

Document Title: Description	Function Group: 600	Information Type: Service Information	Date: 2015/9/28
Profile: GRD, G740B [GB]			

Description

Overview – G710B to G746B

The front axle of a motor grader performs several functions: steering, axle pivot, and wheel lean. It must also be capable of carrying heavy front mounted attachments.

Tandem drive and AWD (All Wheel Drive) grader front axles share a group of common parts. What differentiates the two axles is the “wheel group” that attaches to the knuckle. A tandem drive grader uses a spindle to mount a wheel hub. An AWD grader uses a cradle to mount a hydraulic motor.

Steering

Two hydraulic cylinders pivot the spindles or cradles on king pins in the knuckle. Bushings support the king pins in the knuckle frame. The drag link makes both sides turn together. On tandem drive graders, the king pins are retained by square head setscrews. On AWD graders, however, socket head setscrews are used to provide clearance for hoses. Thrust loads are transmitted between the knuckle and spindle or cradle by a special thrust washer.

Pivoting axle

The pivot of the front axle allows the front wheels to travel over uneven ground with minimal main frame movement. The axle frame mounts onto a pivot pin welded to the main frame. Angular contact bushings, which are pre-loaded and shim adjustable, support the axle frame on the pivot pin. With the front axle raised off the ground, a person weighing 68 – 82 kg (150 – 180 lb) should be able to move the axle on the pivot pin. Stop blocks restrict axle pivot to 16° on each side of the grader's center line.

Wheel lean

Leaning the wheels reduces the turning radius, braces against moldboard imposed side loads, and gives better stability while grading on slopes. Setscrews retain the pivot pins in the knuckles. The pivot pins are supported in the axle frame by spherical bushings. End float is 0,000 – 0,102 mm (0.000 – 0.004 in.) and is shim adjustable. One or two hydraulic cylinders pivot the knuckles and pins to a maximum of 18° each side of center. A lock valve prevents cylinder drift under load. The tie bar keeps both wheels parallel so that they lean together. The pivot block, like a universal joint, allows movement in two directions during wheel lean and steering. Slightly pre-loaded bushings and thrust washers are used in the pivot block.

