

Massey Ferguson®

1648 / 1652 / 1655
Compact Tractor

WORKSHOP SERVICE MANUAL 4283387M2

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Removal and Installation

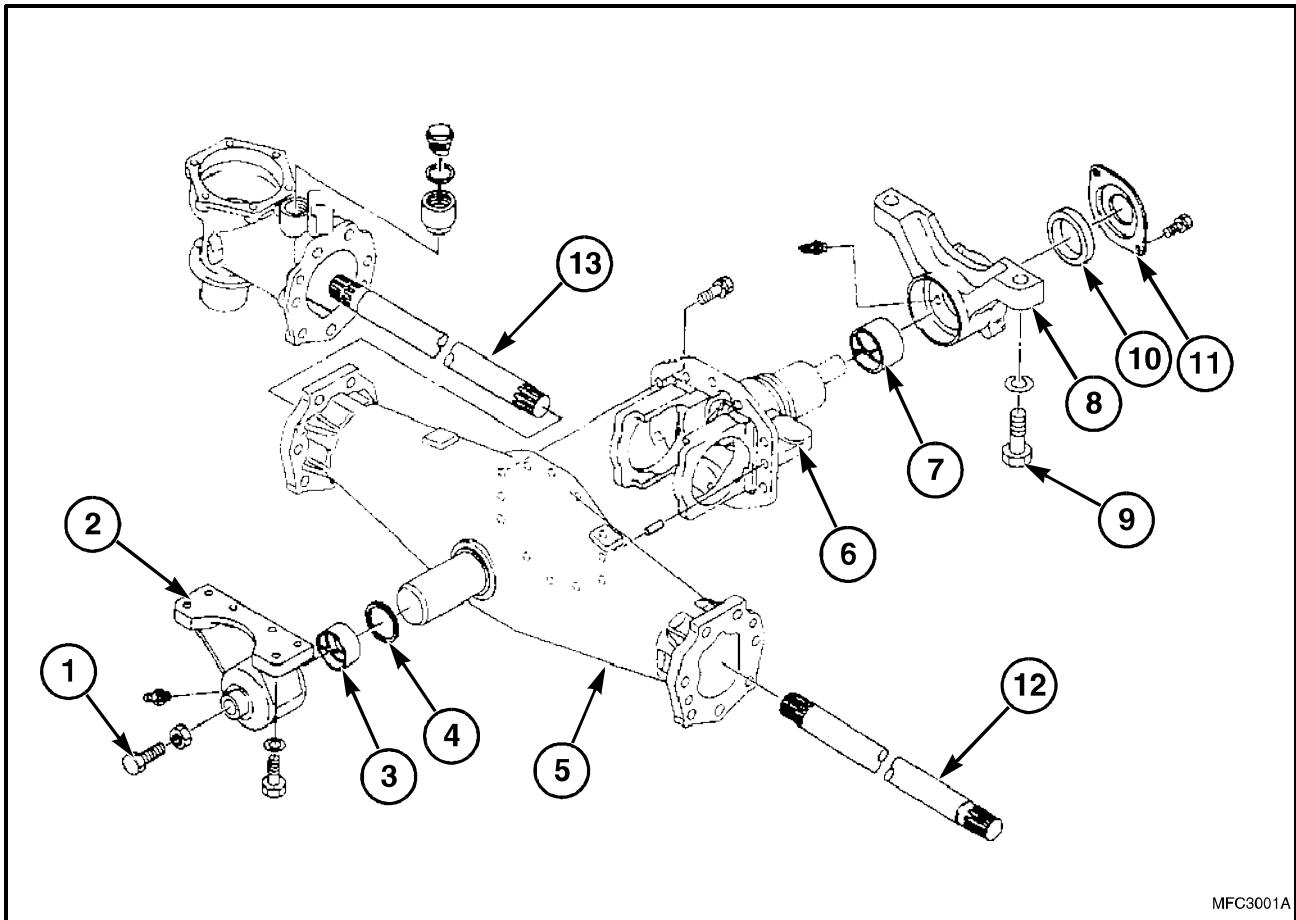


FIG. 4

FIG. 4: Front Axle Component List:

1. Adjusting Bolt
2. Pivot Support
3. Bushing (55 x 60 x 50)
4. Oil Seal
5. Axle Housing
6. Bevel Gear Case Carrier
7. Bushing (65 x 70 x 44)
8. Rear Pivot Support
9. Bolt
10. Oil Seal
11. Cover
12. Axle, left-hand
13. Axle, right-hand

FRONT AXLE

Inspection

FIG. 5: Bevel Gear Housing Shaft Diameter

Measure diameter at a bushing contact point with a micrometer or vernier calipers. Standard value is 65 mm (2.559 in). If measured value is less than usable limit 64.9 mm (2.555 in), replace housing.



FIG. 5

FIG. 6: Bevel Case Bushing Bore

Measure bore diameter of bushing for pivot support with a cylinder gauge or vernier calipers. Standard value is 65.1 mm (2.567 in). If measured value exceeds usable limit 65.2 mm (2.562 in), replace bushing.



FIG. 6

FIG. 7: Front Axle Shaft Diameter

Measure diameter at a bushing contact point with a micrometer or vernier caliper. Standard value is 55 mm (2.165 in). If measured value is less than usable limit 54.9 mm (2.161 in), replace center section.



FIG. 7

FIG. 8: Front Axle Bushing Bore Diameter.

Measure bore diameter of bushing pivot support. Standard value is 55.1 mm (2.169 in). If measured value exceeds usable limit 55.2 mm (2.173 in), replace bushing.

Worn or damaged oil seals, O-rings, and bearings should be replaced.

