



Groundsmaster[®] 455-D

Traction Unit and Cutting Unit

Model No. 30450—Serial No. 22000201 and Up

Model No. 30455—Serial No. 22000201 and Up

PROTOTYPE

Operator's Manual



Warning



The engine exhaust from this product contains chemicals known to the State of California to cause cancer, birth defects, or other reproductive harm.

Important The engine in this product is not equipped with a spark arrester muffler. It is a violation of California Public Resource Code Section 4442 to use or operate this engine on any forest-covered, brush-covered, or grass-covered land as defined in CPRC 4126. Other states or federal areas may have similar laws.

This spark ignition system complies with Canadian ICES-002.

Ce système d'allumage par étincelle de véhicule est conforme à la norme NMB-002 du Canada.

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Introduction

Read this manual carefully to learn how to operate and maintain your product properly. The information in this manual can help you and others avoid injury and product damage. Although Toro designs and produces safe products, you are responsible for operating the product properly and safely.

Whenever you need service, genuine Toro parts, or additional information, contact an Authorized Service Dealer or Toro Customer Service and have the model and serial numbers of your product ready. The model and serial number for the traction unit is on a plate that is mounted on the left front frame member. The model and serial number for the cutting unit is mounted on the top front of the center cutting unit.

Write the product model and serial numbers in the space below:

<p>Model No. _____</p> <p>Serial No. _____</p>
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This manual identifies potential hazards and has special safety messages that help you and others avoid personal injury and even death. **Danger**, **Warning**, and **Caution** are signal words used to identify the level of hazard. However, regardless of the hazard, be extremely careful.

Danger signals an extreme hazard that *will* cause serious injury or death if you do not follow the recommended precautions.

Warning signals a hazard that *may* cause serious injury or death if you do not follow the recommended precautions.

Caution signals a hazard that may cause minor or moderate injury if you do not follow the recommended precautions.

This manual uses two other words to highlight information. **Important** calls attention to special mechanical information and **Note**: emphasizes general information worthy of special attention.

Safety

The **GROUNDMASTER 455-D** was tested and certified by **TORO** for compliance with the **B71.4-1990** specifications of the **American National Standards Institute**. Although hazard control and accident prevention partially are dependent upon the design and configuration of the machine, these factors are also dependent upon the awareness, concern, and proper training of the personnel involved in the operation, transport, maintenance, and storage of the machine. **Improper use or maintenance of the machine can result in injury or death. To reduce the potential for injury or death, comply with the following safety instructions.**

Before Operating

- Read and understand the contents of this manual before starting and operating the machine. Become familiar with the controls and know how to stop the machine and engine quickly.
- Never allow children to operate the machine. Do not allow adults to operate machine without proper instruction. Only trained operators who have read this manual should operate this machine.
- Never operate the machine when under the influence of drugs or alcohol.
- Keep all shields, safety devices and decals in place. If a shield, safety device or decal is defective, illegible or damaged, repair or replace it before operating the machine. Also tighten any loose nuts, bolts or screws to ensure machine is in safe operating condition.
- Always wear substantial shoes. Do not operate machine while wearing sandals, tennis shoes, sneakers or when barefoot. Do not wear loose fitting clothing that could get caught in moving parts and possibly cause personal injury. Wearing safety glasses, safety shoes, long pants and a helmet is advisable and required by some local ordinances and insurance regulations.
- Assure interlock switches are adjusted correctly so engine cannot be started unless traction pedal is in Neutral and cutting unit is Disengaged.
- Remove all debris or other objects that might be picked up and thrown by the blades or fast moving components from other attached implements. Keep all bystanders away from operating area.
- Since diesel fuel is highly flammable, handle it carefully:
 - Use an approved fuel container.
 - Do not remove fuel tank cap while engine is hot or running.

- Do not smoke while handling fuel.
- Fill fuel tank outdoors and only to within an inch from the top of the tank, not the filler neck. Do not overfill.
- Wipe up any spilled fuel.

While Operating

- Sit on the seat when starting and operating the machine.
- Before starting the engine:
 - A. Engage the parking brake.
 - B. Make sure traction pedal is in NEUTRAL and cutting decks are DISENGAGED. Move axle shift to HI or LO position.
 - C. After engine is started, release parking brake and keep foot off traction pedal. Machine must not move. If movement is evident, the neutral return mechanism is adjusted incorrectly; therefore, shut engine off and adjust until machine does not move when traction pedal is released. Refer to Adjusting Traction Drive for Neutral.
- Seating capacity is one person. Therefore, never carry passengers.
- Do not run engine in a confined area without adequate ventilation. Exhaust fumes are hazardous and could possibly be deadly.
- Check interlock switches daily for proper operation. Do not rely entirely on safety switches - use common sense. If a switch fails, replace it before operating the machine. The interlock system is for your protection, so do not bypass it. Replace all interlock switches every two years.
- Using the machine demands attention and to prevent loss of control:
 - Operate only in daylight or when there is good artificial light.
 - Drive slowly. Avoid sudden stops and starts.
 - Watch for holes or other hidden hazards.
 - Look behind machine before backing up.
 - Do not drive close to a sand trap, ditch, creek or other hazard.
 - Reduce speed when making sharp turns and turning on a hillside.
- Traverse slopes carefully. Do not start or stop suddenly when traveling uphill or downhill. Never shift axle when moving. Machine must be on a flat surface and/or brakes must be engaged to prevent freewheeling.

- Operator must be skilled and trained in how to drive on hillsides. Failure to use caution on slopes or hills may cause loss of control and vehicle to tip or roll possibly resulting in personal injury or death.
- This product may exceed noise levels of 85 dB(A) at the operator position. Ear protectors are recommended, for prolonged exposure, to reduce the potential of permanent hearing damage.
- When operating 4 wheel drive machine, always use the seat belt and ROPS together and have seat pivot retaining pin installed.
- If engine stalls or loses headway and cannot make it to the top of a slope, do not turn machine around. Always back slowly straight down the slope.
- Raise cutting decks and latch securely in transport position before driving from one work area to another.
- **Don't take an injury risk!** When a person or pet appears unexpectedly in or near the mowing area, **stop mowing**. Careless operation, combined with terrain angles, ricochets, or improperly positioned guards can lead to thrown object injuries. Do not resume mowing until area is cleared.
- Do not touch engine, muffler or exhaust pipe while engine is running or soon after it is stopped. These areas could be hot enough to cause burns.
- If cutting deck strikes a solid object or vibrates abnormally, stop immediately, turn engine off, set parking brake and wait for all motion to stop. Inspect for damage. If damaged, repair or replace any components before operating.
- Before getting off the seat:
 - D. Set parking brake.
 - E. Move traction pedal to neutral and axle shift to HI or LO position.
 - F. Disengage cutting decks and wait for blades to stop.
 - G. Stop engine and remove key from switch.
 - H. Do not park on slopes unless wheels are chocked or blocked.
- Use only a rigid tow bar if it becomes necessary to tow machine. Use trailer for normal transport.
- Keep body and hands away from pin hole leaks or nozzles that eject high pressure hydraulic fluid. Use cardboard or paper to find hydraulic leaks. Hydraulic fluid escaping under pressure can penetrate skin and cause injury. Fluid accidentally injected into the skin must be surgically removed within a few hours by a doctor familiar with this form of injury or gangrene may result.
- Before disconnecting or performing any work on the hydraulic system, all pressure in system must be relieved by lowering cutting units to the ground and stopping engine.
- If major repairs are ever needed or assistance is desired, contact an Authorized Toro Distributor.
- To reduce potential fire hazard, keep engine area free of excessive grease, grass, leaves and dirt. Clean protective screen on back of machine frequently. Never wash a warm engine or electrical connections with water.
- If engine must be running to perform maintenance or an adjustment, keep hands, feet, clothing and other parts of the body away from cutting units and other moving parts. Keep all bystanders away.
- Do not overspeed the engine by changing governor setting. To assure safety and accuracy, have an Authorized Toro Distributor check maximum engine speed.
- Shut engine off before checking or adding oil to the crankcase.
- Disconnect battery before servicing the machine. If battery voltage is required for troubleshooting or test procedures, temporarily connect the battery.
- At the time of manufacture, the machine conformed to the safety standards for riding mower. Ballast weight, mounted to rear of traction unit, is required for machine to conform to safety standard. **Do not** remove ballast weight at any time. To ensure optimum performance and continued safety certification of the machine, use genuine Toro replacement parts and accessories. Replacement parts and accessories made by other manufacturers may result in non-conformance with the safety standards, and the warranty may be voided.

Maintenance

- Before servicing or making adjustments, stop engine and remove key from the switch.
- Make sure machine is in safe operating condition by keeping all nuts, bolts and screws tight.
- Make sure all hydraulic line connectors are tight, and all hydraulic hoses and lines are in good condition before applying pressure to the system.

Safety and Instruction Decals



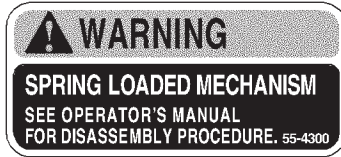
Safety decals and instructions are easily visible to the operator and are located near any area of potential danger. Replace any decal that is damaged or lost.



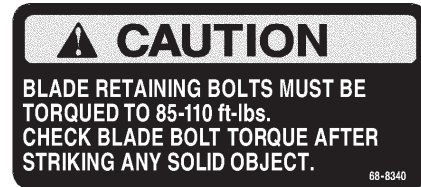
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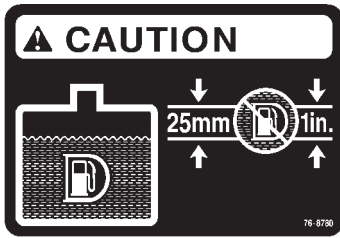


68-8340



70-2560

PROTOTYPE



76-8780



83-9150

DANGER

TO AVOID SERIOUS INJURY OR DEATH COMPLY WITH THE FOLLOWING SAFETY INSTRUCTIONS. READ AND UNDERSTAND OPERATOR'S MANUAL BEFORE OPERATING THIS MACHINE.

LOS OPERADORES DEBEN ESTAR MUY BIEN CAPACITADOS EN UNA OPERACION SEGURA.

USE EXTREME CAUTION ON HILLS AND SLOPES.

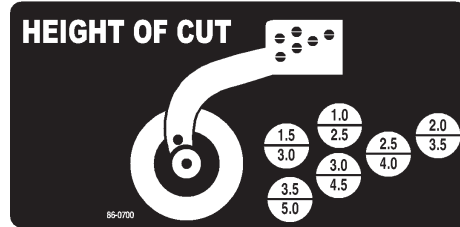
- SEAT BELT SHOULD ALWAYS BE USED WHEN OPERATING WITH ROLL-OVER PROTECTION STRUCTURE. SEAT PIVOT RETAINING PIN MUST BE INSTALLED.
- GO SLOW AND AVOID SHARP TURNS ON SLOPES TO AVOID ROLLOVER.
- DECK MUST BE LOWERED WHEN GOING DOWN SLOPES FOR STEERING CONTROL.
- OPERATOR MUST BE SKILLED AND TRAINED IN SLOPE OPERATION.
- CARRY NO RIDERS. KEEP PEOPLE AND PETS A SAFE DISTANCE FROM MACHINE.
- LIFT AND SECURE DECK BEFORE TRANSPORTING.
 - KEEP ALL GUARDS IN PLACE.
- BEFORE LEAVING OPERATOR'S POSITION:
 - MOVE TRACTION PEDAL TO NEUTRAL.
 - DISENGAGE DECK DRIVE.
 - SET PARKING BRAKE.
 - SHUT OFF ENGINE - REMOVE KEY.
- STOP ENGINE BEFORE ADDING FUEL OR SERVICING MACHINE.
- CHECK PERFORMANCE OF ALL INTERLOCK SWITCHES DAILY.
- BEFORE TOWING SEE OPERATOR'S MANUAL FOR INSTRUCTIONS.

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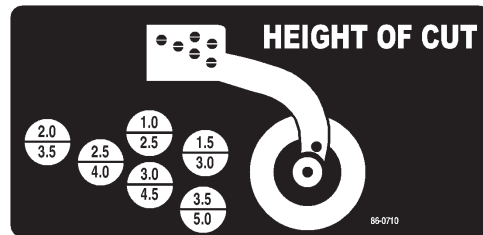
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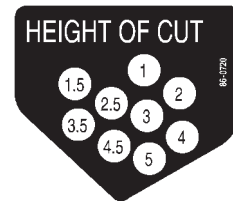
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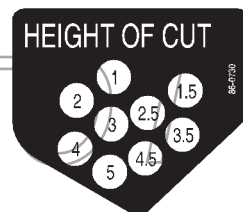
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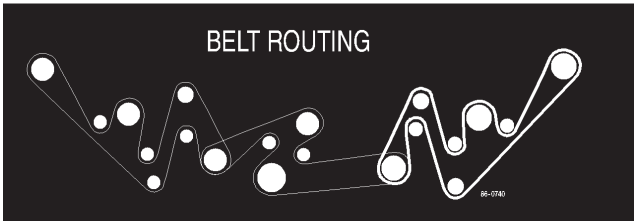
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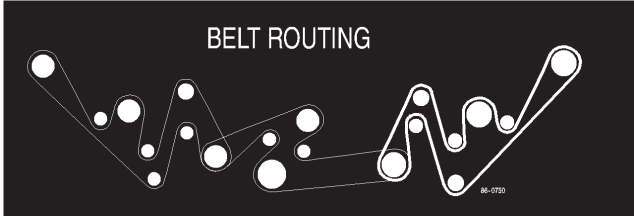
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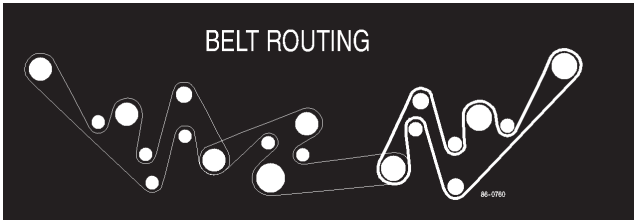
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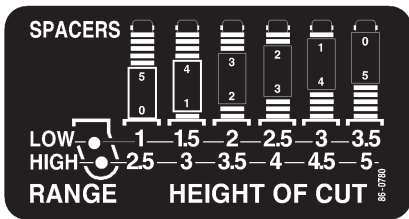
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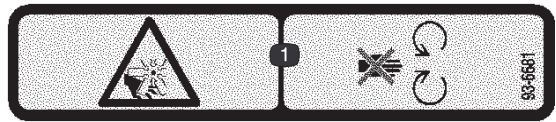
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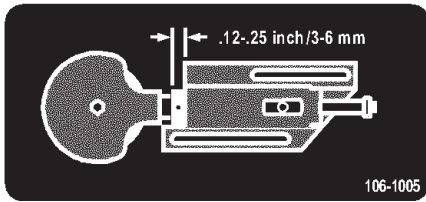
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1. Cutting/dismemberment hazard, fan—stay away from moving parts.



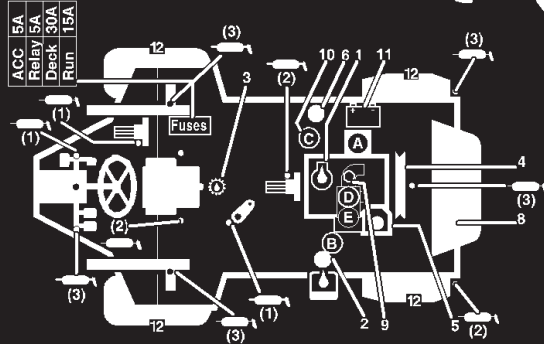
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PROTOTYPE



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GM 455-D 2WD QUICK REFERENCE AID



CHECK/SERVICE

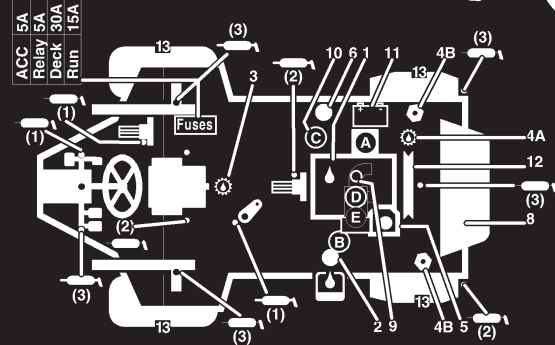
1. ENGINE OIL LEVEL/FILL
2. HYDRAULIC OIL LEVEL/FILL
3. FRONT AXLE OIL LEVEL/FILL
4. FAN BELT
5. COOLANT LEVEL/FILL
6. FUEL-DIESEL ONLY
7. GREASE POINTS (24)
8. RADIATOR SCREEN
9. AIR FILTER SERVICE INDICATOR
10. WATER SEPARATOR/FUEL FILTER
11. BATTERY
12. TIRE PRESSURE (1-1.5 BAR/15-20 PSI)

FLUID SPECIFICATIONS/CHANGE INTERVALS

See operator's manual for initial changes.	FLUID TYPE		CAPACITY		CHANGE INTERVAL		FILTER
	L	USA	FLUID	FILTER	FLUID	FILTER	PART NO.
ENGINE OIL	SAE 15W-40 CD	5	5.3 QT	100 HRS	100 HRS	74-7970 (A)	
HYD. CIRCUIT OIL	Mobil DTE 26	24.6	6.5 G	800 HRS	800 HRS	86-3010 (B)	
AXLE OIL	SAE 80-90 E.P.			800 HRS			
FUEL FILTER					400 HRS	76-5220 (C)	
PRIMARY AIR FILTER						93-9162 (D)	SEE SERVICE INDICATOR
SAFETY AIR FILTER						93-9163 (E)	SEE OPERATOR'S MANUAL
FUEL	>32 F 0 C	NO. 2-D	53	14 GAL.	Drain and flush, 800 hours		
	<32 F 0 C	NO. 1-D					
COOLANT	93-7213 50/50 PEUGEOT ANTI-FREEZE	13.25	3.5 GAL.	Drain and flush, 1500 hours or 2 years, whichever occurs first.			

93-7243

GM 455-D 4WD QUICK REFERENCE AID



CHECK/SERVICE

1. ENGINE OIL LEVEL/FILL
2. HYDRAULIC OIL LEVEL/FILL
3. FRONT AXLE OIL LEVEL/FILL
4. REAR AXLE OIL
 - A. FILL
 - B. CHECK (2)
5. COOLANT LEVEL/FILL
6. FUEL-DIESEL ONLY
7. GREASE POINTS (24)
8. RADIATOR SCREEN
9. AIR FILTER SERVICE INDICATOR
10. WATER SEPARATOR/FUEL FILTER
11. BATTERY
12. FAN BELT
13. TIRE PRESSURE (1-1.5 BAR/15-20 PSI)

FLUID SPECIFICATIONS/CHANGE INTERVALS

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	L	USA	FLUID	FILTER	FLUID	FILTER	PART NO.
ENGINE OIL	SAE 15W-40 CD	5	5.3 QT	100 HRS	100 HRS	74-7970 (A)	
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AXLE OIL	SAE 80-90 E.P.			800 HRS			
FUEL FILTER					400 HRS	76-5220 (C)	
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FUEL	>32 F 0 C	NO. 2-D	53	14 GAL.	Drain and flush, 800 hours		
	<32 F 0 C	NO. 1-D					
COOLANT	93-7213 50/50 PEUGEOT ANTI-FREEZE	13.25	3.5 GAL.	Drain and flush, 1500 hours or 2 years, whichever occurs first.			

