



**GSI**

*MACHINE & FABRICATION*

'55 Second Series - '59

# **GSI SUSPENSION SYSTEM**

-WITH-

## **WATT'S LINK**

INSTALLATION MANUAL

JUNE 2017

REV A.

# '55-'59 REAR SUSPENSION WITH WATT'S LINK INSTALLATION

## **READ FIRST!**

PLEASE READ THROUGH ALL OF THE INSTRUCTIONS AND ENSURE THAT YOU UNDERSTAND THEM. BE SURE THAT YOU HAVE ALL THE REQUIRED GSI COMPONENTS, BASIC TOOLS, AND SKILLS.

## **CUTTING**

THIS KIT REQUIRES SIGNIFICANT CUTTING TO THE EXISTING FRAME. AIR HAMMERS, ABRASIVE CUT-OFF WHEELS, AND RECIPROCATING POWER SAWS (SAWZALL) ARE RECOMMENDED TOOLS. THERE SHOULD BE **NO** NEED FOR ANY MODIFICATION TO THE GSI SUPPLIED PARTS.

## **WELDING**

THIS KIT REQUIRES WELDING TO THE FRAME. MIG (GMAW) WELDING PROCESS WITH A SUITABLE MIX GAS AND ER70S2 WIRE IS RECOMMENDED. ALL COMPONENTS ARE 3/16" OR 1/4" THICK, WELDS SHOULD MATCH THE THICKNESSES OF PARTS BEING WELDED.

**DO NOT GRIND ANY WELDS!** DO NOT QUENCH WELDS WITH WATER OR OIL. ALLOW TO AIR COOL.

## **STOCK PARTS**

THIS GSI KIT WAS DESIGNED USING STOCK OFF THE SHELF MAJOR COMPONENTS.

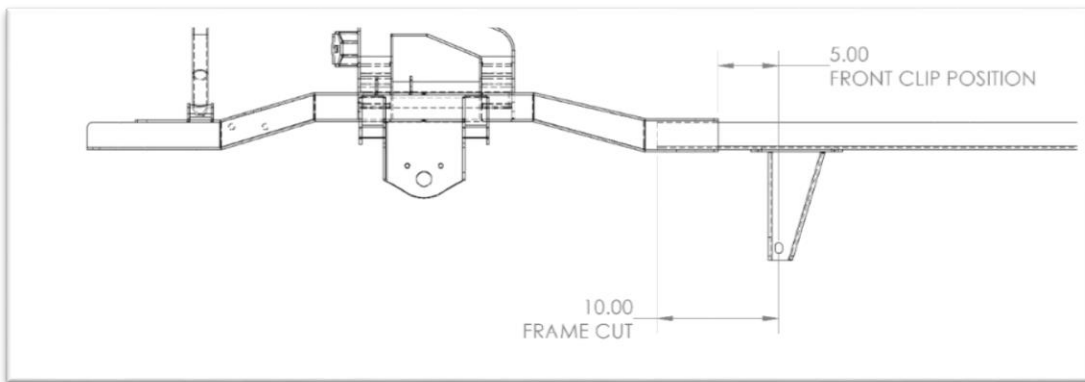
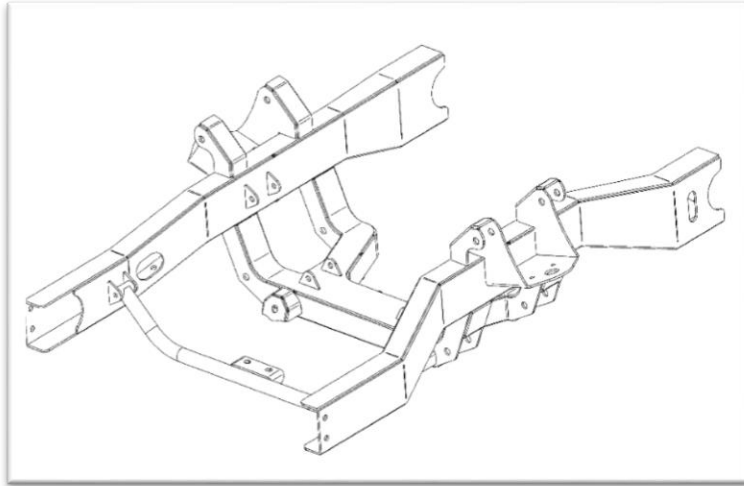
- FRONT UPPER AND LOWER BALL JOINTS, FRONT AND REAR SHOCKS ARE FOR '71- '72 C10 TRUCKS.
- SPINDLES:
  - CPP '71- '72 MODULAR SPINDLE FOR **BIG BRAKES AND 29" + TALL TIRE** (USUALLY 22" WHEELS)
  - CPP '71- '72 2" DROP SPINDLE FOR **29" + TALL TIRE** (USUALLY 22" WHEELS)
  - STOCK '71- '72 SPINDLES FOR 29" OR LESS TALL TIRE
- FORD '85-'93 MUSTANG 2 STEERING RACK
- FRONT AIRBAGS AIRLIFT DOMINATOR D2600
- REAR AIRBAG FIRESTONE 9000

## **STEERING SHAFT SUPPORT AND PAINT**

DUE TO THE CUSTOM NATURE OF VARIOUS INSTALLS, YOU WILL NEED TO DETERMINE HOW TO MOUNT YOUR STEERING LINKAGE. THE CROSSMEMBER POSITIONS THE RACK INPUT SHAFT AT AN ANGLE THAT HAS RESULTED IN A SUCCESSFUL INSTALL WITH MINIMAL UNIVERSAL JOINTS. CUSTOM EXHAUST HEADERS MAY BE REQUIRED. WE SUGGEST THAT THIS IS DONE BEFORE FINAL FINISH FOR OBVIOUS REASONS.

