

***O'Brien's 4 Wheels West  
1302 Hidden Court  
Roseville, CA 95661***

**O'Brien's 4 Wheels West**  
**"Home of the ROCKEATER gears"**  
1302 Hidden Court  
Roseville, CA 95661  
(916) 773-3278

**PLEASE** send back the following information to register the 1 year Manufacturer's Warrantee on your *RockEater Gears!*

**Name of Owner:** \_\_\_\_\_

**Street Address:** \_\_\_\_\_

**City, State, Zip:** \_\_\_\_\_

**Phone #:** \_\_\_\_\_ **E-Mail Address:** \_\_\_\_\_

**Date rec'd:** \_\_\_\_\_ **Date Installed:** \_\_\_\_\_

**Vehicle Installed In:**

**a. Make:** \_\_\_\_\_ (Ford, Jeep, ??) **Model:** \_\_\_\_\_ (Bronco, CJ2A, CJ5, ??)

**b. Engine:** \_\_\_\_\_ (F-head, V-6, V-8, etc) **Cu.In. :** \_\_\_\_\_ Ford/Chev/\_\_\_\_\_

**c. Transmission:** \_\_\_\_\_ (SM420, C-4, NP435, 3,4 or 5sp, etc.)

**d. Adapter Manufacturer:** \_\_\_\_\_ (Advance Adapters, Novak, Downey, Precision, etc.)

**e. other pertinent info. You care to provide:**

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

**f. The above information is true to the best of my knowledge:**

**Signature:** \_\_\_\_\_

**Date:** \_\_\_\_\_

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**JEEP Dana/Spicer Model 18 - Installation Instructions:**

**General Information:**

(revised Jan 1, 2000)

Congratulations on selecting the Rockeater gears for your Early Jeep Dana/Spicer model 18 transfercase. The 4.86:1 & 4.1:1 gear ratio is the hardest to install, because it requires a complete disassembly and major modification of the main case to allow room for or bigger intermediate gear(machining & welding). If you are installing the 3.6:1 gears & have to have the small input hole, they also require modification of the main case but to a lesser degree. The 3.6 gears will fit into a Model 20 main case without cutting or welding and these cases are compatible with the later low geared 4-speed transmissions. For disassembly, you can refer to the original maintenance procedures, and there are only a few differences in the way you would reassemble it. If you are confident that the bearings and seals are OK, they may be able to be reused. The installation involves basically three steps: 1) disassembly and inspection of parts; 2) case modification & 3) re-assembly. The major changes are as follows:

- A. As most of the early Spicer & small input hole Dana cases, The input / high range gear must be installed last into the case( through the back cover), and removed first prior to the removal from the transmission. If you are installing a PTO assembly you need to tell us so we can give you a input gear with a shift clutch on it. If you are using the large input hole case and do not have a PTO you can leave the input gear in place on the transmission output shaft.
- B. Neither the Warn Overdrive nor the Saturn overdrive can be used with this gear set. This due to the small diameter of the input gear.
- C. On the first 500 RockEater gear sets we provided a "Wear Washer", which was installed in the output shaft gear section of the case. It was a spacer (0.060") added between the new high range gear's hardened thrust washer and the snap-ring. It could be machined, and allow you to adjust for wear in your shaft and variances in the clearances over the different years. Our experience over the last three years shows it was not needed, and has allowed us to add this dimension to the gear. Disregard any reference to "Wear Washer". The instructions will have you check the end play with the gear on the shaft, and make any of the necessary adjustments.
- D. We have also included in the kit an hardened thrust washer (0.112"). It can be used in place of your old one or for one that is now needed in front of the snap ring so that the inner race of the front bearing does not touch the new wider high range gear. This gear is approximately 0.125" thicker.
- E. Because you add 0.112" to the gearing between the two tapered bearings by adding the extra thrust washer, you now have to add 0.112" to the forward position of the front bearing

retainer/seal holder (or the preload on those bearing will be too tight). This is done by machining an equal amount (0.112") off of the bearing collar on the front drive shaft housing.

F. The major modification is to the main center section of the cast iron case. The top center of the case needs to be opened up, expanded and then sealed back up. This is done to allow for the larger 6.5" dia. Intermediate gear.

G. Finally, if you are installing our "**SUPER DUTY**" tapered roller bearing kit, there is some additional case modifications needed. The intermediate gear shaft holes will need to be line bored to 1.25" I.D. and the back outside face machined flat, perpendicular, and to a set thickness to position the intermediate gear properly.

Well, good luck, and read through the instructions before actually starting!!

