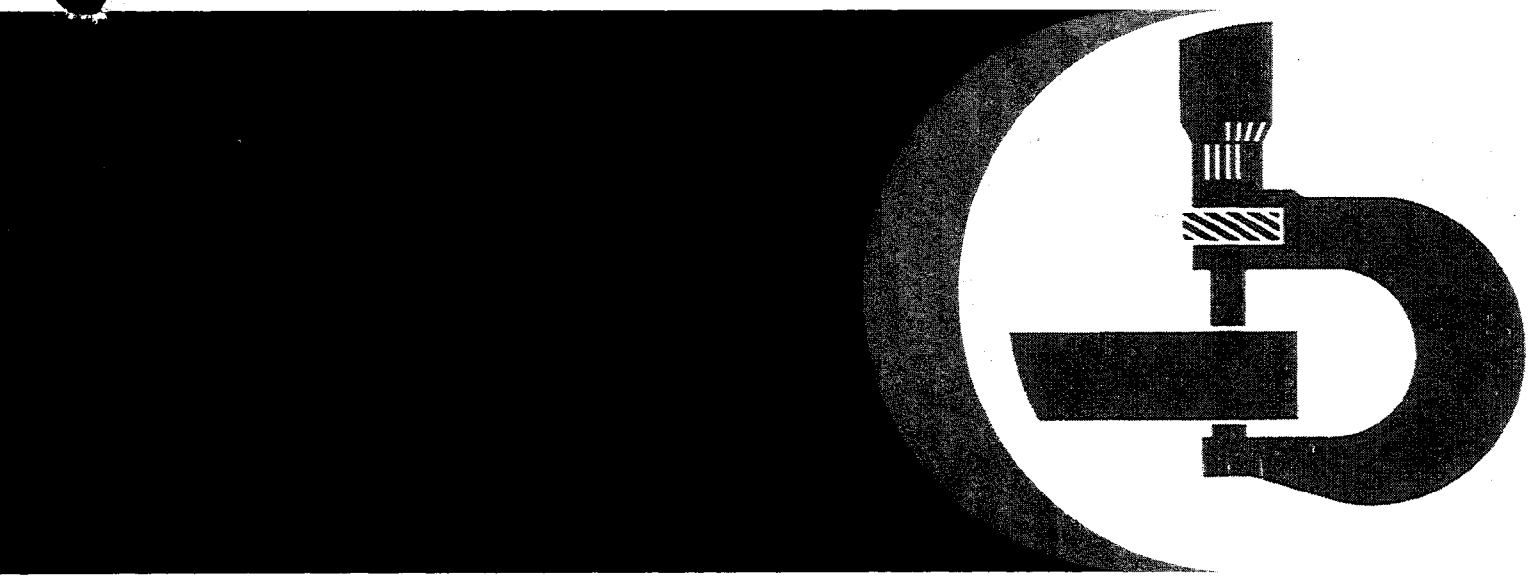
1640, 1840, 2040 and 2040 S Tractors



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1640, 1840, 2040 and 2040 S Tractors
Technical Manual
TM-4363

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Section 10
General

CONTENTS OF THIS SECTION

GROUP 25 – TRACTOR SEPARATION (Tractors with Increased Lifting Capacity)

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 numbers 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

1640, 1840 and 2040 up to engine serial no. 571869 CD and 2040 S up to engine serial no. 547536 CD	16.8 : 1
1640 and 2040 from engine serial no. 571870 CD and 2040 S from engine serial no. 547537 CD	17.4 : 1

Maximum torque

1640 at 1200 rpm	205 Nm	150 ft-lb
1840 and 2040 at 1300 rpm	230 Nm	170 ft-lb
2040 S at 1400 rpm	245 Nm	180 ft-lb

