User Guide & Installation Manual

MUSTANG II IFS KITS

Remember: Measure twice, weld once!

NECESSARY TOOLS & EQUIPMENT:

• Level Work Area
The floor must be level from side to side. A level surface from front to back is best but not required.

• Tape Measure
A 20' tape that measures to a 1/16" is ideal.

• Levels
A 4' level and a 6" magnetic level work best.

• Welder
Helix recommends a MIG (wire feed) to tack everything in place, but a TIG or a stick welder will also work.

• Square
A quick square works well but a carpenters square is sufficient if that's all you have.

• Pencil and Permanent Marker or Soap Stone
These are used for marking reference points.

• Hand Held 90 Degree Grinder and a Cut Off Wheel

• Set Up Wheel and Tire Inflated to the Pressure It Will Be Run At
This needs to be one that you will be using on the finished project and will need to be inflated to the pressure that it will be run at on the vehicle.

Note: In most cases the best place to start is the beginning. Using these instructions you will be starting from the end.

1 Positioning Your Project

The first thing you will need to do is place the Vehicle into the level side to side work area at the exact ride height and posture or rake that you want the finished project to be. This is the desired ride height and posture that you want the finished project to be when it's all put together and driving down the road.

2 Establishing The Vertical Spindle Center Line

The factory vertical spindle line should be scored on the frame rail BEFORE the original suspension is removed. In some applications, like a '53 to '56 Ford F 100, it is desirable to move the vertical spindle center point forward 3/4 of an inch or so to better center the wheel and tire in the wheel well.

If the factory suspension has been removed prior to set up, you can simply use the set up wheel and tire to find where it is best centered in the wheel well opening and then mark the center of the wheel and tire on the frame rail. It is imperative that the vertical spindle center line be located in the same place on both sides of the vehicle. Use a reference point on the frame rail that is consistent on both sides to measure.

Once the vehicle is loaded into the work area, and the vertical spindle center line is established on both frame rails, you'll need to put a level across the frame rails at the spindle center line to verify that the frame rails are level.

The first component of the kit to be installed is the center section of the cross member.
If your vehicles frame is an open C channel, the frame rails will need to be boxed off before the cross member can be installed.

Front

Rear

Boxing plates for specific applications such as 1964 to 1970 Mustang and 1948 to 1956 Ford trucks are available. If the frame rail is at a constant height, then flat plate steel of the same gauge as the frame rail may be used. The frame will need to be boxed for a distance of 18" centered on the vertical spindle center line to install the cross member. Some people like to box the frame from the firewall to the front of the frame. Helix recommends boxing the frame from front to back.

The cross member in this kit will need to be notched to establish both desired ride height and to fit between the inside of the boxed off frame rails. Before we discuss how to determine where the notches in the cross member will be located, we need to discuss the spindles.

Previously we established the vertical spindle center point and scored it's location on the frame rail. Now we need to establish the horizontal spindle center point. Stand the set up wheel and tire on it's tread surface as if it were on the vehicle. Measure from the ground up to the highest point of the tread surface. This is the inflated tire diameter. I will use 28 inches as an example, but you will need to use your inflated tire diameter in the formula to develop your horizontal spindle center.

We need to divide the inflated tire diameter by 2 and subtract 1/4" for the flattening of the tire under the weight of the vehicle. So 28" divided by 2 = 14" - 1/4" = 13 3/4". By the example, 13 3/4" is the horizontal spindle center point. This is where the horizontal center of the spindle will be located with a 28" tire no matter what your ride height is set at.

3 *2" Drop Spindle Vs. Stock Ride Height*

The Mustang II suspension kit is designed to lower your vehicle at least 2" and can lower your vehicle up to 6" with a stock ride height spindle. Since your vehicle is set up at your desired ride height, you can determine whether you need a stock ride height or an optional 2" drop spindle like this :

Measure from the ground to the side of the frame rail at the vertical spindle center point 13 3/4" (by our example) and place a mark on the frame. If this mark comes out below the frame rail it's ok, this is a common occurrence and will depend on where your ride height is set at.

If it comes out more than 2" below the frame rail, you should rethink your ride height. If the horizontal spindle center point comes out in the lower 50% of the frame or below, a stock ride height spindle will be best for your project. If it falls in the top 50% or above the frame rail, you will be better off with a 2" drop spindle for your project.

