

SHOP MANUAL

MASSEY-FERGUSON

MODELS

362 365 375 383 390 390T 398

The tractor serial number is located in two locations, on the serial number plate (Fig. 1) located on the right side of the tractor and stamped on the rear axle casting (Fig. 2). The tractor serial number is coded to identify the machine type, year of manufacture, week of manufacture (during specific year) and specific unit during week.

The illustration shown in Fig. 3 identifies a two-wheel-drive 390 tractor which was the 121st tractor manufactured during the 32nd week of 1988.

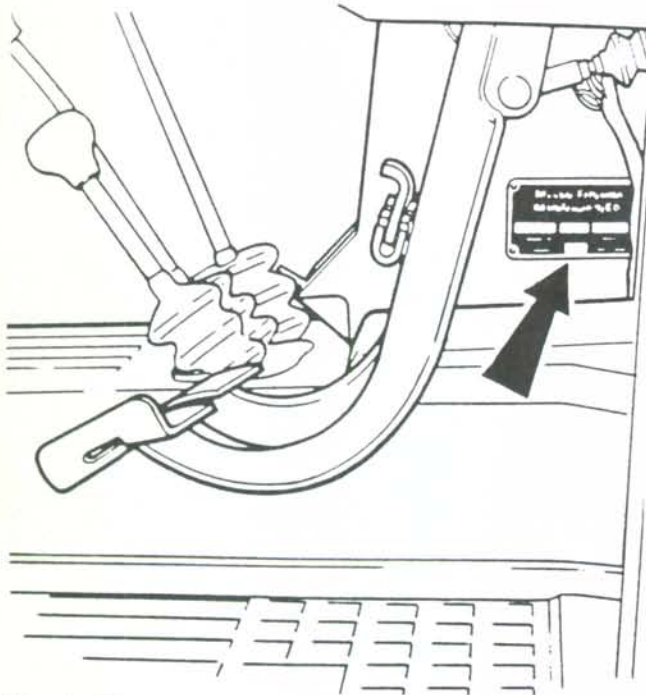


Fig. 1—The tractor serial number is located on plate attached to tractor right side as shown as well as stamped on axle housing as shown in Fig. 2.

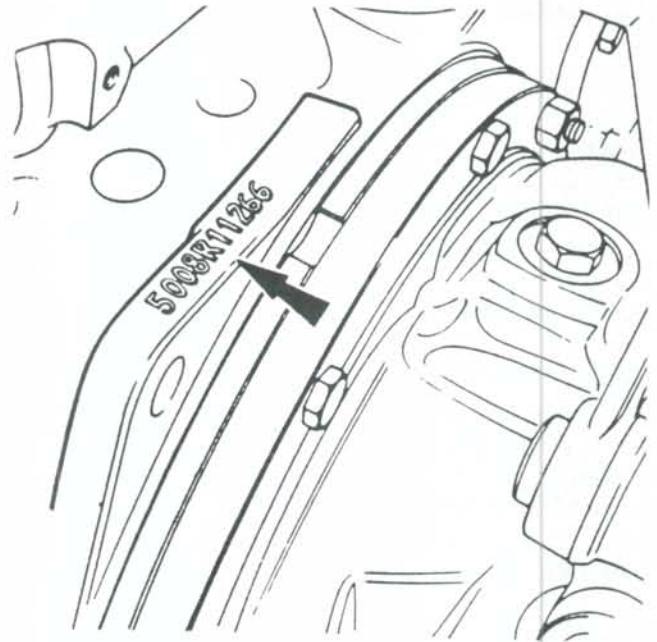
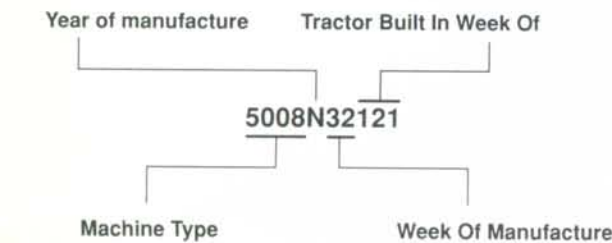


Fig. 2—Tractor serial number is stamped into rear axle housing as shown as well as on plate shown in Fig. 1. Numbers match on original assembly.



Year of manufacture –
 A = Jan. 1992 - Dec. 1992
 B = Jan. 1993 - Dec. 1993
 N = Feb. 1988 - Jan. 1989
 P = Feb. 1989 - Jan. 1990

R = Feb. 1990 - Dec. 1990
 S = Jan. 1991 - Dec. 1991
 U = Aug. 1986 - Jan. 1987
 V = Feb. 1987 - Jan. 1988

Fig. 3—The tractor serial number identifies machine type, year of manufacture, week of manufacture during specific year, and specific unit manufactured during that week. The example shown identifies a two-wheel-drive 390 tractor which was the 121st tractor manufactured during the 32nd week of 1988.

Machine type –
 5006 M-F 375 2WD
 5007 M-F 375 4WD
 5008 M-F 390 2WD
 5009 M-F 390 4WD
 5010 M-F 398 2WD
 5011 M-F 398 4WD
 5266 M-F 383 2WD

5270 M-F 365 2WD
 5271 M-F 365 4WD
 5742 M-F 383 4WD
 5723 M-F 390T 2WD
 5724 M-F 390T 4WD
 5726 M-F 362 2WD
 5727 M-F 362 4WD

INDEX (By Starting Paragraph)

Models
362, 365, 375, 383,
390, 390T and 398

Models
362, 365, 375, 383,
390, 390T and 398

BRAKES

Adjustment -	
Models Before Serial Number V39466	189
Models After Serial Number V39465	190
Disc Brake Assembly	195
Fluid and Bleeding	191
Master Cylinders	192
Slave Cylinders -	
Models Before Serial Number V39466	193
Models After Serial Number V39465	194

CLUTCH (ENGINE)

