



# Service Manual

## Reelmaster® 223-D

### Preface

The purpose of this publication is to provide the service technician with information for troubleshooting, testing, and repair of major systems and components on the Reelmaster 223-D

REFER TO THE REELMASTER 223-D TRACTION UNIT AND CUTTING UNIT OPERATOR'S MANUALS FOR OPERATING, MAINTENANCE AND ADJUSTMENT INSTRUCTIONS. Space is provided in Chapter 2 of this book to insert the Operator's Manuals and Parts Catalogs for your machine. Replacement Operator's Manuals are available by sending complete Model and Serial Number of traction unit and cutting unit to:



**This safety symbol means DANGER, WARNING, or CAUTION, PERSONAL SAFETY INSTRUCTION. When you see this symbol, carefully read the instructions that follow. Failure to obey the instructions may result in personal injury.**

**NOTE:** A NOTE will give general information about the correct operation, maintenance, service, testing or repair of the machine.

**IMPORTANT:** The IMPORTANT notice will give important instructions which must be followed to prevent damage to systems or components on the machine.



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## Safety Instructions

The Reelmaster 223-D was tested and certified by TORO for compliance with the B71.4-1990 specifications of the American National Standards Institute's safety standards for riding mowers when 65 lbs. of ballast is added to rear wheels and a rear weight kit, part no. 75-6690 is installed. 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.



**CAUTION**

**Improper operation, maintenance, troubleshooting, testing, adjustments or repairs 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

1. Read and understand the Operator's Manual before starting, operating, maintaining or repairing the machine. Become familiar with the controls and know how to stop the machine and engine quickly. Replacement Operator's Manuals are available by sending complete Model and Serial Number of traction unit and cutting units to:
2. Never allow children to operate the machine. Do not allow adults to operate the machine without proper instruction. Only trained operators who have read the Operator's Manual should operate the machine.
3. Never operate the machine when under the influence of drugs or alcohol.
4. Keep all shields, safety devices and decals in place. If a shield, safety device or decal is defective 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.
5. 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.
6. Assure interlock switches are adjusted correctly so engine cannot be started unless traction pedal is in NEUTRAL and cutting units are DISENGAGED.
7. Remove all debris or other objects that might be picked up and thrown by the reels or fast moving components from other attached implements. Keep all bystanders away from operating area.

8. Since diesel fuel is highly flammable, handle it carefully:

- A. Use an approved fuel container.
- B. Do not remove fuel tank cap while engine is hot or running.

C. Do not smoke while handling fuel.

D. Fill fuel tank outdoors and only to within an inch of the top of the tank, not the filler neck. Do not overfill.

E. Wipe up any spilled fuel.

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## While Operating

9. Sit on the seat when starting and operating the machine.

10. Before starting the engine:

- A. Engage the parking brake.
- B. Make sure traction pedal is in NEUTRAL and the ENABLE / DISABLE switch is in DISABLE.
- 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.

11. Seating capacity is one person. Therefore, never carry passengers.

12. Do not run engine in a confined area without adequate ventilation. Exhaust fumes are hazardous and could possibly be deadly.

13. Check interlock switches daily for proper operation. If a switch fails, replace it before operation the machine. The interlock system is for your protection, so do not bypass it. Replace all interlock switches every two years.

14. Using the machine demands attention. To prevent loss of control:

- A. Operate only in daylight or when there is good artificial light.
- B. Drive slowly.
- C. Watch for holes or other hidden hazards.
- D. Look behind machine before backing up.
- E. Do not drive close to a sand trap, ditch, creek or other hazard.
- F. Reduce speed when making sharp turns and turning on a hillside.

G. Avoid sudden stops and starts.

15. Traverse slopes carefully. Do not start or stop suddenly when traveling uphill.

16. 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. On 4 wheel drive models, always use the seat belt and ROPS together.

17. 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.

18. 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.

19. Do not touch engine, muffler or exhaust pipe while engine is running or soon after is stopped. These areas could be hot enough to cause burns.

20. If cutting unit 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 reel or bedknife is damaged, repair or replace it before operating. Do not attempt to free blocked cutting unit by reversing its reel direction. Damage to the reel may result.

