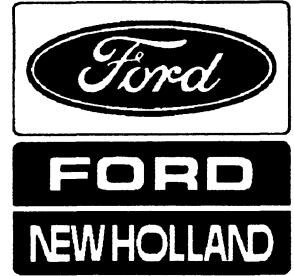


VERSATILE

Service Manual



Tractor
1150



Reprinted

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1150 TRACTOR SERVICE MANUAL



VERSATILE FARM EQUIPMENT COMPANY

A division of Versatile Corporation

1260 CLARENCE AVENUE, WINNIPEG
MANITOBA, CANADA, R3T 1T3/(204) 284-6100

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FOREWORD

This service manual provides instructions for troubleshooting, removal, inspection, replacement and overhaul of 1981, 1982 and 1983 Model 1150 VERSATILE® Tractor components.

The service manual should be used in conjunction with the parts manual for the specific model year.

A table of contents precedes each section providing detailed coverage of the information contained within that section. The index at the end of the book should ease location of specific information.

REVISIONS AND ADDITIONS

The purpose of a loose leaf service manual is to enable us to keep the book updated.

When changes are made, pages will be forwarded to you marked either as replacement or additional pages.

Replacement pages will carry the same page number as the original. Discard the original page and insert the replacement page in its place. Added pages will carry the original page number plus an alphabetical suffix. Insert these pages after the existing page.

Please complete the feedback page at the back of the manual and return it to Versatile Farm Equipment Company. Such information will help us improve our service manuals in the future.

Safety

This section contains general safety precautions which should be thoroughly studied and practised by all service personnel.

GENERAL SAFETY

1. Mount a fire extinguisher in the service area. Maintain it according to manufacturer's recommendations.
2. Never operate tractor in a closed building. If it is absolutely necessary to do so, ensure building is well ventilated and use ducting to channel exhaust fumes outside.
3. Always keep clothing relatively tight and belted. Remove jewelry or any objects that might catch in moving parts.
4. Use steps and handholds when entering or leaving tractor.
5. Park tractor on a clear, level area before servicing. Center steering, put all controls in neutral, set parkbrake, shut down engine and remove key. Engage articulation lock and chock wheels.
6. Operate all tractor controls from operator's seat.
7. Clear personnel before moving tractor.

TRANSPORT SAFETY

1. Use a strong chain, cable or tow bar and attach securely to front frame or drawbar of tractor. Do not tow tractor faster than 25 km/h (15 mph).
2. Use a trailer of at least 22 680 kg (25 ton) capacity to haul tractor.
3. Chain tractor securely to trailer, block wheels, set parkbrake and engage articulation lock to limit tractor movement.

JACKING SAFETY

1. Ensure jacks meet or exceed capacities listed in Special Tools and Equipment sections throughout this manual.
2. Ensure parkbrake and articulation lock are engaged and appropriate wheels are chocked or blocked.
3. Brace swing frame with strong wedge on frame pivot and engage articulation lock to prevent jackknifing.
4. Ensure jack is solid against component to be raised.
5. Use heavy block as base for jack. Block should be long enough to prevent jack sinking, tipping or shifting. Any additional blocks should be under jack.
6. Jack only high enough to install appropriate capacity safety stands.
7. Check jack immediately after starting lift. Lower jack immediately if jack slips or tilts.
8. Do not raise tractor or component higher than jack's limit.
9. Place safety stands under tractor or component and lower jack so that stands take the weight. Do not trust jack to support the weight while working.

HOIST SAFETY

1. Use a chain hoist and frame to lift tractor or components. Follow capacities recommended in Special Tools and Equipment sections throughout the manual.
2. Protect yourself from injury while raising tractor or components by observing the following precautions:
 - a. Do not stand on tractor when lifting.
 - b. Keep hands away from pinch points where parts pivot or where hoist chains or cables tighten against frame.

- c. Do not let tractor or component swing and strike personnel or hoist frame as it leaves ground.
- d. Keep support stands nearby and place under lifted item when the necessary height is reached.
- e. Do not go under tractor or component supported by hoist. Place support stands of recommended capacity under item before working on it.
- 8. Do not remove engine radiator pressure cap while engine is hot. Allow it to cool to 74° C (165° F) before removing pressure cap.
- 9. Shut down engine and remove key before making any linkage adjustment.
- 10. Welding fuel tanks is dangerous and not recommended.
- 11. Repair adhesive is very flammable. Keep adhesive and its vapors away from heat, sparks or flame.