## **Jeep Dana/Spicer model 18:**

### **Section I - CASE REMOVAL/ DISASSEMBLY**

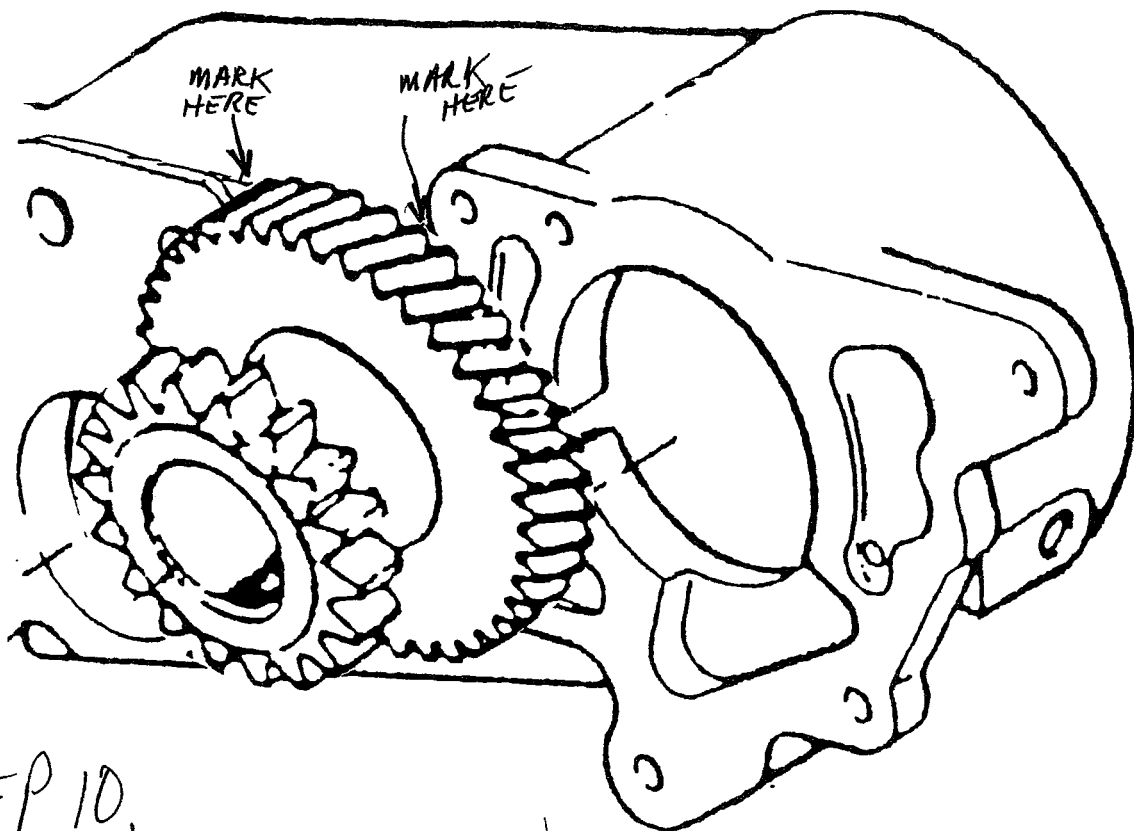
1. Park the vehicle on a dry level surface, block the tires and apply the emergency brake.
2. Remove the drive shafts speedometer cable (and 4WD light if one is installed), & block wheels.
3. Remove shift levers & Emergency Brake linkage as outlined in OEM instructions.
4. Drain the oil out of the transference. Also, drain the transmission if you have an Automatic transmission (or oil in transmission is common with the adapter or if you haven't changed it in the last century).
5. Support the transmission on axle stands or a floor jack forward of the crossmember, and remove the transfer case input gear through the rear access cover.
6. Remove the crossmember, and using another floor or transmission jack remove the transference by unbolting the transference at the back of the transmission.
7. Take the transfer-case to the workbench for modification & installation of gears.
8. Clean any dirt or grease buildup off of the case and remove the bottom oil pan. If you are doing a complete overhaul follow the OEM (Jeep or Dana) maintenance instruction. And upon re-assembly follow our instruction concerning the above exceptions.

**\*NOTE: when removing the intermediate gear do not lose any of the (48) rollers. Inspect the rollers for pits and wear. Likewise with the thrustwashers.**

