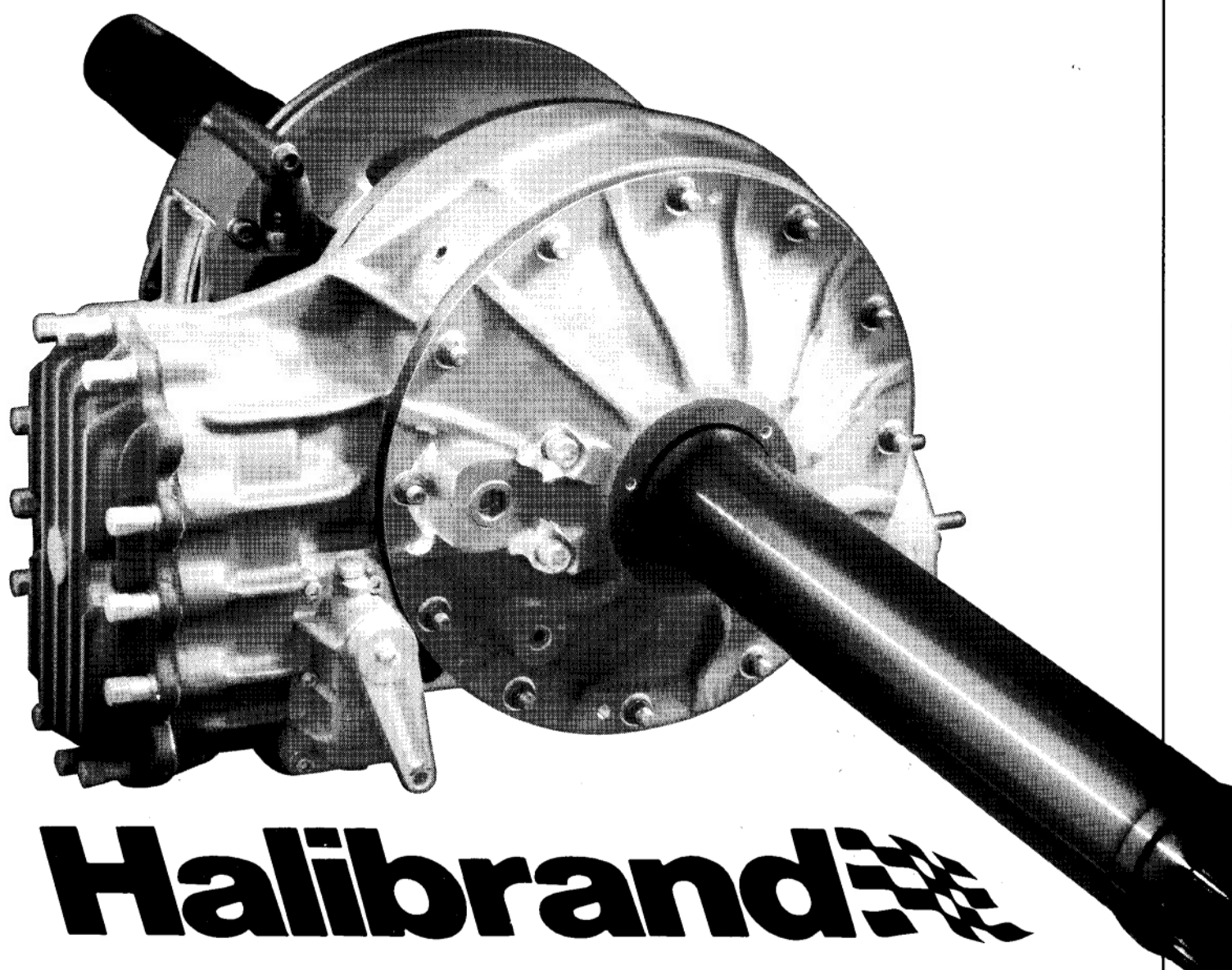


Championship Differential **TECHNICAL MANUAL**



Halibrand

THE WINNINGEST NAME IN RACING DIFFERENTIALS

— We Guarantee It!

Halibrand 

1-800-842-7947
P.O. Box 100, Wellington Airport, Wellington, KS 67152

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Replacement Parts Listing

ITEM	DESCRIPTION	PART NUMBER
1	Plug - 3/8 aluminum	017-5019-A
2	Nut - rear cover	040-4313
3	Cover - rear	293-6002
5	Change Gears	CALL
4	Bearing - rear cover	707-1024
6	Bearing - lower shaft, rear	707-1025
7	Shaft - slider output	296-1407
8	Sleeve - slider	296-1408
9	Bearing - slider pilot	707-1400
10	Hub - slider	296-1409
11	Bearing - slider hub	707-1401
12	Shaft - lower slider	296-1406
	- lower non-slider	266-1006
13	Stud - 5/6-18 and 5/16-24 x 1 1/2	097-6004
14	Stud - 3/8-16 and 3/6-24 x 1 1/4 (short)	097-6006
	3/8-16 and 3/8-24 x 1 7/16 (long)	097-6006
15	Bearing - lower shaft, front	707-1022
16	Stud - 3/8-16 and 3/8-24 x 1 11/16	097-6003
17	Spacer - gear	296-1014
18	Cap Screw - retainer	018-1020
19	Retainer - pinion bearing	296-1008
20	Nut - pinion lock - RH thread	297-1014
	LH thread	297-1013

Replacement Parts Listing

ITEM	DESCRIPTION	PART NUMBER
21	Washer - lock tab	297-1015
22	Bearing Set - pinion	730-6302
23	Ring & Pinion set	
	4.11:1 tapered bearings	296-1203
	4.56:1 tapered bearings	296-1211
	4.86:1 tapered bearings	296-1204
24	Bearing - straddle mount	707-6019
25	Housing - center section	293-1402
26	Plug - 3/8 aluminum	017-5019-A
27	Snubber - pinion	294-6800
28	Nut - snubber locking	043-4008
29	Side Plate - left	293-6350
30	Seal - side plate	637-1134
31	Bearing Cup - side plate	727-6500
32	Bearing Cone - side plate	717-6294
33	Shim - permanent	297-6353
34	Shims -set up kit	298-1097
35	Axle	CALL
36	Side Plate - right	293-6351
37	Washer - 3/8	059-1401-1
38	Nut - side plate	040-0700
39	N/A	
40	N/A	

Replacement Parts Listing

ITEM	DESCRIPTION	PART NUMBER
41	N/A	
42	N/A	
43	Plug - inspection	017-5021-A
44	Plate - block off	293-1411
45	Housing - shift cover	273-1400
46	Rod - shifting	296-1419
47	Bolt - shoulder	015-1011
48	Fork Actuator	296-1418
49	Shift Fork	296-1410
50	Detent Bolt	298-1417
51	Bolt - 3/8-18 x 2 1/2	060-3425
52	Spring - detent	810-2050
53	Ball - detent	707-1415
54	O-ring	647-1007
55	Shift Arm	296-1417
56	Washer	059-1400
57	Bolt	018-1000
58	Bolt - 1/4-20 x 1 SS	060-2700-1
59	Washer - 1/4 flat	059-1200-1
60	Nut - ring gear retainer, locking	040-2150
61	O-ring - side plate	637-6500
62	Posi-Lok assembly - RH thread - LH thread	297-1019-R 297-1019-L
63	O-ring - gear cover	647-1006
64	Bolt - ring gear retainer	090-6000

Installation

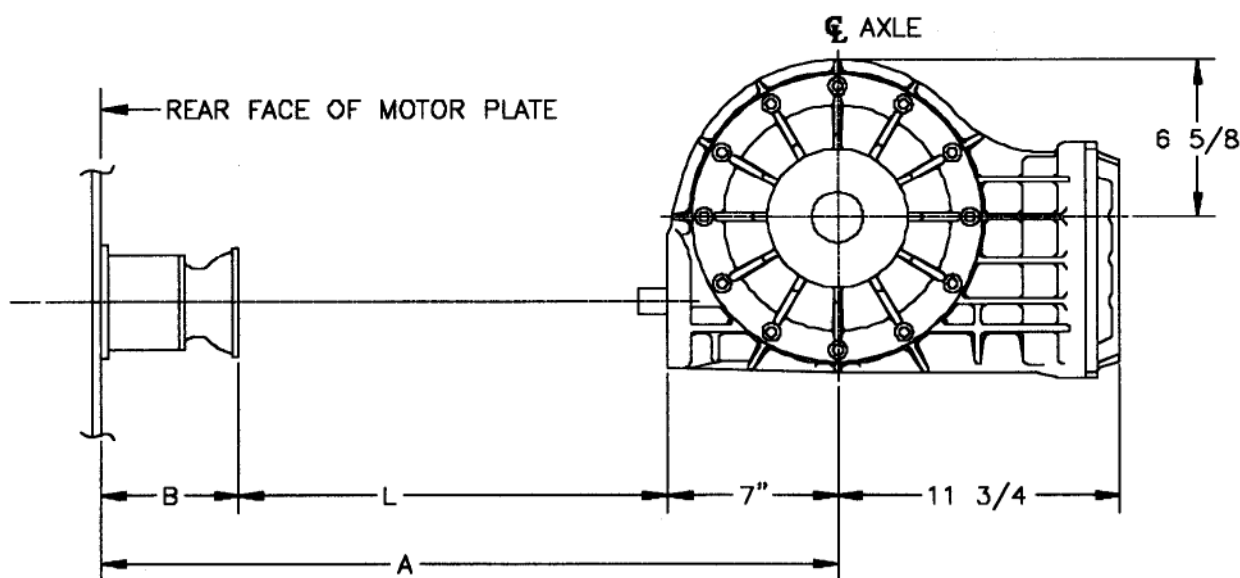
Your Halibrand Super Slider rear end was designed to fit in most car builder's chassis with little or no alteration. However, we would like to offer the following information to aid you in design, installation, troubleshooting, or repairs that are dependent on the dimensions and functions of our unit. Because all quality modern race equipment is composed of precision parts and assemblies, proper care and treatment as well as proper installation is essential.

