

Fig. 73—Exploded view of shifter mechanism used on Models B5100D and B5100E. Components 35 through 44 are used on Model B5100D and components 46 and 47 are used on Model B5100E.

UDT hydrostatic transmission fluid, Shell Donax-TD or TM, Mobil Fluid 350, Exxon Torque Fluid 56. Bleed fuel system as outlined in paragraph 36.

REMOVE AND REINSTALL

All Models

73. Split clutch housing from transmission case as outlined in paragraph 72. Remove shift cover (11—Fig. 73 or Fig. 74) as an assembly with shift components. Remove hydraulic lift covers as outlined in paragraph 99. Remove cap screws and nuts securing gear transmission case to center housing. Separate assemblies, then withdraw transmission assembly while being careful not to allow any component to fall free.

Installation is reverse order of removal. Tighten cap screws and nuts securing transmission to center housing to 39-43 N·m (29-32 ft.-lbs.) torque. Install shift cover assembly. Refer to paragraphs 99 and 72 to complete reassembly.

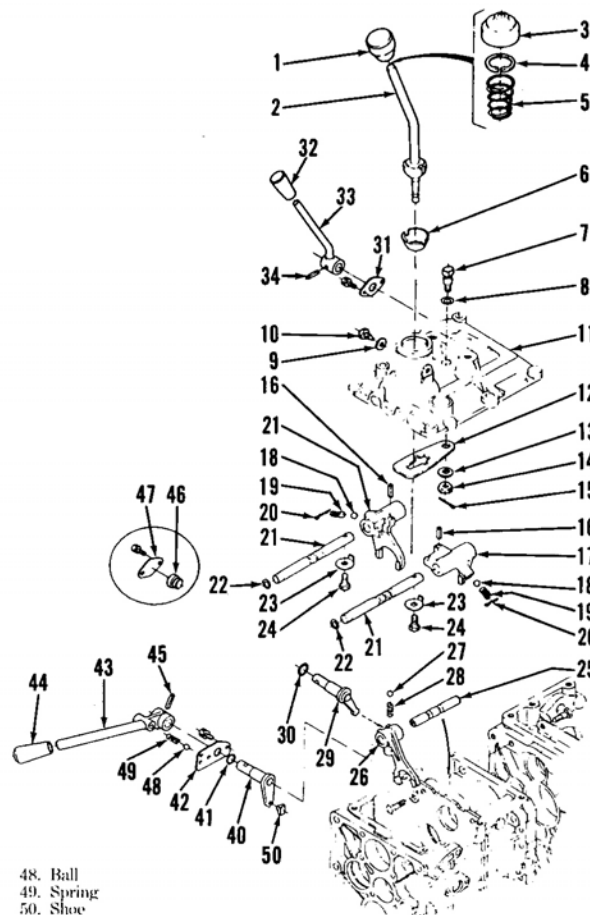
OVERHAUL

All Models

74. Disassembly is evident after reference to Figs. 73 and 77 for Model B5100D, Figs. 73 and 76 for Model

Fig. 74—Exploded view of shifter mechanism used on Models B6100D, B6100E and B7100D. Components (40 through 50) are used on Models B6100D and B7100D and components (46 and 47) are used on Model B6100E.

- 1. Knob
- 2. Shift lever
- 3. Cover
- 4. Snap ring
- 5. Spring
- 6. Bushing
- 7. Check plate bolt
- 8. "O" ring
- 9. Gasket
- 10. Rod guide pin
- 11. Shift cover
- 12. Check plate
- 13. Washer
- 14. Castle nut
- 15. Cotter key
- 16. Pin
- 17. Shift fork
- 18. Ball
- 19. Spring
- 20. Cotter key
- 21. Rail
- 22. "O" ring
- 23. Tab washer
- 24. Cap screw
- 25. Rail
- 26. Shift fork
- 27. Ball
- 28. Spring
- 29. Lever
- 30. "O" ring
- 31. Plate
- 32. Grip
- 33. Range shift lever
- 34. Pin
- 40. Lever
- 41. "O" ring
- 42. Plate
- 43. Front-wheel drive select lever
- 44. Grip
- 45. Pin
- 46. Plug
- 47. Cover plate



- 48. Ball
- 49. Spring
- 50. Shoe

B5100E, Figs. 74 and 79 for Models B6100D and B7100D and Figs. 74 and 78 for Model B6100E.

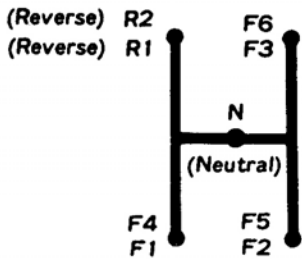


Fig. 75 — View showing main shift lever (2 — Fig. 73 or Fig. 74) shift pattern.

Inspect all components for excessive wear and damage. On Models B6100D, B6100E and B7100D, inside diameter of bushing (70 — Fig. 78 or Fig. 79) should be 20.00-20.02 mm (0.7874-0.8661 inch). Diameter of third shaft (74) at bushing running area should be 19.97-20.02 mm (0.7862-0.8661 inch). Clearance between shaft and bushing should be 0.02-0.06 mm (0.0008-0.0024 inch). Renew all parts as needed.

Reassembly is reverse order of disassembly. Recommended gear backlash is 0.1-0.2 mm (0.004-0.008 inch) with an acceptable limit of 0.4 mm (0.016 inch). Apply a thin coating of a suitable lubricant to all working components during reassembly.

REAR AXLE DIFFERENTIAL AND BEVEL GEARS

All Models

75. REMOVE & REINSTALL. Drain transmission/hydraulic system fluid into a suitable container. Raise hood and disconnect battery cable from negative battery post. Raise rear wheels off the ground, then detach and remove both rear wheels. Remove both rear fender assemblies. Remove seat from

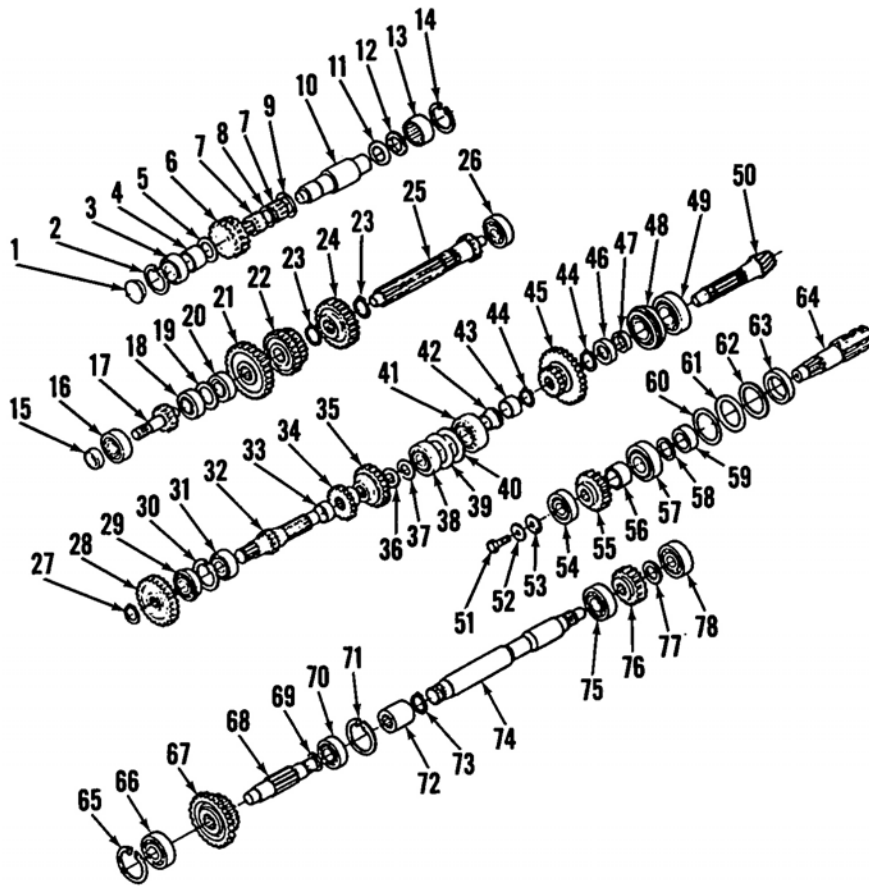


Fig. 76 — Exploded view of transmission gears, shafts and other components showing relative installed position used on Model B5100E.

- | | | | |
|--------------------|-------------------|-----------------------|---------------------|
| 1. Cap | 21. Gear | 40. Spacer | 59. Bushing |
| 2. Snap ring | 22. Gear | 41. Bearing | 60. Shim |
| 3. Bearing | 23. Snap ring | 42. Bushing | 61. Shim |
| 4. Bushing | 24. Gear | 43. Spacer | 62. Spacer |
| 5. Thrust washer | 25. Fourth shaft | 44. Snap ring | 63. Oil seal |
| 6. Gear | 26. Bearing | 45. Gear | 64. Pto shaft |
| 7. Needle bearings | 27. Snap ring | 46. Spacer | 65. Snap ring |
| 8. Spacer | 28. Gear | 47. Stop collar | 66. Bearing |
| 9. Thrust washer | 29. Bearing | 48. Bearing | 67. Gear |
| 10. Reverse shaft | 30. Snap ring | 49. Bearing | 68. Third shaft |
| 11. Shim | 31. Bearing | 50. Bevel pinion gear | 69. Thrust washer |
| 12. Thrust washer | 32. Second shaft | 51. Cap screw | 70. Bearing |
| 13. Needle bearing | 33. Spacer | 52. Washer | 71. Snap ring |
| 14. Snap ring | 34. Gear | 53. Washer | 72. Coupling |
| 15. Oil seal | 35. Gear | 54. Bearing | 73. Snap ring |
| 16. Bearing | 36. Shim | 55. Pto gear | 74. Pto drive shaft |
| 17. Input shaft | 37. Thrust washer | 56. Spacer | 75. Bearing |
| 18. Bearing | 38. Bearing | 57. Bearing | 76. Gear |
| 19. Spacer | 39. Shim | 58. Spacer | 77. Snap ring |
| 20. Bearing | | | 78. Bearing |

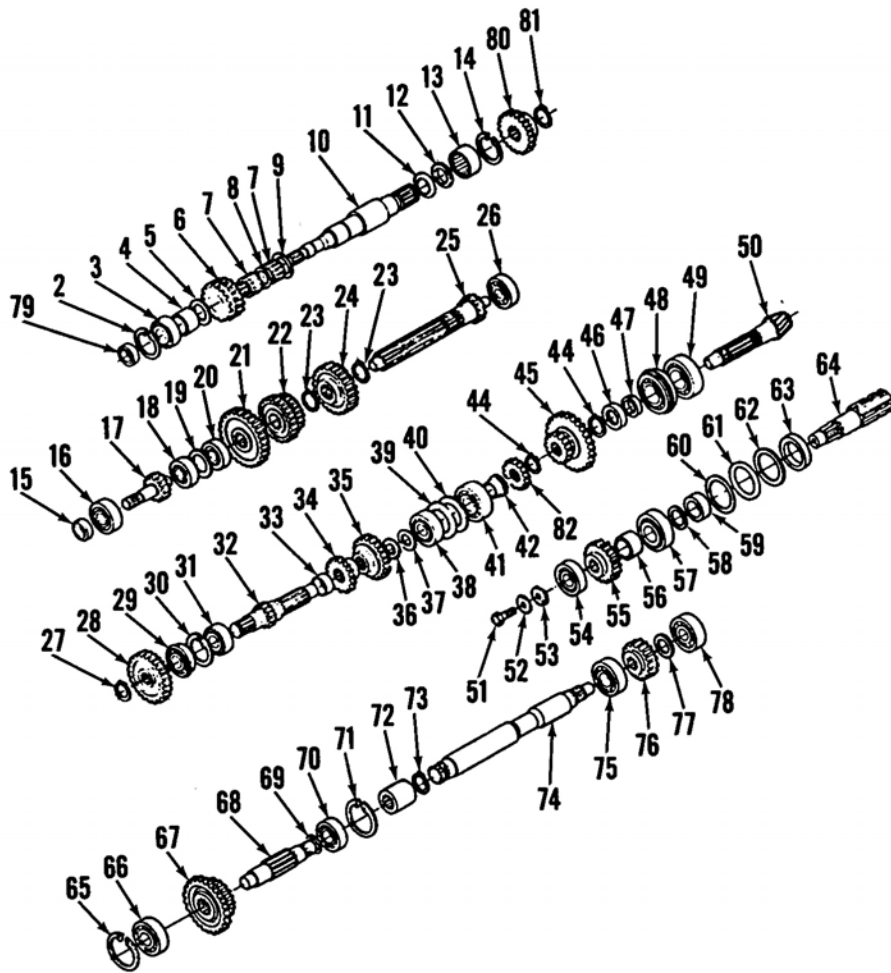


Fig. 77—Exploded view of transmission gears, shafts and other components showing relative installed position used on Model B5100D. For identification of parts, refer to legend in Fig. 75 except for the following front-wheel drive components.