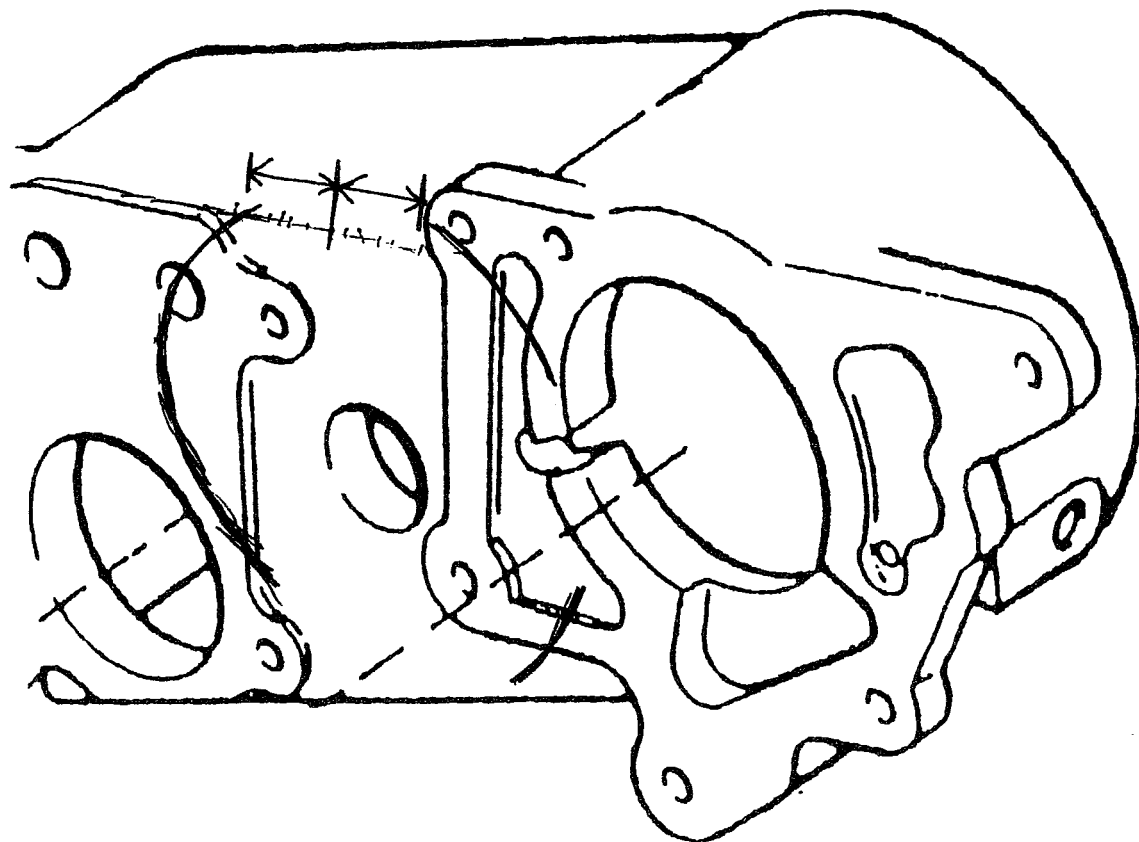
## **Section II - Case Modification:**

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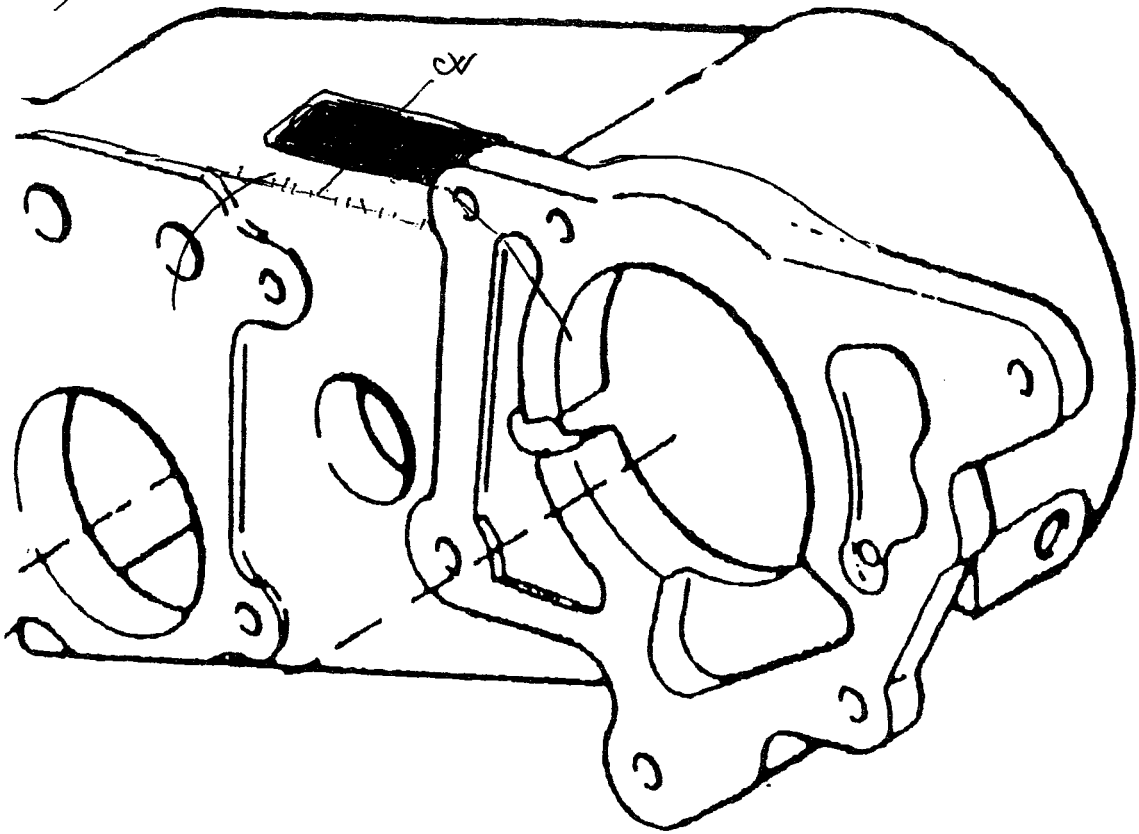
9. It is best to sand or garnet blast the entire case, and inspect it for cracks and/or defects. Also, you will be putting this case in a oven for preheating prior to welding, and they will get awful smoky if not cleaned adequately. In Fact, you will probably be amazed at the number of coats of paint and different colors is you are not the original owner. At the very least, you need to clean the area where the welding will be done.
10. Place the case on the workbench on its back with 2X4's under it to level. Place the new intermediate gear with the large helical side down against the front face of the case. Looking thru the bore, center it on the intermediate gear shaft's hole, and trace the outline of the gear with a felt tip pen near the top of the case. This is done to determine approximately where the outside edges of the hole to be cut will line up. Extend the lines where it intercepts the top of the case, and extend it over the top of the case. Mark a centerline between these two lines.
11. Flip the case so that the bottom is now facing up, and measure the case thickness of the front intermediate shaft hole.
12. Flip the case so that the top is now facing up. Using a straight edge on the front face at the intermediate gear shaft hole and the measured case thickness from step 11, mark the front edge of the hole to be cut.
13. Using the centerline (step 10.) and the front edge (step 12.), mark out a 3 1/4" X 1 1/4" hole that will be centered on the intermediate gear and whose front edge is in line with the front edge of the front thrust washer.
14. Machine out the top of the case from the outside. It is the easiest way. We use a Bridgeport mill with a 3/8" bit to drill the corners, and then cut the outline with a surface mill.
15. Using a side mill and angling the case, bevel cut or chamfer the 1 1/4" sides to at least a 60 degree angle. This will result in an opening that is 3.25" at the outside skin of the case, but 3.5" or so at the inside edge of the case.



