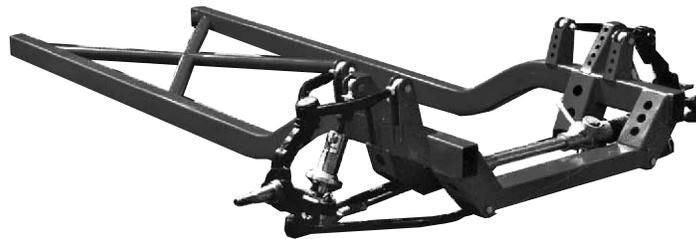




11 Mennonite Church Road  
Spring City, PA 19475  
(610) 948 - 7303

*Installation Instructions*

## **Pro/Series 2000 Tubular A-Arm Front Suspension (Mustang II -Style)**



### ***CAUTION!!!***

The most important requirement for a successful installation of this, or any, S&W chassis component is that you take your time and use good common sense. Check & recheck all measurements before cutting or welding. If you have any questions, before or during the installation - STOP - and call our tech line at 610-948-7303 and we will gladly explain in more detail any step in the installation.

**Please read all instructions in full before beginning installation.**

**Preparation:**

Installing S & W RACE CARS frame rails and front suspension into a clean car is a relatively easy job, although there are certain precautions that should be taken for your safety and to insure that the finished product is aligned properly. It is recommended that you wear eye protection during the removal of the stock floor, suspension and other components, and during welding and fabrication. Proper supports and jack stands must be used, not only for construction purposes (such as keeping the chassis level), but also for safety reasons. This work should be performed in a dry, well lit shop with a level or near-level floor.

While installing your frame rails and front suspension, remember that the quality of your workmanship will directly affect the ultimate strength of the entire race car structure. It is important that all areas to be welded are clean, free of oil, slag, paint, undercoating and, of course rust.

Quality work requires the proper tools. Here is a list of some of the tools you will need.

A. Common hand tools - for removing the stock suspension components and car interior.

B. Jack stands - for supporting the car and new frame rails.

C. Floor jack - for raising the car, removing the front frame section.

D. Measuring tools - 12' tape measure, level, inclinometer, plumb bob, string, builders square, large square felt tip pen or soap stone.

E. Cleaning tools - gasket scraper and wire brush to remove undercoating.

F. Cutting tools - oxyacetylene torches, hand-held reciprocating saw or rotary grinder with a cutting disc.

G. Welding equipment - a MIG welder is recommended. TIG welding is acceptable, but is unnecessary for this type of work.

***Warning: Effective Jan. 1, 1995 stick welding is prohibited by NHRA.***

***S & W Race Cars strongly suggests that these components not be stick welded!***

- 1) With all the stock components still in the car, and the car sitting on the floor at ride height, measure and record the wheelbase.
- 2) Raise the car to a comfortable working height, and level it from front to back, and side to side. This can be done front to back by placing the level on the rocker panel. Level the car side to side by placing the level on the front crossmember and on a horizontal floor panel at the rear of the car.

**Note: from this step to the final step always be aware to maintain the car's level condition!**

- 3) After removing the wheels and tires measure and record the front and rear track width by using a builders square set against the outside face of the front hubs or brake drum. Mark the floor to indicate the locations of the spindles and axle C/L for future reference.
- 4) In order to insure that your frame rails are centered in the car properly, you must find the chassis centerline (C/L). The chassis C/L is the midpoint line that runs the length of the car. To find the C/L, drop a plumb line from the same two points on the opposite side of the car to the shop floor. Do this at the front and rear of the car, for this application measure half the distance between each set of plumb line marks on the floor that you marked in step number 3. Each of these half distances can be connected and a straight line can be drawn on the floor running from front to back, which represents the center line of the car. It is a good idea to drop a plumb line to the C/L on the ground and transfer it onto the car by punching marks on a few crossmembers. Now if you have to move the car or when you do future work, the C/L can be quickly reestablished. The C/L can also be used for suspensions alignment work.

### Disassembly:

- 5) Remove all existing sheet metal (hood, fenders, grill, etc.) and front seats and carpet.
- 6) If your engine and transmission will stay in the same location measure and record the front to rear and side to side location. Then remove engine and transmission, fuel line, electrical wiring, battery, etc..
- 7) **Determining the mounting and cut off location for your application:**
  - A) **Unibody cars;** On these cars, the existing front suspension can usually be removed in one piece by unbolting the subframe from the body, then connect the front frame to the back frame by using 2" x 3" box tubing.
  - B) **Full frame car;** On these cars, so you can reduce the total weight of the car we recommend that you remove as much of the stock frame as possible and replace and connect the front frame with 2" x 3" box tubing.
  - C) **2" x 3" box tube chassis;** On these cars, cut the rear frame so you can butt the front frame to the rear frame so it will place the front spindle at the correct wheelbase.

