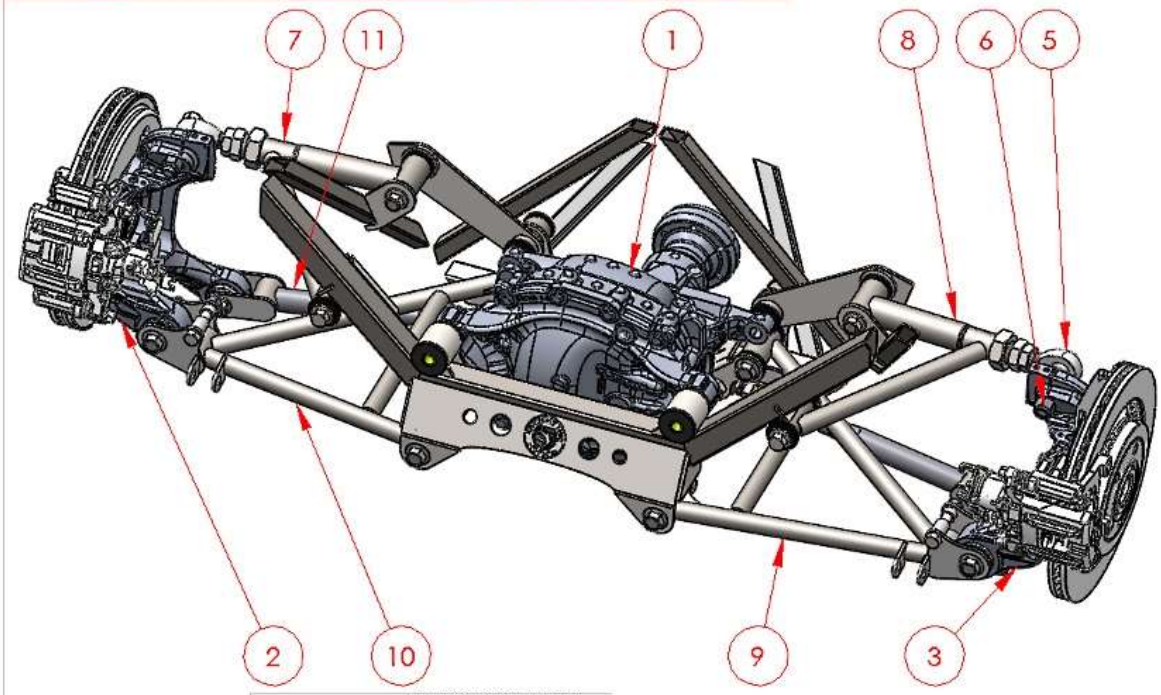
*Controlled Documentation*

| *Part Number:* 33658 | *Revision:* D | *Effective Date:* 3/21/19 | *By:* J. INGERSLEV |
|---|---|---|---|

# IRS

## INSTALLATION INSTRUCTIONS

| ITEM NO. | PART NUMBER | DESCRIPTION | Roadster/QTY. |
|---|---|---|---|
| 1 | CENTER SECTION | | 1 |
| 2 | LEFT SIDE SPINDLE | | 1 |
| 3 | RIGHT SIDE SPINDLE | | 1 |
| 4 | 15857 | ANGLED MOUNT ADAPTER | 2 |
| 5 | HBOLT 0.6250-18x3.5x1.5-N | | 2 |
| 6 | NLN-625C | NYLON INSERT LOCKNUT | 2 |
| 7 | 16078 | IRS LEFT UPPER CONTROL ARM | 1 |
| 8 | 15898 | IRS RIGHT UPPER CONTROL ARM | 1 |
| 9 | 15911 | IRS RIGHT LOWER CONTROL ARM | 1 |
| 10 | 15907 | IRS LEFT LOWER CONTROL ARM | 1 |
| 11 | 15902 | IRS TOE ADJUSTMENT ARM COMPONENTS | 2 |






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

MATERIAL
FINISH
USED ON
APPLICATION ROADSTER/COUPE
PRINTED 8/4/2015

Factory Five Racing, Inc.

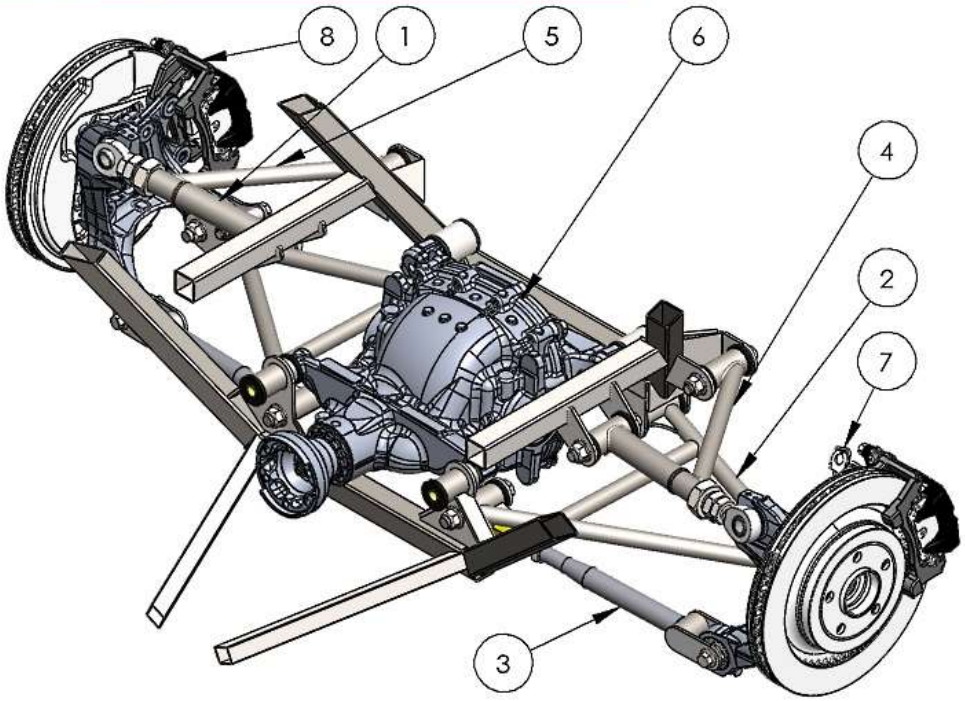
ROADSTER/COUPE IRS COMPONENTS

| | NAME | DATE |
|---|---|---|
| DRAWN | JI | 3/23/15 |
| COMMENTS: | | |

SIZE A DWG. NO. IRS Assembly REV. A
SCALE:1:9 WEIGHT:

Roadster/Coupe

| ITEM NO. | PART NUMBER | DESCRIPTION | Hot Rod/QTY. |
|---|---|---|---|
| 1 | 15911 | IRS RIGHT LOWER CONTROL ARM | 1 |
| 2 | 15906 | IRS LWR CNTRL ARM COMP. | 1 |
| 3 | 15902 | IRS TOE ADJUSTMENT ARM COMPONENTS | 2 |
| 4 | 33998 | UPPER CONTROL ARM | 1 |
| 5 | 34025 | 34025 - IRS RIGHT UPPER CNTRL ARM | 1 |
| 6 | CENTER SECTION | | 1 |
| 7 | LEFT SIDE SPINDLE | | 1 |
| 8 | RIGHT SIDE SPINDLE | | 1 |

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DIMENSIONS ARE IN INCHES
TOLERANCES:
TWO PLACE DECIMAL ±0.01
THREE PLACE DECIMAL ±0.005
FOUR PLACE DECIMAL ±0.001
MATERIAL
FINISH
USED ON
APPLICATION HOT ROD
PRINTED 8/17/2015

| | NAME | DATE |
|---|---|---|
| DRAWN | JI | 3/23/15 |
| CHECKED | | |
| ENG APPR. | | |
| MFG APPR. | | |
| Q.A. | | |
| COMMENTS: | | |

Factory Five Racing, Inc.

HOT ROD IRS COMPONENTS

SIZE A | DWG. NO. IRS Assembly | REV. A
SCALE:1:8 | WEIGHT: | SHEET 4 OF 4

Hot Rod

## Table of Contents

## Parts Included in Kit

IRS frame mount (welded to frame)
L&R lower control arms
L&R upper control arms
Toe arms
L&R CV axles
Koni coil-over shocks
Springs
Fasteners
Driveshaft adapter

## Parts needed

- 2015 or newer Ford Mustang IRS parts
  Super 8.8" center section

  L&R spindles

  L&R brake parts

## Mustang IRS Specifications

| | 2.3L Ecoboost | 3.7L V6 | 5.0L Coyote |
|---|---|---|---|
| Housing | Steel | Aluminum | Steel |
| Weight | 93lb | 78lb | 93lb |
| Gear Ratios | 3.15:1, 3.31:1, 3.55:1 | 3.15:1, 3.55:1 | 3.15:1, 3.55:1 |
| Brakes | 12.6" (320mm) Solid rotor, 45mm single piston aluminum caliper | 12.6" (320mm) Solid rotor, 45mm single piston aluminum caliper | 13.0" (330mm)Vented rotor, 45mm single piston iron caliper |

## Tools required

Philips head screwdriver
5/8" Drill bit
13/16", 15/16" wrenches
13/16", 15/16" 18mm Sockets
Large adjustable wrench – up to 1 5/8"
1/8" Hex Key
Marker
Ruler
Hacksaw
Drill
Plastic mallet
Hammer
Torque wrench