93-7242

PROTOTYPE

Specifications

Traction Unit

Engine	Peugeot, four-cycle, four cylinder, 1.9 liter (1900 cc) displacement, liquid cooled diesel engine; 23.5:1 compression ratio; Low idle—1600 RPM, high idle—3000 RPM
Cooling System	Capacity is 3.5 gallons (13.2 l) of 50/50 mixture of Peugeot recommended anti-freeze (Part No. 93-7213)
Fuel System	Capacity is 12 gallons (45.4 l) of #1 or #2 diesel fuel.
Hydraulic System	Reservoir capacity is 6.5 gallons (24.6 l); replaceable spin-on filter element
Traction System	Ground speed: Low Range; 0–6.5 MPH (0–10.5 km/h) forward and 0–3 (0–4.8 km/h) reverse; High Range: 0–13 MPH (0–20.9 km/h) forward and 0–5 MPH (0–8 km/h) reverse
Front Axle	Two speed axle is designed to withstand heavy duty slope operation and side loading. Separate mowing and transport selections for faster and more efficient machine operation. Neutral position allows easy towing.
Rear Axles	Two Wheel Drive: The large diameter wheel spindles are designed for durability and long wear, yet provide superior stability and maneuverability. Four Wheel Drive: Heavy duty, agricultural type. Hydraulic drive with “on demand” bidirectional clutch and balanced weight distribution provides superior traction on hillsides.
Tires/Wheels	High floatation turf tread tires on de-mountable rims. Front tires: (2) 26 x 12.0–12, 8 ply. Rear tires: (2) 20 x 10.0–10, 6 ply. Tire pressure 20 psi (138 kPa).
Seat	Adjustable fore and aft travel and weight
Diagnostic System	Test ports for forward and reverse traction (2-wheel drive), front and rear axle motors (4-wheel drive), lift and counterbalance circuit, steering circuit, and charge circuit.
Steering System	Automotive type, full power
Brakes	Totally enclosed, non asbestos, dry multi-disc 5-5/8 in. individual wheel and parking brakes on front traction wheels; brakes controlled by individual pedals operated by the left foot; dynamic braking through closed-loop hydrostatic drive.
Electrical System	12 volt battery with 650 cold cranking Amps @ 0°F, 55 amp alternator, ammeter, starter, key switch, and automatic temperature controlled glow plug controller; separately fused, run, deck and instrument/accessory circuits
Interlock System	Designed to stop engine if operator gets off seat while cutting deck drive switch is engaged or traction pedal is forward or reverse. Prevents engine from starting unless traction pedal is in neutral and cutting deck is disengaged. Prevents cutting deck from operating unless axle shift is in LO range. Prevents traction unit from moving if parking brake is engaged.
Warning Lights	Glow plug indicator, engine oil pressure warning, engine coolant temperature warning, charge indicator, water in fuel, low water indicator
Indicators	Engine coolant temperature gauge, fuel gauge, hour meter

Cutting Unit

Type	126 in. (320 cm) width of cut, seven blade, front mounted rotary; 54 in. (137 cm) width of cut, three blade center section; two 36 in. (91 cm) width of cut wings, 90 in. (229 cm) width of cut with one wing up; rear discharge with even dispersion over the entire width of cut
Mowing Rate	Mows up to 8 acres/hr (32,375 m ²) at 6.5 MPH (10.5 km/h)
Trimability	Trims on both sides
Height-of-Cut	Adjustable from 1 to 5 in. (2.5 to 12.7 cm) in 1/2 in. (1.3 cm) increments
Construction	Housings are 12 gauge high strength steel, 5.5 in. (14 cm) deep, welded construction and reinforced with 10 gauge channel. Covers are impact resistant, molded plastic.
Cutter Drive	PTO driven gear box with 1:1 spiral bevel gears. Triple 3V section belt to center deck spindles, "B" section belt to each wing deck with patented belt routing. 1-1/4 inch diameter, spindle shafts mounted on two greaseable, tapered roller bearings. A positive splined connection attaches pulleys to spindle shafts for high torque capacity.
Blades	Seven 19 in. (48 cm) long, 1/4 in. (0.6 cm) thick, and 2-1/2 (6.4 cm) wide, heat treated steel blades
Belt Idlers	Self-tensioning permanently lubricated idlers
Wing Decks	Wings can be hydraulically raised from the operator's seat for transport or cutting with either wing and center deck or center deck only. Wings cut from level to 15° up and down. Further lift disengages the blade and applies a blade brake.
Suspension/Castor Wheels	Four front and two rear pneumatic castor tires with ball bearings. Center deck tires: 10.25 x 3.25 in. Wing deck tires: 8 x 3.25 in. Anti-scalp cup located on each blade. Three anti-scalp rollers on center deck. Deck is hydraulically counterbalanced.

Measurements (approx.)

Overall length (with deck installed)	134 in. (34 m)
Overall width	
Transport	75 in. (1.9 m)
Mowing	127 in. (3.23 m)
Height	58 in. (1.5 m)
with ROPS installed	82 in. (2.1 m)
Wheel Tread	
Front	51 in. (130 cm)
Rear	41 in. (104 cm)
Wheel base	52 in. (132 cm)
Dry weight	
2-wheel drive	3800 lb. (1724 kg)
4-wheel drive	3900 lb. (1769 kg)

Optional Equipment

Broom Kit*	
Snowthrower*	
Roll Over Protection Kit* (Standard on Model 30455)	
Four Post Canopy Kit*	
Spark Arrestor Muffler	Part No. 94-5637
Segmented Wheel Kit	Part No. 76-1880
Brake Light Kit	Part No. 92-7763
Gear Box Pulley (Tip Speed 14,500)	Part No. 86-3100
Windshield Kit*	
Cruise Control Kit	Model No. 30485
Road Light Kit	Model No. 30471
Mulcher Kit	Model NO. 30475
Cab*	
Additional Weights*	
Low Seat Option*	

* Contact your local Toro distributor

Specifications and design subject to change without notice.

Before Operating

Note: Determine the left and right sides of the machine from the normal operating position.

Description	Qty.	Use
Ignition key	1	
Parts catalog	1	
Commercial product setup card	1	
<i>Operator's Manual</i>	2	Read before operating the machine.
Registration card	1	Fill out and return to Toro.

⚠
Caution
⚠

Before servicing or making adjustments to the machine, stop engine and remove key from the switch.

Checking the Engine Oil

Crankcase capacity is 5.3 U.S. quarts (5.1 l) with filter.

1. Park machine on a level surface. Release hood latch and open hood.
2. Remove dipstick from tube cap (Fig. 1), wipe clean and reinstall dipstick into tube cap. Pull it out again and check oil level on dipstick: Oil level must always be in notch area on dipstick.

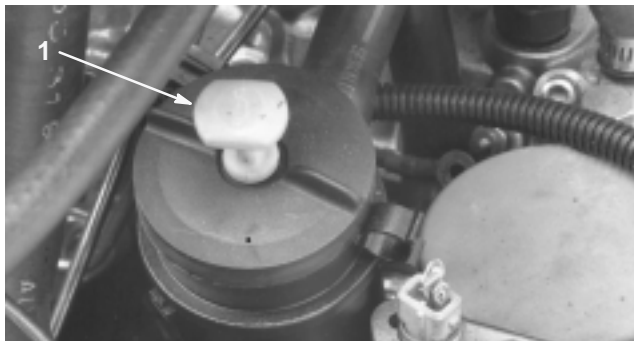


Figure 1

1. Dipstick/tube cap

3. If oil level is low, remove tube cap and add API 15W-40 CF, CF-4, or CG-4 oil until level reaches top of notch on dipstick. **DO NOT OVERFILL.**
4. Install oil tube cap.
5. Close hood and secure latch.

Checking the Cooling System

Capacity of system is 3.5 gallons (13.3 l)

1. Park machine on a level surface. Release hood latch and open hood.
2. Check coolant level. **Coolant level should be up to or above mounting tabs on degasser tank, when engine is cold (Fig. 2).**

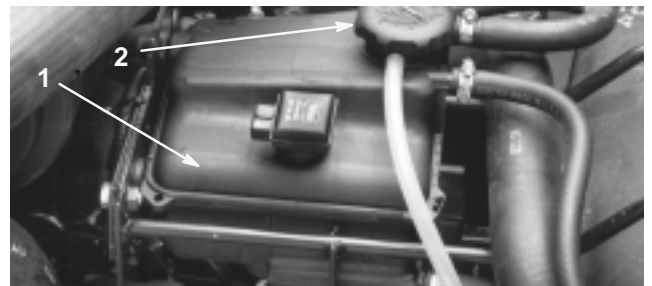


Figure 2

1. Degasser tank
2. Degasser tank cap

3. If coolant is low, remove degasser tank cap (Fig. 2) and add a 50/50 mixture of water and Peugeot recommended anti-freeze (Toro Part No. 93-7213). **Do not use water only or alcohol/methanol base coolants.**
4. Install degasser tank cap.
5. Close hood and secure latch.

Filling the Fuel Tank

1. Park machine on a level surface. Release hood latch and open hood.
2. Remove fuel tank cap (Fig. 3).

PROTOTYPE

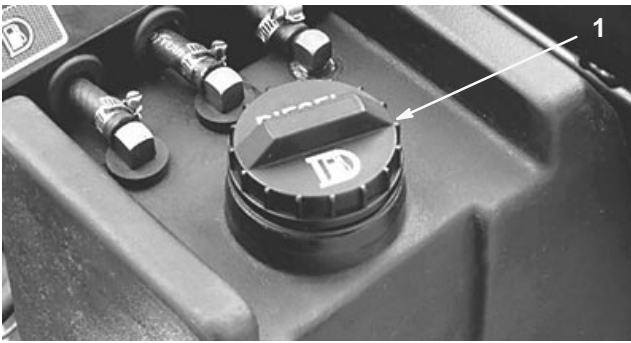


Figure 3

1. Fuel tank cap

3. Fill tank to no more than one inch (25 mm) below bottom of filler neck with No. 2 diesel fuel. **Do not overfill.** Then install cap.

Note: For temperatures below 32°F., No. 1 diesel fuel or a blend should be used.

Danger

Because diesel fuel is highly flammable, use caution when storing or handling it. Do not fill fuel tank while engine is running, hot, or when machine is in an enclosed area. Always fill fuel tank outside and wipe up any spilled diesel fuel before starting the engine. Store fuel in a clean, safety-approved container and keep cap in place. Use diesel fuel for the engine only; not for any other purpose.

4. Close hood and secure latch.

Checking the Hydraulic Circuit Oil

The machine's reservoir is filled at the factory with approximately 6.5 gallons (24.6 l) of high quality hydraulic fluid. **Check the level of hydraulic fluid before the engine is first started and daily thereafter.** Appropriate hydraulic oils are listed below.

The following list is not assumed to be all-inclusive. Hydraulic fluids produced by other manufacturers may be used if they can cross reference to find an equivalent to the products listed. Toro will not assume responsibility for damage caused by improper substitutions, so use only products from reputable manufacturers who will stand behind their recommendation.

Multi-grade Hydraulic Fluid – ISO VG 46

Normal Climate: 0 (–18°C) to 110°F (43°C)

Mobil	DTE 15M
Amoco	Rykon Premium ISO 46
Chevron	Rykon Premium Oil ISO 46
Conoco	Hydroclear AW MV46
Exxon	Univis N46
Pennzoil	AWX MV46
Shell	Tellus T 46
Texaco	Rando HDZ 46

Important The ISO VG 46 Multi-grade fluid has been found to offer optimal performance in a wide range of temperature conditions. For operation in consistently high ambient temperatures, 65°F (18°C) to 120°F (49°C), ISO VG 68 hydraulic fluid may offer improved performance.

Note: Many hydraulic fluids are almost colorless, making it difficult to spot leaks. A red dye additive for the hydraulic system oil is available in 2/3 oz. (20 ml) bottles. One bottle is sufficient for 4–6 gal (15–22 l) of hydraulic oil. Order part no. 44–2500 from your authorized Toro distributor. Not recommended for biodegradable fluid (use food coloring).

1. Park machine on a level surface and stop engine. Make sure machine has been operated so oil is warm. Release hood latch and open hood. Check level of oil by viewing sight gauge (Fig. 4). If oil is visible in gauge, oil level is sufficient.
2. If oil level is not visible in gauge, remove cap from hydraulic oil reservoir (Fig. 4) and slowly add high quality hydraulic fluid until level reaches middle (maximum) of sight gauge. **Do not overfill.**



Figure 4

1. Sight gauge
2. Hydraulic reservoir cap

Important To prevent system contamination, clean top of hydraulic oil containers before puncturing. Assure pour spout and funnel are clean.

3. Install reservoir cap, close hood, and secure latch.

Checking the Front Axle Oil Level

The front axle is shipped from the factory filled with SAE 80–90 wt. gear lube. However, check level before engine is first started and every 50 hours thereafter. Capacity is 128 oz. Check daily for signs of oil loss.

1. Park machine on a level surface.
2. Remove access panel (Fig. 5), in front of seat, to expose front axle/dipstick.

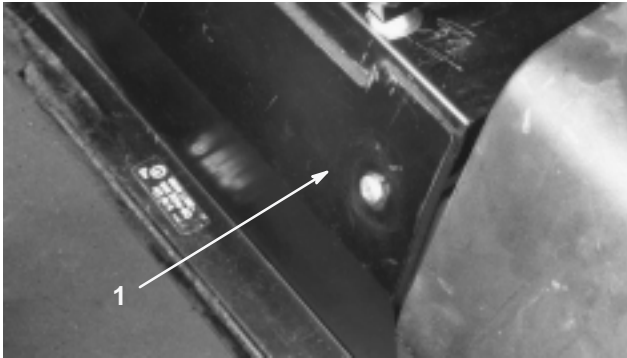


Figure 5

1. Access panel

3. Unscrew dipstick cap (Fig. 6) from the filler neck and wipe it with a clean rag. Screw dipstick cap finger tight onto filler neck. Unscrew the dipstick and check level of lubricant. If level is not within 1/2 inch (13 mm) from the groove in the dipstick, add enough to raise level to groove mark. **Do not overfill** by more than 1/2 inch (13 mm) above groove.



Figure 6

1. Dipstick cap

4. Screw dipstick filler cap finger-tight onto filler neck. It is not necessary to tighten cap with a wrench.

Checking the Rear Axle Lubricant (Model 30455 Only)

The rear axle is shipped from the factory filled with SAE 80–90 wt. gear lube. However, check level before engine is first started and every 50 hours thereafter. Capacity is 80 oz. Check daily for signs of oil loss.

1. Position the machine on a level surface.
2. Clean area around the 3 check plugs, one on each end and one in the center (Fig. 7 and 8).
3. Remove the check plugs and make sure lubricant is up to bottom of hole. If level is low, add enough lubricant to bring the level up to the bottom of the check plug holes.



Figure 7

1. Vent/fill plug
2. Check plug (3)

OTOTYPE

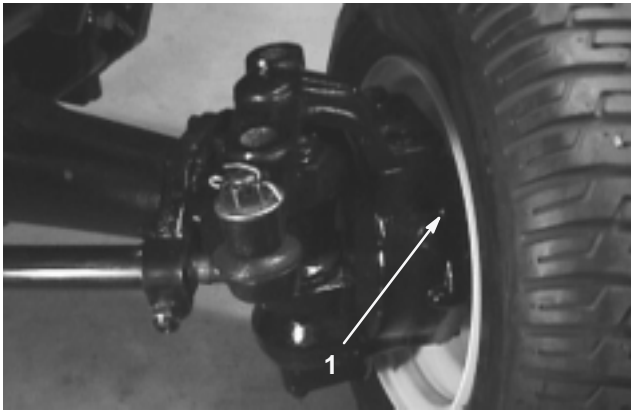


Figure 8

1. Check/fill plug

Checking the Bidirectional Clutch Lubricant (Model 30455 Only)

The Bidirectional Clutch is shipped from the factory filled with Mobil DTE 15 M anti-wear hydraulic fluid. However, check level before engine is first started and every 50 hours thereafter. Capacity is 8 oz. Check daily for signs of oil loss.

1. Position the machine on a level surface.
2. Remove check/fill plug from clutch housing (Fig. 9) and make sure lubricant is up to bottom of hole. If level is low, add enough lubricant to bring the level up to the bottom of the check/fill plug hole.

Note: Do not use gear lube in clutch housing.

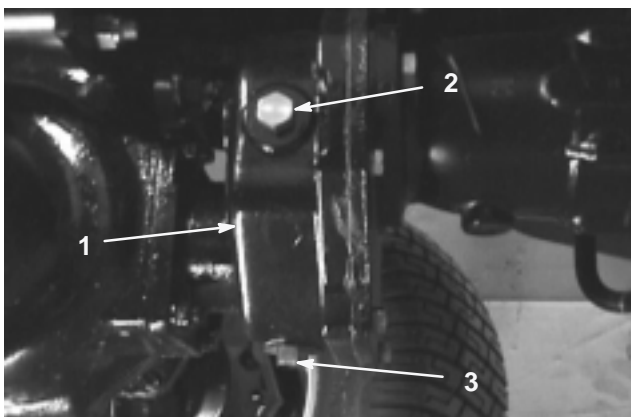


Figure 9

1. Clutch housing
2. Check/fill plug
3. Drain plug

Checking the Tire Pressure

The tires are over-inflated for shipping. Therefore, release some of the air to reduce the pressure. Correct air pressure in the front and rear tires is 20 psi (138 kPa).

Important Maintain even pressure in all tires to assure a good quality-of-cut and proper machine performance. **Do not under-inflate.**

Checking the Torque of the Wheel Nuts or Bolts

Warning

Torque front wheel nuts to 45-55 ft–lb and rear wheel nuts or bolts to 85-100 ft–lb after 1-4 hours of operation and again after 10 hours of operation and every 200 hours thereafter. Failure to maintain proper torque could result in failure or loss of wheel and may result in personal injury.

Checking the Lubricant in the Gear Box

The gear box is designed to operate on SAE 80–90 wt. gear lube. Although the gear box is shipped with lubricant from the factory, initially, check the level before operating the cutting unit and every 50 hours thereafter. Check daily for signs of oil loss.

1. Position the machine and cutting unit on a level surface.
2. Remove check plug from side of gear box (Fig. 10) and make sure lubricant is up to bottom of hole. If level of lubricant is low, remove fill plug on top of gear case (Fig. 10) and add enough lubricant to bring it up to bottom of hole in side.

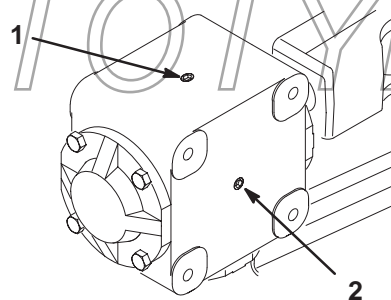
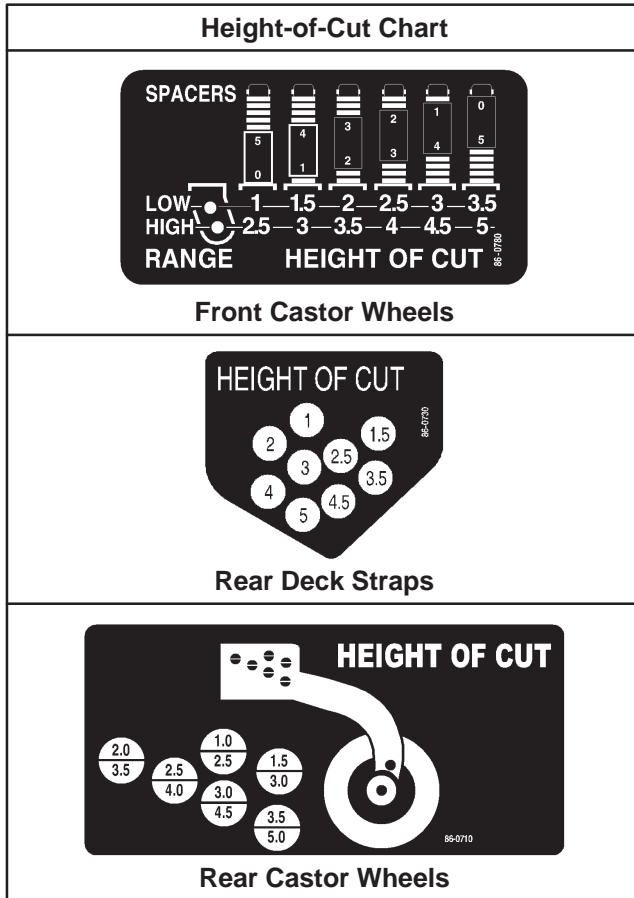


Figure 10

1. Filler plug
2. Check plug

Adjusting the Height-of-Cut

The height-of-cut is adjustable from 1 to 5 inches (2.5 to 12.7 cm) in 1/2 inch (13 mm) increments. Positioning the castor wheel axles in the top holes of the castor forks or pivots (see chart below) allows low range height-of-cut settings from 1 to 3-1/2 in. (2.5 to 8.9 cm); positioning the castor wheel axles in the lower holes of the front castor forks or rear castor pivots (See chart below) allows high range height-of-cut settings from 2-1/2 to 5 in. (6.4 to 12.7 cm).