79. Oil seal

80. Driven gear

81. Snap ring

82. Drive gear

lift cover. Disconnect and remove differential lock and brake rods. Remove control rod from control valve actuating lever. Remove three cap screws retaining control valve to lift cover, then separate components being careful not to drop the two "O" rings. Remove bracket mounted to lift cover cylinder head. Remove top link bracket at rear of lift cover. Remove the nine cap screws securing lift cover to center housing, then tap lift cover upwards using a suitable mallet. Note that lift cover must be lifted upward because of dowel pins located in center housing. Remove the ten cap screws retaining left and right axle case assemblies to center housing. Tap axle shaft with a suitable mallet to break components apart, then carefully extract assemblies. Remove left (18—Fig. 81) and right (17) differential bearing holders and withdraw shims (4 and 5—Fig. 80). Lift out differential and bevel ring gear assembly from center housing.

Installation is reverse order of removal. Renew all gaskets and "O" rings. Backlash between bevel ring gear and bevel pinion should be 0.1-0.2 mm (0.004-0.008 inch) with an allowable limit of 0.4 mm (0.016 inch). Adjust by varying thickness of shim (4 or 5—Fig. 80) until recommended backlash is attained. Tighten cap screws securing left and right axle case to center housing to 48-56 N·m (35-41 ft.-lbs.) torque for M10 cap screws and 77-90 N·m (57-67 ft.-lbs.) torque for M12 cap screws. Tighten cap screws securing lift cover to center housing to 25-29 N·m (19-22 ft.-lbs.) torque. Tighten cap screws mounting top link bracket to lift cover to 41-47 N·m (30-35 ft.-lbs.) torque.

Capacity of transmission/hydraulic system is 13.5 liters (3.6 U.S. gallons) for Models B6100HST-D, B6100HST-E, B7100HST-D and B7100HST-E and 8.5 liters (2.21 U.S. gallons) for Models B5100D and B5100E and 11.5 liters (3 U.S. gallons) on Models B6100D,

B6100E and B7100D. Use only the following transmission/hydraulic fluid or a suitable equivalent: Kubota UDT hydrostatic transmission fluid, Shell Donax-TD or TM, Mobil Fluid 350, Exxon Torque Fluid 56. Add fluid as needed until lubricant level is at full mark on inspection dipstick.

Adjust differential lock control rod as outlined in paragraph 77. Adjust brake pedal free play as outlined in paragraph 80.

76. OVERHAUL. Use a suitable bearing puller and push plate to withdraw left and right case bearings (3—Fig. 80). Bend ears of lock plate (6), then remove the four cap screws securing bevel ring gear (2) to differential case (1). Tap components with a suitable mallet to break apart, then complete separation. Extract retaining pin (8), then slide cross-shaft (9) from differential case. Complete disassembly with reference to Fig. 80.

Clean all parts in a suitable cleaning solvent and blow dry with clean compressed air. Inspect components for excessive wear and damage.

Outside diameter of cross-shaft (9) should be 13.973-13.984 mm (0.5502-0.5506 inch). Inside diameter of spider gears (14) should be 14.000-14.018 mm (0.5512-0.5519 inch). Clearance between shaft outside diameter and bushing inside diameter should be 0.016-0.045 mm (0.0006-0.0018 inch) with an allowable

limit of 0.25 mm (0.01 inch). Outside diameter of side gears (10) should be 31.959-31.975 mm (1.2582-1.2589 inches). Inside diameter of bushing in differential case (1) and bevel ring gear (2) should be 32.000-32.025 mm (1.2598-1.2608 inches). Clearance between side gear outside diameter and bushing inside diameter should be 0.025-0.066 mm (0.0010-0.0026 inch) with an allowable limit of 0.25 mm (0.01 inch). Renew all parts as needed.

Reassembly is reverse order of disassembly. Coat all parts with a thin film of a suitable lubricant during reassembly. Tighten cap screws securing bevel ring gear (2) to differential case (1) to 30-35 N·m (22-26 ft.-lbs.) torque. After reassembly, check backlash between spider gears (14) and side gears (10) using a dial indicator as shown in Fig. 82. Backlash should be 0.15-0.30 mm (0.006-0.012 inch) with an allowable limit of 0.4 mm (0.016 inch). If backlash is

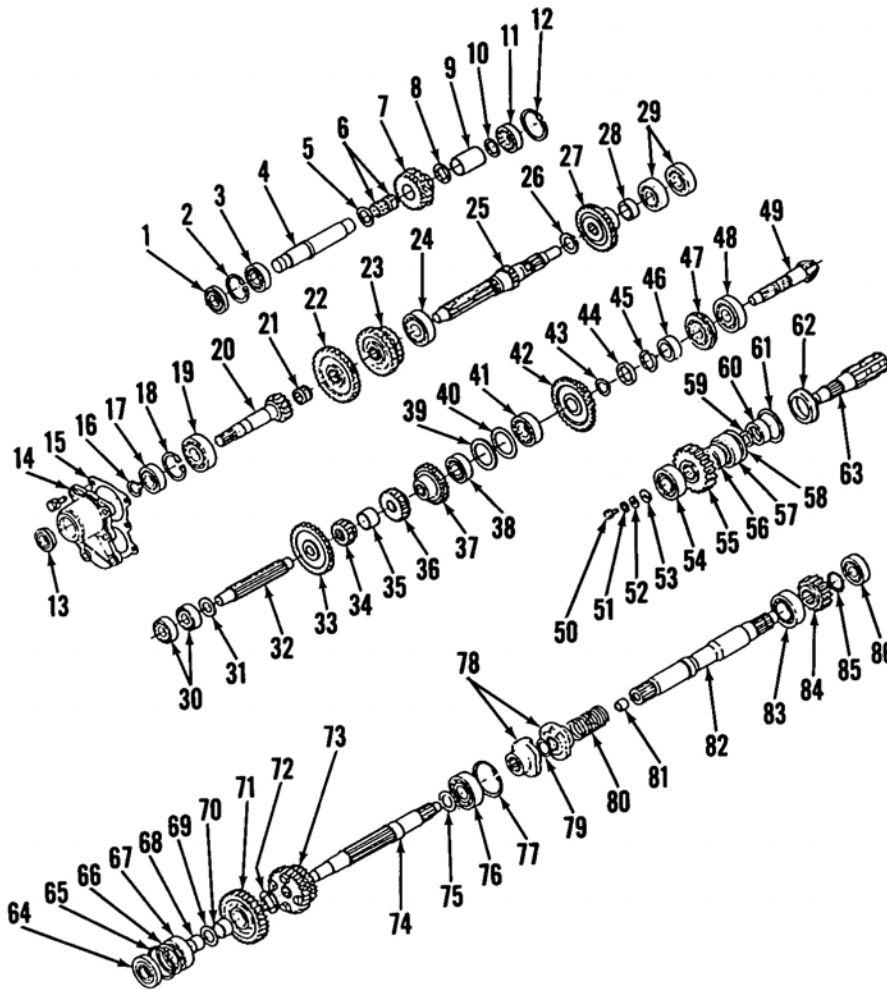


Fig. 78 — Exploded view of transmission gears, shafts and other components used on Model B6100E.

- | | | | |
|--------------------|-------------------|-----------------------|--------------------|
| 1. Oil seal | 23. Gear | 44. Spacer | 65. Snap ring |
| 2. Snap ring | 24. Bearing | 45. Stop collar | 66. Shim |
| 3. Bearing | 25. Fourth shaft | 46. Spacer | 67. Bearing |
| 4. Reverse shaft | 26. Snap ring | 47. Bearing | 68. Spacer |
| 5. Thrust washer | 27. Gear | 48. Bearing | 69. Thrust washer |
| 6. Needle bearings | 28. Spacer | 49. Bevel pinion gear | 70. Bushing |
| 7. Gear | 29. Bearings | 50. Cap screw | 71. Gear |
| 8. Thrust washer | 30. Bearings | 51. Washer | 72. Thrust washer |
| 9. Spacer | 31. Thrust washer | 52. Washer | 73. Gear |
| 10. Thrust washer | 32. Second shaft | 53. Washer | 74. Third shaft |
| 11. Bearing | 33. Gear | 54. Bearing | 75. Shim |
| 12. Snap ring | 34. Gear | 55. Pto gear | 76. Bearing |
| 13. Oil seal | 35. Spacer | 56. Spacer | 77. Snap ring |
| 14. Front cover | 36. Gear | 57. Bearing | 78. One-way clutch |
| 15. Gasket | 37. Gear | 58. Spacer | 79. Snap ring |
| 16. Snap ring | 38. Bearing | 59. Spacer | 80. Spring |
| 17. Bearing | 39. Spacer | 60. Bushing | 81. Bushing |
| 18. Snap ring | 40. Shim | 61. Shim | 82. Fifth shaft |
| 19. Bearing | 41. Bearing | 62. Oil seal | 83. Bearing |
| 20. Input shaft | 42. Gear | 63. Pto shaft | 84. Gear |
| 21. Needle bearing | 43. Snap ring | 64. Oil seal | 85. Snap ring |
| 22. Gear | | | 86. Bearing |

beyond limits adjust by varying thickness of thrust washer (12—Fig. 80). Thrust washer (12) is available in thicknesses of 0.7-0.8 mm (0.0276-0.0315 inch), 0.9-1.0 mm (0.0367-0.0394 inch) and 1.1-1.2 mm (0.0433-0.0472 inch). Correct thickness of thrust washer (13) is 0.9-1.0 mm (0.0367-0.0394 inch).

DIFFERENTIAL LOCK

All Models

77. Differential lock assembly mounts in right axle case housing. To service differential lock components, remove right

axle case assembly as outlined in paragraph 78. Separate differential lock components as shown in Fig. 84.

Inspect all components for excessive wear and damage. Make sure engagement teeth on cam (3—Fig. 83) and differential case (2) engage properly and are not chipped, cracked or damaged in any other way. Measure free length of differential lock spring (5), reference value is 40 mm (1.5748 inches). Renew all parts as needed.