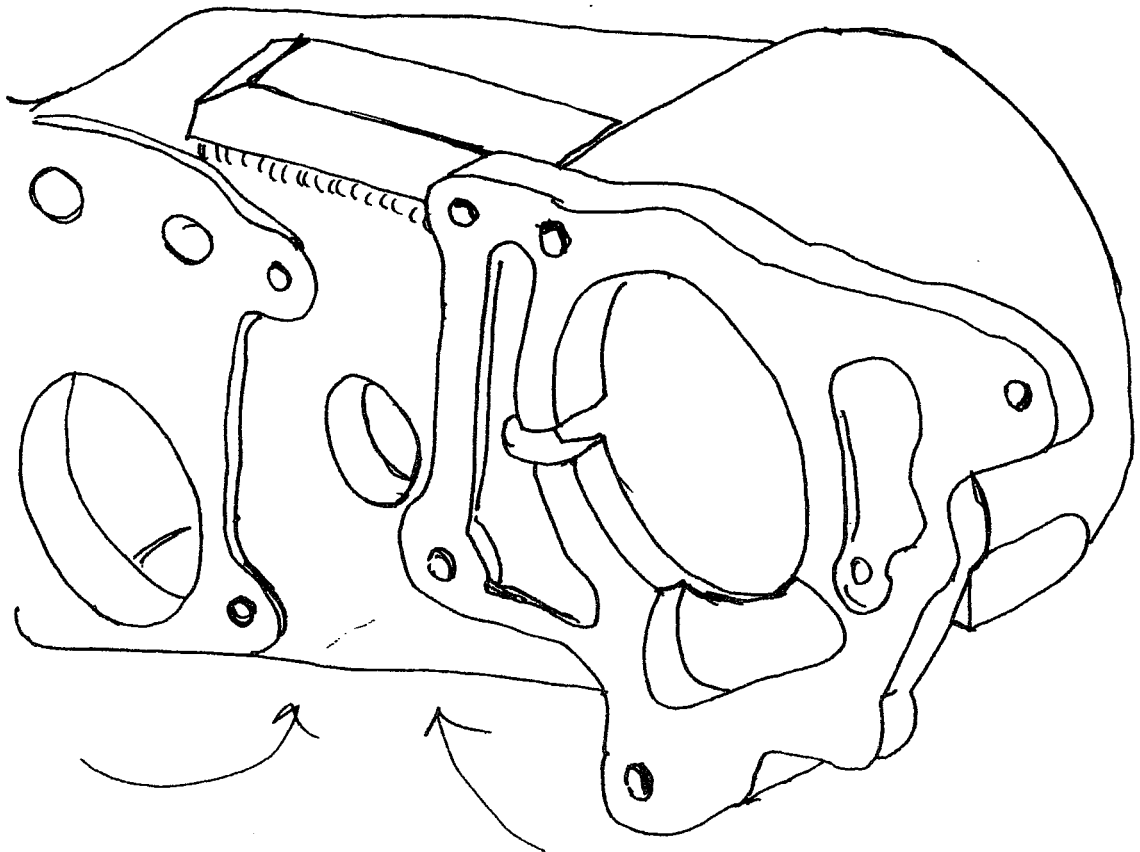
STEP 10.



