SHOP MANUAL

CASE/INTERNATIONAL

MODELS

2090 2290 2390 2590

2094 2294 2394 2594

IDENTIFICATION

Tractor model number and identification serial number are located on a plate on right fender of tractors not equipped with a cab, or on a plate on upper right of cab interior on tractors so equipped. Cab serial number is located on a plate on upper right of cab interior. Engine serial number is located on a plate on right rear of cylinder block. Transmission serial number is on right side of transmission housing. On models so equipped, front-wheel drive serial number is located on a plate on rear of front drive axle housing.

INDEX (By Starting Paragraph)

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INDEX CONT.

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

	Models			
	2090, 2094	**2290, 2294**	**2390, 2394**	**2590, 2594**
GENERAL				
Engine Make	Own			
Engine Model	504BD	504BDT	504BDT	504BDT
Cylinders, No. of	6			
Bore	4-5/8 in. (117.5 mm)			
Stroke	5 in. (127 mm)			
Displacement	504 cu.in. (8.26 L)			
Compression Ratio	16.0:1	15.8:1	15.8:1	15.8:1
Main Bearings, No. of	7			
Cylinder Sleeves, Type	Wet			
Forward Speeds	8,12*	8,12*	12,24**	12,24**

*Models 2090 and 2290 with mechanical shift transmission have 8 forward speeds. Models 2090, 2290, 2094 and 2294 power shift tractors have 12 forward speeds.

**Models 2394 and 2594 equipped with power shift High/Low unit have 24 forward speeds. All other power shift models have 12 forward speeds.

TUNE-UP				
Firing Order	1-5-3-6-2-4			
Valve Tappet Gap, Warm—				
Intake	0.015 in. (0.381 mm)			
Exhaust	0.025 in. (0.635 mm)			
Compression at Cranking Speed	400 psi (2758 kPa)			
Injection Pump—				
Make	Robert Bosch			
Model	PES Multiple Plunger			
Timing	27° BTDC	25° BTDC		
Injection Nozzles—				
Make	Robert Bosch or American Bosch			
Opening Pressure,				
New	3950-4100 psi (27235-28270 kPa)			
Used	3400-3950 psi (23443-27235 kPa)			
Turbocharger—				
Make	.....	Garret (AiResearch) T04B		
Engine Governed Speeds (Rpm)—				
Low Idle	725-775			
High Idle	2280-2320			
Rated Load	2100			
Battery Terminal Grounded	Negative			
CAPACITIES				
Cooling System	38 qts. (36 L)	38 qts. (36 L)	44 qts. (41.6 L)	44 qts. (41.6 L)
Crankcase (w/filters)	19 qts. (17.8 L)	23 qts. (22 L)	30 qts. (28.4 L)	30 qts. (28.4 L)
Transmission & Hydraulic System	100 qts. (94.6 L)	100 qts. (94.6 L)	128 qts. (121.1 L)	128 qts. (121.1 L)
Oil Type	Hy-Tran Plus			
Fuel Tank	65 gal. (246 L)	65 gal. (246 L)	85 gal. (322 L)	85 gal. (322 L)

FRONT AXLE (TWO WHEEL DRIVE)

FRONT WHEEL BEARINGS

All Models

1. Refer to Fig. 1 for typical wheel hub and bearing assembly.

The tapered inner and outer roller bearings are not interchangeable. Clean and inspect bearing cups and cones and renew as necessary. Install inner seal (9) with lip facing spindle flange. Install outer seal (10) with lip facing away from bearing (11). Fill hub cavity and pack bearings with No. 2 lithium grease. Coat surface of seal lips with grease.

When adjusting wheel bearings, tighten nut (7) until drag on hub is felt, then back nut off ¼ turn or until next pin hole lines up. Bearings should have zero end play. Install cotter pin.

SPINDLES

All Models

2. R&R SPINDLES. To remove spindle, lift and support front of tractor and remove wheel. Disconnect tie rod ball joint from steering arm (3—Fig. 2). Remove bolt (1) and washer (2) from arm (3). Note index punch marks on arm and shaft indicating location of tapered splines for left or right steering arm, then remove steering arm. Support spindle and remove snap ring (4) and shims (5), then remove spindle (10) from axle extension (7).

