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MANUAL PREVIEW

Versatile

Service Manual

150 & 160

Bi-Directional

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Make: Versatile	Model: 150	Years Made: 1977-1981
HP-PTO: 54	HP-Engine: 71	HP-Drawbar:
HP-Range: 54	Engine-Make: PERKINS	Engine-Fuel: DIESEL
Engine-Cyl(s)-CID: 4/236	Transmission-STD: HYDRO	Optional:
Fwd/Rev Standard: 3-VAR/3-VAR	Fwd/Rev Optional:	Mfwd-Std/Opt: STD
Tires-Std Front: 11.2-24	Tires-Std Rear: 11.2-24	Wheelbase-Inch: 80
Pto Type: ENGINE	Pto Speed: 540	CAT I-3pt Hitch: True
CAT II-3pt Hitch: True	CAT III-3pt Hitch: False	Hitch Lift:
Hydraulics-Type: OPEN	Hyd-Cap: 40	Hyd-Flow: 15
Hyd Std Outlets: 2	Cooling Capacity: 17	Fuel Tank Capacity: 34
Cab-Std A/C; Rops: OPT	Weight:	New Price: 21476

STEERING COLUMN CONSOLE		
<u>Year</u>		<u>Beginning Serial Number</u>
1977		28
1978		425
1980		750
1981		1150

Paint Codes		
Location		MFG Color Name
BODY		VERSATILE RED
TRIM		YELLOW

Make: Versatile	Model: 160	Years Made: 1982-1983
HP-PTO: 70	HP-Engine: 98.4	HP-Drawbar:
HP-Range: 70	Engine-Make: WAUKESHA	Engine-Fuel: DIESEL/TURBO
Engine-Cyl(s)-CID: 4/220	Transmission-STD: HYDRO	Optional:
Fwd/Rev Standard: 3-VAR/3-VAR	Fwd/Rev Optional:	Mfwd-Std/Opt: STD
Tires-Std Front: 14.9-24	Tires-Std Rear: 14.9-24	Wheelbase-Inch: 80
Pto Type:	Pto Speed: 540	CAT I-3pt Hitch: False
CAT II-3pt Hitch: True	CAT III-3pt Hitch: False	Hitch Lift:
Hydraulics-Type: OPEN	Hyd-Cap: 40	Hyd-Flow: 15
Hyd Std Outlets: 2	Cooling Capacity: 17	Fuel Tank Capacity: 34
Cab-Std A/C; Rops: STD	Weight:	New Price: 38896

STEERING COLUMN CONSOLE		
<u>Year</u>		<u>Beginning Serial Number</u>
1982		1601
1983		2407

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VERSATILE

160 Tractor Engine

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5 Fuel System

5.1 HOW THE SYSTEM WORKS

5.1.1 Fuel Transfer Pump

The mechanically operated fuel transfer pump is mounted on the gear cover on the engine left side. An arm, extending from the pump base, rides on the idler gear eccentric lobe. The lobe actuates the arm, moving fuel through the transfer pump to the fuel filter and pump.

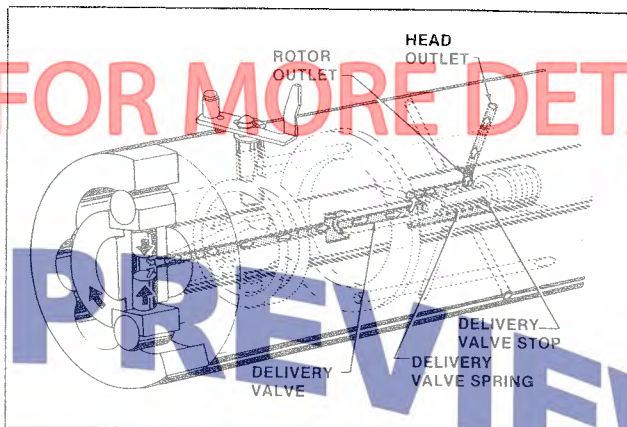


FIGURE 5-2: Discharge Cycle Schematic

5.1.2 Fuel Injection Pump

Pressurized fuel is forced from the transfer pump, through inlets in the injection pump, around the hydraulic head annulus to the charging ring top and into the metering valve. The metering valve position, controlled by the governor, regulates fuel flow to the charging ports. As the distributor rotor revolves, the inlets align with the charging ports allowing fuel flow to the pumping plungers (Figure 5-1). Further rotor rotation allows the inlets to move out of register and the discharge pump opens. The rollers contact the cam lobes forcing the plungers together. Fuel trapped between the plungers is forced to the injectors (Figure 5-2).



