

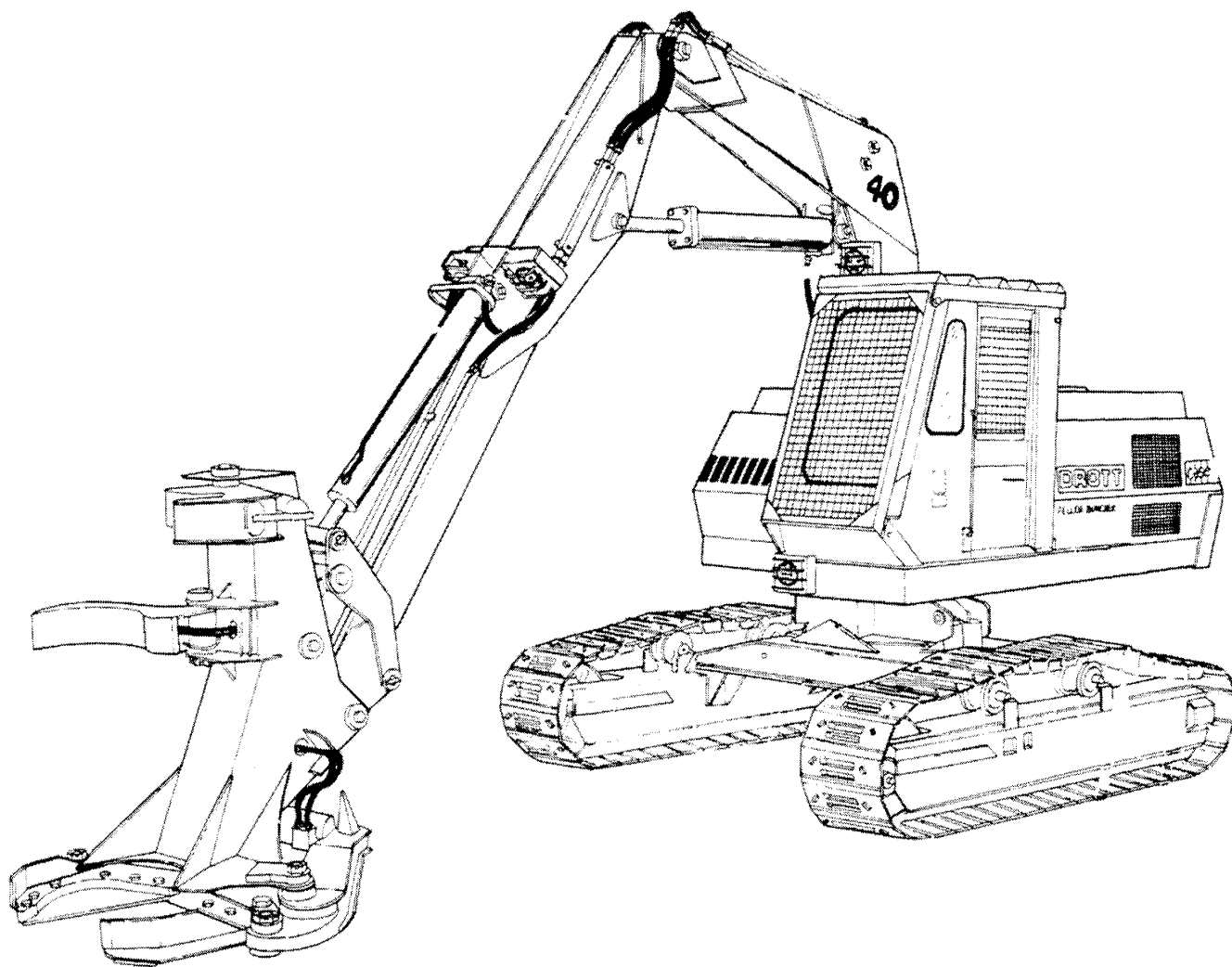
# **40 BLC Feller Buncher**

## **Service Manual**

**S406299**



**40 BLC  
FELLER/BUNCHER  
SERVICE MANUAL  
S-406299**



**JICase**

Drott Division  
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## GENERAL

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## SAFETY



**THIS SAFETY ALERT SYMBOL INDICATES IMPORTANT SAFETY MESSAGES IN THIS MANUAL. WHEN YOU SEE THIS SYMBOL, CAREFULLY READ THE MESSAGE THAT FOLLOWS AND BE ALERT TO THE POSSIBILITY OF PERSONAL INJURY OR DEATH.**



**CAUTION:** When doing any service on the machine, put a tag on the key switch or remove the key to prevent operation of the machine.



**WARNING:** Never disconnect any hydraulic line unless the boom is fully lowered and hydraulic pressure is released. To release hydraulic pressure, stop the engine and move the hydraulic controls forward and back several times.



**WARNING:** To prevent injury and possible death, keep hands, feet and loose clothing away from moving parts during operation.



**DANGER:** Engine exhaust can cause death. If necessary to start the engine in a closed area, make sure there is enough ventilation.



**WARNING:** To prevent injury from burns, always use a solvent that is not flammable for cleaning component parts. **DO NOT** use gasoline or other flammable substances.



**WARNING:** Never fill the fuel tank near an open flame or while the engine is running. Keep cigarettes away.



**CAUTION:** When checking coolant, remove radiator cap slowly to relieve pressure in the system. To prevent burns, remove radiator cap only when engine is cool.



**WARNING:** To help prevent eye injury, wear eye protection when servicing this machine.



When bleeding brakes, loosen bleeder plug approximately one-half to three-quarter turn or until oil just starts to flow. If plug is loosened too far, it may be blown out under pressure.



**CAUTION:** Use brake fluid to clean rubber parts. Acetone, paint thinner or other mineral base solvents must not be used on rubber parts. Mineral base solvents will cause damage and possible failure of the part.



**WARNING:** Stop the engine before doing any maintenance or adjustments. If necessary to make checks while the engine is running, have one person at the controls while the other person makes the check.



Keep a fire extinguisher available and **KNOW HOW TO USE IT.** Check the fire extinguisher at regular intervals for correct operation.



**WARNING:** Batteries produce explosive gases. Keep sparks, flame and cigarettes away. Ventilate when charging or using in enclosed space. Always shield eyes when working near batteries.



**POISON/DANGER:** Batteries contain sulfuric acid which can cause severe burns. Avoid contact with skin, eyes or clothing. Antidote: **EXTERNAL.** flush with water; **INTERNAL.** drink large quantities of water or milk. Follow with milk of magnesia, beaten egg or vegetable oil. Call physician immediately. **EYE.** flush with water for 15 minutes and get prompt medical attention. Keep out of reach of children.



**WARNING:** Never check battery charge by placing a metal object across the posts — the sparks could cause an explosion. Use a voltmeter or hydrometer.