Wheel hub – Tandem drive wheel group

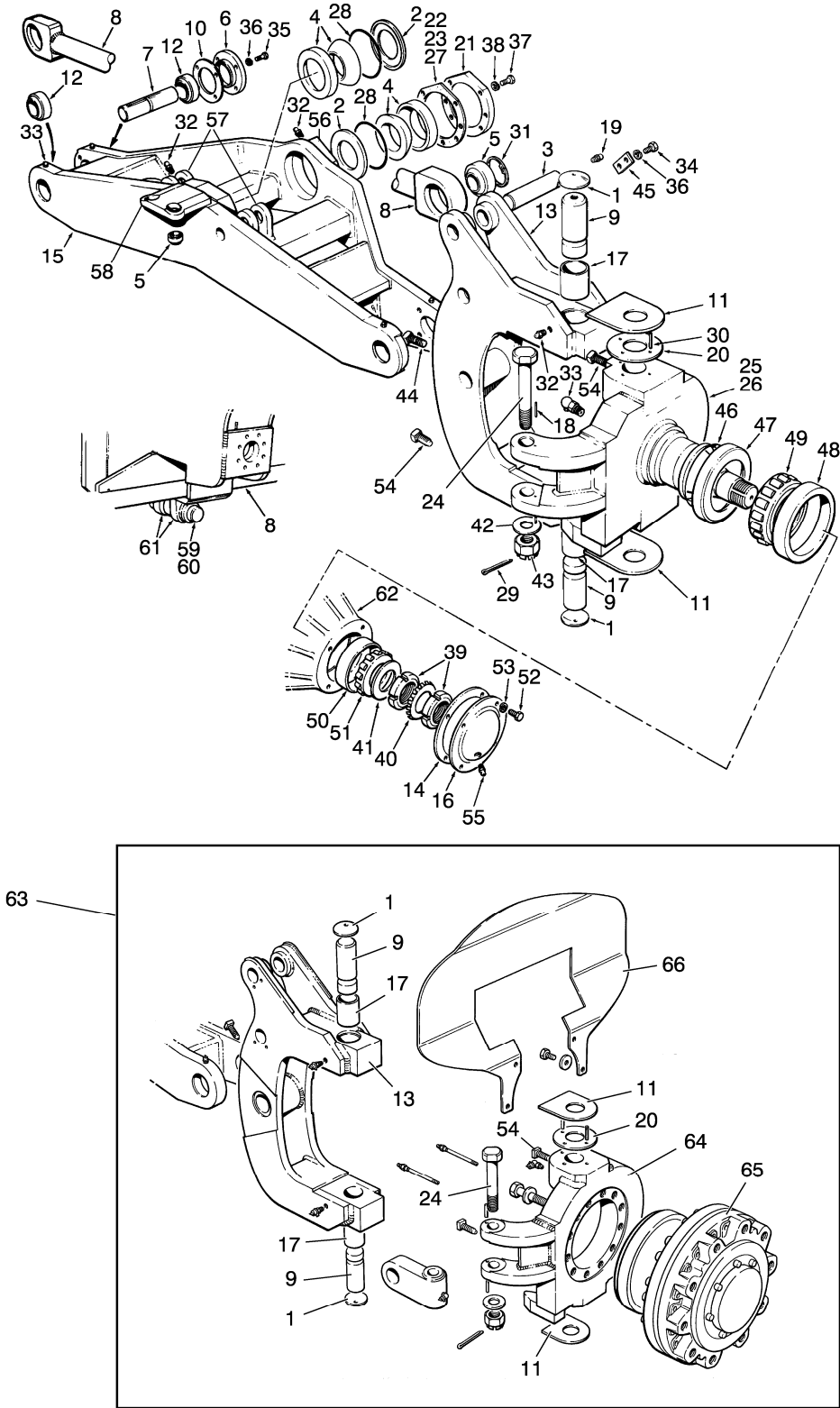
Two tapered roller bearings support the wheel hub. The spindle locknut tightness determines preload. A V-ring seal prevents bearing cavity pressurization and dirt ingress.

Wheel hub – AWD Wheel group

A hydraulic motor is mounted directly onto the AWD hub. The hub mounts into the knuckle the same as the tandem drive axle. A hose guard is mounted to the back of the hub to protect the hydraulic hoses.

Toe-in

The term “toe-in” means that the distance between the front (toe) of the tires is less than the distance between the rear of the tires. On tandem drive models, toe-in is 3 – 6,5 mm (1/8 – 1/4 in.). On AWD models there is no toe-in as front wheels are also driving wheels. Toe-in is altered by adjusting the drag link length.



G0007566

Figure 1
Front axle – G710B to G746B

1. Expansion ring
2. Back-up washer
3. Bearing pin
4. Bearing
5. Bearing
6. Bearing cap

7. Pivot pin
8. Tie bar
9. King pin
10. Shim
11. Spacer
12. Bearing
13. Knuckle - R.H and L.H.
14. Gasket - hub cap
15. Front axle
16. Hub cap
17. Bushing
18. Roll pin
19. Grease fitting
20. Thrust washer
21. Cap
22. Shim - 0.010 in.
23. Shim - 0.005 in.
24. Pin
25. Hub and spindle - L.H.
26. Hub and spindle - R.H.
27. Shim - 0.007 in.
28. O-ring
29. Cotter pin
30. Roll pin
31. Snap ring - internal
32. Grease fitting
33. Grease fitting
34. Bolt
35. Bolt
36. Lock washer
37. Bolt
38. Lock washer
39. Locknut
40. Tabwasher
41. Washer - wheel bearing
42. Flat washer
43. Slotted nut
44. Setscrew
45. Lock plate
46. V-ring seal
47. Back-up ring
48. Cup - inner bearing
49. Cone - inner bearing
50. Cup - outer bearing
51. Cone - outer bearing
52. Bolt
53. Lock washer
54. Setscrew
55. Grease fitting
56. Front bearing mount
57. Lug - wheel lean cylinder
58. Anchor lug - steering cylinder
59. Pin and lug assembly
60. Pin
61. Lug
62. Hub - wheel
63. AWD models
64. AWD hub - RH and LH
65. AWD wheel motor
66. Hose guard