**Note: for some applications and rear frame rail widths you may have to connect the front frame to the rear frame using out riggers or a dropped crossmember.**

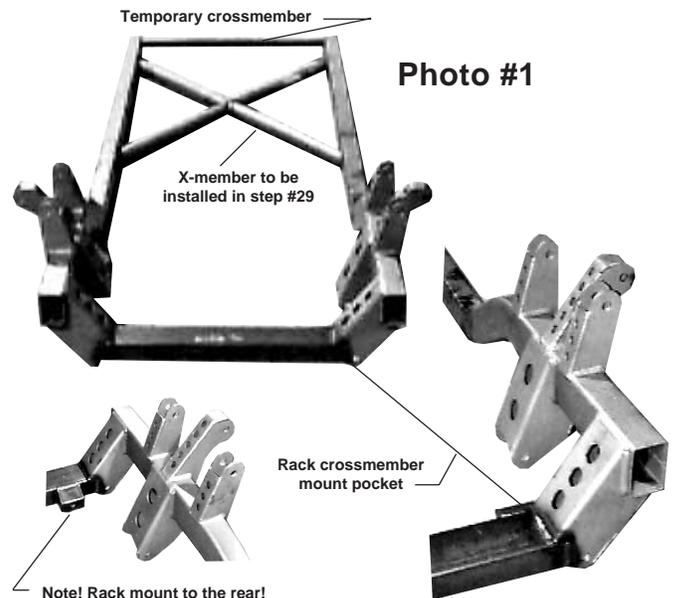
**Remove front frame section as per your application.**

- 8) Remove the stock floor and replace it with steel or aluminum floor panels. **This step is if you want to reduce the total weight of the car and is recommended, but not necessary.**

### Assembly:

- 9) Secure the front frame rails to a flat surface with a clamp or vise. Position the frame rails parallel to each other 30" apart outside of frame to outside of frame, at the front of each frame rail check to make sure the frame rail is level or at zero degrees front to back and side to side. **Note: when positioning the frame rails make sure the upper shock mounting tabs are located up and to the outside as shown in photo #1.**

Included with your frame package is a 26" section of 1-1/4" x .120" wall tubing. Tack weld this piece of tubing, inside the frame rails, at the rear of your frame to hold the frame rails to the correct width during installation. **TACK WELD ONLY!** This section will be removed later in the installation, and cut for use elsewhere. **see photo #1.**



- 10) Position the rack mount crossmember in the frame rail support brackets with the rack & pinion mount toward the rear of the vehicle. **See photo #1.**
- 11) **Tack weld** the crossmember in position.
- 12) Measure from the front of the frame rails back 11-7/8". This will be the centerline of your front spindles. Make a mark on the frame rails at this point so when installing the front frame section, you can use this mark to align your wheelbase.
- 13) Determine the front tire diameter and divide the tire height by two, this dimension is the distance from the bottom of the frame rails to the ground when at ride height.

**(see drawing #1 on next page)**

**Be sure to make your measurement at the point shown in the drawing.**

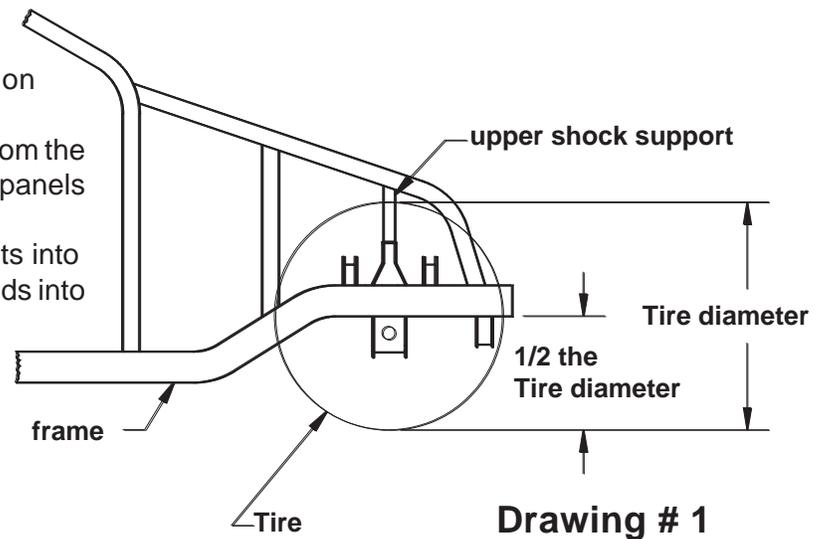
14) Position the front frame section under the front of your car at the correct height that you located in step # 13 and at the correct wheelbase using the mark that you made in step #12.

