torque. Screws (C) should be tightened to 12-16 N·m (106-142 ft.-lbs.) torque. Screws attaching spindle (26) to gear housing (15) should be tightened to 45-58 N·m (33.19-42.78 ft.-lbs.) torque. Wheel retaining lug bolts should be tightened to 79-97 N·m (58.27-71.54 ft.-lbs.) torque. The front axle should contain 3 liters (3.2 quarts) of gear lubricant.

DIFFERENTIAL AND BEVEL GEARS

YM135D and YM155D Models

16. **R&R AND OVERHAUL.** Remove the axle assembly from tractor as outlined in paragraph 5. Support axle securely, then unbolt right axle housing (99 – Fig. 17) from center housing (57), then remove differential. Left axle housing can be unbolted and separated from center housing if desired. Unbolt and remove pinion and carrier (62) from center housing.

NOTE: Shims (58) adjust pinion mesh position with ring gear. Shims (44 and 100)

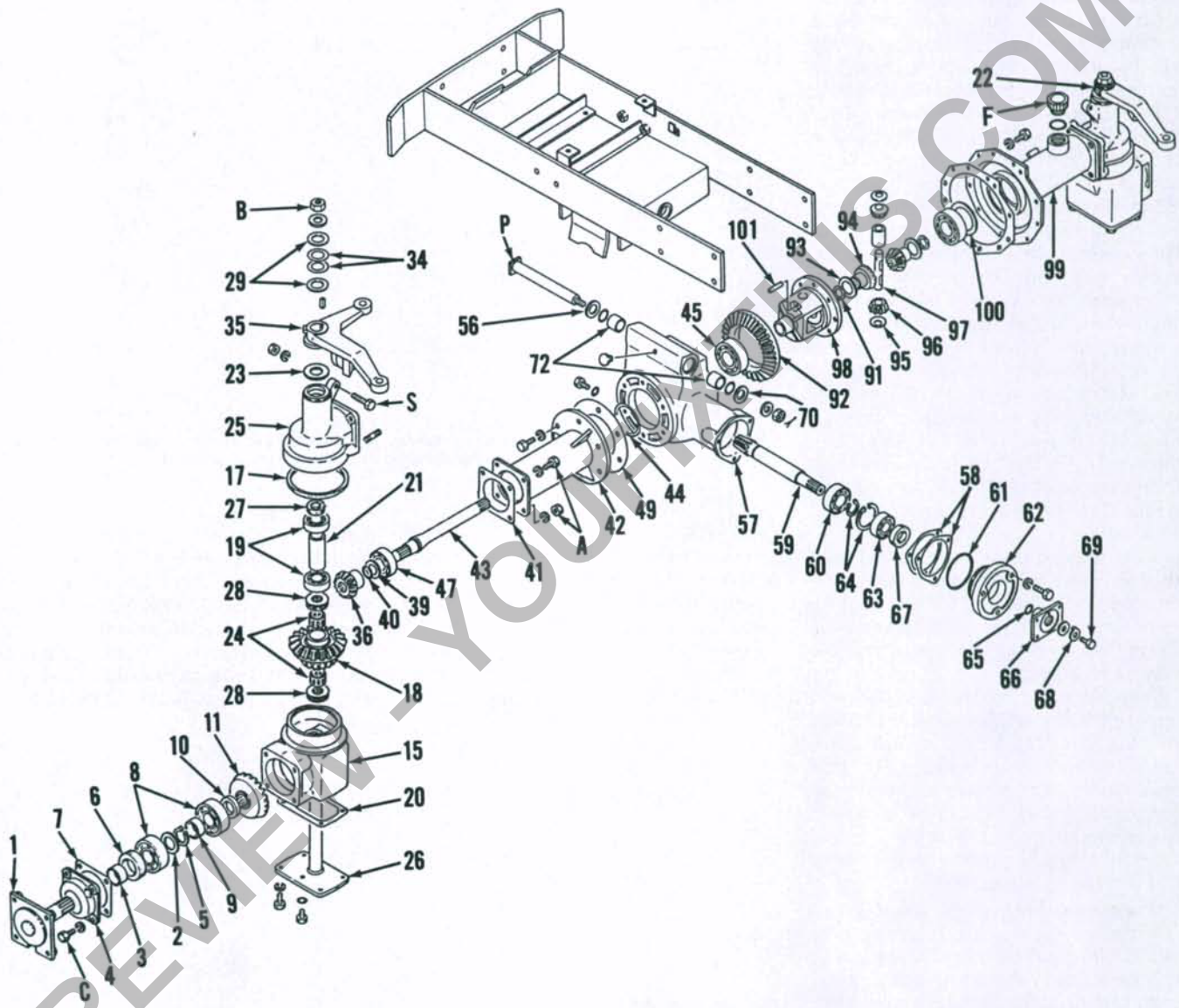


Fig. 17 – Exploded view of the complete axle housing used on late YM135D and YM155D models. Early models are similar.

A. Fasteners attaching outer drive housing
B. Nut attaching steering arm
C. Screws attaching axle housing cover
F. Fill plug
P. Pivot pin
S. Stop screw
1. Axle and hub
2. Washer (30x42x2 mm)
3. Wear sleeve
4. Cover
5. Snap ring
6. Oil seal
7. Gasket
8. Bearings (6306 for late models)
9. Spacer (30x38x13.5 mm for late models)
10. Spacer (30.5x45x9.5 mm for late models) and shims
11. Bevel gear
15. Gear housing
17. Seal
18. Bevel gears
19. Ball bearings (6205 lower, 6205U upper)
20. Gasket
21. Spacer (25x30x72.67 mm)
22. Tie rod arm
23. Washer (25.5x60x1.6 mm)
24. Roller bearings (28x33x16 mm early; 25x31x20 mm late)
25. Spindle housing
26. Spindle
27. Oil seal
28. Thrust bearings (51105)
29. Washers (22.5x40x1 mm)
30. Washer
34. Shims
35. Steering arm
36. Drive gear
37. Drive axle
39. Washer (25.5x32x1 mm) and shims
40. Snap ring
41. Gasket
42. Axle housing
44. Shim (same as 100)
45. Carrier bearing (6207)
47. Bearing (6305)
49. Gasket
56. Thrust washer (same as 70)
57. Center housing
58. Shims
59. Drive pinion
60. Bearing (6305)
61. "O" ring
62. Pinion housing
63. Bearing (6304)
64. Snap rings
65. "O" ring
66. Universal flange
67. Oil seal
68. Lock plate
69. Screw
70. Thrust washer (same as 56)
72. Pivot bushings
91. Thrust washer (14 or 15 mm)
92. Ring gear
93. Thrust washer (0.9, 1.0, 1.1 and 1.2 mm thick)
94. Side gear
95. Thrust washer (0.76-0.86 mm thick)
96. Pinions
97. Pinion shaft
98. Differential housing
99. Axle housing
100. Shims (same as 44)
101. Roll pin