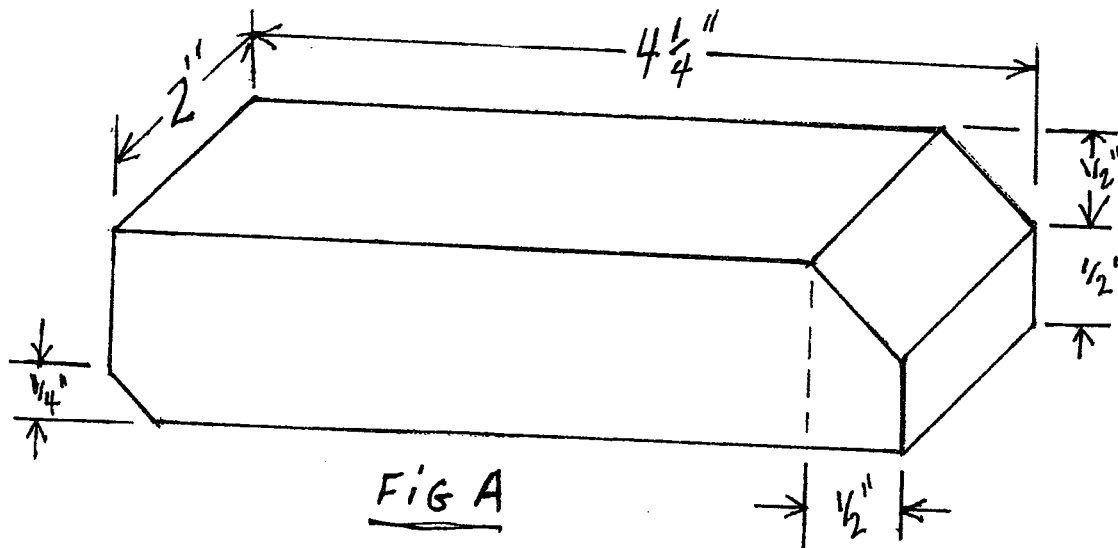
STEP 13



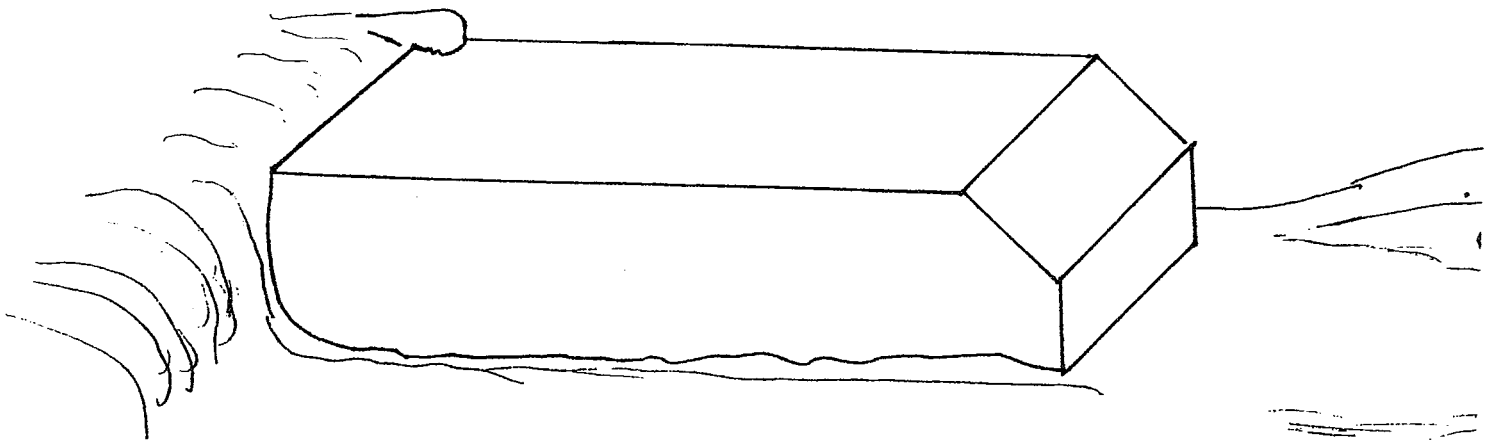
STEP 19.



16. At this point you can temporarily install the intermediate gear to check proper location of the hole, any additional fitting can be done at this point. Be careful to remove the gear before any grinding is done. Remove Intermediate gear when done with this step.
17. Machine a cold-rolled carbon steel block (  $4\frac{1}{4}"$  X  $2"$  X  $1"$  ), as indicated on the enclosed drawing. Basically it has a  $\frac{1}{4}"$ - 45 degree cut out of one of the  $1\frac{1}{4}"$  corners, and on the opposite corner you make a  $\frac{1}{2}"$ - 45 degree cut. See Figure A.

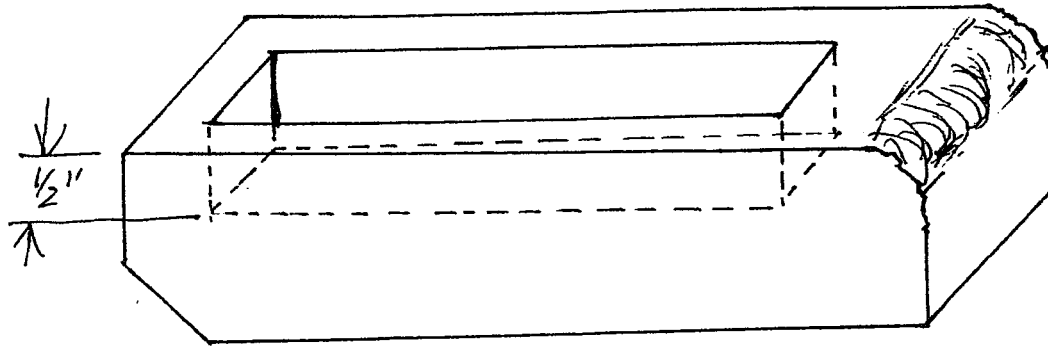


18. Using a die grinder on the bottom of the block rather than the top of the case; Fit the block with the  $\frac{1}{4}"$  cutout facing in the rounded out areas behind the top inside bolt hole and as shown Figure B.

