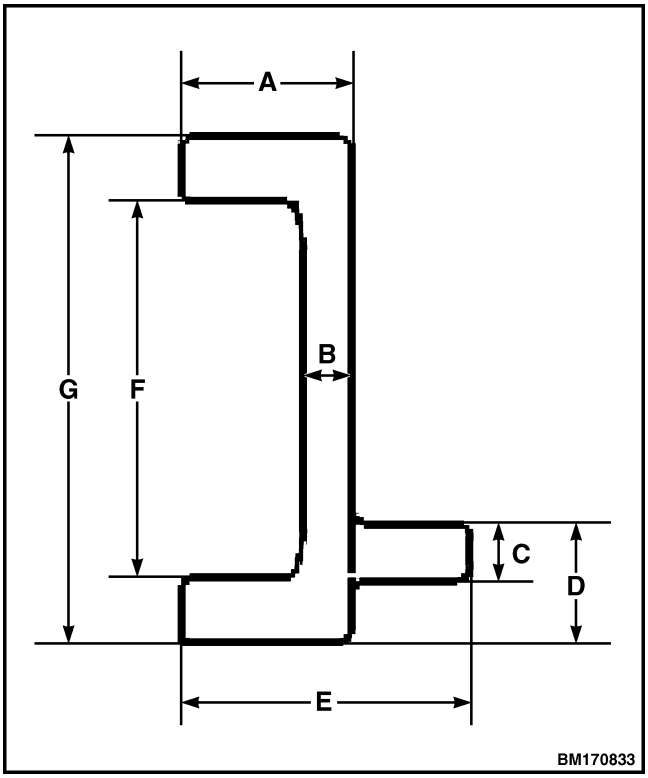


Figure 59. End Face of Inner Mast

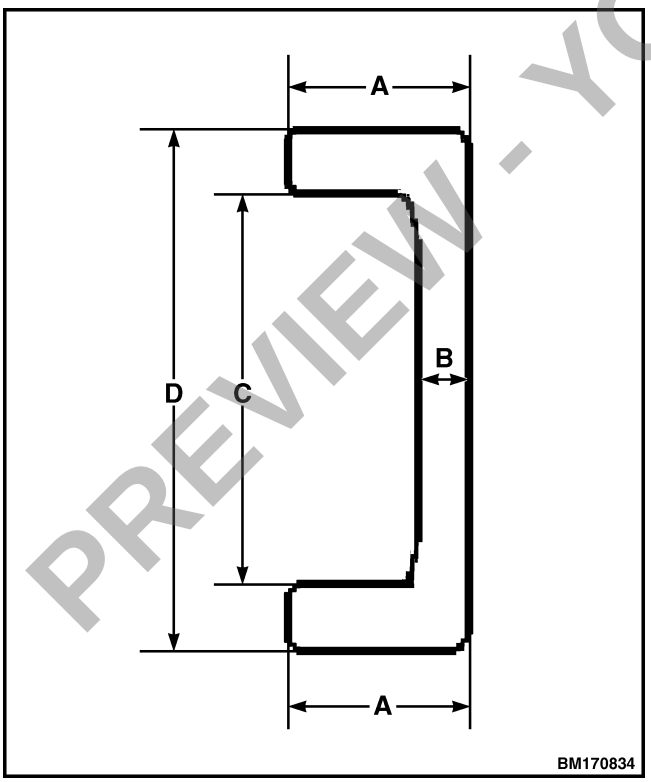


Figure 60. End Face of Outer Mast

INSIDE AND OUTSIDE MASTS

The mast assembly is composed of inside and outside masts. The lower part of the outside mast is connected with the drive axle. The outside mast is connected with piston rod of tilt cylinder. The mast can tilt forward 6º and backward 12º. The inside and outside mast channels are welded parts, bear the loads through rollers and side rollers, and allow the inside mast to raise and lower.

BRACKET

The bracket is welded to the inner mast, and moves up and down along the inner edges of the channel. Each side of the mast has two groups of composite rollers and a group of single rollers. When the forks rise to the maximum height, one pair of main rollers on left and right on top will extend to the upper edge of the inside mast.

The forks are locked inside the groove on the bracket using lock pins, and the spacing of fork may be adjusted.