Driveline Setup

Determining the correct driveshaft and torque tube length is essential to proper operation and durability. In the diagram below, the relationship and dimensions of the rear end, torque tube, and driveshaft to the motor plate are shown. Use them to engineer your chassis/driveline and order the correct driveline components.

If you are in doubt as to these measurements, order the parts long.

In addition to the above mentioned parts, Halibrand can supply 10-10 spline couplers, shifter kits and more to help complete your drivetrain from engine to wheels.



A = Distance between motor plate and centerline of rear axle.

B = Length of I/O box or U-joint adapter from motor plate to centerline of ball housing.

L = **A** MINUS **B** MINUS 7 inches ($A - B - 7"$).

Length of driveshaft: **L** MINUS 3 1/4 inches.**

Length of torque tube WITH collar: **L** MINUS 3 1/4 inches.

Length of torque tube ONLY: **L** MINUS 4 5/6 inches.

****When using flange mounted U-joints, the driveshaft MAY be 3/8 inch longer.**

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Notes

Maintenance

The key to trouble-free long life for any type of equipment is careful, regular service and maintenance. Because quality racing and performance equipment is always a balance between brute strength and weight, every effort should be made to keep each component in prime operating condition. Failure to do so will ALWAYS result in reduced performance and shorter operational life.

Preventative Maintenance

To get the most from your Halibrand rear end, you must maintain a strict regimen of service and inspection both at the track and in the shop. Halibrand recommends the following service sequence:

1. Immediately after the car has run its last lap of the day, and while the rear end is still hot, completely drain all oil into a clean container for return to the shop. Do not wait until you return to the shop to drain the rear end because any particles suspended in the oil will have settled out and will not be completely flushed from the center section. After about 4 hours, all particles will have settled out of the drained oil, allowing you to re-use the oil.

2. In the shop, or between race days and with the rear end still empty, remove the rear cover and inspect closely for any signs of damage, pitting, or excess wear. Check the rear cover bearings for wear or looseness.

3. Check the ring and pinion backlash by rocking the pinion shaft from side to side. Check backlash at 90 degree intervals of axle rotation to compensate for normal run-out and detect abnormal run-out. Backlash should not exceed .003 when the rear end is cold.

4. Repair or correct anything you discover to be defective or questionable. Failure to correct relatively minor problems can cause much more catastrophic and expensive problems later.

5. When all is in proper working order, button up the center section with the change gears you will be using for your next race. Fill the center section and gear change cavity with fresh or cleaned gear oil. If you are not sure which gear set you will be using, leave the change gears out of the case. Do not fill the center section with oil until gear selection has been made and the gears installed.

Operational Maintenance

Common sense and good mechanical techniques will help to insure longer life and reliability for your Halibrand rear end. Experience pays, though, and we have discovered a few techniques that can improve your success.

1. When changing gear sets at the track, it has been common procedure to remove the rear cover, change gears, install the cover, fill the quick change gear cavity with oil, and head for the track. STOP! Always check the oil level in the center section housing before racing, as there is always some oil loss through the lower shaft bearing when the rear cover is removed. Obviously, it does no good to have the quick change gear cavity full if the oil level is low in the center section housing.

2. ALWAYS warm up the rear end BEFORE "standing on it". The cold setup clearances are purposely close (.001 to .003 for ring & pinion backlash) and do not reach the correct operating clearances (.006 to .007) until the center section has warmed up and expanded.

Failure to warm the rear end BEFORE racing or hard operation will not only accelerate gear and bearing wear, but (given sufficient power) could also result in splitting the center section case.

3. If you are involved in a crash or you rap the wall or cushions excessively hard, return to the pits as soon as possible and check for damage to the rear end.

Raise the car off the rear wheels by jacking up under the center section, then rock the wheels to check for excessive ring and pinion backlash or loss of side plate preload. Check as soon as possible and preferably while the rear end is still hot.

Obviously this is not always possible during racing, but try to make these checks as soon as possible. If anything is discovered to be incorrect, Halibrand suggests using your experience and common sense as a guide to continue racing or stop for repairs.

4. Although relatively uncommon, another result of a crash or hitting the wall can be a bent axle. A serious bend will be obvious, but even a slight run-out can result in excess wear and damage to ring and pinion and side plate bearings.

Halibrand recommends that no more than .010 run-out be allowed.

Assembly and Disassembly

This unit is a precision built assembly that was designed for the extreme requirements of today's Sprint car racing. However, the component parts are not designed to be abused during assembly or disassembly by any means including over-pressing, prying, or beating on them.

Good mechanical procedures, proper tools, the right parts, and common sense are all required to service and repair this unit. Make yourself thoroughly familiar with all components, assemblies, procedures, and tools required PRIOR to doing any work on this Halibrand rear end.

Disassembly Guidelines

For the most part, disassembly of the Halibrand rear end is the reverse of assembly procedures. The exception is that when disassembling, the entire case must NEVER be heated with subassemblies still installed.

Heating is required to remove parts, but should be done only to localized areas immediately surrounding the component to be removed. This method is described in the section on HEATING (p. 13).

Do not beat components out of the housings - this can cause cracking, distortions, or other damage. Use the proper tools.

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Mounting Fixtures

Mounting fixtures are required to assemble or disassemble this rear end. The three primary reasons for this are:

1. The case must be stable.
2. The case will be HOT.
3. The case must be placed in several different positions while subassemblies are quickly installed before they can heat up and expand.

One fixture should be designed so the case can be positioned with the change gear cavity facing UP while maintaining access from the bottom. Check to make sure all subassemblies can be installed or removed with the fixture in place.

The second fixture, in combination with the first, should allow the case to be mounted in such a way that both side plates can face UP. In addition, the fixture must have sufficient floor clearance to allow the installation of the axle and subsequent adjustments.

The final fixture is a means to hold the axle in a vertical position without damage while the heated ring gear is installed and bolted down.

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Heating

Caution:

Whenever heating this housing, remember that it is made of magnesium - a flammable metal which, if it catches fire, burns exceedingly hot and is very difficult to extinguish. For this reason, care should be exercised.

- 1. NO heating is required over 350 degree Fahrenheit. Do NOT overheat.*
- 2. Heat slowly and evenly to disperse the heat over the entire area. NEVER hold a torch in one spot or concentrate heat in one area.*
- 3. Make sure the area to be heated is clean and no magnesium shavings, sharp edges, or particles are present that could catch fire.*

There are three ways the center section case may be heated for assembly and disassembly:

1. Heating the entire case for assembly ONLY: Never heat the case and contents to disassemble. A torch or oven (kitchen or shop unit will work) can be used. The case must be clean and ready for the subassemblies to be installed and all subassemblies prepared for installation.

Heat to 350 degrees in an oven for 1/2 hour or use a wide flame on a torch and heat evenly and slowly until the entire case is at a uniform temperature of approximately 350 degrees for several minutes.

Never aim the flame directly into any of the bearing bores.

Do not handle with metal tongs or bars - this could cause scratching, marring, or distortion.

Do use a pair of insulated gloves.

Be especially careful not to concentrate heat or overheat the straddle mount bearing area. This can cause cracking.

2. Reheating if the case cools down too soon. If you cannot install all the subassemblies before the case cools down and contracts, you may carefully reheat the areas immediately adjacent to the bearing bores. Add heat uniformly and be careful not to overheat.

3. Heating the case for disassembly: Heat only the areas immediately around the bearing bores, one at a time as you work. Never heat the entire case as this will heat and expand all the parts and not allow them to be removed without damage. In addition, the expansion of subassemblies inside the case may cause cracking.

Center Section - Subassemblies

Case

The case must be inspected, any repairs made, threads cleaned, and the entire assembly cleaned and dried prior to assembly.

Install combination 3/8-16 and 3/8-24 x 1 1/4 studs at location A on either side of the case over the pinion bore. These studs are SHORTER than the remaining side housing studs. Use RED Locktite.