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CONDENSED SERVICE DATA

GENERAL	YM135, YM135D	YM155, YM155D	YM195, YM195D	YM240, YM240D	YM330, YM330D
Engine Make			OWN		
Engine Model	2T73A	2TR13A	2T84A	2TR20A-X	3T84A or 3T84A-LP
Number of Cylinders	2	2	2	2	3
Bore – mm (in.)	73(2.87)	75(2.95)	84(3.31)	90(3.54)	84(3.31)
Stroke – mm (in.)	75(2.95)	75(2.95)	90(3.54)	90(3.54)	90(3.54)
Displacement – cc	627	662	997	1145	1496
Cubic Inches	38.26	40.39	60.84	69.87	91.29
Transmission –					
Speeds Forward	6	6	8	8	8
Speeds Reverse	2	2	2	2	2
TUNE-UP					
Firing Order	1-2	1-2	1-2	1-2	1-3-2
Number 1 Cyl.			Rear		
Valve Tappet Gap – Cold					
Exhaust – mm (in.)	0.2(0.008)	0.2(0.008)	0.15(0.006)	0.15(0.006)	0.15(0.006)
Inlet – mm (in.)	0.2(0.008)	0.2(0.008)	0.15(0.006)	0.15(0.006)	0.15(0.006)
Horsepower at pto	...	...	...	19.8	...
Battery – Volts	12	12	12	12	12
Polarity Ground	Neg.	Neg.	Neg.	Neg.	Neg.
CAPACITIES – All capacities are in liters and (quarts).					
Cooling System	3.2(3.4)	3.2(3.4)	4.6(4.9)	4.6(4.9)	6.2(6.5)
Engine Crankcase	2.2(2.3)	2.4(2.5)	4.0(4.2)	4.0(4.2)	6.4(6.8)
Front Drive Axle	3.0(3.2)	3.0(3.2)	5.0(5.3)	6.0(6.3)	7.0(7.4)
Fuel Tank	9.5(10)	15(15.8)	22(23.2)	22(23.2)	32(33.8)
Transmission, Hydraulic System and Rear Axle –					
Two Wheel Drive	9.5(10)	9.5(10)	15(15.8)	15(15.8)	20(21)
Four Wheel Drive	9(9.5)	9(9.5)	15(15.8)	15(15.8)	20(21)

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FRONT AXLE AND STEERING GEAR

FRONT AXLE ASSEMBLY

Two Wheel Drive Models

1. **ADJUSTMENT.** Refer to appropriate Fig. 1, 2, 2A or 3 for exploded view of fixed or adjustable tread non-driving axle. Toe-in should be 4-8 mm (5/32-5/16 in.) for all models. Length of drag link should be adjusted to provide equally sharp turns in both directions.

Front axle should not have excessive front to rear clearance at pivot shaft (5). Excessive clearance can be removed from YM195 and YM240 models by relocating brackets (29 – Fig. 2) closer together. Be sure all attaching screws are retightened after adjustment is complete. On all other models, adjust axle play at pivot by tightening the castle nut (2 – Fig. 1 or 3) on pivot shaft. Be sure to install cotter pin to prevent nut from loosening after adjustment is complete.

Front wheel bearings should be removed, cleaned, inspected and renewed if damaged or repacked with new grease after each 300 hours of operation. Tighten the hub retaining castle nut, then lock position by installing cotter pin. Tighten wheel lug bolts to 78-98 N·m (57.5-72.3 ft.-lbs.) torque.

2. **REMOVE AND REINSTALL.** Support front of tractor and disconnect drag link from steering arm. On YM135 and YM155 models, remove cotter pin and castle nut (2 – Fig. 1) from axle pivot shaft, support axle with jack, then remove washer (3) and pivot shaft (5). On YM195 and YM240 models, support axle with jack, unbolt pivot brackets (29 – Fig. 2 or 2A) from frame, then lower axle. On YM330 models, support axle with jack, remove cotter pin from castle nut at rear of pivot shaft, then loosen castle nut (2 – Fig. 3). Remove self locking nut (39), washer (38), sleeve (37) and snap ring (36), then withdraw the pivot shaft.

When assembling YM135 model, castle nut (2 – Fig. 1) should be toward rear. On YM155 model, castle nut is toward front. Bushings (4) are 25 mm (0.984 in.) long for YM135 models; 24 mm (0.945 in.) long for YM155 models. Tighten castle nut (2) on YM135 and YM155 models enough to remove all axle play; however, axle should move smoothly and freely on pivot.

3. **OVERHAUL.** The steering spindle (18 – Fig. 1, 2, 2A and 3) is equipped with renewable bushings (13) and some

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Center pivot pin
diameter . . . . . 34.95-34.975 mm
(1.3760-1.3770 in.)
Center pivot to bushing clearance,
Desired . . . . . 0.025-0.089 mm
(0.0010-0.0035 in.)
Wear limit . . . . . 0.4 mm
(0.0157 in.)
Axle end play on center pin,
Desired . . . . . 0.1-0.3 mm
(0.0039-0.0118 in.)
Maximum limit . . . . . 0.5 mm
(0.0197 in.)

Four Wheel Drive

4. **ADJUSTMENT.** Refer to appropriate paragraphs 15 through 31 for service to individual units. Toe-in should be 4-8 mm for all models.