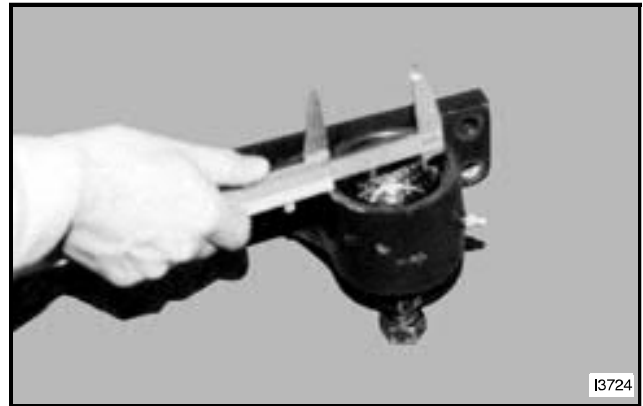
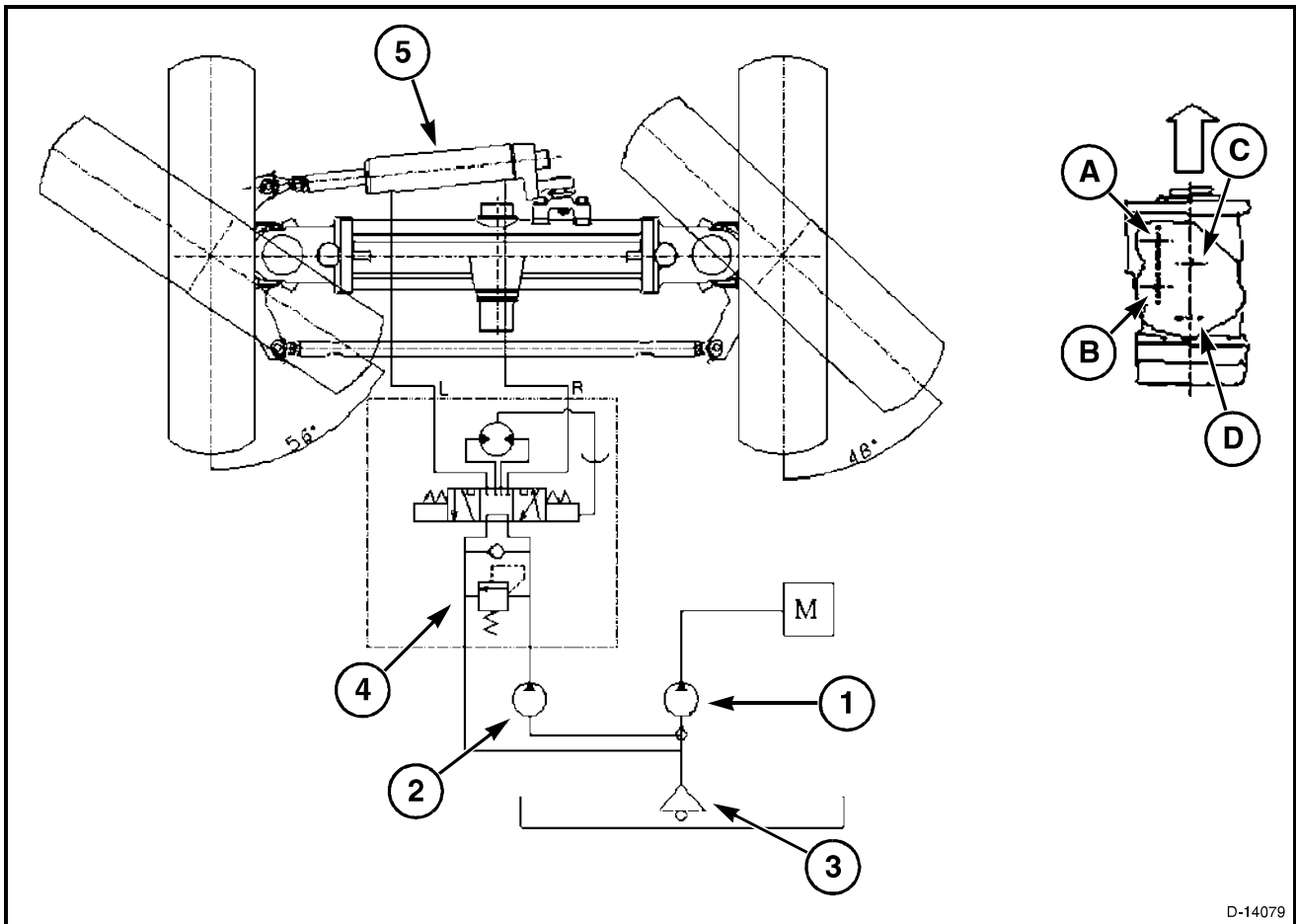


FIG. 8

FRONT AXLE



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FIG. 9

FIG. 9: Construction

- (1) Main Pump
- (2) Sub Pump
- (3) Tank
- (4) Relief Pressure 6.9 MPa (1000 psi)
- (5) Cylinder
- (A) Out
- (B) In
- (C) Left
- (D) Right
- (E) To Steering Wheel

