



**S&W Race Cars and
Components, Inc.**

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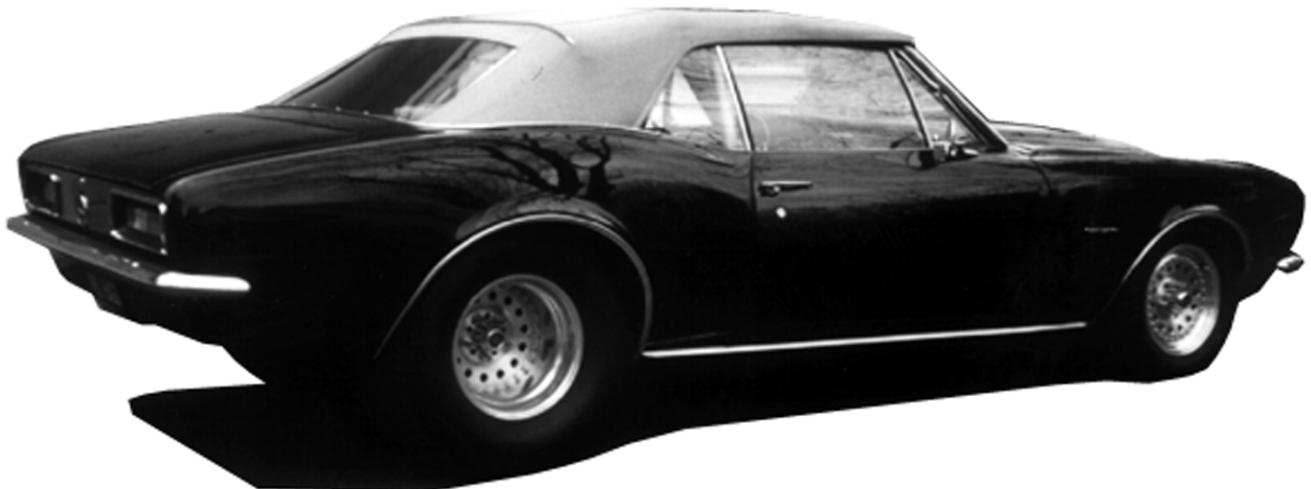
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Installation Instructions

for

Ladder Bar and 4-Link Frame Rails



**for installation of S&W Race Cars direct fit ladder bar,
low-rider ladder bar and 4-link frame rails**

Please read complete instructions thoroughly before beginning!

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 at any time before or during the installation you have any questions - **STOP** - and call our tech line at 610-948-7303 and we will gladly explain in more detail any step in the installation.

Preparation:

Installing S&W RACE CARS frame rails and connectors 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 connectors, 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 rear housing.
- D. Measuring tools - 12' measuring tape, level, inclinometer, plumb bob, string, 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: As of Jan. 1 1995 stick welding has been prohibited by the NHRA!!
S&W Race Cars strongly suggests that these components not be stick welded!!**

- 1) With all the stock components still in the car, measure and record the wheelbase and mark the axle centerline on the car body, directly above the wheel opening.
- 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. Leveling 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.

- 3) In order to insure that your frame rails are centered in the car properly, you must first 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. We suggest using the front control arm mounting points and the seam between the rear of the rocker panel and the quarter panel. Now measure half the distance between each set of plumb line marks on the floor. 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 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 suspension alignment work.

Disassembly:

- 4) Remove all stock components such as front and rear seats, carpeting and insulation, interior trim panels, rear wheels and tires, rear axle assembly, rear springs and shocks, brake lines, fuel lines (remove electric fuel pump if rear mounted) and any rear mounted electrical components or wires.
- 5) If you purchased S&W Race Cars low rider rails you will need to remove the floor at the back section of the car. If you have part number 10-000 or 10-024, you should remove the floor from 39" in front of the axle centerline to the back of the car. If you have part number 10-025, 10-026, or 10-027, you should remove the floor from 27" in front of the axle centerline to the back of the car.
 - a) **For direct fit rails you should not remove the floor**, but you may have to notch the floor for some applications and frame rail locations. You should notch the floor after you locate where the frame rails will be for your application.

