

2750 Tractor



TECHNICAL MANUAL 2750 Tractor

TM4405 (01Aug86) English

TM4405 (01Aug86)

LITHO IN U.S.A.
ENGLISH



2750 TRACTOR TECHNICAL MANUAL TM-4405 (Apr-86)

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For engine information, refer to engine component technical manual, CTM-4, 3179, 4239, and 6359 Engines. The component manual covers basic repair of the engines.

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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
Maximum torque at 1600 rpm	285 N·m	210 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 2610 to 2660 rpm
 Slow idle speed 700 to 800 rpm
 Rated engine speed 2500 rpm
 Working speed range 1600 to 2500 rpm
 PTO* horsepower at engine rated speed — 2500 rpm
 According to DIN SAE J816b 56 kW 75 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 (Roto Diesel R 3443 F 910 or R 3448 F 220) Distributor type

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%.*

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

HI-LO SHIFT UNIT

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

Creeper Transmission

- Type Synchronized reduction unit
- Travel speed decreases in low (1) and reverse ranges by approx. 79%
- Shifting both ranges Mechanical and not under load

COLLAR SHIFT TRANSMISSION

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

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

Type Independent of transmission, can be engaged and disengaged under load

PTO speeds (with engine speed of 2400 rpm) 540 rpm or 540/1000 rpm

PTO clutch Hydraulically operated "wet" disk clutch

PTO brake Hydraulically operated "wet" disk brake

PTO SPEEDS (in rpm)

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

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 Self-adjusting, hydraulically operated "wet" disk brakes

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

HYDRAULIC SYSTEM

Type Closed center, constant pressure system

Standby pressure 15800 to 16200 kPa (158 to 162 bar) (2300-2350 psi)

Operating pressure 14000 kPa (140 bar) (2050 psi)

Hydraulic pump 8-piston pump with variable displacement

Capacities

Fuel tank 98 L (25.90 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.)

Engine crankcase

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

With filter change 8.5 L (2.3 U.S. gal.)

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

Initial filling 64 L (16.9 U.S. gal.)

Oil change 56 L (14.7 U.S. gal.)

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 7.0 L (1.85 U.S. gal.)

Wheelhub each 0.75 L (0.2 U.S. gal.)

Travel Speeds See Operator's Manual

Front and Rear Wheels

Tires, tread widths, tire pressure 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—800 rpm
Fast idle	2610—2660 rpm
Rated speed	2500 rpm

Fan Belt

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

Compressor Belt

The compressor belt should have 19 mm (3/4 in.) flex with 60 N (13 lb) 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.)
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Tractors with SOUND-GARD Body

Travel of slave cylinder operating rod	8.5—12.0 mm (5/16—15/32 in.)
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Front Wheel Toe-In

Tractors without MFWD	3—6 mm	(.12—0.25 in.)
Tractors with MFWD	0—3 mm	(0—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 (M12)	90 N·m	(65 lb-ft)
Tie rod tube, cap screw	55 N·m	(40 lb-ft)
Rear Wheels		
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)

Initial filling 64 L (16.9 U.S. gal)

Oil change 56 L (14.7 U.S. gal)

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 7.0 L (1.85 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 1000 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) 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

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	56 kW	75 hp
Slow idle	700—800 rpm	
Fast idle	2610—2660 rpm	
Rated engine speed	2500 rpm	
Air intake system vacuum	5.5—6.0 kPa 35—60 mbar	(14—25 in. water head)
Air cleaner restriction warning switch closes at a vacuum of	5.5—6.5 kPa 55—65 mbar	(22—26 in. water head)
Radiator cap high pressure valve opens at	40—50 kPa 0.4—0.5 bar	(6—7 psi)
Radiator cap low pressure valve opens at	0—4 kPa 0—0.04 bar	(0—0.6 psi)

Fan Belt

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

COMPRESSOR BELT (If Equipped)

Compressor belt should have 19 mm (3/4 in.) flex with 60 N (13 lb) 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%.*

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

STANDARD TORQUES

RECOMMENDED TORQUES IN N:m, AND FT-LBS FOR UNC AND UNF CAP SCREWS				
Head Marking (Identifying strength)	  or 10.9*		  or 12.9**	
	Thread-O.D. (in.)	N:m	ft-lbs	N:m
1/4	15	10	20	15
5/16	30	20	40	30
3/8	50	35	70	50
7/16	80	55	110	80
1/2	120	85	170	120
9/16	180	130	240	175
5/8	230	170	320	240
3/4	400	300	580	425
7/8	600	445	930	685
1	910	670	1400	1030
1-1/8	1240	910	1980	1460
1-1/4	1700	1250	2800	2060

NOTE: A variation of $\pm 10\%$ is permissible for all torques indicated in this chart.

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.

* Tempered steel high-strength bolts and cap screws

**Tempered steel extra high-strength bolts and cap screws

RECOMMENDED TORQUES IN N·m, and lb-ft FOR METRIC CAP SCREWS

Head marking (identifying strength)	8.8*		10.9**		12.9***	
	N·m	lb-ft	N·m	lb-ft	N·m	lb-ft
Thread-O.D. (mm)						
M5	7	5	9	6.5	10	8.5
M6	10	8.5	15	10	20	15
M8	30	20	40	30	40	30
M10	50	35	80	60	90	70
M12	100	75	140	100	160	120
M14	160	120	210	155	260	190
M16	240	175	350	260	400	300
M20	480	355	650	480	780	575
M24	820	605	1150	850	1350	995
M30	1640	1210	2250	1660	2700	1990
M36	2850	2110	4000	2950	4700	3465

NOTE: A variation of $\pm 10\%$ is permissible for all torques indicated in this chart.

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.

* Regular bolts and cap screws

** Tempered steel high-strength bolts and cap screws

*** Tempered steel extra high-strength bolts and cap screws

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
1-4 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

Special Tools*

Tools

Description and Part No.

Use

D-0502251
Testing Kit
(FKM 10002)

Measuring air intake
system vacuum



* Tools given in parenthesis and their illustrations are alternate tools available for Canada only. Order all other tools through your SERVICE-GARD catalog.

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Fig. 1—Pressure Gauge Set