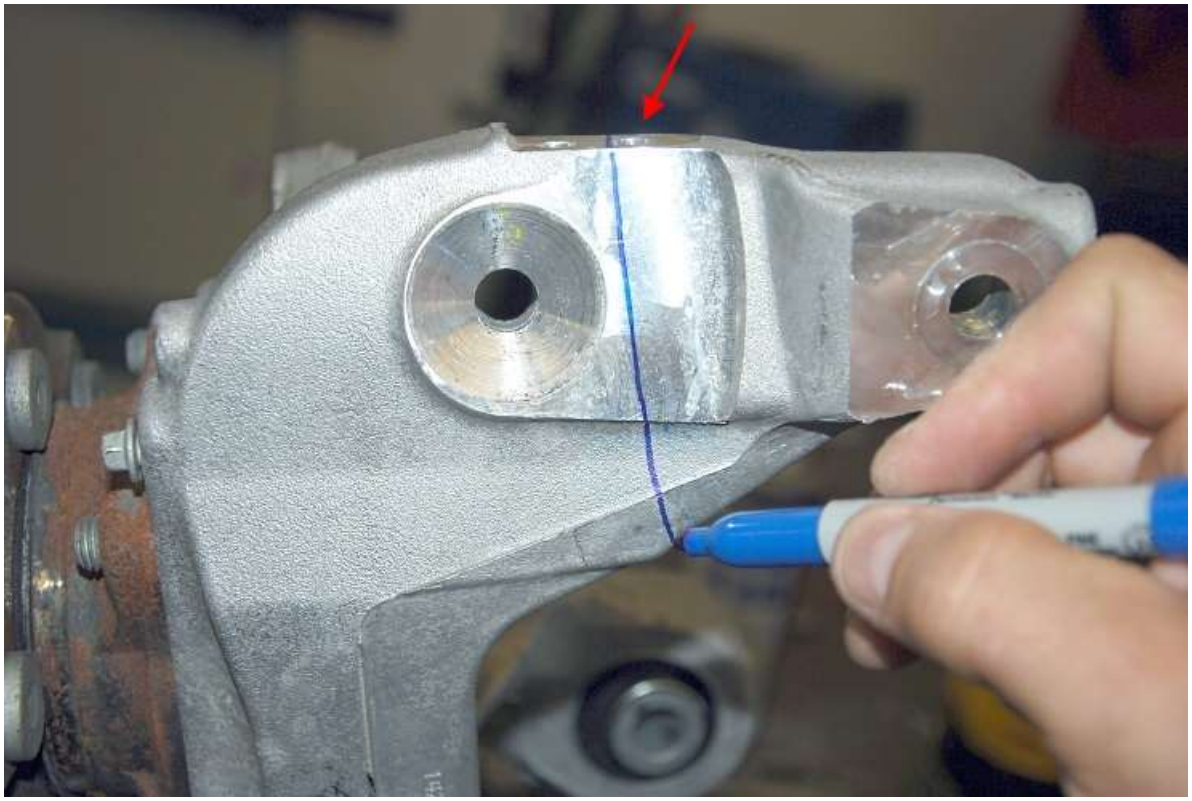
## Parts preparation

### Spindles

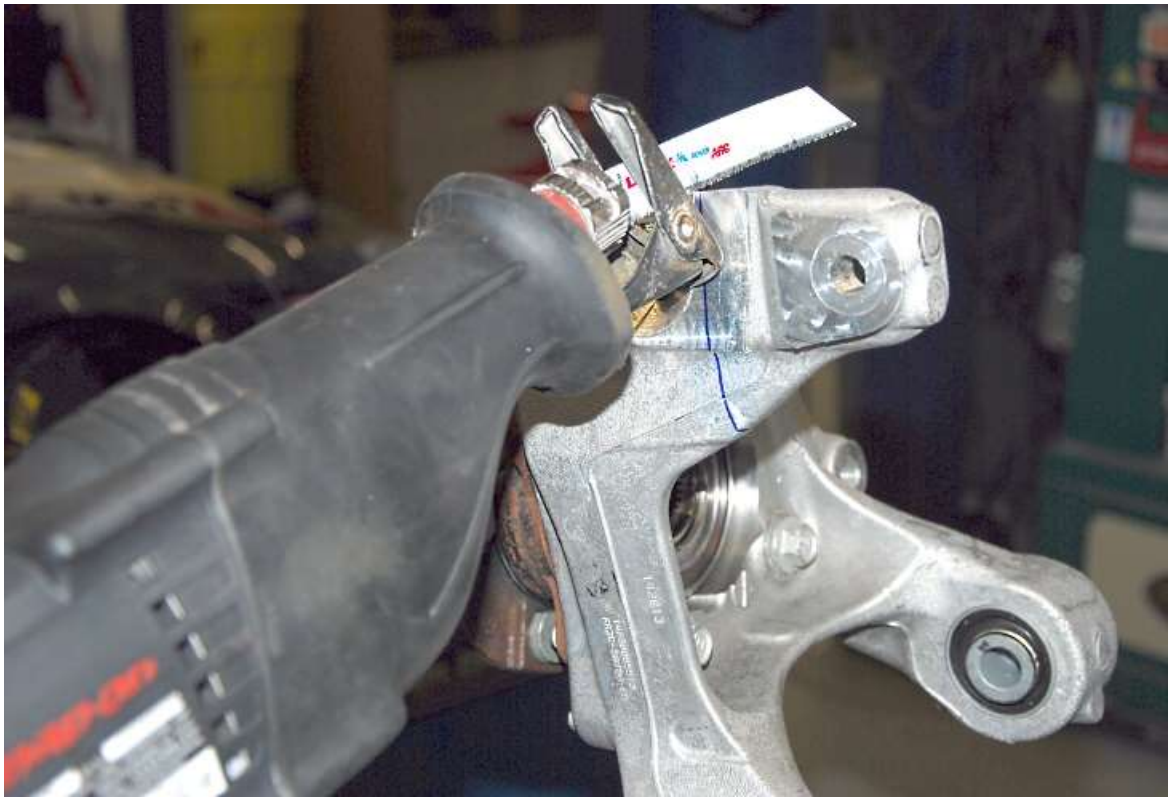
🛠 5/8" drill bit, drill, saw, marker

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

Use a 5/8" drill bit to drill out the tapered hole at the top of the spindle.



Mark the spindle starting at the top just to the inside of the top inside hole down to the corner of the small boss at the bottom of the ear.

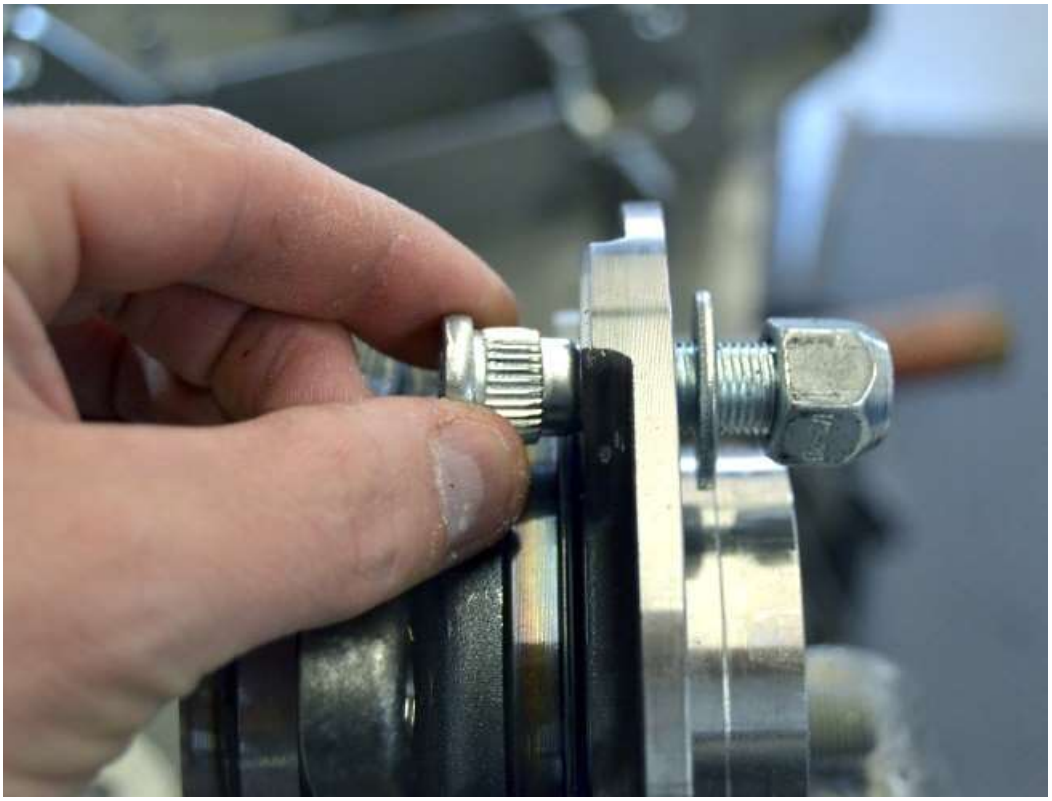


Use a saw to cut the ear off the spindle.  If using a Sawzall or similar, use a wood blade; a 14tpi blade or finer will just get gummed up with the aluminum.