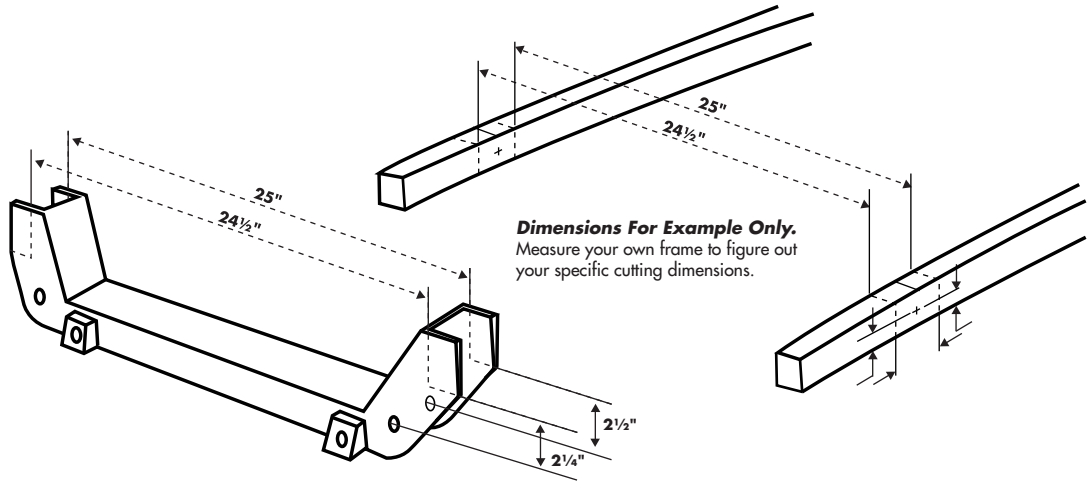
Using a stock ride height spindle, 3 1/2" below the horizontal spindle center will be the location of the lower control arm mounting hole when the cross member is installed and tacked into place.

With a 2" drop spindle the center of the lower control arm mounting hole is 5 1/2" below the horizontal spindle center point.

Our example uses a 28" tall tire so our horizontal spindle center is at 13 3/4". For our example we'll say that 13 3/4" measured from the floor comes to 1" above the bottom of the frame so we will use a stock ride height spindle. If we subtract 3 1/2" from 13 3/4" that would place the center of the lower control arm mounting hole at 10 1/4" off of the ground when the cross member is installed.
The cross member needs to be located so that it is level front to back as well as side to side, so the lower control arm mounting holes will be 10 1/4" from the ground at all four points when the cross member is tacked into place.

4 *Marking the Reference Points*

This is a good time to mark the four reference point on the frame rails where the side walls of the cross member will be located. The cross member with this kit is 3 1/8" wide outside to outside of the side walls. Measure (1") forward (towards the radiator) and (2 1/8") behind (towards the firewall) of the vertical spindle center point to center the cross member. Mark the four reference points all the way around the boxed off frame rail. These are the points where the side walls of the cross member need to be located.



When figuring where the notches will be placed in the cross member, you should keep in mind that the notches in the front side of the cross member and the notches in the back side will almost always be different so you need to do the math on all four points.

We know that the center of the lower control arm mounting holes will be 10 1/4" (by our example) from the ground (at all 4 points) when the cross member is in place. So we need to measure the distance from the bottom of the frame to the ground at all 4 of the reference points one at a time. It's important to do the math at all four points to compensate for any inconsistencies in the frame rail and to avoid the possibility of welding a gap. You want a good tight fit with the cross member and it must be level front to back and side to side.

I'll start with the driver's side reference point that is forward (towards the radiator) of the vertical spindle center point. For our example lets say that from the bottom of the frame rail to the ground is 12 1/4".

If we subtract the distance of the lower control arm mounting hole to the ground 10 1/4" from the distance of the bottom of the frame to the ground 12 1/4" that gives us a difference of 2".

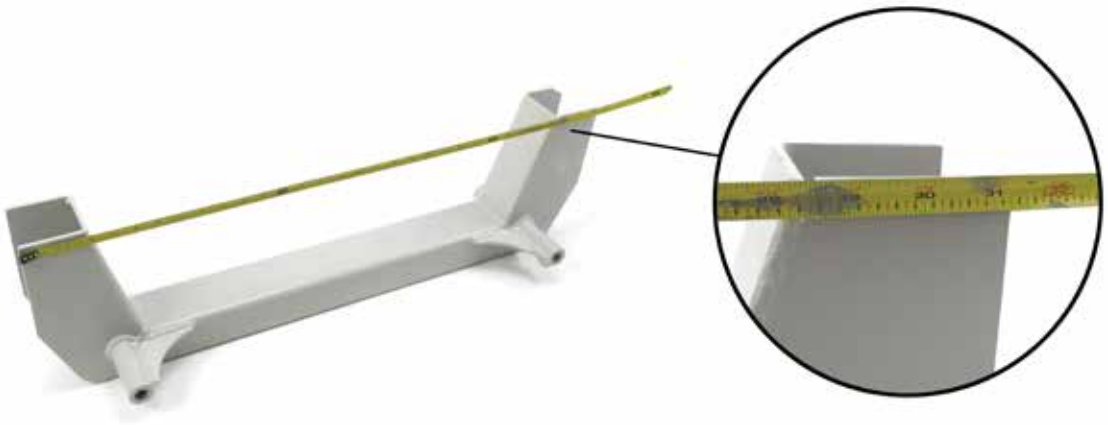
We would then measure on the left front corner of the cross member from the center of the lower control arm mounting hole up the side wall 2" and place a mark. This is the location of the horizontal notch in the cross member.

Next we'll measure for the drivers side rear. Helix recommends an inch or two of rake. So the drivers side reference point behind the vertical spindle center from the bottom of the frame to the ground we will say is 12 1/2".