Clutch Assembly -	
Dual Clutch	94
Split Torque Clutch	96
Clutch Linkage Adjustment	92
Engine/Transmission Split	93

DIESEL FUEL SYSTEM

Bleeding	74
Filters	72
Fuel Injection Pump	83
Fuel Lift Pump	73
Injection Pump Drive Gear	85
Injection Pump	86
Injector Nozzles	75

ELECTRICAL SYSTEM

Alternator and Regulator	88
Circuit Description	90
Starter	89
Wiring Diagrams	90

ENGINE

Cam Followers	40
Camshaft	52
Connecting Rods and Bearings	56
Cooling System	66
Crankshaft and Bearings	57
Crankshaft Rear Oil Seal	61
Cylinder Head	36
Engine Balancer	58
Flywheel	62
Front End/Engine Split	34
Oil Pan	63
Oil Pressure Relief Valve	65
Oil Pump	64
Piston Pins	55
Pistons, Rings and Sleeves	54
R & R Engine	35
Rocker Arms	41

ENGINE (Cont.)

Rod and Piston Units	53
Timing Gear Cover	44
Timing Gear Housing	51
Timing Gears	45
Valve Clearance	42
Valve Guides	38
Valve Springs	39
Valve Timing	43
Valves and Seats	37

FRONT AXLE SYSTEM

(Two-Wheel-Drive Models)

Front Axle Assembly and Steering Linkage	1
----------------------------------------------------	---

FRONT-WHEEL DRIVE

(Four-Wheel-Drive Models)

Differential -	
Except "Hydralock"	13
"Hydralock"	15
Drive Shaft	9
Front Drive Axle	10
Planetary Assembly	11
Steering Knuckle Housing and Wheel Hub	12
Track Rod and Toe-in	8
Tractor Split -	
With Cab	18
Without Cab	17
Transfer Gearbox -	
Except Twelve-Speed Shuttle	19
With Twelve-Speed Shuttle Transmission	20

HYDRAULIC SYSTEM

Auxiliary Hydraulic Pump	226
Auxiliary Remote Control Valves	230
Auxiliary System Pressure	227
Hydraulic Lift Pump	223
Lift Cover	218
Reservoir and Filters	208
Selector Valve	220
Tests and Adjustments	210
Troubleshooting	209

INDEPENDENT

POWER TAKE-OFF

Hydraulic Pressure Tests	206
Left Side Cover and Control Valve	203
Operation	201
Output Shaft	202
Pto Clutch, Brake and Control Valve	204

Models
362, 365, 375, 383,
390, 390T and 398

Models
362, 365, 375, 383,
390, 390T and 398

LIVE POWER TAKE-OFF

Engagement Coupling and Ground Speed Gears	198
Output Shaft, Seal and Rear Bearing	197
Pto Front Drive Shafts and Gears	199

MAIN DRIVE BEVEL DRIVE GEARS AND DIFFERENTIAL

Differential and Bevel Ring Gear	176
Differential Lock	178
Main Drive Bevel Gears	181

REAR AXLE AND FINAL DRIVE

Drive Axle	188
Planetary Assembly	184
Rear Axle Assembly	183

STEERING SYSTEM

Filter and Bleeding	22
Power Cylinder –	
Four-Wheel-Drive Models	32
Two-Wheel-Drive Models	31
Pump –	
With Separate Pump	27
With Tandem Pump	29
Steering Control Valve	33
System Pressure –	
With Separate Steering Pump	24
With Tandem Pump	25
Troubleshooting	23

TRANSMISSION (Eight-Speed Standard)

Countershaft (Layshaft) and Gears	109
Lubrication	98
Mainshaft (Output Shaft) and Gears	108
Planetary Unit	104
Pto Input Shaft and Retainer Housing	105
Pto Lower Shaft Front Bearing and Retainer	106
Reverse Idler Gear and Shaft	110
Shifter Rails and Forks	103
Top Cover and Shift Levers	102
Tractor Rear Split –	
With Cab	100
Without Cab	99
Transmission Input Shaft	107
Transmission Removal	101

TRANSMISSION (Eight-Speed Synchronesh)

Countershaft (Layshaft) and Gears	121
Lubrication	111
Mainshaft (Output Shaft) and Gears	120
Planetary Unit	116
Pto Input Shaft and Retainer Housing	117

TRANSMISSION

(Eight-Speed Synchronesh) (Cont.)

Pto Lower Shaft Front Bearing and Retainer	118
Reverse Idler Gear and Shaft	122
Shifter Rails and Forks	115
Top Cover	114
Tractor Rear Split	112
Transmission Input Shaft	119
Transmission Removal	113

TRANSMISSION

(Twelve-Speed Synchronesh)

Countershaft (Layshaft) and Gears	133
Lubrication	123
Mainshaft (Output Shaft) and Gears	132
Planetary Unit	128
Pto Input Shaft and Retainer Housing	129
Pto Lower Shaft Front Bearing and Retainer	130
Reverse Idler Gear and Shaft	134
Shifter Rails and Forks	127
Top Cover	126
Tractor Rear Split	124
Transmission Input Shaft	131
Transmission Removal	125

TRANSMISSION (Twelve-Speed Multi-Power)

Countershaft (Layshaft) and Gears	145
Lubrication	135
Mainshaft (Output Shaft) and Gears	144
Planetary Unit	140
Pto Input Shaft and Retainer Housing	141
Pto Lower Shaft Front Bearing and Retainer	142
Reverse Idler Gear and Shaft	146
Shifter Rails and Forks	139
Top Cover	138
Tractor Rear Split	136
Transmission Input Shaft and Multi-power Clutch	143
Transmission Removal	137

TRANSMISSION (Eight-Speed Shuttle)

Countershaft (Layshaft) and Gears	157
Lubrication	147
Mainshaft (Output Shaft) and Gears	156
Planetary Unit	152
Pto Input Shaft and Retainer Housing	153
Pto Lower Shaft Front Bearing and Retainer	154
Reverse Idler Gear and Shaft	158
Shifter Rails and Forks	151
Top Cover	150
Tractor Rear Split	148
Transmission Removal	149
Transmission Input Shaft	155