1. Start the engine and raise the cutting unit so height-of-cut can be changed. Stop engine after cutting unit is raised.
2. Position all castor wheel axles in the same holes in the castor forks or pivots.

Front Castor Wheels

1. Remove HOC cap from spindle shaft and slide spindle out of front castor arm (Fig. 11). Slide spacers onto spindle shaft to get desired height-of-cut.

2. Push castor spindle through front castor arm, install remaining spacers onto spindle, and install HOC cap to secure assembly (Fig. 11).

Note: On Center deck only, make sure washer remains on bottom of spindle shaft.

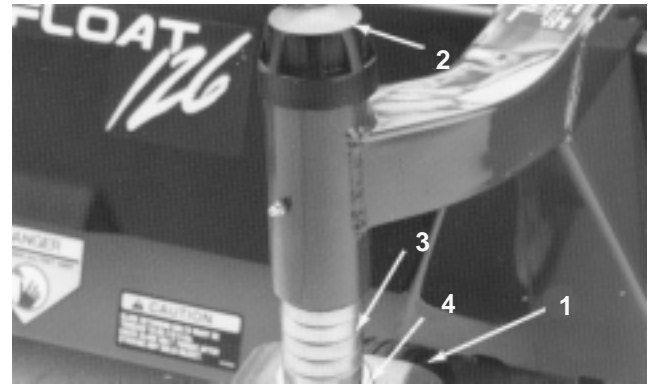


Figure 11

1. Front castor wheel
2. HOC cap
3. Spacers
4. Washer (center deck only)

Rear Castor Wheels

1. Remove hairpin cotter and H.O.C. pin securing rear castor pivot arm to deck bracket (Fig. 12).

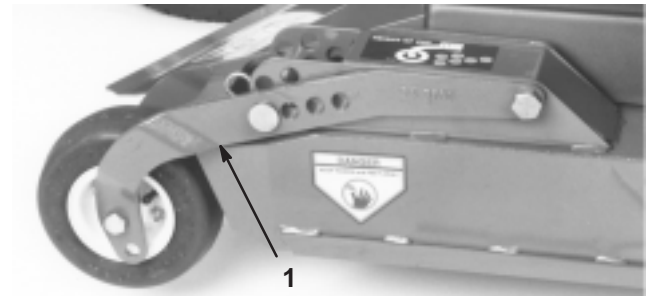


Figure 12

1. Rear castor pivot
2. Align the pivot arm holes with selected height-of-cut bracket holes in the deck frame, install H.O.C. pin and secure with hairpin cotter.

Rear Deck Straps

1. Lower center and wing cutting units to the ground; then raise center cutting unit slightly, until rear deck straps hang freely on wear block of lift arm brackets (Fig. 13). Stop engine after cutting unit is raised.

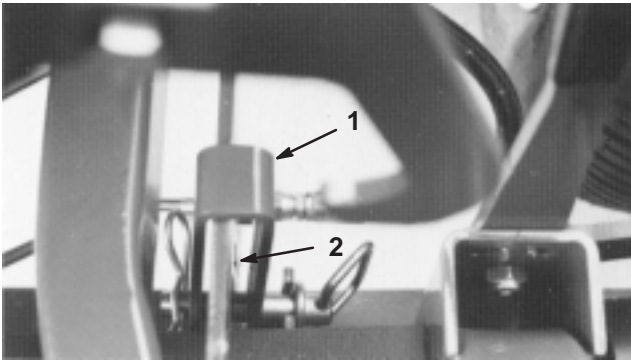


Figure 13

1. Rear deck straps 2. Lift arm brackets

2. Remove hairpin cotter and H.O.C. pin securing rear deck strap to H.O.C. bracket on deck.
3. Slide deck strap forward or backward until holes in strap are aligned with selected height-of-cut bracket holes in the deck frame, install H.O.C. pin and secure with hairpin cotter.

Safety Doors

On each side of the center deck is a safety door that opens and closes as the wing decks are lowered and raised (Fig. 14). The doors open to provide overlap of the cutting blades when the wing units are down. The doors close to provide safety and protection when the wing units are raised. Check to make sure the forward, lower edge of door is even or 1/4 in. (6 mm) higher than lower edge of door guide when wing decks are in the fully raised, transport position. If an adjustment to the door is required, refer to Adjusting the Safety Door, page 41.

Caution

Check the operation of the safety doors daily and each time the deck is cleaned. Repair as needed.

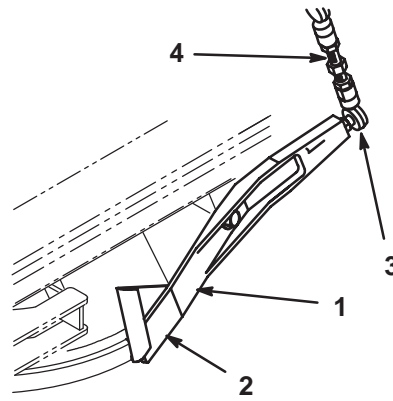


Figure 14

1. Safety door 3. Ball joint
2. Door guide 4. Threaded rod

Operation


Note: Determine the left and right sides of the machine from the normal operating position.

The use of protective equipment, such as but not limited to, for eyes, ears, feet, and head is recommended.


Caution

This machine produces sound levels in excess of 85 dBA at the operator's ear and can cause hearing loss through extended periods of exposure.

Wear hearing protection when operating this machine.



1. Caution



2. Wear hearing protection

Controls

Cutting Unit Engagement Switch

The cutting unit engagement switch (Fig. 15) is used to start and stop cutting unit operation. Lift switch and move forward to actuate cutting unit. Center deck will engage first followed by wing decks engaging approximately one second later.

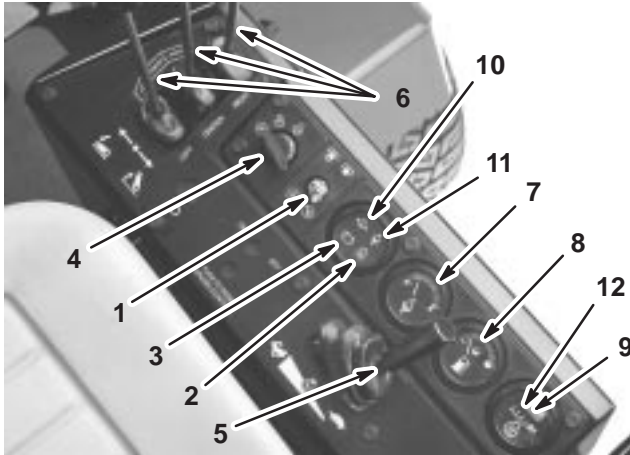


Figure 15

- | | |
|-----------------------------------|--|
| 1. Cutting unit engagement switch | 8. Fuel gauge |
| 2. Glow plug indicator | 9. Low water indicator |
| 3. Charge indicator | 10. Engine oil pressure warning light |
| 4. Key switch | 11. Engine coolant temperature warning light |
| 5. Throttle control | 12. Water in fuel warning light |
| 6. Cutting unit lift controls | |
| 7. Coolant temperature gauge | |

Glow Plug Indicator

The glow plug indicator (Fig. 15) automatically actuates proper glow period when ignition key is turned to ON position. Illuminates when glow plugs are actuated. When glow plugs are heated sufficiently, light goes off indicating engine is ready to start.

Charge Indicator

The charge indicator (Fig. 15) illuminates when system charging circuit malfunctions.

Key Switch

The key switch (Fig. 15) has three positions: OFF, ON and START. Rotate key to START and release key when engine begins running. To stop engine, rotate key to OFF.

Throttle Control

Move the throttle control (Fig. 15) forward to increase engine speed, backward to decrease speed.

Cutting Unit Lift Controls

The two outside levers (Fig. 15) raise and lower the wing cutting units. The center lever raises and lowers the whole cutting unit. Engine must be running to lower cutting unit. When wing cutting units are raised higher than 15°, blades automatically disengage. To lower cutting unit just touch levers momentarily.

Coolant Temperature Gauge

The coolant temperature gauge (Fig. 15) shows temperature of engine coolant.

Fuel Gauge

The fuel gauge (Fig. 15) shows amount of fuel in tank.

Low Water Indicator

The low water indicator (Fig. 15) indicates low water level in cooling system.

Engine Oil Pressure Warning Light

The engine oil pressure warning light (Fig. 15) indicates dangerously low engine oil pressure.

Engine Coolant Temperature Warning Light

The red light (Fig. 15) illuminates and the engine stops when temperature of coolant exceeds 230°F.

Water in Fuel Indicator

The water in fuel indicator (Fig. 15) indicates when there is water in fuel.

Seat

Seat adjusting lever on left side of seat (Fig. 16) allows 4 inch (10.2 cm) fore and aft adjustment. Seat adjusting knob on front of seat, adjusts seat for operator's weight.

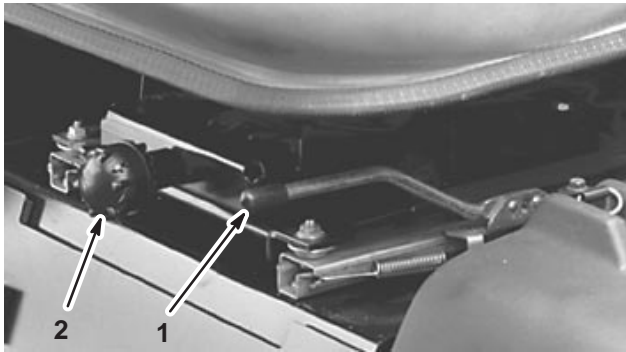


Figure 16

1. Seat adjusting lever 2. Seat adjusting knob

Traction Pedal

The traction pedal (Fig. 17) controls forward and reverse operation. Depress top of pedal to move forward and bottom to move backward. Ground speed depends on how far pedal is depressed. For no load, maximum ground speed, fully depress pedal while throttle is in FAST. For maximum power under load or when going uphill, keep engine rpm high by having throttle in FAST and traction pedal partially engaged. If engine rpm begins to decrease due to load, gradually reduce traction pedal pressure until engine speed is increased.

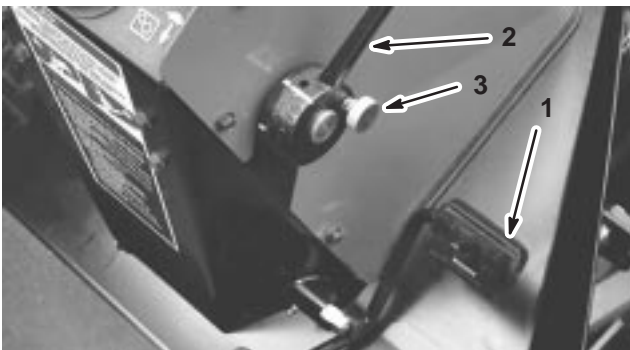


Figure 17

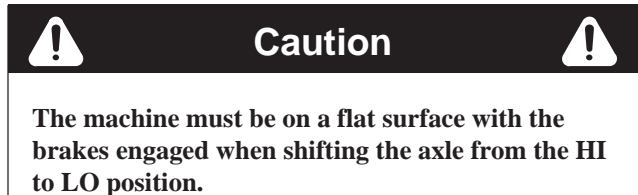
1. Traction pedal 3. Lockout knob
2. Axle shift lever

To stop, reduce foot pressure on traction pedal and allow it to return to center position. On extreme downhill slopes, apply pressure to REVERSE side of pedal, or operate with heel on REVERSE and toe on FORWARD portion of pedal.

Axle Shift Lever

The axle shift lever, located on right side of console (Fig. 17), selects front drive mode. Pull out lockout knob, move lever rearward for mowing operation and forward for transport operation, then release knob to lock selection. Lever must be in LO position to mow. Middle position (N) is for towing.

Important On model 30455, lever must be in LO position to operate in 4-wheel drive.



Brake Pedals

Two foot pedals at the lower left (Fig. 18) operate individual wheel brakes for turning assistance, braking, parking and to aid in obtaining better sidehill traction. Locking pin is for parking.

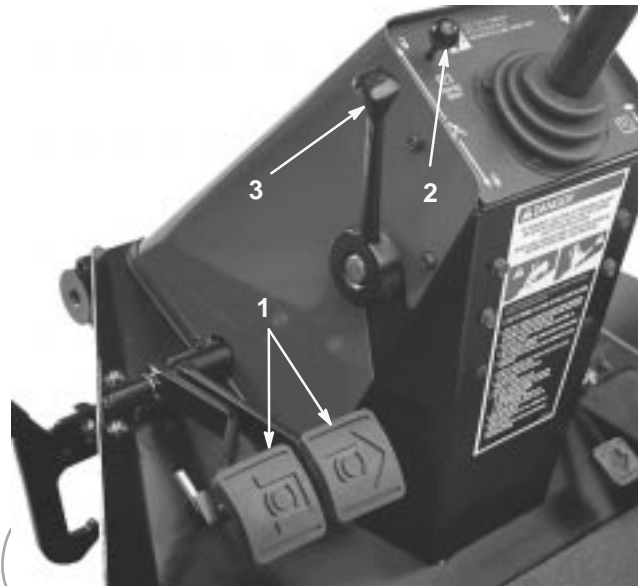


Figure 18

1. Brake pedals 3. Steering wheel tilt lever
2. Parking brake latch

Parking Brake Latch

A knob on the left side of console (Fig. 18) actuates parking brake lock. To engage parking brake, connect pedals with locking pin, push down on both pedals and pull parking brake latch out. To release parking brake, depress both pedals until parking brake latch retracts.

Steering Wheel Tilt Lever

Lever on left side of console (Fig. 18) allows steering wheel to be adjusted for operator comfort.

Transport Latches

Four latches (Fig. 19) secure cutting unit and wings in upright position for transport operation.



Figure 19

1. Transport latch

Hour Meter

The hour meter (under the hood) shows total hours that machine has been operated.

Horn

The horn is in center of steering wheel. Operates only when key switch is in ON.

Starting and Stopping

1. Sit on the seat, keep foot off traction pedal. Ensure that the parking brake is engaged, traction pedal is in NEUTRAL, and cutting unit engagement switch is in the DISENGAGED position.
2. Turn ignition switch to ON position. When glow plug indicator light goes off, engine is ready to START.
3. Turn ignition key to START. Release key when engine starts.
4. To stop, disengage and move all controls to NEUTRAL and set parking brake. Turn key to OFF and remove it from switch. Raise and latch all cutting units in transport position.

Priming the Fuel System

Important The fuel system may need to be primed when a new engine is started for the first time, if it runs out of fuel or if maintenance is performed on the fuel system.

1. Unlatch and raise hood.
2. Insert a 3/16 in. hose over bleed screw and run other end into a container to catch fuel.
3. Loosen fuel filter/water separator bleed screw (Fig. 20) a few turns. Pump priming plunger until a steady stream of fuel comes out of hole in bleed screw. When fuel stops foaming, tighten the bleed screw during the downstroke of the priming plunger. Wipe up any spilled fuel.

Note: Priming fuel filter without opening bleed screw may damage priming plunger.

4. Pump priming plunger until resistance is felt. Try to start engine. If engine does not start repeat step 3.



Figure 20

1. Primer plunger

2. Bleed screw

Note: Note: It may be necessary to bleed the air out of the fuel line between the fuel filter / water separator and the injection pump. To do this, loosen the fitting on the injection pump (Fig. 21) and repeat bleeding procedure.



Figure 21

1. Injection pump fitting

Checking the Interlock System

The purpose of the interlock system is to prevent the engine from cranking or starting unless the traction pedal is in NEUTRAL and the cutting unit engagement switch is DISENGAGED. In addition, the engine will stop when the cutting unit engagement switch is engaged or traction pedal is depressed with operator off the seat, or if the parking brake is engaged.

Caution	
<p>If safety interlock switches are disconnected or damaged, the machine could operate unexpectedly causing personal injury.</p> <ul style="list-style-type: none"> • Do not tamper with the interlock switches. • Check the operation of the interlock switches daily and replace any damaged switches before operating the machine. • Replace switches every two years regardless of whether they are operating properly or not. 	

1. In a wide open area free of debris and bystanders, lower cutting unit to the ground. Stop engine.
2. Move cutting unit engagement switch to DISENGAGED position and remove foot from traction pedal so it is fully released.
3. Rotate the ignition key to START. Engine should start. If engine starts, proceed to step 4. If engine does not start, there may be a malfunction in the interlock system.
4. Rise from the seat and engage the cutting unit engagement switch while the engine is running. The engine should stop within 2 seconds. If engine stops, the

switch is operating correctly; thus, proceed to step 5. If engine does not stop, there is a malfunction in the interlock system.

5. Engage parking brake and depress the traction pedal while engine is running and the cutting unit engagement switch is DISENGAGED. The engine should stop within 2 seconds. If engine stops, the switch is operating correctly; thus, continue operation. If engine does not stop, there is a malfunction in the interlock system.
6. Rise from the seat and depress the traction pedal while engine is running and the cutting unit engagement switch is DISENGAGED. The engine should stop within 2 seconds. If engine stops, the switch is operating correctly; thus, continue operation. If engine does not stop, there is a malfunction in the interlock system.

Operating Characteristics

Familiarization

Before mowing grass, practice operating machine in an open area. Start and stop the engine. Operate in forward and reverse. When you feel familiar with the machine, practice operating around trees and obstacles. Also drive up and down slopes at different speeds.

Warning	
<p>When operating 4-wheel drive machine, always use the seat belt and ROPS together and have seat pivot retaining pin installed.</p>	

Another characteristic to consider is the operation of the brake pedals. The brakes can be used to assist in turning the machine. However, use them carefully, especially on soft or wet grass because the turf may be torn accidentally. Another benefit of the brakes is to maintain traction. For example: When operating on a sidehill, the uphill wheel slips and loses traction. If this situation occurs, depress uphill brake pedal gradually and intermittently until the uphill wheel stops slipping, thus, increasing traction on the downhill wheel.

Warning System

If a warning light comes on during operation, stop the machine immediately and correct the problem before continuing operation. Serious damage could occur if the machine is operated with a malfunction.

Mowing

When you are at the area to be mowed, release cutting unit transport latches.

Move axle shift lever rearward to Mow position and throttle to FAST so engine is running at maximum speed. Lift engagement switch and move forward to engage cutting units.

Curbside Mowing

To reduce the possibility of foreign debris escaping from under the cutter deck while mowing at or near a road or walkway curb, always keep the outside edge of the cutter deck inside the curb. The cutter deck caster wheels should not be guided along the top of the curb; this could cause the cutter deck to hang over the edge of the curb. Never allow the edge of the cutter deck to extend over the edge of the curb while the blades are turning. Always stop mowing and disengage the mower blades when encountering pedestrians or other bystanders.

Note: Cutting deck is equipped with a breakaway system to prevent wing decks from being damaged if a solid object is struck. If a wing deck strikes a solid object and unlatches from center cutting deck, raise and lower wing deck to reset in operating position.

⚠Warning⚠

Cutting deck breakaway system is equipped with a highly compressed spring. If spring removal or repair is required, contact your local authorized Toro Distributor for assistance.

Transport

When mowing is complete, disengage cutting unit and raise it by pulling back on cutting unit lift control levers. Hold levers back until cutting unit is fully raised. **Never raise cutting deck when engaged.** Lock cutting unit in place with transport latches. Move axle shift lever forward to HI position. When driving from one area to another, always shift axle to LO position before encountering a slope. Never shift from HI to LO position while on a slope. Stop machine on a flat surface, engage brakes and shift before climbing the slope. Be careful when driving between objects so you do not accidentally damage the machine or cutting unit.