21. Before getting off the seat:

- A. Move traction pedal to neutral.
- B. Set parking brake.
- C. Disengage cutting units and wait for reels to stop.
- D. Stop engine and remove key from switch.
- E. Do not park on slopes unless wheels are chocked or blocked.

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## While Doing Maintenance, Troubleshooting, Testing, Adjustments or Repairs

22. Before servicing or making adjustments, stop the engine and remove the key from the ignition switch.
23. Make sure machine is in safe operating condition by keeping all nuts, bolts and screws tight.
24. Frequently inspect all hydraulic line connectors and fittings. Make sure all hydraulic hoses and lines are in good condition before applying pressure to the system.
25. 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 the skin and cause injury. Fluid accidentally injected into the skin must be surgically removed within a few hours by a doctor or gangrene may occur.
26. Before disconnecting, or performing any work on the hydraulic system, lower the cutting units to the ground and stop the engine so all pressure is relieved.
27. Be sure you understand a service procedure before working on the machine. Unauthorized modifications to the machine may impair the function, safety and life of the machine. If major repairs are ever needed, or assistance is desired, contact your TORO Distributor.
28. To reduce potential fire hazard, keep engine area free of excessive grease, grass, leaves and dirt. Clean protective screen on front of engine frequently. Do not use flammable solvents for cleaning parts. Do not use diesel fuel, kerosene or gasoline.
29. THE ASBESTOS BRAKE LININGS CONTAIN ASBESTOS FIBERS. BREATHING ASBESTOS DUST MAY BE HAZARDOUS TO YOUR HEALTH AND MAY CAUSE SERIOUS RESPIRATORY OR OTHER BODILY HARM. For your protection:
  - A. AVOID CREATING DUST.
  - B. DO NOT remove brake drum without proper equipment.
  - C. DO NOT work on brake linings without proper protective equipment.
  - D. DO NOT replace brake linings without proper protective equipment.
  - E. DO NOT attempt to sand, grind, chisel, file, hammer, or alter brake linings in any manner without proper protective equipment.
  - F. Follow O.S.H.A. standards for proper protective devices to be used when working with asbestos materials.
30. If the engine must be running to perform an inspection or procedure, use extreme caution. Always use two people, with the operator at the controls able to see the person doing the inspection or procedure. Keep hands, feet, clothing, and body away from cutting units and other moving parts.
31. Do not overspeed the engine by changing governor setting.
32. Shut engine off before checking or adding oil to the engine crankcase.
33. Disconnect the cables from the battery before servicing the machine. If battery voltage is required for troubleshooting or test procedures, temporarily connect the battery.
34. Do not charge a frozen battery because it can explode and cause injury. Let the battery warm to 60° F (15.5° C) before connecting to a charger. Charge the battery in a well-ventilated place so that gases produced while charging can dissipate. Since the gases are explosive, keep open flame and electrical spark away from the battery; do not smoke. Nausea may result if the gases are inhaled. Unplug the charger from the electrical outlet before connecting or disconnecting the charger leads from the battery posts.
35. Wear safety glasses, goggles or a face shield to prevent possible eye injury when using compressed air for cleaning or drying components.
36. Failure to follow proper procedures when mounting a tire on a wheel or rim can produce an explosion which may result in serious injury. Do not attempt to mount a tire unless you have the proper equipment and experience to perform the job. Have it done by your Toro Distributor or a qualified tire service.
37. When changing attachments or performing other service, use the correct blocks and hoists. Always use jackstands to safely support the machine when it is raised by a jack or hoist.
38. Do not use your hand to prevent cutting unit reel from turning while servicing; this can result in personal injury. Use a 1-1/2 in. thick x 4 in. wide x 8 in. long piece of hardwood inserted into front of cutting unit between reel blades.
39. For optimum performance and safety, 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.



# Product Records and Manuals

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## Product Records

Record information about your Reelmaster 223-D on the OPERATION AND SERVICE HISTORY REPORT form. Use this information when referring to your machine.

Insert Operator's Manuals and Parts Manuals for your Reelmaster 223-D at the end of this section.

