

2350 and 2550 Tractors



TECHNICAL MANUAL 2350 and 2550 Tractors

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2350 AND 2550 TRACTORS TECHNICAL MANUAL TM-4403 (May-85)

CONTENTS

SECTION 10 - GENERAL

- Group 00 - Specifications and Special Tools
- Group 05 - Predelivery, Delivery and After-Sales Inspections
- Group 10 - Lubrication and Periodic Service
- Group 15 - Engine and Tractor Tune-Up
- Group 20 - Tractor Separation

SECTION 20 - ENGINE

- Group 00 - Specifications and Special Tools
- Group 05 - General Information Diagnosing Malfunctions
- Group 10 - Cylinder Head, Valves, Camshaft and Balancer Shafts
- Group 15 - Cylinder Block, Liners, Pistons and Connecting Rods
- Group 20 - Crankshaft, Main Bearings and Flywheel
- Group 25 - Timing Gear Train
- Group 30 - Engine Lubrication System
- Group 35 - Cooling System

SECTION 30 - FUEL AND AIR INTAKE SYSTEM

- Group 00 - Specifications and Special Tools
- Group 05 - General Information, Diagnosing Malfunctions
- Group 10 - Fuel Tank, Water Trap, Fuel Transfer Pumps and Fuel Filter
- Group 15 - Roto Diesel Fuel Injection Pump
- Group 20 - Fuel Injection Nozzles
- Group 25 - Cold Weather Starting Aids
- Group 30 - Speed Control Linkage
- Group 35 - Air Cleaner

SECTION 40 - ELECTRICAL SYSTEM

- Group 00 - Specifications and Special Tools
- Group 05 - Description, Diagnosing Malfunctions and Tests
- Group 10 - Wiring Harnesses
- Group 15 - Controls and Instruments
- Group 20 - Lighting Systems
- Group 25 - Wiring Diagrams
- Group 30 - Starting Motor
- Group 35 - Alternator

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CONTENTS

SECTION 50 - POWER TRAIN

- Group 00 - Specifications and Special Tools
- Group 05 - Description, Operation and Lubricating System
- Group 10 - Clutch Operating Linkages
- Group 15 - Engine Clutch
- Group 20 - Hi-Lo Shift Unit
- Group 21 - Reverser Transmission
- Group 22 - Creeper Transmission
- Group 25 - Transmission Shift Linkages
- Group 30 - Synchronized Transmission and Transmission Oil Pump
- Group 31 - Collarshift Transmission and Transmission Oil Pump
- Group 35 - Differential
- Group 40 - Final Drives
- Group 45 - Independent PTO
- Group 46 - Continuous - Running PTO
- Group 50 - Mechanical Front Wheel Drive

SECTION 60 - STEERING SYSTEM AND BRAKES

- Group 00 - Specifications and Special Tools
- Group 05 - Steering
- Group 10 - Brakes

SECTION 70 - HYDRAULIC SYSTEM

- Group 00 - Specifications and Special Tools
- Group 05 - Description, Diagnosing Malfunctions and Pressure Tests
- Group 10 - Oil Reservoir, Filter, Valves and Oil Cooler
- Group 15 - 22.6 cm³ (1.38 cu. in.) Hydraulic Pump
- Group 16 - 40.0 cm³ (2.40 cu. in.) Hydraulic Pump
- Group 20 - Rockshaft
- Group 25 - Selective Control Valve (Poppet Valve Type) and Breakaway Coupler
- Group 26 - Selective Control Valves (Spool Type)
- Group 30 - Remote Cylinder

SECTION 80 - MISCELLANEOUS

- Group 00 - Specifications
- Group 05 - Front Axle
- Group 10 - Front and Rear Wheels

SECTION 90 - OPERATOR'S STATION

- Group 00 - Specifications and Special Tools
- Group 05 - Air Conditioning System
- Group 10 - Cab Ventilation and Heating
- Group 15 - Seats
- Group 20 - SOUND-GARD Body
- Group 25 - ROLL-GARD Protective Structure