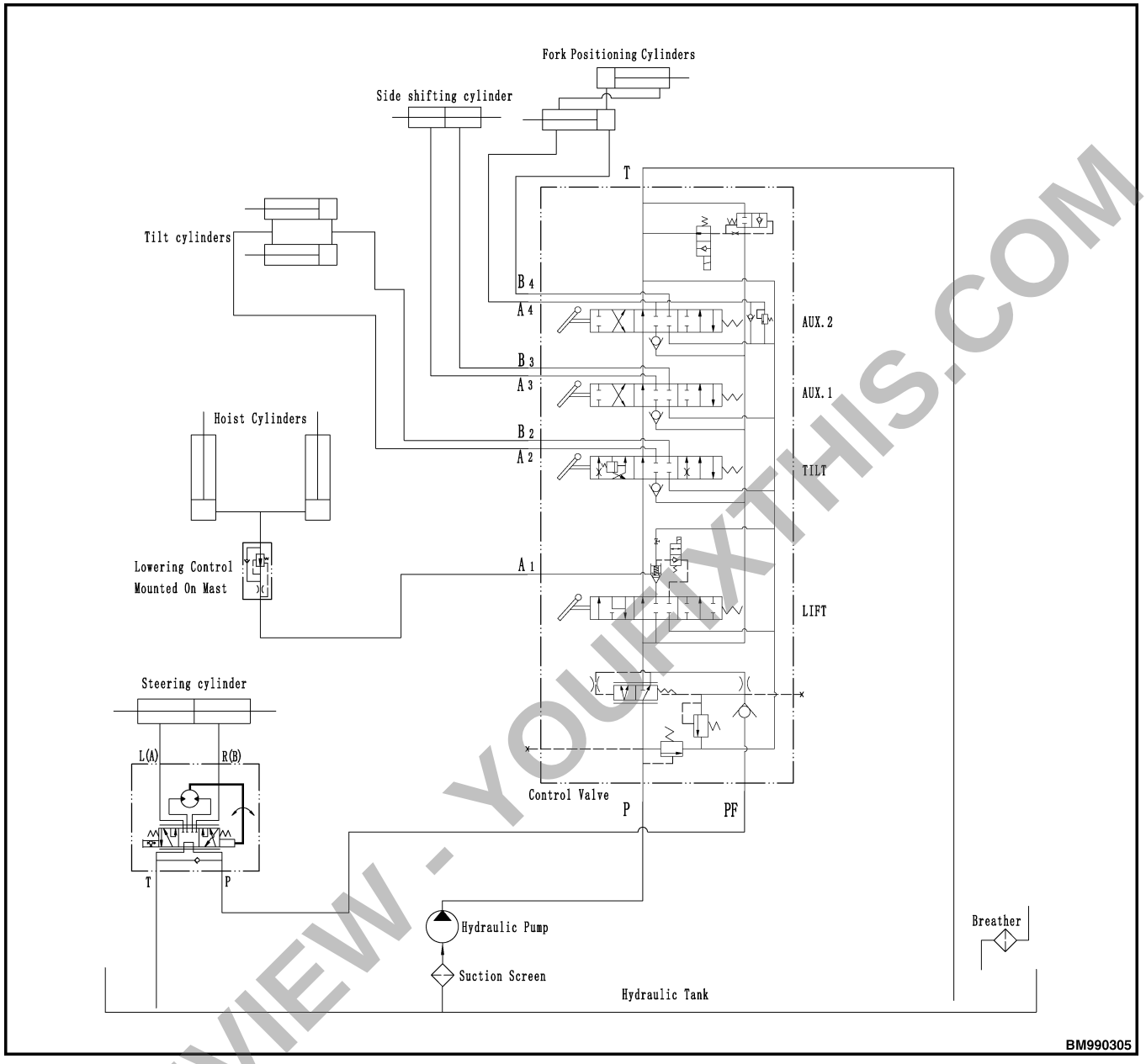
ADJUST

1. Lower the fork to the ground and adjust the nut on the lift chain upper end to ensure that there is the distance A between the combined roller and the inner mast.

Forklift Model	A
1.8-2.5T	24-29 mm (.94-1.14 in.)
3.5T	19-24 mm (.75-.94 in.)

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1. LEFT HAND LIFTING CYLINDER
2. RIGHT HAND LIFTING CYLINDER
3. RIGHT HAND TILT CYLINDER
4. LEFT HAND TILT CYLINDER
5. HYDRAULIC OIL TANK
6. FEEDING OIL FILTER
7. GEAR PUMP
8. STEERING CYLINDER
9. SIDE-SHIFT CYLINDER
10. MULTI-WAY VALVE

Figure 43. Oil Circuit of Hydraulic System (OPS)