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

1640	1200 to 2500 rpm
1840 and 2040	1300 to 2500 rpm
2040 S	1400 to 2500 rpm

Flywheel horsepower at engine rated speed – 2500 rpm

According to DIN 70020,	1640	46 kW	62 hp
	1840 and 2040	51 kW	70 hp
	2040 S	55 kW	75 hp

PTO* horsepower at engine rated speed – 2500 rpm

According to DIN 70020,	1640	41 kW	56 hp
	1840 and 2040	46 kW	63 hp
	2040 S	50 kW	68 hp
According to DIN SAE J816b,	1640	40 kW	54 hp
	1840 and 2040	45 kW	60 hp
	2040 S	48 kW	65 hp

Lubrication system ..... Full internal force feed system, with full flow filter

Engine Clutch ..... Single dry disk with torsion damper or dual-stage dry disk, foot-operated

Cooling System

Type ..... Pressurized system with centrifugal pump

Temperature regulation ..... Thermostat

* 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 %.

Fuel System

Type ..... Direct injection

Fuel injection pump timing to engine ..... TDC

Fuel injection pump type ..... Distributor type

1640

Up to engine serial no. 531584 CD ..... Roto Diesel No. R 3443 F 630
From engine serial no. 531585 CD ..... Roto Diesel No. R 3443 F 980

1840 and 2040

Up to engine serial no. 530063 CD ..... Roto Diesel No. R 3443 F 640
From engine serial no. 530064 CD ..... Roto Diesel No. R 3443 F 970

2040S

Up to engine serial no. 531047 CD ..... Roto Diesel No. R 3443 F 140
From engine serial no. 531048 CD ..... Roto Diesel No. R 3443 F 950

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

Electrical System

Batteries ..... 2 x 12 volts, 55 Ah
Tractors with SG2 cab ..... 2 x 12 volts, 55 or 66 Ah

Alternator with internal regulator

Tractors without operator's cab ..... 14 volts, 33 or 55 amps.
Tractors with operator's cab ..... 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" 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 (I) 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

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

Type ..... Independent of transmission, with engine dual stage clutch

PTO SPEEDS (in rpm)

Engine speed	540 rpm shaft	1000 rpm shaft
800	180* or 210**	335
2400* or 2040**	540	1000
2500	565* or 660**	1040
2660	600* or 705**	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

* Up to tractor serial no. 507867 L
** From tractor serial no. 507868 L

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

Power Steering ..... Hydraulically operated steering linkage

Manual Steering ..... Recirculating ball bearing type

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*	19000 kPa	190 bar	2760 psi
Operating pressure**	17000 kPa	170 bar	2470 psi
Hydraulic pump	4 or 8-piston pump with variable displacement		

Capacities

Fuel tank		
Plastic tank	95 liters	25.1 U.S.gals.
Metal tank	90 liters	23.8 U.S.gals.
Cooling system		
Without operator's cab	13 liters	3.4 U.S.gals.
With operator's cab	15 liters	4.0 U.S.gals.
Engine crankcase		
Without filter change	8 liters	2.1 U.S.gals.
With filter change	8.5 liters	2.25 U.S.gals.
Transmission - Hydraulic system (including oil reservoir and oil cooler)		
Synchronized transmission		
Initial filling		
1640, 1840 and 2040	59 liters	15.6 U.S. gals.
1640 and 2040 with heavy-duty final drives and 2040 S	64 liters	16.9 U.S. gals.
Oil change		
1640, 1840 and 2040	51 liters	13.5 U.S. gals.
1640 and 2040 with heavy-duty final drives and 2040 S	56 liters	14.8 U.S. gals.