Section 10 GENERAL

CONTENTS OF THIS SECTION

	Page		Page
GROUP 00 - SPECIFICATIONS AND SPECIAL TOOLS		GROUP 05 - PREDELIVERY, DELIVERY AND AFTER-SALES INSPECTIONS	
Specifications	10-00-3	Tractor Storage	10-05-1
Serial Numbers	10-00-3	Predelivery Inspection	10-05-2
Model Numbers	10-00-3	Delivery Inspection	10-05-9
Engine	10-00-3	After-Sales Inspection	10-05-10
Engine Clutch	10-00-4		
Cooling System	10-00-4	GROUP 10 - LUBRICATION AND SERVICE	
Fuel System	10-00-4	Lubrication and Service	10-10-1
Electrical System	10-00-5		
Synchronized Transmission	10-00-5	GROUP 15 - TUNE-UP	
Collar Shift Transmission	10-00-5	Preliminary Engine Testing	10-15-1
Hi-Lo Shift Unit	10-00-5	Dynamometer Test	10-15-1
Reverser Transmission	10-00-5	Testing Compression Pressure	10-15-2
Creeper Transmission	10-00-6	Engine Tune-Up	10-15-3
Differential and Final Drives	10-00-6	Checking Tractor Operation	10-15-8
Differential Lock	10-00-6	Standard Torques	10-15-9
PTO	10-00-6		
Mechanical Front Wheel Drive	10-00-7	GROUP 20 - TRACTOR SEPARATION	
Hydrostatic Steering	10-00-7	Separating Between Engine and	
Foot Brakes	10-00-7	Tractor Front End	10-20-1
Handbrake	10-00-7	Removal and Installation of Engine	10-20-5
Hydraulic System	10-00-7	Removal and Installation of	
Capacities	10-00-7	Clutch Housing	10-20-9
Travel Speeds	10-00-8	Removal and Installation of	
Front and Rear Wheels	10-00-8	Final Drives	10-20-13
Dimensions and Weights	10-00-8	Removal and Installation of	
Predelivery, Delivery and		Rockshaft	10-20-18
After-Sales Inspections	10-00-8	Removal and Installation of	
Lubrication and Service	10-00-9	SOUND-GARD® Body	10-20-20
Tune-Up	10-00-11		
Tractor Separation	10-00-12		
Standard Torques	10-00-13		
Special Tools	10-00-15		

Group 00

SPECIFICATIONS AND SPECIAL TOOLS**SPECIFICATIONS****SERIAL NUMBERS**

The engine serial number is stamped into the plate located on the lower front right-hand side of the cylinder block.

NOTE: When ordering engine parts, quote all digits of serial number stamped on the plate.

The plate showing the tractor serial number is located on the right-hand side of the front axle carrier.

NOTE: When ordering tractor spare parts (excluding engine parts), quote all digits and letters of serial number stamped on the plate.

A plate showing the tractor type, transmission serial number, cone point measurement etched into pinion face of differential drive shaft as well as reduction of differential is located on the right-hand side of the transmission case.

MODEL NUMBERS

The fuel injection pump, fuel injection nozzles, alternator, starting motor, hydrostatic steering valve, compressor of air conditioning system (when equipped) and hydraulic pump have model numbers to facilitate identification of different makes of a given unit.

ENGINE

Number of cylinders		4
Cylinder liner bore	106.5 mm	4.19 in.
Stroke	110 mm	4.33 in.
Displacement	3920 cm ³	239 cu. in.
Compression ratio		16.8 : 1
2350 up to engine serial no. 571 490 CD and 2550 up to engine serial no. 547 536 CD		16.8:1
2350 from engine serial no. 571 491 CD and 2550 from engine serial no. 547 537 CD		17.4:1
Maximum torque		
2350 at 1400 rpm	220 N·m	160 lb·ft
2550 at 1400 rpm	250 N·m	185 lb·ft
Firing order		1 - 3 - 4 - 2
Valve clearance (engine hot or cold)		
Intake valve	0.35 mm	0.014 in.
Exhaust valve	0.45 mm	0.018 in.