12 1/2" – 10 1/4" = 2 1/4"

Measure from the center of the lower control arm mounting hole on the back side of the cross member up the side wall 2 1/4" and place the mark. This needs to be done at all four points for the cross member to fit tight and come out level.

We now have a horizontal notch marked on all four corners of the cross member so we need to figure out where the vertical cuts will be. It is important that the cross member is centered between the frame rails. Frame rails almost never run parallel so once again the front and back vertical cuts will almost always be different.
Measure the over all width of your cross member. For our example it is 31 1/4".



Measure the inside to inside of the frame rails at the reference points forward of the vertical spindle point. For our example we have a measurement of 25 3/4".

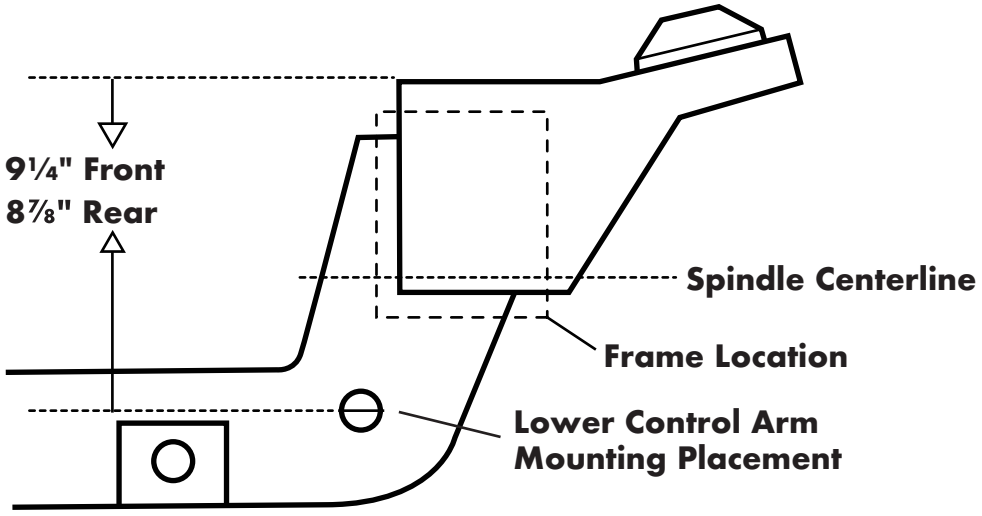
Here's the formula: 31 1/4" – 25 3/4" = 5 1/2" now divide 5 1/2" by 2 = 2 3/4"

Measure from the outside edge of the cross member in toward the center 2 3/4" on both sides of the front of the cross member and place marks. These are the locations of the vertical notches on the front side of the cross member. Repeat this procedure using the reference points for the back side vertical cuts.

Now you should have a vertical and horizontal cut marked on all four corners of the cross member. Simply lay your square on these marks and draw a line around it. This marks the notch that will be cut out. Once the notches are cut out, test fit the cross member into the frame rails. Tack it into position when you have verified that you have a tight fit and a measurement of 10 1/4" from the center of the lower control arm mounting holes to the ground at all four points. You can massage the notches with the grinder if necessary to achieve perfect placement of the cross member.

5 *Placement of the Spring Towers*

The spring tower will be placed so that a straight up vertical measurement from the center of the lower control arm mounting hole to the surface that the upper control arm bolts to on the spring tower is 9 1/4" on the front side of the cross member. This measurement is 8 7/8" on the back side of the cross member.
This is a built in 3 degrees of positive caster or an anti-dive angle. If we add these measurements to the center of the lower control arm to the ground measurement of (10 1/4") we will have the measurement that we need for the top of the spring tower (the surface that the upper control arm bolts to) to the ground. For the front side we will add 10 1/4" + 9 1/4" = 19 1/2".



Take one of the spring towers to the drivers side frame rail. You will be building in the anti-dive angle so mark it with an L to avoid confusion later. Place the spring tower up against the outside of the frame rail and center it on the vertical spindle center line. Move it up or down until you achieve the measurement of 19 1/2" from the top of the spring tower to the ground. Use a straight edge on the top of the frame rail to mark the horizontal cut on the front side of the spring tower.

The back side of the spring tower is 3/8" lower, so mark the top of the frame rail location onto the spring tower on the back side at 19 1/8" from the ground.

Please remember that these measurements are for a 28" tall tire and a stock ride height spindle. If your using a different size tire or a 2" drop spindle, your measurements will be different so use these as an example and do the calculations with your measurements.

The next step is to install the lower control arm. The front side of the lower control arm runs almost parallel with the cross member while the back side of the control arm angles toward the rear of the vehicle. When the control arm is installed you will want to block it up so that it is straight out and level with the ground. Next, install the spindle onto the lower control arm. Bring the spindle up to zero camber pointing straight out sideways. This can be precisely accomplished by attaching a magnetic level to the brake caliper bolt holes.