On tractors for Canada only:
* 15500 kPa 155 bar 2250 psi
** 14000 kPa 140 bar 2050 psi

Collar shift transmission		
Initial filling		
1640, 1840 and 2040	47 liters	12.4 U.S. gals.
1640 and 2040 with heavy-duty final drives	52 liters	13.75 U.S. gals.
Oil change		
1640, 1840 and 2040	39 liters	10.3 U.S. gals.
1640 and 2040 with heavy-duty final drives	44 liters	11.6 U.S. gals.
Oil reservoir	4 liters	1.1 U.S. gals.
Oil cooler	2 liters	0.5 U.S. gals.
Mechanical front wheel drive		
Front axle housing		
up to serial no. 449 999 L	5.3 liters	1.4 U.S. gals.
from serial no. 450 000 L	5.0 liters	1.3 U.S. gals.
Wheel hub housing, each		
up to serial no. 449 999 L	0.75 liters	0.2 U.S. gals.
from serial no. 450 000 L	0.75 liters	0.2 U.S. gals.
Belt pulley	1 liter	0.3 U.S.gals.

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) 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 ASSY.

Tractors without Cab or with OPU

Clutch pedal free travel	approx. 25 mm 1 in.

Tractors with SG2 Cab

Slave cylinder operating rod, stroke	8.5 to 12.0 mm 5/16 to 15/32 in.

FRONT WHEEL TOE-IN

Tractors without front wheel drive	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

Front wheel rim to hub		
Tractors without front wheel drive	180 Nm	130 ft-lb
Tractors with MFWD	300 Nm	220 ft-lb
Axle knees to axle center, cap screws	400 Nm	300 ft-lb

Tractors with Hydrostatic Steering

Tie rod clamps, cap screws		
Cap screw (M 10)	55 Nm	40 ft-lb
Cap screw (M 12)	90 Nm	65 ft-lb
Tie rod tube, cap screw	55 Nm	40 ft-lb

Tractors with Power Steering or Manual Steering

Outer clamp of tie rod, cap screw	90 Nm	65 ft-lb
Inner clamp of tie rod, cap screw	55 Nm	40 ft-lb

Rear wheels		
Rear wheels to axle	400 Nm	300 ft-lb
Wheel disk to hub (rack-and-pinion axle)	400 Nm	300 ft-lb
4-post roll guard		
Roll guard to fender, cap screws	120 Nm	85 ft-lb
U-bolt hex. nuts	130 Nm	95 ft-lb
2-post roll guard		
To final drive housings, cap screws	230 Nm	170 ft-lb
Both suppports to crossbar, cap screws	230 Nm	170 ft-lb
Rear wheel fenders to final drive housings, hex. nuts	130 Nm	95 ft-lb

Lubrication and Service

CAPACITIES

Engine crankcase		
Without filter change	8 liters	2.10 U.S. gals.
With filter change	8.5 liters	2.25 U.S. gals.
Cooling system		
Without cab	13 liters	3.4 U.S. gals.
With cab	15 liters	4.0 U.S. gals.
Transmission – Hydraulic system (including oil reservoir and oil cooler)		
Synchronized transmission		
Initial filling		
1640, 1840 and 2040	59 liters	15.6 U.S. gals.
1640 and 2040 with heavy-duty final drives and 2040 S	64 liters	16.9 U.S. gals.
Oil change		
1640, 1840 and 2040	51 liters	13.5 U.S. gals.
1640 and 2040 with heavy-duty final drives and 2040 S	56 liters	14.8 U.S. gals.
Collar shift transmission		
Initial filling		
1640, 1840 and 2040	47 liters	12.4 U.S. gals.
1640 and 2040 with heavy-duty final drives	52 liters	13.75 U.S. gals.
Oil change		
1640, 1840 and 2040	39 liters	10.3 U.S. gals.
1640 and 2040 with heavy-duty final drives	44 liters	11.6 U.S. gals.
Oil reservoir	4 liters	1.1 U.S. gals.
Oil cooler	2 liters	0.5 U.S. gals.
Mechanical front wheel drive		
Front axle housing		
up to serial no. 449 999 L	5.3 liters	1.4 U.S. gals.
from serial no. 450 000 L	5.0 liters	1.3 U.S. gals.
Wheel hub housing, each		
up to serial no. 449 999 L	0.75 liters	0.2 U.S. gals.
from serial no. 450 000 L	0.75 liters	0.2 U.S. gals.
Belt pulley	1 liter	0.3 U.S. gals.

