

GLP/GDP60VX, GLP/GDP70VX (E878) SERVICE MANUAL CONTENTS

SECTION	PART NUMBER	YRM NUMBER	REV DATE
OPERATOR'S CAB.....	524306203	0100 YRM 1290	04/14
FRAME.....	550055278	0100 YRM 1581	08/13
GM 4.3L V-6 ENGINES.....	524265337	0600 YRM 1251	05/14
KUBOTA DIESEL 3.6L ENGINE.....	550055279	0600 YRM 1579	01/14
KUBOTA ENGINE REPAIR 3.8L DIESEL W/DPF.....	550059479	0600 YRM 1590	09/13
COOLING SYSTEM.....	524223757	0700 YRM 1123	03/13
LPG FUEL SYSTEM GM 4.3L ENGINE WITH PSI.....	550043871	0900 YRM 1556	04/14
THREE-SPEED POWERSHIFT TRANSMISSION REPAIR.....	524288194	1300 YRM 1317	03/13
TRANSMISSION REPAIR (DANA SPICER) 2X2.....	524294873	1300 YRM 1343	03/14
DRIVE AXLE WET BRAKE (SPICER).....	524296605	1400 YRM 1344	12/13
STEERING AXLE.....	524223764	1600 YRM 1133	07/13
BRAKE SYSTEM.....	524262279	1800 YRM 1247	03/13
HYDRAULIC GEAR PUMP.....	524223766	1900 YRM 1136	04/14
HYDRAULIC CLEANLINESS PROCEDURES.....	550073240	1900 YRM 1620	12/14
MAIN CONTROL VALVE.....	524223767	2000 YRM 1137	04/14
CYLINDER REPAIR (MAST S/N A513, A514, A613, A614, B513, B514).....	524294878	2100 YRM 1328	02/14
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WIRE HARNESS REPAIR.....	524223769	2200 YRM 1128	12/14
USER INTERFACE.....	524223770	2200 YRM 1130	12/14
USER INTERFACE.....	524223771	2200 YRM 1131	12/14
ELECTRICAL SYSTEM.....	524223772	2200 YRM 1142	04/14
MAST REPAIRS (S/N A513, A514, A613, A614, A702, A703, A704, A705, A706, A707, A751, A752, B513, B514, B586, B587, B588, B589, B590, B591, B749, B750, B751, B752, B753, B754).....	524265342	4000 YRM 1250	02/14
METRIC AND INCH (SAE) FASTENERS.....	524150797	8000 YRM 0231	10/13
CALIBRATION PROCEDURES.....	524223780	8000 YRM 1134	12/14
PERIODIC MAINTENANCE.....	550055296	8000 YRM 1583	01/14
CAPACITIES AND SPECIFICATIONS.....	550055282	8000 YRM 1584	02/14
DIAGRAMS AND SCHEMATICS.....	550055283	8000 YRM 1585	04/14
DIAGRAMS AND SCHEMATICS.....	550096331	8000 YRM 1689	04/14
DIAGNOSTIC TROUBLESHOOTING MANUAL.....	524221866	9000 YRM 1112	12/14

Service information for Cummins diesel engines can be ordered through the Hyster Literature Distribution Center.
9000 YRM 1112 ON CD

PART NO. 550055273 (12/14)

SAFETY PRECAUTIONS

MAINTENANCE AND REPAIR

- The Service Manuals are updated on a regular basis, but may not reflect recent design changes to the product. Updated technical service information may be available from your local authorized Yale® dealer. Service Manuals provide general guidelines for maintenance and service and are intended for use by trained and experienced technicians. Failure to properly maintain equipment or to follow instructions contained in the Service Manual could result in damage to the products, personal injury, property damage or death.
- When lifting parts or assemblies, make sure all slings, chains, or cables are correctly fastened, and that the load being lifted is balanced. Make sure the crane, cables, and chains have the capacity to support the weight of the load.
- Do not lift heavy parts by hand, use a lifting mechanism.
- Wear safety glasses.
- DISCONNECT THE BATTERY CONNECTOR before doing any maintenance or repair on electric lift trucks. Disconnect the battery ground cable on internal combustion lift trucks.
- Always use correct blocks to prevent the unit from rolling or falling. See HOW TO PUT THE LIFT TRUCK ON BLOCKS in the **Operating Manual** or the **Periodic Maintenance** section.
- Keep the unit clean and the working area clean and orderly.
- Use the correct tools for the job.
- Keep the tools clean and in good condition.
- Always use **YALE APPROVED** parts when making repairs. Replacement parts must meet or exceed the specifications of the original equipment manufacturer.
- Make sure all nuts, bolts, snap rings, and other fastening devices are removed before using force to remove parts.
- Always fasten a DO NOT OPERATE tag to the controls of the unit when making repairs, or if the unit needs repairs.
- Be sure to follow the **WARNING** and **CAUTION** notes in the instructions.
- Gasoline, Liquid Petroleum Gas (LPG), Compressed Natural Gas (CNG), and Diesel fuel are flammable. Be sure to follow the necessary safety precautions when handling these fuels and when working on these fuel systems.
- Batteries generate flammable gas when they are being charged. Keep fire and sparks away from the area. Make sure the area is well ventilated.

NOTE: The following symbols and words indicate safety information in this manual:



WARNING

Indicates a hazardous situation which, if not avoided, could result in death or serious injury.



CAUTION

Indicates a hazardous situation which, if not avoided, could result in minor or moderate injury and property damage.

On the lift truck, the WARNING symbol and word are on orange background. The CAUTION symbol and word are on yellow background.