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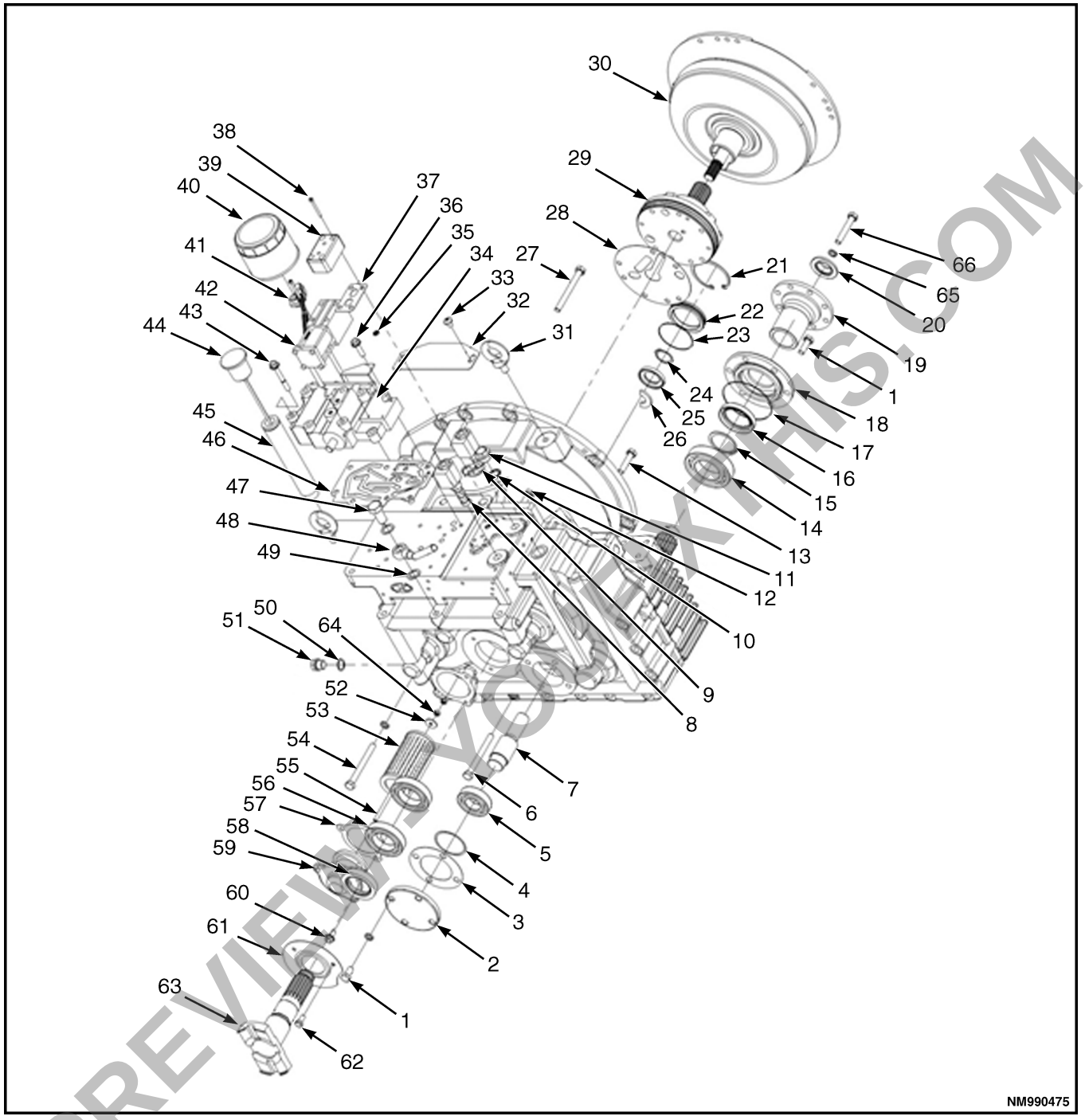


Figure 8. Transmission Assembly

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c. Every 1200 hours, inject 2# lithium base lubricating grease to each grease nipple, and clean the ventilation plug; check the oil surface height of the axle housing, and hub gear (open the oil level plug screw for inspection).

d. Every 200 hours, check the fasteners; check the clearance of hub bearing; check the quality of gear oil inside the axle housing, and in case of discoloration, thinning and metamorphism, new oil should be replaced in a timely manner. The mileage for the first oil change is 2000 km, and there is a need to change the gear oil once per 2400 hours.

4. Major maintenance standards of main parts:

Table 7. Tightening Torque of Main Bolts and Nuts (See Figure 18)

	N·m	lbf ft
Fastening bolt of rear main reduction box assembly (5)	180-220	133-162
Fastening bolt of steering cylinder assembly (19)	115-140	85-103
Baffle fastening bolt (22)	20-25	15-18
Fastening bolt of left and right steering knuckle are (26)	125-150	92-111
Fastening bolt of lower backing pin (43)	125-150	92-111
Fastening bolt of support for tooth ring (37)	85-100	63-74
Fastening bolt of steering stop bolt (44)	140-150	63-74
Oil inlet and outlet plug screw of main reducer (42)	40-50	29-37
End cover fastening bolt (54)	45-55	33-41
Hub oil inlet and outlet plug screw (56)	25-30	18-22
Planet carrier support fastening bolt (61)	180-220	133-162
Planet carrier connecting bolt	80-90	59-66

Table 8. Major Maintenance Standard

Item	Maintenance Standard	Remark
Starting force of rear hub	30-55N	Measure along the tangential direction of hub bolt.
Starting force of steering knuckle	<10N	Measure along the tangential direction of stud.

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Disassembly and Assembly

DISASSEMBLY OF ASSEMBLY

1. Dismantling of planet carrier assembly:

   a. Drain the gear oil on the wheel side.

   b. Use an internal hexagonal wrench to dismantle the hexagon socket countersunk head screw. See item 34, Figure 18.

   c. Slightly turn the planet carrier, pull with force outward, tap on the planet carrier with force at the same time, to shake and loosen the planet carrier, and after the planet carrier becomes loose, remove the planet carrier, but attention should be also paid to the assembly that is heavy, not causing hurt or injury.

      The installation of the planet carrier assembly is opposite to the process above in order, but attention must be paid to the tightening torque of hexagon socket countersunk head screw.