Bolt the upper control arm to the spring tower in the middle of the adjustment slots. Place the spring tower on top of the frame rail centered on the vertical spindle center line. Hold the upper control arm straight out level with the ground and the upper ball joint pointing straight down. Move the spring tower in toward the engine bay or out towards the tire until the ball joint lines up with the hole in the spindle. Make certain that the spring tower is square with the cross member (not the frame rail) and centered on the vertical spindle center line. Using a straight edge mark the outside of the frame rail position onto the spring tower walls on the front and back sides. Repeat this procedure with the right side spring tower except mark it with an R.

You will now have a horizontal mark and a vertical mark on each side of both spring towers. Lay your square on the two marks, draw a line around it. This is the notch you will need to cut out. This method will put you at zero camber in the middle of the adjustment.

Once the notches have been cut out, place the spring towers on the frame rails. Using the level, verify that they are at the same height.

The surface of the spring tower that the upper control arm bolts to will be at a down hill angle towards the fire wall.

6 *Mounting the Rack and Pinion*

The proper placement of the rack and pinion brackets on the cross member is important to avoid the possibility of bump steer. The steering arms on the rack need to run parallel to the lower control arm when it is installed and parallel to the ground.

To do this, bolt the rack brackets onto the rack and pinion with the spacers in between the two. The spacer is there to provide clearance between the tie rod end and the lower control arm.

Install the tie rod ends onto the steering arms on the rack. Install the tie rod ends up through the steering arms on the spindles.

On the front side of the cross member you will find reference lines scored into place to center the rack from side to side. Line the rack brackets up with these lines and place the rack up against the front of the cross member. Raise or lower it until it is at a point where the steering arms on the rack are parallel with the lower control arms and the ground.

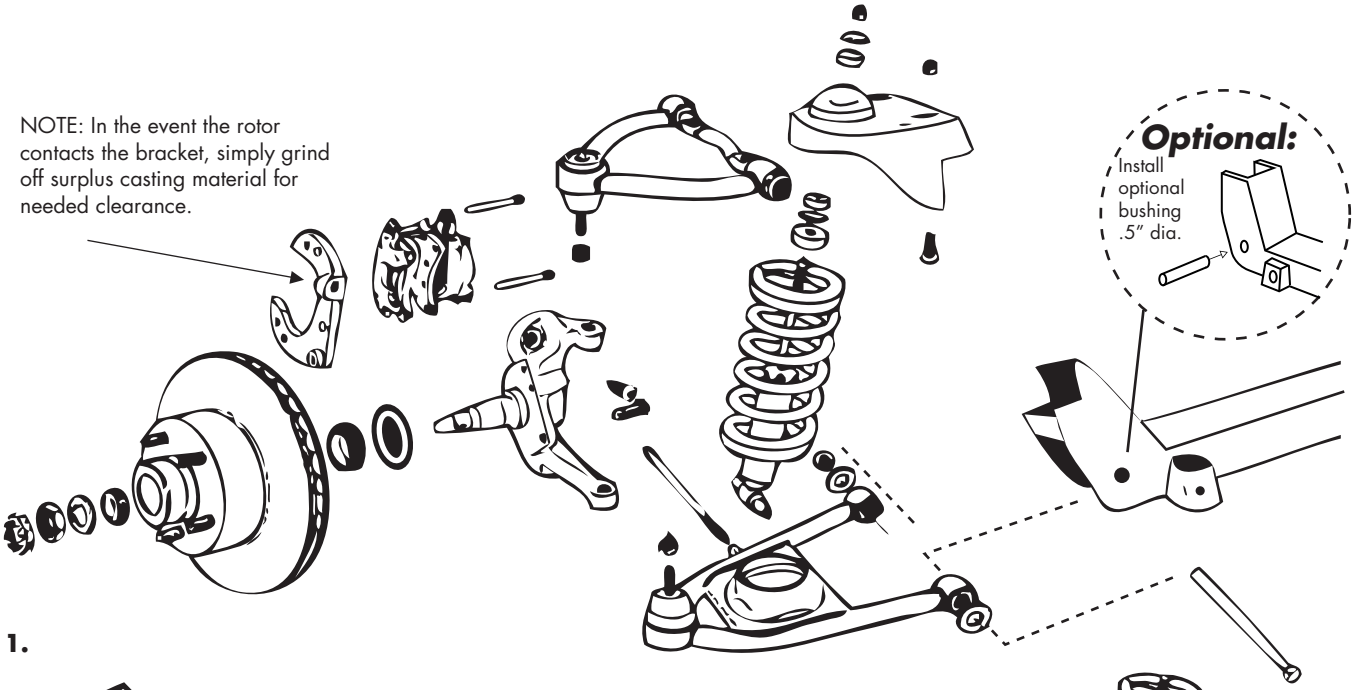
In cases where you have chosen an extremely low ride height, it may to be necessary to c-notch the bottom of the frame rail for additional steering arm clearance.

It is important that the rack and pinion steering arms do not run down hill or up hill to the spindle. Once the proper location is found, either mark the position of the rack brackets or tack them into place. You can now remove them from the rack assembly and weld them down to the cross member without the risk of damaging the bushings.