5. **REMOVE AND REINSTALL.** To remove the front axle from four wheel drive models, first block rear wheels. Loosen the drive shaft cover clamps, remove retaining screws, then move drive shaft cover out of the way. Detach drive shaft from front axle drive pinion. On all models except YM135D and YM155D models, be careful not to lose the steel balls from drive shaft collars. On all models, detach drag link from steering arm. Support weight of tractor by attaching overhead hoist to front weight support, then remove both front wheels. Place a jack under center of front axle to support axle securely when attaching screws are removed.

On all models, except YM330D, remove castle nut from axle pivot, then withdraw pivot shaft. Be careful to prevent axle from falling when pivot is removed, then lower axle away from tractor.

On YM330D models, disconnect battery cables, then remove battery. Remove locknuts (N–Fig. 4) from screws which attach front axle pivot brackets to frame. Remove all eight screws which attach axle pivot brackets to frame, then lower axle away from tractor.

When installing, reverse removal procedure. Be especially careful to prevent axle from slipping from jack while attaching center pivot.

On all models except YM330D, locate axle in correct position, then install center pivot pin. Nut should be toward rear for YM135D models, toward front for YM155D models. Tighten castle nut on YM135D and YM155D models enough to remove all end play, but be sure that axle pivots freely. Install cotter pin through castle nut to maintain adjustment. On YM195D and YM240D models, shims (54–Fig. 23) should be added to provide axle with less than 0.6 mm (0.0236 in.) end play. Axle must be free to move and not bind. Coat threads of the four screws which retain pivot pin with locking compound after selecting correct thickness of shims.

On YM330D models, coat threads of screws which retain axle pivot brackets with a locking compound and tighten to 149 N·m (109.9 ft.-lbs.) torque. End play of axle in center pivot brackets is adjusted by changing thickness of thrust spacers (54–Fig. 23). End play should be less than 0.6 mm (0.0236 in.), but should not cause binding. Thrust spacers (54) are available in 2.0, 2.3 and 2.6 mm thicknesses.

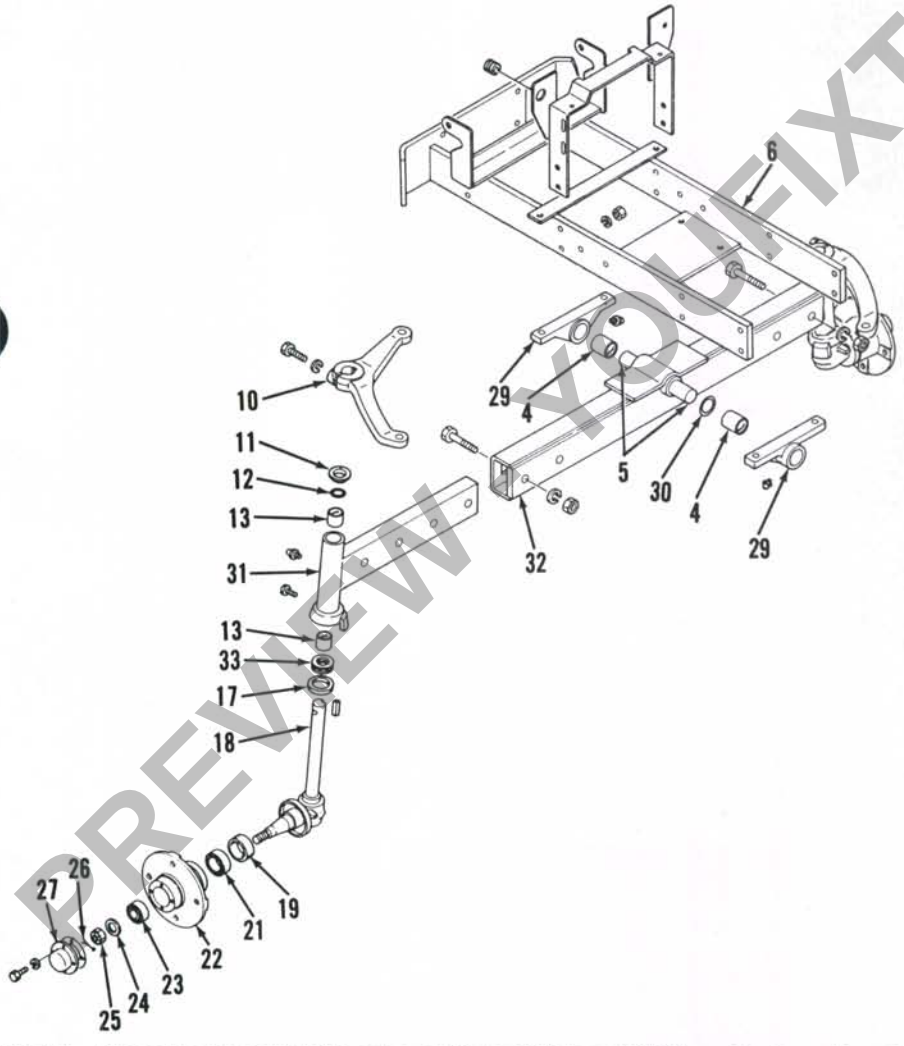


Fig. 2A—Exploded view of adjustable axle available for YM195 and YM240 models. Except for adjustable width feature, heavy duty non-adjustable axle is similar.

4. Bushings (30x40 mm)
6. Frame
10. Steering arm
11. Cover
12. "O" ring
13. Bushing
17. Seal
18. Spindle
19. Seal
21. Taper bearing (32007)
22. Hub
23. Taper bearing (30205)
24. Plain washer
25. Castle nut
26. Cotter pin
27. Cap
29. Pivot bracket
30. Shim
31. Axle extension
32. Axle center member
33. Thrust bearing (51106)

STEERING GEAR

All Models

10. **REMOVE AND REINSTALL.** Remove cap from center of steering wheel, remove steering wheel retaining nut, then use puller to remove steering wheel shaft. Disconnect battery ground cable from battery. Remove the battery from YM135 models. On all models remove the instrument panel and the fuel tank. Detach drag link from steering arm, then unbolt, and remove the steering gear assembly.

Reinstall steering gear, reversing the removal procedure. Coat threads of attaching screws with sealer before installing.