2. Disassembling method of hub assembly:

   a. Remove retaining ring from shaft, out of the axle shaft assembly with reversible circlip pliers. See item 39, Figure 18.

   b. Remove the stub shaft outer baffle ring. See item 38, Figure 18.

   c. Use a wrench to remove the hexagon nut. See item 37, Figure 18.

   d. Remove the internal shield ring of external half shaft. See item 36, Figure 18.

   e. Take out the ring gear assembly (Gear ring baffle ring (33), support for tooth ring (34) and gear ring (35). See Figure 18.

   f. Turn the wheel hub assembly slightly, and make an effort to pull outward, while tapping on hub to shake and loosen the outer bearing inner ring. After the outer bearing inner ring is loose, remove the wheel hub assembly. Attention should be used as the hub assembly is heavy. Caution should be used to not break the outer bearing inner ring at the same time.

      The installation of the hub assembly is opposite to the process above in order. Attention must be used tightening torque and bearing pre-tightening force of hexagon nut (37). See Figure 18.

3. Disassembling method of steering knuckle assembly:

   a. Use a wrench to remove the hexagon bolt (22). See Figure 18.

   b. Remove the baffle (21). See Figure 18.

   c. Take out the connecting rod pin (20). See Figure 18.

   d. Remove the connecting rod (24). See Figure 18.

   e. Use a wrench to remove the Hexagon flange bolt (26 and 43). See Figure 18.

   f. Take out the left steering knuckle arm (25), right steering knuckle arm (75) and lower backing pin (42). See Figure 18.

   g. Hold the axle shaft assembly (51), pull the left steering knuckle (30) and right steering knuckle (74) outward with force. Caution should be used to remove the axle shaft assembly not taken out, and the steering knuckle assembly is heavy. See Figure 18.

      The installation of the left and right steering knuckle assembly is opposite to the process of disassembly. Attention should be used so that the outer axle shaft that does not damage the oil seal port in the left and right steering knuckle, and to the tightening torque of hexagon flange bolt (26 and 43) and hexagon bolt (22). See Figure 18.

4. Disassembly of steering cylinder assembly:

   a. Remove the hexagonal head bolt (5). See Figure 18.

   b. Pull the steering cylinder assembly (18) from axle housing (11). See Figure 18.

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Notes to Installation and Use

a. The main oil pressure of the gearbox is 1.1 ~ 1.4 MPa, the oil inlet pressure of the torque converter is 0.4 ~ 0.6 MPa, and the return oil pressure is 0.1 ~ 0.3 MPa.

b. The working oil temperature of normal oil is 70℃ ~ 90℃, the highest working oil temperature does not exceed 120℃, and the duration is not more than 5 minutes.

c. The working oil should be kept clean, and can not contain impurities; the working oil should be changed after 100 hours of initial work at the normal oil temperature; then, new oil should be changed every 1000 hours or when using after a long time of being discontinued.

d. The gearbox's working oil level height is checked after 3 minutes since the engine is started, and the oil level height should be within the scope of the oil dipstick; the lubrication oil level height of the transmission case is based on the oil plug in the case; the lubricating oil level height of the front and rear main reduction box will be subject to the axle oil plug.

e. Before the vehicle is shifted, the inching valve should be shut down; before braking, the inching valve must be shut down at first, in order to prevent damage to the clutch or causing brake failure.

Table 6. Transmission Fault/Troubleshooting

Fault Item	Reason for Fault and Elimination Method
Efficiency decreases and oil temperature is too high	1. The friction plate is jammed or worn. Check whether the friction plate is glued, with non-uniform contact or warp. 2. The torque converter is short of oil supply. Check whether the oil pump is worn and whether the oil level is on the normal position. 3. The bearing is damaged. Replace the bearing. 4. Check whether the lubricating oil pipe is blocked. 5. The torque converter's one-way wheel is jammed.
Oil leakage	1. The sealing gasket is broken. Replace the sealing gasket. 2. Rubber parts are aged or damaged. Replace the parts. 3. Some parts are damaged and crack. Replace.
Clutch pressure is low and the swing is too big	1. The oil level is low. Check the oil level and add oil to normal oil level. 2. The sealing ring of input shaft assembly and piston are worn or the wedge is tight at the time of inlet assembly. Attention should be paid to when replacing the sealing ring and assembling. 3. The oil pump is worn. Replace the oil pump. 4. Check whether the inching valve rod is reset.

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Table 1. 1.8-3.5T Hydraulic Four-Wheel Drive Rough-Terrain Forklift Truck

Model / Parameter				FD18	FD25	FD35
Performance Parameter	Rated Capacity			1800 kg (4823 lb)	2500 kg (6698 lb)	3500 kg (9377 lb)
	Load Center			500 mm (19.7 in.)		
	Lifting Height			3000 mm (118.1 in.)		
	Free Lifting Height			105 mm (4.1 in.)	160 mm (6.3 in.)	165 mm (6.5 in.)
	Mast Tilt Angle Front/Rear			10/12°		
	Lifting Speed		Full-Load	610 mm/s (24 in/s)	600 mm/s (23.6 in/s)	485 mm/s (19 in/s)
	Running Speed	Hydraulic Truck	Full-Load	19 kph (11.8 mph)	19 kph (11.8 mph)	18 kph (11.1 mph)
			No-Load	20 kph (12.4 mph)	20 kph (12.4 mph)	19 kph (11.8 mph)
	Max Traction Force	Full-Load		38000 N (8542.7 lbf ft)		
	Gradeability	Full-Load		80%	50%	45%
	Efficiency of Differential Lock			45%	45%	45%
	Minimum Turning Radius R			3120 mm (122.8 in.)	3140 mm (123.6 in.)	3140 mm (123.6 in.)