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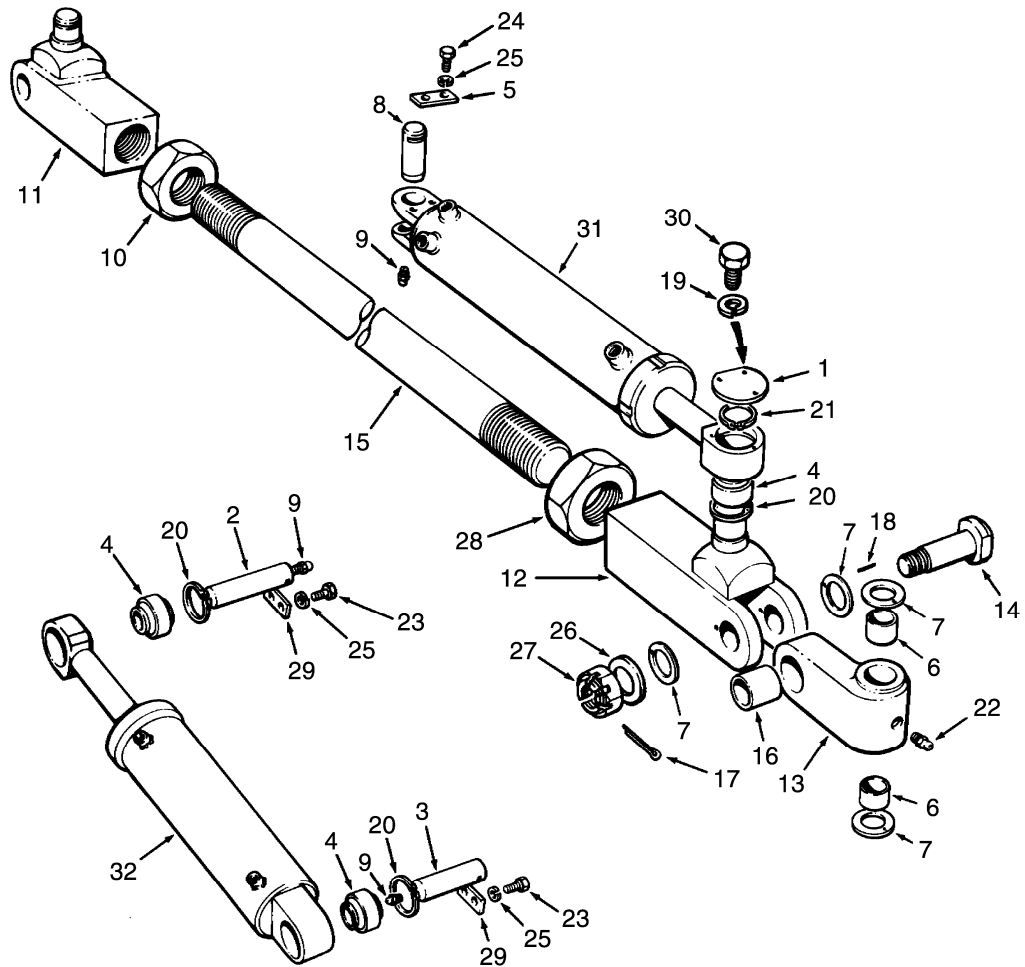
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G0007567