	Models
	362, 365, 375, 383, 390, 390T and 398
TRANSMISSION	
(Twelve-Speed Shuttle)	
Forward/Reverse Shift Control Linkage	164
Lubrication	159
Main Gear Shift Lever and Selector Shaft	163
Main Transmission Countershaft (Layshaft) and Gears	174
Main Transmission Input Shaft	172
Main Transmission Shift Rails and Forks	165
Main Transmission Upper Shaft and Gears	173
Pto Input Shaft and Retainer Housing	170
Pto Lower Shaft Front Bearing and Retainer	171
Range Change Lower Shaft	168

	Models
	362, 365, 375, 383, 390, 390T and 398
TRANSMISSION	
(Twelve-Speed Shuttle) (Cont.)	
Range Change Unit Upper Shaft	166
Range Change Upper Shaft Bearing Preload	167
Range Selector Cam	169
Reverse Idler Gear and Shaft	175
Top Cover	162
Tractor Rear Split	160
Transmission Removal	161
TURBOCHARGER (390T and 398 Models)	
Operation	69
Service	70

DUAL DIMENSIONS

This service manual provides specifications in both U.S. Customary and Metric (SI) systems of measurement. The first specification is given in the measuring system perceived by us to be the preferred system when servicing a particular component, while the second specification (given in parenthesis) is the converted measurement. For instance, a specification of 0.011 inch (0.28 mm) would indicate that we feel the preferred measurement in this instance is the U.S. Customary system of measurement and the Metric equivalent of 0.011 inch is 0.28 mm.

CONDENSED SERVICE DATA

	362	365	Models 375	383-390	390T-398
GENERAL					
Engine Make	Perkins				
Model		A4.236		A4.248S	AT4.236
Build Code	LD31234	LD31190	LD31140	LF31141	LJ31142
Number of Cylinders	4				
Bore		98.4 mm (3.875 in.)		101 mm (3.975 in.)	98.4 mm (3.875 in.)
Stroke	127 mm (5.0 in.)				
Displacement		3.86 L (236 cid)		4.07 L (248 cid)	3.86 L (236 cid)
Compression Ratio	16:1				
Firing Order	1-3-4-2				

	Models
	362, 365, 375, 383, 390, 390T and 398
TRANSMISSION	
(Twelve-Speed Shuttle)	
Forward/Reverse Shift Control Linkage	164
Lubrication	159
Main Gear Shift Lever and Selector Shaft	163
Main Transmission Countershaft (Layshaft) and Gears	174
Main Transmission Input Shaft	172
Main Transmission Shift Rails and Forks	165
Main Transmission Upper Shaft and Gears	173
Pto Input Shaft and Retainer Housing	170
Pto Lower Shaft Front Bearing and Retainer	171
Range Change Lower Shaft	168

	Models
	362, 365, 375, 383, 390, 390T and 398
TRANSMISSION	
(Twelve-Speed Shuttle) (Cont.)	
Range Change Unit Upper Shaft	166
Range Change Upper Shaft Bearing Preload	167
Range Selector Cam	169
Reverse Idler Gear and Shaft	175
Top Cover	162
Tractor Rear Split	160
Transmission Removal	161
TURBOCHARGER (390T and 398 Models)	
Operation	69
Service	70

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	362, 365, 375, 383, 390, 390T and 398
TRANSMISSION	
(Twelve-Speed Shuttle)	
Forward/Reverse Shift Control Linkage	164
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Main Gear Shift Lever and Selector Shaft	163
Main Transmission Countershaft (Layshaft) and Gears	174
Main Transmission Input Shaft	172
Main Transmission Shift Rails and Forks	165
Main Transmission Upper Shaft and Gears	173
Pto Input Shaft and Retainer Housing	170
Pto Lower Shaft Front Bearing and Retainer	171
Range Change Lower Shaft	168

	Models
	362, 365, 375, 383, 390, 390T and 398
TRANSMISSION	
(Twelve-Speed Shuttle) (Cont.)	
Range Change Unit Upper Shaft	166
Range Change Upper Shaft Bearing Preload	167
Range Selector Cam	169
Reverse Idler Gear and Shaft	175
Top Cover	162
Tractor Rear Split	160
Transmission Removal	161
TURBOCHARGER (390T and 398 Models)	
Operation	69
Service	70

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Compression Ratio	16:1				
Firing Order	1-3-4-2				

CONDENSED SERVICE DATA (CONT.)

	Models				
	362	365	375	383-390	390T-398
GENERAL (Cont.)					
Valve Clearance (Cold) –					
Inlet			0.3 mm (0.012 in.)		
Exhaust			0.3 mm (0.012 in.)		
Valve Face Angle					
Inlet		45°			30°
Exhaust			45°		
Valve Seat Angle					
Inlet		45°			30°
Exhaust			45°		
Injection timing – BTDC					
Static		23°		24°	16°
Fuel Pump					
Make			CAV		
Model			DPA		
Engine Low Idle, rpm			725-775		
Engine High Idle, rpm	2310	2420*	2420*	2380*	2420*
Engine Rated Speed, rpm			2200		
Battery Terminal Grounded			Negative		
* High idle no load speed should be 2310 rpm for M-F 365 after engine serial number U261448S, M-F 375 after S. N. U209015P, M-F 390 after S. N. U226834S and M-F 390T/398 after S.N. U219831S.					
SIZES					
Crankshaft Main					
Journal Diameter			See Paragraph 57		
Crankshaft Crankpin					
Diameter			See Paragraph 57		
Camshaft Journal					
Diameter			See Paragraph 52		
Piston Pin Diameter			See Paragraph 54		
Valve Stem Diameter			See Paragraph 38		
CLEARANCES					
Main Bearing Diametral					
Clearance			See Paragraph 57		
Rod Bearing Diametral					
Clearance			See Paragraph 56		
Camshaft Bearing					
Diametral Clearance			See Paragraph 52		
Crankshaft End Play			See Paragraph 57		
Piston Skirt to					
Cylinder Clearance			See Paragraph 54		
CAPACITIES					
Cooling System	14.4 L (15.2 qts.)		15.1 L (16 qts.)		15.5 L (16.4 qts.)
Crankcase With Filter	6.8 L (7.2 qts.)		7.5 L (7.9 qts.)		7.7 L (8.1 qts.)
Transmission –					
Without Spacer			43.4 L (11.5 gal.)		