**DO NOT** wear loose clothing which may catch in moving parts.

## GENERAL



**CAUTION:** *ENGINE FAN AND BELTS.* To prevent possible serious injury avoid contact with rotating fan and belts.



**CAUTION:** *Never operate the alternator on an open circuit. With no battery or other electrical load on the circuit, high voltage will occur in the alternator. This voltage can cause injury to any person who makes contact with the battery terminal of the alternator.*



**CAUTION:** *When removing a battery, always disconnect the (-) negative ground cable first. When installing the battery, always connect the (-) negative ground cable last.*



**CAUTION:** *Storage areas for batteries must be well ventilated to prevent accumulation of hydrogen gas from newly recharged batteries.*



*Disconnect both cables from the battery before you work on the engine or electrical system. Always disconnect the (-) negative ground cable first.*



**CAUTION:** *Hydraulic systems are highly pressurized. Escaping hydraulic oil, even an invisible pinhole leak, can penetrate body tissues causing serious injury. Use a piece of wood or cardboard when looking for leaks — never use the hands or other parts of the body.*

*Relieve hydraulic pressure before disconnecting circuits. When reassembling, make absolutely certain that all connections are tight.*

*If injured by hydraulic oil escaping under pressure, see a doctor immediately. Serious complications may arise if medical attention is not given at once.*



**CAUTION:** *When checking coolant level, remove cap on radiator slowly to relieve pressure within the system.*



**WARNING:** *Read the Operator's Manual before operating the machine.*



**CAUTION:** *Clean any oil spills immediately and keep the work area as clean as possible. A clean area helps prevent accidents.*



**WARNING:** *To avoid personal injury, keep hands clear of turntable ring gear while turntable is being rotated.*



*Never smoke while refueling, servicing the fuel system or working with batteries.*



**CAUTION:** *When releasing grease from track adjustment cylinder, loosen adapter only enough to let grease escape. Do NOT loosen the grease fitting on the adapter. Very high pressure exists in the cylinder when under tension. The adapter and/or grease fitting could fly loose and cause personal injury.*



**CAUTION:** *The idler wheel spring is under tension. If for any reason this spring must be removed, use EXTREME caution.*



*Inspect the machine daily for loose, worn or damaged parts. Have unsafe conditions corrected immediately.*



**CAUTION:** *Before removing or disassembling the swing brake, SET BOOM TO GROUND to prevent turntable from rotating.*



**WARNING:** *If boom is removed, do not swing the turntable over the side of the crawler base. The machine will tip. Never remove the boom unless the upperstructure is directly over the front or rear of the crawler base.*



**CAUTION:** *Activate the horn or give a warning to all persons in the area before you start the engine or move the machine.*



**CAUTION:** *Wear safety goggles and leather gloves when sharpening rotary cutter blades. Keep eyeshield in place when using grinder. Read and understand sharpening instructions before using this device. Failure to follow these instructions could result in serious injury.*



## GENERAL INFORMATION

### INTRODUCTION

This manual gives information on maintenance and service of the DROTT 40BLC FELLER-BUNCHER. All components, systems and functions are included, except the engine. Information on maintenance and service of the engine is in a separate manual.

There are two main parts in this manual. The first part gives information on maintenance, description and troubleshooting. The second part gives instructions for disassembly and repair of components.

Preventive Maintenance is in a separate section at the front of the book and can be used as a ready reference for normal maintenance of the machine. The section includes a Maintenance Chart, recommendations for lubricants, fuels and fluids, capacities, hydraulic pressures and a list of grease fittings.

For purposes of explanation, the machine is separated into three general systems: Mechanical, Electrical and Hydraulic.

Troubleshooting charts for all the systems are in a separate section (See Section 5).

Torque Charts and Schematic Drawings of the Electrical and Hydraulic systems are included in back of this manual for easy reference when troubleshooting the machine.

If further service information is needed, call your nearest DROTT dealer or Service Representative for assistance.

### PARTS AND SERVICE

When you write to the dealer or manufacturer about your DROTT machine, always give reference to the model and PIN (Product Identification Number) of the machine, in addition to the name and location of the part or component. The PIN plate is on the lower right corner of the cab (Figure 1).

All main components of the machine have an identification plate or number on the component housing. The location of the engine serial number plate is shown in Figure 2.

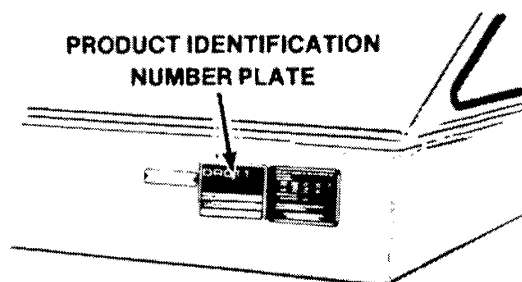


Figure 1. Machine Identification

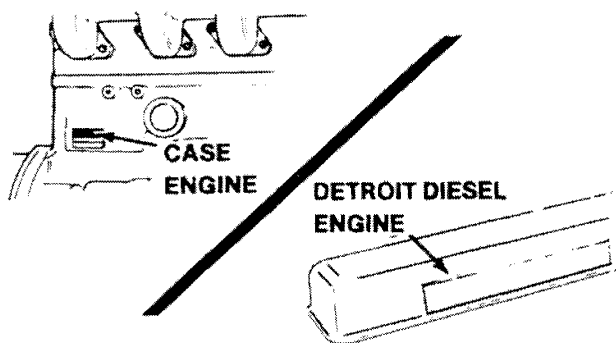


Figure 2. Engine Serial Plate

### EXPLANATION OF INTERNATIONAL SYMBOLS

Symbols are a universal language. The symbols shown here are found in the maintenance chart.



GEAR BOX	HYDRAULIC RESERVOIR	HYDRAULIC FILTER	FILTER AIR
COOLANT	ENGINE OIL	DIESEL FUEL	LUBRICATE with Multipurpose Grease