Figure 2
Drag link – G710B to G746B

- 1. Cap
- 2. Bearing pin
- 3. Bearing pin
- 4. Bearing
- 5. Lock plate
- 6. Bushing
- 7. Thrust washer
- 8. Anchor pin
- 9. Grease fitting
- 10. Jam nut - L.H.
- 11. Yoke - L.H.
- 12. Yoke - R.H.
- 13. Pivot block
- 14. Pivot pin
- 15. Drag link
- 16. Bushing
- 17. Cotter pin
- 18. Roll pin
- 19. Lock washer
- 20. Snap ring - internal
- 21. Snap ring - external
- 22. Grease fitting
- 23. Bolt

24. Bolt
25. Lock washer
26. Flat washer
27. Slotted nut
28. Jam nut
29. Lock plate
30. Bolt

Document Title: Description	Function Group: 600	Information Type: Service Information	Date: 2015/9/28
Profile: GRD, G740B [GB]			

Description

Overview – G780B

The heavy-duty front axle performs all the functions that the standard front axle does: steering, axle pivot, and wheel lean. The fundamental differences between the heavy-duty axle and the standard axle are its size and the types of bearings used. The heavy-duty axle has a more rugged construction to withstand the stresses exerted in rigorous applications.

Steering

A king pin passes through the entire length of the spindle and is retained by a setscrew. Needle roller bearings support the king pin in the knuckle. Thrust loads are transmitted between the spindle and the knuckle by a thrust bearing.

Pivoting axle

The axle pivot pin is a separate part. It is clamped to the main frame by split mounting blocks. Needle roller bearings support the axle frame on the pivot pin. The axle frame end float is limited to 0,076 – 0,127 mm (0.003 – 0.005 in.) and is shim adjustable.

Thrust washers underneath the pivot pin end caps handle the thrust and torsional forces generated between the axle frame and the pivot pin. Minimal force should be required to pivot the front axle when the axle is raised off the ground. Stop blocks restrict axle pivot to 16° on each side of the grader's center line.