# FRONT CLIP INSTALLATION

1. REMOVE THE ENGINE. REMOVE STEERING, ALL SUSPENSION COMPONENTS AND THE STOCK FRONT CROSSMEMBER IS REMOVED AND NOT USED IN ANY WAY. AT THE LEAST THE INNER FENDERWELLS WILL NEED TO BE REMOVED OR MODIFIED FOR CLEARANCE. WE HIGHLY RECOMMEND REMOVING THE CAB ENTIRELY.
2. THIS IS A WELD IN "FRONT CLIP".



3. BOTH FRAME RAILS ARE CUT 10.00 INCHES IN FRONT OF THE FORWARD CAB MOUNT HOLE CENTERLINE.

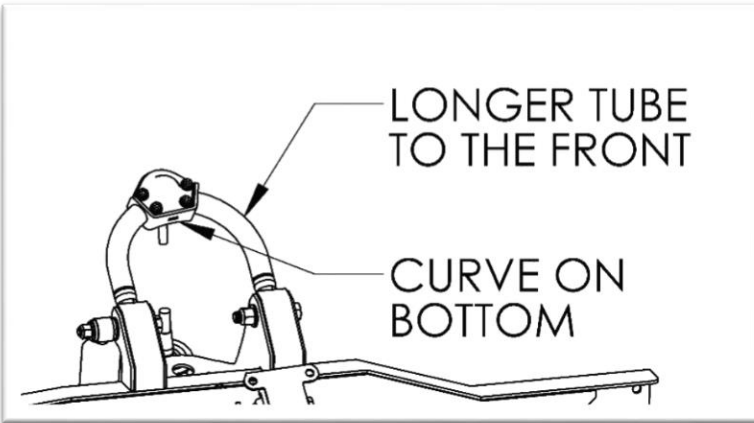
## **DISTORTION NOTE:**

Removal of the factory cross member may cause the frame to distort depending on the condition and accident history of the frame. It may be necessary to compress the frame using tools such as long clamps or ratchet straps to bring the factory frame holes in alignment with the GSI suspension cross member.

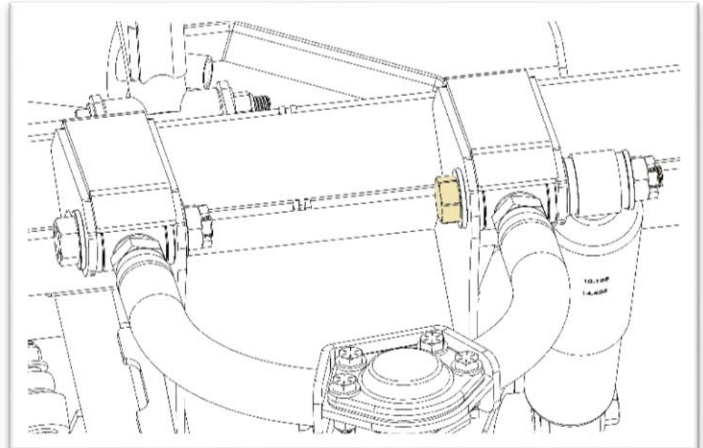
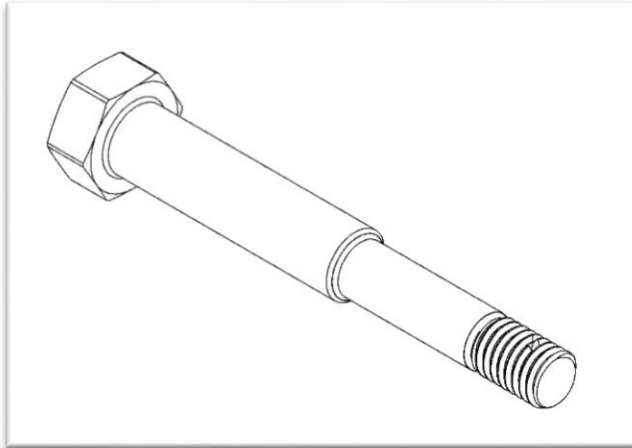
4. THE FRONT CLIP THEN SOCKETS OVER 5.00" OF THE STRAIGHT SECTION OF THE SIDE FRAME RAILS, SO THAT IT IS 5.00" IN FRONT OF THE FORWARD CAB MOUNT HOLE CENTERLINE. DEPENDING ON THE CONDITION OF YOUR FRAME RAILS THIS MAY BE EASIER SAID THAN DONE.
5. ENSURE THAT THE FRONT CLIP IS STRAIGHT AND LEVEL WITH THE FRAME! THIS WILL DIRECTLY EFFECT FITTMENT OF THE FRONT BODY PANELS AND OPERATION OF THE SUSPENSION. YOU DON'T WANT YOUR TRUCK TO NATURALLY TURN. WE SUGGEST DIAGONAL TAPE MEASUREMENTS, USE OF A SQUARE, AND STANDING BACK AND EYBALLING IT.
6. ONCE YOU HAVE REPEATED STEP 5 A FEW TIMES, AND ARE **SURE** YOU HAVE IT STRAIGHT AND LEVEL WITH THE FRAME TACK WELD IT IN PLACE.
7. RECHECK STEP 5, HAVE A FRIEND CHECK STEP 5, THEN FULLY WELD THE FRONT CLIP TO THE FRAME.