# NOMENCLATURE

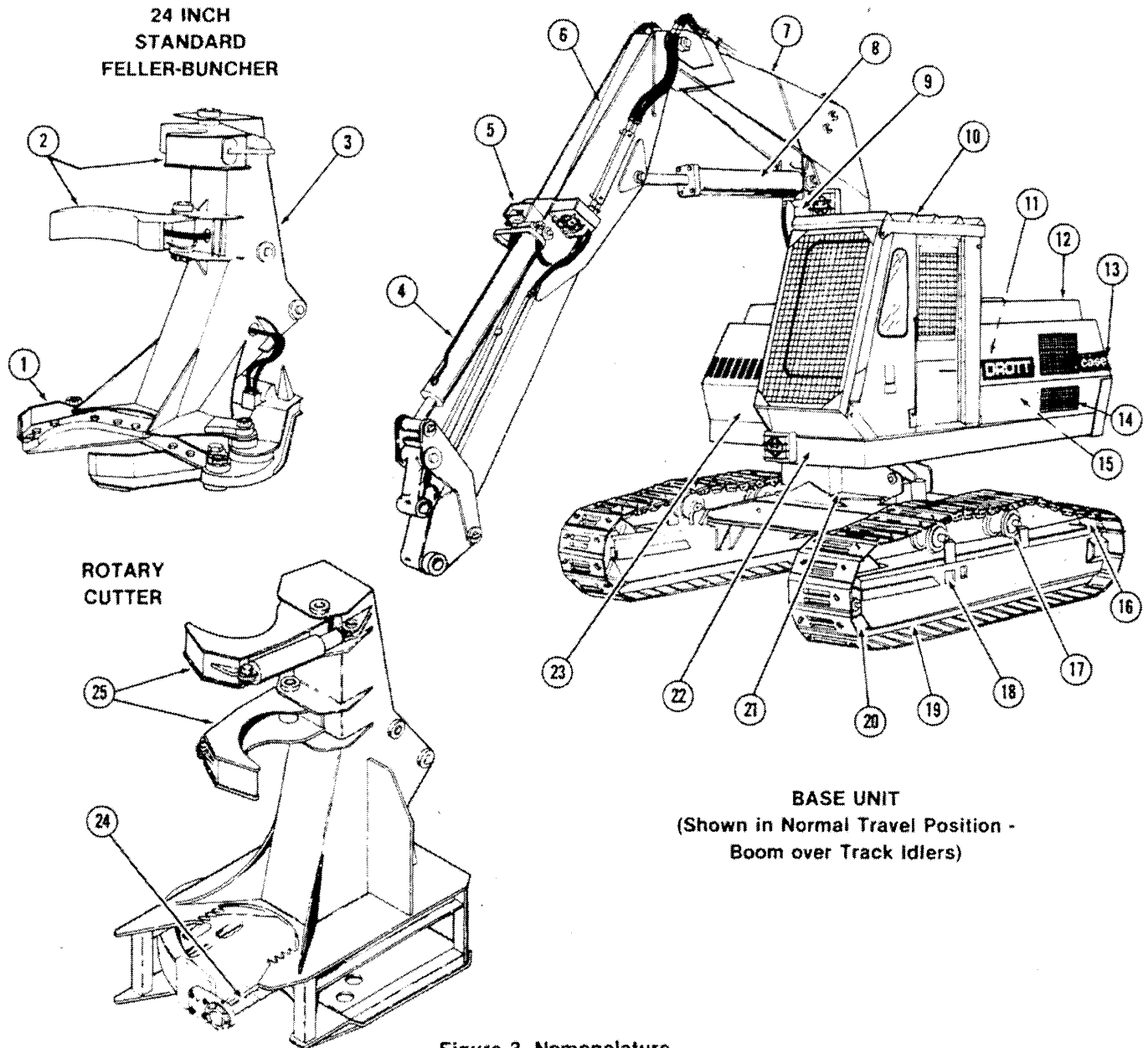


Figure 3. Nomenclature

- |                               |  |   |
|-------------------------------|--|---|
| 1. Shear Arm                  | 10. Logger Cab                                 | 18. Location of Track Adjuster                |
| 2. Grab Arms                  | 11. Location of Main Control Valves            | 19. Location of Track Rollers                 |
| 3. Feller-Buncher Head        | 12. Engine Compartment                         | 20. Idler Wheel                               |
| 4. Tool Cylinder              | 13. Location of Counterweight                  | 21. Turntable Leveler (Optional)              |
| 5. Work Light (Optional)      | 14. Location of Pump                           | 22. Turntable Bearing                         |
| 6. Tool Boom                  | 15. Location of Hydraulic Oil Tank             | 23. Location of Fuel Tank and Swing Mechanism |
| 7. Main Boom                  | 16. Drive Sprocket and Location of Final Drive | 24. Rotary Cutter Blade                       |
| 8. Crowd Cylinder             | 17. Carrier Roller                             | 25. Grab Arms                                 |
| 9. Location of Hoist Cylinder |  |   |

## MACHINE DIRECTIONS

The turntable on the 40BLC rotates a full 360 degrees. The normal travel position is with the boom over the front of the undercarriage (idler end) as shown in figure 4. In this position, directions for both the turntable and the undercarriage are the same. All machine references in this manual to Front, Rear, Right and Left are made in reference to this position. RIGHT is the Operator's right; LEFT is the Operator's left.

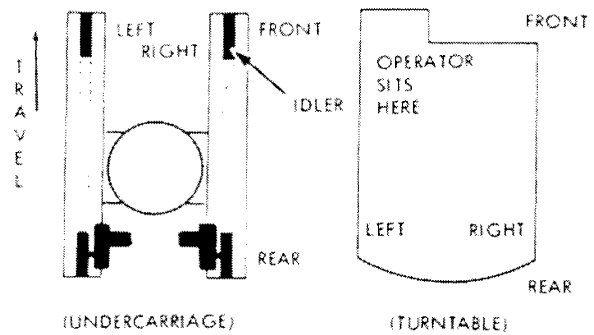


Figure 4. Machine Direction

## GENERAL DESCRIPTION

The Drott 40BLC is a fully hydraulic Unit. Power from the engine becomes hydraulic energy, then is changed to mechanical force by the hydraulic cylinders and motors.

two sections is sent through the main control valves to the machine functions. Mechanical linkages connect the valve spools to the operator's cab.

In the hydraulic system, oil from a gear pump with

Figure 5 shows the flow of power from the engine to the machine functions.

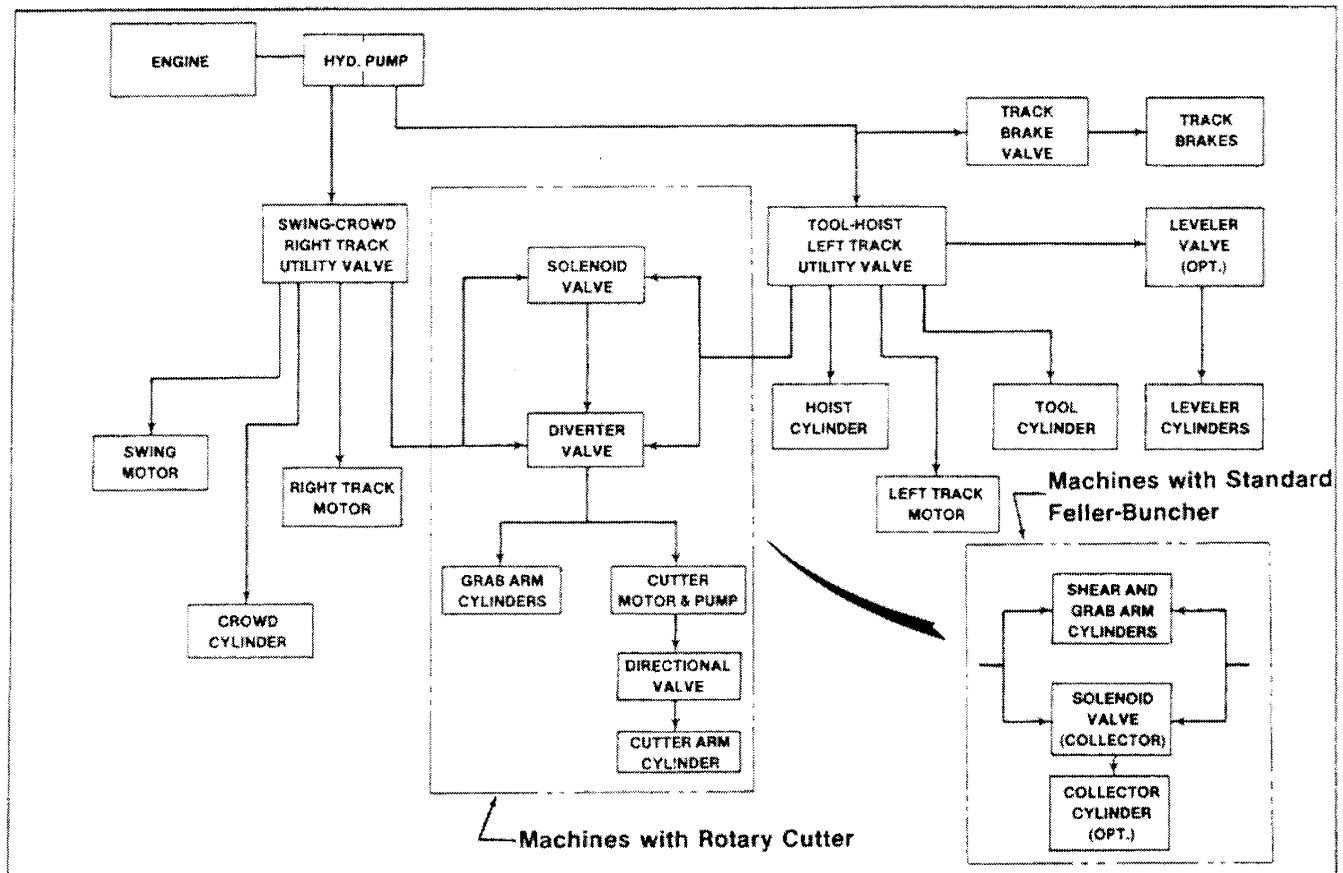


Figure 5. Basic Diagram - 40BLC Feller-Buncher

**GENERAL****SPECIFICATIONS**

ENGINE MODEL	DETROIT DIESEL 4-71N	CASE 504BD
No. of Cylinders	4	6
Bore x Stroke	4.25 in. x 5 in. (108 mm x 127 mm)	4.625 in. x 5 in. (118 mm x 127 mm)
Displacement	284 cu. in. (4 654 cm <sup>3</sup> )	504 cu. in. (8 259 cm <sup>3</sup> )
Horsepower at Gov. rpm	157 (117 kW)	140 (104 kW)
Maximum Torque	400 lb-ft (542 Nm) at 1600 rpm	380 lb-ft (515 Nm) at 1500 rpm
Compression Ratio	18.7:1	17:1
Governed (Full Load) rpm	2300	2200
High (No Load) rpm	2470	2330-2370
Low Idle rpm	600	725-775