15) Tack weld the front frame section to the rear frame for your application **(see step #7).**

16) Install 2" x 3" tubing for outriggers, from the outer front frame rails to the rocker panels at the front of your door jam.

17) Assemble two rod ends and jam nuts into each upper A-arm. Screw the rod ends into the A-arm leaving 4-7 threads showing from the jam nut to the body of the rod ends.

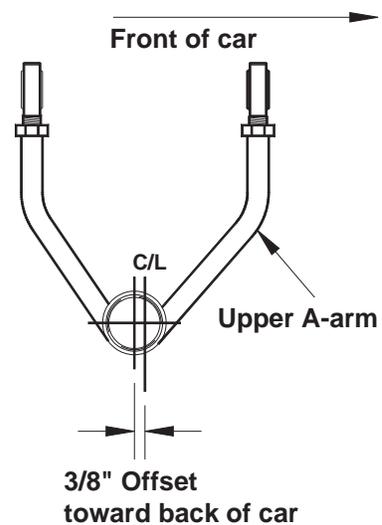
18) Install the upper A-arms onto the upper mounting brackets of the frame rails. When installing the rod ends into the upper A-arm brackets insert half moon spacers between the rod ends and the tabs to give the rod ends clearance from side to side.



**Note: when installing the upper A-arms, the ball joint threaded sleeve is offset to one side, the offset will be positioned toward the rear of the car. (See drawing #2)**

19) Install the lower a-arms onto the lower mounting brackets of the frame rails. **Note: there is a left and right hand side lower a-arm, when positioning the A-arms on the frame you want to have the lower shock mounts pointing upward, this will determine left and right.**

**Drawing #2**



20) Install the shocks and springs onto the lower A-arm shock mounting tabs and upper shock mounts on the frame rails.

21) Install one ball joint through each upper A-arm threaded sleeve from top to bottom, then place the rubber cover over the ball joint on the bottom side of the A-arm.

22) Install one ball joint through each lower a-arm threaded sleeve from bottom to top, then place the rubber cover over the ball joint on the top side of the A-arm.

23) Assemble the spindle onto the lower ball joint first and secure it in place with a nut and cotter pin, pull the upper A-arm down and insert the spindle on the ball joint securing it in place with a nut and cotter pin. **Note: there is a left and right hand spindle, you want the steering arms pointing toward the front of the car.**

24) Install the rack & pinion to the crossmember mounting the splined shaft on the driver side of the car, and securing with the provided nuts and bolts.

25) Thread the tie rod ends onto the steering shaft of the rack & pinion securing them in place with a jam nut.

26) Insert the tie rod ends into the steering arm of the spindles and secure it in place with a nut .

27) Position the front subframe supports in place from the front of your roll cage through your firewall to the front frame section and tack weld in place. **See drawing # 1& photo # 2.**

- 28) Remove the 26" piece of tubing you installed in step 9 from between the rear of the frame rails. Cut this tubing to fabricate two upper shock supports that run from the front subframe supports down to the top of the shock mounts on both sides of the car. After you have cut and fit the shock supports you can tack weld them in place as shown in drawing # 1 & photo # 2.

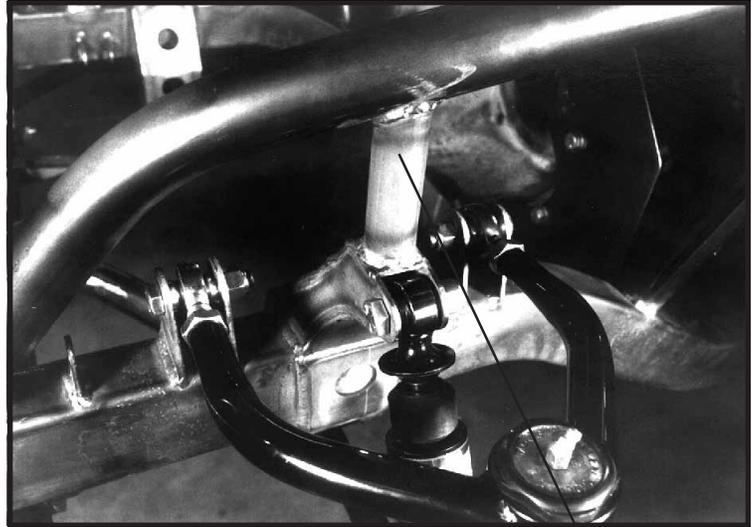
**Note: there is a lot of load on the upper shock mounts and special attention should be taken when installing supports and gussets.**