## FITTING THE FRONT SUSPENSION

8. Install lower ball joints and bushings into the lower arms, if not already done. Keep the ball joints castellated nut and cotter pin
9. Install lower control arms into the lower arm mounts using **lower control arm mount hardware**
10. Install the D2600 airbag onto the lower arms/bag brackets using **front airbag mount hardware**.
  - a. MAKE SURE THE AIR FITTING LINES UP WITH THE HOLE IN THE UPPER BRACKET!
  - b. USE LOCK WASHERS ON TOP AND BOTTOM AIRBAG BOLTS
11. Install upper ball joints into the upper control arms using the hardware provided with the stock ball joint. Keep the ball joints castellated nut and cotter pin.
12. Install upper control arm into upper control arm mounts using **upper control arm mount hardware**.



- a. the rear bolt is the GSI front "super shock bolt". It has a  $\varnothing 5/8$ " shoulder to match up with the rod end in



the upper arm, and a reduced end to allow mounting of the front shocks.

13. Install front shocks to the front super shock bolts.
14. Install the spindle to the upper and lower ball joints using the hardware supplied with the ball joints.
15. Bolt the front shocks to the shock mount on the lower arm.
16. Install jam nuts from steering adaptor on rack and pinion ends.

### **TIE ROD LENGTH NOTE:**

IN SOME CASES, IT IS NECESSARY TO TRIM THE RACK TIE ROD ENDS DUE TO DIFFERENCES IN RACK AND PINION MANUFACTURES TO BRING TOE INTO PROPER ADJUSTMENT. Use the jam nuts and a file to clean up the threads after cutting.

17. Install the rack and pinion to the crossmember using the 5118 power steering RP bushing set, and steering rack hardware.

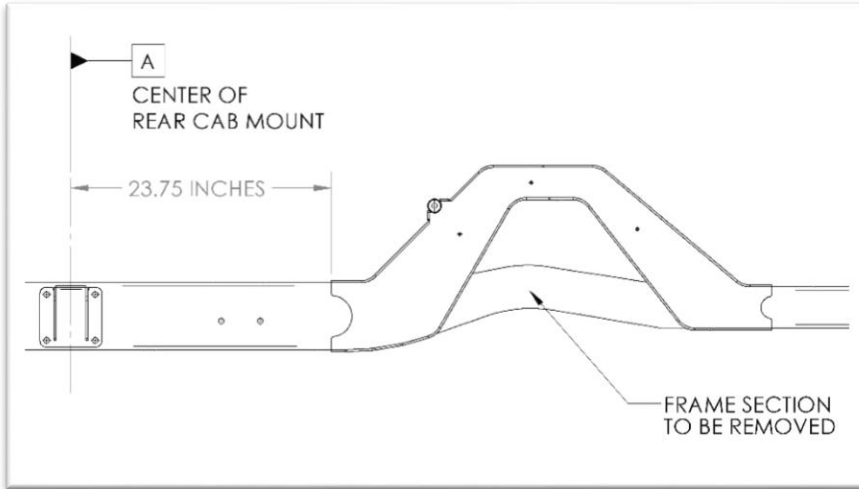
**STEERING BUSHING NOTE:**

MAKE SURE THE THICK SPACER PORTION OF THE RACK BUSHING IS BETWEEN THE RACK AND THE CROSSMEMBER

18. Assemble tie rod adapters with rod end and  $\text{\O}3/4$  jam nuts. Thread them onto the rack and pinion tie rods, which should already have a jam nut installed.
19. Install *STEERING ADAPTOR TAPER BOLT (PN: 5114-1)* into the spindle along with the two misalignment spacers (PN: 5114-2 &-3) The larger of the two goes up against the spindle. Finish with the castellated nut and cotter pin from *STEERING ADAPTOR HARDWARE* kit.
20. Double check you have tightened all hardware and installed cotter pins

# NOTCH AND BRIDGE INSTALLATION

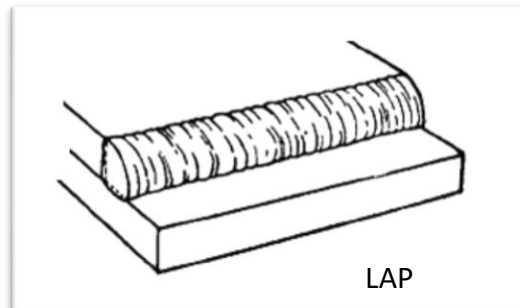
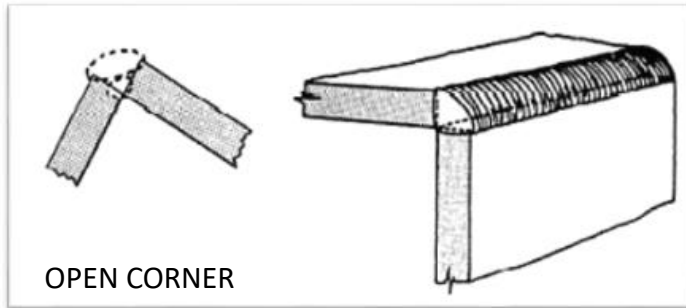
21. STRIP THE REAR FRAME OF ALL SUSPENSION COMPONENTS. **IF YOU PLAN TO REMOVE THE VERY LAST CROSS MEMBER DO NOT DO IT UNTIL FINISHED WITH THIS INSTALL.**
22. PLACE REAR NOTCHES ONTO THE FRAME. THE FRONT OF THE REAR NOTCH SECTIONS IS 23.75 INCHES BEHIND THE CENTER OF THE REAR CAB MOUNTS. MARK THE POSITION ON THE FRAME.