3. SPINDLE BUSHINGS. With spindles removed, spindle bushings (6 and 9—Fig. 2) can be removed using a suitable drift punch. New bushings are presized and should not require reaming if carefully installed. Press new bushings into axle ends until bushing flange seats against surface of axle ends.

Assemble by reversing disassembly procedure making sure punch marks on shaft and steering arm align. Tighten bolt (1) to 200-250 ft.-lbs. (271-339 N · m) torque. Lubricate through grease fitting (8) with No. 2 lithium grease. Tighten tie rod slotted nut to 100-125 ft.-lbs. (136-169 N · m) torque and install new cotter pin.

4. TIE RODS AND TOE-IN. Disassembly of tie rod assembly is obvious after examination of unit and reference to Fig. 3. However, upon reassembly make sure clamp bolt (9) for left side drag link (3) is installed in same number hole as left side axle extension outer bolt; and that right side drag link bolt (11) is installed in one less number hole of drag link (2) than outer mounting bolt of right axle extension. Tighten tie rod ball joint slotted nuts to 100-125 ft.-lbs. (136-169 N · m) torque. Install new cotter pins. Tighten drag link clamp bolt nuts to 45-54 ft.-lbs. (61-73 N · m) torque.

Front wheel toe-in must be 1/8 to 1/2 inch (3.2-12.7 mm). To adjust toe-in, remove clamp bolt (9—Fig. 3) on left drag link. Loosen jam nut (4), then turn drag link (3) in or out until desired toe-in is obtained. Install clamp bolt and tighten nut on clamp bolt to 45-54 ft.-lbs. (61-73 N · m) torque. Tighten jam nut (4) against drag link.

AXLE MAIN MEMBER AND PIVOT PIN

Models 2090 and 2290 (S/N prior to 9905953)

5. To remove axle main member, first raise and support tractor under engine side rails with suitable jack stands. Disconnect tie rods from steering arms, then refer to Fig. 3 and disconnect power steering cylinder (13) from axle main member and tie rod lug. Secure steering cylinder up and out of the way. Be careful not to damage hydraulic lines to cylinder.

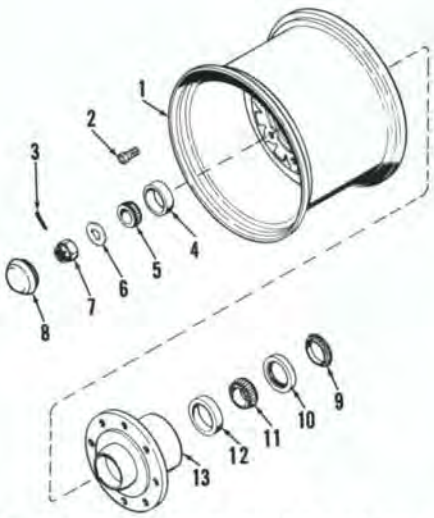

Fig. 1—Exploded view of wheel hub and bearing assembly used on all models.

1. Wheel
2. Bolt
3. Cotter pin
4. Bearing cup
5. Bearing cone
6. Washer
7. Nut
8. Cap
9. Seal (inner)
10. Seal (outer)
11. Bearing cone
12. Bearing cup
13. Hub

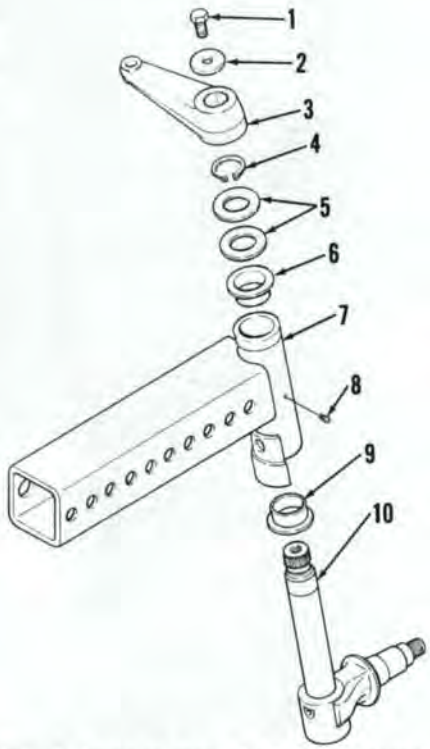

Fig. 2—Exploded view of steering spindle assembly typical of all models.