CONDENSED SERVICE DATA (CONT.)

	362	365	Models 375	383-390	390T-398
CAPACITIES (Cont.)					
Transmission (Cont.)					
With Spacer or Transfer Housing			47.4 L (12.5 gal.)		
Final Drive Rear Planetary Hub – Each Side . .			0.9 L (5 pints)		
Hydrostatic Steering			1.2 L (2.2 pints)		
Front Drive Axle Hubs (Each Side)			1.2 L (2.3 pints)		1.3 L† (2.6 pints)
Front Drive Axle Housing	4.0 L (1.1 gal.)		5.0 L (1.3 gal.)		5.8 L‡ (1.5 gal.)

† Capacity for 390T model is 1.2 L (2.3 pints).

‡ Capacity for 390T model is 5.0 L (1.3 gal.).

FRONT AXLE SYSTEM (TWO-WHEEL-DRIVE)

FRONT AXLE ASSEMBLY AND STEERING LINKAGE

Two-Wheel-Drive Models

1. WHEELS AND BEARINGS. To remove front wheel hub and bearings, first raise and support the front axle extension, then unbolt and remove the tire and wheel assembly. Remove cap (2 or 3—Fig. 4), cotter pin (4), castellated nut (5), washer and outer bearing cone (7). Slide the hub assembly from spindle axle shaft. Remove dust shield (12), seal (9) and inner bearing cone (11). Drive bearing cups (8 and 10) from hub if renewal is required. Pack wheel bearings liberally with a multi-purpose lithium based grease. Reassemble by reversing disassembly procedure. Tighten castellated nut (5) to a torque of 80 N·m (60 ft.-lbs.), then back nut off to the nearest hole and install cotter pin (4). Be sure to install cap (2 or 3) securely.

2. TRACK ROD AND TOE-IN. All models are equipped with hydrostatic steering. On 362 models, a single track rod connects the left and right steering arms which are attached to the steering spindles. On 365-398 models, the two track rods are attached to

each end of the hydrostatic steering rod, which is located between the steering arms. The track rod of all models assures that both left and right wheels turn in unison and the distance between ends of track rod establishes front wheel toe-in.

Ends of track rod are automotive type and should be renewed if wear is excessive. The procedure for removing and installing ends is self-evident. Recommended toe-in is 0-5 mm (0-3/16 inch) for all models. Toe-in should be measured between the wheel rims on center line of axle, parallel to ground, at front and rear of wheels. Rotate wheels and remeasure to be sure that wheels are not bent giving incorrect reading.

Front wheel tread width is adjustable to seven different widths by relocating axle extensions and changing length of track rod using the preexisting attachment holes.

On 362 models, axle extension and hydrostatic steering cylinder bracket retaining screws (1—Fig. 5) should be tightened to 180-230 N·m (135-170 ft.-lbs.) torque. Tighten track setting screw (2) to 45-55 N·m (33-40 ft.-lbs.) torque before tightening locknut. Note that spacers are used on the outer screws between steering cylinder brackets and axle extensions when axle width is at the four widest settings. To make small toe-in adjustments, remove track adjusting screw (2) from left end of track rod, loosen rod end clamp bolt on right end, then turn center section of track rod until toe-in is correct. Reinstall track adjusting screw (2) and tighten rod end clamp bolt to 45-55 N·m (33-41 ft.-lbs.) torque.

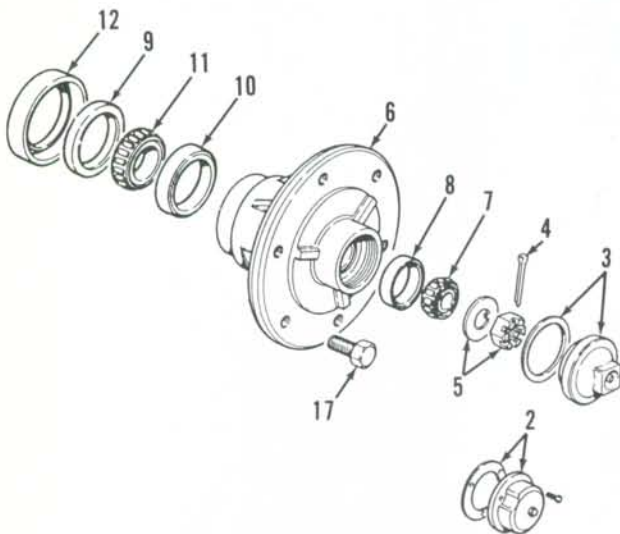


Fig. 4—Exploded view of wheel hub typical of two-wheel-drive models.