Reassembly is reverse order of disassembly. Refer to paragraph 78 to reinstall right axle case assembly. Adjust differential lock pedal travel to a length of 28 mm (1.1024 inches) on Models B5100D and B5100E, 23 mm (0.9055 inch) on Models B6100D, B6100E and B7100D and 4-8 mm (5/32-5/16 inch) on all other models.

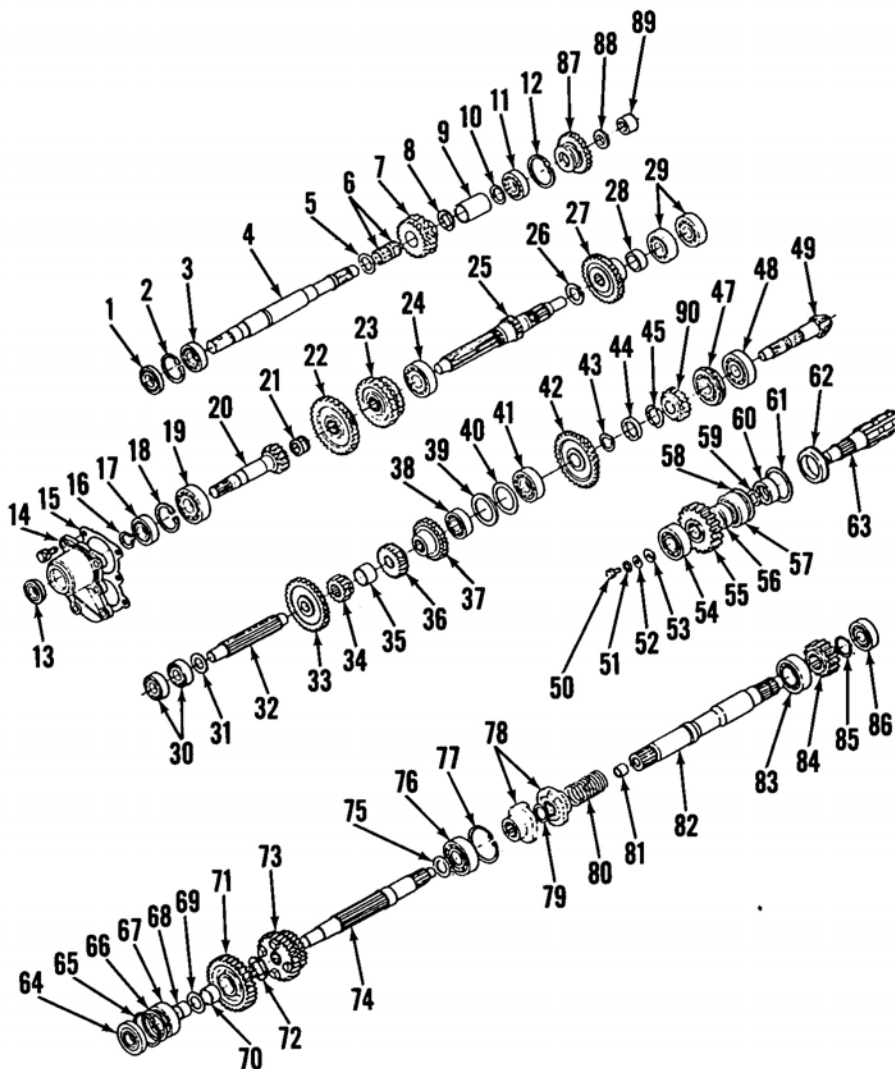


Fig. 79—Exploded view of transmission gears, shafts and other components used on Models B6100D and B7100D. For identification of parts, refer to legend in Fig. 77 except for the following front-wheel drive components.

- 87. Driven gear
- 88. Thrust washer
- 89. Needle bearing
- 90. Drive gear

FINAL DRIVE

All Models

78. REMOVE AND REINSTALL. Drain transmission/hydraulic system fluid into a suitable container. Raise rear wheel of the side to be serviced off the ground, then detach and remove rear

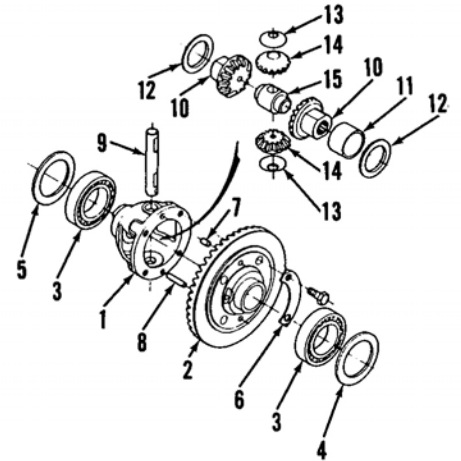


Fig. 80—Exploded view of rear axle differential and bevel ring gear typical of all models.

- 1. Differential case
- 2. Bevel ring gear
- 3. Bearing
- 4. Shim (left)
- 5. Shim (right)
- 6. Lock plate
- 7. Knock pin
- 8. Retaining pin
- 9. Cross-shaft
- 10. Side gear
- 11. Bushing
- 12. Thrust washer
- 13. Thrust washer
- 14. Spider gear
- 15. Thrust collar

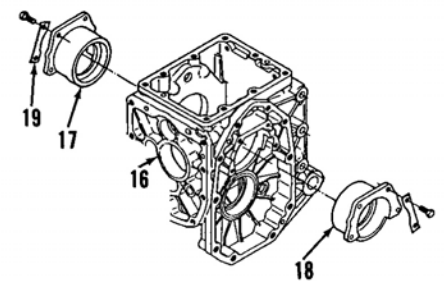


Fig. 81—Left differential bearing holder (18) and right differential bearing holder (17) mount to center housing (16). Retaining cap screws are secured by lock plate (19).

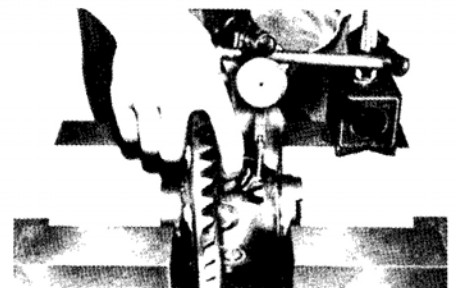


Fig. 82—Check backlash between spider gear and side gear using a dial indicator as shown. Refer to text.

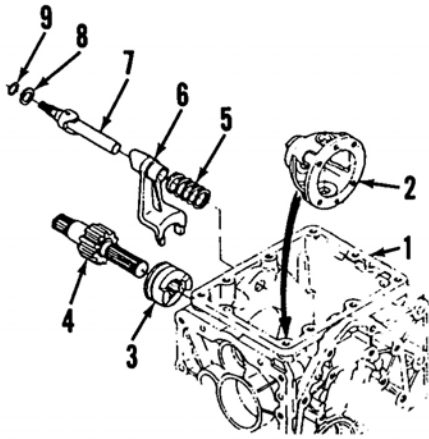


Fig. 83—Exploded view of differential lock assembly typical of the type used on all models.

- | | |
|--------------------------|-------------------|
| 1. Center housing | 6. Fork |
| 2. Differential case | 7. Engagement rod |
| 3. Differential lock cam | 8. Shim |
| 4. Bull pinion gear | 9. "O" ring |
| 5. Spring | |

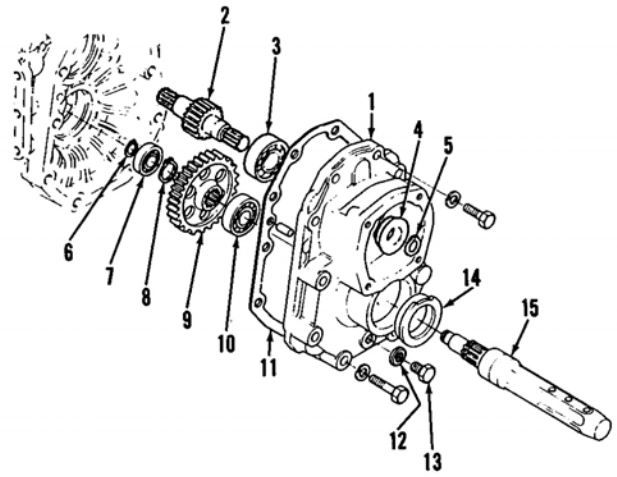
wheel. Remove fender assembly. Disconnect and remove differential lock rod (right side only) and brake rod. Remove the ten cap screws retaining axle case assembly to center housing. Tap axle shaft with a suitable mallet to break components apart, then carefully extract assembly.

Installation is reverse order of removal. Tighten cap screws securing axle case to center housing to 48-56 N·m (35-41 ft.-lbs.) torque for M10 cap screws and 77-90 N·m (57-67 ft.-lbs.) torque for M12 cap screws.

Capacity of transmission/hydraulic system is 13.5 liters (3.6 U.S. gallons) on Models B6100HST-D, B6100HST-E, B7100HST-D and B7100HST-E, 8.5 liters (2.21 U.S. gallons) on Models B5100D and B5100E and 11.5 liters (3 U.S. gallons) on Models B6100D, B6100E and B7100D. Use only the following transmission/hydraulic fluid or a suitable equivalent: Kubota UDT hydrostatic transmission fluid, Shell Donax-TD or TM, Mobil Fluid 350, Exx-

Fig. 85—Exploded view showing final drive assembly used on Models B5100D and B5100E.

1. Rear axle case
2. Bull pinion shaft
3. Bearing
4. Oil seal
5. Snap ring
6. Snap ring
7. Bearing
8. Snap ring
9. Bull gear
10. Bearing
11. Gasket
12. Gasket
13. Drain plug
14. Oil seal
15. Axle shaft



on Torque Fluid 56. Add fluid as needed until lubricant level is at full mark on inspection dipstick.

Adjust differential lock control rod as outlined in paragraph 77. Adjust brake pedal free play as outlined in paragraph 80.

79. OVERHAUL. Before disassembly, check end play of axle shaft (15—Fig. 85 or 86). Recommended end play of axle shaft (15) is 2 mm (0.079 inch). Renewal of axle shaft bearing is required if end play is beyond limit.

Remove brake components as outlined in paragraph 81. If removing right final drive, remove differential lock components. On Models B5100D and B5100E remove snap ring (6—Fig. 85), then extract bearing (7) using a suitable puller. Remove snap ring (8) and withdraw bull gear (9). Using a suitable mallet, tap axle shaft (15) from axle case (1). Remove oil seal (14). Extract bearing (10) from shaft (15) if needed. Remove snap ring (5), then tap pinion shaft (2) from axle case (1). Extract bearing (3) from pinion shaft (2) if needed.

On all other models, remove snap ring

(6—Fig. 86), then extract bearing (7) using a suitable puller. Withdraw bull gear (9) and spacer (16). Remove oil seal (14) and snap ring (8). Using a suitable mallet, tap axle shaft (15) from axle case (1). Extract bearing (10) from shaft (15) if needed. Tap pinion shaft (2) from axle case (1). Extract bearing (3) from pinion shaft (2) if needed.

Examine components for excessive wear and damage. Renew all parts as needed.

Reassembly is reverse order of disassembly. Renew oil seals (4 and 14—Fig. 85 or 86) and gasket (11) during reassembly. Backlash between pinion gear (2) and bull gear (9) should be 0.1-0.2 mm (0.004-0.008 inch) with an allowable limit of 0.5 mm (0.02 inch).