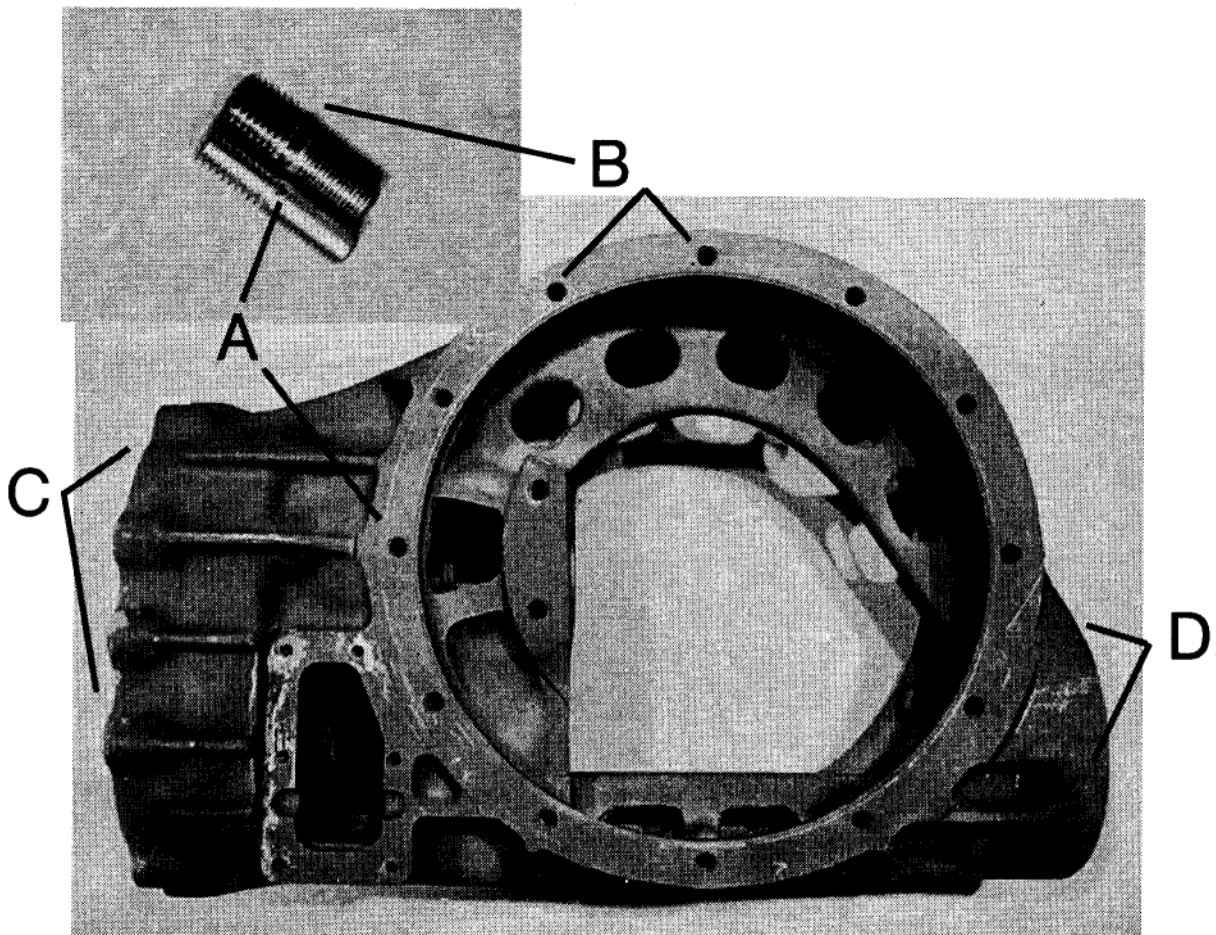
Install combination 3/8-16 and 3/8-24 x 1 7/16 studs at locations B - remaining side housing studs. Use RED Locktite.

Install combination 5/16-18 and 5/16-24 x 1 1/2 studs at locations C for gear change housing cover. Use RED Locktite.

Install combination 3/8-16 and 3/8-24 x 1 11/16 studs at locations D around input shaft bore. Use RED Locktite.

Thread studs into the case to raised shank only. Do not overtighten - snug only. Install the coarse threaded end of the stud into the case.

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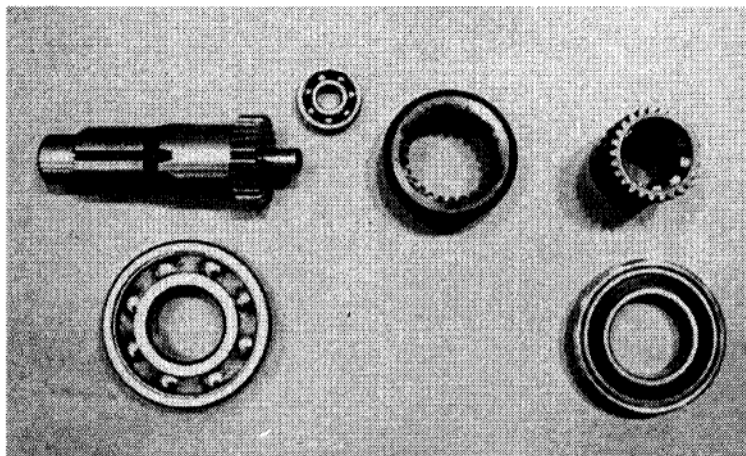
Output Shaft Assembly

This assembly is composed of output shaft B and the rear lower output shaft bearing A.

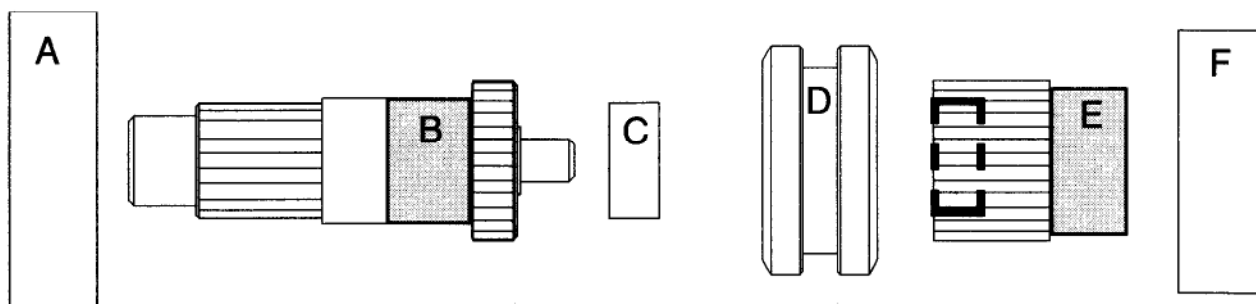
PRESS the bearing on the shaft with the shield facing to the rear.

DO NOT hammer or otherwise force the bearing into place.

Make sure the bearing is fully shouldered on shaded area and against large diameter spline.



Slip slider sleeve D over the splined area on the shaft to check for any restriction in smooth movement



Slider Hub Assembly

The slider hub assembly is composed of the slider hub E, pilot bearing C, and hub bearing F.

The pilot bearing C is pressed into the slider hub E until it is fully shouldered in the area indicated by the dashed lines.

The hub bearing F is pressed onto the slider hub E on the shaded area shown and fully shouldered against the splined area.

Slip slider sleeve D onto the hub splines to check for any restriction to smooth movement.

PRESS components together. Never hammer them together or damage may result.

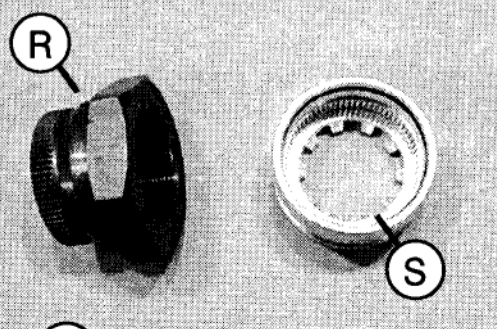
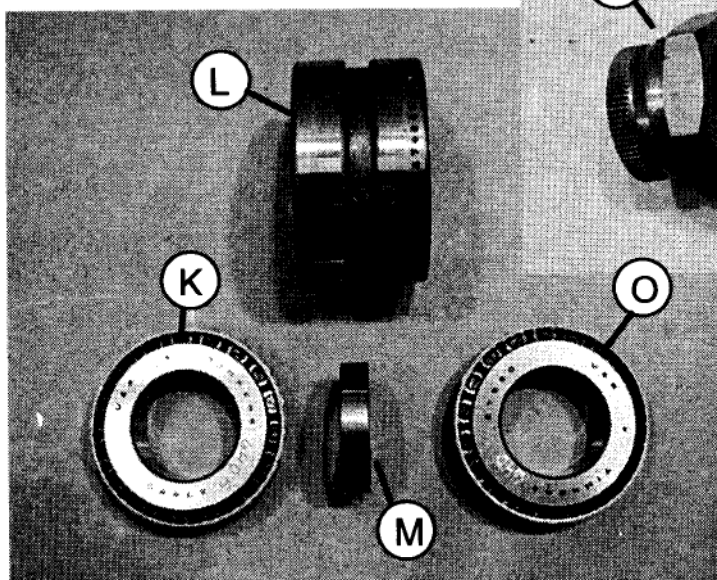
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Pinion Gear Assembly

The pinion gear assembly is composed of the pinion gear, a machined bearing/spacer assembly K, L, M, and O, and the Halibrand Posi-lock unit R and S. (Earlier units used jamb nuts and locking tab washer.)

The bearing set should be considered a matched set and bearing cones must be kept on the matching side of the double race.

The entire assembly is shown at right with Posi-lock shown above and tab lock shown below.



The Posi-Lock unit shown above is designed with threaded side R to tighten down the bearing assembly. Side S is then rotated until it slides over both the pinion spline and side R, locking the unit and bearing assembly in place.

The pinion gear assembly is formed by PRESSING one of the tapered roller bearing cones (K) onto the pinion gear. Make sure it is fully shouldered.

Apply a light engine oil to the bearings as an assembly lube.

The bearing spacer (M) is then slid onto the pinion and against the first bearing cone.

Next, double bearing race L (keep the cones in the correct sides) is placed on the assembly and the remaining cone (O) is pressed into place. Press only until snug against the bearing spacer.

Finally, the Posi-lock (or tab lock set) is installed as described above.