- | | |
|----------------------------------|----------------------------|
| 2. Hub cap | 8. Outer bearing cup |
| 3. Hub cap | 9. Seal |
| 4. Cotter pin | 10. Inner bearing cup |
| 5. Castellated nut & tang washer | 11. Inner bearing cone |
| 6. Hub | 12. Dust shield |
| 7. Outer bearing cone | 17. Wheel retaining screws |

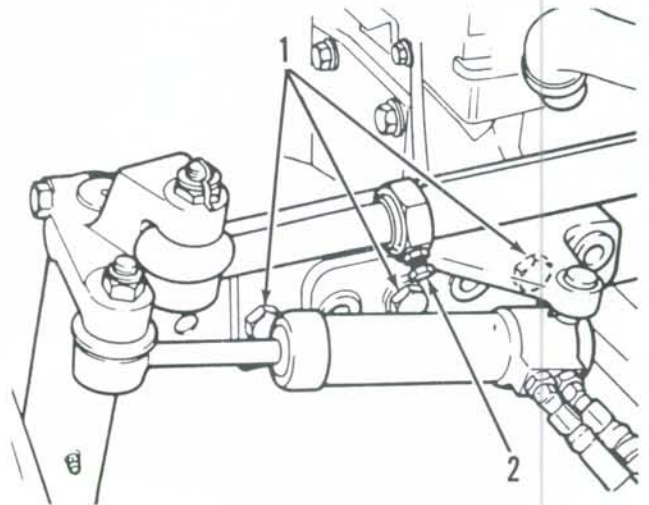


Fig. 5—View of axle left end typical of 362 model. Track adjusting screw and locknut (2) and cylinder bracket and axle extension screws (1) must be properly installed and tightened.

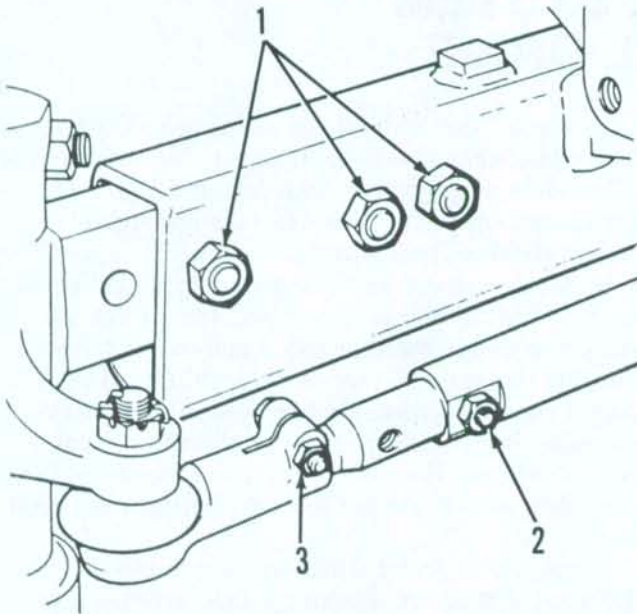


Fig. 6—View of axle left end typical of type used on 365-398 models. Right side is equipped with a similar track rod, adjusting bolt (2) and rod end. Rod end may be locked with clamp bolt (3) as shown or locknut.

On 365-398 models, axle extension retaining screws (1—Fig. 6) should be tightened to 340-450 N·m (250-330 ft.-lbs.) torque. Tighten track setting bolt (2) to 120-160 N·m (90-120 ft.-lbs.). To make small toe-in adjustments, remove track adjusting bolt (2), loosen rod end clamp bolt (3) or jam nut, then turn track rod until toe-in is correct. Reinstall track adjusting bolt (2) and tighten to 120-160 N·m (90-120 ft.-lbs.) torque. Tighten rod end clamp bolt (3) to 45 N·m (33 ft.-lbs.) torque or jam nut to 160-200 N·m (120-130 ft.-lbs.) torque. Equal toe-in adjustments should be made to both sides to center steering.

3. SPINDLES, AXLE EXTENSIONS AND BUSHINGS. To remove spindle (12—Fig. 7 or Fig. 8), first remove the wheel and hub. Disconnect rod end from steering arm (1), remove clamp screw (13) from steering arm, then remove steering arm. Remove key (14) and seal (20) from top of spindle, then lower spindle out of axle extension (19). Remove thrust bearing (11) from spindle. Clean and inspect parts for wear or other damage and renew as necessary.

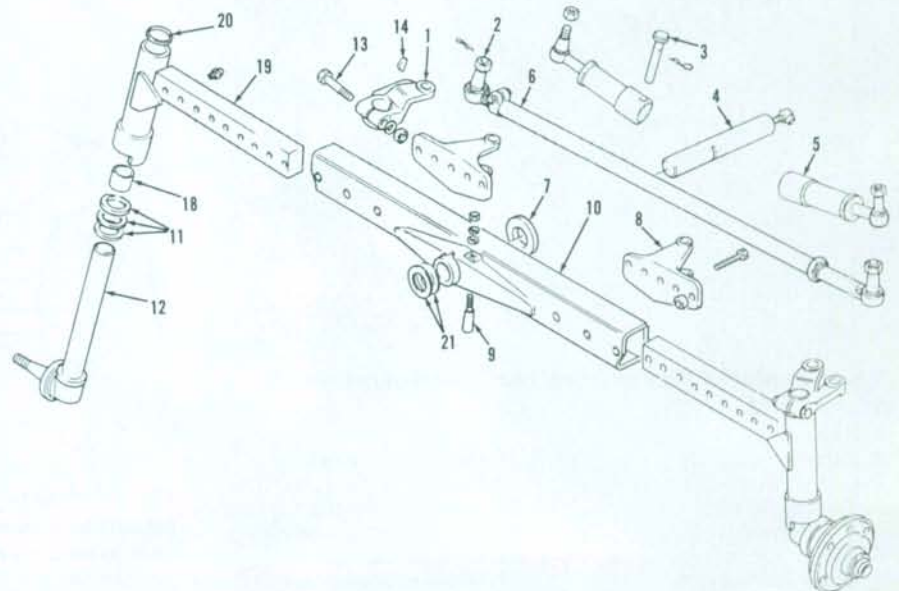
Each axle extension (19) is equipped with two renewable spindle bushings (18). New bushings must be reamed after they are pressed into position. Clean all metal particles from bore and be sure that hole for grease fitting is clean and open before assembling.