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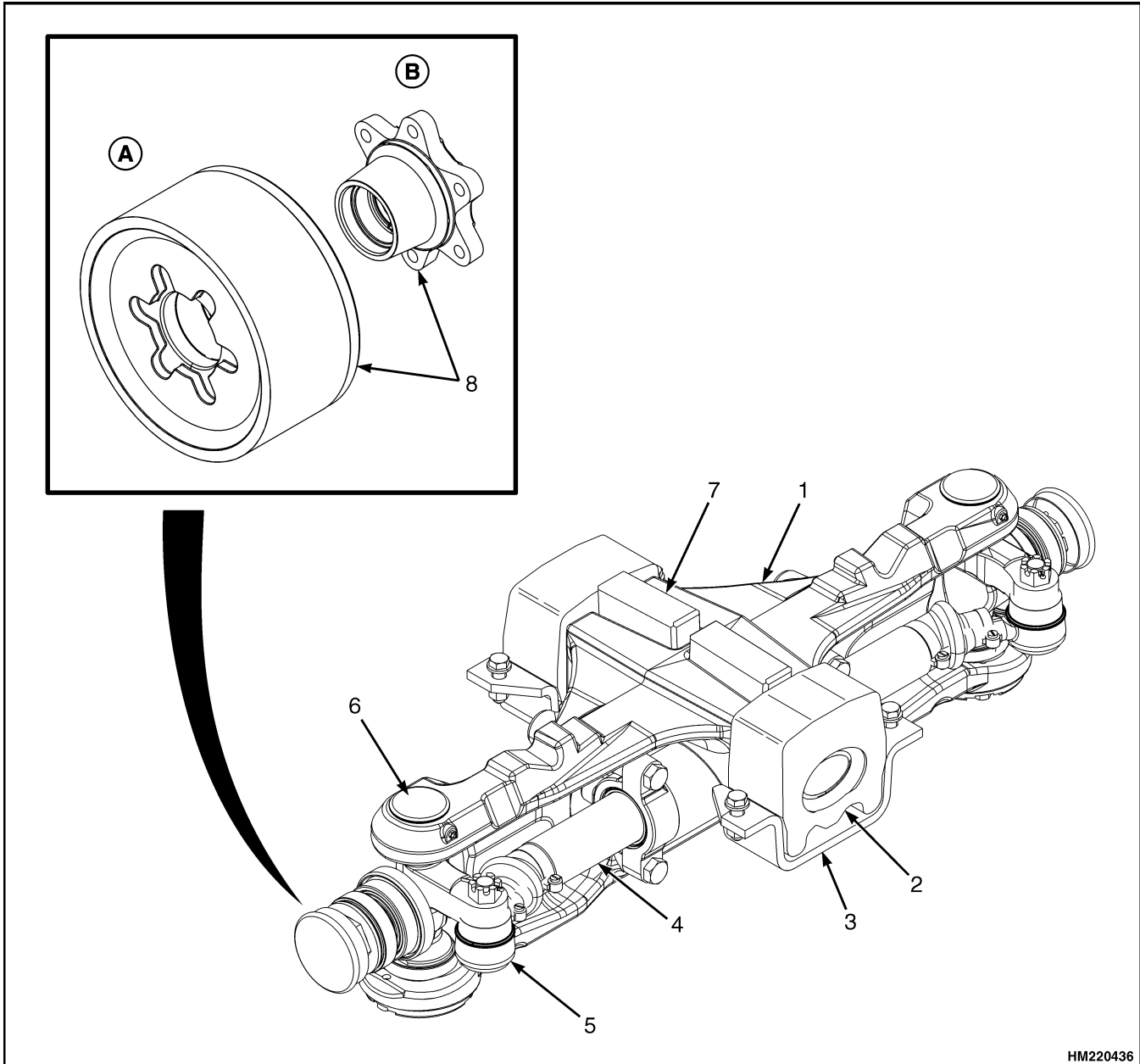
GC/GLC030VX, GC/GLC035VX, GC/GLC040SVX [C809];
 GLP/GDP16VX, GLP/GDP18VX, GLP/GDP20SVX (GP/GLP/GDP030VX,
 GP/GLP/GDP035VX, GP/GLP/GDP040SVX) [C810];
 GLC20-35VX (GC/GLC040-070VX, GC/GLC055SVX) [A910];
 GLP/GDP20-35VX (GP/GLP/GDP040-070VX) [B875];
 GLC40, 45, 55VX; GLC55SVX (GC/GLC080, 100, 120VX; GC/GLC080,
 100VXBCS; GC/GLC120SVX; GC/GLC120VXPRS) [E818, F818];
 GLP/GDP40VX5/VX6; GLP/GDP45SVX5, GLP/GDP45VX6; GLP/GDP50-55VX
 (GP/GLP/GDP080, 090, 100, 110, 120VX) [F813, G813, H813, J813];
 GLC/GDC60VX, GLC/GDC70VX (GC/GLC/GDC135VX, GC/GLC/GDC155VX)
 [C879, D879, E879, F879];
 GLP/GDP60VX, GLP/GDP70VX (GP/GLP/GDP135VX, GP/GLP/GDP155VX)
 [C878, D878, E878];
 GLP/GDP80VX, GLP/GDP80VX9, GLP/GDP90VX (GLP/GDP170VX,
 GLP/GDP175VX36, GLP/GDP190VX) [A909, B909]

General

This section has the description and repair procedures for the steering axle.

The steering axle assembly includes an axle frame, steering cylinder, and two spindle and hub assemblies. See Figure 1. The steering axle is articulated and is connected to the frame by center pivot mounts. The center pivot mounts permit the steering axle to move in the frame mount when the lift truck travels over rough surfaces.

The end caps of the steering cylinder are also the mounts for the cylinder and are held to the shell by the mount capscrews. There are O-rings, seals, and wipers in the end caps to seal the caps to the shell and rod. The ends of the piston rod extend from both ends of the cylinder. A single piston and the seal are at the center of the rod. Oil pressure on one side of the piston moves the piston in the bore. The piston pushes an equal amount of oil from the opposite side of the cylinder.