- 29) At this time install x-brace under floor, (**tack weld only at this time**) making sure it is located in such a way that it does not interfere with your transmission crossmember or driveshaft. S&W Race Cars recommends using our transmission crossmember kit, part # 14-110.
- 30) Install the front wheels and tires and move the front suspension and steering through it's travel, checking all clearances.
- 31) If all clearances are okay, remove wheels, tires and rack & pinion unit. Finish weld all connecting points and supports for the front frame.
- 32) Install your motor and transmission. When installing the motor S & W Race Cars recommends that you use a motor plate and mid-mount to keep the motor and transmission from moving side to side and lateral engine limiters (part # 20-607) on each side of the motor to keep the motor and transmission from moving front to back. When you are sure that the x-brace you installed in step 29 does not interfere with the transmission mount or driveshaft, you may finish weld the x-brace
- 33) Install your front body sheet metal or fiberglass using a S & W front body mounting kit, part# 95-500.

**S & W Race Cars has a complete inventory of motor plates, mid-mounts and engine limiters for most engine and transmission combinations.**

- 34) Reinstall the rack & pinion and the front wheels & tires.

**Photo # 2**

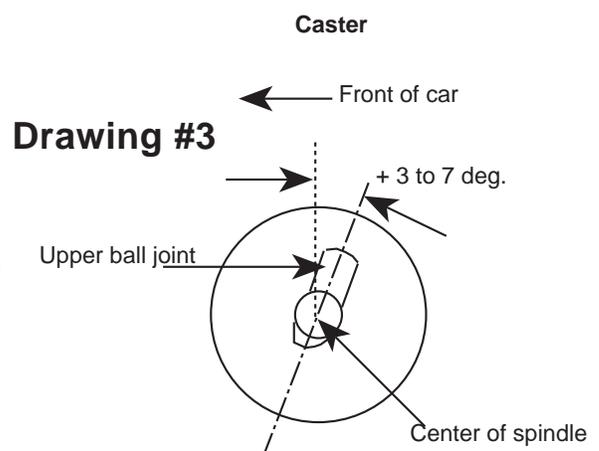


**upper shock support**

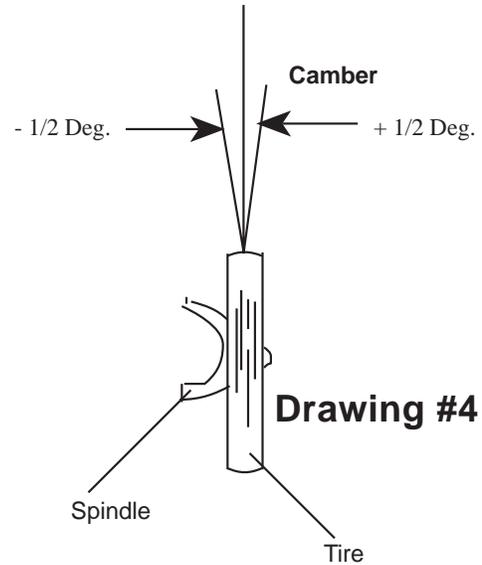
## Front End Alignment:

**S & W Race Cars recommends that the front end alignment should be done by a reputable front end shop with all the proper equipment.**

- 35) Set the caster ( the angle of the spindle) at 3-7 degrees positive, this will angle the top of the spindle back. **(See drawing #3).**
- 36) Set the camber ( the up and down angle of the tire) at plus or minus 1/2 of a degree, this will make the tire as straight up and down as possible. **(See drawing #4 on next page).**



- 37) Set the toe by measuring the width from the center of one front tire to center of the other, at the at the front and rear of the tire, (with the wheels pointed straight ahead). If the front measurement is greater than the rear, your front has toe out. If the front measurement is less than the rear it is toe in. Adjust the tie rod ends until the front is at 1/16" to 1/8" toe-in.
- 38) When the alignment is finished, be sure all nuts are properly tightened and that all cotter pins are correctly installed.



## Related components available from S & W Race Cars.

Part#	Description
55-727	Wilwood lightweight front disc brake kit
55-728	Wilwood med. front disc brake kit
55-781	Strange med. front disc brake kit
50-017	HAL Corp Proma-Star front coil over shocks
50-016	Koni front coil over front shocks
20-607	Lateral engine limiters
35-372	Steering column kit
35-037	Flaming River Mustang II rack & pinion
36-406	S&W rack mounting hardware
35-381	Cable type suspension limiters
95-500	Front end body mounting kit
95-1000	DOORSLAMMERS - The Chassis Book
HP573	Welder's Handbook
per/ application	Front motor plate
per/ application	Mid-mount
14-110	Universal transmission crossmember