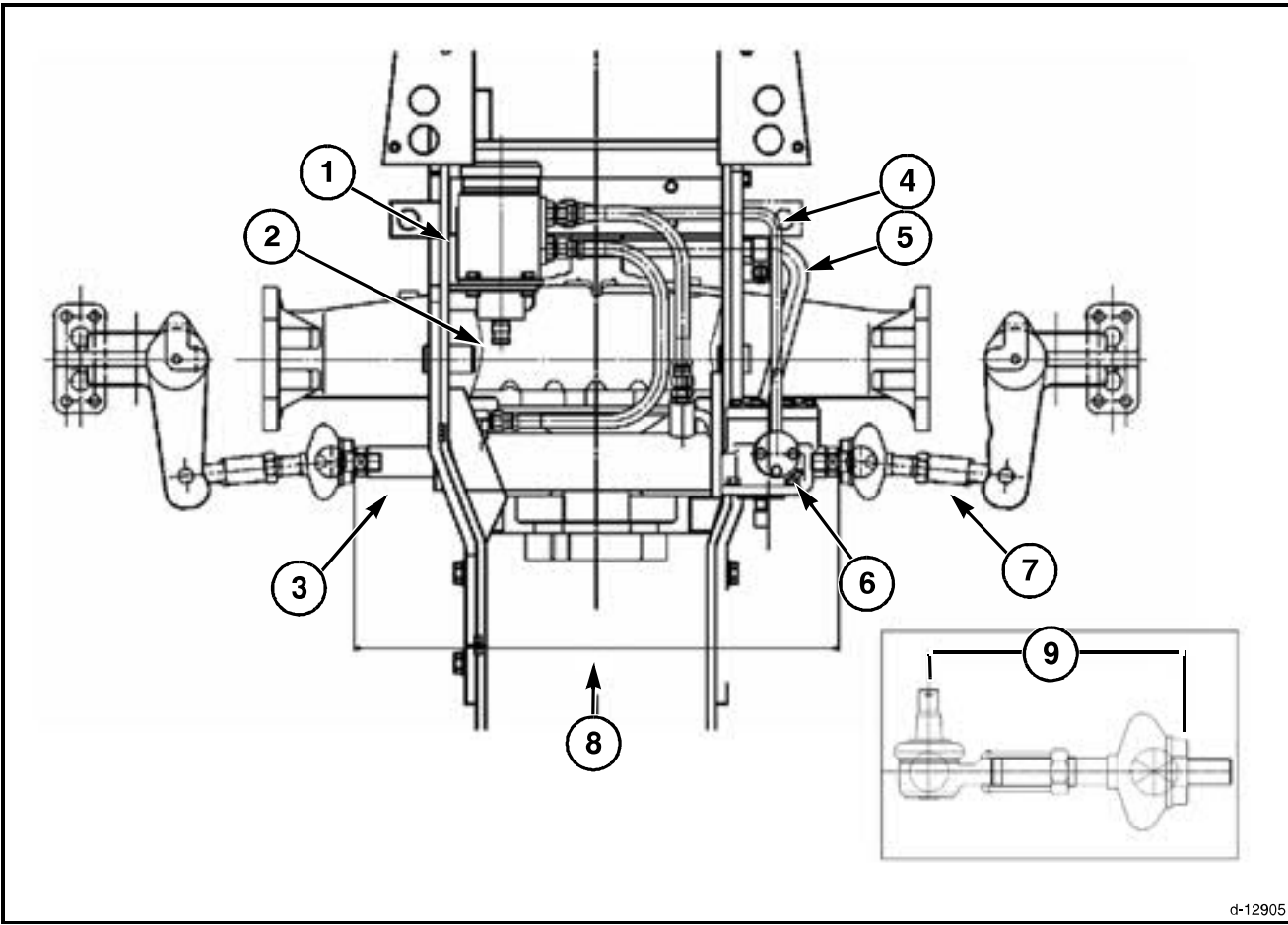


FIG. 10

FIG. 10: Hydraulic Steering Circuit

- (1) Steering Controller
- (2) To the Steering Wheel
- (3) Steering Cylinder
- (4) Delivery Pipe
- (5) Suction Pipe
- (6) Pump
- (7) Tie Rod
- (8) Adjust to 606 mm (23.9 in)
- (9) Adjust to 202 mm (8.0 in)

FRONT AXLE

Assembly

FIGS. 11–12: Coat oil seal, bushing contact surfaces, bore surfaces, and O-rings with grease before assembly.

Install axle with pivot brackets. Use loctite on pivot bracket hardware (1) and (3).

Lower tractor and remove the supports.

Install bushing with seam turned upward.

Do NOT use excessive force while installing bushing.

When fore-and-aft play of front axle exceeds usable limit of 1 mm (.04 in), correct play by tightening adjustment bolt (2). Proper end play is 0 to 0.2 mm (0 to .008 in)

NOTE: After correcting pivot support and end play, tighten the lock nut of adjusting bolt to a torque of 117-136 Nm (87 - 101 lbf ft).

The reassembled front axle must rock smoothly while pivoting.

Install tie-rods and adjust toe-in.

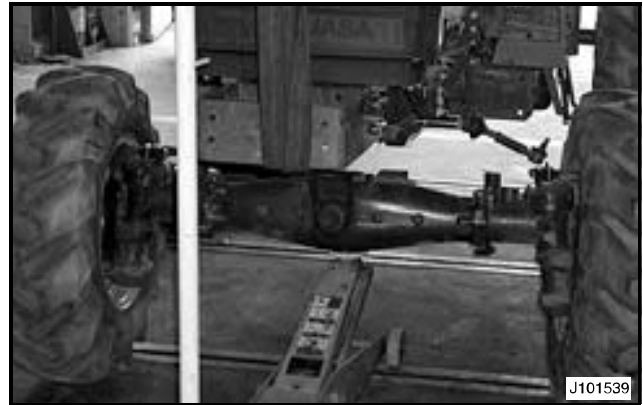


FIG. 11

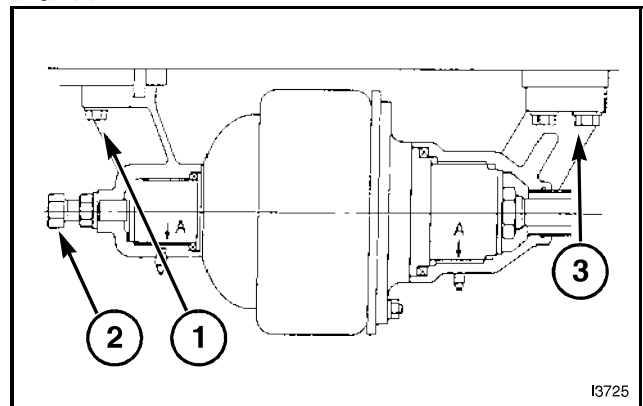
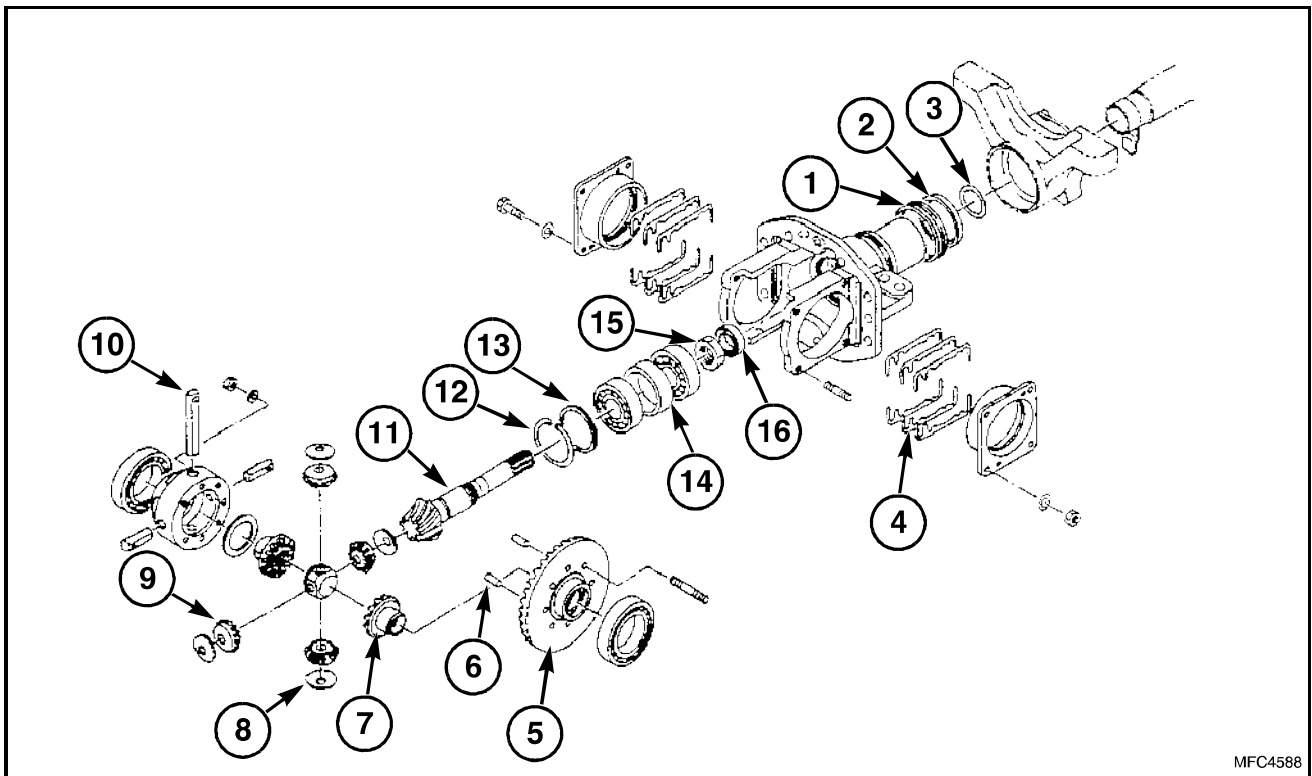


FIG. 12

FRONT DIFFERENTIAL



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FIG. 13

FIG. 13: Front Differential

- (1) X seal
- (2) Thrust collar
- (3) O-ring
- (4) Shim
- (5) Ring gear
- (6) Pin
- (7) Side gear
- (8) Thrust washer
- (9) Differential pinion
- (10) Differential pinion shaft
- (11) Pinion shaft and gear
- (12) Snap ring
- (13) Collar
- (14) Collar
- (15) Nut
- (16) Seal

FRONT AXLE

Removal and Installation Pinion Carrier Assembly

Disassembly

FIG. 14: Remove front axle.