BRAKE

All Models

80. ADJUSTMENT. Disengage brake lock plate so free travel of right and left brake pedal can be measured in-

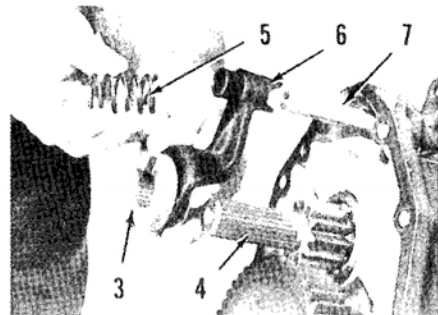
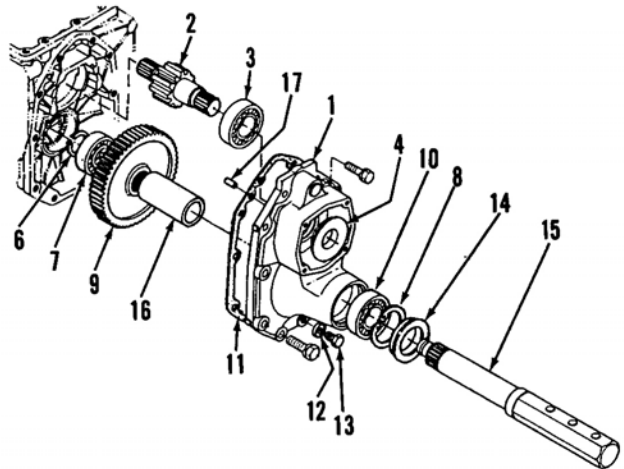


Fig. 84—After removal of right axle case assembly, remove differential lock components as shown. For identification of parts refer to legend in Fig. 83.

Fig. 86—Exploded view showing final drive assembly used on all models except Models B5100D and B5100E. Refer to legend in Fig. 85 for identification of parts except for spacer (16) and dowel pin (17).



dividually. Applying a load of 39-59 N (9-13 lbs.), push down on each brake pedal until beginning of brake actuation is felt. Use a suitable scale and measure this distance. Free travel distance should be 10-30 mm (25/64-1-3/16 inches) with an allowable limit of 40 mm (1-37/64 inches). Difference between right and left brake pedal free travel should not exceed 4 mm (0.16 inch).

81. REMOVE AND REINSTALL.

Raise rear wheel of the side to be serviced off the ground, then detach and remove rear wheel. Remove fender assembly. Disconnect and remove brake rod. Remove the four cap screws securing brake cover (7—Fig. 87 or Fig. 87A) to axle case, then separate cover assembly from axle case. On all models except B5100D and B5100E, remove snap ring (4) before separating brake drum (3) from bull pinion shaft.

Installation is reverse order of

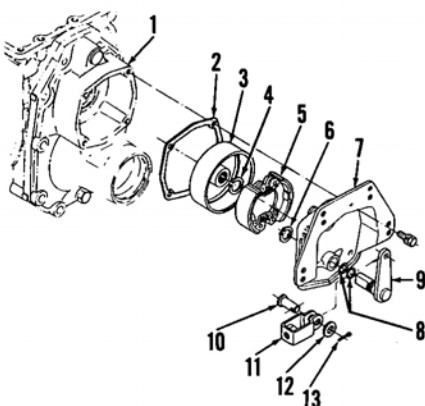


Fig. 87—Exploded view of brake assembly used on Models B6100D, B6100E, B6100HST-D, B6100HST-E, B7100D, B7100HST-D and B7100HST-E.

- | | |
|----------------|-----------------|
| 1. Axle case | 8. "O" ring |
| 2. Gasket | 9. Actuator cam |
| 3. Brake drum | 10. Pin |
| 4. Snap ring | 11. Bracket |
| 5. Brake shoes | 12. Washer |
| 6. Snap ring | 13. Cotter key |
| 7. Cover | |

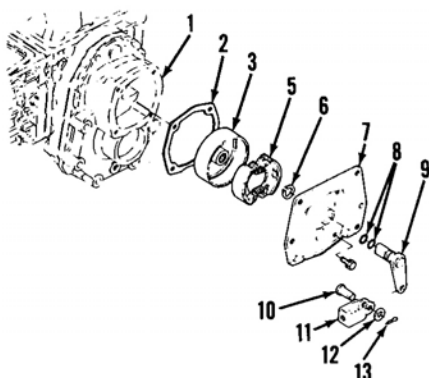


Fig. 87A—Exploded view of brake assembly used on Models B5100D and B5100E. Refer to legend in Fig. 87 for identification of parts.

disassembly. Do not allow oil to touch brake shoe lining or brake drum inner surface. Renew gasket (2) and attach cover (7) assembly to axle case (1). Adjust brake pedal free play as outlined in paragraph 80.

82. OVERHAUL. Inspect linings of brake shoes (5—Fig. 87) for stains from excessive amounts of oil, cracks, excessive wear or any other damage. Measure brake lining thickness,

minimum allowable thickness is 2.5 mm (0.098 inch). Inspect brake drum (3) inner surface for scoring, discoloration from excessive heat, cracks, excessive wear or any other damage. Inside diameter of brake drum should be 95.0-95.1 mm (3.740-3.744 inches) with an allowable limit of 97 mm (3.819 inches). Examine all other components for excessive wear and damage. Renew all parts as needed.

Reassembly is reverse order of disassembly.

POWER TAKE-OFF (Models B6100HST-D—B6100HST-E— B7100HST-D—B7100HST-E)

83. Two rear pto speeds and one mid-pto speed are available by altering the gear combinations through positioning of pto select lever. When pto select lever is placed in low speed range, power is transmitted to rear pto. Rear pto shaft will rotate at a speed of 540 rpm when engine speed is set at 2800 rpm. When pto select lever is placed in high speed range, power is transmitted to rear pto and mid-pto. Rear pto shaft will rotate at a speed of 850 rpm and mid-pto shaft will rotate at a speed of 2450 rpm when engine speed is set at 2800 rpm. A one-way clutch is used to prohibit reverse drive when rear pto speed exceeds engine speed.

REAR PTO

Models B6100HST-D—B6100HST-E—B7100HST-D—B7100HST-E

84. R&R AND OVERHAUL. Drain transmission/hydraulic system fluid into a suitable container. Raise hood and disconnect battery cable from negative battery post. To remove pto components located in center housing, first remove the six cap screws securing rear cover (54—Fig. 88) to center housing (2). Using a suitable mallet, lightly tap rear cover (54) to separate components, then withdraw rear cover with components (43 through 57). Using a suitable puller, extract bearing (42) from shaft end (38). Remove snap ring (41), then withdraw gear (40). To service one-way clutch (34) or extract pto drive shaft (38), first remove hydraulic lift cover as outlined in paragraph 99. Remove all components as needed that will obstruct in center housing and transmission case split. Using suitable holding fixtures, support center housing and transmission case, then split units apart. Remove snap ring (35) and withdraw one-way clutch half (34) and spring (36). Lightly tap front end of shaft (38) to break bearing (39)

loose from center housing bore, then extract shaft.

Inspect all components for damage and excessive wear. Renew all components as needed. Renew seal and gaskets during reassembly.

Installation is reverse of removal. Tighten cap screws securing center housing to transmission case to 19-32 N·m (14-24 ft.-lbs.) torque and nuts to 25-39 N·m (18-29 ft.-lbs.) torque. Reinstall hydraulic lift cover as outlined in paragraph 99. Refill transmission/hydraulic system with 13.5 liters (3.6 U.S. gallons) of the following hydrostatic transmission fluid or a suitable equivalent: Kubota UDT hydrostatic transmission fluid, Shell Donax-TD or TM, Mobil Fluid 350, Exxon Torque Fluid 56.

RANGE TRANSMISSION COMPONENTS

Models B6100HST-D—B6100HST-E—B7100HST-D—B7100HST-E

85. R&R AND OVERHAUL. Service to pto components located in range transmission is outlined in paragraphs 69 and 70. Pto select linkage components are serviced with reference to Fig. 88 after removal of needed range transmission components to allow access to shift components.

MID-PTO

Models B6100HST-D—B6100HST-E—B7100HST-D—B7100HST-E

86. R&R AND OVERHAUL. Drain transmission/hydraulic system fluid into a suitable container. Raise hood and disconnect battery cable from negative battery post. Remove the four cap screws securing case (23—Fig. 88) to bottom side of transmission case (1),

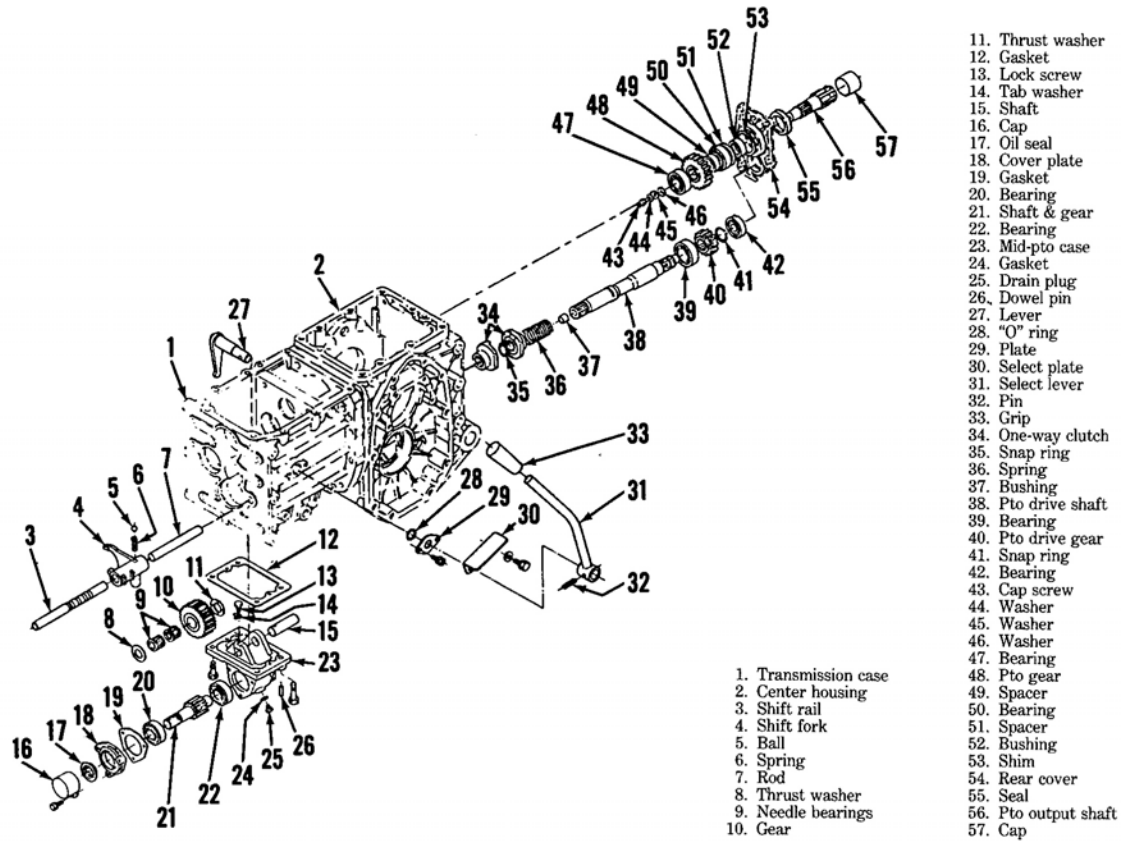


Fig. 88 — Exploded view of pto components used on Models B6100HST-D, B6100HST-E, B7100HST-D and B7100HST-E. Refer to text.