11. **OVERHAUL.** Remove cap screws attaching side cover (16–Fig. 5 or Fig. 6) to housing (21), remove locknut (14), then turn adjusting screw (15) in to push cover away from housing. Loosen nut (25) and turn shaft (6) until gear on shaft (19) is aligned with opening in

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models are equipped with bearings (15 and 33). Inside diameter of bushings (13) should be sufficient to provide correct clearance for the spindle. Adjust spindle end play by adding covers (11 – Fig. 1, 2 or 2A) or shims (40 – Fig. 3) as required.

YM135, YM155

Spindle diameter
at bushing . . . . . 24.948-25.0 mm (0.9822-0.9843 in.)
Spindle to bushing clearance,
Desired . . . . . 0.020-0.124 mm (0.0008-0.0049 in.)
Wear limit . . . . . 0.4 mm (0.0157 in.)
Spindle end play,
Desired . . . . . 0.02-0.086 mm (0.0008-0.0011 in.)
Wear limit . . . . . 1.0 mm (0.0394 in.)
Center pivot pin
diameter . . . . . 21.947-21.980 mm (0.8641-0.8654 in.)
Center pivot to bushing clearance,
Desired . . . . . 0.040-0.123 mm (0.00157-0.0048 in.)
Wear limit . . . . . 0.4 mm (0.0157 in.)
Axle end play on
center pin . . . . . 0.0-0.5 mm (0-0.0197 in.)

YM195, YM240

Spindle diameter
at bushing . . . . . 24.948-25.0 mm (0.9822-0.9843 in.)
Spindle to bushing clearance,
Desired . . . . . 0.020-0.122 mm (0.0008-0.0049 in.)
Wear limit . . . . . 0.25 mm (0.0098 in.)
Spindle end play,
Desired . . . . . 0.02-0.86 mm (0.0008-0.0011 in.)
Wear limit . . . . . 1.0 mm (0.0394 in.)
Center pivot pin
diameter . . . . . 24.967-25.0 mm (0.9830-0.9843 in.)
Center pivot to bushing clearance,
Desired . . . . . 0.020-0.105 mm (0.0008-0.0041 in.)
Wear limit . . . . . 0.4 mm (0.0157 in.)
Axle end play on center pin,
Desired . . . . . 0.1-0.3 mm (0.004-0.011 in.)
Maximum limit . . . . . 0.5 mm (0.0197 in.)

YM330

Spindle diameter
at bushing . . . . . 29.959-29.980 mm (1.1735-1.1803 in.)
Spindle to bushing clearance,
Desired . . . . . 0.020-0.074 mm (0.0008-0.0029 in.)
Wear limit . . . . . 0.25 mm (0.0098 in.)
Spindle end play,
Desired . . . . . 0.02-0.6 mm (0.0008-0.0236 in.)
Wear limit . . . . . 0.7 mm (0.0276 in.)

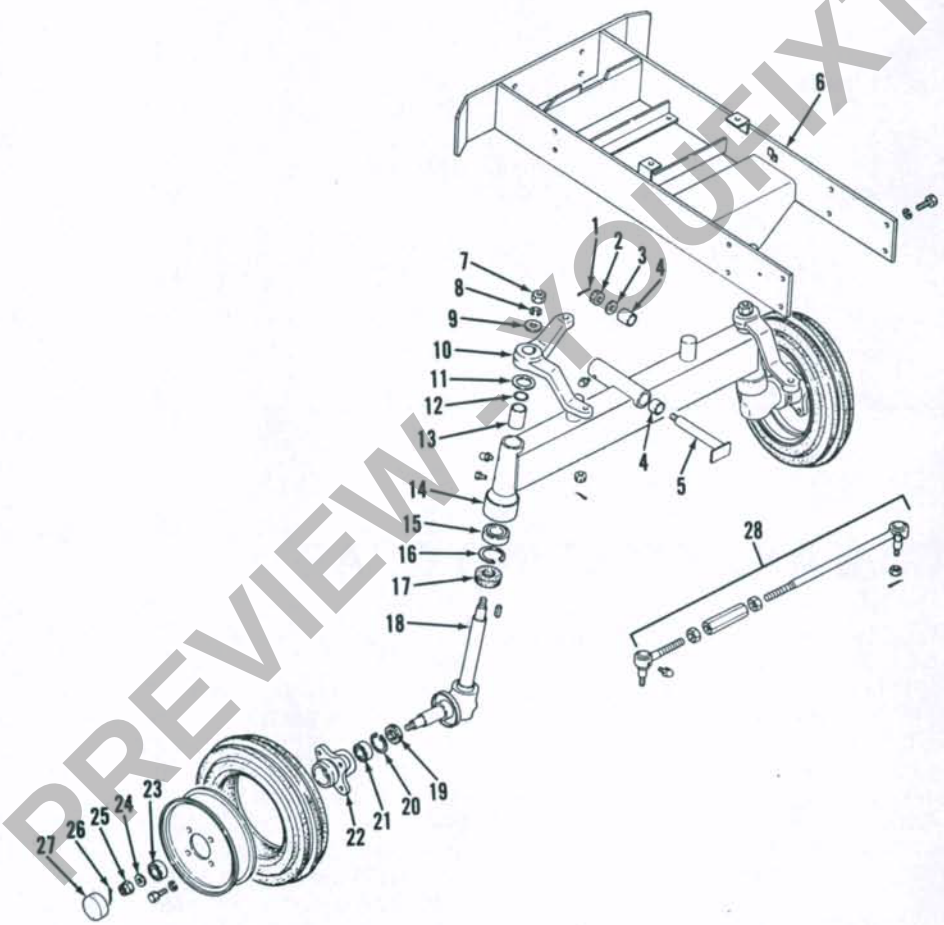


Fig. 1 – Exploded view of non-adjustable front axle used on YM155 models. Axle used on YM135 is similar.