MAINTENANCE SAFETY

- 1. Shut down engine before repairing tractor.
- 2. Be alert when approaching tractor while it is running, especially around the articulation joint.
- 3. Engage articulation lock during tractor overhaul operations.
- 4. Never service, lubricate, clean or adjust tractor while it is running.
- 5. Before working on any hydraulic system component, shut down engine, set parkbrake, turn steering wheel and move implement control levers backwards and forwards several times to relieve system pressure. Disconnect any component that may be connected to the remote couplers.
- 6. Wear a face shield or goggles to protect your eyes and heavy gloves to protect your hands when searching for hydraulic leaks or charging the air conditioning system.
- 7. Escaping hydraulic oil under pressure can penetrate the skin, causing severe personal injury. Use a piece of cardboard or wood as a backstop when searching for leaks. If injured by escaping hydraulic oil, get immediate medical attention.

- 12. During adhesive use and until vapor is dissipated, avoid using spark producing electrical equipment. Keep container closed when not in use.
- 13. Use adhesive only in a well ventilated area.

FUEL AND FLUID SAFETY

- 1. Do not smoke and avoid open flames when:
 - a. Filling fuel tanks.
 - b. Filling batteries.
 - c. Working on air conditioning systems. Refrigerant vapor and flame combine to form a lethal gas.
- 2. Never use an open pail or can to transport fuel. Use only an approved container manufactured for that purpose.
- 3. If clothing is splashed with fuel, change immediately. Fuel soaked clothes are an extreme fire hazard.
- 4. Dispose of all fuel soaked rags. Do not leave them lying around work area where they may be exposed to flame, spark or cigarette smoking.

SECTION 1: SPECIFICATIONS AND DATA

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SECTION 1: SPECIFICATIONS AND DATA

1 Introduction

This section contains general information on specifications, capacities, lubricants, fluids and fuels for the tractor.

2 Hoists and Jacks

Refer to Safety Section at beginning of manual.

3 Specifications

3.1 AIR CLEANER

Type Dual element, dry type with safety element, precleaner, exhaust aspirated, air intake restriction warning light

3.2 AIR CONDITIONER

Charge 3 (3.5 lb)

Oil Level 200 mL (7 oz)

3.3 AXLES

Type Spiral bevel differential unit, outboard planetary, floating ring gear final drive

Differential Ratio 4.63:1

Lubrication SAE 85W140

Oil Capacity 42 L (11.1 gal US)

Planetary Ratio 5.625:1

Final Ratio 26.04:1

3.4 BRAKES

Type
Mechanical Twin disc, twin caliper
Powershift Single disc, twin caliper

Disc
Mechanical 430 mm (17 in.)
driveline mounted on
each side of transmission

Powershift 510 mm (20 in.)
driveline mounted on
each side of transmission

Caliper Twin piston, non-floating,
hydraulically actuated
by foot pedal

Parkbrake Integral with hydraulic brake,
self-adjusting, actuated
by overcenter lever

3.5 CAB

Type Independent module type
with rollover protective structures (ROPS
ASAE S336.1)

Seatbelt SAE J141, SAE J385

3.6 CLUTCH

Type
Mechanical 394 mm (15.5 in.) dia,
three plate dry-type,
safety start switch

Powershift 394 mm (15.5 in.) dia
twin torsional damper,
safety start switch

3.7 COOLING SYSTEM

Capacity 80.4 L (85 qt US)

Radiator Core Area (Frontal) .. 1.25 m² (1 935 in.²)

Fan 915 mm (36 in.) sucker-
type, gear-driven

Pressure Cap 48 kPa (7 psi)

3.8 DIMENSIONS

Wheelbase 3 560 mm (140 in.)
Overall Length 6 890 mm (271 in.)
Nominal Turning Radius 4 630 mm (182 in.)
to centerline of drawbar
Turning Radius
(measure to outside of outer tire) 6 475 mm
(255 in.) with 20.8 × 42 duals
Maximum Operating Weight 20 800 kg (46 500 lb)