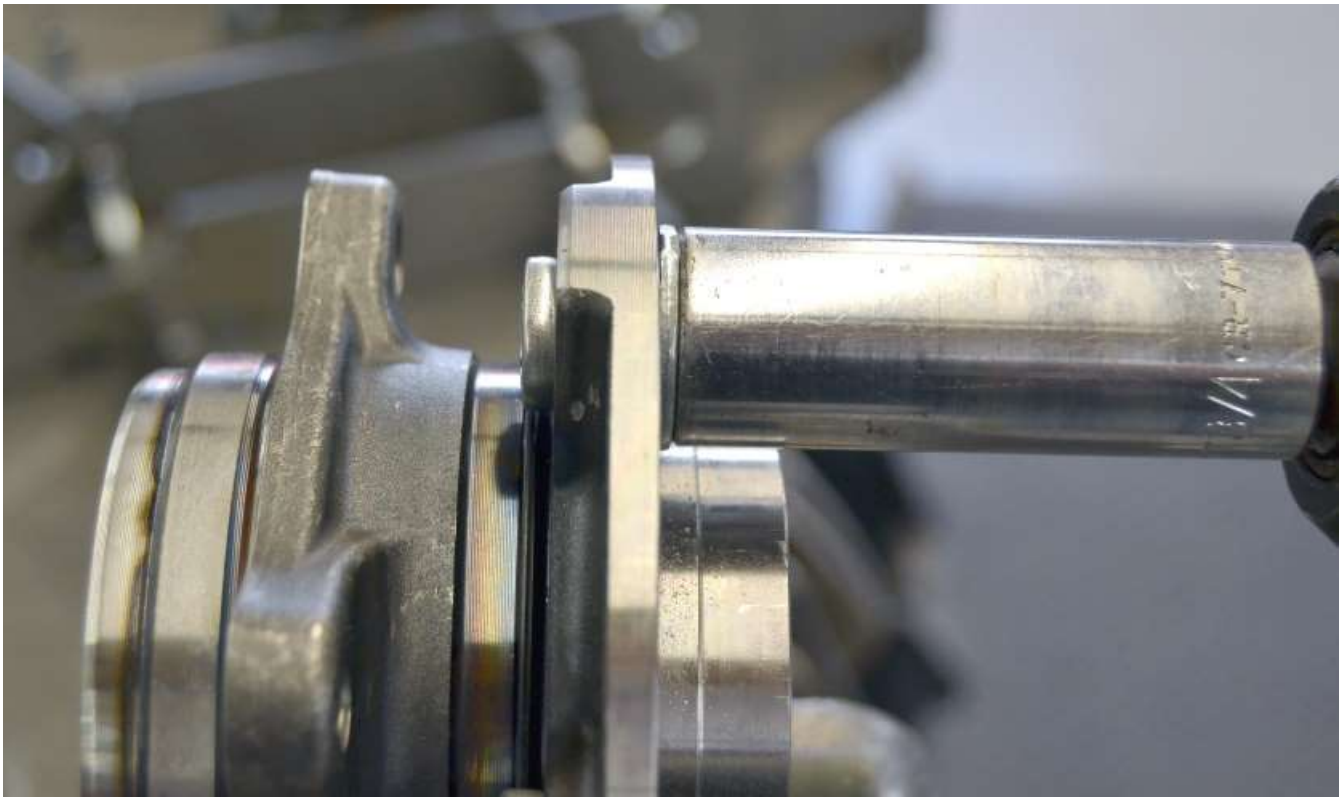
## Hubs

🛠 Hammer, vise, ratchet, ½”-20 lugnut, torque wrench.
🚘 Rear wheel studs.
✋ Removal of the hub from the spindle is not necessary but can make things easier.

Use a vise to lightly hold the side of the wheel stud head then use a hammer to bang out the Mustang studs. Repeat for all of the studs.



Insert one of the included wheel studs into the hub from the back and use a washer and lug nut on the front side.



Use a ratchet to draw the wheel stud into the hub and torque the stud to **135Nm (100lb-ft)**.

Repeat for the other wheel studs.


If the Hub was removed, use Loctite on the threads and reattach to the spindle.

Torque the bolts to **133Nm (98ft-lb)**.

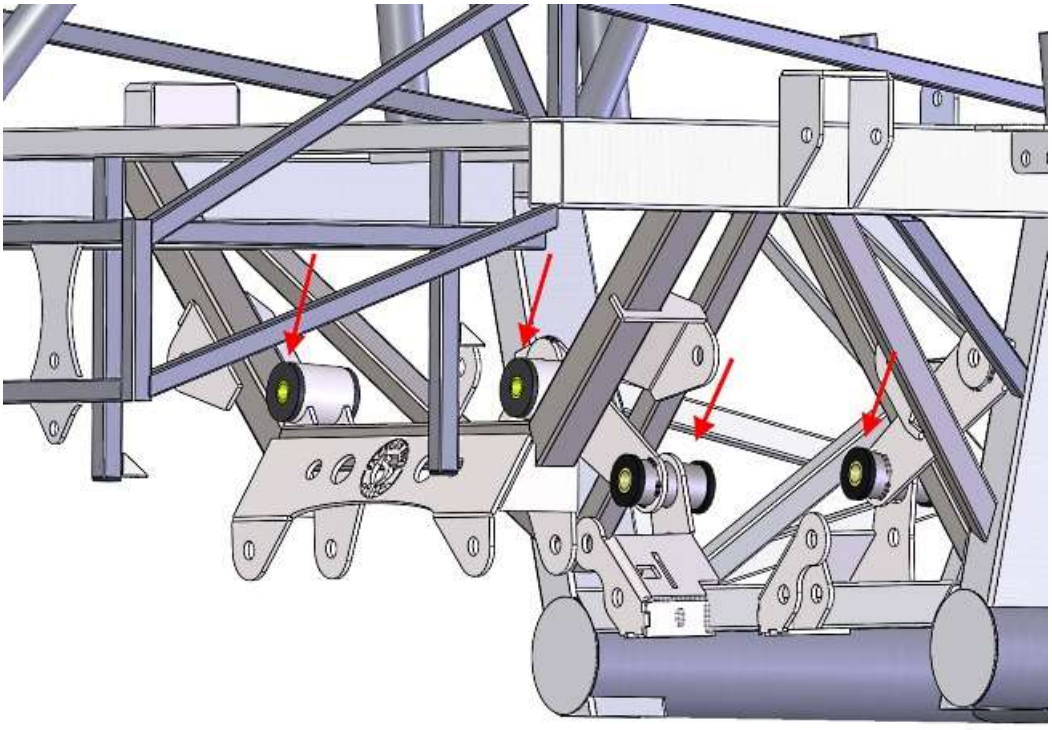
## Center section

🛠 $^5/_8$” drill bit, drill.

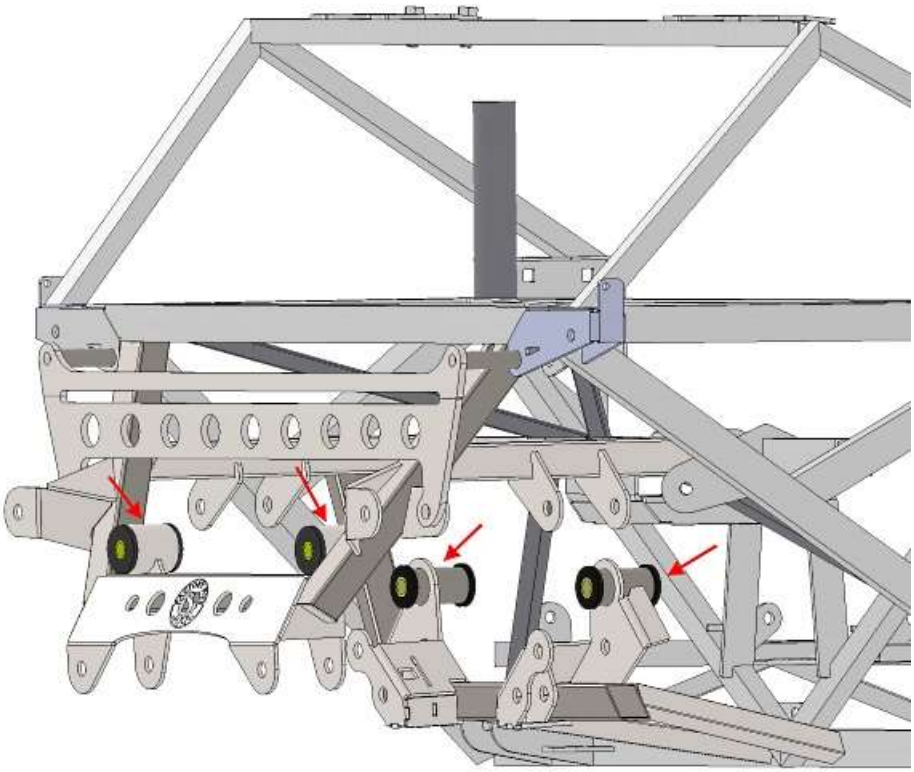
Use a $^5/_8$” drill bit to chase the front mount holes on the center section.

## Frame

🛠 Rubber/plastic mallet
🚘 Differential mounting components



Roadster/Coupe bushing locations.



Hot Rod bushing locations.

Use a plastic mallet to install the polyurethane bushings marked 2048 and the longer ($3^{1}/_{16}$”) sleeves where the front of the center section will mount.

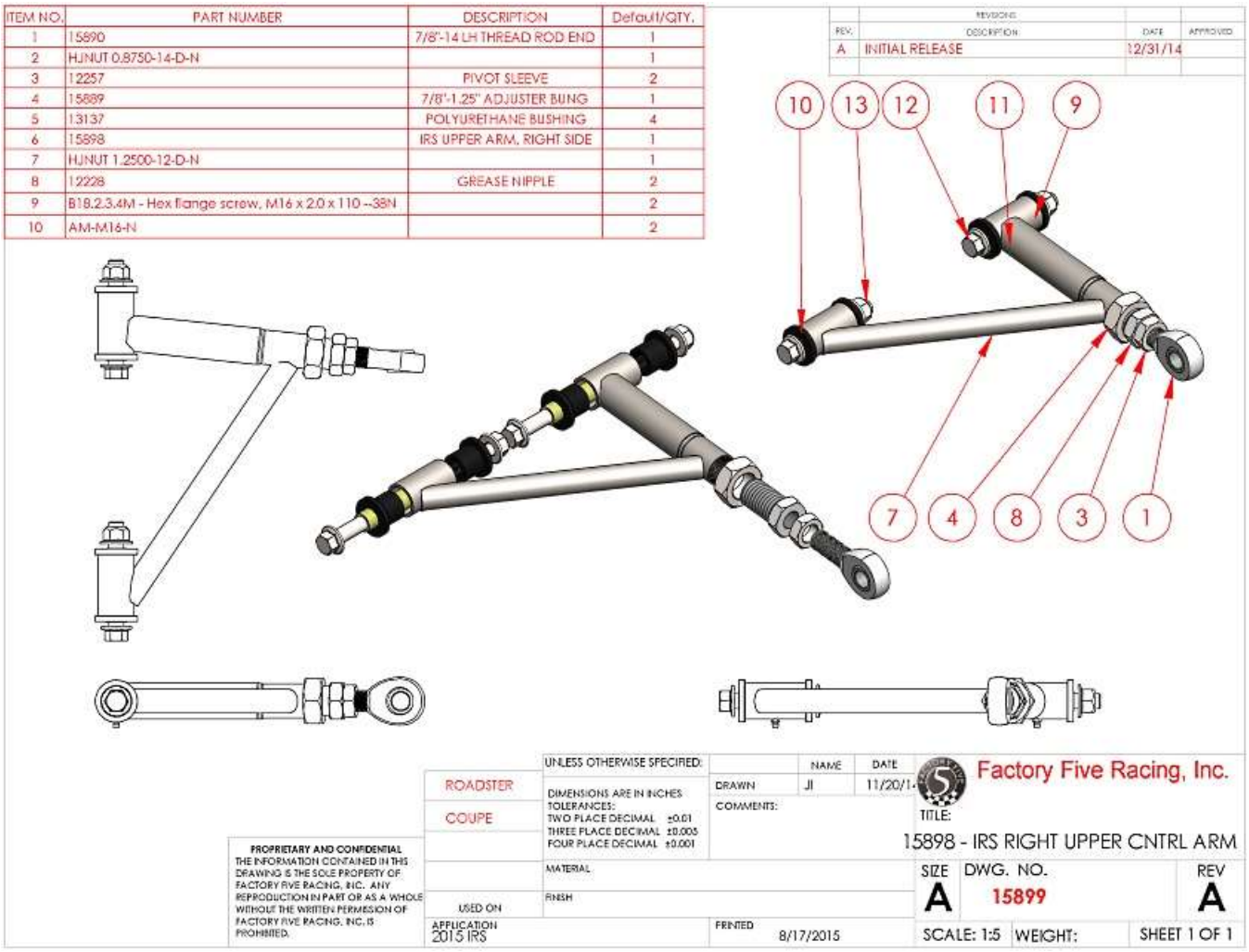
Use a plastic mallet to install the polyurethane bushings marked 2123 and the shorter (2.40”) sleeves where the rear of the center section will mount.

