

CLASSEN®

TURF RAKES / SEEDERS – OPERATOR'S MANUAL ORIGINAL LANGUAGE INSTRUCTIONS



TR-20H / TR-20B TURF RAKE

**TR-20MH / TR-20MB TURF RAKE w/
MULTI-PURPOSE BLADE**

TRC-20H / TRC-20B TURF RAKE w/ CATCHER

TS-20H / TS-20B TURF SEEDER

TR-20RH / TR-20RB TURF RAKE W/ SPRING TINE REEL

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P/N C100619 REV A THIS MANUAL COVERS UNITS MANUFACTURED FROM 02/2012 TO PRESENT

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INTRODUCTION

Thank You

Thank you for purchasing the Classen Turf Rake / Seeder.

Read This Manual

Read this manual carefully to learn how to operate correctly. Failure to do so could result in personal injury or equipment damage.

This manual should be considered a permanent part of your rake/seeder and should remain with it if you sell it.

Warranty

Refer to back page.

Measurements

U.S. units of measure are used in this manual.

Serial Numbers

Write frame and engine serial numbers, plus model numbers in "Owners Record" section below. Your dealer needs these numbers when you order parts. The serial number is located on a sticker on the center section of the frame.

Directions

"Right Hand" and "Left Hand" sides of the unit are determined by facing the back of the unit as you would operate the machine.

OWNER'S RECORD	
Date Purchased	_____
Rake / Seeder Model Number	_____
Rake / Seeder Serial Number	_____
Engine Model Number	_____
Engine Serial Number	_____

NOTICE !!!

Unauthorized modifications may present **extreme** safety hazards to operators and bystanders and could also result in product damage.

Schiller Grounds Care, Inc. strongly warns against, rejects and disclaims any modifications, add-on accessories or product alterations that are not designed, developed, tested and approved by Schiller Grounds Care, Inc. Engineering Department. Any Schiller Grounds Care, Inc. product that is altered, modified or changed in any manner not specifically authorized after original manufacture—including the addition of “after-market” accessories or component parts not specifically approved by Schiller Grounds Care, Inc. will result in the Schiller Grounds Care, Inc. Warranty being voided.

Any and all liability for personal injury and/or property damage caused by any unauthorized modifications, add-on accessories or products not approved by Schiller Grounds Care, Inc. will be considered the responsibility of the individual(s) or company designing and/or making such changes. Schiller Grounds Care, Inc. will vigorously pursue full indemnification and costs from any party responsible for such unauthorized post-manufacture modifications and/or accessories should personal injury and/or property damage result.

Schiller Grounds Care, Inc.

1028 Street Road
Southampton, PA 18966 U.S.A
Phone: 215-357-5110
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MODEL NUMBER

SERIAL NUMBER

MODEL NUMBER: This number appears on sales literature, technical manuals and price lists.

SERIAL NUMBER: This number appears only on your machine. It contains the model number followed consecutively by the serial number. Use this number when ordering parts or seeking warranty information.



This symbol means:
ATTENTION!
BECOME ALERT!

Your safety and the safety of others is involved.

Signal word definitions:

The signal words below are used to identify levels of hazard seriousness. These words appear in this manual and on the safety labels attached to Schiller Grounds Care, Inc. machines. For your safety and the safety of others, read and follow the information given with these signal words and/or the symbol shown above.

⚠ DANGER

DANGER indicates a hazardous situation which, if not avoided, **WILL** result in death or serious injury.

⚠ WARNING

WARNING indicates a hazardous situation which, if not avoided, **COULD** result in death or serious injury.

⚠ CAUTION

CAUTION indicates a hazardous situation which, if not avoided, **COULD** result in minor or moderate injury. It may also be used to alert against unsafe practices or property damage.

⚠ CAUTION

CAUTION used without the safety alert symbol indicates a potentially hazardous situation which, if not avoided, **MAY** result in property damage.

CALIFORNIA**Proposition 65 Warning**

Diesel engine exhaust and some of its constituents are known to the State of California to cause cancer, birth defects and other reproductive harm.

CALIFORNIA**Proposition 65 Warning**

Battery posts, terminals, wiring insulation, and related accessories contain lead and lead compounds, chemicals known to the State of California to cause cancer and birth defects or other reproductive harm.
WASH HANDS AFTER HANDLING.

⚠ WARNING

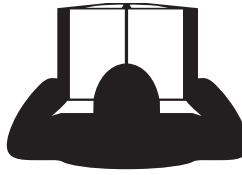
The engine exhaust from this product contains chemicals known to the State of California to cause cancer, birth defects or other reproductive harm.

Machine Preparation

Operator preparation and training

Read the Operation & Safety Manual

- If an operator or mechanic cannot read English, it is the owner's responsibility to explain this material to them. If any portion of this material is unclear, contact your factory representative for clarification.
- Become familiar with the safe operation of the equipment, operator controls and safety signs. Be prepared to stop the engine quickly in an emergency. Do not operate or allow another person to operate this machine if there are any questions about safety.
- All operators and mechanics should be trained. The owner is responsible for training the users.
- Wear appropriate clothing, including safety goggles or safety glasses with side shields when operating. Do not operate barefoot or wearing open sandals. Long hair, loose clothing or jewelry may get tangled in moving parts.
- Wear hearing protection.
- Wear safety glasses.
- Never allow underage children, unskilled or improperly trained people to operate this equipment. Local regulations can restrict the age of the operator.
- Keep warning labels and this operator's manual legible and intact. Replacement labels and manuals are available from the factory.
- Do not operate machine while under the influence of drugs or alcohol.
- The owner/user can prevent and is responsible for accidents or injuries occurring to themselves, other people or property.