1. Cotter pin
2. Castle nut
3. Washer
4. Bushings (25x24 mm for YM135, 25x25 mm for YM155)
5. Pivot shaft
6. Frame
7. Nut
8. Lockwasher
9. Plain washer
10. Steering arm
11. Cover washer (40x3 mm)
12. "O" ring
13. Bushing (29x38 mm)
14. Axle main member
15. Ball bearing (6205)
16. Snap ring
17. Seal
18. Spindle
19. Seal
20. Snap ring
21. Ball bearing (6205)
22. Hub
23. Ball bearing (6204)
24. Plain washer
25. Castle nut
26. Cotter pin
27. Cap
28. Tie rod assy.

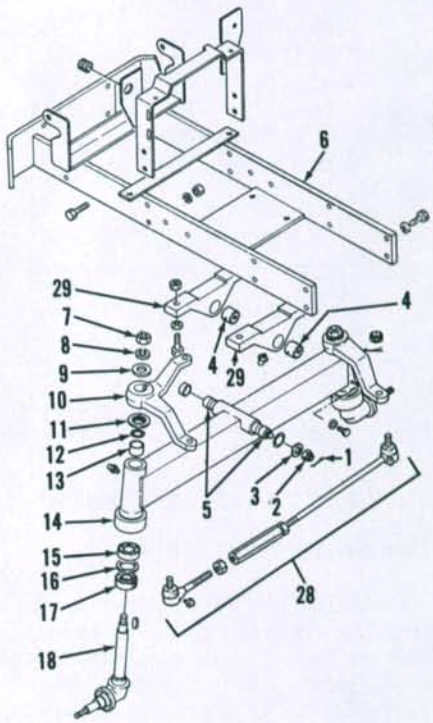


Fig. 2 – Exploded view of standard non-adjustable front axle used on some YM195 and YM240 models. Refer to Fig. 1 for wheel hub and bearings. Refer to Fig. 2A for optional adjustable axle and heavy duty axle.

1. Cotter pin
2. Castle nut
3. Washer
4. Bushings (25x25 mm)
6. Frame
7. Nut
8. Lockwasher
9. Plain washer
10. Steering arm
11. Cover
12. "O" ring
13. Bushing (29x38 mm)
14. Axle main member
15. Ball bearing (6205)
16. Washer (42x51.8x1 mm)
17. Seal
18. Spindle
28. Tie rod
29. Pivot bracket

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nut (14), then remove nut and tang washer. Bump axle (1) out of bearing (12) and gear (11). Seal wear sleeve (3) will remain on axle (1). Unbolt bearing retainer plate (10), then use a soft drift to drive gear and bearing (8) from cover (4).

Support outer drive housing, then remove four screws (B – Fig. 31). Separate outer drive housing (15 – Fig. 32) from spindle housing (25). Be careful to save and record thickness of shims (34) located between steering arm (35) and outer drive housing (15). Steering arm (35) can be lifted from axle.

Unbolt spindle upper cap (31), then bump spindle shaft (26), spindle cap (31), gear (28) and bearing (29), **UP** out of housing (25). Bevel gear (36), bearing (37), thrust washer (39) and shims (38) can be removed after removing snap ring (40).

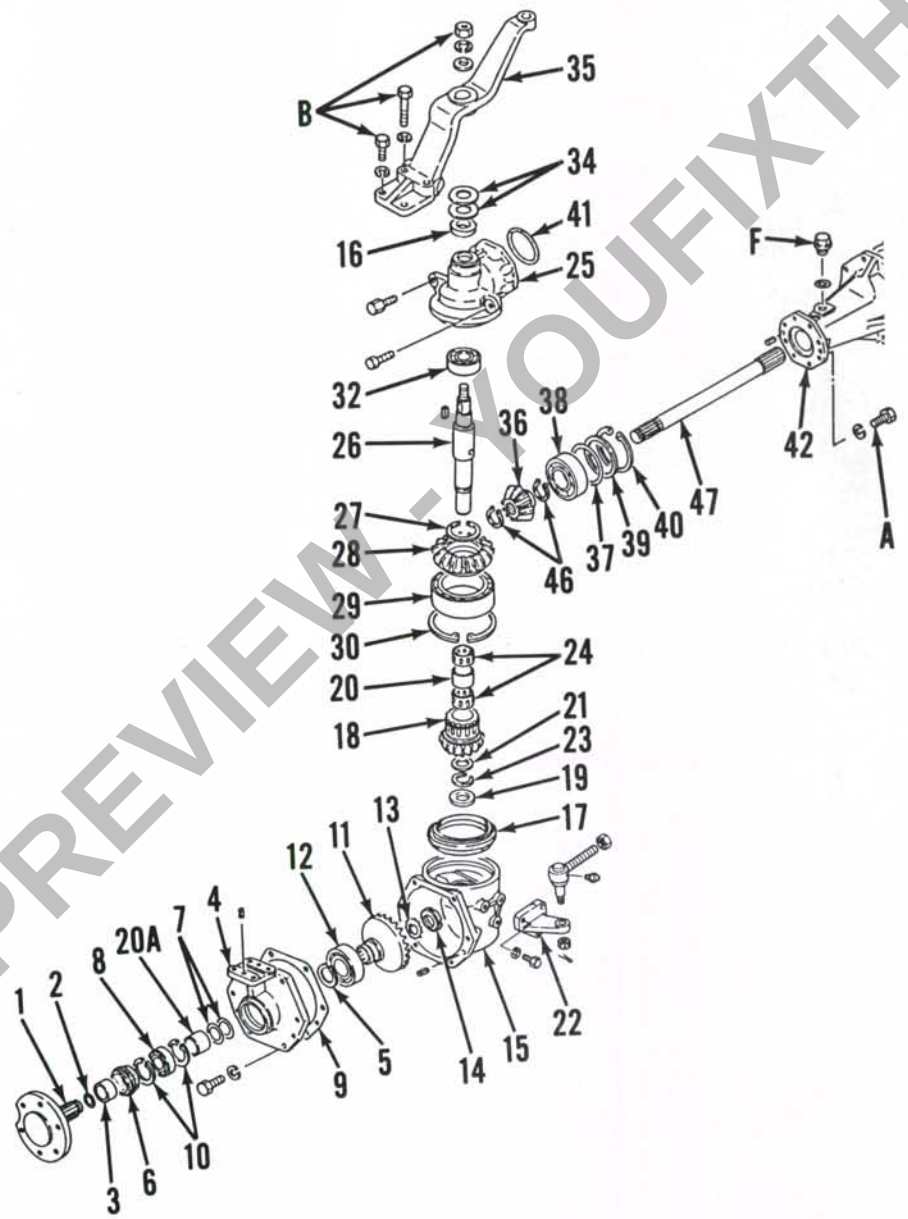
If not already removed, remove screws (A – Fig. 30) and lift housing from axle housing.