23. WITH THE NOTCHES SET ON THE FRAME, INSTALL THE BRIDGE SECTION WITH THE  $\varnothing 3/8$ " ***BRIDGE TO NOTCH*** HARDWARE.

## NOTES

THE FRAME MAY HAVE EXPANDED OR WARPED FROM CROSSMEMBER REMOVAL, ACCIDENTS, OR 40 YEARS OF USE. RATCHET STRAPS OR CLAMPS MAY BE NEEDED TO PULL EVERYTHING TOGETHER.



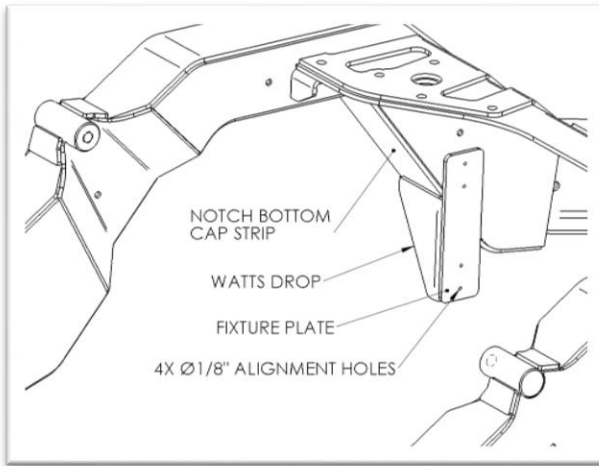
24. LAP WELD NOTCHES TO FRAME ON THE TOP AND OUTSIDES. **DO NOT WELD THE BOTTOM CAPS YET!**
25. ONCE WELDED USE THE INSIDE SURFACES OF THE NOTCH AS A GUIDE TO SAWZALL THE PORTION OF THE FRAME TO BE REMOVED UNDER THE NOTCH AND CUT IT OUT. **DO NOT CUT THE NOTCHES THEMSELVES!**

**NOTE**

BEFORE WELDING THE NOTCH BOTTOM CAP STRIP, MAKE SURE THE WATT'S DROP, AND FIXTURE PLATE LINE UP USING THE FOUR  $\varnothing 1/8$ " ALIGNMENT HOLES. USE  $\varnothing 1/8$ " WELDING ROD, PINS, CLECOS IN THE HOLES.

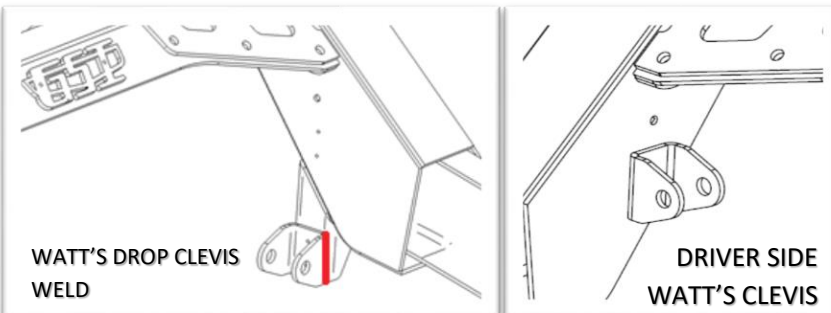
**PROPER PLACEMENT OF THE WATT'S DROP IS CRITICAL!**

**DO NOT WELD THE FIXTURE PLATE, IT IS A THROW AWAY PART!**

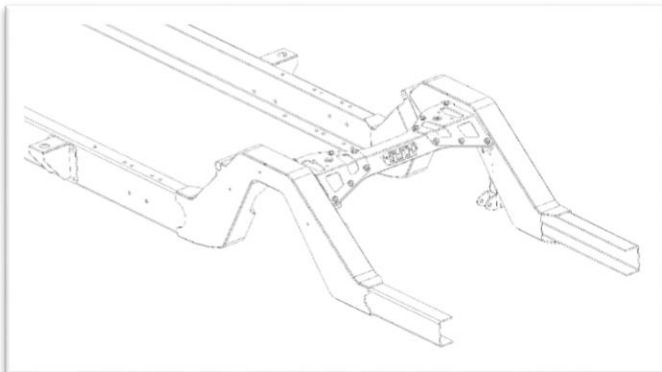


PLACE THE NOTCH BOTTOM CAP STRIP UNDER THE NOTCH, THEN TACK WELD THEM.

26. ONCE THE WATT'S DROP IS TACK WELDED TO THE NOTCH BOTTOM CAP, REMOVE THE FIXTURE PLATE, AND LOCATE THE WATT'S LINK CLEVIS USING THE  $\varnothing 1/8$ " PINS AGAIN AND WELD AT LEAST 2 FULL LENGTH WELDS, ONE ON EACH SIDE OF THE CLEVIS AS SHOWN IN RED.
27. INSTALL THE DRIVER SIDE WATT'S LINK CLEVIS USING THE TWO  $\varnothing 1/8$ " ALIGNMENT HOLES ON THE INSIDE OF THE RIGHT NOTCH. AND WELD THE SAME AS STEP 8.