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Legend for Figure 18.

1. GREASE FITTING
2. FRONT PEDESTAL
3. SUPPORT LOCATING SLEEVE
4. SUPPORT BUSHING
5. HEXAGONAL HEAD BOLT M14X1.5X45/10.9 LEVEL
6. SPRING WASHER 14
7. CYLINDRICAL PIN D12X32
8. REAR MAIN REDUCTION BOX ASSEMBLY
9. MAIN REDUCER GASKET
10. LONG VENTILATION PLUG (R2)½
11. AXLE HOUSING
12. ADJUSTING WASHER
13. SUPPORT BUSHING
14. REAR SUPPORT
15. HEXAGONAL HEAD BOLT M6X16/8.8 LEVEL
16. GASKET
17. STRAIGHT FORCED FILLING OIL CUP M6
18. STEERING CYLINDER ASSEMBLY
19. HEXAGON SOCKET HEAD CAP SCREW M12X45/10.9 LEVEL
20. CONNECTING ROD PIN
21. BAFFLE
22. BOLT M8X16
23. SPRING WASHER8
24. CONNECTING ROD
25. LEFT STEERING KNUCKLE ARM
26. HEXAGON FLANGE BOLT M12X1.25X40/10.9 LEVEL
27. BUSHING
28. ARTICULATED BEARING (ES)
29. ADJUSTING WASHER
30. LEFT STEERING KNUCKLE
31. DOUBLE END STUD
32. SIMRIT COMBINATION OIL SEAL 155X190X17.5/19
33. GEAR RING BAFFLE RING
34. SUPPORT FOR TOOTH RING
35. GEAR RING
36. INTERNAL SHIELD RING OF EXTERNAL HALF SHAFT
37. HEXAGON NUT M12X1.25
38. STUB SHAFT OUTER BAFFLE RING
39. RETAINING RING FOR SHAFT
40. DUST RING
41. ANGULAR-CONTACT ARTICULATED BEARING 35X62X18
42. LOWER BACKING PIN
43. HEXAGON FLANGE BOLT M12X1.25X35/10.9 LEVEL
44. HEXAGON THIN NUT M16
45. STOP BOLT M16X70/10.9 LEVEL
46. SIMRIT COMBINATION OIL SEAL 45X60X16
47. SLIDING BEARING 45X50X40
48. CYLINDRICAL PIN D10X35
49. BUSHING 35X52X16.5
50. SLIDING BEARING 45X50X30
51. AXLE SHAFT ASSEMBLY
52. COMBINED WASHER 20
53. PLUG SCREW M20X1.5
54. BOLT M10X20
55. SPRING WASHER 10
56. PLUG SCREW M14X1.5
57. COMBINED WASHER 14
58. END COVER
59. STEEL BALL 11/16"
60. CYLINDRICAL PIN 10M6X40
61. HEXAGONAL HEAD BOLT M14X1.5X55
62. PLANET WHEEL AXLE
63. STEEL BALL 15/64"
64. HEXAGON SOCKET COUNTERSUNK HEAD SCREW M12X30/8.8 LEVEL
65. PLANET CARRIER
66. PLANET WHEEL BACKUP PLATE
67. PLANET GEAR
68. ROLLER PIN 5X39.8
69. PLANET CARRIER BEARING
70. TAPERED ROLLER BEARING JL819349/JL819310/95X135X20
71. O-SEALING RING 223X2.65
72. HUB
73. HUB BOLT
74. RIGHT STEERING KNUCKLE
75. RIGHT STEERING KNUCKLE ARM

Maintenance and Repair

1. Prior to use of new axle:

a. Before a new axle is used, sulfur phosphorus 90 heavy load gear oil (GL - 5) is added from the bridge packet oil filling port to the main reducer until there is oil overflowing from the bridge packet oil hole (about 8L); the oil filling and drain hole of the hub reducer is transferred to the vertical position, in the face of the hub reducer end cover, the oil filling and drain hole of the hub reducer is set in the top, and sulfur phosphorus 90 heavy load gear oil (GL - 5) is filled from the oil filling and drain hole until there is oil overflowing from the hub side (the oil amount of single hub reducer is about 0.85 liter (0.89 qt)).

b. Inject adequate 2-4% moly NLGI # 2 lithium based grease to each grease nipple.

2. After the new axle is mounted:

After 500 hours or 3months of operation, and there is a need to check the pre-tightening torque of each part fastener.

3. Axle maintenance:

a. Clear the dirt and dust on the ventilation plug in the rear axle housing.

b. Regularly check the oil filling port plug screw and oil drain plug screw, and if oil leakage is found, they should be tightened in time, or the end face sealing gasket is changed.

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Drive, Operation, and Routine Maintenance of Forklift Truck

All operators and service technicians must observe and adhere to all safety requirements described below.