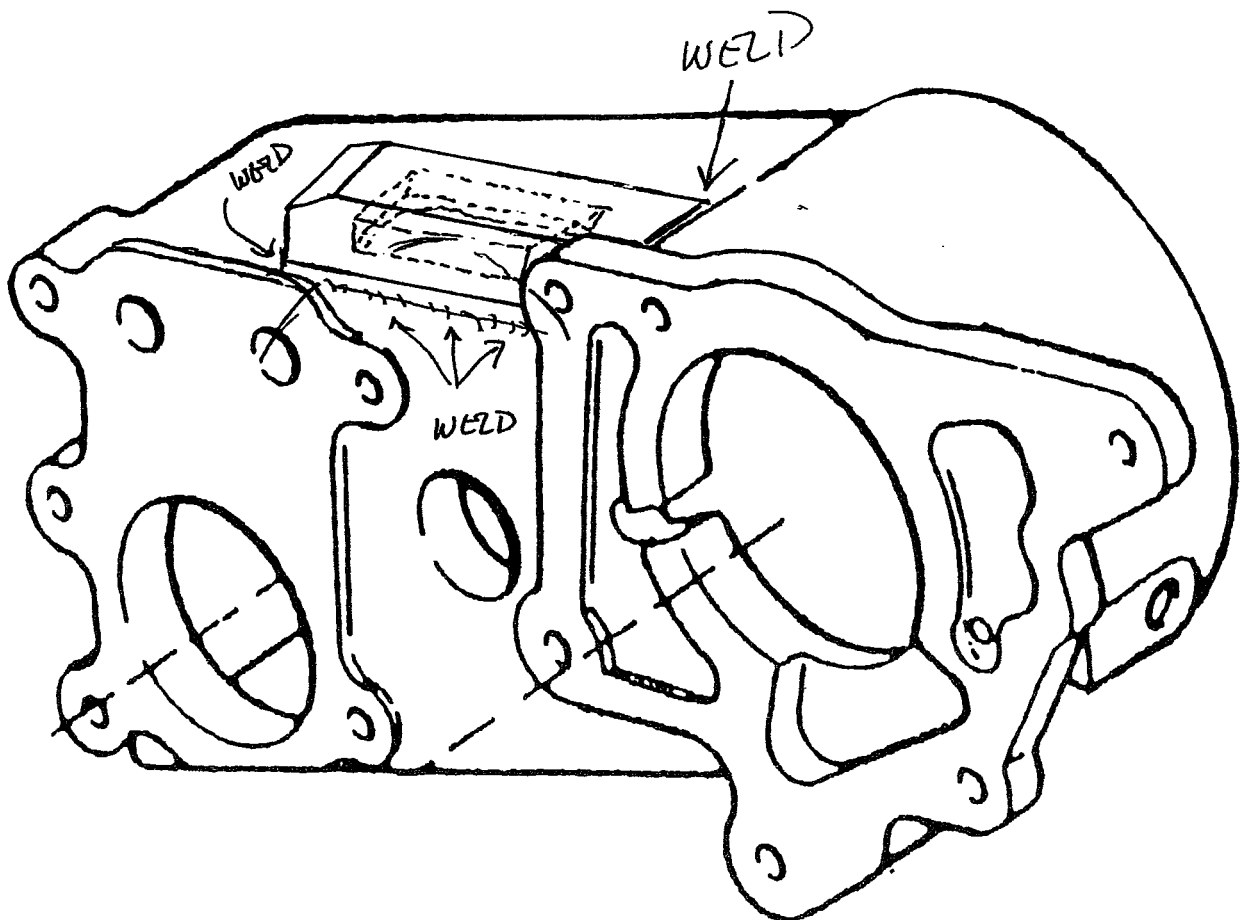


19. With block in place and fitted tightly to the top surface of the case, use the cutout area as a template, and mark the block from the inside of the case with a felt tip pen.

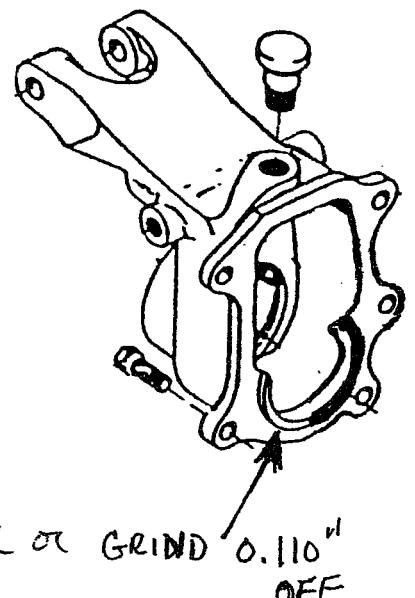
STEP 20



STEP 23



20. Remove the block to the mill, and machine out the marked center area  $\frac{1}{2}$ " deep. You can taper the hole using the 6.5" diameter of the gear or  $\frac{1}{2}$ " 45 degree cut on the ends. This will aid you in drilling a straight hole, but we found is easiest, and cleanest looking, to use a surface mill cut the entire area  $\frac{1}{2}$ " deep. In looking at the resultant block it should be approximately  $\frac{1}{2}$ " thick on top and at least  $\frac{3}{16}$ " thick on the sides. This when welded in place will stiffen the upper section of the case, and actually be stronger than the OEM case.
21. In preparation for welding, preheat the case and possibly the block as indicated by the weld rod manufacturer's instructions. We have had the best results with a weld rod or filler called Nickel 65. It is supposed to be machine-able, and only the cast iron parts are preheated.
22. Clamp the block in place, and check the alignment from looking from inside the case.
23. Weld the block to cast iron case around the outside edge of the block, and using the weld rod or filler (wire) manufacturer's recommended procedure. It is not necessary to weld the inside mating surfaces. It is almost impossible to get to, for machining back the welds. The outside attachment is more than adequate for strengthening the case, but more important: sealing up the case!
24. The next step of the case modification is to drill the  $\frac{3}{8}$ " hole through the 2" dimension of the block. This can be done on a drill press with a carbide tipped drill. But, the most accurate result will be with a Milling machine or other machine that can hold the tool and case rigid enough to cut a straight hole. Drill from the transmission side (top inside  $\frac{3}{8}$ " hole, and new bolt will be needed that is 2  $\frac{1}{2}$ "s longer.
25. The final step involves the front driveshaft housing cover. On the flange that mates up with the front of main case, there is a collar at the bottom that contacts the outer cone of the front tapered roller bearing. This contact sets the position of the gears, and can affect the preload on the bearings. During the assembly of this shafting, you will be adding a 0.110" thrust washer in front of the snap ring that holds high range (helical) output gear. Therefore, and equal amount of space has to be removed from this collar. Measure thickness of the thrust washer to be used in front of the snap ring and then measure the depth of the collar from the machined surface to the top of the collar. Machine or grind down the collar an equal amount to the thrust washer thickness.



### **Optional modification for tapered roller bearing kit:**

**\*NOTE:** These steps should only be performed if your intermediate gear has the tapered roller bearing kit installed. It should also be performed after the welding of the block is done (some distortion of the case could occur during welding and subsequent cooling).