Clean and check all parts, especially seals, bearings and journals for roller bearing. Renew all seals and "O" rings upon reassembly.

Thickness of shims (7 and 38 – Fig. 32) is used to adjust backlash between gears; shims (34) are used to adjust spindle end play. Refer to the following for selection of shims and reassembly.

Install bearing (24) and snap ring (23) in lower bore of housing (25). Assemble spindle (26), snap ring (27), gear (28) and bearing (29), then locate in spindle housing (25). Install gasket (30) and cap (31). Tighten cap retaining screws to 23-30 N·m (16.96-22.13 ft.-lbs.) torque.

Install gear (36) and bearing (37) in bore of housing (25). Bump bearing into bore as far as possible, then install thrust washer (39) and snap ring (40). Measure gap between bearing and thrust washer with feeler gage, then install shims (38) necessary to reduce clearance to 0.07-0.17mm (0.0028-0.0067 in.). Actual backlash between teeth of gears (28 and 36) should be 0.10-0.15 mm (0.0039-0.0059 in.). Remove snap ring (40) and thrust washer (39) to install shims, then reinstall thrust washer and snap ring. Measure clearance again after shims are installed. **Be sure that open section of snap ring is aligned with notch at bottom of housing to assure proper lubrication.**



1. Axle
2. "O" ring (YM240D only)
3. Wear sleeve (40x50x20 mm, YM240D only)
4. Cover
5. Snap ring (YM240D only)
6. Oil seal
7. Shims
8. Ball bearing (6007 for YM195D, 6008 for YM240D)
9. Gasket
10. Snap rings (1 used on YM195D)
11. Bevel gear
12. Ball bearing (6211 for YM240D)
13. Lockwasher
14. Nut
15. Gear housing
16. Seal
17. Seal
18. Bevel gear
19. Washer (25x35x2 mm)
20. Spacer (28x33.5x18 mm for YM195D, 28x33.5x22.5 mm for YM240D)
21. Washer (28x33x6.5 mm for YM195D, 28x33.5x2 mm for YM240D)
22. Tie rod arm
23. Snap ring
24. Roller bearings (K283518)
25. Spindle housing
26. Spindle shaft
27. Snap ring
28. Bevel gear
29. Ball bearing (6013)
30. Snap ring
31. Spacer (42.7x25.5 mm for YM195D, 48.6x38.5 mm for YM240D)
32. Ball bearing
34. Shims
35. Steering arm
36. Drive gear
37. Shims
38. Ball bearing (6207)
39. Washer
40. Snap ring
41. "O" ring
42. Axle housing
46. Snap rings
47. Drive axle

Fig. 22 – Exploded view of outer drive housing used on YM240D models. Model YM195D is similar except for differences in axle (1), gear (11) and related parts.

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CRANKSHAFT AND MAIN BEARINGS

Two Cylinder Models

72. The crankshaft of two cylinder models is supported in two main bearings and crankshaft end thrust is taken by a thrust washer (9–Fig. 60 or Fig. 61) located at each end of the crankshaft. To remove the crankshaft and/or main bearings from all models, proceed as follows:

Separate the front axle, frame and radiator as outlined in paragraph 40, then refer to paragraph 42 to complete removal of engine. Refer to paragraph 45 to remove the cylinder head and to paragraph 54 to remove the timing gear cover. Refer to paragraph 65 to remove the rod and piston units and to paragraph 131 for removing the clutch and flywheel. Pull crankshaft gear from crankshaft and remove the oil pick-up tube. Turn the engine so that weight rests on front face of cylinder block and rear end is up. Weight of crankshaft should be vertical against front of engine.

Unbolt and remove rear main bearing and seal housing, being careful not to damage the rear thrust bearing. Withdraw crankshaft from cylinder block. Use care to prevent damage to all parts including the front thrust bearing which will be free to fall as the crankshaft is lifted out of front main bearing. Inspect main bearings and crankshaft using the following specification data.

