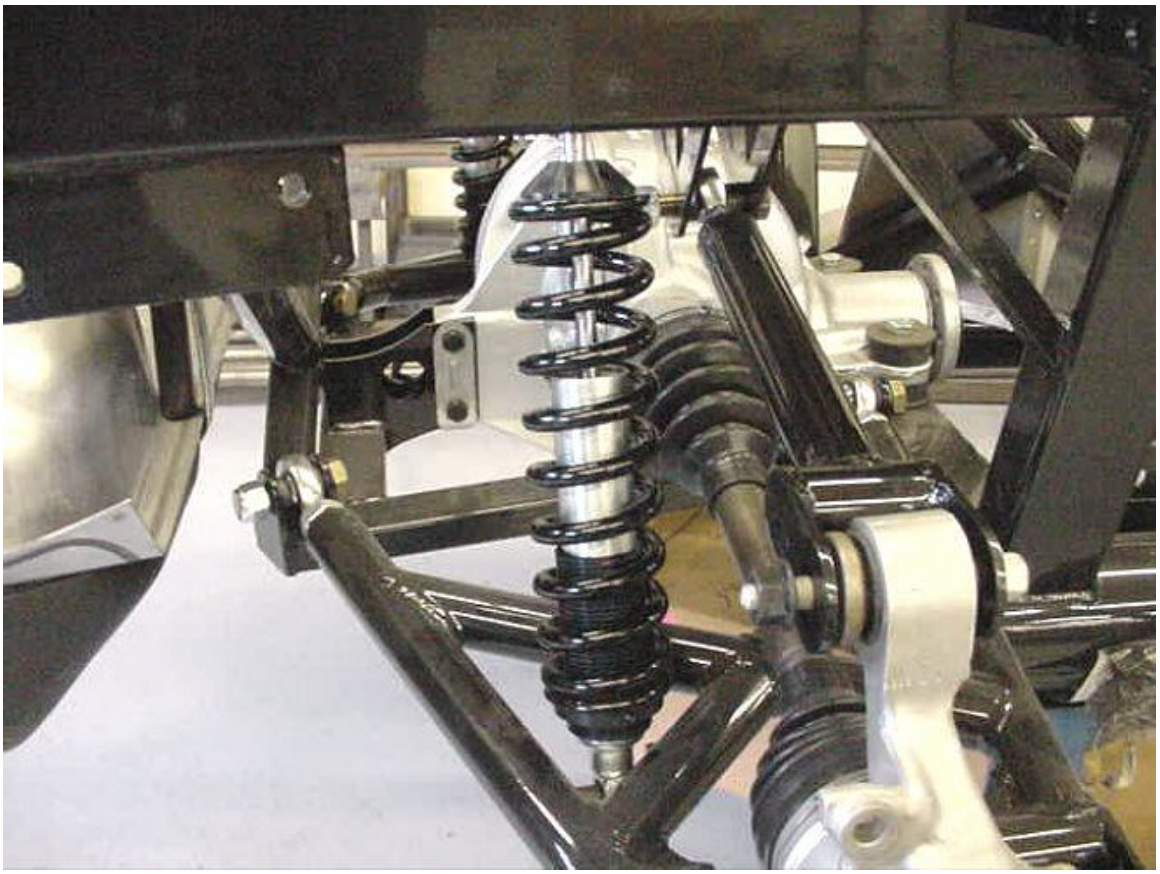
20. Position the shock so that the shock body is up and the collar/spacer end is in the triangle of the lower control arm that the shock mount is in.
21. Fasten the shock to the top mount with the fasteners, washers and spacers provided.



(Left) Lower shock-mounting fasteners/spacers. (Right) Upper shock mounting fasteners/spacers.

22. Fasten the shock to the bottom mount with the fasteners and spacers provided. The longer spacer goes towards the front of the car.

Lower shock mount.



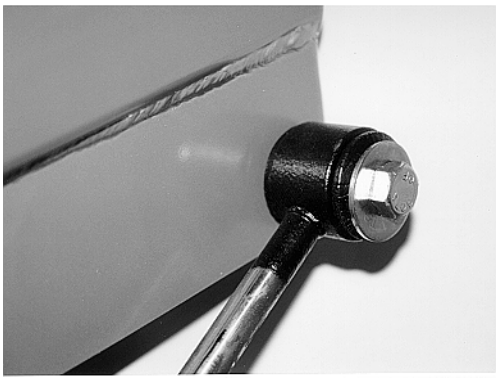
IRS Shock mounted

- **Upper Control Arm Installation**

1. Screw the Jam nuts all the way onto the Rod Ends.
2. Screw the Rod Ends into the upper arms so that there is only ½" of thread sticking out of the arms.
3. Attach the upper arms to the cage using the supplied 5/8" fasteners, washers and spacers. The Quad shock mount should be under the arm.