Remove both wheels.

Remove drain plug from each final drive housing and drain oil.

Remove both outer final drive assemblies from front axle.

NOTE: Shape of front axle does not allow oil to completely drain out of differential area. Use a drain pan to catch remaining oil when differential is removed.

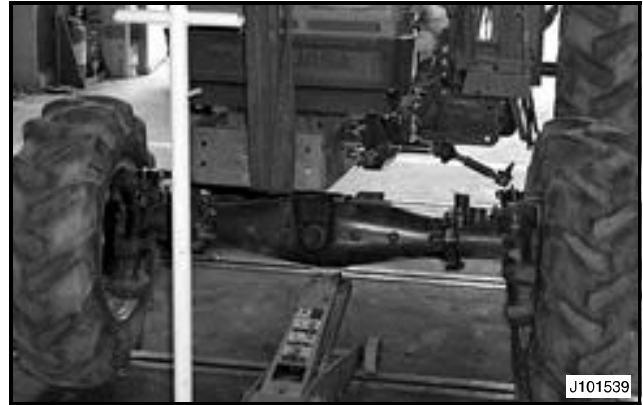


FIG. 14

FIG. 15: Remove right and left front axle shafts. Remove nuts holding differential housing and remove differential assembly.

NOTE: Adhesive used between axle and differential housing forms a tight seal. It will be necessary to use a dull chisel against raised area of differential housing to drive sections apart.

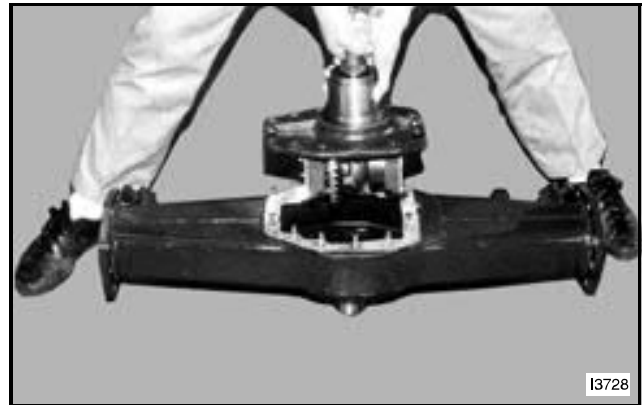


FIG. 15

FIG. 16: Remove bolts from both differential carriers (RH & LH) and push the carriers out with push bolts (1).

NOTE: The number of shims installed and shim thickness should be noted for reassembly.

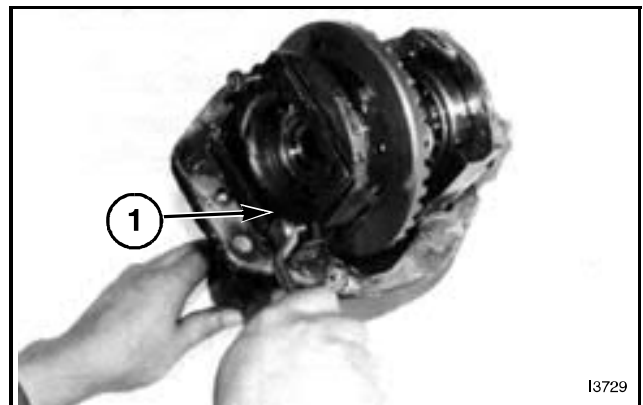


FIG. 16

Overhaul

FIG. 17: End play of bevel pinion should be checked before disassembly. End play should be 0.008 mm (.0003 in)

If end play exceeds specified value, correct it by shimming, when reassembling.

Available shims:

Shim A 0.2 mm (.008 in)

Shim B 0.1 mm (.004 in)

Remove snap ring.

Remove pinion and bearings as an assembly.



FIG. 17

Inspection

FIG. 18: Inspect pinion teeth for wear or damage.

Inspect bearings for wear or roughness.

Replace parts if necessary.

NOTE: Ring gear and pinion gear must be replaced in a matched set.

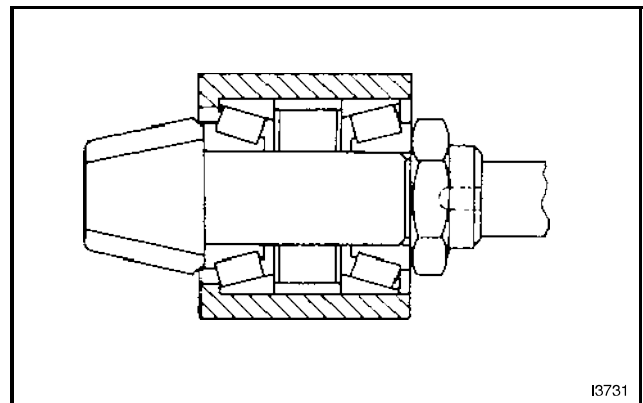


FIG. 18

Assembly

Adjust bearing preload with nut on rear end of pinion shaft.

Specified starting torque is 0.5 to 0.7 Nm (4.3 to 6 lbf in).

Specified end play 0 to 0.2 mm (0 to .008 in).

FIG. 19: Install bearing cone (1) on pinion shaft. Make sure bearing cone is seated at pinion.

Install cups (2) and spacer (3).

Install cone (4).

Install nut (5) and tighten until all endplay is removed between bearing cups (2) and cones (1) and (4).

Cups (2) and spacers (3) should still roll easily on cones (1) and (4).

Install assembly in housing.

Install spacer (6) and snap ring (7).

Measure endplay between snap ring (7) and spacer (6).

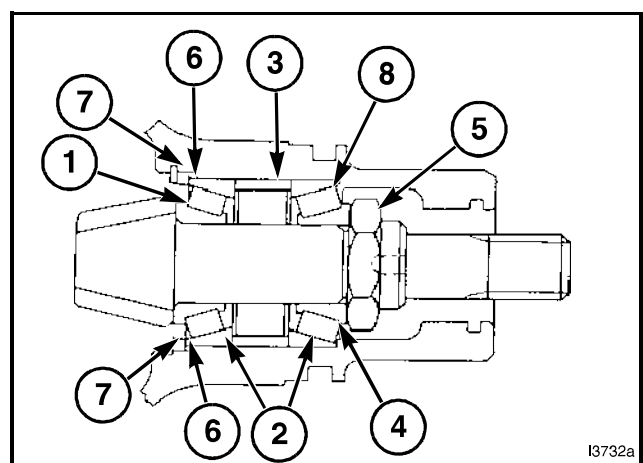


FIG. 19

FRONT AXLE

FIG. 20: Check starting torque as shown with front seal removed. It should be 0.6 to 0.7 Nm (5 to 6 lbf in). If starting torque is not correct it will be necessary to remove snap ring and pinion and readjust nut until correct starting torque is obtained.