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A. CUSHION TRUCKS ONLY

- 1. AXLE FRAME
- 2. MOUNT
- 3. BRACKET
- 4. STEERING CYLINDER

B. PNEUMATIC TRUCKS ONLY

- 5. TIE ROD
- 6. SPINDLE
- 7. MOUNT
- 8. HUB ASSEMBLIES

Figure 1. Steering Axle

When the piston reaches the end of the stroke, a relief valve in the steering circuit controls the oil pressure. The tie rods that connect the spindle arms to the cylinder are not adjustable.

Each spindle turns on two tapered roller bearings in mounts in the axle frame. The preload on the bearings is controlled by shims at the lower bearing cap.

The wheels rotate on two tapered roller bearings and are held on the spindles by a castle nut. The bearing preload of the wheels is adjusted by the castle nut. The grease seals protect the bearings from dirt and water. Wear sleeves protect the hub from wear by the seals.

Steering Axle Assembly Repair

REMOVE



WARNING

PUTTING THE LIFT TRUCK ON BLOCKS

The lift truck must be put on blocks for some types of maintenance and repair. The removal of the mast, drive axle, battery, or counterweight assemblies will cause large changes in the center of gravity. When the lift truck is put on blocks, put additional blocks in the following positions:

- If the mast and drive axle are removed, put blocks under the counterweight so the lift truck cannot fall backward.
- If the counterweight is removed, put blocks under the mast so that the lift truck cannot fall forward.

Put the lift truck on blocks on a solid, even, and level surface. Verify the blocks or stands have enough capacity to hold the lift truck. Use additional blocks next to the tires as necessary to prevent movement of the lift truck. Verify the lifting devices used during repairs can lift the weight of the parts and assemblies.

See the Operating Manual or Periodic Maintenance section for your lift truck model, for the procedures to put the lift truck on blocks.

The steering axle can be removed without removing the counterweight.

1. Verify wheels are set for straight travel. Put lift truck on blocks so the steering axle will have enough clearance to be removed. The top of the axle frame must have clearance under the bottom of the frame at the rear of the lift truck.
2. Disconnect hydraulic lines at steering cylinder. Install plug fittings in cylinder and put caps on hydraulic lines. Plug fittings will prevent spindles from turning as axle is removed from under the lift truck.

NOTE: Steering Axle Assembly may be mounted to the frame with brackets or plates.

3. Slide floor jack or forks of another lift truck under steering axle. Raise lifting device until it holds the weight of the axle assembly.
 - a. To remove bracket type mounts, remove four capscrews and nuts that fasten two brackets under rubber mounts.

See Figure 2 for lift truck model

- GLC20-35VX (GC/GLC040-070VX, GC/GLC055SVX) (A910)

See Figure 3 for lift truck models

- GLP/GDP20-35VX (GP/GLP/GDP040-070VX) (B875)

See Figure 5 for lift truck model

- GLC40, 45, 55VX; GLC55SVX; (GC/GLC080, 100, 120VX; GC/GLC080, 100VXBCS; GC/GLC120SVX; GC/GLC120VXPRS) (E818, F818)

See Figure 6 for lift truck models

- GLP/GDP40VX5/VX6; GLP/GDP45SVX5, GLP/GDP45VX6; GLP/GDP50-55VX (GP/GLP/GDP080, 090, 100, 110, 120VX) (F813, G813, H813, J813)

- b. To remove plate type mounts, remove four capscrews and washers from two plates.

See Figure 4 for lift truck models

- GC/GLC030-035VX, GC/GLC040SVX (C809)
- GLP/GDP16-18VX, GLP/GDP20SVX (GP/GLP/GDP030-035VX, GP/GLP/GDP040SVX) (C810)

See Figure 7 for lift truck models

- GLC/GDC60VX, GLC/GDC70VX, (GC/GLC/GDC135VX, GC/GLC/GDC155VX) (C879, D879, E879, F879)

See Figure 8 for lift truck models

- GLP/GDP60VX, GLP/GDP70VX (GP/GLP/GDP135VX, GP/GLP/GDP155VX) (C878, D878, E878)
- GLP/GDP80VX, GLP/GDP80VX9, GLP/GDP90VX (GLP/GDP170VX, GLP/GDP170VX36, GLP/GDP190VX) (A909, B909)

- c. Remove plates and slowly lower steering axle assembly onto wheels. Carefully roll steering axle assembly away from lift truck.

DISASSEMBLE

1. Remove ring seal, shims, flange, stub shaft and bushing from steering axle assembly for lift truck models below.

See Figure 8 for lift truck models

- GLP/GDP60VX, GLP/GDP70VX (GP/GLP/GDP135VX, GP/GLP/GDP155VX) (C878, D878, E878)
- GLP/GDP80VX, GLP/GDP80VX9, GLP/GDP90VX (GLP/GDP170VX, GLP/GDP170VX36, GLP/GDP190VX) (A909, B909)

2. Put axle on blocks so the wheels just touch the floor. Remove hub cap. Remove cotter pin, washer, and castle nut. Remove bearing cone and discard cotter pin.

NOTE: Identify and tag the outer and inner bearing cones so they can be reassembled in their original locations.

NOTE: The wear ring may not be present on all steering axles.