Use extra care when operating machine on slopes. Drive slowly and avoid sharp turns on slopes to prevent roll overs. The cutting unit must be lowered when going downhill for steering control.

Pushing or Towing Traction Unit

Use only a rigid tow bar if it becomes necessary to tow machine. Make sure axle shift lever is in NEUTRAL position and only tow the machine forward. Use trailer for normal transport. Move axle shift lever to LO position before loading machine on a trailer.

Operating Tips

Mow When Grass is Dry

Mow either in the late morning to avoid the dew, which causes grass clumping or in late afternoon to avoid the damage that can be caused by direct sunlight on the sensitive, freshly mowed grass.

Select the Proper Height-of-Cut Setting to Suit Conditions

Remove approximately one inch or no more than 1/3 of the grass blade when cutting. In exceptionally lush and dense grass you may have to raise your height-of-cut setting another notch.

Mowing in Extreme Conditions

Air is required to cut and recut grass clippings in mower housing, so do not set height-of-cut too low or totally surround housing by uncut grass. Always try to have one side of the mower housing free from uncut grass, allowing air to be drawn into housing. When making an initial cut thru center of uncut area, operate machine slower and back up if mower starts to clog.

Clippings Discharge

Although the deck has rear discharge, some clippings are discharged toward the left side. To avoid discharging undesirable clippings onto pathways, roads, or other non-turf surfaces, mow with the right side of the deck next to the pathway, road, or other non-turf surface.

Mow at Proper Intervals

Under most normal conditions you'll need to mow approximately every 4-5 days. But remember, grass grows at different rates at different times. This means that in order to maintain the same height-of-cut, which is a good practice, you'll need to cut more frequently in early spring; as the grass growth rate slows in mid-summer, cut only every 8-10 days. If you are unable to mow for an extended period due to weather conditions or other reasons, mow first with the height-of-cut at a high level; then mow again 2-3 days later with a lower height setting.

Always Mow with Sharp Blades

A sharp blade cuts cleanly and without tearing or shredding the grass blades like a dull blade. Tearing and shredding causes the grass to turn brown at the edges which impairs growth and increases susceptibility to diseases.

After Operating

To ensure optimum performance, clean underside of mower housings and under belt covers after each use. Use low psi compressed air only. **Do not use water.** If residue is allowed to buildup in mower housings, cutting performance will decrease.

PROTOTYPE

Maintenance

Recommended Maintenance Schedule

Maintenance Service Interval	Maintenance Procedure
After first 10 hours	<ul style="list-style-type: none"> Inspect the PTO and cutting unit belts. Torque the wheel lug nuts. Inspect the engine fan belt.
After first 50 hours	<ul style="list-style-type: none"> Change the engine oil and filter. Check the electric deck clutches adjustment. Check the electric PTO clutch adjustment. Check the engine RPM (at idle and full throttle). Change the hydraulic oil filter.
Every 50 hours	<ul style="list-style-type: none"> Lubricate all grease fittings. Check the cutting unit gear box oil level. Check the rear axle oil level (4wd).
Every 100 hours	<ul style="list-style-type: none"> Change the engine oil and filter. Check the battery level/cable connections.
Every 200 hours	<ul style="list-style-type: none"> Inspect the cooling system hoses. Inspect the PTO and cutting unit belts. Check the electric deck clutches adjustment. Check the electric PTO clutch adjustment. Torque the wheel lug nuts.
Every 400 hours	<ul style="list-style-type: none"> Service the air cleaner.¹ Change the fuel filter. Check the front transaxle oil level. Inspect the fuel lines and connections. Check the engine RPM (at idle and full throttle). Change the rear axle oil (4wd).
Every 800 hours	<ul style="list-style-type: none"> Inspect the engine fan belt. Inspect the engine timing belt.² Drain and clean the fuel tank. Change the hydraulic oil Change the hydraulic oil filter. Change the front transaxle oil Pack the rear axle bearings (2wd). Change the bidirectional clutch fluid (4wd). Check the rear wheel toe-in.
Every 1500 hours or 2 years, whichever occurs first	<ul style="list-style-type: none"> Replace moving hydraulic hoses. Replace safety switches. Flush the cooling system and replace fluid. Replace PTO belts and cutting deck belts.

¹If the indicator shows red

²Replace the timing belt if worn, cracked, or oil soaked. A new timing belt should be installed any time the belt is removed or loosened.

Important Refer to your engine operator's manual for additional maintenance procedures.

Daily Maintenance Checklist

Duplicate this page for routine use.

Maintenance Check Item	For the week of:						
	Mon.	Tues.	Wed.	Thurs.	Fri.	Sat.	Sun.
Check the safety interlock system.							
Check the brake operation.							
Check the engine oil level.							
Check the fuel level.							
Check the cooling system fluid level.							
Drain the water/fuel separator.							
Check the air filter restriction indicator.							
Check the radiator and screen for debris. ¹							
Check for unusual engine noises. ²							
Check for unusual operating noises.							
Check the hydraulic system oil level.							
Check the hydraulic hoses for damage.							
Check for fluid leaks.							
Check the tire pressure.							
Check instrument operation.							
Check the cutting unit safety doors.							
Check the height-of-cut adjustment.							
Clean the deck belt area. ¹							
Check the condition of the blades.							
Lubricate all grease fittings. ³							
Touch up damaged paint.							

¹Use only low pressure compressed air for debris removal. Do **not** use water.

²Check the glow plug and injector nozzles if hard starting, excess smoke, or rough running is noted.

³Immediately **after every** washing, regardless of the interval listed

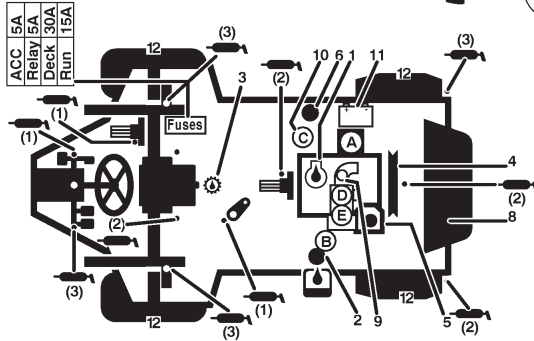
Notation for Areas of Concern

Inspection performed by:		
Item	Date	Information
1		
2		
3		
4		
5		
6		
7		

SERVICE INTERVAL CHARTS

2 Wheel Drive

GM 455-D 2WD QUICK REFERENCE AID



CHECK/SERVICE

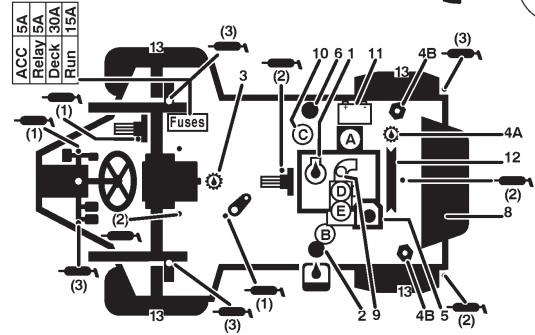
- | | |
|------------------------------|---|
| 1. ENGINE OIL LEVEL/FILL | 7. GREASE POINTS (23) |
| 2. HYDRAULIC OIL LEVEL/FILL | 8. RADIATOR SCREEN |
| 3. FRONT AXLE OIL LEVEL/FILL | 9. AIR FILTER SERVICE INDICATOR |
| 4. FAN BELT | 10. WATER SEPARATOR/FUEL FILTER |
| 5. COOLANT LEVEL/FILL | 11. BATTERY |
| 6. FUEL-DIESEL ONLY | 12. TIRE PRESSURE (1-1.5 BAR/15-20 PSI) |

FLUID SPECIFICATIONS/CHANGE INTERVALS

See operator's manual for initial changes.	FLUID TYPE		CAPACITY		CHANGE INTERVAL		FILTER
	L	USA	FLUID	FILTER	FLUID	FILTER	PART NO.
ENGINE OIL	SAE 15W-40	5	5.3 QT	100 HRS	100 HRS	74-7970 (A)	
HYD. CIRCUIT OIL	Mobil DTE 15M	24.6	6.5 G	800 HRS	800 HRS	86-3010 (B)	
AXLE OIL	SAE 80-90 E.P.			800 HRS			
FUEL FILTER					400 HRS	76-5220 (C)	
PRIMARY AIR FILTER						93-9162 (D)	SEE SERVICE INDICATOR
SAFETY AIR FILTER						93-9163 (E)	SEE OPERATOR'S MANUAL
FUEL	>32°F 0°C	NO. 2-D	53	14 GAL.	Drain and flush, 800 hours		
	<32°F 0°C	NO. 1-D					
COOLANT	93-7213 50/50 PEUGEOT ANTI-FREEZE	13.25	3.5 GAL.	Drain and flush, 1500 hours or 2 years, whichever occurs first.			

4 Wheel Drive

GM 455-D 4WD QUICK REFERENCE AID



CHECK/SERVICE

- | | |
|------------------------------|---|
| 1. ENGINE OIL LEVEL/FILL | 7. GREASE POINTS (23) |
| 2. HYDRAULIC OIL LEVEL/FILL | 8. RADIATOR SCREEN |
| 3. FRONT AXLE OIL LEVEL/FILL | 9. AIR FILTER SERVICE INDICATOR |
| 4. REAR AXLE OIL | 10. WATER SEPARATOR/FUEL FILTER |
| A. FILL | 11. BATTERY |
| B. CHECK (2) | 12. FAN BELT |
| 5. COOLANT LEVEL/FILL | 13. TIRE PRESSURE (1-1.5 BAR/15-20 PSI) |
| 6. FUEL-DIESEL ONLY | |

FLUID SPECIFICATIONS/CHANGE INTERVALS

See operator's manual for initial changes.	FLUID TYPE		CAPACITY		CHANGE INTERVAL		FILTER
	L	USA	FLUID	FILTER	FLUID	FILTER	PART NO.
ENGINE OIL	SAE 15W-40	5	5.3 QT	100 HRS	100 HRS	74-7970 (A)	
HYD. CIRCUIT OIL	Mobil DTE 15M	24.6	6.5 G	800 HRS	800 HRS	86-3010 (B)	
AXLE OIL	SAE 80-90 E.P.			800 HRS			
FUEL FILTER					400 HRS	76-5220 (C)	
PRIMARY AIR FILTER						93-9162 (D)	SEE SERVICE INDICATOR
SAFETY AIR FILTER						93-9163 (E)	SEE OPERATOR'S MANUAL
FUEL	>32°F 0°C	NO. 2-D	53	14 GAL.	Drain and flush, 800 hours		
	<32°F 0°C	NO. 1-D					
COOLANT	93-7213 50/50 PEUGEOT ANTI-FREEZE	13.25	3.5 GAL.	Drain and flush, 1500 hours or 2 years, whichever occurs first.			

PROTOTYPE

Lubricating the Machine

The traction unit and cutting unit have grease fittings that must be lubricated regularly with No. 2 General Purpose Lithium Base Grease. If machine is operated under normal conditions, lubricate all grease fittings after every 25 hours of operation. Lubricate all grease fittings immediately **after every** washing, regardless of interval listed.

The grease fittings that must be lubricated are: lift arm pivot (2), lift cylinder (4), brake arm pivots (2) (Fig. 22); brake pivot (1), brake pivots (2) (Fig. 23); traction pedal pivot (1) (Fig. 24); engine to pump drive shaft (2) (Fig. 25 and 26); traction adjuster (1) (Fig. 27); P.T.O. Bearing (Fig. 28).

2 wheel drive machines only—cylinder end (2), center pivot (1), spindles (2), tie rod assembly (2) (Fig. 29).

4 wheel drive machines only—center pivot (1) (Fig. 30); tie rod assembly (2), king pin bushings (2) **The top fitting on the king pin should only be lubricated annually (2 pumps)**, cylinder ends (2) (Fig. 31).

Cutting deck (2 & 4 wheel drive machines)—blade spindles (7), lift cylinder ball joints (4) and wing deck pivot pins (4) (Fig. 32); castor fork shaft (4) (Fig. 33); PTO to gear box drive shaft assembly (3) (Fig. 34); wing deck ball joints (4) (Fig. 35), and lift arm ball joints (2) (Fig. 36).

1. Wipe grease fittings clean before lubricating.
2. Pump grease into fitting.
3. Wipe up excess grease.

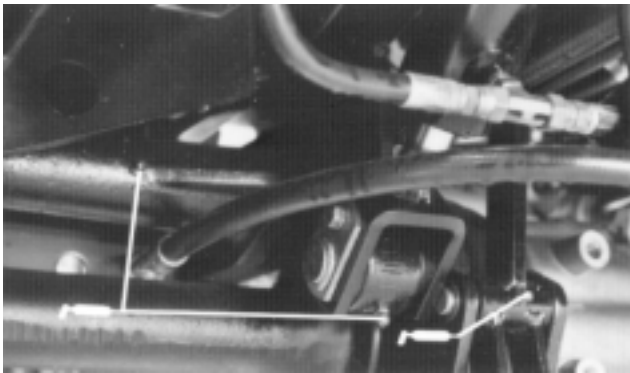


Figure 22

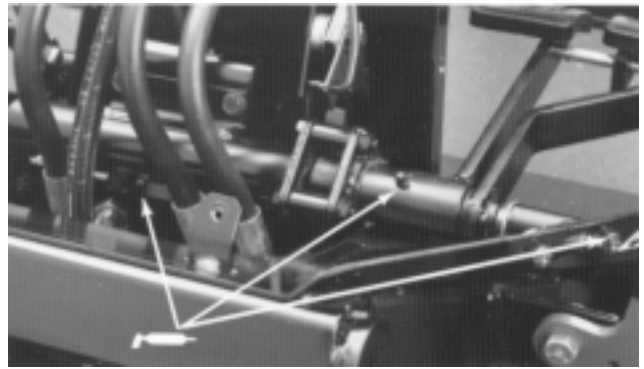


Figure 23

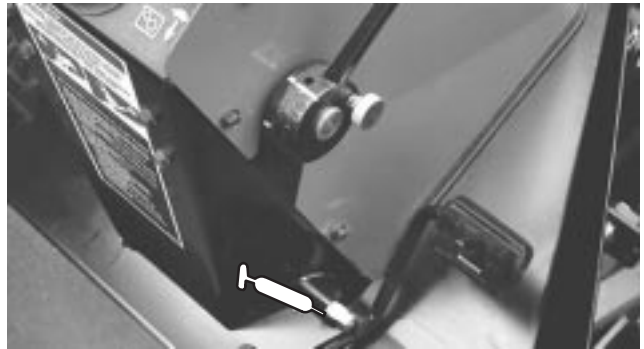


Figure 24

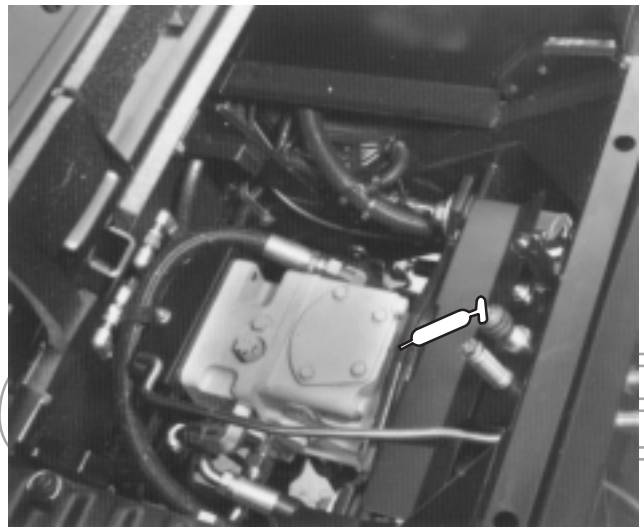


Figure 25

Important Failure to lubricate the hydro pump drive fitting will result in a failure.