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Site preparation and circumstances

- Evaluate the terrain to determine how to safely perform the job. Only use accessories and attachments approved by the manufacturer.
- Clear the area to be cut of objects such as rocks, toys, wire or other debris that may be thrown or get tangled in the rake/seeder.
- Identify and mark objects to be avoided such as sprinkler heads, stakes, water valves, etc.
- Be sure the area is clear of pets and people, especially young children. Never assume they will remain where you last saw them. Stop the machine if any enter the area.
- Operate unit only in daylight or in good artificial light.

Machine Preparation

- Do not tamper with or defeat safety devices. Keep guards, shields and interlock safety devices in place and in proper working condition. They are for your protection.
- Keep all fasteners such as nuts, bolts and pins well secured.
- Visually inspect blade and blade bolts for wear or damage. Replace worn or damaged blades and bolts.
- Verify that machine and attachments, if any, are in good operating condition.
- When using the Turf Rake/ Seeder, make certain frame plate is attached at all times when not bagging.

OPERATING SAFELY

In General

- Use extra care when loading or unloading the machine into a trailer or truck.
- Use caution when making turns and crossing roads and sidewalks. Stop blade when not using.
- Do not run the engine in an enclosed area where dangerous carbon monoxide fumes can collect.
- Never leave a machine unattended. Always turn off blade and stop engine when leaving the operator position. When leaving the machine be sure the wheel drive clutch is engaged.
- Use extreme caution when reversing or pulling machine towards you.

Storage Safety

- Stop the engine and allow to cool before storing.
- Drain the fuel tank outdoors only.
- Store fuel in an approved container in a cool, dry place.
- Keep the machine and fuel containers in a locked storage place to prevent tampering and to keep children from playing with them.
- Do not store the machine or fuel container near heating appliances with an open flame, such as a water heater, or an appliance with a pilot light.
- Keep gasoline storage area free of grass, leaves and excessive grease to reduce fire hazard.
- Clean grass and debris from cutting units, drives, mufflers and engine to help prevent fires.

Starting

- Start according to instructions in this manual or on the machine.
- Before attempting to start the engine, make sure the bail is released.
- When starting the engine, make sure hands and feet are clear of the blade.
- Do not change engine governor settings or overspeed the engine. Operating the engine at excessive speed can increase the hazard of personal injury.



Operating On Slopes

Use Extra Care When Working On Slopes

- Do not operate on slopes if uneasy or uncertain. Ultimate responsibility for safe operation on slopes rests with the operator.
- Do not operate on steep slopes.
- Keep all movement on slopes slow and gradual.
- Do not operate near drop-offs, ditches or embankments. The machine could suddenly turn over if a wheel runs over the edge or an edge caves in.
- Do not turn on slopes unless necessary, and then turn slowly and downhill when possible.
- Be sure of your footing on slopes.
- Travel up and down slopes at a 45° angle rather than across, to prevent unit from tipping over.

Interrupting Operation

- Before leaving the operator's position:
 - Park on level ground.
 - Release bail.
 - Shut off the engine.
- Release bail and wait until the blades stop moving:
 - when not using;
 - for transport;
 - when crossing surfaces other than grass.
- Stop the engine, release bail and wait until the blade stops moving:
 - before refueling;
 - before making blade adjustment.
- Stop the engine, disengage the master clutch, and disconnect the spark plug wire(s):
 - before clearing blockages;
 - before checking, cleaning or working on the machine;
 - after striking a foreign object. Inspect the machine for damage and make repairs before restarting;
 - if the machine begins to vibrate abnormally: shut off machine immediately. Inspect and make repairs as

needed before restarting;

— except for repairs or adjustments as specifically noted, such as for carburetor adjustment, where the engine must be running. Keep hands and feet clear of moving parts in these circumstances.

- Allow the blades to come to a complete stop when stopping operation to clear blockages, unclog, inspect the machine, do maintenance or repair.
- Reduce the throttle setting during engine shut-down and, if the engine is provided with a shut-off valve, turn the fuel off at the conclusion of operation.

MAINTENANCE SAFETY

In general

- Maintain machine according to manufacturer's schedule and instructions for maximum safety and best results.
- Park machine on level ground.
- Never allow untrained personnel to service machine.
- Guards should only be removed by qualified maintenance technician for maintenance/service. Replace when work is complete.
- Adjust or repair only after the engine has been stopped and the blade has stopped moving.
- Disconnect spark plug wire(s) before doing any maintenance.
- Replace parts if worn, damaged or faulty. For best results, always replace with parts recommended by the manufacturer.
- Do not dismantle the machine without releasing or restraining forces which may cause parts to move suddenly.
- Provide adequate support, e.g. jack stands for lifted machine or parts if working beneath.
- Do not put hands or feet near or under rotating parts.
- Clean up spilled oil or fuel thoroughly.
- Replace faulty mufflers.
- To reduce fire hazards, keep the engine, muffler, and fuel storage area free of grass, leaves, debris buildup or grease.

Blades

The rake/seeder blades are sharp and can cut. Use extra caution when handling. Remove obstructions with care. Wrap the blade or wear gloves.

- Only replace blade. Never straighten or weld.
- Keep other persons away from blades.
-



WARNING



Fuel

- Petrol (gasoline) and diesel fuels are flammable; petrol (gasoline) vapors are explosive. Use extra care when handling.
- Store only in containers specifically designed for fuel.
- When refueling or checking fuel level:
 - Stop the engine and allow to cool;
 - Do not smoke;
 - Refuel outdoors only;
 - Use a funnel;
 - Do not overfill;
 - If fuel is spilled, do not attempt to start the engine until the spill is cleaned up and vapors have cleared.
- Replace caps on fuel containers and tanks securely.