## Upper control arms

Upper control arm components
Grease gun

### Roadster

| ITEM NO. | PART NUMBER | DESCRIPTION | Default/QTY. |
|---|---|---|---|
| 1 | 15890 | 7/8"-14 LH THREAD ROD END | 1 |
| 2 | HJNUT 0.8750-14-D-N | | 1 |
| 3 | 12257 | PIVOT SLEEVE | 2 |
| 4 | 15889 | 7/8"-1.25" ADJUSTER BUNG | 1 |
| 5 | 13137 | POLYURETHANE BUSHING | 4 |
| 6 | 15898 | IRS UPPER ARM, RIGHT SIDE | 1 |
| 7 | HJNUT 1.2500-12-D-N | | 1 |
| 8 | 12228 | GREASE NIPPLE | 2 |
| 9 | B18.2.3.4M - Hex flange screw, M16 x 2.0 x 110 --38N | | 2 |
| 10 | AM-M16-N | | 2 |




| REVISIONS | | | |
|---|---|---|---|
| REV. | DESCRIPTION | DATE | APPROVED |
| A | INITIAL RELEASE | 12/31/14 | |

ROADSTER
COUPE

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
USED ON
APPLICATION 2015 IRS

| | NAME | DATE |
|---|---|---|
| DRAWN | JI | 11/20/14 |

COMMENTS:
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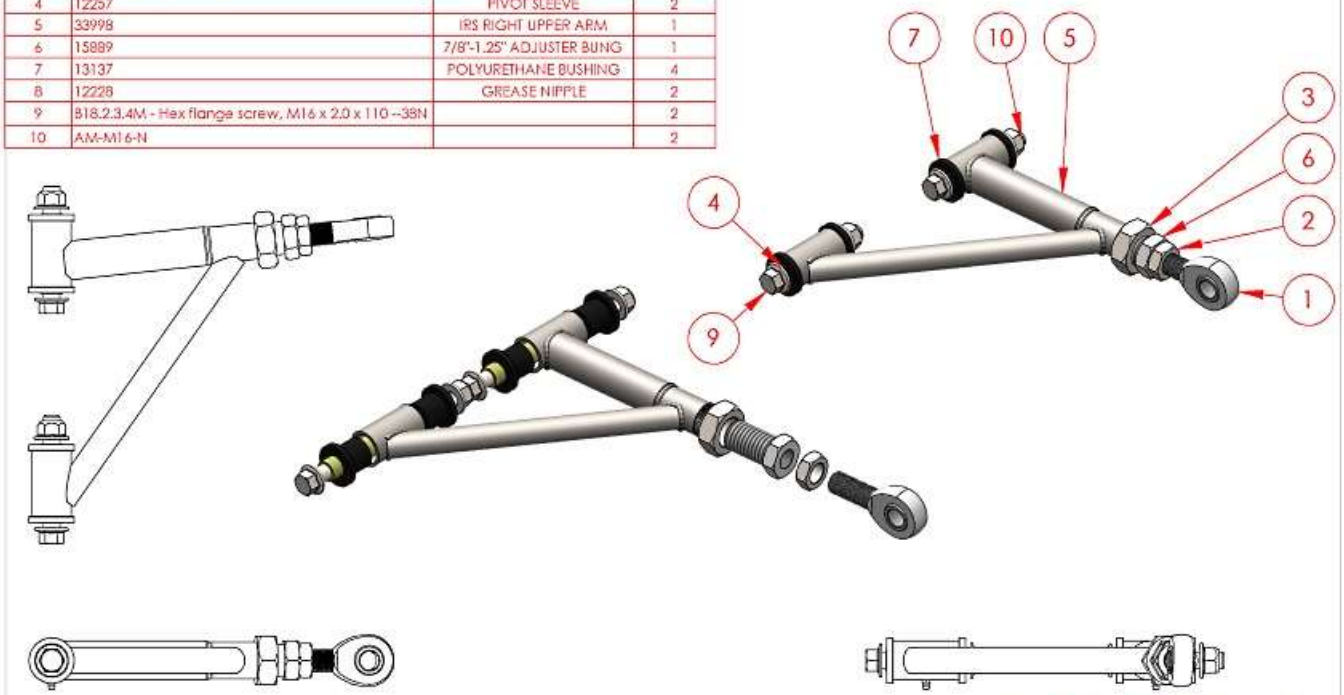
Factory Five Racing, Inc.
TITLE: 15898 - IRS RIGHT UPPER CNTRL ARM
SIZE A | DWG. NO. 15899 | REV A
SCALE: 1:5 | WEIGHT: | SHEET 1 OF 1

Assemble each of the upper control arms as shown.
Grease the control arms using chassis grease until the grease comes out of the flutes in the bushings next to the pivot sleeves.

## Hot Rod

| ITEM NO. | PART NUMBER | DESCRIPTION | 34025/QTY. |
|---|---|---|---|
| 1 | 15890 | 7/8"-14 LH THREAD ROD END | 1 |
| 2 | HJNUT 0.8750-14-D-N | | 1 |
| 3 | HJNUT 1.2500-12-D-N | | 1 |
| 4 | 12257 | PIVOT SLEEVE | 2 |
| 5 | 33998 | IRS RIGHT UPPER ARM | 1 |
| 6 | 15889 | 7/8"-1.25" ADJUSTER BUNG | 1 |
| 7 | 13137 | POLYURETHANE BUSHING | 4 |
| 8 | 12228 | GREASE NIPPLE | 2 |
| 9 | B18.2.3.4M - Hex flange screw, M16 x 2.0 x 110 --38N | | 2 |
| 10 | AM-M16-N | | 2 |

| REVISIONS | | | |
|---|---|---|---|
| REV. | DESCRIPTION | DATE | APPROVED |
| A | INITIAL RELEASE | 3/15/15 | |






| | | | | |
|---|---|---|---|---|
| HOT ROD | UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN INCHES TOLERANCES: TWO PLACE DECIMAL ±0.01 THREE PLACE DECIMAL ±0.005 FOUR PLACE DECIMAL ±0.001 | | NAME | DATE |
| | | DRAWN | JI | 11/20/14 |
| | | COMMENTS: | | |
| | MATERIAL | | | |
| USED ON | FINISH | | | |
| APPLICATION 2015 IRS | | PRINTED | 8/17/2015 | |

Factory Five Racing, Inc.

TITLE: 34025 - IRS RIGHT UPPER CNTRL ARM

| SIZE | DWG. NO. | REV |
|---|---|---|
| A | 33997 | A |

SCALE: 1:5 | WEIGHT: | SHEET 1 OF 1



Assemble each of the upper control arms as shown.

Grease the control arms using chassis grease until the grease comes out of the flutes in the bushings next to the pivot sleeves.

### Lower control arms

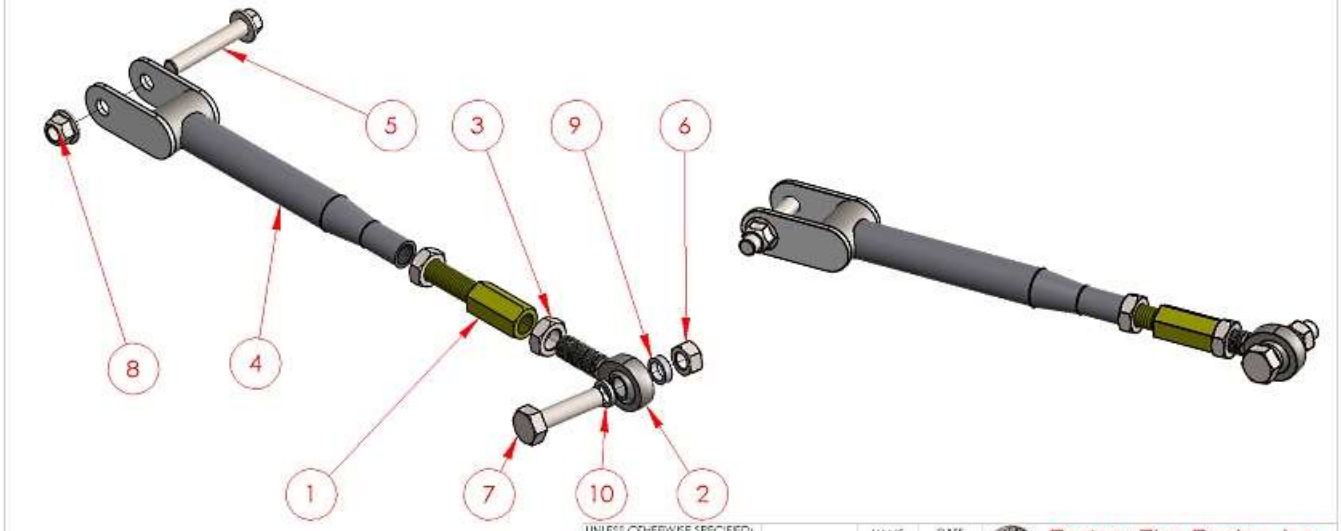
🛠 Grease gun

Grease the control arms using chassis grease until the grease comes out of the flutes in the bushings next to the pivot sleeves.