**UNDERCARRIAGE**

## Track Gauge:

Standard Gauge Loggers .....adjustable 6 ft (1.83 m) to 7 ft (2.13 m)

Wide Gauge Loggers .....fixed 9 ft (2.74 m)

Track Pads .....24 in (610 mm) gripper grouser type

Track Rollers .....10 per track, sealed

Carrier Rollers .....2 per track, sealed

Track Idlers .....Spring cushion, hydraulic tension adjust

Crawler Drives .....Drott final drives, hydraulically-released  
spring brakes and hydraulic gear motors**TURNTABLE SWING**

Turntable Bearing .....Single race ball bearing with internal gear

Swing Drive .....Drott gearbox with mechanical brake and hydraulic gear motor

**COUNTERWEIGHT**

Standard Gauge Units .....6800 lb (3 084 kg)

Wide Gauge Units .....7850 lb (3 561 kg)

**ELECTRICAL SYSTEM**

Type .....12 volt, direct current, negative ground

Battery .....Two 12 volt batteries connected in parallel

Battery Rating .....90 amp hour at 20 hour rate, 13 plates per cell, 300 amp C.C.A.

Alternator .....61 amp

**HYDRAULIC SYSTEM**

Pump .....Gear pump with two sections, 100 gpm (378 L/min) at 2300 rpm

Main Control Valves .....Two 4-spool valves, auxiliary single spool valve optional

Filters .....100 mesh strainer - between oil cooler and pump inlet

33 micron filter - between control valve and hydraulic oil tank

100 mesh strainer - in outlet of hydraulic oil tank

Motors .....Gear type for swing and track drive functions

**ATTACHMENT (SHIPPING WEIGHTS)**

Feller/Buncher - 16 in. (406 mm) .....2600 lb (1 180 kg)

20 in. (508 mm) .....4400 lb (1 996 kg)

24 in. (610 mm) .....5800 lb (2 630 kg)

Rotary Cutter .....5350 lb (2 430 kg)

## SECTION 1 PREVENTIVE MAINTENANCE

### INTRODUCTION

Preventive maintenance at regular intervals is necessary to keep the machine in good condition as long as possible. Adjust the maintenance schedule to your operation, according to the type of work, size of loads, temperature conditions and frequency of equipment use.

The intervals in the Maintenance Chart are for average operating conditions, and must be understood as the **MINIMUM** maintenance necessary for the machine. More frequent maintenance is necessary if the machine is operated in conditions that are below average (for example, in dust, in high or low temperatures, with heavy loads or frequent starting and stopping).

Use the hourmeter, a calendar and a check list to make sure that all necessary maintenance is done according to the schedule.

### CAB INSULATION

Be careful when you clean the cabs which have sound reduction insulation. To clean the insulation, use only a vacuum cleaner or cloth with a small amount of water or mild detergent solution.

DO NOT wash, clean with steam or use a water hose on the insulation. The sound reduction ability of the insulation will be decreased or destroyed if the insulation gets wet.

### SPARK ARRESTING MUFFLERS

#### NOTE:

Laws of some states or provinces may require that this unit be equipped with a **SPARK ARRESTOR OR SPARK ARRESTING MUFFLER**. The State of California as an example, is one state which has such regulations for agricultural and forestry application, plus a regulation for construction applications in forest-covered, brush-covered, or grass-covered lands.

Typically, such laws and regulations require spark arresting devices to be maintained in good working order and typically to be attached to the exhaust system on naturally aspirated engines (engines without turbo charger).

### LUBRICANTS

It is not Drott policy to publish lists of approved lubricants or to guarantee lubricant performance. The responsibility for the quality of any lubricant rests completely with the distributor or manufacturer of the lubricant.

In various paragraphs of this manual, you will find the statement "Use (lubricant brand name) or equivalent." This statement does not constitute an unconditional guarantee of the performance of the brand of oil mentioned; it is intended only as a guide to the type of lubricant recommended for a given application.

#### **IMPORTANT**

**Always install new decals whenever the old decals are destroyed, lost, painted over, or illegible. When individual parts are replaced that have decals attached, be sure to install a new decal with the new part. Replacement decals are available from your Drott dealer.**

## PREVENTIVE MAINTENANCE

### HYDRAULIC OIL RECOMMENDATIONS

Drott DHF Fluid is the hydraulic oil recommendation for use in the hydraulic system. Other oils selected must compare with the following specifications.

OIL WEIGHT	SYSTEM OPERATING TEMPERATURE
SAE 20-20W	50° to 210° F (10° to 99° C)
SAE 10W	0° to 180° F (– 18° to 82° C)
SAE 5W or 5W-20	Arctic Conditions

**Viscosity:** The viscosity of the oil must not be more than 4000 SSU (Universal Saybolt Seconds) when the engine is started, or go below 60 SSU for long periods of operation at high temperatures. Normal operating conditions are between 80 SSU and 180 SSU. The viscosity range must not be less than 90 (for this application).

**Very Cold Temperature Conditions:** SAE 5W or SAE 5W-20 oils can be used if the viscosity of the oil will not be less than 60 SSU at maximum operation temperature. It is necessary to use a preheater and a longer than normal warming period at low operation speed to heat the oil to operating temperature.

### HYDRAULIC SYSTEM OPERATING PRESSURES

VALVE/CIRCUIT	LOCATION	PRESSURE SETTING	
		psi	kPa
Main Relief No. 1	Inlet to Crowd Valve	2500	17 237
Main Relief No. 2	Inlet to Hoist Valve	2500	17 237
Main Relief No. 3	Inlet to Leveler Valve	2050	14 130
Swing Port Reliefs	Cylinder ports of inside (crowd) valve	2500	17 237
Crowd Port Relief – Front		2500	17 237
Crowd Port Relief – Rear		3000	20 685
Track Right Port Reliefs		2500	17 237
Utility No. 1 Port Relief – Front		3000	20 685
Utility No. 1 Port Relief – Rear		2500	17 237
Tool Port Reliefs	Cylinder ports of outside (Hoist) valve	3000	20 685
Hoist Port Reliefs		2500	17 237
Track Left Port Reliefs		2500	17 237
Utility No. 2 Port Relief – Front		3000	20 685
Utility No. 2 Port Relief – Rear		2500	17 237
Swing Cushion Valve	In-line	1350	9 300
Collector Relief	In-line	2500	17 237