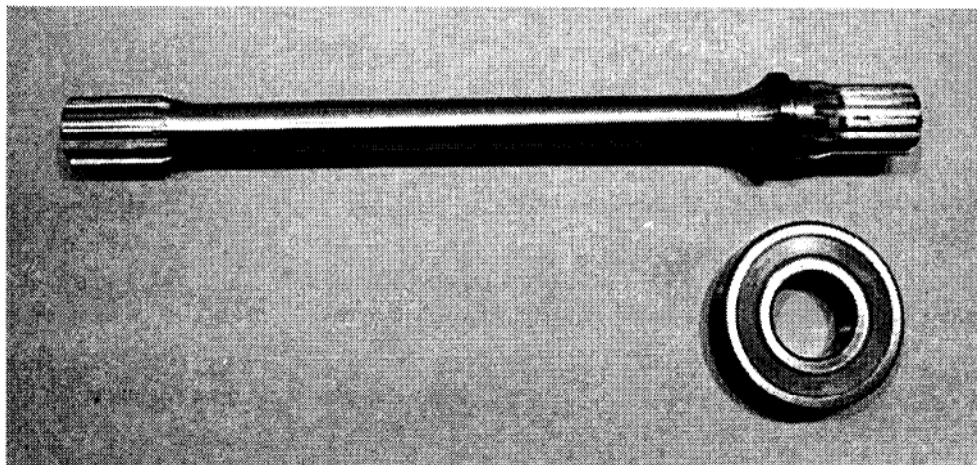
Never hammer these components together as damage will result.

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Lower Input Shaft Assembly

To prepare this assembly, PRESS the bearing onto the shaft. Make certain the bearing is properly shouldered for correct clearancing later. Do not lubricate at this point.

With the bearing in position, squeeze G.E. Silicone II or similar semi-hardening sealant into the spline cavities between the shaft and bearing inner race to limit oil leakage.



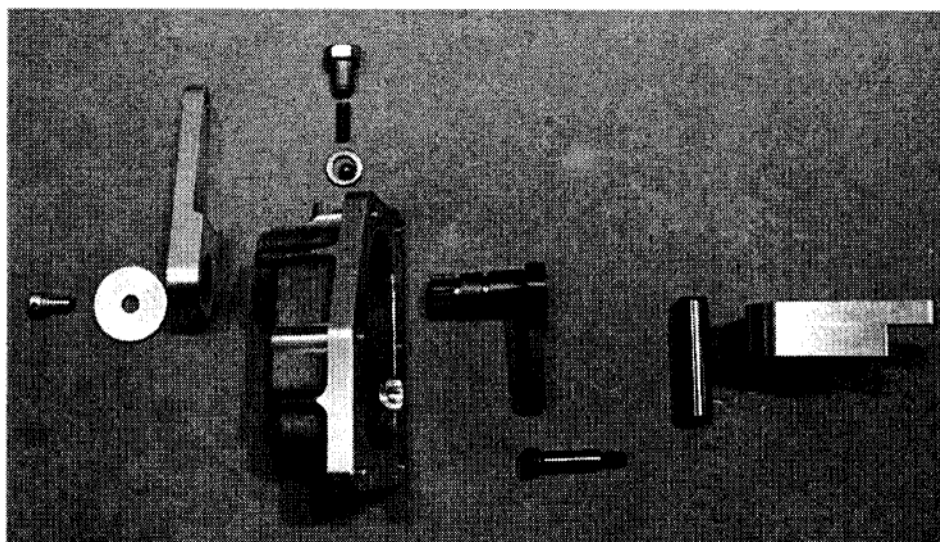
Shift Cover Assembly

This unit is always shipped as a unit because each unit is composed of machine-fit parts. The only service you will want to do is adjustment of the shift lever detent pre-load.

This is done by loosening the lock nut and adjusting the screw in for more positive engagement and out for lighter engagement.

If you find it necessary to make this adjustment, it is best to do so after the rear end and all linkage is installed in the car.

Remember to tighten the lock nut!



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Center Section Assembly

Case Preheat/Assembly Tips

SEE HEATING, p. 13. The best way to assemble this unit from scratch is to heat the entire case in an oven at 350 degrees for at least 1/2 hour. Handle with gloves and make sure your mounting fixture is ready to accept the case and is strong enough to hold it securely. As you will discover, the ability to quickly and correctly install the subassemblies in the case before it cools is strongly affected by how well you are prepared.

A thorough understanding of where each part goes, assembly order, and case position for proper access are all critical for successful completion of this phase.

Make sure all subassemblies are completed and ready to install and arrange them in the order they will be installed.

A clean and uncluttered working space is important. Fumbling for parts or having to reclean a contaminated part wastes time and makes the work more difficult.

Remember - the more professional your preparation and performance, the more likely you are to successfully build a strong and reliable unit capable of measuring up to Halibrand's original high standards.

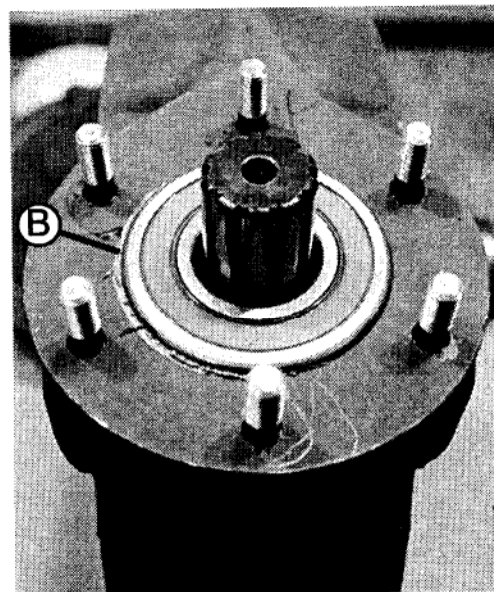
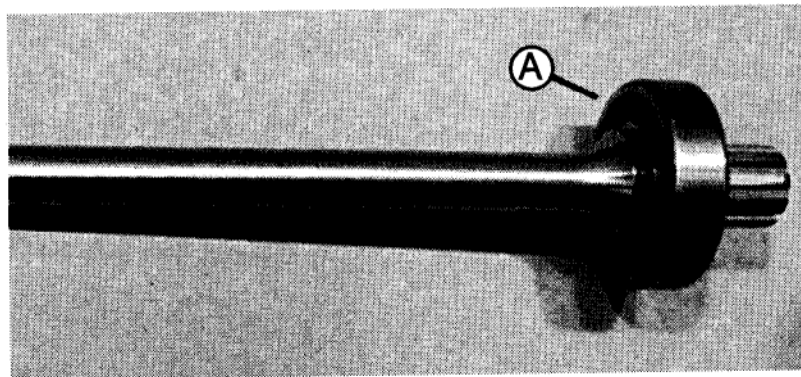
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Lower Input Shaft

Just prior to removing the center housing from the oven, apply a SMALL bead of silicone sealant to the inside outer edge of the bearing (at A) to help seal it.

Position the case in your mounting fixture with the input end of the housing facing UP. Push the shaft assembly into the case until it is fully shouldered. When correctly positioned, there will be about 1/8 inch of the bearing protruding above the housing surface (B). A couple of gentle taps with a soft hammer will help seat the bearing.

DO NOT beat the bearing into place.



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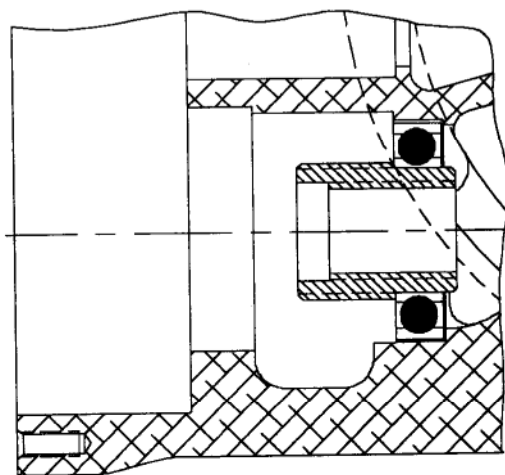
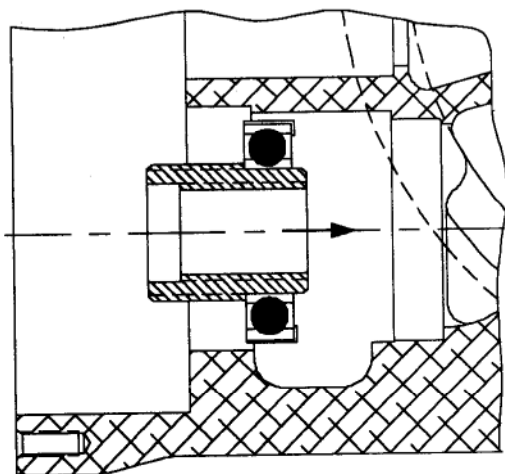
Slider Hub

Immediately following installation of the lower shaft, rotate the center housing so the change gear cavity faces UP.

Using two fingers spread inside the hub, lower the unit into the housing and onto the splined end of the lower shaft. Push the hub down until it is fully shouldered, being careful not to cock the bearing and jam it in the bore. Using a brass drift, tap the bearing lightly to verify it is fully shouldered.