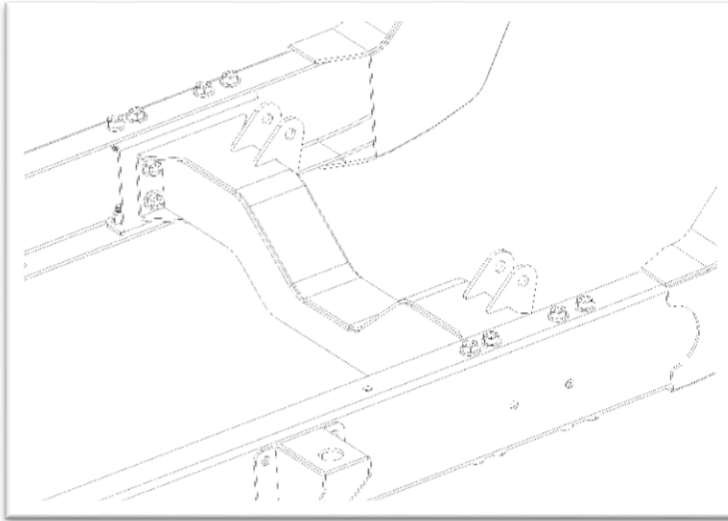


28. STAND BACK, AND ENJOY THE VIEW WHILE LETTING EVERYTHING AIR COOL. QUENCHING THE WELD WITH WATER OR OIL COULD CAUSE THE WELD TO CRACK.



## INSTALLATION OF THE 4 LINK

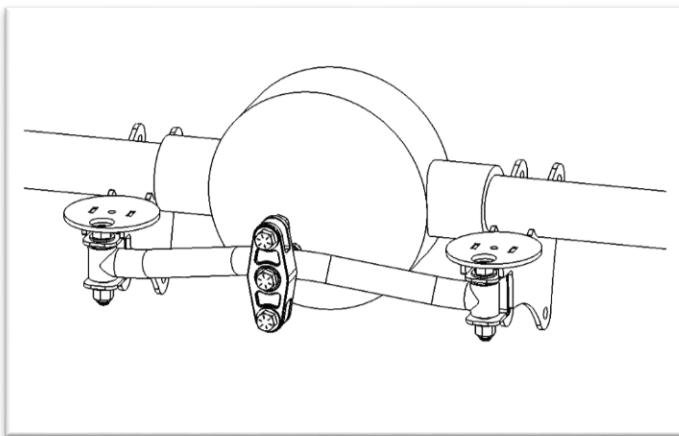
29. REMOVE THE REAR CROSSMEMBER JUST AHEAD OF THE NOTCHES. USE CARE IN REMOVING THE RIVETS AS THEIR HOLES WILL BE REUSED.
30. ONCE REMOVED, DRILL OUT THE OLD RIVET HOLES TO  $\varnothing 1/2"$ . YOU CAN PLACE THE 4 LINK CROSSMEMBER FRAME MOUNTS UP TO THE HOLES FOR A GUIDE, BUT DO NOT MODIFY THE HOLES IN THE GSI PARTS.



31. INSTALL THE 4 LINK CROSSMEMBER FRAME MOUNTS ON BOTH SIDES TO THE INSIDE OF THE FRAME USING THE  $\varnothing 1/2"$  **4 LINK CROSSMEMBER FRAME MOUNT** HARDWARE. BOTH PARTS ARE IDENTICAL!
32. INSTALL THE 4 LINK CROSSMEMBER BETWEEN THE FRAME MOUNTS. USING THE REMAINING HARDWARE.

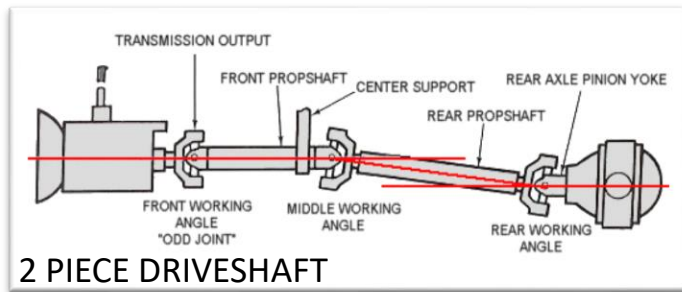
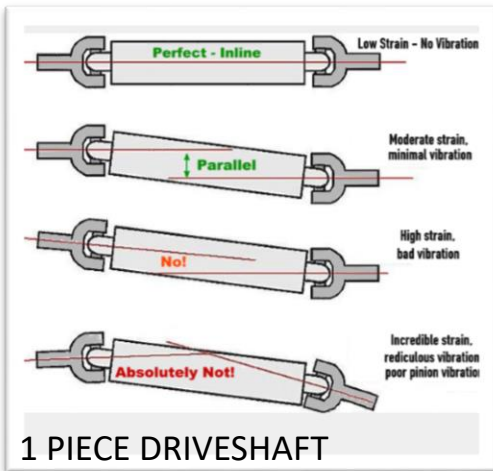
### **AXLE**

33. CLEAN ALL BRACKETRY OFF OF THE 3" DIAMETER AXLE TUBES. DO NOT ALTER THE CENTER HOUSING (PUMPKIN), OR THE AXLE FLANGES (BRAKE FLANGES) ON THE ENDS FOR THIS INSTALL.
34. INSTALL THE WATT'S LINK MOUNTING BAR TO THE 4 LINK AXLE HANGERS WITH THE  $\varnothing 5/8"$  **WATT'S TO AXLE** HARDWARE. **DO NOT FULLY TIGHTEN, IT WILL BE REMOVED FOR FINAL WELDING TO PROTECT THE RUBBER BUSHINGS FROM HEAT.** USE THE MOUNTING BAR TO POSITION THE WIDTH OF THE 4 LINK BRACKETS ON THE AXLE SYMMETRIC ABOUT THE VEHICLES CENTERLINE. THE BRACKETS SHOULD BE INLINE WITH THE 4 LINK HANGERS, SO THAT THE 4 LINK BARS GO STRAIGHT BACK AND PARALLEL WITH THE FRAME.