TRANSPORTING THE FORKLIFT TRUCK

The forklift truck is normally used in the loading and unloading of cargo and short distance transport of cargo. It is not suitable for long distance transport. When the forklift truck must be moved long distance, vessels, trains and heavy trucks with 5 Tons and above rated capacity are required for transport and the following procedures must be performed.

1. Set parking brake.
2. Utilize tie-downs to secure the front of the truck through the two end holes of the outer mast. Secure the rear of the truck through the holes in the counterweight.
3. Secure the front and rear tires properly with wedge bocks.
4. To hoist the forklift truck, feed tow strap through the two end holes of the outer mast and the holes of the counterweight. Hoist the forklift using a lifting device, see Figure 64. Refer to the label for exact hoisting locations.

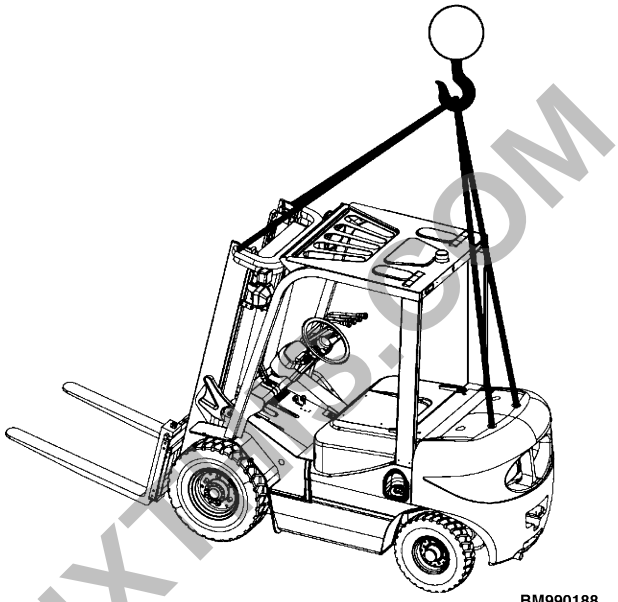


Figure 64. Hoisting Forklift Truck

TOWING

1. Locate the tow pin under the counterweight. Unseat the tow pin and feed a tow strap around the pin. Reinstall the pin. See Figure 65.