3. Slide wheel from spindle. Remove inner bearing cone, wear ring, and oil seal from spindle.

See Figure 2 for lift truck model

- GLC20-35VX (GC/GLC040-070VX, GC/GLC055SVX) (A910)

See Figure 3 for lift truck model

- GLP/GDP20-35VX (GP/GLP/GDP040-070VX) (B875)

See Figure 4 for lift truck models

- GC/GLC030-035VX, GC/GLC040SVX (C809)
- GLP/GDP16-18VX, GLP/GDP20SVX (GP/GLP/GDP030-035VX, GP/GLP/GDP040SVX) (C810)

See Figure 5 for lift truck model

- GLC40, 45, 55VX; GLC55SVX; (GC/GLC080, 100, 120VX; GC/GLC080, 100VXBCS; GC/GLC120SVX; GC/GLC120VXPRS) (E818, F818)

See Figure 6 for lift truck models

- GLP/GDP40VX5/VX6; GLP/GDP45SVX5, GLP/GDP45VX6; GLP/GDP50-55VX (GP/GLP/GDP080, 090, 100, 110, 120VX) (F813, G813, H813, J813)

See Figure 7 for lift truck models

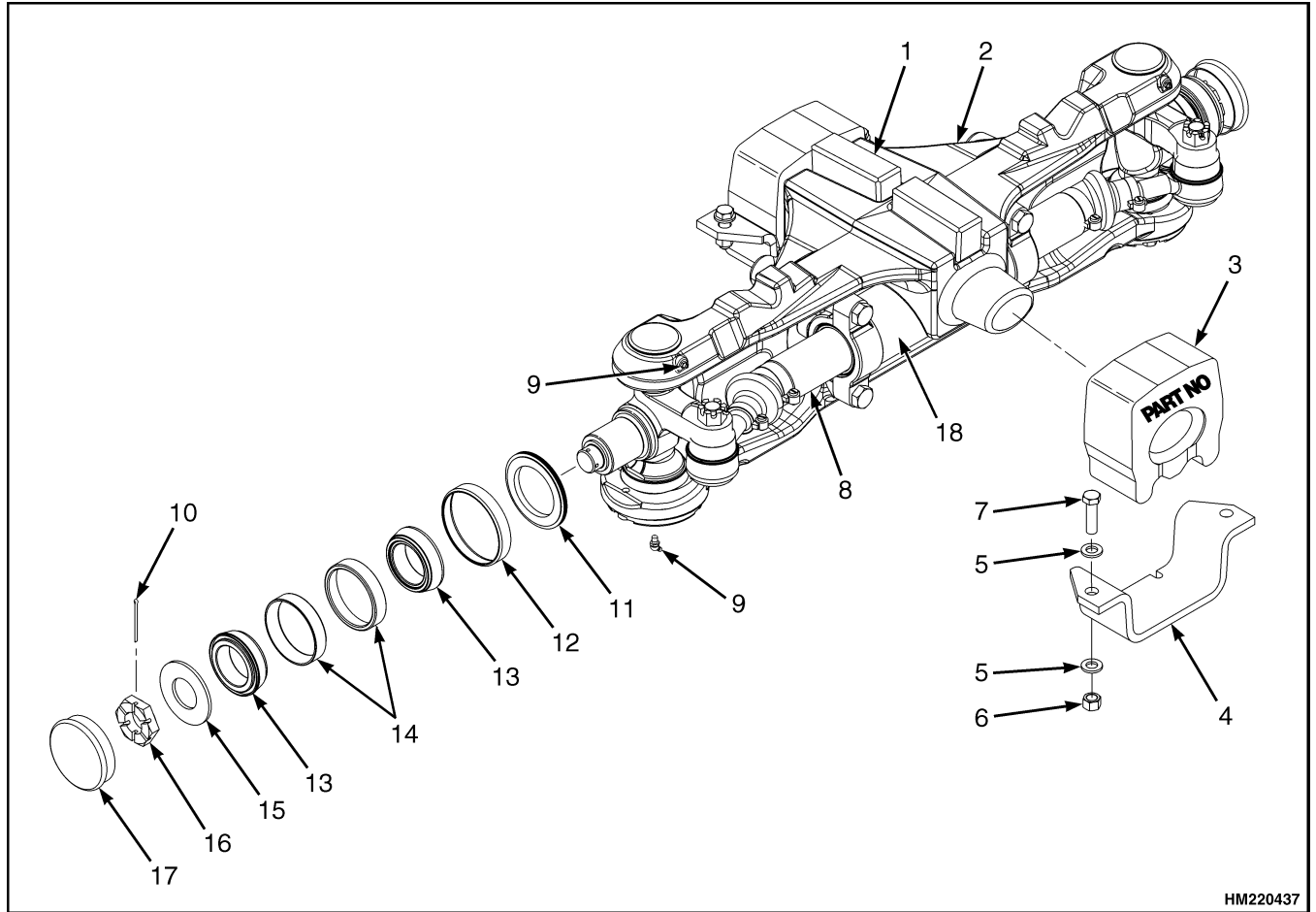
- GLC/GDC60VX, GLC/GDC70VX, (GC/GLC/GDC135VX, GC/GLC/GDC155VX) (C879, D879, E879, F879)

See Figure 8 for lift truck models

- GLP/GDP60VX, GLP/GDP70VX (GP/GLP/GDP135VX, GP/GLP/GDP155VX) (C878, D878, E878)
- GLP/GDP80VX, GLP/GDP80VX9, GLP/GDP90VX (GLP/GDP170VX, GLP/GDP170VX36, GLP/GDP190VX) (A909, B909)

NOTE: If the bearing is replaced, then the associated bearing cup must be replaced also.