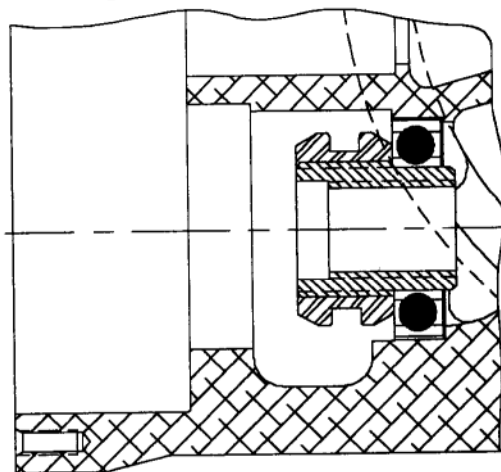
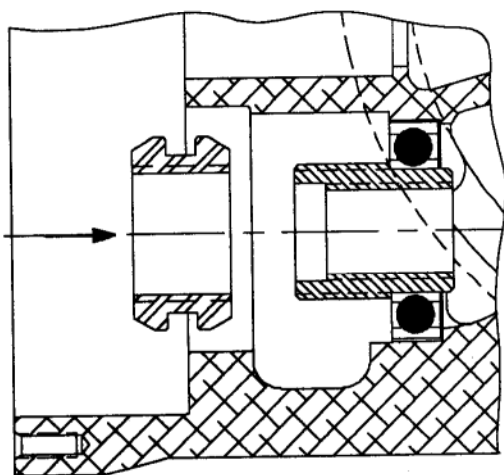
NEVER beat the hub bearing into place.

If, for any reason, the hub gets cocked and jammed, it will be necessary to let the entire rear end cool, remove the lower shaft by heating around its bore, and removing the hub by heating around its bore. It may help when removing these components to use a wet towel to keep them cool while you heat the case around them.



Slider Sleeve

With the hub in place, push the slider sleeve onto the splines of the slider hub before the hub has had a chance to heat up and expand, making it difficult to install the sleeve.



Push the slider sleeve fully onto the slider hub splines.

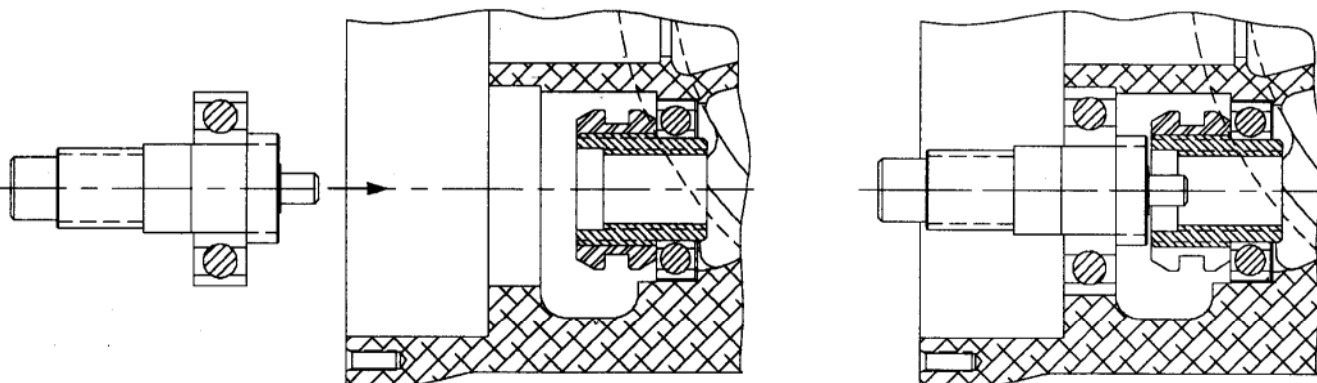
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Output Shaft

Again working quickly before the slider sleeve heats up and expands, install the output shaft.

Push it fully into the bore, giving it a couple of light taps with a soft hammer or brass drift to confirm it is fully shouldered.

Reach into the shifter bore and push the slider sleeve back until it fully engages the output shaft. This will insure proper alignment of the three components as the case fully cools and proper operation of the slider later.



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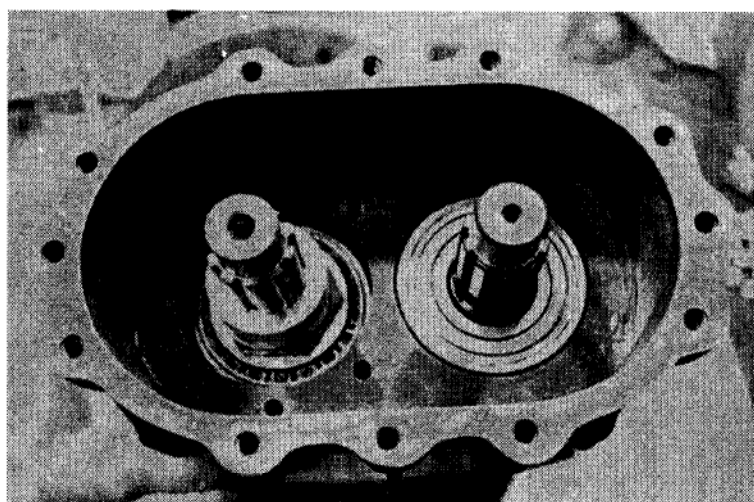
Pinion Gear and Straddle Mount Bearing

Put a dab of grease on the inner end of the pinion assembly and slip the straddle mount bearing in place on the pinion. The grease is used to hold the bearing while you install the entire assembly. The pinion gear assembly and straddle mount bearing are installed at the same time. This makes alignment less complicated and the installation easier.

Use a soft hammer or brass drift and lightly tap to insure both bearings are fully shouldered in the center housing.

If the housing has cooled substantially, you may want to heat the areas around the bearing bores prior to insertion to ease installation.

NEVER force or hammer these components into place as this will almost certainly cause substantial damage - particularly to the straddle mount area.



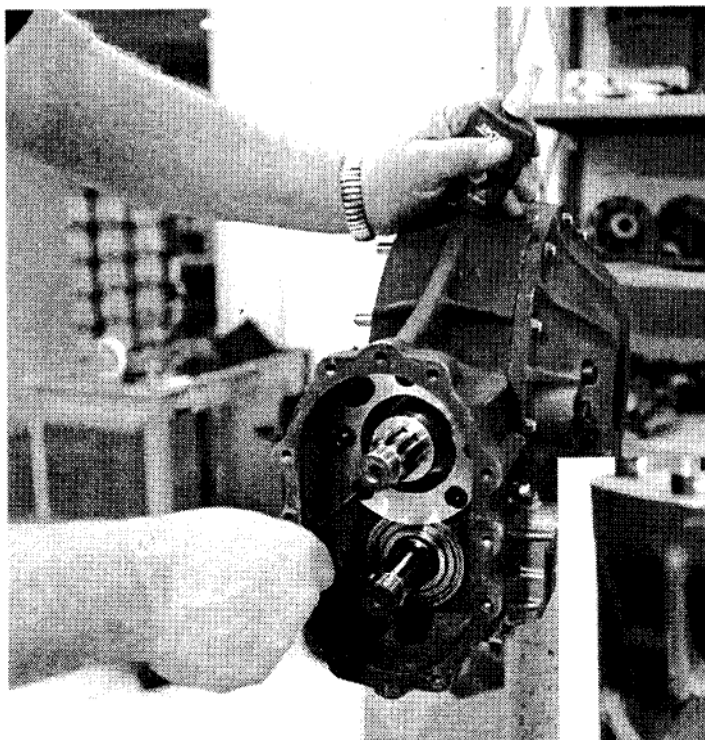
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Bearing Retainer

The final step before allowing the case to completely cool is the installation of the bearing retainer plate.

This component fits in one position only, with the blanked area on the retainer covering the edge of the output shaft bearing.

Use blue Locktite on each of the 7 countersunk hex cap screws and torque them down to 20 ft.-lb.



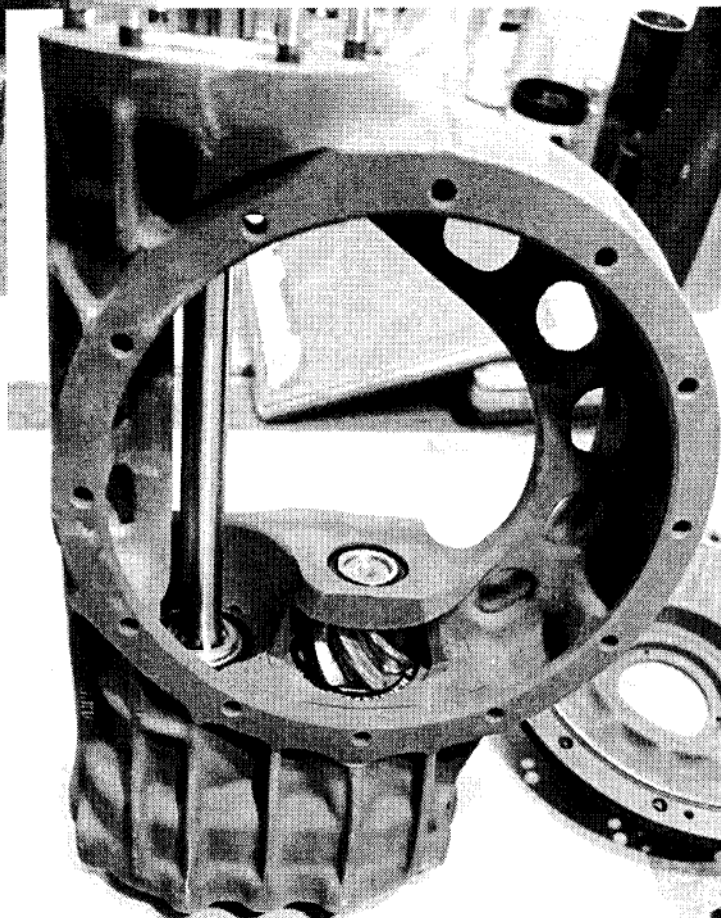
At this point, the housing should look like this.

Cycle the slider several times to make sure it is free and does not bind.

Verify that all components are still in their proper places and correct as required.

Allow the entire unit to air cool slowly. A fan may be used to slightly speed cooling.

NEVER use any liquid to speed cooling as this can cause warpage and cracking to occur.