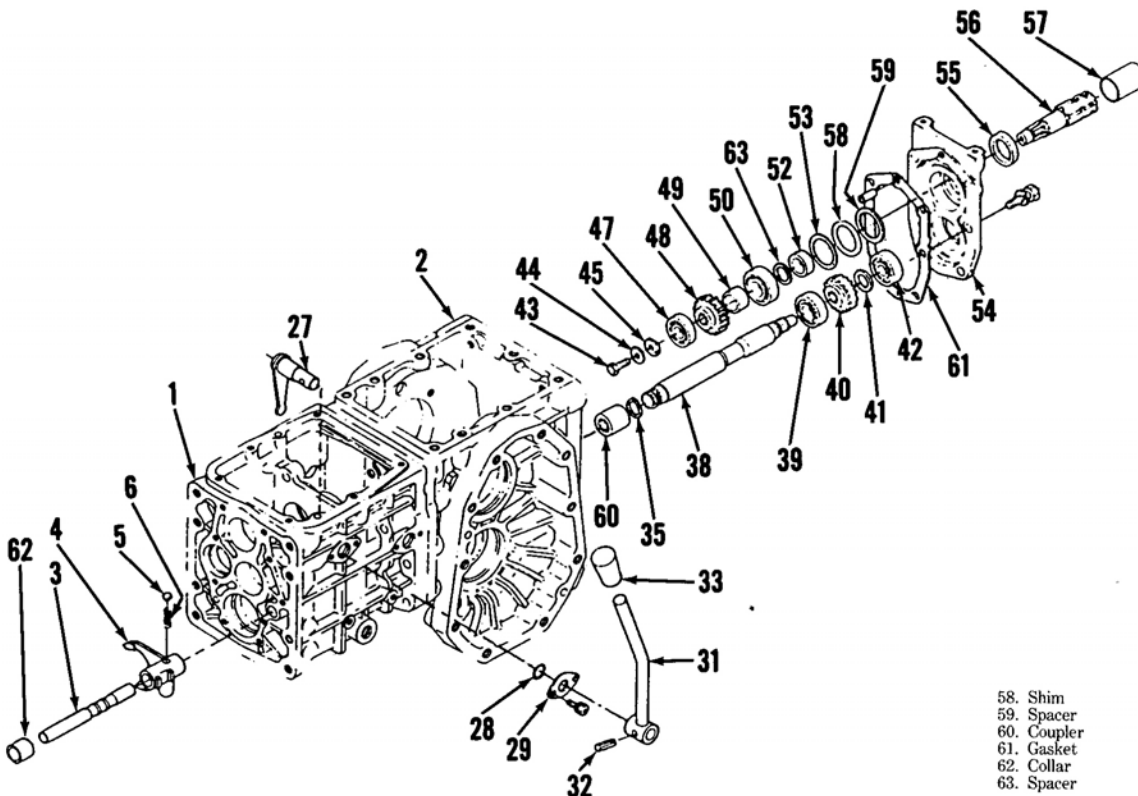


Fig. 89 — Exploded view of pto components used on Models B5100D and B5100E. For identification of parts, refer to legend in Fig. 88 except for the following.

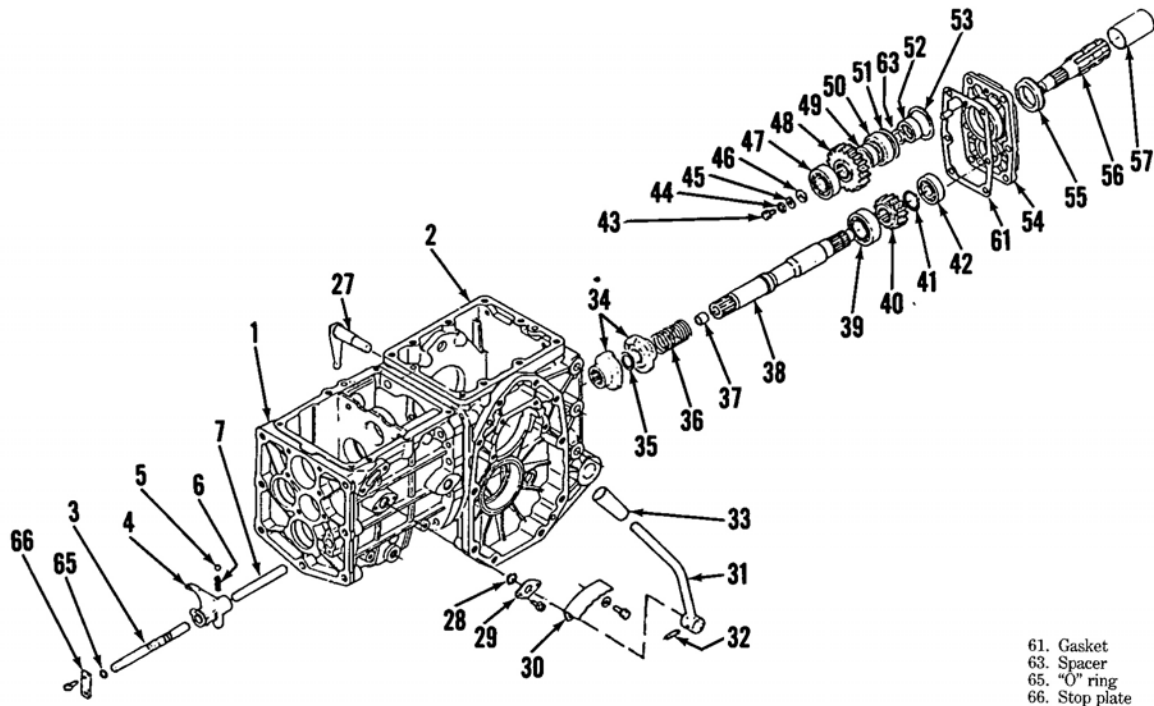


Fig. 90 — Exploded view of pto components used on Models B6100D, B6100E and B7100D. For identification of parts, refer to legend in Fig. 88 except for the following.

61. Gasket
63. Spacer
65. "O" ring
66. Stop plate

then withdraw mid-pto unit.

Disassembly of unit is evident after referral to Fig. 88. Inspect components and renew any which are damaged or excessively worn.

Installation is reverse order of

removal. Install new gasket (12). Tighten cap screws securing case (23) to transmission case (1) to 48-56 N·m (35-41 ft.-lbs.) torque. Refill transmission/hydraulic system with quantity and grade of fluid as noted in paragraph 84.

POWER TAKE-OFF (Models B5100D — B5100E — B6100D — B6100E — B7100D)

87. Two rear pto speeds are available on Models B5100D and B5100E and three rear pto speeds are available on Models B6100D, B6100E and B7100D.

NOTE: Pto second and third speed ranges should never be used except when following the implement instructions.

On Models B5100D and B5100E, when pto select lever is placed in first speed range, rear pto shaft will rotate at a speed of 603 rpm when engine speed is set at 3000 rpm. When pto select lever is placed in second speed range, rear pto shaft will rotate at a speed of 963 rpm when engine speed is set at 3000 rpm.

On Models B6100D, B6100E and B7100D, when pto select lever is placed in first speed range, rear pto shaft will rotate at a speed of 514 rpm when engine speed is set at 2800 rpm. To place pto select lever in second speed range, loosen cap

screw securing lever restrictor plate to transmission case and slide plate forward. When pto select lever is placed in second speed range, rear pto shaft will rotate at a speed of 876 rpm when engine speed is set at 2800 rpm. To place pto select lever in third speed range, remove lever restrictor plate. When pto select lever is placed in third speed range, rear pto shaft will rotate at a speed of 1498 rpm when engine is set at 2800 rpm. After using second or third pto speed, reinstall restrictor plate and securely tighten retaining cap screw.

REAR PTO

Models B5100D — B5100E — B6100D — B6100E — B7100D

88. R&R AND OVERHAUL. Drain transmission/hydraulic system fluid into

a suitable container. Raise hood and disconnect battery cable from negative battery post. To remove pto components located in center housing, first remove the six cap screws securing rear cover (54—Fig. 89 or Fig. 90) to center housing (2). Using a suitable mallet, lightly tap rear cover (54) to separate components, then withdraw rear cover assembly. Using a suitable puller, extract bearing (42) from shaft end (38). Remove snap ring (41), then withdraw gear (40).

To remove shaft (38) on Model B5100D or B5100E, remove hydraulic lift cover as outlined in paragraph 99. Using a suitable mallet, lightly tap shaft rearward to break bearing (39) loose from center housing bore, then extract shaft. Note coupler (60).

On Models B6100D, B6100E and B7100D, to service one-way clutch (34—Fig. 90) or extract pto drive shaft (38), first remove hydraulic lift cover as outlined in paragraph 99. Remove all components as needed that will obstruct in center housing and transmission case split. Using suitable holding fixtures, support center housing and transmission case, then split units apart. Remove snap ring (35) and withdraw one-way clutch half (34) and spring (36). Lightly tap front end of shaft (38) to dislodge bearing (39) from center housing bore, then extract shaft.

Inspect components and renew any which are damaged or excessively worn. Installation is reverse of removal.

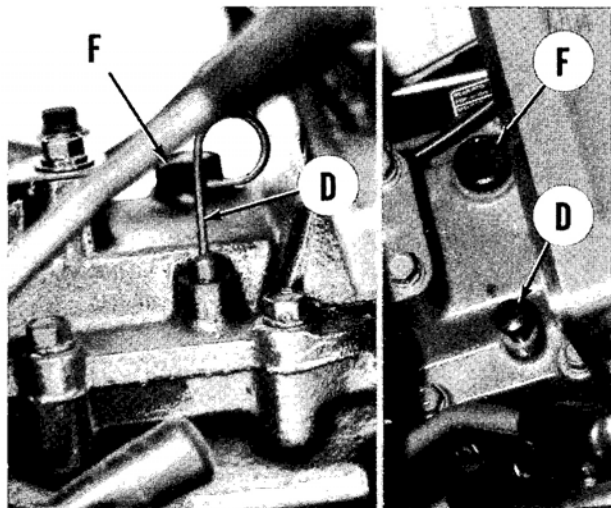


Fig. 91—View shows transmission top cover with two different type of dipsticks (D). Maintain lubricant level at full mark on both models. Add lubricant through fill hole by removing fill cap (F).



Fig. 92—View showing transmission/hydraulic system drain plugs located at bottom of left and right rear axle housings and in bottom of mid-pto housing on models so equipped.

Tighten cap screws securing center housing to transmission case to 19-32 N·m (14-24 ft.-lbs.) torque and nuts to 25-39 N·m (18-29 ft.-lbs.) torque. Reinstall hydraulic lift cover as outlined in paragraph 99. Refill transmission/hydraulic system with 8.5 liters (2.21 U.S. gallons) on Models B5100D and B5100E and 11.5 liters (3 U.S. gallons) on Models B6100D, B6100E and B7100D. Manufacturer recommends the following hydrostatic transmission fluid or a suitable equivalent: Kubota UDT hydrostatic transmission fluid, Shell Donax-TD or TM, Mobil Fluid 350, Exxon Torque Fluid 56.

GEAR TRANSMISSION COMPONENTS

Models B5100D – B5100E – B6100D – B6100E – B7100D

89. **R&R AND OVERHAUL.** Service to pto components located in gear transmission is outlined in paragraphs 73 and 74. Pto select linkage components are serviced with reference to Fig. 89 on Models B5100D and B5100E and Fig. 90 on Models B6100D, B6100E and B7100D after removal of needed gear transmission components to allow access to shift components.

HYDRAULIC LIFT SYSTEM

FLUID AND FILTERS

All Models

90. The hydrostatic transmission (models so equipped), gear or range transmission, differential and hydraulic system share a common sump. Lubricant should be maintained at full level

mark on dipstick (D—Fig. 91). Add lubricant through fill hole under fill cap (F). Fluid should be drained and filled every 200 hours of operation. The hydraulic system strainer (16—Fig. 96) should be cleaned after 200 hours of operation, and on models equipped with hydrostatic drive, transmission oil filter cartridge should be renewed every 200 hours of operation.