**NOTE:** For Hydraulic pressure settings for rotary cutter, see page 107.

### COMPONENT CAPACITIES

Component	Capacity	Lubricant/Fluid
Engine Crankcase: Detroit Diesel 4-71N w/filter change	14 qt (13.2 L) 16 qt (15.1 L)	See recommendations of engine manufacturer in engine manual
Case 504BD w/filter change	12 qt (11.3 L) 13 qt (12.3 L)	
Engine Cooling System	8½ gal (32 L)	½ ethylene glycol base anti-freeze, ½ water
Fuel Tank	75 gal (284 L)	No. 2 Diesel Fuel (See engine manual)
Hydraulic Oil Tank	18.7 gal (70 L)	Drott DHF Fluid or equivalent, see page 10.
Complete Hyd. System	53 gal (200 L)	
Final Drive Transmission	Machines through PIN 882 4.5 qt (4.2 L) Machines with PIN 883 and After 14 qt (13.2 L)	E.P. 80-90 gearlube
Swing Gearbox	11 pt (5.2 L)	E.P. 80-90 gearlube
Ring Gear of Turntable Bearing	Use enough to get good lubrication	Open gear lube (spray type) example: Mobilvac E, Texaco Crater Compound or equivalent
Pressure Gun Grease Fitting	Use enough to remove old grease and contamination	Multipurpose E.P. No. 2 lithium grease, molydisulfide grease or equivalent.

### HYDRAULIC CYLINDERS (Bore X Stroke)

CYLINDER	Units with 16 inch (406 mm) Shear		Units with 20 inch (508 mm) Shear		Units with 24 inch (610 mm) Shear		Rotary Cutter	
	Bore	Stroke	Bore	Stroke	Bore	Stroke	Bore	Stroke
Hoist, Crowd	6.53 in. (165 mm)	45.50 in. (1155 mm)	6.53 in. (165 mm)	45.50 in. (1155 mm)	6.53 in. (165 mm)	45.50 in. (1155 mm)	6.53 in. (165 mm)	45.50 in. (1155 mm)
Tool	5.50 in. (139 mm)	45.50 in. (1155 mm)	5.50 in. (139 mm)	45.50 in. (1155 mm)	6.53 in. (165 mm)	45.50 in. (1155 mm)	6.53 in. (165 mm)	45.50 in. (1155 mm)
Grab Arms	3.50 in. (89 mm)	9.70 in. (246 mm)	4.75 in. (120 mm)	10.00 in. (254 mm)	4.75 in. (120 mm)	10.00 in. (254 mm)	4.75 in. (120 mm)	10.00 in. (254 mm)
Cutter/ Shear Arm	6.25 in. (158 mm)	15.00 in. (380 mm)	6.50 in. (165 mm)	24.50 in. (622 mm)	8.00 in. (203 mm)	29.50 in. (750 mm)	4.75 in. (120 mm)	10.00 in. (254 mm)
Collector	Does Not Apply		3.50 in. (89 mm)	9.70 in. (246 mm)	3.50 in. (89 mm)	9.70 in. (246 mm)	3.50 in. (89 mm)	9.70 in. (246 mm)