3.9 DRAWBAR

Type Swinging clevis of 50 × 150 mm
(2 × 7 in.) steel with wear block.
Replaceable hardened bushing
Height 455 mm (18 in.) to top
of main member

3.10 ELECTRICAL

System Voltage 12 V negative ground
Starting System 24 V negative ground
Batteries Two low maintenance,
8D 29 plates per cell
Alternator 90A, two charge lines
Lamps Two 60W headlights,
eight 50W halogen work lamps,
two red taillights and four flashers
Trailer Connector Cable SAE J560B

3.11 ENGINE

Type Cummins Big Cam III
KTA-1150-C470 inline 6 cylinder tur-
bocharged, aftercooled diesel
Maximum Torque 2 130 N·m (1 570 lbf ft)
at 1 500 r/min
Maximum Brake Horsepower . . . 350 kW (470 hp)
at 2 100 r/min

Full Load Governed Speed 2 100 r/min
Full Throttle (No load) Speed 2 250-
2 300 r/min
Idle Speed 1 000 r/min
Crankcase Capacity 38 L (40 qt US)
Full flow oil filter with bypass oil conditioner
filter and oil to water cooler, 30° angular capaci-
ty oil pan.

3.12 EXHAUST SYSTEM

Muffler One 254 × 381 mm
(10 × 15 in.) dual
Inlet Diameter 127 mm (5 in.)
Outlet Diameter 152 mm (6 in.)

3.13 FRAME

Type 42° angled articulated frame
Oscillation ± 15°
Articulation Lock Bar-type

3.14 FUEL TANKS

Total Capacity 1 515 L (400 gal US)
Type 63.5 mm (2.5 in.) filler neck
on both tanks. Remote breather is 610
mm (24 in.) above tanks

3.15 HYDRAULICS

Tank Capacity
Mechanical 95 L
(25 gal US)
Powershift 83 L
(22 gal US)
Type Closed center; load sensing steering
Pump Two variable displacement
pressure and flow
compensated piston pumps

Displacement 0.045 L (2.77 in³) max

Max Flow at 2 100 r/min 209.7 L/min
(55 gpm US)

Max Flow at 1 000 r/min 100 L/min
(26.5 gpm US)

System Pressure 17.2 MPa (2 500 psi)

3.15.1 STEERING VALVE

Displacement 1.2 L (75 in.³)

Max Flow 147.5 L/min (39 gpm)

Revolutions lock-to-lock 5.3

3.15.2 IMPLEMENT CONTROL VALVE

Type 5 spool; individual flow
on each spool adjustable 0° to 156° ap-
prox on all spools with detented posi-
tions; No. 1 includes float position

Pressure Release 15 MPa ± 517 kPa
(2 175 psi ± 75psi)

System Filtration 100 mesh reusable
screen filter on suction line;
25 micron replacement element
on return line

Temperature Sensor Alarm light set
for 93° C (200° F)

3.16 OPTIONS

Engine Block Coolant Heater
Cold Start Aid
Differential Lock
Clutch Decelerator

3.17 RADIO

Type AM/FM stereo cassette player

3.18 STEERING

Type Hydrostatic, two 101.6 × 460 mm
(4 × 18 in.) cylinders

3.19 TIRES

Inflation See Table 1,
outside tires (duals or triples)
should have 14 kPa (2 psi) less
pressure than inside tires

3.20 TRANSMISSION

Capacity
Mechanical 18.5 L (19 qt US)
Powershift 68.2 L (18 gal US)

Type
Mechanical 8 forward, 4 reverse;
constant mesh with
sliding shift collars
Powershift 12 forward, 2 reverse;
constant mesh with
hydraulic master clutch

Lubrication Independent system with
pump, filter, cooler and
low pressure sensor

TABLE 1-1: Tire Inflation Chart

SIZE	PLY	NO BALLAST	MAX BALLAST
20.8 × 42	10	110 kPa (16 psi)	138 kPa (20 psi)
20.8 × 38	8	110 kPa (16 psi)	143 kPa (20 psi)
24.5 × 32	10	124 kPa (18 psi)	138 kPa (20 psi)
30.5 × 32	10	110 kPa (16 psi)	110 kPa (16 psi)

4 Fuel, Fluids and Lubricants

4.1 FUELS

The tractors operate on No. 2 diesel fuel, although they will also operate satisfactorily on other fuels within these specifications:

1. Less than one percent sulphur content.
2. Sediment and water less than 0.1 percent.
3. Cetane number of at least 40. A higher cetane number fuel may be necessary at low temperatures or high altitudes.
4. Pour point below the lowest expected temperature.
5. Less than 0.02 percent ash content.
6. Viscosity of 1.4 to 5.8 mm²/s at 37.8° C (100° F).