- **Quad shock Installation**

1. Attach the body end of the Quad shock to the upper arm of the IRS with the supplied metric bolt.
2. Attach the shaft end of the Quad shock to the rear quad shock bracket hole on the frame using the washer on the outside of the quad shock as shown in the picture.

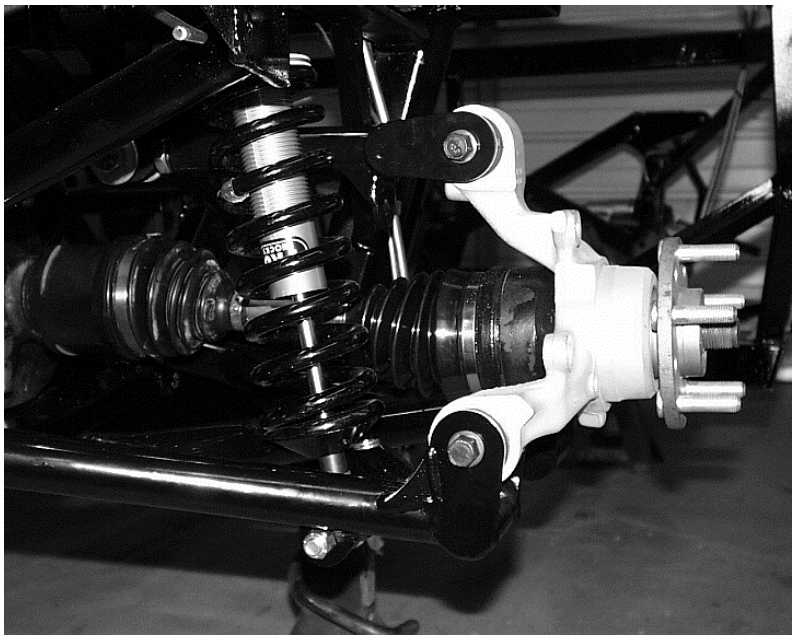


Quadshock mounted to frame bracket.

- **Spindle Installation**

The caliper is mounted on the rearward side of the spindle.

1. Push the inner joint into the center section until it clicks.
2. Push the outer CV Joint through the spindle.
3. Using the OEM T-bird nuts and bolts, fasten the spindle to the control arms.



Pin Drive Independent Rear Suspension assembled on the frame.

4. Attach the large nut using an impact wrench.
5. Put a jack under the lower shock mount and raise the jack until just before the frame lifts off the jack stands in order to simulate ride height.
6. Torque the spindle attachment bolts to **100 Ft-lbs.**

• Rear Calipers and Rotors

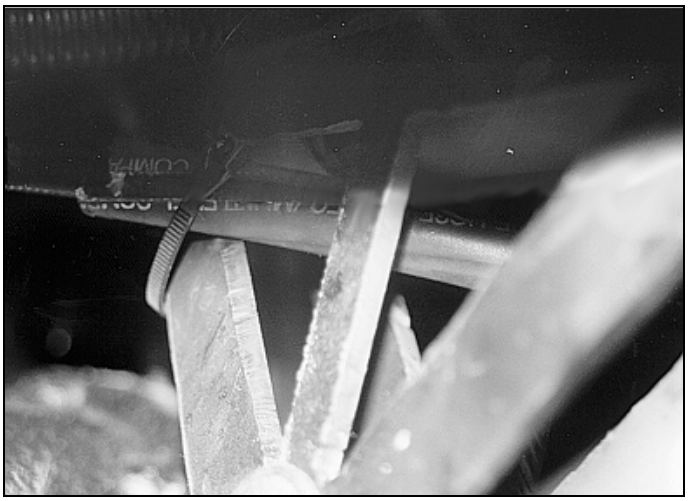
1. Push the slotted rotor onto the spindle.
2. Attach the caliper to the spindle using the OEM T-Bird bolts.

• Emergency Brake Cable Installation

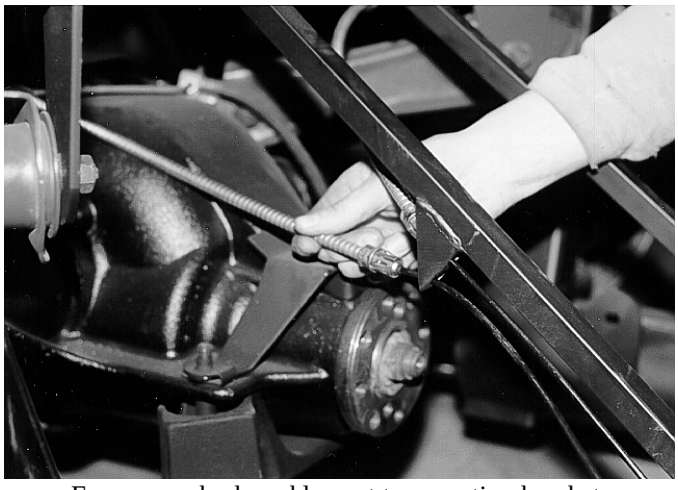
3. Release the emergency brake handle using the button and make sure it is all the way in the down position.
4. Push the cable sleeves into the caliper brackets and attach the cables to the caliper.