MAINTENANCE CHART

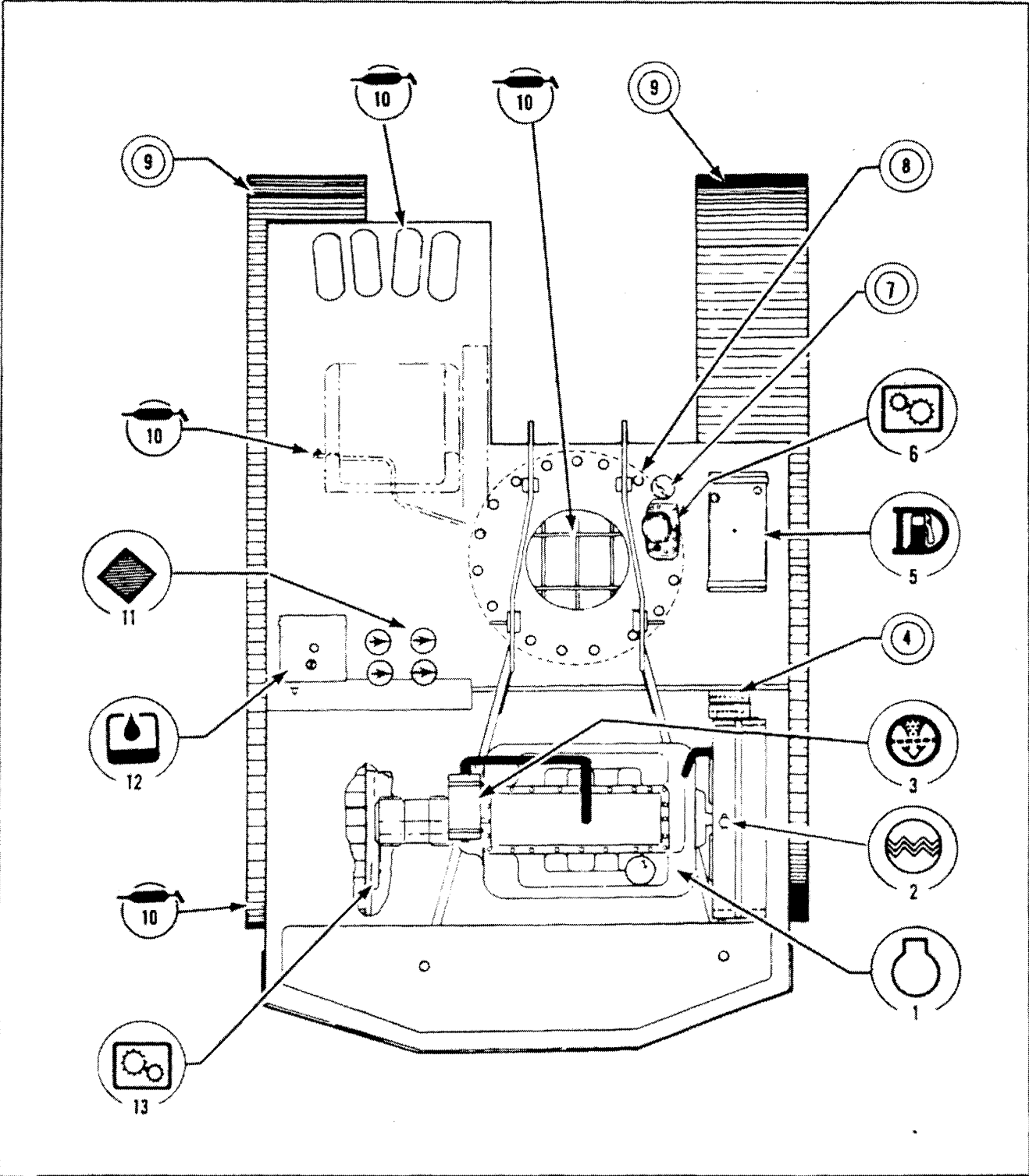


Figure 6. Maintenance Chart



## PREVENTIVE MAINTENANCE CHART

REF.	COMPONENT/SYSTEM	<div>Daily - 10 Hours</div> <div>Weekly - 50 Hours</div> <div>2 Weeks - 100 Hours</div> <div>Monthly - 250 Hours</div> <div>2 Months - 500 Hours</div> <div>6 Months - 1500 Hours</div> <div>12 Months - 3000 Hours</div>							SERVICE/CHECK	INSTRUCTION
1	ENGINE	X							Check oil, drain fuel filter	See Engine Manual
			X						Change oil and filters	See Engine Manual
2	RADIATOR, COOLING SYSTEM	X							Check coolant level	See page 16
			X						Clean fins, remove obstruction, check fan belts	See page 32
					X				Check specific gravity, add corrosion inhibitor	See page 33
						X			Drain and flush system	See Engine Manual
3	AIR CLEANER	X							Check restriction indicator, empty dust cup	See page 17
					X				Clean or replace element	See page 17
4	BATTERIES		X						Check electrolyte level (except "Maintenance Free" type)	See page 17
						X			Clean battery case, posts and connections	See page 17
5	FUEL TANK	X							Fill at end of shift, drain water from tank	See page 17
					X				Clean breather	See page 17
6	SWING GEARBOX		X						Check oil level	See page 19
						X			Change oil, clean breather	See page 19
7	TURNTABLE BEARING	X							Lubricate the ring gear	See page 19
			X						Lubricate the bearing race (thru Central Lube)	See Illustrated Listing
8	TURNTABLE CAPSCREWS				X				Check torque (See also "Special Maintenance" below)	See page 37
9	TRACK	X							Grease pillow blocks, clean tracks	See Illustrated Listing
			X						Check and adjust track tension	See page 27
10	LUBRICATION FITTINGS	X	X						Apply grease per intervals in Illustrated Listing	See page 14
11	HYDRAULIC FILTERS				X				Clean 100 mesh screen, replace paper element	See page 20
12	HYDRAULIC OIL TANK	X							Check oil level	See page 21
					X				Replace breather	See page 22
						X			Change oil, clean screens	See page 21
13	FINAL DRIVE TRANS.		X						Check oil level, look for damage or leaks	See page 22
						X			Change oil	See page 22
14	CAB and CONTROLS	X							Clean cab, check operation of controls	See page 9
				X					Check condition and adjustment of the controls	See page 45
15	BOOM and ATTACHMENT	X							Lubricate thoroughly	See page 40

## SPECIAL MAINTENANCE

### End of First Day or First 10 Hours of Operation

Hydraulic Filters ..... Replace paper element, clean 100 mesh screens  
Hose clamps ..... Tighten all hose clamps on air intake system, radiator hoses and hydraulic hoses

### After First 20 Hours of Operation

Case engine ..... Change run-in oil and filters. See Engine Manual

### After First Week or 50 Hours of Operation

Turntable Capscrews ..... Check for correct torque

## LUBRICATION FITTING CHART

Fig. No.	Location/Title	Qty.	Interval
6A	Turntable Bearing	1	Weekly/50 hours
6B	Control Pedals and Levers	8	Weekly/50 hours
6C	Control Linkage under Cab	10	Weekly/50 hours
6D, 6E	Turntable Leveler	4	Weekly/50 hours
6F	Drive Sprocket Pillow Block	2 per side	Daily/10 hours
6G	Boom and Cylinders	11	Weekly/50 hours
6H	Feller/Buncher (shear)	12	Daily/10 hours
	Collector (Optional)	3	Daily/10 hours
6I	Rotary Cutter	13	Daily/10 hours

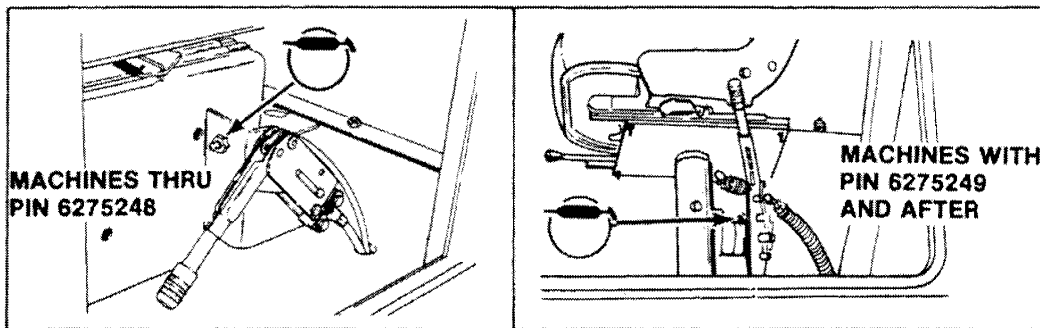


Figure 6A. Lubrication Point for Turntable Bearing (Race)

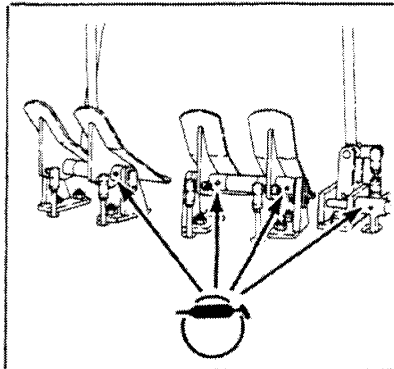


Figure 6B. Grease Fittings on Controls

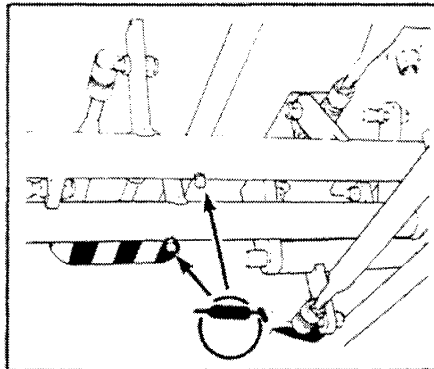


Figure 6C. Grease Fittings on Linkages

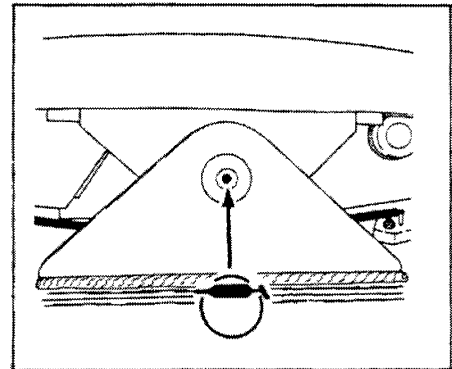


Figure 6D. Grease Fittings on Leveler Pivot

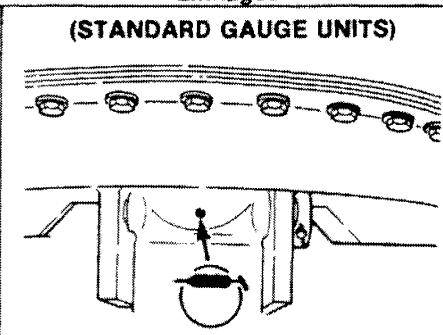
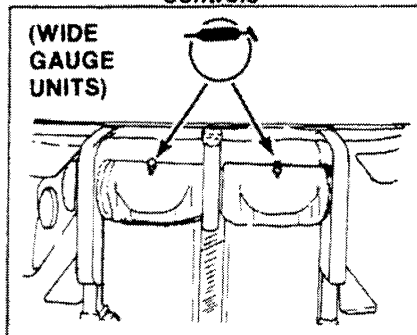


