## CONTENTS

### SECTION 10 - GENERAL
- Group 5 - Specifications
- Group 10 - Predelivery, Delivery, and After-Sales Inspections
- Group 15 - Lubrication
- Group 20 - Engine and Tractor Tune-Up
- Group 25 - Tractor Separation

### SECTION 20 - ENGINE
- Group 5 - General Information and Diagnosing Malfunctions
- Group 10 - Cylinder Head and Camshaft
- 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
- Group 40 - Speed Control Linkage
- Group 45 - Air Intake System

### SECTION 30 - FUEL SYSTEM
- Group 5 - Diagnosing Malfunctions
- Group 10 - Fuel Tank, Transfer Pump, and Fuel Filter
- Group 15 - Roto Diesel Fuel Injection Pump
- Group 20 - Fuel Injection Nozzles
- Group 25 - Cold Weather Starting Aid

### SECTION 40 - ELECTRICAL SYSTEM
- Group 5 - Diagnosing Malfunctions
- Group 10 - Components and Wiring Diagram
- Group 15 - Starting Motor
- Group 20 - Alternator and Regulator

### SECTION 50 - POWER TRAIN
- Group 5 - Engine Clutch and Clutch Linkage
- Group 10 - Hi-Lo Shift Transmission
- Group 20 - Differential
- Group 25 - Final Drives
- Group 30 - PTO and PTO Clutch

### SECTION 60 - FRONT AXLE, STEERING SYSTEM, AND HYDRAULIC BRAKES
- Group 5 - Front Axle
- Group 10 - Steering System
- Group 15 - Hydraulic Brakes

### SECTION 70 - HYDRAULIC SYSTEM
- Group 5 - General Information, Diagnosing Malfunctions and Tests
- Group 10 - Oil Reservoir, Filter, Valves, and Oil Cooler
- Group 15 - Hydraulic Pump and Transmission Oil Pump
- Group 20 - Rockshaft
- Group 25 - Selective Control Valve and Breakaway Coupler

### SECTION 80 - MISCELLANEOUS
- Group 5 - DeLuxe Seat
- Group 10 - Front and Rear Wheels
- Group 15 - Roll Gard

All information, illustrations and specifications contained in this technical manual are based on the latest information available at the time of publication. The right is reserved to make changes at any time without notice.
DIFFERENTIAL AND FINAL DRIVES
Planetary reduction gear and differential with spiral bevel gears.

DIFFERENTIAL LOCK
Hand or foot operated; spring-loaded out of engagement.

POWER TAKE-OFF (PTO)
Independent of transmission, can be engaged and disengaged under load.

The independent PTO is engaged by a hydraulically operated disk clutch. Disengaging the PTO is achieved by operating the hydraulically actuated disk brake.

Changing PTO shaft speed from 540 rpm to 1000 rpm or vice-versa is effected by changing the PTO stub shaft.

PTO Speeds (in rpm)

<table>
<thead>
<tr>
<th>Engine speed in rpm</th>
<th>540 rpm shaft</th>
<th>1000 rpm shaft</th>
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<td>650</td>
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<td>2660</td>
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HYDRAULIC SYSTEM
Closed center, constant pressure system; also includes rockshaft, power steering and selective control valves.

System pressure ............. 155 bar (2250 psi)

Pump ......................... 8-piston pump driven by the engine

POWER STEERING
The steering system is a "closed center" type incorporated in the hydraulic system and supplied with oil by the hydraulic pump. It is connected to the front wheels by means of a steering linkage.

HYDRAULIC BRAKES
The disk brakes run in an oil bath and are hydraulically controlled.

CAPACITIES

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<th>Liters</th>
<th>U.S. gallons</th>
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<tr>
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<td>15.0</td>
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<td>At service intervals</td>
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TRAVEL SPEEDS

FRONT AND REAR WHEELS
For tire sizes, treads, inflation pressure and weights see Operator's Manual.

DIMENSIONS
REMOVAL AND INSTALLATION OF ROCKSHAFT

REMOVAL

IMPORTANT: Work on the hydraulic system requires extreme care and cleanliness. Minute dirt or foreign particles, scratches, nicks or burrs may put the hydraulic system out of function. Before removing the rockshaft, check hydraulic system for leaks.

For safety, disconnect ground straps from batteries.

Remove oil return line 3 (fig. 8) of selective control valves and lines to breakaway couplers.

Free rear wiring harness.

Move selector lever in position "L" (load control) so that the control linkage roller slides along the cam of the control arm when removing the rockshaft.

Remove rockshaft attaching screws and lift rockshaft assembly off transmission case by means of a hoist.

NOTE: After removing rockshaft, cover transmission case to prevent foreign particles from falling into the transmission.