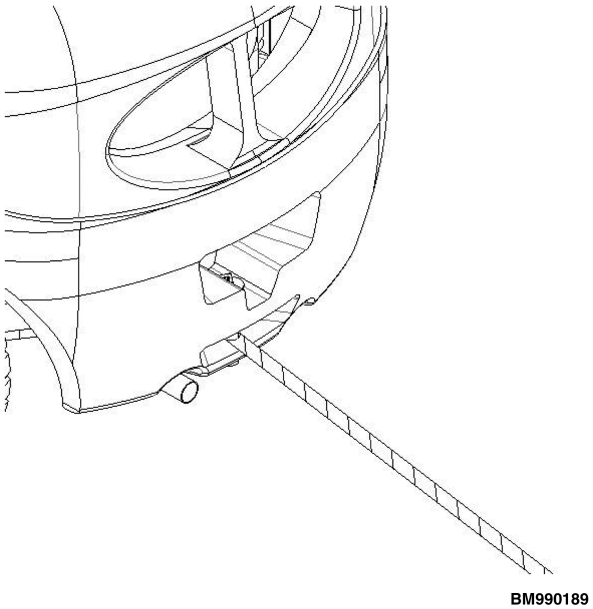


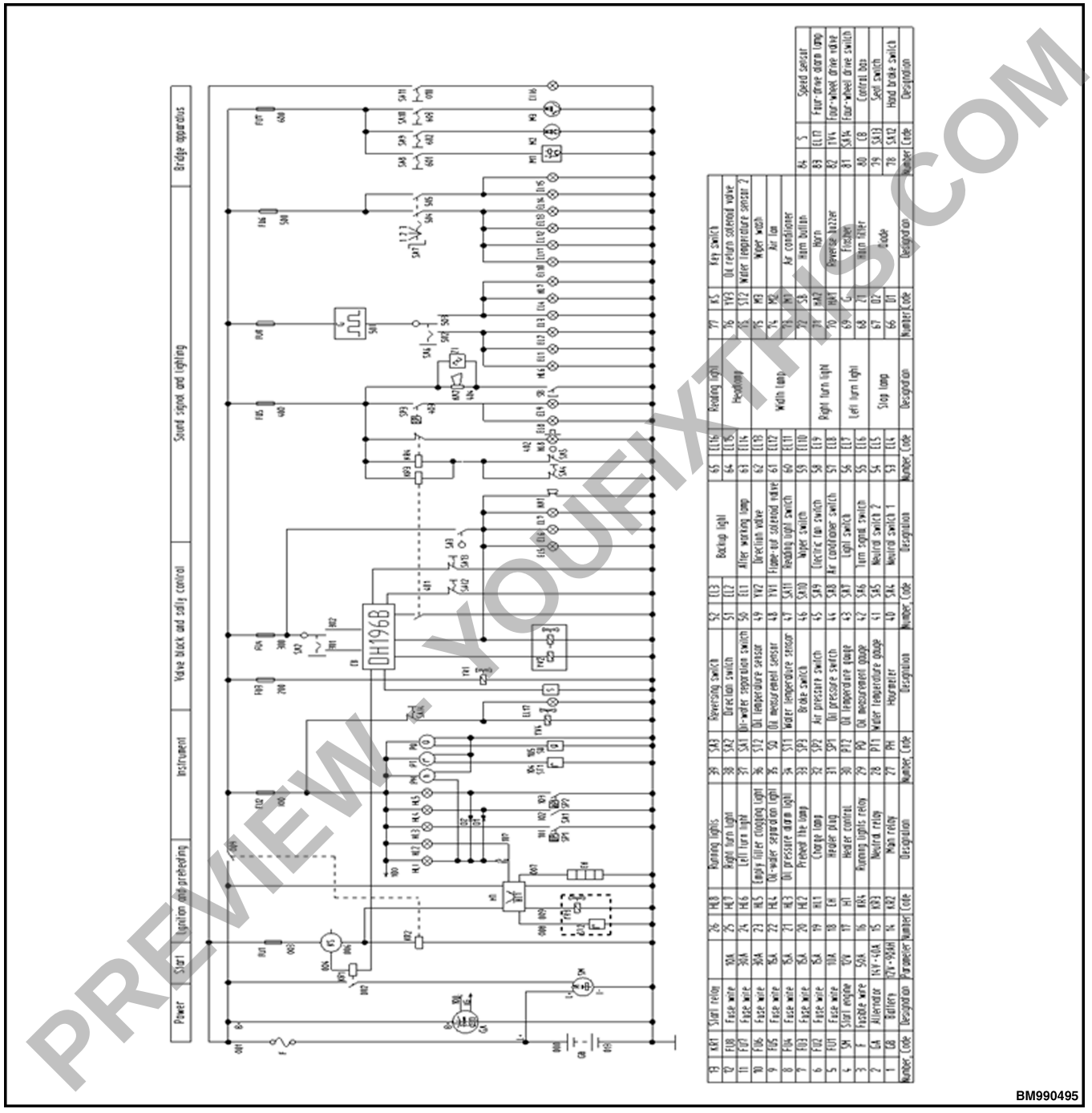
Figure 65. Towing the Forklift Truck

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ELECTRICAL SCHEMATICS

The schematic drawing of different engines differ from each other mainly on the starting system and on the sensor. It is suggested to refer to the specific drawing and real condition of the truck first when carrying out repair.



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Figure 62. Yanmar Engine

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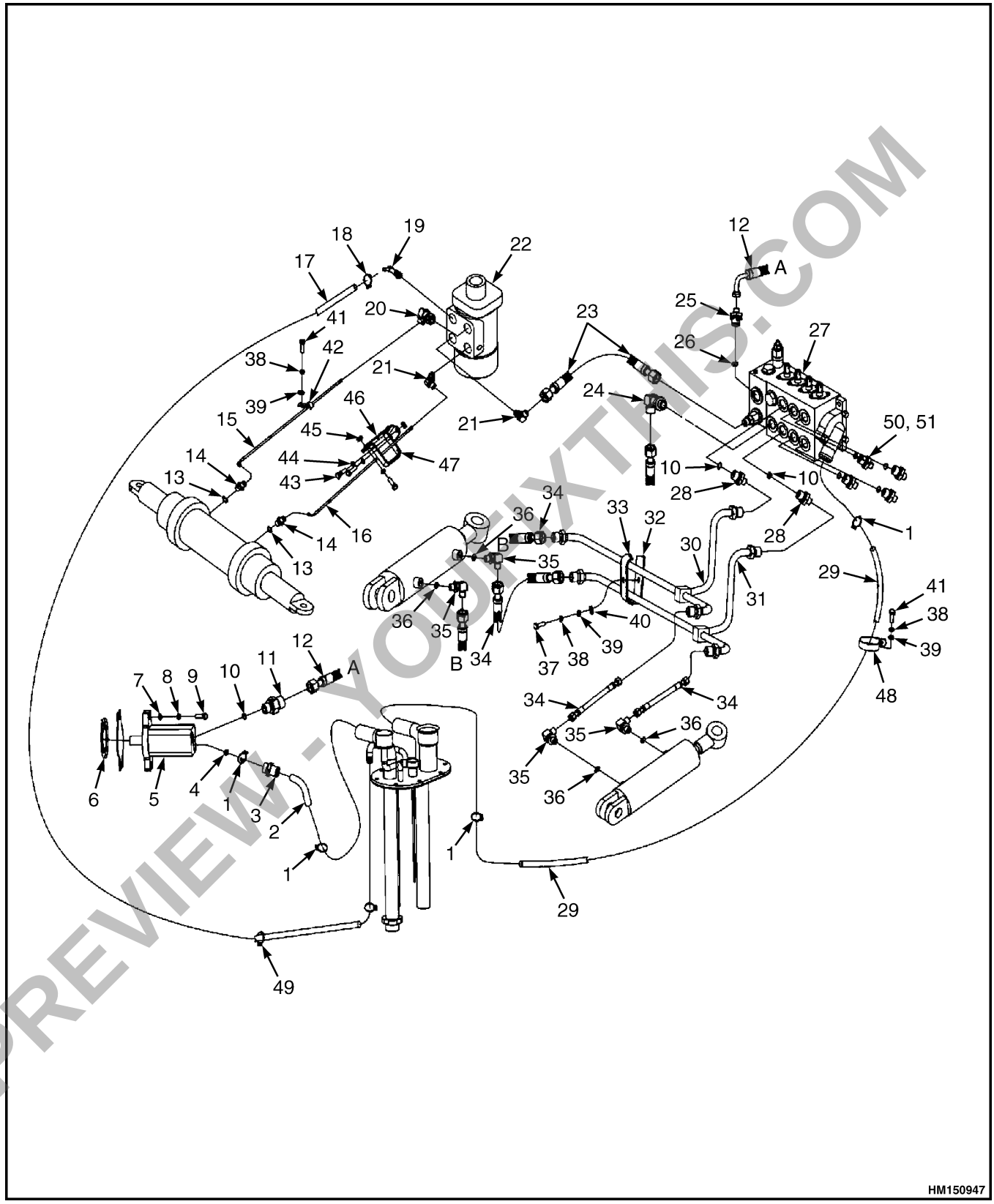