Wheel lean

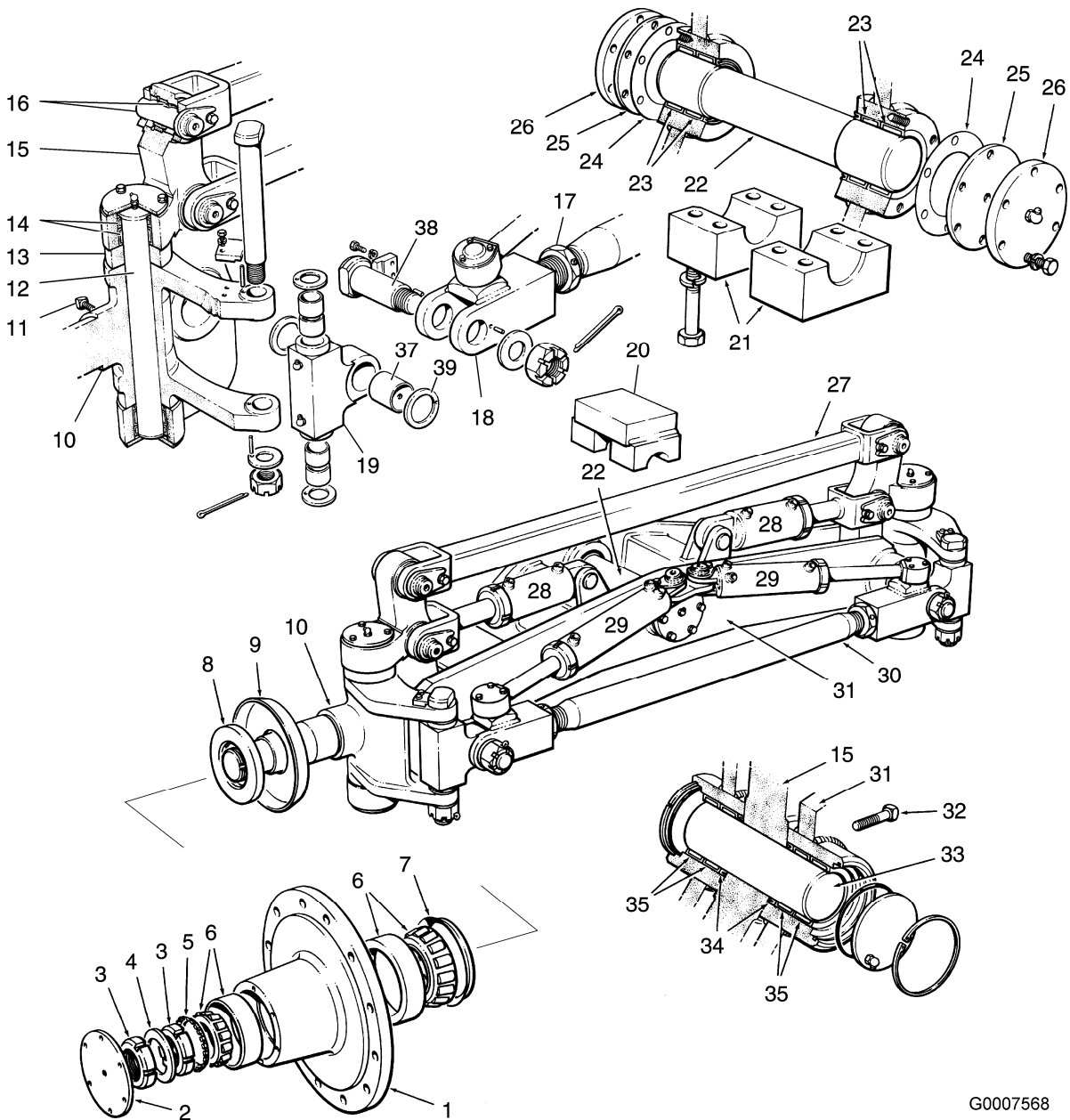
Two hydraulic cylinders pivot the knuckles on pivot pins in the axle frame to a maximum of 18° on each side. A lock valve prevents cylinder drift under load. The tie bar keeps both wheels parallel so that they lean together. Knuckle pivot pins are retained by setscrews and supported in the axle frame by needle roller bearings. End float (shim adjustable) is 0,000 - 0,102 mm (0.000 – 0.004 in.). Slightly preloaded bushings and thrust washers are used in the pivot block.

Wheel group

The heavy-duty front axle has a wider stance between the front tires than the standard front axle to allow full mobility with 20.5 x 25 tires. Two tapered roller bearings support the wheel hub. The spindle locknut tightness determines preload. With the front axle raised, the wheel can be turned with a torque force of 11 – 16 N•m (1 – 2 kgf•m)(8 – 12 lbf•ft). This is measured at one of the hub cap bolts. A V-ring seal prevents bearing cavity pressurization and dirt ingress.

Toe-in

The toe-in measurement for the heavy-duty front axle is 3 - 6,5 mm (1/8 – 1/4 in.). It is the same as the standard front axle. Toe-in is altered by adjusting the drag link length.



G0007568

Figure 1
Front axle – G780B

1. Wheel hub
2. Hub cap
3. Spindle nuts
4. Tabwasher
5. Lock washer
6. Wheel bearings
7. V-ring seal
8. Spacer
9. Dust shield
10. Spindle
11. Lock screw
12. King pin
13. Thrust bearing
14. King pin bearing
15. L.H. knuckle
16. Pin and bearing
17. Toe-in adjustment locknut

18. L.H. steering yoke
19. Pivot block assembly
20. Mounting block - frame
21. Mounting block - matched halves
22. Pivot pin
23. Pivot needle bearings
24. Shims
25. Thrust washer
26. Thrust cap
27. Leaning wheel tie bar
28. Leaning wheel cylinders
29. Steering cylinders
30. Drag link
31. Axle frame
32. Lock screw
33. Knuckle pivot pin
34. Dust seals
35. Knuckle pivot bearings
36. Pivot block pin
37. Bushing
38. Radius arm pin
39. Thrust washer