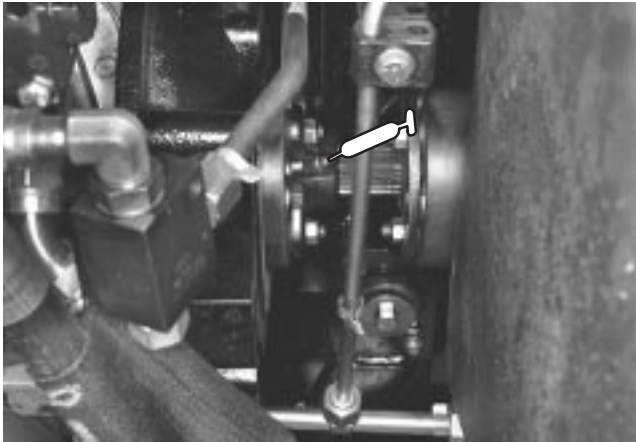


Figure 26

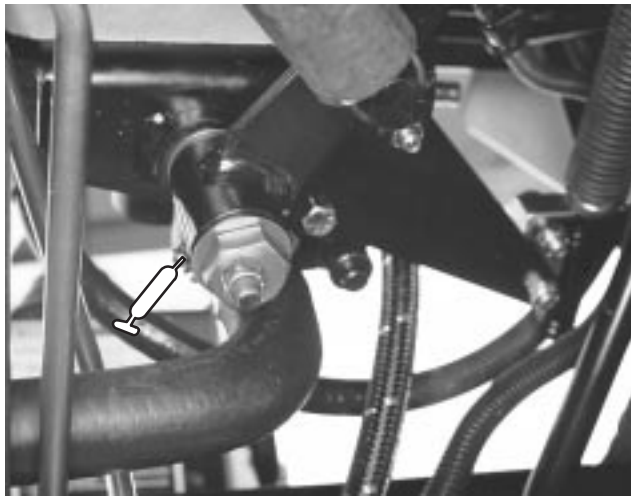


Figure 27

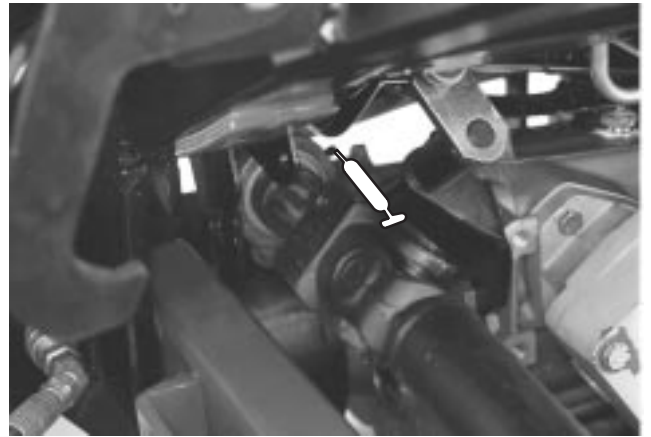


Figure 28

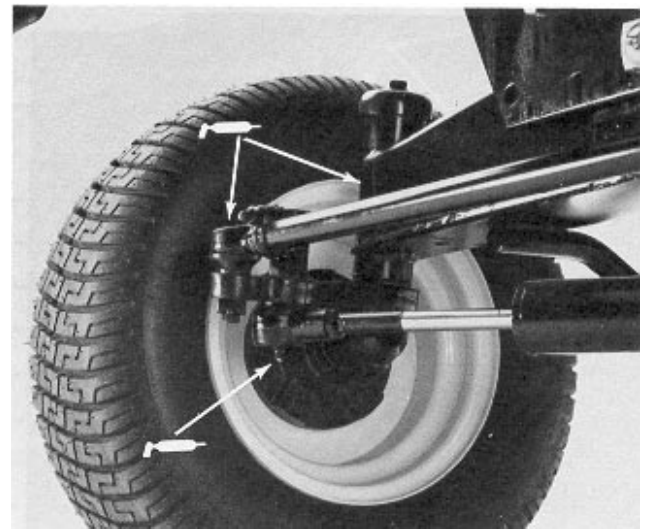


Figure 29

PROTOTYPE

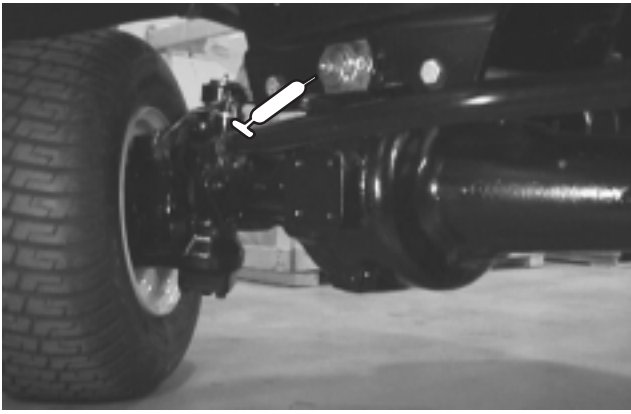


Figure 30

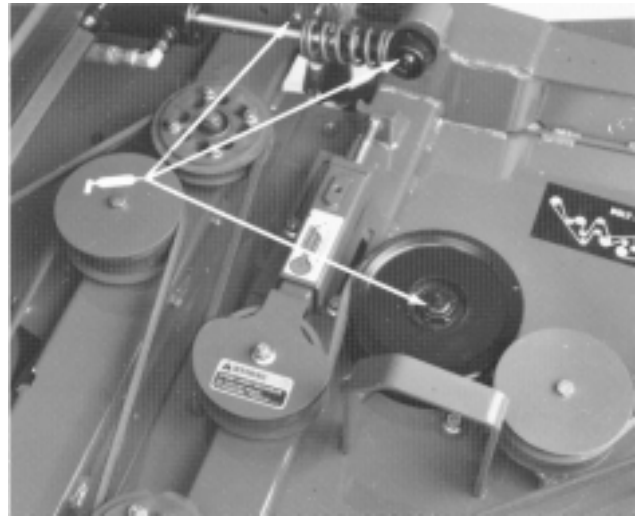


Figure 32



Figure 31

1. Top fitting on king pin



Figure 33

PROTOTYPE

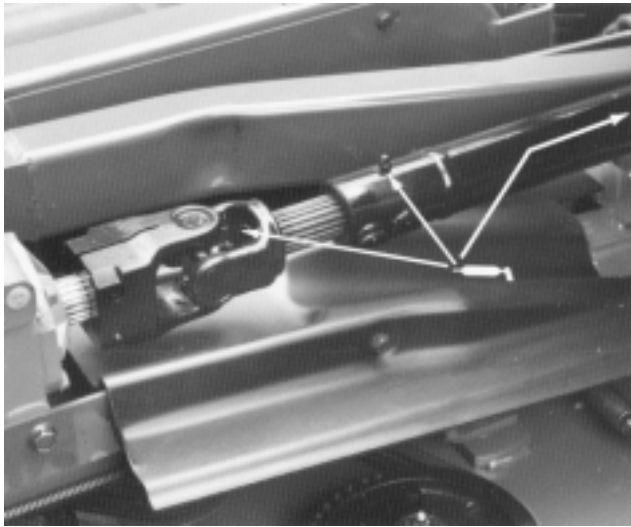


Figure 34

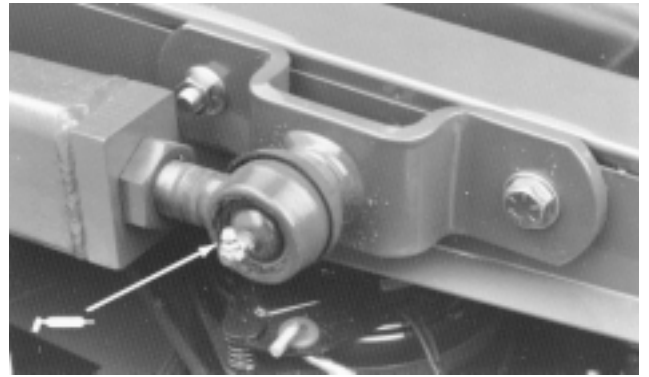


Figure 36

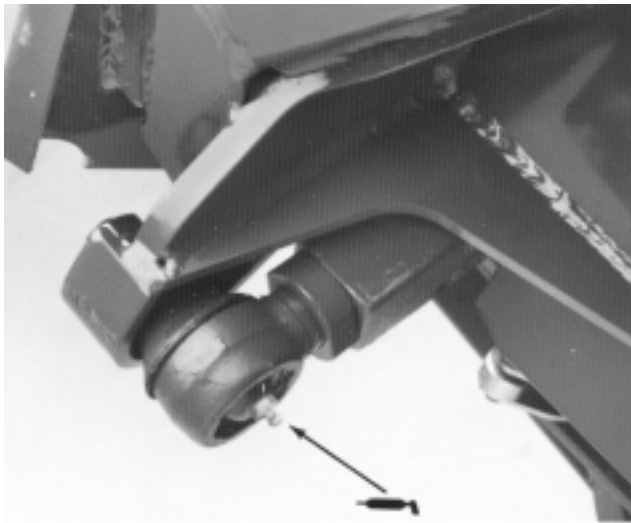


Figure 35

PROTOTYPE



Caution



Before servicing or making adjustments to the machine, stop engine and remove key from the switch.

Servicing the Air Cleaner

Checking the Air Cleaner

1. Check air cleaner body for damage which could possibly cause an air leak. Replace a damaged air cleaner body.
2. Service the air cleaner filters when ever air cleaner indicator (Fig. 37) shows red or every 400 hours (more frequently in extreme dusty or dirty conditions). Do not over service air filter.

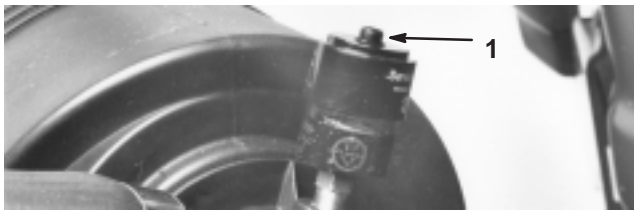


Figure 37

1. Air cleaner indicator

3. Be sure cover is sealing around air cleaner body.

Cleaning the Element

1. Release locking tab securing air cleaner cover to air cleaner body. Separate cover from body (Fig. 38). Clean inside of air cleaner cover.

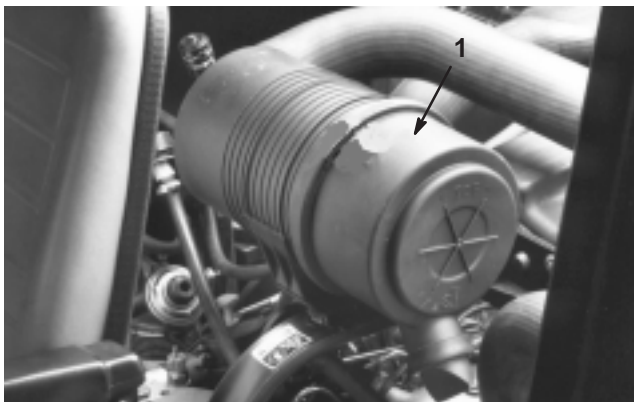


Figure 38

1. Dust cup

2. Gently slide primary filter (Fig. 39) out of air cleaner body to reduce the amount of dust dislodged. Avoid knocking filter against air cleaner body. **Do not remove safety filter.**

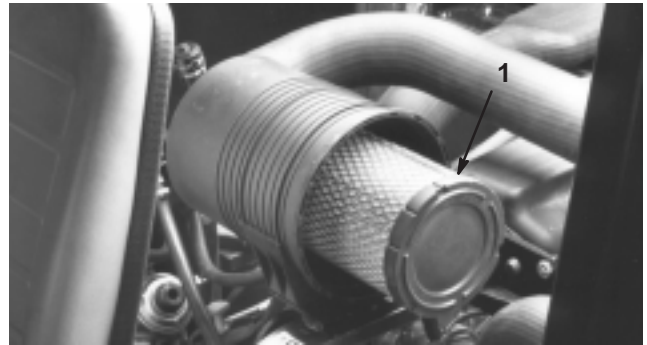


Figure 39

1. Air cleaner primary filter

3. Inspect primary filter and discard if damaged. Do not wash or reuse a damaged filter.

Important Never attempt to clean a safety filter (Located inside primary filter). Replace the safety filter with a new one after every three primary filter services.

4. Use compressed air to clean the filter:
 - A. Blow compressed air from inside to the outside of dry filter element. Do not exceed 100 psi (689 kPa) to prevent damage to the element.
 - B. Keep air hose nozzle at least 2 in. (5 cm) from filter and move nozzle up and down while rotating the filter element. Inspect for holes and tears by looking through the filter toward a bright light.
5. Inspect new filter for shipping damage. Check sealing end of filter. Do not install a damaged filter.
6. Insert new filter properly into air cleaner body. Make sure filter is sealed properly by applying pressure to outer rim of filter when installing. Do not press on flexible center of filter.
7. Reinstall cover and secure locking tab. Make sure cover is positioned with TOP side up.
8. Reset indicator (Fig. 37) if showing red.

ROTOTYPE

Servicing the Engine Oil and Filter

Change oil and filter initially after the first 50 hours of operation, thereafter change oil and filter every 100 hours.

1. Remove drain plug (Fig. 40) and let oil flow into drain pan. When oil stops, install drain plug and new plug seal.



Figure 40

1. Drain plug

2. Remove oil filter (Fig. 41). Apply a light coat of clean oil to the new filter seal before screwing it on. **Do not over-tighten.**

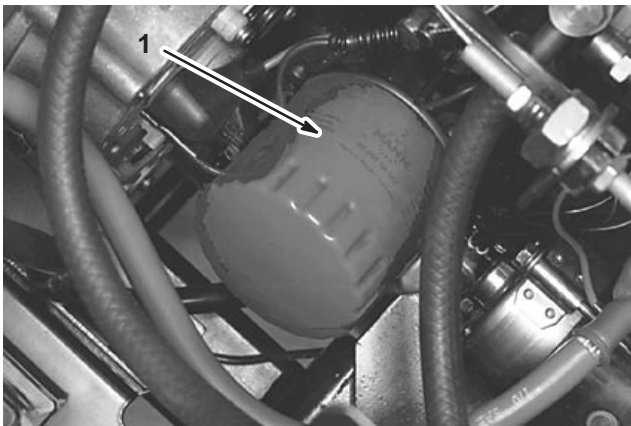


Figure 41

1. Oil filter

3. Add API 15W-40 CF, CF-4, or CG-4 oil to crankcase. Capacity is 5.3 quarts (5 l) with filter.

Servicing the Fuel System

Draining the Fuel Tank

Drain and clean fuel tank every 800 hours of operation or yearly, whichever comes first. Also, drain and clean tank if fuel system becomes contaminated or if machine is to be stored for an extended period. Use clean fuel to flush out the tank.

Danger

Because diesel fuel is highly flammable, use caution when storing or handling it. Do not smoke while filling the fuel tank. Do not fill fuel tank while engine is running, hot, or when machine is in an enclosed area. Always fill fuel tank outside and wipe up any spilled diesel fuel before starting the engine. Store fuel in a clean, safety-approved container and keep cap in place. Use diesel fuel for the engine only; not for any other purpose.

Checking the Fuel Lines and Connections

Check lines and connections every 400 hours or yearly, whichever comes first. Inspect for deterioration, damage, or loose connections.

Draining the Fuel Filter/Water Separator

Drain water or other contaminants from fuel filter/water separator daily.

1. Place a clean container under fuel filter (Fig. 42).

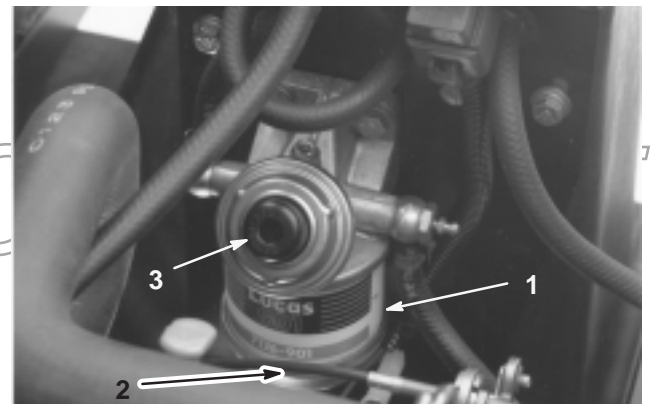


Figure 42

1. Fuel filter/water separator
2. Drain screw
3. Primer plunger

2. Loosen drain thumb screw on side of fuel filter and press primer plunger until only fuel is evident draining into container.

3. Tighten drain screw.

Changing the Fuel Filter

Replace fuel filter if fuel flow becomes restricted, after every 400 hours of operation or annually, whichever comes first.

1. Unscrew bottom filter cap from filter assembly. Remove cap, gaskets, o-ring and filter from assembly. Note position of gaskets and o-ring when disassembling from filter.
2. Install new filter, gaskets, o-ring with filter assembly cap.
3. Prime fuel system; refer to Priming the Fuel System, page 19.

Servicing the Engine Cooling System

Removing Debris

Remove debris from rear screen, oil cooler and radiator daily, clean more frequently in dirty conditions. Use low pressure compressed air.

Important Never spray water onto a hot engine or onto electrical connections as damage may occur.

1. Turn engine off, release hood latch and raise hood. Clean engine area thoroughly of all debris. Close hood.
2. Unscrew knobs and remove rear screen (Fig. 43). Clean screen thoroughly.

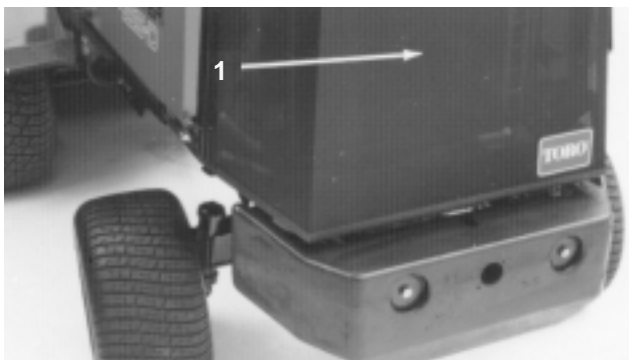


Figure 43

1. Rear screen

3. Unscrew knobs and pivot oil cooler rearward. Clean both sides of oil cooler and radiator area thoroughly with low pressure compressed air. Open hood and blow debris out toward back of machine. Pivot oil cooler back into position and tighten knobs.

Note: Upper portion of fan shroud may be easily unbolted from machine to simplify cleaning.

4. Install rear screen and tighten knobs.

Important Do not use water to clean engine, as damage may occur.

Maintaining the Cooling System

Capacity of the system is 3.5 gallons (13.3 l). Always protect cooling system with a 50/50 solution of water and Peugeot recommended anti-freeze. **Do not use water only in the cooling system.**

After every 100 operating hours, tighten hose connections. Replace any deteriorated hoses.

After every 2 years or 1500 hours, drain and flush the cooling system. Add anti-freeze; refer to Checking the Cooling System, page 11.

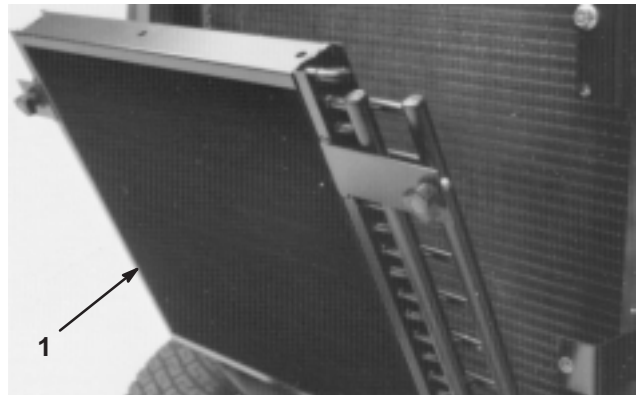


Figure 44

1. Oil cooler

Adjusting the Engine Fan Belt

Check condition and tension of fan belt (Fig. 45) frequently. It is recommended that belt be inspected every 800 hours of operation.

1. Proper tension will allow 1/4 in. (6 mm) deflection on the belt midway between the pulleys, when pressed firmly with thumb.

- If deflection exceeds 1/4 in. (6 mm), loosen alternator mounting bolts. Adjust alternator belt tension by adjusting tension screw (Fig. 45). Check deflection of belt again to assure tension is correct.

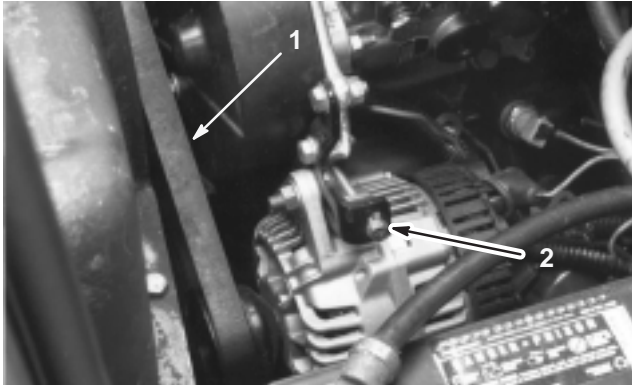


Figure 45

- Fan belt
- Adjusting screw

Checking the Engine Timing Belt

Inspect engine timing belt every 800 hours of operation or yearly.

Remove covers and check for worn, cracked, or oil soaked belt.

Note: A new belt should be installed any time belt is removed or loosened.

Changing the Hydraulic Oil

Change hydraulic oil filter initially after the first 50 hours of operation, thereafter change hydraulic oil and filter after every 800 operating hours. If oil becomes contaminated, contact your local Toro distributor because the system must be flushed. Contaminated oil looks milky or black when compared to clean oil.

- Turn engine off, release hood latch, and raise hood.
- Remove drain plug from rear of reservoir and hydraulic line from front of reservoir (Fig. 46) and let hydraulic oil flow into drain pan. Reinstall and tighten plug and line when hydraulic oil stops draining.
- Fill reservoir with approximately 6.5 gallons (24.6 l) of hydraulic oil; refer to Checking the Hydraulic Circuit Oil, page 12.

Important Use only hydraulic oils specified. Other fluids could cause system damage.

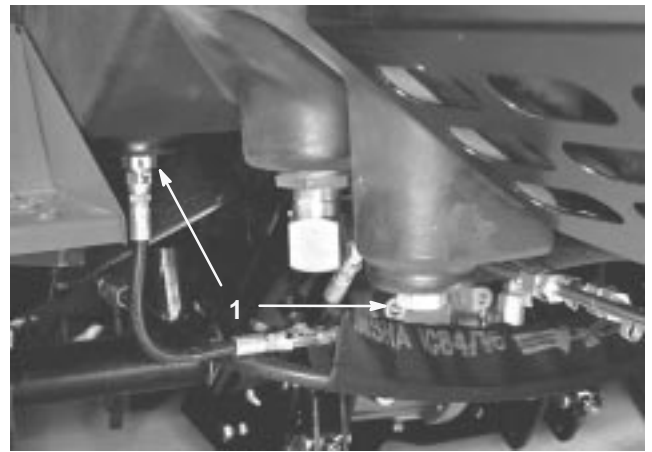


Figure 46

- Hydraulic reservoir drain
- Install reservoir cap, lower hood, and latch. Start engine and use all hydraulic controls to distribute hydraulic oil throughout the system. Also check for leaks. Then stop the engine.
- With wing decks raised, center deck down and oil warm, look into sight gauge (Fig. 47). If hydraulic oil is not visible, add enough oil to raise level to middle (maximum) of sight gauge. To prevent over filling, do not fill if oil is cold. **Do not overfill.**

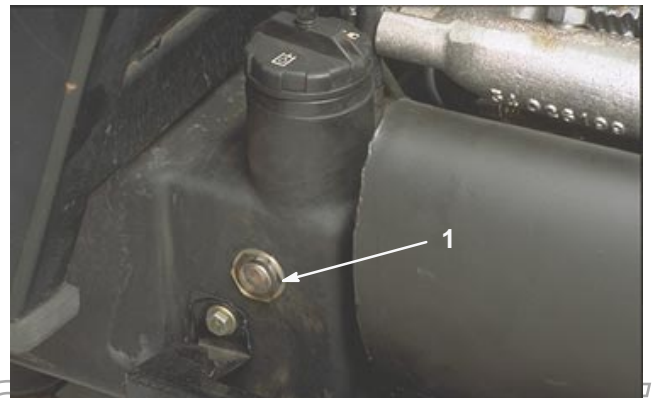


Figure 47

- Sight gauge

Replacing the Hydraulic Filter

Initially, change filter after the first 50 operating hours, thereafter, every 800 operating hours or annually, whichever comes first.