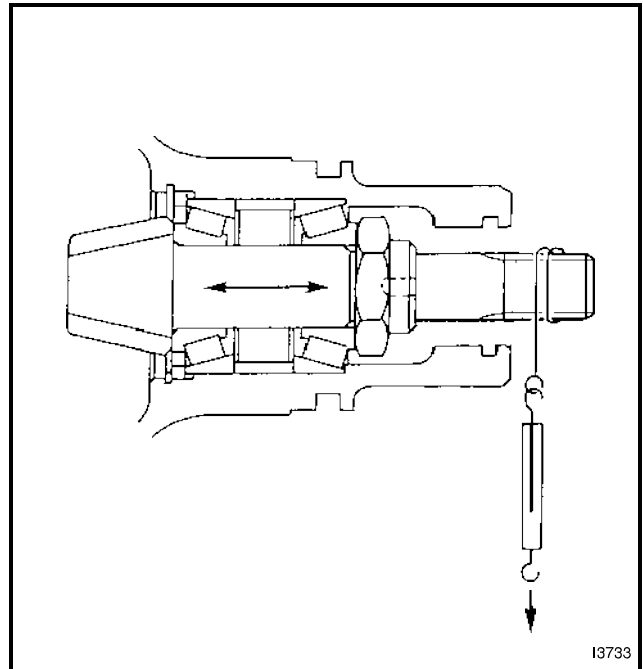


FIG. 20

FIGS. 21–22: When correct starting torque is obtained, remove pinion assembly and stake nut (1).

NOTE: Do not stake nut near threads on shaft. Reinstall pinion, spacer, and snap ring. Make sure end play is within limits.

Lubricate lip on seal (2) and install up to surface (3).

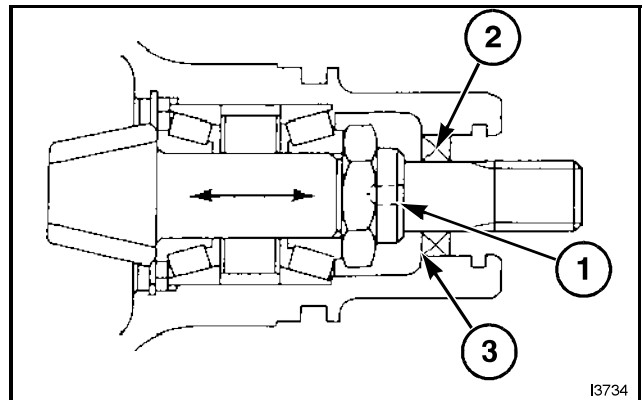


FIG. 21

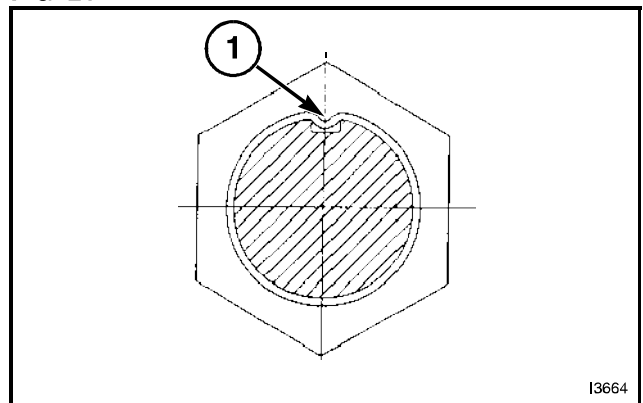


FIG. 22

Differential Gears

Disassembly

FIG. 23: Remove bolts (2).

Push carriers (5) out of the ring gear.

Remove bolts (3) holding ring gear, and remove ring gear.

Remove pins (4) holding differential bevel gears, and differential can be disassembled.

NOTE: Discard straight pins (4).

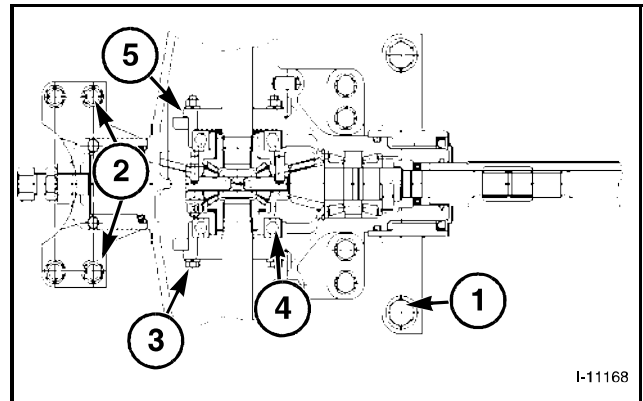


FIG. 23

Inspection

Inspect ring gear for wear or damage.

Inspect bearings for wear or roughness.

Replace parts if necessary.

NOTE: Ring gear and pinion are matched sets. If ring gear is damaged both ring gear and pinion must be replaced.

FRONT AXLE

Assembly

FIG. 24: Coat friction surfaces with grease.

Use new pins (1).

Index ring gear.

IMPORTANT: Ring gear must be indexed properly or failure of spider gears will result.

Apply Loctite to nuts (2) and torque to 29 Nm (21 lbf ft).

Apply loctite to bolts (3) and torque to 59 Nm (43 lbf ft).

Install carrier bolts.

Make certain the backlash between differential pinions and side gears is .1 to .2 mm (.004 to .008 in).

Install carrier in bevel gear case.

Replace thrust washer and/or gears as necessary.

FIG. 25: Check backlash between ring gear and pinion. Backlash should be .1 to .2 mm (.004 to .008 in). Change shim positions from one side of carrier to the other if necessary.

NOTE: After installation, make sure that there is no backlash deviation by tapping both sides of the ring gear with a copper hammer. The backlash should be checked at four different points.