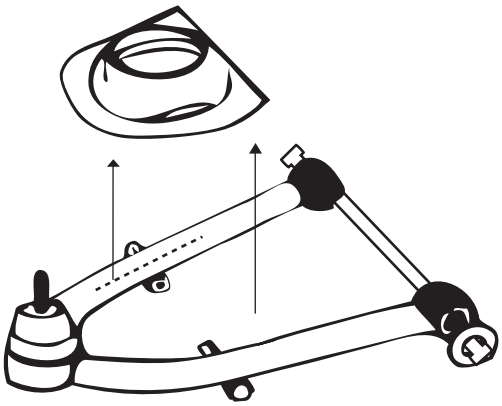
Set your initial alignment specifications and confirm your final geometry. If everything is good to go, you can weld it all down solid and do a final assembly.

MUSTANG II IFS

NOTE: In the event the rotor contacts the bracket, simply grind off surplus casting material for needed clearance.



1.



Optional Coilover & AirBag Procedure

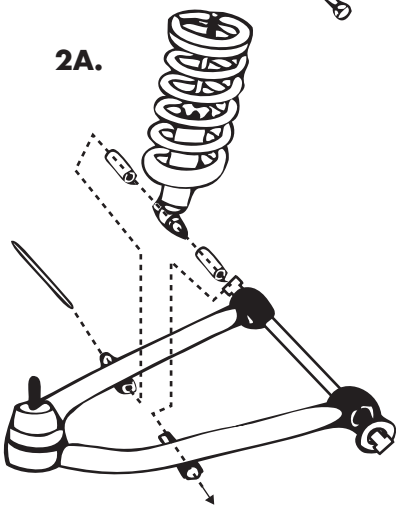
1. Before cutting out the plate, replace the bolt and nut in the arm to retain the shape of the arm. Do not remove the bolt until the new plate has been welded. Cut lower spring landing along welds without damaging tubular control arm and remove. Grind smooth and paint.

2A. Use the two spacers on either side of the coilover lower mount when mounting into the lower control arm.

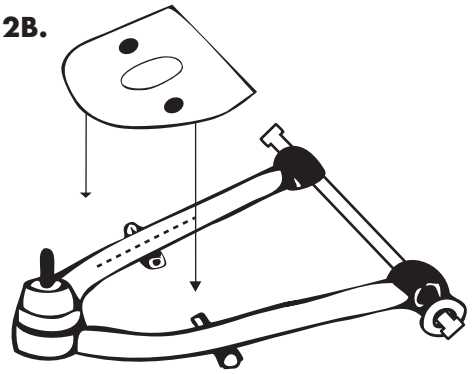
2B. Stitch weld the airbag bracket onto the lower A-arm using 1" welds. Let the arm cool between welds.

3. Install the air bag top hat. For any air bag/air shock kit, the top spring mount on the top hat must be removed.

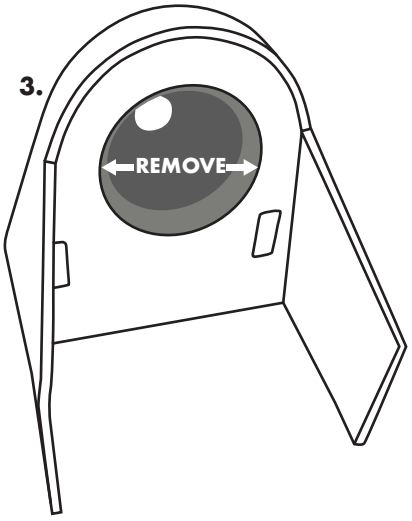
2A.



2B.



3.



COIL OVER ASSEMBLY & ADJUSTMENT

INCLUDED:

- HEXSHX1273 x2
- HEXSHXA1 x2
- HEXSHXA2 x2
- HEXSHXB1 x2
- HEXSPR64230350A x1

1

Grab the shock (HEXSHX1273) and the shock adapter (HEXSHXA1). Insert shock adapter over the shock as shown in the picture below. Make sure that the side that has the lip on the inside goes in first.

2

It should look like this.

3

Next attach loop shock adapter (HEXSHXB1) like shown below.

4

After that you will put the bushing eye adapter (HEXSHXA3) on, as shown below.

5

Now you will attach the Spike stem shock adapter (HEX-SHXB2) to the end of the shock as shown below.

6

Finally you will put the Spring (HEXSPR3) on the shock. Make sure the smaller end goes down first as shown below.

7

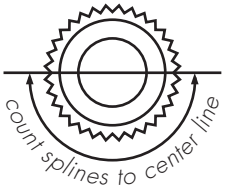
Now repeat for the other side.

NOTE: Use Loctite (or similar thread adhesive) to secure all threaded parts (excluding coil over locking ring).

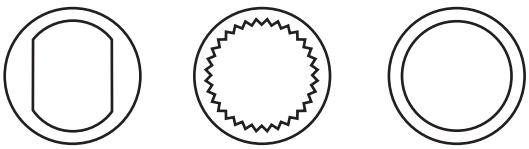
DETERMINING SPLINE SIZE

To determine the spline size of a component (rack and pinion, steering column and steering box), measure the outside diameter and count the number of splines. If there is a flat spot on the shaft and some of the spline are missing, count halfway around where there are splines and double that number. We need to know how many teeth are in a theoretical full circle.