Fast idle speed	2670 to 2660 rpm
Slow idle speed	700 to 800 rpm
Rated engine speed	2500 rpm
Working speed range	
2350 and 2550	1400 to 2500 rpm
PTO* horsepower at engine rated speed—2550 rpm	
According to SAE J816b—2350	41 kW 55 hp
2550	48 kW 65 hp

Lubrication system Full internal force feed system with full flow filter

ENGINE CLUTCH Single dry disk clutch with torsion damper, foot operated

COOLING SYSTEM

Type Pressurized system with centrifugal pump

Temperature regulation Thermostat

FUEL SYSTEM

Type Direct injection

Fuel injection pump timing to engine TDC

Fuel injection pump type Distributor type

2350	Roto Diesel No. R 3448F040
2550 up to engine serial no. 573009CD	Roto Diesel No. R 3443F950
2550 from engine serial no. 573010CD	Roto Diesel No. R 3448F230

Air cleaner Dry-type air cleaner with secondary (safety) element

**With the engine run in (above 100 hours of operation) and having reached operating temperature (engine and transmission); measured by means of a dynamometer. Permissible variation ± 5 per cent.*

Electrical System

Batteries	2 x 12 volts, 55 Ah or 66 Ah
Alternator with internal regulator	
Tractors without SOUND-GARD body	14 volts, 33 or 55 amps.
Tractors with SOUND-GARD body	14 volts, 55 amps.
Starting motor	12 volts, 3 kW (4 hp)
Battery terminal grounded	negative

Synchronized Transmission

Type	Synchronized transmission
Gear selections	8 forward and 4 reverse
Gear shifting	Two forward groups and one reverse group Synchronized forward and reverse shifting within groups

Collar Shift Transmission

Type	Helical gears
Gear selections	8 forward, 4 reverse speeds
Gear shifting	Two forward ranges, One reverse range

Hi-Lo Shift Unit

Type	Hydraulic gear reduction unit which can be shifted under load with "wet" multi- ple disk clutch and brake packs
Travel speed decreases in each gear by	Approx. 20 per cent
Shifting to reduced (Lo) speed	Preloaded cup springs
Shifting to normal (Hi) speed	Hydraulic

Reverser Transmission

Type	Hydraulically controlled can be shifted under load, with "wet" disk clutches and brakes, planetary reverser unit
Gear selections	1 to 4
Increase in reverse gear speeds	Approx. 16 per cent.

Creeper Transmission

Type Synchronized reduction unit
 Travel speed decreases in low (l) and reverse ranges by approx. 79%
 Shifting both ranges Mechanical and not under load

Differential and Final Drives

Type of differential Spiral bevel gears
 Type of final drive Planetary reduction drive

Differential Lock

Operation Hand or foot operated
 Disengage Will disengage automatically as soon as traction has equalized

PTO

INDEPENDENT PTO - 540 rpm or 540/1000 rpm

Type Independent of transmission, can be engaged and disengaged under load
 PTO clutch Hydraulically operated "wet" disk clutch
 PTO brake Hydraulically operated "wet" disk brake

CONTINUOUS - RUNNING PTO - 540 rpm

Type Independent of transmission, with engine dual-stage clutch

PTO SPEEDS (IN RPM)—WITHOUT REVERSER

Engine speed	540 rpm shaft	1000 rpm shaft
800	180	335
2400	540	1000
2500	565	1040
2660	600	1110

PTO SPEEDS (IN RPM)—WITH REVERSER

Engine speed	540 rpm shaft
800	210
2075	540
2400	625
2500	650
2660	690

Mechanical Front Wheel Drive

Type Engaged hydraulically, under full load with "wet" disk clutch

Control Electrical/hydraulic solenoid switch

Engagement Preloaded cup springs

Disengagement Hydraulic

Hydrostatic Steering Without mechanical linkage between steering valve and the front wheels