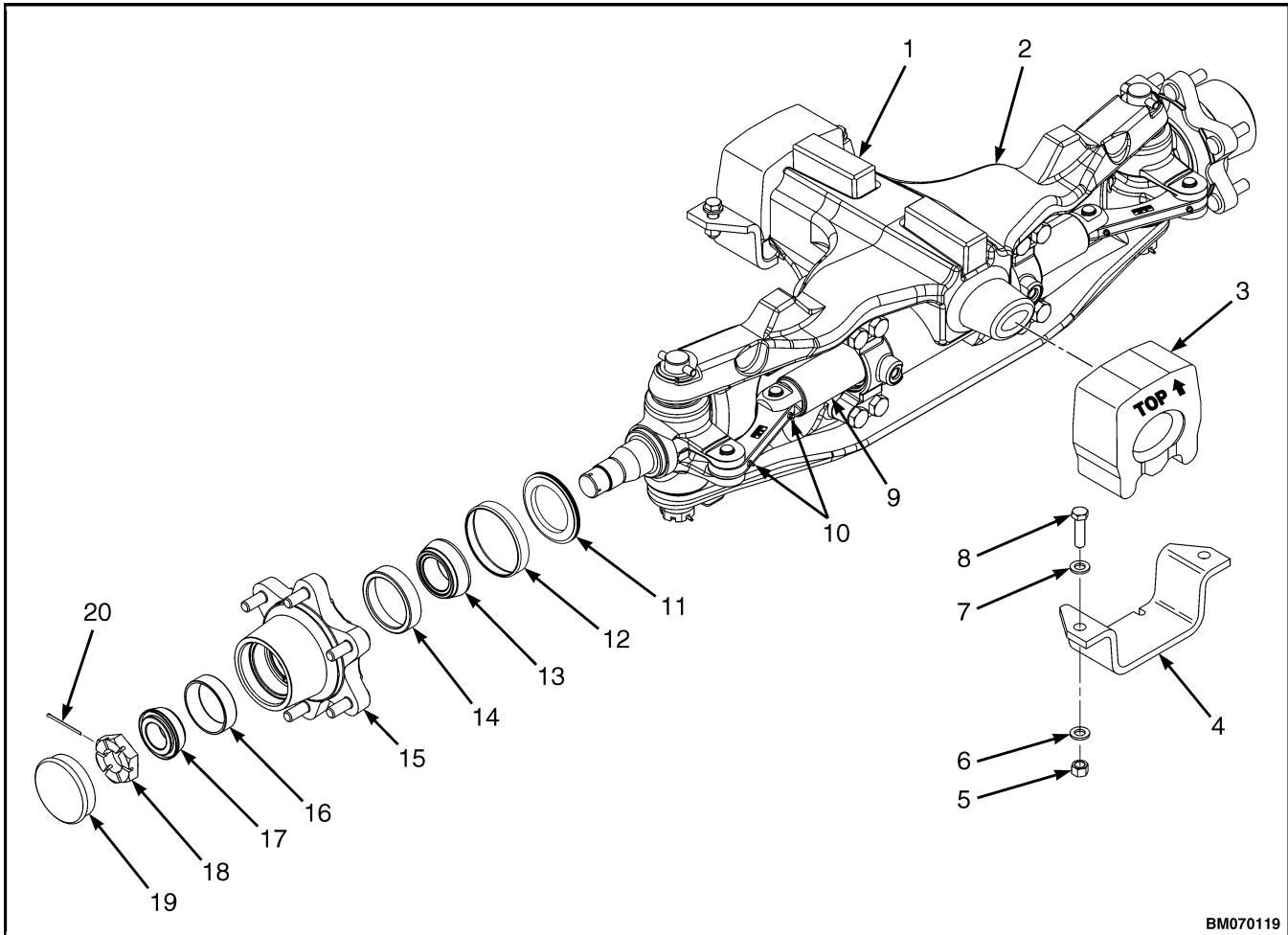
4. If the bearings must be replaced, use a brass drift pin to remove the bearing cups and wear ring.
5. Repeat Step 1 through Step 4 for the other wheel.