Shift Cover

Once the center housing has cooled, lubricate all the moving parts with a light engine oil. Do not use gear lube at this time.

Again check that the slider mechanism is working properly by working the slider sleeve (B) back and forth several times to engage and disengage the output splines.

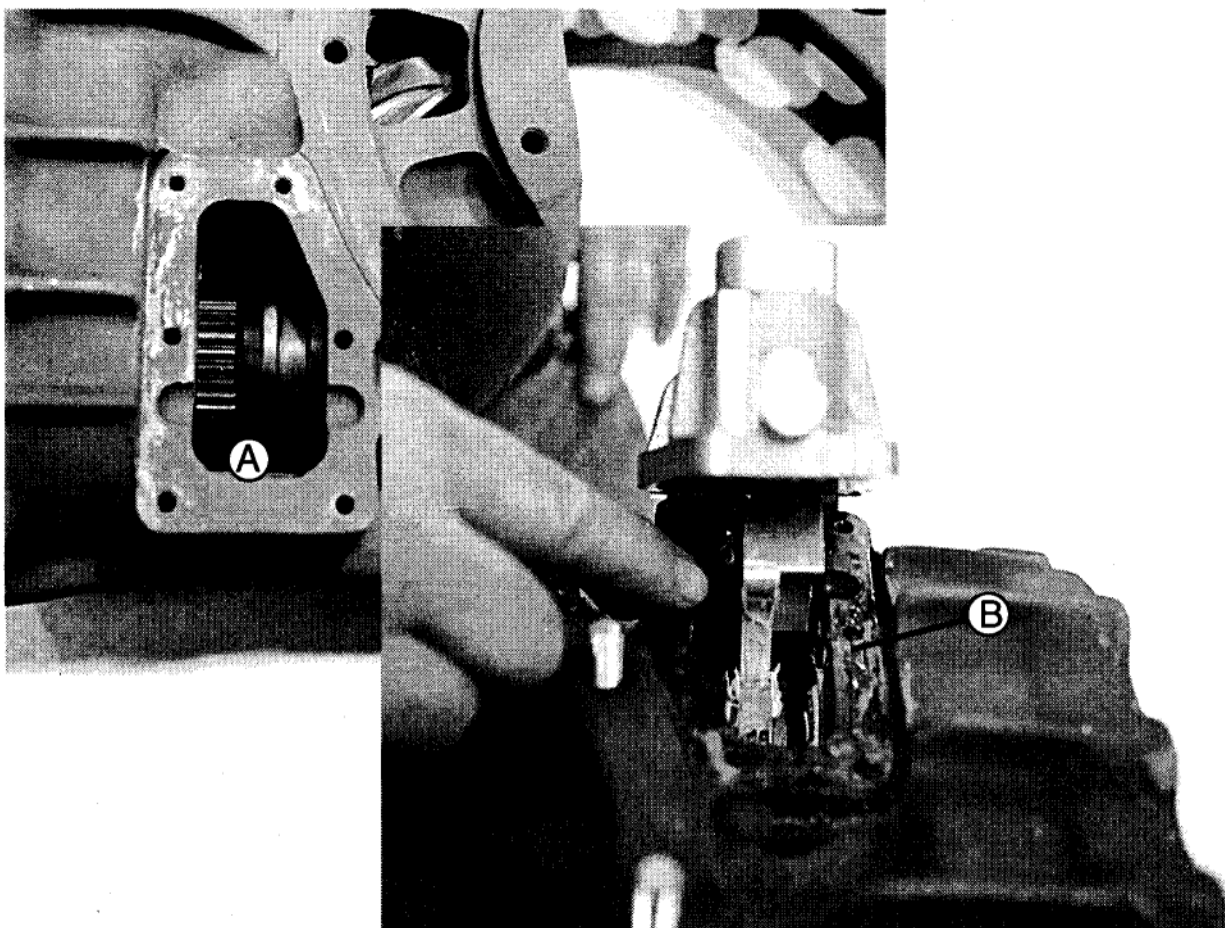
Apply assembly lube to both the groove in the slider sleeve and the fork of the shifter assembly (B).

No gasket is used between the shifter housing and center case. Halibrand recommends GASGACINCH brand liquid gasket sealer be applied to both sides as a sealant.

Install the shifter assembly to the case, making sure the shifter fork is correctly engaged in the slider sleeve groove.

Install the six 1/4-20 cap screws with AN washers with a drop of red Locktite on each. Torque to 10 ft.-lb.

Again cycle the shift mechanism to verify smooth operation and full engagement. Adjustment at this point is not important - set it snug - as final adjustment of shifter detent is best done after final installation with all linkage in place.



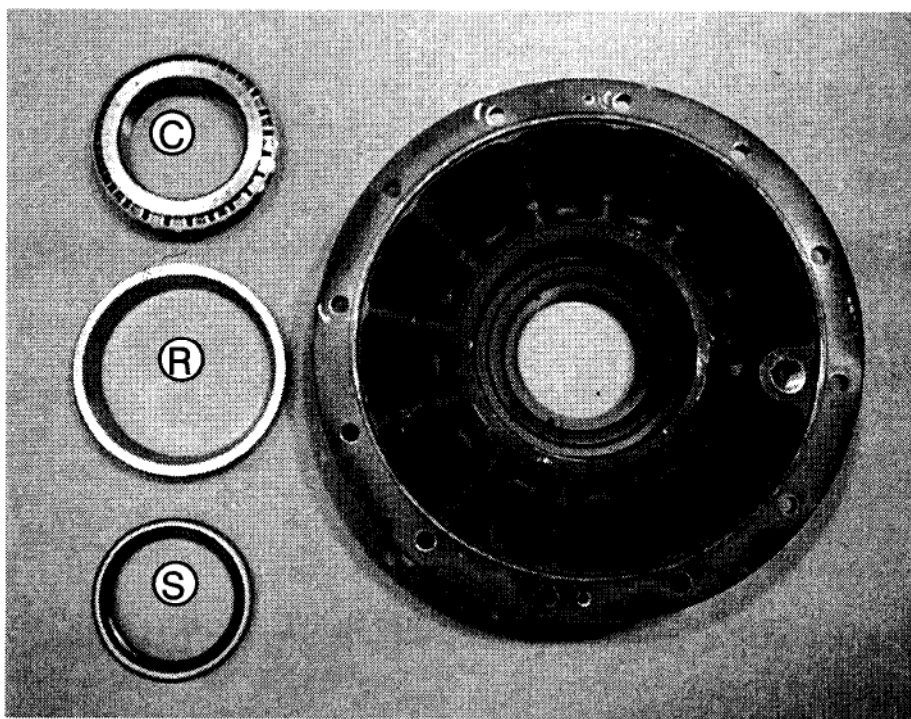
Axle Components/Setup

To complete your Halibrand quick change rear end, final assembly and setup must be completed.

The order of these operations is important. Some operations, particularly the set up procedures, require partial assembly of components to allow proper measurement.

Except where shown, assembly lube consists of light engine oil - again to allow proper measurements to be performed.

Axle preload can be made much easier if a set of special setup bearings are used. These are simply another set of side plate bearing cones (C) that have been honed for a slip fit on the axle shaft rather than a light press fit. This allows the side plate and axle to be removed for adjustment of the shim pack without undue effort. They are a tool and not meant to be installed as permanent bearings.



Side Plates

Both side plates should be inspected for damage, cleaned thoroughly, and heated to 350 degrees prior to assembly. At this point, only the bearing races (R) should be installed by dropping them into the heated side plates and giving them a light tap with a soft hammer or brass drift to verify they are completely shouldered. DO NOT beat them into place or install them cold or damage will result.

Allow the side plates to cool completely. DO NOT attempt speed cooling with ANY liquid as damage may result.

Seals (S) will be installed AFTER setup is completed.

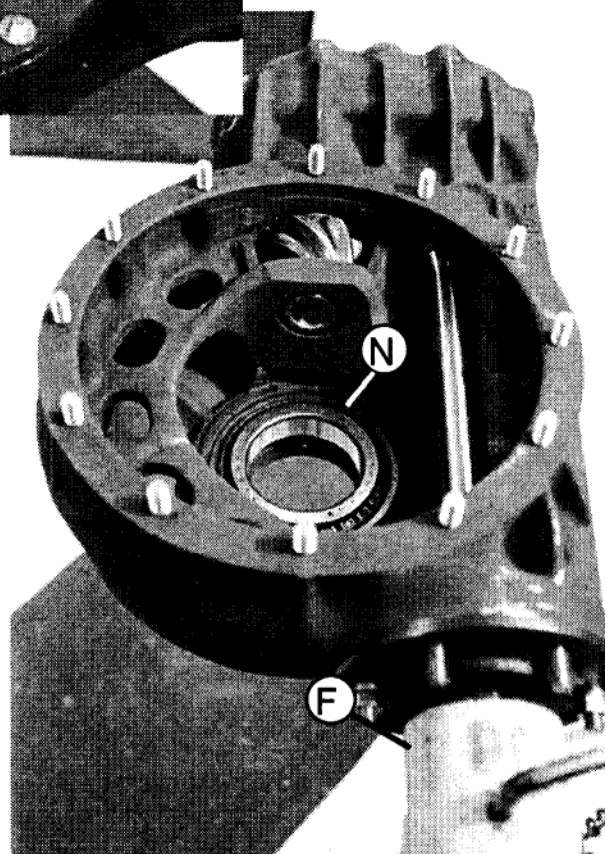
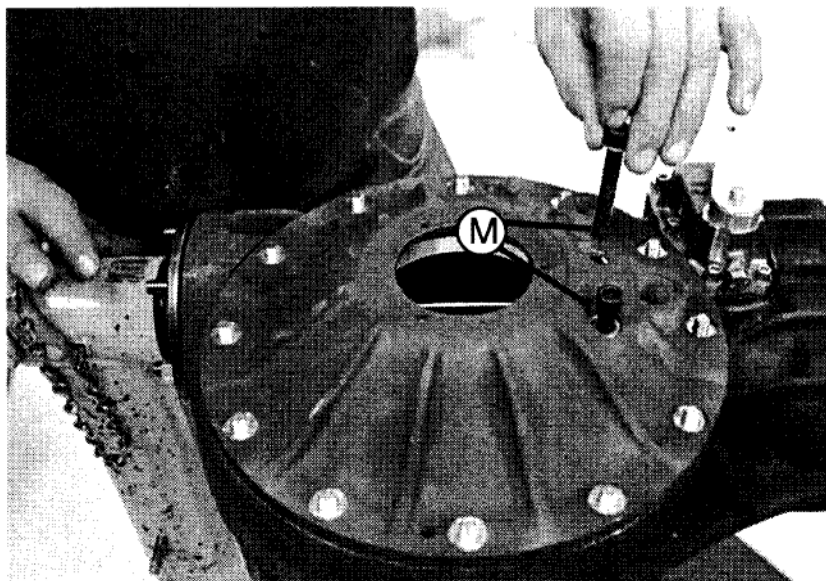
Right Side Plate