Refer to Cummins Manual for further details.

4.2 FLUIDS

SAE J1703 Super Duty Fluid is recommended for all temperature usage.

4.2.2 Coolant

WATER: Clean and preferably soft

ANTIFREEZE: Use a good commercial grade glycol base antifreeze in the proportions recommended by its manufacturer. Do not use oil base or alcohol base antifreezes. Foaming and jelling could result and damage the cooling system.

IMPORTANT

Do not use calcium chloride solution. It is harmful to the cooling system.

IMPORTANT

Do not use Dow Chemical Dowtherm 209 brand antifreeze in the tractor. It is not compatible with the corrosion inhibitor.

Check engine coolant level daily and keep within 50 mm (2 in.) of surge tank filler neck. When adding coolant due to leakage, add one unit DCA to 3.75 L (1 gal US) water then mix at a 1:1 ratio with antifreeze.

4.3 LUBRICANTS

4.3.1 Grades

CD (Commercial grade) used in turbocharged diesel engines. It provides protection from bearing corrosion, engine wear and high temperature deposits.

SF (Service grade) provides increased oxidation stability and improved anti-wear. It also protects against rust, engine deposits and corrosion.

4.3.2 Engine Oil

Check engine oil daily. Do not mix brands or grades of oil. If it is necessary to change brands of oil, completely drain the engine and replace both filters before filling. Oil consumption may vary between 1 and 3 L (1 to 3 qt US) per day depending on loads and operating conditions.

RECOMMENDED OIL

Viscosity	Ambient Temp
10W30	– 25° to 35° C (– 13° to 95° F)
15W40	– 10° C and above (14° F and above)
20W40	0° C and above (32° F and above)

ALTERNATE OILS

Viscosity	Ambient Temp
10W	– 25° to 0° C (– 13° to 32° F)
20W20	– 5° to 20° C (23° to 68° F)
30	4° C and above (39° F and above)
40	10° C and above (50° F and above)

Below – 23° C (– 10° F), refer to Arctic Oil Recommendations in the Cummins Manual.

4.3.3 Differentials and Planetaries

Use SAE 85W140GL5 for temperatures above 32° C (90° F).

Use SAE 80W90GL5 for temperatures below 32° C (90° F)

4.3.4 Hydraulic and Transmission Oil

Use VERSATILE® HyGear 23 for temperatures above 4° C (40° F)

Use VERSATILE® HyGear 24 for temperatures below 4° C (40° F)

4.3.5 Grease

Use lithium complex grease for extreme pressure conditions. Use SAE high temperature, multi-purpose grease for all other fittings.

TABLE 1-2: Fuels, Fluids and Lubrication Schedule

	AS REQUIRED	DAILY 10 HOURS	WEEKLY 50 HOURS	MONTHLY 200 HOURS	400 HOURS	ANNUALLY	LUBRICANT ⁴	NUMBER OF POINTS	SERVICE POINTS ⁵
Change fuel system filter					•	•		1	27
Check brake fluid level			•	•	•	•	D	1	
Change coolant/install precharge element						•		1	
Change coolant filter (DCA)				•	•			1	25
Change engine oil and filters	• ¹			•	•	•	A	2	26,31
Lubricate differentials				•	•	•	C	9,19	
Change planetary/differential oil	• ²				•	•	C	6	8
Change hydraulic oil					•	•	B	1	
Change hydraulic suction filter					•	•		1	33
Change hydraulic return filter				•	•	•		1	32
Change trans oil, wash filter screen					•	•	B	1	29,30
Change trans return filter	• ³			•	•	•		1	28
Lubricate driveline			•	•	•	•	E	11	
Lubricate driveline steady bearing			•	•	•	•	E	1	11
Lubricate main pivot frame			•	•	•	•	E	1	20
Lubricate upper and lower pivots frame			•	•	•	•	E	2	21,24
Lubricate drag link pivot bearings			•	•	•	•	E	4	22
Lubricate steering cylinder pivots			•	•	•	•	E	4	23
Lubricate clutch cross shaft			•	•	•	•	F	2	2
Lubricate clutch shaft support bearing			•	•	•	•	F	1	1
Lubricate clutch release bearing		•	•	•	•	•	F	1	1
Lubricate door and window hinge pins						•	A	4	