Only the Toro replacement filter (Part No. 86-3010) can be used in the hydraulic system.

Important Use of any other filter may void the warranty on some components.

1. Turn engine off, release hood latch and raise hood.
2. Clean area around filter mounting area (Fig. 48). Place drain pan under filter and remove filter.

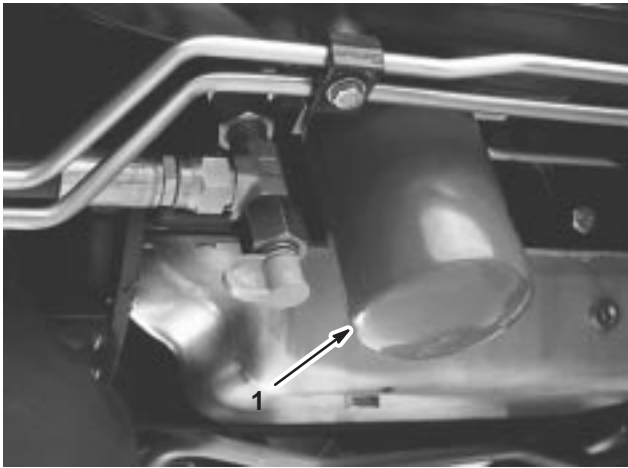


Figure 48

1. Hydraulic filter

3. Lubricate new filter gasket and fill the filter with hydraulic oil.
4. Ensure filter mounting area is clean. Screw filter on until gasket contacts mounting plate. Then tighten filter one half turn.
5. Start engine and let run for about two minutes to purge air from the system. Stop the engine and check oil level. Also check for any leaks.

Checking the Hydraulic Lines and Hoses

Check hydraulic lines and hoses daily for leaks, kinked lines, loose mounting supports, wear, loose fittings, weather deterioration and chemical deterioration. Make all necessary repairs before operating.



Warning



Keep body and hands away from pin hole leaks or nozzles that eject high pressure hydraulic fluid. Use cardboard or paper to find hydraulic leaks. Hydraulic fluid escaping under pressure can penetrate skin and cause injury. Fluid accidentally injected into the skin must be surgically removed within a few hours by a doctor familiar with this form of injury or gangrene may result.

Checking the Hydraulic System Test Ports

The test ports are used to test the hydraulic circuits. Check all pressures when engine is at full speed and hydraulic oil is at normal operating temperature. Contact your local Toro distributor for assistance.

Traction Forward and Reverse (Fig. 49) have a normal relief setting of approximately 6000 psi.

Normal charge pressure is 100–140 psi (689–965 kPa).

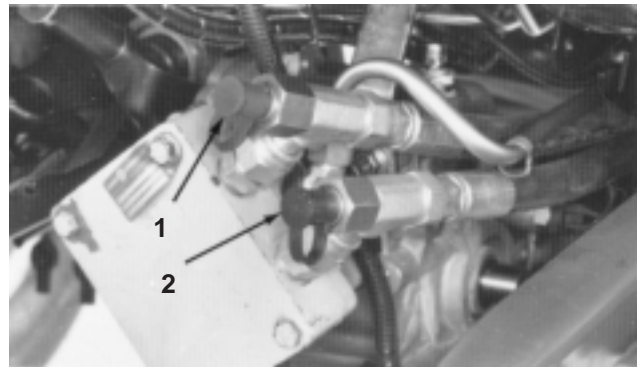


Figure 49

1. Traction forward circuit
2. Traction reverse circuit

Cutting unit Counterbalance normal setting is approximately 600–650 psi (4137–4482 kPa) at high idle and when oil is warm.

Lift circuit relief pressure is approximately 2600–2800 psi (17,926–19,305 kPa) when oil is warm.

Steering Circuit has a normal relief setting of approximately 1200 psi (8274 kPa) at high idle and warm oil.

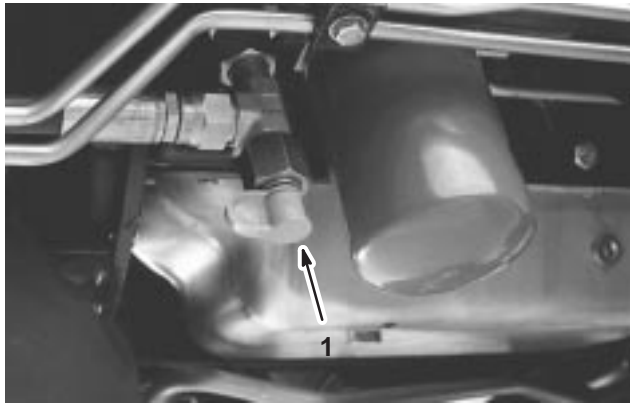


Figure 50

1. Charge pressure

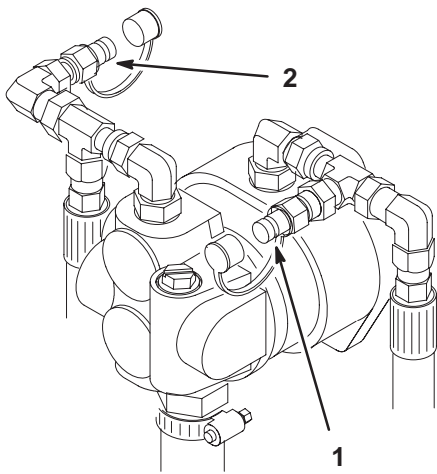


Figure 51

1. Counterbalance/lift circuit 2. Steering circuit

Wing deck cutting unit Counterbalance normal setting is approximately 350–400 psi (2413–2758 kPa) at high idle and when oil is warm (Fig. 52).

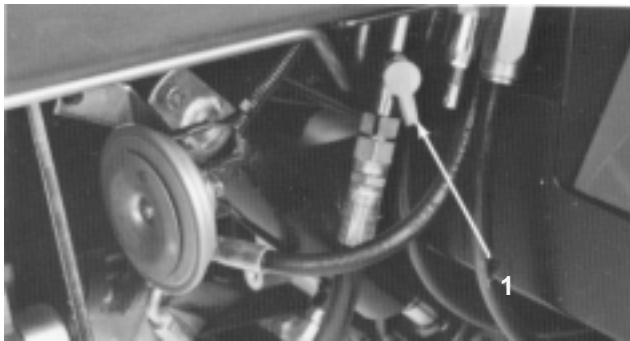


Figure 52

1. Counterbalance (wing decks)

Adjusting the Traction Drive for Neutral

The machine must not creep when traction pedal is released. If it does creep, an adjustment is required.

1. Park machine on a level surface, shut engine off and move shift lever to “HI” position. Depress only the left brake pedal and engage the parking brake.
2. Jack up right side of machine until front tire is off the shop floor. Support machine with jack stands to prevent it from falling accidentally.
3. Under left side of machine, loosen locknut on traction adjustment cam (Fig. 53).

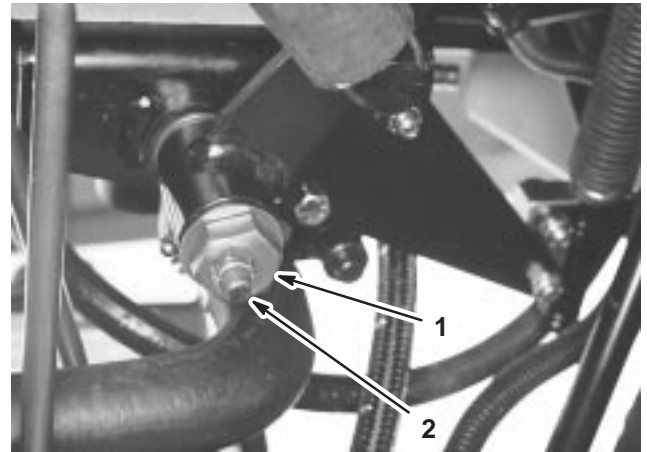


Figure 53

1. Traction adjustment cam 2. Locknut

4. Start engine and rotate cam hex in either direction until wheel ceases rotation.

Warning

Engine must be running so final adjustment of the traction adjustment cam can be performed. To guard against possible personal injury, keep hands, feet, face and other parts of the body away from the muffler, other hot parts of the engine, and other rotating parts.

5. Tighten locknut locking adjustment.
6. Stop the engine and release the right brake. Remove jack stands and lower the machine to the shop floor. Test drive the machine to make sure it does not creep.

Changing the Front Axle Lubricant

After every 800 hours of operation the oil in the front axle must be changed.

1. Position machine on a level surface.
2. Clean area around the drain plug (Fig. 54).

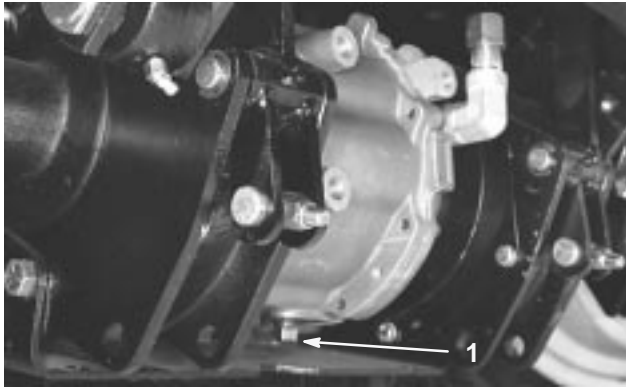


Figure 54

1. Front axle drain plug

3. Remove plug allowing oil to drain into drain pans.
4. After oil is drained, reinstall drain plug into axle.
5. Fill axle with lubricant; refer to Checking the Front Axle Oil Level, page 13.

Changing the Rear Axle Lubricant (Model 30455 Only)

After every 400 hours of operation the oil in the rear axle must be changed.

1. Position machine on a level surface.
2. Clean area around the 3 drain plugs, one on each end and one in the center (Fig. 55).
3. Remove plugs allowing oil to drain into drain pans.
4. After oil is drained, **apply thread sealing compound on drain plug threads** and reinstall in axle.
5. Fill axle with lubricant; refer to Checking the Rear Axle Lubricant, page 13.

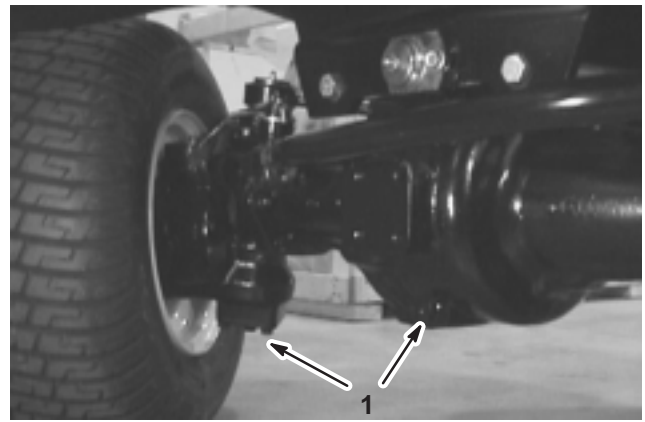


Figure 55

1. Drain plugs (3)

Changing the Bidirectional Clutch Lubricant (Model 30455 Only)

After every 800 hours of operation the oil in the clutch housing must be changed.

1. Position the machine on a level surface.
2. Remove drain plug from clutch housing (Fig. 56) allowing fluid to drain into drain pan.

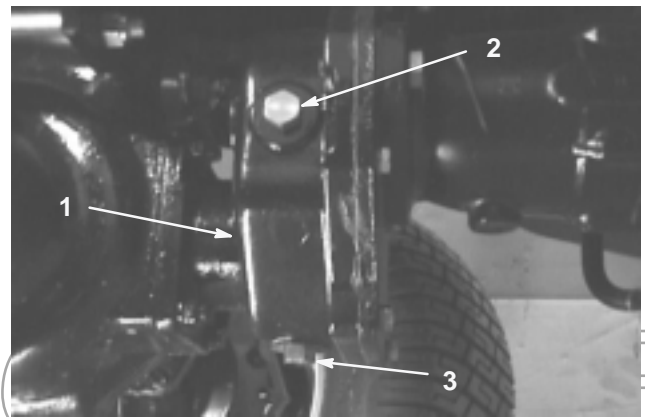


Figure 56

1. Clutch housing
2. Check/fill plug
3. Drain plug

3. After fluid is drained, reinstall drain plug.
4. Remove check/fill plug and add 8 oz. of Mobil DTE 15 M anti-wear hydraulic fluid.

Note: Do not use gear lube in clutch housing.

5. Install check/fill plug.

Adjusting Rear Wheel Toe-In

After every 800 operating hours or annually, check rear wheel toe-in.

Measure center-to-center distance (at axle height) at front and rear of steering tires. Front and rear measurements must be within 1/8 in. (3 mm) of each other.

Adjusting 2-Wheel Drive Models

1. Loosen clamps at both ends of tie rods (Fig. 57).
2. Rotate tie rod to move front of tire inward or outward.
3. Tighten tie rod clamps when adjustment is correct.



Figure 57

1. Tie rod clamps

Adjusting 4-Wheel Drive Models

1. Remove cotter pin and nut securing one of the tie rod ball joints to steering arm. Remove ball joint from steering arm.
2. Loosen clamp securing ball joint to tie rod (Fig. 58).
3. Rotate ball joint one revolution and re-install to steering arm.
4. Inspect toe-in and repeat adjustment as required.
5. Tighten clamp securing ball joint to tie rod.
6. Torque ball joint nut to 40 ft.-lb. (55 N·m) and install cotter pin.

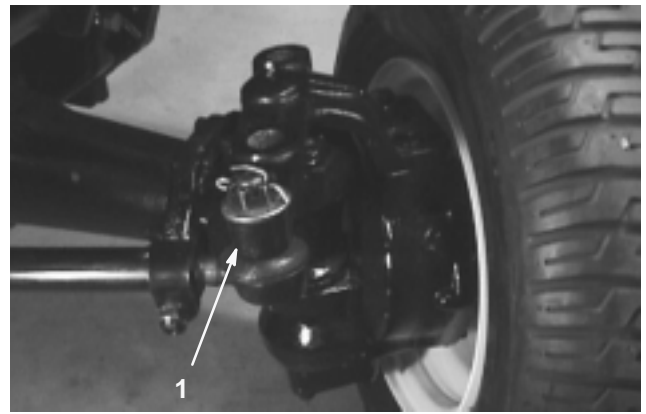


Figure 58

1. Tie rod clamps

Adjusting the Service Brakes

Adjust the service brakes when there is more than 1-1/2 in. (3.8 cm) of “free travel” of the brake pedal, or when the brakes do not work effectively. Free travel is the distance the brake pedal moves before braking resistance is felt.

To reduce free travel of brake pedals, tighten nut on brake rod adjuster (Fig. 59), 1/2 turn at a time, until desired “free play” in pedal is achieved.

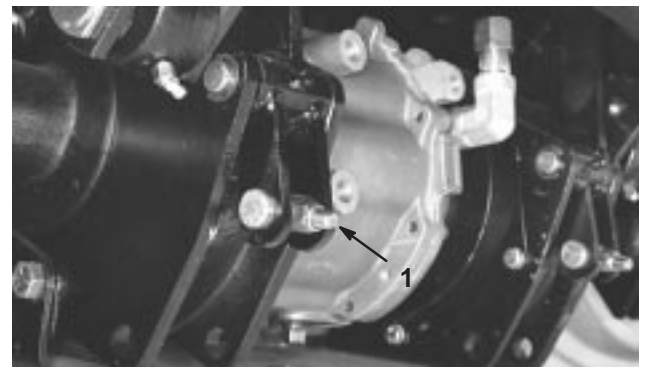


Figure 59

1. Brake rod adjuster

Adjusting the PTO Belt

Re-tension PTO belt initially after the first 10 hours of operation; thereafter, check condition and tension of belt every 200 hours. It is recommended that belt be replaced after every 1500 hours of operation.

Important Mis-adjusted clutches will slip and generate excessive heat (blueing) resulting in failure.

1. Remove 2 screws securing PTO belt cover to adapter plate (Fig. 60) and 1 screw securing belt cover to tab on spring anchor. Remove cover.

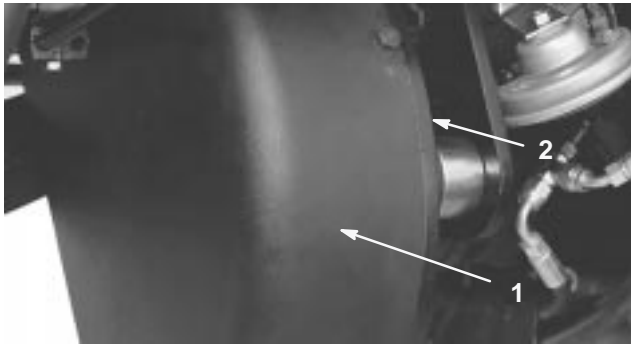


Figure 60

1. PTO belt cover
2. Adapter plate

2. Loosen 3 flange screws and flange nuts securing adapter plate to clutch plate (Fig. 61).
3. Insert end of 1/2 in. (13 mm) drive, 20 in. (51 cm) long, torque wrench into square hole in clutch plate (Fig. 61). With wrench handle parallel to ground, pull wrench upward until 180 ft.-lb. (246 N·m) of torque is applied to tension belt.
4. Tighten flange screws and flange nuts locking adjustment.
5. Reinstall PTO belt cover with screws previously removed.

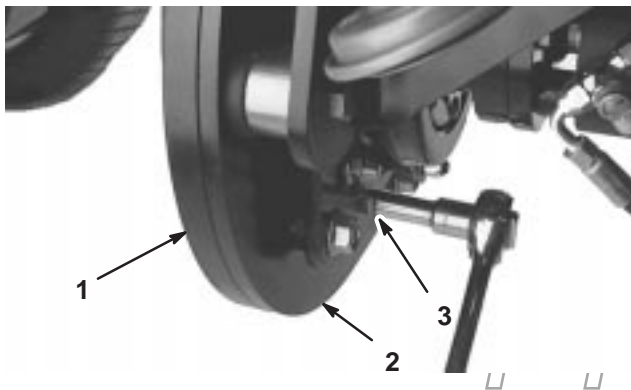


Figure 61

1. PTO belt
2. Adapter plate
3. Square hole

Adjusting the Clutch

The PTO clutch is adjustable to ensure proper engagement and blade braking. Check clutch adjustment initially after the first 10 hours of operation, thereafter, check every 200 hours.

1. To adjust clutch, tighten or loosen locknuts on flange studs.
2. Check adjustment by inserting feeler gauge through slots next to flange studs (Fig. 62).
3. The proper disengaged clearance between the clutch plates is 0.011–0.021 inches (0.28–0.53 mm). It will be necessary to check this clearance at each of the three slots to ensure the plates are parallel to each other.

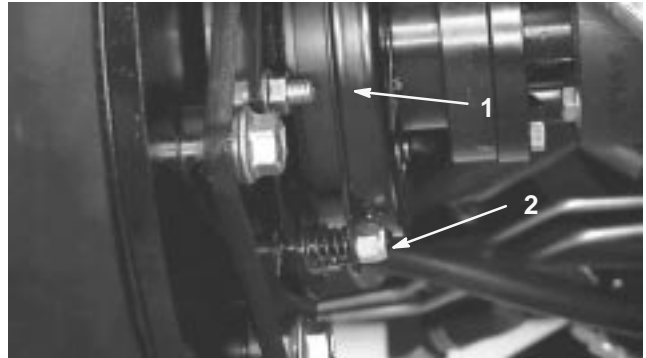


Figure 62

1. Clutch
2. Flange studs

Servicing the Battery



Warning



Battery posts, terminals, and related accessories contain lead and lead compounds, chemicals known to the State of California to cause cancer and reproductive harm. Wash hands after handling.