1. Bolt
2. Washer
3. Steering arm
4. Snap ring
5. Shims
6. Bushing (upper)
7. Axle extension (left hand shown)
8. Grease fitting
9. Bushing (lower)
10. Spindle

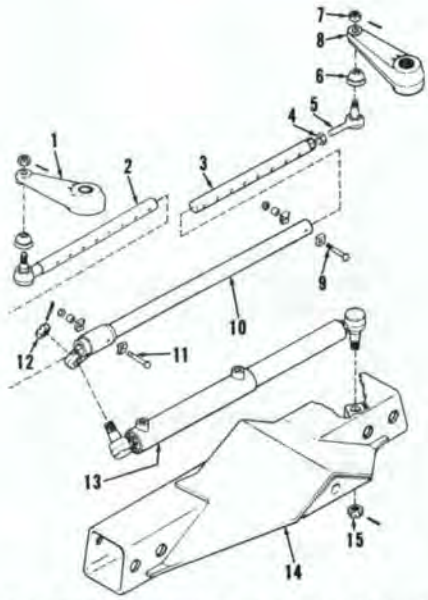

Fig. 3—Exploded view of steering tie rod, cylinder, and arms typical of all models. (Standard wheel base axle shown.)

1. Steering arm (R.H.)
2. Drag link (R.H.)
3. Drag link (L.H.)
4. Jam nut
5. Ball joint
6. Dust cover
7. Slotted nut
8. Steering arm (L.H.)
9. Clamp bolt (L.H.)
10. Tie rod tube
11. Clamp bolt (R.H.)
12. Slotted nut
13. Steering cylinder
14. Axle main member
15. Slotted nut

Refer to Fig. 4, unpin and remove nut (10) from rear of pivot pin (4). Remove collar (11) and thrust washer (12). Remove bolt (17) from lock collar (14). Remove grease fitting (8) and install a slide hammer to pivot pin (4). Support axle main member with a rolling floor jack, then pull pivot pin out front of axle assembly. Catch thrust washers (12), lock collar (14) and shim washer (5) as pin (4) is withdrawn. Lower axle main member enough to clear front support and roll forward away from tractor.

Pin bushings (2 and 3—Fig. 4) can be removed using a suitable drift punch. Drive new bushings into front axle support until flush with axle support casting. Bushings are presized and should require no reaming if carefully installed.

When assembling, raise axle main member into position in axle support aligning pivot pin holes. Place retaining ring (7—Fig. 4) and washer (6) onto pivot pin (4). Insert threaded end of pivot pin into axle support front bushing. Place shim thrust washer (5) between axle main member and axle support and slide pivot pin through washer and into axle main member front block. Install lock collar onto pin behind front block of axle member. Install bolt (17), washer (16) and lock tab (15) into lock collar (14) but do not tighten bolt at this time. Push pivot pin through rear of axle member and into rear of axle support.

Move axle main member as far forward as possible, withdraw pin and install as many shim washers (12) as possible between axle support and rear of axle main member. Move axle member rearward against washers, drive pivot pin rearward until a 1/8 inch (3.2 mm) gap exists between washer (6) and front of axle support as shown in Fig. 5. Tighten lock collar bolt (17) to 50 ft.-lbs. (68 N · m) torque and bend lock tab (15—Fig. 4) over bolt head. Install collar (11) and pivot pin nut (10) on rear of pin and tighten nut against collar (11). Back nut off ¼ turn or until cotter pin hole aligns and install cotter pin. Install grease fittings (8 and 9) and lubricate with No. 2 lithium grease.

All Other Models

6. To remove axle main member, first raise and support tractor under engine side rails with suitable jack stands. Refer to Fig. 3 and disconnect power steering cylinder (13) from axle main member and tie rod lug. Secure cylinder up and out of the way. Be careful not to damage hydraulic lines to cylinder.