Available U-joint combination are:
A) Smooth bore on both ends
B) Smooth bore and Spline or Double D
C.) Spine and/or Double D on each end



MULTIPLY BY TWO



Double D (DD) *Splined (SP)* *Smooth (S)*

VEHICLES WITH SHOCK TOWERS

If your vehicle is equipped with shock towers (Mustang, Falcon, Nova, etc) you will want to remove them.

Support the vehicle on 4 jack stands at approximately the same angle it sits on the ground. Make sure to place the jack stands under the frame rails at the firewall. Remove all old suspension components along with the shock towers. See **Figure 1**. Mark the cut lines around the shock towers and cut them out, making sure to cut them loose from the frame rails. Remove the lower control arm mounts.

VEHICLES WITH "C" CHANNEL FRAMES

All "C" channel frames would benefit from boxing prior to installation.

Cut notches for the coil springs in the rails and remove the lower outer flange in the boxing plate area. See **Figure 2**. Measure back 24-3/4" from the front surface of the front cross member and scribe a line around the rails to denote the spindle centerline. Mark the spring reliefs onto the rails, with the radius centered on the spindle centerline. Make sure to cut away enough material to provide clearance for the radius in the outer boxing plates. Remove any rust from the frame rails, clamp the upper/inner boxing plates onto the rails and tack weld them to the rails. Clamp the outer boxing plates in place and tack weld them to the upper plates and to the frame. Clamp the lower plates in place and tack weld them to the others. Remove all clamps and securely weld all the boxing plates in place. Weld in short sections to prevent warping and grind the welds smooth when finished.

Figure 1.

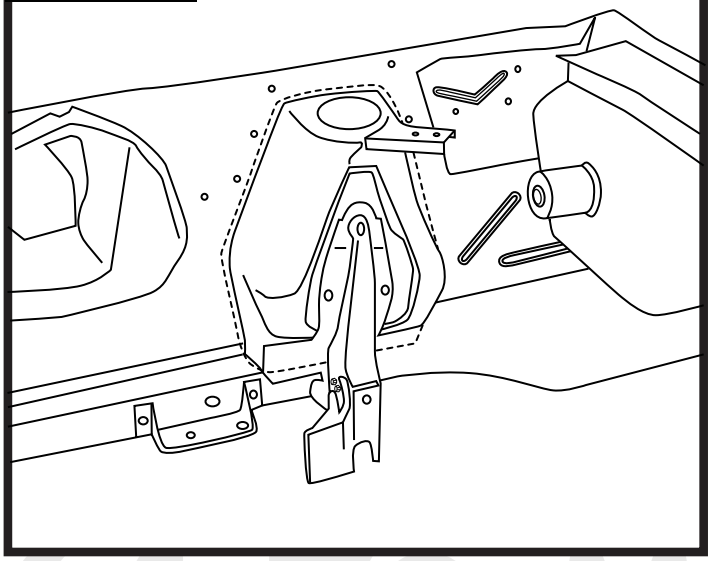
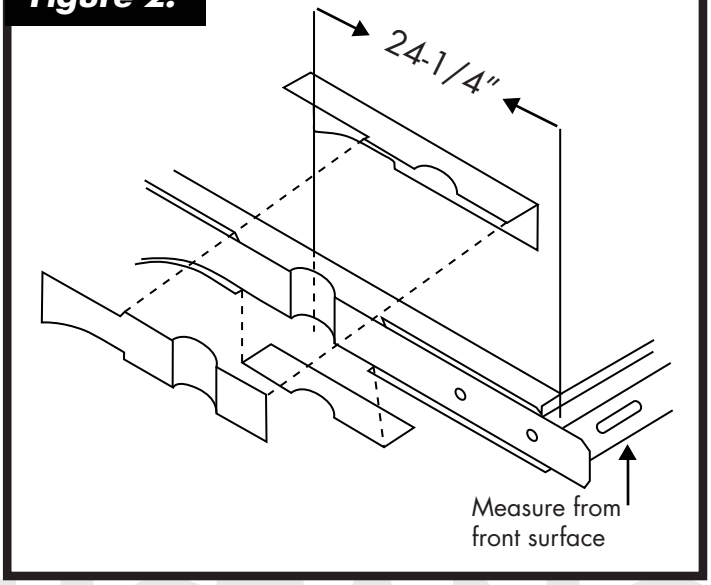


Figure 2.



64-70 MUSTANG

IFS SWAY BAR MOUNTING

Mustang II IFS Sway Bar Kit

1. Assemble the set collars & retaining rings onto the center section of the sway bar followed by a split bushing (flanges toward the center of the bar) toward the outside of each collar, followed by a pillow block toward the outside of each bushing.

2. Slide the bushings into the pillow block, center the sway bar, and then slide the collars against the flange of the bushings and tighten the collars & retaining rings.