INSTALLATION

Use a new gasket between transmission case and rockshaft. Make sure dowels in transmission case and seal of oil inlet passage are installed.

Move selector lever in position "L" so that the control linkage with roller can be slid over the cam.

Install rockshaft, reversing removal procedure and tighten cap screws to specified torque.

As regards further installation operation reverse removal procedure.

For adjustment of rockshaft see Section 70, Group 20.

IMPORTANT: Connect ground straps to negative (-) poles of batteries.

Fig. 8 — Rockshaft, Installed

1 Start safety switch  3 Oil return line
cable 4 Pressure lines, to coupler
2 Selector lever  to coupler

Remove center section of operator’s platform. Disconnect cable 1 (fig. 8) at start safety switch.

Remove operator’s seat. Disconnect both lift links at lift arms.
Section 20

Engine

CONTENTS OF THIS SECTION

GROUP 5 — GENERAL INFORMATION, DIAGNOSING MALFUNCTIONS

Page

General information ........................................... 5-2
Diagnosing malfunctions ..................................... 5-2

GROUP 10 — CYLINDER HEAD AND CAMSHAFT

Page

General information ......................................... 10-1
Cylinder head .................................................. 10-1
Removal ......................................................... 10-1
Repair .......................................................... 10-1
Installation ..................................................... 10-4
Adjusting valve clearance .................................. 10-4
Camshaft ......................................................... 10-5
Removal ......................................................... 10-5
Repair .......................................................... 10-5
Installation ..................................................... 10-6
Specifications ................................................. 10-7
Torques for hardware ....................................... 10-9
Special tools ................................................... 10-9

GROUP 15 — CYLINDER BLOCK, LINERS, PISTONS AND CONNECTING RODS

Page

General information ......................................... 15-1
Removal ......................................................... 15-1
Repair .......................................................... 15-1
Assembly ........................................................ 15-4
Installation ..................................................... 15-4
Specifications ................................................. 15-7
Torques for hardware ....................................... 15-9
Engine break-in ............................................... 15-9
Tune-up data ................................................... 15-10
Special tools ................................................... 15-10

GROUP 20 — CRANKSHAFT, MAIN BEARINGS AND FLYWHEEL

Page

General information ......................................... 20-1
Removal ......................................................... 20-1
Repair .......................................................... 20-1
Installation ..................................................... 20-4
Specifications ................................................. 20-6
Torques for hardware ....................................... 20-7
Special tools ................................................... 20-7

GROUP 25 — TIMING GEAR TRAIN

Page

General information ......................................... 25-1
Removal ......................................................... 25-1
Repair .......................................................... 25-2
Installation ..................................................... 25-3

GROUP 30 — ENGINE LUBRICATION SYSTEM

Page

General information ......................................... 30-1
Removal ......................................................... 30-2
Repair .......................................................... 30-3
Installation ..................................................... 30-4
Adjusting engine oil pressure ................................ 30-5
Specifications ................................................. 30-5
Torques for hardware ....................................... 30-6
Special tools ................................................... 30-6

GROUP 35 — COOLING SYSTEM

Page

General information ......................................... 35-1
Diagnosing malfunctions ................................... 35-2
Repair .......................................................... 35-2
Radiator ......................................................... 35-2
Adjusting fan belt ............................................ 35-2
Water pump ...................................................... 35-2
Checking thermostat ......................................... 35-4
Specifications ................................................. 35-5
Torques for hardware ....................................... 35-5
Special tools ................................................... 35-5

GROUP 40 — SPEED CONTROL LINKAGE

Page

General information ......................................... 40-1
Removal and disassembly .................................... 40-1
Repair .......................................................... 40-2
Assembly and installation .................................... 40-2
Adjusting speed control linkage .......................... 40-3
Specifications ................................................. 40-3

GROUP 45 — AIR INTAKE SYSTEM

Page

General information ......................................... 45-1
Dry-type air cleaner .......................................... 45-1
Pre-filter ......................................................... 45-2
General information ......................................... 45-2
Repair .......................................................... 45-2

Litho in U.S.A.
## Section 30

### Fuel System

#### CONTENTS OF THIS SECTION

<table>
<thead>
<tr>
<th>Group</th>
<th>Description</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>GROUP 5</strong> — DIAGNOSING MALFUNCTIONS</td>
<td>Diagnosing malfunctions</td>
<td>5-2</td>
</tr>
<tr>
<td><strong>GROUP 10</strong> — FUEL TANK, TRANSFER PUMP AND FUEL FILTER</td>
<td>Fuel tank</td>
<td>10-1</td>
</tr>
<tr>
<td><strong>GROUP 15</strong> — ROTO DIESEL FUEL INJECTION PUMP</td>
<td>General information</td>
<td>15-2</td>
</tr>
<tr>
<td><strong>GROUP 20</strong> — FUEL INJECTION NOZZLES</td>
<td>General information</td>
<td>20-1</td>
</tr>
<tr>
<td><strong>GROUP 25</strong> — COLD WEATHER STARTING AID</td>
<td>General information</td>
<td>25-1</td>
</tr>
</tbody>
</table>