Document Title: Steering axle – Disassembly	Function Group: 622	Information Type: Service Information	Date: 2015/9/28
Profile: GRD, G740B [GB]			

Steering axle – Disassembly

The following pages describe how to overhaul the front axle for Models G710B to G746B. Overhaul instructions for the heavy-duty front axle (installed on the Model G780B) are described later in this section. Before starting the overhaul procedure, make sure work area is clean and safe. Make sure proper tools, including a safe lifting device, are available and in good working order. Read all warnings and act accordingly.

NOTE!

Place the grader in the Service Position before starting this overhaul procedure. Refer to [191 Service positions](#).

Document Title: Preparation and Wheel Removal	Function Group: 622	Information Type: Service Information	Date: 2015/9/28
Profile: GRD, G740B [GB]			

Preparation and Wheel Removal

Op nbr 622-051

1. Start the engine when it is safe to do so. Position the moldboard centrally on the circle and 90° to the frame. Lower the moldboard onto wooden blocks. Shut down the engine.



Never work under/on machines without using recommended support equipment.

2. Loosen the wheel rim bolts with the tires on the ground. Start the engine and operate the blade lift cylinders to raise the front end of the grader. Place a safe stand under the nose of the grader. Operate the blade lift cylinders and lower the front end of the grader onto the stand. Shut down the engine. Remove and retain the ignition key.
3. Remove the wheel rim bolts and lock washers and roll the rims and tires away from the front axle.

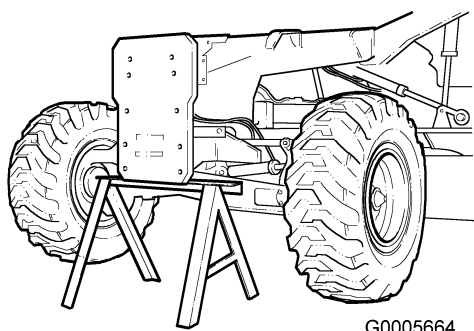


Figure 1

Document Title: Wheel Hub - Removal	Function Group: 622	Information Type: Service Information	Date: 2015/9/28
Profile: GRD, G740B [GB]			

Wheel Hub - Removal

Op nbr 622-052

18516 Socket wrench

1. Attach a safe lifting device to the wheel hub. Remove the hub cap. Remove and discard the hub cap gasket.
2. Bend back the tabs of the tabwasher. Using the special tool P/N 18516, remove the outer locknut, tabwasher and inner locknut. Discard the tabwasher. Remove the wheel bearing washer.
3. Pull the wheel hub out slightly on the spindle and remove the outer bearing cone. Remove the wheel hub from the spindle.

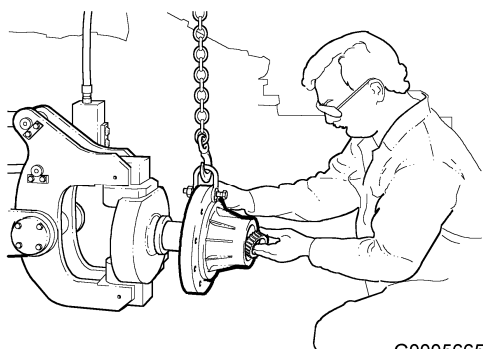


Figure 1

4. Remove the inner bearing cone. Remove and discard the back-up ring and V-ring seal.
5. Inspect the bearing cups for signs of damage or wear. If necessary, use a hammer and soft metal drift to remove them. If replacing the bearing cups, place them in a freezer to shrink them for easier installation.

Document Title: Steering Cylinder Removal	Function Group: - 622	Information Type: Service Information	Date: 2015/9/28
Profile: GRD, G740B [GB]			

Steering Cylinder - Removal

Op nbr 622-053



Compressed air. Never direct to bare skin. Use protective equipment.