35. THE 4 LINK IS DESIGNED TO MAINTAIN A CONSTANT PINION ANGLE THROUGH THE TRAVEL OF THE REAR SUSPENSION. THIS IS IMPORTANT TO HELP PREVENT DRIVESHAFT WEAR AND VIBRATION. THE FOLLOWING GRAPHICS SHOW IDEAL ALIGNMENT OF ALL THE COMPONENTS.



IT IS OFTEN RECOMMENDED THAT THE “REAR WORKING ANGLE” OR “PINION ANGLE” IS PARALLEL TO THE TRANSMISSION TAIL SHAFT (OR FRONT DRIVE SHAFT FOR 2 PIECE SHAFTS). THIS IS OFTEN 3° TO 4° (DEGREES). WITH THE AXLE SET AT THE PROPER ANGLE, PLACE A LEVEL ON THE LOWER AIRBAG MOUNT PLATE AND MAKE IT PARALLEL TO THE GROUND.

36. WHEN YOU ARE SURE OF POSITION AND PINION ANGLE, BE SURE TO CLEAN THE AREA ON THE AXLE TO BE WELDED TO BARE METAL AND TACK WELD THE AXLE BRACKETS ON IN POSITION.

#### **NOTES**

DO NOT FULLY WELD AXLE MOUNTS. TACK FIRST, AND CONTINUE MOCKING UP 4 LINK BARS, SHOCKS, ETC. FULLY WELD ONLY WHEN SURE EVERYTHING WORKS! GRINDING OFF FULLY WELDED AXLE BRACKETS IS NOT FUN.

REMOVE WATT’S LINK MOUNT SO THAT ITS URETHANE BUSHINGS DO NOT MELT DURING FINAL WELDING. AGAIN ALLOW TO COMPLETELY AIR COOL.

## INSTALLING THE 4 LINK BARS AND SHOCKS

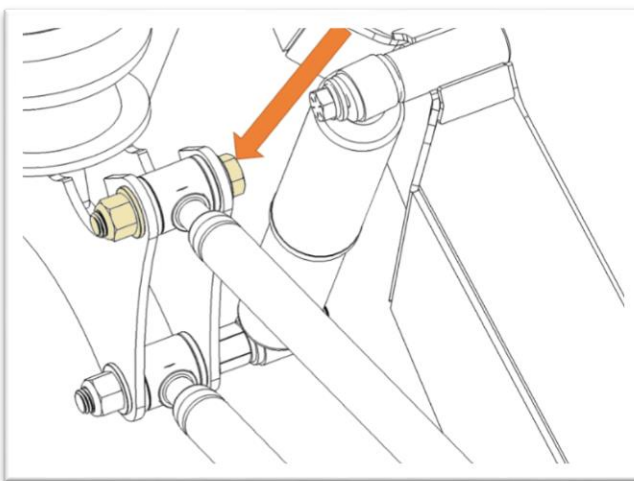
37. BOLT THE SHOCKS TO THE UPPER SHOCK BUNGS USING  $\varnothing 1/2"$  **SHOCK HARDWARE**, USE A SPLIT LOCK WASHER!

38. ADJUST YOUR 4 LINK BARS WITH ROD ENDS INSTALLED AS FOLLOWS:

- a. UPPER 4 LINK BAR SHOULD MEASURE 21 7/8" INCHES BETWEEN CENTER OF THE ROD ENDS
- b. LOWER 4 LINK BAR SHOULD MEASURE 25" INCHES BETWEEN CENTER OF THE ROD ENDS

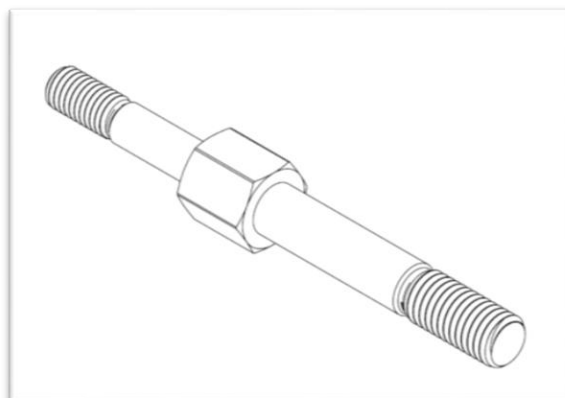
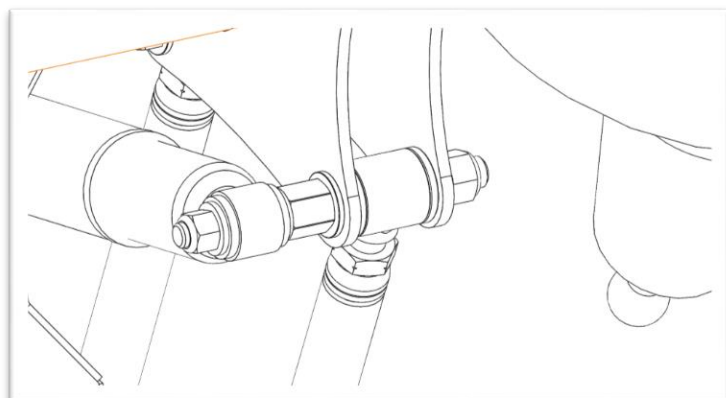
### NOTE:

DEVIATION FROM THE NUMBERS IN a AND b IS **OKAY** AS LONG AS IT WORKS. EVERY TRUCK INSTALL WILL BE DIFFERENT. THESE ARE THE "DESIGN" LENGTHS. TRY TO BE AS CLOSE TO THESE NUMBERS AS POSSIBLE.