YM135, YM135D, YM155, YM155D

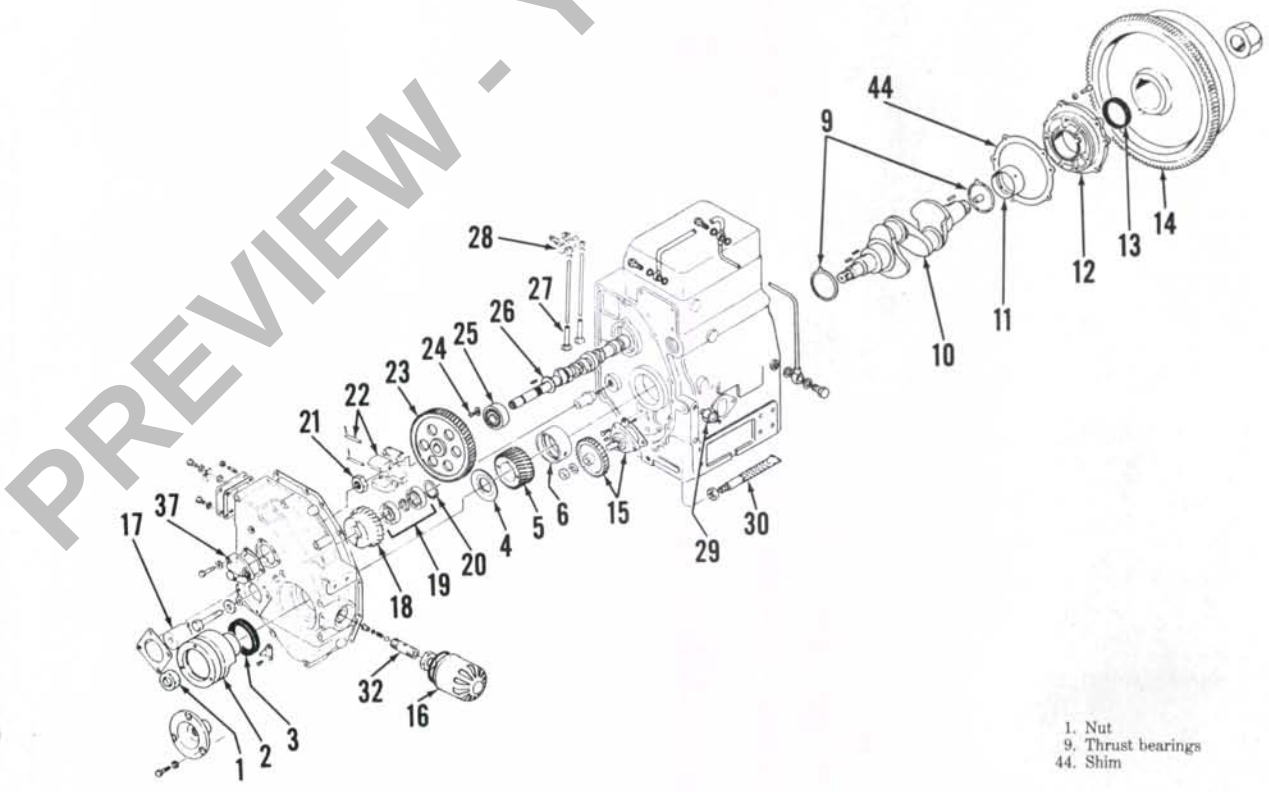
Crankshaft Main Journal (Both)
Diameter–
New . . . . . 64.950-64.964 mm (2.5571-2.5576 in.)
Wear Limit . . . . . 64.91 mm (2.5555 in.)
Main Bearing (Both) Diameter–
New . . . . . 65.00-65.049 mm (2.5591-2.5610 in.)
Wear Limit . . . . . 65.10 mm (2.5630 in.)
Main Journal to Bearing Clearance–
New . . . . . 0.036-0.099 mm (0.0014-0.0039 in.)
Wear Limit . . . . . 0.2 mm (0.0079 in.)

YM195, YM195D, YM240, YM240D

Crankshaft Main Journal (Both)
Diameter–
New . . . . . 69.950-69.964 mm (2.7539-2.7545 in.)
Wear Limit . . . . . 69.90 mm (2.7520 in.)
Main Bearing (Both) Diameter–
New . . . . . 70.00-70.06 mm (2.7559-2.7583 in.)
Wear Limit . . . . . 70.10 mm (2.7598 in.)
Main Journal to Bearing Clearance–
New . . . . . 0.036-0.099 mm (0.0014-0.0039 in.)
Wear Limit . . . . . 0.2 mm (0.0079 in.)

The front main bearing (6–Fig. 60 or Fig. 61) is pressed into cylinder block and the rear main bearing (11) is pressed into rear housing on all models. Be sure to align oil holes in bearings with passages in block and housing when pressing new bearings into position. Rear seal (13) should be pressed into rear bore of housing with lip toward front (inside).

The thrust washers which limit crankshaft end play should be 2.9-3.0 mm (0.1142-0.1181 in.) thick with wear limit of 2.75 mm (0.1083 in.). Crankshaft end play should be 0.1-0.2 mm (0.0039-0.0079 in.) with maximum limit of 0.4 mm (0.0157 in.). Be sure that all bearings and seals are lubricated with engine oil and stand cylinder block on front face so that crankshaft can be inserted from above. Position the front thrust washer in block recess with oil channels toward crankshaft and lug engaging notch in block. Lower the crankshaft into block. Use grease to stick thrust washer into rear bearing and seal housing. Be sure that lubrication grooves are toward crankshaft and lug on thrust washer engages notch in housing. Install rear bearing and seal



1. Nut
9. Thrust bearings
44. Shim

Fig. 61 – Partially exploded view of timing gears, camshaft and crankshaft for YM195, YM195D, YM240 and YM240D models. Refer to Fig. 62 for legend except the following.

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Width of shift fork groove in gears and collars –
Desired .....7.1-7.3 mm (0.2795-0.2874 in.)
Thickness of all shift fork tips .....6.7-6.9 mm (0.2638-0.2717 in.)
Clearance between fork tip and groove –
Desired .....0.2-0.6 mm (0.0079-0.0236 in.)
Wear limit .....1.0 mm (0.0394 in.)
OD of shift fork rails .....14.966-14.984 mm (0.5892-0.5899 in.)
ID of shift fork .....15.000-15.043 mm (0.5906-0.5922 in.)
Clearance between shift fork and rail –
Desired .....0.016-0.077 mm (0.0006-0.0030 in.)
Wear limit .....0.2 mm (0.0079 in.)