When reassembling, install thrust bearing (11) on spindle so that numbered side of bearing is facing upward and insert spindle through axle extension. Install seal (20) and key (14) then locate steering arm on top of spindle. Tighten steering arm retaining clamp screw to a torque of 125-165 N·m (94-122 ft.-lbs.) for 362 models; 280-370 N·m (207-273 ft.-lbs.) torque for 365-398 models. Refer to paragraph 2 for track and toe-in adjustment and other recommended torques. Balance of reassembly is the reverse of disassembly.

4. AXLE CENTER MEMBER, PIVOT PIN AND BUSHINGS. To remove front axle assembly, first remove any front mounted equipment, guards, weights and weight frame. Raise front of tractor in such a way that it will not interfere with the removal of the axle, such as with a support located under engine sump. Removal of wheels, spindles and axle extensions will reduce weight and may make handling the center member easier; however, the complete axle assembly can be removed as a unit.

Fig. 7—Exploded view of front axle typical of two-wheel-drive 362 model.

1. Steering arm
2. Rod end
3. Cylinder pivot pin
4. Axle pivot pin
5. Steering cylinder
6. Track rod
7. Thrust washer
8. Steering cylinder bracket
9. Tapered retaining pin
10. Axle center member
11. Thrust washers
12. Spindle
13. Bushing
14. Axle extension
15. Seal
16. Shims



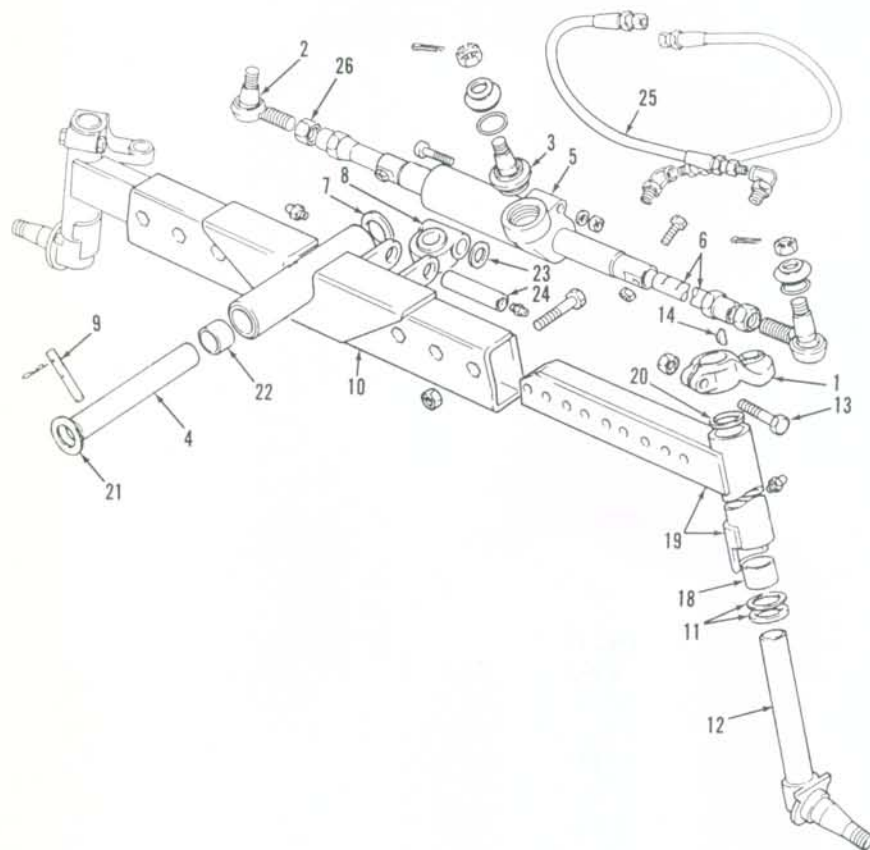


Fig. 8—Exploded view of front axle typical of type used on two-wheel-drive 365-398 models.

1. Steering arm
2. Rod end
3. Cylinder ball joint
4. Axle pivot pin
5. Steering cylinder
6. Track rod
7. Thrust washer
8. Pivot block
9. Retaining pin
10. Axle center member
11. Thrust washers
12. Spindle
14. Key
18. Bushing
19. Axle extension
20. Seal
21. Shims
22. Bushing
23. Shims
24. Pivot pin
25. Hydraulic hoses
26. Jam nut

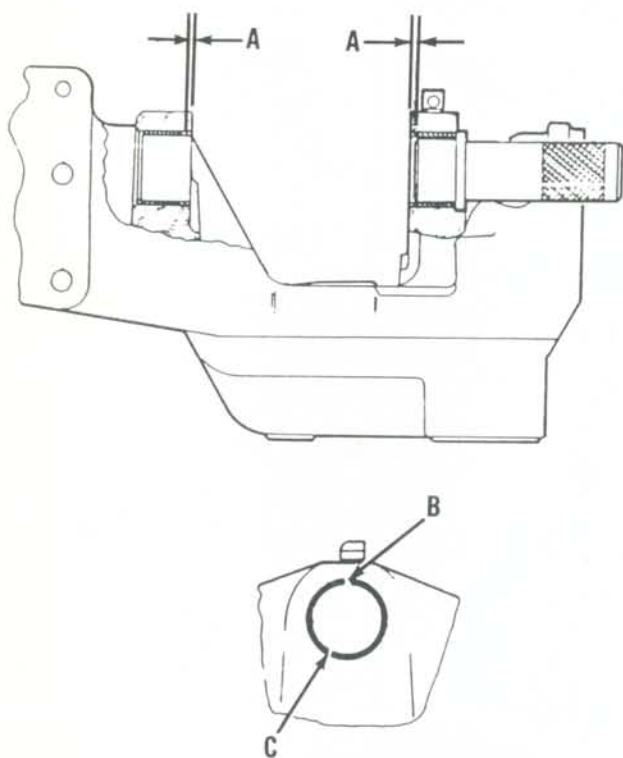


Fig. 9—Axle pivot bushings should be installed as shown for 362 model. Hole (B) should be aligned with grease passage and slot (C) should be in position indicated.