Foot Brakes 1 Self-adjusting, hydraulically operated "wet" disk brakes

Handbrakes Mechanically operated band-type locking brake acting on the differential

Hydraulic System

Type Closed center, constant pressure system

Standby pressure 15800 to 16200 158 to 162 bar 2300 to 2350 psi

Operating pressure 14000 kPa 140 bar 2050 psi

Hydraulic pump 8-piston pump with variable displacement

Capacities

Fuel tank 91 L 24.0 U.S. gal

Cooling System

Without SOUND-GARD body 13 L 3.4 U.S. gal

With SOUND-GARD body 14 L 4.0 U.S. gal

Engine crankcase

Without filter change 8 L 2.1 U.S. gal

With filter change 8.5 L 2.25 U.S. gal

Transmission - Hydraulic system (including oil reservoir and oil cooler)

Synchronized transmission

Dry system—2350 59 L 15.6 U.S. gal

2550 64 L 16.9 U.S. gal

Oil change—2350 51 L 13.5 U.S. gal

2550 56 L 14.8 U.S. gal

Collar shift transmission (with reverser)

Dry system 42 L 11.1 U.S. gal

Oil change 34 L 9.0 U.S. gal

Capacities (Contd.)

Oil reservoir	4 L	1.1 U.S. gal
Oil cooler	2 L	0.5 U.S. gal

Mechanical front wheel drive

Front axle housing	5.0 L	(1.30 U.S. gal)
Wheel hub, each	0.75 L	(0.2 U.S. gal)

Travel Speeds see Operator's Manual

Front and Rear Wheels

tires, tread widths, tire pressures and ballast weights see Operator's Manual

Dimensions and Weights see Operator's Manual

Predelivery, Delivery and After-Sales Inspections**ENGINE SPEEDS**

Slow idle	700 to 800 rpm
Fast idle	2610 to 2660 rpm
Rated speed	2500 rpm

FAN BELT

The fan belt should have 19 mm (3/4 in.) flex with 90 N (20 lb force) pull midway between crankshaft and alternator or water pump (use a spring scale).

COMPRESSOR BELT

The compressor belt should have 19 mm (3/4 i.) flex with 60 N (13 lb force) pull midway between pulleys.

BATTERIES

Specific gravity at an electrolyte temperature
of 20°C (68°F)

Normal and arctic conditions	1.28
Tropical conditions	1.23

Clutch Operating Linkage**Tractors without SOUND-GARD Body**

Clutch pedal free travel 25 mm approx. (1 in.)

Tractors with SOUND-GARD Body

Travel of slave cylinder operating rod 8.5 to 12 mm
5/16 to 15/32 in.

Front Wheel Toe-In

Tractors without MFWD	3 to 6 mm	(0.12 to 0.25 in.)
Tractors with MFWD	0 to 3 mm	(0 to 0.12 in.)

Torques for Hardware

Start safety switch in rockshaft housing, max.	50 N·m	(35 lb-ft)
Front wheel rim to hub		
Tractors without MFWD	180 N·m	(130 lb-ft)
Tractors with MFWD	300 N·m	(220 lb-ft)
Axle knees to axle center, cap screws	400 N·m	(300 lb-ft)
Tie rod clamps		
Cap screw (M10)	55 N·m	(40 lb-ft)
Cap screw (M13)	90 N·m	(65 lb-ft)
Tie rod tube, cap screw	55 N·m	(40 lb-ft)
Rear wheels to axle	400 N·m	(300 lb-ft)
Wheel disk to hub (rack-and-pinion axle)	400 N·m	(300 lb-ft)
2-post ROLL-GARD protective structure		
Supports to crossbar, cap screws	230 N·m	(170 lb-ft)
Supports to final drives, cap screws and nuts	230 N·m	(170 lb-ft)