3. Build the two linkages by threading a jam nut on each male rod end, followed by a female rod end.

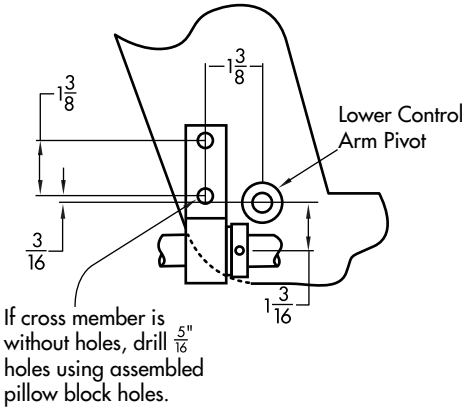
4. Attach the linkages to the control arm. Run the suspension up and down and turn the steering lock to lock to make sure nothing is binding. Adjust the rod end linkages if necessary.

! *Linkage Tab Note. See Diagram C.*

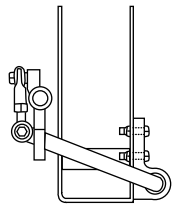
If the linkage mounting tabs are not already welded to the lower control arms, using the linkages, locate the rounded surface of the threaded tab on the front and the top of the lower control arms. With the lower control arm level, weld threaded tab to lower control arm with the threaded tab perpendicular to the linkage to provide full movement of rod ends as the control arm moves up and down.

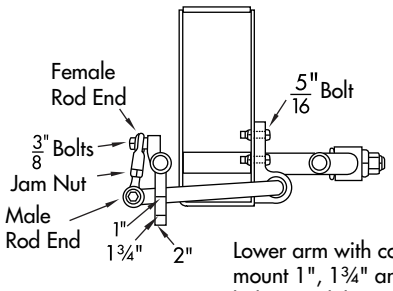
Sway Bar Assembly With Offset Pillow Blocks

A.



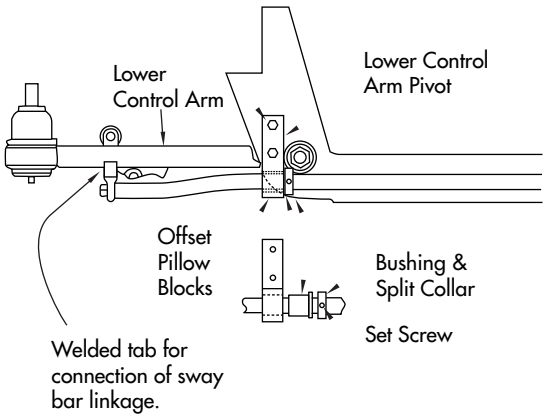
B.


Shown with 3" Up Travel



Lower arm with coilover mount 1", 1¾" and 2" below stock location.

C.



1962-1967 CHEVY NOVA

Figure 1.

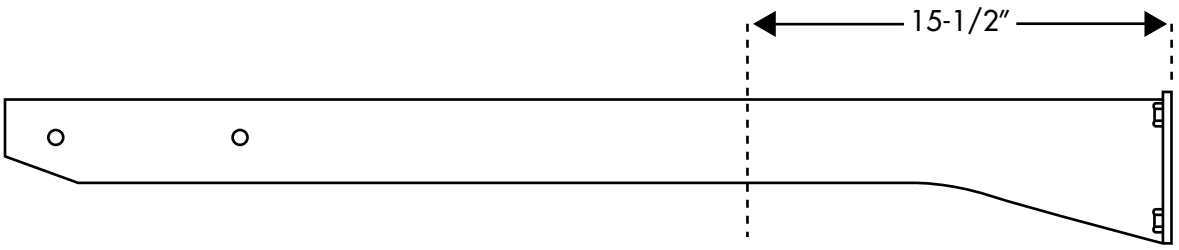


Figure 2.

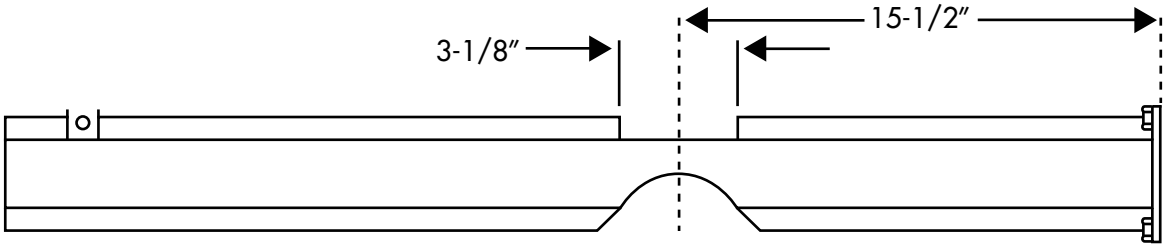
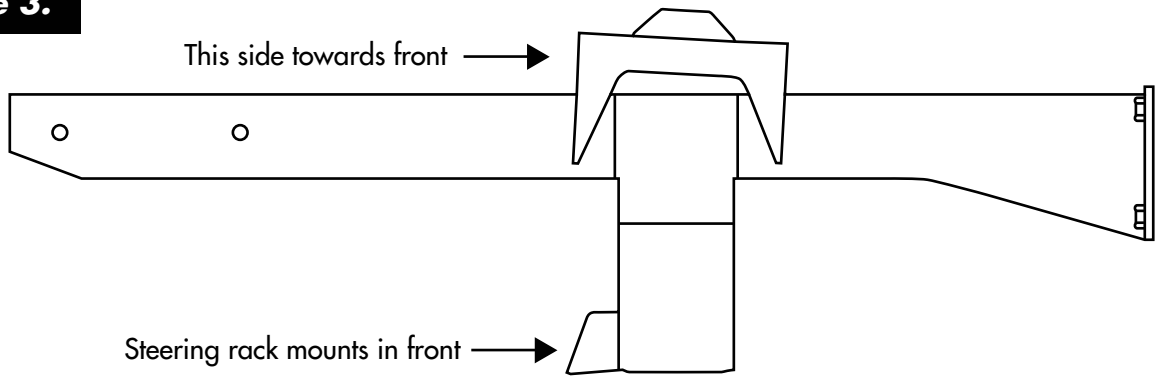