- 25a. Index the intermediate gear shaft holes, and Line bore the intermediate shaft hole to 1.25" (+ .001", - 0.000"). The front side hole will have straight cut sides, so that the O-ring will seal the shaft but allow it to move in & out (allowance for expansion difference of shaft and case).
- 25b. Rotate the case, so that the back of the case is facing up, and surface mill the out side face flat (same O.D. as locking collar), and so that the thickness of the hole, as measured from the thrust washer side is 0.935" (+0.001, -0.002"). Machine a 1/16" chamfer on the outside edge. The rear hole is straight cut with a 1/16" chamfer on the outside edge to allow the locking collar to fully seat on the outside edge. This will position the intermediate gear in the proper position to mesh with the input gear and high range out put gear.
- 25c. The intermediate gear comes with the shaft installed and preload already factory set. Be careful not to swap the roller bearings from one side of the gear to the other as it potentially could change the dimension width of the inner-race to inner-race, and make it too tight between the thrustwasher faces.
- 25d. Fit test the shaft and gear by installing it dry with no sealant on the locking collar & no O-ring. The gear with bearings, tapered spacers and shims inside is placed in the case, and the shaft, threaded end first, is inserted into the case through the front hole. After the shaft is all the way in (flush with front of the case), install the locking collar aligning the woodruff key with the slot in the collar and the rounded slot with the 1/4"-16 hole in case. An Allen socket head bolt is provided to lock the shaft assembly to the case. It is not necessary to install the self locking nut at this time, but using a soft blow hammer ensure all the parts are seated, and the gear rotates smoothly in the case. Some minor grinding on the inside of the case may be necessary due to casting irregularities. Any minor interface problems with the case cast parts should be adjusted now. If you need more room between thrust washer faces to get the assembled gear in the case, only machining the front face (on the inside) should be done. The rear case inside face and locking collar sets the position of the gear for proper engagement with the other gears.
- 25e. Remove all the parts. Clean the case and gear parts to ensure metal filings are not present.

### **Section III – Re-Assembly:**

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26. Before re-assembly make sure to inspect all shafts, bushings, thrust washers, shifting forks, couplers and bearings for wear. Replace as necessary.
27. Re-assemble the case as per the OEM maintenance instructions. Refer to the attached figure with the parts layout for part names and position in the case. We have found it easiest to install the parts in the following order.
28. Install the high/low shift rail(long one, E-17) and shifting fork(E-18) in the case, putting locktight on set screw for the shifting fork (or lock wire if provided for). As per the OEM instruction, install the appropriate bearings, thrust rings and thrust washers (C-6,8,9) in the intermediate gear (using grease to hold in place as per OEM inst.), and place it in the case, sliding the intermediate gear as far as possible from the installed shifting fork. Place the sliding/selector gear in the case with its shift fork collar facing the back of the case. Reposition the intermediate gear, and install the intermediate gear shaft and locking device. For 1 ¼" shaft, needle bearings and thrust washers refer to OEM instruction ( for tapered roller kit refer to step 25d., install ¼" allen head socket bolt and torque self locking nut to 65 ft.-lbs.). With the selector gear in its neutral position, check intermediate gear for proper rotation and smoothness. Then, place the selector gear in the low range position (towards the back of the case, & engaged with the spur gear side of the intermediate gear).
29. **Out of the case**, and using an assembly lube, install the new front output high range gear(G-8x), new or good slotted thrust washer(G-7), and snap ring (G-6) on the output shaft (output shaft {G-1} should have no bearings installed, and shift hub of gear faces the threaded end of shaft with the same sized splines). Check end clearance to be 0.003" to 0.010". If adjustment is needed, grind on or shim the slotted thrust washer (0.112"). Clearance can be checked with a feeler gauge between the shaft and the rear edge of the gear. After shim and thrust washer scheme is determined, it is now ready to be placed in the case. Feed the threaded end thru the front of the case, through the selector gear and out of the rear hole in the case. Since the bearings are removed, there should be enough free play to get the high range gear shift hub and splined section of the shaft past the intermediate gear without having to remove the snap ring, thrust washer and gear.
30. Place the **additional** hardened thrust washer (as a spacer) in front of the snap ring, and replace the front tapered bearing (G-5) and front bearing cone( G-4 cup).
31. Using a die grinder or grinding wheel, cut off approximately ½" of the front driveshaft shift rail (E-15) were it normally sticks into the main case(& somewhat past). This to prevent it from hitting the intermediate gear when it is installed, and you are shifting into 4WD. Reassemble the front cover with a new bearing(D-11), new seal( D-8,9,10), front output shaft (D2), front output clutch(D-19) & driveshaft yoke(D-3,4,6,7) as per OEM instruction. You can leave out the interlocking pin (E-13) if you want to be able to shift into 2WD in either high or low range. Ensure you have the proper parts (new high range gear, hardened thrust washer, snap ring, additional hardened thrust washer, tapered bearing, bearing cup – see

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parts fig.) are installed on front of output shaft. Reinstall the front cover assembly with new gasket & sealant. Torque bolts to 20 -22 ft.-lbs. This sets the proper gear position. Install the detent balls, springs and plugs.

