

SHOP MANUAL

CASE/INTERNATIONAL

MODELS

385—485—585—685—885

Engine serial number is stamped on right side of engine crankcase on all models. Tractor model and serial number are stamped on a plate attached to right side of front axle support. Transmission serial number is stamped on a plate attached to the right rear side of rear main frame. Model and serial number plate for front drive axle is located on left rear of axle housing.

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DUAL DIMENSIONS

This service manual provides specifications in both the U.S. Customary and Metric (SI) system of measurements. The first specification is given in the measuring system used during manufacture, while the second specification (given in parenthesis) is the converted measurement. (For instance, a specification of "0.011 inch (0.279 mm)" would indicate that the equipment was manufactured using the U.S. system of measurement and the metric equivalent of 0.011 inch is 0.279 mm.

CONDENSED SERVICE DATA

	385 Diesel	485 Diesel	585 Diesel	685 Diesel	885 Diesel
GENERAL					
Engine Make	Case/International				
Engine Model	D-155	D-179	D-206	D-239	D-268
Number of Cylinders	3	3	4	4	4
Bore	3.875 in. (98.4 mm)	3.875 in. (98.4 mm)	3.875 in. (98.4 mm)	3.875 in. (98.4 mm)	3.937 in. (100.0 mm)
Stroke	4.37 in. (111.1 mm)	5.06 in. (128.5 mm)	4.37 in. (111.1 mm)	5.06 in. (128.5 mm)	5.51 in. (140.0 mm)
Displacement	155 cu. in. (2.54 L)	179 cu. in. (2.93 L)	206 cu. in. (3.38 L)	239 cu. in. (3.92 L)	268 cu. in. (4.39 L)
Main Bearings,					
Number of	4	4	5	5	5
Cylinder Sleeves	Wet	Wet	Wet	Wet	Wet
Forward Speeds,					
Number of	8 (1)	8 (1)	8 (1)	8 (1)	8 (1)
Alternator/Starter Make . . .	Lucas and Bosch				
Battery Ground	Negative				

(1) Sixteen forward speeds, if equipped with Two-Speed Power Shift.

CONDENSED SERVICE DATA (CONT.)

	385 Diesel	485 Diesel	585 Diesel	685 Diesel	885 Diesel
TUNE-UP					
Compression Pressure	315-340 psi (2) (2172-2344 kPa)				
Firing Order	1-3-2	1-3-2		1-3-4-2	
Valve Tappet Gap (Hot), Intake and Exhaust	0.012 in. (0.304 mm)				
Valve Face Angle	45°				
Valve Seat Angle	44°				
Injection Pump Make	Robert Bosch				
Injection Pump Timing	See Paragraph 61.				
Engine Low Idle — Rpm	725-750				
Engine High Idle — Rpm (No Load)	2340	2480	2590	2705	2650
Engine Full Load — Rpm	2200	2180	2300	2300	2400

(2) Approximate psi (kPa), at sea level, at cranking speed.

SIZES-CLEARANCES-CAPACITIES

Crankshaft Main Journal					
Diameter	3.1484-3.1492 in. (79.97-79.99 mm)				
Crankpin Diameter					
	2.5185-2.5193 in. (63.97-63.99 mm)				
Camshaft Journal Diameter					
	2.2823-2.2835 in. (57.97-58.00 mm)				
Piston Pin Diameter					
	1.4172-1.4174 in. (35.997-36.002 mm)				
Valve Stem Diameter,					
Intake	0.3920-0.3924 in. (9.957-9.967 mm)				
Exhaust	0.3912-0.3915 in. (9.936-9.945 mm)				
Main Bearing Diametral Clearance					
	0.0028-0.0055 in. (0.071-0.140 mm)				
Rod Bearing Diametral Clearance					
	0.002-0.004 in. (0.051-0.102 mm)				
Piston Skirt Diametral Clearance					
	0.0035-0.0050 in. (0.09-0.13 mm)				
Crankshaft End Play					
	0.006-0.009 in. (0.152-0.229 mm)				
Camshaft Bearing Diametral Clearance					
	0.0009-0.0033 in. (0.023-0.084 mm)				
Camshaft End Play					
	0.004-0.018 in. (0.10-0.45 mm)				
Cooling System Capacity	3.0 U.S. gal. (11.4 L)			3.6 U.S. gal. (13.7L)	
Crankcase Oil (With Filter)	8 U.S. qts. (7.5 L)			10 U.S. qts. (9.5 L)	

CONDENSED SERVICE DATA (CONT.)