# Equivalents and Conversions

## Decimal and Millimeter Equivalents

Fractions	Decimals	mm	Fractions	Decimals	mm			
	1/64	0.015625	— 0.397	33/64	0.515625	— 13.097		
1/32	—	0.03125	— 0.794	17/32	—	0.53125	— 13.494	
	3/64	0.046875	— 1.191	35/64	0.546875	— 13.891		
1/16	—	0.0625	— 1.588	9/16	—	0.5625	— 14.288	
	5/64	0.078125	— 1.984	37/64	0.578125	— 14.684		
	3/32	—	0.9375	— 2.381	19/32	—	0.59375	— 15.081
	7/64	0.109275	— 2.778	39/64	0.609375	— 15.478		
1/8	—	0.1250	— 3.175	5/8	—	0.6250	— 15.875	
	9/64	0.140625	— 3.572	41/64	0.640625	— 16.272		
	5/32	—	0.15625	— 3.969	21/32	—	0.65625	— 16.669
	11/64	0.171875	— 4.366	43/64	0.671875	— 17.066		
3/16	—	0.1875	— 4.762	11/16	—	0.6875	— 17.462	
	13/64	0.203125	— 5.159	45/64	0.703125	— 17.859		
	7/32	—	0.21875	— 5.556	23/32	—	0.71875	— 18.256
	15/64	0.234375	— 5.953	47/64	0.734375	— 18.653		
1/4	—	0.2500	— 6.350	3/4	—	0.7500	— 19.050	
	17/64	0.265625	— 6.747	49/64	0.765625	— 19.447		
	9/32	—	0.28125	— 7.144	25/32	—	0.78125	— 19.844
	19/64	0.296875	— 7.541	51/64	0.796875	— 20.241		
5/16	—	0.3125	— 7.938	13/16	—	0.8125	— 20.638	
	21/64	0.328125	— 8.334	53/64	0.828125	— 21.034		
	11/32	—	0.34375	— 8.731	27/32	—	0.84375	— 21.431
	23/64	0.359375	— 9.128	55/64	0.859375	— 21.828		
3/8	—	0.3750	— 9.525	7/8	—	0.8750	— 22.225	
	25/64	0.390625	— 9.922	57/64	0.890625	— 22.622		
	13/32	—	0.40625	— 10.319	29/32	—	0.90625	— 23.019
	27/64	0.421875	— 10.716	59/64	0.921875	— 23.416		
7/16	—	0.4375	— 11.112	15/16	—	0.9375	— 23.812	
	29/64	0.453125	— 11.509	61/64	0.953125	— 24.209		
	15/32	—	0.46875	— 11.906	31/32	—	0.96875	— 24.606
	31/64	0.484375	— 12.303	63/64	0.984375	— 25.003		
1/2	—	0.5000	— 12.700	1	—	1.000	— 25.400	
	1 mm = 0.03937 in.			0.001 in. = 0.0254 mm				

## U.S to Metric Conversions

	To Convert	Into	Multiply By
<b>Linear Measurement</b>	Miles	Kilometers	1.609
	Yards	Meters	0.9144
	Feet	Meters	0.3048
	Feet	Centimeters	30.48
	Inches	Meters	0.0254
	Inches	Centimeters	2.54
	Inches	Millimeters	25.4
<b>Area</b>	Square Miles	Square Kilometers	2.59
	Square Feet	Square Meters	0.0929
	Square Inches	Square Centimeters	6.452
	Acre	Hectare	0.4047
<b>Volume</b>	Cubic Yards	Cubic Meters	0.7646
	Cubic Feet	Cubic Meters	0.02832
	Cubic Inches	Cubic Centimeters	16.39
<b>Weight</b>	Tons (Short)	Metric Tons	0.9078
	Pounds	Kilograms	0.4536
	Ounces (Avdp.)	Grams	28.3495
<b>Pressure</b>	Pounds/Sq. In.	Kilopascal	6.895
	Pounds/Sq. In.	Bar	0.069
<b>Work</b>	Foot-pounds	Newton-Meters	1.356
	Foot-pounds	Kilogram-Meters	0.1383
	Inch-pounds	Kilogram-Centimeters	1.152144
<b>Liquid Volume</b>	Quarts	Liters	0.9463
	Gallons	Liters	3.785
<b>Liquid Flow</b>	Gallons/Minute	Liters/Minute	3.785
<b>Temperature</b>	Fahrenheit	Celsius	1. Subtract 32°
			2. Multiply by 5/9

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