Emergency brake cable in caliper bracket.

5. Bend and route the cables through the upper cage triangles and to the cable bracket in the transmission tunnel.



E-brake cables attached to triangles

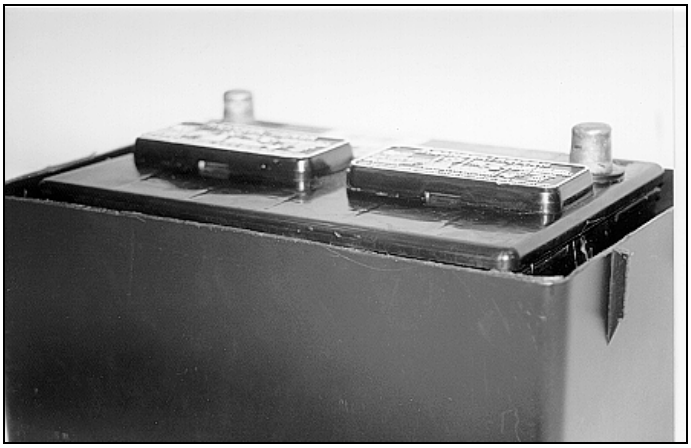


Emergency brake cable next to mounting bracket.

6. Pull on the T connector attached to the emergency brake handle and slide on the cables one at a time.
7. Pull up on the emergency brake handle, so that the automatic tensioning cog can adjust the free play in the lines.

- **Battery Cable/Box Installation**

8. Place the battery in the battery box and mark the height of the flat top of the battery on the box.
9. Remove the battery and use a ruler and marker to mark a line 3/16" below the point marked previously. Mark this all the way around the box.
10. Using a razor blade or tin snips or scissors cut the top of the battery box down to the line marked.

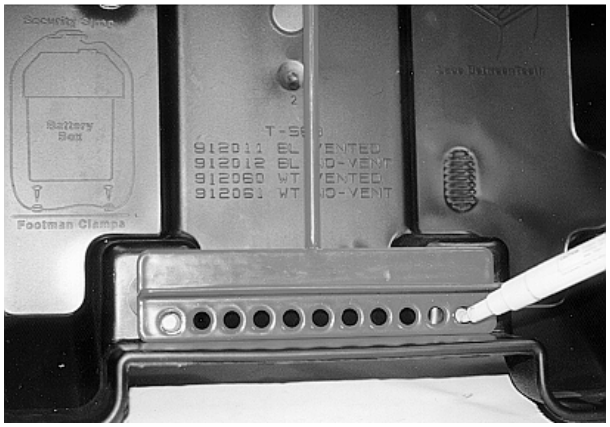


Battery box cut down to size.

11. Replace the battery and place the crossbar hold down over the battery. The crossbar should be able to go over the sides of the battery box.
12. Position the box with battery on the passenger side lower part of the car trunk. Push it forward against the aluminum step and just far enough over so that the crossbar does not touch the side.
13. Use a marker and mark around the base of the box on the aluminum.
14. Hold one of the "J" bolts vertically through the crossbar holddown and locate the ¾" tubes below the aluminum that will be used to fasten the "J" bolts. You may need to slide the crossbar or battery around in the box to line up with the diagonal tube in the trunk. We have included 4 bolts for the battery. Three of these will be able to go into ¾" tubes while the forth can only go into aluminum. If you wish to run all four bolts use a fender washer or weld an additional tube in for the bolt to go into. Note: In SCCA, as long as the battery does not move it is ok. NHRA rules specify two 3/8" bolts as required. Mark the locations of the bolts on the aluminum so that holes can be drilled.
15. Decide which way around the box you would like to run the battery cables and make sure there is enough room for them. There should be enough room in the current location to run them on out of the box on the wall side.
16. There is more than one way to route the battery cable to the front of the car. One way is to Drill a ¾" hole through the aluminum step next to the wall in order to pass the positive battery cable through. Pass the eye end through the aluminum then push on some of the plastic grommeting

around the aluminum edge before pushing through the remaining cable. Another way is to pass the cable through the aluminum next to the shock tower, again using grommeting on the aluminum.