Install the right side plate with O-ring in place and using GASGACINCH as a light sealer between the side plate and center case. No gaskets are used.

Make sure you align the two straddle mount bolt holes in the cover with the straddle mount bolt holes in the case before pushing the cover into place.

Start all the side plate nuts and tighten down in stages, alternating side to side to evenly pull the plate into place. Use red Lock-Tite. Torque to 35 ft.-lb.

Install two straddle mount bolts (M) using red Locktite. Torque to 50 ft.-lb.



Place your side plate setup bearing into the side plate race as shown (N). Use a light engine oil for lubricant.

Also note that the case is secured in a stable fixture (F) that will hold the case steady.

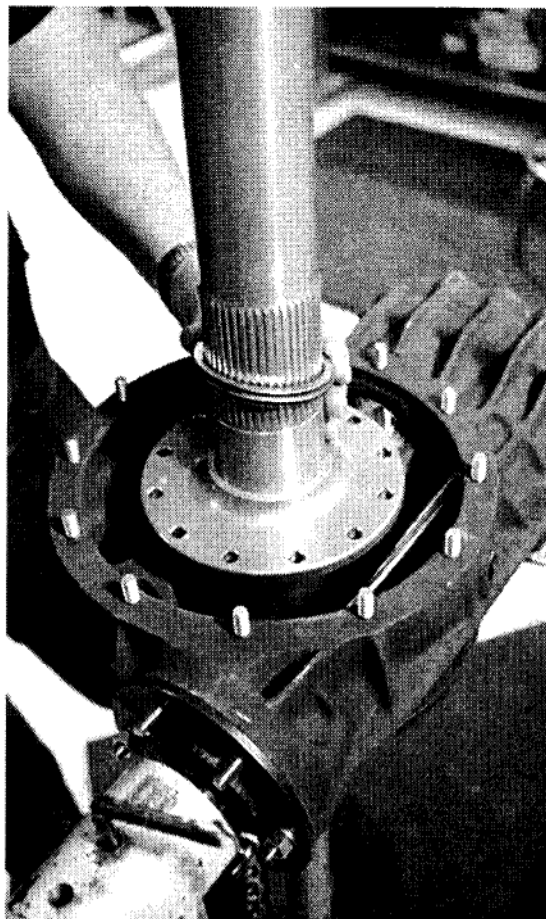
This fixture must also be far enough above the floor to allow the installation of the axle shaft later.

Axle Preload

Use a combination of thick and thin setup shims to create two packs that are roughly the same thickness as the spacers that were removed from the original rear end.

If none are available, or if it is otherwise necessary to start from scratch, a total pack thickness of between .110 and .120 is a good place to start.

Slip the right side shim pack over the axle shaft and, holding the shims and axle securely, lower the axle shaft into place (SEE RIGHT). The axle should slide completely through the bearing and shoulder with the shims against the bearing.



With the axle shaft seated in the right side plate, slip the left shim pack over the axle shaft as shown.

Place the left side setup bearing cone on the axle, firmly seated against the shim pack.

Install the left side plate using non-locking nuts and using no sealant or O-ring as this plate will be removed again.

Slowly tighten down the side plate, alternating from side to side and checking that the axle does not begin to bind at any point. If the side plate is not mating completely with the center housing by the time you have torqued the retainer nuts to 25 ft.-lb., STOP and remove the nuts to determine the cause of the problem. You may have too many shims, there may be foreign material between the shims and bearings, ETC.

When everything is correct, torque the side plate to 35 ft.-lb.

Axle Preload - cont.

With the axle and shims installed and the side plates torqued, grasp the axle shaft and rotate it.

If it rotates freely, with little or no drag, there is insufficient preload.

If it does not rotate, or rotates with a lot of drag, there is too much preload.

The correct preload is determined where there is a definite drag, on the order of 40 to 45 in.-lb. This translates to .012 to .015. This preload is checked with only light oil for lubricant.

Adjustments are made by removing the left side plate and adding or removing shims until the correct preload has been established.

CAUTION: This is a critical adjustment which will affect the performance and lifetime of the entire assembly. Take the time to do this procedure with precision.

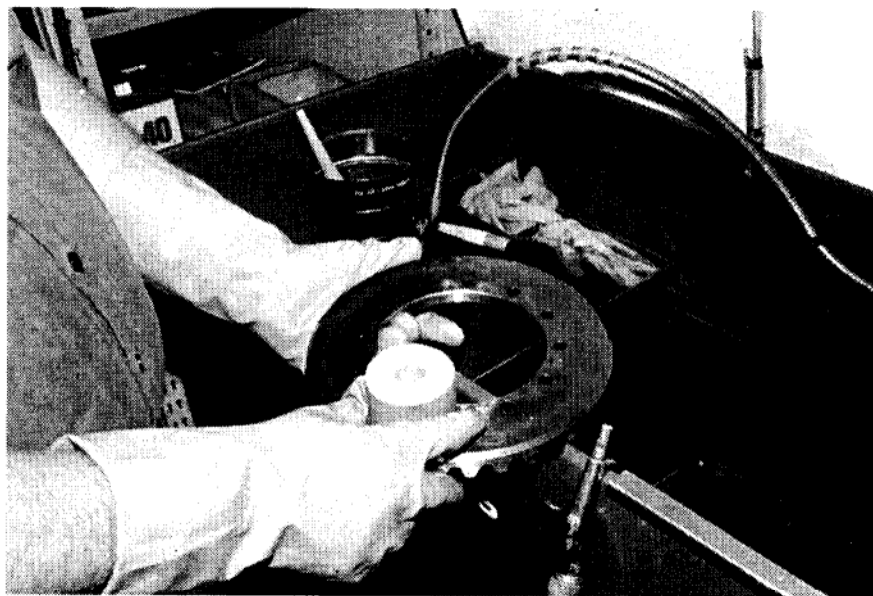
Ring Gear

Remove the axle from the center housing, preserving the shim packs and marking them for later use.

Thoroughly clean and check the ring gear and ring gear flange on the axle shaft for burrs. Using a flat stone with solvent as shown below will help locate any problem areas.

Thoroughly clean and dry both shaft and ring gear. Heat ring gear in an oven to 350 degrees for about 1/2 hour.