385
Diesel

485
Diesel

585
Diesel

685
Diesel

885
Diesel

SIZES-CLEARANCES-CAPACITIES (CONT.)

Transmission, Differential and Hydraulics, Capacity	_____	36 U.S. qts. (3) (34 L)	_____
Oil Type	_____	Hy-Tran Plus	_____
Front Drive Axle Capacity	_____	4.75 U.S. qts. (4.5 L)	_____
Oil Type	_____	SAE 90 EP	_____
Front Drive Axle Hub (Each Side)	_____	0.8 U.S. qt. (0.75 L)	_____
Oil Type	_____	SAE 90 EP	_____

(3) If equipped with front drive axle, add 2.6 U.S. qts. (2.5 L).

FRONT AXLE (TWO-WHEEL DRIVE)

FRONT WHEEL BEARING

All Models

1. Refer to Figs. 1 and 2 for typical wheel hub and bearing assemblies.

The tapered inner and outer roller bearings are not interchangeable. Clean and inspect bearing cups (3 and 5) and cones (2 and 6) and renew as necessary.

NOTE: On adjustable axle hubs, if wear ring (12) is excessively worn, renew wear ring.

Install inner seal (1) on spindle and coat lips of seal with grease. Pack bearings and fill hub cavity with No. 2 lithium grease. Install inner bearing cone (2). Install hub assembly (4), outer bearing cone (6), washer (7) and nut (9). Adjust wheel bearing preload as follows: Tighten nut to a torque of 70 ft.-lbs. (95 N·m) while rotating the hub. Then, loosen nut and retorque to 50 ft.-lbs. (68 N·m) on Models 385, 485 and 585 with standard axles or 25 ft.-lbs. (34 N·m) on Models 385, 485 and 585 equipped with heavy duty axles and all Model 685 and 885 tractors. Then,

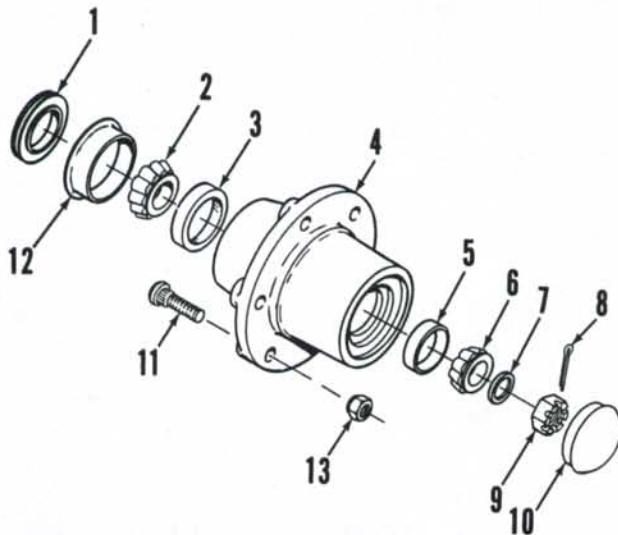


Fig. 1—Exploded view of front wheel hub and bearings used on all two-wheel drive models equipped with adjustable front axles.

- | | |
|-------------------------|--------------------|
| 1. Oil seal | 7. Washer |
| 2. Bearing cone (inner) | 8. Cotter pin |
| 3. Bearing cup (inner) | 9. Castellated nut |
| 4. Hub | 10. Cap |
| 5. Bearing cup (outer) | 11. Lug bolt |
| 6. Bearing cone (outer) | 12. Wear ring |
| | 13. Lug nut |

loosen nut 1/4 turn to align slot in nut with hole in spindle and install cotter pin (8). Install lithium grease in end of hub and in cap (10) and install cap.

SPINDLES

All Models With Adjustable Axles

2. **R&R SPINDLES.** To remove either spindle (9—Figs. 3, 4 or 5), block rear wheels securely and apply park brake. Raise front of tractor and install jack stand under axle main member (13). Unbolt and remove front wheel and hub. Disconnect tie rod from steering arm (2 or 6). Remove bolt (1) and nut (3) and lift off steering arm. Remove Woodruff key (11) and lower spindle (9) with thrust bearing (8) and felt ring (10), downward out of axle extension. Remove thrust bearing and felt ring from spindle.

With spindle removed, check spindle bushings (7) in axle extension for excessive wear or other damage and renew as required. Install new bushings (7) so that lubrication grooves are toward the grease fitting. Drive bushings in from top and bottom of extension until each bushing is 0.060 inch (1.5 mm) below the surface.

When reassembling, install new felt ring (10) and thrust bearing (8) as necessary.

NOTE: Thrust bearing (8) is marked TOP for correct installation.