LUBRICATION AND SERVICE

Capacities

Engine crankcase

Without filter change	8.0 L	(2.1 U.S. gal)
With filter change	8.5 L	(2.3 U.S. gal)

Cooling System

Without SOUND-GARD body	13 L	(3.4 U.S. gal)
With SOUND-GARD body	15 L	(4.0 U.S. gal)

Transmission - Hydraulic system (including oil reservoir and oil cooler)

Synchronized transmission

Dry system - 2350	59 L	15.6 U.S. gal
2550	64 L	16.9 U.S. gal
Oil change - 2350	51 L	13.5 U.S. gal
2550	56 L	14.8 U.S. gal

Collar shift transmission (with reverser)

Dry system	42 L	11.1 U.S. gal
Oil change	34 L	9.0 U.S. gal

Capacities (Contd.)

Oil reservoir	4 L	1.1 U.S. gal
Oil cooler	2 L	0.5 U.S. gal
Mechanical front wheel drive		
Front axle housing	5.0 L	(1.30 U.S. gal)
Wheel hub, each	0.75 L	(0.2 U.S. gal)

Service Intervals

Checking crankcase oil level	every 10 hours
Changing engine oil	every 100 hours
Changing engine oil filter	every 200 hours
Checking transmission/hydraulic system oil level	every 50 hours
Changing transmission/hydraulic system oil filter	every 500 hours
Changing transmission/hydraulic oil	every 1000 hours
Changing hydrostatic steering filter	every 100 hours
Cleaning hydraulic pump strainer	every 1000 hours
Checking MFWD oil level	every 100 hours
MFWD oil change	every 1000 hours
Cleaning and packing front wheel bearings	every 1000 hours
Lubricating grease fittings	
Clutch throw-out bearing grease fitting (when equipped)	every 100 hours
Mechanical front wheel drive universal-jointed shaft	every 50 hours
in wet and muddy conditions	every 10 hours
Front axle and front axle bearings	every 50 hours
in wet and muddy conditions	every 10 hours
Rear axle bearings	every 500 hours
in wet and muddy conditions	every 10 hours
Three-point hitch	every 200 hours

Tune-Up

PTO horsepower* at 2500 rpm rated engine speed

According to SAE J816b,	2350	4 kW	55 hp
	2550	48 kW	65 hp

Compression 2100 kPa 21 bar 300 psi

Slow idle 700 to 800 rpm

Fast idle 2610 to 2660 rpm

Rated engine speed 2500 rpm

Air intake system vacuum 3.5 to 6.0 kPa 35 to 60 mbar 14 to 25 in. water head

Air cleaner restriction warning switch closes at a vacuum of 5.5 to 6.5 kPa 55 to 65 mbar 22 to 26 in. water head

Blow-by at crankcase vent tube, max

2350	2.5 m ³ /h	88 cu ft/h
2550	2.7 m ³ /h	95 cu ft/h

Thermostat open at 82°C 180°F

Radiator cap high pressure valve opens at 40 to 50 kPa 0.4 to 0.5 bar 6 to 7 psi

Radiator cap low pressure valve opens at 0 to 4 kPa 0 to 0.04 bar 0 to 0.6 psi

Fan Belt

Fan belt should have 19 mm (3/4 in.) flex with 90 N (20 lb force) pull midway between crankshaft and alternator or water pump (use a spring scale).

Compressor Belt

Compressor belt should have 19 mm (3/4 in.) flex with 60 N (13 lb force) pull midway between pulleys.