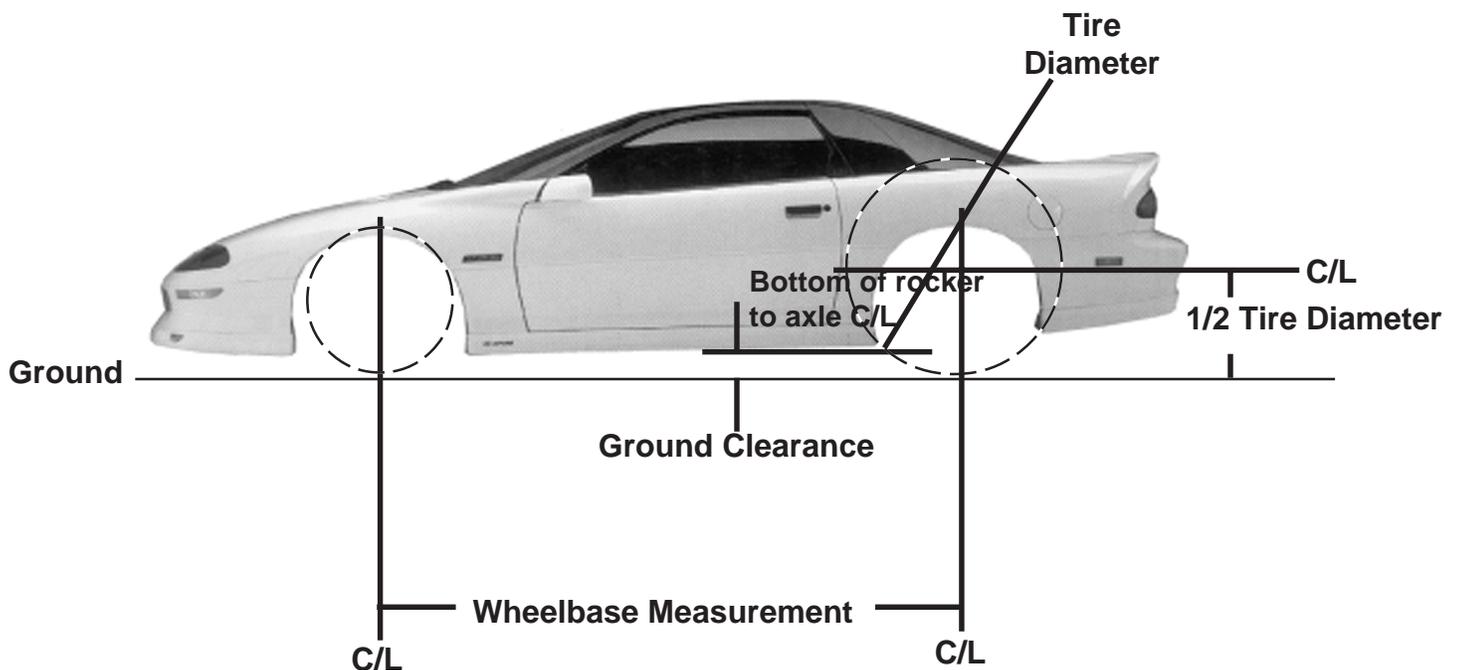
Assembly:

Note: During the installation it is a good idea to just tack weld all your suspension and frame rails in place until you get completely finished, that way if you make a mistake you can fix it relatively easy.

- 6) The most important step in frame rail installation is the location. The frame rails must be located so the suspension has maximum adjustability for your car to work properly.
- 7) Locate the rear housing at your desired ride height and wheel base.
- 8) Install your lower shock mounts (S &W PT# 40-222 or 40-224) to the rear housing as shown in their instructions.
- 9) Using a shock jig made to the installed height of your shocks, locate where the upper shock crossmember will be installed. (The rear of the frame rail height will be determined by the upper shock crossmember height.)
- 10) Install the 4-link or ladder bar to the rear housing with the front brackets bolted to the front tube or tubes as per their instructions. (The front of the frame rail height will be determined by the height of the front of the 4-link or ladder bar. It is very important that you have the front of your 4-link or ladder bar located on the front brackets so you can have the maximum adjustability.)
- 11) After you have located the height and width of the frame rails for your application, tack weld them in place in the car.
 - a) **For the direct fit rails** you should place the rails up to the floor and determine where you will notch the floor.
 - b) Notch the floor at the desired location. Then you can tack weld them in place.
- 12) Install the tires and wheels on the rear housing. Move the suspension up and down through it's travel checking all clearances (tire to body and frame, housing to frame, shock to housing, etc...). If you have a suspension clearance problem refer to your instructions for that item. If all clearances are okay let the car down on the ground and check to see if the ride height is what you want.
- 13) If everything checks out, you should install a roll cage or roll bar, to complete your frame installation. After you have the cage or roll bar tacked in place. Finish welding your suspension, frame rails with crossmembers, and cage or roll bar in place.

Instructions For Locating The Rear Housing Under The Car

- 1) With the car sitting on the ground at ride height and all the weight in the car, measure and record the wheel base and the rear housing center line measurement up and down. The up and down measurement should be made from the same two reference points on the body on both sides of the car.
- 2) Raise the car to a comfortable working height leveling it from side to side and sitting at the same angle front to back as it will ride. Leveling can be done side to side by placing the level on the front crossmember and on a horizontal floor panel at the rear of the car.
- 3) Position the rear housing under the car at the correct wheelbase (**note: the wheelbase should be checked on both sides of the car**) and raised to the desired ride height.
- 4) The ride height of the rear housing will be determined by the tire height and the ground clearance of the body or chassis.
 - a) Determine a suitable ground clearance at the rear edge of the rocker panel. Subtract this ground clearance from 1/2 of the tire diameter, this will give you the measurement from the center line of your axle tube to the bottom edge of the rocker panel. Position the rear at this height, leveling it from side to side.
- 5) Determine the housing location side to side **by the pinion center line**, not the opening of the housing. For most applications the pinion will be centered in the car or have a slight offset to the passenger side.
- 6) Set the pinion angle, the actual angle in degrees is not what is important; what is important is that the pinion is aimed directly at the tail shaft of the transmission. Imagine that the pinion and the driveshaft are one piece, with only one u-joint at the transmission yoke. By reducing the u-joint angle it will also reduce u-joint failure.