FIGURE 5-1: Charge Cycle Schematic

5.1.3 Fuel Injector

Fuel forced from the fuel pump flows through the injector inlet fitting around the injector valve (Figure 5-3). When the fuel pressure exceeds the spring force, the injector valve lifts and allows high pressure fuel to flow through the four spray orifices to the combustion chamber. When fuel flow stops, pressure is reduced and the spring closes the valve. During injection, a small amount of fuel is used to lubricate the working parts. The excess lubricating fuel flows through the fuel leak off, on injector top, and returns to the fuel tank.



FIGURE 5-3: Injector Components

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Reservoir 40 qt US (38 L)

Third Spool Control Optional

Oil Cooler 120 sq in. (780 cm²)

3.14 FRAME

Articulation 35°

Oscillation 5-1/2° engine and axle

Articulation Bearings 1.75 in. (45 mm) dia
ball bushings

Oscillation Bearings 1.25 in. (30 mm) dia
ball bushings

Main Frame Construction 1/4 × 6 in.
(6 × 150 mm) rectangular tubing

3.15 DRAWBAR

Type Straight swinging

Construction ... 1.5 × 2.5 in. (40 × 65 mm) steel

Height ... 17 in. (430 mm) to top of main member

3.16 CAB

Design Independent module type with
rollover protective structure

Steps Slip resistant

Isolation ... Full isolation on four rubber mounts

Seat Belt Adjustable lap type

Seat and Steering Column 180° rotation

3.17 INSTRUMENT PANEL

Gauges Tachometer/hour meter, engine oil
pressure, coolant temperature, voltmeter,
fuel level

Warning Lights Alternator, hydrostatic
charge pressure

Controls Keyswitch, with engine
shutoff lightswitch/hazard, cold
start button

Overhead Controls Turn signals, fan
speed control, heater control, air
conditioning control

Safety Systems Seat lock safety start,
neutral safety switch

Fuses Two 15 A fuses, left-hand protects
gauges, right-hand protects fuel solenoid

3.18 CONTROL CONSOLE

Right Console (engine forward) Range
selector, throttle control, three-point
hitch control

Left Console Hydrostatic speed control,
power take-off control, cold start
control, third spool control (optional)

Auxiliary hydraulic controls are foot operated
by pedals in the engine rear configuration and
hand operated floor mounted levers in the
engine forward configuration.

3.19 POWER TAKE-OFF

Drive Direct driven from engine
flywheel through an 11 in. (280 mm)
dry over center clutch

Speed 540 r/min at 2 250 engine r/min

Control Position ... Left console, engine forward

3.20 THREE-POINT HITCH

Category II convertible to Category I. Sway-
blocks standard with three-point hitch.

3.21 OPTIONS

Third Spool Implement Control Valve

Cab Front and rear wipers, two-speed
pressurizer, heater, air conditioning

Spark Arrestor

Three-Point Hitch

Scraper Blade

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FIGURE 2-11: Engine Lift Points

WARNING



DO NOT PUT FINGERS BETWEEN ENGINE MOUNTING BRACKET AND FRAME.

32. Remove capscrews, washers, nuts and top isolator pads from the four engine mounts.
33. Using hoist, raise engine slightly and move back until front driveline is free of hydrostatic pump and fan is clear of shroud.
34. Raise engine and move to work area.
35. Remove lower isolator pads from frame.

1.4.3 Installation

1. Position engine over frame slightly back of mounting points. Lower engine and move engine forward until universal joint is two in. (50 mm) from splined shaft on hydrostatic pump.
2. Align female spline on universal joint with splined shaft from hydrostatic pump.
3. Carefully move engine forward until splines mesh. Front and rear engine mounting brackets should align with brackets on frame.

4. Position isolators with a piece of wood (Figure 2-12).

5. Lower engine.

6. Install bolts, upper isolators, washers and locknuts.

7. Torque front locknuts to 50 lbf ft (68 N·m) and rear locknuts to 90 lbf ft (122 N·m).

8. Remove hoist.

9. Install PTO driveshaft. Torque capscrews to 25 to 27 lbf ft (34 to 37 N·m).

10. Replace thermoguard at its engine block connection (1981 Model). Torque capscrews to 38 lbf ft (52 N·m).

11. Connect cold start atomizer at engine air intake port. Ensure nozzle points toward incoming air.

12. Connect throttle cable at injector pump.

13. Connect electric wire at fuel shut-off solenoid.

14. Connect PTO cable to its control lever.

15. Connect water temperature sender wire to sender.

16. Connect oil pressure sender wire to oil pressure sender.

17. Connect electrical leads to starter (Figure 2-7). Torque battery cable terminal nut to 5 to 10 lbf ft (7 to 13 N·m) and switch terminal nut to 16 to 30 lbf in. (1.8 to 3.4 N·m).

18. Mount air conditioning compressor. Tension V-belt to 3/16 in (4.75 mm) deflection.

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