NOTE!

Residual pressure may remain in hydraulic circuits containing lock valves.

1. Identify the hydraulic hoses to prevent confusion during assembly. Disconnect the steering cylinder hoses. Plug the open ports and fittings to prevent contamination.
2. Remove the bolts and lock washers retaining the piston rod end cap. Remove the end cap. Remove and discard the external snap ring.
3. Use a suitable puller to remove the piston rod end from the yoke pivot stud.

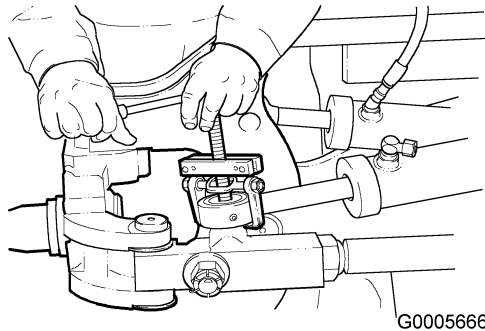


Figure 1

4. Remove the bolts, lock washers and lock plate from the cylinder barrel end.
5. Use a bottle jack under the cylinder barrel anchor pin and remove the pin. Remove the steering cylinder from the front axle. Remove the bearing from the anchor lug.

NOTE!

The bearing can only be removed in one direction.



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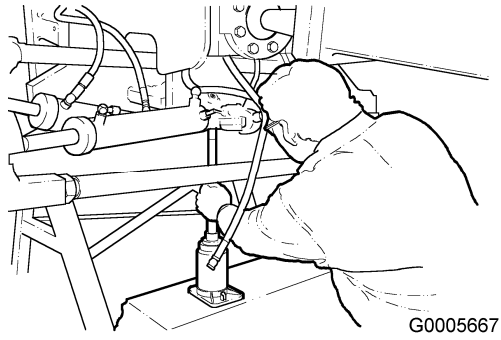


Figure 2

6. Place the steering cylinder on a clean workbench. Remove and discard the internal snap ring. Use a hammer and appropriate drift to remove the bearing.
7. Examine the bearings for signs of damage or wear and replace if necessary.
8. Repeat the removal procedure for the other steering cylinder.

Document Title: Drag link, removing	Function Group: 622	Information Type: Service Information	Date: 2015/9/28
Profile: GRD, G740B [GB]			

Drag link, removing

Op nbr 622-054

1. Use a safe lifting device to support the drag link. Remove and discard the cotter pin securing the slotted nut that retains the pivot pin. Remove the slotted nut, flat washer and pivot pin.

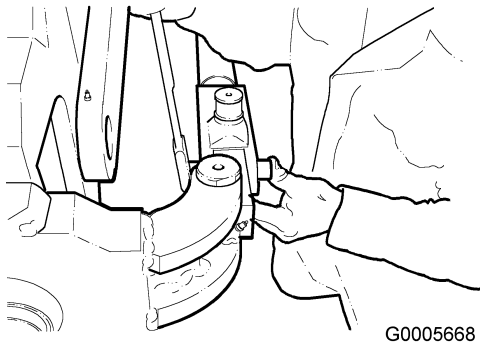


Figure 1

2. Repeat the disassembly procedure for the other pivot pin. Remove the drag link from the front axle. Remove the thrust washers.

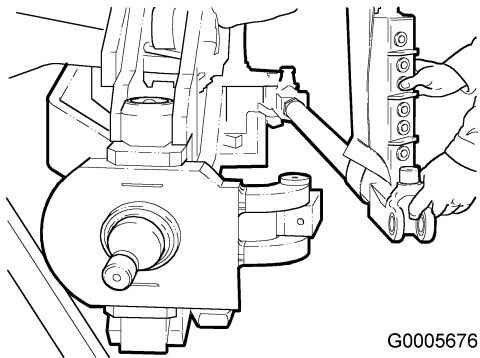


Figure 2

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