Disconnect hydrostatic steering hoses from the steering cylinder or cylinders and cover openings to prevent the entry of dirt. Support the axle with a suitable jack to prevent tipping while permitting the axle to be lowered and moved safely. Remove retaining pin (9—Fig. 7 or Fig. 8), then use a suitable puller to withdraw axle pivot pin (4). Carefully lower the axle assembly and roll axle from under tractor.

Check axle pivot bushings and renew if necessary. Bushings are located in support housing of 362 models and should be installed flush to 0.5 mm (0.020 inch) below flush (A—Fig. 9) with housing bore. Split (C—Fig. 9) in bushing should be down and hole (C) for grease passage should be up as shown. Axle pivot bushings are located in axle of 365-398 models. On all models, it may be necessary to ream bushings after installation. Reverse removal procedure when assembling. Axle end play should be 0.05-0.25 mm (0.002-0.010 inch) on pivot pin. Push the axle toward rear on pivot pin, then measure axle end play with a feeler gauge as shown in Fig. 10 or Fig. 11. Shims (21—Fig. 7 or Fig. 8) are available in various thicknesses for adjusting end play. On 362 models, make sure that tapered pin (9—Fig. 7) is correctly and firmly seated, then tighten retaining nut to 80-140 N·m (70-110 ft.-lbs.) torque. On all models, refer to paragraphs 2 and 3 for additional torque values and assembly notes.

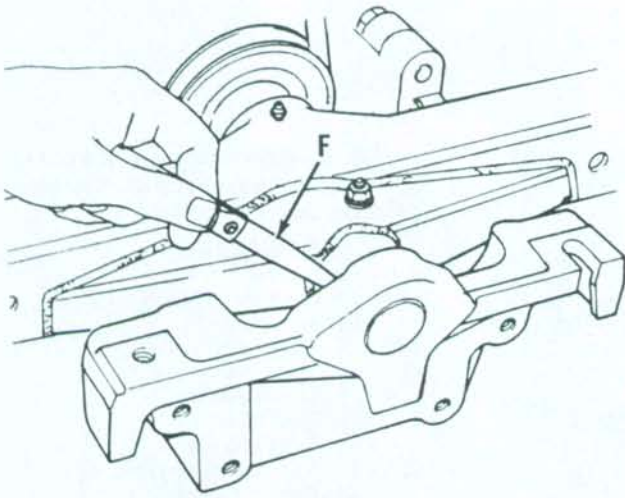


Fig. 10—End play of front axle should be measured with a feeler gauge as shown for 362 model with two-wheel drive.

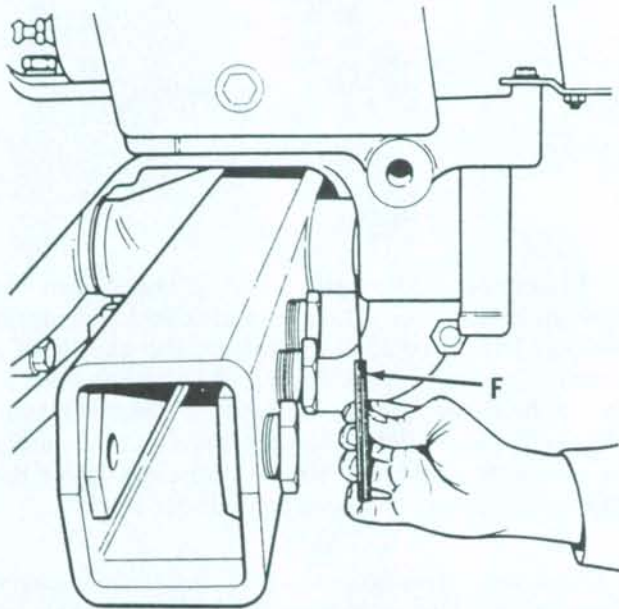


Fig. 11—Measure end play of front axle with a feeler gauge as shown for models 365-398 with two-wheel drive.

5. FRONT SUPPORT. To remove the front support, the axle must be removed, the radiator must be removed and the front support must be unbolted from the front of engine. The front axle, the front support and the remainder of the tractor must each be supported separately while removing, while separated and while assembling. Be sure that sufficient equipment is available before beginning.

To remove front axle support from 362 models, first remove any front mounted equipment, guards, weights and weight frame. Remove grille, hood, hood side panels, air cleaner and battery. Drain cooling system, disconnect radiator hoses and disconnect wires to headlights. Remove radiator and oil cooler

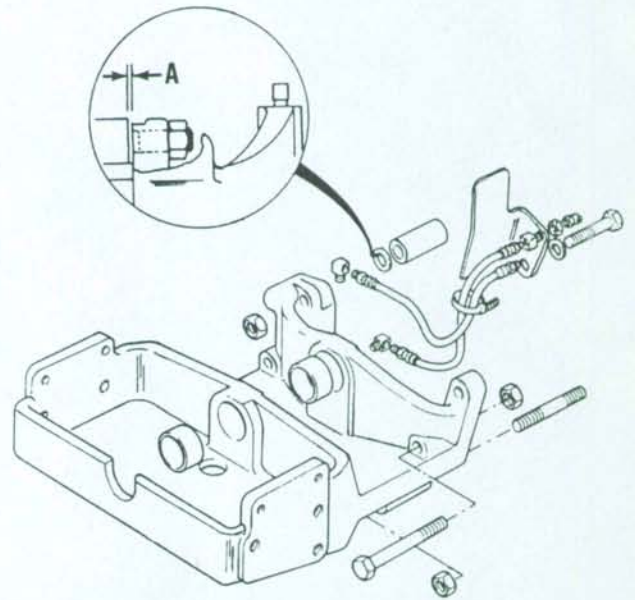


Fig. 12—Measure gap (A) between the top spacer tube on right side and front support of 362 model.

assembly, then refer to paragraph 4 and remove the axle assembly. Attach a hoist or other supporting device to the front support, then unbolt and separate the front support from the front of the engine. Be careful not to lose shims which may be located between front support casting and front of engine.