17. Follow the manual instructions on the routing up to the front of the car once the cable is through the trunk.
18. Locate a point on the frame for the ground cable. You may drill another hole like the positive cable or attach it inside the trunk.
19. Without moving the crossbar or battery move the battery box to the middle of the trunk.
20. Take the battery box top and press it down onto the box over the crossbar.
21. Lift the top of the box off along with the crossbar that should be wedged inside.
22. Mark the location of the holes used for the crossbar bolts with a marker.

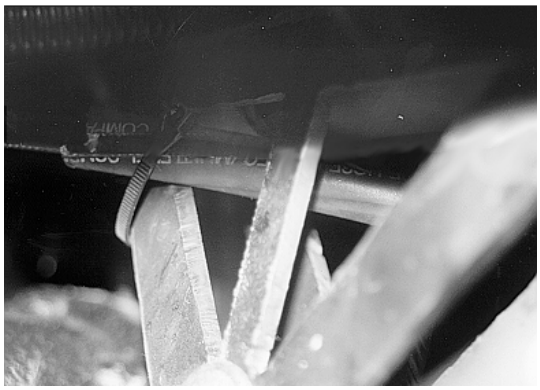


Marking the bolt locations on the box top.

23. Drill ¼" holes through the top of the ¾" tubes only, at the bolt locations marked.
24. Insert the "J" bolts into the tubes so that the threaded part stick straight up.
25. Position the battery box with battery between the bolts and place the crossbar over the bolts.
26. Attach the battery cables to the battery so that they exit the box in the desired location.
27. Place the cover over and onto the "J" bolts.
28. Put washers and the locknuts on the bolts and tighten them evenly until the box does not move.

- **Fuel line Installation**

1. Use the included 5/16" flexible line, and fuel injection hose clamps (FFR#10855) to connect the fuel filter to the hard line using the Mustang connector. Route the hose through the triangles in the upper cage.
2. Slit the old 6" piece of fuel line and wrap it around the new fuel line where it goes through the triangles. Zip tie the line and slit hose in place so that the hose will not wear on the edge of the steel.



Old hose slit and covering new hose. Zip tied in place.

XIV. Final assembly

1. Double check that all of the bolts are tight.
2. Mount your wheels and tires.
3. Lower the car off the jack stands.
4. Set the ride height in the car as specified in the manual
5. Zip tie through the slot in the shocks or tape the threaded collar so that the settings do not change.
6. Align the car to the specifications at the front of these instructions. Do not change the ride height after this is done as this will change the alignment and it will need to be done again.
7. Installing the IRS changes the roll centers of the car compared to the solid axle so the car will roll slightly more than the solid axle. If you are racing the car, call for alignment and spring suggestions.
8. The IRS was designed so that the 5.95" Backspace, Cobra "R" wheels will bolt on. These are fairly inexpensive as far as wheels go and look good on the car.
9. Check the rod end jam nuts to make sure they are tight on a regular basis.

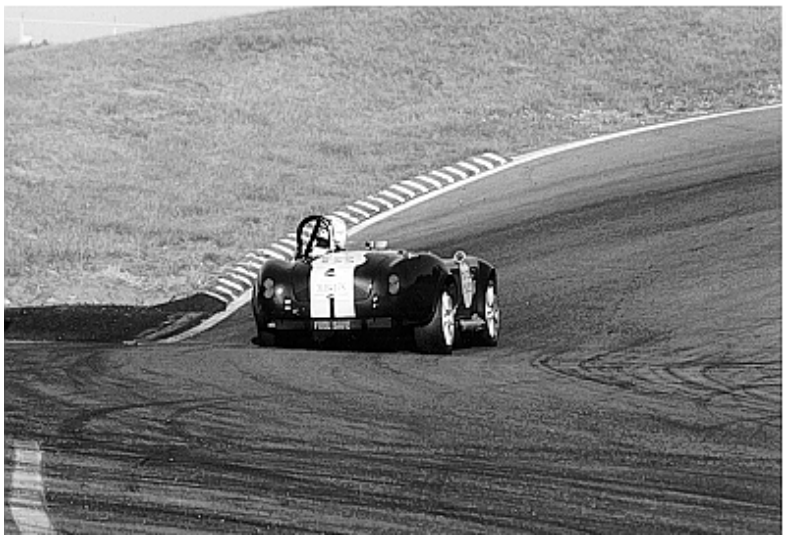
Aftermarket parts availability

No larger brakes are available off the shelf.

Stainless steel braided hoses can be found.

Stiffer shocks and springs are available.

- **Pictures**



Initial testing at New Hampshire International Speedway

Mark Drag racing the twin turbo/IRS prototype car at Run & Gun 1999.
10.91 seconds at 127mph