1. Change oil after the first 50 hours of operation and every 200 hours thereafter.
2. Change oil after the first 30 hours of operation and every 400 hours thereafter.
3. Change filter after the first 50 hours of operation and every 200 hours thereafter.
4. See Table 1-3, Lubricant Brand Equivalency Chart.
5. See Figure 1-1, 1-2 or 1-3 for service point locations.

5 Lubrication

5.1 GENERAL

Service intervals recommended in this manual are based on operation under average conditions. Service the tractor more frequently when operating tractor in conditions of severe heat, cold, dust or humidity. Table 1-2 lists the points and frequency of lubrication. Refer to Table 1-3 for the lubricant brands meeting the required specifications. Figures 1-1 and 1-2 show the tractor lubrication points.

1. Check battery charge every 90 days. If not 1.270 specific gravity, charge batteries. See Electrical System, Section 3, LUBRICATION AND MAINTENANCE.

6 Belts and Filters

6.1 GENERAL

Refer to Table 1-4 for correct replacement belts and filters. Refer to Figure 1-3 for filter locations.

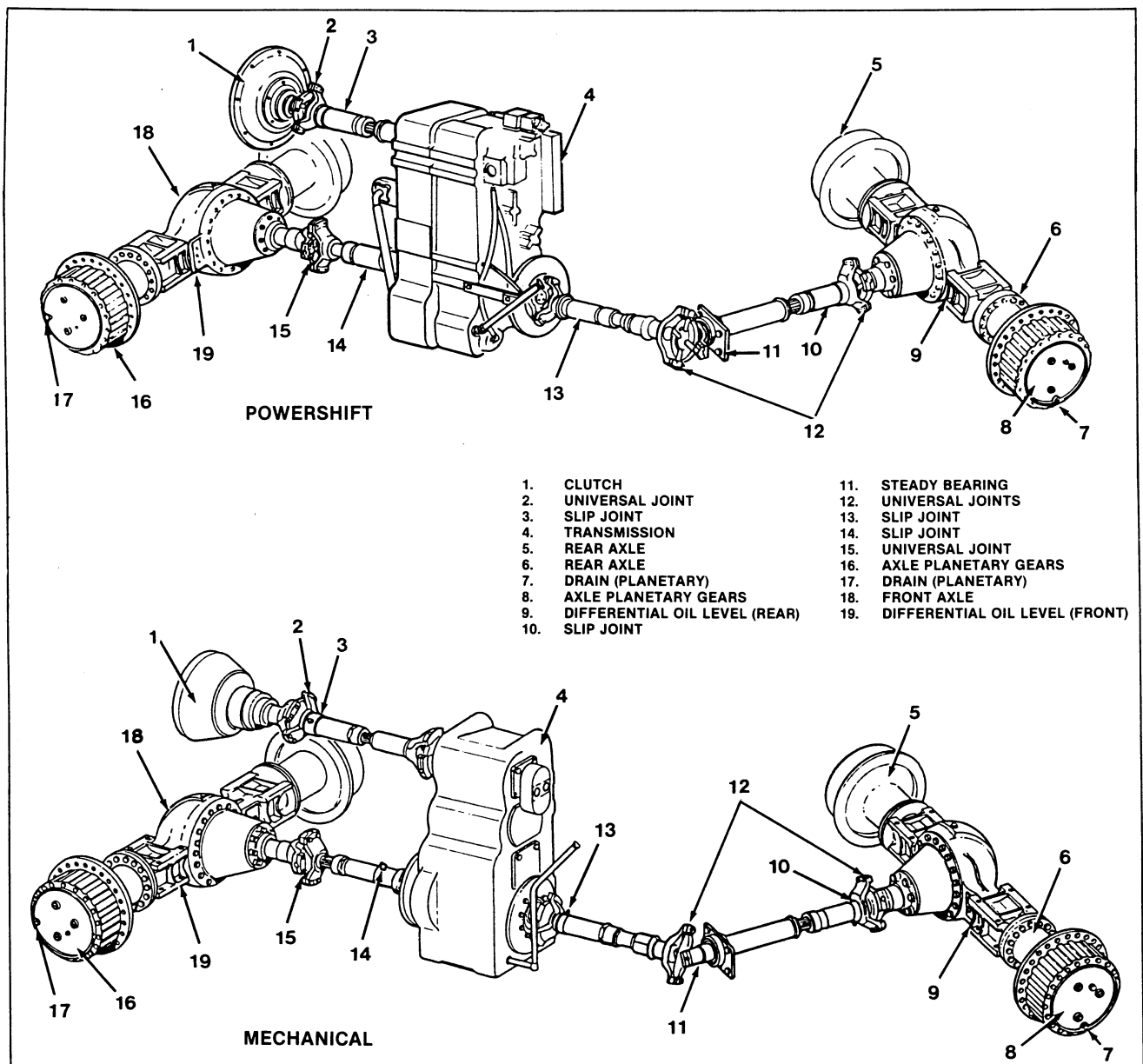


FIGURE 1-1: Driveline Lubrication Points

TABLE 1-3: Lubricant Brands

		VERSATILE	IMPERIAL	SHELL	TEXACO	GULF	CLASSIFICATION
A	Engine		Essolube XD3	Rotella T	Ursa Super Plus	Low Ash Super Duty 15W40	Factory fill is SAE 10W30 SF/CD above 4° C (40° F)
B	Trans Hyd Oil	HyGear 23 HyGear 24	Hydraul 56 Hydraul 50	Donax TD Donax TDL	Texamatic TDH	Duratron	SAE 20 SF/CD above 4° C (40° F) SAE 5W20 below 4° C (40° F)
C	Differential/ Planetary		Gear Oil GX	Spirax HD	Multigear EP	Gearlube	SAE 85W140 GL5 above 32°C (90°F) SAE 80W90 below 32° C (90° F)
D	Brake Fluid		Atlas Extra Heavy Duty 450	Super Heavy Duty Brake Fluid		H.D. Brake Fluid	SAE J 1703F All weather conditions
E	Grease		Unitol	Alvania EP2	Marfak AP	Super Crown E.P.2	SAE Multipurpose grease, high temp, all weather cond
F	Clutch Shaft Support Bearing		Unirex EP2				Extreme pressure conditions, lithium complex grease