#### GROUP 10 — FUEL TANK, TRANSFER PUMP AND FUEL FILTER

- Fuel tank: General information, Removal, Repair, Installation
- Fuel transfer pump: General information, Diagnosing malfunctions, Removal, Repair, Installation
- Fuel filter: General information, Repair
GENERAL INFORMATION

The ROTO-DIESEL fuel injection pump is a horizontally installed distributor pump with mechanical governor and automatic hydraulic speed advance. The moving parts of the pump are simultaneously lubricated and cooled by the Diesel fuel flowing through the pump. No lubricant is required.

Transfer Pump and Metering

The diesel fuel for injection is fed to the cylinders — regardless of their number — by a single unit. Its pump and distributor rotor is fitted with two opposed plungers controlled by a cam ring. The distribution to the individual cylinders is done by the rotor in conjunction with the pump head (see fig. 3). This design assures an equal quantity of fuel being injected into each cylinder at any moment.

On the other end of the rotor, opposite the two pump plungers, there is a transfer pump which delivers the fuel, sucked from the fuel filter, through the metering valve into inlet bore “a”, (see fig. 3) in the pump head, at a pressure which varies with engine speed.

Fig. 2 — Fuel Injection Pump Installed

1 Pump housing with mounting flange  
2 Pump head  
3 Fuel pressure lines  
4 Pump cover  
5 Fuel supply line  
6 Fuel inlet screen  
7 Bleed and fuel return line to tank  
8 Shut-off cable  
9 Adapter  
10 Hydraulic, automatic speed advance  
11 Speed control rod

Fig. 3 — Diagram of Fuel Distribution by Rotor Action

1 Filling the rotor with the fuel quantity adjusted to load requirements  
2 Fuel supply to cylinder, adjusted to load requirements  
3 Pump and distributor rotor  
4 Pump plungers  
5 Pump head

Filling Process (see I, fig. 3): As rotor 1 rotates, the inlet bore “a” in pump head 3 aligns with the inlet bore “b” in the rotor. The fuel coming from the transfer pump reaches the pump plunger chamber through bores “a” and “e” (regulated by the metering valve) and forces the two plungers 2 apart.
INSTALLATION AND ADJUSTMENT

INSTALLING THE INJECTION PUMP

NOTE: Outlets on the fuel injection pump head to which the pressure lines are connected are identified by numbers. For identification the letters V, U, Z, Y, X and W are used in relation to cylinders 1, 5, 3, 6, 2 and 4 in firing order.

1. Fit a new gasket onto the pump housing and slide the housing onto the three studs. Fit pump shaft hub into drive gear and make sure that the dowel fits into bore in pump shaft hub. Insert pump housing into bore in cylinder block front plate. Screw the gear onto pump shaft and tighten three cap screws to the specified torque. Finally screw the three hex. nuts onto the studs and tighten only finger-tight.

2. Set the injection timing accurately (by pivoting the pump housing) (see "Timing the Injection Pump"). Then tighten the mounting nuts to the specified torque.

3. Install mounting hole cover on timing gear cover and tighten securely.

4. Install and connect all fuel lines, the speed control linkage and the shut-off cable. Bleed the fuel system (see below).

Installing Injection Pump with Pump Drive Gear Removed From Engine

1. Mount the injection pump and secure it with the three nuts (the position of the rotor is of no significance).

2. Mount the drive gear onto the pump shaft hub and make sure that the dowel fits into the groove in the shaft hub. At the same time adjust the gear to the injection timing (see section 20, group 25). Tighten the cap screws to the specified torque.

NOTE: By adjusting the gear to the injection timing, the rotor of the injection pump is also turned into the correct position with regard to injection timing.

3. Adjust (see below) and completely install fuel injection pump.

ADJUSTING FUEL INJECTION PUMP

NOTE: After having installed the injection pump, accurately determine the injection timing. This is made by means of the timing marks (see 3 and 4, fig. 5) on the cylinder block front plate 1 (fig. 5) and on the injection pump flange 2.

Loosen attaching nuts of injection pump and pivot pump housing first away from cylinder block as far as slots will allow. Then pivot it back again, but only far enough to place timing mark on the pump flange 2 (see 4, fig. 5) exactly opposite timing mark on the cylinder block front plate 1 (see 3, fig. 5).