### Toe adjustment arms

| ITEM NO. | PART NUMBER | DESCRIPTION | QTY. |
|---|---|---|---|
| 1 | 33388 - LINKAGE ADJUSTER | LINKAGE ADJUSTER | 1 |
| 2 | 12348 3-4 ROD END BODY | 12348 - 3/4"-16 THREAD x 5/8" BORE ROD END | 1 |
| 3 | HJNUT 0.7500-16-D-N | | 2 |
| 4 | 15903 | IRS TOE ARM | 1 |
| 5 | B18.2.3.4M - Hex flange screw, M14 x 2.0 x 80 --34N | | 1 |
| 6 | HNUT 0.6250-11-D-N | 15936 | 1 |
| 7 | HHBOLT 0.6250-11x2.5x1.25-N | 15216 | 1 |
| 8 | AM-M14-N | | 1 |
| 9 | 33240 | 14759 0.25" SPACER | 1 |
| 10 | 15908 | 0.25" SPACER | 1 |

| REVISIONS | | | |
|---|---|---|---|
| REV. | DESCRIPTION | DATE | APPROVED |
| A | INITIAL RELEASE | 1/23/15 | |

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ROADSTER
COUPE

UNLESS OTHERWISE SPECIFIED:
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TOLERANCES:
TWO PLACE DECIMAL ±0.01
THREE PLACE DECIMAL ±0.005
FOUR PLACE DECIMAL ±0.001

| | NAME | DATE |
|---|---|---|
| DRAWN | JI | 1/6/15 |
| COMMENTS: | | |

MATERIAL
FINISH
USED ON
APPLICATION 2015 IRS
PRINTED 5/2/2016

Factory Five Racing, Inc.
TITLE:
IRS TOE ADJUSTMENT ARM COMPONENT

| SIZE | DWG. NO. | REV |
|---|---|---|
| A | 15902 | A |

SCALE: 1:4 WEIGHT: SHEET 1 OF 1

Assemble each of the toe adjustment arms as shown.

## Installation

### Center section

- Rubber/plastic mallet, torque wrench, 18mm, $^{13}/_{16}$" sockets, $^{15}/_{16}$" wrench.
- Differential mounting components.
- Roadster is shown but Coupe and Hot Rod installation is similar.
- Use a friend to help with the heavy center section in the next steps.

Use rags to protect between the front center section mount on the frame.

With the help of a friend, lift the center section nose up into the frame and over the front mount.


Flatten the center section out so it is horizontal then back it up so it is above the mount locations and lower it down so the bolts can be installed. The smaller/shorter bolts are used for the rear mounts.

The larger/longer bolts and nuts are used for the front mounts.

Torque both the front and rear bolts to **135Nm (100 ft-lb)**.

## Toe Adjustment arms

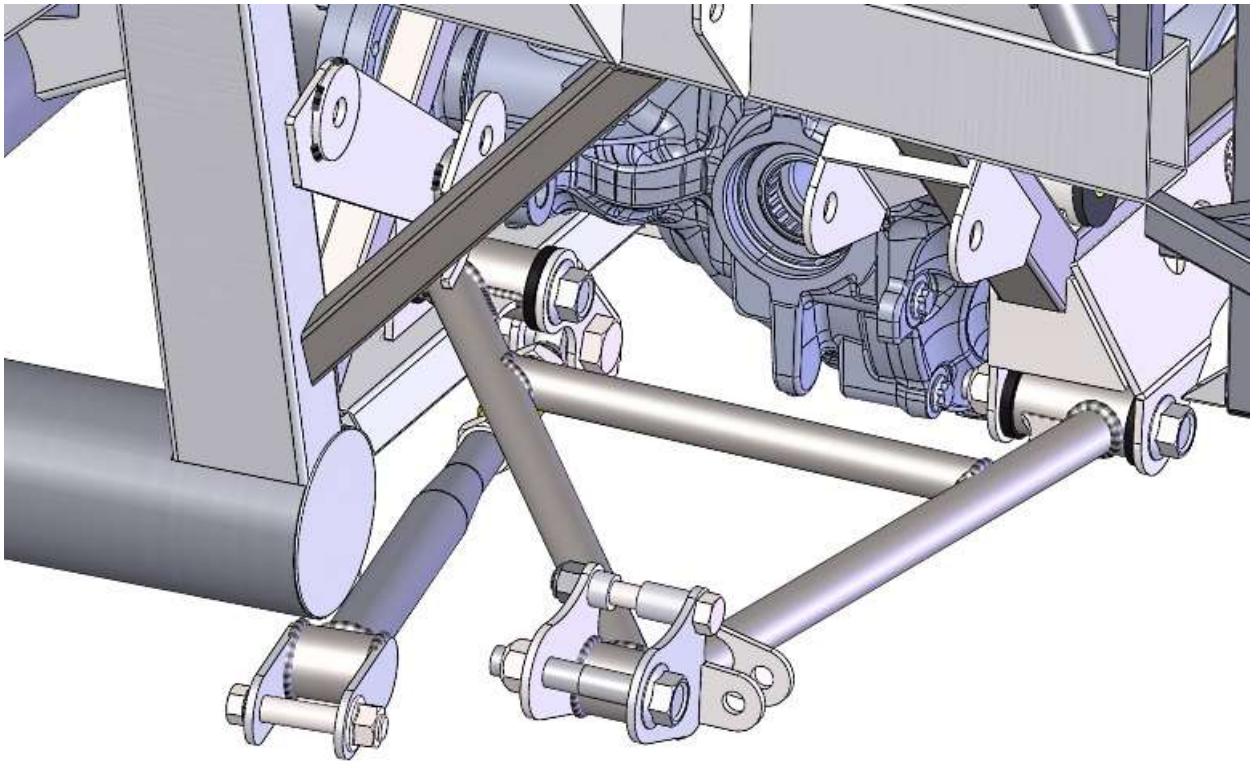
- IRS Toe adjustment arm components
- 13/16" socket, 15/16" wrench, torque wrench.
- For Roadster and Coupe only, if using the sway bar option, pass the bolt through the frame mount bracket when installing the toe arms.
- Swaybars are not available for the Hot Rod.

Attach the toe arms to the frame below the front lower arm mount using the 1/8" thick spacer in the back and the ¼" spacer on the front side of the rod end. Use the 5/8" x 2.25" bolts to attach them to the frame.

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

## Lower control arms

- IRS lower control arm components
- 13/16" socket, 15/16" wrench, torque wrench.



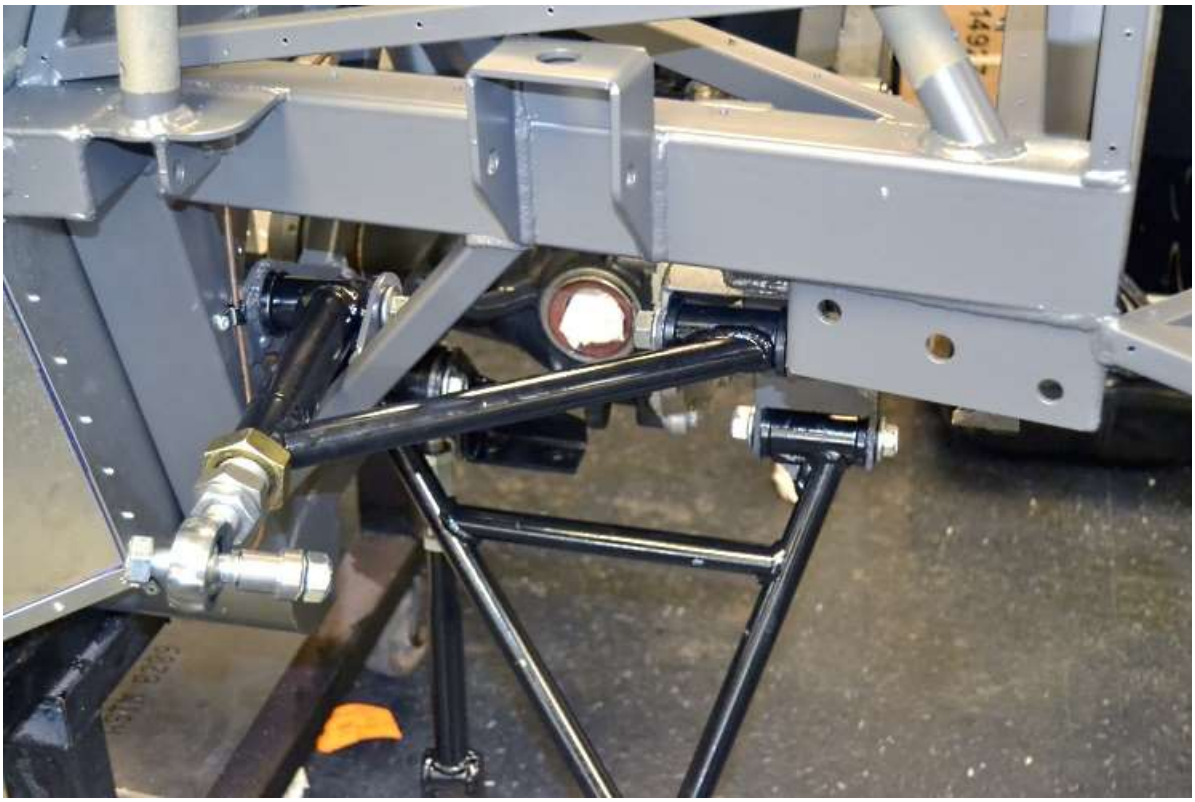
Attach the control arms to the frame with the shock mount towards the rear and spindle brackets up. Use the longer M16 x 110mm (~4 5/16") bolts.

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

## Upper control arms

IRS upper control arm components
13/16" socket, 15/16" wrench, torque wrench.