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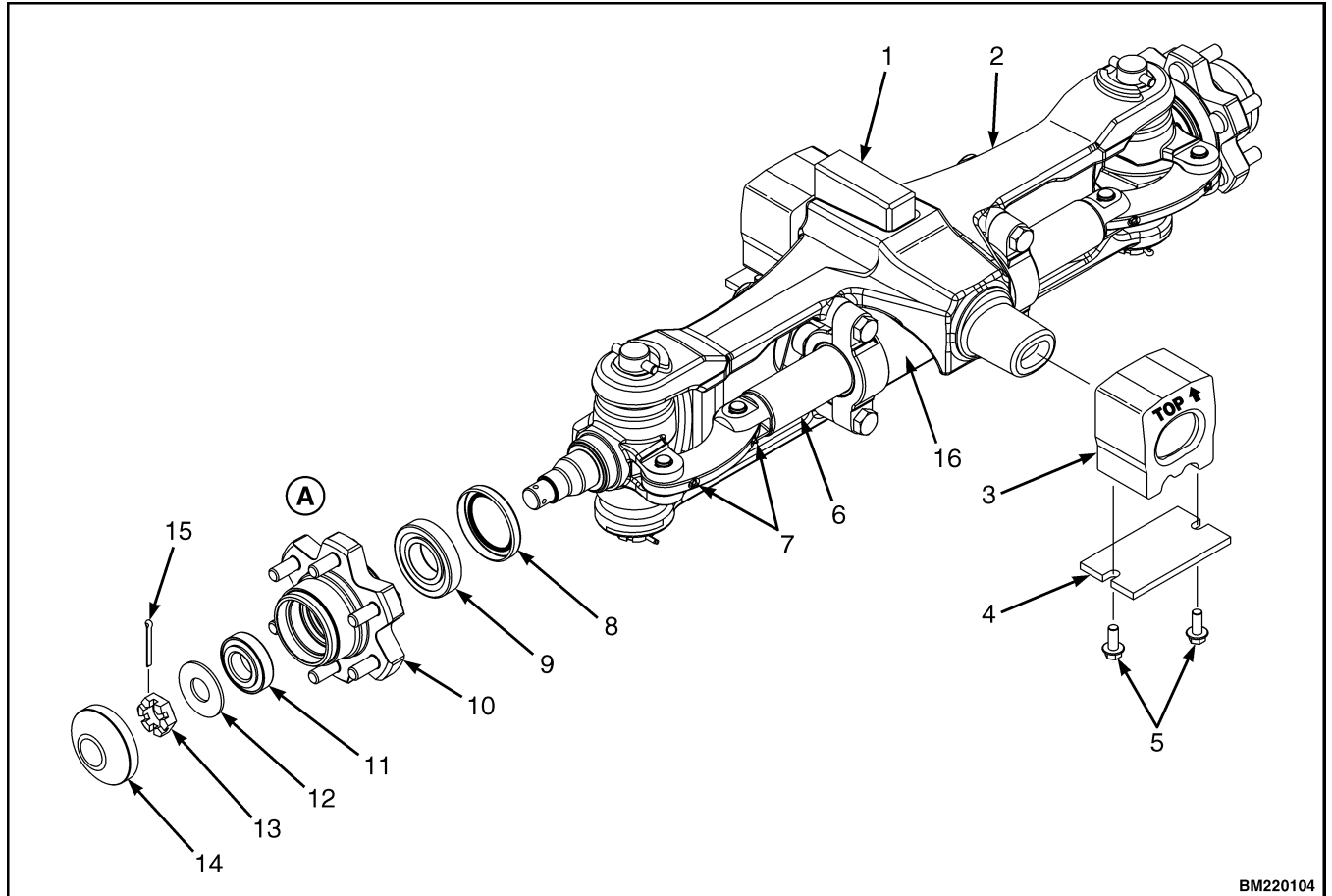
- | | |
|--------------------------|-----------------------|
| 1. MOUNT | 10. COTTER PIN |
| 2. STEER AXLE ASSEMBLY | 11. OIL SEAL |
| 3. MOUNT | 12. WEAR RING |
| 4. PLATE | 13. BEARING CONE |
| 5. WASHER | 14. BEARING CUP |
| 6. LOCK NUT | 15. WASHER |
| 7. CAPSCREW | 16. CASTLE NUT |
| 8. STEERING CYLINDER ROD | 17. HUB CAP |
| 9. LUBRICATION FITTING | 18. STEERING CYLINDER |

Figure 2. Spindle to Tie Rod Assembly for Lift Truck Models GLC20-35VX (GC/GLC040-070VX, GC/GLC055SVX) (A910)



- | | |
|---------------------------|-----------------------|
| 1. MOUNT | 12. WEAR RING |
| 2. STEERING AXLE ASSEMBLY | 13. BEARING CONE |
| 3. MOUNT | 14. BEARING CUP |
| 4. BRACKET | 15. HUB |
| 5. NUT | 16. BEARING CUP |
| 6. WASHER | 17. BEARING CONE |
| 7. WASHER | 18. CASTLE NUT |
| 8. CAPSCREW | 19. HUB CAP |
| 9. STEERING CYLINDER ROD | 20. COTTER PIN |
| 10. LUBRICATION FITTING | 21. STEERING CYLINDER |
| 11. OIL SEAL | |

Figure 3. Spindle to Tie Rod Assembly for Lift Truck Models GLP/GDP20-35VX (GP/GLP/GDP040-070VX) (B875)