Figure 6E. Grease Fittings on Leveler Cylinders

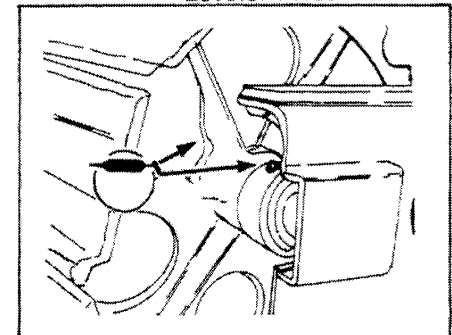


Figure 6F. Grease Fittings on Pillow Blocks

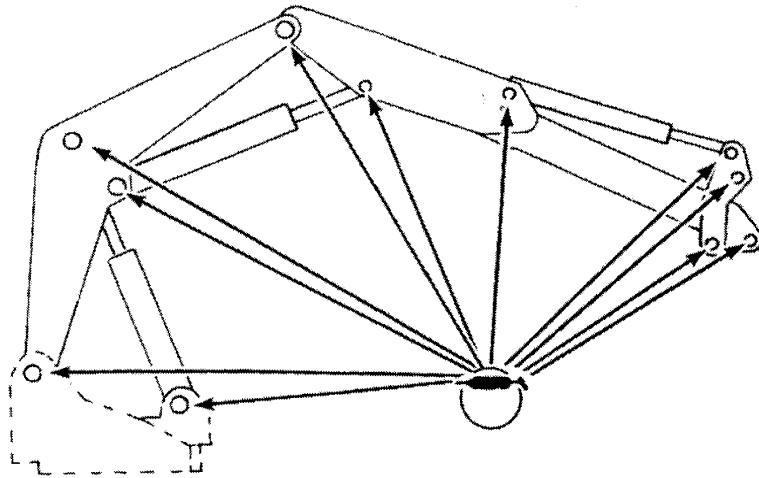


Figure 6G. Grease Fittings on Boom

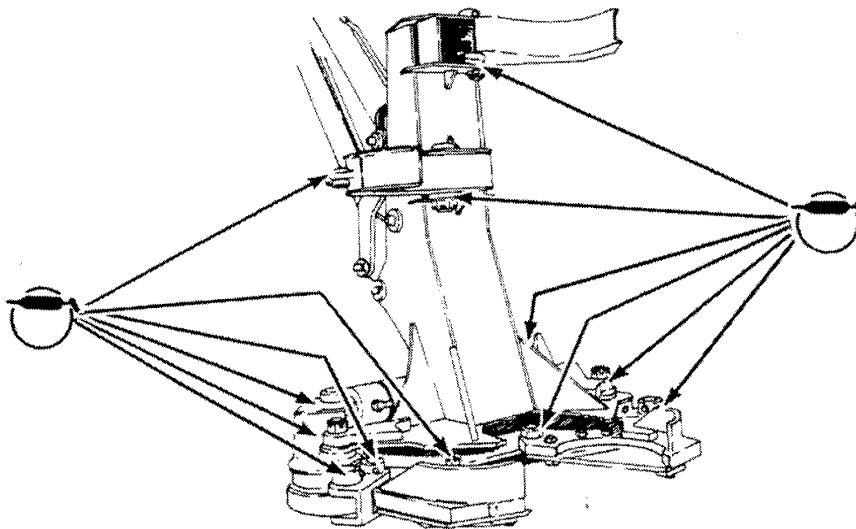


Figure 6H. Grease Fittings on Feller Buncher Shear

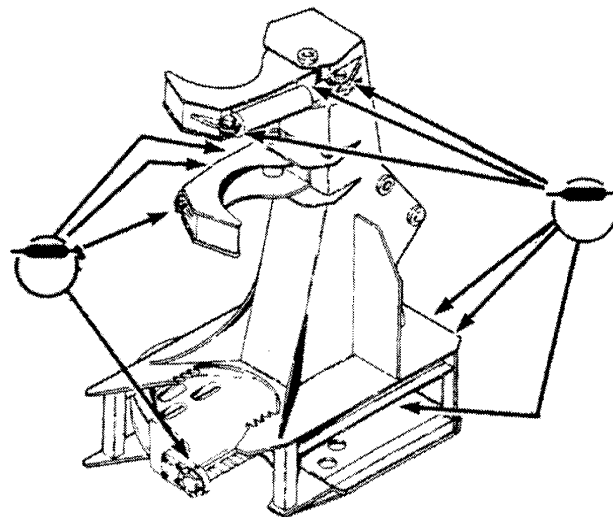


Figure 6I. Grease Fittings on Rotary Cutter

## DETAILS OF PREVENTIVE MAINTENANCE

The remaining pages of this section give the details needed to do the preventive maintenance on this equipment. The instructions are put in order of the Maintenance Chart for easy reference.

**NOTE:** When you do the preventive maintenance, tighten nuts, bolts and clamps where necessary.

### 1 ENGINE

Read the engine manual and do the necessary maintenance for the engine at the intervals given in the engine manual. Carefully follow the procedure given for run-in of the engine. The following maintenance is especially called to your attention.

#### Drain Fuel Filters - Daily

Before operation each day, open the drain valve (Detroit Diesel engine) or loosen the drain plug (Case engine) on the bottom of the primary fuel filter. Wait until any water has been released, then tighten the drain valve or plug.

Water or moisture in the fuel will cause damage to the precision components of the fuel injection system. It is important that the fuel is free of water and foreign material. Also see Fuel Tank, item 5.

#### Check Oil Level - Daily

Before operation each day, make sure the oil is at the correct level (full mark) on the engine dipstick. Add oil as necessary according to the recommendations in the engine manual.

### 2 COOLING SYSTEM

See Mechanical System section for description of the cooling system used on this machine. See engine manual for description of the water pump, internal passages and circulation system.

#### Check Coolant Level - Daily

While the engine is still cold, remove the pressure cap on the radiator and check the coolant level. The coolant must be approximately 2 inches (50 mm) below the filler tube. Add coolant as necessary, but do not over-fill. For coolant recommendations, see page 11.

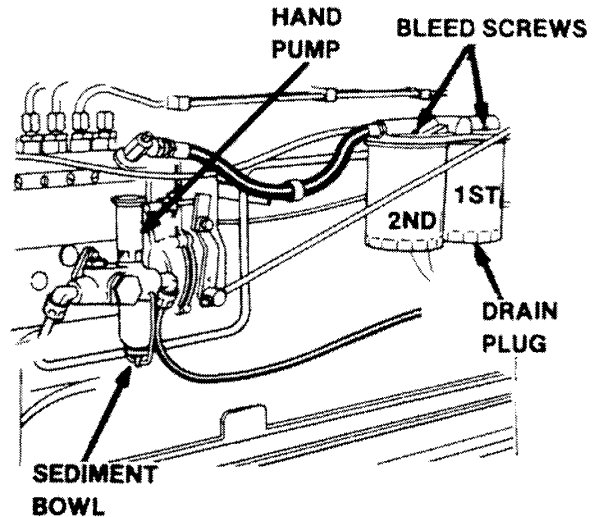


Figure 7. Case Engine

#### DRAIN PETCOCK

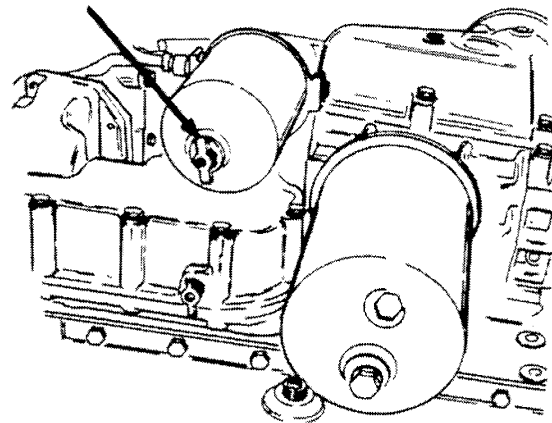


Figure 8. Detroit Diesel Engine



**CAUTION:** When checking coolant level, remove cap on radiator slowly to relieve pressure within the system.

#### Other Maintenance:

See Mechanical System section, page 32.

### 3 AIR CLEANER

Check the restriction indicator on the air intake line daily. When the red band of the indicator is in full view (engine not running), the element needs service. Tighten hose clamps periodically.