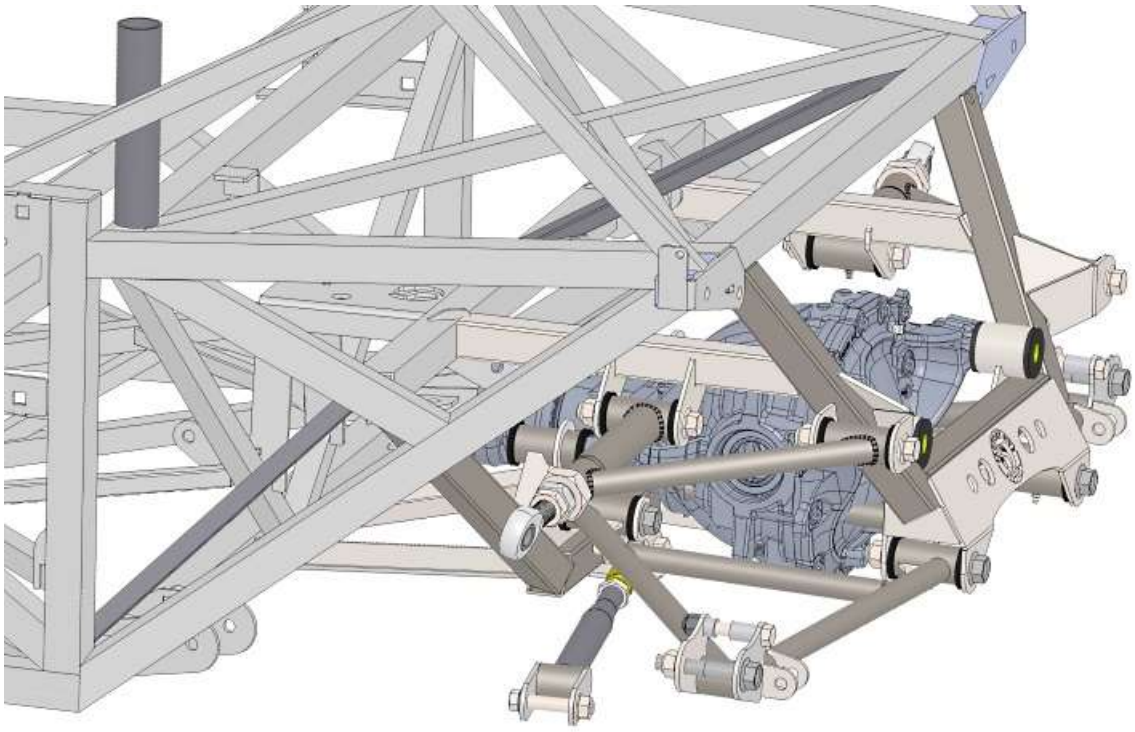
## Roadster/Coupe



Pass the upper control arm thick tube through the triangular area as shown in between the frame mounts. Use the longer M16 x 110mm (~4 5/16") bolts.

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

## Hot Rod

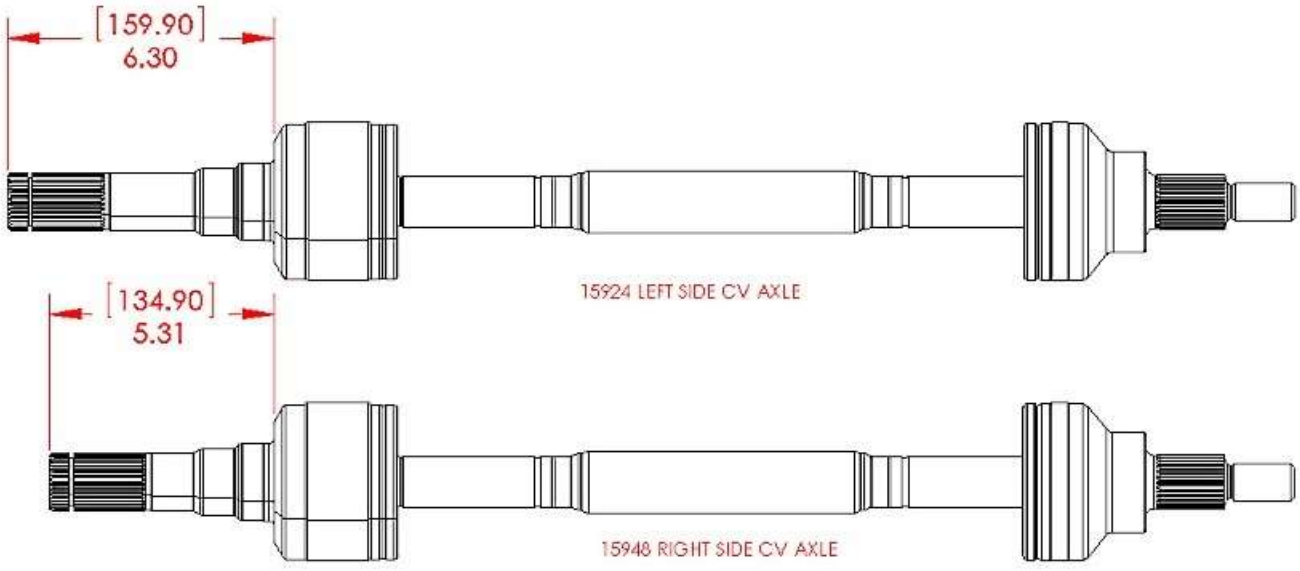


Attach the upper control arms to the frame with the thick tube at the front. Use the longer M16 x 110mm (~4$^{5}/_{16}$") bolts.

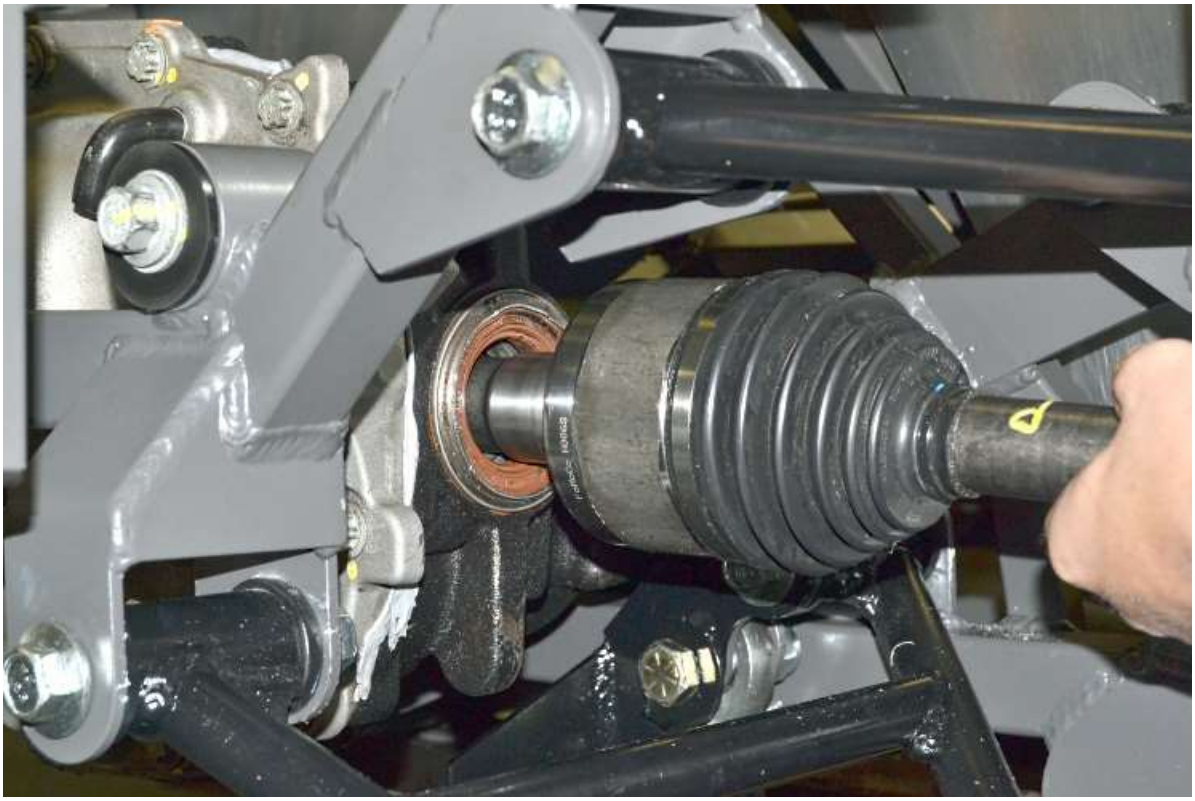
Hold the arm horizontal and torque the bolts to **135Nm (100 ft-lb)**.

## CV Axle

- CV Axles, spindles

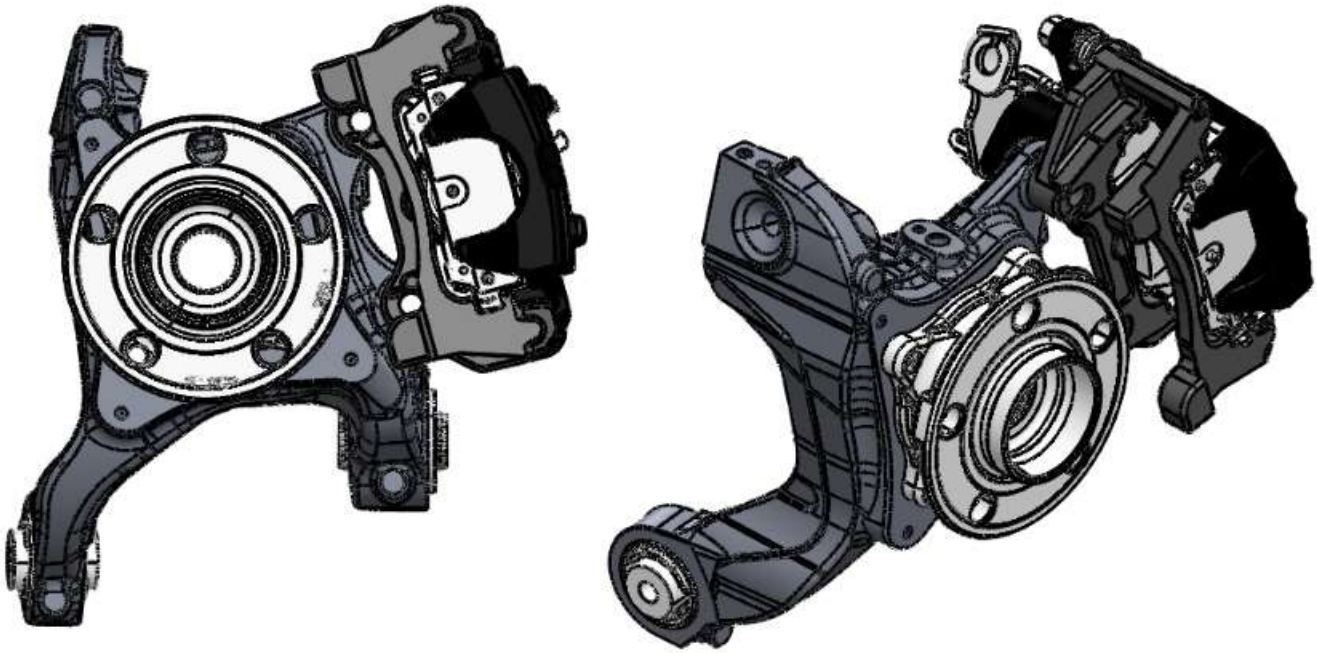



The inside CV joint is different for each side of the car, make sure to use the correct one when installing.