Sparks from static electricity can start fires or cause explosions. Flowing fuel can generate static electricity. To prevent static electricity sparks:

- Keep fuel containers electrically grounded. Do not fill containers in a vehicle or on a truck or trailer bed with a plastic liner. Fill containers on the ground away from

the vehicle.

- When practical, remove petrol (gas) powered equipment from the truck or trailer and refuel it on the ground. If equipment must be refueled on the truck or trailer, refuel from a portable container rather than a dispenser nozzle.
- Keep the dispenser nozzle in contact with the rim of the fuel tank or container opening until fueling is complete. Do not use a nozzle lock-open device.

Storage Safety

- Stop the engine and allow to cool before storing.
- Drain the fuel tank outdoors only.
- Store fuel in an approved container in a cool, dry place.
- Keep the machine and fuel containers in a locked storage place to prevent tampering and to keep children from playing with them.
- Do not store the machine or fuel container near heating appliances with an open flame, such as a water heater, or an appliance with a pilot light.
- Keep gasoline (petrol) storage area free of grass, leaves and excessive grease to reduce fire hazard.
- Clean grass and debris from cutting units, drives, mufflers and engine to help prevent fires.



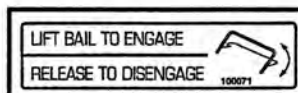
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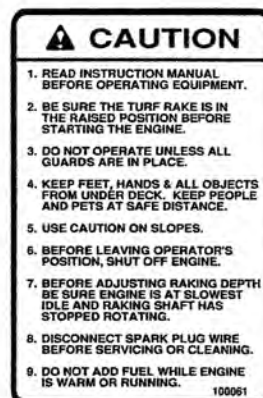
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SEED APPLICATION CHART			
THESE SETTINGS ARE APPROXIMATE GUIDELINES. SEEDING RATES ARE SPEED DEPENDENT. FASTER SPEED DELIVERS LESS SEED.			
SEED TYPE	RATE LBS./ 1000 SQ. FT.	SETTING	
BEST GRASS	0.5	30	
	1.0	33	
	1.5	34	
BERMUDA	2.0	17	
	2.75	19	
BLUEGRASS	2.13	18	
	4.26	18	
PERCUE (CRISPING)	0.50	30	
	0.5	30	
	4.26	27	
	5.25	18	
	7.0	30	
SEED TYPE	RATE LBS./ 1000 SQ. FT.	SETTING	
PERCUE (TALL)	0.50	33	
	4.26	26	
	4.87	27	
	7.05	30	
RYEGRASS	1.4	18	
	5.18	18	
	5.88	20	
	4.8	22	
	5.0	26	
	7.0	27	
	10	30	

9



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ITEM	PART NO.	DESCRIPTION	QTY
1	C100074	DECAL, "CLASSEN"	2
2	C100060	DECAL, "CAUTION - MUFFLER AND SHIELDS"	1
3	C100075	DECAL, "TR-20" (TURF RAKE ONLY)	1
4	C100071	DECAL, "BAIL ENGAGEMENT"	1
5	C100061	DECAL, CAUTION - OPERATING INST.	1
6	C100077	DECAL, "TS-20" (TURF SEEDER ONLY)	1
7	C100069	DECAL, "DANGER, HANDS AND FEET AWAY"	1
8	C100070	DECAL, "DANGER - CARBON MONOXIDE"	1
9	C100138	DECAL, "SEED APPLICATION CHART"	1
		(TURF SEEDER ONLY)	1
10	C100228	DECAL, "CAUTION - CATCHER BAG"	1
		(TURF RAKE ONLY)	1



SAFETY WARNING

DO NOT STORE GASOLINE (PETROL) UNNECESSARILY OVER LONG PERIODS OF TIME. TO PREVENT POSSIBLE EXPLOSION, STORE ONLY IN AN APPROVED “SAFE” CONTAINER. TO PREVENT EXPLOSION OF VAPORIZED FUEL, DO NOT STORE MACHINE WITH FUEL IN TANK OR CARBURETOR IN AN ENCLOSURE WITH OPEN FLAME.

(EXAMPLE: FURNACE OR WATER HEATER PILOT LIGHT.)

STORAGE INSTRUCTIONS

⚠ WARNING

To prevent possible explosion or ignition of vaporized fuel, do not store equipment with fuel in tank or carburetor in enclosure with open flame (for example, a furnace or water heater pilot light).

Daily Storage

- 1. Check engine oil level and air filter element daily.
- 2. Check oil level in gear case.
- 3. Close fuel valve at bottom of fuel tank.
- 4. Clean cutting blade (grass, dirt, etc.).

EXTENDED STORAGE

Before the equipment is put into storage for any period exceeding 30 days:

- 1. Drain all fuel from fuel tank and lines (use a hose or fuel line, routed from fuel tank shut-off to proper container).
- 2. Start engine and run until all fuel is used from the carburetor float bowl.
- 3. While engine is warm, check the transmission oil and refill with the proper weight of oil corresponding to the season when the equipment will next be used.
- 4. Remove the spark plug and squirt a small quantity of engine oil into the cylinder. Turn the engine over a few times to distribute the oil.
- 5. Lubricate all lubrication fittings.
- 6. Clean and oil cutting blade to prevent rust.

OPERATION AFTER EXTENDED STORAGE:

- 1. Check for loose parts and tighten.
- 2. Check for cracked, broken or bent blades and replace.
- 3. Check that all safety decals are in place and legible.
- 4. Fill fuel tank with clean fresh fuel.
- 2. Check crankcase oil level, and start engine.
- 3. Check fuel system for fuel leaks.