After service of the air cleaner, you must reset the indicator by pushing the reset button.

#### Dust Cup - Daily

When the machine is operated in dust or sand conditions, remove and clean the dust cup before operation each day.

- 1 - Loosen retaining clamp and remove the dust cup.
- 2 - Remove baffle and turn dust cup over to remove the dust.
- 3 - Use a cloth with a small amount of water to clean the baffle and dust cup.
- 4 - Install baffle in cup and assemble dust cup on air cleaner, making sure arrow on cup is towards the top. Tighten retaining clamp.

#### Air Cleaner Element

There are three ways to clean the element - with compressed air, by washing or both methods. Washing is best because this method removes foreign material which normally can not be removed with compressed air.

**NOTE: Never run the engine when the element or dust cup is removed.**

- 1 - Use compressed air under low pressure (30 psi [200 kPa] at the nozzle). Hold the nozzle a short distance away and turn the element slowly to make sure you remove as much dust as possible.
- 2 - Wash the element in a filter element cleaner, for example, Case Filter Element Cleaner (available from a Case dealer). Follow the instructions on the container.

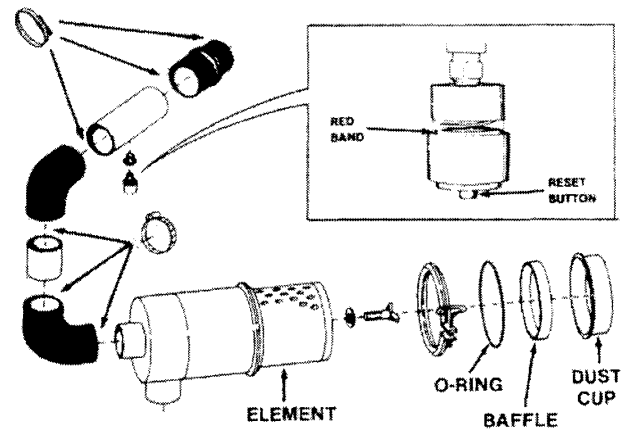


Figure 9. Air Cleaner (Case Engine Installation Shown)

- 3 - After washing, use water under low pressure to remove as much of the solution as possible.
- 4 - Hold an illuminated bulb inside the cleaned element and inspect for damage. Areas which let light through are weak or worn. Also, check for damage to the metal outer cover. If damage or weak areas are found, discard the element.

**NOTE: Air cleaner elements must be replaced after 5 cleanings. Keep an extra element in supply for replacement or for use when the other element is being cleaned.**

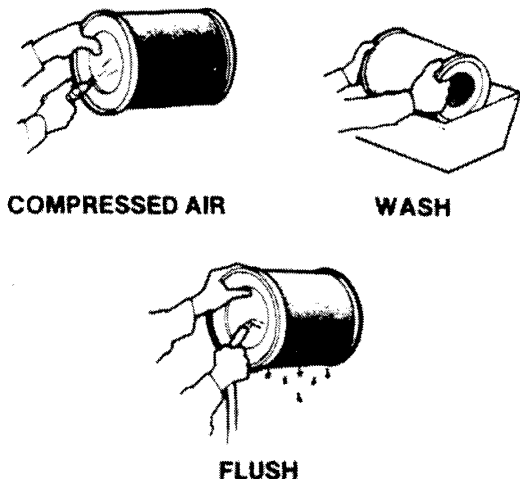


Figure 10. Cleaning of the Element

## PREVENTIVE MAINTENANCE

### 4 BATTERY

Check the electrolyte level weekly or every 50 hours (except "Maintenance Free" type). In hot weather the batteries normally will use more water and must be checked more frequently. Continued high use of water indicates an over-charging condition. See Electrical System section. Add distilled water as needed to keep the electrolyte level above the cell plates.



**WARNING:** Batteries produce explosive gases. Keep sparks, flame and cigarettes away. Ventilate when charging or using in enclosed space. Always shield eyes when working near batteries.

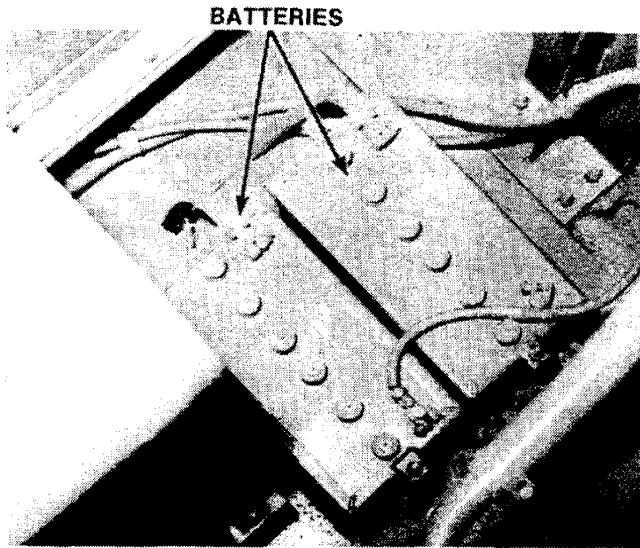


Figure 11. Batteries (Typical Installation)

#### Cleaning the Batteries

Moisture and dirt on top of the battery case can cause a continuous discharge across the battery. It is important to keep the batteries clean.

Every 6 months, 1500 hours or as necessary, clean the battery terminals, cables and case. Use a soda water solution and flush with clean water. A special brush is available at most automotive centers for cleaning the battery posts and connections. For more information on maintenance of batteries, see page 58.

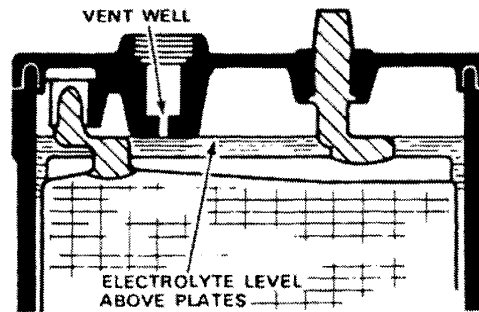


Figure 12. Battery Electrolyte Level

### 5 FUEL TANK

Condensation in the fuel system can be kept to a minimum if the fuel tank is filled at the end of operation each day. For fuel recommendations, see engine manual.

#### Drain Water-Trap - Daily

Before operation each day, open the valve on bottom of fuel tank to release the water that has collected in the fuel tank.



**WARNING:** Never fill the fuel tank near an open flame or while the engine is running. Keep cigarettes away.

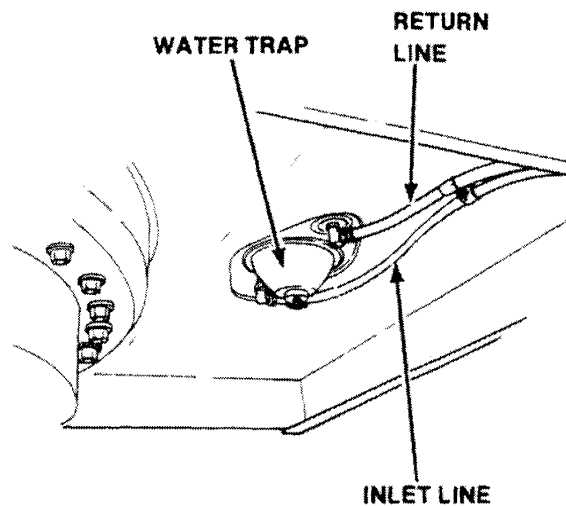


Figure 13. Fuel Tank Water Trap