Capacity of transmission/hydraulic system is 13.5 liters (3.6 U.S. gallons) on Models B6100HST-D, B6100HST-E, B7100HST-D and B7100HST-E, 8.5 liters (2.21 U.S. gallons) on Models B5100D and B5100E and 11.5 liters (3 U.S. gallons) on Models B6100D, B6100E and B7100D. Use only the following transmission/hydraulic fluid or a suitable equivalent: Kubota UDT hydrostatic transmission fluid, Shell Donax-TD or TM, Mobile Fluid 350, Exxon Torque Fluid 56.

Drain plugs (Fig. 92) are located at bottom of left and right rear axle housings and in bottom of mid-pto housing on models so equipped.

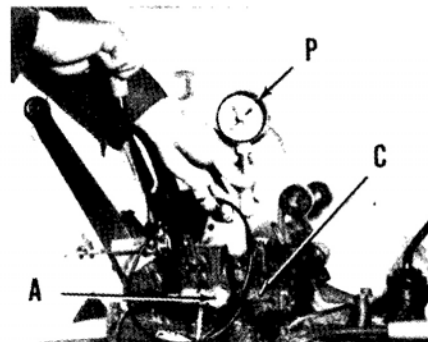


Fig. 93—View showing special Kubota adapter (A) and pressure gage (P) (Tool kit 07916-50041) installed in control valve (C) pressure line inlet. Refer to text.

TESTS AND ADJUSTMENTS

All Models

91. **RELIEF PRESSURE.** Install special Kubota adapter (A—Fig. 93) and pressure gage (P) (Tool kit 07916-50041) or suitable equivalents. Start engine and allow fluid to warm up to 49°C (120°F) (warm to the touch), then move control lever to full up position while observing the pressure gage. Pressure reading should be 10.8-11.8 MPa (1570-1710 psi). Adjust pressure by varying shims (24—Fig. 101). Adding one 0.3 mm

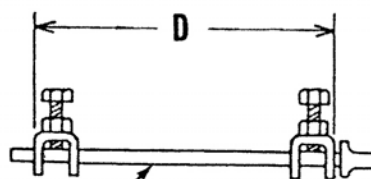
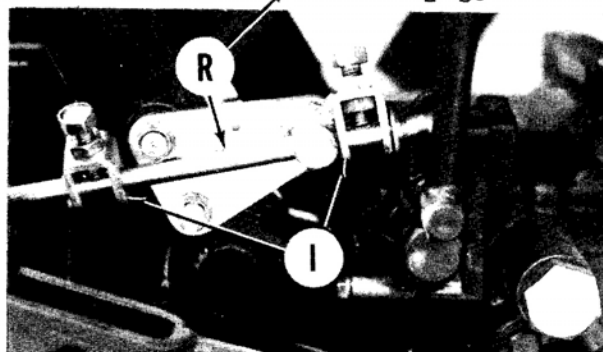


Fig. 94—View showing procedure for measuring distance (D) stops (I) are apart on control rod (R). Refer to text.



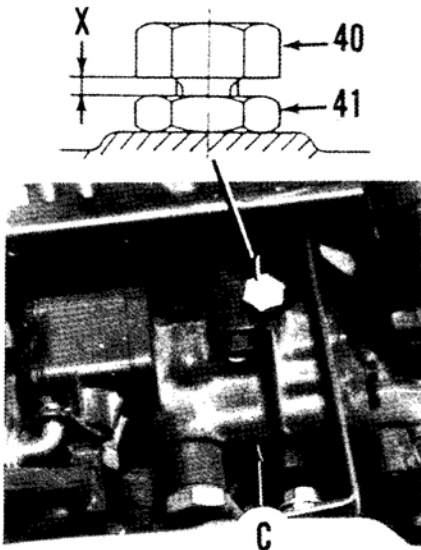


Fig. 95—View showing adjuster screw (40) and locknut (41) located in control valve (C). Clearance (X) is adjusted to control implement lowering speed. Refer to text.

(0.0118 inch) shim will increase the relief valve set pressure 780-980 kPa (110-140 psi).

92. CONTROL ROD ADJUSTMENT. Position front stop (I—Fig. 94) completely forward, then measure distance (D) between stops (I) on control rod (R). Distance (D) should be 124 mm (4.89 inch) on Models B5100D and B5100E and 131 mm (5.16 inch) on all other models. Distance (D) will vary according to type of work. Tilt rear stop at a 60-degree angle away from lift arm as shown in Fig. 94 so interlock and lift arm will clear each other during operation.

NOTE: When using rear pto to drive a three-point mounted tiller or mower, make sure control rod interlock is adjusted so angle of pto shaft universal joint cannot exceed 30 degrees or pto drive shaft damage could occur.

93. IMPLEMENT LOWERING SPEED ADJUSTMENT. Adjuster screw (40—Fig. 95) is located in top of control valve assembly (C). Measure clearance (X) between top of locknut (41) and bottom of adjuster screw (40) head. Clearance (X) should be 3 mm (1/8-inch). Screw (40) should be adjusted to allow an implement to lower from full up position to completely down in 3.8-4.2 seconds when atmosphere temperature is 15°C (59°F). Reducing the clearance slows down the lowering speed while increasing the clearance accelerates the lowering speed. Retighten locknut (41) after completing adjustment.

HYDRAULIC LINES

All Models

94. Shown in Fig. 96 are hydraulic lines located between hydraulic gear pump (G—Fig. 96) and control valve assembly (C). On some models a hydraulic block (Fig. 97) is located in pressure line (20—Fig. 96) and is used as an option to operate external hydraulic attachments. Note that hydraulic block must only be used when simultaneous three-point hitch operation is needed. External attachment control valve must be equipped with a pressure relief valve which limits maximum pressure to 11.8 MPa (1710 psi). Relief pressure beyond limit could cause hydraulic system damage.

HYDRAULIC PUMP

All Models

95. REMOVE AND REINSTALL. Drain transmission/hydraulic system fluid into a suitable container. Raise hood and disconnect negative battery cable. Remove air cleaner assembly, right side cover and throttle linkage. Close fuel shut-off valve at fuel filter, then disconnect fuel supply line from pump. Remove line connecting fuel tank

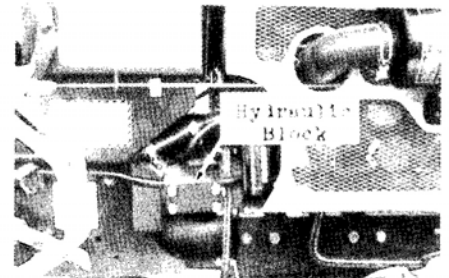


Fig. 97—View showing hydraulic block located in pressure line (20—Fig. 96) used on some models. Block is used as an option to operate external hydraulic attachments when simultaneous three-point hitch operation is needed.

to fuel filter at filter port and plug openings to prevent fuel spillage. Remove fuel filter assembly. Remove fitting screws (14 and 18—Fig. 96), clamp (19) and fitting screw and strainer (16). Remove hydraulic fluid supply lines (12 and 20). Note copper washers (17) and “O” rings (13 and 15) when disassembling. Remove three cap screws and one nut securing hydraulic pump and withdraw pump.

Installation is reverse of removal. Clean hydraulic system strainer (16) if needed. Renew all “O” rings (13 and 15) and copper washers (17) as needed, then securely tighten fitting screws (14, 16 and 18). Replenish transmission/hydraulic system fluid with quantity and grade of lubricant as noted in paragraph 90. Bleed fuel system as outlined in paragraph 36.

96. OVERHAUL. Remove the six screws securing end cover (10—Fig. 98), then separate end cover (10) from pump body (1). Remove “O” rings (2, 8 and 9). Extract outer bushings (7). Remove idler gear (6) and drive gear (5) by lightly tapping shaft end of drive gear (5) with a suitable mallet.

Remove inner bushings (4—Fig. 98) and “O” rings (3). Remove oil seal (11).

Measure inside diameter of bushings

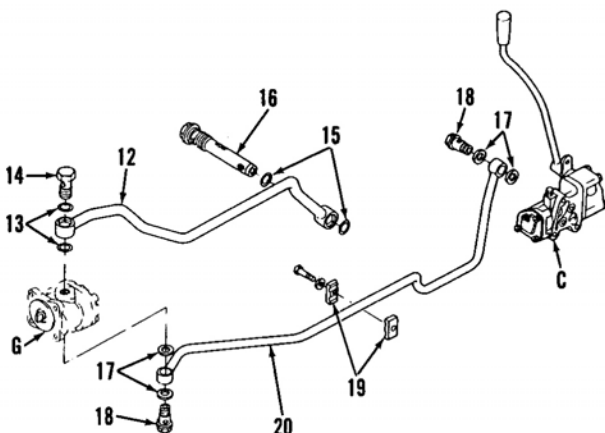


Fig. 96—View showing hydraulic lines located between hydraulic gear pump (G) and control valve assembly (C). Some models are equipped with a hydraulic block (Fig. 97) located in pressure line (20).

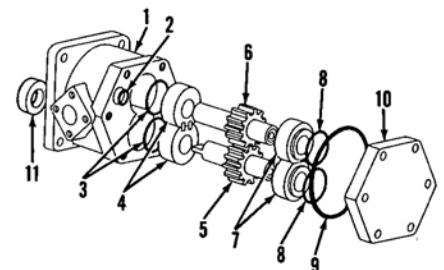


Fig. 98—Exploded view of hydraulic gear pump.

- 1. Pump body
- 2. “O” ring
- 3. “O” rings
- 4. Inner bushings
- 5. Drive gear & shaft
- 6. Idler gear
- 7. Outer bushings
- 8. “O” rings
- 9. “O” ring
- 10. End cover
- 11. Oil seal

(4 and 7). Diameter should be 14.00-14.02 mm (0.5512-0.5520 inch). Measure outside diameter of drive gear (5) and idler gear (6) shafts where they contact their respective bushings. Diameter should be 13.95-13.98 mm (0.5492-0.5504 inch). Clearance between gear shaft and bushing should be 0.02-0.07 mm (0.0008-0.0028 inch) with an allowable limit of 0.15 mm (0.006 inch). If clearance exceeds allowable limit, renew pump assembly. Measure length of bushings (4 and 7). Length should be 14 mm (0.551 inch). Measure clearance between gears (5 and 6) and pump body (1). Clearance should be 0.02 mm (0.0008 inch) with an allowable limit of 0.05 mm (0.0020 inch). If clearance exceeds allowable limit, renew pump assembly.

Examine all components for scratches, roughness, excessive wear or any other damage. Oil seal and "O" rings only are available as individual components, otherwise pump assembly must be renewed as a complete unit.

Reassembly is reverse order of disassembly. Refer to Fig. 99 for correct assembled direction and position of inner bushings (4), outer bushings (7) and idler gear (6). Install oil seal (11) with number on seal facing outward. Coat all working components, "O" rings and oil seal with a thin film of suitable lubricant during reassembly.

CONTROL VALVE

All Models

97. REMOVE AND REINSTALL. Drain transmission/hydraulic system fluid into a suitable container. Detach control rod (81-Fig. 100) from lever (48). Remove fitting screw (18) while noting copper washers (17-Fig. 96). If needed, remove control valve hydraulic supply line. Remove any other components that will obstruct control valve assembly removal. Remove the three cap screws (S-Fig. 100) securing control valve assembly to lift cover, then remove control valve. Note the two "O" rings (32-Fig. 101) located between control valve and lift cover.