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

- When fully installed there should be an 1/8" (~3mm) gap between the inside of the CV joint and the center section. If necessary, compress the CV axle and with the CV axle nut on the end hit the CV axle in with a plastic mallet. Pull on the inner CV joint to make sure that it does not come out.



LEFT SIDE SPINDLE

Slide the spindle onto the outer CV joint and start the nut on the end.

## Spindle

### Lower arm

Connect the bottom of the spindle to the lower control arm using the M16 x 90mm bolts and locknuts. Right side shown.

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

## Upper arm

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

Attach the upper control arm to the spindle using the $^{5}/_{8}$” x 3.50” bolt and locknut.

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

## Toe Link

Attach the Toe link arm to the spindle using the M14 x 80mm bolt and locknut.

Repeat for the right hand side.

Use the torque specifications page at the back of the instructions to torque the control arm to spindle bolts.

## Coil-Over Shock Assembly

- Snap ring pliers, ¾" wrench, ¾" socket, Ratchet, floor jack
- Front shock set, IFS Components, Insulated clip hardware.
- The shocks are pre-valved at the factory in compression and rebound for good street use. The shocks can be adjusted in rebound as per Koni's instructions if so desired.
- The Roadster/Coupe IRS springs are 400lb. The Hot Rod IRS springs are 300lb. Other springs are available for different ride characteristics.
- WARNING! Incorrect assembly and maintenance of this part can cause serious injury or death.

Unpack the shocks, coil-over's and hardware.

Double check the jam nut under the rod end and bump stop to make sure that it is tight.
Screw the spring seat down on the sleeve so it is closer to the unthreaded end.

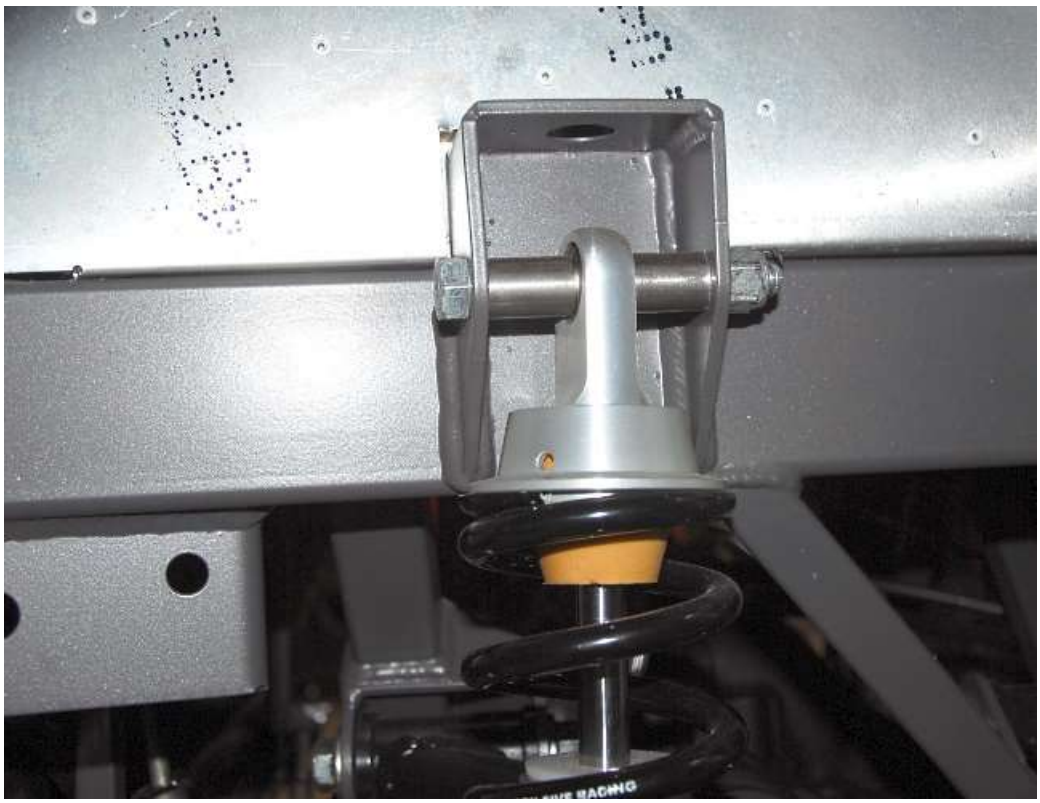
Slide the coil sleeve over the body of the damper beginning at the end which has the rubber bump stop.
The unthreaded end of the sleeve goes first so that it will sit on the snap ring on the shock body.

The coil-over hats have a snap ring which holds it in place. Remove this snap ring to assemble the coil over shock.

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

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

Install the snap ring on the spring hat so that it holds onto the shock end. Make sure that the slot in the snap ring and the slot in the spring hat are not aligned.



Roadster/Coupe - Attach the rod end of the shock to the upper shock mount using the two equal length 1.09” kit spacers.

Hot Rod - Attach the rod end of the shock to the upper shock mount using the two equal length 0.32” kit spacers. Make sure to insert the bolt from the front placing the nut to the rear of the car (allows you to remove the shocks when the car is complete).

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

Jack the spindle up so the body end of the shocks can be mounted on the shock mount on the control arm using the longer 1.09” spacer on the back and $^{7}/_{16}$” spacer in front of the shock.

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

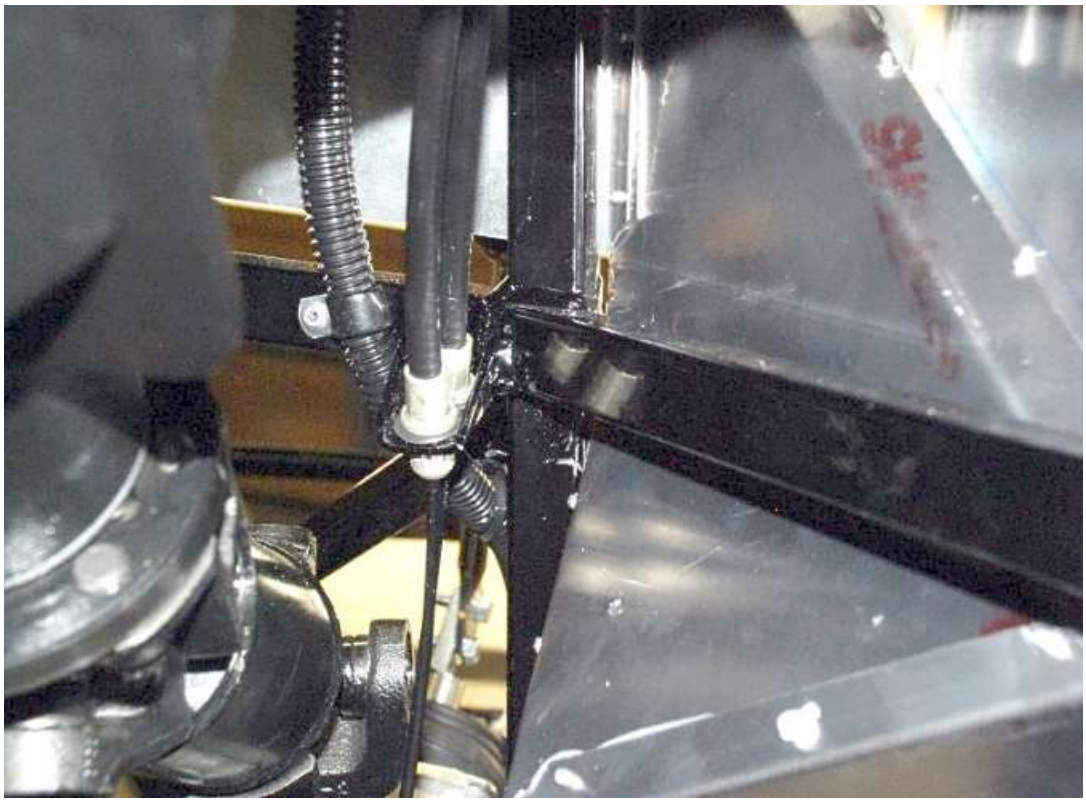
## Optional IRS Brakes

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

Connect the brake hose to the brake caliper.

Torque the banjo bolt to **39 Nm (29 ft-lb)**.
Run the brake hose over to the frame while the suspension is in droop and keep the brake line slack to locate the frame mount.
Run the hard brake lines in the kit to the brake line mount.

### Roadster E-brake cables



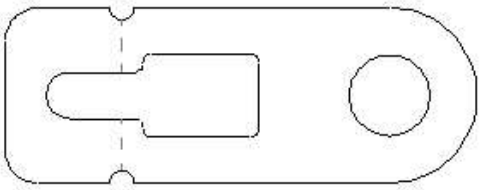
Make sure the FFR cables go through the upper bracket in the transmission tunnel until the sheath end clicks in place.

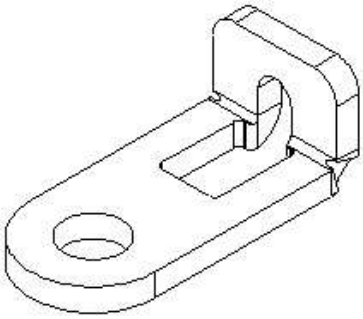
## Wilwood brake routing

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

Run the right cable over the center section and right rear mount then down and over to the brake caliper.