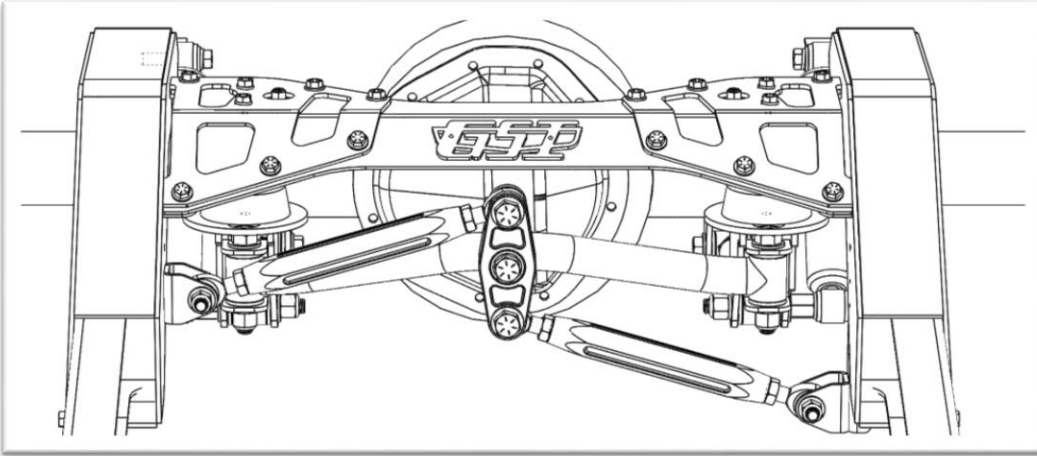
39. INSTALL  $\varnothing 5/8$  **4 LINK** HARDWARE INTO ALL OF THE ROD ENDS, FOR THE 4 LINK HANGERS AND THE AXLE BRACKETS. NOTE THE BOLT CLOSEST TO THE SHOCK HAS ITS HEAD TOWARD THE SHOCK FOR CLEARANCE.

40. THE LOWER AXLE BRACKETS USE THE **GSI SUPER SHOCK BOLT** HARDWARE KIT. IT IS A CUSTOM MANUFACTURED GRADE 8 EQUIVALENT DOUBLE ENDED BOLT. THE  $\varnothing 5/8$  PORTION IS DESIGNED TO HOLD THE LOWER 4 LINK BAR ROD ENDS TO THE AXLE, WHILE THE OPPOSITE  $\varnothing 1/2"$  PORTION IS DESIGNED TO SECURE THE LOWER EYE OF THE SHOCK. USE THE SUPPLIED WASHERS AND NYLOCK NUTS JUST AS YOU WOULD WITH ANY BOLT.

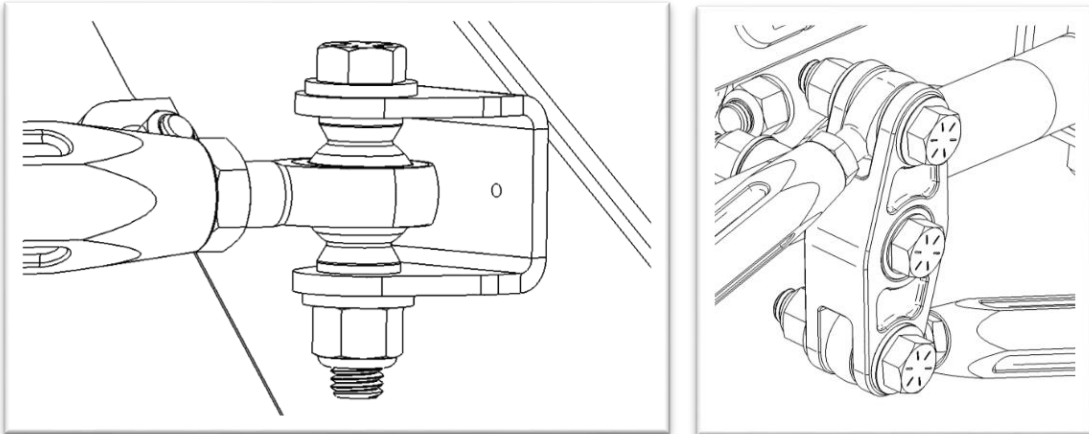


## INSTALL WATT'S LINK COMPONENTS

41. REINSTALL THE WATT'S LINK MOUNTING BAR TO THE AXLE BRACKETS ONCE COOL.
42. CHECK THAT THE TWO LINKS THAT GO FROM THE CENTER LINK TO THE NOTCHES ARE 12-5/16" BETWEEN CENTER OF THE FK ROD ENDS. LIKE THE NOTE IN STEP 18, THESE ARE THE "DESIGN" LENGTHS. TRY TO BE AS CLOSE TO THESE NUMBERS AS POSSIBLE.
43. INSTALL THE WATT'S LINK COMPONENTS PER THE DIAGRAM BELOW, USING THE **WATT'S LINK** HARDWARE. HIGH MISALIGNMENT SPACERS ARE USED ON THE FRAME CLEVIS ENDS.