Installation is reverse order of removal. Renew "O" rings (32) and tighten cap screws (S-Fig. 100) to

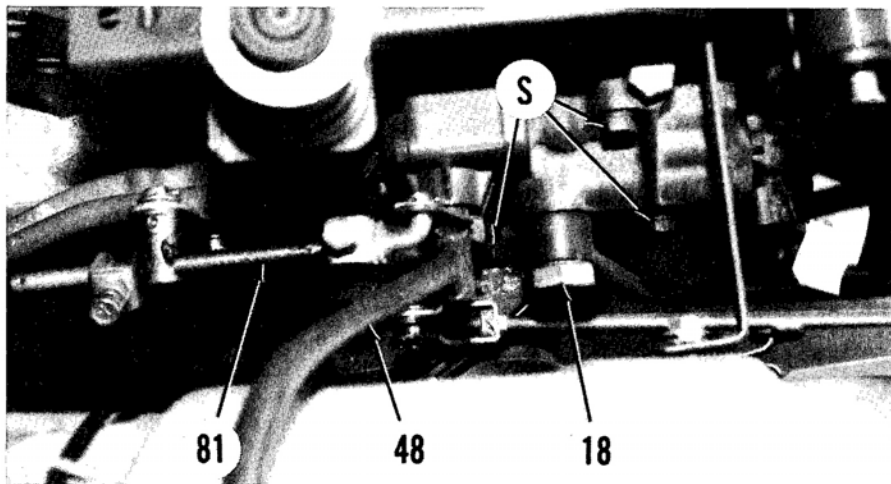


Fig. 100 - Top view of control valve and related components.

- S. Cap screws 18. Fitting screw 48. Control valve lever 81. Control rod

17.7-20.4 N·m (13-15 ft.-lbs.) torque. Renew copper washers (17-Fig. 96) if needed. Replenish transmission/hydraulic system fluid with quantity and grade of lubricant as noted in paragraph 90.

98. OVERHAUL. Remove spring holder (43-Fig. 101), gasket (44), spring (45) and ball (46). Remove cap screws retaining valve cover (36) to control valve body (50), then separate components. Bend tab washer (38) clear of cap screw head (37). Remove cap screw (37) and tab washer (38). Extract lever (48), then lift cam (39) from valve cover (36). Withdraw spool (34) from control valve body

(50). Remove cap screws retaining cover plate (21), then separate plate from control valve body (50). Measure and record the distance adjuster screw (23) protrudes from control valve body surface, then remove adjuster screw (23) and remaining relief valve components (24 through 31).

Clean all components with a suitable cleaning solvent, then blow dry with clean compressed air or dry with a clean lint-free cloth. Inspect spool (34) and valve body bore for heavy scratches, excessive wear or any other damage. If heavy scratches are noted, run your fingernail over the suspected surface, if

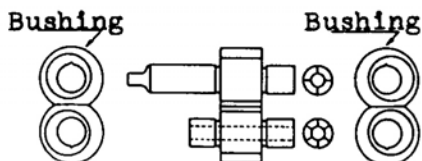
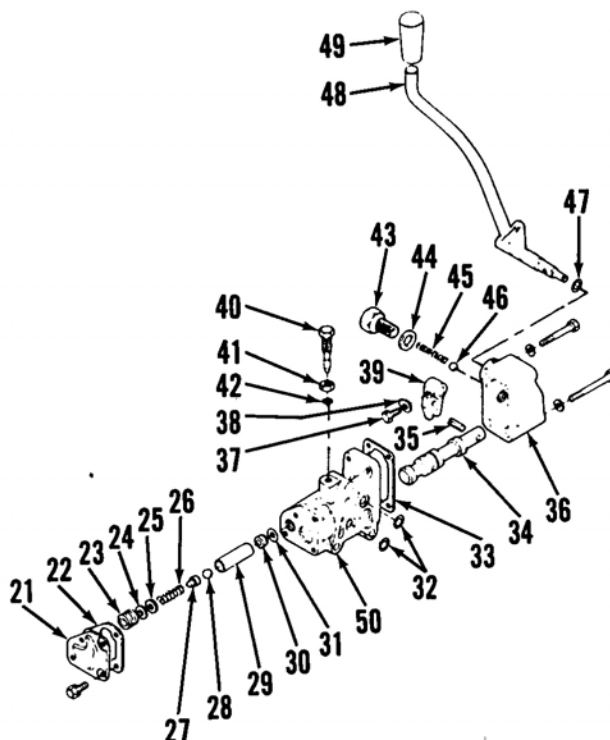


Fig. 99 - View showing correct assembled direction and position of hydraulic pump bushings and gears.

Fig. 101 - Exploded view of control valve assembly.

- 21. Cover plate
- 22. Gasket
- 23. Adjuster screw
- 24. Shim
- 25. Washer
- 26. Spring
- 27. Spring holder
- 28. Ball
- 29. Sleeve
- 30. Seat
- 31. "O" ring
- 32. "O" rings
- 33. Gasket
- 34. Spool
- 35. Pin
- 36. Valve cover
- 37. Cap screw
- 38. Tab washer
- 39. Cam
- 40. Adjuster screw
- 41. Locknut
- 42. "O" ring
- 43. Spring holder
- 44. Gasket
- 45. Spring
- 46. Ball
- 47. "O" ring
- 48. Control valve lever
- 49. Grip
- 50. Control valve body



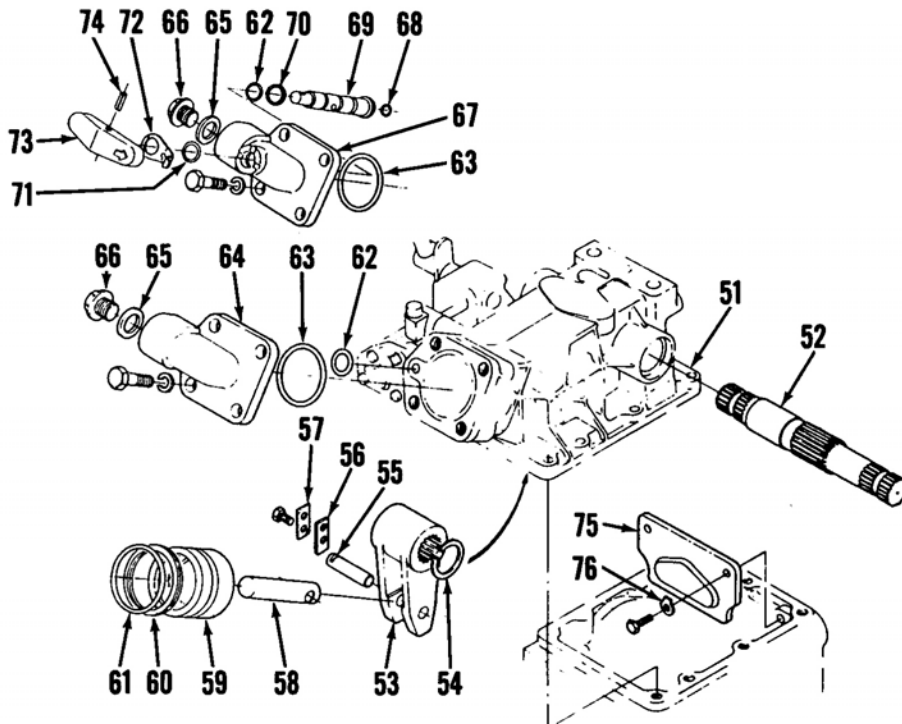


Fig. 102—Exploded view of hydraulic cylinder components typical of all models. Diverter valve used on some models is shown at top. On early models, piston (59) is only fitted with “O” ring (61). On later models, piston (59) is fitted with both seal ring (60) and “O” ring (61).

- | | | |
|------------------|---|-------------------------------------|
| 51. Lift cover | 61. “O” ring | 68. “O” ring |
| 52. Rocker shaft | 62. “O” ring | 69. Diverter valve spool |
| 53. Arm | 63. “O” ring | 70. Washer |
| 54. Snap ring | 64. Cylinder head | 71. “O” ring |
| 55. Shaft | 65. Gasket | 72. Spring plate |
| 56. Washer plate | 66. Plug | 73. Control handle |
| 57. Lock plate | 67. Cylinder head (diverter valve models) | 74. Pin |
| 58. Rod | | 75. Plate |
| 59. Piston | | 76. Tab washer (models so equipped) |
| 60. Seal ring | | |

your nail catches then component must be renewed. It is recommended that both the control valve body (50) and spool (34) be renewed if either is defective. Inspect ball (28) and contact area of seat (30) for excessive wear, suspected oil leakage or any other damage. It is recommended that both ball (28) and

seat (30) be renewed if either is defective. Examine spring (26) for squareness and correct length. Length of spring (26) should be 37.7-38.3 mm (1.484-1.508 inches). Examine all other components for excessive wear or any other damage. Renew all components as needed.

Reassembly is reverse order of

disassembly. Renew all gaskets and “O” rings. Use a suitable lubricant and coat all working components with a thin film of oil during reassembly. Tighten cap screw (37) to 9.8-17.7 N·m (7-13 ft.-lbs.) torque. During reassembly, be sure that pin (35) engages slot in cam (39).

LIFT COVER

All Models

99. REMOVE AND REINSTALL. Lower lift arms to complete down position. Remove seat. Remove control valve assembly as outlined in paragraph 97. Remove bracket mounted on lift cover cylinder head. Remove top link bracket at rear of lift cover. Remove nine cap screws securing lift cover, then with a suitable mallet tap lift cover upward to separate from center housing. Note that lift cover must be lifted straight up because of locating dowel pins.

Installation is reverse order of removal. Tighten cap screws securing lift cover to center housing to 39-45 N·m (29-33 ft.-lbs.) torque. Complete reassembly with reference to paragraph 97. Install seat.

100. OVERHAUL. Remove seat mounting brackets. Remove four cap screws securing cylinder head (64 or 67—Fig. 102) to lift cover (51), then separate components. Extract piston (59) from cylinder bore. Place suitable alignment marks on lift arms (79 and 80—Fig. 103) and rocker shaft (52) to ensure correct positioning during reassembly. Remove cap screws securing left and right lift arms (79 and 80) on rocker shaft (52), then withdraw left lift arm (79) and right lift arm (80) with control rod assembly (81 through 89). Place a suitable alignment mark on rocker shaft (52—Fig. 102) and arm (53) to ensure correct positioning during reassembly. Hold snap ring (54) open and lightly tap rocker shaft (52) against small diameter end to drive rocker shaft (52) from arm (53). Remove oil seals (78—Fig. 103). On models equipped with diverter valve cylinder head (67), disassembly is evident after referral to Fig. 102.

Clean all components with a suitable cleaning solvent, then blow dry with clean compressed air. Inside diameter of cylinder bore should be 60.06-60.10 mm (2.365-2.366 inch) with an allowable limit of 60.15 mm (2.368 inches). Cylinder bore should not taper more than 0.05 mm (0.002 inch). Measure vertical and horizontal inside diameter of lift cover bushings (77—Fig. 103). Right side bushing (large end) diameter should be 31.97-32.04 mm (1.2587-1.2614 inches) with an allowable limit of 32.4 mm

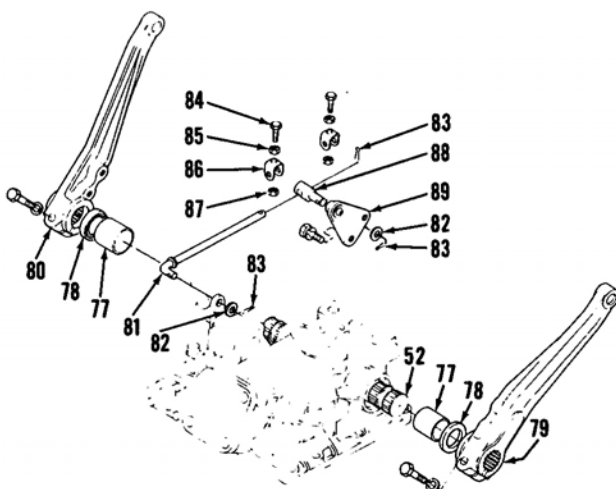


Fig. 103—Exploded view showing rocker shaft, lift arms and control rod assembly typical of all models.