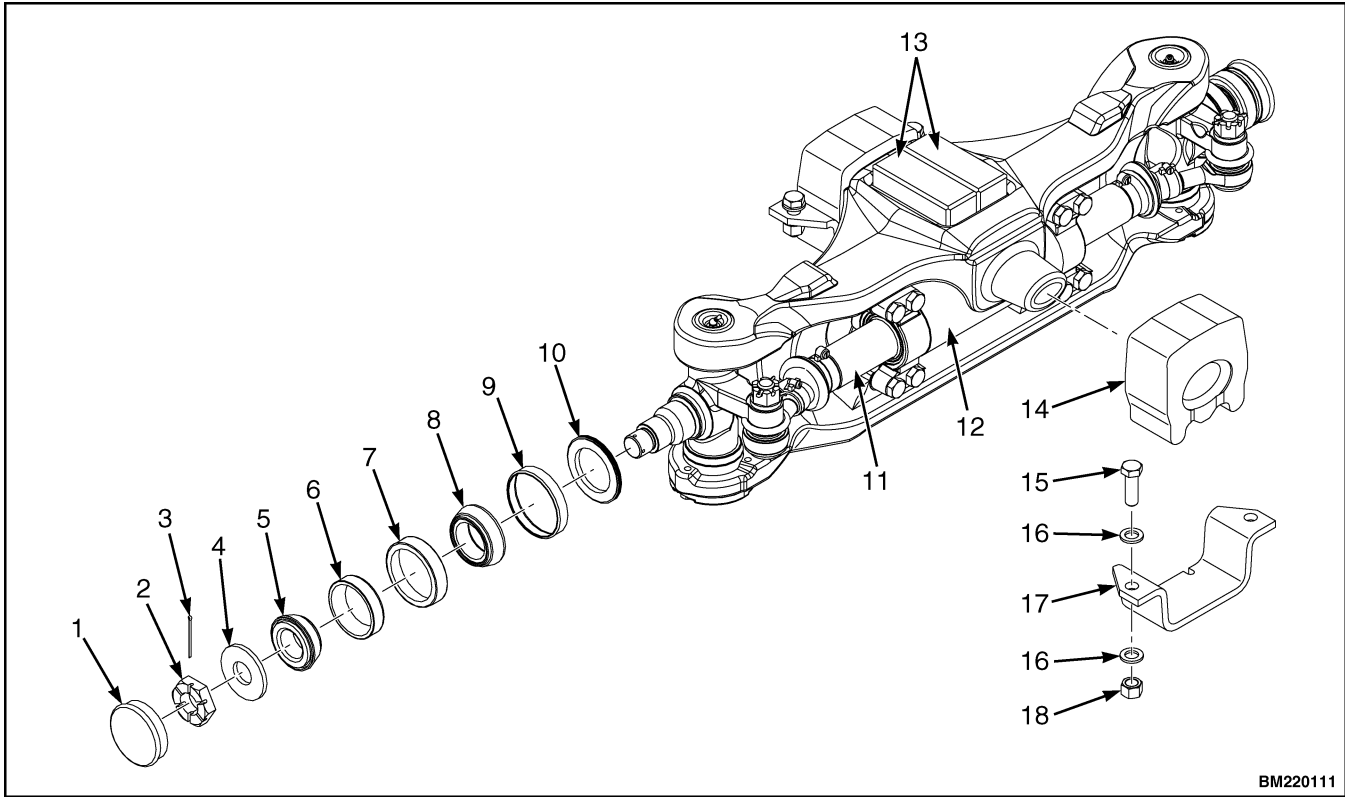


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A. PNEUMATIC TRUCKS ONLY

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|--------------------------|-----------------------|
| 1. MOUNT | 9. BEARING |
| 2. STEER AXLE ASSEMBLY | 10. HUB |
| 3. MOUNT | 11. BEARING |
| 4. PLATE | 12. WASHER |
| 5. CAPSCREW | 13. CASTLE NUT |
| 6. STEERING CYLINDER ROD | 14. HUB CAP |
| 7. LUBRICATION FITTING | 15. COTTER PIN |
| 8. OIL SEAL | 16. STEERING CYLINDER |

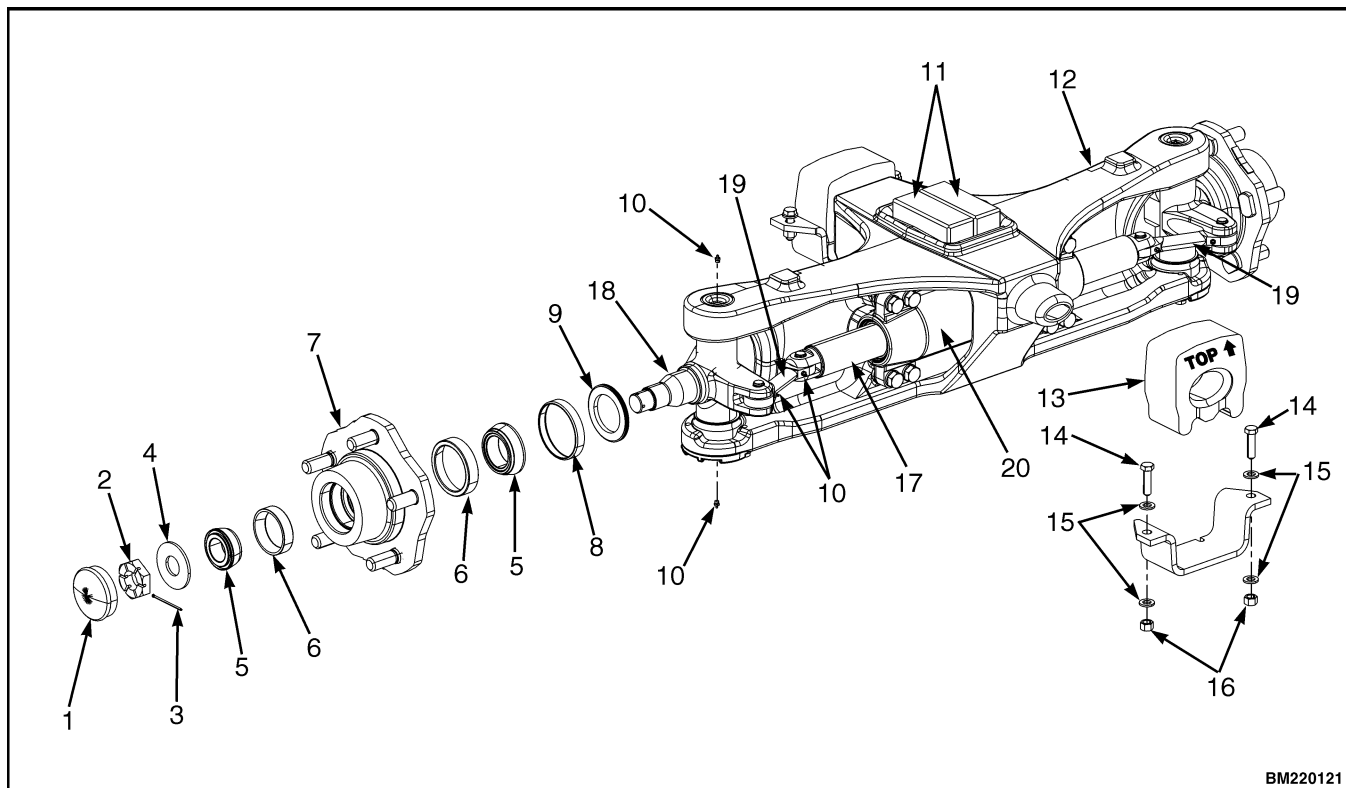
Figure 4. Spindle to Tie Rod Assembly for Lift Truck Models GC/GLC030-035VX, GC/GLC040SVX (C809) and GLP/GDP16-18VX, GLP/GDP20SVX (GP/GLP/GDP030-035VX, GP/GLP/GDP040SVX) (C810)