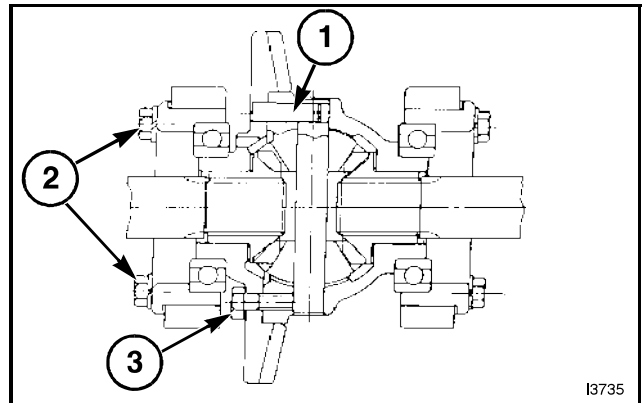
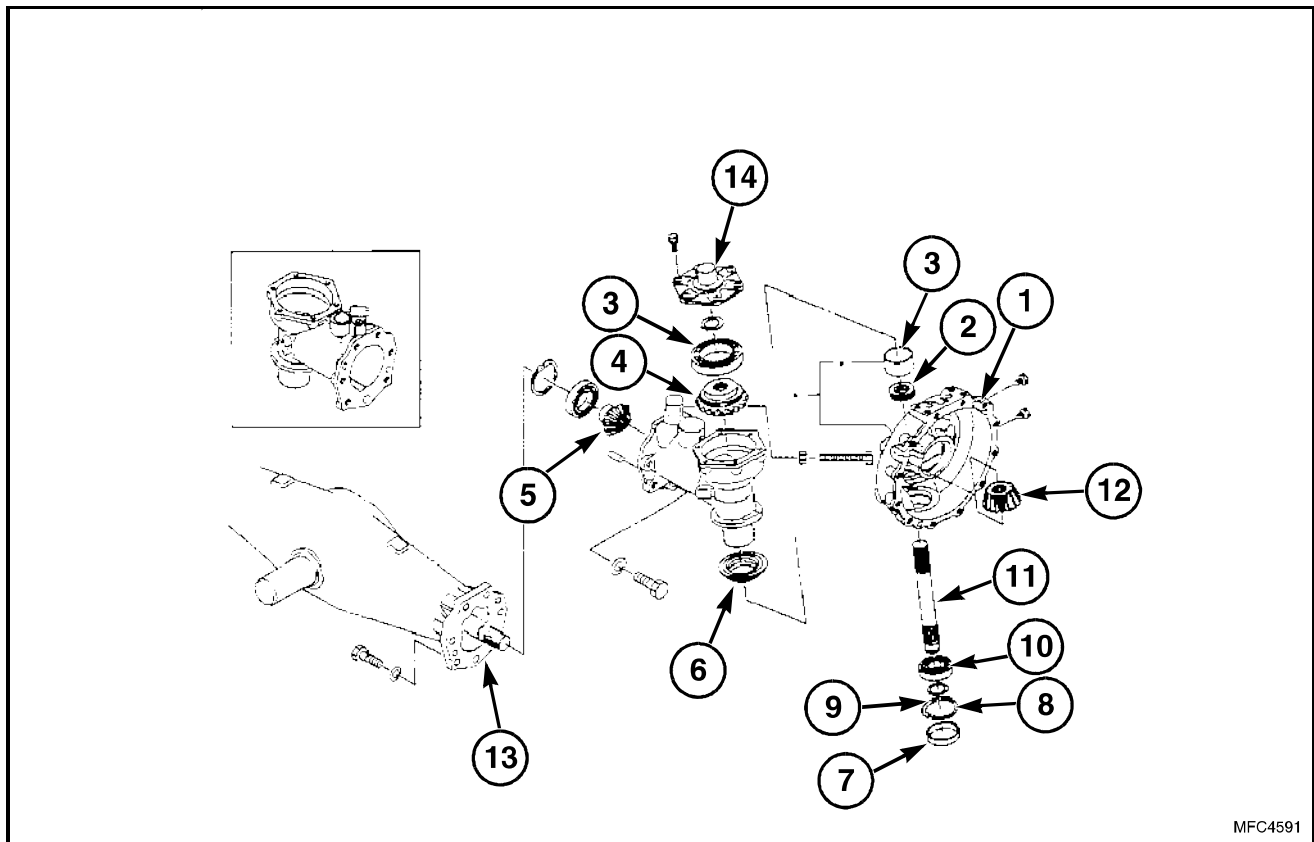


FIG. 24



FIG. 25

FINAL DRIVE - WHEEL



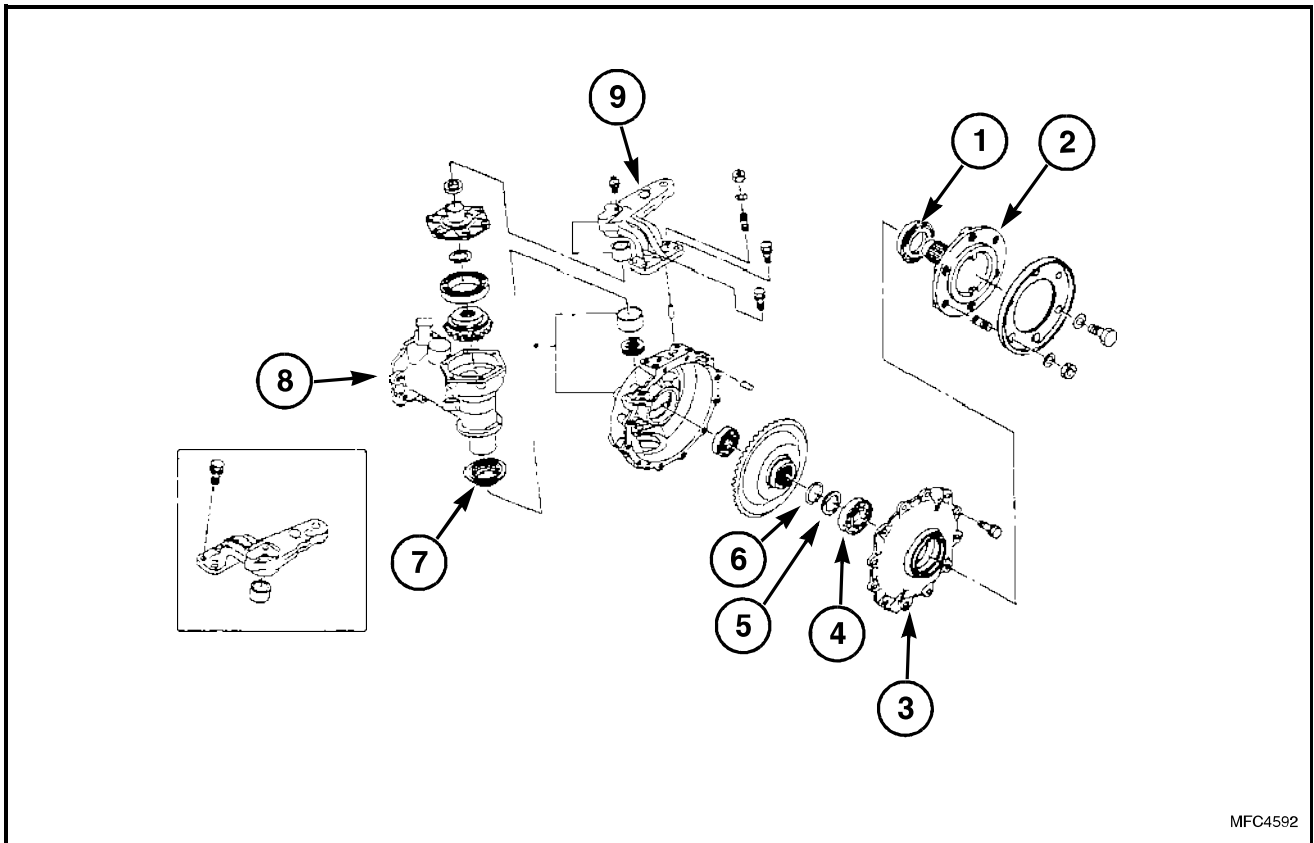
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FIG. 26