Model 2390 and 2590 tractors with S/N prior to 9905953 are equipped with pivot pin lock collar (A—Fig. 6). All models with S/N 9905953 and above are equipped with axle main member with a keyway and Woodruff key (B) on pivot pin shaft (4).

On Models 2390 and 2590 (S/N prior to 9905953) remove bolt on lock collar (A). Loosen pinch bolt on shaft nut (8). Remove front snap ring (9) and grease fitting (10). Unscrew locknut (8), then remove front collar (7) and thrust washers (5 and 6). Remove rear snap ring (14), cup washer (15) and attach a slide hammer to front of pivot pin (4). Support axle main member with a rolling floor jack and pull pivot pin out front of axle and support. Catch split collars (16), shim washers (17 and 11) and lock collar (A) as pivot pin is withdrawn. Lower axle member enough to clear front support and roll forward away from tractor.

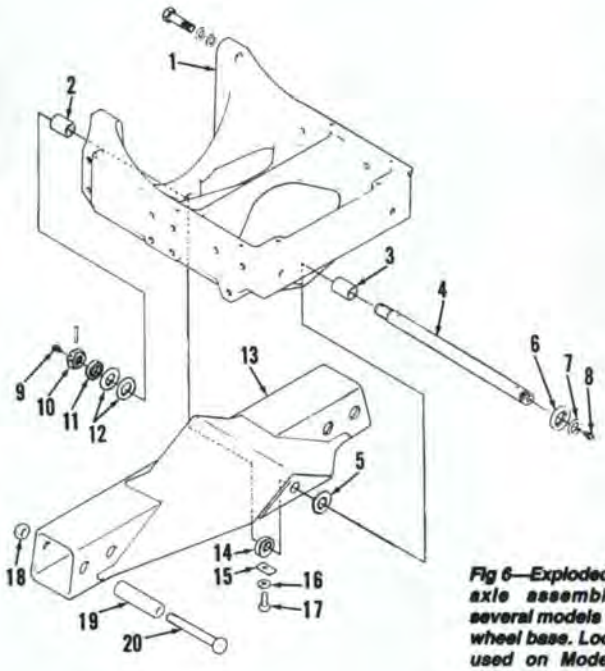

Fig. 4—Exploded view of front axle assembly used on Model 2090 and 2290 tractors (S/N prior to 9905953).

1. Front support
2. Rear bushing
3. Front bushing
4. Pivot pin
5. Shim washer
6. Collar
7. Snap ring
8. Grease fitting
9. Grease fitting
10. Pin nut
11. Collar
12. Thrust washers
13. Axle main member
14. Lock collar
15. Lock tab
16. Washer
17. Bolt
18. Nut
19. Spacer
20. Bolt

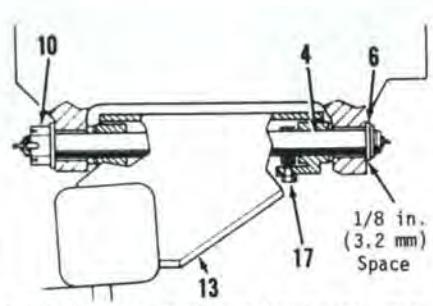

Fig. 5—Cross-sectional view showing pivot pin installation on Model 2090 and 2290 tractors (S/N prior to 9905953). Refer to legend in Fig. 4.