PRE-DELIVERY CHECK LIST

Check the following before you deliver the rake/seeder to the customer.

1. Guards and shields fastened in place.
2. Decals fastened and legible.
3. Tire pressure.
4. Gas lever on engine turned on.
5. All eight lubrication points greased.
6. 2:1 gearbox oil level.
7. Engine oil level.
8. Air cleaner.
9. Touch up scratches.
10. Chain tight.
11. Engine belt tight.
12. Levers working properly.
13. All controls.
14. Add fuel, start engine, test run.

DATE SET UP _____/_____/_____

DELIVERY CHECK LIST

Review the operators manual with the customer.
Explain the following:

1. Classen Mfg., Inc. warranty.
2. Safe operation and service.
3. How to use controls.
4. Operating the machine correctly.
5. Transporting the machine.
6. Correct fuel and lubricants.
7. Daily and periodic inspections.
8. Changing oil after break-in period.
9. Servicing the unit regularly and correctly.
10. Classen Mfg., Inc. parts and service.
11. Give the customer the operators manual and encourage customer to read it.

DATE DELIVERED _____/_____/_____

SIGNATURE _____

NOTES: _____

This image shows a blank sheet of white paper with horizontal ruling lines. The lines are evenly spaced and extend across the width of the page. There are no margins, text, or other markings on the paper.

PRE-OPERATION CHECK LIST (Operator's responsibility)

- Review and follow all safety rules and safety decal instructions.
- Check that all safety decals are installed and in good condition. Replace if damaged.
- Check to make sure all shields and guards are properly installed and in good condition.
- Check that all hardware is properly installed and secured.
- Check to be sure engine is free of dirt and debris. Pay particular attention to the cooling fins, governor parts and muffler. Clean air intake screen. Check air cleaner; service is necessary.
- Inspect area. Remove stones or other hard objects that might cause damage.
- Check that there are no underground utilities in work area.
- Check all lubrication points and grease as instructed in manual.
- Perform a functional check of the safety interlock system each time you operate the unit. If it doesn't work, repair before using the machine.

! WARNING
ALL GUARDS MUST
BE IN PLACE WHILE
MACHINE IS IN OP-
ERATION.

! WARNING
KEEP HANDS AND
FEET AWAY FROM
MOVING PARTS.

READ SAFETY SIGNS

Carefully read and follow caution stickers.

BEFORE STARTING THE ENGINE

1. Be familiar with the controls, how each functions, and what each operates. Read operator's manual before using.
2. With the machine on level ground, check engine oil level. Add oil if necessary, following the engine manufacturer's recommendations. Refer to engine manual supplied with machine.
3. Open the fuel valve.
4. Fill the fuel tank with the amount and type of fuel recommended by the engine manufacturer.
5. Visually check all moving parts and all fasteners, if loose or broken, tighten or replace. Check for broken or bent blades, replace if necessary.

! WARNING

Petrol (gasoline) is extremely flammable and highly explosive under certain conditions. BE SURE to install fuel cap after refueling.



Fill fuel tank with good quality, clean, unleaded regular gasoline to the level recommended by the engine manufacturer.

To Check or Add Fuel:

- Use a funnel to avoid spilling.
- Do it outdoors.
- Do not smoke.
- Stop the engine; allow to cool.
- Do not overfill.
- Clean up spilled fuel.

Practice Safe Maintenance

Keep all machine parts in good condition and fastened in place. Fix damages immediately. Replace worn or broken parts. Whenever you work on the rake/seeder, disconnect spark plug wire.

Start Engine Safely

Make sure hands and feet are out of the way of moving parts when starting engine.

! WARNING

When replacement parts are required, use genuine Schiller Grounds Care, Inc. parts or parts with equivalent characteristics, including type, strength and material. Failure to do so may result in product malfunction and possible injury to the operator and/or bystanders.



Carbon monoxide present in the exhaust is an odorless and deadly gas. Never start or run the engine inside where exhaust fumes can collect.

Provide enough fresh air to keep fumes from getting too strong. Replace any warning decal that becomes illegible immediately.

Starting Engine

1. Turn fuel cock to the "open" position.
2. Turn choke on (closed).
3. Turn ignition switch to "on".
4. Move throttle lever to high RPM setting. Do not exceed 3600 rpm.
5. Pull recoil starter rope until engine starts.
6. After engine is warm, turn off choke (open).
7. Allow engine to run one minute before using.
8. Check engine rpm setting before operating. DO NOT exceed 3600 rpm.

Stopping Engine

1. Turn throttle to "slow" position.
2. Turn off ignition switch.

OPERATING THE TURF RAKE/SEEDER

Preparation

1. Police lawn area for obstacles and debris (i.e. sprinklers, hoses, toys, etc.). Remove all items.
2. Make sure underground sprinkler heads and other hidden obstacles are marked to prevent damage.
3. Mark other areas where unit can be a problem or too risky (i.e. mud, tree roots, steep hills).

Operating

1. Put speed lever in neutral position.
2. Start the engine. CAUTION: To avoid injury, do not place your feet or other body parts under the blade while starting the engine.
3. Engage top bail.
4. Select forward or reverse with the speed lever.
5. Drive Turf Rake/ Seeder to the area to be raked or seeded.
6. Move height adjustment lever to the appropriate setting for the shaft assembly being used. (see "optional shaft assemblies" section).
7. Lift bottom bail to engage the main shaft.
8. Release bail to stop.
10. When finished, reverse steps 6 through 3, leaving the wheel drive handle on for transportation.