Figure 3.



MUSTANG II IFS
1962-1967 CHEVY NOVA

Remember: Measure twice, weld once!

1 *Determine Correct Center Line on Cross member:*

A. Locate the small mount side of cross member as seen in pic below.

B. From this side measure in to 1 7/8 inches as seen in pic below. This will be the center line on your cross member.

2 *Determine Correct Center Line on Car:*

If original suspension still in place:
A. Transfer centerline of spindles with vertical line onto side of frame rails.
Note: The maximum standard frame width that will fit between springs is about 30"- If your frame is wider than that, it will need to be C-notched for springs. If you still have original suspension on frame, it must be removed at this point.

If original suspension is not in place:
A. Position a fender in place on the frame, then stand the front wheel with tire in place of the fender.
B. Slide a tube or other straight implement straight through wheel center.
C. Mark a vertical line at location where it contacts the frame.
D. Place spindle centerline in center of fender opening. At this point the spindle centerline is in center of the fender opening.
E. Now that you have the spindle centerline, measure the width of frame at that point. The maximum standard frame width that will fit between springs is about 30", If your frame is wider than that, it will need to be C-notched for springs. If you still have original suspension on frame, it must be removed at this point.

3 *Determine Vehicle Ride Height*

Determine ride height of front suspension and of entire car, as frame must also be set at correct rake that the finished car will sit.
A. Adjust height of frame, or entire car, to the desired height, and then support frame on jack stands with shims at this height.
B. Check height of spindle by using your set-up wheel, compared to height of frame rail at axle centerline.
C. Mark actual spindle centerline height on side of frame rail (Note : subtract 1/4" from centerline location for flattening of tires under pressure).
If it comes through the wheel below the frame rail, then temporarily tape a piece of cardboard to side of rail to mark centerline on. Please note the bottom of the frame should be no lower than one inch below spindle and the top no more than four inches above the spindle. At this point you can adjust ride height of your car within this range, if your frame is smaller than these dimensions (See Figure 1). You can also adjust the position of the cross member, and the frame, with 2" Dropped Mustang II Spindles, if the frame does not fall within this range. Note that if frame is more than 1/2" below spindle, it will need to be C-notched for rack boots if you do not use dropped spindles. Also note that if you have a thicker frame, remove a 12" long section off and box in top of the frame for spring tower and upper control arm clearance. Later steps will determine the depth of the section to be removed.

4 *Cross member Cuts & Mounting*

For proper installation you need to determine the inner width of the boxed frame rails for your vertical cut. To do this you need to determine the correct horizontal cuts by
A. Using the lower control arm pivot bolts that are 3-1/2" below spindle centerline on standard Mustang geometry. Measure down (or up) from

1962-1967 CHEVY NOVA

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A. Using the lower control arm pivot bolts that are 3-1/2" below spindle centerline on standard Mustang geometry. Measure down (or up) from spindle centerline mark to bottom of your frame rail.

B. Subtract (or add) your dimension from 3-1/2" and difference will be the dimension from control arm inner bolts to horizontal cuts on cross member.

C. Repeat step B twice- 1-3/4" forward and rearward of spindle centerline, as this is where cross member will contact frame (See Figure 3). Please note the frame is tapered and sitting on an angle, so front and back cuts are almost never the same. It is important to remember that the cross member should be level, both side to side and front to back.

D. Transfer dimensions to cross member. Please note the rack mounts are located on the front of cross member. It is important to double check all measurements and cut the cross member. In order to insure a proper fit you need to cut off slightly less than you measured for tight fit. At this point in time the cross member is centered on spindle centerline.

E. When cross member is in place, check to make sure it is level, then tack weld in place.

F. Verify the cross member is as high in the frame as desired. To do this, temporarily assemble the lower control arms and spindles onto cross member.

G. Temporary clamp a 2x4 under cross member with a couple of shims to support the control arms level and stand spindles up on ball joints.

H. Verify ride height. If your ride height is not as desired, then remove cross member and remove or add material as needed, then re-tack in place. Please check upper control arm mounts and confirm they do not need adjustments for positioning of the cross member.

PLEASE CALL FOR VEHICLE SPECIFIC INSTRUCTIONS!

503.693.6608