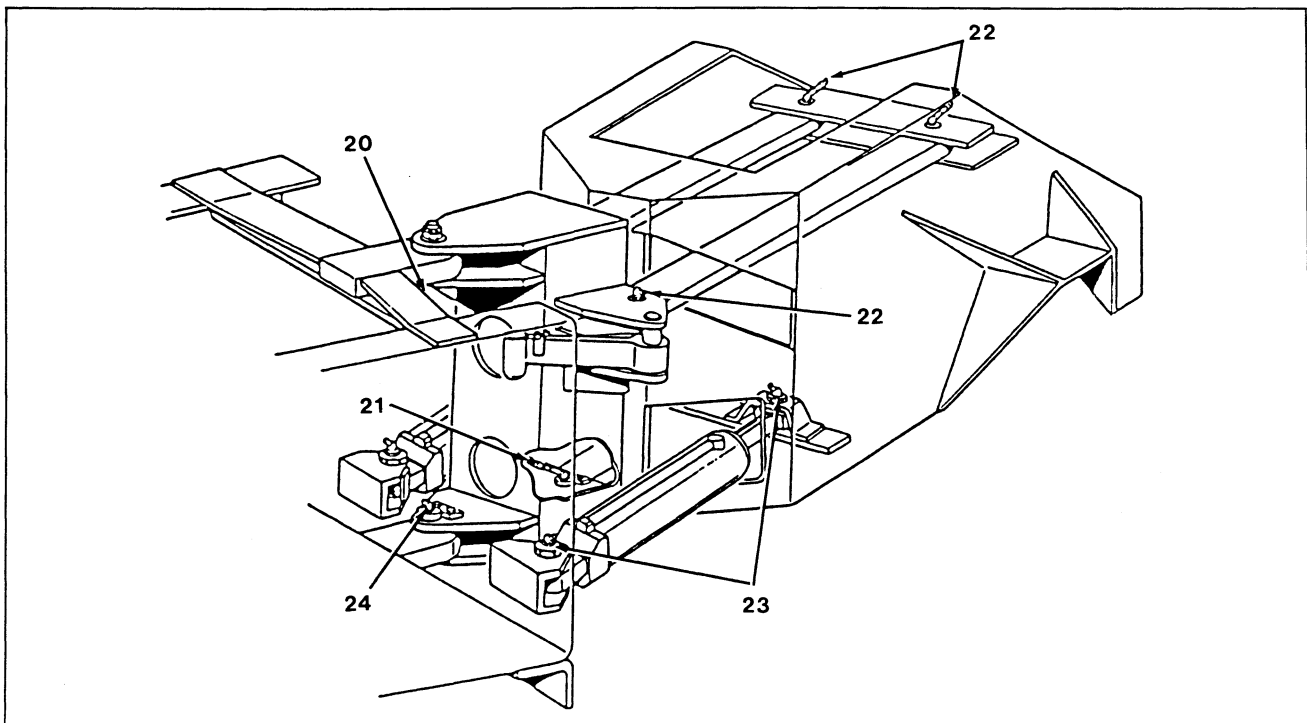


FIGURE 1-2: Steering Cylinder and Articulated Frame Lubrication Points

TABLE 1-4: Belts and Filters

Component	Part Numbers				
	Year	Year	Year	Year	
	1981 (Mech)	1982 (Mech)	1982 (Power.)	1983 (Mech)	1983 (Power.)
Engine Crankcase Filter	31133	31133	31133	31133	31133
Engine Bypass Filter	57124	57124	57124	57124	57124
Fuel Filter Element	61559	61559	61559	61559	61559
Air Cleaner Primary Element	63971	63971	63971	63971	63971
Air Cleaner Safety Element	63972	63972	63972	63972	63972
Water Filter	25881	25881	25881	25881	25881
Water Filter Precharged	26206	26206	26206	26206	26206
Transmission Circuit Element	63304	63304	68256	63304	68256
Hydraulic Suction Element	63290	63290	61071	63290	61070
Hydraulic Return Element	63297	63297	61070	63297	61070
Cab Pressurizer Panel Element	63218	63218	63218	63218	63218
Cab Recirculation Element	63077	63077	63077	63077	63077

7 Storage

7.1 STORING THE TRACTOR

1. Change hydraulic oil.
2. Change transmission oil.
3. Change engine coolant.
4. Drain and flush gear oil from differentials and planetary gear housings. Fill with new oil.
5. Change engine oil and filters.
6. Start engine. While engine is warming up, operate the transmission, hydraulic system, steering and differentials to distribute the new lubricants to components. Warm engine to at least 70° C (160° F); it may be necessary to shield the radiator to achieve this temperature. Stop engine.
7. Clean tractor of all debris, dirt and accumulated grease.
8. Drive tractor to storage location.
9. Relieve tension on alternator, air conditioner compressor and fan belts.
10. Coat all exposed hydraulic cylinder shaft areas with grease or a rust preventative.
11. Using plastic bags or tape, seal the following openings: air cleaner inlet, exhaust muffler, fuel tank breather and air conditioner air intake screens.
12. Touch up all scratches or chips with VERSATILE® paint.
13. Block up tractor to remove weight from tires. Remove dual tires.
14. Cover tires if they will be exposed to heat and/or direct sunlight.
15. If tractor is to be stored outside, cover with a waterproof canvas or other protective material.