GENERAL MAINTENANCE

To keep the rake / seeder in good operating condition, perform the following:



SAFETY WARNING

BLADE SHARPENING – Wear the appropriate personal protective equipment when sharpening blades. Use correct tools for sharpening or when servicing machine.

- Keep blades sharp; a sharp blades cut cleaner, faster and more uniformly and place less load on the machine. Sharpen cutting edge on bevel or top side only.
- Keep drive belt at proper tension and free of oil and dirt at all times.
- Check engine oil level and air filter element daily.
- Check for loose bolts and connections.
- All grease fittings are pressurized type. Use a good grade Lithium Base Grease or equivalent. Grease eccentric arms sparingly every 4 hours of service, all others daily. Wipe off all grease fittings before and after each greasing (there are a total of 8 grease fittings).
- Engine (refer to engine manufacturer's manual).
Changing Blade Assemblies

Within minutes your machine can be converted to a turf rake, turf seeder or turf slicer by purchasing the optional blade assemblies available complete with the side plates, bearings and drive pulley.

OPTIONAL BLADE ASSEMBLIES

Changing Blade Assemblies

Within minutes your machine can be converted to a turf rake, turf seeder or turf slicer by purchasing the optional blade assemblies available complete with the side plates, bearings and drive pulley.

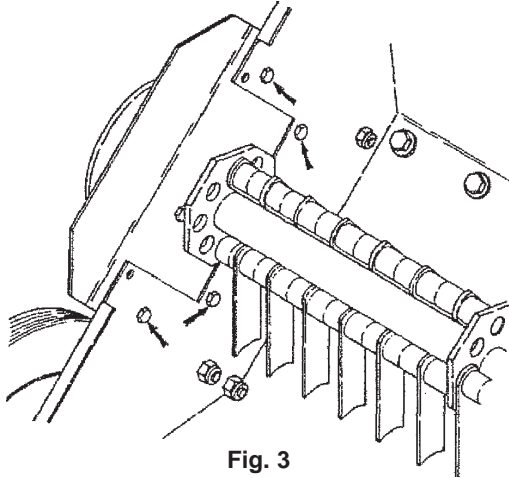


Fig. 3

1. Set unit up on block allowing enough distance beneath machine to change blade assembly.
2. After re-moving the belt shield, remove the twelve bolts on the left side and three on the right side which hold the blade assembly to the main body (Figure 3).
3. Remove the belts from both sides and remove the entire blade assembly. There is no need to loosen any set screws.
4. Next install the optional blade assembly and fasten with six 1/4" x 5/8" bolts on each side. Tighten all bolts on both shields. Center the shaft and tighten the two set screws in each bearing using Pro Lock (nut type, medium strength).
5. When changing back to the original shaft it will not be necessary to loosen any set screws. Only the bolts in the belt shields and the eight bolts holding the shaft will be to be removed.

⚠ CAUTION ⚠

BE CERTAIN THAT THE SET SCREWS ARE TIGHTENED PROPERLY IN BEARINGS AND PULLEY WHEN REASSEMBLING.

Changing Blade Assemblies

1. Set unit up on block allowing enough distance beneath machine to change blade assembly.
2. After re-moving the belt shield, remove the twelve bolts on the left side and three on the right side which hold the blade assembly to the main body (Figure 3).

3. Remove the belts from both sides and remove the entire blade assembly. There is no need to loosen any set screws.
4. Remove the two drive pulleys and bearing plates from the main shaft (one on each side). Replace with new shaft. Reinstall the bearing plates and drive pulleys on the new shaft using Pro Lock (retaining 1, medium strength) on the set screws. The pulleys will be positioned on the shaft by bolts, the 1/4" lock washer, and the pulley retainer washer.
5. Route the belt behind the idler pulleys and roll the belts onto the lower pulleys, then reinstall the belt shields.

⚠ CAUTION ⚠

BE CERTAIN THAT THE SET SCREWS ARE TIGHTENED PROPERLY IN BEARINGS AND PULLEY WHEN REASSEMBLING.

Recommended Height Adjustments

Raking Height

When using the Turf Rake with its raking (flail) blade assembly adjust the raking height as follows.

Normal height is set by placing the Turf Rake on a hard surface making sure one satellite shaft is at dead bottom. Adjust the wheels so the raking fingers on the bottom shaft just touch the ground. DO NOT set the fingers so that they will penetrate the ground as this will counteract the centrifugal force of the fingers and prevent the from raking properly.

With repeated use, raking side of the fingers will begin to wear. To give the fingers a new square raking edge, remove the end plates and turn the entire main shaft assembly 180° and replace it on the Turf Rake. NOTE: Use Pro-Lock (retaining 1, medium strength) on the 7" pulley on the main shaft.

To prolong the life of the main shaft, extra holes are provided. If the circular holes holding the satellite shafts become distorted, rotate all four satellite shafts to the next set of holes.

When using the Turf Rake with it's raking (spring tine) assembly, adjust the raking height as follows:

Normal height is set by placing the Turf rake on a hard surface. Adjust the wheels so the spring tines just barely touch or are slightly above the ground. DO NOT set the spring tines so that they penetrate the ground. Doing this will cause premature damage to the spring tines.

Recommended Height Adjustments

Seeding / Multipurpose Height

The seeding/multipurpose blades are used for cutting grooves for over-seeding and can also be used for verticutting grasses. To set the height properly place unit on the lawn surface and adjust the wheel height up (see Fig. 4). Adjusting the wheel height up lowers the blades.

Seeding:

The proper height setting for over-seeding is approximately 1/4" into the ground. Adjust the wheel height up approximately one notch. If set deeper, grass seed being applied may not germinate. For best results, over-seed in two passes of 1/2 application rate at right angles or in a criss-cross pattern. Water heavily immediately after seeding then lightly for 10-14 days keeping soil moist.