FIG. 26: Final Drive Wheel Components

- (1) Housing
- (2) Flat seat thrust bearing
- (3) Bushing
- (4) Bevel gear 17T
- (5) Bevel gear 13T
- (6) Unitized Seal
- (7) Plug
- (8) Snap ring
- (9) Snap ring
- (10) Bearing
- (11) Counter shaft
- (12) Bevel gear 16T
- (13) Axle shaft
- (14) Bearing cover

FRONT AXLE



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FIG. 27

FIG. 27: Outer Housing Components

- (1) Seal
- (2) Wheel / Axle Hub
- (3) Wheel Cover
- (4) Bearing
- (5) Washer
- (6) Split Ring
- (7) Unitized Seal
- (8) Housing
- (9) Steering Arm

WHEEL SHAFT SEAL OR COVER

Removal and Installation

FIG. 28: Block front axle up on side where cover will be removed.

Remove wheel and tire.

Position an oil pan under housing and remove drain plug to drain oil.

Remove cover bolts (1) and remove cover with axle hub (2) gear (3) and bearing (4).

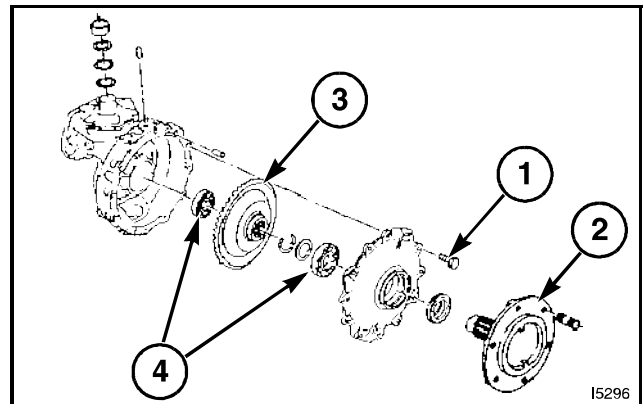


FIG. 28

FIG. 29: Use a suitable puller to remove gear (2) with bearing (1).

Remove split ring (3), washer (4), bearing (5), cover (6) and seal (7).

NOTE: Round one piece split ring is difficult to remove. Use snap ring pliers to spread it out until one end can be pried up out of groove. The ring can then be spiraled out with a pry bar.

This round one-piece split ring must be discarded and a new one installed on reassembly.

The two piece split ring will replace the round, one-piece split ring (3).

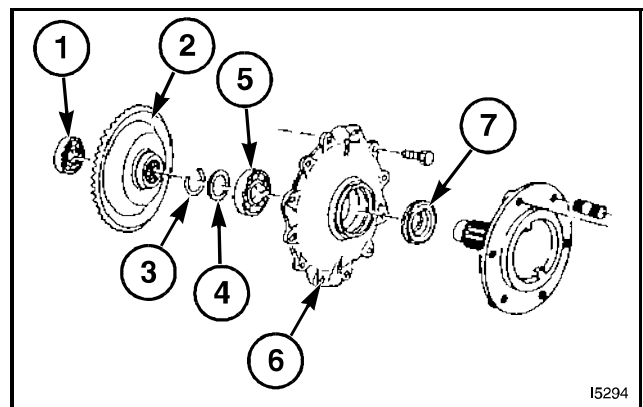


FIG. 29

FIG. 30: Check bearings and replace if they have excessive play or are rough.

Install a suitable sealant on outside of seal housing and install seal (1).

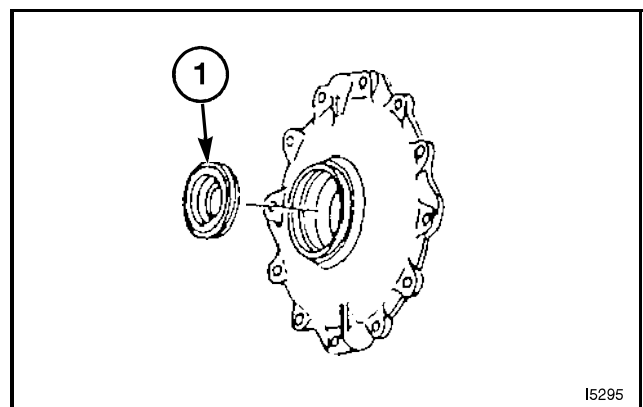


FIG. 30

FRONT AXLE

FIG. 31: Check surface where seal seats on hub (2).

Replace hub if surface is damaged.

Grease inside of seal and install cover on hub, with bearing (4) spacer (5) and snap ring (6) followed by gear (3) and second bearing (4).

Apply gasket eliminator or sealant to housing (8) and install cover carefully on dowel pins (7).

Install and torque bolts (1) to 18 to 29 Nm (14 to 22 lbf ft).

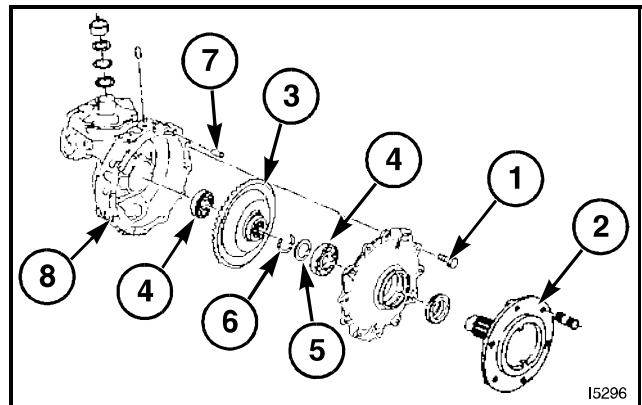


FIG. 31

FIG. 32: Install drain plug (3).

Install wheel with tire and torque wheel bolts to 88 to 108 Nm (65 to 80 lbf ft).

Lower tractor to level front axle.

Remove level plug (1) and fill plug (2).

Add oil until oil level reaches the bottom of level plug hole or until oil level is halfway up the axle shaft when viewed through the fill hole.