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- | | |
|-------------------------|---------------------------|
| 1. HUB CAP | 10. OIL SEAL |
| 2. CASTLE NUT | 11. STEERING CYLINDER ROD |
| 3. COTTER PIN | 12. STEERING CYLINDER |
| 4. WASHER | 13. PADS |
| 5. BEARING CONE (OUTER) | 14. MOUNT |
| 6. BEARING CUP (OUTER) | 15. CAPSCREW |
| 7. BEARING CUP (INNER) | 16. WASHER |
| 8. BEARING CONE (INNER) | 17. PLATE |
| 9. WEAR RING | 18. NUTS |

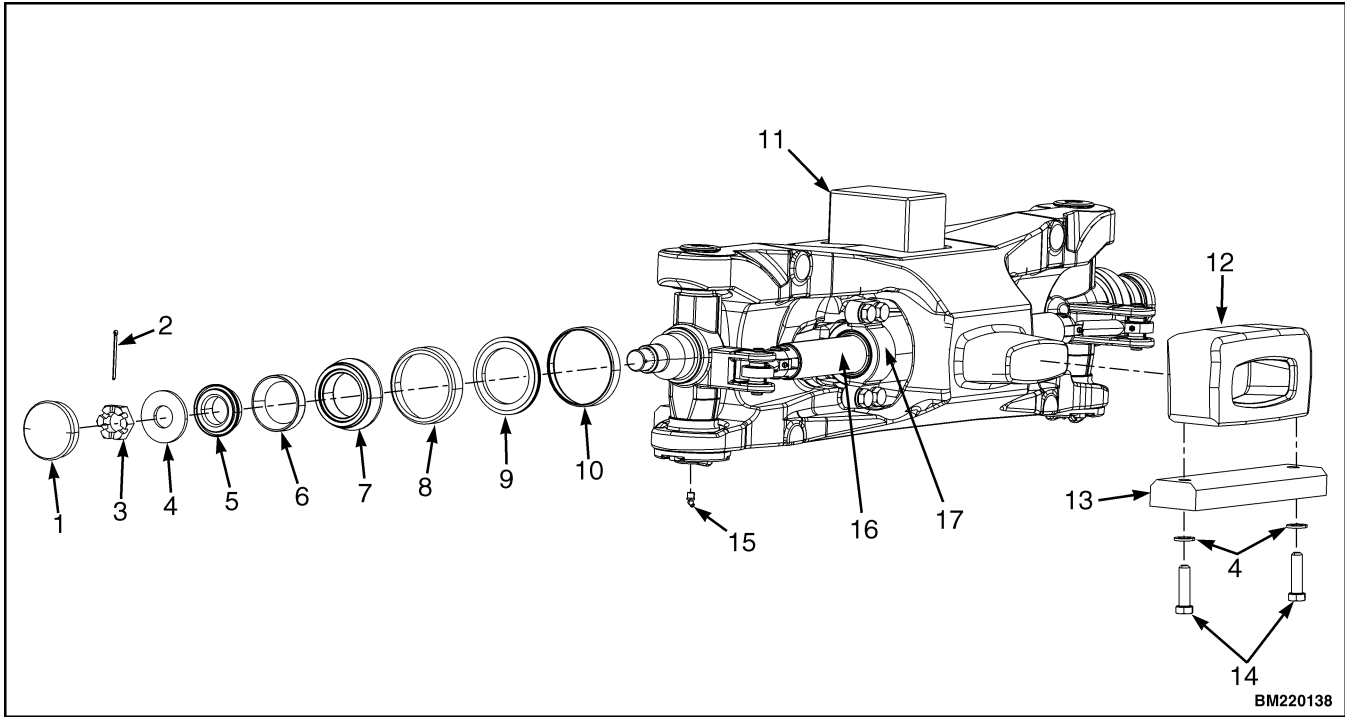
Figure 5. Spindle to Tie Rod Assembly for Lift Truck Models GLC40, 45, 55VX; GLC55SVX; (GC/GLC080, 100, 120VX; GC/GLC080, 100VXBCS; GC/GLC120SVX; GC/GLC120VXPRS) (E818, F818)



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- | | |
|------------------|-------------------------------|
| 1. HUB CAP | 11. MOUNT |
| 2. CASTLE NUT | 12. STEERING AXLE ASSEMBLY |
| 3. COTTER PIN | 13. MOUNT |
| 4. WASHER | 14. CAPSCREW |
| 5. BEARING CONE | 15. WASHER |
| 6. BEARING CUP | 16. NUT |
| 7. HUB | 17. STEERING CYLINDER ROD |
| 8. WEAR RING | 18. SPINDLE (LEFT SIDE SHOWN) |
| 9. OIL SEAL | 19. TIE ROD |
| 10. LUBE FITTING | 20. STEERING CYLINDER |

Figure 6. Spindle to Tie Rod Assembly for Lift Truck Models GLP/GDP40VX5/VX6; GLP/GDP45SVX5, GLP/GDP45VX6; GLP/GDP50-55VX (GP/GLP/GDP080, 090, 100, 110, 120VX) (F813, G813, H813, J813)



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- | | |
|-------------------------|---------------------------|
| 1. HUB CAP | 10. WEAR RING |
| 2. COTTER PIN | 11. PAD |
| 3. CASTLE NUT | 12. MOUNT |
| 4. WASHER | 13. PLATE |
| 5. BEARING CONE (OUTER) | 14. CAPSCREW |
| 6. BEARING CUP (OUTER) | 15. LUBE FITTING |
| 7. BEARING CONE (INNER) | 16. STEERING CYLINDER ROD |
| 8. BEARING CUP (INNER) | 17. STEERING CYLINDER |
| 9. SEAL | |

Figure 7. Spindle to Tie Rod Assembly for Lift Truck Models GLC/GDC60VX, GLC/GDC70VX, (GC/GLC/GDC135VX, GC/GLC/GDC155VX) (C879, D879, E879, F879)

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