7.2 STORING BATTERIES

1. Low maintenance batteries do not require charging before or during storage. Under normal conditions, storage life will be 12 months before recharging.
2. Check battery charge. If not 1.270 specific gravity, charge batteries. See Electrical

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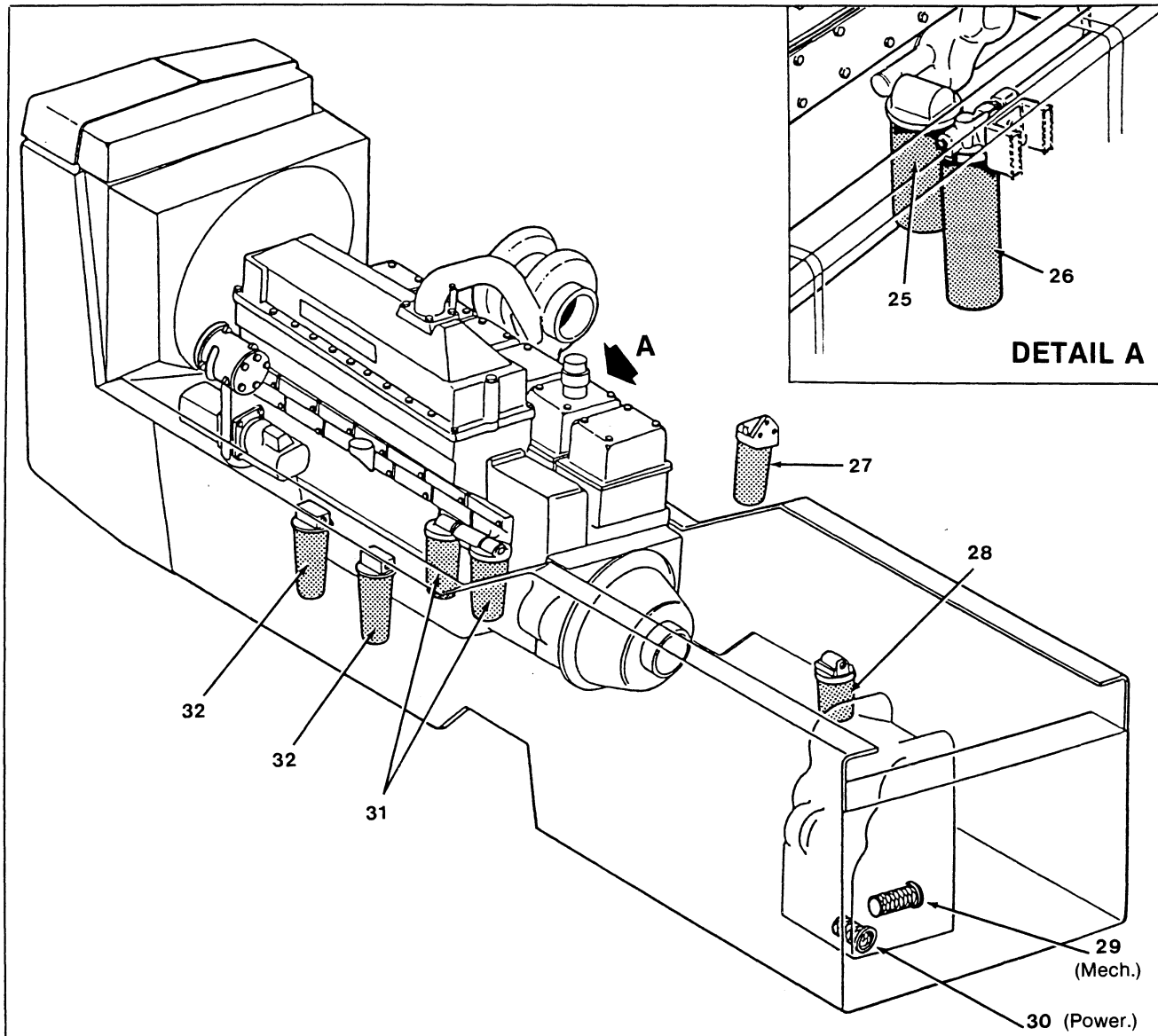


FIGURE 1-3: Filter Locations

System, Section 3, LUBRICATION AND MAINTENANCE.

3. Remove batteries from tractor and store in a dry, weatherproof area.

WARNING

AVOID SMOKING OR OPEN FLAMES IN OR NEAR BATTERY CHARGING AREA DURING OR FOR TWO HOURS FOLLOWING CHARGING



7.3 REMOVAL FROM STORAGE

1. Remove protective covering from tractor tires and seals from air cleaner inlet, exhaust muffler, fuel tank breather and air conditioner air intake screens.
2. Remove blocks. Lower tractor onto tires.
3. Correct any leaks.