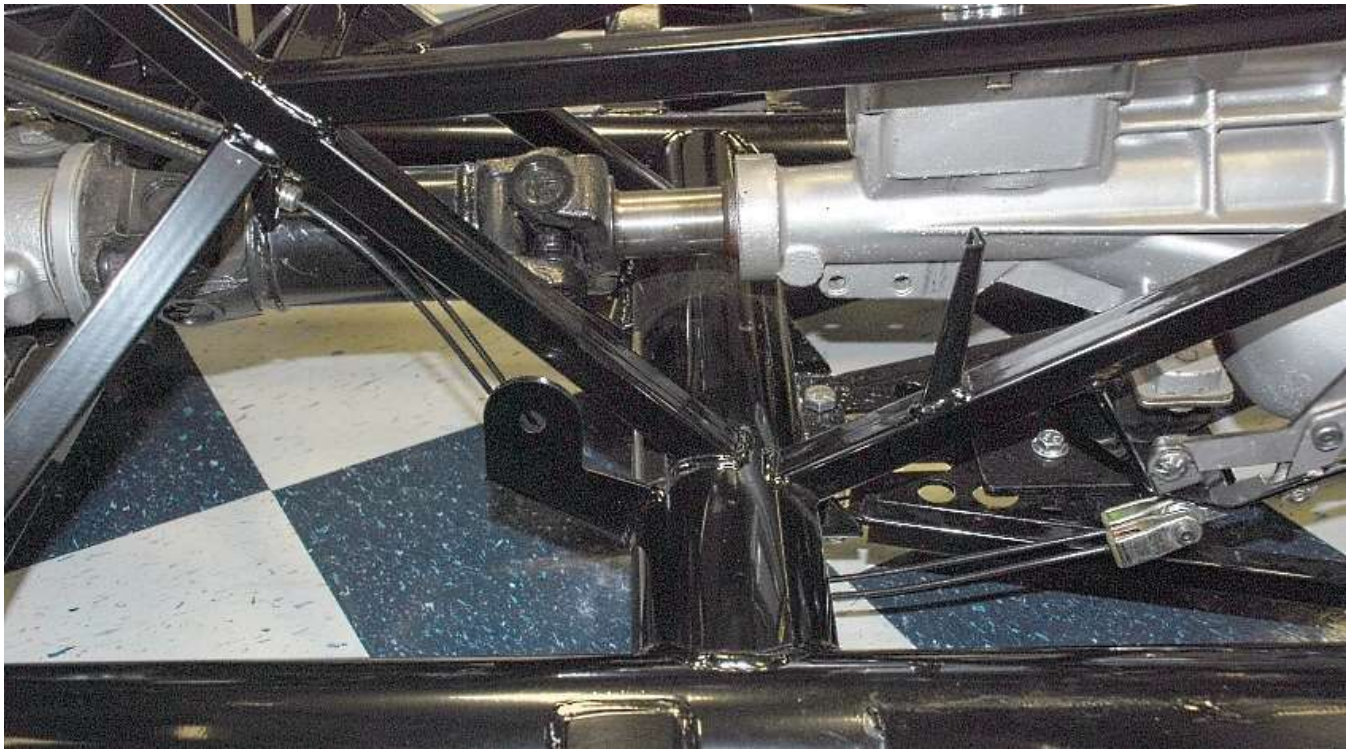
## Wilwood e-brake adapter





WILWOOD CALIPER E-BRAKE ADAPTER

Insert the cable end into the bent bracket then bolt the bracket to the e-brake lever.



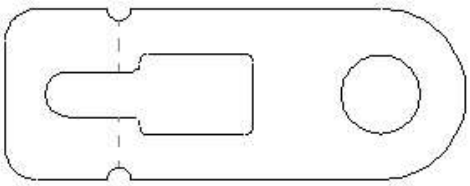
Make sure to run the other end of the brake cables under the 4” crossmember and connect them to the e-brake handle and adjust.

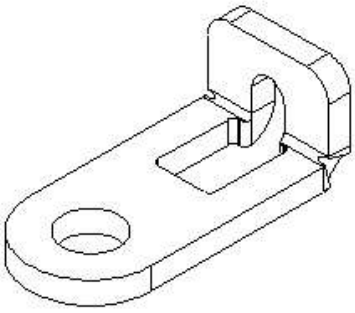
**Hot Rod**

## E-BRAKE CABLES

Push the cables into the bracket forward and to the right of the center section on the frame.

## Wilwood e-brake adapter





WILWOOD CALIPER E-BRAKE ADAPTER

Insert the cable end into the bent bracket then bolt the bracket to the e-brake lever.

## Wilwood brake routing

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

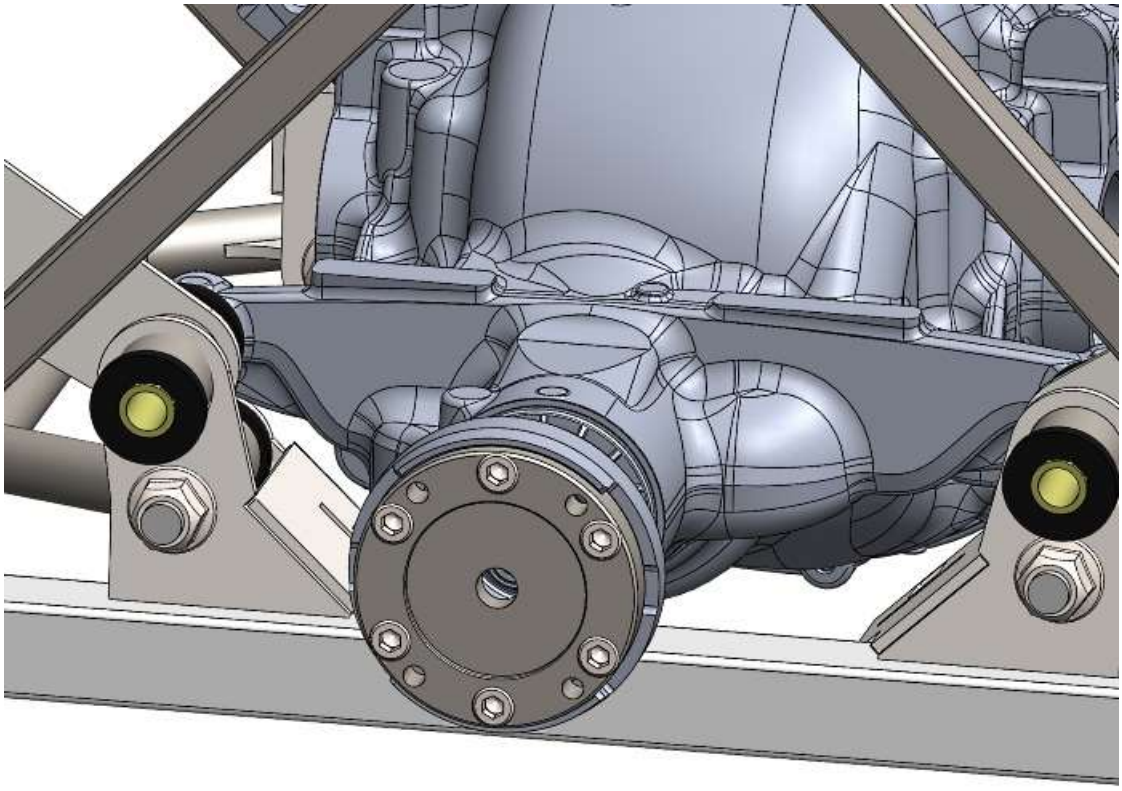
Run the right cable over the center section and right rear mount then down and over to the brake caliper.

## Driveshaft adapter

- There are two different Driveshaft adapters; one for 2015-17 Automatic transmission cars an all 2018+ center sections which is coated clear zinc. The Driveshaft adapter for 2015-17 manual transmission center sections is coated yellow zinc. The standard one included is the clear zinc adapter.
- Driveshaft adapter, fasteners
- 8mm hex socket, torque wrench, Loctite.

Apply the emergency brake.


Apply Loctite to the (6) M10 x 25mm socket head screws.



Attach the driveshaft adapter to the center section pinion flange and torque the bolts in a star pattern to **55Nm (41 ft-lb)**.

Insert the driveshaft into the transmission, bolt the rear flange to the driveshaft adapter and torque the bolts to **109Nm (80 ft-lb)**.

## Fluids

| Name | Specification |
| --- | --- |
| Motorcraft® Additive Friction Modifier (U.S.) XL-3 (U.S.) | EST-M2C118-A |
| Motorcraft® SAE 75W-85 Synthetic Hypoid Gear Lubricant XY-75W85-QL | WSS-M2C942-A |

Fill the rear axle with fluids.

### Capacities

| Fluid | Amount |
| --- | --- |
| SAE 75W-85 Synthetic Hypoid Gear Lubricant | 3.15-3.30 pt (1.49-1.56 L) |
| Friction Modifier | 3.0-3.5 oz (0.089-0.104 L) |

## Alignment specs

Camber: -0.5°to -0.75°
**Total** Toe: 1/8" Toe in

## Torque Specifications

| | LB-FT | Nm | |
|---|---|---|---|
| CENTER SECTION TO FRAME FRONT | 129 | 175 | |
| CENTER SECTION TO FRAME REAR | 129 | 175 | |
| | | | |
| BRAKE CALIPER TO CALIPER BRACKET | 24 | 32 | |
| BRAKE CALIPER BRACKET TO SPINDLE | 129 | 175 | |
| BRAKE HOSE BANJO BOLT TO CALIPER | 29 | 39 | |
| | | | |
| LOWER CONTROL ARM TO FRAME | 100 | 135 | |
| LOWER CONTROL ARM TO SPINDLE | 100 | 135 | |
| | | | |
| TOE LINK TO FRAME | 100 | 135 | |
| TOE LINK TO SPINDLE | 100 | 135 | |
| | | | |
| UPPER CONTROL ARM TO FRAME | 100 | 135 | |
| UPPER CONTROL ARM TO SPINDLE | 100 | 135 | |
| | | | |
| HUB TO SPINDLE | 98 | 133 | |
| CV AXLE NUT | 98 | 133 | THEN ROTATE 45° |
| | | | |
| DRIVESHAFT ADAPTER TO PINION FLANGE | 41 | 55 | |
| DRIVESHAFT TO DRIVESHAFT ADAPTER | 80 | 109 | |