Determining Rear Axle Housing Width

To do this accurately, you should have the wheels and tires that you plan to race. You will need to know.

- 1) Tire section width - To determine section width, lay the tire and wheel combination, with the air pressure you plan to use, on a flat surface. Place a straight edge against the top sidewall and measure the distance to the ground. This is your tire section width.
- 2) Backspacing of your tire/wheel combination - While the tire is on the floor, measure the distance from the inside mounting surface of the wheel to the top of the tire sidewall, using the straight edge as you did above. Next measure the thickness of your brake drum or disc brake rotor hat and subtract the thickness from the backspace measurement.
- 3) Inner fender to inner fender dimension - Take this dimension at the narrowest point of the car such as the three o'clock or nine o'clock position of the quarter panel above the wheel opening.

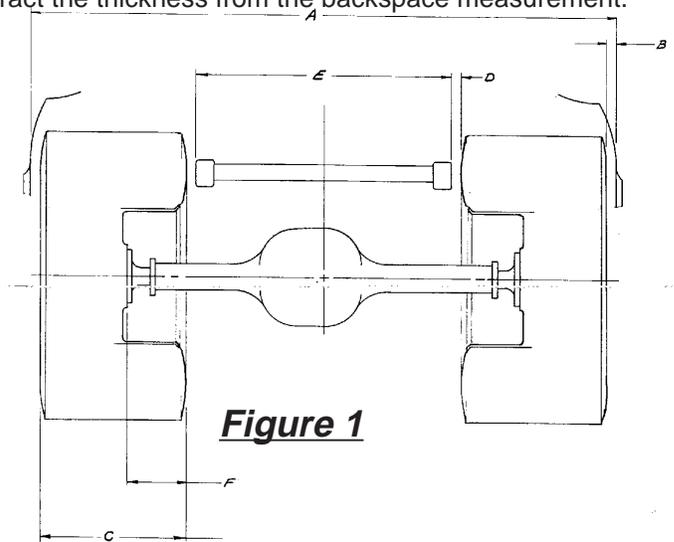


Figure 1

- A = Fender to Fender Width
- B = Fender to Tire Clearance
- C = Tire Section Width
- D = Tire to Frame Clearance
- E = Frame Rail Width
- F = Wheel/Tire Backspacing, less your brake drum or rotor hat thickness

Here is a formula, along with **Figure 1** that will help you calculate the *rear housing width*.

Start with the frame rail width dimension (E) = _____ inches

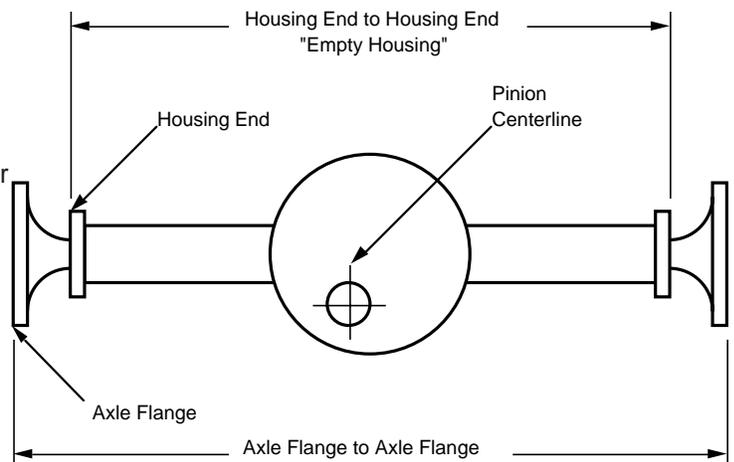
ADD Twice the tire to frame clearance width (D) = _____ inches

ADD Twice the wheel/tire backspacing (F) = _____ inches

This is your **AXLE FLANGE TO AXLE FLANGE** (Outside dimension) = _____ inches

Refer to the chart below and determine the housing end to axle flange dimension listed next to the type of housing end you are using. **SUBTRACT TWICE** that dimension from your previously determined axle flange to axle flange measurement, this total is your housing width.

57-64 Olds	2-3/4"
Big Mopar	2-1/2"
2.835 Small Ford	2-5/8"
3.150 Big Ford	2-1/4"
12 Bolt Chevy	2-3/4"



If you are uncertain as to the type of housing end you are using, please refer to the chart in your S&W Race Cars catalog or call S&W Race Cars for assistance