Slicing

The proper height setting for slicing or aerating is 1/2" to 3/4" into the ground. Adjust the wheel height up one or two notches.

For crawling grasses such as Zoysia, Bermuda, Bahia, etc. raise the wheels only one notch. Crawling grasses should not be sliced too deeply.

For single strand grasses like Bluegrass or Rye, aerate in perpendicular directions for more even slicing. For example, slice in a North-South direction on the first pass, switching to an

East-West direction on the second pass.

As the seeder/multipurpose blades wear they may be rotated to provide a new cutting edge. The wheels may be raised to allow the blades to penetrate deeper into the ground.

Slicing Height

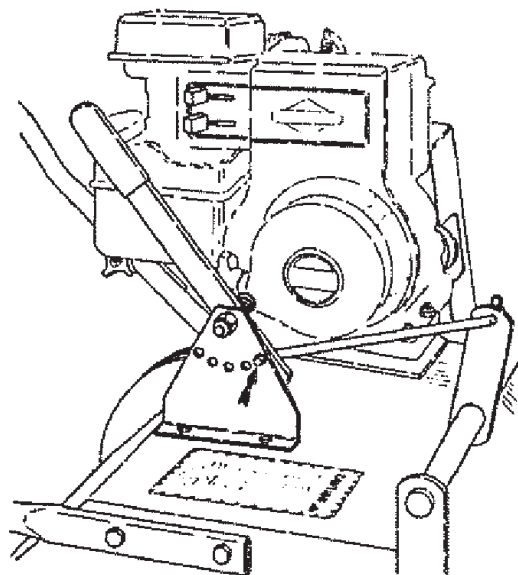


Fig. 4

The slicer blade assembly is recommended for slicing, verticutting or aerating when a thinner blade is preferred.

This is the recommended blade for use on golf course greens. To set the height properly place unit on the lawn surface and adjust the wheel height up (see Fig. 4). Adjusting the wheel height up lowers the blades.

The proper height setting for slicing or aerating is 1/2" to 3/4" into the ground. Adjust the wheel height up one or two notches.

For crawling grasses such as Zoysia, Bermuda, Bahia, etc. Raise the wheels only one notch. Crawling grasses should not be sliced too deeply.

For single strand grasses like Bluegrass or Rye, aerate in perpendicular directions for more even slicing. For example, slice in a North-South direction on the first pass, switching to an

East-West direction on the second pass.

As the slicer blades wear they may be rotated to provide a new cutting edge. The wheels may be raised to allow the blades to penetrate deeper into the ground.

TO KEEP THE TURF RAKE / SEEDER IN GOOD OPERATING CONDITION, PERFORM THE FOLLOWING:

- When replacement parts are required, use genuine Classen parts or parts with equivalent characteristics including type, strength, and material. Failure to do so may result in product malfunction and possible injury to the operator and/or bystanders.
- Keep all safety decals legible. Remove all grease, dirt and debris from decals. Any safety decal that becomes illegible should be replaced immediately (see 'Safety Decals' section). Safety decals can be affixed by peeling off the backing and applying to clear, dry surface. Smooth out to remove any air bubbles.
- Do not operate equipment without shields in place.
- Do not make any adjustments or perform any maintenance while the engine is running.
- Check engine mounting bolts frequently to maintain proper tightness.
- Thoroughly clean off blades when application is completed and apply a light coat of oil to prevent rust on blades.
- Keep belt free of oil and dirt.
- Check for worn or deteriorating components that could create a hazard. When new components are installed, be sure that current safety decals are affixed to the replaced components. Safety decals can be affixed by peeling off the backing and applying to clear, dry surface. Smooth out to remove any air bubbles.

ENGINE MAINTENANCE:

- Refer to engine manufacturer's Owner's Manual.
- Check engine oil level with engine resting in a level position.
- Inspect air filter element and replace if necessary.
- If carburetor adjustment is necessary, stand to one side and keep feet and hands clear while making adjustments.

CARE FOR HYDRAULIC SYSTEM

To keep the hydraulic system in working order, there are a few steps needed to take place. If synthetic oil were used we would suggest a full synthetic oil such as **Mobil 1 15W50, Quaker State Full Synthetic 5W50**, or a similar oil.

CARE FOR HYDRAULIC SYSTEM (cont.)

Oil viscosity is very important to transmission life. For optimum performance the oil viscosity should maintain a viscosity of 13 cSt [70 SUS]. The minimum oil viscosity to prevent component wear is 9 cSt [55 SUS]. These Viscosity requirements are for an oil temperature of 110 degrees Celsius [230 degrees Fahrenheit] Typically; standard SEA 20W-50 multi-viscosity motor oils will meet this requirement. If the operating temperature is elevated then synthetic oil with greater viscosity index, or more viscosity at elevated temperatures, may be needed to meet viscosity requirements.

System Start-up: (purging air from system). Factory Fills unit with SAE 20W-50 multiviscosity motor oil. This will need to be checked when setting up with instructions below.

At system start-up, several things need to be accomplished to ensure a properly running system.

1. Fill the BDU case and expansion level and ensure they do not empty during the following procedure.
2. Start engine and increase throttle to at least 2/3 speed.
3. Open bypass valve by depressing bypass plunger and holding.
4. Adjust control linkage such that transmission control is stroking full forward.
5. Move and hold control in forward for 3 seconds; repeat two additional times.
6. Close bypass valve by releasing bypass plunger.
7. With engine still at same speed, repeat step 5.
8. Move control to neutral.
9. Check engine speed. Adjust to recommended maximum engine speed.
10. Adjust neutral position.
11. Adjust forward control stop to recommended axle speed.
12. Adjust reverse control stop to recommended axle speed.
13. If axle speed is not achieved ensure linkage allows proper movement of transmission control.
14. If transmission control lever is rotating fully but recommended axle speed is not achieved, repeat start-up procedure.
15. Refill expansion tank oil to recommended level.