Important Before welding on the machine, disconnect ground cable from the battery to prevent damage to the electrical system.

Note: Check battery condition weekly or after every 100 hours of operation. Keep terminals and entire battery case clean because a dirty battery will discharge slowly. To clean the battery, wash the entire case with solution of baking soda and water. Rinse with clear water. Coat the battery posts and cable connectors with Grafo 112X (skin-over) grease (Toro Part No. 505-47) or petroleum jelly to prevent corrosion.

Servicing the Fuses

There are 4 fuses in the machines electrical system. They are located inside control panel (Fig. 63).

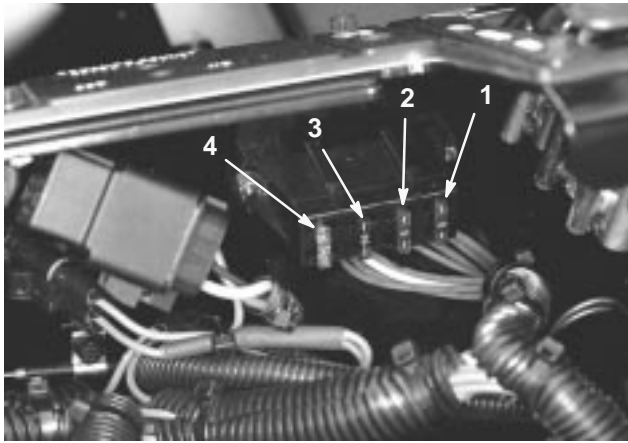


Figure 63

- | | |
|---------------|--------------|
| 1. ACC fuse | 3. Deck fuse |
| 2. Relay fuse | 4. Run fuse |

ACC	5 amp.
Relay	5 amp.
Deck	30 amp.
Run	15 amp.

Pivoting (Tilting) the Cutting Unit

Note: Although not required for normal maintenance procedures, the cutting unit may be pivoted (tilted) to a upright position. Should you desire to tilt the cutting unit, use the following procedure:

Pivoting the Cutting Unit Upright

1. Drive machine onto ramps to raise front of machine.
2. Lower center and wing cutting units to the ground; then raise center cutting unit slightly, until rear deck straps hang freely on lift arm brackets. Stop engine after cutting unit is raised. Set parking brake.
3. Disconnect the 3 hydraulic lines (quick couplers) and wire harness at rear of deck (Fig. 64).

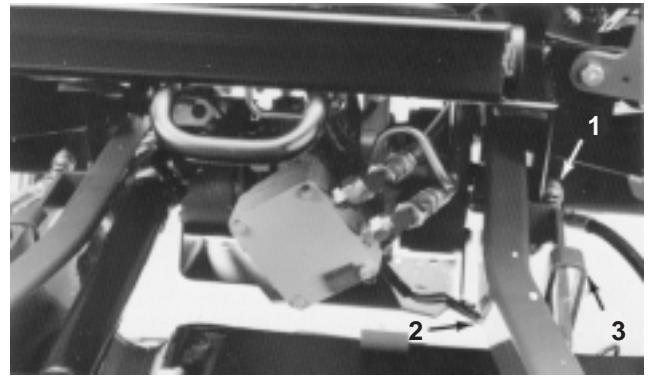


Figure 64

- | | |
|----------------------------|---------------------|
| 1. Hydraulic line couplers | 3. Rear deck straps |
| 2. Wire harness | |

4. Remove hairpin cotters and height-of-cut pins securing rear deck straps to height-of-cut brackets on deck (Fig. 64).
5. Start engine and lower center cutting unit to the ground. Stop engine after cutting unit is lowered.
6. Remove socket head screws securing drive shaft yoke gear box input shaft. Slide yoke off shaft (Fig. 65).

Danger

Do not start the engine and engage the PTO switch when PTO shaft is not connected to gear box on cutting unit. If engine is started and PTO shaft is allowed to rotate, serious injury could result.



Figure 65

- | | |
|---------------------|-------------------------|
| 1. Drive shaft yoke | 2. Gear box input shaft |
|---------------------|-------------------------|

7. Sit on seat, start the engine and slowly raise the center cutting unit allowing cutting unit to pivot upright. Stop the engine and remove the key from the ignition switch.

Pivoting the Cutting Unit Down into the Operating Position

1. Sit on seat, start the engine, and slowly lower the cutting units to the ground; then raise center cutting unit slightly, so rear deck straps can be mounted to lift arm brackets. Stop engine after cutting unit is raised. Set parking brake.
2. Line up holes in yoke and input shaft of gear box. Slide yoke onto shaft and secure together with socket head screws. Torque screws to 20–25 ft.-lb. (27–34 N·m).
3. Secure rear deck straps to height-of-cut brackets on deck with hair pin cotters and height-of-cut pins. Start engine and lower center cutting unit completely to floor. Ensure all lift levers are in the float position and stop engine.
4. Connect wire harness and the 3 hydraulic lines couplers at rear of deck.

Removing the Cutting Unit

1. Lower center and wing cutting units to the ground; then raise center cutting unit slightly, until rear deck straps hang freely on lift arm brackets. Stop engine after cutting unit is raised. Set parking brake.
2. Remove hairpin cotters and height-of-cut pins securing rear deck straps to height-of-cut brackets on deck. Start engine and lower center cutting unit completely to floor. Stop engine after cutting unit is lowered.
3. Disconnect the 3 hydraulic lines (quick couplers) and wire harness at rear of deck.
4. Remove socket head screws securing drive shaft yoke to gear box input shaft. Slide yoke off shaft.
5. Remove the 4 capscrews, flat washers, and flange nuts securing ball joint mounts to castor arms on cutting unit (Fig. 66).

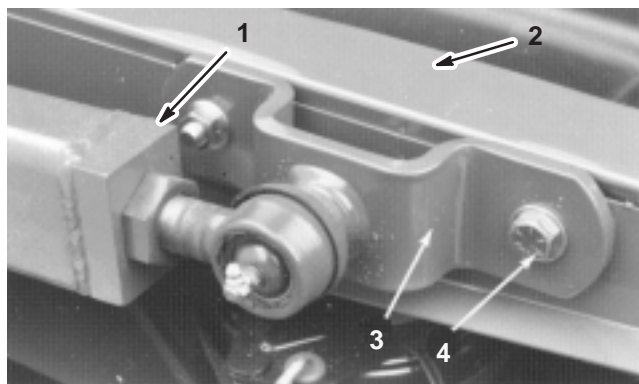


Figure 66

1. Push arm
2. Castor arm
3. Ball joint mount
4. Capscrews and washers

6. Roll the cutting unit away from the traction unit.

Alternate Method

1. Lower center and wing cutting units to the ground, set parking brake and stop engine.
2. Disconnect the 3 hydraulic lines (quick couplers) and wire harness at rear of deck.
3. Remove socket head screws securing drive shaft yoke to gear box input shaft. Slide yoke off shaft.
4. Remove the 2 capscrews and locknuts securing cutting unit carrier frames to traction unit lift arms (Fig. 67).

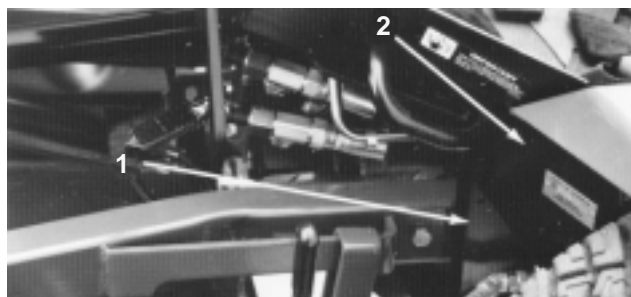


Figure 67

1. Cutting unit carrier frames
2. Traction unit lift arms

5. Slowly back traction unit away from cutting unit.

Installing the Cutting Unit

1. With cutting unit on a level surface, move traction unit into position, aligning drive shaft yoke with gear box input shaft and lift arm ball joints with mounting holes in castor arms. Shut engine off.
2. Secure ball joint mounts to castor arms with capscrews, flatwashers and flangenuts. Tighten capscrews and flangenuts to 100–110 ft.-lb. (136–150 N·m).
3. Line up holes in yoke and input shaft of gear box. Slide yoke onto shaft and secure together with socket head screws. Torque screws to 20–25 ft.-lb. (27–34 N·m).
4. Start engine, raise center cutting unit slightly, so rear deck straps can be mounted on lift arm brackets. Stop engine after cutting unit is raised.
5. Secure rear deck straps to height-of-cut brackets on deck with hairpin cotters and height-of-cut pins. Start engine and lower center cutting unit completely to floor. Ensure all lift levers are in the float position and stop engine.
6. Connect wire harness and the 3 hydraulic lines couplers at rear of deck.

Adjusting the Safety Door

On each side of the center deck is a safety door that opens and closes as the wing decks are lowered and raised (Fig. 68). The doors open to provide overlap of the cutting blades when the wing units are down. The doors close to provide safety and protection when the wing units are raised. Check to make sure the forward, lower edge of door (Fig. 68) is even or 1/4 in. (6 mm) higher than lower edge of door guide when wing decks are in the fully raised, transport position. If an adjustment to the door is required, proceed as follows:

1. Loosen jam nuts securing ball joints to threaded rod (Fig. 68).

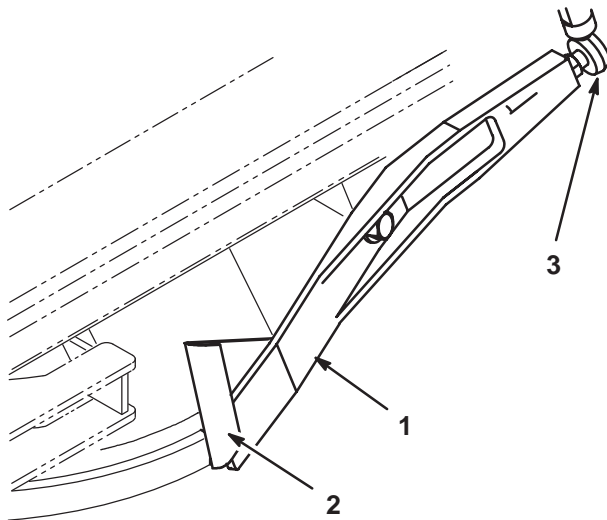


Figure 68

1. Safety door
2. Door guide
3. Ball joint

2. Rotate threaded rod to raise or lower edge of door until is even or 1/4 in. (6 mm) higher than lower edge of door guide when wing decks are in the fully raised, transport position.
3. Tighten jam nuts to lock adjustment.



Caution



Check for proper operation of the safety doors each time the deck is cleaned and repair as needed.

Adjusting the Blade

To ensure proper operation of the cutting unit, there must be 0.25 ± 0.12 in. (6 ± 3 mm) clearance between the tips of the wing and center cutting unit blades (Fig. 69).

1. Raise cutting unit so blades are visible and block center deck section so it cannot fall accidentally. Wing decks must be horizontal to center cutting unit.
2. Rotate a center and adjoining wing blade so there blade tips are aligned. Measure distance between blade tips, distance should be approximately 0.25 ± 0.12 in. (6 ± 3 mm) (Fig. 69).

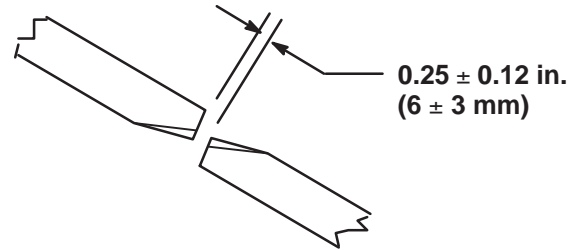


Figure 69

3. To adjust distance, locate adjuster bolt on rear outside corner of center cutting unit (Fig. 70). Loosen jam nut on adjuster bolt. Loosen or tighten adjuster bolts until 0.25 ± 0.12 in. (6 ± 3 mm) clearance is attained, then tighten jam nut.
4. Repeat procedure on opposite side of cutting deck.

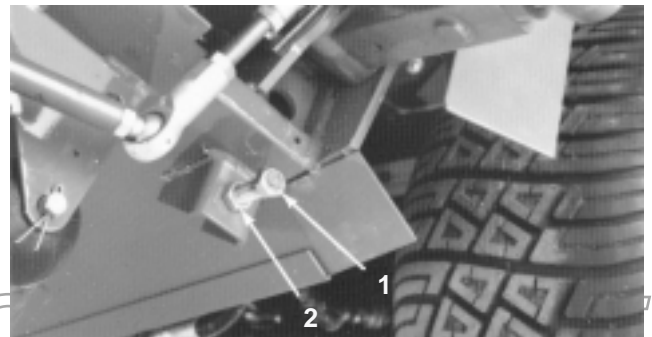


Figure 70

1. Adjuster bolt
2. Jam nut

Important Blade plane is adjusted at the factory and should not need further adjustment.

Adjusting the Belt Tension

Each cutting unit drive belt is individually tensioned by a self tensioning spring loaded idler. When the idlers are properly adjusted, the black plastic sleeve should be 0.12 to 0.25 in. (3 to 6 mm) from the edge of the idler support. When 0.50 in. (13 mm) of the plastic sleeve is exposed, an adjustment is required. To assure proper operation of the cutting unit, check adjustment of spring loaded idler after first 10 hours of operation and every time maintenance on the belt is required.

1. Lower cutting unit to the shop floor. Remove belt covers from center and wing cutting units.
2. Measure the length of the exposed black plastic sleeve (Fig. 71). If distance is 0.12–0.25 in. (3–6 mm), spring loaded idler is properly adjusted and belt tension is correct. If dimension is not correct, proceed to next step.

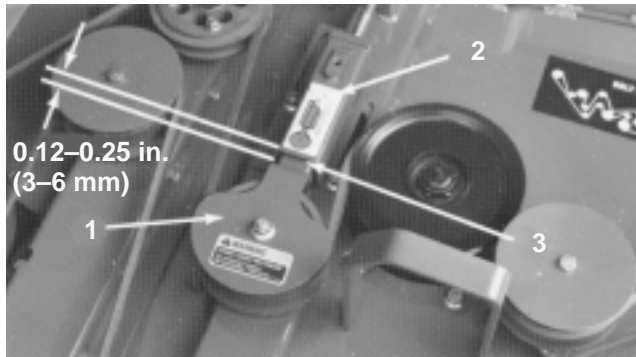


Figure 71

1. Spring loaded idler
 2. Idler support
 3. Black, plastic sleeve
-
3. Loosen the 2 flange head nuts securing idler adjustor tube to top of cutting deck.
 4. Loosen jam nut on adjusting screw and rotate screw until the black plastic sleeve is flush (even) with the edge of idler support.
 5. When distance is attained, tighten jam nut on adjusting screw and the 2 flange head nuts securing idler adjustor tube to top of cutting deck.
 6. Check adjustment on other adjustors and repeat procedure if required.

Replacing the Drive Belts

The blade drive belts are very durable, but after many hours of use, the belts will show signs of wear. Signs of a worn belt are: squealing when belt is rotating, blades slipping when cutting grass, frayed edges, burn marks and cracks. Replace a belt if any of these conditions are evident.

Removing the Wing Deck Belts



Warning



Idler pulley spring loaded, use caution when relieving spring tension on wing belt.

1. Lower cutting unit to the shop floor. Remove belt covers from center and wing cutting units.
2. To relieve tension on wing belt, pull back on idler pulley until holes in idler adjustor tube and tube sleeve are aligned (Fig. 72). Thread a 5/16 in. capscrew into holes retaining parts.

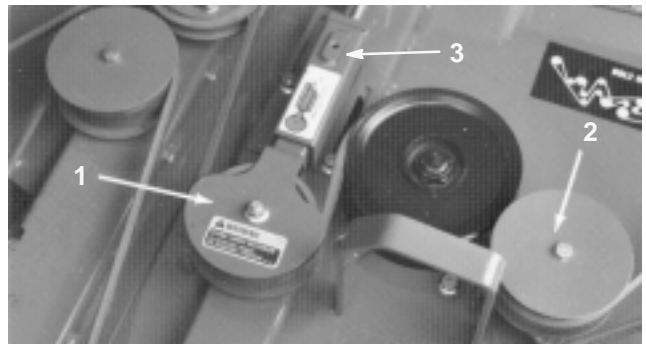


Figure 72

1. Spring loaded idler pulley
 2. Stationary idler pulley
 3. Aligned holes
-
3. Remove hair pin cotter securing clutch rod to front of cutting deck and disconnect rod from deck. Unplug clutch wire from harness (Fig. 73).
 4. To ease wing belt removal, loosen or remove stationary idler pulley next to wing's inner spindle pulley.

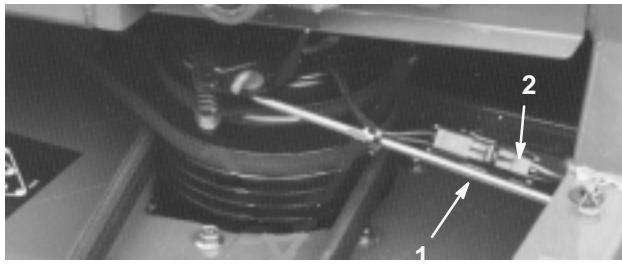


Figure 73

1. Clutch rod 2. Clutch wire

Removing the Center Deck Belt

Warning

Idler pulley spring loaded, use caution when relieving spring tension on center belt.

1. Lower cutting unit to the shop floor. Remove belt covers from center and wing cutting units.
2. To relieve tension on center deck belt, pull back on idler pulley until holes in idler adjustor tube and tube sleeve are aligned. Thread a 5/16 capscrew into holes retaining parts.
3. Remove the wing deck belts; refer to Removing the Wing Deck Belts, page 42.
4. Remove the 2 flange head screws securing drive shaft cover to gear box support (Fig. 74) and remove cover.
5. Remove capscrews and nuts securing front of gear box support to deck channels and loosen capscrews securing rear of gear box support to deck channels (Fig. 74).

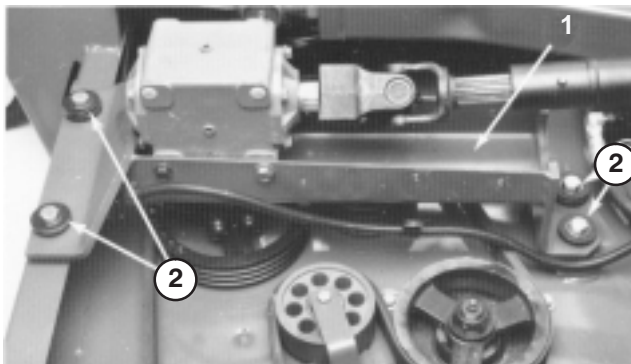


Figure 74

1. Gear box support 2. Capscrews and nuts

6. Raise front of gear box support and remove old belt from around gear box pulley and remaining pulleys.
7. Route new belt around appropriate pulleys as shown in Figure 75.

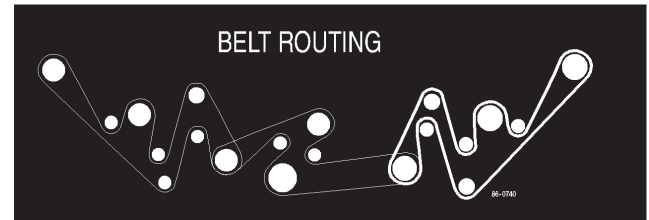


Figure 75

8. Remount gear box support to deck channels with capscrews and nuts previously removed.
9. Reinstall drive shaft cover to gear box support with the 4 flange head screws previously removed.
10. Remount clutch rod to deck with hairpin cotter and plug clutch connector into harness.
11. While holding idler pulley adjustor in position, carefully remove capscrew securing idler adjustor tube to tube sleeve. Allow idler pulley to release, tensioning belt.
12. Check idler pulley adjustment; refer to Adjusting the Belt Tension, page 42.
13. Reinstall belt covers.