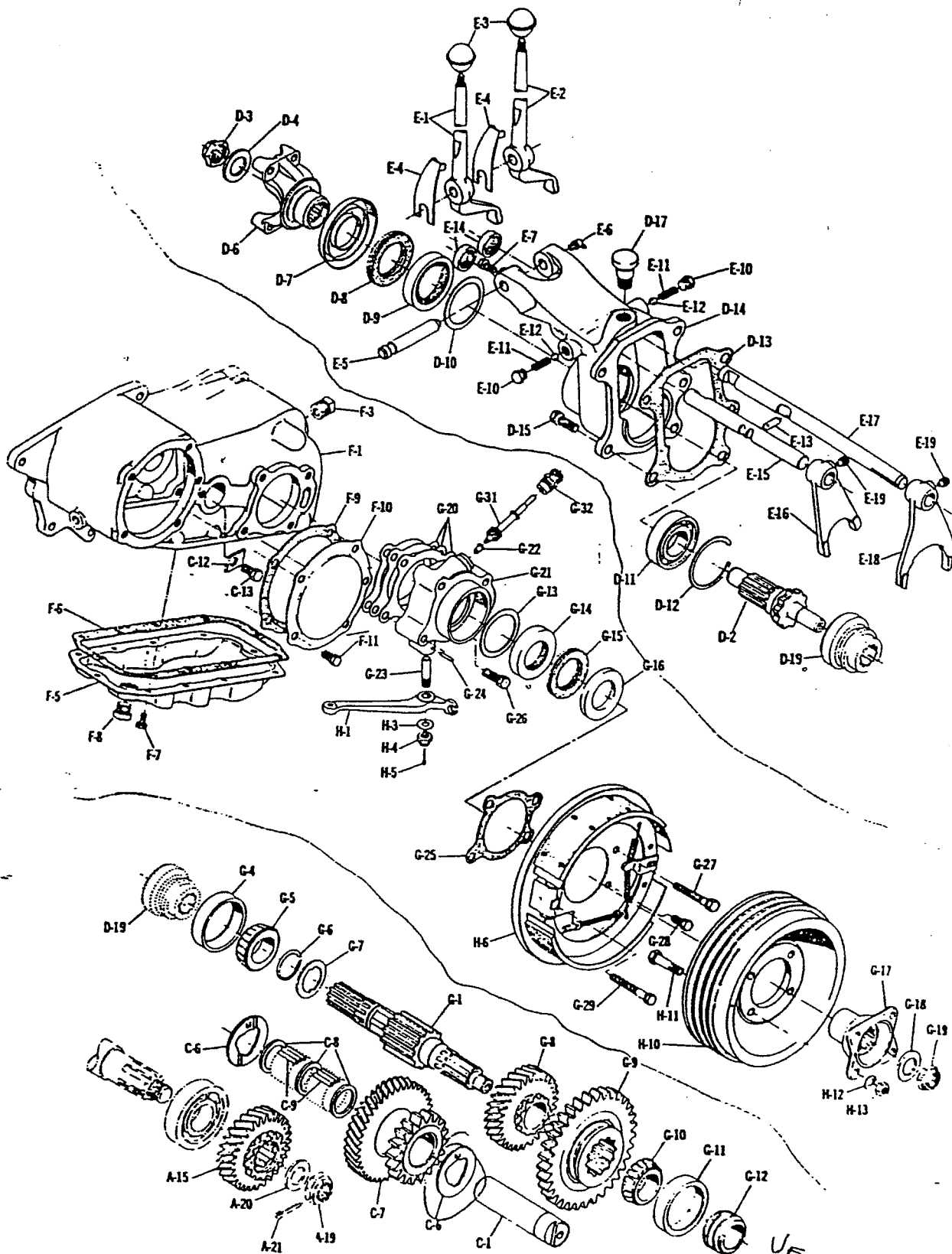
32. Replace seal package in the rear cover, clean shim pack. Using a soft blow hammer tap on rear of output shaft to ensure the front bearing and cup is seated hard up against front cover. Check alignment of helical gears, and install the rear bearing and cup. With the selector gear in neutral, replace the rear cover and shim pack as per OEM instruction. Adjust the shim pack to set preload on bearings. Torque bolts to 20 -22 ft.-lbs. Reinstall rear driveshaft yoke. (& emergency brake assembly if used). Check for free rotation of output shaft in neutral.
33. Reinstall the shift levers per OEM instructions, and check for proper rotation and gear engagement in both high & low range, and 2WD & 4WD. Make sure proper clearance between gears exists.
34. Replace the oil pan cover with new gasket provided, and ensure cover is placed so it does not touch the intermediate gear.
35. Re-install the assembled unit to the transmission. A 3"(3/8"-16) bolt with a rubber flat washer, steel flat washer, lock washer is installed through the welded block, and replaces the stock 1" bolt w/ lock washer. After all bolts are installed attaching the transference to the transmission as per OEM instruction. The input gear is installed thru the rear cover. Then the rear cover is installed
36. While supporting the transmission/transference, replace the crossmember, shift lever mechanism, driveshafts, speedometer cable, and any other accessories that may interface with the transference. (ie. 4WD light, PTO, etc.)
37. Re-Fill the transmission with Manufacturer's recommended fluids. Fill the transference as before with a good quality 75 - 90 weight gear lube or oil (we use Havoline racing). Do not use synthetic's or limited slip type gear lubes for the breakin period (first 500 miles). Never use multipurpose gear lubes as they have an additive for limited slip clutches, and serves no purpose in a model 18. Call if you have any questions.

***GOOD LUCK, ENJOY THE SMOOTH WHEELING, AND ROCK EATING FUN !!***

SPICER

MODEL 18  
PARTS LIST & SPECIFICATIONS

TRANSFER CASE



TAPEL 00 BDL ADVANCE ADAPTER, SPARK SWITCHES B/L

VEH TRANS  
EOD