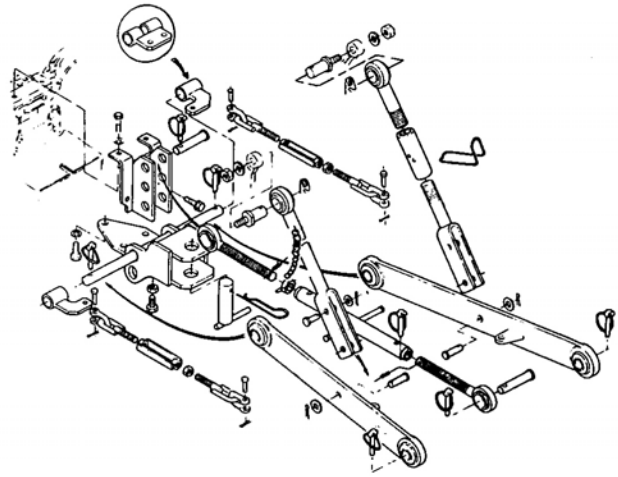
- | |
|--------------------|
| 52. Rocker shaft |
| 77. Bushing |
| 78. Oil seal |
| 79. Left lift arm |
| 80. Right lift arm |
| 81. Control rod |
| 82. Washer |
| 83. Spring clip |
| 84. Adjuster screw |
| 85. Locknut |
| 86. Stop clevis |
| 87. Nut |
| 88. Actuator pin |
| 89. Bracket |

(1.276 inches). Left side bushing (small end) diameter should be 27.97-28.04 mm (1.1012-1.1039 inches) with an allowable limit of 28.4 mm (1.118 inches). Measure outside diameter of rocker shaft (52) where bushings (77) contact shaft (52). Right side (large end) diameter should be 31.92-31.95 mm (1.2567-1.2579 inches). Left side (small end) diameter should be 27.94-27.96 mm (1.100-1.1079 inches). Clearance between rocker shaft (52) and bushings (77) should be 0.01-0.09 mm (0.0004-0.0035 inch) with an allowable limit of 0.5 mm (0.020 inch).

Examine piston (59—Fig. 102) and cylinder bore for heavy scratches. Inspect all other components for excessive wear or any other damage. Renew all components as needed.

Reassembly is reverse order of disassembly. Renew gasket, seals and "O" rings as needed. Use a suitable lubri-

Fig. 104—Exploded view of three-point hitch assembly typical of all models.



cant and coat all seals and "O" rings with a thin film of oil prior to reassembly. Be sure rocker shaft (52—Fig. 103) align-

ment marks are correctly positioned with lift arms (79 and 80) and arm (53—Fig. 102) during reassembly.

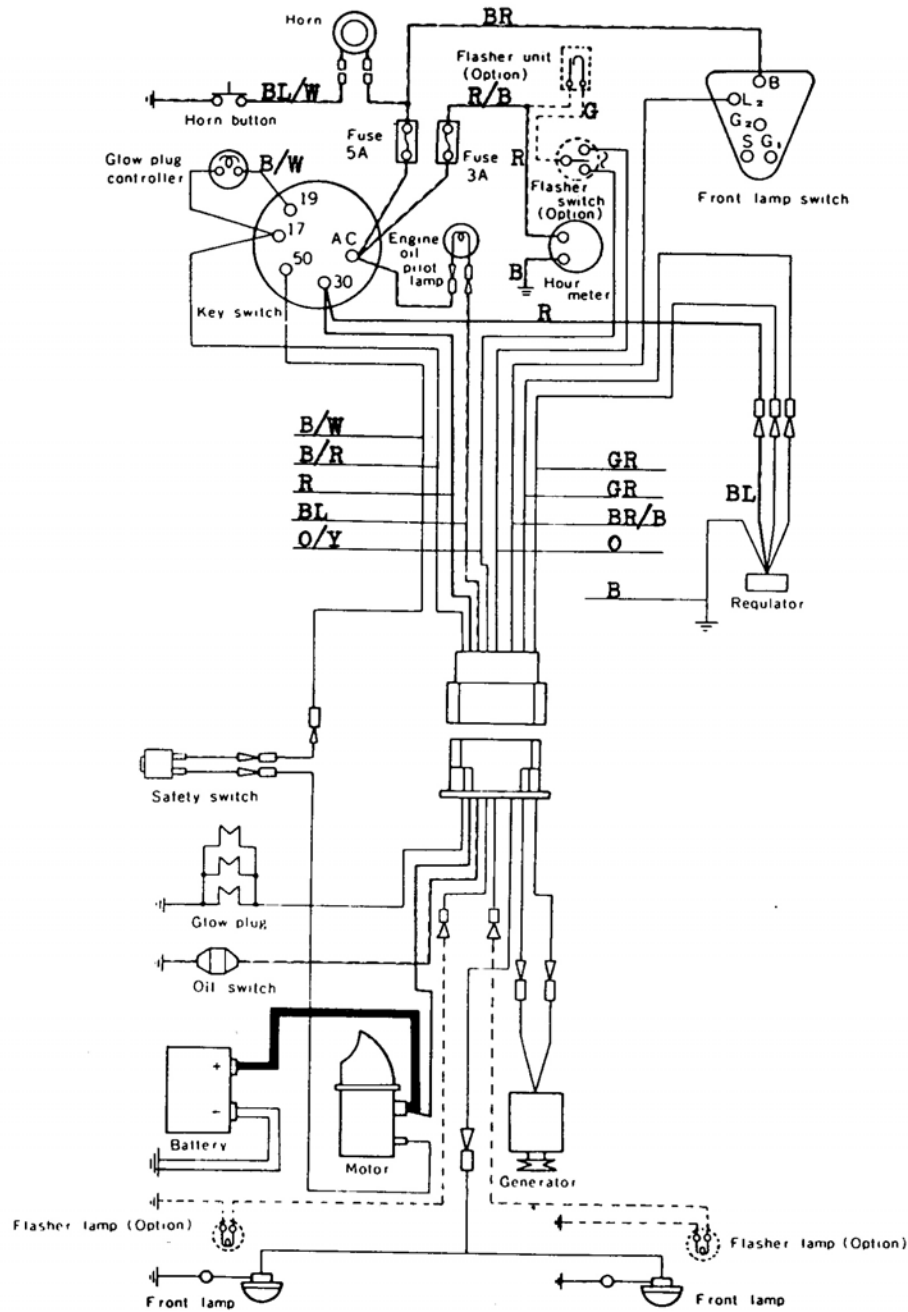


Fig. 105— Typical wiring schematic for Models B5100D, B5100E, B6100D and B6100E.

- | | |
|-------------------|--------------------|
| B. Black | G. Green |
| BL. Blue | GR. Gray |
| BR. Brown | O. Orange |
| B/R. Black/red | O/Y. Orange/yellow |
| B/W. Black/white | R. Red |
| BL/W. Blue/white | R/B. Red/black |
| BR/B. Brown/black | R/W. Red/white |

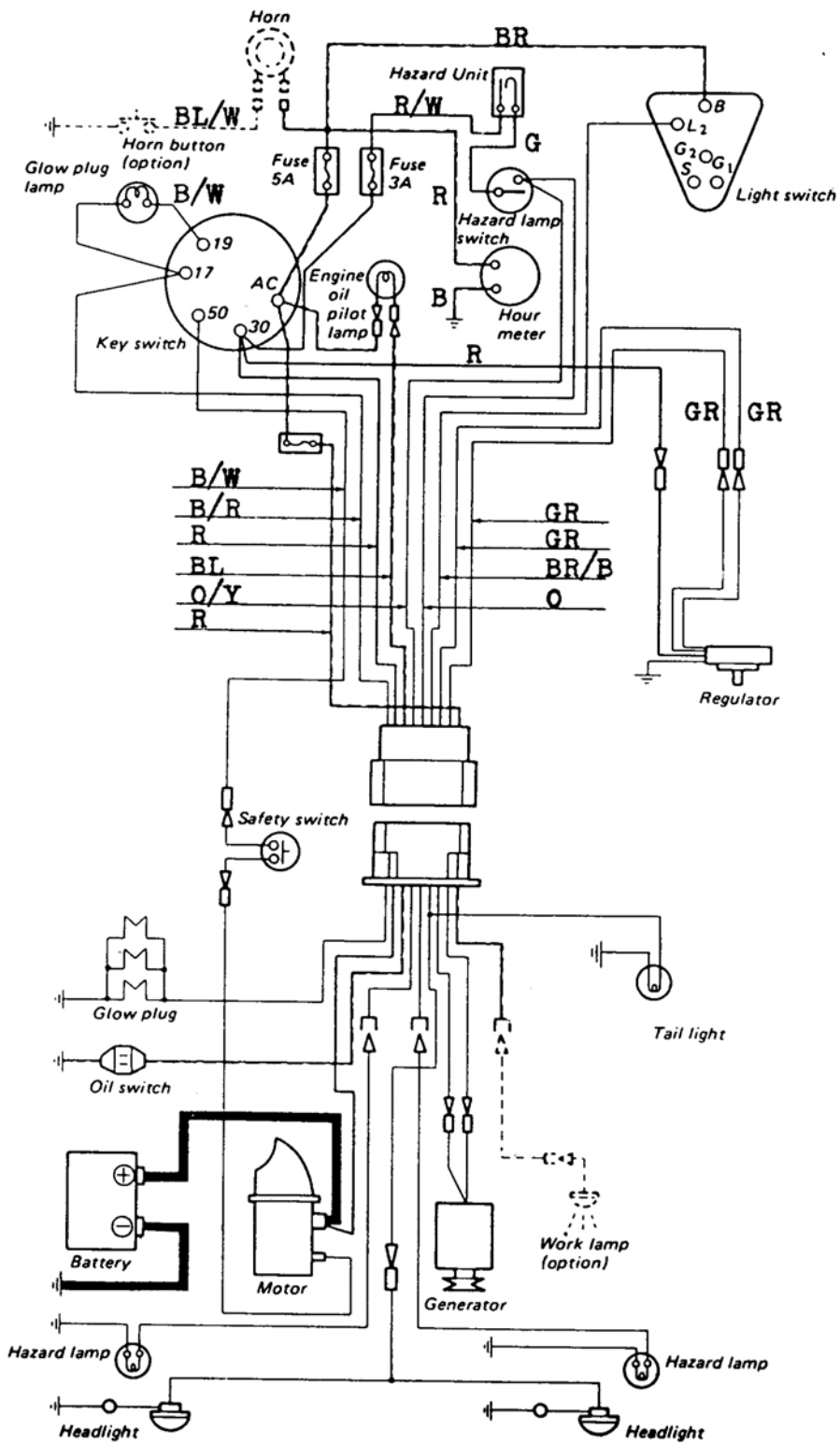


Fig. 106— Typical wiring schematic for Models B6100HST-D, B6100HST-E, B7100D, B7100HST-D and B7100HST-E. Refer to legend in Fig. 105 for wire identification.