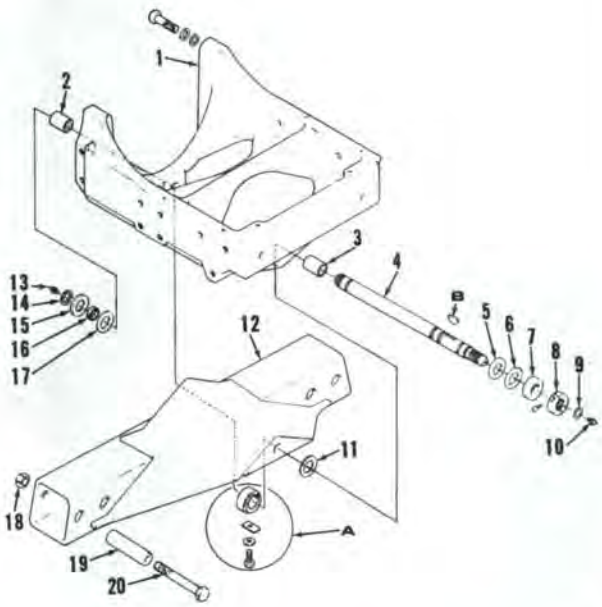

Fig 6—Exploded view of front axle assembly used on several models with standard wheel base. Lock collar (A) is used on Models 2390 and 2590 prior to S/N 9905953. Refer to text.

1. Front support
2. Rear bushing
3. Front bushing
4. Pivot pin
5. Shim washer
6. Thrust washer
7. Collar
8. Shaft nut
9. Snap ring
10. Grease fitting
11. Shim washer
12. Axle main member (standard wheelbase)
13. Grease fitting
14. Snap ring
15. Cup washer
16. Split collars
17. Thrust washer
18. Nut
19. Spacer
20. Bolt

On Models 2090, 2290, 2390 and 2590 (S/N 9905953 and above) and Models 2094, 2294, 2394 and 2594, remove front grease fitting (10—Fig. 6) and snap ring (9), loosen pinch bolt on shaft nut (8) and remove nut, then remove front collar (7) and thrust washer (6). Support axle main member with a rolling floor jack. Using a brass drift, bump pivot pin (4) rearward enough to allow removal of Woodruff key (B). Remove rear snap ring (14), cup washer (15), then using a slide hammer, pull pivot pin forward and out of axle and front support. Catch split collars (16) and thrust washers (11 and 17) as pivot pin is withdrawn.

Pin bushings (2 and 3—Fig. 6) can be removed using a suitable drift punch. Drive new bushings into front axle support until flush with axle support casting. Bushings are presized and should require no reaming if carefully installed.

Reinstall front axle on all models by reversing disassembly procedure.

EXTENDED WHEELBASE FRONT AXLE

Models 2390, 2590, 2094, 2294, 2394, and 2594 So Equipped

7. Models 2390, 2590, 2094, 2294, 2394 and 2594 tractors have an optionally available extended wheel base front axle which increases tractor wheelbase from 104 inches (264 cm) on standard units to 110 inches (279 cm) on Models 2094 and 2294 or 118 inches (300 cm) on Models 2390, 2590, 2394 and 2594. See Fig. 7. Removal of axle main member is similar to that of all model tractors outlined in paragraph 6 except the following: Tie rods and power steering cylinder pass through axle main member (12—Fig. 7); therefore hydraulic lines to steering cylinder must be disconnected for removal of axle. Cap or plug all hydraulic openings to prevent contamination of hydraulic system.

Reassemble by reversing disassembly procedure. Bleed power steering system as outlined in paragraph 25.

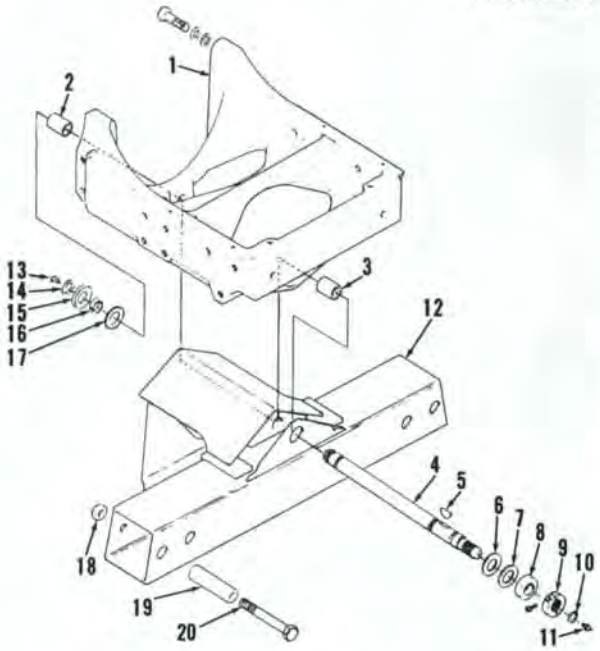

Fig. 7—Exploded view of extended wheelbase front axle main member assembly available on Models 2390, 2590, 2094, 2294, 2394 and 2594.