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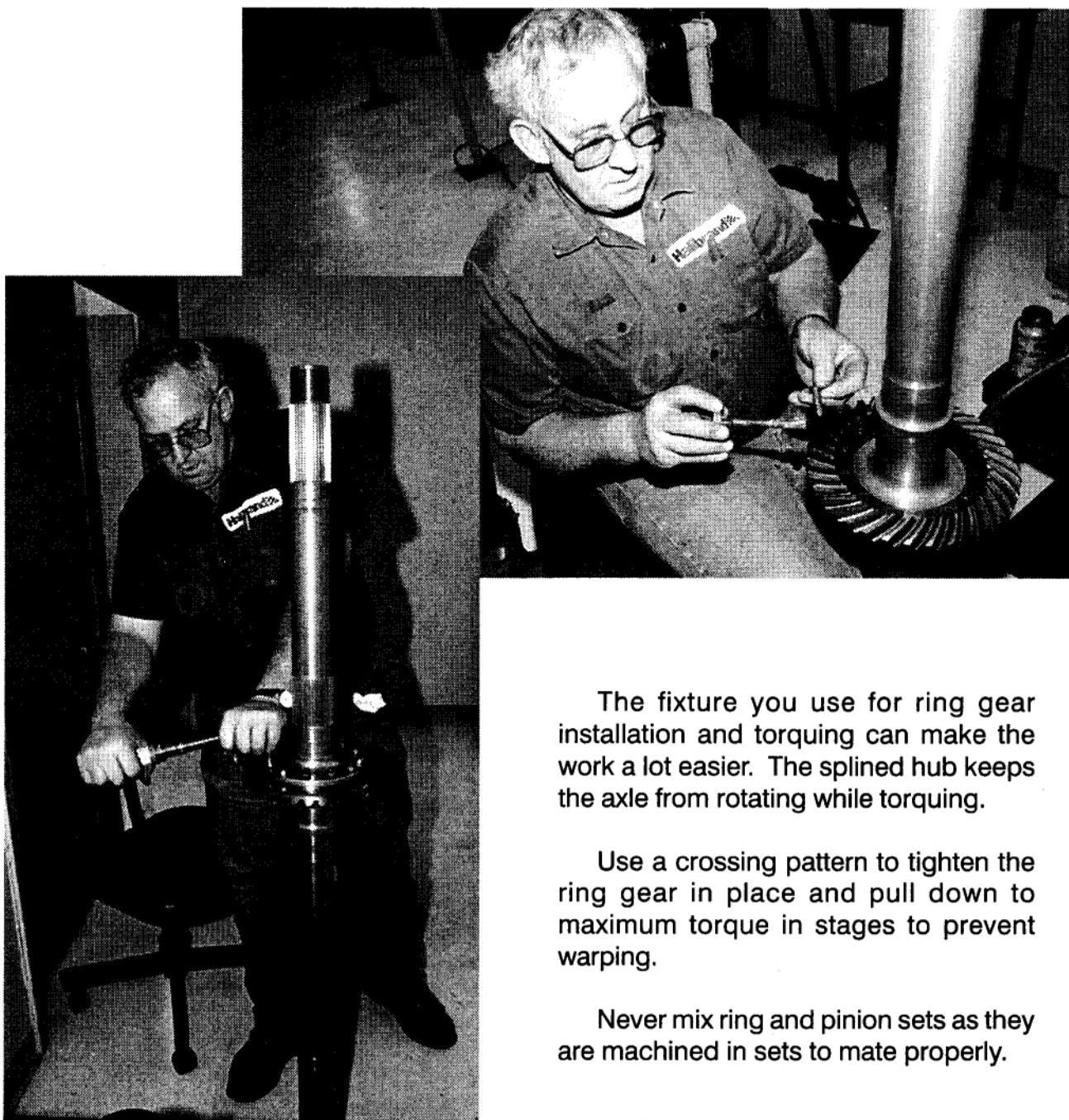
Halibrand

Ring Gear - cont.

Place the axle shaft in an upright position - preferably in a fixture that uses an old splined hub to keep the axle stable and allow you to work in comfort.

Place the heated ring gear in position and, while still warm, begin to install all 12 retainer bolts and nuts.

If you have a 4.11, 4.56 or 4.86 gear set, use anti-seize compound on the through bolts and nuts and torque to 35 ft.-lb.



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The fixture you use for ring gear installation and torquing can make the work a lot easier. The splined hub keeps the axle from rotating while torquing.

Use a crossing pattern to tighten the ring gear in place and pull down to maximum torque in stages to prevent warping.

Never mix ring and pinion sets as they are machined in sets to mate properly.

Halibrand

Pinion Backlash

Without question, the single most important factor affecting the life of a Halibrand rear end is accurate ring to pinion backlash adjustment.

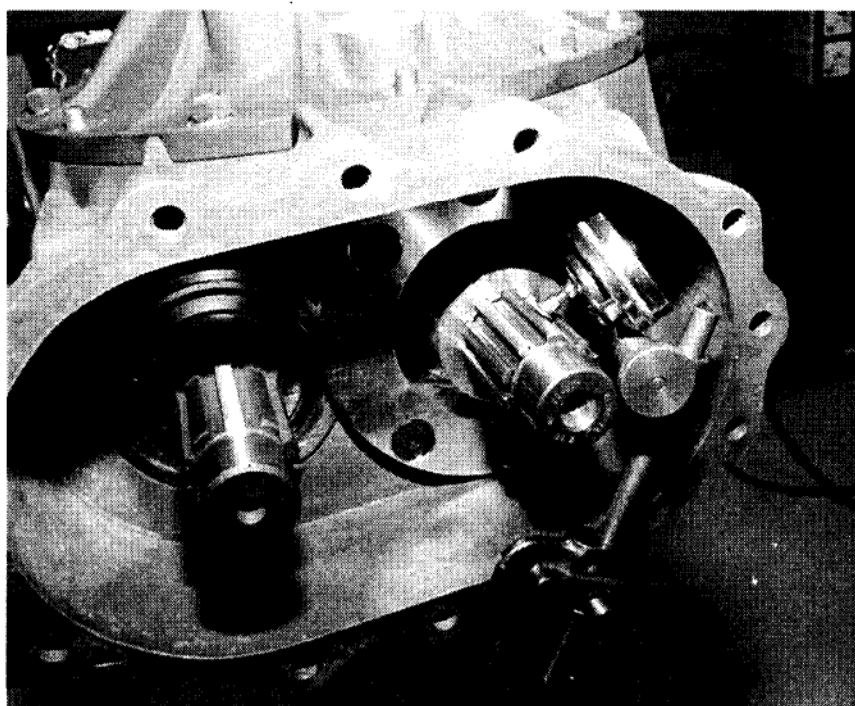
Check and then recheck this adjustment to get the best performance and longest life possible.

Reinstall the right shim pack and axle shaft assembly. At this stage, it is possible to get an idea how close to the correct lash you are by grasping the pinion and working it back and forth. If there is obviously NO lash, there will be no play in the ring and pinion. If there is too much lash, you'll be able to rotate the pinion from side to side an excessive amount without moving the ring gear.

The target lash measurement is .005 and is roughly 1/2 to 1 degree of rotation in the pinion from click to click with the ring gear held tight. Add or subtract shims, moving them from side to side - NOT removing any, until this measurement is perceived to be close.

Install the left side plate, rotating the shaft to verify there is no bind, and tighten to spec.

Set up a dial indicator as shown below and check the backlash.



All ring and pinion sets will have between .002 and .004 of runout. More than .004 is excessive and is caused by foreign material under the gear, a cocked gear, or a defective part.

Check the lash at 4 places in the ring gear rotation and find the point where the lash measurement is lowest.

Set the final lash at the point where the lash measurement is lowest (the "high" spot).

To decrease lash: Subtract shims from the right side and add them to the left side.

To increase lash: Move shims from the left side and add them to the right.

Each .001 of lash is roughly equal to .001 of shim.

The correct lash will be between .005 and .007 or to the measurement marked on the ring gear as a MAXIMUM lash.

Halibrand

Final Assembly

When preload and lash are correct, you're at the point where you do not have to remove and reinstall the axle shaft several times and the permanent bearings can be installed.

To do this, remove the axle from the rear end. Remove and mark the shim packs to make sure they will be returned to the correct side.

Heat the bearing cones in an oven to 350 degrees. Slip them onto the axle over the correct shim packs, one side at a time, until the bearing is fully shouldered. Verify this by gently tapping the inner race with a brass drift.

NEVER beat or hammer these parts into place. Allow to air cool.



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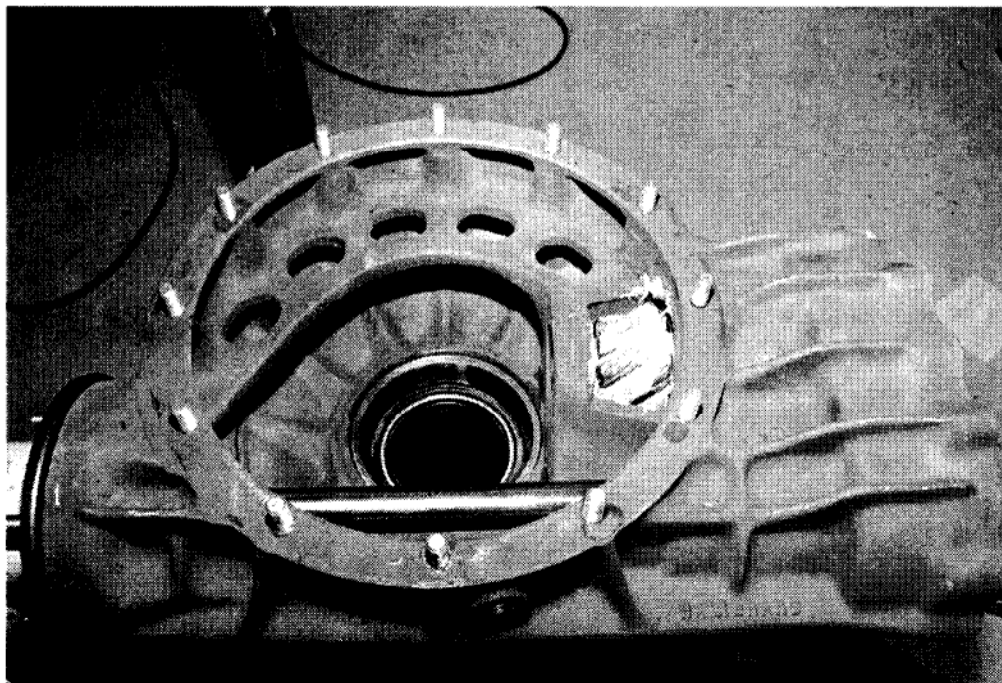
At this time you can also install the two side plate double lip seals.

Use the proper driver and seat them firmly. No sealer is required.

Halibrand

Final Assembly - cont.

Before reinstalling the axle assembly, apply a good coating of assembly lube to the pinion gear, ring gear, and both side plate bearings as shown below. This will prevent excessive wear or heat galling until the gear oil can fully circulate and coat these parts in the field.



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Also, before assembly, coat the lip seals and axle shafts where they contact the seals with oil to prevent damage to the seals on installation.

Finally, install the axle shaft/ring gear assembly as before.

Install the O-ring in the left side plate and apply a coat of GASGACINCH as a sealant between the plate and the center case.

Carefully snug the side plate down and torque to 35 ft.-lb.



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