Install spindle assembly, Woodruff key and steering arm. Tighten steering arm clamping bolt to a

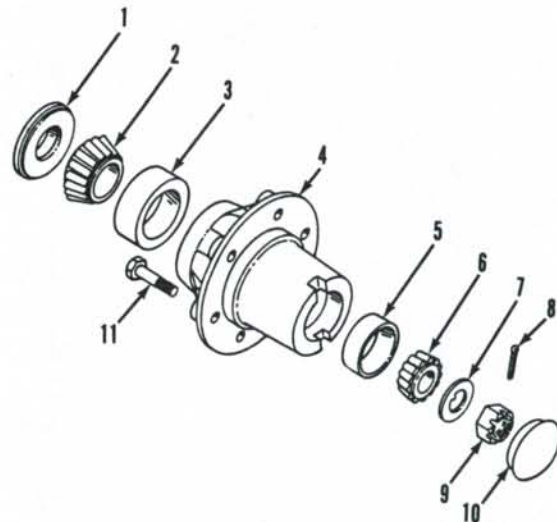


Fig. 2—Exploded view of front wheel hub and bearings used on two-wheel drive models equipped with nonadjustable (cast) front axle. Refer to Fig. 1 for legend.

SERVICE MANUAL

Paragraph 3

torque of 80-90 ft.-lbs. (108-122 N·m). Install tie rod and tighten nut to a torque of 50 ft.-lbs. (68 N·m).

Check oil seal (1—Fig. 1) and renew as necessary as outlined in paragraph 1. Install hub and adjust bearings as in paragraph 1.

All Models With Nonadjustable Cast Axle

3. R&R SPINDLES. To remove either spindle (11—Fig. 6), block rear wheels securely and apply park brake. Raise front of tractor and install jack stand under axle main member (16). Unbolt and remove front wheel and hub.

Remove lubrication fitting from steering arm (5 or 10). Remove three bolts (22) and nuts, then move steering arm, steering cylinder (left side) and tie rod

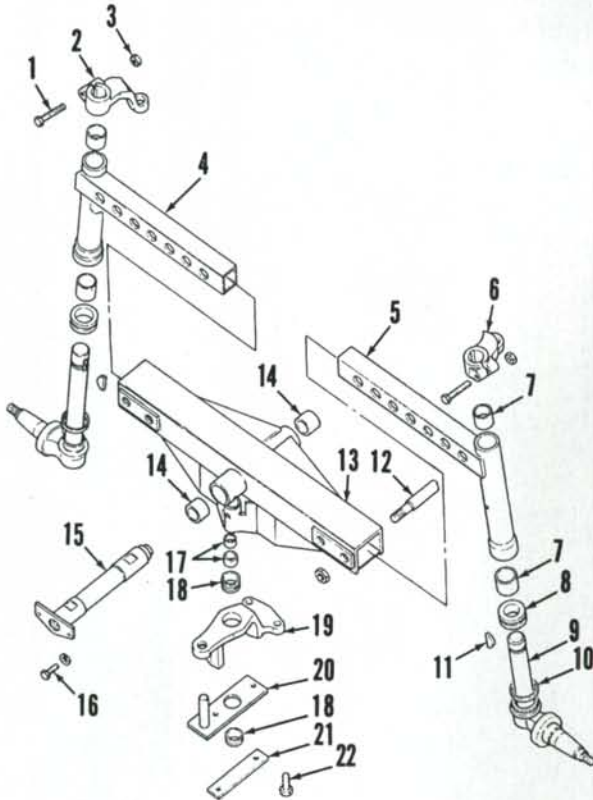


Fig. 3—Exploded view of straight adjustable front axle used on some tractors.

- | | |
|--------------------------|-------------------------------------|
| 1. Bolt | 12. Shoulder bolt |
| 2. Steering arm (R.H.) | 13. Axle main member |
| 3. Nut | 14. Bushings |
| 4. Axle extension (R.H.) | 15. Pivot pin |
| 5. Axle extension (L.H.) | 16. Cap screw (2) |
| 6. Steering arm (L.H.) | 17. Steel bushings |
| 7. Bushings | 18. Bushings |
| 8. Thrust bearing | 19. Steering arm (center) |
| 9. Spindle | 20. Steering cylinder retaining bar |
| 10. Felt ring | 21. Lockplate |
| 11. Woodruff key | 22. Cap screw (2) |