SERVICE INTERVALS

Checking crankcase oil level	every	10 hours
Changing engine oil	every	200 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 FWD oil level	every	100 hours
FWD oil change	every	1000 hours
Cleaning and packing front wheel bearings	every	1000 hours
Lubricating grease fittings		
Universal joints of FWD	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
Clutch throw-out bearing grease fitting (when equipped)	every	100 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 DIN 70020,	1640	.41 kW	56 hp
	1840 and 2040	.46 kW	63 hp
	2040 S	.50 kW	68 hp
According to SAE J 816 b,	1640	.40 kW	54 hp
	1840 and 2040	.45 kW	60 hp
	2040 S	.48 kW	65 hp

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

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 0.4 bar 0 to 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

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

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* 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 (Tractors without Increased Lifting Capacity)

Front axle carrier to engine block		
front attaching cap screws (4 used)	230 Nm	170 ft-lb
rear attaching cap screws (2 used)	180 Nm	130 ft-lb
Front axle carrier to oil pan, cap screws	400 Nm	300 ft-lb
Hydraulic pump drive shaft, cap screws	50 Nm	35 ft-lb
Jointed shaft flange to front axle drive hub (tractors with MFWD), cap screws		
up to serial no. 449 999 L	35 Nm	25 ft-lb
from serial no. 450 000 L	75 Nm	55 ft-lb
Drag link* to bell crank or steering arm, slotted nut**	75 Nm	55 ft-lb
Clutch housing to engine block		
cap screws	230 Nm	170 ft-lb
hex. nuts	230 Nm	170 ft-lb
Oil pan to clutch housing, cap screws	230 Nm	170 ft-lb
Clutch housing to transmission, cap screws	160 Nm	120 ft-lb
Transmission case drain plugs	135 Nm	100 ft-lb
Retainer of hydraulic lines to clutch housing, cap screw	45 Nm	32 ft-lb
Final drive housings to transmission case, cap screws	120 Nm	85 ft-lb
Rockshaft housing to transmission case, cap screws	120 Nm	85 ft-lb
Rear wheels to rear axle	400 Nm	300 ft-lb
Wheel disk to hub (on tractors equipped with rack-and-pinion axle)	400 Nm	300 ft-lb
Rear wheel fenders to final drive housings, hex. nuts	130 Nm	95 ft-lb
4-post roll guard		
Roll guard to fender, cap screws	120 Nm	85 ft-lb
U-bolt hex. nuts	130 Nm	95 ft-lb
2-post roll guard		
to final drive housings, cap screws	230 Nm	170 ft-lb
both supports to crossbar, cap screws	230 Nm	170 ft-lb

* On tractors with power or manual steering

** *NOTE: If cotter pin cannot be inserted when tightening to the specified torque, turn nut to next slot and secure with cotter pin.*

Basic weight to front axle carrier, cap screws	400 Nm	300 ft-lb
Drawbar to transmission case, cap screws	120 Nm	85 ft-lb

OPU Cab

Cab to rubber bearing block, slotted nuts*	10 to 20 Nm	7 to 14 ft-lb
Rubber bearing block to bearing and pivot brackets, cap screws	50 Nm	35 ft-lb
Bearing pivot bracket to final drive housing, cap screws	100 Nm	70 ft-lb
Bearing bracket to battery box, cap screws	50 Nm	35 ft-lb
Battery box to flywheel housing,		
upper cap screw	200 Nm	145 ft-lb
lower cap screws	100 Nm	70 ft-lb

SG2 Cab

Cab to rubber bearing blocks, hex. nuts	200 Nm	145 ft-lb

** NOTE: Insert cotter pin within specified torque.*