Fuels and Fuel Additives

You are here: [EPA Home](#) [Transportation & Air Quality](#) [Fuels & Fuel Additives](#) E15 (a blend of gasoline and ethanol)

E15 (a blend of gasoline and ethanol)

On October 13, 2010, the Environmental Protection Agency partially granted Growth Energy's waiver request application submitted under section 211(f)(4) of the Clean Air Act. This partial waiver will allow fuel and fuel additive manufacturers to introduce into commerce gasoline that contains greater than 10 volume percent (vol%) ethanol and up to 15 vol% ethanol (E15) for use in certain motor vehicles once certain other conditions are fulfilled. It is important to remember that there are a number of additional steps that must be completed - some of which are not under EPA control - to allow the sale and distribution of E15. These include but are not limited to submission of a complete E15 fuels registration application by industry and changes to some states' laws to allow for the use of E15.



[What is E15?](#)

[What is the E15 Waiver?](#)

[What Vehicles May Use E15?](#)

[What Vehicles and Engines May Not Use E15?](#)

[The Agency is Deferring Action on the Waiver Request for the Following Vehicles](#)

[Pending Completion of DOE Testing](#)

[What Conditions are Part of the Waiver Decision?](#)

[What is EPA doing to Address Potential Misfueling?](#)

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What is E15?

Ethanol is an alcohol that can be mixed with gasoline to result in a cleaner-burning fuel. The most common blend of gasoline and ethanol is E10, or 10 percent of ethanol to 90 percent of gasoline. E15 is gasoline containing 15 vol% ethanol.

The primary source of ethanol is corn, but other grains or biomass sources may be used such as sorghum, corn cobs, cornstalks, and switchgrass.

What is the E15 waiver?

In order to protect the emission control systems of vehicles and engines, the Clean Air Act prohibits the introduction of fuels or fuel additives that are not substantially similar to the fuels or additives used in certifying vehicles and engines to emission standards. However, the Act authorizes EPA to grant a waiver of this prohibition for a fuel or additive if it can be demonstrated that vehicles and engines using the otherwise prohibited fuel or additive will continue to meet emission standards over their useful lives.

11/15/2010

In March 2009, Growth Energy (a coalition of U.S. ethanol supporters) and 54 ethanol manufacturers applied for a waiver to increase the allowable amount of ethanol in gasoline from E10 to E15. The waiver application included data on the impact of E15 on vehicle emissions, fuel system materials, and driveability. Additional data were developed by the US Department of Energy, which began testing for potential impacts of various ethanol-gasoline blends on motor vehicle emissions. This testing followed enactment of the Energy Independence and Security Act of 2007, which calls for significantly increasing the amount of biofuels, such as ethanol, to be used in transportation fuel. EPA received over 78,000 public comments about Growth Energy's application.

EPA is partially granting Growth Energy's waiver request application. This partial grant waives the prohibition on fuel and fuel additive manufacturers on the introduction into commerce of gasoline containing greater than 10 vol% ethanol and no more than 15 vol% ethanol for use in certain motor vehicles. More specifically, this action has two components. First, we are approving the waiver for and allowing the introduction into commerce of E15 for use in Model Year (MY) 2007 and newer light-duty motor vehicles, which includes passenger cars, light-duty trucks, and medium-duty passenger vehicles.

The second component of the action is that we are not approving the waiver for E15 use in MY2000 and older light-duty motor vehicles, heavy-duty gasoline engines and vehicles (e.g., delivery trucks), highway and off-highway motorcycles, and nonroad engines, vehicles, and equipment (e.g., boats, snowmobiles, and lawnmowers) because there is insufficient test data to support it for these vehicles and engines. The Agency is deferring a decision on the applicability of a waiver with respect to MY2001-2006 light-duty motor vehicles. EPA expects to make a determination for these vehicles after DOE test data for those model years becomes available.

What Vehicles May Use E15?

- MY2007 and newer cars.
- MY2007 and newer light-duty trucks.
- MY2007 and newer medium-duty passenger vehicles.

What Vehicles and Engines May Not Use E15?

- All motorcycles.
- All vehicles with heavy-duty engines, such as school buses, transit buses, and delivery trucks.
- All off-road vehicles, such as boats and snowmobiles.
- All engines in off-road equipment, such as lawnmowers and chain saws.
- All MY2000 and older cars, light-duty trucks, and SUVs.
- All 2001-2006 cars, light-duty trucks, and medium-duty passenger vehicles (pending a waiver decision with respect to those vehicles).

The Agency is Deferring Action on the Waiver Request for the Following Vehicles and Pending Completion of DOE Testing

- All MY2001-2006 cars.
- All MY2001-2006 light-duty trucks.
- All MY2001-2006 medium-duty passenger vehicles.

What Conditions are Part of the Waiver Decision?

EPA placed two types of conditions on the waiver for E15: those for mitigating the potential for misfueling of E15 into vehicles and engines for which E15 is not approved, and those

addressing fuel and ethanol quality. All conditions must be met prior to the introduction of E15 into commerce.

Fuel quality conditions:

Ethanol used for E15 must meet ASTM International D4806-10.
The Reid Vapor Pressure for E15 is limited to 9.0 psi during the summertime.