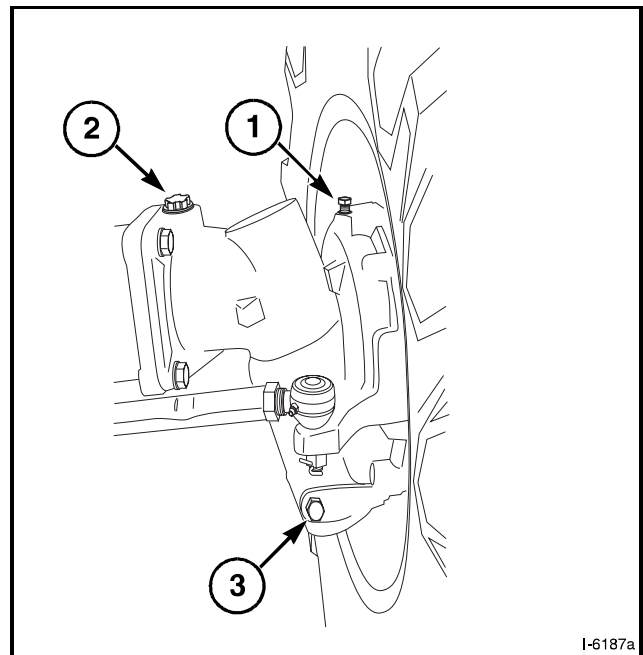


FIG. 32

FRONT AXLE CENTER SECTION

Removal and Installation

FIG. 33: Remove front axle and axle brackets from tractor.

Remove front differential and outer final drive assemblies.

Remove oil fill plug (1).

Install new center section, and install oil fill plug (1).

Reverse procedures to reassemble and install axle.

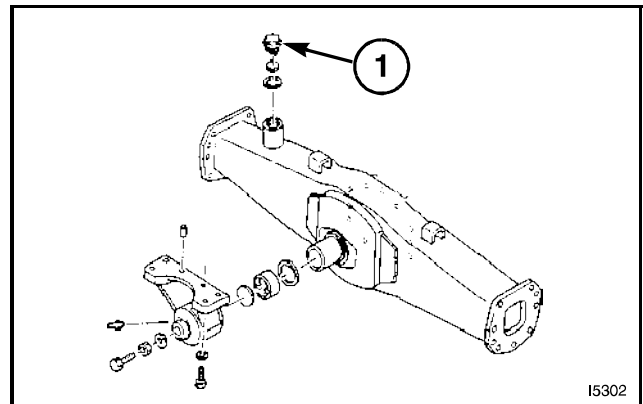


FIG. 33

OIL SEAL ON FRONT AXLE BRACKET

Removal and Installation

FIG. 34: Remove front axle and axle brackets from tractor.

Remove seal (1) from rear casting.

Measure pivot shaft and bushing diameter. Replace if necessary.

Replace seal (1) in pivot.

Grease lips on seal and reinstall axle on pivot.

Reverse procedures to install axle.

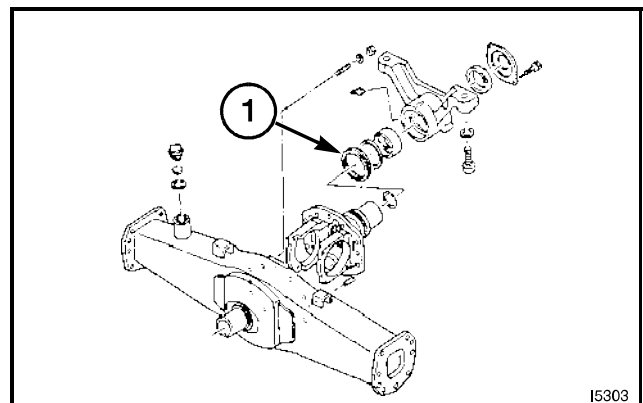


FIG. 34

FRONT AXLE

FINAL DRIVE HOUSING

Overhaul

Inspection Prior to Disassembly of Drive Housing

FIG. 35: Try to move the final drive (1) up and down to measure end play.

Standard Value as Assembled	0 to 0.02 mm (0 to 0.008 in)
Usable Limit	0.5 mm (0.020 in)

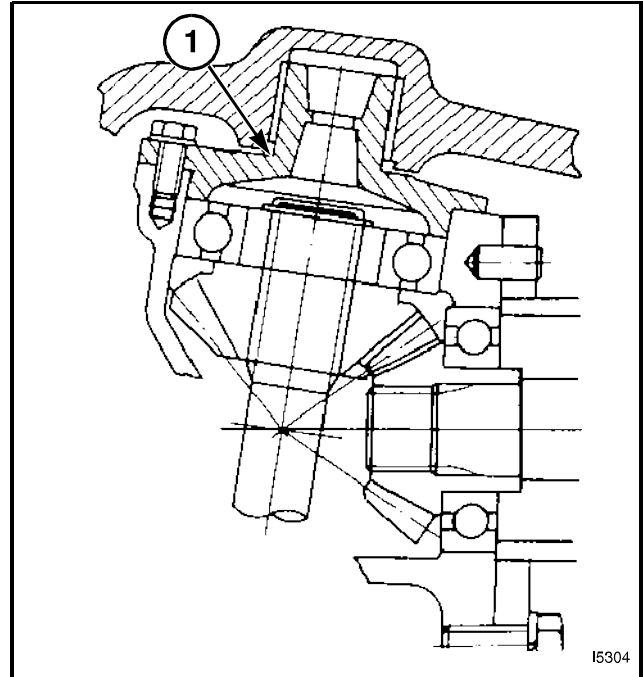


FIG. 35

Disassembly

Before disassembly, lift up front axle and remove wheel on side of final drive that is to be disassembled.

Drain oil from final drive by removing drain plug.

Remove tie-rod or tie-rod end.

FIG. 36: Remove bolts holding final drive to front axle, and remove complete final drive.

Remove bearing cover and remove snap ring, as shown.

Remove lower housing with shaft out the bottom.

Remove wheel shaft cover bolts and take out wheel shaft assembly, with cover and bevel gear.



FIG. 36

FIG. 37: Remove wheel shaft bearing with bevel gear using a puller.

Remove stop ring and remove wheel shaft.

Remove countershaft.



FIG. 37

FIG. 38: Remove expansion plug from bottom of final housing and remove snap ring. Then remove bearing.

Discard expansion plug, and install a new one on reassembly.



FIG. 38

Inspection

Bearing Cover Shaft

FIG. 39: Measure diameter of hub which contacts bushing in drag arm. The standard value is 35 mm (1.378 in). If measured value is less than the usable limit 34 mm (1.338 in), replace bearing cover.

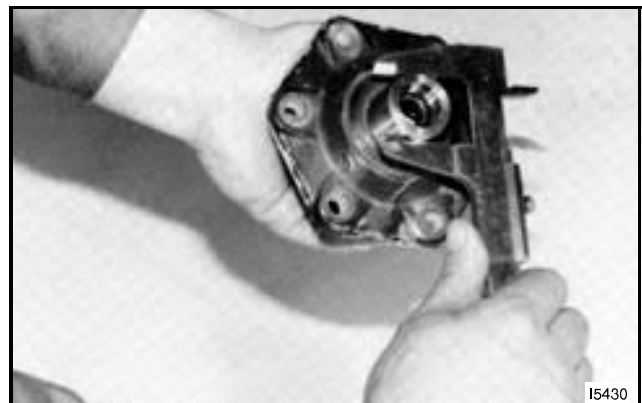


FIG. 39

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