1. Front support
2. Rear bushing
3. Front bushing
4. Pivot pin
5. Woodruff key
6. Shim washer
7. Thrust washer
8. Collar
9. Shaft nut
10. Snap ring
11. Grease fitting
12. Axle main member
13. Grease fitting
14. Snap ring
15. Cup washer
16. Split collars
17. Shim washer
18. Nut
19. Spacer
20. Bolt

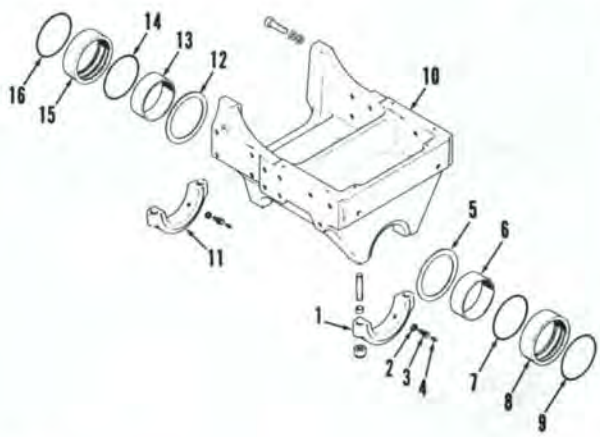

Fig. 8—Front support and component parts used on Models 2094 and 2294 equipped with Carraro front drive axle.

1. Support cap (front)
2. Washer
3. Bushing lock
4. Grease fitting
5. Thrust washer
6. Sleeve
7. "O" ring
8. Bushing
9. "O" ring
10. Front support
11. Support cap (rear)
12. Thrust washer
13. Sleeve
14. "O" ring
15. Bushing
16. "O" ring

FRONT SUPPORT

All Models

8. To remove front support (1—Figs. 4, 6 or 7), first disconnect headlight wiring then remove grille, hood and side panels. Remove radiator as outlined in paragraph 90. Remove front axle main member as outlined in paragraphs 6 or 7. Attach suitable hoist to front support, then unbolt and remove.

Assemble by reversing removal procedure. Tighten front support mounting bolts to 380-450 ft.-lbs. (515-610 N · m) torque.

FRONT-WHEEL DRIVE (CARRARO AXLE)

DRIVE AXLE ASSEMBLY AND SUPPORT

Models 2094 and 2294 So Equipped

9. REMOVE AND REINSTALL. To remove the front drive axle assembly, place transmission in PARK and securely block rear wheels. Unbolt and remove drive shaft shield and the front drive shaft assembly. Disconnect steering cylinder lines and cap or plug all openings. Loosen front wheel to hub nuts on both wheels. Install a side frame jack CAS-10500-1 or equivalent on each side of tractor. Raise front of tractor until wheels are off the ground. Remove wheel nuts and using a hoist, remove front wheels. Place a floor jack or special axle carrier CAS-10500-4 under front axle. Remove bearing lock (3—Fig. 8) and grease fitting (4) from bearing support caps (1 and 11), then unbolt and remove caps. Lower axle (floor jack) or raise tractor (axle carrier) and roll assembly forward from tractor. Remove bushings (8 and 15) with "O" rings (7, 9, 14 and 16), sleeves (6 and 13) and thrust washers (5 and 12).

To remove front support (10—Fig. 8), disconnect headlight wiring, then remove hood, grille and side panels. Remove radiator as outlined in paragraph 90. Attach a hoist to front support, then unbolt and remove.

Reinstall front support by reversing removal procedure. Tighten front support mounting bolts to a torque of 380-450 ft.-lbs. (515-610 N · m).

Inspect thrust washers (5 and 12—Fig. 8), sleeves (6 and 13) and bushings (8 and 15) for excessive wear or other damage and renew as necessary. Install