Misfueling mitigation conditions:

Labels must be placed on E15 retail dispensers indicating that E15 use is only for MY2007 and newer motor vehicles.
Product Transfer Documents (PTDs) must accompany all transfers of fuels for E15 use.
Parties involved in the manufacture of E15 must participate in a survey of compliance at fuel retail dispensing facilities to ensure proper labeling of dispensers.
Parties must submit a plan addressing conditions to EPA for approval.

What is EPA doing to Address Potential Misfueling?

EPA is proposing a regulatory program to help mitigate potential misfueling of certain engines, vehicles and equipment with gasoline containing greater than E10 and no more than E15. This proposed rule would require all E15 fuel dispensers to have a label if a retail station chooses to sell E15 and seeks comment on separate labeling requirements for fuel blender pumps and fuel pumps that dispense E85. Similar to the prohibition in section 211(f)(1), the proposed rule would prohibit the use of gasoline containing greater than 10 vol% ethanol in vehicles and engines not covered by the partial waiver for E15. In addition, the proposed rule would require PTDs specifying ethanol content and Reid Vapor Pressure (RVP) to accompany the transfer of gasoline blended with ethanol and a national survey of retail stations to ensure compliance with these requirements. The proposed rule would also modify the Reformulated Gasoline (RFG) program by updating the Complex Model to allow fuel manufacturers to certify batches of gasoline containing up to E15. The proposed measures would help promote the successful introduction of E15 into commerce.

There will be a 60 day comment period for the proposed rule following publication in the Federal Register. In addition, EPA will hold a public hearing at the Millennium Knickerbocker Hotel in Chicago, IL. The hearing will start at 10 a.m. local time and will continue until everyone present has had a chance to speak. People wishing to testify at the hearing should notify Julia MacAllister at (734) 214-4131 (or at macallister.julia@epa.gov) by November 8, 2010. 150 phone lines will be available for those who wish to listen to the hearing but are unable to attend in person. During the hearing, you may call the following toll-free number: 1-866-299-3188. At the prompt, enter conference code 7342144423 followed by the # sign. Note that you will not be able to present testimony over the phone.

The Waiver Notices

EPA may consider a waiver for gasoline-ethanol blends greater than 10 vol% to be used in non flexible-fueled vehicles under its authority in Clean Air Act section 211 (f)(4).

EPA reviewed the March 2009 application from Growth Energy, available test data and public comments on the

NOTE: You will need Adobe Acrobat Reader, available as a free download, to view some of the files on this page. See EPA's [PDF page](#) to learn more about PDF, and for a link to the free Acrobat Reader.

waiver request. On October 13, 2010, EPA determined that, subject to compliance with all of the conditions listed in the waiver decision, a gasoline produced with greater than E10 and no more than E15 will not cause or contribute to a failure of certain motor vehicles to achieve compliance with the emission standards to which they have been certified over their useful lives. Therefore, EPA partially and conditionally granted the waiver request application submitted by Growth Energy for its gasoline-ethanol blend with up to 15 vol% ethanol.

[Response to Application for Waiver](#) | [PDF Version](#) (58 pp, 4.57M, published November 4, 2010)

[Status Update](#) (July 2010)

[Status Update \(PDF\)](#) (2 pp, 493K, November 30, 2009)

Extension of Comment Period: [Notice](#) | [PDF Version](#) (2 pp, 75K, published May 20, 2009)

[Notice of Receipt of Waiver Application](#) | [PDF Version](#) (3 pp, 77K, published April 21, 2009)

For further information or assistance, please contact [Robert Anderson](#) at 202-343-9718 or anderson.robert@epa.gov.

The Regulations

Proposed Rule: Regulation to Mitigate the Misfueling of Vehicles and Engines with Gasoline Containing Greater than Ten Volume Percent Ethanol and Modifications to the Reformulated and Conventional Gasoline Programs

Fact Sheet: [EPA Announces E15 Partial Waiver Decision and Pump Labeling Proposal](#) | [PDF Version](#) (5 pp, 530K, October 13, 2010)

[Proposed Rule](#) | [PDF Version](#) (49 pp, 3.39M, published November 4, 2010)

For further information or assistance regarding please contact EPA's Assessment and Standards Division voicemail at: (734) 214-4636 or [email](mailto:ASDinfo@epa.gov): ASDinfo@epa.gov.

For more information, please contact the [EPA Fuels Programs Support Line](#) at 202-343-9755.

Please visit the EPA's Transportation and Air Quality web-based repository of mobile source documents, [Document Index System \(DIS\)](#). This searchable repository contains regulations, Federal Register notices, policy letters, and guidance documents.

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This warranty does not include engines or engine parts, tires, batteries, or gearboxes that are covered under separate warranties furnished by their manufacturer or supplier, nor does it include normal maintenance parts, including but not limited to, spark plugs, points, filters, blades, and lubricants.

All service under this warranty will be furnished or performed by our factory authorized service stations.

There is no other expressed warranty. Implied warranties, including those of merchantability and fitness for a particular purpose, are limited to two years from the date of purchase and to the extent permitted by law, any and all implied warranties are excluded. The above remedy of repair and replacement of defective parts is the purchaser's exclusive remedy for any defect, malfunction or breach of warranty. Liability for incidental or consequential damages under any and all warranties is excluded to the extent permitted by law.

NORMAL RESPONSIBILITIES OF THE SELLER AND THE USER

1. The Distributor or Dealer is responsible for the proper assembly and preparation of the product for delivery to the end user.
2. The User is responsible for reading the Manual and Instructions.
3. The User is responsible for proper operation and maintenance as described in the manual.
4. The User is responsible for the replacement of wear items such as blades, belts, tires, batteries, etc.
5. The User is responsible for damage due to improper operation and maintenance, as well as abuse.

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84R**

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