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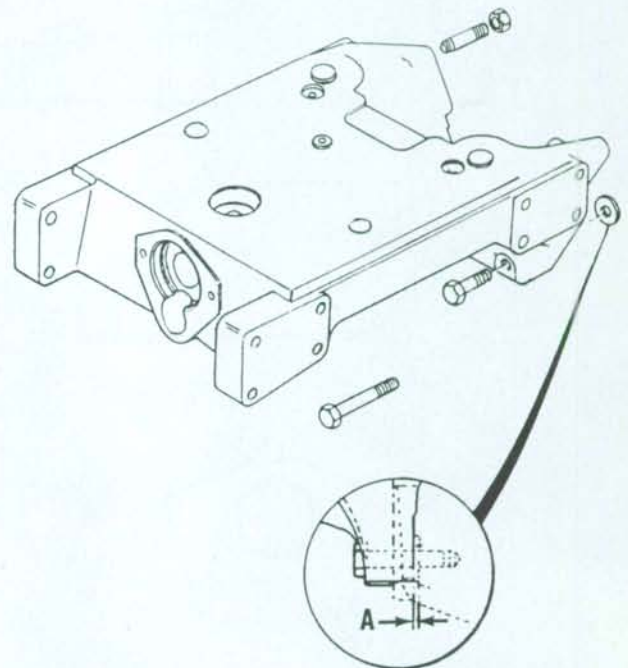


Fig. 13—Use a feeler gauge to measure gap (A) between the lower ears of casting and four-cylinder engine of 365-398 models.

weights and weight frame. Remove fuel tank and radiator and radiator support frame, then refer to paragraph 4 and remove the axle assembly. Attach a hoist or other supporting device to the front support, then unbolt and separate the front support from the front of the engine. Be careful not to lose shims which may be located between front support casting and front of engine.

Reattach front support to engine of all models by reversing the removal procedure, but omitting any shims originally installed between support and engine. On 362 models, tighten the retaining screws to 240-320 N·m (177-236 ft.-lbs.) torque. Measure any

gap (A—Fig. 12) between the top spacer tube on right side and front support with a feeler gauge. Loosen retaining screws and install shims equal to the measured gap plus 0.13 mm (0.005 inch).

Tighten screws retaining front support of 365-398 models to 230-255 N·m (170-190 ft.-lbs.) torque. Use a feeler gauge to measure any gap (A—Fig. 13) between the lower ears of front support casting and engine of 365-398 models. Loosen retaining screws and install shims equal to the measured gap plus 0.13 mm (0.005 inch).

On all models, complete assembly by reversing the removal procedure.

FRONT-WHEEL DRIVE

7. A mechanical front-wheel drive is available on these models. There are some differences between the Front-Wheel Drive Systems used on these models that will be referred to in the servicing instructions which follow.

The front drive is engaged by an electric solenoid/hydraulic valve which directs oil pressure to move a dog clutch, or by a dog clutch which is moved manually by a shift fork by way of mechanical linkage. The transfer gearbox is attached to the left side of the range gearbox of models with twelve-speed shuttle transmissions or located between the rear of the transmission housing and the front of the rear axle housing of other models. On all models, a drive shaft with two "U" joints connects the transfer gearbox to front axle.

TRACK ROD AND TOE-IN

All Four-Wheel-Drive Models

8. All models are equipped with hydrostatic steering. A single track rod connects the left and right steering arms which are attached to the steering spindles. The track rod assures that both left and right wheels turn in unison, and the distance between ends of track rod establishes front wheel toe-in.

Ends of track rod are automotive type and should be renewed if wear is excessive. The procedure for removing and installing ends is self-evident. Recommended toe-in is 0 for all models. Toe-in should be measured between the wheel rims on center line of axle, parallel to ground, at front and rear of wheels. Rotate wheels and remeasure to be sure that wheels are not bent giving incorrect reading.

Front wheel tread width is adjustable to different widths by relocating the wheel on the center disc or by reversing the wheels. If wheels are reversed, they

must be moved to opposite sides of tractor to maintain correct tire tread direction.

To adjust toe-in, loosen the locknuts at each end of the track (tie) rod, then turn the tie rod tube to set the toe-in. Tighten locknuts at each end when adjustment is correct. Nut retaining ball-joint of track rod end in the steering arm should be tightened to 78-86 N·m (58-63 ft.-lbs.) torque for 362-390T models, 108-118 N·m (80-87 ft.-lbs.) torque for 398 models.

DRIVE SHAFT

All Models So Equipped

9. REMOVE AND REINSTALL. To remove drive shaft, first loosen clamps (1 and 2—Fig. 14), then slide guard (3) into the center tube. Remove spring clip (6) from guard at front. Remove bolts (4 and 5) from ends, then remove the shield and drive shaft assembly. Unscrew seal retaining ring from the sliding coupling, remove sliding coupling from rear end of drive shaft, then remove drive shaft from guard tube.

When reassembling, grease splines of sliding coupling and both universal joints. Insert the long section of drive shaft into guard, then assemble sliding coupling at rear, making sure that arrows on drive shaft and sliding coupling are aligned. Coat threads of bolts (4 and 5) with "Loctite 270," then attach drive shaft flanges with bolts (4 and 5) tightened to 55-75 N·m (40-55 ft.-lbs.) torque. Install clip (6) at front (axle end), making sure that drain hole in guard is toward bottom. Distance from step in axle and front of guard should be approximately 90 mm (3.5 inch).

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Tighten screws retaining front support of 365-398 models to 230-255 N·m (170-190 ft.-lbs.) torque. Use a feeler gauge to measure any gap (A—Fig. 13) between the lower ears of front support casting and engine of 365-398 models. Loosen retaining screws and install shims equal to the measured gap plus 0.13 mm (0.005 inch).

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