Adjusting the Deck Clutch

The deck clutches are adjustable to ensure proper engagement and blade braking. Check clutch adjustment after the first 50 hours of operation, thereafter; every 200 hours. Adjust if required.

Important Mis-adjusted clutches will slip and generate excessive heat (blueing) resulting in failure.

1. To adjust clutch, tighten or loosen locknuts on flange studs (Fig. 76).
2. Check adjustment by inserting feeler gauge through slots next to flange studs.
3. The proper disengaged clearance between the clutch plates is 0.011–0.021 inches (0.28–0.53 mm). It will be necessary to check this clearance at each of the three slots to ensure the plates are parallel to each other.

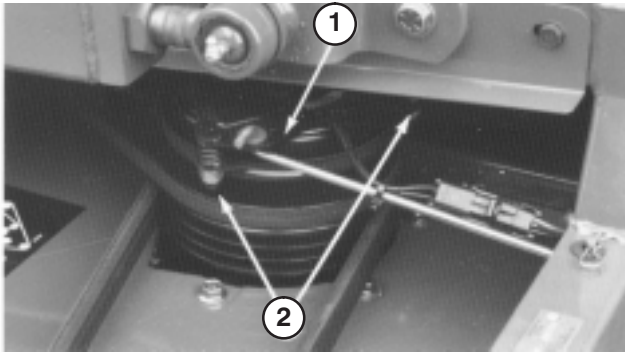


Figure 76

- 1. Clutch
- 2. Flange studs

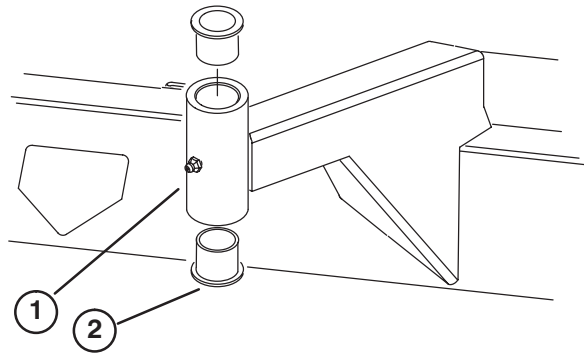


Figure 77

- 1. Front castor arm tube
- 2. Bushings

Servicing the Front Bushings in the Castor Arms

The castor arms have bushings pressed into the top and bottom of the tube and after many hours of operation, the bushings will wear. To check the bushings, move castor fork back and forth and from side to side. If castor spindle is loose inside the bushings, bushings are worn and must be replaced.

1. Raise cutting unit so wheels are off floor and block it so it cannot fall accidentally.
2. Remove HOC cap and spacer(s) from top of castor spindle.
3. Pull castor spindle out of mounting tube. Allow spacer(s) to remain on bottom of spindle.
4. Insert pin punch into top or bottom of mounting tube and drive bushing out of tube (Fig. 77). Also drive other bushing out of tube. Clean inside of tubes to remove dirt.
5. Apply grease to inside and outside of new bushings. Using a hammer and flat plate, drive bushings into mounting tube.
6. Inspect castor spindle for wear and replace it if damaged.
7. Push castor spindle through bushings and mounting tube. Slide spacer(s) onto spindle. Install HOC cap on castor spindle to retain all parts in place.

Servicing Castor Wheels and Bearings

1. Remove locknut from capscrew holding castor wheel assembly between front castor fork (Fig. 78) or rear castor pivot arm (Fig. 79) Grasp castor wheel and slide capscrew out of fork or pivot arm.

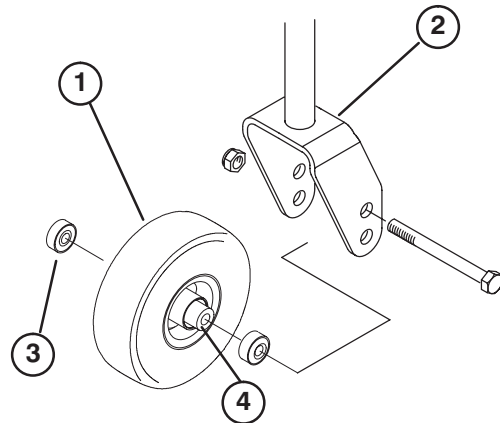


Figure 78

- 1. Castor wheel
 - 2. Front castor fork
 - 3. Bearing (2)
 - 4. Bearing spacer
2. Remove bearing from wheel hub and allow bearing spacer to fall out. Remove bearing from opposite side of wheel hub.
 3. Check the bearings, spacer and inside of wheel hub for wear. Replace defective parts.

- To assemble the castor wheel, push bearing into wheel hub. Slide bearing spacer into wheel hub. Push other bearing into open end of wheel hub to captivate the bearing spacer inside the wheel hub.
- Install castor wheel assembly between castor fork and secure in place with capscrew and locknut.

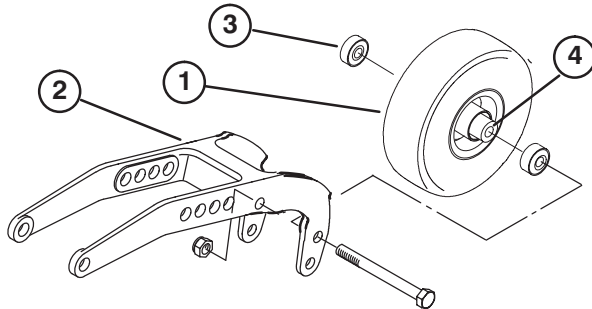


Figure 79

- | | |
|--------------------------|-------------------|
| 1. Castor wheel | 3. Bearing (2) |
| 2. Rear castor pivot arm | 4. Bearing spacer |

Removing and Installing the Blade

The blade must be replaced if a solid object is hit, the blade is out of balance or if the blade is bent. Always use genuine Toro replacement blades to be sure of safety and optimum performance. Never use replacement blades made by other manufacturers because they could be dangerous.

Warning

Do not try to straighten a blade that is bent, and never weld a broken or cracked blade. Always use a new blade to assure continued safety certification of the product.

- Raise cutting unit to highest position, shut the engine off and engage the parking brake. Engage transport latches to prevent cutting unit from falling accidentally.
- Grasp end of blade using a rag or thickly padded glove. Remove blade bolt, anti-scalp cup, and blade from spindle shaft.
- Install blade, sail facing toward cutting unit, with anti-scalp cup and blade bolt. Tighten blade bolt to 85–110 ft.-lb. (116–150 N·m).

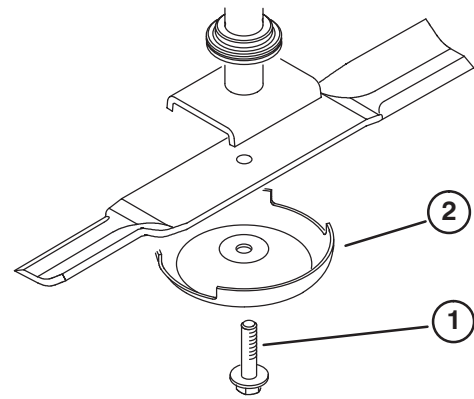


Figure 80

- | | |
|---------------|-------------------|
| 1. Blade bolt | 2. Anti-scalp cup |
|---------------|-------------------|

Inspecting and Sharpening the Blade

- Raise cutting unit to highest position, shut the engine off and engage the parking brake. Engage transport latches to prevent cutting unit from falling accidentally.
- Examine cutting ends of the blade carefully, especially where the flat and curved parts of the blade meet (Fig. 81-A). Since sand and abrasive material can wear away the metal that connects the flat and curved parts of the blade, check the blade before using the machine. If wear is noticed (Fig. 81-B), replace the blade; refer to Removing and Installing the Blade, page 45.

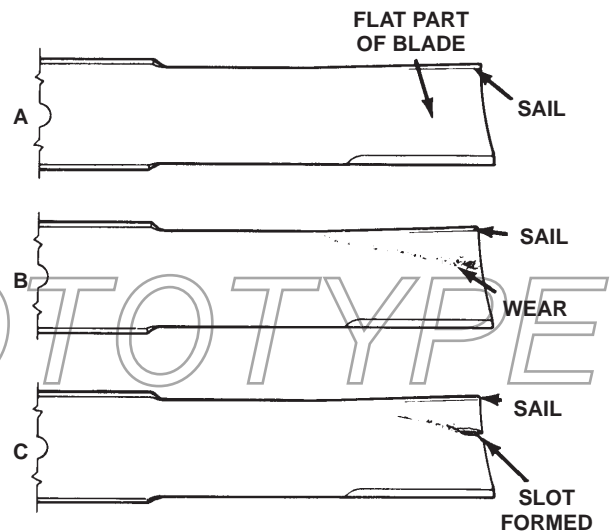


Figure 81

3. Inspect cutting edges of all blades. Sharpen the cutting edges if they are dull or nicked. Sharpen only the top of the cutting edge and maintain the original cutting angle to make sure of sharpness (Fig. 82). The blade will remain balanced if same amount of metal is removed from both cutting edges.

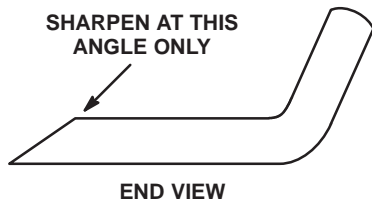


Figure 82

4. To check blade for being straight and parallel, lay blade on a level surface and check its ends. Ends of blade must be slightly lower than the center, and cutting edge must be lower than the heel of the blade. This blade will produce good quality of cut and require minimal power from the engine. By contrast a blade that is higher at the ends than the center, or if cutting edge is higher than the heel, the blade is bent or warped and must be replaced.
5. Install blade, sail facing toward cutting unit, with anti-scalp cup, lock washer, and blade bolt. Tighten blade bolt to 85–110 ft.-lb. (116–150 N·m).

Preparing for Seasonal Storage

Traction Unit

1. Thoroughly clean the traction unit, cutting units and the engine.
2. Check the tire pressure; refer to Checking the Tire Pressure, page 14.
3. Check all fasteners for looseness; tighten as necessary.
4. Grease or oil all grease fittings and pivot points. Wipe up any excess lubricant.
5. Lightly sand and use touch-up paint on painted areas that are scratched, chipped, or rusted. Repair any dents in the metal body.
6. Service the battery and cables as follows:
 - A. Remove the battery terminals from the battery posts.
 - B. Clean the battery, terminals, and posts with a wire brush and baking soda solution.
 - C. Coat the cable terminals and battery posts with Grafo 112X skin-over grease (Toro Part No. 505-47) or petroleum jelly to prevent corrosion.
 - D. Slowly recharge the battery every 60 days for 24 hours to prevent lead sulfation of the battery.

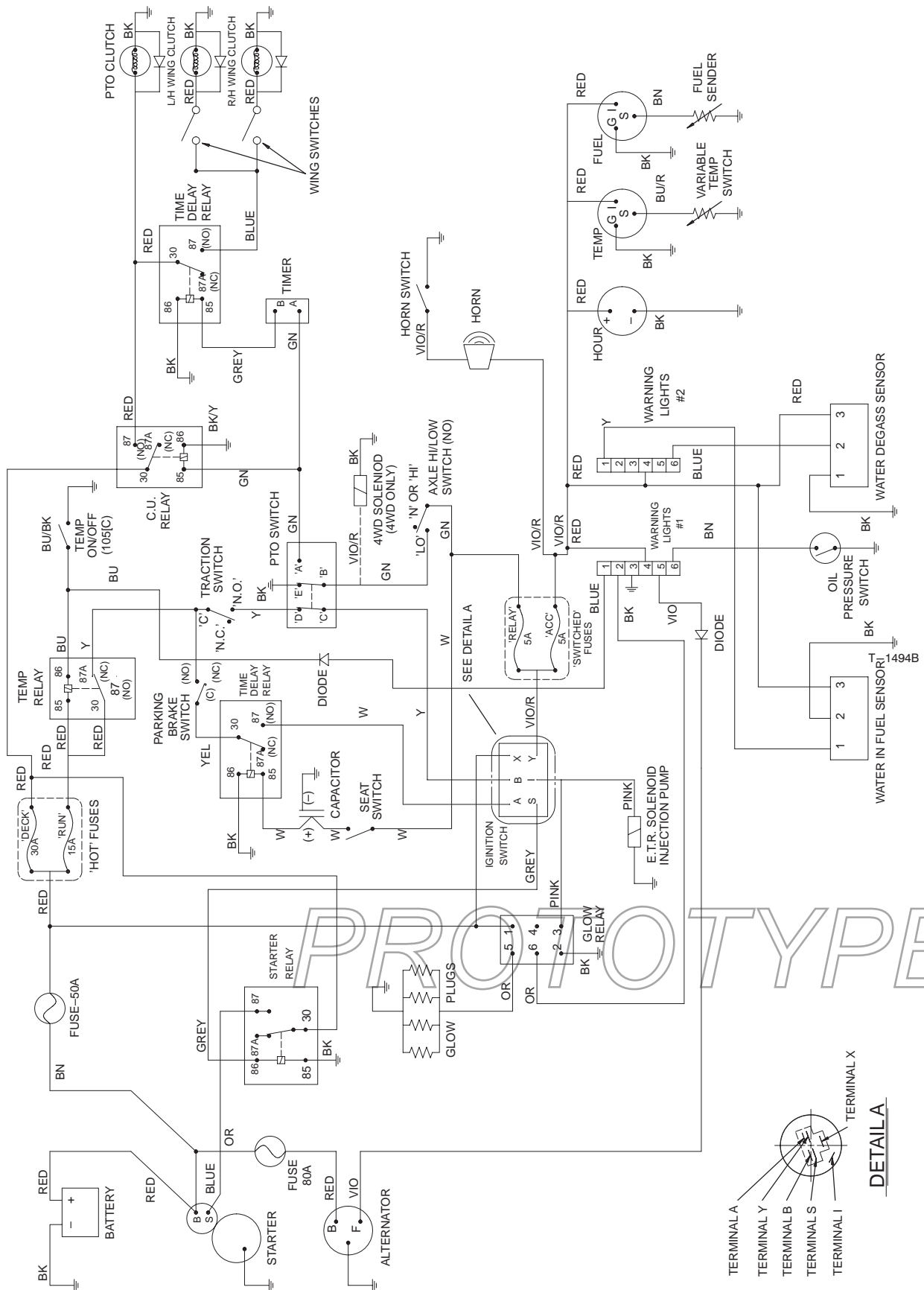
Engine

1. Drain the engine oil from the oil pan and replace the drain plug.
2. Remove and discard the oil filter. Install a new oil filter.
3. Refill oil pan with 5.3 U.S. quarts (5.1 l) of API 15W-40 CF, CF-4, or CG-4 motor oil.
4. Start the engine and run at idle speed for approximately two minutes.
5. Stop the engine.
6. Flush the fuel tank with fresh, clean diesel fuel.
7. Secure all fuel system fittings.
8. Thoroughly clean and service the air cleaner assembly.
9. Seal the air cleaner inlet and the exhaust outlet with weatherproof tape.
10. Check anti-freeze protection and add a 50/50 solution of water and Peugeot recommended anti freeze (Toro Part No. 93-7213) as needed for expected minimum temperature in your area.

Cutting Unit

1. Check blades and tighten blade bolts to 85–110 ft.-lb. (116–150 N·m).
2. Check and lubricate caster arm bushings.
3. Check and lubricate caster wheel bearings (if so equipped). Tighten caster wheel nuts to 140–165 ft.-lb. (191–225 N·m).
4. Check all fasteners for looseness; tighten as necessary.
5. Grease or oil all grease fittings and pivot points. Wipe up any excess lubricant.
6. Lightly sand and use touch-up paint on painted areas that are scratched, chipped, or rusted.
7. Check and relieve tension on drive belts.
8. Thoroughly clean top and underside of cutting units.
9. Store machine with wing decks lowered.

Electrical Schematic



- TERMINAL A
- TERMINAL Y
- TERMINAL B
- TERMINALS
- TERMINAL I
- TERMINAL X

DETAIL A

PROTOTYPE

PROTOTYPE



The Toro General Commercial Products Warranty

A Two-Year Limited Warranty

Conditions and Products Covered

The Toro Company and its affiliate, Toro Warranty Company, pursuant to an agreement between them, jointly warrant your 1996 or newer Toro Commercial Product ("Product") purchased after January 1, 1997, to be free from defects in materials or workmanship for two years or 1500 operational hours*, whichever occurs first. Where a warrantable condition exists, we will repair the Product at no cost to you including diagnosis, labor, parts, and transportation. This warranty begins on the date the Product is delivered to the original retail purchaser.

* Product equipped with hour meter

Instructions for Obtaining Warranty Service

You are responsible for notifying the Commercial Products Distributor or Authorized Commercial Products Dealer from whom you purchased the Product as soon as you believe a warrantable condition exists.

If you need help locating a Commercial Products Distributor or Authorized Dealer, or if you have questions regarding your warranty rights or responsibilities, you may contact us at:

Toro Commercial Products Service Department
Toro Warranty Company
8111 Lyndale Avenue South
Bloomington, MN 55420-1196
952-888-8801 or 800-982-2740
E-mail: commercial.service@toro.com

Owner Responsibilities

As the Product owner, you are responsible for required maintenance and adjustments stated in your operator's manual. Failure to perform required maintenance and adjustments can be grounds for disallowing a warranty claim.

Items and Conditions Not Covered

Not all product failures or malfunctions that occur during the warranty period are defects in materials or workmanship. This express warranty does not cover the following:

- Product failures which result from the use of non-Toro replacement parts, or from installation and use of add-on, modified, or unapproved accessories
- Product failures which result from failure to perform required maintenance and/or adjustments
- Product failures which result from operating the Product in an abusive, negligent or reckless manner
- Parts subject to consumption through use unless found to be defective. Examples of parts which are consumed, or used up, during normal Product operation include, but are not limited to, blades, reels, bedknives, tines, spark plugs, castor wheels, tires, filters, belts, etc.

Countries Other than the United States or Canada

Customers who have purchased Toro products exported from the United States or Canada should contact their Toro Distributor (Dealer) to obtain guarantee policies for your country, province, or state. If for any reason you are dissatisfied with your Distributor's service or have difficulty obtaining guarantee information, contact the Toro importer. If all other remedies fail, you may contact us at Toro Warranty Company.

- Failures caused by outside influence. Items considered to be outside influence include, but are not limited to, weather, storage practices, contamination, use of unapproved coolants, lubricants, additives, or chemicals, etc.
- Normal "wear and tear" items. Normal "wear and tear" includes, but is not limited to, damage to seats due to wear or abrasion, worn painted surfaces, scratched decals or windows, etc.

Parts

Parts scheduled for replacement as required maintenance are warranted for the period of time up to the scheduled replacement time for that part.

Parts replaced under this warranty become the property of Toro. Toro will make the final decision whether to repair any existing part or assembly or replace it. Toro may use factory remanufactured parts rather than new parts for some warranty repairs.

General Conditions

Repair by an Authorized Toro Distributor or Dealer is your sole remedy under this warranty.

Neither The Toro Company nor Toro Warranty Company is liable for indirect, incidental or consequential damages in connection with the use of the Toro Products covered by this warranty, including any cost or expense of providing substitute equipment or service during reasonable periods of malfunction or non-use pending completion of repairs under this warranty. Except for the Emissions warranty referenced below, if applicable, there is no other express warranty. All implied warranties of merchantability and fitness for use are limited to the duration of this express warranty.

Some states do not allow exclusions of incidental or consequential damages, or limitations on how long an implied warranty lasts, so the above exclusions and limitations may not apply to you.

This warranty gives you specific legal rights, and you may also have other rights which vary from state to state.

Note regarding engine warranty: The Emissions Control System on your Product may be covered by a separate warranty meeting requirements established by the U.S. Environmental Protection Agency (EPA) and/or the California Air Resources Board (CARB). The hour limitations set forth above do not apply to the Emissions Control System Warranty. Refer to the Engine Emission Control Warranty Statement printed in your operator's manual or contained in the engine manufacturer's documentation for details.

PROTOTYPE