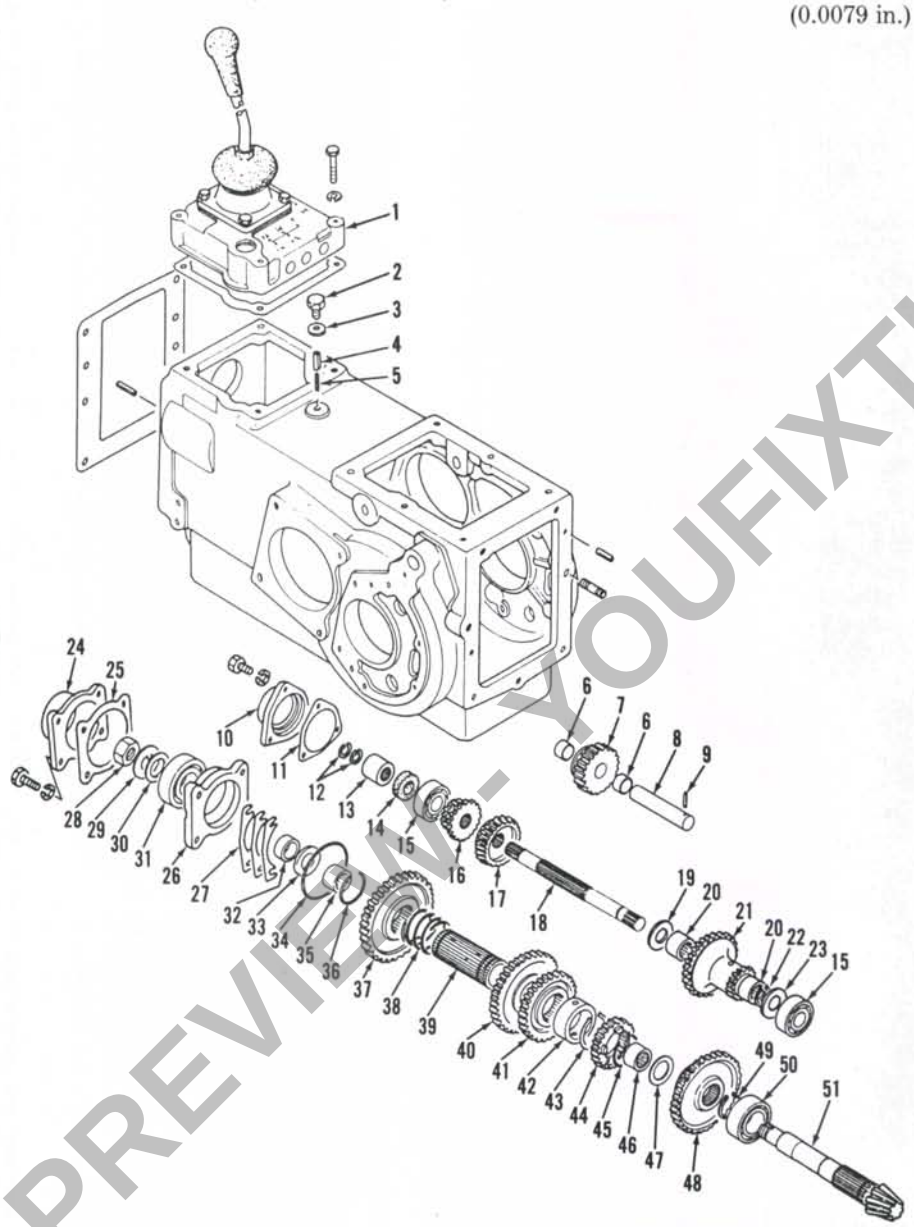


Fig. 161 – Exploded view of transmission gears, shafts and related parts.

1. Shift cover
2. Plug
3. Copper washer
4. Roll pin (6x14 mm)
5. Roll pin (3.6x14 mm)
6. Bushings
7. Reverse gear
8. Shaft
9. Roll pin (6x16 mm)
10. Oil seal retainer
11. Gasket
12. Snap rings
13. Coupling
14. Oil seal (TC355511)
15. Ball bearings (6304)
16. First & second sliding gear
17. Third & fifth sliding gear
18. Main shaft
19. Thrust washer (20x38x4 mm)
20. Needle bearing (2020 TLA)
21. Reduction gear
22. Snap ring
23. Thrust washer
24. Countershaft cover
25. Gasket
26. Bearing retainer
27. Shims
28. Nut
29. Tang washer
30. Washer (20 or 22x38x4.5 mm)
31. Ball bearing (6306)
32. Spacer (20x42x7 mm)
33. Washer
34. "O" ring
35. Needle bearing (2526 TLA)
36. Snap ring (same as 45)
37. First speed gear
38. Spring
39. Countershaft gear sleeve
40. Second speed gear
41. Third speed gear
42. Spacer
43. Snap ring
44. Fifth speed gear
45. Snap ring (same as 36)
46. Needle bearing (same as 35)
47. Thrust washer (20x43x2.5 mm)
48. Range shift gear
49. Snap ring
50. Double row ball bearing (5206)
51. Countershaft & bevel pinion

Press seal (14) into bore of retainer (10) with spring loaded lip toward rear (bearing). Coat lips of seal with grease before installing. Press front needle bearing (20F – Fig. 162) into bore until bearing case is 6 mm (0.2362 in.) below flush with bore as shown at (A). Press rear needle bearing (20R) into bore until bearing case is 1 mm (0.0394 in.) below flush with rear edge of reduction gear (21) as shown at (B). Needle bearings (20F and 20R) have number stamped on one side of bearing case. The stamped numbers on both bearings (20F and 20R) should be toward outside of gear (21).

Usually roll pins (4 and 5 – Fig. 161) do not require removal; however, roll pins must be correctly installed before installing mainshaft (10 through 23). Larger roll pin (4) should be driven into housing with groove toward rear and pin should protrude into bore for rear bearing only to depth of outer bearing race. Smaller (inner) roll pin (5) should be driven into center of larger roll pin but groove should be toward front, away from groove of larger pin. Be sure both roll pins protrude far enough into bore to stop rear bearing outer race, but not enough to interfere with rotation of shaft. Bearing (15) can be pressed into rear bore with numbers stamped on side of race toward rear.

When assembling countershaft, side of bearing (50) with numbers should be toward bevel gear of countershaft (51). Be sure retaining rings (36, 43 and 49) are firmly in place when assembling counter gears. Needle bearings (35 and 46) should be 1 mm (0.0394 in.) below flush with ends of gear sleeve (39). Nut (28) should be tightened to 78.45-98.07 N·m (58-72 ft.-lbs.) torque, then lock position by bending washer (29) around one flat of nut. Refer to paragraph 191 for setting mesh position of bevel pinion by varying thickness of shims (27). Coat gasket (25) with sealer, then tighten stud nuts or screws retaining cover (24) to 22.56-29.42 N·m (17-22 ft.-lbs.) torque.

Install range shift fork, rail, shifter and related parts (26 through 32 – Fig. 160). Roll pin (28) should be installed with groove toward end of rail (27) or front. The roll pin should be centered in rail. "O" ring (30) should be in inner groove of shifter (29) and retainer (31) enters the outermost groove. Screw attaching retainer (31) to housing should be tightened to 22.56-29.42 N·m (17-22 ft.-lbs.) torque.

Bushings (6 – Fig. 161) should be flush with sides of gear (7). Be sure bushings are not protruding. Install reverse gear assembly (6,7,8 and 9) making sure roll pin (9) is installed with groove toward end of shaft (rear).

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