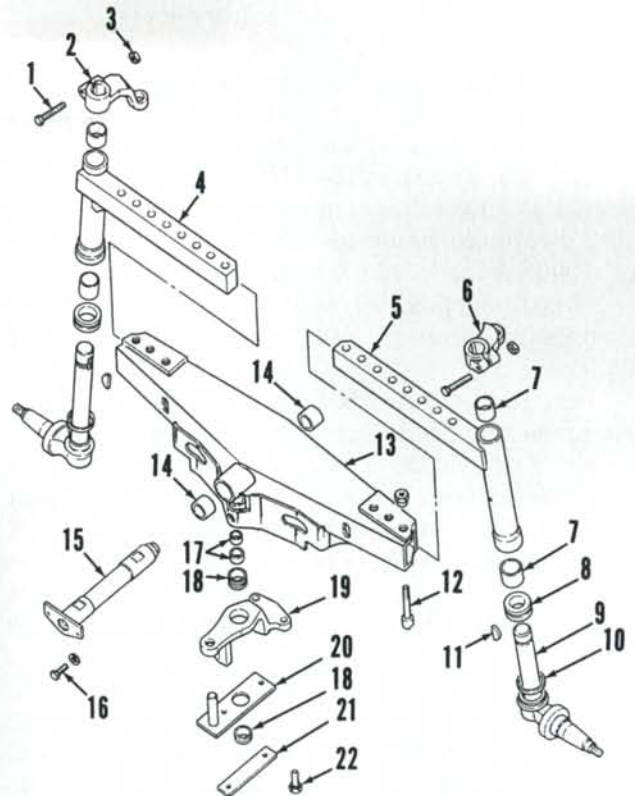


Fig. 4—Exploded view of heavy duty straight adjustable front axle used on some tractors. Refer to Fig. 3 for legend.

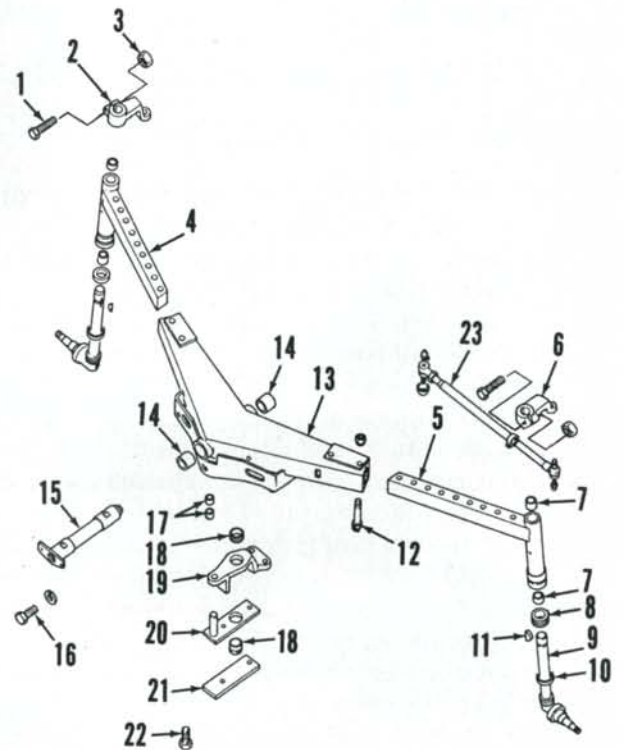


Fig. 5—Exploded view of swept back adjustable front axle used on some tractors. Refer to Fig. 1 for legend except for tie rod assembly (23).

rearward from axle. Remove cap screws (1), caps (2) and gaskets (3). Remove nut and lockwasher from lock pin (15). Drive lock pin forward out of axle main member. Using a hammer and punch, drive kingpin (12) out of axle and spindle. Remove spindle, thrust bearing (14) and shim (13) if so equipped.

Inspect kingpin bushings (4) and renew if necessary. Bushings should be installed until inner ends of bushings are 0.016-0.031 inch (0.4-0.8 mm) below the inside surfaces of spindle bores. Lubrication grooves in bushings must align with lubrication fittings.

Install a new thrust bearing (14), with TOP mark up, on bottom inside edge of spindle. Install spindle over end of axle main member with thrust bearing under axle. Use a jack to hold spindle and bearing tight against bottom of axle. Using a feeler gage, measure gap between upper edge of axle and the spindle. If gap is more than 0.005 inch (0.127 mm), install shims to reduce gap to less than 0.005 inch (0.127 mm). Shims are available in thicknesses of 0.005 and 0.010 inch (0.127 and 0.254 mm).

Inspect kingpin (12) and renew as necessary. Install kingpin with flat nearest to the top and in alignment with hole for the lock pin (15). Install lock pin, lockwasher and nut. Tighten nut securely. Install steering arm and tighten bolts (22) and nuts to a torque of 160-180 ft.-lbs. (217-244 N·m). Install lubrication fitting in steering arm.