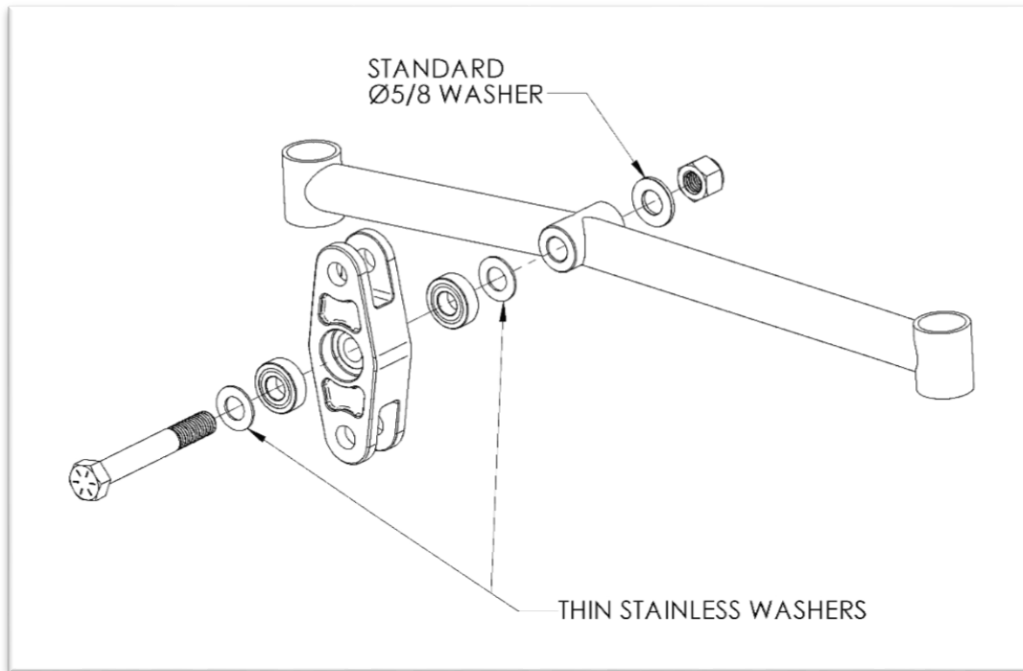
44. WATT'S LINK CLEVIS DETAIL SHOWING HIGH MISALIGNMENT SPACERS INSTALLED.



WATT'S LINK CENTER DETAIL. NO HIGH MISALIGNMENT SPACERS ON THE CENTER FK ROD ENDS.

### **CENTER LINK MOVEMENT!**

ON BOTH SIDES OF THE PRESSED IN BEARINGS THERE ARE THIN STAINLESS WASHERS THAT MUST BE BETWEEN THE BOLT HEAD AND THE BEARING, AND BETWEEN THE BEARING AND THE WATT'S LINK MOUNT.



- **WITHOUT THE TWO STAINLESS WASHERS THE BEARINGS WILL NOT WORK!**
- **IF THE CENTER Ø5/8 BOLT IS TIGHTENED TOO MUCH IT WILL “FREEZE” THE BEARINGS. DO NOT OVERTIGHTEN.**
- **THE CENTER LINK SHOULD BE ABLE TO FREELY MOVE ON THE BEARINGS BY HAND.**

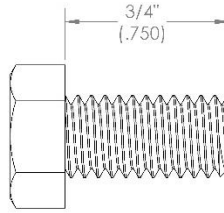
### **NOTE:**

CYCLE SUSPENSION TO ENSURE ALL LINKAGE WORKS PROPERLY TOGETHER AND FULLY WELD REMAINING TACKED PARTS.

# REAR AIRBAGS AND FINAL ASSEMBLY

## **WARNING!**

THE  $\varnothing 3/8$ -16 HARDWARE FOR THE REAR FIRESTONE 9000 AIRBAGS MUST BE  $3/4$  OF AN INCH-LONG BOLTS ONLY!  
A 1 INCH LONG BOLT WILL DESTROY THE AIRBAG.



45. INSTALL AIRBAGS USING  $\varnothing 3/8$  AIRBAG HARDWARE USE THE SPLIT LOCK WASHERS. 2 ON TOP AND 1 ON BOTTOM.
46. YOU WILL NEED TO INSTALL AIR FITTINGS AS NEEDED FOR YOUR AIR SYSTEM. WITH THE VAST NUMBER OF CUSTOM METHODS AND VARIATION IN INDIVIDUAL TRUCKS, INCLUDING AN AIRFITTING KIT IS NOT PRACTICAL.
47. FINAL CHECK:
  - a. DOUBLE CHECK THAT ALL FASTENERS ARE TIGHT.
  - b. ENSURE THE REAR SUSPENSION FREELY MOVES THROUGH ITS ENTIRE TRAVEL.
48. FIRST DRIVE:
  - a. USE EXTREME CAUTION THE FIRST TIME YOU DRIVE.
  - b. PLAN THE DRIVE. STAY AWAY FROM BUSY ROADS AND PLACES WHERE IT IS NOT EASY TO PULL OVER AND PERFORM MAINTENANCE. DO NOT GO ALONE. HAVE A CHASE CAR. STAY CLOSE.
  - c. LISTEN FOR ANY UNUSUAL SOUNDS.
  - d. PERIODICALLY STOP AND INSPECT THAT ALL HARDWARE IS STILL TIGHT.

ENJOY!