**With the engine run in (more than 100 hours of operation) and having reached operating temperature (engine and transmission); measured by means of a dynamometer. Permissible variation + 5 per cent.*

TRACTOR SEPARATION**Torques for Hardware**

Front axle carrier to engine block		
front attaching cap screws (4 used)	230 N·m	170 lb-ft
rear attaching cap screws (2 used)	180 N·m	130 lb-ft
Front axle carrier to oil pan, cap screws	400 N·m	300 lb-ft
Hydraulic pump drive shaft, cap screws	50 N·m	35 lb-ft
Jointed shaft flange to front axle drive hub (tractors with MFWD), cap screws	75 N·m	55 lb-ft
Clutch housing to engine block		
Cap screws	230 N·m	170 lb-ft
Hex. nuts	230 N·m	170 lb-ft
Oil pan to clutch housing, cap screws	230 N·m	170 lb-ft
Clutch housing to transmission case, cap screws	160 N·m	120 lb-ft
Transmission case drain plugs	135 N·m	100 lb-ft
Hydraulic lines retainer to clutch housing, cap screw	45 N·m	32 lb-ft
Final drive housings to transmission case, cap screws	120 N·m	85 lb-ft
Rockshaft housing to transmission case, cap screws	120 N·m	85 lb-ft
Rear wheels to rear axle	400 N·m	300 lb-ft
Wheel disk to hub (on tractors equipped with rack-and-pinion axle)	400 N·m	300 lb-ft
Rear fenders to final drive housings, hex. nuts	130 N·m	95 lb-ft
2-post roll guard to final drive housings	230 N·m	170 lb-ft
both supports to crossbar	230 N·m	170 lb-ft
Basic weight to front axle carrier, cap screws	400 N·m	300 lb-ft
Drawbar to transmission case, cap screws	120 N·m	85 lb-ft
SOUND-GARD Body to rubber bearing blocks, cap screws and hex. nuts	200 N·m	145 lb-ft

ENGLISH TORQUE SPECIFICATIONS

NOTE: Wrench torque tolerance is $\pm 20\%$.

Bolt Diameter	Plain Head*		Three Radial Dashes*		Six Radial Dashes*	
	lb-ft	N·m	lb-ft	N·m	lb-ft	N·m
1/4 in.	6	8	9	12	12	16
5/16 in.	10	14	18	24	25	34
3/8 in.	20	27	30	41	45	61
7/16 in.	30	41	50	68	70	95
1/2 in.	45	61	75	101	110	149
9/16	70	95	110	150	155	210
5/8 in.	95	128	155	210	215	290
3/4 in.	165	225	270	365	385	520
7/8 in.	170	230	435	590	620	840
1 in.	255	345	660	895	930	1260

Torque figures indicated above and in the Specification Sections of this manual are valid for non-greased or non-oiled threads and heads unless otherwise specified. Therefore, do not grease or oil bolts or cap screws unless otherwise specified in this manual.

* Torque value for bolts and cap screws are identified by their head markings.

METRIC TORQUE SPECIFICATIONS

NOTE: Wrench torque tolerance is $\pm 20\%$.

Bolt Diameter	Property Class 8.8*		Property Class 10.9*	
	lb-ft	N·m	lb-ft	N·m
M5	5	6	7	9
M6	8	10	11	15
M8	18	25	26	35
M10	37	50	52	70
M12	66	90	92	125
M16	166	225	229	310
M20	321	435	450	610
M24	554	750	775	1050

Torque figures indicated above and in the Specification Sections of this manual are valid for non-greased or non-oiled threads and heads unless otherwise specified. Therefore, do not grease or oil bolts or cap screws unless otherwise specified in this manual.

* Torque value for bolts and cap screws are identified by their property class head markings.

RECOMMENDED TORQUES IN N·m, AND LB-FT FOR PIPE AND HOSE CONNECTIONS

Thread size	with O-rings		with cone	
	N·m	lb-ft	N·m	lb-ft
3/8-24 UNF	7.5	5.5	8	6
7/16-20 UNF	10	7	12	9
1/2-20 UNF	12	9	15	11
9/16-18 UNF	15	11	25	18
3/4-16 UNF	25	20	45	35
7/18-14 UNF	40	30	60	45
1-1/16-12 UNC	60	45	100	75
1-3/16-12 UNC	70	50	120	90
1-5/16-12 UNC	80	60	140	105
1-5/8-12 UNC	110	80	190	140
1-7/8-12 UNC	150	110	220	160