Fig. 5 — ROTO DIESEL Injection Pump Timing Marks

1 Cylinder block front plate
2 Pump securing flange
3 Timing mark on front plate
4 Timing mark on pump flange

NOTE: If the pump housing has been turned too far when timing the injection pump, pivot pump towards cylinder block as far as the slots will allow. Then pivot pump slowly away from cylinder block until the adjustment is just right. This is necessary to eliminate timing gear backlash.

After correct timing, re-tighten the three pump attaching nuts to the specified torque, making sure that the timing has not altered.

Bleed fuel system and injection pump thoroughly (see page 6).

NOTE: Cylinder block front plates 1 (fig. 5) supplied as spare parts are not provided with a timing mark (see 3, fig. 5).
Section 40

Electrical System

CONTENTS OF THIS SECTION

GROUP 5 — DIAGNOSING MALFUNCTIONS

- Batteries ........................................................................ 5-2
- Alternator ........................................................................ 5-2
- Tests and diagnosis on tractor ........................................ 5-2
- Starting motor .................................................................. 5-4
- Controls .......................................................................... 5-5
- Head lights ....................................................................... 5-5

GROUP 10 — COMPONENTS AND WIRING DIAGRAM

- Important Notes ................................................................ 10-1
- General Information ....................................................... 10-1
- System ........................................................................... 10-1
- Batteries ......................................................................... 10-1
- Controls and Instruments ............................................... 10-1
- Cables and Wires ............................................................ 10-3
- Wiring Diagram ............................................................... 10-4
- Torques for Hardware .................................................... 10-6

GROUP 15 — STARTING MOTOR

- General information ............................................................. 15-1
- Removal .......................................................................... 15-1
- Disassembly .................................................................... 15-1
- Repair ............................................................................. 15-2
- Assembly ......................................................................... 15-5
- Installation ...................................................................... 15-5
- Lubrication instructions before and during assembly .... 15-6
- Specifications .................................................................... 15-6

GROUP 20 — ALTERNATOR AND REGULATOR

- Alternator ........................................................................ 20-1
- General information ............................................................. 20-1
- Removal .......................................................................... 20-2
- Disassembly .................................................................... 20-2
- Testing and repair ............................................................. 20-2
- Assembly ......................................................................... 20-7
- Output test ....................................................................... 20-8
- Installation ...................................................................... 20-8
- Regulator ......................................................................... 20-8
- Specifications .................................................................... 20-8
- Torques for hardware ...................................................... 20-8
- Special tools ..................................................................... 20-8
Section 60

Front Axle, Steering System and
Hydraulic Brakes

CONTENTS OF THIS SECTION

GROUP 5 — FRONT AXLE

General information ........................................ 5-3
Removal ....................................................... 5-3
Repair ......................................................... 5-3
Installation and adjustment ................................ 5-4
Specifications ............................................... 5-5
Torques for hardware ...................................... 5-5

GROUP 10 — STEERING SYSTEM

General information ........................................ 10-2
Operation ..................................................... 10-2
Checking steering system ................................ 10-3
Diagnosing malfunctions ................................. 10-4
Removal ....................................................... 10-5
Repair ......................................................... 10-5
Assembly ...................................................... 10-8
Installation and adjustment ............................. 10-9
Specifications ............................................... 10-10
Torques for hardware .................................... 10-10
Special tools ................................................. 10-11

GROUP 15 — HYDRAULIC BRAKES

Diagnosing malfunctions ................................. 15-1
General information ....................................... 15-1
Removing brake valve and cylinder ................... 15-1
Repair of brake valve and cylinder .................... 15-3
Installing brake valve and cylinder .................... 15-3
Adjustment and bleeding .................................. 15-3
Removing pressure rings and brake disks .......... 15-5
Repair of pressure rings and brake disks .......... 15-5
Installing pressure rings and brake disks .......... 15-5
Specifications ............................................... 15-6
# Section 70

## Hydraulic System

### CONTENTS OF THIS SECTION

<table>
<thead>
<tr>
<th>GROUP</th>
<th>Topic</th>
<th>Page</th>
</tr>
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<td>25-2</td>
</tr>
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<td>Remote Cylinder</td>
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</tr>
</tbody>
</table>
Section 80

CONTENTS OF THIS SECTION

GROUP 5 — DE LUXE SEAT
- General information ................... 5-3
- Repair .................................. 5-3

GROUP 10 — FRONT AND REAR WHEELS
- Front wheels ........................... 10-1
- Repair ................................. 10-1
- Adjusting front wheel bearings 10-2

GROUP 10 — FRONT AND REAR WHEELS
- Rear wheels (rack-and-pinion axle)
  - General information ................. 10-2
  - Removal ............................ 10-3
  - Repair ............................. 10-3
  - Installation ........................ 10-3

GROUP 15 — ROLL GARD
- Installation .......................... 15-1
- Torques for hardware ............... 15-1

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