Figure 56. Schematic Drawing of Hydraulic Pipeline (Diesel and Gasoline Forklift Trucks)

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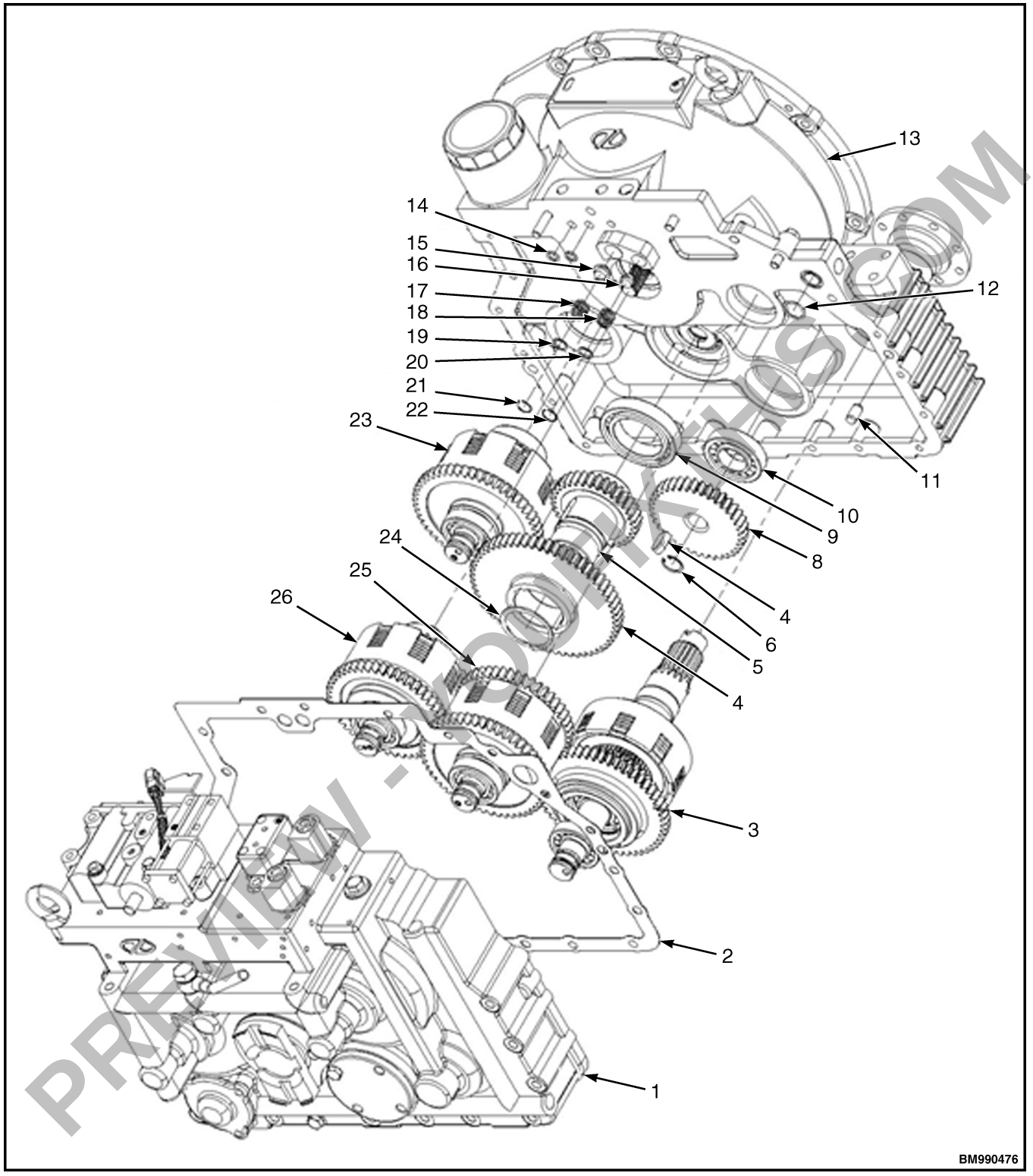


Figure 9. Rear Main Reduction Box

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