Check oil seal (1—Fig. 2) and install new seal, if needed, then install hub and adjust bearings as outlined in paragraph 1.

AXLE MAIN MEMBER AND PIVOT PIN

All Models With Adjustable Axles

4. REMOVE AND REINSTALL. To remove axle main member (13—Figs. 3, 4 and 5), first block rear wheels securely and apply park brake. If so equipped, remove front weights and weight bracket. Unbolt and remove front cover. Support tractor with stands under side rails or oil pan, and remove front wheels. Disconnect tie rod ends from left and right steering arms (2 and 6). Unbolt and remove axle extensions (4 and 5) with spindle assemblies. Identify and disconnect steering cylinder hoses at cylinder. Cap and plug all openings. Remove the cylinder anchor clevis pin. Straighten corners of lock plate (21) and remove cap screws (22), lock plate (21) and cylinder retaining bar (20). Hold cylinder upward and slide cylinder clevis from anchor on axle. Remove steering cylinder. Remove center steering arm (19) and tie rods.

Place a floor jack under axle main member (13). Remove cap screws (16) and thread a slide hammer puller into front end of pivot pin (15). Remove pivot pin, then lower axle main member and remove from under tractor.

Inspect axle pivot bushings (14) and renew if necessary, aligning lubrication holes with lubrication fittings. Inspect cylinder pivot bushings (18) and steering arm pivot bushings (17) and renew as necessary.

Reinstall by reversing removal procedure, keeping the following points in mind: Tighten cap screws (16) and (22) to a torque of 80-90 ft.-lbs. (110-124 N·m). Bend corners of lock plate (21) against flat of bolt head (22). Tighten nuts on shoulder bolts (12) to a torque of 246-272 ft.-lbs. (334-369 N·m). Tighten tie rod end slotted nuts to a torque of 50 ft.-lbs. (68 N·m).

All Models With Nonadjustable Cast Axle

5. REMOVE AND REINSTALL. To remove axle main member (16—Fig. 6), block rear wheels securely and apply park brake. If so equipped, remove front weights and weight bracket. Unbolt and remove front cover. Raise front of tractor and support with stands under side rails or oil pan. Remove front wheels. Identify and disconnect steering cylinder hoses at cylinder. Cap or plug all openings immediately to pre-

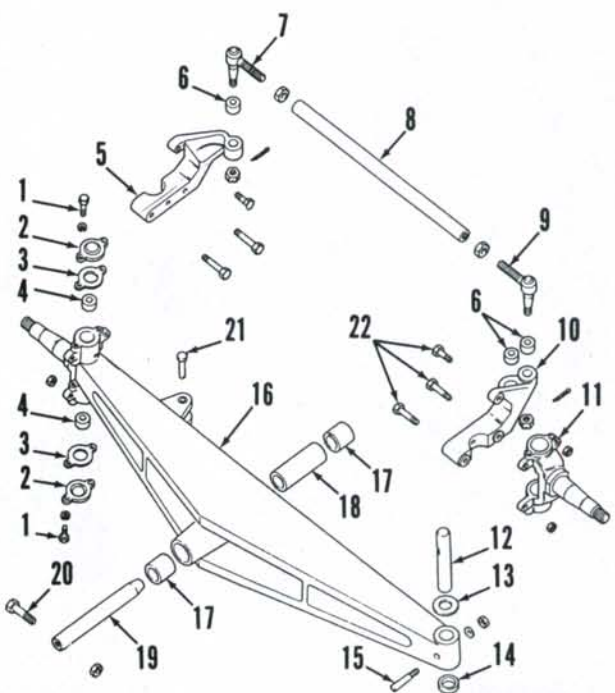


Fig. 6—Exploded view of heavy duty (cast) nonadjustable front axle used on some tractors.

- | | |
|-------------------------|-----------------------|
| 1. Cap screw | 11. Spindle |
| 2. Cap | 12. King pin |
| 3. Gasket | 13. Shim |
| 4. Bushing | 14. Thrust bearing |
| 5. Steering arm (R.H.) | 15. King pin lock pin |
| 6. Dust seal | 16. Axle main member |
| 7. Tie rod end (R.H.) | 17. Bushings |
| 8. Tie rod tube | 18. Spacer |
| 9. Tie rod end (L.H.) | 19. Pivot pin |
| 10. Steering arm (L.H.) | 20. Bolt |
| | 21. Cylinder pin |
| | 22. Bolts |